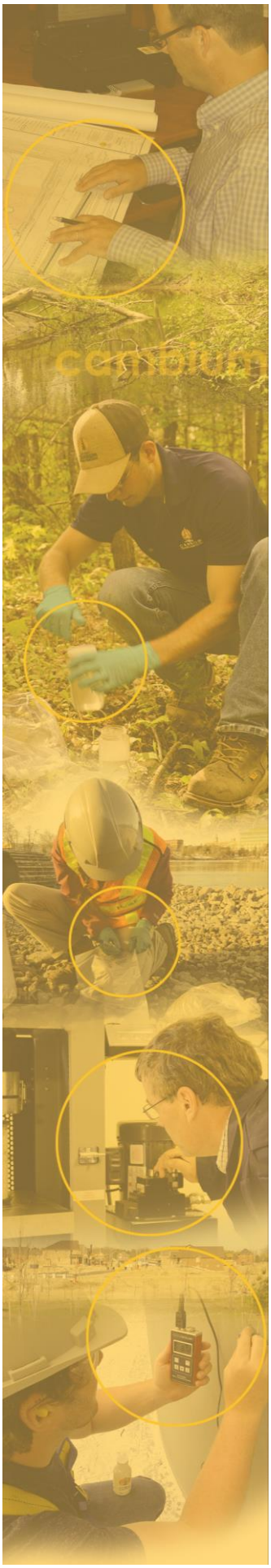

Geotechnical Investigation Report, Paramedic Response Station #29, 107 Glen Cameron Road, Markham, Ontario

Cambium Reference No.: 5984-001

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Prepared for: Regional Municipality of York

Cambium Inc.

843 King Street West, Unit 8
Oshawa, Ontario L1J 2L4

Telephone: (905) 725.6280
Toll Free: (866) 217.7900
Facsimile: (705) 742.7907

cambium-inc.com

TABLE OF CONTENTS

LIST OF APPENDED FIGURES

LIST OF INSERTED TABLES

LIST OF APPENDICES

1.0 INTRODUCTION

Cambium Inc. (Cambium) was retained by the Regional Municipality of York (Client) to complete a geotechnical investigation in support of the design and construction of a proposed paramedic response station to be located at 107 Glen Cameron Road in Markham, Ontario.

The Site is located at the south side of Glen Cameron Road east of Henderson Avenue and is currently a predominantly vacant property with some surficial asphalt pavement and granular fill areas that are used for storage of various materials and vehicles by the adjacent property. The geotechnical investigation was required to confirm the subsurface conditions at the Site in order to provide geotechnical design parameters as input into the design and construction of the proposed single-storey structure as well as associated asphalt parking areas and driveways. A Site Plan, including borehole locations, is included as Figure 1 of this report.

This report presents the methodology and findings of the geotechnical investigation at the Site and addresses the requirements and constraints for the design and construction of the proposed structure and associated asphalt parking areas.

2.0 METHODOLOGY

2.1 BOREHOLE INVESTIGATION

Cambium completed a geotechnical investigation at the Site between March 3, 2017 and March 6, 2017. A total of 16 boreholes were advanced to a termination depth of between 8.1 m below existing grade (mbeg) and 3.7 mbeg within the footprint of the proposed new structure and asphalt parking area respectively. Six (6) of the boreholes were completed within the proposed footprint of the new single-storey structure and the remaining ten (10) boreholes were completed within the proposed footprint of the new asphalt parking area and driveways. The borehole locations are shown on Figure 1. Borehole elevations were surveyed relative to the top of the manhole cover on the south side of Glen Cameron Road in front of civic address 112, which was assigned an elevation of 163.87 m based on a topographic survey of the Site provided to Cambium by the Client that was prepared by J.D. Barnes Limited and dated January 25, 2017. These interpolated elevations are for analytical purposes only, and must be verified prior to finalizing any design or contract parameters upon which they are based.

Drilling and sampling was completed using a track-mounted drill rig operating under the supervision of a Cambium technician. The boreholes were advanced to the sampling depths by means of continuous flight solid stem augers with 50 mm O.D. split spoon samplers. Standard Penetration Test (SPT) N values were recorded for the sampled intervals as the number of blows required to drive a split spoon sampler 305 mm into the soil, using a 63.5 kg drop hammer falling 750 mm, as per ASTM D1586 procedures. The SPT N values are used in this report to assess consistency of cohesive soils and relative density of non-cohesive materials. Soil samples were collected at approximately 0.75 m intervals to 3.0 m depth and 1.5 m intervals beyond 3.0 m. The encountered soil units were logged in the field using visual and tactile methods, and samples were placed in labelled plastic bags for transport, future reference, possible laboratory testing, and storage. Open boreholes were checked for groundwater and general stability prior to backfilling.

A total of three (3) boreholes were outfitted as temporary standpipe piezometers for the purposes of determining the static groundwater level at the Site.

Borehole logs are provided in Appendix A. Site soil and groundwater conditions are described and geotechnical recommendations are discussed in the following sections of this report.

2.2 PHYSICAL LABORATORY TESTING

Physical laboratory testing, including three (3) particle size distribution analyses (LS-702,705), was completed on selected soil samples to confirm textural classification and to assess geotechnical parameters. Moisture content testing was completed on all recovered soil samples. Testing results are presented in Appendix B and are discussed in Section 3.0.

2.3 ENVIRONMENTAL LABORATORY TESTING

Three (3) representative soil samples were submitted to AGAT Laboratories in Mississauga, Ontario, a Canadian Association of Laboratory Accreditation (CALA) certified environmental laboratory. The selected samples were taken from the following boreholes and were submitted for analysis of petroleum hydrocarbons (PHC F1-F4), volatile organic compounds (VOCs), and metals and inorganics.

- Borehole BH103-17, soil sample 2, from a depth of 0.8 m to 1.2 m
- Borehole BH106-17, soil sample 3, from a depth of 1.5 m to 2.0 m
- Borehole BH114-17, soil sample 3, taken from a depth of 1.5 m to 2.0 m

The environmental testing results are summarized in Section 3.6 and the laboratory certificates of analysis are included in Appendix C.

In addition, a composite soil sample was submitted to AGAT Laboratories for TCLP analysis of metals in inorganics under Ontario Regulation 558. These results are summarized in Section 3.6 and the laboratory certificate of analysis is included in Appendix C.

Corrosivity testing was completed on a select sample to determine the potential for corrosion and the results compared to the ANSI / AWWA corrosivity rating system. Results are presented in Appendix C and are discussed in Section 3.6.

3.0 SUBSURFACE CONDITIONS

Based on the results of the borehole investigation, subsurface conditions at the Site generally consist of a surficial layer of reworked native soil underlain by native silty sand to clay and silt till.

A more detailed description of the individual soil units is provided below and the borehole logs are included in Appendix A.

3.1 SURFICIAL LAYERS

3.1.1 TOPSOIL

A surficial layer of topsoil approximately 50 mm in thickness was encountered overlying the reworked native soils described below at boreholes BH102-17 and BH103-17. Further test holes, spaced in a grid pattern would be required to more accurately delineate topsoil thickness.

3.1.2 ASPHALT

A surficial layer of asphalt approximately 50 mm in thickness was encountered overlying the reworked native soils described below at boreholes BH106-17 and BH107-17.

3.2 REWORKED NATIVE SOIL

A layer of material consisting of reworked native soil was encountered from the ground surface at all borehole locations with the exception of boreholes BH102-17, BH103-17, BH106-17, and BH107-17 where it was encountered below the surficial layers of asphalt or topsoil. The texture of the brown reworked native material was predominantly clayey silty sand with trace gravel; trace amounts of organic material and asphalt debris were encountered within this soil layer at various borehole locations.

The layer of reworked native material extended to depths of between 0.8 mbeg to 1.5 mbeg. The reworked native material was encountered in a generally moist in-situ condition with moisture contents varying from 10% to 26% and a loose to compact relative density based on SPT N values between 4 and 29.

While trace amounts of organic material was observed in some of the samples obtained during this investigation, pockets of more highly organic soils could be encountered within this soil layer.

Laboratory particle size distribution analyses were completed for one (1) sample of the reworked native soil, taken from depths of between 0.8 and 1.2 mbeg. The analysis results are summarized in Table 1Table 2 and provided in Appendix B.

Table 1 Summary of Particle Distribution Analyses Results for Reworked Native Soil

Borehole	Sample #	Depth (mbeg)	% Gravel	% Sand	% Silt	% Clay
BH102-17	SS 2	0.8 – 1.2	9	34	30	27

3.3 CLAY AND SILT TO CLAYEY SANDY SILT TILL

A layer of native clay and silt to clayey sandy silt till was encountered in all of the boreholes immediately below the layer of reworked native soil. The texture of this native soil varied from sandy clay and silt with trace gravel to clayey sandy silt with trace gravel.

The till layer was encountered at depths of 0.8 mbeg to 1.5 mbeg and extended to the borehole termination depths ranging between 3.7 mbeg and 8.1 mbeg. This soil was encountered in a moist to wet in-situ condition with moisture contents varying from 8% to 27%. In general, the till material was brown to grey in colour and was encountered in a compact to very dense relative density based on SPT N values ranging from 11 to 74.

Laboratory particle size distribution analyses were completed for two (2) samples of the till material, taken from depths of between 1.5 and 5.0 mbeg. The analysis results are summarized in Table 2 and provided in Appendix B.

Table 2 Summary of Particle Distribution Analyses Results for Till Soils

Borehole	Sample #	Depth (mbeg)	% Gravel	% Sand	% Silt	% Clay
BH108-17	SS 3	1.5 – 2.0	1	21	41	37
BH110-17	SS 6	4.6 – 5.0	2	24	44	30

3.4 BEDROCK

No bedrock was encountered during the course of this investigation.

3.5 GROUNDWATER

Upon completion of drilling, groundwater was encountered at boreholes BH105-17 and BH110-17 at depths between 5.49 mbeg and 7.32 mbeg. All remaining boreholes were found to be dry upon completion of drilling. No caving (sloughing) of the borehole walls was observed at any of the borehole locations upon completion of drilling.

A total of three (3) boreholes, BH103-17, BH105-17, and BH110-17, were outfitted as temporary standpipe piezometers for the purposes of determining the depth to the groundwater table. When a measurement was taken on March 8, 2017, groundwater was determined to be at a depth of 3.2 mbeg at borehole BH103-17, a depth of 0.0 mbeg at borehole BH105-17, and a depth of 1.0 mbeg at borehole BH110-17, which corresponds to an elevation of 160.94 m to 164.62 m.

Grey colouration of sampled soils, as identified by the borehole investigation, suggest anaerobic activity common of a high water mark and was typically encountered at depths between 4.6 mbeg to 6.1 mbeg.

Based on the results of the field investigation and the groundwater measurements, it is anticipated that groundwater is perched within more permeable zones of the till and/or fill layers including silt and sand seams that were encountered at various borehole locations.

The overall moisture content of the soils varied from 8% to 27%.

It should be noted that soil moisture and groundwater levels are affected by seasonal climatic conditions, due to changing precipitation and evaporation rates.

3.6 ENVIRONMENTAL TESTING RESULTS

The Ministry of the Environment and Climate Change (MOECC) document *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act* (Ministry of the Environment, 2011), was referenced in determining the applicable criteria for the Site.

The samples were compared to Table 1, *Full Depth Background Site Condition Standards*, for Residential/ Parkland/ Institutional/ Industrial/ Commercial/ Community Property Use (RPIICC) to determine exceedances in concentrations of the analyzed parameters.

Three (3) soil samples were submitted to AGAT Laboratories for analysis of the parameters outlined in Section 2.3. The results of the soil analysis were compared to Table 1 criteria of the *Standard* (Ministry of the Environment, 2011). The results are summarized on the Certificate of Analysis provided in Appendix C and indicate the following:

- Petroleum Hydrocarbons (PHC F1-F4); parameters tested did not exceed Table 1 criteria.
- Volatile Organic Compounds (VOCs); parameters tested did not exceed Table 1 criteria.
- Metals and Inorganics; parameters tested did not exceed Table 1 criteria

One (1) additional composite soil sample was submitted to AGAT for O.Reg 558 (TCLP) analysis. The results of the TCLP analysis are summarized on the Certificate of Analysis provided in Appendix C and indicate the following:

- Metals and Inorganics; parameters tested did not exceed Schedule 4 criteria outlined in O.Reg. 558.

Based on the test results, the following handling options are available for soils sampled and tested under the program:

- Remain on-site to be appropriately reused as backfill or for re-grading, under the guidance of a Qualified Person (QP) as defined by the MOECC and as approved by a geotechnical engineer;

- Accepted by a Receiving Site with specifications for receipt of soil based on the above test results under the guidance of the receiving site's QP and Fill Management Plan, and subject to the municipality's fill bylaw;
- Disposed of at a waste disposal landfill appropriately certified by the MOECC. Additional testing may be required for O. Reg. 347 waste characterization analysis as directed by the Receiver.

It is noted that the chemical parameters tested and the number of samples do not meet the requirements of a Record of Site Condition and may not meet the requirements of the intended receiving site. This report should not be construed as an Environmental Site Assessment. Handling options provided herein are based solely on the chemical analysis of soils located at the site, at depths ranging from 0.8 m to 2.0 m depth, and do not represent acceptance or suitability of this material on behalf of the intended receiving site. Should conditions encountered or the proposed scope of work vary from those described in this report, Cambium should be notified to evaluate the need for further work.

3.6.1 CORROSIVITY ANALYSIS

One (1) soil sample was submitted to CALA certified AGAT Laboratories for chemical corrosivity analysis. The laboratory results are presented in Appendix C. The sample was analyzed for chloride, sulphate, pH, electrical conductivity, resistivity, redox potential, and sulphide concentrations. The submitted sample, SS 4 from borehole BH101-17, was taken from a depth of 2.3 to 2.7 mbeg.

To determine the potential for corrosion, the laboratory results were compared to the ANSI / AWWA corrosivity rating system, as shown on Table 3. A total score of 10 or greater indicates that the soil may be corrosive. Based on the total points scored, the soil is determined unlikely to be corrosive.

Table 3 Corrosivity Results

Parameter	BH101-17 SS4	
	Test Results	ANSI / AWWA Point Rating
Resistivity (Ω·cm)	7630	0
pH	8.49	0
Redox Potential (mV)	236	0
Sulphide	Trace	2
Moisture Content	Fair	1
Total Points		**3**

Please note that there may be other overriding factors in the assessment of corrosion potential, such as the nature of effluent conveyed, the application of de-icing salts on any access roads and subsequent leaching into the sub-soils and stray currents.

The laboratory test results also indicate that the soluble sulphates concentration of the tested sample is approximately 12 ppm. Based on this concentration, there is a negligible potential for sulphate attack on concrete. Accordingly, normal Type I Portland cement can be used in concrete.

4.0 GEOTECHNICAL CONSIDERATIONS

The following recommendations are based on the borehole information and are intended to assist designers. Recommendations should not be construed as providing instructions to contractors, who should form their own opinions about site conditions, particularly when it comes to groundwater seepage. It is possible that subsurface conditions beyond the borehole locations may vary from those observed. If significant variations are found before or during construction, Cambium should be contacted so that we can reassess our findings, if necessary.

4.1 GENERAL SITE PREPARATION

Existing topsoil, fill, and any organic matter identified or found shall be excavated and removed from beneath any areas of the Site to be developed. The stripped surface must be proof rolled and/or approved by Cambium prior to placement of additional fill or foundations.

Based on the recommended excavation depths for the foundation area, the subgrade material is expected to consist of compact to very dense clay and silt to clayey sandy silt till. If engineered fill placement is required for the structure, it should be noted that when placing soil that will act as support for the foundation or floor slab, placement and compaction should occur during temperatures above freezing.

The in-situ moisture content of the samples was found to be in a generally moist to wet state, potentially making the fine-grained native soils unstable in a wet or saturated condition. The use of approved granular soils such as OPSS 1010 Select Subgrade Material (SSM) or Granular ‘B’ Type I shall be used to minimize construction delays as a result of wet or saturated conditions.

In areas of cut or minor fill where the proof roll and/ or inspection has identified unsuitable subgrade conditions, whether too soft or too wet, material is to be removed and replaced with an approved OPSS 1010 SSM or Granular ‘B’ Type I compacted material, under guidance of Cambium Staff.

4.2 FROST PENETRATION

Based on climate data and design charts, the maximum frost penetration depth below the existing surface at the Site is estimated at 1.4 m.

Exterior footings for the proposed structures should be situated at or below this depth for frost penetration or should be protected.

It is assumed that the pavement structure thickness will be less than 1.4 m, so grading and drainage are very important for good pavement performance and life expectancy. Any utilities should be located below this depth or be appropriately insulated.

4.3 EXCAVATIONS

Temporary excavations must be carried out in accordance with the latest edition of the Occupational Health and Safety Act (OHSA). As per the OHSA, excavations less than 1.2 m deep can have unsupported vertical walls. Areas of loose to compact soils above the groundwater table may be classified as Type 3 soils in accordance with OHSA, with unsupported side slopes no steeper than 1H:1V to the bottom of the excavation.

Excavation side slopes should be protected from exposure to precipitation and associated ground surface runoff and should be inspected regularly for signs of instability. If localized instability is noted during excavations or if wet conditions are encountered, the side slopes should be flattened as required to maintain safe working conditions or excavation sidewalls must be fully supported (shored).

4.4 DEWATERING

Upon completion of drilling, groundwater was encountered at boreholes BH105-17 and BH110-17 at depths between 5.49 mbeg and 7.32 mbeg. All remaining boreholes were found to be dry upon completion of drilling. No caving (sloughing) of the borehole walls was observed at any of the borehole locations upon completion of drilling. A total of three (3) boreholes, BH103-17, BH105-17, and BH110-17, were outfitted as temporary standpipe piezometers for the purposes of determining the depth to the groundwater table. When a measurement was taken on March 8, 2017, groundwater was determined to be at a depth of 3.2 mbeg at borehole BH103-17, a depth of 0.0 mbeg at borehole BH105-17, and a depth of 1.0 mbeg at borehole BH110-17, which corresponds to an elevation of 160.94 m to 164.62 m. Grey colouration of sampled soils, as identified by the borehole investigation, suggest anaerobic activity common of a high water mark and was typically encountered at depths between 4.6 mbeg to 6.1 mbeg. Based on the results of the field investigation and the groundwater measurements, it is anticipated that groundwater is perched within more permeable zones of the till and/or fill layers including silt and sand seams that were encountered at various borehole locations.

Overall, minimal to moderate groundwater seepage is anticipated during excavations and any groundwater seepage that is encountered should be controllable with filtered sumps and pumps. Registration on the Environmental Activity and Sector Registry (EASR) or a Permit to Take Water (PTTW) is likely not required from the Ministry of the Environment and Climate Change (MOECC) as pumping rates should not exceed 50,000 L/day or 400,000 L/day respectively. Higher rates of groundwater infiltration are to be expected where more permeable zones within the till and fill layers, including sand and silt seams, are encountered in open excavations, however, these zones are likely relatively discontinuous across the Site and are not expected to produce significant amounts of groundwater during construction activities within the anticipated depth of excavation. Where higher amounts of groundwater seepage are encountered, the size of the excavation should be minimized to reduce the total amount of groundwater to be removed from the excavation.

It should be noted that the groundwater table is influenced by seasonal fluctuations and major precipitation events.

4.5 BACKFILL AND COMPACTION

An approved OPSS 1010 Granular 'B' Type I or Select Subgrade Material (SSM) shall be used for all upfill and/or backfill. This material will require moisture content adjustments depending on seasonal conditions.

Foundation wall backfill, both on the interior or exterior, and grade raises below the floor slab should be compacted to at least 98 percent of S.P.M.D.D using Granular 'B' Type I material complying with OPSS 1010.

All existing vegetation, topsoil, organic and non-organic fills, and any loose soils shall be removed down to a competent base. The backfill area must be approved by Cambium prior to placement of any new fill, to ensure the suitability of subgrade conditions.

4.5.1 ENGINEERED FILL

When the fill is treated as an engineered fill to support structural elements such as foundations and/or floor slabs the following is recommended for the construction of engineered fill:

I. Remove any and all existing vegetation, surficial topsoil/ organics, organic fills or fills and any loose soils to a competent subgrade for a suitable envelope;

II. The area of the engineered fill should extend horizontally 1 m beyond the outside edge of the foundations then extend downward at a 1:1 slope to the competent native soil;

III. The subgrade or base of the engineered fill area must be approved by Cambium prior to placement of any new fill, to ensure that suitability of subgrade condition;

IV. Place approved OPSS 1010 SSM or Granular 'B' Type I material at a moisture content at or near optimum moisture in suitable maximum 200 mm thick lifts, compacted to 100 percent Standard Proctor Maximum Dry Density (S.P.M.D.D). Any frost penetration into the fill material must be removed prior to placement of subsequent lifts of fill or reviewed by Cambium;

V. Full time testing and inspection of the engineered fill will be required for it to be used as a founding material, as outlined in Section 4.2.2.2 of the Ontario Building Code.

4.6 SEISMIC SITE CLASSIFICATION

The Ontario Building Code (OBC) specifies that the structures should be designed to withstand forces due to earthquakes. For the purpose of earthquake design, geotechnical information shall be used to determine the "Site Class". Based on the explored soil properties and in accordance with Table 4.1.8.4.A of the OBC (2012), it is recommended that Site Class "D" (*Stiff Soil*) be applied for structural design at this site.

4.7 FOUNDATION DESIGN

Assuming that the site is prepared as outlined in our final geotechnical report, the native sub-soils are competent to support the proposed structure on conventional strip and spread footings. It is assumed exterior footings will be placed at a minimum of 1.4 m below final adjacent grade to accommodate the maximum frost protection depth, and placed on undisturbed native clay and silt to clayey sandy silt till soils at depth**.**

Where native in-situ clay and silt to clayey sandy silt till soils are not encountered at footing elevations, grade raises can be accomplished with engineered fill, using an OPSS 1010 SSM or Granular 'B' Type I granular material in 200 mm lifts and compacted to a minimum of 100% SSPD following the steps outlined in Section 4.6.1.

Footings situated at a minimum depth of 1.4 m below the final adjacent grade, founded in undisturbed compact to very dense clay and silt to clayey sandy silt till soils may be designed for an allowable bearing capacity of 150 kPa at SLS and 200 kPa at ULS**.** Where OPSS 1010 SSM or Granular 'B' Type I granular material is utilized as an engineered fill up to underside of proposed footing elevation, the engineered fill may be designed for an allowable bearing capacity of 150 kPa at SLS and 225 kPa at ULS. Settlement potential at the above-noted SLS loadings is less than 25 mm and differential settlement should be less than 10 mm. Suitable bearing soils for footings were encountered at the elevations provided in Table 4.

Table 4 Minimum Borehole Elevation of Allowable Bearing Capacity

Borehole	Depth to Allowable Bearing Capacity (mbeg)	Temporary Benchmark Elevation (m)	Borehole	Depth to Allowable Bearing Capacity (mbeg)	Temporary Benchmark Elevation (m)
BH101-17	1.5	161.88	BH109-17	1.1	163.98
BH102-17	1.5	162.19	BH110-17	1.1	163.80
BH103-17	1.5	162.64	BH111-17	0.8	163.27
BH104-17	1.5	162.56	BH112-17	1.5	162.39
BH105-17	1.5	163.12	BH113-17	1.5	163.47
BH106-17	1.5	163.30	BH114-17	1.5	163.46
BH107-17	1.5	163.40	BH115-17	1.5	163.46
BH108-17	1.2	163.96	BH116-17	1.5	163.26

Interior footings in heated areas, if any, may be set on approved engineered fill or compact to very dense till soils at a minimum depth of 0.55 m below the floor slab. Design loadings for interior footings set on engineered fill or native till are 150 kPa (SLS) and 225 kPa (ULS).

Under no circumstances will the foundations be placed directly on organic materials, loose, frozen subgrade, construction debris, or within ponded water. Footings and walls exposed to frost action shall be backfilled with OPSS 1010 Granular 'B' Type I granular material.

The quality of the subgrade shall be inspected by Cambium during construction, prior to constructing the footings and placing engineered fill, to confirm bearing capacity estimates. Engineered fill shall be placed and compacted as discussed in Section 4.6.

Based on the potential for moderate groundwater infiltration into the footing excavations and the probability that the founding soils will become unstable in the event of reworking due to foot or vehicular traffic, it is recommended that a "mud mat" consisting of lean mix concrete be poured atop the founding soils immediately after excavation and approval for use for footings by a geotechnical engineer. This will prevent loosening of the founding soils and the possible need to subexcavate down to competent soils prior to pouring the footings.

4.8 TEMPORARY SHORING

Consideration should be given to open cut excavations using OHSA 1H:1V requirements. If temporary shoring is required near loaded sidewall or restricted excavations, a soldier pile and lagging system with either a cantilever design or strut bracing to support lateral loads can be used. Sheet piles would also be suitable for use as temporary shoring. Soil properties for use in temporary shoring design are provided in Section 4.9. Alternative shoring systems, such as a caisson wall, would also be suitable for use at this Site though would likely be less time and cost efficient.

4.9 SOIL PROPERTIES FOR LATERAL EARTH PRESSURE

Based on the results of the geotechnical investigation, Cambium has developed parameters for soil properties for lateral earth pressure to be used in the design of foundation walls, retaining walls, and temporary shoring structures; these recommended parameters are provided in Table 5, below.

Table 5 Soil Properties for Lateral Earth Pressure

Soil Property	Loose to Compact Reworked Native Soil	Compact to Very Dense Clay and Silt to Clayey Sandy Silt Till	Compacted Granular Fill
Friction Angle, Φ (º)	28	32	35
Cohesion, c_u (kPa)	5	10	0
Unit Weight, γ (kN/m^3)	18	20	21
Earth Pressure Coefficient at rest, k_o	0.53	0.47	0.43
Earth Pressure Coefficient active, k_a	0.36	0.31	0.27
Earth Pressure Coefficient passive, k_p	2.77	3.25	3.69

The following formula may be used to calculate active lateral thrust (Pa) on yielding retaining structures;

$Pa= (H/2)(Ka)(\gamma H+2q)$

where,

H = Height of retaining structure (m)

γ= unit weight of retained soil (kN/m^3)

q = surcharge (kPa)

4.10 FLOOR SLAB

Provided the area below the proposed buildings is prepared as discussed in Section 4.1, subsurface conditions will be acceptable for slab-on-grade floor slabs.

To create a stable working surface, to distribute loadings, and for drainage purposes, the floor slabs should be constructed on a minimum of 200 mm of OPSS 1010 Granular A compacted to 98 percent of SPMDD.

4.11 SUBDRAINAGE

Given the potential for shallow groundwater elevations, Cambium recommends installation of perimeter perforated pipe sub-drains connected to the storm sewer or to an appropriate frost-free outlet for the footings of any building structure. Subdrains are recommended below any asphalt pavement structure to ensure the longevity of the structure. If exterior concrete slab or curb sub-drains are chosen, they must be connected to a storm sewer or to an appropriate frost-free outlet. It is anticipated that the drainage system would consist of a system of catchbasins draining to storm sewers. In this regard, the subgrade should be carefully proof rolled to a smooth surface and sloped towards the catchbasins to prevent ponding or entrapment of water in the subbase.

Short lengths (5 to 6 m) of perforated stub-drains should be provided at catchbasin locations. Consideration should also be given to providing continuous sub-drains along the sides of the access roads and perimeter edges of the parking areas to promote drainage of the granular materials, provided that the curbs direct overland flow. Curbs surrounding internal islands located at high points in the parking area do not require subgrade drains, provided that the traffic island is hard surfaced to prevent the infiltration of surface water. If the islands have planters that drain to grade or are landscaped, the subgrade drains along the curb should still be used. In addition, the perimeter of the paved areas should be graded to swales to collect overland flow from unpaved areas.

Stub-drains and sub-drains should be a minimum of 300 mm below the bottom of the granular subbase and connected to the catchbasins to provide positive drainage. The subgrade drains should consist of 100 or 150 mm diameter geotextile wrapped perforated pipe, surrounded on all sides by at least 150 mm of clean free draining sand. The pipes should be placed such that the top of the sand filter is at subgrade level.

4.12 BURIED UTILITIES

Trench excavations should generally consider Type 3 soil conditions which require side slopes no steeper than 1H:1V to the bottom of the excavation. The bedding and cover material for any buried utilities should consist of OPSS 1010 Granular A or B Type II, placed in accordance with pertinent Ontario Provincial Standard Drawings (OPSD 802.013). The bedding and cover material shall be placed in maximum 200 mm thick lifts and should be compacted to at least 98 percent of SPMDD. The cover material shall be a minimum of 300 mm over the top of the pipe and compacted to 98 percent SPMDD, taking care not to damage the utility pipes during compaction.

If wet or saturated conditions exist within any utility excavation, consideration should be given to using 19 mm diameter crushed clear stone wrapped in a geotextile filter fabric as pipe bedding.

4.13 PAVEMENT DESIGN

The performance of the pavement is dependent upon proper subgrade preparation. All topsoil and organic materials should be removed down to native material and backfilled with approved engineered fill or native material, compacted to 98 percent SPMDD. The subgrade should be compacted, proof rolled, and inspected by a Geotechnical Engineer. Any areas where rutting or appreciable deflection is noted should be subexcavated and replaced with suitable fill. The fill should be compacted to at least 98 percent SPMDD.

The recommended minimum pavement structure design has been developed for two (2) traffic loading scenario; light duty and heavy duty. The heavy duty design is appropriate for areas where heavy trucks and maintenance vehicles are anticipated to drive while the light duty design is appropriate for areas where no heavy traffic is anticipated. The recommended minimum pavement structure is provided in Table 6.

Table 6 Recommended Minimum Pavement Structure

Pavement Layer	Light Duty	Heavy Duty
Surface Course Asphalt	40 mm HL3 or HL4	40 mm HL3 or HL4
Binder Course Asphalt	50 mm HL8	90 mm HL8
Granular Base	150 mm OPSS 1010 Granular A	200 mm OPSS 1010 Granular A
Granular Subbase	300 mm OPSS 1010 Granular B	300 mm OPSS 1010 Granular B

Material and thickness substitutions must be approved by the Design Engineer.

The thickness of the subbase layer could be increased at the discretion of the Engineer, to accommodate site conditions at the time of construction, including soft or weak subgrade soil replacement.

Compaction of the subgrade should be verified by the Engineer prior to placing the granular fill. Granular layers should be placed in 150 mm maximum loose lifts and compacted to at least 98 percent SPMDD (ASTM D698) standard. The granular materials specified should conform to OPSS standards, as confirmed by appropriate materials testing.

Given the frost susceptible nature of the subgrade soils, subdrains are recommended beneath the pavement structure, connecting to the storm sewer or an alternate frost-free outlet.

The final asphalt surface should be sloped at a minimum of 2 percent to shed runoff. Abutting pavements should be sawcut to provide clean vertical joints with new pavement areas.

4.14 DESIGN REVIEW AND INSPECTIONS

Cambium should be contacted to review and approve design drawings, prior to tendering or commencing construction, to ensure that all pertinent geotechnical-related factors have been addressed. It is important that onsite geotechnical supervision be provided at this Site for excavation and backfill procedures, deleterious soil removal, subgrade inspections, and compaction and concrete testing.

Cambium should be retained to complete testing and inspections during construction operations to examine and approve subgrade conditions, placement and compaction of fill materials, granular base courses, and asphaltic concrete.

5.0 CLOSING

Please note that this report is governed by the attached qualifications and limitations. If you have questions or comments regarding this document, please do not hesitate to contact Bruno Santos, Project Manager at (289) 685-6482, (905) 725-6280 ext. 501 or Janoah Young at (289) 685-6472.

CAMBIUM INC.

Bruno Santos
Project Manager

Stuart Baird, P.Eng.
Senior Project Engineer

Brandon McFarlane, EIT
Project Coordinator

Qualifications and Limitations

Limited Warranty

In performing work on behalf of a client, Cambium relies on its client to provide instructions on the scope of its retainer and, on that basis; Cambium determines the precise nature of the work to be performed. Cambium undertakes all work in accordance with applicable accepted industry practices and standards. Unless required under local laws, other than as expressly stated herein, no other warranties or conditions, either expressed or implied, are made regarding the services, work or reports provided.

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Site Assessments

A site assessment is created using data and information collected during the investigation of a site and based on conditions encountered at the time and particular locations at which fieldwork is conducted. The information, sample results and data collected represent the conditions only at the specific times at which and at those specific locations from which the information, samples and data were obtained and the information, sample results and data may vary at other locations and times. To the extent that Cambium 's work or report considers any locations or times other than those from which information, sample

results and data was specifically received, the work or report is based on a reasonable extrapolation from such information, sample results and data but the actual conditions encountered may vary from those extrapolations.

Only conditions at the site and locations chosen for study by the client are evaluated; no adjacent or other properties are evaluated unless specifically requested by the client. Any physical or other aspects of the site chosen for study by the client, or any other matter not specifically addressed in a report prepared by Cambium, are beyond the scope of the work performed by Cambium and such matters have not been investigated or addressed.

No Reliance

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Appended Figures

GEOTECHNICAL INVESTIGATION

REGIONAL MUNICIPALITY OF YORK

107 Glen Cameron Road,
Markham, Ontario

LEGEND

- Borehole (4m Depth)
- Borehole (8m Depth)
- Railroad
- Subject Property (Approximate)

Notes:
- Subject property is assumed and was obtained March 2017 from the City of Toronto online GIS.
- 2016 aerial imagery obtained March 2017 from the City of Toronto online GIS.
- Site plan overlay obtained from "Feasability 3 - 4 Bay Drive Through" prepared November 2015 by Thomas Brown Architects. Reference No. FS-3.
- Base mapping features are © Queen's Printer of Ontario, 2015 (this does not constitute an endorsement by the Ministry of Natural Resources or the Ontario Government).
- Distances on this plan are in metres and can be converted to feet by dividing by 0.3048.
- Cambium Inc. makes every effort to ensure this map is free from errors but cannot be held responsible for any damages due to error or omissions. This map should not be used for navigation or legal purposes. It is intended for general reference use only.

CAMBIUM

Project Office: 843 King Street West, Unit 8
Oshawa, ON L1J 2L4
Head Office: PO Box 325, 52 Hunter St East
Peterborough, ON, K9H 1G5

Tel: (866) 217.7900 cambium-inc.com

BOREHOLE LOCATION PLAN

Project No.:	5984-001	Date:	March 2017
		Rev.:	
Scale:	1:800	Projection:	NAD 1983 UTM Zone 17N
Created by: GJM	Checked by: BMS	Figure:	1

O:\GIS\project_MXDs\5900-5999\5984-001 Region of York - Geotech - Paramedic Response Station 36, 107 Glen Cameron Rd., Markham, ON\2017-03-14 FIG 1 Borehole Location Plan.mxd

Appendix A
Borehole Logs

Peterborough
Barrie
Oshawa
Kingston
T: 866-217-7900
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Log of Borehole: BH101-17

Client: Regional Municipality of York
Project Name: Geotechnical Investigation
Project No.: 5984-001
Contractor: DBW Drilling Ltd.
Method: Solid Stem Auger
Date Completed: 2017-03-03
Location: 107 Glen Cameron Road, Markham
UTM:
Elevation: 163.38 m

Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
163 / 0		Fill: Brown Clayey Silty Sand, trace Gravel, moist, compact	1	SS	25	22				
			2	SS	44	16				
162 / 1			3	SS	100	18				
		Till: Brown SANDY CLAY and SILT, trace GRAVEL, moist, compact								
161 / 2		Dense	4	SS	67	36				
		Brown CLAYEY SANDY SILT, trace GRAVEL, moist, dense	5	SS	67	40				
160 / 3										
159 / 4		Grey	6	SS	44	32				Borehole was open and dry upon completion
158 / 5		Borehole Terminated at 5.03 m Depth Upon Completion								

Logged By: S. Gibson
Input By: B. McFarlane

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Barrie
Oshawa
Kingston
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Log of Borehole: BH102-17

Client: Regional Municipality of York
Project Name: Geotechnical Investigation
Project No.: 5984-001
Contractor: DBW Drilling Ltd.
Method: Solid Stem Auger
Date Completed: 2017-03-03
Location: 107 Glen Cameron Road, Markham
UTM:
Elevation: 163.69 m

Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
163 / 0		Fill: Brown Clayey Sandy Silt, trace Gravel, trace ORGANICS, moist, compact	1	SS	25	10				
		Loose	2	SS	33	9				SS2 GSA: Gravel 9% Sand 34% Silt 22% Clay 35%
162 / 1		Till: Brown SANDY CLAY and SILT, trace GRAVEL, moist, compact	3	SS	100	21				
		Dense	4	SS	100	46				
161 / 2		Brown CLAYEY SANDY SILT, trace GRAVEL, moist, dense	5	SS	100	34				
160 / 3										Borehole was open and dry upon completion
159 / 4		Grey	6	SS	89	36				
5		Borehole Terminated at 5.03 m Depth Upon Completion								

Logged By: S. Gibson
Input By: B. McFarlane

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Log of Borehole: BH103-17

Client: Regional Municipality of York
Project Name: Geotechnical Investigation
Project No.: 5984-001
Contractor: DBW Drilling Ltd.
Method: Solid Stem Auger
Date Completed: 2017-03-03
Location: 107 Glen Cameron Road, Markham
UTM:
Elevation: 164.14 m

Elevation (m)	Depth	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
164	0	Fill: Brown Clayey Silty Sand, trace Gravel, trace ORGANICS, moist, compact	1	SS	25	11			Cap	
163	1		2	SS	33	17				
162	2	Till: Brown SANDY CLAY and SILT, trace GRAVEL, moist, compact	3	SS	100	25			Bentonite Plug	
			4	SS	100	26			Pipe	
161	3	Brown CLAYEY SANDY SILT, trace GRAVEL, moist, dense	5	SS	100	40				Groundwater measured at 3.2 m depth on 2017-03-08
160	4									
159	5	Grey	6	SS	67	36				
158	6		7	SS	44	26			Sand Pack	
									PVC Screen	
157	7									Borehole was open and dry upon completion
156	8		8	SS	67	45			Cap	
		Borehole Terminated at 8.08 m Depth Upon Completion								

Logged By: S. Gibson
Input By: B. McFarlane

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Log of Borehole: BH104-17

Client: Regional Municipality of York
Project Name: Geotechnical Investigation
Project No.: 5984-001
Contractor: DBW Drilling Ltd.
Method: Solid Stem Auger
Date Completed: 2017-03-03
Location: 107 Glen Cameron Road, Markham
UTM:
Elevation: 164.06 m

Elevation (m)	Depth	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
164	0	Fill: Brown Clayey Silty Sand, trace Gravel, trace ORGANICS, moist, compact	1	SS	33	12				
			2	SS	33	29				
163	1	Till: Brown SANDY CLAY and SILT, trace GRAVEL, moist, compact	3	SS	67	24				
162	2		4	SS	44	29				
161	3	Brown CLAYEY SANDY SILT, trace GRAVEL, moist, compact	5	SS	83	22				
160	4									
159	5	Grey, dense	6	SS	89	45				
158	6		7	SS	83	40				
157	7									Borehole was open and dry upon completion
156	8		8	SS	67	40				
		Borehole Terminated at 8.08 m Depth Upon Completion								

Logged By: S. Gibson
Input By: B. McFarlane

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Log of Borehole: BH105-17

Client: Regional Municipality of York
Project Name: Geotechnical Investigation
Project No.: 5984-001
Contractor: DBW Drilling Ltd.
Method: Solid Stem Auger
Date Completed: 2017-03-03
Location: 107 Glen Cameron Road, Markham
UTM:
Elevation: 164.62 m

SUBSURFACE PROFILE			SAMPLE							
Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
164 / 0		Fill: Brown Clayey Silty Sand, trace Gravel, trace ASPHALT DEBRIS, moist, compact	1	SS	25	13			Cap	Groundwater measured at 0.0 m depth on 2017-03-08
163 / 1			2	SS	33	24				
162 / 2		Till: Brown SANDY CLAY and SILT, trace GRAVEL, moist, compact	3	SS	100	24			Bentonite Plug	
161 / 3			4	SS	67	28			Pipe	
160 / 4		Brown CLAYEY SANDY SILT, trace GRAVEL, wet, compact	5	SS	56	20				
159 / 5		Grey	6	SS	56	13				
158 / 6		Moist, dense	7	SS	67	45			Sand Pack	Groundwater measured at 5.49 m depth upon completion
157 / 7									PVC Screen	
156 / 8			8	SS	83	43			Cap	Borehole remained open upon completion
		Borehole Terminated at 8.08 m Depth Upon Completion								

Logged By: S. Gibson
Input By: B. McFarlane

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Kingston
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Log of Borehole: BH106-17

Client: Regional Municipality of York
Project Name: Geotechnical Investigation
Project No.: 5984-001
Contractor: DBW Drilling Ltd.
Method: Solid Stem Auger
Date Completed: 2017-03-03
Location: 107 Glen Cameron Road, Markham
UTM:
Elevation: 164.80 m

Elevation (m)	Depth	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
164.80	0.00	Asphalt: Asphalt (50 mm)	1	SS	25	14				
		Fill: Brown Sand and Gravel, moist								
164	1	Fill: Brown Clayey Silty Sand, trace Gravel, moist, compact	2	SS	33	14				
163	2	Till: Brown SANDY CLAY and SILT, trace GRAVEL, moist, compact	3	SS	56	29				
		Dense	4	SS	33	34				
162	3	Compact	5	SS	56	20				
161	4									
160	5	Grey CLAYEY SANDY SILT, trace GRAVEL, wet, compact	6	SS	50	16				
159	6									
		Moist, very dense	7	SS	44	74				
158	7									
157	8		8	SS	61	68				Borehole was open and dry upon completion
156.72	8.08	Borehole Terminated at 8.08 m Depth Upon Completion								

Logged By: S. Gibson
Input By: B. McFarlane

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Log of Borehole: BH107-17

Client: Regional Municipality of York
Project Name: Geotechnical Investigation
Project No.: 5984-001
Contractor: DBW Drilling Ltd.
Method: Solid Stem Auger
Date Completed: 2017-03-03
Location: 107 Glen Cameron Road, Markham
UTM:
Elevation: 164.90 m

Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
164 / 0		Asphalt: Asphalt (50 mm)	1	SS	33	10				
		Fill: Brown Clayey Silty Sand, trace Gravel, moist, compact								
164 / 1			2	SS	83	12				
163 / 2		Till: Brown SANDY CLAY and SILT, trace GRAVEL, moist, compact	3	SS	33	24				
		Dense	4	SS	56	32				
162 / 3		Compact	5	SS	83	16				
161 / 4										
		Grey CLAYEY SANDY SILT, trace GRAVEL, moist, compact	6	SS	89	14				
160 / 5										
159 / 6			7	AS						
158 / 7										Borehole was open and dry upon completion
		Dense	8	SS	67	42				
157 / 8		Borehole Terminated at 8.08 m Depth Upon Completion								
156										

Logged By: S. Gibson
Input By: B. McFarlane

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Log of Borehole: BH108-17

Client: Regional Municipality of York
Project Name: Geotechnical Investigation
Project No.: 5984-001
Contractor: DBW Drilling Ltd.
Method: Solid Stem Auger
Date Completed: 2017-03-06
Location: 107 Glen Cameron Road, Markham
UTM:
Elevation: 165.16 m

Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
165 / 0		Fill: Brown Clayey Silty Sand, trace Gravel, moist, compact	1	SS	42	10				
			2	SS	44	21				
164 / 1		Till: Brown SANDY CLAY and SILT, trace GRAVEL, moist, compact	3	SS	56	25				SS3 GSA: Gravel 1% Sand 21% Silt 41% Clay 37%
163 / 2		Dense	4	SS	78	32				
162 / 3			5	SS	83	36				
161 / 4		Grey CLAYEY SANDY SILT, trace GRAVEL, moist to wet, compact	6	SS	100	17				
160 / 5										
159 / 6		Dense	7	SS	89	36				
158 / 7		Contains seams of wet SILT	8	SS	89	51				Borehole was open and dry upon completion
157 / 8		Borehole Terminated at 8.08 m Depth Upon Completion								

Logged By: B. Santos
Input By: B. McFarlane

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Log of Borehole: BH109-17

Client: Regional Municipality of York
Project Name: Geotechnical Investigation
Project No.: 5984-001
Contractor: DBW Drilling Ltd.
Method: Solid Stem Auger
Date Completed: 2017-03-06
Location: 107 Glen Cameron Road, Markham
UTM:
Elevation: 165.08 m

Elevation (m)	Depth	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
165	0	Fill: Brown Clayey Silty Sand, trace Gravel, trace ORGANICS, moist, compact	1	SS	75	21				
			2	SS	83	26				
164	1	Till: Brown SANDY CLAY and SILT, trace GRAVEL, moist, compact								
		Dense	3	SS	89	41				
163	2									
			4	SS	89	43				
162	3									
			5	SS	83	37				
161	4									
		Grey CLAYEY SANDY SILT, trace GRAVEL, moist to wet, compact	6	SS	100	16				
160	5									
159	6	Very dense	7	SS	83	54				
158	7									Borehole was open and dry upon completion
		Contains seams of wet SAND and SILT	8	SS	89	61				
157	8	Borehole Terminated at 8.08 m Depth Upon Completion								

Logged By: B. Santos
Input By: B. McFarlane

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Log of Borehole: BH110-17

Client: Regional Municipality of York
Project Name: Geotechnical Investigation
Project No.: 5984-001
Contractor: DBW Drilling Ltd.
Method: Solid Stem Auger
Date Completed: 2017-03-06
Location: 107 Glen Cameron Road, Markham
UTM:
Elevation: 164.90 m

Elevation (m) / Depth	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
164 / 0	Fill: Brown Clayey Silty Sand, trace Gravel, trace ORGANICS and DEBRIS, moist, compact	1	SS	83	15			Cap	
164 / 1	Till: Brown SANDY CLAY and SILT, trace GRAVEL, moist, compact	2	SS	94	18				Groundwater measured at 1.0 m depth on 2017-03-08
163 / 2	Dense	3	SS	83	38				
		4	SS	89	39				
162 / 3								Bentonite Plug	
	Compact	5	SS	83	28			Pipe	
161 / 4									
160 / 5	Brown CLAYEY SANDY SILT, trace GRAVEL, moist to wet, compact Grey	6	SS	100	11				SS6 GSA: Gravel 2% Sand 24% Silt 44% Clay 30%
159 / 6									
158 / 7	Dense. Contains seams of wet SAND	7	SS	94	36			Sand Pack	Borehole remained open upon completion
								PVC Screen	
157 / 8	Very dense	8	SS	100	51			Cap	Groundwater measured at 7.32 m depth upon completion
156	Borehole Terminated at 8.08 m Depth Upon Completion								

Logged By: B. Santos
Input By: B. McFarlane

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Log of Borehole: BH111-17

Client: Regional Municipality of York
Project Name: Geotechnical Investigation
Project No.: 5984-001
Contractor: DBW Drilling Ltd.
Method: Solid Stem Auger
Date Completed: 2017-03-06
Location: 107 Glen Cameron Road, Markham
UTM:
Elevation: 164.07 m

Elevation (m)	Depth	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
164	0	Fill: Brown Clayey Silty Sand, trace Gravel, trace ORGANICS, moist, compact	1	SS	92	10				
163	1	Till: Brown SANDY CLAY and SILT, trace GRAVEL, moist, compact	2	SS	89	19				
		Dense	3	SS	83	35				
162	2		4	SS	89	30				
161	3		5	SS	100	33				
160	4									
159	5	Grey CLAYEY SANDY SILT, trace GRAVEL, moist to wet, compact	6	SS	100	18				
158	6		7	SS	89	29				
157	7									Borehole was open and dry upon completion
156	8	Dense. Contains seams of wet SAND	8	SS	83	49				
		Borehole Terminated at 8.08 m Depth Upon Completion								

Logged By: B. Santos
Input By: B. McFarlane

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Log of Borehole: BH112-17

Client: Regional Municipality of York
Project Name: Geotechnical Investigation
Project No.: 5984-001
Contractor: DBW Drilling Ltd.
Method: Solid Stem Auger
Date Completed: 2017-03-06
Location: 107 Glen Cameron Road, Markham
UTM:
Elevation: 163.89 m

Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
163 / 0		Fill: Brown Clayey Silty Sand, trace Gravel, trace ORGANICS, moist, compact	1	SS	75	14				
163 / 1			2	SS	83	20				
162 / 2		Till: Brown SANDY CLAY and SILT, trace GRAVEL, moist, compact	3	SS	78	23				
161 / 3			4	SS	83	21				
160 / 4			5	SS	89	25				
159 / 5		Brown CLAYEY SANDY SILT, trace GRAVEL, moist, dense	6	SS	94	31				
158 / 6		Grey, compact	7	SS	72	20				
157 / 7										Borehole was open and dry upon completion
156 / 8			8	SS	78	25				
155		Borehole Terminated at 8.08 m Depth Upon Completion								

Logged By: B. Santos
Input By: B. McFarlane

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Log of Borehole: BH113-17

Client: Regional Municipality of York
Project Name: Geotechnical Investigation
Project No.: 5984-001
Contractor: DBW Drilling Ltd.
Method: Solid Stem Auger
Date Completed: 2017-03-06
Location: 107 Glen Cameron Road, Markham
UTM:
Elevation: 164.97 m

SUBSURFACE PROFILE			SAMPLE							
Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
164 / 0		Fill: Brown Clayey Silty Sand, trace Gravel, trace ORGANICS, moist, compact	1	SS	33	15				
			2	SS	67	21				
163 / 1		Till: Brown SANDY CLAY and SILT, trace GRAVEL, moist, dense	3	SS	50	33				
			4	SS	83	35				
162 / 2		Compact	5	SS	75	29				Borehole was open and dry upon completion
161 / 3		Borehole Terminated at 3.66 m Depth Upon Completion								
4										

Logged By: B. Santos
Input By: B. McFarlane

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Barrie
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Log of Borehole: BH114-17

Client: Regional Municipality of York
Project Name: Geotechnical Investigation
Project No.: 5984-001
Contractor: DBW Drilling Ltd.
Method: Solid Stem Auger
Date Completed: 2017-03-03
Location: 107 Glen Cameron Road, Markham
UTM:
Elevation: 164.96 m

SUBSURFACE PROFILE			SAMPLE							
Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
164 / 0		Fill: Brown Clayey Silty Sand, trace Gravel, trace ORGANICS, moist, loose	1	SS	25	4				
		Compact	2	SS	89	14				
163 / 1		Till: Brown SANDY CLAY and SILT, trace GRAVEL, moist, compact	3	SS	83	24				
162 / 2			4	SS	94	28				
161 / 3			5	SS	78	22				
160 / 4		Grey CLAYEY SANDY SILT, trace GRAVEL, moist, compact	6	SS	89	18				Borehole was open and dry upon completion
5		Borehole Terminated at 5.03 m Depth Upon Completion								

Logged By: S. Gibson
Input By: B. McFarlane

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Log of Borehole: BH115-17

Client: Regional Municipality of York
Project Name: Geotechnical Investigation
Project No.: 5984-001
Contractor: DBW Drilling Ltd.
Method: Solid Stem Auger
Date Completed: 2017-03-06
Location: 107 Glen Cameron Road, Markham
UTM:
Elevation: 164.96 m

SUBSURFACE PROFILE			SAMPLE							
Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
164 / 0		Fill: Brown Clayey Silty Sand, trace Gravel, moist, compact	1	SS	75	11				
			2	SS	83	20				
163 / 2		Till: Brown SANDY CLAY and SILT, trace GRAVEL, moist, compact Dense	3	SS	89	26				
			4	SS	83	33				
162 / 3			5	SS	75	34				Borehole was open and dry upon completion
161 / 4		Borehole Terminated at 3.66 m Depth Upon Completion								

Logged By: B. Santos
Input By: B. McFarlane

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Log of Borehole: BH116-17

Client: Regional Municipality of York
Project Name: Geotechnical Investigation
Project No.: 5984-001
Contractor: DBW Drilling Ltd.
Method: Solid Stem Auger
Date Completed: 2017-03-06
Location: 107 Glen Cameron Road, Markham
UTM:
Elevation: 164.76 m

SUBSURFACE PROFILE			SAMPLE							
Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (10 20 30 40)	Well Installation	Remarks
164 / 0		Fill: Brown Clayey Silty Sand, trace Gravel, moist, compact	1	SS	33	17				
			2	SS	89	23				
163 / 1		Till: Brown SANDY CLAY and SILT, trace GRAVEL, moise, dense	3	SS	94	38				
			4	SS	83	36				
162 / 2			5	SS	67	31				Borehole was open and dry upon completion
161 / 3		Borehole Terminated at 3.66 m Depth Upon Completion								
4										

Logged By: B. Santos
Input By: B. McFarlane

Appendix B

Physical Laboratory Testing Results

Grain Size Distribution Chart

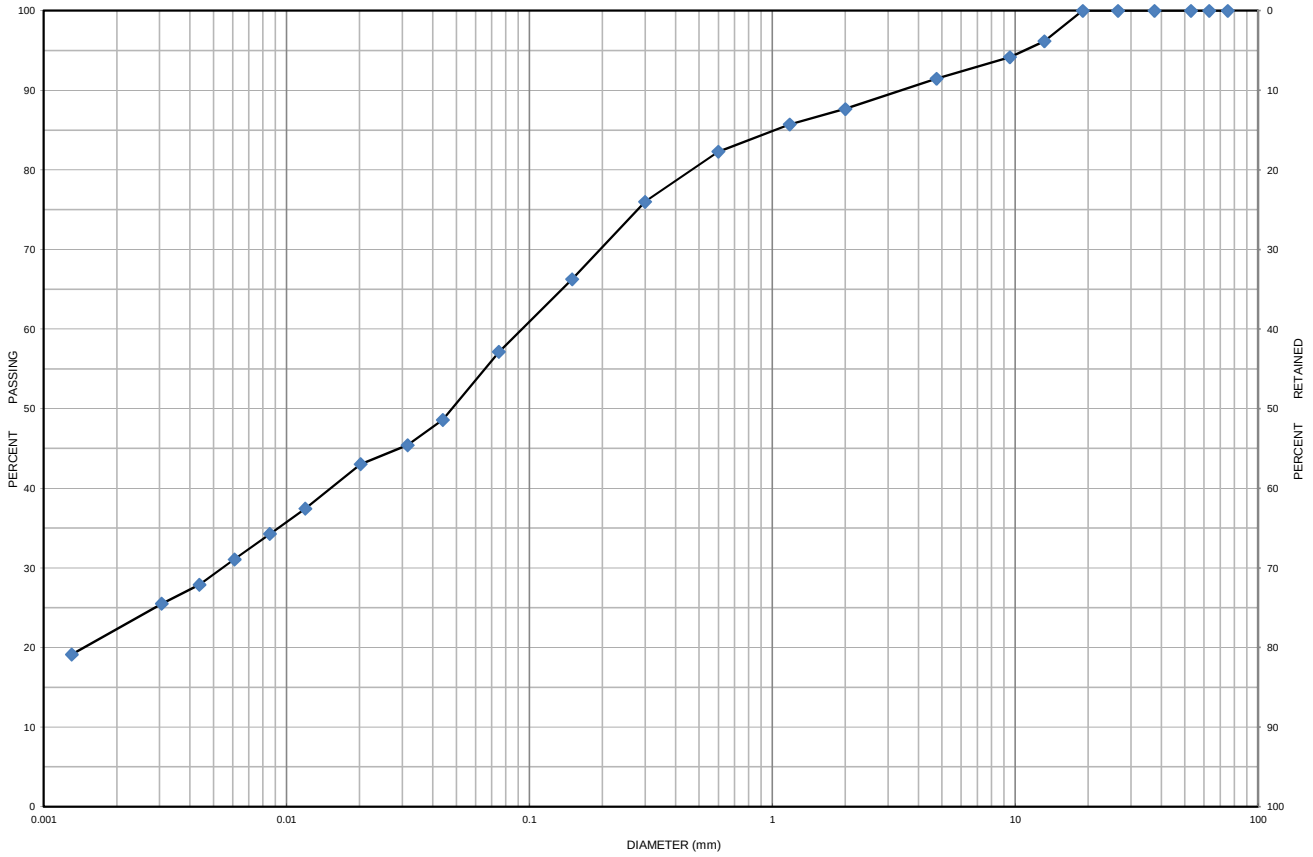
Project Number: *5984-001* **Client:** *Regional Municipality of York*

Project Name: *Paramedic Response Station 36, 107 Glen Cameron Rd.*

Sample Date: *March 3, 2017* **Sampled By:** *Scott Gibson - Cambium Inc.*

Hole No.: *BH 102-17 SS 2* **Depth:** *0.8 m to 1.2 m* **Lab Sample No:** *S-17-0150*

UNIFIED SOIL CLASSIFICATION SYSTEM					
CLAY & SILT (<0.075 mm)	SAND (<4.75 mm to 0.075 mm)			GRAVEL (>4.75 mm)	
	FINE	MEDIUM	COARSE	FINE	COARSE



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
BH 102-17	SS 2	0.8 m to 1.2 m	9	34	57		12.1

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Clayey Sandy Silt trace Gravel	ML	0.093	0.0055	-		

Issued By: _____ *Date Issued:* *March 14, 2017*

(Senior Project Manager)

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Grain Size Distribution Chart

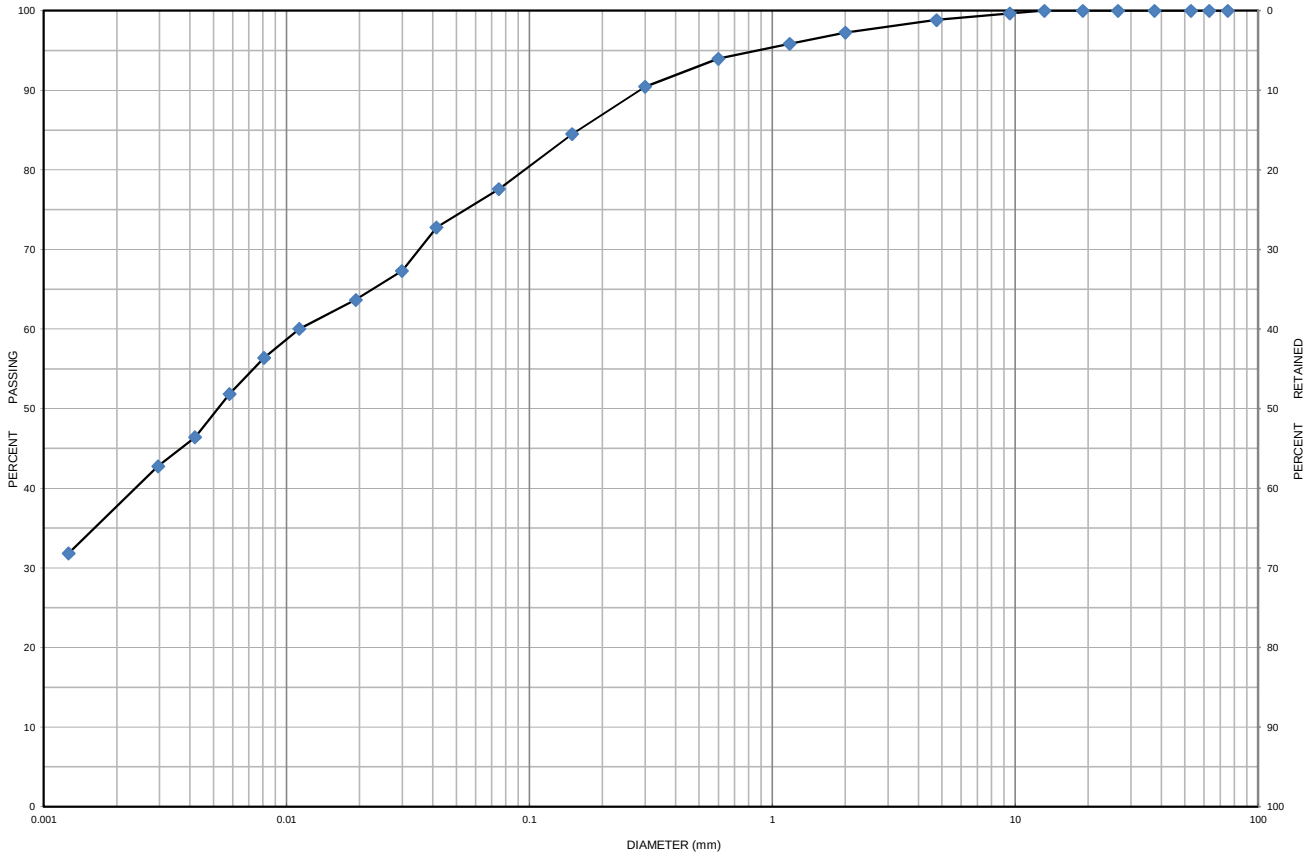
Project Number: *5984-001* **Client:** *Regional Municipality of York*

Project Name: *Paramedic Response Station 36, 107 Glen Cameron Rd.*

Sample Date: *March 3, 2017* **Sampled By:** *Scott Gibson - Cambium Inc.*

Hole No.: *BH 108-17 SS 3* **Depth:** *1.5 m to 2 m* **Lab Sample No:** *S-17-0148*

UNIFIED SOIL CLASSIFICATION SYSTEM					
CLAY & SILT (<0.075 mm)	SAND (<4.75 mm to 0.075 mm)			GRAVEL (>4.75 mm)	
	FINE	MEDIUM	COARSE	FINE	COARSE



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
BH 108-17	SS 3	1.5 m to 2 m	1	21	78		19.0

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Sandy Silt and Clay	ML	0.110	-	-		

Issued By: _____ *Date Issued:* *March 14, 2017*

(Senior Project Manager)

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Grain Size Distribution Chart

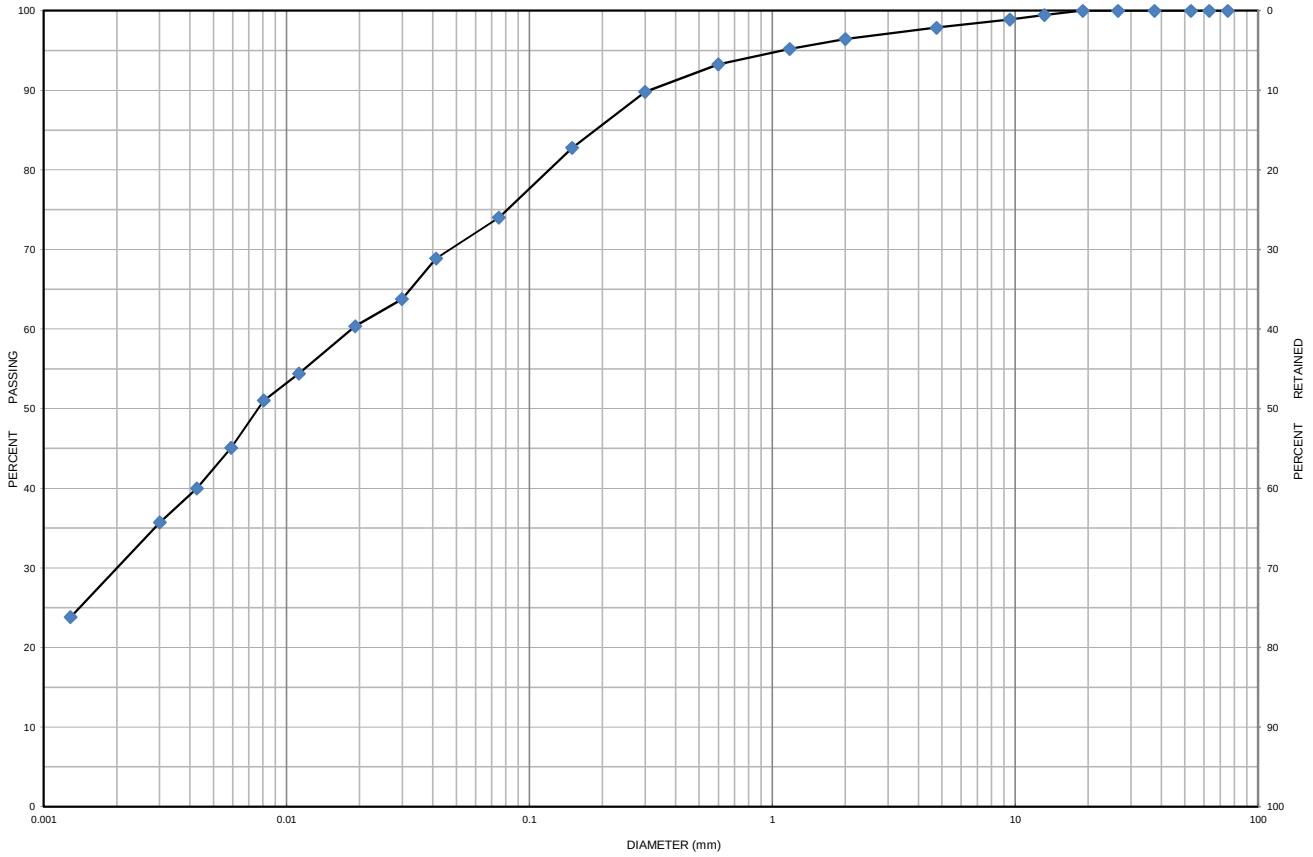
Project Number: *5984-001* **Client:** *Regional Municipality of York*

Project Name: *Paramedic Response Station 36, 107 Glen Cameron Rd.*

Sample Date: *March 3, 2017* **Sampled By:** *Scott Gibson - Cambium Inc.*

Hole No.: *BH 110-17 SS 6* **Depth:** *4.6 m to 5 m* **Lab Sample No:** *S-17-0149*

UNIFIED SOIL CLASSIFICATION SYSTEM					
CLAY & SILT (<0.075 mm)	SAND (<4.75 mm to 0.075 mm)			GRAVEL (>4.75 mm)	
	FINE	MEDIUM	COARSE	FINE	COARSE



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
BH 110-17	SS 6	4.6 m to 5 m	2	24	74		20.3

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Sandy Clayey Silt	ML	0.018	0.002	-		

Issued By: _____ *Date Issued:* *March 14, 2017*

(Senior Project Manager)

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Appendix C

Environmental Laboratory Testing Results

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 17T193675

PROJECT: 5984-001

CLIENT NAME: CAMBIUM

ATTENTION TO: JANOAH YOUNG

SAMPLING SITE:

SAMPLED BY:

Corrosivity Package

DATE RECEIVED: 2017-03-06

DATE REPORTED: 2017-03-13

		SAMPLE DESCRIPTION:		BH 101-17 ss-4
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2017-03-06
Parameter	Unit	G / S	RDL	8235053
*Sulphide	%		0.05	<0.05
Chloride (2:1)	µg/g	NA	2	7
Sulphate (2:1)	µg/g		2	12
pH (2:1)	pH Units		NA	8.49
Electrical Conductivity (2:1)	mS/cm	0.57	0.005	0.131
Resistivity (2:1)	ohm.cm		1	7630
Redox Potential (2:1)	mV		5	236

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

8235053 EC/Resistivity, pH, Chloride, Sulphate and Redox Potential were determined on the extract obtained from the 2:1 leaching procedure (2 parts DI water: 1 part soil).

*Sulphide analyzed at AGAT Vancouver

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 17T193675

PROJECT: 5984-001

CLIENT NAME: CAMBIUM

ATTENTION TO: JANOAH YOUNG

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2017-03-06

DATE REPORTED: 2017-03-13

		SAMPLE DESCRIPTION:		BH 103-17 ss-2	BH 106-17 ss-3	BH 114-17 ss-3
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2017-03-06	2017-03-06	2017-03-06
Parameter	Unit	G / S	RDL	8235056	8235064	8235069
Antimony	µg/g	1.3	0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	3	3	3
Barium	µg/g	220	2	81	95	98
Beryllium	µg/g	2.5	0.5	<0.5	<0.5	<0.5
Boron	µg/g	36	5	6	7	7
Boron (Hot Water Soluble)	µg/g	NA	0.10	0.11	<0.10	<0.10
Cadmium	µg/g	1.2	0.5	<0.5	<0.5	<0.5
Chromium	µg/g	70	2	20	21	21
Cobalt	µg/g	21	0.5	7.2	7.8	8.3
Copper	µg/g	92	1	14	15	15
Lead	µg/g	120	1	6	8	7
Molybdenum	µg/g	2	0.5	<0.5	<0.5	<0.5
Nickel	µg/g	82	1	16	17	19
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
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	28	29	31
Zinc	µg/g	290	5	37	39	42
Chromium VI	µg/g	0.66	0.2	<0.2	<0.2	<0.2
Cyanide	µg/g	0.051	0.040	<0.040	<0.040	<0.040
Mercury	µg/g	0.27	0.10	<0.10	<0.10	<0.10
Electrical Conductivity	mS/cm	0.57	0.005	0.135	0.180	0.158
Sodium Adsorption Ratio	NA	2.4	NA	0.186	1.64	0.313
pH, 2:1 CaCl2 Extraction	pH Units		NA	7.59	7.71	7.66

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

8235056-8235069 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:

AGAT Laboratories

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AGAT WORK ORDER: 17T193675

PROJECT: 5984-001

CLIENT NAME: CAMBIUM

ATTENTION TO: JANOAH YOUNG

SAMPLING SITE:

SAMPLED BY:

O. Reg. 558 Metals and Inorganics

DATE RECEIVED: 2017-03-06

DATE REPORTED: 2017-03-13

		SAMPLE DESCRIPTION:		C1
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		2017-03-06
Parameter	Unit	G / S	RDL	8235076
Arsenic Leachate	mg/L	2.5	0.010	<0.010
Barium Leachate	mg/L	100	0.100	0.613
Boron Leachate	mg/L	500	0.050	<0.050
Cadmium Leachate	mg/L	0.5	0.010	<0.010
Chromium Leachate	mg/L	5	0.010	<0.010
Lead Leachate	mg/L	5	0.010	<0.010
Mercury Leachate	mg/L	0.1	0.01	<0.01
Selenium Leachate	mg/L	1	0.010	<0.010
Silver Leachate	mg/L	5	0.010	<0.010
Uranium Leachate	mg/L	10	0.050	<0.050
Fluoride Leachate	mg/L	150	0.05	0.20
Cyanide Leachate	mg/L	20	0.05	<0.05
(Nitrate + Nitrite) as N Leachate	mg/L	1000	0.70	<0.70

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to O. Reg. 558 - Schedule IV Leachate Quality Criteria

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AGAT WORK ORDER: 17T193675

PROJECT: 5984-001

CLIENT NAME: CAMBIUM

ATTENTION TO: JANOAH YOUNG

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2017-03-06

DATE REPORTED: 2017-03-13

				SAMPLE DESCRIPTION:	BH 103-17 ss-2	BH 106-17 ss-3	BH 114-17 ss-3
				SAMPLE TYPE:	Soil	Soil	Soil
				DATE SAMPLED:	2017-03-06	2017-03-06	2017-03-06
Parameter	Unit	G / S	RDL		8235056	8235064	8235069
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
F3 (C16 to C34)	µg/g	240	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		12.3	10.8	11.4
Surrogate	Unit	Acceptable Limits					
Terphenyl	%	60-140			112	113	101

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

8235056-8235069 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 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.
Fractions 1-4 are quantified without the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

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Certificate of Analysis

AGAT WORK ORDER: 17T193675

PROJECT: 5984-001

CLIENT NAME: CAMBIUM

ATTENTION TO: JANOAH YOUNG

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2017-03-06

DATE REPORTED: 2017-03-13

		SAMPLE DESCRIPTION:		BH 103-17 ss-2	BH 106-17 ss-3	BH 114-17 ss-3
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2017-03-06	2017-03-06	2017-03-06
Parameter	Unit	G / S	RDL	8235056	8235064	8235069
Dichlorodifluoromethane	µg/g	0.05	0.05	<0.05	<0.05	<0.05
Vinyl Chloride	ug/g	0.02	0.02	<0.02	<0.02	<0.02
Bromomethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Trichlorofluoromethane	ug/g	0.25	0.05	<0.05	<0.05	<0.05
Acetone	ug/g	0.5	0.50	<0.50	<0.50	<0.50
1,1-Dichloroethylene	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
Trans- 1,2-Dichloroethylene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Methyl tert-butyl Ether	ug/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
Methyl Ethyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50
Cis- 1,2-Dichloroethylene	ug/g	0.05	0.02	<0.02	<0.02	<0.02
Chloroform	ug/g	0.05	0.04	<0.04	<0.04	<0.04
1,2-Dichloroethane	ug/g	0.05	0.03	<0.03	<0.03	<0.03
1,1,1-Trichloroethane	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
Benzene	ug/g	0.02	0.02	<0.02	<0.02	<0.02
1,2-Dichloropropane	ug/g	0.05	0.03	<0.03	<0.03	<0.03
Trichloroethylene	ug/g	0.05	0.03	<0.03	<0.03	<0.03
Bromodichloromethane	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Methyl Isobutyl Ketone	ug/g	0.5	0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	ug/g	0.05	0.04	<0.04	<0.04	<0.04
Toluene	ug/g	0.2	0.05	<0.05	<0.05	<0.05
Dibromochloromethane	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
Tetrachloroethylene	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
Chlorobenzene	ug/g	0.05	0.05	<0.05	<0.05	<0.05
Ethylbenzene	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

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FAX (905)712-5122
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Certificate of Analysis

AGAT WORK ORDER: 17T193675

PROJECT: 5984-001

CLIENT NAME: CAMBIUM

ATTENTION TO: JANOAH YOUNG

SAMPLING SITE:

SAMPLED BY:

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

DATE RECEIVED: 2017-03-06

DATE REPORTED: 2017-03-13

				SAMPLE DESCRIPTION:	BH 103-17 ss-2	BH 106-17 ss-3	BH 114-17 ss-3
				SAMPLE TYPE:	Soil	Soil	Soil
				DATE SAMPLED:	2017-03-06	2017-03-06	2017-03-06
Parameter	Unit	G / S	RDL		8235056	8235064	8235069
Bromoform	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
o-Xylene	ug/g		0.05		<0.05	<0.05	<0.05
1,3-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
1,2-Dichlorobenzene	ug/g	0.05	0.05		<0.05	<0.05	<0.05
Xylene Mixture	ug/g	0.05	0.05		<0.05	<0.05	<0.05
1,3-Dichloropropene	µg/g	0.05	0.04		<0.04	<0.04	<0.04
n-Hexane	µg/g	0.05	0.05		<0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits					
Toluene-d8	% Recovery	50-140			101	117	103
4-Bromofluorobenzene	% Recovery	50-140			95	92	97

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

8235056-8235069 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

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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FAX (905)712-5122
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Quality Assurance

CLIENT NAME: CAMBIUM
PROJECT: 5984-001
SAMPLING SITE:

AGAT WORK ORDER: 17T193675
ATTENTION TO: JANOAH YOUNG
SAMPLED BY:

Soil Analysis

RPT Date: Mar 13, 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
Corrosivity Package															
*Sulphide	8236161		< 0.05	< 0.05	NA	< 0.05	103%	80%	120%						
Chloride (2:1)	8235053	8235053	7	7	NA	< 2	105%	80%	120%	108%	80%	120%	113%	70%	130%
Sulphate (2:1)	8235053	8235053	12	12	0.0%	< 2	103%	80%	120%	106%	80%	120%	108%	70%	130%
pH (2:1)	8235053	8235053	8.49	8.46	0.4%	NA	100%	90%	110%	NA			NA		
Redox Potential (2:1)	8235053	8235053	236	241	2.1%	< 5	111%	70%	130%	NA			NA		
O. Reg. 153(511) - Metals & Inorganics (Soil)															
Antimony	8231171		<0.8	<0.8	NA	< 0.8	118%	70%	130%	105%	80%	120%	79%	70%	130%
Arsenic	8231171		6	6	0.0%	< 1	107%	70%	130%	106%	80%	120%	101%	70%	130%
Barium	8231171		85	83	2.4%	< 2	101%	70%	130%	99%	80%	120%	103%	70%	130%
Beryllium	8231171		<0.5	0.6	NA	< 0.5	92%	70%	130%	111%	80%	120%	88%	70%	130%
Boron	8231171		8	8	NA	< 5	73%	70%	130%	107%	80%	120%	101%	70%	130%
Boron (Hot Water Soluble)	8236137		0.16	0.16	NA	< 0.10	117%	60%	140%	99%	70%	130%	95%	60%	140%
Cadmium	8231171		<0.5	<0.5	NA	< 0.5	96%	70%	130%	107%	80%	120%	104%	70%	130%
Chromium	8231171		24	25	4.1%	< 2	99%	70%	130%	113%	80%	120%	123%	70%	130%
Cobalt	8231171		13.7	13.9	1.4%	< 0.5	105%	70%	130%	111%	80%	120%	124%	70%	130%
Copper	8231171		34	33	3.0%	< 1	97%	70%	130%	114%	80%	120%	122%	70%	130%
Lead	8231171		13	12	8.0%	< 1	101%	70%	130%	108%	80%	120%	97%	70%	130%
Molybdenum	8231171		0.5	<0.5	NA	< 0.5	108%	70%	130%	105%	80%	120%	108%	70%	130%
Nickel	8231171		29	30	3.4%	< 1	111%	70%	130%	112%	80%	120%	123%	70%	130%
Selenium	8231171		<0.4	<0.4	NA	< 0.4	125%	70%	130%	103%	80%	120%	97%	70%	130%
Silver	8231171		<0.2	<0.2	NA	< 0.2	99%	70%	130%	118%	80%	120%	114%	70%	130%
Thallium	8231171		<0.4	<0.4	NA	< 0.4	98%	70%	130%	104%	80%	120%	97%	70%	130%
Uranium	8231171		0.7	0.7	NA	< 0.5	97%	70%	130%	97%	80%	120%	95%	70%	130%
Vanadium	8231171		31	32	3.2%	< 1	107%	70%	130%	109%	80%	120%	121%	70%	130%
Zinc	8231171		65	65	0.0%	< 5	101%	70%	130%	113%	80%	120%	121%	70%	130%
Chromium VI	8235064	8235064	<0.2	<0.2	NA	< 0.2	95%	70%	130%	103%	80%	120%	99%	70%	130%
Cyanide	8230794		<0.040	<0.040	NA	< 0.040	99%	70%	130%	98%	80%	120%	92%	70%	130%
Mercury	8231171		<0.10	<0.10	NA	< 0.10	98%	70%	130%	96%	80%	120%	89%	70%	130%
Electrical Conductivity	8235053	8235053	0.131	0.128	2.3%	< 0.005	94%	90%	110%	NA			NA		
Sodium Adsorption Ratio	8230784		0.097	0.093	4.2%	NA	NA			NA			NA		
pH, 2:1 CaCl2 Extraction	8234118		7.71	7.85	1.8%	NA	100%	80%	120%	NA			NA		
O. Reg. 558 Metals and Inorganics															
Arsenic Leachate	8236645		<0.010	<0.010	NA	< 0.010	99%	90%	110%	108%	80%	120%	107%	70%	130%
Barium Leachate	8236645		0.279	0.263	NA	< 0.100	97%	90%	110%	98%	80%	120%	97%	70%	130%
Boron Leachate	8236645		0.053	<0.050	NA	< 0.050	97%	90%	110%	99%	80%	120%	103%	70%	130%
Cadmium Leachate	8236645		<0.010	<0.010	NA	< 0.010	98%	90%	110%	97%	80%	120%	96%	70%	130%
Chromium Leachate	8236645		0.010	<0.010	NA	< 0.010	103%	90%	110%	112%	80%	120%	107%	70%	130%
Lead Leachate	8236645		<0.010	<0.010	NA	< 0.010	101%	90%	110%	98%	80%	120%	99%	70%	130%
Mercury Leachate	8236645		<0.01	<0.01	NA	< 0.01	NA	90%	110%	100%	80%	120%	98%	70%	130%

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5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
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Quality Assurance

CLIENT NAME: CAMBIUM

AGAT WORK ORDER: 17T193675

PROJECT: 5984-001

ATTENTION TO: JANOAH YOUNG

SAMPLING SITE:

SAMPLED BY:

Soil Analysis (Continued)

RPT Date: Mar 13, 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
Selenium Leachate	8236645		<0.010	<0.010	NA	< 0.010	94%	90%	110%	105%	80%	120%	105%	70%	130%
Silver Leachate	8236645		<0.010	<0.010	NA	< 0.010	98%	90%	110%	104%	80%	120%	104%	70%	130%
Uranium Leachate	8236645		<0.050	<0.050	NA	< 0.050	99%	90%	110%	98%	80%	120%	95%	70%	130%
Fluoride Leachate	8236645		0.19	0.19	NA	< 0.05	100%	90%	110%	108%	90%	110%	105%	70%	130%
Cyanide Leachate	8236645		<0.05	<0.05	NA	< 0.05	98%	90%	110%	108%	90%	110%	105%	70%	130%
(Nitrate + Nitrite) as N Leachate	8236645		<0.70	<0.70	NA	< 0.70	98%	80%	120%	96%	80%	120%	96%	70%	130%

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.

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AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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Quality Assurance

CLIENT NAME: CAMBIUM
PROJECT: 5984-001
SAMPLING SITE:

AGAT WORK ORDER: 17T193675
ATTENTION TO: JANOAH YOUNG
SAMPLED BY:

Trace Organics Analysis

RPT Date: Mar 13, 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 (-BTEX) (Soil)															
F1 (C6 to C10)	8235069	8235069	< 5	< 5	NA	< 5	92%	60%	130%	89%	85%	115%	104%	70%	130%
F2 (C10 to C16)	8234700		< 10	< 10	NA	< 10	92%	60%	130%	94%	80%	120%	93%	70%	130%
F3 (C16 to C34)	8234700		< 50	< 50	NA	< 50	96%	60%	130%	95%	80%	120%	89%	70%	130%
F4 (C34 to C50)	8234700		< 50	< 50	NA	< 50	89%	60%	130%	104%	80%	120%	85%	70%	130%
O. Reg. 153(511) - VOCs (Soil)															
Dichlorodifluoromethane	8235069	8235069	< 0.05	< 0.05	NA	< 0.05	102%	50%	140%	70%	50%	140%	73%	50%	140%
Vinyl Chloride	8235069	8235069	< 0.02	< 0.02	NA	< 0.02	120%	50%	140%	100%	50%	140%	102%	50%	140%
Bromomethane	8235069	8235069	< 0.05	< 0.05	NA	< 0.05	106%	50%	140%	98%	50%	140%	109%	50%	140%
Trichlorofluoromethane	8235069	8235069	< 0.05	< 0.05	NA	< 0.05	125%	50%	140%	117%	50%	140%	99%	50%	140%
Acetone	8235069	8235069	< 0.50	< 0.50	NA	< 0.50	107%	50%	140%	94%	50%	140%	101%	50%	140%
1,1-Dichloroethylene	8235069	8235069	< 0.05	< 0.05	NA	< 0.05	88%	50%	140%	99%	60%	130%	78%	50%	140%
Methylene Chloride	8235069	8235069	< 0.05	< 0.05	NA	< 0.05	106%	50%	140%	82%	60%	130%	91%	50%	140%
Trans- 1,2-Dichloroethylene	8235069	8235069	< 0.05	< 0.05	NA	< 0.05	87%	50%	140%	96%	60%	130%	77%	50%	140%
Methyl tert-butyl Ether	8235069	8235069	< 0.05	< 0.05	NA	< 0.05	105%	50%	140%	103%	60%	130%	72%	50%	140%
1,1-Dichloroethane	8235069	8235069	< 0.02	< 0.02	NA	< 0.02	110%	50%	140%	101%	60%	130%	75%	50%	140%
Methyl Ethyl Ketone	8235069	8235069	< 0.50	< 0.50	NA	< 0.50	96%	50%	140%	93%	50%	140%	111%	50%	140%
Cis- 1,2-Dichloroethylene	8235069	8235069	< 0.02	< 0.02	NA	< 0.02	89%	50%	140%	109%	60%	130%	106%	50%	140%
Chloroform	8235069	8235069	< 0.04	< 0.04	NA	< 0.04	98%	50%	140%	120%	60%	130%	103%	50%	140%
1,2-Dichloroethane	8235069	8235069	< 0.03	< 0.03	NA	< 0.03	111%	50%	140%	119%	60%	130%	86%	50%	140%
1,1,1-Trichloroethane	8235069	8235069	< 0.05	< 0.05	NA	< 0.05	94%	50%	140%	99%	60%	130%	84%	50%	140%
Carbon Tetrachloride	8235069	8235069	< 0.05	< 0.05	NA	< 0.05	80%	50%	140%	94%	60%	130%	75%	50%	140%
Benzene	8235069	8235069	< 0.02	< 0.02	NA	< 0.02	105%	50%	140%	111%	60%	130%	82%	50%	140%
1,2-Dichloropropane	8235069	8235069	< 0.03	< 0.03	NA	< 0.03	104%	50%	140%	98%	60%	130%	82%	50%	140%
Trichloroethylene	8235069	8235069	< 0.03	< 0.03	NA	< 0.03	102%	50%	140%	98%	60%	130%	77%	50%	140%
Bromodichloromethane	8235069	8235069	< 0.05	< 0.05	NA	< 0.05	105%	50%	140%	98%	60%	130%	75%	50%	140%
Methyl Isobutyl Ketone	8235069	8235069	< 0.50	< 0.50	NA	< 0.50	95%	50%	140%	109%	50%	140%	104%	50%	140%
1,1,2-Trichloroethane	8235069	8235069	< 0.04	< 0.04	NA	< 0.04	111%	50%	140%	111%	60%	130%	100%	50%	140%
Toluene	8235069	8235069	< 0.05	< 0.05	NA	< 0.05	96%	50%	140%	104%	60%	130%	94%	50%	140%
Dibromochloromethane	8235069	8235069	< 0.05	< 0.05	NA	< 0.05	92%	50%	140%	100%	60%	130%	84%	50%	140%
Ethylene Dibromide	8235069	8235069	< 0.04	< 0.04	NA	< 0.04	99%	50%	140%	104%	60%	130%	94%	50%	140%
Tetrachloroethylene	8235069	8235069	< 0.05	< 0.05	NA	< 0.05	98%	50%	140%	106%	60%	130%	94%	50%	140%
1,1,1,2-Tetrachloroethane	8235069	8235069	< 0.04	< 0.04	NA	< 0.04	94%	50%	140%	92%	60%	130%	88%	50%	140%
Chlorobenzene	8235069	8235069	< 0.05	< 0.05	NA	< 0.05	103%	50%	140%	107%	60%	130%	97%	50%	140%
Ethylbenzene	8235069	8235069	< 0.05	< 0.05	NA	< 0.05	95%	50%	140%	101%	60%	130%	94%	50%	140%
m & p-Xylene	8235069	8235069	< 0.05	< 0.05	NA	< 0.05	99%	50%	140%	104%	60%	130%	97%	50%	140%
Bromoform	8235069	8235069	< 0.05	< 0.05	NA	< 0.05	105%	50%	140%	98%	60%	130%	85%	50%	140%
Styrene	8235069	8235069	< 0.05	< 0.05	NA	< 0.05	87%	50%	140%	96%	60%	130%	91%	50%	140%
1,1,2,2-Tetrachloroethane	8235069	8235069	< 0.05	< 0.05	NA	< 0.05	115%	50%	140%	117%	60%	130%	100%	50%	140%
o-Xylene	8235069	8235069	< 0.05	< 0.05	NA	< 0.05	105%	50%	140%	109%	60%	130%	96%	50%	140%

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5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
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Quality Assurance

CLIENT NAME: CAMBIUM

AGAT WORK ORDER: 17T193675

PROJECT: 5984-001

ATTENTION TO: JANOAH YOUNG

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Mar 13, 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
1,3-Dichlorobenzene	8235069	8235069	< 0.05	< 0.05	NA	< 0.05	99%	50%	140%	104%	60%	130%	97%	50%	140%
1,4-Dichlorobenzene	8235069	8235069	< 0.05	< 0.05	NA	< 0.05	106%	50%	140%	112%	60%	130%	101%	50%	140%
1,2-Dichlorobenzene	8235069	8235069	< 0.05	< 0.05	NA	< 0.05	105%	50%	140%	107%	60%	130%	102%	50%	140%
1,3-Dichloropropene	8235069	8235069	< 0.04	< 0.04	NA	< 0.04	88%	50%	140%	79%	60%	130%	93%	50%	140%
n-Hexane	8235069	8235069	< 0.05	< 0.05	NA	< 0.05	109%	50%	140%	104%	60%	130%	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:

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5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
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Method Summary

CLIENT NAME: CAMBIUM

AGAT WORK ORDER: 17T193675

PROJECT: 5984-001

ATTENTION TO: JANOAH YOUNG

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
*Sulphide	INOR-181-6027	modified from ASTM E1915-11	COMBUSTION
Chloride (2:1)	INOR-93-6004	McKeague 4.12 & SM 4110 B	ION CHROMATOGRAPH
Sulphate (2:1)	INOR-93-6004	McKeague 4.12 & SM 4110 B	ION CHROMATOGRAPH
pH (2:1)	INOR 93-6031	MSA part 3 & SM 4500-H+ B	PH METER
Electrical Conductivity (2:1)	INOR-93-6036	McKeague 4.12, SM 2510 B	EC METER
Resistivity (2:1)	INOR-93-6036	McKeague 4.12, SM 2510 B,SSA #5 Part 3	CALCULATION
Redox Potential (2:1)		McKeague 4.12 & SM 2510 B	REDOX POTENTIAL ELECTRODE
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
Cobalt	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Copper	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Lead	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
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
Chromium VI	INOR-93-6029	SM 3500 B; MSA Part 3, Ch. 25	SPECTROPHOTOMETER
Cyanide	INOR-93-6052	MOE CN-3015 & E 3009 A;SM 4500 CN	TECHNICON AUTO ANALYZER
Mercury	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Electrical Conductivity	INOR-93-6036	McKeague 4.12, SM 2510 B	EC METER
Sodium Adsorption Ratio	INOR-93-6007	McKeague 4.12 & 3.26 & EPA SW-846 6010B	ICP/OES
pH, 2:1 CaCl2 Extraction	INOR-93-6031	MSA part 3 & SM 4500-H+ B	PH METER
Arsenic Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Barium Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Boron Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Cadmium Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Chromium Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Lead Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Mercury Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Selenium Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Silver Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Uranium Leachate	MET-93-6103	EPA SW-846 1311 & 3010A & 6020A	ICP-MS
Fluoride Leachate	INOR-93-6018	EPA SW-846-1311 & SM4500-F- C	ION SELECTIVE ELECTRODE
Cyanide Leachate	INOR-93-6052	EPA SW-846-1311 & MOE 3015 & SM 4500 CN- I	TECHNICON AUTO ANALYZER

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5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
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Method Summary

CLIENT NAME: CAMBIUM

AGAT WORK ORDER: 17T193675

PROJECT: 5984-001

ATTENTION TO: JANOAH YOUNG

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
(Nitrate + Nitrite) as N Leachate	INOR-93-6053	EPA SW 846-1311 & SM 4500 - NO3-I	LACHAT FIA

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MISSISSAUGA, ONTARIO
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PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
F1 (C6 to C10)	VOL-91-5009	CCME Tier 1 Method, SW846 5035	P &T GC / FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	CCME Tier 1 Method, SW846 5035	P & T GC / FID
F2 (C10 to C16)	VOL-91-5009	CCME Tier 1 Method	GC / FID
F3 (C16 to C34)	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, SW846 5035,8015	BALANCE
Terphenyl	VOL-91-5009	CCME Tier 1 Method	GC/FID
Dichlorodifluoromethane	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
Bromomethane	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
Acetone	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
Methylene Chloride	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
Methyl tert-butyl Ether	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
Methyl Ethyl Ketone	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
Chloroform	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
1,1,1-Trichloroethane	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
Benzene	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
Trichloroethylene	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
Methyl Isobutyl Ketone	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
Toluene	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
Ethylene Dibromide	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
1,1,1,2-Tetrachloroethane	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
Ethylbenzene	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
Bromoform	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
o-Xylene	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
1,4-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
Xylene Mixture	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
n-Hexane	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: CAMBIUM

AGAT WORK ORDER: 17T193675

PROJECT: 5984-001

ATTENTION TO: JANOAH YOUNG

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Toluene-d8	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS

17T193675

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)

Report Information:

Company: Cambium Inc
Contact: Janoah Young
Address: 843 King St W Unit 8 Oshawa Ontario L1J 2L4
Phone: 8662177900 Fax:
Reports to be sent to
1. Email: Janoah.young@cambium-inc.com
2. Email: Brandon.Mcfarlane@cambium-inc.com

Project Information:

Project: 5984-001
Site Location: 107 Glen Cameron Rd Markham Ont
Sampled By: Scott Gibson
AGAT Quote #: 132650 PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐
Company:
Contact:
Address:
Email:

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)

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

Report Guideline on Certificate of Analysis: ☒ Yes ☐ No

Laboratory Use Only

Work Order #:
Cooler Quantity:
Arrival Temperatures: 6.1 | 7.8 | 8.2
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes: ICE

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):

*TAT is exclusive of weekends and statutory holidays
For 'Same Day' analysis, please contact your AGAT CPM

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)	O. Reg 153: Metals and Inorganics	All Metals	Hydride Metals	ORPs	Full Metals Scan	Regulation/Custom Metals	Nutrients	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	Corrosivity
BH 101-17 ss-4	03/06/17	12:30pm	1	s										☑	X							☑
BH 103-17 ss-2	03/06/17	12:30pm	5	s			X							☑	X							
BH 106-17 ss-3	03/06/17	12:30pm	5	s			X							☑	X							
BH 114-17 ss-3	03/06/17	12:30pm	5	s			X							☑	X							
C1	03/06/17	12:30pm	1	s																☑		

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Scott Gibson	03/06/17	3:30pm	M. GRASIC	Mar6/17	7:30

Page ____ of ____

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