Geotechnical Investigation Report - 49 High Street, Barrie

November 15, 2024

Prepared for:
Wild Gray Capital Management Inc.

Cambium Reference: 19390-001

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1.0 Introduction

Cambium Inc. (Cambium) was retained by Wild Gray Capital Management Inc. (Client) to complete a geotechnical investigation in support of a proposed development at 49 High Street in Barrie, Ontario (Site).

This report presents and summarizes the methodology and findings of the investigation works conducted by Cambium at the Site, and provides geotechnical recommendations based on the investigation results.

1.1 Reviewed Documents

The following project documents were received and reviewed during the drafting of this report:

[1] Khalsa Design Inc. – Brampton, Ontario
49 High Street Apartments; Site Plan; ASP-1; Project No. 23035; September 22, 2024.

[2] Sheldon Creek Developments – Orangeville, Ontario
Approximate borehole elevations received by email on November 1, 2024.

1.2 Standards and Guidelines

Applicable standards, guidelines and other normative documents utilized in preparing geotechnical engineering recommendations for this report are provided below.

[3] Canadian Foundation Engineering Manual – 5th Edition; Canadian Geotechnical Society; 2023.

[4] Ontario Building Code; 2012 Building Code Compendium – Volume 1; July 1, 2022 update (Containing O.Regs. 217/22, 434/22 and 451/22).

2.0 Site and Project Description

The Site consists of an existing four-storey office building bounded by High Street to the west, Dunlop Street West to the south, an adjacent office building to the east and outdoor parking to the north. It is understood that the proposed development will consist of converting the office space to a mixed-use residential building without altering the footprint of the existing building.

Based on the provided drawings [1], the ground floor will be converted to a parking garage with two entrances from High Street and will include tenant storage areas. The existing office layout on the second floor will remain, and the existing office layout on the third and fourth floors will be converted to residential units.

Based on Client liaison it is understood that as-built drawings of the existing building (i.e., indicating the geometry and depth/elevation of existing footings supporting the structure) are not available. It is understood based on Client liaison, and as confirmed during the investigation works conducted by Cambium, that the existing building contains separate basement areas below the existing lobby and on the north side of the building, with the remaining portions of the building footprint having no basement/founded as a slab on grade structure.

A Site Location Plan is provided as Figure 1 of this report.

3.0 Methodology

3.1 Borehole Investigation

During the current investigation works completed by Cambium, five boreholes were advanced through existing floor slabs from accessible main floor and basement areas of the existing building. The borehole locations were determined in coordination with the Client and the Client's structural/environmental consultants and were advanced near the inferred location of existing footings supporting both column members and external walls. A private utility locate was conducted on August 22, 2024, by a utility locator subcontracted by Cambium, to clear the proposed borehole locations with respect to private utilities. Ground penetrating radar (GPR) equipment was additionally employed to determine the orientation/spacing of concrete reinforcement within the floor slabs at each proposed borehole location.

The drilling works were conducted on September 4 and 5, 2024. The boreholes were advanced using limited access drilling equipment selected in consideration of vertical clearance conditions in the rooms from which the boreholes were advanced. Four boreholes were advanced through a slab on grade on the main floor of the building and designated as BH101-24 to BH104-24, and one borehole was advanced from a basement area below the main lobby of the existing building and designated as BH105-24. The main floor drilling area was accessed from High Street, through a door approximately 20 m north of the intersection of High Street and Dunlop Street West at the southwest corner of the existing building. The basement area below the main lobby was accessed from the main floor drilling area by a staircase accessed on the north side of the room. It is noted that an additional basement area exists in the northern portion of the building footprint, accessed through a door and stairwell at the northern extents of the building footprint. During a site visit completed by Cambium prior to the scheduled investigation date, this area was observed to currently be heavily utilized for storage, with immovable storage units observed throughout this basement area. Furthermore, utility services mounted to the ceiling resulted in insufficient vertical clearance in the northern basement area for the available limited access drilling equipment. As such, no boreholes were advanced within the northern basement area during the current investigation works.

A Borehole Location Plan showing the approximate locations of the advanced boreholes and approximate perimeter of the interior rooms from which the boreholes were advanced is provided as Figure 2 of this report.

The boreholes were terminated at depths ranging between 0.4 and 5.2 m below the top of the floor slab at the respective borehole location. A summary of the advanced boreholes is provided in Table 1 below.

Table 1 Borehole Summary

Borehole ID	Location	Top of Floor Slab Elevation (masl)[1]	Notes
BH101-24	Main floor / column	225.79	Early termination at 1.1 m depth due to obstruction.
BH102-24	Main floor / western external wall	225.79	Early termination at 0.4 m depth due to obstruction.
BH103-24	Main floor / eastern external wall	225.79	Advanced to 5.2 m depth and monitoring well installed.
BH104-24	Main floor / column	225.79	Advanced to 5.0 m depth and monitoring well installed.
BH105-24	Basement below lobby / eastern wall of basement room	222.13	Advanced to 2.4 m depth and terminated due to excessive borehole caving.

[1] *Approximate elevation based on Client-provided survey information [2], in m above sea level (masl)*

Boreholes BH101-24 to BH104-24 were advanced to the sampling depths by means of continuous flight solid stem augers with 50-millimetre (mm) O.D. split spoon samplers. Borehole BH105-24 was advanced using a direct push methodology involving the advancement of a larger diameter casing to the proposed sampling depth, followed by removal of the casing and soils retained within the casing, and subsequent sampling using a 50 mm O.D. split spoon sampler. 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 split-spoon samplers used in the investigation limit the maximum particle size that can be sampled and tested to approximately 40 mm. Therefore, particles or objects that may exist within the soils that are larger than this dimension were not sampled and are not represented

in the grain size distributions contained herein. The results of the field tests (i.e., SPT N values) as presented on the borehole logs and in subsequent sections of this report are the values measured directly in the field and are unfactored.

The SPT N values are used in this report to assess consistency of cohesive soils and relative density of non-cohesive soils. Soil samples were generally collected at approximately 0.75 m intervals up to a depth of 3.0 m below ground surface (mbgs) and at 1.5 m intervals thereafter. In BH105-24, continuous sampling was conducted from beneath the floor slab to the borehole termination depth.

Groundwater and caving conditions were noted in the open boreholes during and upon completion of drilling. All boreholes were backfilled and sealed in accordance with Ontario Regulation (O.Reg.) 903, as amended, and the property was reinstated as close to pre-existing conditions as practical. Boreholes BH103-24 and BH104-24 were outfitted with monitoring wells to allow for subsequent water level monitoring at the Site.

The field work for this investigation was observed by members of Cambium's technical staff, who located the boreholes in the field, arranged for the clearance of underground utilities, observed the borehole drilling, sampling and in situ testing operations, logged the boreholes as well as examined and took custody of the recovered soil samples. The samples were identified in the field, placed in appropriate containers, labelled, and transported to our geotechnical laboratory for further visual examination by the project engineer and for laboratory testing.

The prepared borehole logs are provided in Appendix A. Site soil and groundwater conditions and geotechnical recommendations are presented in the following sections of this report.

3.2 Physical Laboratory Testing

Physical laboratory testing, including three particle size distribution analyses (LS-702, 705), was completed on selected soil samples to confirm textural classification and to assess geotechnical parameters. Natural moisture content testing (LS-701) was completed on all retrieved soil samples. The physical laboratory testing results are presented in Appendix B and are discussed in Section 4.0.

4.0 Subsurface Conditions

The stratigraphies encountered in the boreholes advanced at the Site by Cambium are indicated on the attached borehole logs in Appendix A. It is noted that the conditions indicated on the borehole logs are for specific locations only and can vary between and beyond the borehole locations. The soil boundaries indicated on the borehole logs are inferred from non-continuous sampling and observations during drilling. These boundaries are intended to reflect approximate transition zones and should not be interpreted as exact planes of geological change. In addition, the descriptions provided in the borehole logs are inferred from a variety of factors, including visual observations of the soil samples retrieved, laboratory testing, measurements prior to and after drilling, and the drilling process itself (drilling speed, shaking/grinding of the augers, etc.).

In general, subsurface soils encountered below the floor slabs at the borehole locations consisted of non-cohesive soils, which were initially inferred to be potential fill material immediately underlying the slabs, and subsequently transitioned to inferred native sand soils.

4.1 Regional Geology

Ontario Geological Survey (OGS) quaternary geology maps the Site along a boundary between two distinct quaternary formations. To the north of the Site, a formation of glaciofluvial ice-contact deposits consisting of gravel and sand minor till including esker, kame, end moraine, ice-marginal delta and subaqueous fan deposits is projected. To the south of the Site, a formation of non-cohesive glaciomarine deposits consisting of sand, gravelly sand and gravel nearshore and beach deposits is projected.

Physiographic mapping (Chapman, L.J. & Putnam, D.F., 2007) indicates the Site within sand plain formations, with a drumlinized till plain formation projected approximately 0.5 km north of the Site. OGS bedrock geology maps the Site within a bedrock formation consisting of limestone, dolostone, shale, arkose, and sandstone of the Ottawa Group, Simcoe Group and Shadow Lake Formation. Available drift thickness mapping tends to indicate bedrock thicknesses in the order of ±100 m in the Site vicinity.

4.2 Floor Slab

All boreholes advanced by Cambium at the Site were advanced through existing concrete floor slabs, which were cored by the drilling contractor retained by Cambium prior to advancing augers and/or casing. The floor slabs were observed to have thicknesses ranging between approximately 95 and 107 mm, with an average thickness across all borehole locations of about 100 mm. Floor slab thicknesses at the borehole locations are summarized in Table 2 below.

Table 2 Summary of Floor Slab Thicknesses

Borehole ID	Location	Floor Slab Material	Slab Thickness (mm)
BH101-24	Main floor	Reinforced concrete	95.2
BH102-24	Main floor	Reinforced concrete	101.6
BH103-24	Main floor	Reinforced concrete	96.5
BH104-24	Main floor	Reinforced concrete	101.6
BH105-24	Basement below lobby	Reinforced concrete	106.7
Average Thickness			**100.3**

Any concrete strength testing of the cores extracted from the floor slabs was not included in the scope of the current investigation.

4.3 Inferred Fill

Non-cohesive soils inferred to be potential fill material were encountered in all boreholes immediately underlying the floor slabs. In boreholes BH101-24 and BH102-24, the boreholes were terminated on unknown obstructions within the inferred fill material at depths between 0.4 and 1.1 m below the top of the floor slab. In boreholes BH103-24 and BH104-24, which were advanced to the target termination depth of ± 5 mbgs, fill material was inferred to depths between ± 2.1 and 2.7 m. As these boreholes were advanced on the main floor, it is likely that the fill material consisted of backfill material against the adjacent basement walls.

The inferred fill predominantly consisted of a light brown to brown, non-cohesive sand material with trace to some gravel and silt. It is noted that in borehole BH105-24, the inferred fill had a

lesser thickness of ± 100 mm from the underside of the floor slab and consisted of a brown gravelly sand with a trace amount of silt.

SPT N values recorded within the inferred fill ranged between 15 and 25, indicating predominantly compact relative density. A lower SPT N value of 5, indicating loose relative density, was recorded in borehole BH104-24 at a depth of approximately 1 m below the top of the floor slab.

The in-situ moisture content of the inferred fill predominantly ranged between 1.0% and 3.4% based on laboratory testing. Laboratory particle size distribution analysis was completed for one sample obtained from the non-cohesive soil layer to assess soil composition. The test results are provided in Appendix B and are summarized in Table 3 based on the unified soils classification system (USCS).

Table 3 Particle Size Distribution Analysis – Inferred Fill

Borehole/Sample ID	Depth (m)	Material	% Gravel	% Sand	% Silt	%Clay
BH104-24 SS2	0.8 – 1.4	Sand trace Gravel trace Silt trace Clay	6	88	5	1

It should be noted that the fill material was inferred as possible during drilling works based on soil composition/colour and relative density. Actual fill depths at the Site will depend on a variety of factors, including the depths and extents of original excavations required to construct the basement levels and wall/column footings. As such, fill depths particularly below the main floor/slab on grade areas can be expected to vary and will require confirmation during construction works.

4.4 Non-Cohesive Native Soils

Underlying the fill material encountered in boreholes BH103-24 to BH104-24, non-cohesive soils inferred to be native were encountered. The transition to native soils was inferred based on an increase in gravel content and relative density, and the inferred native soils were observed to primarily consist of sand with some gravel to gravelly sand, brown to grey in colour.

The transition to native soils was inferred at depths between 2.1 and 2.7 m below the top of the floor slab on the main floor (BH103-24 and BH104-24, respectively), and at a depth of 0.2 m below the floor slab in the basement area below the main lobby of the existing building (BH105-24), corresponding to absolute elevations between 223.7 and 223.1 masl (BH103-24 and BH104-24), and an absolute elevation of 221.9 masl (BH105-24). A decrease in gravel content was observed below a depth of approximately 4.6 m in boreholes BH103-24 and BH104-24.

SPT N values recorded within the inferred native soils were predominantly over 50, indicating dense to very dense relative density. In boreholes BH103-24 and BH104-24, the decrease in gravel content below a depth of 4.6 m (absolute elevation of approximately 221.2 masl) corresponded to a decrease in SPT N values to 28 and 27, respectively, indicating compact relative density.

Natural moisture contents based on laboratory testing predominantly ranged between 0.9% and 5.4% within the inferred native soils. Below a depth of 4.6 m in boreholes BH103-24 and BH104-24, which were advanced from the main floor, elevated moisture contents of 15.9% and 16.6% were determined, which corresponded with wet soils being observed during drilling.

Laboratory particle size distribution analysis was completed for two samples obtained from the inferred native soils to assess soil composition. The test results are provided in Appendix B and are summarized in Table 4 based on the unified soils classification system (USCS).

Table 4 Particle Size Distribution Analysis – Inferred Native Soils

Borehole/Sample ID	Depth (m)	Material	% Gravel	% Sand	% Silt	%Clay
BH103-24 SS6	4.6 – 5.2	Sand some Silt trace Gravel trace Clay	6	77	14	3
BH105-24 SS2	0.6 – 1.2	Sand some Gravel some Silt trace Clay	19	69	10	2

4.5 Bedrock

Bedrock was not encountered in the boreholes advanced by Cambium at the Site, which were terminated at maximum depths of 5 m below the top of the floor slab (BH103-24 and BH104-

24), and 2.4 m below the top of the floor slab in the basement area below the main lobby of the existing building (BH105-24). The termination depths correspond to absolute elevations of approximately 220.6 and 220.8 masl (BH103-24 and BH104-24), and approximately 219.7 masl (BH105-24).

Obstructions leading to early termination of the boreholes were encountered at depths of 1.1 and 0.4 mbgs in boreholes BH101-24 and BH102-24 respectively. The nature of the encountered obstructions is unknown and any coring or hydrovac excavation works that would be required to expose and/or investigate the nature of the obstructions were not included in the current investigation scope. It is noted that given the projected drift thickness of approximately 100 m within the Site vicinity, the encountered obstructions are not likely to represent a locally higher bedrock surface below the existing building footprint and given that this refusal was encountered within inferred fill materials, it is possible that the early refusal was due to construction debris within the inferred fill.

4.6 Groundwater

The encountered soils were predominantly described as moist throughout the drilling works completed by Cambium. Wet soils were first encountered in boreholes BH103-24 and BH104-24 below depths of 4.6 m and 3.0 m below the top of the floor slab, respectively, corresponding to absolute elevations of 221.2 and 222.8 masl respectively. In borehole BH105-24, which was advanced from the basement area below the main lobby of the existing building, wet soils were first encountered below a depth of 2.3 m below the top of the floor slab, corresponding to an absolute elevation of approximately 219.8 masl.

Borehole caving was not observed in boreholes BH103-24 and BH104-24 immediately upon completion of drilling, however it is noted that extensive caving of the upper soil layers (i.e., inferred fill of lesser relative density than the underlying native soils) was encountered during drilling works prior to reaching the termination depth. Borehole caving was observed in borehole BH105-24 at a depth of 1.2 m below the top of the floor slab, following advancement of the borehole to the termination depth of 2.4 m. It is noted that the caved material in BH105-24 appeared to partly consist of larger cobbles, and that the caved material could not fully be

removed from the borehole using the direct push methodology employed at that location due to the lesser vertical clearance. As such, though continuous attempts were made to advance the borehole to the target termination depth of 5 m below the top of the floor slab, the caved material could not be sufficiently removed and the installation of a monitoring well into inferred wet soils at the location of BH105-24 was not possible within the scoped timeframe of the current investigation. Groundwater-related observations made during drilling are summarized in Table 5 below, and the results of a subsequent follow-up water level measurement completed by Cambium are summarized in Table 6 below.

Table 5 Summary of Groundwater Observations During Drilling

Borehole ID	Depth of Wet Soils First Encountered During Drilling (m)	Depth of Standing Water Upon Completion of Drilling (m)	Caving Depth (m)
BH101-24	-	-	-
BH102-24	-	-	-
BH103-24	4.6	-	-
BH104-24	3.0	-	-
BH105-24	2.3	-	1.2

During the site investigation works conducted by Cambium, an existing monitoring well was noted in the northern basement area of the existing building, which was deemed inaccessible for drilling equipment as described in detail in Section 3.0. The monitoring well was designated as MW1 for the purposes of this report and was included in the follow-up water level measurement conducted by Cambium. It is noted that no information pertaining to the construction of this monitoring well (i.e., borehole logs indicating soil stratigraphy and well installation details, including the well installation date) is known to be available at the time of writing this report. The Client provided Cambium with an approximate top of floor slab elevation of 222.14 masl at the location of MW1.

Table 6 Summary of Water Level Monitoring Results

Date	Borehole ID	Water Level		Well Depth[3] (m)	Screen Interval (m)	Soils within Screen Interval
		Depth (m)	Elevation (masl)			
Sept. 25, 2024	BH103-24	Dry	-	3.8	0.8 – 3.8	Non-Cohesive Inferred Fill and Native Soils
	BH104-24	Dry	-	4.4	1.4 – 4.4	
	MW1 [1]	1.51	220.63[4]	-[2]	-[2]	-[2]

[1] *Existing monitoring well in northern basement area installed by others.*

[2] *No well installation details (i.e., borehole log showing soil stratigraphy, screen interval, etc.) provided to Cambium.*

[3] *As confirmed during water level measurement.*

[4] *Based on absolute elevation of floor slab at borehole location, provided to Cambium by the Client [2].*

It is noted that the depth of wet soils first encountered during drilling, as well as the depth of standing water recorded upon completion of drilling (as applicable), are momentary observations made on the investigation date and are not necessarily indicative of stabilized groundwater conditions at the Site. Groundwater conditions can be expected to vary seasonally and in response to climatic events such as precipitation and snowmelt.

5.0 Geotechnical Considerations

This section of the report provides engineering information on, and recommendations for, the geotechnical design aspects of the project based on our interpretation of the borehole information, the laboratory test data, and our understanding of the project requirements. The information in this portion of the report is provided for planning and design purposes for the guidance of the design engineers and architects. Where comments are made on construction, they are provided only to highlight aspects of construction which could affect the design of the project. Contractors bidding on or undertaking any work at the Site should examine the factual results of the investigation, satisfy themselves as to the adequacy of the information for construction and make their own independent interpretation of the factual data as it affects their proposed construction techniques, schedule, equipment capabilities, costs, sequencing and the like. Cambium will not assume any responsibility for construction-related decisions made by contractors based on this report.

The following recommendations have been developed with the understanding that no storeys will be added to the existing building, and that solely alterations to the existing floor plans are proposed, as needed to convert existing office space to residential space, and to convert the main floor level to a parking garage. No proposed alterations to basement areas are currently known to Cambium based on the provided drawings [1].

5.1 Additional Investigation Works

To adequately support foundation design and to finalize recommendations related to construction, it is recommended that the underside elevations and geometry of existing footings supporting load-bearing walls and columns be confirmed as design progresses. No drawings of the existing building indicating the underside elevation and geometry of existing footings are known by Cambium to be available. The confirmation of footing elevations and geometry can be completed using hydrovac equipment, or by advancing hand-dug holes following partial removal of the existing floor slab adjacent to the footings in question (if practically feasible). It is recommended that geotechnical input be obtained when determining the location of test holes advanced to confirm existing footing geometries. Furthermore, as

access limitation results in boreholes not being advanced throughout the entire building footprint, it is recommended that Cambium conduct additional investigation points during construction to confirm sub-surface conditions through the entire building footprint.

It is noted that the underside elevation of existing footings will be required to finalize recommendations pertaining to any excavations proposed at the Site. Should any excavations adjacent to existing footings extend below the underside elevation of those footings, underpinning works will be required to ensure that existing footings are not undermined.

5.2 Site Preparation

In order to convert the main floor level to a parking garage, it is understood that at minimum, portions of the main floor levels will need to be raised to current external grades. If existing floor slabs within the areas to be raised are to be removed, any incompetent soils (organics, loose/disturbed material, any other deleterious material) should be removed beneath the proposed development area and replaced with competent material according to the backfill and compaction recommendations provided in this report, up to the underside of the proposed new floor slab. Prior to placing new fill material, exposed subgrade areas should be inspected and approved by a geotechnical engineer. If new floor slabs are to be placed on existing floor slabs, the surface of the existing floor slab shall be prepared as directed by the structural engineer responsible for design of the new floor slab. It is recommended that sufficient bearing capacity of the existing footings be confirmed early in the planning phase. Should improvement works be required to increase the bearing capacity of existing footings, removal of the existing floor slab and excavation works as described in further detail below may be required to facilitate the improvement works, depending on the selected foundation improvement method.

5.3 Frost Penetration

Based on climate data and design charts (OPSD3090.101), the maximum frost penetration depth below the surface at the Site is estimated at 1.5 mbgs. Exterior, shallow footings should be situated at or below this depth for frost penetration or should be provided with at least 1.5 m of adjacent earth cover. Footings placed above the frost penetration depth or with insufficient

adjacent earth cover should be appropriately protected with a thermally equivalent amount of insulation. Any services should be located below the frost penetration depth or be appropriately insulated. If additional interior foundations are required for the proposed development, extending footings to frost penetration depths will not be required if the ground floor of the building is continuously heated.

5.4 Excavations

Based on current drawings of the proposed development provided to Cambium [1], it is not anticipated that significant excavation works will be required at the Site, unless improvements to existing footings are required to support additional loads resulting from proposed alterations to the existing building. In general, excavations are anticipated to be limited and will in large part facilitate removal of existing floor slabs (as applicable) or the removal and replacement of any incompetent soil materials underlying the existing floor slabs, in the event that existing floor slabs are removed or if incompetent soils beneath the existing floor slabs are identified during confirmatory coring works as recommended in Section 5.7 below.

Furthermore, the groundwater level was estimated to be more than approximately 4 m below the base of the floor slab on the main floor, and approximately 1.5 m below the floor slab in the northern basement area, based on one follow-up measurement conducted by Cambium in September 2024. It is generally recommended that further water level measurements be conducted in the monitoring wells at the Site to confirm high groundwater levels during late fall and throughout the spring (March to June), however it is not anticipated that significant groundwater seepage will be encountered during anticipated excavation works at the Site.

As such, Type 3 soil conditions in accordance with the Occupational Health and Safety Act (OHSA) are expected to apply at the Site. For Type 3 soils above the groundwater table and within continually dewatered depths, excavation side slopes should be no steeper than 1H:1V. For any excavations extending below the groundwater table, Type 4 soil conditions in accordance with OHSA will apply and the inclination of temporary excavation slopes is to be no steeper than 3H:1V.

It is noted that the above recommendations do not apply for any excavations extending below the underside elevation of existing footings at the Site, immediately adjacent to those footings. If excavations are to extend below the underside of existing footings, underpinning measures will be required and should be designed in advance by a qualified geotechnical engineer.

5.5 Groundwater Control and Dewatering

Wet soils were first encountered at depths ranging between 3.0 and 4.6 m below the top of the existing floor slab in the main floor area, and at a depth of approximately 2.3 m below the top of the existing floor slab in the basement area below the main lobby. During a subsequent water level measurement conducted by Cambium on September 25, 2024, the wells installed in boreholes BH103-24 and BH104-24, on the main floor, were found to be dry. The monitoring well installed in the northern basement area by others during a previous investigation was also included in the measurement conducted by Cambium, with a water level of approximately 1.5 m below the top of the floor slab being measured.

As such, it is not anticipated that excavations at the Site, which are anticipated to be limited in depth or not required depending on whether the existing floor slab can be integrated into the new floor slab (and pending confirmation of the competency of the existing footings to support proposed loads without improvements that would require excavation to the existing footing depths), will encounter groundwater seepage, and any groundwater seepage encountered should be manageable using filtered sumps and pumps.

It is noted that the groundwater level observations made at the Site during drilling and during the follow-up water level measurement in September 2024 represent momentary observations, not taken during a high groundwater season (i.e., typically between March to June). Therefore, it could reasonably be expected that the groundwater table will be higher than that observed during the investigation works/measurements conducted to date. It is generally recommended to conduct excavation works (if required) during drier times of the year to avoid groundwater-related issues.

If deeper excavations are required to satisfy design requirements (i.e., if foundation improvements requiring excavations to the underside of existing footings are deemed

necessary as design progresses), Cambium should be contacted to review and revise the above recommendations as needed in light of actual proposed excavation depths.

In general, the maintenance of a dry excavation for the duration of construction is the Contractor's responsibility, and it is generally recommended that dewatering measures be selected and designed so as to draw down the water level to 1 m or more below the deepest excavation base, prior to the excavation works reaching that elevation. It is noted that any significant drawdown of groundwater proposed at the current Site may induce settlement beneath existing footings, and as such, it is recommended that dewatering works (if required) be conducted with the input and guidance of a qualified geotechnical engineer.

5.6 Foundation Design

Based on Cambium’s understanding of current project requirements, it is understood that existing footings are to be utilized to transfer altered building loads under proposed conditions to the subsurface. Therefore, foundation design will primarily consist of evaluating the current capacity and utilization of existing footings and determining whether the existing footings are capable of supporting the altered loads.

To adequately support the bearing capacity evaluation for the existing footings, the following information should be obtained as accurately as possible/practical:

- The underside elevation and geometry of existing footings supporting load-bearing walls and columns expected to experience an increase in loading under proposed conditions.
- The bearing pressures acting at the underside of footing elevations under existing conditions.
- The bearing pressures that would act at the underside of footing elevations under proposed conditions.

Assuming that the underside elevations of the existing footings are situated at a minimum depth of 1.5 m below the top of the floor slab in the main floor room from which boreholes BH103-24 and BH104-24 were advanced, the bearing strata beneath the existing footings is anticipated to consist of compact to dense non-cohesive soils, based on the results of the

current borehole investigation. For existing footings that will be additionally loaded, or new interior footings if required, a preliminary bearing capacity of 150 kPa (serviceability limit state, or SLS) and 200 kPa (ultimate limit state, or ULS) can be provided for the anticipated bearing strata consistent with the methodology provided in [3], assuming strip footing dimensions between 0.45 and 1.5 m, and spread footing dimensions between 1 x 1 m and 3 x 3 m. It is noted that on the provided conceptual drawings [1], the proposed underside of footing elevation is currently noted as ± 1.2 m. This should be confirmed/reviewed as design progresses in light of frost penetration requirements detailed in this report, and as additional information regarding the underside elevation of the existing footings becomes available. If existing footings are situated above the frost penetration depth, the installation of adequate insulation at the top of the footings, extending sufficiently outward from the footing walls/columns, will be recommended.

If bearing pressures under proposed conditions are confirmed to be less than or equal to the above bearing capacities, and the existing footing dimensions are within the ranges provided above, it is not anticipated that any measures to improve/remediate existing footings would be required, other than potential insulation of the footings if frost penetration requirements are not met under current conditions. It is noted that the above bearing capacity estimates are preliminary and should be confirmed based on actual footing depths and geometries.

Furthermore, proximity of the altered or new footings to basement walls should be considered prior to finalizing the design to ensure that appropriate lateral earth pressures are considered as additional loading will result in increased pressures.

It is generally recommended that the structural condition/integrity of existing footings be confirmed by a structural engineer. This can be completed by retaining a structural engineer to be present for works (hydrovac and/or hand excavation) exposing the existing footings. The scope of investigation works required to adequately confirm the structural condition of existing footings should be determined by the project structural engineer.

If bearing pressures under proposed conditions exceed the final bearing capacity of the existing footings, as confirmed considering the required additional information detailed above,

measures to improve the bearing capacity of the existing footings will be required. Depending on the required increase in bearing capacity, measures such as widening of the existing footings could be considered. In this event, the existing footings could be widened by excavating to the underside of footing elevation, placing formwork on an approved subgrade and widening the footings using cast-in-place reinforced concrete. It is noted that the newly constructed/widened portion of the footings will need to be structurally connected to the existing footings using dowels or similar measures. The design of measures required to ensure structural integrity of widened footings should be completed by the project structural engineer.

Particularly if larger increases in bearing pressures beneath the existing footings are proposed, it is recommended to consider options such as the jet grouting method to improve the bearing capacity of the existing footings. Additional alternatives to improve the bearing capacity of existing footings, depending on the geometry and underside elevation of the existing footings, may be considered and include the installation of drilled micropiles and/or helical piles, and subsequent structural connection of the installed piles to the existing footings.

5.7 Floor Slabs

To create a stable working surface, to distribute loadings, and for drainage purposes, an allowance should be made to provide at least 200 mm of OPSS 1010 Granular A compacted to 98% of Standard Proctor Maximum Dry Density (SPMDD) beneath all new floor slabs, unless the new floor slabs are to be integrated into the existing floor slabs and sufficient thickness of appropriate/compact granular material is confirmed beneath the existing floor slab. If the new floor slab is to be poured on top of and integrated into the existing floor slab, it is generally recommended that a sufficient amount of core holes be advanced at the direction of a geotechnical engineer to confirm the thickness and competency of existing granular material beneath the existing floor slab. As required, dynamic cone penetration testing using hand equipment could be completed as needed at select core hole locations to confirm in-situ relative density of the existing granular material beneath the slab. If the material is identified as very loose or loose, and/or is identified to have settled beneath the slab such that the existing slab is no longer fully supported, removal of the slab may be required, or structural solutions

will need to be developed to ensure that the new floor slab is capable of supporting the anticipated loads. It is recommended that all floor slabs are situated at least 500 mm above the seasonal high groundwater elevation.

Within any interior areas that may be exposed to freezing conditions for extended periods of time, the floor slab may be susceptible to frost heaving, depending on the composition of the subgrade. The subgrade underlying these areas should be adequately insulated to prevent frost penetration.

As it is understood that the main floor is to be converted to a parking garage, higher than normal load may be expected for new floor slabs. Therefore, consideration should be given to utilizing a reinforced floor slab in the parking garage areas. Where reinforced structural slabs are utilized throughout the parking garage floor, the underlying subgrade should consist of 300 mm of OPSS 1010 Granular B, overlain by 150 mm of OPSS 1010 Granular A or 19 mm crushed clear stone. The granular subgrades should be prepared in accordance with and meet required gradation and physical properties set forth in OPSS 1004. Slabs founded on compacted, crushed clear stone or OPSS Granular A material over competent subgrade materials may be designed with a subgrade reaction of 80 MPa/m. As mentioned above, if the new slab is to be integrated into the existing floor slab in the main floor area, additional testing is recommended to confirm competency of the subgrade soils underlying the existing slab.

5.8 Backfill and Compaction

In general, clean non-cohesive soils excavated at the Site are generally anticipated to be suitable for re-use as backfill material, as long as the material is free of organics and/or any other deleterious material and has a moisture content sufficiently close to optimum.

Typically, backfill should be placed in maximum 300 mm thick lifts and should be compacted to a minimum of 98% of Standard Proctor Maximum Dry Density (SPMDD), as confirmed by Proctor testing on a representative number of samples of the material proposed for use as backfill. Backfill adjacent to structural elements should be compacted to 95% of SPMDD, taking care not to damage adjacent structures.

All existing organic and non-organic fills, fill material with excessive construction debris, and any loose soils shall be removed down to a competent base, or as otherwise directed under the supervision and approval of the supervising geotechnical engineer. Backfill areas must be approved by a qualified geotechnical engineer prior to placement of any new fill, to ensure the suitability of subgrade conditions.

5.8.1 Engineered Fill

Where the existing fill is treated as an engineered fill to support structural elements such as foundations, 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/disturbed 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 an imaginary 1H:1V slope to the competent approved native soil. The exposed edges of the engineered fill should be sloped at a maximum of 3H:1V to avoid weakening of the engineered fill edges due to slope movement. If fill is required adjacent to sloped banks (i.e., slope steeper than 3H:1V), the fill shall be placed in stepped planes to avoid a plane weakness.

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.MUNI 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% of SPMDD. 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. Any frost penetration into the fill material must be removed prior to placement of subsequent lifts of fill and reviewed by Cambium.

V. The engineered fill should be placed at least 600 mm above the elevation of the proposed underside of footing (as applicable).

VI. Due to the potential negative effects of differential settlement between the engineered fill and the native soils, in any block where footings are to be placed partly on engineered fill and partly on native soils, reinforcing steel bars should be included and placed within the footings and the top of the foundation walls. All tie reinforcing steel bars should be included and placed within the top of the foundation walls. All tie reinforcing steel bars should have at least 600 mm of overlap. The actual steel reinforcement design should be confirmed / designed by the project structural engineer.

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.

5.9 Lateral Earth Pressure

Lateral earth pressure coefficients (K) are shown in Table 7, with soil mechanical parameters that may be used for the preliminary design of temporary and permanent structures at the Site. It is assumed that potential lateral loads will result from cohesionless, frictional granular backfill material or compact native material.

Table 7 Lateral Earth Pressure Coefficients

Stratum/Parameter	γ / γ' [kN/m^3]	φ [°]	c [kN/m^2]	K_o [-]	K_a [-]	K_p [-]
Granular Backfill (*placed according to compaction requirements detailed in Section 5.8*)	20.5 / 11.5	32	0	0.47	0.31	3.25
Compact Non-Cohesive Soils (*Inferred Fill or Native*)	20.0 / 11.0	30	0	0.50	0.33	3.00

Where: γ = bulk unit weight of soil (kN/m^3)

φ = internal angle of friction (degrees)

K_a = Rankine active earth pressure coefficient (dimensionless)

K_o = Rankine at-rest earth pressure coefficient (dimensionless)

K_p = Rankine passive earth pressure coefficient (dimensionless)

The coefficients provided in Table 7 assume that the surface of the granular backfill is horizontal against any proposed retaining wall, and the wall is vertical and smooth.

Cambium should be contacted to provide updated lateral earth pressure coefficients should the assumptions differ to those noted.

5.10 Seismic Site Classification

For the purpose of earthquake design, geotechnical information shall be used to determine the “Site Class”.

The parameters for determination of Site Classification for Seismic Site Response are set out in Table 4.1.8.4A of the OBC [4]. The classification is based on the determination of the average shear wave velocity in the top 30 metres of the Site stratigraphy, where shear wave velocity (V_s) measurements have been taken. Alternatively, the classification is estimated based on rational analysis of undrained shear strength (S_u) or penetration resistances (N_{60} values).

Based on the explored soil properties and in accordance with Table 4.1.8.4.A, it is recommended that Site Class “D” (stiff soil) be applied for structural design at the Site. Consideration could be given to carrying out shear wave velocity testing (Multichannel Analysis of Surface Waves, “MASW”) to evaluate whether an improved seismic site class can be obtained, if desired.

6.0 Report Limitations

6.1 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 testing.

6.2 Changes in Site and Project Scope

This geotechnical engineering report is intended for planning and design purposes only.

Subsurface conditions can be altered by the passage of sufficient time, natural occurrences, and human intervention. In particular, consideration should be given to contractual responsibilities as they relate to control of groundwater seepage, disturbance of soils, and frost protection.

The design parameters provided, and the engineering advice offered in this report are intended for use by the owner and its retained design consultants. If there are changes to the project scope and development features, these interpretations made of the subsurface information, for geotechnical design parameters, advice, and comments relating to constructability issues and quality control may not be complete for the project. Cambium should be retained to conduct further review to interpret the implications of such changes with respect to this report.

7.0 Closing

We trust that the information contained in this report meets your current requirements. If you have questions or comments regarding this document, please do not hesitate to contact the undersigned at (705) 719-0700.

Respectfully submitted,

Cambium Inc.

DocuSigned by:
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SEB/MG/js

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8.0 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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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.

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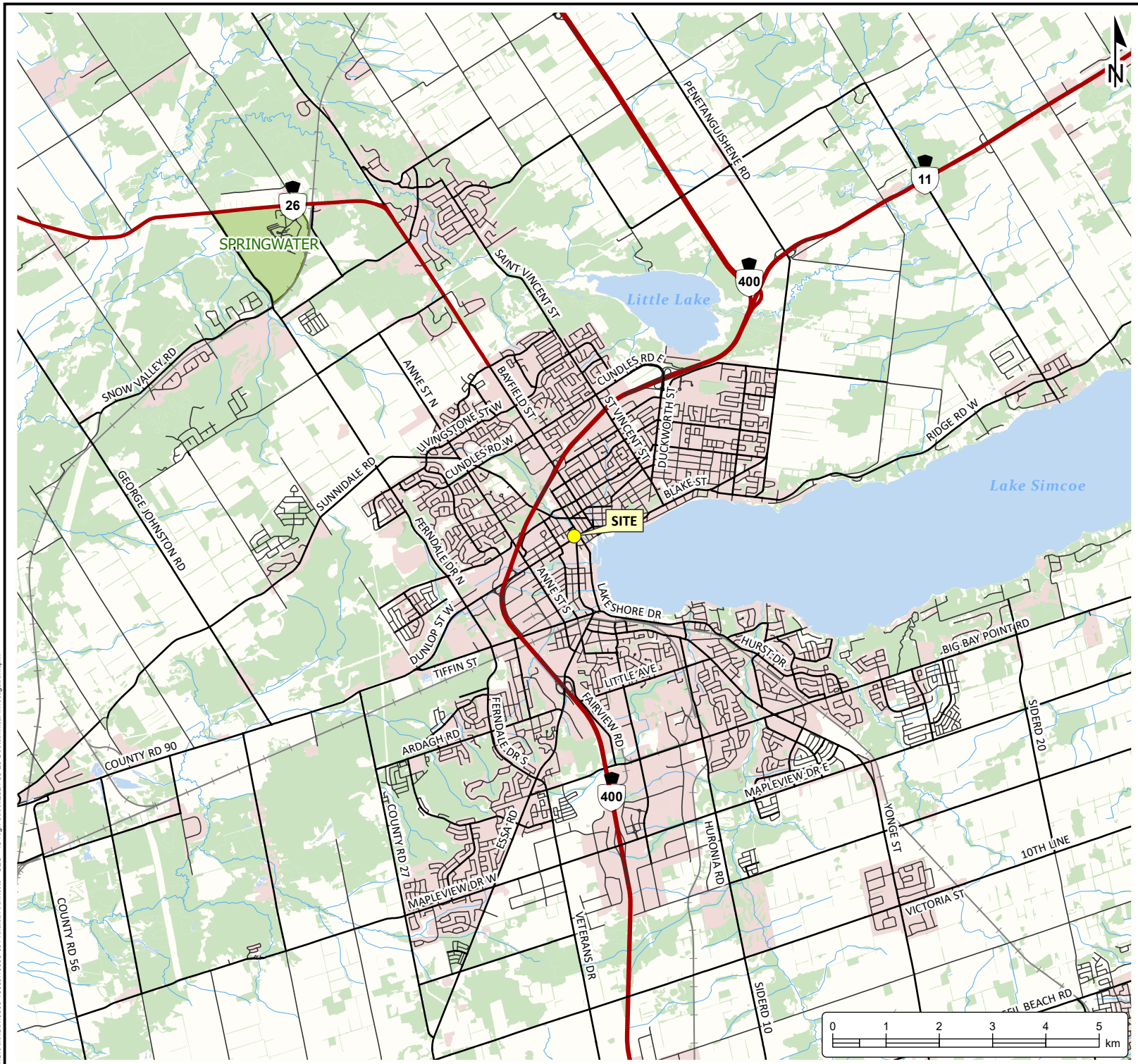
Personal Liability

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

WILD GRAY CAPITAL MANAGEMENT INC.
49 High Street
Barrie, Ontario

LEGEND

- Highway
- Major Road
- Minor Road
- Railway
- Watercourse
- Provincial Park
- Water Area
- Wooded Area
- Built Up Area
- Railway

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SITE LOCATION PLAN

Project No.: 19390-001		Date: September 2024	Rev.:
Scale: 1:100,000		Projection: NAD 1983 UTM Zone 17N	
Created by: RHJ	Checked by: MG	Figure: 1	

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GEOTECHNICAL INVESTIGATION

WILD GRAY CAPITAL MANAGEMENT INC.
49 High Street
Barrie, Ontario

LEGEND

- Borehole
- Monitoring Well
- Site (approximate)

Floor Footprint

- Basement
- Main Floor

Notes:
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BOREHOLE LOCATION PLAN

Project No.: 19390-001		Date: September 2024	Rev.:
Scale: 1:500		Projection: NAD 1983 UTM Zone 17N	
Created by: RHJ	Checked by: MG	Figure: 2	

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Appendix A

Borehole Logs

CAMBIUM

Client: Wild Gray Capital Management
Contractor: Kodiak Drilling
Project No.: 19390-001
Location: 49 High Street, Barrie, ON L4N 5J4

Project Name: 49 High Street
Method: Big Beaver
Elevation: 225.79 mASL
UTM: 17T **N:** 4915766.3 **E:** 603982.4

Log of Borehole: BH101-24
Page: 1 of 1
Date Completed: Sept 4 2024

Elevation (m)	Depth	Description	Elevation / Depth	Number	Type	% Recovery	SPT (N)	% Moisture (25 50 75)	SPT (N) (20 40 60 80)	Well Installation	Log Notes
225.8	0	**CONCRETE:**	225.69 / 0.10								
		FILL: Sand, trace gravel, trace silt, light brown, moist, compact		1	SS	75	19	2.7%	19		
225.3	0.5										
224.8	1			2	SS	100	55	1.9%	55		
			224.72 / 1.07								
224.3	1.5	Borehole terminated @ 1.1 mbgs due to SPT refusal encountered.									Borehole terminated in fill due to unknown obstruction encountered. Borehole caving was not observed. Groundwater was not encountered. Standing water was not observed upon completion of drilling.
223.8	2										
223.3	2.5										
222.8	3										
222.3	3.5										
221.8	4										
221.3	4.5										
220.8	5										
220.3	5.5										
219.8	6										
219.3	6.5										
218.8	7										
218.3											

Atterberg Limits (%) LL PL PI — 25 50 75
Shear Strength Cu, kPa (nat V., rem V.) — 20 40 60 80
% Moisture — 25 50 75
SPT (N) — 20 40 60 80

GRAINSIZE DISTRIBUTION: SAMPLE | GRAVEL | SAND | SILT | CLAY

Logged By: ND **Input By:** ND

Peterborough, Barrie, Whitby, Kingston, Ottawa

CAMBIUM

Client: Wild Gray Capital Management
Contractor: Kodiak Drilling
Project No.: 19390-001
Location: 49 High Street, Barrie, ON L4N 5J4

Project Name: 49 High Street
Method: Big Beaver
Elevation: 225.79 mASL
UTM: 17T **N:** 4915760.6 **E:** 603976.2

Log of Borehole: BH102-24
Page: 1 of 1
Date Completed: Sept 4 2024

Elevation (m)	Depth	Description	Elevation / Depth	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) LL PL PI 25 50 75 / % Moisture 25 50 75	Shear Strength Cu, kPa nat V. rem V. 20 40 60 80 / SPT (N) 20 40 60 80	Well Installation	Log Notes
225.8	0	**CONCRETE:**	225.69								Borehole terminated in fill due to unknown obstruction encountered. Borehole caving was not observed. Groundwater was not encountered. Standing water was not observed upon completion of drilling.
		FILL: Sand, trace gravel, some silt, light brown, moist, compact	0.10 / 225.38	1	SS	83	68	1%	68		
225.3	0.5	Borehole terminated @ 0.4 mbgs due to SPT refusal encountered.	0.41								
224.8	1										
224.3	1.5										
223.8	2										
223.3	2.5										
222.8	3										
222.3	3.5										
221.8	4										
221.3	4.5										
220.8	5										
220.3	5.5										
219.8	6										
219.3	6.5										
218.8	7										
218.3											

GRAINSIZE DISTRIBUTION: SAMPLE | GRAVEL | SAND | SILT | CLAY

Logged By: ND **Input By:** ND

CAMBIUM

Client: Wild Gray Capital Management
Contractor: Kodiak Drilling
Project No.: 19390-001
Location: 49 High Street, Barrie, ON L4N 5J4

Project Name: 49 High Street
Method: Big Beaver
Elevation: 225.79 mASL
UTM: 17T **N:** 4915770.4 **E:** 603985.9

Log of Borehole: BH103-24
Page: 1 of 1
Date Completed: Sept 4 2024

Elevation (m)	Depth	Description	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) LL PL PI	% Moisture	Shear Strength Cu, kPa (nat V. / rem V.)	SPT (N)	Well Installation
225.8	0	**CONCRETE:** 225.69 / 0.10									Cap
		FILL: SAND, trace gravel, trace silt, brown, moist, compact	1	SS	50	25		48.3%		25	Bentonite Plug
225.3	0.5										Riser
224.8	1		2	SS	75	22		1.7%		22	
224.3	1.5										
			3A	SS	83	21		1.2%		21	
223.8	2	223.71 / 2.08	3B	SS				2.6%			
		(SW) SAND: trace to some gravel, trace silt, brown, moist, compact	4A	SS	100	50		1.7%		50	Sand Pack
223.3	2.5	some gravel	4B	SS				1.9%			PVC Screen
222.8	3		5A	SS	100	84		1.5%		84	
222.3	3.5	grey	5B	SS				1.7%			
221.8	4										
221.3	4.5	221.22 / 4.57									Cap
		(SW) SAND: some silt, trace gravel, trace clay, grey, wet, compact	6	SS	100	28		15.9%		28	
220.8	5	220.61 / 5.18									
		Borehole terminated @ 5.2 mbgs due to target depth achieved.									
220.3	5.5										
219.8	6										
219.3	6.5										
218.8	7										
218.3											

Monitoring well dry when measured on Sept. 25, 2024.

Borehole terminated in sand. Borehole caving was not observed. Wet soils first encountered at 4.6 mbgs. Standing water was not observed upon completion of drilling.

GRAINSIZE DISTRIBUTION	SAMPLE	GRAVEL	SAND	SILT	CLAY
	SS 6	6	77	14	3

Logged By: ND **Input By:** ND

Client:	Wild Gray Capital Management	**Project Name:**	49 High Street	**Log of Borehole:**	BH104-24
Contractor:	Kodiak Drilling	**Method:**	Big Beaver	Page:	1 of 1
Project No.:	19390-001	**Elevation:**	225.79 mASL	**Date Completed:**	Sept 5 2024
Location:	49 High Street, Barrie, ON L4N 5J4	**UTM:**	17T **N:** 4915766.6 **E:** 603980.8		

Elevation (m)	Depth	Description	Elevation / Depth	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) LL PL PI / % Moisture	Shear Strength Cu, kPa (nat V., rem V.) / SPT (N)	Well Installation	Log Notes
225.8	0	**CONCRETE:**	225.69 / 0.10							Cap	Monitoring well dry when measured on Sept. 25, 2024.
225.3	0.5	**FILL:** Sand, some gravel, trace silt, trace clay, brown, moist, compact		1A	SS	100	29	3.4%	29	Bentonite Plug	
		trace gravel		1B	SS						
224.8	1	loose		2	SS	42	5	1.5%	5	Riser	
224.3	1.5										
		compact		3	SS	100	15	2.3%	15		
223.8	2										
223.3	2.5	very dense	223.10 / 2.69	4A	SS	100	50	2.7%	50	Sand Pack	
		(SW) gravelly SAND: trace silt, grey, moist, very dense		4B	SS			1.8%			
222.8	3	moist to wet								PVC Screen	
				5	SS	100	75	2.1%	75		
222.3	3.5										
221.8	4										
221.3	4.5		221.22 / 4.57							Cap	
		(SW) SAND: trace gravel, trace silt, trace clay, grey, wet, compact		6	SS	100	27	16.6%	27		Borehole terminated in gravelly sand. Borehole caving was not observed. Wet soils first encountered at 3.0 mbgs. Standing water was not observed upon completion of drilling.
220.8	5	Borehole terminated @ 5 mbgs due to target depth achieved.	220.76 / 5.03								
220.3	5.5										
219.8	6										
219.3	6.5										
218.8	7										
218.3											

GRAINSIZE DISTRIBUTION

SAMPLE	GRAVEL	SAND	SILT	CLAY
SS 2	6	88	5	1

Logged By: ND **Input By:** ND

Peterborough, Barrie, Whitby, Kingston, Ottawa

CAMBIUM

Client: Wild Gray Capital Management
Contractor: Kodiak Drilling
Project No.: 19390-001
Location: 49 High Street, Barrie, ON L4N 5J4

Project Name: 49 High Street
Method: Geotool
Elevation: 222.13 mASL
UTM: 17T **N:** 4915772.1 **E:** 603974.4

Log of Borehole: BH105-24
Page: 1 of 1
Date Completed: Sept 5 2024

Elevation (m)	Depth	Description	Elevation / Depth	Number	Type	% Recovery	SPT (N)	Atterberg Limits (%) LL PL PI 25 50 75 / % Moisture 25 50 75	Shear Strength Cu, kPa nat V. rem V. 20 40 60 80 / SPT (N) 20 40 60 80	Well Installation	Log Notes
222.1	0	**CONCRETE:**	222.03	1A	SS			2.3%			
			0.10								
221.6	0.5	**FILL:** gravelly SAND, trace silt, brown, moist, compact	221.93	1B	SS	50	21	1.5%	21		
			0.20								
221.1	1	**(SW) SAND:** some gravel, some silt, trace clay; grey, moist, compact to very dense grey/brown		2	SS	100	53	1.4%	53		
220.6	1.5	decrease in gravel, grey		3	SS	100	70	1.1%	70		
220.1	2	wet	219.69	4	SS	100	78	5.4%	78		
219.6	2.5	Borehole terminated @ 2.4 mbgs due to SPT refusal encountered.	2.44								Borehole terminated in gravelly sand. Borehole caving was observed at 1.2 mbgs. Wet soils first encountered at 2.3 mbgs. Standing water was not observed upon completion of drilling.
219.1	3										
218.6	3.5										
218.1	4										
217.6	4.5										
217.1	5										
216.6	5.5										
216.1	6										
215.6	6.5										
215.1	7										
214.6											

GRAINSIZE DISTRIBUTION

SAMPLE	GRAVEL	SAND	SILT	CLAY
SS 2	19	69	10	2

Logged By: ND **Input By:** ND

Appendix B

Physical Laboratory Testing Results

Grain Size Distribution Chart

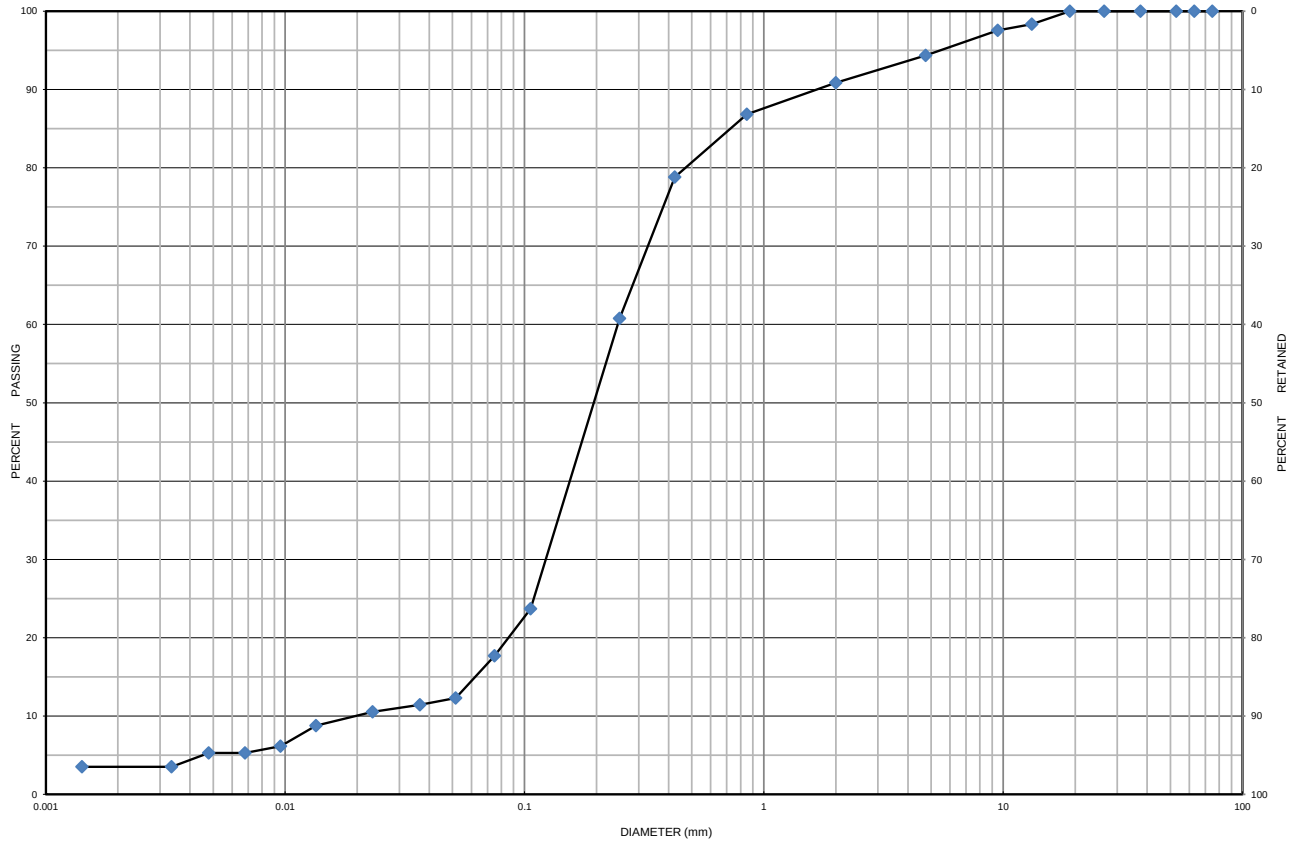
Project Number: *19390-001* **Client:** *Khalsa Architects*

Project Name: *49 High Street*

Sample Date: *September 4 & 5, 2024* **Sampled By:** *Natalie Dubas - Cambium Inc.*

Location: *BH 103-24 SS 6* **Depth:** *4.6 m to 5.2 m* **Lab Sample No:** *S-24-1679*

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 103-24	SS 6	4.6 m to 5.2 m	6	77	14	3	15.9

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Sand some Silt trace Gravel trace Clay	SM	0.240	0.135	0.099	2.42	0.77

Additional information available upon request

Issued By: _____ *Date Issued:* *September 20, 2024*

(Senior Project Manager)

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Grain Size Distribution Chart

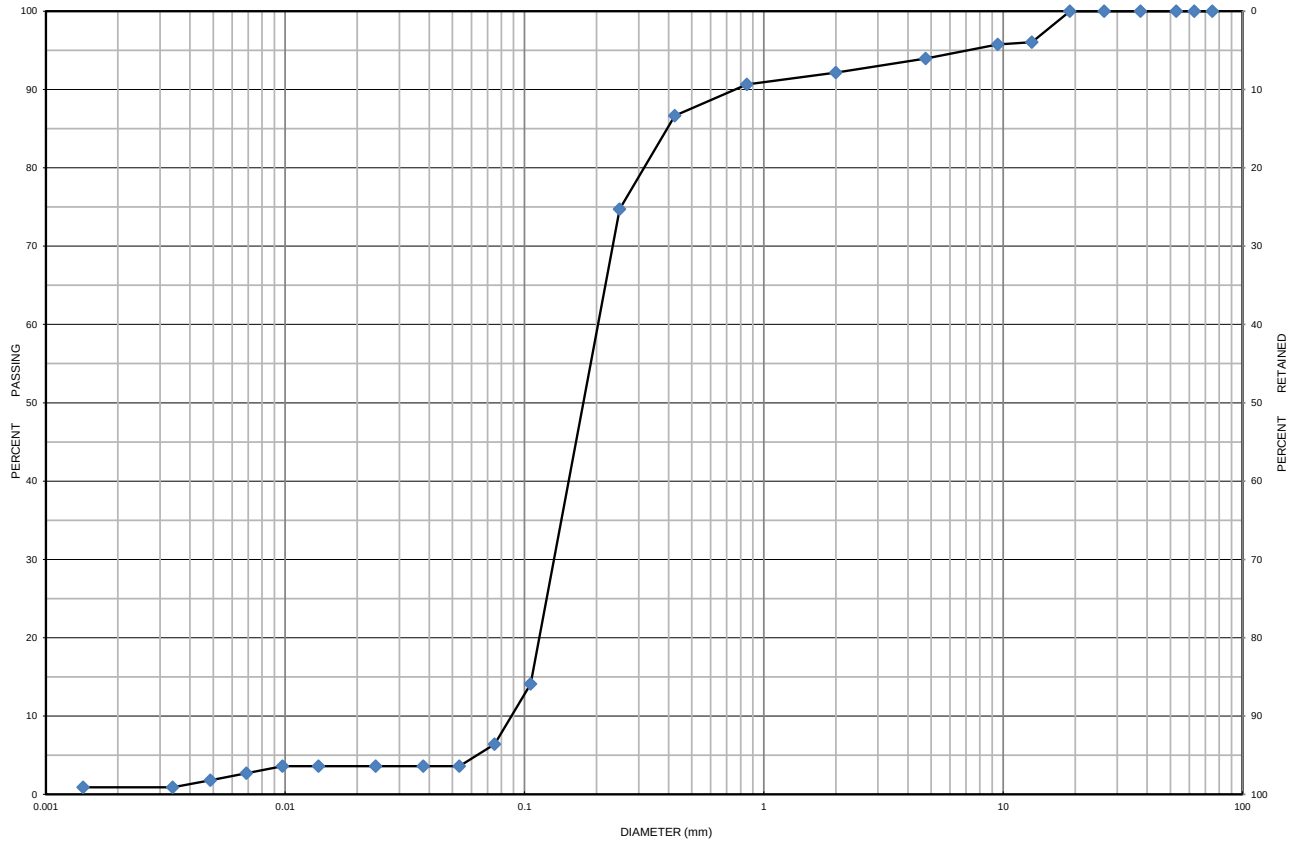
Project Number: *19390-001* **Client:** *Khalsa Architects*

Project Name: *49 High Street*

Sample Date: *September 4 & 5, 2024* **Sampled By:** *Natalie Dubas - Cambium Inc.*

Location: *BH 104-24 SS 2* **Depth:** *0.8 m to 1.4 m* **Lab Sample No:** *S-24-1680*

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 104-24	SS 2	0.8 m to 1.4 m	6	88	5	1	1.5

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Sand trace Gravel trace Silt trace Clay	SP	0.210	0.140	0.089	2.36	1.05

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Grain Size Distribution Chart

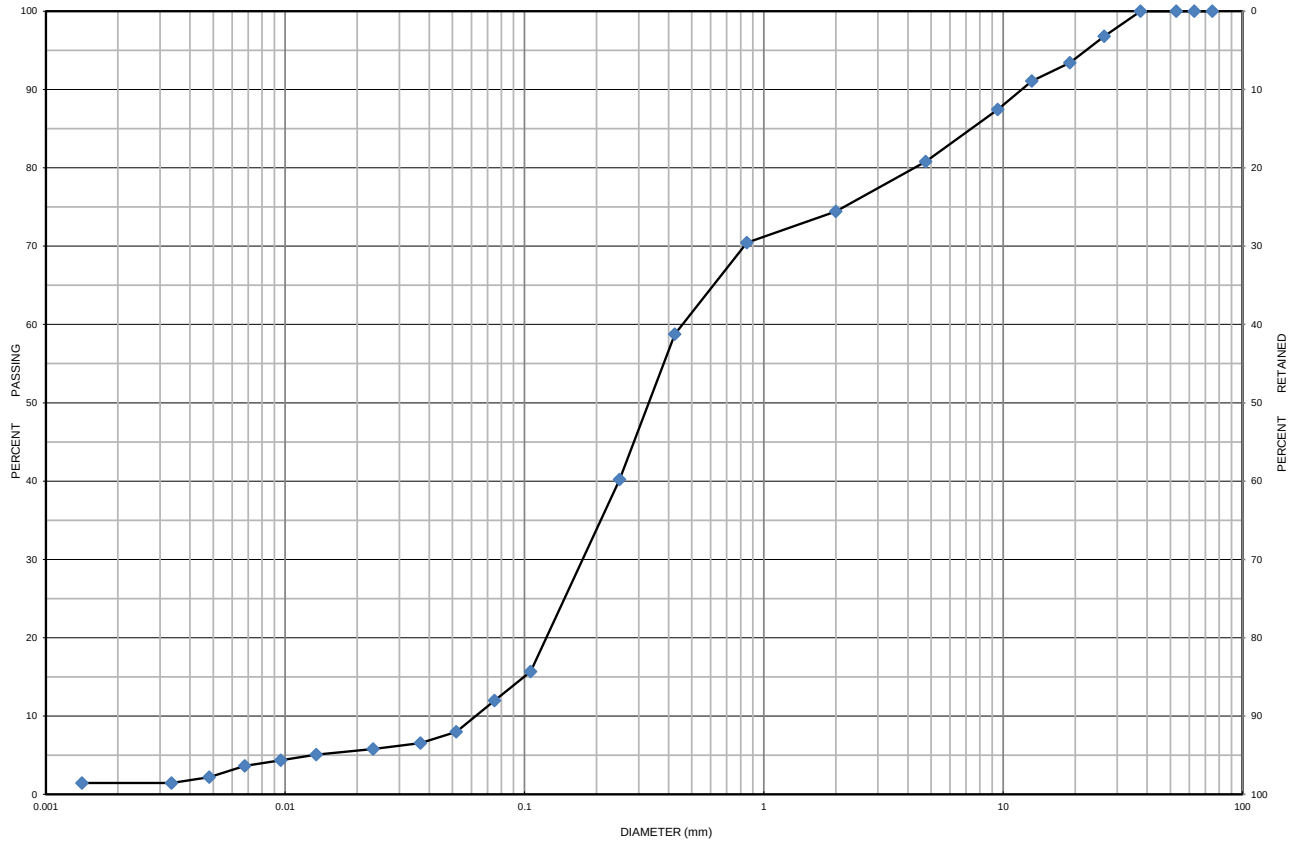
Project Number: *19390-001* **Client:** *Khalsa Architects*

Project Name: *49 High Street*

Sample Date: *September 4 & 5, 2024* **Sampled By:** *Natalie Dubas - Cambium Inc.*

Location: *BH 105-24 SS 2* **Depth:** *0.6 m to 1.2 m* **Lab Sample No:** *S-24-1681*

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 105-24	SS 2	0.6 m to 1.2 m	19	69	10	2	1.4

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Sand some Gravel some Silt trace Clay	SW	0.460	0.170	0.061	7.54	1.03

Additional information available upon request

Issued By: _____ *Date Issued:* *September 20, 2024*

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Moisture Content

Project Number: 19390-001
Project Name: 49 High Street
Client: Khalsa Architects
Date Taken: 2024-09-04

Lab Number: S-24-1678
Date Tested: 2024-09-16
Tested By: M. O'Connor

Borehole Number	Sample Number	Sample Depth (m)	Water Weight (g)	Water Content (%)	Additional Observations
101	1	0.00-0.61	6.5	2.7	
101	2	0.76-1.07	2.9	1.9	NR
102	1	0.00-0.28	3.2	1.0	
103	1	0.00-0.61	95.2	48.3	
103	2	0.76-1.37	4.3	1.7	
103	3A	1.52-2.08	3.3	1.2	
103	3B	2.08-2.13	2.7	2.6	NR
103	4A	2.29-2.39	5.0	1.7	
103	4B	2.39-2.44	1.9	0.9	NR
103	5A	3.05-3.35	3.5	1.5	
103	5B	3.35-3.66	5.4	1.7	NR
103	6	4.57-5.18	82.2	15.9	NR
104	1	0.00-0.61	9.4	3.4	
104	2	0.76-1.37	5.1	1.5	NR
104	3	1.52-2.13	5.1	2.3	
104	4A	2.29-2.69	7.7	2.7	
104	4B	2.69-2.90	5.4	1.8	
104	5	3.05-3.66	6.6	2.1	
104	6	4.72-5.18	50.6	16.6	
105	1A	0.00-0.10	3.4	2.3	NR
105	1B	0.10-0.61	4.4	1.5	
105	2	0.61-1.22	13.0	1.4	NR
105	3	1.22-1.83	3.4	1.1	NR
105	4	1.83-2.44	14.0	5.4	

1 – Contains organics
2 – Contains rubble
3 – Hydrocarbon Odour
4 – Unknown Chemical Odour
5 – Saturated – free water visible
6 – Very moist – near optimum moisture content
7 – Moist – below optimum moisture
8 – Dry – dry texture – powdery
9 – Very small – caution may not be representative
10 – Hold sample for gradation analysis