



**PATERSON
GROUP**

Geotechnical Investigation

Proposed Residential Development

2701 Pagé Road
Ottawa, Ontario

Prepared for 1001263920 Ontario Inc.

Report PG7705-1 dated November 5, 2025

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1.0 Introduction

Paterson Group (Paterson) was commissioned by 1001263920 Ontario Inc. to conduct a geotechnical investigation for the proposed residential development to be located at 2701 Pagé Road in the City of Ottawa (reference should be made to Figure 1 - Key Plan in Appendix 2 of this report).

The objectives of the geotechnical investigation were to:

- Determine the subsoil and groundwater conditions at this site by means of test holes.
- Provide geotechnical recommendations pertaining to design of the proposed development including construction considerations which may affect the design.

The following report has been prepared specifically and solely for the aforementioned project which is described herein. It contains our findings and includes geotechnical recommendations pertaining to the design and construction of the subject development as they are understood at the time of writing this report.

Investigating for the presence or potential presence of contamination on the subject property was not part of the scope of work of the present investigation. Therefore, the present report does not address environmental issues.

2.0 Proposed Development

Based on the available conceptual plan, it is understood that the proposed development will consist of two townhouse-style blocks, each with a basement level. Landscaped areas and driveways are also anticipated as part of the development. It is also expected that the subject site will be municipally serviced.

It is understood that existing structures will be demolished to accommodate the construction of the proposed buildings.

3.0 Method of Investigation

3.1 Field Investigation

Field Program

The field program for the current geotechnical investigation was carried out on September 29, 2025, and consisted of advancing a total of four (4) boreholes to a maximum depth of 7.5 m below existing ground surface. A hand auger hole was also advanced at the southwest corner of the existing building to a depth of 0.7 m below the existing ground surface. The test hole locations were distributed in a manner to provide general coverage of the subject site, taking into consideration underground utilities and site features. The approximate test hole locations are shown on Drawing PG7705-1 – Test Hole Location Plan included in Appendix 2.

The test holes were completed using a low-clearance, auger drill rig operated by a two-person crew. All fieldwork was conducted under the full-time supervision of Paterson personnel under the direction of a senior engineer. The test hole procedure consisted of augering to the required depths at the selected locations, and sampling and testing the overburden.

Sampling and In Situ Testing

Soil samples were collected from the boreholes using two different techniques, namely, sampled directly from the auger flights (AU) or collected using a 50 mm diameter split spoon (SS) sampler. All soil samples were visually inspected and classified on site. The auger and split-spoon samples were placed in sealed plastic bags. All samples were transported to our laboratory for further examination and classification.

The depths at which the auger and split spoon samples were recovered from the boreholes are shown as AU, and SS, respectively, on the Soil Profile and Test Data sheets presented in Appendix 1.

The Standard Penetration Test (SPT) was conducted in conjunction with the recovery of the split-spoon samples. The SPT results are recorded as “N” values on the Soil Profile and Test Data sheets. The “N” value is the number of blows required to drive the split-spoon sampler 300 mm into the soil after a 150 mm initial penetration using a 63.5 kg hammer falling from a height of 760 mm.

Undrained shear strength testing was carried out at regular depth intervals in cohesive soils.

The overburden thickness was evaluated by completing dynamic cone penetration test (DCPT) completed at borehole BH 4-25. The DCPT testing consisted of driving a steel drill rod, equipped with a 50 mm diameter cone at the tip, using a 63.5 kg hammer falling from a height of 760 mm. The number of blows required to drive the cone into the soil is recorded for each 300 mm increment.

The subsurface conditions observed in the test holes were recorded in detail in the field. The soil profiles are logged on the Soil Profile and Test Data Sheets in Appendix 1 of this report.

Groundwater

Groundwater monitoring wells were installed in boreholes BH 1-25, BH 2-25 and BH 3-25 to permit monitoring of the groundwater levels subsequent to the completion of the sampling program. A flexible standpipe piezometer was installed in borehole BH 4-25. The groundwater level readings were obtained after a suitable stabilization period subsequent to the completion of the field investigation. The groundwater observations are discussed in Section 4.3 and presented in the Soil Profile and Test Data sheets in Appendix 1.

3.2 Field Survey

The borehole locations, and ground surface elevation at each borehole location, were surveyed by Paterson using a handheld GPS and referenced to a geodetic datum. The locations of the test holes, and the ground surface elevations at each test hole location, are presented on Drawing PG7705-1 – Test Hole Location Plan in Appendix 2.

3.3 Laboratory Testing

Soil samples were recovered from the subject site and visually examined in our laboratory to review the results of the field logging. Additionally, one (1) shrinkage test, two (2) grain size distribution and hydrometer analysis and four (4) Atterberg Limits tests were completed on selected soil samples. The results are discussed in Section 4.2 and are provided in Appendix 1 of this report. All samples will be stored in the laboratory for a period of one (1) month after issuance of this report. They will then be discarded unless we are directed otherwise.

3.4 Analytical Testing

One (1) soil sample was submitted for analytical testing to assess the corrosion potential for exposed ferrous metals and the potential of sulphate attacks against subsurface concrete structures. The sample was submitted to determine the concentration of sulphate and chloride, the resistivity, and the pH of the samples. The results are presented in Appendix 1 and are discussed further in Section 6.7.

4.0 Observations

4.1 Surface Conditions

The western portion of the subject site is currently occupied by an existing residential building with associated driveway and landscaped areas. The eastern portion of the site is generally vacant and covered by grass and small shrubs.

The site is bordered to the north by Trailsedge Way, to the south by residential buildings, to the east by Contour Street and to the west by Pagé Road. The ground surface across the property slopes gently downwards from west to east at approximate geodetic elevations of 86 to 84.5 m.

4.2 Subsurface Profile

Generally, the subsurface profile encountered at the test hole locations consists of topsoil underlain by fill material consisting of brown silty sand and/or brown silty clay with organics and gravel overlying a deposit of silty clay. The fill material was observed to extend to an approximate depth of 2 m at borehole BH 1-25, located in proximity to the western face of the existing building. However, the depth of fill generally ranged between 0.7 and 0.8 m below existing ground surface at boreholes BH 2-25 through BH 4-25, located within the landscaped rear yard.

At borehole BH 2-25, an approximate 0.5 m thick layer of loose brown silty sand was encountered below the fill layer, extending to an approximate depth of 1.1 m.

A deposit of hard to stiff brown silty clay was encountered underlying the above-noted soils at all borehole locations, becoming firm and grey in colour at approximate depths ranging from 3.0 to 4.5 m.

Practical refusal to the DCPT was encountered at an approximate depth of 23.3 m at borehole BH 4-25.

Reference should be made to the Soil Profile and Test Data sheets in Appendix 1 for the details of the soil profile encountered at each test hole location.

Bedrock

Based on available geological mapping, bedrock in the area of the subject site consists of interbedded limestone and shale of the Lindsay Formation. The overburden drift thickness is estimated to be between 25 and 50 m depth.

Grain Size Distribution and Hydrometer Testing

Two (2) grain size distribution and hydrometer tests were completed to further classify selected soil samples. The results are summarized in Table 1 below and are presented in Appendix 1.

Table 1 – Summary of Grain Size Distribution Analysis					
Borehole	Sample	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BH 2-25	SS4	0.0	0.4	19.6	80.0
BH 3-25	SS4	0.0	1.0	26.0	73.0

Atterberg Limit Tests

A total of four (4) silty clay samples were submitted for Atterberg Limits testing. The test results indicate that the silty clay is generally classified as an Inorganic Clay of High Plasticity (CH). These classifications are in accordance with the Unified Soil Classification System. The results are summarized in Table 2 below.

Table 2 – Summary of Atterberg Limits Results						
Borehole	Sample	Depth (m)	LL (%)	PL (%)	PI (%)	Classification
BH 1-25	SS4	2.2 – 2.5	59	25	34	CH
BH 2-25	SS3	1.5 – 2.1	65	25	40	CH
BH 3-25	SS3	1.5 – 2.1	73	31	42	CH
BH 4-25	SS4	2.2 – 2.8	70	27	43	CH

Notes: LL: Liquid Limit; PL: Plastic Limit; PI: Plasticity Index; CH: Inorganic Clay of High Plasticity

Shrinkage Test

The results of the shrinkage limit test indicate a shrinkage limit of 19.65 and a shrinkage ratio of 1.755.

4.3 Groundwater

Groundwater levels were measured within the installed monitoring wells and piezometer on October 7, 2025. The measured groundwater levels noted at that time are presented in Table 3 and are also presented in Appendix 1.

Table 3 – Summary of Groundwater Levels

Borehole Number	Ground Surface Elevation (m)	Measured Groundwater Level		Dated Recorded
		Depth (m)	Elevation (m)	
BH 1-25*	86.02	5.37	80.65	October 7, 2025
BH 2-25*	85.00	5.34	79.66	
BH 3-25*	84.55	5.05	79.50	
BH 4-25	84.41	Blocked	-	

Note: Ground surface elevations at borehole location are referenced to a geodetic datum.
 '*' – Denotes Monitoring Well

Groundwater levels can also be estimated based on the observed colour and consistency of the recovered soil samples. Based on these observations, the groundwater table can be expected at approximately **4.0 to 5.0 m** below ground surface. The recorded groundwater levels are also provided on the applicable Soil Profile and Test Data sheet presented in Appendix 1.

It should be noted that groundwater levels are subject to seasonal fluctuations. Therefore, the groundwater levels could vary at the time of construction.

5.0 Discussion

5.1 Geotechnical Assessment

From a geotechnical perspective, the subject site is considered suitable for the proposed development. It is recommended that the proposed structures be founded on conventional spread foundations placed on an undisturbed, hard to stiff brown silty clay or firm grey silty clay bearing surface.

Due to the presence of a silty clay deposit at the site, the proposed development will be subjected to grade raise restrictions. Our permissible grade raise recommendations are discussed in Section 5.3.

The above and other considerations are discussed in the following sections.

5.2 Site Grading and Preparation

Stripping Depth

Topsoil and any fill containing significant amounts of deleterious or organic materials, or construction debris/remnants should be stripped from under any buildings, paved areas, pipe bedding and other settlement sensitive structures. Care should be taken not to disturb subgrade soils during site preparation activities.

Existing foundation walls and other construction debris should be entirely removed from within the building perimeters. Under paved areas, existing construction remnants such as foundation walls should be excavated to a minimum of 1 m below final grade.

Fill Placement

Fill used for grading beneath the building areas should consist, unless otherwise specified, of clean imported granular fill, such as Ontario Provincial Standard Specifications (OPSS) Granular A or Granular B Type II. This material should be tested and approved prior to delivery to the site. The fill should be placed in lifts no greater than 300 mm thick and compacted using suitable compaction equipment for the lift thickness. Fill placed beneath the proposed building areas should be compacted to at least 98% of its standard Proctor maximum dry density (SPMDD).

Non-specified existing fill along with site-excavated soil can be used as general landscaping fill and beneath exterior parking areas where settlement of the ground surface is of minor concern. In landscaped areas, these materials should be spread in thin lifts and at least compacted by the tracks of the spreading equipment to minimize voids. If these materials are to be used to build up the subgrade level for areas to be paved, they should be compacted in thin lifts to a minimum density of 95% of their respective SPMDD.

Non-specified existing fill and site-excavated soils are not suitable for use as backfill against foundation walls unless a composite drainage blanket connected to a perimeter drainage system is provided.

5.3 Foundation Design

Bearing Resistance Values

Strip footings, up to 3 m wide, and pad footings, up to 5 m wide, founded on an undisturbed, hard to stiff brown silty clay bearing surface can be designed can be designed using a bearing resistance value at serviceability limit states (SLS) of **125 kPa** and a factored bearing resistance value at ultimate limit states (ULS) of **200 kPa**.

Footings placed on an undisturbed, firm grey silty clay bearing surface can be designed using a bearing resistance value at SLS of **80 kPa** and a factored bearing resistance value at ULS of **120 kPa**.

An undisturbed soil bearing surface consists of one from which all topsoil and deleterious materials, such as loose, frozen or disturbed soil, have been removed prior to the placement of concrete for footings.

A geotechnical resistance factor of 0.5 was applied to the above noted bearing resistance value at ULS.

Footings placed on an undisturbed soil bearing surface and designed using the bearing resistance values at SLS provided above will be subjected to potential post-construction total and differential settlements of 25 and 20 mm, respectively.

Lateral Support

The bearing medium under footing-supported structures is required to be provided with adequate lateral support with respect to excavations and different foundation levels. Above the groundwater level, adequate lateral support is provided to the in-situ bearing medium soils when a plane extending down and out from the bottom edge of the footing at a minimum of 1.5H:1V passes only through in situ soil.

Permissible Grade Raise Recommendations

Due to the presence of the silty clay deposit at the site, a permissible grade raise restriction of **1.5 m** is recommended for grading at the subject site.

If higher than permissible grade raises are required, preloading with or without a surcharge, lightweight fill, and/or other measures should be investigated to reduce the risks of unacceptable long-term post-construction total and differential settlements.

5.4 Design for Earthquakes

The site class for seismic site response can be taken as **Class Xd** for the foundations at the subject site. The soils underlying the subject site are not susceptible to liquefaction. Reference should be made to the latest revision of the Ontario Building Code (OBC) 2024 for a full discussion of the earthquake design requirements.

5.5 Basement Slab

With the removal of all topsoil and fill, containing significant amounts of deleterious or organic materials, the native soil and/or approved fill is considered to be an acceptable subgrade surface on which to commence backfilling for floor slab construction. It is recommended that the upper 300 mm of sub-floor fill consists of 19 mm clear crush stone.

All backfill material within the footprint of the proposed buildings should be placed in a maximum 300 mm thick loose layers and compacted to a minimum of 98% of the material's SPMDD.

Any soft areas should be removed and backfilled with appropriate backfill material prior to placing any fill. OPSS Granular B Type II, with a maximum particle size of 50 mm, are recommended for backfilling below the floor slab.

5.6 Pavement Design

For design purposes, the pavement structure presented in the following tables could be used for the design of car only parking areas and access lanes.

Table 4 – Recommended Asphalt Pavement Structure – Driveways/Car Only Parking Areas

Thickness (mm)	Material Description
50	Wear Course – Superpave 12.5 Asphaltic Concrete
150	BASE – OPSS Granular A Crushed Stone
300	SUBBASE – OPSS Granular B Type II
SUBGRADE – Either fill, in situ soils or OPSS Granular B Type I or II material placed over in situ soil or bedrock.	

Table 5 – Recommended Asphalt Pavement Structure – Access Lanes

Thickness (mm)	Material Description
40	Wear Course – Superpave 12.5 Asphaltic Concrete
50	Binder Course – Superpave 19.0 Asphaltic Concrete
150	BASE – OPSS Granular A Crushed Stone
400	SUBBASE – OPSS Granular B Type II
SUBGRADE – Either fill, in situ soils or OPSS Granular B Type I or II material placed over in situ soil or bedrock.	

Minimum Performance Graded (PG) 58-34 asphalt cement should be used for this project.

If soft spots develop in the subgrade during compaction or due to construction traffic, the affected areas should be excavated and replaced with OPSS Granular B Type II material. The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 99% of the material's SPMDD using suitable vibratory equipment.

Pavement Structure Drainage

Satisfactory performance of the pavement structure is largely dependent on the contact zone between the subgrade material and the base stone in a dry condition. Failure to provide adequate drainage under conditions of heavy wheel loading can result in the fine subgrade soil being pumped into the voids in the stone subbase, thereby reducing load carrying capacity.

Due to the low permeability of the subgrade materials consideration should be given to installing subdrains during the pavement construction. The subdrain inverts should be approximately 300 mm below subgrade level. The subgrade surface should be crowned to promote water flow to the drainage lines.

6.0 Design and Construction Precautions

6.1 Foundation Drainage and Backfill

Foundation Drainage

It is recommended that a perimeter foundation drainage system be provided for each proposed structure which has below-grade space. The system should consist of a 150 mm diameter perforated and corrugated plastic pipe, surrounded on all sides by 150 mm of 19 mm clear crushed stone, which is placed at the footing level around the exterior perimeter of the structure. The pipe should have positive outlet, such as a gravity connection to the storm sewer, or to the sump pit where sump pumps are proposed at the residential dwellings.

Foundation Backfill

Backfill against the exterior sides of the foundation walls should consist of free draining non-frost susceptible granular materials. The greater part of the site excavated materials will be frost susceptible and, as such, are not recommended for re-use as backfill against the foundation walls, unless used in conjunction with a drainage geo-composite, such as Delta Drain 6000, connected to the perimeter foundation drainage system.

6.2 Protection of Footings Against Frost Action

Perimeter footings of heated structures are recommended to be insulated against the deleterious effects of frost action. A minimum 1.5 m thick soil cover, or an equivalent combination of soil cover and foundation insulation, should be provided in this regard.

Exterior unheated footings, such as isolated piers, are more prone to deleterious movement associated with frost action than the exterior walls of the structure, and require additional protection, such as soil cover of 2.1 m, or an equivalent combination of soil cover and foundation insulation.

6.3 Excavation Side Slopes

The side slopes of excavations in the overburden materials should either be cut back at acceptable slopes or should be retained by shoring systems from the start of the excavation until the structure is backfilled. For the proposed development, it is anticipated that sufficient room will be available for the greater part of the excavation to be undertaken by open-cut methods (i.e. unsupported excavations).

The excavation side slopes in the overburden soils, above the groundwater level extending to a maximum depth of 3 m should be cut back at 1H:1V or flatter. A flatter slope is required for excavation below groundwater level, such as 3H:1V. The subsurface soil at this site is considered to be mainly Type 2 and 3 soil according to the Occupational Health and Safety Act and Regulations for Construction Projects.

Excavated soil should not be stockpiled directly at the top of excavations and heavy equipment should be kept away from the excavation sides.

Slopes in excess of 3 m in height should be periodically inspected by the geotechnical consultant in order to detect if the slopes are exhibiting signs of distress.

It is recommended that a trench box is used to protect personnel working in trenches with steep or vertical sides. It is expected that services will be installed by “cut and cover” methods and excavations will not be left open for extended periods of time.

6.4 Pipe Bedding and Backfill

Bedding and backfill materials should be in accordance with the most recent material specifications and standard detail drawings from the department of public works and services, infrastructure services branch of the City of Ottawa.

The pipe bedding for sewer and water pipes should consist of at least 150 mm of OPSS Granular A material. Where the bedding is located on the grey silty clay, the thickness of the bedding material should be increased to 300 mm. The bedding should extend to the spring line of the pipe. The material should be placed in maximum 300 mm thick lifts and compacted to a minimum of 99% of the material’s standard Proctor maximum dry density.

Cover material, from the spring line to a minimum of 300 mm above the obvert of the pipe, should consist of OPSS Granular A (concrete or PSM PVC pipes) or sand (concrete pipe). The bedding and cover materials should be placed in maximum 225 mm thick lifts and compacted to a minimum of 99% of its SPMDD.

It should generally be possible to re-use the site generated fill materials (moist, not wet) above the cover material if excavation and filling operations are carried out in dry and non-freezing weather conditions. The wet silty clay should be given a sufficient drying period to decrease its moisture content to an acceptable level to make compaction possible prior to being re-used.

Where hard surface areas are considered above the trench backfill, the trench backfill material within the frost zone (about 1.8 m below finished grade) and above the cover material should match the soils exposed at the trench walls to minimize differential frost heaving. The trench backfill should be placed in maximum 300 mm thick loose lifts and compacted to a minimum of 95% of the material's SPMDD. All cobbles larger than 200 mm in their longest direction should be segregated from re-use as trench backfill.

6.5 Groundwater Control

It is anticipated that groundwater infiltration into the excavation should be low to moderate and controllable using open sumps. Pumping from open sumps should be sufficient to control the groundwater influx through the sides of shallow excavations. The contractor should be prepared to direct water away from all bearing surfaces and subgrades, regardless of the source, to prevent disturbance to the founding medium.

Permit to Take Water

Under the current regulations enacted by the Ministry of Environment, Conservation and Parks (MECP), any dewatering in excess of 50,000 L/day requires a registration on the Environmental Activity and Sector Registry (EASR), so long as that dewatering is related to construction. If the dewatering is not related to construction, a Permit to Take Water obtained from the MECP will be required.

In the event that an EASR is required to facilitate dewatering of the proposed development, a minimum of three to four weeks should be allotted for completion of the EASR registration and the Water Taking and Discharge Plan, to be prepared by a Qualified Person as stipulated under O.Reg. 63/16. Should a Permit to Take Water be required, a minimum of five to six months should be allotted for completion of the permit, due to the minimum review period imposed by the MECP.

6.6 Winter Construction

Precautions must be taken if winter construction is considered for this project. The subsoil conditions at this site consist of frost susceptible materials. In the presence of water and freezing conditions, ice could form within the soil mass. Heaving and settlement upon thawing could occur.

In the event of construction during below zero temperatures, the founding stratum should be protected from freezing temperatures by the use of straw, propane heaters and tarpaulins or other suitable means. In this regard, the base of the excavations should be insulated from sub-zero temperatures immediately upon exposure and until such time as heat is adequately supplied to the building and the footings are protected with sufficient soil cover to prevent freezing at founding level.

Trench excavations and pavement construction are also difficult activities to complete during freezing conditions without introducing frost in the subgrade or in the excavation walls and bottoms. Precautions should be taken if such activities are to be carried out during freezing conditions. Additional information could be provided, if required.

6.7 Corrosion Potential and Sulphate

The results of analytical testing show that the sulphate content is less than 0.1%. This result is indicative that Type 10 Portland cement (GU – General Use cement) would be appropriate for this site. The chloride content and pH of the sample indicate that they are not a significant factor in creating a corrosive environment for exposed ferrous metals at this site, whereas the resistivity is indicative of a moderate to aggressive corrosive environment.

6.8 Landscaping Considerations

Tree Planting Restrictions

In accordance with the City of Ottawa Tree Planting in Sensitive Marine Clay Soils (2017 Guidelines), Paterson completed a soils review of the site to determine applicable tree planting setbacks. Atterberg Limits testing was completed for recovered silty clay samples at selected locations throughout the subject site. Grain size distribution and hydrometer testing were also completed on selected soil samples. The above-noted soil samples were recovered from elevations below the anticipated design underside of footing elevation and 3.5 m depth below anticipated finished grade. The results of our testing are presented in Section 4.2 and in Appendix 1.

Based on the results of our review, two areas were defined within the subject site in which the tree planting restrictions are defined. The areas are detailed below and are outlined in Drawing PG7705-2-Tree Planting Setback Recommendations presented in Appendix 2.

Area 1 – Low to Medium Sensitivity Clay Area

A low to medium sensitivity clay soil was encountered between anticipated underside of footing elevations and 3.5 m below preliminary finished grade as per City Guidelines at the areas outlined in Drawing PG7705-2-Tree Planting Setback Recommendations in Appendix 2. Based on our Atterberg Limits test results, the modified plasticity limit does not exceed 40% in these areas. The following tree planting setbacks are recommended for the low to medium sensitivity area.

Large trees (mature height over 14 m) can be planted within these areas provided a tree to foundation setback equal to the full mature height of the tree can be provided (e.g. in a park or other green space).

Tree planting setback limits may be reduced to 4.5 m for small (mature tree height up to 7.5m) and medium size trees (mature tree height 7.5 m to 14 m) provided that the conditions noted below are met.

Area 2 – High Sensitivity Clay Area

A high sensitivity clay soil was encountered between anticipated underside of footing elevations and 3.5 m below anticipated finished grade as per City Guidelines at the area outlined in Drawing PG7705-2-Tree Planting Setback Recommendations in Appendix 2. Based on our Atterberg Limits test results, the modified plasticity limit generally exceeds 40% in this area. The following tree planting setbacks are recommended for these high sensitivity areas.

Large trees (mature height over 14 m) can be planted within this area provided a tree to foundation setback equal to the full mature height of the tree can be provided (e.g. in a park or other green space).

Tree planting setback limits is 7.5 m for small (mature tree height up to 7.5m) and medium size trees (mature tree height 7.5 m to 14 m) provided that the following conditions are met:

- The underside of footing (USF) is 2.1 m or greater below the lowest finished grade must be satisfied for footings within 10 m from the tree, as measured from the center of the tree trunk and verified by means of the Grading Plan.
- A small tree must be provided with a minimum of 25 m³ of available soil volume while a medium tree must be provided with a minimum of 30 m³ of available soil volume, as determined by the Landscape Architect. The developer is to ensure that the soil is generally un-compacted when backfilling in street tree planting locations.

- The tree species must be small (mature tree height up to 7.5 m) to medium size (mature tree height 7.5 m to 14 m) as confirmed by the Landscape Architect.
- The foundation walls are to be reinforced at least nominally (minimum of two upper and two lower 15M bars in the foundation wall).
- Grading surrounding the tree must promote drainage to the tree root zone (in such a manner as not to be detrimental to the tree), as noted on the subdivision Grading Plan.

The recommended tree planting setbacks should be required by Paterson, once the proposed Grading Plan and Landscape Plan have been prepared.

Aboveground Swimming Pools, Hot Tubs, Decks and Additions

The in-situ soils are considered to be acceptable for in-ground swimming pools. Above ground swimming pools must be placed at least 5 m away from the residence foundation and neighboring foundations. Otherwise, pool construction is considered routine and can be constructed in accordance with the manufacturer's requirements.

Additional grading around the hot tub should not exceed permissible grade raises. Otherwise, hot tub construction is considered routine and can be constructed in accordance with the manufacturer's specifications.

Additional grading around proposed deck or addition should not exceed permissible grade raises. Otherwise, standard construction practices are considered acceptable.

7.0 Recommendations

The following is recommended to be completed once the preliminary site plan and site development are determined:

- Review of the final design details, from a geotechnical perspective.
- Observation of all bearing surfaces prior to the placement of concrete.
- Sampling and testing of the concrete and fill materials used.
- Periodic observation of the condition of unsupported excavation side slopes in excess of 3 m in height, if applicable.
- Observation of all subgrades prior to backfilling.
- Field density tests to determine the level of compaction achieved.
- Sampling and testing of the bituminous concrete including mix design reviews.

A report confirming that these works have been conducted in general accordance with our recommendations could be issued upon the completion of a satisfactory inspection program by the geotechnical consultant.

All excess soil must be handled as per ***Ontario Regulation 406/19: On-Site and Excess Soil Management.***

8.0 Statement of Limitations

The recommendations provided are in accordance with the present understanding of the project. Paterson requests permission to review the recommendations when the drawings and specifications are completed.

A soils investigation is a limited sampling of a site. Should any conditions at the site be encountered which differ from those at the test locations, Paterson requests immediate notification to permit reassessment of our recommendations.

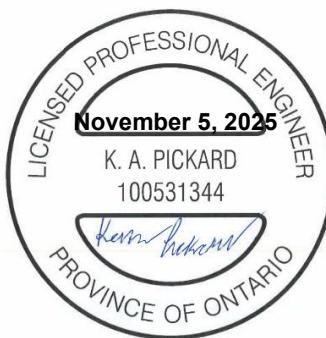
The recommendations provided herein should only be used by the design professionals associated with this project. They are not intended for contractors bidding on or undertaking the work. The latter should evaluate the factual information provided in this report and determine the suitability and completeness for their intended construction schedule and methods. Additional testing may be required for their purposes.

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein or by person(s) other than 1001263920 Ontario Inc., or their agents, is not authorized without review by Paterson for the applicability of our recommendations to the alternative use of the report.

Paterson Group Inc.



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APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

GRAIN SIZE DISTURBUTION AND HYDROMETER TESTING RESULTS

ATTERBERG LIMIT TESTING RESULTS

ANALYTICAL TESTING RESULTS



**PATERSON
GROUP**

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

2701 Page Road, Ottawa, ON

COORD. SYS.: MTM ZONE 9

EASTING: 381529.45

NORTHING: 5033110.98

ELEVATION: 86.02

PROJECT: Proposed Development

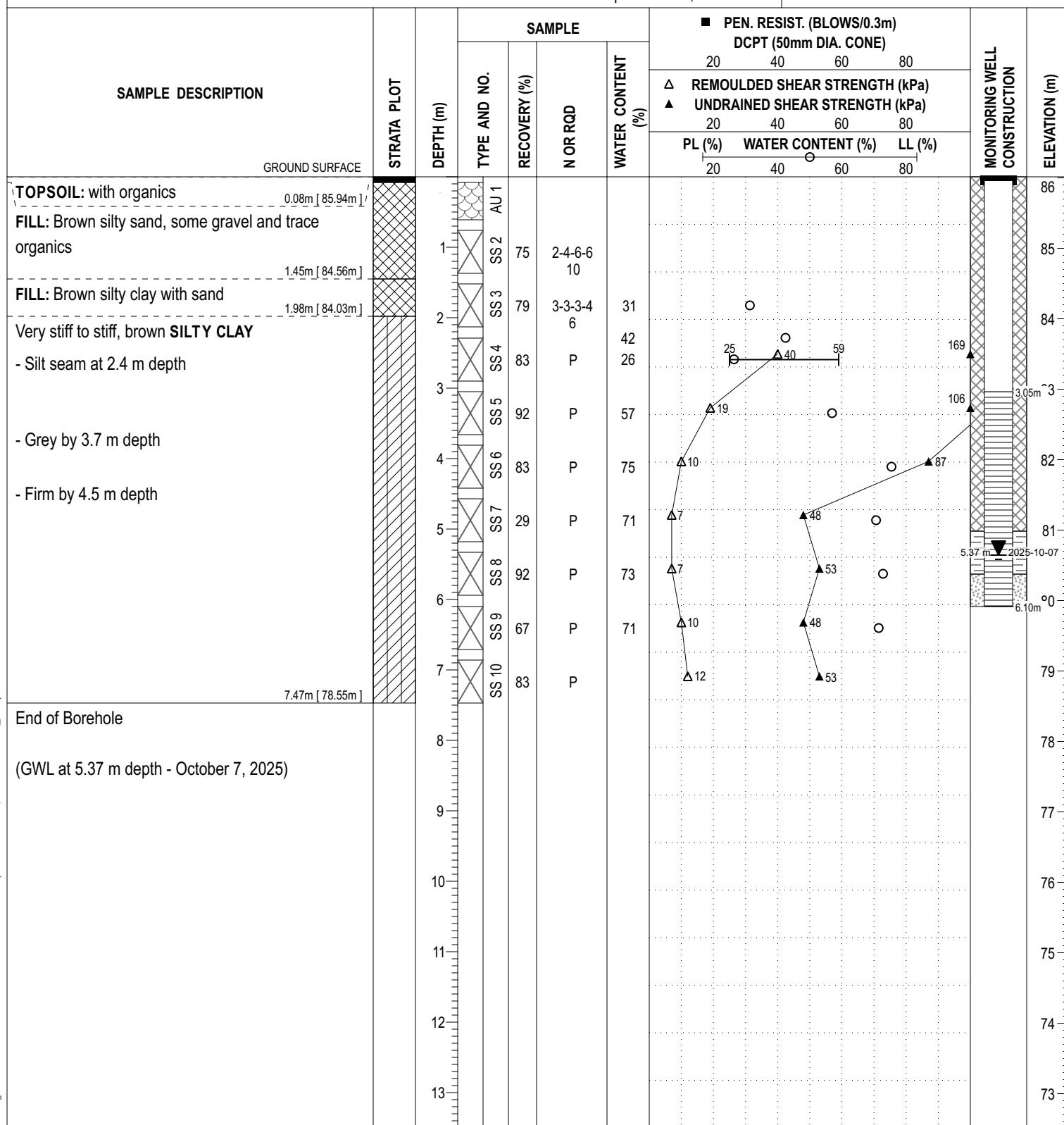
FILE NO.: PG7705

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: September 29, 2025

HOLE NO.: BH 1-25



DISCLAIMER: THE DATA PRESENTED IN THIS SHEET IS THE PROPERTY OF PATERSON GROUP AND THE CLIENT FOR WHOM IT WAS PRODUCED. THIS SHEET SHOULD BE READ IN CONJUNCTION WITH ITS CORRESPONDING REPORT. PATERSON GROUP IS NOT RESPONSIBLE FOR THE UNAUTHORIZED USE OF THIS DATA.



COORD. SYS.: MTM ZONE 9

EASTING: 381564.85

NORTHING: 5033134.24

ELEVATION: 85.00

PROJECT: Proposed Development

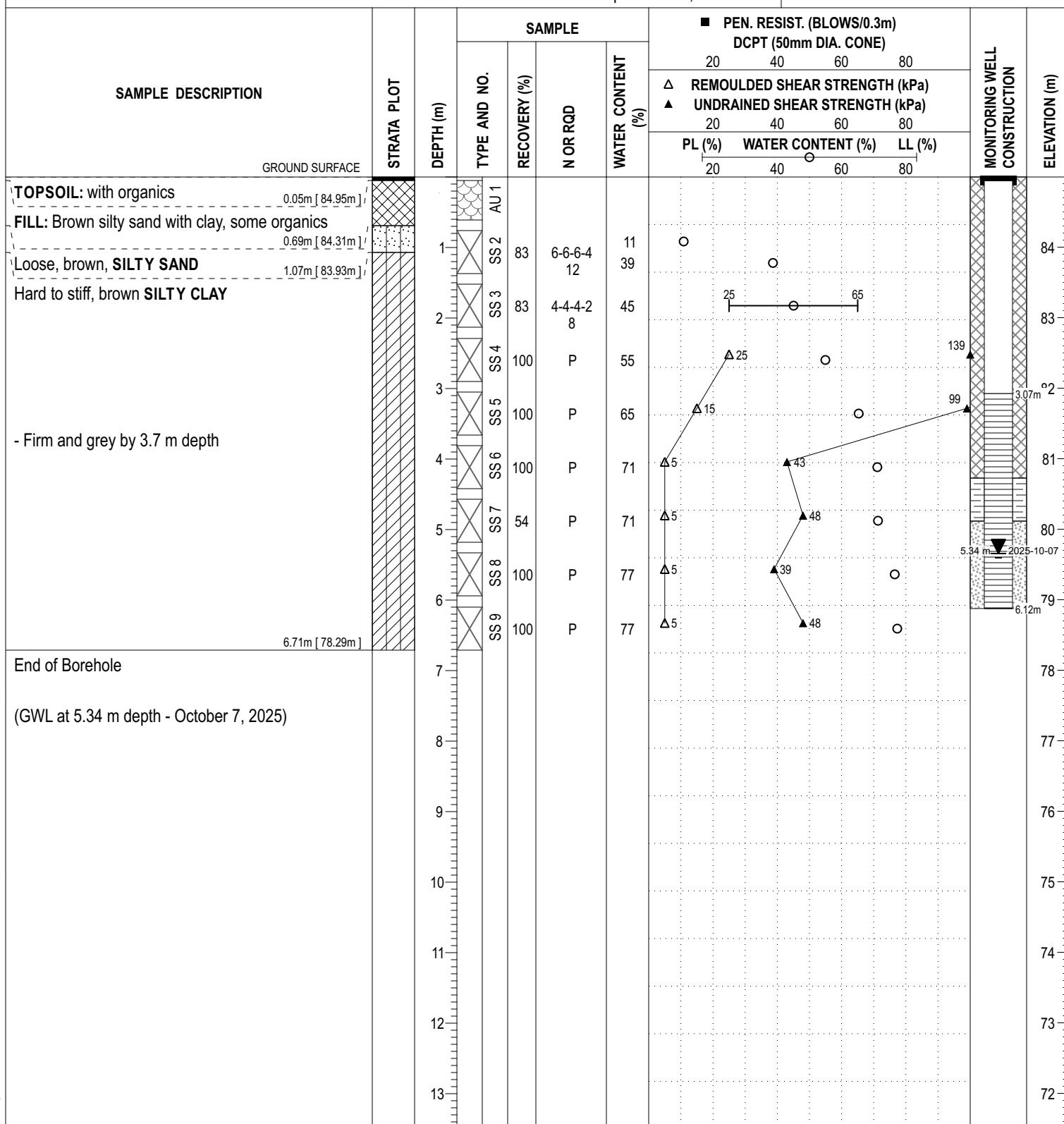
FILE NO.: PG7705

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: September 29, 2025

HOLE NO.: BH 2-25



DISCLAIMER: THE DATA PRESENTED IN THIS SHEET IS THE PROPERTY OF PATERSON GROUP AND THE CLIENT FOR WHOM IT WAS PRODUCED. THIS SHEET SHOULD BE READ IN CONJUNCTION WITH ITS CORRESPONDING REPORT. PATERSON GROUP IS NOT RESPONSIBLE FOR THE UNAUTHORIZED USE OF THIS DATA.



PATERSON GROUP

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

2701 Page Road, Ottawa, ON

COORD. SYS.: MTM ZONE 9

EASTING: 381590.57

NORTHING: 5033136.75

EL E V A T I O N : 84.55

PROJECT: Proposed Development

FILE NO. : PG7705

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: September 29, 2025

HOLE NO. : BH 3-25

SAMPLE DESCRIPTION

GROUND SURFACE

STRATA PLOT

DEPTH (m)

SAMPLE

TYPE AND NO.

RECOVERY (%)

N OR RQD

WATER CONTENT (%)

■ PEN. RESIST. (BLOWS/0.3m)
DCPT (50mm DIA. CONE)
20 40 60 80

△ REMOULDED SHEAR STRENGTH (kPa)
▲ UNDRAINED SHEAR STRENGTH (kPa)
20 40 60 80

PL (%) WATER CONTENT (%) LL (%)
20 40 60 80

MONITORING WELL CONSTRUCTION

ELEVATION (m)

TOPSOIL: with organics 0.05m [84.50m]
FILL: Brown silty sand with organics, trace clay 0.81m [83.74m]
Hard to stiff, brown **SILTY CLAY**

- Grey by 3.0 m depth
- Firm by 3.7 m depth

6.71m [77.84m]

End of Borehole

(GWL at 5.05 m depth - October 7, 2025)

7 8 9 10 11 12 13

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COORD. SYS.: MTM ZONE 9

EASTING: 381603.41

NORTHING: 5033151.82

ELEVATION: 84.41

PROJECT: Proposed Development

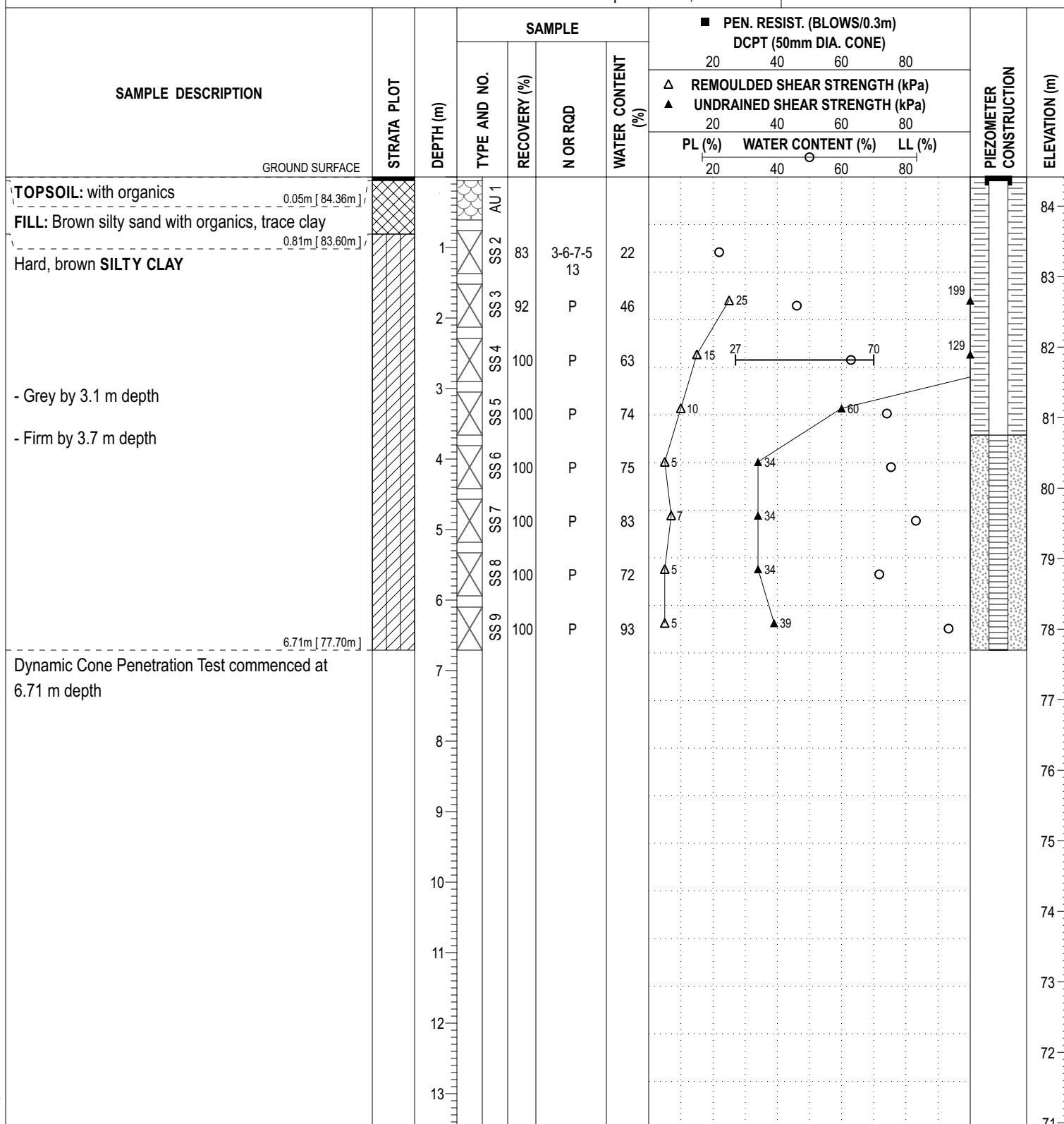
FILE NO.: PG7705

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: September 29, 2025

HOLE NO.: BH 4-25



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**PATERSON
GROUP**

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

2701 Page Road, Ottawa, ON

COORD. SYS.: MTM ZONE 9

EASTING: 381603.41

NORTHING: 5033151.82

ELEVATION: 84.41

PROJECT: Proposed Development

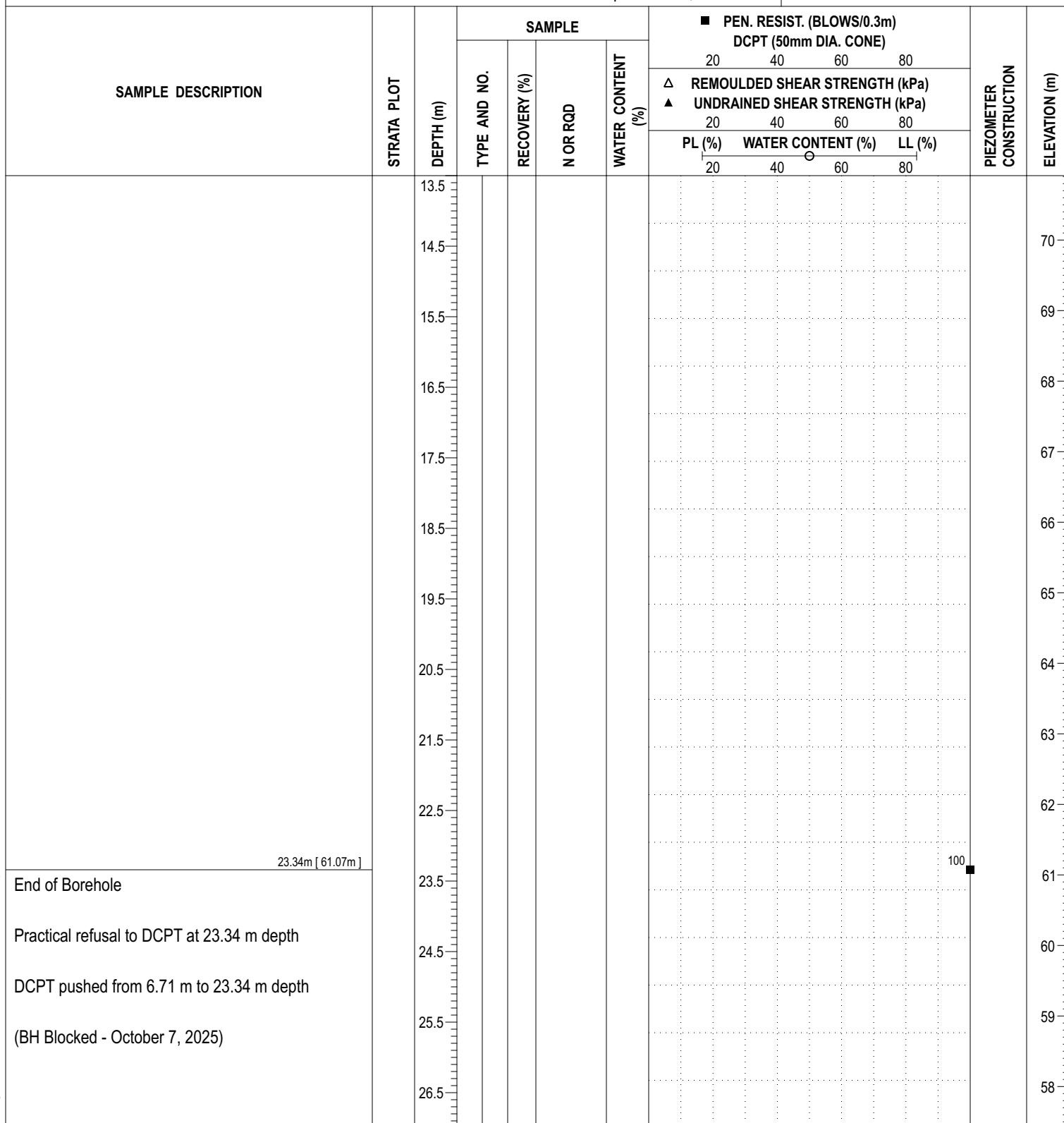
FILE NO.: PG7705

ADVANCED BY: CME-55 Low Clearance Drill

REMARKS:

DATE: September 29, 2025

HOLE NO.: BH 4-25



DISCLAIMER: THE DATA PRESENTED IN THIS SHEET IS THE PROPERTY OF PATERSON GROUP AND THE CLIENT FOR WHOM IT WAS PRODUCED. THIS SHEET SHOULD BE READ IN CONJUNCTION WITH ITS CORRESPONDING REPORT. PATERSON GROUP IS NOT RESPONSIBLE FOR THE UNAUTHORIZED USE OF THIS DATA.



PATERSON GROUP

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

2701 Page Road, Ottawa, ON

COORD. SYS.: MTM ZONE 9

EASTING: 381543.44

NORTHING: 5033109.68

ELEVATION: 85.38

PROJECT: Proposed Development

FILE NO. : PG7705

ADVANCED BY: Hand Huger

REMARKS:

DATE: September 29, 2025

HOLE NO. : HA 1-25

DISCLAIMER: THE DATA PRESENTED IN THIS SHEET IS THE PROPERTY OF PATERSON GROUP AND THE CLIENT FOR WHOM IT WAS PRODUCED. THIS SHEET SHOULD BE READ IN CONJUNCTION WITH ITS CORRESPONDING REPORT. PATERSON GROUP IS NOT RESPONSIBLE FOR THE UNAUTHORIZED USE OF THIS DATA.

SYMBOLS AND TERMS

SOIL DESCRIPTION

Behavioural properties, such as structure and strength, take precedence over particle gradation in describing soils. Terminology describing soil structure are as follows:

Desiccated	-	having visible signs of weathering by oxidation of clay minerals, shrinkage cracks, etc.
Fissured	-	having cracks, and hence a blocky structure.
Varved	-	composed of regular alternating layers of silt and clay.
Stratified	-	composed of alternating layers of different soil types, e.g. silt and sand or silt and clay.
Well-Graded	-	Having wide range in grain sizes and substantial amounts of all intermediate particle sizes (see Grain Size Distribution).
Uniformly-Graded	-	Predominantly of one grain size (see Grain Size Distribution).

The standard terminology to describe the strength of cohesionless soils is the relative density, usually inferred from the results of the Standard Penetration Test (SPT) 'N' value. The SPT N value is the number of blows of a 63.5 kg hammer, falling 760 mm, required to drive a 51 mm O.D. split spoon sampler 300 mm into the soil after an initial penetration of 150 mm.

Relative Density	'N' Value	Relative Density %
Very Loose	<4	<15
Loose	4-10	15-35
Compact	10-30	35-65
Dense	30-50	65-85
Very Dense	>50	>85

The standard terminology to describe the strength of cohesive soils is the consistency, which is based on the undisturbed undrained shear strength as measured by the in situ or laboratory vane tests, penetrometer tests, unconfined compression tests, or occasionally by Standard Penetration Tests.

Consistency	Undrained Shear Strength (kPa)	'N' Value
Very Soft	<12	<2
Soft	12-25	2-4
Firm	25-50	4-8
Stiff	50-100	8-15
Very Stiff	100-200	15-30
Hard	>200	>30

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

Cohesive soils can also be classified according to their “sensitivity”. The sensitivity is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil.

Terminology used for describing soil strata based upon texture, or the proportion of individual particle sizes present is provided on the Textural Soil Classification Chart at the end of this information package.

ROCK DESCRIPTION

The structural description of the bedrock mass is based on the Rock Quality Designation (RQD).

The RQD classification is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be a result of closely-spaced discontinuities (resulting from shearing, jointing, faulting, or weathering) in the rock mass and are not counted. RQD is ideally determined from NXL size core. However, it can be used on smaller core sizes, such as BX, if the bulk of the fractures caused by drilling stresses (called “mechanical breaks”) are easily distinguishable from the normal in situ fractures.

RQD %	ROCK QUALITY
90-100	Excellent, intact, very sound
75-90	Good, massive, moderately jointed or sound
50-75	Fair, blocky and seamy, fractured
25-50	Poor, shattered and very seamy or blocky, severely fractured
0-25	Very poor, crushed, very severely fractured

SAMPLE TYPES

SS	-	Split spoon sample (obtained in conjunction with the performing of the Standard Penetration Test (SPT))
TW	-	Thin wall tube or Shelby tube
PS	-	Piston sample
AU	-	Auger sample or bulk sample
WS	-	Wash sample
RC	-	Rock core sample (Core bit size AXT, BXL, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

SYMBOLS AND TERMS (continued)

GRAIN SIZE DISTRIBUTION

MC%	-	Natural moisture content or water content of sample, %
LL	-	Liquid Limit, % (water content above which soil behaves as a liquid)
PL	-	Plastic limit, % (water content above which soil behaves plastically)
PI	-	Plasticity index, % (difference between LL and PL)
Dxx	-	Grain size which xx% of the soil, by weight, is of finer grain sizes These grain size descriptions are not used below 0.075 mm grain size
D10	-	Grain size at which 10% of the soil is finer (effective grain size)
D60	-	Grain size at which 60% of the soil is finer
Cc	-	Concavity coefficient = $(D30)^2 / (D10 \times D60)$
Cu	-	Uniformity coefficient = $D60 / D10$

Cc and Cu are used to assess the grading of sands and gravels:

Well-graded gravels have: $1 < Cc < 3$ and $Cu > 4$

Well-graded sands have: $1 < Cc < 3$ and $Cu > 6$

Sands and gravels not meeting the above requirements are poorly-graded or uniformly-graded.

Cc and Cu are not applicable for the description of soils with more than 10% silt and clay
(more than 10% finer than 0.075 mm or the #200 sieve)

CONSOLIDATION TEST

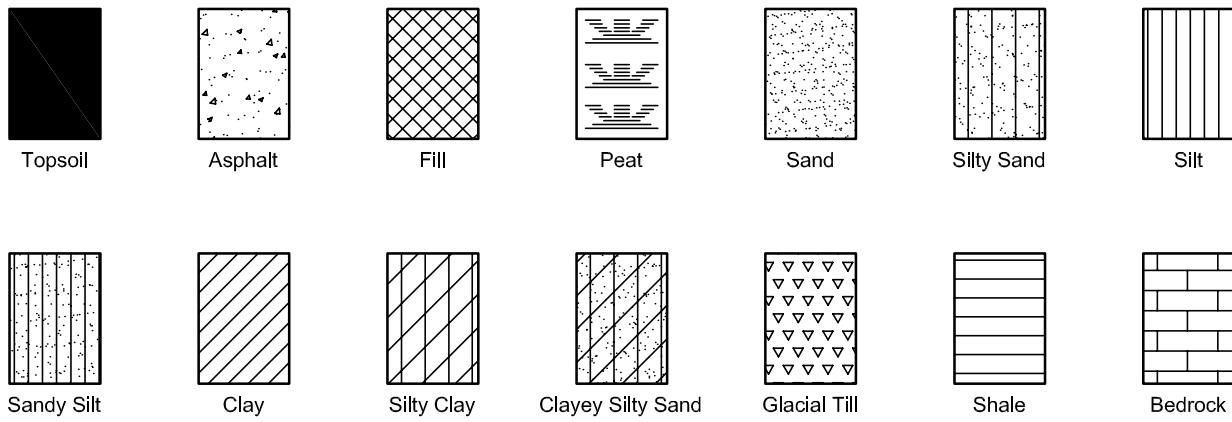
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidation ratio = p'_c / p'_o
Void Ratio		Initial sample void ratio = volume of voids / volume of solids
Wo	-	Initial water content (at start of consolidation test)

PERMEABILITY TEST

k - Coefficient of permeability or hydraulic conductivity is a measure of the ability of water to flow through the sample. The value of k is measured at a specified unit weight for (remoulded) cohesionless soil samples, because its value will vary with the unit weight or density of the sample during the test.

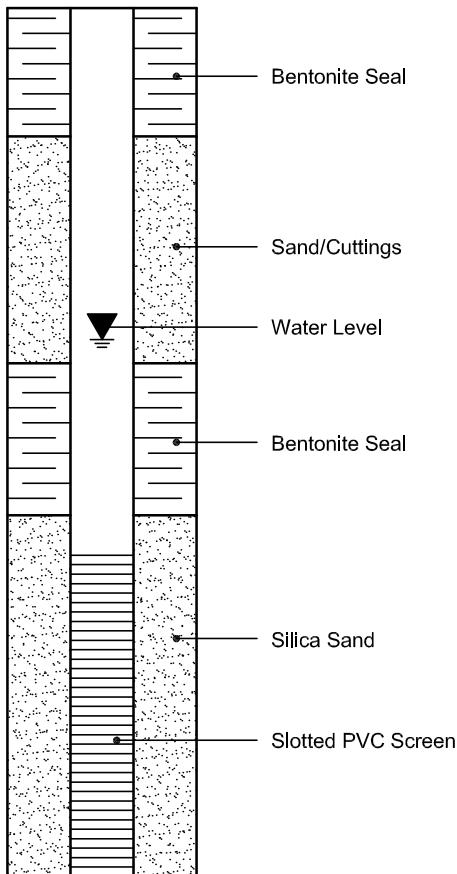
SYMBOLS AND TERMS (continued)

STRATA PLOT

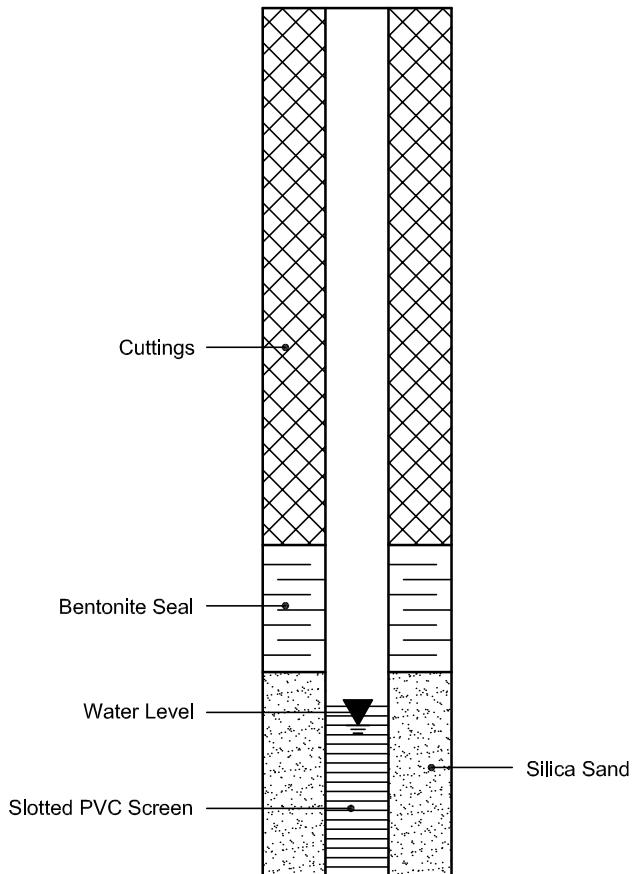


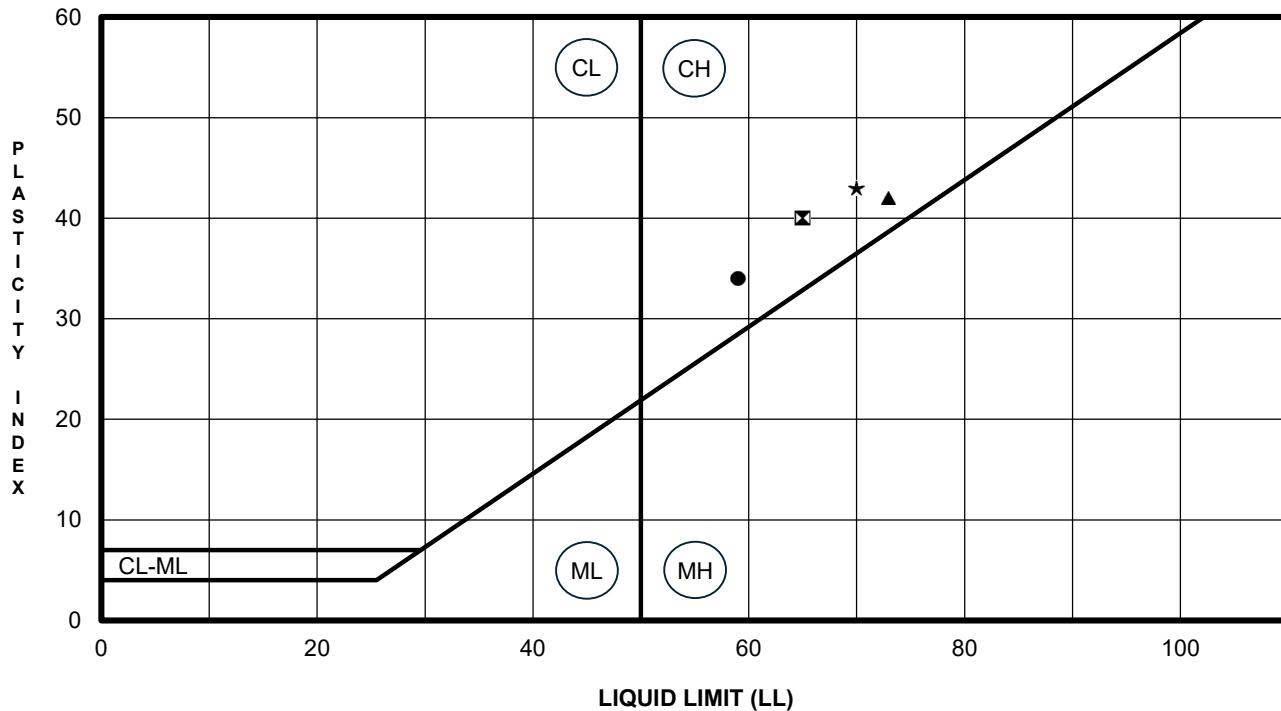
MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION





CLIENT 1001263920 Ontario Inc.

FILE NO.

PG7705

PROJECT Geotechnical Investigation - Proposed Development

DATE

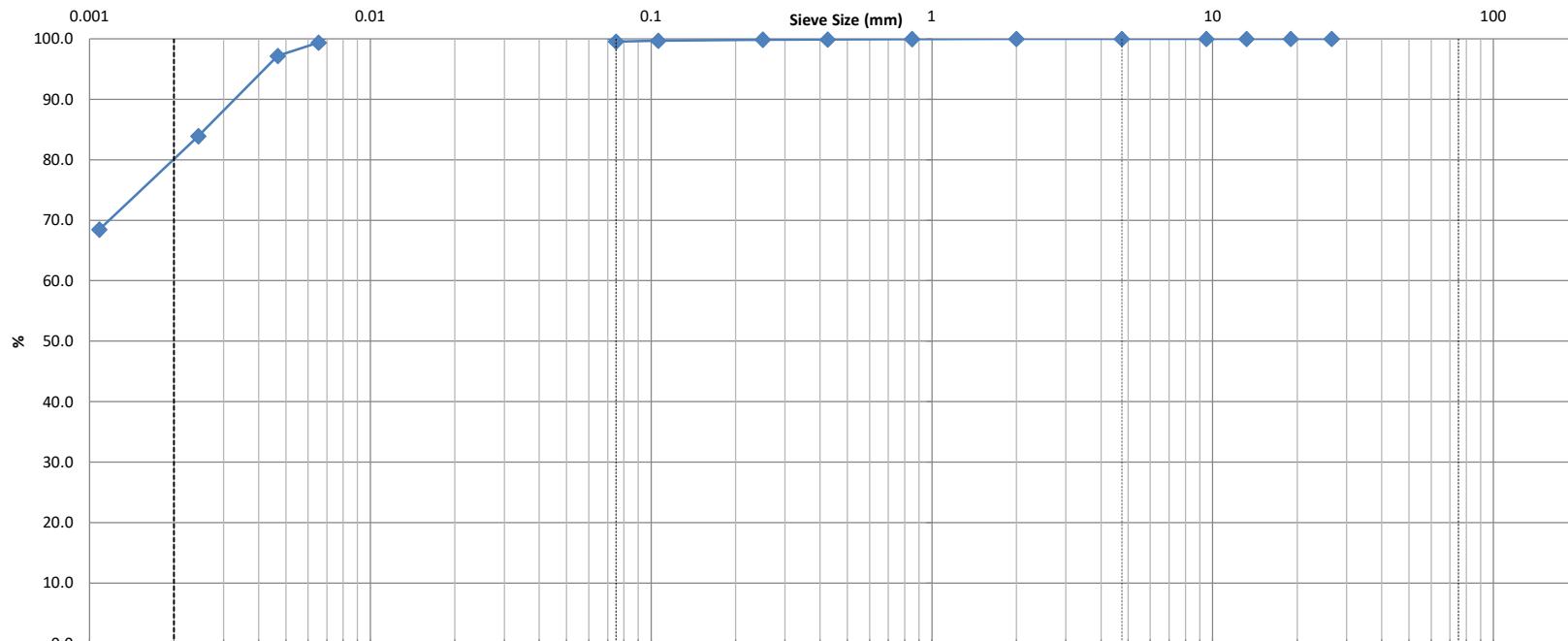
10-Oct-25

Geotechnical Investigation



SIEVE ANALYSIS
ASTM C136

CLIENT:	1001263920 Ontario Inc	DEPTH:	7'6" - 8'6"	FILE NO:	PG7705
CONTRACT NO.:		BH OR TP No.:	BH-25 SS4	LAB NO:	63367
PROJECT:	2701 Page Road			DATE RECEIVED:	1-Oct-25
DATE SAMPLED:	29-Sep-25			DATE TESTED:	2-Oct-25
SAMPLED BY:	Mohammad A.			DATE REPORTED:	10-Oct-25
				TESTED BY:	C.M



Identification	Soil Classification					MC(%)	LL	PL	PI	Cc	Cu
	Clay	Silt			Fine	Medium	Coarse	Fine	Coarse		
						55.1%					
	D100	D60	D30	D10	Gravel (%)		Sand (%)		Silt (%)		Clay (%)
					0.0		0.4		19.6		80.0

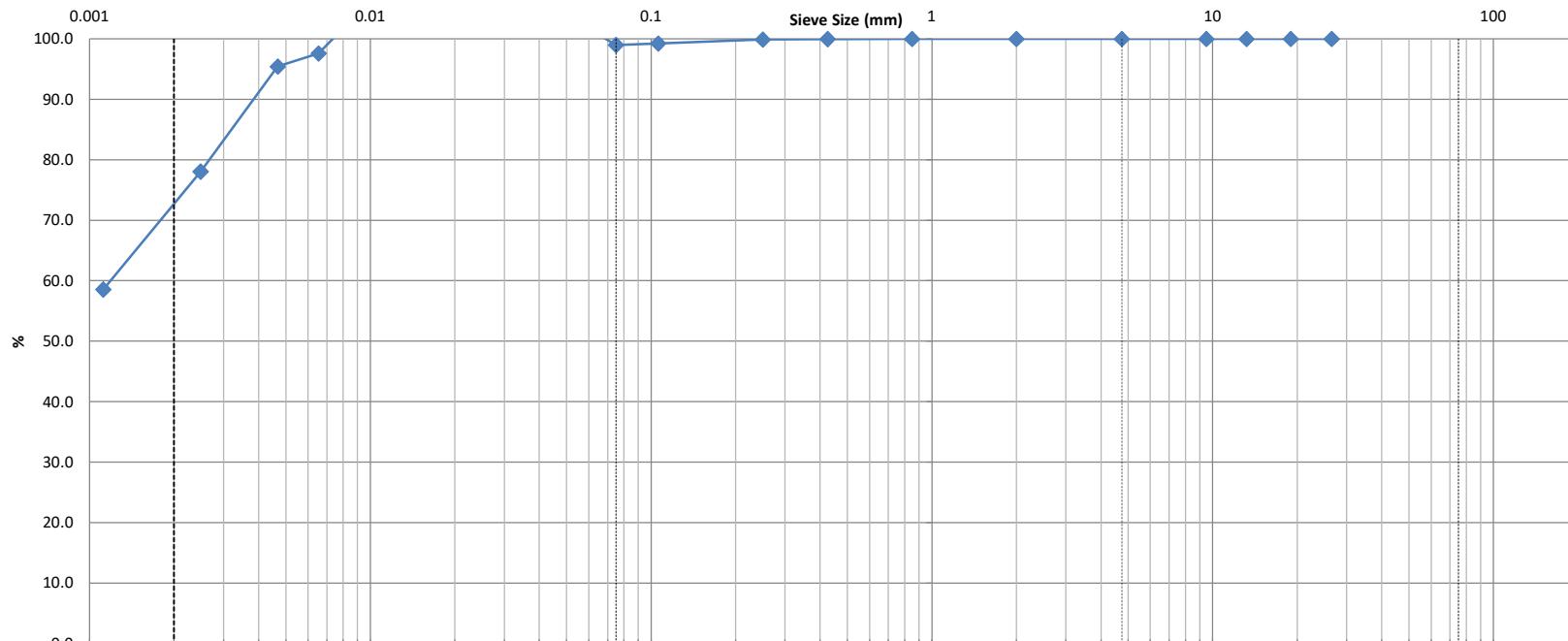
Comments:	
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REVIEWED BY:	Curtis Beadow 	Joe Forsyth, P. Eng.
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SIEVE ANALYSIS
ASTM C136

CLIENT:	1001263920 Ontario Inc	DEPTH:	7'6" - 9'6"	FILE NO:	PG7705
CONTRACT NO.:		BH OR TP No.:	BH3-25 SS4	LAB NO:	63369
PROJECT:	2701 Page Road			DATE RECEIVED:	1-Oct-25
DATE SAMPLED:	29-Sep-25			DATE TESTED:	2-Oct-25
SAMPLED BY:	Mohammad A.			DATE REPORTED:	16-Oct-25
				TESTED BY:	C.M



Clay	Silt		Sand			Gravel		Cobble
	Fine	Medium	Coarse	Fine	Coarse			

Identification	Soil Classification					MC(%)	LL	PL	PI	Cc	Cu
						50.2%					
	D100	D60	D30	D10	Gravel (%)	Sand (%)	Silt (%)	Clay (%)			

Comments:

Curtis Beadow

Joe Forsyth, P. Eng.

REVIEWED BY:

Certificate of Analysis

Report Date: 07-Oct-2025

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 1-Oct-2025

Client PO: 64163

Project Description: PG7705

Client ID:	BH 1-25-SS5-10'-12'	-	-	-	-	-
Sample Date:	29-Sep-25 09:00	-	-	-	-	-
Sample ID:	2540270-01	-	-	-	-	-
Matrix:	Soil	-	-	-	-	-
MDL/Units						

Physical Characteristics

% Solids	0.1 % by Wt.	64.3	-	-	-	-
General Inorganics						

pH	0.05 pH Units	8.12	-	-	-	-
Resistivity						

Resistivity	0.1 Ohm.m	37.8	-	-	-	-
Anions						

Chloride	5 ug/g	25	-	-	-	-
Sulphate						

APPENDIX 2

FIGURE 1 - KEY PLAN

DRAWING PG7705-1 - TEST HOLE LOCATION PLAN

DRAWING PG7705-2 - TREE PLANTING SETBACK RECOMMENDATIONS



FIGURE 1

KEY PLAN

