



Soil Engineers Ltd.

CONSULTING ENGINEERS

GEOTECHNICAL • ENVIRONMENTAL • HYDROGEOLOGICAL • BUILDING SCIENCE

90 WEST BEAVER CREEK ROAD, SUITE 100, RICHMOND HILL, ONTARIO L4B 1E7 · TEL: (416) 754-8515 · FAX: (905) 881-8335

TOWN OF CALEDON
PLANNING
RECEIVED

September 8, 2026

BARRIE
TEL: (705) 721-7863
FAX: (705) 721-7864

MISSISSAUGA
TEL: (905) 542-7605
FAX: (905) 542-2769

OSHAWA
TEL: (905) 440-2040
FAX: (905) 725-1315

NEWMARKET
TEL: (905) 853-0647
FAX: (905) 881-8335

MUSKOKA
TEL: (705) 684-4242
FAX: (705) 684-8522

HAMILTON
TEL: (905) 777-7956
FAX: (905) 542-2769

May 29, 2026

Reference No. 2009-W188

Page 1 of 4

8181926 Canada Inc.
160 Avenue Labrosse
Point-Claire, Quebec
H9R 1A

Attention: Mr. Raj Chahal

**Re: In-Situ Guelph Permeameter Infiltration Testing
Proposed Truck Parking Facility
12541 and 1577 Airport Road
Town of Caledon**

Dear Sir:

As requested, we have completed in-situ infiltration testing and laboratory analysis for collected shallow soil samples in support of the proposed Low Impact Development (LID) stormwater management infrastructure planning and design at the captioned development site (the Subject Site). The assessment and findings are presented in the current letter report.

Background

The Subject Site is located at 12541 and 12577 Airport Road, in the Town of Caledon. A proposed infiltration infrastructure will be implemented to promote infiltration and to address future stormwater management planning and design for the captioned development.

This study was undertaken to verify the permeability and percolation times of the subsoil profile at the proposed location and the depth of the proposed LID measures in the Subject Site. The study will confirm the feasibility of subsoil for the design of infiltration infrastructure to manage collected stormwater runoff, for its redirection to the subsurface, to recharge groundwater, and to meet the stormwater management planning and design objectives for the proposed developed site.

Work Program

Soil Engineers Ltd. (SEL) conducted in-situ percolation testing at the proposed location and depth provided by the client. The tests were conducted at the approximate base of the proposed LID infiltration facilities and ± 1.0 m below the proposed base. This test will more accurately determine the local infiltration rate and will assist in appropriately sizing the facility.

Our representative performed site visit on Oct 21, 2020, to conduct the in-situ infiltration (percolation) testing. The in-situ infiltration (percolation) testing program was conducted at four (4) test locations. An augured hole was done within each test location at the indicated target depths, in the vicinity of the proposed LID infrastructures. The approximate test locations, where the in-situ



percolation tests were attempted are shown on **Drawing No. 1**, enclosed. The ground surface elevations at the test locations are provided in **Table 1**.

Table 1- Test Locations and Depths

Test No.	UTM Coordinates (m)		Ground Surface Elevation (masl)	Depth (mbgs)	Estimated Bottom Elevation (masl)
	Easting	Northing			
TP1	598669	4850872	±244.7	±2.0	±242.7
				±3.0	±241.7
TP2	598786	4850833	±246.6	±3.0	±243.6
				±4.0	±242.6
TP3	598847	4851120	±244.3	±3.0	±241.3
				±4.0	±240.3
TP4	598909	4851104	±243.8	±2.0	±241.8
				±3.0	±240.8

Note: mbgs: metres below ground surface

masl: metres above sea level

For this study, eight (8) in-situ infiltration tests were initiated within four (4) test locations; one (1) test at the bottom elevation for the proposed LID infrastructure, and one (1) test at a depth of ±1.0 meter below the bottom elevation for the proposed LID infrastructure. The in-situ infiltration percolation testing was performed using the Guelph Permeameter (GP) instrument (Model 2800K1). The in-situ tests were conducted at the approximate depths, ranging from ±2.0 m to ±4.0 m below the existing ground surface (mbgs) at elevations, ranging from ±240.3 to ±243.6 metres above sea level (masl).

Methodology

The Guelph Permeameter (GP) is a constant head infiltrometer instrument which operates using the Marriott Bottle principle, whereby a constant ponded head of water is allowed to infiltrate into the unsaturated surface soil via a small test hole augered to penetrate the shallow soil horizon. The constant water head for the instrument is maintained within the test hole by an air tube and its height setting within the instrument. A steady-state flow of water into the subsoil should result after a relatively short period, corresponding to the instrument's ponded water head setting. A higher ponded water head setting should result in a higher steady-state flow of water into the subsoil, than the previous, lower ponded water head setting.

The Field Saturated (fs) hydraulic conductivity (K) estimates for the soil are obtained using the mathematical equations established for the instrument, whereby two (2) steady-state flow measurements, corresponding to the two (2) ponded water head settings for the instrument, can be used as minimum information to estimate the field saturated hydraulic conductivity (K_{fs}) for the soil. The K_{fs} estimates can also be determined, using the one-ponded water head approach which corresponds to one steady-state water flow measurement into the subsoil.

It is critical to note that the K_{fs} and infiltration rates are two (2) different concepts and that translation from one parameter to another cannot be done through unit a of conversion. In accordance with the guidelines from the Toronto and Region Conservation Authority (TRCA) and Credit Valley Conservation Authority (CVC), the infiltration rates are based on the "Low Impact Development Stormwater Management Planning and Design Guide, Table C1", as provided in **Table 2**, below.



Table 2- Approximate Relationship between K_f s, Percolation Time and Infiltration Rate

Hydraulic Conductivity, K_f (cm/Sec)	Percolation Time, T (min/cm)	Infiltration Rate, 1/T (mm/hr)
0.1	2	300
0.01	4	150
0.001	8	75
0.0001	12	50
0.00001	20	30
0.000001	50	12

K_f – field saturated hydraulic conductivity

Source: Ontario Ministry of Municipal Affairs and Housing (OMMAH). 1997; Supplementary Guidelines to the Ontario Building Code 1997, SG-6 Percolation Time and Soil Description.

Infiltration Test Results and Discussion

The in-situ infiltration tests were conducted at depths, ranging from ± 2.0 m to ± 4.0 mbgs. Based on the visual observations in the field, the existing shallow subsoils beneath the site comprise:

- Earth fill, silty clay till (sandy, a trace of gravel), silty clay (a trace of sand)

The results from the attempted in-situ infiltration testing and review and interpretation of the soil grain size analyses for the collected sub-soil samples obtained at the testing depths are summarized in **Table 3**.

Table 3- Estimated Hydraulic Conductivity, Percolation Times, and Infiltration Rates

Test No.	Test and Depth (m)	Soil Type	Ponded Water Head Setting (cm)	Steady State Flow (cm ³ /sec)	Grain Size Permeability Estimation (cm/sec)	In-situ testing of Hydraulic Conductivity (cm/sec)	Estimated Infiltration Rate (mm/hr)
TP1	A ±2.0	Silty Clay, trace of sand	(H1) 10	N/A	10 ⁻⁷ (Figure 1)	N/A	7.5 (GS)
			(H2) 24	N/A			
			Same as Above	-			
	B ±3.0	Silty Clay Till, trace of sand and gravel	(H1) 12	N/A	10 ⁻⁷ (Figure 2)	N/A	7.5 (GS)
			(H2) 24	N/A			
			Same as Above	-			
TP2	A ±3.0	Silty Clay, trace of sand	(H1) 12	N/A	10 ⁻⁷ (Figure 3)	N/A	7.5 (GS)
			(H2) 24	N/A			
			Same as Above	-			
	B* ±4.0	Gravelly Sand, some silty clay	Water Seepage at 4.0m				
	TP3	A ±3.0	Silty Clay Till, sandy, trace of gravel	(H1) 12	N/A	10 ⁻⁷ (Figure 4)	N/A
(H2) 24				N/A			
Same as Above				-			
B ±4.0		Silty Clay, trace of sand	(H1) 12	N/A	10 ⁻⁷ (Figure 5)	N/A	7.5 (GS)
			(H2) 24	N/A			
			Same as Above	-			
TP4	A ±2.0	Silty Clay Till, some sand to sandy trace of gravel	(H1) 12	N/A	10 ⁻⁷ (Figure 6)	N/A	7.5 (GS)
			(H2) 24	N/A			
			Same as Above	-			
	B* ±3.0	Silty Clay Till, trace of sand and gravel	(H1) 12	N/A	N/A	N/A	N/A
			(H2) 24	N/A			
			Same as Above	-			

GS – Grain Size

N/A The test was not successful due to low permeable soil



Attempts were made to complete the in-situ infiltration tests at all the Test locations. However, due to the low permeable soil and water seepage at the testing depths, the in-situ percolation test could not be successfully performed at the indicated depths, using the GP instrument.

Since the use of Guelph Permeameter was not successful at providing results at the testing locations, at the indicated depths, representative subsoil samples were also collected at the testing depths for follow-up, laboratory, grain size analysis as per Ministry of Transpiration (MTO) Laboratory Standards 602 and 702 to confirm the shallow subsoil sample texture classifications in order to interpret and estimate the soil's percolation (T) times and associated infiltration rates. The results for the soil grain size analyses for the collected soil samples, as performed in our laboratory is enclosed for your reference, **Appendix A (Figures 1 to 6)**, inclusive.

Based on the interpretation from the soil grain size analyses plots, as performed in our laboratory, the estimated permeability for the subsoil at the depths ranging between 2.0 to 4.0 m within the silty clay till with trace of sand and gravel layers are 1.0×10^{-7} cm/sec. The infiltration rates will vary depending on the soil density and the amounts of sand and/or silt present in the native subsoils, and for the presence of any vertical soil structure fracturing, and/or macro pores.

General Comments

Toronto and Region Conservation Authority (TRCA) design manual, titled "Low Impact Development Stormwater Management Planning and Design Guide", a safety factor is to be incorporated in the determining of the infiltration rates for the design of LID infiltration infrastructure, such as infiltration galleries, soak away pits or similar technology that would be implemented as part of stormwater management planning and design for site development. A summary of the findings at each test location is presented below:

All Test Location: As previously mentioned, the in-situ percolation test could not be completed at all of the Test locations. As such, the in-situ percolation test cannot be interpreted. Soil exhibiting these infiltration characteristics are not considered suitable for the design of conventional LID infiltration infrastructure, as the subsoil does not meet the minimum 15 mm/hr infiltration rate required for conventional designs for LID infrastructure.

Closure

We trust that this correspondence addresses your current needs and ask that you contact the undersigned should you have any questions or require additional information.

Yours truly,
SOIL ENGINEERS LTD.

Bhawandeep Singh Brar
Bhawandeep Singh Brar, B.Sc.,

Narjes

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



ENCLOSURES

Test Pit Location Plan
Grain Size Distribution Graphs

Drawing 1
Appendix A



Soil Engineers Ltd.

CONSULTING ENGINEERS

GEOTECHNICAL • ENVIRONMENTAL • HYDROGEOLOGICAL • BUILDING SCIENCE

90 WEST BEAVER CREEK ROAD, SUITE 100, RICHMOND HILL, ONTARIO L4B 1E7 · TEL: (416) 754-8515 · FAX: (905) 881-8335

BARRIE
TEL: (705) 721-7863
FAX: (705) 721-7864

MISSISSAUGA
TEL: (905) 542-7605
FAX: (905) 542-2769

OSHAWA
TEL: (905) 440-2040
FAX: (905) 725-1315

NEWMARKET
TEL: (905) 853-0647
FAX: (905) 881-8335

MUSKOKA
TEL: (705) 684-4242
FAX: (705) 684-8522

HAMILTON
TEL: (905) 777-7956
FAX: (905) 542-2769

DRAWING

REFERENCE NO. 2009-W188



N

References: Ontario Ministry of Natural Resources and Forestry
© King's Printer for Ontario, 2026

Key Map

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, Vantor, EarthStar Geographics, and the GIS User Community

Legend

- Approximate Boundary of Subject Site
- Major Road
- Waterbody
- Watercourse
- Test Pit

Soil Engineers Ltd.

In-Situ Test Pit Location Plan

In-Situ Infiltration Testing
12541 & 12577 Airport Road
Town of Caledon

Reference No. 2009-W188

Date: May 29, 2026

Scale:
0 20 40 80 120 160 200
Metres

Drawing No. 1



Soil Engineers Ltd.

CONSULTING ENGINEERS

GEOTECHNICAL • ENVIRONMENTAL • HYDROGEOLOGICAL • BUILDING SCIENCE

90 WEST BEAVER CREEK ROAD, SUITE 100, RICHMOND HILL, ONTARIO L4B 1E7 · TEL: (416) 754-8515 · FAX: (905) 881-8335

BARRIE
TEL: (705) 721-7863
FAX: (705) 721-7864

MISSISSAUGA
TEL: (905) 542-7605
FAX: (905) 542-2769

OSHAWA
TEL: (905) 440-2040
FAX: (905) 725-1315

NEWMARKET
TEL: (905) 853-0647
FAX: (905) 881-8335

MUSKOKA
TEL: (705) 684-4242
FAX: (705) 684-8522

HAMILTON
TEL: (905) 777-7956
FAX: (905) 542-2769

APPENDIX 'A'

GRAIN SIZE DISTRIBUTION GRAPH

REFERENCE NO. 2009-W188

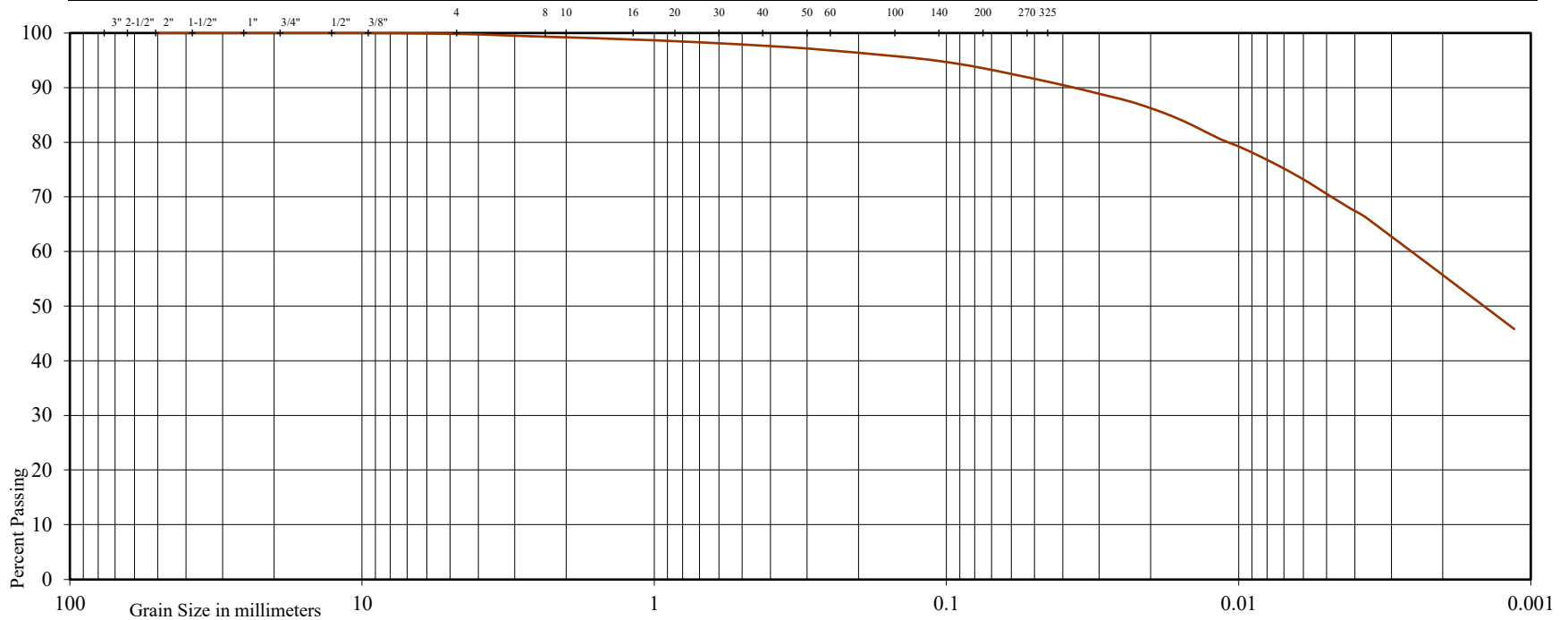


U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL			SAND				SILT	CLAY
COARSE		FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND				SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		



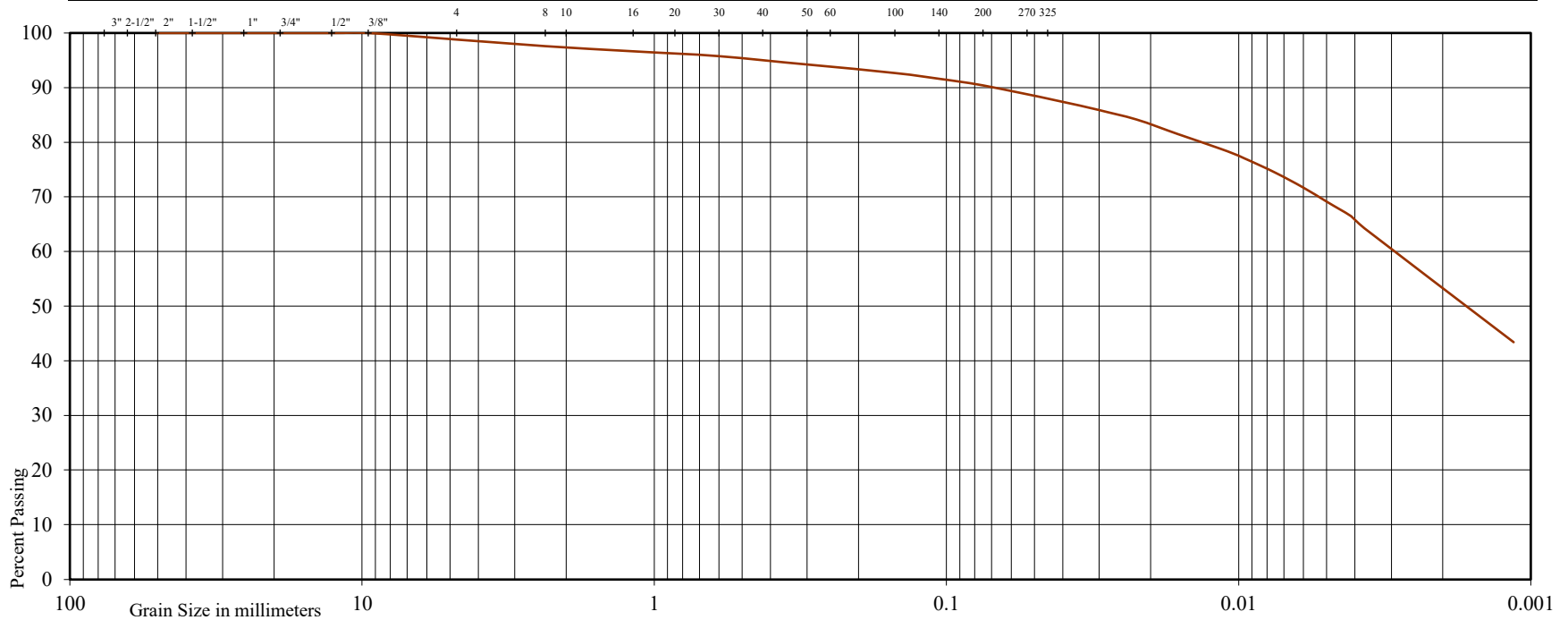


U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL			SAND				SILT	CLAY
COARSE		FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



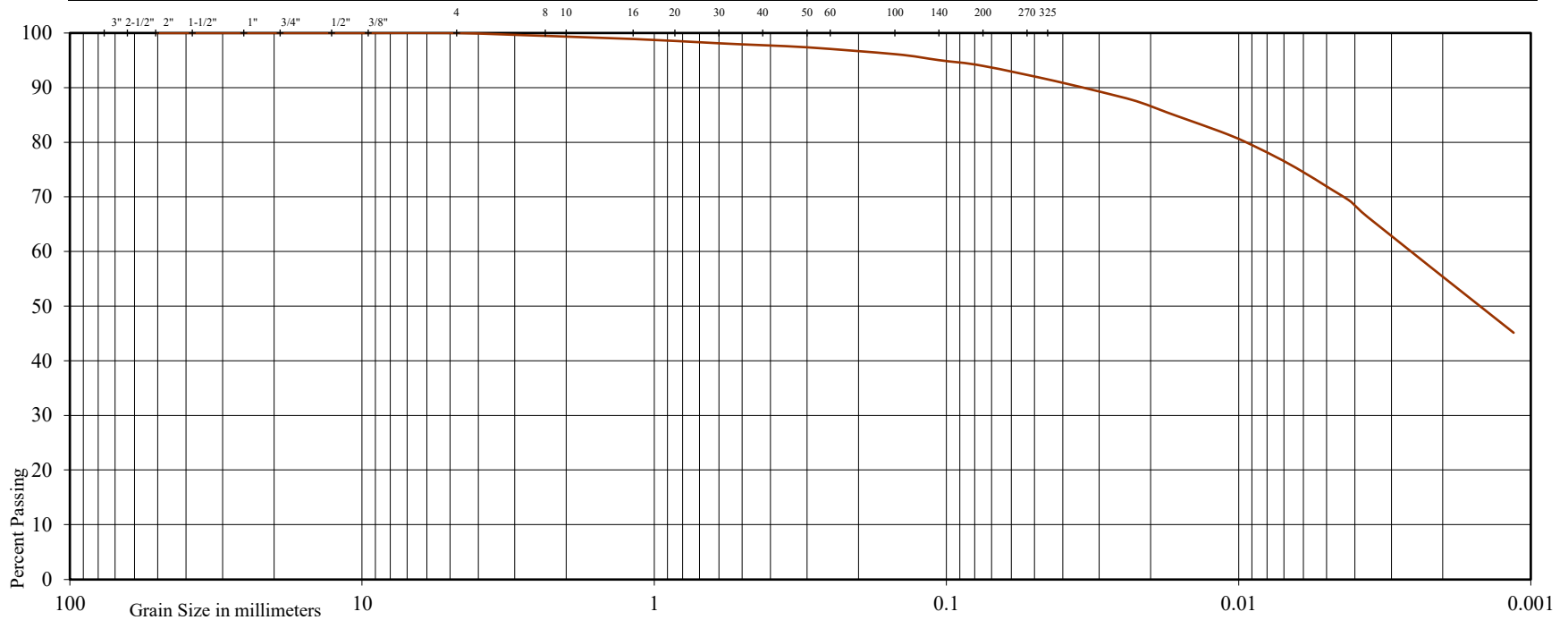


U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL			SAND				SILT	CLAY
COARSE		FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND				SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		



Project: Proposed Truck Parking Facility

Location: 12541 and 12577 Airport Road

Test Pit No: 2

Sample No:

Depth (m): 4.0

Elevation (m):

Liquid Limit (%) = -

Plastic Limit (%) = -

Plasticity Index (%) = -

Moisture Content (%) = -

Estimated Permeability

(cm./sec.) = 10^{-7}

Classification of Sample [& Group Symbol]: SILTY CLAY
a trace of sand



Reference No: 2009-W188

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



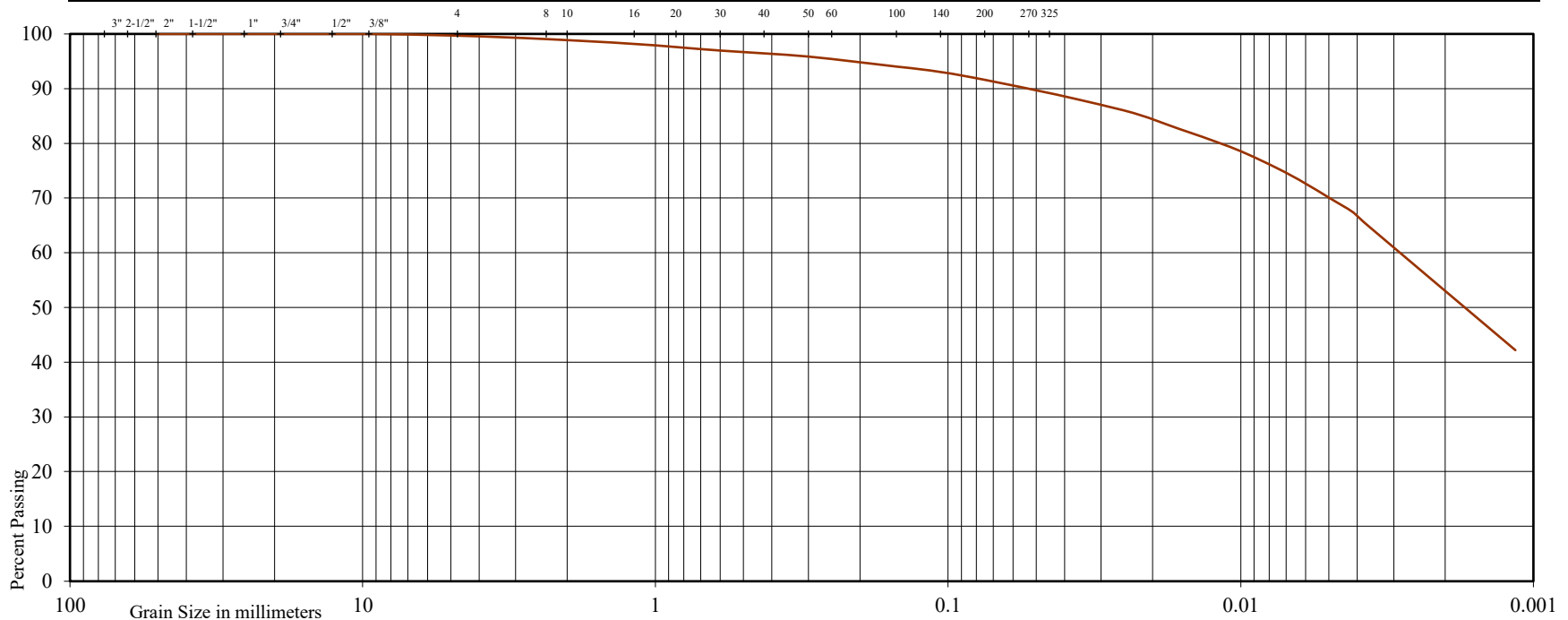


U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL			SAND				SILT	CLAY
COARSE		FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project: Proposed Truck Parking Facility

Location: 12541 and 12577 Airport Road

Test Pit No: 3

Sample No:

Depth (m): 4.0

Elevation (m):

Liquid Limit (%) = -

Plastic Limit (%) = -

Plasticity Index (%) = -

Moisture Content (%) = -

Estimated Permeability

(cm./sec.) = 10^{-7}

Classification of Sample [& Group Symbol]: SILTY CLAY
a trace of sand



U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL			SAND				SILT	CLAY
COARSE		FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND				SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE		

