

December 1, 2025

Report No. 230114-H1RG

The Cellular Connection Ltd.
514504 2nd Line
Amaranth, Ontario
L0N 1L0

Attention: Mr. Stuart Turk, Owner

**HYDROGEOLOGICAL INVESTIGATION REPORT FOR
PROPOSED RESIDENTIAL SUBDIVISION
514504 2ND LINE, AMARANTH, ONTARIO**

Prepared for:

The Cellular Connection Ltd.



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TABLE OF CONTENTS

TITLE SHEET

TABLE OF CONTENTS.....	I
1.0 INTRODUCTION.....	1
1.1 Scope of Work.....	1
1.2 Project Data.....	2
1.3 Site Description.....	3
1.4 Property Ownership.....	3
1.5 List of Reports Reviewed.....	3
2.0 HYDROGEOLOGICAL DATA.....	4
2.1 Physical Setting.....	4
2.2 Water Bodies, Aquifers, Aquitards and Areas of Natural Significance.....	4
2.3 Topography.....	5
2.4 Geology of the Site and Surrounding.....	5
2.5 Site Specific Geology.....	5
3.0 HYDROGEOLOGICAL INVESTIGATION.....	6
3.1 Soil Descriptions.....	6
3.2 Percolation Test.....	8
4.0 GROUNDWATER.....	9
4.1 Monitoring Well Installation Data.....	9
4.2 Dates of Water Level Readings, Depths and Elevations.....	10
4.3 Ground Water Sampling and testing.....	10
4.4 Surrounding Well Records.....	12
5.0 DE-WATERING ANALYSIS.....	12
5.1 Temporary and Permanent De-watering Assessment.....	12
5.2 Determination of Hydraulic Conductivity.....	15
5.3 Radius of Influence.....	15
5.4 Temporary and Permanent Volume of Water to be Taken from the Site.....	16
5.5 Permit to Take Water.....	16

Table of Contents cont . . .

6.0 CONCLUSIONS AND RECOMMENDATIONS..... 17

7.0 REFERENCES..... 18

8.0 GENERAL COMMENTS..... 19

LIST OF APPENDICES

PROJECT DATA..... Appendix “A”

**KEYPLAN, SITE PLAN SHOWING BOREHOLE LOCATIONS,
HYDROLOGICAL MAPS, GEOLOGICAL MAPS,
BOREHOLE LOGS AND GRAIN SIZE DATA. Appendix “B”**

**PLOT OF SLUG TEST RESULTS AND DETERMINATION
OF COEFFICIENT OF HYDRAULIC CONDUCTIVITY,
AND RADIUS OF INFLUENCE Appendix “C”**

1.0 INTRODUCTION

Canada Engineering Services Inc., (CESI) was retained by Mr Stuart Turk of The Cellular Connection Ltd., owner of the property located at 514504 2nd Line, in Amaranth, Ontario, to carry out a Hydrogeological Study for the subject property. It was understood that the owner is proposing to construct roadways with services and 19 additional two-storey residential dwellings with single basement levels on the subject property.

CESI carried out a geotechnical investigation (Report Number 230114-G1, dated November 20, 2023) concurrently with this hydrogeological investigation for the same site. Data presented in this report combined with a desktop study, literature research, data from government entities online database, Ontario Geological Survey database and field work completed for this project, provided the basic resources used in carrying out this assessment.

1.1 Scope of Work

1. Research and document the geological history of the site, the hydrogeological setting of the site and surroundings, and the watershed of the site.
2. Establish soil profiles, underlying bedrock where encountered, groundwater levels and flow characteristics, including flow directions and hydraulic gradients of the site.
3. Research and document available water well records, particularly of wells actively in use that could be affected by de-watering at the site.
4. Determine site topography and surficial drainage patterns/directions.
5. Establish the nearest surface water bodies, such as rivers, creeks, and/or lakes present around the subject site and their approximate distance from the site.
6. Install monitoring wells and conduct in-situ conductivity tests.
7. Carry out water quality testing and compare against the applicable municipal or regional sewer use standards and make recommendations for handling any exceedances, if de-watering is expected to be needed.
8. Calculate estimated permanent and temporary de-watering volumes and impact of site de-watering on the surrounding properties and buildings.

9. Assess whether the volume of water to be extracted and discharged meets or exceeds the permitted volumes by the Ministry of Environment, Conservation and Parks (MECP), Dufferin County standards, and the Township of Amaranth Standards and/or By-laws.
10. Carry out and prepare the hydrogeological review in accordance with the following regulations:
 1. The Ontario Water Resources Act;
 2. Ontario Regulation 387/04; Water Taking and Transfer.
 3. New Tecumseth Sewer Use Bylaw
11. Carry out percolation tests and determine the percolation rates available through the surficial soils at the site, as well their hydraulic conductivities.
12. Present the findings in the hydrogeological report.

1.2 Project Data

The proposed development is a residential subdivision with residential dwellings, and service roads on vacant land located at 514504 2nd Line, in the Township of Amaranth. The proposed residential subdivision comprise of 19 two-storey residents in total, each with one level of basement. The total area of the site is 33 hectares.

The ground elevation of the site area, as referenced to the Topographic Survey Drawing by Schaeffer Dzaldov Purcell Ltd., dated September 12, 2023, ranges from 484.5 masl to 496.0 masl. The ground surface over the site is undulating and the proposed house lots are expected to be at various elevations, following the topography of the site.

The finished floor elevations of the basements of the proposed houses were assumed to be a maximum of 1.2 m below the existing ground floor elevations and the footings are assumed to be a maximum of 300 mm below the finished floor level of the basements. Assuming this, the excavations are expected to be 1.5 m below the existing ground level elevations. Hence, the deepest level of excavation is assumed to be 1.5 m below the proposed new ground levels. However we anticipate that fill from the excavated house lots will be used to raise the external grade another 300 mm to 450 mm immediately around the houses.

One aquifer was found at the site in the silt and clay till layer, which is relatively at shallow depth for most of the site area. The basements of all of the proposed residential houses are not expected to intercept this aquifer layer and thus, no de-watering will be required.

1.3 Site Description

The site is located at 514504 2nd Line, in Amaranth, Ontario. The subject property is mostly vacant and grass covered with one residential building on site. There are storm water ponds on the north, central and south side of the subject property.

The site is located in a developed rural residential area with some agricultural lands. It is bounded by residential dwellings on the north and east sides and vacant lands on the south and west sides. Further east and south beyond 2nd Line and the vacant plot of land are residential dwellings. The subject property has a mildly undulating topography with an overall gentle slope toward the south and east. The existing building on site is on an elevated area with mild slopes all around. There is a gravel driveway from the building toward 2nd Line, which slopes down towards the south and the southeast.

1.4 Property Ownership

The subject property is owned by The Cellular Connection Ltd., and the owner is Mr. Stuart Turk. The contact information of Mr. Turk is as follows:

Mr. Stuart Turk
The Cellular Connection Ltd.
514504 2nd Line
Amaranth, Ontario L0N 1L0
Tel: (647) 669-1742
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1.5 List of Reports Reviewed

1. Canada Engineering Services Inc., Report titled: Geotechnical Investigation Proposed Residential Subdivision 514504 2nd Line, Amaranth, Ontario, Report Number 230114-G1, dated November 20, 2023.

2.0 HYDROGEOLOGICAL DATA

2.1 Physical Setting

According to the Ontario Geological Survey, the site area lies in the Horseshoe Moraines (Unit 5) physiographic region (Chapman, L.J. and Putnam, D.F. 2007. *The physiography of Southern Ontario*; Ontario Geological Survey, Miscellaneous Release - Data 228 ISBN 978-1-4249-5158-1). The physiographic landforms consist of Till Plains (Drumlinized). The physiographic region and landforms of the site area are shown in Drawing Numbers 3 and 4 in Appendix B.

2.2 Water Bodies, Aquifers, Aquitards and Areas of Natural Significance

The site area shares two watersheds. The north portion of the site belongs to the *Nottawasaga River Watershed* and the south portion of the site belongs to the *Upper Grand River Watershed*. The tributaries of the Nottawasaga River flows towards the east and the northeast, whereas the tributaries of the Upper Grand River flows towards the southwest. The surface drainage and the watersheds of the site and surrounding areas are shown in Drawing Numbers 5 and 6 in Appendix B.

The site consists of 5 stormwater ponds, one on the north portion, two at the centre and two at the southern portion of the site. The stormwater ponds are to remain as a part of the proposed subdivision. Another comparatively large pond exists to the north of the site.

The north portion of the site lies within the boundaries of *Nottawasaga Valley Conservation Authority* and *Nottawasaga Valley Source Protection Area*. The southern portion of the site lies within the boundary of *Grand River Conservation Authority* and *Grand River Source Protection Area*. The boundary of the Conservation Authorities and their respective regulated areas on site are shown in Drawing Numbers 7, 8 and 9 in Appendix B.

According to maps published by the *Ontario Ministry of Environment, Conservation and Parks (MECP)*, the site area does not lie within *Wellhead Protection Area*, *Significant Groundwater Recharge Area*, *Issue Contributing Area* or *Highly Vulnerable Aquifer Zone*. However, the southern portion of the site lies within *Intake Protection Zone 3*. The MECP maps showing the area of natural significance regarding groundwater and surface water are shown in Drawing Numbers 10 and 11 in Appendix B.

There was one aquifer found at the site in the silt and clay till layer at various depths throughout the site. None of the proposed houses with one level of basement are expected to intercept this aquifer layer.

2.3 Topography

A topographic map of the site and surroundings is shown in Appendix A. The site has an undulating topography with a high ground at the centre and northwest portions and low grounds on the northeast and south portion of the site. The overall slope of the site area is towards the east and the southeast. The ground level elevations range from 484.5 masl to 496.0 masl.

2.4 Geology of Site and Surrounding

As published by the Ontario Geological Survey, OGS Earth, the bedrock of the site area consists of Armabel Formation (unit 56c). The lithology of this unit consists of sandstone, shale, dolostone, siltstone (Ontario Geological Survey 2011. 1:250 000 scale, Bedrock Geology of Ontario; Ontario Geological Survey, Miscellaneous Release - Data 126 - Revision 1).

The Quaternary geology of the site, as published by the Ontario Geological Survey, belongs to the Tavistock Till (unit 5) sandy silt to silt matrix, silty clay matrix in the south and in the north, moderate to high carbonate content, clast content decreases from moderate to poor northward (Ontario Geological Survey 2000. Quaternary geology, seamless coverage of the Province of Ontario; Ontario Geological Survey, Data Set 14). The surficial geology consists of Glaciolacustrine-derived silty to clayey till (unit 5d).

The geological maps of the site and surrounding areas are shown in Drawing Numbers 13 and 14 in Appendix B.

2.5 Site Specific Geology

From the borehole and hydrogeological investigation conducted by CESI, the stratigraphy of the site consists of the following soil from top to bottom of the boreholes, with some layer appearing in some of the boreholes and not in the others.

Topsoil
Sandy Silt
Peat
Silty Sand Till
Silt and Clay Till
Silty Sand Till

3.0 HYDROGEOLOGICAL INVESTIGATION

The field work for the boreholes was carried out with a track-mounted drill rig with solid stem augers on October 18, 19 and 20, 2023 and was supervised by an engineer from our office. A total of ten boreholes was put down at the site. Monitoring wells were installed to the bottoms of all the deeper boreholes (Borehole Numbers 1, 3, 6, 7 and 10). From the boreholes, soil samples were taken at 500 mm intervals between ground surface and a depth of 3.0 m and thereafter at 1.5 m intervals to the termination of the boreholes. The samples were taken by means of a split-spoon sampler, in accordance with the requirements of the Standard Penetration Test, (CSA test specifications A119.1).

The ten boreholes were put down at the site to a depth of 9.4 m, 5.0 m, 9.6 m, 5.0 m, 5.0 m, 9.6 m, 9.6 m, 5.0 m, 5.0 m and 9.4 m in Borehole Numbers 1 to 10 respectively.

Where practical, field penetrometer readings were taken on the samples from the boreholes to determine the different bearing values of the soils encountered. The approximate bearing pressure values of these are recorded on the borehole logs in the soils description columns. Monitoring wells were installed in Borehole Numbers 1, 3, 6, 7 and 10 to measure groundwater levels.

All samples taken were brought back to our laboratory where moisture content tests, grain size analyses and further visual observations were carried out. Our field and laboratory findings are plotted on the Borehole Log Numbers 1 to 10 and the grain size analysis results are shown on Figure Number 1 and 2 in Appendix B.

3.1 SOIL DESCRIPTION

Details of the soils found in each borehole are as follows:

3.1.1 Top soil

A layer of topsoil was encountered at the surfaces of Borehole Numbers 1, 2, 4, 5, 6, 7, 8, 9 and 10. This layer consisted of a dark grey to grey silty sand, some organics. It was wet and in a loose state and varied in thickness from 100 mm to 900 mm thick.

3.1.2 Silty Sand Fill

A layer of silty sand was encountered at the surface of Borehole Number 3. This layer was brown in colour, was wet and in a compact state down to a depth of 0.76 m below ground surface. This layer was also encountered in Borehole Number 10 below the surficial topsoil layer, however it also consisted of varved clay interbedded within the silty sand, down to a depth of 3.4 m below ground surface.

3.1.3 Peat

A layer of peat was found below the silty sand layer in Borehole Number 3. This layer was black in colour, was wet and in a loose state down to a depth of 0.9 m below ground surface.

3.1.4 Silty Sand Till

Below the topsoil layer in Borehole Numbers 7 and 9 was a layer of silty sand till, some clay, trace gravel. This layer was moist and in a dense state down to a depth of 2.2 m and 1.5 m in Borehole Numbers 7 and 9 respectively. Penetrometer readings taken on samples recovered in the boreholes varied from 300 kPa to 450 kPa.

3.1.5 Silt and Clay Till

Below the topsoil layer in Borehole Numbers 1, 4, 5, 6 and 8, below the silty sand till in Borehole Numbers 2, 7 and 9 and below the peat and silty sand layer in Borehole Numbers 3 and 10, was a layer of silt and clay till, trace to some sand, trace gravel. This layer was mottled grey-brown in colour, was moist to wet and in a stiff to very stiff state down to depths of 4.6 m, 6.1 m in Borehole Numbers 1, 7 respectively and extended down to the bottoms of Borehole Numbers 2, 3, 4, 5, 6, 8, 9 and 10. Penetrometer readings taken on samples recovered in the boreholes varied from 75 kPa to 450 kPa.

3.1.6 Silty Sand Till

Below the silt and clay till layer in Borehole Numbers 7 was a layer of silty sand till, some clay, trace gravel. This layer was moist and in a very dense state down to the bottom of Borehole Number 7. Penetrometer readings taken on samples recovered in the boreholes were greater than 450 kPa.

Detailed borehole logs are shown on Borehole Log Numbers 1 to 10, while their locations are shown on Drawing Number 2 in Appendix “B”.

3.2 PERCOLATION TESTS AND T-TIME DETERMINATIONS

Percolation tests were conducted in two boreholes (P1 and P2) drilled down to a depth of 1.5 m. Percolation rate or T- Time is defined as the rate at which treated wastewater will be absorbed into the soil or as the number of minutes it takes for the water level to fall one centimeter in a hole drilled into a soil and filled with water.

The boreholes were put down with a truck-mounted drill rig down to a depth of 1.5 m in both percolation holes P1 and P2 respectively. The soils found consisted of a brown silt and clay till and extended down to the bottoms of the percolation holes.

A few inches of gravel was placed at the base of each of these holes. The holes were then filled with water and the drops in water levels monitored and recorded. In each case, the test was terminated when three consecutive drops in water levels monitored over consecutive 30 minute periods were within 10% of each other or where the water level virtually ceased to drop over an extended period of time. Using the rates of drops of the water levels, the rates of percolation or T-Time were calculated. From the percolation rates, the surficial hydraulic conductivities of the soils were extrapolated and the results are as follows:

Table No. 1

Percolation Hole No.	Hydraulic Conductivity (cm/sec)	Percolation “T” Time (min/cm)
P1	2.04×10^{-3}	8.18
P2	1.0×10^{-7}	over 50

The locations of the percolation test holes are shown on Drawing Number 2 in Appendix B.

4.0 GROUNDWATER

During the drilling of the boreholes some water seepage was obtained from the boreholes within the silt and clay till and silty sand till layers. Monitoring wells were installed in deep boreholes. The depth of water level varied from 0.97 mbgl to 5.65 mbgl throughout the site. The groundwater seems to follow surface topography of the site and flows outward from the center of the site towards its surroundings. The groundwater flow direction obtained from the latest water level readings taken in the monitoring wells on site on November 29th 2023, are shown in Drawing Number 12 in Appendix B. The general flow direction is towards the north from the center of the site.

4.1 Monitoring Well Installation Data

Five monitoring wells were installed in Borehole Numbers 1, 3, 6, 7 and 10. All five monitoring wells consisted of a 3.1 m screen with a 50-mm internal diameter. The screens were connected to PVC pipe risers, also with internal diameters of 50 mm. The wells were backfilled with sand up to a depth of 3.6 m above the base of the screens and then with bentonite pellets. All monitoring wells installed were raised above the ground level and protected by a metal casing with a lock, which could be opened and closed for future water level readings. The locations of the wells are shown on Drawing Number 2 in Appendix B. The surface elevations of the monitoring wells were taken off the topographic survey drawing by Schaeffer Dzaldov Purcell Ltd., dated September 12, 2023. Borehole Logs/wells with their locations are shown in Appendix B.

The well identities, their dates of installations, their surface elevations, their depths, their base elevations, with well data are shown in Table Number 2 below:

Table Number 2

Borehole/ Monitoring Well	Date of Installation	Surface Elevation (masl)	Depth of monitoring wells (m)	Elevation of base of wells (m)	Length of Well Screen (m)	Length of Sand Backfill (m)
BH 1	Oct 18, 2023	490.2	9.14	481.06	3.1	3.6
BH 3	Oct 20, 2023	485	9.14	475.86	3.1	3.6
BH 6	Oct 19, 2023	490.15	9.14	481.01	3.1	3.6
BH 7	Oct 19, 2023	490.45	9.14	481.31	3.1	3.6
BH 10	Oct 20, 2023	487.9	4.27	483.63	3.1	3.6

4.2 Dates of Water Level Readings, Depths and Elevations

Water levels were taken on the following dates and their depths and elevations are recorded in Table Number 3 below.

Table Number 3

Borehole Number	Date of Reading	Depth of Water Level (m)	Elevation of Water Level (masl)	Remarks
BH 1	October 18, 2023	6.28	483.92	
	November 3, 2023	5.81	484.39	
	November 17, 2023	5.73	484.47	
	November 29, 2023	5.65	484.55	
	May 23, 2025	3.98	486.22	Highest Water Level
BH 3	October 20, 2023	8.53	476.47	
	November 3, 2023	1.09	483.91	
	November 17, 2023	0.40	484.60	Highest Water Level
	November 29, 2023	0.97	484.03	
	May 23, 2025	1.00	484.00	
BH 6	October 19, 2023	8.53	481.62	
	November 3, 2023	2.61	487.54	
	November 17, 2023	2.50	487.65	Highest Water Level
	November 29, 2023	2.64	487.51	
	May 23, 2025	3.12	487.03	
BH 7	October 19, 2023	dry	-	
	November 3, 2023	3.90	486.55	
	November 17, 2023	3.32	487.13	
	November 29, 2023	2.99	487.46	
	May 23, 2025	1.99	488.46	Highest Water Level
BH 10	October 20, 2023	2.00	485.9	
	November 3, 2023	1.38	486.52	
	November 17, 2023	0.88	487.02	Highest Water Level
	November 29, 2023	1.02	486.88	
	May 23, 2025	1.06	486.84	

4.3 Ground Water Sampling and Testing

Even no ground water is to be discharged to the storm sewers of the municipal sewers, one groundwater sample was collected and tested against the New Tecumseth sanitary and storm guideline by Eurofin Laboratories. Eurofin Laboratory is a Canadian Association for Laboratory Accreditation (CALA) Accredited Laboratory

in accordance with ISO/IEC 17025:2020 - “General Requirements for the Competence of Testing and Calibration Laboratories” for analysis of all parameters for the New Tecumseth sanitary and storm guideline. The results indicated that there were no exceedances for discharge of the extracted groundwater into the storm or sanitary sewers, except as noted below and the results from Eurofins labs are attached in Appendix D.

Sanitary Sewers

No exceedances were identified in the sanitary sewer by-law testing; therefore, no treatment is required prior to discharging the groundwater into the sanitary sewer.

Storm Sewers

Four parameters exceeded the limits defined by the storm sewer guidelines and are listed below:

The results indicated that there were no exceedances for discharge of the extracted groundwater into the storm or sanitary sewers, except as noted below and the results from Eurofins labs are attached in Appendix D.

Table Number 4

Parameter	Unit	Permissible Limit	Result Obtained (Exceedances)
Guide Line: Storm Sewer - New Tecumseth			
Total Suspended Solids (TSS)	mg/L	15	583
Cadmium (Cd)	mg/L	0.001	<0.008
Copper (Cu)	mg/L	0.01	0.02
Zinc (Zn)	mg/L	0.04	0.05

For discharge to the storm sewers, which is the usual practice, we believe the elevated Total Suspended Solids value is likely due to turbulence in the water. This is expected to decrease significantly over time and can be controlled to meet the guideline through filtration prior to discharge.

The three other parameters of concern are cadmium, copper, and zinc. These exceedances can be managed effectively by treating the water to reduce these concentrations to within acceptable limits.

However, since no dewatering is contemplated at the site, the exceedences are not a concern.

4.4 Surrounding Well Records

A MECP Well Records Search was conducted within the 500m distance of the site and a total of 11 well records were found. The locations of these wells around the site are shown in Drawing Number 15 in Appendix B. Most of these wells are currently used for domestic water supply purposes. The MECP well Ids, their UTM coordinates, statuses, bottom depths of the wells, ground elevations, bedrock elevations, dates drilled and the average static water levels of these wells are shown in Table Number 5 below.

Table Number 5

MOE Well ID	UTM-X	UTM-Y	STATUS	Purpose		Bottom Depth	Ground Elev	Bedrock Elev	Date Drilled	Average Static Water Level
1701062	566294	4873153	Active	Water Supply	Domestic	42.7	490.2	450.26	15-12-1969	481.65
1703792	566478	4872999	Active	Water Supply	Domestic	36.6	490.5	466.77	18-10-1988	488.11
1704765	566481	4872998	Active	Water Supply	Domestic	54.3	490.5	455.45	05-09-1994	485.93
1703210	566464	4872572	Active	Water Supply	Domestic	41.5	490.2	451.80	29-04-1985	481.67
1701586	566214	4873773	Active	Water Supply	Domestic	77.7	489.8	453.86	04-01-1974	482.21
7407128	566399	4873032	Unknown	Unknown	Unknown	NA	489.9	NA	08-12-2021	NA
7307592	566476	4872363	Active	Water Supply	Domestic	36.0	490.6	454.59	14-06-2017	484.91
7307593	566509	4872381	Abandoned	Industrial	Institutional	24.6	491.3	NA	14-06-2017	NA
1700019	566452	4872558	Active	Water Supply	Domestic	27.4	490.5	466.07	20-08-1958	483.74
1701801	566602	4872477	Active	Water Supply	Domestic	78.3	492.9	455.68	13-11-1974	486.16
1702745	565719	4873576	Active	Water Supply	Domestic	44.8	487.8	465.54	14-01-1981	485.36

The closest of these wells to the edge of the proposed subdivision is Well No. 170162, which is 80 m away from the closest house lot in the proposed subdivision.

5.0 DE-WATERING ANALYSIS

5.1 Temporary and Permanent De-watering Assessment

The subject site is being proposed as a residential subdivision with houses with one level of basement and service roads. The deepest levels of excavation are expected to be 1.5 m below proposed new ground surface. The highest level of groundwater

was found at various depths ranging from 0.4 m to 5.65 m below ground level in the monitoring wells installed at the site.

We have added another 300 mm to the highest water level recorded to allow for high Spring Water level. The topography of the site is undulating with varying elevations and the proposed house lots are far apart and distributed throughout the site, the de-watering assessment was divided into five zones. This was done to more accurately establish the de-watering volumes for the whole site rather than analyzing the whole site as a single de-watering operation. See compartments of the whole site into five zones in Appendix A as follows:

- Zone A:** Around Borehole/Monitoring Well Number 1 - consists of house lot numbers 7, 8, 9, 10, 11 and 12.
- Zone B:** Around Borehole/Monitoring Well Number 3 - including the house lot numbers 16, 17, 18 and 19.
- Zone C:** Around Borehole/Monitoring Well Number 6 - including the house lot numbers 1, 2, 13, 14 and 15.
- Zone D:** Around Borehole/Monitoring Well Number 7 - including the house lot numbers 3, 4, 5 and 6.
- Zone E:** Around Borehole/Monitoring Well Number 10 - including the house lot numbers 14.

The proposed residential houses with one level of underground basements are expected to have Finished Floor Elevations at a depth of 1.2 m below ground level. Adding another 0.3 m for the footings, the deepest level of excavation expected is to be 1.5 mbgl.

Using the highest spring groundwater level, the revised ground level elevations shown on the new conceptual grading plan created in November 2025 by GEI Consultants, and the base of all underside of footings for the proposed houses as located at a depth of 1.5 m below the new grades, we have tabulated the depths of the high spring waters below the footings of each house in Table 6 below:

Table 6

BH No.	BH Surface Elev. (msal)	Highest Water Level (bgl-m)	Highest Water Level Elev. (masl)	Nearest Lot No.	Proposed Grad Elev. (masl) (A)	Lot Basement Assumed Elev. (masl) (A) - 1.5 m	Basement Height above High Water Level (m)
BH-6	490.15	2.50	487.95	Lot-1	489.62	488.12	0.17
BH-6	490.15	2.50	487.95	Lot-2	489.62	488.12	0.17
BH-7	490.45	1.99	488.76	Lot-3	490.57	489.07	0.31
BH-7	490.45	1.99	488.76	Lot-4	490.57	489.07	0.31
BH-7	490.45	1.99	488.76	Lot-5	491.47	489.97	1.21
BH-7	490.45	1.99	488.76	Lot-6	490.88	489.38	0.62
BH-1	490.20	3.98	486.52	Lot-7	490.88	489.38	2.86
BH-1	490.20	3.98	486.52	Lot-8	490.10	488.6	2.08
BH-1	490.20	3.98	486.52	Lot-9	489.41	487.91	1.39
BH-1	490.20	3.98	486.52	Lot-10	489.41	487.91	1.39
BH-1	490.20	3.98	486.52	Lot-11	489.24	487.74	1.22
BH-1	490.20	3.98	486.52	Lot-12	490.26	488.76	2.24
BH-6	490.15	2.50	487.95	Lot-13	490.48	488.98	1.03
BH-10	487.90	0.88	487.32	Lot-14	491.47	489.97	2.65
BH-6	490.15	2.50	487.95	Lot-15	490.30	488.8	0.85
BH-3	485.00	0.40	484.90	Lot-16	486.49	484.99	0.09
BH-3	485.00	0.40	484.90	Lot-17	486.49	484.99	0.09
BH-3	485.00	0.40	484.90	Lot-18	486.42	484.92	0.02
BH-3	485.00	0.40	484.90	Lot-19	486.42	484.92	0.02

Note:

(1) Lot Base of Footing Elev. = Lot Ave. Ground Elev. - 1.5 m

5.2 Determination of Hydraulic Conductivity - Slug Tests

Rising head Slug Tests were carried out in all monitoring wells installed at the site. A known volume of water was bailed out of each well and rates of rises in water levels were recorded. The water levels recorded against time were plotted in Aquifer Test Pro[®] developed by Waterloo Hydrogeologic, and the hydraulic conductivities were obtained using the Hvorslev's method.

The hydraulic conductivities obtained for each of the wells tested were as follows:

Borehole/ Monitoring Well 1 – 1.59E-08
Borehole/ Monitoring Well 3 – 4.56E-07
Borehole/ Monitoring Well 6 – 5.37E-08
Borehole/ Monitoring Well 7 – 3.71E-08
Borehole/ Monitoring Well 10 – 1.08E-07

The highest value of hydraulic conductivity was found in Borehole Number 3. However, since no dewatering is required for any of the houses at the site, the use of hydraulic conductivity is not relevant.

5.3 Radius of Influence

The Sichardt equation was used to calculate the maximum radius of influence of dewatering activity beyond the edge of excavation and it is given by the following formula.

$$R_o = 3000(H-h)K^{1/2}$$

Where (H-h) is the drawdown and K is the hydraulic conductivity of soil

Since, no dewatering is anticipated in Zone A, this does not apply for construction. Considering only one house lot will be excavated and dewatered at a time, the calculated radii of influence from the edge of excavation for each house lots in Zone B, C, D and E are as follows:

Since, there will be no de-watering, there will be no negative impacts on neighbouring water supply wells, river/creeks or other areas of natural significance.

5.4 Temporary and Permanent Volume of Water to be Taken from the Site

Theoretically, the groundwater drawdown for a single well, and the volume of water to be extracted can be calculated from the following expressions:

$$Q = 3.14K(H^2 - h_w^2)/Ln(R/r)$$
$$R_o = 3000 (H-h_w)*K^{0.5}$$
$$r_s = ((a*b)/3.14)^{0.5} \text{ [when } a/b < 1.5 \text{ and } R_o \gg r_s; \quad r = (a+b)/3.14^{0.5} \text{]}$$

where:

Q is in (m³/days) and is the rate of pumping extraction

K is (m/day) and is the hydraulic conductivity

H is in (m) and is depth from water table to depth of assumed impervious base

h_w is in (m) and is the depth of water table above an impervious base after drawdown

r is in (m) and is the equivalent radius of the site

R_o is in (m) and is the radius of influence from the edge of the excavation

R is in (m) and is the radius of influence from the center of site (R_o+r_s)

dH is in (m) is the maximum drawdown

a is in (m) and is the length of the excavation and

b is in (m) and is the width of the excavation

As mentioned earlier, the use of the above formula for calculating dewatering no longer applies.

5.5 Permit to Take Water

The Ministry of Environment, Conservation and Parks will require a permit to take water (PTTW) if the rate of extraction is between 50 m³/day and 400 m³/day. As such, permit to take water (PTTW) will not be required from MECP. An Environmental Activity Sector Registration (EASR) will also not be required.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The geotechnical investigation and follow up deep well installation indicated that the site is underlain by a surficial Topsoil, Sandy Silt, Peat, Silty Sand Till, Silt and Clay Till, Silty Sand Till.

The proposed residential development is to consist of residential houses with service roads, on a undeveloped vacant property. The proposed residential houses are expected to have all their basement finished floor elevations 1.2 m below ground surface level and footings another 300 mm below the finished floor level of the houses. Hence, the deepest levels of excavations are expected to be 1.5 m below the proposed new ground surfaces.

The highest groundwater level observed in monitoring wells installed at site range from 0.4 mbgl to 5.65 mbgl or at elevation 484.55 masl to 487.65 masl. We have allowed another rise in groundwater level in the Spring of 300 mm. With the estimated high spring water level, the new proposed ground elevations and the locations of footings at a depth of 1.5 m below the new proposed ground surface, we have found that the bases of all footings are above the estimated high spring water level. Hence, both temporary and permanent dewatering will not be required at this site.

As shown in the map by MECP, part of the northern half of the site is under regulated area by Nottawasaga Valley Conservation Authority and part of southern half of the site is under regulated area by Upper Grand River Conservation Authority. The southern part of the site lies within the Intake Protection Zone 3. The site does not lie within wellhead protection area, significant groundwater recharge area, highly vulnerable aquifer area, or issue contributing area.

There are no water supply wells, streams/creeks within the radius of influence of dewatering activity. The water from the dewatering is to be managed in storm water ponds existing on site. Hence, no negative impact is anticipated to the existing groundwater quality or quantity at site.

8.0 REFERENCES

Ontario Ministry of Northern Development and Mines, Mines and Minerals Division, Ontario Geology Survey, Bedrock Geology of Southern Ontario via OGSEarth, August 2016.

Ontario Ministry of Northern Development and Mines, Mines and Minerals Division, Ontario Geology Survey, Physiography of Southern Ontario via OGSEarth, August 2016.

Ontario Ministry of Northern Development and Mines, Mines and Minerals Division, Ontario Geology Survey, Surficial Geology of Southern Ontario via OGSEarth, August 2016.

Freeze, R.A. and Cherry, J.A. 1979, Groundwater, Prentice Hall Inc., Eaglewood Cliffs, N.J.

Powers, J.P., Corwin A.B., Schmall P.C., Kaeck W.E., Herridge C.J., Morris M.D., 2007, Construction De-watering and Groundwater Control, New Methods and Applications, Third Edition, John Wiley & Sons Inc.

Driscoll F.G., 1986, Groundwater and Wells, Second Edition, Johnson Filtration Systems Inc.

Ministry of Environment Records available through Freedom of Information

Canada Engineering Services Inc., Report titled: Geotechnical Investigation Proposed Residential Subdivision 514504 2nd Line, Amaranth, Ontario, Report Number 230114-G1, dated November 20, 2023.

Google Earth. 2023.

Google Maps. 2023.

9.0 GENERAL COMMENTS

It is possible that the soil and water conditions between boreholes are quite different from those found at the borehole locations. Any interpretation of data for areas between boreholes should be viewed with this in mind. The accuracy of our report is limited to the findings at specific borehole locations.

The inspections and reviews of data described above were carried out based on the terms of reference as outlined earlier in this report. It was prepared specifically for the use of the property owner for proposed residential subdivision at 514504 2nd Line, Amaranth, Ontario.

In the course of carrying out this Hydrogeological Assessment, the possibility of obtaining imprecise, partial or incorrect data cannot be totally eliminated but only reduced to an acceptable level. This report was prepared with due care and diligence, and is based on information gathered and professional judgement of the best information available at the time of the investigation.

The Consultant makes no warranty, either expressed or implied, as to the Consultant's findings, recommendations, plans, specifications, or professional advice. The Consultant has endeavored to perform its services in accordance with generally accepted standards of practice in effect at the time of performance.

The Client recognizes that neither the Consultant nor any of the Consultant's subconsultants or subcontractors owes any fiduciary responsibility to the Client.

This report or any part of it by any third party, other than the client to whom it is addressed, Mr. Stuart Turk, is strictly prohibited. Canada Engineering Services Incorporated is not responsible for any damages or losses incurred by any other third party arising from the use of this report or for any decisions or actions by any other third party based on this report.

This report was prepared from limited data. Should there be any design or construction changes that would require a review of the hydrogeological analyses or any questions regarding the hydrogeological aspects of any codes, standards or regulations, then this office should be consulted. This may necessitate a supplementary investigation and report for our recommendations to be reliable.

We trust that this report meets your requirements. Please call the undersigned at 647 829 6151 if you have any questions.

Sincerely,
CANADA ENGINEERING SERVICES INC.

Mahesh Khanal, M. Sc.
Project Manager



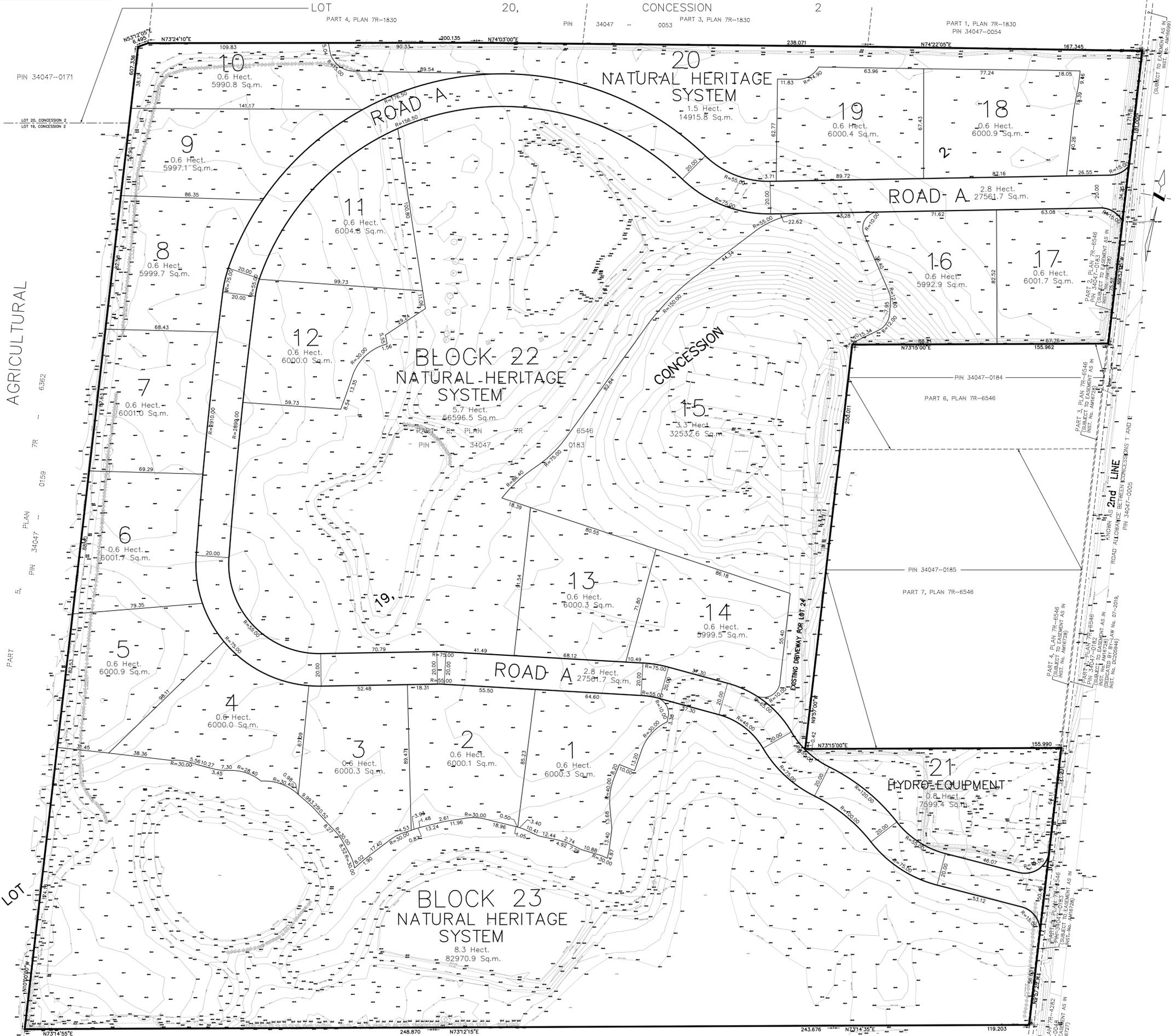
Ram Jagdat. P. Eng., QP.
Consulting Engineer.
Principal
email: ram@cesi.ca
cell: 647 829 6151



Appendix "A"

METRIC: DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

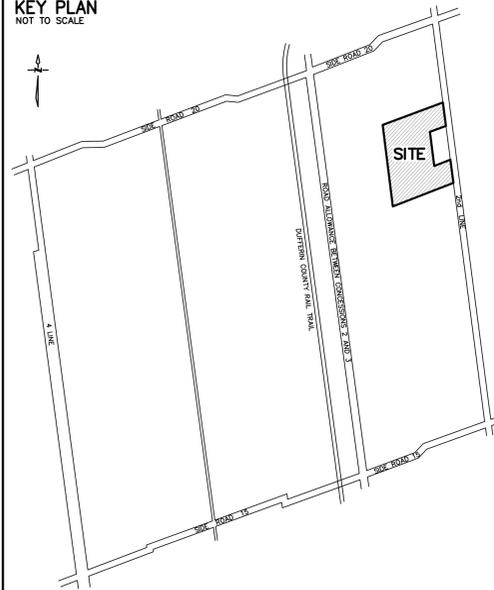
RESIDENTIAL/FARM



DRAFT PLAN OF SUBDIVISION OF

PART OF LOT 19
CONCESSION 2
(GEOGRAPHIC TOWNSHIP OF AMARANTH)
TOWNSHIP OF AMARANTH
COUNTY OF DUFFERIN
OCTOBER 6, 2025

KEY PLAN
NOT TO SCALE



ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51 (17) OF THE PLANNING ACT, R.S.O., 1990

- (a) AS SHOWN ON DRAFT PLAN
- (b) AS SHOWN ON DRAFT PLAN AND KEY PLANS
- (c) AS SHOWN ON DRAFT PLAN
- (d) THE LAND IS TO BE USED ACCORDING TO THE SCHEDULE OF LAND USE
- (e) AS SHOWN ON DRAFT PLAN AND KEY PLANS
- (f) AS SHOWN ON DRAFT PLAN
- (g) AS SHOWN ON DRAFT PLAN AND KEY PLANS
- (h) MUNICIPAL WATER SUPPLY TO BE MADE AVAILABLE
- (i) SOIL IS CLAYEY SILT AND SILTY CLAY TO CLAY
- (j) AS SHOWN ON DRAFT PLAN
- (k) FULL MUNICIPAL SERVICES TO BE MADE AVAILABLE
- (l) SUBJECT TO EASEMENTS AS SHOWN ON THE DRAFT PLAN

SCHEDULE OF LAND USE

LAND USE	LOTS / BLOCKS	(ha)	AREA (ac)	(m ²)
SINGLE DETACHED RESIDENTIAL	LOTS 1 TO 19	14.0525	34.72	140525.0
NATURAL HERITAGE SYSTEM	BLOCK 20	1.4916	3.69	14915.8
HYDRO EQUIPMENT	BLOCK 21	0.7599	1.88	7599.4
NATURAL HERITAGE SYSTEM	BLOCK 22	5.6596	13.98	56596.5
NATURAL HERITAGE SYSTEM	BLOCK 23	8.2971	20.50	82970.9
PUBLIC STREET		2.7562	6.81	27561.7
TOTAL	UNITS 19	33.0169	81.58	330169.3

SCALE 1:1000
(30X36)

OWNER'S AUTHORIZATION
I AUTHORIZE W.E. OUGHTRED AND ASSOCIATES INC. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE COUNTY OF DUFFERIN FOR APPROVAL.

STUART TURK
THE CELLULAR CONNECTION LTD.
DATE: OCTOBER 6, 2025

SURVEYOR'S CERTIFICATE
I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

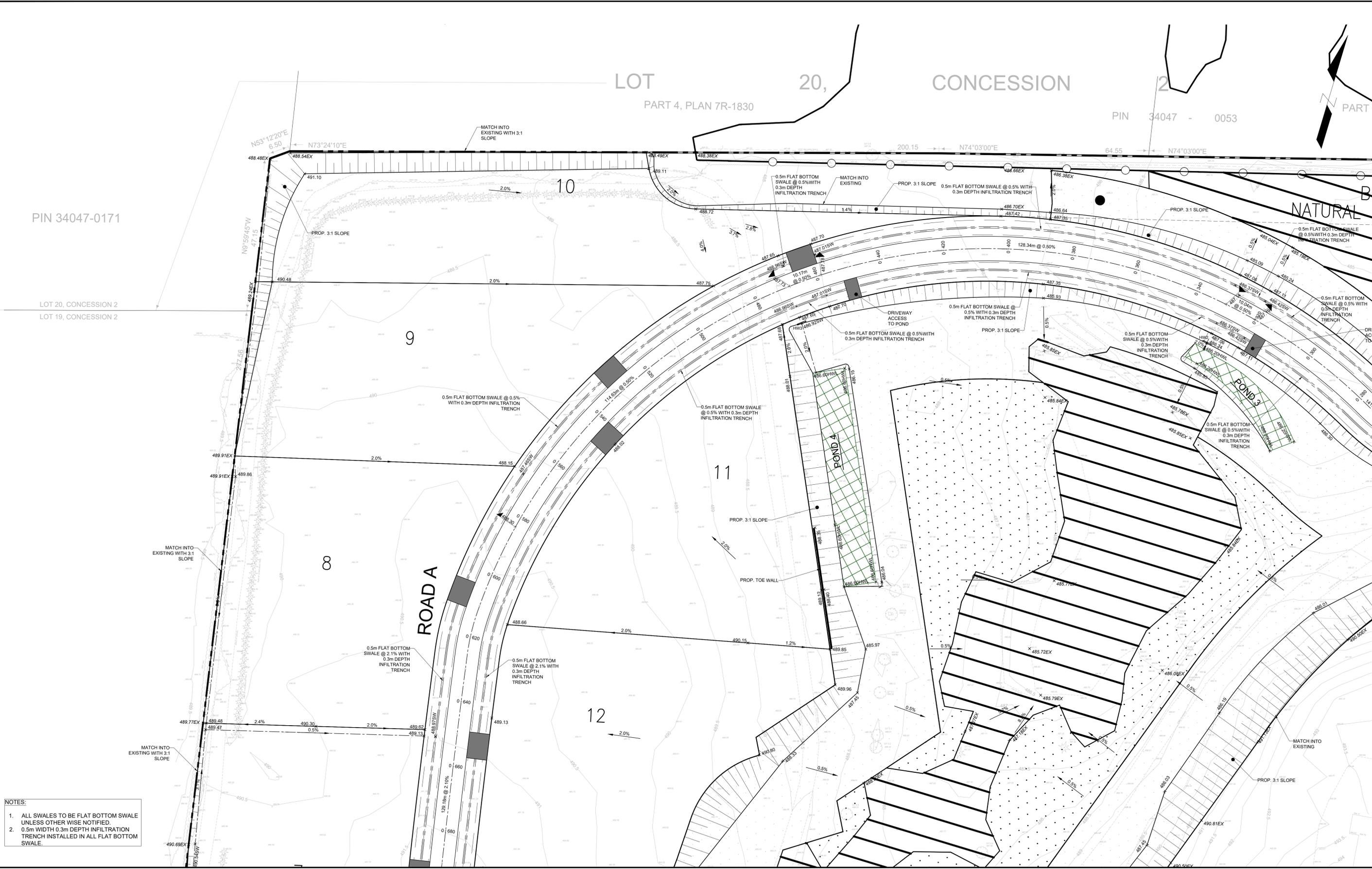
DAN DZALDOV
ONTARIO LAND SURVEYOR
DATE: OCTOBER 6, 2025

SCHAEFFER DZALDOV PURCELL LTD.
ONTARIO LAND SURVEYORS
64 JARDIN DRIVE CONCORD, ONTARIO L4K 3P3 TEL.(416)987-0101
DRAWN ACAD/SL/W CHECKED LEGAL R/MCK SCALE 1:1000 JOB NO. 23-313-01H
PLOT SIZE: 30X36 OCTOBER 6, 2025

AGRICULTURAL

LOT

RESIDENTIAL



PIN 34047-0171

LOT 20, CONCESSION 2
PART 4, PLAN 7R-1830

PIN 34047 - 0053

NATURAL

LOT 20, CONCESSION 2
LOT 19, CONCESSION 2

ROAD A

- NOTES:**
1. ALL SWALES TO BE FLAT BOTTOM SWALE UNLESS OTHERWISE NOTIFIED.
 2. 0.5m WIDTH 0.3m DEPTH INFILTRATION TRENCH INSTALLED IN ALL FLAT BOTTOM SWALE.

SEE DWG. SG-03

LEGEND	
PROPERTY LINE	--- ---
LOT LINES	— — — —
EDGE OF SHOULDER	— — — —
ROAD CENTRE LINE	— — — —
STREET NAME	— — — —
PROPOSED GRADE	x 491.25
EXISTING GRADE	x 490.46EX
PROPOSED SWALE GRADE	x 490.46SW
OVERLAND FLOW ROUTE	— — — —
0.5m FLAT BOTTOM SWALE WITH 0.3m DEPTH INFILTRATION TRENCH	— — — —
V-SHAPED SWALE	— — — —
PROPOSED HEADWALL	— — — —
PROPOSED STORM CULVERT	— — — —
UNEVALUATED WETLAND / PROVINCIAL SIGNIFICANT WETLAND + 15m BUFFER	— — — —
WATERCOURSE/HABITAT	— — — —
UNEVALUATED WETLAND/ PROVINCIAL SIGNIFICANT WETLAND	— — — —
RESTORED HISTORICAL WETLAND	— — — —
CONSTRUCTED WETLAND	— — — —
POST DEVELOPMENT BUFFER (CONSTRUCTED)	— — — —

514504 2ND LINE
PART OF LOT 19, CONCESSION 2
TOWNSHIP OF AMARANTH, COUNTY OF DUFFERIN
THE CELLULAR CONNECTION LTD.



CONCEPTUAL GRADING PLAN
SCALE: 1:500
NOVEMBER 2025
SG-01

CONVESSION

PIN 34047 - 0053

PART 3, PLAN 7R-1830

PART 1, PLAN 7R-1830
PIN 34047-0054

BLOCK 20 NATURAL HERITAGE SYSTEM

SEE DWG. SG-01

SEE DWG. SG-04

LEGEND	
PROPERTY LINE	--- PROPOSED GRADE x 491.25
LOT LINES	--- EXISTING GRADE x 490.46EX
EDGE OF SHOULDER	--- PROPOSED SWALE GRADE x 490.46SW
ROAD CENTRE LINE	--- OVERLAND FLOW ROUTE
STREET NAME	STREET NAME
0.5m FLAT BOTTOM SWALE WITH 0.3m DEPTH INFILTRATION TRENCH	PROPOSED SWALE
PROPOSED HEADWALL	PROPOSED STORM CULVERT
UNEVALUATED WETLAND / PROVINCIALY SIGNIFICANT WETLAND + 15m BUFFER	RESTORED HISTORICAL WETLAND
WATERCOURSE/HABITAT	CONSTRUCTED WETLAND
UNEVALUATED WETLAND/ PROVINCIALY SIGNIFICANT WETLAND	POST DEVELOPMENT BUFFER (CONSTRUCTED)

514504 2ND LINE
PART OF LOT 19, CONVESSION 2
TOWNSHIP OF AMARANTH, COUNTY OF DUFFERIN

THE CELLULAR CONNECTION LTD.



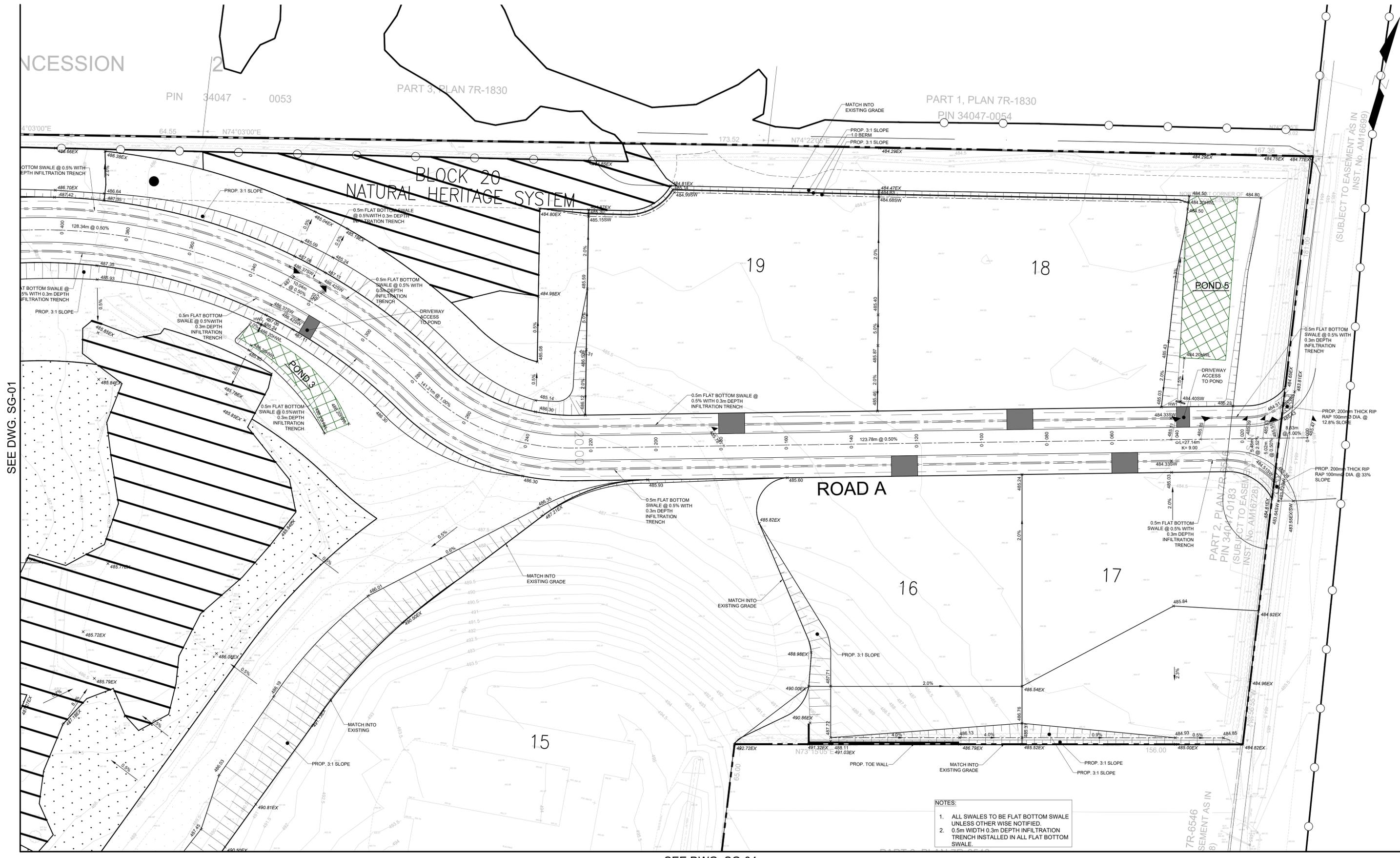
CONCEPTUAL GRADING PLAN

SCALE: 1:500

NOVEMBER 2025

SG-02

- NOTES:
- ALL SWALES TO BE FLAT BOTTOM SWALE UNLESS OTHERWISE NOTIFIED.
 - 0.5m WIDTH 0.3m DEPTH INFILTRATION TRENCH INSTALLED IN ALL FLAT BOTTOM SWALE.

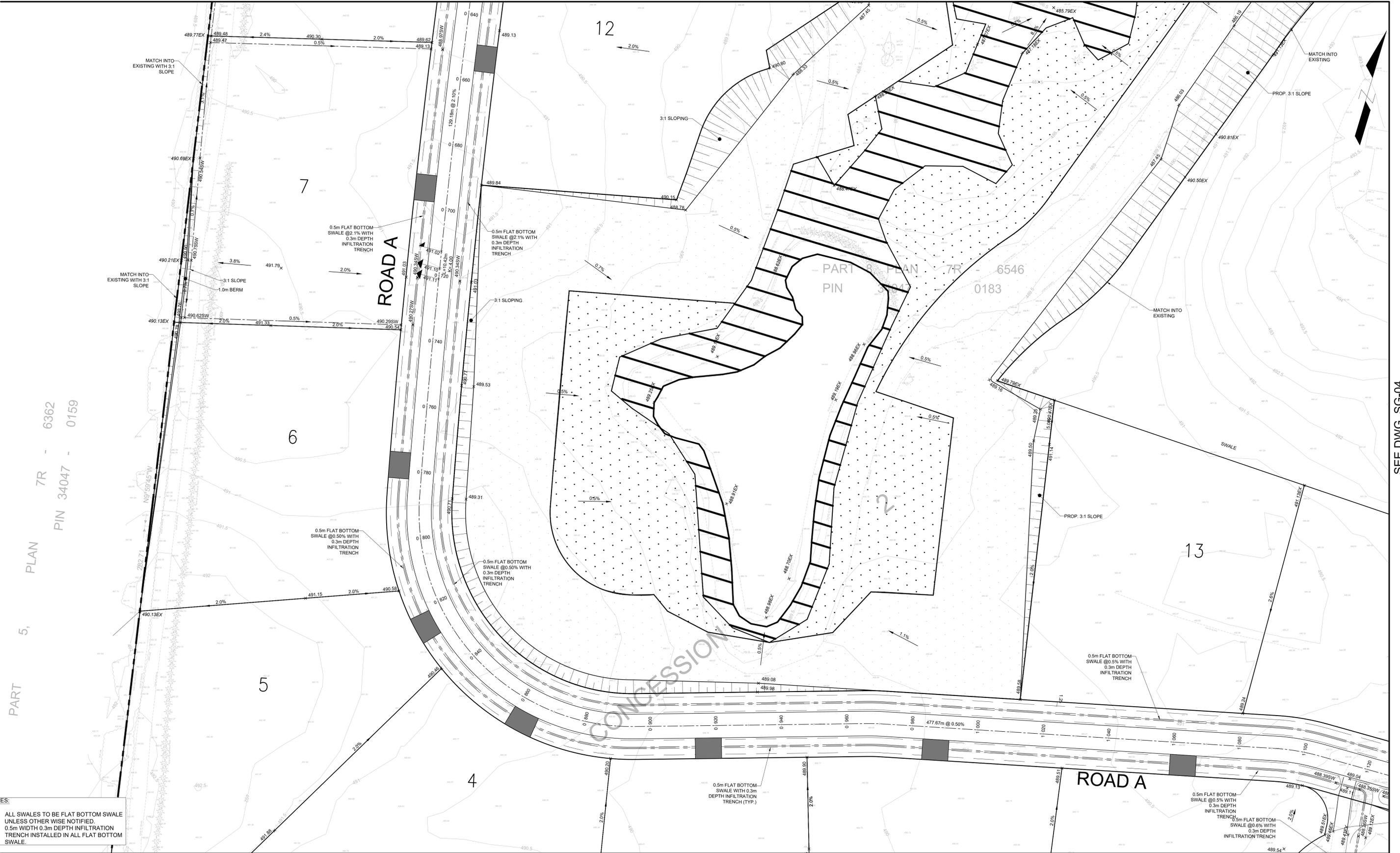


(SUBJECT TO EASEMENT AS IN INST. NO. AM16699)

PART 2, PLAN 7R-1830
PIN 34047-0183
(SUBJECT TO EASEMENT AS IN INST. NO. AM16728)

7R-6546
EASEMENT AS IN INST. NO. AM16728

SEE DWG. SG-01



- NOTES:
1. ALL SWALES TO BE FLAT BOTTOM SWALE UNLESS OTHERWISE NOTIFIED.
 2. 0.5m WIDTH 0.3m DEPTH INFILTRATION TRENCH INSTALLED IN ALL FLAT BOTTOM SWALE.

SEE DWG. SG-05

LEGEND	
PROPERTY LINE	--- ---
LOT LINES	— — — —
EDGE OF SHOULDER	— — — —
ROAD CENTRE LINE	— — — —
STREET NAME	STREET NAME
PROPOSED GRADE	x 491.25
EXISTING GRADE	x 490.46EX
PROPOSED SWALE GRADE	x 490.46SW
OVERLAND FLOW ROUTE	— — — —
0.5m FLAT BOTTOM SWALE WITH 0.3m DEPTH INFILTRATION TRENCH	— — — —
V-SHAPED SWALE	— — — —
PROPOSED HEADWALL	— — — —
PROPOSED STORM CULVERT	— — — —
UNEVALUATED WETLAND / PROVINCIAL SIGNIFICANT WETLAND + 15m BUFFER	— — — —
WATERCOURSE/HABITAT	— — — —
UNEVALUATED WETLAND / PROVINCIAL SIGNIFICANT WETLAND	— — — —
RESTORED HISTORICAL WETLAND	— — — —
CONSTRUCTED WETLAND	— — — —
POST DEVELOPMENT BUFFER (CONSTRUCTED)	— — — —

514504 2ND LINE
 PART OF LOT 19, CONCESSION 2
 TOWNSHIP OF AMARANTH, COUNTY OF DUFFERIN
 THE CELLULAR CONNECTION LTD.



2305387

CONCEPTUAL GRADING PLAN

SCALE: 1:500

NOVEMBER 2025

SG-03

SEE DWG. SG-04

SEE DWG. SG-02

SEE DWG. SG-03

SEE DWG. SG-06



- NOTES:**
1. ALL SWALES TO BE FLAT BOTTOM SWALE UNLESS OTHERWISE NOTIFIED.
 2. 0.5m WIDTH 0.3m DEPTH INFILTRATION TRENCH INSTALLED IN ALL FLAT BOTTOM SWALE.

LEGEND	
PROPERTY LINE	--- ---
LOT LINES	— — — —
EDGE OF SHOULDER	— — — —
ROAD CENTRE LINE	— — — —
STREET NAME	PROPOSED GRADE x 491.25
STREET NAME	EXISTING GRADE x 490.46EX
STREET NAME	PROPOSED SWALE GRADE x 490.46SW
STREET NAME	OVERLAND FLOW ROUTE
0.5m FLAT BOTTOM SWALE WITH 0.3m DEPTH INFILTRATION TRENCH	— — — —
V-SHAPED SWALE	— — — —
PROPOSED HEADWALL	— — — —
PROPOSED STORM CULVERT	— — — —
UNEVALUATED WETLAND / PROVINCIALLY SIGNIFICANT WETLAND + 15m BUFFER	— — — —
WATERCOURSE/HABITAT	— — — —
UNEVALUATED WETLAND/ PROVINCIALLY SIGNIFICANT WETLAND	— — — —
RESTORED HISTORICAL WETLAND	— — — —
CONSTRUCTED WETLAND	— — — —
POST DEVELOPMENT BUFFER (CONSTRUCTED)	— — — —

514504 2ND LINE
 PART OF LOT 19, CONCESSION 2
 TOWNSHIP OF AMARANTH, COUNTY OF DUFFERIN
 THE CELLULAR CONNECTION LTD.



CONCEPTUAL GRADING PLAN
 SCALE: 1:500
 NOVEMBER 2025
 SG-04

SEE DWG. SG-03



- NOTES:**
1. ALL SWALES TO BE FLAT BOTTOM SWALE UNLESS OTHERWISE NOTIFIED.
 2. 0.5m WIDTH 0.3m DEPTH INFILTRATION TRENCH INSTALLED IN ALL FLAT BOTTOM SWALE.

SEE DWG. SG-06

LEGEND		STREET NAME	STREET NAME	0.5m FLAT BOTTOM SWALE WITH 0.3m DEPTH INFILTRATION TRENCH	UNEVALUATED WETLAND / PROVINCIAL SIGNIFICANT WETLAND + 15m BUFFER	RESTORED HISTORICAL WETLAND
PROPERTY LINE	---	PROPOSED GRADE	x 491.25	V-SHAPED SWALE	-----	-----
LOT LINES	---	EXISTING GRADE	x 490.46EX	PROPOSED HEADWALL	-----	-----
EDGE OF SHOULDER	---	PROPOSED SWALE GRADE	x 490.46SW	PROPOSED STORM CULVERT	-----	-----
ROAD CENTRE LINE	---	OVERLAND FLOW ROUTE	---		-----	-----

514504 2ND LINE
 PART OF LOT 19, CONCESSION 2
 TOWNSHIP OF AMARANTH, COUNTY OF DUFFERIN
 THE CELLULAR CONNECTION LTD.



CONCEPTUAL GRADING PLAN
 SCALE: 1:500
 NOVEMBER 2025
 SG-05

SEE DWG. SG-04

SEE DWG. SG-05



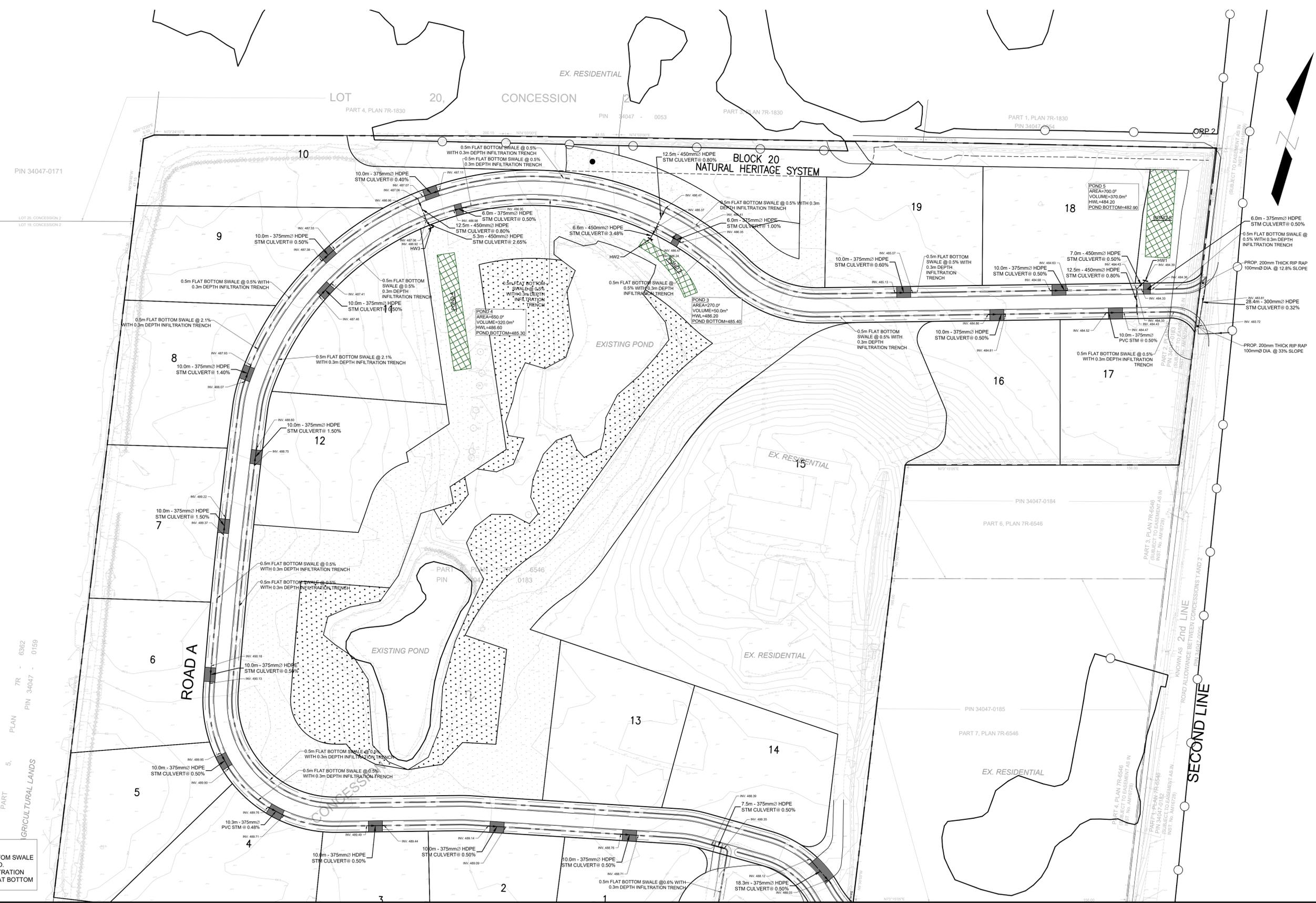
- NOTES:
1. ALL SWALES TO BE FLAT BOTTOM SWALE UNLESS OTHERWISE NOTIFIED.
 2. 0.5m WIDTH 0.3m DEPTH INFILTRATION TRENCH INSTALLED IN ALL FLAT BOTTOM SWALE.

LEGEND	
PROPERTY LINE	--- ---
LOT LINES	— — — —
EDGE OF SHOULDER	— · — · —
ROAD CENTRE LINE	— + — + —
STREET NAME	PROPOSED GRADE x 491.25
STREET NAME	EXISTING GRADE x 490.46EX
STREET NAME	PROPOSED SWALE GRADE x 490.46SW
STREET NAME	OVERLAND FLOW ROUTE
0.5m FLAT BOTTOM SWALE WITH 0.3m DEPTH INFILTRATION TRENCH	— — — —
V-SHAPED SWALE	— · — · —
PROPOSED HEADWALL	— + — + —
PROPOSED STORM CULVERT	— x — x —
UNEVALUATED WETLAND / PROVINCIALY SIGNIFICANT WETLAND + 15m BUFFER	— · — · —
WATERCOURSE/HABITAT	— x — x —
UNEVALUATED WETLAND/ PROVINCIALY SIGNIFICANT WETLAND	— · — · —
RESTORED HISTORICAL WETLAND	— · — · —
CONSTRUCTED WETLAND	— · — · —
POST DEVELOPMENT BUFFER (CONSTRUCTED)	— · — · —

514504 2ND LINE
 PART OF LOT 19, CONSESSION 2
 TOWNSHIP OF AMARANTH, COUNTY OF DUFFERIN
 THE CELLULAR CONNECTION LTD.



CONCEPTUAL GRADING PLAN
 SCALE: 1:500
 NOVEMBER 2025
 SG-06



- NOTES:**
1. ALL SWALES TO BE FLAT BOTTOM SWALE UNLESS OTHERWISE NOTIFIED.
 2. 0.5m WIDTH 0.3m DEPTH INFILTRATION TRENCH INSTALLED IN ALL FLAT BOTTOM SWALE.

SEE DWG. SS-02

LEGEND	
PROPERTY LINE	0.5m FLAT BOTTOM SWALE WITH 0.3m DEPTH INFILTRATION TRENCH
LOT LINES	PROPOSED HEADWALL
EDGE OF SHOULDER	PROPOSED STORM CULVERT
ROAD CENTRE LINE	STREET NAME
	UNEVALUATED WETLAND / PROVINCIAL SIGNIFICANT WETLAND + 15m BUFFER
	WATERCOURSE/HABITAT
	UNEVALUATED WETLAND / PROVINCIAL SIGNIFICANT WETLAND
	RESTORED HISTORICAL WETLAND
	CONSTRUCTED WETLAND
	POST DEVELOPMENT BUFFER (CONSTRUCTED)

514504 2ND LINE
 PART OF LOT 19, CONCESSION 2
 TOWNSHIP OF AMARANTH, COUNTY OF DUFFERIN

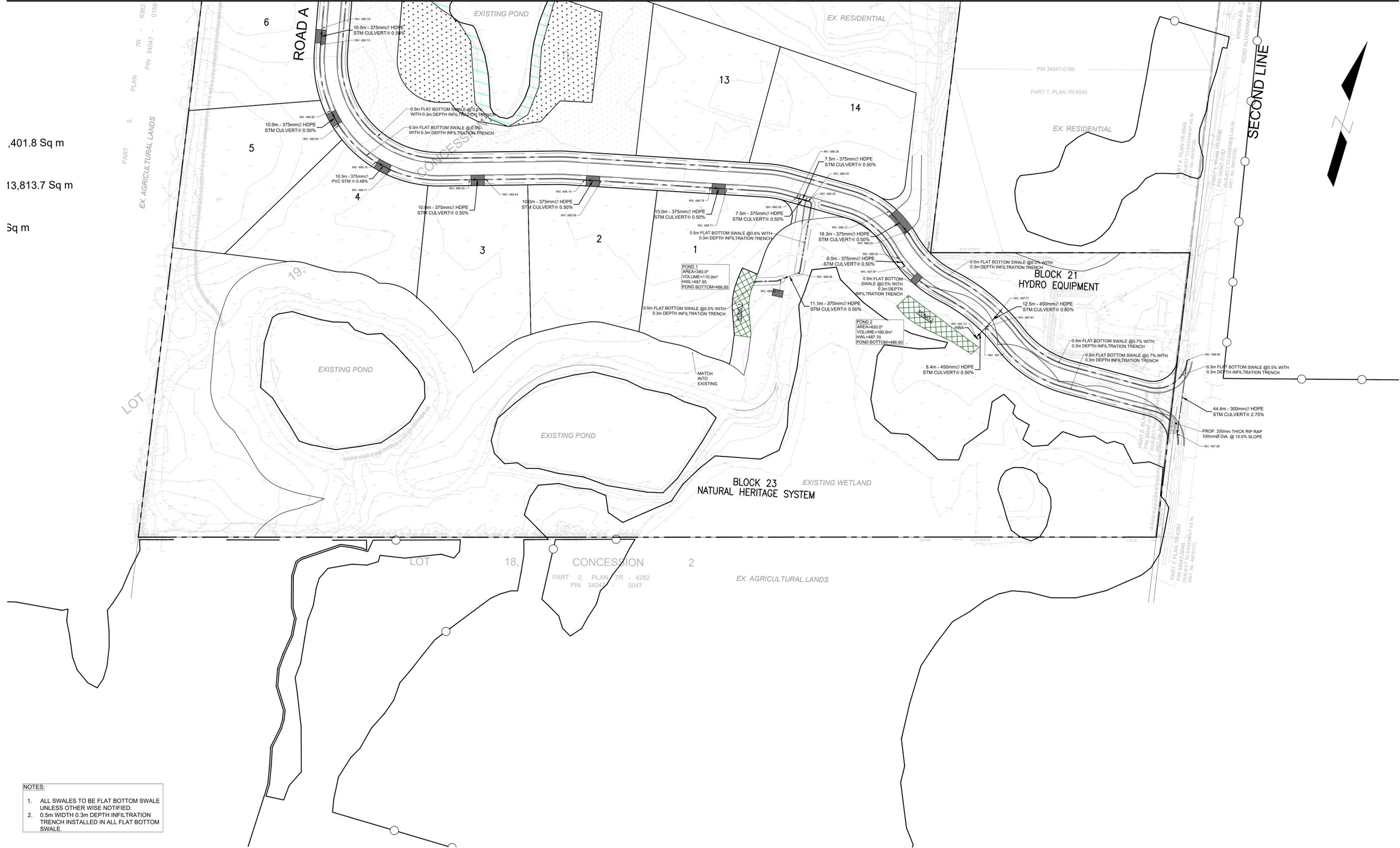
THE CELLULAR CONNECTION LTD.



CONCEPTUAL SERVICING PLAN

2305387 SCALE: 1:1000 NOVEMBER 2025 SS-01

SEE DWG. SS-01



401.8 Sq m
13,813.7 Sq m
Sq m

- NOTES:**
1. ALL SWALES TO BE FLAT BOTTOM SWALE UNLESS OTHER WISE NOTIFIED.
 2. 0.5m WIDTH 0.3m DEPTH INFILTRATION TRENCH INSTALLED IN ALL FLAT BOTTOM SWALE.

LEGEND	
PROPERTY LINE	--- ---
LOT LINES	— — — —
EDGE OF SHOULDER	— — — —
ROAD CENTRE LINE	— — — —
STREET NAME	— — — —
PROPOSED GRADE	x 491.25
EXISTING GRADE	x 488.53
PROPOSED SWALE GRADE	x 490.46SW
OVERLAND FLOW ROUTE	— — — —
0.5m FLAT BOTTOM SWALE WITH 0.3m DEPTH INFILTRATION TRENCH	— — — —
V-SHAPED SWALE	— — — —
PROPOSED DITCH INLET CATCH BASIN	— — — —
PROPOSED HEADWALL	— — — —
PROPOSED STORM CULVERT	— — — —
WOODLAND AREA	— — — —
SIGNIFICANT WETLAND	— — — —
WATERCOURSE/HABITAT	— — — —
UNEVALUATED WETLAND/PROVINCIAL SIGNIFICANT WETLAND	— — — —
UNEVALUATED WETLAND / PROVINCIAL SIGNIFICANT WETLAND + 30m BUFFER	— — — —

514504 2ND LINE
PART OF LOT 19, CONCESSION 2
TOWNSHIP OF AMARANTH, COUNTY OF DUFFERIN

THE CELLULAR CONNECTION LTD.



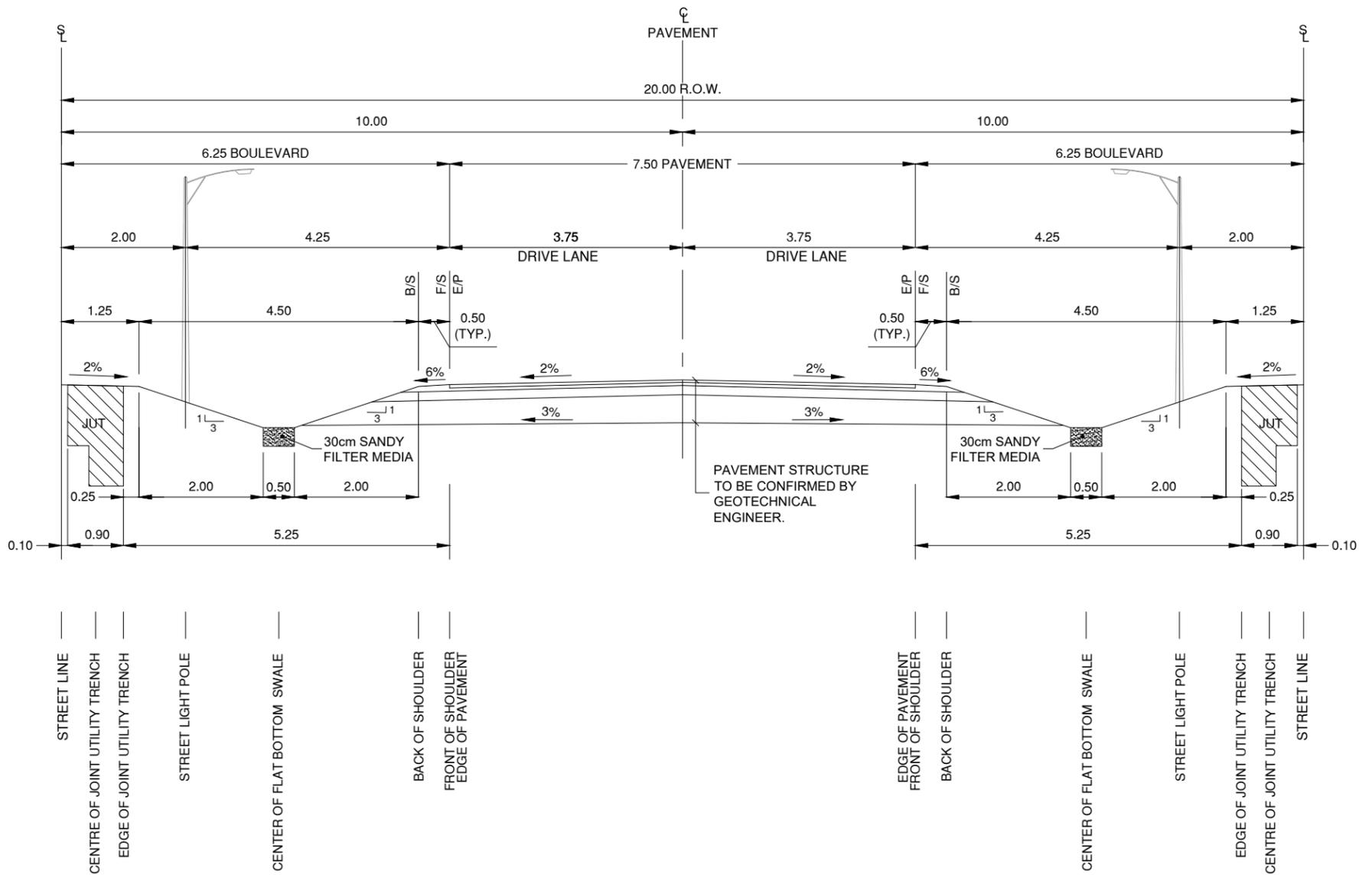
CONCEPTUAL SERVICING PLAN

2305387

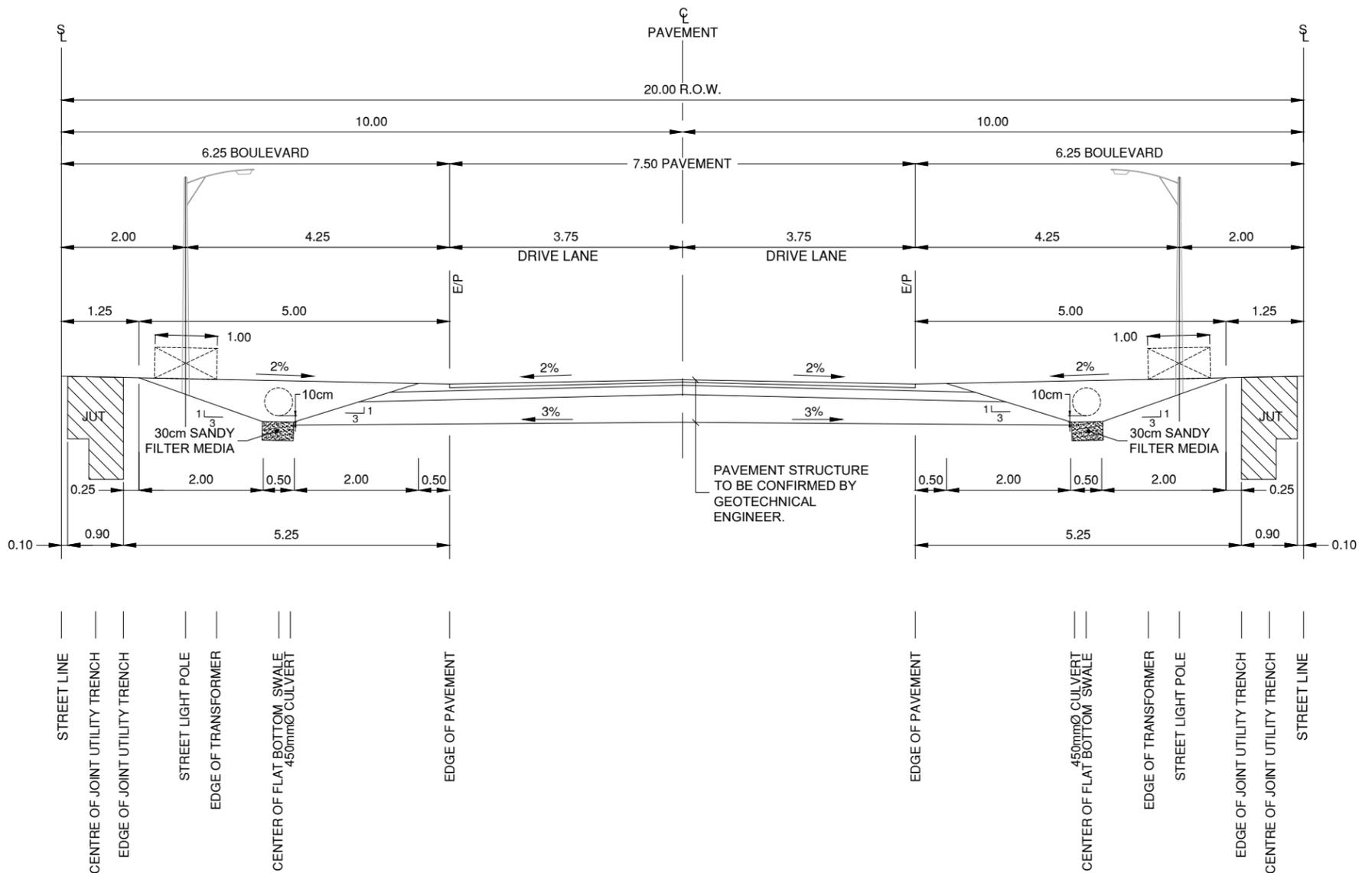
SCALE: 1:1000

NOVEMBER 2025

SS-02



TYPICAL 20m R.O.W. (RIGHT-OF-WAY) CROSS-SECTION
NOT TO SCALE



TYPICAL 20m R.O.W. (RIGHT-OF-WAY) CROSS-SECTION
AT RESIDENTIAL DRIVEWAYS AND TRANSFORMERS
NOT TO SCALE

*NOTE: DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.

514504 SECOND LINE
PART OF LOT 19, CONCESSION 2
TOWNSHIP OF AMARANTH, COUNTY OF DUFFERIN



TYPICAL ROW CROSS-SECTIONS

THE CELLULAR CONNECTION LTD.

2305387

JANUARY 2025

FIG-3

APPENDIX B

**KEYPLAN, BOREHOLE LOCATIONS,
DRAINAGE MAP, GEOLOGICAL MAPS
BOREHOLE LOGS, GRAIN SIZE ANALYSIS**



Google Earth

CLIENT:
THE CELLULAR CONNECTION LTD.

514504 LINE 2,
AMARANTH, ONTARIO
L0N 1L0

PROJECT:
HYDROGEOLOGICAL INVESTIGATION

514504 LINE 2,
AMARANTH, ONTARIO
L0N 1L0

TITLE:
KEYPLAN SHOWING SITE AND
SURROUNDING AREA

SCALE:

AS SHOWN

DRAWING NO:

1

DATE:

JAN / 2024

PROJECT NO

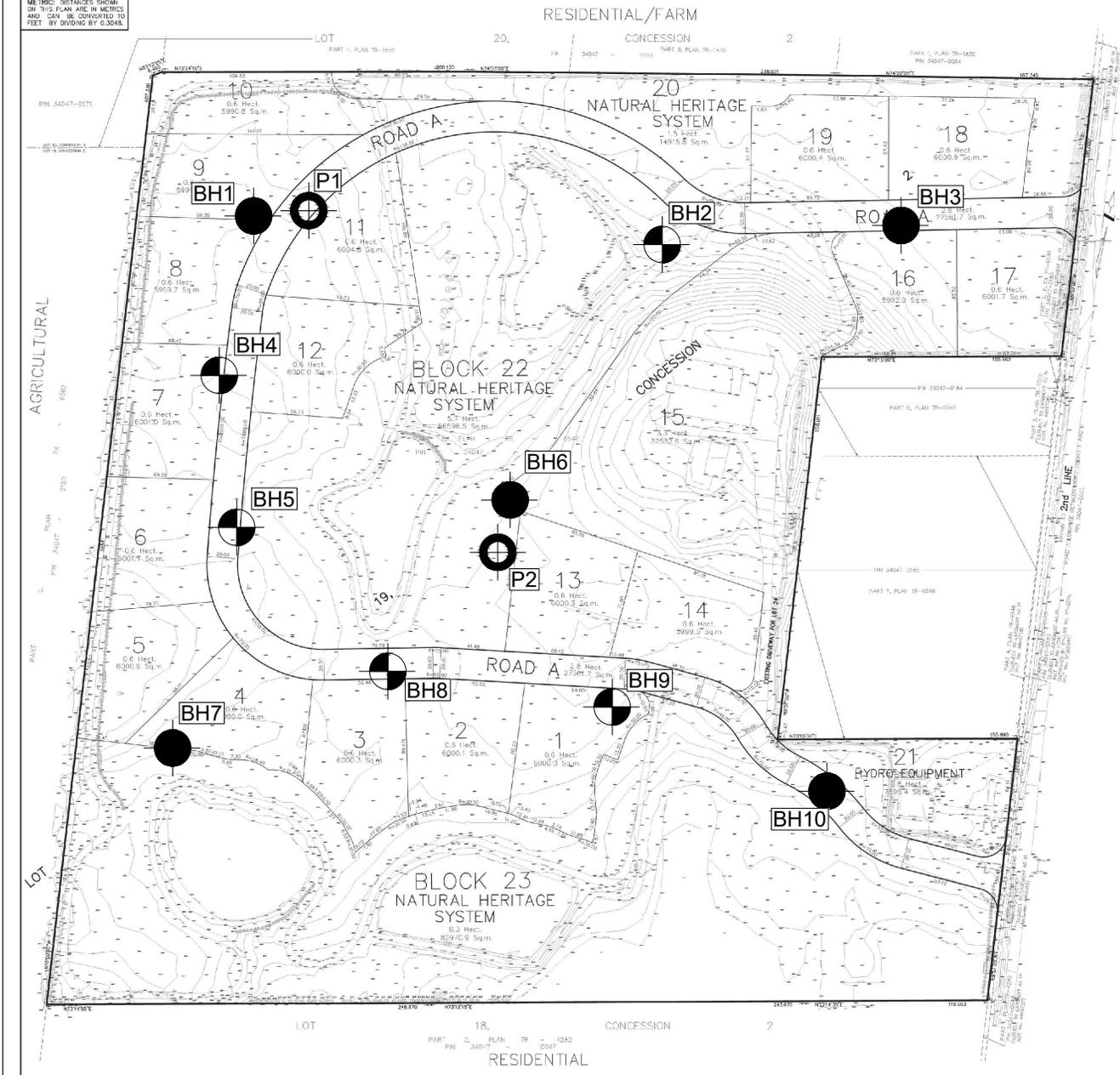
230114



**CANADA ENGINEERING
SERVICES INC.**

39 DAVISBROOK BOULEVARD
SCARBOROUGH, ONTARIO M1T 2H6
Ph: 416 492 4000 Fax: 416 492 4001
E-mail address: cesi@cesi.ca

METRIC DETAILS SHOWN ON THIS PLAN ARE IN METRICS AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.



LEGEND:

- BOREHOLES
- MONITORING WELLS
- PERCOLATION TEST

THIS DRAWING IS PREPARED FROM THE TOPOGRAPHIC DRAFT PLAN OF SUBDIVISION OF PART OF LOT 19 CONCESSION 2 SURVEY PLAN BY SCHAFER DZALDOV PURCELL LTD., OCTOBER 6, 2025.



CLIENT:
THE CELLULAR CONNECTION LTD.

514504 LINE 2,
AMARANTH, ONTARIO
L0N 1L0

PROJECT:
HYDROGEOLOGICAL INVESTIGATION

514504 LINE 2,
AMARANTH, ONTARIO
L0N 1L0

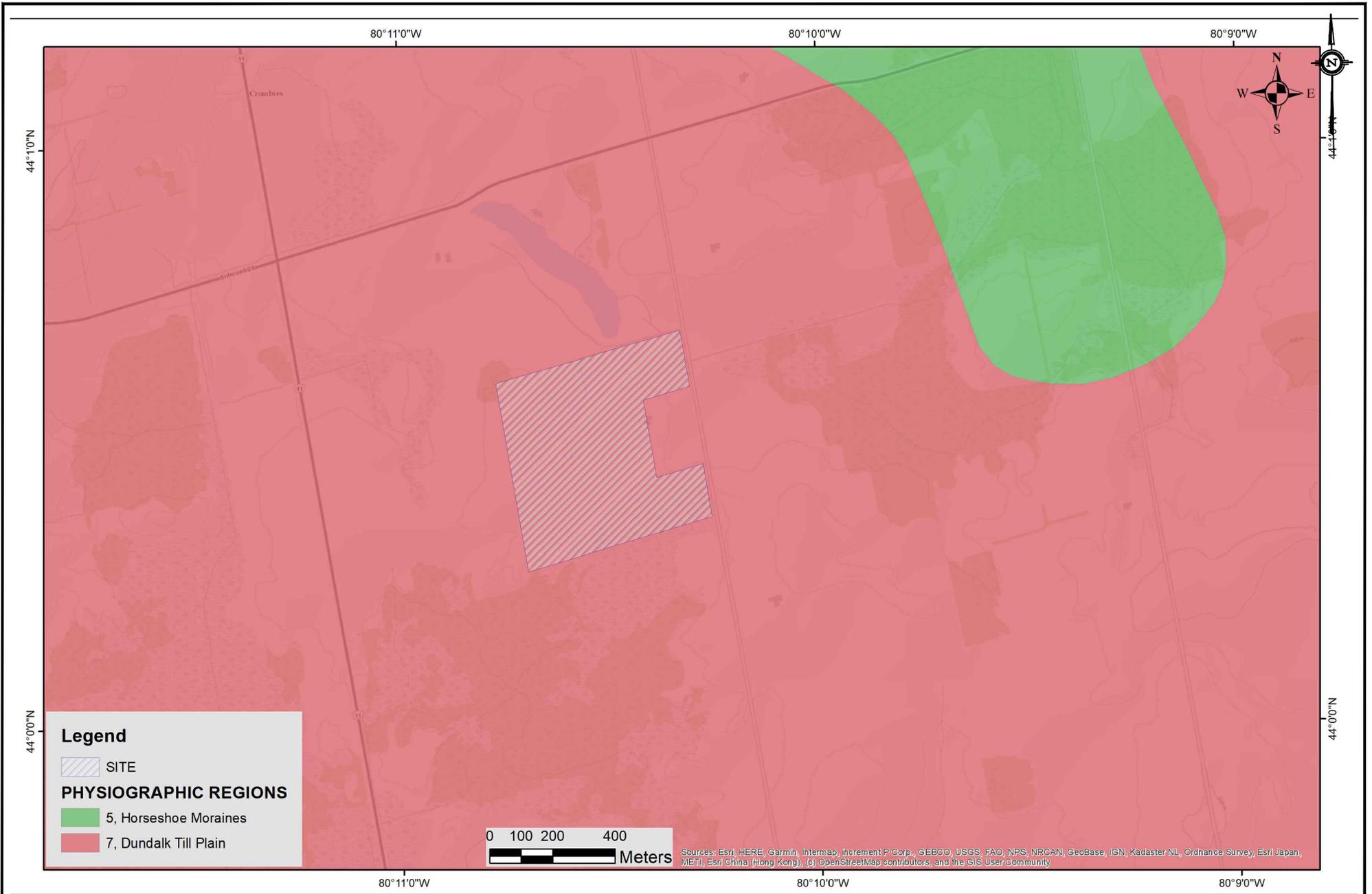
TITLE:
KEYPLAN SHOWING SITE AND
SURROUNDING AREA

SCALE:
AS SHOWN
DRAWING NO.:
2

DATE:
OCT / 2025
PROJECT NO.
230114



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 L0N 1L0

PROJECT:
 HYDROGEOLOGICAL INVESTIGATION
 514504 LINE 2,
 AMARANTH, ONTARIO
 L0N 1L0

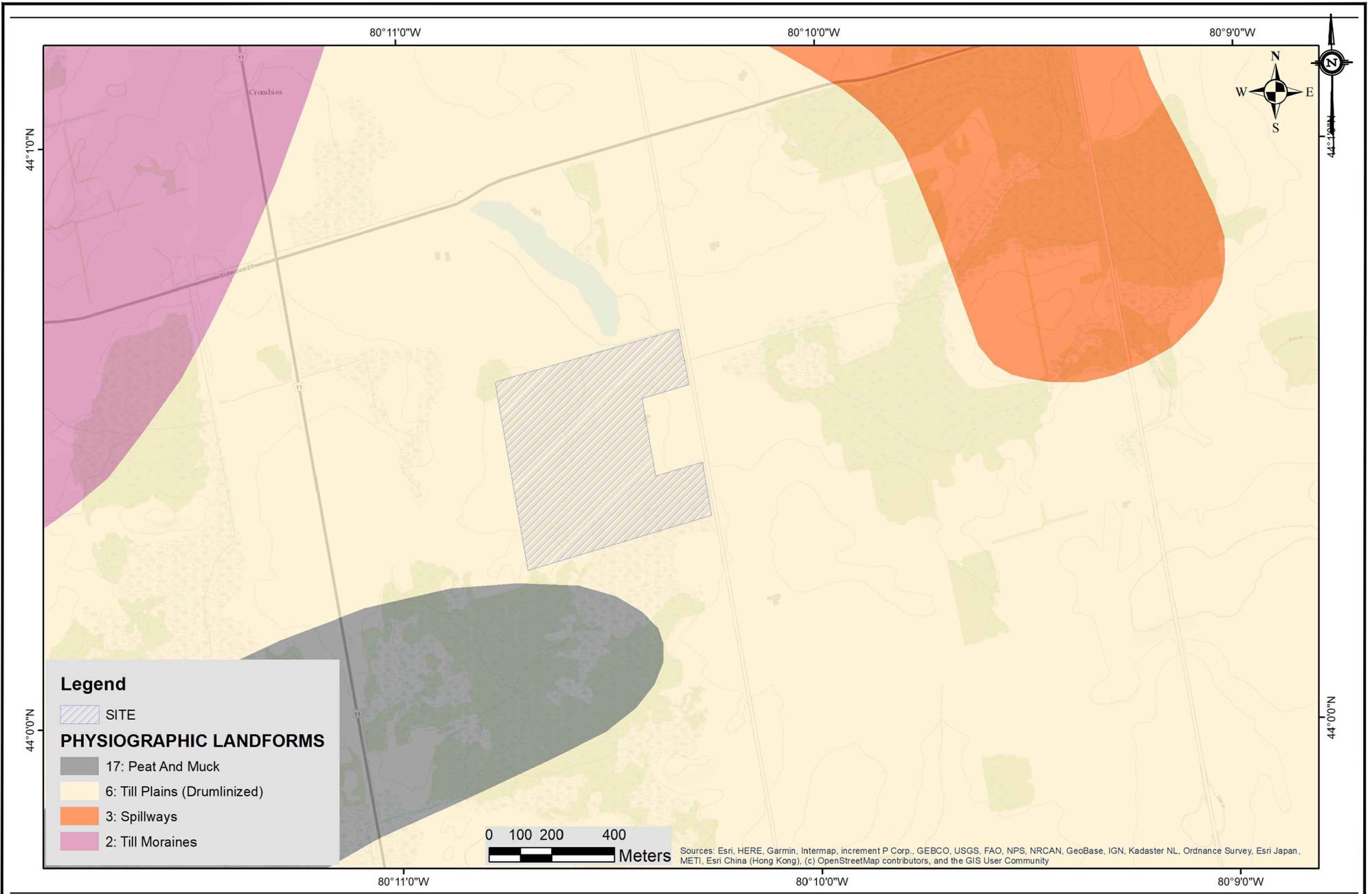
TITLE:
 PHYSIOGRAPHIC REGIONS OF
 SITE AND SURROUNDING AREA

SCALE:
 AS SHOWN
 DRAWING NO:
 3

DATE:
 JAN / 2024
 PROJECT NO:
 230114



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L0N 1L0

PROJECT:
HYDROGEOLOGICAL INVESTIGATION

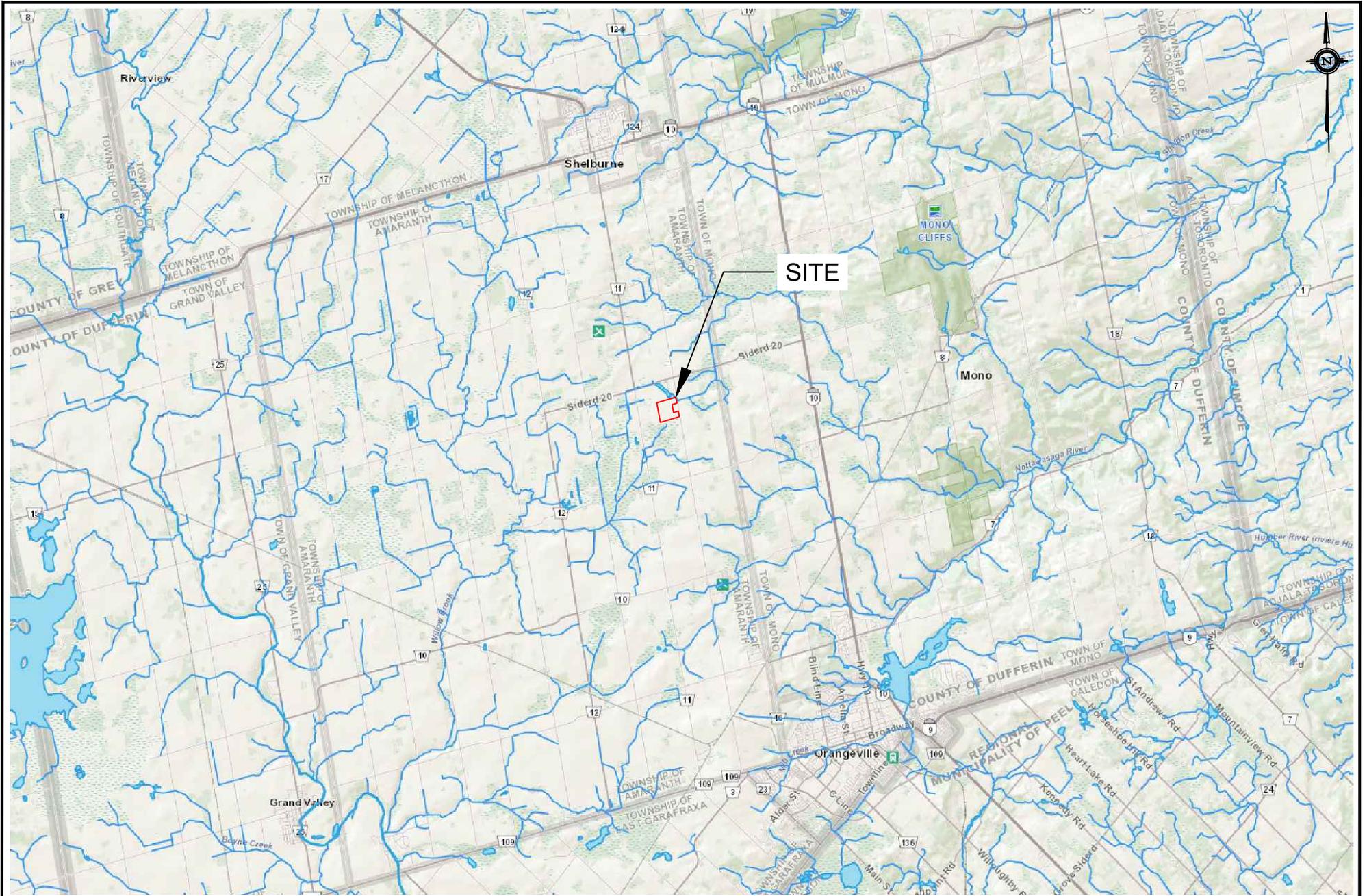
514504 LINE 2,
AMARANTH, ONTARIO
L0N 1L0

TITLE:
PHYSIOGRAPHIC LANDFORMS OF
SITE AND SURROUNDING AREA

SCALE: AS SHOWN	DATE: JAN / 2024
DRAWING NO. 4	PROJECT NO. 230114



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CLIENT:
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 AMARANTH, ONTARIO
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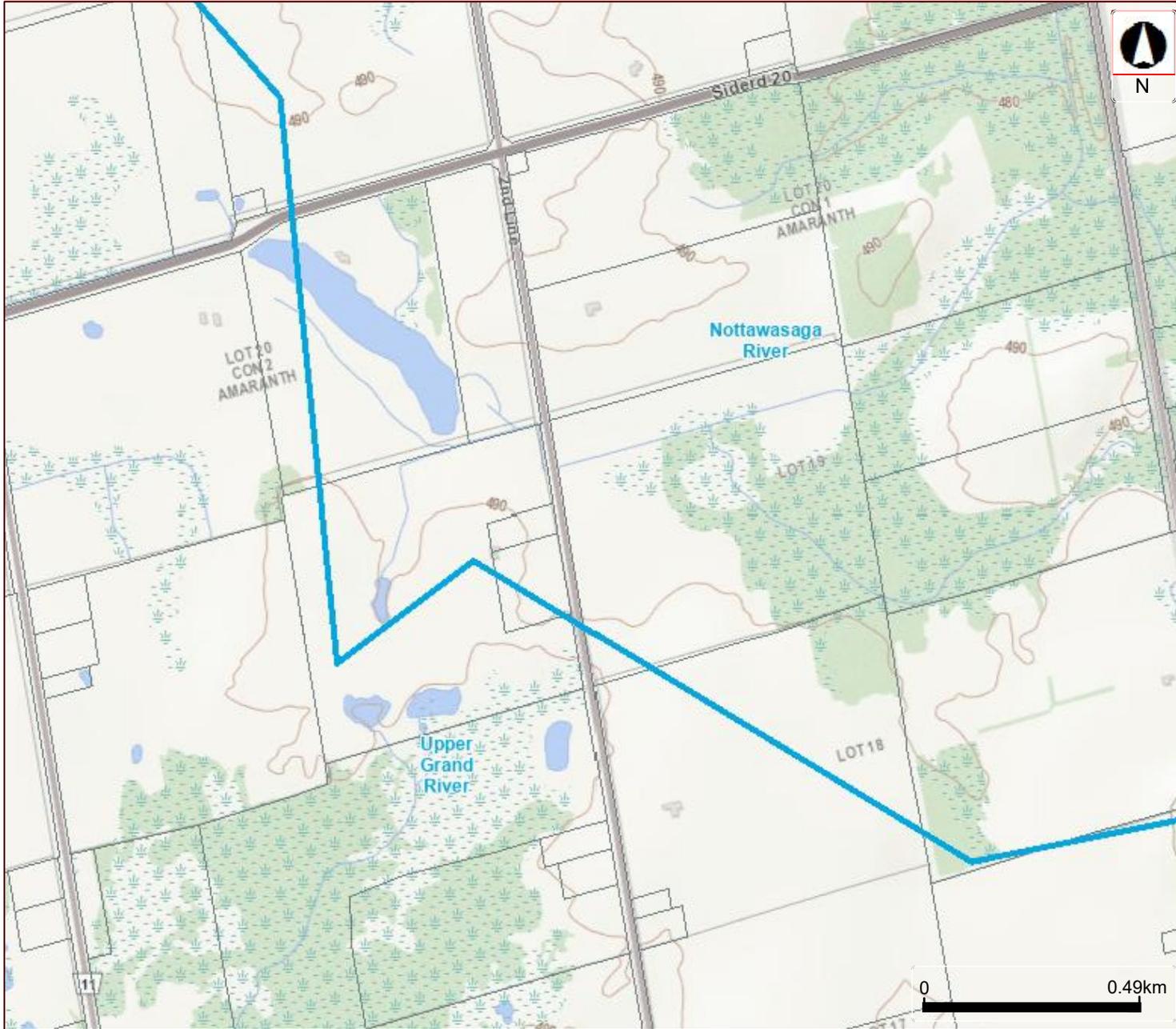
PROJECT:
 HYDROGEOLOGICAL INVESTIGATION
 514504 LINE 2,
 AMARANTH, ONTARIO
 LON 1L0

TITLE:
 SURFACE DRAINAGE AREA OF
 SITE AND SURROUNDING

SCALE:	DATE:
AS SHOWN	JAN / 2024
DRAWING NO:	PROJECT NO
5	230114



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Legend

- Tertiary
- Assessment Parcel

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LON 1L0

PROJECT:
HYDROGEOLOGICAL INVESTIGATION

514504 LINE 2,
AMARANTH, ONTARIO
LON 1L0

TITLE:
WATERSHED OF SITE AND
SURROUNDING

SCALE:
AS SHOWN
DRAWING NO:
6

DATE:
JAN / 2024
PROJECT NO:
230114



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Legend

-  Source Protection Areas
-  Conservation Authority
-  Assessment Parcel

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L0N 1L0

PROJECT:
HYDROGEOLOGICAL INVESTIGATION

514504 LINE 2,
AMARANTH, ONTARIO
L0N 1L0

TITLE:
MECP CONSERVATION
AUTHORITY AND SOURCE
PROTECTION AREA BOUNDARY

SCALE:

AS SHOWN

DRAWING NO:

7

DATE:

JAN / 2024

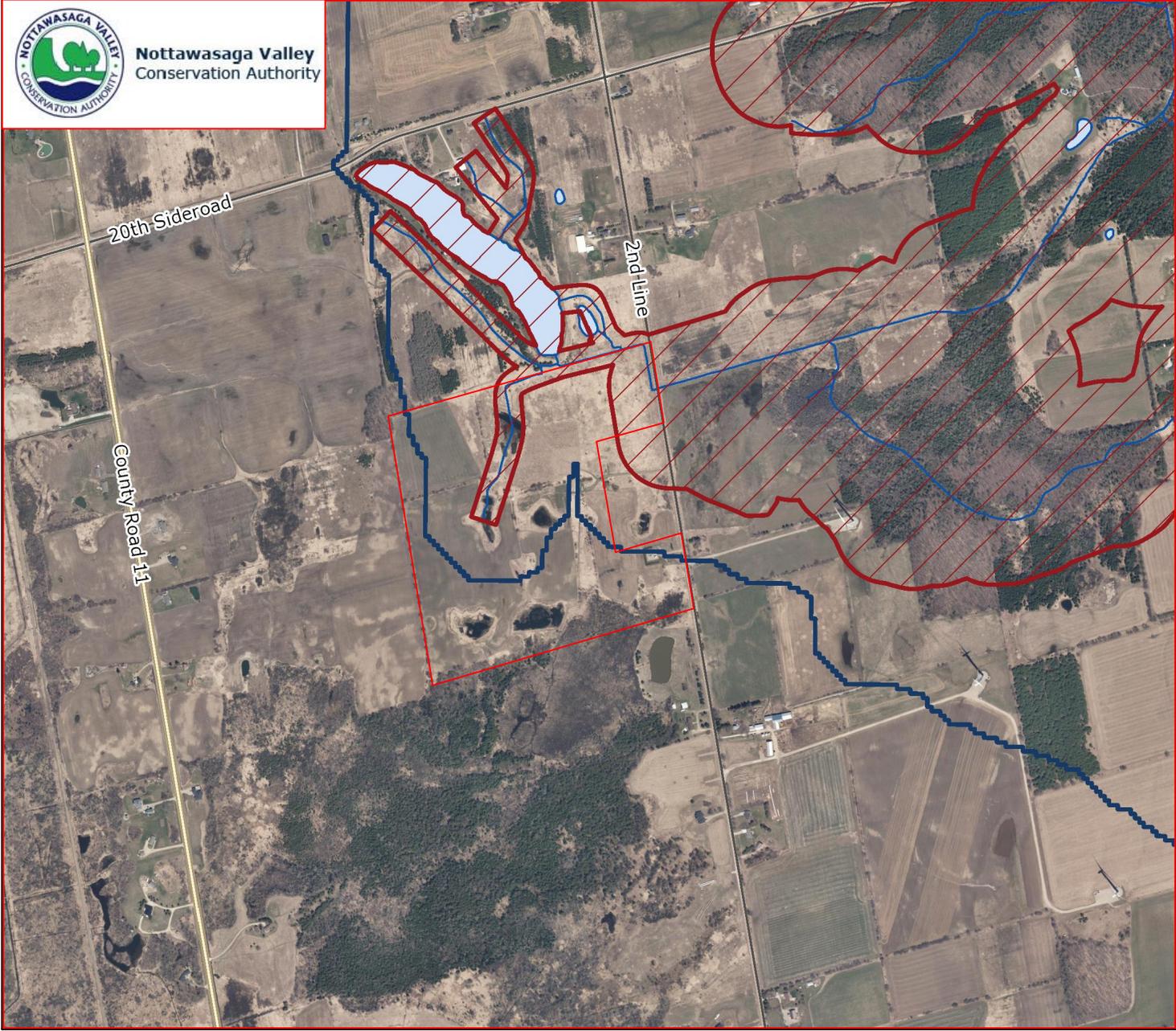
PROJECT NO

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L0N 1L0

PROJECT:
HYDROGEOLOGICAL INVESTIGATION

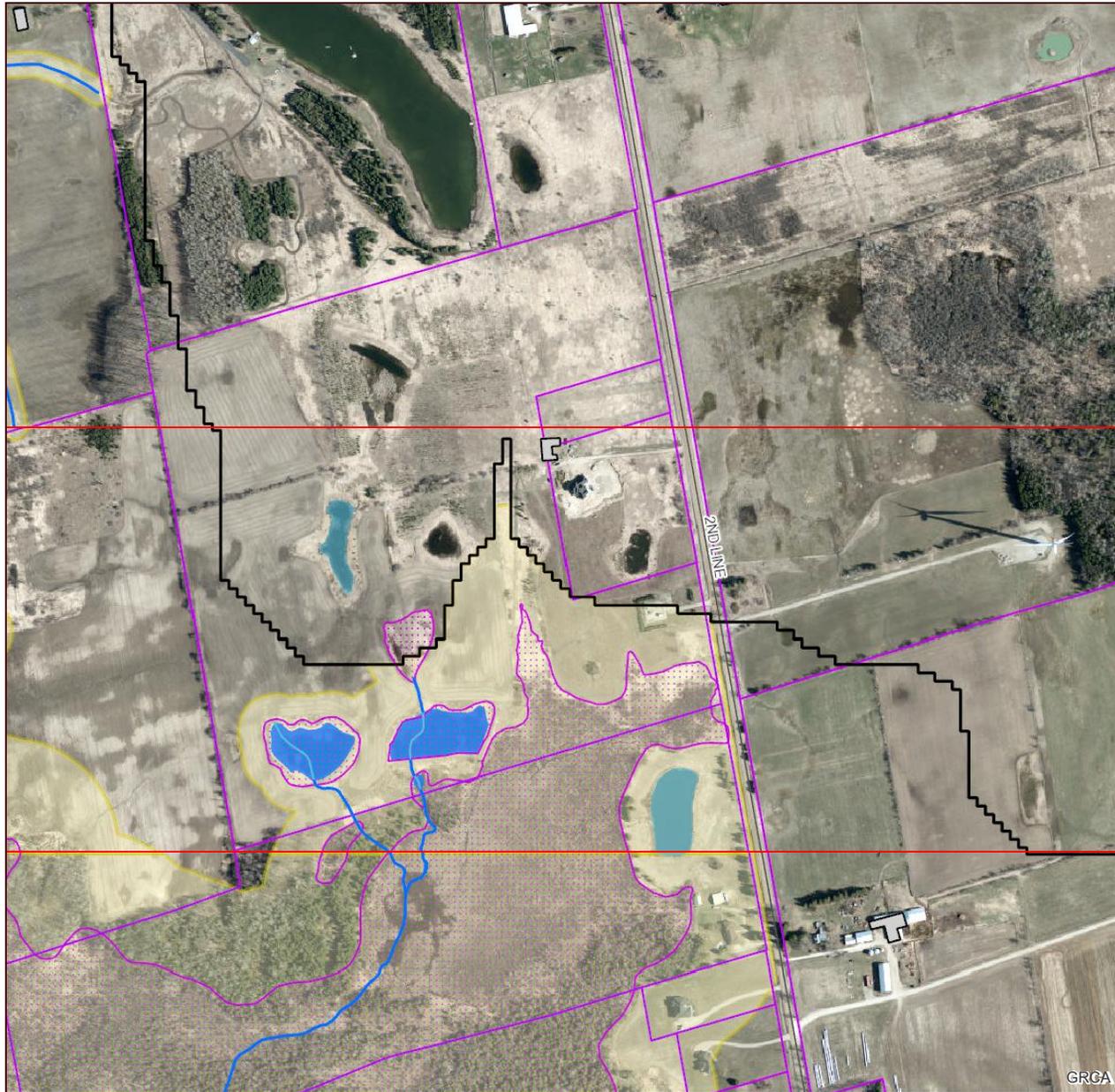
514504 LINE 2,
AMARANTH, ONTARIO
L0N 1L0

TITLE:
NOTTAWASAGA VALLEY
CONSERVATION AUTHORITY
REGULATED AREA AT SITE AND
SURROUNDING

SCALE:	DATE:
AS SHOWN	JAN / 2024
DRAWING NO:	PROJECT NO
8	230114



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Map Centre (UTM NAD83 z17): 566,274.74 4,873,059.51

This map is not to be used for navigation | 2020 Ortho (ON)



Grand River
Conservation Authority
Date: Dec 07, 2023

Grand River Conservation
Authority Regulated Area

Legend

- Regulation Limit (GRCA)
- Regulated Watercourse (GRCA)
- Regulated Waterbody (GRCA)
- Wetland (GRCA)
- Floodplain (GRCA)
 - Engineered
 - Estimated
 - Approximate
 - Special Policy Area
- Slope Valley (GRCA)
 - Steep
 - Oversteep
 - Steep
- Slope Erosion (GRCA)
 - Oversteep
 - Toe
- Lake Erie Flood (GRCA)
- Lake Erie Shoreline Reach (GRCA)
- Lake Erie Dynamic Beach (GRCA)
- Lake Erie Erosion (GRCA)
- Parcel - Assessment (MPAC/MNRF)

This legend is static and may not fully reflect the layers shown on the map. The text of Ontario Regulation 150/06 supercedes the mapping as represented by these layers.

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Disclaimer: This map is for illustrative purposes only. Information contained herein is not a substitute for professional review or a site survey and is subject to change without notice. The Grand River Conservation Authority takes no responsibility for, nor guarantees, the accuracy of the information contained on this map. Any interpretations or conclusions drawn from this map are the sole responsibility of the user.

The source for each data layer is shown in parentheses in the map legend. For a complete listing of sources and citations go to: <https://maps.grandriver.ca/Sources-and-Citations.pdf>



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PROJECT:
HYDROGEOLOGICAL INVESTIGATION

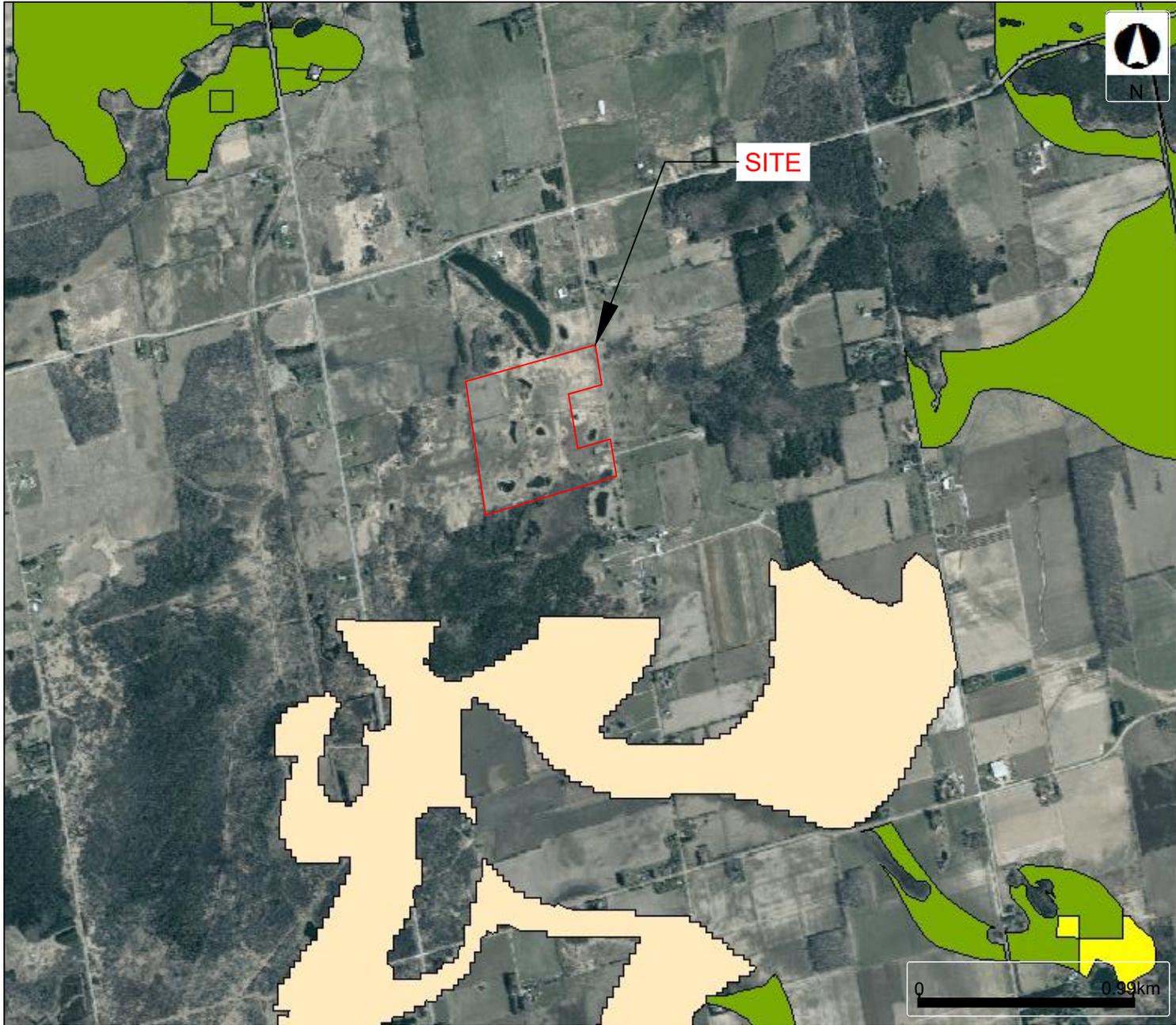
514504 LINE 2,
AMARANTH, ONTARIO
LON 1L0

TITLE:
GRAND RIVER CONSERVATION
AUTHORITY REGULATED AREA AT
SITE AND SURROUNDING

SCALE: AS SHOWN	DATE: JAN / 2024
DRAWING NO: 9	PROJECT NO: 230114



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Legend

- Wellhead Protection Area Q2
- Significant Groundwater Recharge Area
- N/A
- 0
- 2
- 4
- 6
- Assessment Parcel

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PROJECT:
HYDROGEOLOGICAL INVESTIGATION

514504 LINE 2,
AMARANTH, ONTARIO
L0N 1L0

TITLE:
MECP SIGNIFICANT
GROUNDWATER RECHARGE ZONE

SCALE:
AS SHOWN
DRAWING NO:
10

DATE:
JAN / 2024
PROJECT NO:
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E-mail address: cesi@cesi.ca



Legend

-  Issue Contributing Areas
-  Highly Vulnerable Aquifers
- Wellhead Protection Area**
-  A
-  B
-  C
-  C1
-  D
-  F
-  Intake Protection Zone 1
-  Event Based Areas
-  Intake Protection Zone 2
-  Intake Protection Zone 3
- Vulnerable Scoring Area - Groundwater**
-  2
-  4
-  6
-  8
-  10
-  Assessment Parcel

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HYDROGEOLOGICAL INVESTIGATION

514504 LINE 2,
AMARANTH, ONTARIO
L0N 1L0

TITLE:
MECP SIGNIFICANT
GROUNDWATER SENSITIVE AREAS

SCALE: AS SHOWN	DATE: JAN / 2024
DRAWING NO: 11	PROJECT NO: 230114



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PROJECT:
 HYDROGEOLOGICAL INVESTIGATION
 514504 LINE 2,
 AMARANTH, ONTARIO
 L0N 1L0

TITLE:
 GROUNDWATER CONTOUR AND
 FLOW DIRECTION

SCALE:
 AS SHOWN
 DRAWING NO:
 12

DATE:
 JAN / 2024
 PROJECT NO:
 230114



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 Ph: 416 492 4000 Fax: 416 492 4001
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80°12'30"W

80°10'0"W

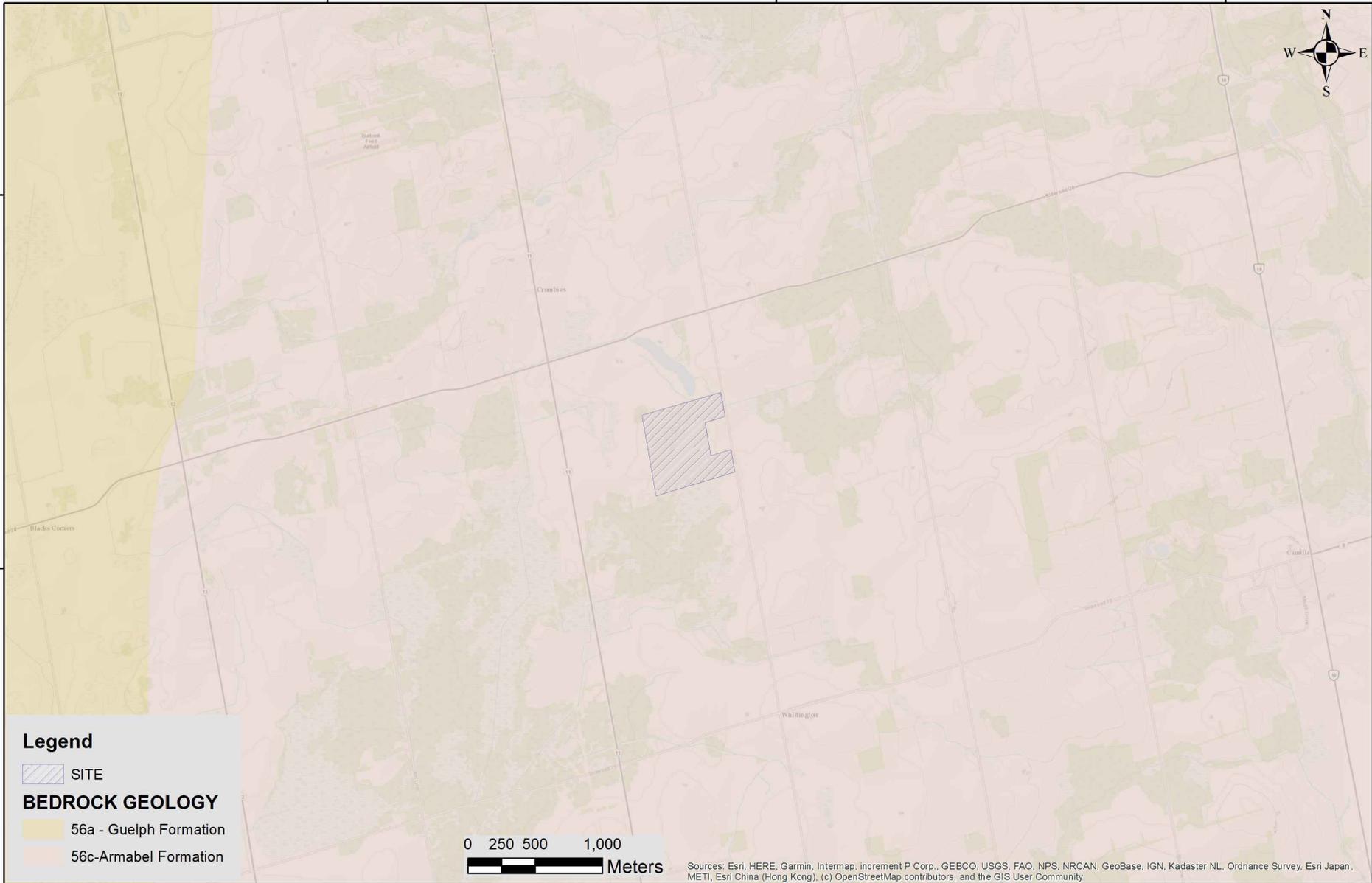
80°7'30"W

44°13'0"N

44°13'0"N

44°0'0"N

44°0'0"N



Legend

SITE

BEDROCK GEOLOGY

56a - Guelph Formation

56c-Armabel Formation



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

80°12'30"W

80°10'0"W

80°7'30"W

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L0N 1L0

PROJECT:
HYDROGEOLOGICAL INVESTIGATION

514504 LINE 2,
AMARANTH, ONTARIO
L0N 1L0

TITLE:
BEDROCK GEOLOGY OF THE
SITE AND SURROUNDING AREA

SCALE:

AS SHOWN

DRAWING NO:

13

DATE:

JAN / 2024

PROJECT NO

230114



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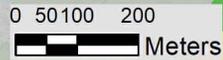


Legend

SITE

SURFICIAL GEOLOGY

- 5d: Glaciolacustrine-derived silty to clayey till
- 6: Ice-contact stratified deposits
- 7a: Sandy deposits
- 20: Organic deposits



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

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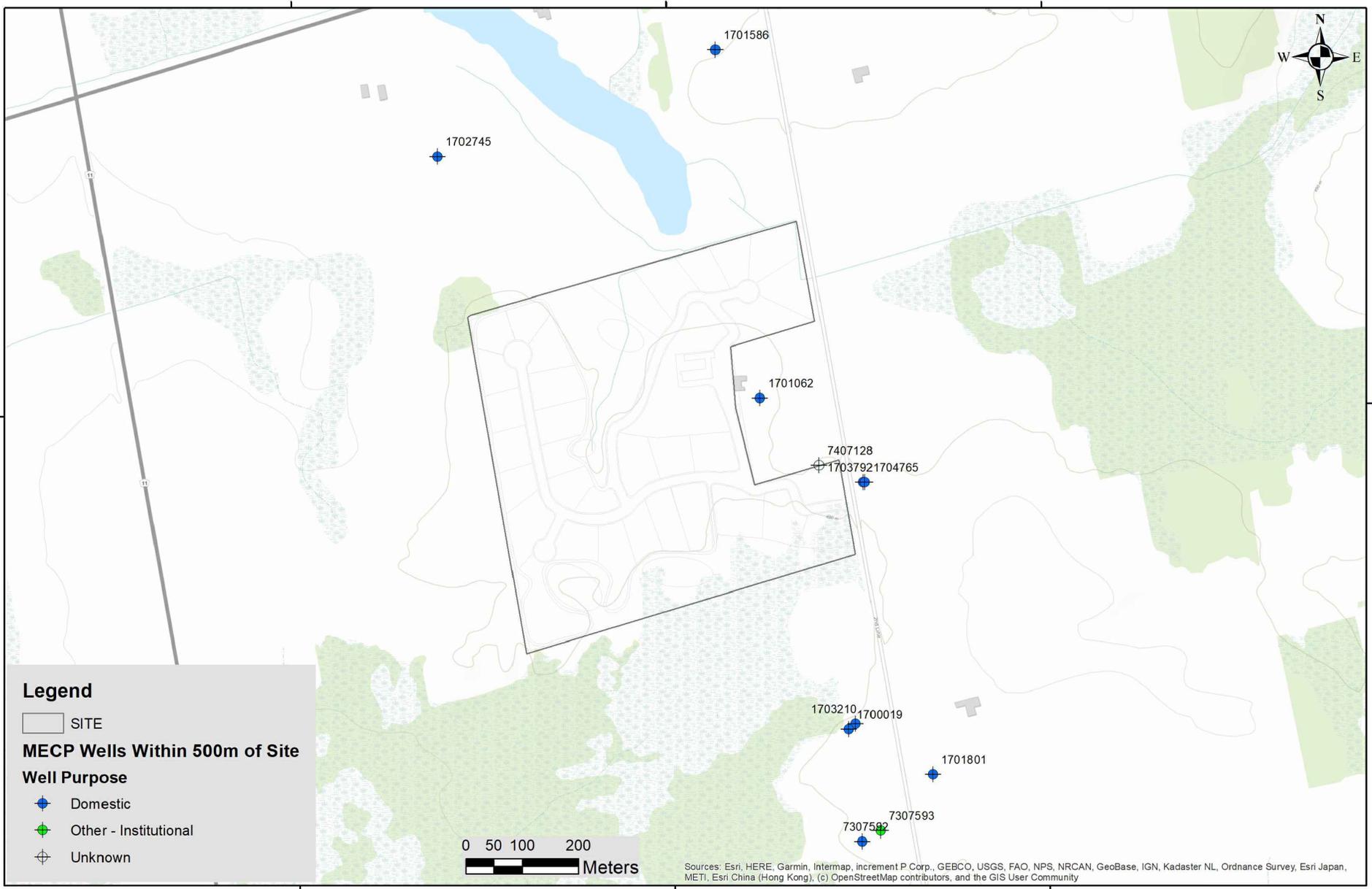
80°11'0"W

80°10'30"W

80°10'0"W

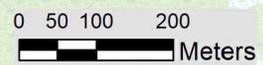
44°0'30"N

44°0'30"N



Legend

- SITE
- MECP Wells Within 500m of Site**
- Well Purpose**
- Domestic
- Other - Institutional
- Unknown



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

80°11'0"W

80°10'30"W

80°10'0"W

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514504 LINE 2,
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L0N 1L0

PROJECT:
HYDROGEOLOGICAL INVESTIGATION

514504 LINE 2,
AMARANTH, ONTARIO
L0N 1L0

TITLE:
MECP WELLS WITHIN 500 M OF
THE SITE

SCALE:	DATE:
AS SHOWN	JAN / 2024
DRAWING NO:	PROJECT NO
15	230114



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39 DAVISBROOK BOULEVARD
SCARBOROUGH, ONTARIO M1T 2H6
Ph: 416 492 4000 Fax: 416 492 4001
E-mail address: cesi@cesi.ca

Project No: 230114

Log of Borehole No. 1

Project: Proposed Subdivision

Client: The Cellular Connection Ltd.

Location: 514504 Line 2, Amaranth, Ontario

Technologist: MK

Depth ft m	Symbol	Description	Depth/Elev.	NUMBER	Sample Type (SS)	Blows/ft	RECOVERY	WELL	Standard Penetration Test					Moisture Content							
									10	20	30	40	50	10	20	30	40	50			
0		Ground Surface	490.20																		
1		TOPSOIL Grey topsoil, organics, wet, loose	489.90	1	SS	14	50	BENTONITE SEAL													
2		SILT AND CLAY TILL (CL) Brown silt and clay till, trace to some sand, trace gravel, wet, stiff to very stiff PPR at 0.6 m = 400 kPa PPR at 1.06 m = 400 kPa PPR at 1.8 m = 400 kPa PPR at 2.6 m = 250 kPa		2	SS	22	100														
3	1				3	SS	22		100												
4					4	SS	13		100												
5	2				5	SS	11		100												
6																					
7																					
8	3																				
9																					
10																					
11			485.63																		
12		SILTY SAND TILL Brown to grey silty sand till, some clay, some gravel, moist, compact to very dense PPR at 4.9 m = 250 kPa PPR at 6.4 m = 200 kPa		6	SS	26	100														
13	4				7	SS	28	100													
14																					
15																					
16	5																				
17																					
18																					
19	6																				
20																					
21																					
22	7																				
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25	8																				
26																					
27																					
28	8																				
29																					
30																					
31	9																				
32																					
33																					
34	10																				
35																					

Drill Method: Track mounted drill rig

Canada Engineering Services Inc.

Drill Date: October 18, 2023

39 Davisbrook Blvd.

Checked By: RJ

Hole Size: 150 mm diameter

Scarborough, Ontario

M1T 2H6

Datum: Geodetic Elevations from Topographic Survey Map by Schaeffer Dzaldov Purcell Ltd., Dated September 12, 2023

Project No: 230114

Log of Borehole No. 2

Project: Proposed Subdivision

Client: The Cellular Connection Ltd.

Engineer: MK

Location: 514504 Line 2, Amaranth, Ontario

Depth	Symbol	Description	Depth/Elev.	NUMBER	Sample Type (SS)	Blows/ft	RECOVERY	SPT					Moisture Content				
								10	20	30	40	50	60	70	10	20	30
0		Ground Surface	487.00														
0-1		TOPSOIL Grey topsoil, organics, wet, compact	486.09	1	SS	12	100										25.76
1-2		SILTY SAND TILL Brown to grey silty sand till, some clay, trace gravel, wet, compact PPR at 1.06 m = 300 kPa PPR at 1.8 m = 450 kPa	484.71	2	SS	16	100										14.93
2-3				3	SS	22	100										20.04
3-4				4	SS	27	100										27.51
4-5				5	SS	18	100										25.38
5-6		Turned grey at 4.6 m PPR at 4.9 m = 450 kPa	481.97	6	SS	32	100										18.77
6-17		END OF BOREHOLE Borehole completely open and dry upon completion PPR = Pocket Penetrometer Reading															

Drill Method: Track mounted drill rig

Canada Engineering Services Inc.

Drill Date: October 19, 2023

39 Davisbrook Blvd.

Checked By: RJ

Hole Size: 150 mm diameter

Scarborough, Ontario

M1T 2H6

Datum: Geodetic Elevations from Topographic Survey Map by Schaeffer Dzaldov Purcell Ltd., Dated September 12, 2023

Project No: 230114

Log of Borehole No. 3

Project: Proposed Subdivision

Client: The Cellular Connection Ltd.

Location: 514504 Line 2, Amaranth, Ontario

Technologist: MK

Depth	Symbol	Description	Depth/Elev.	NUMBER	Sample Type (SS)	Blows/ft	RECOVERY	WELL	Standard Penetration Test					Moisture Content								
									10	20	30	40	50	10	20	30	40	50				
0		Ground Surface	485.00																			
1		SILTY SAND Brown silty sand, some clay, wet, compact		1	SS	11	100														24.99	
2			484.24																			24.64
3		PEAT Black peat, wet, loose		2	SS	9	100															24.09
4		SILT AND CLAY TILL (CL) Mottled brown-grey silt and clay till, trace to some sand, trace gravel, wet, stiff to very stiff PPR at 1.8 m = 300 kPa PPR at 2.6 m = 400 kPa		3	SS	10	100															19.46
5				4	SS	13	100															28.42
6		PPR at 3.4 m = 300 kPa		5	SS	15	100															17.3
7				6	SS	17	100															15.25
8		PPR at 4.9 m = 400 kPa		7	SS	11	100															19.01
9		PPR at 6.4 m = 75 kPa		8	SS	60	100															19.23
10		PPR at 7.9 m = 300 kPa		9	SS	27	100															
11		PPR at 9.3 m = 400 kPa	475.40																			
12		END OF BOREHOLE Borehole completely open upon completion Water level upon completion = 8.53 m Water level on November 3, 2023 = 1.09 m PPR = Pocket Penetrometer Reading																				

Drill Method: Track mounted drill rig

Canada Engineering Services Inc.

Drill Date: October 20, 2023

39 Davisbrook Blvd.

Checked By: RJ

Hole Size: 150 mm diameter

Scarborough, Ontario

M1T 2H6

Datum: Geodetic Elevations from Topographic Survey Map by Schaeffer Dzaldov Purcell Ltd., Dated September 12, 2023

Project No: 230114

Log of Borehole No. 4

Project: Proposed Subdivision

Client: The Cellular Connection Ltd.

Engineer: MK

Location: 514504 Line 2, Amaranth, Ontario

Depth	Symbol	Description	Depth/Elev.	NUMBER	Sample Type (SS)	Blows/ft	RECOVERY	SPT					Moisture Content					
								10	20	30	40	50	60	70	10	20	30	40
0		Ground Surface	490.80															
0.5		TOPSOIL Grey topsoil, organics, wet, compact	490.50	1	SS	21	100											25.7
1.5		SILT AND CLAY TILL (CL) Mottled grey-brown silt and clay till, trace to some sand, trace gravel, moist to wet, very stiff PPR at 0.6 m = 400 kPa PPR at 1.06 m > 450 kPa PPR at 1.8 m > 450 kPa		2	SS	18	100											21.15
2.5				3	SS	24	100											19.49
3.5		PPR at 2.6 m = 350 kPa		4	SS	22	100											22.02
4.5		PPR at 3.4 m = 350 kPa		5	SS	19	100											16.46
5.5		Turned grey at 4.6 m PPR at 4.9 m = 450 kPa		6	SS	52	100											16.63
17		END OF BOREHOLE Borehole completely open and dry upon completion PPR = Pocket Penetrometer Reading	485.77															

Drill Method: Track mounted drill rig

Canada Engineering Services Inc.

Drill Date: October 18, 2023

39 Davisbrook Blvd.

Checked By: RJ

Hole Size: 150 mm diameter

Scarborough, Ontario

M1T 2H6

Datum: Geodetic Elevations from Topographic Survey Map by Schaeffer Dzaldov Purcell Ltd., Dated September 12, 2023

Project No: 230114

Log of Borehole No. 5

Project: Proposed Subdivision

Client: The Cellular Connection Ltd.

Engineer: MK

Location: 514504 Line 2, Amaranth, Ontario

Depth	Symbol	Description	Depth/Elev.	NUMBER	Sample Type (SS)	Blows/ft	RECOVERY	SPT						Moisture Content					
								10	20	30	40	50	60	70	10	20	30	40	
0		Ground Surface	490.56																
1		TOPSOIL Grey topsoil, organics, wet, compact	490.10	1	SS	19	100												19.34
2		SILT AND CLAY TILL (CL) Mottled grey-brown silt and clay till, trace to some sand, trace gravel, moist to wet, very stiff PPR at 0.6 m = 450 kPa PPR at 1.06 m > 450 kPa PPR at 1.8 m > 450 kPa PPR at 2.6 m > 450 kPa PPR at 3.4 m = 450 kPa Turned grey at 3.5 m PPR at 4.9 m = 450 kPa		2	SS	49	100												22.14
3				3	SS	28	100												16.9
4				4	SS	36	100												20.6
5				5	SS	28	100												25.74
6				6	SS	39	100												15.75
7		END OF BOREHOLE Borehole completely open and dry upon completion PPR = Pocket Penetrometer Reading																	
8																			
9																			
10			479.89																

Drill Method: Track mounted drill rig

Canada Engineering Services Inc.

Drill Date: October 18, 2023

39 Davisbrook Blvd.

Checked By: RJ

Hole Size: 150 mm diameter

Scarborough, Ontario

M1T 2H6

Datum: Geodetic Elevations from Topographic Survey Map by Schaeffer Dzaldov Purcell Ltd., Dated September 12, 2023

Project No: 230114

Log of Borehole No. 6

Project: Proposed Subdivision

Client: The Cellular Connection Ltd.

Location: 514504 Line 2, Amaranth, Ontario

Technologist: MK

Depth	Symbol	Description	Depth/Elev.	NUMBER	Sample Type (SS)	Blows/ft	RECOVERY	WELL	Standard Penetration Test					Moisture Content %							
									10	20	30	40	50	10	20	30	40	50			
0		Ground Surface	490.15																		
0-1		TOPSOIL Grey topsoil, organics, wet, loose		1	SS	16	100														
1-3		SILT AND CLAY TILL (CL) Mottled brown-grey silt and clay till, trace to some sand, trace gravel, wet, very stiff to hard PPR at 0.6 m = 300 kPa PPR at 1.1 m = 400 kPa PPR at 1.8 m = 400 kPa		2	SS	28	100														
3-4				3	SS	22	100														
4-6				4	SS	21	100														
6-8		PPR at 2.6 m = 350 kPa		5	SS	21	100														
8-10		Turned grey at 3.3 m PPR at 3.4 m = 350 kPa		6	SS	23	100														
10-15		PPR at 4.9 m = 350 kPa		7	SS	18	100														
15-20		PPR at 6.4 m = 300 kPa		8	SS	27	100														
20-24		PPR at 7.9 m = 350 kPa		9	SS	68	100														
24-28		PPR at 9.3 m = 300 kPa																			
28-31			480.55																		
31-35		END OF BOREHOLE Borehole completely open upon completion Water level upon completion = 8.53 m Water level on November 3, 2023 = 2.61 m PPR = Pocket Penetrometer Reading																			

Drill Method: Track mounted drill rig

Canada Engineering Services Inc.

Drill Date: October 19, 2023

**39 Davisbrook Blvd.
Scarborough, Ontario**

Checked By: RJ

Hole Size: 150 mm diameter

M1T 2H6

Datum: Geodetic Elevations from Topographic Survey Map by Schaeffer Dzaldov Purcell Ltd., Dated September 12, 2023

Project No: 230114

Log of Borehole No. 7

Project: Proposed Subdivision

Client: The Cellular Connection Ltd.

Location: 514504 Line 2, Amaranth, Ontario

Technologist: MK

Depth ft m	Symbol	Description	Depth/Elev.	NUMBER	Sample Type (SS)	Blows/ft	RECOVERY	WELL	Standard Penetration Test					Moisture Content %								
									10	20	30	40	50	10	20	30	40	50				
0		Ground Surface	490.45																			
1		TOPSOIL Grey topsoil, organics, wet, loose	489.84	1	SS	12	100															
2		SILTY SAND TILL Grey to brown silty sand till, some clay, trace gravel, moist, dense PPR at 1.06 m > 450 kPa PPR at 1.8 m > 450 kPa	488.16	2	SS	47	100															
3				3	SS	42	100															
4				4	SS	32	100															
5		SILT AND CLAY TILL (CL) Brown to grey silt and clay till, trace to some sand, trace gravel, wet, very stiff to hard PPR at 2.6 m > 450 kPa Turned grey at 3.0 m PPR at 3.4 m > 450 kPa PPR at 4.9 m = 350 kPa PPR at 6.4 m = 200 kPa PPR at 7.9 m > 450 kPa	481.31	5	SS	25	100															
6				6	SS	21	100															
7				7	SS	17	100															
8				8	SS	86	100															
9		SILTY SAND TILL Grey silty sand till, some clay, trace gravel, moist, very dense PPR at 9.3 m > 450 kPa	480.85	9	SS	62	100															
10																						
11		END OF BOREHOLE Borehole completely open and dry upon completion Water level on November 3, 2023 = 3.90 m PPR = Pocket Penetrometer Reading																				

Drill Method: Track mounted drill rig

Canada Engineering Services Inc.

Drill Date: October 19, 2023

39 Davisbrook Blvd.

Checked By: RJ

Hole Size: 150 mm diameter

Scarborough, Ontario

M1T 2H6

Datum: Geodetic Elevations from Topographic Survey Map by Schaeffer Dzaldov Purcell Ltd., Dated September 12, 2023

Project No: 230114

Log of Borehole No. 8

Project: Proposed Subdivision

Client: The Cellular Connection Ltd.

Engineer: MK

Location: 514504 Line 2, Amaranth, Ontario

Depth	Symbol	Description	Depth/Elev.	NUMBER	Sample Type (SS)	Blows/ft	RECOVERY	SPT		Moisture Content	
								10	20	30	40
0		Ground Surface	489.74								
0-1		TOPSOIL Grey topsoil, organics, wet, compact	488.83	1	SS	10	100				36.96
1-2		SILTY SAND TILL Brown silty sand till, some clay, some gravel, wet, dense to compact PPR at 2.6 m > 450 kPa PPR at 3.4 m = 450 kPa	487.45	4	SS	35	100				10.85
2-3		SILTY SAND TILL Brown silty sand till, some clay, some gravel, wet, dense to compact PPR at 2.6 m > 450 kPa PPR at 3.4 m = 450 kPa	487.45	3	SS	16	100				19.18
3-4		SILTY SAND TILL Brown silty sand till, some clay, some gravel, wet, dense to compact PPR at 2.6 m > 450 kPa PPR at 3.4 m = 450 kPa	487.45	2	SS	11	100				25.95
4-5		SILTY SAND TILL Brown silty sand till, some clay, some gravel, wet, dense to compact PPR at 2.6 m > 450 kPa PPR at 3.4 m = 450 kPa	485.17	5	SS	27	100				11.86
5-6		SILTY SAND TILL Brown silty sand till, some clay, some gravel, wet, dense to compact PPR at 2.6 m > 450 kPa PPR at 3.4 m = 450 kPa	484.71	6	SS	36	100				21.87
6-7		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	485.17								
7-8		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
8-9		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
9-10		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
10-11		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
11-12		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
12-13		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
13-14		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
14-15		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
15-16		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
16-17		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
17-18		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
18-19		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
19-20		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
20-21		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
21-22		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
22-23		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
23-24		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
24-25		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
25-26		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
26-27		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
27-28		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
28-29		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
29-30		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
30-31		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
31-32		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
32-33		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
33-34		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
34-35		SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, hard PPR at 4.9 m = 450 kPa	484.71								
35		END OF BOREHOLE Borehole completely open upon completion Water level upon completion = 4.26 m PPR = Pocket Penetrometer Reading	479.07								

Drill Method: Track mounted drill rig

Canada Engineering Services Inc.

Drill Date: October 19, 2023

39 Davisbrook Blvd.

Checked By: RJ

Hole Size: 150 mm diameter

Scarborough, Ontario

M1T 2H6

Datum: Geodetic Elevations from Topographic Survey Map by Schaeffer Dzaldov Purcell Ltd., Dated September 12, 2023

Project No: 230114

Log of Borehole No. 9

Project: Proposed Subdivision

Client: The Cellular Connection Ltd.

Engineer: MK

Location: 514504 Line 2, Amaranth, Ontario

Depth	Symbol	Description	Depth/Elev.	NUMBER	Sample Type (SS)	Blows/ft	RECOVERY	SPT					Moisture Content					
								10	20	30	40	50	60	70	10	20	30	40
0		Ground Surface	489.87															
0-1	[Symbol]	TOPSOIL Grey topsoil, organics, wet, compact		1	SS	11	100											15.2
1-3	[Symbol]	SILTY SAND TILL Brown silty sand till, some clay, some gravel, wet, compact PPR at 1.06 m = 300 kPa	488.35	2	SS	22	100											16.24
3-6	[Symbol]	SILT AND CLAY TILL (CL) Grey silt and clay till, some sand, trace gravel, wet, very stiff PPR at 1.8 m = 300 kPa PPR at 2.6 m = 300 kPa		3	SS	17	100											18.56
6-9	[Symbol]			4	SS	24	100											17.5
9-11	[Symbol]			5	SS	21	100											17.67
11-15	[Symbol]																	
15-16	[Symbol]	PPR at 4.9 m = 350 kPa																
16-17	[Symbol]		484.84	6	SS	27	100											23.04
17-18		END OF BOREHOLE Borehole completely open and dry upon completion PPR = Pocket Penetrometer Reading																
18-35																		
			479.20															

Drill Method: Track mounted drill rig

Canada Engineering Services Inc.

Drill Date: October 19, 2023

**39 Davisbrook Blvd.
Scarborough, Ontario**

Checked By: RJ

Hole Size: 150 mm diameter

M1T 2H6

Datum: Geodetic Elevations from Topographic Survey Map by Schaeffer Dzaldov Purcell Ltd., Dated September 12, 2023

Project No: 230114

Log of Borehole No. 10

Project: Proposed Subdivision

Client: The Cellular Connection Ltd.

Location: 514504 Line 2, Amaranth, Ontario

Technologist: MK

Depth ft m	Symbol	Description	Depth/Elev.	NUMBER	Sample Type (SS)	Blows/ft	RECOVERY	WELL	Standard Penetration Test					Moisture Content %									
									10	20	30	40	50	10	20	30	40	50					
0		Ground Surface	487.90																				
1		TOPSOIL Grey topsoil, organics, wet, loose	487.60	1	SS	10	100																
2		VARVED SILTY CLAY AND SILTY SAND Mottled grey-brown silty clay interbedded with silty sand with gravel sizes, wet, compact PPR at 0.6 m = 150 kPa PPR at 1.06 m = 400 kPa PPR at 1.8 m = 400 kPa		2	SS	19	100														27.05		
3				3	SS	18	100														17.74		
4				4	SS	20	100															18.19	
5				5	SS	35	60															12.23	
6		SILT AND CLAY TILL (CL) Brown to grey silt and clay till, trace to some sand, trace gravel, wet, very stiff PPR at 3.4 m = 200 kPa Turned grey at 4.9 m PPR at 4.9 m = 200 kPa	484.55																			8.99	
7				6	SS	18	50																20.43
8				7	SS	25	60																17.27
9		PPR at 6.4 m = 350 kPa PPR at 7.9 m = 300 kPa PPR at 9.3 m > 450 kPa																					21.73
10				478.45	9	SS	25	0														20.2	
11		END OF BOREHOLE Borehole open up to 2.1 m upon completion Water level upon completion = 2.0 m Water level on November 3, 2023 = 1.38 m PPR = Pocket Penetrometer Reading																					

Drill Method: Track mounted drill rig

Drill Date: October 20, 2023

Hole Size: 150 mm diameter

Canada Engineering Services Inc.

**39 Davisbrook Blvd.
Scarborough, Ontario
M1T 2H6**

Checked By: RJ

Datum: Geodetic Elevations from Topographic Survey Map by Schaeffer Dzaldov Purcell Ltd., Dated September 12, 2023

Figure 1	Project No.: 230114	GRAINSIZE DISTRIBUTION GRAPH
	Location: 514504 Line 2	Tested By: DA
	Client: The Cellular Connection Ltd.	Test Date: 31-Oct-2023

Symbol	Sample No.	% Clay	% Silt	% Fine Sand	% Medium Sand	% Coarse Sand	% Fine Gravel	% Coarse Gravel	% Cobbles
■	BH1 SA3	29.0	64.0	1.1	4.7	0.3	1.3	0.0	0.0
●	BH1 SA5	27.0	60.2	3.9	3.2	1.1	4.8	0.0	0.0
▲	BH1 SA7	14.9	31.3	17.2	13.0	4.1	9.7	10.1	0.0
▼	BH2 SA3	31.1	56.6	2.9	2.6	1.2	5.9	0.0	0.0
◆	BH2 SA4	35.4	62.8	0.5	1.3	0.1	0.0	0.0	0.0

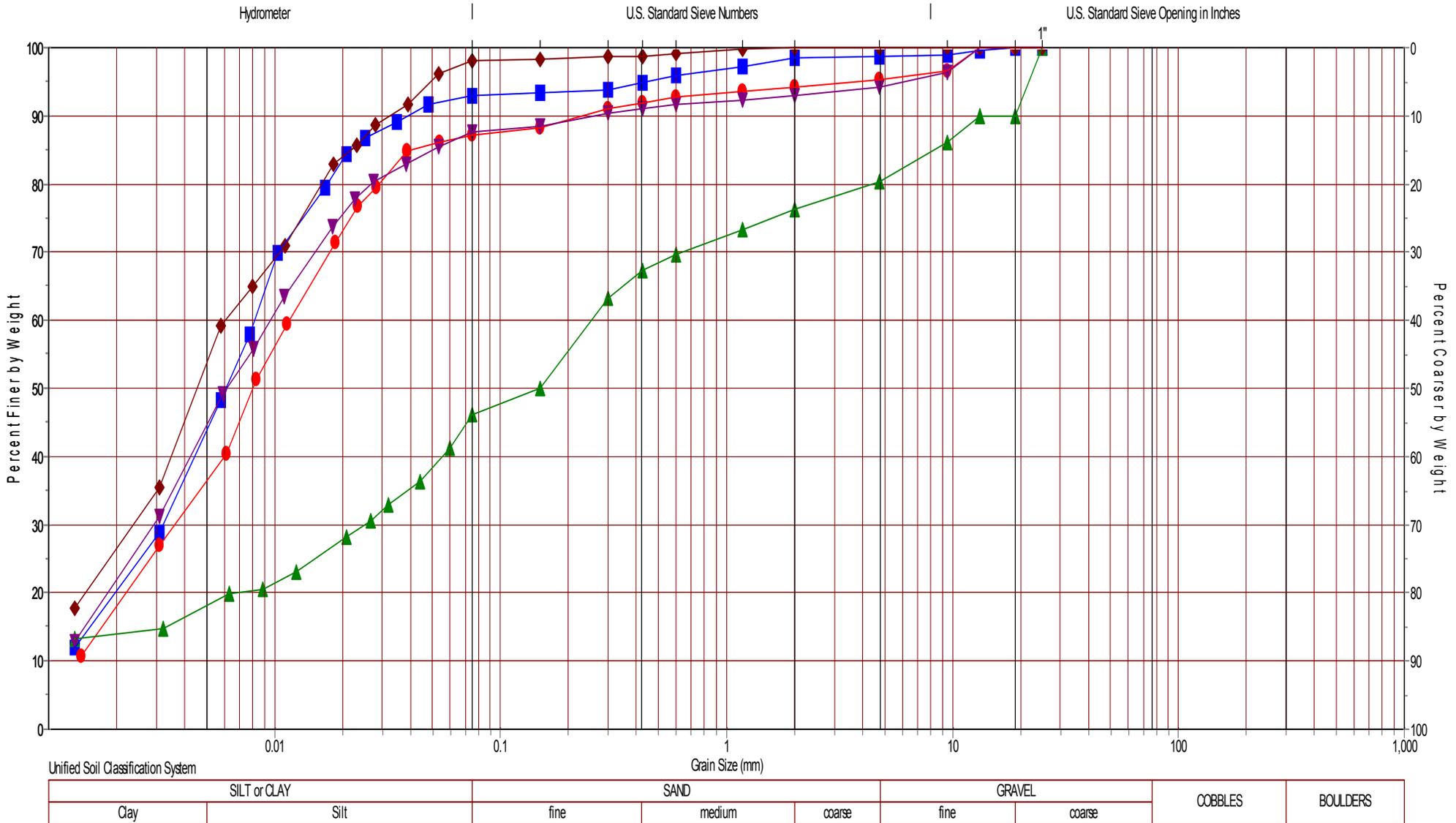
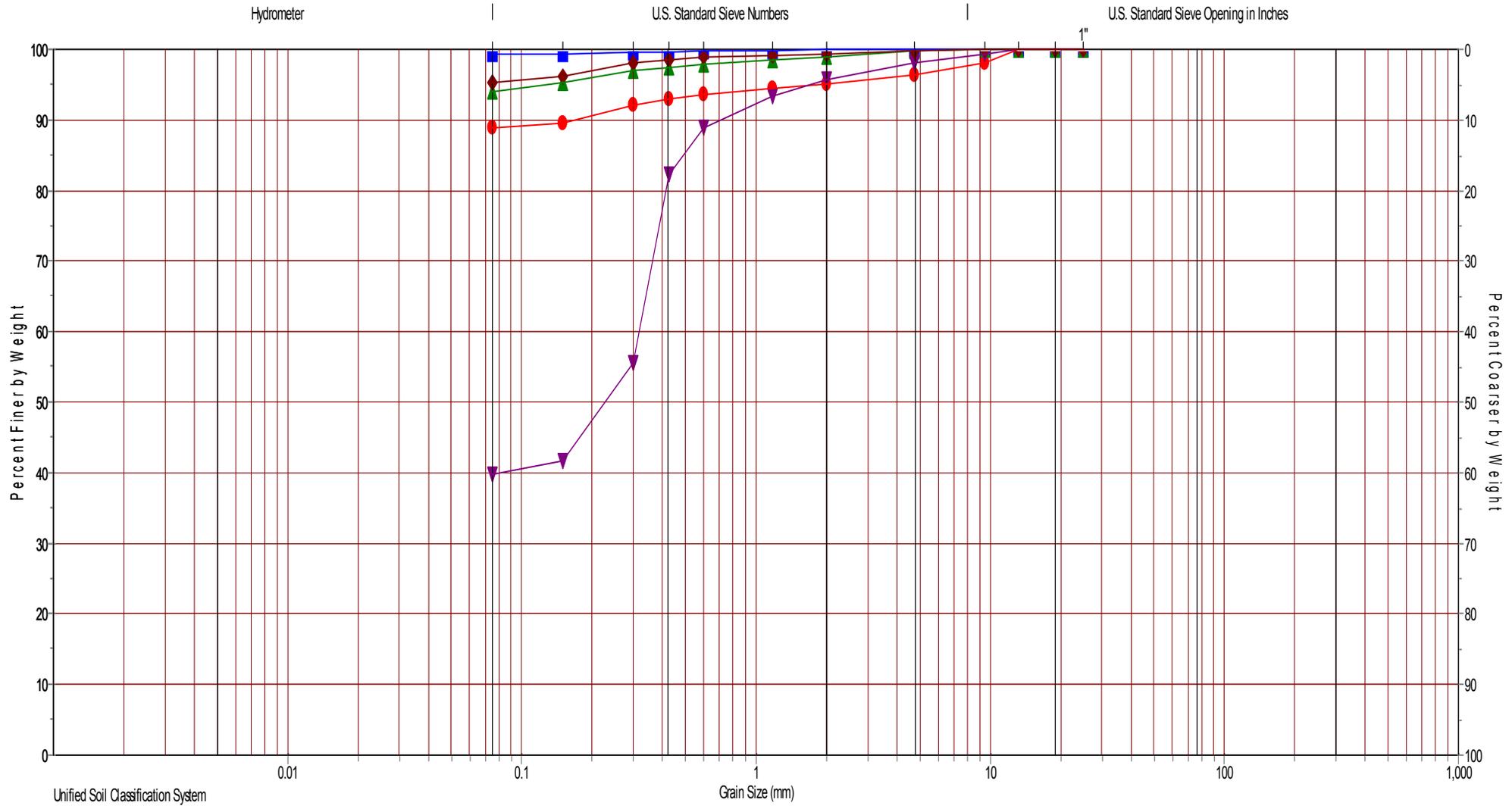


Figure 2	Project No.: 230114	GRAINSIZE DISTRIBUTION GRAPH
	Location: 514504 Line 2, Amaranth	Tested By: DA
	Client: The Cellular Connection Ltd.	Test Date: 31-Oct-2023

Symbol	Sample No.	% Clay	% Silt	% Fine Sand	% Medium Sand	% Coarse Sand	% Fine Gravel	% Coarse Gravel	% Cobbles
■	BH6 SA5	<99.3	<99.3	0.3	0.4	0.0	0.0	0.0	0.0
●	BH6 SA8	<88.9	<88.9	3.2	3.0	1.2	3.8	0.0	0.0
▲	BH7 SA5	<94.1	<94.1	3.1	2.1	0.9	0.3	0.0	0.0
▼	BH10 SA4	<39.9	<39.9	15.9	40.1	2.4	2.0	0.0	0.0
◆	BH10 SA6	<95.4	<95.4	2.9	1.2	0.4	0.3	0.0	0.0



SILT or CLAY		SAND			GRAVEL		COBBLES	BOULDERS
Clay	Silt	fine	medium	coarse	fine	coarse		



CANADA ENGINEERING SERVICES INC

Consulting Engineers - Geotechnical, Environmental and Structural

Atterberg Limits Data Sheet

ASTM D4318-10

Project Name: Proposed Subdivision
 Location: 514504 Line 2, Amaranth
 Sample No: BH1 SA3
 Sample Depth: 1.5 m

Date: 10-Nov-2023
 Tested By: MK
 Test Number: 1

USCS Soil Classification: SILT AND CLAY TILL, TRACE TO SOME SAND, TRACE GRAVEL

TEST			PLASTIC LIMIT				LIQUID LIMIT			
Variable	NO		1	2	3	4	1	2	3	4
	Var.	Units								
Number of Blows	N	blows					37	30	24	18
Can Number	---	---	4	55	3		22	12	13	9
Mass of Empty Can	M _C	(g)	31.60	31.18	31.04		31.55	31.12	31.43	34.75
Mass Can & Soil (Wet)	M _{CMS}	(g)	35.28	34.12	35.57		42.10	52.71	49.79	58.38
Mass Can & Soil (Dry)	M _{CDS}	(g)	34.64	33.58	34.78		39.59	47.58	45.33	52.45
Mass of Soil	M _S	(g)	3.04	2.40	3.74		8.04	16.46	13.90	17.70
Mass of Water	M _W	(g)	0.64	0.54	0.79		2.51	5.13	4.46	5.93
Water Content	w	(%)	21.1	22.5	21.1		31.2	31.2	32.1	33.5

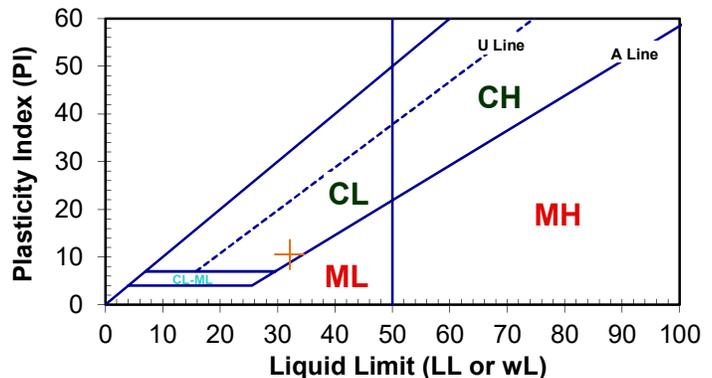
Liquid Limit (LL or w _L) (%):	32.1
Plastic Limit (PL or w _P) (%):	21.6
Plasticity Index (PI) (%):	10.5
USCS Classification:	CL

LOW TO MEDIUM PLASTIC CLAY

PI at "A" Line = 0.73(LL-20)

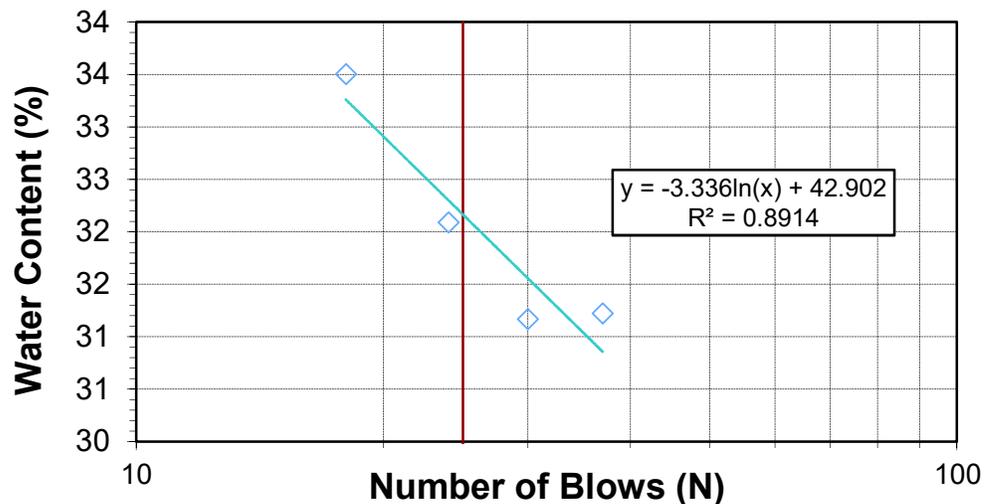
One Point Liquid Limit Calculation:

$$LL = w_n (N/25)^{0.12}$$



PROCEDURE USED

- Wet Preparation Multipoint
- Dry Preparation Multipoint
- Procedure A Multipoint
- Procedure B One-Point



GEOTECHNICAL SYMBOLS AND TERMS USED IN BOREHOLE/TEST PIT LOGS

Soil Description

Terminology describing soil types:

Topsoil	-	Mixture of soil and humus capable of supporting good vegetative growth
Peat	-	Fibrous fragments of visible and invisible decayed organic matter
Till	-	Unstratified and unsorted glacial deposit which may include any particle sizes Such as clay, silt, sand, stone, cobbles and boulders
Fill	-	Materials not identified as deposited by natural geological processes

Terminology describing soil structure:

Desiccated	-	Having visible signs of weathering by oxidization of clay minerals, shrinkage cracks, etc.
Fissured	-	Material breaks along plane of fracture
Varved	-	Composed of regular alternating layers of silt and clay
Laminated	-	Alternating layers of beds less than 6 mm thick
Stratified	-	Alternating layers of beds greater than 6 mm thick
Blocky	-	Material can be broken into small and hard angular lumps
Lensed	-	Irregular shaped pockets of soil having different particle size, texture, or colour from materials above and below
Well Graded	-	Having wide range in grain sizes and substantial amounts of all intermediate particle sizes
Uniformly Graded	-	Predominantly one grain size

Soil descriptions and classification are based on the Unified Soil Classification System (USCS) (ASTM D-2488), which classifies soils on the basis of engineering properties. The system divides soils into three major categories: (1) coarse grained, (2) fine-grained, and (3) highly organic. The soil is then subdivided based on either gradation or plasticity characteristics. This system provides a group symbol (eg. SM) and group name (eg. silty sand) for identification. The classification excludes particles larger than 76 mm.

Terminology describing materials outside the USCS, (eg. particles larger than 76 mm, visible organic matter, construction debris) is based upon the proportion of these materials present:

Trace	- Trace sand, trace silt, etc.	Less than 10%
Some	- Some sand, some silt, etc.	10 - 20%
Adjective	- Gravelly, sandy, silty, clayey, etc.	20 - 30%
“And”	- and gravel, and silt, etc.	> 35%
Noun	- Gravel, Sand, Silt, Clay	> 35% and main fraction

The standard terminology to describe cohesionless soils includes the compactness as determined by the Standard Penetration Test “N” -value.

Compactness	“N” Value
Very Loose	< 4
Loose	4 - 10
Compact	10 - 30
Dense	30 - 50
Very Dense	> 50

GEOTECHNICAL SYMBOLS AND TERMS USED IN BOREHOLE/TEST PIT LOGS

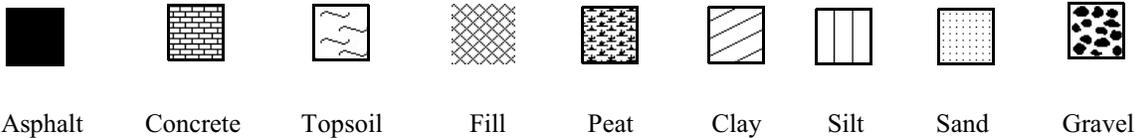
The standard terminology to describe cohesive soils includes consistency, which is based on undrained shear strength as measured by in-situ vane tests, penetrometer tests, unconfined compression tests or similar field and laboratory analysis. Standard Penetration Test “N” values can also be used to provide an approximate indication of the consistency and shear strength of fine grained, cohesive soils.

Consistency	Undrained Shear Strength (kPa)	“N” Value	Field Identification
Very Soft	< 12.5	< 2	Easily penetrated several cm by the fist
Soft	12.5 - 25	2 - 4	Easily penetrated several cm by the thumb
Firm	25 - 50	4 - 8	Can be penetrated several cm by the thumb with moderate effort
Stiff	50 - 100	8 - 15	Readily indented by the thumb but penetrated only with great effort
Very Stiff	100 - 200	15 - 30	Readily indented by the thumb nail
Hard	> 200	> 30	Indented with difficulty by the thumbnail

Note: “N” Value - The Standard Penetration Test records the number of blows of a 140 lb (64 kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (50.8 mm) O.D. split spoon sampler 1 foot (305 mm). For split spoon samples where full penetration is not achieved, the number of blows is reported over the sampler penetration in millimeters (eg. 50/75).

STRATA PLOT

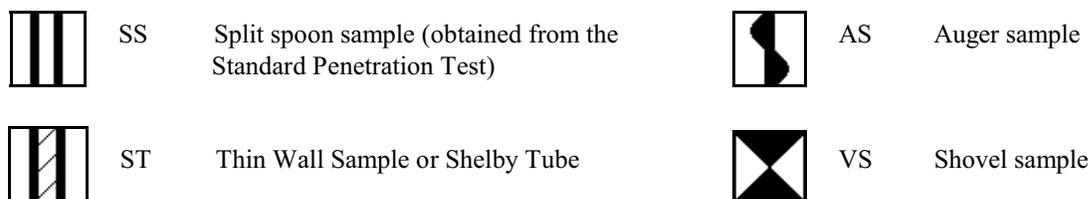
Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols:



WATER LEVEL MEASUREMENTS



SAMPLE TYPE



APPENDIX C

**HYDRAULIC CONDUCTIVITY AND
DEWATERING CALCULATIONS**



Canada Engineering Services Inc.
39 Davisbrook Blvd.
Toronto, Ontario
M1T 2H6

Slug Test Analysis Report

Project: Proposed Subdivision

Number: 230114

Client: The Cellular Connection Ltd.

Location: 514504 Line 2, Amaranth

Slug Test: Slug Test 1

Test Well: BH1

Test Conducted by: MK

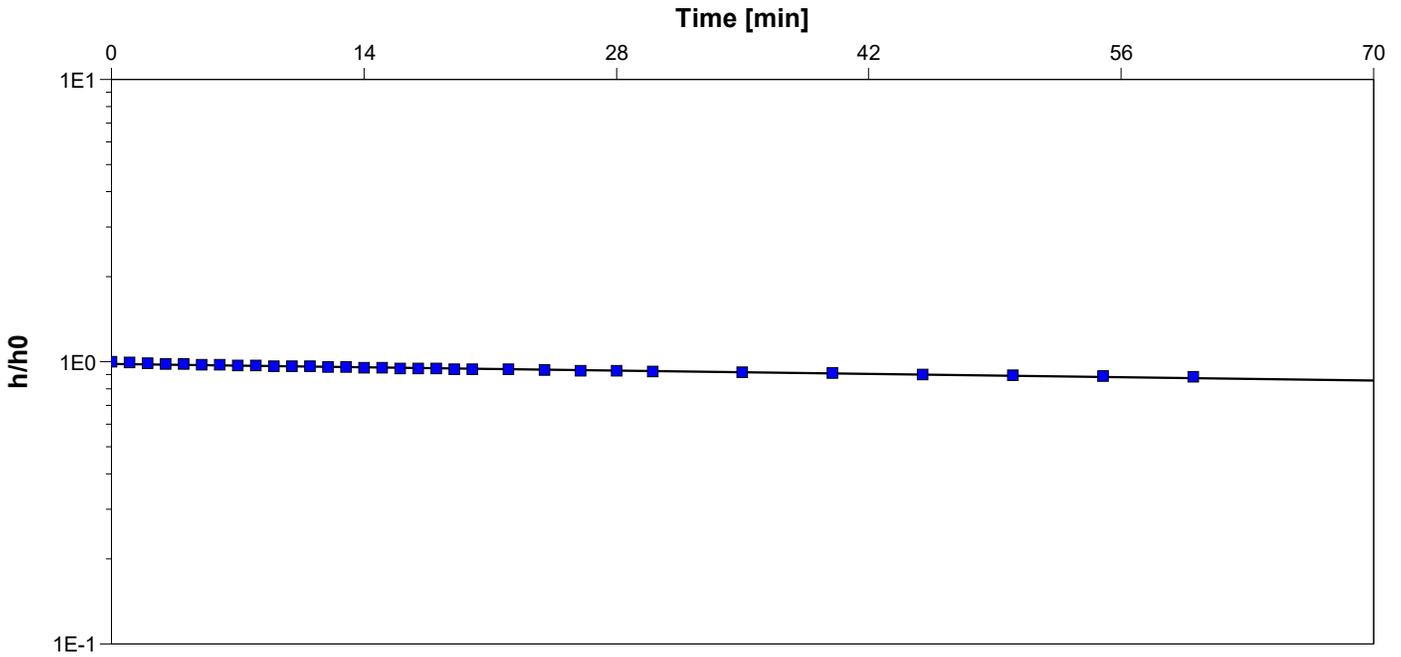
Test Date: 03-Nov-2023

Analysis Performed by: MK

BH1

Analysis Date: 06-Nov-2023

Aquifer Thickness:



Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]
BH1	1.59×10^{-8}



Canada Engineering Services Inc.
39 Davisbrook Blvd.
Toronto, Ontario
M1T 2H6

Slug Test Analysis Report

Project: Proposed Subdivision

Number: 230114

Client: The Cellular Connection Ltd.

Location: 514504 Line 2, Amaranth

Slug Test: Slug Test 2

Test Well: BH3

Test Conducted by: MK

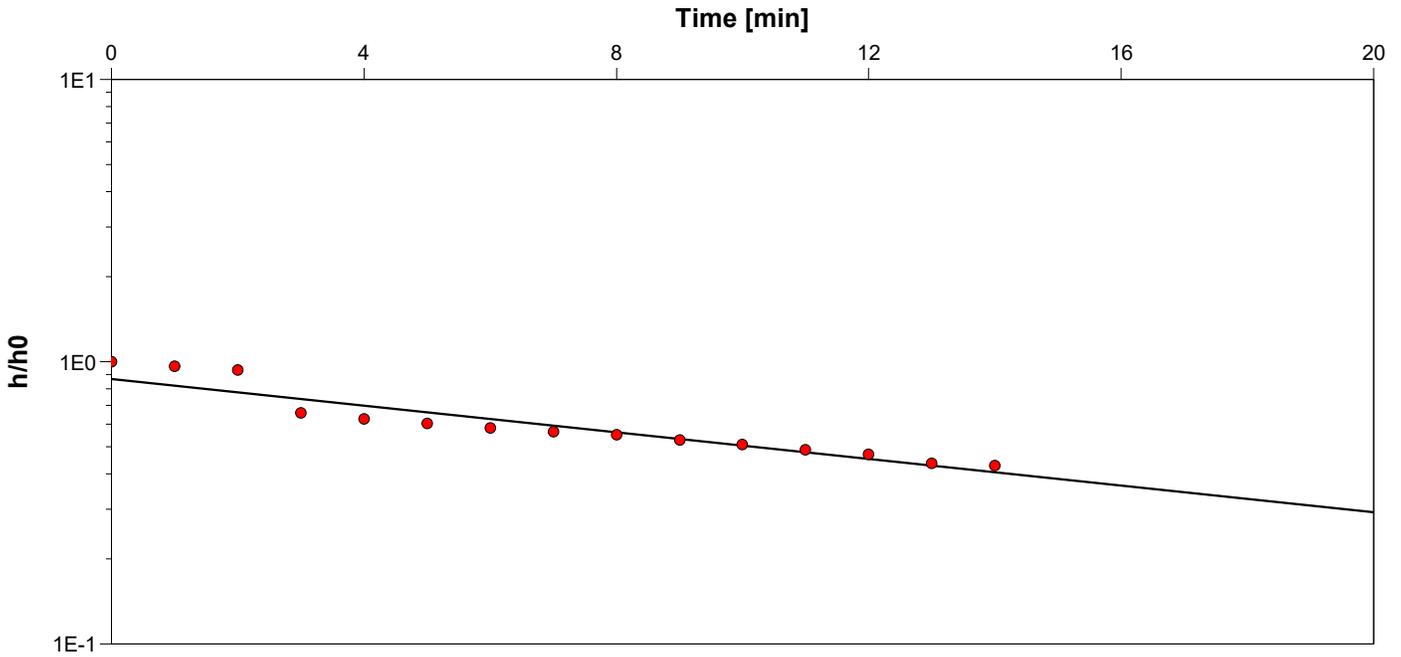
Test Date: 03-Nov-2023

Analysis Performed by: MK

BH3

Analysis Date: 06-Nov-2023

Aquifer Thickness:



Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]
BH3	4.56×10^{-7}



Canada Engineering Services Inc.
39 Davisbrook Blvd.
Toronto, Ontario
M1T 2H6

Slug Test Analysis Report

Project: Proposed Subdivision

Number: 230114

Client: The Cellular Connection Ltd.

Location: 514504 Line 2, Amaranth

Slug Test: Slug Test 3

Test Well: BH6

Test Conducted by: MK

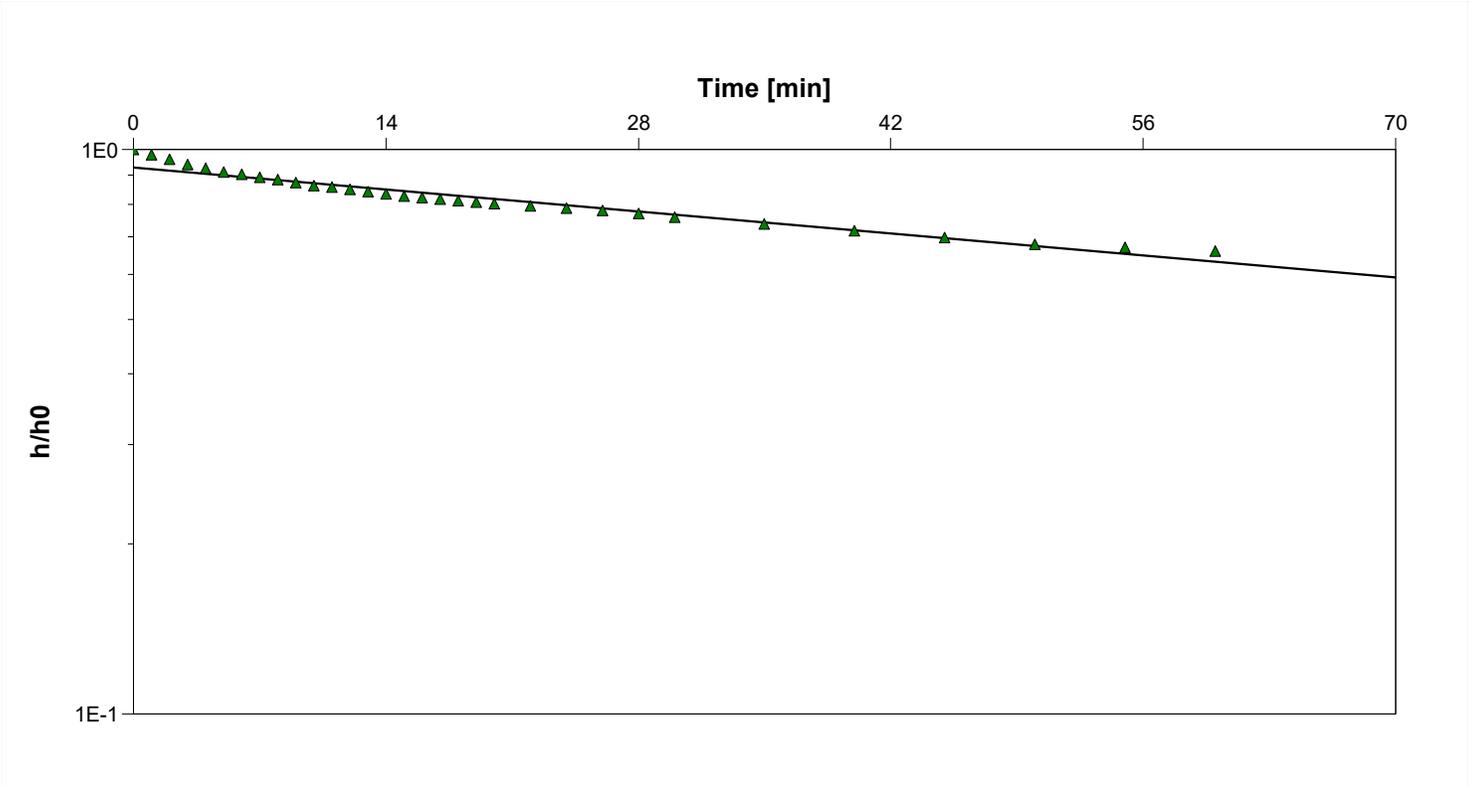
Test Date: 03-Nov-2023

Analysis Performed by: MK

BH6

Analysis Date: 06-Nov-2023

Aquifer Thickness:



Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]
BH6	5.37×10^{-8}



Canada Engineering Services Inc.
39 Davisbrook Blvd.
Toronto, Ontario
M1T 2H6

Slug Test Analysis Report

Project: Proposed Subdivision

Number: 230114

Client: The Cellular Connection Ltd.

Location: 514504 Line 2, Amaranth

Slug Test: Slug Test 4

Test Well: BH7

Test Conducted by: MK

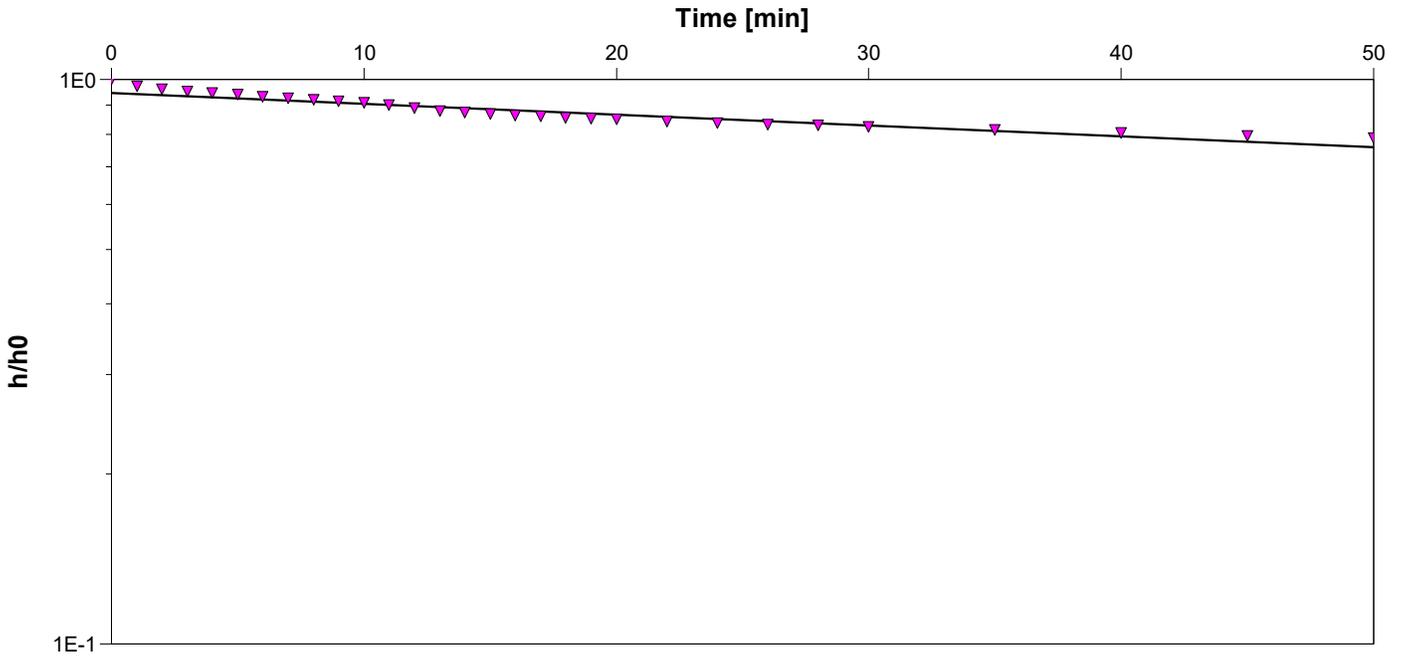
Test Date: 03-Nov-2023

Analysis Performed by: MK

BH7

Analysis Date: 06-Nov-2023

Aquifer Thickness:



Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]
BH7	3.71×10^{-8}



Canada Engineering Services Inc.
39 Davisbrook Blvd.
Toronto, Ontario
M1T 2H6

Slug Test Analysis Report

Project: Proposed Subdivision

Number: 230114

Client: The Cellular Connection Ltd.

Location: 514504 Line 2, Amaranth

Slug Test: Slug Test 5

Test Well: BH10

Test Conducted by: MK

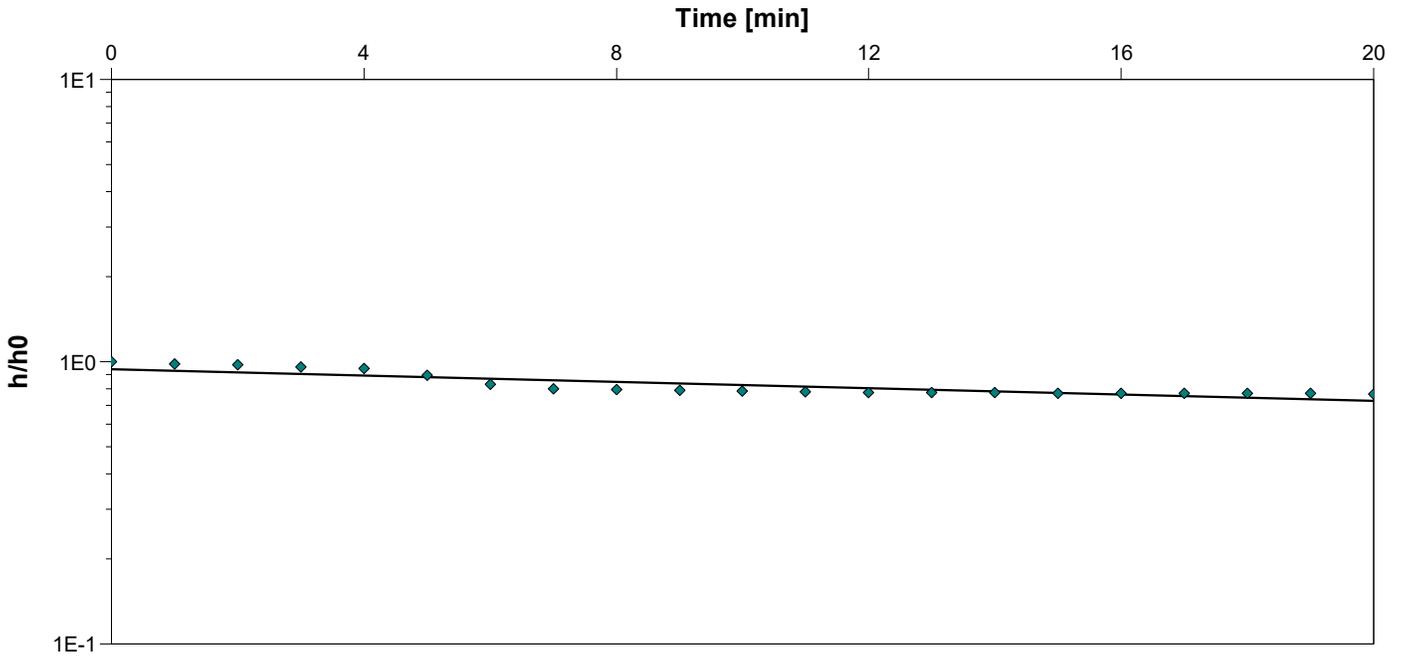
Test Date: 03-Nov-2023

Analysis Performed by: MK

BH10

Analysis Date: 06-Nov-2023

Aquifer Thickness:



Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]
BH10	1.08×10^{-7}

APPENDIX D

**GROUNDWATER CHEMISTRY PLOTTED
AGAINST NEW TECUMSETH SEWER USE BYLAW**



Certificate of Analysis

Client: Canada Engineering Services Inc.
39 Davisbrook Blvd
Scarborough, Ontario
M1T 2H6
Attention: Mr. Lawrence Yu
PO#:
Invoice to: Canada Engineering Services Inc.

Report Number: 3016824
Date Submitted: 2025-05-29
Date Reported: 2025-06-05
Project: 514504 2nd Line Amaranth ON
COC #: 232771

Dear Lawrence Yu:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL: _____
Long Qu, Organics Supervisor

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at: <https://directory.cala.ca/>.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is licensed by the Ontario Ministry of the Environment, Conservation, and Parks (MECP) for specific tests in drinking water (license #2318). A copy of the license is available upon request.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by the Ontario Ministry of Agriculture, Food, and Rural Affairs for specific tests in agricultural soils.

Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline values listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official provincial or federal guideline as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

Client: Canada Engineering Services Inc.
 39 Davisbrook Blvd
 Scarborough, Ontario
 M1T 2H6
 Attention: Mr. Lawrence Yu
 PO#:
 Invoice to: Canada Engineering Services Inc.

Report Number: 3016824
 Date Submitted: 2025-05-29
 Date Reported: 2025-06-05
 Project: 514504 2nd Line Amaranth ON
 COC #: 232771

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
Anions	Cl	1	mg/L	MAC 1500	1768911 WW 1130
	SO4	1	mg/L	MAC 1500	98
General Chemistry	BOD5	1	mg/L	MAC 300	2025-05-23 Water 2 <1
	Cyanide (total)	0.005	mg/L	MAC 1.2	<0.005
	pH	1.00		6.0-9.5	7.80
	Phenols	0.002	mg/L	MAC 0.1	<0.002
	Total Suspended Solids	2	mg/L	MAC 300	200
Metals	Ag	0.01	mg/L	MAC 0.4	<0.01
	Al	0.1	mg/L	MAC 50	3.2
	Aqua-Regia Digest				y
	As	0.02	mg/L	MAC 1	<0.02
	Cd	0.008	mg/L	MAC 0.7	<0.008
	Co	0.01	mg/L	MAC 5	<0.01
	Cr	0.05	mg/L	MAC 2	<0.05
	Cu	0.01	mg/L	MAC 2	<0.01
	Hg	0.0001	mg/L	MAC 0.01	0.0001
	Mn	0.01	mg/L	MAC 5	0.34
	Mo	0.01	mg/L	MAC 5	<0.01
	Ni	0.01	mg/L	MAC 2	<0.01
	Pb	0.01	mg/L	MAC 0.7	<0.01
	Sb	0.01	mg/L	MAC 5	<0.01
	Se	0.02	mg/L	MAC 0.8	<0.02
Sn	0.1	mg/L	MAC 5	<0.1	
Zn	0.04	mg/L	MAC 2	<0.04	
Nutrients	Total Kjeldahl Nitrogen	0.100	mg/L	MAC 50	0.625

Guideline = Sanitary Sewer - NewTecumseth

* = Guideline Exceedence

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 Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Client: Canada Engineering Services Inc.
 39 Davisbrook Blvd
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 M1T 2H6
 Attention: Mr. Lawrence Yu
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 Invoice to: Canada Engineering Services Inc.

Report Number: 3016824
 Date Submitted: 2025-05-29
 Date Reported: 2025-06-05
 Project: 514504 2nd Line Amaranth ON
 COC #: 232771

Lab I.D. 1768911
 Sample Matrix WW
 Sample Type
 Sampling Date 2025-05-23
 Sample I.D. Water 2

Group	Analyte	MRL	Units	Guideline	
Nutrients	Total P	0.020	mg/L	MAC 10	0.177
OCP/PCB	Hexachlorobenzene	0.006	ug/L	MAC 0.1	<0.006
Oil and Grease	Oil & Grease - Mineral	1	mg/L	MAC 15	<1
	Oil & Grease - Non-mineral	1	mg/L	MAC 150	<1
	Oil & Grease - Total	1	mg/L	MAC 165	<1
PCBs	Polychlorinated Biphenyls (PCBs)	0.1	ug/L	MAC 4	<0.1
VOCs Surrogates	1,2-dichloroethane-d4	0	%		114
	4-bromofluorobenzene	0	%		74
	Toluene-d8	0	%		123
Volatiles	1,1,2,2-tetrachloroethane	0.5	ug/L	MAC 60	<0.5
	1,2-dichlorobenzene	0.4	ug/L	MAC 50	<0.4
	1,4-dichlorobenzene	0.4	ug/L	MAC 80	<0.4
	Benzene	0.5	ug/L	MAC 10	<0.5
	Chloroform	0.5	ug/L	MAC 40	<0.5
	Dichloromethane	4.0	ug/L	MAC 90	<4.0
	Ethylbenzene	0.5	ug/L	MAC 60	<0.5
	m/p-xylene	0.4	ug/L		<0.4
	o-xylene	0.4	ug/L		<0.4
	Tetrachloroethylene	0.3	ug/L	MAC 60	<0.3
	Toluene	0.4	ug/L	MAC 20	<0.4
	Trichloroethylene	0.3	ug/L	MAC 50	<0.3
	Xylene; total	0.5	ug/L	MAC 300	<0.5

Guideline = Sanitary Sewer - NewTecumseth

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Certificate of Analysis

Client: Canada Engineering Services Inc.
 39 Davisbrook Blvd
 Scarborough, Ontario
 M1T 2H6
 Attention: Mr. Lawrence Yu
 PO#:
 Invoice to: Canada Engineering Services Inc.

Report Number: 3016824
 Date Submitted: 2025-05-29
 Date Reported: 2025-06-05
 Project: 514504 2nd Line Amaranth ON
 COC #: 232771

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 476423 Analysis/Extraction Date 2025-06-05 Analyst SAH Method SM 5210B			
BOD5	<1 mg/L	93	75-125
Run No 476473 Analysis/Extraction Date 2025-06-02 Analyst SKH Method EPA 351.2			
Total Kjeldahl Nitrogen	<0.100 mg/L	86	70-130
Run No 476518 Analysis/Extraction Date 2025-06-03 Analyst SKH Method EPA 365.1			
Total P	<0.020 mg/L	97	80-120
Run No 476532 Analysis/Extraction Date 2025-06-03 Analyst AaN Method EPA 200.8			
Silver	<0.01 mg/L	100	70-130
Aluminum	<0.1 mg/L	103	70-130
Aqua-Regia Digest			
Arsenic	<0.02 mg/L	98	70-130
Cadmium	<0.008 mg/L	103	70-130
Cobalt	<0.01 mg/L	105	70-130
Chromium Total	<0.05 mg/L	105	70-130
Copper	<0.01 mg/L	110	70-130

Guideline = Sanitary Sewer - NewTecumseth

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 Scarborough, Ontario
 M1T 2H6
 Attention: Mr. Lawrence Yu
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 Invoice to: Canada Engineering Services Inc.

Report Number: 3016824
 Date Submitted: 2025-05-29
 Date Reported: 2025-06-05
 Project: 514504 2nd Line Amaranth ON
 COC #: 232771

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Mercury	0.0001 mg/L	90	70-130
Manganese	<0.01 mg/L	104	70-130
Molybdenum	<0.01 mg/L	93	70-130
Nickel	<0.01 mg/L	104	70-130
Lead	<0.01 mg/L	107	70-130
Antimony	<0.01 mg/L	108	70-130
Selenium	<0.02 mg/L	102	70-130
Sn	<0.1 mg/L	84	70-130
Zinc	<0.04 mg/L	75	70-130
Run No 476546 Analysis/Extraction Date 2025-06-05 Analyst SKH			
Method C SM2540			
Total Suspended Solids	<2 mg/L	100	90-110
Run No 476548 Analysis/Extraction Date 2025-06-04 Analyst IP			
Method SM 4110			
Chloride	<1 mg/L	100	90-110
SO4	<1 mg/L	100	90-110
Run No 476566 Analysis/Extraction Date 2025-06-04 Analyst IP			
Method SM5530D/EPA420.2			
Phenols	<0.001 mg/L	106	50-120

Guideline = Sanitary Sewer - NewTecumseth

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 Scarborough, Ontario
 M1T 2H6
 Attention: Mr. Lawrence Yu
 PO#:
 Invoice to: Canada Engineering Services Inc.

Report Number: 3016824
 Date Submitted: 2025-05-29
 Date Reported: 2025-06-05
 Project: 514504 2nd Line Amaranth ON
 COC #: 232771

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 476573 Analysis/Extraction Date 2025-06-04 Analyst AsA Method SM2320,2510,4500H/F			
pH		92	90-110
Run No 476604 Analysis/Extraction Date 2025-06-04 Analyst Z S Method SM4500-CNC/MOE E3015			
Cyanide (total)	<0.005 mg/L	85	61-139
Run No 476619 Analysis/Extraction Date 2025-06-05 Analyst ACN Method SM 5520B/F			
Oil & Grease - Mineral	<1 mg/L	80	70-130
Oil & Grease - Non-mineral	<1 mg/L		70-130
Oil & Grease - Total	<1 mg/L	95	70-130
Run No 476645 Analysis/Extraction Date 2025-06-04 Analyst AtJ Method EPA 8260			
Tetrachloroethane, 1,1,2,2-	<0.5 ug/L	80	60-130
Dichlorobenzene, 1,2-	<0.4 ug/L	85	60-130
Dichlorobenzene, 1,4-	<0.4 ug/L	85	60-130
Benzene	<0.5 ug/L	78	60-130
Chloroform	<0.5 ug/L	83	60-130
Methylene Chloride	<4.0 ug/L	80	60-130

Guideline = Sanitary Sewer - NewTecumseth

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

Client: Canada Engineering Services Inc.
 39 Davisbrook Blvd
 Scarborough, Ontario
 M1T 2H6
 Attention: Mr. Lawrence Yu
 PO#:
 Invoice to: Canada Engineering Services Inc.

Report Number: 3016824
 Date Submitted: 2025-05-29
 Date Reported: 2025-06-05
 Project: 514504 2nd Line Amaranth ON
 COC #: 232771

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Ethylbenzene	<0.5 ug/L	80	60-130
m/p-xylene	<0.4 ug/L	99	60-130
o-xylene	<0.4 ug/L	75	60-130
Tetrachloroethylene	<0.3 ug/L	71	60-130
Toluene	<0.4 ug/L	74	60-130
Trichloroethylene	<0.3 ug/L	76	60-130
Run No 476661 Analysis/Extraction Date 2025-06-05 Analyst Mal			
Method EPA 8081B			
Hexachlorobenzene	<0.006 ug/L	90	50-140
Polychlorinated Biphenyls	<0.1 ug/L	102	60-140
Run No 476663 Analysis/Extraction Date 2025-06-05 Analyst AtJ			
Method EPA 8260			
Xylene Mixture			

Guideline = Sanitary Sewer - NewTecumseth

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Certificate of Analysis

Client: Canada Engineering Services Inc.
39 Davisbrook Blvd
Scarborough, Ontario
M1T 2H6
Attention: Mr. Lawrence Yu
PO#:
Invoice to: Canada Engineering Services Inc.

Report Number: 3016824
Date Submitted: 2025-05-29
Date Reported: 2025-06-05
Project: 514504 2nd Line Amaranth ON
COC #: 232771

Sample Comment Summary

Sample ID: 1768911 Water 2 Phenols MRL elevated due to matrix interference (dilution was done).

Guideline = Sanitary Sewer - NewTecumseth

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Certificate of Analysis

Client: Canada Engineering Services Inc.
39 Davisbrook Blvd
Scarborough, Ontario
M1T 2H6
Attention: Mr. Lawrence Yu
PO#:
Invoice to: Canada Engineering Services Inc.

Report Number: 3016825
Date Submitted: 2025-05-29
Date Reported: 2025-06-05
Project: 514504 2nd Line Amaranth ON
COC #: 232771

Dear Lawrence Yu:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL: _____
Addrine Thomas, Inorganics Supervisor

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

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Certificate of Analysis

Client: Canada Engineering Services Inc.
 39 Davisbrook Blvd
 Scarborough, Ontario
 M1T 2H6
 Attention: Mr. Lawrence Yu
 PO#:
 Invoice to: Canada Engineering Services Inc.

Report Number: 3016825
 Date Submitted: 2025-05-29
 Date Reported: 2025-06-05
 Project: 514504 2nd Line Amaranth ON
 COC #: 232771

Lab I.D. 1768912
 Sample Matrix STRM W
 Sample Type
 Sampling Date 2025-05-23
 Sample I.D. Water 2

Group	Analyte	MRL	Units	Guideline	
General Chemistry	BOD5	1	mg/L	MAC 15	<1
	pH	1.00		MAC 6.0-9.5	7.66
	Total Suspended Solids	2	mg/L	MAC 15	583*
Metals	Aqua-Regia Digest				Y
	Cd	0.008	mg/L	MAC 0.001	<0.008*
	Cr	0.05	mg/L	MAC 0.08	<0.05
	Cu	0.01	mg/L	MAC 0.01	0.02*
	Ni	0.01	mg/L	MAC 0.05	0.01
	Pb	0.01	mg/L	MAC 0.05	0.01
	Zn	0.04	mg/L	MAC 0.04	0.05*

Guideline = Storm Sewer - NewTecumseth

*** = Guideline Exceedence**

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 Methods references and/or additional QA/QC information available on request.

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Client: Canada Engineering Services Inc.
 39 Davisbrook Blvd
 Scarborough, Ontario
 M1T 2H6
 Attention: Mr. Lawrence Yu
 PO#:
 Invoice to: Canada Engineering Services Inc.

Report Number: 3016825
 Date Submitted: 2025-05-29
 Date Reported: 2025-06-05
 Project: 514504 2nd Line Amaranth ON
 COC #: 232771

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 476423 Analysis/Extraction Date 2025-06-05 Analyst SAH Method SM 5210B			
BOD5	<1 mg/L	93	75-125
Run No 476546 Analysis/Extraction Date 2025-06-05 Analyst SKH Method C SM2540			
Total Suspended Solids	<2 mg/L	100	90-110
Run No 476573 Analysis/Extraction Date 2025-06-04 Analyst AsA Method SM2320,2510,4500H/F			
pH		92	90-110
Run No 476587 Analysis/Extraction Date 2025-06-04 Analyst AaN Method EPA 200.8			
Aqua-Regia Digest			
Cadmium	<0.008 mg/L	114	70-130
Chromium Total	<0.05 mg/L	115	70-130
Copper	<0.01 mg/L	116	70-130
Nickel	<0.01 mg/L	111	70-130
Lead	<0.01 mg/L	116	70-130
Zinc	<0.04 mg/L	113	70-130

Guideline = Storm Sewer - NewTecumseth

*** = Guideline Exceedence**

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Results relate only to the parameters tested on the samples submitted.
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Certificate of Analysis

Client: Canada Engineering Services Inc.
39 Davisbrook Blvd
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M1T 2H6
Attention: Mr. Lawrence Yu
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Invoice to: Canada Engineering Services Inc.

Report Number: 3016825
Date Submitted: 2025-05-29
Date Reported: 2025-06-05
Project: 514504 2nd Line Amaranth ON
COC #: 232771

Sample Comment Summary

Sample ID: 1768912 Water 2 Metals analysis performed on aqua-regia digest of sample material due to solids present in sample and metals MRLs may be elevated.

Guideline = Storm Sewer - NewTecumseth

*** = Guideline Exceedence**

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Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range