Geotechnical Engineering

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Groundwater Impact Assessment: Proposed Commercial Development

3713 Borrisokane Road
Ottawa, Ontario

Prepared For

Caivan Greenbank North Inc.

December 12, 2019

Report PH3959-REP.01

TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

1.1 Terms of Reference

Paterson Group Inc. (Paterson) was retained by Caivan Greenbank North Inc. (Caivan) to carry out a groundwater impact assessment in support of a Site Plan, Zoning and Official Plan application at 3713 Borrisokane Road, Ottawa, Ontario. The proposed development is to be serviced by municipal services and above mentioned Official Plan Amendment has been submitted to permit development on municipal services. However, private servicing options are being reviewed due to the potential timing and delivery of the municipal services.

The proposed development within the severed lot is expected to consist of a single-storey, slab-on-grade warehouse and office building with a combined footprint of approximately 12,806 m^2. The subject site and retained parcel to the east was previously used as an aggregate extraction operation that is now considered to be depleted of resources and is undergoing rehabilitation. The subject site includes a number of sheds and a large vehicle scale. Reference should be made to Paterson Drawing PH3959 - 1 - Proposed Site Layout in Appendix 2 for the site location and general proposed site layout.

If private servicing is required as an interim measure, the wastewater will be treated by an onsite private sewage system. Phase 1 of the proposed development will consist of the assembly building where wastewater will be treated by an on-site private septic system with a design sewage flow of 6,650 L/day. If required, Phase 2 would consist of the office building addition and will have an updated design sewage flow of 33,000 L/day for the proposed development. An Environmental Compliance Approval (ECA) would be required for the second Phase of the sewage system and supporting documents/processes would be completed as necessary.

The purpose of this study has been to carry out a groundwater impact assessment to review the potential impacts related to the municipal servicing and potential interim private services on the Kars Esker underlying the subject site, if required.

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

2.0 BACKGROUND

2.1 Subject Site

The proposed severed lot is bordered by Borrisokane Road to the west followed by Highway 416, to the north by an undeveloped partially treed lot, and to the east and south by proposed municipally serviced residential developments. Specifically, the property is located at 3713 Borrisokane Road, in the City of Ottawa, Ontario (refer to Paterson Drawing PH3959 - 1 - Proposed Site Layout Plan in Appendix 2). The property is approximately rectangular in shape and has an approximate surface area of 7.9 ha. The property is currently zoned Mineral Extraction Operation - Pit Only with a ME2 zoning designation.

The subject site was part of a former aggregate extraction operation. Various fill piles, excavated areas, gravel roads, and construction debris are located throughout the site. Storage sheds, fuel tanks and operating equipment have also been identified throughout the site.

The subject site is bounded to the west by roadside ditches along Borrisokane Road which transmit surficial flows on a seasonal basis to the Jock River located approximately 1.5 km north of the subject site. An unevaluated wetland has also been identified north of the subject within the undeveloped treed land.

2.2 Proposed Municipal Servicing

The proposed development is to be municipally serviced. The proposed services are anticipated to be shallow based on the proposed building designs. The adjacent municipal servicing for the proposed residential subdivision is scheduled to begin in Spring 2020. Based on the availability of the services, it is expected that municipal services will be available for the development in the 2020 calendar year.

2.3 Proposed Interim Sewage System (if required)

In the event that interim private services will be used temporarily for the subject site, a private on-site sewage treatment system has been designed by Paterson to be implemented in a phased approach. The proposed system for Phase 1 of the development has been designed for an estimated sewage flow of 6,650 L/day.

While the Phase 2 portion of the Sewage System has been considered in the potential planning of the project, it is not anticipated that it will be required due to the expected timing of the municipal services.

2.4 Surrounding Land Uses

The general zoning in the area immediately surrounding the subject site consists of the following:

1. DR - Development Reserve
2. MR - Mineral Aggregate Reserve
3. ME2 - Mineral Extraction Operation - Pit Only
4. RU - Rural Countryside
5. RU[200r] - Rural Countryside with Exception Provisions (200r)

The specific land uses for the above zones are summarized below.

6. North:
   - Development Reserve - Land intended for future urban development
   - Mineral Aggregate Reserve

❑ East:
   - Mineral Extraction Operation (Pit Only) - Mineral extraction operation limited to a pit (currently undergoing rehabilitation for future development)

❑ South
   - Mineral Extraction Operation (Pit Only) - Mineral extraction operation limited to a pit (currently undergoing rehabilitation for approved residential development)

❑ West
   - Rural Countryside - Accommodates agricultural, forestry and residential lots
   - Rural Countryside with Exception Provisions (200r) - Additional land use permitted includes waste facilities

Refer to Paterson Drawing PH3959-3 - Zoning Designations for the zoning surrounding the subject area.

2.5 Regional and Site Geology

Published surficial geology mapping for the area in the vicinity of the subject site indicate the site is underlain predominantly 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 2 for the Ontario Geological Survey (OGS)

mapping.

Based on site specific investigative works carried out by this firm (Paterson Report No. PG5016-1, dated November 2019 and PG5155-1, dated December 2019), 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 - 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, drift thickness across the site ranges in thickness from approximately 15 to 25 m. Refer to Paterson Drawing PH3959-5 - Drift Thickness in Appendix 2 for the OGS mapping. Paterson borehole BH14-19 extended to a depth of 31.72 m and did not encounter bedrock.

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 2 for the OGS mapping.

Grain Size Distribution Test

One sieve analysis was completed from TP 41 - G3 and within close proximity to the proposed sewage system to classify the underlying soil according to the United Soil Classification System (USCS). Based on the results of the testing, the soil sample was classified as a poorly graded sand with silt and gravel. The results are presented in the Grain Size Distribution Sheets in Appendix 3.

3.0 METHOD OF STUDY

3.1 Geotechnical Investigations

The geotechnical investigations were conducted between July to November 2019. The field programs consisted of advancing test holes across the subject site to a maximum depth of 31.7 m bgs.

The test holes were distributed in a manner to provide general coverage of the subject site taking into consideration site features. The boreholes were completed with a track-mounted auger drill rig operated by a two-person crew. The test pits were completed using a hydraulic shovel. All fieldwork was conducted under the full-time supervision of Paterson personnel under the direction of a senior engineer.

Sampling and In Situ Testing

Soil samples were recovered using a 50 mm diameter split-spoon sampler or from the auger flights. The split-spoon and auger samples were classified onsite and placed in sealed plastic bags. All samples were transported to our laboratory. The depths at which the split-spoon and auger samples were recovered from the boreholes are shown as SS and AU, respectively, on the Soil Profile and Test Data sheets in Appendix 3.

A Standard Penetration Test (SPT) was conducted in conjunction with the recovery of the split spoon samples. The SPT results are recorded as "N" values on the Soil Profile and Test Data sheets. The "N" value is the number of blows required to drive the split spoon sampler 300 mm into the soil after a 150 mm initial penetration using a 63.5 kg hammer falling from a height of 760 mm. This testing was done in general accordance with ASTM D1586-11 - Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils.

Undrained shear strength testing, using a vane apparatus, was carried out at regular intervals of depth in cohesive soils. The overburden thickness was evaluated by a dynamic cone penetration test (DCPT). The DCPT consists of driving a steel drill rod, equipped with a 50 mm diameter cone at the tip, using a 63.5 kg hammer falling from a height of 760 mm. The number of blows required to drive the cone into the soil is recorded for each 300 mm increment.

Soil samples from the test pits were recovered from the side walls of the open excavation and all soil samples were initially classified on site. The grab samples were placed in sealed plastic bags and all samples were transported to our laboratory. The depths at which the grab samples were recovered from the test holes are shown as ‘G’,

on the Soil Profile and Test Data sheets presented in Appendix 1. Subsurface conditions observed in the test holes were recorded in detail in the filed.

3.2 Overburden Groundwater Observation

Groundwater levels were measured in the piezometers at the borehole locations using an electronic water level tape on July 24, 2019, November 29, 2019, and within the test pits at the time of the excavations. The depths at which water was encountered in each test hole is indicated on the Soil Profile and Test Data sheets in Appendix 3.

4.0 HYDROGEOLOGICAL SETTING

4.1 REGIONAL GROUNDWATER FLOW DIRECTION

Site specific groundwater data from the current geotechnical studies indicate that the surficial groundwater flows in the overburden generally mirror the site topography. The regional groundwater flow is anticipated to be in a west to northwest direction that eventually travels to the Jock River.

A review of the MECP online WWR database indicates that there are approximately 9 mapped water well locations within a 500 m radius surrounding the site. After reviewing the WWR, there are 6 monitoring/test well location and 3 abandoned locations. Potable water supply wells have not been identified within a 500 m radius surrounding the site and no potable water supply wells were found in the downgradient direction prior to outletting to the Jock River. The closest potable water well was noted to the southwest at a distance of approximately 1,300 m within the Trail Road Landfill Complex. This water supply well is not considered to be downgradient. The overburden aquifer thickness in the area is reported to be in the range of 30 m based on available WWRs. The related WWRs have been attached in Appendix 1 with the mapped water wells shown on Paterson Drawing PH3959-2 - MECP Water Well Location Plan in Appendix 2.

The water supply wells outside the 500 m radius of the subject site are typically accessing water from the bedrock aquifer of the Oxford formation. The carbonate rich rock of the Oxford formation is considered to be a good quality groundwater aquifer. However, as shown on the aforementioned Paterson drawing, there are no water supply wells downgradient of the subject site within a 500 m radius, with the closest potable water well located approximately 1,300 m southwest of the subject site.

4.2 LOCAL HYDROGEOLOGY

The shallow groundwater flow in the sand overburden stratum is generally influenced by topographical factors or the discontinuous silty clay layer observed on site and may be affected by local barriers such as Borrisokane Road and Highway 416. Due to the permeable nature of the overburden material it is also acting as a recharge area for the underlying esker and bedrock aquifer.

The shallow groundwater flow in the sand stratum, where overlying the discontinuous silty clay layer, is expected to move horizontally in the upper aquifer until it discharges into municipal drains and/or watercourses, such as the Jock River.

4.3 SURFICIAL DRAINAGE SYSTEM

Due to the permeability of the underlying soils at the subject site, the majority of the surface water will be re-infiltrated with topographic relief on-site directing minor water towards the roadside ditch along Borrisokane Road. The roadside ditch along Borrisokane Road flows intermittently north approximately 1.5 km where it is discharged into the Jock River or re-infiltrates into the underlying soils if there is available capacity.

5.0 GROUNDWATER AND SURFACE QUALITY

Paterson did not review the quality of the groundwater due to the proposed municipal service connections. As the development will be using municipal water and sewer, the quality of the groundwater is not anticipated to be adversely affected by the proposed servicing.

If required for the interim period, Phase 1 would have an interim sewage treatment system until the municipal servicing was available as per the timelines previously discussed. It is not expected that the Phase 2 portion will be required.

5.1 GROUNDWATER IMPACT ASSESSMENT

The proposed development is to be serviced through municipal services and Caivan is following the process to obtain these services. However, private servicing options are being reviewed due to the potential timing and delivery of the municipal services. Based on a review of municipal services, adverse impacts to the groundwater system (Kars Esker) are not expected to occur.

In the event that private servicing is required, potential impacts to the groundwater has been assessed and discussed below.

The subsoil profile within the subject site generally 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.

The hydraulic conductivity values were conservatively estimated based upon previous experience at similar sites in the area, typical values for silty clay and silty sand to sand with varying amounts of gravel, cobbles and boulders. These values typically range from 1×10^{-7} to 1×10^{-9} m/sec for brown silty clay, 1×10^{-4} to 1×10^{-6} m/sec for silty sand to sand and 1×10^{-4} to 1×10^{-9} m/sec for fill material and is dependant on the ratios of the various materials in the deposit or fill material.

It is understood the discharge area for the treated effluent is proposed to be located within the southeast portion of the subject site where the underlying soil is comprised of fill material followed by a sand deposit. The fill material is anticipated to have a moderate to high hydraulic conductivity value and will promote surficial infiltration to the sand, esker and bedrock aquifer. However, the potential sewage system will provide treated effluent meeting the OBC guidelines for the required parameters. The MECP

system is expected to require the use of denitrification with the potential for additional dilution from the esker as it is considered to transmit large quantities of water. As such, it is not expected to adversely impact the overburden and bedrock aquifers from the onsite sewage treatment system (if required). The Phase 1 system effluent will be able to be attenuated within the site boundaries. See the nitrate impact assessment in Section 5.2 of the current report.

Based on our review of reasonable use of groundwater in the subject area, there are no present or potential use of groundwater for domestic consumption down gradient of the subject site.

5.2 PREDICTIVE NITRATE IMPACT ASSESSMENT

This assessment is not required for a site serviced with municipal services. In order to demonstrate that interim private services would adequately support the proposed development, a predictive nitrate impact assessment for the subject site was completed. The values shown in the Predictive Nitrate Impact Assessment attached to this report are summarized below.

- ❏ Site area — 7 Ha
- ❏ Impervious area % — 50 %
- ❏ Daily sewage flow — 8 m^3 (Phase1)
  33 m^3 (Phase 2)
  (Average daily flow - Peak. It is expected that actual volumes will be much lower)
- ❏ Concentration of nitrate in effluent — 20 mg/L
  (Value based upon tertiary treatment system with 50% nitrate reduction)
- ❏ Surplus Water — 415 mm/year
  (The surplus water value was estimated based on Environment Canada Climate Office values with a soil type comprised of fine sand (moderately rooted crops) and anthropogenic sources.
- ❏ Combined infiltration factor based on: — 0.61
  - Topography infiltration factor — 0.11
  - Soil texture infiltration factor — 0.40
  - Cover infiltration factor — 0.10

The topography infiltration factor of 0.11 is based upon a minimum of 2 to 4% grading for the proposed development that equates to a value between rolling (0.2) and hilly land (0.1).

The soil texture infiltration factor was based upon an “open sandy loam” with a value of 0.4 which is a reasonable generalization based upon the previous site investigations by others and available geological mapping.

The “vegetative cover infiltration factor” was calculated as 0.1 based upon the minimum value for cultivated land.

Phase 1

The calculation for the proposed tertiary treatment system designed for Phase 1 results in a predicted nitrate concentration of 8.8 mg/L for the subject site. This value was based upon using a conservative value of up to 10,000 L/day for the daily sewage flow. The average daily peak flow based upon weekday and weekend usage as calculated under Part 8 of the Ontario Building Code (OBC) is 6,650 L/day. It is expected that the actual usage should be much lower and could be verified after construction based upon water usage.

Phase 2

The calculation for the proposed septic system designed for Phase 2 results in a predicted nitrate concentration of 17.3 mg/L for the subject site. This value was based upon using a conservative value of 33,000 L/day for the daily sewage flow, which was the average daily peak flow based upon weekend and weekday usage as calculated under Part 8 of the Ontario Building Code (OBC). It is expected that the actual usage should be much lower and could be verified after construction based upon water usage.

The concentration of the nitrates in the effluent is set at a value of 30 mg/L due to a passive reduction of 25 to 35% within the proposed tertiary treatment system. Based on the predicted nitrate concentration, nitrate reduction will be required for the sewage system for Phase 2 of the development to reach the required value at the property boundaries.

The proposed sewage treatment system for both phases is the Waterloo Biofilter brand. The system is NSF 245 certified and has an available nitrate reduction of 25 to 35% based upon the standard single pass system and 50 to 65% based upon a double pass re-circulation system. This would reduce the nitrate concentration in the effluent from 40 mg/L down to 14 to 20 mg/L. The quality of the effluent would be assessed and if the nitrate did not meet the required standards then the WaterNOx System could be added. The WaterNOx is capable of a 90 to 95% reduction in nitrates. Provided the value of 23 mg/L of nitrates for the fully sized system, a 90% reduction would provide a value

of 2.3 mg/L. The value of 2.3 mg/L would be acceptable based upon the reasonable use assumption we provided and would also be viable for a reasonable use assumption of drinking water.

In addition, the land usage to the north of the subject site in the direction of groundwater flow consists of undeveloped land with proposed municipally serviced residential developments to the northeast. The Trail Road Landfill Complex as well as undeveloped land is located to the west of the site and it would not be reasonable to consider the overburden aquifer as drinking water.

Based on the results of the predicted nitrate impact assessment, it is our opinion that the proposed property can adequately support the proposed commercial development without having an adverse impact on the Kars Esker or the underlying bedrock aquifer.

5.3 SURFACE WATER IMPACT ASSESSMENT

As the development is located in the area of the Kars Esker, there are no surficial watercourses immediately adjacent to the subject site. Any water is infiltrated back into the granular materials and directed off-site through the overburden aquifer. As such, adverse impacts to surrounding surface water systems are not expected.

The proposed development is to be municipally serviced. However, private servicing options are being reviewed due to the potential timing and delivery of the municipal services. Given the permeability of the subsoils and lack of surface water features within the subject site, it is expected that the treated effluent discharge will infiltrate into the underlying soils prior to reaching any surface water systems. Impacts to the surface water system from the treated effluent discharge is expected to be negligible.

6.0 CONCLUSIONS

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

1. The proposed site is located in an area consisting of a previous mineral aggregate/extraction area, development reserve and rural countryside zoning.

2. The proposed development is to be municipally serviced. Therefore, negative impacts to the surface water and groundwater system are not expected.

3. Private servicing options are being reviewed for interim measures due to the potential timing and delivery of the municipal services.

4. Private water supplies have not been identified within 1,300 m of the subject site and none were identified in the downgradient direction prior to the discharge locations at the Jock River approximately 1,500 m northwest.

5. The MECP type sewage system (if required) providing treated sewage effluent is anticipated to meet and/or exceed the MECP guidelines. As such, it would not be expected to adversely impact the overburden/ bedrock aquifers from the proposed discharge. Additionally, no WWRs noted for domestic use were identified within 500 m downgradient from the effluent discharge location.

6. The subject site is an ideal location for the proposed treated effluent discharge due to the lack of potential downstream receptors and municipal services proposed for the properties to the north, east and southeast.

7. The predicted nitrate concentrations at the property boundaries were below the required threshold for the Phase 1 private sewage treatment system (if required on an interim basis), with a standard single pass Waterloo Biofilter treatment and with additional denitrification for Phase 2.

8. It is recommended that the site be approved for the requested re-zoning and lot severance for municipal or private services based upon the groundwater impact assessment.

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.

PATERSON GROUP INC.

Nicholas Zulinski, P.Geo., géo.

Michael S. Killam, P.Eng.

Report Distribution:

- ❑ Caivan Greenbank North Inc. (2 copies)
- ❑ Paterson Group (1 copy)

APPENDIX 1

PUBLISHED MECP WATER WELL RECORDS

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11

1527823

MUNICIP. 15008 (10-14) CON. CON 04 (15-22, 23-24)

COUNTY OR DISTRICT: Ottawa Carleton
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Nepean
CON. BLOCK, TRACT, SURVEY, ETC: Concession 4
LOT (25-27): 10
OWNER (SURNAME FIRST): [redacted]
ADDRESS: 4475 Trail Road
DATE COMPLETED (48-53): DAY 21 MO 3 YR 92

NORTHING (18-24) RC. (25) ELEVATION (26) RC. (30) BASIN CODE (31-47) II III IV

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Sand		Fine	0	20'
Grey	Clay		Dense	20'	35'
Grey	Silt	Clay	Very Fine	35'	68'
Grey	Silt	Till, Boulders	Fine Layered	68'	98'
Grey	Limestone		Broken, Soft	98'	135'
Grey	Limestone	Black Limestone	Soft	135'	193'
Grey	Limestone	Quartz	Med.	193'	200'

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
185 (10-13)	1 FRESH 2 SALTY 3 SULPHUR 4 MINERALS 6 GAS (14)
194 (15-18)	1 FRESH 2 SALTY 3 SULPHUR 4 MINERALS 6 GAS (19)
(20-23)	1 FRESH 2 SALTY 3 SULPHUR 4 MINERALS 6 GAS (24)
(25-28)	1 FRESH 2 SALTY 3 SULPHUR 4 MINERALS 6 GAS (29)
(30-33)	1 FRESH 2 SALTY 3 SULPHUR 4 MINERALS 6 GAS (34) (30)

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
10 (10-11)	1 STEEL 2 GALVANIZED 3 CONCRETE 4 ✓ OPEN HOLE 5 PLASTIC (12)		0	154 (13-16)
6¼ (17-18)	1 ✓ STEEL 2 GALVANIZED 3 CONCRETE 4 OPEN HOLE 5 PLASTIC (19)	,188	0	154 (20-23)
6 (24-25)	1 STEEL 2 GALVANIZED 3 CONCRETE 4 ✓ OPEN HOLE 5 PLASTIC (26)		154'	200 (27-30)

SCREEN

SIZE(S) OF OPENING (SLOT NO.) (31-33)
DIAMETER (34-38) INCHES
LENGTH (39-40) FEET
MATERIAL AND TYPE
DEPTH TO TOP OF SCREEN (41-44) FEET (10)

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)
0 (10-13)	154 (14-17)	Cement Grout (Type 30)
(18-21)	(22-25)	
(26-29)	(30-33)	(80)

71 PUMPING TEST

PUMPING TEST METHOD (10): 1 ✓ PUMP 2 ☐ BAILER
PUMPING RATE (11-14): 30 GPM
DURATION OF PUMPING (15-16) HOURS (17-18) MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING
45 (19-21) FEET	(22-24) FEET

(25) WATER LEVELS DURING: 1 ☐ PUMPING 2 ☐ RECOVERY

15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
(26-28) FEET	(29-31) FEET	(32-34) FEET	(35-37) FEET

IF FLOWING, GIVE RATE (38-41) GPM
PUMP INTAKE SET AT FEET
WATER AT END OF TEST (42): 1 ✓ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☑ DEEP
RECOMMENDED PUMP SETTING (43-45) FEET
RECOMMENDED PUMPING RATE (46-49) GPM
(50-53)

54 FINAL STATUS OF WELL

1 ✓ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED ☐ DEWATERING

55-56 WATER USE

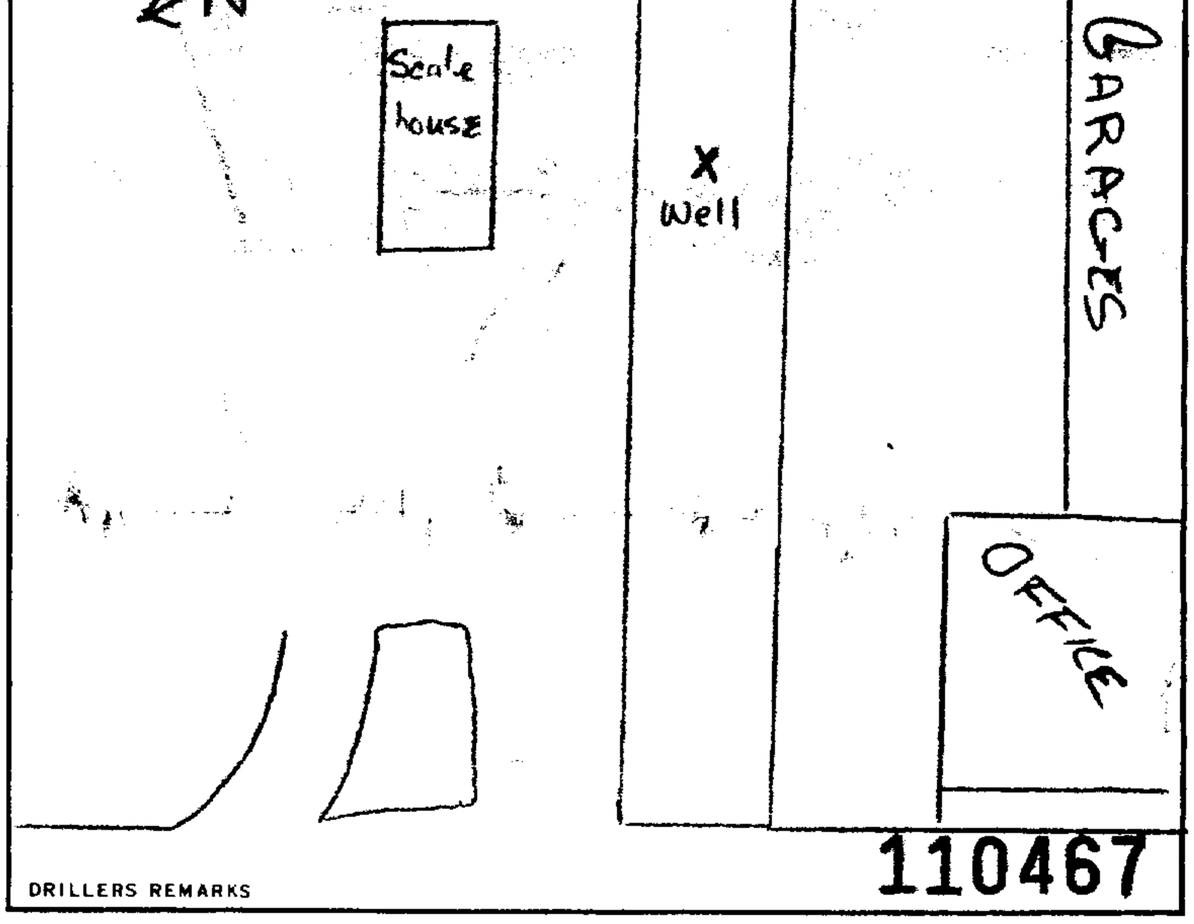
1 ☐ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ✓ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING ☐ OTHER 9 ☐ NOT USED

57 METHOD OF CONSTRUCTION

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ✓ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING ☐ DIGGING ☐ OTHER

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS

110467

CONTRACTOR

NAME OF WELL CONTRACTOR: Valley Drilling Inc
WELL CONTRACTOR'S LICENCE NUMBER: 5222
ADDRESS: PO Box 437 Carp Ont
NAME OF WELL TECHNICIAN: Steve (Tito) Bisson
WELL TECHNICIAN'S LICENCE NUMBER: T-0190
SIGNATURE OF TECHNICIAN/CONTRACTOR
SUBMISSION DATE: DAY ____ MO. ____ YR. ____

OFFICE USE ONLY

DATA SOURCE (58)
CONTRACTOR (59-62): 5222
DATE RECEIVED (63-68): APR 05 1994 (80)
DATE OF INSPECTION
INSPECTOR
REMARKS

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

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1527822

MUNICIP. 15008 CON. CON 04

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CON, BLOCK, TRACT, SURVEY, ETC: Concession 4
LOT: 10
ADDRESS: 4475 Trail Road
DATE COMPLETED: DAY 26 MO 3 YR 92
NORTHING / RC. / ELEVATION / RC. / BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
		PREVIOUSLY DRILLED		0	200'
GREY	LIMESTONE	QUARTZ	HARD.	200'	285'
WHITE	QUARTZITE		HARD	285'	310'
RED	QUARTZITE		HARD.	310'	325'
WHITE	QUARTZITE	GREEN LAYERS	HARD.	325'	340'

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
328	1 ☑ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
5 3/4	1 ☑ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	144	200
5 1/4	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☑ OPEN HOLE 5 ☐ PLASTIC		200'	340'
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER	LENGTH
	INCHES	FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
144	200	TYPE 30 CEMENT GROUT.

71 PUMPING TEST

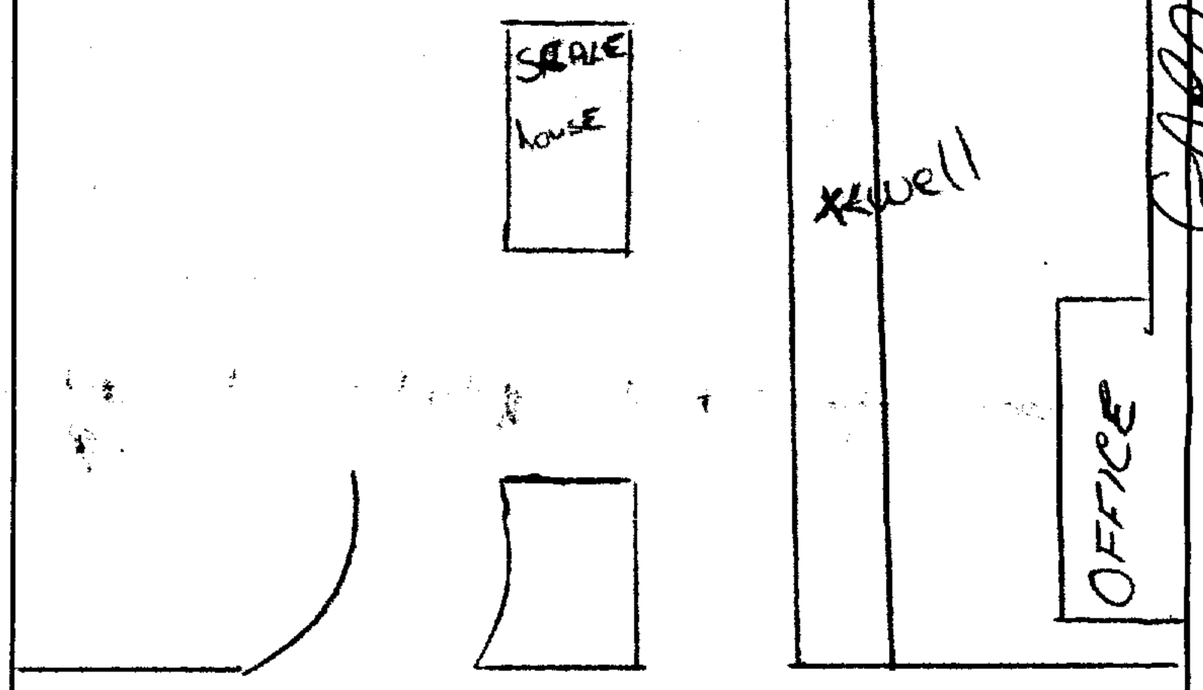
PUMPING TEST METHOD: 1 ☑ PUMP 2 ☐ BAILER
PUMPING RATE: 50 GPM
DURATION OF PUMPING: 12 HOURS
WATER LEVELS DURING: 1 ☑ PUMPING 2 ☐ RECOVERY

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
36 FEET	75 FEET	FEET	FEET	FEET	FEET

IF FLOWING, GIVE RATE: GPM
PUMP INTAKE SET AT: 120 FEET
WATER AT END OF TEST: 1 ☑ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☑ DEEP
RECOMMENDED PUMP SETTING: 120 FEET
RECOMMENDED PUMPING RATE: 25 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS: 110483

FINAL STATUS OF WELL

1 ☑ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED ☐ DEWATERING

WATER USE

1 ☐ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☑ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF CONSTRUCTION

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☑ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING ☐ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: VALLEY DRILLING INC.
WELL CONTRACTOR'S LICENCE NUMBER: 5222
ADDRESS: P.O. Box 1137 CARP, ONT
NAME OF WELL TECHNICIAN: S. Skuse #310 Bill Bisson
WELL TECHNICIAN'S LICENCE NUMBER: T-0190
SIGNATURE OF TECHNICIAN / CONTRACTOR
SUBMISSION DATE: DAY ____ MO. ____ YR. ____

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR 5222 | DATE RECEIVED APR 05 1994
DATE OF INSPECTION | INSPECTOR
REMARKS

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Ontario Ministry of the Environment

Well Tag Number (Place sticker and print number below)

Abandonment

Well Record

Regulation 903 Ontario Water Resources Act

page ___ of ___

Instructions for Completing Form

- For use in the **Province of Ontario** only. This document is a permanent **legal** document. Please retain for future reference.
- All Sections **must** be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Management Coordinator at 416-235-6203.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only

MUN | CON | LOT

Well Owner's Information and Location of Well Information

First Name	Last Name	Mailing Address (Street Number/Name, RR Lot,Concession)
City of Ottawa	[redacted]	RR2 4975 Fmail Road

County/District/Municipality	Township/City/Town/Village	Province	Postal Code	Telephone Number (include area code)
Ottawa Carleton	Ottawa	Ontario	K0A 2Z0	613-580-2424 x22843

Address of Well Location (County/District/Municipality)	Township	Lot	Concession
Ottawa Carleton	Nepean		4

RR#/Street Number/Name	City/Town/Village	Site/Compartment/Block/Tract etc.
RR2 4975 Fmail Road	Ottawa	

GPS Reading	NAD	Zone	Easting	Northing	Unit Make/Model	Mode of Operation:
	83	18	440488	5009573	Magellan	☑ Undifferentiated ☐ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Depth To
grey	sand	silt	Medium to coarse sand, some silt	0	6.1
grey	sand		Coarse sand	6.1	6.55
grey	silt		silt	6.55	6.71
grey	clay	silt	clay, some silt	6.71	9.75
grey	sand		Medium to coarse sand	9.75	12.8

Hole Diameter

Depth From	Depth To	Diameter Centimetres
0	12.8	20.3

Water Record

Water found at ___ Metres / Kind of Water

- ___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other: ___
- ___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other: ___
- ___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other: ___

After test of well yield, water was
☐ Clear and sediment free
☐ Other, specify ___

Chlorinated ☐ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Depth To
Casing				
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	Slot No.		
No Casing or Screen				
	☐ Open hole			

Test of Well Yield

Pumping test method	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Pump intake set at - (metres)	Static Level			
Pumping rate - (litres/min)	1		1	
Duration of pumping ___hrs +___ min	2		2	
Final water level end of pumping ___metres	3		3	
Recommended pump type. ☐ Shallow ☐ Deep	4		4	
Recommended pump depth. ___metres	5		5	
Recommended pump rate. (litres/min)	10		10	
	15		15	
If flowing give rate - (litres/min)	20		20	
	25		25	
If pumping discontinued, give reason.	30		30	
	40		40	
	50		50	
	60		60	

Plugging and Sealing Record ☐ Annular space ☑ Abandonment

Depth set at - Metres From	Depth set at - Metres To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	1.0	hole plug	2 bags
1.0	12.8	cement bentonite grout	1½

Method of Construction

☐ Cable Tool ☐ Rotary (air) ☐ Diamond ☐ Digging
☐ Rotary (conventional) ☐ Air percussion ☐ Jetting ☐ Other
☐ Rotary (reverse) ☐ Boring ☐ Driving

Water Use

☐ Domestic ☐ Industrial ☐ Public Supply ☐ Other
☐ Stock ☐ Commercial ☐ Not used
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

Final Status of Well

☐ Water Supply ☐ Recharge well ☐ Unfinished ☑ Abandoned, (Other)
☐ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
☐ Test Hole ☐ Abandoned, poor quality ☐ Replacement well

Well Contractor/Technician Information

Name of Well Contractor	Well Contractor's Licence No.
OGS	6964

Business Address (street name, number, city etc.): 5518 Appleton Side Road, Almonte Ont K0A 1A0

Name of Well Technician (last name, first name)	Well Technician's Licence No.
Ohlman Brian	T 2593

Signature of Technician/Contractor: X [signature] Date Submitted YYYY MM DD

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.

GPS reading taken on MW-2
this well is located 2m from MW-1

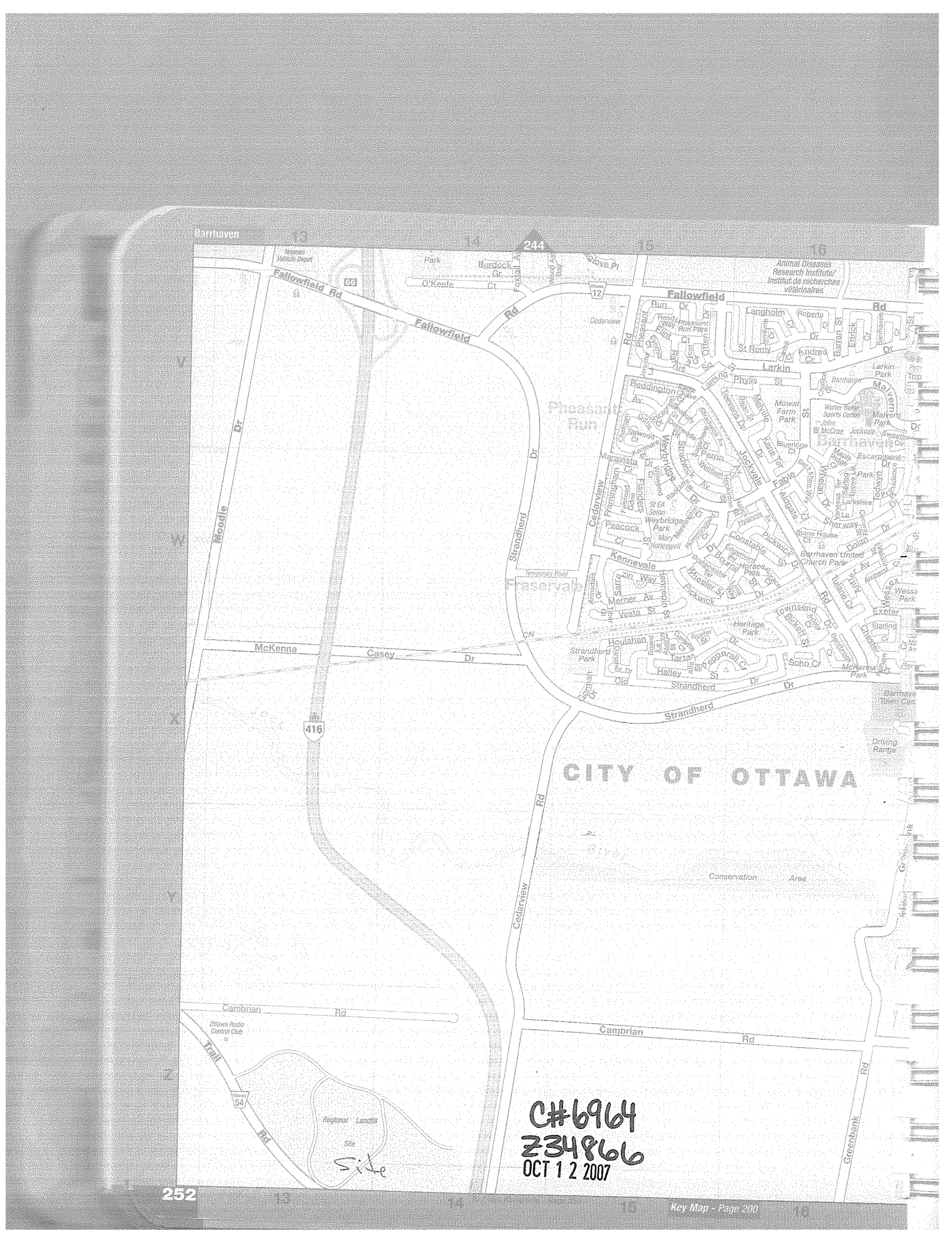
Site plan enclosed

Area map enclosed

Audit No.	Date Well Completed YYYY MM DD
Z 34866	2007 9 10
Was the well owner's information package delivered? ☐ Yes ☐ No	Date Delivered YYYY MM DD: 2007 10 10

Ministry Use Only

Data Source	Contractor
Date Received YYYY MM DD: OCT 12 2007	Date of Inspection YYYY MM DD
Remarks	Well Record Number



C#6964
Z34866
OCT 12 2007

Ontario Ministry of the Environment

Well Tag Number (Place sticker and print number below)

A032155

Well Record

Regulation 903 Ontario Water Resources Act

page ___ of ___

Instructions for Completing Form

- For use in the **Province of Ontario** only. This document is a permanent **legal** document. Please retain for future reference.
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- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only

MUN | CON | LOT

Well Owner's Information and Location of Well Information

First Name	Last Name	Mailing Address (Street Number/Name, RR, Lot, Concession)
City of Ottawa	[redacted]	RR2 4475 Trail Road

County/District/Municipality	Township/City/Town/Village	Province	Postal Code	Telephone Number (include area code)
Ottawa Carleton	Ottawa	Ontario	K0A 2Z0	613-580-2424 x22843

Address of Well Location (County/District/Municipality)	Township	Lot	Concession
Ottawa Carleton	Nepean		4

RR#/Street Number/Name	City/Town/Village	Site/Compartment/Block/Tract etc.
RR2 4475 Trail Road	Ottawa	

GPS Reading	NAD	Zone	Easting	Northing	Unit Make/Model	Mode of Operation:
	83	18	440488	5009575	Magellan	☑ Undifferentiated ☐ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Depth To (Metres)
grey	sand	silt	medium to coarse sand, some silt	0	6.1
grey	sand		Coarse sand	6.1	6.55
grey	silt		Silt	6.55	6.71
grey	clay	silt	clay, some silt	6.71	9.75
grey	sand		medium to coarse sand	9.75	12.8

Hole Diameter

Depth From	Depth To (Metres)	Diameter (Centimetres)
0	12.8	20.3

Water Record

Water found at ___ Metres / Kind of Water

- ___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other: ___
- ___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other: ___
- ___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other: ___

After test of well yield, water was
☐ Clear and sediment free
☐ Other, specify ___

Chlorinated ☐ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth From (Metres)	Depth To (Metres)
Casing				
5.2	☐ Steel ☐ Fibreglass ☑ Plastic ☐ Concrete ☐ Galvanized	0.4	0	10.75
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam	☐ Steel ☐ Fibreglass ☑ Plastic ☐ Concrete ☐ Galvanized	Slot No.	10.75	12.25
6.0		10		
No Casing or Screen				
☐ Open hole				

Test of Well Yield

Pumping test method	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Pump intake set at - (metres)	Static Level			
Pumping rate - (litres/min)	1		1	
Duration of pumping ___hrs +___ min	2		2	
Final water level end of pumping ___metres	3		3	
Recommended pump type. ☐ Shallow ☐ Deep	4		4	
Recommended pump depth. ___metres	5		5	
Recommended pump rate. (litres/min)	10		10	
	15		15	
If flowing give rate - (litres/min)	20		20	
	25		25	
If pumping discontinued, give reason.	30		30	
	40		40	
	50		50	
	60		60	

Plugging and Sealing Record

☑ Annular space ☐ Abandonment

Depth set at - Metres From	Depth set at - Metres To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	0.3	hole plug	½ bag
0.3	6.4	sand backfill	
6.4	10.15	hole plug	7½ bags
10.15	12.25	filter sand	6 bags

Method of Construction

☐ Cable Tool ☐ Rotary (air) ☐ Diamond ☐ Digging
☐ Rotary (conventional) ☐ Air percussion ☐ Jetting ☐ Other hollow stem augers
☐ Rotary (reverse) ☐ Boring ☐ Driving

Water Use

☐ Domestic ☐ Industrial ☐ Public Supply ☐ Other Sampling
☐ Stock ☐ Commercial ☐ Not used
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

Final Status of Well

☐ Water Supply ☐ Recharge well ☐ Unfinished ☐ Abandoned, (Other)
☐ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
☑ Test Hole ☐ Abandoned, poor quality ☐ Replacement well

Well Contractor/Technician Information

Name of Well Contractor	Well Contractor's Licence No.
OGS Inc	6964
Business Address (street name, number, city etc.)	
5510 Appleton Side Road Almonte Ont K0A 1A0	
Name of Well Technician (last name, first name)	**Well Technician's Licence No.**
Ohlmann Brian	T2593
Signature of Technician/Contractor	**Date Submitted** YYYY MM DD
X	

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.

GPS reading taken on MW-1

Site plan enclosed

Area map enclosed

Audit No.	Date Well Completed YYYY MM DD
Z 34860	2007 9 10
Was the well owner's information package delivered? ☐ Yes ☐ No	**Date Delivered** YYYY MM DD: 2007 10 10

Ministry Use Only

Data Source	Contractor
Date Received YYYY MM DD: OCT 12 2007	**Date of Inspection** YYYY MM DD
Remarks	**Well Record Number**

0506E (09/03) Contractor's Copy ☐ Ministry's Copy ☑ Well Owner's Copy ☐ *Cette formule est disponible en français*

DILLON CONSULTING

Dillon Consulting Ltd.
Suite 200, 5310 Canotek Road
Ottawa, ON
K1J 9N5
(613) 745-2213

M4-1

Client: City of Ottawa
Project No.: 07-7490-0800
Drilling Co.: OGS Inc.
Supervised by: EG

Project: Trail Road Landfill Site
Location: Trail Road Landfill
Drilling Method: Hollow-stem auger
Date Started: 9/10/07 Date Completed: 9/10/07

Depth Scale (m)	Stratigraphic Description	Lithology	Depth (m)	Well Construction	Sample Method	Sample Number	Sample N Value	Sample Rec %	Depth Scale (m)
1.0	Medium to coarse sand, some silt, grey, wet.								1.0
2.0									2.0
3.0						1		80	3.0
4.0									4.0
5.0									5.0
6.0	Coarse sand, grey, wet.		6.1			2		85	6.0
	Silt, grey, wet.		6.55						
7.0	Clay, grey, moist, very plastic, some silt.		6.71						7.0
8.0									8.0
9.0						3		90	9.0
10.0	Medium to coarse sand, grey, wet.		9.75						10.0
11.0									11.0
12.0						4		80	12.0
			12.8						

DILLON-MW - NO VOC SEPT 07 TRAIL.GPJ DILLON_MAY13_05.GDT 9/20/07

LITHOLOGY SYMBOLS: Sand; Silt; Silt / Clay

SAMPLE TYPE: Split Spoon

C 6964 OCT 1 2 2007 Z 34860

Ontario Ministry of the Environment

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

Page 1 of 3

[redacted]

Address of Well Location (Street Number/Name, RR)	Township	Lot	Concession
4375 Trail Rd			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Hanna	Ontario	

UTM Coordinates	Zone	Easting	Northing	GPS Unit Make	Model	Mode of Operation
NAD 83	18	440833	5009111	Garmin	Etrex	☐ Undifferentiated ☑ Averaged ☐ Differentiated, specify

Overburden and Bedrock Materials *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (Metres) From	Depth (Metres) To
Brn	Sand	Silt	soft, dry	0	4.27

Hole Details

Depth (Metres) From	Depth (Metres) To	Diameter (Centimetres)
0	4.27	8.25

Water Use

☐ Public ☐ Industrial ☐ Not used ☑ Other, *specify*
☐ Domestic ☐ Commercial ☐ Dewatering
☐ Livestock ☐ Municipal ☑ Monitoring
☐ Irrigation ☑ Test Hole ☐ Cooling & Air Conditioning

Method of Construction

☐ Cable Tool ☐ Air Percussion ☐ Digging
☐ Rotary (Conventional) ☐ Diamond ☐ Boring
☐ Rotary (Reverse) ☐ Jetting ☑ Other, *specify*
☐ Rotary (Air) ☐ Driving Direct Push

Status of Well

☑ Test Hole ☐ Abandoned, Insufficient Supply
☐ Replacement Well ☐ Abandoned, Poor Water Quality
☐ Dewatering Well ☑ Other, *specify* monitoring
☐ Alteration (Construction) ☐ Abandoned, other, *specify*

Construction Details

Inside Diameter (Centimetres)	Material (steel, plastic, fibreglass, concrete, galvanized)	Wall Thickness	Depth (Metres) From	Depth (Metres) To
2.61	PVC Riser	.338	0	3.35

No Casing and Screen Used

Open Hole ☐ Yes ☐ No

Static Water Level Test

Metres

Screen

☐ Galvanized ☐ Steel ☐ Fibreglass ☐ Concrete ☑ Plastic

Outside Diameter (Centimetres)	Slot No.
3.34	10

Annular Space/Abandonment Sealing Record

Depth Set at (Metres) From	Depth Set at (Metres) To	Type of Sealant Used (Material and Type)	Volume Used (Cubic Metres)
0	3.1	Benseal	
3.1	4.27	sand	

Water Details

Water found at Depth	Kind of Water
Metres ☐ Gas	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals
Metres ☐ Gas	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals
Metres ☐ Gas	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals

Disinfected ☐ Yes ☐ No If no, provide reason:

Date Master Well Completed (yyyy/mm/dd): 2009/08/27

Cluster Information *(Please also fill out the additional Cluster Well Information for Well Construction for each parcel of land and cluster.)*

Total Wells in Cluster	Please indicate Number of Cluster Well Information Log Sheets Submitted
4	1
Total Wells on this Property: 4	

Location of Well Cluster

Detailed Map must be provided as an attachment no larger than legal size (8.5" x 14"). Sketches are not allowed.

☐ Check box to confirm detailed map is provided as per Section 11.1 (3)

Consent to release additional information concerning the above-noted th
Si
M
Si

[redacted]

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Soil Sampling	7241

Business Address (Street No./Name, number, RR)	Municipality
12-147 West Beaver Creek	Richmond Hill

Province	Postal Code	Business E-mail Address
ON	L4B1G6	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
905 764-9804	Robinson, Travis

Well Technician's Licence No.	Signature of Technician	Date Submitted (yyyy/mm/dd)
3154		2009/09/04

RR 17th Sideroad Penn

Ministry Use Only

Audit No.	Well Contractor No.
M 02588	
Date Received (yyyy/mm/dd): SEP 22 2009	Date of Inspection (yyyy/mm/dd)
Remarks	

1992 (11/2006)

Ontario Ministry of the Environment

Well **A 087279** (Well Tag No.)

A087279

Cluster Well Information for Cluster Well Construction

Regulation 903 Ontario Water Resources Act

Page 2 of 3

Address of Well Location (Street Number/Name, RR)	Lot	Concession	Township	County/District/Municipality
4375 Trail Rd				

City/Town/Village	Province	Postal Code	GPS Unit Make	Model	Unit Mode of Operation	
Ottawa	Ontario		Garmin	Etrex	☐ Differentiated, specify:	☐ Undifferentiated ☐ Averaged

upon request

Signature of Technician/Contractor	Date (yyyy/mm/dd)

Well # on Sketch	UTM Coordinates Zone	Easting	Northing	Full Depth of Hole (metres)	Hole Diameter (cm)	Method of Construction	Casing Material	Casing Length (metres)	Screen Interval (metres) From	To	Annular Space Sealant Used	Static Water Level (metres)	Abandonment Sealant Used	Comments	Date of Completion (yyyy/mm/dd)
2	18	440748	5009219	3.1	8.25	Direct Push	PVC	2.13	2.13	3.1	Benseal				2009/08/2
3	18	440684	5009402	3.66	8.25	Direct Push	PVC	2.74	2.74	3.60	Benseal				2009/08/2
4	18	440616	5009552	3.1	8.25	Direct Push	PVC	2.13	2.13	3.1	Benseal				2009/08/27

Well Contractor and Well Technician Information

Business Name of Well Contractor	Business Address (Street Number/Name, RR)	Municipality	Province
Strata Soil Sampling	#2-147 West Beaver Creek	Richmond Hill	ON

Postal Code	Business Telephone No. (inc. area code)	Well Contractor's Licence No.	Business E-mail Address
L4B1C6			

Name of Well Technician (First Name, Last Name)	Well Technician's Licence No.	Date Submitted (yyyy/mm/dd)	Signature of Technician
Travis Robinson	31594	2009/09/04	BB 1796

Date 1st Well in Cluster Constructed (yyyy/mm/dd)	Date Last Well in Cluster Constructed (yyyy/mm/dd)
2009/08/27	2009/08/27

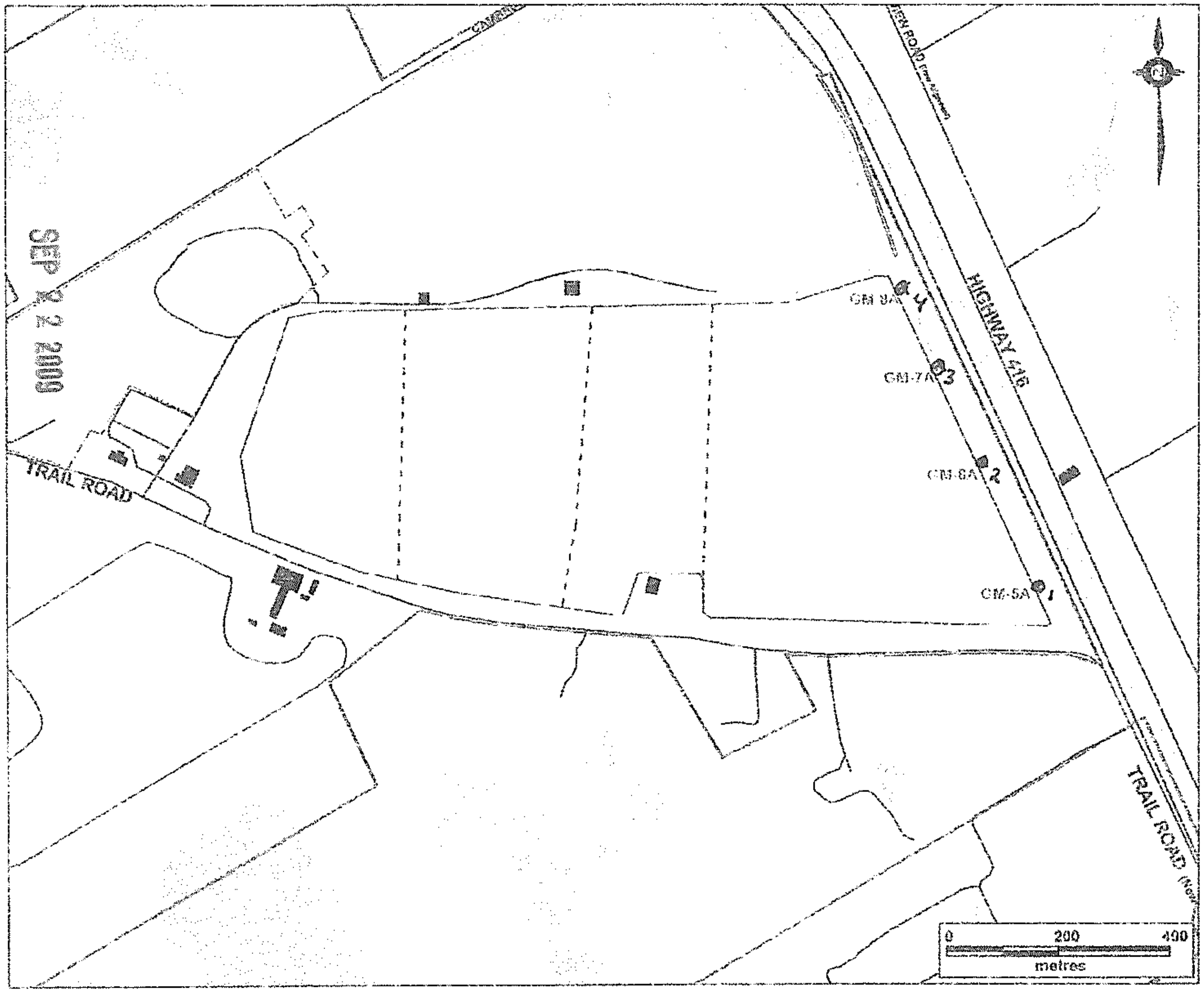
Ministry Use Only

Date Received (yyyy/mm/dd)	Date Inspected (yyyy/mm/dd)
SEP 22 2009	
Audit No: C06026	Remarks: M025488

1991 (11/2006) Ministry's Copy

Pg 3 of 3

C-7241
M025888
C06026



LEGEND

WATER BODY

GM-5A

TRAIL ROAD LANDFILL SITE
2009 MONITORING AND OPERATING PROGRAM

2009 LANDFILL GAS MONITORING LOCATIONS

DILLON CONSULTING

DATE: AUGUST 2009		FIGURE NO 1
SCALE: SEE SCALE BAR		

6666

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: ☑ Metric ☐ Imperial

Well Tag No. **Tag#: A190843** A190843

Well Record

Regulation 903 Ontario Water Resources Act

5-19480 Page ____ of ____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
City of	Ottawa		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
110 Laurier Avenue West, 5th Floor	Ottawa	ON	K1P 1J1	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
Trail Road Landfill			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Ottawa	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	440744	5009359		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Brn	Topsoil	Sand	Soft	0	.31
Brn	Sand	Silt, gravel	Soft	.31	3.35

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	.31	Monument, Concrete	
.31	1.52	Bentonyte	
1.52	3.35	Sand	

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☑ Boring ☐ Digging
☐ Air percussion
☐ Other, *specify* _____

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☑ Test Hole ☑ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, *specify* _____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
5.20	PVC	.390	0	1.83

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
6.03	PVC	10	1.83	3.35

Status of Well

☐ Water Supply
☐ Replacement Well
☑ Test Hole
☐ Recharge Well
☐ Dewatering Well
☑ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, *specify* _____
☐ Other, *specify* _____

Water Details

Water found at Depth (m/ft)	Kind of Water	Hole Diameter Depth From (m/ft)	Depth To (m/ft)	Diameter (cm/in)
☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*	0	3.35	15.24
☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*			
☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*			

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, *specify* _____

If pumping discontinued, give reason: _____

Pump intake set at (m/ft) _____

Pumping rate (l/min / GPM) _____

Duration of pumping _____ hrs + _____ min

Final water level end of pumping (m/ft) _____

If flowing give rate (l/min / GPM) _____

Recommended pump depth (m/ft) _____

Recommended pump rate (l/min / GPM) _____

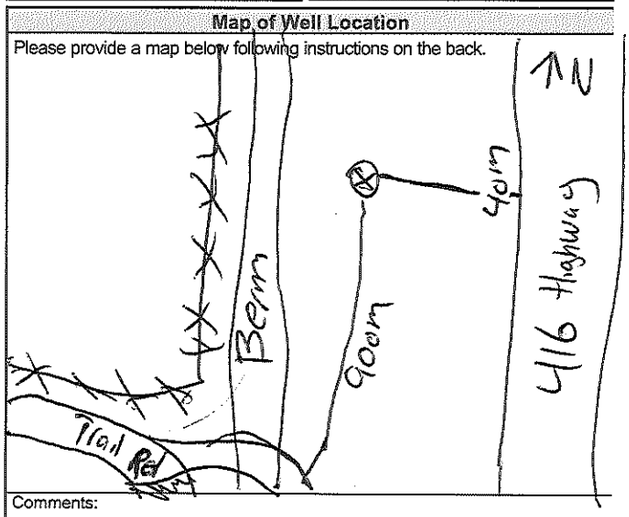
Well production (l/min / GPM) _____

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Drilling Group	7241

Business Address (Street Number/Name)	Municipality	Province	Postal Code	Business E-mail Address
165 Shields Court	Markham	Ont	L3R 6V8	wrecords@stratagroup.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)	Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
905 940 7919	Kauffeldt, Kajsa	3935	Kajsa Kauffeldt	2016/11/28

Well owner's information package delivered: ☐ Yes ☐ No

Date Package Delivered: Y Y Y Y M M D D

Date Work Completed: 2016/11/25

Ministry Use Only

Audit No. Z238155

DEC 23 2016 Received

0506E (2014/11)

Ministry's Copy

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

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

Annular Space/Abandonment Sealing Record

Depth From	Depth To	Type of Sealant Used (Material and Type)	Volume 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

Abandoned-Other

Construction Record - Casing

Inside Diameter	Open Hole or material	Depth From	Depth To

Construction Record - Screen

Outside Diameter	Material	Depth From	Depth 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 From	Depth To	Type of Sealant Used (Material and Type)	Volume 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 Diameter	Open Hole or material	Depth From	Depth To
2 inch	PLASTIC	3 ft	40 ft

Construction Record - Screen

Outside Diameter	Material	Depth From	Depth 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	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	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 From	Depth To	Type of Sealant Used (Material and Type)	Volume Placed
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 Diameter	Open Hole or material	Depth From	Depth To
5.2 cm	PLASTIC	0 m	1.83 m

Construction Record - Screen

Outside Diameter	Material	Depth From	Depth 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	Depth To	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

PH3959 - 1 - PROPOSED SITE LAYOUT

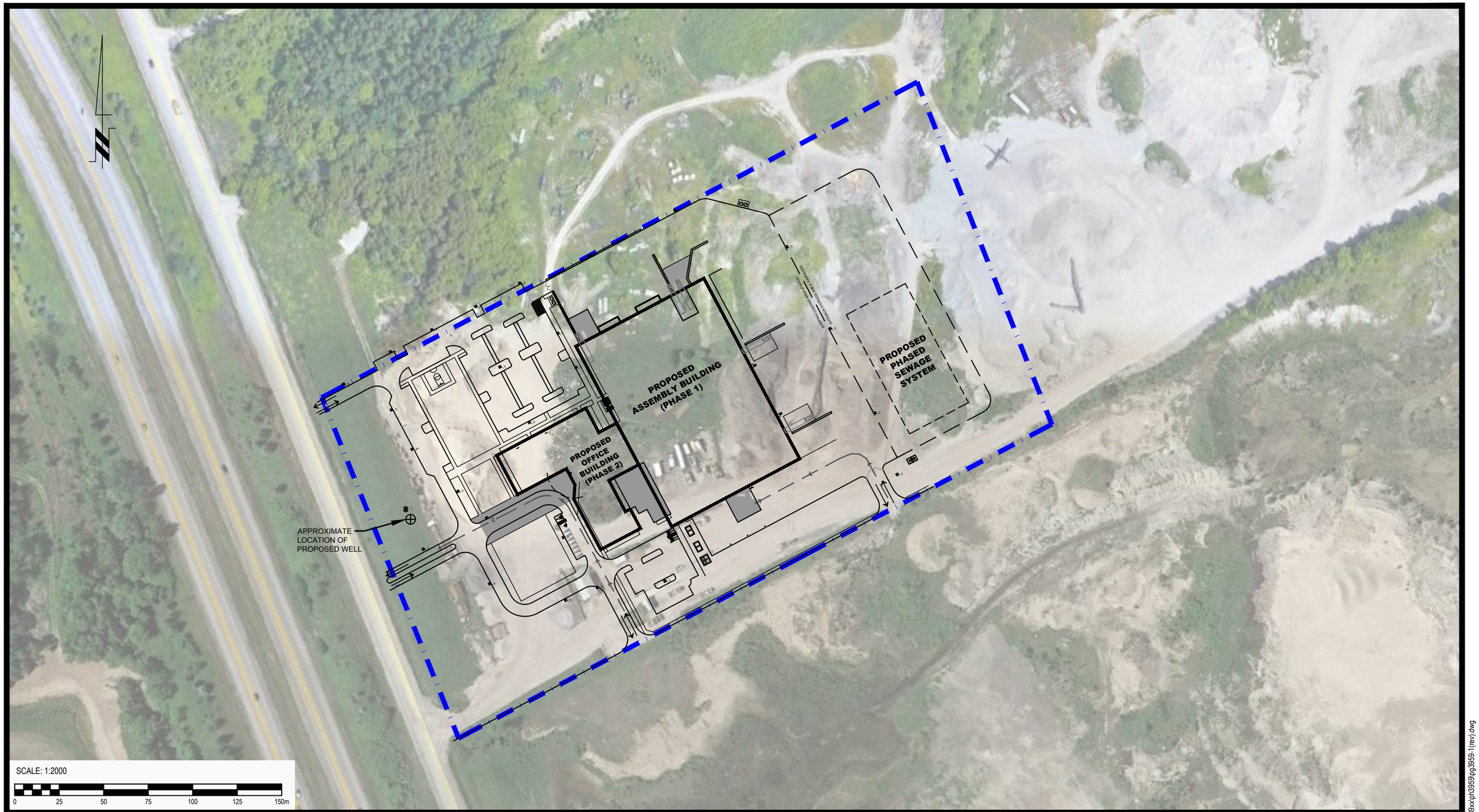
PH3959 - 2 - MECP WATER WELL LOCATION PLAN

PH3959 - 3 - ZONING DESIGNATIONS

PH3959 - 4 - SURFICIAL GEOLOGY

PH3959 - 5 - DRIFT THICKNESS

PH3959 - 6 - BEDROCK GEOLOGY



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Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL
0			

CAIVAN GREENBANK NORTH INC.

GROUNDWATER IMPACT ASSESSMENT
3713 BORRISOKANE - PROPOSED COMMERCIAL DEVELOPMENT
OTTAWA, ONTARIO

Title:
PROPOSED SITE LAYOUT

Scale: 1:2000	Date: 11/2019
Drawn by: RCG	Report No.: PH3959-1
Checked by: EA	PH3959-1
Approved by: MK	Revision No.:

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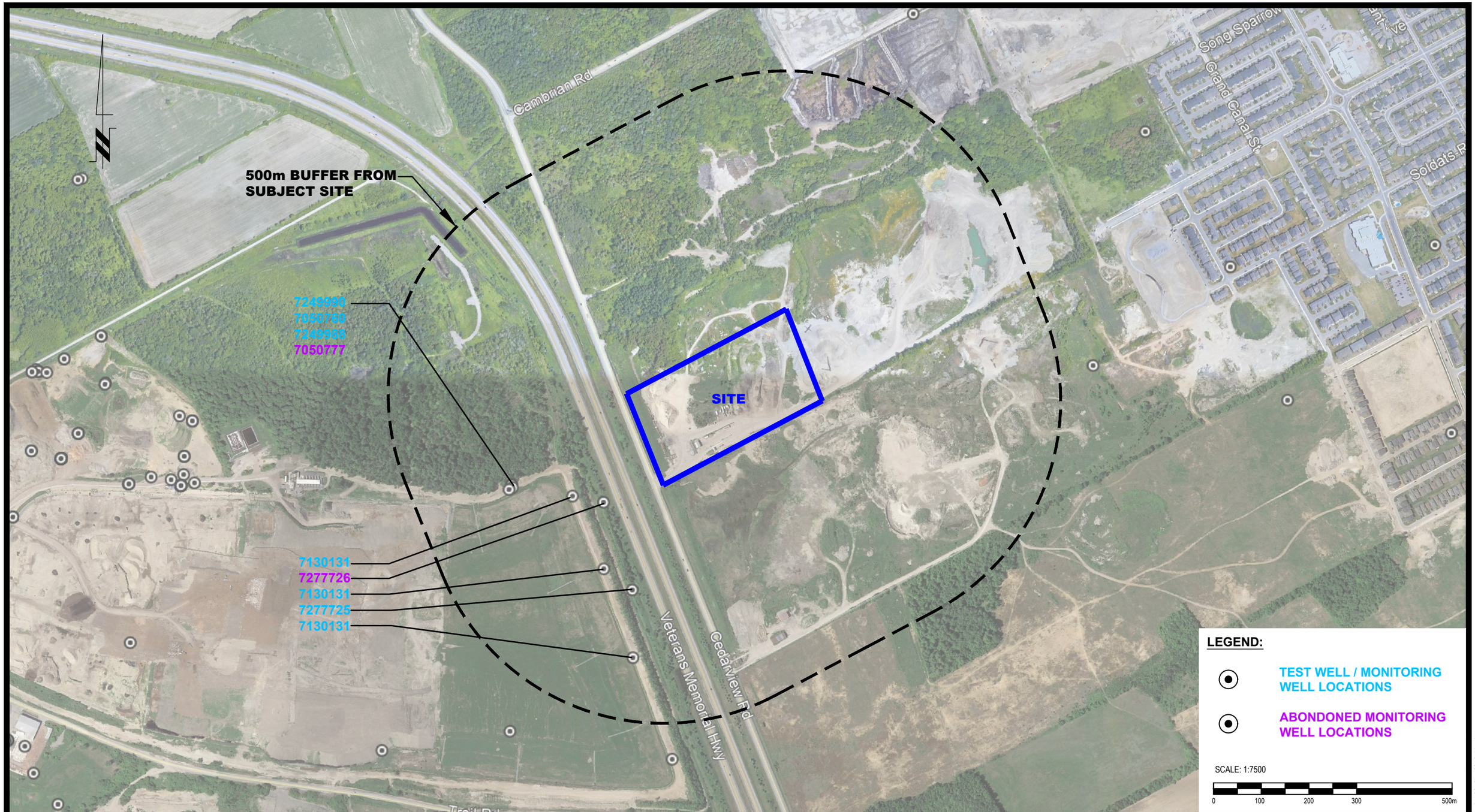

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NO.	REVISIONS	DATE	INITIAL
0			

CAIVAN GREENBANK NORTH INC.

GROUNDWATER IMPACT ASSESSMENT
3713 BORRISOKANE - PROPOSED COMMERCIAL DEVELOPMENT
OTTAWA, ONTARIO

Title:
MECP WATER WELL LOCATION PLAN

Scale: 1:7500	Date: 11/2019
Drawn by: RCG	Report No.: PH3959-1
Checked by: EA	**PH3959-2**
Approved by: MK	Revision No.:

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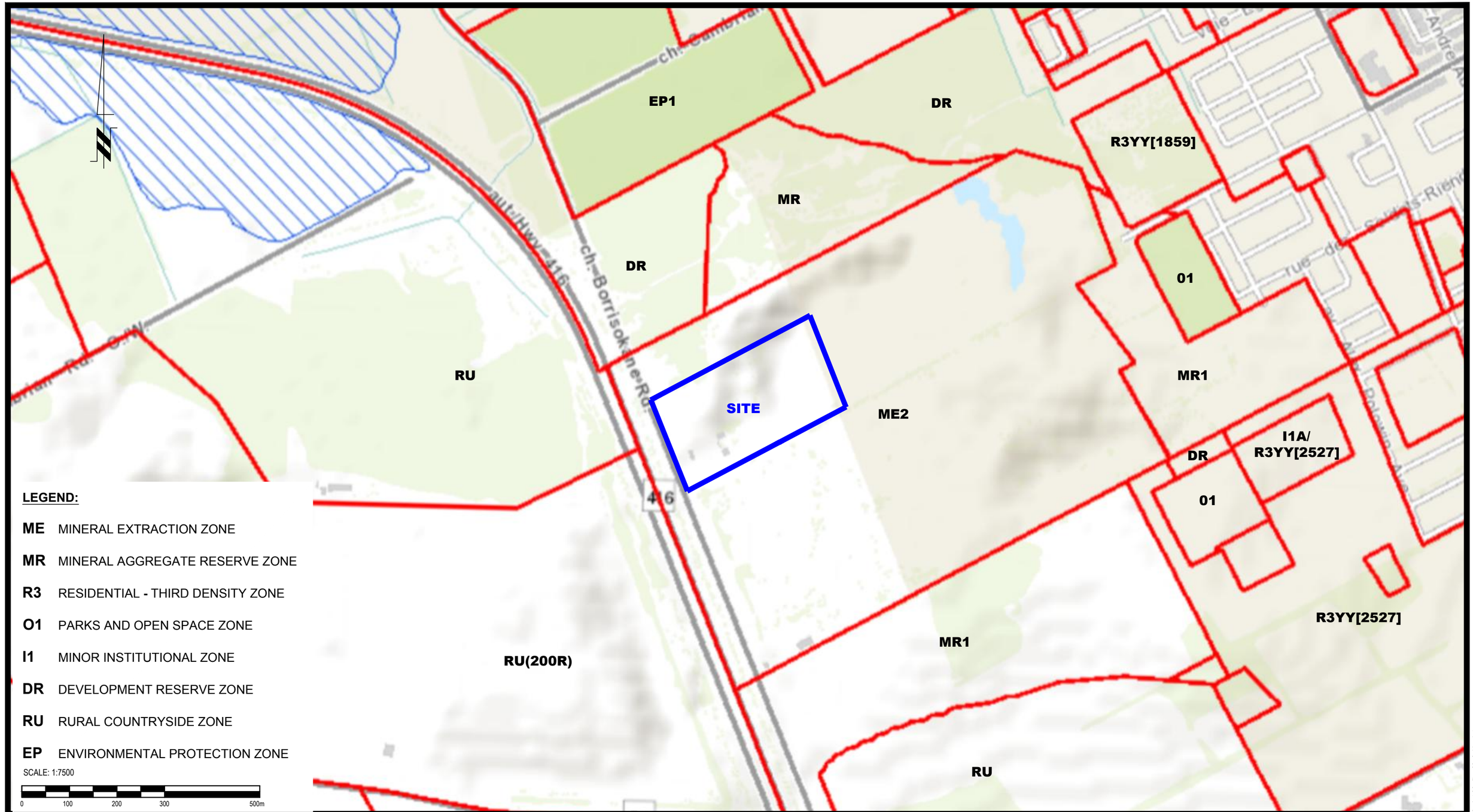

LEGEND:

ME MINERAL EXTRACTION ZONE

MR MINERAL AGGREGATE RESERVE ZONE

R3 RESIDENTIAL - THIRD DENSITY ZONE

O1 PARKS AND OPEN SPACE ZONE

I1 MINOR INSTITUTIONAL ZONE

DR DEVELOPMENT RESERVE ZONE

RU RURAL COUNTRYSIDE ZONE

EP ENVIRONMENTAL PROTECTION ZONE

SCALE: 1:7500

0 100 200 300 500m

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CAIVAN GREENBANK NORTH INC.

GROUNDWATER IMPACT ASSESSMENT
3713 BORRISOKANE - PROPOSED COMMERCIAL DEVELOPMENT
OTTAWA, ONTARIO

Title:
ZONING DESIGNATIONS

Scale: 1:7500	Date: 11/2019
Drawn by: RCG	Report No.: PH3959-1
Checked by: EA	PH3959-3
Approved by: MK	Revision No.:

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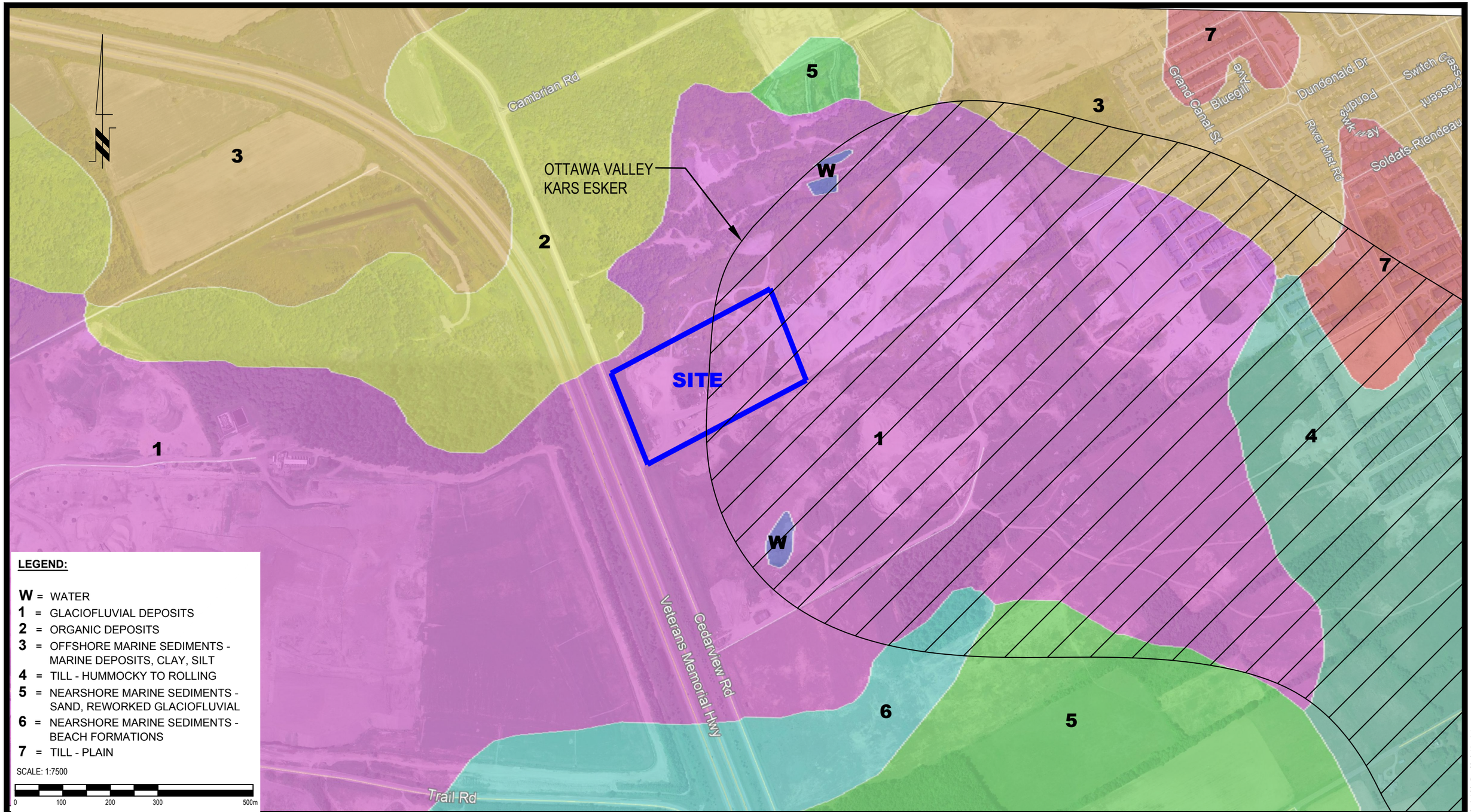

LEGEND:

- **W** = WATER
- **1** = GLACIOFLUVIAL DEPOSITS
- **2** = ORGANIC DEPOSITS
- **3** = OFFSHORE MARINE SEDIMENTS - MARINE DEPOSITS, CLAY, SILT
- **4** = TILL - HUMMOCKY TO ROLLING
- **5** = NEARSHORE MARINE SEDIMENTS - SAND, REWORKED GLACIOFLUVIAL
- **6** = NEARSHORE MARINE SEDIMENTS - BEACH FORMATIONS
- **7** = TILL - PLAIN

SCALE: 1:7500

0 100 200 300 500m

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NO.	REVISIONS	DATE	INITIAL
0			

CAIVAN GREENBANK NORTH INC.

GROUNDWATER IMPACT ASSESSMENT
3713 BORRISOKANE - PROPOSED COMMERCIAL DEVELOPMENT
OTTAWA, ONTARIO

Title:

SURFICIAL GEOLOGY

Scale: 1:7500	Date: 11/2019
Drawn by: RCG	Report No.: PH3959-1
Checked by: EA	**PH3959-4**
Approved by: MK	Revision No.:

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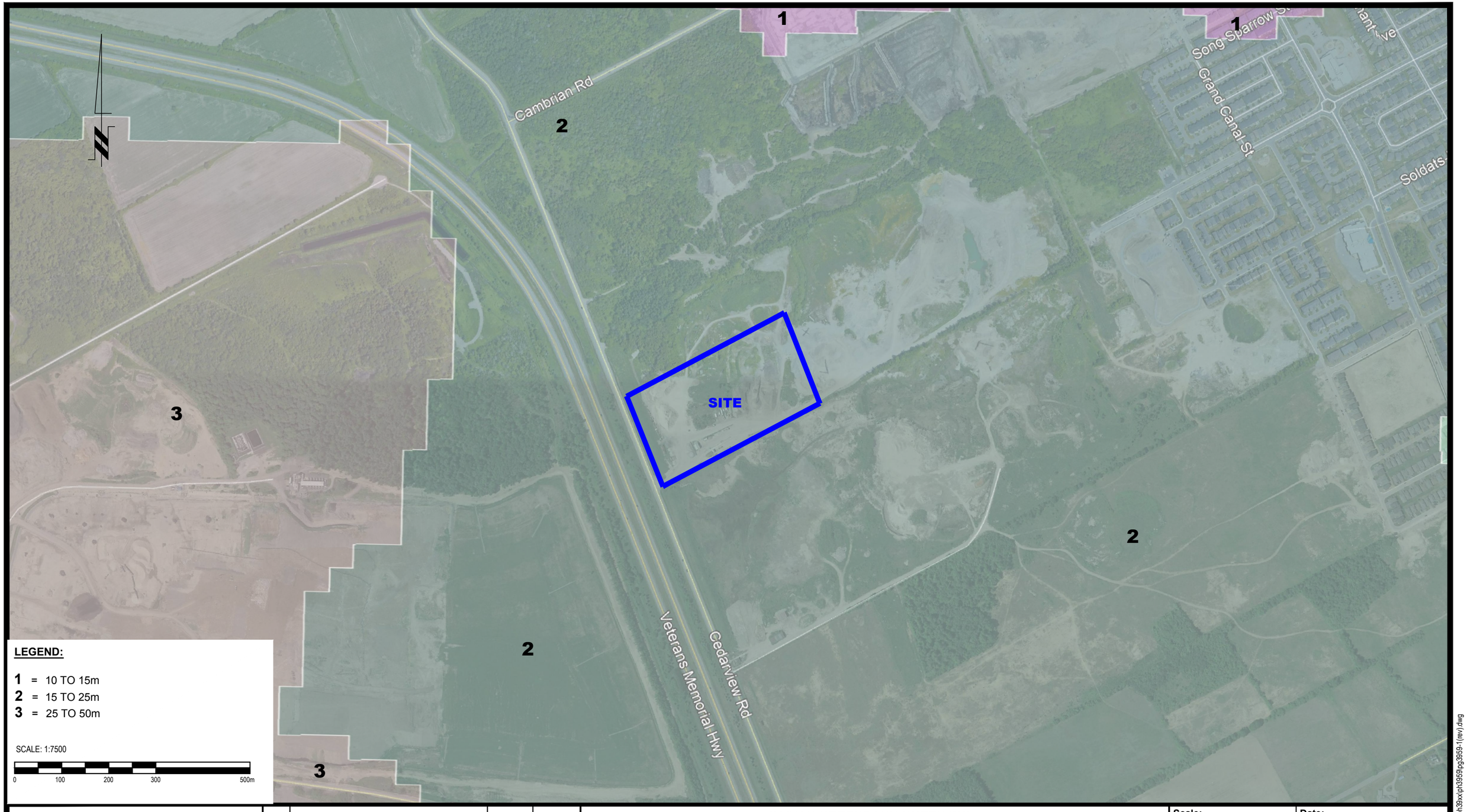

LEGEND:

1 = 10 TO 15m
2 = 15 TO 25m
3 = 25 TO 50m

SCALE: 1:7500

0 100 200 300 500m

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0			

CAIVAN GREENBANK NORTH INC.

GROUNDWATER IMPACT ASSESSMENT
3713 BORRISOKANE - PROPOSED COMMERCIAL DEVELOPMENT
OTTAWA, ONTARIO

Title:

DRIFT THICKNESS

Scale: 1:7500	Date: 11/2019
Drawn by: RCG	Report No.: PH3959-1
Checked by: EA	PH3959-5
Approved by: MK	Revision No.:

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NO.	REVISIONS	DATE	INITIAL
0			

CAIVAN GREENBANK NORTH INC.

GROUNDWATER IMPACT ASSESSMENT
3713 BORRISOKANE - PROPOSED COMMERCIAL DEVELOPMENT
OTTAWA, ONTARIO

Title:
BEDROCK GEOLOGY

Scale: 1:7500	Date: 11/2019
Drawn by: RCG	Report No.: PH3959-1
Checked by: EA	**PH3959-6**
Approved by: MK	Revision No.:

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APPENDIX 3

PG5016 - 1 - SOIL PROFILE AND TEST DATA

PG5155 - 1 - SOIL PROFILE AND TEST DATA

PG5155 - 1 - TEST HOLE LOCATION PLAN

GRAIN SIZE DISTRIBUTION SHEETS

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
3713 Borrisokane Road
Ottawa, Ontario

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

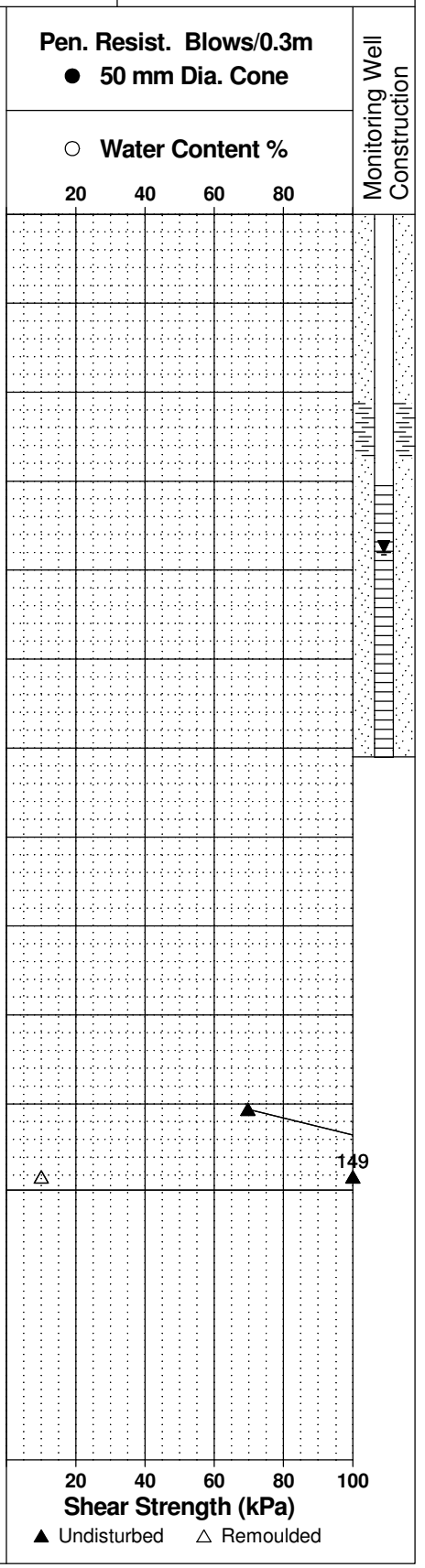
FILE NO. PG5016

REMARKS

HOLE NO. BH 6

BORINGS BY CME 55 Power Auger **DATE** 2019 July 23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	103.89
TOPSOIL 0.30		AU	1				
FILL: Brown silty clay, some sand and gravel		SS	2	71	12	1	102.89
		SS	3	38	10	2	101.89
2.30							
FILL: Brown sand, some gravel, trace cobbles and boulders		SS	4	29	6	3	100.89
		SS	6	12	12		
3.66							
Compact to loose, brown **SILTY SAND,** some gravel		SS	7	71	22	4	99.89
		SS	8	100	10	5	98.89
		SS	9	100	12	6	97.89
		SS	10	100	5		
		SS	11	33	3	7	96.89
7.87							
Stiff to very stiff, grey **SILTY CLAY/CLAYEY SILT,** some sand, trace gravel		SS	12	100	1	8	95.89
		SS	13	100	1	9	94.89
		SS	14	100	1	10	93.89
10.97							
End of Borehole							
(GWL @ 3.80m - July 24, 2019)							



Monitoring Well Construction

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
3713 Borrisokane Road
Ottawa, Ontario

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

FILE NO. PG5016

REMARKS

HOLE NO. BH 7

BORINGS BY CME 55 Power Auger **DATE** 2019 July 23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	103.77
FILL: Brown silty sand and gravel		AU	1				
1.07		SS	2	0	9	1	102.77
		SS	3	62	13	2	101.77
		SS	4	62	14	3	100.77
Compact to dense, brown **SILTY SAND**		SS	5	54	22		
		SS	5	96	23	4	99.77
		SS	7	71	24	5	98.77
		SS	8	100	27	6	97.77
6.70		SS	9	100	38		
End of Borehole							
(GWL @ 3.66m - July 24, 2019)							

Pen. Resist. Blows/0.3m
● **50 mm Dia. Cone**
○ **Water Content %**
20 40 60 80

Monitoring Well Construction

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
3713 Borrisokane Road
Ottawa, Ontario

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

FILE NO. PG5016

REMARKS

HOLE NO. BH 8

BORINGS BY CME 55 Power Auger **DATE** 2019 July 23

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	100.95
		AU	1				
FILL: Brown sand, some gravel		SS	2	62	15	1	99.95
1.93		SS	3	100	3	2	98.95
Brown **SANDY SILT/SILT,** trace clay							
2.49		SS	4	100	2	3	97.95
Stiff, grey **SILTY CLAY/CLAYEY SILT,** trace sand						4	96.95
						5	95.95
6.10						6	94.95
		SS	5	100	5		
Loose to compact, brown **SILTY SAND**						7	93.95
8.23		SS	6	100	11	8	92.95
End of Borehole							
(GWL @ 5.08m - July 24, 2019)							

Pen. Resist. Blows/0.3m
● **50 mm Dia. Cone**
○ **Water Content %**

20 40 60 80

Piezometer Construction

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
3713 Borrisokane Road
Ottawa, Ontario

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

FILE NO. PG5016

REMARKS

HOLE NO. TP 9

BORINGS BY Excavator **DATE** 2019 July 26

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	104.06		
FILL: Brown silty sand, some gravel, organics, trace cobbles, boulders, metal pieces		G	1			1	103.06		
1.40									
FILL: Brown silty clay with sand, gravel, some cobbles, boulders		G	2			2	102.06		
						3	101.06		
						4	100.06		
4.80									
Brown **SAND,** some gravel		G	3			5	99.06		
5.20									
End of Test Pit									
(Groundwater infiltration at 2.9m depth)									

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
3713 Borrisokane Road
Ottawa, Ontario

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

FILE NO. PG5016

REMARKS

HOLE NO. TP10

BORINGS BY Excavator **DATE** 2019 July 26

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	106.58		
FILL: Brown sand with gravel, cobbles and boulders		G	1						
0.70						1	105.58		
FILL: Brown silty sand with gravel, trace cobbles and boulders		G	2			2	104.58		
3.30						3	103.58		
FILL: Brown silty clay, trace sand and gravel		G	3			4	102.58		
6.20						5	101.58		
FILL: Brown sand, some gravel, trace cobbles and boulders		G	4			6	100.58		
7.10						7	99.58		
End of Test Pit									
(TP dry upon completion)									

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
3713 Borrisokane Road
Ottawa, Ontario

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

FILE NO. PG5016

REMARKS

HOLE NO. TP11

BORINGS BY Excavator **DATE** 2019 July 26

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	105.18		
FILL: Brown sand with gravel, trace cobbles and boulders		G	1						
0.60						1	104.18		
FILL: Brown sand with gravel		G	2			2	103.18		
						3	102.18		
4.40		G	3			4	101.18		
Brown **SAND,** some gravel						5	100.18		
						6	99.18		
6.30		G	4						
End of Test Pit									
(TP dry upon completion)									

Pen. Resist. Blows/0.3m: ● 50 mm Dia. Cone; ○ Water Content %
20 40 60 80

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
3713 Borrisokane Road
Ottawa, Ontario

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

FILE NO. PG5016

REMARKS

HOLE NO. TP12

BORINGS BY Excavator **DATE** 2019 July 26

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	103.85		
		G	1			1	102.85		
Brown **SAND** some gravel, trace to some cobbles and boulders						2	101.85		
		G	2			3	100.85		
						4	99.85		
5.00									
GLACIAL TILL: Brown clayey silt with sand and gravel 5.20		G	3			5	98.85		
End of Test Pit									
(Groundwater infiltration at 4.7m depth)									

Pen. Resist. Blows/0.3m: ● 50 mm Dia. Cone; ○ Water Content %

20 40 60 80

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
3713 Borrisokane Road
Ottawa, Ontario

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

FILE NO. PG5016

REMARKS

HOLE NO. TP13

BORINGS BY Excavator **DATE** 2019 July 26

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	104.50		
FILL: Dark brown to brown sand with gravel, some cobbles and boulders		G	1			1	103.50		
		G	2			2	102.50		
		G	3			3	101.50		
						4	100.50		
4.80									
Brown **SAND,** trace gravel		G	4			5	99.50		
5.60									
End of Test Pit (Groundwater infiltration at 4.8m depth)									

20 40 60 80

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
3713 Borrisokane Road
Ottawa, Ontario

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

FILE NO. PG5016

REMARKS

HOLE NO. TP14

BORINGS BY Excavator **DATE** 2019 July 26

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	100.63		
FILL: Brown sand		G	1						
0.50									
FILL: Brown silty sand, some clay and gravel, trace cobbles and boulders		G	2			1	99.63		
1.60									
Brown **SAND,** trace gravel		G	3			2	98.63		
2.80									
Grey **SILTY CLAY**		G	4			3	97.63		
						4	96.63		
4.60									
End of Test Pit									
(Groundwater infiltration at 1.8m depth)									

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

Geotechnical Investigation
3713 Borrisokane Road
Ottawa, Ontario

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

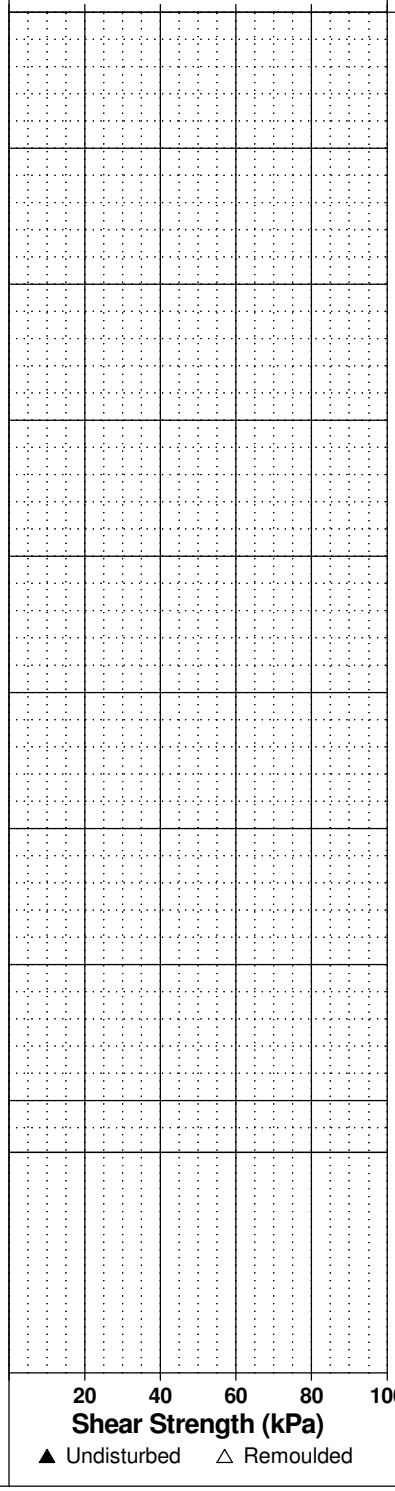
FILE NO. PG5016

REMARKS

HOLE NO. TP25

BORINGS BY Excavator **DATE** 2019 September 17

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	106.40		
FILL: Brown silty sand, trace organics, concrete and building mat		G	1			1	105.40		
3.81						2	104.40		
FILL: Brown silty sand with clay, cobbles and boulders		G	2			3	103.40		
						4	102.40		
						5	101.40		
						6	100.40		
						7	99.40		
8.18						8	98.40		
Stiff, grey **SILTY CLAY** 8.38		G	3						▽
End of Test Pit									
(GWL @ 8.2m depth based on field observations)									



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SOIL PROFILE AND TEST DATA

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

DATUM Geodetic

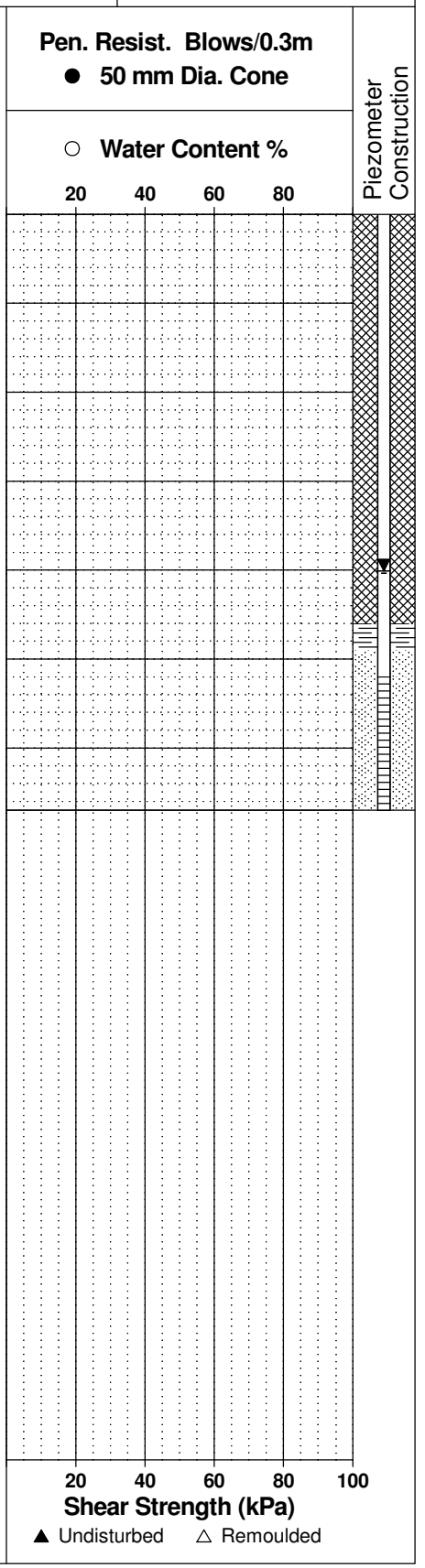
FILE NO. PG5155

REMARKS

HOLE NO. BH 9-19

BORINGS BY CME 55 Power Auger **DATE** 2019 November 14

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	104.25
		AU	1				
FILL: Brown silty clay with sand and gravel, trace asphalt and organics		SS	2	79	29	1	103.25
		SS	3	50	65	2	102.25
		SS	4	46	7		
2.97						3	101.25
FILL: Brown sand with gravel, trace clay		SS	5	17	5		
		SS	6	25	5	4	100.25
4.50							
		SS	7	38	3	5	99.25
FILL: Brown silty clay, some sand, gravel, trace organics		SS	8	75	5		
		SS	9	58	9	6	98.25
6.70							
End of Borehole							
(GWL @ 4.01m - Nov. 29, 219)							



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SOIL PROFILE AND TEST DATA

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

DATUM Geodetic

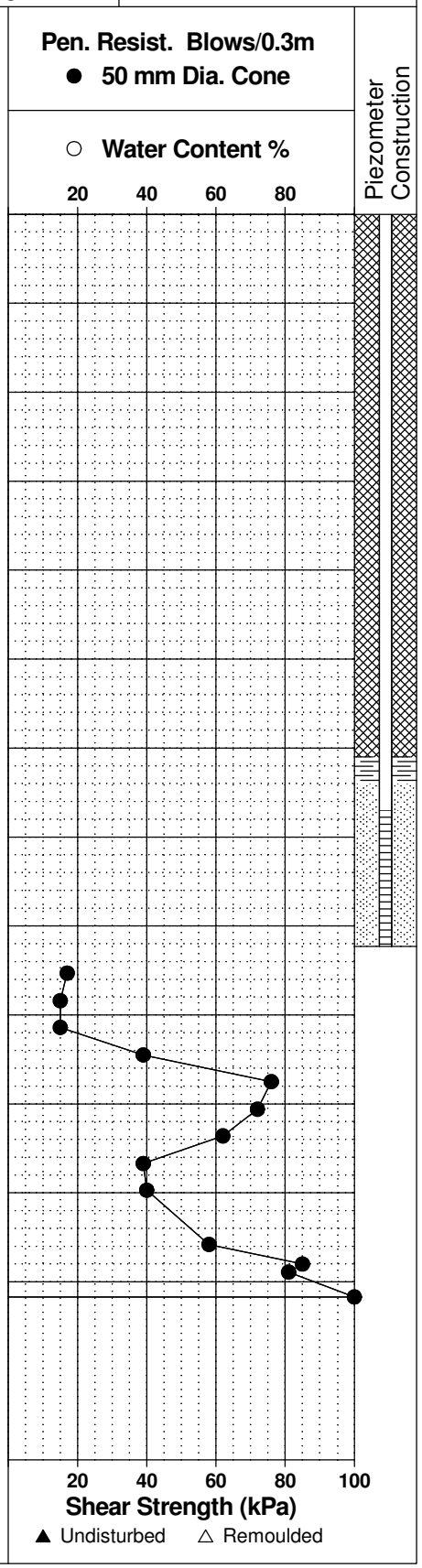
FILE NO. PG5155

REMARKS

HOLE NO. BH10-19

BORINGS BY CME 55 Power Auger **DATE** 2019 November 13

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	104.36
FILL: Brown silty sand with gravel		AU		1			
		SS	2	50	20	1	103.36
1.45							
		SS	3	58	27	2	102.36
FILL: Brown sand, some gravel, trace clay, asphalt and cobbles		SS	4	46	13		
		SS	5	58	18	3	101.36
		SS	6	29	14	4	100.36
4.50							
		SS	7	33	5	5	99.36
		SS	8	42	19		
FILL: Brown silty clay, some sand and gravel, trace asphalt and organics		SS	9	50	5	6	98.36
		SS	10	38	5	7	97.36
		SS	11	58	11	8	96.36
8.23							
Dynamic Cone Penetration Test commenced at 8.23m depth.						9	95.36
						10	94.36
						11	93.36
12.17						12	92.36
End of Borehole Practical DCPT refusal at 12.17m depth (Piezometer dry/blocked at 4.58m depth - Nov. 29, 2019)							



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SOIL PROFILE AND TEST DATA

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

DATUM Geodetic

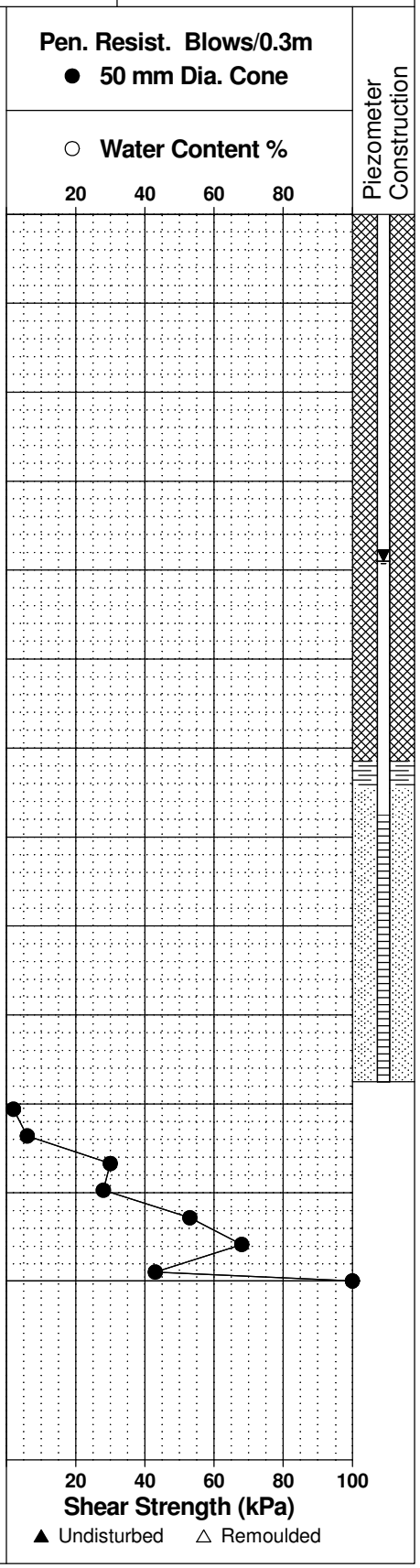
REMARKS

BORINGS BY CME 55 Power Auger **DATE** 2019 November 14

FILE NO. PG5155

HOLE NO. BH11-19

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	104.17
FILL: Brown sand with gravel and cobbles, trace clay and organics		AU	1				
0.69							
FILL: Brown silty clay, some sand, gravel and organics		SS	2	54	31	1	103.17
1.45							
FILL: Brown sand, some gravel, trace clay, gravel, organics and asphalt		SS	3	46	14	2	102.17
		SS	4	29	13		
2.97						3	101.17
FILL: Brown silty clay, some sand and gravel, trace organics and asphalt		SS	5	29	7	4	100.17
		SS	6	62	8		
		SS	7	33	10	5	99.17
		SS	8	58	11		
6.01						6	98.17
FILL: Brown silty sand, some clay and gravel, trace asphalt and construction debris		SS	9	42	12		
		SS	10	0	10	7	97.17
		SS	11	8	12	8	96.17
8.30							
Brown **SILTY CLAY to SILTY SAND,** some gravel, trace organics		SS	12	71	4	9	95.17
		SS	13	75	2		
9.75						10	94.17
Dyanmic Cone Penetration Test commenced at 9.75m depth.						11	93.17
11.99							
End of Borehole							
Practical DCPT refusal at 11.99m depth.							
(GWL @ 3.90m - Nov. 29, 219)							



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SOIL PROFILE AND TEST DATA

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

DATUM Geodetic

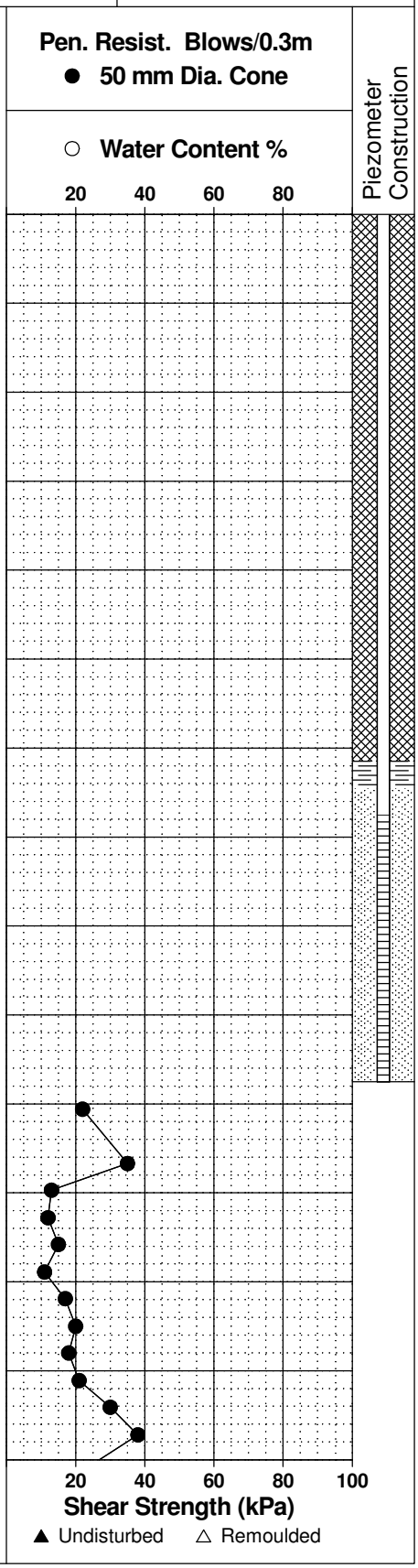
FILE NO. PG5155

REMARKS

HOLE NO. BH12-19

BORINGS BY CME 55 Power Auger **DATE** 2019 November 14

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	105.09
FILL: Brown sand, trace gravel and organics (0.69)		AU	1				
FILL: Brown silty clay, some sand and gravel, trace organics and asphalt		SS	2	46	7	1	104.09
(2.21)		SS	3	12	13	2	103.09
		SS	4	21	20		
		SS	5	79	14	3	102.09
FILL: Brown sand with gravel, trace clay and organics		SS	6	88	31	4	101.09
(5.26)		SS	7	33	36	5	100.09
		SS	8	83	7		
FILL: Brown silty clay, some to trace sand and gravel		SS	9	100	2	6	99.09
- 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)		SS	13	62	4	10	95.09
Dynamic Cone Penetration Test commenced at 9.75m depth.						11	94.09
						12	93.09
						13	92.09
						14	91.09



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SOIL PROFILE AND TEST DATA

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

DATUM Geodetic

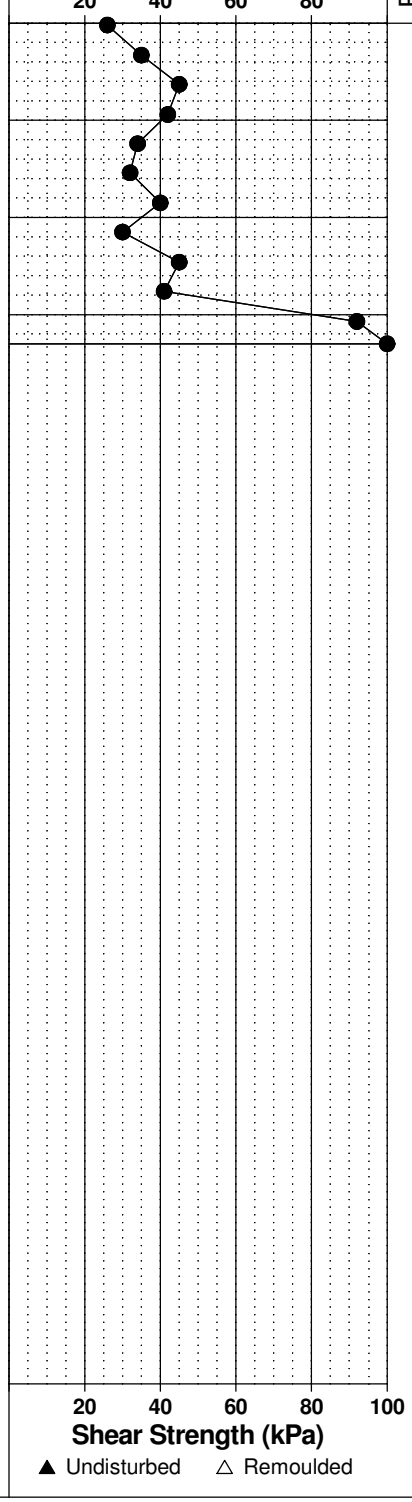
FILE NO. PG5155

REMARKS

HOLE NO. BH12-19

BORINGS BY CME 55 Power Auger **DATE** 2019 November 14

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0			
						14	91.09		
						15	90.09		
						16	89.09		
						17	88.09		
17.30									
End of Borehole									
Practical DCPT refusal at 17.30m depth.									
(Piezometer dry/blocked at 2.84m depth - Nov. 29, 2019)									



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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. BH13-19

BORINGS BY CME 55 Power Auger **DATE** 2019 November 15

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	105.43
		AU	1				
		SS	2	42	24	1	104.43
		SS	3	54	15	2	103.43
FILL: Brown and, some gravel, trace clay, organics and asphalt		SS	4	75	22	3	102.43
		SS	5	75	48		
		SS	6	54	33	4	101.43
		SS	7	29	16	5	100.43
5.26							
Brown/black **SILTY CLAY,** trace sand		SS	8	100	2	6	99.43
		SS	9	100	2		
6.70							
End of Borehole							
(Piezometer dry/blocked at 5.04m depth - Nov. 29, 2019)							

Pen. Resist. Blows/0.3m
● **50 mm Dia. Cone**
○ **Water Content %**

20 40 60 80

Piezometer Construction

20 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. BH14-19

BORINGS BY CME 55 Power Auger **DATE** 2019 January 15

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	104.42
FILL: Brown sand, some gravel, some to trace clay		AU	1				
		SS	2	58	50	1	103.42
1.45							
		SS	3	96	13	2	102.42
		SS	4	54	6		
FILL: Brown silty clay with sand and gravel, trace organics		SS	5	42	4	3	101.42
		SS	6	54	4	4	100.42
		SS	7	46	2	5	99.42
6.02		SS	8	25	3		
		SS	9	50	15	6	98.42
FILL: Brown sand with clay, some gravel, trace organics		SS	10	0	13	7	97.42
7.54							
FILL: Brown silty clay with sand, some gravel and organics		SS	11	54	15	8	96.42
8.41							
FILL: Brown sand with gravel		SS	12	25	7	9	95.42
9.07							
Brown **SILTY CLAY** with sand, trace gravel		SS	13	21	8		
		SS	14		13	10	94.42
10.59							
		SS	15	654	14	11	93.42
Compact to dense, brown **SAND**		SS	16	79	37		
						12	92.42
- some silt by 12.1m depth		SS	17	62	40		
						13	91.42
- trace clay by 13.6m depth		SS	18	71	42		
						14	90.42

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone
○ Water Content %
20 40 60 80

Piezometer Construction

20 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. BH14-19

BORINGS BY CME 55 Power Auger **DATE** 2019 January 15

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE									
14.40		SS	19	83	30	14	90.42		
Grey **SILTY CLAY,** trace sand and gravel		SS	20	75	9	15	89.42		
		SS	21	88	3	16	88.42		
		SS	22	96	5				
		SS	23	100	7	17	87.42		
		SS	24	100	6	18	86.42		
		SS	25	100	7	19	85.42		
		SS	26	100	6	20	84.42		
21.54		SS	27	0	50+	21	83.42		
Dense to very dense, grey **SANDY SILT**		SS	28	54	48	22	82.42		
23.93						23	81.42		
Very dense, brown **SAND,** some silt, trace clay and gravel		SS	29	75	54	24	80.42		
25.45						25	79.42		
Very dense, grey **SILT,** some sand		SS	30	42	51	26	78.42		
26.97						27	77.42		
GLACIAL TILL: Very dense, grey sand, some clay, gravel, cobbles and boulders		SS	31	50	61	28	76.42		

Pen. Resist. Blows/0.3m: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

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

DATUM Geodetic

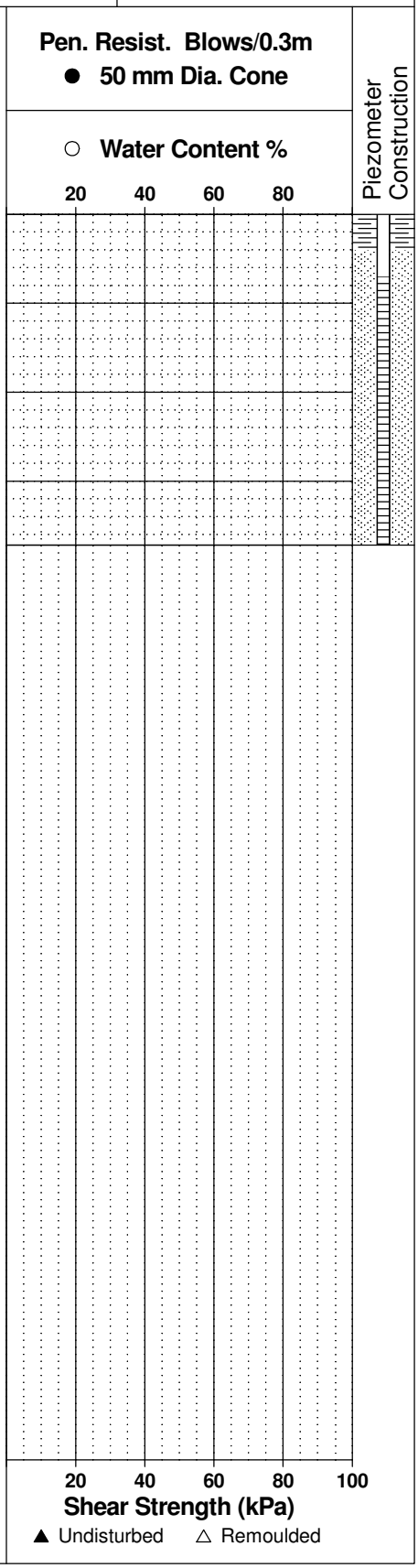
FILE NO. PG5155

REMARKS

HOLE NO. BH14-19

BORINGS BY CME 55 Power Auger **DATE** 2019 January 15

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE									
		SS	32	50	50+	28	76.42		
GLACIAL TILL: Very dense, grey sand, some clay, gravel, cobbles and boulders		RC	1	100		29	75.42		
		RC	2	27		30	74.42		
31.72						31	73.42		
End of Borehole									
(Piezometer dry/blocked at 2.07m depth - Nov. 29, 2019)									



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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. BH15-19

BORINGS BY CME 55 Power Auger **DATE** 2019 November 15

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE									
TOPSOIL 0.18		AU	1			0	105.02		
FILL: Brown sand, some gravel, trace silty clay		SS	2	29	12	1	104.02		
1.45		SS	3	44	50+	2	103.02		
FILL: Brown silty clay, some sand and gravel, trace organcis		G	4			3	102.02		
2.97		SS	5	100	11	4	101.02		
FILL: Brown silty sand, some sand		SS	6	100	2	5	100.02		
4.50		SS	7	79	40	6	99.02		
FILL: Brown sand		SS	8	71	31				
- trace gravel by 6.0m depth		SS	9	67	29				
6.70									
End of Borehole									

20 40 60 80

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

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

DATUM Geodetic

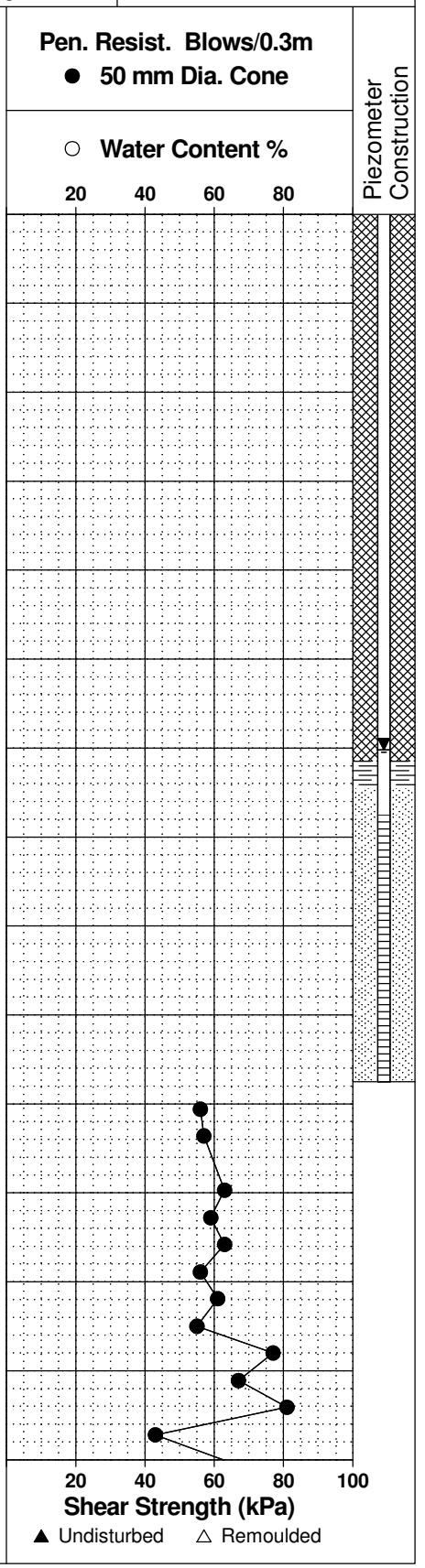
FILE NO. PG5155

REMARKS

HOLE NO. BH16-19

BORINGS BY CME 55 Power Auger **DATE** 2019 November 18

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	105.31
TOPSOIL 0.15		AU	1				
FILL: Brown silty clay with sand and gravel 0.69		SS	2	79	42	1	104.31
FILL: Brown and, some clay and gravel, trace organics		SS	3	54	15	2	103.31
2.21							
FILL: Brown silty clay with sand, some gravel, trace organics, asphalt		SS	4	71	5	3	102.31
2.97							
FILL: Brown sand, some clay and gravel, trace organics		SS	5	58	21		
3.73						4	101.31
FILL: Brown silty clay with sand, trace gravel		SS	6	67	11		
4.50							
Brown **SILTY CLAY,** some sand, trace gravel		SS	7	96	14	5	100.31
		SS	8	100	4		
6.02						6	99.31
		SS	9	75	19		
		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		
						9	96.31
		SS	13	0	13		
9.75						10	95.31
Dynamic Cone Penetration Test commenced at 9.75m depth.						11	94.31
						12	93.31
						13	92.31
						14	91.31



Piezometer Construction

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

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

DATUM Geodetic

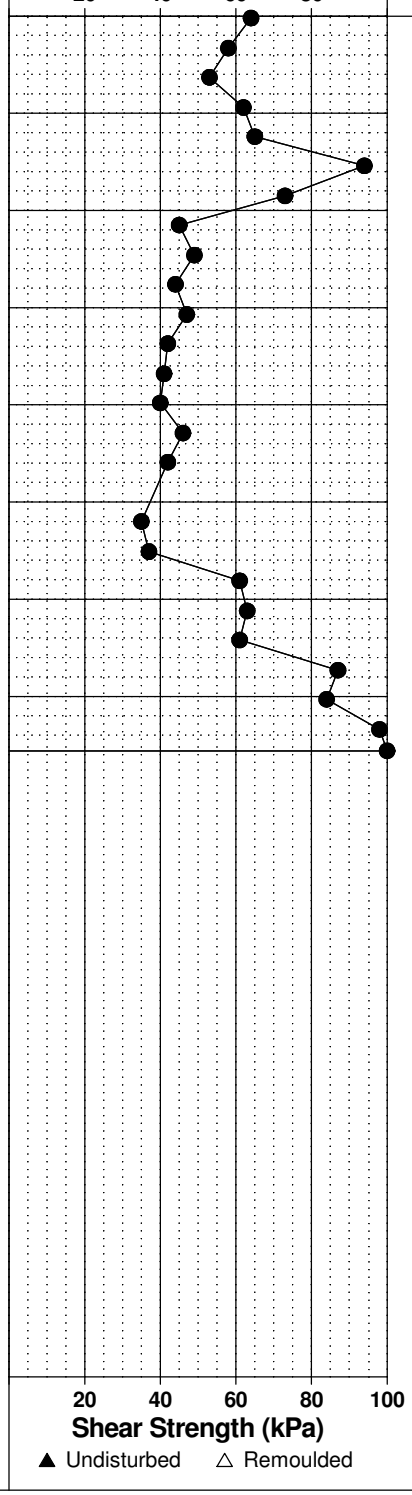
FILE NO. PG5155

REMARKS

HOLE NO. BH16-19

BORINGS BY CME 55 Power Auger **DATE** 2019 November 18

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						14	91.31		
						15	90.31		
						16	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

FILE NO. PG5155

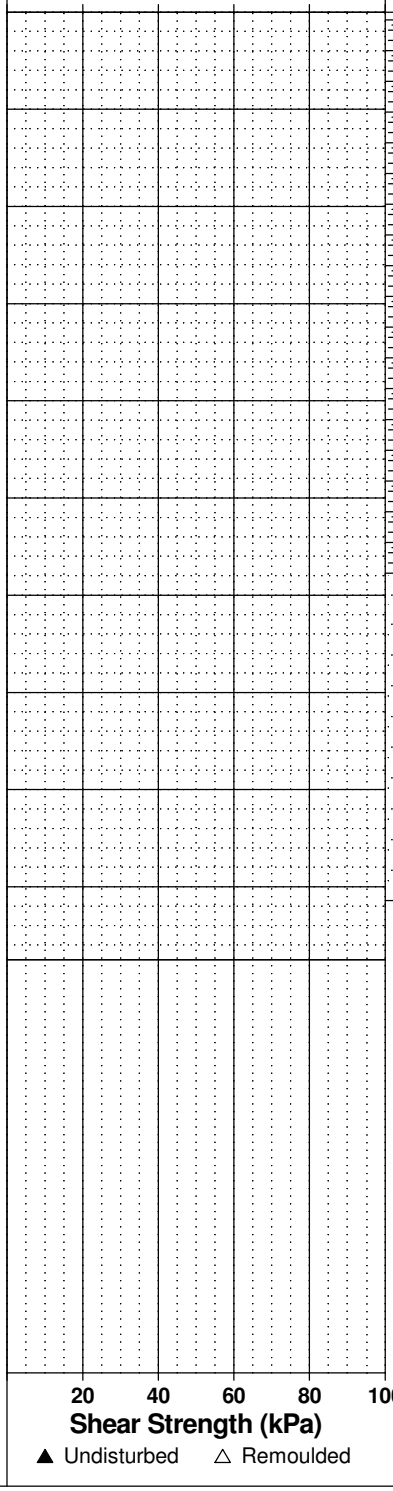
REMARKS

HOLE NO. BH17-19

BORINGS BY CME 55 Power Auger **DATE** 2019 November 19

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	105.30
FILL: Brown silty sand with gravel and cobbles, trace brick and organics		AU	1				
1.07						1	104.30
FILL: Brown sand with gravel, trace cobbles		SS	2	46	17	2	103.30
2.59							
FILL: Brown silty clay, some sand and gravel		SS	3	96	9	3	102.30
4.11						4	101.30
		SS	4	58	20	5	100.30
		SS	5	67	22		
Compact, brown **SAND,** trace gravel		SS	6	50	19	6	99.30
		SS	7	54	13	7	98.30
		SS	8	67	14	8	97.30
		SS	9	75	4	9	96.30
		SS	10	100	11		
9.75							
End of Borehole							
(GWL @ 6.73m - Nov. 29, 219)							

Pen. Resist. Blows/0.3m
● **50 mm Dia. Cone**
○ **Water Content %**



Monitoring Well Construction

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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. BH18-19

BORINGS BY CME 55 Power Auger **DATE** 2019 November 19

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	103.24
FILL: Brown silty sand, some gravel, trace organics		AU	1				
1.45						1	102.24
FILL: Brown silty clay, some sand and gravel, trace organics		SS	2	54	6	2	101.24
2.59							
		SS	3	88	11	3	100.24
Compact to loose, brown **SAND,** trace gravel						4	99.24
		SS	4	58	9	5	98.24
5.26							
		SS	5	88	12	6	97.24
		SS	6	54	12		
Grey **SILTY CLAY,** some sand		SS	7	48	16	7	96.24
		SS	8	96	1	8	95.24
		SS	9	96	1		
9.07						9	94.24
		SS	10	96	2		
Very loose, grey **SAND,** trace clay		SS	11	92	2	10	93.24
10.67							
End of Borehole							
(GWL @ 4.03m - Nov. 29, 219)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone
○ Water Content %

20 40 60 80

Piezometer Construction

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

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

DATUM Geodetic

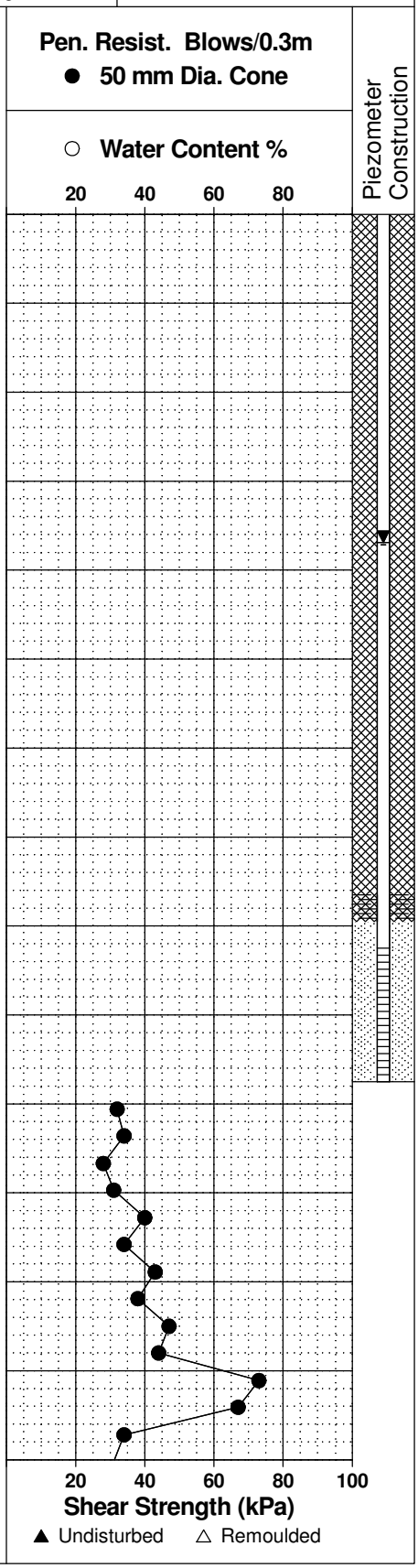
FILE NO. PG5155

REMARKS

HOLE NO. BH19-19

BORINGS BY CME 55 Power Auger **DATE** 2019 November 19

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	104.14
FILL: Brown silty sand, some gravel, trace organics 0.51		AU	1				
FILL: Brown silty clay, some sand and gravel 1.45		SS	2	47	50+	1	103.14
FILL: Brown sand with silty clay, some gravel, trace organics		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
6.02		SS	8	42	6	6	98.14
FILL: Brown sand, some organics and gravel 6.78		SS	9	88	21		
Loose to compact, brown **SAND,** trace gravel		SS	10	83	4	7	97.14
		SS	11	46	16	8	96.14
		SS	12	38	21	9	95.14
9.75		SS	13	54	18		
Dynamic Cone Penetration Test commenced at 9.75m depth.						10	94.14
						11	93.14
						12	92.14
						13	91.14
						14	90.14



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SOIL PROFILE AND TEST DATA

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

DATUM Geodetic

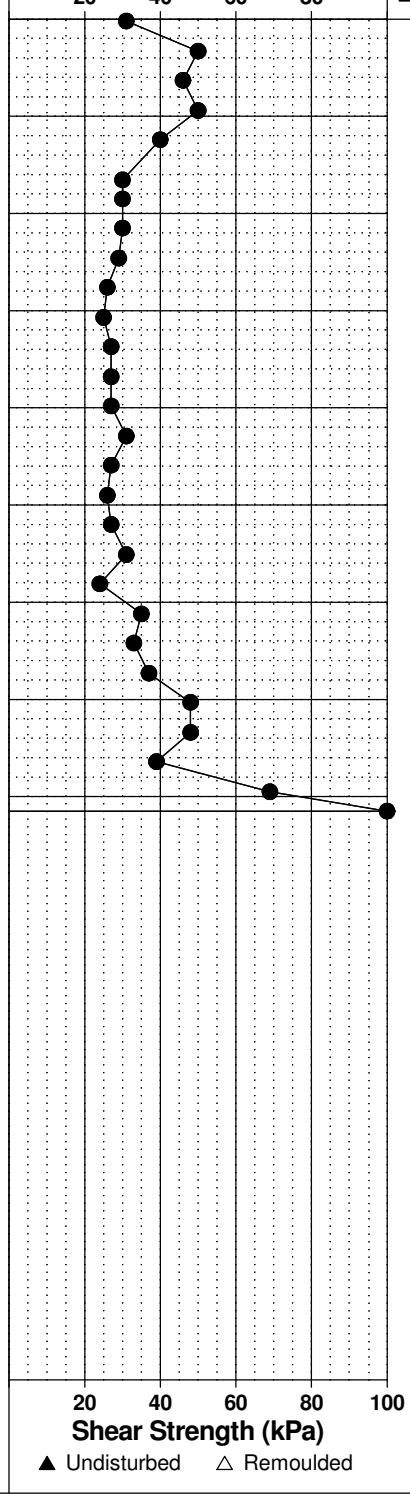
FILE NO. PG5155

REMARKS

HOLE NO. BH19-19

BORINGS BY CME 55 Power Auger **DATE** 2019 November 19

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						14	90.14		
						15	89.14		
						16	88.14		
						17	87.14		
						18	86.14		
						19	85.14		
						20	84.14		
						21	83.14		
22.15						22	82.14		
End of Borehole Practical DCPT refusal at 22.15m depth. (GWL @ 3.69m - Nov. 29, 219)									



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SOIL PROFILE AND TEST DATA

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

DATUM Geodetic

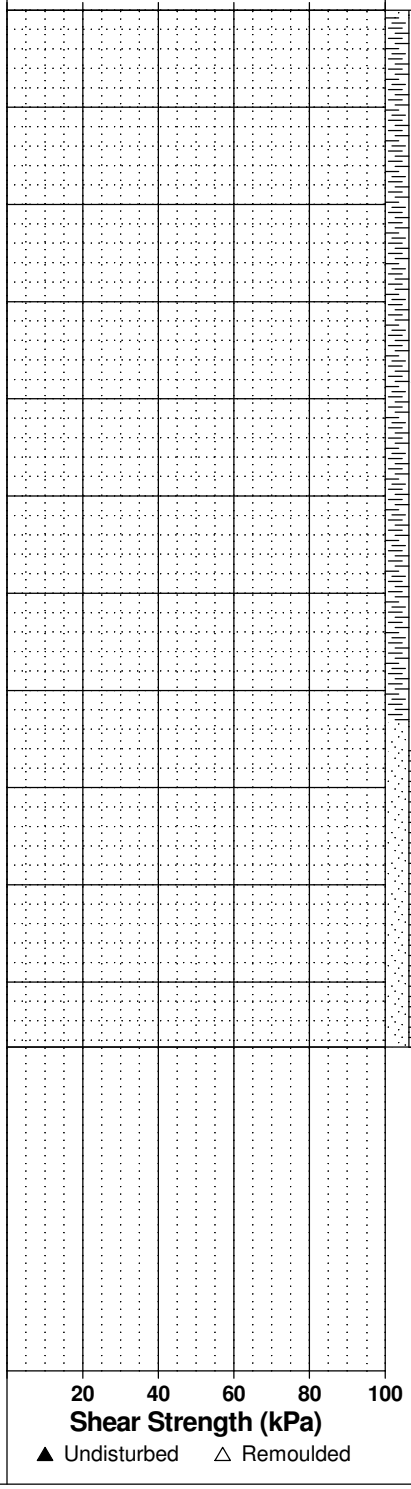
FILE NO. PG5155

REMARKS

HOLE NO. BH20-19

BORINGS BY CME 55 Power Auger **DATE** 2019 November 19

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Monitoring Well Construction
GROUND SURFACE						0	100.24		
FILL: Brown silty sand, trace gravel and organics		AU	1			1	99.24		
		SS	2	42	12	2	98.24		
2.59									
		SS	3	58	5	3	97.24		
FILL: Brown sand, trace gravel		SS	4	79	7	4	96.24		
		SS	5	54	15	5	95.24		
6.02						6	94.24		
Compact, brown **SAND,** trace gravel and clay seams		SS	6	58	19				
		SS	7	54	12	7	93.24		
7.54									
Compact, grey **SILTY SAND** with gravel and clay		SS	6	50	8	8	92.24		
8.30									
		SS	9	71	2	9	91.24		
Grey-brown **SILTY CLAY,** trace sand		SS	10	92	2				
		SS	11	100	1	10	90.24		
10.67									
End of Borehole									
(GWL @ 3.83m - Nov. 29, 219)									



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SOIL PROFILE AND TEST DATA

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

DATUM Geodetic

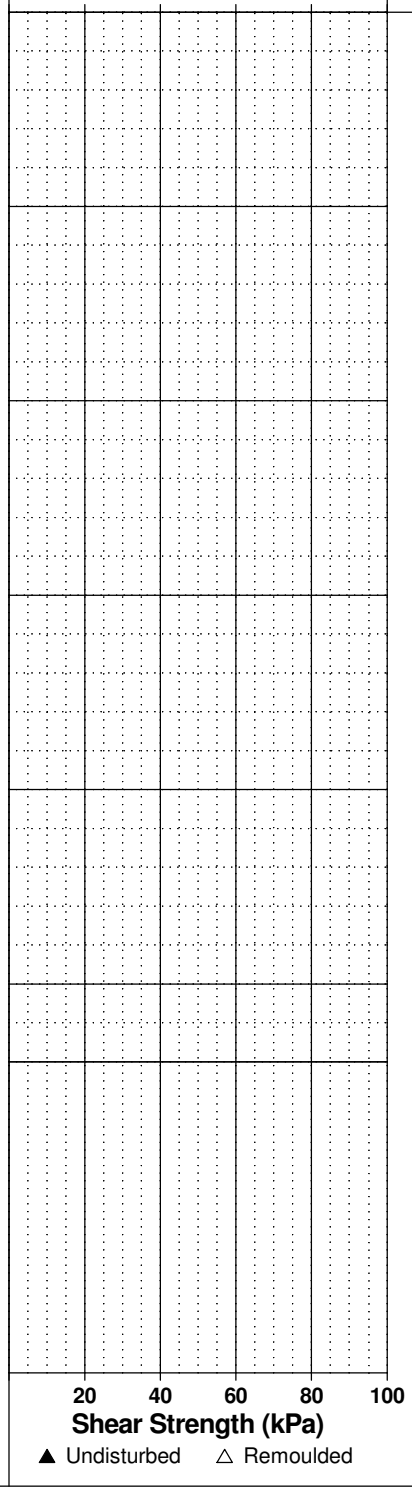
FILE NO. PG5155

REMARKS

HOLE NO. TP32

BORINGS BY Excavator **DATE** 2019 November 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	102.23		
FILL: Brown sand, some gravel, cobbles, trace clay and organics		G	1						
0.30						1	101.23		
						2	100.23		
Brown **SAND,** some gravel, trace cobbles		G	2			3	99.23		
						4	98.23		
4.70									
Brown **SAND,** some clay, gravel, cobbles and boulders		G	3			5	97.23		▽
5.40									
End of Test Pit									
(GWL at 4.8m depth based on field observations)									



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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. TP33

BORINGS BY Excavator **DATE** 2019 November 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	103.94		
FILL: Brown sand with gravel, cobbles, trace organics		G	1						
0.30						1	102.94		
FILL: Brown sand, trace gravel		G	2						
3.30						2	101.94		
						3	100.94		
Grey **SILTY CLAY,** trace sand		G	3			4	99.94		
5.00						5	98.94		
End of Test Pit									
(Groundwater infiltration at 3.1m depth)									

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ 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. TP34

BORINGS BY Excavator **DATE** 2019 November 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	103.24		
FILL: Brown sand, trace gravel and organics		G	1						
0.60									
FILL: Brown silty clay, some sand, gravel, organics and topsoil		G	2			1	102.24		
1.05									
FILL: Brown sand, trace gravel		G	3			2	101.24		
						3	100.24		
3.60									
Loose to compact, brown **SAND**		G	4			4	99.24		
						5	98.24		
5.20									
End of Test Pit									
(Groundwater infiltration at 3.15m depth)									

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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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. TP35

BORINGS BY Excavator **DATE** 2019 November 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE									
FILL: Topsoil, trace organics, gravel and sand 0.15		G	1			0	10530.00		
FILL: Brown sand, some gravel and cobbles						1	10529.00		
		G	2			2	10528.00		
3.10						3	10527.00		
Loose, brown **SAND**						4	10526.00		
		G	3			5	10525.00		
6.10						6	10524.00		
End of Test Pit									
(TP dry upon completion)									

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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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. TP36

BORINGS BY Excavator **DATE** 2019 November 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	105.10		
TOPSOIL 0.15		G	1						
FILL: Brown sand, some topsoil, gravel, cobbles						1	104.10		
- some asphalt between 2.4 and 2.7m depth						2	103.10		
		G	2			3	102.10		
4.50						4	101.10		
GLACIAL TILL: Loose, brown sand, some gravel, cobbles and clay						5	100.10		
6.05		G	3			6	99.10		
End of Test Pit									
(GWL @ 5.95m depth based on field observations)									

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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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. TP37

BORINGS BY Excavator **DATE** 2019 November 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	105.02		
FILL: Brown sand with topsoil, some gravel (0.15)		G	1						
FILL: Brown sand, some gravel and cobbles, trace asphalt						1	104.02		
(3.10)		G	2			2	103.02		
Loose to compact, brown **SAND**						3	102.02		
		G	3			4	101.02		
(5.00)		G	4			5	100.02		
Stiff, grey **SILTY CLAY,** trace sand (5.70)									
End of Test Pit									
(TP dry upon completion)									

Pen. Resist. Blows/0.3m: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ 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. TP38

BORINGS BY Excavator **DATE** 2019 November 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	106.11		
FILL: Brown silty clay, some sand, gravel, organics (0.15)		G	1						
						1	105.11		
		G	2						
Fir, brown **SILTY CLAY,** trace sand and gravel						2	104.11		
						3	103.11		
						4	102.11		
		G	3			5	101.11		
(5.50)									
End of Test Pit									
(TP dry upon completion)									

Pen. Resist. Blows/0.3m: ● 50 mm Dia. Cone; ○ Water Content %
20 40 60 80

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

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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

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	105.29		
FILL: Brown silty clay, some gravel, organics		G	1						
0.15						1	104.29		
		G	2						
FILL: Brown sand, some clay, gravel, construction debris						2	103.29		
						3	102.29		
						4	101.29		
		G	3			5	100.29		
5.50									
End of Test Pit									
(TP dry upon completion)									

Pen. Resist. Blows/0.3m: ● 50 mm Dia. Cone; ○ Water Content %
20 40 60 80

20 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. TP40

BORINGS BY Excavator **DATE** 2019 November 12

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE									
FILL: Brown sand, some gravel, cobbles		G	1			0	106.46		
0.15									
FILL: Brown sand, some gravel, cobbles, trace brick						1	105.46		
						2	104.46		
		G	2						
- trace clay by 3.2m depth						3	103.46		
						4	102.46		
		G	3			5	101.46		
5.20									
End of Test Pit									
(Groundwater infiltration at 5.1m depth)									

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ 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. TP41

BORINGS BY Excavator **DATE** 2019 November 12

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	105.10		
FILL: Brown sand, some clay, gravel, cobbles, organics		G	1						
0.25						1	104.10		
FILL: Brown silty clay, some gravel, cobbles, trace sand						2	103.10		
		G	2			3	102.10		
3.60									
Compact, brown **SAND,** some gravel						4	101.10		
		G	3			5	100.10		
5.60									
End of Test Pit									
(TP dry upon completion)									

20 40 60 80

20 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. TP42

BORINGS BY Excavator **DATE** 2019 November 12

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	104.51		
FILL: Brown silty clay, some sand, gravel, cobbles, trace organics and construction debris		G	1			1	103.51		
		G	2			2	102.51		
3.40						3	101.51		
Stff, brown **SILTY CLAY,** some sand, trace cobbles		G	3			4	100.51		
5.40						5	99.51		
End of Test Pit (Groundwater infiltration at 5.0m depth)									

20 40 60 80

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

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. TP43

BORINGS BY Excavator **DATE** 2019 November 12

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	104.67		
FILL: Brown silty clay, some topsoil trace gravel (0.20)		G	1						
FILL: Brown silty clay, some sand, gravel, cobbles, trace construction debris		G	2			1	103.67		
(2.90)						2	102.67		
FILL: Gry silty clay, some sand, gravel, cobbles		G	3			3	101.67		
(5.20)						4	100.67		
End of Test Pit						5	99.67		
(Groundwater infiltration at 4.9m depth)									

Pen. Resist. Blows/0.3m: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

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

DATUM Geodetic

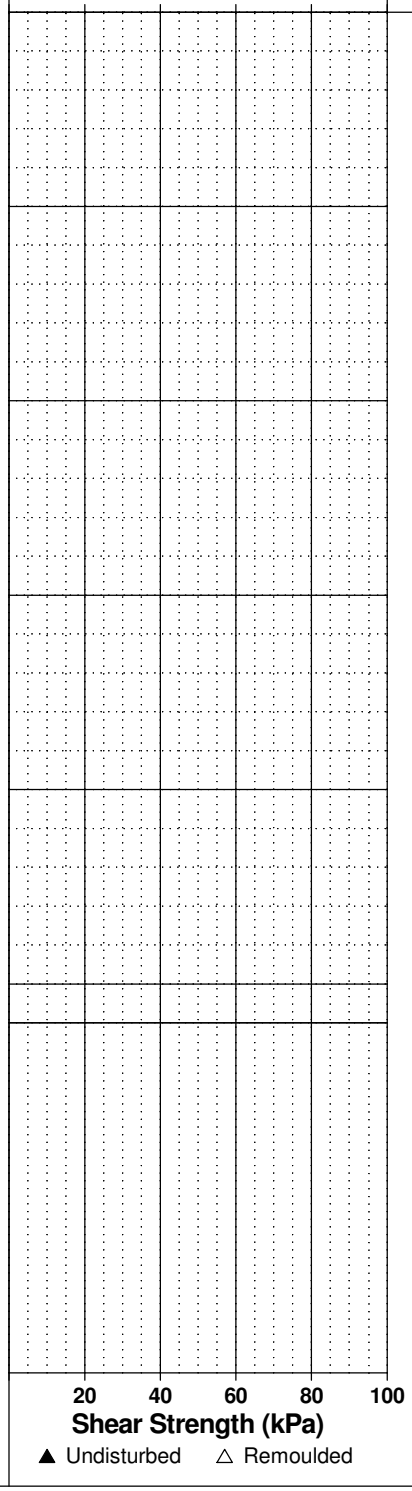
FILE NO. PG5155

REMARKS

HOLE NO. TP44

BORINGS BY Excavator **DATE** 2019 November 12

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	103.85		
FILL: Brown silty clay, some sand, gravel		G	1						
0.15						1	102.85		
FILL: Brown sand, some gravel, cobbles, trace construction debris		G	2			2	101.85		
3.70						3	100.85		
FILL: Brown sand, some gravel, cobbles, trace clay		G	3			4	99.85		
5.20						5	98.85		
End of Test Pit									
(Groundwater infiltration at 4.6m depth)									



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SOIL PROFILE AND TEST DATA

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

DATUM Geodetic

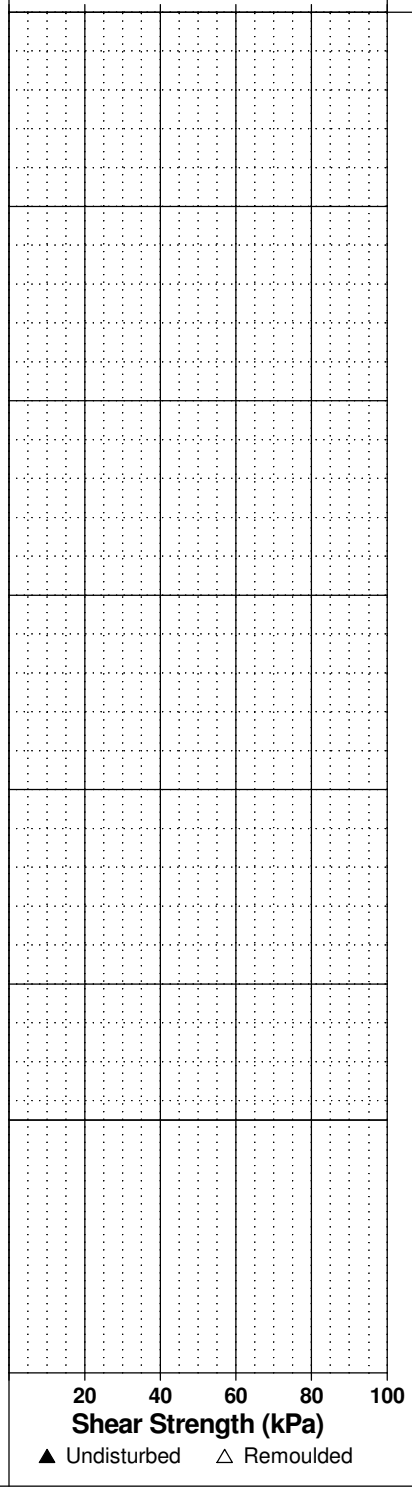
FILE NO. PG5155

REMARKS

HOLE NO. TP45

BORINGS BY Excavator **DATE** 2019 November 12

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	104.14		
FILL: Brown sand, some gravel, cobbles, clay, trace organics		G	1			1	103.14		
		G	2			2	102.14		
						3	101.14		
3.50									
FILL: Brown silty clay, some sand, gravel, trace cobbles		G	3			4	100.14		
						5	99.14		
5.70									
End of Test Pit (TP dry upon completion)									



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SOIL PROFILE AND TEST DATA

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

DATUM Geodetic

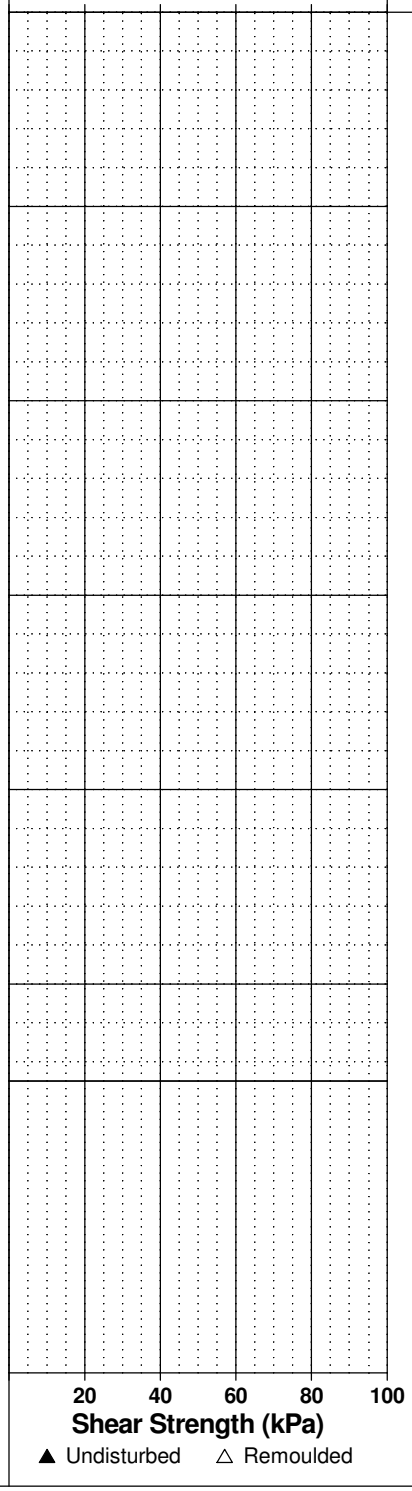
FILE NO. PG5155

REMARKS

HOLE NO. TP46

BORINGS BY Excavator **DATE** 2019 November 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	102.74		
		G	1						
FILL: Brown sand, some gravel, trace organics						1	101.74		
						2	100.74		
		G	2						
3.00						3	99.74		
Loose, brown **SAND,** trace silt						4	98.74		
						5	97.74		
5.50		G	3						
End of Test Pit									
(GWL @ 5.35m depth based on field observations)									



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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. TP47

BORINGS BY Excavator **DATE** 2019 November 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	101.19		
FILL: Brown sand and gravel		G	1						
0.60						1	100.19		
FILL: Grey silty clay, some sand and gravel						2	99.19		
		G	2			3	98.19		
3.10									
Loose, brown **SAND,** trace silt						4	97.19		
		G	3			5	96.19		
5.45									
End of Test Pit (Groundwater infiltration at 5.3m depth)									

Pen. Resist. Blows/0.3m: ● 50 mm Dia. Cone; ○ Water Content %

20 40 60 80

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

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

DATUM Geodetic

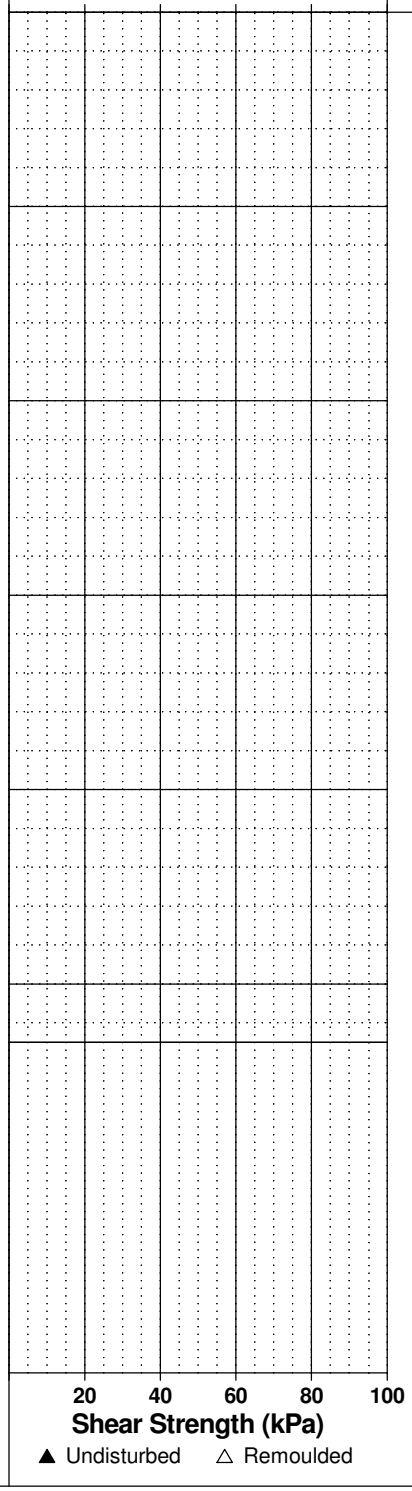
FILE NO. PG5155

REMARKS

HOLE NO. TP48

BORINGS BY Excavator **DATE** 2019 November 12

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	102.61		
FILL: Brown sand with some to trace gravel		G	1			1	101.61		
						2	100.61		
		G	2			3	99.61		
3.50						4	98.61		
Loose to dense, brown **SAND**		G	3			5	97.61		
5.30									
End of Test Pit (Groundwater infiltration at 4.9m depth)									



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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. TP49

BORINGS BY Excavator **DATE** 2019 November 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	103.49		
FILL: Brown sand and gravel, some cobbles, trace clay		G	1						
		G	2			1	102.49		
1.10									
Loose, brown **SAND**						2	101.49		
						3	100.49		
						4	99.49		
		G	3			5	98.49		
5.30									
End of Test Pit (TP dry upon completion)									

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ 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. TP50

BORINGS BY Excavator **DATE** 2019 November 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	103.62		
		G	1						
						1	102.62		
FILL: Brown sand and gravel, trace cobbles, organics						2	101.62		
						3	100.62		
3.95		G	2			4	99.62		
FILL: Brown sandy clay to clayey sand with gravel, some cobbles									
		G	3			5	98.62		
5.20									
End of Test Pit									
(GWL @ 4.9m depth based on field observations)									

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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SOIL PROFILE AND TEST DATA

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

DATUM Geodetic

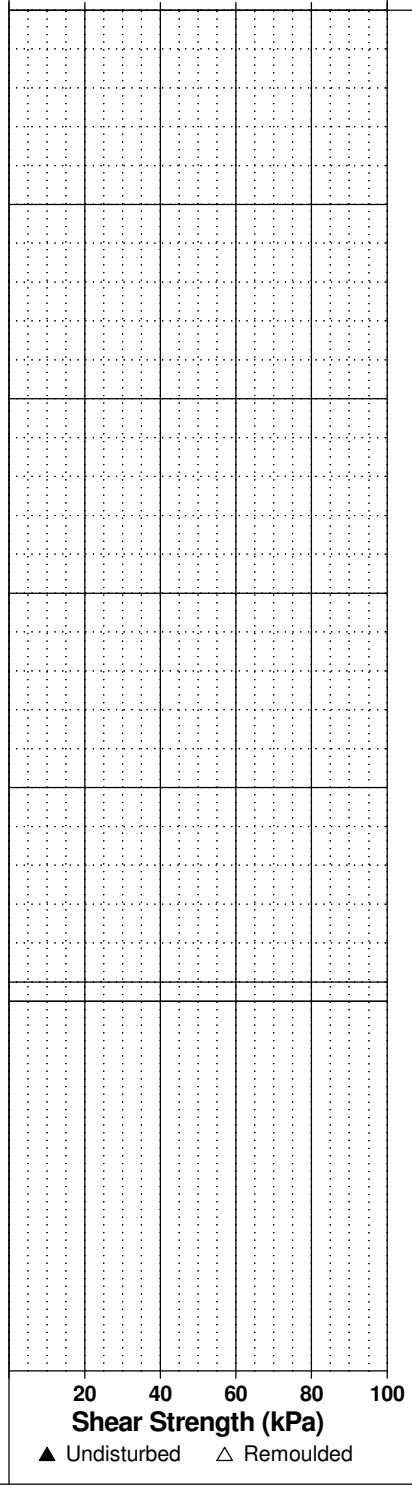
FILE NO. PG5155

REMARKS

HOLE NO. TP51

BORINGS BY Excavator **DATE** 2019 November 12

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE									
FILL: Brown sand, some gravel, cobbles, trace clay (0.20)		G	1			0	103.92		
						1	102.92		
						2	101.92		
FILL: Brown sand, trace gravel		G	2			3	100.92		
						4	99.92		
		G	3			5	98.92		
(5.10) End of Test Pit									
(Groundwater infiltration at 5.0m depth									



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SOIL PROFILE AND TEST DATA

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

DATUM Geodetic

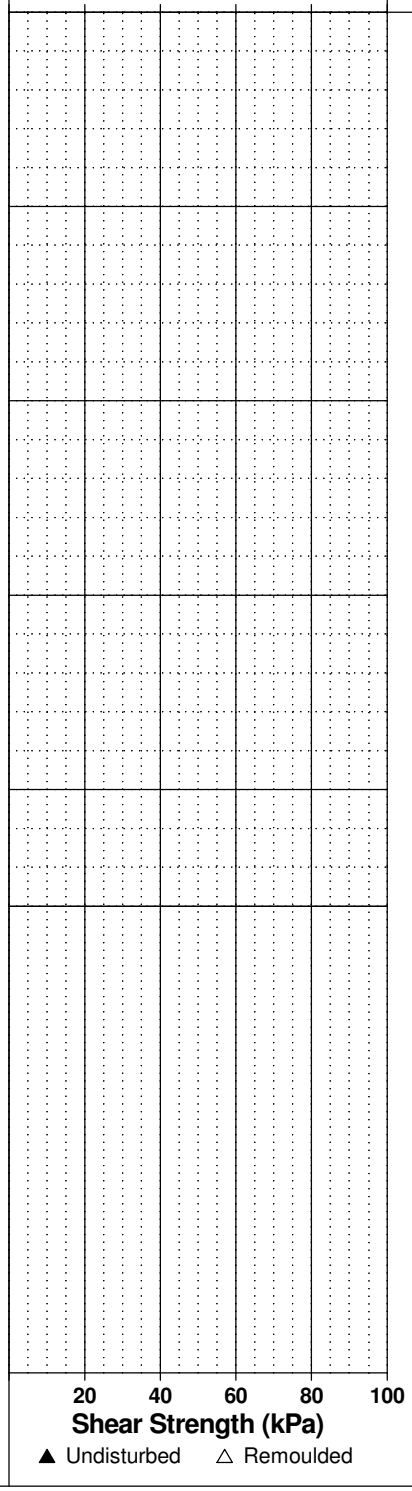
FILE NO. PG5155

REMARKS

HOLE NO. TP52

BORINGS BY Excavator **DATE** 2019 November 12

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	104.04		
FILL: Brown sand, some gravel		G	1						
0.40									
						1	103.04		
						2	102.04		
FILL: Brown sand, some gravel, cobbles, trace clay and organics		G	2			3	101.04		
		G	3			4	100.04		
4.60									
End of Test Pit									
(TP dry upon completion)									



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SOIL PROFILE AND TEST DATA

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

DATUM Geodetic

FILE NO. PG5155

REMARKS

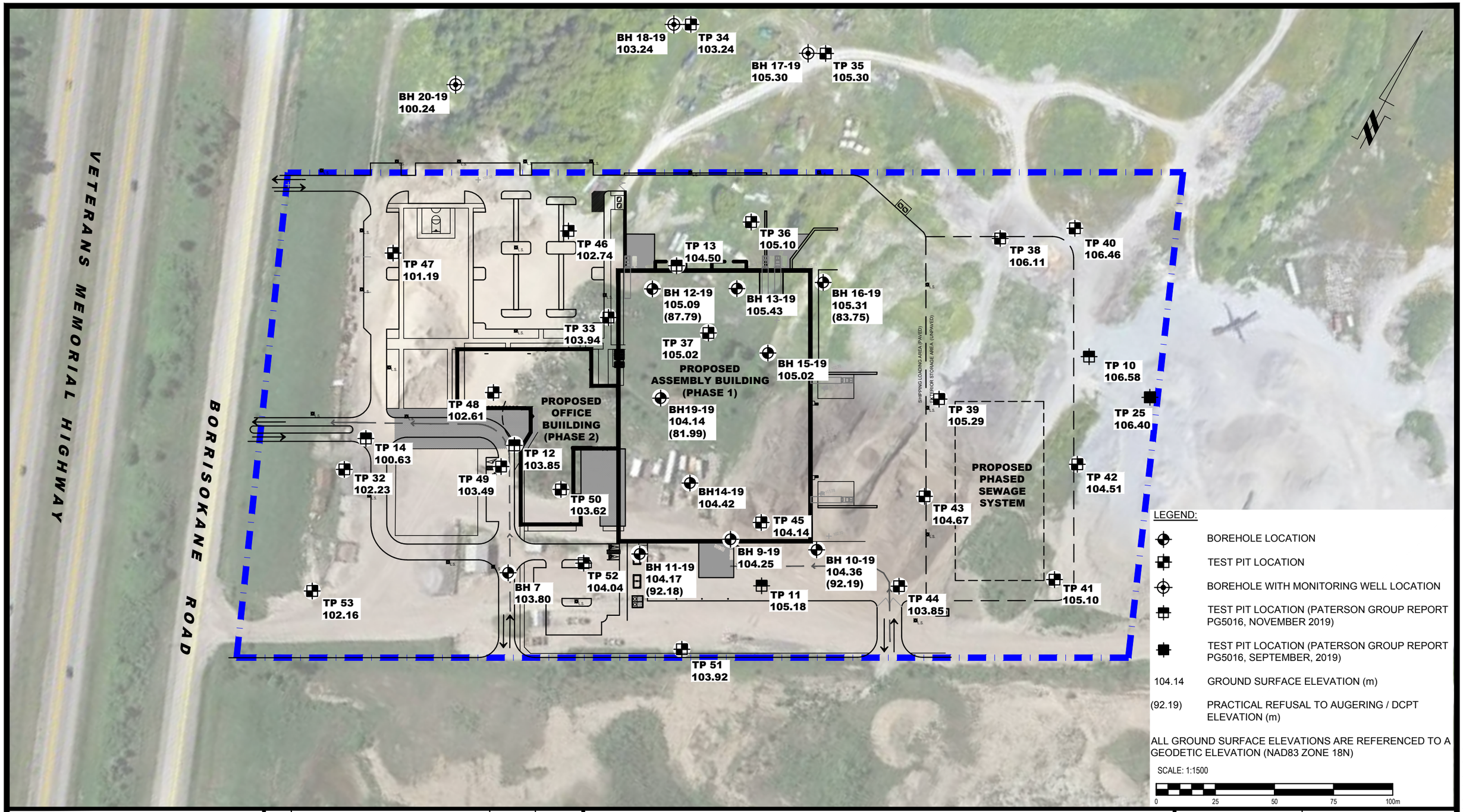
HOLE NO. TP53

BORINGS BY Excavator **DATE** 2019 November 11

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	102.16		
FILL: Brown sand and gravel, trace organics (0.25)		G	1						
						1	101.16		
						2	100.16		
FILL: Brown sand, trace gravel		G	2						
						3	99.16		
		G	3			4	98.16		
(5.05)						5	97.16		
End of Test Pit									
(GWL @ 4.6m depth based on field observations)									

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded



LEGEND:

- BOREHOLE LOCATION
- TEST PIT LOCATION
- BOREHOLE WITH MONITORING WELL LOCATION
- TEST PIT LOCATION (PATERSON GROUP REPORT PG5016, NOVEMBER 2019)
- TEST PIT LOCATION (PATERSON GROUP REPORT PG5016, SEPTEMBER, 2019)
- 104.14 GROUND SURFACE ELEVATION (m)
- (92.19) PRACTICAL REFUSAL TO AUGERING / DCPT ELEVATION (m)

ALL GROUND SURFACE ELEVATIONS ARE REFERENCED TO A GEODETIC ELEVATION (NAD83 ZONE 18N)

SCALE: 1:1500

0 25 50 75 100m

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154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

CAIVAN GREENBANK NORTH INC.

GEOTECHNICAL INVESTIGATION
3713 BORRISOKANE - PROPOSED COMMERCIAL DEVELOPMENT
OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:1500	Date: 12/2019
Drawn by: YA	Report No.: PG5155-1
Checked by: EA	Dwg. No.: PG5155-1
Approved by: DJG	Revision No.:

p:\autocad drawings\geotechnical\pg51xx\pg5155\pg5155-1-thlp.dwg

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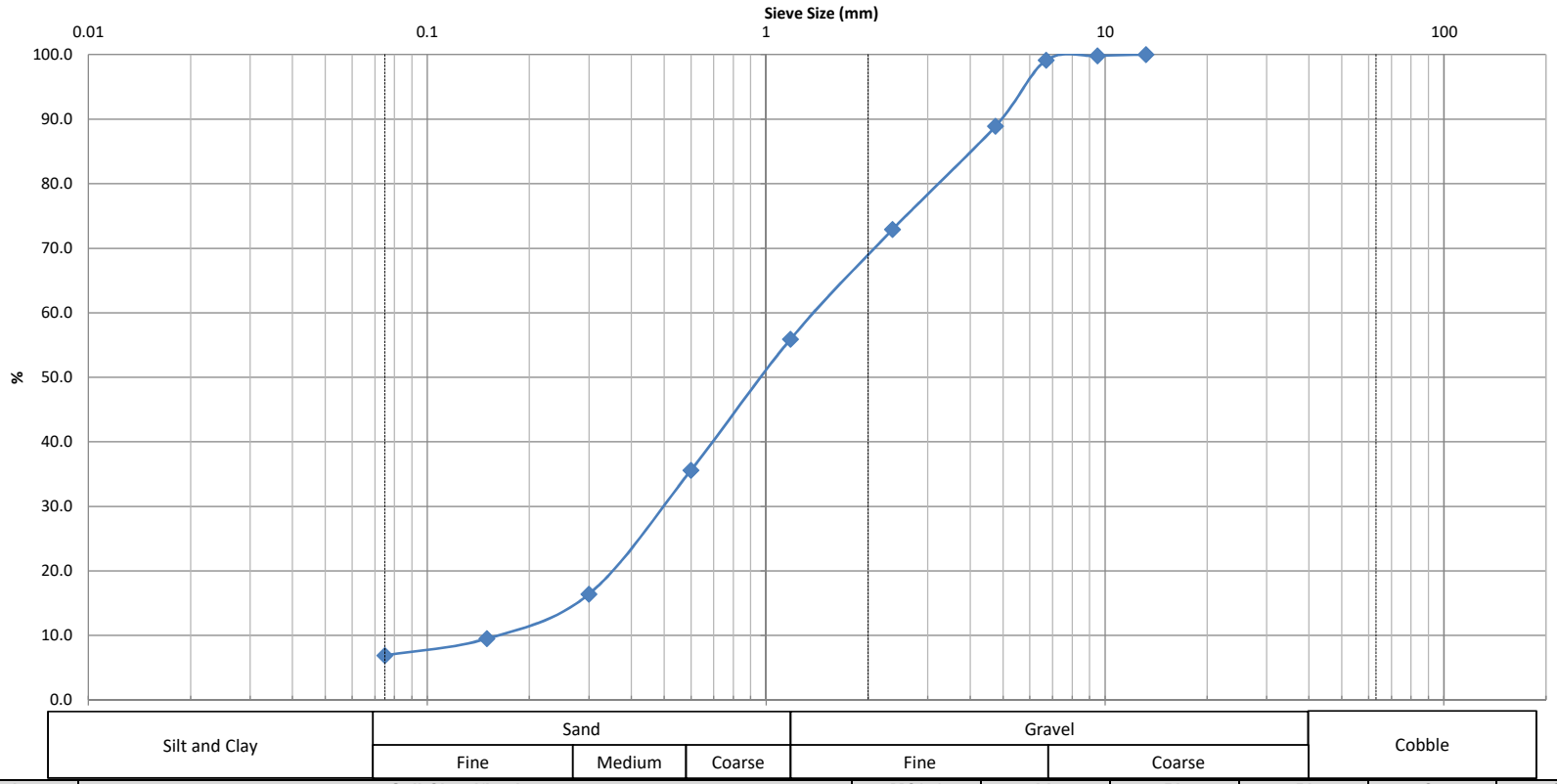
SIEVE ANALYSIS
ASTM C136

CLIENT:	Caivan	DESCRIPTION:	Sand	FILE NO:	PH3959
CONTRACT NO.:	-	SPECIFICATION:	-	LAB NO:	14105
PROJECT:	3713 Borrisokane	INTENDED USE:	-	DATE RECEIVED:	14-Nov-19
		PIT OR QUARRY:	-	DATE TESTED:	18-Nov-19
DATE SAMPLED:	14-Nov-19	SOURCE LOCATION:	TP41 - G3	DATE REPORTED:	20-Nov-19
SAMPLED BY:	E. Ardley	SAMPLE LOCATION:	4.7 - 4.75m	TESTED BY:	NV / DB



Identification	Soil Classification	MC(%)	LL	PL	PI	Cc	Cu
						0.96	8.1

D100	D60	D30	D10	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
13.2	1.45	0.5	0.18	27.1	66.0	6.9	

Comments:

Curtis Beadow **Joe Fosyth, P. Eng.**