



# Terraprobe

Consulting Geotechnical & Environmental Engineering  
Construction Materials Inspection & Testing

September 22, 2015

File No. 1-15-0441  
Brampton Office

590816 Ontario limited  
c/o G. Merulla Inc.  
2616 Cynara Road  
Mississauga, Ontario  
L5B 2R7

Attention: Mr. Frank Merulla

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**RE: TEST PIT INVESTIGATION  
PERCOLATION RATE (T-TIME) ANALYSIS  
PROPOSED SEPTIC BED  
2935 & 2955 MISSISSAUGA ROAD  
MISSISSAUGA**

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Dear Mr. Merulla:

Terraprobe Inc. was retained by 590816 Ontario Limited c/o G. Merulla to conduct a test pit investigation at the above noted site located in the southeast quadrant of the intersection of Mississauga Road and Dundas Street West, in the City of Mississauga, Ontario (Figure 1). The municipal addresses of the properties are 2935 and 2955 Mississauga Road, Mississauga. The objective of the investigation was to obtain subsurface soil samples from the test pit locations to determine Soil Percolation Rate ('T-Time') for the future septic beds (one septic bed for each property).

Terraprobe previously completed a geotechnical investigation and slope stability and stream bank erosion analysis for the property which consisted of advancing a total of four (4) boreholes extending to depths varying from about 7.5 to 9.0 m below existing grade. The results of this investigation were presented in our Geotechnical Investigation Report (File No. 1-08-3220, dated September 4, 2008).

The test pit investigation was conducted on July 22 and 27, 2015 comprising a total of four (4) test pits (Test Pits 1 to 4), excavated to depths varying from 2.3 to 2.9 m below existing grade.

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**Terraprobe Inc.**

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903 Barton Street, Unit 22  
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220 Bayview Drive, Unit 25  
Barrie, Ontario L4N 4Y8  
(705) 739-8355 Fax: 739-8369

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1012 Kelly Lake Rd., Unit 1  
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[www.terraprobe.ca](http://www.terraprobe.ca)

Test Pits 1 and 2 were excavated in the general area of the proposed septic bed footprint at 2935 Mississauga Road, while Test Pits 3 and 4 were excavated within the proposed septic bed area at 2955 Mississauga Road. The test pit locations were finalized and established by Terraprobe in consultation with the client. The locations of test pits are provided on Figure 2.

Test pits were excavated using a rubber tire backhoe by an excavation contractor retained by the client. The field investigation was conducted under the full time supervision of a member of our field engineering staff who logged the test pits and examined the soil samples as obtained. All test pits remained open and dry upon completion of the excavation. Soil samples were obtained from the test pits and sealed in clean plastic bags and transported to our geotechnical laboratory for Sieve and Hydrometer (grain size) analysis. A Sieve and Hydrometer analysis was carried on four (4) selected soil samples (Test Pit 1, Sample 3; Test Pit 2, Sample 4, Test Pit 3, Sample 3 and Test Pit 4, Sample 4) to estimate percolation rates (T-Time') for each soil sample. Based on the soil gradation curve, percolation rates were estimated. The results of the analysis and percolation rates (T-Time') are appended and summarized below:

Test Pit No.	Sample		Soil Description		Estimated Percolation Rate ("T-time")	Estimated Permeability
	No.	Depth below Grade	MIT	Unified Soil Classification System		
1	3	1.2 m	SILT AND SAND, some clay, trace gravel	ML (Inorganic silt and very fine sand)	30 min/cm	10 <sup>-7</sup> cm/sec or less
2	4	1.7 m	SANDY SILT, some clay, some gravel	ML (Inorganic silt and very fine sand)	35 min/cm	10 <sup>-7</sup> cm/sec or less
3	3	1.7 m	SANDY SILT, some clay, some gravel	ML (Inorganic silt and very fine sand)	35 min/cm	10 <sup>-7</sup> cm/sec or less
4	4	2.3 m	SILTY SAND, gravelly, some clay	SM (silty sand, sand silt mixtures)	20 min/cm	10 <sup>-5</sup> cm/sec

Based on the soil gradation curves test results for the samples analyzed, the soil composition varied from sandy silt to silt and sand to silty sand with trace gravel to gravelly and some clay. Under the Unified Soil Classification System, three (3) soil samples (Test Pit 1, Sample 3; Test Pit 2, Sample 4 and Test Pit 3, Sample 3) are classified as ML (inorganic silt and very fine sand with slight plasticity), and one (1) sample (Test Pit 4, Sample 4) as SM (silty sand, sand silt mixtures). The Supplementary Standards to the Ontario

Building Code 2006 document *Percolation Time and Soil Descriptions (SB-6)* assigns percolation rates of 20-50 min/cm for ML soils and 8-20 min/cm for SM soils. Based on the percentage of fines and the range of relative density of the materials, percolation rates of 30 min/cm (Test Pit 1, Sample 3); 35min/cm (Test Pit 2, Sample 4 and Test Pit 3, Sample 3) and 20 min/cm (Test Pit 4, Sample 4) are considered appropriate.

It should be noted that the percolation rates as noted above are estimated values based on the composition of the soil samples tested. It should be noted that the soil conditions may vary between and beyond the test pits locations. Terraprobe Inc. does not present the estimated percolation rate given in this report as a warranty of performance for the soils tested. The client or any third party using this information as a basis for the septic field design assumes all risk associated with their evaluation of this report and all other pertinent criteria used in the design of such structure.

Terraprobe Inc. assumes no responsibility for the application of the above-noted percolation rates ("T"-Time) for use in the intended septic field design. The design of the septic bed must be conducted by a qualified professional with due regard to site-specific conditions and other design considerations. Further, Terraprobe Inc. does not present the estimated percolation rates and soil permeability values given in this report as a warranty of performance for the soils tested.

We trust that the foregoing is sufficient for your present requirements. If you have any questions or if we can be of further assistance, please do not hesitate to contact us.

Yours truly

**Terraprobe Inc.**

Abdus Sobahan, M. Eng., P. Eng.  
Geotechnical Engineer

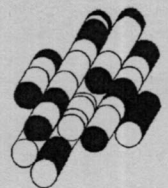


B. Singh, M.A.Sc., P. Eng.  
Principal

encl.: Abbreviations, Terminology and General Information  
"T-Time" Analysis Test Reports  
Figure 1 - Site Location Plan  
Figure 2 - Test Pit Location Plan

# ENCLOSURES

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SAMPLING METHODS		PENETRATION RESISTANCE
AS	auger sample	<p><b>Standard Penetration Test (SPT)</b> resistance ('N' values) is defined as the number of blows by a hammer weighing 63.6 kg (140 lb.) falling freely for a distance of 0.76 m (30 in.) required to advance a standard 50 mm (2 in.) diameter split spoon sampler for a distance of 0.3 m (12 in.).</p> <p><b>Dynamic Cone Test (DCT)</b> resistance is defined as the number of blows by a hammer weighing 63.6 kg (140 lb.) falling freely for a distance of 0.76 m (30 in.) required to advance a conical steel point of 50 mm (2 in.) diameter and with 60° sides on 'A' size drill rods for a distance of 0.3 m (12 in.)."</p>
CORE	cored sample	
DP	direct push	
FV	field vane	
GS	grab sample	
SS	split spoon	
ST	shelby tube	
WS	wash sample	

COHESIONLESS SOILS		COHESIVE SOILS			COMPOSITION	
Compactness	'N' value	Consistency	'N' value	Undrained Shear Strength (kPa)	Term (e.g)	% by weight
very loose	< 4	very soft	< 2	< 12	trace silt	< 10
loose	4 – 10	soft	2 – 4	12 – 25	some silt	10 – 20
compact	10 – 30	firm	4 – 8	25 – 50	silty	20 – 35
dense	30 – 50	stiff	8 – 15	50 – 100	sand and silt	> 35
very dense	> 50	very stiff	15 – 30	100 – 200		
		hard	> 30	> 200		

### TESTS AND SYMBOLS

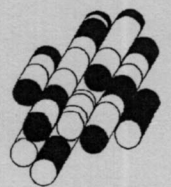
MH	mechanical sieve and hydrometer analysis	$\nabla$	Unstabilized water level
w, w <sub>c</sub>	water content	$\nabla$	1 <sup>st</sup> water level measurement
w <sub>L</sub> , LL	liquid limit	$\nabla$	2 <sup>nd</sup> water level measurement
w <sub>P</sub> , PL	plastic limit	$\nabla$	Most recent water level measurement
I <sub>P</sub> , PI	plasticity index		
k	coefficient of permeability	3.0+	Undrained shear strength from field vane (with sensitivity)
γ	soil unit weight, bulk	C <sub>c</sub>	compression index
G <sub>s</sub>	specific gravity	c <sub>v</sub>	coefficient of consolidation
φ'	internal friction angle	m <sub>v</sub>	coefficient of compressibility
c'	effective cohesion	e	void ratio
c <sub>u</sub>	undrained shear strength		

### FIELD MOISTURE DESCRIPTIONS

<b>Damp</b>	refers to a soil sample that does not exhibit any observable pore water from field/hand inspection.
<b>Moist</b>	refers to a soil sample that exhibits evidence of existing pore water (e.g. sample feels cool, cohesive soil is at plastic limit) but does not have visible pore water
<b>Wet</b>	refers to a soil sample that has visible pore water

# **T-TIME ANALYSIS TEST REPORT**

**TERRAPROBE INC.**





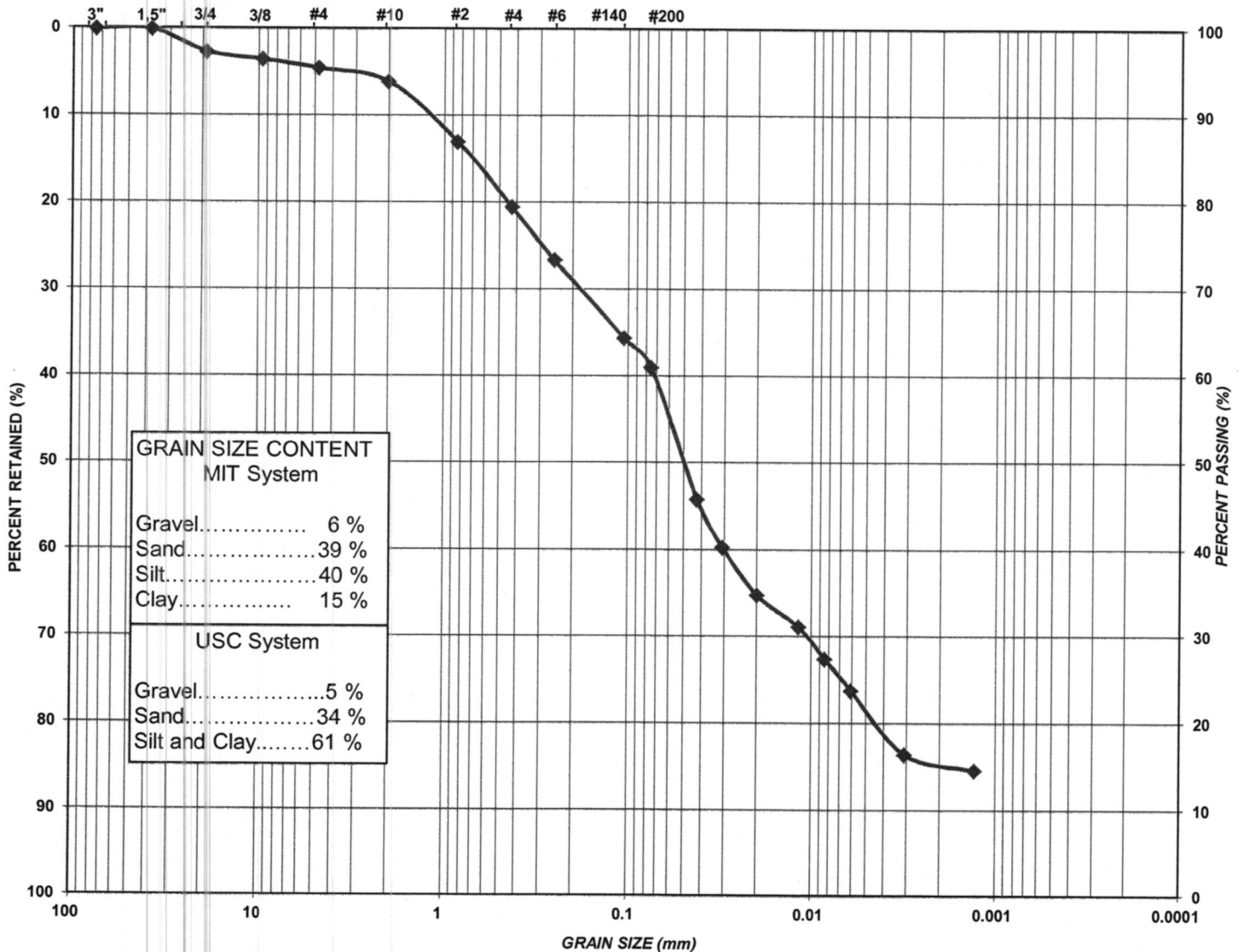
PROJECT: **Estimation of Soil Percolation Rate**  
 LOCATION: **2935 Mississauga Rd., Mississauga , ON**  
 CLIENT: **580816 Ontario Inc**  
 TEST PIT NUMBER: **TP1**  
 SAMPLE NUMBER: **3**  
 SAMPLE DEPTH: **1.2 m**  
 MIT DESCRIPTION: **SILT AND SAND, some clay, trace gravel**  
 USC SYMBOL: **ML**

FILE NO.: **1-15-0441-01**  
 LAB NO.: **1152C**  
 SAMPLE DATE: **July 22 & 27, 2015**  
 SAMPLED BY: **S.M.**

*\* To be read in conjunction with cover letter only \**  
 Estimated rate of Percolation = 30 min/cm

### GRAIN SIZE DISTRIBUTION

U.S. STANDARD SIEVE SIZES



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



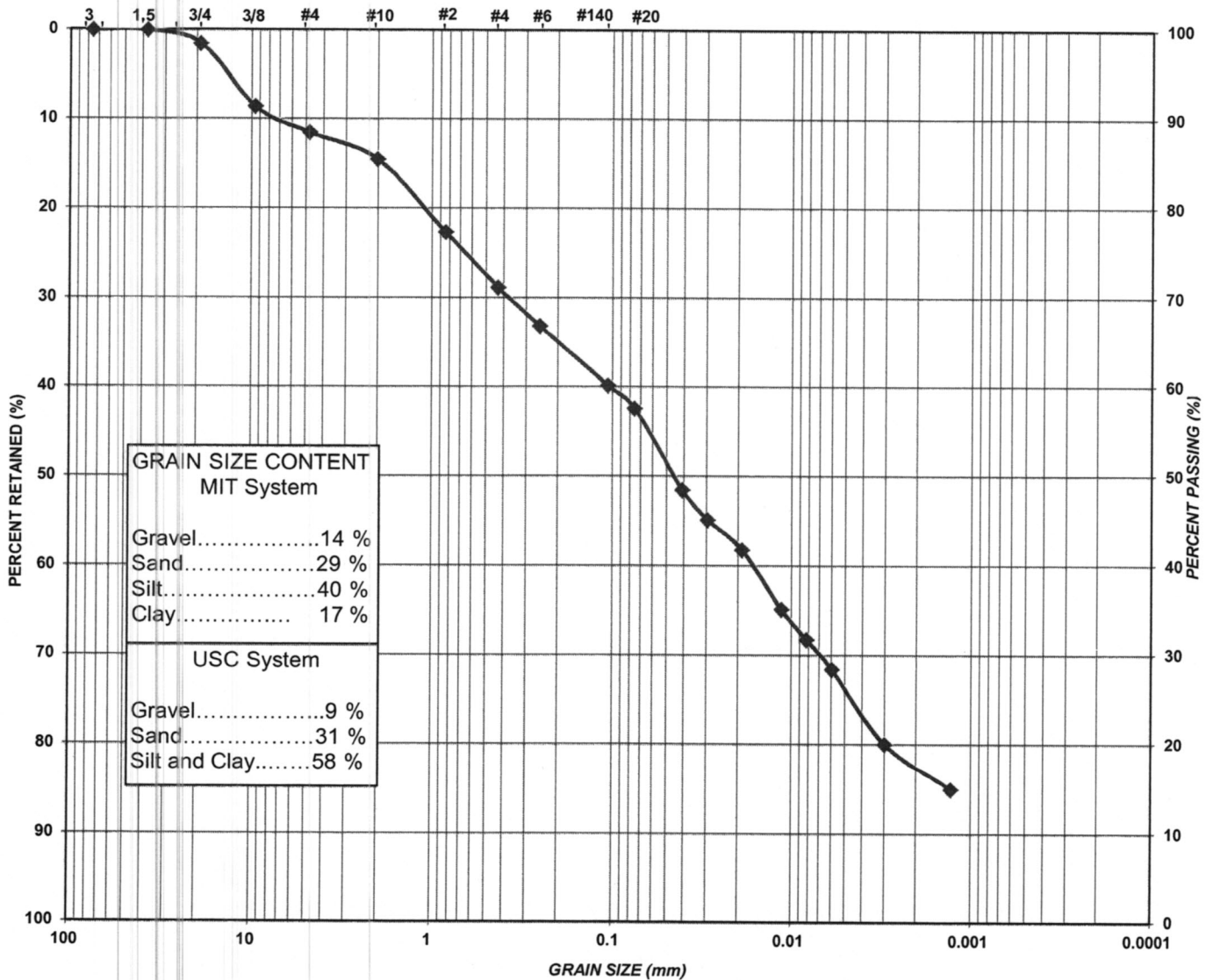
PROJECT: Estimation of Soil Percolation Rate  
 LOCATION: 2935 Mississauga Rd., Mississauga, ON  
 CLIENT: 580816 Ontario Inc  
 TEST PIT NUMBER: TP2  
 SAMPLE NUMBER: 4  
 SAMPLE DEPTH: 1.70m  
 MIT DESCRIPTION: SANDY SILT, some clay, some gravel  
 USC SYMBOL: ML

FILE NO.: 1-15-0441-01  
 LAB NO.: 1152D  
 SAMPLE DATE: July 22 & 27, 2015  
 SAMPLED BY: S.M.

*\* To be read in conjunction with cover letter only \**  
 Estimated rate of Percolation = 35 min/cm

### GRAIN SIZE DISTRIBUTION

U.S. STANDARD SIEVE SIZES



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





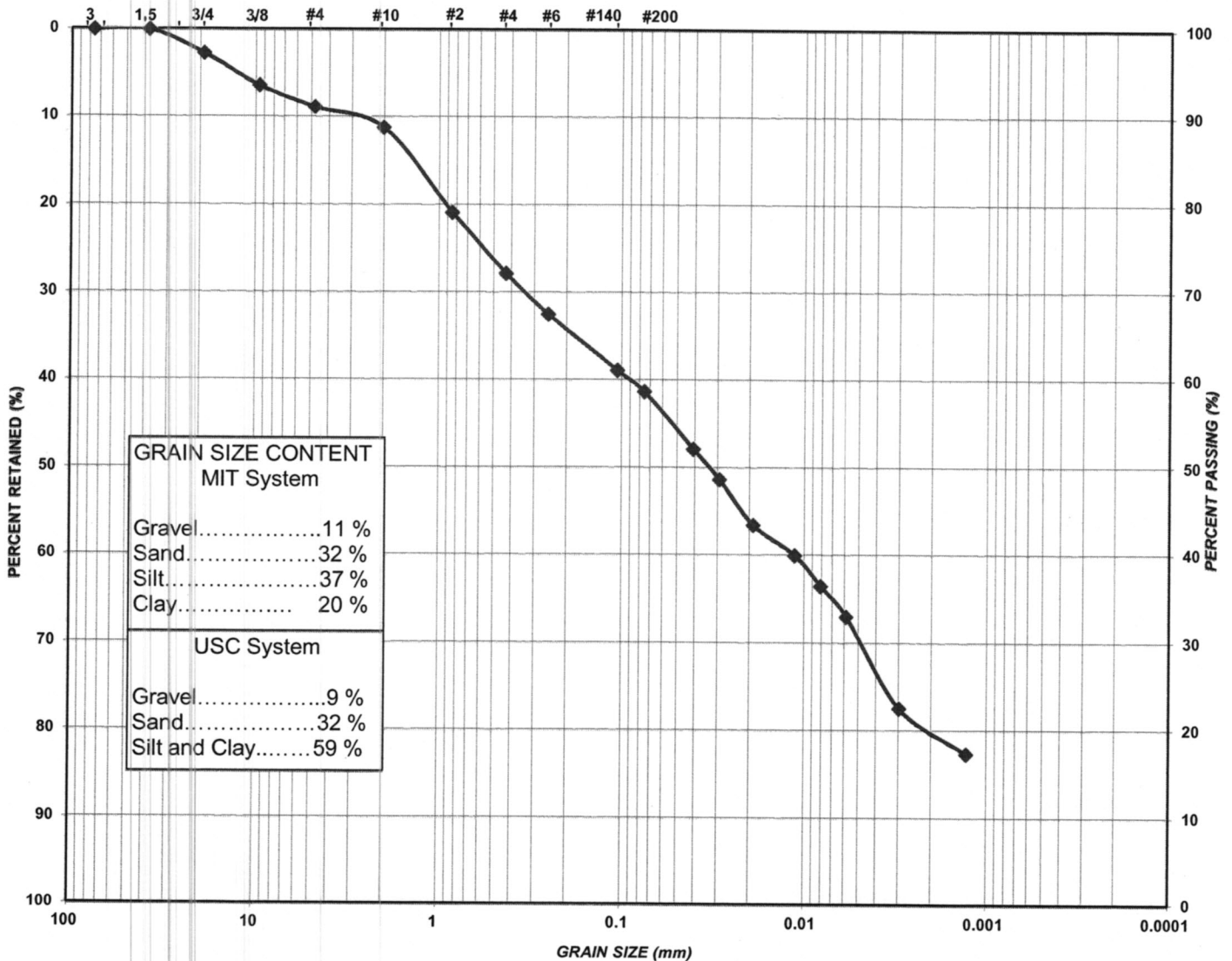
PROJECT: Estimation of Soil Percolation Rate  
 LOCATION: 2955 Mississauga Rd., Mississauga, ON  
 CLIENT: 580816 Ontario Inc  
 TEST PIT NUMBER: TP3  
 SAMPLE NUMBER: 3  
 SAMPLE DEPTH: 1.7m  
 MIT DESCRIPTION: SANDY SILT, some clay, some gravel  
 USC SYMBOL: ML

FILE NO.: 1-15-0441-01  
 LAB NO.: 1152A  
 SAMPLE DATE: July 27, 2015  
 SAMPLED BY: S.M.

\* To be read in conjunction with cover letter only \*  
 Estimated rate of Percolation = 35 min/cm

### GRAIN SIZE DISTRIBUTION

U.S. STANDARD SIEVE SIZES



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



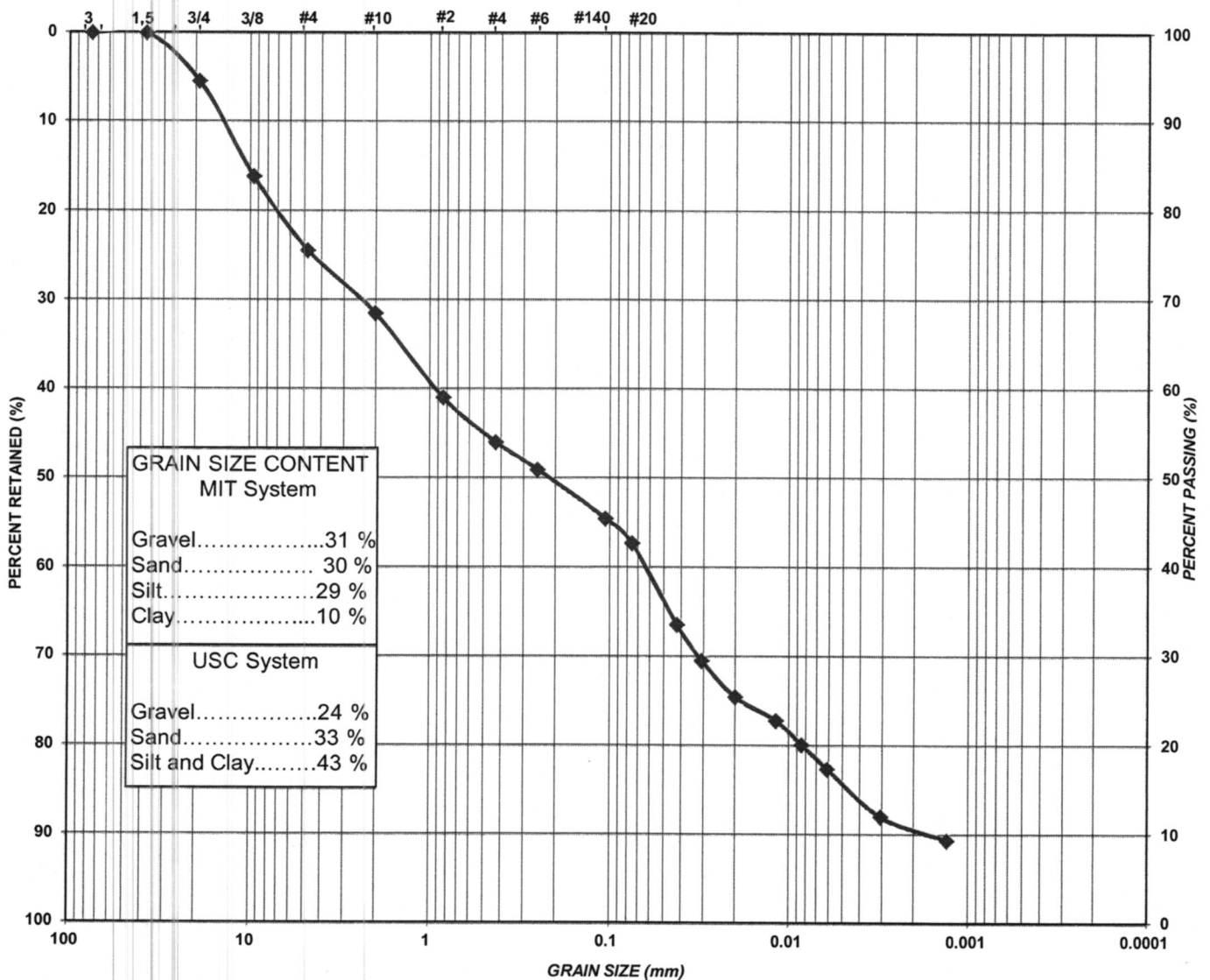
PROJECT: Estimation of Soil Percolation Rate  
 LOCATION: 2955 Mississauga Rd., Mississauga , ON  
 CLIENT: 580816 Ontario Inc  
 TEST PIT NUMBER: TP4  
 SAMPLE NUMBER: 4  
 SAMPLE DEPTH: 2.30m  
 MIT DESCRIPTION: SILTY SAND, gravelly, some clay  
 USC SYMBOL: SM

FILE NO.: 1-15-0441-01  
 LAB NO.: 1152B  
 SAMPLE DATE: July 27, 2015  
 SAMPLED BY: S.M.

*\* To be read in conjunction with cover letter only \**  
 Estimated rate of Percolation = 20 min/cm

### GRAIN SIZE DISTRIBUTION

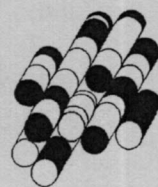
U.S. STANDARD SIEVE SIZES

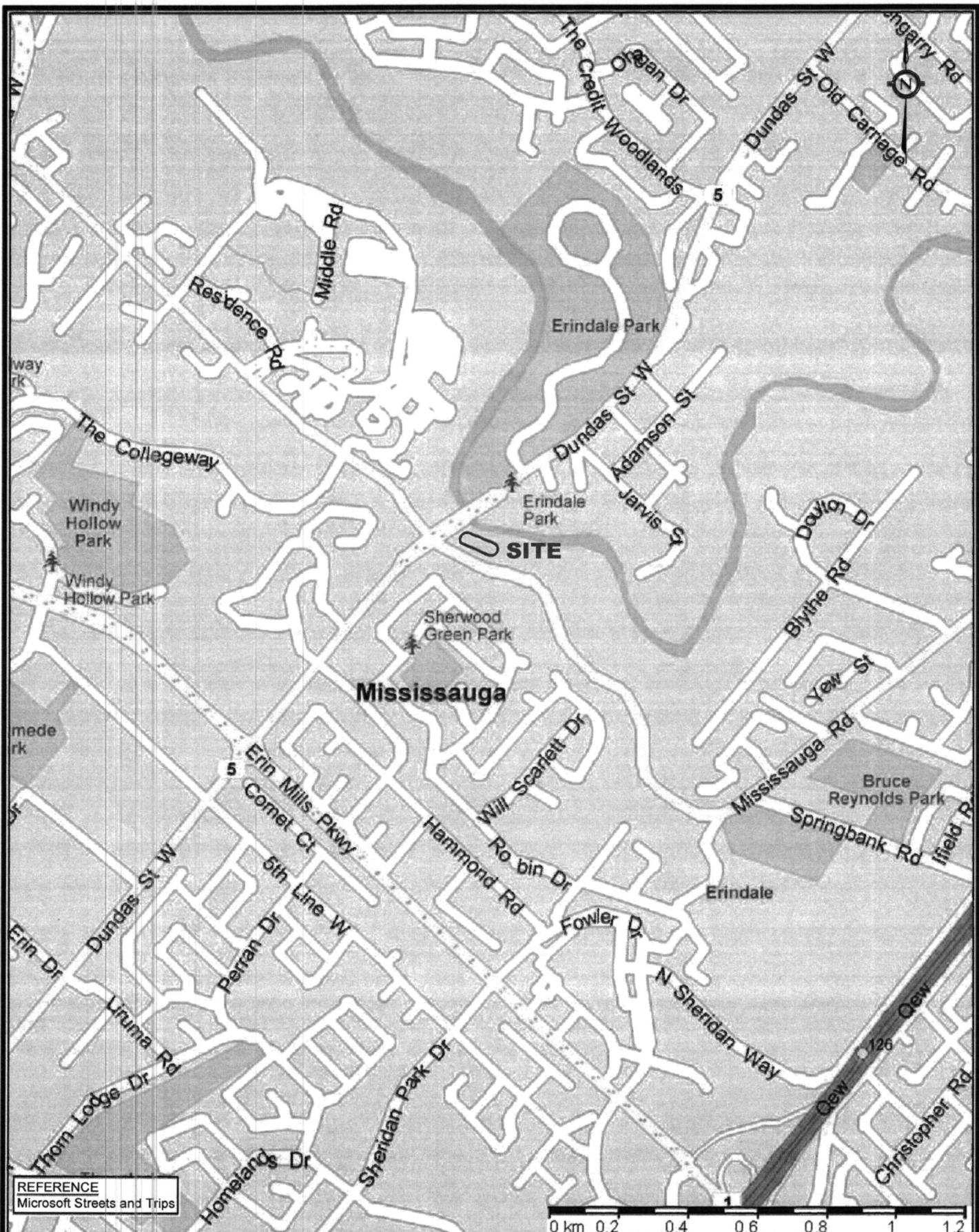


MIT SYSTEM	GRAVEL			SAND			SILT	CLAY
	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		
UNIFIED SYSTEM	GRAVEL			SAND			SILT AND CLAY	
	COARSE	FINE	COARSE	MEDIUM	FINE			

# FIGURES

**TERRAPROBE INC.**





REFERENCE  
Microsoft Streets and Trips

0 km 0.2 0.4 0.6 0.8 1 1.2



**Terraprobe**

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Title: **SITE LOCATION PLAN**

File No.: 1-15-0441

FIGURE:

1

DUNDAS STREET WEST

ASSUMED NORTH

PART 1, PLAN 168286 (M.T.O. PLAN P-1601-167)  
PIN 15381-0154

BH 1

BH 2

TP4  
2955 Mississauga Rd  
TP3

LOT  
RANGE  
SOUTH

PIN 13 59-0001

MISSISSAUGA ROAD

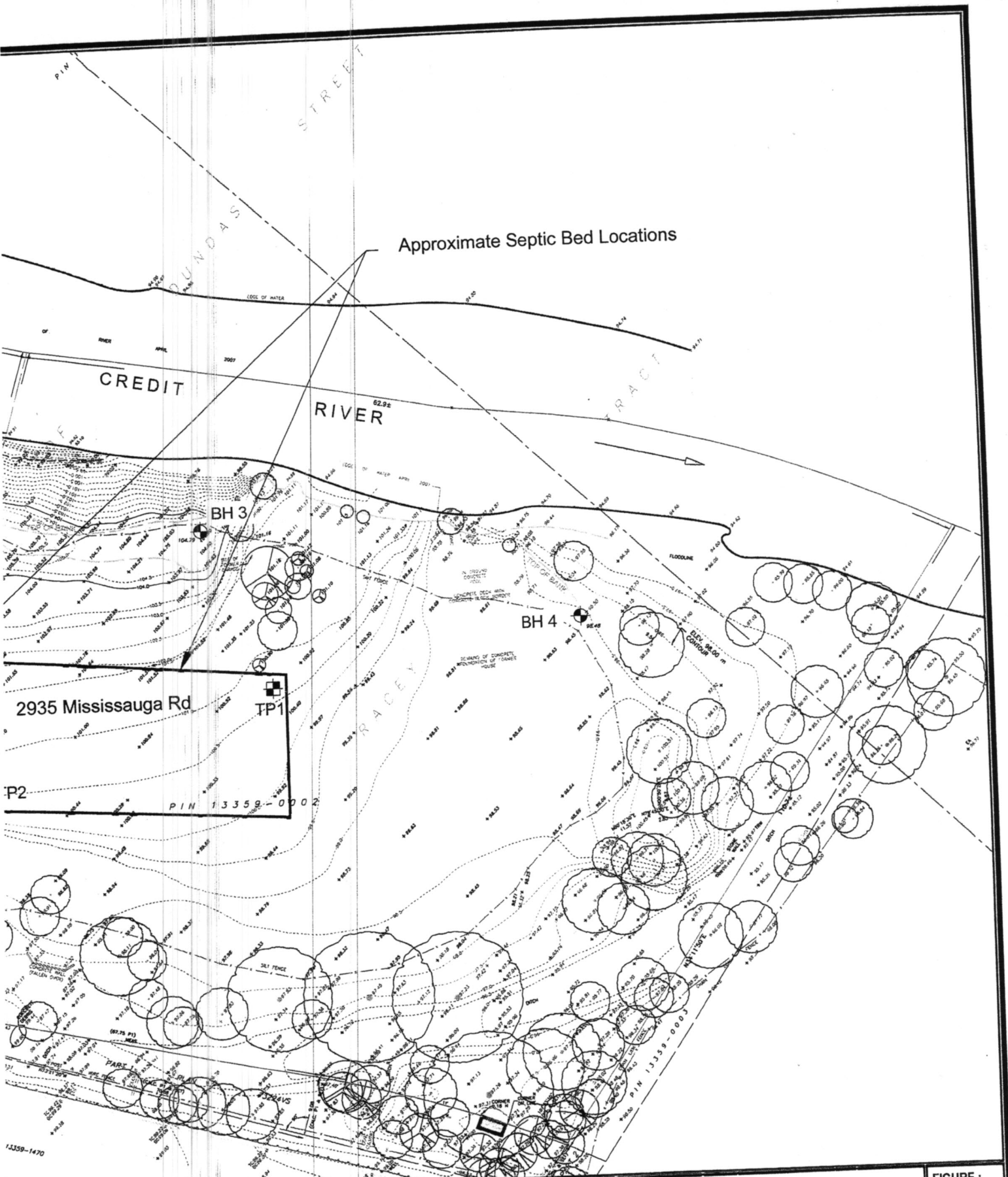
LEGEND

TEST PIT LOCATION

REFERENCE  
Job No. 1-08-3220  
Figure No.: 3  
By: Terraprobe

SCALE  
5 0 5 10

D:\Projects\1-08-3220\1-08-3220.dwg - 2/15/08 - 2:15:18 PM - 2955 Mississauga Rd.dwg - 2/15/08 - 2:15:18 PM - 2955 Mississauga Rd.dwg - 2/15/08 - 2:15:18 PM - 2955 Mississauga Rd.dwg



Approximate Septic Bed Locations

CREDIT RIVER

CREDIT RIVER

BH 3

BH 4

2935 Mississauga Rd

TP1

P2

PIN 13359-0002

13359-1470

20 metres



**Terraprobe**

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Title:

**TEST PIT LOCATION PLAN**

File No.

1-15-0441

FIGURE:

**2**