



March 18, 2020

LON-00017793-GE

Mr. Dan Wade, Vice President  
AGM Engineering Ltd.  
3514 White Oak Road  
London, Ontario  
N6E 2Z9

Attention: Mr. Wade

**Soil Assessment – Proposed Low Impact Development (LID)  
Stormwater Management Design  
Poplar Hill Subdivision, Coldstream, Ontario**

**Introduction**

As requested, an EXP representative attended the above-mentioned site to supervise the excavation of nine (9) test pits. The purpose of the program was to assess the sub-surface soil and groundwater conditions for the implementation of possible LID stormwater management design. Based on a draft plan of subdivision provided by the client, it is understood that the development will consist of ten (10) single family residential lots.

**Methodology**

On March 6, 2020, nine (9) test pits were excavated at various locations, using a back-hoe excavator. The test pits were terminated at depths of approximately 3.5 m to 4.6 m below ground surface (bgs). The locations of the test pits are shown on **Drawing 1**, appended.

During the excavation, the stratigraphy in the test pits was examined and logged in the field by EXP geotechnical personnel. Observations of groundwater seepage depths during excavation are recorded in **Appendix A**.

Following excavation of each test pit, groundwater observations were made. The test pits were then backfilled with the excavated material and surfaced with the reclaimed topsoil.

Representative samples of the various soil strata encountered at the test locations were taken to our laboratory in London for further examination by a Geotechnical Engineer and laboratory classification



testing. Laboratory testing for this investigation comprised five (5) grain size analyses with results presented in **Appendix B**.

The test pit locations were established in the field through UTM coordinates in conjunction with a site plan provided by the client. Ground surface elevations at the test pit locations were surveyed to top of 6" steel spike in east side of Hydro Pole B4T7MB at the south side of the intersection of Thirlwall Boulevard and Ilderton Road. The temporary benchmark was assigned an assumed elevation of 100.00 m.

### **Soil and Groundwater Conditions**

The detailed stratigraphy encountered in the test pits is shown in the test pit logs found in **Appendix A**, and summarized in the following paragraphs.

#### ***Topsoil***

Each test pit was surfaced with a layer of topsoil. The topsoil ranged in thickness between 150 mm and 300 mm.

*It should be noted that topsoil quantities should not be established from the information provided at the test pit locations only. If required, a more detailed analysis (involving additional shallow test pits) is recommended to accurately quantify the amount of topsoil to be removed for construction purposes.*

#### ***Sand***

Underlying the topsoil in Test Pits TP1 to TP3, TP5, TP6, TP8 and TP9 a sand layer was encountered. The brown sand contained trace to some silt, trace to some gravel, and extended to between 1.0 m and 1.5 m below ground surface (bgs). Based on tactile examination, the sand was described as moist.

#### ***Sand and Gravel***

Each test pit was terminated in a stratum of sand and gravel. The sand and gravel was brown in colour, contained trace silt, and was generally in a moist to very moist state (based on tactile examination) becoming wet between depths of 3.0 and 4.6 m bgs in moist of the test pits.

#### ***Groundwater Conditions***

Details of the groundwater conditions observed within the test pits are provided on the attached Test Pit Logs. Upon completion of excavation, the open test pit excavations were examined for the presence of groundwater and groundwater seepage. Upon completion of excavation, groundwater was measured between 3.5 m and 4.6 m bgs in Test Pits TP1 to TP5, TP7 and TP8. Test Pits TP6 and TP9 did not encounter groundwater to the depth of completion. Groundwater seepage was observed in Test Pits TP1 to TP5, TP7 and TP8 between 3.0 m and 4.6 m bgs during excavation..

It should be noted that insufficient time was available to measure to stabilized groundwater table. It is further noted that the depth to the groundwater table may vary in response to climatic or seasonal conditions, and as such, may differ at the time of construction, with higher levels in wet seasons. Capillary rise effects should also be anticipated in fine-grained soil deposits.

### **Low Impact Development (LID)**

It is understood that LID stormwater management design requires the practical availability of unsaturated, sufficiently pervious soil with depth and aerial extent to accommodate the infiltration of stormwater run-off created by land development.

Based on the information collected at the test pit locations, and the above cited criteria, the near surface soils encountered at the test pit locations have potential for use in LID stormwater management design. The following table summarizes the depths and assumed elevations where the upper surface of the sand/sand and gravel was encountered and the depth and assumed elevation of where groundwater seepage was observed. No underlying impervious soils were encountered in the test pit program.

**Table 1 – Low Impact Development Potential**

Test Pit No.	Assumed Ground Elevation (m)	Assumed Elevation of Top of Sand (m)	Assumed Elevation of Top of Sand and Gravel (m)	Assumed Shallow Groundwater Elevation (m)	Thickness of LID material above observed groundwater (m)	Thickness of LID Material Available for Design (m)
TP1	100.75	100.50	99.75	96.15	4.35	<b>3.35</b>
TP2	100.84	100.59	99.34	97.34	3.25	<b>2.25</b>
TP3	101.81	101.56	100.61	97.21	4.35	<b>3.35</b>
TP4	99.88	---	99.73	96.88	2.85	<b>1.85</b>
TP5	100.28	100.03	99.28	96.78	3.25	<b>2.25</b>
TP6	101.92	101.62	100.42	---	4.62 <sup>2</sup>	<b>3.62<sup>2</sup></b>
TP7	99.69	---	99.44	96.69	2.75	<b>1.75</b>
TP8	100.42	100.12	98.92	96.42	3.70	<b>2.70</b>
TP9	101.72	101.52	100.42	---	4.52 <sup>2</sup>	<b>3.52<sup>2</sup></b>

- Notes:
1. Assumed groundwater elevations are based on the depth of groundwater seepage encountered during test pit excavation on March 6, 2020.
  2. Groundwater seepage was not observed in Test Pits TP6 and TP9. Thickness of LID material assumes that water table is at an assumed elevation of 97.00 m.
  3. Depth of available LID material for design considers the recommended 1 m buffer above water table. Actual available LID material for design may vary from the above and can be verified through the installations of monitoring wells.

Five (5) grain size analyses were carried out samples obtained from the test pits advanced at the site: one (1) of the sand soil and four (4) of the sand and gravel deposits. The gradations are generally representative of the LID soils available at the site. The results are provided in **Appendix B**.

For consideration in design, based on the grain size distribution, the estimated hydraulic conductivity (K) of the sand was approximately  $5.4 \times 10^{-3}$  cm/s while the K value for the sand and gravel ranged between  $8.8 \times 10^{-2}$  cm/s and  $3.8 \times 10^{-1}$  cm/s. This corresponds with an estimated infiltration rate of 100 mm/hr in the sand and 260 mm/hr to 300 mm/hr in the sand and gravel. It is understood that recommended factors of safety will be applied to the estimated parameters cited above for use in design.

## General Comments

We trust that this letter is satisfactory for your present requirements. Should you have any questions regarding this matter, please do not hesitate to contact our office.

Yours very truly,

EXP Services Inc.



Eric M. Buchanan, P. Eng.  
Geotechnical Services



Botel Chiu, M. Eng., P. Eng.  
Vice President, Earth and Environment  
Southwestern Ontario

Attachments: Drawing 1 – Test Pit Location Plan  
Appendix A – Test Pit Logs  
Appendix B – Grain Size Analyses  
Appendix C – Limitations and Use of Report

Distribution: Mr. Dan Wade, Vice President dan@agm.com

EXP Services Inc.

*Client: AGM Engineering Ltd.  
Poplar Hill Subdivision – Coldstream, Ontario  
Project Number: LON-00017793-GE  
Date: March 18, 2020*

## Drawings





**-LEGEND-**

■ TP1 Approximate Test Pit Location

**-NOTES-**

1. The boundaries and soil types have been established only at test hole locations. Between test holes they are assumed and may be subject to considerable error.
2. Soil samples will be retained in storage for 3 months and then destroyed unless client advises that an extended time period is required.
3. Topsoil quantities should not be established from the information provided at the test hole locations.
4. The site plan was reproduced from Google Earth Pro and should be read in conjunction with EXP Geotechnical Report LON-00017793-GE.

**Geotechnical Investigation**  
**Poplar Wood Subdivision**  
 Coldstream, Ontario

<b>CLIENT</b> AGM Engineering Ltd.	
<b>TITLE</b> Test Pit Location Plan	
Prepared By: E.B.	Reviewed By: B.C.
<b>EXP Services Inc.</b> 15701 Robin's Hill Road, London, ON, N5V 0A5	
<b>DATE</b> MARCH 2020	<b>SCALE</b> NTS
<b>PROJECT NO.</b> LON-00017793-GE	<b>DWG.</b> 1

EXP Services Inc.

*Client: AGM Engineering Ltd.  
Poplar Hill Subdivision – Coldstream, Ontario  
Project Number: LON-00017793-GE  
Date: March 18, 2020*

## Appendix A – Test Pit Logs





# TEST PIT LOG

TP1

Sheet 1 of 1

PROJECT Poplar Woods Subdivision PROJECT NO. LON-00017793-GE  
 CLIENT AGM Engineering DATUM Local  
 LOCATION Coldstream, Ontario DATES: Excavation March 6, 2020 Water Level \_\_\_\_\_

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES			BULK DENSITY (kN/m <sup>3</sup> )	SHEAR STRENGTH			
					TYPE	NUMBER	RECOVERY (mm or %)		N VALUE (blows or RQD %)	S Field Vane Test (#=Sensitivity)		Atterberg Limits and Moisture
					▲ Penetrometer		■ Torvane		40	80 kPa		
					● SPT N Value		× Dynamic Cone		10	20	30	40
0	100.8	TOPSOIL - 250 mm										
	100.5	SAND - brown, trace silt, some gravel, moist										
1	99.8	SAND AND GRAVEL - brown, trace silt, moist to very moist										
2												
3												
4												
	96.2	- becoming wet near 4.6 m bgs End of Test Pit at 4.6 m bgs.		▼								
5												

**NOTES**  
 1) Test Pit Log interpretation requires assistance by EXP before use by others. Test Pit Log must be read in conjunction with EXP Report LON00017793-GE.  
 2) Groundwater measured near 4.6 m bgs upon completion of excavation.  
 3) Sidewalls stable upon completion of excavation.  
 4) bgs denotes below ground surface.  
 5) Elevations referenced from temporary benchmark set as nail at hydro pole (B4T7MB) at south side of the intersection of Thirlwall Boulevard and Iderton Road.

**SAMPLE LEGEND**  
 AS Auger Sample     SS Split Spoon     ST Shelby Tube  
 Rock Core (eg. BQ, NQ, etc.)     VN Vane Sample

**OTHER TESTS**  
 G Specific Gravity    C Consolidation  
 H Hydrometer    CD Consolidated Drained Triaxial  
 S Sieve Analysis    CU Consolidated Undrained Triaxial  
 γ Unit Weight    UU Unconsolidated Undrained Triaxial  
 P Field Permeability    UC Unconfined Compression  
 K Lab Permeability    DS Direct Shear

**WATER LEVELS**  
 ▽ Apparent    ▼ Measured    ▲ Artesian (see Notes)



# TEST PIT LOG

TP2

Sheet 1 of 1

PROJECT Poplar Woods Subdivision PROJECT NO. LON-00017793-GE  
 CLIENT AGM Engineering DATUM Local  
 LOCATION Coldstream, Ontario DATES: Excavation March 6, 2020 Water Level \_\_\_\_\_

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES			BULK DENSITY (kN/m <sup>3</sup> )	SHEAR STRENGTH						
					TYPE	NUMBER	RECOVERY (mm or %)		N VALUE (blows) or RQD (%)	◆ S Field Vane Test (#=Sensitivity)	▲ Penetrometer	■ Torvane	Atterberg Limits and Moisture		
	100.8								40	80	kPa				
0	100.6	TOPSOIL - 250 mm													
		SAND - brown, trace silt, trace gravel, moist													
-1															
	99.3	SAND AND GRAVEL - brown, trace silt, moist													
-2															
		- becoming wet near 3.5 m bgs		▽											
-3															
-4															
	96.2	End of Test Pit at 4.6 m bgs.													
-5															

**NOTES**

- 1) Test Pit Log interpretation requires assistance by EXP before use by others. Test Pit Log must be read in conjunction with EXP Report LON00017793-GE.
- 2) Groundwater measured near 4.0 m bgs upon completion of excavation.
- 3) Sidewalls stable upon completion of excavation.
- 4) bgs denotes below ground surface.
- 5) Elevations referenced from temporary benchmark set as nail at hydro pole (B4T7MB) at south side of the intersection of Thirlwall Boulevard and Iderton Road.

**SAMPLE LEGEND**

AS Auger Sample     SS Split Spoon     ST Shelby Tube  
 Rock Core (eg. BQ, NQ, etc.)     VN Vane Sample

**OTHER TESTS**

G Specific Gravity    C Consolidation  
 H Hydrometer    CD Consolidated Drained Triaxial  
 S Sieve Analysis    CU Consolidated Undrained Triaxial  
 γ Unit Weight    UU Unconsolidated Undrained Triaxial  
 P Field Permeability    UC Unconfined Compression  
 K Lab Permeability    DS Direct Shear

**WATER LEVELS**

▽ Apparent    ▼ Measured    ▲ Artesian (see Notes)



# TEST PIT LOG

TP3

Sheet 1 of 1

PROJECT Poplar Woods Subdivision PROJECT NO. LON-00017793-GE  
 CLIENT AGM Engineering DATUM Local  
 LOCATION Coldstream, Ontario DATES: Excavation March 6, 2020 Water Level \_\_\_\_\_

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES			BULK DENSITY (kN/m <sup>3</sup> )	SHEAR STRENGTH					
					TYPE	NUMBER	RECOVERY (mm or %)		N VALUE (blows or RQD %)	◆ S Field Vane Test (#=Sensitivity)	▲ Penetrometer	■ Torvane	Atterberg Limits and Moisture	
	101.8								40	80 kPa				
0	101.6	TOPSOIL - 250 mm												
		SAND - brown, trace silt, trace gravel, moist												
1	100.6	SAND AND GRAVEL - brown, trace silt, moist												
2														
3														
4														
	97.2	- becoming wet near 4.6 m bgs End of Test Pit at 4.6 m bgs.		▼										
5														

**NOTES**

- 1) Test Pit Log interpretation requires assistance by EXP before use by others. Test Pit Log must be read in conjunction with EXP Report LON00017793-GE.
- 2) Groundwater measured near 4.6 m bgs upon completion of excavation.
- 3) Sidewalls stable upon completion of excavation.
- 4) bgs denotes below ground surface.
- 5) Elevations referenced from temporary benchmark set as nail at hydro pole (B4T7MB) at south side of the intersection of Thirlwall Boulevard and Iderton Road.

**SAMPLE LEGEND**

AS Auger Sample     SS Split Spoon     ST Shelby Tube  
 Rock Core (eg. BQ, NQ, etc.)     VN Vane Sample

**OTHER TESTS**

G Specific Gravity    C Consolidation  
 H Hydrometer    CD Consolidated Drained Triaxial  
 S Sieve Analysis    CU Consolidated Undrained Triaxial  
 γ Unit Weight    UU Unconsolidated Undrained Triaxial  
 P Field Permeability    UC Unconfined Compression  
 K Lab Permeability    DS Direct Shear

**WATER LEVELS**

▽ Apparent    ▼ Measured    ▲ Artesian (see Notes)



# TEST PIT LOG

TP4

Sheet 1 of 1

PROJECT Poplar Woods Subdivision PROJECT NO. LON-00017793-GE  
 CLIENT AGM Engineering DATUM Local  
 LOCATION Coldstream, Ontario DATES: Excavation March 6, 2020 Water Level \_\_\_\_\_

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES			BULK DENSITY (kN/m <sup>3</sup> )	SHEAR STRENGTH	
					TYPE	NUMBER	RECOVERY (mm or %)		N VALUE (blows or RQD %)	◆ S Field Vane Test (#=Sensitivity)
0	99.9	TOPSOIL - 150 mm							40	80 kPa
	99.7	SAND AND GRAVEL - brown, trace silt, moist								
		- becoming wet near 3.0 m bgs		▽						
	96.4	End of Test Pit at 3.5 m bgs.		▼						
1										
2										
3										
4										
5										

**NOTES**

- Test Pit Log interpretation requires assistance by EXP before use by others. Test Pit Log must be read in conjunction with EXP Report LON00017793-GE.
- Groundwater measured near 3.5 m bgs upon completion of excavation.
- Sidewalls unstable during excavation.
- bgs denotes below ground surface.
- Elevations referenced from temporary benchmark set as nail at hydro pole (B4T7MB) at south side of the intersection of Thirlwall Boulevard and Iderton Road.

**SAMPLE LEGEND**

AS Auger Sample     SS Split Spoon     ST Shelby Tube  
 Rock Core (eg. BQ, NQ, etc.)     VN Vane Sample

**OTHER TESTS**

G Specific Gravity    C Consolidation  
 H Hydrometer    CD Consolidated Drained Triaxial  
 S Sieve Analysis    CU Consolidated Undrained Triaxial  
 γ Unit Weight    UU Unconsolidated Undrained Triaxial  
 P Field Permeability    UC Unconfined Compression  
 K Lab Permeability    DS Direct Shear

**WATER LEVELS**

▽ Apparent    ▼ Measured    ▲ Artesian (see Notes)



# TEST PIT LOG

TP5

Sheet 1 of 1

PROJECT Poplar Woods Subdivision PROJECT NO. LON-00017793-GE  
 CLIENT AGM Engineering DATUM Local  
 LOCATION Coldstream, Ontario DATES: Excavation March 6, 2020 Water Level \_\_\_\_\_

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES			BULK DENSITY (kN/m <sup>3</sup> )	SHEAR STRENGTH				
					TYPE	NUMBER	RECOVERY (mm or %)		N VALUE (blows) or RQD (%)	◆ S Field Vane Test (#=Sensitivity)	▲ Penetrometer	■ Torvane	Atterberg Limits and Moisture
	100.3								40	80	kPa		
	100.0	TOPSOIL - 250 mm											
		SAND - brown, trace silt, trace gravel, moist											
	99.3	SAND AND GRAVEL - brown, trace silt, moist											
		- becoming wet near 3.5 m bgs		▽									
	96.3	End of Test Pit at 4.0 m bgs.		▼									

**NOTES**

- 1) Test Pit Log interpretation requires assistance by EXP before use by others. Test Pit Log must be read in conjunction with EXP Report LON00017793-GE.
- 2) Groundwater measured near 4.0 m bgs upon completion of excavation.
- 3) Sidewalls unstable during excavation.
- 4) bgs denotes below ground surface.
- 5) Elevations referenced from temporary benchmark set as nail at hydro pole (B4T7MB) at south side of the intersection of Thirlwall Boulevard and Iderton Road.

**SAMPLE LEGEND**

AS Auger Sample     SS Split Spoon     ST Shelby Tube  
 Rock Core (eg. BQ, NQ, etc.)     VN Vane Sample

**OTHER TESTS**

G Specific Gravity    C Consolidation  
 H Hydrometer    CD Consolidated Drained Triaxial  
 S Sieve Analysis    CU Consolidated Undrained Triaxial  
 γ Unit Weight    UU Unconsolidated Undrained Triaxial  
 P Field Permeability    UC Unconfined Compression  
 K Lab Permeability    DS Direct Shear

**WATER LEVELS**

▽ Apparent    ▼ Measured    ▲ Artesian (see Notes)



# TEST PIT LOG

TP6

Sheet 1 of 1

PROJECT Poplar Woods Subdivision PROJECT NO. LON-00017793-GE  
 CLIENT AGM Engineering DATUM Local  
 LOCATION Coldstream, Ontario DATES: Excavation March 6, 2020 Water Level \_\_\_\_\_

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES			BULK DENSITY (kN/m <sup>3</sup> )	SHEAR STRENGTH							
					TYPE	NUMBER	RECOVERY (mm or %)		N VALUE (blows) or RQD (%)	◆ S Field Vane Test (#=Sensitivity)	▲ Penetrometer	■ Torvane	Atterberg Limits and Moisture			
									40	80	kPa	W <sub>p</sub>	W	W <sub>L</sub>	● SPT N Value	× Dynamic Cone
									10	20					30	40
0	101.9	TOPSOIL - 300 mm														
	101.6	SAND - brown, trace silt, trace gravel, moist														
	100.4	SAND AND GRAVEL - brown, trace silt, moist														
	97.3	- becoming very moist near 4.6 m bgs End of Test Pit at 4.6 m bgs.														

**NOTES**

- 1) Test Pit Log interpretation requires assistance by EXP before use by others. Test Pit Log must be read in conjunction with EXP Report LON00017793-GE.
- 2) No groundwater seepage encountered.
- 3) Sidewalls stable upon completion of excavation.
- 4) bgs denotes below ground surface.
- 5) Elevations referenced from temporary benchmark set as nail at hydro pole (B4T7MB) at south side of the intersection of Thirlwall Boulevard and Iderton Road.

**SAMPLE LEGEND**

AS Auger Sample     SS Split Spoon     ST Shelby Tube  
 Rock Core (eg. BQ, NQ, etc.)     VN Vane Sample

**OTHER TESTS**

G Specific Gravity    C Consolidation  
 H Hydrometer    CD Consolidated Drained Triaxial  
 S Sieve Analysis    CU Consolidated Undrained Triaxial  
 γ Unit Weight    UU Unconsolidated Undrained Triaxial  
 P Field Permeability    UC Unconfined Compression  
 K Lab Permeability    DS Direct Shear

**WATER LEVELS**

Apparent     Measured     Artesian (see Notes)







# TEST PIT LOG

TP8

Sheet 1 of 1

PROJECT Poplar Woods Subdivision PROJECT NO. LON-00017793-GE  
 CLIENT AGM Engineering DATUM Local  
 LOCATION Coldstream, Ontario DATES: Excavation March 6, 2020 Water Level \_\_\_\_\_

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES			BULK DENSITY (kN/m <sup>3</sup> )	SHEAR STRENGTH							
					TYPE	NUMBER	RECOVERY (mm or %)		N VALUE (blows or RQD %)	◆ S Field Vane Test (#=Sensitivity)	▲ Penetrometer	■ Torvane	Atterberg Limits and Moisture			
	100.4								40	80	kPa	W <sub>p</sub>	W	W <sub>L</sub>	● SPT N Value	× Dynamic Cone
	100.1	TOPSOIL - 300 mm														
		SAND - brown, trace silt, trace gravel, moist														
	98.9	SAND AND GRAVEL - brown, trace silt, moist														
		- becoming wet near 4.0 m bgs		▼												
	95.8	End of Test Pit at 4.6 m bgs.														

**NOTES**

- 1) Test Pit Log interpretation requires assistance by EXP before use by others. Test Pit Log must be read in conjunction with EXP Report LON00017793-GE.
- 2) Groundwater measured near 4.0 m bgs upon completion of excavation.
- 3) Sidewalls stable upon completion of excavation.
- 4) bgs denotes below ground surface.
- 5) Elevations referenced from temporary benchmark set as nail at hydro pole (B4T7MB) at south side of the intersection of Thirlwall Boulevard and Iderton Road.

**SAMPLE LEGEND**

AS Auger Sample     SS Split Spoon     ST Shelby Tube  
 Rock Core (eg. BQ, NQ, etc.)     VN Vane Sample

**OTHER TESTS**

G Specific Gravity    C Consolidation  
 H Hydrometer    CD Consolidated Drained Triaxial  
 S Sieve Analysis    CU Consolidated Undrained Triaxial  
 γ Unit Weight    UU Unconsolidated Undrained Triaxial  
 P Field Permeability    UC Unconfined Compression  
 K Lab Permeability    DS Direct Shear

**WATER LEVELS**

▽ Apparent    ▼ Measured    ▲ Artesian (see Notes)



# TEST PIT LOG

TP9

Sheet 1 of 1

PROJECT Poplar Woods Subdivision PROJECT NO. LON-00017793-GE  
 CLIENT AGM Engineering DATUM Local  
 LOCATION Coldstream, Ontario DATES: Excavation March 6, 2020 Water Level \_\_\_\_\_

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES				BULK DENSITY (kN/m <sup>3</sup> )	SHEAR STRENGTH									
					TYPE	NUMBER	RECOVERY (mm or %)	N VALUE (blows or RQD %)		◆ S Field Vane Test (#=Sensitivity)	▲ Penetrometer	■ Torvane	Atterberg Limits and Moisture		● SPT N Value	× Dynamic Cone			
										40	80 kPa	W <sub>p</sub>	W	W <sub>L</sub>	10	20	30	40	
0	101.7																		
	101.5	TOPSOIL - 200 mm																	
		SAND - brown, some silt, trace gravel, moist																	
	100.4	SAND AND GRAVEL - brown, trace silt, moist																	
	97.1	- becoming very moist near 4.6 m bgs End of Test Pit at 4.6 m bgs.																	
5																			

**NOTES**

- 1) Test Pit Log interpretation requires assistance by EXP before use by others. Test Pit Log must be read in conjunction with EXP Report LON00017793-GE.
- 2) No groundwater seepage encountered.
- 3) Sidewalls stable upon completion of excavation.
- 4) bgs denotes below ground surface.
- 5) Elevations referenced from temporary benchmark set as nail at hydro pole (B4T7MB) at south side of the intersection of Thirlwall Boulevard and Iderton Road.

**SAMPLE LEGEND**

AS Auger Sample     SS Split Spoon     ST Shelby Tube  
 Rock Core (eg. BQ, NQ, etc.)     VN Vane Sample

**OTHER TESTS**

G Specific Gravity    C Consolidation  
 H Hydrometer    CD Consolidated Drained Triaxial  
 S Sieve Analysis    CU Consolidated Undrained Triaxial  
 γ Unit Weight    UU Unconsolidated Undrained Triaxial  
 P Field Permeability    UC Unconfined Compression  
 K Lab Permeability    DS Direct Shear

**WATER LEVELS**

Apparent     Measured     Artesian (see Notes)

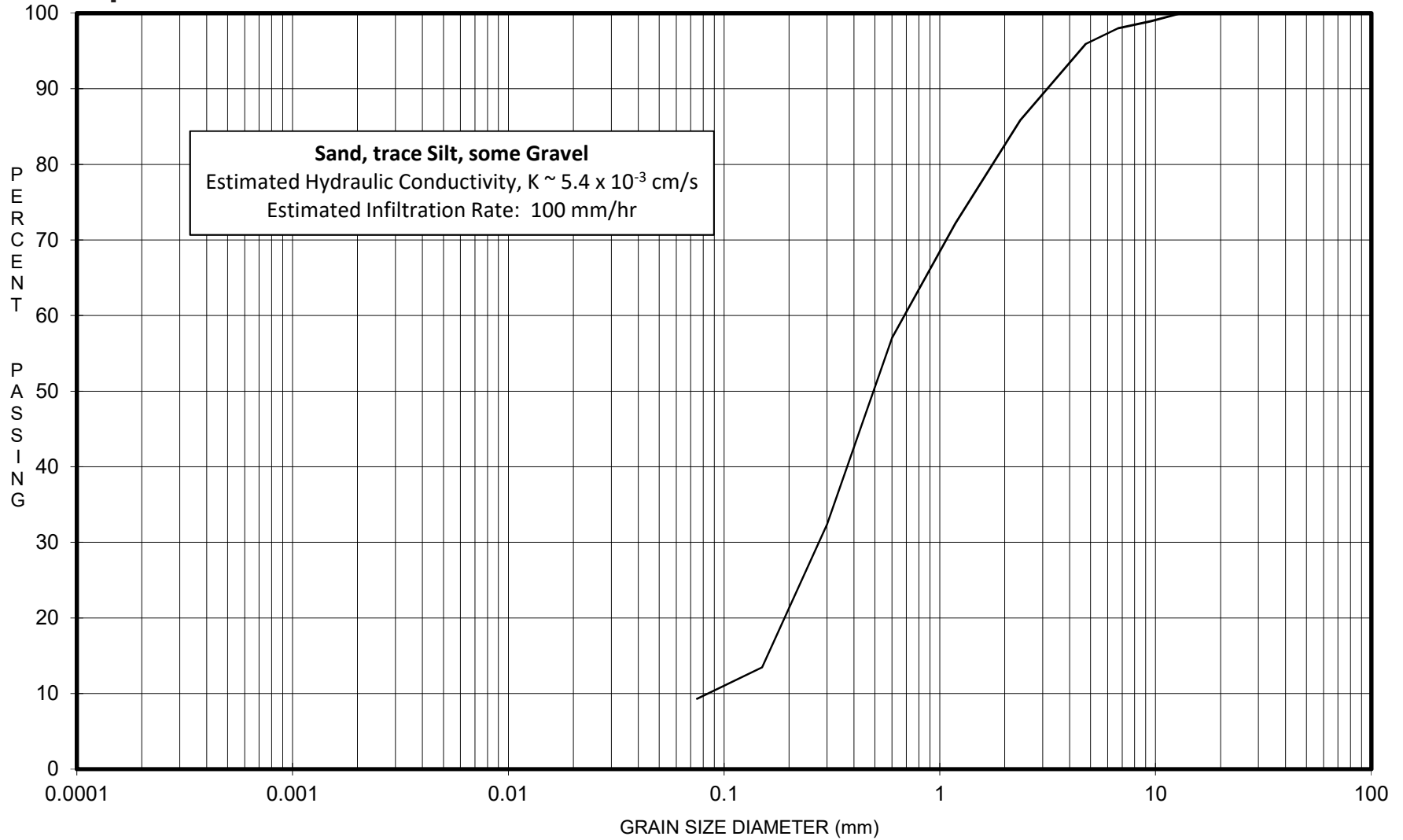
EXP Services Inc.

*Client: AGM Engineering Ltd.  
Poplar Hill Subdivision – Coldstream, Ontario  
Project Number: LON-00017793-GE  
Date: March 18, 2020*

## **Appendix B – Grain Size Analyses**



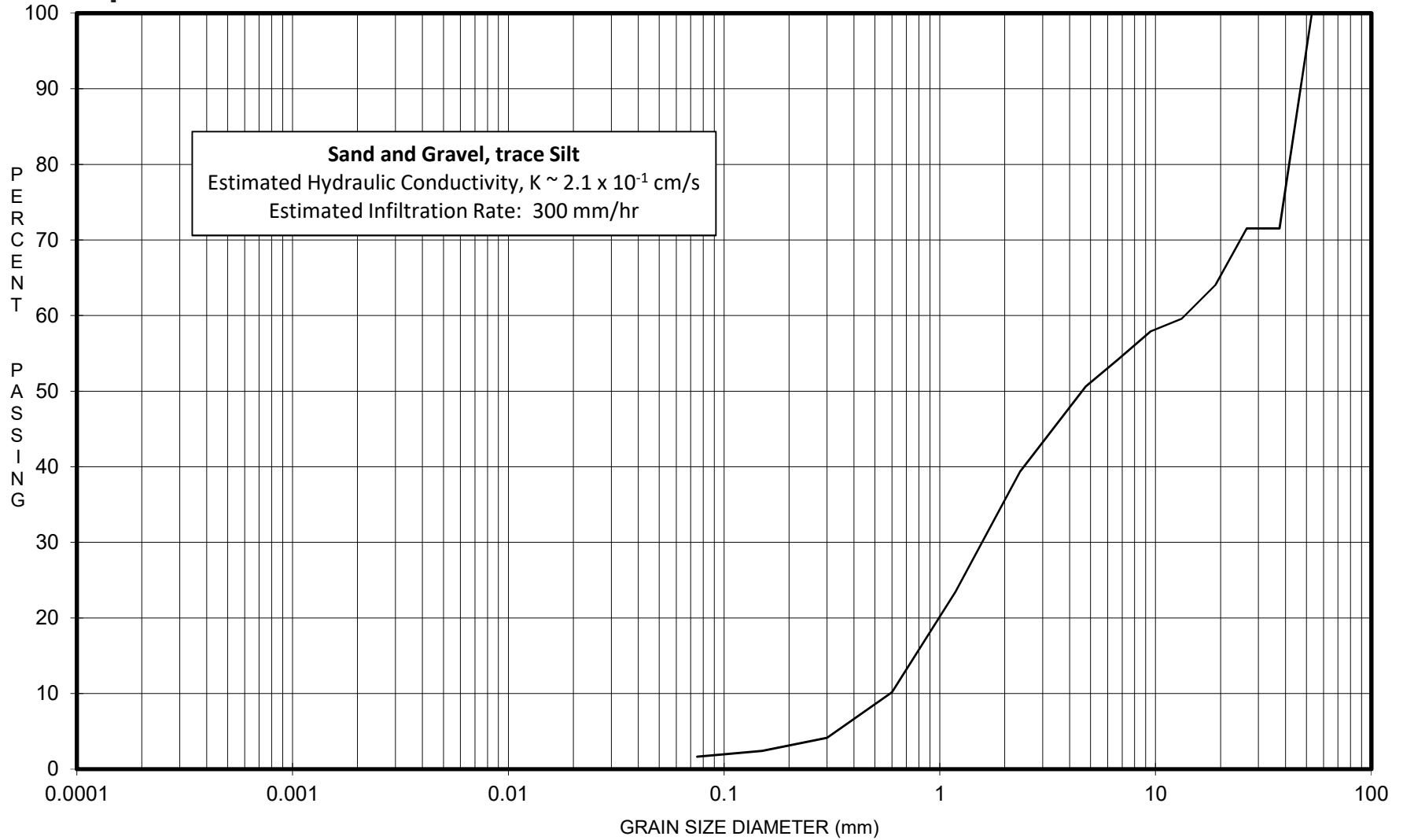
# MECHANICAL GRAIN SIZE ANALYSIS



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	
	SILT			SAND			GRAVEL			
MODIFIED M.I.T. CLASSIFICATION	<b>Sample Description: Sand (TP1 S1, 0.0 - 1.5 m depth)</b>						<b>Poplar Woods Subdivision Project: LON-00017793-GE</b>			<b>Figure 1</b>



# MECHANICAL GRAIN SIZE ANALYSIS

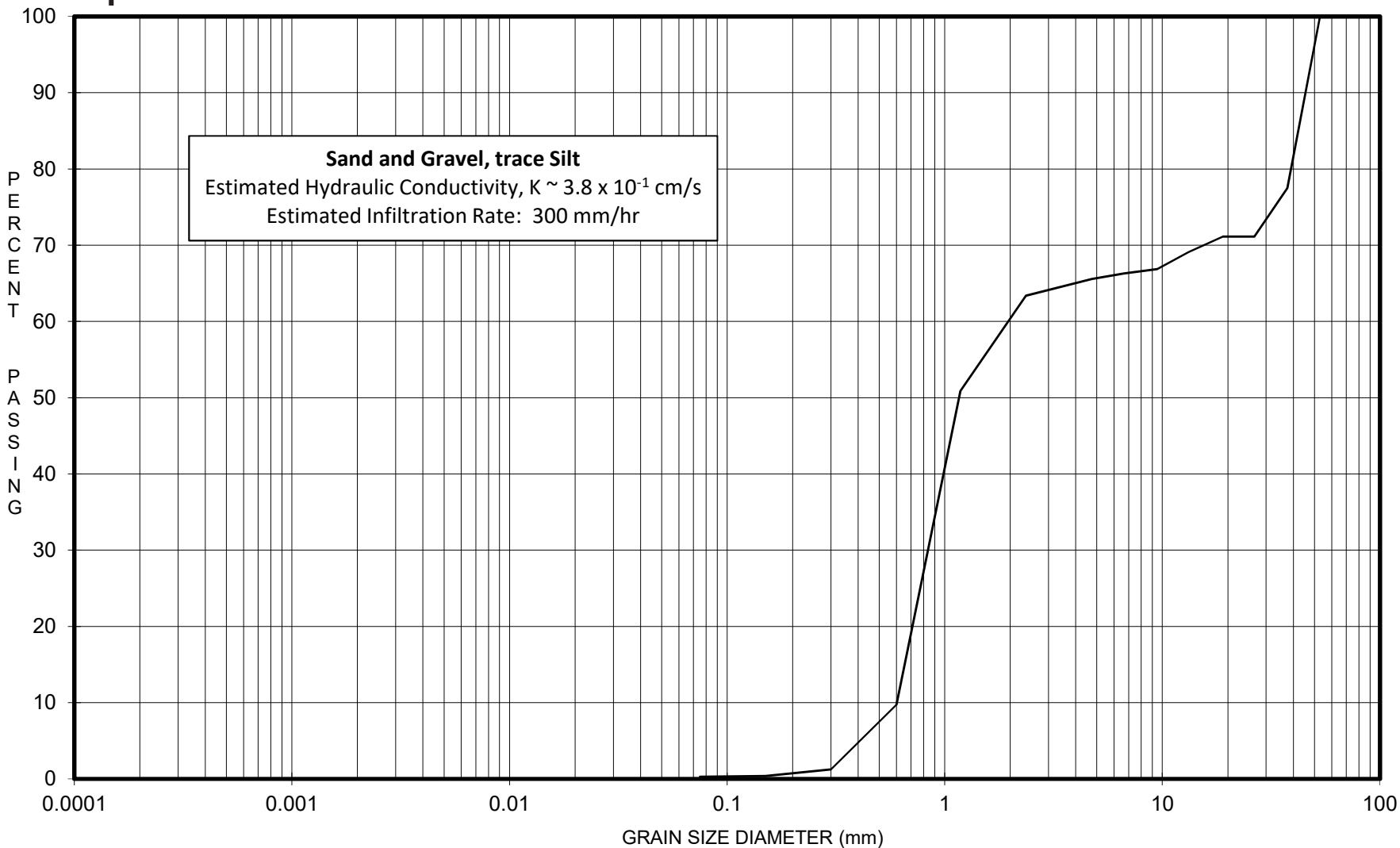


CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE
	SILT			SAND			GRAVEL		
MODIFIED M.I.T. CLASSIFICATION	<b>Sample Description: Sand and Gravel (TP1 S3, 3.0 - 4.6 m depth)</b>					<b>Poplar Woods Subdivision Project: LON-00017793-GE</b>			<b>Figure 2</b>





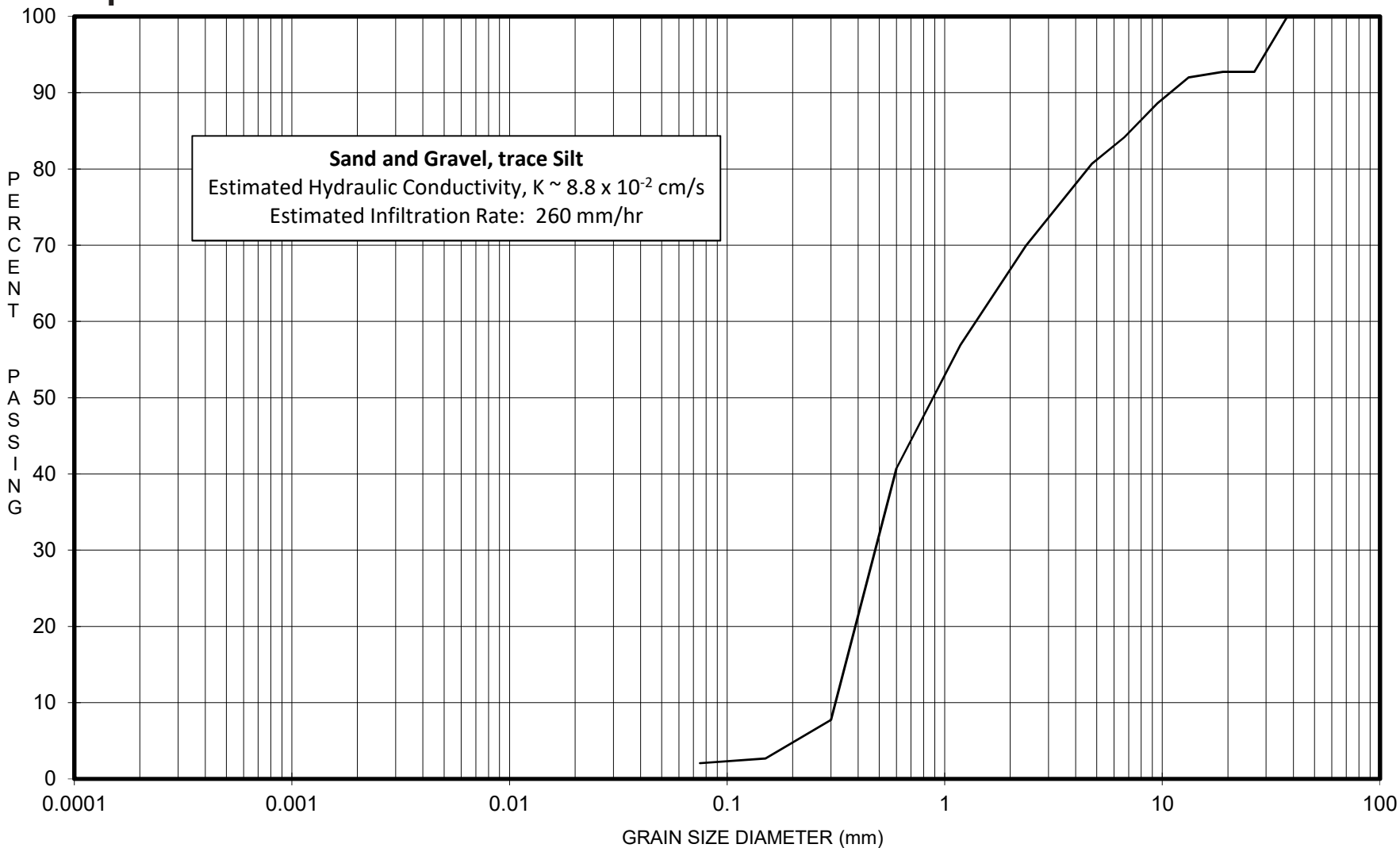
# MECHANICAL GRAIN SIZE ANALYSIS



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE
	SILT			SAND			GRAVEL		
MODIFIED M.I.T. CLASSIFICATION	<b>Sample Description:</b> <b>Sand and Gravel (TP6 S3, 3.0 - 4.6 m depth)</b>					<b>Poplar Woods Subdivision</b> <b>Project: LON-00017793-GE</b>			<b>Figure 3</b>



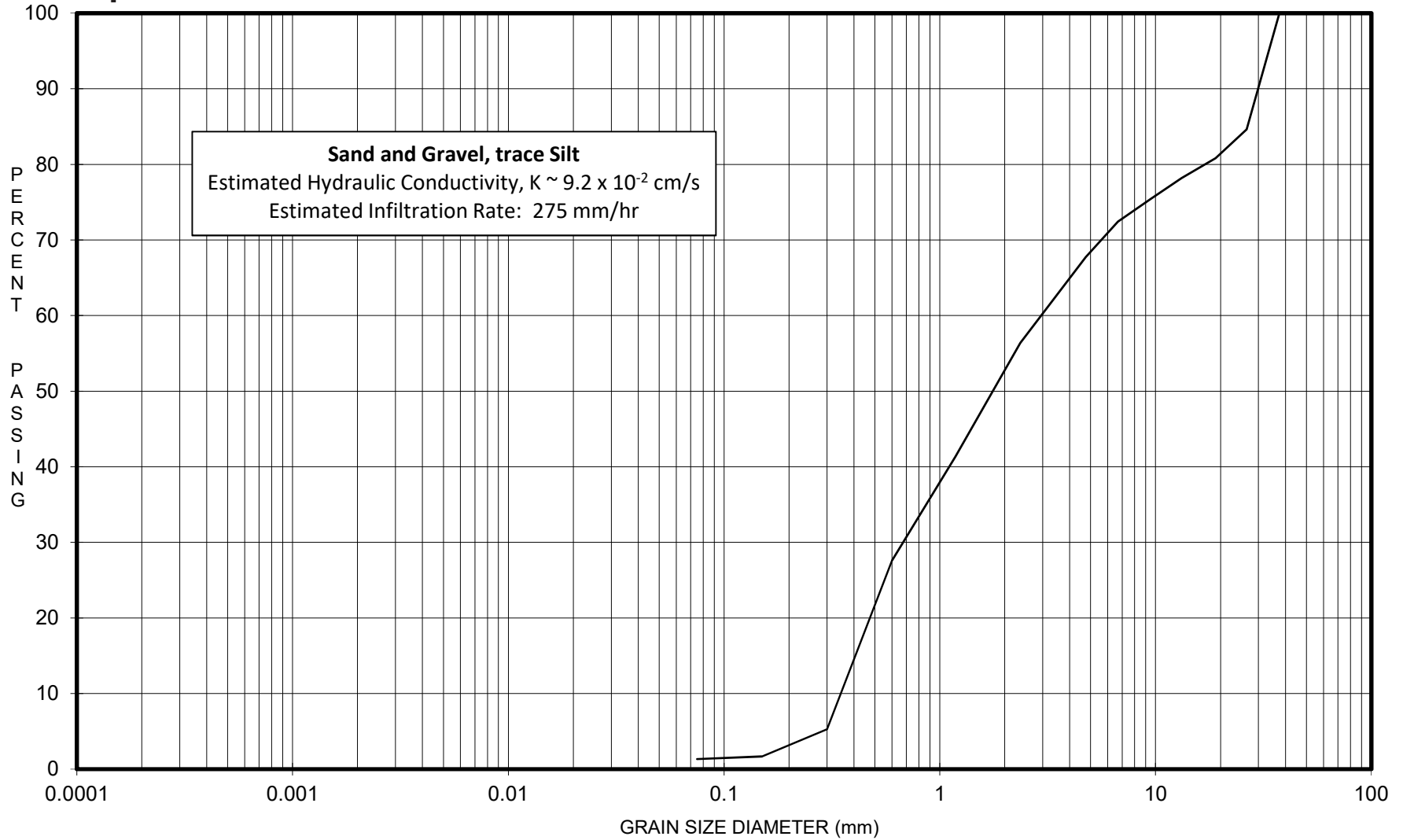
# MECHANICAL GRAIN SIZE ANALYSIS



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE
	SILT			SAND			GRAVEL		
MODIFIED M.I.T. CLASSIFICATION	<b>Sample Description: Sand and Gravel (TP7 S1, 0.0 - 1.5 m depth)</b>					<b>Poplar Woods Subdivision Project: LON-00017793-GE</b>			<b>Figure 4</b>



# MECHANICAL GRAIN SIZE ANALYSIS



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE
	SILT			SAND			GRAVEL		
MODIFIED M.I.T. CLASSIFICATION	<b>Sample Description:</b> Sand and Gravel (TP7 S2, 1.5 - 3.0 m depth)					<b>Poplar Woods Subdivision</b> <b>Project: LON-00017793-GE</b>			<b>Figure 5</b>

EXP Services Inc.

*Client: AGM Engineering Ltd.  
Poplar Hill Subdivision – Coldstream, Ontario  
Project Number: LON-00017793-GE  
Date: March 18, 2020*

## **Appendix C – Limitations and Use of Report**

## **LIMITATIONS AND USE OF REPORT**

### **BASIS OF REPORT**

This report (“Report”) is based on site conditions known or inferred by the geotechnical investigation undertaken as of the date of the Report. Should changes occur which potentially impact the geotechnical condition of the site, or if construction is implemented more than one year following the date of the Report, the recommendations of exp may require re-evaluation.

The Report is provided solely for the guidance of design engineers and on the assumption that the design will be in accordance with applicable codes and standards. Any changes in the design features which potentially impact the geotechnical analyses or issues concerning the geotechnical aspects of applicable codes and standards will necessitate a review of the design by exp. Additional field work and reporting may also be required.

Where applicable, recommended field services are the minimum necessary to ascertain that construction is being carried out in general conformity with building code guidelines, generally accepted practices and exp’s recommendations. Any reduction in the level of services recommended will result in exp providing qualified opinions regarding the adequacy of the work. exp can assist design professionals or contractors retained by the Client to review applicable plans, drawings, and specifications as they relate to the Report or to conduct field reviews during construction.

Contractors contemplating work on the site are responsible for conducting an independent investigation and interpretation of the borehole results contained in the Report. The number of boreholes necessary to determine the localized underground conditions as they impact construction costs, techniques, sequencing, equipment and scheduling may be greater than those carried out for the purpose of the Report.

Classification and identification of soils, rocks, geological units, contaminant materials, building envelopment assessments, and engineering estimates are based on investigations performed in accordance with the standard of care set out below and require the exercise of judgment. As a result, even comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel may fail to locate some conditions. All investigations or building envelope descriptions involve an inherent risk that some conditions will not be detected. All documents or records summarizing investigations are based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated. Some conditions are subject to change over time. The Report presents the conditions at the sampled points at the time of sampling. Where special concerns exist, or the Client has special considerations or requirements, these should be disclosed to exp to allow for additional or special investigations to be undertaken not otherwise within the scope of investigation conducted for the purpose of the Report.

### **RELIANCE ON INFORMATION PROVIDED**

The evaluation and conclusions contained in the Report are based on conditions in evidence at the time of site inspections and information provided to exp by the Client and others. The Report has been prepared for the specific site, development, building, design or building assessment objectives and purpose as communicated by the Client. exp has relied in good faith upon such representations, information and instructions and accepts no responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of any misstatements, omissions, misrepresentation or fraudulent acts of persons providing information. Unless specifically stated otherwise, the applicability and reliability of the findings, recommendations, suggestions or opinions expressed in the Report are only valid to the extent that there has been no material alteration to or variation from any of the information provided to exp.

### **STANDARD OF CARE**

The Report has been prepared in a manner consistent with the degree of care and skill exercised by engineering consultants currently practicing under similar circumstances and locale. No other warranty, expressed or implied, is made. Unless specifically stated otherwise, the Report does not contain environmental consulting advice.

### **COMPLETE REPORT**

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment form part of the Report. This material includes, but is not limited to, the terms of reference given to exp by its client (“Client”), communications between exp and the Client, other reports, proposals or documents prepared by exp for the Client in connection with the site described in the Report. In order to properly understand the suggestions, recommendations and opinions expressed in the Report, reference must be made to the Report in its entirety. exp is not responsible for use by any party of portions of the Report.