

TECHNICAL MEMORANDUM

DATE September 25, 2018

PROJECT NO. 1784392-2000

TO 1384341 Ontario Ltd.

FROM Loren Bekeris and Brian Byerley

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REVISED DESKTOP HYDROGEOLOGICAL ASSESSMENT PROPOSED RESIDENTIAL SUBDIVISION 5957 AND 5969 FERNBANK ROAD, OTTAWA, ONTARIO

This report presents the results of a revised desktop hydrogeological assessment carried out for the proposed residential development site at 5957 and 5969 Fernbank Road in Stittsville (Ottawa), Ontario. It is understood that the hydrogeological assessment is required for draft plan approval.

The purpose of this hydrogeological assessment was to determine the general soil and groundwater conditions across this site, by means of existing data from on-site test pits, and to address possible construction-related impacts to private water supply wells. The on-site information was enhanced with published mapping and publicly available information. The water well records in the Ministry of the Environment, Conservation and Parks (MECP) Water Well Information System (WWIS) for nearby water wells were used to provide further information regarding hydrogeological conditions in the area and identify where nearby water well users are taking their water.

1.0 DESCRIPTION OF PROJECT AND SITE

Plans are being prepared to construct a residential development to be located at 5957 and 5969 Fernbank Road in Stittsville (Ottawa), Ontario. The project limits for the proposed development are shown on Figure 1.

The following is known about the site and proposed development:

- The property is roughly rectangular in shape with a maximum length and width of approximately 810 and 290 metres, respectively.
- The site has a relatively flat to gently sloping topography, from about elevation 118 metres above sea level (masl) at the northwestern corner of the site to 107 masl at the southeastern corner.
- The site is bounded to the west by existing urban residential development, to the north by the Goulbourn Recreation Complex, to the east by Shea Road, and to the south by Fernbank Road.
- The site primarily consists of undeveloped vacant land, with some rows of trees. A house is located at 5957 Fernbank Road. The property is to be developed as a residential subdivision.
- A stormwater management pond will be located at southeast corner of the site (Block 204).
- A City park will be located within the north central portion of the site (Block 203).
- A school (which is not part of this current investigation) will be located at the northeast corner of the site (Block 202).

2.0 GEOLOGY AND HYDROGEOLOGY

The following sections describe the published local geology and hydrogeology in the vicinity of the site.

2.1 Surficial Geology

Based on published mapping (Figure 2), the surficial geology at the site is interpreted to consist of organic deposits in the northwest corner, shallow bedrock in the northern half, glacial till in the southern half, and fine to medium sand in the southeastern corner. Published mapping indicates the bedrock surface to be at depths in the range of 1 to 5 metres below the ground surface across the site (Figure 3).

2.2 Bedrock Geology

The Ontario Geological Survey bedrock geology mapping indicates that the site is underlain by the Gull River Formation, consisting of interbedded limestone and silty dolostone with shale and sandstone partings.

2.3 Hydrogeology

2.3.1 Overburden Aquifer

The shallow overburden deposits in the area are generally not capable of supplying sufficient quantities of groundwater to be considered an aquifer. As a result, the principal water supply aquifer within the vicinity of the site is considered to be the underlying bedrock formations.

2.3.2 Bedrock Aquifers

The Gull River formation is generally considered to provide a poor to moderate yield of potable water due to the shale content of the bedrock. Well yields in this formation have been reported from less than 10 to 15 L/min. Generally, the Gull River formation is capable of providing sufficient yields for domestic water supplies. Groundwater flow in the Gull River formation is controlled predominantly by fractures or sandstone interbeds, as the massive crystalline limestone layers generally provide little to no water.

3.0 SITE SPECIFIC GEOLOGY AND HYDROGEOLOGY

3.1 General

Golder Associates completed a geotechnical investigation at this site in 2017, which included 15 test pits advanced across the site.

Based on a review of the geotechnical investigation results and published geological mapping, the subsurface conditions at the site are interpreted to consist of deposits of silts and sands over glacial till over limestone bedrock. The Record of Test Pits is included as Table 1, and test pit locations are indicated on Figure 1.

3.2 Site Specific Geology

Topsoil and Fill

Topsoil exists at the ground surface at all of the test pit locations, except at test pit 17-05, where 0.5 metres of sand and brush fill is located above the topsoil, and at test pit 17-09, where neither topsoil nor fill was encountered. Where encountered, the topsoil ranges from about 100 to 750 millimetres in thickness. A layer of fill was encountered below the topsoil at test pit 17-06. The fill consists of sand and gravel containing cobbles, and extends down to a depth of about 1.2 metres below the existing ground surface.

Sand and Silt

Discontinuous deposits of sand, silt, silty sand to sandy silt exist below the topsoil and fill in test pits 17-01, 17-03, 17-04, and 17-07 to 17-15. The sand and silt deposits were not fully penetrated in all of the test pits, but were proven to extend to depths ranging from about 0.2 to 4.2 metres below the existing ground surface.

Glacial Till

A discontinuous deposit of glacial till was encountered below the sand and silt layers in test pits 17-02, 17-05, 17-06, 17-07, 17-11, 17-14, and 17-15. The glacial till generally consists of a heterogeneous mixture of gravel, cobbles, and boulders in a soil matrix of silty sand to sandy silt. The glacial till was not fully penetrated in all the test pits but was proven to depths ranging from 1.1 to 4.5 metres below the existing ground surface.

Bedrock

Refusal to excavating was encountered at all of the test pit locations, except test pit 17-12 and 17-14, at depths ranging from about 0.2 to 3.3 metres below the existing ground surface.

The following table summarizes the ground surface, depth to refusal, and refusal elevations as encountered at the test pit locations.

Test Pit Number	Ground Surface Elevation (masl)	Refusal Depth (mbgs)	Refusal Elevation (masl)
17-01	111.1	0.9	110.2
17-02	109.5	1.1	108.4
17-03	111.8	1.1	110.7
17-04	112.0	1.3	110.7
17-05	113.6	1.6	112.0
17-06	111.3	1.5	109.8
17-07	108.9	1.8	107.1
17-08	109.5	0.4	109.1
17-09	111.9	0.2	111.7
17-10	110.9	1.9	109.0
17-11	109.7	2.1	107.6
17-13	105.9	3.3	102.6
17-15	108.6	3.4	105.2

Notes: masl: metres above sea level; mbgs: metres below ground surface

3.3 Hydrogeology

Groundwater seepage was observed in test pits 17-04, 17-12, 17-13 and 17-14 at depths of about 1.3 to 3.4 metres below the existing ground surface. Based on the materials encountered in the test pits, the water table is interpreted to lie in the glacial till, sandy silt or underlying bedrock.

It should be noted that groundwater levels are expected to fluctuate seasonally. Higher groundwater levels are expected during wet periods of the year, such as spring.

4.0 POTENTIAL IMPACTS TO EXISTING GROUNDWATER USERS

The maximum depth of the proposed infrastructure (sewer and watermain) is assumed to be approximately 5 metres below ground surface. The water table was found to be at an average of 2.5 metres below ground surface; therefore, dewatering during construction of site services will require approximately 2.5 metres of dewatering. Assuming the maximum hydraulic conductivity of the dewatered glacial till, sandy silt or underlying bedrock is 10^{-5} metres/second, the maximum radius of influence associated with this dewatering is approximately 30 metres (at a distance of 30 metres, less than 0.1 metre of water level drawdown would occur after 14 days of dewatering). To ensure a conservative assessment of potential impacts to groundwater users, existing groundwater users within 100 metres of the site were considered.

4.1 Nearby Groundwater Supply Wells

There are a total of three wells in the WWIS database that were constructed as water supply wells, located within 100 metres of the site (see Figure 1). Based on aerial photographs, there do not appear to be residences or buildings in the vicinity of the wells along Fernbank Road with Well ID 1513784 and 1511566. It is interpreted that these well records have incorrect location data in the WWIS or that the wells are no longer in use. The remaining well record within 100 metres of the site is Well ID 1522590, which is located within the site boundary and appears to correspond to the residence located at 5957 Fernbank Road. It is understood that this residence will be removed as part of site development and the water supply well will be decommissioned. Based on the absence of water supply wells within 100 metres of the site, impacts to groundwater users due to the construction dewatering activities at the site are not anticipated. It is understood that there are no structures or land uses planned for the site that would permanently lower the groundwater levels in the area surrounding the site (i.e., deep drained foundations).

4.2 Recommended Monitoring Program

Prior to construction at the site, it is recommended to confirm that there are no active water supply wells within 100 metres of the site. If any wells are identified, a well survey should be undertaken. Information to be collected during the well survey could include the depth of the well, type of pump, and static water level. Water quality samples could be collected and analyzed for a typical suite of parameters (i.e. the 'subdivision package' as per MOECC Procedure D-5-5).

5.0 LIMITATIONS AND USE OF MEMORANDUM

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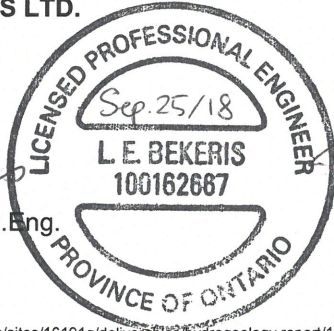
6.0 CLOSURE

We trust this submission satisfies the requirements for a desktop hydrogeological assessment of the proposed residential subdivision development at 5957 and 5969 Fernbank Road, in Ottawa, Ontario. If you have any questions regarding this report, please contact the undersigned.

GOLDER ASSOCIATES LTD.

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LEB/BTB/sg

[https://golderassociates.sharepoint.com/sites/16191g/deliverables/hydrogeology report/1784392-tm-rev 3-hydrogeology assessment_25sep2018.docx](https://golderassociates.sharepoint.com/sites/16191g/deliverables/hydrogeology%20report/1784392-tm-rev%203-hydrogeology%20assessment_25sep2018.docx)

Attachments: Table 1 – Record of Test Pits
Figure 1 – Site Plan
Figure 2 – Surficial Geology
Figure 3 – Drift Thickness

TABLE 1
RECORD OF TEST PITS

<u>Test Pit Number</u>	<u>Depth</u>	<u>Description</u>
<u>Elevation</u>	<u>(metres)</u>	
<u>(Metres)</u>		
17-01 (111.09 metres)	0.00 – 0.25	TOPSOIL – (ML) Sandy SILT; non-cohesive, dark brown, moist
	0.25 – 0.92	(ML) Sandy SILT, brown; non-cohesive, moist
	0.92	END OF TEST PIT – Refusal to excavation on bedrock
		NOTE: Test pit dry upon completion
	<u>Sample</u>	<u>Depth (m)</u>
	1	0.30 – 0.75
17-02 (109.47 metres)	0.00 – 0.30	TOPSOIL – (SM) Sandy SILT; non-cohesive, dark brown, moist
	0.30 – 1.05	(SM) Sandy SILT, some gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist
	1.05	END OF TEST PIT – Refusal to excavation on bedrock
		NOTE: Test pit dry upon completion
	<u>Sample</u>	<u>Depth (m)</u>
	1	0.04 – 1.00
17-03 (111.80 metres)	0.00 – 0.30	TOPSOIL – (ML) Sandy SILT; brown; non-cohesive, moist
	0.30 – 1.05	(SP) SAND, some non-plastic fines and gravel; grey, non-cohesive, moist
	1.30	END OF TEST PIT – Refusal to excavation on bedrock
		NOTE: Test pit dry upon completion
	<u>Sample</u>	<u>Depth (m)</u>
	1	0.10 – 0.25
	2	0.50 – 1.25
17-04 (112.01 metres)	0.00 – 0.25	TOPSOIL – (ML) Sandy SILT; dark brown; non-cohesive, moist
	0.25 – 1.30	(SM) SILTY SAND, trace gravel; brown; non-cohesive, moist
	1.30	END OF TEST PIT – Refusal to excavation on bedrock
		NOTE: Water seepage at 1.3 metres depth

TABLE 1
RECORD OF TEST PITS

<u>Test Pit Number</u>	<u>Depth</u>	<u>Description</u>						
<u>Elevation</u>	<u>(metres)</u>							
<u>(Metres)</u>								
		<table><tr><th><u>Sample</u></th><th><u>Depth (m)</u></th></tr><tr><td>1</td><td>0.30 – 0.50</td></tr></table>	<u>Sample</u>	<u>Depth (m)</u>	1	0.30 – 0.50		
<u>Sample</u>	<u>Depth (m)</u>							
1	0.30 – 0.50							
17-05	0.00 – 0.50	FILL – (SP) SAND; brown, contains brush (WIND ROW); non-cohesive, moist						
(113.55 metres)	0.50 – 0.70	TOPSOIL – (ML) Sandy SILT; dark brown; non-cohesive moist						
	0.70 – 1.60	(SM) SILTY SAND, some gravel; grey, contains cobbles and boulders (GLACIAL TILL), non-cohesive, moist						
	1.60	END OF TEST PIT – Refusal to excavation on bedrock						
		NOTE: Test pit dry upon completion						
		<table><tr><th><u>Sample</u></th><th><u>Depth (m)</u></th></tr><tr><td>1</td><td>1.00 – 1.50</td></tr></table>	<u>Sample</u>	<u>Depth (m)</u>	1	1.00 – 1.50		
<u>Sample</u>	<u>Depth (m)</u>							
1	1.00 – 1.50							
17-06	0.00 – 0.20	FILL/TOPSOIL – (ML) Sandy SILT; brown; non-cohesive, moist						
(111.29 metres)	0.20 – 1.20	FILL – (SP/GP) SAND and GRAVEL; brown, contains cobbles (BLAST ROCK); non-cohesive, moist						
	1.20 – 1.50	(ML) Sandy SILT, some gravel; grey (GLACIAL TILL); non-cohesive, moist						
	1.50	END OF TEST PIT – Refusal to excavation on bedrock						
		NOTE: Test pit dry upon completion						
		<table><tr><th><u>Sample</u></th><th><u>Depth (m)</u></th></tr><tr><td>1</td><td>1.30 – 1.50</td></tr></table>	<u>Sample</u>	<u>Depth (m)</u>	1	1.30 – 1.50		
<u>Sample</u>	<u>Depth (m)</u>							
1	1.30 – 1.50							
17-07	0.00 – 0.25	TOPSOIL – (SM) SILTY SAND; dark brown; non-cohesive, moist						
(108.94 metres)	0.25 – 1.10	(SM) SILTY SAND; brown; non-cohesive, moist						
	1.10 – 1.80	(SM) SILTY SAND; brown; contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist						
	1.80	END OF TEST PIT – Refusal to excavation on bedrock						
		NOTE: Test pit dry upon completion						
		<table><tr><th><u>Sample</u></th><th><u>Depth (m)</u></th></tr><tr><td>1</td><td>0.50 – 1.00</td></tr><tr><td>2</td><td>1.25 – 1.75</td></tr></table>	<u>Sample</u>	<u>Depth (m)</u>	1	0.50 – 1.00	2	1.25 – 1.75
<u>Sample</u>	<u>Depth (m)</u>							
1	0.50 – 1.00							
2	1.25 – 1.75							

TABLE 1
RECORD OF TEST PITS

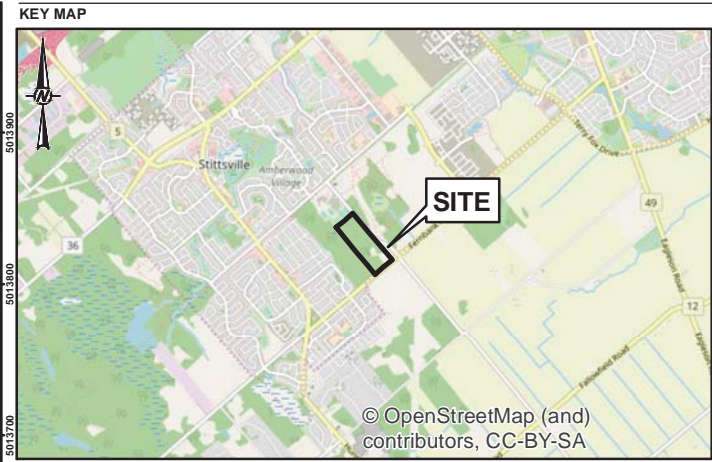
<u>Test Pit Number</u> <u>Elevation</u> <u>(Metres)</u>	<u>Depth</u> <u>(metres)</u>	<u>Description</u>
17-08 (109.50 metres)	0.00 – 0.10	TOPSOIL – (SM) SILTY SAND; dark brown; non-cohesive, moist
	0.10 – 0.40	(SM) SILTY SAND; brown; non-cohesive, moist
	0.40	END OF TEST PIT – Refusal to excavation on bedrock
		NOTE: Test pit dry upon completion
	<u>Sample</u>	<u>Depth (m)</u>
	1	0.10 – 0.40
17-09 (111.92 metres)	0.00 – 0.15	(SP) SAND, some non-plastic fines, trace gravel; brown; non-cohesive, moist
	0.15	END OF TEST PIT – Refusal to excavation on bedrock
		NOTE: Test pit dry upon completion
	<u>Sample</u>	<u>Depth (m)</u>
	1	0.00 – 0.15
17-10 (110.93 metres)	0.00 – 0.15	TOPSOIL (ML) Sandy SILT; dark brown; non-cohesive, moist
	0.15 – 1.85	(SP) SAND, some non-plastic fines, trace gravel; grey; non-cohesive, moist
	1.85	END OF TEST PIT – Refusal to excavation on bedrock
		NOTE: Test pit dry upon completion
	<u>Sample</u>	<u>Depth (m)</u>
	1	0.30 – 0.65
	2	1.50 – 1.75

TABLE 1
RECORD OF TEST PITS

<u>Test Pit Number</u> <u>Elevation</u> <u>(Metres)</u>	<u>Depth</u> <u>(metres)</u>	<u>Description</u>
17-11 (109.72 metres)	0.00 – 0.40	TOPSOIL (ML) Sandy SILT; dark brown; non-cohesive, moist
	0.40 – 1.10	(SM) SILTY SAND; brown; non-cohesive, moist
	1.10 – 2.10	(SM) SILTY SAND, trace gravel; grey, (GLACIAL TILL); non-cohesive, moist
	2.10	END OF TEST PIT – Refusal to excavation on bedrock
		NOTE: Test pit dry upon completion
	<u>Sample</u>	<u>Depth (m)</u>
	1	0.50 – 1.00
	2	1.25 – 1.75
17-12 (107.17 metres)	0.00 – 0.35	TOPSOIL – (ML) Sandy SILT; dark brown; non-cohesive, moist
	0.35 – 1.20	(ML) Sandy SILT; brown; non-cohesive, moist
	1.20 – 4.20	(ML) Sandy SILT; grey-brown, non-cohesive, wet
	4.20	END OF TEST PIT
		NOTE: Water seepage causing side walls to collapse
	<u>Sample</u>	<u>Depth (m)</u>
	1	0.50 – 1.00
	2	1.50 – 2.50
TP 17-13 (105.91 metres)	0.00 – 0.30	TOPSOIL – (ML) Sandy SILT; dark brown; non-cohesive, moist
	0.30 – 0.85	(SP/ML) SAND and SILT; brown; non-cohesive, moist
	0.85 – 2.95	(ML) Sandy SILT; grey-brown, non-cohesive, moist
	2.95 – 3.30	(ML) SILT, trace sand; grey; non-cohesive, moist
	3.30	END OF TEST PIT – Refusal to excavation on bedrock
		NOTE: Water seepage at 3.0 metres depth
	<u>Sample</u>	<u>Depth (m)</u>
	1	0.40 – 0.60
	2	0.95 – 1.30
	3	3.00 – 3.30

TABLE 1
RECORD OF TEST PITS

<u>Test Pit Number</u> <u>Elevation</u> <u>(Metres)</u>	<u>Depth</u> <u>(metres)</u>	<u>Description</u>
TP 17-14 (106.80 metres)	0.00 – 0.20	TOPSOIL – (ML) Sandy SILT; dark brown; non-cohesive, moist
	0.20 – 1.50	(SM) SILTY SAND; brown; non-cohesive, moist
	1.50 – 4.50	(SM) SILTY SAND, some gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet
	4.50	END OF TEST PIT
		NOTE: Water seepage at 3.4 metres depth Water seepage causing side walls to collapse
	<u>Sample</u>	<u>Depth (m)</u>
	1	0.30 – 1.25
	2	2.00 – 2.50
TP 17-15 (108.58 metres)	0.00 – 0.75	TOPSOIL – (ML) Sandy SILT; dark brown; non-cohesive, moist
	0.75 – 1.25	(SM) SILTY SAND, brown, non-cohesive, moist
	1.25 – 1.60	(SM) SILTY SAND, some gravel; grey, contains cobbles and boulders (GLACIAL TILL); non-cohesive, moist
	1.60	END OF TEST PIT – Refusal to excavation on bedrock
		NOTE: Test pit dry
	<u>Sample</u>	<u>Depth (m)</u>
	1	0.50 – 1.00
	2	1.30 – 1.55



LEGEND

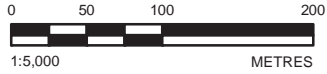
- APPROXIMATE TEST PIT LOCATION
- MECP LISTED WATER WELLS
- SITE BOUNDARY
- 100m BUFFER FROM SITE BOUDNARY

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER ASSOCIATES LTD, UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2014
2. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 18, VERTICAL DATUM: CGVD28

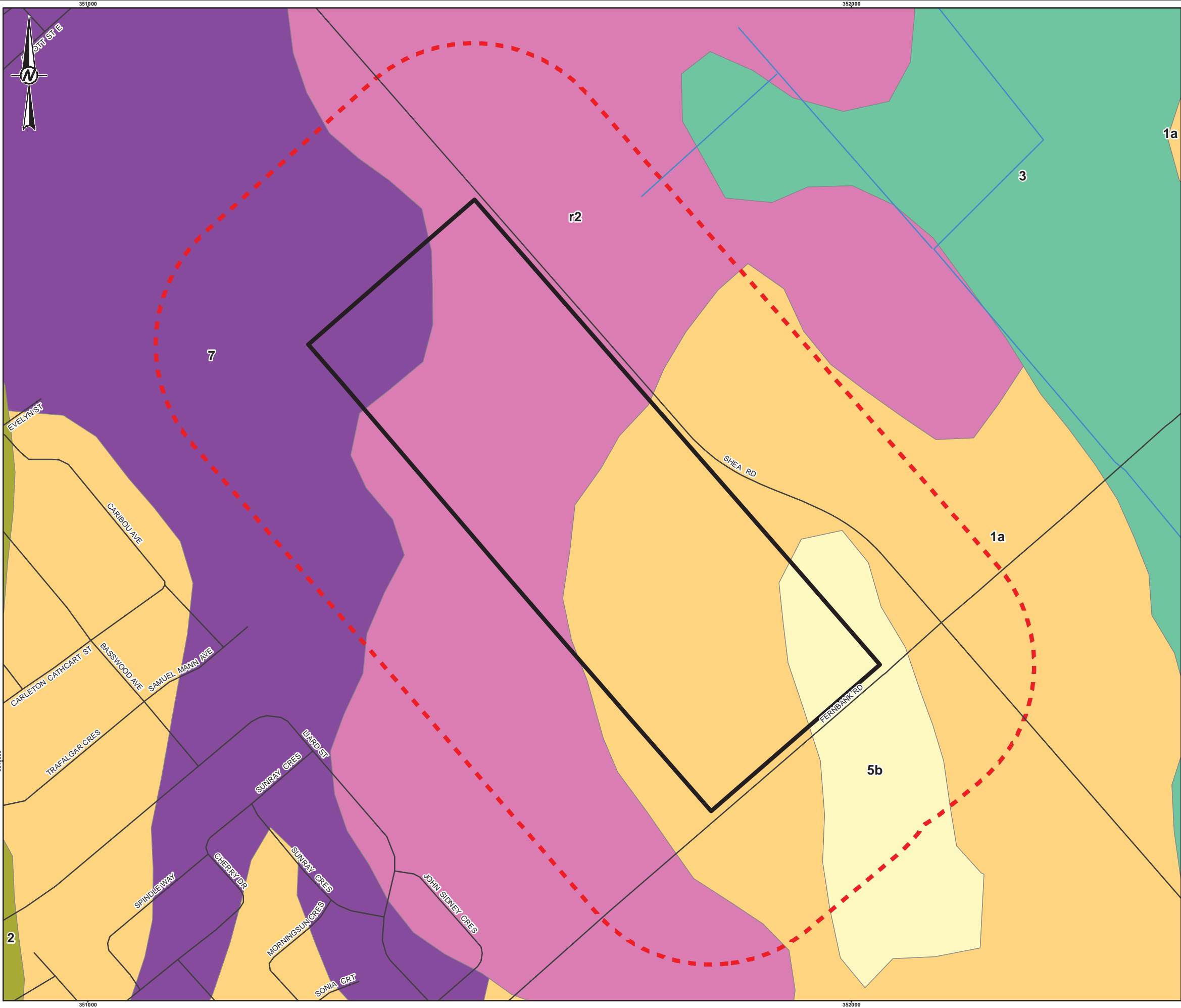


CLIENT			1384341 ONTARIO LTD.		
PROJECT			HYDROGEOLOGICAL ASSESSMENT; PROPOSED RESIDENTIAL DEVELOPMENT; 5957 AND 5969 FERNBANK ROAD, OTTAWA,		
TITLE			SITE PLAN		
CONSULTANT			YYYY-MM-DD	2018-09-24	
			DESIGNED	---	
			PREPARED	ABD	
			REVIEWED	LEB	
			APPROVED	BTB	
PROJECT NO.		CONTROL	REV.		FIGURE
1784392		0002	0		1

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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the G'S User Community

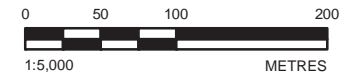
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 28mm



- LEGEND**
- ROADWAY
 - WATERMAIN
 - 100m BUFFER FROM SITE BOUDNARY
 - SITE BOUNDARY
 - 7 7. ORGANIC DEPOSITS: MUCK & PEAT
 - 5b 5b: NEARSHORE SEDIMENTS: FINE TO MEDIUM GRAINED SAND
 - 3 3. OFFSHORE MARINE DEPOSITS: CLAY, SILTY CLAY & SILT
 - 2 2. ICE CONTACT STRATIFIED DRIFT: GRAVEL & SAND
 - 1a 1a. TILL, PLAIN WITH LOCAL RELIEF <5 m
 - r2 r2. BEDROCK: LIMESTONE, DOLOMITE, SANDSTONE & LOCAL SHALE

NOTE(S)
1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)
1. LAND INFORMATION ONTARIO (LIO) DATA PRODUCED BY GOLDER ASSOCIATES LTD. UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2014
2. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 18, VERTICAL DATUM: CGVD28
3. SERVICE LAYER CREDITS: © OPENSTREETMAP (AND) CONTRIBUTORS, CC-BY-SA
4. BÉLANGER, J. R. 2008 URBAN GEOLOGY OF THE NATIONAL CAPITAL AREA, GEOLOGICAL SURVEY OF CANADA, OPEN FILE 5311, 1 DVD.



CLIENT 1384341 ONTARIO LTD.		
PROJECT HYDROGEOLOGICAL ASSESSMENT; PROPOSED RESIDENTIAL DEVELOPMENT; 5957 AND 5969 FERNBANK ROAD, OTTAWA,		
TITLE SURFICIAL GEOLOGY		
CONSULTANT	YYYY-MM-DD	2018-09-24
	DESIGNED	---
	PREPARED	ABD
	REVIEWED	LEB
	APPROVED	BTB
PROJECT NO. 1784392	CONTROL 0002	REV. 0
		FIGURE 2

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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 28mm



LEGEND

ROADWAY

WATERMAIN

100m BUFFER FROM SITE BOUDNARY

SITE BOUNDARY

GSC TREND IN DEPTH TO BEDROCK (METRES)

0 to 1

1 to 2

2 to 3

3 to 5

5 to 10

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

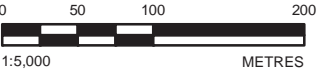
REFERENCE(S)

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3. SERVICE LAYER CREDITS: © OPENSTREETMAP (AND) CONTRIBUTORS, CC-BY-SA

4. 2010 BÉLANGER, J. R., URBAN GEOLOGY OF THE NATIONAL CAPITAL AREA, GEOLOGICAL SURVEY OF CANADA, OPEN FILE D3256, 2001



CLIENT

1384341 ONTARIO LTD.

PROJECT

HYDROGEOLOGICAL ASSESSMENT; PROPOSED RESIDENTIAL DEVELOPMENT; 5957 AND 5969 FERNBANK ROAD, OTTAWA,

TITLE

DRIFT THICKNESS

CONSULTANT	YYYY-MM-DD	2018-09-24
DESIGNED	----	
PREPARED	ABD	
REVIEWED	LEB	
APPROVED	BTB	

GOLDER

PROJECT NO.	CONTROL	REV.	FIGURE
1784392	0002	0	3