PATERSON GROUP

Geotechnical Investigation

Proposed Residential Development

6408 Renaud Road
Ottawa, Ontario

Prepared for NCTL Homes Inc.

Report PG7326-1 dated December 23, 2024

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1.0 Introduction

Paterson Group (Paterson) was commissioned by NCTL Homes Inc. to conduct a geotechnical investigation for the proposed residential development to be located at 6408 Renaud 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 available information it is understood that the future development will generally consist of 8 low-rise townhomes with one basement level and one slab-on-grade village house, associated landscaped areas, parking areas, driveways, and pathways. It is anticipated that the subject site will be municipally serviced.

3.0 Method of Investigation

3.1 Field Investigation

Field Program

The field program for the current geotechnical investigation was carried out on November 6, 2024, and consisted of a total of four (4) boreholes advanced to a maximum depth of 7.3 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 existing site features and conditions. The borehole locations are shown on Drawing PG7326-1 – Test Hole Location Plan included in Appendix 2.

The boreholes were completed using a track-mounted power 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 from our geotechnical department. The drilling procedures consisted of augering to the required depths at the selected locations, 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 samples were visually inspected and initially classified on site, placed in sealed plastic bags, and 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 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 in cohesive soils using a field vane apparatus.

The overburden thickness was evaluated by a dynamic cone penetration test (DCPT) completed at borehole BH 1-24. The DCPT testing consists 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 boreholes 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

All boreholes were fitted with flexible piezometers to permit monitoring of the groundwater levels subsequent to the completion of the sampling program. 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 Subsection 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 test hole location were surveyed by Paterson using a high precision handheld GPS and referenced to a geodetic datum. The location of the boreholes and ground surface elevation at each test hole location are presented on Drawing PG7326-1 – 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. A total of two Atterberg limits tests, one linear shrinkage analysis, and one grain size distribution and hydrometer test were completed on selected soil samples. Moisture content testing was completed on all recovered soil samples from the current investigation. The results of the testing are presented in Subsection 4.2 and are provided in Appendix 1.

Sample Storage

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 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 collected from BH 3-24 and 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 Subsection 6.7.

4.0 Observations

4.1 Surface Conditions

The subject site currently consists of an existing one-storey residential dwelling with one basement level with a detached garage and an associated asphalt driveway. The remainder of the site consists of grass-covered landscaped areas and mature trees.

The subject site is located near the intersection of Renaud Road and Rue Fern Casey Street and is bordered by Renaud Road to the north, a residential dwelling to the east, a densely treed area to the south, and Rue Fern Casey Street to the west.

The ground surface across the subject site is relatively flat with a gradual upward slope from south to north, varying between approximate geodetic elevations of 87.2 and 87.6 m. The site is approximately at grade with the surrounding properties and roadways.

4.2 Subsurface Profile

Overburden

The subsurface profile encountered at the test hole locations generally consists of a thin layer of topsoil and/or fill overlaying a deposit of loose to compact, brown silty sand. The fill was observed to consist of brown silty clay and/or brown silty sand with gravel, crushed stone and trace organics, or granular crushed stone.

The silty sand deposit was observed to overlay a firm to very stiff, brown silty clay deposit, transitioning to a soft to stiff, grey silty clay.

Practical refusal to DCPT testing was encountered at a depth of 29.2 m below the existing ground surface at the location of BH 1-24.

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, the local bedrock consists of interbedded limestone and shale of the Lindsay Formation. The overburden thickness is generally anticipated to range between approximately 25 to 50 m below the existing ground surface.

Atterberg Limits Testing

Two Atterberg limits tests were completed on select silty clay samples recovered from BH 3-24 and BH 4-24. The results of the Atterberg limits tests are summarized in Table 1 and presented on the Atterberg Limits Testing Results sheet in Appendix 1.

Table 1 – Atterberg Limits Results

Sample	Depth (m)	LL (%)	PL (%)	PI (%)	w (%)	Classification
BH 3-24-SS4	2.59	74	36	38	75	CH
BH 4-24-SS4	2.59	71	35	36	77	CH

Notes: LL: Liquid Limit; PL: Plastic Limit; PI: Plasticity Index; w: Water Content,
CL: Inorganic Clay of Low Plasticity, CH: Inorganic Clay of High Plasticity,
ML: Inorganic Silt of Low Plasticity, MH: Inorganic Silt of High Plasticity

Grain Size Distribution and Hydrometer Testing

One hydrometer test was completed on select silty clay samples recovered from BH 3-24, to classify selected soil samples according to the Unified Soil Classification System (USCS). The results are summarized in Table 2 and presented on the Hydrometer Testing Results sheet in Appendix 1.

Table 2 – Grain Size Distribution Results

Sample	Depth (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BH 3-24-SS4	2.59	0.0	0.2	19.3	80.5

Note: The ground surface elevation at each borehole location was surveyed using a handheld GPS using a geodetic datum.

Shrinkage Testing

One linear shrinkage test was completed on select silty clay samples recovered from BH 3-24, to determine planting setbacks. The results are summarized in Table 3 and presented on the Shrinkage Analysis Results sheet in Appendix 1.

Table 3 – Shrinkage Testing

Sample	Depth (m)	Shrinkage Limit	Shrinkage Ratio
BH 3-24-SS4	2.59	20.55	1.76

Note: The ground surface elevation at each borehole location was surveyed using a handheld GPS using a geodetic datum.

4.3 Groundwater

Groundwater levels were recorded at piezometers installed at the borehole locations on November 11, 2024. The groundwater level readings at that time are presented in Table 4 and are noted on the applicable Soil Profile and Test Data sheets in Appendix 1.

Table 4 – Summary of Groundwater Levels

Borehole Number	Ground Surface Elevation (m)	Measured Groundwater Level		Date Recorded
		Depth (m)	Elevation (m)	
BH 1-24	87.57	3.74	83.83	November 11, 2024
BH 2-24	87.16	1.73	85.43	
BH 3-24	87.36	2.38	84.98	
BH 4-24	87.27	3.36	83.91	

Note: The ground surface elevation at each borehole location was surveyed using a handheld GPS using a geodetic datum.

It should be noted that due to the impermeable nature of the subsurface soils, surface water can become trapped within a backfilled borehole that can lead to higher than typical groundwater level observations.

The long-term groundwater levels can also be estimated based on the observed color, consistency, and moisture content of the recovered soil samples. Based on these observations, the long-term groundwater table can be expected at approximately **2.0 to 3.0 m** below the existing ground surface. 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 expected that the proposed residential buildings and the village house may be founded on conventional shallow footings placed on undisturbed, compact brown silty sand, firm to very stiff brown silty clay, or soft to stiff grey silty clay.

Due to the presence of the sensitive silty clay deposit, the proposed development will be subjected to a permissible grade raise restriction.

Where the silty sand subgrade below buildings and paved areas is found to be in a loose state of compaction, proof-rolling using a suitably sized roller is required to be completed under dry conditions and above freezing temperatures to achieve adequate compaction levels and under the full supervision and approval of Paterson at the time of construction.

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

5.2 Site Grading and Preparation

Stripping Depth

Topsoil and deleterious fill, such as those containing significant organic materials, should be stripped from under any buildings, paved areas, pipe bedding, and other settlement sensitive structures. Care should be taken not to disturb adequate bearing soils below the founding level during site preparation activities. Disturbance of the subgrade may result in sub-excavation of the disturbed material and the placement of additional suitable fill material.

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 placed for grading throughout the building footprints should consist, unless otherwise specified, of clean imported granular fill, such as Ontario Provincial Standard Specifications (OPSS) Granular A or Granular B Type II.

The imported fill material should be tested and approved prior to delivery to the site.

The fill should be placed in maximum 300 mm thick loose lifts and compacted by suitable compaction equipment. Fill placed beneath the buildings should be compacted to a minimum of 98% of the standard Proctor maximum dry density (SPMDD).

Non-specified existing fill along with site-excavated soil could be placed as general landscaping fill and beneath exterior parking areas where settlement of the ground surface is of minor concern. These materials should be spread in a maximum of 300 mm thick loose lifts and at least compacted by the tracks of the spreading equipment to minimize voids. If this material is to be used to build up the subgrade level for areas to be paved, it should be compacted in a maximum 300 mm thick loose lift to at least 95% of the material's SPMDD. The placement of subgrade material should be reviewed at the time of placement by Paterson personnel.

Non-specified existing fill and site-excavated soils are not suitable for placement as backfill against foundation walls, unless used in conjunction with a geocomposite drainage membrane, such as Miradrain G100N or Delta Terraxx, or equivalent, connected to a perimeter drainage system.

5.3 Foundation Design

Bearing Resistance Values

Using continuously applied loads, conventional shallow footings (silty sand) and strip footings, up to 3 m wide, and pad footings, up to 5 m wide (silty clay) for the proposed buildings can be designed using the bearing resistance values presented in Table 5.

Table 5 - Bearing Resistance Values

Bearing Surface	Bearing Resistance Value at SLS (kPa)	Factored Bearing Resistance Value at ULS (kPa)
Compact Brown Silty Sand	100	150
Firm Brown Silty Clay	100	150
Stiff Brown Silty Clay	125	175
Soft Grey Silty Clay	50	75
Stiff to Firm Grey Silty Clay	75	115

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

It is expected that a minimum bearing capacity at SLS of **75 kPa** will be required for the proposed dwellings with footings placed on an undisturbed, soft to firm, grey silty clay for the proposed building. To achieve a minimum bearing capacity at SLS of **75 kPa**, the following procedure will be required.

- ❑ A minimum 500 mm thick layer of engineered fill, consisting of OPSS Granular A or Granular B Type II crushed stone over a bi-axial geogrid (such as Terrafix 360R or equivalent) followed by a non-woven geotextile, be placed over an undisturbed, soft grey silty clay. Alternatively, a minimum 50 mm thick mud slab can be used instead of the geotextile as detailed below.
- ❑ The fill should be tested and approved prior to delivery to the site.
- ❑ The fill should be placed in maximum 300 mm thick lifts and compacted using suitable compaction equipment for the lift thickness.
- ❑ The fill placed beneath the footing area should be compacted at least 98% of the standard Proctor maximum dry density (SPMDD).
- ❑ The fill material should be extended horizontally at least 300 mm beyond each edge of the proposed footings.

If this method is used, a modified permissible grade raise restriction for the proposed buildings will be recommended. Please refer to the Permissible Grade Raise Recommendations section on the following page for additional information.

The bearing resistance values are provided for footings placed on undisturbed soil bearing surfaces. An undisturbed soil bearing surface consists of one from which all topsoil and deleterious materials, such as loose, frozen, or disturbed soil, whether in-situ or not, have been removed, prior to placement of concrete for footings.

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 or engineered fill 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 or engineered fill of the same or higher capacity as that of the bearing medium.

Proof Rolling and Subgrade Improvement for Loose Sand Below Footings

Where the silty sand bearing surface for foundations is found to be in a loose state, as determined by Paterson at the time of construction, a proof rolling program will be required for the bearing surface using suitable compaction equipment prior to forming for foundations. Improving the bearing surface compaction will provide a suitable bearing medium. The proof rolling program should be **completed under dry conditions and above freezing temperatures** and reviewed and approved by Paterson.

Depending on the looseness and degree of saturation at the time of construction, other measures (additional compaction, dewatering, mud-slab, sub-excavation and reinstatement of crushed stone fill) may be recommended to accommodate site conditions at the time of construction. These considerations should be evaluated at the time of construction by Paterson on a footing-specific basis.

Permissible Grade Raise Recommendations

Due to the presence of a compressible silty clay deposit within the subject site, consideration must be given to potential settlements that could occur due to the combined loads from the proposed footings, groundwater lowering effects, and grade raise fill. The foundation loads to be considered for the settlement case are the continuously applied loads which consist of the unfactored dead loads and the portion of the unfactored live load that is considered to be continuously applied.

Due to the presence of the silty clay deposit, a permissible grade raise restriction of **0.7 m** above existing ground surface is recommended for the proposed development. A post-development groundwater lowering of 0.5 m was considered in our permissible grade raise restriction calculations. However, for roadways, access roads and parking areas, a permissible grade raise of **1 m** is considered acceptable from a geotechnical perspective.

Where the proposed dwellings are being built on soft grey silty clay and the bearing medium improvement system is implemented (as noted on the previous page), the permissible grade raise restriction for the proposed dwellings will be reduced to 0.5 m above the existing ground surface.

If greater 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.

Settlement

The total and differential settlement will be dependent on the characteristics of the proposed buildings. For design purposes, based on the recommendations provided herein, the total and differential settlements are estimated to be 25 to 20 mm, respectively. A post-development groundwater lowering of 0.5 m was assumed

5.4 Design for Earthquakes

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

5.5 Basement Floor Slab/Slab on Grade Construction

With the removal of all topsoil and deleterious materials within the footprint of the proposed buildings, a native soil surface or engineered fill surface approved by Paterson personnel at the time of construction, is considered to be an acceptable subgrade surface on which to commence backfilling for basement floor slab or slab on grade construction. Where the subgrade consists of silty sand in a loose state of compaction a vibratory drum roller should complete several passes over the subgrade surface as a proof-rolling program, reviewed and approved by Paterson at the time of construction. Any poor performing areas under proof rolling or soft areas should be removed and reinstated with an engineered fill, such as OPSS Granular A or Granular B Type II placed in maximum 300 mm thick loose lifts and compacted to a minimum of 98% of the material's SPMDD.

It is recommended that the upper 200 mm of sub-slab fill below a basement floor slab or slab-on-grade for buildings founded on shallow foundations should consist of OPSS Granular A crushed stone compacted to a minimum of 98% of the material's SPMDD.

Where existing fill, free of deleterious material and significant organic content, is encountered below the floor slab, provisions should be made to removing the existing fill from within the building footprint and replacing the fill with OPSS Granular A or Granular B Type II compacted to a minimum 98% of the material's SPMDD.

It is acceptable to use workable, site excavated brown silty clay, free of deleterious materials and organics, below the floor slab and outside the lateral support zone of the proposed footings, provided the material is placed under dry conditions and above freezing temperatures, and is reviewed and approved by Paterson prior to placement. The silty clay backfill should be compacted using a sheepsfoot roller making several passes under the full supervision of Paterson field personnel. A minimum 500 mm thick cap layer of OPSS Granular A or Granular B Type II should be placed over the silty clay and compacted to a minimum 98% of the material's SPMDD.

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

5.6 Pavement Design

For design purposes, the pavement structures presented in the following tables could be used for the design of car only parking areas and local roadways.

Table 6 - Recommended Pavement Structure – Car-Only Parking Areas

Thickness (mm)	Material Description
50	**Wear Course** - HL-3 or Superpave 12.5 Asphaltic Concrete
150	**BASE** - OPSS Granular A Crushed Stone
300	**SUBBASE** - OPSS Granular B Type II
SUBGRADE - Either in-situ soil, fill, or OPSS Granular B Type I or II material placed over in-situ soil or fill.	

Table 7 - Recommended Pavement Structure - Local Residential Roadways

Thickness (mm)	Material Description
40	**Wear Course** – HL-3 or Superpave 12.5 Asphaltic Concrete
50	**Binder Course** – Hl-8 or Superpave 19.0 Asphaltic Concrete
150	**BASE** - OPSS Granular A Crushed Stone
450	**SUBBASE** - OPSS Granular B Type II
SUBGRADE - Either in-situ soil, fill, or OPSS Granular B Type I or II material placed over in-situ soil or fill.	

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.

Weak subgrade conditions may be experienced over service trench fill materials. This may require the use of a geotextile, such as Terratrack 200 or equivalent, thicker subbase, or other measures that can be recommended at the time of construction as part of the field observation program.

The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 100% of the material's SPMDD using suitable vibratory equipment.

Pavement Structure Drainage

The satisfactory performance of the pavement structure is largely dependent on the contact zone between the subgrade material and the base stone remaining 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.

Where silty clay is anticipated at subgrade level, consideration should be given to installing subdrains during the pavement construction as per City of Ottawa standards. The subdrain inverts should be approximately 300 mm below subgrade level, and the subgrade surface should be crowned to promote water flow to drainage lines.

6.0 Design and Construction Precautions

6.1 Foundation Drainage, Waterproofing and Backfill

Foundation Drainage and Waterproofing

It is recommended that a perimeter foundation drainage system be provided for the proposed structures. The system should consist of a 150 mm diameter, geotextile wrapped, perforated, corrugated, plastic pipe, surrounded on all sides by 150 mm of 19 mm clear crushed stone, placed at the footing level around the exterior perimeter of the structures. The clear crushed stone should be wrapped in a non-woven geotextile. The pipe should have a positive outlet, such as a gravity connection to the sump pump pit or storm sewer or ditch.

Underfloor Drainage

An underfloor drainage system may be required below the basement slabs of the proposed dwellings. For preliminary design purposes, it is recommended that the interior perimeter and underfloor drainage pipes should consist of 100 or 150 mm diameter corrugated perforated plastic pipe sleeved with a geosock, placed at approximately 12 m. Paterson should review the detailed engineering drawings, once available, to provide specific underfloor drainage recommendations.

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 composite drainage system, such as Delta Terraxx or an approved equivalent. Imported granular materials, such as clean sand or OPSS Granular B Type I granular material, should otherwise be used for this purpose.

Sidewalks, Walkways and Paved Areas

Backfill material below sidewalks, walkways, asphalt paved areas, or other settlement sensitive structures should consist of a minimum 300 mm thick layer of free draining, non-frost susceptible material placed in maximum 300 mm thick loose lifts and compacted to at least 98% of its SPMDD.

6.2 Protection of Footings Against Frost Action

Perimeter footings of heated structures are required 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. These should be provided with a minimum 2.1 m thick soil cover or an equivalent combination of soil cover and foundation insulation

6.3 Excavation Side Slopes

The temporary excavation side slopes anticipated should either be excavated to acceptable slopes or retained by shoring systems from the beginning of the excavation until the structures are backfilled. For the proposed development, it is expected 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 above the groundwater level extending to a maximum depth of 3 m should be cut back at 1H:1V or flatter. The flatter slope is required for excavation below groundwater level. The subsurface soil at this site is considered to be mainly a Type 2 and Type 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 maintain safe working distance from the excavation sides.

Excavation side slopes carried out for the building footprint are recommended to be provided surface protection from erosion by rain and surface water runoff where shoring is not anticipated to be implemented. This can be accomplished by covering the entire surface of the excavation side-slopes with tarps secured between the top and bottom of the excavation and approved by Paterson personnel at the time of construction. It is further recommended to maintain a relatively dry surface along the bottom of the excavation footprint to mitigate the potential for sloughing of side-slopes.
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.

A trench box is recommended to protect personnel working in trenches with steep or vertical sides. Services are expected to be installed by “cut and cover” methods and excavations should not remain 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.

At least 150 mm of OPSS Granular A should be used for pipe bedding for sewer and water pipes. The bedding should extend to the spring line of the pipe. Cover material, from the spring line to at least 300 mm above the obvert of the pipe, should consist of OPSS Granular A or Granular B Type II with a maximum size of 25 mm. The bedding and cover materials should be placed in maximum 225 mm thick lifts and compacted to a minimum of 99% of the material's standard Proctor maximum dry density.

It should generally be possible to re-use the upper portion of the dry to moist (not wet) brown silty clay and silty sand above the cover material if the excavation and backfilling operations are carried out in dry weather conditions. Any stones greater than 200 mm in their longest dimension should be removed from these materials prior to placement.

The backfill material within the frost zone (about 1.5 m below finished grade) should match the soils exposed at the trench walls to reduce potential differential frost heaving. The backfill should be placed in maximum 225 mm thick loose lifts and compacted to a minimum of 95% of the material's SPMDD.

Clay Seals

To reduce long-term lowering of the groundwater level at this site, clay seals should be provided in the service trenches if the trenches will be founded within the silty clay deposit. The seals should be at least 1.5 m long and should extend from trench wall to trench wall. Generally, the seals should extend from the frost line and fully penetrate the bedding, sub-bedding, and cover material. The barriers should consist of relatively dry and compactable brown silty clay placed in maximum 225 mm thick loose layers and compacted to a minimum of 95% of the material's SPMDD using a sheepsfoot roller.

The clay seals should be placed at the site boundaries and at strategic locations at no more than 60 m intervals in the service trenches.

6.5 Groundwater Control

Groundwater Control for Building Construction

Due to the relatively impervious nature of the silty clay materials, it is anticipated that groundwater infiltration into the excavations 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 disturbances to the founding medium.

Permit to Take Water

A temporary Ministry of the Environment, Conservation and Parks (MECP) permit to take water (PTTW) may be required for this project if more than 400,000 L/day of ground and/or surface water is to be pumped during the construction phase. A minimum 4 to 5 months should be allowed for completion of the PTTW application package and issuance of the permit by the MECP.

For typical ground or surface water volumes being pumped during the construction phase, typically between 50,000 to 400,000 L/day, it is required to register on the Environmental Activity and Sector Registry (EASR). A minimum of two 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. If a project qualifies for a PTTW based upon anticipated conditions, an EASR will not be allowed as a temporary dewatering measure while awaiting the MECP review of the PTTW application.

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 (normal cement) would be appropriate for this site. The chloride content and the pH of the sample indicate that they are not significant factors in creating a corrosive environment for exposed ferrous metals at this site, whereas the resistivity is indicative of an aggressive to very aggressive corrosive environment.

6.8 Landscaping Consideration

Tree Planting Restrictions

In accordance with the City of Ottawa Tree Planting in Sensitive Marine Clay Soils (2017 Guidelines), Paterson completed a review of the soils at 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. The results of our Atterberg limits, shrinkage, and hydrometer testing are presented in Appendix 1.

Based on the results of the Atterberg limit testing mentioned above, the plasticity index was found to be less than 40% for all the tested silty clay samples. In addition, based on the moisture levels and consistency of the encountered clay, the silty clay deposit encountered across the subject site is considered to be a low to medium sensitivity silty clay deposit.

The following tree planting setbacks are recommended for low to medium sensitivity silty clay deposits throughout the subject site.

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

Tree planting setback limits may be reduced to **4.5** m for small (mature height up to 7.5 m) and medium size trees (mature height 7.5 to 14 m), provided that the conditions noted below 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 centre of the tree trunk and verified by means of the Grading Plan as indicated procedural changes below.

- A small tree must be provided with a minimum 25 m^3 of available soil volume while a medium tree must be provided with a minimum of 30 m^3 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 15 mm 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).

7.0 Recommendations

It is recommended that the following be carried out by Paterson once preliminary and future details of the proposed development have been prepared:

- ❑ Review preliminary and detailed grading, servicing, landscaping, and structural plan(s) from a geotechnical perspective.

- ❑ Review of the geotechnical aspects of the excavation contractor's shoring designs, if not designed by Paterson, prior to construction, if applicable.

- ❑ Review of architectural, civil, mechanical and structural plans pertaining to the underfloor drainage systems and waterproofing details for elevator shafts, if not designed by Paterson.

It is a requirement for the foundation design data provided herein to be applicable that a material testing and observation program be performed by the geotechnical consultant. The following aspects of the program should be performed by Paterson:

- ❑ Observation of all bearing surfaces prior to the placement of concrete.

- ❑ Observation of driving and re-striking of all pile foundations.

- ❑ Sampling and testing of the concrete and fill materials.

- ❑ Review and inspection of the installation of the foundation drainage systems.

- ❑ 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 and follow-up field density tests to determine the level of compaction achieved.

- ❑ 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 soils, with the exception of engineered crushed stone fill, generated by construction activities that will be transported on-site or off-site should 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 soil investigation is a limited sampling of a site. Should any conditions at the site be encountered that 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 of 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 NCTL Homes 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.

Owen R. Canton, B.Eng.

Dec. 23, 2024
LICENSED PROFESSIONAL ENGINEER
F. I. ABOU-SEIDO
100156744
PROVINCE OF ONTARIO

Faisal I. Abou-Seido, P.Eng.

Report Distribution:

- ❏ NCTL Homes Inc. (Email Copy)
- ❏ Paterson Group (1 Copy)

APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

SYMBOLS AND TERMS

ATTERBERG LIMIT TESTING RESULTS

GRAIN SIZE DISTRIBUTION and HYDROMETER TEST RESULTS

SHRINKAGE ANALYSIS RESULTS

ANALYTICAL TESTING RESULTS

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
6408 Renaud Road, Ottawa, Ontario

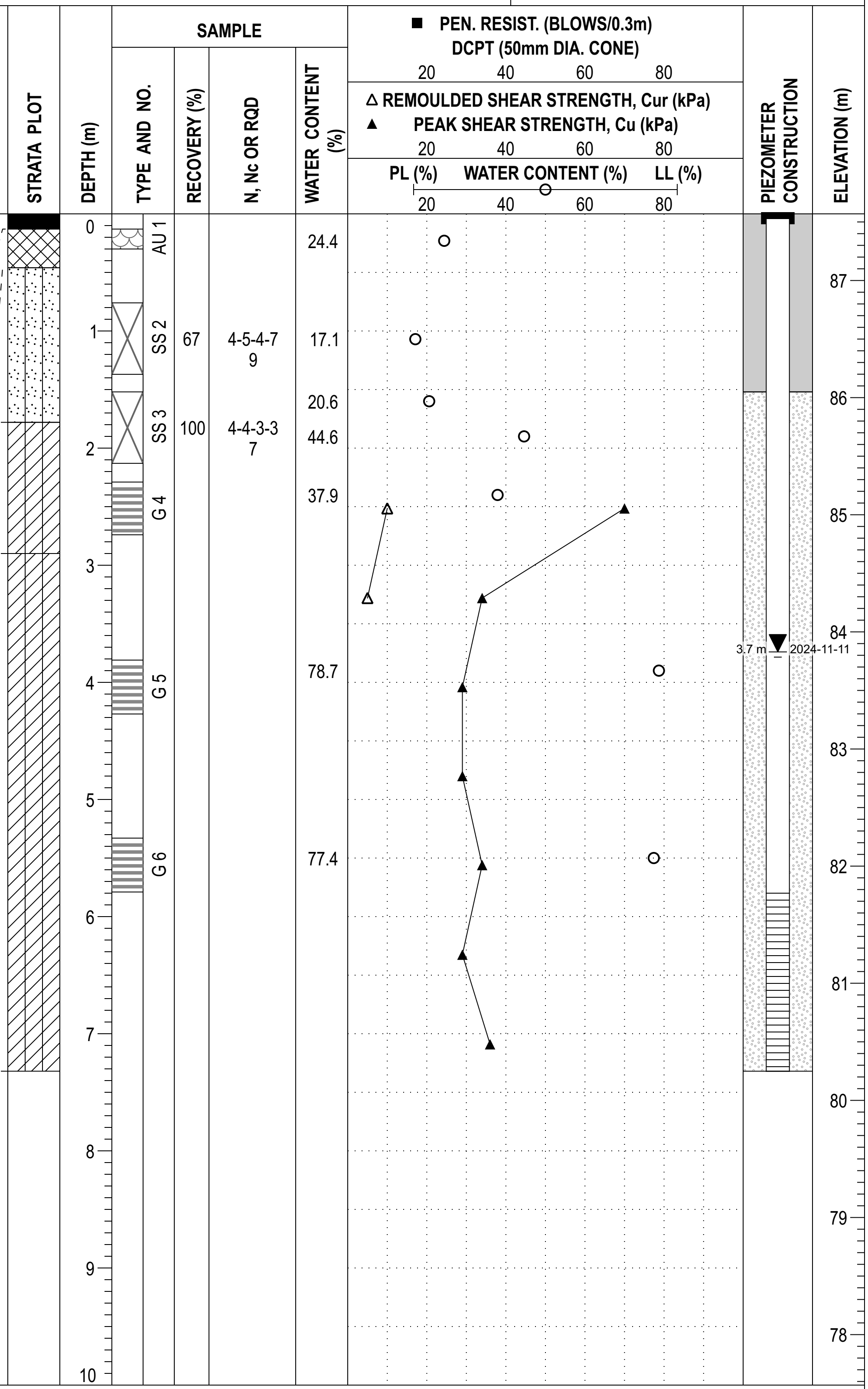
PATERSON GROUP

COORD. SYS.: MTM ZONE 9 **EASTING:** 382685.32 **NORTHING:** 5033249.95 **ELEVATION:** 87.57

PROJECT: Proposed Residential Development
BORINGS BY: CME-22 Low Clearance Drill
REMARKS:
DATE: November 06, 2024

FILE NO. : PG7326
HOLE NO. : BH 1-24

SAMPLE DESCRIPTION (GROUND SURFACE)	TYPE AND NO.	RECOVERY (%)	N, Nc OR RQD	WATER CONTENT (%)
TOPSOIL — 0.13m [87.44m]	AU 1			24.4
FILL: Stiff, brown silty clay, trace organics and gravel - Some crushed stone by 0.30 m depth — 0.46m [87.11m]				
Loose, brown **SILTY** fine **SAND** — 1.78m [85.79m]	SS 2	67	4-5-4-7 9	17.1
				20.6
Stiff, brown **SILTY CLAY** — 2.90m [84.67m]	SS 3	100	4-4-3-3 7	44.6
	G 4			37.9
Firm, grey **SILTY CLAY** — 7.32m [80.25m]	G 5			78.7
	G 6			77.4
Dynamic Cone Penetration Test commenced at 7.32 m depth				



P:/AutoCAD Drawings/Test Hole Data Files/PG73xx/PG7326/data.sqlite 2024-11-27, 15:44 Paterson_Template CE

COORD. SYS.: MTM ZONE 9 **EASTING:** 382685.32 **NORTHING:** 5033249.95 **ELEVATION:** 87.57

PROJECT: Proposed Residential Development

BORINGS BY: CME-22 Low Clearance Drill

REMARKS:

DATE: November 06, 2024

FILE NO. : PG7326

HOLE NO. : BH 1-24

SAMPLE DESCRIPTION (GROUND SURFACE)	STRATA PLOT	DEPTH (m)	SAMPLE: TYPE AND NO.	SAMPLE: RECOVERY (%)	SAMPLE: N, Nc OR RQD	SAMPLE: WATER CONTENT (%)	■ PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / △ REMOULDED SHEAR STRENGTH, Cur (kPa) ▲ PEAK SHEAR STRENGTH, Cu (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
Dynamic Cone Penetration Test pushed from 7.32 m to 29.06 m depth		10							
									77
		11							76
		12							75
		13							74
		14							73
		15							72
		16							71
		17							70
		18							69
		19							68
		20							

PATERSON GROUP

SOIL PROFILE AND TEST DATA

Geotechnical Investigation

6408 Renaud Road, Ottawa, Ontario

COORD. SYS.: MTM ZONE 9 **EASTING:** 382685.32 **NORTHING:** 5033249.95 **ELEVATION:** 87.57

PROJECT: Proposed Residential Development

BORINGS BY: CME-22 Low Clearance Drill

REMARKS:

DATE: November 06, 2024

FILE NO. : PG7326

HOLE NO. : BH 1-24

SAMPLE DESCRIPTION	STRATA PLOT	DEPTH (m)	SAMPLE: TYPE AND NO.	SAMPLE: RECOVERY (%)	SAMPLE: N, Nc OR RQD	WATER CONTENT (%)	■ PEN. RESIST. (BLOWS/0.3m) DCPT (50mm DIA. CONE) 20 40 60 80 / △ REMOULDED SHEAR STRENGTH, Cur (kPa) ▲ PEAK SHEAR STRENGTH, Cu (kPa) 20 40 60 80 / PL (%) WATER CONTENT (%) LL (%) 20 40 60 80	PIEZOMETER CONSTRUCTION	ELEVATION (m)
GROUND SURFACE									
Dynamic Cone Penetration Test pushed from 7.32 m to 29.06 m depth		20							
									67
		21							
									66
		22							
									65
		23							
									64
		24							
									63
		25							
									62
		26							
									61
		27							
									60
		28							
									59
29.16m [58.41m]		29							
End of Borehole Practical refusal to DCPT at 29.16 m depth (GWL at 3.74 m depth - November 11, 2024)									58
		30							

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation

6408 Renaud Road, Ottawa, Ontario

PATERSON GROUP

COORD. SYS.: MTM ZONE 9 **EASTING:** 382701.42 **NORTHING:** 5033221.45 **ELEVATION:** 87.16

PROJECT: Proposed Residential Development

BORINGS BY: CME-22 Low Clearance Drill

REMARKS:

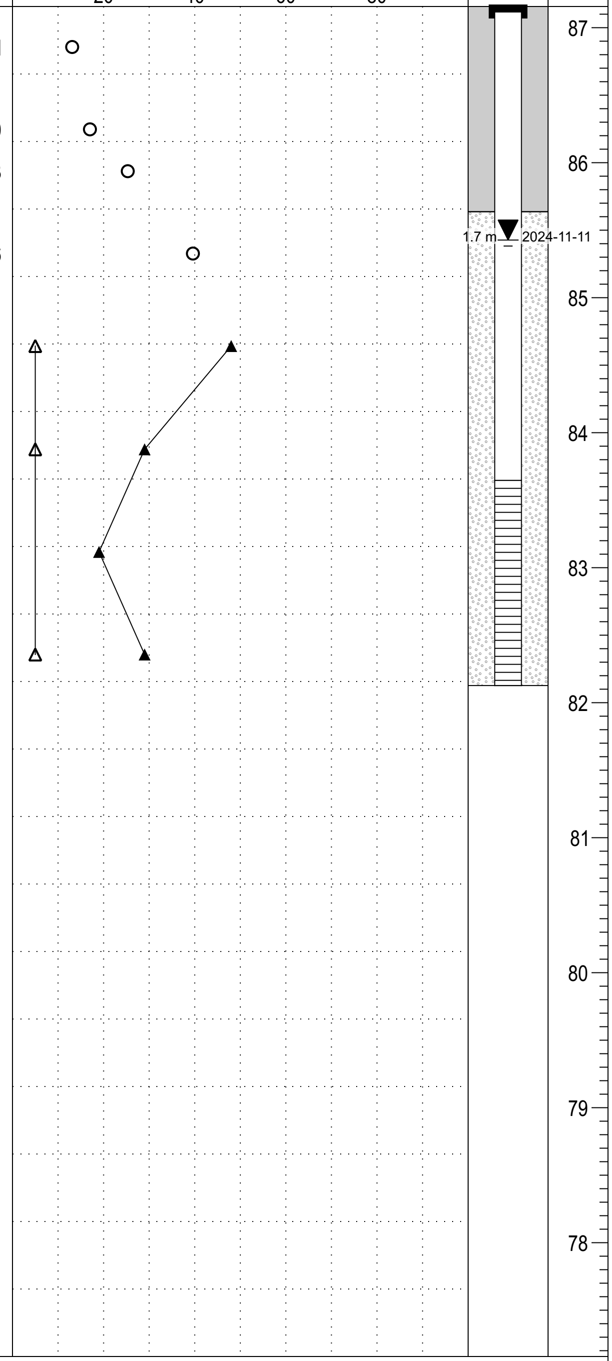
DATE: November 06, 2024

FILE NO. : PG7326

HOLE NO. : BH 2-24

SAMPLE DESCRIPTION	Depth / Elevation	Sample Type and No.	Recovery (%)	N, Nc or RQD	Water Content (%)
GROUND SURFACE	0 / 87.16				
TOPSOIL	0.10m [87.06m]	AU 1			13.1
Compact, brown **SILTY** fine **SAND**	1.30m [85.86m]	SS 2	87	5-7-7-4 14	17.0
Stiff to firm, brown **SILTY CLAY**	2.44m [84.72m]				25.3
		SS 3	100	3-2-2-2 4	39.6
Firm to soft, grey **SILTY CLAY**	5.03m [82.13m]				
End of Borehole					

(GWL at 1.73 m depth - November 11, 2024)



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation

6408 Renaud Road, Ottawa, Ontario

PATERSON GROUP

COORD. SYS.: MTM ZONE 9 **EASTING:** 382668.30 **NORTHING:** 5033238.50 **ELEVATION:** 87.36

PROJECT: Proposed Residential Development

BORINGS BY: CME-22 Low Clearance Drill

REMARKS:

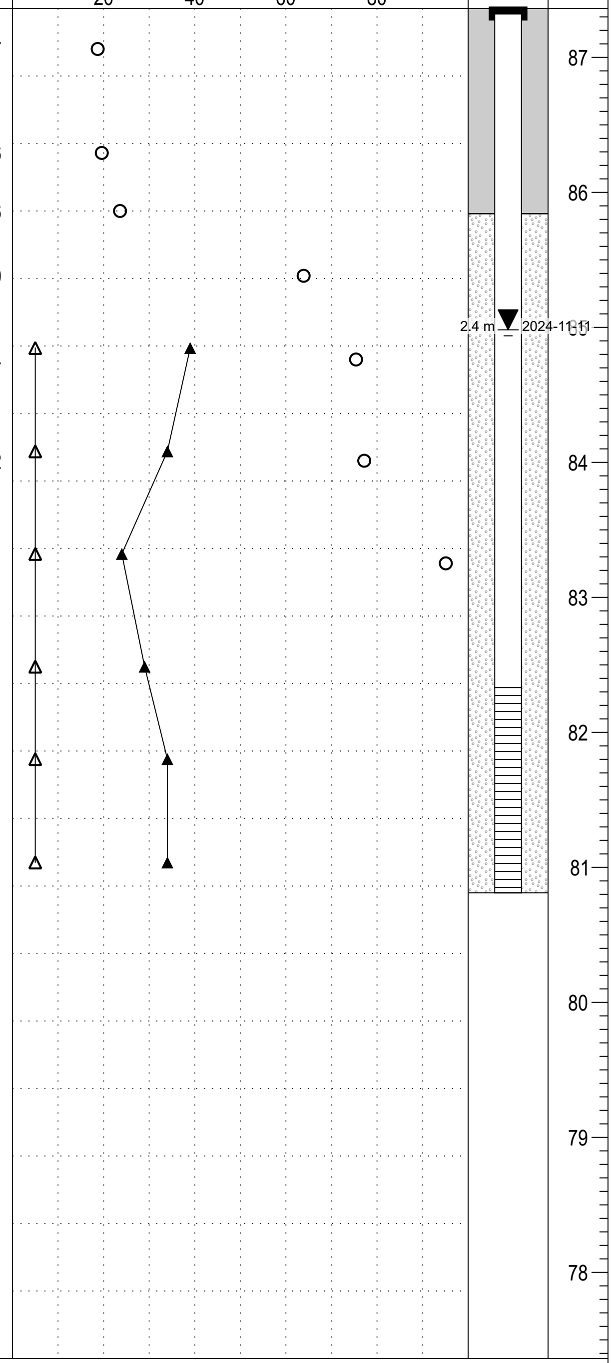
DATE: November 06, 2024

FILE NO. : PG7326

HOLE NO. : BH 3-24

SAMPLE DESCRIPTION	Depth / Elevation
GROUND SURFACE	
FILL: Granular crushed stone, with gravel	0.03m [87.33m]
FILL: Compact, brown silty fine sand, with crushed stone	0.13m [87.23m]
TOPSOIL	0.20m [87.16m]
Compact, brown **SILTY SAND**	1.68m [85.68m]
Firm, brown **SILTY CLAY** - Silty seam at 2.0 m depth	2.21m [85.15m]
Firm to soft, grey **SILTY CLAY**	6.55m [80.81m]
End of Borehole (GWL at 2.38 m depth - November 11, 2024)	

TYPE AND NO.	RECOVERY (%)	N, Nc OR RQD	WATER CONTENT (%)
AU 1			18.7
SS 2	67	4-6-6-8 12	19.6
			23.6
SS 3	100	4-2-2-2 4	63.9
SS 4	100	P	75.4
SS 5	100	P	77.2
SS 6	100	P	95.1



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SOIL PROFILE AND TEST DATA

Geotechnical Investigation

6408 Renaud Road, Ottawa, Ontario

PATERSON GROUP

COORD. SYS.: MTM ZONE 9 **EASTING:** 382679.79 **NORTHING:** 5033216.81 **ELEVATION:** 87.27

PROJECT: Proposed Residential Development

BORINGS BY: CME-22 Low Clearance Drill

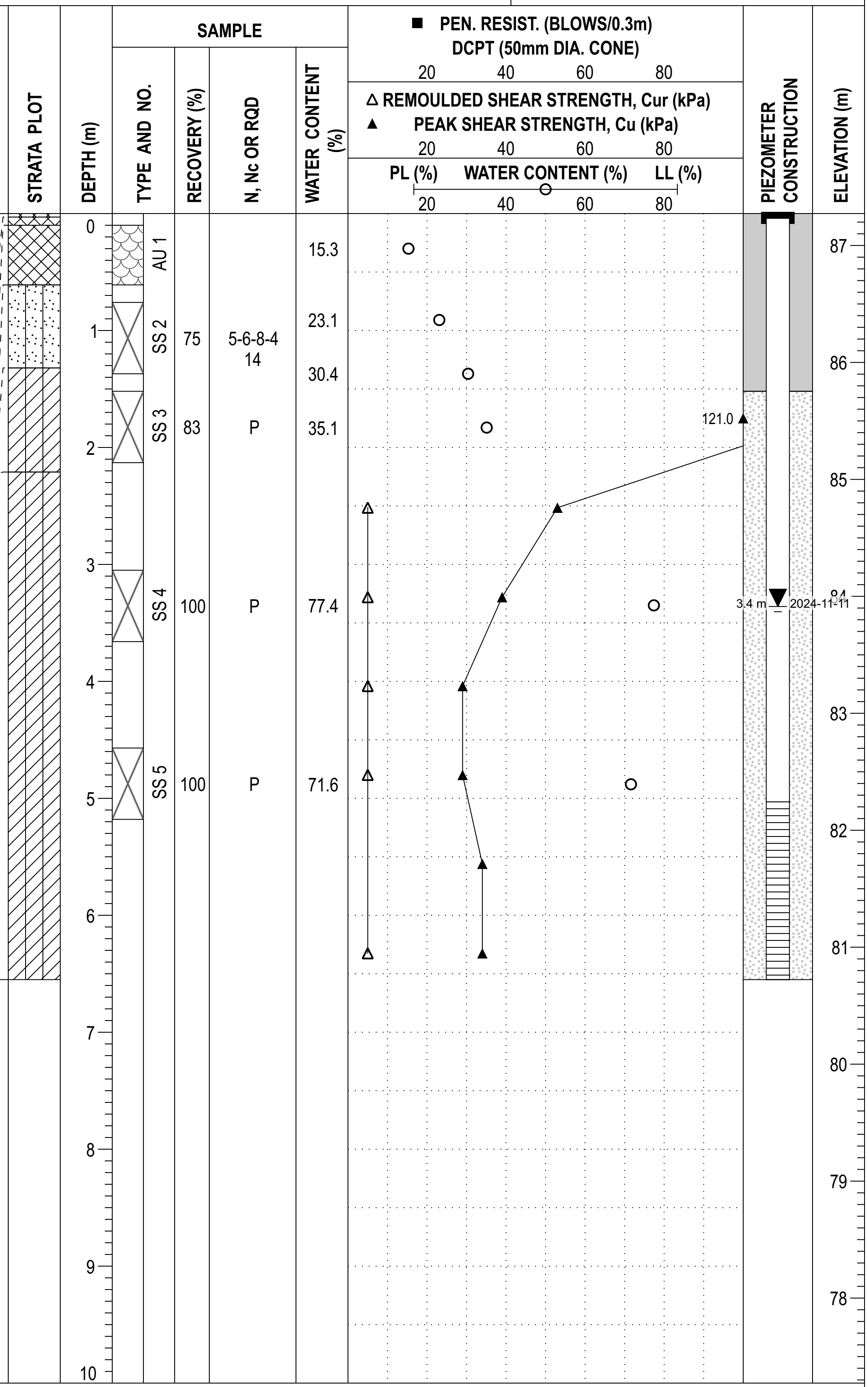
REMARKS:

DATE: November 06, 2024

FILE NO. : PG7326

HOLE NO. : BH 4-24

SAMPLE DESCRIPTION	Depth to base	SAMPLE TYPE AND NO.	RECOVERY (%)	N, Nc OR RQD	WATER CONTENT (%)
GROUND SURFACE					
FILL: Granular crushed stone with gravel	0.03m [87.24m]	AU 1			15.3
FILL: Compact, brown silty fine sand, with crushed stone	0.10m [87.17m]	SS 2	75	5-6-8-4 14	23.1
FILL: Stiff, brown silty clay, some crushed stone and sand	0.61m [86.66m]				30.4
Compact, brown **SILTY** fine **SAND**	1.32m [85.95m]	SS 3	83	P	35.1
Very stiff, brown **SILTY CLAY**	2.21m [85.06m]				
Stiff to firm, grey **SILTY CLAY**	6.55m [80.72m]	SS 4	100	P	77.4
		SS 5	100	P	71.6
End of Borehole (GWL at 3.36 m depth - November 11, 2024)					



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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 x 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

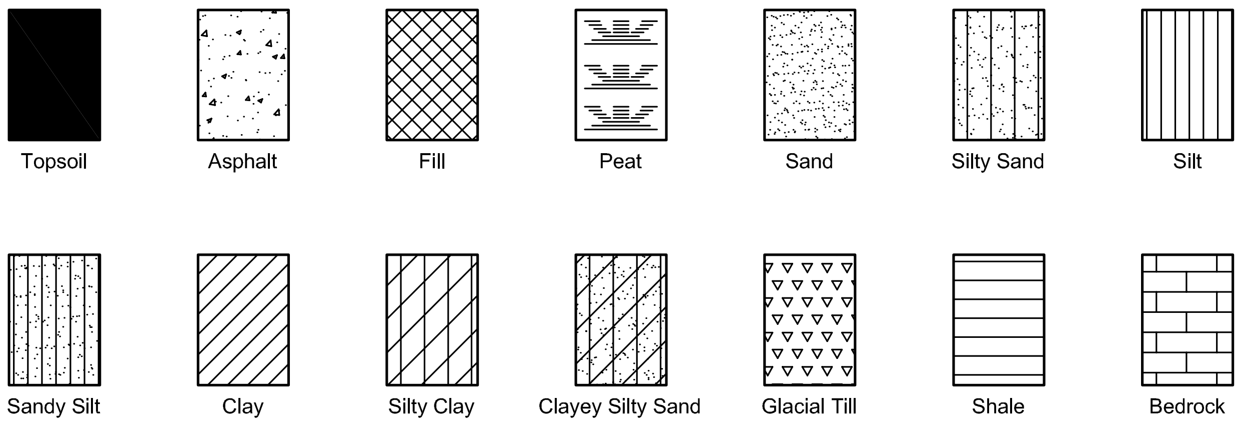
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void 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.

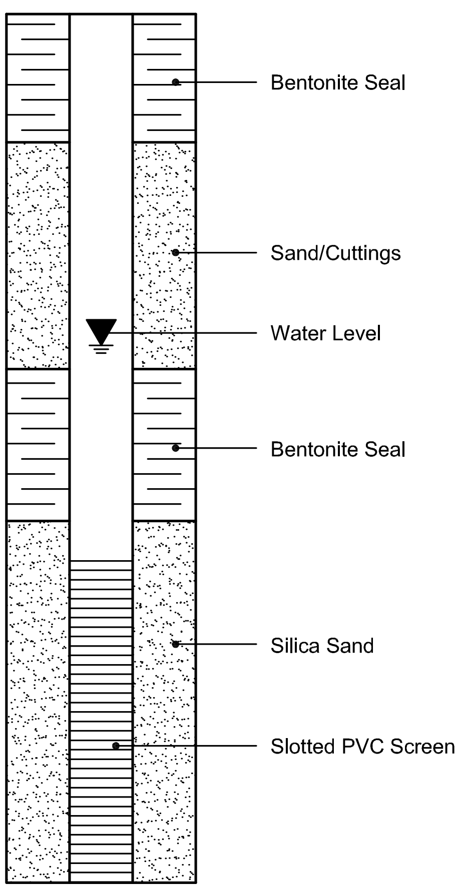
SYMBOLS AND TERMS (continued)

STRATA PLOT

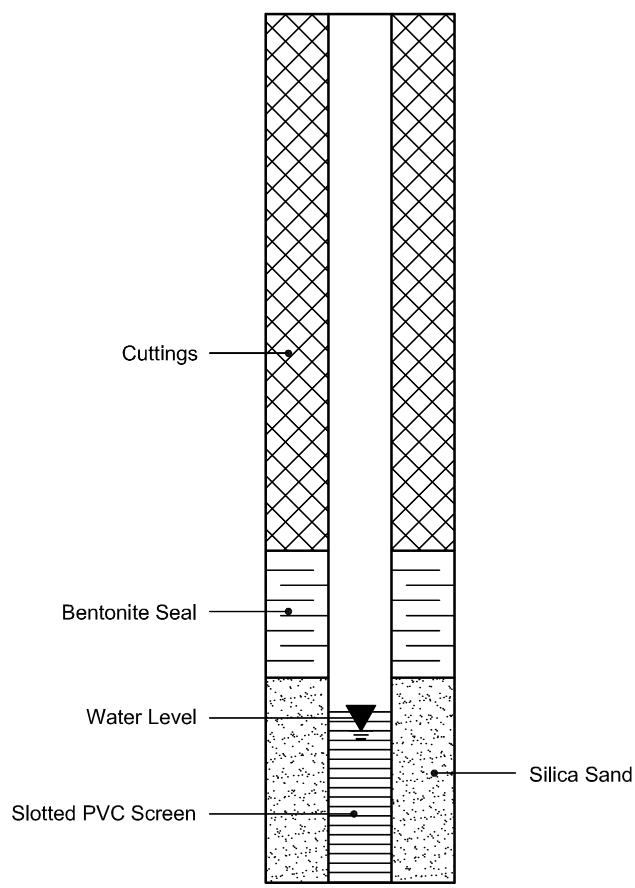


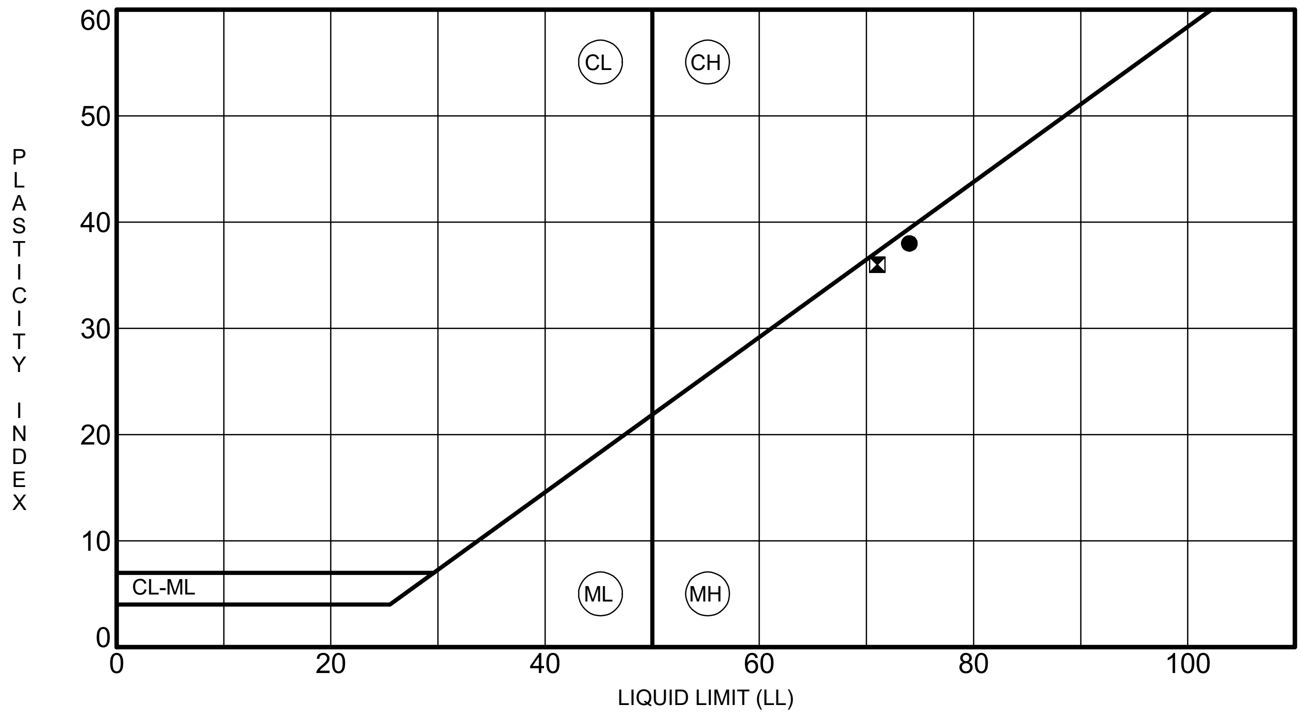
MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION





	Specimen Identification		LL	PL	PI	Fines	Classification
●	**BH 3-24**	**SS4**	**74**	**36**	**38**		**CH - Inorganic clays of high plasticity**
⧗	**BH 4-24**	**SS4**	**71**	**35**	**36**		**CH - Inorganic clays of high plasticity**

CLIENT **NCTL Homes Inc.**

PROJECT **Geotechnical Investigation - 6408 Renaud Road, Ottawa, Ontario**

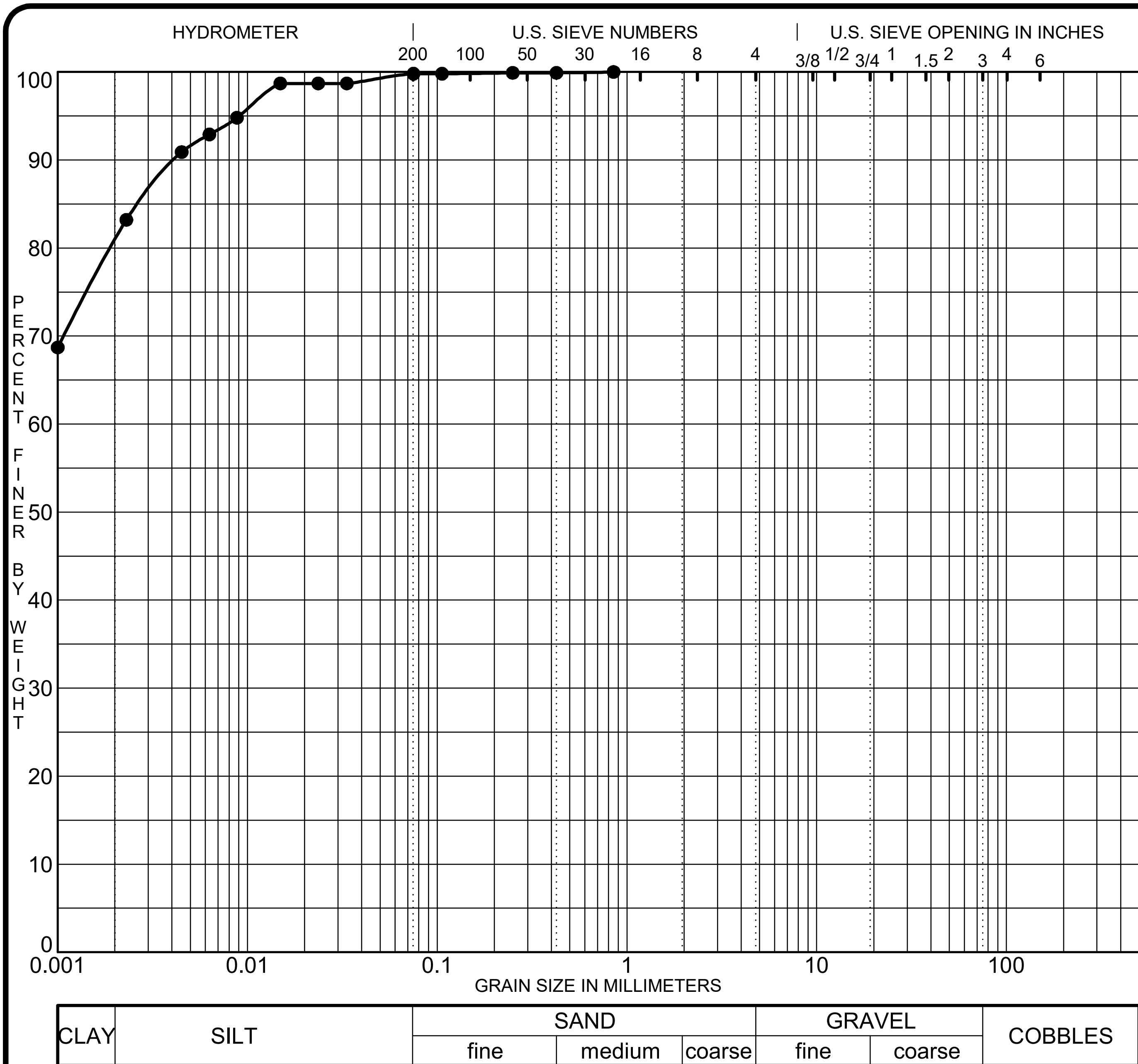
FILE NO. **PG7326**

DATE **6 Nov 24**

PATERSON GROUP

9 Auriga Drive
Ottawa, Ontario
K2E 7T9
TEL: (613) 226-7381

ATTERBERG LIMITS' RESULTS



	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	**BH 3-24**	**SS4**	**CH - Inorganic clays of high plasticity**	**80.1**	**74**	**36**	**38**		
⊠									
▲									
★									

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**BH 3-24**	**SS4**	**0.85**				**0.0**	**0.2**	**19.3**	**80.5**
⊠										
▲										
★										

CLIENT **NCTL Homes Inc.**

PROJECT **Geotechnical Investigation - 6408 Renaud Road, Ottawa, Ontario**

FILE NO. **PG7326**

DATE **6 Nov 24**

PATERSON GROUP

9 Auriga Drive
Ottawa, Ontario
K2E 7T9
TEL: (613) 226-7381

GRAIN SIZE DISTRIBUTION

PARACEL LABORATORIES LTD.

Order #: 2445443

Certificate of Analysis

Report Date: 12-Nov-2024

Client: Paterson Group Consulting Engineers (Ottawa)

Order Date: 7-Nov-2024

Client PO: 61688

Project Description: PG7326

	Client ID:	BH3-24-SS4	-	-	-	-	-
	Sample Date:	07-Nov-24 09:00	-	-	-	-	-
	Sample ID:	2445443-01	-	-	-	-	-
	Matrix:	Soil	-	-	-	-	-
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	56.2	-	-	-	-	-
General Inorganics							
pH	0.05 pH Units	7.15	-	-	-	-	-
Resistivity	0.1 Ohm.m	16.7	-	-	-	-	-
Anions							
Chloride	10 ug/g	52	-	-	-	-	-
Sulphate	10 ug/g	66	-	-	-	-	-

APPENDIX 2

FIGURE 1 – KEY PLAN

DRAWING PG7326-1 – TEST HOLE LOCATION PLAN

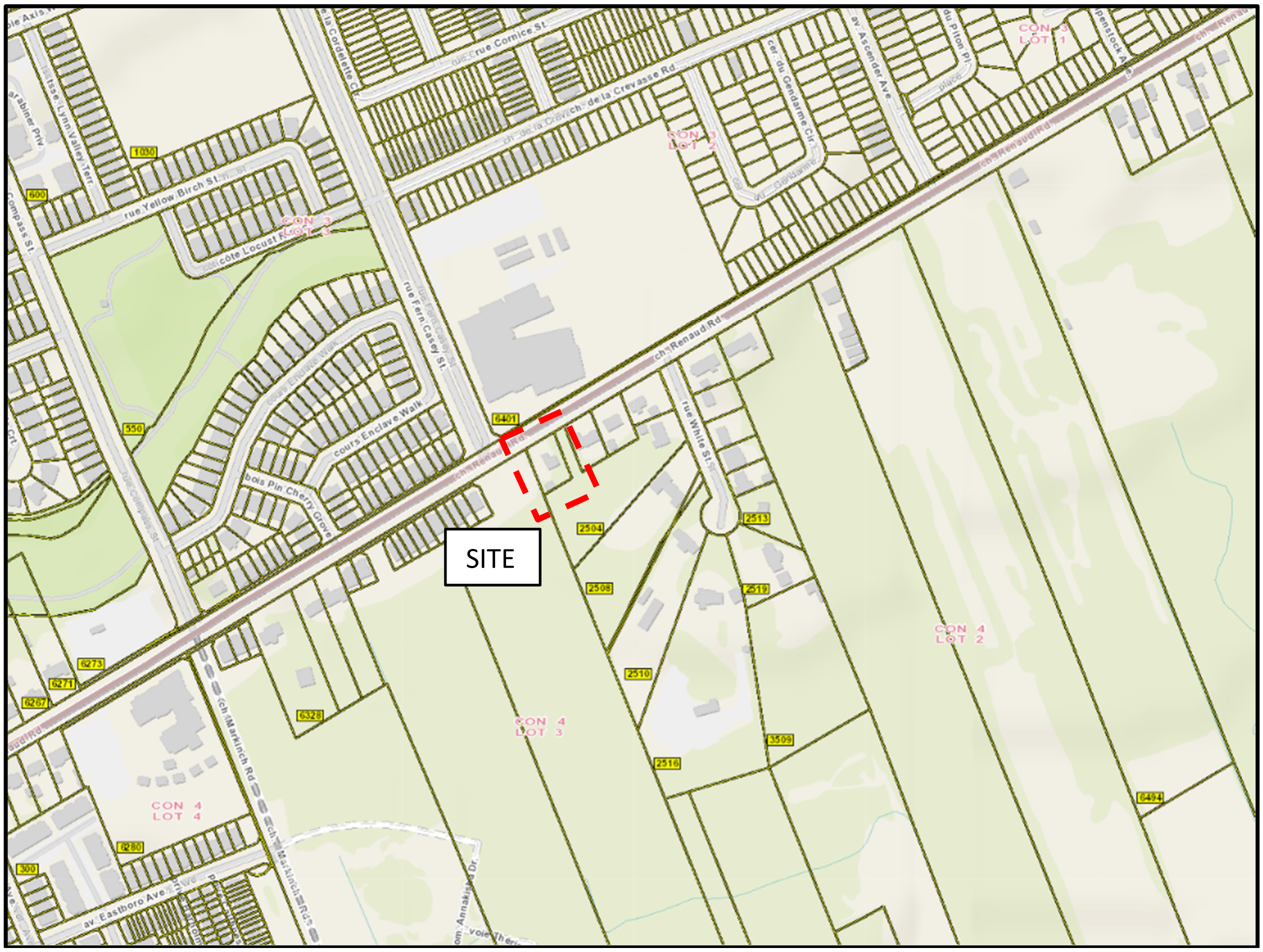


FIGURE 1

KEY PLAN

PATERSON GROUP

LEGEND:

⌖	BOREHOLE LOCATION
87.36	GROUND SURFACE ELEVATION (m)
{58.41}	PRACTICAL REFUSAL TO DCPT ELEVATION (m)

GROUND SURFACE ELEVATIONS AT BOREHOLE LOCATIONS ARE REFERENCED TO A GEODETIC DATUM.

SCALE: 1:250

0 1 2 3 4 5 10 15m

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL

NCTL HOMES INC.
GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
6408 RENAUD ROAD

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:250	Date: 11/2024
Drawn by: ZS	Report No.: PG7326-1
Checked by: OC	Dwg. No.: PG7326-1
Approved by: FA	Revision No.:

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11x17