

# Existing Conditions - Geotechnical Tewin Lands Ottawa, Ontario

Prepared for Taggart Investments and Algonquins of Ontario

Report PG5827 1 Revision 5 dated September 2024



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# **1.0 Introduction**

This geotechnical report is part of a set of technical reports which have been prepared as part of Phase 1 of the Tewin study process. The Tewin Study Area ("Study Area") lands were identified as a future urban development area in the new City of Ottawa Official Plan (2023). The Study Area is located in southeast Ottawa, generally bordered by Leitrim Road to the north, Farmers Way to the east, Thunder Road to the south, and Anderson Road and Ramsayville Road to the west. The Study Area is outlined in Figure 1 below. These technical reports are intended to establish an understanding of the existing physical, social and ecological conditions that characterize the Study Area. Where appropriate, these reports also identify preliminary opportunities to help guide the next phase of the master planning process.

This information will be used to identify opportunities and strategic considerations that will inform the Tewin community design process going forward, as well as frame the preparation of additional site-specific technical studies and recommendation reports. Development at Tewin will explore new approaches to planning, design and development, including alternative strategies and solutions that can successfully implement the key community objectives.

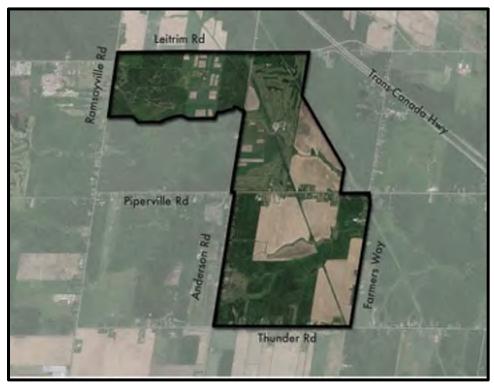


Figure 1: The Tewin Study Area is identified in black outline



# 1.1 Integrated Master Plan & Municipal Class EA Process

The ambition and scale of Tewin requires ongoing internal and external consultation. The purpose of the integrated Master Plan and Municipal Class EA process is to consolidate the various technical and community planning elements of the project to promote coordinated community engagement through streamlined and aligned decision making. This format will ensure critical partners, consultants and stakeholders are brought together at major milestones to identify and track challenges and opportunities through the development process.

The integrated Master Plan and Municipal Class EA process will include a public consultation strategy and technical study review timeline that achieves the requirements of the Master Plan and Municipal Class EA concurrently. The statutory Municipal Class EA meetings will be timed to align with the development of the community objectives, urban framework, preferred plans, and the draft secondary plan. Additional public and targeted consultations will be planned to complement the statutory consultation requirements. The development of the One Planet Action Plan (OPAP) will occur in parallel, with the final OPAP available at the time of final secondary plan Council approval. One Planet Living endorsement will follow Council approval of the secondary plan.

# **1.2 Tewin Overview and Community Vision**

Tewin is planned to be a community of approximately 45,000 people and thousands of jobs. It will be more compact and denser than existing suburbs in Ottawa, with new urban areas integrated alongside valuable natural areas. Tewin will be an inclusive community, anchored in Algonquin wisdom and placekeeping principles, and welcoming to all. The community will have a meaningful mix of land uses and support active mobility, to achieve a complete, future ready community. The Tewin Project Team and City of Ottawa have committed to exploring appropriate options, alternatives and standards to enable Tewin to become a model of best practices in sustainable and inclusive community design in the North American context.

The integrated Master Plan and Municipal Class EA process will bring together various technical and community planning considerations.

The key objectives for Tewin are to create a community that is:

- > Anchored in Algonquin wisdom, principles and placekeeping;
- A benchmark for community design, demonstrating achievement of the 5 Big Moves identified in the Ottawa Official Plan;



- Mobility-oriented and supportive, promoting a broad range of active forms of movement, where personal vehicles are optional;
- Characterized by a meaningful mix of housing, community amenities, jobs and services in order to achieve a complete, future-ready community;
- Designed to protect and integrate alongside valuable natural areas and agricultural lands; and
- > Affordable, inclusive, healthy, welcoming and accessible to all.

# **1.3 Tewin Intent: A Forward-Thinking Framework**

Development at Tewin will explore new approaches to planning, design and development, finding successful options and alternatives to implement the key community objectives, in some cases likely going beyond what current development standards would allow for. The Tewin Project Team and the City of Ottawa have articulated these in the "Tewin Intent" which sets out the following:

#### 1. Bold and Innovative Thinking:

Tewin is about creating a new kind of community, a future-focused model for smart, healthy and sustainable development. It will be a people-centred place that seeks to create the conditions for well-being. The Tewin Project Team will be open to bold ideas, innovative approaches, creative solutions, efficient use of land and resources, emerging technologies, smart city infrastructure that advances the City's goals and objectives, and other future-forward ideas and opportunities that will enable Tewin to reach its full potential.

#### 2. Integrating Algonquin Values and Principles:

Algonquin principles, values and teachings will guide the planning, consultation, design and development process for Tewin. The integration of Algonquin principles and design intentions will ensure the community is nature-based and sensitive to Mother Earth while creating capacity-building and economic development opportunities for the Algonquin people.

#### 3. Sustainability and Resilience:

Tewin will be a model community that will position Ottawa as a leader in integrated sustainable design with the goal of being a resilient and holistic community. Tewin will be guided by the One Planet Living framework and Algonquin values of respect for the earth.



The Community Design Plan will respond to the City's High Performance Development Standard and Climate Change Master Plan and will result in a Community Energy Plan. A Community Energy Plan and performance-based sustainability metrics that address climate mitigation and adaptation, and the other categories of the High-Performance Development Standards will be established from the start and monitored over time.

#### 4. Systems-Based Environmental Planning

Tewin's organization and functions will be designed to respect nature and integrate natural features and landscapes into its form, character, and spirit. To that end, the Tewin Project Team is committed to pursuing a systems-based approach to natural heritage protection, environmental management, and water management in a way that is inclusive and integrated and encourages stewardship and a positive relationship with the natural world. Natural features are regarded as opportunities rather than constraints, will be woven into the fabric of the community, and will be central to its design and character.

#### 5. Alternative Design Solutions

Designing a community of the future requires progressive and forward-thinking infrastructure solutions. The Tewin Project Team is committed to being solutions-oriented and will consider alternative design and engineering standards that prioritize natural systems, pedestrians, cyclists and transit users, and which efficiently use available land and resources.

Surface water management strategies that achieve quality, conveyance and storage objectives will be based on the fundamentals of natural cycles, green/soft infrastructure, and multi-use opportunities that complement the human realm. Infrastructure design will consider the needs of those involved in the construction, operation and maintenance of municipal services to find opportunities to efficiently service the community and showcase sustainable practices while meeting the community's needs.

A framework for assessing alternative design standards will be established to consider and review alternatives against existing standards within the context of goals and objectives for the City and Tewin.

#### 6. Cost-Effectiveness and Efficiency

Tewin will demonstrate best practices in efficient and compact development. As a dense, mixed-use community of scale, Tewin will achieve a critical mass of people and jobs to support new infrastructure investments.



The Tewin Project Team is committed to exploring opportunities to optimize the community's efficiency through a range of strategies, including prioritizing spaceefficient modes of transportation, use of technology, green infrastructure, innovative construction practices, shared-use agreements, and mixed-use forms of development that will promote the efficient use and optimization of land; housing affordability; and supporting the long-term financial viability of the community and city resources.

#### 7. Integrated Planning Process

We are committed to advancing Tewin through a comprehensive and integrated planning and environmental assessment process where possible or applicable. The process will bring together various planning, environmental, transportation, urban design, infrastructure, economic, financial, social and technical considerations. The process will be underpinned by engagement with the Algonquin people, other stakeholders, and the public.

#### 8. Collaboration and Problem Solving

The Tewin Project Team and City of Ottawa Project Team are committed to working collaboratively together to move Tewin forward in an expedited way. We will plan with a spirit of collaboration and joint problem-solving to ensure that the development of Tewin meets the best interests of the City of Ottawa and the Algonquins of Ontario.

#### 9. Communication and Transparency

The Tewin Project Team and the City of Ottawa Project Team commit to open and transparent communication throughout the project. This will require proactively sharing information between the groups as decisions are made and ensuring relevant communication materials are distributed in a timely manner.

The Tewin Project Team and the City of Ottawa Project Team will ensure that all parties, including City Council, residents, and other stakeholders, are provided with pertinent details. Effective information sharing will ensure the project achieves outcomes that are, to the greatest extent possible, known by all involved.

# **1.4 Existing Conditions Technical Reports**

A range of specialized consultants have been studying the physical environment of the Study Area to support community design, servicing strategies and the future development of Tewin. This data has been collected and reported on in a set of Existing Conditions and Opportunities Reports, of which this document is one. The full suite of reports includes the following:



- Tewin Existing Conditions and Preliminary Opportunities Report dated September 2024 and prepared by Urban Strategies
- Fluvial Geomorphology Study Tewin Lands: Existing Conditions Summary Report - Bear Brook and Ramsay Creek Watersheds dated October 2024 and prepared by GEO Morphix Ltd.
- **Tewin Lands: Existing Conditions Hydrogeological Study** dated September 2024 and prepared by Dillon Consulting
- Existing Conditions Geotechnical: Tewin Lands dated September 2024 and prepared by Paterson Group
- Tewin Lands: Natural Heritage Preliminary Existing Conditions Report dated April 2024 and prepared by Kilgour and Associates
- Tewin Lands: Cumulative Hydrologic Impact Assessment dated April 2024 and prepared by J.F. Sabourin and Associates
- **Tewin Lands: 2021-22 Field Monitoring Report** dated April 2024 and prepared by J.F. Sabourin and Associates
- **Tewin Lands Existing Conditions Water Budget** dated October 2024 and prepared by J.F. Sabourin and Associates
- Stage 1 Archaeological Assessment Tewin Lands dated July 14, 2023 and prepared by WSP Canada Inc.
- **Tewin Mobility Existing Conditions** dated January2024 and prepared by CGH Transportation

# **1.5 Framework for Identifying Preliminary Opportunities**

Given the unique scale, vision and project goals for Tewin, as well as the shared commitment to exploring new ways of advancing the community design process as expressed in the Tewin Intent, the Phase 1 reports for Tewin include a discussion of potential opportunities to be explored in subsequent stages of the integrated Master Plan and Municipal Class EA process. The identification of preliminary constraints and opportunities, as well as a preliminary community structure, is required in Phase 1 of the integrated Master Plan and Municipal Class EA process as per specific Terms of Reference that were established for each of the Tewin planning, environmental and transportation studies.

The opportunities introduced within these reports are based on a series of key policy directions and strategic considerations, including:

- **Ottawa's new Official Plan**, which promotes the creation of complete, transit-supportive communities;
- Algonquin values and principles, underscored by respect for nature, integration of water, and planning the natural environment to achieve long-term vitality over many generations;
- **The Tewin Intent**, which promotes innovative thinking and alternative, performancebased solutions;
- **One Planet Living**, a holistic framework for achieving environmental resiliency, sustainable development, and reduced carbon emissions;
- **Provincial policy** direction focused on supporting housing development and facilitating growth, in order to address the province's housing supply challenges; and,



• An integrated, systems-based approach to planning at Tewin that brings together diverse planning, environmental, technical and economic considerations.

# **1.6 Tewin Lands: Existing Conditions Geotechnical Study** Introduction

Paterson Group (Paterson) completed a geotechnical investigation to evaluate the geotechnical conditions of the subsurface profile located throughout the study area. Generally, the subsurface profile encountered consists of a deposit of silty clay overlain by a relatively thin layer of weathered clay or sand and underlain by a deposit of glacial till and further by the bedrock formation.

It is understood the proposed Tewin community will consist of a compact to dense urban area integrated alongside valuable natural features with a meaningful mix of land uses. Overall, the community is expected to be provided with structures ranging between low- to high-rise structures with mixed-use purposes (residential, commercial, institutional, municipal, etc.).

Overall, the proposed community development is considered to be feasible and suitable throughout the study area from a geotechnical perspective. The soil deposit encountered throughout the study area is considered to be the same as deposits encountered in other developed areas and communities in the Ottawa Region. Examples of these communities consist of Half Moon Bay in Barrhaven, Arcadia and Blackstone in Kanata, Cardinal Creek Village, Trailsedge, Petrie's Landing and Summerside West in Orleans, Riverside South and the majority of the Golden Triangle and Centretown areas.

The soils encountered throughout the subject are typical for the type of deposit encountered throughout the Ottawa area and are the type of soils the City of Ottawa's *Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa* are based upon. Based on this, the investigation, design and construction methodologies that would be undertaken throughout the proposed Tewin development would be considered conventional and in accordance with the methodologies set out and complete throughout the City of Ottawa.

Based on this, the proposed development is considered feasible and suitable for the study area from a geotechnical perspective.



# 2.0 Method of Investigation

# 2.1 Field Investigation

### **Field Program**

The field program for the current study was carried out between March 14 to April 13, 2022, May 26 to June 10, 2022, and December 5 to December 7, 2022. At those times, 98 boreholes were advanced up to a maximum depth of 58.0 m below the existing ground surface. It should be noted that the investigation being undertaken for the study area is on-going at the time of preparing this report. The test hole locations were determined in the field by Paterson personnel, taking into consideration site features.

The test holes were placed in a manner to provide general coverage of the study area taking into consideration site features and underground utilities. The test hole locations for the current investigation are presented on Drawing PG5827-1 - Test Hole Location Plan included in Appendix 2.

Historical investigations by Paterson were undertaken throughout the study area between September 27 and October 4, 2011. During that time, a total of 16 boreholes were advanced to a maximum depth of 9.7 m below ground surface. The soil profiles encountered by Paterson are presented on the Soil Profile and Test Data sheets in Appendix 1.

The boreholes were completed using a track-mounted drill rig operated by a twoperson crew. All fieldwork was conducted under the full-time supervision of Paterson personnel under the direction of a senior engineer from the geotechnical division. The testing procedure consisted of augering to the required depths and at the selected locations sampling the overburden.

### Sampling and In Situ Testing

Soil samples were either recovered directly from the auger flights (AU), collected using a 50 mm diameter split-spoon (SS) sampler, or 73 mm diameter thin walled (TW) Shelby tubes in conjunction with a piston sampler. Rock cores were obtained using 47.6 mm inside diameter coring equipment. Grab samples (G) were also collected from borehole locations. All soil samples were visually inspected and initially classified on site. The auger, grab and split-spoon samples were placed in sealed plastic bags and the Shelby tubes were sealed at both ends on site and protected from disturbances over the entire process. Rock cores were placed in cardboard boxes.



All samples were transported to our laboratory for further examination and classification. The depths at which the auger, grab, split spoon, Shelby tube samples, and rock core samples were recovered from the test holes are shown as AU, G, SS, TW, and RC, 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. Depths at which the split-spoon was pushed through an interval that was previously disturbed by testing using a vane apparatus are indicated as "P" on the Soil Profile and Test Data sheets presented in Appendix 1.

Rock samples were recovered from BH 17-22, BH 23-22, BH 24-22 and BH 72-22 using a core barrel and diamond drilling techniques. A recovery value and a Rock Quality Designation (RQD) value were calculated for each drilled section of bedrock and are shown on the Soil Profile and Test Data sheets in Appendix 1. The recovery value is the ratio, in percentage, of the length of the bedrock sample recovered over the length of the drilled section. The RQD value is the ratio, in percentage, of the total length of intact rock pieces longer than 100 mm in one drilled section over the length of the drilled section. These values are indicative of the bedrock quality.

Undrained shear strength testing was carried out in cohesive soils using a field vane apparatus.

Cone-penetration testing (CPT) was completed at select locations to supplement existing borehole coverage. The CPT hole logs are in Appendix 1 of this report. Monitoring wells were installed at all boreholes to permit monitoring of the groundwater levels subsequent to the completion of the sampling program. The groundwater observations are presented in the Soil Profile and Test Data sheets attached to this report.

Soil samples were recovered from the study area and visually examined in our laboratory to review the results of the field logging.

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

All of the test holes from the current investigation have been instrumented with a standard 51 mm diameter PVC monitoring well.

Monitoring wells were installed to allow monitoring of the groundwater level subsequent to the completion of the sampling program. Groundwater observations are discussed in Subsection 3.3 and presented in the Soil Profile and Test Data sheets in Appendix 1.

#### Monitoring Well Installation

Typical monitoring well construction details are described below:

- > Slotted 32 mm diameter PVC screen at the base of each borehole.
- 51 mm diameter PVC riser pipe from the top of the screen to the ground surface.
- No.3 silica sand backfill within annular space around screen.
- > Bentonite hole plug directly above PVC slotted screen.
- Clean backfill from top of bentonite plug to the ground surface.

Refer to the Soil Profile and Test Data sheets in Appendix 1 for specific well construction details.

## 2.2 Field Survey

The test hole locations were selected by Paterson to provide general coverage of the study area, taking into consideration the existing site features and underground utilities. The test hole 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 test holes and ground surface elevation at each test hole location are presented on Drawing PG5827-1 - Test Hole Location Plan in Appendix 2.

# 2.3 Laboratory Testing

Soil and bedrock samples were recovered from the study area and visually examined in our laboratory to review the results of the field logging. Atterberg Limits, hydrometer, consolidation, and shrinkage testing was completed on select samples obtained from the current geotechnical investigation.



Unconfined compressive strength testing was carried out on bedrock samples from boreholes BH 17-22, BH 23-22, BH 24-22 and BH 72-22. Moisture content testing was completed on all retrieved soil samples from the current investigation.

Paterson has also completed 3 Atterberg Limits tests and 18 consolidation tests on select soil samples retrieved during previous investigations.

The results of the current and historical testing are discussed in Subsection 3.2 and are provided in Appendix 1 of this report.

### 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 we are otherwise directed.

# 2.4 Analytical Testing

Twelve (12) soil samples were submitted for analytical testing to assess the corrosion potential for exposed ferrous metals and the potential of sulphate attacks against subsurface concrete structures by others. The samples were submitted to determine the concentration of sulphate and chloride, the resistivity, and the pH of the samples. The results are discussed further in Subsection 5.3 of this report.

# 2.5 Permeameter and Hydraulic Conductivity (Slug) Testing

# **Permeameter Testing**

In-situ permeameter testing was conducted using a Pask (Constant Head Well) Permeameter to confirm infiltration rates of the surficial soils at the study area. At select locations, two (2) 83 mm holes, approximately 1.5 m away from each other, were excavated using a Riverside/Bucket auger to a depth of 0.3 to 0.6 m below existing ground surface. All soils from the auger flights were visually inspected and initially classified on-site. The permeameter reservoir was filled with water and inverted into the hole, ensuring that it was relatively vertical and rested on the bottom of the hole.

As the water infiltrated into the soil, the water level of the reservoir was monitored at various time intervals until the rate of fall reached equilibrium, known as "quasi steady state" flow rate. Quasi steady state flow can be considered to have been obtained after measuring 3 to 5 consecutive rate of fall readings with identical values. The values for the steady state rate of fall were recorded for each location. The results of testing are further discussed in Subsection 3.4 of this report.



# Hydraulic Conductivity (Slug) Testing

Hydraulic conductivity (slug) testing was conducted at each monitoring well location to estimate anticipated groundwater flow rates within the subsoils at the study area.

The test data was analyzed as per the method set out by Hvorslev (1951). Assumptions inherent in the Hvorslev method include a homogeneous and isotropic aquifer of infinite extent with zero-storage assumption, and a screen length significantly greater than the monitoring well diameter.

The assumption regarding aquifer storage is considered to be appropriate for groundwater inflow through the overburden aquifer. The assumption regarding screen length and well diameter is considered to be met based on a screen length of 1.5 m or 3.0 and a diameter of 0.05 m. While the idealized assumptions regarding aquifer extent, homogeneity, and isotropy are not strictly met in this case (or in any real-world situation), it has been our experience that the Hvorslev method produces effective point estimates of hydraulic conductivity in conditions similar to those encountered at the study area.

The Hvorslev analysis is based on the line of best fit through the field data (hydraulic head recovery vs. time), plotted on a semi-logarithmic scale. In cases where the initial hydraulic head displacement is known with relative certainty, such as in this case where a physical slug has been introduced, the line of best fit is considered to pass through the origin. The semi-log drawdown vs. time plots for rising and falling head at each borehole location are presented in Appendix 1. The results of testing are further discussed in Subsection 3.4 of this report.



# 3.0 Observations

# 3.1 Surface Conditions

The study area consists generally of undeveloped agricultural lands with several portions consisting of treed areas and forests. Existing buildings, including residential dwellings and farmstead structures, are present throughout the several of the agricultural land areas. An existing golf course is located at 4175 Anderson Road.

The study area was observed to be intersected by the Smith-Gooding municipal drain centrally throughout the parcels located north of Piperville Road. Parcels located south of Piperville Road were observed to be intersected by the Johnston municipal drain which outlets further into a shallow creek continuing beyond the eastern boundary of the study area and along Farmers Way. Paterson completed an assessment of the stability of the slopes present along these watercourses and is discussed further in Section 6.9 of this report.

The site is bordered by residential properties and/or agricultural lands along the majority of the site boundaries. The ground surface at the study area is relatively flat and approximately at grade with the surrounding roadways and properties.

# 3.2 Subsurface Profile

### Overburden

Generally, the subsurface profile encountered at the test hole locations consisted of topsoil underlain by a layer of silty sand and/or brown silty clay and further by a deep deposit of grey silty clay. The silty clay deposit was observed to be underlain by a glacial till deposit and further by the underlying bedrock formation.

The silty sand layer generally consisted of a loose to compact brown silty sand with varying amounts of clay. The silty sand layer was generally observed to extend up to a depth of 3.7 m below existing ground surface.

A thin and intermediate layer of brown and/or grey silty sand was observed between the brown and grey layers of silty clay at BH 3-22, BH 25-22 BH 26-22, BH 35-22, BH 52-22, BH 53-22, BH 57-22, BH 60-22, BH 63-22, BH 64-22, BH 70-22 and BH 73-22 to BH 75-22. Reference can be made to Drawing PG5827-3 - Surficial Sand Layer Thickness Contour Plan for the test hole locations and approximate sand layer thickness contours based on the depth of surficial sand encountered in the test holes.



The brown silty clay layer generally consisted of very stiff to stiff brown silty clay with varying amounts of sand. The silty sand and/or brown silty clay layer was observed to be underlain by a deep deposit of soft to firm, grey silty clay which became stiff to very stiff with depth. The silty clay deposit was encountered up to a depth of 47.6 m below existing ground surface.

The silty clay deposit was observed to be underlain by a deposit of glacial till deposit which generally consisted of compact to dense, grey silty sand with clay, gravel, cobbles and boulders, and extended up to a depth range between 21.8 and 52.3 m below existing ground surface.

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

#### Grain Size Distribution and Hydrometer Testing

85 sieve analysis and hydrometer tests were completed to classify selected soil samples according to the Unified Soil Classification System (USCS). The results are summarized in Table 1 and are presented on the Grain-Size Distribution and Hydrometer Testing Results sheets in Appendix 1.

Table 1 – Su	Table 1 – Summary of Grain Size Distribution Analysis						
Borehole	Sample	Gravel (%)	Sand (%)	Silt (%)	Clay (%)		
BH 1-22	AU1	5.0	43.6	37.4	14.0		
BH 2-22	SS3	0.0	0.5	24.5	75.0		
BH 3-22	SS4	0.0	3.9	28.6	67.5		
BH 4-22	SS4	0.0	0.2	29.3	70.5		
BH 5-22	SS3	0.0	0.4	30.1	69.5		
BH 6-22	SS3	0.0	1.5	26.5	72.0		
BH 7-22	SS3	0.0	0.9	45.1	54.0		
BH 8-22	SS3	0.0	3.0	41.0	56.0		
BH 9-22	SS9	0.0	2.5	28.0	69.5		
BH 10-22	SS5	0.0	0.4	42.6	57.0		
BH 11-22	SS6	0.0	0.3	36.2	63.5		
BH 12-22	SS2	0.0	11.3	35.7	64.0		
BH 13-22	SS4	0.0	0.3	44.2	49.5		
BH 14-22	SS3	0.0	6.3	31.7	59.5		
BH 15-22	SS3	0.4	8.4	36.3	63.0		
BH 16-22	SS3	0.0	0.7	37.4	14.0		
BH 18-22	SS7	0.0	0.2	37.3	62.5		
BH 18A-22	SS3	0.0	0.5	33.0	66.5		



Borehole	Sample	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BH 19-22	SS2	0.0	7.8	34.2	58.0
BH 20-22	SS3	0.0	2.4	31.1	66.5
BH 22-22	SS12	0.0	0.5	39.5	60.0
BH 22A-22	SS2	0.0	5.4	25.6	69.0
BH 23-22	SS3	0.0	0.5	22.5	77.0
BH 24-22	SS3	0.0	5.0	64.5	30.5
BH 25-22	SS5	0.0	2.2	35.8	62.0
BH 26-22	SS5	0.0	3.6	29.4	67.0
BH26A-22	SS2	0.0	92.0	4.0	4.0
BH 27-22	SS6	0.0	3.5	32.0	64.5
BH 28A-22	SS2	0.0	0.7	28.8	70.5
BH 29-22	SS3	0.0	5.8	44.2	50.0
BH 30-22	SS11	0.0	0.3	24.7	75.0
BH 31-22	SS3	0.0	2.5	21.5	76.0
BH 32-22	SS7	0.0	0.6	28.9	70.5
BH 33-22	SS3	0.0	6.5	41.5	52.0
BH 34-22	SS7	0.0	0.8	41.2	58.0
BH 35-22	SS6	0.0	1.5	30.5	68.0
BH 36-22	SS5	0.0	0.7	47.8	51.5
BH 37-22	G3	0.0	7.3	49.7	43.0
BH 38-22	SS3	0.0	0.8	29.7	69.5
BH 38A-22	SS1	0.0	53.9	35.1	11.0
BH 39-22	SS3	0.0	4.2	45.3	50.5
BH 39A-22	SS2	0.0	7.4	31.6	61.0
BH 40-22	SS3	0.0	0.7	28.8	70.5
BH 41-22	SS9	0.0	0.8	31.2	68.0
BH 42-22	SS3	0.0	1.0	37.0	62.0
BH 43-22	SS3	0.0	0.9	33.1	66.0
BH 44-22	SS3	0.0	1.6	38.4	60.0
BH 45-22	SS3	0.0	1.4	37.6	61.0
BH 45A-22	SS1	0.0	19.3	36.7	44.0
BH 46-22	SS10	0.0	0.4	48.1	51.5
BH 47-22	SS1	0.0	71.4	14.6	14.0
BH 48-22	SS3	0.0	27.8	27.2	45.0
BH 49-22	SS8	0.0	0.6	41.4	58.0
BH 49A-22	SS1	1.2	38.3	32.1	28.4
BH 50-22	SS8	0.0	0.2	32.8	67.0
BH 51-22	SS6	0.0	0.6	48.9	50.5
BH 52-22	SS6	0.0	0.7	45.8	53.5
BH 53-22	SS5	0.0	0.8	42.2	57.0
BH 54-22	SS7	0.0	0.7	39.8	59.5
BH 55-22	SS7	0.2	0.7	38.6	60.5



Borehole	Sample	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BH 56A-22	SS2	0.0	3.7	47.3	49.0
BH 57-22	SS12	0.0	0.6	42.4	57.0
BH 58-22	SS1	0.1	79.1	15.8	5.0
BH 59-22	SS7	0.0	0.4	58.6	41.0
BH 59A-22	SS2	0.0	6.6	33.4	60.0
BH 60-22	SS3	0.0	2.6	43.9	53.5
BH 60A-22	SS1	0.0	86.1	9.4	4.5
BH 61-22	SS3	0.0	1.1	21.7	78.0
BH 62-22	SS6	0.0	0.3	28.5	70.0
BH 63-22	SS3	0.0	1.5	35.9	9.5
BH 63A-22	SS1	0.0	54.6	34.9	63.0
BH 64-22	SS5	0.0	2.1	34.9	59.0
BH 65-22	SS3	0.0	6.1	47.3	49.0
BH 66-23	SS3	0.0	1.8	27.7	70.5
BH 68-22	SS1, SS2	0.0	50.8	31.2	18.0
BH 69-22	SS3	0.0	1.1	63.4	35.5
BH 69A-22	SS1	0.0	1.4	37.6	61.0
BH 70-22	SS7	0.0	0.6	39.4	60.0
BH 71-22	SS4	0.0	2.4	48.1	49.5
BH 72-22	SS4	0.0	2.3	37.2	60.5
BH 73-22	SS2	0.0	55.0	43.5	1.5
BH 74-22	SS4	0.0	94.1	4.9	1.0
BH 74-22	SS9	0.0	0.5	34.0	65.5
BH 75-22	SS6	0.0	1.8	42.2	56.0
BH 76-22	SS3	0.0	5.3	25.7	69.0
BH 77-22	SS5	0.0	0.3	31.7	68.0

### **Atterberg Limit Tests**

62 selected silty clay samples were submitted for Atterberg limits testing. The results are summarized in Table 2 and attached to the end of this report.

Table 2 – Atterberg Limits Results								
Borehole	Sample	Depth (m)	LL (%)	PL (%)	PI (%)	Classification		
BH 1-22	SS2	1.1	63	28	35	СН		
BH 2-22	SS2	1.1	47	20	27	CL		
BH 3-22	G3	2.5	32	14	18	CL		
BH 4-22	SS2	1.1	58	23	35	СН		
BH 5-22	SS2	1.1	53	27	26	CH		
BH 6-22	SS3	1.8	60	30	30	СН		
BH 7-22	SS2	1.1	58	25	33	СН		
BH 8-22	SS2	1.1	50	23	27	CL		



Borehole	Sample	Depth (m)	LL (%)	PL (%)	PI (%)	Classification
BH 9-22	SS2	1.1	57	26	31	СН
BH 10-22	SS3	1.8	59	25	34	СН
BH 11-22	SS2	1.1	49	21	28	CL
BH 12-22	SS2	1.1	46	21	25	CL
BH 13A-22	SS1	1.1	58	26	32	СН
BH 14-22	SS2	1.1	50	22	28	CL
BH 15-22	SS2	1.1	54	23	31	СН
BH 16-22	SS2	1.1	56	26	30	СН
BH 17-22	SS3	3.4	82	24	58	СН
BH 18-22	SS2	1.1	60	27	33	СН
BH 19-22	SS4	2.6	58	25	33	СН
BH 20-22	SS2	1.1	53	27	26	СН
BH 22-22	SS2	1.1	63	30	33	СН
BH 23-22	SS2	1.1	61	23	38	СН
BH 24-22	SS2	1.1	68	24	44	СН
BH 25-22	SS3	1.8	60	20	40	СН
BH 26A-22	SS1	0.3	52	22	30	СН
BH 27-22	SS3	1.1	48	22	26	CL
BH 29-22	SS2	1.1	53	23	30	СН
BH 30-22	SS2	1.1	69	32	37	СН
BH 31-22	SS2	1.1	60	27	33	СН
BH 32-22	SS2	1.1	61	28	33	СН
BH 33-22	SS2	1.1	55	24	31	СН
BH 34-22	SS5	3.4	57	26	31	СН
BH 35-22	SS3	1.8	43	27	16	CL
BH 36-22	SS4	2.6	27	15	12	CL
BH 37-22	SS2	1.1	62	29	33	СН
BH 38-22	SS2	1.1	66	33	33	CH-MH
BH 39-22	SS2	1.1	73	37	36	MH
BH 40-22	SS2	1.1	66	31	35	СН
BH 41-22	SS2	1.1	46	21	25	CL
BH 42-22	SS2	1.1	26	17	9	CL
BH 43-22	SS2	1.1	67	32	35	СН
BH 44-22	SS2	1.1	60	28	32	СН
BH 46A-22	SS1	1.1	33	18	15	CL
BH 47-22	SS3	1.8	68	30	38	СН
BH 48-22	SS2	1.1	69	33	36	CH-MH
BH 49-22	SS2	1.1	58	30	28	CH-MH
BH 50-22	SS3	1.8	53	26	27	СН
BH 51-22	SS3	1.8	58	26	32	СН
BH 52-22	SS6	4.1	53	25	28	СН
BH 53-22	SS2	1.1	80	41	39	MH
BH 54-22	SS2	1.1	53	26	27	СН
BH 55-22	SS2	1.1	41	21	20	CL
BH 56-22	SS3	1.8	56	25	31	СН
BH 57-22	SS2	1.1	42	20	22	CL
BH 58-22	SS3	1.8	81	39	42	MH
BH 59-22	SS2	1.1	69	31	38	СН
BH 60-22	AU1	0.5	43	19	24	CL



Borehole	Sample	Depth (m)	LL (%)	PL (%)	PI (%)	Classification
BH 61-22	SS2	1.1	50	27	23	CL
BH 62-22	SS3	1.8	56	25	31	СН
BH 63-22	SS1	0.2	45	21	24	CL
BH 64-22	SS2	1.1	62	28	34	СН
BH 65-22	SS2	1.1	53	24	29	СН
BH 66-23	SS3	1.8	74	23	51	СН
BH 68-22	SS3	1.8	30	17	13	CL
BH 69-22	SS2	1.1	63	28	35	СН
BH 70-22	SS2	1.1	28	11	17	CL
BH 71-22	SS3	2.6	31	16	15	CL
BH 75-22	SS4	2.6	61	19	42	СН
BH 76-22	SS2	1.1	62	20	42	СН
<b>Note:</b> LL: Liqu Inorganic Clay			: Plastic Index	; CH: Inorga	inic Clay of	High Plasticity; CL:

Three selected silty clay samples were submitted for Atterberg limits testing by Paterson in previous investigations. The results of the Atterberg limits are summarized in Table 3 and on the Atterberg Limits Results sheet in Appendix 1.

Table 3 – Historical Atterberg Limits Results								
Borehole	LL (%)	PL (%)	PI (%)	Classification				
BH 3	77	28	49	СН				
BH 8	50	21	29	CL				
BH 9	42 20 22 CL							
	uid Limit; PL: Plast rganic Clay of Low		ic Index; CH: Inorgar	nic Clay of High Plasticity;				

#### Shrinkage Limit

Twelve selected silty clay samples were submitted for shrinkage limits testing. The results are summarized in Table 4 below.

Borehole	Sample	Depth (m)	Shrinkage Limit (%)	Shrinkage Ratio	MC (%)
BH 6A-22	SS2	1.1	19.63	1.853	55.6
BH 18-22	SS4	2.6	26.47	1.600	97.1
BH 31-22	SS2	1.1	22.65	1.734	81.9
BH 38A-22	SS3	1.8	22.49	1.706	115.3
BH 42A-22	SS1	1.8	15.42	1.849	53.0
BH 45A-22	SS2	1.1	18.74	1.836	49.6
BH 49A-22	SS2	1.8	24.35	1.694	37.3
BH 50-22	SS3	1.8	23.15	1.738	72.6
BH 55-22	SS1	0.3	24.41	1.820	64.2
BH 63A-22	SS5	1.8	17.05	1.866	53.3
BH 59-22	SS5	3.4	17.34	1.818	66.6



Borehole	Sample	Depth (m)	Shrinkage Limit (%)	Shrinkage Ratio	MC (%)
BH 70-22	SS5	3.9	24.58	1.692	83.7
BH 71-22	SS5	4.9	21.32	1.745	93.4
Note: MC: M	oisture Conte	ent			

### **Consolidation Testing**

Generally, the potential long-term settlement of a clay deposit may be evaluated based on its compressibility characteristics. A method to evaluate these characteristics is by completing unidimensional consolidation tests on undisturbed soil samples collected from Shelby tube samples. A total of eighteen (18) consolidation tests were completed from Shelby tubes collected during the previous investigation and twenty-four (24) from the present investigation. The results of Paterson's historical and current consolidation testing are presented in Table 5A and Table 5B, respectively, and in Consolidation Testing Results sheet in Appendix 1.

The value for  $p_c$  is the preconsolidation pressure and  $p_o$  is the effective overburden pressure of the test sample. The difference between the values is the available preconsolidation. The values for  $C_{cr}$  and  $C_c$  are the recompression and compression indices, respectively. These soil parameters are a measure of the compressibility due to stress increases below and above the preconsolidation pressures.

Borehole	Sample	Depth (m)	p' <sub>c</sub> (kPa)	p'₀ (kPa)	C <sub>cr</sub>	Cc
BH 1	TW4	4.36	74.0	44.0	0.027	3.606
BH 2	TW3	3.58	64.0	33.0	0.024	2.803
BH 3	TW3	4.27	66.0	53.0	0.019	3.537
BH 3	TW4	5.87	116.0	63.0	0.020	0.434
BH 4	TW5	4.27	86.0	38.0	0.056	1.228
BH 5	TW3	3.20	67.0	31.0	0.039	2.218
BH 6	TW4	3.61	55.0	34.0	0.050	2.619
BH 6A	TW1	2.04	62.0	24.0	0.032	2.559
BH 7	TW2	2.82	78.0	29.0	0.019	1.127
BH 8	TW3	2.72	60.0	28.0	0.040	2.391
BH 8	TW4	4.36	51.0	38.0	0.046	2.310
BH 9	TW4	3.38	55.0	32.0	0.067	3.811
BH11	TW4	4.29	71.0	45.0	0.051	3.026
BH12A	TW1	3.59	63.0	33.0	0.046	5.112
BH13	TW5	8.91	95.0	82.0	0.032	2.616
BH14	TW3	3.49	90.0	40.0	0.032	3.306
BH15	TW3	5.34	79.0	46.0	0.041	3.160
BH16	TW4	5.03	85.0	49.0	0.041	2.551



Borehole	Sample	Depth (m)	p' <sub>c</sub> (kPa)	p'₀ (kPa)	C <sub>cr</sub>	Cc
BH1A-22	TW1	4.04	52.481	39.53	0.064	3.750
BH5-22	TW4	3.40	102.33	33.29	0.023	2.143
BH6A-22	TW3	2.67	70.0	35.4	0.042	1.152
BH9-22	TW7	9.45	120.23	78.06	0.024	4.794
BH13B-22	TW1	4.19	72.11	43.43	0.025	3.724
BH14-22	TW5	4.14	81.28	38.63	0.020	3.608
BH14-22	TW4	2.62	54.28	29.2	0.051	1.779
BH16-22	TW4	3.35	67.61	34.48	0.020	1.493
BH19-22	TW3	1.93	56.23	27.51	0.017	1.087
BH21-22	TW4	2.59	72.44	35.61	0.047	2.518
BH21-22	TW6	4.11	56.23	45.0	0.037	1.579
BH22A-22	TW1	2.59	53.95	34.9	0.041	1.368
BH27-22	TW4	1.91	53.13	23.37	0.047	2.364
BH28-22	TW5	3.35	67.09	25.69	0.041	1.909
BH30-22	TW10	7.16	81.41	56.33	0.091	3.302
BH34-22	TW4	2.67	50.74	29.3	0.056	1.916
BH36-22	TW5	3.35	70.0	32.97	0.036	2.638
BH37-22	TW15	10.97	112.2	86.41	0.018	1.47 <i>°</i>
BH38A-22*	TW5	3.35	62.52	39.62	0.052	0.935
BH40-22*	TW8	5.74	54.12	57.28	0.042	0.750
BH42A-22	TW3	4.06	81.91	36.66	0.057	3.000
BH43-22	TW6	5.05	71.34	51.23	0.045	2.250
BH44-22*	TW7	5.82	59.4	59.4	0.018	0.484
BH45-22	TW6	4.12	74.47	45.24	0.033	1.148
BH46A-22*	TW3	7.26	63.1	72.79	0.046	2.000
BH47-22*	TW6	4.67	63.09	50.32	0.055	2.647
BH48-22	TW6	4.22	74.13	44.96	0.033	1.515
BH49A-22	TW3	2.59	54.95	36.74	0.075	2.586
BH49A-22*	TW4	4.75	50.12	50.11	0.043	1.364
BH55-22*	TW8	5.79	57.54	54.71	0.037	1.111
BH56A-22	TW3	2.59	66.07	28.25	0.022	0.409
BH59A-22*	TW3	2.59	63.1	34.92	0.043	0.856
BH61-22	TW6	4.12	54.45	37.69	0.060	4.77
BH62-22	TW5	3.45	48.6	33.6	0.040	1.630
BH64-22	TW4	2.77	77.63	37.57	0.038	1.282
BH64-22	TW6	4.22	69.18	46.53	0.049	2.344

The values of  $p'_c$ ,  $p'_o$ ,  $C_{cr}$  and  $C_c$  are estimates determined from standard engineering test procedures.

Natural variations within the soil deposit will affect the results. The p'<sub>o</sub> parameter is directly influenced by the groundwater level. Groundwater levels were measured during the site investigation.



Lowering the groundwater level increases the  $p'_{\circ}$  and reduces the available preconsolidation. Unacceptable settlements could be induced by a significant lowering of the groundwater level. The  $p'_{\circ}$  values for the consolidation tests completed for the previous and present investigations are based on the long-term groundwater level observed at each borehole location.

### Bedrock

Bedrock was cored in BH 17-22, BH 23-22, BH 24-22 and BH 72-22 to a maximum depth of 58.0 m. The recorded average RQD value ranged from 34 to 100% while the recovery values were 100% at all boreholes. Based on these results the quality of the bedrock ranges from poor to excellent. Shale with interbedded limestone was encountered at BH 17-22, BH 23-22 and BH 24-22. Red siltstone was encountered at BH 72-22. Based on available geological mapping, the bedrock in the subject area consists of Paleozoic shale of the Carlsbad formation, with an anticipated overburden drift thickness ranging between 25 and 100 m depth.

### Unconfined Compressive Strength Testing of Bedrock Core Samples

Six bedrock cores obtained during the current investigation were tested for unconfined compressive strength of the bedrock specimens. The results are summarized in Table 6 below.

Table 6 – S	Table 6 – Summary of Unconfined Bedrock Compressive Strength Testing						
Borehole	Sample	Test Core Depth (m)	Test Core Elevation (m)	Unconfined Compressive Strength (MPa)			
BH 17-22	RC4	55.1	27.2	46.2			
BH 23-22	RC4	53.0	26.7	87.8			
BH 24-22	RC2	35.6	42.7	146.9			
BH 24-22	RC4	37.6	40.7	46.2			
BH 72-22	RC3	23.9	54.8	57.9			
BH 72-22	RC5	29.1	49.6	29.7			

# 3.3 Groundwater

Groundwater levels were recorded at each borehole location instrumented with a monitoring device. The groundwater level readings are presented in the Soil Profile and Test Data sheets in Appendix 1 and in Table 7 on the following page.



		Ground	Me	asured	
Borehole	Observation	Surface	Ground	water Level	Dete Deserded
Number	Method	Elevation	Depth	Elevation	Date Recorded
		(m)	(m)	(m)	
	Manitaring Mall	70.72	0.24	79.49	May 24, 2022
BH 1-22	Monitoring Well	79.73	0.88	78.85	August 5, 2022
BH 2-22	Monitoring Wall	79.64	0.24	79.40	May 24, 2022
DП 2-22	Monitoring Well	79.04	0.75	78.90	August 2, 2022
			0.49	79.11	May 24, 2022
BH 3-22	Monitoring Well	79.60	0.85	78.75	August 3, 2022
			0.91	78.69	December 13, 202
BH 4-22	Monitoring Well	78.95	0.82	78.12	May 24, 2022
DIT 4-22	wormoning wei	70.95	1.15	77.80	August 3, 2022
BH 5-22	Monitoring Well	78.76	1.02	77.74	May 24, 2022
DIT J-22	wontoning wei	70.70	1.20	77.56	August 3, 2022
BH 6-22	Monitoring Woll	82.11	0.20	79.91	May 27, 2022
БП 0-22	Monitoring Well	02.11	0.73	81.38	July 27, 2022
BH 7-22	Monitoring Well	81.48	0.46	81.02	May 27, 2022
DП /-22	wontoning weil	01.40	1.04	80.45	July 29, 2022
	Manitaring Wall	90 51	0.23	80.28	May 27, 2022
BH 8-22	Monitoring Well	80.51	0.86	79.65	July 29, 2022
			1.32	77.92	May 27, 2022
BH 9-22	Monitoring Well	79.24	1.31	77.93	August 2, 2022
	-		1.47	77.77	December 13, 202
BH 10-22	Monitoring Well	82.47	Monit	oring well dest	troyed by fallen tree.
DI 44 00	Manitaring Wall	04 74	1.17	80.54	May 27, 2022
BH 11-22	Monitoring Well	81.71	1.39	80.33	August 2, 2022
DU 10 00	Manitaring Wall	90.02	0.09	79.93	May 27, 2022
BH 12-22	Monitoring Well	80.02	1.24	78.79	July 29, 2022
DU 12 22	Manitaring Wall	90.07	0.25	80.72	May 27, 2022
BH 13-22	Monitoring Well	80.97	0.68	80.29	July 28, 2022
	Monitoring Mall	90.07	0.18	80.79	May 27, 2022
BH 13A-22	Monitoring Well	80.97	0.67	80.30	July 28, 2022
	Monitoring Mall	91 61	0.29	81.32	May 27, 2022
BH 14-22	Monitoring Well	81.61	0.88	80.73	July 27, 2022
	Monitoring Mall	01.00	1.51	79.77	May 27, 2022
BH 15-22	Monitoring Well	81.28	1.64	79.64	July 28, 2022
		01.00	0.64	80.66	May 27, 2022
BH 16-22	Monitoring Well	81.30	1.20	80.10	July 28, 2022
		00.00	8.02	74.31	July 28, 2022
BH 17-22	Monitoring Well	82.33	2.94	79.39	December 15, 202
		70 45	0.44	77.71	June 15, 2022
BH 18-22	Monitoring Well	78.15	0.97	77.18	August 3, 2022
BH 18A-22	Monitoring Well	78.15	0.52	77.63	June 15, 2022
			0.50	77.97	June 15, 2022
BH 19-22	Monitoring Well	78.47	0.81	77.66	August 2, 2022



		Ground		asured	
Borehole	Observation	Surface	Ground	water Level	Date Recorded
Number	Method	Elevation	Depth	Elevation	Date Necolueu
		(m)	(m)	(m)	
BH 20-22	Monitoring Well	78.65	0.59	78.06	May 25, 2022
DI120-22	wontoning wei	70.05	0.87	77.78	August 3, 2022
BH 21-22	Monitoring Wall	79.17	0.72	78.45	May 27, 2022
DFT 21-22	Monitoring Well	79.17	1.25	77.92	August 3, 2022
			0.16	78.54	May 27, 2022
BH 22-22	Monitoring Well	78.70	0.30	78.40	August 3, 2022
			1.38	77.32	December 13, 2022
BH 22A-22	Monitoring Wall	78.70	0.66	78.04	May 27, 2022
DFI 22A-22	Monitoring Well	70.70	1.43	77.27	August 3, 2022
BH 23-22	Monitoring Wall	79.74	1.24	78.50	August 8, 2022
DH 23-22	Monitoring Well	79.74	1.03	78.71	December 15, 2022
	Monitoring Wall	79.20	1.61	76.68	August 8, 2022
BH 24-22	Monitoring Well	78.29	1.76	76.53	February 6, 2023
BH 25-22	Monitoring Well	79.36	0.95	78.41	December 13, 2022
	Manitaring Mall	70.77	0.50	79.27	May 26, 2022
BH 26-22	Monitoring Well	79.77	0.68	79.10	August 8, 2022
	Maniferina VMall	70.77	0.50	79.27	May 26, 2022
BH 26A-22	Monitoring Well	79.77	0.67	79.11	August 8, 2022
		79.71	0.87	78.84	May 26, 2022
BH 27-22	Monitoring Well		1.02	78.70	August 8, 2022
	-		1.27	76.26	August 5, 2022
DU 00.00	Maniferina VMall	77.50	0.89	76.64	May 26, 2022
BH 28-22	Monitoring Well	77.53	1.27	76.26	August 5, 2022
BH 28A-22	Monitoring Well	77.53	0.96	76.57	May 26, 2022
DU 00 00	Manitaring Mall	70.70	0.88	77.85	May 26, 2022
BH 29-22	Monitoring Well	78.73	1.01	77.72	August 8, 2022
BH 29A-22	Monitoring Well	78.73	0.92	77.81	May 26, 2022
	Manitaring Wall	70.74	1.23	78.48	May 26, 2022
BH 30-22	Monitoring Well	79.71	1.27	78.45	August 8, 2022
BH 31-22	Monitoring Well	78.48	1.24	77.24	August 5, 2022
<b>DU 00 00</b>		77.04	1.25	76.69	May 26, 2022
BH 32-22	Monitoring Well	77.94	1.65	76.29	August 5, 2022
<b>D</b> I 1 0 0 0 0		70.00	1.02	77.31	May 26, 2022
BH 33-22	Monitoring Well	78.33	1.17	77.17	August 5, 2022
DU O A OO	Maria in the second	70.07	0.38	78.67	May 24, 2022
BH 34-22	Monitoring Well	79.05	0.55	78.50	August 9, 2022
	Manifestina Materi	70.07	0.27	78.40	May 24, 2022
BH 35-22	Monitoring Well	78.67	0.46	78.21	August 9, 2022
		70.05	0.41	78.24	May 24, 2022
BH 35A-22	Monitoring Well	78.65	0.43	78.22	August 9, 2022
			0.77	77.85	May 24, 2022
BH 36-22	Monitoring Well	78.62	1.34	77.28	August 9, 2022



Borehole	Observation	Ground Surface		asured water Level	
Number	Method	Elevation (m)	Depth (m)	Elevation (m)	Date Recorded
			2.18	75.71	June 17, 2022
BH 37-22	Monitoring Well	77.89	1.14	76.75	August 9, 2022
			1.15	76.74	December 13, 2022
			0.78	76.99	May 24, 2022
BH 38-22	Monitoring Well	77.77	1.10	76.67	August 9, 2022
			0.73	77.04	December 13, 2022
BH 38A-22	Monitoring Well	77.77	0.72	77.05	May 24, 2022
DI1 30A-22	wormoning wei	11.11	0.81	76.96	August 9, 2022
BH 39-22	Monitoring Well	77.69	0.69	77.00	May 24, 2022
DH 39-22	wormoning wei	11.09	1.22	76.47	August 9, 2022
BH 40-22	Monitoring Well	79.51	0.67	78.84	May 26, 2022
DI140-22	wormoning wei	79.01	100	78.51	August 15, 2022
			0.63	78.74	May 26, 2022
BH 41-22	Monitoring Well	79.37	0.81	78.56	August 15, 2022
			0.47	78.90	December 13, 2022
BH 42-22	Monitoring Well	77.61	0.62	76.99	May 26, 2022
DN 42-22	wontoning weil	77.01	0.71	76.91	August 15, 2022
	Manitaring Wall	77.61	0.84	76.77	May 26, 2022
BH 42A-22	Monitoring Well	77.61	0.75	76.86	August 15, 2022
BH 43-22	Monitoring Well	79.91	0.36	79.55	May 27, 2022
BH 44-22	Manitaring Wall	79.37	0.43	78.94	May 27, 2022
DП 44-22	Monitoring Well	19.31	1.39	77.98	August 16, 2022
	Manitaring Wall	90.10	0.29	79.90	May 27, 2022
BH 45-22	Monitoring Well	80.19	0.84	79.35	August 16, 2022
BH 45A-22	Monitoring Well	80.19	0.13	80.06	May 27, 2022
			0.85	79.33	May 27, 2022
BH 46-22	Monitoring Well	80.18	1.67	78.51	August 16, 2022
			1.03	79.15	December 13, 2022
			0.80	78.19	May 26, 2022
BH 47-22	Monitoring Well	78.99	1.17	77.82	August 15, 2022
			0.85	78.14	December 13, 2022
	Manitaring Mall	70.00	0.92	78.07	May 26, 2022
BH 47A-22	Monitoring Well	78.99	1.24	77.75	August 15, 2022
	Monitoring Mall	78.81	0.71	78.10	May 26, 2022
BH 48-22	Monitoring Well	10.01	0.89	77.92	August 15, 2022
	Monitoring Mall	70.06	0.39	78.87	May 27, 2022
BH 49-22	Monitoring Well	79.26	0.83	78.43	August 15, 2022
	Monitoring Mall	70.06	0.36	78.90	May 27, 2022
BH 49A-22	Monitoring Well	79.26	0.81	78.45	August 15, 2022
		70.40	0.74	78.74	May 25, 2022
BH 50-22	Monitoring Well	79.48	0.93	78.55	August 10, 2022
BH 51-22	Monitoring Well	79.94	0.92	79.02	August 10, 2022



Borehole	Observation	Ground Surface		asured water Level	
Number	Number Method	Elevation (m)	Depth (m)	Elevation (m)	Date Recorded
BH 52-22	Monitoring Well	80.24	0.63	79.61	May 25, 2022
БП 52-22	wontoning weil	00.24	0.58	79.66	August 10, 2022
BH 53-22	Monitoring Well	79.48	0.84	78.62	May 25, 2022
DI 1 33-22	wormoning wei	79.40	0.96	78.52	August 10, 2022
BH 54-22	Monitoring Well	80.19	0.15	80.04	May 27, 2022
DI1 34-22	wormoning wei	00.10	0.83	79.36	August 12, 2022
BH 55-22	Monitoring Well	80.24	0.34	79.90	May 27. 2022
BIT 00 22	Worldening Weil	00.24	1.14	79.11	August 12, 2022
			0.37	79.84	May 27, 2022
BH 56-22	Monitoring Well	80.21	0.93	79.29	August 12, 2022
			0.58	79.63	December 13, 2022
BH 56A-22	Monitoring Well	80.21	0.20	80.01	May 27, 2022
21100/122	inenitering treit	00.21	0.86	79.36	August 12, 2022
BH 57-22	Monitoring Well	79.91	0.65	79.26	May 25, 2022
BITOT 22	Monitoring Won	10.01	1.03	78.88	August 10, 2022
		_	0.53	80.39	June 10, 2022
BH 58-22	Monitoring Well	80.92	1.70	79.22	August 12, 2022
			0.96	79.96	December 13, 2022
BH 58A-22	Monitoring Well	80.92	0.40	80.52	June 10, 2022
DI100/(22	Worldening Weil	00.02	1.14	79.78	August 12, 2022
BH 59-22	Monitoring Well	79.31	0.33	78.98	May 25, 2022
211 00 22	inenitering treit	10.01	0.81	78.51	August 12, 2022
BH 59A-22	Monitoring Well	79.31	0.18	79.13	May 25, 2022
			1.38	77.93	August 12, 2022
			0.74	79.00	May 25, 2022
BH 60-22	Monitoring Well	79.74	0.96	78.78	August 10, 2022
			0.52	79.22	December 13, 2022
BH 60A-22	Monitoring Well	79.74	0.64	79.10	May 25, 2022
BH 61-22	Monitoring Well	79.20	0.64	78.56	May 25, 2022
BITOT 22	Monitoring Won	10.20	0.96	78.24	August 11, 2022
BH 62-22	Monitoring Well	78.98	0.87	78.11	May 25, 2022
BIT OF FE	Monitoring Won	10.00	1.24	77.74	August 11, 2022
BH 63-22	Monitoring Well	78.66	0.66	78.00	May 25, 2022
	-		1.16	77.50	August 11, 2022
BH 63A-22	Monitoring Well	78.66	0.66	78.00	May 25, 2022
			0.90	77.93	May 25, 2022
BH 64-22	Monitoring Well	78.83	1.24	77.59	August 11, 2022
			0.89	77.94	December 13, 2022
BH 65-22	Monitoring Well	79.14	1.09	78.05	June 10, 2022
2.1.00 22			1.90	77.24	August 12, 2022
			0.83	79.48	May 27, 2022
BH 68-22	Monitoring Well	80.31	1.28	79.04	August 12, 2022



Borehole	Observation	Ground Surface		asured water Level	Dete Desended
Number	Number Method	Elevation (m)	Depth (m)	Elevation (m)	Date Recorded
			0.75	79.72	May 27, 2022
BH 69-22	Monitoring Well	80.47	1.43	79.05	August 12, 2022
			1.09	79.38	December 13, 2022
	Manitaring Wall	90.47	0.16	80.31	May 27, 2022
BH 69A-22	Monitoring Well	80.47	0.91	79.56	August 12, 2022
BH 70-22	Monitoring Well	79.42	0.39	79.03	December 13, 2022
DU 74 00	Manitanin a Malu	70.40	1.03	77.45	June 15, 2022
BH 71-22	Monitoring Well	78.48	1.44	77.05	August 15, 2022
DU 70.00	Manitanin a Malu	70.74	1.66	77.06	August 15, 2022
BH 72-22	Monitoring Well	78.71	1.58	77.13	February 6, 2023
BH 73-22	Monitoring Well	79.94	1.05	78.89	December 13, 2022
BH 74-22	Monitoring Well	78.97	0.7	78.27	December 13, 2022
BH 75-22	Monitoring Well	78.99	0.95	78.04	December 13, 2022
BH 76-22	Monitoring Well	77.89	0.4	77.49	December 13, 2022
BH 77-22	Monitoring Well	79.00	1.12	77.88	December 13, 2022
Summary o	of Groundwater Le	evels – Previ	ous Inve	stigation (PG	2466)
BH 1		78.78	1.5	77.28	
BH 2	-	79.62	1.0	78.62	
BH 3	-	78.74	2.4	76.34	
BH 4	-	79.97	1.0	78.97	September 27, 201
BH 5	-	80.39	1.0	79.39	
BH 6	-	79.76	1.0	78.76	
BH 7	-	80.10	1.0	79.10	0
BH 8	Field	80.01	0.95	79.06	September 29, 201
BH 9	Observations	77.04	1.0	76.04	
BH 10	-	78.41	1.5	76.91	September 30, 201 <sup>°</sup>
BH 11	-	79.02	1.6	77.42	-
BH 12	-	78.79	1.0	77.79	
BH 13	-	77.67	2.4	75.27	October 3, 2011
BH 14	-	78.76	1.6	77.16	
BH 15	1	78.56	1.7	76.86	Ostab == 4,0044
BH 16	1	79.45	1.6	77.85	October 4, 2011
	und surface elevation a nced to a geodetic dat		location wa	s surveyed usin	g a high precision GPS

It should be noted that surface water can become trapped within a backfilled borehole that can lead to higher than typical groundwater level observations.

Paterson field personnel had observed some treed areas with saturated surface conditions at the time of completing the initial portion of the field investigation (March through April 2022) during the peak period of local snowmelt.



Paterson field personnel have further observed that surface saturated conditions had generally subsided throughout the open field and treed areas throughout the study area during the second portion of the field investigation (May and June 2022). Paterson field staff completed additional field reconnaissance between June and August 2022 as part of the slope stability and hydrogeological testing investigations. The majority of the study area had been traversed by our field personnel at that time, including along all notable watercourses intersecting the study area. Surface saturation was not observed throughout treed or farmed portions of the study area at that time. Further, water levels throughout the municipal drains and creeks appeared relatively stagnant and shallow at the time of the slope stability review. Treed areas were not observed to be providing an influx of surface water to the watercourses.

Based on these observations, historical investigation work, moisture content, observed color and consistency of the recovered soil samples, the long-term groundwater table is expected to be located within the unweathered portion of the clay deposit and/or perched within the lowest portion of the sand layer underlain by unweathered, grey silty clay due to its relatively impermeable and saturated state.

Based on these observations, the current pre-development long-term groundwater table is generally located at a depth of approximately **1 to 2** m below ground surface throughout the study area. This depth is expected to vary slightly between individual parcels throughout the site given the variability in the presence and thickness of surficial soil layers influencing the local groundwater table depth. These layers generally consist of unsaturated sand, weathered brown silty clay, saturated sand, and unweathered grey silty clay. Based on this, the local groundwater table depth for a specific parcel within the study area should be evaluated based on the parcel-specific subsurface soil and groundwater conditions from a geotechnical perspective.

Paterson will continue to generally monitor surficial saturation conditions throughout the study area as part of future fieldwork and investigations and from a geotechnical perspective. It should be noted that groundwater levels are subject to seasonal fluctuations and could vary at the time of construction.

# 3.4 Permeameter and Slug Testing Results

## Permeameter Testing Results

A total of 78 permeameter tests were conducted at 39 locations to provide the general coverage of the study area from July 18 to July 26, 2022.



Preparation and testing of this investigation are in accordance with the Canadian Standards Association (CSA) B65-12-Annex E. Field saturated hydraulic conductivity values were determined using the Engineering Technologies Canada (ETC) Ltd. Reference tables provided in the most recent ETC Past Permeameter User Guide dated July 2018.

Infiltration rates have been determined based on approximate relationships provided by the Ontario Ministry of Municipal Affairs and Housing – Supplementary Guidelines to the Ontario Building Code, 1997 – SG-6 – Percolation Time and Soil Descriptions.

Field saturated hydraulic conductivity (K<sub>fs</sub>) values and estimated infiltration values are presented in Table 8 below.

Table 8 – Summary of Field Saturated Hydraulic Conductivity Testing Results and Estimated Infiltration Rates				
Test Hole Location	Infiltration Testing Elevation (m)	Soil Type Tested	K <sub>fs</sub> (m/second)	Infiltration Rate (mm/hour)
BH1-22	79.43	Brown Silty Sand	1.90E-06	55
DITI-22	79.13	Brown Silty Sand w/ Clay	1.30E-06	50
BH3-22	79.30	Brown Silty Clay w/ Sand	7.80E-08	23
DI 13-22	79.00	Brown Silty Sand	3.80E-06	66
BH5-22	78.46	Brown Silty Sand w/ Clay	1.30E-06	50
DI 13-22	78.16	Brown Silty Sand	4.70E-07	38
BH6-22	81.81	Brown Silty Clay w/ Sand	1.60E-07	28
DH0-22	81.51	Brown Silty Clay	8.10E-09	≤13
BH11-22	81.41	Brown Silty Sand	3.10E-06	63
DH11-22	81.11	Brown Silty Sand	3.80E-05	122
BH12-22	79.72	Brown Silty Sand	6.30E-07	41
DITIZ-22	79.42	Brown Silty Sand w/ Clay	6.30E-07	41
BH14-22	81.31	Brown Silty Sand	3.10E-07	34
DH 14-22	81.01	Brown Silty Clay	8.10E-09	≤13
BH15-22	80.98	Brown Silty Sand	3.80E-06	66
DH 10-22	80.68	Brown Coarse Silty Sand	1.40E-05	94
	82.03	Brown Silty Sand	8.10E-08	24
BH17-22	81.73	Brown Silty Sand	2.50E-06	59
	78.40	Brown Silty Sand	9.40E-07	45
BH22-22	78.10	Brown Silty Sand w/ Clay	3.10E-07	34
	79.44	Brown Silty Sand	2.50E-06	59
BH23-22	79.14	Brown Silty Sand	2.50E-06	59



Test Hole Location	Infiltration Testing Elevation (m)	Soil Type Tested	K <sub>fs</sub> (m/second)	Infiltration Rate (mm/hour)
BH24-22	77.99	Brown Silty Sand	3.10E-07	34
DI 124-22	77.69	Brown Silty Sand	2.50E-06	59
BH29-22	78.43	Brown Silty Sand w/ Clay	6.30E-07	41
DI 123-22	78.13	Brown Silty Sand w/ Clay	1.30E-06	50
BH30-22	79.41	Brown Silty Sand	3.10E-07	34
DH30-22	79.11	Brown Silty Sand w/ Clay	1.30E-06	50
BH32-22	77.64	Brown Silty Sand	1.30E-06	50
DN92-22	77.34	Brown Silty Clay	3.10E-07	34
DU00 00	78.03	Brown Silty Sand	1.90E-06	55
BH33-22	77.73	Brown Silty Sand	1.60E-06	52
	78.37	Brown Silty Sand	4.57E-06	70
BH35-22	78.07	Brown Silty Sand	3.10E-07	34
DU 00.00	78.32	Brown Silty Sand	5.00E-06	71
BH36-22	78.02	Brown Silty Sand	6.30E-06	76
<b>DU 100, 00</b>	77.39	Brown Silty Sand w/ Clay	1.90E-06	55
BH39-22	77.09	Brown Silty Clay	7.80E-08	23
	79.21	Brown Silty Clay	4.00E-08	20
BH40-22	78.91	Brown Silty Clay w/ Sand	2.40E-07	32
BH42-22	77.31	Brown Silty Sand w/ Trace Clay	3.10E-07	34
	77.01	Brown Silty Clay w/ Sand	3.10E-07	34
	79.89	Brown Silty Sand w/ Clay	9.40E-07	45
BH45-22	79.59	Brown Silty Clay	1.60E-07	28
	78.69	Brown Silty Sand w/ Clay	4.70E-07	38
BH47-22	78.39	Brown Silty Clay w/ Sand	1.60E-07	28
	78.51	Brown Silty Sand w/ Clay	4.19E-07	36
BH48-22	78.21	Brown Silty Clay w/ Sand	6.30E-07	41
	78.96	Brown Silty Sand	6.30E-07	41
BH49-22	78.66	Brown Silty Sand	2.50E-06	59
	79.18	Brown Silty Clay w/ Sand	1.60E-07	28
BH50-22	78.88	Brown Silty Clay	7.80E-08	23
	79.94	Brown Silty Clay w/ Sand	6.50E-08	22
BH52-22	79.64	Brown Silty Clay w/ Sand	4.00E-08	20
	79.18	Brown Silty Clay w/ Sand	1.60E-07	28
BH53-22	78.88	Brown Silty Clay w/ Sand	4.00E-08	20
	79.94	Brown Silty Clay	6.30E-08	22
BH55-22	79.64	Brown Silty Clay	8.10E-09	≤13
	79.61	Brown Silty Clay	8.10E-09	≤13
BH57-22	79.31	Brown Silty Clay	4.00E-08	20
	80.62	Brown Silty Sand	1.30E-06	50
BH58-22	80.32	Brown Silty Sand w/ Clay	3.10E-07	34



Test Hole Location	Infiltration Testing Elevation (m)	Soil Type Tested	K <sub>fs</sub> (m/second)	Infiltration Rate (mm/hour)
BH59-22	79.01	Brown Silty Sand	6.30E-07	41
БПЭ9-22	78.71	Brown Silty Clay	1.60E-07	28
BH60-22	79.44	Brown Silty Clay w/ Sand	1.30E-07	27
БП00-22	79.14	Brown Silty Clay	3.10E-07	34
DU64.00	78.90	Brown Silty Sand w/ Clay	8.10E-07	44
BH61-22	78.60	Brown Silty Clay w/ Sand	2.40E-07	32
	78.68	Brown Silty Sand	9.40E-07	45
BH62-22	78.38	Brown Silty Clay w/ Sand	2.40E-07	32
	78.36	Brown Silty Clay w/ Sand	8.10E-08	24
BH63-22	78.06	Brown Silty Clay	1.60E-07	28
	80.17	Brown Silty Sand	3.10E-07	34
BH69-22	79.87	Brown Silty Clay	6.30E-07	41
DU 74 00	78.18	Brown Silty Sand	6.30E-05	140
BH71-22	77.88	Brown Silty Sand	8.20E-06	81
	78.41	Brown Silty Clay	8.10E-08	24
BH72-22	78.11	Brown Silty Sand w/ Clay	1.30E-06	50

## Hydraulic Conductivity (Slug) Testing Results

Hydraulic conductivity tests were conducted at 58 monitoring well locations throughout the study area during the month of August and December 2022. The testing results are summarized in Table 9 below.

Table 9 – Su	Table 9 – Summary of Hydraulic Conductivity (Slug) Testing Results					
Borehole ID	Screened Soil	Hydraulic Conductivity, K (m/sec)				
BH1-22	Grey Silty Clay	8.11E-08				
BH4-22	Grey Silty Clay, trace Sand	1.93E-08				
BH5-22	Grey Silty Clay, trace Sand	8.41E-08				
BH6-22	Grey Silty Clay, trace Sand	8.32E-08				
BH7-22	Grey Silty Clay	2.06E-08				
BH8-22	Grey Silty Clay	3.23E-08				
BH9-22	Grey Silty Clay, trace Sand	8.70E-09				
BH11-22	Grey Silty Clay, trace Sand	8.40E-09				
BH12-22	Grey Silty Clay, trace Sand	2.68E-08				
BH13-22	Grey Silty Clay, trace Sand	2.03E-08				
BH13A-22	Grey/Brown Silty Clay, trace Sand	1.97E-05				
BH14-22	Grey Silty Clay, trace Sand	1.89E-08				
BH15-22	Grey Silty Clay	5.32E-08				
BH16-22	Grey Silty Clay	6.43E-09				
BH17-22	Bedrock	4.49E-06				



Borehole ID	Screened Soil	Hydraulic Conductivity, K (m/sec)
BH18-22	Grey/Brown Silty Clay	2.48E-08
BH19-22	Grey Silty Clay	1.49E-08
BH22-22	Grey Silty Clay, Some Sand Seams	1.03E-08
BH26-22	Grey Silty Clay, trace Sand	3.25E-07
BH27-22	Grey Silty Clay	3.60E-07
BH28-22	Grey Silty Clay, trace Sand	1.05E-08
BH29-22	Grey Silty Clay	4.09E-08
BH31-22	Grey Silty Clay	9.95E-09
BH32-22	Grey Silty Clay	4.52E-08
BH33-22	Grey Silty Clay	4.67E-07
BH34-22	Grey Silty Clay	2.16E-07
BH35-22	Grey Silty Clay	8.81E-07
BH36-22	Grey Silty Clay	4.89E-08
BH37-22	Grey Silty Clay	9.32E-09
BH38-22	Grey Silty Clay	6.26E-08
BH39-22	Grey Silty Clay	5.03E-08
BH40-22	Grey Silty Clay	4.29E-06
BH41-22	Grey Silty Clay, trace Sand	1.05E-07
BH42-22	Grey Silty Clay with Sand Seams	1.82E-07
BH44-22	Grey Silty Clay with Sand Seams	5.56E-07
BH45-22	Grey Silty Clay with Sand Seams	1.32E-07
BH46-22	Grey Silty Clay with Sand Seams	3.38E-08
BH47-22	Grey Silty Clay	4.03E-07
BH48-22	Grey Silty Clay with Sand Seams	6.46E-08
BH49-22	Grey Silty Clay with Sand Seams	2.64E-06
BH50-22	Grey Silty Clay	2.59E-06
BH51-22	Grey Silty Clay	1.35E-07
BH53-22	Grey Silty Clay	1.69E-07
BH54-22	Grey Silty Clay, trace Sand	1.66E-07
BH55-22	Grey Silty Clay with Sand Seams	9.94E-08
BH56-22	Grey Silty Clay	1.49E-07
BH57-22	Grey Silty Clay	4.27E-08
BH58-22	Grey Silty Clay with Sand Seams	2.69E-07
BH59-22	Grey Silty Clay with Sand Seams	1.54E-07
BH60-22	Grey Silty Clay	2.74E-07
BH61-22	Grey Silty Clay	2.63E-07
BH62-22	Grey Silty Clay	1.29E-07
BH63-22	Grey Silty Clay with Sand Seams	9.91E-06
BH64-22	Grey Silty Clay	1.70E-07
BH65-22	Grey Silty Clay	2.11E-07
BH68-22	Grey Silty Clay with Sand Seams	1.61E-08
BH69-22	Grey Silty Clay	2.03E-07
BH71-22	Grey Silty Clay	4.83E-08

### Summary of Results

Based on the results of our field testing and sampling associated with the permeameter testing, two types of grain-size distribution of sand were encountered at the time of testing. These generally consisted of (i) brown coarse silty sand to silty sand and (ii) brown silty sand containing trace to some clay.

Permeameter testing throughout the brown coarse silty sand to silty sand layer yielded hydraulic conductivity rates between approximately  $6.3 \times 10^{-5}$  and  $8.1 \times 10^{-8}$  m/s. Further, infiltration rates for this layer were observed to range between approximately 24 to up to 140 mm/hour. Permeameter testing throughout the brown silty sand containing trace to some clay yielded hydraulic conductivity rates between approximately  $1.9 \times 10^{-6}$  and  $3.1 \times 10^{-7}$  m/s. Further, infiltration rates for this layer were observed to rates between approximately  $1.9 \times 10^{-6}$  and  $3.1 \times 10^{-7}$  m/s. Further, infiltration rates for this layer were observed to range between 34 to up to 54 mm/hour.

Slug testing conducted at monitoring wells screened within the brown silty clay layer yielded hydraulic conductivity values ranging between approximately  $2.0x10^{-5}$  to  $2.5x10^{-8}$  m/s. The higher conductivity measured at BH 13A-22 is expected to be attributed to the presence of sand within the screened soil horizons and is not considered reflective of the hydraulic conductivity for weathered, brown silty clay. Permeameter testing throughout the brown silty clay yielded hydraulic conductivity rates between approximately  $6.3x10^{-7}$  and  $8.1x10^{-9}$  m/s. Further, infiltration rates for this deposit were observed to range between approximately less than 13 to up to 41 mm/hour.

Slug testing conducted at monitoring wells screened within the grey silty clay layer yielded hydraulic conductivity values ranging between approximately  $9.9x10^{-6}$  to  $6.4x10^{-9}$  m/s. Slug testing conducted at the monitoring well installed at BH 17-22 and screened within the bedrock formation yielded a hydraulic conductivity value of approximately  $4.5x10^{-6}$  m/s.

These values are generally consistent with similar material Paterson has encountered on other sites and typical published values for silty clay and silty sand. It should be noted that the range in testing results noted above can be attributed to the variability in composition and consistency of the layers encountered where the monitoring well screens and permeameter inverts were located.

It is important to note that the infiltration rates derived from the K<sub>fs</sub> values in the above-noted tables are unfactored and should not be used for design purposes without prior discussion with Paterson. Infiltration-based low impact development (LID) strategies using the above-noted infiltration rates should be adjusted with an appropriate safety correction factor.



The safety correction factor that would be considered at the time of future parceland system-specific designs would be dependent on the size and invert depth of those systems relative to the infiltration rates observed within 1.5 m below their bases.



# 4.0 Discussion

### 4.1 Geotechnical Assessment

The study area is considered suitable for the proposed development from a geotechnical perspective. Since detailed design details of the future development are not known at this time, geotechnical design information provided in this report may only be considered preliminary.

Once preliminary design plans have been developed for the study area, parceland development-specific recommendations and other geotechnical considerations may be provided at that time. Further, supplemental geotechnical field investigation will be required in support of future low-, mid- and/or high-rise structures. The appropriate foundation support system for buildings is dependent on the building-type, loading and founding depth. Several foundation support options are listed below and discussed in the following sections:

- Low- to mid-rise conventional wood-framed residential dwellings and low to mid-rise steel-framed commercial-style structures are anticipated to be supported by a conventional spread footing foundation placed on an approved fill and/or native and undisturbed in-situ stiff silty clay or silty sand bearing surface.
- Mid-rise concrete-framed structures imposing higher stress conditions onto the underlying bearing mediums are anticipated to be supported using a raft slab placed on a stiff to firm grey silty clay bearing surface.
- Mid to high-rise buildings that exceed the load bearing capacity of the aforementioned foundations would require raft foundations or deep foundations, such as end bearing piled foundations that extend down to a clean, surface sounded bedrock bearing surface.

Due to the presence of the silty clay deposit throughout the study area, a permissible grade raise restriction will be required for the proposed grading. Our recommendations for grade raise restrictions are considered preliminary at the time of issuing this report and are subject to change upon completion of future investigations and site-specific settlement monitoring programs.

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



## 4.2 Permissible Grade Raise Recommendations

Based on the results of the field investigation, a permissible grade raise restriction of 0.5 to 0.6 m above the existing and original ground surface may be considered as a preliminary recommendation for grading throughout the majority of the subject site. It should be understood that the currently recommended range is preliminary and is not considered representative of the restriction that would apply to the entirety of the subject site. Adjustments to the currently recommended grade raise restriction are subject to supplemental investigation findings and settlement monitoring programs. Localized zones throughout the subject site are also expected to be able to support higher grade raise restrictions, which will be evaluated during the design phase of the development. Therefore, it should be noted that a re-evaluation of the permissible grade raise recommendations by Paterson is required once details of the proposed development are finalized.

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. Provided sufficient time is available to induce the required settlements, consideration could be given to surcharging the study area (i.e., anticipating 2 to 3 years of surcharging where undertaken). Alternatively, consideration could also be given to undertaking a test fill pile program (similar timeline as surcharging) to assess the suitability to raise the currently recommended permissible grade raise recommendations in conjunction with a supplemental investigation.

Consideration can be given to integrating wick-drains for these programs to reduce timelines for achieving sufficient settlement prior to construction, however, these types of measures are typically undertaken by a specialized ground improvement contractor with proprietary installation methodologies and products. Based on this, reductions in the amount of time that could be allotted for undertaking surcharge programs in conjunction with wick drains throughout the subject site should be advised upon by Paterson after a coordinated review with a specialized ground improvement contractor that would be retained by the developer. The coordinated discussions would be intended to understand the methodology considered by the specialized contractor and to provide their designers with appropriate geotechnical parameters for guiding their wick-drain system designs, if sought by the developer.

A post-development groundwater lowering of 0.5 m within the underlying clay deposit was assumed for our calculations where the groundwater table was interpreted to be located with the silty clay deposit.



A post-development groundwater lowering anticipated to be the thickness of existing saturated sand was considered where the groundwater table was interpreted to be perched above the sand-clay interface. It should be noted that the current pre-development and future post-construction groundwater conditions are not considered to be the same, such that permissible grade raise recommendations should not depend on the current pre-development groundwater levels measured at piezometers and monitoring wells.

## 4.3 Design for Earthquakes

The site class for seismic site response can be taken as **Class E** for foundations bearing over the overburden identified throughout the study area. The soils underlying the study area are not susceptible to liquefaction or cyclic softening. Reference should be made to the latest revision of the Ontario Building Code for a full discussion of the earthquake design requirements.



# **5.0 Design and Construction Considerations**

## 5.1 Excavation Side Slopes

Excavations for buildings and services can be carried out using conventional excavation techniques and in accordance with the Occupational Health and Safety Act, Regulations for Construction projects. The side slopes of excavations in the overburden materials should be either cut back at acceptable slopes or should be retained by shoring systems from the start of the excavation until the structure is backfilled. These systems may consist of conventional systems such as soldier pile and lagging or interlocking sheet piling. These systems and their affiliated support systems would be explored on a block-specific basis. Further, consideration should be given to undertaking supplemental investigation during future stages of design and development to confirm Soil Types in accordance with OHSA regulations when excavation depths would be better understood.

#### **Unsupported Side Slopes**

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

It is recommended that Paterson review drawings considering excavations prior to construction and tendering to verify adequate subsoil conditions have been considered as part of the design process from a geotechnical perspective. Further, it is recommended that Paterson review servicing plans and profiles considering excavations to verify appropriate soil types considered in *Ontario Regulation 213/91: Construction Projects* have been incorporated from a geotechnical perspective.

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 Paterson in order to detect if the slopes are exhibiting signs of distress. Excavation side slopes should also be protected from erosion by surface water and rainfall events by the use of tarpaulins or other means of erosion protection along their footprint in conjunction with dry conditions at the slope toes. It is recommended that a trench box be used at all times to protect personnel working in trenches. 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. Grey clay soils sub-excavated from service trenches are not anticipated to be able to be re-used for service trench reinstatement.



#### Excavation Base Stability

The base of supported excavations can fail by three (3) general modes:

- Shear failure within the ground caused by inadequate resistance to loads imposed by grade difference inside and outside of the excavation,
- > Piping from water seepage through granular soils, and
- Heave of layered soils due to water pressures confined by intervening low permeability soils.

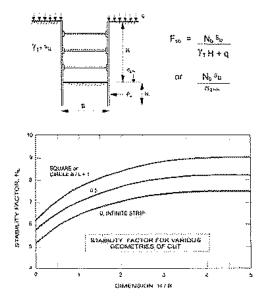
The factor of safety with respect to base heave, FS<sub>b</sub>, is:

$$FS_b = N_b s_u / \sigma_z$$

where:

- N<sub>b</sub> stability factor dependent upon the geometry of the excavation and given in Figure 1 on the following page.
- su undrained shear strength of the soil below the base level.
- $\sigma_z$  total overburden and surcharge pressures at the bottom of the excavation.

Shear failure of excavation bases is typically rare in granular soils if adequate lateral support is provided. Inadequate dewatering can cause instability in excavations made through granular or layered soils. The potential for base heave in cohesive soils should be determined for stability of flexible retaining systems. As a preliminary precaution, service trench excavations exceeding 4 to 5 m in depth should be assessed for excavation base stability during the design phase to verify the suitability of conventional cut-and-cover excavation techniques.





#### **Trenchless Excavations for Service Infrastructure**

Considering the study area is underlain by a relatively firm deposit of silty clay, conditions may be favourable for the use of trenchless excavation methods for service installations. Current trenchless techniques generally consist of horizontal direction drilling, jack and boring, pipe jacking using a tunnel-boring-machine and/or microtunnelling. Trenchless excavation techniques are advantageous to conventional open-cut methods since they mitigate potential for basal instability and reduce the volume of excess soil and imported trench backfill. However, these techniques are not as economical as compared to conventional open-cut techniques.

Typically, the above-noted methods will require the use of entry and exit shafts supported by temporary shoring systems. Excavations extending below the sand-to-clay interface should be planned to mitigate high levels of influx into the excavation from this interface. Below this interface, groundwater infiltration is expected to be low and controllable using conventional sump pumps.

Subsurface conditions that could be encountered during the trenchless installation would consist of flowable soils, which could further result in settlement of the overlying ground surface. Given the predominantly clayey nature of the subsoils located throughout the study area, this is not expected to occur for trenchless excavations undertaken below the sand-to-clay interface. However, given that surficial sand located upon the clay layer surface is in a saturated state, flowable sand may be encountered should the trench alignment intersect this interface.

As a general precaution, where flowable soils could be potentially encountered, a soil plug would be implemented in the lead casing by setting back the augers from the leading edge of the casing. The soil plug would prevent soils from flowing into the casing, thus mitigating settlement at the ground surface. This would be coordinated between Paterson and the trenchless excavation contractor at an earlier stage in the planning of these types of installations.

It is recommended that all plans considering the use of trenchless excavation techniques and/or installation of services within the unweathered, grey silty clay be reviewed at a planning stage by Paterson. Paterson may provide appropriate design and construction recommendations based on the depth and alignment of these types of servicing works once they are known at that time.



### **Temporary Shoring**

Depending on the depth of future underground levels, if considered, temporary shoring systems may be required to support the overburden soil to complete the required excavations where insufficient room is available for open cut methods.

If a temporary shoring system is considered, the design and implementation of these temporary systems will be the responsibility of the excavation contractor and their design team. The shoring requirements designed by a structural engineer specializing in those works will depend on the depth of the excavation, the proximity of the adjacent structures and the elevation of the adjacent building foundations and underground services. Inspections and approval of the temporary system will also be the responsibility of the designer.

It is the responsibility of the shoring contractor to ensure that the temporary shoring system is in compliance with safety requirements, designed to avoid any damage to adjacent structures and include dewatering control measures. In the event that subsurface conditions differ from the approved design during the actual installation, it is the responsibility of the shoring contractor to commission the required experts to re-assess the design and implement the required changes.

The temporary shoring system could consist of a soldier pile and lagging system or interlocking steel sheet piling. Any additional loading due to street traffic, neighbouring buildings, construction equipment, adjacent structures, and facilities, etc., should be included to the earth pressures described below.

Furthermore, the design of the temporary shoring systems should take into consideration a full hydrostatic condition which can occur during significant precipitation events. These systems could be cantilevered, anchored, or braced. The shoring system is recommended to be adequately supported to resist toe failure, if required, but means of extending the piles into the bedrock through pre-augered holes if a soldier pile and lagging system is the preferred method. The earth pressures acting on the temporary shoring system may be provided by Paterson during the design stage of excavations that would require the use of soil retention systems such as temporary shoring systems.

As a general note, the active earth pressure should be calculated where wall movements are permissible while the at-rest pressure should be calculated if no movement is permissible. The dry unit weight should be calculated above the groundwater level while the effective unit weight should be calculated below the groundwater level.



The hydrostatic groundwater pressure should be included to the earth pressure distribution wherever the effective unit weight is calculated for earth pressures. If the groundwater level is lowered, the dry unit weight for the soil/bedrock should be calculated full weight, with no hydrostatic groundwater pressure component.

For design purposes, the minimum factor of safety of 1.5 should be calculated.

### 5.2 Groundwater Control

Based on our observations, pumping from open sumps should be sufficient to control the groundwater influx through the sides of shallow excavations. It is anticipated that groundwater infiltration into the excavations should be low to moderate and controllable using open sumps throughout the clay overburden.

Initially high rates of infiltration will be experienced in excavations crossing below the sand to clay interface where sand is present in the overlying surficial soils. Further, excavations terminating within the saturated portion of the sand layer may require the use of well points to dewater the excavation perimeter in conjunction with other techniques to cut-off influx from the excavation sides and base.

However, stabilized infiltration rates are anticipated to be controllable using conventional open sump techniques. 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

A temporary Ministry of the Environment, Conservation and Parks (MECP) permit to take water (PTTW) will be required 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.



#### Impacts on Neighbouring Structures

It is imperative that all precautions be considered during the design phase to mitigate the long-term dewatering of the underlying clay deposit to mitigate potential for higher-than-tolerable amounts of settlement to be experienced by the deposit and the overlying structures. Detailed recommendations will be provided by Paterson for structure-specific considerations at a later stage of design.

As a preliminary recommendation, future building foundations located below the long-term groundwater table should be provided with a groundwater suppression system to mitigate potential to drain the local groundwater table which the structure would be founded within. Further, the implementation of techniques such as clay seals for service trenches and restricting tree setbacks to building foundations, among other techniques, would be advised to be implemented during the design phase and as is routinely undertaken throughout the City of Ottawa. Therefore, provided appropriate and conventional measures are taken to limit long-term dewatering of the underlying deposit, future development is not anticipated to negatively impact local groundwater conditions for neighbouring existing buildings that would result in negative impacts.

#### Feasibility of Development and Current Water Levels

It is our experience that the pre-development water levels measured at the monitoring wells are not considered representative of groundwater conditions that would be encountered during the post-development phase of the subject site. Our interpretation noted in *Section 3.3 – Groundwater* of this report suggest that the long-term groundwater table is expected to be located within the unweathered portion of the clay deposit and/or perched within the lowest portion of the sand layer underlain by unweathered, grey silty clay due to its relatively impermeable and saturated state.

Long-term post-development dewatering resulting from undertaking service excavations, creating high densities of impermeable surfaces (roofs, paved roads, etc.) will result in a long-term lowering of the pre-development groundwater table, and as expected and advised upon in the City of Ottawa's *Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa*. Based on that, the pre-development groundwater levels measured within the monitoring wells should not be considered representative of constraints associated with depths which structures may be limited to being founded within during the design phase. It is recommended that long-term groundwater conditions should be considered during the design phase of the development and as based on the depth which soils transition to from weathered to unweathered and as advised by Paterson during the design phase of the proposed development.



# 5.3 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 aggressively corrosive environment.

## 5.4 Landscaping Considerations

#### **Tree Planting Considerations**

Due to the presence of the aforementioned clay deposit, the location of street trees will be governed by the potential for soil volume change where trees and houses are located above a clay deposit. Setbacks between street trees and building foundations should be assessed in accordance with the latest version of City of Ottawa's *Tree Planting in Sensitive Marine Clay Soils* during the planning and design phases of the proposed development.

The soil volume change potential and setback of trees from building foundations has been preliminarily assessed in accordance with the City of Ottawa's *Tree Planting in Sensitive Marine Clay Soils* (2017 Guidelines). Based on the current testing results, the plasticity index for the majority of the tested clay samples was found to be less than 40%, which would indicate the presence of a clay with low to medium potential for soil volume change.

Based on the current guidelines, large trees (mature height over 14 m) can be planted within the subject site 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:

- □ 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 m<sup>3</sup> of available soils volume while a medium tree must be provided with a minimum of 30 m<sup>3</sup> 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.

It is expected that tree planting setback recommendations will be assessed on a development-specific basis as grading plans are made available for the future development and based on area-specific current and future geotechnical investigation information.

## 5.5 Slope Stability Assessment

#### Summary of Assessment

Paterson completed a desktop assessment and field review of the subject site. The slope stability assessment was conducted in accordance with the City of Ottawa's *Slope Stability Guidelines for Development Application in the City of Ottawa* (2004) and the Ontario Ministry of Natural Resource *Technical Guide – River and Stream Systems: Erosion Hazard Limit* (2002). The desktop assessment consisted of evaluating the LiDAR and topographical maps to verify slope height, steepness, valley floor width and other features associated with slope stability. The field review consisted of assessing the current slope conditions. The review was completed by Paterson field personnel as part of the geotechnical investigation between June 2022 to August 2022. The slopes forming the channel sidewalls along the length of the following watercourses were reviewed at that time:

- □ Smith-Gooding municipal drain in the northwest and northeast portions of the study area,
- Ramsey Creek crossing the parcel located at the southwest corner of Leitrim Road and Anderson Road
- Johnston municipal drain located in the east of Anderson Road
- Several tributaries located throughout the lands bound by Piperville Road, Farmers Way, Thunder Road, and Anderson Road.



The field review generally consisted of observing surface conditions along the length of the channel including identifying the presence of vegetation, erosion and other features associated with slope stability. Paterson field personnel verified subsurface information and in-situ shear strength of cohesive soils at select slope sections using a hand-auger and field vane apparatus, respectively.

Water levels and flow within the watercourses were generally observed, including identifying signs of recent high-water marks or other signs of previous rises in the water levels. The top of slope alignment was determined in the field by Paterson personnel based on our field observations and assessed using a high-precision handheld GPS unit.

Overall, a total of thirty-six (36) slope cross sections throughout the above-noted locations were analyzed as part of the slope stability analysis. The locations for the slope sections were chosen conservatively to evaluate the worst-case scenarios (i.e., areas with steepest topography, lesser stiff cohesive soils, proximity between the toe of the bank and edge of the watercourse, potential active erosion, and height of slope among other considerations determined at the desktop and reassessed during the field evaluation stages) as well as represent the variability of the subsurface conditions, signs of erosion, and other features that could impact the slope stability analysis.

Topographic surface elevations were measured at select cross-sections in combination with LiDAR information to evaluate the corresponding slope. The select slope locations were analyzed using SLIDE, a computer program for two-dimensional slope stability analysis.

Based on the results of our desktop analysis, field observations and slope stability analysis, a Limit of Hazard Lands was assigned from the top of slope for the abovenoted sections of the study areas watercourses. The cross-section locations and associated Limit of Hazard Lands setbacks are presented on Drawings PG5827-4 through PG5827-8 in Appendix 2. Photographs of the subject slopes have been also attached to the present report.

#### **Summary of Field Observations**

The following section is a summary of our observations during the time of our field review of the subject slopes:



# Smith-Gooding Municipal Drain – West of Anderson Road (Section A to Section H and Section LL)

The existing slope bordering the western portion of the Smith-Gooding Municipal Drain located between Ramsayville Road and Anderson Road is generally heavily vegetated with brush and mature trees. The majority of the abutting table lands are heavily treed, however, the northern half of the channel intersecting the southern portion of 4640 Leitrim Road consists of farmed agricultural lands.

The slope profile across the watercourse was observed to range between approximate steepness' of 0.6H:1V to 2.7H:1V. Further, the slopes were observed to be between 1.4 to 2.2 m in height. The width of the watercourse was noted to be between approximately 1 and 5 m wide. At the time of our visit, the depth of the water ranged between 0.5 to 2 m in depth. The variability was generally observed to be caused by beaver dams. The water level was observed to be stagnant across the majority of the channel at the time of our review.

The majority of the slope appeared to consist of stiff, brown silty clay, which was underlain by firm, grey silty clay in close proximity to the water level. Some erosion had been observed throughout the length of the watercourse. This generally consisted of some erosion of the bank face resulting in minor undercutting along the channels edge at some locations. Occasionally shallow and low slip surfaces restricted to close proximity to the water level were observed in areas with sharp bends in the channel alignment. Overall, vegetation was observed to be intact and mature across the majority of the channel length.

Reference should be made to Drawing PG5827-4 - Limit of Hazard Lands Plan in Appendix 2 which depicts the above-noted section of the watercourse and the associated slope stability cross-sections and setback information.

# Smith-Gooding Municipal Drain – East of Anderson Road (Section K to Section R and Section II)

The existing slope bordering the eastern portion of the Smith-Gooding Municipal Drain located between Anderson Road and the eastern boundary of 5055 Piperville Road is generally well-vegetated with brush and patches of mature trees. The majority of the abutting table lands consist of landscaped (4175 Anderson Road) or agricultural lands (5055 Piperville Road).



The slope profile across the watercourse was observed to range between approximate steepness of 0.9H:1V to 3.5H:1V. Further, the slopes were observed to be between 1.3 to 3.0 m in height. The width of the watercourse was noted to be between approximately 1 and 3 m wide. At the time of our visit, the depth of the water ranged between 0.5 to 1.2 m in depth with signs of the high-water mark being approximately 300 mm above the water level at the time of our review. The variability was generally observed to be caused by beaver dams. The majority of the channel was observed to contain stagnant water with the exception of areas immediately beyond beaver dam footprints. Relatively low-speed flow was observed in areas immediately beyond beaver dams.

The majority of the slope appeared to consist of stiff, brown silty clay, which was underlain by firm, grey silty clay in close proximity to the water level. Some erosion had been observed throughout the length of the watercourse. This generally consisted of erosion of the bank face resulting in some undercutting along the channels edge at several locations. The bank face in areas of active erosion was observed to consist of bare soil and did not contain mature vegetation or brush. Recent shallow slip surface was not observed at the time of our site visit for this portion of the watercourse. Overall, vegetation was observed to be intact and mature across the majority of the channel lengths table land, valley sidewalls and valley corridors.

Reference should be made to Drawing PG5827-6 - Limit of Hazard Lands Plan in Appendix 2 which depicts the above-noted section of the watercourse and the associated slope stability cross-sections and setback information.

#### Ramsey Creek – Leitrim Road to Anderson Road (Section I and Section J)

The existing slope bordering the eastern portion of Ramsay Creek located between Leitrim Road and Anderson Road is generally heavily vegetated with brush and mature trees. It should be noted that several mature trees in proximity to the channel had recently fallen due to a heavy storm producing high winds during the Summer of 2022. However, the fallen trees were not observed to have impacted the slope's stability at the time of our review.

The bank face profile along the watercourse was observed to range between approximate steepness' of 3.2H:1V to 4.8H:1V. Further, the bank faces were observed to be between 0.5 to 0.6 m in height. The width of the watercourse was noted to be between approximately 1 and 5 m wide. At the time of our visit, the depth of the water ranged between 0.5 to 1.5 m in depth.



The majority of the slope appeared to consist of stiff, brown silty clay, which was underlain by firm, grey silty clay in close proximity to the current water level. Some erosion had been observed throughout the length of the watercourse. This generally consisted of some erosion of the bank face resulting in minor undercutting along the channels edge at some locations. Overall, vegetation was observed to be intact and mature across the majority of the channel length.

Reference should be made to Drawing PG5827-5 - Limit of Hazard Lands Plan in Appendix 2 which depicts the above-noted section of the watercourse and the associated slope stability cross-sections and setback information.

# Johnston Municipal Drain – East of Anderson Road (Section GG and Section HH)

The existing slope bordering the eastern portion of the Johnston Municipal Drain located east of Anderson Road is generally heavily vegetated with brush and mature trees. The slope profile across the watercourse was observed to range between approximate steepness' of 1.3H:1V to 1.5H:1V. Further, the slopes were observed to be between 1.3 to 1.5 m in height. The width of the watercourse was noted to be between approximately 1.5 and 2 m wide. At the time of our visit, the depth of the water ranged between 0.5 to 1 m in depth.

The majority of the slope appeared to consist of stiff, brown silty clay, which was underlain by firm, grey silty clay in close proximity to the water level. No notable erosion had been observed throughout the length of the watercourse. Overall, vegetation was observed to be intact and mature across the majority of the channel length.

Reference should be made to Drawing PG5827-8 - Limit of Hazard Lands Plan in Appendix 2, which depicts the above-noted section of the watercourse and the associated slope stability cross-sections and setback information.

# Creek East of Johnston Municipal Drain and Other Ditches (Section S to Section EE, Section JJ and Section KK)

Several channels, including a channel extending further downstream and east of the Johnston Municipal Drain, were reviewed as part of this assessment. Two of these channels consist of tributary branches extending from the main channel. The main channel consists of watercourse connecting between the eastern extent of the Johnston Municipal Drain and outletting further east and across Farmers Way.



The slope profile across these watercourses were observed to range between approximate steepness' of 1.3H:1V to greater than 7H:1V. Further, the slopes were observed to be between 1.0 to 4.8 m in height. The width of the watercourse was noted to be between approximately 1 and nearly 10 m wide. At the time of our visit, the depth of the water ranged between 0.3 to 0.8 m in depth. The variability was generally observed to be caused by beaver dams. The majority of the channel was observed to contain water which appeared stagnant in heavily vegetated wide-valley areas and with low-speed in areas where the channel became constricted in width.

The majority of the slope appeared to consist of stiff, brown silty clay, which was underlain by firm, grey silty clay in close proximity to the water level. Some erosion had been observed throughout the length of the watercourse. This generally consisted of erosion of the bank face resulting in some undercutting along the channels edge at several locations. The bank face in areas of active erosion was observed to consist of bare soil and did not contain mature vegetation or brush. Some recent shallow slip failures had been observed in areas with the highest slopes and in proximity to several closely-spaced meanders in the watercourses alignment and west of Farmers Way. Overall, vegetation was observed to be intact and mature across the majority of the channel lengths table land, valley sidewalls and valley corridors.

Reference should be made to Drawing PG5827-7 - Limit of Hazard Lands Plan in Appendix 2 which depicts the above-noted section of the watercourse and the associated slope stability cross-sections and setback information. Further, a summary of the analyzed sections is presented in Table 11.



Slope Section ID	Slope Height (m)	Approximate Inclination
А	2.0	2.1H:1V
В	1.4	0.6H:1V
С	1.5	1.1H:1V
D	2.1	2.0H:1V
E	2.1	1.7H:1V
F	1.6	2.7H:1V
G	1.5	2.1H:1V
Н	1.5	1.1H:1V
I	0.6	3.2H:1V
J	0.5	4.8H:1V
K	0.6	1.9H:1V
L	0.5	1.0H:1V
М	0.6	1.8H:1V
Ν	0.5	1.3H:1V
0	0.5	0.8H:1V
Р	0.8	1.6H:1V
Q	3.0	3.5H:1V
R	0.9	0.9H:1V
S	0.1	15.9H:1V
Т	0.6	5.4H:1V
U	1.9	3.6H:1V
W	0.6	2.3H:1V
Х	0.5	13.1H:1V
Y	0.5	1.3H:1V
Z	0.6	2.5H:1V
AA	4.8	5.5H:1V
BB	4.0	2.3H:1V
CC	4.1	2.6H:1V
DD	4.4	4.5H:1V
EE	5.1	1.1H:1V
GG	2.4	2.4H:1V
HH	1.3	1.3H:1V
	1.3	0.9H:1V
JJ	1.8	2.1H:1V
KK	1.7	7.1H:1V
LL	2.2	1.0H:1V



#### Slope Stability Assessment

Based on the above-noted field observations, and in accordance with Table 4.2 of the Ontario Ministry of Natural Resource *Technical Guide – River and Stream Systems: Erosion Hazard Limit* (2002), it has been determined that all slope sections present a slope instability rating value exceeding 35. Therefore, the slopes were assessed using the methodology provided by the MNR for slopes in confined channels with "moderate potential for instability" and in accordance with the City of Ottawa's *Slope Stability Guidelines for Development Application in the City of Ottawa* (2004).

The analyses of the stability of the slopes were carried out using SLIDE, a computer program which permits a two-dimensional slope stability analysis using several methods including the Bishop's method, which is a widely used and accepted analysis method. The program calculates a factor of safety, which represents the ratio of the forces resisting failure to those favoring failure. Theoretically, a factor of safety of 1.0 represents a condition where the slope is stable.

However, due to intrinsic limitations of the calculation methods and the variability of the subsoil and groundwater conditions, a factor of safety greater than one is usually required to ascertain that the risks of failure are acceptable. A minimum factor of safety of 1.5 is generally recommended for conditions where the failure of the slope would endanger permanent structures.

The cross-sections were analyzed based on the existing conditions observed during our site visit and review of the subgrade information collected during our geotechnical investigation. The slope profiles were modeled based on topographic information obtained by Paterson field personnel using a high-precision handheld GPS unit and supplemented with publicly available LiDAR information.

The location of the cross-sections was conservatively chosen to analyze the worstcase scenarios encountered throughout the subject site, from a slope stability perspective. Further, observations included in the *Fluvial Geomorphology Study* – *Tewin Lands: Existing Conditions Summary Report* – *Bear Brook and Ramsay Creek Watersheds* dated September 18, 2024 and prepared by GEO-Morphix were also considered as part of our analysis and review. It should be noted that meander belt widths provided in the GEO-Morphix report are depicted on Drawing PG5827-4 through PG5827-8 – Limit of Hazard Lands Plan.



The slope stability analysis was completed at each slope cross-section under worst-case-scenario by assigning cohesive soils under fully saturated conditions. Subsoil conditions at the cross-sections were inferred based on boreholes nearest to the analyzed slope sections and general knowledge of the area's geology.

The effective strength soil parameters used for static analysis were chosen based on the subsoil information recovered during the geotechnical investigation. The effective strength soil parameters used for static analysis are presented in Table 12.

Table 12 - Effective Strength Soil and Material Parameters (Static Analysis)						
Soil Layer	Unit Weight (kN/m <sup>3</sup> )	Friction Angle (degrees)	Cohesion (kPa)			
Brown Silty Clay	17	33	5			
Grey Silty Clay	16	33	10			

The total strength parameters for seismic analysis were chosen based on the in situ, undrained shear strengths recovered within the boreholes completed at the time of our geotechnical investigation and based on our general knowledge of the geology in the area. The strength parameters used for seismic analysis at the slope cross-sections are presented in Table 13 below.

Table 13 - Total Strength Soil and Material Parameters (Seismic Analysis)							
Soil Layer	Unit Weight (kN/m³)	Friction Angle (degrees)	Undrained Shear Strength (kPa)				
Brown Silty Clay	17	-	80				
Grey Silty Clay	16	-	20				

The parameters selected are considered conservative of strength estimates for the subsoil profiles present throughout the subject site. Relatively low and consistent shear strengths were selected for undrained analysis of slopes in seismic loading scenarios. Typical and appropriate parameters were selected for drained/static loading analysis of the subject slopes. Based on this, although the parameters are relatively uniform for the sections, they are considered appropriate and conservative for analyzing the subject slopes from a geotechnical perspective.



### Static Loading Analysis

The factor of safety was found to be greater than 1.5 at the majority of slope section with the exception of Section B located along the Smith-Gooding Municipal Drain and Section BB located along the Johnston Municipal Drain. As such, a stable slope setback of 2 m was provided to each of these sections to provide the minimum distance to attain a factor of safety of 1.5 for the static loading scenario.

#### Seismic Loading Analysis

An analysis considering seismic loading and the groundwater at ground surface was also completed. A horizontal acceleration of 0.16g was considered for all slopes. This acceleration is considered as half of the peak (horizontal) ground acceleration (PGA) of 0.32g. A factor of safety of 1.1 is considered to be satisfactory for stability analyses including seismic loading.

The results indicated the factor of safety exceeded 1.1 at all slope sections analyzed for stability analyses considering seismic loading.

#### Limit of Hazard Lands

Based on our review, the slopes evaluated as part of this assessment are considered stable from a geotechnical perspective. Since the slopes are in close proximity to active watercourses, toe erosion is considered to be a major factor impacting slope stability. The majority of the watercourse alignments did not appear to be impacted by active erosion. However, some signs of active erosion were observed during the field assessment.

Severity of erosion generally depended on channel geometry and alignment that would be favorable to be producing more turbulent flow patterns along the channels when water levels would be at their highest. Less severe erosion was observed along relatively straight and long portions of channels and consisted of occasional small patches of loss of vegetation along the bank face.

This was mostly observed throughout the Smith-Gooding municipal drain west of 5055 Piperville Road, the Johnston municipal drain and ditches throughout 4828 Piperville Road.



Notable erosion was observed in areas where several consecutive sharp meander bends in the watercourse alignment occurred within a relatively short distance. This was generally observed throughout the creek west of Farmers Way (area of Sections Y, Z, AA, BB, CC, DD, EE, JJ, KK) and consisted of some undercutting at the toe of slope or edge of the bank along the watercourse. This was also observed as areas where a relatively shallow portion of the bank sidewalls along the channel would consist of relatively bare soil with a small amount of mature vegetation. Some undercutting was observed where the watercourse extended much deeper than the top of the abutting bank throughout the area of the Smith-Gooding municipal drain throughout 5055 Piperville Road.

Based on these observations, channel measurements and the results of slope stability analysis, Paterson assigned a Limit of Hazard Lands setback from the observed top of slope alignment. The Limit of Hazard Lands is a setback formed by a combination of allowances considering stable slope, toe erosion and erosion access. The allowances were selected based on our field observations and in accordance with the City of Ottawa's *Slope Stability Guidelines for Development Applications* (2004) and the Ministry of Natural Resource's *Technical Guide – River and Stream Systems: Erosion Hazard Limit* (2002).

Where the subject slopes have been identified to form unconfined systems by the project geomorphologist, the erosion hazard limit is recommended to consist of the greater of the Limit of Hazard Lands setback provided herein, the meander belt width provided by the project geomorphologist, or other setback exceeding the aforementioned erosion hazard limits.

The Limit of Hazard Lands setbacks assigned by Paterson provided for each slope section is summarized in Table 14.



Table 14 – Su	immary of Lim	it of Hazard L	ands Setbacks						
Smith-Goodin	g Municipal Dra	in – West of Ar	derson Road						
Cross Section ID	Stable Slope Allowance (m)	Toe Erosion Allowance (m)	Erosion Access Allowance (m)	Limit of Hazard Lands Setback (m)					
A, C, D, E, F, G, H, LL	0	8	6	14					
В	2	8	6	16					
Smith-Gooding Municipal Drain – East of Anderson Road									
Cross Section ID	Stable Slope Allowance (m)	Toe Erosion Allowance (m)	Erosion Access Allowance (m)	Limit of Hazard Lands Setback (m)					
K, L, M, N, O, P, Q, R, II	0	8	6	14					
Ramsey Creek	<ul> <li>Leitrim Road</li> </ul>	to Anderson F	Road						
Cross Section ID	Stable Slope Allowance (m)	Toe Erosion Allowance (m)	Erosion Access Allowance (m)	Limit of Hazard Lands Setback (m)					
I, J	0	0 5 6 11							
Johnston Mun	nicipal Drain – E	ast of Anderso	n Road						
Cross Section ID	Stable Slope Allowance (m)	Toe Erosion Allowance (m)	Erosion Access Allowance (m)	Limit of Hazard Lands Setback (m)					
GG, HH	0	8	6	14					
Other Ditches	and Creek East								
Cross Section ID	Stable Slope Allowance (m)	Toe Erosion Allowance (m)	Erosion Access Allowance (m)	Limit of Hazard Lands Setback (m)					
S, T, U, V, X, Y, Z	0	5	6	11					
W, AA, CC, DD, EE, JJ, KK	0	8	6	14					
BB	2	8	6	16					
			to PG5827-8 for the lo lopes reviewed as part						



The existing vegetation on the slope faces should not be removed as it contributes to the stability of the slope and reduces erosion. Based on our current assessment of the existing slopes and watercourse conditions, the Limit of Hazard Lands setback may be reduced by several considerations such as the re-shaping of unstable slopes/table lands, implementation of erosion protection systems, founding of structures below the zone of influence of unstable slopes and re-construction or re-alignment of the channels.

These strategies may be explored in further detail once future development plans are prepared and the proximity of development may be assessed against the existing Limit of Hazard Lands setback. It should be noted that the current Limit of Hazard Lands setback is based on existing conditions. Based on this, future proposed conditions such as grade raise height and building loads should be accounted for in a revised slope stability analysis where development will be in proximity to the current Limit of Hazard Lands setback. Further, future development conditions may adjust the existing slope conditions impacting the current Limit of Hazard Lands setback such that currently provided setback values may be adjusted to omit or increase current setback values.

#### Preliminary Landslide Risk Review

Paterson has completed a preliminary and for-information-purposes-only review of the expected level of study that may be required to be undertaken for future landslide hazard and risk assessments for slopes located throughout the subject site. However, it should be acknowledged that the nature of any future site-specific landslide study would be determined by City of Ottawa and/or associated review agencies/authorities and is not to the discretion of Paterson.

The site characteristics that impact landslide susceptibility for slopes comprised of marine clay generally consists of the proximity to mapped historic landslides, slope height and topographic relief, proximity to watercourses, overburden drift thickness, the presence of potential artesian groundwater conditions, the geometry and fluvial characteristics of watercourses and associated table valley corridors, and the sensitivity of the clay located throughout the area of the subject slopes.

Based on our review of the above-mentioned factors, it is our opinion that there are no criteria triggering retrogressive landslide risk concerns within the study area. Once the City has established their City-wide set of guidelines related to landslide risks, any mitigation requirements for downstream lands relating to the Tewin development would be considered and implemented where required through future phases of the development approvals process.



## 5.6 Low-Impact Development (LID) Design Considerations

Based on the results of our investigation, two relatively shallow subsurface conditions are present throughout the study area from an LID perspective. One condition consists of an approximately 0.5 to 3.7 m thick layer of mostly saturated silty sand overlying unweathered, impermeable, and saturated grey silty clay. The other consists of relatively impermeable weathered, partially saturated brown silty clay underlain by unweathered, impermeable, and saturated grey silty clay.

Due to the observed relatively low permeability and saturated nature of the majority of the soils located throughout the study area, infiltration-based LID measures are not expected to be generally adequate from a hydrogeological perspective. However, an evaluation of the effectiveness of LID measures is required once the development plans are further advanced.

While small amounts of groundwater recharge and discharge could potentially take place on a localized scale within the clay deposit, neither the topographical or geological conditions are suitable for recharge or discharge to be occurring on a large scale at the study area.

Based on this, there are limited surface techniques, such as rear yard catch basins, bioswales, amended topsoil finishes and other measures that can be used in conjunction with soak-away pits that may be considered suitable if designed in accordance with the hydrogeological soil parameters that Paterson can provide.

Stormwater retention systems, such as ponds and basins, are generally considered suitable for use throughout the study area given the relatively impervious nature of the subsoils. Stormwater ponds will naturally retain stormwater and will not generally require improvement by commercial impermeable liner products. Sandier subsoil sidewalls, if encountered, would likely require improvement to retain stormwater by the use of an impermeable clay liner or other liner products.

It is generally recommended Paterson advise on suitable LID strategies during the early stages of design of the future development. This would mitigate incorporating strategies that may be incompatible with the soils encountered at the study area prior to detailed design stages.



# 6.0 Recommendations

It is recommended that the following be carried out once preliminary and future details pertaining to site plans are prepared for the study area:

- Assess the requirement to undertake supplemental investigations and monitoring programs once future development designs have been established.
- Review preliminary and detailed grading and servicing plan(s) from a geotechnical perspective. This would include the potential for the use of LID's and other stormwater management facilities considered throughout the study area.
- Review all plans and drawings considering excavation works that would take place throughout the study area to assess suitability of existing coverage from a geotechnical perspective.
- Review the pertinence of findings and recommendations provided in this report for future works concerning soil and/or subsurface works and evaluate the consideration for supplemental investigations.

The following are generally recommended to be completed by Paterson at the time of future construction works throughout the study area:

- 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 materials and placement of mud slabs.
- > 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 Paterson.

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



# 7.0 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 Taggart Investments and Algonquins of Ontario or their agents is not authorized without review by Paterson for the applicability of our recommendations to the alternative use of the report.

PROFESSION

September

#### Paterson Group Inc.

Drew Petahtegoose, P. Eng.

#### **Report Distribution:**

- Taggart Investments and Algonquins of Ontario (digital copy)
- Paterson Group (1 copy)

David J. Gilbert, P.Eng.



# **APPENDIX 1**

## SOIL PROFILE AND TEST DATA SHEETS

### CONE PENETRATION TEST HOLE PROFILE AND TEST DATA SHEETS

### SYMBOLS AND TERMS

### SUMMARY OF UNDRAINED SHEAR STRENGTH MEASUREMENTS

### GRAIN SIZE DISTRIBUTION AND HYDROMETER TESTING RESULTS

### ATTERBERG LIMITS TESTING RESULTS

### SUMMARY OF CONSOLODATION TESTING RESULTS

### CONSOLIDATION TESTING RESULTS

### ANALYTICAL TESTING RESULTS

# SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

9 Auriga Drive, Ottawa, Ontario K2E 7T9

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

Geodetic DATUM

#### REMARKS

BORINGS BY CME-55 Low Clearance	Drill			п		March 14	2022		HOLE N BH 1-		
SOIL DESCRIPTION	ргот		SAN	IPLE		DEPTH	ELEV.		esist. B	lows/0.3m a. Cone	Well
	STRATA P	ТҮРЕ	NUMBER	°. © © © ©	VALUE r RQD	(m)	(m)			ntent %	Monitoring Well Construction
GROUND SURFACE	N I	_	ä	RE	N OF		70 70	20	40	60 80	Š⊗
		AU AU	1				-79.73	0			<b>⊻</b>
Brown SILTY CLAY with sand 0.69		ss	2	75	3	1-	-78.73		<u> </u>		
Very stiff to stiff, brown SILTY CLAY		Тт	3	96							
- grey by 1.8m depth						2-	-77.73				
		ss	4	92	P	3-	-76.73			• •	
									· · · · · · · · · · · · · · · · · · ·		
		ss	5	92	Р	4-	-75.73			C	
						5-	-74.73				
6 55		X G	6			6-	-73.73			· · · · · · · · · · · · · · · · · · ·	
End of Borehole	<u>r r r r r</u>		_								
(GWL @ 0.24m - May 24, 2022)											
								20 Shor	40 sr Strong	60 80 gth (kPa)	100
								Undist	urbed 2	A Remoulded	d

# patersongroup Consulting Engineers

## SOIL PROFILE AND TEST DATA

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### DATUM Geodetic FILE NO. **PG5827** REMARKS HOLE NO. **BH 1A-22** BORINGS BY CME-55 Low Clearance Drill DATE March 14, 2022 SAMPLE Pen. Resist. Blows/0.3m Monitoring Well Construction STRATA PLOT DEPTH ELEV. SOIL DESCRIPTION 50 mm Dia. Cone (m) (m) N VALUE or RQD RECOVERY NUMBER TYPE 0/0 Water Content % Ο **GROUND SURFACE** 80 20 40 60 0+79.73TOPSOIL 0.25 Brown SILTY CLAY with sand 0.69 119 1+78.73 2 + 77.73Very stiff to stiff, brown SILTY CLAY 3+76.73 - grey by 1.8m depth 4+75.73 ΤW 1 92 4.72 End of Borehole 20 40 60 80 100 Shear Strength (kPa) Undisturbed △ Remoulded

# SOIL PROFILE AND TEST DATA

Ingineers Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

# DATUM Geodetic

REMARKS
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FILE NO. PG5827
HOLE NO.

BORINGS BY CME-55 Low Clearance	Drill			D	ATE	March 14	, 2022	BH 2-22
SOIL DESCRIPTION	РІОТ		SAN	IPLE	1	DEPTH	ELEV.	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone > 5
	STRATA	ТҮРЕ	NUMBER	°% RECOVERY	N VALUE or RQD	(m)	(m)	Pen. Resist. Blows/0.3m• 50 mm Dia. Cone• Water Content %20406080
GROUND SURFACE	0j		Z	RE	z <sup>o</sup>	0-	-79.64	
TOPSOIL       0.30         Brown SILTY SAND with clay       0.69		⊠ AU	1					
Very stiff to stiff, brown <b>SILTY CLAY</b>		ss	2	42	Р	1-	-78.64	
		ss	3	75	Р		77.04	A O
- firm to soft and grey by 1.5m depth	X	<u>//</u>				2-	-77.64	
						3-	-76.64	
	X							
		ss	4	83	Р	4-	-75.64	
	X					F	74.04	
	X					5-	-74.64	
		G	5			6-	-73.64	C C
6.55 End of Borehole	XX							
(GWL @ 0.24m - May 24, 2022)								
(GWL @ 0.2411 Wdy 24, 2022)								
								20 40 60 80 100 Shear Strength (kPa)
								▲ Undisturbed △ Remoulded

# SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Ge	eodetic
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#### REMARKS

FILE NO. PG5827
HOLE NO.

BORINGS BY CME-55 Low Clearan	ce Drill			D	ATE	March 15	, 2022	BH 3-22
SOIL DESCRIPTION	PLOT		SAN	IPLE		DEPTH	ELEV.	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone
	STRATA E	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	Water Content %
GROUND SURFACE				<u></u>	-	0-	-79.60	20 40 60 80 ≥ 0
Very stiff, reddish brown <b>SILTY CLAY</b> , trace sand	).25 1.07	∑ AU	1	42	P	1-	-78.60	0
Loose to compact, brown <b>SILTY</b> SAND n- grey by 1.5m depth	1.98	ss	3	58	26	2-	-77.60	
							-76.60	
							-75.60	
Soft to firm, grey SILTY CLAY		X ss	4	83	Р		-74.60	
End of Borehole	<u>6.71</u>	ss	5	92	Р	6-	-73.60	<u>.</u> Ф
(GWL @ 0.49m - May 24, 2022)								
								20         40         60         80         100           Shear Strength (kPa)         ▲         ▲         Undisturbed         △         Remoulded

## SOIL PROFILE AND TEST DATA

FILE NO.

PG5827 HOLE NO. BH 4-22

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### DATUM Geodetic

RE	MARK	(S

BORINGS BY CME-55 Low Clearance	Drill		D	ATE	March 15	, 2022
SOIL DESCRIPTION	гот	SAN	IPLE		DEPTH	ELEV
SOL DESCRIPTION	А		ĸ	ы.	(m)	(m)

SOIL DESCRIPTION	PLOT		SAN	IPLE		DEPTH	ELEV.	Pe				ows/0.: a. Cone		Nell N
	STRATA P	ТҮРЕ	NUMBER	°. © SECOVERY	N VALUE or RQD	(m)	(m)					ntent %		Monitoring Well Construction
GROUND SURFACE				8	ZŬ	- 0-	78.95	:	20	4	) (	50 8 	0	ΣŬ
TOPSOIL0.2	8	资AU	1				/ 0.00		0					
		ss	2	63	Р	1-	77.95		· · · · ·	· · · · ·	<del></del>		12	₽₽Ē
										) - ( ) - ( ) - (	T ( : : - ( - - ( : : - : - : - - ( : - : - : - : -			릴 릴
Very stiff to stiff brown SILTY		ss	3	63	P	2-	76.95					<b>_</b>		릴릴
Very stiff to stiff, brown <b>SILTY</b> <b>CLAY,</b> trace sand		ss	4	58	Р				<b>*</b>			0		
						3-	75.95							արերություններություններ Գրերիներիներիներիներ
- soft and grey by 2.3m depth		1						· · · <del>413</del> · · · · · · ·	<b>.</b>					릴릴
		ss	5	83	Р	4-	-74.95						O	릨릠
						_				· · · · · ·				
						5-	-73.95							
						6	-72.95							
		ss	6	83	Р	0-	72.95						0	<u>.                                    </u>
6.7	. <u>  { / / / / / / / / / / / / / / / / / / </u>										· · · · · · · · · · · · · · · · · · ·			
(GWL @ 0.82m - May 24, 2022)														
(GWL @ 0.02111 - May 24, 2022)														
									20 Shei	40 ar S		50 8 th (kPa	30 10 a)	0
									Indis					

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# SOIL PROFILE AND TEST DATA

▲ Undisturbed △ Remoulded

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic									FILE NO.		
REMARKS									HOLE NO	).	
BORINGS BY CME-55 Low Clearance I	Drill	1		D	ATE	March 15	, 2022		BH 5-2	22	1
SOIL DESCRIPTION	PLOT		SAN			DEPTH (m)	ELEV. (m)		esist. Bl	ows/0.3m a. Cone	g Well ion
	STRATA	ТҮРЕ	NUMBER	° ≈ © © ©	N VALUE or RQD			• V	Vater Cor	ntent %	Monitoring Well Construction
GROUND SURFACE	Ω Ω		Z	RE	z <sup>o</sup>	0	-78.76	20	40 <del>6</del>	50 80	Ĕΰ
		🕅 AU	1			0-	-70.70	0			
Loose, brown <b>SILTY SAND,</b> some 0.91		ss	2	58	Р	1-	-77.76			1	
		A 33	2	50		•	11.10				
Very stiff to stiff, brown <b>SILTY</b> <b>CLAY,</b> trace sand		ss	3	83	P	2-	-76.76	4		0	
	X										
- firm to soft and grey by 1.5m depth						3-	-75.76				目目
		TW	4	96							
		ss	5	67	Р	4-	-74.76	.4		0	
						5-	-73.76				1目
							70 70				目
		ss	6	83	Р	6-	-72.76			0	
6.71 End of Borehole			Ū								-
(GWL @ 1.02m - May 24, 2022)											
(GWL @ 1.02111 - May 24, 2022)											
								20	40 4	::: ::: ∖∩	00
								Shea	40 6 ar Streng	th (kPa)	00

# SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

HOLE NO.

9 Auriga Drive, Ottawa, Ontario K2E 7T9

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

#### REMARKS

	_		0.4.1	DATE March 16, 2				Den D	BH 6-22			
SOIL DESCRIPTION	PLOT		SAN			DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m • 50 mm Dia. Cone				
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(11)	(11)	• Wa	ter Cont	ent %	Monitoring Wall	
GROUND SURFACE			N	RE	zo	0-	-82.11	20	40 60	80	_	
OPSOIL0.25	-	au B	1			0	02.11	0				
		ss	2	17	Р	1-	-81.11	<b>A</b> O		1	64	
/ery stiff to stiff, brown <b>SILTY</b> CLAY, trace sand										· · · · · · · · · · · · · · · · · · ·		
		ss	3	100	Р	2-	-80.11	4		<u>)</u>		
sand seams from 0.7 to 1.5m depth								4			E	
		ss	4	100	Р	3-	-79.11			0		
firm and grey by 2.2m depth	WX.	Д				1_	-78.11					
							10.11					
		ss	5	67	Р	5-	-77.11	4		0	_	
		Vaa	•	07		6-	-76.11					
6.71	<u>XX</u>	∦ss	6	67	P					O .		
GWL @ 0.20m - May 27, 2022)												
								20 Shaar	40 60	80 1	οo	
								Shear	Strength	<b>1 (KPa)</b> Remoulded		

# SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geodetic

#### REMARKS

DATUM

BORINGS BY CME-55 Low Clearance [	Drill			П		March 16	2022			HOLE N			
SOIL DESCRIPTION	PLOT		SAN	IPLE		DEPTH	ELEV.	Per	n. Res	sist. B	lows/0. a. Con		Well
	STRATA P	ТҮРЕ	NUMBER	% RECOVERY	N VALUE of RQD	(m)	(m)				ntent %		Monitoring Well Construction
GROUND SURFACE	S E	H	ЮN	REC	N O H				20			30	Mon Con
		-				0-	-82.11						
Very stiff to stiff, brown <b>SILTY</b> <b>CLAY</b> , trace sand		ss	1	50	8	1-	-81.11			0			
- sand seams from 0.7 to 1.5m depth		ss	2	58	2	2-	-80.11				0		
3.05 Firm and grey by 2.2m depth		TW	3	88		3-	-79.11						
End of Borehole								5		Streng	60 € gth (kPa ∆ Remou	30 10 a)	00

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# SOIL PROFILE AND TEST DATA

Undisturbed

△ Remoulded

FILE NO.

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM	Geodetic

REMARKS									PG582 HOLE NO			
BORINGS BY CME-55 Low Clearance	Drill			0	ATE	March 16	, 2022		BH 7-2	2		
SOIL DESCRIPTION	PLOT		SAN	MPLE		DEPTH	ELEV.		en. Resist. Blows/0.3m ● 50 mm Dia. Cone			
	STRATA I	ТҮРЕ	NUMBER	% RECOVERY	VALUE r RQD	(m)	(m)		Vater Con		Monitoring Well	
GROUND SURFACE	ST	Ĥ	ЮN	REC	N OL (			20	40 6		Mon	
TOPSOIL0.28	B ₹₹₹	⊠ AU	1			- 0-	-81.48	0			_ <b>T</b>	
		ss	2	58	Р	1-	-80.48			24	19	
Hard to stiff, brown <b>SILTY CLAY,</b> trace sand		12								1(		
		ss	3	100	P	2-	-79.48			0		
- some sand seams from 0.3 to 1.4m depth						3-	-78.48					
		ss	4	67	Р	5	70.40	4		0	<u>111111111111111111111111111111111111</u>	
- soft to firm and grey by 2.2m depth						4-	-77.48		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		
		ss	5	0	P					· · · · · · · · · · · · · · · · · · ·		
			5			5-	-76.48					
						6-	-75.48					
6.71		ss	6	67	Р			<u>.</u>		O		
End of Borehole												
(GWL @ 0.46m - May 27, 2022)												
								20 Shea	40 6 ar Strengt		00	

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

REMARKS
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BORINGS BY CME-55 Low Clearance	e Drill			D	ATE	March 17	, 2022	HOLE NO. <b>BH 8-22</b>
SOIL DESCRIPTION	PLOT		SAN	IPLE		DEPTH	ELEV.	
	STRATA 1	ТҮРЕ	NUMBER	°⊗ RECOVERY	N VALUE or RQD	(m)	(m)	Pen. Resist. Blows/0.3m         ● 50 mm Dia. Cone         ○ Water Content %         20       40       60       80
GROUND SURFACE	ν. Γ	L.	IN	REC	z ö	0-	-80.51	<b>20 40 60 80</b> ≥ C
TOPSOIL0. Brown SILTY SAND, some clay 0.	20 69	⊠AU	1			0	00.51	0
		ss	2	50	Р	1-	-79.51	169 ▲ O
		ss	3	58	Р			
Very stiff to stiff, brown <b>SILTY</b> CLAY, trace sand						2-	-78.51	
CLAT, ITACE Sanu						3-	-77.51	
		TW	4	100				
- soft and grey by 3.8m depth						4-	-76.51	
		Тw	5			5	-75.51	
		ss	6	100	Р	5	75.51	
			7	100		6-	-74.51	
6.	71							
End of Borehole								
(GWL @ 0.23m - May 27, 2022)								
								20 40 60 80 100
								Shear Strength (kPa)
								▲ Undisturbed △ Remoulded

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

9 Auriga Drive, Ottawa, Ontario K2E 7T9

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

Geodetic DATUM

REMARKS								HOLE NO.
BORINGS BY CME-55 Low Clearance	e Drill			D	ATE	March 18	, 2022	BH 9-22
SOIL DESCRIPTION	PLOT		SAN	IPLE	1	DEPTH	ELEV.	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone
	STRATA	ТҮРЕ	NUMBER	°⊗ RECOVERY	VALUE r RQD	(m)	(m)	Pen. Resist. Blows/0.3m     ■       ● 50 mm Dia. Cone     >       ○ Water Content %     >       20     40     60     80
GROUND SURFACE	2		Ŋ	REC	N OR C		70.04	20 40 60 80
	5	- S AU	1			0-	-79.24	6
Loose to compact, brown <b>SILTY</b> 0.6 SAND with clay	59	ss	2	12	Р	1-	-78.24	
Very stiff to stiff, brown <b>SILTY</b> <b>CLAY</b> , trace sand		ss	3	83	P		-77.24	
								4
- firm and grey by 2.2m depth						3-	-76.24	
						4-	-75.24	
		ss	4	83	Р	5-	-74.24	
						6-	-73.24	
						7-	-72.24	
		ss	5	83	Р	8-	-71.24	
		ТW	6	92		9-	-70.24	
			0	52		10-	-69.24	
		ss	7	83	Р	11-	-68.24	
		тw	8	100		12-	-67.24	
		X ss	9	83	P	13-	-66.24	
		X G	10			14-	-65.24	
15.0						15	-64.24	
End of Borehole						10-	04.24	
(GWL @ 1.32m - May 24, 2022)								
								20         40         60         80         100           Shear Strength (kPa)           ▲ Undisturbed △ Remoulded

### SOIL PROFILE AND TEST DATA

40

20

▲ Undisturbed

80

△ Remoulded

100

60

Shear Strength (kPa)

9 Auriga Drive. Ottawa. Ontario K2F 7T9

**Geotechnical Investigation** Proposed Mixed-Use Community Development

REMARKS
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5 Adriga Drive, Ottawa, Oritario RZE 715					Te	win Com	munity -	Ottawa, O	Ontario		
DATUM Geodetic					•				FILE NO.		
REMARKS									HOLE NO	).	
BORINGS BY CME-55 Low Clearance I	Drill			D	ATE	March 21	, 2022	1	BH10-	·22	
SOIL DESCRIPTION	РГОТ		SAN	IPLE		DEPTH (m)	ELEV. (m)		esist. Bl 0 mm Dia	ows/0.3m a. Cone	Monitoring Well Construction
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(11)	(11)	O Water Content %			
GROUND SURFACE	Ω.	_	Ā	RE	zö			20	40 6	60 80	≗ပိ
TOPSOIL0.15		X ss	1	42	1	0-	-82.47			<b>)</b>	
Loose, reddish brown to brown SILTY SAND		ss	2	42	7	1-	-81.47	0			
<u>- some clay by 1.4m depth</u> <u>1.60</u> Very stiff to stiff, brown <b>SILTY CLAY</b>		ss	3	100	Р	2-	-80.47		8 4		
		тw	4	96							
<ul> <li>very soft to firm and grey by 2.2m depth</li> </ul>		ss	5	100	Р	3-	-79.47		7	0	
						4-	-78.47				
		ss	6	100	Ρ	5-	-77.47		*	0	
		X G	7			6-	-76.47	4		0	
<u>6.71</u> Dynamic Cone Penetration Test commenced at 6.71m depth. Cone pushed up to 22.5m depth, borehole terminated.											

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

9 Auriga Drive, Ottawa, Ontario K2E 7T9

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

Geodetic DATUM

REMARKS BORINGS BY CME-55 Low Clearand	ce Drill			D	ATE I	March 21	, 2022	HOLE NO. BH11-22
SOIL DESCRIPTION	PLOT		SAN	<b>IPLE</b>	1	DEPTH	ELEV.	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone
	STRATA P	ТҮРЕ	NUMBER	% RECOVERY	VALUE r ROD	(m)	(m)	Pen. Resist. Blows/0.3m         ■           ● 50 mm Dia. Cone         >           ○ Water Content %         >           20         40         60         80
GROUND SURFACE	<u>ي</u>	5.	N	REC	N OF C		04 74	20 40 60 80 <sup>O</sup>
	15	∦ss	1	42	5	0-	-81.71	0
Loose, reddish brown to brown 0 SILTY SAND	.60	ss	2	58	Р	1-	-80.71	
Very stiff to stiff, brown <b>SILTY</b> CLAY, trace sand						2-	-79.71	
firm and grey by 2.2m depth		ss	3	100	Р	3-	-78.71	
		Vaa					-77.71	
		∦ss	4	100	P			
							-76.71	
		ss	5	100	Р	6-	-75.71	G.
		ΤW	6	96		7-	-74.71	
		ss	7	67	Р	8-	-73.71	
		TW	8	100		9-	-72.71	
End of Borehole	0.75	-						
(GWL @ 1.17m - May 27, 2022)								
								20         40         60         80         100           Shear Strength (kPa)         ▲         Undisturbed         △         Remoulded

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### SOIL PROFILE AND TEST DATA

Undisturbed

△ Remoulded

FILE NO

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

									PG58	27	
REMARKS									HOLE N		
BORINGS BY CME-55 Low Clearance D	Drill			D	ATE	March 22	, 2022	1	BH12	-22	
SOIL DESCRIPTION	РГОТ		SAN	IPLE	1	DEPTH	ELEV.		esist. B 0 mm Di	lows/0.3m a. Cone	Well
	STRATA	TYPE	NUMBER	% RECOVERY	VALUE r ROD	(m)	(m)	0	Vater Co	ntent %	Monitoring Well Construction
GROUND SURFACE	5 S	Р	NC	REC	N OL A			20	40	60 80	U N
<b>TOPSOIL</b> 0.20		( ss	1	8	3	0-	-80.02				₹
Loose, reddish brown to brown 0.69 SILTY SAND		ss	2	12	2	1-	-79.02			1	<b>4</b> 9 ▲
Very stiff to stiff, brown SILTY CLAY, some to trace sand		ss	3	75	Р	2-	-78.02	A C			
- firm to soft and grey by 1.8m depth											
							-77.02				
		TW	4	100		4-	-76.02				
		( ss ∎⊤∷v	5	100	P	5-	-75.02				
6.71		TW K G	6 7	100		6-	-74.02				
Dynamic Cone Penetration Test commenced at 6.71m depth. Cone pushed up to 13.5m depth, borehole terminated. (GWL @ 0.09m - May 27, 2022)								20	40 ar Strenç		

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

HOLE NO.

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

### DATUM Geodetic

SOIL DESCRIPTION         0         EVALUATION         DEPTH (m)         ELEV. (m)         0         50 mm Dia Cone           GROUND SURFACE         0		SOIL DESCRIPTION 법		SAN	<b>IPLE</b>		DEDTI		Pen. Resist. Blows/0.3m			
TOPSOIL       0.20	SOIL DESCRIPTION			~	ХХ	Що			• 50 mm Dia. Cone	Monitoring Wall		
TOPSOIL       0.20       X       G       1         Brown SILTY SAND with clay       0.76       X       G       1         Very stiff to stiff, brown SILTY       SS       2       67       P       1 - 79.97         Very stiff to stiff, brown SILTY       SS       3       75       P       3 - 77.97         Very soft to soft and grey by 2.0m       SS       3       75       P       4 - 76.97         Septh       SS       4       100       P       5 - 75.97       0         End of Borehole       G       5       6       74.97       0		[RAT	LYPE	JMBEI	COVEI	VALU ALU			• Water Content %	o itori		
Brown SiLTY SAND with clay       0.76       I       SS       2       67       P       1-79.97         Very stiff to stiff, brown SiLTY       SS       2       67       P       1-79.97         Very soft to soft and grey by 2.0m       SS       3       75       P       3-77.97         Very soft to soft and grey by 2.0m       SS       3       75       P       4-76.97         SS       4       100       P       5-75.97       0       0         End of Borehole       G       5       6       6-74.97       0		". ".		N	REC	z Ö	0-	-80 07	20 40 60 80			
/ery stiff to stiff, brown SILTY       SS       2       67       P       1 - 79.97         /LAY, trace sand       2 - 78.97       2 - 78.97       3 - 77.97         wery soft to soft and grey by 2.0m       SS       3       75       P       3 - 77.97         Mepth       SS       4       100       P       5 - 75.97       0         G       5       6 - 74.97       0       0       0			G	1				00.37	q			
very soft to soft and grey by 2.0m       SS       3       75       P       3-77.97         Mepth       SS       3       75       P       4-76.97         SS       4       100       P       5-75.97         G       5       6-74.97       0			ss	2	67	Р	1-	-79.97		_		
epth SS 3 75 P 4-76.97 SS 4 100 P 5-75.97 G 5 6-74.97	ery stiff to stiff, brown <b>SILTY</b> CLAY, trace sand						2-	-78.97		-		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	very soft to soft and grey by 2.0m		x ss	3	75	P	3-	-77.97				
G 5 6-74.97							4-	-76.97				
nd of Borehole			ss	4	100	Р	5-	-75.97	0			
	6.55		χG	5			6-	-74.97	e e			
GWL @ 0.25m - May 27, 2022)												

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### Geodetic DATUM

REMARKS
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BORINGS BY Track-Mount Power Auge	er			D	ATE	March 28	, 2022			HOLE	NO. 3 <b>A-22</b>		
SOIL DESCRIPTION	PLOT		SAN	IPLE		DEPTH (m)	ELEV. (m)		n. Re	sist. I	Blows/0 Dia. Con		g Well ion
	STRATA	ТҮРЕ	NUMBER	∾ RECOVERY	N VALUE or RQD	(,	(,	0	) Wa	ater C	ontent 9	%	Monitoring Well Construction
GROUND SURFACE	_		N	R	z <sup>0</sup>	0-	-80.97	2	20	40	60	80	
TOPSOIL 0.20 Brown SILTY SAND with clay 0.76	+	-				0	00.37						<u>       </u> ¥
		ss	1	42	Р	1-	-79.97			0			
		Ê											
Very stiff to stiff, brown <b>SILTY</b> CLAY, trace sand		X ss	2	83	Р	2-	-78.97			C	)		
<ul> <li>very soft to soft and grey by 2.0m depth</li> </ul>		TW	3	92		3-	-77.97						
4.42						4-	-76.97						
End of Borehole		-											
(GWL @ 0.18m - May 27, 2022)													
										46			
								5	20 Shear ndistur		60 Igth (kP △ Remo		U

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

HOLE NO.

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

### DATUM Geodetic

						ATE I		, 2022 BH13B-22					
SOIL DESCRIPTION				SAN			DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m     ● 50 mm Dia. Cone	tion			
		TRAIS	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD			• Water Content %	Construction			
GROUND SURFACE					щ	-	0-	-80.97	20 40 60 80 ≥				
OVERBURDEN								-79.97					
	2.29						2-	-78.97					
	<u>z.z</u> 9							-77.97					
Very soft, grey SILTY CLAY	4.88		тw	1	100		4-	-76.97					
End of Borehole	<u>4.00 / /</u>	44											
End of Borehole									20 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded				

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### SOIL PROFILE AND TEST DATA

 $\blacktriangle$  Undisturbed  $\triangle$  Remoulded

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic									FILE NO		
REMARKS BORINGS BY Track-Mount Power Auge	٩r			г	ATE	March 29	2022		HOLE N BH14	0.	
	PLOT		SAN	/IPLE		DEPTH	ELEV.		Resist. B	lows/0.3m	/ell
SOIL DESCRIPTION			R	IRY	Вą	(m)	(m)	• 5	50 mm Di	a. Cone	ring V
	STRATA	ТҮРЕ	NUMBER	* RECOVERY	N VALUE or RQD				Nater Co		Monitoring Well Construction
GROUND SURFACE						0-	81.61	20		60 80	≥0  ⊻
TOPSOIL0.25		ss	1	17	2			0			
Very stiff to stiff, brown <b>SILTY</b>		ss	2	33	3	1-	-80.61	<u></u>	<u> </u>		109
CLÁY, some sand		ss	3	67	Р	2-	-79.61				
- soft to very soft and grey by 1.6m depth		τw	4	88			70.04			0	
dop::/						3-	-78.61				
		тw	5	100		4-	-77.61			· · · · · · · · · · · · · · · · · · ·	
		ss	6	67	Р	5-	-76.61			0	
6.55		G	7			6-	-75.61				
End of Borehole		<u> </u>									
(GWL @ 0.29m - May 27, 2022)											
								20	40 ar Streng	60 80	100
								She	ar Strenç	gth (kPa)	

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

HOLE NO.

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

BORINGS BY Track-Mount Power Aug	er			D	ATE	March 29	, 2022	BH15-22
SOIL DESCRIPTION	PLOT	SAMPLE			DEPTH			Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone
	STRATA	ТҮРЕ	NUMBER	°% RECOVERY	N VALUE or RQD	(m)	(m)	Pen. Resist. Blows/0.3m         ● 50 mm Dia. Cone         ○ Water Content %         20       40       60       80
GROUND SURFACE		_		8	2 *	0-	-81.28	
TOPSOIL0.20	Ŋ   +   + ′	ss	1	25	6		01.20	0
1.0		ss	2	50	4	1-	-80.28	0
Firm, brown SILTY CLAY		ss	3	75	Р	2-	-79.28	
- grey by 1.4m depth						3-	-78.28	
		ss	4	8	Р	4-	-77.28	
						5-	-76.28	
						6-	-75.28	
		ss	5	100	Р	7-	-74.28	
		тw	6	100		8-	-73.28	
<u>9.1</u> Dynamic Cone Penetration Test commenced at 9.14m depth. Cone pushed up to 26.77m depth, borehole terminated.	4	X G	7			9-	-72.28	
(GWL @ 1.51m - May 27, 2022)								
								20         40         60         80         100           Shear Strength (kPa)           ▲ Undisturbed         △ Remoulded

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

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Geotechnical Investigation
 Proposed Mixed-Use Community Development
 Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geodetic

### REMARKS

DATUM

BORINGS BY Track-Mount Power Auge	r			C	DATE	March 30	, 2022		BH16-		
SOIL DESCRIPTION	н <b>S</b> /			IPLE	1	DEPTH ELEV.		Pen. Resist. Blows/0.3m • 50 mm Dia. Cone			Well
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	• <b>v</b>	/ater Con	tent %	Monitoring Well Construction
GROUND SURFACE	01		4	R	z	0-	-81.30	20	40 6	0 80	≥ŏ
	XXX	ss	1	50	2		01.00		0		
Brown SILTY SAND 0.25	XX			50	P	1-	-80.30				
Very stiff to stiff, brown SILTY CLAY	X	ss	2	58	P	'	00.00				
	X	ss	3	50	P	2-	-79.30	#		0	
- firm and grey by1.7m depth	X					2	79.50				
	X					3-	-78.30				
	X	тw	4	92		5	70.50				
	X	$\nabla$	_			1-	-77.30		• • • • • • • • • • • • • • • • • • • •	· · · · · · · · · · · · · · · · · · ·	
	XX	∦ ss	5	67	P		//.50			O	
	X	тw	6	96		5-	-76.30				
	XX					5	70.50				
	X	ΧG	7			6-	-75.30	1		0	
<u>6.55</u>	X	<u> </u>					75.50		· · · · · · · · · · · · · · · · · ·		1
End of Borehole		-									1
(GWL @ 0.64m - May 27, 2022)											
											1
								20	40 6	0 80 1	00
								Shea ▲ Undist	ur Strengt	i <b>h (kPa)</b> Remoulded	

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

REMARKS	
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PG5827
HOLE NO.
DU17 00

BORINGS BY Track-Mount Power Au	ger			D	ATE .	June 9, 202	22	BH17-22
SOIL DESCRIPTION			SAN	<b>IPLE</b>		DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m     ■       ● 50 mm Dia. Cone     >
GROUND SURFACE	TYPE TYPE STRATA TYPE STRATA		(11)	O Water Content %				
TOPSOIL 0.2	28					0-8	82.33	20 40 60 80 2
_oose to compact, brown <b>SILTY</b> SAND with clay, trace gravel 1.4			1 2			1-8	81.33	0
grey by 0.7m depth	-					2-8	80.33	
		ss	3	100	Р	3-7	79.33	<b>A</b>
							78.33	
							77.33	
		ss	4	100	Р		76.33 75.33	<b>O</b>
							74.33	
irm to stiff, grey SILTY CLAY						9-7	73.33	
		X ss	5	0	P	10-7	72.33	<b>▲ ●</b> O
						11-7	71.33	
		ss	6	100	Р	12-7	70.33	<b>A</b> O
						13-6	69.33	
							68.33	
		ss	7	83	Р		67.33	
							66.33 65.33	
							00.00	20 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded

### SOIL PROFILE AND TEST DATA

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

DATUM Geodetic

#### REMARKS

PG5827
HOLE NO.
DU17 00

BORINGS BY Track-Mount Power A	uger			D	ATE 、	June 9, 20	022	BH17-22		
SOIL DESCRIPTION			SAMPLE			DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m     □       ● 50 mm Dia. Cone     ≥		
GROUND SURFACE	STRATA	ЭДХТ	NUMBER	% RECOVERY	N VALUE of RQD			Pen. Resist. Blows/0.3m       ■         ● 50 mm Dia. Cone       >         ○ Water Content %       >         20       40       60       80		
Firm to stiff, grey SILTY CLAY		∑ss ∑ss	8	100	P	18- 19- 20- 21- 22- 23- 24- 25- 26- 27- 28- 29- 30- 31- 32- 33-	-65.33 -64.33 -63.33 -62.33 -61.33 -60.33 -59.33 -59.33 -57.33 -57.33 -55.33 -55.33 -54.33 -54.33 -51.33 -52.33 -51.33 -51.33 -50.33 -49.33			

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

DATUM Geodetic

REMARKS BORINGS BY Track-Mount Power Aug	er			D	ATE 、	June 9, 2	022	HOLE NO. BH17-22			
SOIL DESCRIPTION			SAMPLE			DEPTH	ELEV.	Pen. Resist. Blows/0.3m       Image: Constant of the second			
		луры	NUMBER	% RECOVERY	VALUE r RQD	(m)	(m)	O Water Content %			
GROUND SURFACE	STRATA	•	IN	RE	N OL	24	40.00	20 40 60 80			
						34-	-48.33				
						35-	47.33				
						36-	46.33				
						37-	45.33	139			
						20.	-44.33				
						39-	-43.33	159			
iff to very stiff, grey SILTY CLAY						40-	42.33	▲▲ 			
						41-	41.33				
						42-	40.33				
		∛ss	11	67	P	43-	-39.33	1149			
		<u> </u>									
						44-	-38.33				
						45-	-37.33				
46.23	3	-				46-	-36.33				
						47-	-35.33				
LACIAL TILL: Very dense, grey						48-	-34.33				
LACIAL TILL: Very dense, grey ty clay with sand, gravel, cobbles ad boulders		ss	12	75	50+			<b>O</b>			
						49-	-33.33				
						50-	-32.33				
51.03	3					51-	-31.33	20 40 60 80 100			
								Shear Strength (kPa) ▲ Undisturbed △ Remoulded			

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

#### REMARKS

PG5827
HOLE NO.
DU17 00

BORINGS BY Track-Mount Power Auge	er			D	ATE .	June 9, 2	022		BH17-	-22			
SOIL DESCRIPTION	PLOT		SAN	IPLE		DEPTH	ELEV. (m)		Resist. Bl 50 mm Dia	ows/0.3m a. Cone	Monitoring Well Construction		
GROUND SURFACE	STRATA	ТҮРЕ	NUMBER	° ≈	N VALUE or RQD	(m)		Water Content %					
BEDROCK: Very poor quality, black shale 51.97		RC	1	100	0		-31.33	20	40 6	50 80			
		RC	2	100	92		-30.33 -29.33				շերներներներներ Չորսերերներներ		
<b>BEDROCK:</b> Very good quality, black shale interbedded with grey limestone		RC	3	100	93		-28.33						
		RC	4	100	100		-27.33 -26.33						
57.99		RC	5	100	95	57-	-25.33						
End of Borehole								20 She ▲ Undis	ar Streng	50 80 10 th (kPa)	- 00		

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

#### REMARKS

PG5827 HOLE NO.

BORINGS BY Track-Mount Power Auge	er	DATE /				April 12, 2	2022	BH18-22			
SOIL DESCRIPTION	PLOT		SAN			DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m     =       ● 50 mm Dia. Cone     ≥ □			
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or ROD	(11)	(11)	Pen. Resist. Blows/0.3m       ■         ● 50 mm Dia. Cone       > 50 mm Dia. Cone         ○ Water Content %       > 50 mm OD         20       40       60       80			
GROUND SURFACE	•	_	I	R	z <sup>0</sup>	0-	-78.15	20 40 60 80 ≥Ŏ			
TOPSOIL       0.30         Very loose, brown SILTY SAND       0.69		ss	1	42	3			O IIII			
Stiff to firm, brown SILTY CLAY		ss	2	67	Р	1-	-77.15				
- soft to firm and grey by 1.4m depth		X ss	3	50	Р	2-	-76.15				
		∦ss ∦g	4 5	100	Ρ	3-	-75.15				
			5 6			1-	-74.15				
		∦ G ∦ss	ъ 7	100	Р						
		∆ 33 X G	, 8	100	1	5-	-73.15				
6. <u>55</u>		G	9			6-	-72.15				
Dynamic Cone Penetration Test commenced at 6.55m depth. Cone pushed up to 13.84m depth, borehole terminated. (GWL @ 0.44m - June 15, 2022)		-						20 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded			

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### Geodetic DATUM

REMARKS
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BORINGS BY Track-Mount Power Auge	er			D	ATE /	April 12, 2	2022			HOLE NO			
SOIL DESCRIPTION	PLOT		SAN	SAMPLE DEPTH ELEV.				Pen. Resist. Blows/0.3m • 50 mm Dia. Cone					Well
	STRATA I	ТҮРЕ	NUMBER	°% ©™®®®®®®®®®®®®®®®®®®®®®®®®®®®®®®®®®®®®	VALUE r ROD	(m)	(m)		• Water Content %				Monitoring Well Construction
GROUND SURFACE	LS.	H	NN	REC	N OF			2	0 4	10 E	60 E	30	Cor
		x ss	1		3	0-	-78.15		0				EE
Very loose, brown SILTY SAND 0.69			•										
Stiff to firm, brown SILTY CLAY		∦ ss	2	25	Р	1-	-77.15			5			
- soft to firm and grey by 1.4m depth		ss	3		Р	2-	-76.15	· · · · · · · · · ·	(  (	<b>)</b>			
						3-	-75.15						
<u>3.66</u>		TW	4	62			/ 0110	· · · · · · · · · · · · · · · · · · ·			· · · · · · · · · · · · · · ·		•
End of Borehole													
(GWL @ 0.52m - June 15, 2022)													
								2	0 4	<b>10</b> θ	60 E	30 10	00
								S		Streng		a)	

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

Geodetic DATUM

#### REMARKS

PG5827
HOLE NO.

BORINGS BY Track-Mount Power Auge	er			D	ATE	April 11, 2	2022			BH19-22			
SOIL DESCRIPTION	PLOT		SAN	SAMPLE		DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m     =       ● 50 mm Dia. Cone     >					) Well
	STRATA	ТҮРЕ	NUMBER	∾ RECOVERY	N VALUE or RQD	(11)	(11)	(	) Wa	ter Co	ntent %	/o	Monitoring Well
GROUND SURFACE	01		Д	RE	z	0-	-78.47	2	0	40	60 E	30	Ξċ
TOPSOIL0.15Very loose, brown SILTY SAND0.69			1	33	2				þ				
Stiff, brown <b>SILTY CLAY</b> with sand seams		( SS ∎⊤N/	2	25	Р	1-	-77.47	<b>A</b>		c			
		тw 7 оо	3	100		2-	-76.47						
		⟨ ss ⟨ g	4 5	100	Р	3-	-75.47					0	
Soft, grey SILTY CLAY		G	6			4-	-74.47						
		тw	7	100		5-	-73.47						
		G	8			6-	-72.47	Å					
6.55 End of Borehole		G	9									0 	
(GWL @ 0.50m - June 15, 2022)													
								5	<b>Shear</b> ndisturk	Streng	<b>60 8</b>   <b>th (kPa</b> ∆ Remou	a)	 00

### SOIL PROFILE AND TEST DATA

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

### DATUM Geodetic

REMARKS
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PG5827
HOLE NO.
BH20-22

BORINGS BY Track-Mount Power Auge	er			D	ATE	April 12, 2	2022	1	BH20-22				
SOIL DESCRIPTION	PLOT		SAN			DEPTH (m)	ELEV. (m)	Pen ●			ows/0.3 . Cone		g Well ion
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(,	(,	0			tent %		Monitoring Well Construction
GROUND SURFACE				<u> </u>	<b>–</b>	0-	78.65	20	) 4	0 6	0 80	)	20
Loose, brown SILTY SAND 0.69	┥┼┝ ┲┲┲	X SS	1	58	4			0				1	
Very stiff to stiff, brown SILTY CLAY		X ss	2	58	P	1=	-77.65	/	0				
- firm to soft and grey by 1.4m depth		X SS	3	100	P	2-	-76.65	4	/	.0		······································	Դիրերիներին երերերին հետոներին Դերերիներին երերերին երերիներին
		∦ ss	4	100	P	3-	-75.65				0		
		TW	5	100			74.05	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·				
		X G V C	6 7			4-	-74.65	4	1				
		X G V C				5-	-73.65	4					
		X G X G	8 9			6-	-72.65				· · · · · · · · · · · · · · · · · · ·	O	
End of Borehole 6.55		-											
(GWL @ 0.59m - May 25, 2022)													
								20					0
									near S		<b>h (kPa</b> Remoul		

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

#### REMARKS

PG5827
HOLE NO.
DU01 00

BORINGS BY Track-Mount Power Auger			C	DATE	April 11, 2	2022	BH21-22					
SOIL DESCRIPTION	PLOT	SAN	<b>IPLE</b>	1	DEPTH	ELEV.	Pen. Resist. Blows/0.3m       ■         ● 50 mm Dia. Cone       >         ○ Water Content %       >         20       40       60       80					
	STRATA F	NUMBER	°8 ©	N VALUE or RQD	(m)	(m)	• Water Content %					
GROUND SURFACE TOPSOIL 0.25	Vaa				0-	-79.17	<u></u>					
/ery loose, brown SILTY SAND 0.69	<u></u> ↓ ↓ ∧ ss	1	42	3			0					
	ss	2	0	P	1-	-78.17						
ery stiff to stiff, brown SILTY CLAY	ss	3	0	P								
					2-	-77.17						
firm to soft and grey by 2.2m depth	TW	4	100		3-	-76.17						
	G	5			0	/0.17	A A					
	Тт	6	100		4-	-75.17						
			100									
	X G	7			5-	-74.17						
	G	8 9					4					
6.55	G	9			6-	-73.17						
nd of Borehole												
GWL @ 0.72m - May 27, 2022)												
							20 40 60 80 100 Shear Strength (kPa)					
							▲ Undisturbed △ Remoulded					

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827 HOLE NO.

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### Geodetic DATUM

BORINGS BY	Track-Mount Power Auger	

BORINGS BY Track-Mount Power Auge	er			D	ATE	April 12, 2	2022		E	BH21/	<b>A-22</b>		
SOIL DESCRIPTION	PLOT		SAN	IPLE	1	DEPTH	ELEV.	Per		st. Bl			Well on
	STRATA	ТҮРЕ	NUMBER	°⊗ RECOVERY	N VALUE or RQD	(m)	(m)	C		er Cor			Monitoring Well Construction
GROUND SURFACE	ς.	51	N	REC	z <sup>0</sup>			2	0 4	i0 6	30 03	30	S S S S
TOPSOIL 0.25		_				0-	-79.17						
Vary loope brown CILTY CAND 0.60													
Very stiff to stiff, brown SILTY CLAY	XX	∦ ss	1	75	5	1-	-78.17		0				
End of Borehole													
								2	0 4	· · · · · · · · · · · · · · · · · · ·	i i i i i i i i i i i i i i i i i i i	+ · · · · · · · · · · · · · · · · · · ·	 00
								S	hear S	Streng	th (kPa	a)	
								▲ Ui	ndisturb	ed ∆	Remou	Ided	

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### **Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic									FILE	NO. 5 <b>827</b>		
REMARKS									HOLE	NO.		
BORINGS BY Track-Mount Power Auge					DATE	April 8, 20	022		1	22-22		
SOIL DESCRIPTION	PLOT		SAN		1	DEPTH (m)	ELEV. (m)			Blows/0. Dia. Con		Monitoring Well Construction
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	VALUE r RQD				Vator (	Content %		toring
GROUND SURFACE	STE	7.L	NUN	RECO	N OF			20	40		o 30	Moni Cons
TOPSOIL 0.15	-   '	X ss	1	12	4	0-	-78.70					<b></b>
Loose, brown SILTY SAND 0.69		ss	2	83	Р	1-	77.70				17	ությունը ու
		x X ss	3	100	Р					0		
Very stiff to stiff, brown <b>SILTY</b> <b>CLAY,</b> some sand seams		X ss	4	0	P	2-	-76.70					
		7 G	5	0		3-	75.70					
- soft to firm and grey by 2.2m depth		XG	6			1-	-74.70					
							74.70					
		X ss	7	100	P	5-	-73.70				0	
		X G	8			6-	72.70					
		X G	9									
		G	10			7-	-71.70					
- stiff to very stiff by 7.6m depth		ss	11	100	Р	8-	70.70					
		ss	12	100	Р		00.70			o	Translation (	
9.60		G	13			9-	-69.70			0	12	
End of Borehole												
(GWL @ 0.16m - May 27, 2022)												
								20	40	60 8	30 10	00
								Shea ▲ Undis	ar Stre	ngth (kPa △ Remo	a)	

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### **Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM	Geodetic

REMARKS
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PG5827	7
HOLE NO.	

BORINGS BY Track-Mount Power Auge	er			D	ATE	April 11, 2	2022				e no. 22A			
SOIL DESCRIPTION	PLOT		SAN			DEPTH (m)	ELEV. (m)					ws/0. Cone		g Well ion
	STRATA	ТҮРЕ	NUMBER	° ≈ © ©	N VALUE or RQD		(,	0	Wa	iter (	Con	tent %	, 0	Monitoring Well Construction
GROUND SURFACE	N N		Z	RE	z °	0	70 70	20	)	40	60	) 8	30	∣≚ö
<b>TOPSOIL</b> 0.15	$+$ $+$ $+$ $\times$	SS	1	50	3	- 0-	-78.70							
Loose, brown SILTY SAND0.69			0	07		1-	77.70							
Very stiff to stiff, brown SILTY		SS	2	67	3	1	11.10			· · · · · · · · ·				
CLÁY, some sand seams		SS	3	100	Р	2-	76.70		· · · · · · · · · · · · · · · · · · ·		·····			
- soft to firm and grey by 2.2m depth		т.,,	4	100		2	/0./0							
End of Borehole	P/L	тw	4	100						<u> </u>	<u></u>	<u></u>		-
(GWL @ 0.66m - May 27, 2022)														
										1	<u> </u>	<u> </u>		4
								20	) hoor	40 Stro	60 Itonati	) a h (kPa	30 1( a)	00
								Jana Jana Jana Jana Jana Jana Jana Jana	distur	bed		Remou	<b>▲/</b> ulded	

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

REMARKS
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PG5827
HOLE NO.
BH23-22

BORINGS BY Track-Mount Power Au	ger	1		D	ATE 、	June 6, 2022	BH23-22
SOIL DESCRIPTION	РГОТ		SAN	<b>IPLE</b>	1	DEPTH ELEV (m) (m)	Pen. Resist. Blows/0.3m     □       ● 50 mm Dia. Cone     ≥ 5
GROUND SURFACE	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE of RQD		Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content % 20 40 60 80
TOPSOIL0.2	20	⊠AU	1			0+79.74	<u>o</u>
Loose to compact, brown <b>SILTY</b> 0.6 <b>SAND,</b> some clay	59 	ss	2	92	Р	1+78.74	
Very stiff to firm, brown SILTY CLAY2.0	0			52		2+77.74	
						3+76.74	
		∦ ss	3	42	P	4-75.74	
						5-74.74	
		x ss	4	100	Р	6-73.74	
Firm, grey SILTY CLAY		N 22	4	100		7-72.74	
						8-71.74	
		x ss	5	100	Р	9-70.74	
- stiff to very stiff by 10.2m depth		Δ				10-69.74	
						11-68.74	
		ss	6	100	P	12-67.74	0
						13-66.74	
						14-65.74	
		ss	7	100	Р	15-64.74	40
						16+63.74	
						17+62.74	20 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geodetic DATUM

REMARKS BORINGS BY Track-Mount Power Aug	aer			D	ATE 、	June 6, 2	022	HOLE NO. BH23-22
SOIL DESCRIPTION	PLOT		SAN	IPLE		DEPTH	ELEV.	
SUIL DESCRIPTION	STRATA P	ТҮРЕ	NUMBER	% RECOVERY	VALUE Pr ROD	(m)	(m)	Pen. Resist. Blows/0.3m       Image: Constant of the second
GROUND SURFACE	LS I	н	NN	REC	N OL	17	60.74	20 40 60 80 🖻
							-62.74 -61.74	
		X G	8			19-	-60.74	φ
						20-	-59.74	
						21-	-58.74	
		X ss	9	100	Р	22-	-57.74	
						23-	-56.74	
		XG	10			24-	-55.74	À OA
Stiff to very stiff, grey SILTY CLAY						25-	-54.74	
						26-	-53.74	
		x ss	11	100	Р	27-	-52.74	4
				100	1	28-	-51.74	
						29-	-50.74	
		X G	12				-49.74	
							-48.74	
							-47.74	
							-46.74	
						34-	-45.74	20 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded

### SOIL PROFILE AND TEST DATA

FILE NO. PG5827

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

DATUM	Geodetic

REMARKS BORINGS BY Track-Mount Power Aug	ler			D	ATE .	June 6, 2	022	HOLE NO. BH23-22			
SOIL DESCRIPTION 법			SAN	<b>IPLE</b>	I	DEPTH	ELEV.	Pen. Resist. Blows/0.3m       Image: Construction of the second sec			
	STRATA I	ЭЛУТ	NUMBER	% RECOVERY	VALUE r RQD	(m)	(m)	• Water Content %			
GROUND SURFACE	S.	••	Ĩ	REC	N O L	24	45.74	20 40 60 80 S			
						34-	-45.74				
						35-	-44.74				
						36-	-43.74				
						37-	-42.74	104			
						38-	-41.74				
						39-	-40.74				
						40-	-39.74				
iff to very stiff, grey SILTY CLAY						41-	-38.74				
						42-	-37.74				
						13-	-36.74	12			
						44-	-35.74				
						45-	-34.74				
						46-	-33.74				
						47-	-32.74				
47.6	3	-									
						48-	-31.74				
LACIAL TILL: compact to dense,		- RC	1	39		49-	-30.74	    			
ey silty sand with clay, gravel, bbles and boulders		- RC	2	39		50-	-29.74				
		_	2	39		51-	-28.74				
								20 40 60 80 100 <b>Shear Strength (kPa)</b> ▲ Undisturbed △ Remoulded			

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

o Adriga Brito, Ottana, Ortano NEE 710					Te	win Com	munity -	Ottawa, C	Ontario		
DATUM Geodetic									FILE NO. PG582	7	
REMARKS									HOLE NO		
BORINGS BY Track-Mount Power Auge	er			D	ATE .	June 6, 2	022		BH23-2	22	
SOIL DESCRIPTION	РГОТ		SAN	<b>IPLE</b>	1	DEPTH (m)	ELEV. (m)		esist. Blo 0 mm Dia		l Well
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	VALUE r RQD		(11)	• V	Vater Con	tent %	Monitoring Well Construction
GROUND SURFACE	LS LS	H	NN	REC	N OL (		00.74	20	40 6	0 80	Cor Cor
GLACIAL TILL: compact to dense, grey silty sand with clay, gravel, cobbles and boulders52.33		RC	3	21			-28.74 -27.74				
REDROCK: Poor to good quality		RC	4	100	34	53-	-26.74				
BEDROCK: Poor to good quality, grey limestone with black shale 55.27		RC	5	100	73		-25.74 -24.74				
End of Borehole								20			
								20 Shea ▲ Undist	40 60 ar Strengt	0 80 10 : <b>h (kPa)</b> Remoulded	⊣ 00

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

HOLE NO.

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

DATUM Geodetic

RINGS BY Track-Mount Power Aug	jer			D	DATE 、	June 1, 20	)22	BH24-22
SOIL DESCRIPTION	PLOT		SAN			DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m• 50 mm Dia. Cone
ROUND SURFACE	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD			Pen. Resist. Blows/0.3m       • 50 mm Dia. Cone       ○ Water Content %       20     40
OPSOIL 0.2	0	- 🗟 AU	1			0-	-78.29	0
ose to compact, brown <b>SILTY</b> 0.6 N <b>D</b>	9	ss	2	58	Р	1-	-77.29	124
ry stiff to stiff, brown <b>SILTY CLAY</b>	3		-				-76.29	
		G	3					4 9
		ss	4	75	Р		-75.29	
						4-	-74.29	
						5-	-73.29	
		ss	5	92	P	6-	-72.29	
						7-	-71.29	
						8-	-70.29	
m to stiff, grey SILTY CLAY		G	6			9-	-69.29	
						10-	-68.29	
						11-	-67.29	
		X ss	7	100	P	12-	-66.29	<b>A O</b>
			1	100		13-	-65.29	
						14-	-64.29	
		ss	8	100	P	15-	-63.29	
		100	o			16-	-62.29	
	Į¥,					17-	-61.29	20 40 60 80 100 Shear Strength (kPa)

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geodetic DATUM

#### REMARKS

REMARKS BORINGS BY Track-Mount Power A	uger			D	ATE .	June 1, 2	022	HOLE NO. BH24-22
SOIL DESCRIPTION	РГОТ		SAMPL				ELEV.	Pen. Resist. Blows/0.3m■● 50 mm Dia. Cone≥
GROUND SURFACE	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	Pen. Resist. Blows/0.3m       Image: Constant of the second
GROUND SURFACE				щ		17-	-61.29	
		_				18-	-60.29	
		∦ss	9	100	Р	19-	-59.29	
						20-	-58.29	
						21-	-57.29	
		∦ss	10	100	Р	22-	-56.29	
						23-	-55.29	
						24-	-54.29	
rm to stiff, grey SILTY CLAY						25-	-53.29	
						26-	-52.29	
		_				27-	-51.29	
		∦ss	11	100	Р	28-	-50.29	
						29-	-49.29	
						30-	-48.29	
						31-	-47.29	<u>∖</u>
						32-	-46.29	
32 LACIAL TILL: Dense, grey silty 33 and with clay, gravel, cobbles and	2.92	-	_	100	10	33-	-45.29	
oulders		RC	1	100	18	34-	-44.29	20 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded

### SOIL PROFILE AND TEST DATA

Undisturbed

△ Remoulded

FILE NO.

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geodetic

#### REM

DATUM

DEMARKS									F	PG582	27	
REMARKS	<b>.</b> .				A T F	luna 1 O	000			IOLE NO 3 <b>H24</b> -		
BORINGS BY Track-Mount Power Aug			0.41		AIE	June 1, 2	022	D				
SOIL DESCRIPTION	PLOT				м	DEPTH (m)	ELEV. (m)				ows/0.3m a. Cone	g Well tion
	STRATA	ТҮРЕ	NUMBER	∾ RECOVERY	N VALUE of RQD			С	Wat	er Cor	ntent %	Monitoring Well Construction
GROUND SURFACE	S		N	RE	zö	31-	-44.29	2	0 4	io e	60 80	≚ö
<b>BEDROCK:</b> Poor to fair quality, grey limestone		RC	2	100	60		-43.29					
35.79		-				36-	-42.29		· · · · · · · · · · · · · · · · · · ·			
<b>BEDROCK:</b> Good to excellent		RC	3	100	90		-41.29					
quality, grey limestone interbedded with black shale		- RC	4	100	98							
38.76			4	100	90	38-	-40.29		· · · · · · · · · · · · · · · · · · ·			
								20	0 4 ihear (	10 G	0 80 1 th (kPa)	000

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

HOLE NO.

S Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

### DATUM Geodetic

Compact, brown SILTY SAND         1.60         X SS         2         50         19         1         1         8.36           Soft, grey SILTY CLAY         SS         5         100         P         3         76.36         4         75.36         4         75.36         4         75.36         4         75.36         5         74.36         5         5         74.36         4         75.36         5         74.36         5         5         73.36         6         73.36         6         73.36         6         73.36         6         73.36         6         73.36         6         73.36         6         73.36         6         73.36         6         73.36         6         73.36         6         73.36         6         73.36         6         73.36         6         73.36         6         73.36         6         73.36         6         73.36         6         73.36         100         9         100 <th>BORINGS BY CME-55 Low Clearance</th> <th>Drill</th> <th>1</th> <th></th> <th>D</th> <th>DATE</th> <th>Decembe</th> <th>er 7, 2022</th> <th>2</th> <th>BH25-2</th> <th></th> <th>1</th>	BORINGS BY CME-55 Low Clearance	Drill	1		D	DATE	Decembe	er 7, 2022	2	BH25-2		1
ITOPSOIL       0.10       8 AU       1         FILL: Brown silty clay, some sand       0.26       8 AU       1         Compact, brown SILTY SAND       1.60       8 SS       2 50       19         TW       4       100       3       2-77.36         Soft, grey SILTY CLAY       SS       5       100       P         Soft, grey SILTY CLAY       SS       6       100       P         End of Borehole       6.71       SS       8       100       P         GWL @ 0.95m - Dec. 13, 2022)       SS       8       100       P	SOIL DESCRIPTION	PLOT		SAN	<b>IPLE</b>							Nell on
ITOPSOIL       0.10       8 AU       1         FILL: Brown silty clay, some sand       0.26       8 AU       1         Compact, brown SILTY SAND       1.60       8 SS       2 50       19         TW       4       100       3       2-77.36         Soft, grey SILTY CLAY       SS       5       100       P         Soft, grey SILTY CLAY       SS       6       100       P         End of Borehole       6.71       SS       8       100       P         GWL @ 0.95m - Dec. 13, 2022)       SS       8       100       P			ТҮРЕ	UMBER	% COVERY	VALUE r RQD	(m)	(m)	• W	ater Con	tent %	onitoring
Intersect       0.10       8 AU       1         FILL: Brown silty clay, some sand       0.86       SS       2       50       19       1-78.36         Compact, brown SILTY SAND       1.60       SS       3       100       3       2-77.36         Soft, grey SILTY CLAY       SS       5       100       P       3-76.36         Soft, grey SILTY CLAY       SS       6       100       P       5-74.36         TW       7       100       6-73.36       6-73.36         End of Borehole       (GWL @ 0.95m - Dec. 13, 2022)       SS       8       100       P         20       40       60       80       100       Shear Strength (kPa)       100		_		Z	RE	z °	0-	-79.36	20	40 60	) 80	žΰ
Compact_brown SILTY SAND 1.60 Soft, grey SILTY CLAY Soft, grey SILTY CLAY 6.71 Soft, grey SILTY CLAY 6.71 Soft do Borehole (GWL @ 0.95m - Dec. 13, 2022) Soft do Borehole (GWL		- +~ ~ ~	⊠ AU	1								
Soft, grey SILTY CLAY			ss	2	50	19	1-	-78.36				<b>    ⊻</b>
Sott, grey SILTY CLAY	<u> </u>		ss	3	100	3	2-	-77.36				
Soft, grey SILTY CLAY Soft, grey SILTY CLAY SS 6 100 P 5-74.36 TW 7 100 6-73.36 CGWL @ 0.95m · Dec. 13, 2022) SS 8 100 P CGWL @ 0.95m · Dec. 13, 2022) SS 8 100 P CGWL @ 0.95m · Dec. 13, 2022) SS 8 100 P CGWL @ 0.95m · Dec. 13, 2022) SS 8 100 P CGWL @ 0.95m · Dec. 13, 2022) SS 9 100 P CGWL @ 0.95m · Dec. 13, 2022) SS 9 100 P CGWL @ 0.95m · Dec. 13, 2022) SS 9 100 P CGWL @ 0.95m · Dec. 13, 2022) SS 9 100 P SS 9 10			ΤW	4	100							
SS 6 100 P 5-74.36 TW 7 100 6-73.36 (GWL @ 0.95m - Dec. 13, 2022) SS 8 100 P (GWL @ 0.95m - Dec. 13, 2022)			ss	5	100	Р	3-	-76.36	· · · · · · · · · · · · · · · · · · ·			
TW 7 100 End of Borehole (GWL @ 0.95m - Dec. 13, 2022)	Soft, grey SILTY CLAY		1				4-	75.36				
TW 7 100 End of Borehole (GWL @ 0.95m - Dec. 13, 2022)			       99	6	100	P	_					
<u>6.71</u> SS 8 100 P End of Borehole (GWL @ 0.95m - Dec. 13, 2022) SS 8 100 P <u>5.71</u> SS 8 100 P						'	5-	-74.36	Ţ			
End of Borehole (GWL @ 0.95m - Dec. 13, 2022)							6-	73.36		· · · · · · · · · · · · · · · · · · ·		
(GWL @ 0.95m - Dec. 13, 2022)	6.7	1	x ss	8	100	P						
20 40 60 80 100 Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
												00
											Remoulded	

### SOIL PROFILE AND TEST DATA

▲ Undisturbed

△ Remoulded

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

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DATUM Geodetic									FILE N		
REMARKS BORINGS BY CME-55 Low Clearance [	ווייכ				A T F	Decembe		h	HOLE		
BORINGS BY CME-55 Low Clearance [			641	/IPLE	AIE	Decembe	1 7, 2022			Blows/0.3	
SOIL DESCRIPTION	<b>PLOT</b>				비수	DEPTH (m)	ELEV. (m)			Dia. Cone	
	STRATA	ПУРЕ	NUMBER	% RECOVERY	N VALUE of ROD			0	Nater C	ontent %	Monitoring Well
GROUND SURFACE			N	RE	z <sup>0</sup>	0_	-79.36	20	40	60 80	) ŽČ
TOPSOIL       0.10         FILL: Brown silty clay, some sand       0.86							79.00				
0.00		-				1-	-78.36				
~		-				2-	77.36				· · · · · · · · · · · · · · · · · · ·
Soft, grey SILTY CLAY						3-	-76.36				
4.42		TW	1	100		4-	-75.36				
								20 She	40 ar Strer	60 80 ngth (kPa)	) 100 )

#### SOIL PROFILE AND TEST DATA

Geotechnical Investigation
 Proposed Mixed-Use Community Development
 Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

### DATUM Geodetic

REMARKS
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PG5827
HOLE NO.
RH26-22

FILE NO.

#### BORINGS BY Track-Mount Power Auger DATE April 6, 2022 SAMPLE Pen. Resist. Blows/0.3m Monitoring Well Construction STRATA PLOT DEPTH ELEV. SOIL DESCRIPTION 50 mm Dia. Cone • (m) (m) N VALUE or RQD RECOVERY NUMBER TYPE o/0 Water Content % Ο **GROUND SURFACE** 80 20 40 60 0+79.77TOPSOIL 00 0.15 SS 1 62 Ò Loose, brown SILTY SAND, trace 0.30 liclay <u>0.91</u> 1+78.77 SS 2 54 28 Very stiff, brown SILTY CLAY Compact, grey SILTY SAND T.83 SS Ρ 3 75 2 + 77.77SS 4 Ρ 100 . . 3+76.77 Firm, grey SILTY CLAY, trace sand 4+75.77 SS 5 Ρ 100 O 5+74.776.10 6+73.77 Z G 6 End of Borehole (GWL @ 0.50m - May 26, 2022) 20 40 60 80 100 Shear Strength (kPa) Undisturbed △ Remoulded

# patersongroup Consulting Engineers

### SOIL PROFILE AND TEST DATA

Geotechnical Investigation
 Proposed Mixed-Use Community Development
 Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geodetic

#### REMARKS

DATUM

PG5827
HOLE NO.

BORINGS BY Track-Mount Power Auger				DATE	April 6, 20	022	BH26A-22	
SOIL DESCRIPTION	РГОТ	S	AMPLE	1	DEPTH	ELEV.	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone	Nell OD
	STRATA		RECOVERY	N VALUE or RQD	(m)	(m)	• Water Content %	Monitoring weil Construction
GROUND SURFACE	ß		RE	z °		70 77	20 40 60 80	žΰ
		SS 1	62	4	] 0-	-79.77	• • • • • • • • • • • • • • • • • • •	T
Loose, brown SILTY SAND, trace 0.30		s 2	2 54	28	1-	-78.77		
Very stiff, brown SILTY CLAY Compact, grey SILTY SAND1.83								
Compact, grey SILTY SAND 1.63	S	ss  3	3   100	P	2-	77.77		<u> </u>
Firm, grey SILTY CLAY, trace sand	X s	ss 4	l 100	Р			<b>O</b>	
	Пт	w 5	5 100		3-	-76.77		
3.66 End of Borehole	1//	<b>vv</b>						
(GWL @ 0.50m - May 26, 2022)								
							20 40 60 80 100	
							Shear Strength (kPa)	
							▲ Undisturbed △ Remoulded	

### SOIL PROFILE AND TEST DATA

Monitoring Well Construction

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Geotochnical Investigation inity Development Ontario

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9 Auriga Drive, Ottawa, Ontario K2E 7T9		•	5		Pr		lixed-Us	e Commur Ottawa, C		velopm	nent
DATUM Geodetic									FILE N	-	
REMARKS									PG5		
BORINGS BY Track-Mount Power Auge	r			D	ATE	April 6, 20	)22		HOLE		
SOIL DESCRIPTION	PLOT		SAN	IPLE		DEPTH	ELEV.	Pen. Re	esist. E 0 mm D		
GROUND SURFACE	STRATA P	ТҮРЕ	NUMBER	°° RECOVERY	N VALUE or RQD	(m)	(m)		/ater Co		
TOPSOIL 0.18		ss	1		6	- 0-	-79.71	0			
Loose, brown SILTY SAND 0.53 Very stiff to stiff, brown SILTY CLAY .17 Compact, brown SILTY SAND 1.45		ss	2		Р	1-	-78.71	0	<u>O</u>		
		TW	3	100		2-	-77.71			+	
		∦ ss ∛ ss	4 5	0 83	P P	3-	-76.71				D
Soft to firm, grey SILTY CLAY		тพ	6	100		4-	-75.71				
						5-	-74.71				
6.55		¤ G	7			6-	-73.71		0		
Dynamic Cone Penetration Test commenced at 6.55m depth. Cone pushed up to 17.48m depth, borehole terminated.											
(GWL @ 0.87m - May 26, 2022)											

40 60 80 20 100 Shear Strength (kPa) ▲ Undisturbed  $\triangle$  Remoulded

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM	Geodetic
DATUM	Geodetic

#### REMARKS

PG5827 HOLE NO.

BORINGS BY Track-Mount Power Auger DATE					ATE	April 7, 20	)22	BH28-22	
SOIL DESCRIPTION	PLOT		SAMF			DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone	
	STRATA	TYPE		% RECOVERY	N VALUE or RQD			Pen. Resist. Blows/0.3m         ● 50 mm Dia. Cone         ○ Water Content %         20       40       60       80	
GROUND SURFACE				Ř	4	0-	-77.53	20 40 60 80 ≥ O	
TOPSOIL0.20	(XX)	X ss	1	12	2	0	//.00		
Very stiff to stiff, brown <b>SILTY</b> CLAY, trace sand		ss	2	0	Р	1-	-76.53		
		ss	3	0	Р	2-	-75.53		
- firm to stiff and grey by 0.9m depth		ss	4	100	Р				
		Tw	5	100		3-	-74.53		
		∬ss	6	67	P	4-	-73.53		
		тw	7	100		5-	-72.53		
		× G	8					•	
6.55						6-	-71.53		
End of Borehole		-							
(GWL @ 0.89m - May 26, 2022)									
								20 40 60 80 100 Shear Strength (kPa)	
								▲ Undisturbed △ Remoulded	

### SOIL PROFILE AND TEST DATA

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geodetic

#### REMARKS

DATUM

BORINGS BY	Track-Mount	Power	Auge	r

HOLE NO.
BH28A-22

FILE NO.

PG5827

BORINGS BY Track-Mount Power Auger			D	ATE	April 7, 20	022	1	BH28/	4-22	
SOIL DESCRIPTION 법		SAM			DEPTH (m)	ELEV.		Resist. Blo 50 mm Dia		Well
STRATA	ЭЧХТ	NUMBER	°8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	N VALUE or RQD	(11)	(m)	0	Water Cor	itent %	Monitoring Well
GROUND SURFACE		4	RE	z	0-	77.53	20	40 6	50      80	ž
TOPSOIL0.20	ss	1	17	2		11.55		c	<b>)</b>	
Very stiff to stiff, brown SILTY CLAY	ss	2	100	2	1-	76.53		0		
- firm and grey by 0.9m depth	ss	3	100	Р	0	75 50		0	0	
2.29 // End of Borehole	12				2-	-75.53				
(GWL @ 0.96m - May 26, 2022)										
							20 She	40 6 ar Streng	50 80 1 th (kPa)	00
							▲ Undis	sturbed $\triangle$	Remoulded	

### SOIL PROFILE AND TEST DATA

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

### DATUM Geodetic

PG5827
HOLE NO.
BH29-22

BORINGS BY Track-Mount Power Auge	er			D	ATE /	April 7, 20	)22	BH29-22
SOIL DESCRIPTION	РІОТ	SAI		IPLE		DEPTH ELEV. (m) (m)		Pen. Resist. Blows/0.3m=● 50 mm Dia. Cone≥ 5
	STRATA	ЭЛУРЕ	NUMBER	°% ©™ECOVERY	N VALUE or RQD	(11)	(11)	Pen. Resist. Blows/0.3m• 50 mm Dia. ConeO Water Content %20406080
GROUND SURFACE		V				0-	-78.73	
TOPSOIL0.25 Brown SILTY CLAY with sand0.69		ss	1	25	7			O 130 ₹
		X ss	2	33	Р	1-	-77.73	
		ss	3	100	Р	2-	-76.73	
Very stiff to stiff, brown <b>SILTY CLAY</b>		∛ss	4	100	Р			
- soft and grey by 2.2m depth		G	5			3-	-75.73	
		ss	6	75	Р	4-	-74.73	
				75				
		X G	7			5-	-73.73	
		X G X G	8 9			6-	-72.73	
<u>6.55</u> Dynamic Cone Penetration Test commenced at 6.55m depth. Cone pushed up to 13.82m depth, borehole terminated. (GWL @ 0.88m - May 26, 2022)		_						

### SOIL PROFILE AND TEST DATA

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geodetic

#### REMARKS

DATUM

FILE NO. PG5827
HOLE NO. BH29A-22

BORINGS BY Track-Mount Power Aug	er			D	ATE	April 7, 20	022		B	H29/	-22		
SOIL DESCRIPTION	PLOT		SAN	IPLE	1	DEPTH (m)	ELEV. (m)	Pen			ows/0.3 . Cone		l Well on
	STRATA	ТҮРЕ	NUMBER	° ≈ © © ©	N VALUE or RQD			0			tent %		Monitoring Well Construction
GROUND SURFACE				Ř	4	- 0-	-78.73	20		) 6	0 8	0	
TOPSOIL0.25		ss	1	33					0				
		ss	2	42	6	1-	77.73		0	· · · · · · · · · · · · · · · · · · ·			
Very stiff to stiff, brown <b>SILTY CLAY</b>		Ê							· · · · · · · · · · ·	• • • • • • • • • •	•••••••		
- soft and grey by 2.2m depth		ss	3	0	0	2-	-76.73		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·			
2.90		ss	4	100	0								
End of Borehole													
(GWL @ 0.92m - May 26, 2022)													
								20	) 40	) 6	0 8	0 10	00
								S	hear S	trengt	h (kPa	i)	
								🔺 Un	disturbe	ed ∆	Remou	lded	

### SOIL PROFILE AND TEST DATA

ers Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

DATUM Geodetic

#### REMARKS

PG5827 HOLE NO.

ORINGS BY Track-Mount Power Auger				<b>DATE</b> April 7, 2022				BH30-22					
SOIL DESCRIPTION			SAN	IPLE		DEPTH (m)	ELEV.	Pen. Resist. Blows/0.3m     ■       ● 50 mm Dia. Cone     >					
	STRATA PLOT	ЛҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(11)	(m)	Pen. Resist. Blows/0.3m       ■         ● 50 mm Dia. Cone       Monoport         ○ Water Content %       0         20       40       60       80					
GROUND SURFACE		X ss	1	58	4	0-	-79.71						
Loose, brown SILTY SAND 0.69		( <u>)</u>				4	70 71	149					
/ery stiff to stiff, brown SILTY CLAY		ss	2	33	Р		-78.71						
firm to soft and grey by 1.5m depth		ss	3	50	Р	2-	-77.71						
nin to solt and grey by 1.5m depth		тw	4	100				5					
		ss	5	75	Р	3-	-76.71						
		X G	6			4-	-75.71						
		X G	7			5-	-74.71						
		ss	8	100	Р	6-	-73.71	<b>▲</b> •					
		G	9			0	75.71						
		тw	10	100		7-	-72.71						
		∛ ss	11	100	Р								
		$\Box$		100		8-	-71.71						
		X G X G	12 13			9-	-70.71						
9.60 End of Borehole		-											
GWL @ 1.23m - May 26, 2022)													
								20       40       60       80       100         Shear Strength (kPa)         ▲ Undisturbed       △ Remoulded					

### SOIL PROFILE AND TEST DATA

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

### DATUM Geodetic

REMARKS
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PG5827
HOLE NO.
BH31-22

BORINGS BY Track-Mount Power Auge	RINGS BY Track-Mount Power Auger DATE				ATE	April 6, 2022 BH31-22						
SOIL DESCRIPTION	PLOT	н SA		SAMPLE			ELEV. (m)	Pen. Resist. Blows/0.3m         ● 50 mm Dia. Cone				
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(11)	• W	ater Content %	Monitoring Well Construction		
GROUND SURFACE				R	ZŬ	0-	-78.48	20	40 60 80	ΣŬ		
TOPSOIL0.23Loose, brown SILTY SAND0.69		AU	1					o				
Very stiff to stiff, brown SILTY CLAY		ss	2	92	Р	1-	-77.48					
- soft to firm and grey by 1.5m depth		ss	3	50	Р	2-	-76.48	4	• · · · · · · · · · · · · · · · · · · ·			
		ss	4	67	Р			4	Θ			
		G	5			3-	-75.48	4	· · · · · · · · · · · · · · · · · · ·			
				07		4-	-74.48					
		ss	6	67	P	-	7 4.40	4				
		G	7			5-	-73.48		O	- 目		
		G	8					4	0			
		G	9			6-	-72.48					
6.55 End of Borehole	μχ	1								-		
								20		100		
								Shea	r Strength (kPa) urbed △ Remoulded			

### SOIL PROFILE AND TEST DATA

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geodetic

#### REMARKS

DATUM

PG5827 HOLE NO.

BORINGS BY Track-Mount Power Auge	er DATE April				April 6, 2022			BH32-22			
SOIL DESCRIPTION	PLOT		SAN	IPLE		DEPTH (m)	ELEV. (m)		ist. Blows/0. mm Dia. Con	.3m e	Nell on
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(11)	(11)		ter Content %	/6	Monitoring Well Construction
GROUND SURFACE				Ř	4	0-	-77.94	20	40 60 8	80	≥o
TOPSOIL0.20Loose, brown SILTY SAND0.69		ss	1	67	6			0		14	
Very stiff to stiff, brown SILTY CLAY		∦ ss	2	58	P	] -	-76.94		0		IIIIII ¥IIIII
- firm to soft and grey by 1.5m depth		TW	3	96	_	2-	-75.94				11/11/11/11/11/11/11/11/11/11/11/11/11/
		∦ ss ∎tw	4 5	100	Р	3-	-74.94			0	
		G	6			4-	-73.94				
		ss	7	100	Р	5-	-72.94			O	
		G G	8 9			6-	-71.94		φ		
End of Borehole6.55	<u>XX</u>	-									
(GWL @ 1.25m - May 26, 2022)											
								20 Shear ▲ Undisturi	Strength (kP	80 100 ( <b>a)</b>	U
										nueu	

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### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

PG5827
HOLE NO.
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STRATA PLOT			MPLE		DEPTH	ELEV.				
STRATA		BER	ЗХ				Pen. Resist. Blows/0.3m     =       ● 50 mm Dia. Cone     ≥			
	,	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	0 1	Vater C	Content %	Monitoring Well
120	_:/\ s	S 1	33	7	0-	-78.33	<b>20</b>	40	60 80	
0.20										
	S	5 2	75	P	1-	-77.33			0	
	s	S 3	100	Р	2-	-76.33	4	$\overline{}$	· · · · · · · · · · · · · · · · · · ·	
	Т	V 4	100							
					3-	-75.33				
			100	P		=				
	Įχ c	i   6			4-	-74.33	4		0	
	s	S 7	42	Р	5-	-73.33		0		
		i 8						<b>\</b>		
		i 9			6-	-72.33				
e										
	.55		TW 4 SS 5 G 6 SS 7 SS 7 G 8 9	TW 4 100 SS 5 100 G 6 SS 7 42 G 8 G 9	TW 4 100 SS 5 100 P G 6 SS 7 42 P G 8 G 9 SS 7	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	TW 4 100 SS 5 100 P G 6 SS 7 42 P G 8 G 9 G 9 G 8 G 9 G 7 C G 8 G 9 G 7 C G 8 G 9 G 7 C G 7 C C G 7 C C G 7 C C C G 7 C C C C C C C C C C C C C C C C C C C	TW 4 100 SS 5 100 P G 6 SS 7 42 P G 8 G 9 G 9 G 9 G 9 G 9 G 9 G 9 G 9 G 9 G 9	TW 4 100 SS 5 100 P G 6 SS 7 42 P G 8 G 9 G 9 G 9 G 9 G 9 G 9 G 9 G 9 G 9 G 9

### SOIL PROFILE AND TEST DATA

▲ Undisturbed △ Remoulded

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic REMARKS							<b>,</b>		FILE NO. PG582	27	
BORINGS BY Track-Mount Power Aug	er			D	ATE	April 5, 20	)22		HOLE NO		
SOIL DESCRIPTION		SAMPLE				DEPTH ELEV.			ows/0.3m a. Cone	Well	
	STRATA PLOT	ТҮРЕ	NUMBER	% RECOVERY	VALUE r ROD	(m)	(m)		/ater Cor		Monitoring Well Construction
GROUND SURFACE	LS I	н	NN	REC	N Or C			20	40 6	60 80	Cor
TOPSOIL0.18	3	X ss	1	42	4	0-	-79.05	0			<b> </b> _ <b> ▼</b>  _
Loose, brown SILTY SAND		Ê	_		_		70.05				
- grey by 1.4m depth		ss	2	50	P	-	-78.05		0		
<u>1.9</u> 8		ss	3	50	Р	2-	-77.05	0	· · · · · · · · · · · · · · · · · · ·		ներներիներին Արերերիներին
		TW	4	100		2	77.00	0			
			4	100		3-	-76.05				
		X ss	5	100	Р			<b>·</b> ♠	• • • • • • • • • • • • • • • • • • • •	<b>•</b>	
Firm to soft, grey SILTY CLAY		G	6			4-	-75.05		· · · · · · · · · · · · · · · · · · ·	- O	
Finn to soit, grey SILTT CLAT											
		∦ ss	7	100	P	5-	-74.05		0		十目:
		G	8								
6.55		⊠ G	9			6-	-73.05			0	
Dynamic Cone Penetration Test commenced at 6.55m depth. Cone pushed up to 18.21m depth, borehole terminated. (GWL @ 0.38m - May 24, 2022)											
								20 Shea	40 6 Ir Streng		00

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

#### REMARKS

PG5827
HOLE NO.
DU25 00

BORINGS BY Track-Mount Powe	r Auger			[	DATE	April 5, 2	022		E	3H35-	22	
SOIL DESCRIPTION		PLOT	SAI	MPLE		DEPTH		Pen. Resist. Blows/0.3m     =       ● 50 mm Dia. Cone     ≥				Well
		STRATA E	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	(			ntent %	Monitoring Well
GROUND SURFACE				R	zv	- 0-	-78.67	2	L	io e	50 80	
TOPSOIL	0.15	∦ ss	1	50	4				O			IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
Loose, brown <b>SILTY SAND</b>	1.45	ss	2	58	6	1.	-77.67		0			
Soft, grey SILTY CLAY	2.20	ss	3	50	Р	2.	-76.67	4		0		
Loose, grey <b>SILTY SAND,</b> trace clay	2.97	ss	4	100	Р		75 07					
		ss	5	8	P	3-	-75.67		0			
		ss	6	100	P	4	-74.67			0		
Soft to firm, grey SILTY CLAY		G	7			5-	-73.67					
		G	8 9			6	-72.67			0		
End of Borehole	_ <u>6.55</u>						12.01					
(GWL @ 0.27m - May 24, 2022)												
								2	20 4 Shoor (	lo 6 Strong	60 80	100
									ndisturb	ed ^	<b>th (kPa)</b> Remoulded	ł
					1				iaiotuit	<u> </u>		•

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### SOIL PROFILE AND TEST DATA

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

### DATUM Geodetic

REMARKS
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FILE NO.
PG5827
HOLE NO.

BORINGS BY Track-Mount Power	Auge	er	<b>DATE</b> April 5, 2022					BH35A-22						
SOIL DESCRIPTION		PLOT		SAMPLE			DEPTH (m)	ELEV. (m)		Pen. Resist. Blows/0.3m • 50 mm Dia. Cone				g Well ion
		STRATA	ТҮРЕ	NUMBER	° © © © © © ©	N VALUE or RQD	()	(,				ntent		Monitoring Well Construction
GROUND SURFACE TOPSOIL	0.15		Vee	4			0-	-78.65	2	<u> </u>	40 	60	80	
Loose, brown SILTY SAND			∦ ss	1	17	3				0				III VIII
	<u>1.45</u>		ss	2	42	6	1-	-77.65		<u> </u>				
Soft, grey SILTY CLAY	<u>2.13</u>		ΤW	3	100		2-	-76.65						
End of Borehole														
(GWL @ 0.41m - May 24, 2022)									5	20 Shear ndisturi	Streng	60 <b>jth (kP</b>	a)	00

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

#### REMARKS

PG5827
HOLE NO.
BH36-22

BORINGS BY Track-Mount Power Auge	er	DATE April 4, 2022 BH36-					BH36-22	
SOIL DESCRIPTION	РІОТ		SAMPLE			DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m     □       ● 50 mm Dia. Cone     ⊃
	STRATA	ТҮРЕ	NUMBER	° ≈ © © © ©	N VALUE or RQD	(11)	(11)	Pen. Resist. Blows/0.3mImage: Constant of the second s
GROUND SURFACE			~	R	ZŸ	0	-78.62	20 40 60 80 ≥ Ŏ
TOPSOIL0.25		ss	1	33	15	0-	-70.02	Φ
Compact to loose, brown SILTY SAND 1.45		ss	2	17	6	1-	-77.62	
		тw	3	100		2-	-76.62	
		ss	4	25	Р			
		TW	5	100		3-	-75.62	
Soft to firm, grey SILTY CLAY		ss	6	67	Р	4-	-74.62	
		G	7			5-	-73.62	
		G	8 9			6-	-72.62	
<u>6.55</u> Dynamic Cone Penetration Test commenced at 6.55m depth. Cone pushed up to 14.02m depth, borehole terminated. (GWL @ 0.77m - May 24, 2022)								20 40 60 80 100 Shear Strength (kPa)
								▲ Undisturbed △ Remoulded

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

#### REMARKS

FILE NO. PG5827
HOLE NO.
007 00

BORINGS BY Track-Mount Power Aug			D	ATE /	April 4, 20	HOLE NO. BH37-22						
SOIL DESCRIPTION	PLOT		SAN	IPLE	1	DEPTH	ELEV.	<ul> <li>Pen. Resist. Blows/0.3m</li> <li>● 50 mm Dia. Cone</li> </ul>				
GROUND SURFACE	STRATA F	ТҮРЕ	NUMBER	% RECOVERY	N VALUE of RQD	(m)	(m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content % 20 40 60 80				
TOPSOIL 0.28		X ss	1	50	8	0-	-77.89					
Loose, brown SILTY SAND 0.69												
Very stiff to stiff, brown SILTY CLAY		∦ ss	2	42	3	1-	-76.89	Ο Ο				
		G	3			2-	-75.89					
- firm to soft by 1.5m depth		X G	4			2	75.05	I A A A A A A A A A A A A A A A A A A A				
arey by 0.1m donth						3-	-74.89					
- grey by 2.1m depth		τw	5	100								
		G	6			4-	-73.89					
		∛ss	7	100	Р							
				100	1	5-	-72.89					
		X G	8			6-	-71.89					
		G	9				71.00	A B				
		∛ss	10	100	Р	7-	-70.89					
				100	1							
		X G	11			8-	-69.89					
		G	12									
		∛ss	13	100	Р	9-	-68.89					
						10-	-67.89					
		X G	14			10	07.00					
		тw	15	100		11-	-66.89					
- stiff by 11.4m depth		∬ss	16	67	Р							
		A 93		07	1	12-	-65.89					
		тw	17	100								
		ss	18	67	Р	13-	-64.89					
		G	19			14-	-63.89					
						14	00.00					
15.24		ΧG	20			15-	-62.89					
End of Borehole												
(GWL @ 2.18m - June 17, 2022)												
								20 40 60 80 100 Shear Strength (kPa)				

### SOIL PROFILE AND TEST DATA

Geotechnical Investigation
 Proposed Mixed-Use Community Development
 Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

### DATUM Geodetic

REMARKS

PG5827
HOLE NO.
BH38-22

BORINGS BY Track-Mount Power A	RINGS BY Track-Mount Power Auger DATE						022	BH38-22						
SOIL DESCRIPTION	SOIL DESCRIPTION 너 너 너			<b>IPLE</b>	1	DEPTH	ELEV.	Pen. Resist. Blows/0.3 • 50 mm Dia. Cone	m Sell					
	STRATA F	ТҮРЕ	NUMBER	°8 ©	N VALUE or RQD	(m)	(m)	Pen. Resist. Blows/0.3m         ■           ● 50 mm Dia. Cone         >           ○ Water Content %         □           20         40         60         80         >						
GROUND SURFACE	ß		Z	RE	z o	0		20 40 60 80	ĕõ					
	0.25	ss	1	67	23	- 0-	-77.77	φ						
	0.69	ss	2	83	Р	1-	-76.77	0	199 ¥					
Very stiff to stiff, reddish brown SILTY CLAY		// SS	3	83	P									
- firm to soft by 1.5m depth		∑ 00 ∦ G	4		'	2-	-75.77							
		X G	5			3-	-74.77							
- grey by 2.2m depth						1-	-73.77							
		X ss	6	100	P	4	/3.//	▲						
		∦ ss	7	100	P	5-	72.77							
		X G X G	8 9			6-	-71.77	▲ ▲ · · · · · · · · · · · · · · · · · ·						
6 End of Borehole	<u>6.55</u>													
(GWL @ 0.78m - May 24, 2022)														
(GWL @ 0.76m - May 24, 2022)														
								20 40 60 80	100					
								Shear Strength (kPa)						
								▲ Undisturbed △ Remould	iea					

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM	Geodetic
DATUM	Geodelic

#### REMARKS

HOLE NO.
BH38A-22

FILE NO. PG5827

ORINGS BY Track-Mount Power	1	<b>DATE</b> April 1, 2022						BH38A-22										
SOIL DESCRIPTION	РГОТ	SAMPLE				DEPTH	ELEV.	Per	n. Resi 50 n	st. Blo nm Dia			Mall					
GROUND SURFACE	STRATA I						ТҮРЕ	NUMBER	°° © © ©	N VALUE or RQD	N VALUE or RQD	(m)	2		er Cor		, 5 10	Monitoring Well
OPSOIL	0.25	ss	1	42	24	0-	-77.77						E					
compact, brown SILTY SAND	0.69	÷.	•	72	24					· · · · · · · · · · · · · · · · · · ·								
ery stiff to stiff, reddish brown		X ss	2	100	4	1-	-76.77			O								
firm to soft by 1.5m depth		ss	3	100	P	2-	-75.77	·····	· · · · · · · · · · · · · · · · · · ·	C	)·····	······································						
grey by 2.2m depth		TW	4	100														
grey by 2.2m depth		Тт	5	100		3-	-74.77											
nd of Borehole	3.66	1	-						<u> </u>									
GWL @ 0.72m - May 24, 2022)																		
<u> </u>																		
										0 6			 00					
	1	1	i i	i .	i.	1	1	· · ·	Shear S	1								

### SOIL PROFILE AND TEST DATA

neers Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

### DATUM Geodetic

REMARKS
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PG5827
HOLE NO.
BH39-22

BORINGS BY Track-Mount Power Auge		<b>DATE</b> April 1, 2022					BH39-22							
SOIL DESCRIPTION	РГОТ		SAN	IPLE	1	DEPTH (m)	ELEV. (m)			Blows/0.: Dia. Cone	3m III 3m V_u			
	STRATA	TYPE	NUMBER	° ≈ © © ©	VALUE r RQD	(11)	(11)	0 1	Nater C	ontent %	Monitoring Well Construction			
GROUND SURFACE	N I	_	ž	RE	N OH OH			20	40	60 8	o So			
TOPSOIL0.30		ss	1	50	9	0-	-77.69	C	5					
Very stiff to stiff, brown SILTY CLAY		ss	2	50	Р	1-	-76.69		0					
with sand		ss	3	75	Р	2-	-75.69	4						
- firm to soft by 1.5m depth		тw	4	100		3-	-74.69							
- grey by 2.2m depth		ss	5	75	Р				¢					
		ss	6	100	Р	4-	-73.69			0				
		X SS		100	P	5-	-72.69			0				
		X G X G	8 9			6-	-71.69			0				
6.55 End of Borehole	MZZZ	-												
(GWL @ 0.69m - May 24, 2022)														
								20	40	60 8	60 100			
									ar Stren	ngth (kPa △ Remou	a)			
									unnen		lucu			

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### **Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

Geodetic DATUM

er			D	ATE	March 16	2022		HOLE			
	SAMPLE				DEPTH	ELEV.		esist.		Well	
1	LYPE	JMBER	% COVERY	VALUE ROD	(m)	(m)					Monitoring Well Construction
5 S		Ы	REC	z <sup>o</sup>		70 54	20	40	60 8	80	Mo Cor
	≅ AU	1			0-	-79.51		)			
	1-7		58	Р	1-	-78.51			<u> </u>	14	
	8										իրի
	x ss	3	100	P	2-	-77.51	4	C			իրի
	1						0				
	ss	4	67	Р	3-	-76.51			0		ուներել ու ներերերերի երերերի ու ներերերի։ • •
					4-	-75 51					
		5	96			70.01			· · · · · · · · · · · · · · · · · · ·		
	ss	6	12	Р	5-	-74.51			O		
	тw	7	100								
	X G	8			6-	-73.51			<u> </u>		
	-										
									ngth (kPa	a)	00
		LAPE PLOT	LIONALE SAM	LIOTA EXAMPLE SAMPLE SAMPLE SAMPLE SAMPLE SS 4 SS 3 SS 4 SS 4 SS 4 C SS 5 C SS 5 C S	LIDITA EXAMPLE SAMPLE SAMPLE AU 1 SS 2 SS 2 SS 3 100 P SS 4 67 P TW 5 96 TW 5 96 12 P TW 7 100 G 8	SAMPLE       DEPTH (m)         LOTA       E       E       AI       MIL       MIL	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	NA         SAMPLE         DEPTH (m)         ELEV. (m)         Pen. Rd           H         Rd         Rd         Rd         Rd         Rd         0         79.51         20           SS         2         58         P         1         78.51         20         0         79.51         20           SS         3         100         P         2         77.51         20         0	Bit         SAMPLE         DEPTH         ELEV. (m)         Pen. Resist. 50 mm           No         1         58         P         1-78.51         0 </td <td>SAMPLE         DEPTH (m)         ELEV. (m)         Pen. Resist. Blows/0. • 50 mm Dia. Content 9. 20 40 60 8           8 AU 1         0         79.51         0         79.51         0</td> <td>Part         DATE         March 16, 2022         BH40-22           SAMPLE         DEPTH         ELEV. (m)         Pen. Resist. Blows/0.3m         50 mm Dia. Cone           AU         1         SS         2         58         P         -79.51         0         -79.51         0         -79.51         0         -0         -79.51         0         -0         -79.51         0         -0<!--</td--></td>	SAMPLE         DEPTH (m)         ELEV. (m)         Pen. Resist. Blows/0. • 50 mm Dia. Content 9. 20 40 60 8           8 AU 1         0         79.51         0         79.51         0	Part         DATE         March 16, 2022         BH40-22           SAMPLE         DEPTH         ELEV. (m)         Pen. Resist. Blows/0.3m         50 mm Dia. Cone           AU         1         SS         2         58         P         -79.51         0         -79.51         0         -79.51         0         -0         -79.51         0         -0         -79.51         0         -0 </td

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### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

#### REMARKS

REMARKS BORINGS BY Track-Mount Power Aug	jer			D	ATE	March 16	, 2022	HOLE NO. <b>BH41-22</b>
SOIL DESCRIPTION		SAMPLE					ELEV.	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone
	STRATA I	ТҮРЕ	NUMBER	°. © © © © © ©	VALUE r rod	(m)	(m)	Pen. Resist. Blows/0.3m       ■         ● 50 mm Dia. Cone       Monoport         ○ Water Content %       0         20       40       60       80
GROUND SURFACE	ν.		N	REC	N OL		70.07	20 40 60 80 <sup>O</sup>
			1			0-	-79.37	0
Loose to compact, reddish brown 0.6		ss	2	67	8	1-	-78.37	0
		⊥ I ss	3	100	Р			0
Very stiff to stiff, brown <b>SILTY</b> <b>CLAY,</b> some to trace sand		1 33	3	100	F	2-	-77.37	
- firm to very soft and grey by 2.8m		тw	4	100		3-	-76.37	
depth						4-	-75.37	
		x ss	5	100	Р	5-	-74.37	O NIN
					•	6-	-73.37	
						7-	-72.37	
		ss	6	100	Ρ	8-	-71.37	
						9-	-70.37	
		ТW	7	62		10-	-69.37	
						11-	-68.37	
		TW	8	96		12-	-67.37	101
		x ss	9	100	Р	13-	-66.37	
- stiff by 13.7m depth		X G	10			14-	-65.37	
14.9	4							
End of Borehole								
(GWL @ 0.63m - May 26, 2022)								
								20 40 60 80 100 Shear Strength (kPa)
								▲ Undisturbed △ Remoulded

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### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

REMARKS
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PG5827
HOLE NO.
BH42-22

BORINGS BY Track-Mount Power	Auger			C	DATE	March 17	, 2022		E	3H42-	22		
SOIL DESCRIPTION			SAN	MPLE		DEPTH ELEV.	ELEV.	Pen. Resist. Blows/0.3m					Well
	STRATA PLOT	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)				ntent %		Monitoring Well
GROUND SURFACE	LS		NC	REC	N N	0	-77.61	2	20 4	<b>1</b> 0 6	0 8	0	Mo
TOPSOIL Very stiff, brown SILTY CLAY with	0.25	AU 🕅	1				77.01			0			
intermittent layers of silty sand		ss	2	33	P	1-	-76.61		0		A	<u>r:</u>	39
- firm and grey by 1.5m depth		ss	3	100	P	0	75.04	4					
ann and grey by 1.5m depth		A G	4			2-	-75.61			C	>		
						3-	-74.61						
		ss	5	100	P		70.04						
		G	6			4-	-73.61					······································	
		ss	7	100	Р	5-	-72.61					<b>)</b>	
		G	8 9			6-	-71.61			0		· · · · · · · · · · · · · · · · · · ·	
End of Borehole	<u>6.55</u>	4					/					······································	-
GWL @ 0.62m - May 26, 2022)													
(GWL @ 0.02111 - May 20, 2022)													
									80 Shear S	10 6 Strengt	80 80 th (kPa	ບ 1 1)	00
									ndisturk		Remou		

### SOIL PROFILE AND TEST DATA

FILE NO. PG5827

HOLE NO.

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

0.0

DATUM Geodetic

#### REMARKS

STRATA PLOT	ТҮРЕ	SAN		Йо	DEPTH (m)	ELEV. (m)			Blows/0.3 Dia. Cone	3m =
STRATA	ТҮРЕ	NUMBER	VER!	E O						
				N VALUE or RQD					Content %	
	1		_ д		0-	-77.61	20	40	60 8	0
2					1-	-76.61				
	ss	1	100	Р	2-	-75.61		·····		0
	ss	2	100	Р		-74.61			0	
	<b>.</b>	_	100		4-	-73.61				
2	TW	3	100		т 	70.01			·····	
							20			0 100

#### SOIL PROFILE AND TEST DATA

FILE NO. PG5827 HOLE NO.

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

DAIOM	00

DATUM	Geodetic

SOIL DESCRIPTION       Normal Participation       Same participation       Normal Partin Participation       Normal Participation <t< th=""><th>BORINGS BY Track-Mount Power Auge</th><th>er</th><th colspan="6">DATE March 21,</th><th>BH42B-22</th></t<>	BORINGS BY Track-Mount Power Auge	er	DATE March 21,						BH42B-22
GROUND SURFACE     H H H H H H H H H H H H H H H H H H H	SOIL DESCRIPTION	PLOT		SAN	1				Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone > 5
OVERBURDEN 0-77.61			гуре	UMBER	°° COVERY	VALUE r ROD	(11)	(11)	Water Content %
OVERBURDEN  2.13  0+77.61  1-76.61  2+75.61  0+77.61	GROUND SURFACE	ŝ	-	1	REC	zö			<b>20 40 60 80 ≥ </b>
$2.13 \qquad 2.13 \qquad 2 + 75.61 \qquad 2 + 75.61 \qquad 1 + 2 + 75.61 \qquad 1 + 2 + 75.61 \qquad 1 + 2 + 1 + 2 $	OVERBURDEN								
End of Borehole	0.10							75.04	
20 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed & Remoulded	End of Borehole						2-	-75.61	20 40 60 80 100 Shear Strength (kPa)

# patersongroup Consulting Engineers

### SOIL PROFILE AND TEST DATA

Undisturbed

△ Remoulded

9 Auriga Drive, Ottawa, Ontario K2E 7T9 Propos

#### Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic									FILE I	NO. 5 <b>827</b>		
REMARKS BORINGS BY Track-Mount Power Auge	sr			r		March 17	2022		HOLE			
			SAN	/IPLE				Pen. R		Blows/0.3r	n =	
SOIL DESCRIPTION	A PLOT		~	ХХ	ЫO	DEPTH (m)	ELEV. (m)	• 5	i0 mm	Dia. Cone	M gu	ction
	STRATA	ТҮРЕ	NUMBER	* RECOVERY	VALUE r RQD			0	Vater C	Content %	Monitoring Well	nstru
GROUND SURFACE			N	RE	N OF	- 0-	-79.91	20	40	60 80		
<b>TOPSOIL</b> 0.25	Ħ	∑ AU	1			Ū	/ 0.01		0		<b>u</b>	1111
		ss	2	33	Р	1-	-78.91		OZ	2	149	իկկկ
Very stiff to stiff, reddish brown <b>SILTY CLAY</b> with sand seams		ss	3	100	Р	2-	-77.91	A		0		։ Դիկիկիկիկիկիկիկիկիկիկիկիկին։
SILTI OLAT WIT Sally Seall'S		X G	4				77.51		D,A			իլիկ
- firm to soft and grey by 2.3m depth		Тт	5	100		3-	-76.91					իրի
						4-	-75.91		· · · · · · · · · · · · · · · · · · ·			լլլլլ
		∦ ss	6	33	P		70.01			0		
		TW	7	88		5-	-74.91					
		X G X G	8 9			6-	-73.91			0		
6.55 End of Borehole	<u> </u>											
(GWL @ 0.36m - May 27, 2022)												
								20 She	40 ar Stre	60 80 ngth (kPa)	100	

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

#### REMARKS

BORINGS BY       Track-Mount Power Auger       DATE       March 17, 2022       BH44-22         SOIL DESCRIPTION       Image: state s	Monitoring Well Construction
GROUND SURFACE     Image: Book of the second s	toring
TOPSOIL         0 − 79.37	inc
Very stiff to stiff, reddish brown SILTY CLAY with sand	
2.29 SS 3 67 P 2-77.37	
Loose to compact, brown SILTY 2.59 SS 4 67 2 3-76.37	
Soft, grey SILTY CLAY with sand TW 6 92 4-75.37	
5-74.37	
TW 7 83 6-73.37	
End of Borehole	
(GWL @ 0.43m - May 27, 2022)	
20 40 60 80 Shear Strength (kPa) ▲ Undisturbed △ Remoulder	100

### SOIL PROFILE AND TEST DATA

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### DATUM Geodetic

REMARKS
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FILE NO.
PG5827
HOLE NO.
BH/15-22

BORINGS BY Track-Mount Power Auger DATE M						March 18	, 2022			3H45-	22			
SOIL DESCRIPTION		РІОТ			MPLE		DEPTH (m)	ELEV. (m)	Per			ows/0.3 a. Cone	m	g Well tion
		STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD			0			ntent %		Monitoring Well Construction
GROUND SURFACE					<u></u>	<b>–</b>	- 0-	80.19	2	2 <b>0</b> /	<b>10 €</b> ⊣	60 80		
TOPSOIL Brown SILTY SAND, some clay	0.15	F#	∛ ss	1	8	2	l î	00110		o				I₹E
Very stiff to stiff, reddish brown			ss	2	67	Р	1-	-79.19			0	\$	14	ու երերեներու երերերին երերերին երերություն։ Թե
	2.21		ss	3	100	Р	2-	-78.19	4			-0-		<u>սիրիկ</u>
Loose, grey SILTY SAND	2.74		ss	4	42	Р		77.40		0				<u>որիիի</u>
			ss	5	100	Р	3-	-77.19	Å		<b>þ</b>			
Soft, grey SILTY CLAY with sand			ΤW	6	100		4-	-76.19					· · · · · · · · · · · · · · · · · · ·	
seams			ss	7	100	Р	5-	-75.19			0			
			G	8 9			6-	-74.19			,   0	D.	· · · · · · · · · · · ·	
End of Borehole	<u>6.55</u>	EE A	-										······································	
(GWL @ 0.29m - May 27, 2022)														
														l
														l
											: : :			
									2	0 Shear	10 é Strena	80 80 th (kPa)	10	0
									▲ U	ndisturk	ed △	Remould	bet	

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

HOLE NO.

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geodetic

#### REMARKS

DATUM

BORINGS BY Track-Mount Power	Auge	er			D	ATE	March 18	, 2022	BH45A-22						
SOIL DESCRIPTION		РІОТ		SAN	IPLE	1	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m         ● 50 mm Dia. Cone						
		STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(,	(11)	Pen. Resist. Blows/0.3m       ■         ● 50 mm Dia. Cone       >         ○ Water Content %       >         20       40       60       80						
GROUND SURFACE		01		4	R	z <sup>o</sup>	0	-80.19							
TOPSOIL Brown SILTY SAND, some clay	<u>0.15</u> 0.25		ss	1	33	2			0						
Reddish brown <b>SILTY CLAY</b> with sand seams			ss	2	33	7	1-	-79.19	<b></b>						
End of Borehole	<u>2.13</u>	X	∦ss	3	100	0	2-	-78.19							
(GWL @ 0.13m - May 27, 2022)															
									20 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded						

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### Geodetic DATUM

#### REMARKS

EMARKS								HOLE NO.						
DRINGS BY Track-Mount Power Aug			CAN		ATE	March 18	, 2022	BH46-22 Pen. Resist. Blows/0.3m						
SOIL DESCRIPTION	PLOT		JAN			DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m       ■         ● 50 mm Dia. Cone       >         ○ Water Content %       >         20       40       60       80						
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD			• Water Content %						
ROUND SURFACE	ST	H	NN	REC	z o			20 40 60 80 <b>E</b>						
		ss	1	42	2	0-	-80.18	0						
rown SILTY SAND, trace clay 0.30		ss	2	0	Р	1-	-79.18							
		X G	3											
ery stiff to stiff, reddish brown ILTY CLAY with sand seams						2-	-78.18							
ILIY CLAY with sand seams		X G	4			3-	-77.18							
firm to stiff and grey by 3.0m depth		ss	5	100	Р			Ö.						
		G	6			4-	76.18							
		∛ss	7	100	Р	F	-75.18							
firm by 5.3m depth		X G	8			5-	75.10							
						6-	74.18							
		X G	9											
		ss	10	100	Р	7-	-73.18							
		G	11			8-	-72.18	<b>440</b>						
		∏G	12											
		G	13			9-	-71.18	$- \mathbf{h} \mathbf{h} \mathbf{h} \mathbf{h} \mathbf{h} \mathbf{h} \mathbf{h} \mathbf{h}$						
9.60	YXX/	-												
GWL @ 0.85m - May 27, 2022)														
								20 40 60 80 100						
								Shear Strength (kPa) ▲ Undisturbed △ Remoulded						

### SOIL PROFILE AND TEST DATA

FILE NO. PG5827

HOLE NO. BH46A-22

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

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-						16		munity -	Ollav
DATUM Geodetic									
REMARKS									
BORINGS BY Track-Mount Power	Auge	r			D	ATE	March 18	, 2022	
SOIL DESCRIPTION		PLOT		SAN	IPLE		DEPTH	ELEV.	Pe
				R	ïRΥ	Вą	(m)	(m)	
		STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD			
GROUND SURFACE	0.10	-	/		8		0-	-80.18	
	0.18		ss	1		5			
							1-	-79.18	
							2-	-78.18	
Very stiff to stiff, reddish brown SILTY CLAY with sand seams									
			тw	2	100		3-	-77.18	
- soft and grey by 3.0m depth			•	-			4-	-76.18	
								70.10	
							5-	-75.18	
							c	-74.18	
							0-	-14.10	
	7 47		ss	3	100		7-	-73.18	
End of Borehole	<u>7.47</u>		7 - 2	-					

SOIL DESCRIPTION	PLOT		SAN	IPLE		DEPTH		Pen.			lows/0. ia. Con		Monitoring Well Construction			
	STRATA P	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	• Water Content %								
D SURFACE	S H	Ĥ	ŊΝ	REC	N OF			20				30	Mon Con			
		X ss	1		5	0-	-80.18		0	-						
0.18 0.30 0.30 0.30	X	ДСС	•				70.10									
						1-	-79.18			· · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·				
						2-	-78.18		·····	·······						
to stiff, reddish brown AY with sand seams										· · · · · · · · · · · · · · · · · · ·						
						3-	77.18			·····						
grey by 3.0m depth		TW	2	100												
						4-	-76.18									
						_				•••••••						
						5-	-75.18									
						6-	-74.18			· · · · · · · · · · · · · · · · · · ·						
						0	74.10									
		Vee	0	100		7-	-73.18									
7.47 prehole	Γ <i>IX</i>	∦ss	3	100												
JENOIE																
								20	4	0	60 8	30 10	00			
								l Si I ▲ Un	near 5 disturbe	ed and	<b>gth (kP</b> a ∆ Remo	a) ulded				
									-		_					

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

Geotechnical Investigation
 Proposed Mixed-Use Community Development
 Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geodetic

#### REMARKS

DATUM

BORINGS BY Track-Mount Power Aug	er			D	ATE	March 21	, 2022			le no. 147-2			
SOIL DESCRIPTION	PLOT										ws/0.3r . Cone	n	Well
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	0	Nater	Con	tent %		Monitoring Well Construction
GROUND SURFACE	S		Z	RE	zÓ			20	40	60	0 80	ĺ	≚ပိ
	6	₿ AU	1			0-	-78.99	0					
Loose to compact, brown SILTY SAND1.43	5	ss	2	42	Р	1-	-77.99						<u>IIIIII</u> T
		ss	3	75	Р	0	70.00	А.		0			
Stiff, brown SILTY CLAY		G	4				-76.99	À	0	×			
- grey by 2.3m depth		Тw	5	100		3-	-75.99			/			
- firm by 3.8m depth		G	6			4-	-74.99		Ť		D		
		TW	7	100		5-	-73.99						
6 5		X G X G	8 9			6-	-72.99			0	<b>)</b>		
Dynamic Cone Penetration Test commenced at 6.55m depth. Cone pushed up to 18.29m depth, borehole terminated.													
(GWL @ 0.80m - May 26, 2022)													
								20 She ▲ Undis			) 80 <b>h (kPa)</b> Remould	1 <b>0</b> ed	)0

### SOIL PROFILE AND TEST DATA

FILE NO.

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

REMARKS BORINGS BY Track-Mount Power Au SOIL DESCRIPTION	ger		SA	MPLE		March 21	, 2022	1				
	ШОТС	+	SA									
						DEPTH					ows/0.3m . Cone	Well
		TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	0		er Con	Monitoring Well	
GROUND SURFACE	Ŭ		IO N	REC	N OF		-78.99	20		0 6		Mon
						- 0-	-70.99					
OVERBURDEN						1-	-77.99					
End of Borehole	3					2-	76.99					11
(GWL @ 0.92m - May 26, 2022)												
(and @ 0.02.11 may 20, 2022)												
								20	<u></u> д	0 6	0 80 -	100
								Sh Sh	near S	Strengt	t <b>h (kPa)</b> Remoulded	

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM	Geodetic
DATUM	Geodetic

#### REMARKS

PG5827
HOLE NO.

BORINGS BY Track-Mount Power Auge	r			D	ATE I	March 21	, 2022	1	HOLE N BH48		
SOIL DESCRIPTION	РГОТ	S	SAM	PLE		DEPTH	ELEV.			lows/0.3 ia. Cone	m
	STRATA I TYPE		NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)			ontent %	m :
GROUND SURFACE	Ω -		<b>Z</b>	RE	zö		70.01	20	40	60 80	
OPSOIL0.33	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	S	1	67	16	0-	-78.81	φ			
	s	s	2	42	Р	1-	-77.81		- <u>0</u> 4		109
ery stiff to stiff, brown <b>SILTY CLAY</b> ith sand seams			3	17	Р					0	121
				17	1	2-	-76.81				
firm and grey by 2.2m depth		G	4			3-	-75.81				
	s	S	5	50	Р					0	
	Т	w	6	100		4-	-74.81	X			
		G	7			5-	-73.81		0		
		G	8				70.01				
			9			6-	-72.81			· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·
6.55											
GWL @ 0.71m - May 26, 2022)											
								20	40	60 80	100
									ar Streng	<b>gth (kPa)</b> △ Remould	1

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

#### REMARKS

PG5827 HOLE NO.

BORINGS BY Track-Mount Power Auge	er			D	ATE	March 22	, 2022	BH49-22
SOIL DESCRIPTION	PLOT		SAMPLE DEPTH				ELEV.	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone > 5
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE of RQD	(m)	(m)	Pen. Resist. Blows/0.3m       ■         ● 50 mm Dia. Cone       □         ○ Water Content %       □         20       40       60       80
GROUND SURFACE		Vaa				0-	-79.26	<u></u>
Compact brown SILTY SAND	ΠTΓ	ss	1	0	3			
1.07		ss	2	83	11	1-	-78.26	
Very stiff to stiff, brown <b>SILTY CLAY</b> with sand seams		G	3			2_	-77.26	
- soft to firm and grey by 2.3m depth		G	4					
		ss	5	100	Р	3-	-76.26	
		X G	6			4-	-75.26	
			7					
		X G				5-	-74.26	
		X SS ≍ G	8 9	87	Р	6-	-73.26	
<u>6.55</u> Dynamic Cone Penetration Test commenced at 6.55m depth. Cone pushed up to 10.97m depth, borehole terminated. (GWL @ 0.39m - May 27, 2022)								20         40         60         80         100           Shear Strength (kPa)         △ Remoulded         100

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geodetic

### REMARKS

DATUM

BORINGS BY	Track-Mount Power Aug

SOIL DESCRIPTION         No.         SAMPLE         DEPTH (m)         ELEV. (m)         Pen. Resist. Blows/0.3m :50 mm Dia. Cone           GROUND SURFACE Compact, brown SILTY SAND OFFICE         0.76         1         10         1         79.26         1         78.26         2         40         60         80           Very stiff to stiff, brown SILTY CLAY - firm and grey by 2.3m depth         SS         1         10         1         76.26         1         76.26         1 <th>BORINGS BY Track-Mount Power Auge</th> <th><u>ər</u></th> <th></th> <th></th> <th>D</th> <th>ATE</th> <th>March 22</th> <th>, 2022</th> <th></th> <th></th> <th>ε NO. <b>19Α-2</b>2</th> <th>2</th> <th></th>	BORINGS BY Track-Mount Power Auge	<u>ər</u>			D	ATE	March 22	, 2022			ε NO. <b>19Α-2</b> 2	2	
GROUND SURFACE       E	SOIL DESCRIPTION	PLOT		SAN									Monitoring Well Construction
Compact, brown SILTY SAND       0.76       0       79.26       0       79.26         Very stiff to stiff, brown SILTY CLAY       SS       1       10       1       78.26       0       0       79.26         - firm and grey by 2.3m depth       SS       2       2       77.26       0       0       1			ТҮРЕ	UMBER UMBER ⊗ COVERY VALUE F ROD		(11)	0	• Water Content %					
Compact, brown SiLTY SAND       0.76       10       1-78.26       0       0         Very stiff to stiff, brown SiLTY CLAY       SS       2       2-77.26       0       0         - firm and grey by 2.3m depth       TW       3       92       3-76.26       0       0         TW       3       92       3-76.26       4-75.26       0       0       0         End of Borehole       TW       4       100       5-74.26       0       0       0	GROUND SURFACE	01			R	zv	0	70.00	20	40	60	80	∣≥ŭ
- firm and grey by 2.3m depth - firm and grey by 3.3m depth - firm and grey by 3.3m depth								-79.26					
- firm and grey by 2.3m depth TW 3 92 3-76.26 4-75.26 End of Borehole TW 4 100 5-74.26	Very stiff to stiff, brown SILTY CLAY					10	1-	-78.26		>			
5.18 TW 4 100 3-76.26 4-75.26 5-74.26	- firm and grey by 2.3m depth						2-	-77.26				· · · · · · · · · · · · · · · · · · ·	
5.18 TW 4 100 5-74.26				3	92		3-	-76.26					-
End of Borehole							4-	-75.26					
End of Borehole	5 19		Тw	4	100		5-	-74 26					- - -
(GWL @ 0.36m - May 27, 2022)	End of Borehole	FRAZ					0	74.20					-
	(GWL @ 0.36m - May 27, 2022)												

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

#### REMARKS

PG5827
HOLE NO.
BH20-33

BORINGS BY Track-Mount Power Auge	er	i		D	ATE	March 23	, 2022	BH50-22
SOIL DESCRIPTION	PLOT				SAMPLE DEPTI			Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(,	(m)	Pen. Resist. Blows/0.3m       ■         ● 50 mm Dia. Cone       Monitoring         ○ Water Content %       20         20       40       60       80
GROUND SURFACE				8	ZŬ	0-	-79.48	20 40 60 80 ≥O
\_ <b>TOPSOIL</b> 0.25	H+ H	au Bau	1			0	75.40	o
Compact, brown SILTY SAND		ss	2	58	18	1-	-78.48	
		ss	3	100	Р	2-	-77.48	
		G	4			0	76 49	o i i i i i i i i i i i i i i i i i i i
Soft to firm, grey SILTY CLAY		ss	5	100	Р	3-	-76.48	O O
		G	6			4-	-75.48	
		тw	7	100		5-	-74.48	
		X SS X G	8 9	100	Р	6-	-73.48	
6.55 Dynamic Cone Penetration Test commenced at 6.55m depth. Cone pushed up to 13.72m depth, borehole terminated. (GWL @ 0.74m - May 25, 2022)			9					20 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

#### REMARKS

PG5827 HOLE NO.

BORINGS BY Track-Mount Power Auge	er			D	ATE	March 23	, 2022	BH51-22			
SOIL DESCRIPTION	PLOT								DEPTH (m)	FI FV	Pen. Resist. Blows/0.3m       ■         ● 50 mm Dia. Cone       Menu Hermitian         ○ Water Content %       Would for the second seco
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	VALUE r RQD		(11)	• Water Content %			
GROUND SURFACE	STI	f	NUN	RECO	N OF O			20 40 60 80 $\ge$ O			
						0-	-79.94				
Compact, brown SILTY SAND		⊠ AU ∬ SS	1 2	67	15	1-	-78.94				
1.45		ss	3	67	Р						
		Т	4	100		2-	-77.94				
		G	4 5	100		3-	-76.94				
Soft to firm, grey SILTY CLAY				100	Р	4-	-75.94				
		X SS X G	6 7	100	P			● ● ●			
						5-	-74.94				
0.55		TW G	8 9	100		6-	-73.94				
Dynamic Cone Penetration Test commenced at 6.55m depth. Cone pushed up to 14.02m depth, borehole terminated.								20         40         60         80         100           Shear Strength (kPa)         Undisturbed         △ Remoulded         A			

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

#### REMARKS

PG5827
HOLE NO.

BORINGS BY Track-Mount Powe	r Auger	ſ			D	ATE	March 23	, 2022	BH52-22		
SOIL DESCRIPTION		РГОТ		SAMPLE			DEPTH ELEV.		Pen. Resist. Blows/0.3m 50 mm Dia. Cone		
		STRATA P	ТҮРЕ	NUMBER	°% RECOVERY	N VALUE or RQD	(m)	(m)	<ul> <li>Water Content %</li> </ul>	Monitoring Well Construction	
GROUND SURFACE				-	RI	z <sup>0</sup>	0-	-80.24	20 40 60 80	ΣŎ	
Very stiff, reddish brown SILTY CLAY, trace sand	_ <u>0.30</u> 1.07		⊠ AU	1	50			-79.24	o.	ներիներիներիներին։ « •	
Loose, brown SILTY SAND	†	ΠŤ	ss	2	58	9	1	79.24	O	րիր Միր	
,- grey by 1.5m depth	1.83		ss	3	0	Р	2-	-78.24			
			G	4						լրի լիկ	
		X			100		3-	-77.24			
		X	TW	5	100						
Soft, grey SILTY CLAY		X	ss	6	100	Р	4-	-76.24	••••••••••••••••••••••••••••••••••••••		
			тw	7	100		5-	-75.24	Q		
		X	G	8							
	_ <u>6.55</u>	X	₿ G	9			6-	-74.24			
End of Borehole			-								
(GWL @ 0.63m - May 25, 2022)											
									20 40 60 80 10 Shoer Strength (//De)	00	
									Shear Strength (kPa) ▲ Undisturbed △ Remoulded		

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM	Geodetic
DATUM	Geodetic

#### REMARKS

PG5827
HOLE NO.
DU52 00

BORINGS BY Track-Mount Power Auge	er	i		D	ATE	March 24	, 2022	BH53-22
SOIL DESCRIPTION		SAMPLE			1	DEPTH	ELEV.	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone > 5
	STRATA PLOT	ТҮРЕ	NUMBER	» RECOVERY	VALUE r RQD	(m)	(m)	Pen. Resist. Blows/0.3m       ■         ● 50 mm Dia. Cone       > Duiton         ○ Water Content %       > Duiton         20       40       60       80
GROUND SURFACE	ũ	-	Ĭ.	REC	N OF		/_	<b>20 40 60 80 ≥</b> °
TOPSOIL0.28		⊠ AU	1			- 0-	-79.48	
Very stiff, reddish brown <b>SILTY</b> <b>CLAY,</b> trace sand seams 1.45		ss	2	58	7	1-	-78.48	
Compact, grey SILTY SAND 1.83		ss	3	75	Р	2-	-77.48	
		G	4					
		ss	5	100	Р	3-	-76.48	
Stiff to soft, grey SILTY CLAY		G	6			4-	-75.48	
		ss	7	100	Р	5-	-74.48	
6.55		X G X G	8 9			6-	-73.48	
Dynamic Cone Penetration Test commenced at 6.55m depth. Cone pushed up to 17.07m depth, borehole terminated. (GWL @ 0.84m - May 25, 2022)								20 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

HOLE NO.

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

#### REMARKS

BORINGS BY Track-Mount Power Aug	er			D	ATE	March 24	, 2022	BH54-22
SOIL DESCRIPTION	PLOT		SAN	IPLE	1	DEPTH	ELEV.	Pen. Resist. Blows/0.3m • 50 mm Dia. Cone
	STRATA I	ТҮРЕ	NUMBER	% RECOVERY	VALUE r RQD	(m)	(m)	Pen. Resist. Blows/0.3m         ● 50 mm Dia. Cone         ○ Water Content %         20       40       60       80
GROUND SURFACE	ι. Γ	L.	N	REC	N O H O			20 40 60 80
		AU	1			0-	-80.19	0
Very stiff, brown <b>SILTY CLAY</b> with some sand	5	ss	2	67	Р	1-	-79.19	
Loose to compact, brown SILTY SAND2.2		ss	3	67	Р	2-	-78.19	
		G	4			3-	-77.19	
		ss	5	8	P		-76.19	
Soft, grey SILTY CLAY, trace sand		X G X SS	6 7	100	P			
		X G	8			5-	-75.19	
6.5		G	9			6-	-74.19	<u> </u> ↓ <u>∴</u> <u> </u> :
End of Borehole		_						
(GWL @ 0.15m - May 27, 2022)								
								20 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

detic

#### REMARKS

PG5827 HOLE NO.

BORINGS BY Track-Mount Power Auge	er			D	ATE	March 24	, 2022	BH55-22					
SOIL DESCRIPTION	PLOT			IPLE		DEPTH (m)	ELEV. (m)			ows/0.3n a. Cone	u Vell tion		
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD					ntent %	Monitoring Well Construction		
GROUND SURFACE				щ		0-	80.24	20	40	60 80			
7 <b>TOPSOIL</b> 0.20	(XX)	X SS	1	33	2	Ū	00.2.	0			⊨⊻⊨		
Very stiff to stiff, brown <b>SILTY CLAY</b> with sand and sand seams		ss	2	33	Р	1-	-79.24	4	0				
with sand and sand seams		ss	3	25	Р	2-	-78.24		0				
- soft and grey by 2.2m depth		Тw	4	96		3-	-77.24						
		ss	5	100	Р					O			
		X G	6			4-	-76.24			· · · · · · · · · · · · · · · · · · ·			
		ss	7	100	Р	5-	-75.24		0				
		TW ⊠G	8 9	100		6-	-74.24		O				
6. <u>55</u> End of Borehole													
(GWL @ 0.34m - May 27, 2022)													
$(GWE \oplus 0.54 m - May 27, 2022)$													
								20	40	60 80	100		
								Shea ▲ Undistu	r Streng	th (kPa)			

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

#### REMARKS

PG5827 HOLE NO.

BORINGS BY Track-Mount Power	Auge	er			D	ATE	March 25	, 2022	BH56-22				
SOIL DESCRIPTION		PLOT		SAN	IPLE		DEPTH	ELEV.	Pen. Resist. Blows/0.3m■● 50 mm Dia. Cone≥ 5				
		STRATA I	ТҮРЕ	NUMBER	°% RECOVERY	N VALUE or RQD	(m)	(m)	Pen. Resist. Blows/0.3m       ■         ● 50 mm Dia. Cone       Mountoring         ○ Water Content %       20       40       60       80				
GROUND SURFACE		03		Z	RE	z °	0	00.01	20 40 60 80 <b>Š</b> Ö				
	0.18		ss	1	8	2	0-	-80.21	0 = ¥=				
Very loose to compact, brown SILTY SAND	1.45		ss	2	42	10	1-	-79.21					
			ss	3	100	Р	2-	-78.21					
			G	4									
			ss	5	67	Р	3-	-77.21					
Stiff to soft, grey SILTY CLAY			G	6			4-	-76.21					
			ss	7	67	Р	5-	-75.21	- <b> </b>				
			G	8 9				74.04	<b>▲</b> 0				
	6.55	X	p G	9			6-	-74.21					
Dynamic Cone Penetration Test commenced at 6.55m depth. Cone pushed up to 14.02m depth, boreh terminated.	<del>)</del>		-										
(GWL @ 0.37m - May 27, 2022)													
									20 40 60 80 100				
									Shear Strength (kPa) ▲ Undisturbed △ Remoulded				

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

9 Auriga Drive, Ottawa, Ontario K2E 7T9

### **Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

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BORINGS BY Track-Mount Power A	uger				D	ATE	March 25	, 2022		HOLE N		
SOIL DESCRIPTION		PLOT		SAN	IPLE		DEPTH (m)	ELEV. (m)		lows/0.3m ia. Cone	Well	
		STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(11)	(11)	• V	Vater Co	ontent %	Monitoring Well Construction
GROUND SURFACE		S		N	RE	z °	0	-80.21	20	40	60 80	
Very loose to compact, brown SILTY SAND	.18		- ∑ss	1	50	10		-79.21	C			
Stiff to soft, grey SILTY CLAY			ss Tw	2 3	100 100	Р	2-	-78.21			0	
End of Borehole	. <u>90</u>	1/.//										-
(GWL @ 0.20m - May 27, 2022)									20 Shea ▲ Undis	ar Streng	60 80 1 gth (kPa) △ Remoulded	00

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic
DATUM Geodetic

REMARKS	
BORINGS BY	Track

FILE NO. PG5827 HOLE NO. BH57-22

BORINGS BY Track-Mount Power Auger DATE March 25,								, 2022	BH57-22
SOIL DESCRIPTION		PLOT		SAN			DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone
		STRATA	ТҮРЕ	NUMBER	» RECOVERY	N VALUE or RQD	(,	(,	Pen. Resist. Blows/0.3m         ● 50 mm Dia. Cone         ○ Water Content %         20       40       60       80
GROUND SURFACE					<u>щ</u>	-	0-	-79.91	20 40 60 80 ≥ 0
TOPSOIL Very stiff, reddish brown SILTY CLAY with sand	0.28 1.45		i au Ss	1 2	67	6		-78.91	
Compact, grey SILTY SAND	2.21		тw	3	50		2-	-77.91	O
			TW G	4 5	100		3-	-76.91	
			∦ss ∦g	6 7	87	Р		-75.91	
Stiff to firm, grey SILTY CLAY			G	8			5-	-74.91	
- soft by 6.0m depth			ss	9	67	Р	6-	-73.91	• • • • • • • • • • • • • • • • • • •
			тw	10	100		7-	-72.91	
			G	11			8-	-71.91	
	9.60		X SS X G	12 13	100	P	9-	-70.91	
End of Borehole	_ <u>J. UU</u>	* // /	-						
(GWL @ 0.65m - May 25, 2022)									20 40 60 80 100 Shear Strength (kPa)
									Shear Strength (kPa) ▲ Undisturbed △ Remoulded

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

#### REMARKS

PG5827
HOLE NO.
DUE0 00

BORINGS BY Track-Mount Power Aug			0	DATE	March 28	, 2022	BH58-22					
SOIL DESCRIPTION		SAN	<b>IPLE</b>	1	DEPTH	ELEV.	Per			lows/0.3m a. Cone	Mell	
	STRATA PLOT	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	С			ntent %	Monitoring Well
GROUND SURFACE				8	2 0	- 0-	80.92	2	0 4	10 	60 80	≥(
TOPSOIL0.18	3 + +   + /	∦ ss	1	50	6				>			≣₹
Loose, brown <b>SILTY SAND</b>	5	ss	2	0	Р	1-	-79.92				0	
Stiff to firm, brown <b>SILTY CLAY</b> with sand seams		SS G	3 4	33	Р	2-	-78.92	<u>ک</u>				
		x ss	4 5	100	P	3-	-77.92				O	
- soft and grey by 2.2m depth		G	6			4-	-76.92				<b>O</b>	
		ss	7	67	9	5-	-75.92				0	
6.55		X G X G	8 9			6-	-74.92				0	
Dynamic Cone Penetration Test commenced at 6.55m depth. Cone pushed up to 14.50m depth, borehole terminated.		-										-
(GWL @ 0.53m - June 10, 2022)												
								2	<u> </u>	10	60 80 1	
								S	hear S	Streng	60 80 1 gth (kPa)	00
									ndisturb		A Remoulded	

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### Geodetic DATUM

REMARKS
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BORINGS BY Track-Mount Power Auge	r			п	ATE	March 28	2022		HOLE NO. <b>BH58A-22</b>				
SOIL DESCRIPTION	PLOT		SAN			DEPTH	ELEV.						
	STRATA I	ТҮРЕ	NUMBER	% RECOVERY	N VALUE of RQD	(m)	(m)		/ater Content %	Construction			
GROUND SURFACE			N	RE	z <sup>o</sup>	0-	-80.92	20	40 60 80 2				
TOPSOIL 0.18		-					00.02		5	₹			
Loose, brown <b>SILTY SAND</b>		ss	1	0	Ρ	1-	-79.92						
Stiff to firm, brown SILTY CLAY with		ss	2	0	Р	2-	-78.92						
sand seams		тw	3	0		2	-77.92						
- soft and grey by 2.2m depth		тw	4	83		S-	-77.92						
4.27	XX	ТW	5	0		4-	-76.92						
End of Borehole													
(GWL @ 0.40m - June 10, 2022)													
								20	40 60 80 100				
								Shea ▲ Undistu	r Strength (kPa)				

### SOIL PROFILE AND TEST DATA

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### DATUM Geodetic

REMARKS
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PG5827 HOLE NO. BH59-22

BORINGS BY Track-Mount Power	Auger DATE				ATE	March 28	, 2022	BH59-22	
SOIL DESCRIPTION		РІОТ		SAN	MPLE		DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m       □         ● 50 mm Dia. Cone       ≥ ⊖
		STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE of RQD	(11)	(11)	Pen. Resist. Blows/0.3m         ● 50 mm Dia. Cone         ○ Water Content %         20       40       60       80
GROUND SURFACE		01		4	RE	z <sup>o</sup>		70.01	20 40 60 80 <b>≥</b> Ŭ
	0.15	XX	∛ ss	1	33	4	0-	-79.31	<b>O</b>
			ss	2	42	7	1-	-78.31	
Very stiff to stiff, reddish brown to brown SILTY CLAY with sand			ss	3	42	Р	2-	-77.31	
seams			G	4					
- soft and grey by 2.2m depth			ss	5	100	Р	3-	-76.31	
			G	6			4-	-75.31	
			ss	7	100	Р	5-	-74.31	C C
			X G X G	8 9			6-	-73.31	
End of Borehole	<u>6.55</u>	11	-						
(GWL @ 0.33m - May 25, 2022)									
									20 40 60 80 100 Shear Strength (kPa)
									▲ Undisturbed △ Remoulded

### patersongroup Consulting SOIL PROFILE Geotechnical Investigation

### SOIL PROFILE AND TEST DATA

20

▲ Undisturbed

40

60

Shear Strength (kPa)

80

△ Remoulded

100

Monitoring Well Construction

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9 Auriga Drive, Ottawa, Ontario K2E 7T9	Pr	Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario									
DATUM Geodetic							-		FILE		
REMARKS									HOLE	5827	
BORINGS BY Track-Mount Power Auge	er			D	ATE	March 28	, 2022			59 <b>A-2</b>	2
SOIL DESCRIPTION		SAMPLE				DEPTH	ELEV.		lesist. 50 mm		
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	ALUE RQD	(m)	0 1	Nater C	Conter	nt %	
GROUND SURFACE	Ω.		IN	REC	N OF		70.04	20	40	60	80
TOPSOIL0.15	XX	-				- 0-	-79.31				
Very stiff to stiff, reddish brown to brown SILTY CLAY with sand		ss	1	0	Ρ	1-	-78.31				
seams		ss	2	42	Ρ	2-	-77.31				0
- soft and grey by 2.2m depth		тw	3	96							
End of Borehole											
(GWL @ 0.18m - May 25, 2022)											

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

#### REMARKS

PG5827 HOLE NO.

BORINGS BY Track-Mount Power Auger DATE						March 29	, 2022		BH60-	-22	
SOIL DESCRIPTION	H     SAMPLE     DEPTH     ELEV.     Pen. Resist. Blows/0       H     H     H     H     H       H     H     H     H       H     H     H     H						Monitoring Well Construction				
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	VALUE r RQD	(11)	(11)				tructi
	STR	TY	MUN		N VP					ntent %	lonit
GROUND SURFACE	-			<u></u>	4	- 0-	-79.74	20	40 6	60 80 	≥0
Very stiff, brown SILTY CLAY, trace0.69		<b>⊉</b> AU	1					0			<u>1111</u>
sand	- [1] [ ] [	ss	2	50	15	1-	-78.74	0			
Compact, brown SILTY SAND <u>1.58</u>		ss	3	100	Р	0	-77.74	Δ		0	ներուներությունըներուներուներին 
		A A G	4			2-	-//./4				
						3-	-76.74				
Soft, grey SILTY CLAY		ss	5	100	P				<b>.</b>	0	
		G	6			4-	-75.74	····· •	0		
		ss	7	87	Р	5	-74.74			0	
						5-	-/4./4				
		TW G	8 9	100		6-	-73.74		· · · · · · · · · · · · · · · · · · ·	- O	
6.55	5 1/1	1								······································	-
(GWL @ 0.74m - May 25, 2022)											
(GWL @ 0.74III - May 23, 2022)											
								20 Shea	40 ( Streng	60 80 10 Jth (kPa)	òo
								Undistu	rbed ∠	Remoulded	
					1						

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827 HOLE NO.

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

### DATUM Geodetic

REMARKS
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BORINGS BY Track-Mount Power Auge	er			D	ATE I	March 29	, 2022	BH60A-22
SOIL DESCRIPTION		SAMPLE			DEPTH		ELEV.	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone > 5
	STRATA PLOT	ТҮРЕ	NUMBER	% RECOVERY	VALUE r rod	(m)	(m)	Pen. Resist. Blows/0.3m         ● 50 mm Dia. Cone         ○ Water Content %         20       40       60       80
GROUND SURFACE	5 T S	H	ŊŊ	REC	N OF			20 40 60 80 ≥O
TOPSOIL 0.25	ZZXI	-				0-	-79.74	
Very stiff, brown <b>SILTY CLAY,</b> trace0.69		ss	1	50	22	1-	-78.74	¥.
Compact, brown SILTY SAND 1.58							/0./ 1	
Soft, grey SILTY CLAY 2.13	XX.	ss	2	8	Р	2-	-77.74	
End of Borehole								
(GWL @ 0.64m - May 25, 2022)								
								20 40 60 80 100
								Shear Strength (kPa)
								▲ Undisturbed △ Remoulded

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

#### REMARKS

PG5827
HOLE NO.
DUC1 00

BORINGS BY Track-Mount Power Auger					DATE	March 29	, 2022	1	BH61-22			
SOIL DESCRIPTION	EC E		SAN	<b>IPLE</b>		DEPTH	ELEV.		lesist. Bl 50 mm Di	Mell		
GROUND SURFACE	с 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		NUMBER	° ≈	N VALUE or RQD	(m)	(m)		Nater Co		Monitoring Well	
	0.28	_ ₽X ss	1	87	31	- 0-	-79.20	0			- · · · · ·	
Dense to compact, brown SILTY SAND	1.45	ss	2	67	11	1-	-78.20		0		יווינים איניים איני איניים איניים איניים מערכי איניים א	
- brown silty clay layer from 0.8 to	1.45	ss	3	100	Р	2-	-77.20			0		
		тw	4	100								
		ss	5	100	Р	3-	-76.20		þ.	· · · · · · · · · · · · · · · · · · ·		
Firm to soft, grey SILTY CLAY		тw	6	100		4-	-75.20					
		ss	7	100	Р	5-	-74.20			0		
		G G	8 9			6-	-73.20		C	) •		
End of Borehole	<u>6.55</u>	24								•••••••••••••••••••••••••••••••••••••••	-	
(GWL @ 0.64m - May 25, 2022)												
								20 She ▲ Undis	ar Streng	60 80 1 ]th (kPa) ∆ Remoulded	⊣ I <b>00</b>	

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

#### REMARKS

PG5827
HOLE NO.
BH62-22

BORINGS BY Track-Mount Power Aug	er		DATE March 30, 2022 BH62-22					
SOIL DESCRIPTION	PLOT		SAN	IPLE	1	DEPTH		Pen. Resist. Blows/0.3m=● 50 mm Dia. Cone≥ 5
	STRATA	ТҮРЕ	NUMBER	°% RECOVERY	N VALUE or RQD	(m)	(m)	Pen. Resist. Blows/0.3m     ■       ● 50 mm Dia. Cone     Monitorities       ○ Water Content %     Building to the second s
GROUND SURFACE				Ř	4	0-	78.98	20 40 60 80 ≥ C
_ <b>TOPSOIL</b> 0.3	) +   +   +	∦ ss	1	42	14	Ŭ	/ 0.00	
Compact, brown SILTY SAND	5	ss	2	58	15	1-	-77.98	
		ss	3	67	Р	2-	-76.98	· · · · · · · · · · · · · · · · · · ·
		G	4			3-	-75.98	
Firm to soft, grey SILTY CLAY		TW	5	100				
		∦ ss	6	67	P	4-	-74.98	
		TW G	7 8	100		5-	-73.98	
6.5	5	Ğ	9			6-	-72.98	
Dynamic Cone Penetration Test commenced at 6.55m depth. Cone pushed up to 11.00m depth, borehole terminated. (GWL @ 0.87m - May 25, 2022)								
								Shear Strength (kPa) ▲ Undisturbed △ Remoulded

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

Geodetic DATUM

#### REMARKS

PG5827 HOLE NO. סרכט טט

BORINGS BY Track-Mount Power	Auge	r	DATE March 30, 202						BH63-22			
SOIL DESCRIPTION		РІОТ		SAN	IPLE	1	DEPTH (m)	ELEV. (m)		Pen. Resist. Blows/0.3m • 50 mm Dia. Cone		
		STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(11)	(11)	Pen. Resist. Blows/0.3m			
GROUND SURFACE		-			8	2	0-	-78.66	20		50     80	≥υ
	0.30 0.69	1XX	ss	1	17	5			0			
Loose, brown SILTY SAND			ss	2	42	7	1-	-77.66		0		
	<u>1.45</u>		ss	3	100	Р		70.00	<u>А</u>	· · · · · · · · · · · · · · · · · · ·	O	ուներիներիներիներին Յուրերիներիներիներին
			G	4			2-	-76.66			O	
		X					3-	-75.66				
Soft, grey SILTY CLAY with sand		X	ss	5	100	Р					9	
seams		X	G	6			4-	-74.66				
			ss	7	100	Р	5-	-73.66		o		
		X	G	8						C	<b>)</b>	
	0 55	X	G	9			6-	-72.66		O		
End of Borehole	<u>6.55</u>		_									
(GWL @ 0.66m - May 25, 2022)												
									20	40 (		+ 00
									Shea	ar Streng	th (kPa) Remoulded	

### SOIL PROFILE AND TEST DATA

**Geotechnical Investigation Proposed Mixed-Use Community Development** Tewin Community - Ottawa, Ontario

**DATE** March 30, 2022

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### DATUM Geodetic

REMARKS

BORINGS BY	Track-Mount Power Auge	r	

FILE NO. <b>PG5827</b>
HOLE NO. <b>BH63A-22</b>
esist. Blows/0.3m 0 mm Dia. Cone

▲ Undisturbed △ Remoulded

SOIL DESCRIPTION		РІОТ		SAN	IPLE		DEPTH	ELEV.		n. Resi	st. Bl nm Dia			Vell
SUL DESCRIPTION		STRATA P	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)			er Cor			Monitoring Well Construction
GROUND SURFACE		S	Р	NC	REC	Z O			2	20 4	06	50	80	N N
TOPSOIL	0.30		_				- 0-	-78.66						
Stiff, brown SILTY CLAY	0.69													
Compact, brown SILTY SAND	1.45		∦ss	1	33	14	1-	-77.66		0				
		XX	ss	2	33	Р	2-	-76.66					0	
		XX	TW	3	96		2	/ 0.00						
Soft, grey <b>SILTY CLAY</b> with sand seams		XX	1 0 0	3	90		3-	75.66						
		XX												1
	4 40	XX	ss	4	100	0	4-	74.66		• • • • • • • • • • • •	· · · · · · · · · · · · · · · · · · ·		······································	
End of Borehole	<u>4.42</u>	<u> </u>	Δ	-										
(GWL @ 0.66m - May 25, 2022)														
(GWL @ 0.0011 - May 23, 2022)											· · · · · · · · · · · · · · · · · · ·			
										20 4	0 6	50	80 1	 00
										Shear S	Streng		a)	
					1					n diaturb.	وت ۸ امه	Domo	, uldod	

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

Geodetic DATUM

#### REMARKS

PG5827 HOLE NO. 

SOIL DESCRIPTION         SAMPLE         DEFINING         ELEV. (m)         Pen. Resist. Blows0.3m         Pen. Resist. Blows0.3m           GROUIND SURFACE         0.33         55         1         33         20         -7.8.33         -7.7.83         -7.7	BORINGS BY Track-Mount Power	r Auger			C	DATE	March 30	, 2022		BH64-2	22	
TOPSOIL       0.33       0.69       0.55       1       33       20         Compact brown SiLTY SAND       0.69       0.55       1       77.83       0       1       77.83         Loose, brown SiLTY SAND       2.21       SS       3       25       P       2       76.83         Soft, grey SiLTY CLAY       SS       5       42       P       3       75.83       0         Soft, grey SiLTY CLAY       SS       7       67       P       5       73.83       0       0       0         CWL @ 0.90m - May 25, 2022)       6       9       6       9       6       72.83       0       0       0         20       40       60       8       0       0       0       0       0       0         CGWL @ 0.90m - May 25, 2022)       0<	SOIL DESCRIPTION	LOT		SAMPLE				Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				
TOPSOIL       0.33       0.69       0.55       1       33       20         Compact brown SiLTY SAND       0.69       0.55       1       77.83       0       1       77.83         Loose, brown SiLTY SAND       2.21       SS       3       25       P       2       76.83         Soft, grey SiLTY CLAY       SS       5       42       P       3       75.83       0         Soft, grey SiLTY CLAY       SS       7       67       P       5       73.83       0       0       0         CWL @ 0.90m - May 25, 2022)       6       9       6       9       6       72.83       0       0       0         20       40       60       8       0       0       0       0       0       0         CGWL @ 0.90m - May 25, 2022)       0<			ТҮРЕ	NUMBER	* ECOVERY	N VALUE or RQD	(m)	(m)	• W	ater Con	itent %	10nitoring
Compact, brown SILTY SAND 0.661 TA 00 1 00 25 Very stiff, reddish brown SILTY 1.45 CAP Losse, brown SILTY SAND 2.21 Soft, grey SILTY CLAY Soft, grey SILTY CLAY End of Borehole (GWL @ 0.90m · May 25, 2022)		0.00					0-	78.83	20	40 6	0 80	20
Very stiff, reddish brown SILTY         1.44         SS         2         50         5         1         177.83           Loose, brown SILTY SAND         2.21         SS         3         25         P         2         76.83           Soft, grey SILTY CLAY         SS         5         42         P         3         75.83           Soft, grey SILTY CLAY         SS         7         67         P         5         73.83           End of Borehole         6.55         G         9         6         72.83         6         72.83           End of Borehole         (GWL @ 0.90m - May 25, 2022)         S		$-\frac{0.33}{0.69}$	ss	1	33	20			0			
SS       7       67       P       5-73.83         G       8       9       6-72.83       0         End of Borehole       (GWL @ 0.90m - May 25, 2022)       0       0       0         G       9       1       1       1       1         GWL @ 0.90m - May 25, 2022)       0       0       0       0         20       40       60       80       100         Shear Strength (kPa)       100       100       100	Very stiff, reddish brown <b>SILTY</b>	WX.	ss	2	50	5	1-	-77.83		<b>5</b>		
SS       7       67       P       5-73.83         G       8       9       6-72.83       0         End of Borehole       (GWL @ 0.90m - May 25, 2022)       0       0       0         G       9       1       1       1       1         GWL @ 0.90m - May 25, 2022)       0       0       0       0         20       40       60       80       100         Shear Strength (kPa)       100       100       100	Loose, brown SILTY SAND	+  - 2.21	ss	3	25	Р	2-	-76.83	0			
SS       7       67       P       5-73.83         G       8       9       6-72.83       0         End of Borehole       G       9       6-72.83       0         (GWL @ 0.90m - May 25, 2022)       6       9       1       1         20       40       60       80       100         Shear Strength (kPa)       100       100       100			Tw	4	96					· · · · · · · · · · · · · · · · · · ·		
SS       7       67       P       5-73.83         G       8       9       6-72.83       0         End of Borehole       G       9       6-72.83       0         (GWL @ 0.90m - May 25, 2022)       6       9       1       1         20       40       60       80       100         Shear Strength (kPa)       100       100       100			ss	5	42	P	3-	-75.83		0		
SS       7       67       P       5-73.83         G       8       9       6-72.83       0         End of Borehole       G       9       6-72.83       0         (GWL @ 0.90m - May 25, 2022)       6       9       1       1         20       40       60       80       100         Shear Strength (kPa)       100       100       100	Soft arev SILTY CLAY		Тт	6	92		4-	-74.83				<u>նիկի</u>
G B G G B G G G G G G G G G G G G G G G			ss	7		P	5.	72 02		o		
6.55 G 9 6-72.83							5-	73.03		0		
End of Borehole (GWL @ 0.90m - May 25, 2022)			Ğ	9			6-	72.83		C	▶ • • • • • • • • • • • • • • • • • • •	
20 40 60 80 100 Shear Strength (kPa)	End of Borehole	_ <u>6.55 / / / /</u>	1									-
20 40 60 80 100 Shear Strength (kPa)	(GWL @ 0.90m - May 25, 2022)											
Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
Shear Strength (kPa)												
												00
▲ Undisturbed △ Remoulded											t <b>h (kPa)</b> Remoulded	

### SOIL PROFILE AND TEST DATA

S Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### DATUM Geodetic

#### REMARKS

PG5827
HOLE NO.

BORINGS BY Track-Mount Power Aug	ger			C	DATE	March 31	, 2022	BH65-22
SOIL DESCRIPTION	РГОТ		SAN	<b>IPLE</b>	1	DEPTH	ELEV.	Pen. Resist. Blows/0.3m     □       ● 50 mm Dia. Cone     ≥
GROUND SURFACE	STRATA 1	ЭДХТ	NUMBER	* RECOVERY	N VALUE or RQD	(m)	(m)	Pen. Resist. Blows/0.3m         ● 50 mm Dia. Cone         ○ Water Content %         20       40       60       80
	5	x ss	1	50	4	0-	-79.14	
TOPSOIL         0.1           Loose, brown SILTY SAND         0.6	9					4	70.14	
		ss	2	50	6	1-	-78.14	
Vary stiff to stiff raddiab brown		ss	3	100	P	2-	-77.14	•••••
/ery stiff to stiff, reddish brown SILTY CLAY		G	4					0
		ss	5	100	P	3-	-76.14	
soft and grey by 2.9m depth				100			75 4 4	
		K G	6			4-	-75.14	
		ss	7	100	Р	5-	-74.14	
		G	8					
6.5	-	G	9			6-	-73.14	Φ Δ <b>Δ</b>
Dynamic Cone Penetration Test commenced at 6.55m depth. Cone bushed up to 19.91m depth, borehole erminated. GWL @ 1.09m - June 10, 2022)								
								20         40         60         80         100           Shear Strength (kPa)           ▲ Undisturbed         △ Remoulded

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

HOLE NO.

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### DATUM Geodetic

	E		SAN	<b>IPLE</b>				Pen. Resist. Blows/0.3m		
SOIL DESCRIPTION	A PLOT				Но	DEPTH (m)	ELEV. (m)	● 50 mm Dia. Cone		
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	OF ROD					Pen. Resist. Blows/0.3m       Image: Constant of the second
GROUND SURFACE OPSOIL 0.2	5	x ss	1	87	5	0-	-80.31	20 40 60 80 ≥		
oose, brown SILTY SAND 0.6	Ĩ	Ц Б					70.04	139		
		ss	2	67	Р	1-	-79.31			
ery stiff to stiff, brown <b>SILTY CLAY</b>		ss	3	67	Р	2-	-78.31			
		ss	4	50	Р					
firm to stiff and grey by 2.2m depth		ss	5	33	Р	3-	-77.31			
		Ê	6		•	1-	-76.31			
		X G	o			+	70.01			
firm by 4.6m depth		ss	7	50	Р	5-	-75.31			
		G	8							
		ΧG	9			6-	-74.31			
						7-	-73.31			
		G	10			/	70.01			
		ss	11	100	Р	8-	-72.31			
		G	12					<b>4</b>		
9.6		G	13			9-	-71.31			
nd of Borehole	<u>• 17 / / / / / / / / / / / / / / / / / / </u>	-								
GWL @ 0.83m - May 27, 2022)										
								20 40 60 80 100		
								Shear Strength (kPa) ▲ Undisturbed △ Remoulded		

### SOIL PROFILE AND TEST DATA

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

### DATUM Geodetic

REMARKS
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PG5827	
HOLE NO.	
BH60-22	

BORINGS BY Track-Mount Power Auge	er	1		D	ATE	April 13, 2	2022	1	BH	69-22		
SOIL DESCRIPTION	PLOT		SAN	IPLE	1	DEPTH	ELEV.			Blows/0.3m Dia. Cone	Monitoring Well	
	STRATA I	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)		• Water Content %			
GROUND SURFACE	Ω.	-	Ĩ	RE	zö	0	-80.47	20	40	60 80	l ≥ c	
TOPSOIL         0.20           Very loose, brown         SILTY SAND         0.69	++ +'	ss	1	25	3		-00.47	ο				
		ss	2	50	Р	1-	-79.47	0		<u>4</u>		
/ery stiff to stiff, brown SILTY CLAY		ss	3	100	Р	2-	-78.47	#				
firm and grey by 2.2m depth		ss	4	83	Р					0		
		ss	5	75	Р	3-	-77.47	4		0		
		G	6			4-	-76.47					
		ss	7	50	Р	5-	-75.47		<b>/</b>	0		
		X G X G	8 9			6-	-74.47	4	(	•		
Oynamic Cone Penetration Test commenced at 6.55m depth. Cone bushed up to 10.97m depth, borehole erminated. GWL @ 0.75m - May 27, 2022)												
								20 She ▲ Undis		60 80 1 ength (kPa) △ Remoulded	⊣ I00	

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geodetic

### REMARKS

DATUM

BORINGS BY Track-Mount Power Aug	er			D	ATE	April 13, 2	2022			e no. <b>69A-22</b>		
SOIL DESCRIPTION	PLOT		SAN	IPLE		DEPTH (m)	ELEV. (m)			Blows/ Dia. Co		g Well ion
	STRATA	ТҮРЕ	NUMBER	° ≈ © ©	N VALUE or RQD		(,	• V	Vater	Content	%	Monitoring Well Construction
GROUND SURFACE				R	z	0	90.47	20	40	60	80	
TOPSOIL0.20	)	-				0-	-80.47					
Loose, brown SILTY SAND 0.69	9	-										目
Very stiff to stiff, brown <b>SILTY CLAY</b>		∦ ss ∦ ss	1	67 25	4 5		-79.47		0			
End of Borehole	YZZ	1				2-	-78.47					-
(GWL @ 0.16m - May 27, 2022)								20 Shea	40 ar Stre	60 ength (kl		00

### SOIL PROFILE AND TEST DATA

40

20

Undisturbed

60

Shear Strength (kPa)

80

△ Remoulded

100

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### **Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

REMARKS	
BORINGS BY	CME-

DATUM Geodetic					•				FILE NO		
REMARKS								-	HOLE N	0.	
BORINGS BY CME-55 Low Clearance I	Drill			D	ATE I	Decembe	er 5, 2022	2	BH70	-22	
SOIL DESCRIPTION	PLOT		SAN			DEPTH (m)	ELEV. (m)			ows/0.3m a. Cone	J Well on
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	VALUE r rod		(11)	• w	ater Co	ntent %	Monitoring Well Construction
GROUND SURFACE	ST	H	NN	REC	N O L			20	40	60 80	N N N
TOPSOIL0.33			4			0-	-79.42				∎
Compact, brown SILTY SAND		6	1	50	10		-78.42				
_ grey by 0.8m depth 1.45		∦ ss	2	58	12		70.42				
		ss	3	42	Р	2-	-77.42				
Firm to soft, grey SILTY CLAY with		$\mathbb{V}$		100	_	3-	-76.42				
intermittent sand seams to 4.6m		ss	4	100	P						
depth.		ss	5	58	Р	4-	-75.42				
		ss	6	83	Р	5	-74.42				
						5-	-74.42				
						6-	-73.42		· · · · · · · · · · · · · · · · · · ·		
6.71	X	🛛 ss	7	83	Р			▲ ▲			
Dynamic Cone Penetration Test commenced at 6.71m depth. Cone pushed to 30.48m depth, no DCPT refusal encountered, borehole terminated. (GWL @ 0.39m - Dec. 13, 2022)											

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geodetic

#### REMARKS

DATUM

DRINGS BY CME-55 Low Clea	Irance [			SAN	D IPLE	ATE			Per	n. Resi		ows/0.:		
SOIL DESCRIPTION		STRATA PLOT	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)	C			a. Cone		Monitoring Well
ROUND SURFACE		ST	H	IJИ	REC	N OF			2				60	Mon
OPSOIL	0.33		_				0-	-79.42						-
ompact, brown <b>SILTY SAND</b>								70.40						
grey by 0.8m depth	1.45		-				1-	-78.42					· · · · · · · · · · · ·	
							2-	-77.42						-
rm to soft, grey SILTY CLAY			тw	1	100									
			тw	2	77		3-	-76.42				· · · · · · · · · · · · · · · · · · ·		-
	4.11	X		2				75 40						
nd of Borehole	·' '_'-		-				4-	-75.42						
										· · · ·				
										· · · · · · · · · · · · · · · · · · ·				
									2	0 4	0 6	i i i i i i i i i i i i i i i i i i i	0 1	00
												th (kPa	a)	

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

#### REMARKS

PG5827
HOLE NO.
DU71 00

BORINGS BY Track-Mount Power Aug	ger	_		D	DATE .	June 2, 2	022	HOLE NO. BH71-22
SOIL DESCRIPTION	PLOT		SAN	<b>IPLE</b>	1	DEPTH (m)		Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone
	STRATA	ЭДХТ	NUMBER	* RECOVERY	N VALUE or RQD	(m)	(m)	Pen. Resist. Blows/0.3m       • 50 mm Dia. Cone       ○ Water Content %       20     40       60     80
GROUND SURFACE TOPSOIL 0.2	2	Vaa				0-	78.48	20 40 60 80 2
Compact brown SILTY SAND	3+++	ss	1	83	5			<b>•</b>
Hard to very stiff, brown <b>SILTY</b>		ss	2	100	13	1-	-77.48	0 0 121
2.1	3					2-	-76.48	
		x ss x ss	3 4	83 100	P P	3-	-75.48	
			_	100		4-	-74.48	
Stiff to firm, grey SILTY CLAY		ss	5	100	P		-73.48	
		ss	6	100	Р		-71.48	O.
		ss	7	100	Р	8-	-70.48	0
<u>9.6</u>	0	⊠ AU	8			9-	-69.48	
Dynamic Cone Penetration Test commenced at 9.60m depth. Cone pushed up to 30.25m depth, borehole terminated.								
(GWL @ 1.03m - June 15, 2022)								
								20         40         60         80         100           Shear Strength (kPa)         ▲         Indisturbed         △ Remoulded

### SOIL PROFILE AND TEST DATA

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

#### REMARKS

PG5827
HOLE NO.
BH20-00

ORINGS BY Track-Mount Power Au	ger	1		D	ATE	May 27, 202	22	BH72-22
SOIL DESCRIPTION	РГОТ		SAN	IPLE		-	ELEV.	Pen. Resist. Blows/0.3m • 50 mm Dia. Cone
	STRATA I	ТҮРЕ	NUMBER	°. ∧ Secovery	N VALUE or RQD	(m)	(m)	• Water Content %
GROUND SURFACE	20			<u></u>	-	0+7	78.71	
ery stiff to stiff, reddish brown to rown SILTY CLAY		⊠ AU ∬ SS	1 2	100	Р	1-7	7.71	
1.4								4
rm, grey SILTY CLAY				1.0	_	2+7	76.71	121
		ss	3	42	Р	3+7	75.71	
rey silty sand layer from 2.2 to 7m depth		ss	4	42	Р		-	
						4+7	4.71	
						5+7	73.71	
						6-7	2.71	
		ss	5	100	Р		, .	<b>▲</b> ⊙
						7-7	71.71	
						8+7	70.71	
						0-6	69.71	
						9-0	9.71	
						10+6	8.71	
						11-6	67.71	
		ss	6	100	Р	12+6	6./1	ф
		A 99		100		13-6	65.71	
						14+6	64.71	
			_		_	15+6	63.71	
		ss	7	100	Р	16+6	2 71	<u>А</u> О
							<i>1</i> .1	
	ΓKA,	1				17+6	61.71	
								20 40 60 80 100 Shear Strength (kPa)
								▲ Undisturbed △ Remoulded

### SOIL PROFILE AND TEST DATA

FILE NO.

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geodetic

DATUM

									PILE	NO. 5827		
<b>REMARKS</b> <b>BORINGS BY</b> Track-Mount Power Aug	er			D	ATE	May 27, 2	2022			e no. <b>72-22</b>		
	РГОТ		SAMPLE DEPTH ELEV.						lesist.	Blow	s/0.3m	Vell
SOIL DESCRIPTION		ы	ER	ERY	VALUE r RQD	(m)	(m)	• {	0 mm	Dia. C	one	Monitoring Well Construction
	STRATA	ТҮРЕ	NUMBER	°% RECOVERY	N VAJ of R					Conte		Aonitc
GROUND SURFACE				н		17-	61.71	20	40	60	80	
						18-	-60.71					
Firm to stiff, grey <b>SILTY CLAY</b>		ss	8	100	Р					Q		
<u>19.35</u>	5	1					-59.71					
<b>GLACIAL TILL:</b> Compact, red silty sand with gravel, clay, cobbles and boulders						20-	-58.71					
				0.1	07	21-	-57.71					
21.82	$\frac{2}{1}$	∬ SS _ RC	9 1	31 87	27 0	22-	-56.71	0				ייייייייייייייייייייייייייייייייייייי
		RC	2	100	41	23-	-55.71					
						24-	-54.71					
<b>BEDROCK:</b> Poor to excellent quality, red siltstone		RC	3	100	74							
						25-	-53.71					
		RC	4	100	77	26-	-52.71					
			5	100	100	27-	-51.71					
28.29	$(\frac{1}{2}, \frac{1}{2}, $	RC	5	100	100	28-	-50.71					
End of Borehole												
								20 <b>She</b> ▲ Undis		60 ength ( △ Re	80 ( <b>kPa)</b> emoulded	100

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

HOLE NO.

9 Auriga Drive, Ottawa, Ontario K2E 7T9

**Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

Geodetic DATUM

BORINGS BY	CME-55 Lov	v Clearance Drill

BORINGS BY CME-55 Low Clearance	Drill			D	ATE	Decembe	r 5, 2022	BH73-22
SOIL DESCRIPTION	РІОТ		SAN	IPLE	1	DEPTH	ELEV.	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ≥ 5
	STRATA I	ТҮРЕ	NUMBER	°. © © © © © ©	N VALUE or RQD	(m)	(m)	Pen. Resist. Blows/0.3m         ● 50 mm Dia. Cone         ○ Water Content %         20       40       60       80
GROUND SURFACE	Ω Ω		N	RE	z o	0-	-79.94	20 40 60 80
TOPSOIL0.10	444	 ⊠AU	1			0	79.94	
Compact, brown <b>SILTY SAND</b>		ss	2	4	10	1-	-78.94	<b>.</b>
		ss	3	58	12	2-	-77.94	
Comapct, grey SILTY SAND to SANDY SILT		ss	4	75	Р			
3.73		ss	5	75	Р	3-	-76.94	
		ss	6	92	Р	4-	-75.94	<u> </u>
Firm, grey SILTY CLAY, trace sand		ss	7	100	Р	5-	-74.94	
6.71		ss	8	92	P	6-	-73.94	
End of Borehole								
(GWL @ 1.05m - Dec. 13, 2022)								
								20         40         60         80         100           Shear Strength (kPa)           ▲ Undisturbed         △ Remoulded

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

9 Auriga Drive, Ottawa, Ontario K2E 7T9

#### **Geotechnical Investigation** Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

Geodetic DATUM

BORINGS BY CME-55 Low Clearand	e Drill			Г		Decembe	er 6 2022	)	HOLE N		
SOIL DESCRIPTION	LOT		SAN	IPLE		DEPTH	ELEV.	Pen. R	esist. E	lows/0.3m ia. Cone	Mell
	STRATA F	ТҮРЕ	NUMBER	* RECOVERY	VALUE r ROD	(m)	(m)			ontent %	Monitoring Well Construction
GROUND SURFACE			ž	RE	N OL	0-	-78.97	20	40	60 80	°° S°⊻
<b>TOPSOIL</b> 0. <b>FILL:</b> Brown silty sand	.36	S AU	1				10.91				·····
	.45	ss	2	75	11	1-	-77.97				
Compact to loose, grey SILTY SAND		ss	3	58	11	2-	-76.97				
SAND	.97	ss	4	25	6	0	75.07				
		ss	5	50	Р	3-	-75.97	<b>†</b>			
		ТW	6	100		4-	-74.97				
Firm, grey SILTY CLAY		ss	7	100	Р	5-	-73.97				
		Тw	8	100		6	-72.97				
6.	.71	ss	9	100	Р	0-	12.91				······
End of Borehole		T									
(GWL @ 0.70m - Dec. 13, 2022)											
								20 Shea ▲ Undist	40 ar Stren urbed	60 80 gth (kPa) △ Remoulded	100

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

HOLE NO.

9 Auriga Drive, Ottawa, Ontario K2E 7T9

Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

DATUM Geodetic

Concernment       A       B       B       B       B       B       B       B       B       C       O       Torson         GROUND SURFACE       0.10       0.69       1       2       83       15       1       77.99       0       78.99       0       78.99       0       78.99       0       78.99       0       78.99       0       76.99       0       76.99       0       75.99       0       75.99       0       75.99       0       75.99       0       75.99       0       75.99       0       75.99       0       77.99       0       0       77.99       0       0       77.99       0       0       77.99       0       0       77.99       0	SOIL DESCRIPTION	PLOT		SAN	<b>IPLE</b>	1	DEPTH	ELEV.	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone	Well
TOPSOIL       0.10       0.69       8 AU       1       0       78.99         Compact, brown SILTY SAND to       SS       2       83       15       1       77.99         Sandy SiLT       2.21       SS       3       50       11       2       76.99         Soft to firm, grey SILTY CLAY       SS       5       100       P       3       75.99         Soft to firm, grey SILTY CLAY       SS       6       92       P       5       73.99         End of Borehole       SS       7       100       P       6       72.99			ЭАХТ	NUMBER	<sup>∞</sup> RECOVERY	N VALUE or RQD			• Water Content %	Monitoring Well
Compact, grey SILTY SAND to       SS       2       83       15       1 - 77.99         SANDY SILT       2.21       SS       3       50       11       2 - 76.99         Soft to firm, grey SILTY CLAY       SS       4       100       P       3 - 75.99         Soft to firm, grey SILTY CLAY       SS       5       100       P       4 - 74.99         Soft to firm, grey SILTY CLAY       SS       6       92       P       5 - 73.99         End of Borehole       SS       7       100       P       4 - 72.99	TOPSOIL	0.10		4			0-	-78.99		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		0.69	<b>7</b> 0		83	15	1-	-77.99		L
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$										
Soft to firm, grey SILTY CLAY Soft to firm, grey SILTY CLAY SS 5 100 P 4-74.99 5-73.99 6-72.99 6-72.99		2.21					2-	-76.99		
Soft to firm, grey SILTY CLAY       4-74.99         SS       6       92       P         5-73.99       6-72.99         End of Borehole       SS       7							3-	-75.99		
SS = 6 = 92 = P = 5 = 73.99 = 6 = 72.99 = 72.99	Soft to firm, grey <b>SILTY CLAY</b>		ss	5	100	P				
End of Borehole SS 7 100 P							4-	-74.99		
End of Borehole6.71 SS 7 100 P			ss	6	92	Р	5-	-73.99		
End of Borehole6.71 SS 7 100 P								70.00		
End of Borehole		6.71	ss	7	100	Р	0-	-72.99		
GWL @ 0.95m - Dec. 13, 2022)	Ind of Borehole		T							
	GWL @ 0.95m - Dec. 13, 2022)									
									20 40 60 80 10	00

### SOIL PROFILE AND TEST DATA

20

▲ Undisturbed

40

Shear Strength (kPa)

60

80

△ Remoulded

100

Monitoring Well Construction

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**Geotechnical Investigation** Proposed Mixed-Use Community Development

9 A

### DA

REMARKS
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9 Auriga Drive, Ottawa, Ontario K2E 7T9					Te	win Com	munity -	Ottawa,	Ontario		
DATUM Geodetic									FILE NO		
REMARKS									HOLE NO		
BORINGS BY CME-55 Low Clearance E	Drill			D	ATE	Decembe	r 6, 2022	2	BH76	-22	
SOIL DESCRIPTION	PLOT		SAN	IPLE		DEPTH	ELEV. (m)		Resist. Bl 50 mm Dia	ows/0.3m a. Cone	
	STRATA F	ТҮРЕ	NUMBER	°8 ≈COVERY	VALUE r RQD	(m)					
GROUND SURFACE	STR	ΤΥ	MUN	RECO	N VI OF			0 V 20	Water Col 40	60 80	
TOPSOIL0.10	$\times$	 § AU	1			0-	-77.89				
FILL: Brown silty sand0.69		ss	2	100	1	1-	-76.89				
		ss	3	67	Ρ	2-	-75.89				
Soft to firm, grey <b>SILTY CLAY</b> with intermittent sand seams to 2.0m depth.		тw	4	100		3-	-74.89				
аерш.		тw	5	100		4-	-73.89		· · · · · · · · · · · · · · · · · · ·		
		ss	6	83	Ρ	5-	-72.89				
		<b>W</b>	7	100		6-	-71.89				
6.71 End of Borehole	XX	X ss	8	75	Ρ					· · · · · · · · · · · · · · · · · · ·	
(GWL @ 0.40m - Dec. 13, 2022)											

### SOIL PROFILE AND TEST DATA

FILE NO.

PG5827

HOLE NO.

gineers Geotechnical Investigation Proposed Mixed-Use Community Development Tewin Community - Ottawa, Ontario

9 Auriga Drive, Ottawa, Ontario K2E 7T9

### DATUM Geodetic

BORINGS BY CME-55 Low Clearance	Drill			D	ATE I	Decembe	er 5, 2022	BH77-22			
SOIL DESCRIPTION	PLOT	S		IPLE	1	DEPTH	ELEV.	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone	Well		
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	• Water Content %	Construction		
GROUND SURFACE			N	RE	zo	0-	-79.00	20 40 60 80	ŠŎ		
<b>TOPSOIL</b> 0.30	$\times$	⊠ AU	1				/ 0.00				
FILL: Brown silty sand		ss	2	58	8	1-	78.00		¥		
FILL: Brown silty clay, some sand       2.03	XXX	ss	3	92	4	2-	-77.00				
						3-	-76.00	<b>A</b>			
		∦ss	4	42	P		-75.00				
Soft, grey SILTY CLAY		∬ss	5	71	Р		-74.00				
6.71		ss	6	71	Р	6-	-73.00		<u>=</u> ]:		
End of Borehole											
(GWL @ 1.12m - Dec. 13, 2022)											
								20 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded			

### Consulting Engineers

#### SOIL PROFILE AND TEST DATA

FILE NO.

**Geotechnical Investigation** 8th Line Road and Anderson Road Ottawa, Ontario

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

DATUM Ground surface elevations provided by Stantec Geomatics Ltd.

	provide	Juby		.0 000	manoc					PG2466	
REMARKS									HOLE NO	BH 1	
BORINGS BY CME 55 Power Auger				D	DATE 2	27 Septen	nber 201 <sup>-</sup>	1		БПТ	
SOIL DESCRIPTION	PLOT		SAN	IPLE	-	DEPTH	ELEV.		esist. Blo 0 mm Dia.		ter tion
			Ř	RX R		(m)	(m)			Conc	ome
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD			• <b>v</b>	later Cont	ent %	Piezometer Construction
GROUND SURFACE			-	RI	zö	0-	-78.78	20	40 60	) 80	
0.2	5	🕈 AU	1				/0./0				
Very loose, brown SILTY SAND1.1	, , , , , , , , , , , , , , , , , , ,	≊ ∬ ss	2	100	2	1-	-77.78		• • • • • • • • • • • • • • • •	· • · · · • · • · · · · · · · · · · · ·	
Stiff, brown <b>SILTY CLAY</b> , some sand seams		1 00	2					·	• • • • • • • • • • • • • • • •		
<u>2.0</u>	3					2-	-76.78		•••••••••••••••••		
		Тw	3	100							
Stiff, grey SILTY CLAY						3-	-75.78			•••••••	
- soft to firm by 3.0m depth									• • • • • • • • • • • • • • • •		
		тw	4	100		4-	-74.78		•••••		
									•••••		
						5-	-73.78				
									•••••		
						6-	72.78			····	
						7-	-71.78		••••••	·····	
								4			
						8-	-70.78		• • • • • • • • • • • • • •	•••••••••••••••••	
							10110	4			
						0	-69.78				
0.6						3	09.70				
9.6 End of Borehole											
(GWL @ 1.5m depth based on											
field observations)											
								20 Shea	40 60 ar Strengt	) 80 10 h (kPa)	JU
								🔺 Undisti		Remoulded	

Consulting Engineers

### SOIL PROFILE AND TEST DATA

FILE NO.

**Geotechnical Investigation** 8th Line Road and Anderson Road Ottawa, Ontario

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

DATUM Ground surface elevations provided by Stantec Geomatics Ltd.

		otanic	,0 000	matio				PG2466	
REMARKS								HOLE NO. PL 2	
BORINGS BY CME 55 Power Auger			D	ATE 2	27 Septer	nber 201	1	BH 2	
SOIL DESCRIPTION	TOIT	SAN	<b>IPLE</b>	1	DEPTH (m)	ELEV. (m)		esist. Blows/0.3m 0 mm Dia. Cone	eter ction
	STRATA TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(11)	(11)	• <b>N</b>	Vater Content %	Piezometer Construction
GROUND SURFACE	Ω.	N	REC	z <sup>ö</sup>			20	40 60 80	
Very loose, brown SILTY	::::::::::::::::::::::::::::::::::::::	1			0-	-79.62			
SAND0.60		'							
Stiff to firm, brown <b>SILTY CLAY</b> with sand seams <u>1.52</u>	SS	2	100	3	1-	-78.62			
					2-	-77.62			
	тw	3	100		3-	-76.62			
					4-	-75.62			
Firm, grey SILTY CLAY	TW	4	100		5-	-74.62		· • • • • • • • • • • • • • • • • • • •	
					6-	-73.62			
					7-	-72.62	аналананан Алананан Алананан		
					8-	-71.62			
<u>9.6</u> 0					9-	-70.62			
Dynamic Cone Penetration Test commenced @ 9.60m depth. Cone pushed to 17.0m depth.					10-	-69.62	· · · · · · · · · · · · · · · · · · ·		****
					11-	-68.62			
					12-	-67.62			****
					13-	-66.62			****
					14-	-65.62	20	40 60 80 10	1 00
							Shea	ar Strength (kPa)	
							🔺 Undisti	urbed $\triangle$ Remoulded	

patersongro		n	Cor	nsulting Jineers		SOIL PROFILE AND TEST DATA							
154 Colonnade Road South, Ottawa, O		-		jineers	8th	n Line Ro	ad and A	estigation I Anderson Road					
DATUM Ground surface elevations p				ec Georr		<b>tawa, On</b> s Ltd.	tario		FILE NO	D. PG2466			
REMARKS													
BORINGS BY CME 55 Power Auger				DA	TE 2	27 Septer	nber 201	1	HOLEN	<sup>60.</sup> BH 2			
	E.		SAN	SAMPLE		DEDTU	ELEV.	Pen. R	esist. B	lows/0.3m	- 5		
SOIL DESCRIPTION	A PLOT			ĸ	ы .	DEPTH (m)	(m)	• 5	0 mm Di	ia. Cone	mete 'uctic		
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD			• <b>v</b>	/ater Co	ntent %	Piezometer Construction		
GROUND SURFACE	ν.		Ŋ	REC	zö		05 00	20	40	60 80	шО		
						14-	-65.62		· · · · · · · · ·				
								• • • • • • • • • • • •					
						15-	-64.62						
						16-	-63.62		• • • • • • • • •				
									• • • • • • • • • •				
						17-	-62.62		•••••				
						18-	-61.62						
						19-	60.62		• • • • • • • • • • •				
						20-	-59.62						
						-			• • • • • • • • • •				
						21-	-58.62						
						21-	-30.02						
									<b>X</b>				
						22-	-57.62	· · · · · · · · · · ·					
						23-	-56.62						
								· · · · · · · · · · · · · · ·					
						24-	-55.62	· · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·			
						25-	-54.62	• • • • • • • • • • • • •					
						20	01.02		<b>F</b>				
						00	50.00						
						26-	-53.62						
						27-	-52.62						
							<b>.</b>	· · · · · · · · · · · · · · ·	•				
						28-	-51.62	20	40	60 80 10	<del> </del> 00		
								Shea	ar Stren	gth (kPa)			

△ Remoulded

Undisturbed

patersongro		n	Cons			SOIL	PRO	FILE AI	ND TES	T DATA	
154 Colonnade Road South, Ottawa, O		-		sulting ineers	8	eotechnic th Line Ro	load				
<b>DATUM</b> Ground surface elevations p				c Geon		<b>ttawa, On</b> cs Ltd.	tario		FILE NO.	<b>DOD</b>	
REMARKS										PG2466	
BORINGS BY CME 55 Power Auger				DA	TE	27 Septen	nber 201 <sup>-</sup>	1	HOLE NO.	BH 2	
	Т		SAN	<b>IPLE</b>				Pen. R	esist. Blov	vs/0.3m	. с
SOIL DESCRIPTION	A PLOT		ĸ	RY	۲ ۲	DEPTH (m)	ELEV. (m)	• 5	0 mm Dia.	Cone	Piezometer Construction
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or ROD	1		• v	Vater Conte	ent %	Diezo
GROUND SURFACE	ũ		IN	REC	zö		E1 60	20	40 60	80	-0
						- 28-	-51.62				
						00	50.00			••••••	
						29-	-50.62				
								·			
						30-	-49.62	• • • • • • • • • • • • •		•••••••••••	
						31-	-48.62	• • • • • • • • • • •			
								• • • • • • • • • • • • • • •			
<u>32.00</u> End of Borehole						32-	-47.62				
(GWL @ 1.0m depth based on field observations)											
								20	40 60	80 10	0
								She	ar Strength	(kPa)	-
								▲ Undist	urbed $\triangle$ F	Remoulded	

patersongroup		Con	sulting ineers	SOIL PROFILE AND TEST DATA							
154 Colonnade Road South, Ottawa, C		-		ineers	Geotechnical Investigation 8th Line Road and Anderson Road Ottawa, Ontario						
DATUM Ground surface elevations p				c Geor			tario		FILE NO.		
REMARKS			Stanto	0.0001	latioe					PG2466	
BORINGS BY CME 55 Power Auger				DA	TE 2	27 Septer	nber 201 <sup>-</sup>	1	HOLE NO.	BH 3	
	Б		SAN	IPLE					lesist. Blow	s/0.3m	<b>-</b>
SOIL DESCRIPTION	PLOT			Я		DEPTH (m)	ELEV. (m)	• 5	i0 mm Dia. C	one	Piezometer Construction
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD			• v	Vater Conte	nt %	iezor onstri
GROUND SURFACE	LS LS	H	БN	REC	N V OF			20	40 60	80	۵Ö
Loose, brown SILTY SAND,		X AU	1			0-	-78.74				
some clay0.69		× 7						• • • • • • • • • • • • •			
		ss	2	100	5	1-	-77.74	·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	
Stiff, brown SILTY CLAY						2	-76.74			······	
						2-	70.74	· · · · · · · / · · · · ·			××
2.90						3-	-75.74	A			
		TW	3	100		4-	-74.74				8
			3	100						<u> </u>	
						5-	-73.74				
		TW	4	100							
Soft to firm, grey SILTY CLAY						6-	72.74		Ŕ		
								· · · · · · · · · · · · · · · · · · ·	······································		
						7-	-71.74				
						8-	-70.74		<b>.</b>	·····	
			_			9-	-69.74	·····	••••••••••••••••••••••••••••••••••••••		
9.75		TW	5	100							
commenced @ 9.75m depth.						10-	-68.74			·····	
Cone pushed 30.56m depth with no resistance.						44	07.74		•••••••		
						-	-67.74				
						12-	-66.74				
						12-	00.74				
						13-	-65.74	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	
									•••••••••••••••••		
						14-	-64.74			· · · · · · · · · · · · · · · · · · ·	
								20 She	40 60 ar Strength	80 10 (kPa)	0
								🔺 Undist	-	emoulded	

natoreonarc		n	Con	sulting		SOIL	- PRO	FILE AND TEST DATA						
patersongro	JU	Υ	Eng	sulting ineers	-	Geotechnical Investigation 8th Line Road and Anderson Road								
154 Colonnade Road South, Ottawa, O	ntario	o K2E	7J5			h Line Ro tawa, On		Anderson Road						
<b>DATUM</b> Ground surface elevations p	rovide	ed by s	Stante	ec Geo	matic	s Ltd.		FILE NO. PG2466						
REMARKS								HOLE NO. DULO						
BORINGS BY CME 55 Power Auger	1			D	ATE	27 Septer	nber 201	1 BH 3						
SOIL DESCRIPTION	PLOT	SAMPLE				DEPTH	ELEV.	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone						
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	● 50 mm Dia. Cone ○ Water Content %						
GROUND SURFACE	01		Z	RE	z <sup>o</sup>	14-	-64.74	20 40 60 80						
						16-	-63.74 -62.74 -61.74							
						18-	-60.74							
						19-	-59.74							
						20-	-58.74							
						21-	-57.74							
						22-	-56 74							

20-58.74 $21-57.74$ $22-56.74$ $23-55.74$ $24-54.74$ $25-53.74$ $26-52.74$ $26-52.74$ $27-51.74$ $28-50.74$ $20-40-60-80-100$ Shear Strength (kPa) $4 - 40-60-80-100$ Shear Strength (kPa) $4 - 40-60-80-100$ Shear Strength (kPa)		<u>.</u>
21-57.74 22-56.74 23-55.74 24-54.74 25-53.74 26-52.74 27-51.74 28-50.74 20 40 60 80 100 Shear Strength (kPa) 100		
21-57.74 22+56.74 23-55.74 24-54.74 25+53.74 26+52.74 27-51.74 28+50.74 20 40 60 80 100 Shear Strength (kPa) 100		\$ · · · · · · · · · · · · · · · · · · ·
21-57.74 22+56.74 23-55.74 24-54.74 25+53.74 26+52.74 27-51.74 28+50.74 20 40 60 80 100 Shear Strength (kPa) 100		
21-57.74 22-56.74 23-55.74 24-54.74 25-53.74 26-52.74 27-51.74 28-50.74 20-40-60-80-100 Shear Strength (kPa) 100		8 74
22-56.74 23-55.74 24-54.74 25-53.74 26-52.74 27-51.74 20 40 50 80 100 Shear Strength (kPa)		
22-56.74 23-55.74 24-54.74 25-53.74 26-52.74 27-51.74 20 40 50 80 100 Shear Strength (kPa)		
22-56.74 23-55.74 24-54.74 25-53.74 26-52.74 27-51.74 20 40 50 80 100 Shear Strength (kPa)		
22-56.74 23-55.74 24-54.74 25-53.74 26-52.74 27-51.74 20 40 50 80 100 Shear Strength (kPa)		
22-56.74 23-55.74 24-54.74 25-53.74 26-52.74 27-51.74 28-50.74 20 40 60 80 100 Shear Strength (kPa)		
23-55.74 24-54.74 25-53.74 26-52.74 27-51.74 28-50.74 20 40 60 80 100 Shear Strength (kPa)		07.74
23-55.74 24-54.74 25-53.74 26-52.74 27-51.74 28-50.74 20 40 60 80 100 Shear Strength (kPa)		
23-55.74 24-54.74 25-53.74 26-52.74 27-51.74 28-50.74 20 40 60 80 100 Shear Strength (kPa)		
23-55.74 24-54.74 25-53.74 26-52.74 27-51.74 28-50.74 20 40 60 80 100 Shear Strength (kPa)		······································
23-55.74 24-54.74 25-53.74 26-52.74 27-51.74 28-50.74 20 40 60 80 100 Shear Strength (kPa)		
23-55.74 24-54.74 25-53.74 26-52.74 27-51.74 28-50.74 20 40 60 80 100 Shear Strength (kPa)		b6.74 + + + + + + + + + + + + + + + + + + +
24-54.74 $25-53.74$ $26-52.74$ $27-51.74$ $28-50.74$ $20  40  60  80  100$ Shear Strength (kPa)		\$ · · · \$ · · · · \$ · · · · \$ · · · · ·
24-54.74 $25-53.74$ $26-52.74$ $27-51.74$ $28-50.74$ $20  40  60  80  100$ Shear Strength (kPa)		
24-54.74 $25-53.74$ $26-52.74$ $27-51.74$ $28-50.74$ $20  40  60  80  100$ Shear Strength (kPa)		↓
24-54.74 $25-53.74$ $26-52.74$ $27-51.74$ $28-50.74$ $20  40  60  80  100$ Shear Strength (kPa)		
24-54.74 $25-53.74$ $26-52.74$ $27-51.74$ $28-50.74$ $20  40  60  80  100$ Shear Strength (kPa)		55 74
25-53.74 $26-52.74$ $27-51.74$ $28-50.74$ $20   40   60   80   100$ Shear Strength (kPa)		
25-53.74 $26-52.74$ $27-51.74$ $28-50.74$ $20   40   60   80   100$ Shear Strength (kPa)		
25-53.74 $26-52.74$ $27-51.74$ $28-50.74$ $20   40   60   80   100$ Shear Strength (kPa)		
25-53.74 $26-52.74$ $27-51.74$ $28-50.74$ $20   40   60   80   100$ Shear Strength (kPa)		
25-53.74 $26-52.74$ $27-51.74$ $28-50.74$ $20   40   60   80   100$ Shear Strength (kPa)		
26-52.74 $27-51.74$ $28-50.74$ $20   40   60   80   100$ Shear Strength (kPa)	24 3	
26-52.74 $27-51.74$ $28-50.74$ $20   40   60   80   100   Shear Strength (kPa)$		
26-52.74 $27-51.74$ $28-50.74$ $20   40   60   80   100   Shear Strength (kPa)$		
26-52.74 $27-51.74$ $28-50.74$ $20   40   60   80   100   Shear Strength (kPa)$		
26-52.74 $27-51.74$ $28-50.74$ $20   40   60   80   100   Shear Strength (kPa)$		0.74
27-51.74 28-50.74 20 40 60 80 100 Shear Strength (kPa)		53.74
27-51.74 28-50.74 20 40 60 80 100 Shear Strength (kPa)		
27-51.74 28-50.74 20 40 60 80 100 Shear Strength (kPa)		
27-51.74 28-50.74 20 40 60 80 100 Shear Strength (kPa)		
27-51.74 28-50.74 20 40 60 80 100 Shear Strength (kPa)		
27-51.74 28-50.74 20 40 60 80 100 Shear Strength (kPa)		2.74 <del>  * * * * * * * * * * * * * * * * * * </del>
28-50.74 20 40 60 80 100 Shear Strength (kPa)		······································
28-50.74 20 40 60 80 100 Shear Strength (kPa)		
28-50.74 20 40 60 80 100 Shear Strength (kPa)		\$ · · · · • · · · · · · · · · · · · · ·
28-50.74 20 40 60 80 100 Shear Strength (kPa)		<u>.</u>
28-50.74 20 40 60 80 100 Shear Strength (kPa)		51.74
20 40 60 80 100 Shear Strength (kPa)		
20 40 60 80 100 Shear Strength (kPa)		<u></u>
20 40 60 80 100 Shear Strength (kPa)		
20 40 60 80 100 Shear Strength (kPa)		1
20 40 60 80 100 Shear Strength (kPa)		
Shear Strength (kPa)		
		20 40 60 80 100
		Shear Strength (kPa)
▲ Undisturbed △ Remoulded		
		▲ Undisturbed △ Remoulded

patersongro		n	Con	sulting	SOIL PROFILE AND TEST DATA							
154 Colonnade Road South, Ottawa, O		-		sulting ineers	8t		ad and A	igation Inderson R	load			
DATUM Ground surface elevations p				c Geor		<b>ttawa, On</b> s Ltd.	tario		FILE NO.			
REMARKS			0101.10		latio	0 _10.				PG2466		
BORINGS BY CME 55 Power Auger				DA	TE	27 Septen	nber 201 <sup>.</sup>	1	HOLE NO.	BH 3		
	Ę	SAMPLE							esist. Blov	ws/0.3m	, с	
SOIL DESCRIPTION	PLOT			к	64	DEPTH (m)	ELEV. (m)	• 50 mm Dia. Cone			netel uctio	
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD			• V	Vater Conte	ent %	Piezometer Construction	
GROUND SURFACE	SI	E F	NN	REC	N OL	00	50.74	20	40 60		шO	
						- 28-	-50.74					
						29-	-49.74	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	• • • • • • • • • • • • • • • • • • •		
						30-	-48.74					
30.56		-										
(GWL @ 2.4m depth based on												
field observations)												
								20 She	40 60 ar Strength	80 10 (kPa)	t <b>)0</b>	
								▲ Undist		Remoulded		

Consulting Engineers

## SOIL PROFILE AND TEST DATA

▲ Undisturbed

 $\triangle$  Remoulded

FILE NO.

**Geotechnical Investigation** 8th Line Road and Anderson Road Ottawa, Ontario

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

DATUM Ground surface elevations provided by Stantec Geomatics Ltd.

DATUM Ground surface elevations	prona	00.07	June		matiot				PG2466	
REMARKS									HOLE NO. BH 4	
BORINGS BY CME 55 Power Auger				0	DATE 2	27 Septen	nber 201	1	<b>ВП 4</b>	<del></del>
SOIL DESCRIPTION	PLOT		SAN	<b>IPLE</b>	1	DEPTH	ELEV.		esist. Blows/0.3m mm Dia. Cone	eter
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	0 Wa	ater Content %	Piezometer
GROUND SURFACE	្រួ		NC N	REC	N			20	40 60 80	
		`∰ AU	1			0-	-79.97		· · · · · · · · · · · · · · · · · · ·	
Compact, brown <b>SILTY</b> SAND, trace gravel		ss	2	54	18	1-	-78.97			
- grey by 1.2m depth	1	ss	3	42	10	2-	-77.97			
<u>&amp;</u>		ss	4	50	1					
						3-	-76.97			
		тw	5	100		4-	-75.97			
Soft to firm, grey SILTY CLAY						5-	-74.97			
						6-	-73.97			
						7-	-72.97			
						8-	-71.97			
						9-	-70.97			
9.6 End of Borehole	0									
(GWL @ 1.0m depth based on field observations)										
,										
								20 20	<u>·   · · ·   · · ·   · · · ·</u> 40 60 80 10 r Strength (kPa)	4 00

patersongro		n	Consulting Engineers		SOIL PROFILE AND TEST DATA						
154 Colonnade Road South, Ottawa, O		-		ineers	8t	eotechnic h Line Ro ttawa, On	ad and A	gation nderson R	load		
DATUM Ground surface elevations p	rovide	ed by S	Stante	c Geon					FILE NO.	PG2466	
REMARKS									HOLE NO.		
BORINGS BY CME 55 Power Auger	1			DA	TE	27 Septen	nber 201 <sup>-</sup>	1		BH 4A	
SOIL DESCRIPTION	PLOT		SAN			DEPTH (m)	ELEV. (m)		esist. Blo 0 mm Dia.		neter iction
	STRATA	TYPE	NUMBER	% RECOVERY	N VALUE or RQD			• V	Vater Cont	ent %	Piezometer Construction
GROUND SURFACE	ι. Γ		N N	REC	zÖ	0	-79.97	20	40 60	80	щO
Compact, brown SILTY SAND, trace gravel - grey by 1.2m depth 2.21 Soft, grey SILTY CLAY 3.50 End of Borehole		TW	1	100		1- 2-	-78.97 -77.97 -76.97				
								20 Shea ▲ Undist	40 60 ar Strengtl urbed △	) 80 10 h ( <b>kPa)</b> Remoulded	00

#### patersongroup SOIL PROFILE AND TEST DATA Consulting Engineers **Geotechnical Investigation** 8th Line Road and Anderson Road 154 Colonnade Road South, Ottawa, Ontario K2E 7J5 Ottawa, Ontario Ground surface elevations provided by Stantec Geomatics Ltd. DATUM FILE NO. PG2466 REMARKS HOLE NO. BH 5 BORINGS BY CME 55 Power Auger DATE 27 September 2011

BURINGS BY CIVIE 55 FOWER Auger										
SOIL DESCRIPTION	РГОТ		SAN	IPLE		DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone		
GROUND SURFACE	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD			Pen. Resist. Blows/0.3m       □         ● 50 mm Dia. Cone       □         □       Water Content %         20       40       60       80		
	$\cdot$	×	1			0+	80.39			
Loose, brown <b>SILTY SAND</b>		§ AU ∬ SS	2	75	9	1-	-79.39			
		тw	3	100		2-	78.39			
			Ū			3-	-77.39			
		τw	4	100			-76.39			
Soft to firm, grey SILTY CLAY							-75.39 -74.39			
							-73.39			
						8-	72.39			
9.60						9-	-71.39			
End of Borehole (GWL @ 1.0m depth based on field observations)										
								20         40         60         80         100           Shear Strength (kPa)           ▲ Undisturbed         △ Remoulded		

### SOIL PROFILE AND TEST DATA patersongroup Consulting Engineers **Geotechnical Investigation** 8th Line Road and Anderson Road 154 Colonnade Road South, Ottawa, Ontario K2E 7J5 Ottawa, Ontario DATUM Ground surface elevations provided by Stantec Geomatics Ltd.

REMARKS	

	FILE	NO.	PG	2466	
	HOLE	NO.	Bŀ	6	
	esist. 0 mm l			lm	Diezometer
W	/ater C	onte	nt % 8		Piezol Constr

BORINGS BY CME 55 Power Auger			0	DATE	27 Septen	BH 6			
SOIL DESCRIPTION	PLOT		SAN	IPLE	1	DEPTH	ELEV.	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone	
GROUND SURFACE	STRATA E	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	Pen. Resist. Blows/0.3m         ● 50 mm Dia. Cone         ○ Water Content %         20       40       60       80	
Compact, brown SILTY SAND		¥ AU	1	62	24		-79.76 -78.76		
<u>1</u> .	45	ss	3	100	1	2-	-77.76		
		TW	4	100			-76.76		
Soft to firm, grey SILTY CLAY							-75.76 -74.76		
							-73.76		
							-72.76 -71.76		
9	<u>60</u>					9-	-70.76		
End of Borehole (GWL @ 1.0m depth based on field observations)									
								20       40       60       80       100         Shear Strength (kPa)         ▲ Undisturbed       △ Remoulded	

patersongro		n	Consulting Engineers		SOIL PROFILE AND TEST DATA						
154 Colonnade Road South, Ottawa, O		-		ineers	8tł	eotechnic n Line Roa tawa, On	ad and A	igation Inderson F	load		
DATUM Ground surface elevations p	orovide	ed by \$	Stante	c Georr					FILE NO. PG2466		
REMARKS									HOLE NO.		
BORINGS BY CME 55 Power Auger					TE 2	29 Septen	nber 201			BH 6A	
SOIL DESCRIPTION	PLOT	SAMPLE				DEPTH (m)	ELEV. (m)		Pen. Resist. Blows/0.3m 50 mm Dia. Cone		
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD			• V	Vater Conte	ent %	Piezometer Construction
GROUND SURFACE	ŗ.		<b>N</b>	REC	z <sup>0</sup>	0	70.70	20	40 60	80	шО
Compact, brown SILTY SAND							-79.76 -78.76				
<u>1.45</u>		тw	1	100			-77.76			•	
Soft, grey SILTY CLAY 2.74						2-	-77.70	·		<u>О</u>	
End of Borehole								20 She ▲ Undist	40 60 ar Strength urbed △ 1	9 80 10 1 ( <b>kPa</b> ) Remoulded	00

Consulting Engineers

## SOIL PROFILE AND TEST DATA

FILE NO.

**Geotechnical Investigation** 8th Line Road and Anderson Road Ottawa, Ontario

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

DATUM Ground surface elevations provided by Stantec Geomatics Ltd.

	/ O VIGC	Juby	Junio	0 000	matio				PG2466
REMARKS									
BORINGS BY CME 55 Power Auger				D	ATE 2	29 Septen	nber 201 <sup>-</sup>	1	BH 7
SOIL DESCRIPTION	PLOT		SAN	IPLE		DEPTH	ELEV.		esist. Blows/0.3m 0 mm Dia. Cone
			8	RY	E۵	(m)	(m)		
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or ROD			0 <b>N</b>	esist. Blows/0.3m       0 mm Dia. Cone       Vater Content %
GROUND SURFACE		L,		Ř	4	0-	-80.10	20	40 60 80
Loose, brown <b>SILTY SAND</b>		ss	1	42	6	Ū	00110	· · · · · · · · · · · · · · · · · · ·	
Very stiff, brown <b>SILTY CLAY</b>						1-	-79.10		
						2-	-78.10		
		TW	2	100		3-	-77.10		<u></u> о
						4-	-76.10		
		TW	3	100					
Firm, grey SILTY CLAY			Ū			5-	-75.10		
						6-	-74.10		
						7-	-73.10	4	
						8-	-72.10		
						9-	-71.10	·····	
Dynamic Cone Penetration Test commenced @ 9.60m depth.						10-	-70.10		
Cone pushed to 33.50m depth.						11_	-69.10	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·
						12-	-68.10		
						13-	-67.10		
						14-	-66.10	·	40 60 80 100
								Shea	ar Strength (kPa)
								🔺 Undist	

patersongro		n	Con	sulting		SOIL	. PROI	FILE AI	ND TEST DATA	
154 Colonnade Road South, Ottawa, C	-	•	ineers	Ge 8ti Ot	Road					
DATUM Ground surface elevations p	orovid	ed by	Stante	ec Geor	natics	s Ltd.			FILE NO. PG2466	
BORINGS BY CME 55 Power Auger				DA	TE 2	29 Septen	nber 2011		HOLE NO. BH 7	
SOIL DESCRIPTION		SAN	<b>IPLE</b>		DEPTH	ELEV.		Resist. Blows/0.3m 50 mm Dia. Cone		
	STRATA P	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	0 V 20	Vater Content %	

**GROUND SURFACE** 

Piezometer Construction

20

\*\*\*\*

14+66.10

15+65.10

16+64.10

17+63.10

18+62.10

19+61.10

20+60.10

21+59.10

22+58.10

23+57.10

24+56.10

25+55.10

26+54.10

27+53.10

28+52.10

40

. . . . . . . . . . . . . . . .

60

80

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Ś

riangle Remoulded

100

÷

Undisturbed

20 40 60 80 Shear Strength (kPa)

patersongroup		Consulting Engineers		SOIL PROFILE AND TEST DATA						
•		-		ineers	8tł		ad and A	gation nderson R	load	
154 Colonnade Road South, Ottawa, Or						tawa, On	tario		1	
DATUM Ground surface elevations pr	ovide	ed by S	Stante	ec Geon	natics	s Ltd.			FILE NO. PG2466	
REMARKS						29 Septen			HOLE NO. BH 7	
BORINGS BY CME 55 Power Auger										
SOIL DESCRIPTION	PLOT		SAN	<b>IPLE</b>		DEPTH	ELEV.	Pen. Resist. Blows/0.3m • 50 mm Dia. Cone		ion
SOIL DESCRIPTION			R	RY	ЩО	(m)	(m)	• 5	o min Dia. Cone	
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD			0 <b>V</b>	Vater Content %	Piezometer Construction
GROUND SURFACE	ß		N N	RE	z <sup>0</sup>	00	50.10	20	40 60 80	
						- 28-	-52.10			
								• • • • • • • • • • • • •		
						29-	-51.10	••••••		
									······································	
						30-	-50.10			
						31-	-49.10			
							40.40		······································	
						32-	-48.10			
						33-	-47.10			
End of Borehole 33.50										÷
Practical DCPT refusal @ 33.50m depth										
(GWL @ 1.0m depth based on										
field observations)										
								20 Shea	40 60 80 1 ar Strength (kPa)	-1   <b>00</b>

▲ Undisturbed

## Consulting Engineers Geotechnical Investigation

Geotechnical Investigation 8th Line Road and Anderson Road

Shear Strength (kPa)

△ Remoulded

▲ Undisturbed

Ottawa, Ontario

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

DATUM Ground surface elevations p	provided	by Sta	antec Geo	omatic	s Ltd.			FILE NO.	PG2466	
			-			abox 001	4	HOLE NO.	BH 8	
BORINGS BY CME 55 Power Auger				DATE	29 Septer	nber 201				
SOIL DESCRIPTION	РГОТ		SAMPLE		DEPTH (m)	ELEV. (m)		esist. Blov 0 mm Dia. (		Piezometer Construction
	STRATA	ЭЛХРЕ	NUMBER % RECOVERY	N VALUE or RQD			• <b>v</b>	later Conte	ent %	Diezon
GROUND SURFACE	Ω.		REG	z ö		00.04	20	40 60	80	-0
TOPSOIL0.30	) 	AU	1		- 0-	-80.01				
Compact, brown SILTY SAND			2 42	24	1-	-79.01	· · · · · · · · · · · · · · · · · · ·	•••••	······································	
Firm, grey SILTY CLAY,										
some sand2.13					2-	-78.01	1	· · · · · · · · · · · · · · · · · · ·		
	·	тw	3 100					••••••		
					3-	-77.01				
							<b>A</b>	•••••		
		тw	4 100		4-	-76.01		•••••		
								••••••••••••••••••••		
					5-	-75.01		•••••		
Soft to firm, grey SILTY CLAY										
					6-	-74.01		• • • • • • • • • • • • • • • • • •	•••••••••••••••••••••••••••••••••••••••	
					_		•	••••••		
					/-	-73.01	<u>.</u>			
						70.01		• • • • • • • • • • • • • • • •		
					8-	-72.01				
					0.	-71.01				
9.60					5	71.01				
End of Borehole							··· <u>À</u> ·····	••••	······	
(GWL @ 0.95m depth based										
on field observations)										
							20	40 60	80 10	

Consulting Engineers

## SOIL PROFILE AND TEST DATA

Geotechnical Investigation 8th Line Road and Anderson Road Ottawa, Ontario

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

<b>DATUM</b> Ground surface elevations	provided by	Stante	ec Geo	matics	s Ltd.			FILE NO.	PG2466	
REMARKS								HOLE NO		
BORINGS BY CME 55 Power Auger			C	ATE (	30 Septer	nber 201	1		БПЭ	
SOIL DESCRIPTION	A PLOT		MPLE ਸ਼	E a	DEPTH (m)	ELEV. (m)		esist. Blo 0 mm Dia.		Piezometer Construction
	STRATA TYPE	NUMBER	% RECOVERY	N VALUE or RQD				later Con		Piezo Constr
GROUND SURFACE	5		<u> щ</u>		0-	-77.04	20	40 6	0 80	
	″ :  :  <mark>`</mark> ⊗ AL	J 1								
Loose, brown SILTY SAND		2	75	7	1-	-76.04			· · · · · · · · · · · · · · · · · · ·	
sand seams	ТМ	/ 3	100		2-	-75.04		· · · · · · · · · · · · · · · · · · ·		
					3-	-74.04				
	ТМ	/ 4	100		4-	-73.04		· · · · · · · · · · · · · · · · · · ·		
Soft to firm, grey SILTY CLAY					5-	-72.04			······································	
					6-	-71.04				
						-70.04		••••••		
								· · · · · · · · · · · · · · · · · · ·	······································	
					8-	-69.04				
9.60	0				9-	-68.04				
End of Borehole										
(GWL @ 1.0m depth based on field observations)										
							20 She	40 6 ar Strepgt		00
							Sne ▲ Undist	ar Strengt urbed △	n (KPa) Remoulded	

## patersongroup Consulting SOIL PROFILE AND TEST DATA 154 Colo DATUM

-	nade Road South, Ottawa, Ontario K2E 7	Engineers 7J5	Geotechnical Investigation 8th Line Road and Anderson R Ottawa, Ontario	load	
DATUM	Ground surface elevations provided by S	Stantec Geoma	atics Ltd.	FILE NO.	PG2466
REMARKS				HOLE NO.	
BORINGS B	CME 55 Power Auger	DAT	E 30 September 2011		BH10

BORINGS BY CME 55 Power Auger				D	ATE (	30 September 201	1	DITIU	
SOIL DESCRIPTION	ТОТЧ	SAMPLE				DEPTH ELEV.		Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone	
	STRATA	ЭДХТ	NUMBER	% RECOVERY	N VALUE or RQD	(m) (m)		Vater Content %	Piezometer Construction
GROUND SURFACE				щ		0+78.41	20	40 60 80	
Loose, brown SILTY SAND	0.25 1	x au ∛ ss	1 2	92	8	1+77.41			
some sand	<u>2.00</u>	<u> </u>	۷	52	0	2+76.41			
						3-75.41			
		TW	3	100		4-74.41			
		тw	4	100		5-73.41			
Soft to firm, grey SILTY CLAY						6-72.41			
						7-71.41			
						8-70.41			
Dynamic Cone Penetraton Test	9.60					9-69.41			
commenced @ 9.60m depth. Cone pushed tp 31.5m depth.						10+68.41			
						11-67.41			
						12+66.41			
						13+65.41			
						14+64.41		ar Strength (kPa)	<del>1</del> DO
							🔺 Undist	urbed $\triangle$ Remoulded	

natersonarc	patersongroup						_ PRO	FILE AND TEST DATA			
154 Colonnade Road South, Ottawa, Ot	Engineers 7J5			Geotechnical Investigation 8th Line Road and Anderson Road Ottawa, Ontario							
DATUM       Ground surface elevations provided by Stantec Geomatics Ltd.       FILE NO.       PG2466											
REMARKS BORINGS BY CME 55 Bower Auger BATE 20 September 2011 BH10											
BORINGS BY CME 55 Power Auger				D	ATE 🗧	30 Septen	nber 201	1	БПІО		
SOIL DESCRIPTION			SAMPLE			DEPTH	ELEV.	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone			
	A P		NUMBER	RY	Що	(m)	(m)				
	STRATA	TYPE		% RECOVERY	I VALUE or RQD			• <b>v</b>	Ater Content %	Piezometer Construction	
GROUND SURFACE				8	z		C4 44	20	40 60 80		
						1 14-	-64.41		· • • • • • • • • • • • • • • • • • • •		

GROUND SURFACE	TYPE	NUMBER	% RECOVERY	N VALUE or RQD			• Water Content %
		z	- E				
			<b>щ</b>	z			20 40 60 80
					14-	-64.41	
					15-	-63.41	
					16-	-62.41	
					17-	-61.41	
					18-	-60.41	
					19-	-59.41	
					20-	-58.41	
					21-	-57.41	
					22-	-56.41	
					23-	-55.41	
					24-	-54.41	
					25-	-53.41	
					26-	-52.41	
					27-	-51.41	
					28-	-50.41	20 40 60 80 100 Shear Strength (kPa)
							▲ Undisturbed △ Remoulded

patersongroup			Consulting Engineers		SOIL PROFILE AND TEST DATA								
154 Colonnade Road South, Ottawa, Ot						8th Line Road and Anderson Road							
DATUM Ground surface elevations p				C Geor		ttawa, On	tario		FILE NO.				
REMARKS	ovide	Su by	Starite		natio	5 LIU.				PG2466			
BORINGS BY CME 55 Power Auger DATE 30 September 2011 BH10 BH10													
	SAN	/IPLE					esist. Blow	re/0 3m					
SOIL DESCRIPTION	A PLOT						Ы о	DEPTH (m)	ELEV. (m)		0 mm Dia. (		Piezometer Construction
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD			• v	Vater Conte	nt %	<sup>o</sup> iezc		
GROUND SURFACE	0		N	REC	z <sup>ö</sup>		-50.41		40 60 80		-0		
						20-	-30.41	• • • • • • • • • • • • •		••••••			
						29-	-49.41		••••••	•••••••••••••••••••••••••••••••••••••••			
							-01	· · · · · · · · · · · · · · · · · · ·		••••••••••••			
						30-	-48.41	• • • • • • • • • • • • • •					
								· · · · · · · · · · · · · · · · · · ·	••••••	•••••••••••••••••••••••••••••••••••••••			
						31-	-47.41						
21.95													
End of Borehole 31.85									·····	· · · · · · · · · · · · · · · · · · ·			
Practical DCPT refusal @													
31.85m depth													
(GWL @ 1.5m depth based on field observations)													
								20 Sho	40 60	80 10	0		
								Snea Mundist	ar Strength urbed $\triangle R$	(KPa) emoulded			

Consulting Engineers

## SOIL PROFILE AND TEST DATA

FILE NO.

**PG2466** 

Geotechnical Investigation 8th Line Road and Anderson Road Ottawa, Ontario

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

**DATUM** Ground surface elevations provided by Stantec Geomatics Ltd.

REMARKS											
BORINGS BY CME 55 Power Auger				D	ATE 3	30 Septen	nber 2011	DLI1			
SOIL DESCRIPTION	PLOT	SAMPLE				DEPTH ELEV.		Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone			
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	Pen. Resist. Blows/0.3m         ● 50 mm Dia. Cone         ○ Water Content %			
GROUND SURFACE	ß	_	E E	RE	z <sup>ö</sup>		70.00	20 40 60 80			
Loose, brown <b>SILTY SAND,</b> some gravel0.6		X AU	1			0-	-79.02				
Stiff, brown <b>SILTY CLAY,</b> some sand seams		ss	2	92	4	1-	-78.02				
2.1	3	TW	3	100		2-	-77.02				
						3-	-76.02				
		тw	4	100		4-	-75.02				
Soft to firm, grey SILTY CLAY						5-	-74.02				
						6-	-73.02				
						7-	-72.02				
						8-	-71.02				
9.6	50					9-	-70.02				
End of Borehole											
(GWL @ 1.6m depth based on field observations)											
								20 40 60 80 100 Shear Strength (kPa)			
								▲ Undisturbed △ Remoulded			

## Consulting Engineers

## SOIL PROFILE AND TEST DATA

**Geotechnical Investigation** 8th Line Road and Anderson Road Ottawa, Ontario

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

DATUM Grou

ind surface	elevations	provided by	Stantec	Geomatics	Ltd.

FILE NO.	DC0/66
	PG2466

<b>3H12</b>
ßŀ

BORINGS BY CME 55 Power Auger		1		D	ATE (	3 October	2011	BH12	
SOIL DESCRIPTION	PLOT		SAN	<b>IPLE</b>	1	DEPTH	ELEV.	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone	
GROUND SURFACE	STRATA 1	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	Pen. Resist. Blows/0.3m           ● 50 mm Dia. Cone           ○ Water Content %           20         40         60         80	
TOPSOIL 0.2	0	- 411	-			0-	-78.79		
FILL: Brown silty sand, some 0.4 gravel Compact, brown SILTY SAND	<b>6</b> 	∞ AU	1 2	42	13	1-	-77.79		
1.4	5					2-	-76.79		
		тw	3	0		2	70.79		
						3-	-75.79		
		TW	4	100		4-	-74.79		
Soft to firm, grey SILTY CLAY						5-	-73.79		
						6-	-72.79		
						7-	-71.79		
						8-	-70.79		
						9-	-69.79		
9.6 End of Borehole	0/1/2/								
(GWL @ 1.0m depth based on field observations)									
								20 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded	

patersongro	n	Consulting Engineers			SOIL PROFILE AND TEST DATA						
154 Colonnade Road South, Ottawa, Or		-				Geotechnical Investigation 8th Line Road and Anderson Road Ottawa, Ontario					
DATUM Ground surface elevations pr				c Geon			tario		FILE NO.		
REMARKS		,							PG24	66	
BORINGS BY CME 55 Power Auger				DA	TE (	3 October	2011		HOLE NO. BH1:	2 <b>A</b>	
	ы		SAN	IPLE				Pen. R	esist. Blows/0.3m		
SOIL DESCRIPTION	A PLOT				۲o	DEPTH (m)	ELEV. (m)	• 5	Piezometer Construction		
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD			• <b>v</b>	Vater Content %	Piezo	
GROUND SURFACE	01		z	RE	z <sup>o</sup>	0-	-78.79	20	40 60 80		
TOPSOIL0.20	$\times\!\!\times\!\!\times$					0	10.19	• • • • • • • • • • • • •	•••••••••••••••••••••••••••••••••••••••		
Igravel						-	77 70	••••••	•••••••••••••••••••••••••••••••••••••••	·····	
Compact, brown SILTY SAND 1.45						1-	-77.79		· · · · · · · · · · · · · · · · · · ·		
						0	70 70			·····	
						2-	-76.79				
Soft, grey SILTY CLAY							75 70	♠			
		тw	1	100		3-	-75.79			107.43	
										••••••••••••••••••••••••••••••••••••••	
4.27	XX					4-	-74.79		• • • • • • • • • • • • • • • • • • •	<del>*••••</del>	
End of Borehole											
								20	40 60 80	100	
								Shea Undist	ar Strength (kPa) urbed △ Remoulded		
										4	

#### SOIL PROFILE AND TEST DATA patersongroup Consulting Engineers **Geotechnical Investigation** 8th Line Road and Anderson Road 154 Colonnade Road South, Ottawa, Ontario K2E 7J5 Ottawa, Ontario Ground surface elevations provided by Stantec Geomatics Ltd. DATUM FILE NO. PG2466 REMARKS HOLE NO. **BH13** BORINGS BY CME 55 Power Auger DATE 3 October 2011 SAMPLE Pen. Resist. Blows/0.3m Piezometer Construction STRATA PLOT DEPTH ELEV. SOIL DESCRIPTION 50 mm Dia. Cone • (m) (m) RECOVERY N VALUE or RQD NUMBER TYPE Water Content % Ο 40 60 80 **GROUND SURFACE** 20 0+77.67÷.;.;.;.;.;.;.;.;.;.;.;.;.;.;.; AU 1 Compact, brown SILTY SAND - some clay by 0.6m depth 1+76.67 SS 2 83 10 1.45 Stiff to firm, brown SILTY 2+75.67 CLAY 2.90 3+74.67 4+73.67 3 100 W 5+72.67100 W 4 6+71.67 Firm, grey SILTY CLAY 7+70.67 8+69.67

5

w

9.60

End of Borehole

field observations)

(GWL @ 2.4m depth based on

100

9+68.67

40

Shear Strength (kPa)

20

Undisturbed

60

80

△ Remoulded

100

## Consulting Engineers

## SOIL PROFILE AND TEST DATA

Geotechnical Investigation 8th Line Road and Anderson Road Ottawa, Ontario

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

DATUM	Gro

DATUM Ground surface elevations p	FILE NO.	PG2466									
REMARKS				_			0044		HOLE NO.	BH14	
BORINGS BY CME 55 Power Auger					ATE 3	3 October	2011				
SOIL DESCRIPTION	PLOT			IPLE		DEPTH (m)	ELEV. (m)		esist. Blo 0 mm Dia.		neter uction
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD			• V	Vater Cont	ent %	Piezometer Construction
GROUND SURFACE		-		Ř	4	0-	-78.76	20	40 60	) 80	
TOPSOIL0.28Compact, brown SILTY SAND0.69		S AU	1								
Stiff, brown <b>SILTY CLAY,</b> some sand seams		$\langle ss  $	2	83	11	1-	-77.76	· · · · · · · · · · · · · · · · · · ·		······································	
<u>2.13</u>						2-	-76.76				
		тw	3	100		3-	-75.76		······································		
		<b>.</b>				4-	-74.76			· · · · · · · · · · · · · · · · · · ·	
Soft to firm, grey SILTY CLAY		τw	4	100			-73.76			······································	
							-72.76			••••••••••••••••••••••••••••••••••••••	
							-71.76				
							-70.76				
9.60 Dynamic Cone Penetration Test							-69.76	······································			
commenced @ 9.60m depth. Cone pushed to 33.8m depth.						10-	-68.76			· · · · · · · · · · · · · · · · · · ·	4
						11-	-67.76			· · · · · · · · · · · · · · · · · · ·	
						12-	-66.76			· · · · · · · · · · · · · · · · · · ·	
							-65.76			· · · · · · · · · · · · · · · · · · ·	
						14-	-64.76	20 Shea ▲ Undist	40 60 ar Strengtl urbed △		년 1 <b>00</b>
	1 1			1							

# Solid PROFILE AND TEST DATA Solid PROFILE AND TEST DATA 154 Colonnade Road South, Ottawa, Ontario K2E 7J5 Geotechnical Investigation DATUM Ground surface elevations provided by Stantec Geomatics Ltd. File NO. REMARKS HOLE NO. FULL NO.

										E NO.	BH14	
BORINGS BY CME 55 Power Auger				D	ATE 3	3 October	2011				<b>БП 14</b>	
SOIL DESCRIPTION	DIG		SAMPLE			DEPTH (m)	ELEV. (m)	<ul><li>Pen. Resist. Blows/0.3m</li><li>50 mm Dia. Cone</li></ul>			neter uction	
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE of RQD			• <b>W</b>	/ater C	Conten	t %	Piezometer Construction
GROUND SURFACE				R	Z	14-	-64.76	20	40	60	80	
							-63.76		• • • • • • • • • •	· · · · · · · · · · · · · · · · · · ·		
						16-	-62.76		• • • • • • • • • • • • • • • • • • • •	<pre>&gt;</pre>	· · · · · · · · · · · · · · · · · · ·	
						17-	-61.76					
							-60.76		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	
							-59.76 -58.76					
							-57.76	· · · · · · · · · · · · · · · · · · ·				
							-56.76	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		
							-55.76		• • • • • • • • • •			
						24-	-54.76					
						25-	-53.76	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · ·	······································	
						26-	-52.76					
						27-	-51.76					
						28-	-50.76	20 Shor	40	60	80 10	0
								Shea Undistu		ength (I △ Rer	<b>KPa)</b> moulded	

patersongroup		Consulting Engineers		SOIL PROFILE AND TEST DATA							
154 Colonnade Road South, Ottawa, Onta						8th Line Road and Anderson Road					
DATUM Ground surface elevations prov				c Geor		<b>tawa, On</b> s Ltd.	tario		FILE NO.		
REMARKS		u by t	Starico			5 210.			FILLING	PG2466	
BORINGS BY CME 55 Power Auger DATE 3 October 2011 BH14											
-		SAMPLE						Pen. Resist. Blows/0.3m			_
SOIL DESCRIPTION	- - -					DEPTH (m)			) mm Dia. Co		Piezometer Construction
		ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD		()		latar Cantan	F 0/	ezom
	4.T.C	ΤΥ	MUN	LECO	N VI			0 W 20	Ater Content 40 60	80	Ë
GROUND SURFACE	-					28-	-50.76	20	40 00		
								• • • • • • • • • • • • • • • •	· · · · · · · · · · · · · · · · · · ·	•••••••••••••••	
						29-	-49.76				
						30-	-48.76				
						01	47 70			•••••	
						31-	-47.76				
						32-	-46.76		· · · · · · · · · · · · · · · · · · ·	•••••••••••••••••	
							10.70	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		
						33-	-45.76	• • • • • • • • • • • • •	· · · · · · · · · · · · · · · · · · ·		
<u>33.88</u> End of Borehole	_										•
Practical DCPT refusal @											
33.88m depth											
(GWL @ 1.6m depth based on field observations)											

100

20 40 60 80 Shear Strength (kPa)

▲ Undisturbed

# patersongroup Consulting Engineers

## SOIL PROFILE AND TEST DATA

▲ Undisturbed

△ Remoulded

**Geotechnical Investigation** 8th Line Road and Anderson Road Ottawa, Ontario

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

DATUM

<b>DATUM</b> Ground surface elevations	ound surface elevations provided by Stantec Geomatics Ltd.										
REMARKS									HOLE NO.	BH15	
BORINGS BY CME 55 Power Auger					ATE 4	4 October	2011				
SOIL DESCRIPTION	PLOT			MPLE	м	DEPTH (m)	ELEV. (m)		esist. Blo 0 mm Dia.		neter uction
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or ROD				later Cont		Piezometer Construction
GROUND SURFACE				<u>м</u>	4	0-	-78.56	20	40 60	) 80 ·····	××× ×××
Loose, brown SILTY SAND, 0.6 some clay	~ ^ ^       .	ss v	1	50	6			· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	· • · · · • • • • • · · · · · · · · · ·	
Stiff to firm, brown SILTY CLAY with sand seams		ss	2	75	3	1-	-77.56	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	• • • • • • • • • • • • • • • • • • •	
2.2	1					2-	-76.56	·		• • • • • • • • • • • • • • • • • • • •	
						3-	-75.56			· • · · · · • · • · • · • · · · · · · ·	
		тw	3			4-	-74.56				
Firm, grey SILTY CLAY		Тт	4			5-	-73.56				
						6-	-72.56				
						7-	-71.56		••••••••••••••••••••••••••••••••••••••	· · · · · · · · · · · · · · · · · · ·	
						8-	-70.56			••••••	
9.6						9-	-69.56	· # · · · · · · · · · · · · · · · · · ·		•••••	
End of Borehole		1									
(GWL @ 1.7m depth based on field observations)											
								20 Shea	40 60 ar Strengtl	) 80 10 h (kPa)	00

## Consulting Engineers

## SOIL PROFILE AND TEST DATA

Geotechnical Investigation 8th Line Road and Anderson Road Ottawa, Ontario

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

DATUM Ground surface elevat		FILE NO.	PG2466								
REMARKS						HOLE NO.	BH16				
BORINGS BY CME 55 Power Auge	er			D	ATE 4	4 October	2011			DITIO	
SOIL DESCRIPTION	PLOT		SAN			DEPTH (m)	ELEV. (m)		esist. Blow 0 mm Dia. (		neter uction
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD			• <b>v</b>	Vater Conte	nt %	Piezometer Construction
GROUND SURFACE	01		Z	RE	z °	0	70.45	20	40 60	80	
TOPSOIL	_0.20	k ss	1		10	0-	-79.45			•••••••••••••••••••••••••••••••••••••••	$\bigotimes \bigotimes$
Loose, brown SILTY SAND	0.60										
Stiff to firm, brown <b>SILTY</b> <b>CLAY</b> with sand seams		∦ ss	2	100	4	1-	-78.45		······································	······································	
	_ <u>2.13</u>					2-	-77.45			· · · · · · · · · · · · · · · · · · ·	
		тw	3	100		3-	-76.45				
						4-	-75.45		······································	· · · · · · · · · · · · · · · · · · ·	
Soft to firm, grey SILTY CLAY		τw	4	100		5-	-74.45		• • • • • • • • • • • • • • • • • • • •	·····	द्वीपीपीपी द्वीपतिपति
						6-	-73.45				terterter Universiter
						7-	-72.45				
						8-	-71.45			· · · · · · · · · · · · · · · · · · ·	
	<u>9.60</u>					9-	-70.45				
Dynamic Cone Penetration Test commenced @ 9.60m depth. Cone pushed to 16.5m depth.						10-	-69.45			· · · · · · · · · · · · · · · · · · ·	
						11-	-68.45		······	• • • • • • • • • • • • • • •	
						12-	-67.45				****
						13-	-66.45				****
						14-	-65.45				
								20 Shea	40 60 ar Strength	80 10 (kPa)	00
								▲ Undist	-	Remoulded	

patersongro	arconaroun		Сог	nsulting gineers	SOIL PROFILE AND TEST DATA						
154 Colonnade Road South, Ottawa, O		-		gineers	8t		ad and A	igation Inderson R	Road		
<b>DATUM</b> Ground surface elevations p				ec Geon	-	<b>ttawa, On</b> s Ltd.	tario		FILE NO.		
REMARKS									PG2466		
BORINGS BY CME 55 Power Auger				DA	TE	4 October	2011		HOLE NO. BH16		
	ы		SA	MPLE				Pen. R	lesist. Blows/0.3m		
SOIL DESCRIPTION	A PLOT		~	ХХ	ы о	DEPTH (m)	ELEV. (m)	• 5	0 mm Dia. Cone	Piezometer Construction	
	STRATA	ТҮРЕ	NUMBER	% RECOVERY	N VALUE or RQD			• v	Vater Content %	Piezo Const	
GROUND SURFACE	0		z	RE	z <sup>o</sup>	14-	-65.45	20	40 60 80		
						14-	-05.45	• • • • • • • • • • • • •			
						4.5	04.45				
						15-	-64.45				
						16-	-63.45	• • • • • • • • • • •			
17.02 End of Borehole		-				17-	-62.45			•	
Practical DCPT refusal @ 17.02m depth											
(GWL @ 1.6m depth based on											
field observations)											
								20 Shea	40 60 80 1 ar Strength (kPa)	00	

▲ Undisturbed

△ Remoulded

		Height system used	Height system used				
DATERCON	Geotechnical Investigation	Geodetic					
PATERSON		Elevation [m]					
GROOP	Proposed Mixed-Use Community Development	77.90					
Project ID	Client	Northing [m]	Easting [m]				
PG5827	Taggart Investments and Algonquins of Ontario	5023301.08	383197.23				
Cone name	Project location name	Depth [m]					
CPT 1-23	Tewin Lands, Ottawa, Ontario	50.93					
Cone type	Investigation start date	Scale	Page				
CPT PROBE 15 cm2	3/23/2023	1:120	1/1				
Remarks1							
Classification by Robertson 1990 — ac [kPa] — fs [kPa] — y2 [kPa] — Su(ac) [kPa]							

Classification by Robertson 1990	——— qc [kPa]			
(b)	0.0 1 000.0 2 000.0	0.0 20.0 40.0	0.00 500.00 1 000.00	
77.5	77.5			77.5
77.5- 77.0- 76.5- 76.0- 75.74 Silty sand to sandy silt 75.5- 75.0- 74.5- 74.0- 74.5- 74.10 73.76 73.0- 73.76	77.0			77.0
76.5	76.5			76.5
76.0 75.74 Silty sand to sandy silt	76.0			76.0
75.5 <b>75.26</b>	75.5			75.5
75.0	75.0	5		75.0
74.5 Clays, clay to silty clay	74.5			74.5
74.0 <b>73.76</b>	74.0	<u> </u>		74.0
73.5	73.5		~	73.5
		5		73.0
72.5 - Clays, clay to silty clay	72.5	}		72.5
72.0	72.0	}		72.0
71.0 70.98	71.0		}	71.0
70.5	70.5			71.0
70.0	70.0			70.0
69.5	69.5			69.5
69.0	69.0	7	<u> </u>	<u><u> </u></u>
68.5	68.5			68.5
68.0 Clays, clay to silty clay	68.0	<u>-</u>		68.0
67.5	67.5			67.5
67.0	67.0	$\frac{1}{2}$		67.0
66.5	66.5			66.5
66.0	66.0		\$	66.0
65.5 <b>65.16</b> 65.0 <b>65.1</b>	65.0	<u> </u>		65.5
64.5	64.5			64.5
64.0	64.0	7		64.0
63.5	63.5	2		63.5
63.0	63.0			63.0
62.5 Clays, clay to silty clay	62.5		<u>&amp;</u>	62.5
62.0	62.0			62.0
61.5	61.5	5		61.5
61.0	61.0			61.0
60.5	60.5			60.5
60.0	60.0			60.0
59.5	59.5			59.0
58.5	58.5			58.5
58.0 -	58.0		~	58.0
57.5-	57.5			57.5
57.0	57.0			57.0
56.5	56.5			56.5
56.0	56.0			56.0
55.5 Clays, clay to silty clay	55.5			55.5
55.0	55.0			55.0
54.5	54.5			54.5
54.0	54.0		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	54.0
53.5 53.0	53.5	2		53.5
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52.0	52.0			52.0
51.5-	51.5		1045.3000 1072.4000 7	51.5
51.0	51.0			51.0
1	1			

		Height system used				
DATERCON	Geotechnical Investigation	Geodetic				
PATERSON		Elevation [m]				
OROOP	Proposed Mixed-Use Community Development	78.71				
Project ID	Client	Northing [m]	Easting [m]			
PG5827	Taggart Investments and Algonquins of Ontario	5022805.05	383245.36			
Cone name	Project location name	Depth [m]				
CPT 2-23	Tewin Community, Ottawa, Ontario	54.	.41			
Cone type	Investigation start date	Scale	Page			
CPT PROBE 15 cm2	3/23/2023	1:110	1/1			
Remarks1						
Classification by	Deharteen 1000					

Classification by Robertson 1990	— 🗲 qc [kPa]		——— u2 [kPa]	
(b)	0.0 1 000.0 2 000.0	0.0 20.0 40.0	0.00 500.00 1 000.00	0.0 20.0 40.0 60.0
78.5	78.5			78.5
78.0	78.0			78.0
77.5	77.5			77.5
77.0	77.0			77.0
76.5 <b>76.27</b>	76.5		2	76.5
76.0 75.79 Clean sands to silty sands	76.0			76.0
78.5 78.0 77.5 77.0 76.5 76.0 75.5 75.0 75.5 75.0 74.5 74.11	75.5			75.5
75.0 Clays; clay to silty clay	75.0			75.0
74.5	74.5	<u>}</u>		74.5
74.0	74.0			74.0
73.5 <b>73.35</b> Clays; clay to silty clay	73.5	5		73.5
	73.0			73.0
72.5 Clays; clay to silty clay	72.5		}	72.5
72.0 71.77 Clays; clay to silty clay	72.0			72.0
71.5-	71.5			71.5
71.0	71.0	}		71.0
70.5 Clays; clay to silty clay	70.5			70.5
70.0	70.0	5		70.0
69.5 <b>69.11</b>	69.5			69.5
69.0	69.0			69.0
68.5 Clays; clay to silty clay	68.5			68.5
68.0- Clays; clay to silty clay	68.0			68.0
67.5 <b>67.37</b>	67.5	}		67.5
67.0	67.0			67.0
66.5	66.5			66.5
66.0	66.0			66.0
65.5 -	65.5			65.5
65.0	65.0			65.0
64.5	64.5		<u>}</u>	64.5
64.0	64.0	4	2	64.0
63.5- 63.0-	63.5	{	}	63.0
62.5	62.5	}	{	62.5
62.0	62.0			62.0
Clays; clay to silty clay	61.5			61.5
61.0	61.0		2	61.0
60.5 -	60.5			60.5
60.0	60.0			60.0
59.5	59.5			59.5
59.0 -	59.0			59.0
58.5	58.5			58.5
58.0 -	58.0			58.0
57.5	57.5			57.5
57.0-	57.0			57.0
56.5	56.5			56.5
56.0	56.0			56.0
55.5 Sensitive, fine grained	55.5			55.5
55.0	55.0			55.0
54.5	54.5	2		54.5
54.0	54.0			54.0

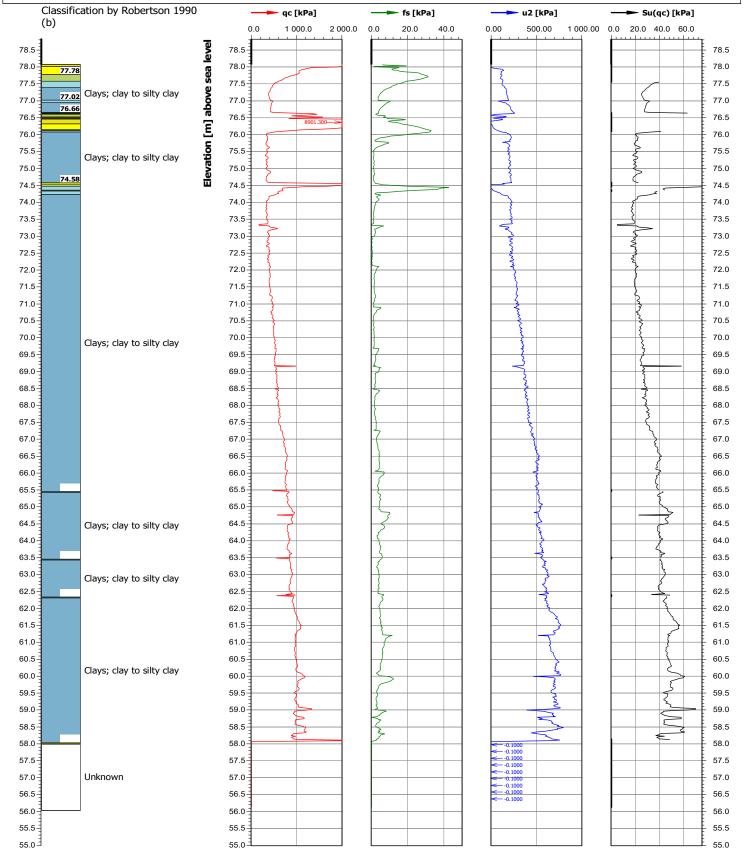
		Height system used					
DATERCON	Geotechnical Investigation	Geo	detic				
PATERSON		Elevation [m]					
GROUP	Proposed Mixed-Use Community Development	79.23					
Project ID	Client	Northing [m]	Easting [m]				
PG5827	Taggart Investments and Algonquins of Ontario	5022386.46	383107.40				
Cone name	Project location name	Depth [m]					
CPT 2-23	Tewin Community - Ottawa, Ontario	55	.93				
Cone type	Investigation start date	Scale	Page				
CPT PROBE 15 cm2	3/24/2023	1:105	1/1				
Remarks1							
Classification by	Classification by Robertson 1990 — qc [kPa] — fs [kPa] — u2 [kPa] — Su(qc) [kPa]						

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4.5	ation by Robertson 1990	qc [kPa]		——— u2 [kPa]	
(b)		0.0 1 000.0 2 000.0	0.0 20.0 40.0	0.00 500.00 1 000.00	0.0 50.0 100.0 150.0
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	Clean sands to silty sands	<b>0</b> 78.0		X III	
5 77.31		<b>8</b> 77.5			
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5 76.51 76.27		<b>E</b> 76.5	2		
0-		<b>6</b> 76.0	5		
			3		$ \zeta $
5-	Clays; clay to silty clay	75.5		$\overline{\langle}$	
0- <b>74.65</b>		<b>D</b> 75.0			
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5-		71.5		<u> </u>	
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5-		70.5			
0		70.0		<u>}</u>	
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0-		69.0			
5-		68.5	7		
0-		68.0	<u>}</u>		
5-		67.5			
0-		67.0		2	
				<b>A</b>	
5-		66.5	5	<u>F</u>	
0-		66.0		2	
5-	Clays; clay to silty clay	65.5	}	<b>&gt;</b>	
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5-		64.5	}		
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5-		1 <mark>7</mark>			1 7 1
		63.5			
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5-		62.5			
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0-		57.0	$\left  \left\{ \right. \right. \right $		<u> </u>
5-		56.5	$\frac{2}{2}$		
		56.0			
5-		55.5			

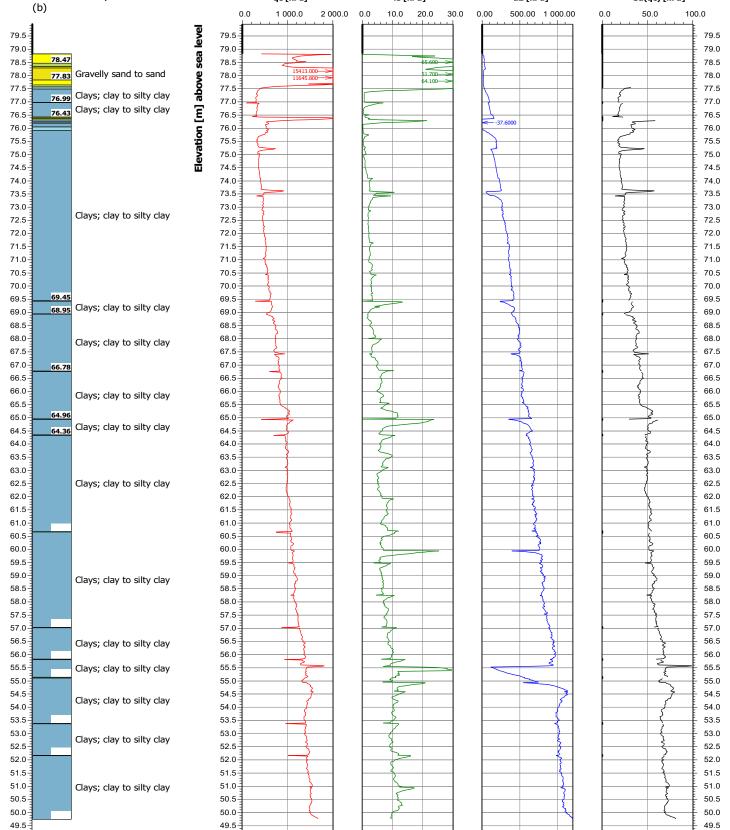
		Height system used	Height system used		
DATE OF COM	Geotechnical Investigation	Geo	detic		
PATERSON		Elevation [m]			
GROOP	Proposed Mixed-Use Community Development	78.82			
Project ID	Client	Northing [m]	Easting [m]		
PG5827	Taggart Investments and Algonquins of Ontario	5022278.85	383609.78		
Cone name	Project location name	Depth [m]			
CPT 4-23	Tewin Community, Ottawa, Ontario	56	.04		
Cone type	Investigation start date	Scale	Page		
CPT PROBE 15 cm2	3/24/2023	1:105	1/1		
Remarks1					



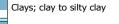
		Height system used			
DATERCOLL	Geotechnical Investigation	Geodetic			
PATERSON		Elevation [m]			
GROUP	Proposed Mixed-Use Community Development	80.39			
Project ID	Client	Northing [m]	Easting [m]		
PG5827	Taggart Investments and Algonquins of Ontario	5021950.16	382323.58		
Cone name	Project location name	Depth [m]			
CPT 5-23	Tewin Community, Ottawa, Ontario	54	.57		
Cone type	Investigation start date	Scale	Page		
CPT PROBE 15 cm2	3/27/2023	1:120	1/1		
Remarks1					
Classification by Robertson 1990 — qc [kPa] — fs [kPa] — u2 [kPa] — Su(qc) [kPa]					

	ication by Robertson 1990	——— qc [kPa]		——— u2 [kPa]	
(b)		0.0 1 000.0 2 000.0	0.0 10.0 20.0 30.0	0.00 500.00 1 000.00	0.0 50.0 100.0
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79.5	Clean sands to silty sands Clays; clay to silty clay	79.5			79.5
79.0 <mark>78.</mark>	Clean sands to silty sands	79.0			79.0
78.5	S S	78.5	43.600->		78.5
78.0	at	78.0			78.0
77.5	Clays; clay to silty clay	77.5			77.5
77.0 <b>76.</b>	<sup>83</sup> <b>C</b>	77.0			77.0
76.5	Ę	76.5			76.5
76.0	EN SA	76.0			76.0
75.5	Ū.	75.5			<u><u></u> <u></u> <u></u> <u></u> <u></u> 75.5</u>
75.0		75.0			75.0
74.5		74.5	7		74.5
74.0		74.0			74.0
73.5		73.5			73.5
73.0	Clays; clay to silty clay	73.0			73.0
72.5		72.5			72.5
72.0		72.0	7		72.0
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70.0 <b>69.</b>	77	70.0	}		70.0
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68.5		68.5	2	2	68.5
68.0		68.0	}		68.0
				}	
67.5		67.5		3	67.5
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66.5		66.5	$\leq$	\$	66.5
66.0		66.0	3		66.0
65.5		65.5			65.5
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62.0	Clays; clay to silty clay	62.0			62.0
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55.5-		55.5		3	55.5
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30.0					55.5

		Height system used			
	Geotechnical Investigation	Geodetic			
PATERSON		Elevation [m]			
GROOP	Proposed Mixed-Use Community Development	79.95			
Project ID	Client	Northing [m]	Easting [m]		
PG5827	Taggart Investments and Algonquins of Ontario	5022493.74	382026.72		
Cone name	Project location name	Depth [m]			
CPT 6-23	Tewin Community, Ottawa, Ontario	49	.76		
Cone type	Investigation start date	Scale	Page		
CPT PROBE 15 cm2	3/27/2023	1:135	1/1		
Remarks1					
Classification by Robertson 1990 — qc [kPa] — fs [kPa] — u2 [kPa] — Su(qc) [kPa]					



		Geotech	nical Investigat	ion		Height system used			
PATERSON GROUP						Geodetic Elevation [m]			
		oposed Mixed-U	se Community I	Development			79.30		
ect ID Client PG5827		ggart Investmen	ts and Alaonau	ins of Ontario		Northing [m] 5023027.	Easting	[m] 382405.35	
	ect location name		unity, Ottawa,			Depth [m]	49.38		
e type Inves	stigation start date			Untario		Scale	49.38 Page		
CPT PROBE 15 cm2 arks1			3/28/2023			1:135		1/1	
Classification by Rob	ertson 1990	qc	[kPa]			🗕 u2 [kPa]		(qc) [kPa]	
(b)			 000.0 2 000.0		5.0 20.0 0.00	500.00 1 000.00		50.0 100.0	
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78.5	lev	78.5						78	
78.0	ea	78.0	12413.500 >	28.7	<u> </u>			78	
77.5	e silty clay Elevation [m] above sea level	77.5		41.9			~	77	
Clays; clay to	silty clay	77.0						77	
76.5	]al	76.5						76	
76.0-	Ē	76.0						76	
75.5	- u	75.5						75	
75.0	atic	75.0		2		2		75	
74.5- 74.0- Clays; clay to	silty clay	74.0						74	
73.5-		73.5				¥	374	74	
73.0		73.0		2		5		73	
72.5		72.5				<u>}</u>	_ <u>}</u>	72	
72.0		72.0				<u> </u>		72	
71.5 Clays; clay to	silty clay	71.5			—   -	}		71	
71.0		71.0						71	
70.5 Clays; clay to	silty clay	70.5						70	
70.0 <b>69.92</b>		70.0						70	
69.5 Clays; clay to 69.0 68.88	silty clay	69.5		}		3		69	
68.5		68.5		7		3	7	68	
68.0		68.0						68	
67.5		67.5		2			<u> </u>	67	
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63.0		63.0					{	63	
62.5		62.5			_			62	
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61.5		61.5	}	3			5	61	
61.0 Clays; clay to	siity clay	61.0		5	—   -			61	
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59.5		59.5	}	2				59	
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58.0		58.0		3		~		58	
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Clays; clay to silty clay

Sensitive, fine grained Clays; clay to silty clay

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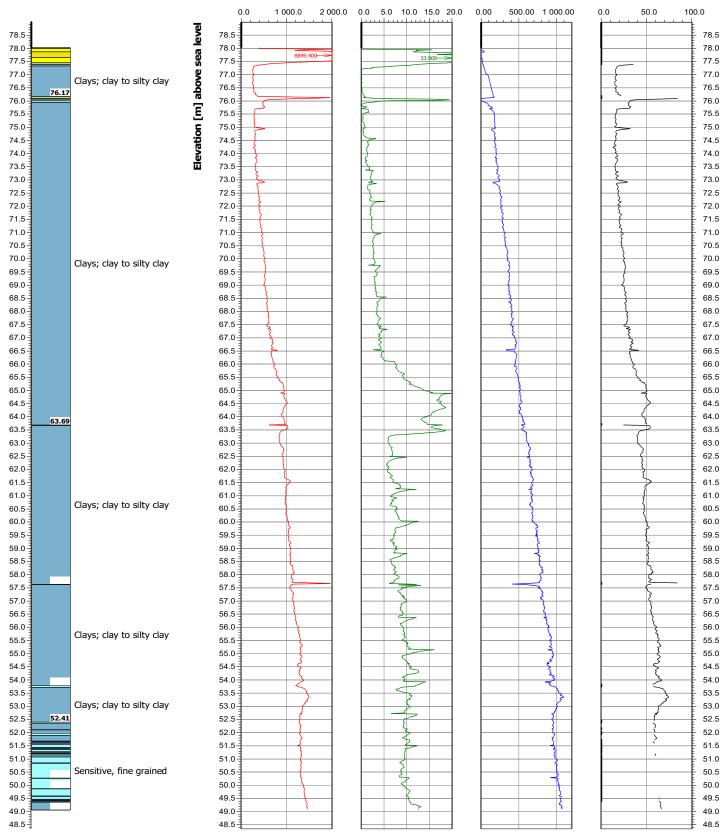
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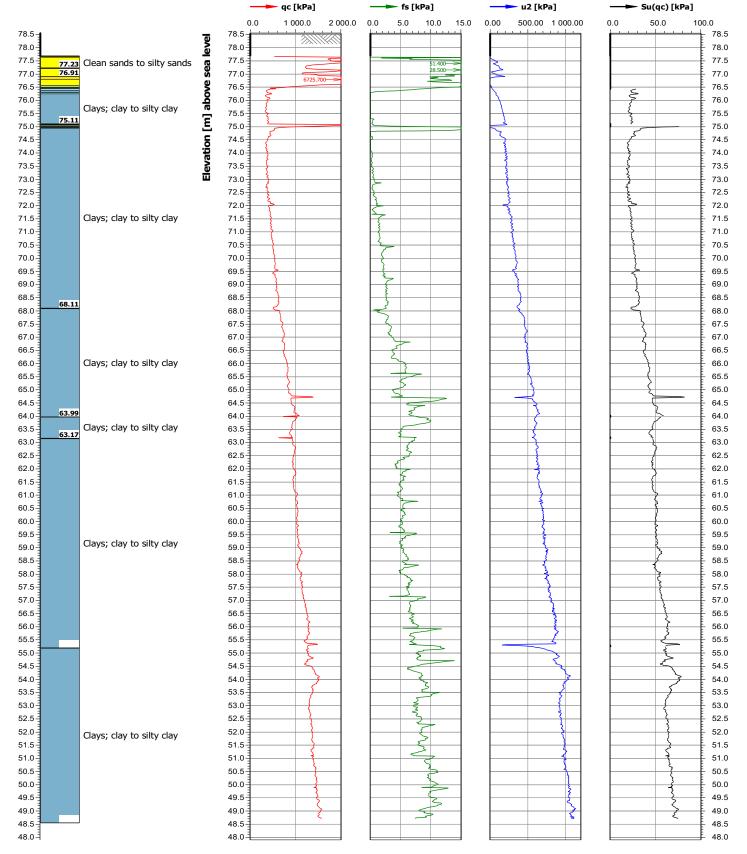
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		Height system used				
N DITTO COLL	Geotechnical Investigation	Geo	Geodetic			
PATERSON		Elevation [m]				
GROUP	Proposed Mixed-Use Community Development	78.99				
Project ID	Client	Northing [m]	Easting [m]			
PG5827	Taggart Investments and Algonquins of Ontario	5023365.26	382517.77			
Cone name	Project location name	Depth [m]				
CPT 8-23	Tewin Community, Ottawa, Ontario	49	.07			
Cone type	Investigation start date	Scale	Page			
CPT PROBE 15 cm2	3/28/2023	1:135	1/1			
Remarks1						
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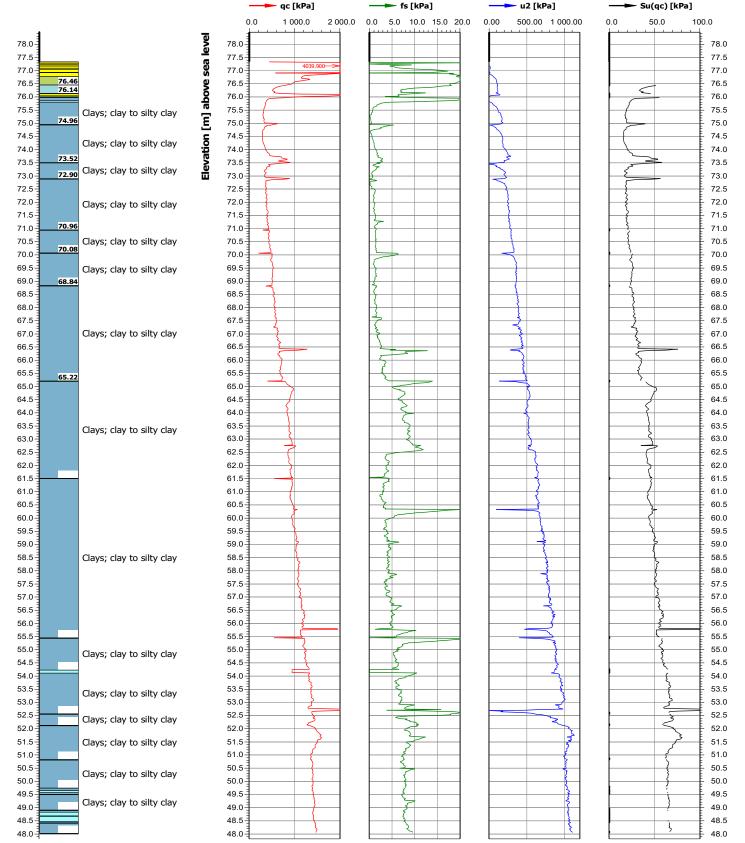


		Height system used			
DATERCOLL	Geotechnical Investigation	Geo	detic		
PATERSON	Duran and Missed Line Community Davidsement	Elevation [m]			
OROOF	Proposed Mixed-Use Community Development	78.55			
Project ID	Client	Northing [m]	Easting [m]		
PG5827	Taggart Investments and Algonquins of Ontario	5023110.30	382735.08		
Cone name	Project location name	Depth [m]			
CPT 9-23	Tewin Community, Ottawa, Ontario	48	.57		
Cone type	Investigation start date	Scale	Page		
CPT PROBE 15 cm2	3/28/2023	1:135	1/1		
Remarks1					
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		Height system used	Height system used			
DATERCON	Geotechnical Investigation	Geodetic				
PATERSON	Duran and Missed Line Community Development	Elevation [m]				
OROOF	Proposed Mixed-Use Community Development	78.46				
Project ID	Client	Northing [m]	Easting [m]			
PG5827	Taggart Investments and Algonquins of Ontario	5023694.67	382296.87			
Cone name	Project location name	Depth [m]				
CPT 11-23	Tewin Community, Ottawa, Ontario	48	.00			
Cone type	Investigation start date	Scale	Page			
CPT PROBE 15 cm2	3/29/2023	1:135	1/1			
Remarks1						



		Geotechnical Investigation	n	Height system used	eodetic				
PATERSON	Proposed Mixed-Use Community Development			Elevation [m]					
oject ID PG5827	Client Taggart Ir	Taggart Investments and Algonquins of Ontario 5024572.22							
ne name CPT 12-23	Project location name	Tewin Community, Ottawa, Ontario			49.21				
ne type CPT PROBE 15 cm2	Investigation start date	3/29/2023		Scale 1:135	Page 1/1				
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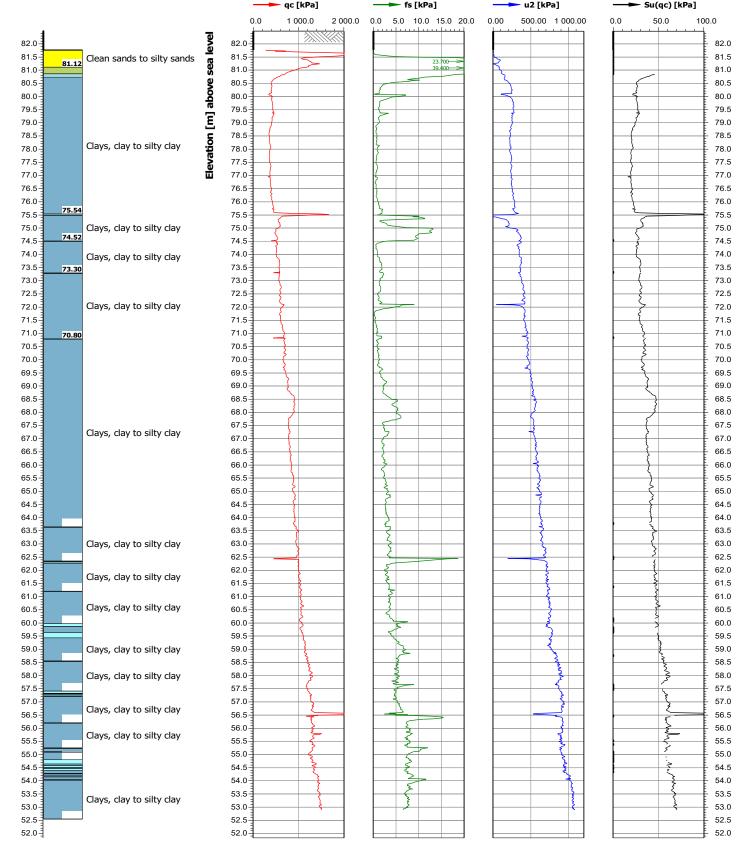
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		Height system used Geodetic			
DATERCON	Geotechnical Investigation				
PATERSON		Elevation [m]			
GROOP	Proposed Mixed-Use Community Development	82.48			
Project ID	Client	Northing [m]	Easting [m]		
PG5827	Taggart Investments and Algonquins of Ontario	5023313.27	379090.06		
Cone name	Project location name	Depth [m]			
CPT 13-23	Tewin Community, Ottawa, Ontario	52	2.56		
Cone type	Investigation start date	Scale	Page		
CPT PROBE 15 cm2	3/30/2023	1:135	1/1		
Remarks1					
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		Height system used			
DATERCOLL	Geotechnical Investigation	Geodetic			
PATERSON	Duran and Missed Har Community Development	Elevation [m]			
OROOP	Proposed Mixed-Use Community Development	82.48			
	Client		Easting [m]		
PG5827	Taggart Investments and Algonquins of Ontario	5023307.84	379086.98		
Cone name	Project location name	Depth [m]			
CPT 14-23	Tewin Community, Ottawa, Ontario	52.70			
Cone type	Investigation start date	Scale	Page		
CPT PROBE 15 cm2	3/30/2023	1:135	1/1		
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