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Hydrogeological Study for a Private Water Well Supply Proposed Commercial / Industrial Development

> 3713 Borrisokane Road Ottawa, Ontario

> > **Prepared For**

Caivan (Greenbank North) Inc.

March 18, 2020

Report PH3959-REP.03



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1.0 INTRODUCTION

Paterson has conducted a Hydrogeological Study for a Private Water Well Supply in support of a proposed lot severance of an existing industrial property located at 3713 Borrisokane Road. The purpose of these works has been to determine the suitability of the water supply aquifer underlying the subject site to service a proposed lot severance. The severance will consist of the creation of one lot that is identified as 3713 Borrisokane Road (Part 1) and 3717 Borrisokane Road (Part 2), as shown on J.D Barnes Plan 4R-32754 dated March 19, 2020 in Appendix 3. Specifically, these works are being carried out to satisfy Condition 3 of the Committee of Adjustment Decision, File No. D08-01-20/B-00004 and D08-01-20/B-00007. This report supercedes Paterson Report PH3959-REP.02 - Desktop Hydrogeological Review for a Private Water Supply Well dated December 12, 2019.

This report is to be read in conjunction with Paterson Report PH3959-REP.01-Groundwater Impact Assessment: Proposed Commercial Development dated December 12, 2019. The report provides an overview of the impacts related to the proposed sewage system and the reasonable use assessment.

1.1 Terms of Reference

Paterson Group Inc. (Paterson) was retained by Caivan (Greenbank North) Inc. (Caivan) to carry out a Hydrogeological Study for a Private Water Supply in support of a lot severance application at 3713 Borrisokane Road, Ottawa, Ontario. The proposed development is intended to be serviced by municipal services in the future and the process to complete the future municipal servicing has been commenced. At this time, the current report is intended to meet the lot severance requirements for Condition 3 within the Committee of Adjustment Decision.

The proposed development within Part 1 is expected to consist of a two storey, slab-on-grade warehouse and office building with a combined footprint of approximately 11,794 m². The subject site (Part 1) and Part 2 to the east were previously used as an aggregate extraction operation that is now considered to be depleted of resources and is undergoing rehabilitation. Reference should be made to Paterson Drawing PH3959 - 1 - Rev.1 - Proposed Site Layout in Appendix 3 for the site location and general proposed site layout.

The subject site is located immediately west of the approved Community Design Plan (CDP) boundary within a rural zone requiring private services. A potable water supply well has been constructed onsite in support of the lot severance application.

Hydrogeological Study for a Private Water Supply Well



Proposed Commercial / Industrial Development 3713 Borrisokane Road, Ottawa, Ontario

The purpose of this study has been to carry out a hydrogeological review to determine the suitability of the water supply aquifer system underlying the site to adequately supply the proposed development for potable usage. Specifically, the intent of this report is not to design the water distribution system, but to determine the availability of a safe, reliable water supply having sufficient quality and quantity to provide interim potable water for the proposed development.

This study was conducted in general accordance with Ontario Ministry of Environment guidance document Procedure D-5-5 - Technical Guideline for Private Wells; Water Supply Assessment.

The following report has been prepared specifically and solely for the aforementioned project described herein. It contains our findings and recommendations pertaining to the private services for the subject site as it is understood at the time of writing this report.



2.0 BACKGROUND

2.1 Subject Site

The subject site is approximately 7.9 ha (Part 1) and is located at 3713 Borrisokane Road in the City of Ottawa, Ontario (refer to Paterson Drawing PH3959 - 1 - Rev.1 - Proposed Site Layout Plan and J.D Barnes Ltd. Plan 4R-32754 in Appendix 3). The subject site is bounded to the west of the site by Borrisokane Road followed by Highway 416 and the Trail Road Landfill Facility. An undeveloped partially treed lot borders the site to the north and a proposed residential development to the north and east. East of the site lies undeveloped land with future plans to construct a residential development on municipal services. The property is currently zoned Mineral Extraction Operation - Pit with an ME2 zoning designation. However, the Ontario Ministry of Natural Resources and Forestry has confirmed that the Drummond Costello Pit license has been surrendered in accordance with appropriate Ministry requirements.

The subject site was formerly used as part of an aggregate extraction operation. Various fill piles, excavated areas, gravel roads, as well as scattered construction debris are located across the site.

2.2 Neighbouring Properties

The subject property is bordered by Borrisokane Road to the west followed by Highway 416 and then by the Trail Road Landfill Facility, an undeveloped partially treed lot to the north, undeveloped lands being rehabilitated to the east for a proposed residential development in the future and a currently proposed residential development (The Ridge). See Paterson Drawing PH3959 - 1 - Rev.1 - Proposed Site Layout Plan in Appendix 3.

2.3 Neighbouring Wells

A search of the Ministry of the Environment, Conservation and Parks (MECP) online water well mapping database found nine (9) well records within 500 m of the subject site. Six (6) of the WWRs were recorded as either monitoring/test wells, and the other three (3) WWRs are abandonment records. There are no recorded potable water wells within 500 m of the subject site. All nearby rural properties currently consist of commercial and industrial usages. Municipal services will exist in the proposed developments to the east and northeast within the CDP boundary. See Paterson Drawing PH3959 - 2 - MECP Water Well Location Plan in Appendix 3.



2.4 Regional Geology

Published surficial geology mapping for the area in the vicinity of the subject site indicate that the site is underlain by a glaciofluvial deposit with a portion of the site located within the Ottawa Valley Kars Esker. Refer to Paterson Drawing PH3959 - 4 - Surficial Geology in Appendix 3 for the Ontario Geological Survey (OGS) mapping.

Based on site specific investigative works carried out by this firm (Paterson Report No. PG5155-1 Revision 1, dated Feb 10, 2020), the general subsoil profile encountered within the subject area consisted of a fill layer overlying a silty sand and/or sand deposit with varying amount of gravel, cobbles and boulders. A discontinuous brown to grey silty clay was encountered below the sand deposit and/or fill layer at select test hole locations. The clay layer extends from west to east and pinches out within the subject site. Reference should be made to Paterson Drawing PG5155-1 Revision 1 - Test Hole Location Plan and the associated Soil Profile and Test Data sheets in Appendix 3 for specific details of the soil profiles encountered at each test hole location.

According to the available mapping from Natural Resources Canada for Drift Thickness, the overburden across the site ranges in thickness from approximately 15 to 25 m. Paterson borehole BH14-19 extended to a depth of 31.72 m and did not encounter bedrock.

During the construction of TW1, grey and black limestone bedrock was recorded at 33.8 m depth below ground surface (bgs), and white sandstone was recorded to be encountered at 87.2 m bgs.

The OGS mapping indicates that the subject lands are underlain by dolostone and limestone bedrock of the Oxford Formation. Refer to Paterson Drawing PH3959-6 - Bedrock Geology in Appendix 3 for the OGS mapping. Underlying the Oxford Formation is the March and Nepean Formations consisting of sandstone. The Oxford Formation is widely used as an aquifer to provide good quality and quantity water supplies. The underlying sandstone formations are well known to provide groundwater considered to be very high in quantity and quality. Some of the municipal water supplies for the Villages surrounding the City use the Nepean aquifer to provide adequate quantity and quality without adversely affecting other water users or the aquifer.



2.5 Proposed Development

The proposed development is anticipated to be serviced through municipal services in the future and Caivan is following the process to obtain these services. However, private servicing options are being reviewed to comply with the Committee of Adjustment Decision as previously referenced. If private services are needed on an interim basis, the buildings are proposed to be constructed in a phased approach as noted below.

Phase 1

The proposed Phase 1 building is expected to consist of a two storey, slab-on-grade assembly building with a footprint of approximately 9,341 m². It is anticipated that associated paved access lanes, vehicle parking areas and landscaped areas will surround the proposed buildings. The estimated peak season employee count is 40 employees working two shifts a day, with an estimated maximum daily sewage flow volume of 6,650 L/day (based on Ontario Building Code - 2012 - Part 8).

Phase 2

The proposed Phase 2 building is an office/showroom building. This phase is proposed to be completed subsequent to Phase 1. The office building has an approximate footprint of 2,453 m². The estimated maximum daily flow volume is 22,253 L/day, which will require an environmental compliance application (ECA) and supporting documents/processes for the private on-site sewage treatment system. Refer to Paterson Drawing PH3959 - 1 - Rev.1 - Proposed Site Layout Plan in Appendix 3 for further details.

Existing Water Supply Well Location

The proposed development is anticipated to be municipally serviced. However, a private water supply well has been constructed (March 6, 2020) onsite after consultation with the City of Ottawa and has been constructed to meet Condition 3 of the Committee of Adjustment Decision. The location of the potable water supply well is outside the minimum required setbacks as per O.Reg. 903 and is located upgradient of the proposed sewage system area. Refer to Paterson Drawing PH3959 - 1 - Rev.1 - Proposed Site Layout Plan in Appendix 3 for the existing location of the water supply well.



Peak Season Maximum Daily Water Demand

Although the development will be constructed in a phased approach, the potable water supply well is proposed to be used to supply both phases of the development dependent upon the timing of municipal services.

Paterson Group completed theoretical daily water demand calculations for the proposed development. In order to determine the peak seasonal maximum daily water demand, the follow parameters have been used.

For Phase 1, the factory is assumed to have 40 employees at 2 shifts per day, and the factory office space is approximately 80 m^2 . This equates to (40 employees x 2 shifts x 75 L/day) + ((80 m^2 / 9.3 m^2) x 75 L/day) for a total of 6,650 L/Day.

For Phase 2, a daycare with 15 children and two adults, a design/visitor center with 30 visitors per hour for 8 hours of the day, and an office space of 2,006 m^2 were used for the calculations. This equates to ((15 children x 75 L/day) + (2 adults x 75 L/day)) + (30 visitors per hour x 8 hours a day = 240 visitors x 20 L/day) + ((2,006 m^2 / 9.3 m^2) x 75 L/day) for a total of 22,253 L/day.

Maximum peak season daily flows result in a total of (6,650 L/day + 22,253 L/day) for a total of 28,903 L/day.



3.0 METHOD OF STUDY

A new drilled well (TW1) was constructed for use as a test well for this hydrogeological assessment and as a potential production well. The design of TW1 was based on preconsultation with the City of Ottawa.

3.1 Test Well Construction

Test Well 1 (TW1)

As a means to demonstrate the adequacy of the aquifer underlying the subject lands, with respect to water quality and quantity, a new drilled well was constructed and tested. TW1 has a 260 mm diameter steel casing extending to a depth of 34.7 m below ground surface. The 260 mm steel casing extends 0.92 m into bedrock. A 158 mm diameter steel casing was installed inside the 260 mm diameter steel casing extending to a depth of 60.4 m below ground surface. The total depth of the well was indicated to be 97.5 m. According to the well record, gray and black limestone bedrock was recorded at a depth of approximately 33.8 m below ground surface (bgs), and white sandstone was recorded to be encountered at 87.2 m bgs.

The new drilled well is located in the southern portion of the property. Refer to attached Paterson Drawing PH3959 - 1 - Rev.1 - Proposed Site Layout Plan in Appendix 3 for the approximate well location. It is proposed that this well will service the proposed commercial / industrial development. The new drilled well is fully accessible with the 150 mm diameter steel casing extending 0.43 m above the 260 mm diameter steel stickup. The well stick-up meets the minimum height requirement as per Ontario Regulation 903.

3.2 Grouting Inspection

Test Well 1 (TW1)

Qualified Paterson personnel completed the grouting inspection on TW1 on March 5 and 6, 2020. Qualified Paterson personnel witnessed the welding and setting of the 260 mm diameter steel casing on March 5, 2020. Paterson witnessed the welding and setting of the 158 mm diameter steel casing and subsequent placement of grouting on March 6, 2020. TW1 conforms to O.Reg 903 standards.



Observation Wells (OBS1 and OBS2)

As per the pre-consultation with the City of Ottawa, the two deepest existing monitoring wells along Borrisokane Road, completed by Dillon Consulting Ltd. (Dillon) were outfitted with electronic dataloggers. The Dillon borehole logs were provided to Paterson by the City of Ottawa representatives, and can be found attached to this report in Appendix 2.

MW 186-1 and MW 187-1 were chosen as they were the two deeper wells between TW1 and the Trail Road Waste Facility. Both wells were outfitted with a datalogger which monitored water levels for 24 hours prior to the pumping test and 24 hours after the completion of the pumping test. Both borehole logs can be found attached in Appendix 1, and can be seen located on the attached plan: Dillon Consulting Project: 18-7333 - Plan Trail Road Landfill Site dated Feb 11, 2020 in Appendix 3.

MW 186-1 (OBS1) has a total depth of 10.11 m below ground surface, and contains a 50 mm diameter PVC well. According to the borehole log, the subsurface profile consists of a brown coarse grained sand with a grey clayey silt and grey clay layer occurring between 5.5 to 6.1 m depth below ground surface. Water levels were not recorded on the borehole log. The water level prior to the pumping test was measured to be at 6.20 m below the top of the casing. The water level at the end of the pumping test was 6.17 m below the top of the casing. The horizontal separation from OBS1 to TW1 is 253 m, indicated by Paterson Drawing PH3959 - 1 - Rev.1 - Proposed Site Layout Plan in Appendix 3.

MW 187-1 (OBS2) has a total depth of 10.67 m below ground surface, and contains a 50 mm diameter PVC well. According to the borehole log, the subsurface profile consists of a brown coarse grained sand with a grey clay to silty clay with some sand layer occurring between 5.8 to 7.3 m depth below ground surface. Water levels were not recorded on the borehole log. The water level prior to the pumping test was measured to be at 7.06 m below the top of the casing. The water level at the end of the pumping test was 7.04 m below the top of the casing. The horizontal separation from OBS2 to TW1 is 376 m, indicated by Paterson Drawing PH3959 - 1 - Rev.1 - Proposed Site Layout Plan in Appendix 3.



3.3 Pumping Test

Test Well 1 (TW1)

As a means to evaluate the water supply aquifer intercepted by the well, the well was subjected to a 12 hour constant rate pumping test. The duration was based on the preliminary Hydrogeology and Terrain Analysis Guidelines and the City of Ottawa preconsultation. The pumping test was conducted on March 10, 2020 under the full-time supervision of Paterson personnel.

A submersible pump was provided by Air Rock Drilling for the 12 hour pumping test. A licensed water well technician (Air Rock Drilling) was retained to complete the necessary plumbing related activities. A discharge hose assembly with a gate valve was connected to the rented pump. The discharge line was placed at a sufficient distance to ensure that the discharge water was being directed away from the well. Upon completion of the test, the pump was removed and the well was disinfected by Air Rock Drilling.

The pumping test was carried out at a pumping rate of 68 L/min for a duration of 12 hours. During the pumping test, the pumping rate was periodically measured using the timed volume correlation method. The pump rate was maintained within 5% of the selected pump rate. The static water level was recorded and an electronic datalogger (VanEssen TD-Diver) was installed in the test well prior to the start of the pumping test. The data logger recorded water levels at 30 second intervals. In addition, manual water level readings were taken at periodic intervals during the test.

A electronic barometer (VanEssen TD-Barometer) was installed in the test well prior to the start of the pumping test and was used for barometric correction on the dataloggers in TW1, OBS1, and OBS2.

Recovery data was collected from the well following the completion of the pumping. The well was noted to have achieved 95% recovery approximately 4.5 minutes after the completion of the pumping.

Groundwater samples were collected at 6 hours and 12 hours after the start of pumping. Prior to collection of the groundwater samples, the free chlorine residual was verified to be non-detectable. The water samples were submitted for comprehensive testing of bacteriological, chemical and physical water quality parameters consistent with the standard 'Subdivision Supply' suite of parameters, with additional testing for Volatile Organic Compounds (VOC's) and metals as per the City of Ottawa pre-



consultation.

All samples were collected unfiltered and unchlorinated and were placed directly into clean bottles supplied by the analytical laboratory. Samples were placed immediately into a cooler with ice and were transported directly to the Eurofins laboratory in Ottawa. All samples were received by the laboratory within 24 hours of collection.

A series of field tests of the pumped water were carried out at the well head during the 12 hour pumping test. The parameters tested at the well head included: pH, total dissolved solids, conductivity, turbidity and temperature.

Observation Wells (OBS1 and OBS2)

The static water levels were recorded and electronic dataloggers (VanEssen TD-Diver) were installed in the test wells prior to the start of the pumping test. The data loggers recorded water levels at 1 minute intervals. In addition, manual water level readings were taken at periodic intervals during the pumping test.

OBS1 had water levels which fluctuated between 6.15 to 6.34 m below the top of the casing during the overall monitoring period. As a 0.19 m water level fluctuation was measured for this observation well during the monitoring period, the fluctuation of 0.03 m during the pumping test on TW1 is considered to be related to ambient conditions.

OBS2 had water levels which fluctuated between 7.02 to 7.18 m below the top of casing during the overall monitoring period. As a 0.16 m water level fluctuation was measured for this observation well during the monitoring period, the fluctuation of 0.02 m during the pumping test on TW1 is considered to be related to ambient conditions.

4.0 AQUIFER ANALYSIS

4.1 Water Quantity

Pumping test data was analyzed using AquiferTest Pro (v. 2016.1) aquifer analysis software package by Schlumberger Water Services. Drawdown data was measured using an electronic water level tape and an electronic datalogger unit.

TABLE 1:SUMMARY OF WATER SUPPLY AQUIFER CHARACTERISTICS OF TW1							
AQUIFER PARAMETER	RESULT OF ANALYSIS						
Transmissivity (m²/day)	1940						
Pumping Rate (L/min)	68						
Pre-test Static Water Level (m)	9.5						
End of Test Water level (m)	15.06						
Available Drawdown (m)	88.04						
% Drawdown During Pumping Test	10.8						
Specific Capacity (L/min/m drawdown)	12.2						

The drawdown data was analyzed using the Theis (Theis, 1935), Theis Recovery, and the Cooper & Jacob methods of analysis (Cooper & Jacob, 1946). Aquifer transmissivity is estimated to be approximately 1940 m²/day.

The pumping test results show that TW1 has a high yield to support the water demands for the proposed commercial / industrial development. Maximum drawdown at a constant pumping rate for a period of 12 hrs was approximately 5.56 m (10.8 % of the available drawdown). 95 % recovery was achieved approximately 4.5 minutes after the end of pumping.

The total volume of water pumped during the 12 hour pumping event was approximately 48,960 L. This is in excess of the average daily sewage flow volume required to support the proposed commercial / industrial development, according to Paterson calculations.

The suitability of the aquifer to supply the proposed commercial / industrial development was assessed using the methodology provided in MECP Procedure D-5-5 (MOEE, 1996).

Hydrogeological Study for a Private Water Supply Well



Proposed Commercial / Industrial Development 3713 Borrisokane Road, Ottawa, Ontario

Based on the information summarized in Table 1, it is readily apparent that the new water supply well has intercepted a significant water supply aquifer which has sufficient quantity to service the proposed commercial / industrial development at peak seasonal use. The transmissivity aquifer parameter suggests an aquifer which is able to transmit adequate quantities of water relatively quickly with fast recharge capabilities.

Given the analyses presented and summarized above, it is our opinion that there is an adequate supply of water to service the proposed commercial / industrial development on the property.

The observation wells, OBS1 and OBS2, experienced negligible drawdown (0.03 and 0.02 m increase in water level) during the pumping test of TW1. The drawdown is attributed to a surficial connection to the shallow aquifer as the water level was increasing in both observation wells while precipitation was occurring and started to decrease after the precipitation stopped. Minor variability (0.16 to 0.18 m water level fluctuations) in the static water level of the observation wells in the days subsequent to the pumping test of TW1 were recorded.

4.2 Water Quality

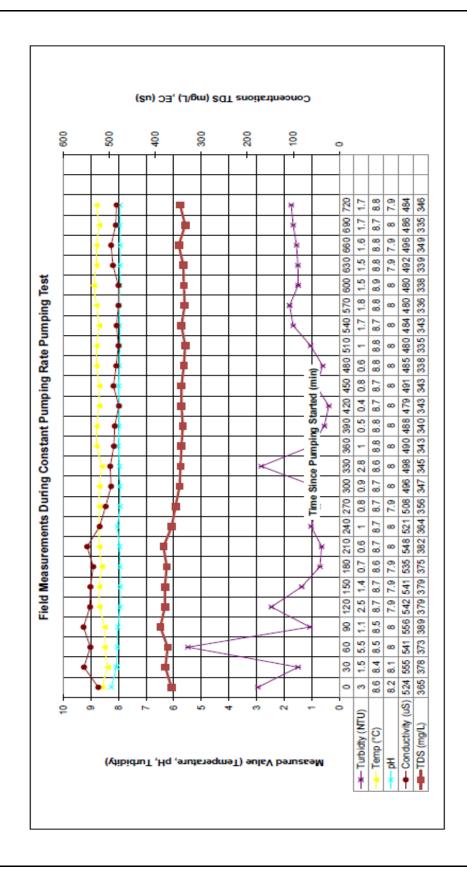
Field Data

Turbidity, electrical conductivity, total dissolved solids (TDS), pH and temperature were measured at the wellhead during the pumping test. The measurements and time intervals for each of these parameters are summarized on the graphical representation below. In addition, a Hach Pocket Colorimeter II chlorine reader was used to measure the free chlorine residual level. No chlorine residual was detected in the discharge water prior to the collection of the water samples.

Ottawa Kingston

North Bay

Proposed Commercial / Industrial Development 3713 Borrisokane Road, Ottawa, Ontario





Ottawa

Kingston

North Bay

Proposed Commercial / Industrial Development 3713 Borrisokane Road, Ottawa, Ontario

		OF	OWS	Γ			
		- 0.	1	TW1			
PARAMETER	UNITS	LIMIT	TYPE	GW1 (6 hr) 10/03/2020	GW2 (12 hr) 10/03/2020		
MICROBIOLOGICAL	•	•	•	•			
Escherichia Coli (E.Coli)	ct/100mL	0	MAC	0	0		
Total Coliforms	ct/100mL	0	MAC	0	0		
GENERAL CHEMICAL - HEALTH I	RELATED	•	•	•			
Fluoride	mg/L	1.5 (2.4)	MAC	0.7	0.66		
N-NO2 (Nitrite)	mg/L	1	MAC	< 0.10	< 0.10		
N-NO3 (Nitrate)	mg/L	10	MAC	< 0.10	< 0.10		
Turbidity (Laboratory)	NTU	1.0 (5.0)	MAC/AO	0.8	1.9		
Turbidity (Field)	NTU	1.0 (5.0)	MAC/AO	1.0	1.7		
N-NH3 (Ammonia)	mg/L	-	-	0.09	0.10		
Total Kjeldahl Nitrogen	mg/L	-	-	0.263	0.296		
GENERAL CHEMICAL - AESTHET		<u> </u>		0.203	0.250		
Hardness (as CaCO3)	mg/L	100	OG	119	126		
Ion Balance	unitless	100	-	0.89	0.91		
Total Dissolved Solids	mg/L	500	AO	280	280		
Alkalinity (as CaCO3)		500	OG	164	166		
Chloride	mg/L	250	AO	164 44	41		
	mg/L						
Aluminum	mg/L	0.1	OG	< 0.01	< 0.01		
Antimony	mg/L	0.006	IMAC	< 0.0005	< 0.0005		
Arsenic	mg/L	0.01	IMAC	< 0.001	< 0.001		
Barium	mg/L	1	MAC	0.04	0.05		
Bismuth	mg/L			< 0.002	< 0.002		
Boron	mg/L	5	IMAC	0.23	0.21		
Cadmium	mg/L	0.005	MAC	< 0.0001	< 0.0001		
Calcium	mg/L	-	-	23	24		
Chromium	mg/L	0.05	MAC	< 0.001	< 0.001		
Cobalt	mg/L	-	-	< 0.0002	< 0.0002		
Colour	TCU	5	AO	< 2	< 2		
Conductivity	uS/cm	-	-	511	500		
Copper	mg/L	1	AO	< 0.001	< 0.001		
Dissolved Organic Carbon	mg/L	5	AO	0.7	0.7		
Iron	mg/L	0.3	AO	0.08	0.12		
Lead	mg/L	0.01	MAC	< 0.001	< 0.001		
Magnesium	mg/L	-	-	15	16		
Manganese	mg/L	0.05	AO	< 0.01	< 0.01		
Mercury	mg/L	0.001	MAC	< 0.0001	< 0.0001		
Molybdenum	mg/L	-	-	< 0.005	< 0.005		
Nickel	mg/L	-	-	<0.005	<0.005		
pH	unitless	6.5-8.5	AO	8.37	8.39		
Phenois	mg/L	-	-	< 0.001	< 0.001		
Potassium	mg/L	-	-	7	7		
Selenium	mg/L	0.05	MAC	< 0.001	< 0.001		
Silver	mg/L	-	-	< 0.0001	< 0.0001		
Sodium	mg/L	200	AO	56	51		
Sulphate	mg/L	500	AO	33	33		
Sulphide	mg/L	0.05	AO	< 0.01	< 0.01		
Tannin & Lignin	mg/L	-	-	< 0.1	< 0.1		
Tin	mg/L	-	-	< 0.01	< 0.01		
Titanium	mg/L	-	-	< 0.01	< 0.01		
Uranium	mg/L	0.02	MAC	< 0.001	< 0.001		
Vanadium	mg/L	- 0.02	- INFIC	< 0.001	< 0.001		
Zinc	mg/L	5	AO	< 0.01	< 0.001		

^{1.} ODWS identifies the following types of parameters:

MAC=Maximum Allowable Concentration

AO = Aesthetic Objective

OG= Operational Guideline

IMAC= Interim Maximum Accaptable Concentration

2. Shaded Concentration Indicates an Exceedance of the ODWS Objective



Ottawa

Kingston

North Bay

Proposed Commercial / Industrial Development 3713 Borrisokane Road, Ottawa, Ontario

TABLE 2: GROUNDWATER GEOCHE	MISTRY (TW1)					
		10	ows	TW1		
DARAMETER	LINUTE			IW1		
PARAMETER	UNITS	LIMIT	TYPE	GW1 (6 hr)	GW2 (12 hr)	
				10/03/2020	10/03/2020	
General Chemical - Volatile Organic	Compounds (VOC's)				
1,1,1,2-tetrachloroethane	ug/L			<0.5	<0.5	
1,1,1-trichloroethane	ug/L			<0.4	<0.4	
1,1,2,2-tetrachloroethane	ug/L			<0.5	<0.5	
1,1,2-trichloroethane	ug/L			<0.4	<0.4	
1,1-dichloroethane	ug/L			<0.4	< 0.4	
1,1-dichloroethylene	ug/L	14	MAC	<0.5	<0.5	
1,2-dichlorobenzene	ug/L	200	MAC	<0.4	< 0.4	
1,2-dichloroethane	ug/L	5	IMAC	<0.2	<0.2	
1,2-dichloropropane	ug/L			<0.5	<0.5	
1,3,5-trimethylbenzene	ug/L			<0.3	<0.3	
1,3-dichlorobenzene	ug/L			<0.4	<0.4	
1,3-Dichloropropylene (cis+trans)	ug/L			<0.3	<0.3	
1,4-dichlorobenzene	ug/L	5	MAC	<0.4	<0.4	
Acetone	ug/L			<30	<30	
Benzene	ug/L	1	MAC	<0.5	< 0.5	
Bromodichloromethane	ug/L			< 0.3	< 0.3	
Bromoform	ug/L			<0.4	< 0.4	
Bromomethane	ug/L			<0.5	< 0.5	
c-1,2-Dichloroethylene	ug/L			<0.4	<0.4	
c-1,3-Dichloropropylene	ug/L			< 0.2	<0.2	
Carbon Tetrachloride	ug/L	2	MAC	< 0.2	< 0.2	
Chloroethane	ug/L			<0.2	<0.2	
Chloroform	ug/L			< 0.5	< 0.5	
Dibromochloromethane	ug/L			< 0.3	< 0.3	
Dichlorodifluoromethane	ug/L			< 0.5	< 0.5	
Dichloromethane	ug/L	50	MAC	<4.0	<4.0	
Ethylbenzene	ug/L	140	MAC	<0.5	<0.5	
Ethylene Dibromide	ug/L			<0.2	<0.2	
Hexane	ug/L			<5	<5	
m/p-xylene	ug/L			< 0.4	< 0.4	
Methyl Ethyl Ketone (MEK)	ug/L			<10	<10	
Methyl Isobutyl Ketone (MIBK)	ug/L			<10	<10	
Methyl Tert Butyl Ether (MTBE)	ug/L	15	AO	<2	<2	
Monochlorobenzene	ug/L	80	MAC	<0.5	<0.5	
o-xylene	ug/L			<0.4	<0.4	
Styrene	ug/L			<0.5	< 0.5	
t-1,2-Dichloroethylene	ug/L			<0.4	<0.4	
t-1,3-Dichloropropylene	ug/L			<0.2	<0.2	
Tetrachloroethylene	ug/L	10	MAC	<0.3	< 0.3	
Toluene	ug/L	60	MAC	<0.5	<0.5	
Trichloroethylene	ug/L	5	MAC	<0.3	<0.3	
Trichlorofluoromethane	ug/L			<0.5	<0.5	
Vinyl Chloride	ug/L	1	MAC	<0.2	<0.2	
Xylene; total	ug/L	90	MAC	<0.5	< 0.5	

^{1.} ODWS identifies the following types of parameters:

MAC=Maximum Allowable Concentration

AO = Aesthetic Objective

OG= Operational Guideline

IMAC= Interim Maximum Accaptable Concentration

2. Shaded Concentration Indicates an Exceedance of the ODWS Objective



Laboratory Data

The laboratory water quality obtained from the pumping test of TW1 is provided in Table 2 above and the laboratory analyses reports can be found attached.

The bacteriological test results (Certificate of Analysis - Report No. 1926944) indicated that the test sample at the 6 and 12 hour interval were non-detect (0 ct/100 mL) for E.Coli and Total Coliforms.

The water quality of the subject water supply well meets all the Ontario Drinking Water Standards maximum acceptable concentrations (MAC). Furthermore, the water meets all of the aesthetic objectives (AO) and operational guidelines (OG) with the exception of the following:

Hardness

Exceedance of the above parameter are not uncommon of the water supply in the subject aquifer. The groundwater parameters are discussed in detail below.

Hardness as CaCO₃

Hardness, expressed as calcium carbonate, an operational guideline, does not appear in the ODWS. Rather, it appears in the Technical Support Documents for Ontario Drinking Water Standards, Objectives and Guidelines as a parameter with an operational guideline of 100 mg/L. At the measured concentration of 119 and 126 mg/L, the water is considered to be hard. The Technical Support Document for ODWS publication states that water with hardness in excess of 500 mg/L may be unacceptable for most domestic purposes, however, there is no maximum treatable value available. It is expected the hardness concentration can be treated using standard commercial water softener technologies, if desired. Discharging of wastes from water treatment should be directed away from the septic system.

Sodium

Sodium is an aesthetic parameter, and was detected in the test samples at a concentration of 56 and 51 mg/L, which is less than the ODWS aesthetic objective of 200 mg/L. Sodium is a unique water quality parameter in that it has a cautionary limit of 20 mg/L for health related purposes, but can be present in raw water up to 200 mg/L and still be within the aesthetic objective. It is a requirement of the ODWS that the Medical Officer of Health be notified of the water quality results where sodium is



Hydrogeological Study for a Private Water Supply Well

Proposed Commercial / Industrial Development 3713 Borrisokane Road, Ottawa, Ontario

present in concentrations exceeding 20 mg/L and it is intended for consumption. The purpose of this is such that the information can be disseminated to local physicians for their use in the treatment of individuals requiring reduced sodium dietary needs.

Report No.:PH3959-REP.03

Date of Issuance: March 18, 2020



5.0 CONCLUSIONS

Based on the information contained within the body of this report, the following conclusions can be drawn:

- 1. The water supply aquifer intercepted by TW1 is considered to be more than adequate to support the seasonal peak water quantity demands for the proposed commercial / industrial development.
- The preferred water supply aquifer intercepted by TW1 contains a water supply
 that is potable, and contains only elevated concentrations of hardness. The
 concentrations are within the aesthetic objective values for the ODWS. The
 hardness can be treated with current readily available commercial water
 conditioning equipment, if desired.
- 3. The sodium concentrations were measured to be above the 20 mg/L reporting limit and, as such, the Medical Officer of Health for the City of Ottawa should be informed to assist area physicians in the treatment of local residents on sodium reduced diets.
- 4. The results of the water supply assessment suggests that the water supply aquifer underlying the subject site can support the proposed commercial / industrial development from both a quality and quantity perspective.

Report No.:PH3959-REP.03

Date of Issuance: March 18, 2020

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein or by person(s) other than Caivan (Greenbank North) Inc., or their agents, is not authorized without review by Paterson for the applicability of our recommendations to the alternative use of the report.

We trust that this report satisfies your present requirements. Should you have any questions regarding this report, do not hesitate to contact us.

Yours truly,

PATERSON GROUP INC.

Erik Ardley, Bsc. Geology

Junior Hydrogeologist

Michael S. Killam, P.Eng.

Hydrogeologist



APPENDIX 1

MECP WATER WELL RECORD - TW1

PUBLISHED MECP WATER WELL RECORDS

DILLON CONSULTING MONITORING WELL RECORDS - OBS1, AND OBS2

	Ministry of the Environment	Tag#:A27	4388		Well Record
Ontario	and Climate Change	1000	200	Regulation 903 Ontario	
Measurements recorded	in: Metric Imperial	<u>H014</u>	<u>.388' </u>	F	age of
Well Owner's Inform First Name	ation Lasi Name / Organization		E-mail Address		☐ Well Constructed
Caivon	Born Naven Ke	ntal htd. lot	sterson (Stoup	by Well Owner
Mailing Address (Street Nu	. 12	Municipality What	Province	Postal Code Teleph	one No. (inc. area code)
Well Location		-			
Address of Well Location (S	RRISOKANE R	Township New	Dean	Lot 9 Conce	P. F.
County/District/Municipality	Exletan	City/Town/Village	2001	Province Ontario	Postal Code
UTM Coordinates Zone		Municipal Plan and Su	plot Number	Other CO	124 - 041
NAD 8 3	HOM 10 00 9	II DUVEN 5K-	bd54 Vosta the back of this form)	1)(YEMSK-	13403-PATT
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- 9	rey + Ble	ck hines	tore		111/286'
	nute oans	sime			286 3251
-					
			-	*	
	Annular Space		Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z		
Depth Set at (m/ft)	Type of Sealant Used	Volume Placed	After test of well yield, wa	Service and the service of the servi	n Recovery
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1881 01 #	Postosa & Clu	$\frac{50.40}{}$	If pulpping discontinued,	give reason: Static Level 3(0" 85.6"
180 0	(114 300.10		1 39.	7 164-2
10 10 E	Bartonia Slu	m 420	Pump Intake set at (mff)) <u> 2 48.</u>	1 2 56.a
Method of Constru	SAN	Well Use	Pumping rate (Vmin / ©PI	1 700	8 3 48.9
		☐ Commercial ☐ Not used ☐ Municipal ☐ Dewatering	Duration of pumping	4 57.	5 4 43.3
Boring	. 1'	☐ Test Hole ☐ Monitoring ☐ Cooling & Air Conditioning	hrs + min		3 5 39.
Air percussion Other, specify	☐ Industrial ☐ Other, specify		80,60		
Constru	ction Record - Casing	Status of Well	If flowing give rate (Vmin /	GPM) 15 75.	1 15 31.04
Inside Open Hole OR N Diameter (Galvanized, Fibi (cm/is) Concrete, Plastic	reglass, Thickness _ 1	Water Supply To Replacement Well	Recommended pump de		8 ²⁰ 31504 9 ²⁵ 1
(cm/fb) Concrete, Plastic	2011	☐ Test Hole ☐ Recharge Well	Recommended pump rat	1 10	7 30
CIVIL STOOL	100" 10"	Dewatering Well	(Vmin CEM) 20	40-0	7 80 1 E 40 1
11/4" OD HE	6 188" +2'	Observation and/or Monitoring Hole	Well production (Vmin Lef	50 8	3 50 S
678 Exm	0 198	(Construction)	Distrifected?	60 20 16	5" 60 7
	ction Record - Screen	Insufficient Supply Abandoned, Poor		Map of Well Location	
Outside Diameter (cm/in) Material (Plastic, Galvanize	ed, Steel) Slot No. Erom	To Abandoned, other,	Please provide a map b	elow following instructions of	on the back.
(specify		}	
		Other, specify	#37(3	0.24	'
	iter Details	Hole Diameter	#3713 Brrisokan Road	= 12	X
*** A	of Water: Fresh Untested	Depth (<i>m/ft</i>) Diameter From To (<i>cm/in</i>)	Poor l	こにか	
Water found at Depth Kind of	of Water: Fresh Untested	0' 20' 1234"	2000(ZKW.
	ther, specifyof Water: Fresh Untested	20' 198' 93/4")))	
	her, specify	98' Bao' 61/8"		1 1	
Well Co Business Name of Well Contr	intractor and Well Technician) actor	nformation Well Contractor's Licence No.	Barr	Isdale R	od.
AL Rock Pil Bysiness Address (Street Nur	LING CO LAD	C7681			_
6659 tack	town Road	Pich word	Comments:	2/20m 10	CAT
Province Postal C		SS	Well owner's Date Pack	age Delivered Mir	istry Use Only
Bus.Telephone No. (inc. area co	ode) Name of Well Technician (Las	(I)	information package	AuditiNo	Z302528
Well Technician's Licence No. Si	gnature of Technician and/or Contr	actor Date Submitted	delivered	Completed	UULUEU
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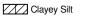


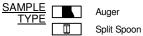
DILLONCONSULTING

Page <u>1</u> of <u>1</u>

M186-1

Client: Dillon Consulting Ltd. Project: Trail Road Landfill Drilling Program Location: Trail Road Landfill Project No.: 18-7333 Drilling Method: Hollow Stem Augers Drilling Co.: Aardvark Drilling Inc. Date Started: 19-12-11 Date Completed: 19-12-11 Supervised by: TTN Lithology Depth Depth Depth Method Stratigraphic Description Well Construction (m) (m) (m) Stick-up Sand 0.5^{-} Brown coarse grained sand 0.5 1.0-1.5-2.0 2.0 2.5 -2.53.0 -3.0Solid 0.05 m diameter PVC through bentonite seal 3.5 3.5 4.0 4.0 4.5 4.5 5.0 -5.0 DILLON MW DEPTH 2019 M183-M187 + TEST WELL TRAIL LANDFILL BOREHOLE LOGS.GPJ DILLON TEMPLATE - JAN2011.GDT 20-2-28 5.5 -5.5 5.49 **Clayey Silt** 5.64 6.0 Grey clayey silt -6.06.1 Clay 6.5 -6.5 Solid 0.05 m diameter PVC through Grey Clay fine sand pack 7.0--7.0 Sand 7.5-Brown coarse grained sand with gravel -7.58.0--8.0 Slotted 0.05 m diameter PVC through 8.5 8.5 fine sand pack 9.0 9.0 9.5 9.5 10.0 10.11

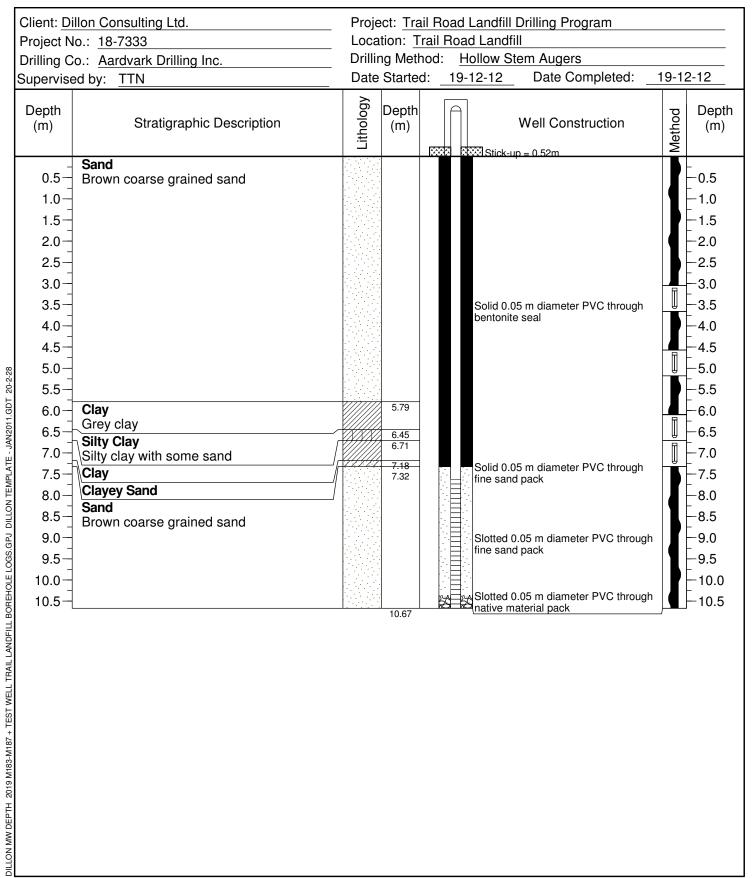






Dillon Consulting Ltd. 177 Collonade Řoad, Suite 101 Ottawa, Ontario K2E 7J4 Telephone: (613) 745-2213 Fax: (613) 745-3491

Page _ 1 _ of _ 1 _ M187-1









The Ontario Water Resources Act

WATER WELL RECORD

Ontario	Ironment 1. PRINT ONLY IN	SPACES PROVIDED	15	27823	الحسيد مستعدا	CON.	
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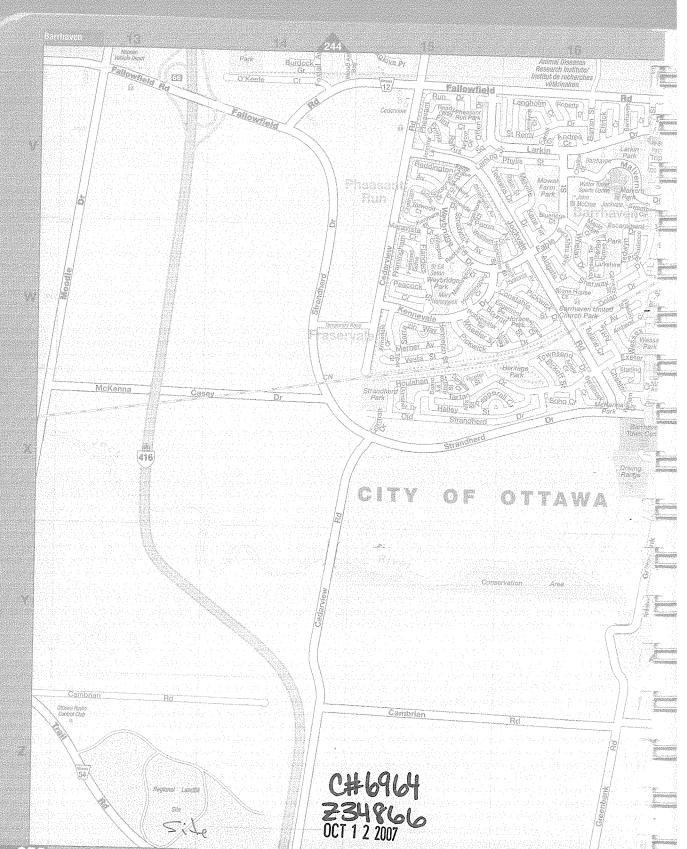
The Ontario Water Resources Act

WATER WELL RECORD

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Rotary (reve	rse) Bo		ater Use	Driving			H H	A WAYP 20 Y	Nose			
Domestic		dustrial		Public Supp	oly	Other						
Stock Irrigation		ommercial unicipal	—	Not used Cooling & a	ir conditioning		Audit No.		Date We	II Complete	d	
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		Contractor/	Technician I			iconos Nis	Data Source	Ministry	Use On Contract			
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usiness Addre	ess (street name,		1 A 1	1			Date Received	YYYY MM DD	Date of I	nspection	YYYY	MM DD
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	chnician/Contract	***************************************		Dat	te Submitted YYYY	MM DD						



252

Key Map - Page 200

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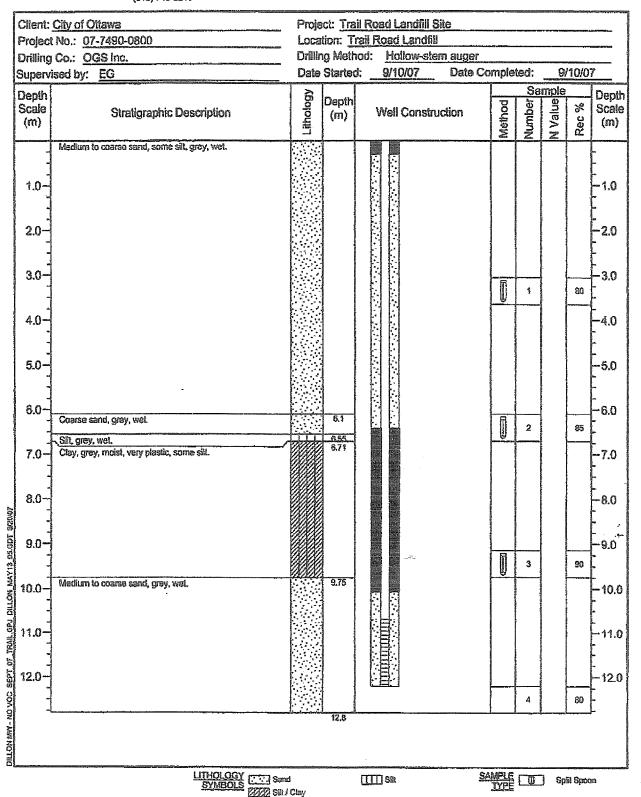
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31 O Mea	ung	NAD Zor			99575	Laye	. 🕻 🖈	**************************************	lifferentiated	<u></u>	Avera	ageo
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an e	1	200 0					Darse San		***************************************	6.1		6,22
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Depth From	Metre To		Inside	Material	Wall	Depth	Metres	Pumping test method		Down		ecovery Water Leve
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O	15.2	3 20.3						Pump intake set at -	Static	, And an analysis of the second	-	
				Steel Fibreglass	Casing			(metres) Pumping rate -	Level 1		1	
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· ·	Nater Re	ecord	2.5	Galvanized	0.4		10.75	Duration of pumping	2		2	
Water foun at Met	id res / I	Kind of Water		Steel Fibreglass				hrs + min				
[m	Fre	sh Sulphur	4 km - 111	Plastic Concrete				Final water level end of pumping	3		3	
Gas Other:	Salt	ty Minerals		Galvanized			·	Recommended pump	<u> </u>		A	
<u> </u>				Steel Fibreglass	· · · · · · · · · · · · · · · · · · ·			type. ☐Shallow ☐ Deep				
m ☐ Gas	Fre Salt			Plastic Concrete	A. A			Recommended pump	R		5	
Other:				Galvanized				depthmetres		· .		
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☐ Gas ☐ Other:	Sal	ty Minerals	Outside diam	Steel Fibreglass	Slot No.	A. S.		(litres/min) If flowing give rate -	15	<u></u>	15	
·		eld, water was		Plastic Concrete	•	25.01	12.25	(litres/min)	20 25		20 25	
Clear a			6-0	Galvanized				If pumping discontin-	30		30	<u></u>
Other,	specify_			No Ca	sing or Scree	n		ued, give reason.	40		40	
Chlorinate	d TYes	No		Open hole					50		50	
									60		60	
		ugging and Se	aling Reco	ord		ndonment		Location				
Depth set	at - Metres	Material and typ	e (bentonite s	slurry, neat cement slurry) e	etc. Volume I (cubic m	· ·	In diagram below Indicate north by	v show distances of well from	om road,	lot line, a	ınd bui	ilding.
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Rotary ((reverse)	Boring			on the al	ngers						
		P		er Use						;		
☐ Domest ☐ Stock	ic	☐ Industria		Public Supply Not used	50 m	ther						
Ctook Irrigatio	n	Municip		Cooling & air o		*	Audit No.	21000 Dat	e Well Co	ompleted		5 AR #
	· · · · · · · · · · · · · · · · · · ·			tus of Well				34860 Dat		2-00°	7	MM DD
☐ Water S		Recharge we		Unfinished	Abandone	d, (Other)	Was the well ow package delivere	TIOI O IIIIOTI IUUOI	e Delivere	1 1	/YY	MM DD
_I Observa ✓ Test Ho	ation well ole	Abandoned, Abandoned,	insufficient support quality	upply Dewatering Replacement v	well	· · · · · · · · · · · · · · · · · · ·	Package delivere	u:	·		3 (10 10
VALVOOR				chnician Information				Ministry Use			~·····································	
lame of W		ctor		Well	Contractor's Lice	1	Data Source	Cor	ntractor			
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72218		The second second	e Rond	LO strom LA	KOAIA	·o	not 4		o niope	THE YY	/YY 	MM DD
	**************************************	cian (last name, f	irst name)		Technician's Lice	1	Remarks	2 2007 We	II Record	Number		

Signature of Technician/Contractor



Dillon Consulting Ltd. Suite 200, 5310 Canatak Road Oltawa, ON K1J 9N5 (613) 745-2213 Page <u>1</u> of <u>1</u> M4-1



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OCT 1 2 2007 Z 34860



A087279

Well Tag No. for Master Well (Place Sticker and/or Print Below)

A 087279

Master Well Record for Cluster Well Construction

Regulation 903 Ontario Water Resources Act

	Well Location (Stre	Towns	hip		Lot			Concessi	Concession		
	1375 Trail Rd hty/District/Municipality City/Town/Village						***************************************	Thinks of the state of the stat		Province Ontario	Postal Code
UTM Coord NAD		ing Northin 11 0 8 3 3 5 0 0		GPS Unit	t Make	Model E+-e	_X	Mode of C	peration:	Undifferentiated	Averaged
·····		k Materials <i>(see ins</i> Other		ie back i	of this fo	orm) (Metres)	Depth	(Metres)		Details Diame	ter
Colour Bon	Material Sand	Materials	Descrip		From	To	From	To CL 0.7	8.25	(Centime	
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		and with the definition of the control of the contr				· · · · · · · · · · · · · · · · · · ·		Y		Construction	iduoning
		AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA						(Conventio		nd B	ying
APPPYA1400000 A1A1600000 VIACOO	·	***************************************					Rotary	(Reverse) (Air)	☐ Jetting ☐ Driving	Direct	her, specify Push
	***************************************	996-844-1168611111111111111111111111111111		foliar/18	VIA14444	**************************************	☐ Test H	ole	20 No. 10 No	s of Well oned, Insufficient (Supply
	4000	777 NANASA, 7A77777 A PANASA A MARABA A	A		· · · · · · · · · · · · · · · · · · ·		Dewat	ement Well ering Well	TOther,	oned, Poor Water specify <u>YM b A</u>	1400100
	yearness and the second	**************************************	A A State of the Association A						ction) [Aband cneen Used	oned, other, speci	ter/Level Test
		Construction D					Open Hole	5	No	3 3 1	etres
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2,6	1 Puc	Riser		338	0	3,35	Outside D	iameter (Ca 3 4	anlimetres)	Stot No. 10	PROPERTY OF THE STATE OF THE ST
·/·······		anning the state of the state o	~~~				Water for	ınd at Dep	Water De	tails f Water	
1							 Water for	Metres [sh []Salty [] f Water	Sulphur [Minerals
Depth Set a		r Space/Abandonme Type of Sealant	e majoppanase san ngerma san pappaganin	ord	Volum	e Used	Water for	Metres (sh []Salty [] f Water	Sulphur () Minerals
From	`To	(Material and Ty			(Cubic			Metres	Gas Fre	sh Salty	
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							Cluster Informati	nformation	i (Please sisc I Construction	Hours the section	onal Cluster Well of land and cluster.)
								lls in Cluste		Please indicate	Number of Cluster Well Sheets Submitted
						**************************************		lls on this F	roperty	uselineus	
								Map must b	e provided as a		larger than legal size
									s are not allowe		per Section 11.1 (3)
							Concept th Si	to ralazea	additional info	TOTAL CAMPACE	ing the displayed
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Province	Postal Co	11(16)					100000000000000000000000000000000000000	\$5500000000000000000000000000000000000	588	Well Contractor N	
9055	104-4306	Name of Well Technic	a trav	15			SEP	aved (yyyy/ri 2 2 201		Date of inspection	(yyyy/mrn/dd)
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392 (11/2006)	-	×2 1	1794	-)		a Maria			@ Queen	's Printer for Ontario, 2006

Ontario Ministry of the Environment

Well A 087279

Well Tag No.)

Cluster Well Information for Cluster Well Construction

Regulation 903 Ontario Water Resources Act

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		Concession Township County/District/Municipality						upon request Signature of Technician/Contractor	IData ((ital				
43	75 TRail Rd			~~~~						~~~~			Date (yyyy/mm/dd)
City/To	own/Village Provi Fawy Onta	1	stal Code	1 1	GPS Unit Make	Model Etrex	1	de of Opera		differentiated	Averaged		
	Tavia One	ai 10			C &. 111/10	FIREX	Dille!	entiated, s	pecity:				
Well # on Skelch	UTM Coordinates Zone Easting Northing	Full Depth of Hole (metres)	Hole Diameter (cm)	Method of Construction		ial Casing Length (metres)	Screen Int From	erval (metres) To	Annular Space Sealant Used	Static Water Level (metres)	Abandonment Sealant Used	Comments	Date of Completion (yyyy/mm/dd)
2	1844 0748 5009219	3.1	3.25	Direct	PUL	213	2.13	3. /	Benseul				2009/08/2
3	184406845009402		3.25	Push	PVC	2.74	2.74	3,60	Benjear				2009 /08 /2
4	1844061650095572		8.25	Prish	PUL	2.13	2.13	3.1	Benseul				2009/08/27
	V V V V V V V V V V V V V V V V V V V			***************************************									
	# 100 mm												

	**************************************			.=====									
- PERSONAL PROPERTY.	Contractor and Well Technician Infess Name of Well Contractor	formation		Add	- /Chroat Niverbas/	N DD\		Municipa	R.F.		D	Date 1st Well in Cluster Constructed Date Last W (www.man/dd) / 68 / 27 (www.man/dd)	all in Cluster Constructed
	stata sol samplini	C		0-147	s (Sheet Vullide)	rille Me	016	NIC ICIDA	iny nmond	1/11/	Province	Ministry Use Only	
Business Name of Well Contractor Stata Sol Samping Postal Code Business Address (Street Number/Name, RR) Municipality Province H 2-141 W1S+ BAUC Ceek R LChmand H Province Well Contractor's Licence No. Business E-mail Address							Date Received (yyyy/mm/dd) Date Inspe	ected (yyyy/mm/dd)					
	Name of Well Technician (First Name, Last Name) Well Technician's Licence No. Date Submitted (yyyy/mm/dd) Signature of Technician Audit No. Remarks								0/1/1				
	Trais Robinson			3 1	1614	3007/07/K	<u> </u>					c06026 mi	<u> </u>
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Allo

TRAIL ROAD LANDFILL SITE 2009 MONITORING AND COERATING PROGRAM und, fril gaz mentoressyril golander Roskales algest fra 200 Estant gal samelad eg 2009 LANDFILL GAS MONITORING LOCATIONS SEE SCALE BAR DATE: AUCUST 2000 SOME BANNER TONNE DITTOM CONTRACTOR GB-56 TRAIL ROAD NO 300 CEN.7A X 2 2009 SEP

C-7241 mo2588 C06026

Po		Ministry of the Environment of the Change	ent Well T	ag Nc. Tag#:		Brandetia	•		ecord
Measurem	ents recorded in:	Metric Imperi	al 7	4190847	3	Regulation	<i>n 903 Ontario W</i> ▮ <i>I (</i>)		ources Act of
P1000000000000000000000000000000000000	ner's Informati		-			<u>- 341</u>	<u> </u>		
First Name	e of	Last Name / Organi	zation		E-mail Address			_	Constructed ell Owner
Mailing Add	dress (Street Numl	per/Name)	11. rl	Municipality	Province	Postal Code	Telephone		area code)
Well Loca	Conference of the contract of	<u>whove Wat, 5</u>	th Hour	<u>Ottawa</u>	ON	IKIPL	<u> </u>	70/000/000/000/00/	
 Districtly objects the east of trace. 	Well Location (Str	eet Number/Name)		Township		Lot	Concessi	on	
County/Dis	trict/Municipality	[andfil]		City/Town/Village / /		Announce a	Province	Postal	Code
UTM Cased		N. 0		07/	wa		Ontario		
NAD	linates Zone East	ting 410 7 44 STO 0	^-~	Municipal Plan and Sub	lot Number		Other		
		Materials/Abandonmer					1	Don	th (m/ft)
General C	olour Mos	t Common Material	0	ther Materials	Gene	ral Description	1	From	th (<i>m/ft</i>) To 2 1
1200	7	torsq.1		och d		DOLT		<u> </u>	1.21
1917	7	<u> sana</u>		21t, grave 1	-	>0/7		131	3.35
					30.00	t tradition time as a			***************************************
									
							1		
		***************************************					19910 001 1 - 01		
Denth Se	et at (<i>m/ft</i>)	Annular Spac Type of Sealant U		Volume Placed	After test of well yield,		ell Yield Testin		ecovery
From	To	(Material and Type		(m³/ft²)	☐ Clear and sand f		Time Water Let	vel Time	Water Level
$-\mathcal{Q}_{-}$	131 m	10 nument,	cu cre H		Other, specify If pumping discontinue	ed, give reason:	Static	(min)	(m/ft)
13	1.52	Benta	ryte_		-	. •	Level 1	1	
1,52	3,35	Ban			Pump intake set at (r	m/ft)	2	2	
					Pumping rate (l/min /	COM	3	3	
Meth ☐ Cable To	nod of Construc	tion Diamond Public	Well U □ Comm		Fulliping rate (vmilit)	GPIVIJ	4	4	
Rotary (0	Conventional) 🔲 J	etting Domestic	☐ Munici	pal Dewatering	Duration of pumping hrs + r	min	5	5	
Rotary (F		Oriving Livestock Digging Irrigation	est H	Iole	Final water level end c			10	
☐ Air percu ☐ Other, sp		☐ Industrial☐ Other, spe	ecify		If flowing give rate (I/r	min / GPM)	15	15	
		tion Record - Casing		Status of Well	I I HOWING GIVE TAKE (II)	imi i Oi ivij	20	20	
Inside Diameter (cm/in)	Open Hole OR Ma (Galvanized, Fibre Concrete, Plastic,	glass, Thickness	Depth (<i>m/ft)</i> om To	☐ Water Supply ☐ Replacement Well	Recommended pump	o depth (m/ft)	25	25	***************************************
5,20	EV C	390 (390 (7 100	— Test Hole ☐ Recharge Well	Recommended pump	o rate	30	30	-
2100	(* -	1970	2 1102	Dewatering Well Observation and/or			40	40	
				Monitoring Hole	Welt production (I/mir	n / GPM)	50	50	
				(Construction) Abandoned.	Disinfected? Yes No		60	60	
	Construc	tion Record - Screen		Insufficient Supply Abandoned, Poor		Map of W	ell Location		
Outside Diameter	Material (Plastic, Galvanized	Ciak Na	Depth (<i>m/ft</i>)	Water Quality Abandoned, other,	Please provide a map	below following	instructions on the	back.	1/11
(cm/in)		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		specify		11			7-10
6.63	fuc	10 28	3.35	Other, specify		711	\sim	5	
	Wa	er Details		Hole Diameter		111		~ j.	2
Water foun	THE PARTY OF THE P	f Water: ☐ Fresh ☐ Unto	ested De	pth (m/ft) Diameter		11		•	116 Hahwas
	n/ft) ☐ Gas ☐ Oth	er, <i>specify</i> f Water:	From	To (cm/in) 3,35 15,24		13/1	ļ		专!
(m	ı∕ft)	er, specify		7,23 13,27	The state of the s	121米	15		1
	id at Depth Kind o n/ft) □ Gas □ Oth	f Water: Fresh Unte	ested		* I was	TILL	100		7/
	Well Cor	itractor and Well Tech				× 1 1		The state of the s	_
/, \	ame of Well Contra	ctor	N	/ell Contractor's Licence No.	TIGH Re	AT.	<i>y</i>		
	ddress (Street Num			Junicipality	Comments:	4 1/	•	<u></u>	
165 Province	Shields Postal C	ode Business E-ma	l Address	mulchan					
Om	+ L3R	GND Wreca	150 E	Brutasoilean	Well owner's Date P	ackage Delivere	202200000000000000000000000000000000000	istry Use	Only
Bus.Telepho	one No. (inc. area cod	de) Name of Well Technic	an (Last Name	, First Name)	package v v		Audit No.	Z 23	8155
	ian's Licence No. Sig	nature of Technician and	er, Contractor D		Yes Date V	Vork Completed	7 A DE	ີງ 2 3	2016
0506E (2014/	<u> 3 5 </u>	Kap V fr		30 14 1 M 38	No KO		名り Received		Ontario, 2014
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Well ID

Well ID Number: 7249988 Well Audit Number: *Z199790*

Well Tag Number:

This table contains information from the original well record and any subsequent updates.

Well Location

Address of Well Location	4475 TRAIL ROAD
Township	NEPEAN TOWNSHIP
Lot	
Concession	
County/District/Municipality	OTTAWA-CARLETON
City/Town/Village	Ottawa
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 18 Easting: 440490.00 Northing: 5009568.00
Municipal Plan and Sublot Number	
Other	

Overburden and Bedrock Materials Interval

Annular Space/Abandonment Sealing Record

Depth From	Depth To	Type of Sealant Used (Material and Type) Volum Placed	
0 ft	40 ft	BENTONITE GROUT	
0 ft	40 ft	BENTONITE GRAVEL	

Method of Construction & Well Use

Method of Construction	Well Use
H.S.A.	
	Monitoring

Status of Well

Construction Record - Casing

Inside	Open Hole or material	Depth	
Diameter	- F	From	To

Construction Record - Screen

Outside Diameter Material Depth Depth From To

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 7238

Results of Well Yield Testing

After test of well yield, water was
If pumping discontinued, give reason
Pump intake set at
Pumping Rate
Duration of Pumping
Final water level
If flowing give rate
Recommended pump depth
Recommended pump rate
Well Production
Disinfected?

Draw Down & Recovery

Draw Down Time(min)	Draw Down Water level	Recovery Time(min)	Recovery Water level
SWL			
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	

15	15
20	20
25	25
30	30
40	40
45	45
50	50
60	60

Water Details

Water Found at Depth Kind

Hole Diameter

Depth From	Depth To	Diameter
0 ft	40 ft	8 inch

Audit Number: Z199790

Date Well Completed: August 28, 2015

Date Well Record Received by MOE: October 14, 2015

Well ID

Well ID Number: 7249990 Well Audit Number: *Z199792* Well Tag Number: *A175298*

This table contains information from the original well record and any subsequent updates.

Well Location

Address of Well Location	4475 TRAIL ROAD
Township	NEPEAN TOWNSHIP
Lot	
Concession	
County/District/Municipality	OTTAWA-CARLETON
City/Town/Village	Ottawa
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 18 Easting: 440483.00 Northing: 5009564.00
Municipal Plan and Sublot Number	
Other	

Overburden and Bedrock Materials Interval

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To
BRWN	SAND	SILT	LOOS	0 ft	2 ft
GREY	SAND	SILT	LOOS	2 ft	17 ft
GREY	GRVL	SAND	LOOS	17 ft	20 ft
GREY	CLAY	SILT	SOFT	20 ft	37 ft
GREY	SAND	GRVL	LOOS	37 ft	50 ft

Annular Space/Abandonment Sealing Record

Depth	Depth	Type of Sealant Used (Material and Type)	Volume
From	To		Placed
0 ft	39 ft	BENTONITE GROUT	

Method of Construction & Well Use

Method of Construction	Well Use	
Rotary (Convent.)		
	Monitoring	

Status of Well

Observation Wells

Construction Record - Casing

Inside	Open Hole or material	Depth	Depth
Diameter		From	To
2 inch	PLASTIC	3 ft	40 ft

Construction Record - Screen

Outside Diameter Material Depth Depth From To
2 inch PLASTIC 40 ft 50 ft

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 7238

Results of Well Yield Testing

After test of well yield, water was
If pumping discontinued, give reason
Pump intake set at
Pumping Rate
Duration of Pumping
Final water level
If flowing give rate
Recommended pump depth
Recommended pump rate
Well Production
Disinfected?

Draw Down & Recovery

Draw Down Time(min)	Draw Down Water level	Recovery Time(min)	Recovery Water level
SWL			
1		1	
2		2	

3 4	3
5	5
10	10
15	15
20	20
25	25
30	30
40	40
45	45
50	50
60	60

Water Details

Water Found at Depth Kind

Hole Diameter

Depth From	Depth To	Diameter
0 ft	29 ft	6 inch
29 ft	50 ft	4 inch

Audit Number: Z199792

Date Well Completed: August 27, 2015

Date Well Record Received by MOE: October 14, 2015

Well ID

Well ID Number: 7277726 Well Audit Number: Z238154 Well Tag Number: A190844

This table contains information from the original well record and any subsequent updates.

Well Location

Address of Well Location	TRAIL ROAD LANDFILL
Township	NEPEAN TOWNSHIP
Lot	
Concession	
County/District/Municipality	OTTAWA-CARLETON
City/Town/Village	Ottawa
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 18 Easting: 440681.00 Northing: 5009540.00
Municipal Plan and Sublot Number	
Other	

Overburden and Bedrock Materials Interval

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To
BRWN	LOAM		SOFT	0 m	.31 m
BRWN	SAND	GRVL	LOOS	.31 m	3.35 m

Annular Space/Abandonment Sealing Record

	Depth To	Type of Sealant Used (Material and Type)	
0 m	.31 m	CONCRETE	
.31 m	1.52 m	BENTONITE	
1.52 m	3.35 m	FILTER SAND	

Method of Construction & Well Use

Method of Construction	Well Use
Boring	
	Test Hole

Status of Well

Monitoring and Test Hole

Construction Record - Casing

Inside		Depth	Depth
Diameter Open Hole or material		From	To
5.2 cm	PLASTIC	0 m	1.83 m

Construction Record - Screen

Outside Material Depth From To
6.03 cm PLASTIC 1.83 m 3.35 m

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 7241

Results of Well Yield Testing

After test of well yield, water was
If pumping discontinued, give reason
Pump intake set at
Pumping Rate
Duration of Pumping
Final water level
If flowing give rate
Recommended pump depth
Recommended pump rate
Well Production
Disinfected?

Draw Down & Recovery

Draw Down Time(min)	Draw Down Water level	Recovery Time(min)	Recovery Water level
SWL			
1		1	
2		2	
3		3	
4		4	

5	5
10	10
15	15
20	20
25	25
30	30
40	40
45	45
50	50
60	60

Water Details

Water Found at Depth Kind

Hole Diameter

Depth From		Diameter
0 m	3.35 m	15.24 cm

Audit Number: Z238154

Date Well Completed: November 23, 2016

Date Well Record Received by MOE: December 23, 2016

APPENDIX 2

EUROFINS CERTIFICATE OF ANALYSIS

AQUIFERTEST PRO - PUMPING TEST ANALYSIS REPORTS

PG5155: SOIL PROFILES AND TEST DATA LOGS

DILLON PROJECT NO:18-7333 SOIL PROFILES AND TEST DATA LOGS



Environment Testing

Client: Paterson Group

154 Colonnade Rd. South

Nepean, ON K2E 7T7

Attention: Mr. Erik Ardley

PO#: 29626

Invoice to: Paterson Group

 Report Number:
 1926944

 Date Submitted:
 2020-03-11

 Date Reported:
 2020-03-17

 Project:
 PH3959

 COC #:
 208266

Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D. Guideline	1484408 GW 2020-03-10 TW1-GW1	1484409 GW 2020-03-10 TW1-GW2
Anions	CI	1 1	mg/L	AO 250	44	41
	F	0.10	mg/L	MAC 1.5	0.70	0.66
	N-NO2	0.10	mg/L	MAC 1.0	<0.10	<0.10
	N-NO3	0.10	mg/L	MAC 10.0	<0.10	<0.10
	SO4	1	mg/L	AO 500	33	33
General Chemistry	Alkalinity as CaCO3	5	mg/L	OG 500	164	166
	Colour	2	TCU	AO 5	<2	<2
	Conductivity	5	uS/cm		511	500
	DOC	0.5	mg/L	AO 5	0.7	0.7
	рН	1.00		6.5-8.5	8.37	8.39
	S2-	0.01	mg/L	AO 0.05	<0.01	<0.01
	TDS	10	mg/L	AO 500	280	280
	Turbidity	0.1	NTU	AO 5.0	0.8	1.9
Hardness	Hardness as CaCO3	1	mg/L	OG 100	119*	126*
Indices/Calc	Ion Balance	0.01			0.89	0.91
Metals	Ag	0.0001	mg/L		<0.0001	<0.0001
	Al	0.01	mg/L	OG 0.1	<0.01	<0.01
	As	0.001	mg/L	IMAC 0.01	<0.001	<0.001
	В	0.01	mg/L	IMAC 5.0	0.23	0.21
	Ва	0.01	mg/L	MAC 1.0	0.04	0.05
	Bi	0.002	mg/L		<0.002	<0.002
	Ca	1	mg/L		23	24
	Cd	0.0001	mg/L	MAC 0.005	<0.0001	<0.0001
	Со	0.0002	mg/L		<0.0002	<0.0002
	Cr	0.001	mg/L	MAC 0.05	<0.001	<0.001

Guideline = ODWSOG

Results relate only to the parameters tested on the samples submitted. Methods references and/or additional QA/QC information available on request.

^{* =} Guideline Exceedence



Environment Testing

Client: Paterson Group

154 Colonnade Rd. South

Nepean, ON K2E 7T7

Attention: Mr. Erik Ardley

PO#: 29626

Invoice to: Paterson Group

 Report Number:
 1926944

 Date Submitted:
 2020-03-11

 Date Reported:
 2020-03-17

 Project:
 PH3959

 COC #:
 208266

Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D. Guideline	1484408 GW 2020-03-10 TW1-GW1	1484409 GW 2020-03-10 TW1-GW2
Metals	Cu	0.001	mg/L	AO 1.0	<0.001	<0.001
IVICIAIS	Fe	0.001	mg/L	AO 1.0	0.08	0.12
	Hg	0.0001	mg/L	MAC 0.001	<0.0001	<0.0001
	K	1	mg/L	IVIAC 0.001	7	7
	Mg	1	mg/L		15	16
	Mn	0.01	mg/L	AO 0.05	<0.01	<0.01
	Mo	0.005	mg/L	710 0.00	<0.005	<0.005
	Na	2	mg/L	AO 200	56	51
	Ni	0.005	mg/L	7.0 200	<0.005	<0.005
	Pb	0.001	mg/L	MAC 0.010	<0.001	<0.001
	Sb	0.0005	mg/L	IMAC 0.006	<0.0005	<0.0005
	Se	0.001	mg/L	MAC 0.05	<0.001	<0.001
	Sn	0.01	mg/L		<0.01	<0.01
	 Ti	0.01	mg/L		<0.01	<0.01
	U	0.001	mg/L	MAC 0.02	<0.001	<0.001
	V	0.001	mg/L		<0.001	<0.001
	Zn	0.01	mg/L	AO 5.0	<0.01	<0.01
Microbiology	Escherichia Coli	0	ct/100mL	MAC 0	0	0
0,	Total Coliforms	0	ct/100mL	MAC 0	0	0
Nutrients	N-NH3	0.010	mg/L		0.093	0.097
	Total Kjeldahl Nitrogen	0.100	mg/L			0.296
	-	0.200	mg/L		0.263	
Subcontract-Inorg	Phenols	0.001	mg/L		<0.001	<0.001
-	Tannin & Lignin	0.1	mg/L		<0.1	<0.1
VOCs Surrogates	1,2-dichloroethane-d4	0	%		93	90

Guideline = ODWSOG

* = Guideline Exceedence

Results relate only to the parameters tested on the samples submitted. Methods references and/or additional QA/QC information available on request.



Environment Testing

Client: Paterson Group

154 Colonnade Rd. South

Nepean, ON K2E 7T7

Attention: Mr. Erik Ardley

PO#: 29626

Invoice to: Paterson Group

 Report Number:
 1926944

 Date Submitted:
 2020-03-11

 Date Reported:
 2020-03-17

 Project:
 PH3959

 COC #:
 208266

Group	Analyte	MRL	Units	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D. Guideline	1484408 GW 2020-03-10 TW1-GW1	1484409 GW 2020-03-10 TW1-GW2
VOCs Surrogates	4-bromofluorobenzene	0	%		109	109
- Coo Gameganos	Toluene-d8	0	%		101	102
Volatiles	1,1,1,2-tetrachloroethane	0.5	ug/L		<0.5	<0.5
	1,1,1-trichloroethane	0.4	ug/L		<0.4	<0.4
	1,1,2,2-tetrachloroethane	0.5	ug/L		<0.5	<0.5
	1,1,2-trichloroethane	0.4	ug/L		<0.4	<0.4
	1,1-dichloroethane	0.4	ug/L		<0.4	<0.4
	1,1-dichloroethylene	0.5	ug/L	MAC 14	<0.5	<0.5
	1,2-dichlorobenzene	0.4	ug/L	MAC 200	<0.4	<0.4
	1,2-dichloroethane	0.2	ug/L	IMAC 5	<0.2	<0.2
	1,2-dichloropropane	0.5	ug/L		<0.5	<0.5
	1,3,5-trimethylbenzene	0.3	ug/L		<0.3	<0.3
	1,3-dichlorobenzene	0.4	ug/L		<0.4	<0.4
	1,3-Dichloropropylene (cis+trans)	0.3	ug/L		<0.3	<0.3
	1,4-dichlorobenzene	0.4	ug/L	MAC 5	<0.4	<0.4
	Acetone	30	ug/L		<30	<30
	Benzene	0.5	ug/L	MAC 1	<0.5	<0.5
	Bromodichloromethane	0.3	ug/L		<0.3	<0.3
	Bromoform	0.4	ug/L		<0.4	<0.4
	Bromomethane	0.5	ug/L		<0.5	<0.5
	c-1,2-Dichloroethylene	0.4	ug/L		<0.4	<0.4
	c-1,3-Dichloropropylene	0.2	ug/L		<0.2	<0.2
	Carbon Tetrachloride	0.2	ug/L	MAC 2	<0.2	<0.2
	Chloroethane	0.2	ug/L		<0.2	<0.2
	Chloroform	0.5	ug/L		<0.5	<0.5

Guideline = ODWSOG

Results relate only to the parameters tested on the samples submitted. Methods references and/or additional QA/QC information available on request.

^{* =} Guideline Exceedence



Environment Testing

Client: Paterson Group

154 Colonnade Rd. South

Nepean, ON K2E 7T7

Attention: Mr. Erik Ardley

PO#: 29626

Invoice to: Paterson Group

 Report Number:
 1926944

 Date Submitted:
 2020-03-11

 Date Reported:
 2020-03-17

 Project:
 PH3959

 COC #:
 208266

				Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1484408 GW 2020-03-10 TW1-GW1	1484409 GW 2020-03-10 TW1-GW2
Group	Analyte	MRL	Units	Guideline		
Volatiles	Dibromochloromethane	0.3	ug/L		<0.3	<0.3
	Dichlorodifluoromethane	0.5	ug/L		<0.5	<0.5
	Dichloromethane	4.0	ug/L	MAC 50	<4.0	<4.0
	Ethylbenzene	0.5	ug/L	MAC 140	<0.5	<0.5
	Ethylene Dibromide	0.2	ug/L		<0.2	<0.2
	Hexane	5	ug/L		<5	<5
	m/p-xylene	0.4	ug/L		<0.4	<0.4
	Methyl Ethyl Ketone (MEK)	10	ug/L		<10	<10
	Methyl Isobutyl Ketone (MIBK)	10	ug/L		<10	<10
	Methyl Tert Butyl Ether (MTBE)	2	ug/L	AO 15	<2	<2
	Monochlorobenzene	0.5	ug/L	MAC 80	<0.5	<0.5
	o-xylene	0.4	ug/L		<0.4	<0.4
	Styrene	0.5	ug/L		<0.5	<0.5
	t-1,2-Dichloroethylene	0.4	ug/L		<0.4	<0.4
	t-1,3-Dichloropropylene	0.2	ug/L		<0.2	<0.2
	Tetrachloroethylene	0.3	ug/L	MAC 10	<0.3	<0.3
	Toluene	0.5	ug/L	MAC 60	<0.5	<0.5
	Trichloroethylene	0.3	ug/L	MAC 5	<0.3	<0.3
	Trichlorofluoromethane	0.5	ug/L		<0.5	<0.5
	Vinyl Chloride	0.2	ug/L	MAC 1	<0.2	<0.2
	Xylene; total	0.5	ug/L	MAC 90	<0.5	<0.5

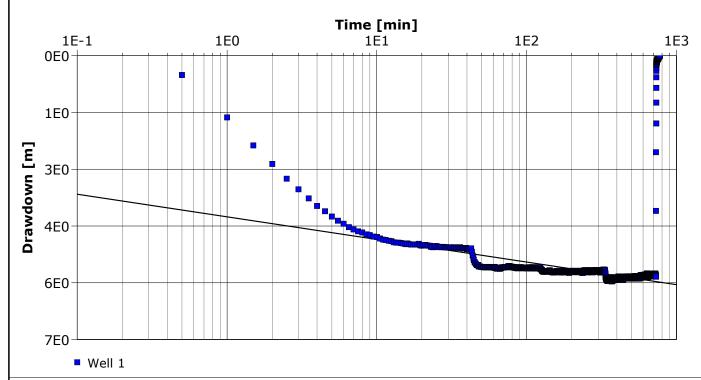
Guideline = ODWSOG

* = Guideline Exceedence

Results relate only to the parameters tested on the samples submitted. Methods references and/or additional QA/QC information available on request.

Pumping Test Analysis Report Project: ABIC Number: PH3959 Client: Caivan Location: 3713 Borrisokane Pumping Test: Pumping Test - TW1 Pumping Well: Well 1 Test Conducted by: EA Test Date: 12/03/2020 Analysis Performed by: EA Theis Analysis Date: 12/03/2020 Aquifer Thickness: Discharge: variable, average rate 68 [l/s] Time [min] 600 800 1000 200 400 0.00 1.40 Drawdown [m] 2.80 4.20 5.60 7.00 Calculation using Theis **Observation Well** Transmissivity Radial Distance to Storage coefficient PW $[m^2/d]$ [m] Well 1 1.93×10^{3} 0.08

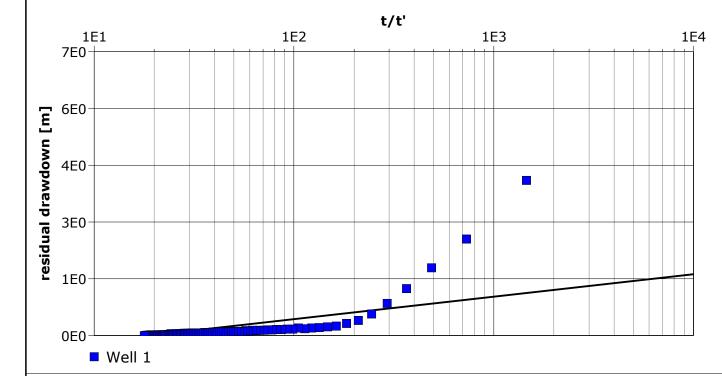
	Pumping Test	Analysis Report
	Project: ABIC	
	Number: PH3959)
	Client: Caivan	
Location: 3713 Borrisokane	Pumping Test: Pumping Test - TW1	Pumping Well: Well 1
Test Conducted by: EA		Test Date: 12/03/2020
Analysis Performed by: EA	Coop Jacoob 1	Analysis Date: 12/03/2020
Aguifer Thickness:	Discharge: variable, average rate 68 [l/	sl



Calculation using COOPER & JACOB

•				
Observation Well	Transmissivity	Storage coefficient	Radial Distance to PW	
	[m²/d]		[m]	
Well 1	1.93 × 10 ³		0.08	

		Pumping Test An	alysis Report
		Project: ABIC	
		Number: PH3959	
		Client: Caivan	
Location: 3713 Borrisokane	Pumping Test: Pum	ping Test - TW1	Pumping Well: Well 1
Test Conducted by: EA	•		Test Date: 12/03/2020
Analysis Performed by: EA	Theis Recovery		Analysis Date: 12/03/2020
Aquifer Thickness:	Discharge: variable,	average rate 68 [l/s]	



Calculation using THEIS & JACOB

•			
Observation Well	Transmissivity	Radial Distance to PW	
	[m²/d]	[m]	
Well 1	1.95 × 10 ³	0.08	

					Pumping Te	st An	alysis Report		
					Project: ABIC				
					Number: PH39	959			
					Client: Caiva	an			
Loc	ation: 3713 Borrisokane		Pumping T	est: Pump	oing Test - TW1		Pumping Well: \	Well 1	
Tes	t Conducted by: EA						Test Date: 12/0	3/2020	
Αqι	uifer Thickness: NAN m		Discharge:	variable,	average rate 68	[l/s]			
	Analysis Name	Analysis Perfo	ormed by	Method n	ame	Well		T [m²/d]	S
1	Theis	EA		Theis		Well	1	1.93 × 10 ³	
2	Coop Jacoob 1	EA		Cooper &	Jacob I	Well	1	1.93 × 10 ³	
3	Theis Recovery	EA		Theis Red	covery	Well	1	1.95 × 10 ³	

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME 55 Power Auger

DATE 2019 November 14

FILE NO. PG5155

HOLE NO. BH 9-19

BORINGS BY CME 55 Power Auger					DATE	2019 Nov	ember 1	4	HOLL	BH 9-19	
SOIL DESCRIPTION	PLOT		SAN	/IPLE	T	DEPTH	ELEV.			Blows/0.3m Dia. Cone	
	STRATA 1	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	0 V	Vater C	Content %	Diozomotor
GROUND SURFACE	×××	× -	-	2	4	0-	104.25	20	40	60 80	<u>∩</u>
		§ AU	1								\otimes
	\bigotimes	\sqrt{ss}	2	79	29	1-	103.25				$\stackrel{\otimes}{\mathbb{R}}$
ILL: Brown silty clay with sand and ravel, trace asphalt and organics	\bigotimes		۷	'3	23						
		ss	3	50	65	2-	102.25				\bigotimes
	\bowtie	7 00			_	_	102.20				\bigotimes
2.97		SS	4	46	7	9	101.25				\bigotimes
ILL: Brown sand with gravel, trace		ss	5	17	5	3-	101.25				
lay	\bowtie	<u> </u>					400.05				\bigotimes
4. <u>50</u>	\bigotimes	\ ss	6	25	5	4-	100.25				▓
		ss	7	38	3	_					$\stackrel{\text{\tiny M}}{=}$
ILL: Brown silty clay, some sand,	\bowtie	∝ SS	<i>.</i> 8	75	5	5-	-99.25				
ravel, trace organics		- 00	O	'3							
	\bowtie	7	0	F0		6-	-98.25				
6.70 nd of Borehole	\bowtie	ss	9	58	9						- -
GWL @ 4.01m - Nov. 29, 219)											
								20	40	60 80 1	00
										ngth (kPa)	50
								▲ Undis		△ Remoulded	
			i	1	1	1	1	1			

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME 55 Power Auger

DATE 2019 November 13

FILE NO. PG5155

HOLE NO. BH10-19

BORINGS BY CME 55 Power Auge	er				0	ATE 2	2019 Nov	ember 1	3		В	H10-19)
SOIL DESCRIPTION		PLOT		SAN	/IPLE	T	DEPTH	ELEV.			Blows		, 5
GROUND SURFACE		STRATA F	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)			Conten		Piezometer Construction
GROOND SOLII AGE			×				0-	104.36	20				
FILL: Brown silty sand with gravel			§ AU	2	50	00	1 -	103.36					
	1.45		\ - -	2	50	20	'	100.00					· 👹 员
			ss	3	58	27	2-	102.36					
		\bowtie	∑ ss	4	46	13							
FILL: Brown sand, some gravel, trace clay, asphalt and cobbles			∑ ∑ss	5	58	18	3-	101.36					
	4.50		ss	6	29	14	4-	100.36					
	<u>4.50</u>		V 00	_	00	_							
			\ ss	7	33	5	5-	99.36					
			ss	8	42	19							
FILL: Brown silty clay, some sand			∐ V			_	6-	98.36					
and gravel, trace asphalt and organics			\ ss	9	50	5							
- J			ss	10	38	5	7-	97.36					
			X ss	11	58	11							
Dynamic Cone Penetration Test	<u>8</u> . <u>2</u> 3		<u> </u>	' '	50	' '	8-	96.36					
commenced at 8.23m depth.							_		7				
							9-	95.36					
												•	
							10-	94.36				6	
										•			
							11-	-93.36					
							40	00.00					
End of Borehole	1 <u>2.17</u>		-				12-	92.36					•
Practical DCPT refusal at 12.17m depth													
(Piezometer dry/blocked at 4.58m depth - Nov. 29, 2019)													
20,20									20	40	60	80 1	100
									She	ar Str	ength (k	(Pa)	
									▲ Undis	turbed	△ Ren	noulded	

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME 55 Power Auger

DATE 2019 November 14

FILE NO. PG5155

HOLE NO. BH11-19

BORINGS BY CME 55 Power Auger				D	ATE	2019 Nov	ember 14	4		В	H11-19	
SOIL DESCRIPTION	PLOT		SAN	IPLE		DEPTH	ELEV.			Blows/ Dia. Co		, ,
	STRATA P	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)			Content		Piezometer
GROUND SURFACE		2		2	z °	0-	-104.17	20	40	60	80	<u>a</u> C
FILL: Brown sand with gravel and cobbles, trace clay and organics 0.6	9	AU	1				104.17					
FILL: Brown silty clay, some sand, gravel and organics 1.4	5	ss	2	54	31	1-	-103.17					
FILL: Brown sand, some gravel, race clay, gravel, organics and		ss	3	46	14	2-	-102.17					
asphalt2.9	7 💥	SS	4	29	13	3-	-101.17					
		ss	5	29	7							
FILL: Brown silty clay, some sand		ss	6	62	8	4-	-100.17					
and gravel, trace organics and asphalt		ss	7	33	10	5-	-99.17					
<u>6.0</u>	1	ss	8	58	11	6-	-98.17					
FILL: Brown silty sand, some clay		ss	9	42	12							
and gravel, trace asphalt and construction debris		ss	10	0	10	7-	-97.17					
<u>8.3</u>	0	ss	11	8	12	8-	-96.17					
Brown SILTY CLAY to SILTY SAND, some gravel, trace organics		ss	12	71	4	9-	-95.17					
	5	ss	13	75	2							
commenced at 9.75m depth.						10-	-94.17					
						11-	-93.17			•		1
11.9 [.] End of Borehole	9	-							•	•		
Practical DCPT refusal at 11.99m depth.												
(GWL @ 3.90m - Nov. 29, 219)												
								20 She ▲ Undis		60 ength (k △ Rem	Pa)	00

Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

SOIL PROFILE AND TEST DATA

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

Geotechnical Investigation

DATUM **REMARKS** FILE NO.

Geodetic

HOLE NO. RH12-10

PG5155

BORINGS BY CME 55 Power Auger				D	ATE 2	2019 Nov	ember 1	4	BH12-19	
SOIL DESCRIPTION	PLOT		SAN	IPLE	ı	DEPTH	ELEV.	_	lesist. Blows/0.3m 50 mm Dia. Cone	r L
	STRATA I	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	0 V	Vater Content %	Piezometer Construction
GROUND SURFACE		,		K	-	0-	105.09	20	40 60 80	L O
FILL: Brown sand, trace gravel and organics 0.69		AU	1							
FILL: Brown silty clay, some sand and gravel, trace organics and		ss	2	46	7	1 -	104.09			
asphalt2.21		ss	3	12	13	2-	103.09			
		ss	4	21	20	3-	-102.09			
		ss	5	79	14		102.00			
FILL: Brown sand with gravel, trace clay and organics		ss	6	88	31	4-	101.09			
<u>5.26</u>		ss	7	33	36	5-	100.09			
		ss	8	83	7	6-	-99.09			
FILL: Brown silty clay, some to trace sand and gravel		ss	9	100	2		00.00		× × × × × × × × × × × × × × × × × × ×	
- grey by 6.0m depth		ss	10	100	2	7-	-98.09			
- brown/black by 6.8m depth 8.31		ss	11	100	2	8-	97.09			
Grey SILTY CLAY, trace sand 9.07		ss	12	92	13	9-	-96.09			
Loose, brown SAND 9.75	X	ss	13	62	4		00.00			
Dynamic Cone Penetration Test commenced at 9.75m depth.						10-	-95.09			
						11-	94.09	1		
						19-	-93.09			
							30.00	}		
						13-	-92.09			
						14-	-91.09	20	40 60 80 10	10
									ar Strength (kPa)	

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - Borrisokane Rd.
Ottawa, Ontario

DATUM Geodetic FILE NO. **PG5155 REMARKS** HOLE NO. BH12-19 BORINGS BY CME 55 Power Auger DATE 2019 November 14 **SAMPLE** Pen. Resist. Blows/0.3m STRATA PLOT **DEPTH** ELEV. Piezometer Construction **SOIL DESCRIPTION** 50 mm Dia. Cone (m) (m) N VALUE or RQD RECOVERY NUMBER Water Content % **GROUND SURFACE** 80 20 14+91.09 15 + 90.0916 + 89.0917+88.09 End of Borehole Practical DCPT refusal at 17.30m depth. (Piezometer dry/blocked at 2.84m depth - Nov. 29, 2019) 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

Pro

SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME 55 Power Auger

DATE 2019 November 15

FILE NO. PG5155

HOLE NO. BH13-19

BORINGS BY CME 55 Power Auger				D	ATE 2	2019 Nov	ember 15	5	HOL	E NO.	BH13	-19
SOIL DESCRIPTION	PLOT		SAN	/IPLE		DEPTH (m)	ELEV.	Pen. Re			vs/0.3m Cone	
	STRATA	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(111)	(111)	0 V	ent %	Piezometer		
GROUND SURFACE	ั้ง		N	RE	zö		105.43	20	40	60	80	Pie
	\bigotimes	AU	1									
		ss	2	42	24	1-	104.43					
FILL: Brown and, some gravel, trace		ss	3	54	15	2-	103.43					
clay, organics and asphalt		X ss	4	75	22	3-	-102.43					
		∑ ss V ss	5	75	48	4-	101.43					
		∑ ss	6	54	33							
<u>5</u> .26		∑ ss	7	29	16	5-	100.43					
Brown/black SILTY CLAY, trace sand		∑ ss	8	100	2	6-	-99.43					
6.70 End of Borehole		∑ ss	9	100	2			-0-1-0-1				
(Piezometer dry/blocked at 5.04m depth - Nov. 29, 2019)												
								20 Shea ▲ Undist		60 ength	80 (kPa) Remoulde	100

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME 55 Power Auger

DATE 2019 January 15

BH14-19

BORINGS BY CME 55 Power Auger				D	ATE 2	2019 Jan	uary 15		HOL	E NO.	BH	14-19)
SOIL DESCRIPTION	PLOT		SAN	/IPLE	T	DEPTH	ELEV.	Pen. R ● 5		. Blo n Dia.			
	STRATA E	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	0 V	Vater	Cont	ent %	6	Diozomotor
GROUND SURFACE		~		<u> </u>		0-	104.42	20	40	60	•	30 	
FILL: Brown sand, some gravel, some to trace clay		§ AU √ SS	1	58	50		-103.42						
1.45		ss	3	96	13	_							
						2-	102.42						
		ss	4	54	6	3-	-101.42						**
FILL: Brown silty clay with sand and		ss	5	42	4								
gravel, trace organics		ss	6	54	4	4-	100.42						
		ss	7	46	2	5-	-99.42						
6.02		ss	8	25	3		00.40						
		ss	9	50	15	6-	-98.42						
FILL: Brown sand with clay, some gravel, trace organics 7.54		∑ ∑ss	10	0	13	7-	-97.42						***
FILL: Brown silty clay with sand,		ss	11	54	15	8-	-96.42						***
FILL: Brown sand with gravel 9.07		ss	12	25	7		05.40						
Brown SILTY CLAY with sand, trace		ss	13	21	8	9-	-95.42						
gravel		ss	14		13	10-	94.42						
10.59		ss	15	654	14	11-	-93.42						
Compact to dense, brown SAND		∫ ∑ss	16	79	37	40	00.40						
some silt by 12.1m depth		ss	17	62	40	12-	-92.42						
- trace clay by 13.6m depth		ss	18	71	42	13-	91.42						
, , , , , , , , , , , , , , , , , , , ,		X				14-	-90.42						
								20 Shea ▲ Undist		60 engtl △		a)	100

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME 55 Power Auger

DATE 2019 January 15

PG5155

HOLE NO. BH14-19

BORINGS BY CME 55 Power Auger				D	ATE 2	2019 Jan	uary 15		IIOL	E NO.	BH14	1 -19
SOIL DESCRIPTION	PLOT		SAN	IPLE	T	DEPTH	ELEV.	Pen. R ● 5		Blow Dia. (
	STRATA E	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	0 V	Vater	Conte	ent %	2010
GROUND SURFACE	,	∦ SS	19	83	30	14-	-90.42	20	40	60	80	
14.40		ss	20	75	9	15-	-89.42					
		ss	21	88	3							
		ss	22	96	5	16-	-88.42					
Grey SILTY CLAY , trace sand and		ss	23	100	7	17-	-87.42					
gravel		ss	24	100	6	18-	-86.42					
		ss	25	100	7	19-	-85.42					
		ss	26	100	6	20-	-84.42					
						21 -	-83.42					
21.54	1///	ss	27	0	50+	22-	-82.42					
Dense to very dense, grey SANDY SILT		: : :				23-	-81.42					
23.93	3	ss	28	54	48		-80.42					
Very dense, brown SAND , some silt, trace clay and gravel		ss	29	75	54							
25.45	<u> </u> 					25-	-79.42					
ery dense, grey SILT, some sand		ss	30	42	51	26-	-78.42					
26.97 GLACIAL TILL: Very dense, grey sand, some clay, gravel, cobbles and	,	\ \ \ \ \				27-	-77.42					
poulders	\^,^,^	∭ ss	31	50	61	28-	-76.42	20	40	60	80	100
									ar Str	ength		

SOIL PROFILE AND TEST DATA

FILE NO.

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

Geodetic

DATUM

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

												110.	PG	5155	
REMARKS										ı	HOLE	NO.	RH1	4-19	
BORINGS BY CME 55 Power Auger					ATE 2	2019 Jan 	uary 15	Т							
SOIL DESCRIPTION	PLOT		SAN	IPLE		DEPTH	ELEV.		Pen.				ws/0.3 Cone		_
SOIL DESCRIPTION			Ä	RY	買り	(m)	(m)			30 1		Dia.	COHE		Piezometer Construction
	STRATA	TYPE	NUMBER	% RECOVERY	N VALUE or RQD				0	Wa	ter C	Cont	tent %	,	zom
GROUND SURFACE	ั้ง		N	REC	Z Ö	00	70.40		20) ,	40	60	8	0	Pie
	^^^^	_				28-	-76.42			<u> </u>					
	^^^^						75.40								
		∑ SS	32	50	50+	29-	-75.42								
GLACIAL TILL: Very dense, grey sand, some clay, gravel, cobbles and		RC	1	100			7								
boulders	\^^^^/	_				30-	74.42			<u> </u>					
	\^^^^	DC	_	0.7		0.1	70.40								
	\^^^^/ \^^^^/	RC	2	27		31-	-73.42								
31.72 End of Borehole	1^^^^	_								<u> </u>	1		- - - -		
(Piezometer dry/blocked at 2.07m depth - Nov. 29, 2019)															
									20		1 0	60		0 1	00
								_		near disturk			h (kPa Remou		

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

40

▲ Undisturbed

Shear Strength (kPa)

60

80

△ Remoulded

100

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

DATUM Geodetic FILE NO. PG5155 **REMARKS** HOLE NO. BH15-19 **BORINGS BY** CME 55 Power Auger DATE 2019 November 15 **SAMPLE** Pen. Resist. Blows/0.3m STRATA PLOT DEPTH ELEV. Piezometer Construction **SOIL DESCRIPTION** 50 mm Dia. Cone (m) (m) RECOVERY N VALUE or RQD NUMBER Water Content % **GROUND SURFACE** 80 20 0+105.02**TOPSOIL** 1 FILL: Brown sand, some gravel, trace silty clay 1+104.022 29 SS 12 SS 3 44 50 +2+103.02FILL: Brown silty clay, some sand and gravel, trace organcis G 4 3+102.02SS 5 100 11 FILL: Brown silty sand, some sand 4+101.02SS 6 100 2 7 SS 79 40 5 ± 100.02 FILL: Brown sand 8 31 6+99.02- trace gravel by 6.0m depth SS 9 67 29 End of Borehole

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME 55 Power Auger

DATE 2019 November 18

FILE NO. PG5155

HOLE NO. BH16-19

BORINGS BY CME 55 Power Auge	r			D	ATE 2	2019 Nov	ember 1	3	DI110-13	<u>, </u>
SOIL DESCRIPTION	PLOT		SAN	IPLE		DEPTH (m)	ELEV. (m)		Blows/0.3m Dia. Cone].
GROUND SURFACE	STRATA	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(111)	(111)	○ Water	Content %	Piezometer
	0.15	x				0-	-105.31	20 40	- 	
FILL: Brown silty clay with sand and gravel	0.15 b.69	AU	1							
		∦ ss	2	79	42	1+	-104.31			
	2.21	ss	3	54	15	2-	-103.31			
FILL: Brown silty clay with sand, some gravel, trace organics, asphal	t 2.97	ss	4	71	5		100.01			
FILL: Brown sand, some clay and	3.73	ss	5	58	21	3-	-102.31			
FILL: Brown silty clay with sand,	4.50	ss	6	67	11	4-	-101.31			
Brown SILTY CLAY , some sand,		ss	7	96	14	5-	-100.31			
race gravel	6.02	ss	8	100	4		-99.31			
		ss	9	75	19	6-	-99.31			
		ss	10	71	29	7-	-98.31			
Compact, brown SAND, trace silt and gravel		ss	11	67	36	8-	-97.31			
		ss	12	83	20		-96.31			
Ş	9.75	ss	13	0	13	9-	-96.31			
Dynamic Cone Penetration Test commenced at 9.75m depth.		_				10-	-95.31			
						11-	-94.31			
						10	00.01		\$.
						12	-93.31			
						13-	-92.31			-
						14-	-91.31	20 40	60 80 1	100
									ength (kPa) △ Remoulded	100

SOIL PROFILE AND TEST DATA

40

▲ Undisturbed

Shear Strength (kPa)

60

80

△ Remoulded

100

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Geotechnical Investigation
Prop. Residential Development - Borrisokane Rd.
Ottawa, Ontario

DATUM Geodetic FILE NO. **PG5155 REMARKS** HOLE NO. BH16-19 BORINGS BY CME 55 Power Auger DATE 2019 November 18 **SAMPLE** Pen. Resist. Blows/0.3m STRATA PLOT **DEPTH** ELEV. Piezometer Construction **SOIL DESCRIPTION** 50 mm Dia. Cone (m) (m) N VALUE or RQD RECOVERY NUMBER Water Content % **GROUND SURFACE** 80 20 14 + 91.3115 + 90.3116+89.31 17+88.31 18+87.31 19+86.31 20+85.31 21 +84.31 21.56 End of Borehole Practical DCPT refusal at 21.56m depth. (GWL @ 6.02m - Nov. 29, 219)

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME 55 Power Auger

DATE 2019 November 19

FILE NO. PG5155

HOLE NO. BH17-19

BORINGS BY CME 55 Power Auger	DATE 2019 November 19							9	BH17-19				
SOIL DESCRIPTION	PLOT		SAN	/IPLE		DEPTH	ELEV.			Blows/0	.3m	Well	
	STRATA F	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)			Content 9	%	Monitoring Well Construction	
GROUND SURFACE	ß	_	Z	Ä	Z O		405.40	20	40	60	80	ဋိပိ	
FILL: Brown silty sand with gravel and cobbles, trace brick and organics		AU	1			0-	105.42						
<u>_1.07</u>						1-	104.42						
FILL: Brown sand with gravel, trace cobbles		ss	2	46	17	2-	103.42						
FILL: Brown silty clay, some sand		ss	3	96	9	3-	-102.42						
and gravel						4-	-101.42						
		ss	4	58	20	5-	100.42						
		ss	5	67	22	6-	-99.42						
Compact, brown SAND , trace gravel		ss	6	50	19		00.42						
		ss	7	54	13	7-	-98.42						
		ss	8	67	14	8-	97.42						
		ss	9	75	4	9-	-96.42						
		SS	10	100	11								
(GWL @ 6.73m - Nov. 29, 219)													
								20	40	60	80 10	0	
								She ▲ Undis		ength (kP △ Remo			

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME 55 Power Auger

DATE 2019 November 19

FILE NO. PG5155

HOLE NO. BH18-19

BORINGS BY CME 55 Power Auger				D	ATE 2	2019 Nov	9		BH18-	19	
SOIL DESCRIPTION	PLOT		SAN	IPLE		DEPTH	ELEV.			lows/0.3m ia. Cone	Well
GROUND SURFACE	STRATA P	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)			ontent %	Monitoring Well
GROUND SURFACE		×				0-	103.89	20	40	00 00	
FILL: Brown silty sand, some gravel, crace organics		Ä AU	1			1-	102.89				
FILL: Brown silty clay, some sand		ss	2	54	6	2-	101.89				
and gravel, trace organics 2.59		-				_	101.00				
		ss	3	88	11	3-	100.89				
Compact to loose, brown SAND, race gravel						4-	-99.89				T
5.26		ss	4	58	9	5-	-98.89				
		ss	5	88	12	6-	-97.89				
		ss	6	54	12						
Grey SILTY CLAY, some sand		ss	7	48	16	7-	96.89				
		SS	8	96	1	8-	-95.89				
9.07		ss	9	96	1	9-	-94.89				
ery loose, grey SAND, trace clay		SS	10	96	2	10-	-93.89				
10.67		\ SS	11	92	2		30.03				
GWL @ 4.03m - Nov. 29, 219)											
								20 Shea ▲ Undist	ar Streng	60 80 gth (kPa) △ Remoulded	100

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Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

SOIL PROFILE AND TEST DATA

DATUM Geodetic FILE NO. **PG5155** REMARKS HOLE NO. BH19-19 BORINGS BY CMF 55 Power Auger DATE 2019 November 19

STRATA PLOT		SAN	IPLE		DEPTH	ELEV.	Pen. Resist. Blows/0.3m	
					ł		 50 mm Dia. Cone 	_ !
\vdash	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	O Water Content %	Piezometer
••	-	Z	H	z o			20 40 60 80	Fig. 6
	AU	1			0-	-104.14		
	SS	2	47	50+	1-	-103.14		
	SS	3	50	9	2-	-102.14		
	SS	4	4	7		101 11		
	ss	5	46	6	3-	-101.14		
	SS	6	42	7	4-	-100.14		
	SS	7	21	4	5-	-99.14		
	SS	8	42	6	6-	-98 14		
	ss	9	88	21		00		
	ss	10	83	4	7-	-97.14		
	ss	11	46	16	8-	-96.14		_
	ss	12	38	21	9-	-95.14		
	ss	13	54	18				
					10-	-94.14	.	
					11-	-93.14		
					12-	-92.14	<u> </u>	
					13-	-91.14		
					14-	-90.14		100
			SS 2 SS 3 SS 4 SS 5 SS 6 SS 7 SS 8 SS 9 SS 10 SS 11 SS 11	SS 2 47 SS 3 50 SS 4 4 SS 5 46 SS 6 42 SS 7 21 SS 8 42 SS 9 88 SS 10 83 SS 11 46 SS 12 38	SS 2 47 50+ SS 3 50 9 SS 4 4 7 SS 5 46 6 SS 6 42 7 SS 7 21 4 SS 8 42 6 SS 9 88 21 SS 10 83 4 SS 11 46 16 SS 12 38 21	SS 2 47 50+ 1- SS 3 50 9 2- SS 4 4 7 3- SS 5 46 6 42 7 4- SS 7 21 4 5- SS 8 42 6 6- SS 9 88 21 7- SS 10 83 4 7- SS 11 46 16 8- SS 12 38 21 9- SS 13 54 18 10- 11- 11- 11- 11- 11- 11- 11-	SS 2 47 50+ 1-103.14 SS 3 50 9 2-102.14 SS 4 4 7 3-101.14 SS 5 46 6 SS 6 42 7 4-100.14 SS 7 21 4 5-99.14 SS 8 42 6 6-98.14 SS 9 88 21 SS 10 83 4 7-97.14 SS 11 46 16 8-96.14 SS 12 38 21 9-95.14	SS 2 47 50+ 1-103.14 SS 3 50 9 2-102.14 SS 4 4 7 SS 5 46 6 SS 6 42 7 4-100.14 SS 7 21 4 5-99.14 SS 9 88 21 SS 10 83 4 7-97.14 SS 11 46 16 8-96.14 SS 12 38 21 9-95.14 SS 13 54 18 10-94.14 11-93.14 12-92.14 13-91.14 14-90.14 14-90.14

SOIL PROFILE AND TEST DATA

▲ Undisturbed

△ Remoulded

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

DATUM Geodetic FILE NO. **PG5155 REMARKS** HOLE NO. BH19-19 BORINGS BY CME 55 Power Auger DATE 2019 November 19 **SAMPLE** Pen. Resist. Blows/0.3m STRATA PLOT **DEPTH** ELEV. Piezometer Construction **SOIL DESCRIPTION** 50 mm Dia. Cone (m) (m) N VALUE or RQD RECOVERY NUMBER Water Content % **GROUND SURFACE** 80 20 14 + 90.1415 + 89.1416+88.14 17+87.14 18+86.14 19 + 85.1420+84.14 21 + 83.1422+82.14 22.15 End of Borehole Practical DCPT refusal at 22.15m depth. (GWL @ 3.69m - Nov. 29, 219) 40 60 80 100 Shear Strength (kPa)

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME 55 Power Auger

DATE 2019 November 19

FILE NO. PG5155

HOLE NO. BH20-19

SOIL DESCRIPTION A	BORINGS BY CME 55 Power Auger				D	ATE 2	2019 Nov	ember 1	9		E	3H20-1	9
GROUND SURFACE AU 1 SS 2 42 12 2-101.72 2.59 FILL: Brown silty sand, trace gravel and organics SS 3 58 5 4-99.72 SS 4 79 7 5-98.72 Compact, brown SAND, trace gravel and clay seams 7.54 Compact, grey SILTY SAND with gravel and clay seams 7.54 SS 6 50 8 8-95.72 Grey-brown SILTY CLAY, trace sand Find of Borehole O 103.72 1-102.72 0 40 60 80 O 103.72 1-102.72 1-102.72 1-102.72 0 40 60 80 O 7-103.72 1-102.72 1	SOIL DESCRIPTION	LOT		SAN	IPLE		4 1		_				Well
FILL: Brown silty sand, trace gravel and organics SS 2 42 12 2-101.72 2.59 SS 3 58 5 4 79 7 5-98.72 Grey-brown SAND, trace gravel and clay seams 7.54 SS 7 54 12 Compact, grey SILTY SAND with gravel and clay SS 9 71 2 SS 9 9 94.72 SS 10 92 2 SS 11 100 1			TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	0 V	Vater C	Conter	nt %	Monitoring Well
FILL: Brown silty sand, trace gravel and organics SS 2 42 12 2-101.72 2.59 SS 3 58 5 4-99.72 FILL: Brown sand, trace gravel SS 4 79 7 5-98.72 SS 5 54 15 6-97.72 Compact, brown SAND, trace gravel and clay seams 7.54 Compact, grey SILTY SAND with gravel and clay SS 6 50 8 8-95.72 Compact, grey SILTY SAND with gravel and clay SS 9 71 2 SS 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	anone com Acc		× ΛΙΙ	1			0-	103.72					
2.59 SS 3 58 5 3-100.72 3-1			*\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\				1-	-102.72					
SS 3 58 5 4 99.72 SS 4 79 7 5 98.72 SS 5 54 15 6 97.72 Compact, brown SAND, trace gravel and clay seams 7.54 SS 6 58 19 Compact, grey SILTY SAND with gravel and clay SS 7 54 12 7 96.72 SS 9 71 2 9 94.72 SS 10 92 2 SS 10 92 2 SS 11 100 1	2.59		∦ ss	2	42	12	2-	101.72					
SS 4 79 7 5-98.72 SS 5 54 15 6-97.72 Compact, brown SAND, trace gravel and clay seams Compact, grey SILTY SAND with gravel and clay SS 6 50 8 8-95.72 SS 9 71 2 SS 9 71 2 SS 9 71 2 SS 10 92 2 SS 11 100 1			ss	3	58	5	3-	100.72					
SS 5 54 15 6-97.72 Compact, brown SAND, trace gravel and clay seams SS 7 54 12 7-96.72 Compact, grey SILTY SAND with gravel and clay SS 6 50 8 8-95.72 SS 9 71 2 SS 9 71 2 SS 10 92 2 SS 10 92 2 SS 11 100 1	FILL: Brown sand, trace gravel		×				4-	99.72					
Compact, brown SAND, trace gravel and clay seams SS 6 58 19			/ <u>\</u>				5-	-98.72					
Compact, brown SAND, trace gravel and clay seams SS 7 54 12 7 96.72	6.02	2	<u></u>	5	54	15	6-	-97.72					
Compact, grey SILTY SAND with gravel and clay SS 6 50 8 8-95.72 SS 9 71 2 SS 9 71 2 SS 10 92 2 SS 11 100 1 End of Borehole	Compact, brown SAND , trace gravel and clay seams						7-	96.72					
SS 9 71 2 9-94.72 SS 10 92 2 SS 11 100 1 10-93.72 End of Borehole	Compact, grey SILTY SAND with		<u> </u>				8-	-95.72					
SS 11 100 1 10-93.72 Ind of Borehole			ss	9	71	2	9-	-94.72					
End of Borehole	eand		11				10-	-93.72					
	10.67	7	1										
	2												
20 40 60 80 Shear Strength (kPa) ▲ Undisturbed △ Remoulded									Shea	ar Stre	ngth (kPa)	100

SOIL PROFILE AND TEST DATA

3713 Borrisokane Road Ottawa, Ontario

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

Geotechnical Investigation

DATUM Ground surface elevations provided by J.D. Barnes Limited. FILE NO. PG5016 **REMARKS** HOLE NO. **BH7** BORINGS BY CME 55 Power Auger **DATE** 2019 July 23 **SAMPLE** Pen. Resist. Blows/0.3m Monitoring Well Construction STRATA PLOT DEPTH ELEV. **SOIL DESCRIPTION** 50 mm Dia. Cone (m) (m) N VALUE or RQD RECOVERY NUMBER Water Content % **GROUND SURFACE** 80 20 0+103.77ΑU 1 FILL: Brown silty sand and gravel 1.07 1+102.77SS 2 0 9 SS 3 62 13 2+101.77SS 4 62 14 3+100.77SS 5 54 22 Compact to dense, brown SILTY **Y** SAND 4 + 99.77SS 5 96 23 SS 7 71 24 5+98.77SS 8 100 27 6+97.77SS 9 100 38 End of Borehole (GWL @ 3.66m - July 24, 2019) 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

DATUM Geodetic									FILE NO. PG5155	5
BORINGS BY Excavator				-	ATE :	2019 Nov	ombor 1	4	HOLE NO. TP32	
BORINGS BY EXCAVATOR			CVI	MPLE	DAIE	2019 1101	ember i		Resist. Blows/0.3m	
SOIL DESCRIPTION	PLOT					DEPTH (m)	ELEV. (m)		50 mm Dia. Cone	ter
	STRATA	TYPE	NUMBER	% RECOVERY	VALUE r RQD			0 V	Water Content %	Piezometer Construction
GROUND SURFACE	, p	.	Z	E	N VZ		400.00	20	40 60 80	Pie C
FILL: Brown sand, some gravel, cobbles, trace clay and organics 0.3	30	G	1			- 0-	102.23			
						1-	-101.23			
						2-	-100.23			
Brown SAND , some gravel, trace cobbles						3-	-99.23			
		= G	2			4-	-98.23			
<u>4</u> .7	70	_								 <u>⊽</u>
Brown SAND , some clay, gravel, cobbles and boulders	10	= G	3			5-	-97.23			
End of Test Pit		_								
(GWL at 4.8m depth based on field observations)										
								20 Shea ▲ Undis	ar Strength (kPa)	100

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - Borrisokane Rd.
Ottawa, Ontario

DATUM Geodetic FILE NO. PG5155 **REMARKS** HOLE NO. **TP33 BORINGS BY** Excavator DATE 2019 November 11 **SAMPLE** Pen. Resist. Blows/0.3m STRATA PLOT **DEPTH** ELEV. Piezometer Construction **SOIL DESCRIPTION** • 50 mm Dia. Cone (m) (m) N VALUE or RQD RECOVERY NUMBER Water Content % **GROUND SURFACE** 80 20 0+103.94FILL: Brown sand with gravel, 1 cobbles, trace organics 0.30 1 + 102.94G 2 FILL: Brown sand, trace gravel 2+101.94 3+100.944 + 99.94Grey SILTY CLAY, trace sand G 3 5.00 5+98.94End of Test Pit (Groundwater infiltration at 3.1m depth) 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded

Geotechnical Investigation

Prop. Residential Development - Borrisokane Rd.

SOIL PROFILE AND TEST DATA

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

Geodetic

Ottawa, Ontario

FILE NO. **PG5155**

HOLE NO.

REMARKS

DATUM

BORINGS BY Excavator				D	ATE 2	2019 Nov	ember 1	HOLE	TP34	
SOIL DESCRIPTION	PLOT		SAN	/IPLE		DEPTH (m)	ELEV. (m)	Pen. Resist. E ● 50 mm D		<u>~</u>
CDOUND CUDEACE	STRATA	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	()	(111)	O Water Co		Piezometer
GROUND SURFACE		= G	1	-		0-	-103.24	20 40	60 80	-
FILL: Brown sand, trace gravel and organics		– u	'							
FILL: Brown silty clay, some sand, gravel, organics and topsoil		= G -	2			1 -	-102.24			
FILL: Brown sand, trace gravel						2-	-101.24			
3.60		= G	3			3-	-100.24			
_oose to compact, brown SAND						4-	-99.24			
5.20		= G	4			5-	-98.24			
End of Test Pit (Groundwater infiltration at 3.15m depth)										
								20 40 Shear Stren		00

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

DATUM Geodetic									FILE	E NO.	PG	5155	
REMARKS				_		2040 N -		.	HOL	E NO.	TP3	35	
BORINGS BY Excavator					ATE 2	2019 Nov	ember 1						
SOIL DESCRIPTION	A PLOT			MPLE	E O	DEPTH (m)	ELEV. (m)	Pen. F			ws/0. . Cone		ter ction
	STRATA	TYPE	NUMBER	% RECOVERY	N VALUE or RQD			o \	Vater	Con	tent %	, o	Piezometer Construction
GROUND SURFACE				88	Z O	0-	-10530.0	20	40	60) 8	8 0	ĒĞ
FILL: Topsoil, trace organics, 0.15 gravel and sand		<u> </u>	1				10000.0						
						1-	-10529.0	10					
FILL: Brown sand, some gravel and cobbles													
cobbles						2-	10528.0	0					1
		= G	2										
<u>3.10</u>		– u -	۷			3-	-10527.0	0					
						4-	-10526.0	0					
Loose, brown SAND													4
		= G	3			5-	10525.0	0					-
End of Test Pit		_				6-	10524.0	0					1
(TP dry upon completion)													
								20	40	60	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	80 1	00
									ar Str	engt	h (kPa Remou	a)	JU

TOPSOIL

gravel, cobbles

2.7m depth

FILL: Brown sand, some topsoil,

- some asphalt between 2.4 and

GLACIAL TILL: Loose, brown sand, some gravel, cobbles and clay

(GWL @ 5.95m depth based on field

End of Test Pit

observations)

G

G

2

3

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - Borrisokane Rd.
Ottawa. Ontario

1 + 104.10

2 + 103.10

3 + 102.10

4+101.10

5 + 100.10

6 + 99.10

60

△ Remoulded

Shear Strength (kPa)

▲ Undisturbed

100

154 Colonnade Road South, Ottawa, Ont		Ot	tawa, Or	ntario								
DATUM Geodetic									FILE N		G5155	
REMARKS BORINGS BY Excavator				D/	ATE 2	2019 Nov	ember 1	1	HOLE	NO.	P36	
SOIL DESCRIPTION	PLOT		SAN	IPLE		DEPTH	ELEV.	Pen. R	esist. 60 mm l			2
	STRATA E	TYPE	NUMBER	°⁰ COVERY	N VALUE or RQD	(m)	(m)	0 V	Vater C	ontent	t %	Piezometer Construction
GROUND SURFACE	03		Z	REC	z ^o	0-	20	40	60	80	اچ ج	

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY Excavator

DATE 2019 November 11

FILE NO. PG5155

HOLE NO. TP37

BORINGS BY Excavator				D	ATE 2	2019 Nov	ember 11	l	HOL	E NO.	P 37	
SOIL DESCRIPTION	PLOT		SAN	IPLE	ı	DEPTH	ELEV.			. Blows/ n Dia. Co		
	STRATA I	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	0 V	Vater	Content	:%	Piezometer
GROUND SURFACE	-			Ĭ Ř		0-	105.02	20	40	60	80	┛
FILL: Brown sand with topsoil, 0.1	5	= G	1									
FILL: Brown sand, some gravel and cobbles, trace asphalt						1-	-104.02					
cobbies, trace asphait						2-	-103.02					
		_				2	-102.02					
<u>3</u> . <u>1</u>	0	_ G _	2			3-	- 102.02					
Loose to compact, brown SAND						4-	-101.02					
<u>5.0</u>	0	= G - = G	3			5-	-100.02					
etiff, grey SILTY CLAY , trace sand	0	- u -	7				•					
end of Test Pit												
TP dry upon completion)												
								20 Shea ▲ Undis		60 ength (k △ Rem	Pa)	00

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

SOIL PROFILE AND TEST DATA

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

DATUM Geodetic FILE NO. **PG5155 REMARKS** HOLE NO.

BORINGS BY Excavator				0	ATE 2	2019 Nov	ember 11	1	HOL	E NO.	P38	
SOIL DESCRIPTION	PLOT		SAN	/IPLE	1	DEPTH (m)	ELEV. (m)			. Blows		<u></u>
	STRATA	TYPE	NUMBER	» RECOVERY	N VALUE or RQD	(111)	(111)			Conten		Piezometer
GROUND SURFACE FILL: Brown silty clay, some sand, 0.19	5 000	- G	1	<u>н</u>	_	0-	106.11	20	40	60	80	Т.
gravel, organics						1-	-105.11					
		= G	2			2-	-104.11					
Fir, brown SILTY CLAY , trace sand and gravel						3-	-103.11					
						4-	-102.11					
<u>5.5</u>		= G -	3			5-	-101.11					
End of Test Pit (TP dry upon completion)												
								20 Shea ▲ Undis		60 ength (l △ Re		00

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

DATUM Geodetic FILE NO. **PG5155 REMARKS** HOLE NO. **TP39 BORINGS BY** Excavator DATE 2019 November 12 **SAMPLE** Pen. Resist. Blows/0.3m STRATA PLOT **DEPTH** ELEV. Piezometer Construction **SOIL DESCRIPTION** • 50 mm Dia. Cone (m) (m) N VALUE or RQD RECOVERY NUMBER TYPE Water Content % **GROUND SURFACE** 80 20 0 + 105.29FILL: Brown silty clay, some gravel,0.15 organics 1 + 104.29G 2 2 + 103.29**FILL:** Brown sand, some clay, gravel, construction debris 3+102.294+101.29G 3 5 ± 100.29 End of Test Pit (TP dry upon completion) 40 60 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

40

▲ Undisturbed

Shear Strength (kPa)

60

△ Remoulded

100

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

154 Colonnade Road South, Ottawa, Ontario K2E 7J5 Ottawa, Ontario **DATUM** Geodetic FILE NO. **PG5155 REMARKS** HOLE NO. **TP40 BORINGS BY** Excavator DATE 2019 November 12 **SAMPLE** Pen. Resist. Blows/0.3m STRATA PLOT DEPTH ELEV. Piezometer Construction **SOIL DESCRIPTION** • 50 mm Dia. Cone (m) (m) N VALUE or RQD RECOVERY NUMBER TYPE **Water Content % GROUND SURFACE** 80 20 0+106.46FILL: Brown sand, some gravel, cobbles 1+105.46FILL: Brown sand, some gravel, cobbles, trace brick 2+104.46 G 2 3+103.46- trace clay by 3.2m depth 4+102.46G 3 5 ± 101.46 5.20 End of Test Pit (Groundwater infiltration at 5.1m depth)

Pr

SOIL PROFILE AND TEST DATA

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

DATUM Geodetic					•				FILE NO	PG5155	
REMARKS BORINGS BY Excavator				-	ATE 1	2019 Nov	rombor 1	0	HOLE N	o. TP41	
BORINGS BY EXCAVATOR	H		SAN	/IPLE	AIE				L esist. Bi	lows/0.3m	
SOIL DESCRIPTION	PLOT		<u> </u>	T		DEPTH (m)	ELEV. (m)		0 mm Di		ier
	STRATA	TYPE	NUMBER	% RECOVERY	VALUE r RQD			0 W	Vater Co	ntent %	Piezometer Construction
GROUND SURFACE	ST	Ħ	N	REC	N or V			20		60 80	Piez Con
FILL: Brown sand, some clay, gravel, cobbles, organics 0.25		= G	1			0-	105.10				
\ <u>9.41-0.9, 0000.0009, 01941.1100</u>											
						1-	104.10				
FILL: Brown silty clay, some gravel, cobbles, trace sand											
ŕ						2-	103.10				
		= G	2			3-	102.10				
3.60		-									
						4-	101.10				
Compact, brown SAND, some											
gravel		= G	3								
		ŭ				5-	100.10				
							100.10				
<u>5.6</u> 0											
End of Test Pit	1	-									
(TP dry upon completion)											
								20	40	60 80 1	00
									ar Streng	gth (kPa) \(\text{Remoulded} \)	

Prop. Residential Development - Borrisokane Rd.

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

Geotechnical Investigation Ottawa, Ontario

SOIL PROFILE AND TEST DATA

DATUM Geodetic FILE NO. **PG5155 REMARKS** HOLE NO.

BORINGS BY Excavator				D	ATE 2	2019 Nov	ember 12	2	HOL	LE NO	ГР42	
SOIL DESCRIPTION	PLOT		SAN	/IPLE	ı	DEPTH	ELEV.			. Blow n Dia. C		
	STRATA E	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	o \	Nater	Conte	nt %	Piezometer
GROUND SURFACE			_	K	-	0-	-104.51	20	40	60	80	:
ILL: Brown silty clay, some sand,		= G	1			1-	-103.51 ·					
ILL: Brown silty clay, some sand, ravel, cobbles, trace organics and onstruction debris		= G	2			2-	-102.51 ·					
<u>3</u> .4	0	-				3-	-101.51					
tff, brown SILTY CLAY, some and, trace cobbles		= G	3			4-	-100.51					
5.4		-				5-	-99.51					
nd of Test Pit Groundwater infiltration at 5.0m epth)												
								20 She ▲ Undis		60 rength	80 (kPa) emoulded	100

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

DATUM Geodetic									FILE N	o. PG515 5	5
BORINGS BY Excavator				5	ATE 1	2019 Nov	rombor 1	n	HOLE	NO. TP43	
BORINGS BY EXCAVATOR	F		CAN	MPLE	AIE 4	2019 1100	rember i		ooiet l	Blows/0.3m	
SOIL DESCRIPTION	A PLOT				H 0	DEPTH (m)	ELEV. (m)			Dia. Cone	eter ction
	STRATA	TYPE	NUMBER	% RECOVERY	N VALUE or RQD			o w	ater C	ontent %	Piezometer Construction
GROUND SURFACE		- 0		2	Z •	0-	104.67	20	40	60 80	<u> </u>
FILL: Brown silty clay, some topsoil _{0.20}		= G	1								
						1 -	103.67				
FILL: Brown silty clay, some sand, gravel, cobbles, trace construction debris											
		= G	2			2-	102.67				
2.90		_									
						3-	101.67				
FILL: Gry silty clay, some sand, gravel, cobbles						4-	-100.67				
		= G	3			5-	-99.67				
<u>5.20</u> End of Test Pit	XXX	-									
(Groundwater infiltration at 4.9m depth)											
								20 Shea ▲ Undist		60 80 agth (kPa) △ Remoulded	100

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

DATUM Geodetic					•				FILE	NO.	PG5155	j
REMARKS				_	(0010 Na.		0	HOLI	E NO. T	P44	
BORINGS BY Excavator			041		AIE 2	2019 Nov	ember 17					
SOIL DESCRIPTION	A PLOT			#PLE	田口	DEPTH (m)	ELEV. (m)	Pen. Re ● 5		Dia. Co		ter
	STRATA	TYPE	NUMBER	% RECOVERY	N VALUE or RQD			0 W		Conten		Piezometer Construction
GROUND SURFACE				2	N	0-	103.85	20	40	60	80	<u> </u>
FILL: Brown silty clay, some sand, 0.15 gravel		<u> </u>	1									
						1-	-102.85					
FILL: Brown sand, some gravel, cobbles, trace construction debris												
						2-	101.85					
		= G	2			3-	-100.85					
3.70		_				4-	-99.85					
FILL: Brown sand, some gravel, cobbles, trace clay		= G	3			5-	-98.85					
End of Test Pit		-										
(Groundwater infiltration at 4.6m depth)								20 Shea		60 ength (l	(Pa)	1000

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

DATUM Geodetic FILE NO. **PG5155 REMARKS** HOLE NO. **TP45 BORINGS BY** Excavator DATE 2019 November 12 **SAMPLE** Pen. Resist. Blows/0.3m STRATA PLOT **DEPTH** ELEV. Piezometer Construction **SOIL DESCRIPTION** • 50 mm Dia. Cone (m) (m) N VALUE or RQD RECOVERY NUMBER TYPE Water Content % **GROUND SURFACE** 80 20 0 + 104.14G 1 1 + 103.14FILL: Brown sand, some gravel, cobbles, clay, trace organics 2 + 102.143+101.14G 2 3.50 4 + 100.14FILL: Brown silty clay, some sand, gravel, trace cobbles 5+99.14G 3 5.70 End of Test Pit (TP dry upon completion) 40 60 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

DATUM Geodetic									FILE	NO.	i5155	
REMARKS									HOLE	E NO.	16	
BORINGS BY Excavator					ATE 2	2019 Nov	ember 1		<u> </u>			
SOIL DESCRIPTION	A PLOT			/IPLE	H 0	DEPTH (m)	ELEV. (m)			Blows/0. Dia. Con		ter
	STRATA	TYPE	NUMBER	% RECOVERY	N VALUE or RQD					Content %		Piezometer Construction
GROUND SURFACE	XXX			K	-	0-	102.74	20	40	60 8	30 	
FILL: Brown sand, some gravel, trace organics		= G	1			1-	-101.74					
						2-	100.74					-
<u>3.</u> 0	0	= G	2			3-	-99.74					7
Loose, brown SAND , trace silt						4-	-98.74					
5.5	60	= G	3			5-	-97.74					
End of Test Pit		_										
(GWL @ 5.35m depth based on field observations)								20 Shea		60 € ength (kPa	a)	000

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

DATUM Geodetic FILE NO. PG5155 **REMARKS** HOLE NO. **TP47 BORINGS BY** Excavator DATE 2019 November 11 **SAMPLE** Pen. Resist. Blows/0.3m STRATA PLOT DEPTH ELEV. Piezometer Construction **SOIL DESCRIPTION** • 50 mm Dia. Cone (m) (m) N VALUE or RQD RECOVERY NUMBER Water Content % **GROUND SURFACE** 80 20 0+101.19G 1 FILL: Brown sand and gravel 0.60 1 + 100.19FILL: Grey silty clay, some sand and gravel 2 + 99.192 G 3+98.194+97.19Loose, brown SAND, trace silt 5+96.19= G 3 5.45 End of Test Pit (Groundwater infiltration at 5.3m depth) 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

DATUM Geodetic									FILE	NO.	G5155	
REMARKS				_	ATE (2019 Nov	rombor 1	0	HOL	E NO	P48	
BORINGS BY Excavator	- L		SVI	/IPLE	AIE 4	2019 1100	rember i		ociet	Blows		
SOIL DESCRIPTION	PLOT				ш	DEPTH (m)	ELEV. (m)			Dia. Co		ter
	STRATA	TYPE	NUMBER	**************************************	N VALUE or RQD			0 V	Vater	Content	%	Piezometer Construction
GROUND SURFACE	on on			88	z °	0-	102.61	20	40	60	80	iž S
		– G	1									
FILL: Brown sand with some to trace gravel						1-	101.61					
						2-	100.61					
	3.50	= G	2			3-	-99.61					
Loose to dense, brown SAND		- 0	0			4-	-98.61					
	<u>5</u> .30	= G	3			5-	-97.61					
End of Test Pit (Groundwater infiltration at 4.9m depth)		-										
								20 Shea ▲ Undist	40 ar Stream	60 ength (k △ Rem	Pa)	00

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

DATUM Geodetic FILE NO. **PG5155 REMARKS** HOLE NO. **TP49 BORINGS BY** Excavator DATE 2019 November 11 **SAMPLE** Pen. Resist. Blows/0.3m STRATA PLOT **DEPTH** ELEV. Piezometer Construction **SOIL DESCRIPTION** • 50 mm Dia. Cone (m) (m) N VALUE or RQD RECOVERY NUMBER Water Content % **GROUND SURFACE** 80 20 0+103.49FILL: Brown sand and gravel, some cobbles, trace clay G 2 1 + 102.492+101.49 3+100.49Loose, brown SAND 4 + 99.495 + 98.49= G 3 5.30 End of Test Pit (TP dry upon completion) 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

Geodetic

DATUM

SOIL PROFILE AND TEST DATA

FILE NO.

DEMARKS												PG	i5155	
REMARKS						0040 N		_		но	LE NO). TP:	50	
BORINGS BY Excavator	_			D	ATE	2019 Nov	rember 1	1						
	PLOT		SAN	/IPLE		DEPTH	ELEV.	P				ows/0.		
SOIL DESCRIPTION				K	ш .	(m)	(m)		• 5	50 mr	n Dia	a. Con	е	ter ter
	STRATA	TYPE	NUMBER	% RECOVERY	N VALUE or RQD				o 1	Natai	· Car	ntent %	/-	Piezometer Construction
ODOUND OUDEAGE	STF	Ţ	NON	E C	N N O N O N									jez(
GROUND SURFACE	XXX			Щ		0-	103.62		20	40		60 8	B0	11110
		_ (
		= G	1											
														-
						1-	102.62							1
FILL: Brown sand and gravel, trace cobbles, organics														
cobbles, organics														1
						2-	101.62							
														1
						3-	100.62							
						3	100.02							
<u>3</u> .9	5	= G	2			4-	99.62							
									<u>.</u> . <u>.</u>					
FILL: Brown sandy clay to clayey sand with gravel, some cobbles									<u>.</u>					
sand with gravel, some cobbles									<u>.</u>	<u> </u>				
									ļ. . <u>.</u>					-
		= G	3			5-	98.62							-
<u>5.2</u> End of Test Pit	0	-							++	-				-
(GWL @ 4.9m depth based on field observations)														
obbot valione,														
									20	40				00
												th (kP		
					1		1	🔺	undis	turbed		Remo	ulded	

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

DATUM Geodetic									FILE	NO. PG515	5
REMARKS				_		2010 No.		0	HOL	E NO. TP51	
BORINGS BY Excavator					DAIL	2019 Nov	ember i				
SOIL DESCRIPTION	PLOT			MPLE	ы.	DEPTH (m)	ELEV. (m)			Blows/0.3m Dia. Cone	ter
	STRATA	TYPE	NUMBER	RECOVERY	N VALUE or RQD			0 V	Vater	Content %	Piezometer Construction
GROUND SURFACE	01			R	Z	0-	103.92	20	40	60 80	i č
FILL: Brown sand, some gravel, 0.	20	= G -	1				100.02				
						1-	-102.92				
						2-	-101.92				
FILL: Brown sand, trace gravel											
		⊨ G	2			3-	-100.92				
						4-	-99.92				
<u>5</u> . End of Test Pit	10	G G	3			5-	-98.92				
(Groundwater infiltration at 5.0m depth								20 She:	40 ar Stre	60 80 ength (kPa)	100
								Snea ▲ Undist		engtn (KPa) △ Remoulded	

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

DATUM Geodetic FILE NO. **PG5155 REMARKS** HOLE NO. **TP52 BORINGS BY** Excavator DATE 2019 November 12 **SAMPLE** Pen. Resist. Blows/0.3m STRATA PLOT **DEPTH** ELEV. Piezometer Construction **SOIL DESCRIPTION** • 50 mm Dia. Cone (m) (m) N VALUE or RQD RECOVERY NUMBER Water Content % **GROUND SURFACE** 80 20 0+104.04FILL: Brown sand, some gravel G 1 0.40 1+103.042+102.04 FILL: Brown sand, some gravel, cobbles, trace clay and organics G 2 3+101.04G 3 4 + 100.04End of Test Pit (TP dry upon completion) 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

DATUM Geodetic FILE NO. **PG5155 REMARKS** HOLE NO. **TP53 BORINGS BY** Excavator DATE 2019 November 11 **SAMPLE** Pen. Resist. Blows/0.3m STRATA PLOT DEPTH ELEV. Piezometer Construction **SOIL DESCRIPTION** • 50 mm Dia. Cone (m) (m) N VALUE or RQD RECOVERY NUMBER TYPE Water Content % **GROUND SURFACE** 80 20 FILL: Brown sand and gravel, trace 0.25 0+102.16G 1 organics 1+101.162 + 100.16G 2 FILL: Brown sand, trace gravel 3+99.164 + 98.16G 3 5 + 97.16End of Test Pit (GWL @ 4.6m depth based on field observations) 40 60 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd.

SOIL PROFILE AND TEST DATA

FILE NO.

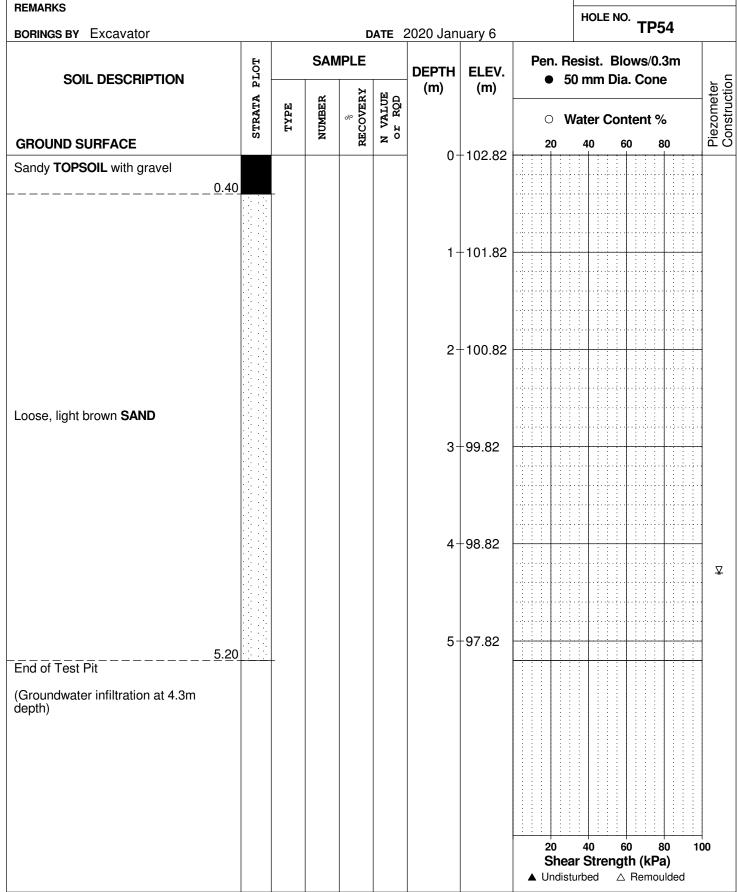
PG5155

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

Geodetic

DATUM

Ottawa, Ontario



154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

DATUM Geodetic									FILE NO	PG5155	
BORINGS BY Excavator				-	ATE '	2020 Jan	uary 6		HOLE N	o. TP55	
BONINGS BY EXCAVATOR	H		SAN	иPLE	AIL	2020 0411	dary 0	Pen F	⊥ Resist R	lows/0.3m	
SOIL DESCRIPTION	A PLOT				H 0	DEPTH (m)	ELEV. (m)		50 mm Di		ster
	STRATA	TYPE	NUMBER	% RECOVERY	N VALUE or RQD			o \	Water Co	ntent %	Piezometer Construction
GROUND SURFACE	0,			찚	z °	0-	103.31	20	40	60 80	اق ٢
FILL: Sand and gravel with topsoil	50										
						1-	102.31				
Light brown SAND						2-	-101.31				
						3-	-100.31				
4.3 End of Test Pit	80					4-	-99.31				-
(Groundwater infiltration at 3.2m depth)											
								20 She	ar Streng	60 80 1 http://doi.org/10.1001/10.100	│ 00

SOIL PROFILE AND TEST DATA

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

DATUM Geodetic									FILE NO. PG5155
REMARKS				_		0000 lan			HOLE NO. TP56
BORINGS BY Excavator					DATE	2020 Jan	uary 6		
SOIL DESCRIPTION	PLOT		SAI	MPLE		DEPTH (m)	ELEV. (m)	1	esist. Blows/0.3m 0 mm Dia. Cone
	STRATA	TYPE	NUMBER	* RECOVERY	N VALUE or RQD	(,	(,	0 V	Vater Content % 40 60 80
GROUND SURFACE	SI	H	DN DN	REC	N		100.41	20	40 60 80
FILL: Sand and gravel with topsoil						- 0-	102.41		
<u>U</u> .'	60 🔆	_							
						1-	101.41		
							101.41		
						_			
						2-	100.41		
Light brown CAND									
Light brown SAND						3-	99.41		
						4-	98.41		
						_	07.44		
						5-	97.41		
<u>5</u> .	40								
End of Test Pit									
(Groundwater infiltration at 4.6m									
depth)									
								20	40 60 80 100
								Shea	ar Strength (kPa)
								▲ Undist	turbed △ Remoulded

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

DATUM Geodetic									FILE NO	D. PG5155	5
REMARKS BORINGS BY Excavator				г	ΔTE '	2020 Jan	uarv 6		HOLE N	io. TP57	
DOTHINGS BT Excavator	H		SAN	/IPLE	AIL			Pen. R	esist. B	slows/0.3m	
SOIL DESCRIPTION	A PLOT				ш	DEPTH (m)	ELEV. (m)			ia. Cone	ter
	STRATA	TYPE	NUMBER	% RECOVERY	N VALUE or RQD			0 V	Vater Co	ontent %	Piezometer Construction
GROUND SURFACE	ισ O O O O		Ē	RE	z ö	0-	101.89	20	40	60 80	<u>≅</u> 8
FILL: Gravel with topsoil	0.60	-					101100				
						1-	-100.89				
						2-	99.89				
Loose, light brown SAND						3-	-98.89				
	4.80	_				4-	-97.89				<u>▼</u>
End of Test Pit											
(Groundwater infiltration at 4.2m depth)								20 She ▲ Undis	ar Stren	60 80 1 g th (kPa) △ Remoulded	100

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SOIL PROFILE AND TEST DATA

DATUM Geodetic					'				FILE NO.	PG5155	
REMARKS BORINGS BY Excavator				r	ATE '	2020 Jan	uary 6		HOLE NO.	TP58	
SOIL DESCRIPTION	PLOT		SAN	/IPLE		DEPTH (m)	ELEV.		esist. Blo 0 mm Dia.		r on
	STRATA	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(111)	(111)		/ater Cont		Piezometer Construction
GROUND SURFACE				K	-	0-	102.31	20	40 60	80	<u> </u>
FILL: Sand and gravel with topsoil		-				1 -	-101.31				
Loose, light brown SAND						2-	-100.31				. □
3.60 End of Test Pit		-				3-	-99.31				
(Groundwater infiltration at 2.6m depth)								20 Shea • Undist	40 60 ar Strengtl urbed △		000

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SOIL PROFILE AND TEST DATA

DATUM Geodetic											FILE	NO.	PC	3515	5
REMARKS										ī	HOLE	E NO	TP	50	
BORINGS BY Excavator				D	ATE	2020 Jan	uary 6						11	J J	1
SOIL DESCRIPTION	PLOT		SAN	/IPLE		DEPTH (m)	ELEV. (m)	F	Pen. ●				ws/0 . Con		70.0
	STRATA	TYPE	NUMBER	% RECOVERY	VALUE r RQD	(,	(,		0	Wa	ter (Con	tent 9	%	Piezometer Construction
GROUND SURFACE	, g		¥	RE	NO		100.01		20		40	60)	80	Pie C
FILL: Sand and gravel with topsoil						0-	103.81								
FILL: Grey-brown silty sand with dark grey to black clay		G G	1 2			2- 3- 4- 5-	-102.81 -101.81 -100.81 -99.81								
<u>6</u> .9	0														
								•	20 Sh	ear	40 Stre	60 engt	h (kP Remo	a)	_ 100

SOIL PROFILE AND TEST DATA

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

DATUM Geodetic					•				FILE	NO. PG5155	
REMARKS				_		0000 law			HOLE	TP59	
BORINGS BY Excavator					AIL	2020 Jan	uary 6				
SOIL DESCRIPTION	PLOT			IPLE →	EJ.	DEPTH (m)	ELEV. (m)			Blows/0.3m Dia. Cone	ter
	STRATA	TYPE	NUMBER	% RECOVERY	N VALUE or RQD			0 V	Vater (Content %	Piezometer Construction
GROUND SURFACE	מ		z	RE	z °			20	40	60 80	ig S
End of Test Pit											
(TP dry upon completion)								20	40	60 80 1	
								Shea ▲ Undist	ar Stre turbed	ength (kPa) △ Remoulded	

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

DATUM Geodetic FILE NO. **PG5155 REMARKS** HOLE NO. **TP60 BORINGS BY** Excavator DATE 2020 January 6 **SAMPLE** Pen. Resist. Blows/0.3m STRATA PLOT DEPTH ELEV. Piezometer Construction **SOIL DESCRIPTION** 50 mm Dia. Cone (m) (m) N VALUE or RQD RECOVERY NUMBER Water Content % **GROUND SURFACE** 80 20 0+102.04FILL: Gravel with topsoil 0.60 1+101.042+100.04 Compact, light brown SILTY SAND with clay ⊻ 3+99.044 + 98.044.20 End of Test Pit (Groundwater infiltration at 2.8m depth) 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd.

SOIL PROFILE AND TEST DATA

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Geodetic

Ottawa, Ontario

DATUM REMARKS FILE NO. **PG5155**

REMARKS				_	ATE (2020 Jan	uoni 6	HOLE NO. TP61
BORINGS BY Excavator SOIL DESCRIPTION	PLOT		SAN	IPLE	AIE A	2020 Jan DEPTH	ELEV.	Pen. Resist. Blows/0.3m
SOIL DESCRIPTION	STRATA P	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	● 50 mm Dia. Cone ○ Water Content % 20 40 60 80
GROUND SURFACE	, S		Ä	REC	z ö	0-	101.76	20 40 60 80 G
FILL: Grey-brown silty sand with							101.76	
FILL: Grey-brown silty sand with clay, cobbles and construction debris		G	1			1-	-100.76	
1.80		_				2-	-99.76	
Loose, light brown SAND								
3.60		_				3-	98.76	
End of Test Pit (Groundwater infiltration at 2.3m depth)								
								20 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

DATUM Geodetic									FILE	NO.	G5155	
REMARKS							_		HOL	E NO	P62	
BORINGS BY Excavator				D	ATE 2	2020 Jan	uary 6				02	
SOIL DESCRIPTION	PLOT		SAN	/IPLE		DEPTH (m)	ELEV. (m)			Blows/ Dia. Co		er ion
	STRATA	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(,	(,	0 V	Vater	Content	%	Piezometer Construction
GROUND SURFACE	ָ מ	•	ž	N. N.	zö		404.04	20	40	60	80	S e
		G	1			0-	101.34					
FILL: Dark grey to black silty sand with organics						1-	-100.34					
2.10		-				2-	-99.34					
Loose, light brown SAND						3-	-98.34					<u> </u>
Loose, light brown SAND						4-	-97.34					
		-				5-	-96.34					-
(Groundwater infiltration at 2.5m depth)								20 Shea ▲ Undisi		60 ength (k △ Rem	Pa)	000

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

DATUM Geodetic									FILE	NO.	G5155	
REMARKS				_		0000 lan			HOLI	E NO.	P63	
BORINGS BY Excavator			CVI	MPLE	DAIL	2020 Jan	uary 6	Don B	ooiot	Blows/0		
SOIL DESCRIPTION	PLOT		SAI			DEPTH (m)	ELEV. (m)			Dia. Co		e.
	STRATA	TYPE	NUMBER	* RECOVERY	N VALUE or RQD			0 V	Vater •	Content	%	Piezometer
GROUND SURFACE	SI	H	NG	REC	NO		100.10	20	40	60	80	Pie.
FILL: Gravel wtih topsoil	30					- 0-	102.13					
	50					1-	-101.13					
		G	1									
Loose, brown SAND with cobbles		_				2-	100.13					
						3-	99.13					↓ ↓
4. End of Test Pit	46	_				4-	98.13					
(Groundwater infiltration at 3.1m depth)												
								20 She		60 ength (ki	Pa)	00

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Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

SOIL PROFILE AND TEST DATA

DATUM	Geodetic						FILE NO.	PG5155	
REMARKS							HOLE NO.	TD 0.4	
BORINGS BY	Excavator	DAT	E 2	2020 Jani	uary 6			TP64	
						•			

BORINGS BY Excavator				п	ΔTF :	2020 Jan	uarv 6		HOLE	NO. TP64	
SOIL DESCRIPTION	PLOT		SAN	/IPLE		DEPTH (m)	ELEV.			Blows/0.3m Dia. Cone	25
	STRATA	TYPE	NUMBER	» RECOVERY	N VALUE or RQD	(111)	(111)			ontent %	Piezometer Construction
GROUND SURFACE				2	2 0	0-	103.81	20	40	60 80	<u> </u>
						1-	-102.81				
FILL: Grey-brown silty sand with						2-	101.81				
FILL: Grey-brown silty sand with gravel and cobbles, trace organics and asphalt		G	1			3-	100.81				
						4-	-99.81				
						5-	-98.81				
5.	80										
End of Test Pit (Groundwater infiltration at 4.2m depth)											
								20 Shea ▲ Undis	40 ar Strer	60 80 ngth (kPa) △ Remoulded	100

Geotechnical Investigation

Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

SOIL PROFILE AND TEST DATA

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Geodetic

FILE NO.

PG5155

DATUM

BORINGS BY Excavator				F	NATE '	2020 Jan	uary 6		HOL	E NO. T	P65	
SOIL DESCRIPTION		SAMPLE			AIE A	DEPTH	ELEV.	Pen. Resist. Blows/0.3m • 50 mm Dia. Cone				Piezometer
GGIL BLOGILLI HON	STRATA PLOT	TYPE	NUMBER	* RECOVERY	N VALUE or RQD	(m)	(m)	Water Content %				
GROUND SURFACE	, v			핊				20	40	40 60 80		
FILL: Gravel with topsoil 0.2	20						-102.82 -					
						1-	-101.82 -					
						2-	-100.82 -					
Compact, dark brown SILTY SAND with gravel and cobbles		G	1			3-	-99.82					<u>Z</u>
						4-	-98.82					
5.4	.O					5-	-97.82					-
End of Test Pit (Groundwater infiltration at 3.2m depth)												
								20 She ▲ Undis	40 ar Str turbed	60 ength (k △ Ren		100

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

DATUM Geodetic									FILE NO	PG5155)		
REMARKS BORINGS BY Excavator DATE 2020 January 6									HOLE NO. TP66				
BORINGS BY Excavator	PLOT		CA.		DAIE	2020 Jan	Dom D	Pen. Resist. Blows/0.3m					
SOIL DESCRIPTION			SAMPLE		邑〇	DEPTH (m)	ELEV. (m)	Pen. R ● 5	ster				
	STRATA	TYPE		% RECOVERY	N VALUE or RQD			0 V	Vater Co	Piezometer Construction			
GROUND SURFACE					z o		103.08	20	40 (60 80 +	i <u>a</u> č		
FILL: Gravel with topsoil 0.5	20	_											
Compact, dark brown SILTY SAND , some cobbles, trace boulders						1-	-102.08						
			8			2-	101.08						
		G											
		G	0										
											_		
						3-	100.08				⊻		
											-		
											.		
											-		
4.:	20					4-	99.08				1		
End of Test Pit													
(Groundwater infiltration at 2.7m													
depth)													
								00	40	20 00 1	100		
								20 Shea	40 (ar Streng		00		
■ Undisturbed △ Remoul													

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

DATUM Geodetic									FILE	NO.	PG5	5155	
REMARKS									HOL	E NO.	TP67		
BORINGS BY Excavator	1 1			D	ATE 2	2020 Jan	uary 8				IPO		l
SOIL DESCRIPTION	PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m • 50 mm Dia. Cone					ro on
	STRATA	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(111)	(111)	0 V	O Water Content %				
GROUND SURFACE	מ		NO	REC	Z O		100.00	20	40 60 80)	Piezometer Construction
FILL: Gravel and cobbles, trace boulders and crushed stone						0-	-103.88						
1.00		_				1 -	-102.88						
						2-	-101.88 -						
FILL: Dark brown silty sand with gravel, some cobbles and organics, trace boulders, wood and concrete		G	1			3-	-100.88						
5.40						4-	4-99.88						
						5-	-98.88						
End of Test Pit		_											
(TP dry upon completion)								20 Shea			80 (kPa))	000

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

DATUM Geodetic									FILE NO.	PG5155	
REMARKS BORINGS BY Excavator				г	DATE :	2020 Jan	uarv 8		HOLE NO	D. TP68	
SOIL DESCRIPTION	PLOT		SAN	/IPLE		DEPTH (m)	ELEV.		esist. Bl 0 mm Dia	ows/0.3m a. Cone	er on
	STRATA	TYPE	NUMBER	RECOVERY	N VALUE or RQD	(,	(,	0 V	Vater Cor		Piezometer Construction
GROUND SURFACE	XXX			2	Z	0-	101.76	20	40 6	60 80 	تقن
FILL: Gravel with topsoil	0.90	_									
						1-	100.76				
Loose, light brown SAND						2-	99.76				_
	3.90					3-	-98.76				
End of Test Pit		-									
(Groundwater infiltration at 2.4m depth)								20	40	60 80 1	000
									ar Streng	th (kPa) Remoulded	

Prop. Residential Development - Borrisokane Rd.

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

Geotechnical Investigation Ottawa, Ontario

SOIL PROFILE AND TEST DATA

DATUM	Geodetic			FILE NO. PG5155	
REMARKS				HOLE NO.	
BORINGS BY	' Excavator	DATE	2020 January 8	TP69	

BORINGS BY Excavator				D	ATE 2	2020 Jan	uary 8		HOLE NO	D. TP69	
SOIL DESCRIPTION	' '			IPLE		DEPTH (m)	ELEV. (m)		esist. Bl 0 mm Dia	ows/0.3m a. Cone	ter tion
	STRATA	TYPE	NUMBER	% RECOVERY	N VALUE or RQD			0 V	Vater Cor	ntent %	Piezometer Construction
GROUND SURFACE	• • • • • • • • • • • • • • • • • • •			2	z ö	0-	102.88	20	40 6	80 80	Ē Ŏ
FILL: Gravel with topsoil	.60										
						1-	-101.88				
						2-	-100.88				
Loose, light brown SAND						3-	-99.88				
						4-	-98.88				. ⊈
End of Test Pit (Groundwater infiltration at 4.2m	.02	_				5-	-97.88				
depth)								20 Shea	40 Gar Streng		000

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

DATUM Geodetic					•				FILE NO	o. PG5155	
REMARKS				_		0000 1	•		HOLE N	NO. TP70	
BORINGS BY Excavator			C 4 1		DAIL	2020 Jan	uary 8	Dam D	:-4 5		
SOIL DESCRIPTION	PLOT			MPLE >	F-3	DEPTH (m)	ELEV. (m)			Blows/0.3m Dia. Cone	ter
	STRATA	TYPE	NUMBER	% RECOVERY	N VALUE or RQD			0 V	/ater Co	ontent %	Piezometer Construction
GROUND SURFACE	מ	Į,	ğ	REC	z ö		100.00	20	40	60 80	S Pie
FILL: Gravel with crushed stone and topsoil	- X					0-	102.02				
FILL: Dark brown silt with gravel, cobbles and construction debris		_				1-	-101.02				
Loose, light brown SAND	60 🔆	-				2-	100.02				
<u>3</u> .ź End of Test Pit	20	-				3-	99.02				
(Groundwater infiltration at 3.2m depth)								20 Shea ▲ Undist		60 80 1 gth (kPa) △ Remoulded	000

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Prop. Residential Development - Borrisokane Rd.
Ottawa, Ontario

154 Colonnade Road South, Ottawa, Ontario K2E 7J5 **DATUM** Geodetic FILE NO. **PG5155 REMARKS** HOLE NO. **TP71 BORINGS BY** Excavator DATE 2020 January 8 **SAMPLE** Pen. Resist. Blows/0.3m STRATA PLOT DEPTH ELEV. Piezometer Construction **SOIL DESCRIPTION** 50 mm Dia. Cone (m) (m) N VALUE or RQD RECOVERY NUMBER **Water Content % GROUND SURFACE** 80 20 0+101.32FILL: Dark brown silt with organics, gravel, cobbles and construction Loose, light brown SAND 1.02 1 + 100.32Stiff, grey SILTY CLAY, trace organics G 1 2 + 99.323+98.32⊻ Loose, light brown SAND 4+97.324.60 End of Test Pit (Groundwater infiltration at 3.4m depth) 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

DATUM Geodetic									FILE NO	o. PG5155	.
REMARKS									HOLE N	JO	
BORINGS BY Excavator				D	ATE 2	2020 Jan	uary 8			TP72	1
SOIL DESCRIPTION	PLOT			/IPLE	H 0	DEPTH (m)	ELEV. (m)			Blows/0.3m via. Cone	ter
	STRATA	TYPE	NUMBER	% RECOVERY	N VALUE or RQD			0 W	/ater Co	ontent %	Piezometer Construction
GROUND SURFACE	0,		-	2	2 0	0-	101.92	20	40	60 80	<u>i</u> o
FILL: Dark brown organic silt with gravel, cobbles, trace boulders and constrcution debris							-100.92				
Loose, light brown SAND 2.30		-				2-	-99.92				
		_				3-	-98.92				
Stiff, grey SILTY CLAY , trace organics						4 -	-97.92				
						5-	-96.92				
5.90											
End of Test Pit											
(TP dry upon completion)											
										gth (kPa)	⊣ 1 00
								Shea	r Stren		∐ 1 00

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation Prop. Residential Development - Borrisokane Rd. Ottawa, Ontario

DATUM Geodetic					'				FILE NO.	PG5155	
REMARKS BORINGS BY Excavator				-	ATE '	2020 Jan	uary 8		HOLE NO.	TP73	
SOIL DESCRIPTION	PLOT		SAN	MPLE	TATE	DEPTH	ELEV.	1	⊔ esist. Blo 0 mm Dia.	ws/0.3m	r c
	A B B B B B B B B B B B B B B B B B B B							/ater Cont		Piezometer Construction	
GROUND SURFACE	o o		Z	8	z °	0-	102.39	20	40 60	80	ižŏ
FILL: Brown silty sand with gravel, cobbles, boulders, trace organics							-101.39				
Loose, light brown SAND		_				2-	-100.39				
3.90						3-	99.39				\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
End of Test Pit		_									
(Groundwater infiltration at 2.9m depth)								20 Shee	40 60 ar Strengt		000
								▲ Undist	urbed △	Remoulded	

SOIL PROFILE AND TEST DATA

Geotechnical Investigation 3713 Borrisokane Road Ottawa, Ontario

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

Ground surface elevations provided by J.D. Barnes Limited.

REMARKS

BORINGS BY Excavator

PG5016

HOLE NO. TP10

BORINGS BY Excavator				D	ATE 2	2019 July	26				TP1	0	
SOIL DESCRIPTION	PLOT		SAN	/IPLE		DEPTH	ELEV.	Pen. R ● 5			ws/0.: Cone		_
	STRATA 1	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(m)	(m)	0 V	Vater	Cont	tent %	, o	Piezometer
GROUND SURFACE	, o		Z	핊	z °	0-	106.58	20	40	60	8 (60	Ë
FILL: Brown sand with gravel, cobbles and boulders0.	70	_ _ G	1			0-	- 106.36						
						1-	-105.58						
FILL: Brown silty sand with gravel, race cobbles and boulders						2-	-104.58						
		G	2				104.00						
<u>3</u> .	30					3-	103.58						
		G	3			4-	-102.58						
FILL: Brown silty clay, trace sand and gravel													
						5-	-101.58						
<u>6</u> .	20					6-	-100.58						-
FILL: Brown sand, some gravel, race cobbles and boulders		_ _ G	4										
End of Test Pit	10					7-	-99.58						
(TP dry upon completion)													
								20 Shea ▲ Undis			h (kPa	a)	⊣ 00

SOIL PROFILE AND TEST DATA

Geotechnical Investigation 3713 Borrisokane Road Ottawa, Ontario

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

Ground surface elevations provided by J.D. Barnes Limited.

REMARKS

DATUM

FILE NO.

PG5016

HOLE NO.

BORINGS BY Excavator			D		HOLE NO. TP11					
SOIL DESCRIPTION	PLOT		SAN	/IPLE		DEPTH (m)	ELEV. (m)		esist. Blows/0.3m 0 mm Dia. Cone	Į.
	STRATA	TYPE	NUMBER	» RECOVERY	N VALUE or RQD	()	(,		Vater Content %	Piezometer
GROUND SURFACE				μ.	_	0-	105.18	20	40 60 80	<u> </u>
FILL: Brown sand with gravel, trace cobbles and boulders0.60		□ G	1							
						1-	104.18			_
						2-	103.18			_
FILL: Brown sand with gravel		G	2							
						3-	102.18			
						3-	102.16			
						4-	101.18			
4.40		G	3			•	101110			
						5	100.18			
Brown SAND , some gravel						3-	-100.16			
						_	00.10			1
6.30		G	4			6-	-99.18			
End of Test Pit	1									
TP dry upon completion)										
								20	40 60 80	_ 100
									ar Strength (kPa)	100
								▲ Undist	turbed △ Remoulded	

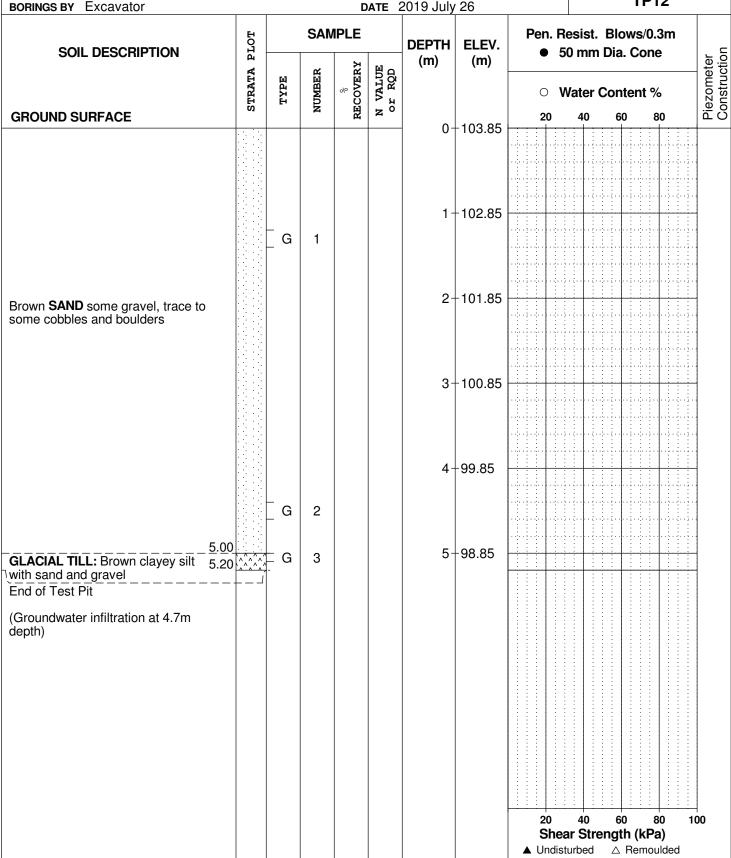
SOIL PROFILE AND TEST DATA

Geotechnical Investigation

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

3713 Borrisokane Road Ottawa, Ontario

Ground surface elevations provided by J.D. Barnes Limited. **DATUM** FILE NO. PG5016 **REMARKS** HOLE NO. **TP12 BORINGS BY** Excavator **DATE** 2019 July 26



SOIL PROFILE AND TEST DATA

Geotechnical Investigation 3713 Borrisokane Road

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

Ottawa, Ontario

Ground surface elevations provided by J.D. Barnes Limited. DATUM FILE NO. **PG5016** REMARKS HOLE NO. **TP13 BORINGS BY** Excavator DATE 2019 July 26

BORINGS BY Excavator					ATE	2019 July	/ 26			117	13
	PLOT		SAN	/IPLE	T	DEPTH		1		Blows/0. Dia. Con	
	STRATA E	且	3ER	% RECOVERY	VALUE r RQD	(m)	(m)				
	STR2	TYPE	NUMBER	% O	N VA			0 '	Water	Content 9	6
GROUND SURFACE	02	_		2	z o	0-	104.50	20	40	60	80 i
		<u> </u>									
		⊏ G	1								
		Š				1 -	103.50				
		×									
FILL: Dark brown to brown sand											
with gravel, some cobbles and						2-	102.50				
boulders		G	2								
							101 50				
		G	3			3-	101.50				
		*				4-	100.50				
								- <u></u>			
	_ 4.80	* *									
		G	4			5-	99.50				
Brown SAND , trace gravel											
	_ 5.60	_									
End of Test Pit											
(Groundwater infiltration at 4.8m depth)											
30ptil)											
								20 She	40 ear Stre	60 a ength (kP	80 100 a)
								▲ Undis		△ Remo	ulded
		1	1	1	1	1	1				

SOIL PROFILE AND TEST DATA

Geotechnical Investigation 3713 Borrisokane Road Ottawa, Ontario

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

DATUM Ground surface elevations provided by J.D. Barnes Limited.

FILE NO. PG5016

REMARKS

HOLE NO.

BORINGS BY Excavator			D	ATE 2	2019 July	HOLE NO. TP14					
SOIL DESCRIPTION	PLOT		SAN	/IPLE	I	DEPTH (m)	ELEV. (m)			lows/0.3m ia. Cone	7.0
CROUND CUREACE	STRATA	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(111)	(111)			intent %	Piezometer
GROUND SURFACE						0-	100.63	20	40	60 80	111
FILL: Brown sand0.50		□ G	1								
FILL: Brown silty sand, some clay and gravel, trace cobbles and						1 -	-99.63				-
ooulders ´ 1. <u>6</u> 0		G	2								
						2-	-98.63				
Brown SAND , trace gravel		_ _ G	3								
2.80		_				3-	-97.63				
		G	4				07.00				
Grey SILTY CLAY											
						4-	-96.63				
4.60 End of Test Pit) <i> </i>										
Groundwater infiltration at 1.8m depth)											
								20	40	60 80 1	00
								Shea	ır Strenç	gth (kPa) △ Remoulded	5 5

Ground surface elevations provided by J.D. Barnes Limited.

SOIL PROFILE AND TEST DATA

Geotechnical Investigation 3713 Borrisokane Road Ottawa. Ontario

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

Ottawa, Ontario

REMARKS

DATUM

FILE NO. PG5016

HOLE NO. TD26

BORINGS BY Excavator				D	ATE 2	2019 Sep	18 TP26	
SOIL DESCRIPTION	PLOT		SAN	IPLE		DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ■ 50 mm Dia. Cone
	STRATA	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	(111)	(111)	 50 mm Dia. Cone Water Content % 40 60 80
GROUND SURFACE				н		0-	105.54	20 40 60 80
						1 -	-104.54	
FILL: Brown silty sand with clay, race organics and cobbles								
		= G	1			2-	-103.54	
						3-	-102.54	
4.09		_				4-	-101.54	
						5	-100.54	
TLL: Brown silty clay with concrete nd boulders		= G	2			3	100.54	
						6-	-99.54	
						7-	-98.54	
7.67 End of Test Pit		_						
TP dry upon completion)								
								20 40 60 80 100
								Shear Strength (kPa) ▲ Undisturbed △ Remoulded

SYMBOLS AND TERMS

SOIL DESCRIPTION

Behavioural properties, such as structure and strength, take precedence over particle gradation in describing soils. Terminology describing soil structure are as follows:

Desiccated	-	having visible signs of weathering by oxidation of clay minerals, shrinkage cracks, etc.
Fissured	-	having cracks, and hence a blocky structure.
Varved	-	composed of regular alternating layers of silt and clay.
Stratified	-	composed of alternating layers of different soil types, e.g. silt and sand or silt and clay.
Well-Graded	-	Having wide range in grain sizes and substantial amounts of all intermediate particle sizes (see Grain Size Distribution).
Uniformly-Graded	-	Predominantly of one grain size (see Grain Size Distribution).

The standard terminology to describe the strength of cohesionless soils is the relative density, usually inferred from the results of the Standard Penetration Test (SPT) 'N' value. The SPT N value is the number of blows of a 63.5 kg hammer, falling 760 mm, required to drive a 51 mm O.D. split spoon sampler 300 mm into the soil after an initial penetration of 150 mm.

Relative Density	'N' Value	Relative Density %
Very Loose	<4	<15
Loose	4-10	15-35
Compact	10-30	35-65
Dense	30-50	65-85
Very Dense	>50	>85

The standard terminology to describe the strength of cohesive soils is the consistency, which is based on the undisturbed undrained shear strength as measured by the in situ or laboratory vane tests, penetrometer tests, unconfined compression tests, or occasionally by Standard Penetration Tests.

Consistency	Undrained Shear Strength (kPa)	'N' Value
Very Soft	<12	<2
Soft	12-25	2-4
Firm	25-50	4-8
Stiff	50-100	8-15
Very Stiff	100-200	15-30
Hard	>200	>30

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

Cohesive soils can also be classified according to their "sensitivity". The sensitivity is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil.

Terminology used for describing soil strata based upon texture, or the proportion of individual particle sizes present is provided on the Textural Soil Classification Chart at the end of this information package.

ROCK DESCRIPTION

The structural description of the bedrock mass is based on the Rock Quality Designation (RQD).

The RQD classification is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be a result of closely-spaced discontinuities (resulting from shearing, jointing, faulting, or weathering) in the rock mass and are not counted. RQD is ideally determined from NXL size core. However, it can be used on smaller core sizes, such as BX, if the bulk of the fractures caused by drilling stresses (called "mechanical breaks") are easily distinguishable from the normal in situ fractures.

RQD %	ROCK QUALITY
90-100	Excellent, intact, very sound
75-90	Good, massive, moderately jointed or sound
50-75	Fair, blocky and seamy, fractured
25-50	Poor, shattered and very seamy or blocky, severely fractured
0-25	Very poor, crushed, very severely fractured

SAMPLE TYPES

SS	-	Split spoon sample (obtained in conjunction with the performing of the Standard Penetration Test (SPT))
TW	-	Thin wall tube or Shelby tube
PS	-	Piston sample
AU	-	Auger sample or bulk sample
WS	-	Wash sample
RC	-	Rock core sample (Core bit size AXT, BXL, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

SYMBOLS AND TERMS (continued)

GRAIN SIZE DISTRIBUTION

MC% - Natural moisture content or water content of sample, %

Liquid Limit, % (water content above which soil behaves as a liquid)
 PL - Plastic limit, % (water content above which soil behaves plastically)

PI - Plasticity index, % (difference between LL and PL)

Dxx - Grain size which xx% of the soil, by weight, is of finer grain sizes

These grain size descriptions are not used below 0.075 mm grain size

D10 - Grain size at which 10% of the soil is finer (effective grain size)

D60 - Grain size at which 60% of the soil is finer

Cc - Concavity coefficient = $(D30)^2 / (D10 \times D60)$

Cu - Uniformity coefficient = D60 / D10

Cc and Cu are used to assess the grading of sands and gravels:

Well-graded gravels have: 1 < Cc < 3 and Cu > 4 Well-graded sands have: 1 < Cc < 3 and Cu > 6

Sands and gravels not meeting the above requirements are poorly-graded or uniformly-graded.

Cc and Cu are not applicable for the description of soils with more than 10% silt and clay

(more than 10% finer than 0.075 mm or the #200 sieve)

CONSOLIDATION TEST

p'_o - Present effective overburden pressure at sample depth

p'c - Preconsolidation pressure of (maximum past pressure on) sample

Ccr - Recompression index (in effect at pressures below p'c)
Cc - Compression index (in effect at pressures above p'c)

OC Ratio Overconsolidaton ratio = p'_c/p'_o

Void Ratio Initial sample void ratio = volume of voids / volume of solids

Wo - Initial water content (at start of consolidation test)

PERMEABILITY TEST

Coefficient of permeability or hydraulic conductivity is a measure of the ability of water to flow through the sample. The value of k is measured at a specified unit weight for (remoulded) cohesionless soil samples, because its value will vary with the unit weight or density of the sample during the test.

SYMBOLS AND TERMS (continued)

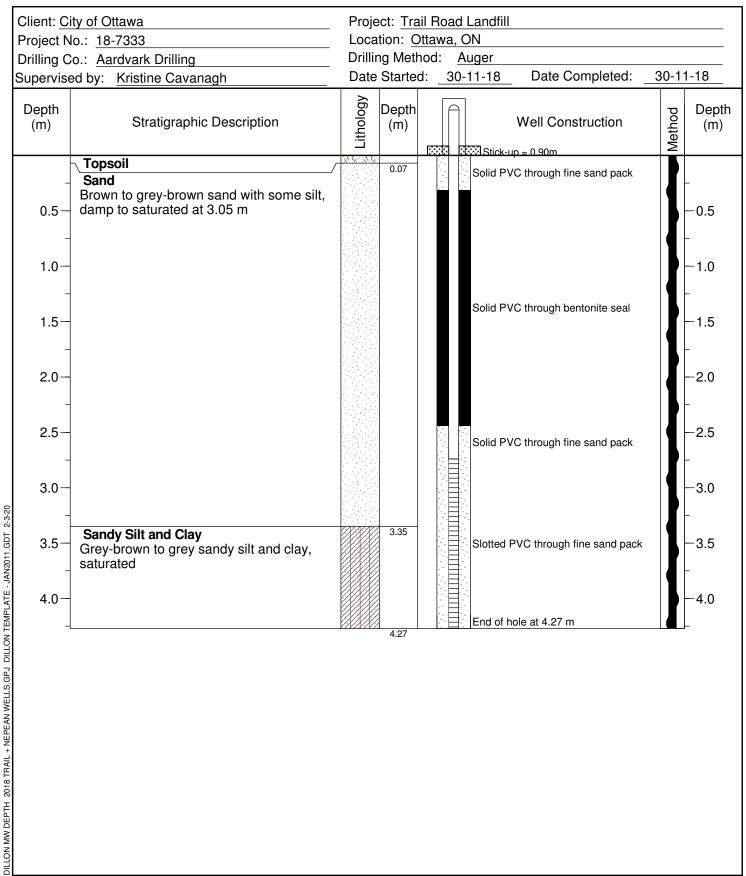
STRATA PLOT



MONITORING WELL AND PIEZOMETER CONSTRUCTION

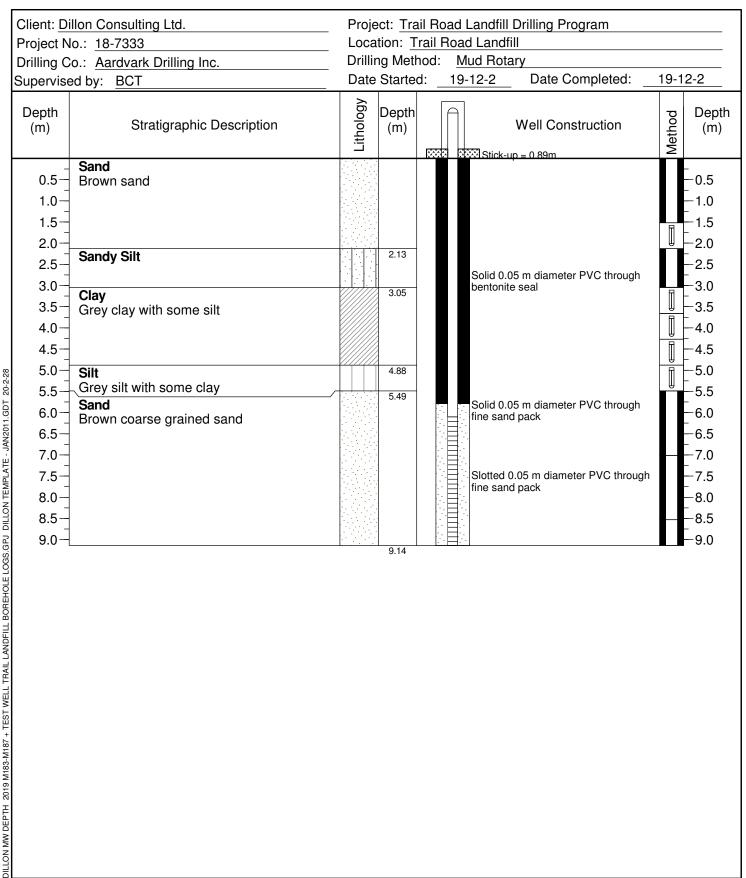


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Dillon Consulting Ltd. 177 Collonade Road, Suite 101 Ottawa, Ontario K2E 7J4 Telephone: (613) 745-2213 Fax: (613) 745-3491







BOREHOLE LOG	PROJECT: 92-287	BOREHOLE: M79 1 of 1
Trail Road Landfill	¥	DATE: 23 November 1992
1992 Drilling and Geophysics Program	GEOLOGIST LD	
TOD Designationality of Ottom	Contaton	PERMATEON IN C - ACT

FUR: R	gional Municipality of Ottawa-Carleton					L	LEVA	TION WLE	m ASL
DEPTH (m)	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	NUMBER		N UPLUE WA	X UNTER	X X X		WATER CONTENT (%)
1 1.6 2 3 4	SAND AND SILT FILL Grey brown sand and silt fill, moist to wet, very soft. Placed as embankment material for Highway 416 SAND Grey brown coarse sand, some medium sand, moist to wet. becoming saturated below about 3 m. seam of fine sand and silt at about 4.6m	800	1 2 3 4 5	88 88 88 88 88	8 15 31 21 40 26			15 30 45 60	10 20 30 40
	Borehole terminated in saturated aand at about 4.9 m								



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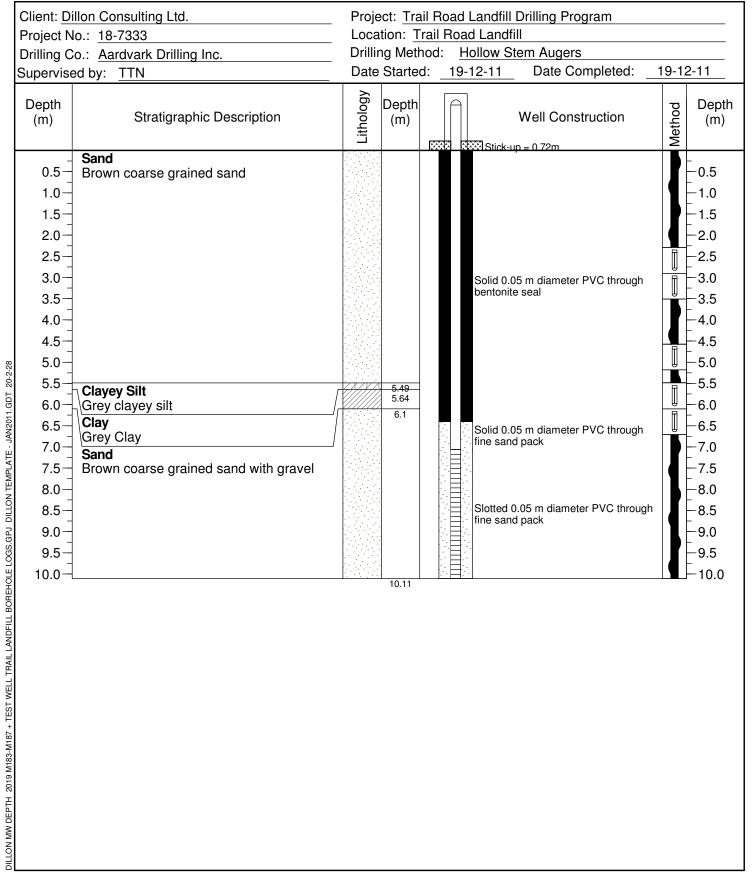
Client: Dillon Consulting Ltd. Project: Trail Road Landfill Drilling Program Location: Trail Road Landfill Project No.: 18-7333 Drilling Method: Hollow Stem Augers Drilling Co.: Aardvark Drilling Inc. Date Started: 19-12-12 Date Completed: 19-12-12 Supervised by: TTN Lithology Depth Depth Depth Method Stratigraphic Description Well Construction (m) (m) (m) Stick-up Sand 0.5 -Brown coarse grained sand 0.5 1.0-1.5-2.0 2.0 2.5 2.5 3.0 3.0 -3.5 3.5 Solid 0.05 m diameter PVC through bentonite seal 4.0 -4.0 4.5 4.5 5.0 -5.0 DILLON MW DEPTH 2019 M183-M187 + TEST WELL TRAIL LANDFILL BOREHOLE LOGS.GPJ DILLON TEMPLATE - JAN2011.GDT 20-2-28 5.5 -5.5 Clay 6.0 6.0-Grey clay 6.5 -6.5 6.45 Silty Clay 6.71 7.0--7.0Silty clay with some sand 7 18 Solid 0.05 m diameter PVC through 7.5-Clay -7.5 7.32 fine sand pack Clayey Sand 8.0-8.0 Sand 8.5 8.5 Brown coarse grained sand 9.0-Slotted 0.05 m diameter PVC through 9.0 fine sand pack 9.5-9.5 10.0-10.0 Slotted 0.05 m diameter PVC through native material pack 10.5 10.5 10.67

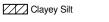


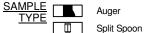




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BOREHOLE LOG	PROJECT: 91-134	BOREHOLE: M8B-I,II 1 of 1
MONITOR REPLACEMENT	DATE: 12 March 1991	
TRAIL ROAD LANDFILL - HIGHWAY 416		GEOLOGIST LD
FOR: Ministry of Transport of Ontario		ELEVATION 101.8 m ASI.

			=				_	==		M ASL
DEPTH (m)	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	NUMBER	TYPE	N CALUE	X WATER	X REC	% RQD	ALUE	WATER CONTEN (%)
1 2 3 4 5 - 6 6.4 7 7.8 8 8.5	Light to medium brown fine to medium sand, moist, loose to compact. -Becoming saturated with some coarse sand below about 2 m. -Occasional sea shell fragments below about 3.8 m. -Assumed clay seam between about 6.4 to 7.3 m. -Becoming a sand and gravel below about 7.3 m with cobbles below about 8.3 m. Borshole terminated at 8.53 m in assumed sand and gravel. NOTE: Stratigraphy below about 5.2 m inferred from		3 4 8	55	14 17 16 12					
	drill cuttings. Monitors installed in separate boreholes.									

APPENDIX 3

PH3959 - 1 - REV.1 - PROPOSED SITE LAYOUT PLAN

PG5155 - 1 - REVISION 1 - TEST HOLE LOCATION PLAN

DILLON CONSULTING PROJECT NO:18-7333 - 2019 GROUNDWATER MONITORING LOCATIONS

PH3959 - 2 - MECP WATER WELL LOCATION PLAN

PH3959 - 4 - SURFICIAL GEOLOGY

PH3959 - 6 - BEDROCK GEOLOGY

J.D BARNES LTD. PLAN 4R-32754

