



Terraprobe

Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing

File No. 1-19-0773-46
Brampton Office

Geotechnical
Investigation,
Engineering, &
Design

Shoring Design
& Earth
Retention
Systems

Pavement
Evaluation &
Design

Environmental
Assessment &
Remediation
Services

Hydrogeology

Building
Systems &
Sciences

Construction
Materials
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Earthworks,
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Testing

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Concrete
Testing

CCIL Certified
Aggregates &
Asphalt Testing

CWB Certified
Welding &
Structural Steel

July 31, 2020

Streetcar c/o 31 Huron Street Inc.
1230 Dundas Street East
Toronto, Ontario
M4M 1S3

Attention: Mr. Jeff Magwood

**RE: PRELIMINARY HYDROGEOLOGICAL ASSESSMENT REPORT SUMMARY
31 HURON STREET
COLLINGWOOD, ONTARIO**

Dear Mr. Jeff Magwood:

Terraprobe Inc. is pleased to provide Streetcar c/o 31 Huron Street Inc. with the results of the preliminary hydrogeological assessment summary for 31 Huron Street, Collingwood, Ontario.

The preliminary hydrogeological assessment report summary includes the overall findings for the groundwater monitoring program, groundwater quality assessment, and short-term construction dewatering and long-term post construction foundation drainage flow rate estimates. The preliminary hydrogeological summary report does not replace a detailed hydrogeological assessment.

If you have any questions or concerns regarding either of the documents, please do not hesitate to contact the undersigned.

Yours truly,

Terraprobe Inc.

Alyssa Davis, M.Sc., G.I.T.
Project Coordinator

Narjes Alijani, M.Sc., P.Geo.
Project Manager

Terraprobe Inc.

Greater Toronto

11 Indell Lane
Brampton, Ontario L6T 3Y3
(905) 796-2650 Fax: 796-2250

Hamilton – Niagara

903 Barton Street, Unit 22
Stoney Creek, Ontario L8E 5P5
(905) 643-7560 Fax: 643-7559

Central Ontario

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Barrie, Ontario L4N 4Y8
(705) 739-8355 Fax: 739-8369

Northern Ontario

1012 Kelly Lake Rd., Unit 1
Sudbury, Ontario P3E 5P4
(705) 670-0460 Fax: 670-0558

www.terraprobe.ca

EXECUTIVE SUMMARY

Terraprobe Inc. (Terraprobe) was retained by Streetcar c/o 31 Huron Street Inc. to conduct a Preliminary Hydrogeological Assessment for the proposed mixed-use commercial-residential development located in the northwest corner of the intersection of Huron Street and Heritage Drive, in the Town of Collingwood, Ontario with a municipal address of 31 Huron Street (the “Site”). The location of the Site is shown in **Figure 1**. Terraprobe also completed a concurrent Geotechnical Study at the Site (File No. 1-19-0773-01).

The Site consists of a rectangular shaped parcel of land with an approximate area of 4,690 square metres (1.16 acres). The Site is currently vacant and undeveloped. Terraprobe understands that the future development of the Site will include a six (6) storey mixed-used residential and commercial building with two (2) levels of underground parking. The proposed development details are summarized in **Table I**.

Table I: Proposed Development Details

Proposed Development						
Development Phase	Above Grade Levels	Below Grade Levels				The Highest Groundwater Level Elevation (masl)
		Underground Structure	Lowest Finished Floor		Approximate Base of Excavation (masl)	
			Depth (m)	Elevation (masl)		
Proposed Commercial-Residential Building	6	P2	5.8	173.6	173.1 ±	178.01

*The estimated dewatering Elevator pit and footing walls are not included for the current assessment.

Six (6) boreholes were drilled and four (4) monitoring wells were installed within footprint of the proposed development. **Figure 2 and Figure 3** show the location of the boreholes and monitoring wells. In general, four (4) main stratigraphic units were encountered at the Site. Inferred bedrock was encountered at depths of borehole termination for those advanced at the Site during the subsurface investigation. Details for the subsoil profile and the grain size distribution graphs are presented in **Appendix A and B**, respectively. A summary of the units and the estimated hydraulic conductivity for each unit are summarized in **Table II**.

Table II: Summary of Subsoil Profile beneath the Site and estimated hydraulic conductivity

Site Stratigraphy			
Stratum/Formation	Depth Range (mbgs)	Elevation Range (masl)	Hydraulic Conductivity (m/s)
Topsoil/ Earth Fill	0.0 to 2.3	179.2 to 175.9	1.0×10^{-6} ***
Sandy Silt Till	2.3 to 6.1	176.9 to 172.3	2.35×10^{-7} *
Sandy Silt	6.1 to 9.2	176.2 to 169.2	4.9×10^{-7} **
Bedrock (inferred)	> 9.2	> 169.0	1.0×10^{-7} ***

*Indicates hydraulic conductivity calculated by an in-situ hydraulic conductivity test (BH5)

**Indicates hydraulic conductivity estimated from grain size distribution graphs (BH1)

***Indicates hydraulic conductivity estimated using typical published values from Freeze and Cherry (1979)

The ground water conditions at the Site are presented in **Table III**.

Table III: Summary of Groundwater Conditions

Ground Water Conditions	
Highest Ground Water Elevation (masl)*	Elev. 178.01 (0.6 ± m below prevailing ground surface (mbgs))
Zone of Influence, Short Term (m)	It is zero due to implementation of an impermeable shoring.

Details of the groundwater exceedances in comparison to the Town of Collingwood Sewer By-Law limits are presented in **Table IV**. Details are presented in **Appendix C**.

Table IV: Summary of Groundwater Exceedances of the Town of Collingwood Sewer By-Law Limits

Ground Water Quality			
Sample ID	Sample Collection Date	Town of Collingwood Storm Sewer Limits	Town of Collingwood Sanitary Sewer Limits
Untreated Ground Water (SW-UF)	February 10, 2020	Meets	Meets

It is assumed that the excavation is to be supported by impermeable shoring (caisson walls) on all sides of the excavation. Short-term construction dewatering flow rates and long-term dewatering requirements were estimated considering the Site plans dated July 31, 2020. **Figure 3** presents the footprint of the proposed underground structure. Details for short-term dewatering and long-term foundation drainage flow rates are presented in **Appendix D**. The findings along with the anticipated requirements are summarized in **Table V**:

Table V: Dewatering Requirements for Groundwater Control

Ground Water Quantity: Short Term (Construction) – S.F. * 1.5 Used						
Shoring Option	Ground Water Seepage		19 mm (2 year) Design Rainfall Event		Total Volume	
	L/day	L/min	L/day	L/min	L/day	L/min
<i>Impermeable (Caissons)</i>	2,000	1.4	68,500	47.6	70,500	49
Ground Water Quantity: Long Term (Post Construction) – S.F. * 1.5 Used						
Shoring Option	Ground Water Seepage		19 mm (2 year) Design Rainfall Event		Total Volume	
	L/day	L/min	L/day	L/min	L/day	L/min
<i>Impermeable (Caissons)</i>	26,500	18.4	4,000	2.8	30,500	21.2



Regulatory Requirements	
Environmental Activity and Sector Registry (EASR) Posting	Required
Short Term Permit to Take Water (PTTW)	Not Required
Long Term Permit to Take Water (PTTW)	Not Required
Short Term Discharge Agreement Town of Collingwood	Required
Long Term Discharge Agreement Town of Collingwood	Required

*S.F.: Safety Factor

ATTACHMENTS:

FIGURES:

Figure 1 – Site Location Plan

Figure 2 – Borehole and Monitoring Well Location Plan

Figure 3 – Proposed Underground Floor Plan, P2

APPENDICES:

Appendix A – Borehole Logs

Appendix B – Grain Size Distribution Graphs

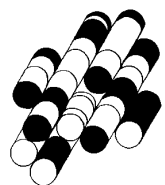
Appendix C – Groundwater Quality Test Results

Appendix D – FEM Modelling and Dewatering Rate Calculations



FIGURES

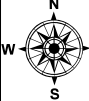
TERRAPROBE INC.





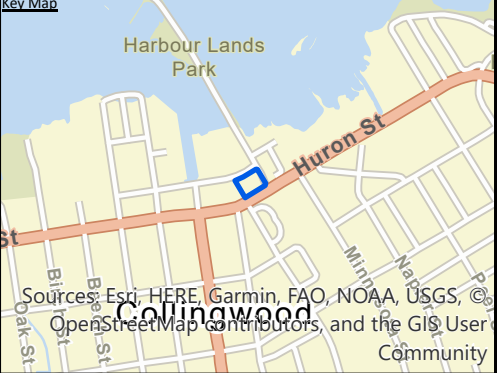


Consulting Geotechnical & Environmental Engineering
Construction Materials, Inspection & Testing



References:
ESRI, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus Ds, USDA, USGS, AeroGRID, IGN, and the GIS User Community.Basemaps

Key Map



Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

Notes:

Legend:

 Approximate Site Location

Project Title:

Hydrogeological Assessment

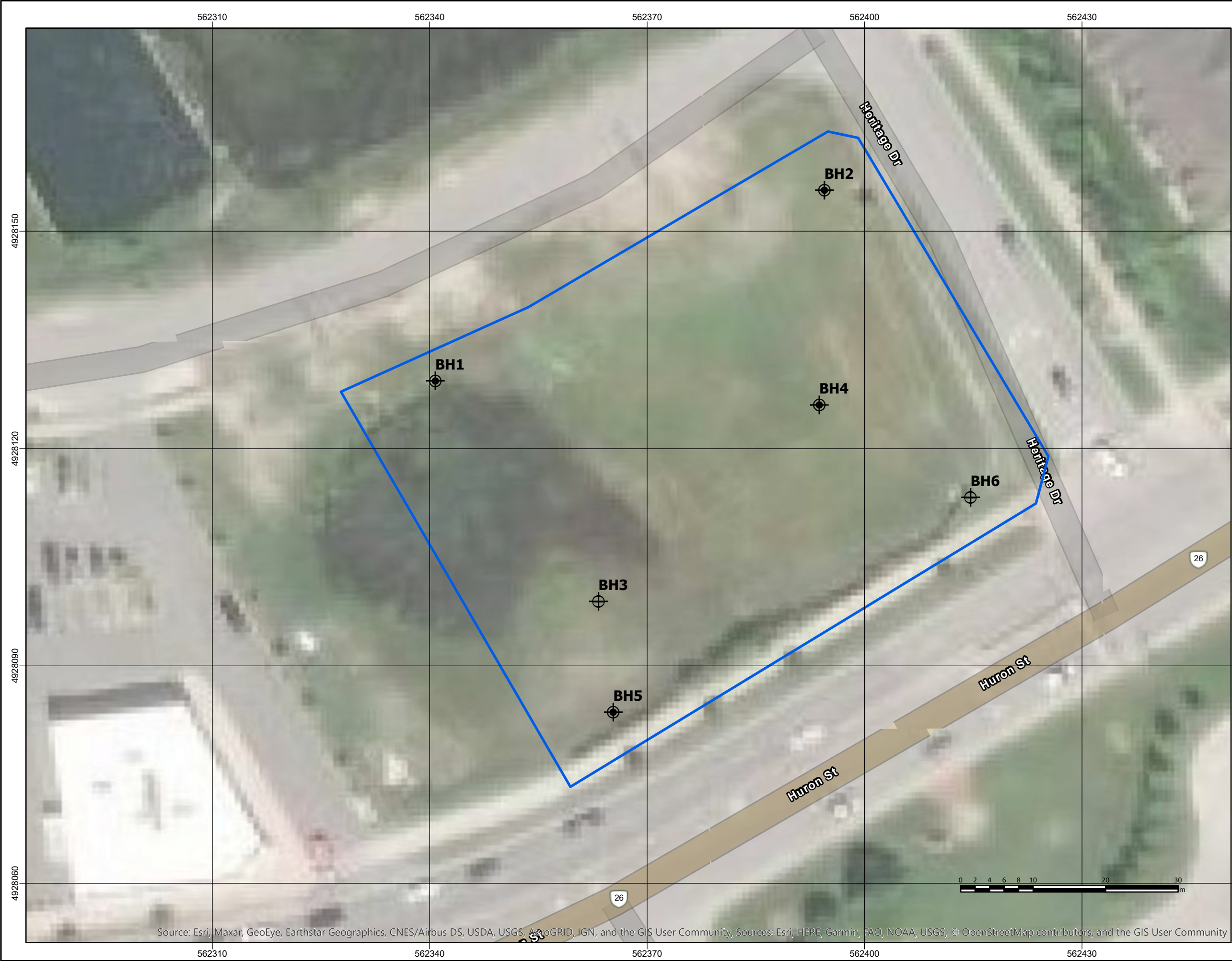
Site Location:

31 Huron Street, Collingwood, Ontario

Figure Title:

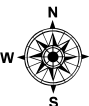
Site Location Plan

Designed By: AD	File No.: 1-19-0773-46
Drawn By: SSK	Scale: As Shown
Reviewed By: BW	Figure No.: 1
Date: June 2020	



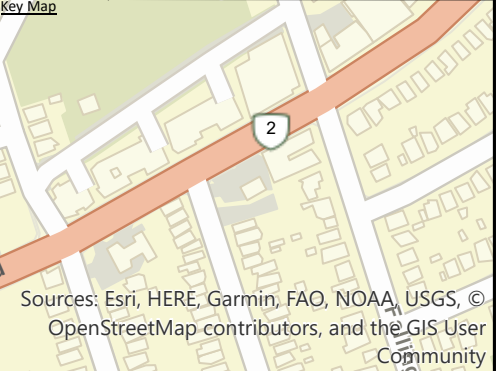


Consulting Geotechnical & Environmental Engineering
Construction Materials, Inspection & Testing



References:
Topographical Plan of Survey
Part of Lot 29
Registered Plan 1425
City of Toronto
Dated: December 11, 2002
By: R. G. McKIBBON LIMITED

Key Map



Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

Notes:

Legend:

-  Approximate Site Location
-  Approximate Monitoring Well Location
-  Approximate Borehole Location

Project Title:

Hydrogeological Assessment

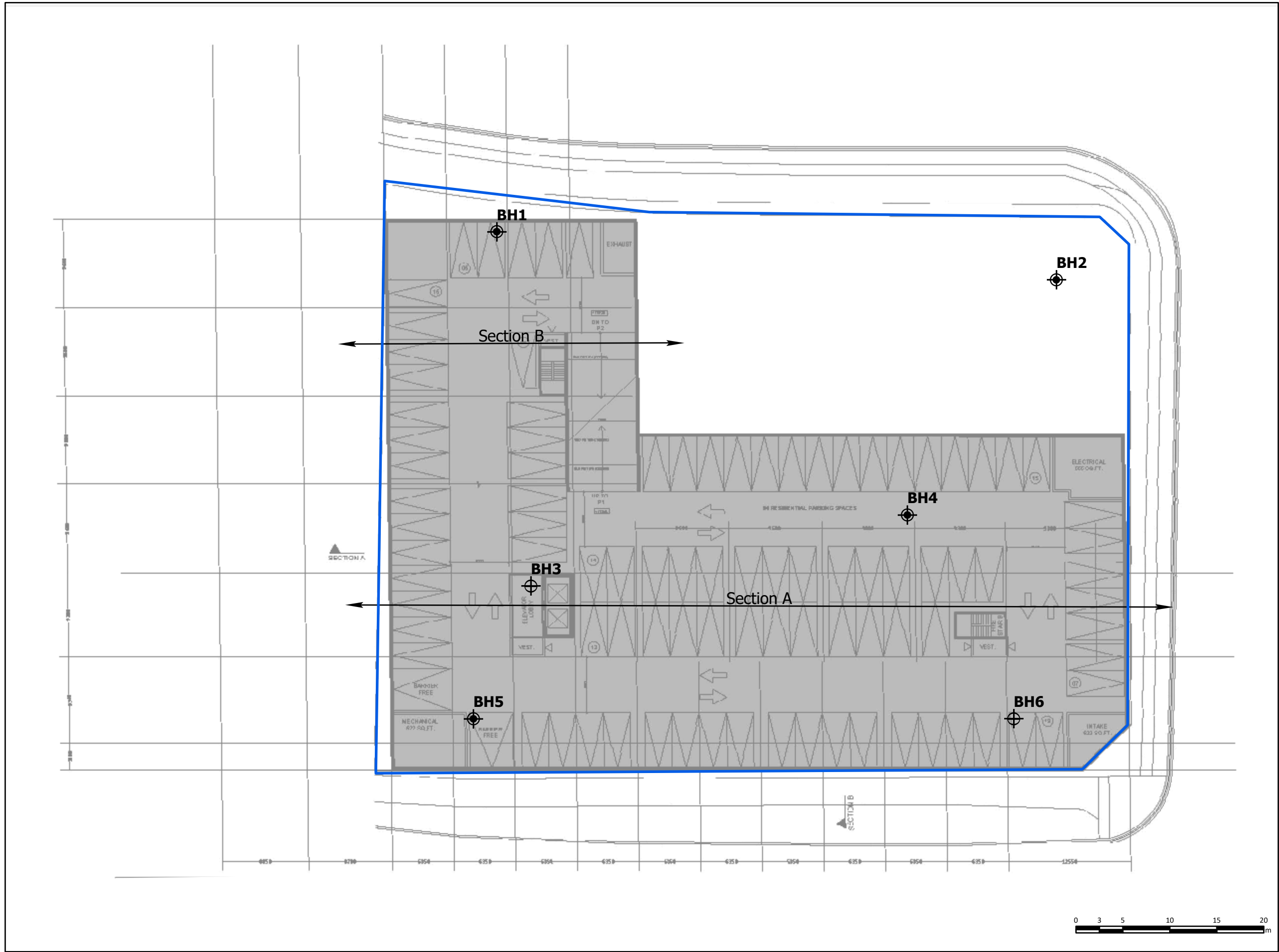
Site Location:

31 Huron Street, Collingwood, Ontario

Figure Title:

Borehole and Monitoring Well Plan

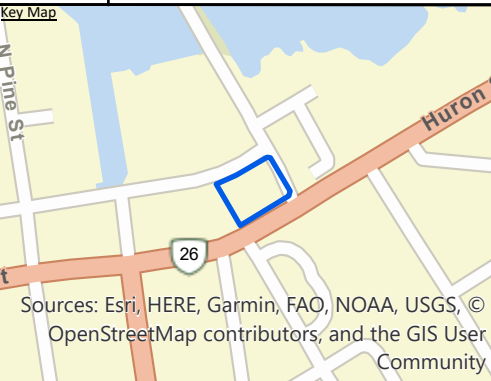
Designed By: AD	File No.: 1-19-0733-46
Drawn By: SSK	Scale: As Shown
Reviewed By: BW	Figure No.: 2
Date: June 2020	



References:

Proposed Floor Plan P2
31 Huron Street Collingwood
Dwg No: D-090
By: Streetcar Rethink Urban Living

Key Map



Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, ©
OpenStreetMap contributors, and the GIS User
Community

Notes:

Legend:

- Approximate Site Location
- Approximate Cross Section Location
- Approximate Monitoring Well Location
- Approximate Borehole Location

Project Title:

Hydrogeological Assessment

Site Location:

31 Huron Street, Collingwood, Ontario

Figure Title:

Proposed Floor Plan (P-2 Level)

Designed By:

AD

File No.:

1-19-0773-46

Drawn By:

SSK

Scale:

As Shown

Reviewed By:

BW

Figure No.:

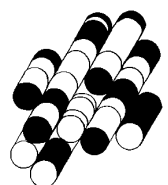
3

Date:

July 2020

APPENDIX A

TERRAPROBE INC.



Project No. : 1-19-0773-01

Client : 31 Huron Street Inc.

Originated by : HH

Date started : January 13, 2020

Project : 31 Huron Street

Compiled by : HA

Sheet No. : 1 of 1

Location : Collingwood, Ontario

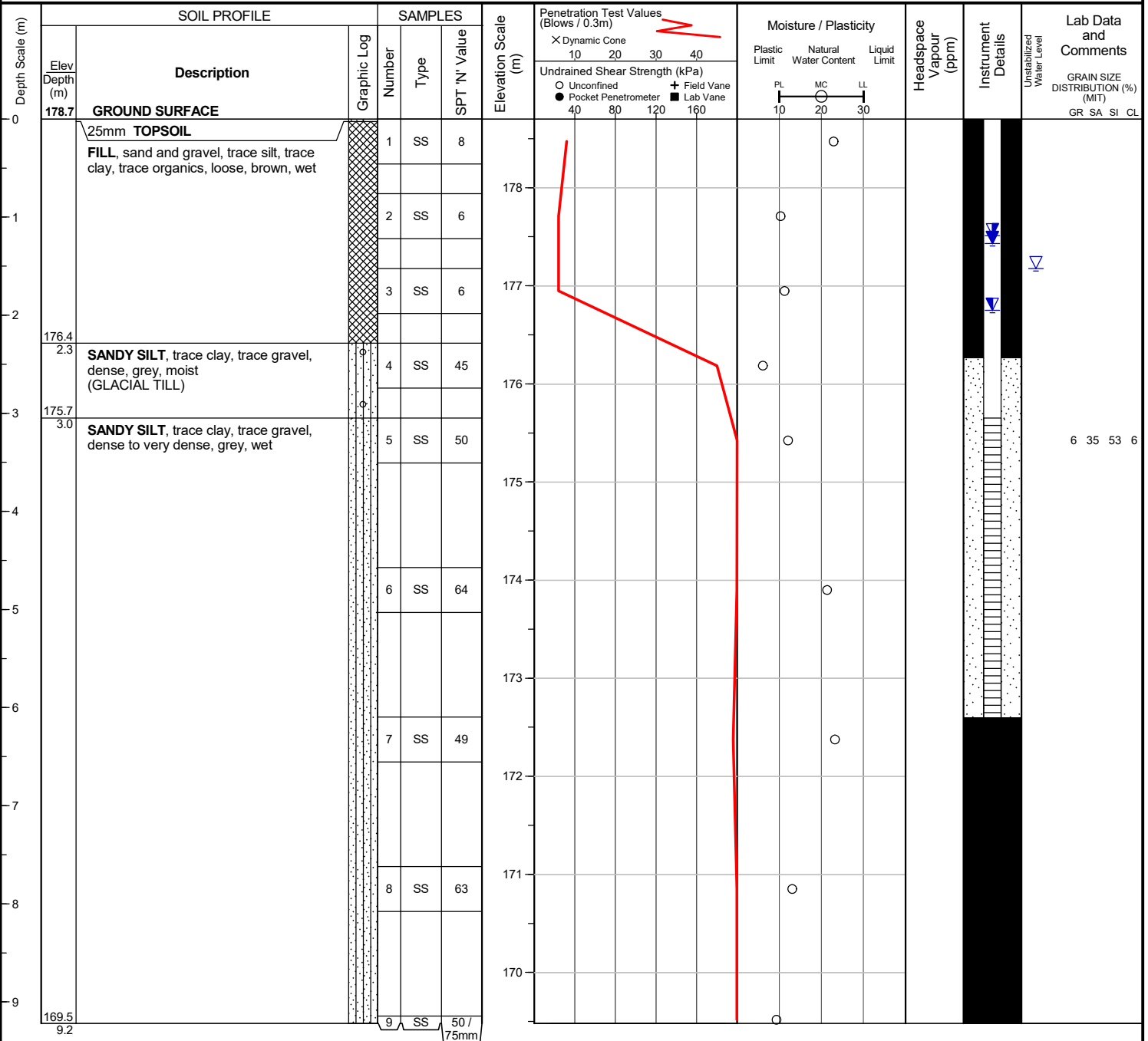
Checked by : MMT

Position : E: 562341, N: 4928129 (UTM 17T)

Elevation Datum : Geodetic

Rig type : Track-mounted

Drilling Method : Solid stem augers



END OF BOREHOLE

Unstabilized water level measured at 1.5 m below ground surface; borehole caved to 1.8 m below ground surface upon completion of drilling.

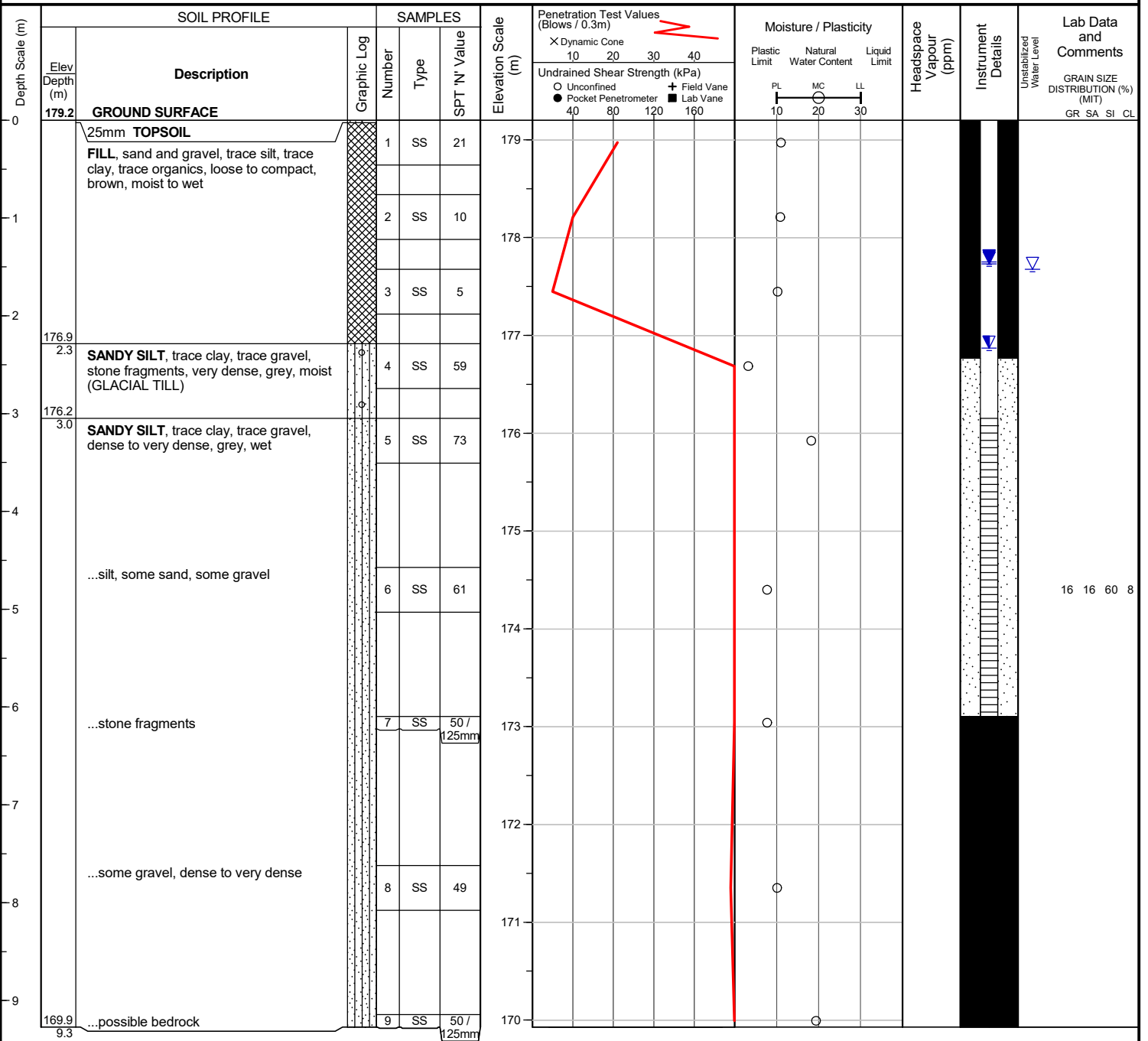
50 mm dia. monitoring well installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jan 20, 2020	2.0	176.8
Feb 6, 2020	1.2	177.5
Feb 10, 2020	1.2	177.5
Feb 20, 2020	1.3	177.5
Mar 6, 2020	1.3	177.4

Project No. : 1-19-0773-01	Client : 31 Huron Street Inc.	Originated by : HH
Date started : January 13, 2020	Project : 31 Huron Street	Compiled by : HA
Sheet No. : 1 of 1	Location : Collingwood, Ontario	Checked by : MMT

Position : E: 562395, N: 4928156 (UTM 17T)	Elevation Datum : Geodetic
Rig type : Track-mounted	Drilling Method : Solid stem augers



END OF BOREHOLE

Unstabilized water level measured at 1.5 m below ground surface; borehole caved to 2.1 m below ground surface upon completion of drilling.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jan 20, 2020	2.3	176.9
Feb 6, 2020	1.5	177.7
Feb 10, 2020	1.5	177.7
Feb 20, 2020	1.6	177.6
Mar 6, 2020	1.5	177.8

Project No. : 1-19-0773-01

Client : 31 Huron Street Inc.

Originated by : DH

Date started : January 20, 2020

Project : 31 Huron Street

Compiled by : HA

Sheet No. : 1 of 1

Location : Collingwood, Ontario

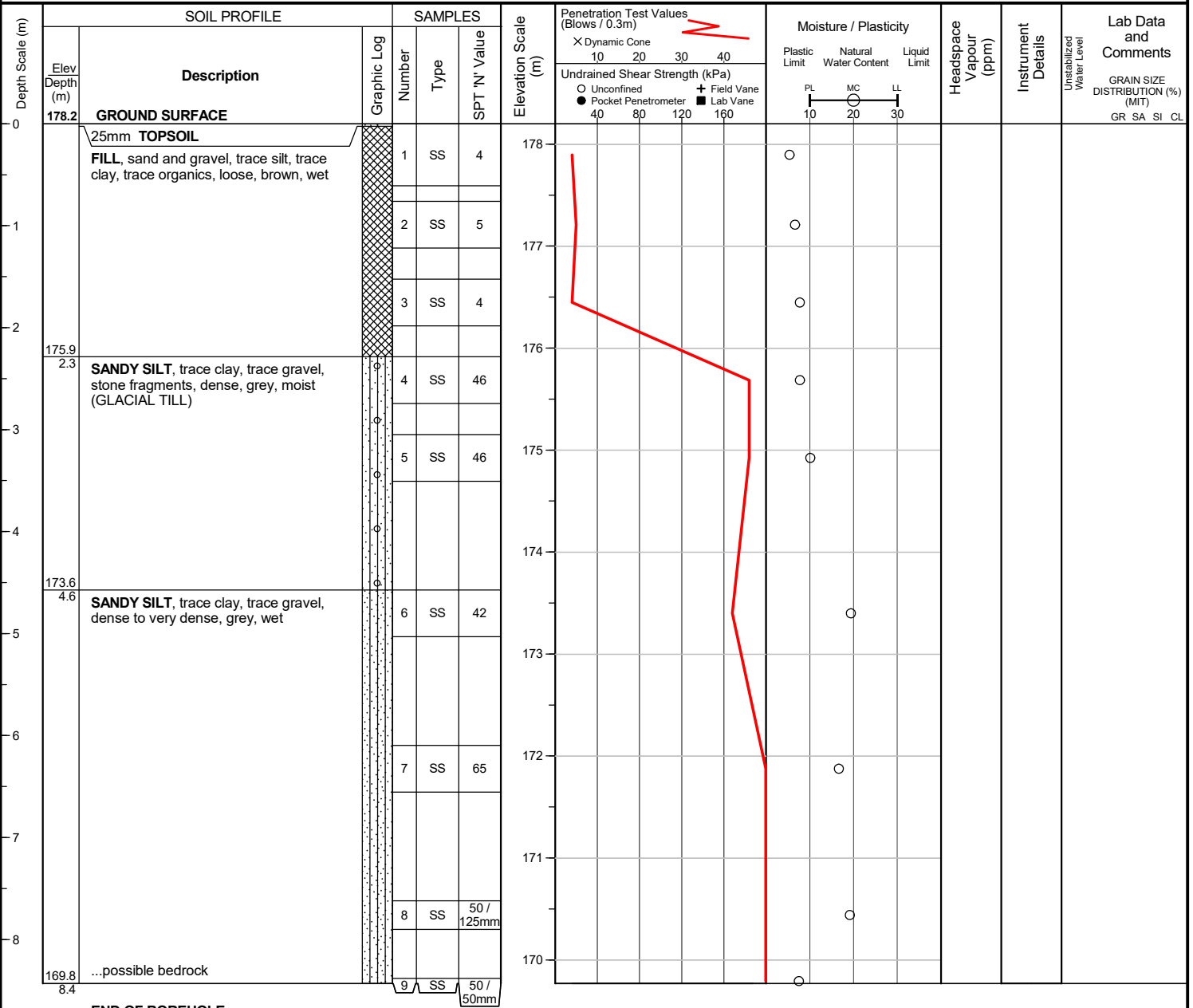
Checked by : MMT

Position : E: 562363, N: 4928099 (UTM 17T)

Elevation Datum : Geodetic

Rig type : Track-mounted

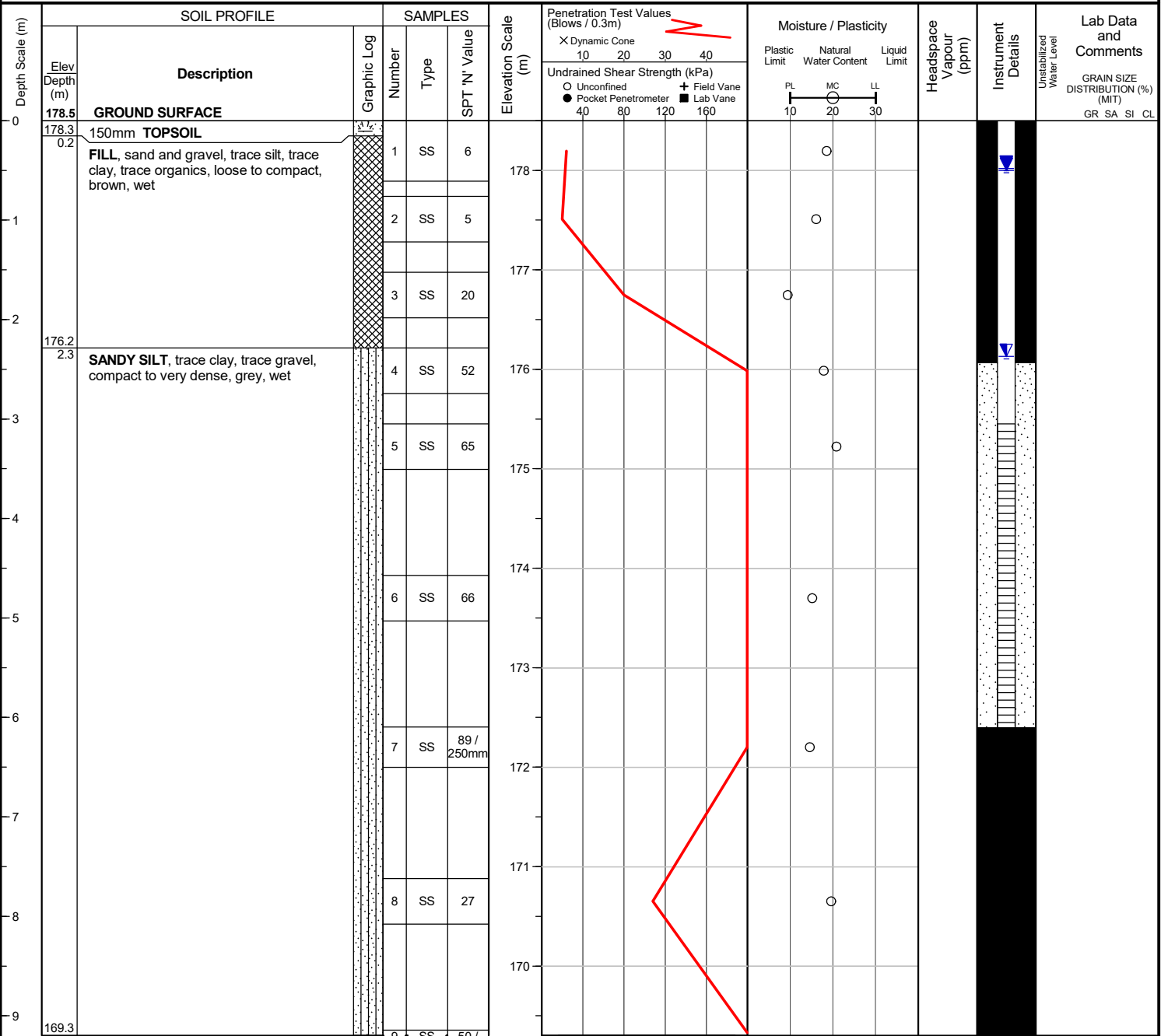
Drilling Method : Solid stem augers



Borehole was dry and open upon completion of drilling.

Project No. : 1-19-0773-01	Client : 31 Huron Street Inc.	Originated by : DH
Date started : January 14, 2020	Project : 31 Huron Street	Compiled by : HA
Sheet No. : 1 of 1	Location : Collingwood, Ontario	Checked by : MMT

Position : E: 562394, N: 4928126 (UTM 17T)	Elevation Datum : Geodetic
Rig type : Track-mounted	Drilling Method : Solid stem augers



END OF BOREHOLE
Auger refusal on inferred bedrock

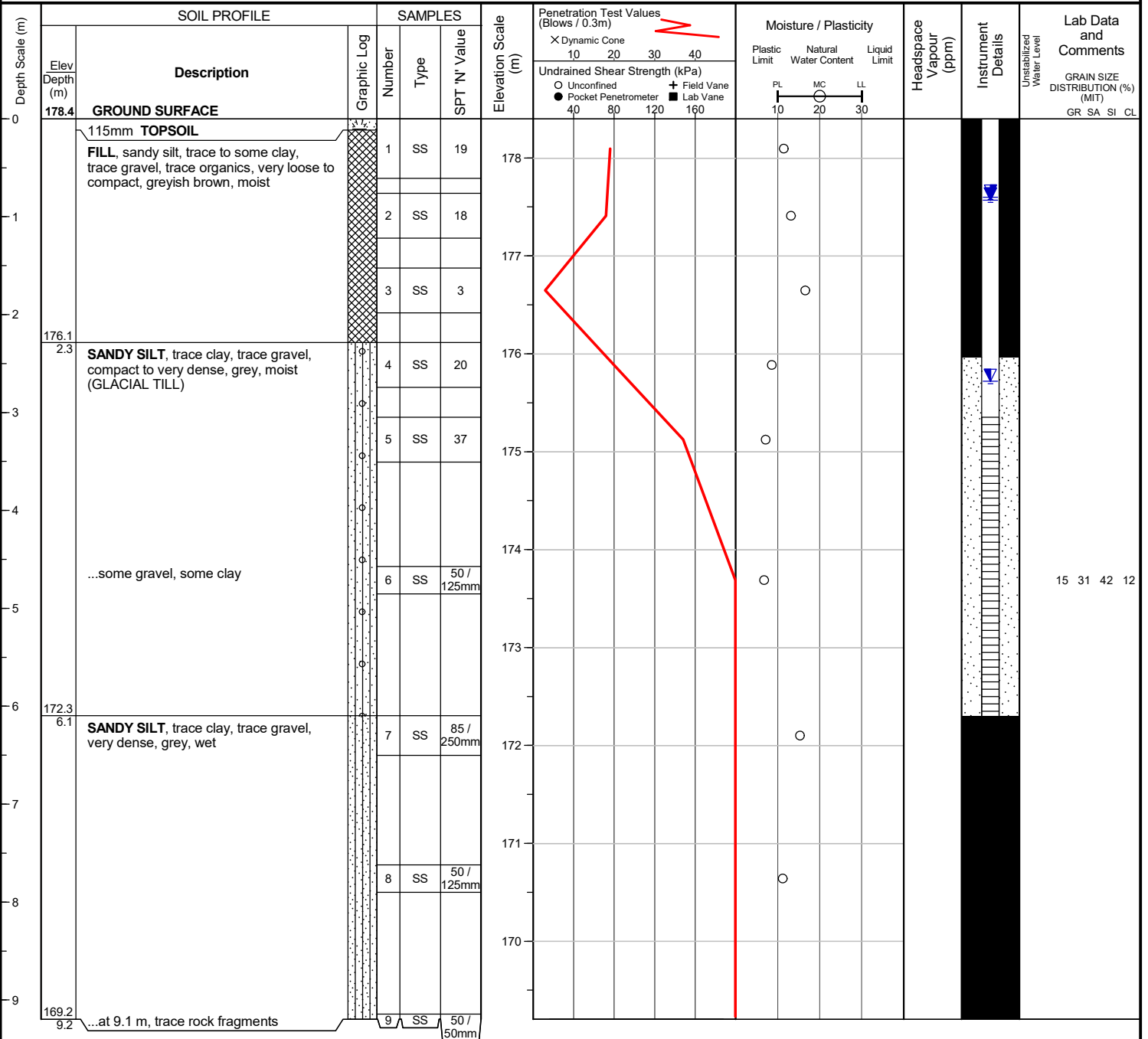
Borehole was dry and open upon completion of drilling.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jan 20, 2020	2.4	176.1
Feb 6, 2020	0.5	178.0
Feb 10, 2020	0.6	177.9
Feb 20, 2020	0.6	177.9
Mar 6, 2020	0.5	178.0

Project No. : 1-19-0773-01 Client : 31 Huron Street Inc. Originated by : DH
 Date started : January 15, 2020 Project : 31 Huron Street Compiled by : HA
 Sheet No. : 1 of 1 Location : Collingwood, Ontario Checked by : MMT

Position : E: 562365, N: 4928084 (UTM 17T) Elevation Datum : Geodetic
 Rig type : Track-mounted Drilling Method : Solid stem augers



END OF BOREHOLE

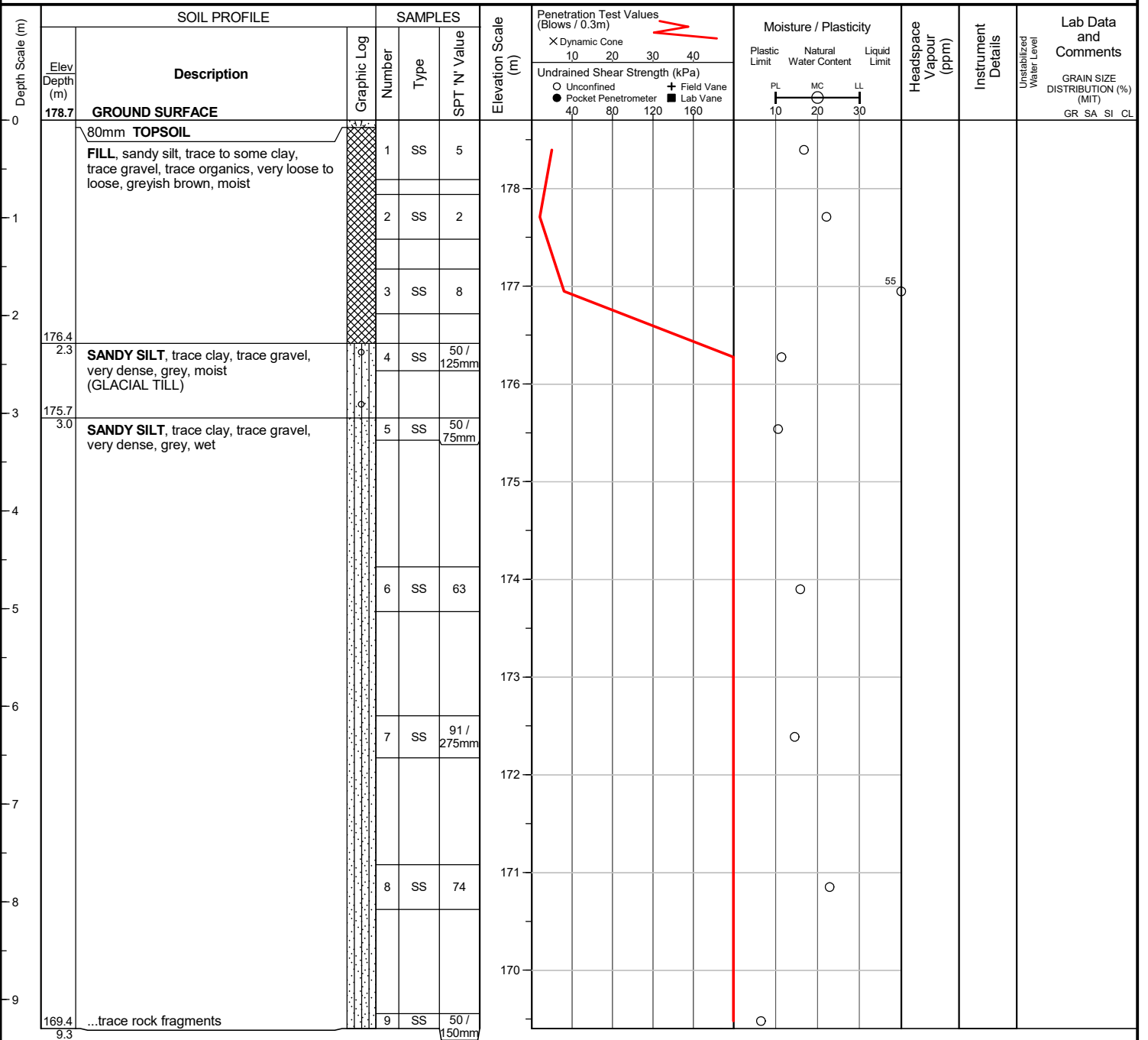
Borehole was dry and open upon completion of drilling.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Jan 20, 2020	2.7	175.7
Feb 6, 2020	0.8	177.6
Feb 10, 2020	0.8	177.6
Feb 20, 2020	0.9	177.5
Mar 6, 2020	0.8	177.6

Project No. : 1-19-0773-01	Client : 31 Huron Street Inc.	Originated by : DH
Date started : January 14, 2020	Project : 31 Huron Street	Compiled by : HA
Sheet No. : 1 of 1	Location : Collingwood, Ontario	Checked by : MMT

Position : E: 562415, N: 4928113 (UTM 17T)	Elevation Datum : Geodetic
Rig type : Track-mounted	Drilling Method : Solid stem augers

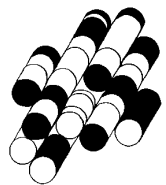


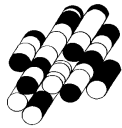
END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

APPENDIX B

TERRAPROBE INC.





Terraprobe

SIEVE AND HYDROMETER ANALYSIS TEST REPORT

PROJECT: 31 Huron Street, Collingwood, Ontario

LOCATION: Greater Toronto Area, On.

CLIENT: 31 Huron Street Inc.

BOREHOLE: 1

SAMPLE NUMBER: 5

SAMPLE DEPTH:

SAMPLE DESCRIPTION: SAND AND SILT, trace clay, trace gravel

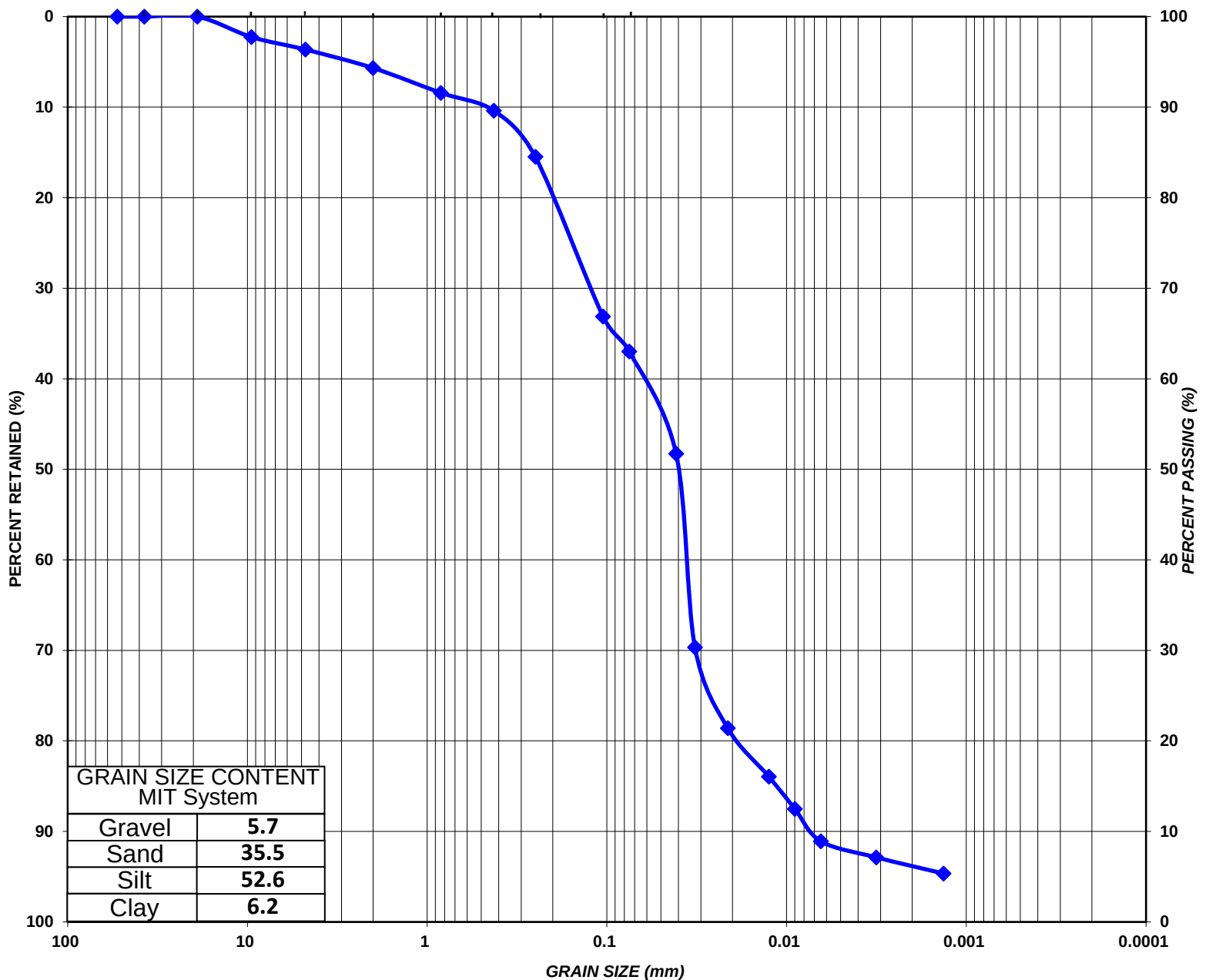
FILE NO.: 1-19-0773

LAB NO.: 1015A

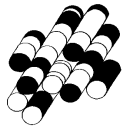
SAMPLE DATE: Jan 14, 2020

SAMPLED BY: P.H.

GRAIN SIZE DISTRIBUTION ANALYSIS



MIT SYSTEM	GRAVEL			COARSE	MEDIUM	FINE	SILT	CLAY
				SAND				
UNIFIED SYSTEM ASTM D2487	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY		
	GRAVEL		SAND					



Terraprobe

SIEVE AND HYDROMETER ANALYSIS TEST REPORT

PROJECT: 31 Huron Street, Collingwood, Ontario

LOCATION: Greater Toronto Area, On.

CLIENT: 31 Huron Street Inc.

BOREHOLE: 2

SAMPLE NUMBER: 6

SAMPLE DEPTH:

SAMPLE DESCRIPTION: SILT, some sand, some gravel, trace clay

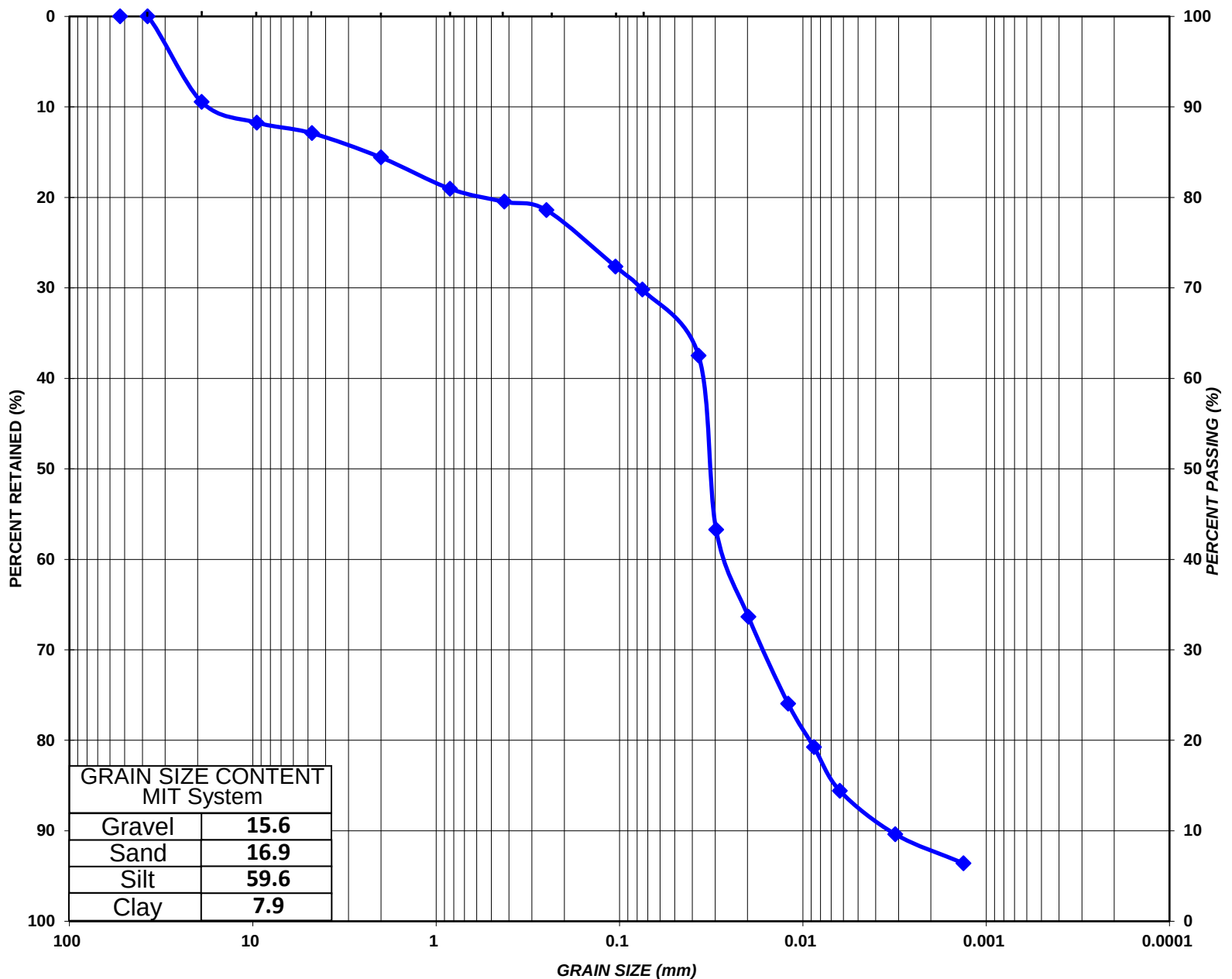
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LAB NO.: 1015B

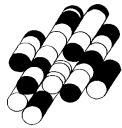
SAMPLE DATE: Jan 14, 2020

SAMPLED BY: P.H.

GRAIN SIZE DISTRIBUTION ANALYSIS



MIT SYSTEM	GRAVEL			COARSE	MEDIUM	FINE	SILT	CLAY
				SAND				
UNIFIED SYSTEM ASTM D2487	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY		
	GRAVEL		SAND					



Terraprobe

SIEVE AND HYDROMETER ANALYSIS TEST REPORT

PROJECT: 31 Huron Street, Collingwood, Ontario

LOCATION: Greater Toronto Area, On.

CLIENT: 31 Huron Street Inc.

BOREHOLE: 5

SAMPLE NUMBER: 6

SAMPLE DEPTH:

SAMPLE DESCRIPTION: SANDY SILT, some gravel, some clay

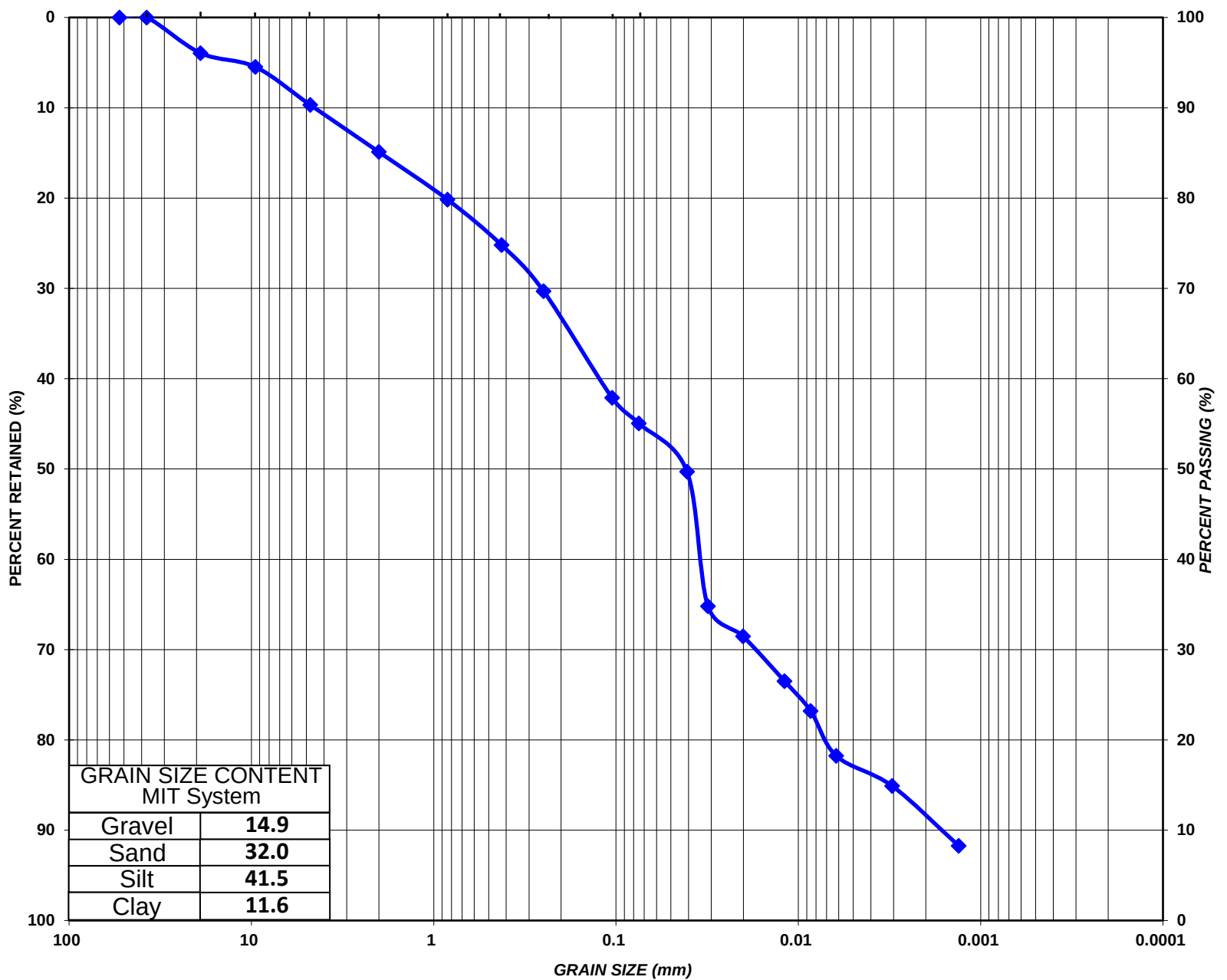
FILE NO.: 1-19-0773

LAB NO.: 1015C

SAMPLE DATE: Jan 14, 2020

SAMPLED BY: P.H.

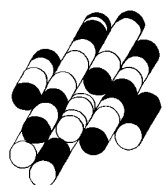
GRAIN SIZE DISTRIBUTION ANALYSIS



MIT SYSTEM	GRAVEL			COARSE	MEDIUM	FINE	SILT	CLAY
				SAND				
UNIFIED SYSTEM ASTM D2487	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY		
	GRAVEL		SAND					

APPENDIX C

TERRAPROBE INC.





FINAL REPORT

CA14333-FEB20 R1

1-19-0773-46, 31 Huron St., Collingwood

Prepared for

Terraprobe Inc



FINAL REPORT

CA14333-FEB20 R1

First Page

CLIENT DETAILS

Client Terraprobe Inc

Address 11 Indell Lane
Brampton, ON
L6T 3Y3, Canada

Contact Alyssa Davis

Telephone (905) 796-2650

Facsimile

Email adavis@terraprobe.ca

Project 1-19-0773-46, 31 Huron St., Collingwood

Order Number

Samples Ground Water (1)

LABORATORY DETAILS

Project Specialist Jill Campbell, B.Sc.,GISAS

Laboratory SGS Canada Inc.

Address 185 Concession St., Lakefield ON, K0L 2H0

Telephone 2165

Facsimile 705-652-6365

Email jill.campbell@sgs.com

SGS Reference CA14333-FEB20

Received 02/10/2020

Approved 02/18/2020

Report Number CA14333-FEB20 R1

Date Reported 02/18/2020

COMMENTS

RL - SGS Reporting Limit

Temperature of Sample upon Receipt: 8 degrees C

Cooling Agent Present: yes

Custody Seal Present: yes

Chain of Custody Number: 012877

SIGNATORIES

Jill Campbell, B.Sc.,GISAS



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FINAL REPORT

CA14333-FEB20 R1

Client: Terraprobe Inc

Project: 1-19-0773-46, 31 Huron St., Collingwood

Project Manager: Alyssa Davis

Samplers: Mark Carhart

PACKAGE: **SANSEW - General Chemistry (WATER)**

Sample Number 8
Sample Name SW-UF
Sample Matrix Ground Water

L1 = SANSEW / WATER / - - Collingwood Sewer Use ByLaw - Sanitary Sewer Discharge - BL_2009_118

L2 = SANSEW / WATER / - - Collingwood Sewer Use ByLaw - Storm Sewer Discharge - BL_2009_118

Sample Date 10/02/2020

Parameter	Units	RL	L1	L2	Result
-----------	-------	----	----	----	--------

General Chemistry

Biochemical Oxygen Demand (BOD5)	mg/L	2	300		< 4 †
Total Suspended Solids	mg/L	2	300		194
Total Kjeldahl Nitrogen	as N mg/L	0.5	50		1.0

PACKAGE: **SANSEW - Metals and Inorganics (WATER)**

Sample Number 8
Sample Name SW-UF
Sample Matrix Ground Water

L1 = SANSEW / WATER / - - Collingwood Sewer Use ByLaw - Sanitary Sewer Discharge - BL_2009_118

L2 = SANSEW / WATER / - - Collingwood Sewer Use ByLaw - Storm Sewer Discharge - BL_2009_118

Sample Date 10/02/2020

Parameter	Units	RL	L1	L2	Result
-----------	-------	----	----	----	--------

Metals and Inorganics

Cyanide (total)	mg/L	0.01	1.2		< 0.01
Sulphate	mg/L	0.2	1500		69
Fluoride	mg/L	0.06	10		0.18
Sulphide	mg/L	0.02	1		< 0.02
Aluminum (total)	mg/L	0.001	50		4.91
Antimony (total)	mg/L	0.0009	5		< 0.0009
Arsenic (total)	mg/L	0.0002	1		0.0035
Bismuth (total)	mg/L	0.00000	5		0.000057
		7			
Cadmium (total)	mg/L	0.00000	0.7		0.000067
		3			



FINAL REPORT

CA14333-FEB20 R1

Client: Terraprobe Inc

Project: 1-19-0773-46, 31 Huron St., Collingwood

Project Manager: Alyssa Davis

Samplers: Mark Carhart

PACKAGE: SANSEW - Metals and Inorganics
(WATER)

Sample Number 8

Sample Name SW-UF

Sample Matrix Ground Water

Sample Date 10/02/2020

L1 = SANSEW / WATER / - - Collingwood Sewer Use ByLaw - Sanitary Sewer Discharge - BL_2009_118

L2 = SANSEW / WATER / - - Collingwood Sewer Use ByLaw - Storm Sewer Discharge - BL_2009_118

Parameter	Units	RL	L1	L2	Result
Metals and Inorganics (continued)					
Chromium (total)	mg/L	0.00008	2.8	0.2	0.00700
Cobalt (total)	mg/L	0.000004	5		0.00338
Copper (total)	mg/L	0.0002	2	0.1	0.0202
Iron (total)	mg/L	0.007	50		6.30
Lead (total)	mg/L	0.00001	0.7	0.05	0.0325
Manganese (total)	mg/L	0.00001	5		0.630
Molybdenum (total)	mg/L	0.00004	5		0.00617
Nickel (total)	mg/L	0.0001	2	0.05	0.0078
Phosphorus (total)	mg/L	0.003	10		0.216
Selenium (total)	mg/L	0.00004	0.8		0.00009
Silver (total)	mg/L	0.00005	0.4		< 0.00005
Tin (total)	mg/L	0.00006	5		0.00215
Titanium (total)	mg/L	0.00005	5		0.149
Zinc (total)	mg/L	0.002	2	0.05	0.036



FINAL REPORT

CA14333-FEB20 R1

Client: Terraprobe Inc

Project: 1-19-0773-46, 31 Huron St., Collingwood

Project Manager: Alyssa Davis

Samplers: Mark Carhart

PACKAGE: SANSEW - Microbiology (WATER)

Sample Number 8
Sample Name SW-UF
Sample Matrix Ground Water
Sample Date 10/02/2020

L1 = SANSEW / WATER / - - Collingwood Sewer Use ByLaw - Sanitary Sewer Discharge - BL_2009_118

L2 = SANSEW / WATER / - - Collingwood Sewer Use ByLaw - Storm Sewer Discharge - BL_2009_118

Parameter	Units	RL	L1	L2	Result
Microbiology					
E. Coli	cfu/100mL	-		200	< 2 †

PACKAGE: SANSEW - Oil and Grease (WATER)

Sample Number 8
Sample Name SW-UF
Sample Matrix Ground Water
Sample Date 10/02/2020

L1 = SANSEW / WATER / - - Collingwood Sewer Use ByLaw - Sanitary Sewer Discharge - BL_2009_118

L2 = SANSEW / WATER / - - Collingwood Sewer Use ByLaw - Storm Sewer Discharge - BL_2009_118

Parameter	Units	RL	L1	L2	Result
Oil and Grease					
Oil & Grease (total)	mg/L	2			< 2
Oil & Grease (animal/vegetable)	mg/L	4	150		< 4
Oil & Grease (mineral/synthetic)	mg/L	4	15		< 4

PACKAGE: SANSEW - Other (ORP) (WATER)

Sample Number 8
Sample Name SW-UF
Sample Matrix Ground Water
Sample Date 10/02/2020

L1 = SANSEW / WATER / - - Collingwood Sewer Use ByLaw - Sanitary Sewer Discharge - BL_2009_118

L2 = SANSEW / WATER / - - Collingwood Sewer Use ByLaw - Storm Sewer Discharge - BL_2009_118

Parameter	Units	RL	L1	L2	Result
Other (ORP)					
pH	no unit	0.05	9.5	9	7.61
Chloride	mg/L	0.2	1500		570
Mercury (total)	mg/L	0.00001	0.01	0.001	0.00003



FINAL REPORT

CA14333-FEB20 R1

Client: Terraprobe Inc

Project: 1-19-0773-46, 31 Huron St., Collingwood

Project Manager: Alyssa Davis

Samplers: Mark Carhart

PACKAGE: SANSEW - PCBs (WATER)

Sample Number 8
Sample Name SW-UF
Sample Matrix Ground Water
Sample Date 10/02/2020

L1 = SANSEW / WATER / - - Collingwood Sewer Use ByLaw - Sanitary Sewer Discharge - BL_2009_118

L2 = SANSEW / WATER / - - Collingwood Sewer Use ByLaw - Storm Sewer Discharge - BL_2009_118

Parameter	Units	RL	L1	L2	Result
Polychlorinated Biphenyls (PCBs) - Total	mg/L	0.0001	0.004		< 0.0001

PCBs

PACKAGE: SANSEW - Phenols (WATER)

Sample Number 8
Sample Name SW-UF
Sample Matrix Ground Water
Sample Date 10/02/2020

L1 = SANSEW / WATER / - - Collingwood Sewer Use ByLaw - Sanitary Sewer Discharge - BL_2009_118

L2 = SANSEW / WATER / - - Collingwood Sewer Use ByLaw - Storm Sewer Discharge - BL_2009_118

Parameter	Units	RL	L1	L2	Result
4AAP-Phenolics	mg/L	0.002	0.1		0.006

Phenols

PACKAGE: SANSEW - SVOCs (WATER)

Sample Number 8
Sample Name SW-UF
Sample Matrix Ground Water
Sample Date 10/02/2020

L1 = SANSEW / WATER / - - Collingwood Sewer Use ByLaw - Sanitary Sewer Discharge - BL_2009_118

L2 = SANSEW / WATER / - - Collingwood Sewer Use ByLaw - Storm Sewer Discharge - BL_2009_118

Parameter	Units	RL	L1	L2	Result
Hexachlorobenzene	mg/L	0.00001	0.0001		< 0.0001 †

SVOCs

PACKAGE: SANSEW - VOCs (WATER)

Sample Number 8
Sample Name SW-UF
Sample Matrix Ground Water

L1 = SANSEW / WATER / - - Collingwood Sewer Use ByLaw - Sanitary Sewer Discharge - BL_2009_118



FINAL REPORT

CA14333-FEB20 R1

Client: Terraprobe Inc

Project: 1-19-0773-46, 31 Huron St., Collingwood

Project Manager: Alyssa Davis

Samplers: Mark Carhart

PACKAGE: **SANSEW - VOCs (WATER)**

Sample Number 8
Sample Name SW-UF
Sample Matrix Ground Water
Sample Date 10/02/2020

L1 = SANSEW / WATER / - - Collingwood Sewer Use ByLaw - Sanitary Sewer Discharge - BL_2009_118

L2 = SANSEW / WATER / - - Collingwood Sewer Use ByLaw - Storm Sewer Discharge - BL_2009_118

Parameter	Units	RL	L1	L2	Result
VOCs					
Chloroform	mg/L	0.0005	0.04		< 0.0005
1,2-Dichlorobenzene	mg/L	0.0005	0.05		< 0.0005
1,4-Dichlorobenzene	mg/L	0.0005	0.08		< 0.0005
Methylene Chloride	mg/L	0.0005	0.06		< 0.0005
1,1,2,2-Tetrachloroethane	mg/L	0.0005	0.06		< 0.0005
Tetrachloroethylene (perchloroethylene)	mg/L	0.0005	0.06		< 0.0005
Trichloroethylene	mg/L	0.0005	0.05		< 0.0005

PACKAGE: **SANSEW - VOCs - BTEX (WATER)**

Sample Number 8
Sample Name SW-UF
Sample Matrix Ground Water
Sample Date 10/02/2020

L1 = SANSEW / WATER / - - Collingwood Sewer Use ByLaw - Sanitary Sewer Discharge - BL_2009_118

L2 = SANSEW / WATER / - - Collingwood Sewer Use ByLaw - Storm Sewer Discharge - BL_2009_118

Parameter	Units	RL	L1	L2	Result
VOCs - BTEX					
Benzene	mg/L	0.0005	0.01		< 0.0005
Ethylbenzene	mg/L	0.0005	0.09		< 0.0005
Toluene	mg/L	0.0005	0.02		< 0.0005
Xylene (total)	mg/L	0.0005			< 0.0005
m-p-xylene	mg/L	0.0005			< 0.0005
o-xylene	mg/L	0.0005			< 0.0005

EXCEEDANCE SUMMARY

No exceedances are present above the regulatory limit(s) indicated



FINAL REPORT

CA14333-FEB20 R1

QC SUMMARY

Anions by IC
Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-IENVIIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chloride	DIO0221-FEB20	mg/L	0.2	<0.2	1	20	97	80	120	100	75	125
Sulphate	DIO0221-FEB20	mg/L	0.2	<0.2	2	20	92	80	120	91	75	125

Biochemical Oxygen Demand
Method: SM 5210 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0022-FEB20	mg/L	2	< 2	3	30	104	70	130	83	70	130

Cyanide by SFA
Method: SM 4500 | Internal ref.: ME-CA-IENVISFA-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Cyanide (total)	SKA0077-FEB20	mg/L	0.01	<0.01	ND	10	90	90	110	90	75	125



FINAL REPORT

CA14333-FEB20 R1

QC SUMMARY

Fluoride by Specific Ion Electrode
Method: SM 4500 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-014

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Fluoride	EWL0140-FEB20	mg/L	0.06	<0.06	2	10	104	90	110	107	75	125

Mercury by CVAAS
Method: EPA 7471A/SM 3112B | Internal ref.: ME-CA-IENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (total)	EHG0012-FEB20	mg/L	0.00001	< 0.00001	ND	20	90	80	120	119	70	130



FINAL REPORT

CA14333-FEB20 R1

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-ENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (total)	EMS0053-FEB20	mg/L	0.00005	<0.00005	6	20	104	90	110	86	70	130
Aluminum (total)	EMS0053-FEB20	mg/L	0.001	<0.001	2	20	99	90	110	NV	70	130
Arsenic (total)	EMS0053-FEB20	mg/L	0.0002	<0.0002	8	20	103	90	110	102	70	130
Bismuth (total)	EMS0053-FEB20	mg/L	0.000007	<0.000007	ND	20	100	90	110	107	70	130
Cadmium (total)	EMS0053-FEB20	mg/L	0.000003	<0.000003	9	20	99	90	110	97	70	130
Cobalt (total)	EMS0053-FEB20	mg/L	0.000004	<0.000004	4	20	103	90	110	101	70	130
Chromium (total)	EMS0053-FEB20	mg/L	0.00008	<0.00008	8	20	105	90	110	NV	70	130
Copper (total)	EMS0053-FEB20	mg/L	0.0002	<0.0002	2	20	102	90	110	NV	70	130
Iron (total)	EMS0053-FEB20	mg/L	0.007	<0.007	3	20	97	90	110	NV	70	130
Manganese (total)	EMS0053-FEB20	mg/L	0.00001	<0.00001	3	20	103	90	110	NV	70	130
Molybdenum (total)	EMS0053-FEB20	mg/L	0.00004	<0.00004	ND	20	101	90	110	102	70	130
Nickel (total)	EMS0053-FEB20	mg/L	0.0001	<0.0001	7	20	104	90	110	93	70	130
Lead (total)	EMS0053-FEB20	mg/L	0.00001	<0.00001	ND	20	104	90	110	99	70	130
Phosphorus (total)	EMS0053-FEB20	mg/L	0.003	<0.003	6	20	97	90	110	NV	70	130
Antimony (total)	EMS0053-FEB20	mg/L	0.0009	<0.0009	ND	20	103	90	110	NV	70	130
Selenium (total)	EMS0053-FEB20	mg/L	0.00004	<0.00004	12	20	98	90	110	96	70	130
Tin (total)	EMS0053-FEB20	mg/L	0.00006	<0.00006	8	20	99	90	110	NV	70	130
Titanium (total)	EMS0053-FEB20	mg/L	0.00005	<0.00005	7	20	99	90	110	NV	70	130
Zinc (total)	EMS0053-FEB20	mg/L	0.002	<0.002	1	20	98	90	110	125	70	130



FINAL REPORT

CA14333-FEB20 R1

QC SUMMARY

Microbiology
Method: SM 9222D | Internal ref.: ME-CA-IENVIMIC-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
E. Coli	BAC9119-FEB20	cfu/100mL	-	ACCEPTED	ACCEPTED							
					D							

Oil & Grease
Method: MOE E3401 | Internal ref.: ME-CA-IENVIGC-LAK-AN-019

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Oil & Grease (total)	GCM0167-FEB20	mg/L	2	<2	NSS	20	102	75	125			



FINAL REPORT

CA14333-FEB20 R1

QC SUMMARY

Oil & Grease-AV/MS

Method: MOE E3401/SM 5520F | Internal ref.: ME-CA-IENVIGC-LAK-AN-019

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Oil & Grease (animal/vegetable)	GCM0167-FEB20	mg/L	4	< 4	NSS	20	NA	70	130			
Oil & Grease (mineral/synthetic)	GCM0167-FEB20	mg/L	4	< 4	NSS	20	NA	70	130			

pH

Method: SM 4500 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0134-FEB20	no unit	0.05	NA	0		99			NA		

Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-IENVISFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0082-FEB20	mg/L	0.002	<0.002	ND	10	105	90	110	98	75	125



FINAL REPORT

CA14333-FEB20 R1

QC SUMMARY

Polychlorinated Biphenyls

Method: MOE E3400/EPA 8082A | Internal ref.: ME-CA-IENVIGC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Polychlorinated Biphenyls (PCBs) - Total	GCM0137-FEB20	mg/L	0.0001	<0.0001	NSS	30	97	60	140	NSS	60	140

Semi-Volatile Organics

Method: EPA 3510C/8270D | Internal ref.: ME-CA-IENVIGC-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Hexachlorobenzene	GCM0148-FEB20	mg/L	0.00001	< 0.0001	NSS	30	87	50	140	NSS	50	140

Sulphide by SFA

Method: SM 4500 | Internal ref.: ME-CA-IENVISFA-LAK-AN-008

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Sulphide	SKA0081-FEB20	mg/L	0.02	<0.02	ND	20	99	80	120	NA	75	125



FINAL REPORT

CA14333-FEB20 R1

QC SUMMARY

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-IENVIEWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0137-FEB20	mg/L	2	< 2	0	10	NV	90	110	NA		

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-IENVISFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen	SKA0086-FEB20	as N mg/L	0.5	<0.5	8	10	101	90	110	110	75	125



FINAL REPORT

CA14333-FEB20 R1

QC SUMMARY

Volatile Organics

Method: EPA 5030B/8260C | Internal ref.: ME-CA-ENVIGC-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
1,1,2,2-Tetrachloroethane	GCM0151-FEB20	mg/L	0.0005	<0.0005	ND	30	99	60	130	106	50	140
1,2-Dichlorobenzene	GCM0151-FEB20	mg/L	0.0005	<0.0005	ND	30	98	60	130	102	50	140
1,4-Dichlorobenzene	GCM0151-FEB20	mg/L	0.0005	<0.0005	ND	30	98	60	130	102	50	140
Benzene	GCM0151-FEB20	mg/L	0.0005	<0.0005	ND	30	99	60	130	104	50	140
Chloroform	GCM0151-FEB20	mg/L	0.0005	<0.0005	5	30	99	60	130	102	50	140
Ethylbenzene	GCM0151-FEB20	mg/L	0.0005	<0.0005	ND	30	99	60	130	103	50	140
m-p-xylene	GCM0151-FEB20	mg/L	0.0005	<0.0005	ND	30	100	60	130	104	50	140
Methylene Chloride	GCM0151-FEB20	mg/L	0.0005	<0.0005	ND	30	96	60	130	99	50	140
o-xylene	GCM0151-FEB20	mg/L	0.0005	<0.0005	ND	30	98	60	130	102	50	140
Tetrachloroethylene (perchloroethylene)	GCM0151-FEB20	mg/L	0.0005	<0.0005	ND	30	99	60	130	103	50	140
Toluene	GCM0151-FEB20	mg/L	0.0005	<0.0005	ND	30	100	60	130	104	50	140
Trichloroethylene	GCM0151-FEB20	mg/L	0.0005	<0.0005	ND	30	99	60	130	102	50	140

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS Insufficient sample for analysis.

RL Reporting Limit.

↑ Reporting limit raised.

↓ Reporting limit lowered.

NA The sample was not analysed for this analyte

ND Non Detect

Samples analysed as received. Solid samples expressed on a dry weight basis. "Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated. This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at http://www.sgs.com/terms_and_conditions.htm. The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents.

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-- End of Analytical Report --

Laboratory Information Section - Lab use only

Received By (signature):

Received By (signature):
 Received Date: 03/10/20 (mm/dd/yy)
 Received Time: 15:15 (hr : min)

Quotation #: 1-19-0773-46
 Project #: 1-19-0773-46
 TURNAROUND TIME (TAT) REQUIRED
 TAT's are quoted in business days (exclude statutory holidays & weekends).
 Samples received after 6pm or on weekends: TAT begins next business day

P.O. #: 31 HURON ST, COLLEEN
 Site Location/ID: 31 HURON ST, COLLEEN
 LAB LIMS #: CA 14333-
 FEB 20

Received By (signature):
 Received Date: 03/10/20 (mm/dd/yy)
 Received Time: 15:15 (hr : min)

Custody Seal Present: Yes ☒ No ☐
 Custody Seal Intact: Yes ☒ No ☐
 Cooling Agent Present: Yes ☐ No ☐
 Temperature Upon Receipt (°C): 70.8

LAB LIMS #: CA 14333-
 FEB 20

INVOICE INFORMATION

Company: Ferraprobe
 Contact: 11 Indell Lane
 Address: Brampton, ON
 Phone: 905-796-2650
 Fax: 905-796-2650
 Email: a.davis@ferraprobe.ca

(same as Report Information)
 Company: Ferraprobe
 Contact: LORRA PEOSS
 Address: 11 Indell Lane
 Phone: 905-796-2650
 Fax: 905-796-2650
 Email: l.pross@ferraprobe.ca

REPORT INFORMATION

Company: Ferraprobe
 Contact: 11 Indell Lane
 Address: Brampton, ON
 Phone: 905-796-2650
 Fax: 905-796-2650
 Email: a.davis@ferraprobe.ca

(same as Report Information)
 Company: Ferraprobe
 Contact: LORRA PEOSS
 Address: 11 Indell Lane
 Phone: 905-796-2650
 Fax: 905-796-2650
 Email: l.pross@ferraprobe.ca

REGULATIONS

Regulation 153/04:
☐ Table 1 ☐ Res/Park ☐ Soil Texture:
☐ Table 2 ☐ Ind/Com ☐ Coarse
☐ Table 3 ☐ Agr/Other ☐ Medium
☐ Table ☐ Fine

Other Regulations:
☐ Reg 347/558 (3 Day min TAT)
☐ PWOC ☐ MMER
☐ CCME ☐ Other:
☐ MISA

RECORD OF SITE CONDITION (RSC)

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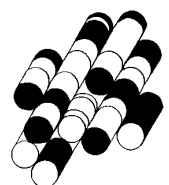
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APPENDIX D

TERRAPROBE INC.



Material Name	Color	KS (m/s)
Topsoil/Earth Fill		1e-006
Sandy Silt Till		2.35e-007
Sandy Silt		4.9e-007
Inferred Bedrock		1e-007
ST Caisson		1e-009

Excavation Dimensions: 40.7 m x 76.1 m
Section Cut: W-E

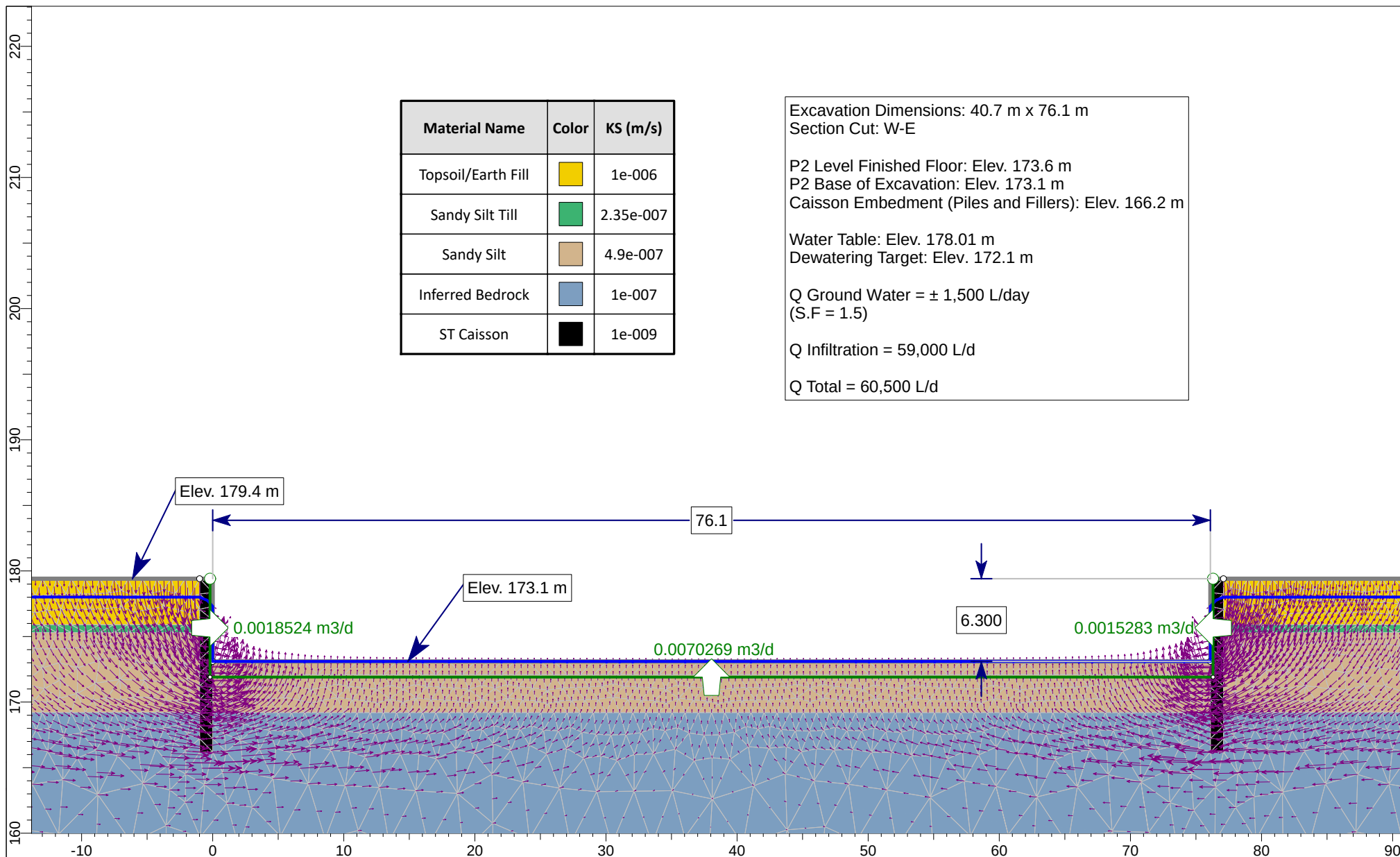
P2 Level Finished Floor: Elev. 173.6 m
P2 Base of Excavation: Elev. 173.1 m
Caisson Embedment (Piles and Fillers): Elev. 166.2 m

Water Table: Elev. 178.01 m
Dewatering Target: Elev. 172.1 m

Q Ground Water = $\pm 1,500$ L/day
(S.F = 1.5)

Q Infiltration = 59,000 L/d

Q Total = 60,500 L/d



SLIDEINTERPRET 7.031

Notes
Refer to Hydrogeological
Report for factual information
supporting this analysis.

Project 1-19-0773-46 31 Huron Street, Collingwood		
Analysis P2 Level Dewatering, Section A, Short Term, Caisson Wall		
Date 7/30/2020	Scale 1:400	File 1-19-0773 - 31 Huron Street, Collingwood.slm
By MA	Ref. Rev.0	

Material Name	Color	KS (m/s)
Topsoil/Earth Fill		1e-006
Sandy Silt Till		2.35e-007
Sandy Silt		4.9e-007
Inferred Bedrock		1e-007
ST Caisson		1e-009

Excavation Dimensions: 19.2 m x 25.4 m
Section Cut: W-E

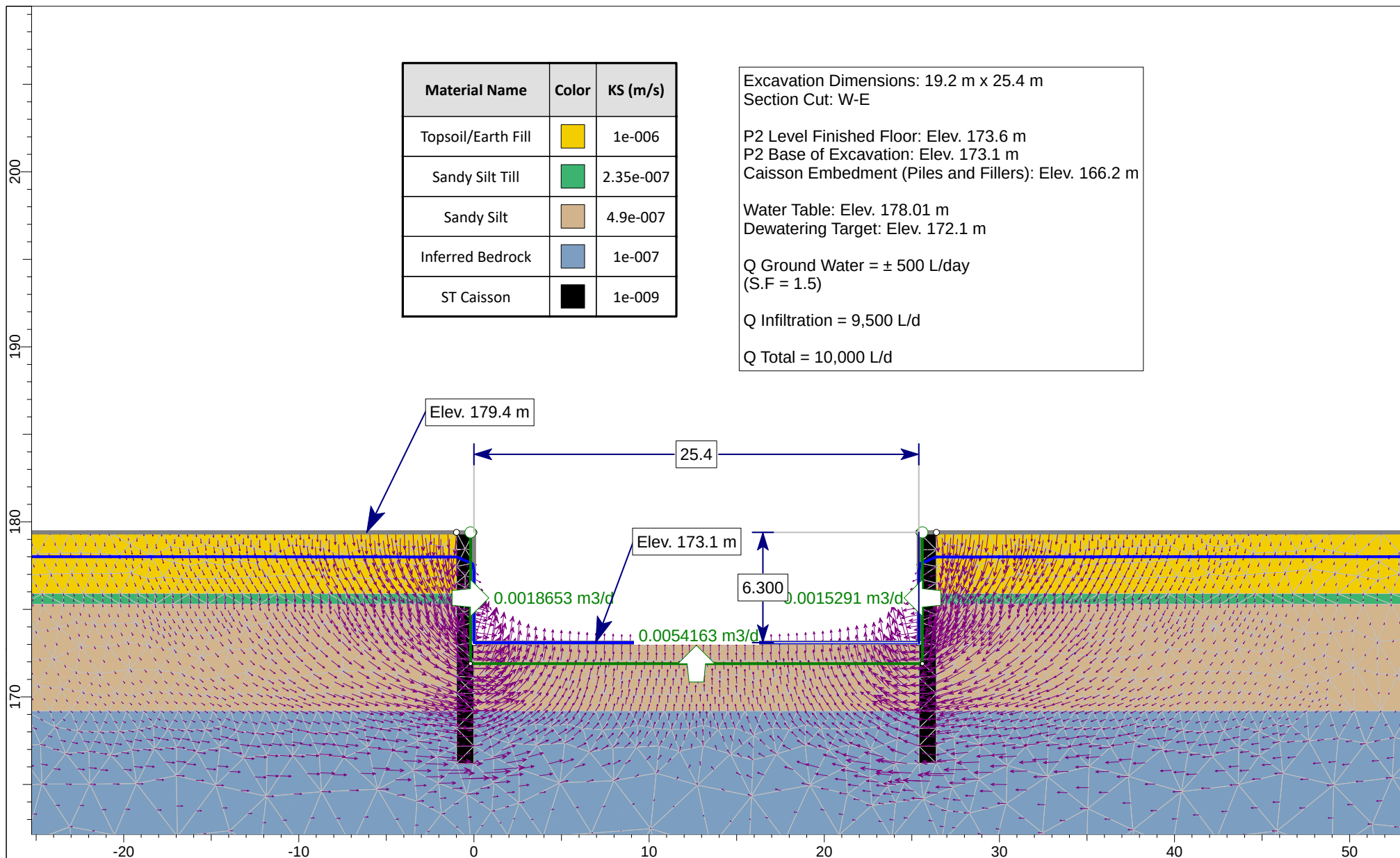
P2 Level Finished Floor: Elev. 173.6 m
P2 Base of Excavation: Elev. 173.1 m
Caisson Embedment (Piles and Fillers): Elev. 166.2 m

Water Table: Elev. 178.01 m
Dewatering Target: Elev. 172.1 m

Q Ground Water = ± 500 L/day
(S.F = 1.5)

Q Infiltration = 9,500 L/d

Q Total = 10,000 L/d



Material Name	Color	KS (m/s)
Topsoil/Earth Fill		1e-006
Sandy Silt Till		2.35e-007
Sandy Silt		4.9e-007
Inferred Bedrock		1e-007
LT Caisson		1e-007

Excavation Dimensions: 40.7 m x 76.1 m
Section Cut: W-E

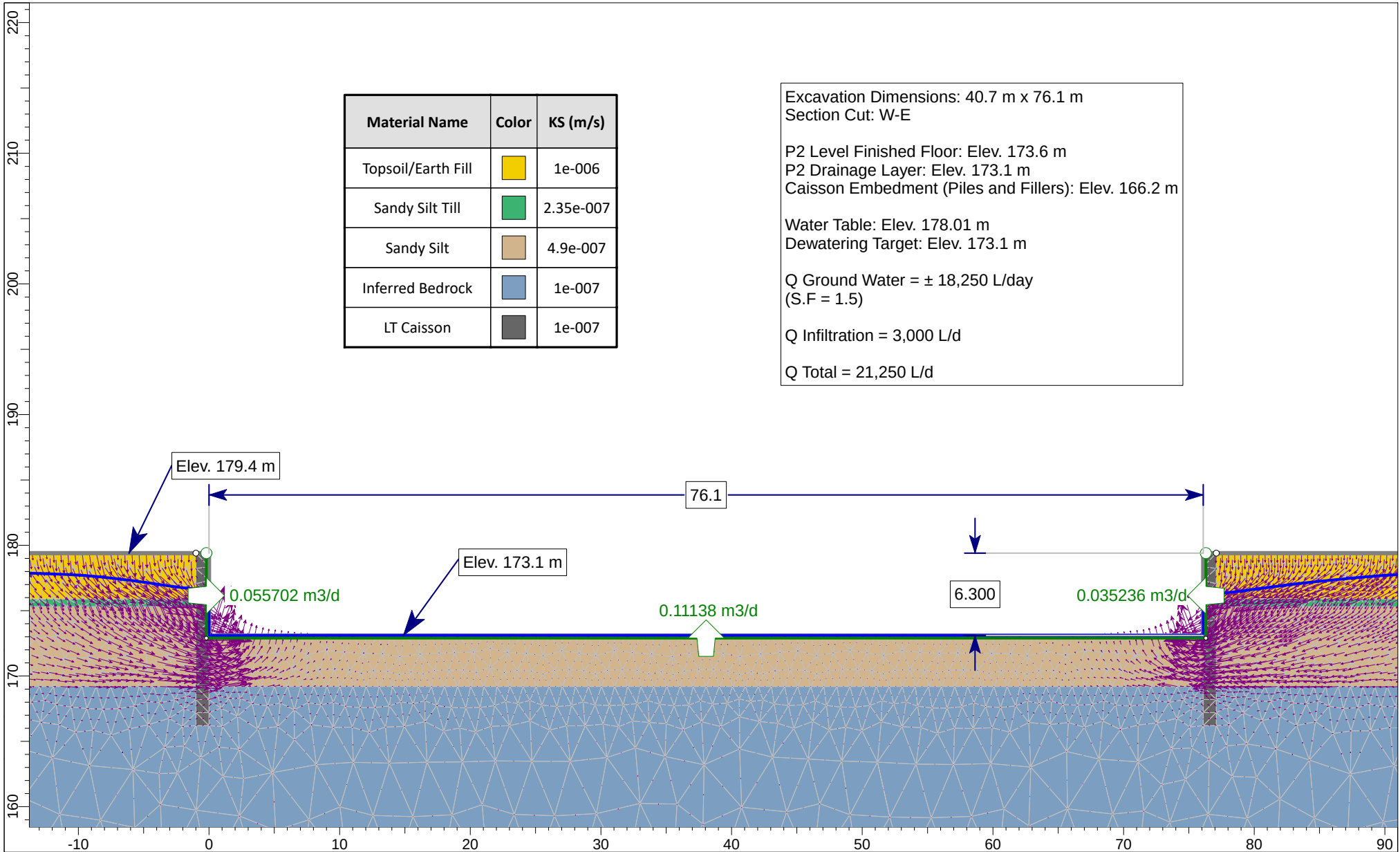
P2 Level Finished Floor: Elev. 173.6 m
P2 Drainage Layer: Elev. 173.1 m
Caisson Embedment (Piles and Fillers): Elev. 166.2 m

Water Table: Elev. 178.01 m
Dewatering Target: Elev. 173.1 m

Q Ground Water = ± 18,250 L/day
(S.F = 1.5)

Q Infiltration = 3,000 L/d

Q Total = 21,250 L/d



Notes
Refer to Hydrogeological
Report for factual information
supporting this analysis.

Project 1-19-0773-46 31 Huron Street, Collingwood		
Analysis P2 Level Dewatering, Section A, Long Term, Caisson Wall		
Date 7/30/2020	Scale 1:400	File 1-19-0773 - 31 Huron Street, Collingwood.slm
By MA	Ref. Rev.0	

Material Name	Color	KS (m/s)
Topsoil/Earth Fill		1e-006
Sandy Silt Till		2.35e-007
Sandy Silt		4.9e-007
Inferred Bedrock		1e-007
LT Caisson		1e-007

Excavation Dimensions: 19.2 m x 25.4 m
Section Cut: W-E

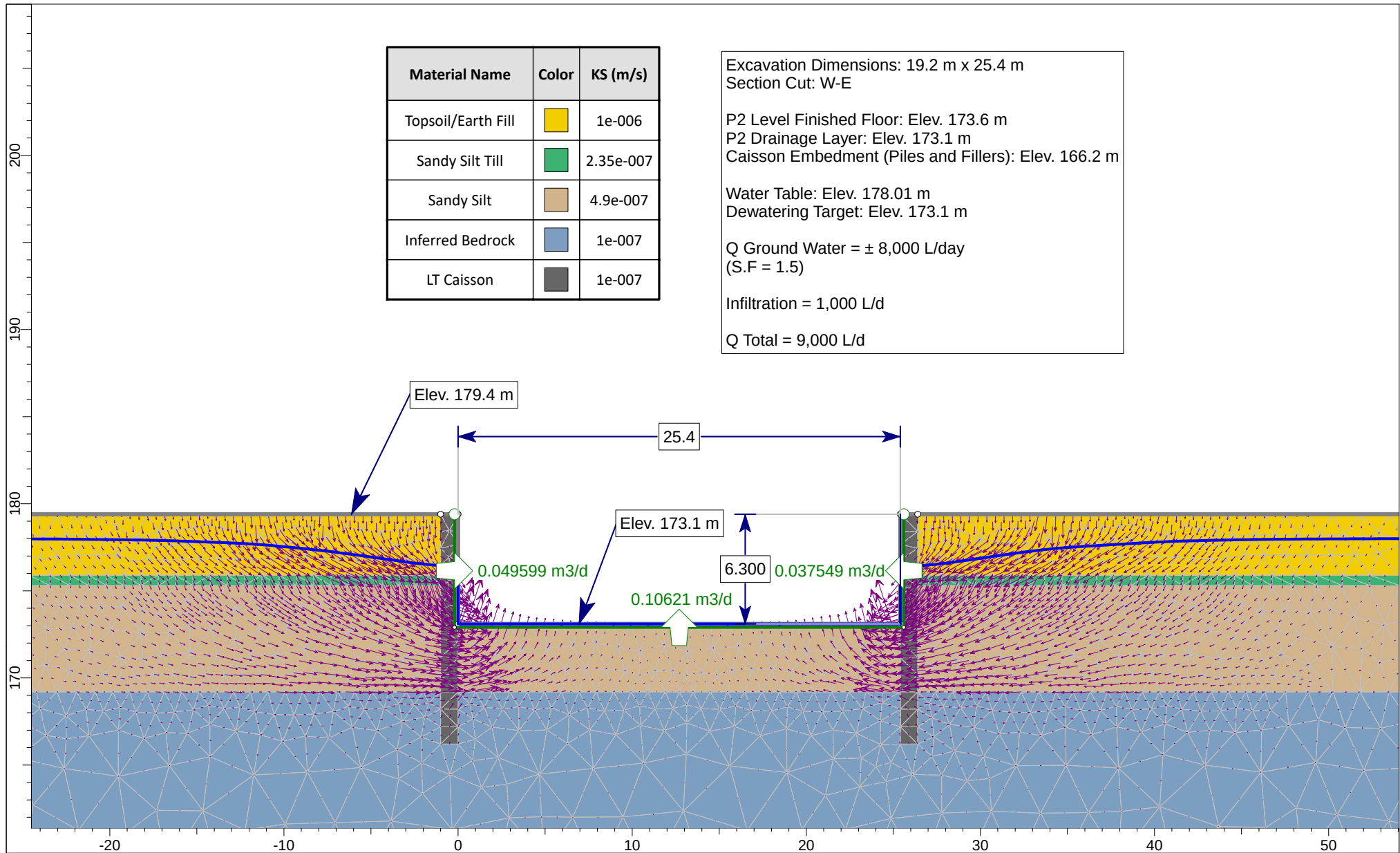
P2 Level Finished Floor: Elev. 173.6 m
P2 Drainage Layer: Elev. 173.1 m
Caisson Embedment (Piles and Fillers): Elev. 166.2 m

Water Table: Elev. 178.01 m
Dewatering Target: Elev. 173.1 m

Q Ground Water = ± 8,000 L/day
(S.F = 1.5)

Infiltration = 1,000 L/d

Q Total = 9,000 L/d



Notes
Refer to Hydrogeological
Report for factual information
supporting this analysis.

Project
1-19-0773-46 | 31 Huron Street, Collingwood

Analysis
P2 Level | Dewatering, Section B, Long Term, Caisson Wall

Date
7/30/2020

Scale
1:300

File
1-19-0773 - 31 Huron Street, Collingwood.sldm

By
MA

Ref.
Rev.0



Short-Term Construction Dewatering Flow Rate Estimate Details

<u>Dewatering flow rate from Groundwater Source</u>		
Excavation Dimensions - Section A		
<i>NS (m)</i>	40.7	
<i>EW (m)</i>	76.1	
<i>Area (m²)</i>	3097.27	
<i>Perimeter (m)</i>	233.6	
Q BASE		
Flow (m³/day)	Length of Base (m)	Flow (L/day)
0.0085658	40.7	348.62806
Q SIDES (m³/day)		
Flow	Perimeter (m)	Flow (L/day)
0.00180770	208.2	3.76E+02
Q Total	L/day	724.99
Safety Factor		1.5
	L/day	1,087.49
	L/day	1,500.00

<u>Dewatering Flow Rate from Rainfall Event</u>		
Rainfall Event		
<i>Year</i>	2	100
<i>Hour</i>	3	12
<i>Depth (mm)</i>	25	94
<i>Depth (m)</i>	0.019	0.085
2 Year Event (L/day)	58,848	59,000
100 Year Event (L/Day)	263,268	263,500

Estimated Short-Term Dewatering Flow Rate

L/day	60,500.00
L/min	42.01

Short-Term Construction Dewatering Flow Rate Estimate Details

<u>Dewatering flow rate from Groundwater Source</u>		
Excavation Dimensions - Section B		
<i>NS (m)</i>	19.2	
<i>EW (m)</i>	25.4	
<i>Area (m²)</i>	487.68	
<i>Perimeter (m)</i>	89.2	
Q BASE		
Flow (m³/day)	Length of Base (m)	Flow (L/day)
0.0065556	19.2	125.86752
Q SIDES (m³/day)		
Flow	Perimeter (m)	Flow (L/day)
0.00181600	63.8	1.16E+02
Q Total	L/day	241.73
Safety Factor		1.5
	L/day	362.59
	L/day	500.00

<u>Dewatering Flow Rate from Rainfall Event</u>		
Rainfall Event		
<i>Year</i>	2	100
<i>Hour</i>	3	12
<i>Depth (mm)</i>	25	94
<i>Depth (m)</i>	0.019	0.085
2 Year Event (L/day)	9,266	9,500
100 Year Event (L/Day)	41,453	41,500

Estimated Short-Term Dewatering Flow Rate

L/day	10,000.00
L/min	6.94

Long-Term Foundation Drainage Flow Rate Estimate Details

Foundation Flow Rate flow rate from Groundwater Source		
Excavation Dimensions - Section A		
<i>NS (m)</i>	40.7	
<i>EW (m)</i>	76.1	
<i>Area (m²)</i>	3097.27	
<i>Perimeter (m)</i>	233.6	
Q BASE		
Flow (m ³ /day)	Length of Base (m)	Flow (L/day)
0.0111380	40.7	453.32
Q SIDES (m ³ /day)		
Flow	Perimeter (m)	Flow (L/day)
0.05570200	208.2	11,597.16
Q Total	L/day	
		12,050.47
Safety Factor		1.5
	L/day	18,075.71
	L/day	18,500.00

Foundation Drainage Flow Rate from Rainfall Event		
Infiltration		
<i>Perimeter</i>	Slice	25mm event
233.6	0.5	0.025

2 Year Event (L/day)	2,920
2 Year Event (L/day)	3,000
2 Year Event (L/min)	2.08

Estimated Foundation Drainage Flow Rate

L/day	21,500.00
L/min	14.93

Long-Term Foundation Drainage Flow Rate Estimate Details

Foundation Flow Rate flow rate from Groundwater Source		
Excavation Dimensions - Section B		
<i>NS (m)</i>	19.2	
<i>EW (m)</i>	25.4	
<i>Area (m²)</i>	487.68	
<i>Perimeter (m)</i>	89.2	
Q BASE		
Flow (m ³ /day)	Length of Base (m)	Flow (L/day)
0.1062100	19.2	2,039.23
Q SIDES (m ³ /day)		
Flow	Perimeter (m)	Flow (L/day)
0.04959900	63.8	3,164.42
Q Total	L/day	5,203.65
Safety Factor		1.5
	L/day	7,805.47
	L/day	8,000.00

Foundation Drainage Flow Rate from Rainfall Event		
Infiltration		
<i>Perimeter</i>	Slice	19 mm event
<i>89.2</i>	0.5	0.019

2 Year Event (L/day)	847
2 Year Event (L/day)	1,000
2 Year Event (L/min)	0.69

Estimated Foundation Drainage Flow Rate

L/day	9,000.00
L/min	6.25