APPENDIX B

BOREHOLE LOGS &

LABORATORY TEST RESULTS

NOTES ON SAMPLE DESCRIPTIONS

1. All descriptions included in this report follow the Canadian Foundation Engineering Manual soil classification system, based on visual and tactile examination which are consistent with the field identification procedures. Soil descriptions and classifications are based on the Unified Soil Classification System (USCS), based on visual and tactile observations. Where grain size analyses have been specified, mechanical grain size distribution has been used to confirm the soil classification.

Soil Classification (based on particle diameter)
Clay: < 0.002 mm
Silt: 0.002 – 0.075 mm
Sand: 0.075 – 4.75 mm
Gravel: 4.75 mm – 75 mm
Cobbles: 75 – 200 mm
Boulders: > 200 mm

Terminology & Proportion
Trace: < 10%
Some: 10-20%
Adjective, sandy, gravelly, etc.: 20-35%
And, and gravel, and silt, etc.: > 35%
Noun, Sand, Gravel, Silt, etc.: > 35% and main fraction

2. The compactness condition of cohesionless soils is based on excavator / drilling resistance, and Standard Penetration Test (SPT) N-values where available. The Canadian Foundation Engineering Manual provides the following summary for reference.

Compactness of Cohesionless Soils	SPT N-Value (# blows per 0.3 m penetration of split-spoon sampler)
Very Loose	0 – 4
Loose	4 – 10
Compact	10 – 30
Dense	30 – 50
Very Dense	50+

3. Topsoil Thickness - It should be noted that topsoil quantities should not be established from information provided at the test hole locations only. If required, a more detailed analysis with additional test holes may be recommended to accurately quantify the amount of topsoil to be removed for construction purposes.

4. Fill material is heterogeneous in nature, and may vary significantly in composition, density and overall condition. Where uncontrolled fill is contacted, it is possible that large obstructions or pockets of otherwise unsuitable or unstable soils may be present beyond the test hole locations.

5. Where glacial till is referenced, this is indicative of material which originates from a geological process associated with glaciation. Because of this geological process, till must be considered heterogeneous in composition and as such, may contain pockets and / or seams of material such as sand, gravel, silt or clay. Till often contains cobbles or boulders and therefore, contractors may encounter them during excavation, even if they are not indicated on the test hole logs. Where soil samples have been collected using borehole sampling equipment, it should be understood that normal sampling equipment can not differentiate the size or type of obstruction. Because of horizontal and vertical variability of till, the sample description may be applicable to a very limited area; therefore, caution is essential when dealing with excavations in till material.

6. Consistency of cohesive soils is based on tactile examination and undrained shear strength where available. The Canadian Foundation Engineering Manual provides the following summary for field identification methods and classification by corresponding undrained shear strength.

Consistency of Cohesive Soils	Field Identification	Undrained Shear Strength (kPa)
Very Soft	Easily penetrated several cm by the fist	0 – 12
Soft	Easily penetrated several cm by the thumb	12 – 25
Firm	Can be penetrated several cm by the thumb with moderate effort	25 – 50
Stiff	Readily indented by the thumb, but penetrated only with great effort	50 – 100
Very Stiff	Readily indented by the thumb nail	100 – 200
Hard	Indented with difficulty by the thumbnail	200+

LDS	Project	**Geotechnical Investigation**	Borehole ID **1**
	Project Location	**233 Upper Queen Street, Thorndale, Ontario**	*Sheet 1 of 1*
	Project Number	**GE-00630**	

Date Drilled	**January 20, 2022**	Ground Surface Elevation	**286.10 m asl**
Drill Rig	**D50T Track Mount**	Groundwater Level at Completion	**Dry**
Drilling Method	**Hollow Stem Auger**	Technician	**R. Walker**
Drilling Contractor	**London Soil Tests**	Checked By	**A. Chen**

Depth (m)	Sample Type	Sample Number	Recovery (%)	SPT N-value (blows/0.3 m)	Graphic Log	Material Description	Remarks and Other Tests
0.0						**TOPSOIL** - dark brown, silty loam, moist, 200 mm	
0.5						**FILL** - brown, sandy silt, moist to wet, loose	
1.0		1	60	6			*MC - 21.2%*
1.5					*1.37 m*	**SILT TILL** - brown to grey, some sand, trace clay, trace gravel, moist, compact to very dense	
		2	80	11			*MC - 14.5%*
2.0							
2.5		3	50	47			*MC - 10.0%*
3.0						- turn to grey	
		4	80	40			*MC - 10.1%*
3.5							
4.0							
4.5							
		5	50	45			*MC - 10.7%*
5.0							
5.5							
6.0							
		6	40	66	*6.55 m*		*MC - 11.3%*
6.5						BH Terminated at 6.55 m; BH observed open and dry upon completion of drilling.	
7.0							
7.5							
8.0							

Legend

- SPT Sample
- Bulk Sample
- Shelby Tube
- Stabilized Groundwater
- Inferred Groundwater

Well Construction Details

Pipe Diameter	**no well installed**
Installation Depth	
Screen Length	
Depth of Bentonite Seal	

Additional Notes

MC - denotes moisture content

LDS	Project	**Geotechnical Investigation**	Borehole ID **2/MW**
	Project Location	**233 Upper Queen Street, Thorndale, Ontario**	*Sheet 1 of 1*
	Project Number	**GE-00630**	

Date Drilled	**January 20, 2022**	Ground Surface Elevation	**286.32 m asl**
Drill Rig	**D50T Track Mount**	Groundwater Level at Completion	**-**
Drilling Method	**Hollow Stem Auger**	Technician	**R. Walker**
Drilling Contractor	**London Soil Tests**	Checked By	**A. Chen**

Depth (m)	Sample Type	Sample Number	Recovery (%)	SPT N-value (blows/0.3 m)	Graphic Log	Material Description	Remarks and Other Tests
0.0				0.21 m (23-Feb-22)		**TOPSOIL** - dark brown, silty loam, moist, 150 mm	
0.5						**FILL** - brown, sandy silt, containing rubber fragments, moist, loose	
1.0		1	50	7			*MC - 11.9%*
1.37 m							
1.5						**SILT TILL** - brown to grey, some sand, trace clay, trace gravel, moist, compact to very dense	
2.0		2	70	16			*MC - 14.3%*
2.5		3	60	23			*MC - 11.5%*
3.0		4	70	79		- layers of saturated sand and gravel - turn to grey	*MC - 10.7%*
3.5							
4.0							
4.5		5	60	80			*MC - 10.8%*
5.0					5.03 m	BH Terminated at 5.03 m; MW installed at 4.57 m - refer to details below	
5.5							
6.0							
6.5							
7.0							
7.5							
8.0							

Legend

- SPT Sample
- Bulk Sample
- Shelby Tube
- Stabilized Groundwater
- Inferred Groundwater

Well Construction Details

Pipe Diameter	50 mm CPVC pipe
Installation Depth	4.57 m
Screen Length	1.52 m w/ No. 2 filter sand
Depth of Bentonite Seal	2.44 m

Additional Notes

MC - denotes moisture content

Water Levels:

January 25, 2021 - 1.01 m bgs

February 23, 2021 - 0.21 m bgs

LDS	Project	**Geotechnical Investigation**	Borehole ID **3/MW**
	Project Location	**233 Upper Queen Street, Thorndale, Ontario**	*Sheet 1 of 1*
	Project Number	**GE-00630**	

Date Drilled	**January 20, 2022**	Ground Surface Elevation	**285.41 m asl**
Drill Rig	**D50T Track Mount**	Groundwater Level at Completion	**-**
Drilling Method	**Hollow Stem Auger**	Technician	**R. Walker**
Drilling Contractor	**London Soil Tests**	Checked By	**A. Chen**

Depth (m)	Sample Type	Sample Number	Recovery (%)	SPT N-value (blows/0.3 m)	Graphic Log	Material Description	Remarks and Other Tests
				0.11 m (23-Feb-22)		**TOPSOIL** - dark brown, silty loam, moist, 250 mm	
0.5						**SANDY SILT** - brown, trace clay, trace gravel, moist, compact	
1.0		1	70	11	*1.37 m*		*MC - 18.2%*
1.5		2	70	12		**SILT TILL** - brown to grey, some sand, trace clay, trace gravel, moist, compact to very dense	*MC - 16.2%*
2.0							
2.5		3	70	69/250 mm	*2.90 m*	- turn to grey	*MC - 12.1%*
3.0		4	60	73		**SAND AND GRAVEL** - grey, trace clay, trace silt, moist to saturated, very dense	*MC - 8.0%*
3.5						Gradation: 17.6% Silt & Clay, 46.0% Sand, 36.4% Gravel	
4.0					*4.04 m*		
4.5		5	50	50/100 mm		**SILT TILL** - grey, some sand, trace clay, trace gravel, moist, very dense	*MC - 10.8%*
5.0							
5.5							
6.0		6	20	50/75 mm	*6.18 m*		*MC - 12.2%*
6.5						BH Terminated at 6.18 m; MW installed at 6.10 m - refer to details below	
7.0							
7.5							
8.0							

Legend

- SPT Sample
- Bulk Sample
- Shelby Tube
- Stabilized Groundwater
- Inferred Groundwater

Well Construction Details

Pipe Diameter	50 mm CPVC pipe
Installation Depth	6.10 m
Screen Length	3.05 m w/ No. 2 filter sand
Depth of Bentonite Seal	2.44 m

Additional Notes

MC - denotes moisture content

Water Levels:

January 25, 2021 - 0.70 m bgs

February 23, 2021 - 0.11 m bgs

LDS	Project	**Geotechnical Investigation**	Borehole ID **4/MW**
	Project Location	**233 Upper Queen Street, Thorndale, Ontario**	*Sheet 1 of 1*
	Project Number	**GE-00630**	

Date Drilled	**January 20, 2022**	Ground Surface Elevation	**285.35 m asl**
Drill Rig	**D50T Track Mount**	Groundwater Level at Completion	**-**
Drilling Method	**Hollow Stem Auger**	Technician	**R. Walker**
Drilling Contractor	**London Soil Tests**	Checked By	**A. Chen**

Depth (m)	Sample Type	Sample Number	Recovery (%)	SPT N-value (blows/0.3 m)	Graphic Log	Material Description	Remarks and Other Tests
				0.16 m (23-Feb-22)		**TOPSOIL** - dark brown, silty loam, moist, 250 mm	
0.5						**SANDY SILT** - brown, trace clay, trace gravel, moist, loose	
1.0		1	50	5			*MC - 14.2%*
					1.37 m		
1.5		2	80	13		**SILT TILL** - brown to grey, some sand, trace clay, trace gravel, moist, compact to very dense	*MC - 13.9%*
2.0							
2.5		3	60	41			*MC - 7.4%*
3.0		4	60	50/75 mm		- turn to grey	*MC - 6.2%*
3.5							
4.0							
4.5		5	30	50/130 mm		- layers of wet sand	*MC - 6.8%*
5.0							
5.5							
6.0		6	30	50/75 mm	*6.33 m*		*MC - 8.2%*
6.5						BH Terminated at 6.33 m; MW installed at 4.57 m - refer to details below	
7.0							
7.5							
8.0							

Legend

- SPT Sample
- Bulk Sample
- Shelby Tube
- Stabilized Groundwater
- Inferred Groundwater

Well Construction Details

Pipe Diameter	50 mm CPVC pipe
Installation Depth	4.57 m
Screen Length	1.52 m w/ No. 2 filter sand
Depth of Bentonite Seal	2.74 m

Additional Notes

MC - denotes moisture content

Water Levels:

January 25, 2021 - 0.89 m bgs

February 23, 2021 - 0.16 m bgs

LDS	Project	**Geotechnical Investigation**	Borehole ID **5**
	Project Location	**233 Upper Queen Street, Thorndale, Ontario**	*Sheet 1 of 1*
	Project Number	**GE-00630**	

Date Drilled	**January 20, 2022**	Ground Surface Elevation	**284.67 m asl**
Drill Rig	**D50T Track Mount**	Groundwater Level at Completion	**Dry**
Drilling Method	**Hollow Stem Auger**	Technician	**R. Walker**
Drilling Contractor	**London Soil Tests**	Checked By	**A. Chen**

Depth (m)	Sample Type	Sample Number	Recovery (%)	SPT N-value (blows/0.3 m)	Graphic Log	Material Description	Remarks and Other Tests
0.0						**TOPSOIL** - dark brown, silty loam, moist, 250 mm	
0.5						**SANDY SILT** - brown, trace clay, trace gravel, moist to wet, compact	
1.0		1	50	10			*MC - 24.3%*
					1.37 m		
1.5						**SILT TILL** - brown to grey, some sand, trace clay, trace gravel, moist, compact to very dense	
2.0		2	50	11			*MC - 14.1%*
2.5		3	80	27			*MC - 13.8%*
3.0						- turn to grey	
3.5		4	60	88			*MC - 6.7%*
4.0							
4.5		5	30	50/100 mm			*MC - 6.0%*
5.0							
5.5							
6.0		6	50	50/75 mm			*MC - 6.5%*
					6.33 m		
6.5						BH Terminated at 6.33 m; BH observed open and dry upon completion of drilling.	
7.0							
7.5							
8.0							

Legend

- SPT Sample
- Bulk Sample
- Shelby Tube
- Stabilized Groundwater
- Inferred Groundwater

Well Construction Details

Pipe Diameter	**no well installed**
Installation Depth	
Screen Length	
Depth of Bentonite Seal	

Additional Notes

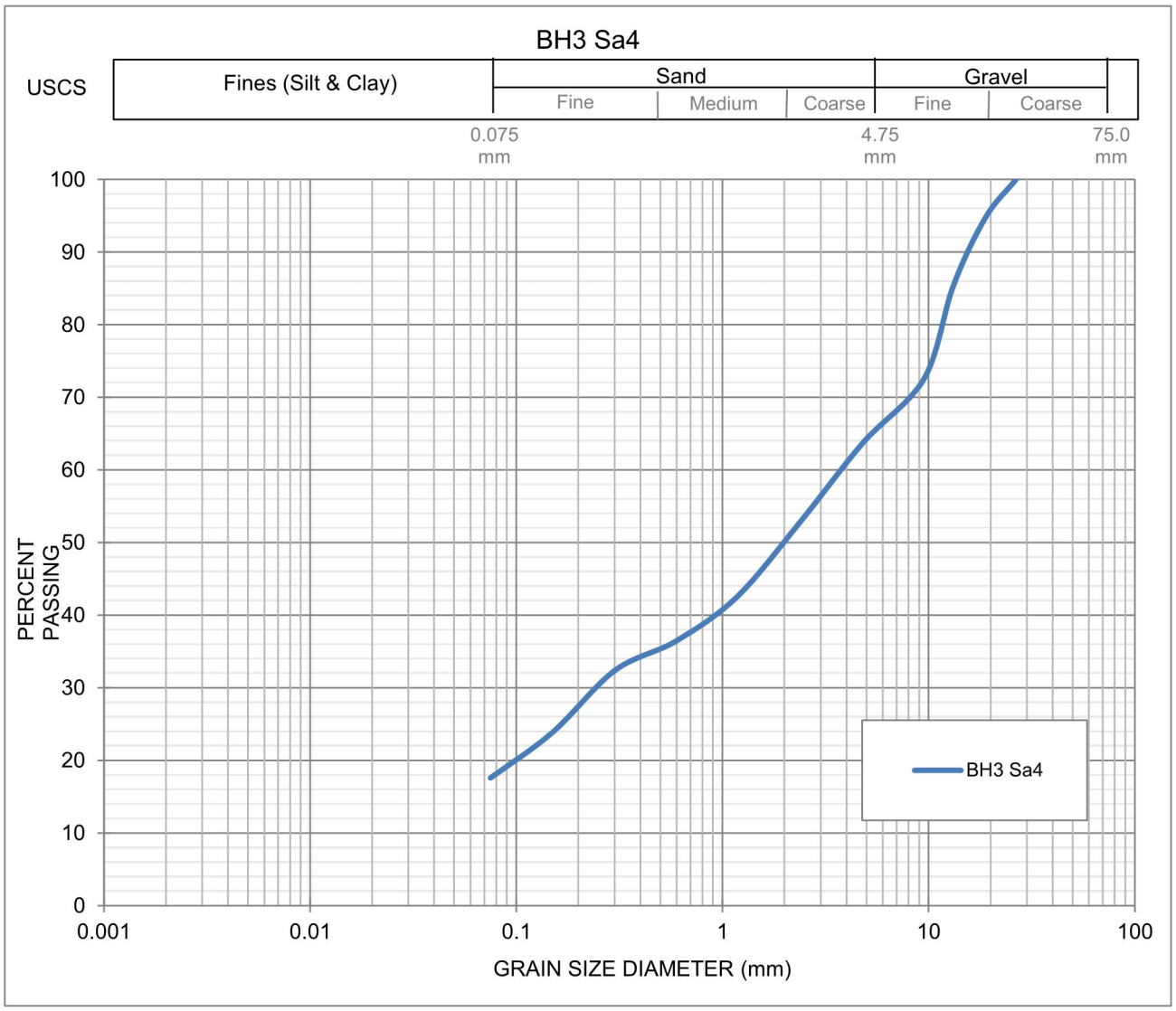
MC - denotes moisture content

Particle Size Distribution
Results of Sieve Analysis

Project Name: Geotechnical Investigation **Date:** 4-Feb-22

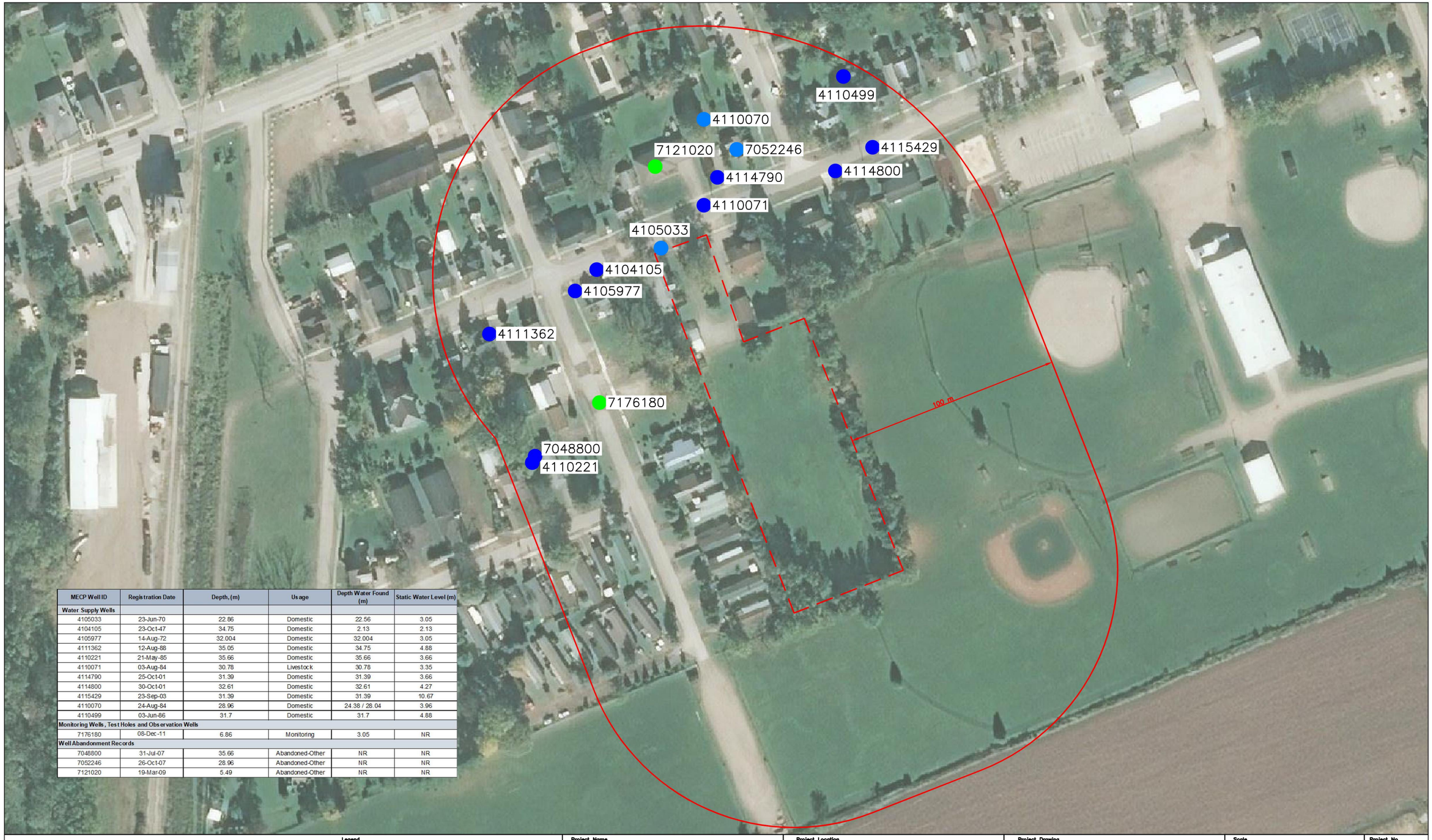
Project Location: 233 Upper Queen Street, Thorndale **Project No.:** GE-00630

Sample ID	Unified Soil Classification				Moisture Content (%)
	Fines (Silt & Clay)	% Sand	% Gravel	% Cobbles	
BH3 Sa4	17.6%	46.0%	36.4%	0.0%	8.0



APPENDIX C

MECP WELL RECORD SUMMARY



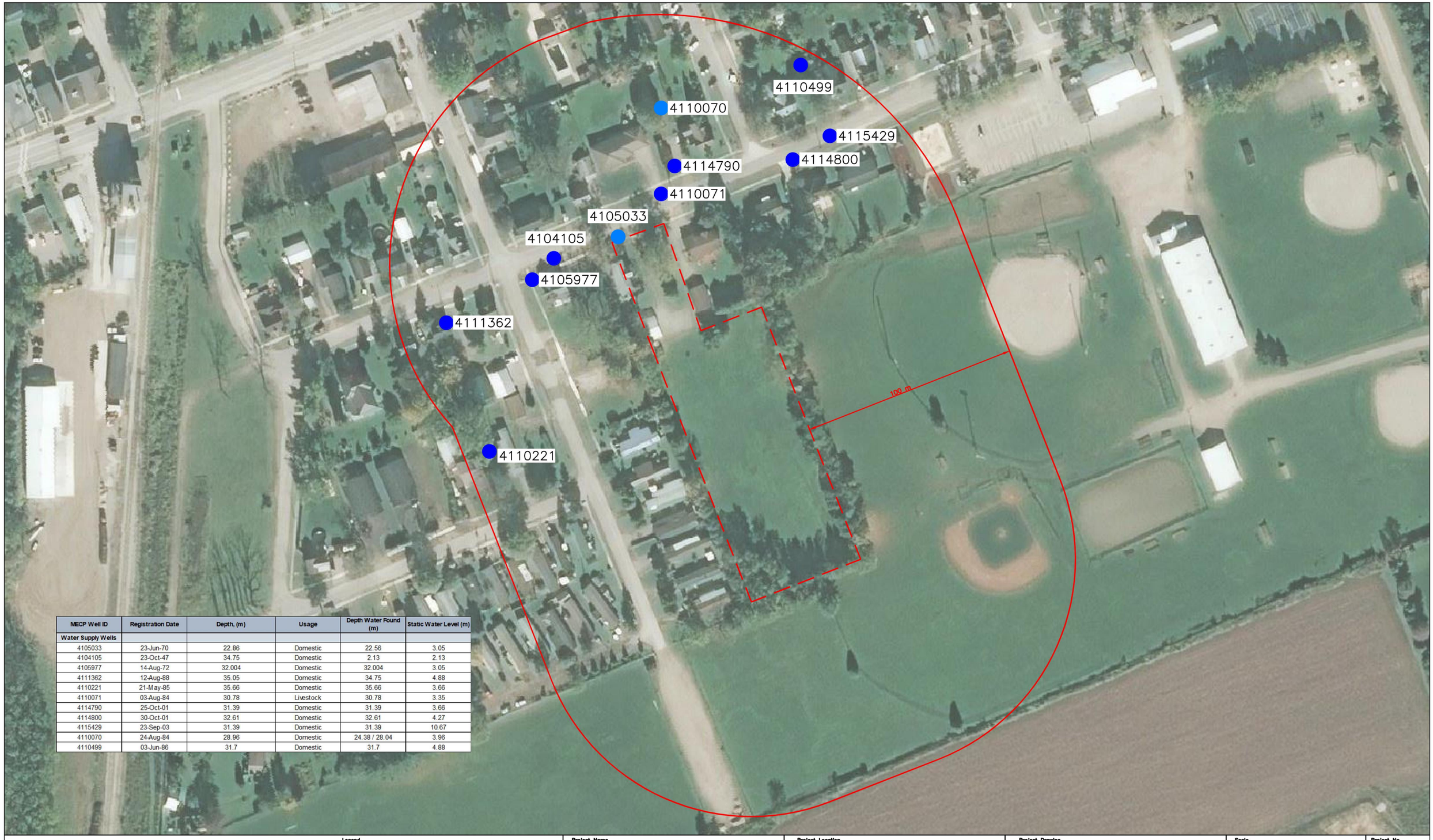
MECP Well ID	Registration Date	Depth, (m)	Usage	Depth Water Found (m)	Static Water Level (m)
Water Supply Wells					
4105033	23-Jun-70	22.86	Domestic	22.56	3.05
4104105	23-Oct-47	34.75	Domestic	2.13	2.13
4105977	14-Aug-72	32.004	Domestic	32.004	3.05
4111362	12-Aug-88	35.05	Domestic	34.75	4.88
4110221	21-May-85	35.66	Domestic	35.66	3.66
4110071	03-Aug-84	30.78	Livestock	30.78	3.35
4114790	25-Oct-01	31.39	Domestic	31.39	3.66
4114800	30-Oct-01	32.61	Domestic	32.61	4.27
4115429	23-Sep-03	31.39	Domestic	31.39	10.67
4110070	24-Aug-84	28.96	Domestic	24.38 / 28.04	3.96
4110499	03-Jun-86	31.7	Domestic	31.7	4.88
Monitoring Wells, Test Holes and Observation Wells					
7176180	08-Dec-11	6.86	Monitoring	3.05	NR
Well Abandonment Records					
7048800	31-Jul-07	35.66	Abandoned-Other	NR	NR
7052246	26-Oct-07	28.96	Abandoned-Other	NR	NR
7121020	19-Mar-09	5.49	Abandoned-Other	NR	NR

LDS

Legend

- DEEP WELL (>30m)
- INTERMEDIATE WELL (15–30m)
- SHALLOW WELL (<15m)
- NON RECORDED DEPTH WELL
- PROPERTY OUTLINE
- 100m RADIUS FROM PROPERTY OUTLINE

Project Name	Project Location	Project Drawing	Scale	Project No
GEOTECHNICAL INVESTIGATION	223 UPPER QUEEN STREET THORNDALE, ONTARIO	MECP WELL LOCATION PLAN	1:1600	GE–00630
			Date: FEB 2022	Drawing #: C1



MECP Well ID	Registration Date	Depth, (m)	Usage	Depth Water Found (m)	Static Water Level (m)
Water Supply Wells					
4105033	23-Jun-70	22.86	Domestic	22.56	3.05
4104105	23-Oct-47	34.75	Domestic	2.13	2.13
4105977	14-Aug-72	32.004	Domestic	32.004	3.05
4111362	12-Aug-88	35.05	Domestic	34.75	4.88
4110221	21-May-85	35.66	Domestic	35.66	3.66
4110071	03-Aug-84	30.78	Livestock	30.78	3.35
4114790	25-Oct-01	31.39	Domestic	31.39	3.66
4114800	30-Oct-01	32.61	Domestic	32.61	4.27
4115429	23-Sep-03	31.39	Domestic	31.39	10.67
4110070	24-Aug-84	28.96	Domestic	24.38 / 28.04	3.96
4110499	03-Jun-86	31.7	Domestic	31.7	4.88

LDS

Legend

- WATER SUPPLY WELL (>30m)
- WATER SUPPLY WELL (15–30m)
- PROPERTY OUTLINE
- 100m RADIUS FROM PROPERTY OUTLINE

Project Name

GEOTECHNICAL INVESTIGATION

Project Location

223 UPPER QUEEN STREET
THORNDALE, ONTARIO

Project Drawing

MECP WATER SUPPLY WELL
LOCATION PLAN

Scale

1:1600

Project No

GE–00630

Date

FEB 2022

Drawing #

C2

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