FOUNDATION INVESTIGATION REPORT
PROPOSED SEWER PIPE CROSSINGS
HWY 427 INSIDE WIDENING
FROM FASKEN DRIVE TO STEELES AVENUE
TORONTO, ONTARIO
G.W.P. 202-95-00

Geocres Number: 30M12-292

Report to

SNC-Lavalin

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TABLE OF CONTENTS

APPENDICES

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1 INTRODUCTION

This report presents the factual findings obtained from a foundation investigation conducted at the location of fifteen (15) proposed sewer pipe crossings under Highway 427. Installation of the sewer pipe crossings is part of the Highway 427 inside widening from Fasken Drive to Steeles Avenue in Toronto, Ontario.

The purpose of the investigation was to explore the subsurface conditions at the proposed sewer crossing locations and, based on the data obtained, to provide borehole location plans, records of boreholes, laboratory test results, stratigraphic profiles and a written description of the subsurface conditions.

Thurber carried out the investigation as a sub-consultant to SNC-Lavalin under the Ministry of Transportation Ontario (MTO) Agreement Number 2004-E-0071.

2 PROJECT AND SITE DESCRIPTION

The inside widening of Highway 427 from Fasken Drive to Steeles Avenue includes the installation of fifteen (15) sewer pipes that cross either the northbound or southbound lanes of Highway 427.

Highway 427 is currently a 6-lane highway, surrounded by industrial, commercial and residential properties along the route. The topography of this section of the highway gently increases from the south to the north. The site is situated within the South Slope physiographic region. The geology generally comprises a till plain consisting of clayey silt to silty clay (Halton Till) grading into a sandy

silt to silty sand till with depth. The underlying bedrock consists of grey shale with hard siltstone and limestone interlayers of the Georgian Bay Formation.

3 SITE INVESTIGATION AND FIELD TESTING

Site investigation and field testing for the proposed pipe crossings consisted of drilling and sampling thirty (30) boreholes, designated as PC-01 to PC-30, to approximate depths of 10 m below the ground surface. At each of the fifteen pipe crossings, one borehole was drilled near each end of the crossing as specified in the terms of reference. All boreholes were drilled within the period of December 20, 2009 to January 13, 2010.

All boreholes were drilled at night during approved lane closure times on the inside and outside shoulders of the northbound and southbound lanes of Highway 427. Lane closures and traffic control were carefully planned for drilling each borehole. Prior to commencement of drilling, utility clearances were obtained for all borehole locations.

The approximate borehole locations are shown on the Borehole Locations and Soil Strata Drawings in Appendix E. The coordinates and elevations of the boreholes are given on these drawings and on the individual Record of Borehole Sheets in Appendix A. The borehole coordinates were surveyed using a Trimble Pathfinder ProXRT differential GPS, and the approximate ground surface elevations were determined using the sewer profile drawings provided by SNC-Lavalin.

Solid stem augers were used to advance the boreholes, and samples were obtained at selected intervals using a 50 mm diameter split spoon sampler in conjunction with the Standard Penetration Test (SPT).

A member of Thurber's engineering staff supervised the drilling and sampling operations on a full time basis. The supervisor logged the boreholes, visually examined the recovered samples, and transported them to Thurber's laboratory for further examination and testing.

Groundwater conditions in the open boreholes were observed throughout the drilling operations. Fourteen standpipe piezometers were installed at selected locations to permit monitoring of groundwater levels. The piezometers consisted of 19 mm PVC pipes with slotted screens. The locations and completion details of the piezometers are shown in Table A-1 in Appendix A. The borehole completion details are also shown in Table A-1.

4 LABORATORY TESTING

All recovered soil samples were subjected to Visual Identification (VI) and soil classification. Moisture content determinations were carried out on all soil samples. Approximately 28% of the recovered soil samples were also subjected to grain size distribution analyses (sieve and hydrometer) and Atterberg Limits testing where appropriate. The results of this testing program are presented on the Record of Borehole sheets in Appendix A and on the figures contained in Appendix B.

5 DESCRIPTION OF SUBSURFACE CONDITIONS

This section presents a generalized summary of the subsurface conditions encountered at the borehole locations drilled for the proposed pipe crossings. Reference is made to the Record of Borehole sheets in Appendix A. Stratigraphic profiles for each pipe crossing are also presented on the Borehole Locations and Soil Strata Drawings in Appendix E. An overall description of the stratigraphy encountered in Boreholes PC-01 to PC-30 is given in the following paragraphs. However, the factual data presented in the Record of Borehole Sheets governs any interpretation of the site conditions. It must be recognized that soil conditions may vary between borehole locations.

In general terms, the soil stratigraphy encountered along this stretch of the highway consists of asphalt pavement and fill overlying native silty clay to clayey silt till deposits. Occasional sand deposits as well as zones of sandy silt to silty sand till were also encountered in the boreholes. More detailed descriptions of the individual stratum are presented below.

5.1 Asphalt

Asphalt was present at the ground surface in the majority of the boreholes. The asphalt thickness ranged from 75 mm to 400 mm. No asphalt was encountered at Boreholes PC-19, PC-20, or PC-24. All boreholes were drilled on the shoulders of Highway 427 and therefore the asphalt thicknesses do not necessarily represent the conditions under the travelled lanes of the highway. The thickness of asphalt may also vary between and beyond the borehole locations.

5.2 Fill

Fill was encountered below the asphalt in all of the boreholes. The upper part of the fill consisted of granular material, ranging from sand with some gravel and some silt, to sand and gravel with trace silt. The granular fill was mainly encountered to depths ranging from 0.6 m to 1.3 m below the ground surface or to elevations ranging from 164.5 m to 180.7 m. Locally thicker granular fill layers were encountered at Boreholes PC-13 (4.0 m deep), PC-14 (2.2 m deep) and PC-27 (2.4 m deep). At Borehole PC-20, the upper fill encountered at the ground surface consisted of silty clay mixed with sand to 0.5 m depth (Elev. 164.9 m).

Recorded SPT N-values in the granular fill ranged from 11 to 72 blows per 0.3 m penetration, and therefore the upper fill is described as compact to very dense.

The majority of the boreholes also encountered a lower fill layer overlying the native soils. This fill mainly consisted of clayey silt and silty clay with some sand, trace gravel and trace cobbles, however some zones of sand to sandy silt fill were also encountered. The lower fill was encountered to depths ranging from 2.3 m to 9.8 m or to elevations 159.7 m to 176.3 m. The lower fill was not encountered in Boreholes PC-19 or PC-20.

The SPT N-values recorded in the clayey silt to silty clay lower fill ranged from 6 blows per 0.3 m penetration to 63 blows per 0.275 m penetration, indicating that the fill has a firm to

hard consistency. SPT N-values in the sand to sandy silt zones in the lower fill ranged from 7 to 43 blows per 0.3 m penetration, and therefore are described as loose to dense.

The natural moisture contents of the fill samples obtained generally ranged from approximately 1% to 11% in the upper fill and 4% to 33% in the lower fill.

Grain size distribution curves for fill samples tested are presented on the Record of Borehole sheets and on Figures B1 to B11 of Appendix B. Atterberg Limit test results are presented on Figures B19 to B23 of Appendix B.

The results of the laboratory gradation and Atterberg Limits tests are summarized as follows:

Upper Fill (Granular Material):

Soil Particles	(%)
Gravel	19 to 48
Sand	42 to 70
Silt and Clay	4 to 22

Lower Fill:

Soil Particles	(%)
Gravel	0 to 15
Sand	7 to 48
Silt	27 to 77
Clay	4 to 62

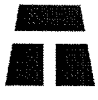
Index Property	(%)
Liquid Limit	22 to 49
Plastic Limit	14 to 24

The above results show that the clayey silt to silty clay lower fill is of low to intermediate plasticity with group symbols of CL-ML to CI.

5.3 Glacial Till

Native brown to grey silty clay till containing trace sand to sandy, trace gravel, and trace cobbles was encountered below the fill in all of the boreholes except for PC-21, PC-22, PC-25, and PC-26. In Boreholes PC-19, PC-20, and PC-21, silty sand till with some clay lenses and trace gravel was also encountered. The till deposits were encountered at depths ranging from 0.5 m to 9.1 m, or elevations 159.7 m to 174.2 m, and generally extended to the full depth of the boreholes at 9.8 m below the ground surface (Elev. 155.7 m to 171.2 m).

Based on SPT N-values ranging from 4 blows for 0.3 m of penetration to 50 blows per 0.075 m penetration, the silty clay till is described as firm to hard, although typically the till is stiff to hard. The silty sand till is described as compact to very dense, based on SPT N-values ranging from 18 blows per 0.3 m penetration to 82 blows per 0.275 m penetration.



The natural moisture contents of the samples recovered from glacial till deposits ranged from 7% to 33%.

Grain size distribution curves for the till samples tested are presented on the Record of Borehole sheets and on Figures B13 to B18 of Appendix B. Atterberg Limit test results are presented on Figures B24 to B28 of Appendix B.

The results of laboratory gradation and Atterberg Limits tests are summarized as follows:

Soil Particles	(%)
Gravel	0 to 10
Sand	5 to 45
Silt	29 to 60
Clay	11 to 66

Index Property	(%)
Liquid Limit	18 to 67
Plastic Limit	12 to 28

The above results show that the silty clay till ranges from low to high plasticity with group symbols of CL-ML to CH.

Occasional cobbles were encountered in the glacial till in the boreholes. Glacial tills inherently contain cobbles and boulders.

5.4 Sand

In Boreholes PC-21 to PC-24, sand deposits ranging in composition from sand with some silt to sand and gravel were encountered within the native material. The sand deposits were encountered at depths from 4.7 m to 7.3 m below the ground surface (Elev. 160.9 m to 163.6 m), and extended to depths of 8.8 m up to the full depth of the boreholes at 9.8 m below ground (Elev. 159.3 m to 159.6 m).

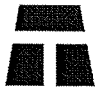
The SPT N-values recorded in the sand deposits ranged from 22 to 47 blows for 0.3 m of penetration, indicating that the deposits are compact to dense.

The sand deposits were observed to be moist to wet, with natural moisture contents of recovered samples ranging from 6% to 20%.

Grain size distribution curves for samples tested from the sand deposits are presented on the Record of Borehole sheets and on Figures B12 of Appendix B.

The results of the laboratory gradation tests are summarized as follows:

Soil Particles	(%)
Gravel	27 to 47
Sand	42 to 63
Silt and Clay	8 to 29



5.5 Water Levels

The groundwater level was observed in the boreholes during and upon completion of drilling. Fourteen standpipe piezometers were installed to monitor water levels after completion of drilling. The water levels measured in the piezometers are summarized in Table 5.1.

Table 5.1 – Measured Groundwater Levels

Borehole	Date	Water Level (m)	
		Depth	Elevation
PC-03	January 18, 2010	4.3	163.0
PC-05	January 18, 2010	5.6	159.9
PC-08	January 18, 2010	6.3	161.1
PC-09	January 18, 2010	5.3	165.8
PC-11	January 18, 2010	Dry	Dry
PC-14	January 18, 2010	5.1	167.7
PC-15	January 18, 2010	8.2	161.0
PC-18	January 18, 2010	3.2	164.4
PC-20	January 18, 2010	2.1	163.3
PC-21	January 18, 2010	5.1	163.1
PC-24	January 18, 2010	6.1	162.9
PC-25	January 18, 2010	4.3	176.9
PC-28	January 18, 2010	4.4	176.6
PC-29	January 18, 2010	5.8	174.1

The above table indicates that the groundwater levels along this stretch of Highway 427 range from Elevations 159.9 m to 176.9 m.

The above values are short-term readings and seasonal fluctuations of the groundwater level are to be expected. In particular, the groundwater level may be at a higher elevation after the spring snowmelt or after periods of heavy rainfall.

6 MISCELLANEOUS

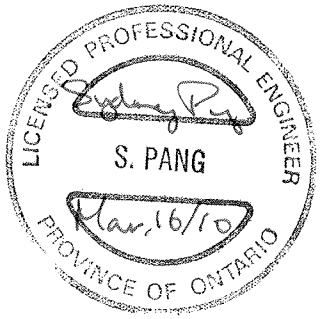
The drilling and sampling equipment was supplied and operated by Walker Drilling Ltd. of Utopia, Ontario. Traffic control was provided by Barricade Traffic Services of Concord, Ontario. The field work was supervised on a full time basis by Ms. Eckie Siu, Mr. Luke Gilarski, Mrs. Lindsey Blaine, Mr. Stephane Loranger, and Mr. Mark Farrant of Thurber Engineering Ltd. Laboratory testing was carried out at Thurber's Laboratory in Oakville, Ontario.

Supervision of the field program was conducted by Mrs. Lindsey Blaine and Mr. Mark Farrant, P.Eng. Interpretation of the field data and preparation of the investigation report was conducted by Mr. Mark Farrant, P.Eng. and Mr. Sydney Pang, P.Eng.

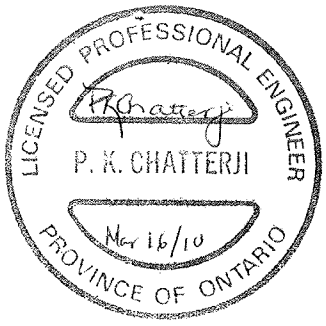
Dr. P.K. Chatterji, P.Eng., a Designated Principal Contact for MTO Foundations Projects, reviewed the report.

THURBER ENGINEERING LTD.

Mark Farrant, P.Eng.
Geotechnical Engineer



Sydney Pang, P.Eng.
Associate, Senior Project Engineer



P.K. Chatterji, P.Eng.
Review Principal

Appendix A

Record of Borehole Sheets

SYMBOLS, ABBREVIATIONS AND TERMS USED ON RECORDS OF BOREHOLES

1. TEXTURAL CLASSIFICATION OF SOILS

CLASSIFICATION	PARTICLE SIZE	VISUAL IDENTIFICATION
Boulders	Greater than 200mm	same
Cobbles	75 to 200mm	same
Gravel	4.75 to 75mm	5 to 75mm
Sand	0.075 to 4.75mm	Not visible particles to 5mm
Silt	0.002 to 0.075mm	Non-plastic particles, not visible to the naked eye
Clay	Less than 0.002mm	Plastic particles, not visible to the naked eye

2. COARSE GRAIN SOIL DESCRIPTION (50% greater than 0.075mm)

TERMINOLOGY	PROPORTION
Trace or Occasional	Less than 10%
Some	10 to 20%
Adjective (e.g. silty or sandy)	20 to 35%
And (e.g. sand and gravel)	35 to 50%

3. TERMS DESCRIBING CONSISTENCY (COHESIVE SOILS ONLY)

DESCRIPTIVE TERM	UNDRAINED SHEAR STRENGTH (kPa)	APPROXIMATE SPT[(1)] 'N' VALUE
Very Soft	12 or less	Less than 2
Soft	12 to 25	2 to 4
Firm	25 to 50	4 to 8
Stiff	50 to 100	8 to 15
Very Stiff	100 to 200	15 to 30
Hard	Greater than 200	Greater than 30

NOTE: Hierarchy of Soil Strength Prediction

1) Laboratory Triaxial Testing
2) Field Insitu Vane Testing
3) Laboratory Vane Testing
4) SPT value
5) Pocket Penetrometer

4. TERMS DESCRIBING DENSITY (COHESIONLESS SOILS ONLY)

DESCRIPTIVE TERM	SPT "N" VALUE
Very Loose	Less than 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	Greater than 50

5. LEGEND FOR RECORDS OF BOREHOLES

SYMBOLS AND ABBREVIATIONS FOR SAMPLE TYPE

SS Split Spoon Sample WS Wash Sample AS Auger (Grab) Sample
TW Thin Wall Shelby Tube Sample TP Thin Wall Piston Sample
PH Sampler Advanced by Hydraulic Pressure PM Sampler Advanced by Manual Pressure
WH Sampler Advanced by Self Static Weight RC Rock Core SC Soil Core

$$\text{Sensitivity} = \frac{\text{Undisturbed Shear Strength}}{\text{Remoulded Shear Strength}}$$

$\blacktriangledown$ Water Level

C_{pen} Shear Strength Determination by Pocket Penetrometer

(1) SPT 'N' Value Standard Penetration Test 'N' Value – refers to the number of blows from a 63.5kg hammer free falling a height of 0.76m to advance a standard 50 mm outside diameter split spoon sampler for 0.3 m depth into undisturbed ground.

(2) DCPT Dynamic Cone Penetration Test – Continuous penetration of a 50 mm outside diameter, 60° conical steel point attached to "A" size rods driven by a 63.5 kg hammer free falling a height of 0.76 m. The resistance to cone penetration is the number of hammer blows required for each 0.3 m advance of the conical point into undisturbed ground.

UNIFIED SOILS CLASSIFICATION

MAJOR DIVISIONS		GROUP SYMBOL	TYPICAL DESCRIPTION
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	GW	Well-graded gravels or gravel-sand mixtures, little or no fines.
		GP	Poorly-graded gravels or gravel-sand mixtures, little or no fines.
		GM	Silty gravels, gravel-sand-silt mixtures.
		GC	Clayey gravels, gravel-sand-clay mixtures.
	SAND AND SANDY SOILS	SW	Well-graded sands or gravelly sands, little or no fines.
		SP	Poorly-graded sands or gravelly sands, little or no fines.
		SM	Silty sands, sand-silt mixtures.
		SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS	SILTS AND CLAYS $W_L < 50\%$	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays. ($W_L < 30\%$).
		CI	Inorganic clays of medium plasticity, silty clays. ($30\% < W_L < 50\%$).
		OL	Organic silts and organic silty-clays of low plasticity.
	SILTS AND CLAYS $W_L > 50\%$	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
		CH	Inorganic clays of high plasticity, fat clays.
		OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils.
CLAY SHALE			
SANDSTONE			
SILTSTONE			
CLAYSTONE			
COAL			

Table A-1 – Borehole Completion Details

Location	Details	
	Piezometer Tip Depth / Elevation (m)	Completion Details
PC-01	None Installed	Backfilled with bentonite holeplug to 3.2 m, cuttings to 0.1 m, and asphalt to ground surface.
PC-02	None Installed	Backfilled with bentonite holeplug to 3.0 m, cuttings to 0.2 m, concrete to 0.1 m, and asphalt to ground surface.
PC-03	9.1 / 158.2	Piezometer with 1.5 m slotted screen installed with sand filter to 6.1 m, bentonite seal from 6.1 m to 3.0 m, and cuttings to surface.
PC-04	None Installed	Backfilled with bentonite holeplug to 3.6 m, cuttings to 0.1 m, and asphalt to ground surface.
PC-05	9.1 / 156.4	Piezometer with 1.5 m slotted screen installed with sand filter to 6.6 m, bentonite seal from 6.6 m to 2.7 m, cuttings from 2.7 m to 0.15 m, and asphalt to ground surface.
PC-06	None Installed	Backfilled with bentonite holeplug to 2.7 m, cuttings to 0.1 m, and asphalt to ground surface.
PC-07	None Installed	Backfilled with bentonite holeplug to 3.0 m, cuttings to 0.3 m, sand to 0.1 m, and asphalt to ground surface.
PC-08	9.1 / 158.3	Piezometer with 1.5 m slotted screen installed with sand filter to 6.7 m, bentonite seal from 6.7 m to 3.1 m, cuttings from 3.1 m to 0.15 m, and asphalt to ground surface.
PC-09	9.1 / 162.0	Piezometer with 1.5 m slotted screen installed with sand filter to 6.1 m, bentonite seal from 6.1 m to 3.1 m, and cuttings to ground surface.
PC-10	None Installed	Backfilled with bentonite holeplug to 3.0 m, cuttings to 0.2 m, sand to 0.1 m, and asphalt to ground surface.
PC-11	9.1 / 163.9	Piezometer with 1.5 m slotted screen installed with sand filter to 6.7 m, bentonite seal from 6.7 m to 3.1 m, cuttings from 3.1 m to 0.6 m, and asphalt to ground surface.
PC-12	None Installed	Backfilled with bentonite holeplug to 2.7 m, cuttings to 0.1 m, and asphalt to ground surface.
PC-13	None Installed	Backfilled with bentonite holeplug to 3.0 m, cuttings to 0.3 m, and asphalt to ground surface.
PC-14	9.1 / 163.7	Piezometer with 1.5 m slotted screen installed with sand filter to 6.1 m, bentonite seal from 6.1 m to 3.1 m, and cuttings to ground surface.
PC-15	9.3 / 159.9	Piezometer with 1.5 m slotted screen installed with sand filter to 6.6 m, bentonite seal from 6.6 m to 1.9 m, cuttings from 1.9 m to 0.2 m, and cement to ground surface.
PC-16	None Installed	Backfilled with bentonite holeplug to 3.0 m, cuttings to 0.1 m, and asphalt to ground surface.
PC-17	None Installed	Backfilled with bentonite holeplug to 2.5 m, cuttings to 0.15 m, and asphalt to ground surface.
PC-18	9.1 / 158.5	Piezometer with 1.5 m slotted screen installed with sand filter to 6.7 m, bentonite seal from 6.7 m to 4.4 m, cuttings from 4.4 m to 0.15 m, and asphalt to ground surface.
PC-19	None Installed	Backfilled with bentonite holeplug to 3.0 m, cuttings to 0.3 m, and sand and gravel to ground surface.

PC-20	9.1 / 156.3	Piezometer with 1.5 m slotted screen installed with sand filter to 6.1 m, bentonite seal from 6.1 m to 1.8 m, and cuttings to ground surface.
PC-21	8.2 / 160.0	Piezometer with 1.5 m slotted screen installed with sand filter to 6.1 m, bentonite seal from 6.1 m to 2.0 m, cuttings from 2.0 m to 0.15 m, and asphalt to ground surface.
PC-22	None Installed	Backfilled with bentonite holeplug to 2.1 m, cuttings to 1.5 m, and asphalt to ground surface.
PC-23	None Installed	Backfilled with bentonite holeplug to 2.0 m, cuttings to 0.1 m, and asphalt to ground surface.
PC-24	7.6 / 161.4	Piezometer with 1.5 m slotted screen installed with sand filter to 5.5 m, bentonite seal from 5.5 m to 3.1 m, cuttings from 3.1 m to 0.3 m, and concrete to ground surface.
PC-25	8.8 / 172.4	Piezometer with 1.5 m slotted screen installed with sand filter to 7.0 m, bentonite seal from 7.0 m to 1.5 m, cuttings from 1.5 m to 0.15 m, and cement to ground surface.
PC-26	None Installed	Backfilled with bentonite holeplug to 1.9 m, cuttings to 0.1 m, and asphalt to ground surface.
PC-27	None Installed	Backfilled with bentonite holeplug to 3.0 m, cuttings to 0.15 m, and asphalt to ground surface.
PC-28	9.1 / 171.9	Piezometer with 1.5 m slotted screen installed with sand filter to 7.1 m, bentonite seal from 7.1 m to 2.0 m, cuttings from 2.0 m to 0.3 m, and cement to ground surface.
PC-29	9.1 / 170.8	Piezometer with 1.5 m slotted screen installed with sand filter to 7.3 m, bentonite seal from 7.3 m to 2.4 m, cuttings from 2.4 m to 0.3 m, and cement to ground surface.
PC-30	None Installed	Backfilled with bentonite holeplug to 2.6 m, cuttings to 0.2 m, and asphalt to ground surface.

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-01 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 839 007.7 E 296 413.9 ORIGINATED BY ES
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2009.12.24 - 2009.12.24 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
167.0											
0.0	**ASPHALT:** (90mm)						167				
0.1	**SAND** and **GRAVEL**, some silt Dense Brown Damp		1	SS	50				○		35 48 17 (SI+CL)
166.1	(FILL)										
1.0	Clayey **SILT**, some sand, trace gravel Very Stiff to Stiff Brown (FILL)		2	SS	26		166		○		
			3	SS	13		165		○		
164.7											
2.4	Silty **CLAY**, with sand, trace gravel Very Stiff to Hard Mottled Brown Grey (TILL)(CL to CL-ML)		4	SS	20				○⊢		4 36 40 20
			5	SS	18		164		○		
			6	SS	32		163		○		
			7	SS	35		162		○		
			8	SS	20		161		○		
			9	SS	17		160		○⊢		5 37 39 19
							159				
			10	SS	20		158		○		
157.3											
9.8	END OF BOREHOLE AT 9.8m.										

Continued Next Page

+ ^{3}, × ^{3}: Numbers refer to Sensitivity

20
15 ⊕ 5 (%) STRAIN AT FAILURE
10

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-01 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 839 007.7 E 296 413.9 ORIGINATED BY ES

HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN

DATUM Geodetic DATE 2009.12.24 - 2009.12.24 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						GR SA SI CL
	Continued From Previous Page										
	BOREHOLE OPEN AND DRY UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 3.2m, THEN CUTTINGS TO 0.1m, THEN ASPHALT TO SURFACE.										

$+^3, \times^3$: Numbers refer to Sensitivity

$15 \oplus^{20}_{10} 5$ (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-02 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 839 015.8 E 296 432.7 ORIGINATED BY ES
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2009.12.20 - 2009.12.20 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%)	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
167.3											
0.0	**ASPHALT:** (115mm)										
0.1	Gravelly **SAND**, some silt Very Dense to Dense Brown Damp (FILL)		1	SS	62		167				27 63 10 (SI+CL)
166.2			2	SS	42						
1.1	Clayey **SILT**, some sand, trace gravel Hard to Stiff Brown (FILL)		3	SS	23		166				
			4	SS	13		165				
164.1											
3.2	Silty **SAND**, some clay, some gravel Dense Brown Damp (FILL)		5	SS	43		164				14 44 29 13
163.5											
3.8	Silty **CLAY**, sandy, trace gravel Very Stiff to Hard Brown (TILL)(CL)		6	SS	19		163				
			7	SS	57		162				
			8	SS	40		161				1 23 41 35
			9	SS	11		160				
	Stiff Becoming Grey						159				
			10	SS	30		158				
157.6											
9.8	END OF BOREHOLE AT 9.8m.										

Continued Next Page

+ ^{3}, × ^{3}: Numbers refer to Sensitivity

20 / 15 ⊕ 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-02 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 839 015.8 E 296 432.7 ORIGINATED BY ES
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2009.12.20 - 2009.12.20 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa O UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
	Continued From Previous Page										
	BOREHOLE OPEN AND DRY UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 3.0m, THEN CUTTINGS TO 0.2m, THEN CONCRETE TO 0.1m, THEN ASPHALT TO SURFACE.										

$+^3$, $\times^3$: Numbers refer to Sensitivity

20
15 ⊕ 5
10
(%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-03 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 839 093.7 E 296 419.2 ORIGINATED BY LG
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2009.12.20 - 2009.12.20 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
167.3									
0.0	**ASPHALT:** (150mm)								
0.2	Gravelly **SAND**, some silt Dense Grey Moist (FILL)		1	SS	36		167		31 54 15 (SI+CL)
166.4									
0.9	Clayey **SILT**, sandy, trace gravel Very Stiff Grey (FILL)		2	SS	22		166		
165.8									
1.5	Sandy **SILT**, some clay, trace gravel Compact to Loose Grey Moist (FILL)		3	SS	16				
			4	SS	7		165		
164.4									
2.9	Sandy **SILT**, with clayey silt pockets, trace gravel Compact Brown Moist (FILL)(CL-ML)		5	SS	14		164		6 28 52 14
			6	SS	24				
162.8							163		
4.5	Silty **CLAY**, sandy, trace gravel Stiff to Very Stiff Brown (TILL)(CL-ML)		7	SS	14				
							162		
			8	SS	24		161		
							160		
			9	SS	18				4 36 42 18
							159		
			10	SS	21		158		
157.6									
9.8	END OF BOREHOLE AT 9.8m.								

DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100

SHEAR STRENGTH kPa 20 40 60 80 100
○ UNCONFINED + FIELD VANE
● QUICK TRIAXIAL × LAB VANE

PLASTIC LIMIT w_P NATURAL MOISTURE CONTENT w LIQUID LIMIT w_L
WATER CONTENT (%) 20 40 60

Continued Next Page

+³, ×³: Numbers refer to Sensitivity

20 / 15 ⊕ 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/25/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-03 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 839 093.7 E 296 419.2 ORIGINATED BY LG
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2009.12.20 - 2009.12.20 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa 20 40 60 80 100 (○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE, × LAB VANE)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
	Continued From Previous Page										
	Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2010.01.18 4.3 163.0										

$+^3$, $\times^3$: Numbers refer to Sensitivity

$15 \oplus^{20}_{10} 5$ (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/25/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-04 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 839 099.6 E 296 433.7 ORIGINATED BY LG
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2009.12.22 - 2009.12.22 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa: ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
167.1											
0.0	**ASPHALT:** (75mm)						167				
0.1	Sandy **SILT**, trace clay Brown Moist (FILL)		1	AS					○		9 47 31 13
166.5 0.6	Clayey **SILT**, some sand, trace gravel Very Stiff Brown Moist (FILL)		1	SS	24		166		○		
165.7 1.4	Sandy **SILT**, some clay, trace to some gravel Dense to Loose Brown Moist (FILL)		2	SS	30				○		
			3	SS	8		165		○		11 32 45 12
164.1 3.0	Sandy **SILT**, with clayey silt pockets, trace gravel Loose to Dense Brown Moist (FILL)		4	SS	9		164		○		
			5	SS	30		163		○		
162.2 4.9	Silty **CLAY**, sandy, trace gravel, with 100mm topsoil layer at 4.9m Stiff to Very Stiff Brown (TILL)(CL-ML)		6	SS	12				○ ○		
							162				
			7	SS	13		161		○		
							160				
			8	SS	12				⊖		2 31 48 19
							159				
							158				
			9	SS	26				○		
157.4 9.8	END OF BOREHOLE AT 9.8m.										

Continued Next Page

+ ^{3}, × ^{3}: Numbers refer to Sensitivity

20 / 15 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-04 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 839 099.6 E 296 433.7 ORIGINATED BY LG
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2009.12.22 - 2009.12.22 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa O UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						GR SA SI CL
	Continued From Previous Page										
	BOREHOLE OPEN AND DRY UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 3.6m, THEN CUTTINGS TO 0.1m, THEN ASPHALT COLD PATCH TO SURFACE.										

$+^3$, $\times^3$: Numbers refer to Sensitivity

20 / 15 ⊕ 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-05 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 839 252.0 E 296 315.0 ORIGINATED BY ES
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2009.12.23 - 2009.12.23 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
165.5											
0.0	**ASPHALT:** (100mm)										
0.1	**SAND** and **GRAVEL**, some silt Very Dense to Compact Brown Damp (FILL)		1	SS	54		165	○	○		40 49 11 (SI+CL)
164.5			2	SS	14				○		
1.0	Clayey **SILT**, sandy, trace gravel Firm to Very Stiff Brown (FILL)		3	SS	8		164		○		
			4	SS	16		163		○		
			5	SS	17		162		○		
160.9			6	SS	27				○		4 28 55 13
4.6	Silty **CLAY**, with sand, trace gravel Very Stiff to Hard Grey to Brown (TILL)(CL-ML)		7	SS	19		161		○		
							160 ▼				
			8	SS	34		159		○		
			9	SS	21		158		○		
							157				
			10	SS	38		156		⊣		4 37 39 20
155.8											
9.8	END OF BOREHOLE AT 9.8m.										

Continued Next Page

+ ^{3}, × ^{3}: Numbers refer to Sensitivity

$\frac{20}{15 \oplus 5}$ (%) STRAIN AT FAILURE
10

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-05 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 839 252.0 E 296 315.0 ORIGINATED BY ES

HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN

DATUM Geodetic DATE 2009.12.23 - 2009.12.23 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa 20 40 60 80 100 (○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE, × LAB VANE)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
	Continued From Previous Page										
	BOREHOLE OPEN AND DRY UPON COMPLETION. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2010.01.18 5.6 159.9										

$+^3$, $\times^3$: Numbers refer to Sensitivity

20 / 15 ⊕ 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-06 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 839 260.0 E 296 340.3 ORIGINATED BY ES
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2009.12.21 - 2009.12.21 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
165.8											
0.0	**ASPHALT:** (100mm)										
0.1	**SAND** and **GRAVEL**, trace silt Very Dense to Compact Brown Damp (FILL)		1	SS	72						41 55 4 (SI+CL)
164.7			2	SS	16		165				
1.1	Silty **CLAY**, sandy, trace gravel, occasional cobbles Stiff to Hard Brown (FILL)(CI)		3	SS	11		164				0 30 44 26
			4	SS	11		163				
			5	SS	21						
			6	SS	30		162				
159.7			7	SS	20		161				
6.1	Silty **CLAY**, sandy, trace gravel Hard Brown (TILL)(CL)		8	SS	33		160				3 32 45 20
	Becoming grey		9	SS	54		159				
156.1			10	SS	36		158				
9.8	END OF BOREHOLE AT 9.8m.						157				

Continued Next Page

$+^3$, $\times^3$: Numbers refer to Sensitivity

15 20 5 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-06 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 839 260.0 E 296 340.3 ORIGINATED BY ES

HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN

DATUM Geodetic DATE 2009.12.21 - 2009.12.21 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L / WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						GR SA SI CL
	Continued From Previous Page										
	BOREHOLE OPEN AND DRY UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 2.7m, THEN CUTTINGS TO 0.1m, THEN ASPHALT TO SURFACE.										

$+^3$, $\times^3$: Numbers refer to Sensitivity

20
15 ⊕ 5
10
(%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-07 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 839 779.4 E 296 126.5 ORIGINATED BY LG
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2009.12.20 - 2009.12.20 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
167.6											
0.0	**ASPHALT:** (150mm)										
0.2	Gravelly **SAND**, trace silt Very Dense Brown Moist		1	SS	50/ 0.125		167				
166.9											
0.8	(FILL)		2	SS	24						
	Silty **CLAY**, sandy, trace gravel Very Stiff to Firm Grey (FILL)(CL)		3	SS	8		166				
			4	SS	6		165				2 31 45 22
			5	SS	10						
163.9							164				
3.7	Silty **CLAY**, sandy, trace gravel Very Stiff to Hard Grey (TILL)(CL)		6	SS	20						
			7	SS	17		163				1 31 46 22
	Occasional sand and gravel layers		8	SS	14		162				
	Occasional cobbles						161				
			9	SS	23		160				0 24 51 25
							159				
157.9			10	SS	35		158				
9.8	END OF BOREHOLE AT 9.8m.										

Continued Next Page

$+^3$, $\times^3$: Numbers refer to Sensitivity

20
15 ⊕ 5 (%) STRAIN AT FAILURE
10

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-07 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 839 779.4 E 296 126.5 ORIGINATED BY LG

HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN

DATUM Geodetic DATE 2009.12.20 - 2009.12.20 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P NATURAL MOISTURE CONTENT w LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
	Continued From Previous Page										
	BOREHOLE OPEN AND DRY UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 3.0m, CUTTINGS TO 0.3m, SAND TO 0.1m, THEN COLD PATCH TO SURFACE.										

+ ^{3}, × ^{3}: Numbers refer to Sensitivity

20 / 15 ⊕ 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-08 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 839 781.3 E 296 143.6 ORIGINATED BY ES
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2009.12.23 - 2009.12.23 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH kPa ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
167.4												
0.0	**ASPHALT:** (90mm)											
0.1	**SAND**, some gravel Very Dense Brown Damp		1	SS	57		167					
166.5	(FILL)											
0.9	Silty **CLAY**, sandy, trace gravel Stiff to Very Stiff Brown (FILL)(CL)		2	SS	23							5 31 40 24
			3	SS	9		166					
			4	SS	12		165					
			5	SS	14							
	Occasional cobbles		6	SS	21		164					
162.7												
4.7	Silty **CLAY**, sandy, trace gravel Very Stiff to Hard Brown to Grey (TILL)(CL)		7	SS	21		163					
							162					
			8	SS	23	▼	161					6 35 40 19
			9	SS	50/ 0.075		160					
							159					
			10	SS	46		158					
157.6												
9.8	END OF BOREHOLE AT 9.8m.											

Continued Next Page

+ ³, × ³: Numbers refer to Sensitivity

20 / 15 ⊕ 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-08 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 839 781.3 E 296 143.6 ORIGINATED BY ES

HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN

DATUM Geodetic DATE 2009.12.23 - 2009.12.23 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa O UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						GR SA SI CL
	Continued From Previous Page										
	BOREHOLE OPEN AND DRY UPON COMPLETION. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2010.01.18 6.3 161.1										

$+^3$, $\times^3$: Numbers refer to Sensitivity

$^{20}_{15}\oplus^{5}_{10}$ (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-09 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 840 225.4 E 295 920.3 ORIGINATED BY LG
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2009.12.21 - 2009.12.21 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH kPa ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
171.1												
0.0	**ASPHALT:** (150mm)						171					
0.2	**SAND** and **GRAVEL**, trace silt Compact Brown Moist (FILL)		1	SS	26					○		42 54 4 (SI+CL)
170.3												
0.8	Silty **CLAY**, sandy, trace gravel Stiff Brown (FILL)(CL)		2	SS	10		170			○		
			3	SS	9		169			○⊣		3 34 42 21
			4	SS	15					○		
			5	SS	8		168			○		
			6	SS	12		167			○		
165.4							166					
5.6	Silty **CLAY**, sandy, trace gravel Stiff to Very Stiff Mottled Brown Grey (TILL)(CL)		7	SS	13		165			○		
	Becoming Brown		8	SS	19		164			○⊣		3 32 42 23
							163					
161.3			9	SS	24		162			○		
9.8	END OF BOREHOLE AT 9.8m.											

Continued Next Page

+ ^{3}, × ^{3}: Numbers refer to Sensitivity

20 / 15 ⊕ 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-09 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 840 225.4 E 295 920.3 ORIGINATED BY LG

HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN

DATUM Geodetic DATE 2009.12.21 - 2009.12.21 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa: O UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
	Continued From Previous Page										
	BOREHOLE OPEN AND DRY UPON COMPLETION. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2010.01.18 5.3 165.8										

$+^3$, $\times^3$: Numbers refer to Sensitivity

20 / 15 ⊕ 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-10 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 840 227.5 E 295 937.8 ORIGINATED BY SLL
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2009.12.23 - 2009.12.23 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa: ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
170.9 / 0.0											
0.1	**ASPHALT:** (75mm)		1	SS	50/						
	Gravelly **SAND**, some silt Very Dense Brown		1	GS	0.075						21 64 15 (SI+CL)
170.2 / 0.7	Moist (FILL)										
	Silty **CLAY**, with sand, trace gravel Very Stiff to Stiff Brown (FILL)(CL)		2	SS	18		170				
			3	SS	12		169				
			4	SS	15						1 35 42 22
	Occasional fine sand seams		5	SS	21		168				
			6	SS	10		167				
			7	SS	14		166				
163.8			8	SS	12		165				4 35 39 22
7.2	Silty **CLAY**, sandy, trace gravel Stiff to Very Stiff Brown (TILL)						164				
			9	SS	13		163				
			10	SS	18		162				
161.2 / 9.8	END OF BOREHOLE AT 9.8m.										

Continued Next Page

+ ^{3}, × ^{3}: Numbers refer to Sensitivity

15 (20, 10, 5) (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-10 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 840 227.5 E 295 937.8 ORIGINATED BY SLL
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2009.12.23 - 2009.12.23 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						GR SA SI CL
	Continued From Previous Page										
	BOREHOLE OPEN AND DRY UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 3.0m, CUTTINGS TO 0.2m, SAND TO 0.1m, THEN ASPHALT TO SURFACE.										

$+^3$, $\times^3$: Numbers refer to Sensitivity

20 / 15 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-11 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 840 786.3 E 295 620.1 ORIGINATED BY LRB
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2010.01.10 - 2010.01.10 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa: ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
173.0							173				
0.0	**ASPHALT:** (100mm)										
0.1	Silty **SAND**, some clay, trace gravel Very Dense Brown		1	SS	71				○		
172.2	(FILL)						172				
0.8	Silty **CLAY**, with sand, some gravel Very Stiff to Stiff Grey (FILL)		2	SS	25				○		
			3	SS	22		171		○		15 39 32 14
	Becoming brown		4	SS	18				○		
			5	SS	11		170		○		
168.7			6	SS	14				○		
4.3	Silty **CLAY**, trace to some sand, trace gravel Very Stiff to Hard Brown (TILL)(Cl)		7	SS	17		169		○		1 17 29 53
							168				
			8	SS	35		167		○		
							166				
			9	SS	19		165		○		
							164				
163.2			10	SS	30				○		0 5 29 66
9.8	END OF BOREHOLE AT 9.8m.										

Continued Next Page

$+^3$, $\times^3$: Numbers refer to Sensitivity

20 / 15 ⊕ 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

RECORD OF BOREHOLE No PC-11 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 840 786.3 E 295 620.1 ORIGINATED BY LRB
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2010.01.10 - 2010.01.10 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa: ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L / WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						GR SA SI CL
	Continued From Previous Page										
	BOREHOLE OPEN AND DRY UPON COMPLETION. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2010.01.18 Dry										

$+^3$, $\times^3$: Numbers refer to Sensitivity

$15 \oplus^{20}_{10} 5$ (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-12 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 840 796.8 E 295 645.0 ORIGINATED BY ES
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2009.12.22 - 2009.12.22 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa: ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
173.4											
0.0	**ASPHALT:** (100mm)										
0.1	Gravelly **SAND**, some silt Very Dense Brown Damp (FILL)		1	SS	63		173				32 55 13 (SI+CL)
172.1			2	SS	50						
1.3	Silty **CLAY**, some sand, trace gravel Firm to Very Stiff Brown (FILL)(CI-CL)		3	SS	8		172				
			4	SS	10		171				3 15 33 49
			5	SS	15		170				
			6	SS	14		169				
			7	SS	23						
166.2			8	SS	10		168 167				2 19 42 37
7.2	Silty **CLAY**, some sand, trace gravel Very Stiff Grey (TILL)		9	SS	18	▽	166 165				
163.6			10	SS	21		164				
9.8	END OF BOREHOLE AT 9.8m.										

Continued Next Page

$+^3$, $\times^3$: Numbers refer to Sensitivity

20 / 15 ⊕ 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-12 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 840 796.8 E 295 645.0 ORIGINATED BY ES

HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN

DATUM Geodetic DATE 2009.12.22 - 2009.12.22 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	Continued From Previous Page										
	BOREHOLE OPEN AND WATER LEVEL AT 8.8m UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 2.7m, CUTTINGS TO 0.1m, THEN ASPHALT TO SURFACE.										

$+^3$, $\times^3$: Numbers refer to Sensitivity

20 15 10 5 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-13 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 840 848.4 E 295 594.4 ORIGINATED BY MEF
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2010.01.10 - 2010.01.10 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
172.6											
0.0	**ASPHALT:** (150mm)										
0.2	Gravelly **SAND**, some silt Very Dense to Compact Brown Dry (FILL)		1	AS			172		○		
			1	SS	59				○		
			2	SS	52		171		○		21 65 14 (SI+CL)
			3	SS	16		170		○		
			4	SS	20		169		○		
168.6											
4.0	Silty **CLAY**, some sand, trace gravel, trace rootlets Firm Grey (FILL)		5	SS	8				○		
			6	SS	6		168		○		4 18 32 46
166.5							167				
6.1	Silty **CLAY**, sandy, trace gravel Stiff to Very Stiff Brown (TILL)(CL)		7	SS	10		166		○		
			8	SS	22		165		○		
			9	SS	14		164		⊣○⊢		0 33 47 20
162.8							163				
9.8	END OF BOREHOLE AT 9.8m.										

Continued Next Page

$+^3$, $\times^3$: Numbers refer to Sensitivity

20 / 15 ⊕ 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-13 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 840 848.4 E 295 594.4 ORIGINATED BY MEF
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2010.01.10 - 2010.01.10 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P NATURAL MOISTURE CONTENT w LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						GR SA SI CL
	Continued From Previous Page										
	BOREHOLE OPEN AND DRY UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 3.0m, THEN CUTTINGS TO 0.3m, THEN ASPHALT PATCH TO SURFACE.										

$+^3$, $\times^3$: Numbers refer to Sensitivity

$\oplus^{20}_{10}$ (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-14 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 840 857.8 E 295 618.1 ORIGINATED BY LG
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2009.12.22 - 2009.12.22 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
172.8											
0.0	**ASPHALT:** (150mm)										
0.2	**SAND**, some gravel, some silt Dense to Compact Brown Moist (FILL)		1	AS					○		
			1	SS	36		172		○		19 66 15 (SI+CL)
			2	SS	11		171		○		
170.6											
2.2	Silty **CLAY**, sandy, trace gravel Firm Brown (FILL)(CI)		3	SS	6		170		○		
			4	SS	8				⊖		2 20 38 40
			5	SS	7		169		○		
167.8			6	SS	8		168		○		
5.0	Silty **CLAY**, some sand, trace gravel Firm to Very Stiff Brown (TILL)(CL)										
			7	SS	9		167		○		
							166				
			8	SS	4		165		⊖		1 16 47 36
							164				
			9	SS	26				○		
163.1											
9.8	END OF BOREHOLE AT 9.8m.										

Continued Next Page

$+^3$, $\times^3$: Numbers refer to Sensitivity

20 / 15 ⊕ 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-14 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 840 857.8 E 295 618.1 ORIGINATED BY LG
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2009.12.22 - 2009.12.22 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa: O UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L / WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
	Continued From Previous Page										
	BOREHOLE OPEN AND DRY UPON COMPLETION. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2010.01.18 5.1 167.7										

$+^3$, $\times^3$: Numbers refer to Sensitivity

20
15 ⊕ 5
10
(%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

RECORD OF BOREHOLE No PC-15 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 841 187.1 E 295 457.6 ORIGINATED BY SLL
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2010.01.13 - 2010.01.13 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH kPa ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w_L	WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
169.2															
0.0 / 168.7	**ASPHALT:** (400mm)						169								
0.5 / 168.5	**SAND**, some gravel Brown Moist (FILL)														
0.7	Silty **CLAY**, sandy, trace gravel Very Stiff to Hard Brown (FILL)(CI)		1	SS	36										
			2	SS	29		168								
166.6			3	SS	40		167								1 30 31 38
2.6	Silty **CLAY**, some sand to sandy, trace gravel Hard Brown (TILL)(CL)		4	SS	36		166								
			5	SS	38		165								
			6	SS	70		164								
	becoming Very Stiff to Stiff becoming Grey		7	SS	20		163								
			8	SS	13	▼	162 161								2 21 32 45
159.4			9	SS	8		160								
9.8	END OF BOREHOLE AT 9.8m.														

Continued Next Page

$+^3$, $\times^3$: Numbers refer to Sensitivity

20 / 15 ⊕ 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-15 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 841 187.1 E 295 457.6 ORIGINATED BY SLL

HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN

DATUM Geodetic DATE 2010.01.13 - 2010.01.13 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa: O UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L / WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
	Continued From Previous Page										
	BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2010.01.18 8.2 161.0										

+^{3}, ×^{3}: Numbers refer to Sensitivity

20 / 15 ⊕ 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-16 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 841 193.5 E 295 473.7 ORIGINATED BY ES
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2009.12.22 - 2009.12.22 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE, × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
169.5											
0.0	**ASPHALT:** (125mm)										
0.1	**SAND** and **GRAVEL**, some silt Very Dense to Compact Brown Damp (FILL)		1	SS	60		169		○		35 52 13 (SI+CL)
168.2			2	SS	25				○		
1.3	Silty **CLAY**, some sand, trace gravel Very Stiff Brown (FILL)(CI)		3	SS	29		168		○		
166.8	Cobble at 2.7m		4	SS	23		167		○		2 13 34 51
2.7	Silty **SAND**, some gravel, trace clay pockets, occasional cobbles Compact Brown Damp (FILL)		5	SS	27		166		○		
166.0											
3.5	Silty **CLAY**, some sand, trace gravel Very Stiff Grey (FILL)		6	SS	10		165		○		
165.6											
3.9	Silty **CLAY**, some sand, trace gravel Stiff to Very Stiff Grey (TILL)(CI) becoming Brown		7	SS	22	▽	164		○		
			8	SS	26		163		○		
			9	SS	23		162		○		0 16 32 52
			10	SS	15		161		○		
159.7							160		○		
9.8	END OF BOREHOLE AT 9.8m.										

Continued Next Page

+ ^{3}, × ^{3}: Numbers refer to Sensitivity

20 / 15 ⊕ 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-16 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 841 193.5 E 295 473.7 ORIGINATED BY ES
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2009.12.22 - 2009.12.22 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa: O UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L / WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
	Continued From Previous Page										
	BOREHOLE OPEN AND WATER LEVEL AT 5.9m UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 3.0m, THEN CUTTINGS TO 0.1m, THEN ASPHALT TO SURFACE.										

$+^3$, $\times^3$: Numbers refer to Sensitivity

15 (20/10) 5 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-17 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 841 380.8 E 295 374.6 ORIGINATED BY SLL
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2010.01.12 - 2010.01.12 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
167.3											
0.0	**ASPHALT:** (125mm)										
0.1	Gravelly **SAND**, trace silt Brown Moist (FILL)		1	GS			167		○		26 70 4 (SI+CL)
166.7											
0.6	Silty **CLAY**, sandy, trace gravel Very Stiff to Hard Brown (FILL)		1	SS	17				○		
			2	SS	24		166		○		
165.1											
2.3	Silty **CLAY**, sandy, trace gravel Hard to Very Stiff Brown to Grey (TILL)(CL to CI)		3	SS	22		165		○		
			4	SS	35		164		○		2 24 43 31
			5	SS	55				○		
			6	SS	29		163				
			7	SS	21		162				1 31 37 31
			8	SS	22		161		○		
			9	SS	48		160		○		
157.6							159				
9.8	END OF BOREHOLE AT 9.8m.						158				

Continued Next Page

+^{3}, ×^{3}: Numbers refer to Sensitivity

(%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-17 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 841 380.8 E 295 374.6 ORIGINATED BY SLL

HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN

DATUM Geodetic DATE 2010.01.12 - 2010.01.12 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						GR SA SI CL
	Continued From Previous Page										
	BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 2.5m, AUGER CUTTINGS TO 0.15m, AND ASPHALT PATCH TO SURFACE.										

$+^3$, $\times^3$: Numbers refer to Sensitivity

$\oplus^{20}_{15\ 10\ 5}$ (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-18 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 841 386.0 E 295 391.8 ORIGINATED BY ES
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2009.12.21 - 2009.12.21 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%)	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
167.6											
0.0	**ASPHALT:** (125mm)										
0.1	Gravelly **SAND**, trace silt, occasional cobbles		1	SS	38		167				27 63 10 (SI+CL)
166.9	Dense										
0.7	Brown		2	SS	63/ 0.275						
	Damp										
	(FILL)										
	Silty **CLAY**, trace sand, trace gravel, occasional cobbles		3	SS	27		166				0 7 31 62
	Hard to Very Stiff										
	Brown										
165.3	(FILL)(CI)										
2.3	Silty **CLAY**, sandy, trace gravel		4	SS	15		165				
	Stiff to Hard										
	Brown		5	SS	35						
	(TILL)(CL)						164				
			6	SS	31						
			7	SS	26		163				
							162				
			8	SS	13						3 26 35 36
							161				
	230mm clay layer at 7.6m		9	SS	34		160				
							159				
			10	SS	34						
157.8							158				
9.8	END OF BOREHOLE AT 9.8m.										

Continued Next Page

$+^3$, $\times^3$: Numbers refer to Sensitivity

(%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-18 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 841 386.0 E 295 391.8 ORIGINATED BY ES

HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN

DATUM Geodetic DATE 2009.12.21 - 2009.12.21 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P NATURAL MOISTURE CONTENT w LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						GR SA SI CL
	Continued From Previous Page										
	BOREHOLE OPEN AND WATER LEVEL AT 6.1m UPON COMPLETION. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2010.01.18 3.2 164.4										

+^{3}, ×^{3}: Numbers refer to Sensitivity

20 / 15 ⊕ 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

RECORD OF BOREHOLE No PC-19 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 841 838.0 E 295 217.3 ORIGINATED BY LG
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2009.12.21 - 2009.12.21 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
165.6											
0.0	**SAND** and **GRAVEL**, trace silt Brown Moist		1	AS					○		48 42 10
165.0	(FILL)										(SI+CL)
0.6	Silty **CLAY**, some sand, trace gravel Firm to Stiff Brown (TILL)(CI)		1	SS	7		165		○		
			2	SS	12		164		○		
			3	SS	8		163		○		0 18 30 52
			4	SS	5		162		○		
161.6											
4.0	Silty **SAND**, some clay lenses, trace gravel Compact to Very Dense Grey Moist (TILL)		5	SS	32		161		○		
			6	SS	30		160		○		
			7	SS	29		159		○		
			8	SS	82/ 0.275		158		○		10 45 34 11
	Occasional cobbles										
156.9											
8.7	Sandy **SILT**, trace gravel Compact Grey Moist		9	SS	16		157		○		
155.8							156				
9.8	END OF BOREHOLE AT 9.8m.										

Continued Next Page

+ ^{3}, × ^{3}: Numbers refer to Sensitivity

15 (20 / 10) 5 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/25/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-19 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 841 838.0 E 295 217.3 ORIGINATED BY LG
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2009.12.21 - 2009.12.21 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa O UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P NATURAL MOISTURE CONTENT w LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
	Continued From Previous Page										
	BOREHOLE OPEN AND DRY UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 3.0m, CUTTINGS TO 0.3m, THEN SAND AND GRAVEL TO SURFACE.										

$+^3$, $\times^3$: Numbers refer to Sensitivity

20 / 15 ⊕ 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/25/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-20 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 841 843.8 E 295 226.9 ORIGINATED BY LG
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2009.12.23 - 2009.12.23 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa: O UNCONFINED, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
165.4											
0.0 / 164.9	Silty **CLAY**, mixed with **SAND**, trace gravel Brown (FILL)(CL)		1	AS							4 36 27 33
0.5	Silty **CLAY**, some sand, trace gravel Stiff Brown (TILL)		1	SS	10		165		o		
			2	SS	14		164		o		
			3	SS	9		163		o		
			4	SS	13		162		o		
161.3											
4.1	Silty **SAND**, some clay lenses, trace gravel Compact to Dense Grey (TILL)(CL-ML)		5	SS	18		161		o		
			6	SS	35		160				
158.2							159		o⊣		1 27 55 17
7.2	Silty **CLAY**, trace sand, trace gravel Hard to Stiff Grey (TILL)(CL)		7	SS	40		158		o		
							157				
155.7			8	SS	14		156		⊣o		0 9 35 56
9.8	END OF BOREHOLE AT 9.8m.										

Continued Next Page

+³, ×³: Numbers refer to Sensitivity

20 / 15 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/25/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-20 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 841 843.8 E 295 226.9 ORIGINATED BY LG

HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN

DATUM Geodetic DATE 2009.12.23 - 2009.12.23 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa: O UNCONFINED, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
	Continued From Previous Page										
	BOREHOLE OPEN AND DRY UPON COMPLETION. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2010.01.18 2.1 163.3										

$+^3$, $\times^3$: Numbers refer to Sensitivity

$\frac{20}{15 \oplus 5}$ (%) STRAIN AT FAILURE
10

ONTMT4S 9270.GPJ 1/25/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-21 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 844 149.4 E 294 503.4 ORIGINATED BY SLL
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2010.01.21 - 2010.01.21 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
168.2											
0.0	**ASPHALT**: (180mm)										
0.2	**SAND**, some gravel Brown Moist (FILL)		1	GS			168		○		
167.5											
0.8	Silty **CLAY**, sandy, trace gravel Firm to Very Stiff Brown (FILL)(CL)		1	SS	7				○		2 28 38 32
			2	SS	19		167		○		
	wood fragments at 2.4m		3	SS	20		166		○		
164.5			4	SS	8		165		○		
3.7	Silty **CLAY**, trace sand, trace topsoil Firm Brown (FILL)		5	SS	7				○		
			6	SS	8	▼	164		○		
							163				
			7	SS	6		162		○		
160.9							161				
7.3	**SAND** and **GRAVEL**, some silt Dense Brown Wet		8	SS	34				○		47 42 11 (SI+CL)
159.4							160				
8.8	Silty **SAND**, trace clay, trace gravel Very Dense Grey Moist (TILL)		9	SS	84		159		○		
158.5											
9.8	END OF BOREHOLE AT 9.8m.										

Continued Next Page

+ ^{3}, × ^{3}: Numbers refer to Sensitivity

20 / 15 ⊕ 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

RECORD OF BOREHOLE No PC-21 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 844 149.4 E 294 503.4 ORIGINATED BY SLL
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2010.01.21 - 2010.01.21 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa: O UNCONFINED + FIELD VANE; ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L; WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						GR SA SI CL
	Continued From Previous Page										
	Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.										
	WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2010.01.06 7.5 160.7 2010.01.18 5.1 163.1										

$+^3$, $\times^3$: Numbers refer to Sensitivity

$\oplus^{20}_{15\ 10\ 5}$ (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

RECORD OF BOREHOLE No PC-22 1 OF 1 METRIC

G.W.P. 202-95-00 LOCATION N 4 844 151.6 E 294 519.6 ORIGINATED BY LRB
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2010.01.10 - 2010.01.10 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH kPa ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P NATURAL MOISTURE CONTENT w LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
167.9												
0.0	**ASPHALT:** (90mm)											
0.1	**SAND** and **GRAVEL**, silty Compact Brown		1	SS	29					○		35 43 22 (SI+CL)
167.3												
0.6	Damp (FILL)											
	Silty **CLAY**, with sand, trace gravel Very Stiff to Stiff Brown (FILL)(CL)		2	SS	26		167			○		
			3	SS	16		166			○		
			4	SS	20		165			○		
	(50mm) thin sandy zone		5	SS	8					⊣○⊢		0 41 33 26
	Occasional wood pieces		6	SS	21		164			○		
163.2												
4.7	**SAND**, some silt, trace gravel Dense Grey/Brown Moist		7	SS	47		163			○		
161.8												
6.1	Gravelly **SAND**, silty Dense Brown		8	SS	42		162			○		27 44 29 (SI+CL)
161.4												
6.5	Wet											
	SAND, some silt Brown Wet						161					
160.6												
7.3	**SAND** and **GRAVEL**, some silt Dense Brown Wet		9	SS	35		160			○		
159.6												
8.4	END OF BOREHOLE AT 8.4m DUE TO AUGER REFUSAL ON POSSIBLE BOULDER OR BEDROCK. BOREHOLE OPEN AND WET UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 2.1m, THEN CUTTINGS TO 1.5m, THEN ASPHALT TO SURFACE.											

+ ³, × ³: Numbers refer to Sensitivity

15 20 10 5 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

RECORD OF BOREHOLE No PC-23 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 844 228.9 E 294 492.0 ORIGINATED BY SLL
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2010.01.06 - 2010.01.06 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
169.4											
0.0	**ASPHALT:** (175mm)										
0.2	**SAND**, some gravel, some silt Brown Moist		1	GS			169		○		
168.7											
0.6	(FILL)										
	Silty **CLAY**, sandy, trace gravel Stiff to Hard Brown (FILL)(CL)		1	SS	11				○		
							168				
			2	SS	20				○ ⊢		1 29 44 26
			3	SS	36		167		○		
166.4											
3.0	**SILT**, some clay, trace sand, trace gravel Very Stiff Brown Moist		4	SS	25		166		○		1 7 77 15
165.6											
3.7	(FILL)										
	Silty **CLAY**, some sand, trace gravel Stiff to Hard Grey (TILL)		5	SS	10	▽			○		
							165				
			6	SS	46						
163.6							164				
5.8	Gravelly **SAND**, trace silt Compact Brown Wet		7	SS	22		163		○		
			8	SS	26		162		○		27 63 10 (SI+CL)
			9	SS	23		161				
159.6							160		○		
9.8	END OF BOREHOLE AT 9.8m.										

Continued Next Page

+ ^{3}, × ^{3}: Numbers refer to Sensitivity

(%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-23 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 844 228.9 E 294 492.0 ORIGINATED BY SLL

HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN

DATUM Geodetic DATE 2010.01.06 - 2010.01.06 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L / WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
	Continued From Previous Page										
	BOREHOLE OPEN TO 6.1m AND WATER LEVEL AT 4.3m UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 2.0m, THEN CUTTINGS TO 0.1m, THEN ASPHALT TO SURFACE.										

$+^3$, $\times^3$: Numbers refer to Sensitivity

$\oplus^{20}_{15\ 10\ 5}$ (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-24 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 844 229.1 E 294 507.8 ORIGINATED BY MEF
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2009.01.10 - 2009.01.10 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
169.0											
0.0	**SAND** and **GRAVEL**, some silt Brown Dry (FILL)		1	AS			169		○		
168.3											
0.8	Silty **CLAY**, sandy, trace gravel Stiff Brown (FILL)(CL)		1	SS	9		168		○		3 33 43 21
			2	SS	11		167		○		
			3	SS	9				○		
165.7			4	SS	9		166		○		
3.4	Silty **CLAY**, some sand, trace gravel, trace shale fragments Loose to Compact Grey Dry (TILL)		5	SS	22		165		○		5 13 60 22
			6	SS	11		164		○		
162.9							163				
6.1	**SAND** and **GRAVEL**, trace silt Compact to Dense Brown Wet		7	SS	28				○		
							162				
			8	SS	35		161		○		41 51 8 (SI+CL)
	Becoming grey										
159.3			9	SS	40		160		○		
9.8	END OF BOREHOLE AT 9.8m.										

Continued Next Page

$+^3$, $\times^3$: Numbers refer to Sensitivity

20 / 15 ⊕ 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-24 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 844 229.1 E 294 507.8 ORIGINATED BY MEF
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2009.01.10 - 2009.01.10 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa: O UNCONFINED + FIELD VANE; ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L; WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						GR SA SI CL
	Continued From Previous Page										
	BOREHOLE OPEN TO 7.6m, AND WET AT 6.1m UPON COMPLETION. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2010.01.18 6.1 162.9										

$+^3$, $\times^3$: Numbers refer to Sensitivity

20
15 ⊕ 5
10
(%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-25 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 845 118.7 E 294 324.3 ORIGINATED BY LRB
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2010.01.12 - 2010.01.12 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
181.2											
0.0	**ASPHALT:** (225mm)										
0.2	Gravelly **SAND**, trace silt Brown Damp (FILL)						181		○		25 66 9 (SI+CL)
180.5 0.6	**SILT** and **SAND** Compact Brown Damp (FILL)		1	SS	23		180		○		
			2	SS	17		179		○		
			3	SS	20		178		○		
	trace clay		4	SS	17		177		○		0 48 48 4
	becoming Wet		5	SS	12	▼	176		○		
176.3 4.9	Silty **CLAY**, some sand, trace gravel Stiff to Very Stiff Brown (FILL)(CI)		6	SS	10		175		○		
			7	SS	13		174		○		1 18 39 42
			8	SS	13		173		○		
			9	SS	19		172		○		
171.4 9.8	END OF BOREHOLE AT 9.8m.										

Continued Next Page

+ ^{3}, × ^{3}: Numbers refer to Sensitivity

20 / 15 ⊕ 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/25/10

Ministry of Transportation
Ontario

RECORD OF BOREHOLE No PC-25 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 845 118.7 E 294 324.3 ORIGINATED BY LRB
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2010.01.12 - 2010.01.12 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa: O UNCONFINED, + FIELD VANE, ● QUICK TRIAXIAL, × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
	Continued From Previous Page										
	Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2010.01.18 4.3 176.9										

$+^3$, $\times^3$: Numbers refer to Sensitivity

$\begin{matrix}20\\15\\10\end{matrix}$ 5 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/25/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-26 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 845 120.9 E 294 338.7 ORIGINATED BY SLL
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2010.01.13 - 2010.01.13 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
181.3											
0.0	**ASPHALT:** (225mm)										
0.2	**SAND**, some gravel Brown Moist (FILL)		1	GS			181		○		
180.7 0.6	**SILT** and **SAND**, trace to some clay, trace gravel Compact Brown Moist (FILL)		1	SS	29				○		
			2	SS	18		180		○		0 37 59 4
			3	SS	21		179		○		
			4	SS	26		178		○		
176.8			5	SS	18				○		1 37 50 12
4.5	Silty **CLAY**, some sand, trace gravel Stiff Brown (FILL)(CI)		6	SS	11		177		○		
			7	SS	8		176		○		
			8	SS	12		175		○		1 20 43 36
			9	SS	12		174		○		
171.5							173		○		
9.8	END OF BOREHOLE AT 9.8m.						172		○		

Continued Next Page

$+^3$, $\times^3$: Numbers refer to Sensitivity

$\overset{20}{15\oplus 5}$ $\overset{}{10}$ (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-26 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 845 120.9 E 294 338.7 ORIGINATED BY SLL

HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN

DATUM Geodetic DATE 2010.01.13 - 2010.01.13 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L / WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
	Continued From Previous Page										
	BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 1.9m, THEN CUTTINGS TO 0.1m THEN ASPHALT TO SURFACE.										

$+^3$, $\times^3$: Numbers refer to Sensitivity

$15 \oplus^{20}_{10} 5$ (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-27 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 845 255.6 E 294 299.8 ORIGINATED BY LRB
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2010.01.12 - 2010.01.12 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
180.6											
0.0	**ASPHALT:** (125mm)										
0.1	**SAND**, some silt, some gravel Compact Brown Damp (FILL)		1	SS	50/ 0.125		180	○	○		
			2	SS	14						
			3	SS	21		179		○		
178.2											
2.4	Sandy **SILT**, some clay zones Compact to Loose Brown Wet (FILL)		4	SS	16		178		○		
			5	SS	21				○		0 29 66 5
176.5							177				
4.1	Silty **CLAY**, sandy Very Stiff Brown		6	SS	8				○		
176.0	(FILL)										
4.6	Silty **CLAY**, trace sand, trace gravel Stiff to Very Stiff Brown (FILL)		7	SS	9		176		○		
			8	SS	10		175		○		
			9	SS	17		174		○		
171.5							173		○		
9.1	Silty **CLAY**, trace sand, trace rootlets, with 50mm topsoil layer Stiff Brown		10	SS	12		172		○		0 6 34 60
170.9	(TILL)(CH)						171		○		
9.8	END OF BOREHOLE AT 9.8m.										

Continued Next Page

$+^3$, $\times^3$: Numbers refer to Sensitivity

$\overset{20}{15\oplus 5}$ $\overset{}{10}$ (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-27 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 845 255.6 E 294 299.8 ORIGINATED BY LRB
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2010.01.12 - 2010.01.12 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa: O UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						GR SA SI CL
	Continued From Previous Page										
	BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 3.0m, AUGER CUTTINGS TO 0.15m AND ASPHALT PATCH TO SURFACE.										

$+^3$, $\times^3$: Numbers refer to Sensitivity

$15 \oplus^{20}_{10} 5$ (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-28 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 845 257.0 E 294 318.8 ORIGINATED BY SLL
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2010.01.13 - 2010.01.13 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
181.0							181				
0.0	**ASPHALT:** (225mm)										
0.2	Gravelly **SAND**, some silt Brown Moist		1	GS					○		31 57 12 (SI+CL)
180.4	(FILL)										
0.6	**SILT** and **SAND**, trace clay, trace gravel Compact Brown Moist (FILL)		1	SS	29		180		○		
			2	SS	26		179		○		
			3	SS	16		178		○		
			4	SS	20				○		0 41 51 8
177.2							177				
3.7	Silty **CLAY**, trace gravel, with some sand seams Stiff to Very Stiff Brown (FILL)		5	SS	11	▼			○		
			6	SS	16		176		○		
			7	SS	15		175		○		
			8	SS	13		174		○		
	trace shale fragments						173		○		
171.9							172				
9.1	Silty **CLAY**, some sand, trace rootlets and wood fragments, with 50mm topsoil layer Very Stiff Brown (TILL)(CH)	TOPSOIL	9	SS	19				⊢●		0 10 51 39
171.2											
9.8											

Continued Next Page

+ ^{3}, × ^{3}: Numbers refer to Sensitivity

20 / 15 ⊕ 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-28 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 845 257.0 E 294 318.8 ORIGINATED BY SLL

HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN

DATUM Geodetic DATE 2010.01.13 - 2010.01.13 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P NATURAL MOISTURE CONTENT w LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
	Continued From Previous Page										
	END OF BOREHOLE AT 9.8m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2010.01.18 4.4 176.6										

$+^3$, $\times^3$: Numbers refer to Sensitivity

$\oplus^{20}_{15\ 10\ 5}$ (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-29 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 845 453.6 E 294 280.2 ORIGINATED BY LRB
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2010.01.12 - 2010.01.12 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
179.9											
0.0	**ASPHALT:** (125mm)										
0.1	**SAND**, some silt, trace gravel Brown Damp (FILL)										
178.8			1	SS	23		179				
1.0	Silty **CLAY**, some sand, trace gravel Very Stiff to Stiff Grey/Brown (FILL)(CL)		2	SS	12		178				
			3	SS	5						0 20 40 40
			4	SS	4		177				
			5	SS	7		176				
175.3											
4.6	**SILT**, some sand to sandy, some clay, trace gravel Compact Brown Moist (FILL)		6	SS	27		175				1 18 66 15
173.8						▼	174				
6.1	Silty **CLAY**, sandy, trace gravel Stiff to Hard Brown (TILL)(CL)		7	SS	12						
			8	SS	19		173				
							172				
							171				
170.1			9	SS	31						1 23 42 34
9.8	END OF BOREHOLE AT 9.8m.										

Continued Next Page

$+^3$, $\times^3$: Numbers refer to Sensitivity

20 / 15 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-29 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 845 453.6 E 294 280.2 ORIGINATED BY LRB

HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN

DATUM Geodetic DATE 2010.01.12 - 2010.01.12 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						GR SA SI CL
	Continued From Previous Page										
	Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2010.01.18 5.8 174.1										

ONTMT4S 9270.GPJ 1/22/10

$+^3$, $\times^3$: Numbers refer to Sensitivity

20 / 15 ⊕ 5 / 10 (%) STRAIN AT FAILURE

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-30 1 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 845 453.9 E 294 289.8 ORIGINATED BY SLL
HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN
DATUM Geodetic DATE 2010.01.04 - 2010.01.04 CHECKED BY MEF

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
180.0											
0.0	**ASPHALT:** (135mm)						180				
0.1	**SAND**, some gravel, some silt Brown Moist (FILL)		1	GS							
179.4											
0.6	Silty **CLAY**, sandy, trace gravel Stiff to Firm Grey (FILL)(CL)		1	SS	13		179				
			2	SS	10		178				
			3	SS	7						
			4	SS	8		177				0 30 44 26
175.7			5	SS	6		176				
4.3	Sandy **SILT**, trace clay Compact Brown to Grey Moist to Wet (FILL)		6	SS	28						0 29 67 4
174.2							175				
5.8	Silty **CLAY**, some sand, trace gravel Stiff Grey (TILL)		7	SS	9		174				
172.6							173				
7.4	Sandy **SILT** Brown										
172.2	Moist										
7.8	Silty **CLAY**, sandy, trace gravel Very Stiff to Hard Brown (TILL)(CL)		8	SS	18		172				
			9	SS	40		171				2 34 44 20
170.2											
9.8	END OF BOREHOLE AT 9.8m.										

Continued Next Page

$+^3$, $\times^3$: Numbers refer to Sensitivity

$\overset{20}{15\oplus 5}$ (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Ministry of Transportation
Ontario

THURBER

RECORD OF BOREHOLE No PC-30 2 OF 2 METRIC

G.W.P. 202-95-00 LOCATION N 4 845 453.9 E 294 289.8 ORIGINATED BY SLL

HWY 427 BOREHOLE TYPE Solid Stem Auger COMPILED BY AN

DATUM Geodetic DATE 2010.01.04 - 2010.01.04 CHECKED BY MEF

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m^3	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						GR SA SI CL
	Continued From Previous Page										
	BOREHOLE OPEN TO 5.2m, DRY UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 2.6m, THEN CUTTINGS TO 0.2m, THEN ASPHALT TO SURFACE.										

$+^3$, $\times^3$: Numbers refer to Sensitivity

20 / 15 ⊕ 5 / 10 (%) STRAIN AT FAILURE

ONTMT4S 9270.GPJ 1/22/10

Appendix B

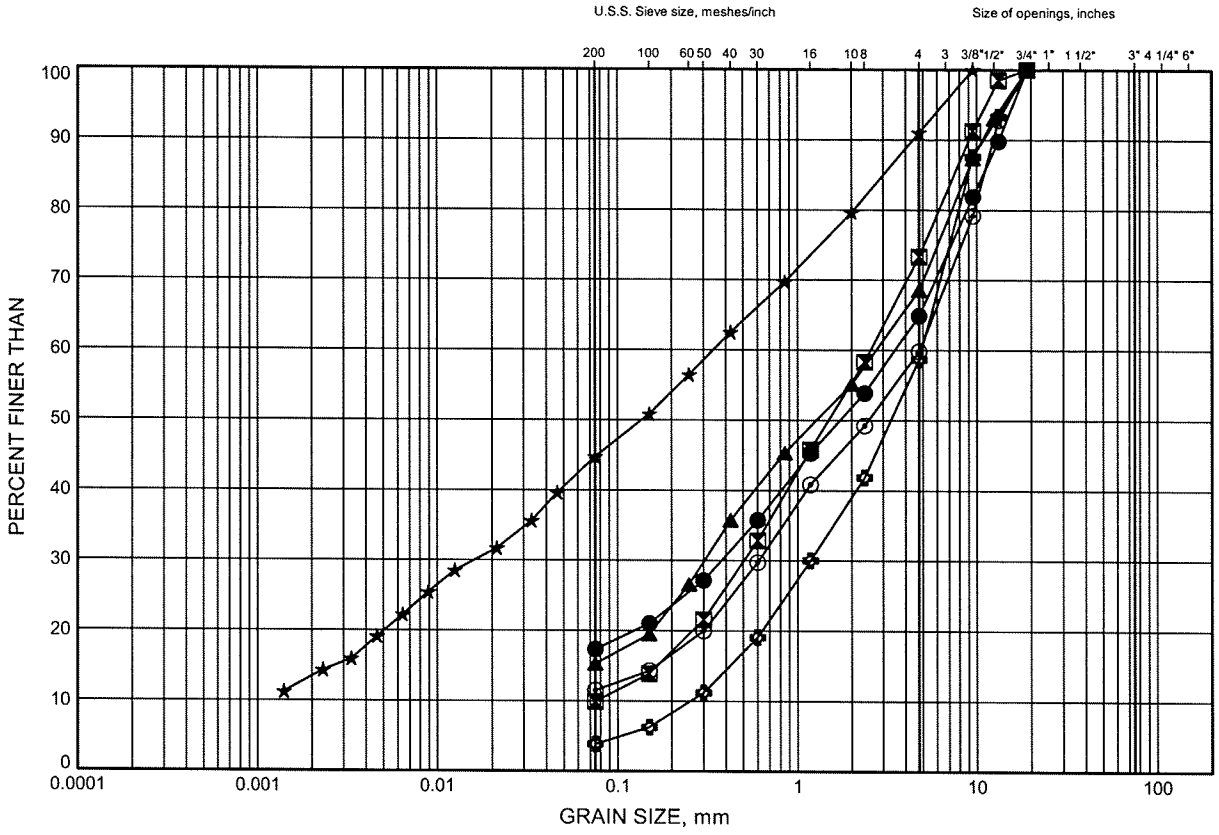
Laboratory Test Results

Hwy 427 Northbound and Southbound

GRAIN SIZE DISTRIBUTION

FIGURE B1

GRANULAR FILL



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	PC-01	0.46	166.57
⊠	PC-02	0.46	166.89
▲	PC-03	0.30	167.02
★	PC-04	0.30	166.80
⊙	PC-05	0.46	165.06
✿	PC-06	0.46	165.37

W.P.# 202-95-00.....
Prepared By MFA.....
Checked By MEF.....

THURBER

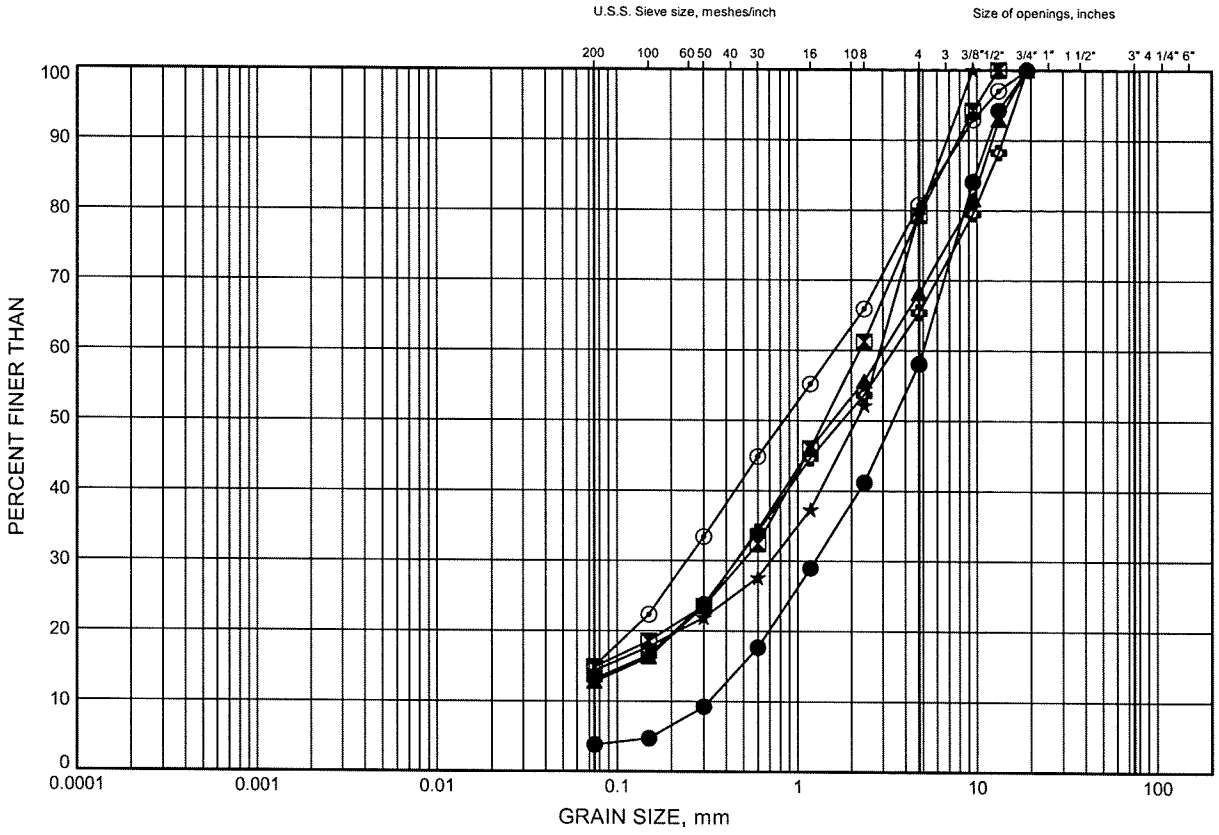
GRAIN SIZE DISTRIBUTION - THURBER 9270.GPJ 1/22/10

Hwy 427 Northbound and Southbound

GRAIN SIZE DISTRIBUTION

FIGURE B2

GRANULAR FILL



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	PC-09	0.30	170.75
⊠	PC-10	0.20	170.72
▲	PC-12	0.46	172.91
★	PC-13	1.83	170.73
⊙	PC-14	1.07	171.78
✿	PC-16	0.46	169.01

W.P.# 202-95-00
Prepared By MFA
Checked By MEF

THURBER

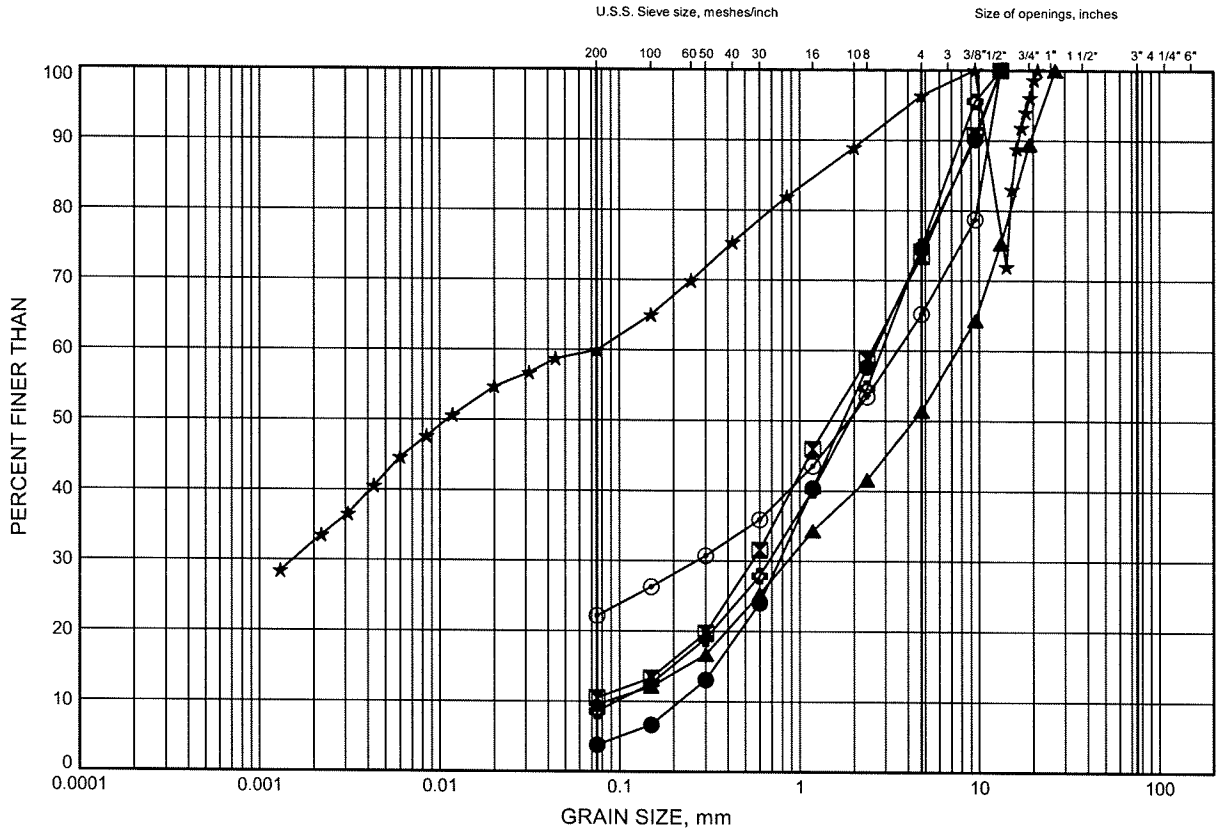
GRAIN SIZE DISTRIBUTION - THURBER 9270.GPJ 1/22/10

Hwy 427 Northbound and Southbound

GRAIN SIZE DISTRIBUTION

FIGURE B3

GRANULAR FILL



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	PC-17	0.27	167.08
⊠	PC-18	0.46	167.12
▲	PC-19	0.30	165.29
★	PC-20	0.30	165.10
⊙	PC-22	0.38	167.54
✿	PC-25	0.30	180.85

W.P.# 202-95-00
Prepared By MFA
Checked By MEF

THURBER

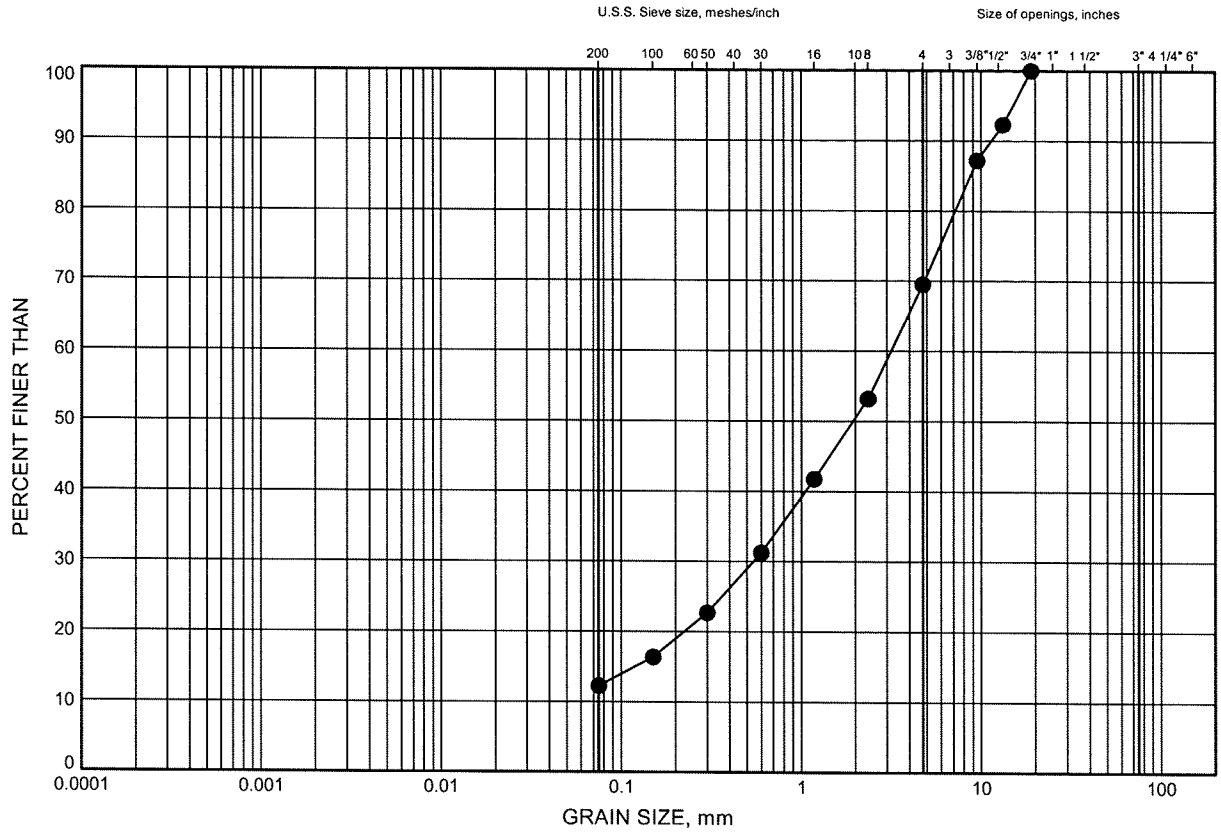
GRAIN SIZE DISTRIBUTION - THURBER 9270.GPJ 1/22/10

Hwy 427 Northbound and Southbound

GRAIN SIZE DISTRIBUTION

FIGURE B4

GRANULAR FILL



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	PC-28	0.30	180.67

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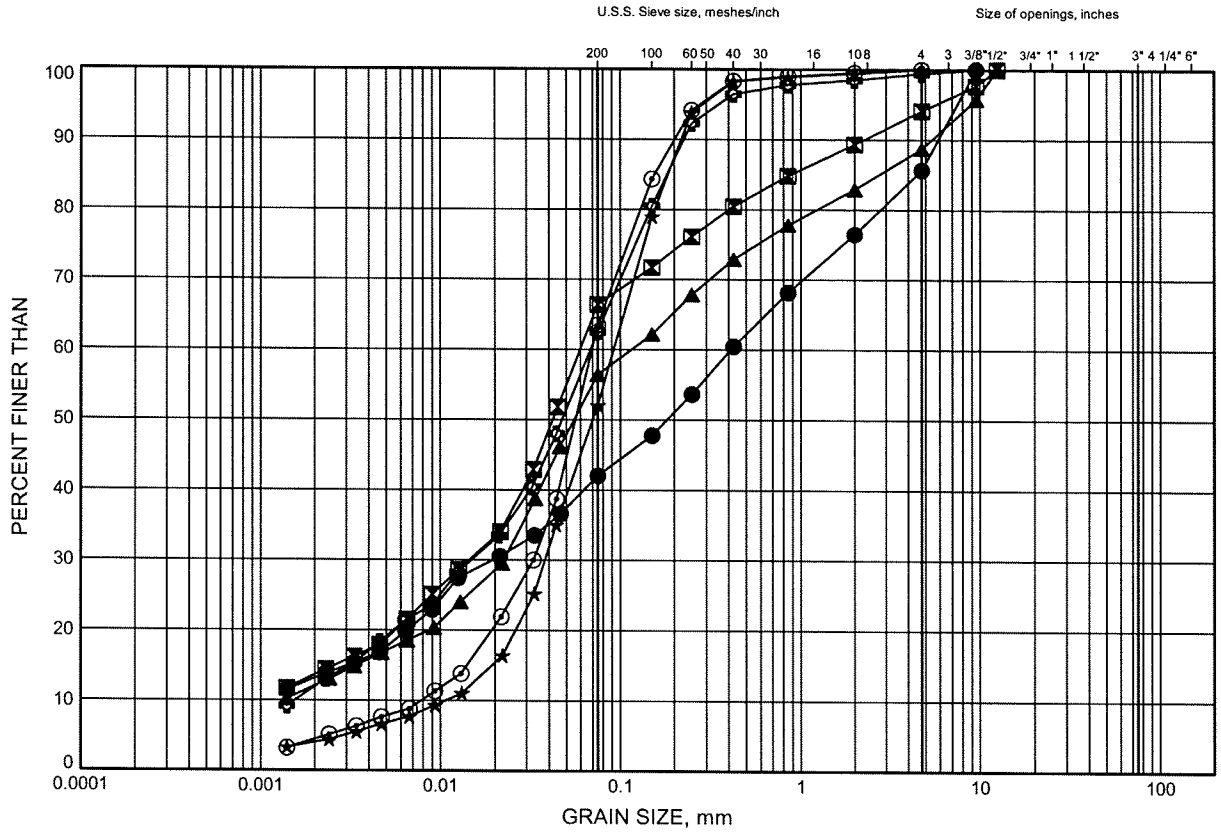
GRAIN SIZE DISTRIBUTION - THURBER 9270.GPJ 1/22/10

Hwy 427 Northbound and Southbound

GRAIN SIZE DISTRIBUTION

FIGURE B5

SAND TO SANDY SILT FILL



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	PC-02	3.35	163.99
⊠	PC-03	3.35	163.97
▲	PC-04	2.59	164.52
★	PC-25	3.35	177.80
⊙	PC-26	1.83	179.45
✪	PC-26	4.11	177.16

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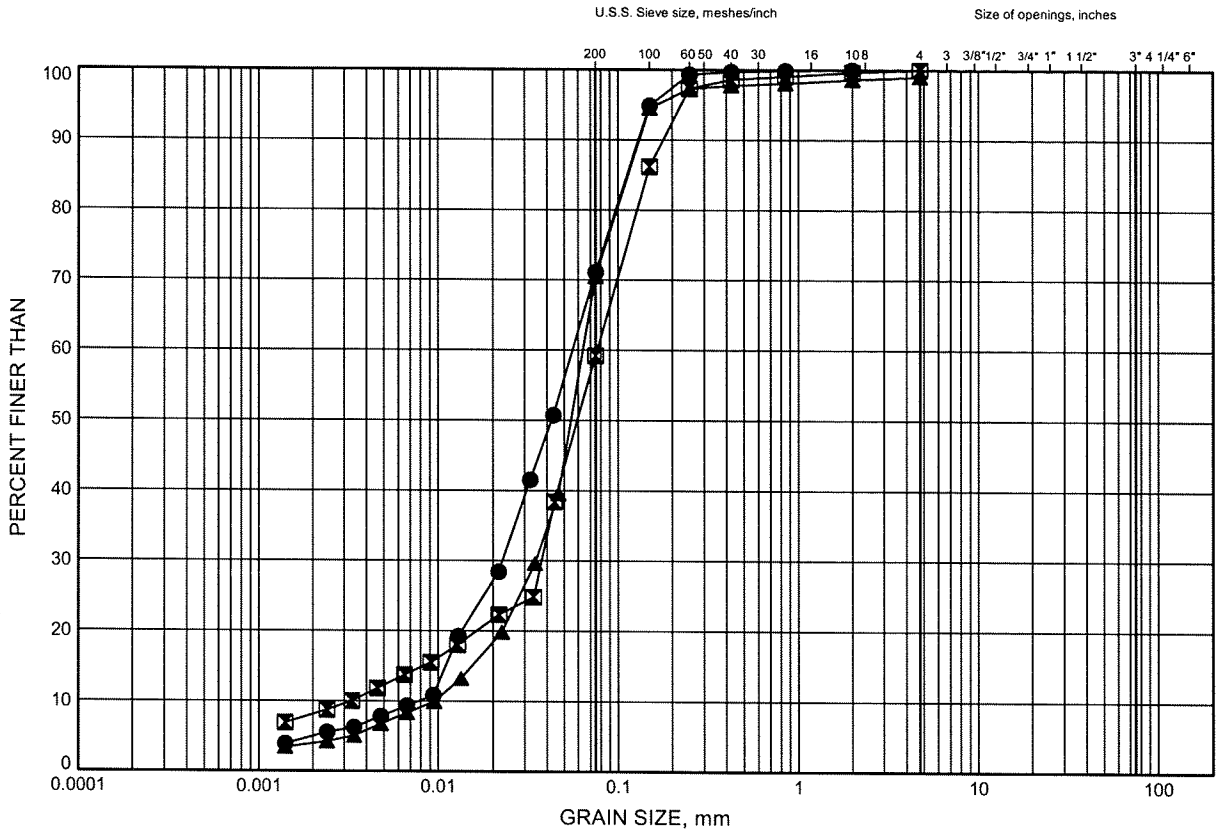
Hwy 427 Northbound and Southbound

GRAIN SIZE DISTRIBUTION

FIGURE B6

SAND TO SANDY SILT FILL



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	PC-27	3.35	177.25
⊠	PC-28	3.35	177.62
▲	PC-30	4.88	175.12

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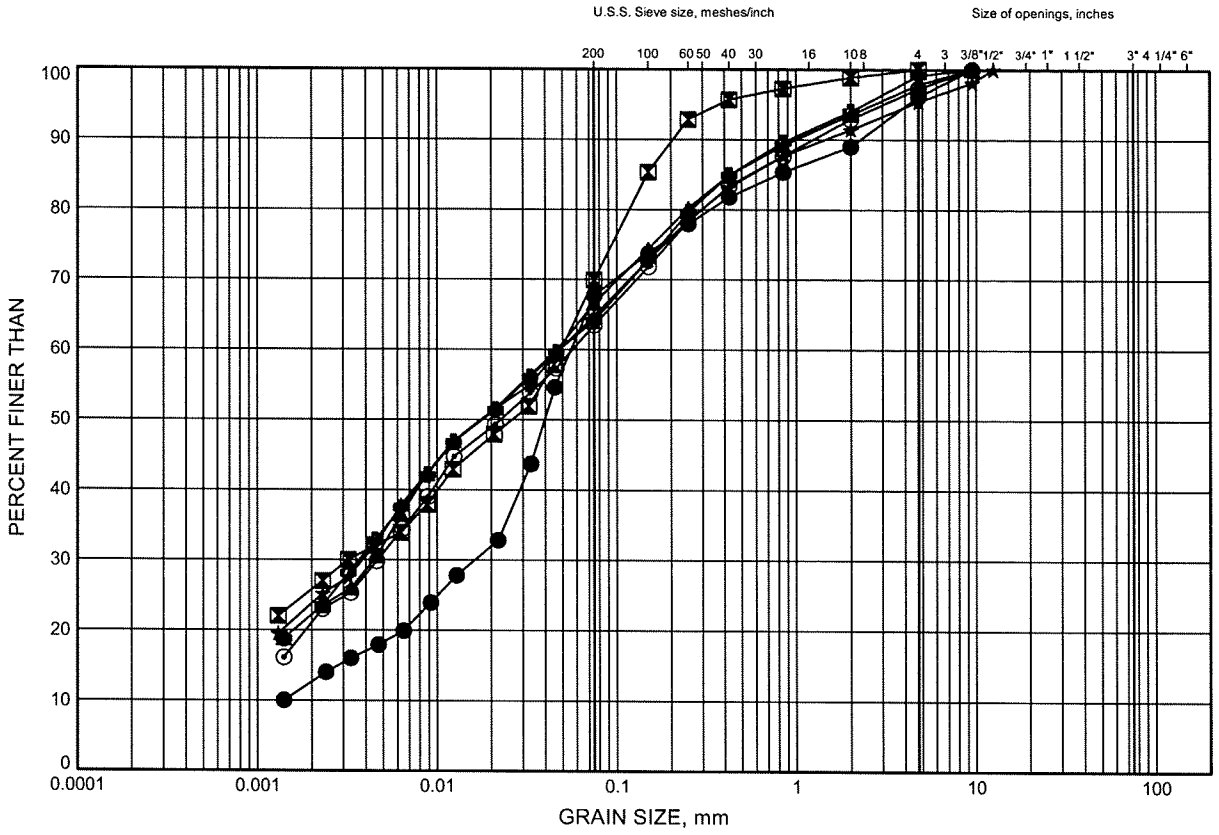
Hwy 427 Northbound and Southbound

GRAIN SIZE DISTRIBUTION

FIGURE B7

CLAYEY SILT TO SILTY CLAY FILL



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	PC-05	4.11	161.40
⊠	PC-06	1.83	163.99
▲	PC-07	2.59	165.05
★	PC-08	1.07	166.31
⊙	PC-09	1.83	169.22
✿	PC-10	2.59	168.33

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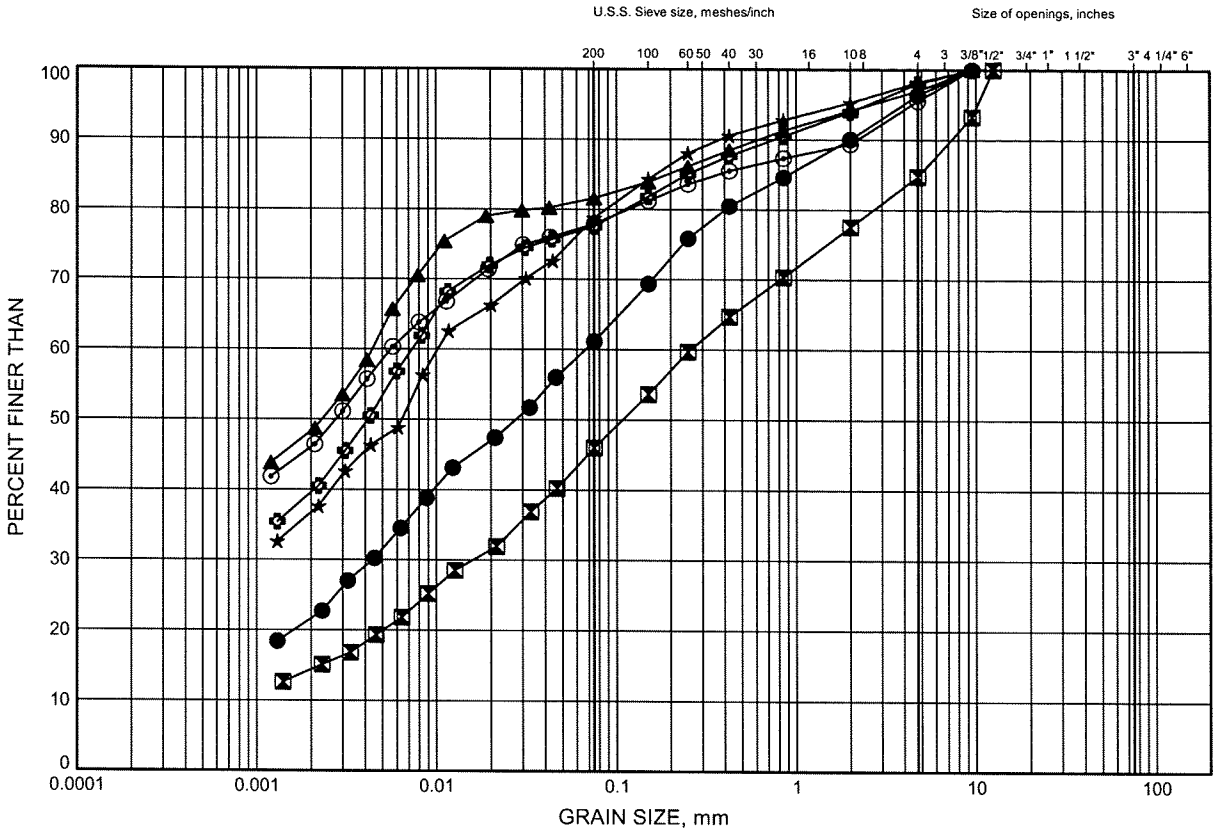
Hwy 427 Northbound and Southbound

GRAIN SIZE DISTRIBUTION

FIGURE B8

CLAYEY SILT TO SILTY CLAY FILL



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	PC-10	6.40	164.52
⊠	PC-11	1.83	171.15
▲	PC-12	2.59	170.78
★	PC-12	6.40	166.97
⊙	PC-13	4.88	167.68
✿	PC-14	3.35	169.49

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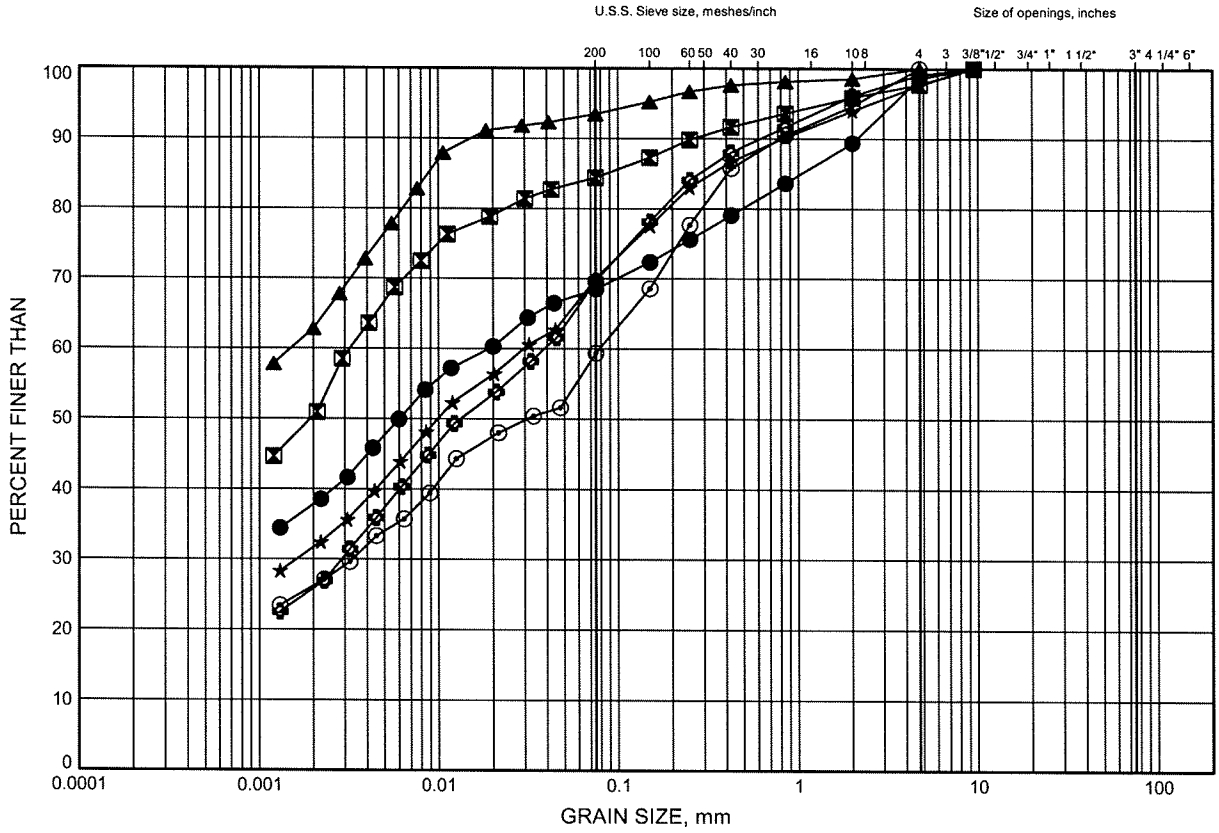
Hwy 427 Northbound and Southbound

GRAIN SIZE DISTRIBUTION

FIGURE B9

CLAYEY SILT TO SILTY CLAY FILL



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	PC-15	2.46	166.73
⊠	PC-16	2.59	166.88
▲	PC-18	1.83	165.75
★	PC-21	1.07	167.18
⊙	PC-22	3.35	164.57
✿	PC-23	1.83	167.53

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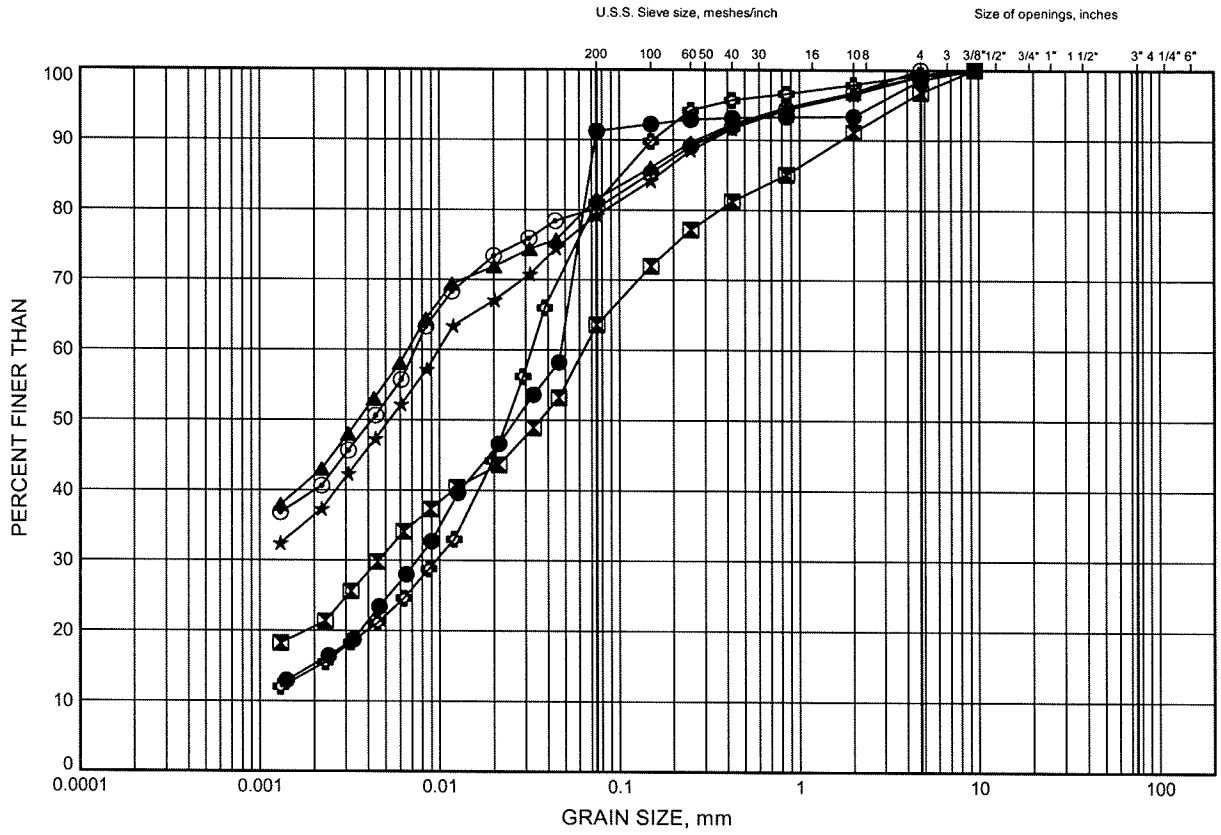
Hwy 427 Northbound and Southbound

GRAIN SIZE DISTRIBUTION

FIGURE B10

CLAYEY SILT TO SILTY CLAY FILL



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	PC-23	3.35	166.01
⊠	PC-24	1.07	167.95
▲	PC-25	6.40	174.75
★	PC-26	6.40	174.88
⊙	PC-29	2.59	177.29
✿	PC-29	4.88	175.00

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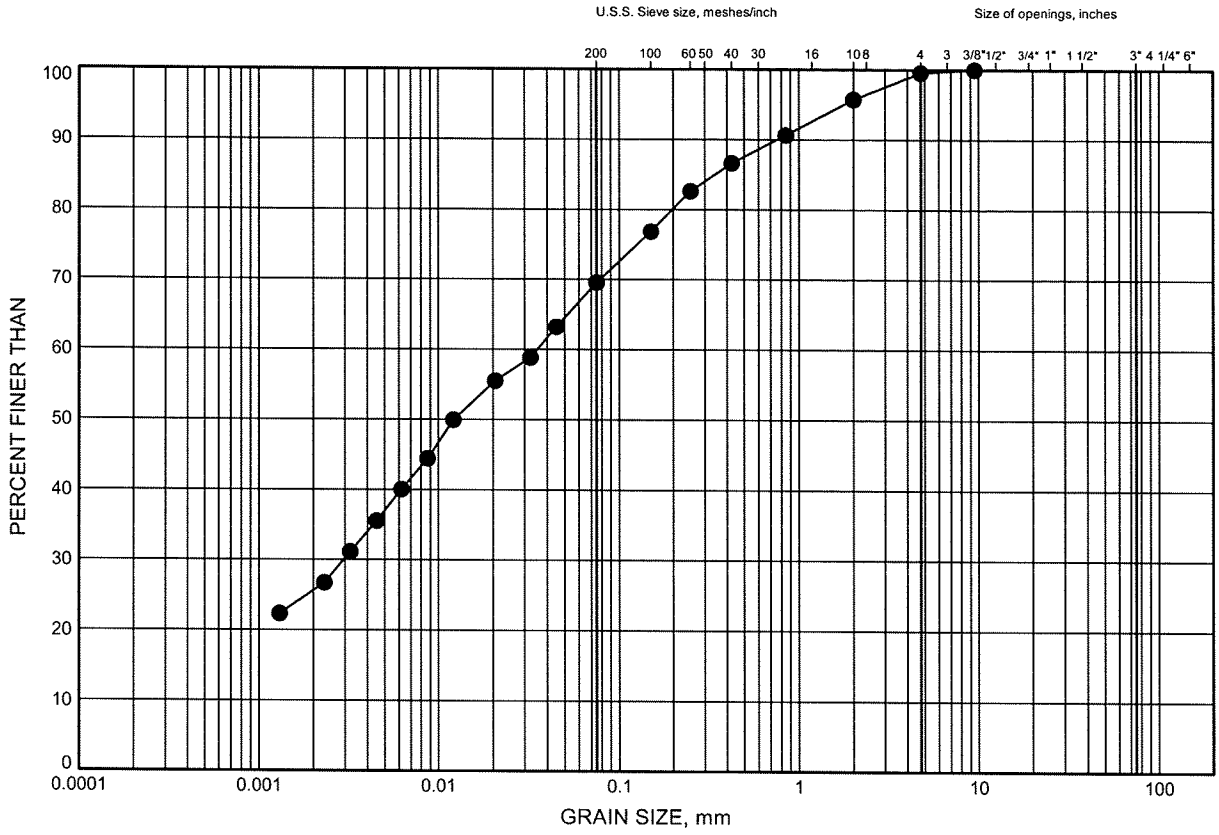
Hwy 427 Northbound and Southbound

GRAIN SIZE DISTRIBUTION

FIGURE B11

CLAYEY SILT TO SILTY CLAY FILL



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	PC-30	3.35	176.65

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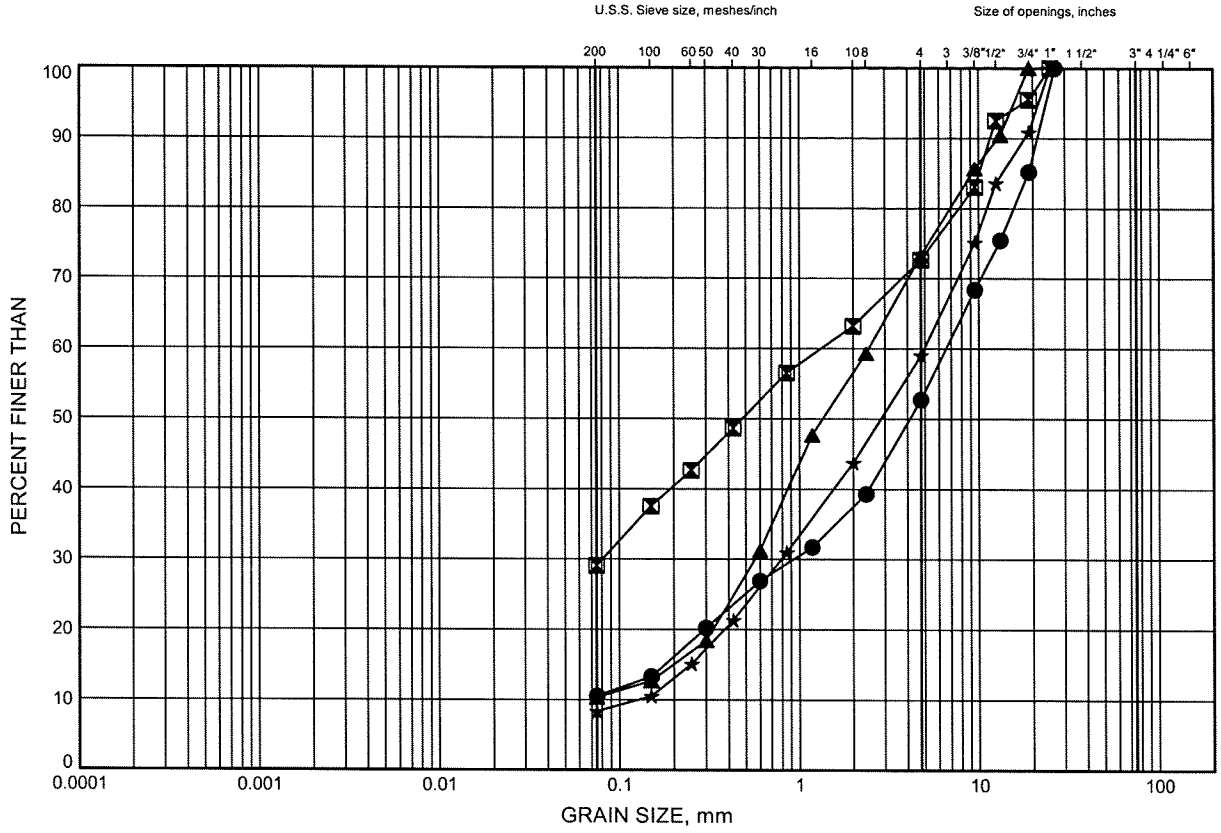
Hwy 427 Northbound and Southbound

GRAIN SIZE DISTRIBUTION

FIGURE B12

SAND TO SAND & GRAVEL



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	PC-21	7.92	160.32
⊠	PC-22	6.40	161.52
▲	PC-23	7.92	161.43
★	PC-24	7.92	161.09

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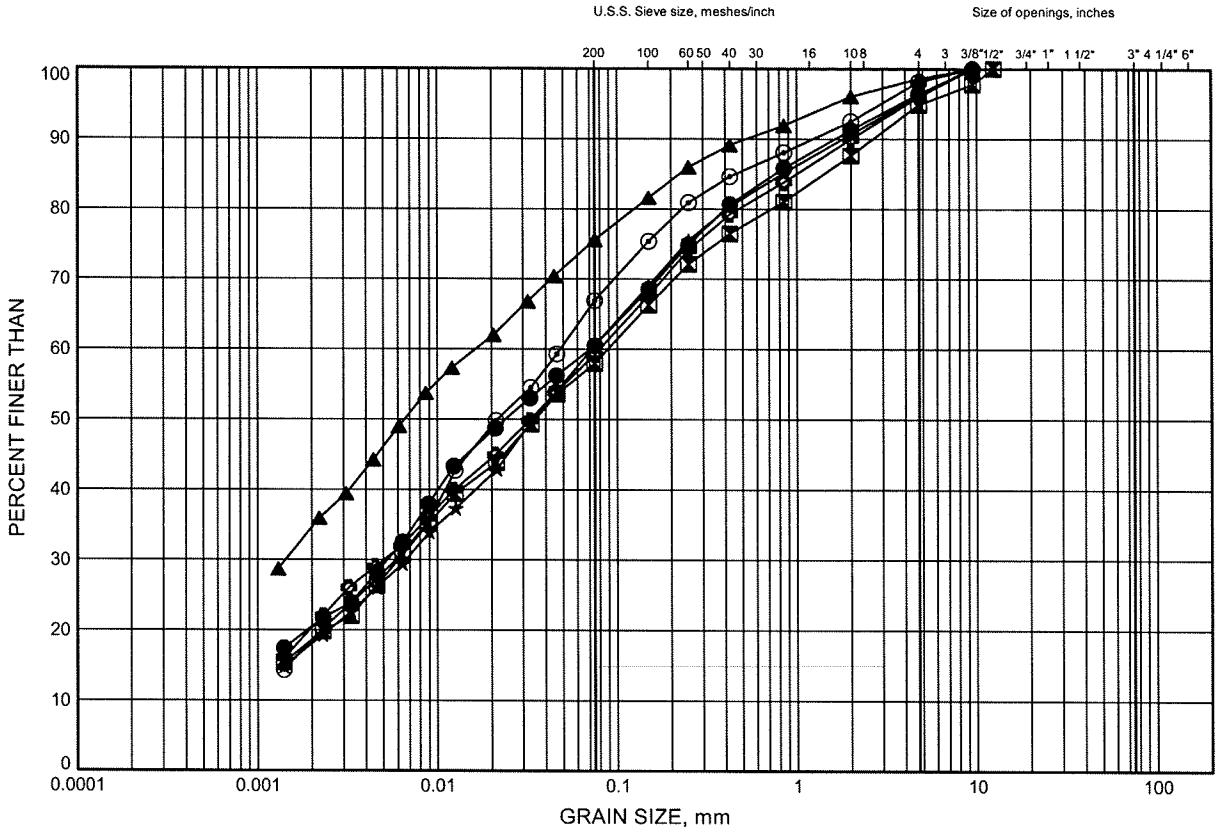
Hwy 427 Northbound and Southbound

GRAIN SIZE DISTRIBUTION

FIGURE B13

SILTY CLAY TILL



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	PC-01	2.59	164.43
⊠	PC-01	7.92	159.10
▲	PC-02	6.40	160.95
★	PC-03	7.92	159.40
⊙	PC-04	7.92	159.18
✿	PC-05	9.45	156.07

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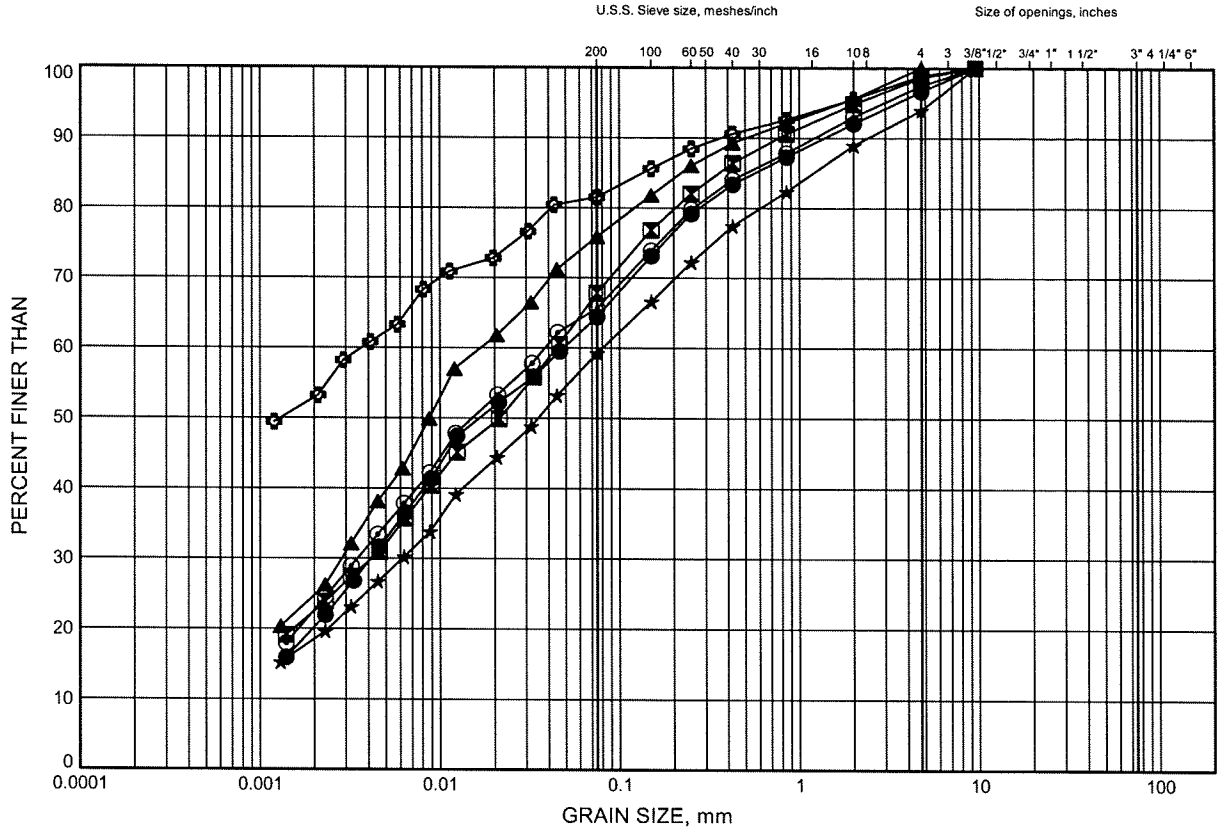
Hwy 427 Northbound and Southbound

GRAIN SIZE DISTRIBUTION

FIGURE B14

SILTY CLAY TILL



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	PC-06	6.40	159.42
⊠	PC-07	4.88	162.76
▲	PC-07	7.92	159.72
★	PC-08	6.40	160.98
⊙	PC-09	7.92	163.13
✿	PC-11	4.88	168.10

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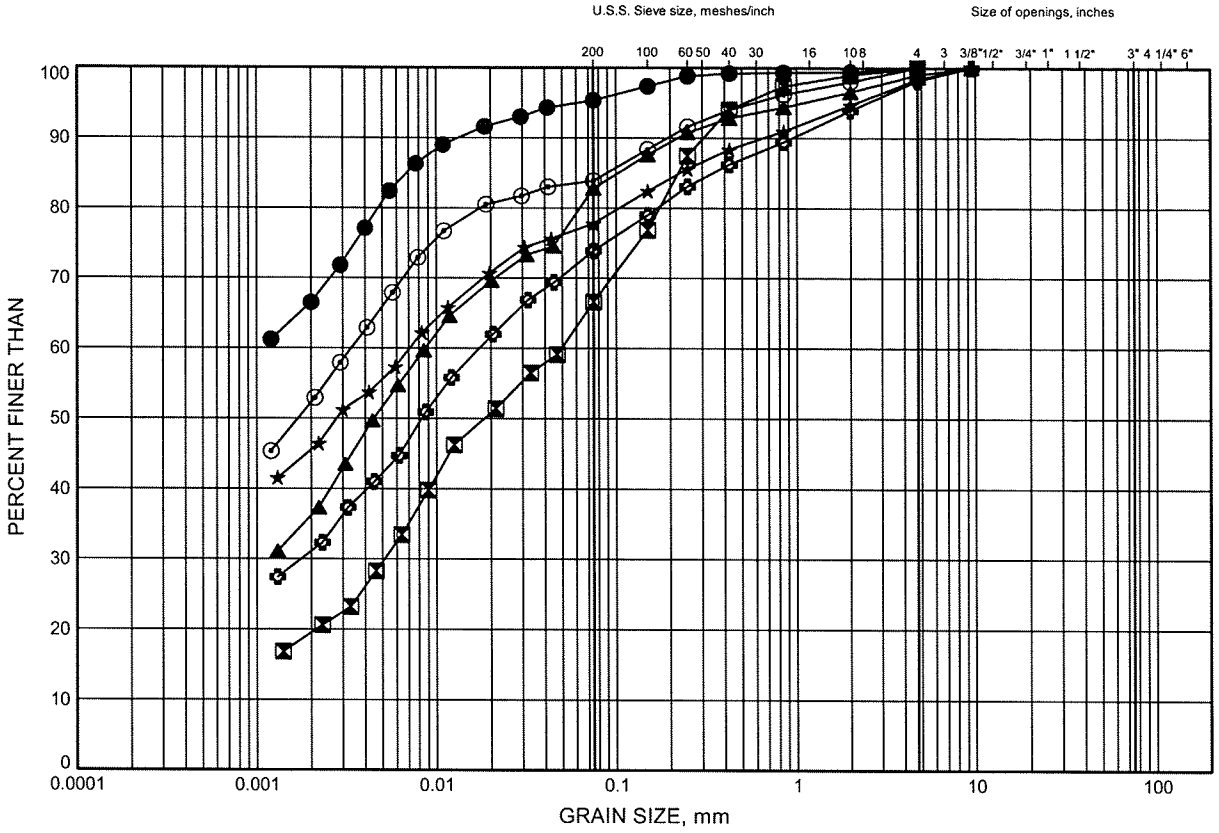
Hwy 427 Northbound and Southbound

GRAIN SIZE DISTRIBUTION

FIGURE B15

SILTY CLAY TILL



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	PC-11	9.45	163.53
⊠	PC-13	9.45	163.11
▲	PC-14	7.92	164.92
★	PC-15	7.92	161.27
⊙	PC-16	7.92	161.55
✿	PC-17	3.35	163.99

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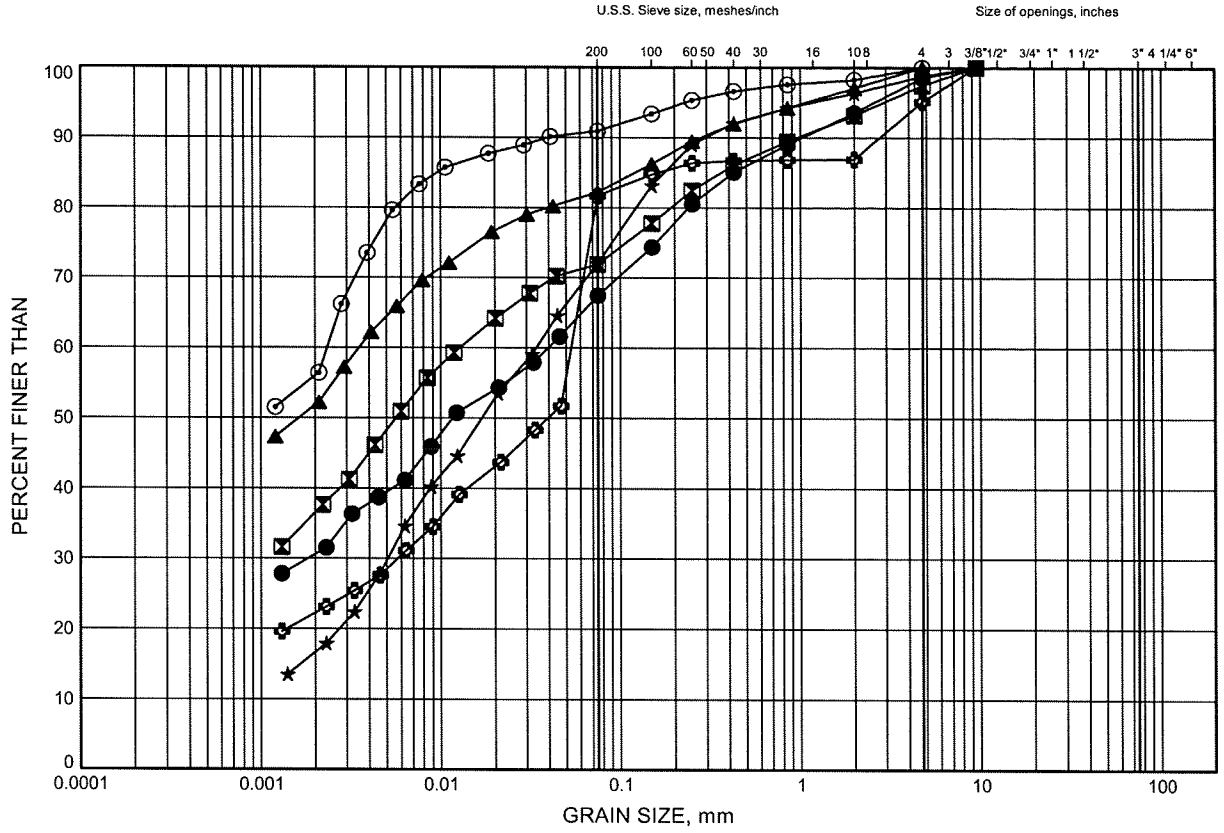
Hwy 427 Northbound and Southbound

GRAIN SIZE DISTRIBUTION

FIGURE B16

SILTY CLAY TILL



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	PC-17	6.40	160.94
⊠	PC-18	6.40	161.18
▲	PC-19	2.59	163.00
★	PC-20	6.40	159.01
⊙	PC-20	9.45	155.96
✿	PC-24	4.11	164.90

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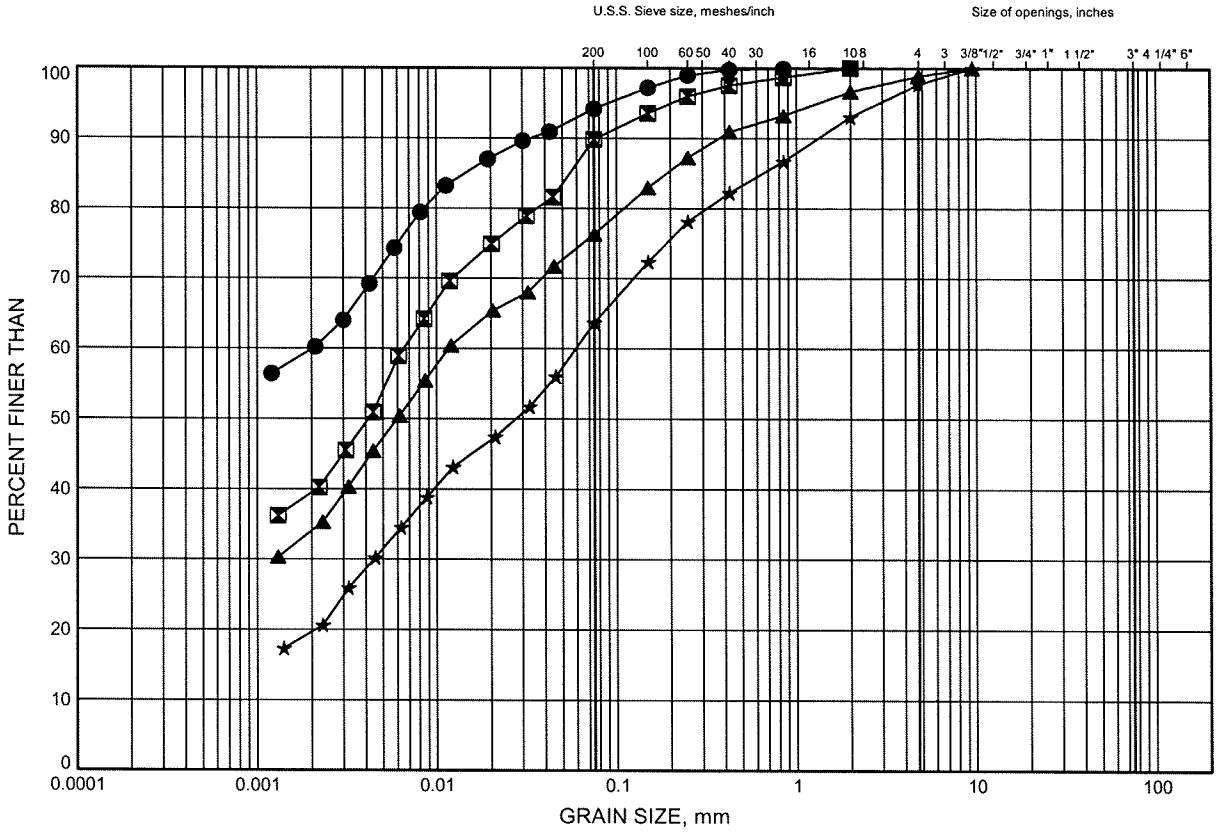
Hwy 427 Northbound and Southbound

GRAIN SIZE DISTRIBUTION

FIGURE B17

SILTY CLAY TILL



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	PC-27	9.45	171.16
⊠	PC-28	9.45	171.52
▲	PC-29	9.45	170.43
★	PC-30	9.45	170.55

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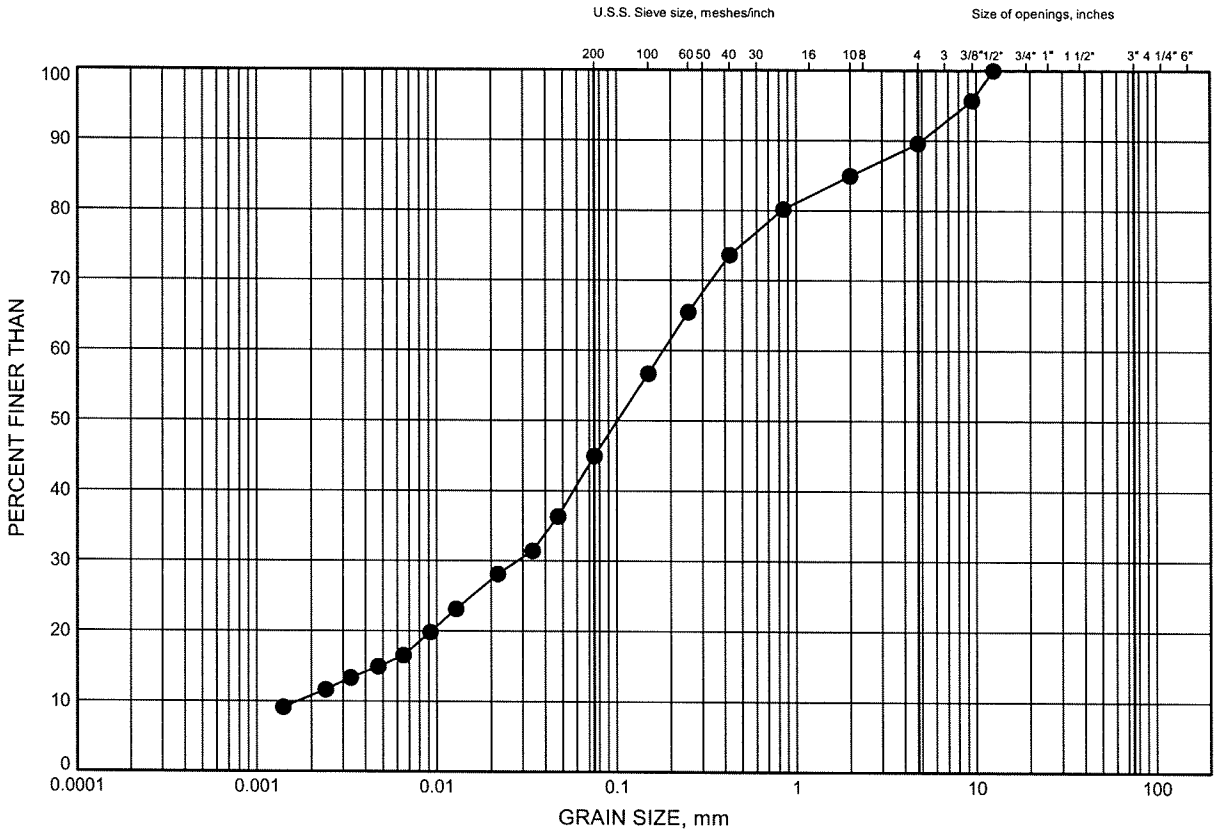
Hwy 427 Northbound and Southbound

GRAIN SIZE DISTRIBUTION

FIGURE B18

SILTY SAND TILL



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	PC-19	7.76	157.83

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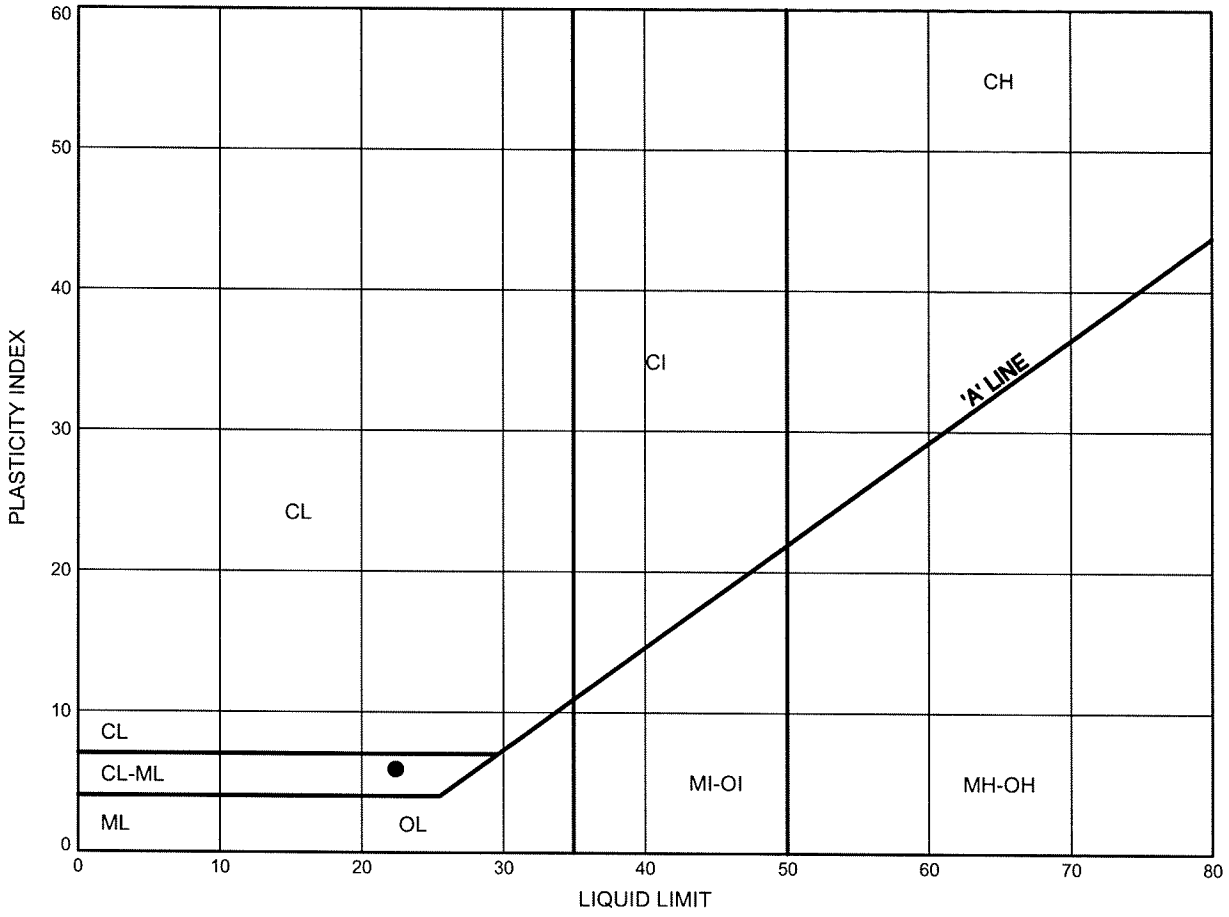
Hwy 427 Northbound and Southbound

ATTERBERG LIMITS TEST RESULTS

FIGURE B19

SANDY SILT FILL



SYMBOL	BH	DEPTH (m)	ELEV. (m)
●	PC-03	3.35	163.97

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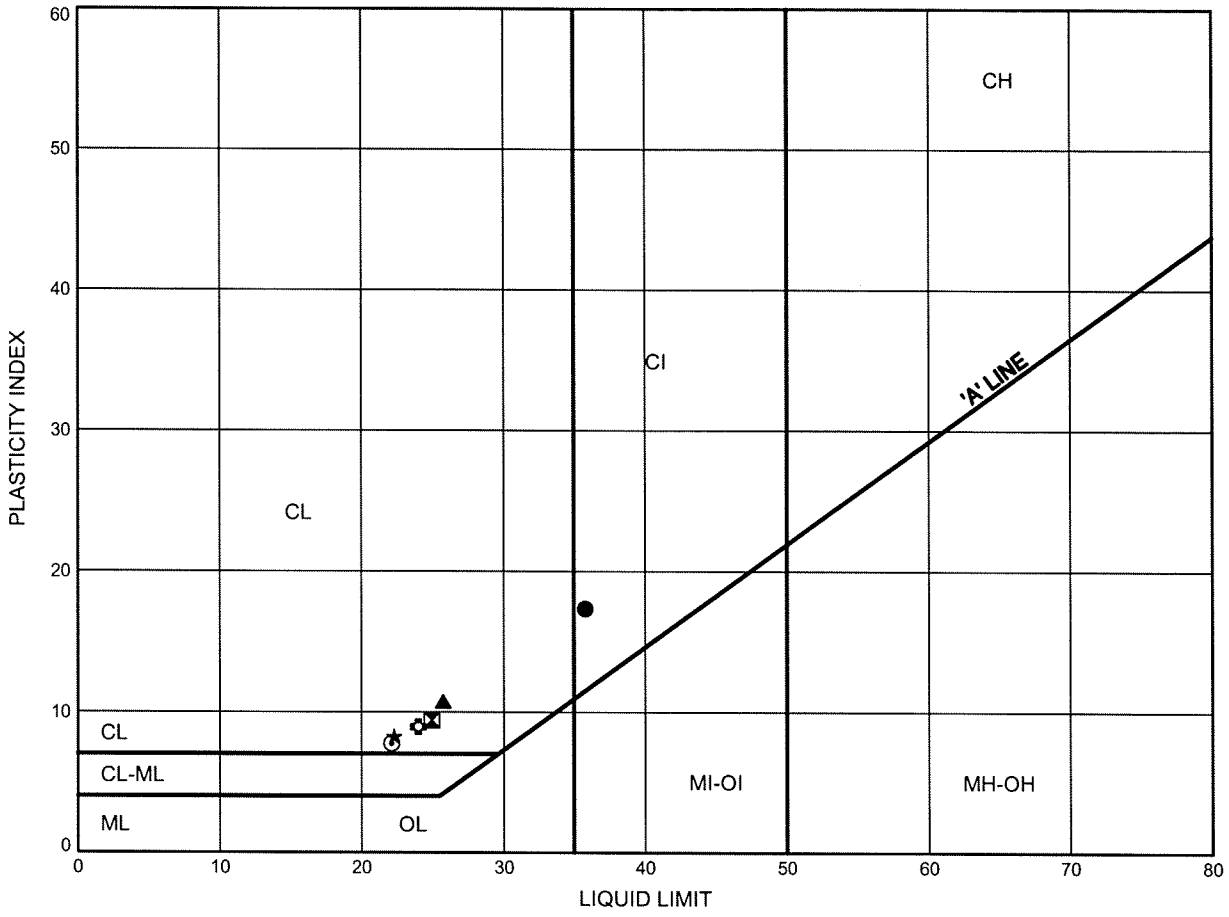
Hwy 427 Northbound and Southbound

ATTERBERG LIMITS TEST RESULTS

FIGURE B20

SILTY CLAY FILL



SYMBOL	BH	DEPTH (m)	ELEV. (m)
●	PC-06	1.83	163.99
⊠	PC-07	2.59	165.05
▲	PC-08	1.07	166.31
★	PC-09	1.83	169.22
⊙	PC-10	2.59	168.33
✿	PC-10	6.40	164.52

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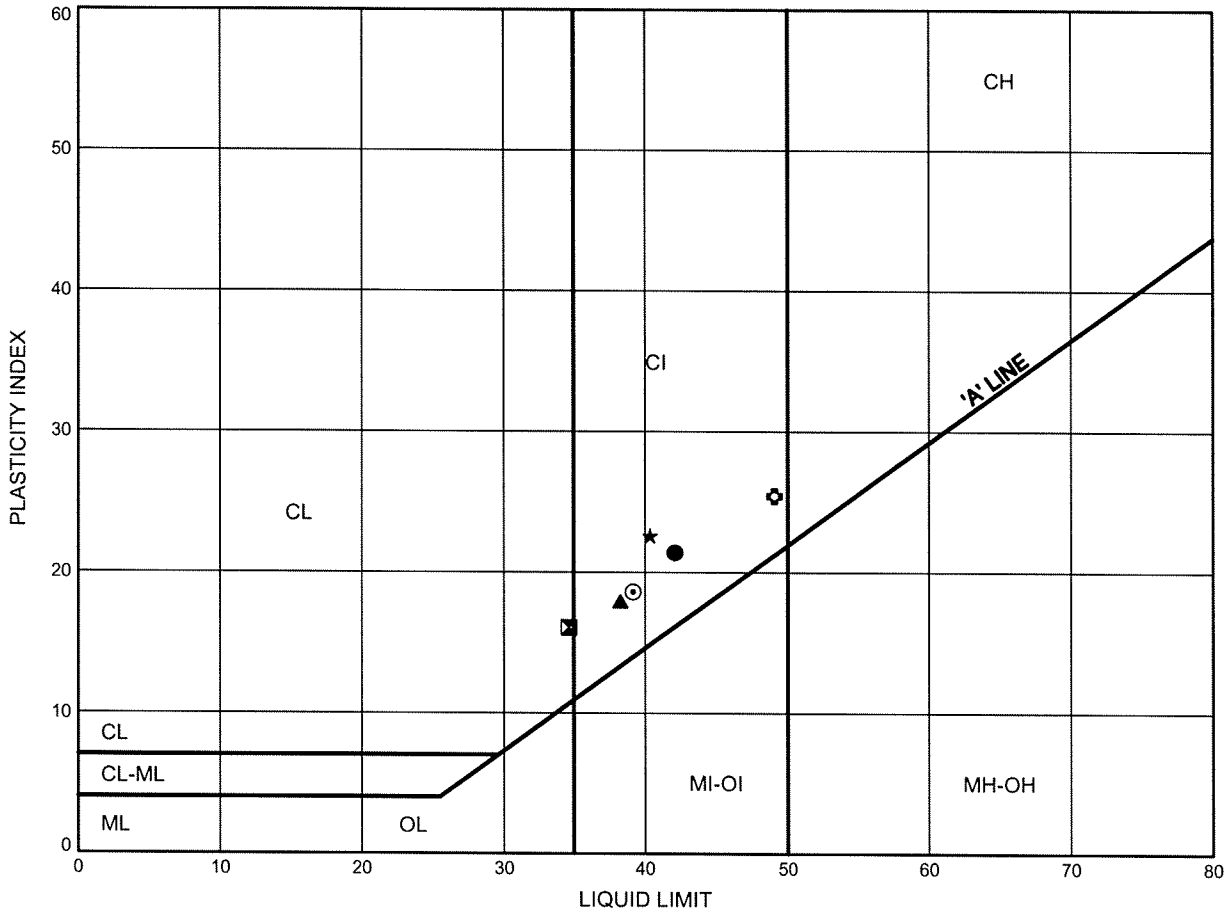
ATTERBERG LIMITS TEST RESULTS

FIGURE B21

SILTY CLAY FILL



SYMBOL	BH	DEPTH (m)	ELEV. (m)
●	PC-12	2.59	170.78
⊠	PC-12	6.40	166.97
▲	PC-14	3.35	169.49
★	PC-15	2.46	166.73
⊙	PC-16	2.59	166.88
✿	PC-18	1.83	165.75

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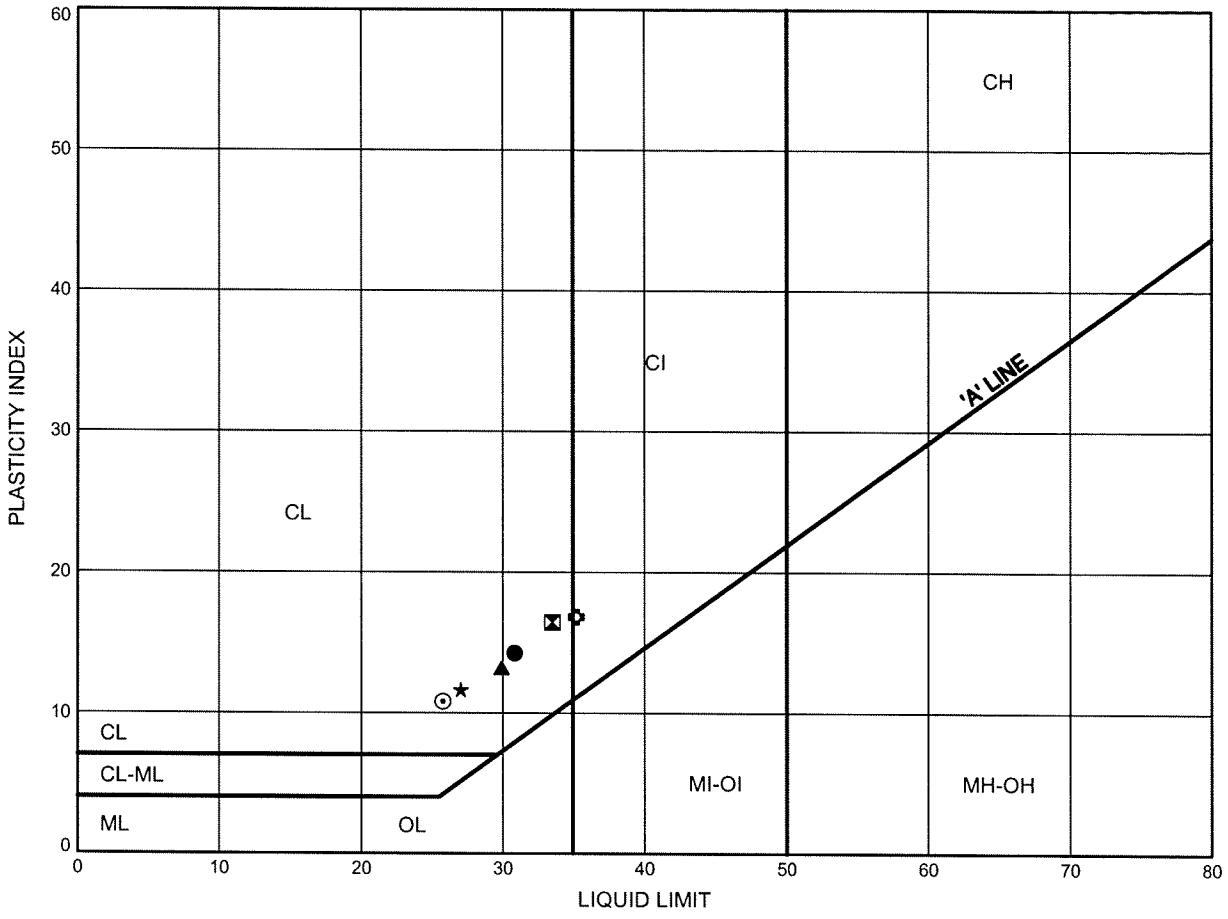
ATTERBERG LIMITS TEST RESULTS

FIGURE B22

SILTY CLAY FILL



SYMBOL	BH	DEPTH (m)	ELEV. (m)
●	PC-20	0.30	165.10
⊠	PC-21	1.07	167.18
▲	PC-22	3.35	164.57
★	PC-23	1.83	167.53
⊙	PC-24	1.07	167.95
✿	PC-25	6.40	174.75

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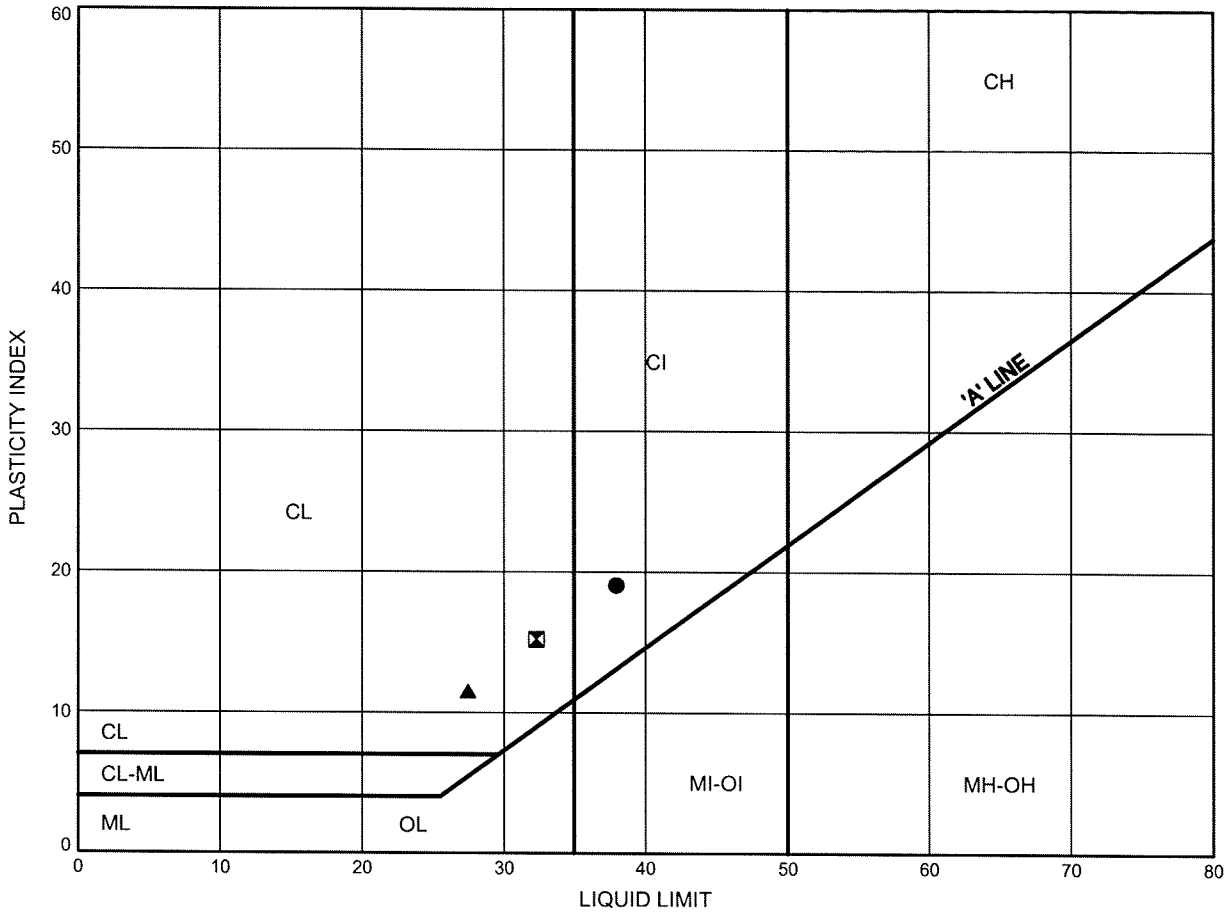
Hwy 427 Northbound and Southbound

ATTERBERG LIMITS TEST RESULTS

FIGURE B23

SILTY CLAY FILL



SYMBOL	BH	DEPTH (m)	ELEV. (m)
●	PC-26	6.40	174.88
⊠	PC-29	2.59	177.29
▲	PC-30	3.35	176.65

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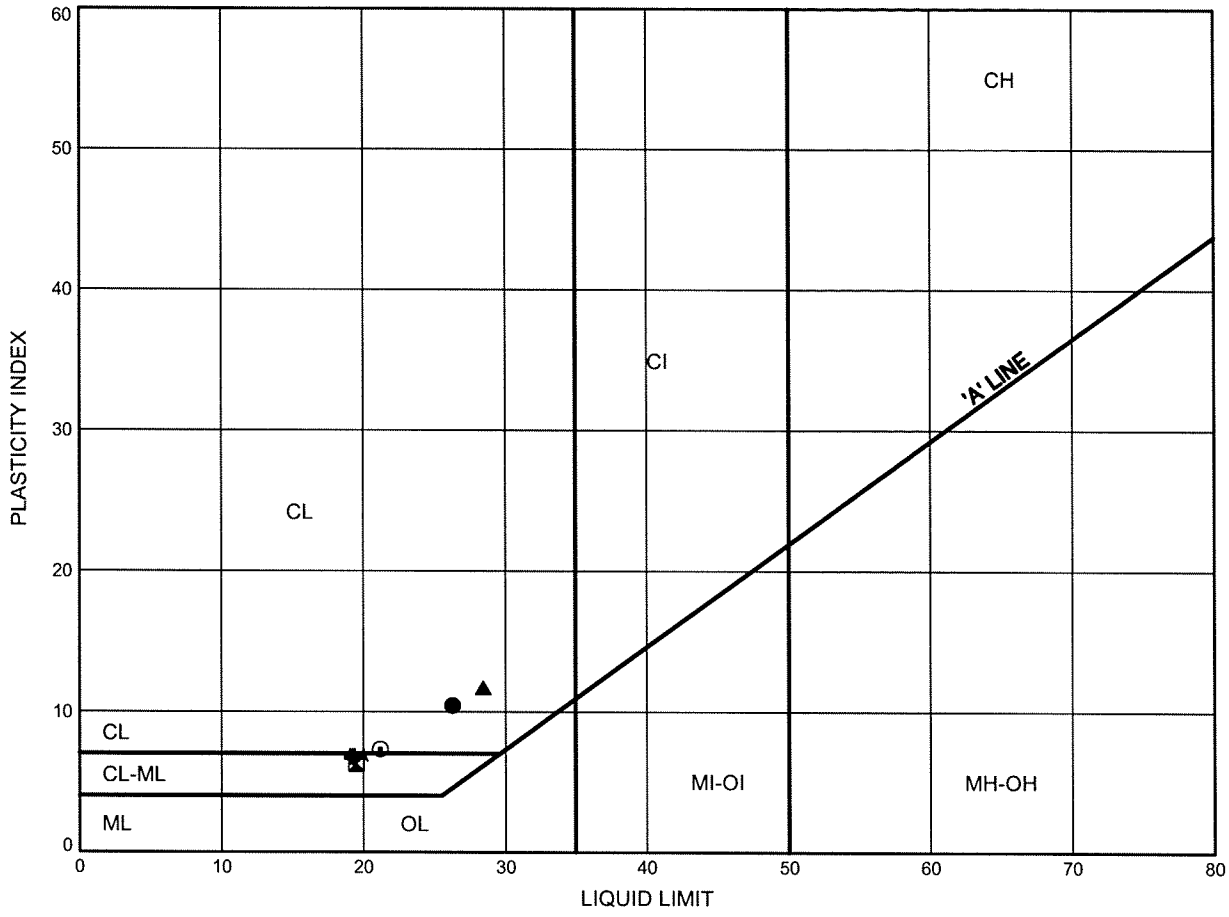
Hwy 427 Northbound and Southbound

ATTERBERG LIMITS TEST RESULTS

FIGURE B24

SILTY CLAY TILL



SYMBOL	BH	DEPTH (m)	ELEV. (m)
●	PC-01	2.59	164.43
⊠	PC-01	7.92	159.10
▲	PC-02	6.40	160.95
★	PC-03	7.92	159.40
⊙	PC-04	7.92	159.18
✿	PC-05	9.45	156.07

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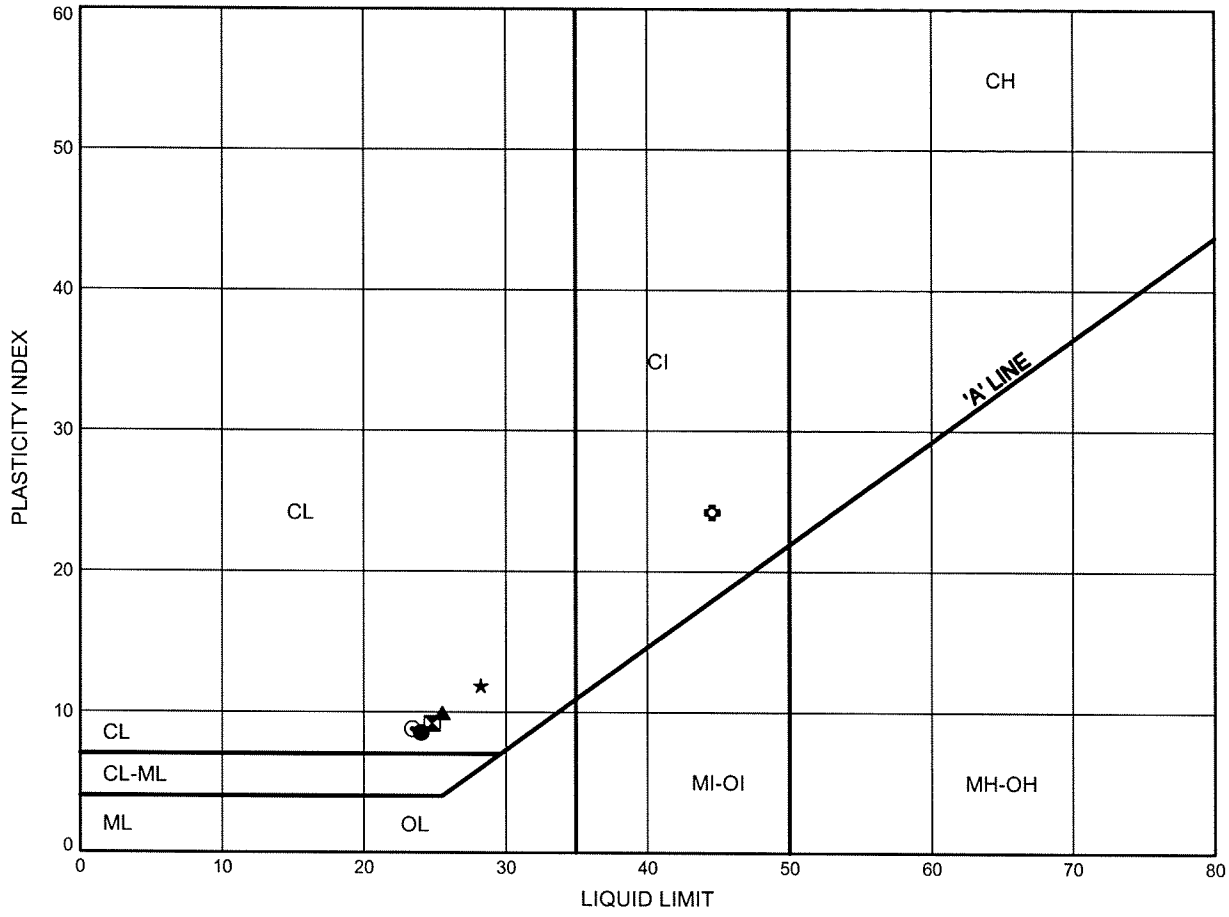
Hwy 427 Northbound and Southbound

ATTERBERG LIMITS TEST RESULTS

FIGURE B25

SILTY CLAY TILL



SYMBOL	BH	DEPTH (m)	ELEV. (m)
●	PC-06	6.40	159.42
⊠	PC-07	4.88	162.76
▲	PC-07	7.92	159.72
★	PC-08	6.40	160.98
⊙	PC-09	7.92	163.13
✿	PC-11	4.88	168.10

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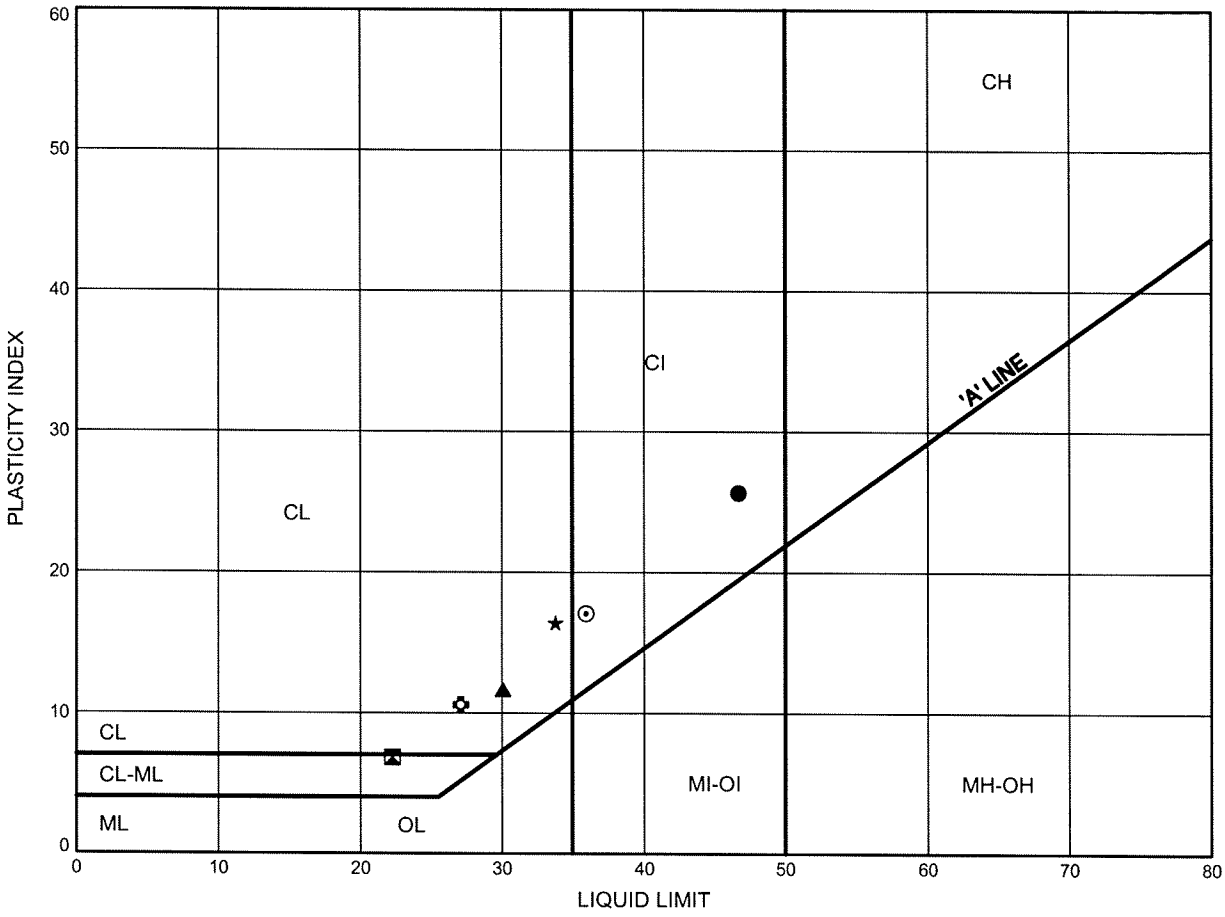
Hwy 427 Northbound and Southbound

ATTERBERG LIMITS TEST RESULTS

FIGURE B26

SILTY CLAY TILL



SYMBOL	BH	DEPTH (m)	ELEV. (m)
●	PC-11	9.45	163.53
⊠	PC-13	9.45	163.11
▲	PC-14	7.92	164.92
★	PC-15	7.92	161.27
⊙	PC-16	7.92	161.55
✿	PC-17	3.35	163.99

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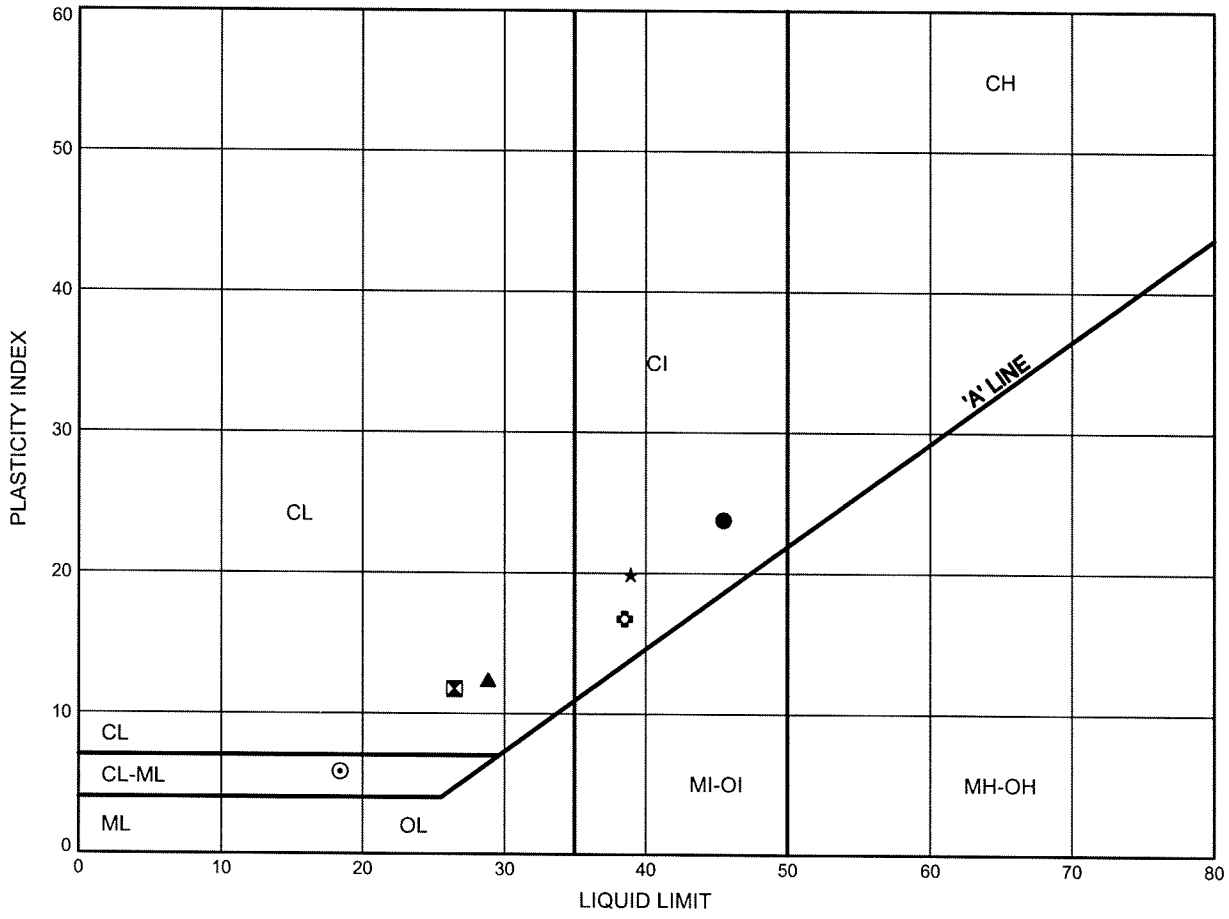
Hwy 427 Northbound and Southbound

ATTERBERG LIMITS TEST RESULTS

FIGURE B27

SILTY CLAY TILL



SYMBOL	BH	DEPTH (m)	ELEV. (m)
●	PC-17	4.88	162.47
⊠	PC-17	6.40	160.94
▲	PC-18	6.40	161.18
★	PC-19	2.59	163.00
⊙	PC-20	6.40	159.01
✿	PC-20	9.45	155.96

Date January 2010

Project 202-95-00

THURBER

Prep'd MFA

Chkd. MEF

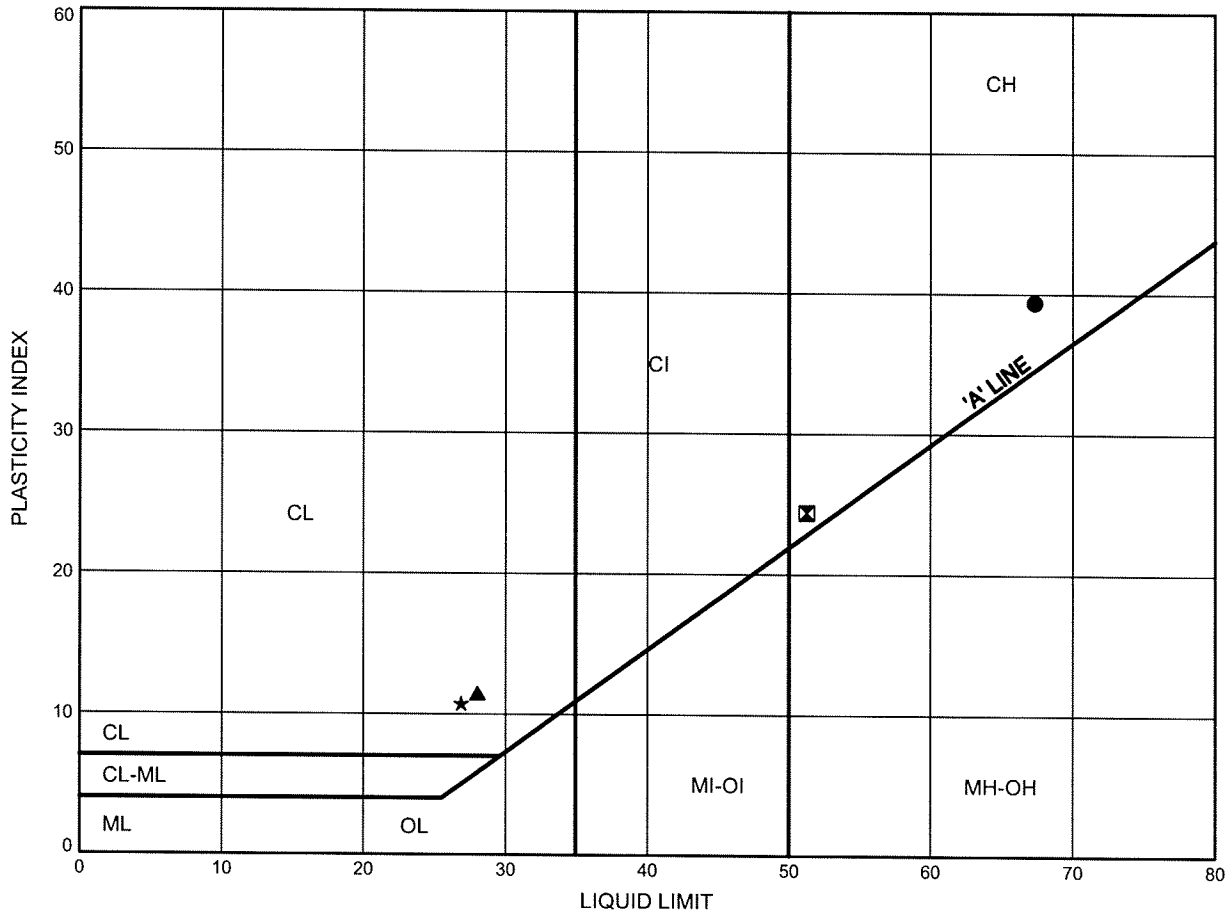
THURBALT 9270.GPJ 1/22/10

Hwy 427 Northbound and Southbound

ATTERBERG LIMITS TEST RESULTS

FIGURE B28

SILTY CLAY TILL



SYMBOL	BH	DEPTH (m)	ELEV. (m)
●	PC-27	9.45	171.16
⊠	PC-28	9.45	171.52
▲	PC-29	9.45	170.43
★	PC-30	9.45	170.55

Date January 2010

Project 202-95-00

THURBER

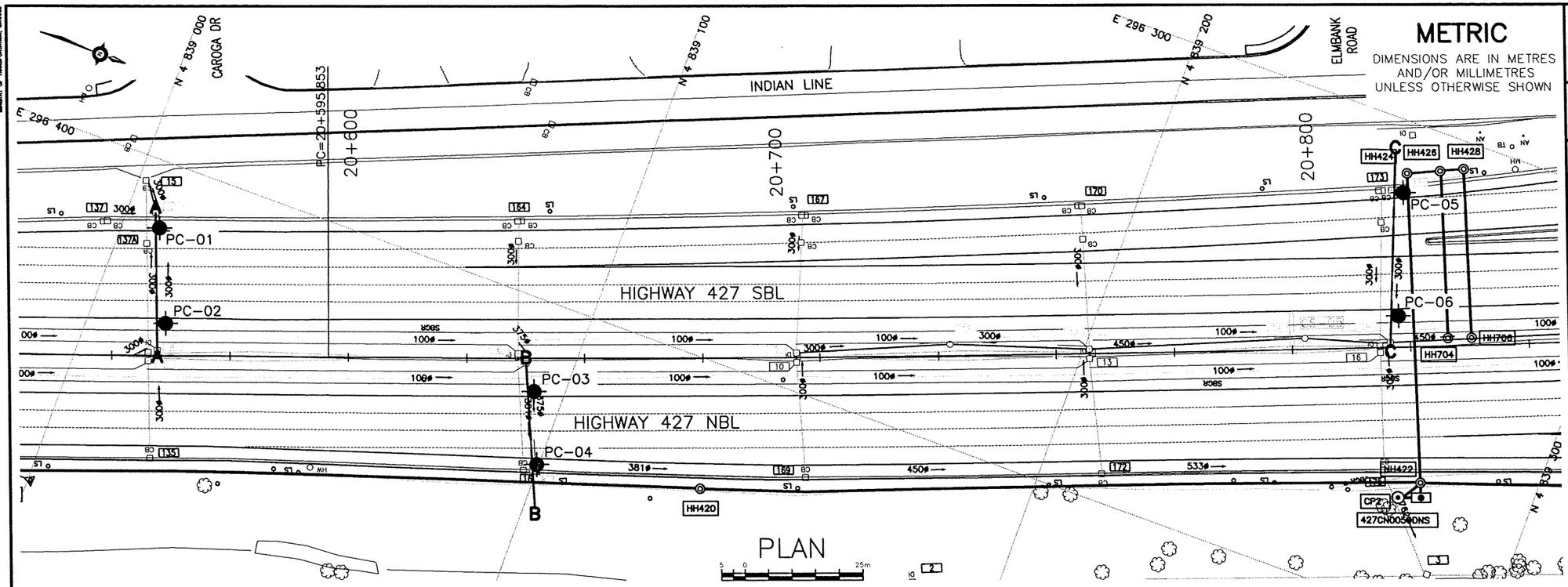
Prep'd MFA

Chkd. MEF

THURBALT 9270.GPJ 1/22/10

Appendix C

Borehole Locations and Soil Strata Drawings



METRIC

DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

CONT No
GWP No 202-95-00

HIGHWAY 427
INSIDE WIDENING
PROPOSED SEWER PIPE CROSSINGS
BOREHOLE LOCATIONS AND SOIL STRATA

SHEET

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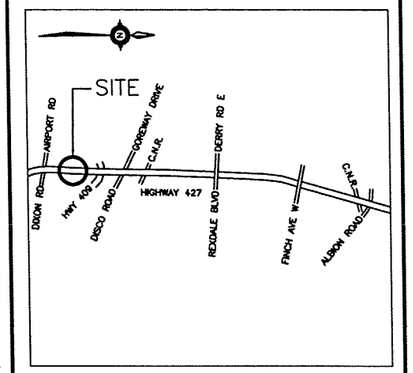


KEYPLAN

LEGEND

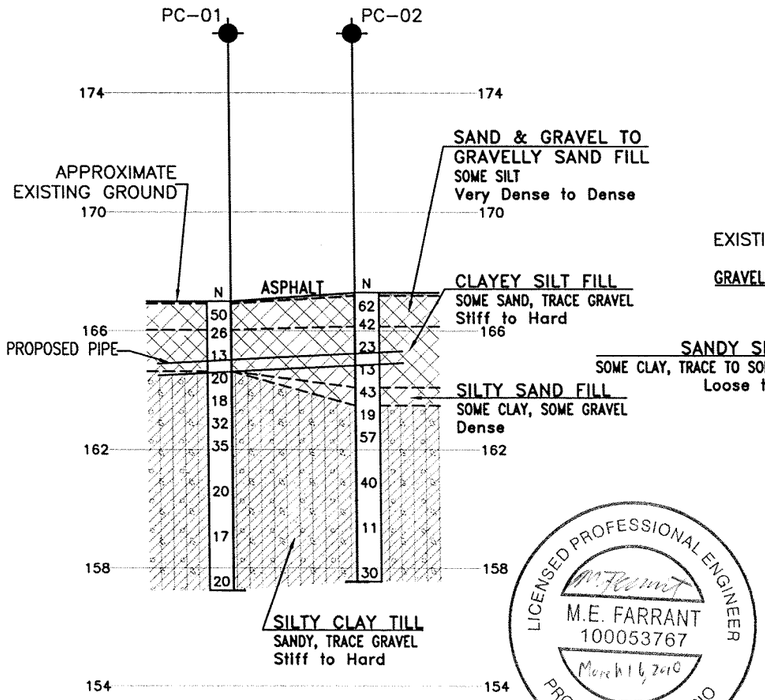
✦	Borehole
⊕	Borehole and Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60° Cone, 475J/blow)
PH	Pressure, Hydraulic
▽	Water Level
▽	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
PC-01	167.0	4 839 007.7	296 413.9
PC-02	167.3	4 839 015.8	296 432.7
PC-03	167.3	4 839 093.7	296 419.2
PC-04	167.1	4 839 099.6	296 433.7
PC-05	165.5	4 839 252.0	296 315.0
PC-06	165.8	4 839 260.0	296 340.3

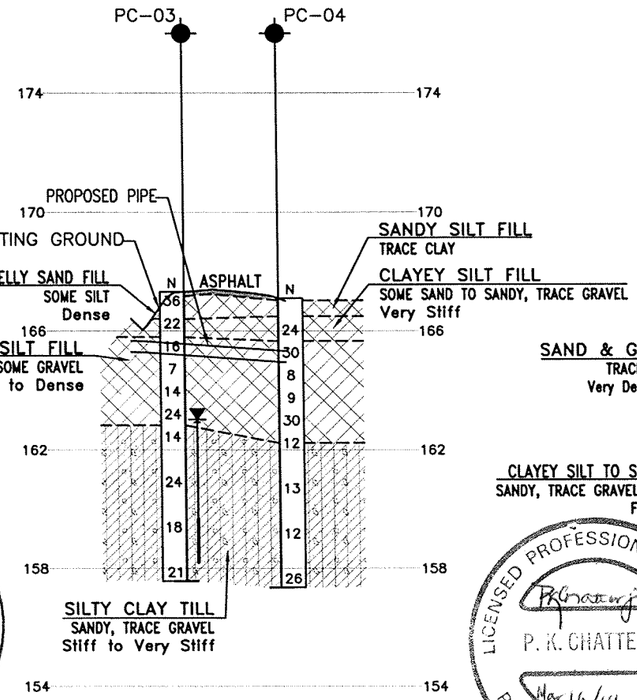
-NOTES-

1) The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
2) This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

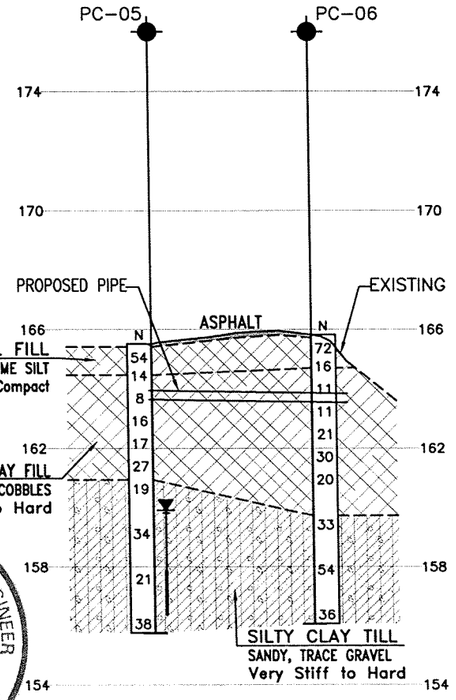
GEOCRES No. 30M12-292



SECTION A–A



SECTION B–B

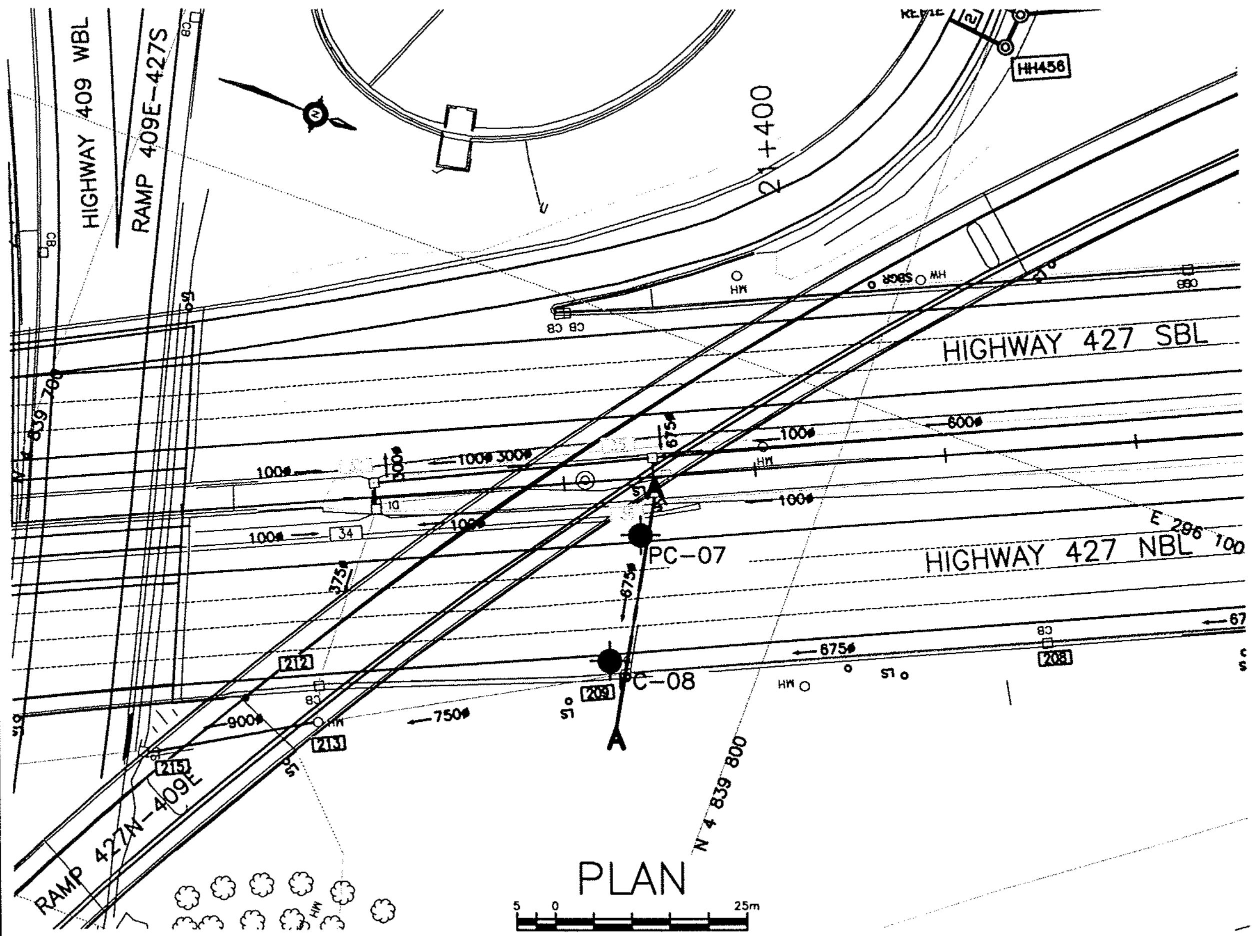


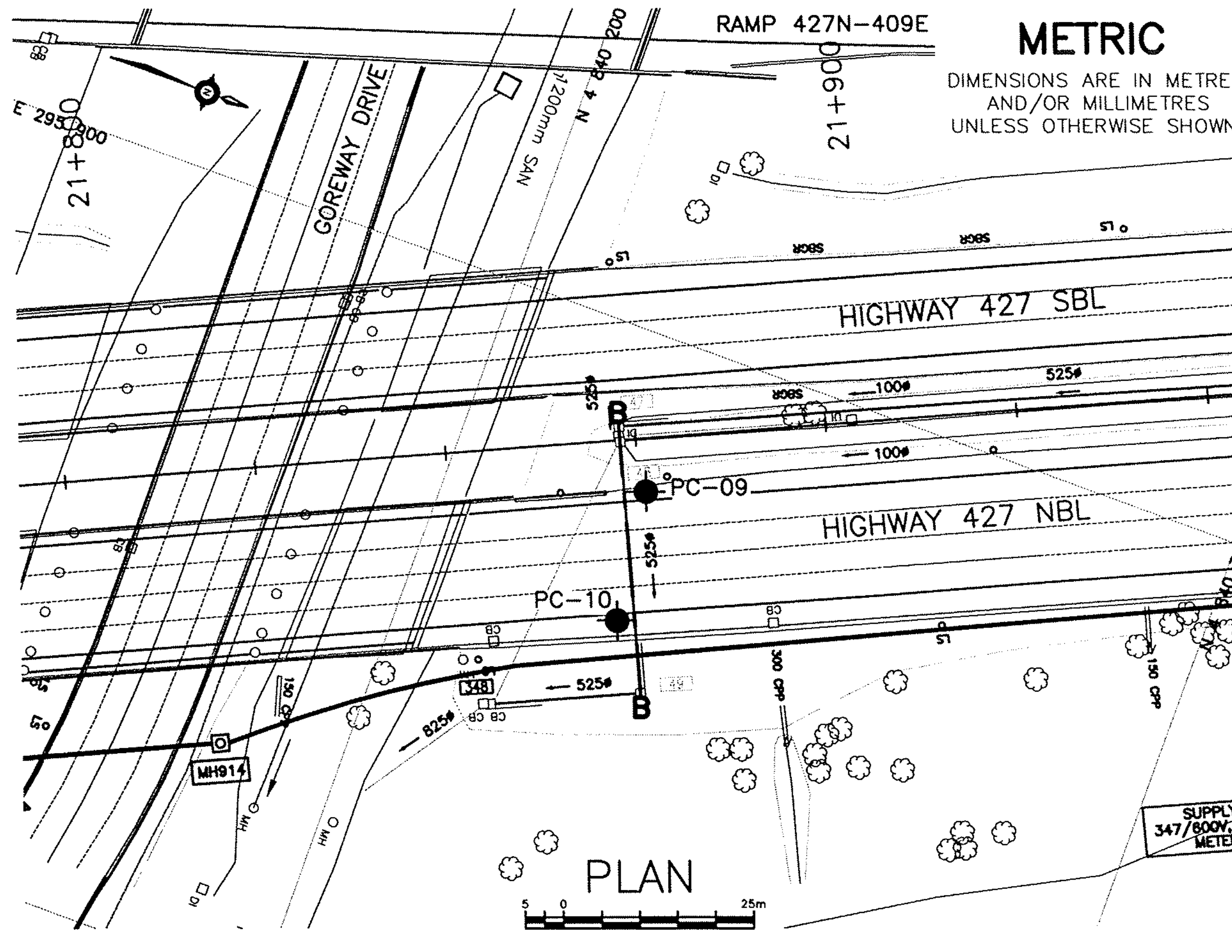
SECTION C–C

LICENSED PROFESSIONAL ENGINEER
M.E. FARRANT
100053767
March 16, 2010
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
P. K. CHATTERJI
Mar 16/10
PROVINCE OF ONTARIO

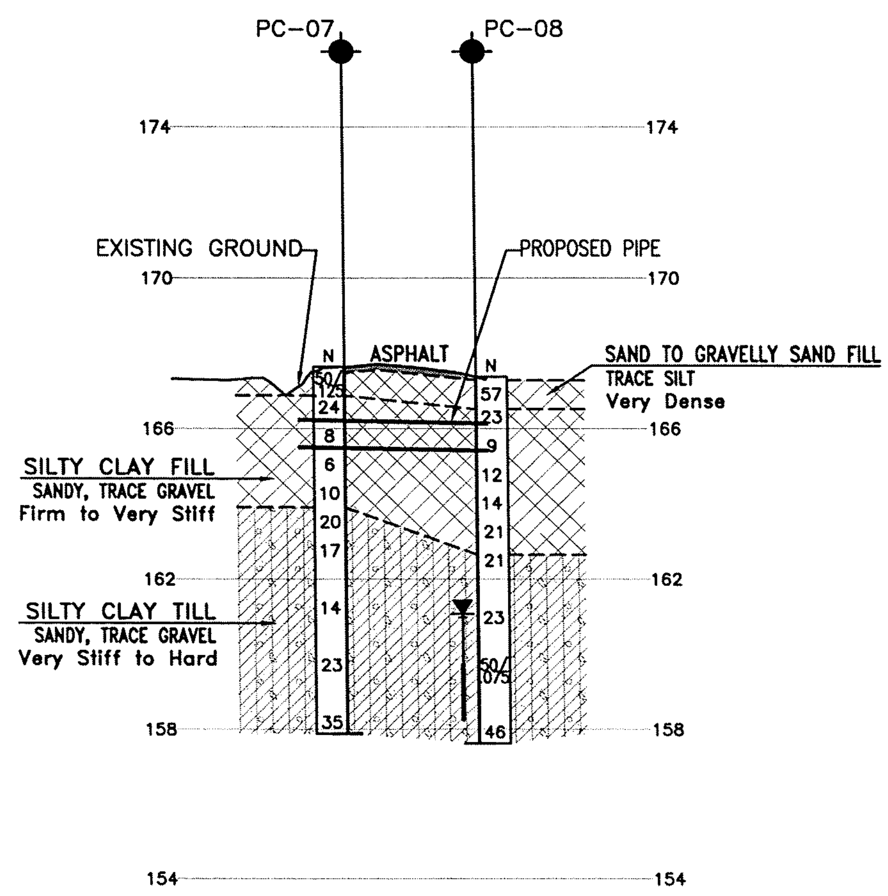
REVISIONS			
DATE	BY	DESCRIPTION	
DESIGN MEF	CHK PKC	CODE	LOAD — DATE JAN. 2010
DRAWN MFA	CHK PKC	SITE	STRUCT — DWG 1





METRIC

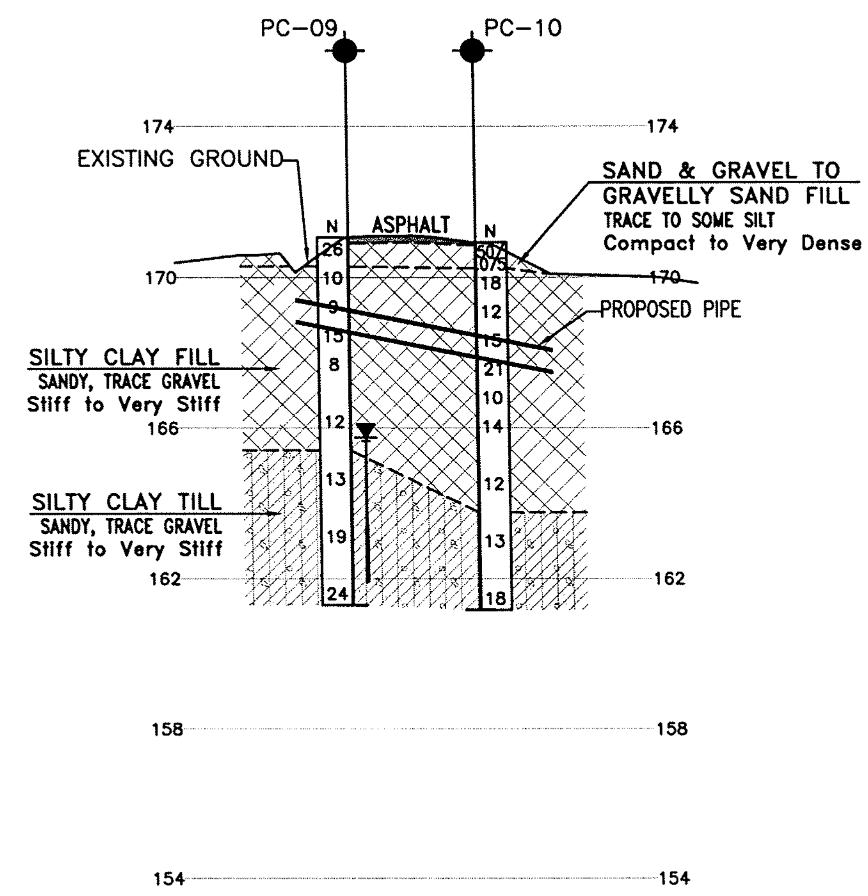
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN



SECTION A–A

LICENSED PROFESSIONAL ENGINEER M.E. FARRANT 100053767 March 16, 2010 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER P. K. CHATTERJI Mar 16/10 PROVINCE OF ONTARIO



SECTION B–B

CONT No	
GWP No 202-95-00	
HIGHWAY 427 INSIDE WIDENING PROPOSED SEWER PIPE CROSSINGS BOREHOLE LOCATIONS AND SOIL STRATA	SHEET

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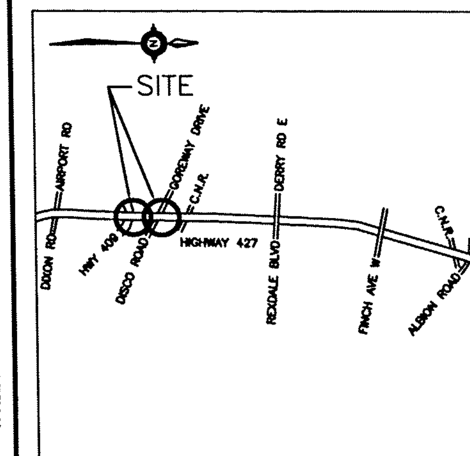


KEYPLAN

LEGEND

Symbol	Description
●	Borehole
⊕	Borehole and Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60° Cone, 475J/blow)
PH	Pressure, Hydraulic
▽	Water Level
⊤	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
PC-07	167.6	4 839 779.4	296 126.5
PC-08	167.4	4 839 781.3	296 143.6
PC-09	171.1	4 840 225.4	295 920.3
PC-10	170.9	4 840 227.5	295 937.8

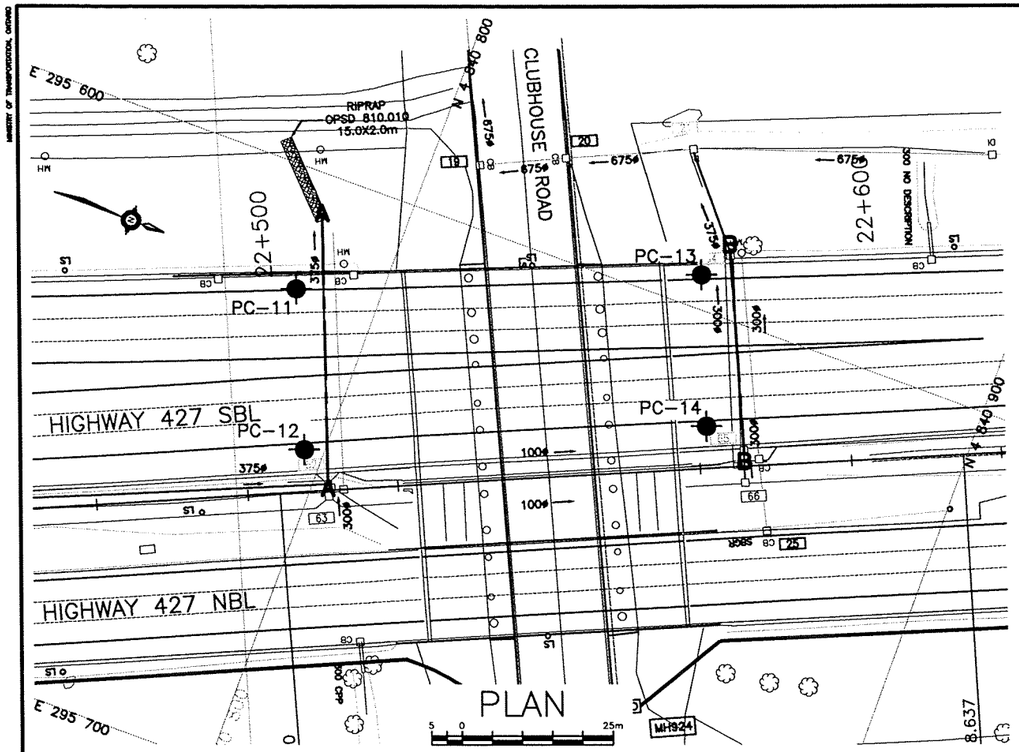
-NOTES-

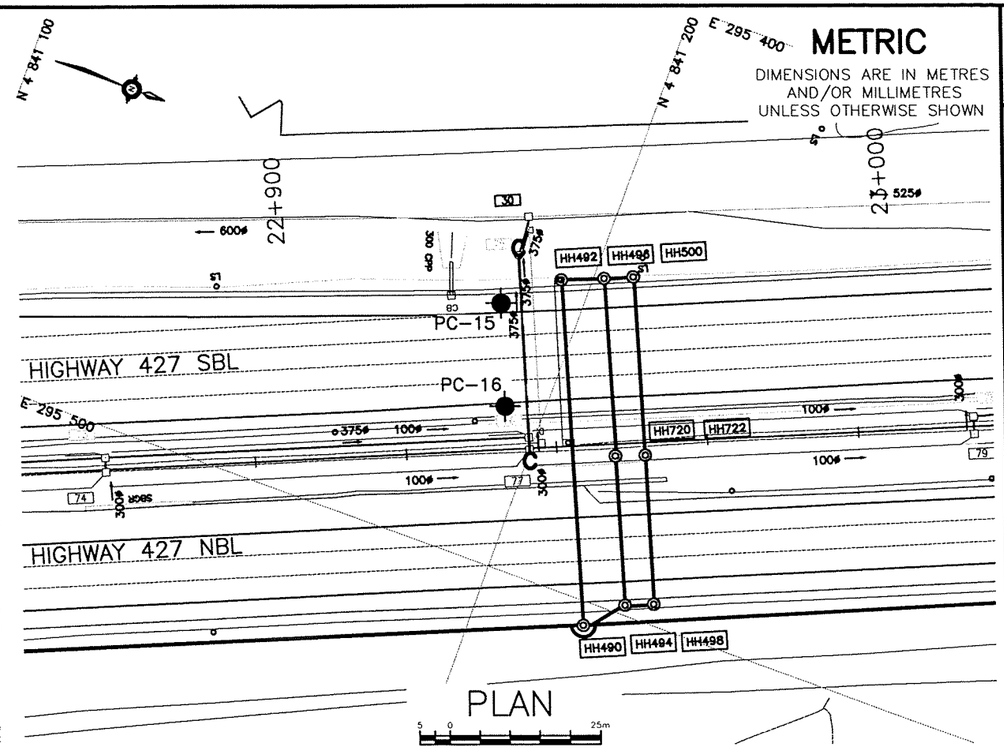
1) The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
2) This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 30M12-292

REVISIONS	DATE	BY	DESCRIPTION

DESIGN MEF	CHK PKC	CODE	LOAD	DATE JAN. 2010	
DRAWN MFA	CHK PKC	SITE	STRUCT	DWG 2	





METRIC

DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

CONT No
GWP No 202-95-00

HIGHWAY 427
INSIDE WIDENING
PROPOSED SEWER PIPE CROSSINGS
BOREHOLE LOCATIONS AND SOIL STRATA

SHEET

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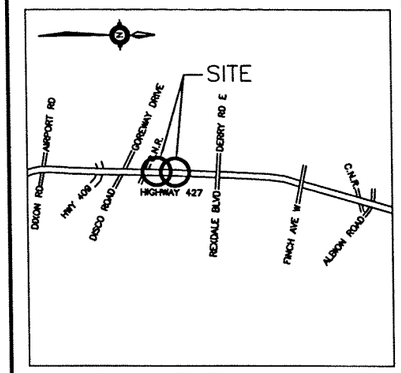
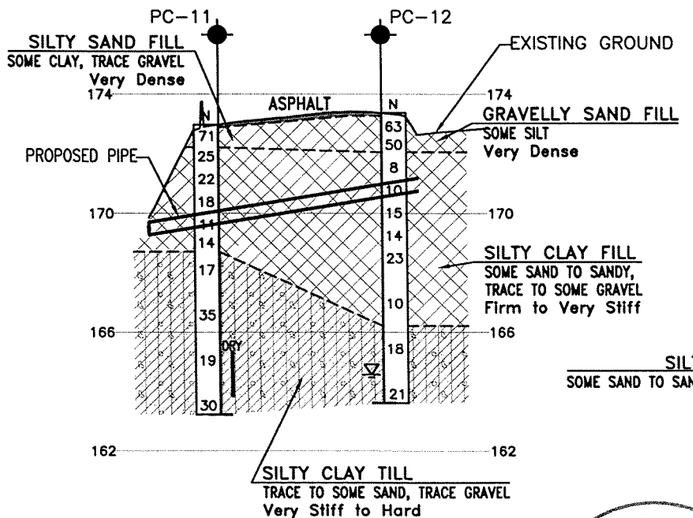
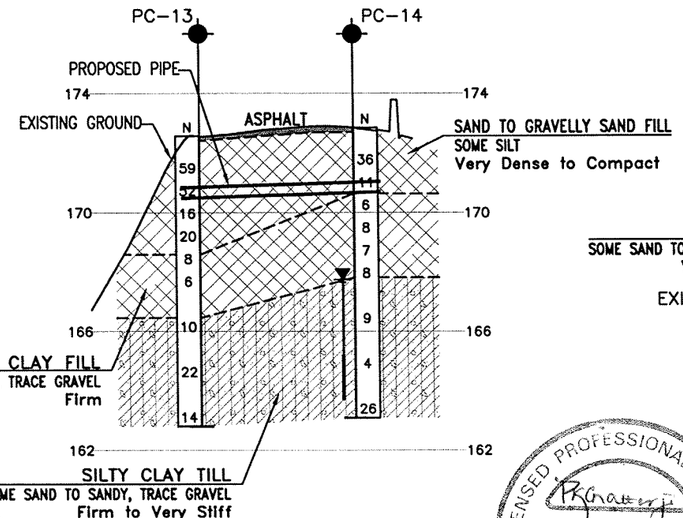


KEYPLAN



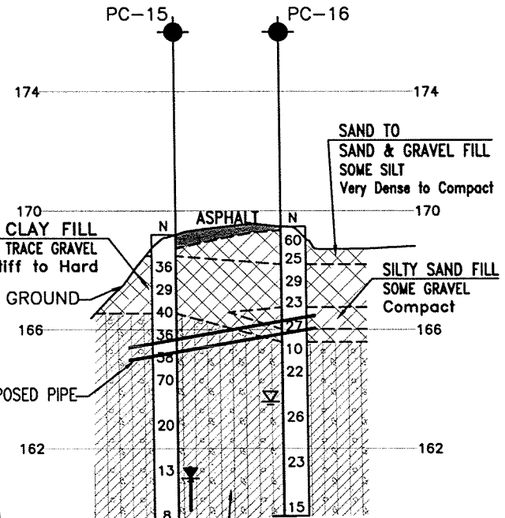
SECTION A-A

5 0 25m
1 0 5m



SECTION B-B

5 0 25m
1 0 5m



SECTION C-C

5 0 25m
1 0 5m

LEGEND

⊕	Borehole
⊕	Borehole and Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60° Cone, 475J/blow)
PH	Pressure, Hydraulic
▽	Water Level
	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
PC-11	173.0	4 840 786.3	295 620.1
PC-12	173.4	4 840 796.8	295 645.0
PC-13	172.6	4 840 848.4	295 594.4
PC-14	172.8	4 840 857.8	295 618.1
PC-15	169.2	4 841 187.1	295 457.6
PC-16	169.5	4 841 193.5	295 473.7

-NOTES-

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GEOCRES No. 30M12-292

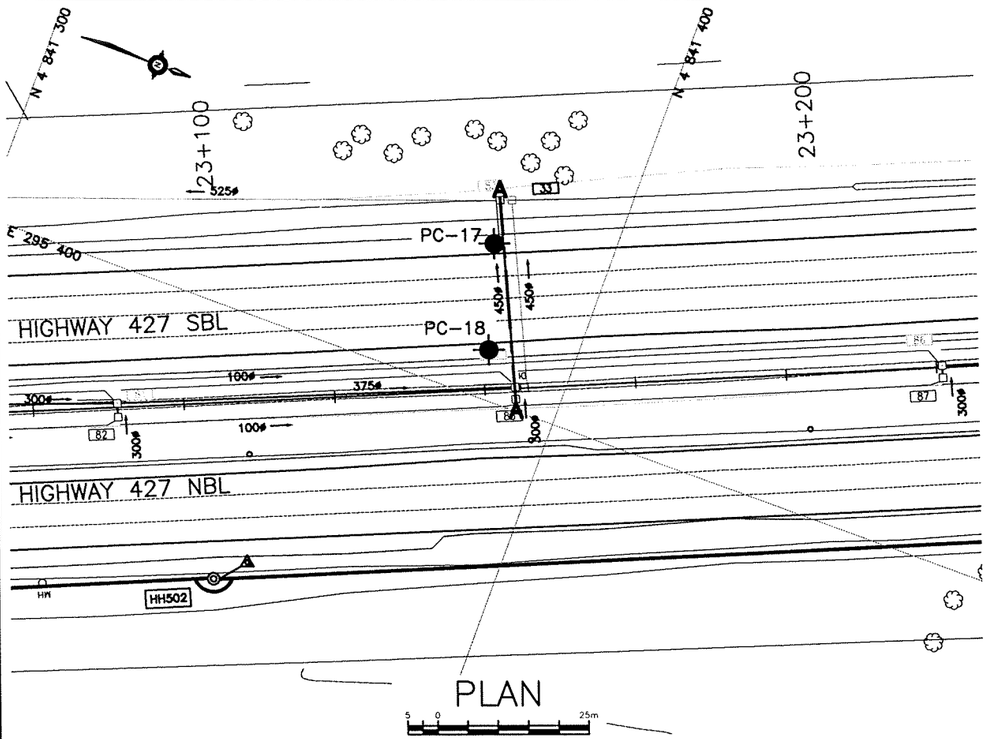
LICENSED PROFESSIONAL ENGINEER
M.E. FARRANT
100053767
March 16, 2010
PROVINCE OF ONTARIO

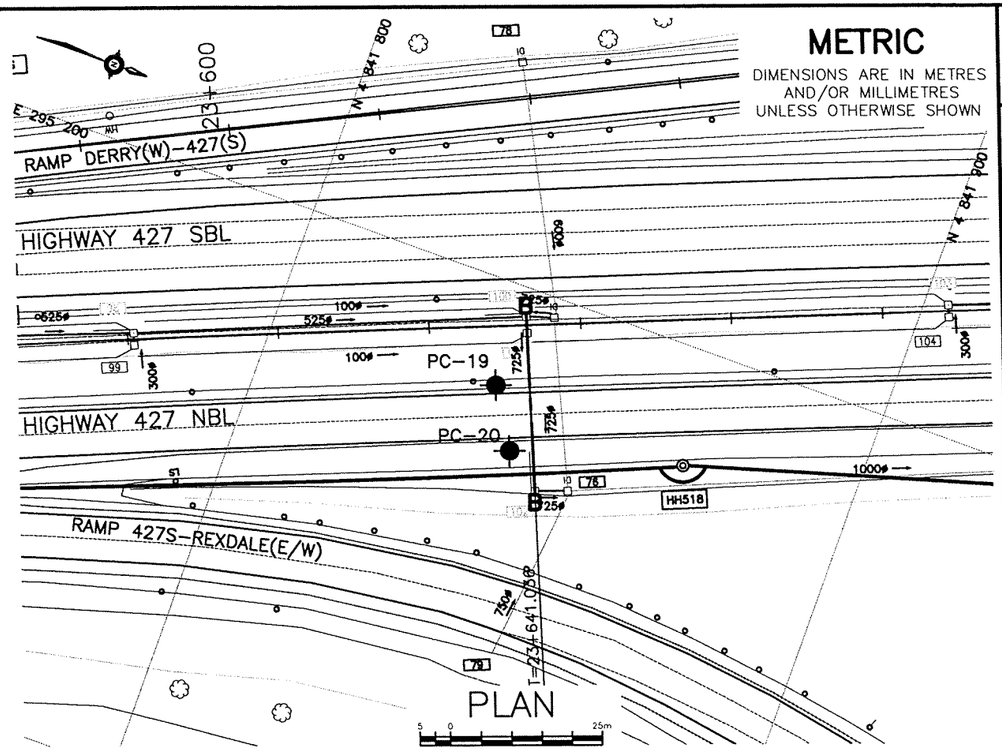
LICENSED PROFESSIONAL ENGINEER
P. K. CHATTERJI
Mar 16/10
PROVINCE OF ONTARIO

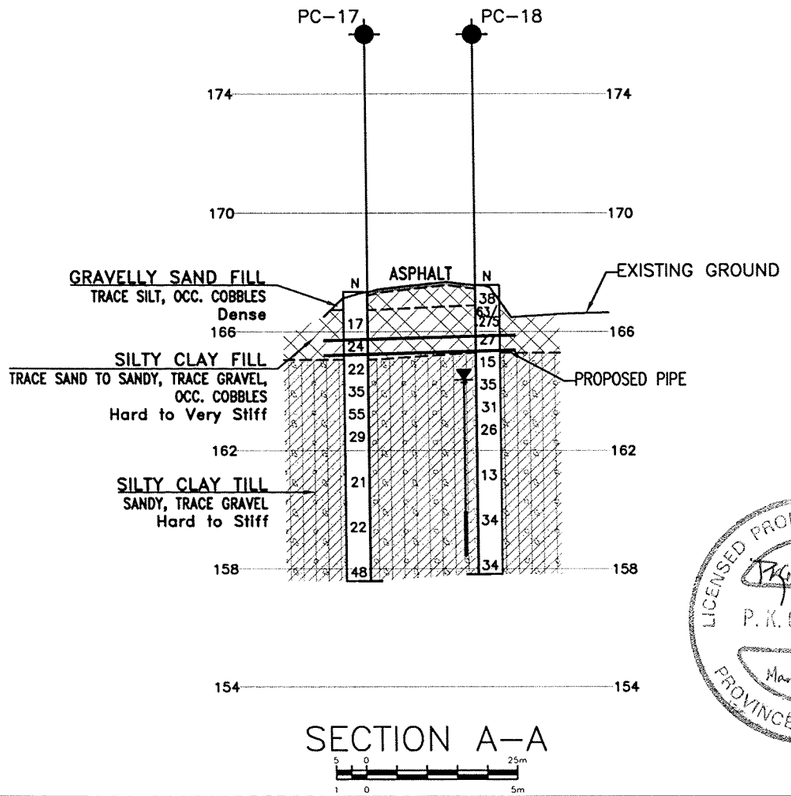
REVISIONS		
DATE	BY	DESCRIPTION

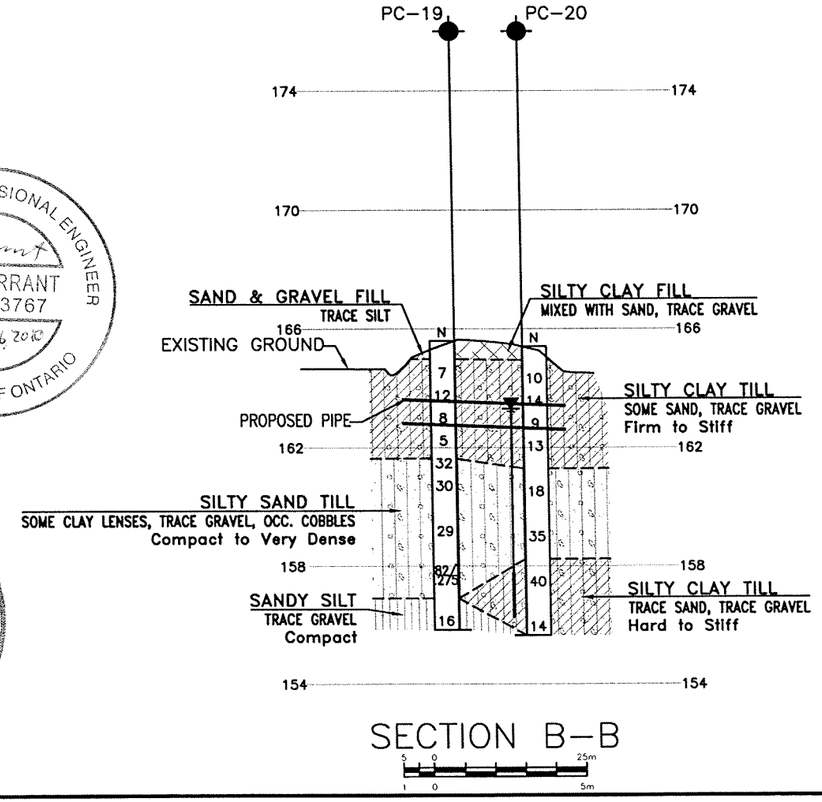
DESIGN	MEF	CHK	PKC	CODE		LOAD	DATE JAN. 2010
DRAWN	MFA	CHK	PKC	SITE		STRUCT	DWG 3

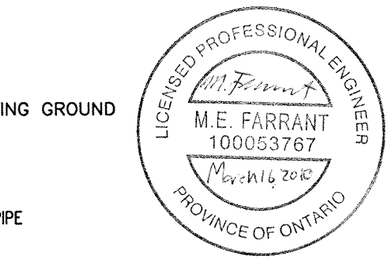
FILENAME











METRIC

DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

CONT No
GWP No 202-95-00

SHEET

HIGHWAY 427
INSIDE WIDENING
PROPOSED SEWER PIPE CROSSINGS
BOREHOLE LOCATIONS AND SOIL STRATA

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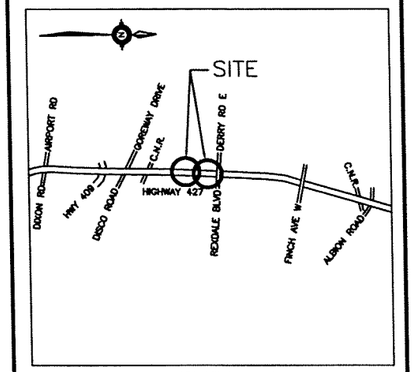

KEYPLAN

LEGEND

⊕	Borehole
⊕	Borehole and Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60° Cone, 475J/blow)
PH	Pressure, Hydraulic
⧖	Water Level
⧖	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
PC-17	167.3	4 841 380.8	295 374.6
PC-18	167.6	4 841 386.0	295 391.8
PC-19	165.6	4 841 838.0	295 217.3
PC-20	165.4	4 841 843.8	295 226.9

-NOTES-

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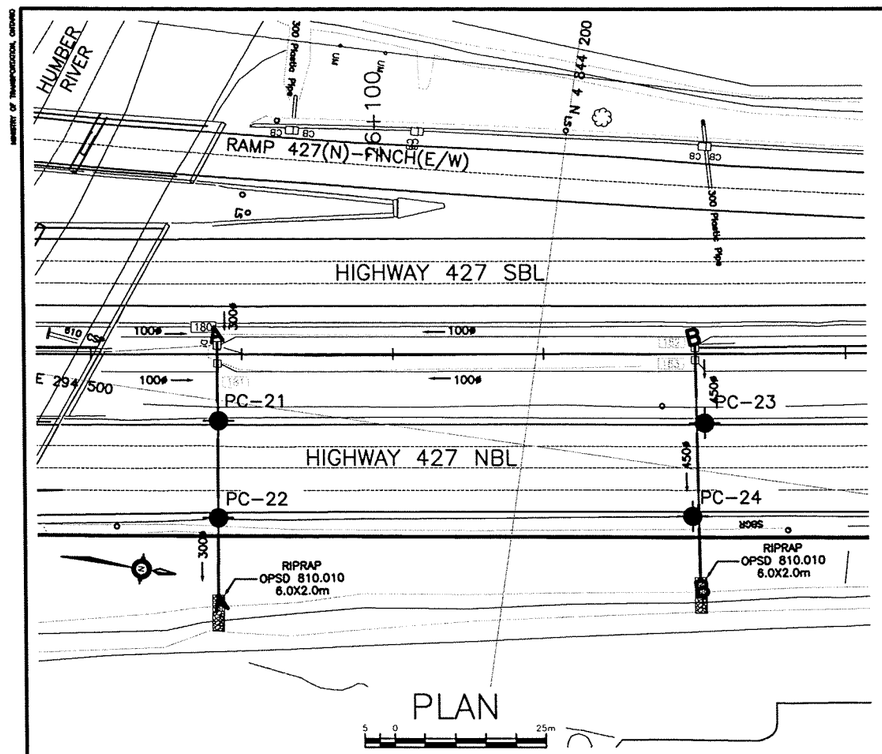
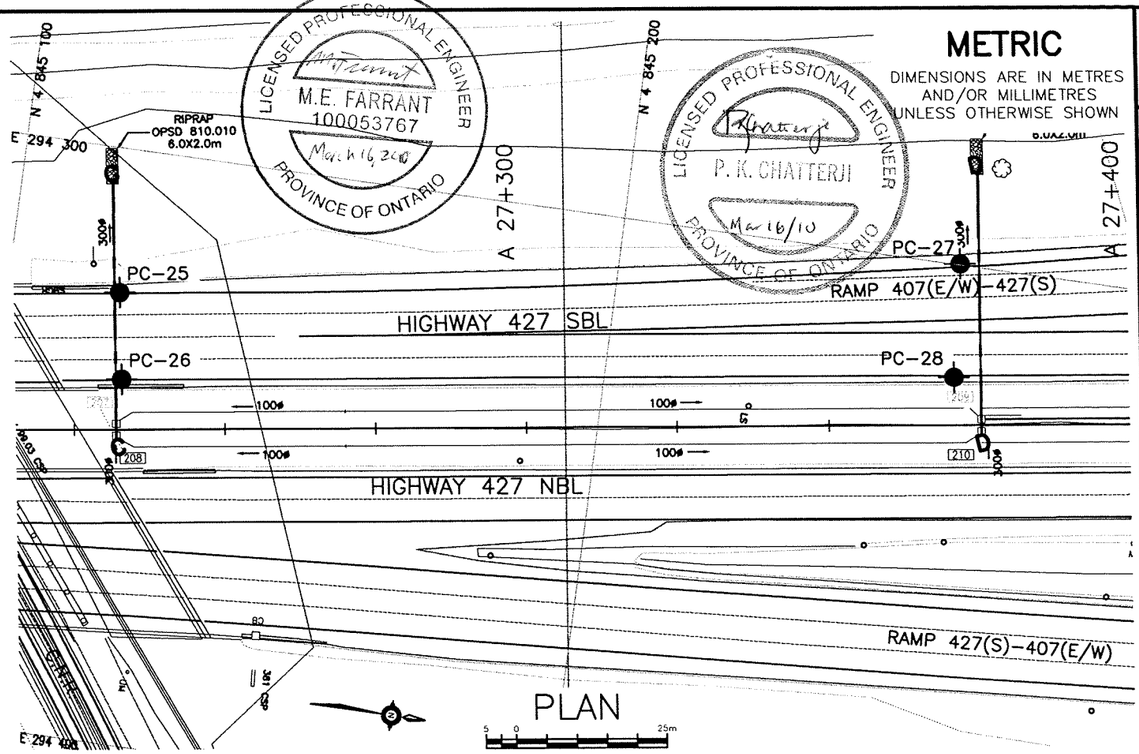
GEOCRES No. 30M12-292

REVISIONS			
DATE	BY	DESCRIPTION	
DESIGN MEF	CHK PKC	CODE	LOAD
DRAWN MFA	CHK PKC	SITE	STRUCT

DATE JAN. 2010
DWG 4

FILENAME:





LICENSED PROFESSIONAL ENGINEER
M.E. FARRANT
100053767
March 16, 2010
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
P. K. CHAITERJI
Mar 16/10
PROVINCE OF ONTARIO

METRIC

DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

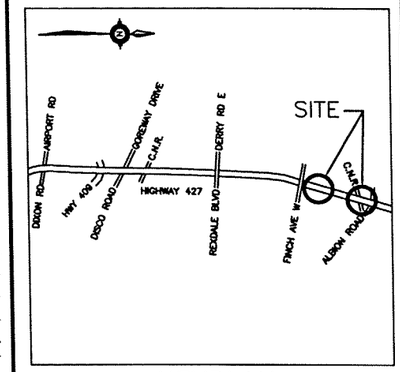
CONT No
GWP No 202–95–00

SHEET

HIGHWAY 427
INSIDE WIDENING
PROPOSED SEWER PIPE CROSSINGS
BOREHOLE LOCATIONS AND SOIL STRATA

SNC·LAVALIN

THURBER ENGINEERING LTD.
GEOTECHNICAL • ENVIRONMENTAL • MATERIALS



KEYPLAN

LEGEND

⊕	Borehole
⊕	Borehole and Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60° Cone, 475J/blow)
PH	Pressure, Hydraulic
▽	Water Level
▽	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
PC–21	168.2	4 844 149.4	294 503.4
PC–22	167.9	4 844 151.6	294 519.6
PC–23	169.4	4 844 228.9	294 492.0
PC–24	169.0	4 844 229.1	294 507.8
PC–25	181.2	4 845 118.7	294 324.3
PC–26	181.3	4 845 120.9	294 338.7
PC–27	180.6	4 845 255.6	294 299.8
PC–28	181.0	4 845 257.0	294 318.8

-NOTES-

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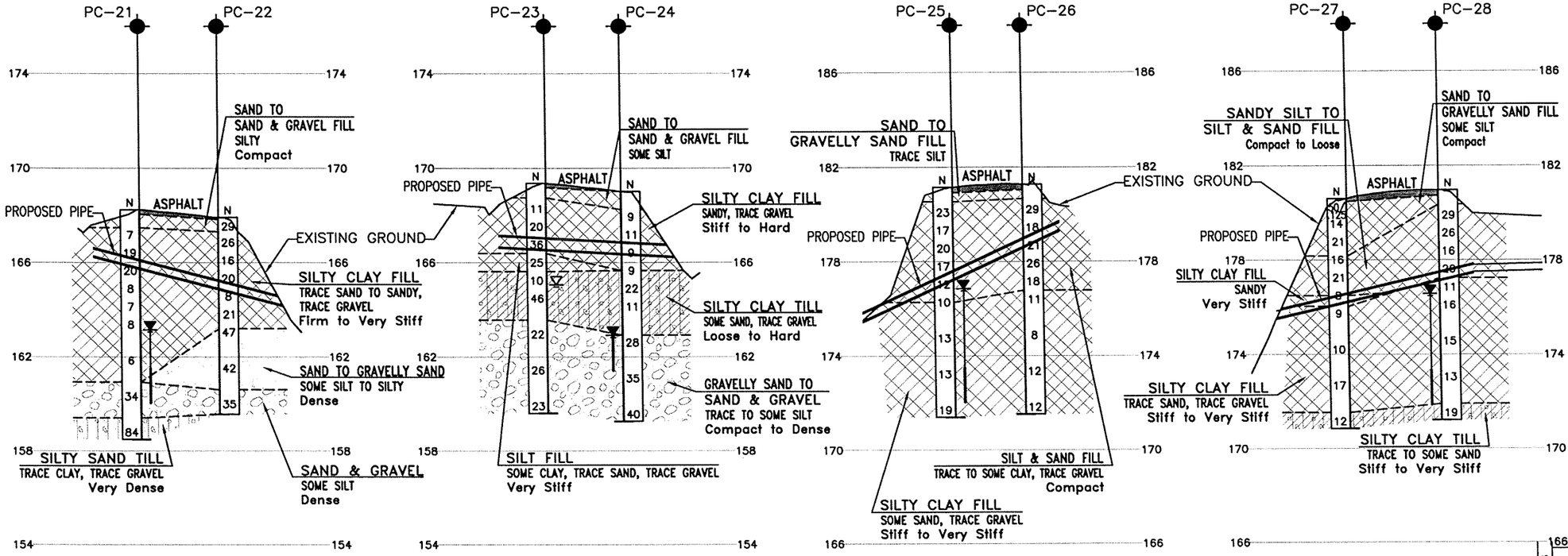
GEOCRES No. 30M12-292



SECTION A–A
SECTION B–B
SECTION C–C
SECTION D–D

REVISIONS	DATE	BY	DESCRIPTION

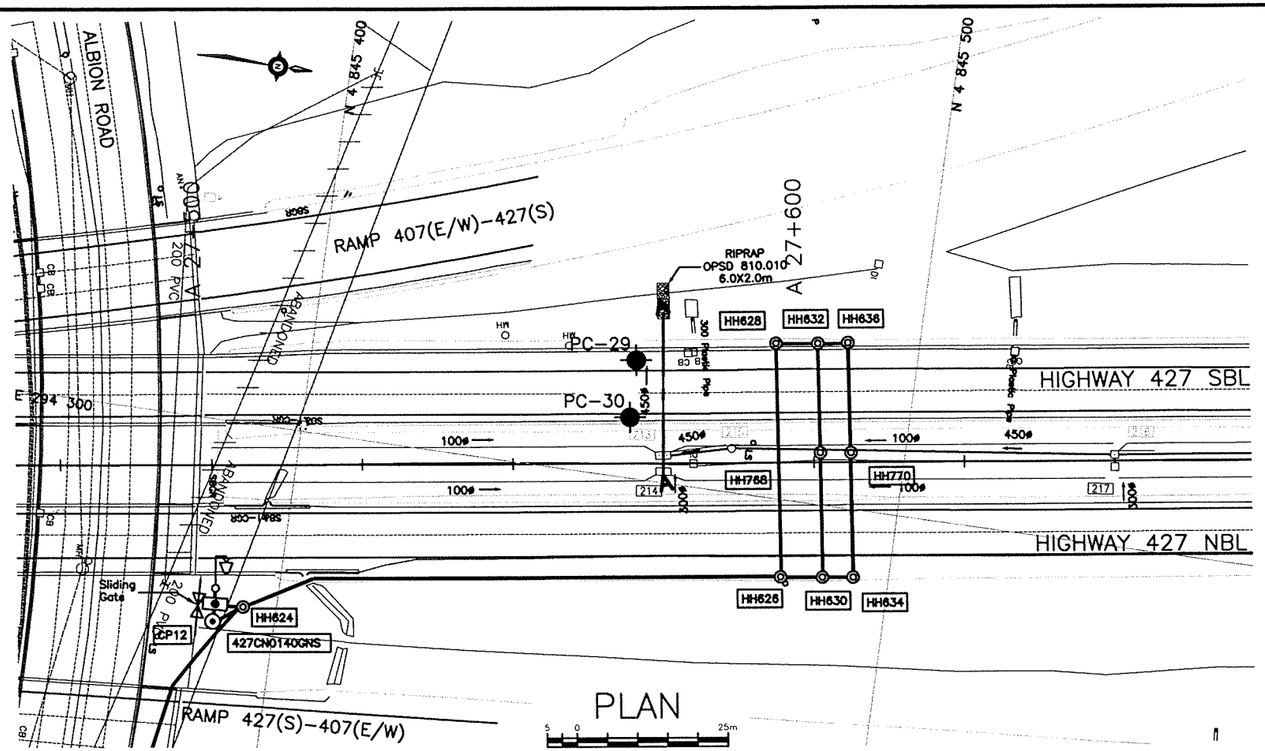
DESIGN	MEF	CHK	PKC	CODE		LOAD	DATE JAN. 2010
DRAWN	MFA	CHK	PKC	SITE		STRUCT	DWG 5

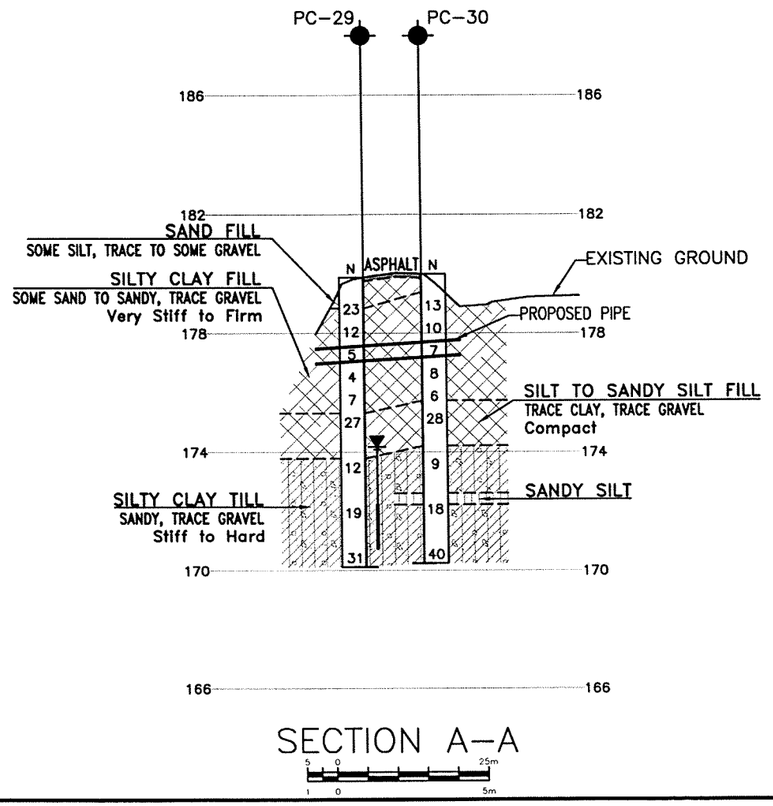
FILENAME:

MINISTRY OF TRANSPORTATION, ONTARIO

METRIC

DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN





CONT No
GWP No 202-95-00

SHEET

HIGHWAY 427
INSIDE WIDENING
PROPOSED SEWER PIPE CROSSINGS
BOREHOLE LOCATIONS AND SOIL STRATA

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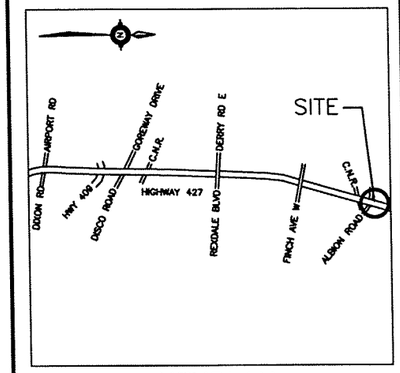

KEYPLAN

LEGEND

⌖	Borehole
⊕	Borehole and Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60° Cone, 475J/blow)
PH	Pressure, Hydraulic
⧖	Water Level
⧗	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
PC-29	179.9	4 845 453.6	294 280.2
PC-30	180.0	4 845 453.9	294 289.8

-NOTES-

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GEOCRES No. 30M12-292

LICENSED PROFESSIONAL ENGINEER
M.E. FARRANT
100053767
March 16 2010
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
P. K. CHATTERJI
Mar 16/10
PROVINCE OF ONTARIO

REVISIONS		
DATE	BY	DESCRIPTION

DESIGN	MEF	CHK	PKC	CODE		LOAD	DATE JAN. 2010
DRAWN	MFA	CHK	PKC	SITE		STRUCT	DWG 6

FILENAME