Geotechnical Investigation - Norwood Residential Development, Norwood, ON

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Prepared for:
CAP Norwood Developments Inc.

Cambium Reference: 14288-003

CAMBIUM INC.

866.217.7900

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1.0 Introduction

Cambium Inc. (Cambium) was retained by CAP Norwood Developments Inc. (Client) to complete a geotechnical investigation in support of the proposed residential development located between Mill Street and Asphodel 10th Line in the town of Norwood, Ontario (Site).

The development area is known as 52 Mill Street, Norwood and encompasses approximately 87 acres in size. The topography is sloped gently east to west and is currently used for cash crops. It is proposed that the property be subdivided with approximately 405 low density residential units and 387 medium density residential units that will be constructed with basements where possible.

This report presents the methodology and findings of the geotechnical investigation at the Site and addresses requirements and constraints for the design and construction of the subdivision.

2.0 Methodology

2.1 Borehole and Test Pit Investigation

A borehole investigation and test pit investigation were conducted on April 20, 21, 26, and 27, 2022, to assess subsurface conditions at the Site. A total of seventeen (17) boreholes, designated BH101-22 through BH117-22 and twenty-four (24) test pits, designated TP118-22 through TP141-22, were advanced at the Site for geotechnical and hydrogeological purposes and are shown on Figure 1.

Drilling and sampling for the boreholes was completed using a track-mounted drill rig, under the supervision of a Cambium technician. The boreholes were advanced to their terminated 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 (SS) 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 0.75 m intervals from 0 mbeg to 5.03 mbeg. Borehole logs are provided in Appendix A.

The test pits were excavated to a predetermined depth of 3 mbeg using a Cambium sourced backhoe, under the supervision of a Cambium technician. Dynamic Probe Penetration Test (DPT) values were recorded for the sampled intervals as the number of blows required to drive a 19 mm diameter steel rod 150 mm into the soil with an 8 kg hammer falling 750 mm. The DPT values are used in this report to assess consistency of cohesive soils and relative density of non-cohesive materials.

Boreholes BH104-22, BH105-22, BH112-22 and BH115-22 were equipped as monitoring wells to allow for the assessment of groundwater elevations over time.

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 test pits and boreholes were checked for groundwater and general stability prior to backfilling. All test pits were backfilled to as close to pre-existing conditions as

possible. All boreholes not equipped as monitoring wells were backfilled and sealed in accordance with Ontario Regulation (O.Reg.) 903.

Borehole and test pit locations were surveyed in the field using a Sokia RTK unit. Elevations were measured in relation to the top nut of the fire hydrant located at the intersection of King Street and Mill Street. Geodetic elevation of the fire hydrant was provided by Jewel Engineering to be 206.05 masl (meters above sea level). The ground surface at the location of each borehole and test pit has been measured relative to this elevation, with an accuracy of 0.01m.

Borehole and test pit 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 eight (8) 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 (LS-701) was completed on all retrieved soil samples. Results are presented in Appendix B and are discussed in subsequent sections of this report.

3.0 Subsurface Conditions

Subsurface conditions at the Site generally consist of layer of loose to compact, dark brown silt topsoil underlain by moist silty sand, which extends to a depth of 0.3 mbeg to 2.1 mbeg in locations BH101-22, BH102-22, BH105-22 to BH113-22, BH115-22 to BH117-22, TP118-22 to TP122-22, TP126-21 to TP130-22, and TP132-22 to TP141-22, and to 3.6 mbeg in TP121-22. In test pits and boreholes BH102-22, BH103-22, BH107-22, BH110-22, BH112-22, and BH117-22, loose, moist to wet, silt dominant soils were found underlying the silty sand soil, extending to depths of 1.4 mbeg to 2.9 mbeg. Moist to saturated, gravel and sand dominant soils were found to extend from the base of the aforementioned soils to termination depth in all locations except BH107-22, TP121-22, TP137-22, and TP138-22. The gravel and sand was found to have a dense to very dense relative density.

Bedrock was encountered at depths ranging from 1.5 mbgs to 4.88 mbgs in TP119-22, TP127-22, and TP134-22 to TP138-22, and all boreholes, except BH101-22 and BH103-22.

Groundwater was generally found to be at a depth of at least 1.5 mbeg throughout the site, and often at depths greater than 3 mbeg, except in the location of BH112-22, where it was found to be at a depth of 0.76 mbeg. Ground water levels in monitoring wells ranged from 1.24 mbeg in BH112-22 to depths of 2.7 mbeg.

The individual soil units are described in detail below and shown on the borehole and test pit logs provided in Appendix A and Appendix B.

3.1 Topsoil

All test pits and boreholes encountered a dark brown silt topsoil with trace sand at surface. The topsoil contains some to frequent rootlets and varying amounts of gravel and cobble. The topsoil ranged in thickness from 150 mm to 300 mm in all locations, except borehole BH104-22, which had a thickness of 600 mm. The topsoil was generally found to be moist at the time of the investigation.

3.2 Silty Sand

Light brown to brown silty sand, and silt and sand with trace to some clay and gravel was encountered immediately below topsoil or below relatively thin layers of silt in all locations except BH107-22, BH111-22, BH114-22, BH115-22, TP124-22, TP125-22, and TP131-22 extending to depths of 0.3 mbeg to termination depth within these locations,. The silty sand was free of organics and was found to be moist to wet at the time of investigation. SPT and DPT blow counts provide evidence that the silty sand ranged from a loose to compact relative density.

Laboratory particle size distribution analyses were completed on one (1) sample of the silty sand material taken from the test pits and boreholes and depths described in Table 1. The soil samples and analysis results are based on the Unified Soil Classification System (USCS) scale, with full results provided in Appendix B.

Table 1 Particle Size Distribution Analysis

Test Pit	Depth (mbeg)	Description	% Gravel	% Sand	% Silt	% Clay	% Moisture Content
BH102-22 SS4	2.3 – 2.7	Silt some Clay	0	3	86	11	27.8
BH104-22 SS3	1.5 – 2.0	Sand and Silt some Clay some Gravel	10	42	35	13	8.2
BH105-22 SS3	1.5 – 2.0	Sandy Silt	0	28	72		23.7
BH107-22 SS3	1.5 – 2.0	Sandy Silt	0	28	72		16.1
BH109-22 SS3	1.5 – 2.0	Gravelly Sand and Silt	21	40	39		8.2
BH111-22 SS2	0.8 – 1.2	Gravelly Silty Sand	27	44	24	5	6.3
BH115-22 SS3	1.5 – 2.0	Gravelly Silty Sand	34	46	20		6.4
BH117-22 SS3	1.5 – 2.0	Gravelly Sand some Silt	20	65	15		4.7

3.3 Silt

Brown silt dominant soils with variable amounts of clay and sand were encountered in boreholes BH102-22 to BH103-22, BH105-22 through BH108-22, BH110-22, BH112-22, BH113-22, BH115-22, BH117-22, and TP121-22. These soils were generally found within 3m of surface, except in BH107-22 where it extends to bedrock at a depth of 4.4 mbeg. The silt

soils were encountered immediately below topsoil or as interbedded horizons within the silty sand units. The silt was found to range from moist to wet at the time of the investigation. SPT and DPT blow counts provide evidence of a loose relative density.

Laboratory particle size distribution analyses were completed on three (3) samples of the silt dominant material taken from the test pits and boreholes and depths described in Table 1. The soil samples and analysis results are based on the Unified Soil Classification System (USCS) scale, with full results provided in Appendix B.

3.4 Sand and Gravel

Light brown to brown to grey gravel and sand dominant soils with variable amounts of silt and trace amounts of clay were encountered generally at the base of, or throughout boreholes BH102-22, BH110-22 through BH117-22, and all test pits except TP121-22, TP137-22 and TP138-22. The gravel and sand soils were also present as interbedded layers within the sandy silt at depths less than 2.0 mbeg in boreholes BH101-22, BH104-22, and BH117-22. . The gravel and sand soil was found to range from moist to saturated with increasing depth at the time of investigation. SPT and DPT blow counts provide evidence that the gravel and sand had a range of dense to very dense relative density.

Laboratory particle size distribution analyses were completed on four (4) samples of the gravel and sand material taken from the test pits and boreholes and depths described in Table 1. The soil samples and analysis results are based on the Unified Soil Classification System (USCS) scale, with full results provided in Appendix B.

3.5 Bedrock

All boreholes were terminated on auger refusal on presumed bedrock at depths between 1.98 mbgs and 4.88 mbgs, except for BH101-22 and BH103-22. Test pits TP119-22, TP127-22, and TP134-22 to TP138-22 were terminated on excavator refusal on bedrock at depths between 1.5 mbgs and 3.3 mbgs. The depth to bedrock and bedrock elevation is summarized in Table 2. Overall, the bedrock elevation at the site varies from 197.04 masl to 211.59 masl, with shallower bedrock encountered in the east end of the site and the deepest bedrock encountered in the west end of the site. Coring of the bedrock was not part of the scope of

work for this project. It is possible that some occurrences of auger refusal are on boulders above the bedrock, but overall bedrock is shallow across the site.

Table 2 Bedrock Depth and Elevation

Location (Boreholes)	Surface Elevation (masl)	Depth to Bedrock (mbeg)	Elevation of Bedrock (masl)
BH102-22	205.33	3.05	202.28
BH104-22	208.93	3.15	205.78
BH105-22	202.46	4.42	198.04
BH106-22	208.34	4.57	203.77
BH107-22	204.31	4.42	199.89
BH108-22	210.41	4.67	205.74
BH109-22	209.64	4.88	204.76
BH110-22	209.74	3.96	205.78
BH111-22	210.21	4.88	205.33
BH112-22	209.28	2.67	206.61
BH113-22	211.7	1.98	209.72
BH114-22	213.02	3.35	209.67
BH115-22	210.83	2.59	208.24
BH116-22	210.41	2.59	207.82
BH117-22	210.34	4.57	205.77
Location (Test Pits)	**Surface Elevation (masl)**	**Depth to Bedrock (mbeg)**	**Elevation of Bedrock (masl)**
TP119-22	203.59	3.3	200.29
TP127-22	208.81	2.55	206.26
TP134-22	213.61	2.25	211.36
TP135-22	211.98	1.95	210.03
TP136-22	213.09	1.5	211.59
TP137-22	210.37	1.95	208.42
TP138-22	209.88	1.5	208.38

Note: Boreholes not shown in Table 2 did not encounter bedrock within 5 m of existing grade. Test pits not shown did not encounter bedrock with 3 m of existing grade.

3.6 Groundwater

Boreholes BH101-22, BH103-22, BH104-22, BH106-22, BH109-22, BH110-22, BH113-22, BH114-22, BH116-22 were dry on completion of drilling. The remaining boreholes had groundwater levels at depths varying from 0.76 mbgs to 4.42 mbgs. Boreholes BH105-22 and

BH112-22 had sloughing, on completion, to depths of 4.11 mbeg and 2.59 mbeg. All other boreholes remained open upon completion.

Groundwater levels were measured in the four (4) monitoring wells, BH104-22, BH105-22, BH112-22, and BH115-22, on May 4, 2022, and found to range from 1.24 mbeg to 2.72 mbeg, with no water present in BH104-22.

Test pits TP121-22, TP128-22, TP129-22, TP130-22, TP132-22, TP133-22, and TP140-22 had groundwater seepage on completion of excavation, to depths varying from 1.05 mbgs to 3.3 mbgs. The remaining test pits were dry on completion of excavation. Test pits TP121-22, TP 122-22, TP128-22, TP138-22, and TP140-22 had sidewall caving to depths ranging from 0.60 mbeg and 3.3 mbeg on completion. All other test pits remained open upon completion.

Grey soils indicating the long-term presence of the water table were encountered in BH101-22, BH103-22, BH104-22, BH105-22, and TP 121-22, at depths ranging from 1.2 mbeg to 4.05 mbeg.

A summary of the measured water levels as well as water level on completion and the depth to grey soils is provided in Table 3.

In general, groundwater was encountered at depths greater than 1.5 mbeg and as such, significant groundwater seepage into excavations for foundations is not anticipated within the assumed excavation depths, provided they are completed in a drier time of year. In areas where deeper excavations extend below groundwater level, as would be the case with underground services, a permit to take water or registration in ESAR may be required and is discussed further in the accompanying hydrogeological report.

Table 3 Groundwater Level Measurement and Elevation

Location	Surface Elevation (masl)	First Encounter of Groundwater (m) / Elev (masl)	Water Level on Completion (m) / Elev (masl)	Grey Soils Below Depth (m) / Elev (masl)	Measured Water Level May 4, 2022 (m) / Elev (masl)
BH101-22	204.43	-	-	2.1 / 202.33	
BH102-22	205.33	1.52 / 203.81	3.05 / 202.28	-	
BH103-22	206.1	-	-	4.05 / 202.05	
BH104-22	208.93	-	-	1.2 / 207.73	No water level found
BH105-22	202.46	1.52 / 200.94	3.05 / 199.41	2.35 / 200.11	2.72 / 199.74
BH107-22	204.31	4.42 / 199.89	4.42 / 199.89	-	
BH108-22	210.41	1.52 / 208.89	2.13 / 208.28	-	
BH111-22	210.21	3.05 / 207.16	1.83 / 208.38	-	
BH112-22	209.28	0.76 / 208.52	0.76 / 208.52	-	1.24 / 208.04
BH115-22	210.83	1.52 / 209.31	1.68 / 209.15	-	2.02 / 208.82
BH117-22	210.34	2.29 / 208.05	4.57 / 205.77	-	
TP121-22	203.75	3.3 / 200.45	3.6 / 200.15	1.5 / 202.25	
TP128-22	208.28	2.4 / 205.88	2.55 / 205.73	-	
TP129-22	210.85	2.4 / 208.45	2.85 / 208.00	-	
TP130-22	210.1	1.8 / 208.30	3.0 / 207.10	-	
TP132-22	209.94	2.4 / 207.54	2.85 / 207.10	-	
TP133-22	210.92	1.05 / 209.87	-	-	
TP140-22	209.73	1.95 / 207.78	2.85 / 206.88	-	

Note: All boreholes and test pits not shown in Table 3 did not encounter any sign of groundwater, including grey soils.

It is noted that groundwater levels vary seasonally and in response to climatic activity. Given the variability in soil types and water levels at the site, consideration should be given to measuring the groundwater levels seasonally to determine the best conditions for construction.

4.0

4.0 Geotechnical Considerations

The following recommendations are based on the borehole and test pit 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. It is possible that subsurface conditions beyond the test pit 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 Site Preparation

Any and all vegetation and organic soils, including topsoil, should be removed from beneath the proposed homes, roadways and utilities. The exposed subgrade should be proof-rolled and inspected by qualified geotechnical engineering personnel prior to the placement of any fill or bedding material. Any loose/soft soils identified at the time of proof-rolling that are unable to be uniformly compacted should be sub-excavated and removed. The excavations created through the removal of these materials should be backfilled with approved engineered fill consistent with the recommendations provided below.

4.2 Frost Penetration

Based on climate data and design charts, the frost penetration depth below the pavement at the site is estimated at 1.4 m.

It is assumed that the pavement structure thickness will be less than 1.4 m, so grading and drainage are important for good pavement performance and life expectancy.

Any services/utilities should be located below this depth or be appropriately insulated.

4.3 Excavations and Shoring

All excavations must be carried out in accordance with the latest edition of the Occupational Health and Safety Act (OHSA). Loose native soils may be classified as Type 4 soils in accordance with the OHSA and may be excavated with unsupported side slopes no steeper than 3H:1V. The generally compact native soils may be classified as Type 3 soils above the

groundwater table in accordance with OHSA and may be excavated with unsupported side slopes no steeper than 1H:1V. Below the groundwater table these soils may be considered Type 4 soils. The dense native soils, generally encountered at greater depths, may be classified as Type 2 soils above the groundwater table in accordance with OHSA. Type 2 soils may be excavated with unsupported side slopes no steeper than 1H:1V within 1.2 m of the base of the excavation. Test excavations should be carried out at the time of construction to assess the soil integrity and water levels to determine any shoring requirements.

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 excavation or if wet conditions are encountered, the side slopes should be flattened as required to maintain safe working conditions or the excavation sidewalls must be fully supported (shored).

Based on bedrock elevation at the site, there will be some need for removal of bedrock in order to properly install the underground services to the required depth. It is understood that excavations will be made to approximately 3.0 mbeg to 3.5 mbeg, and as such up to 2 m of bedrock will need to be removed in some areas, but generally much less. It is possible that near surface weathered bedrock may be scraped off with a large excavator in places, however if the bedrock is massive and unweathered with minimal fractures hoe ramming or blasting of the rock may be required. The Town of Norwood should be consulted prior to either operation to ensure the work falls within their bylaws and that proper monitoring and inspections are completed.

It should be noted that bedrock was not cored or investigated at this site, and subsequently the quality of rock cannot be commented on at this time.

4.3.1 Trench Box

While use of trench boxes is an effective and economical trench-support method, it is not usually intended to shore up or otherwise support trench walls, they are meant to protect workers in case of a cave-in**.** When using the trench boxes, excavation should be done so that the space between the trench box and the excavation is minimized. Any space between the

box and the trench wall needs to be backfilled and the soil compacted. Trench boxes need to be installed expediently.

4.4 Dewatering

Based on the water levels on completion of each borehole and test pit, the elevation of the water table varies over the site from 0.8 mbeg to 4.0 mbeg, but is generally no shallower than 1.5 mbeg.

Assuming that construction of homes is to occur in a dry season, and footings are to be placed above the water table, significant groundwater seepage is not anticipated within the excavation depths. Any seepage within the excavation depths but should be controllable with filtered sumps and pumps and a Permit to Take Water (PTTW) or registry in the Environmental Activity and Sector Registry (EASR) for the Ministry of the Environment, Conservation and Parks (MECP) will not be required.

In the event that homes are to include basements that extend to depths greater than 1.5 mbeg, or in areas identified with locally high groundwater, significant groundwater seepage may occur. Additionally, placement of services is anticipated at a depth of 3 m below final grade, with potential for cuts of up to 2 m, resulting in excavations as deep as 5 m in places, which will result in significant groundwater seepage and a PTTW or registry in the EASR may be required. Further discussion regarding dewatering is provided in the accompanying hydrogeological report.

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

4.5 Backfill and Compaction

Excavated topsoil from the Site is not appropriate for use as fill below grading, roadways and parking areas. Excavated sand and silt soil and imported fill, not containing organics or any other deleterious material, may be appropriate for use as engineered fill, provided that the actual or adjusted moisture content at the time of construction is within a range that permits compaction to required densities. Some moisture content adjustments may be required

depending upon seasonal conditions. Geotechnical inspections and testing of engineered fill are required to confirm acceptable quality.

Any engineered fill below foundations should be placed in lifts appropriate to the type of compaction equipment used on site and be compacted to a minimum of 100% of standard Proctor maximum dry density (SPMDD), as confirmed by nuclear densometer testing. If native soils from the site are not used as engineered fill, imported material for engineered fill should consist of clean, non-organic soils, free of chemical contamination or deleterious material. The moisture content of the engineered fill will need to be close enough to optimum at the time of placement to allow for adequate compaction. Consideration could be given to using a material meeting the specifications of OPSS 1010 Granular B. If conditions are wet at the time of construction, compaction of granular fill may not be possible, and 19 mm diameter crushed clear stone wrapped in a geotextile filter fabric (Terrafix 270R or equivalent) should be used in place of engineered fill. Staged or stepped excavation and placement of the geotextile and clear stone may help limit the requirement for a PTTW or registry in the Environmental Activity and Sector Registry for the MECP.

Foundation wall and any buried utility backfill material should consist of free-draining imported granular material. Most of the native site soils are too fine-grained to provide proper drainage, and as such this should be accomplished using well graded Granular B Type 1 material complying with OPSS 1010. The fill should be placed in maximum 300 mm thick lifts and compacted to a minimum of 95 SPMDD.

The backfill material, if any, in the upper 300 mm below the pavement subgrade elevation should be compacted to 100 percent of SPMDD in all areas.

4.6 Foundation Design – Homes

Assuming that the site is prepared as outlined above, the native sub-soils are competent to support the proposed homes on conventional strip and spread footings but may require deeper excavations and fill in some loose areas. Assuming exterior footings will be placed a minimum of 1.2 m below final grade for frost protection, these footings can be founded on compact native sand and silt soils, at depths and bearing capacities identified in Table 4.

Table 4 Footing Depth and Associated Bearing Capacity

Investigative Area	Surface Elevation (masl)	Estimated Depth of High Groundwater (mbeg/masl)	Minimum Depth to meet 75 kPa SLS (mbeg/masl)	Minimum Depth to meet 150 kPa SLS (mbeg/masl)
BH102-22	205.33	1.5 / 203.83	1.5 / 208.38	2.9 / 202.40
BH103-22	206.1	-	1.5 / 204.60	2.1 / 204.00
BH105-22	202.46	1.5 / 200.96	-	2.1 / 200.36
BH112-22	209.28	0.8 / 208.48	1.5 / 207.78	2.1 / 207.18
TP120-22	203.49	-	1.65 / 201.84	2.1 / 201.39
TP121-22	203.75	3.3 / 200.45	1.95 / 201.80	2.25 / 201.50
TP122-22	208.78	-	2.5 / 206.28	2.8 / 205.98
TP123-22	209.67	-	1.4 / 208.27	2.25 / 207.42
TP128-22	208.28	2.4 / 205.88	1.8 / 206.48	2.4 / 205.88
TP130-22	210.1	1.8 / 208.30	1.95 / 208.15	2.1 / 208.00
TP132-22	209.94	2.4 / 207.54	1.8 / 208.14	1.95 / 207.99
TP133-22	210.92	-	-	1.8 / 209.12
TP137-22	210.37	-	-	1.65 / 208.72
TP139-22	209.92	-	1.8 / 208.12	1.95 / 207.97
TP140-22	209.73	1.95 / 207.68	1.4 / 208.33	1.7 / 208.03
TP141-22	204.86	-	-	2.1 / 202.76

Note: Footings set on soil in areas of boreholes and test pits not shown in Table 4 may be designed to an allowable bearing capacity of 150 kPa (SLS) at frost penetration depth.

Footings situated in areas of borehole and test pits not listed in Table 4 may be designed to an allowable bearing capacity of 150 kPa at SLS and 225 kPa at ULS, at frost penetration depth.

Any required grade raises to the footing elevations 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% of Standard Proctor Maximum Dry Density (SSPMD).

Any footings set in engineered fill extending to undisturbed native soils may be designed to an allowable bearing capacity of 150 kPa at SLS and 225 kPa at ULS.

Settlement potential at the noted SLS loadings is less than 25 mm and differential settlement should be less than 10 mm.

In areas where footings are placed over the transition from native soil to engineered fill the foundation should be reinforced with two 15 M rebar in the footing and at the top of foundation walls.

Bedrock was observed at shallow depths in some areas of the Site and as such, footings should either be placed entirely on bedrock, or entirely on a minimum of 300 mm of competent native soil or engineered fill.

In instances where competent soil is not encountered until greater depths, as is the case with the area of test pit TP130-22, and groundwater conditions are not conducive to support conventional footings at footing elevation, grade beams braced by helical piles or specialized foundation systems such as a Legalett Geo-Slab insulated slab foundation may be used to support homes. Alternatively, provided water infiltration rates are not excessive, excavations for footings may be taken to the required depth and backfilled with clear stone, completely wrapped in geotextile, to the footing elevations. Excavations should be completed in short sections to limit water infiltration and should extend laterally from the edge of the footing a distance equivalent to the thickness of the fill at a minimum. It is recommended that additional testing be conducted in this area to define the extent of the poor soil conditions prior to development.

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.

4.6.1 Floor Slabs

Inorganic native soils or engineered fill are considered competent to support floor slab loads. Subgrade soils should be leveled, proof-rolled and inspected by a geotechnical engineer. Any soft loose areas identified would need to be subexcavated and replaced with compacted engineered fill as discussed in Section 4.5. Given the anticipated subgrade conditions, to create a stable working surface and to distribute loadings, shallow floor slabs should be constructed on a minimum of 200 mm of OPSS Granular A and basement floor slabs should be placed on a minimum of 300 mm of OPSS Granular A, compacted as outlined in Section 4.5.

4.6.2 Subdrainage

The average groundwater table at the Site is designed to be below the footing elevations proposed in Table 4 however, assuming the proposed structures are to have basements,

perimeter subdrains are recommended, given that groundwater conditions on the site may vary seasonally, with the potential for higher groundwater at times. Geotextile wrapped perforated pipe subdrains set in a trench of clear stone and connected to a sump or other appropriate frost-free outlets are recommended for all footings.

4.7 Lateral Earth Pressures

Lateral earth pressure coefficients (K) for foundation and retaining wall design are provided below. It is assumed that potential lateral loads will result from cohesionless, frictional materials, such as well-drained granular backfill.

Ko (at rest)	0.42
Ka (active)	0.27
Kp (passive)	3.7

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)

A unit weight of 22 kN/m^3 should be assumed for compacted granular backfill loadings.

4.8 Buried Utilities

All utilities should be places at a minimum depth of 1.4 mbeg in order to prevent damage to do frost or be adequately insulated. Where required, trench excavations should consider Type 3 soil conditions which allow for excavation side slopes no steeper than 1H:1V. Where unsaturated dense native soil is present Type 2 soil conditions may be present, requiring excavation side slopes no steeper than 1H:1V, beginning at a height of 1.2 m above the floor of the excavation.

4.8.1 Pipe Bedding and Cover

Bedding and cover material for watermains and sanitary systems should consist of OPSS 1010 Granular A, placed in accordance with pertinent Ontario Provincial Standard Drawings (OPSD 802), as per the Township of Asphodel and Norwood's Water and Wastewater Systems Design Standards – Rev 1, dated 05/02/2021. 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.

Service connection trenches that have a trench bed sloping down from the main trench may require the installation of an appropriate clay plug, or similar solution, to prevent the flow of ground water from the trench towards the abutting properties.

4.9 Roadway Design Recommendations

The performance of the pavement is dependent upon proper subgrade preparation. All topsoil and organic materials should be removed down to native sand and silt material and backfilled with approved engineered fill or native material, compacted to 98% SPMDD. The subgrade should be 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% SPMDD.

To completely protect against damage due to frost heaving, excavations would have to be made to the maximum frost penetration depth, below ground water elevations, and backfilled with free-draining granular material. In order to reduce costs an alternative pavement structure design is proposed. It should be noted that while the designs presented will provide adequate support for the intended use, some minor frost heaving could persist, resulting in minor degradation and minimal annual maintenance.

The recommended pavement structure design for the proposed internal roads has been developed based on a subgrade with moderate to high amounts frost susceptible fines. The pavement structure assumes all roads will be low volume residential roadways. The recommended minimum pavement structure is provided in Table 5.

Table 5 Recommended Minimum Pavement Structure

Pavement Layer	Residential Roads
Surface Course Asphalt	40 mm HL3 or HL4
Binder Course Asphalt	50 mm HL8
Granular Base	150 mm OPSS 1010 Granular A
Granular Subbase	400 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 200 mm maximum loose lifts and compacted to at least 98% of SPMDD (ASTM D698) standard. The granular materials specified should conform to OPSS standards, as confirmed by appropriate materials testing.

The final asphalt surface should be sloped at a minimum of 2% to shed runoff. Any abutting pavements should be saw cut to provide clean vertical joints with new pavement areas.

4.10 Design Review and Inspections

Test excavations should be advanced throughout the Site, prior to construction, to compare findings to those observed in this report. Should soil or groundwater conditions change drastically from this report, a qualified geotechnical engineer should be consulted.

Testing and inspections should be carried out during construction operations to examine and approve subgrade conditions, placement and compaction of fill materials, and dewatering requirements. Concrete used during construction should also be tested for slump, air entrainment and compressive strength.

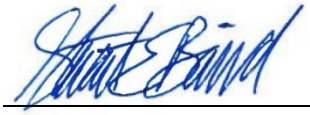
We should be contacted to review and approve design drawings, prior to tendering or commencing construction, to ensure that all pertinent geotechnical-related factors have been addressed. It is important that onsite geotechnical supervision be provided at this site for excavation and backfill procedures,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

5.0 Closing

We trust the information in this report is sufficient for your current needs. If you have questions or comments regarding this document, please do not hesitate to contact Mr. Baird or Mr. Peterkin at (705) 742-7900 ext. 332 or 301.

Respectfully submitted,

Cambium Inc.



Stuart Baird, M.Eng., P.Eng.
General Manager - Geotechnical

Brian Peterkin, M.Eng., P.Geo.
Senior Project Manager

SEB/BP/jfr

\\camfile\Projects\14200 to 14299\14288-003 CAP Norwood Dev - HydroG GEO ESA - 42 & 52 Mill St, Norwood\Deliverables\REPORT - Geotech\Final\REV 1 - 2022-06-22 RPT Norwood Res Dev Geotech (14288-003).docx

6.0 Standard 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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The findings and results presented in reports prepared by Cambium are based on the materials and information provided by the client to Cambium and on the facts, conditions and circumstances encountered by Cambium during the performance of the work requested by the client. In formulating its findings and results into a report, Cambium assumes that the information and materials provided by the client or obtained by Cambium from the client or otherwise are factual, accurate and represent a true depiction of the circumstances that exist. Cambium relies on its client to inform Cambium if there are changes to any such information and materials. Cambium does not review, analyze or attempt to verify the accuracy or completeness of the information or materials provided, or circumstances encountered, other than in accordance with applicable accepted industry practice. Cambium will not be responsible for matters arising from incomplete, incorrect or misleading information or from facts or circumstances that are not fully disclosed to or that are concealed from Cambium during the provision of services, work or reports.

Facts, conditions, information and circumstances may vary with time and locations and Cambium's work is based on a review of such matters as they existed at the particular time and location indicated in its reports. No assurance is made by Cambium that the facts, conditions, information, circumstances or any underlying assumptions made by Cambium in connection with the work performed will not change after the work is completed and a report is submitted. If any such changes occur or additional information is obtained, Cambium should be advised and requested to consider if the changes or additional information affect its findings or results.

When preparing reports, Cambium considers applicable legislation, regulations, governmental guidelines and policies to the extent they are within its knowledge, but Cambium is not qualified to advise with respect to legal matters. The presentation of information regarding applicable legislation, regulations, governmental guidelines and policies is for information only and is not intended to and should not be interpreted as constituting a legal opinion concerning the work completed or conditions outlined in a report. All legal matters should be reviewed and considered by an appropriately qualified legal practitioner.

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.

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Personal Liability

The client expressly agrees that Cambium employees shall have no personal liability to the client with respect to a claim, whether in contract, tort and/or other cause of action in law. Furthermore, the client agrees that it will bring no proceedings nor take any action in any court of law against Cambium employees in their personal capacity.

Appended Figures

GEOTECHNICAL INVESTIGATION

CAP NORWOOD DEVELOPMENTS INC
52 Mill Street
Norwood, Ontario

LEGEND

- Benchmark
- Borehole
- Monitoring Well
- Test Pit
- Railroad
- Site (approximate)

Notes:
- BM1-22 is the top nut of a fire hydrant with a given elevation of 100 m rel.
- BM2-22 is the top nut of a fire hydrant with an elevation of 97.84 m rel. relative to BM1-22.
- Overlay was obtained from RFA Planning Consultant Inc. Job No. 852. Development Concept for Draft Plan of Subdivision, dated Nov 6, 2023
- 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.

194 Sophia Street
Peterborough, Ontario, K9H 1E5
Tel: (705) 742.7900 Fax: (705) 742.7907
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BOREHOLE LOCATION PLAN

Project No.:	14288-003	Date:	May 2022
		Rev.:	
Scale:	1:5,000	Projection:	NAD 1983 UTM Zone 18N
Created by:	PAS	Checked by:	BP
Figure:	2		

O:\GIS\MXDs\14200-14299\14288-003 CAP Norwood Dev - HydroG GEO ESA - 42 & 52 Mill St, Norwood\2022-05-04 FIG 2 Borehole Location Plan.mxd

Appendix A

Borehole Logs & Test Pit Logs

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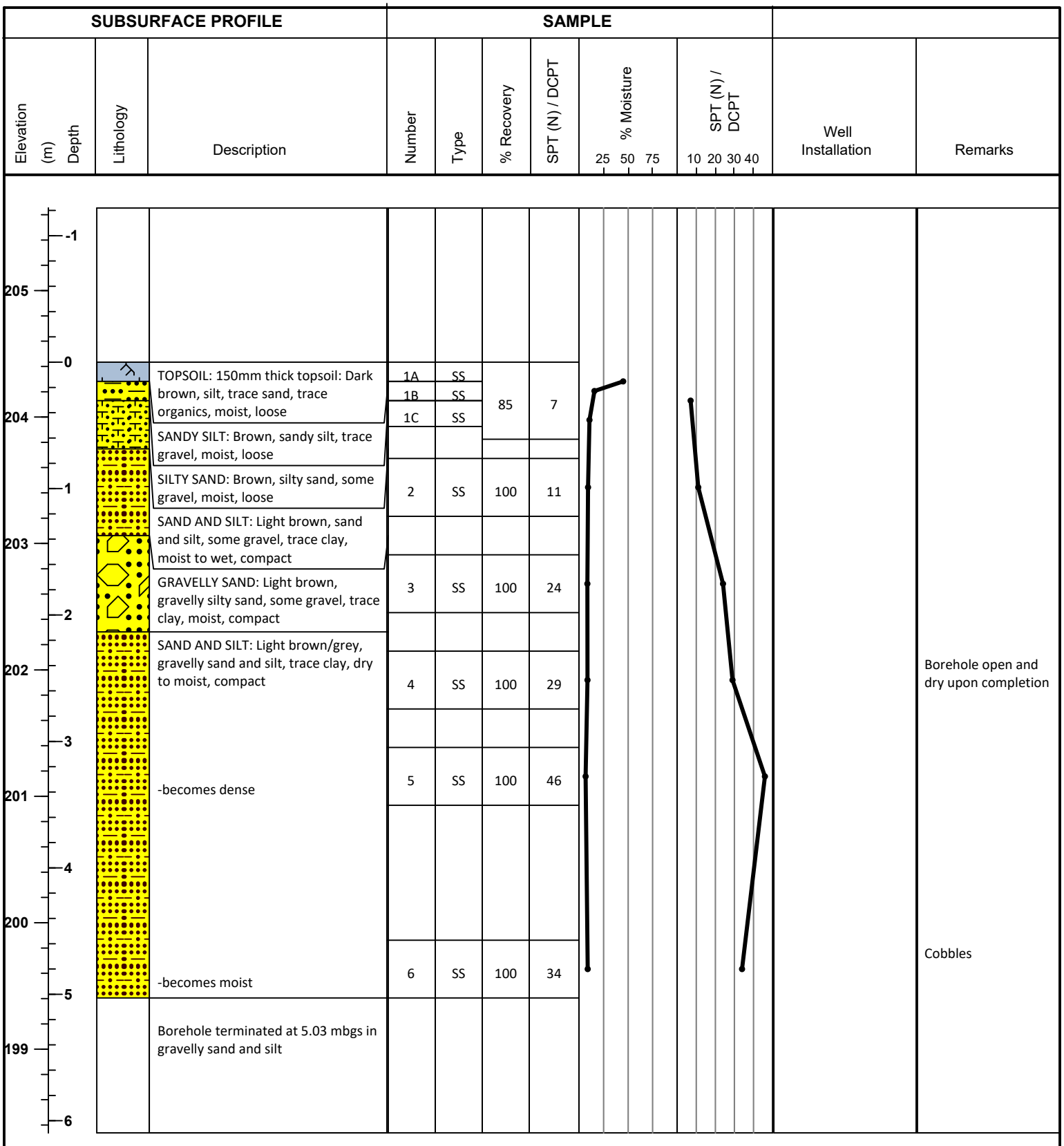
Log of Borehole: BH101-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 20, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263264.8937 E, 4919157.519 N	**Elevation:**	204.434 masl



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Log of Borehole: BH102-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 20, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263372.1357 E, 4919103.341 N	**Elevation:**	205.325 masl

SUBSURFACE PROFILE			SAMPLE							
Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N) / DCPT	% Moisture (25 50 75)	SPT (N) / DCPT (10 20 30 40)	Well Installation	Remarks
206 / -1										
205 / 0		TOPSOIL: 300mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, loose	1A	SS	75	4				
			1B	SS						
		SILTY SAND: Brown, silty sand, trace clay, moist, loose								
204 / -1			2	SS	80	6				
			3A	SS						
		SILT: Brown, silt, some clay, trace sand, moist to wet, loose	3B	SS	100	5				Groundwater first encountered at 1.52 mbgs
203 / -2										
			4	SS	100	7				SS4 GSA: 0% gravel 3% sand 86% silt 11% clay
										Water level upon completion at 3.05 mbgs
202 / -3		GRAVELLY SAND: Brown, gravelly silty sand, trace clay, moist to wet, very dense	5	SS	100	50/50				
		Borehole terminated at 3.05 mbgs on presumed bedrock								Borehole open upon completion
201 / -4										
200 / -5										
-6										

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Log of Borehole: BH103-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 20, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263401.7241 E, 4919213.468 N	**Elevation:**	206.096 masl

SUBSURFACE PROFILE			SAMPLE							
Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N) / DCPT	% Moisture (25 50 75)	SPT (N) / DCPT (10 20 30 40)	Well Installation	Remarks
207 / -1										
206 / 0		TOPSOIL: 100mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, loose	1A 1B	SS SS	50	5				
		SILTY SAND: Brown, silty sand, trace clay, trace organics, moist, loose								
205 / -1		-no organics	2	SS	80	4				
		SILT: Brown, silt, some clay, trace sand, moist to wet, loose	3	SS	100	5				
204 / -2		SILT AND SAND: Light brown, silt and sand, trace clay, moist to wet, compact	4	SS	100	19				
203 / -3		SILT AND SAND: Light brown, gravelly silt and sand, trace clay, moist, dense -becomes grey	5	SS	80	34				Borehole open and dry upon completion
202 / -4		SILT AND SAND: Grey, gravelly silt and sand, trace clay, dry to moist, dense	6	SS	80	46				
201 / -5		Borehole terminated at 5.03 mbgs in gravelly silt and sand								
200 / -6										

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Log of Borehole: BH104-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 20, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263527.4327 E, 4919126.817 N	**Elevation:**	208.934 masl

SUBSURFACE PROFILE			SAMPLE								
Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N) / DCPT	% Moisture (25 50 75)	SPT (N) / DCPT (10 20 30 40)	Well Installation	Remarks
210 / -1										
209 / 0		TOPSOIL: 600mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, loose	1	SS	50	4			Cap	
208 / 1		GRAVELLY SAND: Light brown/grey, gravelly silty sand, trace clay, moist, dense	2	SS	60	43			Pipe; Bentonite Plug	No water level detected when measured on May 4, 2022
207 / 2		SAND AND SILT: Grey, sand and silt, some clay, some gravel, moist, compact	3	SS	100	15				SS3 GSA: 10% gravel 42% sand 35% silt 13%clay
206 / 3		SAND AND SILT: Grey, gravelly sand and silt, some clay, moist, dense	4	SS	100	46			Sand Pack; PVC Screen	Borehole open and dry upon completion
			5	SS	100	50/100			Cap	
205 / 4		Borehole terminated at 3.2 mbgs on presumed bedrock								
204 / 5										
203 / 6										

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Log of Borehole: BH105-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 21, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263261.4148 E, 4919290.377 N	**Elevation:**	202.457 masl

SUBSURFACE PROFILE			SAMPLE							
Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N) / DCPT	% Moisture (25 50 75)	SPT (N) / DCPT (10 20 30 40)	Well Installation	Remarks
203 / -1										
202 / 0		TOPSOIL: 225 mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, loose	1A	SS	75	4			Cap	
			1B	SS						
		SANDY SILT: Brown, sandy silt, trace clay, moist, loose							Pipe	
201 / 1		SANDY SILT: Light brown, sandy silt, trace clay, moist to wet, loose	2	SS	100	4			Bentonite Plug	
		-becomes very loose, wet	3	SS	90	3				Groundwater first encountered at 1.52 mbgs
200 / 2		-becomes compact	4A	SS	80	37			Sand Pack	SS3 GSA: 0% gravel 28% sand 72% silt & clay
		SAND AND SILT: Grey, gravelly sand and silt, moist to wet, dense	4B	SS					PVC Screen	Water level measured at 2.72 mbgs on May 4, 2022
199 / 3		-becomes saturated	5	SS	40	29				Water level upon completion at 3.05 mbgs
198 / 4		Borehole terminated at 4.42 mbgs on presumed bedrock							Cap	Borehole caving occurred up to 4.11 mbgs upon completion
197 / 5										
197 / 6										

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Log of Borehole: BH106-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 21, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263380.2677 E, 4919466.901 N	**Elevation:**	208.343 masl

SUBSURFACE PROFILE			SAMPLE							
Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N) / DCPT	% Moisture (25 50 75)	SPT (N) / DCPT (10 20 30 40)	Well Installation	Remarks
208.343 / 0		TOPSOIL: 300mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, loose	1A	SS	75	4				
			1B	SS						
207.743 / 0.6		SANDY SILT: Brown, sandy silt, trace clay, moist, loose	2A	SS	80	16				
			2B	SS						
206.943 / 1.4		SAND AND SILT: Light brown, gravelly sand and silt, moist, compact	3	SS	80	41				
205.743 / 2.6		-becomes dense	4	SS	60	54				
204.743 / 3.6		-becomes dry to moist, very dense	5	SS	50	50/425				Borehole open and dry upon completion
203.773 / 4.57		Borehole terminated at 4.57 mbgs on presumed bedrock	6	SS	100	50/50				

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Log of Borehole: BH107-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 21, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263454.8087 E, 4919307.502 N	**Elevation:**	204.314 masl

SUBSURFACE PROFILE			SAMPLE							
Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N) / DCPT	% Moisture (25 50 75)	SPT (N) / DCPT (10 20 30 40)	Well Installation	Remarks
205 / -1										
204 / 0		TOPSOIL: 300mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, very loose	1A	SS	85	3				
			1B	SS						
		SANDY SILT: Brown, sandy silt, trace clay, moist, very loose								
203 / -1		SILT: Light brown, silt, some sand, some clay, moist to wet, loose	2A	SS	100	8				
			2B	SS						
		SANDY SILT: Light brown, sandy silt, trace clay, moist to wet, compact	3	SS	100	18				SS3 GSA: 0% gravel 28% sand 72% silt & clay
202 / -2			4	SS	100	21				Borehole open upon completion
201 / -3		-sand becomes coarser	5	SS	100	17				
200 / -4		-trace gravel, wet, very dense	6	SS	100	50/75				Groundwater first encountered at 4.42 mbgs
		Borehole terminated at 4.42 mbgs on presumed bedrock								Water level upon completion at 4.42 mbgs
199 / -5										
-6										

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Log of Borehole: BH108-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 21, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263506.3392 E, 4919437.261 N	**Elevation:**	210.409 masl

SUBSURFACE PROFILE			SAMPLE							
Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N) / DCPT	% Moisture (25 50 75)	SPT (N) / DCPT (10 20 30 40)	Well Installation	Remarks
211 / -1										
210 / 0		TOPSOIL: 300mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, very loose	1A	SS	75	3				
			1B	SS						
		SANDY SILT: Brown, sandy silt, trace clay, moist, very loose								
209 / -1		SAND AND SILT: Light brown, gravelly sand and silt, trace clay, moist, compact	2	SS	80	20				
										Groundwater first encountered at 1.52 mbgs
208 / -2		-becomes wet	3	SS	80	13				Water level upon completion at 2.13 mbgs
			4	SS	60	14				
207 / -3		-becomes saturated	5	SS	50	13				
206 / -4										Borehole open upon completion
		-becomes very dense	6	SS	100	50/100				
205 / -5		Borehole terminated at 4.67 mbgs on presumed bedrock								
-6										

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Log of Borehole: BH109-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 21, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263498.4301 E, 4919578.083 N	**Elevation:**	209.636 masl

SUBSURFACE PROFILE			SAMPLE							
Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N) / DCPT	% Moisture (25 50 75)	SPT (N) / DCPT (10 20 30 40)	Well Installation	Remarks
210 / 0		TOPSOIL: 150mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, very loose	1A	SS						
			1B	SS	75	3				
209 / 1		SILTY SAND: Brown, silty sand, trace clay, moist, very loose								
		SILT AND SAND: Brown, silt and sand, trace clay, moist to wet, very loose	2A	SS						
			2B	SS	60	1				
208 / 2		SAND AND SILT: Light brown, gravelly sand and silt, moist, compact	3	SS	100	27				SS3 GSA: 21% gravel 40% sand 39% silt & clay
207 / 3		-becomes very dense	4	SS	70	51				
			5	SS	100	60				
206 / 4										
205 / 5			6	SS	100	50/ 275				Borehole open and dry upon completion
204 / 6		Borehole terminated at 4.88 mbgs on presumed bedrock								

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Log of Borehole: BH110-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 21, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263594.2056 E, 4919677.787 N	**Elevation:**	209.735 masl

SUBSURFACE PROFILE			SAMPLE							
Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N) / DCPT	% Moisture (25 50 75)	SPT (N) / DCPT (10 20 30 40)	Well Installation	Remarks
210 / 0		TOPSOIL: 200mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, loose	1A	SS	65	4				
			1B	SS						
209 / 1		SANDY SILT: Brown, sandy silt, trace clay, moist, loose								
		SILTY SAND: Brown, silty sand, trace clay, moist, loose	2A	SS	100	5				
		SILT: Brown, silt, some sand, some clay, moist to wet, loose	2B	SS						
208 / 2			3A	SS	85	13				
		SILTY SAND: Light brown, silty sand, trace clay, trace gravel, moist to wet, compact	3B	SS						
		GRAVELLY SAND: Light brown, gravelly silty sand, trace clay, moist to wet, dense	4	SS	60	36				
207 / 3			5	SS	100	48				Borehole open and dry upon completion
206 / 4		Borehole terminated at 3.96 mbgs on presumed bedrock								
205 / 5										
204 / 6										

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Log of Borehole: BH111-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 21, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T263661.3887 E, 4919579.516 N	**Elevation:**	210.205 masl

SUBSURFACE PROFILE			SAMPLE							
Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N) / DCPT	% Moisture (25 50 75)	SPT (N) / DCPT (10 20 30 40)	Well Installation	Remarks
211 / -1										
210 / 0		TOPSOIL: 150mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, loose	1A 1B 1C	SS SS SS	85	7				
		SILTY SAND: Brown, silty sand, trace clay, moist to wet, loose								
209 / 1		GRAVELLY SAND: Brown, gravelly silty sand, trace clay, moist to wet, compact	2	SS	80	45				SS2 GSA: 27% gravel 44% sand 24% silt 5%clay
		-becomes moist, dense								
208 / 2		-becomes light brown, moist to wet, very dense	3	SS	30	70				Water level upon completion at 1.83 mbgs
		-becomes dense	4	SS	20	30				
207 / 3		-becomes very dense	5	SS	100	50/ 400				Groundwater first encountered at 3.05 mbgs
206 / 4										Borehole open upon completion
205 / 5		Borehole terminated at 4.88 on presumed bedrock	6	SS	100	50/ 275				
/ 6										

Logged By: J. Riseling **Input By:** J. Riseling

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Log of Borehole: BH112-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 21, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263763.0134 E, 4919801.271 N	**Elevation:**	209.28 masl

Elevation (m) / Depth	Description	Number	Type	% Recovery	SPT (N) / DCPT	Well Installation	Remarks
210 / -1							
209 / 0	TOPSOIL: 200mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, very loose	1A	SS	85	3	Cap	Groundwater first encountered at 0.76 mbgs
		1B	SS			Pipe	
	SANDY SILT: Brown, sandy silt, trace clay, moist, very loose					Bentonite Plug	Water level upon completion at 0.76 mbgs
208 / 1	SILTY SAND: Brown, silty sand, wet, loose	2	SS	100	4		
	SILT: Brown, silt, some sand, some clay, wet, loose	3A	SS	50	5		Water level measured at 1.24 mbgs on May 4, 2022
207 / 2	SILTY SAND: Brown, silty sand, trace clay, wet, loose	3B	SS			Sand Pack	
	GRAVELLY SAND: Brown, gravelly silty sand, trace clay, saturated, very dense	4	SS	40	50/ 375	PVC Screen	
206 / 3	Borehole terminated at 2.67 mbgs on presumed bedrock					Cap	Borehole caving occurred up to 2.59 mbgs upon completion
205 / 4							
204 / 5							
/ 6							

% Moisture: 25 50 75

SPT (N) / DCPT: 10 20 30 40

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Log of Borehole: BH113-22

Client: CAP Norwood Dev
Contractor: Canadian Environmental
Location: 42 Mill Street, Norwood

Project Name: 42 & 52 Mill Street, Norwood
Method: Solid Stem Auger
UTM: 18T 263859.3257 E, 4919563.455 N

Project No.: 14288-003
Date Completed: April 20, 2022
Elevation: 211.703 masl

Depth (m)	Description (Subsurface Profile)	Sample Number	Type	% Recovery	SPT (N) / DCPT	Remarks
0	TOPSOIL: 300mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, very loose	1A	SS	80	3	
	SANDY SILT: Brown, sandy silt, trace clay, moist, very loose	1B	SS			
	GRAVELLY SAND: Grey, gravelly silty sand, dry to moist, dense	2	SS	50	38	
	-becomes very dense	3	SS	70	50/ 400	Borehole open and dry upon completion
1.98	Borehole terminated at 1.98 mbgs on presumed bedrock					

Columns: Elevation (m) / Depth; Lithology; Description; Number; Type; % Recovery; SPT (N) / DCPT; % Moisture (25 50 75); SPT (N) / DCPT (10 20 30 40); Well Installation; Remarks

Elevation scale: 212, 211, 210, 209, 208, 207, 206
Depth scale: -1, 0, 1, 2, 3, 4, 5, 6

Logged By: J. Riseling
Input By: J. Riseling

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Log of Borehole: BH114-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 20, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263757.541 E, 4919417.733 N	**Elevation:**	213.015 masl

SUBSURFACE PROFILE			SAMPLE								
Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N) / DCPT	% Moisture (25 50 75)	SPT (N) / DCPT (10 20 30 40)	Well Installation	Remarks
214 / -1										
213 / 0		TOPSOIL: 100mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, loose	1A 1B	SS SS	50	16				
		GRAVELLY SAND: Brown/grey, gravelly silty sand, dry to moist, compact								
212 / -1		-becomes very dense	2	SS	60	50/ 275				
			3	SS	85	58				
211 / -2										
			4	SS	100	50/ 100				
210 / -3										
			5	SS	80	50/ 250				Borehole open and dry upon completion
209 / -4		Borehole terminated at 3.5 mbgs on presumed bedrock								
208 / -5										
207 / -6										

Logged By: J. Riseling **Input By:** J. Riseling

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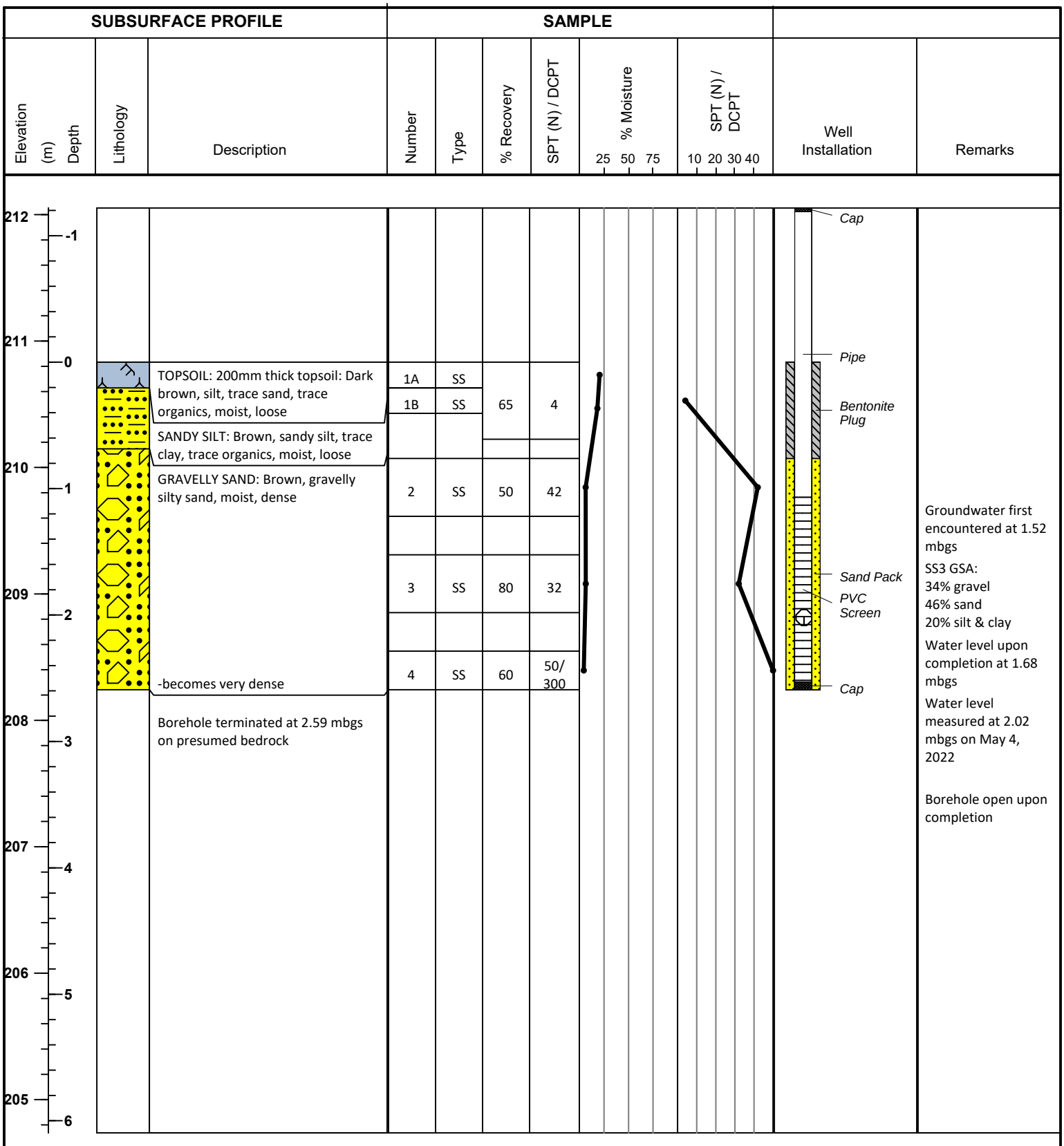
Log of Borehole: BH115-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 20, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263931.2517 E, 4919417.57 N	**Elevation:**	210.833 masl



Logged By: J. Riseling **Input By:** J. Riseling

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Log of Borehole: BH116-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 20, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263788.3967 E, 4919215.355 N	**Elevation:**	210.406 masl

SUBSURFACE PROFILE			SAMPLE								
Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N) / DCPT	% Moisture (25 50 75)	SPT (N) / DCPT (10 20 30 40)	Well Installation	Remarks
211 / -1										
210 / 0		TOPSOIL: 150mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, loose	1A 1B	SS SS	60	7				
		SILTY SAND: Brown, silty sand, trace gravel, trace clay, moist, loose -becomes compact	2A 2B	SS SS	67	10				
209 / 1		GRAVELLY SAND: Brown, gravelly sand, some silt, trace clay, moist, dense	3	SS	100	42				
208 / 2		GRAVEL: Grey, gravel, some sand, some silt, dry, very dense	4A 4B	SS SS	50	50/ 275				Borehole open and dry upon completion
207 / 3		Borehole terminated at 2.59 mbgs on presumed bedrock								
206 / 4										
205 / 5										
6										

Logged By: J. Riseling **Input By:** J. Riseling

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Log of Borehole: BH117-22

Client:	CAP Norwood Dev	**Project Name:**	42 & 52 Mill Street, Norwood	**Project No.:**	14288-003
Contractor:	Canadian Environmental	**Method:**	Solid Stem Auger	**Date Completed:**	April 20, 2022
Location:	42 Mill Street, Norwood	**UTM:**	18T 263640.3596 E, 4919276.71 N	**Elevation:**	210.34 masl

SUBSURFACE PROFILE			SAMPLE							
Elevation (m) / Depth	Lithology	Description	Number	Type	% Recovery	SPT (N) / DCPT	% Moisture (25 50 75)	SPT (N) / DCPT (10 20 30 40)	Well Installation	Remarks
211 / -1										
210 / 0		TOPSOIL: 200mm thick topsoil: Dark brown, silt, trace sand, trace organics, moist, very loose	1A	SS	80	3				
			1B	SS						
		SILTY SAND: Brown, silty sand, trace clay, moist, loose								
209 / 1			2	SS	100	4				
		GRAVELLY SAND: Brown, gravelly sand, some silt, trace clay, moist, compact	3	SS	80	17				SS3 GSA: 20% gravel 65% sand 15% silt & clay
208 / 2		SILT: Brown, silt, some clay, some sand, some gravel, moist to wet, loose	4	SS	100	9				Groundwater first encountered at 2.29 mbgs
207 / 3		GRAVELLY SAND: Brown, gravelly silty sand, trace clay, moist to wet, compact	5	SS	80	29				
206 / 4		-becomes very dense	6	SS	10	50/50				Water level upon completion at 4.57 mbgs
205 / 5		Borehole terminated at 4.63 mbgs on presumed bedrock								Borehole open upon completion
-6										

Logged By: J. Riseling **Input By:** J. Riseling

TABLE 1: TEST PIT LOGS
42 & 52 Mill Street, Norwood
Technician: Josh Riseling
Cambium Reference No. 14288-003
Completed: April 26 & 27, 2022

Test Pit ID	Depth (mbgs[1])	Soil Sample	% Moisture	Material Description	Depth (m)	DPT[2] (Blows/150 mm)
					0.15	2
	0-0.15	GS1		150 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	4
TP118-22	0.15-0.75	GS2		Brown, SILTY SAND, trace clay, moist	0.45	6
	0.75-1.5	GS3		Light brown, GRAVELLY SILTY SAND, trace clay	0.6	8
18T 263459.2299 E	1.5-2.4	GS4		Same as above	0.75	6
4919096.046 N	2.4-3.0	GS5		Same as above	0.9	10
					1.05	17
206.812 masl					1.2	22
				Test pit terminated at 3.0 mbgs in gravelly silty sand	1.35	4
				No groundwater or caving observed upon completion	1.5	12
					1.65	50
					0.15	2
	0-0.3	GS1		300 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	5
TP119-22	0.3-1.2	GS2		Light brown, SILTY SAND, trace clay, moist	0.45	7
	1.2-2.1	GS3		Light brown, GRAVELLY SILTY SAND, moist	0.6	6
18T 263307.8794 E	2.1-3.0	GS4		Same as above	0.75	6
4919249.476 N	3.3			Bedrock	0.9	8
					1.05	9
203.588 masl					1.2	13
				Test pit terminated at 3.3 mbgs on bedrock	1.35	4
				No groundwater or caving observed upon completion	1.5	16
					1.65	22
					1.8	28
					1.95	27
					2.1	35
					2.25	50
					0.15	1
	0-0.15	GS1		150 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	3
TP120-22	0.15-0.9	GS2		Brown, SILTY SAND, trace clay, moist	0.45	6
	0.9-1.5	GS3		Brown, SILTY SAND, some clay, moist to wet	0.6	7
18T 263381.7756 E	1.5-2.1	GS4		Light brown, SILTY SAND, some gravel, trace clay, moist	0.75	8
4919293.79 E	2.1-3.0	GS5		Light brown, GRAVELLY SILTY SAND, trace clay, moist	0.9	9
					1.05	10
203.488 masl					1.2	8
				Test pit terminated at 3.0 mbgs in gravelly silty sand	1.35	2
				No groundwater or caving observed upon completion	1.5	4
					1.65	11
					1.8	11
					1.95	10
					2.1	28
					2.25	39
					2.4	48

1. mbgs = metres below ground surface
2. Dynamic probe penetration test, consisting of driving a 19 mm diameter steel rod 150 mm into the soil with an 8 kg hammer falling 750 mm.

TABLE 1: TEST PIT LOGS
42 & 52 Mill Street, Norwood
Technician: Josh Riseling
Cambium Reference No. 14288-003
Completed: April 26 & 27, 2022

Test Pit ID	Depth (mbgs[1])	Soil Sample	% Moisture	Material Description	Depth (m)	DPT[2] (Blows/150 mm)
					0.15	1
	0-0.15	GS1		150 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	3
TP121-22	0.15-0.75	GS2		Brown, SILTY SAND, trace clay, moist	0.45	6
	0.75-1.5	GS3		Brown, SILTY SAND, some clay, moist to wet	0.6	8
18T 263323.0037 E	1.5-2.4	GS4		Light brown/grey, SILTY SAND, some clay, moist	0.75	9
4919401.899 N	2.4-3.0	GS5		Same as above, trace gravel	0.9	10
					1.05	13
203.75 masl					1.2	15
				Test pit terminated at 3.6 mbgs in silty sand	1.35	1
				Groundwater seepage observed at 3.3 mbgs	1.5	3
				Water level observed at 3.6 mbgs upon completion	1.65	4
				Sidewall caving observed at 3.3 mbgs	1.8	5
					1.95	9
					2.1	17
					2.25	30
					2.4	38
					0.15	2
	0-0.2	GS1		200 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	5
TP122-22	0.2-1.2	GS2		Light brown, SILTY SAND, trace clay, moist	0.45	5
	1.2-2.25	GS3		Same as above	0.6	7
18T 263435.1018 E	2.25-3.0	GS4		Light brown, GRAVELLY SILTY SAND, moist	0.75	8
4919413.538 N					0.9	6
					1.05	5
208.78 masl				Test pit terminated at 3.0 mbgs in gravelly silty sand	1.2	5
				No groundwater observed upon completion	1.35	1
				Sidewall caving observed at 0.9 mbgs	1.5	1
					1.65	1
					1.8	1
					1.95	1
					2.1	1
					2.25	1
					2.4	21

1. mbgs = metres below ground surface
2. Dynamic probe penetration test, consisting of driving a 19 mm diameter steel rod 150 mm into the soil with an 8 kg hammer falling 750 mm.

TABLE 1: TEST PIT LOGS
42 & 52 Mill Street, Norwood
Technician: Josh Riseling
Cambium Reference No. 14288-003
Completed: April 26 & 27, 2022

Test Pit ID	Depth (mbgs[1])	Soil Sample	% Moisture	Material Description	Depth (m)	DPT[2] (Blows/150 mm)
					0.15	2
	0-0.2	GS1		200 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	5
TP123-22	0.2-0.6	GS2		Brown, SAND, some silt, some gravel, moist	0.45	8
	0.6-1.5	GS3		Light brown, SAND, some silt, trace gravel, moist	0.6	8
18T 263570.6278 E	1.5-2.4	GS4		Brown, GRAVELLY SAND, some silt, moist	0.75	7
4919349.463 N	2.4-3.0	GS5		Same as above	0.9	5
					1.05	12
209.674 masl					1.2	22
				Test pit terminated at 3.0 mbgs in gravelly sand	1.35	3
				No groundwater or caving observed upon completion	1.5	9
					1.65	11
					1.8	13
					1.95	13
					2.1	17
					2.25	39
					2.4	50
					0.15	3
	0-0.3	GS1		300 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	9
TP124-22	0.3-1.2	GS2		Light brown, GRAVELLY SILTY SAND, trace clay, moist	0.45	39
	1.2-2.1	GS3		Same as above	0.6	50
18T 263487.625 E	2.1-3.0	GS4		Same as above	0.75	
4919227.613 N					0.9	
					1.05	
205.446 masl				Test pit terminated at 3.0 mbgs in gravelly silty sand	1.2	
				No groundwater or caving observed upon completion	1.35	4
					1.5	20
					1.65	50
					0.15	1
	0-0.3	GS1		300 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	2
TP125-22	0.3-1.2	GS2		Light brown, GRAVELLY SILTY SAND, trace clay, moist	0.45	2
	1.2-2.1	GS3		Same as above	0.6	4
18T 263587.5195 E	2.1-3.0	GS4		Same as above	0.75	11
4919198.145 N					0.9	50
					1.05	
208.502 masl				Test pit terminated at 3.0 mbgs in gravelly silty sand	1.2	
				No groundwater or caving observed upon completion	1.35	9
					1.5	42
					1.65	50

1. mbgs = metres below ground surface
2. Dynamic probe penetration test, consisting of driving a 19 mm diameter steel rod 150 mm into the soil with an 8 kg hammer falling 750 mm.

TABLE 1: TEST PIT LOGS
42 & 52 Mill Street, Norwood
Technician: Josh Riseling
Cambium Reference No. 14288-003
Completed: April 26 & 27, 2022

Test Pit ID	Depth (mbgs[1])	Soil Sample	% Moisture	Material Description	Depth (m)	DPT[2] (Blows/150 mm)
					0.15	1
	0-0.15	GS1		150 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	2
TP126-22	0.15-0.9	GS2		Brown, SILTY SAND, trace clay, trace organics, moist	0.45	2
	0.9-1.5	GS3		Light brown, SAND, some silt, trace clay, moist	0.6	2
18T 263673.8582 E	1.5-2.4	GS4		Light brown, GRAVELLY SILTY SAND, moist	0.75	3
4919184.81 N	2.4-3.0	GS5		Same as above	0.9	4
					1.05	3
211.056 masl					1.2	4
				Test pit terminated at 3.0 mbgs in gravelly silty sand	1.35	3
				No groundwater or caving observed upon completion	1.5	11
					1.65	29
					1.8	50
					0.15	2
	0-0.15	GS1		150 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	4
TP127-22	0.15-0.75	GS2		Brown, SILTY SAND, trace clay, trace organics, moist	0.45	6
	0.75-1.65	GS3		Light brown, SAND, some silt, trace clay, moist	0.6	6
18T 263736.9108 E	1.65-2.55	GS4		Light brown, GRAVELLY SILTY SAND, moist	0.75	6
4919266.591 N					0.9	7
					1.05	5
208.81 masl				Test pit terminated at 2.55 mbgs on bedrock	1.2	5
				No groundwater or caving observed upon completion	1.35	8
					1.5	50
					0.15	2
	0-0.2	GS1		200 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	4
TP128-22	0.2-0.9	GS2		Brown, SANDY SILT, trace clay, moist	0.45	5
	0.9-1.5	GS3		Brown, SILTY SAND, trace clay, moist to wet	0.6	6
18T 263669.5935 E	1.5-2.4	GS4		Light brown, GRAVELLY SILTY SAND, moist to wet	0.75	9
4919343.14 N	2.4-3.0	GS5		Same as above	0.9	10
					1.05	12
208.276 masl					1.2	11
				Test pit terminated at 3.0 mbgs in gravelly silty sand	1.35	2
				Groundwater seepage observed at 2.4 mbgs	1.5	4
				Water level observed at 2.55 mbgs upon completion	1.65	5
				Sidewall caving observed at 0.9 mbgs	1.8	12
					1.95	17
					2.1	7
					2.25	15
					2.4	50

1. mbgs = metres below ground surface
2. Dynamic probe penetration test, consisting of driving a 19 mm diameter steel rod 150 mm into the soil with an 8 kg hammer falling 750 mm.

TABLE 1: TEST PIT LOGS
42 & 52 Mill Street, Norwood
Technician: Josh Riseling
Cambium Reference No. 14288-003
Completed: April 26 & 27, 2022

Test Pit ID	Depth (mbgs[1])	Soil Sample	% Moisture	Material Description	Depth (m)	DPT[2] (Blows/150 mm)
					0.15	2
	0-0.3	GS1		300 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	7
TP129-22	0.3-0.9	GS2		Brown, SILTY SAND, trace clay, moist	0.45	8
	0.9-1.5	GS3		Brown, SILT AND SAND, trace clay, moist	0.6	12
18T 263689.7605 E	1.5-2.4	GS4		Light brown, GRAVELLY SILTY SAND, moist to wet	0.75	18
4919465.412 N	2.4-3.0	GS5		Same as above, wet	0.9	14
					1.05	13
210.846 masl					1.2	14
				Test pit terminated at 3.0 mbgs in gravelly silty sand	1.35	5
				Groundwater seepage observed at 2.4 mbgs	1.5	15
				Water level observed at 2.85 mbgs upon completion	1.65	44
				No caving observed upon completion	1.8	50
					0.15	1
	0-0.2	GS1		200 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	4
TP130-22	0.2-0.9	GS2		Brown, SILTY SAND, trace clay, moist to wet	0.45	7
	0.9-1.8	GS3		Brown, SILTY SAND, some gravel, trace clay, moist to wet	0.6	9
18T 263592.0739 E	1.8-2.4	GS4		Light brown, GRAVELLY SILTY SAND, trace clay, moist to wet	0.75	10
4919499.753 N	2.4-3.0	GS5		Same as above	0.9	12
					1.05	16
210.096 masl					1.2	22
				Test pit terminated at 3.0 mbgs in gravelly silty sand	1.35	4
				Groundwater seepage observed at 1.8 mbgs	1.5	4
				Water level observed at 3.0 mbgs upon completion	1.65	3
				No caving observed upon completion	1.8	4
					1.95	13
					2.1	33
					2.25	50
					0.15	1
	0-0.2	GS1		200 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	3
TP131-22	0.2-1.2	GS2		Light brown, GRAVELLY SAND, some silt, trace clay, moist to wet	0.45	5
	1.2-2.1	GS3		Same as above	0.6	7
18T 263566.1644 E	2.1-3.0	GS4		Same as above	0.75	9
4919572.217 N					0.9	12
					1.05	50
209.662 masl				Test pit terminated at 3.0 mbgs in gravelly sand	1.2	
				No groundwater or caving observed upon completion	1.35	4
					1.5	50

1. mbgs = metres below ground surface
2. Dynamic probe penetration test, consisting of driving a 19 mm diameter steel rod 150 mm into the soil with an 8 kg hammer falling 750 mm.

TABLE 1: TEST PIT LOGS
42 & 52 Mill Street, Norwood
Technician: Josh Riseling
Cambium Reference No. 14288-003
Completed: April 26 & 27, 2022

Test Pit ID	Depth (mbgs[1])	Soil Sample	% Moisture	Material Description	Depth (m)	DPT[2] (Blows/150 mm)
					0.15	1
	0-0.15	GS1		150 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	3
TP132-22	0.15-0.6	GS2		Brown, SILTY SAND, trace clay, moist	0.45	5
	0.6-1.5	GS3		Brown, SILT AND SAND, trace clay, moist	0.6	6
18T 263707.1165 E	1.5-2.4	GS4		Light brown, GRAVELLY SILTY SAND, moist to wet	0.75	9
4919695.665 N	2.4-3.0	GS5		Same as above, wet	0.9	12
					1.05	12
209.94 masl					1.2	11
				Test pit terminated at 3.0 mbgs in gravelly silty sand	1.35	2
				Groundwater seepage observed at 2.4 mbgs	1.5	5
				Water level observed at 2.85 mbgs upon completion	1.65	7
				No caving observed upon completion	1.8	10
					1.95	18
					2.1	39
					2.25	50
					0.15	2
	0-0.3	GS1		300 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	5
TP133-22	0.3-0.9	GS2		Brown, SILTY SAND, trace clay, moist	0.45	5
	0.9-1.2	GS3		Light brown, GRAVELLY SILTY SAND, wet, trace clay	0.6	10
18T 263811.4872 E	1.2-2.4	GS4		Same as above, moist	0.75	8
4919691.934 N	2.4-3.0	GS5		Same as above	0.9	14
					1.05	10
210.921 masl					1.2	20
				Test pit terminated at 3.0 mbgs in gravelly silty sand	1.35	1
				Groundwater at 1.05 mbgs	1.5	3
				No water level or caving observed upon completion	1.65	8
					1.8	20
					1.95	36
					2.1	50
					0.15	2
	0-0.2	GS1		200 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	4
TP134-22	0.2-1.2	GS2		Light brown, SILTY SAND, trace clay, moist	0.45	6
	1.2-1.8	GS3		Light brown, GRAVELLY SILTY SAND, moist	0.6	8
18T 263754.5517 E	1.8-2.25	GS4		Same as above	0.75	22
4919601.034 E					0.9	50
					1.05	
213.61 masl				Test pit terminated at 2.25 mbgs on bedrock	1.2	8
				No groundwater or caving observed upon completion	1.35	50

1. mbgs = metres below ground surface
2. Dynamic probe penetration test, consisting of driving a 19 mm diameter steel rod 150 mm into the soil with an 8 kg hammer falling 750 mm.

TABLE 1: TEST PIT LOGS
42 & 52 Mill Street, Norwood
Technician: Josh Riseling
Cambium Reference No. 14288-003
Completed: April 26 & 27, 2022

Test Pit ID	Depth (mbgs[1])	Soil Sample	% Moisture	Material Description	Depth (m)	DPT[2] (Blows/150 mm)
					0.15	2
	0-0.2	GS1		200 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	10
TP135-22	0.2-0.6	GS2		Brown, SILTY SAND, trace clay, moist	0.45	8
	0.6-1.2	GS3		Light brown, GRAVELLY SILTY SAND, moist	0.6	6
18T 263781.1848 E	1.2-1.95	GS4		Same as above	0.75	5
4919504.206 N					0.9	50
					1.05	
211.982 masl				Test pit terminated at 1.95 mbgs on bedrock	1.2	7
				No groundwater or caving observed upon completion	1.35	17
					1.5	50
					1.65	
					1.8	
					1.95	
					2.1	
					2.25	
					0.15	1
	0-0.3	GS1		300 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	5
TP136-22	0.3-0.6	GS2		Brown, SILTY SAND, trace clay, moist	0.45	6
	0.6-1.5	GS3		Brown, GRAVELLY SILTY SAND, moist	0.6	19
18T 263881.0651 E					0.75	50
4919463.612 N					0.9	
				Test pit terminated at 1.5 mbgs on bedrock	1.05	
213.088 masl				No groundwater or caving observed upon completion	1.2	10
					1.35	50
				Large cobbles throughout		
					0.15	2
	0-0.3	GS1		300 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	3
TP137-22	0.3-1.2	GS2		Brown, SILTY SAND, trace clay, moist	0.45	4
	1.2-1.95	GS3		Same as above	0.6	4
18T 263827.6047 E					0.75	5
4919332.42 N					0.9	5
				Test pit terminated at 1.95 mbgs on bedrock	1.05	6
210.368 masl				No groundwater or caving observed upon completion	1.2	6
					1.35	0
					1.5	2
					1.65	50
					1.8	

1. mbgs = metres below ground surface
2. Dynamic probe penetration test, consisting of driving a 19 mm diameter steel rod 150 mm into the soil with an 8 kg hammer falling 750 mm.

TABLE 1: TEST PIT LOGS
42 & 52 Mill Street, Norwood
Technician: Josh Riseling
Cambium Reference No. 14288-003
Completed: April 26 & 27, 2022

Test Pit ID	Depth (mbgs[1])	Soil Sample	% Moisture	Material Description	Depth (m)	DPT[2] (Blows/150 mm)
					0.15	1
	0-0.15	GS1		150 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	3
TP138-22	0.15-1.05	GS2		Brown, SILTY SAND, trace clay, moist	0.45	7
	1.05-1.5	GS3		Light brown, SILTY SAND, some clay, moist to wet	0.6	8
18T 263861.8087 E					0.75	15
4919252.342 N					0.9	50
				Test pit terminated at 1.5 mbgs on bedrock	1.05	
209.877 masl				No groundwater or water level observed upon completion	1.2	15
				Sidewall caving observed at 0.6 mbgs	1.35	50
					0.15	2
	0-0.3	GS1		300 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	5
TP139-22	0.3-1.2	GS2		Brown, SILTY SAND, trace clay, moist	0.45	6
	1.2-2.1	GS3		Light brown, GRAVELLY SILTY SAND, trace clay, moist	0.6	6
18T 263604.7646 E	2.1-3.0	GS4		Same as above	0.75	7
4919410.865 N					0.9	8
					1.05	10
209.924 masl				Test pit terminated at 3.0 mbgs in gravelly silty sand	1.2	11
				No groundwater or caving observed upon completion	1.35	1
					1.5	2
					1.65	3
					1.8	9
					1.95	29
					2.1	50
					0.15	2
	0-0.3	GS1		300 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	5
TP140-22	0.3-0.75	GS2		Brown, SILTY SAND, trace clay, moist	0.45	9
	0.75-1.5	GS3		Light brown, GRAVELLY SAND, trace clay, moist to wet, some silt	0.6	9
18T 263475.3943 E	1.5-2.4	GS4		Same as above, wet	0.75	8
4919493.625 N	2.4-3.0	GS5		Same as above	0.9	10
					1.05	16
209.734 masl					1.2	29
				Test pit terminated at 3.0 mbgs in gravelly sand	1.35	5
				Groundwater seepage observed at 1.95 mbgs	1.5	10
				Water level observed at 2.85 mbgs upon completion	1.65	27
				Sidewall caving observed at 0.9 mbgs	1.8	50

1. mbgs = metres below ground surface
2. Dynamic probe penetration test, consisting of driving a 19 mm diameter steel rod 150 mm into the soil with an 8 kg hammer falling 750 mm.

TABLE 1: TEST PIT LOGS
42 & 52 Mill Street, Norwood
Technician: Josh Riseling
Cambium Reference No. 14288-003
Completed: April 26 & 27, 2022

Test Pit ID	Depth (mbgs[1])	Soil Sample	% Moisture	Material Description	Depth (m)	DPT[2] (Blows/150 mm)
					0.15	2
	0-0.15	GS1		150 mm TOPSOIL: Dark brown, silt, trace sand, frequent rootlets, moist	0.3	8
TP141-22	0.15-0.75	GS2		Light brown, SILTY SAND, trace clay, moist	0.45	11
	0.75-1.8	GS3		Same as above, some gravel	0.6	12
18T 263333.4648 E	1.8-2.1	GS4		Light brown, GRAVELLY SILTY SAND, moist	0.75	22
4919169.725 N	2.1-3.0	GS5		Same as above	0.9	18
					1.05	22
204.859 masl					1.2	28
				Test pit terminated at 3.0 mbgs in gravelly silty sand	1.35	1
				No groundwater or caving observed upon completion	1.5	2
					1.65	6
					1.8	4
					1.95	9
					2.1	50

Appendix B
Physical Laboratory Data

Grain Size Distribution Chart

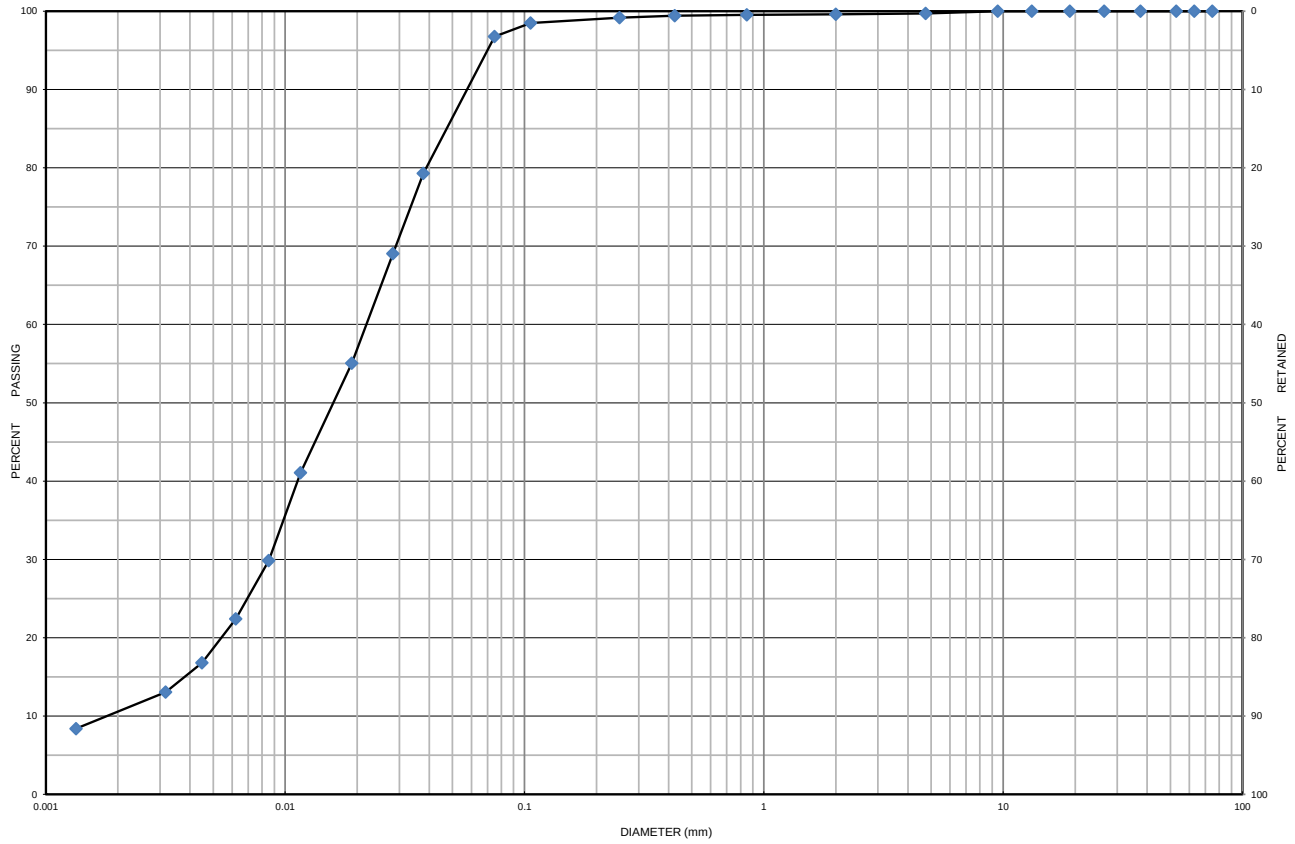
Project Number: *14288-003* **Client:** *CAP Norwood Developments Inc.*

Project Name: *Hydrogeological, Geotechnical, ESA - 42 & 52 Mill St, Norwood*

Sample Date: *April 20 & 21, 2022* **Sampled By:** *Josh Riseling - Cambium Inc.*

Location: *BH 102-22 SS 4* **Depth:** *2.3 m to 2.7 m* **Lab Sample No:** *S-22-0740*

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 102-22	SS 4	2.3 m to 2.7 m	0	3	86	11	27.8

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Silt some Clay trace Sand	ML	0.0220	0.0087	0.0017	12.94	2.02

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Grain Size Distribution Chart

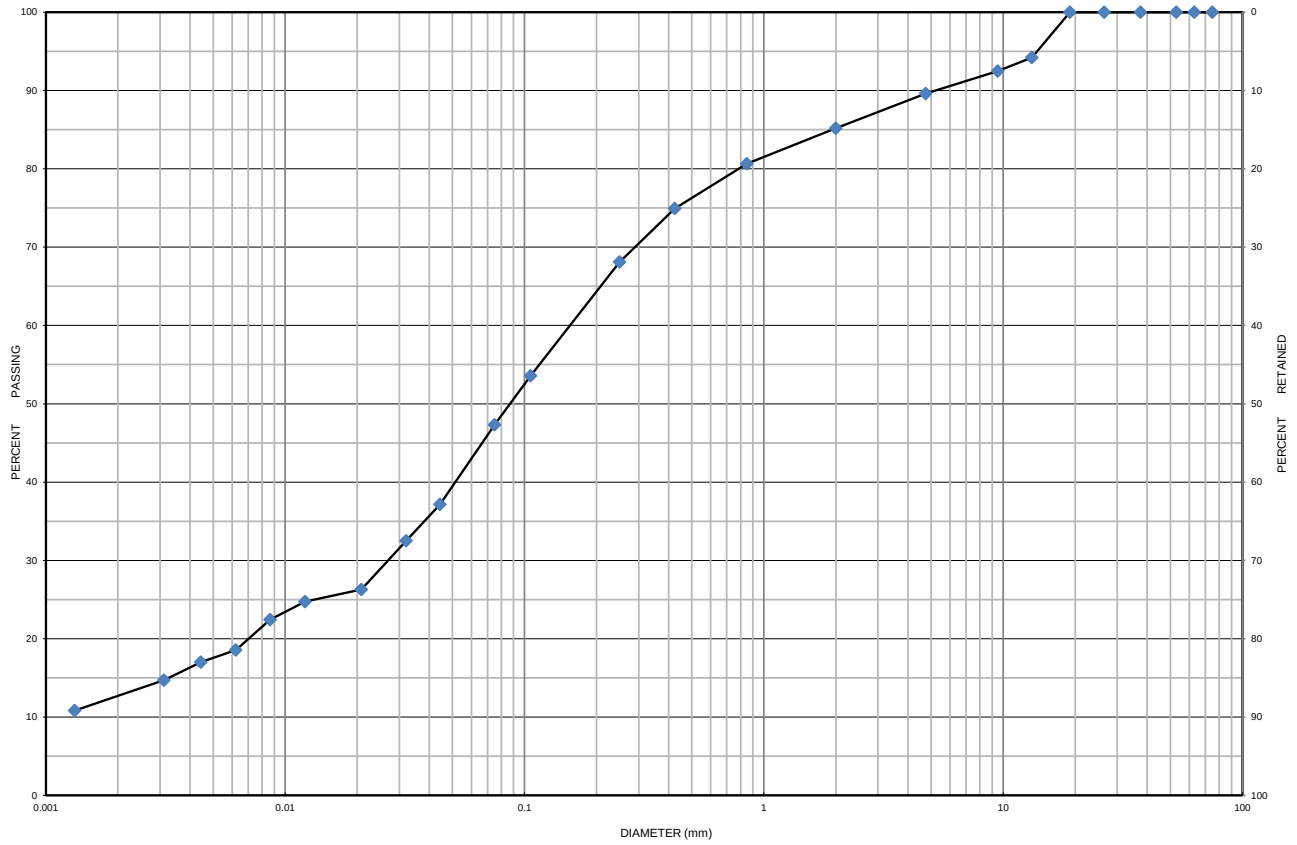
Project Number: *14288-003* **Client:** *CAP Norwood Developments Inc.*

Project Name: *Hydrogeological, Geotechnical, ESA - 42 & 52 Mill St, Norwood*

Sample Date: *April 20 & 21, 2022* **Sampled By:** *Josh Riseling - Cambium Inc.*

Location: *BH 104-22 SS 3* **Depth:** *1.5 m to 2 m* **Lab Sample No:** *S-22-0741*

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 104-22	SS 3	1.5 m to 2 m	10	42	35	13	8.2

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Sand and Silt some Clay some Gravel	SM	0.160	0.026	-	-	-

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Grain Size Distribution Chart

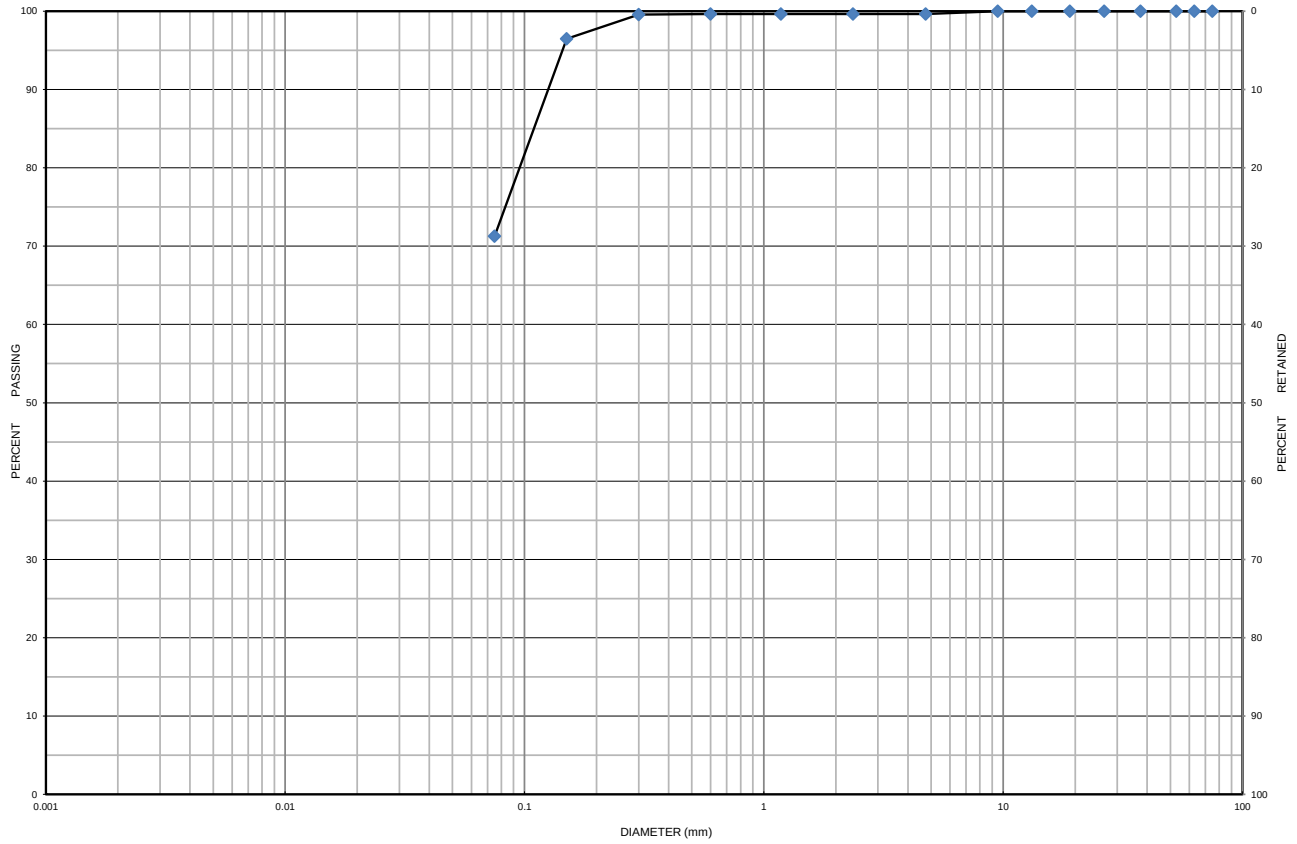
Project Number: *14288-003* **Client:** *CAP Norwood Developments Inc.*

Project Name: *Hydrogeological, Geotechnical, ESA - 42 & 52 Mill St, Norwood*

Sample Date: *April 20 & 21, 2022* **Sampled By:** *Josh Riseling - Cambium Inc.*

Location: *BH 105-22 SS 3* **Depth:** *1.5 m to 2 m* **Lab Sample No:** *S-22-0742*

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 105-22	SS 3	1.5 m to 2 m	0	28	72		23.7

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

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Grain Size Distribution Chart

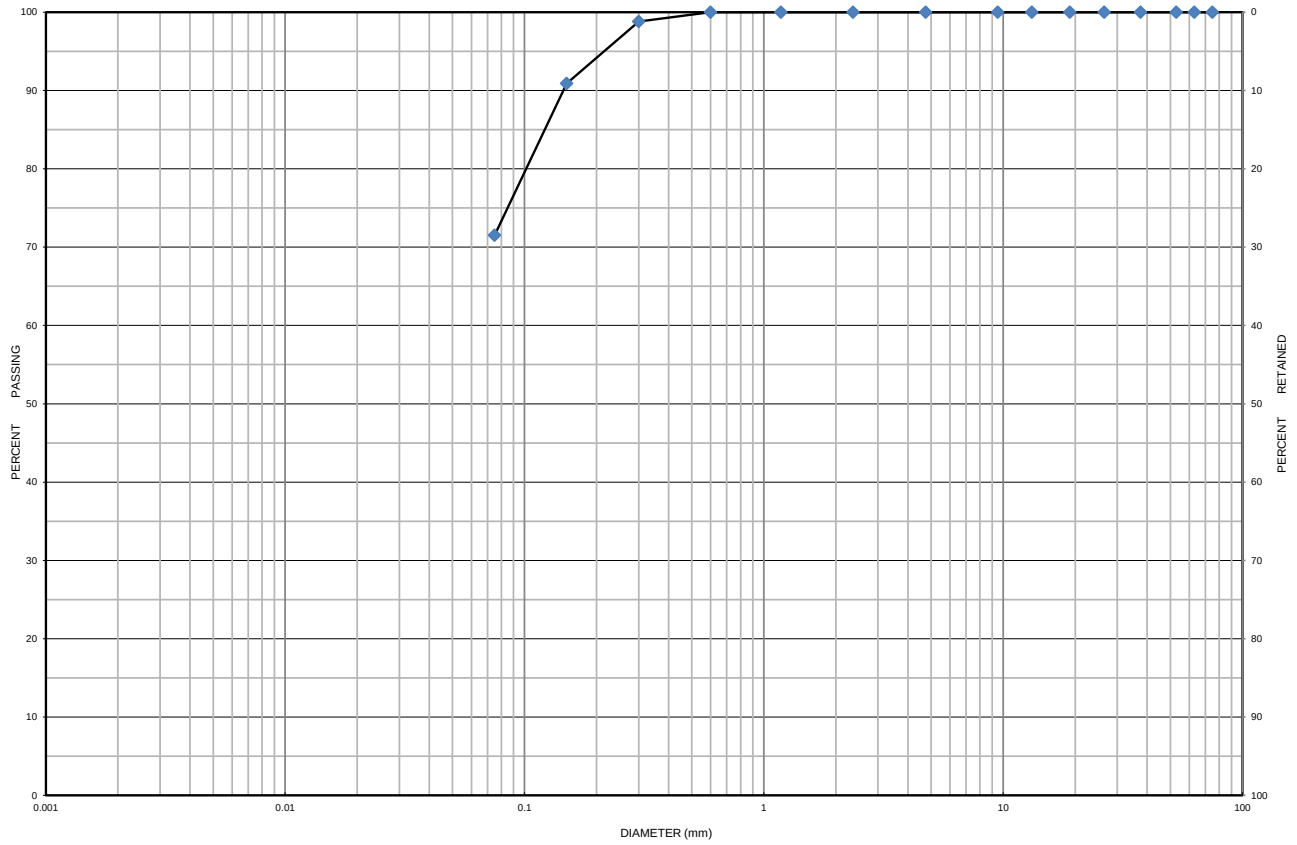
Project Number: *14288-003* **Client:** *CAP Norwood Developments Inc.*

Project Name: *Hydrogeological, Geotechnical, ESA - 42 & 52 Mill St, Norwood*

Sample Date: *April 20 & 21, 2022* **Sampled By:** *Josh Riseling - Cambium Inc.*

Location: *BH 107-22 SS 3* **Depth:** **Lab Sample No:** *S-22-0743*

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 107-22	SS 3		0	28	72		16.1

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

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Grain Size Distribution Chart

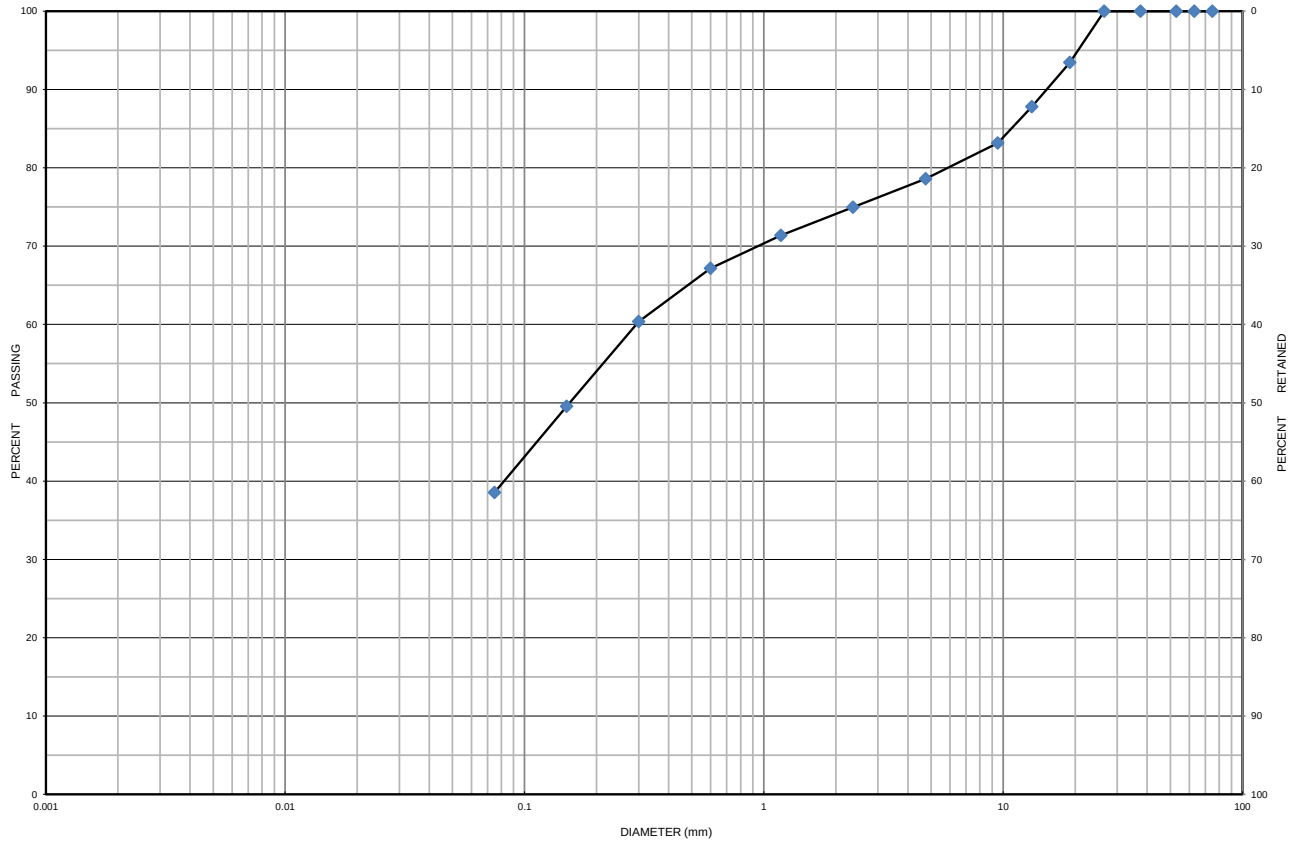
Project Number: *14288-003* **Client:** *CAP Norwood Developments Inc.*

Project Name: *Hydrogeological, Geotechnical, ESA - 42 & 52 Mill St, Norwood*

Sample Date: *April 20 & 21, 2022* **Sampled By:** *Josh Riseling - Cambium Inc.*

Location: *BH 109-22 SS 3* **Depth:** *1.5 m to 2 m* **Lab Sample No:** *S-22-0744*

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 109-22	SS 3	1.5 m to 2 m	21	40	39		8.2

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Gravelly Sand and Silt	SM	0.300	-	-	-	-

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Grain Size Distribution Chart

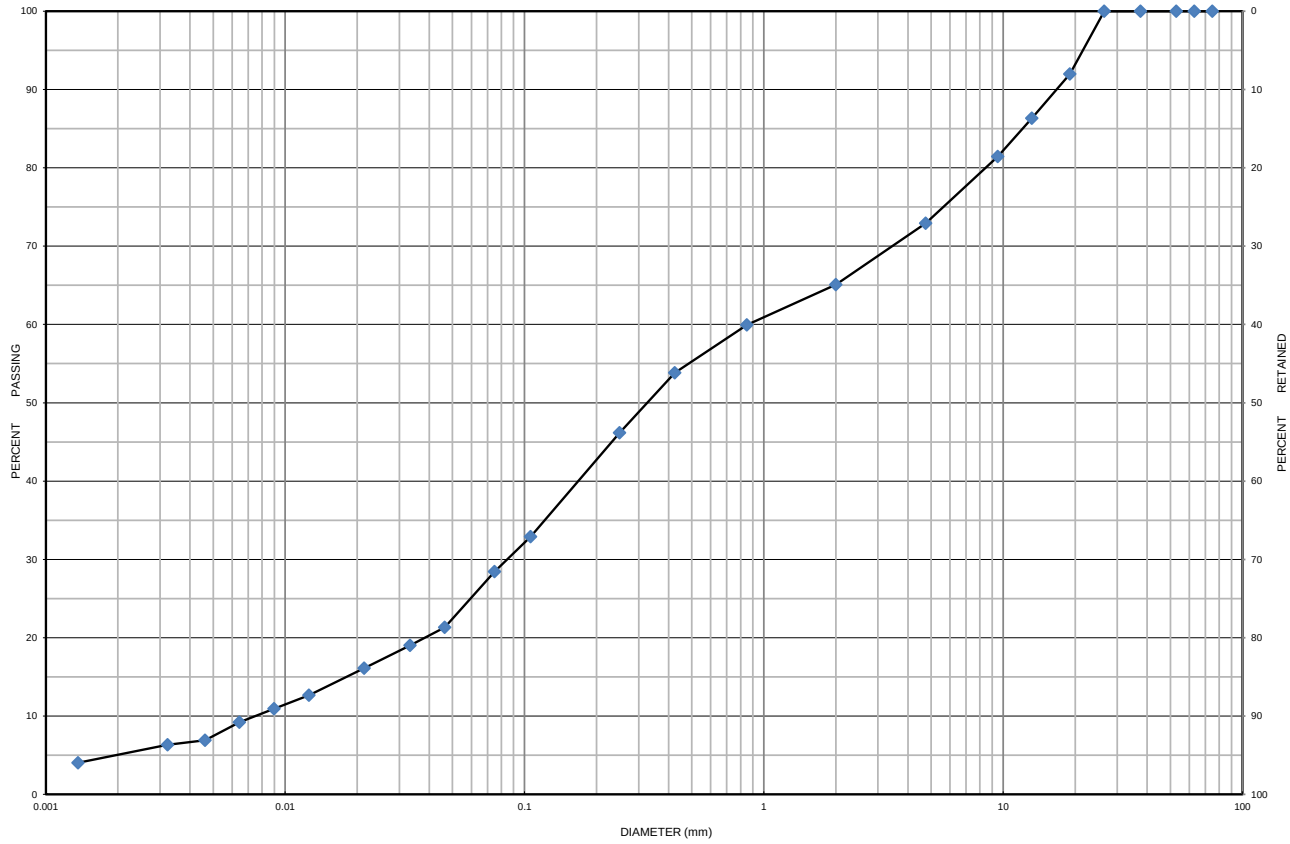
Project Number: *14288-003* **Client:** *CAP Norwood Developments Inc.*

Project Name: *Hydrogeological, Geotechnical, ESA - 42 & 52 Mill St, Norwood*

Sample Date: *April 20 & 21, 2022* **Sampled By:** *Josh Riseling - Cambium Inc.*

Location: *BH 111-22 SS 2* **Depth:** *0.8 m to 1.2 m* **Lab Sample No:** *S-22-0747*

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 111-22	SS 2	0.8 m to 1.2 m	27	44	24	5	6.3

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Gravelly Silty Sand trace Clay	SM	0.8800	0.0860	0.0075	117.33	1.12

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Grain Size Distribution Chart

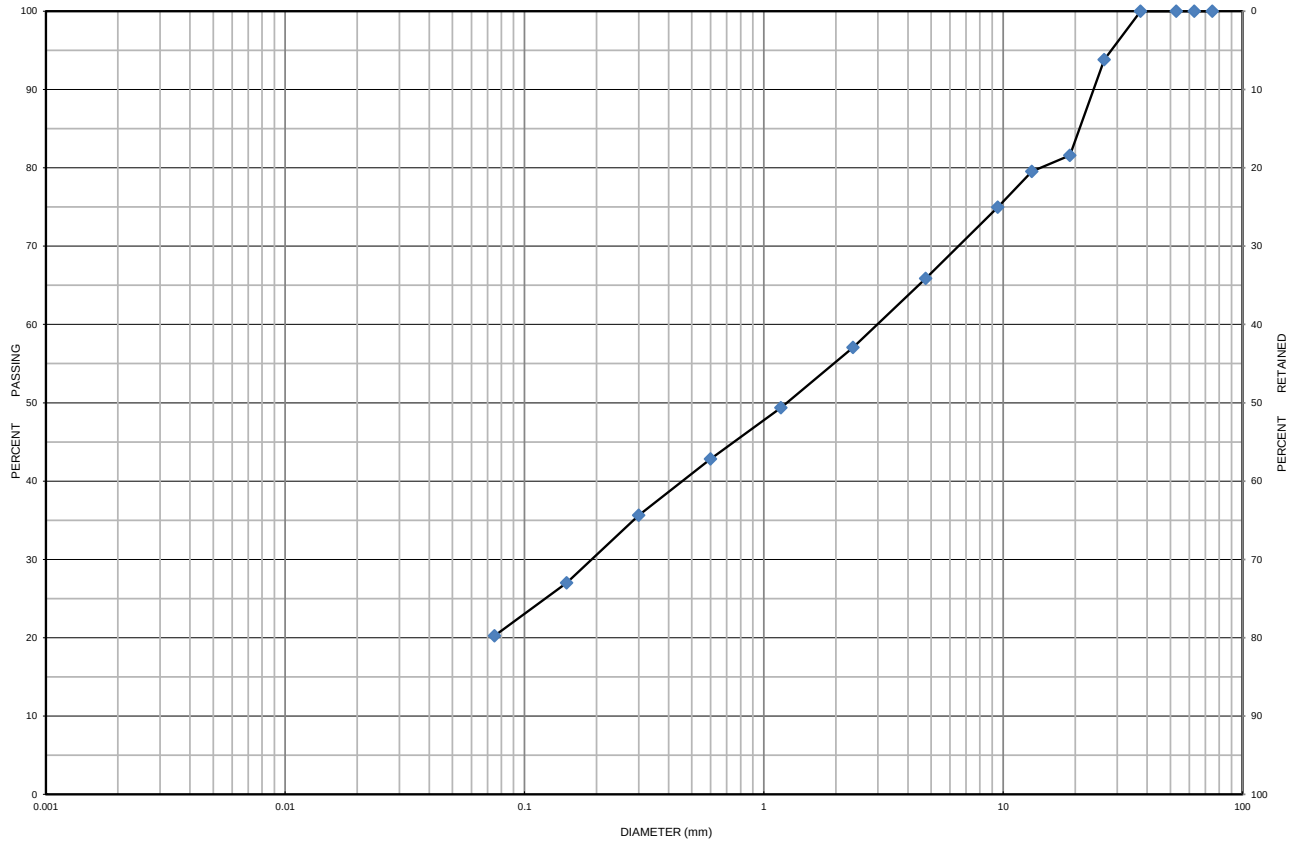
Project Number: *14288-003* **Client:** *CAP Norwood Developments Inc.*

Project Name: *Hydrogeological, Geotechnical, ESA - 42 & 52 Mill St, Norwood*

Sample Date: *April 20 & 21, 2022* **Sampled By:** *Josh Riseling - Cambium Inc.*

Location: *BH 115-22 SS 3* **Depth:** *1.5 m to 2 m* **Lab Sample No:** *S-22-0745*

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 115-22	SS 3	1.5 m to 2 m	34	46	20		6.4

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Gravelly Silty Sand	SM	3.000	0.190	-	-	-

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Grain Size Distribution Chart

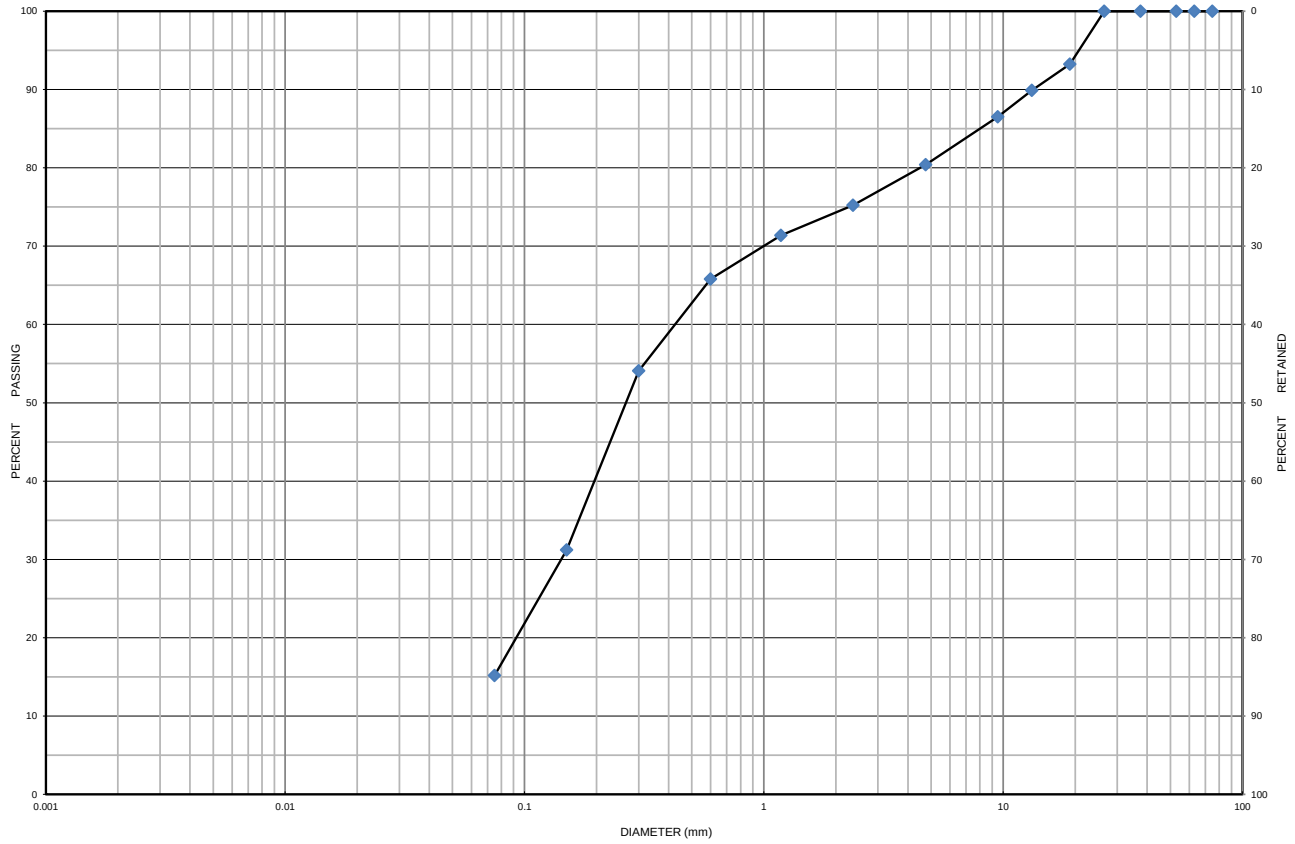
Project Number: *14288-003* **Client:** *CAP Norwood Developments Inc.*

Project Name: *Hydrogeological, Geotechnical, ESA - 42 & 52 Mill St, Norwood*

Sample Date: *April 20 & 21, 2022* **Sampled By:** *Josh Riseling - Cambium Inc.*

Location: *BH 117-22 SS 3* **Depth:** *1.5 m to 2 m* **Lab Sample No:** *S-22-0746*

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 117-22	SS 3	1.5 m to 2 m	20	65	15		4.7

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Gravelly Sand some Silt	SM	0.420	0.150	-	-	-

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