



Technical Memorandum

Date: October 3, 203 (Revised January 18, 2024) **Project No.:** 300043141.0002

Project Name: Block 210 - Site Approval Hydrogeology Brief

Client Name: 970 Mapleview Construction Inc.

Submitted To: Sal Crimi - S.C. Land Management Inc.

Originally Submitted By: Dwight Smikle, M.Sc., P.Geo.

Revised By: Dwight Smikle, M.Sc., P.Geo.

1.0 Introduction

R.J. Burnside & Associates Limited (Burnside) has been requested to prepare the following hydrogeological brief to support submission of an application for Site Plan Approval for Block 210 within Phase 2A of Mapleview Park subdivision in Barrie. Block 210 is approximately 0.76 ha located on Mapleview Drive East in the southeast portion of the 970 Mapleview Inc. lands (Figure 1) herein referred to as the subject lands. The Site Plan Concept (4 Architecture Inc, January 2023) includes townhomes with parking and amenity space.

The subject lands (Block 210, Phase 2A) are located within the 970 Mapleview Inc. lands that were studied by Burnside and for which a report entitled "Hydrogeological Study in Support of Draft Plan – 970 Mapleview Construction Inc. Barrie, Ontario" was completed in November 2019. The current hydrogeology brief draws from the work previously completed as the subject lands are totally within those previously studied.

2.0 Hydrogeological Setting

The local soils underlying the subject lands were investigated as a part of various studies including the Burnside hydrogeological study and geotechnical studies completed by Golder. Numerous boreholes were drilled as part of previous studies to determine the properties of the underlying soils. The locations of boreholes drilled in the area of the subject lands are shown on Figure 2 (attached). Borehole logs from boreholes in the vicinity of the subject lands are provided in Appendix A.

The boreholes indicate that the local soils consist of sandy silt to silty sand in the shallow overburden. At BH16-30 (located on the subject lands) the soils consist of 0.7 m of loose sand underlain by 7 m of non-cohesive sandy silt till. Geological cross-sections were produced as part of the Burnside study and indicated that the 907 Maplevue lands are underlain by a layer of sand and silt with a thickness of up to 13 m overlying silt clay till. Cross-section A-A' for the subject lands has been produced based on information from the Burnside report to illustrate the hydrogeological setting interpreted to occur beneath Block 210 (Figure 3).

2.1 Seasonal Groundwater High

Seasonal groundwater high at monitoring well BH16-30 located within the subject lands was 255.5 masl or 7.33 m below ground surface (Burnside, 2019). Seasonal variations in water levels observed at the well were up to 0.5 m resulting in a groundwater level that ranged between 7.3 m to 7.8 m below ground surface. The hydrograph for BH16-30 is provided in Appendix B.

Based on preliminary grading drawings available at this time, the groundwater should be well below any proposed building foundations (approximately 260 masl) meeting the minimum separation of 0.5 m between bottom of foundations and seasonal groundwater high.

2.2 Significant Groundwater Recharge Areas

The available LSRCA mapping indicates that Block 210 is located within a Significant Groundwater Recharge Area (SGRA) (Figure 4). Borehole BH16-30 located within the subject lands indicates that surficial sediments consist of sand and compact to dense sandy silt till. The deep water table found at this location supports the interpretation that the area is a recharge area. In keeping with the Lake Simcoe Protection Plan Policy 6.40 DP, major development within an SGRA is required to demonstrate that the quality and quantity of groundwater in these areas and the function of the recharge area will be protected, improved, or restored in post-development.

3.0 Groundwater Balance

Development of an area affects the natural water balance. The most significant difference between pre- and post-development conditions is the addition of impervious surfaces as a type of surface cover (i.e., roads, parking lots, driveways, and rooftops). Impervious surfaces prevent infiltration of water into the soils and the removal of the vegetation removes the evapotranspiration component of the natural water balance resulting in evaporation as the only remaining loss mechanism (beside runoff).

To minimize the potential impacts of development on the water balance, the use of Low Impact Development (LID) measures for stormwater management are generally recommended. A water balance and stormwater management plan was completed for the entire subdivision as part of Draft Plan approval (Burnside, 2019). As per the plan that was previously submitted, decreases in infiltration on the subject lands as a result of the development will be mitigated by directing runoff to stormwater management pond SWM14.

The stormwater management strategy for the site plan relies on the overall subdivision to mitigate the recharge deficit. It is noted that based on location and consistency in the hydrogeological setting it is not anticipated that the function of the recharge area will be impacted by mitigation on the surrounding lands. The water balance analysis for the SWM pond indicated a recharge mitigation volume of 118,228 m³/year based on a continuous PCSWMM model (970 Mapleview Drive East City of Barrie SWM Facility 14 Stormwater Management Report, Burnside 2021). When compared to the post-development recharge deficit of 55,700 m³/year from the hydrogeological study, it is apparent that a surplus is available. This surplus is likely to enhance the function of the recharge area.

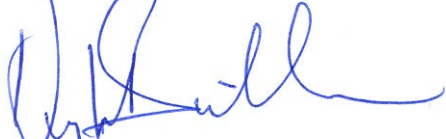
The SWM pond is also expected to enhance infiltration by extending the period of infiltration based on detention in the pond. Extended infiltration will support the function of the recharge area. In addition, a treatment train approach has been approved for the overall stormwater management strategy that will allow the mimicking of the natural hydrology. The treatment train approach is designed to reduce the potential for impacts to recharge water quality.

Based on the enhancement of recharge quantity and protection of quality of water entering the aquifer it is concluded that the functions of the recharge area will be protected and enhanced in post-development conditions.

4.0 Dewatering

The Ministry of the Environment, Conservation and Parks (MECP) has regulations that govern water taking for construction dewatering. Water takings above 50,000 L/day but below 400,000 L/day require registration under Environmental Activity Sector Registry (EASR). Takings above 400,000 L/day require a Category 3 Permit to Take Water (PTTW). The groundwater table at the subject lands ranges between 7 m and 8 m below ground surface. This is well below the expected depth of excavations associated to servicing connections and building foundations. Based on the anticipated depth of excavations for service installation and the depth to water table, the need for dewatering is not anticipated. Since construction dewatering and foundation drain dewatering is not proposed, there should be no impact to any private supply wells within 300 m of the subject lands.

R.J. Burnside & Associates Limited



Dwight Smikle, M.Sc., P.Geo.
Vice President – Hydrogeology
DS:cl

Enclosure(s) Figures
Appendix A – Borehole Logs
Appendix B – Hydrograph

In the preparation of the various instruments of service contained herein, R.J. Burnside & Associates Limited was required to use and rely upon various sources of information (including but not limited to: reports, data, drawings, observations) produced by parties other than R.J. Burnside & Associates Limited. For its part R.J. Burnside & Associates Limited has proceeded based on the belief that the third party/parties in question produced this documentation using accepted industry standards and best practices and that all information was therefore accurate, correct and free of errors at the time of consultation. As such, the comments, recommendations and materials presented in this instrument of service reflect our best judgment in light of the information available at the time of preparation. R.J. Burnside & Associates Limited, its employees, affiliates and subcontractors accept no liability for inaccuracies or errors in the instruments of service provided to the client, arising from deficiencies in the aforementioned third party materials and documents.

R.J. Burnside & Associates Limited makes no warranties, either express or implied, of merchantability and fitness of the documents and other instruments of service for any purpose other than that specified by the contract.

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1/18/2024 3:20 PM

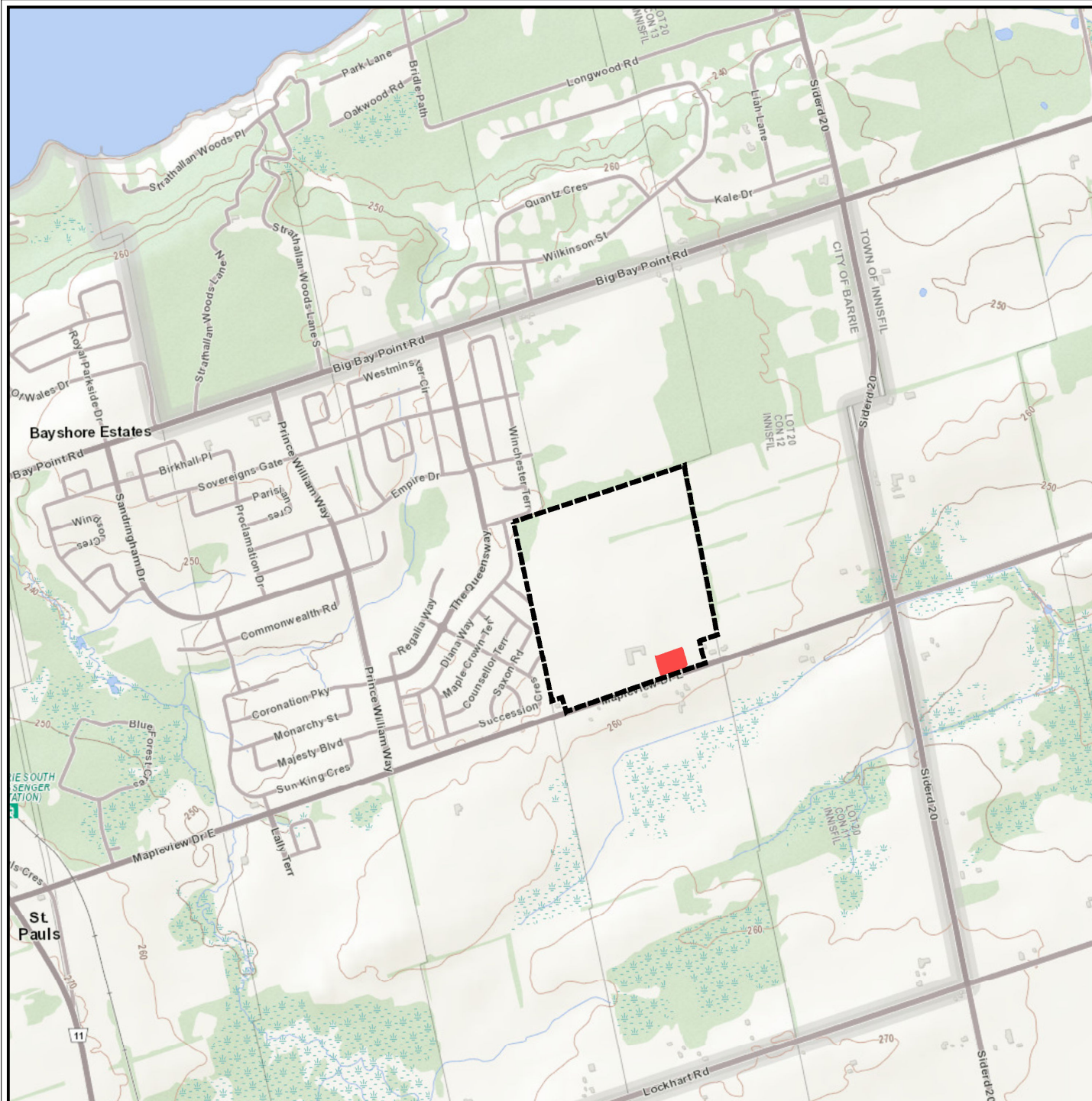


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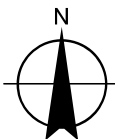


Figures



LEGEND

- SUBJECT LANDS (BLOCK 210)
- 970 MAPVIEW INC. LANDS



Client / Report

970 MAPVIEW INC.
BLOCK 210 - MAPVIEW PARK
SITE PLAN APPLICATION
HYDROGEOLOGICAL BRIEF

Figure Title:

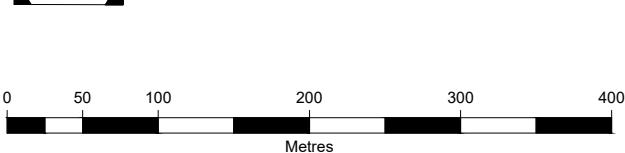
SITE LOCATION

Drawn	Checked	Date	Figure No.
SK	SC	January 2024	1
Scale		Project No.	
1:20,000		300043141.2000	



LEGEND

- SUBJECT LANDS (BLOCK 210)
- 970 MAPLEVIEW INC. LANDS
- MONITORING WELL (RJB, 2014)
- MONITORING WELL (GOLDER, 2016)
- MONITORING WELL (EXP, 2020)
- BOREHOLE (GOLDER, 2016)
- BOREHOLE (EXP, 2020)
- MECP WELL RECORD LOCATION
- A A' CROSS-SECTION LOCATION KEY



Client / Report

970 MAPLEVIEW INC.
BLOCK 210 - MAPLEVIEW PARK
*SITE PLAN APPLICATION
HYDROGEOLOGICAL BRIEF*

Figure Title

**BOREHOLE, WELL AND
CROSS-SECTION PLAN**

Drawn

SK

Checked

SC

Date

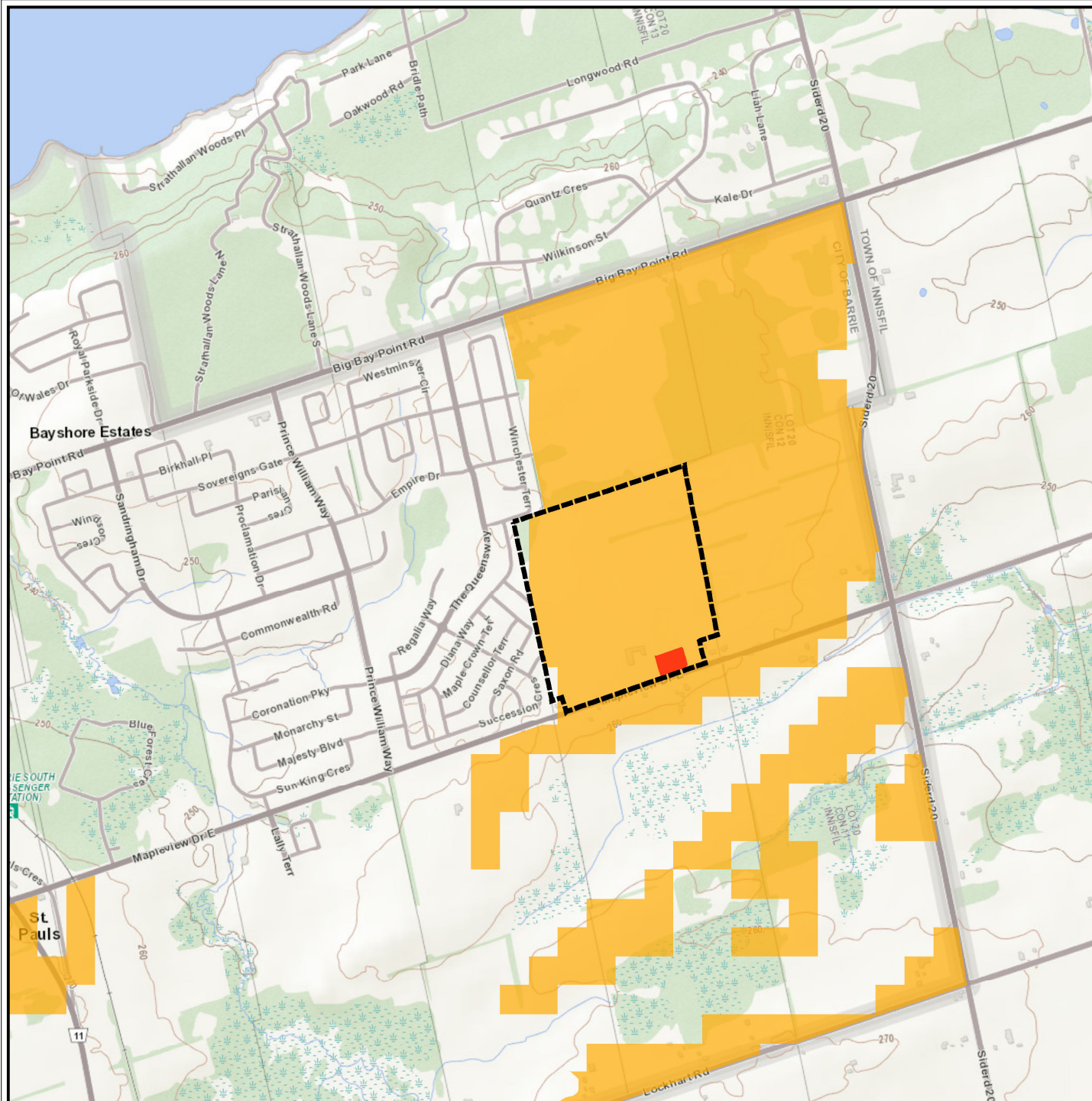
January 2024

Project No.

300043141.2000

Figure No.

2

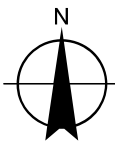
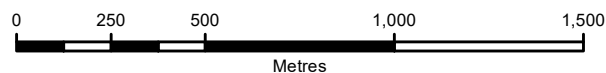


LEGEND

- SUBJECT LANDS (BLOCK 210)
- 970 MAPVIEW INC. LANDS
- SIGNIFICANT GROUNDWATER RECHARGE AREAS (SGRA)

Sources:

1. Ministry of Natural Resources, © King's Printer for Ontario
2. Natural Resources Canada © His Majesty the King in Right of Canada.
3. SGRA mapping obtained from Lake Simcoe Regional Conservation Authority (2018)



Client / Report

970 MAPVIEW INC.
BLOCK 210 - MAPVIEW PARK
SITE PLAN APPLICATION
HYDROGEOLOGICAL BRIEF

Figure Title:

SIGNIFICANT GROUNDWATER RECHARGE AREAS

Drawn	Checked	Date	Figure No. 4
SK	SC	January 2024	
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Appendix A

Borehole Logs

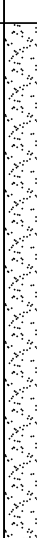
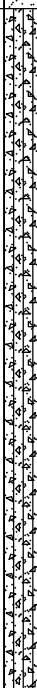
PROJECT: 1661309
LOCATION: N 4912310.49; E 611545.68

RECORD OF BOREHOLE: BH16-29

BORING DATE: October 5, 2016

SHEET 1 OF 1
DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa		nat V.	+	Q -	WATER CONTENT PERCENT						
										rem V.	⊕	U -							
								20	40	60	80								
0		GROUND SURFACE		265.95															
	Truck Mount Power Auger Solid Stem Auger	(SW) gravelly SAND, trace silt; brown, cobble fragments; non-cohesive, dry to moist, loose to dense		0.00	1	DO	9												
1					2	DO	3												
2																			
3																			
4		(SM) SILTY SAND, some gravel; grey to brown, cobble fragments, (TILL); non-cohesive, dry to moist, compact to very dense		262.44 3.51	5	DO	26												
5																			
6																			
7																			
8																			
9																			
10																			

DEPTH SCALE
1 : 50



LOGGED: DF
CHECKED: NL

LOCATION: N 4912310.08; E 611672.23

RECORD OF BOREHOLE: BH16-30

BORING DATE: October 7, 2016

SHEET 1 OF 2

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

[illegible]

DEPTH SCALE

1 : 50



LOGGED: DF

CHECKED: NL

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PROJECT: 1661309
LOCATION: N 4912310.08; E 611672.23

RECORD OF BOREHOLE: BH16-30

BORING DATE: October 7, 2016

SHEET 2 OF 2
DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa		nat V. + Q - rem V. ⊕ U - ○		WATER CONTENT PERCENT Wp — W — Wi				
								20	40	60	80	10 ⁻⁶	10 ⁻⁵	10 ⁻⁴		
10		--- CONTINUED FROM PREVIOUS PAGE --- 1. Groundwater measured at a depth of 8.5 m below existing grade upon completion of drilling October 7, 2016. 2. Groundwater measured in monitoring well at a depth of 8.0 m below existing grade on November 9, 2016.														
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																

DEPTH SCALE
1 : 50



LOGGED: DF
CHECKED: NL

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PROJECT: 1661309
LOCATION: N 4912388.98; E 611739.40

RECORD OF BOREHOLE: BH16-31

BORING DATE: October 7, 2016

SHEET 1 OF 1
DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m											
								SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT						
												Wp — W — Wi						
								20	40	60	80	10 ⁻⁶	10 ⁻⁵	10 ⁻⁴	10 ⁻³			
0		GROUND SURFACE		261.40														
	Truck Mount Power Auger Solid Stem Auger	TOPSOIL		0.00														
		(SP) SAND, trace silt; light brown to orange brown, cobble fragments; non-cohesive, dry to moist, very loose		0.15	1	DO	4											
1			(SM) SILTY SAND; grey to light brown; non-cohesive, moist, compact to very dense		260.38	2A	DO	2										
					1.02	2B												
						3	DO	12										
2																		
						4	DO	38										
3						5	DO	53										
4																		
					6	DO	60											
5		laminated in Sample 6																
6																		
					7A													
		(SP) SAND, trace to some silt; light brown, laminated; non-cohesive, moist to wet, dense to very dense		255.15	7B	DO	51											
				6.25														
7																		
					8	DO	46											
8																		
		End of Borehole		253.32														
				8.08														
9		NOTE: 1. Groundwater measured at a depth of 6.8 m below existing grade upon completion of drilling October 7, 2016.																
10																		

DEPTH SCALE

1 : 50



LOGGED: DF
CHECKED: NL

PROJECT: 1661309

LOCATION: N 4912297.98; E 611773.63

RECORD OF BOREHOLE: BH16-36

SHEET 1 OF 1

BORING DATE: October 4, 2016

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m												
								SHEAR STRENGTH				WATER CONTENT PERCENT							
								Cu, kPa				nat V. + Q - rem V. ⊕ U - ●						Wp — W — Wi	
								20	40	60	80	10 ⁻⁶	10 ⁻⁵	10 ⁻⁴	10 ⁻³				
0		GROUND SURFACE		261.26 0.00															
	Truck Mount Power Auger Solid Stem Auger	FILL-(SW) gravelly SAND, some silt; dark brown to brown; non-cohesive, dry to moist, compact			1	DO	26												
		(SP) SAND, trace to some silt, trace to some gravel; light brown to brown, laminated; non-cohesive, moist to wet, loose to dense		260.65 0.61															
1					2	DO	11												
2					3	DO	9												
3					5	DO	25												
4																			
5					6	DO	33												
6																			
7																			
8																			

DEPTH SCALE

1 : 50



LOGGED: DF

CHECKED: NL

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Appendix B

Hydrograph

BH16-30 (Well Depth 9.2 m, Screened in Sand) **Groundwater Elevations**

