30 Rose Street
Ayr, ON

Geotechnical Investigation Report

Project Location:
30 Rose Street, Ayr, ON

Prepared for:
Alexander Chmelar
30 Rose Street
Ayr, ON N0B 1E0

Prepared by:
MTE Consultants Inc.
520 Bingemans Centre Drive
Kitchener, ON N2B 3X9

June 11, 2024

MTE File No.: 55318-100

Engineers, Scientists, Surveyors.

Contents

Tables

Appendices

1.0 INTRODUCTION

MTE Consultants Inc. (MTE) was retained by Mr. Alexander Chmelar to conduct a geotechnical investigation for a proposed residential development to be completed on a vacant lot located directly south of 30 Rose Street in Ayr, Ontario.

The site is currently vacant, and it is understood that the proposed development will consist of a two-storey house with a walkout basement. It is understood that the proposed house will be provided with full municipal services.

The site is bordered by adjacent residential properties to the north and south, Rose Street to the east, and the Nith River to the west. The Nith River abuts the toe of the existing on-site slope. The ground surface elevation slopes down towards the Nith River. Elevations measured at the borehole locations varied from Elevation 287.5 to 283.0 meters above sea level (masl), a grade difference of up to 4.5 m.

The purpose of this geotechnical investigation is to determine the soil and groundwater conditions in the area of the proposed development and provide geotechnical engineering recommendations for site grading, excavations and dewatering, site servicing, foundations, basements, and construction inspection and testing.

2.0 FIELD AND LABORATORY PROGRAM

The fieldwork for this investigation was carried out on May 22, 2024 and involved the drilling of three (3) boreholes (Boreholes BH101-24 to BH103-24) to depths ranging from 5.0 to 6.6 meters below ground surface (mbgs). The locations of the boreholes are shown on the Site Plan, **Figure 1 in Appendix A**.

Private and public utility companies were contacted by the property owner prior to the start of drilling activities in order to isolate underground utilities near the boring locations.

The boreholes were advanced with a Diedrich D50 track mounted drill rig equipped with continuous flight hollow stem augers, and was supplied and operated by London Soil Test Ltd.

Representative soil samples were recovered throughout the depths explored. Standard Penetration Tests (SPT) were carried out during sampling operations in the boreholes using conventional split spoon equipment. The SPT N-values recorded are plotted on the borehole logs in **Appendix B**.

The boreholes were backfilled with soil cuttings and bentonite in accordance with Ontario Regulation 468/10 (formerly O. Reg. 903) under the provinces Water Resources Act.

The fieldwork was monitored throughout by a member of our geotechnical engineering staff, who directed the drilling and excavation procedures; recorded SPT N-values; documented the soil stratigraphies; monitored the groundwater conditions; and transported the recovered soil samples to our office for further classification.

The ground surface elevations at the borehole locations were surveyed by MTE and referenced to a geodetic datum.

All of the soil samples collected were submitted for moisture content testing with the results provided on the borehole logs in **Appendix B**. Additionally, two soil samples were submitted for particle size distribution analysis. The results of the particle size distribution analyses are provided in Table 101 in **Appendix C.** The remaining soil samples will be stored for a period of 1 month and will be discarded of at that time without prior request from the client to extend storage time.

3.0 SOIL CONDITIONS

Reference is provided to the appended borehole logs for soil stratigraphy details, SPT N-values, moisture content profiles, and groundwater observations and measurements. Soil conditions encountered in the boreholes typically consist of fill material underlain by sand and gravel, silty sand, and sandy silt deposits.

3.1 Fill

Fill was encountered surficially at each borehole locations and extended to depths ranging from 0.1 to 0.8 mbgs. The composition of the fill was dark brown sandy silt. The fill also contained organics within all borehole locations.

SPT N-values measured in the fill material varied from 5 to 8 blows per 300 mm penetration of the split spoon sampler indicating loose conditions. Insitu moisture contents in the fill were about 5 to 26% indicating moist to wet conditions.

3.2 Gravel and Sand

Native gravel and sand deposits were encountered below fill in all boreholes and was underlain by a silty sand deposit at 6.1 mbgs within Borehole BH101-24 and was underlain by sandy silt layers at 0.8 mbgs within Boreholes BH102-24 and BH103-24. The gravel and sand generally contained trace silt and clay, was brown in colour and contained occasional cobbles within Borehole BH101-24.

The results of a particle size distribution analysis conducted on a sample of the gravel and sand deposit are provided in **Appendix C** and summarized in the following table:

Table 1 – Results of Gravel and Sand Soil Particle Size Distribution Analysis

Borehole Number	Sample Depth (mbgs)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BH101-24	1.5 – 2.0	58	34	7	1

SPT N-values measured in the gravel and sand deposits varied from 5 to 46 blows per 300 mm penetration of the split spoon sampler indicating loose to dense conditions. Insitu moisture contents in the gravel and sand deposits were about 3 to 26% indicating damp to wet conditions.

3.3 Silty Sand Deposits

Native silty sand deposits were encountered below the gravel and sand deposit in Borehole BH101-24 at a depth of 6.1 mbgs, and interlayered with sandy silt deposits within Boreholes BH102-24 and BH103-24. The silty sand was brown to grey in colour and generally consisted of silty sand with trace to some gravel. The silty sand contained occasional cobbles within Borehole BH103-24.

SPT N-values measured in the silty sand deposits varied from 26 to greater than 50 blows per 300 mm penetration of the split spoon sampler indicating compact to very dense conditions. Insitu moisture contents in the silty sand deposits were about 7 to 19% indicating moist to saturated conditions.

3.4 Sandy Silt Deposits

Native sandy silt deposits were encountered interlayered with the gravel and sand, and silty sand deposits in Boreholes BH102-24 and BH103-24, extending to the borehole termination depth. The upper layers of sandy silt were brown and the lower layers were grey in colour. The sandy silt generally consisted of sandy silt with trace clay and trace to some gravel. The upper layer of sandy silt within Borehole BH102-24 contained occasional cobbles.

The results of a particle size distribution analysis conducted on a sample of the sandy silt deposit are provided in **Appendix C** and summarized in the following table:

Table 2 – Results of Sandy Silt soil Particle Size Distribution Analysis

Borehole Number	Sample Depth (mbgs)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BH103-24	0.8 – 1.2	1	22	70	7

SPT N-values measured in the sandy silt deposits varied from 26 to greater than 50 blows per 300 mm penetration of the split spoon sampler indicating compact to very dense conditions. Insitu moisture contents in the sandy silt deposits were about 8 to 17% indicating moist to very moist conditions.

4.0 GROUNDWATER CONDITIONS

Groundwater observations and measurements were carried out in the open boreholes at the time of drilling and are summarized on the borehole logs. Saturated soil conditions were not encountered at the time of drilling except at Borehole BH101-24 below 6.1 mbgs (Elevation 281.4 masl). However, the change of stratigraphy color from brown to grey below 2.3 to 3.0 mbgs (Elevations 280.7 to 280.1 masl) within Boreholes BH102-24 and BH103-24, respectively, is indicative of permanent saturated conditions, and the long term groundwater levels are not expected to drop below these depths.

It should be noted that the groundwater levels can vary and are subject to seasonal fluctuations and local variations.

5.0 DISCUSSION AND RECOMMENDATIONS

5.1 General

The project involves the proposed development of a two-storey house with a walkout basement. It is understood that the proposed house will be provided with full municipal services.

Soil conditions encountered in the boreholes typically consist of fill material underlain by native sand and gravel, silty sand, and sandy silt deposits. Saturated soil conditions were not encountered at the time of drilling except at Borehole BH101-24 below 6.1 mbgs (Elevation 281.4 masl). However, the change of stratigraphy color from brown to grey below 2.3 to 3.0 mbgs (Elevations 280.7 to 280.1 masl) within Boreholes BH102-24 and BH103-24, respectively, is indicative of permanent saturated conditions, and the long term groundwater levels are not expected to drop below these depths.

Based on the results of this geotechnical investigation the site is suitable for the proposed residential development.

The following subsections of this report contain geotechnical recommendations pertaining to development of the property including site preparation, excavations and dewatering, site servicing, foundations, basements, and construction inspection and testing.

5.2 Site Preparation

Prior to carrying out any engineered fill operations, any vegetation, topsoil, organics, and other deleterious materials should be stripped and removed. The fill with organics was generally confined to the upper 0.1 to 0.8 mbgs of material. It is recommended that the average depth of fill with organics should be increased by 50 to 100 mm when calculating stripping volumes to account for uncertainty and overstripping. Any organic fill and topsoil could be used in landscaping areas.

The newly-exposed subgrade should be inspected and proof rolled in the presence of qualified geotechnical personnel to verify if the subgrade will provide support as intended in the original design. The primary purpose of the inspection is to identify poorly performing areas which should be sub-excavated.

For any engineered fill placement, the structural fill used for raising grades beneath the proposed townhouse buildings should comprise granular material such as OPSS 1010 Granular ‘B’ or OPSS 1010 Select Subgrade Material. Any imported fill should be tested and verified by qualified geotechnical personnel prior to placement.

Structural fill pads should extend a minimum 1.0 m beyond the edge of the footing envelope of any building and down to subgrade at an angle of 45 degrees to the horizontal. Full time testing by geotechnical personnel is required during fill placement and compaction to monitor material quality, lift thickness, and verify the compaction by in-situ density testing (as per the 2012 Ontario Building Code).

All engineered fill should be placed in maximum 300 mm thick lifts and compacted to the following percentages:

Table 3 – Engineered Fill Requirements

Fill Use	Minimum Compaction Required
Structural fill to support buildings	100% SPMDD
Subgrade fill beneath pavements or services	95% SPMDD
Bulk fill in landscape areas	90% SPMDD

The native subgrade soils are susceptible to disturbance and it is recommended that construction traffic on the subgrade be minimized.

In order to minimize the effects of weather and groundwater, fill operations onsite should be carried out in the dry summer months.

5.3 Excavations and Dewatering

All excavations at the site should be carried out in conformance with the Ontario Occupational Health and Safety Act and Regulations for Construction Projects. The predominate soils encountered at the site are classified as Type 3 soils, and temporary side slopes through this material must be cut at an inclination of 1.0 horizontal to 1.0 vertical or less from the base of the excavation, exclusive of groundwater effects.

Where wet to saturated conditions are encountered, excavation side slopes should be expected to slough to flatter inclinations, potentially 3.0 horizontal to 1.0 vertical or flatter.

Trench side slopes must be continuously inspected especially after periods of heavy rainfall or snow melt to identify areas of instability. Surface water should be directed away from entering the trench.

Saturated soil conditions were not encountered at the time of drilling except at Borehole BH101-24 below 6.1 mbgs (Elevation 281.4 masl). However, the change of stratigraphy color from brown to grey below 2.3 to 3.0 mbgs (Elevations 280.7 to 280.1 masl) within Boreholes BH102-24 and BH103-24, respectively, is indicative of permanent saturated conditions, and the long term groundwater levels are not expected to drop below these depths.

It is not expected that excavations will extend into the saturated soils. It is expected that nuisance dewatering from precipitation and isolated seams can be handled using conventional sump pump techniques. However, if excavations do extend below the saturated conditions encountered on site, moderate to significant groundwater inflow should be anticipated, particularly within the gravel and sand deposits. A more involved dewatering system will likely be required if excavations are required to extend to those depths.

It will be necessary to flatten or support the excavation side slopes where groundwater seepage is occurring to ensure stability. Every excavation that a worker may be required to enter shall be kept reasonably free of water (O. Reg. 213/91, s. 230).

It should be noted that an Environmental Activity and Sector Registry (EASR) or Category 3 Permit to Take Water (PTTW), issued by the Ministry of Environment, Conservation and Parks, will be required if the dewatering system/sumps result in a water taking of more than 50,000 L/day or 400,000 L/day, respectively. The design of the dewatering system should be left to the contractor’s discretion to control groundwater at least 0.5 m below the invert level in order to provide stable excavation base. The contractor should notify the prime consultant in the event that they feel an EASR/PTTW will be needed.

5.4 Site Servicing

5.4.1 Pipe Bedding

It is anticipated invert elevation of the pipes will be at conventional 2 to 3 m depths below ground surface. No bearing problems are anticipated for pipes set on properly dewatered native inorganic subsoil or imported structural fill. The bedding material may need to be thickened if excavations encounter soft or spongy soil from the base of the service trench.

Pipe bedding for services should be conventional Class 'B' pipe bedding comprising a minimum 150 mm thick layer of OPSS 1010 Granular 'A' aggregate below the pipe invert. Granular 'A' type aggregate should be provided around the pipe to at least 300 mm above the pipe and the bedding aggregate should be compacted to a minimum 100% Standard Proctor Maximum Dry Density (SPMDD), as per the Region of Waterloo and Area Municipalities Design Guidelines and Supplemental Specifications for Municipal Services Document (DGSSMS), dated February 2024.

A well-graded clear stone such as Coarse Aggregate for HL4 Asphaltic Concrete (OPSS 1003) could be used in the sewer trenches as bedding below the spring line of the pipe to facilitate sump pump dewatering, if necessary. The clear stone should be compacted with a plate tamper and fully wrapped with a non-woven geotextile to prevent the migration of fine particles from the saturated soils.

5.4.2 Trench Backfilling

The trenches above the specified pipe bedding should be backfilled with inorganic onsite soils placed in maximum 300 mm thick lifts and compacted to at least 98% SPMDD, as per the DGSSMS. Where trenches enter the proposed residential buildings the backfill should be compacted to 100% SPMDD or 5 MPa lean-mix concrete may be used. Wet or saturated native soils are not considered suitable for reuse as trench backfill. Any additional material required to be imported at the site should meet OPSS Select Subgrade Material specifications.

To minimize potential problems, backfilling operations should follow closely after excavation so that only a minimal length of trench is exposed. Care should be taken to protect side slopes of excavations by diverting surface run-off away from the excavations. If construction extends into the winter, then additional steps should be taken to minimize frost and ensure that frozen material is not used as backfill.

5.5 Foundation Design

It is understood that the proposed development will consist of a two storey house. It is anticipated that the house will be provided with a walkout basement and constructed with conventional strip and/or pad footings.

In general, the undisturbed compact to very dense native soils or engineered structural fill are considered suitable to support the proposed building foundations.

The following table provides the minimum recommended depth and elevation for conventional spread footings founded on undisturbed native soils for a factored geotechnical bearing resistance at Ultimate Limit States (ULS) of 225 kPa, and soil bearing resistance for 25 mm of settlement at Serviceability Limit States (SLS) of 150 kPa.

Table 4 – Recommended Minimum Footings/Structural Fill Placement Elevation

Borehole Number	Borehole Ground Surface Elevation (masl)	Depth Below Existing Ground Surface to Suitable Native Soil (mbgs)	Native Soil Type	Elevation of Suitable Native Soil (masl)
BH101-24	287.5	0.8*	Sand and Gravel	286.7
BH102-24	283.0	0.8*	Sandy Silt	282.2
BH103-24	283.1	0.8*	Sandy Silt	282.3

***Note: A minimum depth of 1.2 m is required for frost protection**

The founding soils are susceptible to disturbance by construction activity, especially during wet weather and care should be taken to preserve the integrity of the material as bearing strata.

The footing areas must be inspected by qualified geotechnical personnel to ensure that the soil conditions encountered at the time of construction are suitable to support the design resistances prior to pouring concrete. It is recommended to compact the foundation subgrade areas to 100% SPMDD prior to constructing the footings to account for any inconsistencies created during the structural fill activities. Any disturbed, organic and deleterious material, or loose material which cannot be properly compacted identified during the inspection should be removed from the footing areas and replaced with concrete.

All exterior floor slabs and footings in unheated areas must be provided with a minimum 1.2 m of earth cover or equivalent insulation after final grading in order to minimize the potential of damage due to frost action, as per Ontario Provincial Standard Drawing, OPSD 3090.101, dated November 2010. If construction is undertaken during the winter, the subgrade soil and concrete should be protected from freezing.

Where spread footings are constructed at different elevations, the difference in elevation in the individual footing should not be greater than one half of the clear distance between the footings. The lower footing should be constructed first so that if it is necessary to construct the lower footings at a greater depth than anticipated, the elevation of the upper footings can be adjusted accordingly. Stepped strip footings should be constructed in accordance with OBC Section 9.15.3.9.

5.5.1 Basements

Basements at this site must be provided with perimeter weeping tile systems as per the Ontario Building Code (Section 9.14). The drain tile or pipe should be laid on undisturbed or well-compacted soil so that the top of the tile or pipe (minimum 100 mm diameter) is below the bottom of the basement floor slab. The top and sides of the drain tile or pipe shall be surrounded with not less than 150 mm of crushed stone or other clean coarse granular material containing no more than 10% of material that will pass the 4 mm sieve. The crushed stone should be wrapped with filter cloth. The weeping tile must drain to a suitable frost-free outlet or sump equipped with an automatic pump that will discharge water into a storm sewer service or other frost free outlet.

The portion of the exterior basement walls and floor slabs below finished ground level must be waterproofed as per the Ontario Building Code (Subsection 9.13.3). Free-draining sand materials should be used for basement wall backfill. The basement wall backfill should be graded to allow drainage away from the foundation.

The basement walls should be designed to resist the lateral earth pressure. For calculating the lateral earth pressure, the coefficient of earth pressure (K) may be assumed as 0.50 for cohesionless sandy soils and 1.0 for silt (Section 20.7.2 Canadian Foundation Engineering Manual 2023). The bulk unit weight of the retained backfill may be taken as 21 kN/m^3 for well-compacted soil. An appropriate factor of safety should be employed.

5.5.2 Concrete Slab-On-Grade Floors

It is understood that the floor slab for the proposed building will likely be constructed using conventional concrete slab-on-grade techniques, following removal of any fill and organic soils, and inspecting the subgrade soils.

The subgrade for the floor slabs should comprise undisturbed native soil or well-compacted fill. Any additional material required to raise grades below the floor slab should be comprised of granular soil, and be compacted to 98% SPMDD.

A modulus of subgrade reaction of 25 MPa/m should be used in the design of the floor slab.

A minimum 100 mm thick layer of coarse clean granular material containing not more than 10% material that will pass a 4 mm sieve shall be placed beneath slabs in buildings as per Subsection 9.16.2 of the Ontario Building Code. If the subgrade soil is wet, we strongly recommend that subfloor weeping tiles be placed and connected to the sump pit.

If a moisture-sensitive floor finish is to be applied to the slab, then we recommend that a 15 mil polyethylene moisture vapour barrier be installed directly beneath the slab as per Article 9.13.2.7 of the Ontario Building Code. The purpose of the vapour barrier is to reduce moisture transfer by diffusion as per Article 5.5.1.2 of the Ontario Building Code. Joints in the vapour barrier should be lapped not less than 100 mm.

Concrete testing should be performed onsite to determine the slump, temperature, and air entrainment; and concrete cylinders should be cast for compressive strength testing.

5.6 Construction Inspection and Testing

MTE recommends that geotechnical inspection and testing procedures be conducted throughout the various phases of the project.

Engineer site visits should be conducted to confirm geotechnical bearing resistances for footings. Soil compaction testing should be carried out on structural fill beneath the proposed townhouse buildings, foundation wall backfill, subslab granular fill, and trench backfill. Laboratory and field testing of the pavement structure components (granulars and asphaltic concrete) should be conducted, as well as concrete testing for foundations, curbs and sidewalks.

MTE offers soil compaction, concrete, and asphalt testing, as well as soil inspection services through our Stratford, Kitchener, Burlington, and London offices.

6.0 LIMITATIONS OF REPORT

Services performed by MTE Consultants Inc. (MTE) were conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the Geotechnical Engineering & Consulting profession practicing under similar conditions in the same geographic area were the services are provided. No other warranty or representation expressed or implied as to the accuracy of the information, conclusions or recommendations is included or intended in this report.

This report was completed for the sole use of the Client. This report is not intended to be exhaustive in scope or to imply a risk-free site. As such, this report may not deal with all issues potentially applicable to the site and may omit aspects which are or may be of interest to the reader.

In addition, it should be recognized that a soil sample result represents one distinct portion of a site at the time it is collected, and that the findings of this report are based on conditions as they existed during the time period of the investigation. The material in the report reflects our best judgment using the information available at the time the report was written. The soil and groundwater conditions between and beyond the test holes may differ from those encountered in the test holes. Should subsurface conditions arise that are different from those in the test holes MTE should be notified to determine whether or not changes should be made as a result of these conditions.

It should be recognized that the passage of time may affect the views, conclusions and recommendations (if any) provided in this report because groundwater conditions of a property can change, along with regulatory requirements. All design details were not known at the time of submission of this report and it is recommended MTE should be retained to review the final design documents prior to construction to confirm they are consistent with our report recommendations. Should additional or new information become available, MTE recommends that it be brought to our attention in order that we may determine whether it affects the contents of this report.

Any use which another party makes of this report, or any reliance on, or decisions to be made based upon it, are the responsibility of such parties. MTE accepts no responsibility for liabilities incurred by or damages, if any, suffered by another party as a result of decisions made or actions taken, based upon this report. Others with interest in the site should undertake their own investigations and studies to determine how or if the condition affects them or their plans. The contractors bidding on this project or undertaking the construction should make their own interpretation of the factual information and draw their own conclusions as to how subsurface conditions may affect their work.

The benchmark and elevations provided in this report are primarily established to identify differences between the test hole locations and should not be used for other purposes such as, planning, development, grading, and excavation.

6.1 Signatures

All of which is respectfully submitted,

MTE Consultants Inc.

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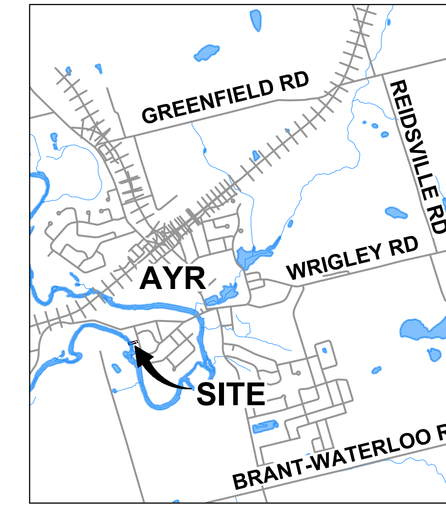
Appendix A

Figures

CAD: P:\P\55318\100\55318-100-GE01.1.DWG

Plot Date: May 29, 2024 – 11:08 AM



KEY PLAN (nts)

LEGEND

— — —	SITE
⊕	BOREHOLE
(283.1m)	ELEVATION (m AMSL)

REFERENCES

BING IMAGERY AS OF MAY 29 - 2024; AND LAND INFORMATION ONTARIO, ROAD AND WATER NETWORK, WETLANDS, © KING'S PRINTER FOR ONTARIO, 2024 (key plan).

NOTES

THIS FIGURE IS SCHEMATIC ONLY AND TO BE READ IN CONJUNCTION WITH ACCOMPANYING TEXT.

ALL LOCATIONS ARE APPROXIMATE.

0 3 6 9 12 15m

MTE

Engineers, Scientists, Surveyors

PROJECT

GEOTECHNICAL INVESTIGATION
30 ROSE STREET
AYR, ONTARIO

TITLE

SITE PLAN

Drawn	Scale	Figure
DCH	1:300	1
Checked	Project No. 55318-100	
Date 2024-05-24	Rev No. 0	

Appendix B

Borehole Logs

ID No.: BH101-24

Project Name: Rose Street Residential Development

MTE File No.: 55318-100

Client: Alexander Chmelar

Site Location: 30 Rose Street, Ayr, ON

Date Completed: 5/22/2024

Drilling Contractor: London Soil Test Ltd.

Drill Rig: Diedrich D50 Track Mounted

Drill Method: Hollow Stem Augers

Protective Cover: N/A

Subsurface Profile		Sample				
Soil Description	Elevation (masl) Depth (m)	Number	Type	Dynamic Cone × Standard Penetration ● (20 40 60 80)	Water Content % ● (10 20 30)	Groundwater Observations and Standpipe Details
Ground Surface	287.5					
FILL loose dark brown sandy silt, some gravel and organics, very moist	0.0 / 286.7	1	SS	5	14	Cuttings
GRAVEL AND SAND compact to dense brown sand and gravel, trace silt and clay, occasional cobbles, damp	0.8	2	SS	23	4	
		3	SS	46	3	
		4	SS	31	3	
		5	SS	42	4	Bentonite
		6	SS	27	3	
SILTY SAND very dense brown silty sand, trace gravel, saturated	281.4 / 6.1 / 280.9	7	SS	64	19	Dry Cave
Drilling Terminated	6.6					

Shear Strength (PP) kPa ▲ Shear Strength (FV) kPa ■ (50 100 150 200)

Depth: ft 0 2 4 6 8 10 12 14 16 18 20 22 24; m 0 2 4 6

Water encountered at 6.1 mbgs during drilling

Field Technician: H. Sandhu

Drafted by: J. Fuller

Reviewed by: K. Rundle Drake

ID No.: BH102-24

Project Name: Rose Street Residential Development

MTE File No.: 55318-100

Client: Alexander Chmelar

Site Location: 30 Rose Street, Ayr, ON

Date Completed: 5/22/2024

Drilling Contractor: London Soil Test Ltd.

Drill Rig: Diedrich D50 Track Mounted

Drill Method: Hollow Stem Augers

Protective Cover: N/A

Subsurface Profile

Elevation (masl) / Depth (m)	Soil Description
283.0	Ground Surface
0.0	**FILL** loose dark brown sandy silt, some organics, wet
282.2 / 0.8	**GRAVEL AND SAND** loose brown sand and gravel, trace silt, wet
281.5 / 1.5	**SANDY SILT** dense to very dense light brown sandy silt, trace gravel, moist; occasional cobbles/boulders
280.7 / 2.3	**SILTY SAND** dense to compact grey silty sand, some gravel, moist
278.4 / 4.6	**SANDY SILT** compact grey sandy silt, some gravel, trace clay, moist
278.0 / 5.0	Drilling Terminated

Sample

Number	Type	Standard Penetration	Water Content (%)
1	SS	5	26
2	SS	30	10
3	SS	50/100mm	8
4	SS	43	9
5	SS	26	10
6	SS	29	10

Dynamic Cone; Standard Penetration: 20 40 60 80

Shear Strength (PP) kPa; Shear Strength (FV) kPa: 50 100 150 200

Water Content %: 10 20 30

Depth: ft 0–24; m 0–6

Groundwater Observations and Standpipe Details

Cuttings

Bentonite

Dry Cave

Borehole dry upon drilling completion

Field Technician: H. Sandhu

Drafted by: J. Fuller

Reviewed by: K. Rundle Drake

Sheet: 1 of 1

ID No.: BH103-24

Project Name: Rose Street Residential Development

MTE File No.: 55318-100

Client: Alexander Chmelar

Site Location: 30 Rose Street, Ayr, ON

Date Completed: 5/22/2024

Drilling Contractor: London Soil Test Ltd.

Drill Rig: Diedrich D50 Track Mounted

Drill Method: Hollow Stem Augers

Protective Cover: N/A

Subsurface Profile: Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Standard Penetration	Water Content (%)	Groundwater Observations and Standpipe Details
Ground Surface	283.1 / 0.0					
FILL loose dark brown sandy silt, some organics, moist		1	SS	8	5	Cuttings
GRAVEL AND SAND loose brown sand and gravel, trace silt, moist	282.3 / 0.8	2	SS	26	15	Cuttings
SANDY SILT compact light brown sandy silt, trace clay and gravel, very moist	281.6 / 1.5	3	SS	28	11	Cuttings
SILTY SAND compact to very dense brown silty sand, some gravel, occasional cobbles, very moist to moist		4	SS	50/75mm	7	Cuttings
grey	280.1 / 3.0	5	SS	60	8	Bentonite
SANDY SILT dense grey sandy silt, some gravel, wet	278.5 / 4.6	6	SS	32	17	Bentonite
Drilling Terminated	278.1 / 5.0					Dry Cave

Dynamic Cone ×; Standard Penetration ● (20 40 60 80)

Shear Strength (PP) ▲ kPa; Shear Strength (FV) ■ kPa (50 100 150 200)

Water Content ● % (10 20 30)

Borehole dry upon drilling completion

Field Technician: H. Sandhu

Drafted by: J. Fuller

Reviewed by: K. Rundle Drake

Appendix C

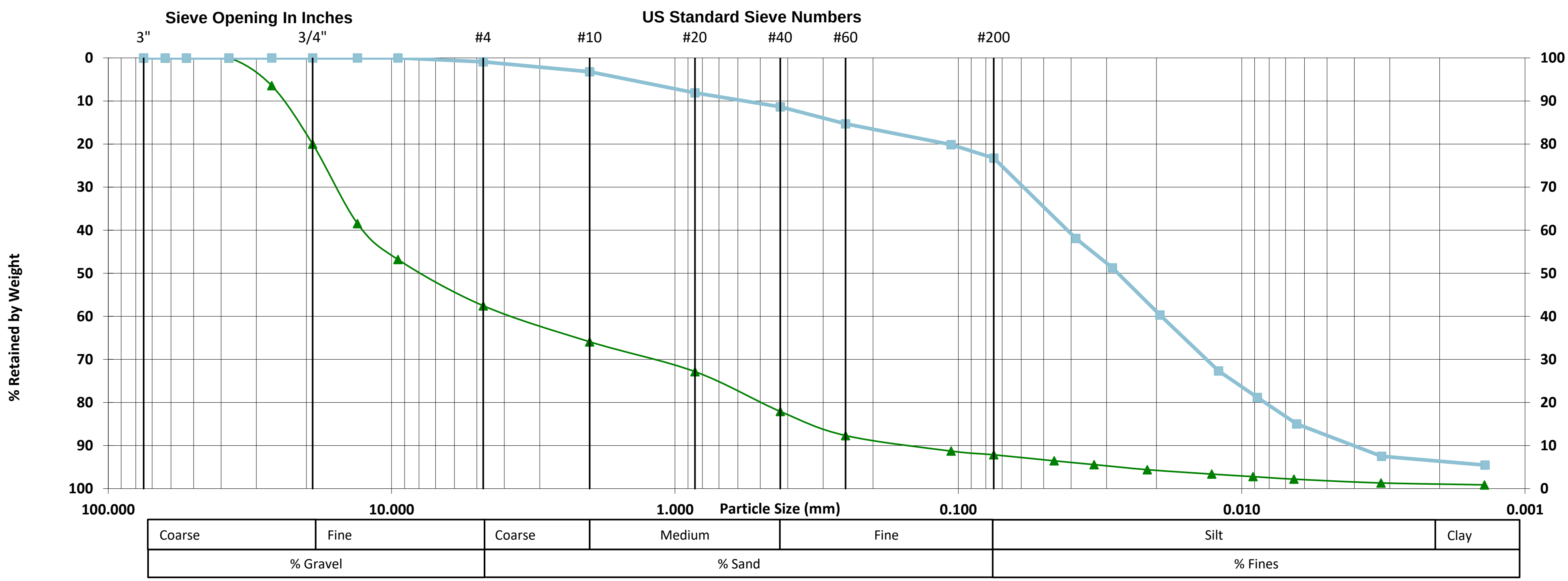
Laboratory Testing

MTE

Particle Size Distribution Analysis Test Results

Project Name:	**30 Rose Street**	**Date Sampled:**	**May 22, 2024**	**MTE File No.:**	**55318-100**
Client:	**Alexander Chmelar**	**Date Tested:**	**June 5-10, 2024**	**Table No:**	**101**
Project Location:	**30 Rose Street, Ayr, ON**				

Unified Soil Classification



Symbol	Borehole ID	Sample #	Sample Depth	Description
▲ (green)	BH101-24	SS-3	1.5-2.0mbgs	GRAVEL and SAND, trace Silt and Clay
■ (blue)	BH103-24	SS-2	0.8-1.2mbgs	Sandy SILT, trace Clay and Gravel

NOTES: