GEOTECHNICAL INVESTIGATION OF THE PROPOSED BUILDING ADDITION AND SITE DEVELOPEMENT
145 WALGREEN ROAD
OTTAWA, ON

Project No.: CCO-25-1370-01

Prepared for:

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egis

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APPENDICES

1.0 INTRODUCTION

Egis Group Ltd. (Egis) was retained by W.O. M.W. Realty Limited (the Client) to perform a geotechnical investigation and provide design recommendations for the proposed building addition of 145 Walgreen Road (the project) located in the Ottawa, ON.

The foundation design recommendations and construction considerations will be developed based on factual findings from a geotechnical investigation performed at the above-mentioned site by Egis Canada Ltd.

The purpose of the investigation was to explore the subsurface conditions at nine (9) boreholes, BH24-1 to BH24-9, and to provide borehole location plans, record of borehole logs, and laboratory test results. This report provides anticipated geotechnical conditions influencing the design and construction of the proposed one-storey commercial building addition with a mezzanine, as well as recommendations for construction of proposed CNG compressor concrete pad.

This report is prepared for the sole use of client. The use of this report, or any reliance on it by any third party, is the responsibility of such a third party. This report is subject to the limitations as shown in Appendix A. It is understood that the project will be performed in accordance with all applicable codes and standards present within its jurisdiction.

2.0 PROJECT UNDERSTANDING

It is understood that The Client intends to construct a commercial building addition, approximately 517 square meters, and concrete pad for a CNG compressor at the southwest corner of the property located at 145 Walgreen Road, Ottawa, ON. The proposed structure addition is a one-story building with a mezzanine, slab-on-grade and with no basement or underground parking. Included are the access roads, parking spaces nearby and a planned area for a CNG compressor.

3.0 SITE DESCRIPTION

3.1 Existing Site Conditions

The property under consideration for the proposed development is located in an urban area with commercial properties around it. The current site is situated on the south side of the Walgreen Road, with a two-storey office building at the front followed by an existing slab on grade shop at the rear (south) end of the property. Existing commercial buildings are located to the east and west, a sports field and associated facilities are located to the north, and an empty woodland lot is located to the south.

3.2 Site Geology

Based on published physiography maps of the area (Ontario Geological Survey, OGS), the site is located in an area that is a boundary with the Ottawa Valley Clay Plains to the north, and the Smiths Falls Limestone Plain to the south.

Surficial geology maps of Southern Ontario indicate the site is situated in an area with Organic Deposits comprising of peat, muck and marl, and the northwest edge of the site is shown as shallow Paleozoic bedrock. The bedrock within the area is identified to be comprised of limestone, dolostone and sandstone of the Ottawa Group and the Shadow Lake formation.

4.0 FIELD PROCEEDURES

Egis conducted a site visit prior to the planned drilling date and marked the proposed borehole locations. In addition, Egis cleared the site of Public and Private buried utilities before the commencement of geotechnical drilling. Utility clearance requisitions were submitted to Ontario One Call (ON1Call) to obtain Public utility locates. The fieldwork was coordinated with the client. A third-party private utility locator was retained to locate any utilities not covered within the Ontario One Call Public locate system.

The fieldwork was conducted on August 14 and 15, 2024 and consisted of drilling nine (9) boreholes that were advanced to drilling depths ranging from 1.40 to 5.62 m bgs. The boreholes were drilled using a CME-55 truck-mounted drilling rig, outfitted with hollow stem augers. The equipment used for drilling was owned and operated by George Downing Estate Drilling Ltd. Of Grenville, Quebec. Soil samples were obtained at 0.76 m intervals in boreholes using a 51 mm outside diameter split spoon sampler in accordance with the Standard Penetration Test (SPT) procedure. The drilling was terminated at planned drilling depths. The bedrock was cored and sampled to approximately 3.58 and 3.68m depth from the top of the encountered bedrock surface in boreholes 24-1 and 24-2, respectively. Additionally, a 25 mm diameter standpipe piezometer was installed in borehole BH24-2 for temporary groundwater monitoring within the proposed building addition area.

Three (3) 51 mm diameter, monitoring wells were installed in borehole BH24-4 MW, BH24-7 MW and BH24-8 MW. The wells were protected in traffic rated flush-mount caps. Details and location information of the wells are provided in Section 6.2 and summarized in Table 7.

Boreholes and monitoring wells were backfilled with auger cuttings and bentonite hole-plug and restored to the existing ground level as per Regulation 903 requirements. A summary of borehole locations and drilling depths is shown in Table 1. The borehole locations are shown on Figure 2, Included in Appendix B.

Table 1: Borehole Information

Borehole ID	Drilled Date	Coordinates (Geodetic)			Borehole Depth	
		UTM Zone 18 T Easting	UTM Zone 18 T Northing	Surface El. (m asl)	Depth (m bgs)	Bottom El. (m asl)
BH24-1	August 14, 2024	424860.028	5013333.663	127.31	4.98	122.33
BH24-2	August 14, 2024	424875.725	5013335.166	127.12	5.62	121.50
BH24-3	August 14, 2024	424771.810	5013232.316	127.73	1.70	126.03
BH24-4 MW	August 15, 2024	424838.524	5013284.046	127.10	3.63	123.47
BH24-5	August 14, 2024	424759.248	5013262.774	128.24	2.79	125.45
BH24-6	August 14, 2024	424813.379	5013323.206	127.76	3.56	124.20
BH24-7 MW	August 15, 2024	424732.700	5013307.240	128.46	3.45	125.01
BH24-8 MW	August 15, 2024	424777.960	5013353.352	127.64	3.05	124.59
BH24-9	August 14, 2024	424813.379	5013323.206	127.22	3.33	123.89

The fieldwork was supervised by an Egis representative and the subsurface stratigraphy encountered at the borehole locations was recorded based on the recovered samples, and samples were submitted to the Egis Geotechnical Laboratory for further visual examination and testing. The boreholes were surveyed with a Trimble R2 GPS unit to record their locations and geodetic elevations.

5.0 LABORATORY TEST PROCEDURES

Geotechnical Laboratory testing on representative soil samples was performed at the Egis Geotechnical Laboratory and included determination of natural moisture content, sieve and hydrometer grain-size analysis,

and Atterberg Limits testing. The Laboratory tests were performed in accordance with American Society for Testing Materials (ASTM) test procedures.

The rock core samples returned to the laboratory were subjected to detailed visual examination and additional classification by a geotechnical engineer. Unconfined compressive strength tests were completed on selected bedrock samples. The results are discussed in this report and provided in Appendix D.

Parcel Laboratories Ltd., Ontario carried out chemical testing on a representative soil sample to determine the potential susceptibility to corrosion of ductile iron pipes and concrete attack parameters. The tested chemical parameters consisted of pH, chloride, sulphate and resistivity. Laboratory test results are included in Appendix D.

The rest of the soil samples recovered will be stored in Egis storage facility for a period of three (3) months after submission of the final report. Samples will be disposed after this period of time unless otherwise requested in writing by the client.

6.0 SUBSURFACE CONDITIONS

6.1 General

The site stratigraphy typically consists of five distinct layers. The layers were identified as Asphalt, Fill, Silt/Sandy Silt, Sandy Silt Till/Silty Sand Till and Limestone Bedrock. For classification purposes, the pavement structure, fill materials, and surficial soils encountered at this site can be divided into five (5) general layers:

1. Asphalt
2. Fill
3. Silt/Sandy Silt
4. Sandy Silt Till/Silty Sand Till
5. Bedrock/Refusal

The fills and soils encountered during the course of investigation, together with the field and laboratory test results are shown on the borehole records included in Appendix C. Laboratory test results are included in Appendix D. Description of the strata encountered are given below.

6.1.1 Asphalt

Two boreholes were advanced within the existing paved section, asphalt was measured to be at approximately 100 mm in the investigated boreholes BH24-6 and BH24-8 MW.

6.1.2 Fill

The fill layer was encountered at the surface or below the pavement in all boreholes and extended to a depth ranging from 0.45 m to 0.91 m bgs. The fill layer is composed mainly of granular fill, silty sand and gravelly sand to sand and gravel, trace to pockets of organics and trace of rootlets. This grey, brown, dark brown and dark grey fill layer was found to be in a moist to very moist state. In borehole BH24-9, a 50 mm topsoil/organic soil layer was encountered at the surface.

One (1) representative sample from the fill layer was subjected to grain-size analysis and the layer was observed to contain on average 18% of Gravel, 51% of Sand and 31% of Fines. The fill grain-size analysis summary is shown in Table 2, and the laboratory test results of the grain size analysis are shown in Appendix D.

Table 2: Grain-size Analysis Summary of the Fill Layer

Borehole ID	Sample	Constituent Material in percent weight		
		Gravel (%)	Sand (%)	Fines
BH 24-7 MW	SS-1	18.1	51.2	30.7

The SPT N-Value within the fill layer ranged from approximately 10 to 40 which indicated a compact to dense relative density.

6.1.3 Silt/Sandy Silt

A layer of silt/sandy silt was encountered below the fill layer in all boreholes except for BH 24-5, observed to extend to depths ranging approximately from 1.26 to 3.05 m bgs. In general, this layer is comprised of silt to sandy silt with trace to some clay, trace of sand and trace of rootlets encountered in the upper zone of the layer below the fill layer in most of the boreholes. The natural moisture content for this greyish brown layer was observed to be approximately 16%.

Two (2) representative samples from the silt/sandy silt layer were subjected to grain-size “Hydrometer” analysis and the layer was observed to contain on average 2% gravel, 20% sand, and 69% silt and 9% clay. The silt/sandy silt grain-size analysis summary is shown in Table 3, and the laboratory test results of grain size analysis are included in Appendix D.

Table 3: Grain-Size Analysis Summary of Silt/Sandy Silt Layer

Borehole ID	Sample	Constituent Material in percent weight			
		Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BH 24-3	SS-2	0.7	8.2	79.4	11.7
BH24-8 MW	SS-2	3.7	31.8	58.2	6.3

The SPT N-value for this layer ranged range from 10 to 50 blows/75 mm, which indicate a relative density of compact to very dense according to CFEM (2006).

6.1.4 Sandy Silt Till/Silty Sand Till

A till layer of sandy silt till/silty sand till was encountered below the fill and/or silt/sandy silt layer in all the boreholes. In general, the till layer is comprised of sandy silt till/silty sand till. The natural moisture content for this greyish brown and grey layer ranged from 7% to 13%.

Four (4) representative samples from the sandy silt till/silty sand till were subjected to grain-size analysis and the layer was observed to contain on average 13% gravel, 34% sand, 50% silt and 7% clay. The till grain-size analysis summary is shown in Table 4, and the laboratory test results of grain size analysis are included in Appendix D.

Table 4: Grain-Size Analysis Summary of Sandy Silt Till/Silty Sand Till Layer

Borehole ID	Sample	Constituent Material in percent weight			
		Gravel (%)	Sand (%)	Fines (%)	
				Silt (%)	Clay (%)
BH24-2	SS-3	20.1	37.2	42.7	
BH24-4 MW	SS-4	12.3	29.2	58.5	
				52.5	6.0
BH24-7 MW	SS-3	14.4	48.2	37.4	

				29.8	7.6
BH24-9	SS-3	5.3	21.4	73.3	
				66.9	6.4

The SPT N-value for this layer ranged range from 26 to 50 blows/25 mm, which indicate a relative density of compact to very dense according to CFEM (2006).

6.1.5 Bedrock/Refusal

Auger refusal was encountered in all boreholes except for BH24-4 MW on inferred bedrock at depth ranging from 1.40 to 3.56 m below existing ground surface. The bedrock was encountered and cored in the foundation area boreholes in BH24-1 and BH24-2 below the sandy silt till/silty sand till layer between 1.40 and 1.94 m bgs which corresponds to elevations El. 125.91 and El. 125.18 m. The bedrock was cored and sampled to depths 4.98 m and 5.62 m bgs in boreholes BH24-1 and BH24-2, respectively.

Based on the retrieved rock cores from boreholes within the proposed building addition footprint, the bedrock was identified as limestone and was observed to be strong to very strong, grey to dark grey, slightly weathered, thinly bedded and has fair to excellent quality based on RQD values (65 % to 96%).

The rock core (RC) samples recovered from bedrock were accurately recorded based on the length of each run and the samples encountered were evaluated for Total Core Recovery (TCR), and Rock Quality Designation (RQD). Four (4) samples of bedrock core were tested for unconfined compressive strength at the Egis Geotech laboratory. The laboratory results and bedrock core photographs are summarized in Table 5 and included in Appendix D.

Table 5: Rock-Core Summary

Borehole ID	Rock Core	Core Depth (m bgs)	Core El. (m asl)	TCR (%)	RQD (%)	UCS (MPa)
BH24-1	RC-3	1.40 – 2.58	125.91 – 124.73	100	67	93.2
BH24-1	RC-5	4.09 – 4.98	123.22 – 122.33	100	74	119.6
BH24-2	RC-5	2.58 – 4.10	124.54 – 123.02	100	92	103.4

BH24-2	RC-6	4.10 – 5.62	123.02– 121.50	100	68	70.6

6.2 Groundwater

At the time of investigation, groundwater level observations were made during and immediately upon completion of drilling. The results are summarized in Table 6.

Table 6: Groundwater Observations Upon Completion of Drilling

Borehole ID	Borehole Depth		Cave-in		Groundwater	
	Depth (m bgs)	Elevation (m asl)	Depth (m bgs)	Elevation (m asl)	Depth (m bgs)	Elevation (m asl)
BH24-1	4.98	122.33	1.00	126.31	1.00	Wet at the bottom
BH24-2	5.62	121.50	-	-	Dry	Dry
BH24-3	1.70	126.03	0.76	126.97	0.76	Wet at the bottom
BH24-4 MW	3.63	123.47	-	-	1.75	125.35
BH24-5	2.79	125.45	1.98	126.26	Dry	Dry
BH24-6	3.56	124.20	2.74	125.02	Dry	Dry
BH24-7 MW	3.45	125.01	-	-	Dry	Dry
BH24-8 MW	3.05	124.59	-	-	Dry	Dry
BH24-9	3.33	123.89	2.61	124.61	Dry	Dry

Monitoring wells were installed in BH24-04 MW, BH24-07 MW and BH24-08 MW, for the purpose of hydrogeological investigation and groundwater monitoring. A standpipe piezometer was installed in BH24-02 to

obtain a water level measurement in the proposed building area. A subsequent groundwater level measurement was completed on August 29, 2024, and groundwater observations are presented in the following Table 7.

Table 7: Monitoring Wells Summary

BH/MW ID	Screen Interval Depth (m bgs)	Water Level Observations			Remarks
		Date	Depth (m bgs)	Elev. (m asl)	
BH24-2 SP*	1.24 – 1.85	August 29, 2024	0.86	126.26	
BH24-4 MW	1.52 – 3.05	August 29, 2024	1.20	125.90	
BH24-7 MW	1.52 – 3.05	August 29, 2024	1.37	127.09	
BH24-8 MW	1.52 – 3.05	August 29, 2024	0.81	126.83	

* A Standpipe (SP) was installed in BH24-02 to measure the water level at the proposed building addition.

Groundwater levels may be expected to fluctuate due to extreme weather events and seasonal changes.

6.3 Chemical Analysis

Chemical analysis was conduced by Paracel Laboratories in Ottawa, ON, to determine the resistivity, pH, sulphate and chloride content of a representative soil sample collected from BH24-4 MW and BH24-8 MW. The sample was chosen from within the estimated infrastructure and foundation depths. A summary of chemical analysis results is shown in Table 8 and the laboratory results are shown in Appendix D.

Table 8: Chemical Analysis Summary

Borehole ID	Sample	Depth (m bgs)	Chemical Analysis			
			pH (pH units)	Resistivity (ohm.cm)	Chloride (ppm)	Sulphate (ppm)
BH24-4 MW	SS-3	1.52 - 2.13	7.33	8440	11	26
BH24-8 MW	SS-4	2.29 - 2.70	7.37	1260	422	70

7.0 DISCUSSION AND RECOMMENDATIONS

7.1 General

This section of the report provides engineering recommendations on the geotechnical design aspects of the project based on the project requirements and our interpretation of the subsurface soils information. The discussions and recommendations presented are intended to provide sufficient information to the designer of the proposed building to select the suitable type of foundation to support the structure.

The foundation design recommendations presented in this section have been developed following Part 4 of the 2015 National Building Code of Canada (NBCC) and 2012 Ontario Building Code (OBC) extending the Limit State Design approach. The recommendations presented herein are subject to the limitations noted in Appendix A "Limitations of Report" which forms an integral part of this document.

7.2 Overview

It is understood that the proposed building addition is a one-storey structure with a mezzanine, without basement or underground parking. It is also understood that the finished floor elevation for the proposed building addition will be at the same finish floor elevation of the existing slab-on-grade at approximately El. 127.70 m. The finished floor elevation was interpolated from the Surveyor's Real Property Report, Part 1, included in Appendix E.

For the current project, the following list summarizes some key geotechnical details that were considered in the suggested geotechnical recommendations:

- The existing fill and any loose or disturbed soil is required to be cleared from the footprint of the footings of the proposed building.
- Considering the structural loads expected at the foundation level, the provision of conventional spread and strip footings is adequate. The footings shall be bearing on the silt/sandy silt, sandy silt till/silty sand till or the bedrock surface. Footings are expected to be buried to resist overturning, sliding, and to provide protection against frost action.
- The proposed structure can be designed using a seismic Site Class C.
- Excavation for foundations will be advanced below the existing ground level through the fill, silt/sandy silt and sandy silt till/silty sand till. The silt/sandy silt and sandy silt till/silty sand till can be classified as Type 3 soil above the water table and below the water table as Type 4 soil per the Occupational Health and Safety Act (OHSA). Therefore, excavation sides shall be sloped from its bottom at a minimum gradient of 3H:1V. For trench excavation that is deeper than 1.2 m or a worker is required to enter, excavation shall be carried out within trench boxes, which is fully braced to resist lateral earth pressure.

- A subgrade reaction modulus of 20,000 kN/m2/m can be used for the design of the slab-on-grade constructed on compacted Granular A bedding. This value shall not be used for the native subgrade.

7.3 Foundations

In general, the subsurface conditions at the site of the proposed building addition consist of asphalt, fill material, silt/sandy silt and sandy silt till/silty sand till to the bedrock surface. The silt/sandy silt and sandy silt till/silty sand till were observed to be in compact to very dense state of relative density. Limestone bedrock was encountered within the proposed addition footprint and was observed to be strong to very strong, grey to dark grey, thinly bedded, and has fair to excellent quality based on RQD values (65% to 96%).

Two main design possibilities were considered in this report. It is up to the structural designer to choose the most suitable option, or a combination of the two options.

- Ultimate geotechnical resistance for bearing of shallow footings on native soil.
- Ultimate geotechnical resistance for bearing of shallow footings on bedrock.

7.3.1 Shallow Foundation on Native Soil

The proposed building addition structure can be supported on a shallow conventional strip/spread footing system bearing on the silt/sandy silt or sandy silt till/silty sand till founding subgrade soil at or below the elevation of 126.06 m if recommended capacities are adequate. The size of the selected footing shall be determined using geotechnical resistance at Serviceability Limit State (SLS) of 200 kPa for 25 mm of settlement and a factored bearing resistance of 300 kPa under Ultimate Limit States (ULS).

Excavation for the construction of the footings will proceed through the asphalt, fill, native silt/sandy silt and sandy silt till/silty sand till deposits. Excavation of overburden soil shall be performed using conventional hydraulic excavating equipment.

Excavations shall be kept reasonably free of water. If groundwater is encountered at a shallow depth, the groundwater table shall be lowered to a minimum 0.5 m below the excavation depth using an appropriate dewatering system. Recommendations for appropriate dewatering measures beyond conventional sump pump techniques such as a positive dewatering system (e.g., well points or other specialized methods) to effectively lower the static groundwater level shall be provided by a specialized dewatering contractor.

The Occupational Health and Safety Act (OHSA) of Ontario indicates that side slopes in the silt/silty sand above the water table could be classified as Type 3 soil and below the water table as Type 4 soil and sloped no steeper than 3H:1V or be shored. If space restrictions exist, the excavations of depth greater than 1.2 m can be carried out within trench boxes, which are fully braced to resist lateral earth pressure.

Footings should be placed on undisturbed native inorganic soil. The subgrade should be reviewed and approved by a geotechnical engineer. If encountered, compressible soils, organic matter, or soft or loose areas within the

native subgrade should be sub-excavated and replaced with granular A conforming to OPSS 1010 compacted in 300mm maximum loose lifts to a minimum of 100% SPMDD which shall be used for grade raise or to level any over excavation below the foundation level.

If the native subgrade is disturbed during excavation, the subgrade shall be proof rolled before constructing the spread footings. Granular A conforming to OPSS 1010 compacted in 300mm loose lifts to minimum of 100% SPMDD shall be used for grade raise or to level any over excavation below the foundation level.

7.3.2 Shallow Foundation on Bedrock

The ULS factored bearing resistance was estimated using the Rock Mass Rating (RMR) method by Bieniawski (1989). RMR method was utilized to determine the required parameters for bearing capacity resistance at ULS conditions for the bedrock.

The proposed building addition structure can be supported on a shallow conventional strip/spread footing system bearing on the surface of the bedrock. The size of the selected footing shall be determined using a factored bearing resistance of 500 kPa under Ultimate Limit States (ULS).

The provided factored bearing resistance at ULS is based on the uniaxial compressive strength of rock. The size of the selected footing shall be determined by a structural engineer. The selected size of the footing shall have adequate compressive strength to provide resistance to the structural loads from the building and to avoid failure in concrete material under the applied pressure. Shallow footings shall comply with the minimum widths recommended by the Ontario Building Code (OBC) (2012).

The ultimate bearing capacity will govern the design. Serviceability limit state as defined by allowable settlements is not applicable for this project on rock subgrade.

Provided the bedrock surface is properly cleaned of soil and weathered material at the time of construction, the settlement of footings using the above factored bearing resistance should be negligible. The bearing capacities are calculated for a flat subgrade.

Highly weathered or fractured bedrock, which includes bedrock that can be excavated using hydraulic excavating equipment with only moderate effort, is required to be removed. Therefore, depending on the subgrade condition, subgrade grouting or poured mud slabs may be required. The mud slabs shall provide a minimum of 15 MPa compressive strength at 28 days testing.

The rock bearing surface should be inspected by qualified geotechnical personnel to confirm that the surface has been acceptably cleaned of soil, and that weathered, or excessively fractured bedrock has been removed.

7.3.3 Frost Protection

Based on the freezing index for Ottawa, Ontario Region provided for this site, the frost penetration depth is expected at 1.8 m below the ground surface. Frost penetration depth is estimated based on the OPSD 3090.101, Foundation Frost Penetration Depths for Southern Ontario.

All perimeter and exterior foundation elements, or interior foundation elements in unheated areas should be provided with a minimum of 1.8 m of earth cover above the underside of the footing or equivalent thermal rigid insulation for frost protection purposes.

7.4 Seismic Site Classification

Seismic site classification is completed based on NBCC (2015) and OBC (2012) Section 4.1.8.4 and Table 4.1.8.4.A. This classification system is based on the average soil properties in the upper 30 m and accounts for site-specific shear wave velocity of soil and rock, standard penetration resistance, and plasticity parameters of cohesive soils.

Based on the investigation results the site can be classified as Seismic Site Class (C). According to OBC (2012) Section 4.1.8.4 and Table 4.1.8.4.A , the average shear wave velocity (Vs) for Site Class C ranged between 360 to 760 m/s.

7.5 Engineered Fill

Footings shall be installed on native silt/sandy silt, sandy silt till/silty sand till or the bedrock surface. Any over excavation shall be leveled by granular A conforming to OPSS 1010 for native soil and lean concrete of minimum 15 MPa at 28 days strength for the bedrock.

The proposed engineered fill, beyond the footings influence zone, can be any material conforming to granular criteria as outlined in OPSS 1010. Material conforming to 'Granular' criteria are considered free draining and compactable and can be utilized as the engineered fill. This can apply to the backfill beyond foundation walls. The engineered fill shall be compacted to a minimum of 98% SPMDD.

All fills should be placed in horizontal lifts of uniform thickness of no more than 300 mm before compaction at appropriate moisture content determined by the Proctor test. The requirement for fill material and compaction may be addressed with a note on the structural drawing for foundation or grading drawing, and with a Non-Standard Special Provision (NSSP). Any topsoil, organics, or loose sand should be removed before placing engineered fill material.

7.6 Slabs-on-Grade

Excavation for the construction of the slab-on-grades will proceed through the asphalt and/or fill to to expose a competent native undisturbed subgrade. The exposed subgrade must be kept dry at all times to minimize the

disturbance of the subgrade. The native subgrade shall be proof rolled before the placement of granular bedding. The exposed native subgrade should be examined and approved by the Geotechnical Engineer.

Slab-on-grades are considered free-floating (not attached to the foundation walls). The interior slab-on-grade should be supported on a minimum of 200 mm of Granular A bedding compacted to 100% SPMDD. The rest of the fill, above the native soil and below the slab shall be Granular B Type II and compacted to a minimum of 100% SPMDD. It is recommended that compaction efforts are approved under the supervision of a geotechnical representative.

No perimeter drainage will be required, where the finished floor elevation is at least 150 mm above the exterior grades, which are sloped away from the structure a minimum of 2 percent gradient.

If for the design of any portions of the slab-on-grade, the modulus of subgrade reaction (k) is required, the following recommendation can be used for structural modeling. Modulus of subgrade reaction is a multi-function complex correlation that varies with the subgrade material, grade-raise fill material, and the flexural stiffness of the structural slab. However, simplified assumptions were made to estimate the spring modulus for slab-on-grade on compacted Granular A. To estimate the modulus of subgrade reaction, through a simplistic approach, a 2 m square section of the concrete slab-on-grade under the applied loads. Since the modulus of subgrade reaction is needed for the ultimate failure design of the slab, it is assumed the failure can occur at a 25 mm deformation. Considering these assumptions, a subgrade reaction modulus of 20,000 kN/m2/m can be used for the design of the slab-on-grade. This k-value is only valid for the construction of slab-on-grade on compacted Granular A bedding. This value shall not be used for the native subgrade.

For exterior slab-on-grade, a subgrade reaction modulus of 20,000 kN/m^2/m is recommended for design. The slab should be supported on a minimum of 150 mm of Granular A bedding and 450 mm Granular B Type II and compacted to a minimum of 100% SPMDD. Any additional fill required above the native soil should Granular B Type II and compacted to a minimum of 100% SPMDD. The designer should provision an adequate slope and incorporating subdrains to provide appropriate runoff discharge and rapid drainage to mitigate the effects of frost heaving. Expansion, construction, and dummy joints should be spaced as required by the applicable standards.

7.7 Lateral Earth Pressure

Free draining material should be used as backfill material for foundation walls. If proper drainage is provided, "at rest" condition may be assumed for calculation of earth pressure on foundation walls. The following parameters shown in Table 9 are recommended for the granular backfill.

Table 9: Lateral Earth Pressure Parameters for Granular A and B and Horizontal Backfill

Pressure Parameter	Expected Value		
	Granular A	Granular B	Other OPSS. MUNI 1010 'Granular"
Unit Weight (γ) KN/M3	22.5	21.7	20.0
Cohesion (c)	--	--	--
Angle of Internal Friction (ϕ)	35°	32°	31°
Coefficient of Active Earth Pressure (k_a)	0.27	0.31	0.32
Coefficient of Passive Earth Pressure (k_p)	3.69	3.25	3.12
Coefficient of Earth Pressure at Rest (k_o)	0.43	0.47	0.48

7.8 Cement Type and Corrosion Potential

Two soil samples were submitted to Paracel laboratories for testing of chemical properties relevant to exposure of concrete elements to sulphate attacks as well as potential soil corrosivity effects on buried metallic structural elements. Test results are presented in Table 8.

The concentration of sulphate in the tested samples are considered negligible, and the potential for sulphate attack on concrete structures is low. Therefore, Type GU Portland cement may be adequate to protect buried concrete elements.

Based on electrical resistivity results and chloride content, the corrosion potential for buried steel elements ranges from medium to elevated potential for corrosion of the buried ferrous metals, which should be taken into consideration in the design of buried steel elements.

7.9 Flexible Pavement

For most of the site, the pavement structure is most likely to be placed on engineered fill material overlaying the native soil. All fill and organic material shall be removed from the proposed pavement site and replaced with

engineered fill. The existing silt/sandy silt soil or sandy silt till/silty sand till below the fill material can act as the pavement subgrade if verified by visual confirmation and proof rolling.

Where engineered fill is required, it should consist of Granular B Type I or SSM in accordance with OPSS 1010, should be used and compacted to 95% of the Standard Proctor Maximum Dry Density (SPMDD), with the upper 600 mm of the fill should be compacted to 98% SPMDD to serve as subbase.

The pavement structure proposed in this design, considers the accommodation of heavy-weight commercial vehicles. Based on the heavy vehicle usage a heavy-duty pavement structure design is recommended for driveways and parking areas of the site. The heavy-duty pavement structure design specifications are given in Table .

Table 10: Heavy Duty Pavement Structures

Materials		Thickness (mm)	
		Parking Areas	Driveways
Surface	Superpave 12.5 mm, Design Category B, PG 58-34, or 50 mm HL-3 (OPSS 1150)	50	50
Binder	Superpave 19.0 mm, Design Category B, PG 58-34, or 50 mm HL-8 (OPSS 1150)	50	80
Base	OPSS Granular A	300	300
Subbase	OPSS Granular B Type II	450	450

8.0 CONSTRUCTION CONSIDERATIONS

Any organic material, existing fill or loose soil of any kind should be removed from the footprint of the footings and all structurally load-bearing elements. The Structural Fill, if directly supporting the load of the structure, should be free from any recycled or deleterious material, it should not be placed in lifts thicker than 300 mm and should be compacted to 100% SPMDD. Site preparation and requirements of engineered fill placement are noted in through previous sections. Refer to relevant sections for material and compaction requirements.

For excavation for foundations purposes, the silt/sandy silt and sandy silt till/silty sand till layers can be classified as Type 3 soil above the water table and below the water table as Type 4 soil per the Occupational Health and

Safety Act (OHSA). Excavation sides shall be sloped from its bottom at a minimum gradient of 3H:1V. For trench excavation that is deeper than 1.2 m or a worker is required to enter, excavation shall be carried out within trench boxes, which is fully braced to resist lateral earth pressure.

All backfilling shall comply with the OPSS.MUNI 501 and the City of Ottawa Special Provision General No. D-029 for compaction requirements, unless the design recommendations included in this report exceed provisions of OPSS.MUNI 501 and D-029.

Foundation walls should be backfilled with free-draining material with granular material conforming to OPSS 1010 Granular criteria. The native soils are not a suitable material for backfilling. Sub-drains with positive drainage to the City sewer should be provided at foundation level if the floor slab is not at least 150 mm above the exterior grades, which sloped away from the structure a minimum of 2 percent gradient.

A geotechnical engineer or technician should attend the site to confirm the native subgrade, type of fill material, and level of compaction. All bearing surfaces should be inspected by experienced geotechnical personnel prior to placing the footings to ensure the excavated subgrade is at the reported and recommended condition.

9.0 GROUNDWATER

No groundwater was encountered upon completion of boreholes except in boreholes BH24-1, BH24-3 and BH24-4 MW, the water elevations ranged from El. 125.35 to 126.97 m. The measured groundwater in the installed monitoring wells at the time of site investigation were at elevations approximately EI.125.90 to 127.09 m asl. Therefore, we expect the observed water was mainly seepage water resulting from the (localized) perched water within the fill layer and the cohesionless silt/sandy silt and sandy silt till/silty sand till layers.

However, surface runoff seepage will need to be adequately controlled and water quantities will depend on seasonal conditions, depths of excavations, and the duration that excavations are left open. Recommendations for appropriate dewatering measures beyond conventional sump pump techniques such as a positive dewatering system (e.g., well points or other specialized methods) to effectively lower the static groundwater level shall be provided by a specialized dewatering contractor. Dewatering shall extend to a minimum 0.5 m below the proposed depth of excavation.

The excavations are expected to proceed through multiple fill and soil layers including the road and grading fill, silt/sandy silt and silty sand/sandy silt till. The hydraulic conductivity (k) value of the fills is expected to be high (i.e., $k > 1x10^{-3}$ cm/sec) and for the silt/sandy silt and sandy silt till/silty sand till layers is expected to be in the range of $1x10^{-3}$ to less than $1x10^{-6}$ cm/sec. These are typical hydraulic conductivity values estimated based on soil gradations. These hydraulic conductivity values are provided as a reference only.

A Permit to Take Water (PTTW) from the Ontario Ministry of the Environment, Conservation and Parks (MECP) will be required if the quantity of water to be pumped from the Site exceeds 400,000 L/day. For expected groundwater extraction between 50,000 and 400,000 L/day, an Environmental Activity and Sector Registry (EASR) permit is adequate. Based on observations made during the site investigation and observed water levels in the

monitoring wells on August 29, 2024, and other available information to date, it is expected that PTTW is not required. An EASR permit may be adequate for this Project. However, if excavation is advanced below the groundwater, the volume of pumped water per day will be a function of the length of the excavated trench and the dewatered zone. The contractor shall decide on the proper application process based on groundwater elevations at the time of construction.

10.0 SITE SERVICES

10.1 Excavation and Trenching

It is understood that open trench excavation is the preferred construction and installation method. Overburden excavation is expected to be conducted without unusual problems using conventional hydraulic powered equipment. Based on our understanding of the Project, we anticipate that the excavations will extend to a depth approximately 2.4 m bgs. The excavations will extend through the pavement structure, fill, silt/sandy silt and sandy silt till/silty sand till.

All excavations must be undertaken in accordance with the requirements of the Occupational Health and Safety Act of Ontario (OHSA), Regulations for Construction O.Reg. 213/91, with specific reference to acceptable size slopes and stabilization requirements. The general stratigraphy outlined herein can be considered an OHSA Type 3 Soil above groundwater and Type 4 Soil below groundwater. Above the groundwater level, the soils are considered Type 3 Soil and the excavation for utilities should be conducted through a minimum 1H:1V or a flatter slope from the excavations bottom. Below the groundwater level, the soils are considered to be Type 4 Soil and the excavation side slopes must be sloped from its bottom cut back at 3H:1V. For excavations through multiple soil types, the side slope geometry is governed by the soil with the highest number designation. No surface surcharges should be placed closer to the edge of the excavation than a distance equal to twice the depth of the excavation unless an excavation support system has been designed to accommodate such a surcharge.

Alternatively, if the minimum slope requirement cannot be achieved due to space restrictions, the excavations of depth greater than 1.2 m can be carried out within a fully braced, steel trench box for worker and public safety. Unprotected excavation is not recommended. The protection system for excavations should be designed following OPSS.MUNI 539, Construction Specification for Temporary Protection Systems, and OPSS.MUNI 902, Construction Specifications for Excavating and Backfilling – Structures. The contractor should retain a professional engineer to provide detailed drawings for excavation and temporary support of the excavation walls during construction. Trench box shop drawings shall be stamped by a professional engineer.

Surface runoff seepage is expected in the excavations and will need to be adequately controlled. Water quantities will depend on seasonal conditions, depths of excavations, and the duration that excavations are left open. Groundwater will travel easily through the fill material, silt/sandy silt and sandy silt till/silty sand till. Existing utility trenches which join or intersect the excavations may act as a drain and supply off-Site water into the excavations. Recommendations for appropriate dewatering measures beyond conventional sump pump techniques such as a

positive dewatering system (e.g., well points or other specialized methods) to effectively lower the static groundwater level shall be provided by a specialized dewatering contractor.

Dewatering, if required, shall extend to a minimum 0.5 m below the proposed depth of excavation at each segment, otherwise, the specified compaction may not be achieved for the pipe bedding.

10.2 Pipe Bedding and Cover

Bedding material should be placed on undisturbed native inorganic soil. The subgrade should be reviewed and approved by a geotechnical engineer. If encountered, compressible soils, organic matter, or soft or loose areas within the native subgrade should be sub-excavated and replaced to the bottom of the bedding layer using Engineered Fill.

Utilities bedding and cover material should be in accordance with Ontario Provincial Standard Drawing OPSD 802.010 and OPSD 802.013 for flexible pipes and OPSD 802.031 and OPSD 802.033 for rigid pipes. Utilities should be supported on a minimum of 150 mm bedding of Granular A (OPSS 1010). The bedding should be compacted and shaped to receive the bottom of the pipe. The Engineered Fill should extend a minimum of 0.3 m beyond the edge of the pipe and then downward at a 1H:1V to the undisturbed native subgrade.

To extend the life of buried utilities, it is recommended utility bedding and backfill to be separated from the native soil by filter geotextile.

If the native subgrade below the bedding was disturbed or unstable due to construction activities, it may be necessary to place a sub-bedding layer consisting of 300 mm of Granular B Type II beneath the Granular A or the Granular A layer could be thickened. The use of clear stone as a bedding layer is not recommended on this project since fine particles from native soil could potentially migrate into the voids in the clear crushed stone, but if necessary due to groundwater inflow or the failure to maintain the groundwater level below the excavation, 19 mm clear stone bedding can be used in accordance with Ontario Provincial Standard Drawing OPSS 1004. Clear stone bedding materials shall be fully wrapped in non-woven geotextile filter fabric to avoid any native soil migration.

Utility cover material should be from bedding level to at least 300 mm above the top of pipe. The cover material can be Granular A or Granular B type II compacted to 98% SPMDD. All covers are to be compacted to 100% SPMDD if they are intersecting structural elements. The engineer designing utilities shall ensure the proposed utility pipes can tolerate compaction loads. The cover material should be placed on each side of the pipe and should be completed simultaneously.

10.3 Trench Backfill

All backfill materials should conform to OPSS 401. The backfill material shall be Granular A or B, Type I, II, or III, unshrinkable fill, or native material. Trench backfill materials above the pipe cover material may consist of approved excavated materials such as the existing fill and native materials other than clay soils. The backfill

materials should be free from frozen lumps, organic matter, rocks and boulders over 150mm in diameter or deleterious materials. Imported fill, if required to make up the balance of trench backfill, it should consist of compactable and inorganic earth borrow as per OPSS 206 and 212, or selected subgrade material (SSM) as per OPSS 1010.

At the subject site, the burial depth of water-bearing utility lines is typically 2.4 m below the ground surface. If this depth is not achievable, equivalent thermal insulation should be provided. The contractor should retain a professional engineer to provide detailed drawings for excavation and temporary support of the excavation walls during construction.

Regardless of the type of material used as backfill, it should be placed in lifts not exceeding 300 mm in thickness in loose measurement and should be compacted to a minimum of 98% of SPMDD using suitable vibratory compaction equipment.

11.0 CLOSURE

We trust this geotechnical investigation and design recommendation report meets the requirements of your project. The "Limitations of Report" presented in Appendix A are an integral part of this report. Please contact the undersigned should you have any questions or concerns.

Egis Group Ltd.

	
Nader Girgis, M.Sc, P.Eng. Geotechnical Engineer Nader.GIRGIS@egis-group.com	Michelle Wang, M.Sc, P.Eng. Geotechnical Engineer Michelle.WANG@egis-group.com

12.0 REFERENCES

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GEOTECHNICAL INVESTIGATION OF THE PROPOSED BUILDING ADDITION AND SITE DEVELOPMENT

145 WALGREEN RD, OTTAWA, ON

APPENDIX A: LIMITATIONS OF REPORT

egis

LIMITATIONS OF REPORT

Egis Canada Ltd. (Egis) carried out the field work and prepared the report. This document is an integral part of the Foundation Investigation and Design report presented.

The conclusions and recommendations provided in this report are based on the information obtained at the borehole locations where the tests were conducted. Subsurface and groundwater conditions between and beyond the boreholes may differ from those encountered at the specific locations where tests were conducted and conditions may become apparent during construction, which were not detected and could not be anticipated at the time of the site investigation. The benchmark level used and borehole elevations presented in this report are primarily to establish relative differenced in elevations between the borehole locations and should not be used for other purposes such as to establish elevations for grading, depth of excavations or for planning construction.

The recommendations presented in this report for design are applicable only to the intended structure and the project described in the scope of the work, and if constructed in accordance with the details outlined in the report. Unless otherwise noted, the information contained in this report does not reflect on any environmental aspects of either the site or the subsurface conditions.

The comments or recommendation provided in this report on potential construction problems and possible construction methods are intended only to guide the designer. The number of boreholes advanced at this site may not be sufficient or adequate to reveal all the subsurface information or factors that may affect the method and cost of construction. The contractors who are undertaking the construction shall make their own interpretation of the factual data presented in this report and make their conclusions, as to how the subsurface conditions of the site may affect their construction work.

The boundaries between soil strata presented in the report are based on information obtained at the borehole locations. The boundaries of the soil strata between borehole locations are assumed from geological evidences. If differing site conditions are encountered, or if the Client becomes aware of any additional information that differs from or is relevant to the Egis findings, the Client agrees to immediately advise Egis so that the conclusions presented in this report may be re-evaluated.

Under no circumstances shall the liability of Egis for any claim in contract or in tort, related to the services provided and/or the content and recommendations in this report, exceed the extent that such liability is covered by such professional liability insurance from time to time in effect including the deductible therein, and which is available to indemnify Egis. Such errors and omissions policies are available for inspection by the Client at all times upon request, and if the Client desires to obtain further insurance to protect it against any risks beyond the coverage provided by such policies, Egis will co-operate with the Client to obtain such insurance.

Egis prepared this report for the exclusive use of the Client. Any use which a third party makes of this report, or any reliance on or decision to be made based on it, are the responsibility of such third parties. Egis accepts no responsibility and will not be liable for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this report.

GEOTECHNICAL INVESTIGATION OF THE PROPOSED BUILDING ADDITION AND SITE DEVELOPMENT

145 WALGREEN RD, OTTAWA, ON

APPENDIX B: SITE AND BOREHOLE LOCATION PLANS

egis

LEGEND

- Site Location
- Local Road
- Major Road
- Watercourse
- Waterbody
- Wooded Area

500 250 0 500

Scale 1:15,000 Metres

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2024.

CLIENT: W.O M.W REALTY LIMITED

PROJECT: GEOTECHNICAL INVESTIGATION OF THE PROPOSED BUILDING ADDITION AND SITE DEVELOPMENT 145 WALGREEN ROAD

TITLE: SITE LOCATION

egis
115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742

PROJECT NO:	CCO-25-1370-01
Date	Sep., 19, 2024
GIS	AH
Checked By	JP

FIGURE: 1

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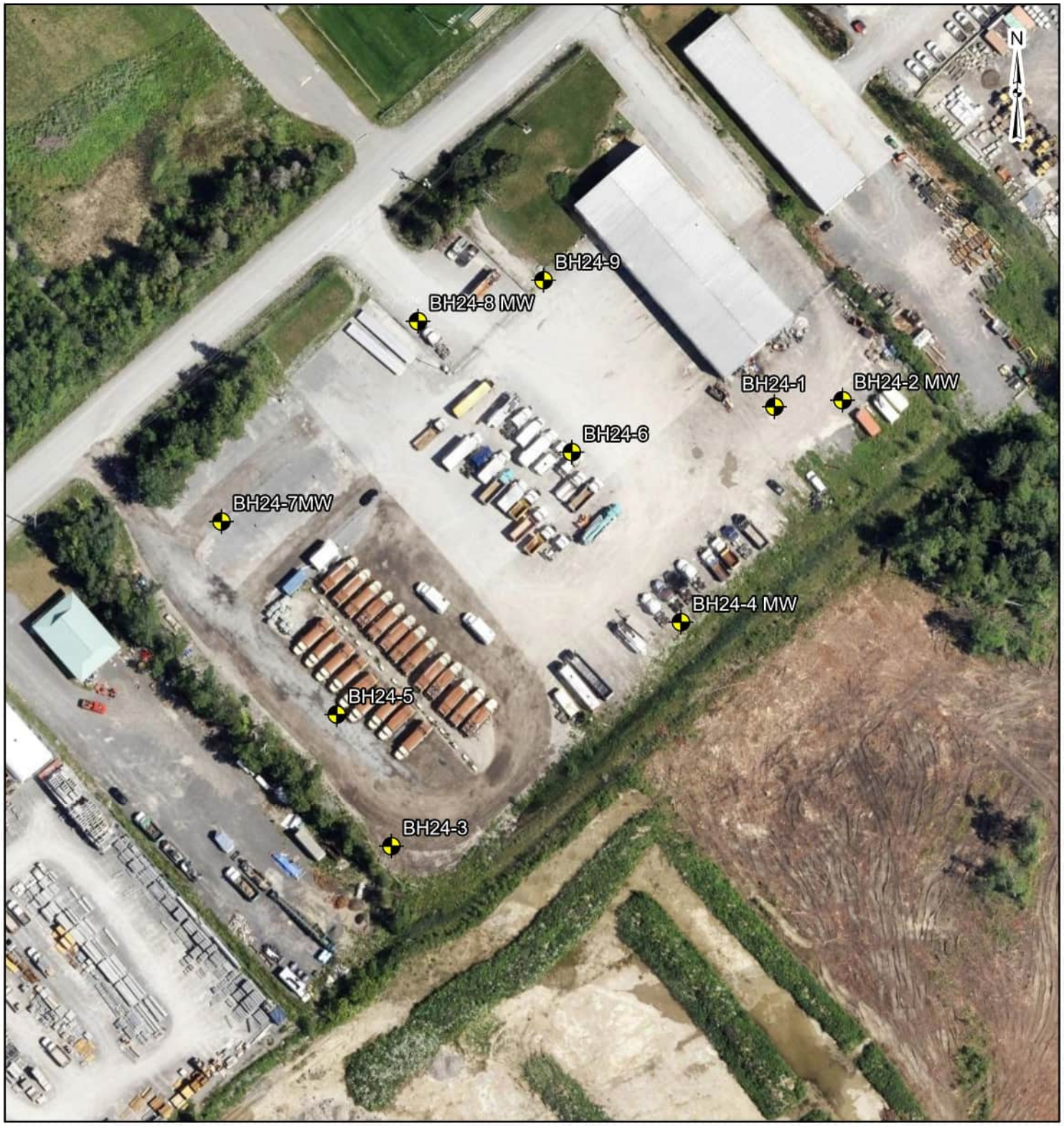

40 20 0 40

Scale 1:1,250 Metres

LEGEND

Borehole/ Monitoring Well Locations

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2024.

CLIENT: W.O M.W REALTY LIMITED

PROJECT: GEOTECHNICAL INVESTIGATION OF THE PROPOSED BUILDING ADDITION AND SITE DEVELOPMENT 145 WALGREEN ROAD

TITLE: BOREHOLE LOCATIONS

egis
115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742

PROJECT NO:	CCO-25-1370-01
Date	Sep., 19, 2024
GIS	AH
Checked By	JP

FIGURE: 2

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GEOTECHNICAL INVESTIGATION OF THE PROPOSED BUILDING ADDITION AND SITE DEVELOPMENT

145 WALGREEN RD, OTTAWA, ON

APPENDIX C: BOREHOLE LOGS

egis

EXPLANATION OF TERMS USED IN REPORT

N-VALUE: THE STANDARD PENETRATION TEST (SPT) N-VALUE IS THE NUMBER OF BLOWS REQUIRED TO CAUSE A STANDARD 51mm O.D SPLIT BARREL SAMPLER TO PENETRATE 0.3m INTO UNDISTURBED GROUND IN A BOREHOLE WHEN DRIVEN BY A HAMMER WITH A MASS OF 63.5 kg, FALLING FREELY A DISTANCE OF 0.76m. FOR PENETRATIONS OF LESS THAN 0.3m N-VALUES ARE INDICATED AS THE NUMBER OF BLOWS FOR THE PENETRATION ACHIEVED. AVERAGE N-VALUE IS DENOTED THUS $\bar{N}$.

DYNAMIC CONE PENETRATION TEST: CONTINUOUS PENETRATION OF A CONICAL STEEL POINT (51mm O.D. 60° CONE ANGLE) DRIVEN BY 475J IMPACT ENERGY ON 'A' SIZE DRILL RODS. THE RESISTANCE TO CONE PENETRATION IS MEASURED AS THE NUMBER OF BLOWS FOR EACH 0.3m ADVANCE OF THE CONICAL POINT INTO THE UNDISTURBED GROUND.

SOILS ARE DESCRIBED BY THEIR COMPOSITION AND CONSISTENCY OR DENSENESS.

CONSISTENCY: COHESIVE SOILS ARE DESCRIBED ON THE BASIS OF THEIR UNDRAINED SHEAR STRENGTH (c_u) AS FOLLOWS:

C_u (kPa)	0 – 12	12 – 25	25 – 50	50 – 100	100 – 200	>200
	VERY SOFT	*SOFT*	*FIRM*	*STIFF*	*VERY STIFF*	*HARD*

DENSENESS: COHESIONLESS SOILS ARE DESCRIBED ON THE BASIS OF DENSENESS AS INDICATED BY SPT N VALUES AS FOLLOWS:

N (BLOWS/0.3m)	0 – 5	5 – 10	10 – 30	30 – 50	>50
	VERY LOOSE	*LOOSE*	*COMPACT*	*DENSE*	*VERY DENSE*

ROCKS ARE DESCRIBED BY THEIR COMPOSION AND STRUCUTRAL FEATURES AND/OR STRENGTH.

RECOVERY: SUM OF ALL RECOVERED ROCK CORE PIECES FROM A CORING RUN EXPRESSED AS A PERCENT OF THE TOTAL LENGTH OF THE CORING RUN.

MODIFIED RECOVERY: SUM OF THOSE INTACT CORE PIECES, 100mm+ IN LENGTH EXPRESSED AS A PERCENT OF THE LENGTH OF THE CORING RUN. THE ROCK QUALITY DESIGNATION (RQD), FOR MODIFIED RECOVERY IS:

RQD (%)	0 – 25	25 – 50	50 – 75	75 – 90	90 – 100
	VERY POOR	*POOR*	*FAIR*	*GOOD*	*EXCELLENT*

JOINT AND BEDDING:

SPACING	50mm	50 – 300mm	0.3m – 1m	1m – 3m	>3m
JOINTING	*VERY CLOSE*	*CLOSE*	*MOD. CLOSE*	*WIDE*	*VERY WIDE*
BEDDING	*VERY THIN*	*THIN*	*MEDIUM*	*THICK*	*VERY THICK*

ABBREVIATIONS AND SYMBOLS

FIELD SAMPLING

SS	SPLIT SPOON	TP	THINWALL PISTON
WS	WASH SAMPLE	OS	OSTERBERG SAMPLE
ST	SLOTTED TUBE SAMPLE	RC	ROCK CORE
BS	BLOCK SAMPLE	PH	TW ADVANCED HYDRAULICALLY
CS	CHUNK SAMPLE	PM	TW ADVANCED MANUALLY
TW	THINWALL OPEN	FS	FOIL SAMPLE
GS	GRAB SAMPLE		

STRESS AND STRAIN

u_w	kPa	PORE WATER PRESSURE
r_u	1	PORE PRESSURE RATIO
σ	kPa	TOTAL NORMAL STRESS
σ'	kPa	EFFECTIVE NORMAL STRESS
τ	kPa	SHEAR STRESS
$\sigma_1, \sigma_2, \sigma_3$	kPa	PRINCIPAL STRESSES
ε	%	LINEAR STRAIN
$\varepsilon_1, \varepsilon_2, \varepsilon_3$	%	PRINCIPAL STRAINS
E	kPa	MODULUS OF LINEAR DEFORMATION
G	kPa	MODULUS OF SHEAR DEFORMATION
μ	1	COEFFICIENT OF FRICTION

MECHANICALL PROPERTIES OF SOIL

m_v	kPa^{-1}	COEFFICIENT OF VOLUME CHANGE
c_c	1	COMPRESSION INDEX
c_s	1	SWELLING INDEX
c_a	1	RATE OF SECONDARY CONSOLIDATION
c_v	m^2/s	COEFFICIENT OF CONSOLIDATION
H	m	DRAINAGE PATH
T_v	1	TIME FACTOR
U	%	DEGREE OF CONSOLIDATION
σ'_{vo}	kPa	EFFECTIVE OVERBURDEN PRESSURE
σ'_p	kPa	PRECONSOLIDATION PRESSURE
τ_f	kPa	SHEAR STRENGTH
c'	kPa	EFFECTIVE COHESION INTERCEPT
Φ'	$^{-o}$	EFFECTIVE ANGLE OF INTERNAL FRICTION
c_u	kPa	APPARENT COHESION INTERCEPT
Φ_u	$^{-o}$	APPARENT ANGLE OF INTERNAL FRICTION
τ_R	kPa	RESIDUAL SHEAR STRENGTH
τ_r	kPa	REMOULDED SHEAR STRENGTH
S_t	1	SENSITIVITY = c_u / τ_r

PHYSICAL PROPERTIES OF SOIL

ρ_s	kg/m^3	DENSITY OF SOLID PARTICLES	e	1,%	VOID RATIO	e_{min}	1,%	VOID RATIO IN DENSEST STATE
γ_s	kN/m^3	UNIT WEIGHT OF SOLID PARTICLES	n	1,%	POROSITY	I_D	1	DENSITY INDEX = $\frac{e_{max} - e}{e_{max} - e_{min}}$
ρ_w	kg/m^3	DENSITY OF WATER	w	1,%	WATER CONTENT	D	mm	GRAIN DIAMETER
γ_w	kN/m^3	UNIT WEIGHT OF WATER	s_r	%	DEGREE OF SATURATION	D_n	mm	N PERCENT – DIAMETER
ρ	kg/m^3	DENSITY OF SOIL	w_L	%	LIQUID LIMIT	C_u	1	UNIFORMITY COEFFICIENT
γ	kN/m^3	UNIT WEIGHT OF SOIL	w_P	%	PLASTIC LIMIT	h	m	HYDRAULIC HEAD OR POTENTIAL
ρ_d	kg/m^3	DENSITY OF DRY SOIL	w_s	%	SHRINKAGE LIMIT	q	m^3/s	RATE OF DISCHARGE
γ_d	kN/m^3	UNIT WEIGHT OF DRY SOIL	I_P	%	PLASTICITY INDEX = ($W_L - W_L$)	v	m/s	DISCHARGE VELOCITY
ρ_{sat}	kg/m^3	DENSITY OF SATURATED SOIL	I_L	1	LIQUIDITY INDEX = ($W - W_P$)/ I_P	i	1	HYDAULIC GRADIENT
γ_{sat}	kN/m^3	UNIT WEIGHT OF SATURATED SOIL	I_C	1	CONSISTENCY INDEX = ($W_L - W$) / 1_P	k	m/s	HYDRAULIC CONDUCTIVITY
ρ'	kg/m^3	DENSITY OF SUBMERED SOIL	$e_{,max}$	1,%	VOID RATIO IN LOOSEST STATE	j	kN/m^3	SEEPAGE FORCE
γ'	kN/m^3	UNIT WEIGHT OF SUBMERGED SOIL						

PROJECT NO.: **CCO-25-1370**

PROJECT: Geotechnical Investigation - Proposed Addition and Site Works

CLIENT: W.O M.W Realty Limited

PROJECT LOCATION: 145 Walgreen Road, Ottawa, ON

Drilling Date: Aug/14/2024 - Aug/14/2024

BH Location: N 5013333.663; E 424860.028

Drilling Equipment: CME 55

Drilling Method: Hollow Stem Augers, NQ Core

Remarks: GPS Coordinate System UTM NAD 83

BH No: 24-1

Datum: Geodetic

Elevation: 127.31 m

Compiled by: JF

Checked by: NG

ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES: NUMBER	TYPE	"N" BLOWS/0.3 m / RQD (%)	RECOVERY (%) / TCR (%)	GROUNDWATER CONDITIONS	DEPTH (m) / ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT / WATER CONTENT (%)	Remarks and Grain Size Distribution (%) / Unit Weight (kN/m³) / Pocket Penetro. (kPa)
127.31								0.0 / 127			GR SA SI CL
0.00 / 126.96	**FILL:** granular fill, grey, dense, moist.		1	SS	40	63%					
0.35 / 126.55	silty sand, trace to pockets of organics and trace rootlets in the upper zone, brown.										
0.76 / 126.05	**SILT/SANDY SILT:** trace to some clay, trace gravel, greyish brown, very dense, moist.		2	SS	50/ 75mm	62%		1.0 / 126			
1.26 / 125.91	**SANDY SILT TILL/SILTY SAND TILL:** greyish brown, very dense, moist.										
1.40	**LIMESTONE BEDROCK:** slightly weathered, grey to dark grey, thinly bedded, strong to very strong, fair to excellent quality based on RQD.		3	RC	67	100%		2.0 / 125			UCS = 93.2 Mpa
			4	RC	65	100%		3.0 / 124			
			5	RC	74	100%		4.0 / 123			UCS = 119.6 Mpa
122.33											
4.98	**END OF BOREHOLE** -Upon completion of drilling and before coring, the borehole was open to 1.00 m bgs (El. 126.31 m asl) and wet at the bottom.										

GRAPH NOTES

30 / 3 Upper value = Field Vane Shear Strength / Lower value = Vane Sensitivity

○ ε=3% Strain at Failure

1MP SOIL LOG 145 WALGREEN GINT LOGS FINAL.GPJ MP_OTTAWA_FOUNDATIONS.GDT 24/12/5

PROJECT NO.: **CCO-25-1370**

PROJECT: Geotechnical Investigation - Proposed Addition and Site Works

CLIENT: W.O M.W Realty Limited

PROJECT LOCATION: 145 Walgreen Road, Ottawa, ON

Drilling Date: Aug/14/2024 - Aug/14/2024

BH Location: N 5013335.166; E 424875.725

Drilling Equipment: CME 55

Drilling Method: Hollow Stem Augers, NQ Core

Remarks: GPS Coordinate System UTM NAD 83

BH No: 24-2

Datum: Geodetic

Elevation: 127.12 m

Compiled by: JF

Checked by: NG

ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS/0.3 m	RQD (%)	RECOVERY (%) TCR (%)	GROUNDWATER CONDITIONS	DEPTH (m)	ELEVATION (m)	Remarks and Grain Size Distribution (%)
127.12									0.0	127	
0.00 126.74	**FILL:** granular fill, grey, compact, moist.		1	SS	21		79%	Bentonite			
0.38 126.36	silty sand, trace to pockets of organics and trace rootlets in the upper zone, brown.										
0.76 125.60	**SILT/SANDY SILT:** trace to some clay, trace gravel, greyish brown, dense, moist.		2	SS	31		75%	W. L. 126.26 Aug 29, 24 Riser Sand	1.0	126	
1.52 125.18	**SANDY SILT TILL/SILTY SAND TILL:** greyish brown, very dense, moist.		3	SS	50/ 100mm		81%	Screen			20.1 37.2 (42.7)
1.94	**LIMESTONE BEDROCK:** slightly weathered, grey to dark grey, thinly bedded, strong to very strong, fair to excellent quality based on RQD.		4	RC	96		100%		2.0	125	
			5	RC	92		100%	Bentonite	3.0 4.0	124 123	UCS = 103.4 Mpa
			6	RC	68		100%		5.0	122	
121.50											UCS = 70.6 Mpa
5.62	**END OF BOREHOLE** - Upon completion of drilling, no water was observed in the installed standpipe. - On August 29, 2024, the water level in the installed standpipe was measured at 0.86 m bgs (El. 126.26 m asl). -Standpipe was installed at 1.85 m bgs (El. 125.27 m asl).										

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80

SHEAR STRENGTH (kPa): Field. Shear Vane (x) & Sensitivity (s); Pocket Penetrometer ✖; Quick Triaxial ●; Unconfined ○; 20 40 60 80

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L

WATER CONTENT (%): 10 20 30 40 50 60 70 80 90

7.1

GR SA SI CL

GRAPH NOTES

30 / 3 Upper value = Field Vane Shear Strength; Lower value = Vane Sensitivity

○ ε=3% Strain at Failure

1MP SOIL LOG 145 WALGREEN GINT LOGS FINAL.GPJ MP_OTTAWA_FOUNDATIONS.GDT 24/12/5

egis

PROJECT NO.: **CCO-25-1370**

PROJECT: Geotechnical Investigation - Proposed Addition and Site Works

CLIENT: W.O M.W Realty Limited

PROJECT LOCATION: 145 Walgreen Road, Ottawa, ON

Drilling Date: Aug/14/2024 - Aug/14/2024

BH Location: N 5013232.316; E 424771.81

Drilling Equipment: CME 55

Drilling Method: Hollow Stem Augers

Remarks: GPS Coordinate System UTM NAD 83

BH No: 24-3

Datum: Geodetic

Elevation: 127.73 m

Compiled by: JF

Checked by: NG

ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS/0.3 m / RQD (%)	RECOVERY (%) / TCR (%)	GROUNDWATER CONDITIONS	DEPTH (m) / ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT	Remarks and Grain Size Distribution (%)
127.73								0.0			
0.00 / 127.27	**FILL:** silty sand, trace to some gravel, trace organics and rootlets, dark brown, compact, moist.		1	SS	12	67%					
0.46 / 126.97	brown, very moist.							127			
0.76 / 126.21	**SILT/SANDY SILT:** trace to some clay, trace gravel, greyish brown, compact, moist to very moist.		2	SS	18	79%		1.0		16	0.7 8.2 79.4 11.7
1.52 / 126.03	**SANDY SILT TILL/SILTY SAND TILL:** greyish brown, very dense, moist to very moist.		3	SS	50/ 25mm	71%					
1.70	**END OF BOREHOLE** - The borehole was terminated after encountering auger refusal at 1.70 m bgs (El. 126.03 m asl). - Upon completion of drilling, the borehole was open to 0.76 m bgs (El. 126.97 m asl) and was wet at the bottom.										

SHEAR STRENGTH (kPa): Field. Shear Vane (x) & Sensitivity (s); Pocket Penetrometer ✖; Quick Triaxial ●; Unconfined ○; 20 40 60 80

WATER CONTENT (%): 10 20 30 40 50 60 70 80 90; w_P w w_L

Remarks and Grain Size Distribution (%): Unit Weight (kN/m³) Pocket Penetro. (kPa); GR SA SI CL

GRAPH NOTES

30 / 3 Upper value = Field Vane Shear Strength; Lower value = Vane Sensitivity

○ ε=3% Strain at Failure

1MP SOIL LOG 145 WALGREEN GINT LOGS FINAL.GPJ MP_OTTAWA_FOUNDATIONS.GDT 24/12/5

egis

PROJECT NO.: **CCO-25-1370**
PROJECT: Geotechnical Investigation - Proposed Addition and Site Works
CLIENT: W.O M.W Realty Limited
PROJECT LOCATION: 145 Walgreen Road, Ottawa, ON

Drilling Date: Aug/15/2024 - Aug/15/2024
BH Location: N 5013284.046; E 424838.524
Drilling Equipment: CME 55
Drilling Method: Hollow Stem Augers
Remarks: GPS Coordinate System UTM NAD 83

BH No: 24-4 MW

Datum: Geodetic
Elevation: 127.10 m
Compiled by: JF
Checked by: NG

ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS/0.3 m	RQD (%)	RECOVERY (%) TCR (%)	GROUNDWATER CONDITIONS	DEPTH (m)	ELEVATION (m)	Remarks and Grain Size Distribution (%) GR SA SI CL
127.10											
0.00	**FILL:** gravel and sand, some silt, dark brown, dense, moist.		1	SS	33		75%		0.0	127	
126.65											
0.45	**SILT/SANDY SILT:** trace to some clay, trace gravel, greyish brown, dense to compact, moist.		2	SS	21		71%	Bentonite	1.0	126	
125.83											
1.27	layer of very moist sand and gravel.							Riser			
125.58											
1.52	**SANDY SILT TILL/SILTY SAND TILL:** grey, compact, moist to very moist.		3	SS	26		29%	Sand	2.0	125	
124.81											
2.29	very dense.		4	SS	56		88%	Screen	3.0	124	12.3 29.2 52.5 6.0
123.60			5	SS	73		88%	Bentonite			
3.50	Trace stone fragements.										
123.47											
3.63	**END OF BOREHOLE** - Upon completion of drilling, the water level in the installed well was measured at 1.75 m bgs (El. 125.35 m asl). - On August 29, 2024, the water level in the installed well was measured at 1.20 m bgs (El. 125.90 m asl).										

W. L. 125.90 Aug 29, 24
W. L. 125.35 Aug 15, 24

DYNAMIC CONE PENETRATION RESISTANCE PLOT
SHEAR STRENGTH (kPa)
Field. Shear Vane (x) & Sensitivity (s)
Pocket Penetrometer
Quick Triaxial / Unconfined
20 40 60 80

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40 50 60 70 80 90

12.5

Unit Weight (kN/m³)
Pocket Penetro. (kPa)

1MP SOIL LOG 145 WALGREEN GINT LOGS FINAL.GPJ MP_OTTAWA_FOUNDATIONS.GDT 24/12/5

GRAPH NOTES
30 Upper value = Field Vane Shear Strength
3 Lower value = Vane Sensitivity
=3% Strain at Failure

PROJECT NO.: **CCO-25-1370**

PROJECT: Geotechnical Investigation - Proposed Addition and Site Works

CLIENT: W.O M.W Realty Limited

PROJECT LOCATION: 145 Walgreen Road, Ottawa, ON

Drilling Date: Aug/14/2024 - Aug/14/2024

BH Location: N 5013262.774; E 424759.248

Drilling Equipment: CME 55

Drilling Method: Hollow Stem Augers

Remarks: GPS Coordinate System UTM NAD 83

BH No: 24-5

Datum: Geodetic

Elevation: 128.24 m

Compiled by: JF

Checked by: NG

ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS/0.3 m	RQD (%)	RECOVERY (%) TCR (%)	GROUNDWATER CONDITIONS	DEPTH (m)	ELEVATION (m)	Remarks and Grain Size Distribution (%)
128.24									0.0		
0.00	**FILL:** gravelly sand, some silt, brown, moist.		1	GS						128	
127.48									1.0		
0.76	**SANDY SILT TILL/SILTY SAND TILL:** trace rootlets and organics in the upper ±80 mm, greyish brown, compact, moist.		2	SS	27		33%			127	
126.72											
1.52	grading more sandy, very dense.		3	SS	58		75%		2.0	126	
125.64			4	SS	50/100mm		75%				
2.60	trace stone fragments.										
125.45											
2.79	**END OF BOREHOLE** - The borehole was terminated after encountering auger refusal at 2.79 m bgs (El. 125.45 m asl). - Upon completion of drilling, the borehole was open to 1.98 m bgs (El. 126.26 m asl) and dry.										

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80

SHEAR STRENGTH (kPa): Field. Shear Vane (x) & Sensitivity (s); Pocket Penetrometer ✖; Quick Triaxial ●; Unconfined ○; 20 40 60 80

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L

WATER CONTENT (%): 10 20 30 40 50 60 70 80 90

Unit Weight (kN/m³) Pocket Penetro. (kPa)

GR SA SI CL

GRAPH NOTES

30 / 3 Upper value = Field Vane Shear Strength; Lower value = Vane Sensitivity

○ ε=3% Strain at Failure

1MP SOIL LOG 145 WALGREEN GINT LOGS FINAL.GPJ MP_OTTAWA_FOUNDATIONS.GDT 24/12/5

egis

PROJECT NO.: **CCO-25-1370**
PROJECT: Geotechnical Investigation - Proposed Addition and Site Works
CLIENT: W.O M.W Realty Limited
PROJECT LOCATION: 145 Walgreen Road, Ottawa, ON

Drilling Date: Aug/14/2024 - Aug/14/2024
BH Location: N 5013323.206; E 424813.379
Drilling Equipment: CME 55
Drilling Method: Hollow Stem Augers
Remarks: GPS Coordinate System UTM NAD 83

BH No: 24-6

Datum: Geodetic
Elevation: 127.76 m
Compiled by: JF
Checked by: NG

ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS/0.3 m / RQD (%)	RECOVERY (%) / TCR (%)	GROUNDWATER CONDITIONS	DEPTH (m) / ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT / WATER CONTENT (%)	Remarks and Grain Size Distribution (%) / Unit Weight (kN/m³) / Pocket Penetro. (kPa)
127.76								0.0			
127.66	**ASPHALT** ±100 mm.										
0.10	**FILL:** granular fill, grey, compact, moist.		1	GS							
126.85								127			
0.91	**SILT/SANDY SILT:** trace to some clay, trace gravel, greyish brown, compact, moist to very moist.		2	SS	21	63%		1.0			
126.24											
1.52	dense, moist.		3	SS	47	83%		126			
125.47								2.0			
2.29	very dense.		4	SS	96	100%		125			
124.71								3.0			
3.05	**SANDY SILT TILL/SILTY SAND TILL:** greyish brown, very dense, moist to very moist.		5	SS	50/ 50mm	65%					
124.31											
3.45	trace limestone fragments.										
124.20											
3.56	**END OF BOREHOLE** - The borehole was terminated after encountering auger refusal at 3.56 m bgs (El. 124.20 m asl). - Upon completion of drilling, the borehole was open to 2.74 m bgs (El. 125.02 m asl) and dry.										

Remarks and Grain Size Distribution (%): GR SA SI CL

GRAPH NOTES
30 Upper value = Field Vane Shear Strength
3 Lower value = Vane Sensitivity
ε=3% Strain at Failure

1MP SOIL LOG 145 WALGREEN GINT LOGS FINAL.GPJ MP_OTTAWA_FOUNDATIONS.GDT 24/12/5

PROJECT NO.: **CCO-25-1370**

PROJECT: Geotechnical Investigation - Proposed Addition and Site Works

CLIENT: W.O M.W Realty Limited

PROJECT LOCATION: 145 Walgreen Road, Ottawa, ON

Drilling Date: Aug/15/2024 - Aug/15/2024

BH Location: N 5013307.24; E 424732.7

Drilling Equipment: CME 55

Drilling Method: Hollow Stem Augers

Remarks: GPS Coordinate System UTM NAD 83

BH No: 24-7 MW

Datum: Geodetic

Elevation: 128.46 m

Compiled by: JF

Checked by: NG

ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS/0.3 m / RQD (%)	RECOVERY (%) / TCR (%)	GROUNDWATER CONDITIONS	DEPTH (m)	ELEVATION (m)	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) Field. Shear Vane (x) & Sensitivity (s) Pocket Penetrometer ✖ Quick Triaxial ● Unconfined ○	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%)	Remarks and Grain Size Distribution (%) Unit Weight (kN/m³) Pocket Penetro. (kPa) GR SA SI CL
128.46										20 40 60 80	10 20 30 40 50 60 70 80 90	
0.00	**FILL:** silty sand, some gravel, trace clay and rootlets, brown, dense, moist.		1	SS	38	75%		0.0			7.8	
128.08									128			18.1 51.2 (30.7)
0.38	sandy silt, trace organics and rootlets, dark grey, dense to compact.						Bentonite					
127.62			2	SS	10	75%		1.0				
0.84	**SILT/SANDY SILT:** trace organics and rootlets in the upper ±300 mm, greyish brown, compact, moist.						Riser					
126.94												
1.52	**SANDY SILT TILL/SILTY SAND TILL:** greyish brown, dense, moist to very moist.		3	SS	38	100%	Sand	2.0				14.4 48.2 29.8 7.6
126.17									126			
2.29	layer of weathered limestone, very dense.		4	SS	50/ 100 mm	50%	Screen					
125.77												
2.69	moist.							3.0				
125.01			5	SS	50/ 100 mm		Bentonite					
3.45	**END OF BOREHOLE** - The borehole terminated after encountering auger refusal at 3.45 m bgs (El. 125.01 m asl). - Upon completion of drilling, no water was observed in the installed well. - On August 29, 2024, the water level in the installed well was measured at 1.37 m bgs (El. 127.09 m asl).											

W. L. 127.09 Aug 29, 24

GRAPH NOTES

30 / 3 Upper value = Field Vane Shear Strength; Lower value = Vane Sensitivity

○ ε=3% Strain at Failure

1MP SOIL LOG 145 WALGREEN GINT LOGS FINAL.GPJ MP_OTTAWA_FOUNDATIONS.GDT 24/12/5

PROJECT NO.: **CCO-25-1370**

PROJECT: Geotechnical Investigation - Proposed Addition and Site Works

CLIENT: W.O M.W Realty Limited

PROJECT LOCATION: 145 Walgreen Road, Ottawa, ON

Drilling Date: Aug/15/2024 - Aug/15/2024

BH Location: N 5013353.352; E 424777.96

Drilling Equipment: CME 55

Drilling Method: Hollow Stem Augers

Remarks: GPS Coordinate System UTM NAD 83

BH No: 24-8 MW

Datum: Geodetic

Elevation: 127.64 m

Compiled by: JF

Checked by: NG

ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES: NUMBER	TYPE	"N" BLOWS/0.3 m / RQD (%)	RECOVERY (%) / TCR (%)	GROUNDWATER CONDITIONS	DEPTH (m)	ELEVATION (m)	Remarks and Grain Size Distribution (%)
127.64								0.0		
127.54	**ASPHALT** ±100 mm.									
127.49	**FILL:** sand and gravel, some silt, brown, moist.									
0.15	sandy silt, trace organics and gravel.		1	GS			Bentonite		127	
126.88										
0.76	**SILT/SANDY SILT:** trace gravel and clay, trace rootlets in the upper ±80 mm, greyish browm, compact, moist.		2	SS	15	63%	W. L. 126.83 Aug 29, 24	1.0		3.7 31.8 58.2 6.3
126.12							Riser			
1.52	**SANDY SILT TILL/SILTY SAND TILL:** greyish browm, dense, moist.		3	SS	40	92%	sand	2.0	126	
125.35										
2.29	grading more sandy, very dense.		4	SS	50/ 100 mm	67%	Screen		125	
124.59								3.0		
3.05	**END OF BOREHOLE** - The borehole was terminated after encountering auger refusal at 3.05 m bgs (El. 124.59 m asl). - Upon completion of drilling, no water was observed in the installed well. - On August 29, 2024, the water level in the installed well was measured at 0.81 m bgs (El. 126.83 m asl).									

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80

SHEAR STRENGTH (kPa): Field. Shear Vane (x) & Sensitivity (s); Pocket Penetrometer ✖; Quick Triaxial ●; Unconfined ○; 20 40 60 80

PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT: w_P w w_L

WATER CONTENT (%): 10 20 30 40 50 60 70 80 90

16.2

Remarks and Grain Size Distribution (%): Unit Weight (kN/m³) Pocket Penetro. (kPa)

GR SA SI CL

GRAPH NOTES

30 / 3 Upper value = Field Vane Shear Strength; Lower value = Vane Sensitivity

○ ε=3% Strain at Failure

1MP SOIL LOG 145 WALGREEN GINT LOGS FINAL.GPJ MP_OTTAWA_FOUNDATIONS.GDT 24/12/5

PROJECT NO.: **CCO-25-1370**
PROJECT: Geotechnical Investigation - Proposed Addition and Site Works
CLIENT: W.O M.W Realty Limited
PROJECT LOCATION: 145 Walgreen Road, Ottawa, ON

Drilling Date: Aug/14/2024 - Aug/14/2024
BH Location: N 5013323.206; E 424813.379
Drilling Equipment: CME 55
Drilling Method: Hollow Stem Augers
Remarks: GPS Coordinate System UTM NAD 83

BH No: 24-9

Datum: Geodetic
Elevation: 127.22 m
Compiled by: JF
Checked by: NG

ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS/0.3 m / RQD (%)	RECOVERY (%) / TCR (%)	GROUNDWATER CONDITIONS	DEPTH (m) / ELEVATION (m)	Remarks and Grain Size Distribution (%) GR SA SI CL
127.22								0.0 / 127	
0.00 / 126.46	**FILL:** ±50 mm of topsoil/organic soil followed br sand and gravel, trace to some silt, trace organics and rootlets, grey, compact, moist.		1	SS	10	29%			
0.76	**SILT/SANDY SILT:**trace to some clay, trace gravel, greyish brown, dense, moist.		2	SS	30	67%		1.0 / 126	
			3	SS	47	75%		2.0 / 125	5.3 21.4 66.9 6.4
124.77 / 2.45	**SANDY SILT TILL/SILTY SAND TILL:** grey, very dense, moist.		4	SS	64	92%		3.0 / 124	
124.04 / 3.18	trace limestone fragments.		5	SS	55/ 125mm	82%			
123.89 / 3.33	**END OF BOREHOLE** - The borehole was terminated after encountering auger refusal at 3.33 m bgs (El. 123.89 m asl). - Upon completion of drilling, the borehole was open to 2.61 m bgs (El. 124.61 m asl) and dry.								

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80

SHEAR STRENGTH (kPa)
Field. Shear Vane (x) & Sensitivity (s)
Pocket Penetrometer ✖
● Quick Triaxial ○ Unconfined
20 40 60 80

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40 50 60 70 80 90

Unit Weight (kN/m³)
Pocket Penetro. (kPa)

GRAPH NOTES
30 / 3 Upper value = Field Vane Shear Strength / Lower value = Vane Sensitivity
○ ε=3% Strain at Failure

1MP SOIL LOG 145 WALGREEN GINT LOGS FINAL.GPJ MP_OTTAWA_FOUNDATIONS.GDT 24/12/5

GEOTECHNICAL INVESTIGATION OF THE PROPOSED BUILDING ADDITION AND SITE DEVELOPMENT

145 WALGREEN RD, OTTAWA, ON

APPENDIX D: LABORATORY TEST RESULTS

egis

Unconfined Compressive Strength of Intact Rock Cores

ASTM D7012 Method C

Project No.:	CCO-25-1370-01	**Date Issued:**	September 9,2024
Lab No.:	OL-24031	**Report No.:**	1 of 2
Project Name:	145 Walgreen Road		

Core No.:	1	**Moisture Condition:**	Dry as received		
Borehole Location:	BH24-1	**Run/RC:**	3	**Depth (ft):**	7'2"-7'7"
Date Sampled:	Aug 14,2024	**Received:**	Aug 29,2024	**Tested:**	Sept 9,2024
Core No.:	2	**Moisture Condition:**	Dry as received		
Borehole Location:	BH24-1	**Run/RC:**	5	**Depth (ft):**	15'6"-16'0"
Date Sampled:	Aug 14,2024	**Received:**	Aug 29,2024	**Tested:**	Sept 9,2024
Core No.:	3	**Moisture Condition:**	Dry as received		
Borehole Location:	BH24-2	**Run/RC:**	5	**Depth (ft):**	10'5"-11'2"
Date Sampled:	Aug 14,2024	**Received:**	Aug 29,2024	**Tested:**	Sept 9,2024

Core No. :	1	2	3
Diameter (mm)	47.4	47.4	47.4
Thickness/Height (mm)	96.6	99.5	97.4
Density (Kg/m^3)	2683	2698	2697
Compressive Strength (Mpa)	93.2	119.6	103.4
Mass of Core (g)	457.4	473.7	463.5
Description of Failure	Type 1	Type 4/2	Type 1

Remarks: Core#2 Diagonal fracture with some columnar vertical cracking through top end. No well formed Cones on ether end.

Core# 1&3 Relatively well-formed cone on one end, vertical cracks running through end, no well formed cone on other end.

Reviewed By: _____ **Date:** _____

Jason Hopwood-Jones
Laboratory Manager

Unconfined Compressive Strength of Intact Rock Cores

ASTM D7012 Method C

Project No.:	CCO-25-1370-01	**Date Issued:**	September ,2024
Lab No.:	OL-24031	**Report No.:**	2 of 2
Project Name:	145 Walgreen Road		

Core No.:	4	**Moisture Condition:**	Dry as received		
Borehole Location:	BH24-2	**Run/RC:**	6	**Depth (ft):**	17'6"-18' 0"
Date Sampled:	Aug 14,2024	**Received:**	Aug 29,2024	**Tested:**	Sept 9,2024
Core No.:		**Moisture Condition:**	Dry as received		
Borehole Location:		**Run:**		**Depth (ft):**	
Date Sampled:		**Received:**		**Tested:**	
Core No.:		**Moisture Condition:**			
Borehole Location:		**Run:**		**Depth (ft):**	
Date Sampled:		**Received:**		**Tested:**	

Core No. :	4	5	
Diameter (mm)	47.4		
Thickness/Height (mm)	102.8		
Density (Kg/m^3)	2692		
Compressive Strength (Mpa)	70.6		
Mass of Core (g)	488.4		
Description of Failure	4		

Remarks: Core#4 Diagonal fracture with some columnar vertical cracking through top end. No well formed Cones on ether end.

Reviewed By: _____ **Date:** _____

Jason Hopwood-Jones
Laboratory Manager

Retrieved Rock Cores

Borehole: BH24-1

RC 3 – 125.91 to 124.73 m
(RQD = 67%)

RC 4 – 124.73 to 123.22 m
(RQD = 65%)

RC 5 – 123.22 to 122.33 m
(RQD = 74%)

egis	**Proposed Addition** **145 Walgreen Road, Ottawa, ON**	**Project No: CCO-25-1370-01** **Client: W.O M.W Realty Limited**

Retrieved Rock Cores

Borehole: BH24-2

RC 4 – 125.18 to 124.54 m
(RQD = 96%)

RC 5 – 124.54 to 123.02 m
(RQD = 92%)

RC 6 – 123.02 to 121.50 m
(RQD = 68%)

egis	**Proposed Addition** **145 Walgreen Road, Ottawa, ON**	**Project No: CCO-25-1370-01** **Client: W.O M.W Realty Limited**

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Certificate of Analysis

Egis Canada Ltd. (Nepean)
215 Menten Place, Unit 104
Nepean, ON K2H 9C1
Attn: Jeff Forrester

Client PO: CCO-25-1370-01
Project: CCO-25-1370-01 (145 Walgreen Rd)
Custody: 70629

Report Date: 4-Sep-2024
Order Date: 27-Aug-2024

Order #: 2435197

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
2435197-01	BH 24-4 SS-3
2435197-02	BH 24-8 SS-4

Approved By:

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 04-Sep-2024

Client: **Egis Canada Ltd. (Nepean)**

Order Date: 27-Aug-2024

Client PO: **CCO-25-1370-01**

Project Description: CCO-25-1370-01 (145 Walgreen Rd)

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Anions	EPA 300.1 - IC, water extraction	4-Sep-24	4-Sep-24
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	30-Aug-24	30-Aug-24
Resistivity	EPA 120.1 - probe, water extraction	29-Aug-24	29-Aug-24
Solids, %	CWS Tier 1 - Gravimetric	28-Aug-24	29-Aug-24

Certificate of Analysis

Report Date: 04-Sep-2024

Client: **Egis Canada Ltd. (Nepean)**

Order Date: 27-Aug-2024

Client PO: **CCO-25-1370-01**

Project Description: CCO-25-1370-01 (145 Walgreen Rd)

	Client ID:	BH 24-4 SS-3	BH 24-8 SS-4	-	-		
	Sample Date:	15-Aug-24 09:00	15-Aug-24 10:30	-	-	-	-
	Sample ID:	2435197-01	2435197-02	-	-		
	Matrix:	Soil	Soil	-	-		
	MDL/Units						
Physical Characteristics							
% Solids	0.1 % by Wt.	89.2	93.9	-	-	-	-
General Inorganics							
pH	0.05 pH Units	7.33	7.37	-	-	-	-
Resistivity	0.1 Ohm.m	84.4	12.6	-	-	-	-
Anions							
Chloride	10 ug/g	11	422	-	-	-	-
Sulphate	10 ug/g	26	70	-	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions								
Chloride	ND	10	ug/g					
Sulphate	ND	10	ug/g					
General Inorganics								
Resistivity	ND	0.1	Ohm.m					

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	12.0	10	ug/g	11.4			4.9	35	
Sulphate	27.4	10	ug/g	26.5			3.6	35	
General Inorganics									
pH	7.16	0.05	pH Units	7.15			0.1	2.3	
Resistivity	12.5	0.1	Ohm.m	12.7			1.7	20	
Physical Characteristics									
% Solids	82.7	0.1	% by Wt.	83.8			1.3	25	

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	108	10	ug/g	11.4	97.1	82-118			
Sulphate	123	10	ug/g	26.5	96.4	80-120			

Certificate of Analysis

Report Date: 04-Sep-2024

Client: **Egis Canada Ltd. (Nepean)**

Order Date: 27-Aug-2024

Client PO: **CCO-25-1370-01**

Project Description: CCO-25-1370-01 (145 Walgreen Rd)

Qualifier Notes:

Sample Data Revisions:

None

Work Order Revisions / Comments:

Received at temperature > 25C

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Soil results are reported on a dry weight basis unlesss otherwise noted.

Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

PARAC LABORATORIES

Paracel ID: 2435197

rent Blvd.
K1G 4J8
7
cellabs.com
.com

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only) № 70629

Client Name: Egis Canada Ltd.	Project Ref: CCO-25-1370-01 (445 Walgreen Rd)
Contact Name: Jeffrey Forrester	Quote #:
Address: 215 Menten Place, Unit 104, Ottawa, ON K2H 9C1	PO #: CCO-25-1370-01
Telephone:	E-mail: Jeffrey.Forrester@egis-group.com cc: Jay.Patel@egis-group.com

Page 1 of 1

Turnaround Time
☐ 1 day ☐ 3 day
☐ 2 day ☐ Regular
Date Required:

☐ REG 153/04 ☐ REG 406/19

☐ Table 1 ☐ Res/Park ☐ Med/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☐ Table 3 ☐ Agri/Other
☐ Table ___
For RSC: ☐ Yes ☐ No

Other Regulation
☐ REG 558 ☐ PWQO
☐ CCME ☐ MISA
☐ SU - Sani ☐ SU - Storm
Mun:
☐ Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analysis

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Corrosivity Package	(Sulphate, pH, Chloride, Resistivity)
1	BH 24-4 SS-3	S	0	1	08/15/24	9:00 AM		
2	BH 24-8 SS-4	S	0	1	08/15/24	10:30 AM		
3								
4								
5								
6								
7								
8								
9								
10								

Comments: Test for Corrosivity Package (Sulphate, pH, chloride, Resistivity)

Method of Delivery: Walkin

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab: SO	Verified By: SS
Relinquished By (Print): Jay Patel	Date/Time: Aug 27/24 3:16	Date/Time: Aug 27, 2024 4:55p	Date/Time: 28 Aug 24 00:39
Date/Time: August 27, 2024	Temperature: 27 °C	Temperature: 11.9 °C	pH Verified: ☐ By:

egis

WATER CONTENT DETERMINATION

Test Method Utilized	☑ MTO LS-701	☐ ASTM D 2216	☐ AASHTO T-265				
Project No.: CCO-25-1370-01-05-03					Date Received: August 20,2024		
Project Name/Location: Geotech Invest. - 145 Walgreen Road.					Date Tested: August 21,2024		
Material Type: Soils					Lab Sample No.: OL-24031		
Borehole No.	Depth Sample Taken (ft ')	Sample Container I.D.	Wet Sample + Tare (A)	Dry Sample + Tare (B)	Tare (C)	Mass of Sample (D) (B-C)	% Moisture (A-B)/Dx100
BH24-2 SS-3	5'0"-6'4"	P.86	760.19	718.26	130.26	588.00	**7.1**
BH24-3 SS-2	2'6"-4'6"	P.98	601.15	536.05	129.43	406.62	**16.0**
BH24-4 SS-4	7'6"-9'5"	P.96	690.69	630.36	148.02	482.34	**12.5**
BH24-7 SS-1	0'0"-2'0"	P.35	1054.04	990.83	184.74	806.09	**7.8**
BH24-8 SS-2	2'6"-4'6"	P.100	581.30	522.00	156.68	365.32	**16.2**

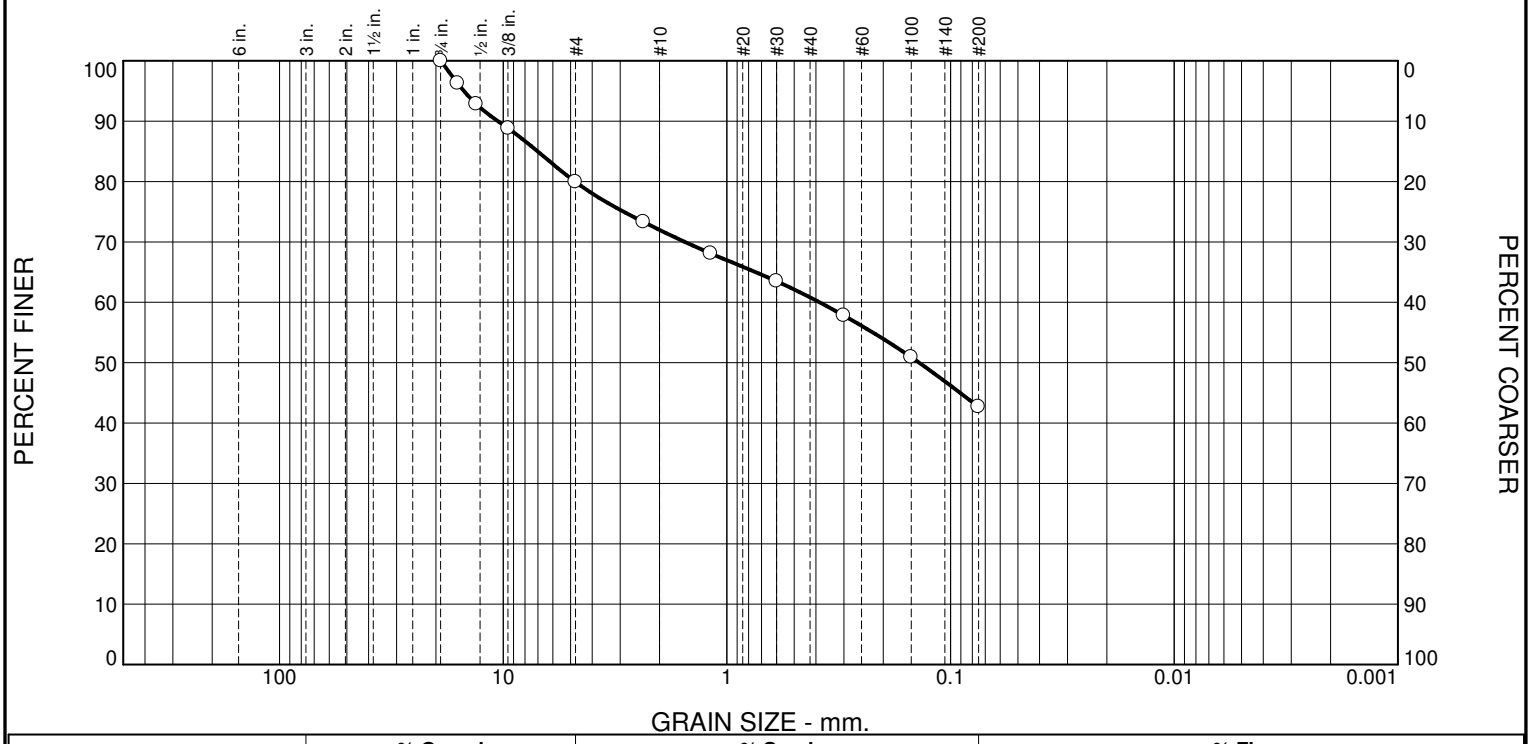
Non-Comformance's from Test Procedure: N/A

Comments:

Checked by: J.H-J

Signature:

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	20.1	7.9	11.2	18.1	42.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
19.0mm	100.0		
16.0mm	96.3		
13.2mm	92.8		
9.5mm	88.8		
4.75mm	79.9		
2.36mm	73.3		
1.18mm	68.1		
0.600mm	63.5		
0.300mm	57.8		
0.150mm	50.9		
0.075mm	42.7		

* (no specification provided)

Material Description

Fine Gravelly Silt/Clay and Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= AASHTO (M 145)=

Coefficients

D_{90}= 10.5513 D_{85}= 7.0195 D_{60}= 0.3854
D_{50}= 0.1382 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=2.18

Date Received: Aug 20,2024 **Date Tested:** Aug 25,2024

Tested By: J.H-J

Checked By: J.Hopwood-Jones

Title: Lab Manager

Location: BH24-2 SS-3
Sample Number: SS-3 **Depth:** 5'0"-6'4"

Date Sampled: Aug 14,2024

egis

Client: WO MW Realty Limited
Project: 145 Walgreen Road

Project No: CCO-251370-01 **Figure**

GRAIN SIZE DISTRIBUTION TEST DATA

2024-08-29

Client: WO MW Realty Limited
Project: 145 Walgreen Road
Project Number: CCO-251370-01
Location: BH24-2 SS-3
Depth: 5'0"-6'4" **Sample Number:** SS-3
Material Description: Fine Gravelly Silt/Clay and Sand
Sample Date: Aug 14,2024
Date Received: Aug 20,2024
Tested By: J.H-J **Test Date:** Aug 25,2024
Checked By: J.Hopwood-Jones **Title:** Lab Manager

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
588.00	0.00	0.00	19.0mm	0.00	100.0	0.0
			16.0mm	21.96	96.3	3.7
			13.2mm	42.25	92.8	7.2
			9.5mm	65.70	88.8	11.2
			4.75mm	117.98	79.9	20.1
			2.36mm	156.94	73.3	26.7
			1.18mm	187.62	68.1	31.9
			0.600mm	214.64	63.5	36.5
			0.300mm	248.12	57.8	42.2
			0.150mm	288.63	50.9	49.1
			0.075mm	337.07	42.7	57.3

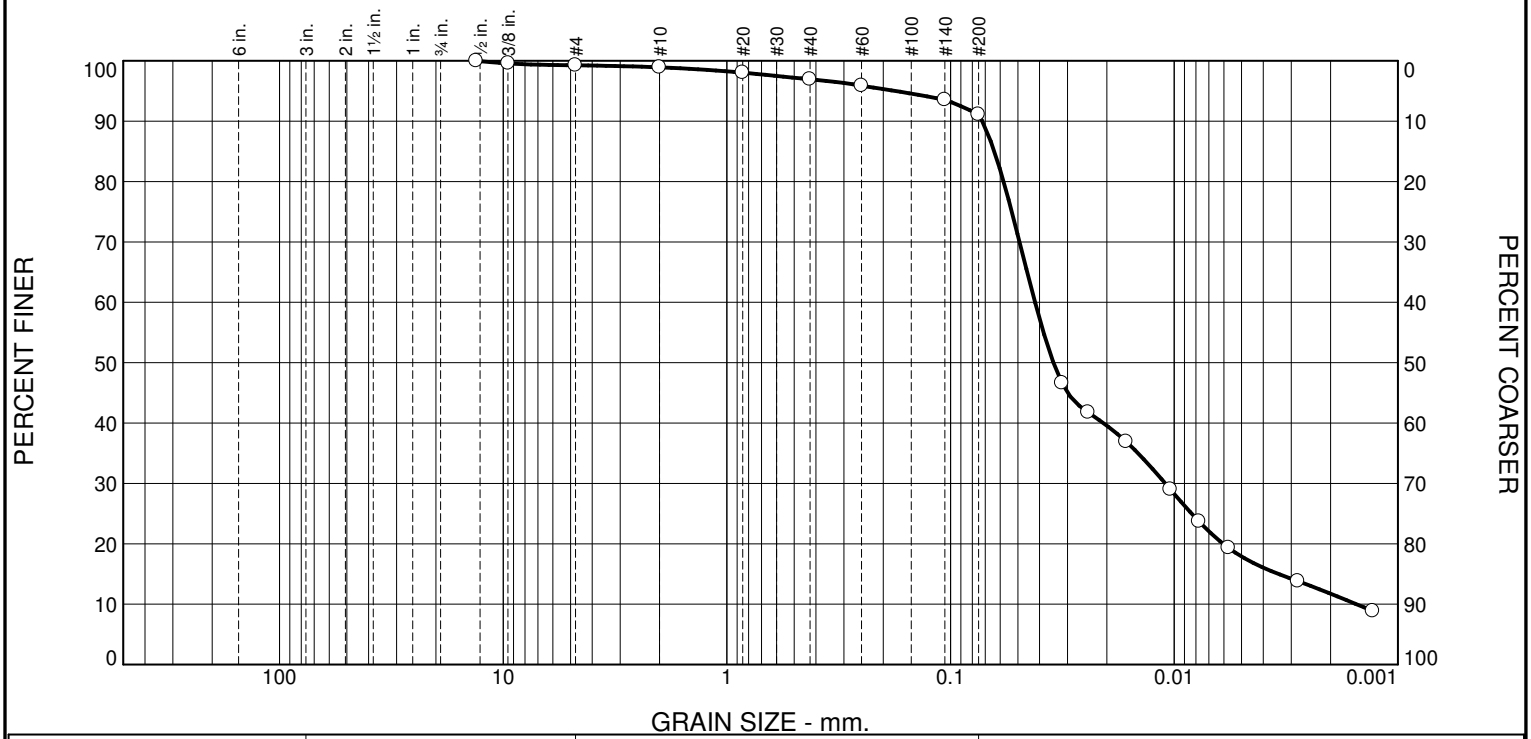
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	20.1	20.1	7.9	11.2	18.1	37.2			42.7

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
						0.1382	0.3854	4.7759	7.0195	10.5513	15.0032

Fineness Modulus
2.18

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.7	0.4	2.0	5.8	79.4	11.7

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
13.2mm	100.0		
9.5mm	99.6		
4.75mm	99.3		
2.00mm	98.9		
0.850mm	98.0		
0.425mm	96.9		
0.250mm	95.9		
0.106mm	93.5		
0.075mm	91.1		
0.0317 mm.	46.6		
0.0243 mm.	41.8		
0.0164 mm.	36.9		
0.0104 mm.	29.0		
0.0078 mm.	23.7		
0.0057 mm.	19.3		
0.0028 mm.	13.8		
0.0013 mm.	8.9		

* (no specification provided)

Material Description

Silt some Clay trace Sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= AASHTO (M 145)=

Coefficients

D_{90}= 0.0722 D_{85}= 0.0638 D_{60}= 0.0419
D_{50}= 0.0347 D_{30}= 0.0110 D_{15}= 0.0034
D_{10}= 0.0015 C_u= 27.30 C_c= 1.87

Remarks

F.M.=0.15

Date Received: Aug 20,2024 **Date Tested:** Aug 25,2024

Tested By: R.C

Checked By: J.Hopwood-Jones

Title: Lab Manager

Location: BH24-3 SS-2
Sample Number: SS-2 **Depth:** 2'6"-4'6"

Date Sampled: Aug 14,2024

egis

Client: WO MW Realty Limited
Project: 145 Walgreen Road

Project No: CCO-251370-01 **Figure**

GRAIN SIZE DISTRIBUTION TEST DATA

2024-08-29

Client: WO MW Realty Limited
Project: 145 Walgreen Road
Project Number: CCO-251370-01
Location: BH24-3 SS-2
Depth: 2'6"-4'6" **Sample Number:** SS-2
Material Description: Silt some Clay trace Sand
Sample Date: Aug 14,2024
Date Received: Aug 20,2024
Tested By: R.C **Test Date:** Aug 25,2024
Checked By: J.Hopwood-Jones **Title:** Lab Manager

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
406.62	0.00	0.00	13.2mm	0.00	100.0	0.0
			9.5mm	1.71	99.6	0.4
			4.75mm	3.01	99.3	0.7
			2.00mm	4.38	98.9	1.1
109.35	0.00	0.00	0.850mm	0.97	98.0	2.0
			0.425mm	2.19	96.9	3.1
			0.250mm	3.38	95.9	4.1
			0.106mm	5.94	93.5	6.5
			0.075mm	8.65	91.1	8.9

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 98.9
Weight of hydrometer sample =109.35
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -4.5
Meniscus correction only = -1.0
Specific gravity of solids = 2.775
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.6007 **-** 0.187 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	22.1	57.0	52.9	0.0128	56.0	6.1	0.0317	46.6	53.4
2.00	22.1	51.5	47.4	0.0128	50.5	7.2	0.0243	41.8	58.2
5.00	22.1	46.0	41.9	0.0128	45.0	8.2	0.0164	36.9	63.1
15.00	22.1	37.0	32.9	0.0128	36.0	9.9	0.0104	29.0	71.0
30.00	22.1	31.0	26.9	0.0128	30.0	11.0	0.0078	23.7	76.3
60.00	22.1	26.0	21.9	0.0128	25.0	11.9	0.0057	19.3	80.7
280.00	21.1	20.0	15.7	0.0130	19.0	13.0	0.0028	13.8	86.2
1440.00	20.5	14.5	10.1	0.0131	13.5	14.1	0.0013	8.9	91.1

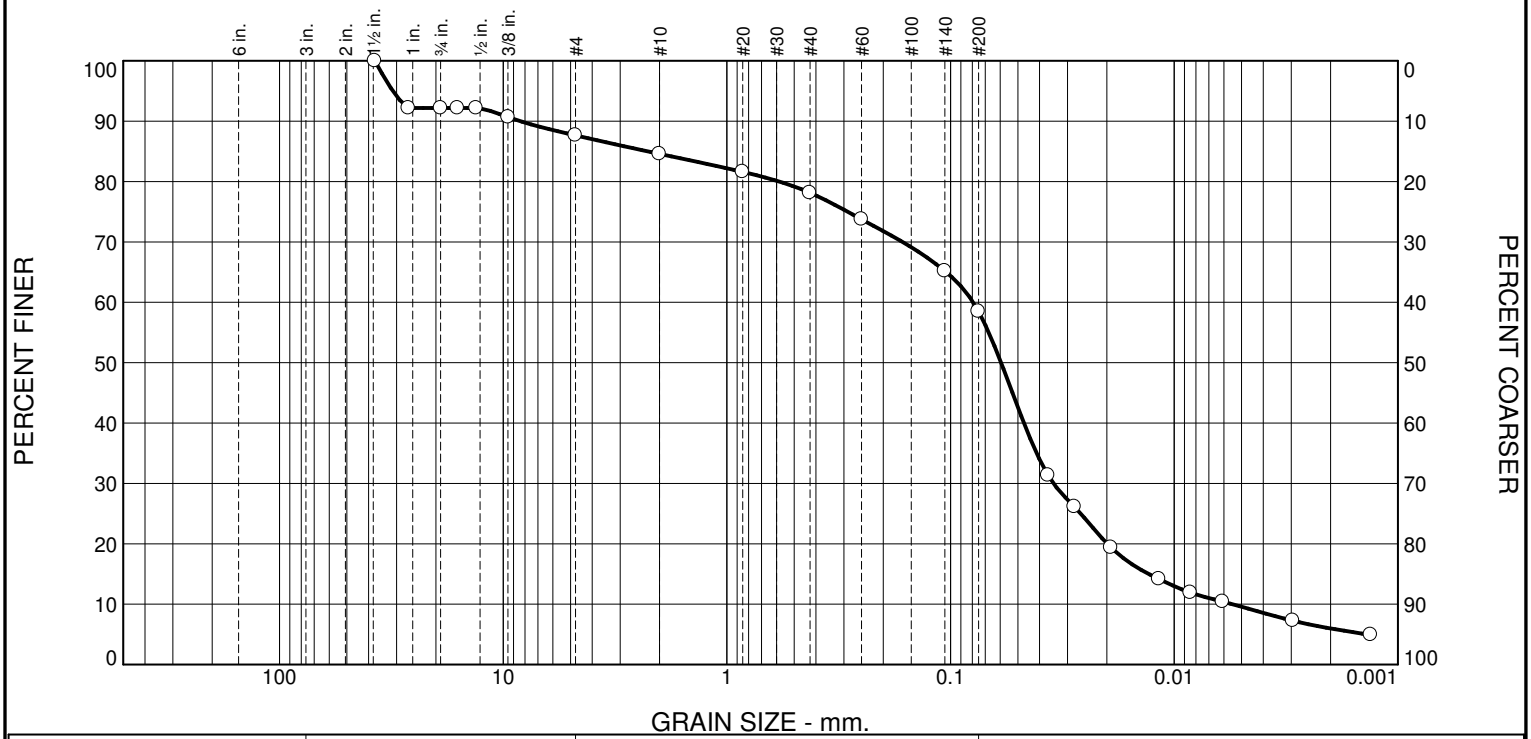
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.7	0.7	0.4	2.0	5.8	8.2	79.4	11.7	91.1

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0015	0.0034	0.0060	0.0110	0.0208	0.0347	0.0419	0.0580	0.0638	0.0722	0.1758

Fineness Modulus	C_u	C_c
0.15	27.30	1.87

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	7.8	4.5	3.1	6.5	19.6	52.5	6.0

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
37.5mm	100.0		
26.5mm	92.2		
19.0mm	92.2		
16.0mm	92.2		
13.2mm	92.2		
9.5mm	90.7		
4.75mm	87.7		
2.00mm	84.6		
0.850mm	81.6		
0.425mm	78.1		
0.250mm	73.7		
0.106mm	65.2		
0.075mm	58.5		
0.0367 mm.	31.4		
0.0279 mm.	26.1		
0.0192 mm.	19.4		
0.0117 mm.	14.2		
0.0085 mm.	11.9		
0.0061 mm.	10.4		
0.0029 mm.	7.3		
0.0013 mm.	4.9		

* (no specification provided)

Material Description

Sandy Silt some Gravel trace Clay

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 8.3700 D_{85}= 2.2614 D_{60}= 0.0793
D_{50}= 0.0595 D_{30}= 0.0347 D_{15}= 0.0130
D_{10}= 0.0055 C_u= 14.41 C_c= 2.76

Remarks

F.M.=1.37

Date Received: Aug 20,2024 **Date Tested:** Aug 25,2024

Tested By: R.C

Checked By: J.Hopwood-Jones

Title: Lab Manager

Location: BH24-4 SS-4
Sample Number: SS-4 **Depth:** 7'6"-9'5"

Date Sampled: Aug 14,2024

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Client: WO MW Realty Limited
Project: 145 Walgreen Road

Project No: CCO-251370-01 **Figure**

GRAIN SIZE DISTRIBUTION TEST DATA

2024-08-29

Client: WO MW Realty Limited
Project: 145 Walgreen Road
Project Number: CCO-251370-01
Location: BH24-4 SS-4
Depth: 7'6"-9'5" **Sample Number:** SS-4
Material Description: Sandy Silt some Gravel trace Clay
Sample Date: Aug 14,2024
Date Received: Aug 20,2024
Tested By: R.C **Test Date:** Aug 25,2024
Checked By: J.Hopwood-Jones **Title:** Lab Manager

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
482.34	0.00	0.00	37.5mm	0.00	100.0	0.0
			26.5mm	37.70	92.2	7.8
			19.0mm	37.70	92.2	7.8
			16.0mm	37.70	92.2	7.8
			13.2mm	37.70	92.2	7.8
			9.5mm	44.97	90.7	9.3
			4.75mm	59.53	87.7	12.3
			2.00mm	74.39	84.6	15.4
110.12	0.00	0.00	0.850mm	3.87	81.6	18.4
			0.425mm	8.38	78.1	21.9
			0.250mm	14.11	73.7	26.3
			0.106mm	25.28	65.2	34.8
			0.075mm	33.97	58.5	41.5

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 84.6
Weight of hydrometer sample =110.12
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -4.5
Meniscus correction only = -1.0
Specific gravity of solids = 2.775
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.6007 **-** 0.187 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	22.1	46.0	41.9	0.0128	45.0	8.2	0.0367	31.4	68.6
2.00	22.1	39.0	34.9	0.0128	38.0	9.5	0.0279	26.1	73.9
5.00	22.1	30.0	25.9	0.0128	29.0	11.2	0.0192	19.4	80.6
15.00	22.1	23.0	18.9	0.0128	22.0	12.5	0.0117	14.2	85.8
30.00	22.1	20.0	15.9	0.0128	19.0	13.0	0.0085	11.9	88.1
60.00	22.1	18.0	13.9	0.0128	17.0	13.4	0.0061	10.4	89.6
275.00	21.1	14.0	9.7	0.0130	13.0	14.2	0.0029	7.3	92.7
1440.00	20.5	11.0	6.6	0.0131	10.0	14.7	0.0013	4.9	95.1

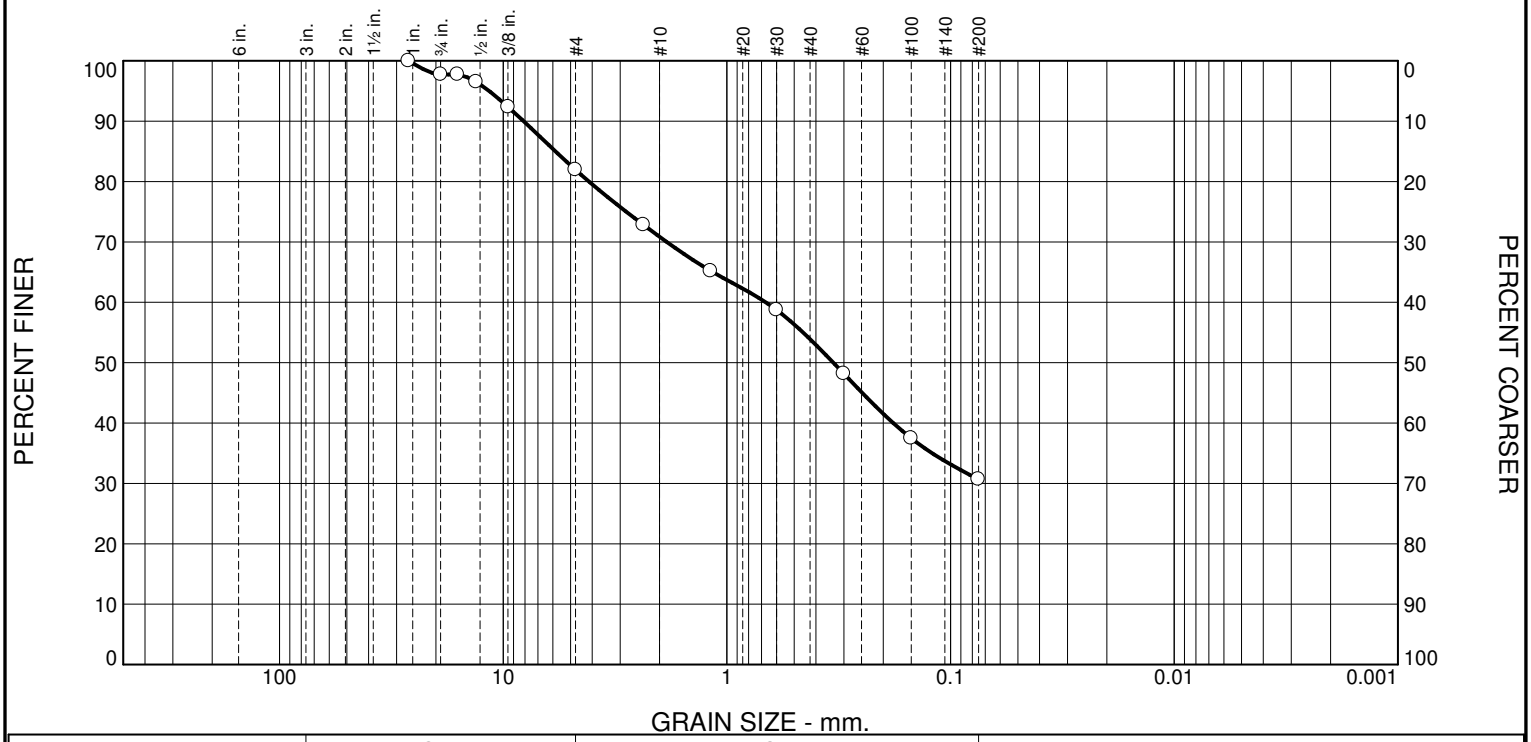
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	7.8	4.5	12.3	3.1	6.5	19.6	29.2	52.5	6.0	58.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0014	0.0055	0.0130	0.0199	0.0347	0.0470	0.0595	0.0793	0.5824	2.2614	8.3700	31.1651

Fineness Modulus	C_u	C_c
1.37	14.41	2.76

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.3	15.8	11.0	17.0	23.2	30.7	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
26.5mm	100.0		
19.0mm	97.7		
16.0mm	97.7		
13.2mm	96.5		
9.5mm	92.3		
4.75mm	81.9		
2.36mm	72.8		
1.18mm	65.2		
0.600mm	58.7		
0.300mm	48.2		
0.150mm	37.5		
0.075mm	30.7		

* (no specification provided)

Material Description

Silty/Clayey Sand some Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= AASHTO (M 145)=

Coefficients

D_{90}= 8.1118 D_{85}= 5.8393 D_{60}= 0.6706
D_{50}= 0.3344 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Note: Organics present.
F.M.=2.46

Date Received: Aug 20,2024 **Date Tested:** Aug 25,2024

Tested By: J.H-J

Checked By: J.Hopwood-Jones

Title: Lab Manager

Location: BH24-7 SS-1
Sample Number: SS-1 **Depth:** 0'0"-2'0"

Date Sampled: Aug 14,2024

egis

Client: WO MW Realty Limited
Project: 145 Walgreen Road

Project No: CCO-251370-01 **Figure**

GRAIN SIZE DISTRIBUTION TEST DATA

2024-08-29

Client: WO MW Realty Limited
Project: 145 Walgreen Road
Project Number: CCO-251370-01
Location: BH24-7 SS-1
Depth: 0'0"-2'0"
Sample Number: SS-1
Material Description: Silty/Clayey Sand some Gravel
Sample Date: Aug 14,2024
Date Received: Aug 20,2024
Testing Remarks: Note: Organics present.
Tested By: J.H-J
Test Date: Aug 25,2024
Checked By: J.Hopwood-Jones
Title: Lab Manager

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
806.09	0.00	0.00	26.5mm	0.00	100.0	0.0
			19.0mm	18.31	97.7	2.3
			16.0mm	18.31	97.7	2.3
			13.2mm	28.36	96.5	3.5
			9.5mm	61.82	92.3	7.7
			4.75mm	145.56	81.9	18.1
			2.36mm	218.99	72.8	27.2
			1.18mm	280.56	65.2	34.8
			0.600mm	332.55	58.7	41.3
			0.300mm	417.76	48.2	51.8
			0.150mm	503.97	37.5	62.5
			0.075mm	558.91	30.7	69.3

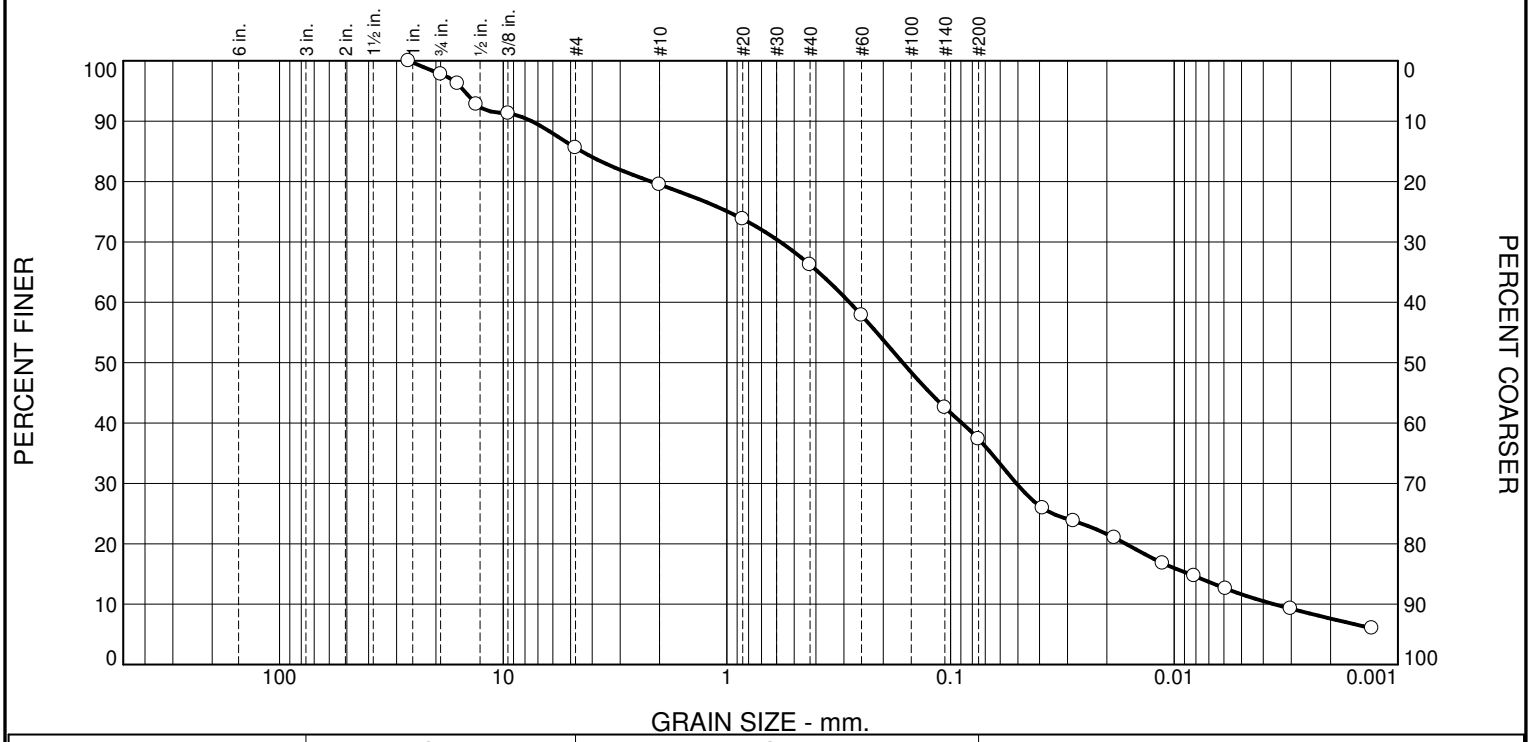
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	2.3	15.8	18.1	11.0	17.0	23.2	51.2			30.7

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
					0.1804	0.3344	0.6706	4.1366	5.8393	8.1118	11.5636

Fineness Modulus
2.46

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.2	12.2	6.1	13.3	28.8	29.8	7.6

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
26.5mm	100.0		
19.0mm	97.8		
16.0mm	96.2		
13.2mm	92.8		
9.5mm	91.3		
4.75mm	85.6		
2.00mm	79.5		
0.850mm	73.8		
0.425mm	66.2		
0.250mm	57.8		
0.106mm	42.5		
0.075mm	37.4		
0.0387 mm.	25.9		
0.0282 mm.	23.8		
0.0185 mm.	21.0		
0.0113 mm.	16.8		
0.0081 mm.	14.7		
0.0059 mm.	12.6		
0.0030 mm.	9.3		
0.0013 mm.	6.0		

* (no specification provided)

Material Description

Silty Sand some Gravel trace Clay

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= AASHTO (M 145)=

Coefficients

D_{90}= 7.4579 D_{85}= 4.4584 D_{60}= 0.2832
D_{50}= 0.1635 D_{30}= 0.0508 D_{15}= 0.0086
D_{10}= 0.0036 C_u= 78.93 C_c= 2.54

Remarks

F.M.=1.89

Date Received: Aug 20,2024 **Date Tested:** Aug 25,2024

Tested By: R.C

Checked By: J.Hopwood-Jones

Title: Lab Manager

Location: BH24-7 SS-3
Sample Number: SS-3 **Depth:** 5'0"-7'0"

Date Sampled: Aug 14,2024

egis

Client: WO MW Realty Limited
Project: 145 Walgreen Road

Project No: CCO-251370-01 **Figure**

GRAIN SIZE DISTRIBUTION TEST DATA

2024-08-29

Client: WO MW Realty Limited
Project: 145 Walgreen Road
Project Number: CCO-251370-01
Location: BH24-7 SS-3
Depth: 5'0"-7'0" **Sample Number:** SS-3
Material Description: Silty Sand some Gravel trace Clay
Sample Date: Aug 14,2024
Date Received: Aug 20,2024
Tested By: R.C **Test Date:** Aug 25,2024
Checked By: J.Hopwood-Jones **Title:** Lab Manager

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
616.54	0.00	0.00	26.5mm	0.00	100.0	0.0
			19.0mm	13.62	97.8	2.2
			16.0mm	23.34	96.2	3.8
			13.2mm	44.37	92.8	7.2
			9.5mm	53.64	91.3	8.7
			4.75mm	88.82	85.6	14.4
			2.00mm	126.38	79.5	20.5
110.36	0.00	0.00	0.850mm	7.92	73.8	26.2
			0.425mm	18.44	66.2	33.8
			0.250mm	30.07	57.8	42.2
			0.106mm	51.30	42.5	57.5
			0.075mm	58.50	37.4	62.6

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 79.5
Weight of hydrometer sample =110.36
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -4.5
Meniscus correction only = -1.0
Specific gravity of solids = 2.775
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.6007 **-** 0.187 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	22.1	41.0	36.9	0.0128	40.0	9.1	0.0387	25.9	74.1
2.00	22.1	38.0	33.9	0.0128	37.0	9.7	0.0282	23.8	76.2
5.00	22.1	34.0	29.9	0.0128	33.0	10.4	0.0185	21.0	79.0
15.00	22.1	28.0	23.9	0.0128	27.0	11.6	0.0113	16.8	83.2
30.00	22.1	25.0	20.9	0.0128	24.0	12.1	0.0081	14.7	85.3

Hydrometer Test Data (continued)

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
60.00	22.1	22.0	17.9	0.0128	21.0	12.7	0.0059	12.6	87.4
250.00	21.1	17.5	13.2	0.0130	16.5	13.5	0.0030	9.3	90.7
1440.00	20.5	13.0	8.6	0.0131	12.0	14.4	0.0013	6.0	94.0

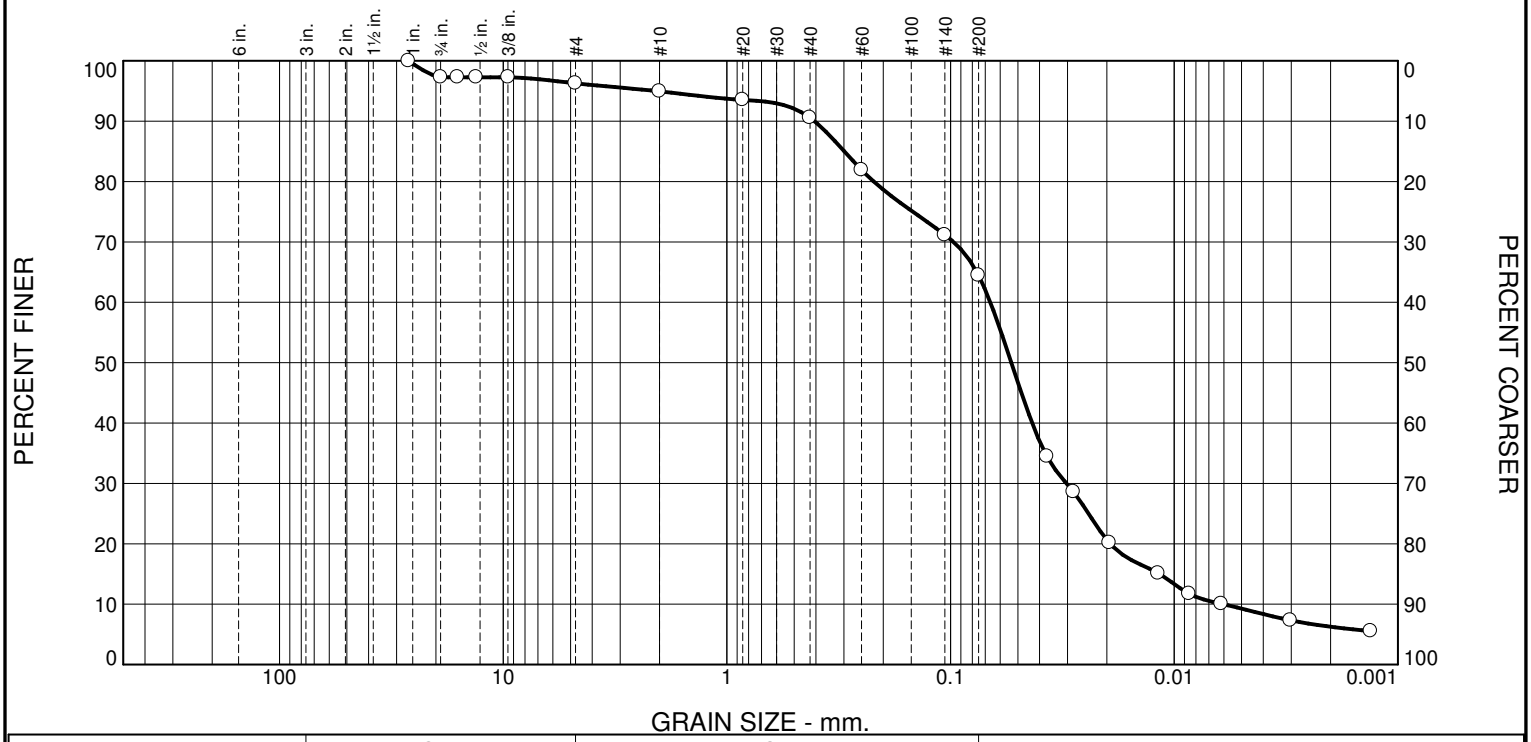
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	2.2	12.2	14.4	6.1	13.3	28.8	48.2	29.8	7.6	37.4

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0036	0.0086	0.0165	0.0508	0.0890	0.1635	0.2832	2.1807	4.4584	7.4579	14.9175

Fineness Modulus	C_u	C_c
1.89	78.93	2.54

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.7	1.0	1.4	4.3	26.1	58.2	6.3

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
26.5mm	100.0		
19.0mm	97.3		
16.0mm	97.3		
13.2mm	97.3		
9.5mm	97.3		
4.75mm	96.3		
2.00mm	94.9		
0.850mm	93.5		
0.425mm	90.6		
0.250mm	81.9		
0.106mm	71.2		
0.075mm	64.5		
0.0371 mm.	34.5		
0.0282 mm.	28.6		
0.0195 mm.	20.2		
0.0118 mm.	15.1		
0.0086 mm.	11.7		
0.0061 mm.	10.1		
0.0030 mm.	7.3		
0.0013 mm.	5.5		

* (no specification provided)

Material Description

Sandy Silt trace Clay trace Gravel

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= AASHTO (M 145)=

Coefficients

D_{90}= 0.4062 D_{85}= 0.2987 D_{60}= 0.0664
D_{50}= 0.0535 D_{30}= 0.0303 D_{15}= 0.0117
D_{10}= 0.0061 C_u= 10.96 C_c= 2.28

Remarks

F.M.=0.67

Date Received: Aug 20,2024 **Date Tested:** Aug 25,2024

Tested By: R.C

Checked By: J.Hopwood-Jones

Title: Lab Manager

Location: BH24-8 SS-2
Sample Number: SS-2 **Depth:** 2'6"-4'6"

Date Sampled: Aug 14,2024

egis

Client: WO MW Realty Limited
Project: 145 Walgreen Road

Project No: CCO-251370-01 **Figure**

GRAIN SIZE DISTRIBUTION TEST DATA

2024-08-29

Client: WO MW Realty Limited
Project: 145 Walgreen Road
Project Number: CCO-251370-01
Location: BH24-8 SS-2
Depth: 2'6"-4'6" **Sample Number:** SS-2
Material Description: Sandy Silt trace Clay trace Gravel
Sample Date: Aug 14,2024
Date Received: Aug 20,2024
Tested By: R.C **Test Date:** Aug 25,2024
Checked By: J.Hopwood-Jones **Title:** Lab Manager

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
365.32	0.00	0.00	26.5mm	0.00	100.0	0.0
			19.0mm	9.93	97.3	2.7
			16.0mm	9.93	97.3	2.7
			13.2mm	9.93	97.3	2.7
			9.5mm	9.93	97.3	2.7
			4.75mm	13.57	96.3	3.7
			2.00mm	18.47	94.9	5.1
109.71	0.00	0.00	0.850mm	1.64	93.5	6.5
			0.425mm	5.06	90.6	9.4
			0.250mm	15.04	81.9	18.1
			0.106mm	27.49	71.2	28.8
			0.075mm	35.20	64.5	35.5

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 94.9
Weight of hydrometer sample =109.71
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -4.5
Meniscus correction only = -1.0
Specific gravity of solids = 2.775
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.6007 **-** 0.187 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	22.1	45.0	40.9	0.0128	44.0	8.4	0.0371	34.5	65.5
2.00	22.1	38.0	33.9	0.0128	37.0	9.7	0.0282	28.6	71.4
5.00	22.1	28.0	23.9	0.0128	27.0	11.6	0.0195	20.2	79.8
15.00	22.1	22.0	17.9	0.0128	21.0	12.7	0.0118	15.1	84.9
30.00	22.1	18.0	13.9	0.0128	17.0	13.4	0.0086	11.7	88.3

Hydrometer Test Data (continued)

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
60.00	22.1	16.0	11.9	0.0128	15.0	13.8	0.0061	10.1	89.9
265.00	21.1	13.0	8.7	0.0130	12.0	14.4	0.0030	7.3	92.7
1440.00	20.5	11.0	6.6	0.0131	10.0	14.7	0.0013	5.5	94.5

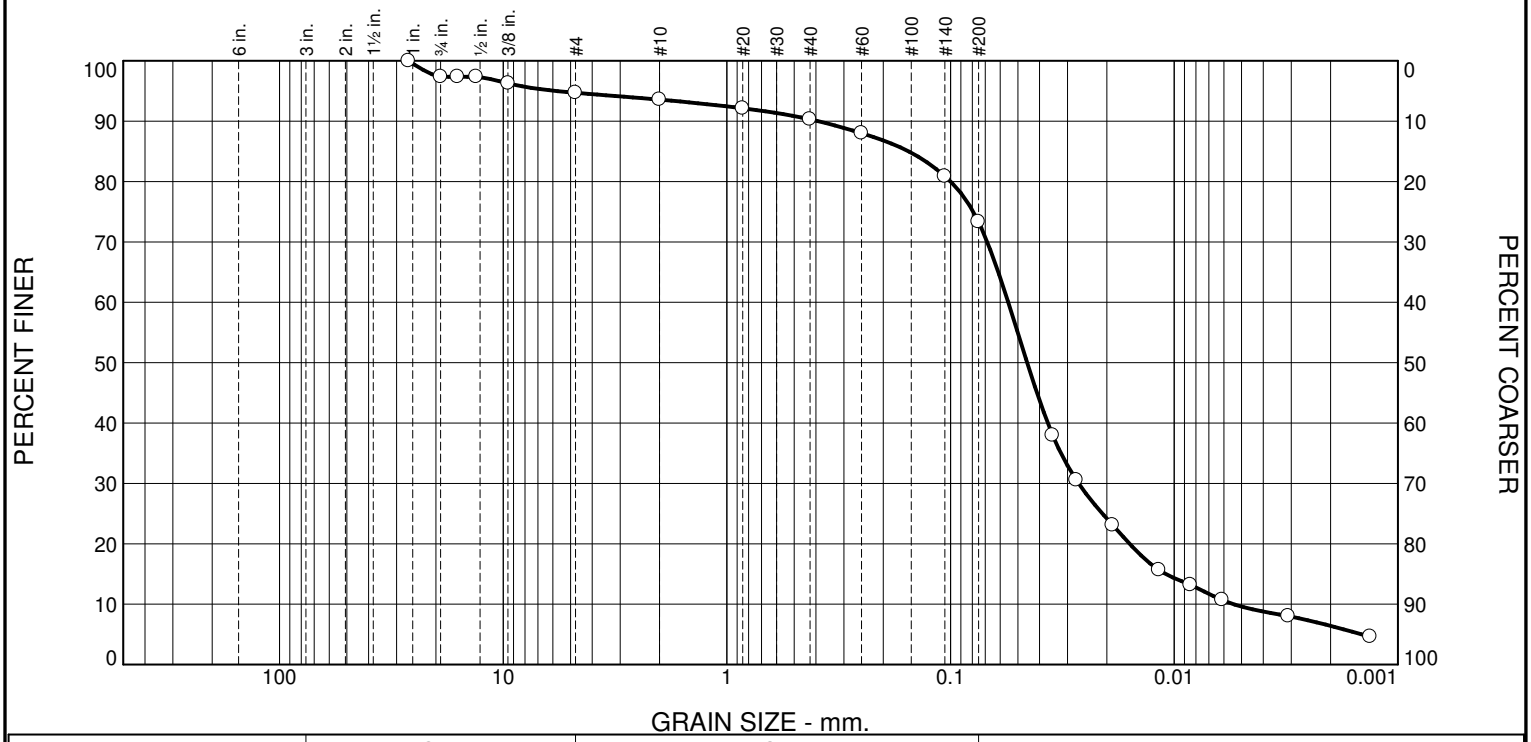
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	2.7	1.0	3.7	1.4	4.3	26.1	31.8	58.2	6.3	64.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0061	0.0117	0.0193	0.0303	0.0432	0.0535	0.0664	0.2203	0.2987	0.4062	2.0669

Fineness Modulus	C_u	C_c
0.67	10.96	2.28

Particle Size Distribution Report



% +75mm	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.6	2.7	1.1	3.3	17.0	66.9	6.4

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
26.5mm	100.0		
19.0mm	97.4		
16.0mm	97.4		
13.2mm	97.4		
9.5mm	96.3		
4.75mm	94.7		
2.00mm	93.6		
0.850mm	92.1		
0.425mm	90.3		
0.250mm	88.0		
0.106mm	80.9		
0.075mm	73.3		
0.0350 mm.	38.0		
0.0274 mm.	30.5		
0.0188 mm.	23.1		
0.0117 mm.	15.7		
0.0085 mm.	13.2		
0.0061 mm.	10.7		
0.0031 mm.	8.0		
0.0013 mm.	4.6		

* (no specification provided)

Material Description

Sandy Silt trace Clay trace Gravel

Atterberg Limits (ASTM D 4318)

PL= **LL=** **PI=**

Classification

USCS (D 2487)= **AASHTO (M 145)=**

Coefficients

D_{90}= 0.3907 D_{85}= 0.1541 D_{60}= 0.0552
D_{50}= 0.0455 D_{30}= 0.0268 D_{15}= 0.0109
D_{10}= 0.0054 C_u= 10.16 C_c= 2.39

Remarks

F.M.=0.60

Date Received: Aug 20,2024 **Date Tested:** Aug 25,2024

Tested By: R.C

Checked By: J.Hopwood-Jones

Title: Lab Manager

Location: BH24-9 SS-3
Sample Number: SS-3 **Depth:** 5'0"-7'0"

Date Sampled: Aug 14,2024

egis

Client: WO MW Realty Limited
Project: 145 Walgreen Road

Project No: CCO-251370-01 **Figure**

GRAIN SIZE DISTRIBUTION TEST DATA

2024-08-29

Client: WO MW Realty Limited
Project: 145 Walgreen Road
Project Number: CCO-251370-01
Location: BH24-9 SS-3
Depth: 5'0"-7'0" **Sample Number:** SS-3
Material Description: Sandy Silt trace Clay trace Gravel
Sample Date: Aug 14,2024
Date Received: Aug 20,2024
Tested By: R.C **Test Date:** Aug 25,2024
Checked By: J.Hopwood-Jones **Title:** Lab Manager

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
506.63	0.00	0.00	26.5mm	0.00	100.0	0.0
			19.0mm	13.37	97.4	2.6
			16.0mm	13.37	97.4	2.6
			13.2mm	13.37	97.4	2.6
			9.5mm	18.95	96.3	3.7
			4.75mm	26.80	94.7	5.3
			2.00mm	32.56	93.6	6.4
110.16	0.00	0.00	0.850mm	1.69	92.1	7.9
			0.425mm	3.84	90.3	9.7
			0.250mm	6.55	88.0	12.0
			0.106mm	14.96	80.9	19.1
			0.075mm	23.83	73.3	26.7

Hydrometer Test Data

Hydrometer test uses material passing #10
Percent passing #10 based upon complete sample = 93.6
Weight of hydrometer sample =110.16
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = -4.5
Meniscus correction only = -1.0
Specific gravity of solids = 2.775
Hydrometer type = 152H
Hydrometer effective depth equation: L = 16.6007 **-** 0.187 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
1.00	22.1	50.0	45.9	0.0128	49.0	7.4	0.0350	38.0	62.0
2.00	22.1	41.0	36.9	0.0128	40.0	9.1	0.0274	30.5	69.5
5.00	22.1	32.0	27.9	0.0128	31.0	10.8	0.0188	23.1	76.9
15.00	22.1	23.0	18.9	0.0128	22.0	12.5	0.0117	15.7	84.3
30.00	22.1	20.0	15.9	0.0128	19.0	13.0	0.0085	13.2	86.8

Hydrometer Test Data (continued)

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer	Percent Retained
60.00	22.1	17.0	12.9	0.0128	16.0	13.6	0.0061	10.7	89.3
250.00	21.1	14.0	9.7	0.0130	13.0	14.2	0.0031	8.0	92.0
1440.00	20.5	10.0	5.6	0.0131	9.0	14.9	0.0013	4.6	95.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	2.6	2.7	5.3	1.1	3.3	17.0	21.4	66.9	6.4	73.3

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0015	0.0054	0.0109	0.0158	0.0268	0.0368	0.0455	0.0552	0.1001	0.1541	0.3907	5.7715

Fineness Modulus	C_u	C_c
0.60	10.16	2.39

GEOTECHNICAL INVESTIGATION OF THE PROPOSED BUILDING ADDITION AND SITE DEVELOPMENT

145 WALGREEN RD, OTTAWA, ON

APPENDIX E: ADDITIONAL DRAWINGS

egis

SURVEYOR'S REAL PROPERTY REPORT
WITH TOPOGRAPHIC DETAILS
PART 1 - PLAN SHOWING

PART OF BLOCK 5
REGISTERED PLAN 4M-300
CITY OF OTTAWA

J.D. BARNES LIMITED

SCALE 1 : 300

5 0 5 10 20 metres

METRIC DISTANCES AND/OR COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

NOTES

BEARINGS ARE MTM GRID, AND DERIVED FROM GLOBAL NAVIGATION SATELLITE SYSTEMS (GNSS) BY REAL TIME NETWORK (RTN) OBSERVATIONS, MTM ZONE 9, NAD 83, (CSRS) (2010.0).

FOR BEARING COMPARISONS, A COUNTER-CLOCKWISE ROTATION OF 0°21'45" WAS APPLIED TO BEARINGS ON PLANS 4R-3575, 4R-6705, 4R-15902 AND 4R-16206.

DISTANCES ARE GROUND.

ALL BUILDING TIES ARE TAKEN TO CONCRETE FOUNDATION UNLESS OTHERWISE NOTED.

COMPLIANCE WITH ONTARIO BUILDING CODE SETBACK REQUIREMENTS ARE NOT VERIFIED BY THIS SURVEY.

PART 2 - SURVEY REPORT

- DESCRIPTION
  PART OF BLOCK 5 REGISTERED PLAN 4M-300, BEING ALL OF PIN 04536 -0704 (LT), IN THE CITY OF OTTAWA.
- REGISTERED EASEMENTS AND/OR RIGHTS-OF-WAY
  SUBJECT TO AN EASEMENT OVER PART 2, PLAN 4R-3575 AS IN INST. LT263907
- BOUNDARY FEATURES
  NOTE LOCATION OF THE DITCH ALONG THE WESTERLY LIMIT OF THE SUBJECT PROPERTY
  NOTE LOCATION OF THE DITCHES ALONG THE SOUTHERLY LIMIT OF THE SUBJECT PROPERTY
  NOTE LOCATION OF THE DITCH, THE CHAIN LINK FENCE AND THE SIGN ALONG THE EASTERLY LIMIT OF THE SUBJECT PROPERTY
  NOTE LOCATION OF THE OVERHEAD UTILITY CABLES, THE HYDRO POLES, THE CULVERTS AND THE DITCHES ALONG THE NORTHERLY LIMIT OF THE SUBJECT PROPERTY

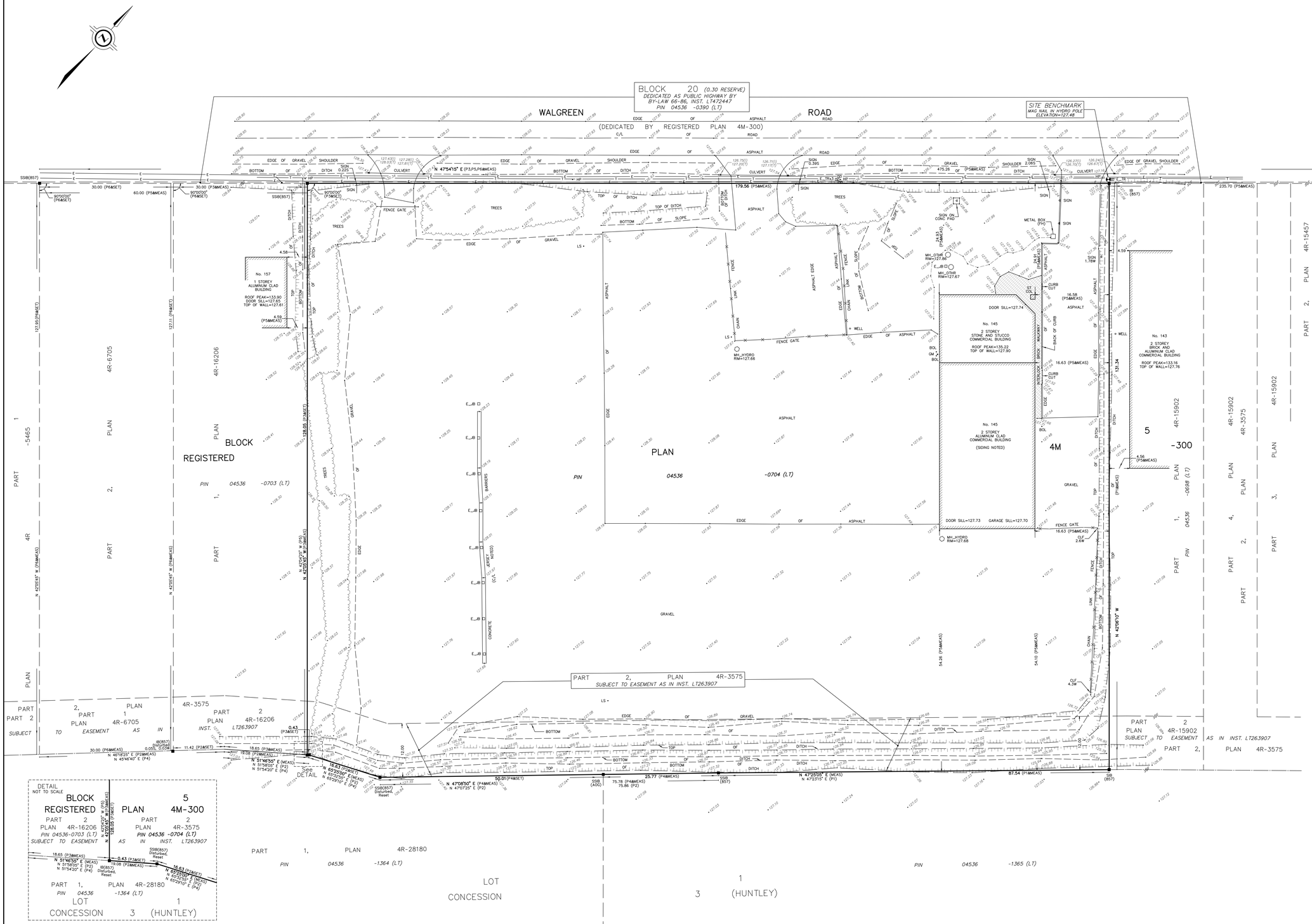
LEGEND

■	DENOTES	SURVEY MONUMENT FOUND
SIB	DENOTES	STANDARD IRON BAR
SSIB	DENOTES	SHORT STANDARD IRON BAR
IB	DENOTES	IRON BAR
MEAS	DENOTES	MEASURED
WIT	DENOTES	WITNESS
Acc	DENOTES	ACCEPT
RP	DENOTES	REGISTERED PLAN 4M-300
P1	DENOTES	PLAN 4R-15902
P2	DENOTES	PLAN 4R-3575
P3	DENOTES	PLAN 4R-16206
P4	DENOTES	PLAN 4R-28180
P5	DENOTES	SURVEYOR'S REAL PROPERTY REPORT BY FAIRHALL, MOFFATT & WOODLAND LIMITED DATED DECEMBER 16, 2015
P6	DENOTES	PLAN 4R-6705
AOG	DENOTES	ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
857	DENOTES	FAIRHALL, MOFFATT & WOODLAND LIMITED
	DENOTES	PROPERTY LINE

N=NORTH / S=SOUTH / E=EAST / W=WEST

TOPOGRAPHIC LEGEND

FDN	DENOTES FOUNDATION
CONC	DENOTES CONCRETE
ALUM	DENOTES ALUMINUM
C/L	DENOTES CENTERLINE
ST C	DENOTES STONE COLUMN
CLF	DENOTES CHAIN LINK FENCE
(T)	DENOTES TOP
(I)	DENOTES INVERT
• BOL	DENOTES BOLLARD
• HP	DENOTES HYDRO POLE
• LS	DENOTES LIGHT STANDARD
• GM	DENOTES GAS METER
□ E_...B	DENOTES HYDRO JUNCTION BOX
⌧ E_TR	DENOTES HYDRO TRANSFORMER
○ MH_HYDRO	DENOTES HYDRO MANHOLE
—— E ——	DENOTES OVERHEAD HYDRO CABLE
—— T ——	DENOTES OVERHEAD TELEPHONE CABLE



ELEVATION NOTE:

1. IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE SITE BENCHMARKS HAVE NOT BEEN ALTERED OR DISTURBED AND THAT ITS RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION SHOWN ON THIS DRAWING.

2. ELEVATIONS ARE GEODETIC AND ARE REFERRED TO CITY OF OTTAWA BENCHMARK POINT 001968118 HAVING A PUBLISHED ELEVATION OF 126.18 METRES (OGVD28:78).

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE REGULATIONS MADE UNDER THEM.

2. THE SURVEY WAS COMPLETED ON MARCH 21, 2024.

APRIL 1, 2024
DATE

GEORGE ZERVOS
ONTARIO LAND SURVEYOR

THIS PLAN OF SURVEY RELATES TO AOLS PLAN SUBMISSION FORM NUMBER V-58135

J.D.BARNES LIMITED
SURVEYING MAPPING GIS
LAND INFORMATION SPECIALISTS
62 STEACIE DRIVE, SUITE 103, KANATA, ON K2K 2A9
T: (613) 731-7244 F: (613) 254-8659 www.jdbarnes.com

DRAWN BY:	CHECKED BY:	REFERENCE NO.:
RP/NS	GZ/NS	24-10-026-00
PLOTTED: 4/5/2024		DATED: 04/01/24

PREPARED FOR: WHITE OWL GROUP

FILE: G:\24-10-026\001\drawing\TOP01\24-10-026-00_TOP01.dgn

PART 1 - PLAN SHOWING

PART OF BLOCK 5
REGISTERED PLAN 4M-300
CITY OF OTTAWA

SCALE 1 : 300

5 0 5 10 20 metres

METRIC DISTANCES AND/OR COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

LEGEND

■	DENOTES	SURVEY MONUMENT FOUND
SIB	DENOTES	STANDARD IRON BAR
SSIB	DENOTES	SHORT STANDARD IRON BAR
IB	DENOTES	IRON BAR
MEAS	DENOTES	MEASURED
WIT	DENOTES	WITNESS
Acc	DENOTES	ACCEPT
RP	DENOTES	REGISTERED PLAN 4M-300
P1	DENOTES	PLAN 4R-15902
P2	DENOTES	PLAN 4R-3575
P3	DENOTES	PLAN 4R-16206
P4	DENOTES	PLAN 4R-28180
P5	DENOTES	SURVEYOR'S REAL PROPERTY REPORT BY FAIRHALL, MOFFATT & WOODLAND LIMITED DATED DECEMBER 16, 2015
P6	DENOTES	PLAN 4R-6705
AOG	DENOTES	ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
857	DENOTES	FAIRHALL, MOFFATT & WOODLAND LIMITED
	DENOTES	PROPERTY LINE

N=NORTH / S=SOUTH / E=EAST / W=WEST

SITE DATA:

GROSS LOT AREA: 21545.47sq.m. (231908.45 sq.ft) - (5.32 Ac.)

PHASE 1-
BUILDING AREA = 1764.31 sq.m. (18990.87sq.ft) - (8.18%)

ASPHALT AREA = 577.05 sq.m. (6211.31sq.ft.) - (2.67%)

CONCRETE AREA = 109.5sq.m. (1178.65sq.ft.) - (0.47%)

LANDSCAPED AREA = 7204.67sq.m. (77550.42sq.ft) - (33.43%)

GRAVEL AREA = 11904.1sq.m. (128134.66sq.ft) - (55.25%)

148 Employee car parking spaces

Total Truck Parking Spots : 80 (12ft wide)

Existing Office: 486.61 sq.m

Existing Office Level 2: 188.4sq.m

Existing Shop: 624.87 sq.m

Proposed Shop Expansion: 519.60 sq.m

DRAWING TITLE:
Miller Waste Systems
145 WALGREEN RD.
SITE PLAN

PROJECT NO. –	SCALE: 1: 300
DATE: 2024-06-25	SHEET: SP-1
DESIGNED BY: –	
DRAWN BY: SV	