V. A. WOOD ASSOCIATES LIMITED
CONSULTING GEOTECHNICAL ENGINEERS
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PRELIMINARY GEOTECHNICAL INVESTIGATION
PROPOSED SUBDIVISION - PHASE 1
ELGIN STREET EAST
COBOURG, ONTARIO

Ref. No. 7503-18-10A

April 2019

Prepared for:

Rondeau (Cobourg) Ltd.
c/o Fourteen Estates
513 Westney Road South, Unit 4
Ajax, Ontario
L1S 6W8

CONTENTS

APPENDICES

ENCLOSURES

*1.0 **INTRODUCTION***

V.A. Wood Associates Limited was retained by Rondeau (Cobourg) Ltd. to carry out a preliminary geotechnical investigation for the proposed subdivision at Elgin Street East in Cobourg, Ontario.

The 110± hectare property is presently vacant and appeared to have largely been farmland. The proposed development is divided into 7 phases (as shown on the plan in Appendix A) and will include single detached residential lots, medium density housing, a mixed use and seniors housing, an elementary school, commercial areas, a water reservoir, six storm water management ponds and a network of access roads. The Phase 1 area is located on the west side of the property.

The purpose of the investigation was to reveal the subsurface conditions and provide recommendations for the design and construction of the site services, storm water ponds and the paved areas, and the preliminary design of the foundations of the proposed structures.

*2.0 **FIELD WORK***

The field work was carried out between December 5, 2018 and February 22, 2019, and consisted of 122 boreholes. Twenty two of the boreholes were put down within the Phase 1 area at the locations shown on Enclosure 1. The boreholes were advanced to the sampling depths by means of a power-auger machine, equipped for soil sampling. Standard Penetration tests were carried out at frequent intervals of depth and the results are shown on the Borehole Logs as N-values. Monitoring wells were installed in the boreholes at the proposed storm water management pond.

The field work was supervised by a field technician and the soil samples were transported to our laboratory for further examination, classification and testing. The geodetic ground elevation at each borehole location was provided by H. F. Grander Co. Ltd., OLS.

*3.0 **SUBSURFACE CONDITIONS***

Full details of the soils encountered in each borehole are given on the Borehole Logs in Enclosures 2 to 23 inclusive, and the following notes are intended to summarize this data.

*All of the boreholes encountered a surficial layer of mixed **topsoil and sandy silt**,300 to 500± mm thick. This material contained organics in places and is likely to be cultivated soil. Standard Penetration tests in this deposit gave N-values between 1 and 12 blows/300mm (the higher values likely due to frozen ground), and its moisture content varied between 14 and 37%.*

Based on the test results the topsoil and sandy silt is considered to be in a generally very loose to loose condition.

*The topsoil and sandy silt in Boreholes 6, 7 and 95 was underlain by a layer of **silty sand/sandy silt**, which extended to a depth of between 0.7 and 1.4 m below grade. This deposit is composed of fine sand and silt, and is likely to be alluvial in origin. Standard Penetration tests in this deposit gave N-values between 2 and 3 blows/300mm, and its moisture content was of the order of 21%.*

Based on the test results the silty sand/sandy silt is considered to have a very loose relative density.

The silty sand in Boreholes 6, 7 and 95, and the topsoil/sandy silt in the remaining boreholes were underlain by a native deposit of ***silty sand till****, which extended to a depth of more than 18.6 m below grade (maximum depth investigated). This glacial deposit is composed of a silty sand matrix which contained some gravel and grades to sandy silt till in places. Standard Penetration tests in this deposit gave N-values between 12 and more than 100 blows/300mm (8 to 9 blows/300m and wet at the top in Boreholes 1 and 95), and its moisture content varied between 4 and 16%. The grain size distribution curves of representative samples of the silty sand till are shown in Enclosures 24 and 25.*

Based on the test results the silty sand till is considered to have a compact to very dense relative density.

4.0 GROUNDWATER CONDITIONS

A free water surface was encountered in most of the boreholes at a depth of between 0.8 and 9.7 m below grade. Some of the boreholes, particularly the shallow boreholes located on the hill slope, were dry and open to the full depth on completion of the fieldwork. It is noted that the water level was measured immediately after completion of drilling and it is likely that the water level had not yet stabilized in the boreholes.

An examination of the samples revealed that the native till deposits were generally moist and changed in colour from brown to grey generally at a depth of between 2 and 11.5 m below grade.

Based on the foregoing the ground water table is considered to be located at a depth of at least 2 m below existing grade in the lower lying areas and at least 8.5 m below grade in the elevated areas.

Monitoring wells were installed at the proposed location of the SWM pond in Boreholes 95 and 96, and these were comprised of 50 mm diameter PVC pipes with a screen and sand surround at the lower 3 m and bentonite seal close to ground surface. The details of the well installation are shown in the Monitoring Well Logs in Appendix 'B'.

The monitoring wells were dipped on February 7, 2019 and the findings are as follows:

Monitoring Well Number	*Depth of Well*	*Ground Water Level*	
		Depth	*Elevation*
MW95	*12.2 m*	*1.85 m*	*101.11*
MW96	*12.2 m*	*0.3 m*	*109.23*

Based on the findings, the groundwater table at the location of the pond is considered to be at Elev. 109.2 to 101.1, with seasonal variations. Regular monitoring of the water levels is recommended.

*5.0 **DISCUSSION AND RECOMMENDATIONS***

5.1 General

The boreholes encountered generally 0.3 to 0.6± m thick mixed topsoil and sandy silt (possible cultivated soil), followed by 0 to 0.9 m of very loose silty sand/sandy silt, then a competent glacial deposit of silty sand till. The groundwater table is considered to be located between 2 and 11± m below grade.

Phase 1 is to be developed for a number of residential lots with a road network, a village square and a storm water management pond (SWM Pond 'D').

Details of the proposed structures were not available at the time of this report and, therefore, the following recommendations should be reviewed when these details are available. The recommendations for the foundations are preliminary and once details of the structures are available an assessment should be made if and what supplementary detailed investigations are warranted.

5.2 Earthworks

Phase 1 area is located on a hill and will require cuts of between 1 m and 10± m over most of the area to be developed. All topsoil, previously cultivated soil and any underlying very loose silty sand and sandy silt should be removed and set aside for re-use for landscaping

purposes. The bulk of the cut material will be comprised of native silty sand till, which will generally be suitable for re-use as engineered fill.

Based on the Lot Grading Plan (shown in Appendix 'A') backfill will be required on the northern and southern fringes of Phase 1. On the northern fringe, backfill of between 1 m and 4.5 m will be required over the triangle located northwest of the northwest corner of Street D. At the southern fringe, the backfill will generally be less than 2.5 m thick and will mainly be required on the lots to the south of Street B. The excavated native silty sand till may be used as backfill to these areas and should be engineered. The moisture content of excavated till should be kept to within 2% of its optimum value, and the backfill should be placed in not more than 200 mm thick horizontal loose lifts and compacted to at least 98% of its Standard Proctor maximum dry density SPMDD).

Cobbles and boulders will likely be encountered during excavation within the native till.

5.3 Service Trenches

Based on the invert elevations shown on the Storm and Sanitary Servicing Plans (given in Appendix 'A') and the geotechnical data from the Borehole Logs, the subgrade of the pipes in Phase 1 area will likely be composed of dense to very dense native silty sand till. This material will generally provide adequate support for the pipes and allow the use of normal Class 'B' bedding using Granular 'A' material.

Clear crushed stone should not be used as bedding, otherwise the fines from the surrounding subsoils may migrate into the voids of the stone and cause undesirable settlements. If there is local softening of the trench grade, then the bedding thickness may have to be increased.

The excavation for the services will exceed depths of 6 m in some areas. No major construction problems, due to water, are expected within the anticipated excavation depths. Provision should, however, be made for the control of any surface water run-off or perched water seepages by pumping from local sumps, as and where required.

Excavations of more 1.2 m should be sloped at an angle of 1:1. Alternatively, the excavation may be supported by braced sheeting or trench boxes.

In case the service trenches are to be located below the water table, trench collars should be employed to ensure that the groundwater flow is not impacted.

The excavated native silty sand till will generally be suitable for use as trench backfill provided that it is free of topsoil, roots and other organics, and its moisture content is kept within 2% of the optimum. If the on-site materials become wet, they should be air-dried prior to re-use as trench backfill. Alternatively, imported granular material could be used as backfill. All backfill should be placed in 150 to 200 mm thick horizontal lifts and uniformly compacted to at least 95% SPMDD. The backfill around manholes should consist of well-graded and well-compacted granular material.

To minimize potential problems and wetting of the subgrade material, backfilling operations should follow closely after excavation so that only a minimal length of trench slope is exposed. Should construction be carried out in the winter season, particular attention should be given to make sure frozen material is not used a backfill.

5.4 Foundations

In Phase 1 area, the footings of the houses and the buildings within the Village Square will likely be comprised of dense to very dense native silty sand till, which is considered capable of supporting normal footings designed to a bearing pressure in SLS of at least 200 kPa (300 kPa ULS).

The lots on the northwest fringe of Phase 1 will require significant engineered backfill, and footings of the houses will likely be founded on engineered fill. Some of the lots at the southeast fringe will also require some backfill, and it is possible that the footings of the houses will be on engineered fill. Footings on the engineered fill may be designed based on a bearing pressure in SLS of 150 kPa (225 kPa ULS) and should be reinforced. We recommend that the backfill be allowed to sit for at least 1 month prior to construction of the footings.

All exterior footings or footings in unheated areas should be located at least 1.2 m below finished grade for adequate frost protection. The recommended bearing pressures will

likely to be sufficient for the proposed structures and will allow the use of normal foundation construction procedures.

The total and differential settlements of footings designed to the above bearing pressures will be less than 25 and 20 mm respectively. These are normally considered to be acceptable for the proposed structures.

The minimum footing sizes should not be less than those specified in the National Building Code of Canada. The slopes between footings should be inclined such that elevation differences between adjacent footings are not more than one half of the horizontal distance between them.

All foundation excavations should be inspected by geotechnical personnel from V.A. Wood Associates Limited to ensure the founding soils are similar to those identified in the Borehole Logs and that they are capable of supporting the design loads.

Based on the 2012 Ontario Building Code the classification of soils for seismic design should be based on the average soil properties of the top 30 m of the soil profile. The deepest boreholes were 18.6 m deep and encountered dense to very dense till deposits. The very dense soils are expected to extend to depth and, in this case, a Site Class 'C' classification may be used for the Phase 1 area.

For the design of members resisting lateral loads, the recommended soil parameters are as follows:

Soil Parameter	*Loose Fill*	*Dense Silty Sand Till*	*Engineered Fill*
Unit Weight	*20 kN/m³*	*21 kN/m³*	*21 kN/m³*
Friction Angle	*29°*	*35°*	*32°*
Cohesion	*0*	*0*	*0*
Coefficient of Earth Pressure At Rest	*0.52*	*0.43*	*0.47*
Coefficient of Active Pressure	*0.35*	*0.27*	*0.31*
Coefficient of Passive Pressure	*2.9*	*3.7*	*3.2*
Coefficient of Friction	--	*0.45*	*0.45*

5.5 *Basements*

The basement walls and other earth retaining structures should be designed to resist lateral earth pressures, the magnitude of which can be determined from:

$$p = K(\gamma\ d + q)$$

where

p = *earth pressure, kN/m²*

K = *earth pressure coefficient, 0.5 for sand fill*

γ = *unit weight of backfill, 20 kN/m³ for sand*

d = *depth below finished grade, m*

q = *surcharge on backfill, kN/m²*

Water will tend to collect around and under the basements which, therefore, should be designed to resist hydrostatic pressures unless a perimeter drainage system is installed. Water collected in this system should be connected to the local storm drainage system either by gravity or by a permanent sump pump.

Surface drainage should be directed away from the houses and buildings.

The subgrade of the basement floor slabs will likely be composed of dense to very dense native silty sand till or engineered fill, which are generally suitable subgrade materials. The proposed subgrade should be inspected and any soft or wet areas identified should be sub-excavated and replaced with approved compacted fill. Any fill required should be comprised of approved on-site or imported material placed in not more than 200 mm thick loose lifts and compacted to at least 98% SPMDD.

A layer of well-graded free-draining granular material, at least 150 mm thick and compacted to 98% of its SPMDD, should be placed under the floor slab to provide a uniform bearing surface and to act as a vapour barrier.

5.6 Pavements

It is anticipated that both light duty and heavy duty pavements are required. Considering the traffic requirements and subsoil conditions, the recommended pavement designs are:

	Car Parking Areas (Light Duty Asphalt)	*Access Roads/Driveways (Heavy Duty Asphalt)*
	(mm)	*(mm)*
HL-3 Asphaltic Concrete	*50*	*40*
HL-8 Asphaltic Concrete	*--*	*75*
Granular 'A' or 20 mm crusher run limestone	*150*	*150*
Granular 'B' or 50 mm crusher run limestone	*200*	*300*

All topsoil, vegetation remains, organics, loose or wet soil and any deleterious materials

should be removed from the areas to be paved. The exposed subgrade should be proof-rolled and any soft or wet areas identified should be sub-excavated and replaced with approved well compacted fill.

The base and sub-base granular materials should be compacted to at least 98% SPMDD and the asphaltic concrete to 96% Marshall density. The thicknesses shown above are compacted thicknesses of the layers.

Frequent inspection by geotechnical personnel from V.A. Wood Associates Limited should be carried out during construction to verify the compaction of the subgrade, base courses and asphaltic concrete by in-situ density testing using nuclear gauges.

5.7 Storm Water Management Pond

A storm water management pond, SWM Pond D, is proposed on the south side of the Phase 1 area. The proposed pond invert is at Elev. 98.75, and based on the existing grades the construction of the pond will require an excavation of between 5 and 12 m of dense to very dense native till. Based on the logs of Boreholes 95 and 96 the subgrade of the invert and slopes of the pond will likely be comprised of very dense silty sand till.

The grain size distribution of representative soil samples taken at around the proposed pond invert are shown in Enclosures 124 and 125, and reference to these indicates that the subgrade soil may be classified under the USCS classification system as SM.

Based on the findings, and considering the very dense nature of the subsoils, the typical range for soil permeability and infiltration rate are as follows:

Sample No.	*BH95/S6*	*BH96/S10*
Elevation	*98.4 m*	*98.7 m*
Soil Description (USCS Classification)	*Silty SAND (SM)*	*Silty SAND (SM)*
Soil Permeability, k	*10^{-4} to 10^{-5} cm/sec*	*10^{-4} to 10^{-5} cm/sec*
Infiltration Rate	*30-50 mm/hr*	*30-50 mm/hr*

The ground water level in Borehole 95 was at Elev. 101.1 on February 7, 2019 and this will likely be subject to seasonal variations.

6.0 STATEMENT OF LIMITATIONS

The Statement of Limitations presented on Appendix 'C' is an integral part of this report.

V.A. WOOD ASSOCIATES LIMITED

Prepared by:

Rene Quiambao, P. Eng.

Reviewed by:

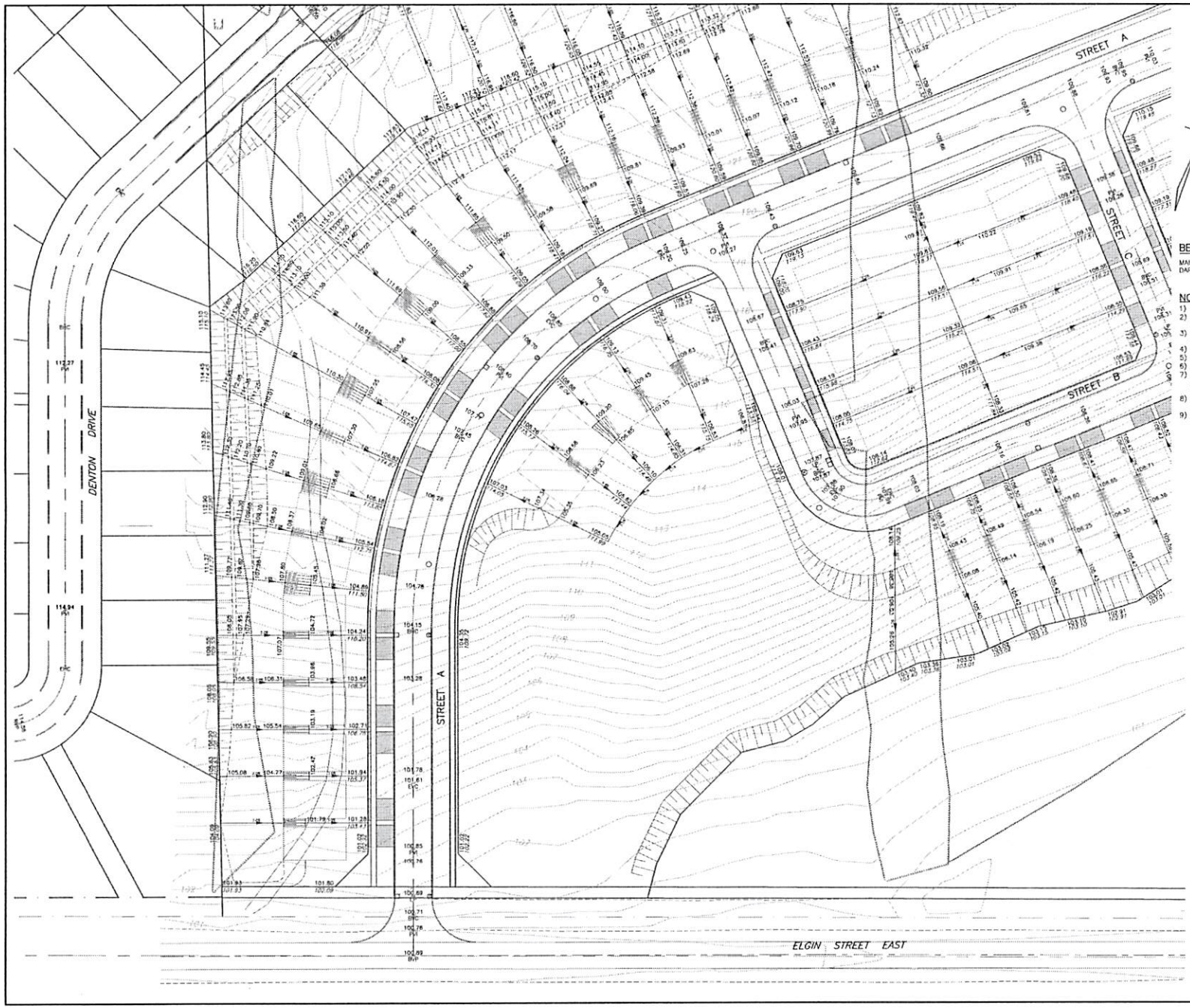
V. Wood, M.Eng., P.Eng.,

RQ/VW

APPENDICES

APPENDIX 'A'

Site Grading and Servicing Plans



BENCHMARK ELEVATION 100.197m

MAIL AND WASHER IN EAST FACE H.B. POLE NORTH WEST CORNER ELGIN AND DARCY STREET.

NOTES

1) LOT GRADES SHALL BE 2% MIN TO 5% MAX.
2) SWALE GRADES SHALL BE 2% (MIN) TO 5% (MAX) UNLESS OTHERWISE NOTED.
3) ALL SWALES SHALL HAVE 3:1 SIDE SLOPES (MAX) AND BE SODDED ON 150mm OF TOPSOIL.
4) ALL SLOPES SHALL BE 3:1 (MAX) AND BE SODDED ON 150mm OF TOPSOIL.
5) REAR YARDS TO BE RESTORED WITH 300mm TOPSOIL AND SOD.
6) LIMIT OF ENGINEERED FILL SUBJECT TO ENGINEERED FILL REPORT.
7) DISTURBED AREAS AND FUTURE DEVELOPMENT SHALL BE GRADED SUCH THAT THERE IS NO PONDING WATER AND DRAINAGE IS DIRECTED AWAY FROM PROPOSED LOTS.
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9) ALL VACANT BLOCKS SHALL BE SEEDED ON 150mm TOPSOIL AND MAINTAINED TO THE SATISFACTION OF THE DIRECTOR OF ENGINEERING SERVICES.

LEGEND

ORIGINAL GROUND CONTOUR	103
ORIGINAL SURVEY ELEVATION	103
ORIGINAL GROUND ELEVATION	101.35
PROPOSED ELEVATION	103.15
PROPOSED SWALE	
DIRECTION OF DRAINAGE	
DIRECTION OF OVERLAND FLOW	
ENGINEERED FILL LOT	
DRIVEWAY LOCATION	
LIMIT OF SURFACE PONDING	
LIMIT OF PHASE	

NO.	DATE	REVISION	BY

REVISIONS

APPROVED	APPROVED
DIRECTOR, ENGINEERING SERVICES MUNICIPALITY OF	DIRECTOR, ENGINEERING SERVICES REGION OF
DATE	DATE

THE CORPORATION OF THE TOWN OF COBOURG
PUBLIC WORKS DIVISION – ENGINEERING DEPARTMENT

VILLAGES OF CENTRAL PARK
RONDEAU (Cobourg) Ltd.

LOT GRADING PLAN

D.G. Biddle & Associates Limited
consulting engineers and planners
96 KING STREET EAST • OSHAWA ON L1H 1B6
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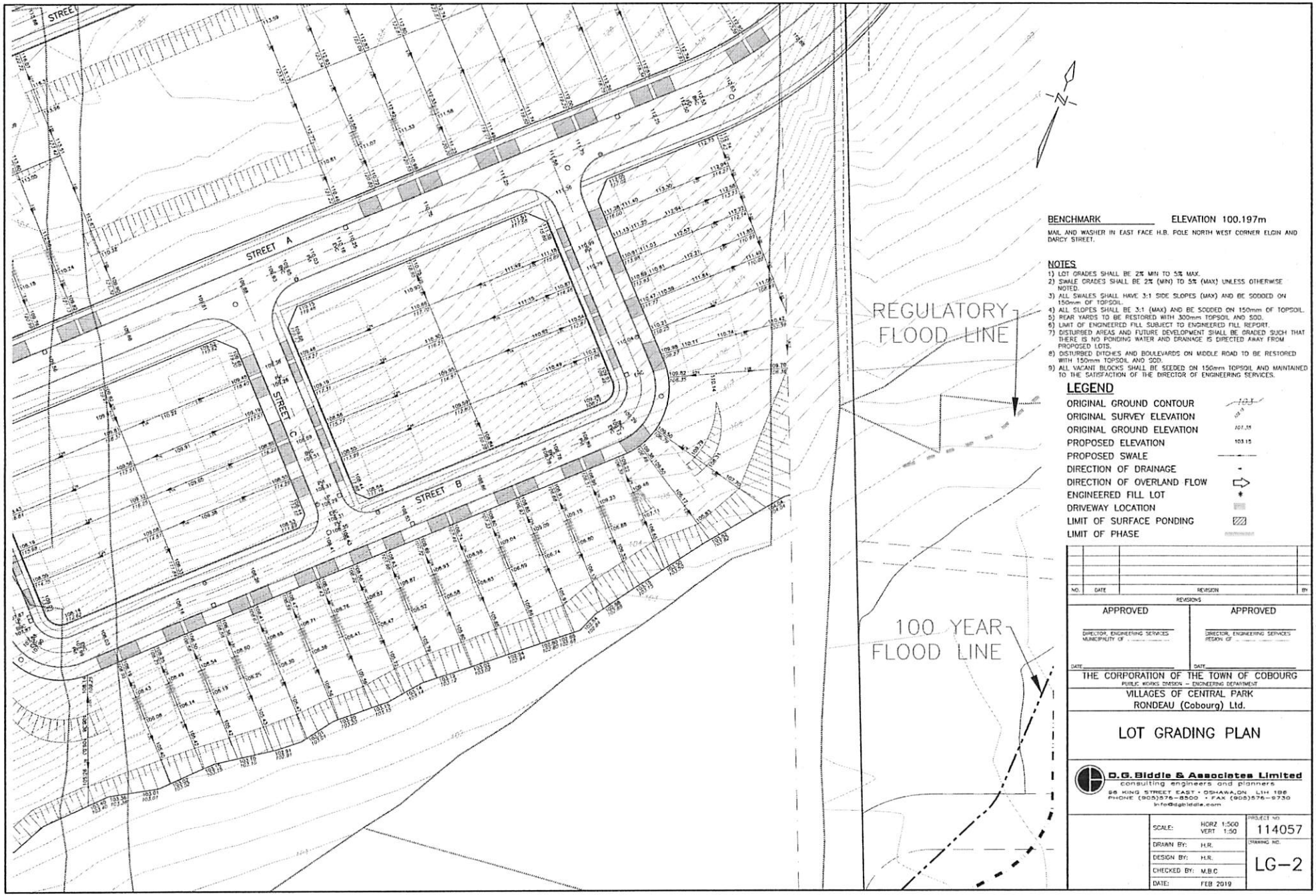

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ORIGINAL SURVEY ELEVATION	103
ORIGINAL GROUND ELEVATION	101.15
PROPOSED ELEVATION	103.15
PROPOSED SWALE	
DIRECTION OF DRAINAGE	
DIRECTION OF OVERLAND FLOW	
ENGINEERED FILL LOT	
DRIVEWAY LOCATION	
LIMIT OF SURFACE PONDING	
LIMIT OF PHASE	

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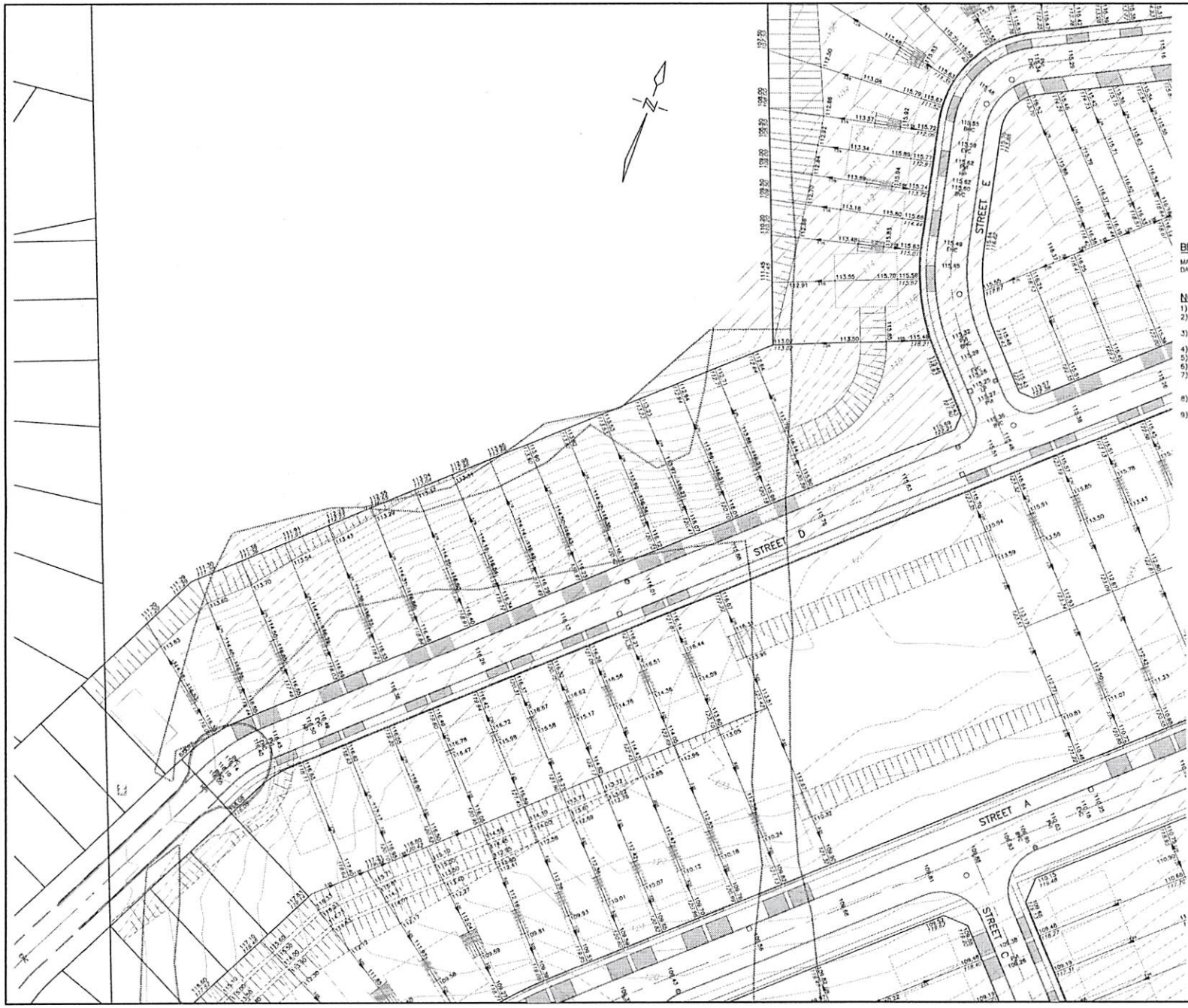

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ORIGINAL SURVEY ELEVATION	103.0
ORIGINAL GROUND ELEVATION	101.35
PROPOSED ELEVATION	103.15
PROPOSED SWALE	
DIRECTION OF DRAINAGE	-
DIRECTION OF OVERLAND FLOW	
ENGINEERED FILL LOT	*
DRIVEWAY LOCATION	
LIMIT OF SURFACE PONDING	
LIMIT OF PHASE	

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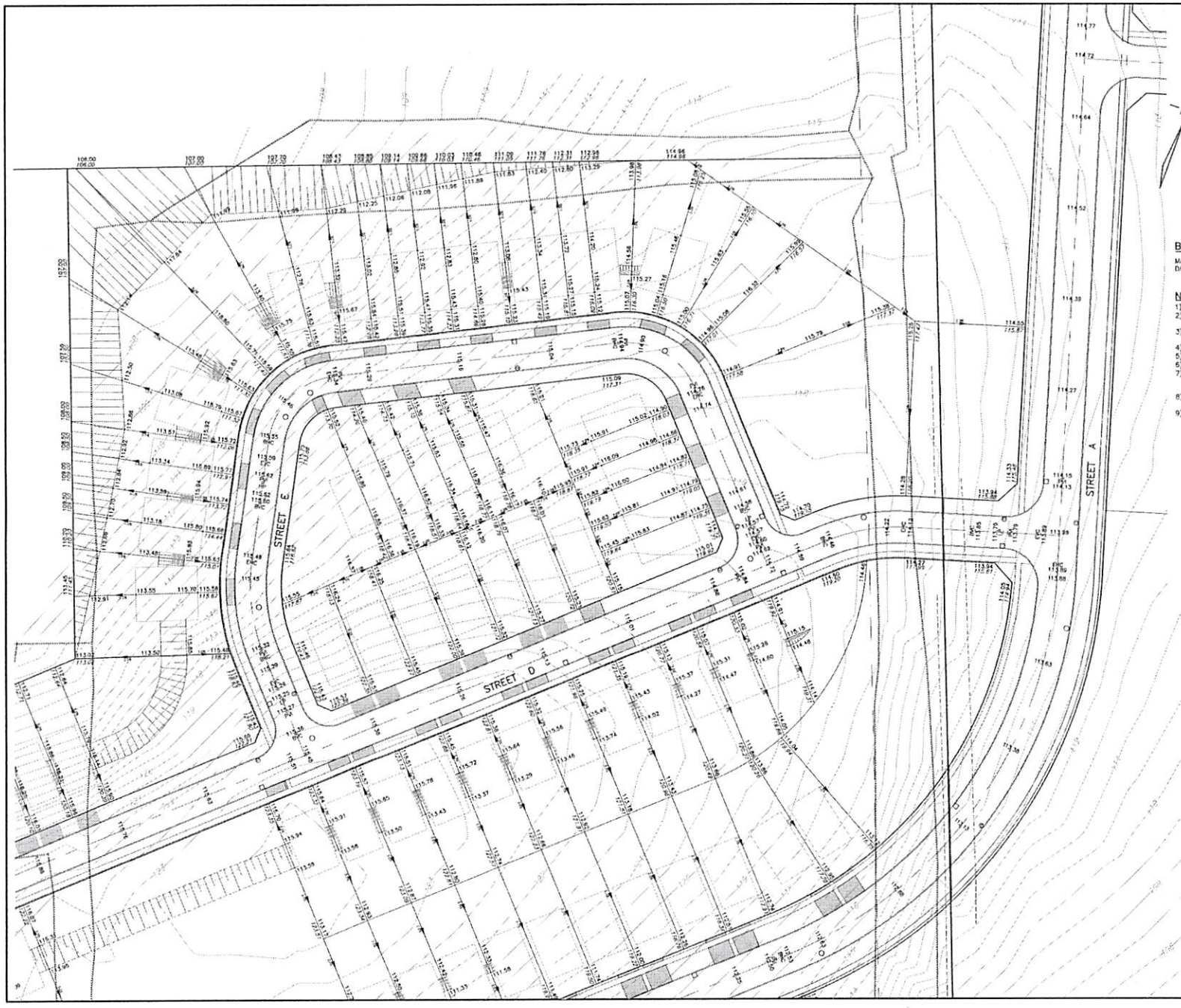

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LEGEND

ORIGINAL GROUND CONTOUR	107.5
ORIGINAL SURVEY ELEVATION	107
ORIGINAL GROUND ELEVATION	107.35
PROPOSED ELEVATION	103.15
PROPOSED SWALE	
DIRECTION OF DRAINAGE	
DIRECTION OF OVERLAND FLOW	
ENGINEERED FILL LOT	*
DRIVEWAY LOCATION	
LIMIT OF SURFACE PONDING	
LIMIT OF PHASE	

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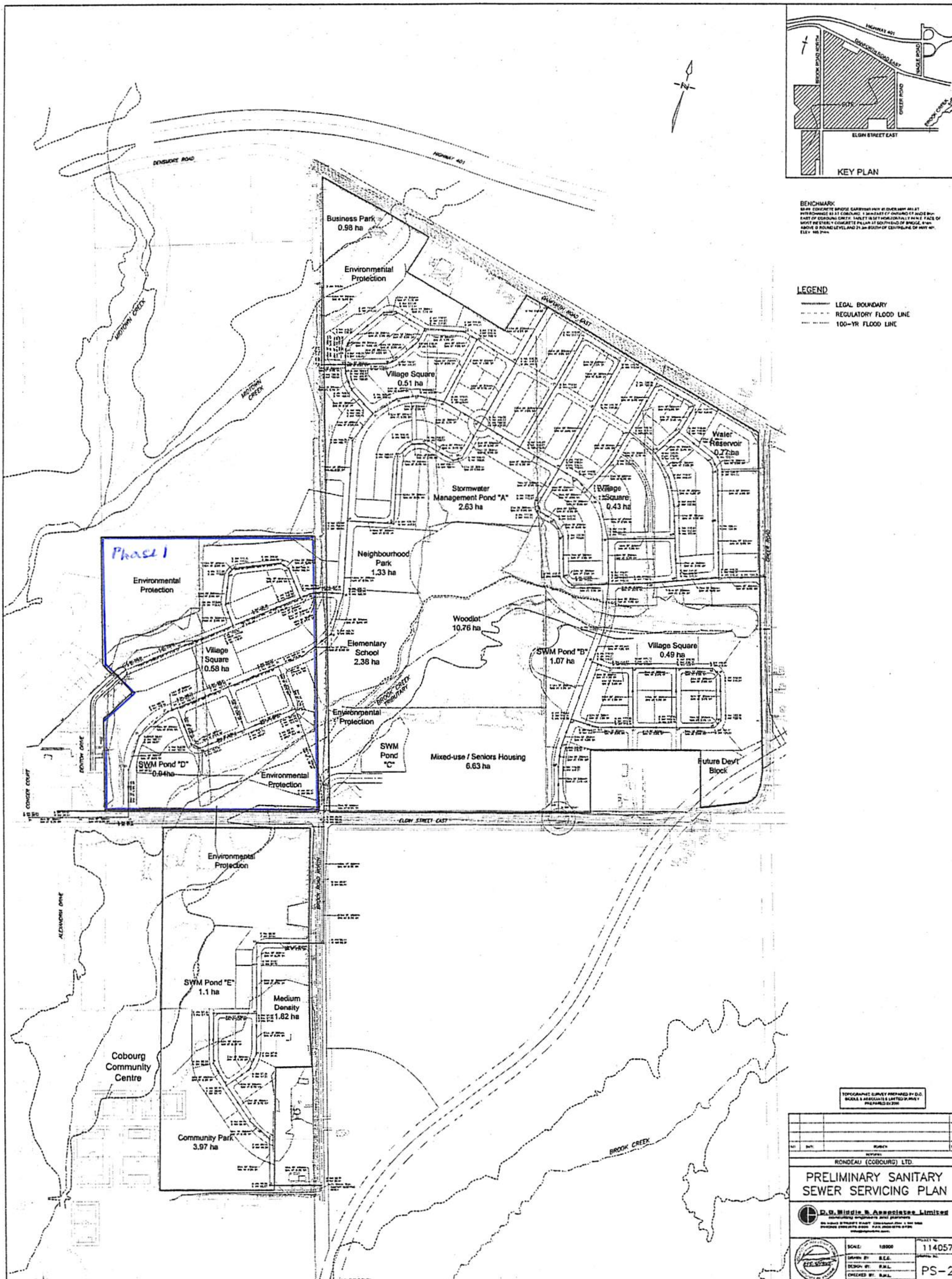
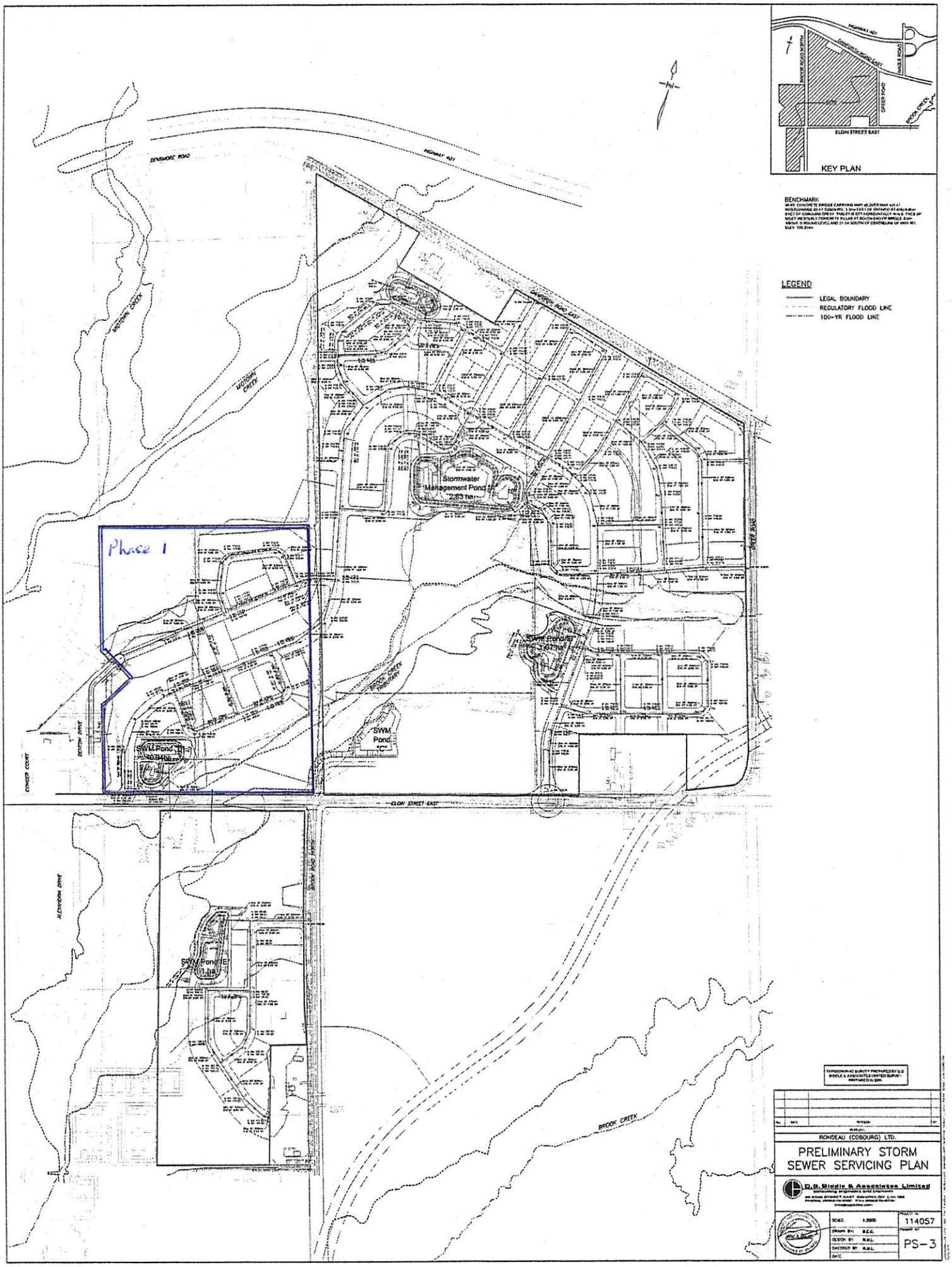
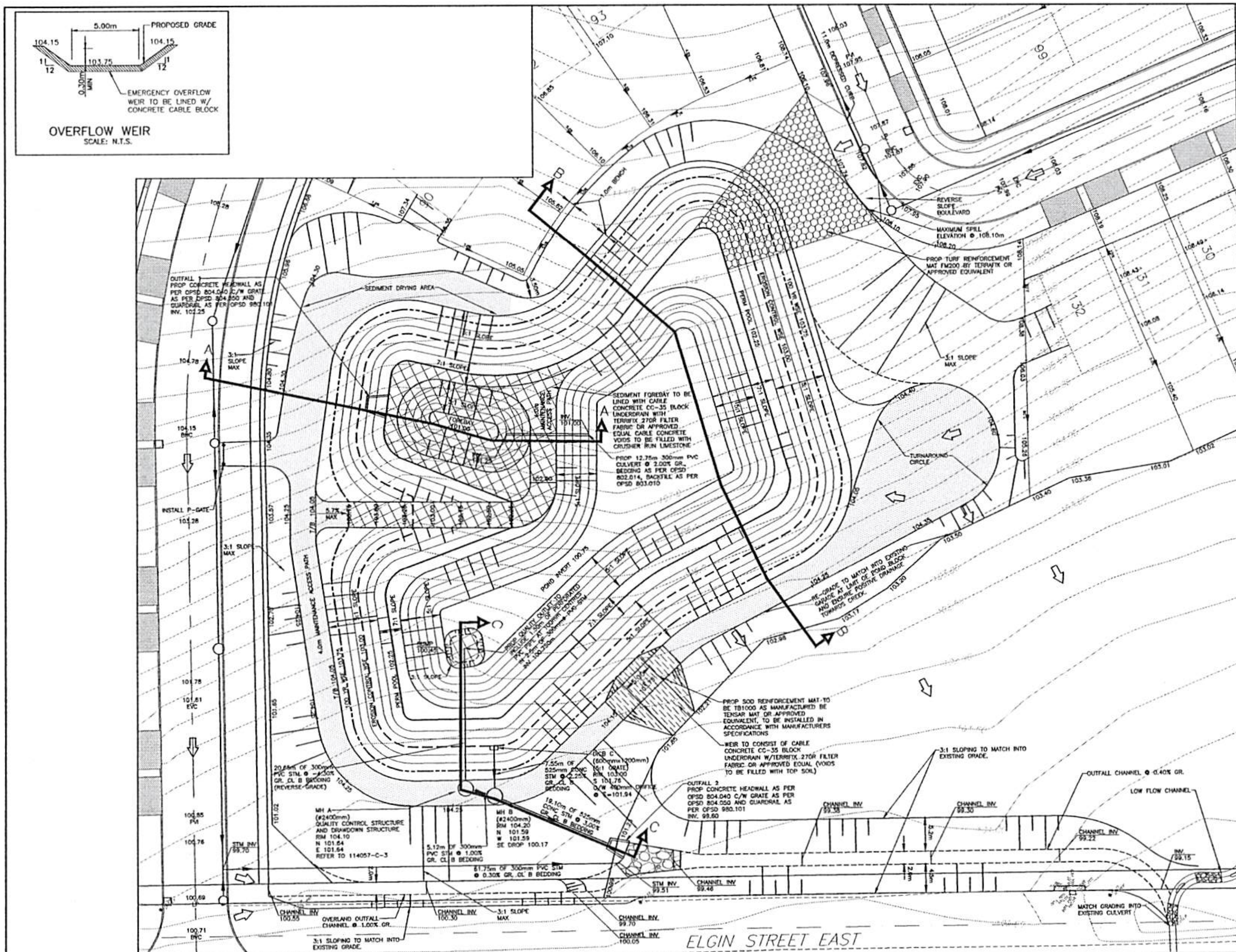


HIGHWAY 401
DENSMORE ROAD
DANFORTH ROAD EAST
NAGLE ROAD
GREER ROAD
ELGIN STREET EAST
BROOK CREEK
KEY PLAN
BENCHMARK
LEGEND
LEGAL BOUNDARY
REGULATORY FLOOD LINE
100-YR FLOOD LINE
MIDTOWN CREEK
Business Park
0.98 ha
Environmental Protection
Village Square
0.51 ha
Water Reservoir
0.77 ha
Stormwater Management Pond "A"
2.63 ha
Village Square
0.43 ha
Phase I
Environmental Protection
Neighbourhood Park
1.33 ha
Woodlot
10.76 ha
Village Square
0.58 ha
Elementary School
2.38 ha
SWM Pond "B"
1.07 ha
Village Square
0.49 ha
BROOK CREEK TRIBUTARY
Environmental Protection
SWM Pond "C"
Mixed-use / Seniors Housing
6.63 ha
Future Dev't Block
SWM Pond "D"
0.94ha
Environmental Protection
DENTON DRIVE
CONGER COURT
ELGIN STREET EAST
Environmental Protection
ALEXANDRIA DRIVE
BROOK ROAD NORTH
SWM Pond "E"
1.1 ha
Medium Density
1.82 ha
Cobourg Community Centre
Community Park
3.97 ha
BROOK CREEK
RONDEAU (COBOURG) LTD.
PRELIMINARY SANITARY SEWER SERVICING PLAN
D.G. Biddle & Associates Limited
SCALE: 1:5000
114057
PS-2


KEY PLAN
HIGHWAY 401
DAVIDSON ROAD EAST
BRIDGE ROAD NORTH
BRIDGE ROAD
OFFER ROAD
BROOK CREEK
SITE
ELGIN STREET EAST
BENCHMARK
LEGEND
LEGAL BOUNDARY
REGULATORY FLOOD LINE
100-YR FLOOD LINE
DENMORE ROAD
HIGHWAY 401
MOTHERN CREEK
DAVIDSON ROAD EAST
Stormwater Management Pond 'A' 2.63 ha
Phase 1
SWM Pond 'B' 1.07 ha
SWM Pond 'C'
SWM Pond 'D' 10.34 ha
BROOK CREEK TRIBUTARY
BOTTOM DRIVE
CONGER COURT
ELGIN STREET EAST
ALEXANDRA DRIVE
BRIDGE ROAD NORTH
SWM Pond 'E' 1 ha
BROOK CREEK
RONDEAU (COBOURG) LTD.
PRELIMINARY STORM SEWER SERVICING PLAN
D.G. Biddle & Associates Limited
SCALE: 1:2000
PROJECT No. 114057
DRAWN BY: B.E.G.
DESIGN BY: R.M.L.
CHECKED BY: R.M.L.
DATE
SHEET No. PS-3



NOTES

1. REFER TO DRAWING 114057 C-2 AND C-3 FOR SECTIONS AND DETAILS
2. POND SLOPES TO BE SODDED ON 600mm OF TOPSOIL FROM ELEVATION 102.25m TO ELEVATION 104.05m. ALL REMAINING DISTURBED AREAS TO BE SEEDED ON 600mm OF TOPSOIL.
3. 4.0m MAINTENANCE ACCESS SHALL CONSIST OF THE FOLLOWING:
   BELOW 103.75m – CABLE CONCRETE CC-35 BLOCKS UNDERLAIN WITH 450mm OF 50mm C.R.L. AND TERRAFIX 270R FILTER FABRIC (VOIDS TO BE FILLED WITH CRUSHER RUN LIMESTONE)
   ABOVE 103.75m – 450mm OF 50mm CRUSHER RUN LIMESTONE.
4. ALL PVC CULVERTS SHALL BE DR35, BEDDING AS PER OPSD 802.014
5. POND WARNING SIGNS SHALL BE PURCHASED FROM THE TOWN OF COBOURG. LOCATION OF POND SIGNS WILL BE DETERMINED BY THE TOWN.
6. ALL MANHOLES WITHIN THE POND BLOCK TO HAVE BOLT DOWN LIDS AS PER OPSD 401.060.
7. ALL MANHOLES TO HAVE 1.5m TALL MARKERS.
8. A QUALIFIED GEOTECHNICAL ENGINEER SHALL BE ON SITE DURING CONSTRUCTION OF THE POND TO ENSURE THAT EITHER THE NATIVE SOILS ARE ADEQUATE OR SUITABLE ALTERNATIVES BE PUT IN PLACE DURING CONSTRUCTION.
9. ALL POND WORKS SHALL BE SUPERVISED FULL TIME AND WILL REQUIRE CERTIFICATION FROM THE GEOTECHNICAL ENGINEER AND CONSULTING ENGINEER FOR INSTALLATION, MATERIALS AND FINAL ELEVATIONS, TO THE SATISFACTION OF THE DIRECTOR OF ENGINEERING.

MONITORING/MAINTENANCE

THE FOLLOWING MONITORING AND INSPECTION PROGRAM IS RECOMMENDED FOR THE WET POND FACILITY:

- MONITORING AND INSPECTION AFTER EVERY SIGNIFICANT RAINFALL EVEN DURING THE FIRST TWO YEARS OF OPERATION (APPROXIMATELY 4 INSPECTIONS PER YEAR.) ANNUAL INSPECTIONS AFTER THE INITIAL TWO YEARS.
- THE MONITORING AND INSPECTION SHOULD INCLUDE OBSERVATIONS OF THE HYDRAULIC OPERATION (DRAW DOWN TIME, INLET AND OUTLET FUNCTION); CONDITION OF VEGETATION IN ALL ZONES OF THE POND (WET AND DRY); EVIDENCE OF GREASE/OIL CONTAMINATION; TRASH BUILD UP. TABLE 6.1 OF THE MOE STORMWATER MANAGEMENT FACILITY DESIGN BRIEF) DESCRIBES HOW TO ASSESS THE FACILITY'S HYDRAULIC OPERATION.

THE FOLLOWING MAINTENANCE PROGRAM IS RECOMMENDED FOR THE WET POND FACILITY:

- GRASS CUTTING AND WEED CONTROL IN NOT RECOMMENDED.
- ONCE THE UPLAND PLANTING ARE STABILIZED THERE WILL BE LITTLE NEED OF MAINTENANCE IN THIS AREA. SHORELINE PLANTINGS AND AQUATIC THERE WILL BE LITTLE NEED FOR MAINTENANCE IN THIS AREA. SHORELINE PLANTING AND AQUATIC PLANTINGS MAY REQUIRE RE-ESTABLISHMENT EVERY 2-5 YEARS AS OBSERVATION DICTATES.
- SEDIMENT REMOVAL FREQUENCY IS DEPENDENT ON A NUMBER OF FACTORS FROM UPSTREAM LAND USE AND DEVELOPMENT ACTIVITIES TO MUNICIPAL STREET SANDING PRACTICES. WE HAVE RECOMMENDED AN ANNUAL MEASUREMENTS OF SEDIMENT DEPTH ACCUMULATION AND REMOVAL FREQUENCY OF EVERY 10 YEARS.
- INLET AND OUTLET STRUCTURES SHOULD BE MAINTAINED TO CLEAR BLOCKAGE AS REQUIRED BY OBSERVATIONS. MAINTENANCE REPLACEMENT OF THESE STRUCTURES IS BASED ON A LIFE SPAN OF THE MATERIALS.
- TRASH REMOVAL IS RECOMMENDED ON A YEARLY BASIS OD AS OBSERVATION REQUIRES BASED ON SURROUNDING AIRBORNE TRASH ACCUMULATION.

LEGEND

ORIGINAL GROUND CONTOUR	103
ORIGINAL ELEVATION	101.35
PROPOSED ELEVATIONS	103.15
DIRECTION OF OVERLAND FLOW	⇨
MAINTENANCE ACCESS	
CONCRETE CABLE BLOCK	
SOD REINFORCEMENT MAT	

NO.	DATE	REVISION	BY

REVISIONS

RONDEAU (COBOURG) LTD.

STORMWATER MANAGEMENT FACILITY–POND D

D.G. Biddle & Associates Limited
consulting engineers and planners
96 KING STREET EAST · OSHAWA,ON L1H 1B6
PHONE (905)576-8500 · FAX (905)576-9730
info@dgbiddle.com

SCALE:	1:300	PROJECT NO. 114057
DRAWN BY:	D.D.M.	DRAWING NO. C–1
DESIGN BY:	D.D.M.	
CHECKED BY:	M.B.C.	
DATE:	APRIL 2019	

APPENDIX 'B'

Monitoring Well Logs

Project No: 7503-18-10

Project: Proposed Subdivision

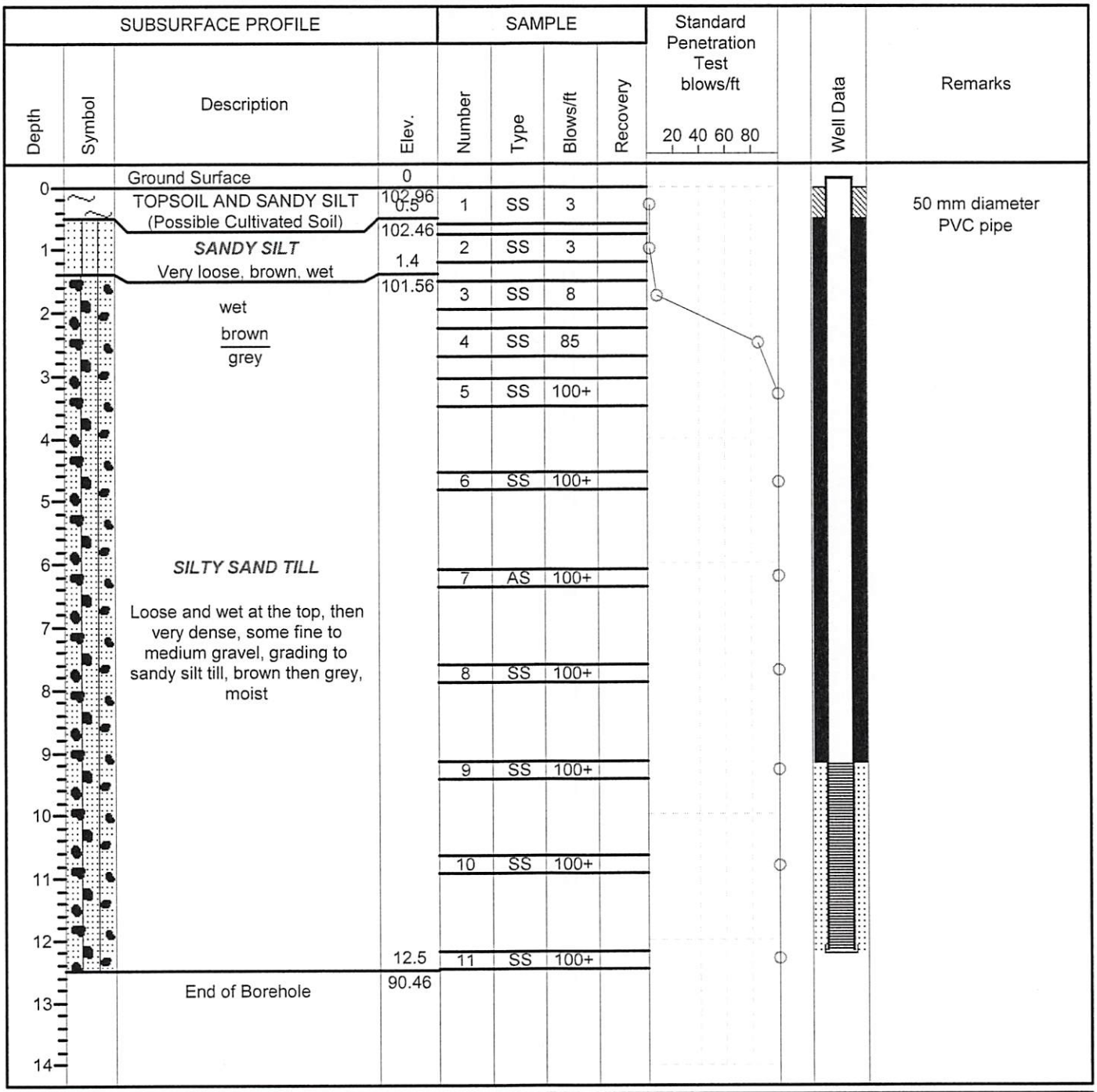
Client: Rondeau (Cobourg) Ltd.

Location: Elgin Street East, Cobourg, ON

Monitoring Well No.: 95

Enclosure: B1

Engineer: VAWood Assoc.



Drilled By: Young's Drilling Inc.

Drill Method: Auger

Drill Date: January 25, 2019

V A WOOD ASSOCIATES LTD.
1080 Tapscott Road, Unit 24
Scarborough, ON
M1X 1E7

Hole Size: 110 mm

Datum: Geodetic

Sheet: 1 of 1

Project No: 7503-18-10

Project: Proposed Subdivision

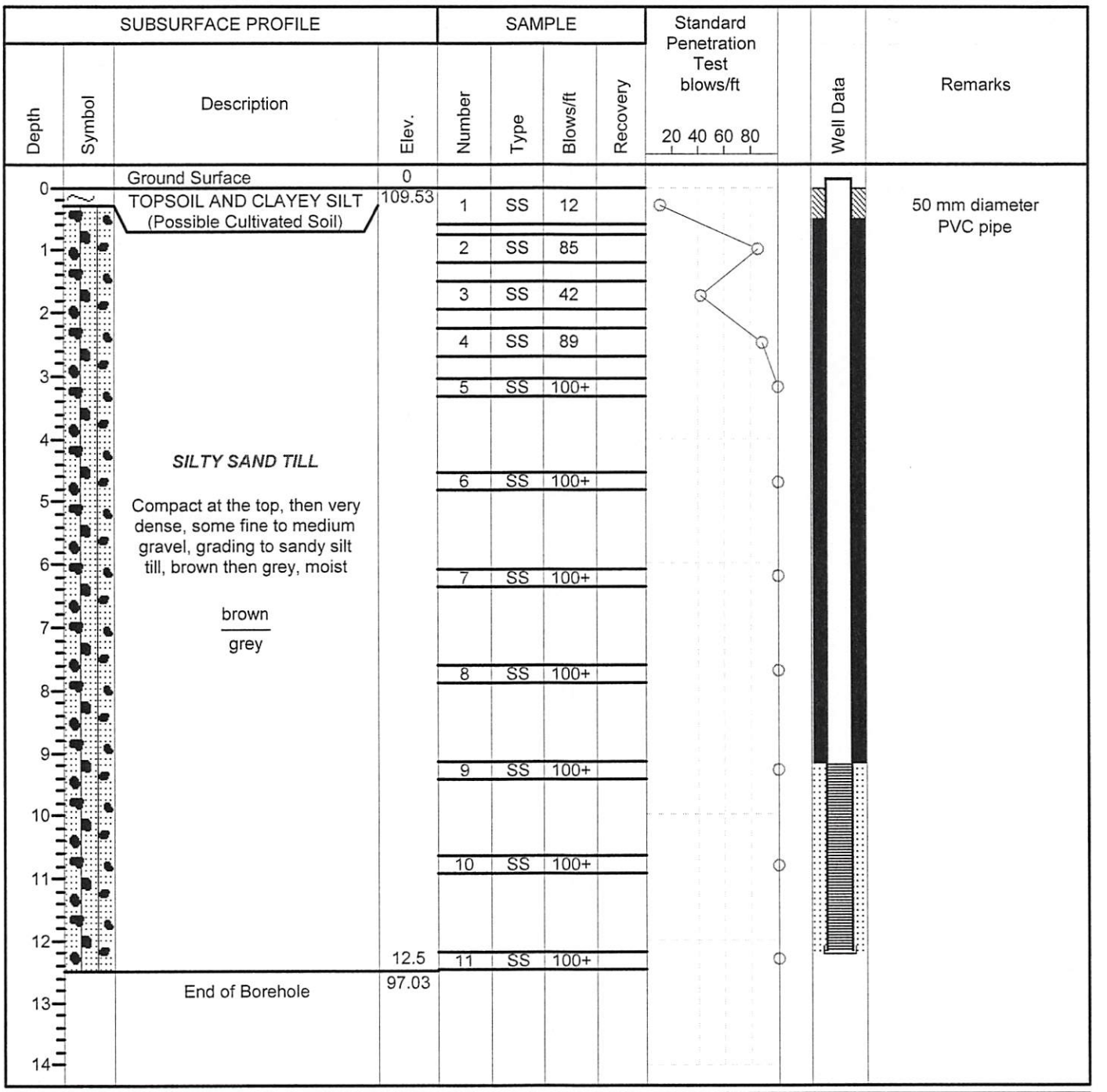
Client: Rondeau (Cobourg) Ltd.

Location: Elgin Street East, Cobourg, ON

Monitoring Well No.: 96

Enclosure: B2

Engineer: VAWood Assoc.



Drilled By: Young's Drilling Inc.

Drill Method: Auger

Drill Date: January 25, 2019

V A WOOD ASSOCIATES LTD.
1080 Tapscott Road, Unit 24
Scarborough, ON
M1X 1E7

Hole Size: 110 mm

Datum: Geodetic

Sheet: 1 of 1

APPENDIX 'C'

Statement of Limitations

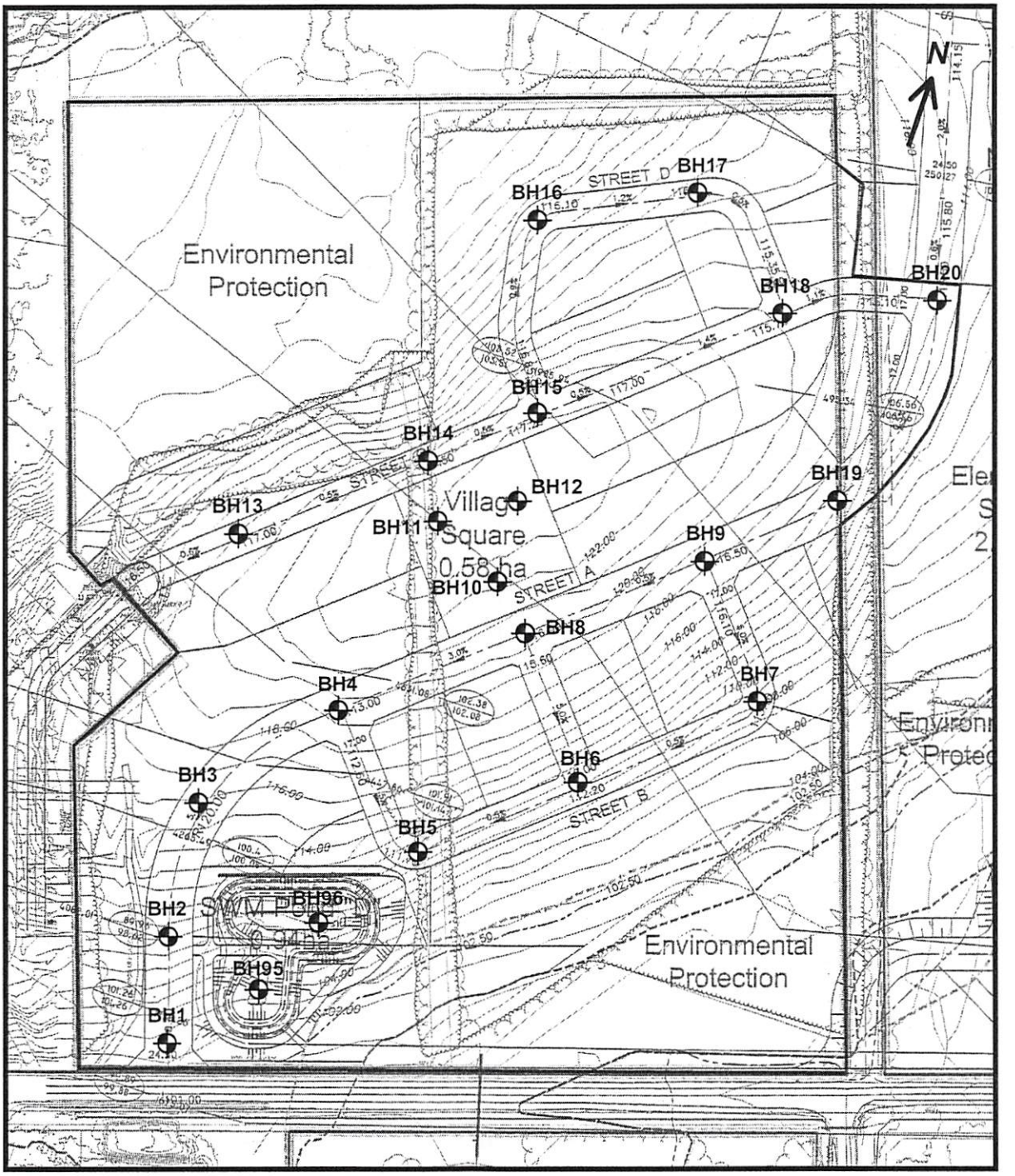
STATEMENT OF LIMITATIONS

The conclusions and recommendations in this report are based on information determined at the borehole locations and on geological data of a general nature which may be available for the area investigated. Soil and groundwater conditions between and beyond the boreholes may differ from those encountered at the borehole locations and conditions may become apparent during construction which would not be detected or anticipated at the time of the soil investigation.

We recommend that we be retained to ensure that all necessary stripping, subgrade preparation and compaction requirements are met, and to confirm that the soil conditions do not deviate materially from those encountered in the boreholes. In cases where this recommendation is not followed, the company's responsibility is limited to interpreting accurately the information encountered at the borehole locations.

This report is applicable only to the project described in the introduction, constructed substantially in accordance with details of alignment and elevations quoted in the text.

ENCLOSURES



BOREHOLE LOCATION PLAN

Reference No : 7503-18-10

Borehole No : 1

Enclosure No : 2

Client : Rondeau (Cobourg) Ltd.

Project : Proposed Subdivision

Method : Auger

Location : Elgin Street East, Cobourg, ON

Diameter : 110 mm

Datum Elevation : Geodetic

Date : January 17, 2019

SUBSURFACE PROFILE					SAMPLE					
Elevation m	Depth m	Description	Symbol	Water	Number	Type	N-value	Standard Penetration Test blows/300mm (20 40 60 80)	Moisture Content, % (10 30 50)	Remarks
102.7	0	Ground Surface								
		TOPSOIL AND CLAYEY SILT (Possible Cultivated Soil)			1	SS	9			frozen surface
102.1										
	1	wet			2	SS	15			
		wet			3	SS	9			
	2	brown / grey		▼						
		SILTY SAND TILL			4	SS	42			cave in at 2.4 m
		Compact and wet at the top, then dense to very dense, some fine to medium gravel, grading to sandy silt till, brown then grey, moist								
	3				5	SS	100+			
	4									
	5				6	SS	100+			
	6									
96.3					7	SS	100+			
		End of Borehole								
	7									
	8									
	9									

V.A. WOOD ASSOCIATES LIMITED

Disk :

Sheet : 1 of 1

Reference No : 7503-18-10

Borehole No : 2

Enclosure No : 3

Client : Rondeau (Cobourg) Ltd.

Project : Proposed Subdivision

Method : Auger

Location : Elgin Street East, Cobourg, ON

Diameter : 110 mm

Datum Elevation : Geodetic

Date : January 17, 2019

Elevation m	Depth m	Description	Symbol	Water	Number	Type	N-value	Standard Penetration Test blows/300mm (20 40 60 80)	Moisture Content, % (10 30 50)	Remarks
110.89	0	Ground Surface								
110.29		TOPSOIL and SANDY SILT Very loose, wet (Possible Cultivated Soil)			1	SS	3			
	1				2	SS	57			
					3	SS	73			
	2				4	SS	100+			
		SILTY SAND TILL								
	3	Very dense, some fine to medium gravel, grading to sandy silt till, brown then grey, moist			5	SS	100+			
	4			▼						
					6	SS	100+			
	5									
	6				7	SS	100+			
	7									
					8	SS	100+			cave in at 7.9 m
	8	brown / grey								
	9				9	SS	100+			
100.69	10				10	SS	100+			
		End of Borehole								
	11									
	12									
	13									

V.A. WOOD ASSOCIATES LIMITED

Disk :

Sheet : 1 of 1

Reference No : 7503-18-10

Borehole No : 3

Enclosure No : 4

Client : Rondeau (Cobourg) Ltd.

Project : Proposed Subdivision

Method : Auger

Location : Elgin Street East, Cobourg, ON

Diameter : 110 mm

Datum Elevation : Geodetic

Date : January 16, 2019

Elevation m	Depth m	Description	Symbol	Water	Sample Number	Sample Type	N-value	Standard Penetration Test blows/300mm (20 40 60 80)	Moisture Content, % (10 30 50)	Remarks
116.08	0	Ground Surface								
115.58	0	TOPSOIL AND SANDY SILT (Possible Cultivated Soil)			1	SS	2			
	1	wet at the top			2	SS	15			
	2				3	SS	30			
	2				4	SS	72			
	3				5	SS	100+			
	4				6	SS	100+			
	5				7	SS	100+			
	6	brown								
	7	grey			8	SS	100+			
	8	*SILTY SAND TILL*			9	SS	100+			cave in at 8.8 m
	9	Compact at the top, then very dense, some fine to medium gravel, grading to sandy silt till, brown then grey, moist			10	SS	100+			
	10				11	SS	100+			
	11				12	SS	100+			
	12				13	SS	100+			
	13				14	SS	100+			
	14				15	SS	100+			
	15									
	16									
	17									
97.48	18									
	19	End of Borehole								

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Disk :

Sheet : 1 of 1

Reference No : 7503-18-10

Borehole No : 4

Enclosure No : 5

Client : Rondeau (Cobourg) Ltd.

Project : Proposed Subdivision

Method : Auger

Location : Elgin Street East, Cobourg, ON

Diameter : 110 mm

Datum Elevation : Geodetic

Date : January 15, 2019

Elevation m	Depth m	Description	Symbol	Water	Number	Type	N-value	Standard Penetration Test blows/300mm (20 40 60 80)	Moisture Content, % (10 30 50)	Remarks
119.52	0	Ground Surface								
119.02		TOPSOIL AND SANDY SILT (Possible Cultivated Soil)			1	SS	2			
	1				2	SS	42			
	2				3	SS	48			
	3				4	SS	100+			
	4				5	SS	83			
	5	*SILTY SAND TILL*			6	SS	100+			
	6	Dense at the top, then very dense, some fine to medium gravel, grading to sandy silt till, brown then grey, moist			7	SS	100+			
	7									
	8	brown / grey			8	SS	100+			
	9				9	SS	86			
	10				10	SS	100+			
	11									cave in at 11.6 m
	12				11	SS	100+			
	13				12	SS	100+			
	14				13	SS	100+			
	15									
	16				14	SS	100+			
	17									
100.92	18				15	SS	100+			
	19	End of Borehole								

V.A. WOOD ASSOCIATES LIMITED

Disk :

Sheet : 1 of 1

Reference No : 7503-18-10

Borehole No : 5

Enclosure No : 6

Client : Rondeau (Cobourg) Ltd.

Project : Proposed Subdivision

Method : Auger

Location : Elgin Street East, Cobourg, ON

Diameter : 110 mm

Datum Elevation : Geodetic

Date : January 16, 2019

SUBSURFACE PROFILE					SAMPLE					
Elevation m	Depth m	Description	Symbol	Water	Number	Type	N-value	Standard Penetration Test blows/300mm (20 40 60 80)	Moisture Content, % (10 30 50)	Remarks
111.05	0	Ground Surface								
		TOPSOIL and SANDY SILT Very loose, wet (Possible Cultivated Soil)			1	SS	3			
110.45	1				2	SS	100+			
	2				3	SS	100+			
		SILTY SAND TILL			4	SS	80			
	3	Very dense, some fine to medium gravel, grading to sandy silt till, brown then grey, moist			5	SS	91			
	4			▼						
	5				6	SS	100+			
	6				7	SS	100+			cave in at 6.7 m
	7	brown / grey								
	8				8	SS	100+			
	9				9	SS	100+			
100.85	10				10	SS	100+			
		End of Borehole								
	11									
	12									
	13									

V.A. WOOD ASSOCIATES LIMITED

Disk :

Sheet : 1 of 1

Reference No : 7503-18-10

Borehole No : 6

Enclosure No : 7

Client : Rondeau (Cobourg) Ltd.

Project : Proposed Subdivision

Method : Auger

Location : Elgin Street East, Cobourg, ON

Diameter : 110 mm

Datum Elevation : Geodetic

Date : January 15, 2019

Elevation m	Depth m	Description	Symbol	Water	Number	Type	N-value	Standard Penetration Test blows/300mm (20 40 60 80)	Moisture Content, % (10 30 50)	Remarks
109.75	0	Ground Surface								
109.45		TOPSOIL AND CLAYEY SILT (Possible Cultivated Soil)			1	SS	3			Borehole open and dry on completion
109.05		***SILTY SAND*** Very loose, fine sand, brown, wet			2	SS	39			
	1				3	SS	50			
	2	***SILTY SAND TILL*** Compact at the top, then very dense, some fine to medium gravel, grading to sandy silt till, brown then grey, moist		DRY	4	SS	100+			
	3				5	SS	60			
	4	brown / grey								
					6	SS	100+			
	5									
	6				7	SS	100+			
103.35		End of Borehole								
	7									
	8									
	9									

V.A. WOOD ASSOCIATES LIMITED

Disk :

Sheet : 1 of 1

Reference No : 7503-18-10

Borehole No : 7

Enclosure No : 8

Client : Rondeau (Cobourg) Ltd.

Project : Proposed Subdivision

Method : Auger

Location : Elgin Street East, Cobourg, ON

Diameter : 110 mm

Datum Elevation : Geodetic

Date : January 9, 2019

SUBSURFACE PROFILE					SAMPLE					
Elevation m	Depth m	Description	Symbol	Water	Number	Type	N-value	Standard Penetration Test blows/300mm (20 40 60 80)	Moisture Content, % (10 30 50)	Remarks
107.3	0	Ground Surface								
107		TOPSOIL and SANDY SILT (Possible Cultivated Soil)			1	SS	2			
106.6		*SILTY SAND* Very loose, brown, wet								
	1				2	SS	32			
					3	SS	49			
	2	*SILTY SAND TILL* Dense at the top, then very dense, some fine to medium gravel, grading to sandy silt till, brown, moist			4	SS	56			
	3			▼	5	SS	70			
	4									cave in at 4.3 m
102.45					6	SS	100+			
	5	End of Borehole								
	6									
	7									
	8									

V.A. WOOD ASSOCIATES LIMITED

Disk :

Sheet : 1 of 1

Reference No : 7503-18-10

Borehole No : 8

Enclosure No : 9

Client : Rondeau (Cobourg) Ltd.

Project : Proposed Subdivision

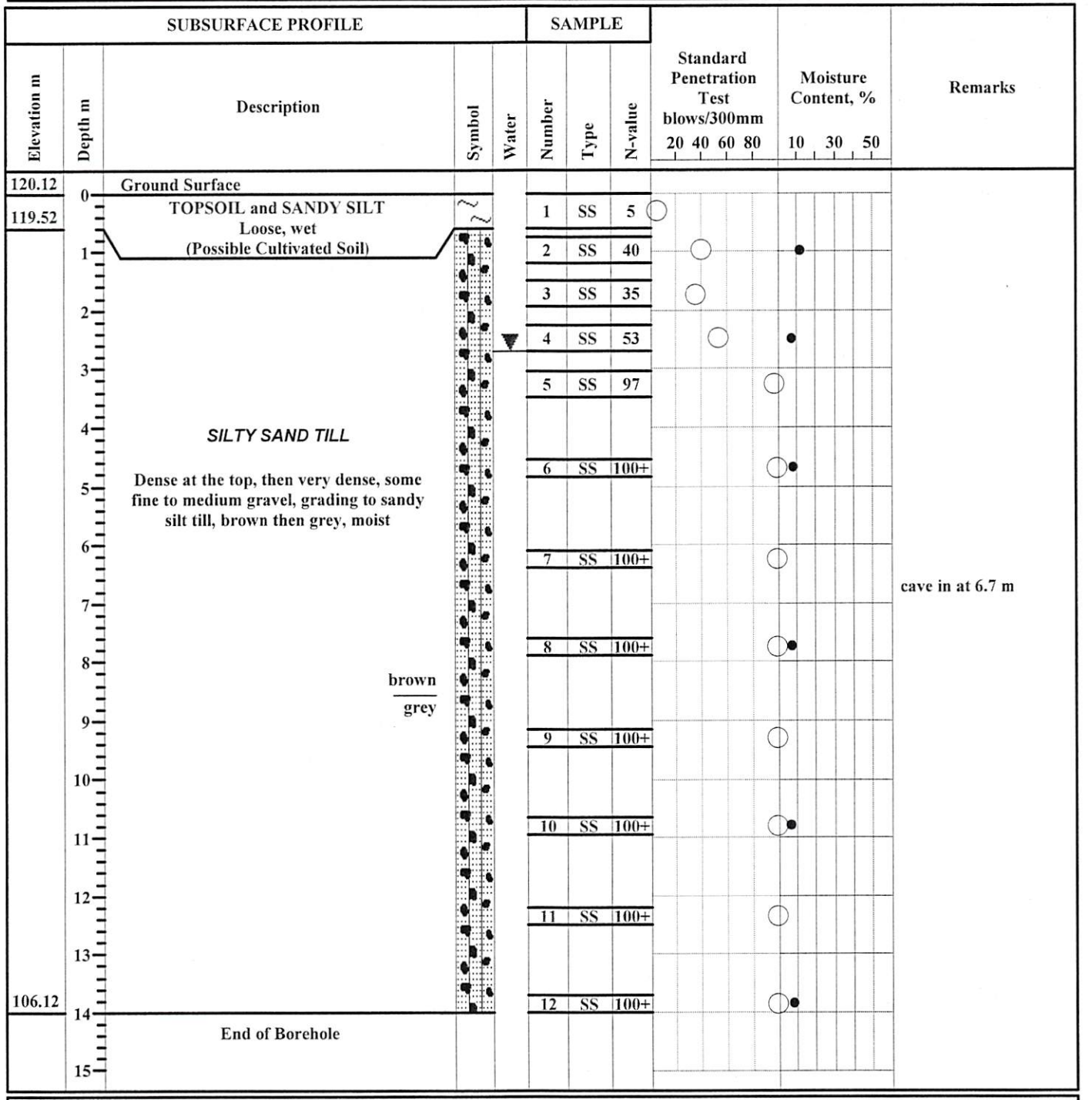
Method : Auger

Location : Elgin Street East, Cobourg, ON

Diameter : 110 mm

Datum Elevation : Geodetic

Date : January 9, 2019



V.A. WOOD ASSOCIATES LIMITED

Disk :

Sheet : 1 of 1

Reference No : 7503-18-10

Borehole No : 9

Enclosure No : 10

Client : Rondeau (Cobourg) Ltd.

Project : Proposed Subdivision

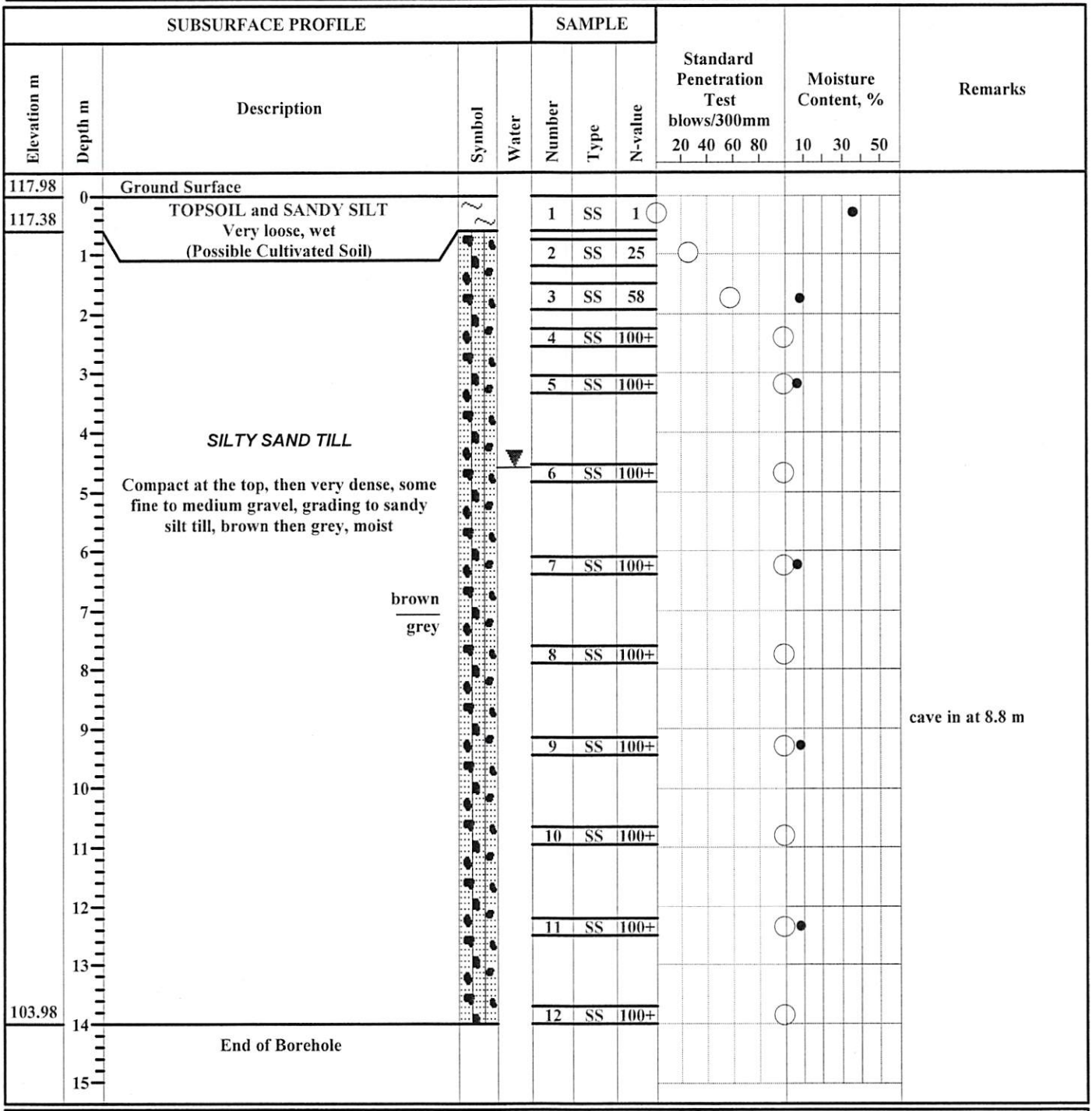
Method : Auger

Location : Elgin Street East, Cobourg, ON

Diameter : 110 mm

Datum Elevation : Geodetic

Date : January 9, 2019



V.A. WOOD ASSOCIATES LIMITED

Disk :

Sheet : 1 of 1

Reference No : 7503-18-10

Borehole No : 10

Enclosure No : 11

Client : Rondeau (Cobourg) Ltd.

Project : Proposed Subdivision

Method : Auger

Location : Elgin Street East, Cobourg, ON

Diameter : 110 mm

Datum Elevation : Geodetic

Date : January 8, 2019

Elevation m	Depth m	Description	Symbol	Water	Sample Number	Sample Type	N-value	Standard Penetration Test blows/300mm (20 40 60 80)	Moisture Content, % (10 30 50)	Remarks
122.09	0	Ground Surface								
		TOPSOIL and SANDY SILT Very loose, wet (Possible Cultivated Soil)			1	SS	1			
121.49					2	SS	33			
	1				3	SS	61			
	2	*SILTY SAND TILL* Dense at the top, then very dense, some fine to medium gravel, grading to sandy silt till, brown, moist			4	SS	76			cave in at 2.1 m
	3				5	SS	100+			
	4									
117.24					6	SS	100+			
	5	End of Borehole								
	6									
	7									
	8									

V.A. WOOD ASSOCIATES LIMITED

Disk :

Sheet : 1 of 1

Reference No : 7503-18-10

Borehole No : 11

Enclosure No : 12

Client : Rondeau (Cobourg) Ltd.

Project : Proposed Subdivision

Method : Auger

Location : Elgin Street East, Cobourg, ON

Diameter : 110 mm

Datum Elevation : Geodetic

Date : January 8, 2019

SUBSURFACE PROFILE					SAMPLE					
Elevation m	Depth m	Description	Symbol	Water	Number	Type	N-value	Standard Penetration Test blows/300mm (20 40 60 80)	Moisture Content, % (10 30 50)	Remarks
122.97	0	Ground Surface								
		TOPSOIL and SANDY SILT Very loose, wet (Possible Cultivated Soil)			1	SS	3			Borehole open on completion
122.37										
	1				2	SS	59			
					3	SS	66			
	2	*SILTY SAND TILL* Very dense, some fine to medium gravel, grading to sandy silt till, brown, moist			4	SS	100+			
	3				5	SS	100+			
	4			▼						
118.12					6	SS	100+			
	5	End of Borehole								
	6									
	7									
	8									

V.A. WOOD ASSOCIATES LIMITED

Disk :

Sheet : 1 of 1

Reference No : 7503-18-10

Borehole No : 12

Enclosure No : 13

Client : Rondeau (Cobourg) Ltd.

Project : Proposed Subdivision

Method : Auger

Location : Elgin Street East, Cobourg, ON

Diameter : 110 mm

Datum Elevation : Geodetic

Date : January 7, 2019

SUBSURFACE PROFILE					SAMPLE					
Elevation m	Depth m	Description	Symbol	Water	Number	Type	N-value	Standard Penetration Test blows/300mm (20 40 60 80)	Moisture Content, % (10 30 50)	Remarks
123.68	0	Ground Surface								
123.28		TOPSOIL and SANDY SILT Loose, wet (Possible Cultivated Soil)			1	SS	5			
	1				2	SS	43			
					3	SS	31			
	2	*SILTY SAND TILL* Compact to dense, then very dense, some fine to medium gravel, grading to sandy silt till, brown, moist			4	SS	79			
	3				5	SS	52			
	4			▼						cave in at 3.8 m
118.83					6	SS	100+			
	5	End of Borehole								
	6									
	7									
	8									

V.A. WOOD ASSOCIATES LIMITED

Disk :

Sheet : 1 of 1

Reference No : 7503-18-10

Borehole No : 13

Enclosure No : 14

Client : Rondeau (Cobourg) Ltd.

Project : Proposed Subdivision

Method : Auger

Location : Elgin Street East, Cobourg, ON

Diameter : 110 mm

Datum Elevation : Geodetic

Date : January 18, 2019

SUBSURFACE PROFILE					SAMPLE					
Elevation m	Depth m	Description	Symbol	Water	Number	Type	N-value	Standard Penetration Test blows/300mm (20 40 60 80)	Moisture Content, % (10 30 50)	Remarks
120.15	0	Ground Surface								
119.65		TOPSOIL AND CLAYEY SILT (Possible Cultivated Soil)			1	SS	9			frozen surface
	1				2	SS	41			Borehole open and dry on completion
	2	*SILTY SAND TILL*			3	SS	75			
		Dense at the top, then very dense, some fine to medium gravel, grading to sandy silt till, brown then grey, moist		DRY	4	SS	100+			
	3				5	SS	100+			
	4									
	5				6	SS	100+			
	6	brown / grey			7	SS	100+			
113.75		End of Borehole								
	7									
	8									
	9									

V.A. WOOD ASSOCIATES LIMITED

Disk :

Sheet : 1 of 1

Reference No : 7503-18-10

Borehole No : 14

Enclosure No : 15

Client : Rondeau (Cobourg) Ltd.

Project : Proposed Subdivision

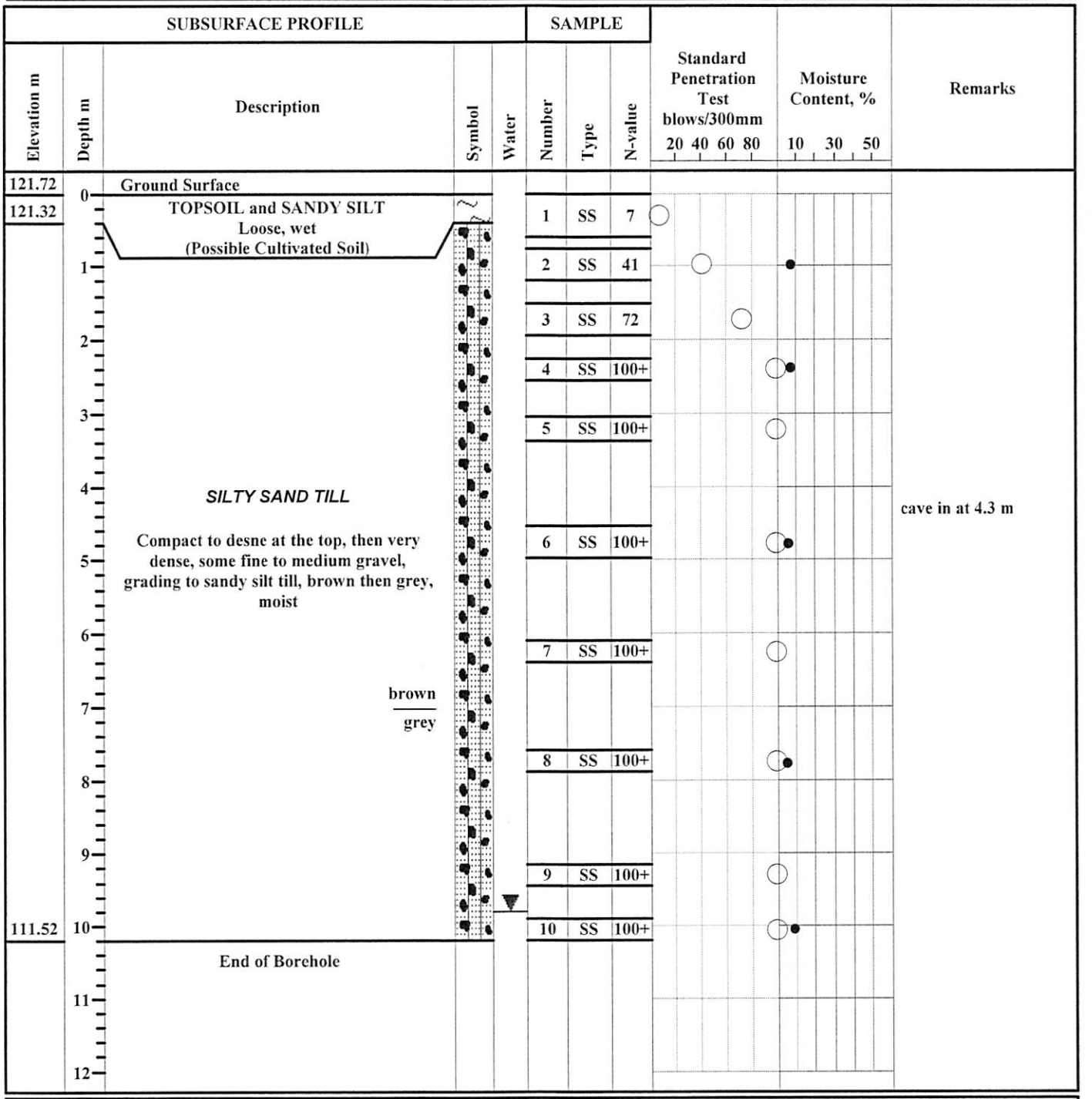
Method : Auger

Location : Elgin Street East, Cobourg, ON

Diameter : 110 mm

Datum Elevation : Geodetic

Date : January 7, 2019



V.A. WOOD ASSOCIATES LIMITED

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Reference No : 7503-18-10

Borehole No : 15

Enclosure No : 16

Client : Rondeau (Cobourg) Ltd.

Project : Proposed Subdivision

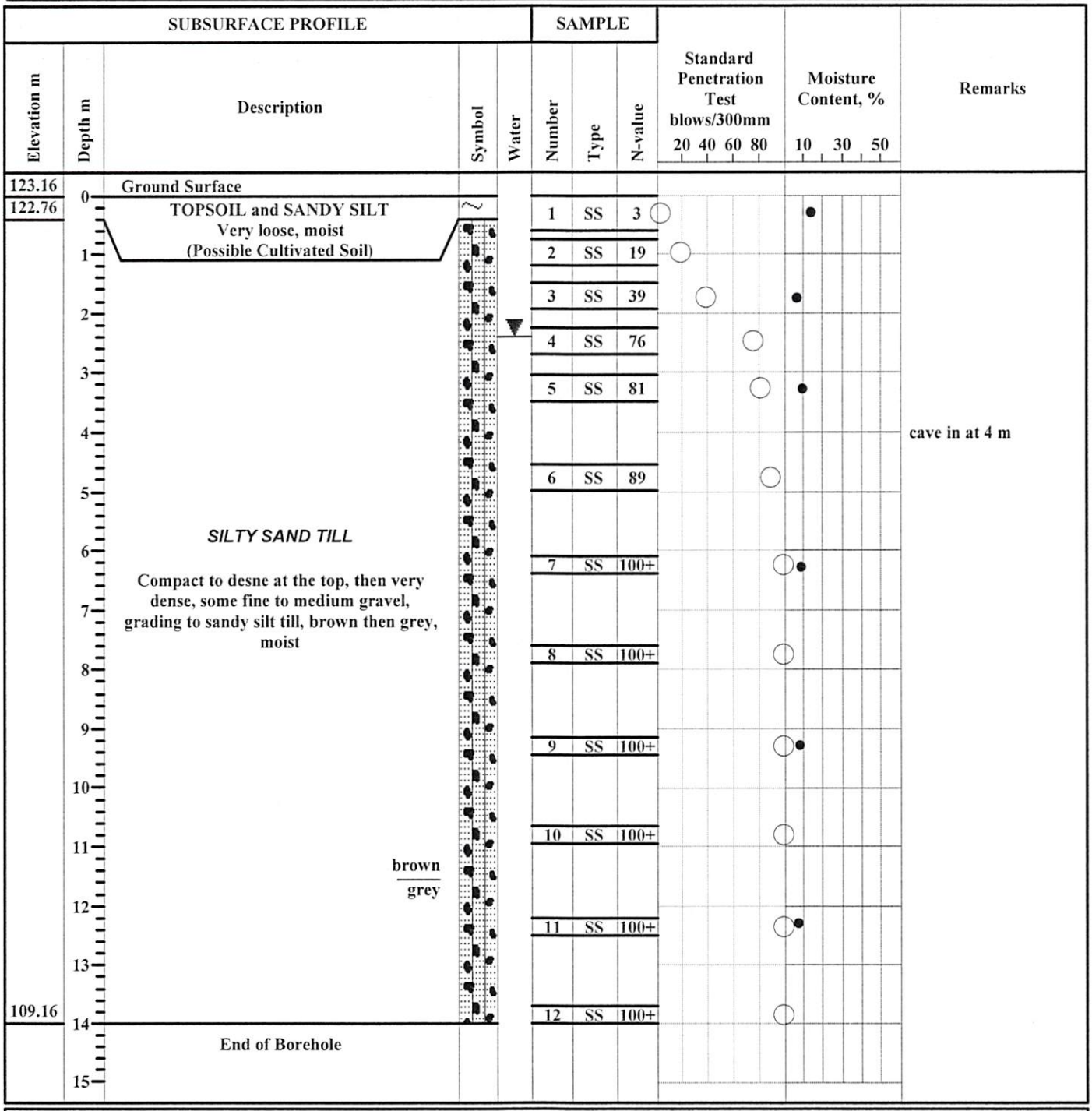
Method : Auger

Location : Elgin Street East, Cobourg, ON

Diameter : 110 mm

Datum Elevation : Geodetic

Date : January 8, 2019



V.A. WOOD ASSOCIATES LIMITED

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Reference No : 7503-18-10

Borehole No : 16

Enclosure No : 17

Client : Rondeau (Cobourg) Ltd.

Project : Proposed Subdivision

Method : Auger

Location : Elgin Street East, Cobourg, ON

Diameter : 110 mm

Datum Elevation : Geodetic

Date : January 7, 2019

Elevation m	Depth m	Description	Symbol	Water	Number	Type	N-value	Standard Penetration Test blows/300mm (20 40 60 80)	Moisture Content, % (10 30 50)	Remarks
112.95	0	Ground Surface								
		TOPSOIL and SANDY SILT Loose, moist (Possible Cultivated Soil)			1	SS	4			Borehole open and dry on completion
112.45										
	1	*SILTY SAND TILL* Loose at the top, then very dense, some fine to medium gravel, grading to sandy silt till, brown, moist		DRY	2	SS	61			
					3	SS	96			
	2				4	SS	100+			
	3				5	SS	100+			
109.55		End of Borehole								
	4									
	5									
	6									
	7									
	8									

V.A. WOOD ASSOCIATES LIMITED

Disk :

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Reference No : 7503-18-10

Borehole No : 17

Enclosure No : 18

Client : Rondeau (Cobourg) Ltd.

Project : Proposed Subdivision

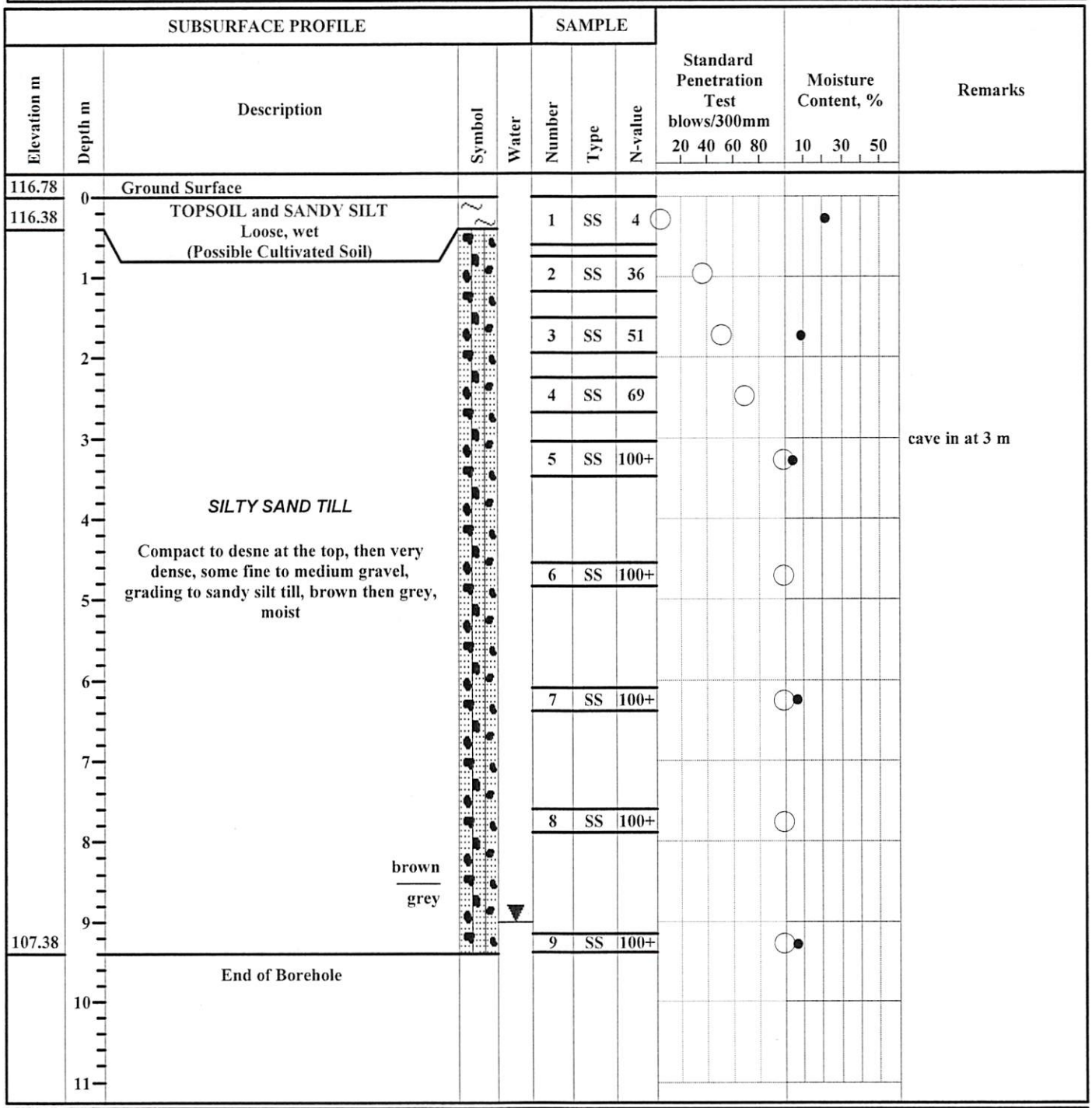
Method : Auger

Location : Elgin Street East, Cobourg, ON

Diameter : 110 mm

Datum Elevation : Geodetic

Date : January 7, 2019



V.A. WOOD ASSOCIATES LIMITED

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Reference No : 7503-18-10

Borehole No : 18

Enclosure No : 19

Client : Rondeau (Cobourg) Ltd.

Project : Proposed Subdivision

Method : Auger

Location : Elgin Street East, Cobourg, ON

Diameter : 110 mm

Datum Elevation : Geodetic

Date : January 14, 2019

Elevation m	Depth m	Description	Symbol	Water	Sample Number	Sample Type	N-value	Standard Penetration Test blows/300mm (20 40 60 80)	Moisture Content, % (10 30 50)	Remarks
119.92	0	Ground Surface								
119.42	0	TOPSOIL AND SANDY SILT Loose, moist (Possible Cultivated Soil)			1	SS	4			
	1				2	SS	29			
	2				3	SS	31			
	2				4	SS	27			
	3				5	SS	61			cave in at 3 m
	4									
	5	*SILTY SAND TILL* Compact at the top, then very dense, some fine to medium gravel, grading to sandy silt till, brown then grey, moist			6	SS	33			
	6				7	SS	100+			
	7									
	8	brown / grey			8	SS	100+			
	9				9	SS	100+			
	10									
	11				10	SS	100+			
	12				11	SS	100+			
	13									
105.92	14				12	SS	100+			
	14	End of Borehole								
	15									

V.A. WOOD ASSOCIATES LIMITED

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Reference No : 7503-18-10

Borehole No : 19

Enclosure No : 20

Client : Rondeau (Cobourg) Ltd.

Project : Proposed Subdivision

Method : Auger

Location : Elgin Street East, Cobourg, ON

Diameter : 110 mm

Datum Elevation : Geodetic

Date : January 14, 2019

Elevation m	Depth m	Description	Symbol	Water	Number	Type	N-value	Standard Penetration Test blows/300mm (20 40 60 80)	Moisture Content, % (10 30 50)	Remarks
113.25	0	Ground Surface								
		TOPSOIL AND SANDY SILT (Possible Cultivated Soil)			1	SS	50+			
	1	suspected boulder at 0.3 m			2	SS	30			
					3	SS	26			
	2				4	SS	73			
	3	*SILTY SAND TILL*			5	SS	100+			
	4	Compact at the top, then very dense, some fine to medium gravel, grading to sandy silt till, brown then grey, moist			6	SS	100+			
	5	brown / grey								
	6			▼	7	SS	100+			
	7									
					8	SS	100+			
	8									
	9				9	SS	100+			cave in at 9.8 m
	10									
102.25	11				10	SS	100+			
		End of Borehole								
	12									
	13									

SUBSURFACE PROFILE | SAMPLE

V.A. WOOD ASSOCIATES LIMITED

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Reference No : 7503-18-10

Borehole No : 20

Enclosure No : 21

Client : Rondeau (Cobourg) Ltd.

Project : Proposed Subdivision

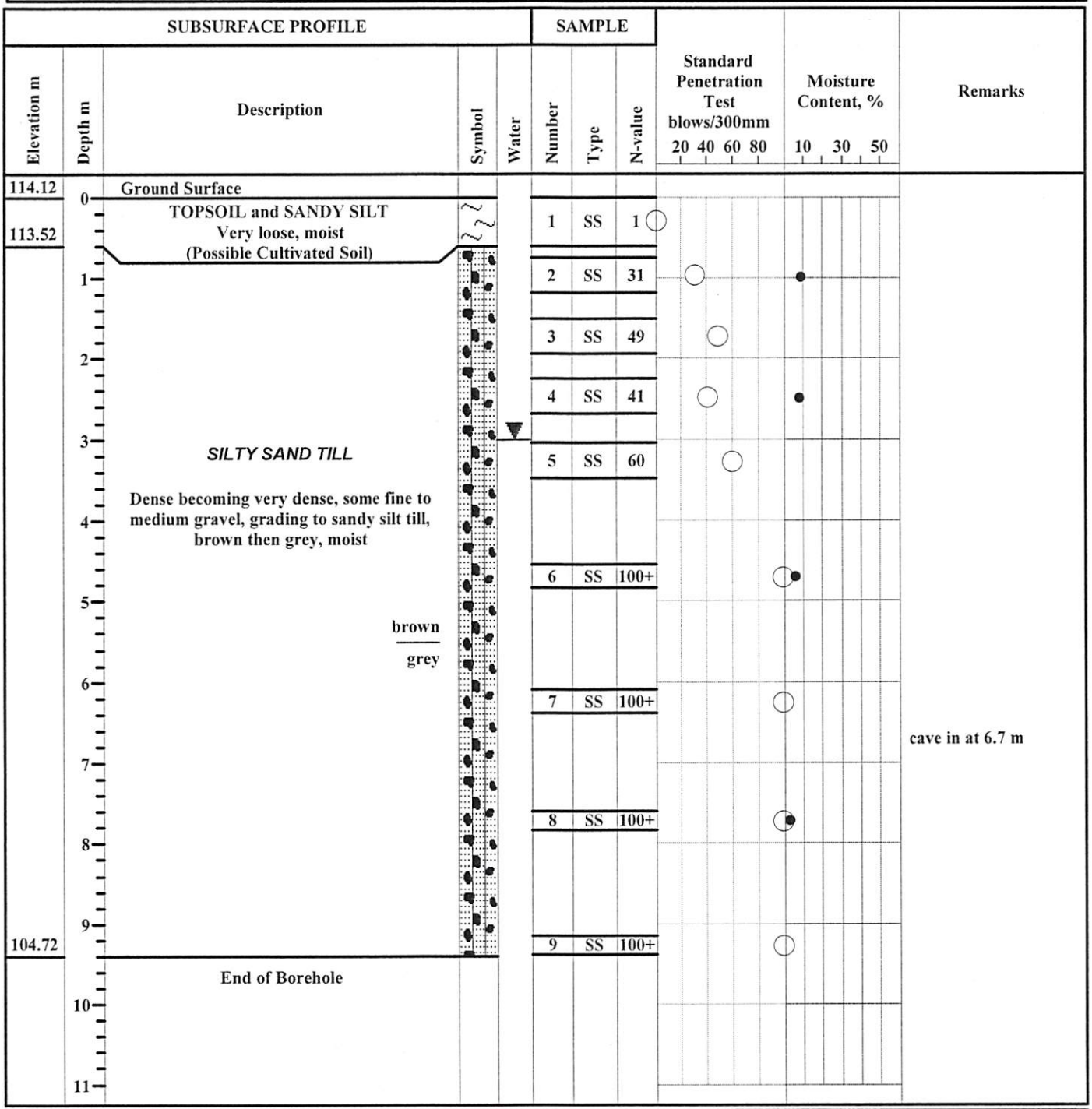
Method : Auger

Location : Elgin Street East, Cobourg, ON

Diameter : 110 mm

Datum Elevation : Geodetic

Date : January 4, 2019



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Reference No : 7503-18-10

Borehole No : 95

Enclosure No : 22

Client : Rondeau (Cobourg) Ltd.

Project : Proposed Subdivision

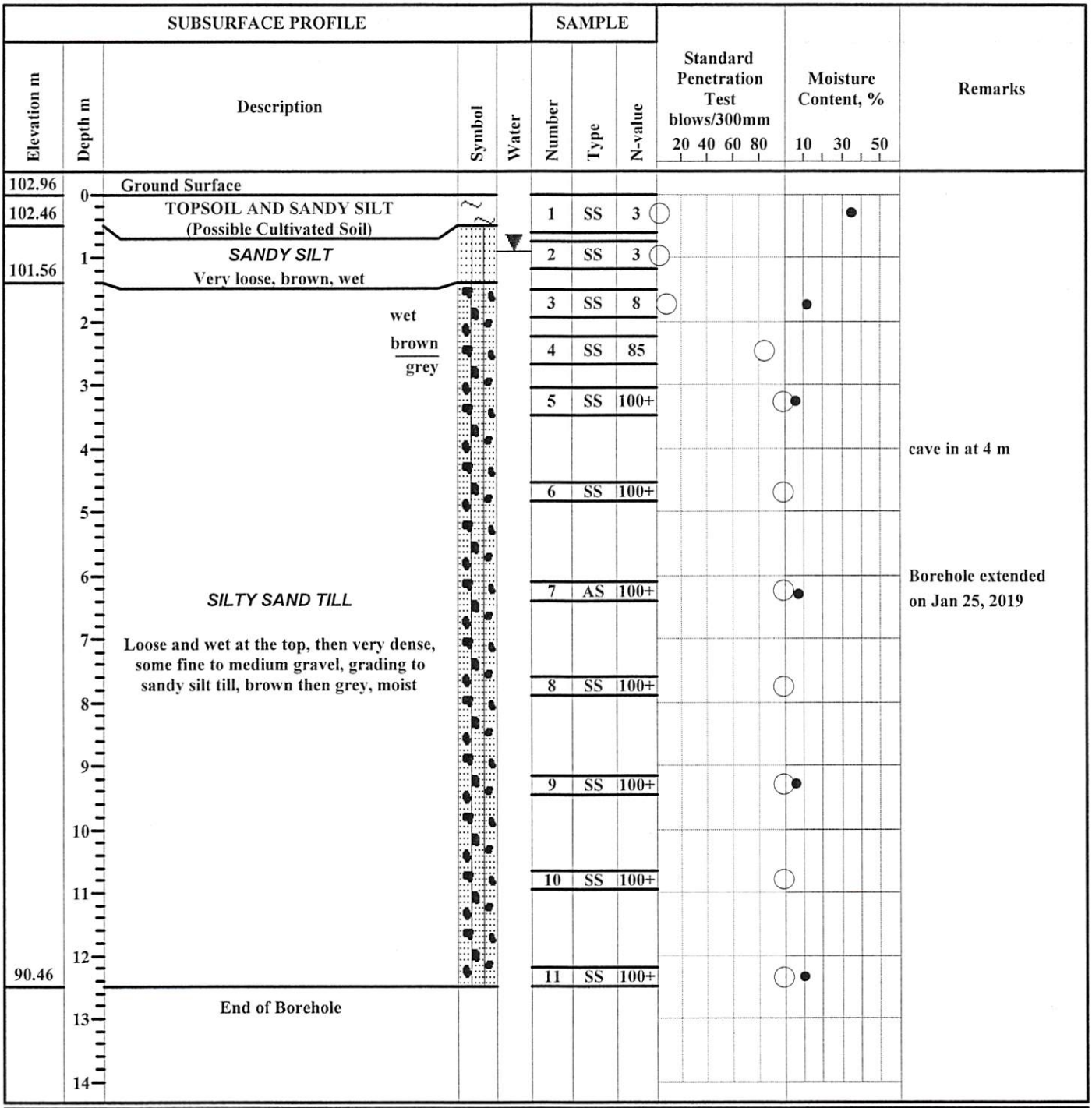
Method : Auger

Location : Elgin Street East, Cobourg, ON

Diameter : 110 mm

Datum Elevation : Geodetic

Date : January 17, 2019



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Reference No : 7503-18-10

Borehole No : 96

Enclosure No : 23

Client : Rondeau (Cobourg) Ltd.

Project : Proposed Subdivision

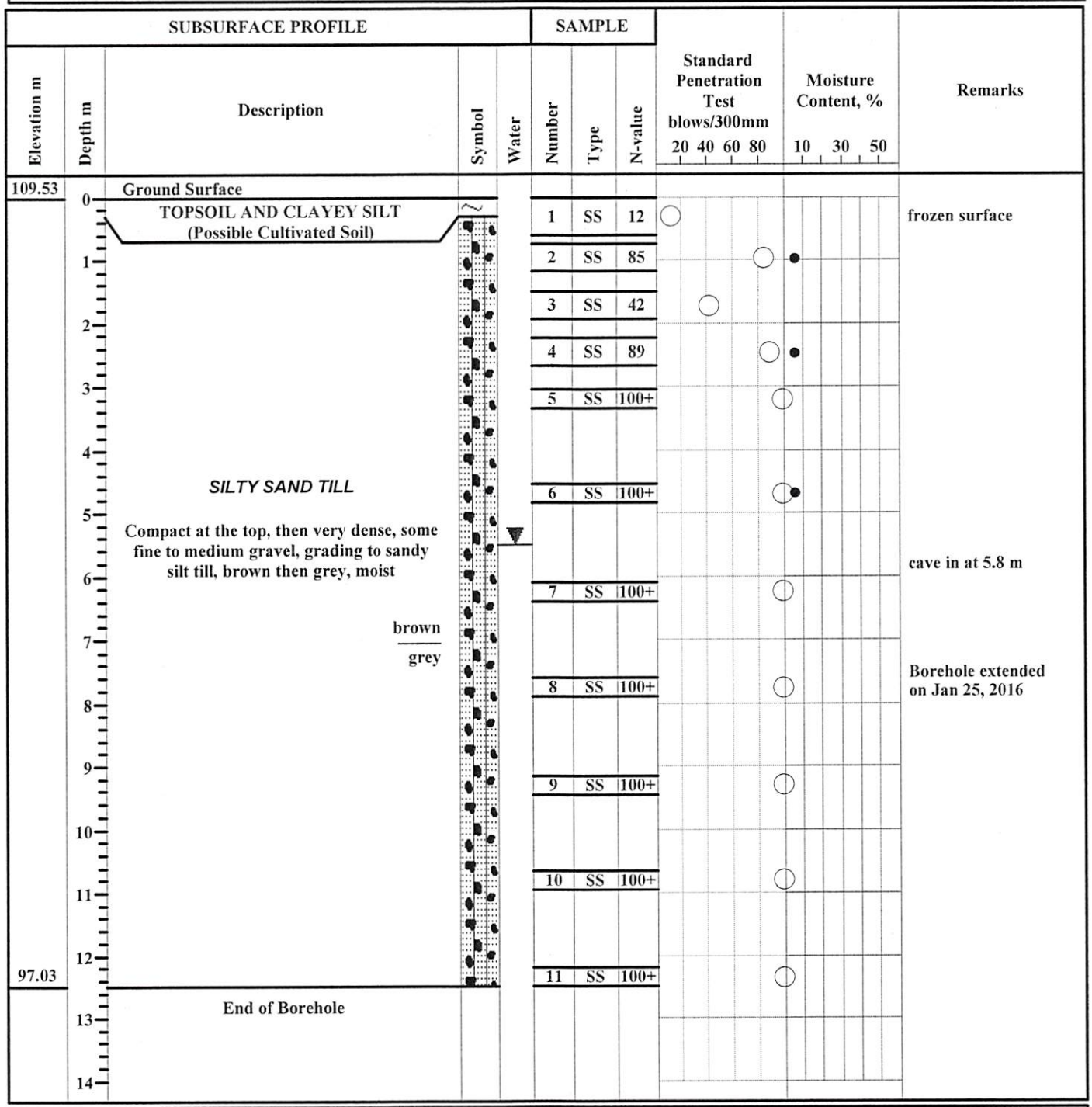
Method : Auger

Location : Elgin Street East, Cobourg, ON

Diameter : 110 mm

Datum Elevation : Geodetic

Date : January 18, 2019



V.A. WOOD ASSOCIATES LIMITED

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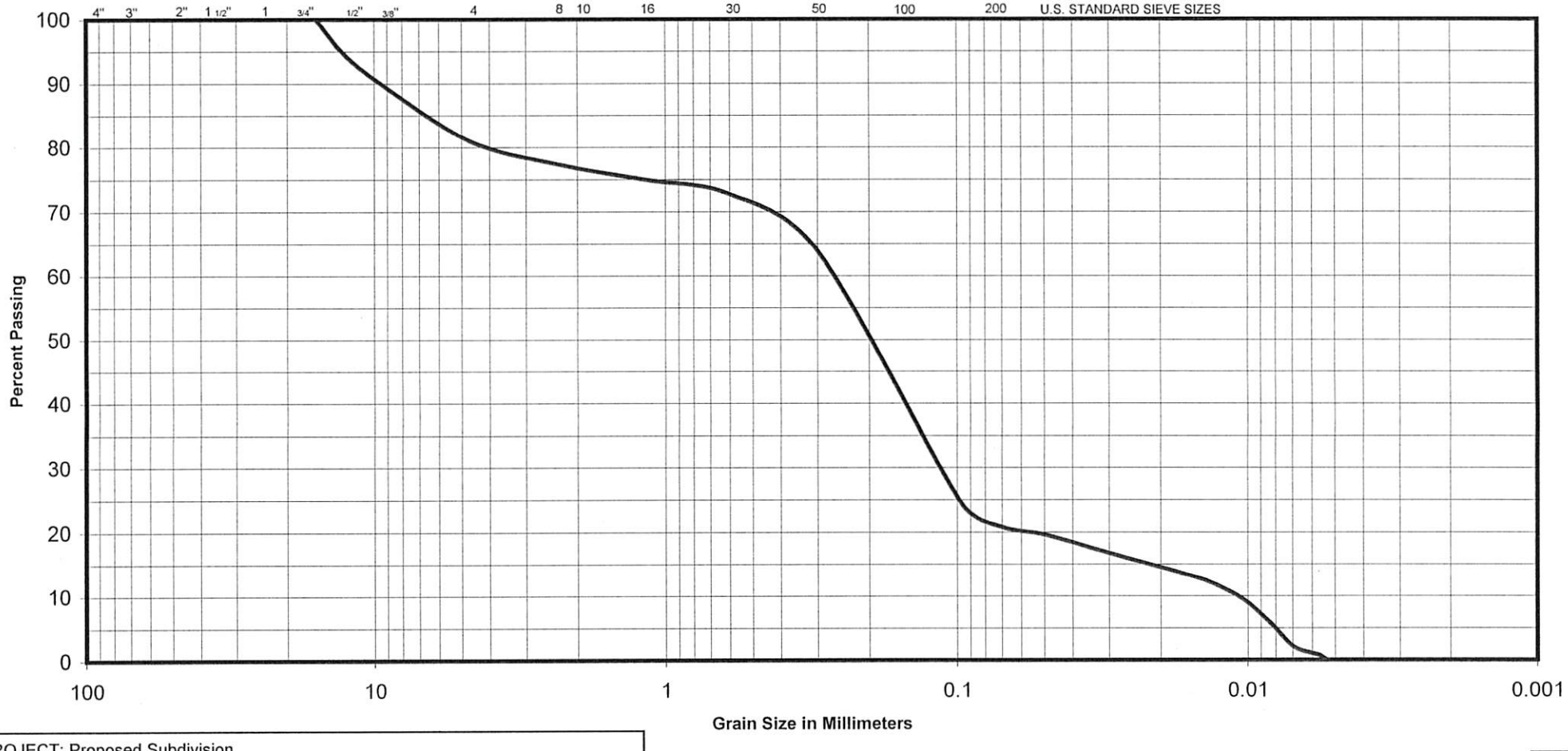
GRAIN SIZE DISTRIBUTION

OUR REFERENCE No.: 7503-18-10

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	

UNIFIED SOIL CLASSIFICATION SYSTEM



PROJECT: Proposed Subdivision
LOCATION: Elgin Street East, Cobourg, ON
BOREHOLE NO.: 95
SAMPLE NO.: 6
DEPTH : 4.8 m
DATE: January 2019

Silty SAND, some gravel (SM)

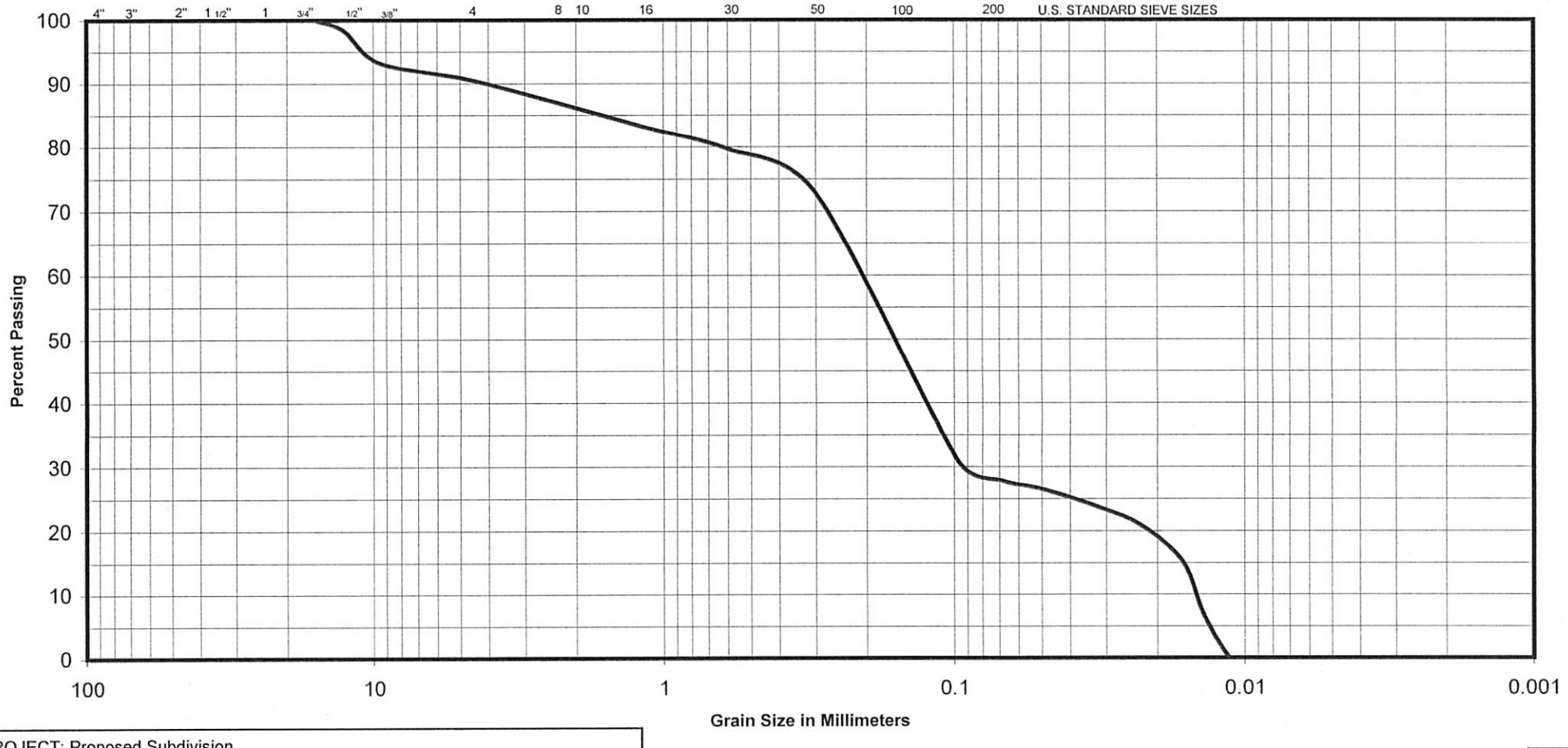
ENCLOSURE No.: 24

GRAIN SIZE DISTRIBUTION

OUR REFERENCE No.: 7503-18-10

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	

UNIFIED SOIL CLASSIFICATION SYSTEM



PROJECT: Proposed Subdivision
LOCATION: Elgin Street East, Cobourg, ON
BOREHOLE NO.: 96
SAMPLE NO.: 10
DEPTH : 10.8 m
DATE: January 2019

Silty SAND, trace gravel (SM)

ENCLOSURE No.: 25