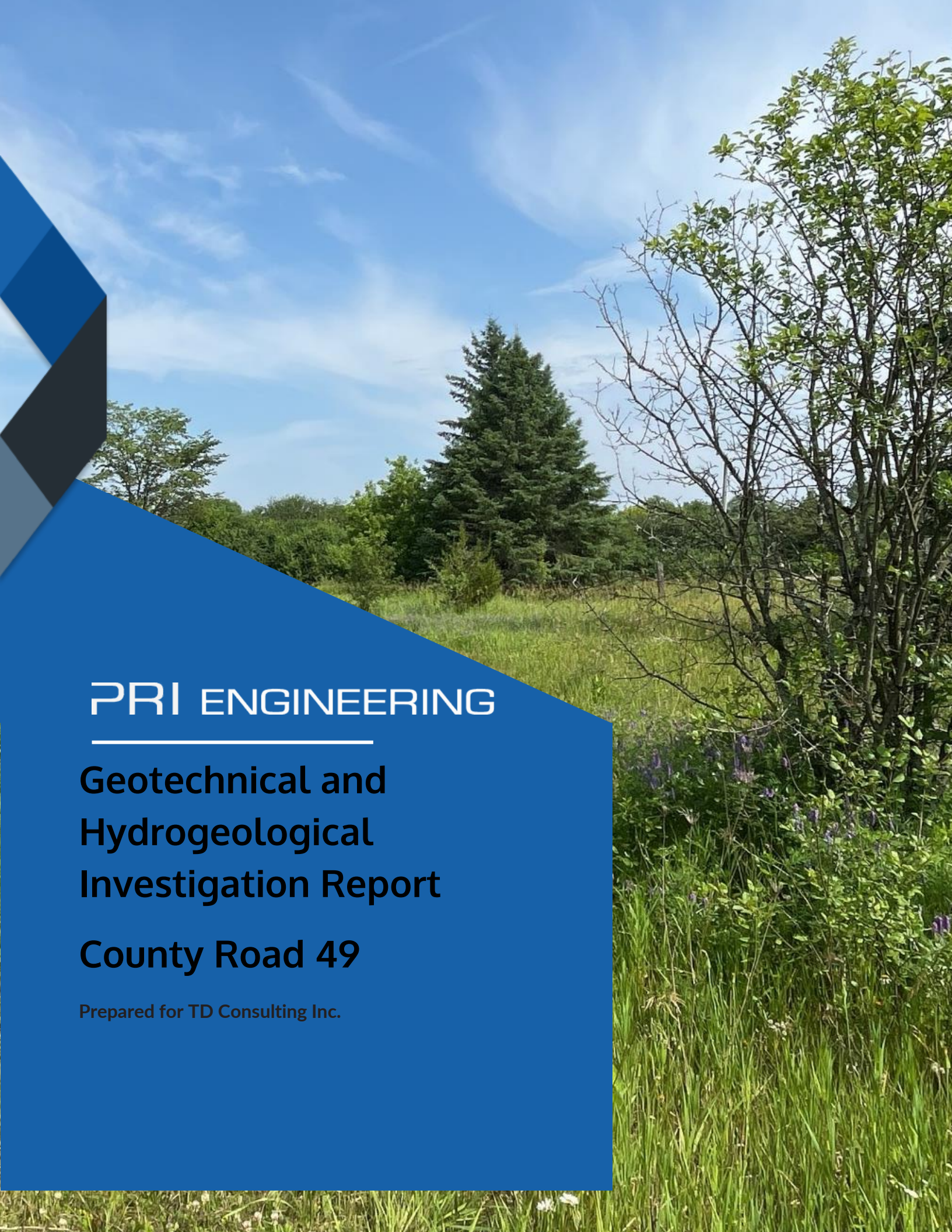


PRI ENGINEERING

Geotechnical and Hydrogeological Investigation Report

County Road 49

Prepared for TD Consulting Inc.

PRI ENGINEERING

November 13, 2023

Nick Fegan
Project Manager
TD Consulting Inc.
155 St David Street
Lindsay, ON K9V 4Z6

Emailed to: *nick@td-consulting.ca*

Subject: **Geotechnical and Hydrogeological Investigation – REV01**
County Road 49
Bobcaygeon, Ontario
PRI Project No. 23-075

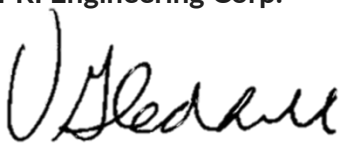
To Mr. Fegan,

PRI Engineering Corp. is pleased to submit the following Geotechnical and Hydrogeological Investigation Report summarizing the field investigation completed at County Road 49, in Bobcaygeon, ON. The Geotechnical and Hydrogeological Investigation was carried out to determine the subsurface conditions for foundation recommendations for the proposed 14 residential dwellings as part of new subdivision plan, along with the proposed rezoning for the accommodation of commercial structures.

This report presents the results of the geotechnical and hydrogeological investigations completed between August and September, 2023. The site plan noting borehole locations, borehole logs, laboratory test results, and slug test results are provided as appendices.

We trust that this is straightforward and meets with your present requirements. Please contact us if you have any questions.

Yours truly,
PRI Engineering Corp.



Vikki Gledhill, P.Eng.
Geotechnical Engineer

205 St. George Street, Unit 2 | Lindsay, ON K9V 5Z9 | 705.702.3921

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List of Acronyms and Abbreviations

ASTM	American Society for Testing and Materials
ANSI	American National Standards Institute
AWWA	American Water Works Association
CCIL	Canadian Council of Independent Laboratories
CFEM	Canadian Foundation Engineering Manual
CPT	Cone Penetration Test
CSA	Canadian Standards Association
KRCA	Kawartha Region Conservation Authority
mBGS	Metres Below Ground Surface
mbeg	Metres Below Existing Grade
OBC	Ontario Building Code
OHS	Occupational Health and Safety
PRI	PRI Engineering Corp.
SPMDD	Standard Proctor Maximum Dry Density
SPT	Standard Penetration Test
USCS	Unified Soil Classification System

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1 Introduction

PRI Engineering Corp. (PRI) is pleased to submit the following Geotechnical and Hydrogeological Investigation Report related to the proposed development of subdivision plan (the Site) comprised of 14 residential lots (ranging from minimum 1.25 acres to maximum 1.97 acres), located along County Road 49, north of Bobcaygeon, in the County of Peterborough, ON.

From provided documents, it is understood that as well as the main residential development, consideration for rezoning of commercial strucure at southern side is required. It is also understood that the northeastern side of the region is identified to be under Kawartha Region Conservation Authority (KRCA) regulation.

Background information summarizing existing findings are described in **Section 2**. The field program procedures and associated laboratory program are summarized in **Section 3**. The subsurface profile and borehole conditions are outlined in **Section 4**, and **Section 5** summarizes comments and recommendations for the proposed addition.

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2 Background Information

Prior to mobilization to the Site, PRI reviewed the following references as part of the background information review:

- Proposed Site Plan (*Drawing No. SP-1, Project No. 021-471*) and *Record of Pre-Consultation document*, development by the *Planning Department of Peterborough County*, provided by *TD Consulting Inc. (TDC)* showing information regarding location and sizes of 14 residential lots, in relation to rezoning of 9 Industrial / Commercial Storage Units on the southern portion of subdivision plan adjoined by existing Municipal Works Yard.
- Additionally, restrictions communicated prior to fieldwork included consideration for Lots 10 and 11 on Northeastern side, where a pond was identified as part of *Natural Heritage Evaluation*, whose boundaries needs to be precisely demarcated / surveyed.
- Similarly, on northern extents of Lot 13 and 14, wetlands are currently under regulation of KRCA.
- Water well records from the Ministry of the Environment, Conservation and Parks (MECP), Waterwell Database;
- *Bedrock Geology of Ontario* and *Surficial Geology of Ontario KML* Data Files, *Ontario Geological Survey*
- *Google Earth* satellite imagery between 2009 to 2019.

Based on Google Earth satellite imagery, the provided site plan, and the completed field investigation, the Site is predominately wooded, with dense vegetation in areas in the north. No buried utilities were noted within the project area surrounding the boreholes investigation area. The Site varies in elevation. An access path (including tree clearing) was made by TDC in order to access borehole locations in the northern portion of the Site. In addition, portions of the Site were inaccessible due to presence of wetlands, as identified by TDC.

Based on Ontario Geological Survey records, the bedrock in the region comprises of limestone, dolostone, shale, arkose, sandstone Ottawa Group; Simcoe Group; Shadow Lake Formation. From historic well records, limestone is to be likely encountered in the region. Similarly, based on Ontario Geological Survey records, the Site consists of till deposits of the Pleistocene period comprising of undifferentiated, predominantly sandy silt to silt matrix, commonly rich in clasts, often high in total matrix carbonate content.

From available well records, information of static water levels observed varying from dry at the extreme end to depths between minimum 6.4 metres below ground surface (mBGS) to 27.4 mBGS (approximate elevation around 276 metres [m] in the northeast to 281.5 m in the southwest corner of the property) in the area. Related subsurface lithology from water well records is summarized in **Table 1** (below).

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Table 1: Summary of Water Well Records

Well ID	GPS Coordinates/Site Address	Approx. Location Relative to Center of Site	Static Water Level (m)	Stratigraphy	
				Recorded Depths (mBGS)	Lithology Description
5101896	694879 E, 4936518 N	Within Site (South)	Dry	0 – 6.1 6.1 – 10.9 10.9 – 18.3	Dry well Clay and stones Limestone rock
5107786	694812 E, 4936876 N	Within Site (North)	6.4	0 – 5.8 5.8 – 11.4	Brown, clay, stone Grey, limestone, hard
7053804	694993 E, 4937074 N	SE of Site	19.8	0 – 0.3 0.3 – 6.1 6.1 – 24.4	Black, topsoil Brown, clay, stones Grey, limestone
7292012	694910 E, 4937213 N	SE of Site	27.4	0 – 0.3 0.3 – 4.8 4.8 – 30.5	Black topsoil, soft Brown, fine sand Grey, limestone

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3 Geotechnical Investigation Procedures

Prior to the field investigation, underground utility locates, including water, electrical, sewer, gas, telephone, cable, etc., were completed using Ontario One-call services. Private locates were also completed at the Site. Borehole locations were finalized in the field based on utility clearance and other obstructions (i.e., trees, overhead lines, vehicles, equipment, etc.) observed at the time of the investigation.

3.1 Field Investigation Program

The borehole investigation was completed between August 9 to August 10, 2023. A total of seven (7) boreholes, designated as BH23-01 through BH23-07, were advanced at accessible areas at the Site. Upon completion of boreholes advancement, four (4) of the boreholes had monitoring wells installed identified as (MW-01, MW-03, MW-05, and MW-07).

Boreholes were advanced and terminated after encountering auger refusal on presumed bedrock with no further penetration into the ground. The boreholes were advanced using a track-mounted 7822DT drill rig equipped with 152 millimetre (mm) Outer Diameter (O.D.) solid stem auger, and 50 mm O.D size for split spoon sampler operating under the full-time supervision of PRI and in general accordance with the Standard Penetration Test (SPT) procedure (American Society for Testing and Materials D1586). The result of SPT sampling in terms of N-values are referred to as consistency for cohesive soils and relative density for non-cohesive materials.

A qualified PRI geotechnical engineering technician supervised the drilling and logged and sampled the boreholes in accordance with industry standards. Subsurface conditions were logged in the field in accordance with PRI geotechnical protocols. Recovered soil samples were inspected and logged in the field by PRI personnel using visual and tactile methods. Soil samples were placed in moisture-proof containers for transportation to the laboratory for review and selected testing. Standpipes with screens were installed in selected four (4) boreholes (MW23-01, MW23-03, MW23-05, and MW23-07) to convert them into monitoring wells. Subsurface conditions including groundwater seepage were logged prior to backfilling.

A Borehole and Monitoring Well Location Plan is provided as **Figure 1**. Borehole logs are included as **Appendix A.** Borehole location information and depth details are summarized in **Table 2** (below).

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Table 2: Borehole GPS Coordinates and Termination Depths

Borehole ID	GPS Coordinates		Termination Depth (mBGS)
	Northing	Easting	
BH23-01 / MW23-01	44.561136	-78.547456	2.9
BH23-02	44.560908	-78.546334	2.4
BH23-03 / MW23-03	44.559237	-78.548058	2.1
BH23-04	44.558384	-78.547703	2.0
BH23-05 / MW23-05	44.558242	-78.545182	2.4
BH23-06	44.557609	-78.546663	2.1
BH23-07 / MW23-07	44.557386	-78.545936	3.5

3.2 Laboratory Testing

Soil samples from the field investigation program were recovered and retained for further review, selected testing, and storage. Selected samples were submitted to a Canadian Certified Independent Laboratory for the tests summarized in **Table 3** (below).

Table 3: Laboratory Test Quantities and Reference Standards

Analysis	Standard	Quantity
Natural Moisture Content	ASTM D2216-98	28
Particle Size Distribution Analysis	ASTM D422	5
Corrosivity Analysis	Various Standards	3

Results from the Natural Moisture Content Analysis are summarized on the Borehole logs with Particle Size Distribution Curves, Atterberg Limits Results are provided as **Appendix A** and **B**. A summary of corrosivity analyses as per the American National Standards Institute (ANSI) / American Water Works Association (AWWA) rating system is discussed in the section below. The Certificate of Analysis and ANSI/AWWA rating system are also provided as **Appendix C**.

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4 Subsurface Conditions

The inferred subsurface profiles are based on the borehole logs from the field investigation program. While we believe conditions are representative of actual site conditions, if future findings differ from those encountered at the completed boreholes, we should be consulted to revise our recommendations based on actual conditions at the time of construction. The following are the specific subsurface conditions encountered at borehole locations. Borehole logs are attached as **Appendix A**.

4.1 Topsoil

Surficial topsoil was encountered at all of the boreholes, varying in depths between 100 mm to 800 mm. Assessment of organic matter content or other topsoil quality tests were beyond the scope of this current study.

4.2 Gravel and Sand

Stratum of gravel and sand mixture was encountered in all seven (7) boreholes, at depths ranging from 0.1 mBGS to 0.8 mBGS. The material contained trace to some amounts of silt and clay. Organic material was noted at a depth of 2.4 mBGS at borehole BH23-05. The SPT blow counts varied from 10 to greater than 50 blows per 300 mm of soil penetration and were interpreted as compact to very dense. The gravel and sand were described as moist to saturated, and the lab determined moisture content varied from 2% to 14%.

Five (5) laboratory particle size distribution analysis was completed on a select sample of the silty sand. The test results are attached in **Appendix B** and are summarized in **Table 4** (below), as per the Unified Soil Classification System:

Table 4: Summary of Laboratory Particle Size Analyses – Gravel and Sand

Borehole ID	Sample No.	Depth (mBGS)	Gravel*		Sand**	Silt***	Clay****
BH23-01	SS2	0.8 - 1.4	35		35	30	
BH23-01	SS3	1.5 - 2.1	43		34	23	
BH23-03	SS2	0.8 - 1.4	38		38	18	6
BH23-05	SS3	1.5 - 2.1	44		38	14	4
BH23-07	SS4	2.2 - 2.9	36		39	18	7

*Material passing 3-inch sieve opening and retained by No. 4 sieve.
**Material passing No. 4 sieve and retained by No. 200 sieve.
***Material passing No. 200 sieve and greater than 0.002 mm (based on hydrometer results).
****Material smaller than 0.002 mm (based on hydrometer results).

4.3 Bedrock and Other Observations

Practical refusal to further borehole advancement was encountered in all the seven (7) boreholes. The cause of refusal was inferred to be bedrock refusal, where grinding was observed with no

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further advancement of auger. Historic data suggests the bedrock in the region is limestone. Assessment of bedrock quality was outside the current scope of work. A summary of bedrock termination depths is provided in **Table 5** (below).

Table 5: Bedrock Summary

Borehole ID	Bedrock Depth (mBGS)	Additional Observations
BH23-01	2.9	Difficult to advance, continuous spinning, Auger refusal
BH23-02	2.4	
BH23-03	2.1	
BH23-04	2.1	
BH23-05	2.7	
BH23-06	2.9	
BH23-07	5.2	

4.4 Groundwater and Borehole Stability Observations

Upon completion of drilling, water level was observed in one (1) borehole/monitoring well (BH23-01/MW-23-01). The remaining boreholes/monitoring wells were dry both prior to and post installation of polyvinylchloride pipe for the day of investigation (August 9, 2023).

Two (2) boreholes were observed to cave in after completion of drilling, while the others remained opened and stable. **Table 6** (below) summarizes the groundwater level measured and remark on stability of boreholes upon completion.

Table 6: Groundwater Conditions Summary

Borehole ID	Groundwater Level Measurements	Stability of Borehole Upon Completion
BH23-01 / MW23-01	1.3	Hole opened at 2.9 mBGS
BH23-02	N/A	Hole caved
BH23-03 / MW23-03	Dry	Hole opened and stable
BH23-04	Dry	Hole opened and stable
BH23-05 / MW23-05	Dry	Hole opened and stable
BH23-06	Dry	Hole opened and stable
BH23-07 / MW23-07	N/A	Hole caved at 3.5 mBGS

As most of the monitoring wells (with the exception of MW23-01) were dry, an attempt was made to obtain relevant information from the MCEP published document and grainsize distribution for further delineation of the hydrogeological properties for the study area.

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4.5 Slug Tests

Slug test results for manual readings and datalogger measurements taken at monitoring wells MW23-01, MW23-03, MW23-05, and MW23-07 are summarized in **Table 7** (below) and provided as **Appendix D**. Hydraulic conductivity was estimated from the data using the following **Equation 1** (Hvorslev, 1951):

$$Q_t = \pi r^2 \frac{dh}{dt} = FK(H_0 - h_t)$$

Where:

- K is hydraulic conductivity in cm/s;
- r is the radius of well casing in cm;
- L is the sand screen length in cm;
- R is the radius of the screen; and
- T_0 is the time for water level to recover to 37% of its initial change.

Test completion was defined as the point in which the water level recovered to approximately 63% recharge. The rate of inflow or outflow from the well at any time is proportional to the conductivity of the soil and the unrecoverable head difference (h_0 - h_t).

The resulting average hydraulic conductivity values are summarized in **Table 7** (below).

Table 7: Summary of Hydraulic Conductivity Test Results

Monitoring Well ID (Test ID)	Well Screen Interval (mBGS)	Screened Unit	Approximate Hydraulic Conductivity (m/s)		
			Datalogger Readings	Manual Readings	Average
MW23-01	1.2 – 2.7	Sand and Gravel	2.3×10^{-8}	2.9×10^{-8}	2.6×10^{-8}
MW23-03	0.5 – 2.0	Topsoil/Sand and Gravel	1.0×10^{-7}	1.2×10^{-7}	1.1×10^{-7}
MW23-05	0.8 – 2.3	Sand and Gravel	1.4×10^{-7}	2.0×10^{-7}	1.7×10^{-7}
MW23-07	1.8 – 3.4	Sand and Gravel	3.7×10^{-8}	4.9×10^{-8}	4.3×10^{-8}

4.6 Percolation Rates

Percolation rates of the overburden sand and gravel are included based on the grain size analyses attached in **Appendix B.** Percolation rates are based on the Supplementary Standard to the Ontario Building Code 2012 document *Percolation Time and Soil Descriptions (SB-5).* Estimates of

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percolation rates are based on entirety on the grain size distribution curves, and range between 8 min/cm and 13 min/cm.

4.7 Corrosivity Analysis

Three (3) samples were analyzed for chloride, sulphate, and sulphide concentrations, pH, electrical conductivity/resistivity, and redox potential at the Site. Laboratory data was compared to the ANSI/AWWA corrosivity rating system (provided in **Appendix C**) to determine the corrosive nature of the tested materials. A sample scoring greater than 10 points is considered to represent a corrosive environment with respect to grey or cast-iron alloys, other considerations including use of de-icing salts or stray electrical currents, to name a few have not been considered. Additional analysis or testing may be required for alternative material types (i.e., copper, aluminum, etc.). **Table 8** summarizes the results for the subject site and the total allotted points based on the rating system.

Table 8: Corrosivity Analytical Result and ANSI/AWWA Point Rating Summary

Parameter		Redox Potential (mV)	Sulphides (%)	Moisture Content (%)	pH	Resistivity (ohms-cm)	Total Points
BH23-04 SS2/0.8-1.4 mBGS	Value	281	<0.04	2.8	8.81	7250	3
	Rating	0	0	0	3	0	
BH23-05 SS2/0.8-1.4 mBGS	Value	273	<0.04	6.9	8.96	7410	3
	Rating	0	0	0	3	0	
BH23-06 SS3/1.5-2.1 mBGS	Value	290	<0.04	2.9	9.11	8260	3
	Rating	0	0	0	3	0	

Based on the test results, corrosion conditions at the Site do not appear to be significant. However, it is noted that there may be overriding factors in assessments of corrosion potential, such as the application and leaching of de-icing salts and stray electrical currents, to name a few. PRI recommends that the engineer of record should consider corrosivity potential for the Site based on the final design and provide considerations for buried utilities and reinforcement rebar.

Laboratory test results for water-soluble sulphate concentration were generally 9.8 micrograms per gram (µg/g) to 16 µg/g and was compared to Table 3 of Canadian Standards Association (CSA) A23.1-09 to assess the risk of sulphate attack on cementitious materials. As such, the recommended exposure class at the site is F-2 and Type GU cement would be appropriate for most structural components used in concrete mix designs, with the final design considerations to be determined by the structural engineer.

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5 Geotechnical Recommendations

The following recommendations are intended for design and construction of the proposed development at the aforementioned location. Recommendations are based on the borehole information described in **Section 4**. While we believe the findings are representative, conditions may vary beyond the investigated locations. If significant differences in the subsurface conditions described above are found later, particularly during construction or as more information becomes available, PRI should be contacted immediately to revise our findings and recommendations, as necessary.

Recommendations are intended for Designers and are not intended as instructions to Contractors, who should perform their own investigations to confirm any conditions that may affect construction schedules, costs and selected methodologies. Recommendations in this report must not be used by third parties without the express written consent of PRI.

5.1 Site Preparation

Prior to grading and earthworks operations, any organics and otherwise deleterious material should be stripped from beneath proposed structures, grading fill areas and roadways. Areas should then be excavated to the proposed subgrade level, which is expected to extend through the sand and gravel, and to the underlying bedrock. The subgrade should be inspected by the Geotechnical Engineer or qualified personnel working under the direct supervision of the Geotechnical Engineer. Any loose limestone or debris or other deleterious materials should be removed prior to construction. Loose or soft subsoils which have not been adequately densified during proof-rolling, if any, should be removed and replaced with approved fill and shall be placed and compacted as per **Section 5.5** (below). If excessive rutting, loose areas, or unexpected quantities of organic materials are identified during the proof rolling, a geotextile separator (e.g., Terrafix 300R or approved equivalent) may be an option to limit the depth of any sub-excavation. Approval for specific use of geotextiles shall be approved by the Geotechnical Engineer. The subgrade should be inspected by the Geotechnical Engineer or qualified personnel working under the direct supervision of the Geotechnical Engineer.

5.2 Excavations

It is expected that site foundations will extend to the bedrock surface, and that building foundations will not require vertical excavations into the rock. Based on the borehole investigation, and previous experience in the region, it is expected that the upper weathered bedrock excavation, if any, for the proposed site foundations can be completed with ripper tooth equipped backhoes and heavy mechanical breakers and rippers. Although unlikely, some localized rock squeeze could develop within thinly bedded rock units, due to construction unloading induced horizontal stresses. The sides of the shallow soil excavation depths should not require any vertical supports. However, if excavations into bedrock exceed 1.2 m, PRI should be contacted to review the excavations.

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Excavations should be constructed in accordance with the most recent version of the Occupational Health and Safety Act (OHSA). The existing compact to dense sand and gravel above the groundwater table can be classified as Type 3 material in accordance with Ontario Regulation 213/91 s.226 under the OHSA. Thus, temporary excavation side-slopes within the soils should be sloped at a minimum grade of 1H:1V from the base of the excavation, or they must be properly supported (shored). Soils below the groundwater table and organic-rich soils are considered Type 4 and should be sloped at a minimum grade of 3H:1V from the excavation bottom.

Excavations should be protected from exposure to precipitation and associated ground surface runoff and should be inspected regularly for signs of instability. If localized instability is noted during excavation, or if wet conditions are encountered, side slopes should be flattened or supported, as required by regulations, to maintain safe working conditions. All excavations should comply with applicable local, provincial and federal safety regulations, including the current OHSA Excavation and Trench Safety Standards.

Temporary shoring may be needed when excavating close to utilities, property boundaries and any other existing structures or site elements, to prevent materials from sloughing and undermining these features. The Contractor shall be responsible to maintain stable excavations for the project.

5.3 Groundwater Quantity and Dewatering Requirements:

It is assumed that the proposed buildings are expected to require a maximum excavation depth of 2 m and the ground water strike is expected to be below the excavation depth, no significant dewatering is expected to be required. Intermittent sump pumping may be required to remove nuisance water attributed to perched ground water and surface water intrusion.

Water levels should be verified at the time of construction, and PRI should be contacted to review all final designs, anticipated date of construction, dewatering methods, and permitting requirements once the final construction and design details are available to provide more detailed requirements.

5.4 Service Trenches

It is anticipated that only shallow service trenches will be required for the development. Trench excavations should follow the recommendations of Section 5.2 of this report. Service pipes can be installed with Class B bedding in accordance with OPSD 802.010. Pipe bedding should be compacted to at least 95% of Standard Proctor Maximum Dry Density (SPMDD) or as specified in Section 5.5 of this report.

5.5 Material Reuse, Backfill and Compaction

Fill materials containing deleterious material (e.g., topsoil, rootlets, etc.) are not considered suitable for reuse as backfill or for supporting foundations, nor should they be used for any of the pavement base or sub-base materials.

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If consideration is given to reuse excavated soils at the time of construction, it is recommended that all materials designated for reuse be inspected by the Geotechnical Engineer prior to and/or during construction, to confirm that no deleterious material are present. Cobbles and boulders content within reused material should be less than 5% by mass. If cobble and boulder content exceed this limit, the material should be screened to remove all material greater than 60 mm, or an approved equivalent must be used.

Prior to placing any fill, all subgrade surfaces must be approved by the Geotechnical Engineer as noted in Section 5.1 (above). Materials used for fill should be placed in maximum 200 mm loose lifts and compacted to 100% of the SPMDD below foundations and structural components, 98% of the SPMDD beneath access roads, and 95% of the SPMDD in general fill areas. Compaction operations should be completed using a self-propelled vibratory compactor or jumping-jack plate tamper where access is limited. Backfill loose lift thicknesses may need to be reduced to achieve the above-noted compaction values based on compaction equipment utilized (i.e., small tampers or jumping-jack).

It is recommended that foundation backfill consist of free-draining, non-frost susceptible granular fill material, such as Ontario Provincial Standard and Specifications (OPSS) 1010 Granular 'B' Type I materials or approved equivalent.

Service trench backfill may consist of approved portions of the native soils, subject to the constraints and limitations stated above with respect to reuse. Alternatively, imported materials, such as OPSS 1010 Granular 'B' Type I, Select Subgrade Materials (SSM), or approved equivalent may be used. If soils are to be exported from the Site, confirmatory field screening and chemical soil analyses should be completed at the time of export to verify acceptance to the standards of the receiving site.

5.6 Frost Considerations

Based on OPSD 3090.101, the frost penetration depth for the Site area is 1.6 m below final exterior grades, unless foundation elements extend to the bedrock surface. High density Styrofoam insulation, or an approved equivalent, should be considered to provide equivalent frost protection where sufficient soil cover does not exist of foundation elements or adequate resistance to frost heave is not anticipated.

5.7 Seismic Site Class

The Ontario Building Code specifies that structures should be designed to withstand forces due to earthquakes. For the purpose of earthquake design, the information relevant to the geotechnical conditions at a site is attributed by the "Site Class.' Based on the explored soil properties and in accordance with Table 4.1.8.4.A of the Building Code (2006), it is recommended that Site Class 'B' (rock) be applied for the current design. Analysis of shear waves may be required to justify increases in Site Class designation under the Code.

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5.8 Foundation Design

It is understood that basements are proposed for the residential developments at the Site. Based on borehole data the basement foundations will be founded on limestone bedrock or sand and gravel. For preliminary design a design bearing pressure of 750 kilopascals (kPa) (SLS) or 1,125 kPa (ULS) may be assumed for foundations extending to bedrock, and a bearing pressure of 225 kPa (ULS) or 150 kPa (SLS) for foundations on sand and gravel. Field confirmation of the allowable bearing capacity is required by the Geotechnical Engineer or qualified staff working under the supervision of the Geotechnical Engineer during construction.

5.9 Soil Retaining Structures

The lateral earth pressures acting on the rigid walls of the buried structures or retaining walls within the overburden over the groundwater table may be calculated from the following expression.

$$P = K_1(\gamma_1 h_1 + q)$$

Where:

- P = lateral earth pressure acting at depth h in kPa
- K_1 = earth pressure coefficient for overburden soils = 0.55; for granular fills = 0.50
- γ_1 = bulk unit weight of overburden soils = 17.0 kN/m^3; granular fills = 22.5 kN/m^3
- h_1 = depth to point of interest in overburden in metres
- q = equivalent value of surcharge on the ground surface in kPa

The above expression assumes that the well point system or perimeter drainage system prevents the build-up of any hydrostatic pressure behind the wall. If groundwater is not drained, then rigid walls should be designed for hydrostatic pressure.

5.10 Access Road and Parking Lot Design

It is assumed that the majority of traffic will consist of light duty vehicles for the design of the internal roadway within the development and the roadway is to be considered a local roadway classification in accordance with the City of Kawartha Lakes design standards. Provided that preparation of the Site is completed in accordance with recommendations stated above, the following minimum pavement structure should be suitable for the proposed asphalt construction, as per the City of Kawartha Lakes – Design Guidelines and Standard Drawings, Dated 2004 (Revised 2010):

5.10.1 Local Roadway

- 40 mm minimum OPSS HL4 (SP 12.5) Surface Course Compacted to 92.5% to 97.5% MRD;
- 50 mm minimum OPSS HL8 (SP 19) Base Course Compacted to 92.5% to 97.5% MRD;

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- 150 mm minimum OPSS 1010 Granular 'A' Base Compacted to 98% of SPMDD; and
- 300 mm minimum OPSS 1010 Granular 'B' Base Compacted to 98% of SPMDD.

5.10.2 Driveways

- 50 mm minimum OPSS HL3 (SP 12.5) Surface Course Compacted to 92.5% to 97.5% MRD; and,
- 150 mm minimum OPSS 1010 Granular 'A' Base Compacted to 98% of SPMDD.

The thickness of the granular base material could be increased at the discretion of the Engineer, or granular subbase layers could be added, to accommodate site conditions at the time of the construction.

The existing overburden material on site are not suitable for the proposed base or subbase construction and should be disposed appropriately or placed beneath an approved granular material as outlined above. It is recommended that within the area of the pavement, excavation be performed to remove any encountered organics and loose soils and the grade be restored using properly compacted engineered fill.

5.11 Sewage Servicing Capabilities

An attempt was made to identify the constraints in developing sewage servicing capabilities for the project, such as environmental, terrain hydrogeological analysis, stratigraphy etc.

In general, the study area is sloping southward. The highest ground elevation within the project area is varying between EL284m and EL290m, with a general slope towards the south. No municipal water well is identified in the proximity of the project limit. However, multiple private wells in the region are identified which require enough protection from the proposed septic system.

The project area is surrounded by thick vegetation which has potential for environmentally sensitive species. More specific arborist and ecology study is recommended prior to initiating the construction work.

Stratigraphically, the soil is comprised of topsoil up to 0.8 m, underlain by sand and gravel between 2 m from the northeast to around 5 m in southwest. A bedrock comprise of limestone is encountered between 2 mBGS and 5 mBGS, within the project area. Based on the stratigraphic information, it is assumed that septic system will be rest on or close to the bedrock above the regional static groundwater level.

A flood plain study was performed using available floodplain mapping study. The Timmins storm with a total rainfall of 193 mm is identified as the regional storm event for this part of Ontario. A closest available 'Technical Report' on 'Flood Plain Mapping Study Bobcaygeon Tributary' dated July 2019, performed by Kawartha Conservation is reviewed to identify potential flooding hazards and impact on Sewage Servicing capabilities for the project. As indicated in the report, most of the watershed flows in the west channel, originating in the rolling farmland northwest of the

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intersection of County Road 49 and Anderson Road. Flood Plain Mapping Study report is identifying the 6-hour SCS storm as the highest peak flow for the 100-year event.

Based on reviewed information and hydrogeological properties identified during recent study within the project area, it is our understanding that there will not be any impact on regional hydrogeology due to proposed project at County Road 49, Trent Lakes, County of Peterborough, ON.

5.12 Low Impact Development

Low Impact Development (LID) design is aimed at maintaining natural or predevelopment hydrologic conditions, including minimizing the volume of runoff produced at the site. There are several LID practices that can be implemented at site (i.e. rainwater harvesting, infiltration trenches, bioretention, etc.). It is understood that the LID features at the site have yet to be finalized. As it relates to the current scope of work, PRI has characterized the site soils, and provided infiltration rates as input into LID design. These rates are summarized as follows:

- Sand and Gravel = 12 to 30 mm/hr

Appropriate safety factors for calculating design infiltration rates should be considered. The current scope of work did not include an assessment of infiltration of the underlying bedrock. Bedrock onsite was noted to be approximately 2.0 mBGS and should be considered an impermeable layer, and infiltration would not be feasible in this material. The designer should consider the depth to bedrock in the applicable LID design.

If more accurate infiltration rates are required to support design, an in-situ test should be completed at site.

5.13 Inspections and Testing

During construction, a qualified geotechnical engineer should be contacted to review and comment on the foundation and pavement design details to confirm that the geotechnical requirements stated in this report are addressed.

Geotechnical inspections are critical during construction operations for quality control and assurance. Inspection and testing services should include verification of subgrade soil and bedrock conditions below bases, slabs, footings, and parking areas, monitoring of the placement of engineered fill, and general testing of geotechnical materials including engineered fill, concrete, and asphalt.

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6 Construction Supervision and Limitations

The data, conclusions and recommendations which are presented in this geotechnical report, and the quality thereof, are based on a scope of work developed and authorized by the Client. While we believe the test pit information to be representative of Site conditions in the investigated areas, subsurface conditions between and beyond sampled locations may vary. If significant differences in any of the subsurface conditions described in this report are found, PRI should be contacted immediately to revise our findings and recommendations, if necessary.

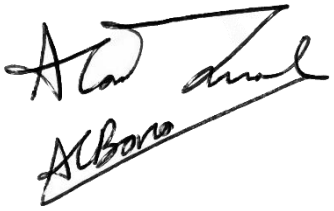
Our comments on construction considerations are provided, but are not intended as instructions to Contractors, nor shall they be interpreted as specifications for construction. Contractors bidding shall make their own interpretations of factual information to determine how subsurface conditions may affect their methods, costs and schedules.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. PRI accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We trust this meets your current requirement, please do not hesitate to contact the undersigned if you have any questions.

Yours truly,

PRI Engineering Corp.



Alaa Alborno
Project Coordinator

Vikki Gledhill, P.Eng.
Geotechnical Engineer

Praharsh Dhyani, M.Sc., P.Geo, QP
Program Manager – Environmental

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Figures

KEY MAP
N.T.S

APPROXIMATE SITE LOCATION

BOREHOLE LOCATION AND ID		
ID	EASTING	NORTHING
BH23-01/MW23-01	44.561136	-78.547456
BH23-02	44.560908	-78.546334
BH23-03/MW23-03	44.559205	-78.546055
BH23-04	44.558384	-78.547033
BH23-05/MW23-05	44.558242	-78.545182
BH23-06	44.557609	-78.546663
BH23-07/MW23-07	44.557386	-78.545936

LEGEND

BH23-## APPROXIMATE BOREHOLE LOCATION AND ID

0 25 50 Meters

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205 ST. GEORGE STREET, UNIT 2
LINDSAY, ON K9V 5Z9
TEL: 705-702-3921
www.priengineering.com

NOTES:
1. KEY MAP FROM GOOGLE MAPS AND USED FOR REFERENCE PURPOSES ONLY.
2. BOREHOLE LOCATIONS OBTAINED FROM HANDHELD GPS UNIT.

REV NO.	ISSUANCE	DATE
00	ISSUED FOR REPORT	29SEP23

PROJECT NAME:
COUNTY RD 49

DRAWING NAME:
BOREHOLE AND MONITORING WELL LOCATION PLAN

PROJ. NO.:	DWG. BY:	CHKD. BY:	APPR. BY:
23-075	SD	MW	VG

DRAWING NUMBER: F-01

PRI ENGINEERING

Appendix A

Borehole Explanation Forms, Borehole Logs

BOREHOLE LOG EXPLANATION FORM

This explanatory section provides the background to assist in the use of the borehole logs. Each of the headings used on the borehole log, is briefly explained.

DEPTH

This column gives the depth of interpreted geologic contacts in metres below ground surface.

STRATIGRAPHIC DESCRIPTION

This column gives a description of the soil based on a tactile examination of the samples and/or laboratory test results. Each stratum is described according to the following classification and terminology.

Soil Classification*		Terminology	Proportion
Silt & Clay	< 0.075 mm	"trace" (e.g. trace sand)	<10%
Sand	0.075 to 4.75 mm	"some" (e.g. some sand)	10% - 20%
Gravel	4.75 to 75 mm	adjective (e.g. sandy)	20% - 35%
Cobbles	75 to 300 mm	"and" (e.g. and sand)	35% - 50%
Boulders	>300 mm	noun (e.g. sand)	>50%

* Extension of USCS Classification system unless otherwise noted.

The use of the geologic term "till" implies that both disseminated coarser grained (sand, gravel, cobbles or boulders) particles and finer grained (silt and clay) particles may occur within the described matrix.

The compactness of cohesionless soils and the consistency of cohesive soils are defined by the following:

COHESIONLESS SOIL		COHESIVE SOIL	
Compactness	Standard Penetration Resistance "N", Blows / 0.3 m	Consistency	Standard Penetration Resistance "N", Blows / 0.3 m
Very Loose	0 to 4	Very Soft	0 to 2
Loose	4 to 10	Soft	2 to 4
Compact	10 to 30	Firm	4 to 8
Dense	30 to 50	Stiff	8 to 15
Very Dense	Over 50	Very Stiff	15 to 30
		Hard	Over 30

The moisture conditions of cohesionless and cohesive soils are defined as follows.

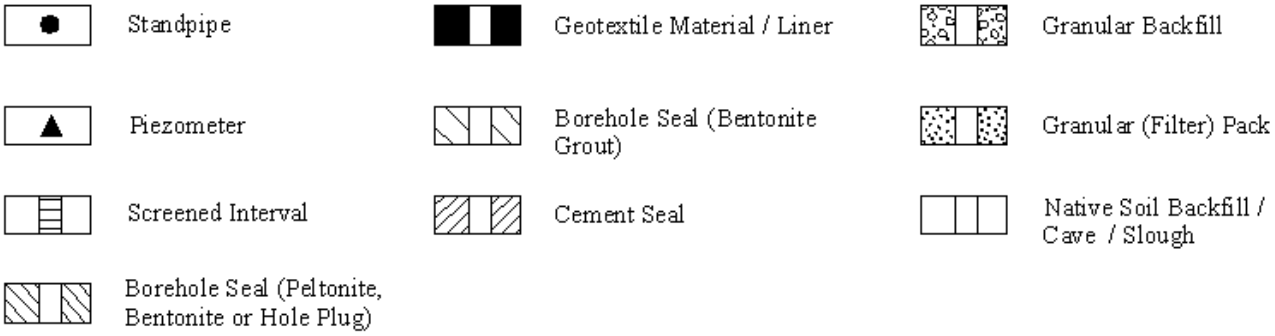
COHESIONLESS SOILS	COHESIVE SOILS		
Dry	DTPL	-	Drier Than Plastic Limit
Moist	APL	-	About Plastic Limit
Wet	WTPL	-	Wetter Than Plastic Limit
Saturated	MWTPL	-	Much Wetter Than Plastic Limit

STRATIGRAPHY

Symbols may be used to pictorially identify the interpreted stratigraphy of the soil and rock strata.

MONITOR DETAILS

This column shows the position and designation of standpipe and/or piezometer ground water monitors installed in the borehole. Also the water level may be shown for the date indicated.



Where monitors are placed in separate boreholes, these are shown individually in the "Monitor Details" column. Otherwise, monitors are in the same borehole. For further data regarding seals, screens, etc., the reader is referred to the summary of monitor details table.

SAMPLE

These columns describe the sample type and number, the "N" value, the water content, the percentage recovery, and Rock Quality Designation (RQD), of each sample obtained from the borehole where applicable. The information is recorded at the approximate depth at which the sample was obtained. The legend for sample type is explained below.

SS	=	Split Spoon	GS	=	Grab Sample
ST	=	Thin Walled Shelby Tube	CS	=	Channel Sample
AS	=	Auger Flight Sample	WS	=	Wash Sample
CC	=	Continuous Core	RC	=	Rock Core

$$\% \text{ Recovery} = \frac{\text{Length of Core Recovered Per Run}}{\text{Total Length of Run}} \times 100$$

Where rock drilling was carried out, the term RQD (Rock Quality Designation) is used. The RQD is an indirect measure of the number of fractures and soundness of the rock mass. It is obtained from the rock cores by summing the length of core recovered, counting only those pieces of sound core that are 100 mm or more in length. The RQD value is expressed as a percentage and is the ratio of the summed core lengths to the total length of core run. The classification based on the RQD value is given below.

RQD Classification	RQD (%)
Very poor quality	< 25
Poor quality	25 - 50
Fair quality	50 - 75
Good quality	75 - 90
Excellent quality	90 - 100

TEST DATA

The central section of the log provides graphs which are used to plot selected field and laboratory test results at the depth at which they were carried out. The plotting scales are shown at the head of the column.

Dynamic Penetration Resistance - The number of blows required to advance a 51 mm diameter, 60º steel cone fitted to the end of 45 mm OD drill rods, 0.3 m into the subsoil. The cone is driven with a 63.5 kg hammer over a fall of 750 mm.

Standard Penetration Resistance - Standard Penetration Test (SPT) "N" Value - The number of blows required to advance a 51 mm diameter standard split-spoon sampler 300 mm into the subsoil, driven by means of a 63.5 kg hammer falling freely a distance of 750 mm. In cases where the split spoon does not penetrate 300 mm, the number of blows over the distance of actual penetration in millimetres is shown as $\frac{xBlows}{mm}$

Water Content - The ratio of the mass of water to the mass of oven-dry solids in the soil expressed as a percentage.

W_P - Plastic Limit of a fine-grained soil expressed as a percentage as determined from the Atterberg Limit Test.

W_L - Liquid Limit of a fine-grained soil expressed as a percentage as determined from the Atterberg Limit Test.

REMARKS

The last column describes pertinent drilling details, field observations and/or provides an indication of other field or laboratory tests that were performed.

BORING NUMBER BH23-01

PRI ENGINEERING

CLIENT TD Consulting
PROJECT NAME Country RD 49
PROJECT NUMBER 23-075
PROJECT LOCATION Bobcaygeon, ON
DATE STARTED 8/9/23 **COMPLETED** 8/9/23
GROUND ELEVATION
DRILLING CONTRACTOR Strata Drilling Group
GROUND WATER LEVELS:
DRILLING METHOD 152 mm Hollow Stem Auger with 50 mm Split Spoon
LOGGED BY AH **CHECKED BY** VG
AT END OF DRILLING 1.2 m
NOTES Lat:44.561136, Long:-78.547456
AFTER DRILLING ---

DEPTH (m)	ELEVATION (mASL)	GRAPHIC LOG	MATERIAL DESCRIPTION	MONITOR WELL DETAILS	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	SPT N VALUE / PL MC LL / FINES CONTENT (%)	REMARKS AND TESTS
0.0			TOPSOIL:		SS 1	58	1-1-2-3 (3)		29		Borehole was open upon completion of drilling
0.8			SAND AND GRAVEL: Brown SAND AND GRAVEL, some silt, some clay, moist, compact		SS 2	100	4-7-6-14 (13)		10		GSA SS2: Gravel: 35% Sand: 35% Silt and clay: 30% Groundwater observed at 1.22 m below ground surface upon completion of drilling
1.0					SS 3	42	3-5-5-13 (10)		13		GSA SS3: Gravel: 43% Sand: 34% Silt and Clay: 23%
2.0			- Dark brown, saturated		SS 4	50	5-30-50 (80)		7		
2.9			Borehole terminated upon refusal at 2.9 m below ground surface on presumed BEDROCK.								

SPT N VALUE: 20 40 60 80
PL MC LL: 20 40 60 80
FINES CONTENT (%): 20 40 60 80

BORING NUMBER BH23-02

PRI ENGINEERING

CLIENT TD Consulting
PROJECT NAME Country RD 49
PROJECT NUMBER 23-075
PROJECT LOCATION Bobcaygeon, ON
DATE STARTED 8/10/23 **COMPLETED** 8/10/23
GROUND ELEVATION
DRILLING CONTRACTOR Strata Drilling Group
GROUND WATER LEVELS:
DRILLING METHOD 152 mm Hollow Stem Auger with 50 mm Split Spoon
LOGGED BY AH **CHECKED BY** VG
AT END OF DRILLING ---
NOTES Lat:44.560908, Long:-78.546334
AFTER DRILLING ---

DEPTH (m)	ELEVATION (mASL)	GRAPHIC LOG	MATERIAL DESCRIPTION	MONITOR WELL DETAILS	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	SPT N VALUE / PL MC LL / FINES CONTENT (%)	REMARKS AND TESTS
			TOPSOIL:		SS 1	25	1-1-3-3 (4)		42		Borehole was open and dry upon completion of drilling
0.8											
1.0			SAND AND GRAVEL: Brown SAND AND GRAVEL, some silt, some clay, moist to saturated, compact		SS 2	100	5-15-17-12 (32)		8		
					SS 3	50	18-50		9		
2.0											
2.4					SS 4	100	50/102		14		
			Borehole terminated upon refusal at 2.4 m below ground surface on presumed BEDROCK.								

BORING NUMBER BH23-03

PRI ENGINEERING

CLIENT TD Consulting
PROJECT NAME Country RD 49
PROJECT NUMBER 23-075
PROJECT LOCATION Bobcaygeon, ON
DATE STARTED 8/9/23 **COMPLETED** 8/9/23
GROUND ELEVATION
DRILLING CONTRACTOR Strata Drilling Group
GROUND WATER LEVELS:
DRILLING METHOD 152 mm Hollow Stem Auger with 50 mm Split Spoon
LOGGED BY AH **CHECKED BY** VG
AT END OF DRILLING ---
NOTES Lat:44.559237, Long:-78.548058
AFTER DRILLING ---

DEPTH (m)	ELEVATION (mASL)	GRAPHIC LOG	MATERIAL DESCRIPTION	MONITOR WELL DETAILS	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	SPT N VALUE / PL MC LL / FINES CONTENT (%)	REMARKS AND TESTS
			TOPSOIL:		SS 1	67	1-1-1-2 (2)		40		Borehole was open and dry upon completion of drilling
0.8											
1.0			SAND AND GRAVEL: Brown to grey SAND AND GRAVEL, some silt, some clay, moist to saturated, compact		SS 2	100	10-23-19-24 (42)		5		GSA SS2: Gravel: 38% Sand: 38% Silt:19% Clay: 5%
2.0					SS 3	77	14-17-20-50 (37)		8		
2.1			Borehole terminated upon refusal at 2.1 m below ground surface on presumed BEDROCK.								

BORING NUMBER BH23-04

PRI ENGINEERING

CLIENT TD Consulting
PROJECT NAME Country RD 49
PROJECT NUMBER 23-075
PROJECT LOCATION Bobcaygeon, ON
DATE STARTED 8/9/23 **COMPLETED** 8/9/23
GROUND ELEVATION
DRILLING CONTRACTOR Strata Drilling Group
GROUND WATER LEVELS:
DRILLING METHOD 152 mm Hollow Stem Auger with 50 mm Split Spoon
LOGGED BY AH **CHECKED BY** VG
AT END OF DRILLING ---
NOTES Lat:44.558384, Long:-78.547033
AFTER DRILLING ---

DEPTH (m)	ELEVATION (mASL)	GRAPHIC LOG	MATERIAL DESCRIPTION	MONITOR WELL DETAILS	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	SPT N VALUE / PL MC LL / FINES CONTENT (%)	REMARKS AND TESTS
			TOPSOIL: Brown TOPSOIL, moist		SS 1	58	0-2-3-2 (5)		30		Borehole was open and dry upon completion of drilling
0.8			SAND AND GRAVEL: Brown to grey SAND AND GRAVEL, some silt, some clay, moist to saturated, compact to very dense		SS 2	100	13-28-32-34 (60)		2		
1.0					SS 3	67	16-24		2		
2.0											
2.1			Borehole terminated upon refusal at 2.1 m below ground surface on presumed BEDROCK.								

BORING NUMBER BH23-05

PRI ENGINEERING

CLIENT TD Consulting
PROJECT NAME Country RD 49
PROJECT NUMBER 23-075
PROJECT LOCATION Bobcaygeon, ON
DATE STARTED 8/10/23 **COMPLETED** 8/10/23
GROUND ELEVATION
DRILLING CONTRACTOR Strata Drilling Group
GROUND WATER LEVELS:
DRILLING METHOD 152 mm Hollow Stem Auger with 50 mm Split Spoon
LOGGED BY AH **CHECKED BY** VG
AT END OF DRILLING ---
NOTES Lat:44.558242, Long:-78.545182
AFTER DRILLING ---

DEPTH (m)	ELEVATION (mASL)	GRAPHIC LOG	MATERIAL DESCRIPTION	MONITOR WELL DETAILS	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	SPT N VALUE / PL MC LL / FINES CONTENT (%)	REMARKS AND TESTS
			TOPSOIL:		SS 1	46	1-1-3-4 (4)		24		Borehole was open and dry upon completion of drilling
0.8			SAND AND GRAVEL: Brown to grey SAND AND GRAVEL, some silt, trace clay, moist, compact to very dense		SS 2	88	15-17-16-16 (33)		4		GSA SS2: Gravel: 44% Sand: 38% Silt: 14% Clay: 4%
1.0					SS 3	92	8-10-16-18 (26)		5		
2.0			- Organics		SS 4	38	50		6		
2.7			Borehole terminated upon refusal at 2.7 m below ground surface on presumed BEDROCK.								

BORING NUMBER BH23-06

PRI ENGINEERING

CLIENT TD Consulting
PROJECT NAME Country RD 49
PROJECT NUMBER 23-075
PROJECT LOCATION Bobcaygeon, ON
DATE STARTED 8/10/23 **COMPLETED** 8/10/23
GROUND ELEVATION
DRILLING CONTRACTOR Strata Drilling Group
GROUND WATER LEVELS:
DRILLING METHOD 152 mm Hollow Stem Auger with 50 mm Split Spoon
LOGGED BY AH **CHECKED BY** VG
AT END OF DRILLING ---
NOTES Lat:44.557609, Long:-78.546663
AFTER DRILLING ---

DEPTH (m)	ELEVATION (mASL)	GRAPHIC LOG	MATERIAL DESCRIPTION	MONITOR WELL DETAILS	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	SPT N VALUE / PL MC LL / FINES CONTENT (%)	REMARKS AND TESTS
0.2			TOPSOIL:								
			SAND AND GRAVEL: Brown to grey SAND AND GRAVEL, some silt, trace clay, moist, compact to very dense		SS 1	63	1-5-5-12 (10)		21		Borehole was open and dry upon completion of drilling
1.0					SS 2	75	6-32-50 (82)		2		
2.0					SS 3	77	46-50		3		GSA SS4: Gravel: 36% Sand: 39% Silt: 18% Clay: 7%
2.9					SS 4	83	46-37-50 (87)		2		
			Borehole terminated upon refusal at 2.9 m below ground surface on presumed BEDROCK.								

BORING NUMBER BH23-07

PRI ENGINEERING

CLIENT TD Consulting
PROJECT NAME Country RD 49
PROJECT NUMBER 23-075
PROJECT LOCATION Bobcaygeon, ON
DATE STARTED 8/9/23 **COMPLETED** 8/9/23
GROUND ELEVATION
DRILLING CONTRACTOR Strata Drilling Group
GROUND WATER LEVELS:
DRILLING METHOD 152 mm Hollow Stem Auger with 50 mm Split Spoon
LOGGED BY AH **CHECKED BY** VG
AT END OF DRILLING ---
NOTES Lat:44.557386, Long:-78.545936
AFTER DRILLING ---

DEPTH (m)	ELEVATION (mASL)	GRAPHIC LOG	MATERIAL DESCRIPTION	MONITOR WELL DETAILS	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	SPT N VALUE / PL MC LL / FINES CONTENT (%)	REMARKS AND TESTS
0.1			TOPSOIL: Brown silty clay TOPSOIL, moist SAND AND GRAVEL: Brown to grey SAND AND GRAVEL, some silt, trace clay, moist, compact to very dense		SS 1	63	1-1-5-6 (6)		10		Borehole was dry upon completion of drilling
1.0					SS 2	88	12-14-19-21 (33)		4		
1.5			GRAVEL: White GRAVEL, trace silt, dry		SS 3	100	20-43-34-38 (77)		2		
2.0											
2.3			SAND AND GRAVEL: Brown to grey SAND AND GRAVEL, some silt, trace clay, moist, very dense		SS 4	67	10-21-50 (71)		4		
3.0					SS 5	100	14-42-43-50 (85)		4		Borehole caved at 3.51 m below ground surface
4.0											
5.0					SS 6	0	50				
5.2			Borehole terminated upon refusal at 5.2 m below ground surface on presumed BEDROCK.								

SPT N VALUE: 20 40 60 80
PL MC LL: 20 40 60 80
FINES CONTENT (%): 20 40 60 80

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Appendix B

Geotechnical Laboratory Results

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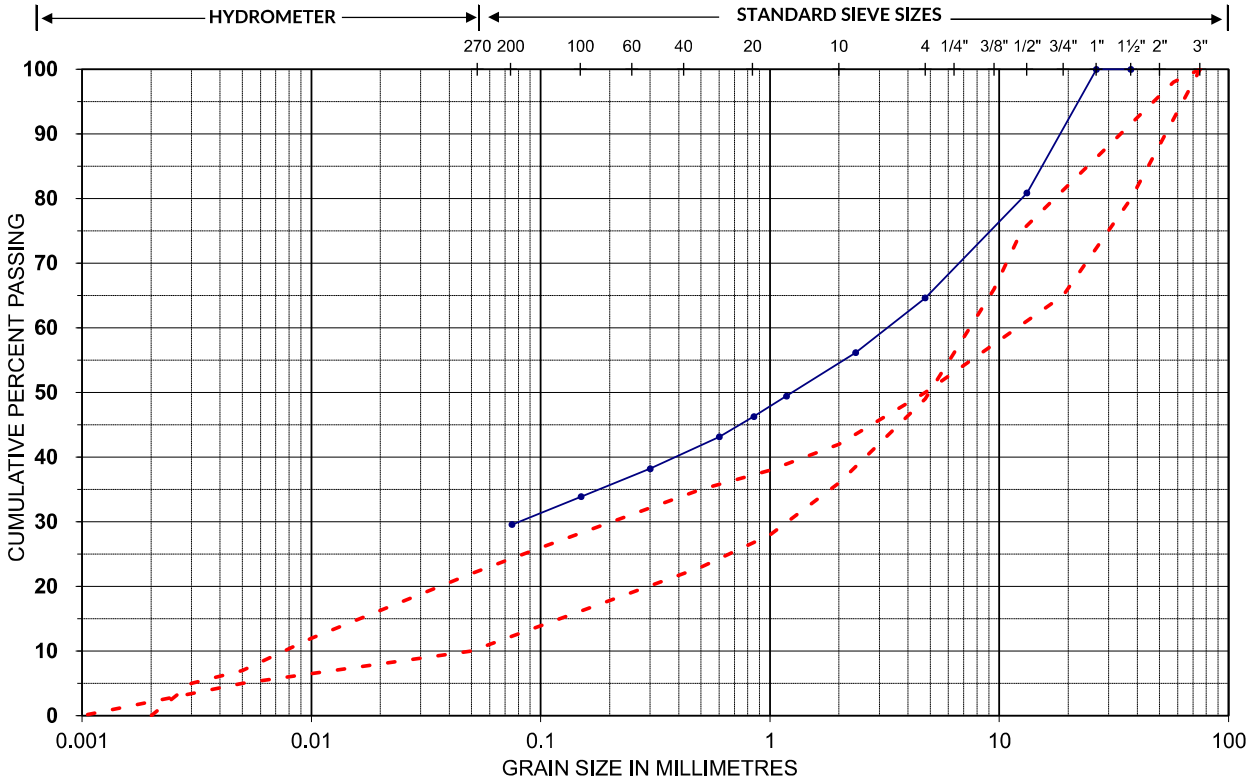
(705) 702-3921
info@priengineering.com
www.priengineering.com

SIEVE ANALYSIS

LS - 602

T-Time Analysis
MMAH Supplementary Standard SB-6

Project Name: County Rd 49 **Project No.:** 23-075 **Sample Date:** 9-Aug-23
Site ID: BH23-01 **Sample No./Depth:** SS2 / 2.5' - 4.5' **LAB ID:** 23GSA-123



Silt or Clay	Sand	Gravel

GM envelope T = 4 - 12 min/cm

Estimated T = 13 min/cm

Sieve Size (mm)	% Passing
37.5	100.0
26.5	100.0
13.2	80.9
4.75	64.6
2.36	56.2

Sieve Size (mm)	% Passing
1.180	49.5
0.600	43.1
0.300	38.2
0.150	33.9
0.075	29.6

NOTES

Percolation rates are based on the Supplementary Standard to the Ontario Building Code 2012 document *Percolation Time and Soil Descriptions (*SB-5). It should be noted, PRI did not conduct field investigations in conjunction with the sample collection, or witness the collection of the sample tested. PRI assumes no responsibility for the application of the above-noted percolation rate ("T"-Time) for use in design of an on-site sewage dispsal system. The design of an on-site sewage system must be conduction by a qualified professional with due regard for a number of site-specific conditions in addition to the percolation rate of the soil. The client or any third party using this informaiton as a basis for design assumes all risk associated with their evaluation of this report and all other criteria used in the design of any private sewage disposal system. This report is based entirely on the grain size distribution curve of the soil sample submitted for analysis. Additional analyses may be required following any future processing of the subject material or following supply of the material to individual sites for use in any tile bed construction.

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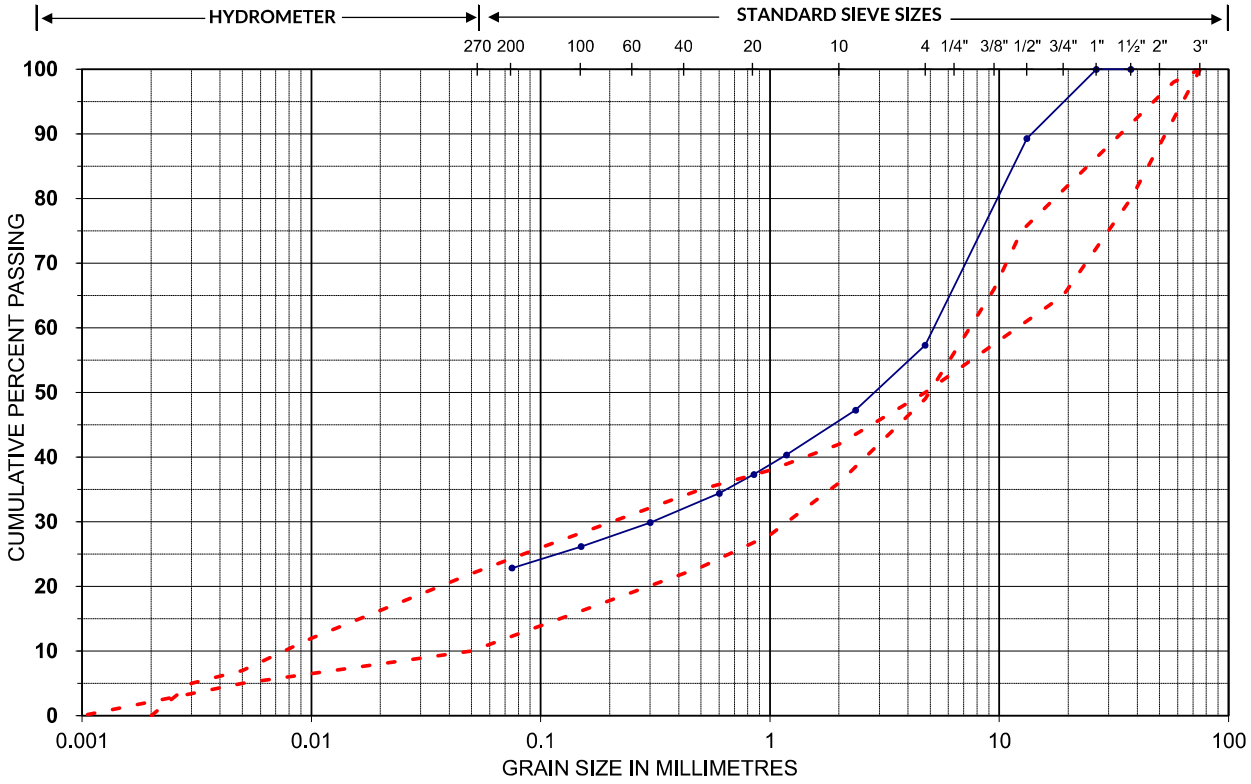
205 St.George Street, Unit 2, Lindsay, ON, K9V 5Z9
(705) 702-3921
info@priengineering.com
www.priengineering.com

SIEVE ANALYSIS

LS - 602

T-Time Analysis
MMAH Supplementary Standard SB-6

Project Name: County Rd 49 **Project No.:** 23-075 **Sample Date:** 9-Aug-23
Borehole/Test Pit ID.: BH23-01 **Sample No./Depth:** SS3 / 5' - 7' **LAB ID:** 23GSA-123



Silt or Clay	Sand	Gravel

GM envelope T = 4 - 12 min/cm

Estimated T = 12 min/cm

Sieve Size (mm)	% Passing
37.5	100.0
26.5	100.0
13.2	89.3
4.75	57.3
2.36	47.3

Sieve Size (mm)	% Passing
1.180	40.3
0.600	34.4
0.300	29.9
0.150	26.2
0.075	22.9

NOTES

Percolation rates are based on the Supplementary Standard to the Ontario Building Code 2012 document *Percolation Time and Soil Descriptions (*SB-5). It should be noted, PRI did not conduct field investigations in conjunction with the sample collection, or witness the collection of the sample tested. PRI assumes no responsibility for the application of the above-noted percolation rate ("T"-Time) for use in design of an on-site sewage dispsal system. The design of an on-site sewage system must be conduction by a qualified professional with due regard for a number of site-specific conditions in addition to the percolation rate of the soil. The client or any third party using this informaiton as a basis for design assumes all risk associated with their evaluation of this report and all other criteria used in the design of any private sewage disposal system. This report is based entirely on the grain size distribution curve of the soil sample submitted for analysis. Additional analyses may be required following any future processing of the subject material or following supply of the material to individual sites for use in any tile bed construction.

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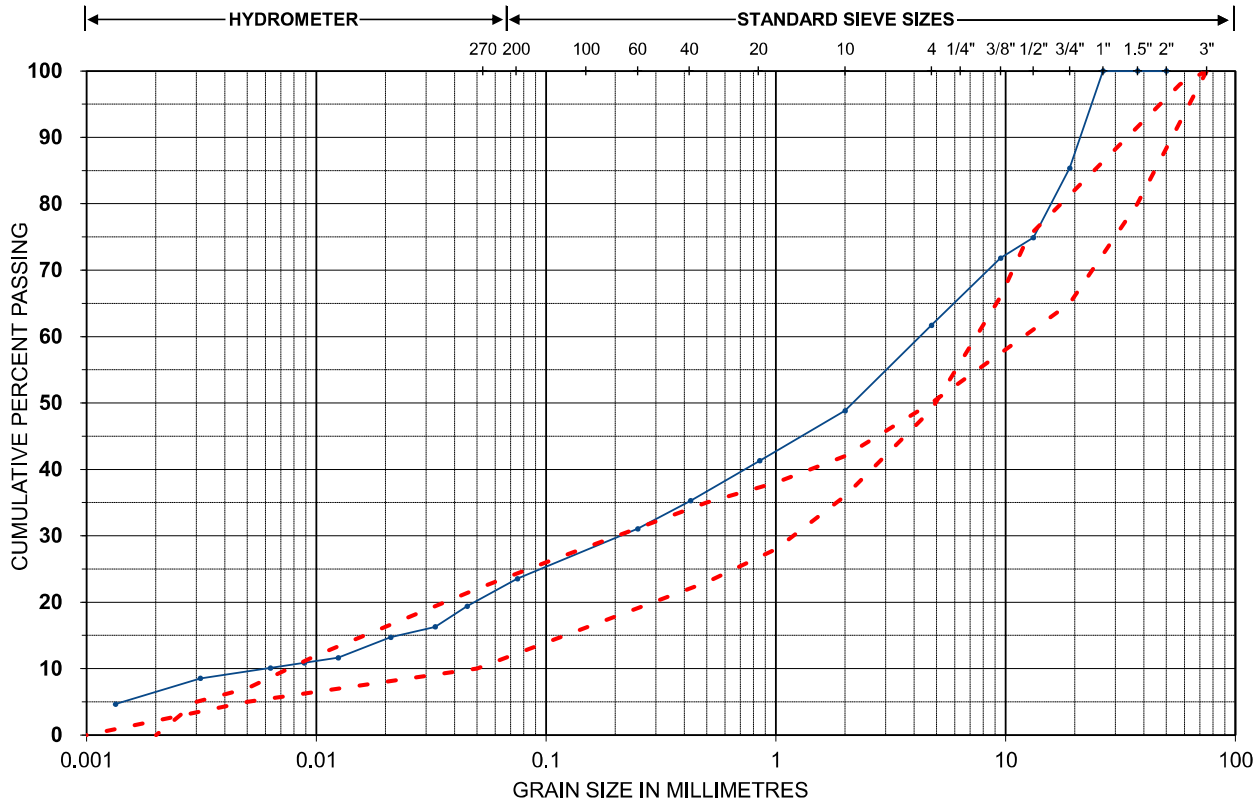
PARTICLE SIZE DISTRIBUTION

LS - 702

T-Time Analysis
MMAH Supplementary Standard SB-6

Project Name: County Rd 49 **Project No.:** 23-075 **Sample Date:** 9-Aug-23
Borehole/Test Pit ID.: BH23-03 **Sample No./Depth:** SS2/ 2.5' - 4.5' **LAB ID:** 23HYD-267



Silt or Clay	Sand	Gravel

GM envelope T = 4 - 12 min/cm

Estimated T = 12 min/cm

Sieve Size (mm)	% Passing
37.5	100.0
26.5	100.0
19.0	85.4
13.2	74.9
9.5	71.8
4.750	61.7
2.000	48.8
0.850	41.3
0.425	35.3
0.250	31.1
0.075	23.5

Hydrometer (mm)	% Passing
0.045	19.4
0.033	16.3
0.021	14.7
0.012	11.6
0.009	10.9
0.006	10.1
0.003	8.5
0.001	4.7

NOTES

Percolation rates are based on the Supplementary Standard to the Ontario Building Code 2012 document *Percolation Time and Soil Descriptions (*SB-5). It should be noted, PRI did not conduct field investigations in conjunction with the sample collection, or witness the collection of the sample tested. PRI assumes no responsibility for the application of the above-noted percolation rate ("T"-Time) for use in design of an on-site sewage dispsal system. The design of an on-site sewage system must be conduction by a qualified professional with due regard for a number of site-specific conditions in addition to the percolation rate of the soil. The client or any third party using this informaiton as a basis for design assumes all risk associated with their evaluation of this report and all other criteria used in the design of any private sewage disposal system. This report is based entirely on the grain size distribution curve of the soil sample submitted for analysis. Additional analyses may be required following any future processing of the subject material or following supply of the material to individual sites for use in any tile bed construction.

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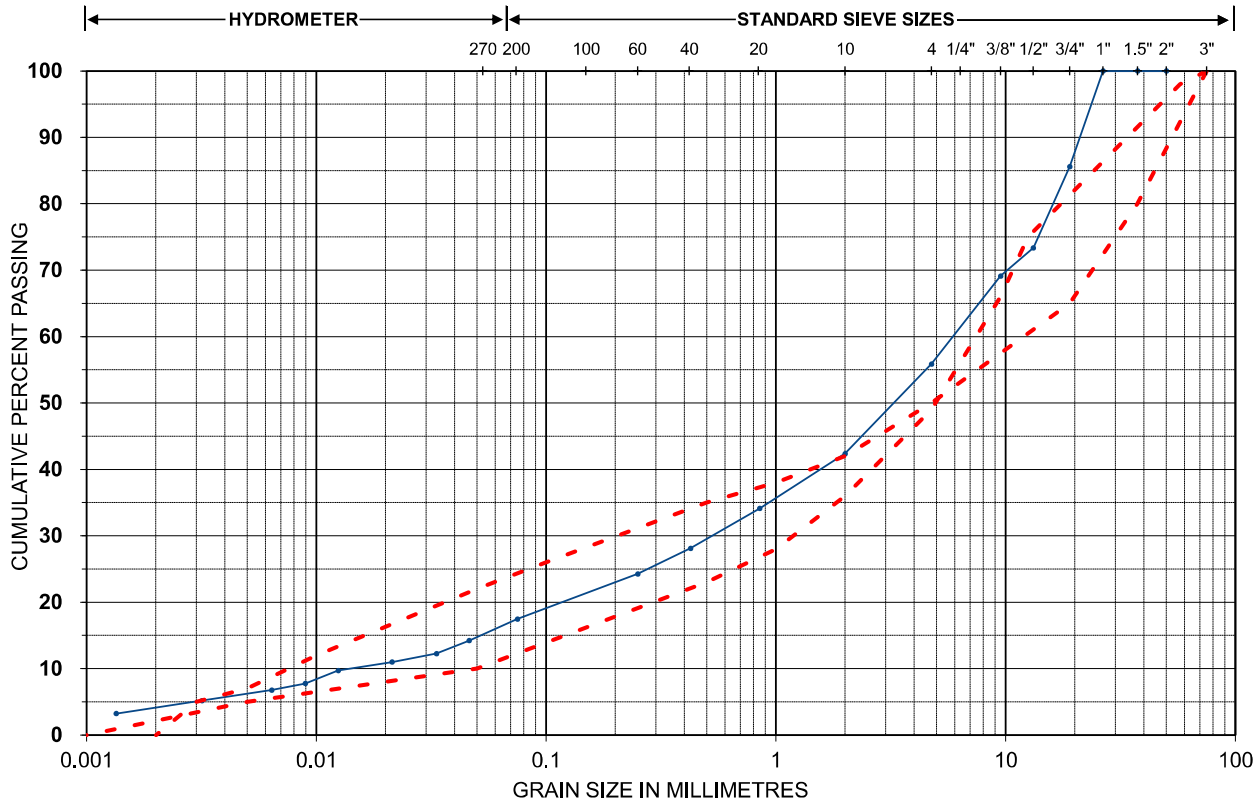
PARTICLE SIZE DISTRIBUTION

LS - 702

T-Time Analysis
MMAH Supplementary Standard SB-6

Project Name: County Rd 49 **Project No.:** 23-075 **Sample Date:** 9-Aug-23

Borehole/Test Pit ID.: BH23-05 **Sample No./Depth:** SS3 / 5' - 7' **LAB ID:** 23HYD-268



Silt or Clay	Sand	Gravel

GM envelope T = 4 - 12 min/cm

Estimated T = 8 min/cm

Sieve Size (mm)	% Passing
37.5	100.0
26.5	100.0
19.0	85.6
13.2	73.4
9.5	69.1
4.750	55.9
2.000	42.4
0.850	34.1
0.425	28.1
0.250	24.3
0.075	17.5

Hydrometer (mm)	% Passing
0.046	14.2
0.033	12.3
0.021	11.0
0.012	9.7
0.009	7.8
0.006	6.8
0.003	5.2
0.001	3.2

NOTES

Percolation rates are based on the Supplementary Standard to the Ontario Building Code 2012 document *Percolation Time and Soil Descriptions (*SB-5). It should be noted, PRI did not conduct field investigations in conjunction with the sample collection, or witness the collection of the sample tested. PRI assumes no responsibility for the application of the above-noted percolation rate ("T"-Time) for use in design of an on-site sewage dispsal system. The design of an on-site sewage system must be conduction by a qualified professional with due regard for a number of site-specific conditions in addition to the percolation rate of the soil. The client or any third party using this informaiton as a basis for design assumes all risk associated with their evaluation of this report and all other criteria used in the design of any private sewage disposal system. This report is based entirely on the grain size distribution curve of the soil sample submitted for analysis. Additional analyses may be required following any future processing of the subject material or following supply of the material to individual sites for use in any tile bed construction.

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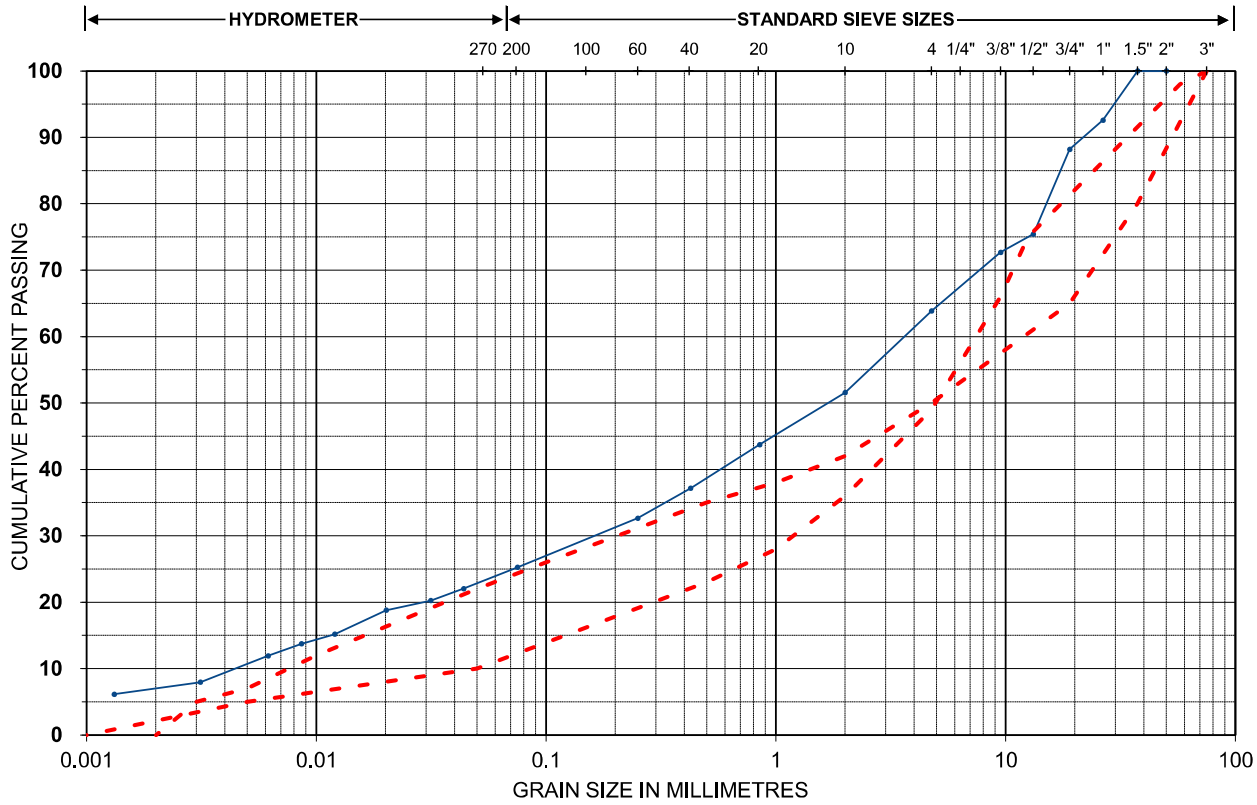
PARTICLE SIZE DISTRIBUTION

LS - 702

T-Time Analysis
MMAH Supplementary Standard SB-6

Project Name: County Rd 49 **Project No.:** 23-075 **Sample Date:** 9-Aug-23

Borehole/Test Pit ID.: BH23-07 **Sample No./Depth:** SS4 / 7.5' - 9.5' **LAB ID:** 23HYD-269



Silt or Clay	Sand	Gravel

GM envelope T = 4 - 12 min/cm

Estimated T = 13 min/cm

Sieve Size (mm)	% Passing
37.5	100.0
26.5	92.6
19.0	88.2
13.2	75.5
9.5	72.7
4.750	63.9
2.000	51.6
0.850	43.7
0.425	37.2
0.250	32.6
0.075	25.3

Hydrometer (mm)	% Passing
0.044	22.1
0.031	20.2
0.020	18.8
0.012	15.2
0.009	13.7
0.006	11.9
0.003	8.0
0.001	6.1

NOTES

Percolation rates are based on the Supplementary Standard to the Ontario Building Code 2012 document *Percolation Time and Soil Descriptions (*SB-5). It should be noted, PRI did not conduct field investigations in conjunction with the sample collection, or witness the collection of the sample tested. PRI assumes no responsibility for the application of the above-noted percolation rate ("T"-Time) for use in design of an on-site sewage dispsal system. The design of an on-site sewage system must be conduction by a qualified professional with due regard for a number of site-specific conditions in addition to the percolation rate of the soil. The client or any third party using this informaiton as a basis for design assumes all risk associated with their evaluation of this report and all other criteria used in the design of any private sewage disposal system. This report is based entirely on the grain size distribution curve of the soil sample submitted for analysis. Additional analyses may be required following any future processing of the subject material or following supply of the material to individual sites for use in any tile bed construction.

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Appendix C

Corrosivity Laboratory Results, ANSI/AWWA Soil Corrosivity Scoring System

FINAL REPORT

CA40165-AUG23 R1

23-075, Cnty Rd 49

Prepared for

PRI Engineering Corp.

FINAL REPORT

CA40165-AUG23 R1

First Page

CLIENT DETAILS

Client	PRI Engineering Corp.
Address	1 William Street, Suite 4 Lindsay, Ontario M5J 2L7. Canada
Contact	Vikki Gledhill
Telephone	519-536-5805
Facsimile	
Email	vikki.gledhill@priengineering.com
Project	23-075, Cnty Rd 49
Order Number	
Samples	Soil (3)

LABORATORY DETAILS

Project Specialist	Jill Campbell, B.Sc.,GISAS
Laboratory	SGS Canada Inc.
Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	2165
Facsimile	705-652-6365
Email	jill.campbell@sgs.com
SGS Reference	CA40165-AUG23
Received	08/16/2023
Approved	08/23/2023
Report Number	CA40165-AUG23 R1
Date Reported	08/23/2023

COMMENTS

Temperature of Sample upon Receipt: 9 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: n/a

Corrosivity Index is based on the American Water Works Corrosivity Scale according to AWWA C-105. An index greater than 10 indicates the soil matrix may be corrosive to cast iron alloys.

SIGNATORIES

Jill Campbell, B.Sc.,GISAS

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FINAL REPORT

CA40165-AUG23 R1

Client: PRI Engineering Corp.
Project: 23-075, Cnty Rd 49
Project Manager: Vikki Gledhill
Samplers: Arman Yazdani

MATRIX: SOIL

			Sample Number	5	6	7
			Sample Name	BH23-04/SS2	BH23-05/SS2	BH23-06/SS3
			Sample Matrix	Soil	Soil	Soil
			Sample Date	09/08/2023	09/08/2023	09/08/2023
Parameter	**Units**	**RL**		**Result**	**Result**	**Result**
Corrosivity Index						
Corrosivity Index	none	1		3	4	3
Soil Redox Potential	mV	no		281	273	290
Sulphide (Na2CO3)	%	0.04		< 0.04	< 0.04	< 0.04
pH	pH Units	0.05		8.81	8.96	9.11
Resistivity (calculated)	ohms.cm	-9999		7250	7410	8260
General Chemistry						
Conductivity	uS/cm	2		138	135	121
Metals and Inorganics						
Moisture Content	%	0.1		2.8	6.9	2.9
Sulphate	µg/g	0.4		9.8	16	12
Other (ORP)						
Chloride	µg/g	0.4		19	23	28

QC SUMMARY

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-IENVIIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO0404-AUG23	µg/g	0.4	<0.4	1	35	105	80	120	110	75	125
Sulphate	DIO0404-AUG23	µg/g	0.4	<0.4	3	35	97	80	120	102	75	125

Carbon/Sulphur

Method: ASTM E1915-07A | Internal ref.: ME-CA-IENVIARD-LAK-AN-020

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Sulphide (Na2CO3)	ECS0071-AUG23	%	0.04	< 0.04	ND	20	87	80	120			

Conductivity

Method: SM 2510 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0346-AUG23	uS/cm	2	2	0	20	100	90	110	NA		

QC SUMMARY

pH

Method: SM 4500 I Internal ref.: ME-CA-IENVIEWL-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0346-AUG23	pH Units	0.05	NA	0		102			NA		

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS Insufficient sample for analysis.
RL Reporting Limit.
↑ Reporting limit raised.
↓ Reporting limit lowered.
NA The sample was not analysed for this analyte
ND Non Detect

Results relate only to the sample tested.
Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.
"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.
Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

This report supersedes all previous versions.

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY

SGS Environment, Health & Safety - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environment
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361

No: Page 1 of 1

Laboratory Information Section - Lab use only

Received By: R. Saunders
Received Date: AUG 16 2023 (mm/dd/yy)
Received Time: 12 : 40 (hr : min)
Received By (signature):
Custody Seal Present: Yes ☐ No ☐
Custody Seal Intact: Yes ☐ No ☐
Cooling Agent Present: Yes ☐ No ☑ Type: ICE
Temperature Upon Receipt (°C): 9.9.9
LAB LIMS #: CA40165-Aug23

REPORT INFORMATION	INVOICE INFORMATION
Company: PRI	☒ same as Report Information
Contact: Vikki Gledhill	Company:
Address: 205 West Geogry St Lindsay ON	Contact:
Phone: 705 750 7976	Address:
Fax:	Phone:
Email: vikki.gledhill@gmail.com	Email:

Quotation #: P.O. #:
Project #: 23-075 Site Location/ID: Cnty Rd 49

TURNAROUND TIME (TAT) REQUIRED

☒ Regular TAT (5-7days) TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 6pm or on weekends: TAT begins next business day

RUSH TAT (Additional Charges May Apply): ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days

PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

Specify Due Date:

***NOTE**: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

REGULATIONS

☐ O.Reg 153/04 ☐ O.Reg 406/19
☐ Table 1 ☐ Res/Park Soil Texture:
☐ Table 2 ☐ Ind/Com ☐ Coarse
☐ Table 3 ☐ Agri/Other ☐ Medium/Fine
☐ Table ____
Soil Volume ☐ 50m3 ☐ >350m3

Other Regulations: ☐ Reg 347/558 (3 Day min TAT) ☐ PWQO ☐ MER ☐ CCME ☐ Other: ☐ MISA ☐ PDWS Not Reportable *See note

Sewer By-Law: ☐ Sanitary ☐ Storm Municipality:

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	M&I: Field Filtered (Y/N)	M&I: Metals & Inorganics (incl CrVI, CN, Hg pH,(B(HWS),EC,SAR-soil) (Cl, Na-water)	M&I: Full Metals Suite (ICP metals plus B(HWS-soil only) Hg, CrVI	M&I: ICP Metals only (Sb,As,Ba,Be,B,Cd,Cr,Co,Cu,Pb,Mo,Ni,	SVOC: PAHs only	SVOC: SVOCs all incl PAHs, ABNs, CPs	PCB: PCBs Total ☐ Aroclor ☐	PHC: F1-F4 + BTEX	PHC: F1-F4 only no BTEX	VOC: VOCs all incl BTEX	VOC: BTEX only	Pest: Pesticides Organochlorine or specify other	Other: Corrosivity	Other:	Other:	Other:	Other: Appendix 2: 406/19 Leachate Screening Levels Table : ____	Other: Sewer Use: Specify pkg:	Other: Water Characterization Pkg General ☐ Extended	TCLP: Specify TCLP tests ☐ M&I ☐ VOC ☐ PCB ☐ B(a)P ☐ ABN ☐ Ignit	COMMENTS:
1	BH23-04/SS2	08/09/23		1	S													X							
2	BH23-05/SS2	08/10/23		1	S													X							
3	BH23-06/SS3	08/1023		1	S													X							
4																									
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									

Observations/Comments/Special Instructions

Sampled By (NAME): Arman Yazdani **Signature:** A.Y. Date: 08,10,23 (mm/dd/yy)
Relinquished by (NAME): Vikki Gledhill **Signature:** V Gledhill Date: 08,14,23 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1.4
Date of Issue: 22 May. 2020

Table A.1 Soil-test evaluation

Soil Characteristics Based on Samples Taken Down to Pipe Depth		
Resistivity—ohm-cm (based on water-saturated soil box):		Points*
	<1,500	10
	≥1,500–1,800	8
	>1,800–2,100	5
	>2,100–2,500	2
	>2,500–3,000	1
	>3,000	0
pH:		
	0–2	5
	2–4	3
	4–6.5	0
	6.5–7.5	0†
	7.5–8.5	0
	>8.5	3
Redox potential:		
	> +100 mV	0
	+50 to +100 mV	3.5
	0 to +50 mV	4
	Negative	5
Sulfides:		
	Positive	3.5
	Trace	2
	Negative	0
Moisture:		
	Poor drainage, continuously wet	2
	Fair drainage, generally moist	1
	Good drainage, generally dry	0

*Ten points or greater indicates that soil is corrosive to ductile-iron pipe; protection is needed. Refer to paragraph A.3 for a description of Uniquely Severe Environments and additional considerations.

†If sulfides are present and low (<100 mv) or negative redox-potential results are obtained, add three points for this range.

PRI ENGINEERING

Appendix D

Slug Test Results

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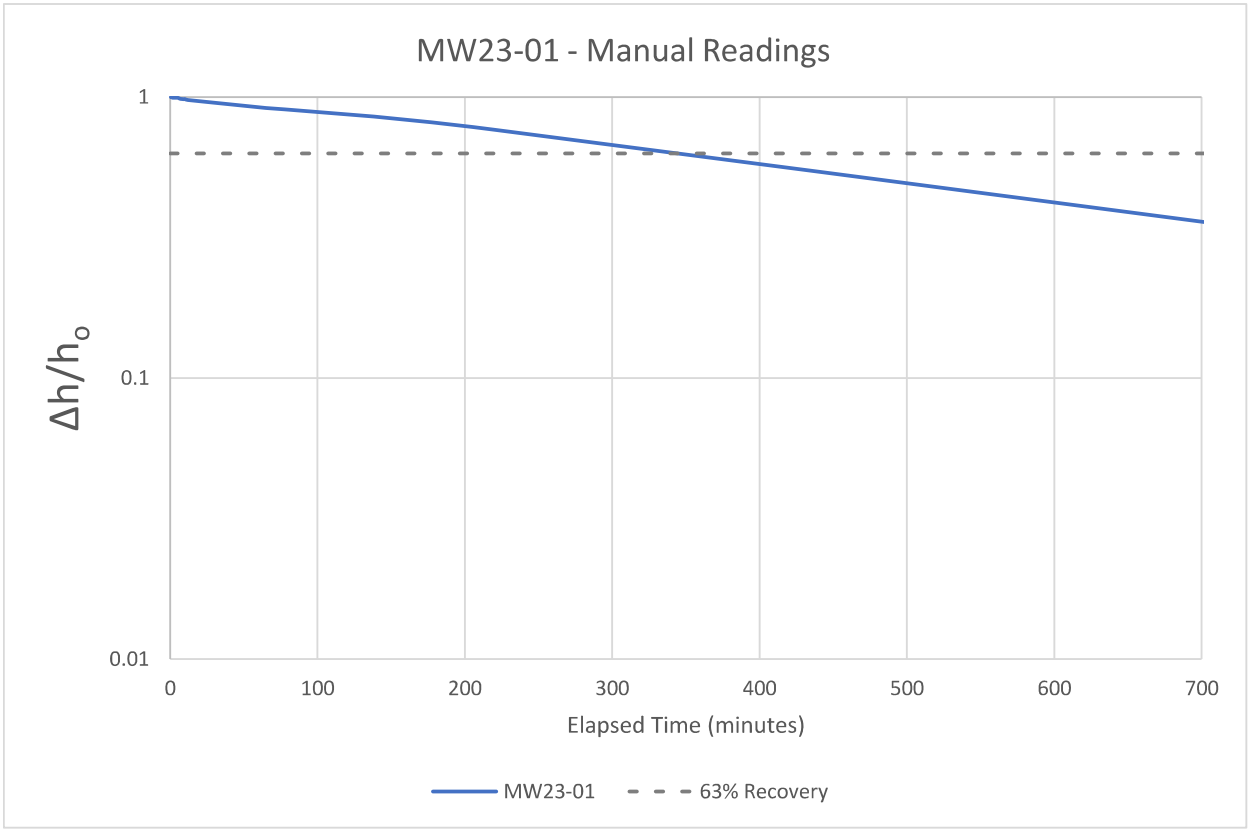
SLUG TEST - MANUAL READINGS

PROJECT:	County Rd 49
LOCATION:	Bobcaygeon, ON
PROJECT NO:	23-075
WELL ID:	MW23-01

Test Date:	22-Sep-23	Technician:	ASH
Static Water Level (mBTOP):	2.25	Sand screen Length, L (m):	1.98
Well Depth (mBGS):	4.06	Pipe Screen Length (m):	1.52
Borehole Radius, R (mm):	100	Time, T_0 (min):	350
Monitoring Radius, r (mm):	25.4	Hydraulic Conductivity,K(m/s):	2.3E-08

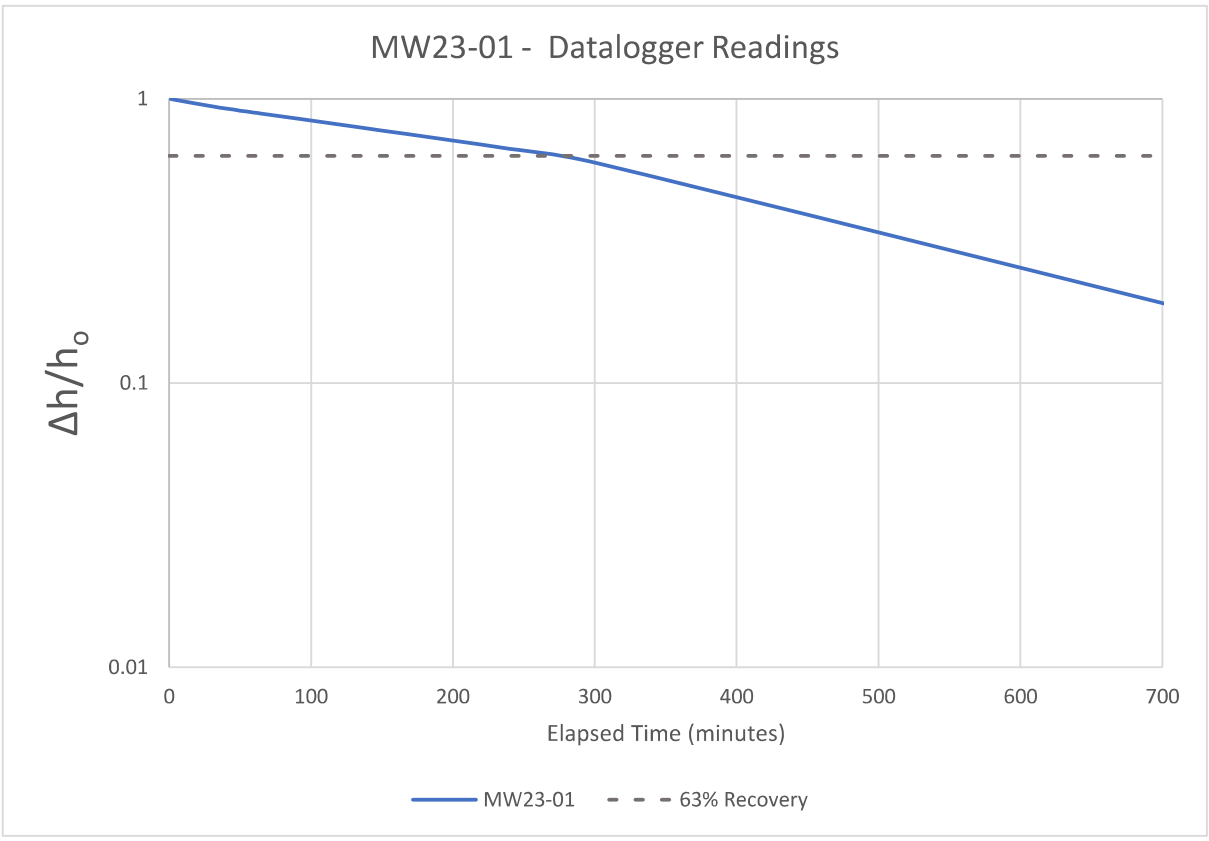


PRI ENGINEERING

SLUG TEST - DATALOGGER READINGS

PROJECT:	County Rd 49
LOCATION:	Bobcaygeon, ON
PROJECT NO:	23-075
WELL ID:	MW23-01

Test Date:	22-Sep-23	Technician:	ASH
Static Water Level (mBTOP):	2.25	Sand screen Length, L (m):	1.98
Well Depth (mBGS):	4.06	Pipe Screen Length (m):	1.52
Borehole Radius, R (mm):	100	Time, T_0 (min):	280
Monitoring Radius, r (mm):	25.4	Hydraulic Conductivity,K(m/s):	2.9E-08

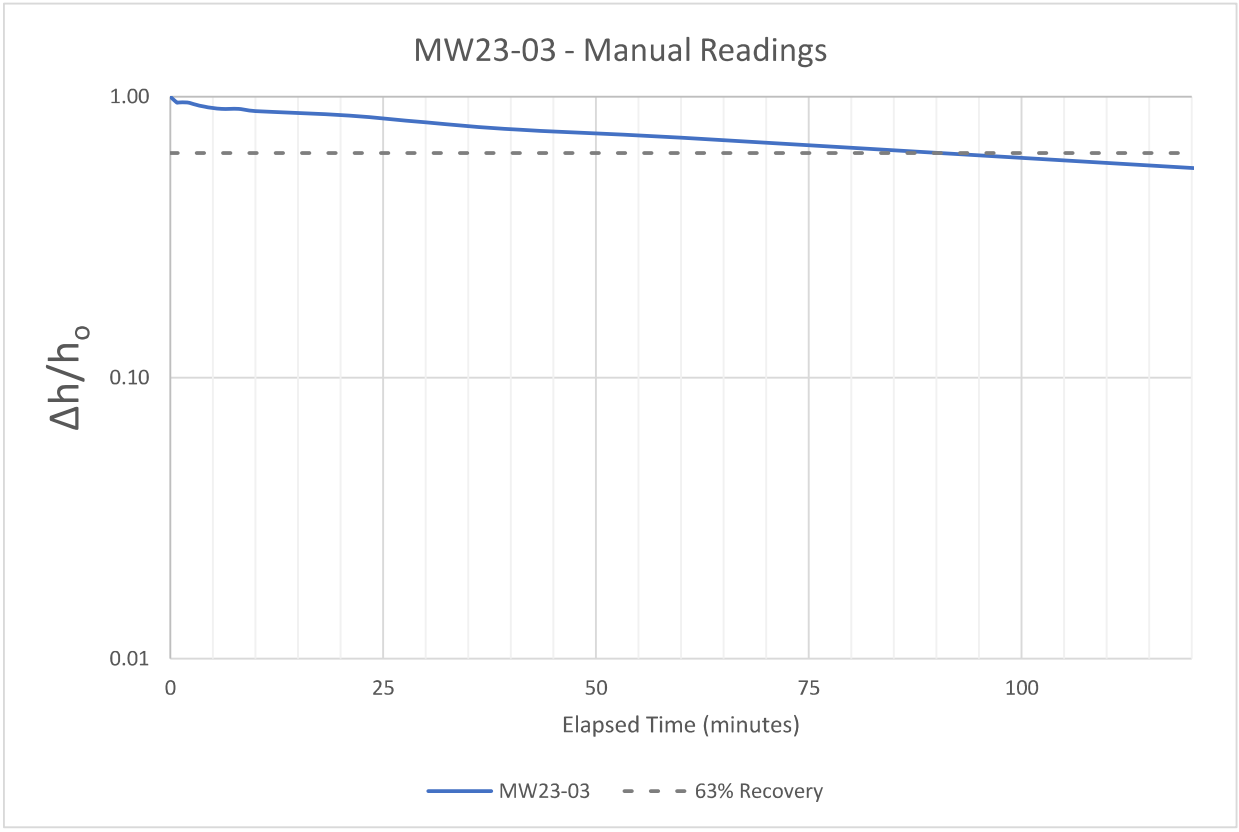


PRI ENGINEERING

SLUG TEST - MANUAL READINGS

PROJECT:	County Rd 49
LOCATION:	Bobcaygeon, ON
PROJECT NO:	23-075
WELL ID:	MW23-03

Test Date:	22-Sep-23	Technician:	ASH
Static Water Level (mBTOP):	3.35	Sand screen Length, L (m):	1.8
Well Depth (mBGS):	3.35	Pipe Screen Length (m):	1.5
Borehole Radius, R (mm):	76.2	Time, T_0 (min):	90
Monitoring Radius, r (mm):	25.4	Hydraulic Conductivity,K(m/s):	1.0E-07

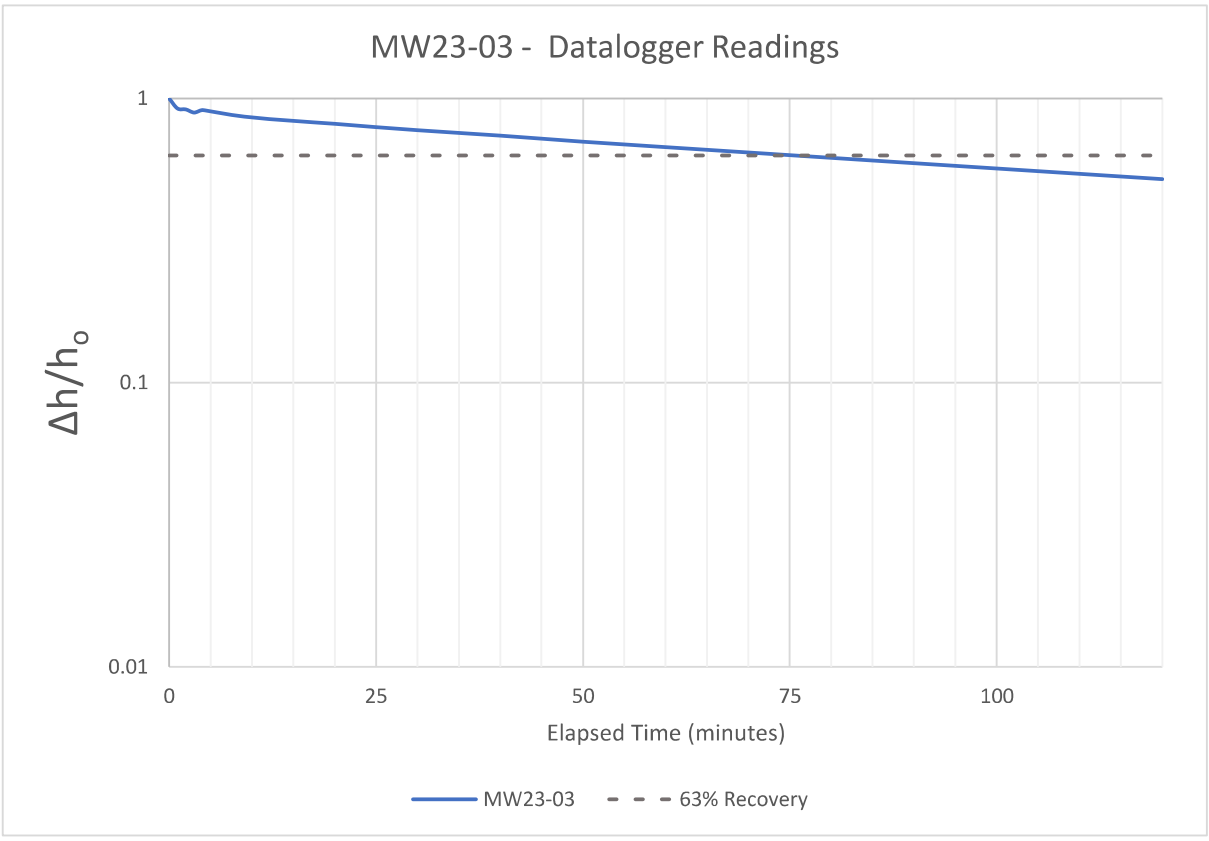


PRI ENGINEERING

SLUG TEST - DATALOGGER READINGS

PROJECT:	County Rd 49
LOCATION:	Bobcaygeon, ON
PROJECT NO:	23-075
WELL ID:	MW23-03

Test Date:	22-Sep-23	Technician:	ASH
Static Water Level (mBTOP):	3.35	Sand screen Length, L (m):	1.8
Well Depth (mBGS):	3.35	Pipe Screen Length (m):	1.5
Borehole Radius, R (mm):	76.2	Time, T_0 (min):	75
Monitoring Radius, r (mm):	25.4	Hydraulic Conductivity,K(m/s):	1.2E-07

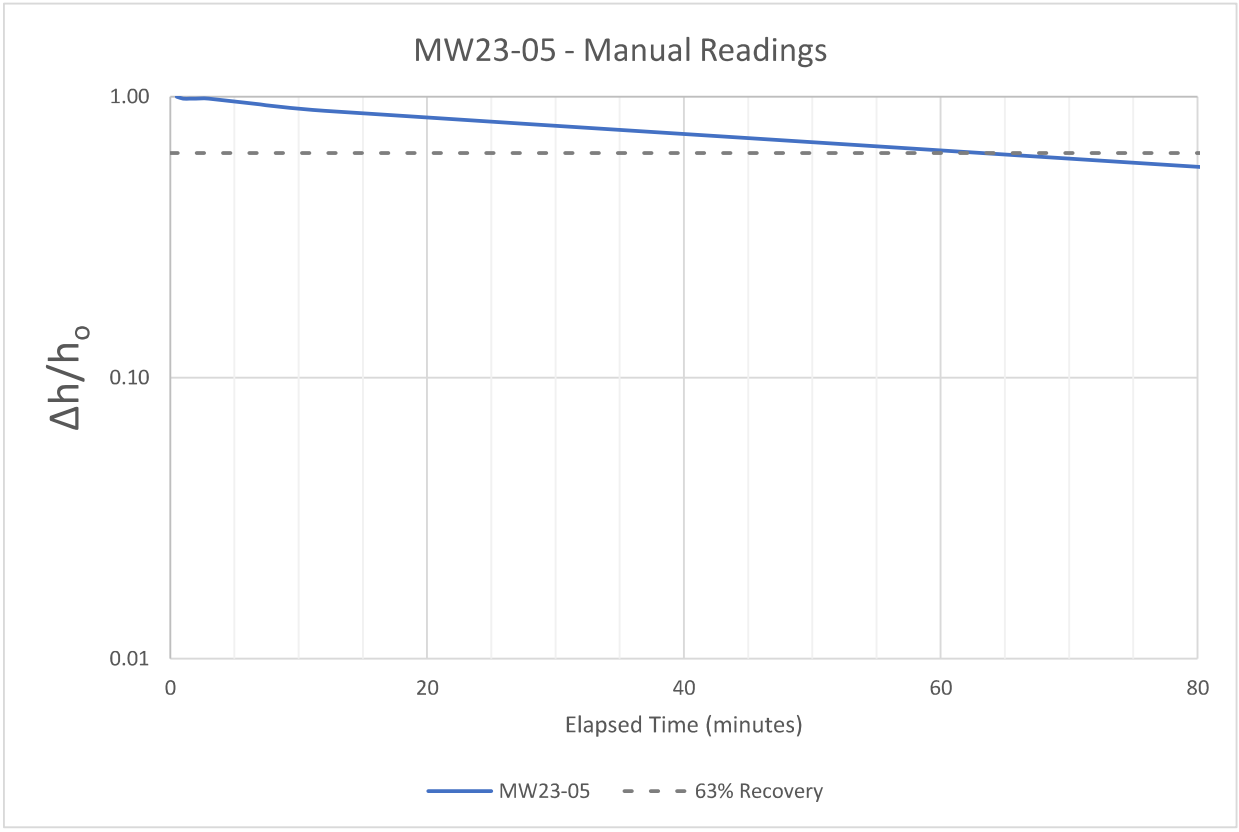


PRI ENGINEERING

SLUG TEST - MANUAL READINGS

PROJECT:	County Rd 49
LOCATION:	Bobcaygeon, ON
PROJECT NO:	23-075
WELL ID:	MW23-05

Test Date:	22-Sep-23	Technician:	ASH
Static Water Level (mBTOP):	3.25	Sand screen Length, L (m):	1.98
Well Depth (mBGS):	3.25	Pipe Screen Length (m):	1.52
Borehole Radius, R (mm):	76.2	Time, T_0 (min):	65
Monitoring Radius, r (mm):	25.4	Hydraulic Conductivity,K(m/s):	1.4E-07

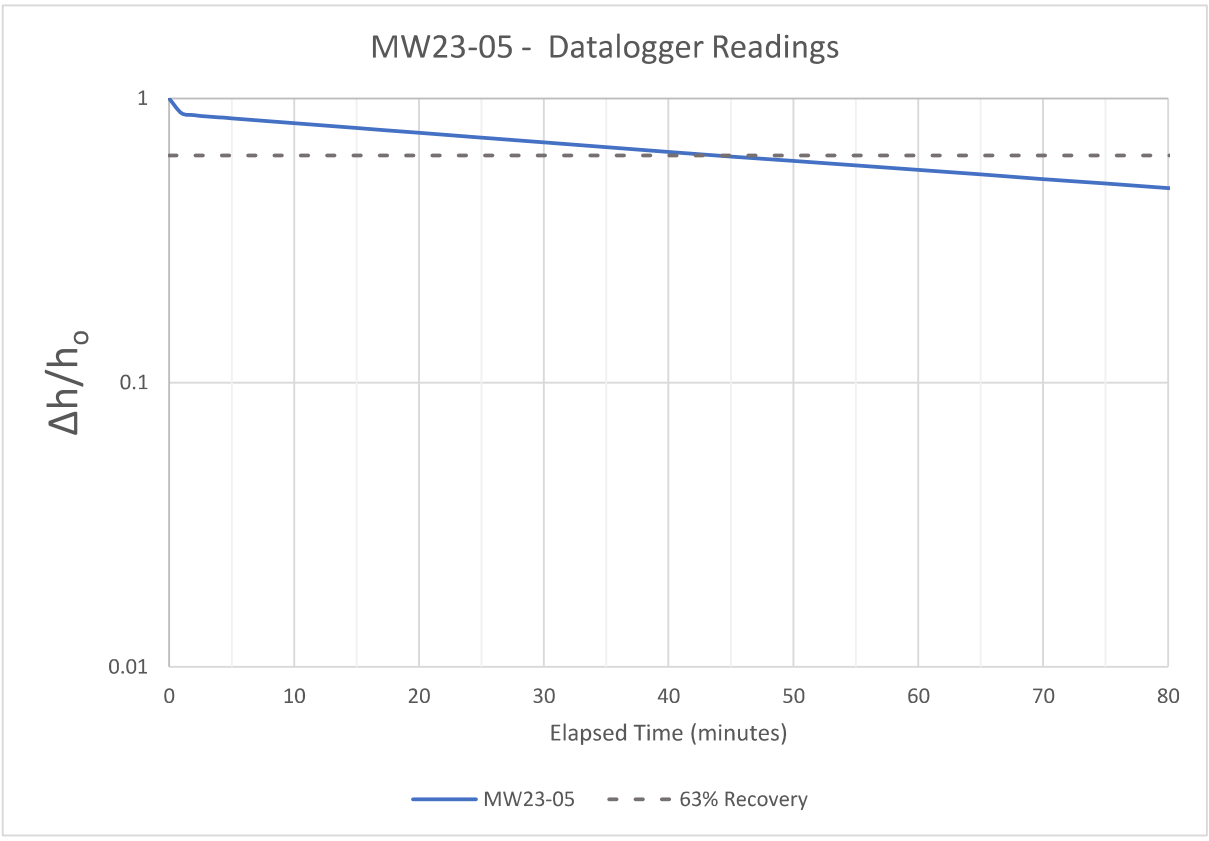


PRI ENGINEERING

SLUG TEST - DATALOGGER READINGS

PROJECT:	County Rd 49
LOCATION:	Bobcaygeon, ON
PROJECT NO:	23-075
WELL ID:	MW23-05

Test Date:	22-Sep-23	Technician:	ASH
Static Water Level (mBTOP):	3.25	Sand screen Length, L (m):	1.98
Well Depth (mBGS):	3.25	Pipe Screen Length (m):	1.52
Borehole Radius, R (mm):	76.2	Time, T_0 (min):	45
Monitoring Radius, r (mm):	25.4	Hydraulic Conductivity,K(m/s):	2.0E-07

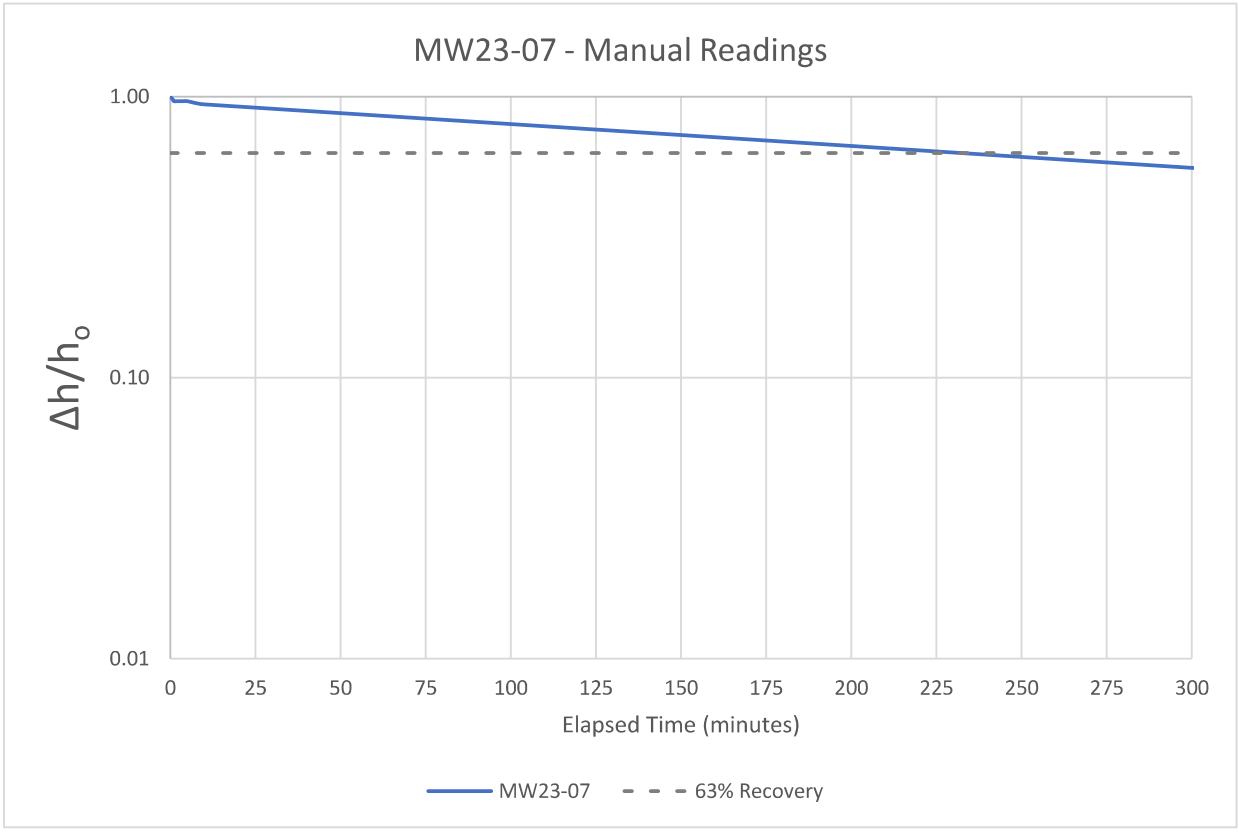


PRI ENGINEERING

SLUG TEST - MANUAL READINGS

PROJECT:	County Rd 49
LOCATION:	Bobcaygeon, ON
PROJECT NO:	23-075
WELL ID:	MW23-07

Test Date:	22-Sep-23	Technician:	ASH
Static Water Level (mBTOP):	4.43	Sand screen Length, L (m):	1.98
Well Depth (mBGS):	4.43	Pipe Screen Length (m):	1.52
Borehole Radius, R (mm):	76.2	Time, T_0 (min):	240
Monitoring Radius, r (mm):	25.4	Hydraulic Conductivity,K(m/s):	3.7E-08



PRI ENGINEERING

SLUG TEST - DATALOGGER READINGS

PROJECT:	County Rd 49
LOCATION:	Bobcaygeon, ON
PROJECT NO:	23-075
WELL ID:	MW23-07

Test Date:	22-Sep-23	Technician:	ASH
Static Water Level (mBTOP):	4.43	Sand screen Length, L (m):	1.98
Well Depth (mBGS):	4.43	Pipe Screen Length (m):	1.52
Borehole Radius, R (mm):	76.2	Time, T_0 (min):	180
Monitoring Radius, r (mm):	25.4	Hydraulic Conductivity,K(m/s):	4.9E-08