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**FOUNDATION INVESTIGATION REPORT  
NOISE BARRIER WALLS  
QEW WIDENING FROM HIGHWAY 406  
TO GARDEN CITY SKYWAY  
ST. CATHARINES, ONTARIO  
G.W.P. 607-00-00**

Submitted to:

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GEOCREs No.

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## 1.0 INTRODUCTION

Golder Associates Ltd. (Golder) has been retained by Morrison Hershfield Limited (MH) on behalf of the Ministry of Transportation, Ontario (MTO) to provide foundation engineering services associated with the widening of the Queen Elizabeth Way (QEW) between Highway 406 and the Garden City Skyway in the City of St. Catharines, in the Region of Niagara. Foundation engineering services are required for the widening or replacement of five structures (Third Street overpass, Martindale Road underpass, Lake Street underpass, Geneva Street overpass, and Welland Avenue overpass), new retaining walls and noise barrier walls, culvert extensions and high mast light poles.

This report addresses the foundation investigation carried out for the proposed noise barrier walls between Station 10+415, approximately 400 m west of Ontario Street, and Station 14+825, approximately 400 m east of Welland Avenue.

The terms of reference and scope of work for the foundation engineering services are outlined in MTO's Request for Proposal for Agreement No. 2005-A-000564, issued in July 2002, and in Section 6.8 of MH's *Technical Proposal* for G.W.P. 607-00-00.

## **2.0 SITE DESCRIPTION**

The proposed noise barrier walls extend along the north and south sides of the QEW from Station 10+415, approximately 400 m west of Ontario Street, to Station 14+825, approximately 400 m east of Welland Avenue, in St. Catharines, Ontario.

Throughout the study area, the QEW runs roughly parallel to and north of (below) the Niagara escarpment, and sub-parallel to and south of Lake Ontario; the highway is located closer to the lake near the western portion of the study area, and trends away from the lake toward the eastern portion of the study area.

The terrain along the QEW is generally flat-lying to gently sloping, with a regional slope downward to the north toward Lake Ontario. East of Martindale Pond, the QEW climbs gradually toward the east, from about Elevation 92 m to 93 m near Ontario Street to about Elevation 101 m to 101.5 m near Welland Avenue. Fill embankments are present above the natural ground surface along the QEW and the local roads throughout the study area.

### 3.0 INVESTIGATION PROCEDURES

The field work for the widening of the QEW from Highway 406 to the Garden City Skyway was carried out by Golder from October to December 2004 and May to August 2005, during which time boreholes were advanced as part of the subsurface investigations for the widening or replacement of five structures, new retaining walls and noise barrier walls, culvert extensions, and high mast light poles. Of these boreholes, eighty-eight have been used in this report for the proposed noise barrier walls. Drawings 1 to 4 show the locations of these boreholes.

The field investigation was carried out using truck- and track-mounted drill rigs supplied and operated by Walker Drilling Ltd. of Utopia, Ontario. The boreholes were advanced to depths ranging from 5.2 m to 36.7 m below the existing ground surface, using 108 mm diameter solid stem augers. Soil samples were obtained at intervals of 0.75 m to 1.5 m in depth within the upper 20 m of the boreholes, and at 3 m spacing below this depth. The samples were obtained using a 50 mm outer diameter split-spoon sampler driven by an automatic hammer, in accordance with Standard Penetration Test (SPT) procedure. In situ vane testing (using an MTO "N" vane) was carried out at selected depths through softer cohesive strata, where encountered.

The groundwater conditions in the open boreholes were observed throughout the drilling operations and standpipe piezometers were installed in selected boreholes to permit monitoring of the groundwater level at these locations. The piezometers consist of 50 mm outside diameter rigid PVC tubing with a 1.5 m long slotted screen sealed within a filter sand pack at a selected depth within the boreholes (typically within the clayey silt to silty clay till deposit). The screen and filter sand pack have been backfilled to ground surface using bentonite pellets. Boreholes that did not have piezometers installed were backfilled to ground surface upon completion of the drilling operations, using bentonite pellets.

The field work was supervised on a full-time basis by a member of Golder's staff who located the boreholes in the field, arranged for the clearance of underground service locations, directed the drilling, sampling, and in situ testing operations, and logged the boreholes. The soil samples were identified in the field, placed in labelled containers and transported to Golder's laboratory in Mississauga for further examination and testing. Index and classification tests consisting of water content determinations, Atterberg limits and grain size distribution analyses were carried out on selected soil samples.

The as-drilled borehole locations were measured in the field by Golder relative to site features and the alignment of the walls staked by MH, and the ground surface elevations at the borehole locations were determined from the digital terrain model (DTM) for this project. The borehole locations (NAD83 northing and easting coordinates) and ground surface elevations (referenced to geodetic datum) are presented on the Record of Borehole sheets and on Drawings 1 to 4.

## 4.0 GENERAL SITE GEOLOGY AND STRATIGRAPHY

### 4.1 Regional Geological Conditions

The area of the QEW from Highway 406 to the Garden City Skyway lies within the Iroquois Plain physiographic region, as delineated in *The Physiography of Southern Ontario*<sup>1</sup> and *Urban Geology of Canadian Cities*<sup>2</sup>.

The Iroquois Plain extends around the western shore of Lake Ontario; on the south side of the lake, in the St. Catharines area, the Plain is located between the present Lake Ontario shorebluffs and the foot of the Niagara Escarpment. The Plain is comprised of the flat to undulating lake bed and beaches of the former glacial Lake Iroquois, which occupied this area during the last glacial recession.

The surficial soils in the Iroquois Plain are typically comprised of glaciolacustrine clays and silts. However, in the St. Catharines area, surficial deposits of beach sand and gravel are also present. The surficial sands, silts and clays are underlain by an extensive till deposit; portions of the till are considered to be “water-lain” (that is, formed by sediment rain-out either from a floating ice margin or from iceberg dumping), resulting in a predominantly massive, matrix-supported structure, as well as relatively thin sand to silt stringers or interlayers. This extensive till deposit may be underlain by or interlayered with a lower glaciolacustrine clay deposit, although this glaciolacustrine layer is absent in some portions of the Iroquois Plain in the St. Catharines area. Finally, the till and/or glaciolacustrine layer may be underlain by a lower till unit, that typically has increasing gravel content with proximity to the underlying bedrock (Menzies and Taylor, 1998).

The overburden soils are underlain by red shale bedrock of the Queenston Formation. This shale formation contains siltstone interlayers as well as “occasional patches of gypsum” (Menzies and Taylor, 1998).

### 4.2 Site Stratigraphy

The detailed subsurface soil and groundwater conditions as encountered in the boreholes advanced during this investigation, together with the results of the laboratory tests carried out on selected soil samples, are given on the attached Record of Borehole sheets and Figures 1A to 6H

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<sup>1</sup> Chapman, L.J. and D.F. Putnam. *The Physiography of Southern Ontario*, Ontario Geological Survey Special Volume 2, Third Edition, 1984. Accompanied by Map P.2715, Scale 1:600,000.

<sup>2</sup> J. Menzies and E.M. Taylor. “Urban Geology of St. Catharines-Niagara Falls, Region Niagara”. In *Urban Geology of Canadian Cities*, Geological Association of Canada Special Paper 42, Ed. P.F. Karrow and O.L. White, 1998.

following the text of this report. The stratigraphic boundaries shown on the borehole records are inferred from non-continuous sampling, observations of drilling progress and the results of Standard Penetration Tests. These boundaries, therefore, represent transitions between soil types rather than exact planes of geological change. Subsoil conditions will vary between and beyond the borehole locations.

In general, the surficial soils at the site consist of fill materials associated with embankments for the QEW and local roads, overlying a thick deposit of clayey silt to silty clay till of firm to hard consistency. Relatively thin surficial deposits of silty sand to sandy silt and clayey silt to silty clay were encountered in some of the boreholes, overlying the till deposit. In the deeper boreholes the clayey silt to silty clay till was often underlain by dense to very dense silty sand to sandy silt till, sand or silt. The boreholes were typically terminated within the clayey silt to silty clay till at depths ranging from about 5.2 m to 36.7 m below the ground surface.

A more detailed description of the subsurface conditions encountered in the boreholes is provided in the following sections. The deeper soil deposits (for example, lower granular deposits or residual soils below about 20 m depth), as encountered in the 400-series and 500-series boreholes advanced at the Geneva Street and Welland Avenue overpass sites, respectively, are not addressed in this report as they are located below the depth of interest for noise barrier wall foundations.

#### **4.2.1 Topsoil**

About 70 mm to 150 mm of topsoil was encountered at ground surface in eleven of the boreholes that were advanced within landscaped areas, outside of the paved roadways or shoulders.

#### **4.2.2 Asphalt and Fill Materials**

In forty-four of the boreholes advanced through the QEW or local roadway pavements, a layer of asphalt about 100 mm to 200 mm in thickness was encountered at ground surface. In Boreholes W-57, W-69 and W-72 the asphalt layer was underlain by a layer of concrete about 100 mm to 250 mm thick. Fill material is present below the pavements, and fill materials were typically encountered in the remaining boreholes at ground surface. The fill extends to depths ranging from about 0.5 m to 9.1 m below the ground surface, as encountered in the boreholes.

The existing fill materials vary in composition from sand to sand and gravel or crushed limestone, clayey silt to silty clay, and foundry sand. The results of grain size distribution testing carried out on fourteen selected samples of the fill are shown on Figure 1A and 1B. A 150 mm to 200 mm thick layer of concrete was encountered in Boreholes W-37, W-42, W-54 and W-80 within or at the base of the fill material.

Atterberg limits testing was conducted on six selected samples of the cohesive fill, and measured plastic limits of 13 to 17 per cent, liquid limits of 18 to 35 per cent, and plasticity indices of 5 to 18 per cent; these results, which are plotted on a plasticity chart on Figure 2, indicate that the cohesive fill is typically a clayey silt of low plasticity.

The measured SPT “N” values within the cohesionless fill ranged from about 4 to 70 blows per 0.3 m of penetration, indicating that the fill has a variable, loose to very dense relative density. The layers of foundry sand that were encountered within the QEW embankment fill in some boreholes yielded SPT “N” values ranging from 10 to 107 blows per 0.3 m of penetration, indicating that this portion of the fill has a compact to very dense, and generally very dense, relative density. The measured SPT “N” values within the cohesive fill ranged from 4 to 40 blows per 0.3 m of penetration, indicating that the clayey silt fill has a variable, firm to hard consistency.

#### **4.2.3 Surficial Silty Sand to Sandy Silt**

Surficial deposits of cohesionless soil were encountered in some of the boreholes (Boreholes 403, 406, W-15, W-16, W-17, W-20, W-32, W-44, W-45, W-48, W-50, W-53, W-54, W-56, W-58, W-59, W-60 and W-67), generally below the topsoil or fill and on top of the clayey silt to silty clay till deposit. Where encountered, the surficial cohesionless deposits varied from about 0.2 m to 2.3 m in thickness.

The surficial cohesionless soils vary in composition from silty sand to sandy silt containing trace to some gravel; silty clay seams were observed within the deposit at some locations. The results of grain size distribution tests conducted on five samples of the surficial silty sand to sandy silt are shown on Figure 3; on this Figure, the result for Borehole W-48, Sample 2 demonstrates the presence of silty clay seams within the deposit. In addition, organic matter, rootlets and wood fragments were observed in recovered samples of the surficial silty sand to sandy silt.

The measured SPT “N” values ranged from 4 to 29 blows per 0.3 m of penetration, indicating that the surficial silty sand to sandy silt has a loose to very dense state of packing.

#### **4.2.4 Surficial Clayey Silt to Silty Clay**

Surficial layers of cohesive soil were encountered in some of the boreholes (Boreholes 405, W-18, W-42, W-72 and W-79) below the topsoil or fill, and on top of the clayey silt to silty clay till deposit. Where encountered as part of this investigation, the surficial cohesive soils varied from about 0.7 m to 1.5 m in thickness.

The surficial cohesive soils vary in composition from clayey silt to silty clay containing trace to some sand, trace gravel, and trace quantities of organic material. The result of a grain size distribution test conducted on one selected sample of the surficial clayey silt to silty clay is shown on Figure 3.

The SPT “N” values measured within the surficial clayey silt to silty clay ranged from 5 to 18 blows per 0.3 m of penetration, indicating that this material has a firm to very stiff consistency.

#### **4.2.5 Clayey Silt to Silty Clay Till**

An extensive till deposit was encountered beneath the topsoil, fill and surficial soil deposits, where present, in all of the boreholes. The surface of this deposit was encountered at a depth of between 0.1 m and 9.4 m below the ground surface at the borehole locations, ranging between Elevations 89.2 m and 103.2 m (generally rising toward the east). All of the W-series boreholes were terminated within the till deposit; where fully penetrated in some of the deeper boreholes advanced for the Geneva Street and Welland Avenue structures, the till deposit is greater than 20 m in thickness.

The till consists of brown to grey clayey silt to silty clay, containing trace to some sand and gravel/shale fragments. Seams of silt and sandy silt were noted within some of the recovered till samples. Interlayers of moist to wet silty sand to sand and silt were encountered within the clayey silt to silty clay till deposit in Boreholes W-26, W-42 and W-45; these interlayers vary from 0.2 m to greater than 0.9 m in thickness. The results of grain size distribution testing completed on forty selected samples of the clayey silt to silty clay till are shown on Figures 5A to 5D. Although boulders and cobbles were not encountered within the deposit in the boreholes advanced as part of this investigation, the deposit is glacially-derived and may contain cobbles and boulders.

Atterberg limits testing was completed on 147 samples of the till deposit, and measured plastic limits of 13 to 25 per cent, liquid limits of 21 to 51 per cent, and plasticity indices of 9 to 30 per cent. These results, which are plotted on plasticity charts on Figures 6A through 6H, confirm that the till varies from a clayey silt of low plasticity to a silty clay of intermediate plasticity.

The SPT “N” values measured within the clayey silt to silty clay till deposit generally ranged from 6 to 60 blows per 0.3 m of penetration. In situ vane testing was carried out within the firm to stiff zones of the till deposit, where encountered, and measured undrained shear strengths ranging from about 45 kPa to greater than 100 kPa; the detailed results of the field vane testing are presented on the borehole records. The results of the SPT “N” values and in situ vane testing indicate that the till deposit has a firm to hard, but typically stiff to hard, consistency.

### 4.3 Groundwater Conditions

The water levels in the boreholes advanced by Golder in 2004 and 2005 were noted during and after the drilling operations; typically, the open boreholes were dry upon completion of drilling. Piezometers were installed in nine of the boreholes that are included with this report, generally sealed within the clayey silt to silty clay till deposit. Details of the piezometer installations are shown in the borehole records following the text of this report.

Typically, the water level measured in the piezometers installed as part of the subsurface investigation for the noise barrier walls and for other elements of this project varies from about 1.5 m to 4 m below the natural ground surface at the site. The recorded water levels in the piezometers are summarized below:

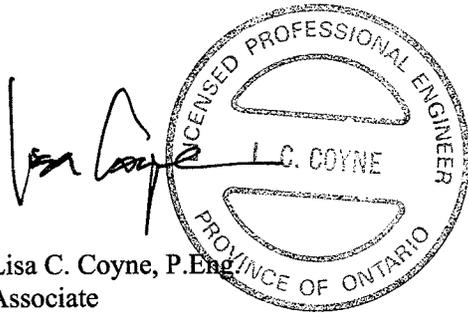
<i>Borehole Number</i>	<i>Ground Surface Elevation (m)</i>	<i>Water Level Depth (m)</i>	<i>Water Level Elevation (m)</i>	<i>Date</i>
405	100.0	2.8	97.2	Aug 8, 2005
		0.6	99.4	Dec 6, 2005
503	101.4	11.6	89.8	May 13, 2005
		13.7	87.7	Dec 20, 2005
507	101.5	1.6	99.9	May 13, 2005
		6.0	95.5	Dec 20, 2005
W-9A	93.8	2.8	91.0	Aug 8, 2005
		1.7	92.1	Dec 6, 2005
W-25	94.5	3.8	90.7	Aug 8, 2005
		2.5	92.0	Dec 6, 2005
W-59	102.0	8.7	93.3	Aug 8, 2005
		3.7	98.3	Dec 6, 2005
W-61	101.8	7.3	94.5	Aug 8, 2005
		2.5	99.3	Dec 6, 2005
W-65	101.2	4.2	97.0	Aug 8, 2005
		1.2	100.0	Dec 6, 2005
W-77	101.4	3.2	98.2	Aug 8, 2005
		1.1	100.3	Dec 6, 2005

The groundwater levels will subject to seasonal fluctuations, and will be higher during wetter periods of the year. In addition, the surficial silty sand to sandy silt soils, where present, should be expected to be water-bearing, with water “perched” on top of the underlying, less permeable clayey silt to silty clay till deposit. Water may also be present at the base of cohesionless fill soils, again “perched” on top of the clayey silt to silty clay till deposit.

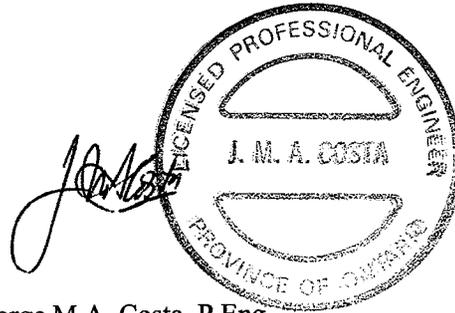
### 5.0 CLOSURE

This Foundation Investigation Report was prepared by Ms. Sarah Grady and reviewed by Ms. Lisa Coyne, P.Eng., an Associate and geotechnical engineer with Golder. Mr. Jorge Costa, P.Eng., a Principal and Designated MTO Contact for Golder, carried out an independent review of the report.

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## LIST OF ABBREVIATIONS

The abbreviations commonly employed on Records of Boreholes, on figures and in the text of the report are as follows:

### I. SAMPLE TYPE

AS	Auger sample
BS	Block sample
CS	Chunk sample
SS	Split-spoon
DS	Denison type sample
FS	Foil sample
RC	Rock core
SC	Soil core
ST	Slotted tube
TO	Thin-walled, open
TP	Thin-walled, piston
WS	Wash sample

### III. SOIL DESCRIPTION

#### (a) Cohesionless Soils

Density Index (Relative Density)	N Blows/300 mm or Blows/ft.
Very loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very dense	over 50

### II. PENETRATION RESISTANCE

#### Standard Penetration Resistance (SPT), N:

The number of blows by a 63.5 kg. (140 lb.) hammer dropped 760 mm (30 in.) required to drive a 50 mm (2 in.) drive open sampler for a distance of 300 mm (12 in.)

#### (b) Cohesive Soils

#### Consistency

	$c_u, s_u$	
	kPa	psf
Very soft	0 to 12	0 to 250
Soft	12 to 25	250 to 500
Firm	25 to 50	500 to 1,000
Stiff	50 to 100	1,000 to 2,000
Very stiff	100 to 200	2,000 to 4,000
Hard	over 200	over 4,000

#### Dynamic Cone Penetration Resistance; $N_d$ :

The number of blows by a 63.5 kg (140 lb.) hammer dropped 760 mm (30 in.) to drive uncased a 50 mm (2 in.) diameter, 60° cone attached to "A" size drill rods for a distance of 300 mm (12 in.).

**PH:** Sampler advanced by hydraulic pressure

**PM:** Sampler advanced by manual pressure

**WH:** Sampler advanced by static weight of hammer

**WR:** Sampler advanced by weight of sampler and rod

#### Piezo-Cone Penetration Test (CPT)

A electronic cone penetrometer with a 60° conical tip and a project end area of 10 cm<sup>2</sup> pushed through ground at a penetration rate of 2 cm/s. Measurements of tip resistance ( $Q_t$ ), porewater pressure (PWP) and friction along a sleeve are recorded electronically at 25 mm penetration intervals.

### IV. SOIL TESTS

w	water content
$w_p$	plastic limit
$w_l$	liquid limit
C	consolidation (oedometer) test
CHEM	chemical analysis (refer to text)
CID	consolidated isotropically drained triaxial test <sup>1</sup>
CIU	consolidated isotropically undrained triaxial test with porewater pressure measurement <sup>1</sup>
$D_R$	relative density (specific gravity, $G_s$ )
DS	direct shear test
M	sieve analysis for particle size
MH	combined sieve and hydrometer (H) analysis
MPC	Modified Proctor compaction test
SPC	Standard Proctor compaction test
OC	organic content test
SO <sub>4</sub>	concentration of water-soluble sulphates
UC	unconfined compression test
UU	unconsolidated undrained triaxial test
V	field vane (LV-laboratory vane test)
$\gamma$	unit weight

**Note: 1** Tests which are anisotropically consolidated prior to shear are shown as CAD, CAU.

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## LIST OF SYMBOLS

Unless otherwise stated, the symbols employed in the report are as follows:

### I. General

$\pi$	3.1416
$\ln x$ ,	natural logarithm of x
$\log_{10}$	x or log x, logarithm of x to base 10
g	acceleration due to gravity
t	time
F	factor of safety
V	volume
W	weight

### II. STRESS AND STRAIN

$\gamma$	shear strain
$\Delta$	change in, e.g. in stress: $\Delta \sigma$
$\epsilon$	linear strain
$\epsilon_v$	volumetric strain
$\eta$	coefficient of viscosity
$\nu$	poisson's ratio
$\sigma$	total stress
$\sigma'$	effective stress ( $\sigma' = \sigma - u$ )
$\sigma'_{vo}$	initial effective overburden stress
$\sigma_1, \sigma_2, \sigma_3$	principal stress (major, intermediate, minor)
$\sigma_{oct}$	mean stress or octahedral stress $= (\sigma_1 + \sigma_2 + \sigma_3)/3$
$\tau$	shear stress
u	porewater pressure
E	modulus of deformation
G	shear modulus of deformation
K	bulk modulus of compressibility

### III. SOIL PROPERTIES

#### (a) Index Properties

$\rho(\gamma)$	bulk density (bulk unit weight*)
$\rho_d(\gamma_d)$	dry density (dry unit weight)
$\rho_w(\gamma_w)$	density (unit weight) of water
$\rho_s(\gamma_s)$	density (unit weight) of solid particles
$\gamma'$	unit weight of submerged soil ( $\gamma' = \gamma - \gamma_w$ )
$D_R$	relative density (specific gravity) of solid particles ( $D_R = \rho_s / \rho_w$ ) (formerly $G_s$ )
e	void ratio
n	porosity
S	degree of saturation

#### (a) Index Properties (continued)

w	water content
$w_l$	liquid limit
$w_p$	plastic limit
$I_p$	plasticity index = $(w_l - w_p)$
$w_s$	shrinkage limit
$I_L$	liquidity index = $(w - w_p)/I_p$
$I_C$	consistency index = $(w_l - w)/I_p$
$e_{max}$	void ratio in loosest state
$e_{min}$	void ratio in densest state
$I_D$	density index = $(e_{max} - e) / (e_{max} - e_{min})$ (formerly relative density)

#### (b) Hydraulic Properties

h	hydraulic head or potential
q	rate of flow
v	velocity of flow
i	hydraulic gradient
k	hydraulic conductivity (coefficient of permeability)
j	seepage force per unit volume

#### (c) Consolidation (one-dimensional)

$C_c$	compression index (normally consolidated range)
$C_r$	recompression index (over-consolidated range)
$C_s$	swelling index
$C_a$	coefficient of secondary consolidation
$m_v$	coefficient of volume change
$c_v$	coefficient of consolidation
$T_v$	time factor (vertical direction)
U	degree of consolidation
$\sigma'_p$	pre-consolidation pressure
OCR	over-consolidation ratio = $\sigma'_p / \sigma'_{vo}$

#### (d) Shear Strength

$\tau_p, \tau_r$	peak and residual shear strength
$\phi'$	effective angle of internal friction
$\delta$	angle of interface friction
$\mu$	coefficient of friction = $\tan \delta$
$c'$	effective cohesion
$c_{u,s_u}$	undrained shear strength ( $\phi = 0$ analysis)
p	mean total stress $(\sigma_1 + \sigma_3)/2$
$p'$	mean effective stress $(\sigma'_1 + \sigma'_3)/2$
q	$(\sigma_1 + \sigma_3)/2$ or $(\sigma'_1 + \sigma'_3)/2$
$q_u$	compressive strength $(\sigma_1 + \sigma_3)$
$S_t$	sensitivity

- Notes:**
- 1  $\tau = c' + \sigma' \tan \phi'$
  - 2 shear strength = (compressive strength)/2
  - \* density symbol is  $\rho$ . Unit weight symbol is  $\gamma$  where  $\gamma = \rho g$  (i.e. mass density x acceleration due to gravity)



PROJECT 04-1111-002 **RECORD OF BOREHOLE No 401** 2 OF 3 **METRIC**  
 W.P. 607-00-00 LOCATION N 4781742.3 ; E 325860.8 ORIGINATED BY PKS  
 DIST Central HWY QEW BOREHOLE TYPE 108 mm Diameter Solid Stem Augers COMPILED BY HJ  
 DATUM Geodetic DATE June 29, 2005 CHECKED BY LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa						
	--- CONTINUED FROM PREVIOUS PAGE ---													
	CLAYEY SILT, some sand, trace gravel and shale pieces (TILL) Stiff to very stiff Grey Moist		13	SS	14									
			14	SS	14									
			15	SS	17									
			16	SS	20									
			17	SS	17									
			18	SS	25									
			19	SS	81									
	Becoming red below 25.0 m depth													
	Containing shale pieces below 27.4 m depth													
77.4	CLAYEY SILT, some sand, trace gravel and shale pieces (TILL/RESIDUAL SOIL) Hard Red Moist													
28.3														

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 +<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No 401</b>	3 OF 3 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781742.3 ; E 325860.8</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>HJ</u>
DATUM <u>Geodetic</u>	DATE <u>June 29, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT  γ  kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									
	--- CONTINUED FROM PREVIOUS PAGE ---																
	CLAYEY SILT, some sand, trace gravel and shale pieces (TILL/RESIDUAL SOIL) Hard Red Moist	[Hatched Box]	20	SS	153	75											
			74														
			73	21	SS	100/0.13							○				11 21 55 13
72.0 33.7	END OF BOREHOLE		22	SS	100/7.15												
	Note: 1.) Borehole dry upon completion of drilling operations.																

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

**RECORD OF BOREHOLE No 402** 1 OF 3 **METRIC**

PROJECT 04-1111-002 W.P. 607-00-00 LOCATION N 4781732.1 ; E 325899.5 ORIGINATED BY PKS

DIST Central HWY QEW BOREHOLE TYPE 108 mm Diameter Solid Stem Augers COMPILED BY HJ

DATUM Geodetic DATE June 27, 2005 CHECKED BY LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)							
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)						
						20	40	60	80	100	20	40	60	80	100	10	20	30	GR	SA	SI	CL	
106.0	GROUND SURFACE																						
0.0	ASPHALT																						
0.2	Sand and gravel (FILL) Compact to very dense Red Moist		1	SS	53																		
			2	SS	24																		
			3	SS	13																		
103.0																							
3.1	Silty sand to sand, some silt, trace to some gravel (FILL) Loose to compact Red Moist		4	SS	7																		
			5	SS	12																		
			6	SS	4																		
99.6																							
6.4	Sand and gravel (FILL) Compact to very dense Grey/brown Moist		7	SS	30																		
	Wet below 7.6 m depth		8	SS	50																		
96.9																							
9.1	CLAYEY SILT, some sand, trace gravel and shale pieces (TILL) Stiff to very stiff Grey Moist/wet		9	SS	16																		
			10	SS	15																		
			11	SS	15																		
			12	SS	13																		

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 +<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No 402</b>	2 OF 3 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781732.1 ; E 325899.5</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>HJ</u>
DATUM <u>Geodetic</u>	DATE <u>June 27, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL				
ELEV. DEPTH	DESCRIPTION	NUMBER	TYPE	"N" VALUES			20	40						60	80	100	20
	--- CONTINUED FROM PREVIOUS PAGE ---																
	CLAYEY SILT, some sand, trace gravel and shale pieces (TILL) Stiff to very stiff Grey Moist/wet	13	SS	11		90											
		14	SS	10		89											
88.2																	
17.8	SILTY CLAY, some sand, trace gravel and shale fragments (TILL) Firm to Stiff Grey Wet	15	SS	8		88											
		16	SS	8		86											
		17	SS	9		85											
		18	SS	10		83											
	Containing sand seams below 24.4 m depth	19	SS	11		81											
79.8						80											
26.2	CLAYEY SILT, some sand, trace gravel, shale and limestone pieces (TILL) Hard Grey to red Wet	20	SS	43		79											
77.7						78											
28.3	CLAYEY SILT, some sand, trace gravel, shale and limestone pieces (TILL/RESIDUAL SOIL) Hard Red Wet	21	SS	93		77											

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 +<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No 402</b>	3 OF 3 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781732.1 ; E 325899.5</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>HJ</u>
DATUM <u>Geodetic</u>	DATE <u>June 27, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT $\gamma$ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
	--- CONTINUED FROM PREVIOUS PAGE ---					○ UNCONFINED    + FIELD VANE ● QUICK TRIAXIAL    × REMOULDED					WATER CONTENT (%)					
						20	40	60	80	100						
72.2	CLAYEY SILT, some sand, trace gravel, shale and limestone pieces (TILL/RESIDUAL SOIL) Hard Red Wet		22	SS	103						○					
75																
74			23	SS	110/30											
73			24	SS	116											
33.8	END OF BOREHOLE  Note:  1. Water level measured in open borehole at 32.6 m depth (Elev. 73.4 m) upon completion of drilling operations.															

MIS-MTO 001 04111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity    ○ 3% STRAIN AT FAILURE

**PROJECT** 04-1111-002 **RECORD OF BOREHOLE No 403** **1 OF 3 METRIC**  
**W.P.** 607-00-00 **LOCATION** N 4781714.1 ; E 325863.9 **ORIGINATED BY** PKS  
**DIST** Central **HWY** QEW **BOREHOLE TYPE** 108 mm Diameter Solid Stem Augers **COMPILED BY** HJ  
**DATUM** Geodetic **DATE** June 19, 2005 **CHECKED BY** LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa					
105.8	GROUND SURFACE												
0.0	ASPHALT												
0.2	Sand and gravel (FILL) Loose to dense Reddish brown to red Moist		1	SS	38								
			2	SS	25								
			3	SS	8								
			4	SS	8								
102.0	Foundry sand (FILL) Compact to very dense Black Moist		5	SS	10								
			6	SS	25								
			7	SS	82								
99.3	Sandy SILT Very dense Brown Moist												
98.2	CLAYEY SILT to SILTY CLAY, trace sand, trace gravel (TILL) Stiff to very stiff Grey-brown Moist		8	SS	24								
			9	SS	28								
	Becoming grey below 10.7 m depth		10	SS	14								
			11	SS	12								
			12	SS	14								
90.8													

MIS-MTO 001 04111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

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 +<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE



PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No 403</b>	3 OF 3 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781714.1 ; E 325863.9</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>HJ</u>
DATUM <u>Geodetic</u>	DATE <u>June 19, 2005</u>	CHECKED BY <u>LCC</u>

ELEV DEPTH	SOIL PROFILE DESCRIPTION	STRAT PLOT	SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT $\gamma$ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
			NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa										
								20	40	60	80	100						
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × REMOULDED										
								WATER CONTENT (%)										
								20	40	60	80	100	10	20	30			
72.3	CLAYEY SILT, trace sand, trace gravel (TILL) Hard Grey Moist Containing shale pieces and red in color below 30.5 m depth		21	SS	57		75											
33.5				22	SS	100/20		72						○				
70.8								71										
35.1	Red SHALE (BEDROCK)						70											
69.2			23	SS	100/07													
36.7	END OF BOREHOLE  Note: 1.) Borehole dry upon completion of drilling operations.																	

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE



**RECORD OF BOREHOLE No 404** 2 OF 3 **METRIC**

PROJECT 04-1111-002 W.P. 607-00-00 LOCATION N 4781705.4 ; E 325898.0 ORIGINATED BY PKS

DIST Central HWY QEW BOREHOLE TYPE 108 mm Diameter Solid Stem Augers COMPILED BY HJ

DATUM Geodetic DATE June 22, 2005 CHECKED BY LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)							
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)						
						20	40	60	80	100	20	40	60	80	100	10	20	30	GR	SA	SI	CL	
--- CONTINUED FROM PREVIOUS PAGE ---																							
	CLAYEY SILT, trace sand and gravel (TILL) Stiff to very stiff Grey Wet		13	SS	14																		
			14	SS	15																		
			15	SS	14																		
			16	SS	14																		
84.2			17	SS	12																		
22.0	SILTY CLAY, trace sand, trace gravel (TILL) Stiff Grey Wet		18	SS	9																		
81.7																							
24.4	CLAYEY SILT, some sand, trace gravel (TILL) Very stiff to hard Grey Moist		19	SS	17																		
			20	SS	19																		
			21	SS	17																		

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No 404</b>	3 OF 3 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781705.4 ; E 325898.0</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>HJ</u>
DATUM <u>Geodetic</u>	DATE <u>June 22, 2005</u>	CHECKED BY <u>LCC</u>

ELEV DEPTH	SOIL PROFILE DESCRIPTION	STRAT PLOT	SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
			NUMBER	TYPE	"N" VALUES			20	40	60	80	100						20
75.6 30.5	SAND and SILT, trace to some clay (TILL/RESIDUAL SOIL) Very dense Grey to red Moist to wet	[Strat Plot Pattern]	22	SS	1007.10		76											
72.5 33.6	CLAYEY SILT, some sand trace gravel and shale pieces (TILL/RESIDUAL SOIL) Hard Red Wet	[Strat Plot Pattern]					75											
70.9 35.2	END OF BOREHOLE  Note: 1.) Open borehole wet below 10.7m depth upon completion of drilling operations.	[Strat Plot Pattern]	23	SS	1007.13		74											5 36 53 6
							73											
							72											
							71											

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No 405</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781733.9; E 325941.6</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>HJ</u>
DATUM <u>Geodetic</u>	DATE <u>July 28, 2005</u>	CHECKED BY <u>LCC</u>

ELEV DEPTH	SOIL PROFILE DESCRIPTION	STRAT PLOT	SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
			NUMBER	TYPE	"N" VALUES			20	40					
100.0	GROUND SURFACE													
8.0	TOPSOIL													
99.2	CLAYEY SILT, some sand, trace to some gravel, trace organics Firm Dark brown Moist		1	SS	6									
0.8	CLAYEY SILT to SILTY CLAY, some sand, trace gravel (TILL) Stiff to hard Brown Moist		2	SS	32									
			3	SS	32									
	Wet below 2.1 m depth		4	SS	15									
			5	SS	27									
			6	SS	16									
	Becoming grey below 4.5 m depth		7	SS	9									0 9 49 42
			8	SS	17									
			9	SS	15									
			10	SS	16									
90.1	END OF BOREHOLE													
9.9	Note: 1. Water level measured in open borehole at 8.2 m depth upon completion of drilling operations. 2. Water level measured in piezometer at 2.8 m depth (Elevation 97.2 m) on August 8, 2005. 3. Water level measured in piezometer at 0.6 m depth (Elevation 99.4 m) on December 6, 2005.													

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No 406</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781719.6 ; E 325844.8</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>HJ</u>
DATUM <u>Geodetic</u>	DATE <u>June 17, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa					
105.6	GROUND SURFACE												
0.0	ASPHALT												
0.2	Sand and gravel (FILL) Very dense Red Moist												
104.5			1	SS	107								
1.1	Foundry sand (FILL) Very dense Black Moist		2	SS	77								
			3	SS	60								
			4	SS	53								
			5	SS	78								
			6	SS	74								
99.2			7	SS	55								
6.4	Sand and gravel (FILL) Very dense Grey Moist												
98.0			8	SS	16								0 19 72 9
7.6	Sandy SILT Compact Brown Wet												
96.2			9	SS	26								
95.9	CLAYEY SILT, some sand, trace gravel (TILL) Very stiff Grey Wet												
9.8	END OF BOREHOLE												
	Note: 1. Bottom of borehole wet upon completion of drilling operations.												

MIS-MTO 001 04111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE



**PROJECT** 04-1111-002 **RECORD OF BOREHOLE No 502** **1 OF 3 METRIC**

W.P. 607-00-00 LOCATION N 4781342.0 ; E 327287.0 ORIGINATED BY PKS

DIST Central HWY QEW BOREHOLE TYPE 108 mm Diameter Solid Stem Augers COMPILED BY SLP

DATUM Geodetic DATE December 13, 2004 CHECKED BY LCC

SOIL PROFILE		STRAT PLOT	SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)									
ELEV DEPTH	DESCRIPTION		NUMBER	TYPE	"N" VALUES			20	40						60	80	100	20	40	60	80	100	10
101.2	GROUND SURFACE																						
0.0	TOPSOIL																						
100.4	Sand and gravel, trace rootlets (FILL)		1	SS	7																		
0.8	Loose Red Moist		2	SS	9																		
	SILTY CLAY, trace to some sand, trace gravel (TILL)		3	SS	22																		
	Stiff to very stiff		4	SS	23																		
	Brown		5	SS	17																		
	Moist to wet		6	SS	14																		
			7	SS	13																		

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No 502</b>	2 OF 3 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781342.0 ; E 327287.0</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SLP</u>
DATUM <u>Geodetic</u>	DATE <u>December 13, 2004</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)		
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa										
						20	40	60	80	100								
82.0	--- CONTINUED FROM PREVIOUS PAGE ---  SILTY CLAY, trace to some sand, trace gravel (TILL) Firm to stiff Grey to reddish grey Wet		14	SS	10													
			15	SS	8													
			16	SS	7													
			17	SS	12													
19.2	CLAYEY SILT, some sand, trace gravel (TILL) Stiff to very stiff Grey/red Moist to wet		18	SS	15													
			19	SS	24													
			20	SS	38													
			21	SS	109													
76.8	SILTY SAND, trace gravel, trace shale fragments Dense to very dense Grey/red Wet		22	SS	107													
24.4			23	SS	100/13													
72.1																		
29.1																		

MIS-MTO 001\_041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

Continued Next Page

 +<sup>3</sup>, X<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No 502</b>	3 OF 3 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781342.0 ; E 327287.0</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SLP</u>
DATUM <u>Geodetic</u>	DATE <u>December 13, 2004</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT $\gamma$ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV. DEPTH	DESCRIPTION	STRAT PLOT NUMBER	TYPE	"N" VALUES			20	40	60	80	100					
	-- CONTINUED FROM PREVIOUS PAGE --															
	END OF BOREHOLE  Note:  1. Water level at 24.4 m depth upon (Elev. 76.8 m) completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, X<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE



**RECORD OF BOREHOLE No 503** 2 OF 3 **METRIC**

PROJECT 04-1111-002 W.P. 607-00-00 LOCATION N 4781350.0 ; E 327255.0 ORIGINATED BY PKS

DIST Central HWY QEW BOREHOLE TYPE 108 mm Diameter Solid Stem Augers COMPILED BY SLP

DATUM Geodetic DATE December 16, 2004 CHECKED BY LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	NUMBER	TYPE	"N" VALUES			20	40						60
--- CONTINUED FROM PREVIOUS PAGE ---														
83.5	SILTY CLAY, trace to some sand, trace gravel (TILL) Firm to stiff Grey Wet	14	SS	7										
			15	TO	PH									
17.9		CLAYEY SILT, some sand, trace gravel (TILL) Very stiff Grey Wet  Contains shale fragments below 22.0 m depth	16	SS	15									
			17	SS	15									
			18	SS	22									
			19	SS	29									
77.0	GRAVELLY SAND to SAND, some gravel, some silt, trace clay, containing shale fragments Dense to very dense Grey Wet		20	SS	33									
24.4			21	SS	110								24 54 17 5	
74.0		SANDY SILT, containing clayey silt seams Very dense Grey Wet												
27.4			22	SS	100/23									
72.2														
29.2														

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+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No 503</b>	3 OF 3 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781350.0 ; E 327255.0</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SLP</u>
DATUM <u>Geodetic</u>	DATE <u>December 16, 2004</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT $\gamma$	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV. DEPTH	DESCRIPTION	STRAT PLOT NUMBER	TYPE	"N" VALUES			20	40	60	80	100	W <sub>p</sub>	W	W <sub>L</sub>			10
	END OF BOREHOLE																
	Note: 1. Water level at 24.4 m depth upon completion of drilling operations. 2. Water level in piezometer at 13.7 m depth (Elevation 87.7 m) on December 20, 2004. 3. Water level in piezometer at 11.6 m depth (Elevation 90.2 m ) on May 13, 2005 and on December 6, 2005.																

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+<sup>3</sup>, X<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

**PROJECT** 04-1111-002 **RECORD OF BOREHOLE No 504** **1 OF 3 METRIC**  
**W.P.** 607-00-00 **LOCATION** N 4781321.0; E 327215.0 **ORIGINATED BY** PKS  
**DIST** Central **HWY** QEW **BOREHOLE TYPE** 108 mm Diameter Solid Stem Augers **COMPILED BY** SLP  
**DATUM** Geodetic **DATE** December 20, 2004 **CHECKED BY** LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa					
101.5	GROUND SURFACE												
0.0	Asphalt												
0.2	Sand and gravel (FILL) Compact Brown/red Moist		1	SS	28								
100.3			2	SS	13								
1.2	SILTY CLAY, trace to some sand, trace gravel (TILL) Stiff to very stiff Brown Moist		3	SS	17								
			4	SS	19								
			5	SS	16								
			6	SS	14						42		
			7	SS	13								
96.0													
5.5	SILTY CLAY, trace to some sand, trace gravel (TILL) Stiff Grey Wet		8	SS	8								
			9	SS	7								
			10	SS	9								0 7 46 47
			11	SS	8								
89.5													
12.0	SILTY CLAY, trace to some sand, trace gravel (TILL) Firm to stiff Grey Wet		12	SS	7								
			13	SS	6						43		

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 +<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE



PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No 504</b>	3 OF 3 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781321.0; E 327215.0</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SLP</u>
DATUM <u>Geodetic</u>	DATE <u>December 20, 2004</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT $\gamma$ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	20	40	60	80						100	SHEAR STRENGTH kPa	
	-- CONTINUED FROM PREVIOUS PAGE --																		
71.0						71													
30.5	SILT, trace to some sand, trace clay, trace gravel Very dense Grey Wet END OF BOREHOLE  Note:  1. Water level in open borehole at 25.9 m depth (Elev. 75.6 m) upon completion of drilling operations.	23	SS	106												3 7 82 8			
70.6																			
30.9																			

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+<sup>3</sup>, X<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

**PROJECT** 04-1111-002 **RECORD OF BOREHOLE No 505** **1 OF 3 METRIC**  
**W.P.** 607-00-00 **LOCATION** N 4781313.0; E 327227.0 **ORIGINATED BY** PKS  
**DIST** Central **HWY** QEW **BOREHOLE TYPE** 108 mm Diameter Solid Stem Augers **COMPILED BY** SLP  
**DATUM** Geodetic **DATE** December 15, 2004 **CHECKED BY** LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa					
101.4	GROUND SURFACE												
0.0	Asphalt												
0.2	Sand and gravel (FILL) Compact Red Wet		1	SS	14								
			2	SS	20								
99.9						100							
1.5	SILTY CLAY, trace to some sand, trace gravel (TILL) Stiff to very stiff Brown/grey Wet		3	SS	25								
			4	SS	24								
			5	SS	15								
			6	SS	34						41		
			7	SS	21								
			8	SS	13								
94.5						95							
6.9	SILTY CLAY, trace to some sand, trace gravel (TILL) Stiff Grey Wet		9	TO	PH								
			10	SS	9								
			11	SS	9								
	Containing trace shale fragments below 12.5 m depth		12	SS	18								
88.0						90							
13.4	SILTY CLAY, trace to some sand, trace gravel (TILL) Firm to stiff Grey Wet		13	SS	8								
						89							
						88							
						87							

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 +<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT 04-1111-002 **RECORD OF BOREHOLE No 505** 2 OF 3 **METRIC**  
 W.P. 607-00-00 LOCATION N 4781313.0; E 327227.0 ORIGINATED BY PKS  
 DIST Central HWY QEW BOREHOLE TYPE 108 mm Diameter Solid Stem Augers COMPILED BY SLP  
 DATUM Geodetic DATE December 15, 2004 CHECKED BY LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	NUMBER	TYPE	"N" VALUES			20	40					
84.0	SILTY CLAY, trace to some sand, trace gravel (TILL) Firm to stiff Grey Wet	14	SS	12								46	
85.0						1.8							
85.0						2.3							
84.0		15	TO	PH									
17.4	CLAYEY SILT, some sand, trace gravel (TILL) Very stiff to hard Grey Wet	16	SS	16									
		17	SS	18									
		18	SS	31									
		19	SS	27									
		20	SS	27									
75.5	SILTY SAND, trace gravel Dense to very dense Grey/red to grey Wet	21	SS	49									
25.9		22	SS	100/20									

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 +<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

3 24 58 15

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No 505</b>	3 OF 3 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781313.0;E 327227.0</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SLP</u>
DATUM <u>Geodetic</u>	DATE <u>December 15, 2004</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT			UNIT WEIGHT	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	20	40	60	80	100	W <sub>p</sub>	W		
70.7	END OF BOREHOLE		23	SS	100/23	71										
30.7	Note: 1. Water level in open borehole at 24.4 m depth (Elev. 77.0 m) upon completion of drilling operations.															

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+<sup>3</sup>, X<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT 04-1111-002 **RECORD OF BOREHOLE No 506** 1 OF 1 **METRIC**  
 W.P. 607-00-00 LOCATION N 4781316.5; E 327181.5 ORIGINATED BY PKS  
 DIST Central HWY QEW BOREHOLE TYPE 108 mm Diameter Solid Stem Augers COMPILED BY SLP  
 DATUM Geodetic DATE December 21, 2004 CHECKED BY LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)								
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)							
						20	40	60	80	100	20	40	60	80	100	10	20	30		GR	SA	SI	CL	
101.4	GROUND SURFACE																							
0.0	Asphalt																							
0.2	Sand and gravel (FILL) Compact Brown/red Moist		1	SS	24																			
			2	SS	13																			
99.9																								
1.5	SILTY CLAY, trace to some sand, trace gravel (TILL) Stiff to very stiff Brown to brown/grey Moist		3	SS	18																			
			4	SS	21																			
			5	SS	14																			
			6	SS	14																			
			7	SS	14																			
			8	SS	16																			
94.7	END OF BOREHOLE																							
6.7	Note: 1. Borehole dry upon completion of drilling operations.																							

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No 507</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781306.1 ; E 327232.2</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SLP</u>
DATUM <u>Geodetic</u>	DATE <u>December 14, 2004</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)							
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)						
						20	40	60	80	100	20	40	60	80	100	10	20	30	GR	SA	SI	CL	
101.5	GROUND SURFACE																						
0.0	Sandy silt, trace gravel (FILL) Compact Red Moist		1	SS	15																		
100.4			2	SS	11																		
1.1	SILTY CLAY, trace to some sand, trace gravel and shale fragments (TILL) Stiff to hard Brown/grey Moist		3	SS	28												46						
			4	SS	31																		
			5	SS	36																		
			6	SS	18																		0 5 40 55
			7	SS	16																		
96.0																							
5.5	SILTY CLAY, trace to some sand, trace gravel (TILL) Stiff Grey Wet		8	SS	10																		
94.7																							
6.7	END OF BOREHOLE																						
	Notes: 1. Borehole dry upon completion of drilling operations. 2. Water level in piezometer at 6.0 m depth (Elevation 95.5 m ) on December 20, 2004. 3. Water level in piezometer at 1.6 m depth (Elevation 99.9 m) on May 13, 2005. 4. Water level in piezometer at 1.9 m depth (Elevation 99.6 m) on December 6, 2005.																						

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+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-1</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4782339.3 ; E 323568.7</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>June 2, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)
						20	40	60	80	100							
92.0	GROUND SURFACE																
8.9	TOPSOIL		1	SS	16												
	CLAYEY SILT, some sand, trace gravel (TILL) Very stiff to hard Brown Moist		2	SS	26												
			3	SS	34												
			4	SS	40												
	Grey below 3.1 m depth		5	SS	57												
			6	SS	21												0 10 59 31
			7	SS	21												
86.8	END OF BOREHOLE																
5.2	Note: 1. Borehole dry upon completion of drilling operations.																

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-2</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4782259.3 ; E 323584.2</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>June 2, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	20	40	60	80					
93.0	GROUND SURFACE															
8.9	TOPSOIL Clayey silt, some sand, trace gravel (FILL) Stiff Brown Moist		1	SS	14											
			2	SS	12											
			3	SS	13											
			4	SS	13											
90.0																
3.1	CLAYEY SILT, some sand, trace gravel (TILL) Very stiff to hard Brown Moist		5	SS	35											
			6	SS	31											
	Grey below 4.6 m depth		7	SS	15											
87.8																
5.2	END OF BOREHOLE  Note: 1. Borehole dry upon completion of drilling operations.															

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+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

**PROJECT** 04-1111-002 **RECORD OF BOREHOLE No W-3** **1 OF 1 METRIC**  
**W.P.** 607-00-00 **LOCATION** N 4782223.7 ; E 323544.6 **ORIGINATED BY** PKS  
**DIST** Central **HWY** QEW **BOREHOLE TYPE** 108 mm Diameter Solid Stem Augers **COMPILED BY** SG  
**DATUM** Geodetic **DATE** July 15, 2005 **CHECKED BY** LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT			UNIT WEIGHT $\gamma$	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	20 40 60 80 100	20 40 60 80 100	W <sub>p</sub>	W		
92.5	GROUND SURFACE												
0.0	ASPHALT												
0.2	Sand and gravel (FILL) Compact												
91.7	Brown Moist												
0.8	CLAYEY SILT, some sand, trace gravel (TILL) Very stiff to hard Brown Moist		1	SS	28								
			2	SS	29								
			3	SS	41							3	11 64 22
			4	SS	60								
			5	SS	22								
	Grey below 4.4 m depth		6	SS	33								
			7	SS	29								
			8	SS	32								
			9	SS	32								
82.8	END OF BOREHOLE												
9.8	Note: 1. Borehole dry upon completion of drilling operations.												

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-4</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4782197.9; E 323466.4</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>June 3, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
						20	40	60	80	100						
92.8	GROUND SURFACE															
8.9	TOPSOIL Clayey silt, some sand, trace gravel (FILL) Stiff Brown Moist		1	SS	14											
			2	SS	10											
			3	SS	12											
90.5																
2.3	CLAYEY SILT, trace to some sand, trace gravel (TILL) Stiff to very stiff Brown becoming grey below 3.1 m depth Moist		4	SS	26											0 9 64 27
			5	SS	11											
			6	SS	14											
			7	SS	14											
87.6																
5.2	END OF BOREHOLE  Note: 1. Borehole dry upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-5</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4782180.3 ; E 323406.6</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>June 3, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	20	40	60	80					
93.0	GROUND SURFACE															
89.7	TOPSOIL Clayey silt, some sand, trace gravel (FILL) Firm to hard Brown/grey Moist		1	SS	34											
			2	SS	15											
			3	SS	9											
			4	SS	8											
			5	SS	6											
89.2	CLAYEY SILT, some sand, trace gravel (TILL) Stiff to very stiff Grey Moist		6	SS	8											
87.8	END OF BOREHOLE		7	SS	23											
5.2	Note: 1. Borehole dry upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE



PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-7</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4782257.6 ; E 323817.5</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>June 7, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa												
						20	40	60	80	100	○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × REMOULDED									
						20	40	60	80	100	WATER CONTENT (%)									
93.5	GROUND SURFACE																			
0.0	Clayey silt, some sand, trace gravel (FILL) Firm Brown Moist		1	SS	7															
			2	SS	8															
			3	SS	7															
91.2																				
2.3	CLAYEY SILT, some sand, trace gravel Firm Grey Moist		4	SS	6															
			5	SS	5															
89.7																				
3.8	CLAYEY SILT, some sand, trace gravel (TILL) Very stiff Grey Moist		6	SS	15															
			7	SS	26															
88.3																				
5.2	END OF BOREHOLE  Note: 1. Water level in open borehole measured at 3.96 m depth (Elev. 89.5 m) upon completion of drilling operations.																			

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-8</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4782251.8 ; E 323893.2</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>June 7, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
							20	40	60	80	100					
93.7	GROUND SURFACE															
0.0	Clayey silt, some sand, containing organics (FILL) Firm Brown/grey Moist		1	SS	7											
			2	SS	7											
			3	SS	7											
			4	SS	5											
90.7																
3.1	CLAYEY SILT, some sand, trace gravel (TILL) Stiff to very stiff Brown to grey Moist		5	SS	9											1 12 59 28
			6	SS	15											
			7	SS	21											
88.5																
5.2	END OF BOREHOLE  Note: 1. Borehole dry upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

**RECORD OF BOREHOLE No W-9A** 1 OF 1 **METRIC**

PROJECT 04-1111-002 W.P. 607-00-00 LOCATION N 4782238.4 ; E 323969.3 ORIGINATED BY PKS

DIST Central HWY QEW BOREHOLE TYPE 108 mm Diameter Solid Stem Augers COMPILED BY SG

DATUM Geodetic DATE July 25, 2005 CHECKED BY LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)								
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)							
						20	40	60	80	100	20	40	60	80	100	10	20	30		GR	SA	SI	CL	
93.8	GROUND SURFACE																							
0.0	Clayey silt, some sand, trace gravel, containing roots/topsoil (FILL)		1	SS	7																			
93.0	Firm Brown Moist																							
0.8	CLAYEY SILT, some sand, trace gravel (TILL)		2	SS	19																			
	Very stiff to hard Brown Moist																							
			3	SS	32																			
			4	SS	29																			
			5	SS	30																			
			6	SS	21																			
			7	SS	24																			
87.7																								
6.1	CLAYEY SILT, some sand, trace gravel (TILL)		8	SS	58																			
	Hard Brown Moist																							
			9	SS	56																			
84.7																								
9.1	SILTY CLAY, some sand, trace gravel (TILL)																							
84.1	Grey Very stiff Moist																							
9.8	END OF BOREHOLE																							
	Note: 1. Borehole dry upon completion of drilling operations. 2. Water level in piezometer measured at 2.8 m depth (Elev. 91.0 m) on Aug. 8, 2005 and at 1.7 m depth (Elev. 92.1 m) on Dec. 6, 2005.																							

MIS-MTO 001 04111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-10</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4782215.4 ; E 324046.9</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>June 7, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
						20	40	60	80	100						
94.0	GROUND SURFACE															
0.0	Clayey silt, some sand, trace gravel, containing organics (FILL) Stiff Brown Moist		1	SS	8											
			2	SS	12											
92.5																
1.5	CLAYEY SILT, some sand, trace gravel (TILL) Very stiff Brown Moist		3	SS	23											
			4	SS	22											
			5	SS	26											
			6	SS	23											
	Grey below 4.4 m depth		7	SS	15											
88.8																
5.2	END OF BOREHOLE  Note: 1. Borehole dry upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-11</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4782197.0 ; E 324119.3</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>June 10, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
						20	40	60	80	100						
94.4	GROUND SURFACE															
0.0	Crushed limestone (FILL) Compact Brown Moist		1	SS	16											
93.6																
0.9	Clayey silt with sand, trace gravel (FILL) Firm Brown Moist		2	SS	5											
92.9																
1.5	Silty sand, trace gravel (FILL) Loose Brown Moist		3	SS	15							o				
	CLAYEY SILT, some sand, trace gravel (TILL) Stiff to hard Brown Moist		4	SS	32											
			5	SS	34											
	Grey below 3.8 m depth		6	SS	18											
			7	SS	14											
89.2	END OF BOREHOLE															
5.2	Note: 1. Borehole dry upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-12</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4782177.9; E 324191.8</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>June 7, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)		
						20	40	60	80	100									
94.6	GROUND SURFACE																		
0.0	Sand and gravel (FILL) Compact Brown/red Moist		1	SS	15														
			2	SS	12														
93.1																			
1.5	CLAYEY SILT, some sand, trace gravel (TILL) Very stiff to hard Brown Moist		3	SS	16														
			4	SS	35														
			5	SS	27														
			6	SS	22														
	Grey below 4.6 m depth																		
89.4			7	SS	17														
5.2	END OF BOREHOLE  Note: 1. Borehole dry upon completion of drilling operations.																		

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE



PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-14</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4782139.3 ; E 324337.0</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>June 6, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
						20	40	60	80	100						
95.0	GROUND SURFACE															
0.0	Sand and gravel (FILL) Compact Brown Moist		1	SS	25											
94.2																
0.8	Clayey silt, some sand, trace gravel (FILL) Firm		2	SS	7											
93.5	Brown/grey Moist															
1.5	CLAYEY SILT, trace to some sand, trace gravel (TILL) Stiff to very stiff Brown Moist		3	SS	18											
			4	SS	24											0 7 58 35
			5	SS	23											
			6	SS	19											
	Grey below 4.6 m depth															
			7	SS	14											
89.8	END OF BOREHOLE															
5.2	Note: 1. Borehole dry upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-15</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4782120.3 ; E 324409.7</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>June 6, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)
							20	40	60	80	100						
95.2	GROUND SURFACE																
0.0	Clayey silt, some sand, trace gravel (FILL) Stiff Grey Moist		1	SS	13												
94.4	Silty SAND, trace gravel, containing organics Loose Brown/black Moist/wet		2	SS	4												
0.8			3	SS	7												
92.9	CLAYEY SILT, some sand, trace gravel (TILL) Very stiff Grey Wet		4	SS	16												
2.3			5	SS	18												
			6	SS	15												
			7	SS	15												
90.0	END OF BOREHOLE																
5.2																	
	Note: 1. Water level in open borehole measured at 2.7 m depth (Elev. 92.5 m) upon completion of drilling operations.																

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE



PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-17</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4782094.1 ; E 324557.6</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>July 20, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)								
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)							
						20	40	60	80	100	20	40	60	80	100	10	20	30		GR	SA	SI	CL	
95.4	GROUND SURFACE																							
0.0	ASPHALT																							
0.2	Sand and gravel (FILL) Compact																							
94.6	Brown Moist																							
0.8	Silty sand, trace gravel (FILL) Loose to compact		1	SS	19																			
93.7	Red Moist																							
1.7	Silty SAND, trace gravel Loose		2	SS	9																			
93.1	Brown Moist																							
2.3	CLAYEY SILT, some sand, trace gravel (TILL) Very stiff		3	SS	26																			
			4	SS	24																			
			5	SS	26																			
	Grey below 4.3 m depth																							
			6	SS	15																			
90.2	END OF BOREHOLE																							
5.2	Note: 1. Borehole dry upon completion of drilling operations.																							

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-18</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4782076.6 ; E 324630.6</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>July 20, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
						20 40 60 80 100	20 40 60 80 100									
95.5	GROUND SURFACE															
0.0	ASPHALT															
0.2	Sand and gravel (FILL)															
	Brown Moist															
94.7																
	Silty sand, trace gravel (FILL)															
0.9	Compact Red Moist		1	SS	10											0 18 64 18
	CLAYEY SILT, some sand, trace gravel															
93.5	Stiff to very stiff		2	SS	16											
	Brown Moist															
2.0																
	CLAYEY SILT, some sand, trace gravel (TILL)		3	SS	22											
	Stiff to very stiff															
	Brown becoming grey below 2.7 m depth															
	Moist		4	SS	12											
			5	SS	13											
			6	SS	13											
90.3	END OF BOREHOLE															
5.2	Note: 1. Borehole dry upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE



**RECORD OF BOREHOLE No W-20** 1 OF 1 **METRIC**

PROJECT 04-1111-002

W.P. 607-00-00 LOCATION N 4782041.2; E 324776.9 ORIGINATED BY PKS

DIST Central HWY QEW BOREHOLE TYPE 108 mm Diameter Solid Stem Augers COMPILED BY SG

DATUM Geodetic DATE July 20, 2005 CHECKED BY LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)								
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)							
						20	40	60	80	100	20	40	60	80	100	10	20	30		GR	SA	SI	CL	
95.8	GROUND SURFACE																							
0.0	ASPHALT																							
0.2	Silty sand, some gravel (FILL) Compact Brown/red Moist																							
94.6			1	SS	20																			
1.2	Silty SAND, trace gravel Loose to compact Brown Moist																							
94.0			2	SS	9																			
1.8	CLAYEY SILT, some sand, trace gravel, containing shale pieces (TILL) Stiff to hard Brown becoming grey below 3.1 m depth Moist																							
			3	SS	34																			
			4	SS	29																			
			5	SS	25																			
	Red-brown and gravelly from 4.6 to 5.2 m depth																							
			6	SS	24																			
			7	SS	16																			
			8	SS	15																			
			9	SS	17																			
86.1	END OF BOREHOLE																							
9.8	Note: 1. Borehole dry upon completion of drilling operations.																							

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, X<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-21</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4782145.2; E 324183.3</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>June 8, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)								
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)							
						20	40	60	80	100	20	40	60	80	100	10	20	30		GR	SA	SI	CL	
94.6	GROUND SURFACE																							
89.7	TOPSOIL Clayey silt, some sand, trace gravel (FILL) Stiff to very stiff Brown Moist		1	SS	17																			
			2	SS	12																			
93.1	CLAYEY SILT, some sand, trace gravel (TILL) Stiff to very stiff Brown Moist		3	SS	8																			
			4	SS	23																			
			5	SS	22																			
	Grey below 3.8 m depth		6	SS	12																			
			7	SS	13																			
89.4	END OF BOREHOLE																							
5.2	Note: 1. Borehole dry upon completion of drilling operations.																							

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-22</b>	1 OF 1	<b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4782133.8 ; E 324232.0</u>	ORIGINATED BY <u>PKS</u>	
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>	
DATUM <u>Geodetic</u>	DATE <u>June 8, 2005</u>	CHECKED BY <u>LCC</u>	

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
							20	40	60	80	100					
94.9	GROUND SURFACE															
0.0	Clayey silt, some sand, trace gravel, containing organics (FILL) Firm to very stiff Brown Moist		1	SS	22											
			2	SS	10											
			3	SS	7											
92.6																
2.3	CLAYEY SILT, some sand, trace gravel (TILL) Firm to stiff Brown becoming grey below 3.1 m depth Moist		4	SS	5											
			5	SS	9											
			6	SS	6											
	Wet below 4.3 m depth		7	SS	7											
			8	SS	14											
88.2																
6.7	END OF BOREHOLE															
	Note: 1. Water level in open borehole measured at 5.5 m depth (Elev. 89.4 m) upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-23</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4782118.1 ; E 324305.4</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>June 8, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT $\gamma$ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
						20 40 60 80 100	20 40 60 80 100	20 40 60 80 100	20 40 60 80 100	20 40 60 80 100						
95.0 0.0	GROUND SURFACE Silty sand and gravel, containing asphalt pieces and organics (FILL) Loose to compact Brown/black Moist		1	SS	24											
			2	SS	12											
			3	SS	5											
92.7 2.3	CLAYEY SILT, trace to some sand, trace gravel (TILL) Stiff to very stiff Brown Moist		4	SS	11						15			1 8 61 30		
			5	SS	11											
	Wet below 3.8 m depth		6	SS	15	▽					20					
	Grey below 4.6 m depth		7	SS	22											
89.8 5.2	END OF BOREHOLE  Note: 1. Water level in open borehole measured at 4.0 m depth (Elev. 91.0 m) upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE



PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-25</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4782073.8 ; E 324448.9</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>June 9, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
							20	40	60	80	100					
94.5	GROUND SURFACE															
0.0	Clayey silt to silty sand, trace gravel (FILL) Firm to stiff/Loose to compact Brown/red Moist		1	SS	11											
			2	SS	9											
			3	SS	7											
92.2	CLAYEY SILT, some sand, trace gravel (TILL) Stiff Grey Moist		4	SS	9											
2.3			5	SS	12											
			6	SS	12											1 13 55 31
			7	SS	15											
89.3	END OF BOREHOLE															
5.2	Notes: 1. Borehole dry upon completion of drilling operations. 2. Water level measured at 3.8 m depth (Elev. 90.7 m) on Aug. 8, 2005. 3. Water level measured at 2.5 m depth (elev. 92.0 m) on Dec. 6, 2005.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-26</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4782054.7 ; E 324521.2</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>June 8, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
						20	40	60	80	100						
94.4	GROUND SURFACE															
0.0	Clayey silt, some sand, trace gravel (FILL) Stiff Brown Moist		1	SS	10											
93.6	CLAYEY SILT, some sand, trace gravel (TILL) Stiff to very stiff Brown Moist  Grey below 2.3 m depth		2	SS	12											
0.8			3	SS	16											
			4	SS	12											
			5	SS	14											
90.1	SAND and SILT, trace clay, trace gravel Compact Red Moist		6	SS	19											
4.3			7	SS	15											
89.2	END OF BOREHOLE															
5.2	Note: 1. Borehole dry upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-27</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4782025.0 ; E 324637.0</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>June 9, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
						20	40	60	80	100						
94.0	GROUND SURFACE															
0.0	Silty sand, trace gravel, containing organics (FILL) Loose to compact Brown Moist		1	SS	10											
			2	SS	8											
92.5																
1.5	CLAYEY SILT, some sand, trace gravel (TILL) Very stiff Brown to grey Moist		3	SS	16							o				
			4	SS	16											
			5	SS	17											
			6	SS	19											
			7	SS	17											
88.8	Containing shale fragments below 5.0 m depth											o				
5.2	END OF BOREHOLE															
	Note: 1. Open borehole wet at 5.2 m depth upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-28</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4782021.2 ; E 324667.6</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>June 9, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
							20	40	60	80	100					
95.0	GROUND SURFACE															
0.0	Clayey silt, some sand, trace gravel (FILL) Firm to stiff Brown Moist		1	SS	9											
			2	SS	5											
			3	SS	4											
92.7																
2.3	CLAYEY SILT, some sand, trace gravel (TILL) Stiff to very stiff Grey Wet		4	SS	15											
			5	SS	13											
			6	SS	13											
			7	SS	12											
89.8																
5.2	END OF BOREHOLE  Note: 1. Water level in open borehole measured at 4.3 m (Elev. 90.7 m) upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, X<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE



PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-30</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781983.9; E 324812.7</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>June 9, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)
						20	40	60	80	100							
96.0	GROUND SURFACE																
0.7	TOPSOIL		1	SS	7												
95.2	Clayey silt, some sand, containing topsoil (FILL)		2	SS	7												
0.8	Firm Brown Moist																
94.5	Silty sand, trace gravel (FILL)																
1.5	Loose Red Moist/wet		3	SS	28												
	CLAYEY SILT, trace to some sand, trace gravel (TILL)		4	SS	13												
	Stiff to very stiff Brown becoming grey below 2.3 m depth Moist		5	SS	12												
		6	SS	15													
		7	SS	14													
90.8	END OF BOREHOLE																
5.2	Note: 1. Borehole dry upon completion of drilling operations.																

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, X<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

**RECORD OF BOREHOLE No W-31** 1 OF 1 **METRIC**

PROJECT 04-1111-002 W.P. 607-00-00 LOCATION N 4781955.5 ; E 324882.7 ORIGINATED BY PKS

DIST Central HWY QEW BOREHOLE TYPE 108 mm Diameter Solid Stem Augers COMPILED BY SG

DATUM Geodetic DATE June 10, 2005 CHECKED BY LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)									
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)								
						20	40	60	80	100	20	40	60	80	100	10	20	30		GR	SA	SI	CL		
95.9	GROUND SURFACE																								
0.0	Sand and gravel (FILL)		1	SS	13																				
0.2	Compact Brown																								
95.3	Clayey silt, some sand, trace gravel (FILL)		2	SS	9																				
0.6	Stiff Brown Moist																								
94.4	Silty sand (FILL)		3	SS	17																				
1.5	Loose Brown Moist																								
	CLAYEY SILT, some sand, trace gravel (TILL)		4	SS	24																				
	Stiff to very stiff Grey Moist																								
		5	SS	16																					
		6	SS	15																					
		7	SS	13																					
90.7	END OF BOREHOLE																								
5.2	Note: 1. Borehole dry upon completion of drilling operations.																								

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-32</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781934.9; E 324954.7</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>June 10, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
						20	40	60	80	100						
						○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × REMOULDED					WATER CONTENT (%)				GR SA SI CL	
96.4	GROUND SURFACE															
0.0	Silty SAND, trace gravel Compact Brown Moist		1	SS	12											
			2	SS	15											
94.9																
1.5	CLAYEY SILT, some sand, trace gravel (TILL) Very stiff Grey Moist		3	SS	21										0 12 51 37	
			4	SS	27											
			5	SS	22											
			6	SS	22											
			7	SS	17											
91.2	END OF BOREHOLE															
5.2	Note: 1. Borehole dry upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

**RECORD OF BOREHOLE No W-37** 1 OF 1 **METRIC**

PROJECT 04-1111-002 W.P. 607-00-00 LOCATION N 4781736.7 ; E 325782.0 ORIGINATED BY PKS

DIST Central HWY QEW BOREHOLE TYPE 108 mm Diameter Solid Stem Augers COMPILED BY SG

DATUM Geodetic DATE June 16, 2005 CHECKED BY LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
						20	40	60	80	100						
104.7	GROUND SURFACE															
0.0	ASPHALT															
0.2	Sand and gravel (FILL)															
104.1	Compact Brown Moist															
0.6	Foundry sand (FILL) Very dense Black Moist		1	SS	90											
			2	SS	46											
			3	SS	78											
			4	SS	70											
			5	SS	53											
			6	SS	66											
98.8	Concrete															
6.1	Silty sand (FILL) Loose Black Moist		7	SS	9											
97.1	CLAYEY SILT, some sand, trace gravel (TILL) Stiff to hard Brown Moist		8	SS	32											
	Grey below 9.1 m depth															
95.0			9	SS	11											
9.8	END OF BOREHOLE															
	Note: 1. Borehole dry upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

**PROJECT** 04-1111-002 **RECORD OF BOREHOLE No W-41** **1 OF 1 METRIC**  
**W.P.** 607-00-00 **LOCATION** N 4781754.1 ; E 325812.2 **ORIGINATED BY** PKS  
**DIST** Central **HWY** QEW **BOREHOLE TYPE** Power Auger, 108 mm Solid Stem Augers **COMPILED BY** SG  
**DATUM** Geodetic **DATE** July 8, 2005 **CHECKED BY** LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)								
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)							
						20	40	60	80	100	20	40	60	80	100	10	20	30		GR	SA	SI	CL	
105.0	GROUND SURFACE																							
0.0	ASPHALT																							
0.2	Sand and gravel (FILL) Compact Brown Moist																							
104.2	Foundry sand (FILL) Very dense Black Moist		1	SS	80																			
0.8			2	SS	69																			
			3	SS	78																			
			4	SS	76																			
			5	SS	75																			
			6	SS	90																			
98.9																								
6.1	Silty SAND, some gravel, trace clay Compact Brown Moist		7	SS	21																			
97.4																								
7.6	SILTY CLAY, some sand, trace gravel (TILL) Very stiff to hard Brown Moist		8	SS	32																			
95.3																								
9.8	END OF BOREHOLE		9	SS	23																			
	Note: 1. Borehole dry upon completion of drilling operations.																							

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

**RECORD OF BOREHOLE No W-42** 1 OF 1 **METRIC**

PROJECT 04-1111-002 W.P. 607-00-00 LOCATION N 4781686.7 ; E 325975.7 ORIGINATED BY PKS

DIST Central HWY QEW BOREHOLE TYPE 108 mm Diameter Solid Stem Augers COMPILED BY SG

DATUM Geodetic DATE June 17, 2005 CHECKED BY LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)								
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)							
						20	40	60	80	100	20	40	60	80	100	10	20	30		GR	SA	SI	CL	
106.1	GROUND SURFACE																							
0.0	ASPHALT																							
0.2	Silty sand, trace gravel, trace slag pieces (FILL) Compact to dense Red Moist																							
			1	SS	46																			
			2	SS	17																			
			3	SS	18																			
			4	SS	14																			
			5	SS	27																			
			6	SS	18																			
100.2	Concrete																							
6.1	CLAYEY SILT, some sand, containing organics Firm Grey/black Moist/wet		7	SS	6																			
98.5	CLAYEY SILT, some sand, trace gravel (TILL) Hard Brown Moist		8	SS	35																			
97.0	Silty SAND Dense Grey Wet		9	SS	46																			
96.4	END OF BOREHOLE																							
9.8	Note: 1. Borehole dry upon completion of drilling operations.																							

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-43</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781657.9 ; E 326045.0</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>July 12, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)							
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)						
						20	40	60	80	100	20	40	60	80	100	10	20	30	GR	SA	SI	CL	
100.4	GROUND SURFACE																						
0.0	ASPHALT																						
	Sand and gravel (FILL) Compact Brown Moist																						
99.3			1	SS	17																		
1.1	CLAYEY SILT to SILTY CLAY, trace to some sand, trace gravel (TILL) Stiff to very stiff Brown Moist		2	SS	19																		
			3	SS	14																		
			4	SS	12																		
			5	SS	13																		
			6	SS	9																		
			7	SS	12																		
93.7	END OF BOREHOLE																						
6.7	Note: 1. Borehole dry upon completion of drilling operations.																						

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-44</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781638.0; E 326117.2</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>July 13, 2005</u>	CHECKED BY <u>LCC</u>

ELEV. DEPTH	SOIL PROFILE DESCRIPTION	STRAT PLOT	SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
			NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa										WATER CONTENT (%)
								20	40	60	80	100						
100.8	GROUND SURFACE																	
0.0	ASPHALT																	
	Sand and gravel (FILL)																	
100.0	Compact Brown Moist																	
0.8	Silty SAND, trace gravel																	
	Loose Brown/black Moist																	
99.3																		
1.5	SILTY CLAY, trace sand and gravel (TILL)																	
	Stiff to very stiff																	
	Brown becoming grey below 2.3 m depth																	
	Moist																	
			1	SS	7													
			2	SS	23													
			3	SS	14													
			4	SS	8													
			5	SS	8													
			6	SS	12													
94.1	END OF BOREHOLE																	
6.7	Note: 1. Borehole dry upon completion of drilling operations.																	

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

**RECORD OF BOREHOLE No W-45** 1 OF 2 **METRIC**

PROJECT 04-1111-002 W.P. 607-00-00 LOCATION N 4781618.7 ; E 326189.8 ORIGINATED BY PKS

DIST Central HWY QEW BOREHOLE TYPE 108 mm Diameter Solid Stem Augers COMPILED BY SG

DATUM Geodetic DATE July 13, 2005 CHECKED BY LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa					
101.2	GROUND SURFACE												
0.0	ASPHALT												
0.1	Sand and gravel (FILL) Compact Brown Moist		1	SS	17								
99.7													
1.7	Silty SAND, trace gravel Compact Brown Moist		2	SS	11								
	CLAYEY SILT, some sand, trace gravel (TILL) Stiff Grey Moist		3	SS	7								
			4	SS	6								
			5	SS	7								
			6	SS	7								
94.3													
6.9	SILTY CLAY to CLAYEY SILT, trace to some sand, trace gravel (TILL) Stiff to very stiff Grey Moist		7	SS	11							1 7 46 46	
			8	SS	15								
			9	SS	11								
			10	SS	12								
			11	SS	16								
87.0													
14.3	Silty SAND, some gravel, trace clay Compact Red												

MIS-MTO.001\_041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

Continued Next Page

+<sup>3</sup>, X<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-45</b>	2 OF 2 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781618.7 ; E 326189.8</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>July 13, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT $\gamma$ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	20	40	60	80					
	--- CONTINUED FROM PREVIOUS PAGE ---															
85.4 15.9	CLAYEY SILT, some sand, trace gravel (TILL) Very stiff Grey Moist	[Hatched Box]	12	SS	18									[Moisture Content Plot]		
	END OF BOREHOLE  Note: 1. Borehole dry upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, X<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-46</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781591.3 ; E 326265.5</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>July 14, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)				
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	20	40	60	80						100	20	40	60
101.6	GROUND SURFACE																			
0.0	ASPHALT																			
100.8	Silty SAND, trace gravel (FILL) Compact Brown Moist																			
0.8	SILTY CLAY, trace sand, trace gravel (TILL) Stiff Grey Moist		1	SS	17															
			2	SS	10															
			3	SS	9															
			4	SS	6															
			5	SS	7															
96.0	END OF BOREHOLE																			
5.6	Note: 1. Borehole dry upon completion of drilling operations.																			

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-47</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781567.9 ; E 326331.2</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>June 7, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)							
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)						
						20	40	60	80	100	20	40	60	80	100	10	20	30	GR	SA	SI	CL	
101.7	GROUND SURFACE																						
0.0	ASPHALT																						
0.2	Silty sand, trace to some gravel (FILL) Compact Brown Moist		1	SS	21																		5 62 27 6
100.2	SILTY CLAY, trace sand, trace gravel (TILL) Stiff Grey Moist		2	SS	8																		
1.5			3	SS	9																		
			4	SS	6																		
			5	SS	6																		
96.1	END OF BOREHOLE																						
5.6	Note: 1. Borehole dry upon completion of drilling operations.																						

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-48</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781553.7 ; E 326405.3</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>August 4, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)								
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)							
						20	40	60	80	100	20	40	60	80	100	10	20	30		GR	SA	SI	CL	
101.9	GROUND SURFACE																							
0.0	ASPHALT																							
0.2	Sand and gravel (FILL)																							
101.1	Brown Moist																							
0.8	Silty sand, trace gravel (FILL)		1	SS	25																			
100.4	Compact Brown Moist																							
1.5	Silty SAND, trace gravel, containing silty clay seams		2	SS	22																			
100.4	Loose to compact Brown Wet																							
99.0			3	SS	9																			
2.9	SILTY CLAY, some sand, trace gravel (TILL)		4	SS	10																			
99.0	Stiff Grey Wet																							
98.0			5	SS	9																			
97.0			6	SS	7																			
96.3																								
5.6	END OF BOREHOLE																							
	Note: 1. Water level in open borehole measured at 4.9 m depth (Elev. 97.0 m) upon completion of drilling operations.																							

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-49</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781531.9; E 326476.9</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>August 4, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
						20	40	60	80	100						
102.5	GROUND SURFACE															
0.0	ASPHALT															
0.2	Sand and gravel (FILL) Brown Moist															
101.7																
0.8	Silty sand, trace gravel (FILL) Compact Brown Moist		1	SS	18											
101.0																
1.5	CLAYEY SILT to SILTY CLAY, trace to some sand, trace gravel (TILL) Stiff Grey Moist		2	SS	10											
			3	SS	10											
			4	SS	12											
			5	SS	7											
			6	SS	7											
96.9																
5.6	END OF BOREHOLE															
	Note: 1. Borehole dry upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-50</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781494.5 ; E 326553.4</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>August 4, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
						20	40	60	80	100						
105.8	GROUND SURFACE															
0.0	ASPHALT															
0.2	Sand and gravel (FILL) Brown Moist															
105.0	Silty SAND, trace gravel Compact Brown Moist		1	SS	19											
0.8			2	SS	20											
103.2			3	SS	15											
2.6	CLAYEY SILT to SILTY CLAY, some sand, trace gravel (TILL) Stiff to very stiff Brown becoming grey below 3.1 m depth Wet		4	SS	11											
			5	SS	11											
			6	SS	9											
100.2																
5.6	END OF BOREHOLE															
	Note: 1. Bottom of borehole wet upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-51</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781716.5 ; E 325957.4</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>July 8, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)								
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)							
						20	40	60	80	100	20	40	60	80	100	10	20	30		GR	SA	SI	CL	
106.1	GROUND SURFACE																							
0.0	Sand and gravel (FILL) Compact Grey Moist																							
105.2	Silty sand, trace gravel, trace clay (FILL) Compact to dense Reddish brown Moist		1	SS	47																			
0.9			2	SS	47																			
			3	SS	26																			
			4	SS	17																			
			5	SS	21																			
			6	SS	18																			
99.7			7	SS	66																			
99.4	Sand and gravel, containing foundry sand, brick and asphalt fragments (FILL) Very dense Grey/black Moist																							
6.7	CLAYEY SILT, some sand, trace gravel (TILL) Hard Brown Moist to wet		8	SS	47																			
96.4			9	SS	30																			
9.8	END OF BOREHOLE																							
	Note: 1. Water level in open borehole measured at 9.5 m (Elev. 96.6 m) upon completion of drilling operations.																							

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE





**RECORD OF BOREHOLE No W-54** 1 OF 1 **METRIC**

PROJECT 04-1111-002 W.P. 607-00-00 LOCATION N 4781660.5 ; E 326175.3 ORIGINATED BY PKS

DIST Central HWY QEW BOREHOLE TYPE 108 mm Diameter Solid Stem Augers COMPILED BY SG

DATUM Geodetic DATE July 7, 2005 CHECKED BY LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)							
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)						
						20	40	60	80	100	20	40	60	80	100	10	20	30	GR	SA	SI	CL	
103.0	GROUND SURFACE																						
0.0	ASPHALT																						
0.2	Silty sand, trace to some gravel, trace clay (FILL) Compact to very dense Reddish brown Moist		1	SS	66																		
			2	SS	28																		
			3	SS	19																		
			4	SS	45																		
99.0	CONCRETE		5	SS	100/15																		
4.1	SAND and SILT, trace gravel, trace clay Compact Brown Wet		6	SS	14																		
96.9	CLAYEY SILT, some sand, trace gravel (TILL) Stiff to very stiff Grey Moist		7	SS	18																		
6.1			8	SS	14																		
93.3	END OF BOREHOLE		9	SS	14																		
9.8	Note: 1. Borehole dry upon completion of drilling operations.																						

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-55</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781653.3 ; E 326250.8</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>July 11, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)
						20	40	60	80	100							
101.2	GROUND SURFACE																
0.0	ASPHALT																
0.2	Silty sand, trace gravel (FILL) Compact Brown Moist		1	SS	10												
99.7																	
1.5	SILTY CLAY, some sand, trace gravel (TILL) Stiff to very stiff Brown Moist		2	SS	14												
			3	SS	19												
			4	SS	10												
97.4																	
3.8	CLAYEY SILT, trace sand, trace gravel (TILL) Stiff Grey Moist		5	SS	8												
			6	SS	9												
96.0																	
5.2	END OF BOREHOLE  Note: 1. Borehole dry upon completion of drilling operations.																

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-56</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781629.6 ; E 326322.0</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>June 7, 2005</u>	CHECKED BY <u>LCC</u>

ELEV DEPTH	SOIL PROFILE DESCRIPTION	STRAT PLOT	SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
			NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa										WATER CONTENT (%)
								20	40	60	80	100						
101.6	GROUND SURFACE																	
0.0	ASPHALT																	
0.2	Sand and gravel (FILL) Compact																	
100.8	Red Moist																	
0.8	Silty SAND, trace gravel Compact		1	SS	25													
100.1	Brown Moist																	
1.5	CLAYEY SILT, trace to some sand, trace gravel (TILL) Stiff to very stiff		2	SS	18													
	Grey Moist		3	SS	13													
			4	SS	10													
			5	SS	8													
	Silty sand layer from 4.6 m to 5.3 m depth		6	SS	9													
			7	SS	16													
94.9	END OF BOREHOLE																	
6.7	Note: 1. Borehole dry upon completion of drilling operations.																	

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-57</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781614.2 ; E 326395.4</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>June 7, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)
						20	40	60	80	100							
101.7	GROUND SURFACE																
0.0	ASPHALT																
0.2	CONCRETE																
	Silty sand, trace clay (FILL) Compact Brown Moist		1	SS	15												
			2	SS	7												
99.7			3	SS	12												
2.0	CLAYEY SILT to SILTY CLAY, some sand, trace gravel (TILL) Stiff Grey Moist		4	SS	9												
			5	SS	9												
			6	SS	8												
			7	SS	11												
95.0	END OF BOREHOLE																
6.7	Note: 1. Borehole dry upon completion of drilling operations.																

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-58</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781596.4 ; E 326468.6</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>July 11, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
						20	40	60	80	100						
101.5	GROUND SURFACE															
0.0	ASPHALT															
0.1	Sand and gravel (FILL)															
100.7	Compact Brown Moist															
0.8	Silty SAND, trace gravel		1	SS	29											
100.0	Compact Brown Moist/wet															
1.5	SILTY CLAY, trace to some sand, trace gravel (TILL)		2	SS	7											
	Stiff Grey Moist		3	SS	9											
			4	SS	8											
96.3	END OF BOREHOLE		5	SS	8											
5.2	Note: 1. Borehole dry upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-59</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781601.9; E 326530.7</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>July 27, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)								
ELEV. DEPTH	DESCRIPTION	NUMBER	TYPE	"N" VALUES			20	40						60	80	100	20	40	60	80	100
102.0	GROUND SURFACE																				
0.0	TOPSOIL																				
0.2	Silty SAND, trace gravel Compact Brown Moist	1	SS	18																	
		2	SS	16																	
		3	SS	15																	
100.0	CLAYEY SILT to SILTY CLAY, trace to some sand, trace gravel (TILL) Stiff Grey Moist	4	SS	11																	
2.0		5	SS	11																	
		6	SS	8																	
		7	SS	7																	
		8	SS	13																	
		9	SS	11																	
		10	SS	7																	
91.8	END OF BOREHOLE																				
10.2	Note: 1. Borehole dry upon completion of drilling operations. 2. Water level in piezometer measured at 8.7 m depth (Elev. 93.3m) on Aug. 8, 2005 and at 3.7 m depth (Elev. 98.3 m) on December 6, 2005.																				

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-60</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781508.5 ; E 326755.5</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>July 18, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)			
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)		
						20	40	60	80	100									
101.5	GROUND SURFACE																		
0.0	Silty sand, trace gravel, containing organics and asphalt pieces (FILL) Compact Brown Moist		1	SS	16														
100.7	SILTY CLAY, trace to some sand, trace to some gravel (TILL) Stiff to hard Brown Moist		2	SS	11														
0.8			3	SS	8											41			
			4	SS	12														
			5	SS	24												9	13	42 36
			6	SS	35											41			
			7	SS	13														
96.3	END OF BOREHOLE																		
5.2	Note: 1. Borehole dry upon completion of drilling operations.																		

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-61</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781490.7 ; E 326829.5</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>July 18, 2005</u>	CHECKED BY <u>LCC</u>

ELEV. DEPTH	SOIL PROFILE DESCRIPTION	STRAT PLOT	SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
			NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa										
								20	40	60	80	100						
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × REMOULDED					WATER CONTENT (%)				GR SA SI CL	
101.8	GROUND SURFACE																	
0.0	Sand and gravel (FILL) Compact Brown Moist		1	SS	9													
0.2	SILTY CLAY, trace to some sand, trace gravel (TILL) Stiff to hard Brown Moist		2	SS	17													
			3	SS	31													
			4	SS	12													
	Grey below 3.0 m depth		5	SS	8													
			6	SS	8													
			7	SS	9													
			8	SS	12													
			9	SS	14													
			10	SS	15													
92.1	END OF BOREHOLE																	
9.8	Note: 1. Borehole dry upon completion of drilling operations. 2. Water level in piezometer at 7.3 m depth (Elev. 94.5 m) on Aug. 8, 2005 and at 2.5 m depth (Elev. 99.3 m) on Dec. 6, 2005.																	

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-62</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781471.5; E 326901.9</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>July 18, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)			
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)		
						20	40	60	80	100									
101.6	GROUND SURFACE																		
0.0	Clayey silt, some sand, trace gravel, containing organics (FILL) Stiff to very stiff Brown Moist		1	SS	15														
			2	SS	9														
100.1																			
1.5	SILTY CLAY, some sand, trace gravel (TILL) Stiff to very stiff Brown Moist		3	SS	20														
			4	SS	22														
			5	SS	16														
			6	SS	15														
			7	SS	12														
96.4	END OF BOREHOLE																		
5.2	Note: 1. Borehole dry upon completion of drilling operations.																		

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-63</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781447.8 ; E 326973.2</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>July 19, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
						20	40	60	80	100						
						○ UNCONFINED	+	FIELD VANE								
						● QUICK TRIAXIAL	×	REMOULDED								
						20	40	60	80	100	10	20	30			
101.5	GROUND SURFACE															
0.0	Silty sand, trace gravel (FILL) Loose Red Moist		1	SS	9											
100.7																
0.8	SILTY CLAY, some sand, trace gravel (TILL) Stiff to very stiff Brown Moist		2	SS	15							○				
			3	SS	15											
			4	SS	17									42		
			5	SS	14							○				
			6	SS	12											
			7	SS	14									41		
96.3																
5.2	END OF BOREHOLE  Note: 1. Borehole dry upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE





**RECORD OF BOREHOLE No W-66** 1 OF 1 **METRIC**

PROJECT 04-1111-002 W.P. 607-00-00 LOCATION N 4781363.3 ; E 327182.7 ORIGINATED BY PKS

DIST Central HWY QEW BOREHOLE TYPE 108 mm Diameter Solid Stem Augers COMPILED BY SG

DATUM Geodetic DATE July 25, 2005 CHECKED BY LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa						WATER CONTENT (%)
107.5	GROUND SURFACE													
0.0	ASPHALT													
0.2	Sand and gravel (FILL) Brown Moist													
106.7	Clayey silt, some sand, trace gravel (FILL) Firm to very stiff Brown Moist	[Hatched Pattern]	1	SS	7									
106														
105														
104														
103														
102														
101.4	Gravelly sand, some silt (FILL) Compact Brown Moist to wet	[Hatched Pattern]	7	SS	28								23 55 18 4	
101														
99.9	SILTY CLAY, some sand, trace gravel (TILL) Very stiff to hard Brown Moist	[Hatched Pattern]	8	SS	60									
99														
97.8	END OF BOREHOLE	[Hatched Pattern]	9	SS	22									
98														
9.8	Note: 1. Borehole dry upon completion of drilling operations.													

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE



PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-68</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781460.0 ; E 326660.9</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>July 25, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)								
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)							
						20	40	60	80	100	20	40	60	80	100	10	20	30		GR	SA	SI	CL	
103.5	GROUND SURFACE																							
0.0	Silty sand, trace gravel (FILL) Loose to compact Brown Moist		1	SS	9																			
			2	SS	23																			
102.0																								
1.5	SILTY CLAY, some sand, trace gravel (TILL) Stiff Brown/grey Moist		3	SS	13													45						
			4	SS	14																			
	Becoming grey below 3.1 m depth		5	SS	8																			
			6	SS	8																			
			7	SS	7														41					
97.9																								
5.6	END OF BOREHOLE																							
	Note: 1. Borehole dry upon completion of drilling operations.																							

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-69</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781343.3 ; E 327097.9</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>July 21, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
101.5	GROUND SURFACE															
0.0	ASPHALT															
0.2	CONCRETE															
	Silty sand, trace gravel (FILL) Compact Red Moist		1	SS	18											
100.1																
1.4	SILTY CLAY, trace to some sand, trace gravel (TILL) Stiff to very stiff Brown Moist		2	SS	20											
			3	SS	22											
			4	SS	18											
			5	SS	15									48		1 3 38 58
			6	SS	14											
96.3																
5.2	END OF BOREHOLE															
	Note: 1. Borehole dry upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

**RECORD OF BOREHOLE No W-70** 1 OF 1 **METRIC**

PROJECT 04-1111-002 W.P. 607-00-00 LOCATION N 4781323.1 ; E 327306.1 ORIGINATED BY PKS

DIST Central HWY QEW BOREHOLE TYPE 108 mm Diameter Solid Stem Augers COMPILED BY SG

DATUM Geodetic DATE July 24, 2005 CHECKED BY LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
						20	40	60	80	100						
107.6	GROUND SURFACE															
0.0	ASPHALT															
0.2	Sand and gravel to gravel, some sand, trace silt (FILL) Loose Brown/grey Moist		1	SS	7											
			2	SS	8											
105.0			3	SS	6											
2.6	Clayey silt to silty clay, some sand, trace to some gravel (FILL) Stiff Brown Moist		4	SS	13											
			5	SS	12											
			6	SS	10											
101.5			7	SS	70											
6.1	Silty sand and gravel (FILL) Very dense Brown/red Moist															
100.0			8	SS	32											
7.6	SILTY CLAY, some sand, trace gravel (TILL) Very stiff to hard Brown Moist															
			9	SS	28											
97.9																
9.8	END OF BOREHOLE															
	Note: 1. Borehole dry upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

**RECORD OF BOREHOLE No W-71** 1 OF 1 **METRIC**

PROJECT 04-1111-002 W.P. 607-00-00 LOCATION N 4781309.5 ; E 327348.7 ORIGINATED BY PKS

DIST Central HWY QEW BOREHOLE TYPE 108 mm Diameter Solid Stem Augers COMPILED BY SG

DATUM Geodetic DATE July 24, 2005 CHECKED BY LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa					
107.2	GROUND SURFACE												
0.0	ASPHALT												
0.2	Sand and gravel (FILL) Compact												
106.4	Brown Moist												
0.8	Clayey silt, some sand, trace to some gravel (FILL) Firm to very stiff Brown Moist		1	SS	8								
			2	SS	5								
			3	SS	6								
			4	SS	6								
			5	SS	14								
			6	SS	22								
101.7	Sand and gravel (FILL) Grey Moist												
5.6	SILTY CLAY, some sand, trace gravel (TILL) Very stiff to hard Brown Moist		7	SS	15								
			8	SS	27							47	
97.5			9	SS	31								
9.8	END OF BOREHOLE												
	Note: 1. Borehole dry upon completion of drilling operations.												

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-72</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781300.4 ; E 327426.3</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>July 21, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
						20 40 60 80 100	20 40 60 80 100									
101.3	GROUND SURFACE															
0.0	ASPHALT															
	CONCRETE															
100.5	Sand and gravel (FILL)															
0.8	Compact Brown Moist		1	SS	4											
99.8	SILTY CLAY, some sand, trace gravel, containing organics															
1.5	Firm Grey to grey-black Moist		2	SS	14											
	SILTY CLAY, some sand, trace gravel (TILL)															
	Stiff to very stiff Brown Moist		3	SS	14											
			4	SS	17									48		
			5	SS	15											
96.1			6	SS	13											
5.2	END OF BOREHOLE															
	Note: 1. Borehole dry upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

**RECORD OF BOREHOLE No W-73** 1 OF 1 **METRIC**

PROJECT 04-1111-002 W.P. 607-00-00 LOCATION N 4781263.8 ; E 327492.2 ORIGINATED BY PKS

DIST Central HWY QEW BOREHOLE TYPE 108 mm Diameter Solid Stem Augers COMPILED BY SG

DATUM Geodetic DATE July 24, 2005 CHECKED BY LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa					
104.0	GROUND SURFACE												
0.0	ASPHALT												
0.2	Sand and gravel (FILL) Compact Brown Moist												
103.2	Clayey silt, some sand, trace to some gravel (FILL) Stiff to hard Brown/red Moist		1	SS	11								
0.8			2	SS	15								
				3	SS	24							
				4	SS	32							
				5	SS	11							
99.4	CLAYEY SILT to SILTY CLAY, some sand, trace gravel (TILL) Very stiff Brown Moist		6	SS	18								
4.6			7	SS	20								
				8	SS	27							
				9	SS	29							
94.3	END OF BOREHOLE												
9.8	Note: 1. Borehole dry upon completion of drilling operations.												

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-74</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781255.6 ; E 327567.5</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>July 21, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
						20	40	60	80	100						
101.0	GROUND SURFACE															
0.0	Sand and gravel (FILL) Compact Brown Moist															
100.4																
0.6	SILTY CLAY, some sand, trace gravel (TILL) Stiff to very stiff Brown Moist		1	SS	9											
			2	SS	11											
			3	SS	19											
			4	SS	13											
			5	SS	15											
			6	SS	14											
95.8	END OF BOREHOLE															
5.2	Note: 1. Borehole dry upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-75</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781231.4 ; E 327639.7</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>July 21, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
						20	40	60	80	100						
100.9	GROUND SURFACE															
0.0	Sand and gravel (FILL) Compact Brown Moist															
100.3																
0.6	SILTY CLAY, some sand, trace gravel (TILL) Stiff to very stiff Brown Moist		1	SS	15											
			2	SS	16											
			3	SS	15											
			4	SS	14											
			5	SS	13											
			6	SS	12											
95.7	END OF BOREHOLE															
5.2	Note: 1. Borehole dry upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

**RECORD OF BOREHOLE No W-76** 1 OF 1 **METRIC**

PROJECT 04-1111-002 W.P. 607-00-00 LOCATION N 4781307.0 ; E 327269.3 ORIGINATED BY PKS

DIST Central HWY QEW BOREHOLE TYPE 108 mm Diameter Solid Stem Augers COMPILED BY SG

DATUM Geodetic DATE July 27, 2005 CHECKED BY LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT			UNIT WEIGHT $\gamma$	REMARKS & GRAIN SIZE DISTRIBUTION (%)		
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	20	40	60	80			100	W <sub>p</sub>
107.8	GROUND SURFACE														
0.0	ASPHALT														
0.2	Sand and gravel (FILL)														
107.2	Brown Moist														
0.6	Clayey silt, trace to some sand, trace gravel (FILL)		1	SS	13										
	Stiff to very stiff		2	SS	11										
	Reddish brown to brown		3	SS	14										
	Moist		4	SS	13										
			5	SS	20									5	6 56 33
			6	SS	18										
101.7	Sand and gravel (FILL)														
6.1	Compact Brown/grey Moist/wet		7	SS	22										
101.1	SILTY CLAY, some sand, trace gravel (TILL)														
6.7	Very stiff to hard		8	SS	41										
	Brown/grey														
	Moist		9	SS	21										
98.0	END OF BOREHOLE														
9.8	Note: 1. Borehole dry upon completion of drilling operations.														

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, X<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

PROJECT <u>04-1111-002</u>	<b>RECORD OF BOREHOLE No W-77</b>	1 OF 1 <b>METRIC</b>
W.P. <u>607-00-00</u>	LOCATION <u>N 4781265.1 ; E 327334.9</u>	ORIGINATED BY <u>PKS</u>
DIST <u>Central</u> HWY <u>QEW</u>	BOREHOLE TYPE <u>108 mm Diameter Solid Stem Augers</u>	COMPILED BY <u>SG</u>
DATUM <u>Geodetic</u>	DATE <u>July 21, 2005</u>	CHECKED BY <u>LCC</u>

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa					
101.4	GROUND SURFACE						20 40 60 80 100						
0.0	ASPHALT												
0.2	Sand and gravel (FILL)												
100.8	Compact Brown Moist												
0.6	SILTY CLAY, some sand, trace gravel (TILL) Firm to very stiff Brown Moist		1	SS	6								
			2	SS	15						51		
			3	SS	20								
			4	SS	14								
			5	SS	13								
			6	SS	11								
96.2	END OF BOREHOLE												
5.2	Notes: 1. Borehole dry upon completion of drilling operations. 2. Water level measured in piezometer at 3.2 m depth (Elev. 98.2 m) on August 8, 2005. 3. Water level measured in piezometer at 1.1 m depth (Elev. 100.3 m) on December 6, 2005.												

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

**RECORD OF BOREHOLE No W-78** 1 OF 1 **METRIC**

PROJECT 04-1111-002 W.P. 607-00-00 LOCATION N 4781260.2; E 327412.0 ORIGINATED BY PKS

DIST Central HWY QEW BOREHOLE TYPE 108 mm Diameter Solid Stem Augers COMPILED BY SG

DATUM Geodetic DATE July 27, 2005 CHECKED BY LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT w	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
						20	40	60	80	100						
105.7	GROUND SURFACE															
0.0	ASPHALT															
0.2	Sand and gravel (FILL)															
105.1	Brown Moist															
0.6	Clayey silt, some sand, trace gravel (FILL) Stiff to very stiff Reddish brown to brown Moist		1	SS	12											
	Contains layers of dense, black foundry sand		2	SS	12											
			3	SS	11											
			4	SS	42											
			5	SS	48											
101.1	Sand and gravel (FILL) Very dense Grey/red Moist/wet		6	SS	53											
99.6	SILTY CLAY, some sand, trace gravel (TILL) Very stiff to hard Brown Moist		7	SS	60											
6.1			8	SS	29											
95.9	END OF BOREHOLE		9	SS	26											
9.8	Note: 1. Water level in open borehole measured at 9.1 m depth (Elev. 96.6 m) upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE



**RECORD OF BOREHOLE No W-80** 1 OF 1 **METRIC**

PROJECT 04-1111-002 W.P. 607-00-00 LOCATION N 4781213.0; E 327554.3 ORIGINATED BY PKS

DIST Central HWY QEW BOREHOLE TYPE 108 mm Diameter Solid Stem Augers COMPILED BY SG

DATUM Geodetic DATE July 27, 2005 CHECKED BY LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)								
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)							
						20	40	60	80	100	20	40	60	80	100	10	20	30		GR	SA	SI	CL	
102.0	GROUND SURFACE																							
0.0	ASPHALT																							
0.1	Sand and gravel (FILL)																							
101.2	Brown Moist																							
100.9	Sandy silt, trace gravel and clay (FILL)		1	SS	18																			
1.2	Compact Red Moist																							
	Concrete		2	SS	22																			
	SILTY CLAY, some sand, trace gravel (TILL)																							
	Very stiff to hard Brown Moist		3	SS	25																			
			4	SS	46																			
			5	SS	34																			
			6	SS	32																			
96.8	END OF BOREHOLE																							
5.2	Note: 1. Water level in open borehole measured at 1.2 m depth (Elev. 100.8 m) upon completion of drilling operations.																							

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE

**RECORD OF BOREHOLE No W-81** 1 OF 1 **METRIC**

PROJECT 04-1111-002 W.P. 607-00-00 LOCATION N 4781189.7 ; E 327625.8 ORIGINATED BY PKS

DIST Central HWY QEW BOREHOLE TYPE 108 mm Diameter Solid Stem Augers COMPILED BY SG

DATUM Geodetic DATE July 27, 2005 CHECKED BY LCC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
						20	40	60	80	100						
101.7	GROUND SURFACE															
0.0	ASPHALT															
	Sand and gravel (FILL)															
	Brown/grey															
	Moist															
100.9	Clayey silt, some sand, trace gravel (FILL)		1	SS	12											
0.8	Stiff															
	Brown															
	Moist															
100.2	SILTY CLAY, some sand, trace gravel (TILL)		2	SS	23											
1.5	Very stiff to hard															
	Brown															
	Moist															
			3	SS	34											
			4	SS	32											
			5	SS	22											
			6	SS	22											
96.5	END OF BOREHOLE															
5.2	Note: 1. Water level in open borehole measured at 3.4 m depth (Elev. 98.3 m) upon completion of drilling operations.															

MIS-MTO 001 041111002AAMTO.GPJ GAL-MISS.GDT 23/1/07

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity      ○ 3% STRAIN AT FAILURE



**METRIC**  
 DIMENSIONS ARE IN METRES AND/OR  
 MILLIMETRES UNLESS OTHERWISE SHOWN.  
 STATIONS IN KILOMETRES + METRES.

CONT No.  
 WP No.607-00-00

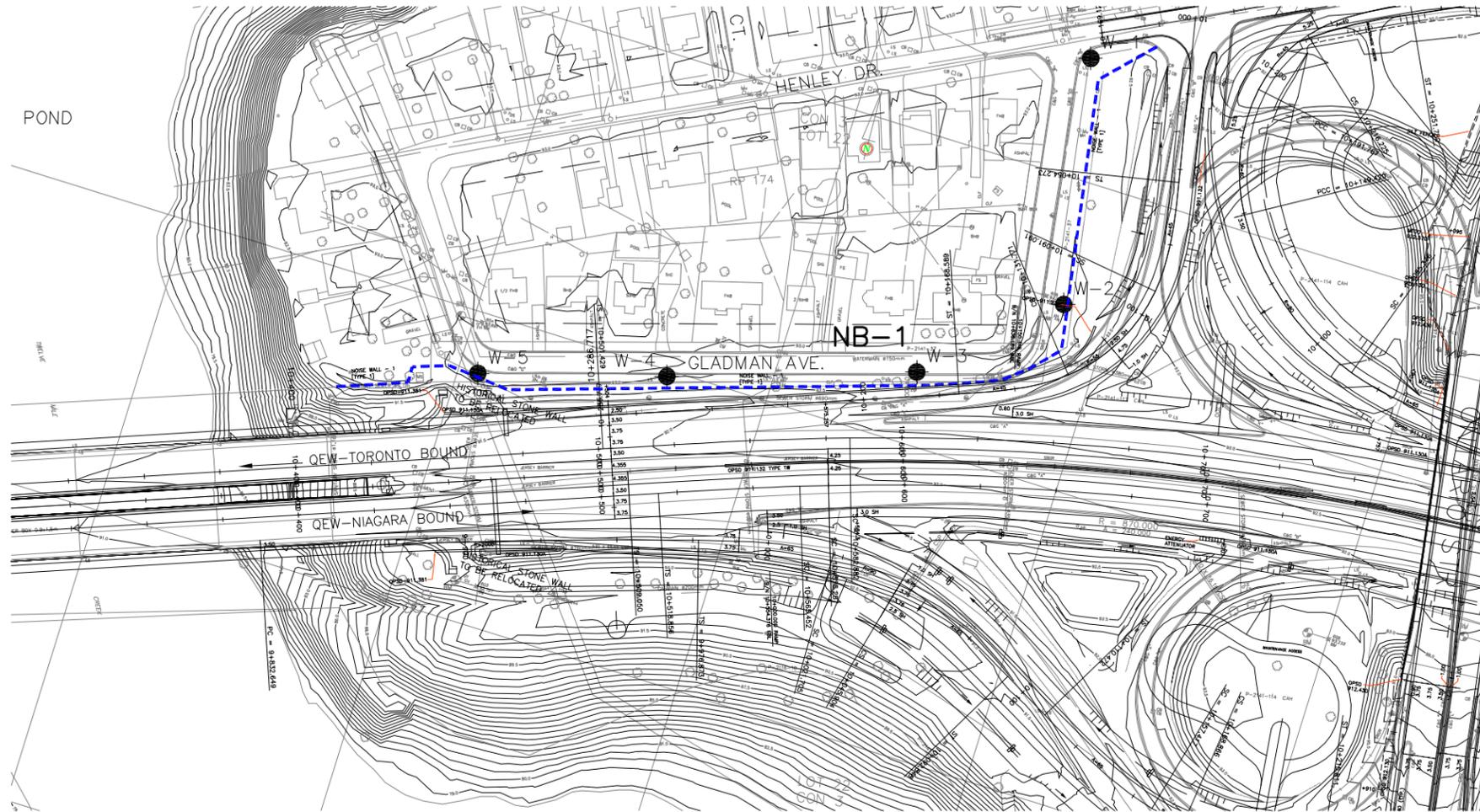


NOISE BARRIER WALL 1  
 BOREHOLE LOCATIONS

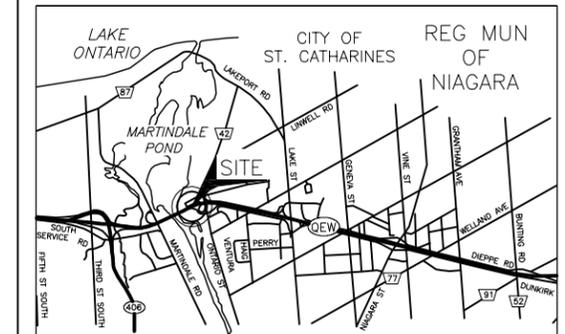
SHEET



**Golder Associates Ltd.**  
 MISSISSAUGA, ONTARIO, CANADA



**PLAN**



**KEY PLAN**

SCALE  
 1 0 1 km

**LEGEND**

● Borehole-Current Investigation

No.	ELEVATION	CO-ORDINATES	
		NORTHING	EASTING
W-1	92.0	4782339.3	323568.7
W-2	93.0	4782259.3	323584.2
W-3	92.5	4782223.7	323544.6
W-4	92.8	4782197.9	323466.4
W-5	93.0	4782180.3	323406.6

**NOTES**

This drawing is for subsurface information only. The proposed structure details/works are shown for illustration purposes only and may not be consistent with the final design configuration as shown elsewhere in the Contracts Documents.

The boundaries between soil strata have been established only at borehole locations. Between Boreholes the boundaries are assumed from geological evidence.

The complete foundation investigation and design report for this project and other related documents may be examined at the Materials Engineering and Research Office, Downsview. Information contained in this report and related documents is specifically excluded in accordance with Section GC 2.01 of OPS General Conditions.

**REFERENCE**

Base plans provided in digital format by Morrison Hershfield Limited, drawing file nos. x4026design.dwg and x4026baseplan.dwg, received March 21, 2005.

NO.	DATE	BY	REVISION

Geocres No.

HWY. QEW	PROJECT NO. 04-1111-002	DIST.
SUBM'D. KG	CHKD. KG	DATE: DEC 2006
DRAWN: MSM	CHKD. JMAG	APPD. LCC
		DWG. 1

**METRIC**  
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN. STATIONS IN KILOMETRES + METRES.

CONT No.  
WP No.607-00-00

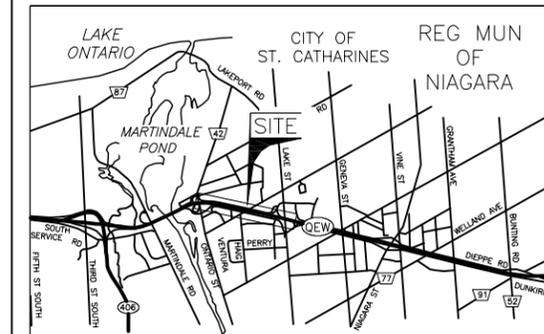


NOISE BARRIER WALLS 2 AND 3  
BOREHOLE LOCATIONS

SHEET



**Golder Associates Ltd.**  
MISSISSAUGA, ONTARIO, CANADA



**KEY PLAN**  
SCALE  
1 0 1 km

**LEGEND**

● Borehole-Current Investigation

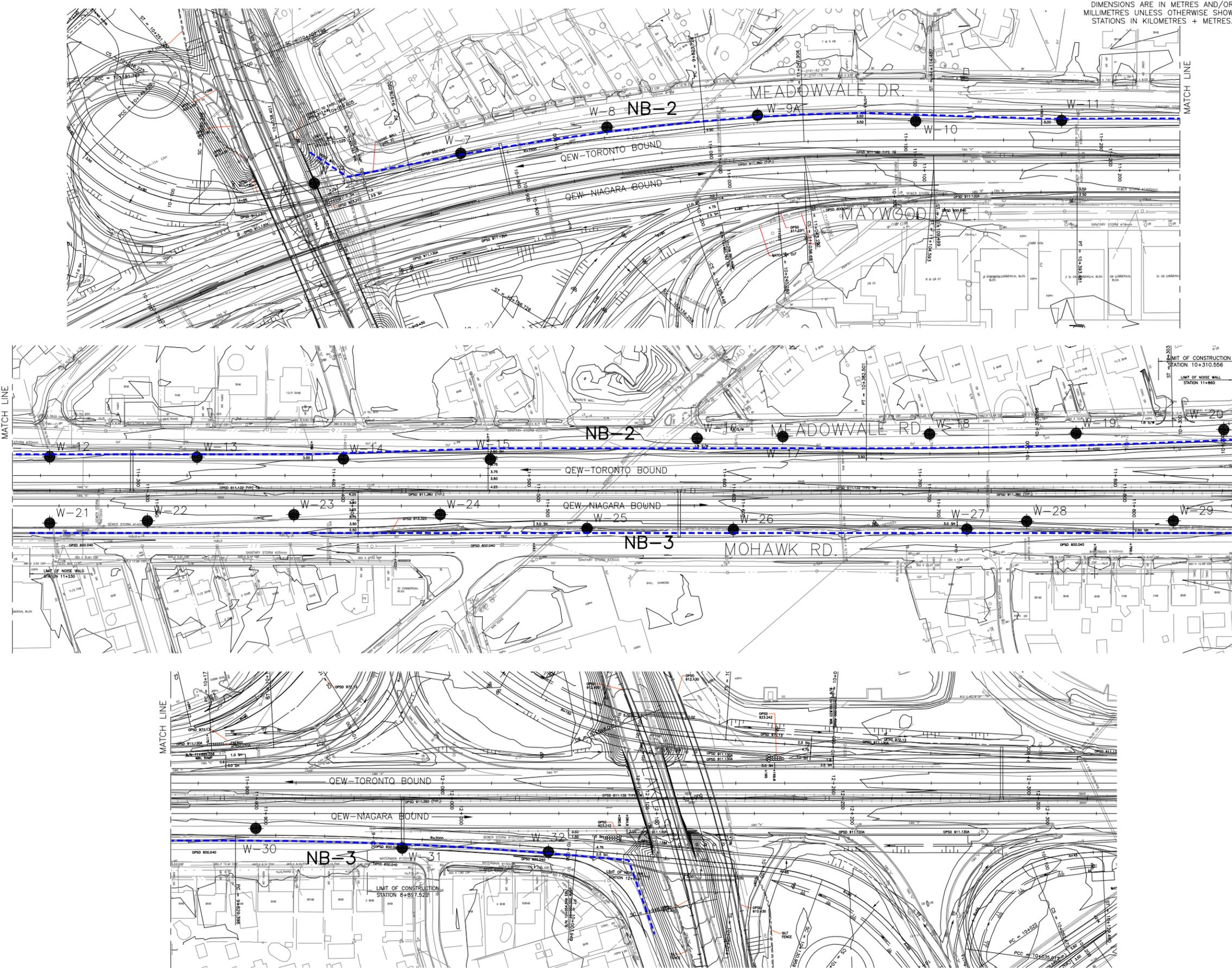
No.	ELEVATION	CO-ORDINATES	
		NORTHING	EASTING
W-6	93.0	4782261.6	323741.1
W-7	93.5	4782257.6	323817.5
W-8	93.7	4782251.8	323893.2
W-9A	93.8	4782238.4	323969.3
W-10	94.0	4782215.4	324046.9
W-11	94.4	4782197.0	324119.3
W-12	94.6	4782177.9	324191.8
W-13	94.9	4782158.9	324264.7
W-14	95.0	4782139.3	324337.0
W-15	95.2	4782120.3	324409.7
W-16	95.2	4782104.3	324514.8
W-17	95.4	4782094.1	324557.6
W-18	95.5	4782076.6	324630.6
W-19	95.6	4782058.2	324703.3
W-20	95.8	4782041.2	324776.9
W-21	94.6	4782145.2	324183.3
W-22	94.9	4782133.8	324232.0
W-23	95.0	4782118.1	324305.4
W-24	95.2	4782099.5	324377.9
W-25	94.5	4782073.8	324448.9
W-26	94.4	4782054.7	324521.2
W-27	94.0	4782025.0	324637.0
W-28	95.0	4782021.2	324667.6
W-29	95.8	4782002.6	324740.3
W-30	96.0	4781983.9	324812.7
W-31	95.9	4781955.5	324882.7
W-32	96.4	4781934.9	324954.7

**NOTES**

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NO.	DATE	BY	REVISION
Geocres No.			PROJECT NO. 04-1111-002 DIST.
HWY. QEW	CHKD. KG	DATE: DEC 2006	SITE:
SUBM'D. KG	CHKD. JMAC	APPD. LCC	DWG. 2



**PLAN**

SCALE  
20 0 20 40 m

**REFERENCE**

Base plans provided in digital format by Morrison Hershfield Limited, drawing file nos. x4026design.dwg and x4026baseplan.dwg, received March 21, 2005.

**METRIC**  
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN. STATIONS IN KILOMETRES + METRES.

CONT No.  
WP No.607-00-00

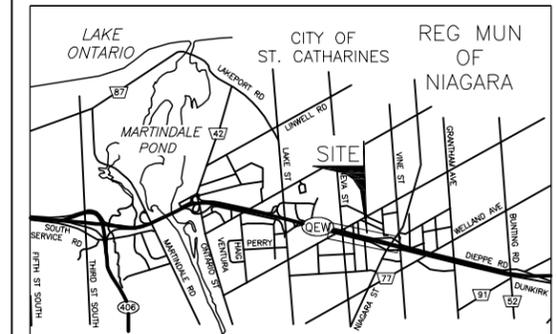
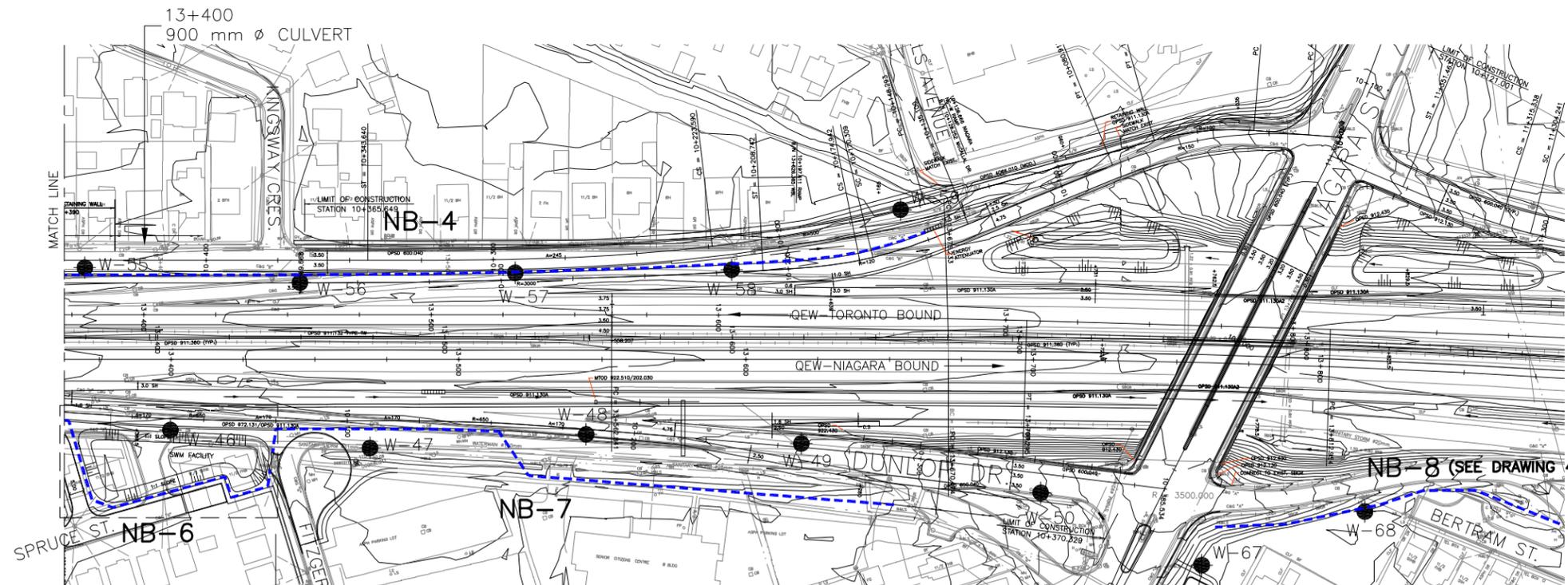
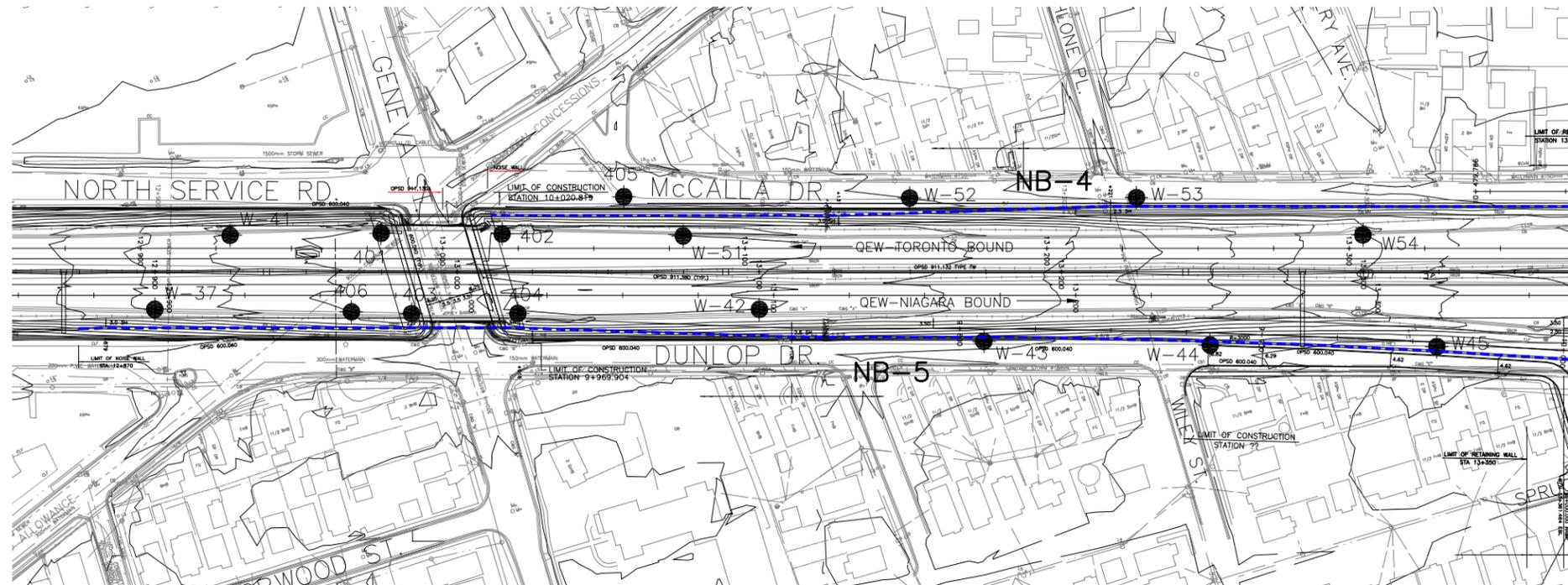


NOISE BARRIER WALLS  
4, 5, 6 AND 7  
BOREHOLE LOCATIONS

SHEET



**Golder Associates Ltd.**  
MISSISSAUGA, ONTARIO, CANADA



**KEY PLAN**  
SCALE  
1 0 1 km

**LEGEND**

● Borehole-Current Investigation

No.	ELEVATION	CO-ORDINATES	
		NORTHING	EASTING
W-37	104.7	4781736.7	325782.0
W-41	105.0	4781754.1	325812.2
W-42	106.1	4781686.7	325975.7
W-43	100.4	4781657.9	326045.0
W-44	100.8	4781638.0	326117.2
W-45	101.2	4781618.7	326189.8
W-46	101.6	4781591.3	326265.5
W-47	101.7	4781567.9	326331.2
W-48	101.9	4781553.7	326405.3
W-49	102.5	4781531.9	326476.9
W-50	105.8	4781494.5	326553.4
W-51	106.1	4781716.5	325957.4
W-52	100.0	4781709.9	326033.1
W-53	100.5	4781691.2	326105.8
W-54	103.0	4781660.5	326175.3
W-55	101.2	4781653.3	326250.8
W-56	101.6	4781629.6	326322.0
W-57	101.7	4781614.2	326395.4
W-58	101.5	4781596.4	326468.6
W-59	102.0	4781601.9	326530.7
W-67	104.5	4781456.2	326601.3
W-68	103.5	4781460.0	326660.9
401	105.7	4781742.3	325860.8
402	106.0	4781732.1	325899.5
403	105.8	4781714.1	325863.9
404	106.1	4781705.4	325898.0
405	100.0	4781733.9	325941.6
406	105.6	4781719.6	325844.8

**REFERENCE**

Base plans provided in digital format by Morrison Hershfield Limited, drawing file nos. x4026design.dwg and x4026baseplan.dwg, received March 21, 2005.

**NOTES**

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The complete foundation investigation and design report for this project and other related documents may be examined at the Materials Engineering and Research Office, Downsview. Information contained in this report and related documents is specifically excluded in accordance with Section GC 2.01 of OPS General Conditions.



NO.	DATE	BY	REVISION

Geocres No.

HWY. QEW	PROJECT NO. 04-1111-002	DIST.
SUBM'D. KG	CHKD. KG	DATE: DEC 2006
DRAWN: MSM	CHKD. JMAM	APPD. LCC
		DWG. 3

**METRIC**  
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN. STATIONS IN KILOMETRES + METRES.

CONT No.  
WP No.607-00-00

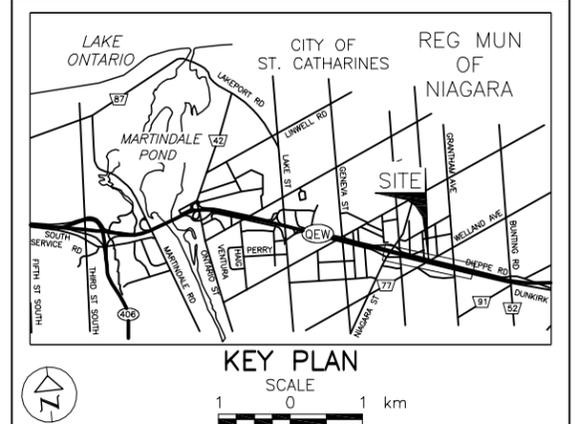
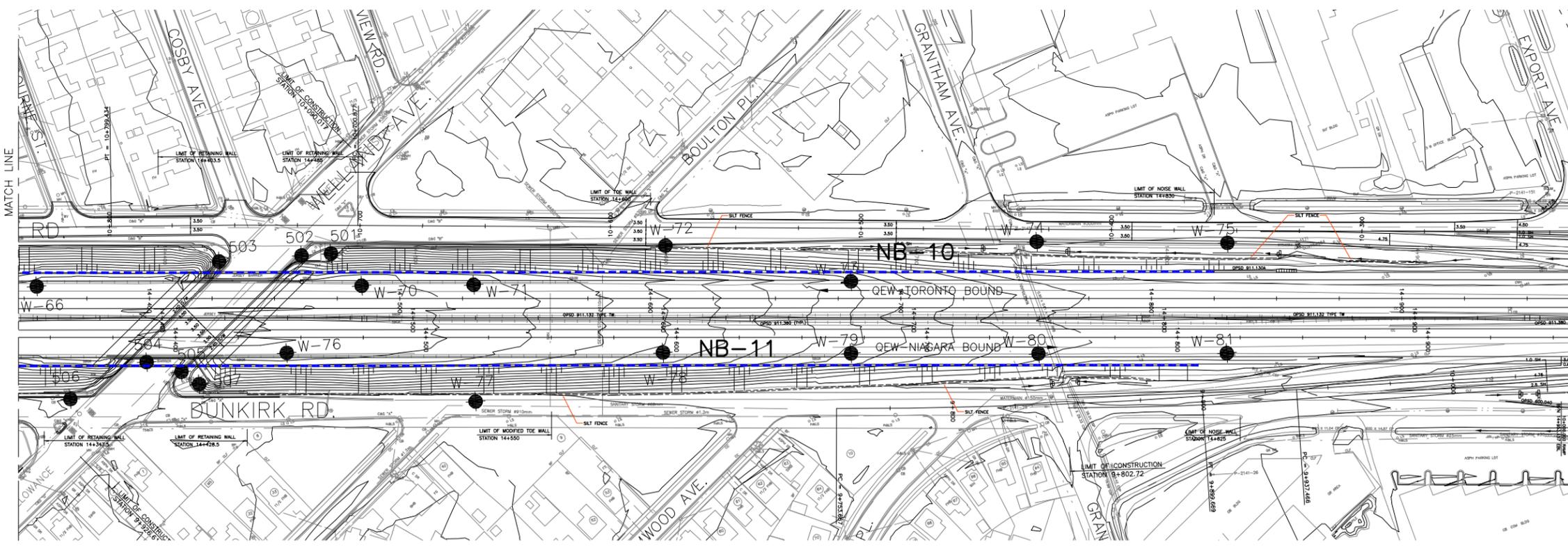
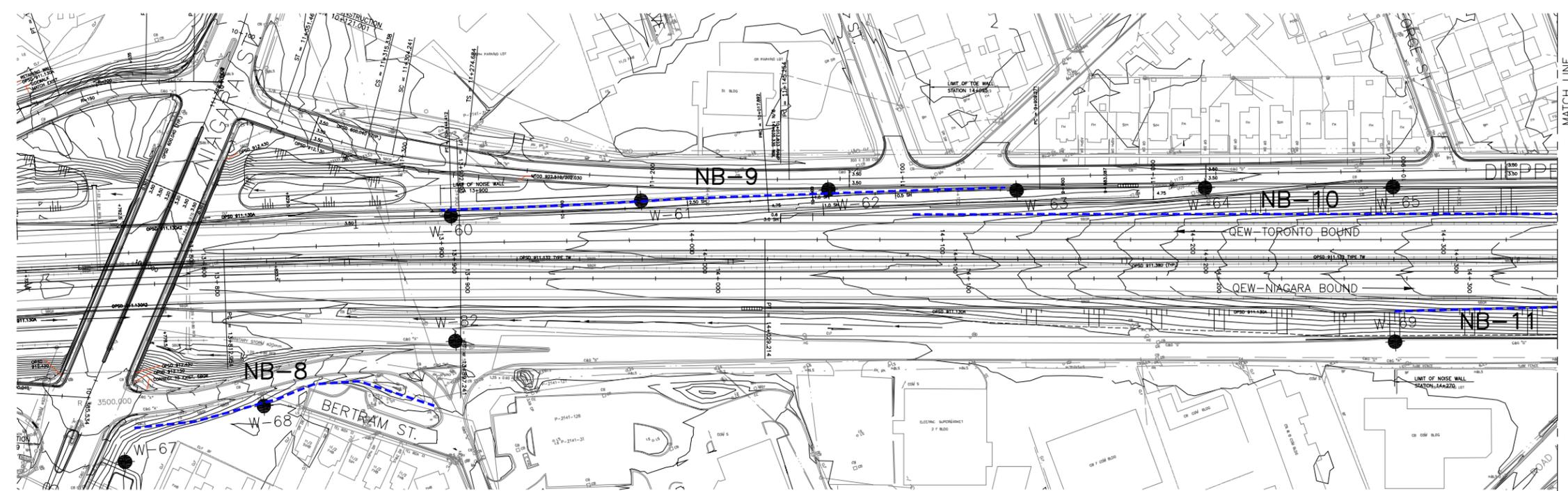


NOISE BARRIER WALLS  
8, 9, 10 AND 11  
BOREHOLE LOCATIONS

SHEET



**Golder Associates Ltd.**  
MISSISSAUGA, ONTARIO, CANADA



LEGEND

● Borehole-Current Investigation

No.	ELEVATION	CO-ORDINATES	
		NORTHING	EASTING
W-60	101.5	4781508.5	326755.5
W-61	101.8	4781490.7	326829.5
W-62	101.6	4781471.5	326901.9
W-63	101.5	4781447.8	326973.2
W-64	101.4	4781425.2	327045.0
W-65	101.2	4781402.1	327116.4
W-66	107.5	4781363.3	327182.7
W-67	104.5	4781456.2	326601.3
W-68	103.5	4781460.0	326660.9
W-69	101.5	4781343.3	327097.9
W-70	107.6	4781323.1	327306.1
W-71	107.2	4781309.5	327348.7
W-72	101.3	4781300.4	327426.3
W-73	104.0	4781263.8	327492.2
W-74	101.0	4781255.6	327567.5
W-75	100.9	4781231.4	327639.7
W-76	107.8	4781307.0	327269.3
W-77	101.4	4781265.1	327334.9
W-78	105.7	4781260.2	327412.0
W-79	104.0	4781236.5	327483.2
W-80	102.0	4781213.0	327554.3
W-81	101.7	4781189.7	327625.8
W-82	102.0	4781460.7	326741.7
501	101.2	4781339.1	327298.4
502	101.2	4781342.0	327287.0
503	101.4	4781350.0	327255.0
504	101.5	4781321.0	327215.0
505	101.4	4781313.0	327227.0
506	101.4	4781316.5	327181.5
507	101.5	4781306.1	327232.2

REFERENCE

Base plans provided in digital format by Morrison Hershfield Limited, drawing file nos. x4026design.dwg and x4026baseplan.dwg, received March 21, 2005.

NOTES

This drawing is for subsurface information only. The proposed structure details/works are shown for illustration purposes only and may not be consistent with the final design configuration as shown elsewhere in the Contracts Documents.

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NO.	DATE	BY	REVISION

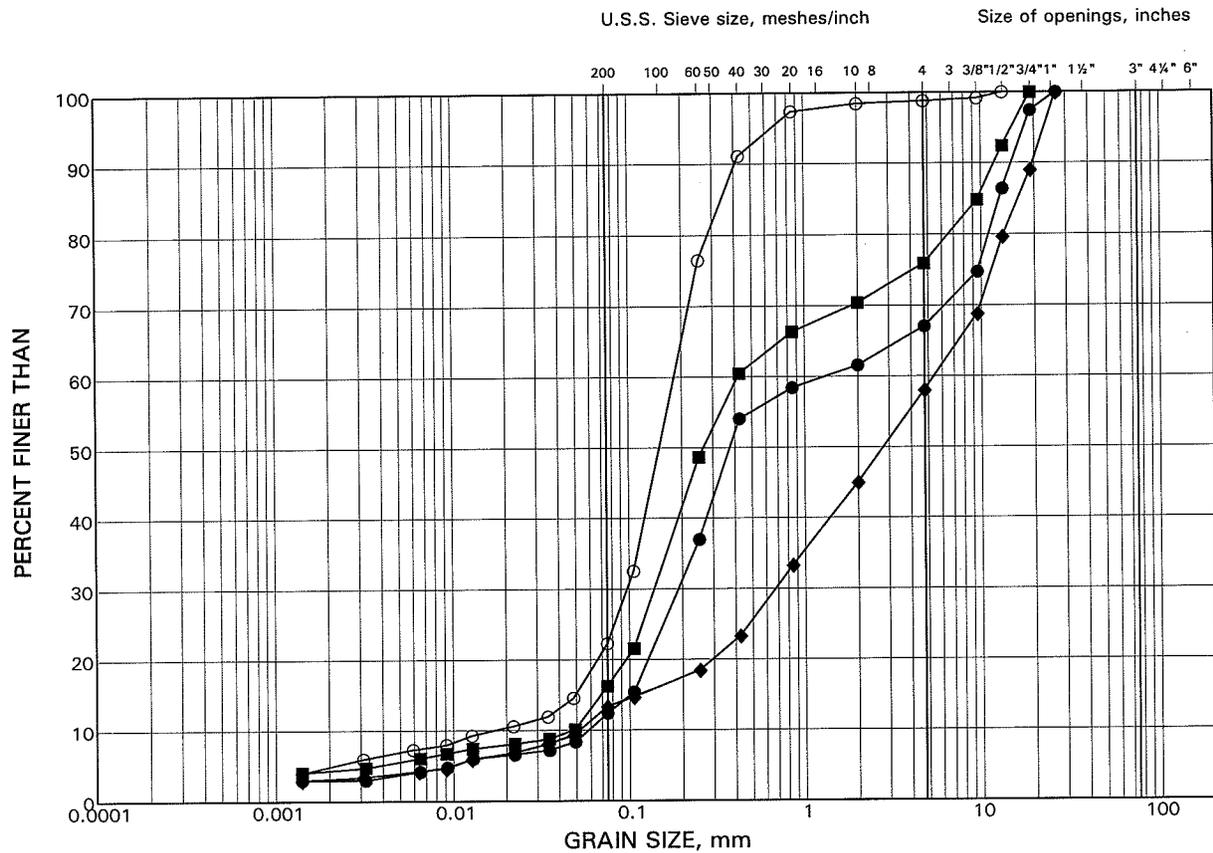
Geocres No. \_\_\_\_\_ PROJECT NO. 04-1111-002 DIST. \_\_\_\_\_

HWY. QEW	CHKD. KG	DATE: DEC 2006	SITE:
SUBM'D. KG	CHKD. JMAC	APPD. LCC	DWG. 4

# GRAIN SIZE DISTRIBUTION TEST RESULTS

Fill

FIGURE 1A



SILT AND CLAY SIZES		FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE
FINE GRAINED		SAND SIZE			GRAVEL SIZE		SIZE

## LEGEND

SYMBOL	BOREHOLE	SAMPLE	ELEVATION (m)
●	401	7	99.3
■	402	4	102.7
◆	403	4	102.4
○	404	4	102.8

Date January, 2007  
Project 04-1111-002-9

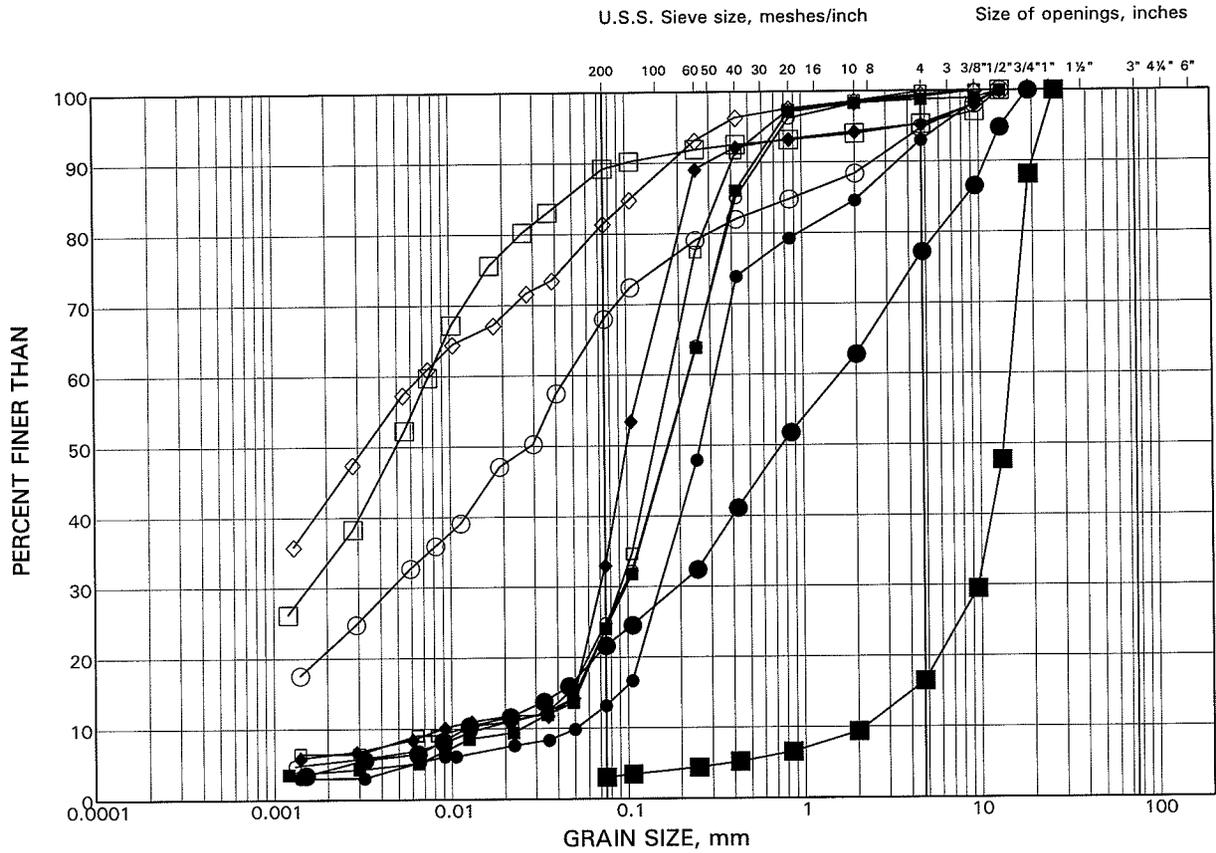
**Golder Associates**

Prepared by LG  
Checked by *ll*

# GRAIN SIZE DISTRIBUTION TEST RESULTS

Fill

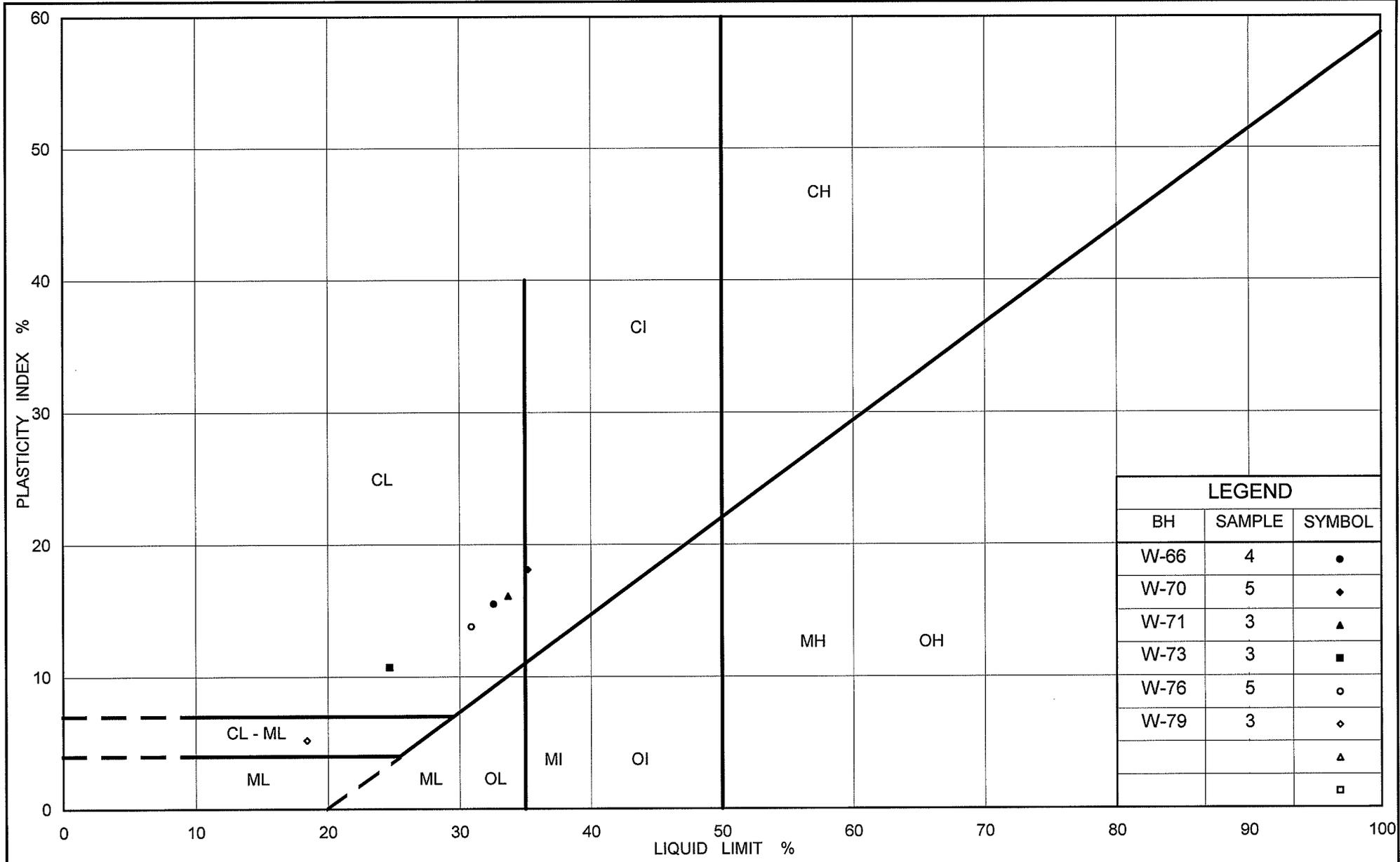
FIGURE 1B



SILT AND CLAY SIZES		FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE
FINE GRAINED		SAND SIZE			GRAVEL SIZE		SIZE

### LEGEND

SYMBOL	BOREHOLE	SAMPLE	ELEVATION (m)
●	W-41	4	101.6
■	W-42	3	103.5
◆	W-47	1	100.6
○	W-51	4	102.7
□	W-54	3	100.4
◇	W-62	2	100.5
●	W-66	7	101.1
■	W-70	2	105.8
○	W-73	3	101.4
□	W-76	5	103.7

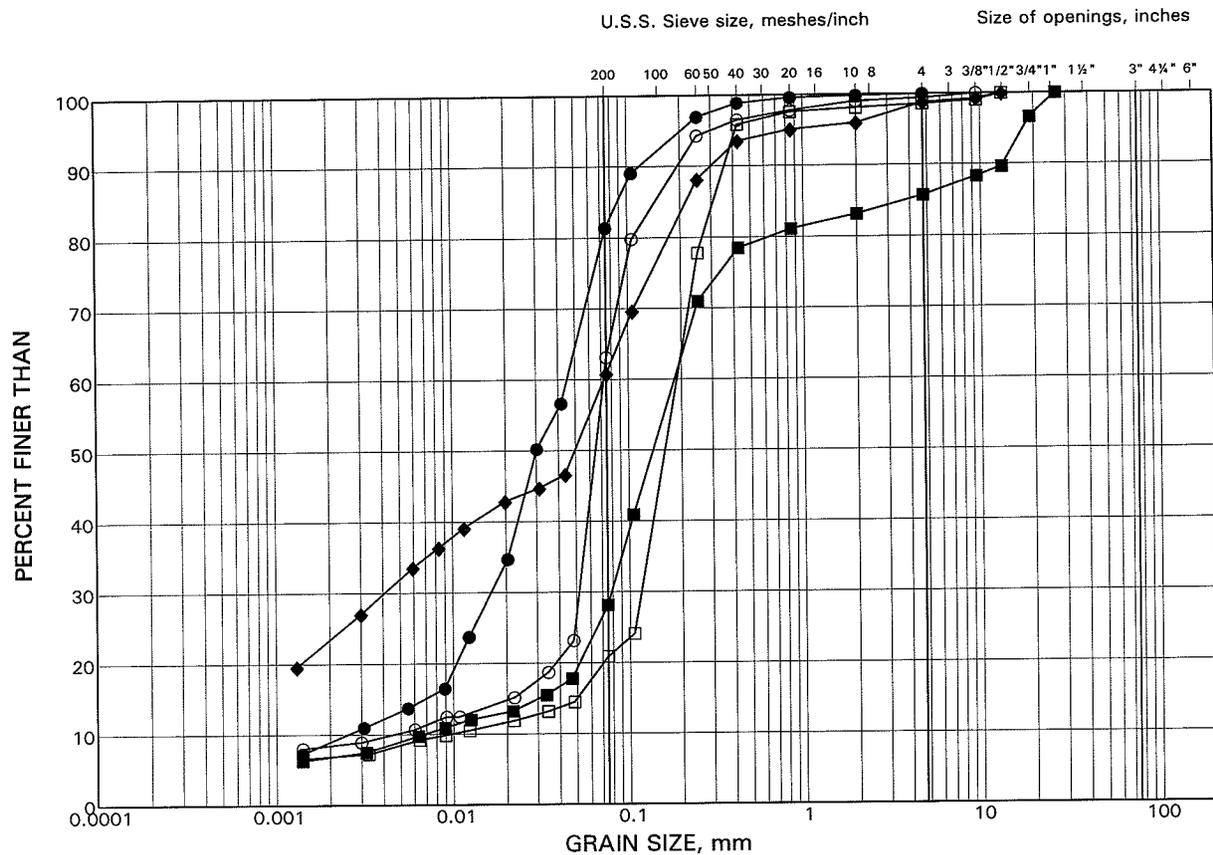


## PLASTICITY CHART Fill

# GRAIN SIZE DISTRIBUTION TEST RESULTS

Surficial Silty Sand to Sandy Silt

FIGURE 3



SILT AND CLAY SIZES		FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE
FINE GRAINED		SAND SIZE			GRAVEL SIZE		SIZE

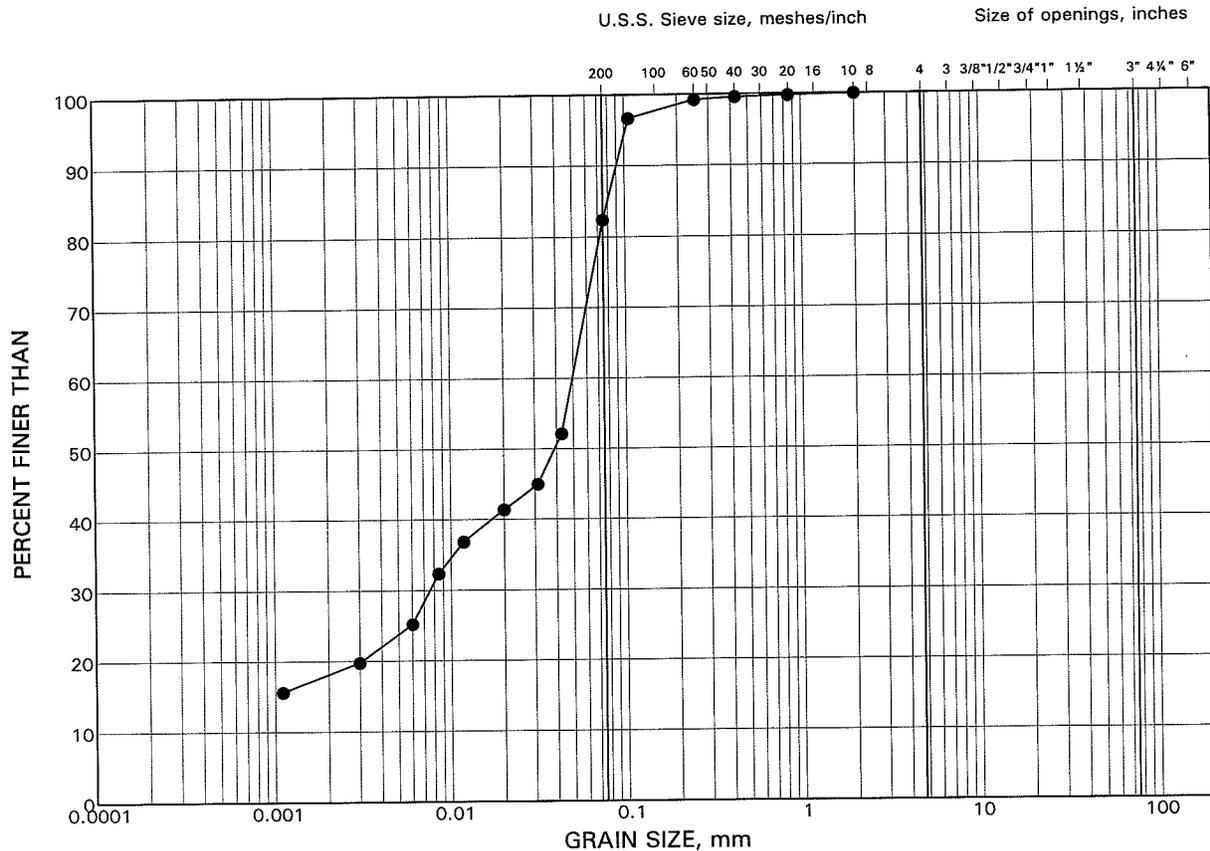
### LEGEND

SYMBOL	BOREHOLE	SAMPLE	ELEVATION (m)
●	406	8	97.7
■	W-41	7	98.6
◆	W-48	2	100.1
○	W-54	6	98.1
□	W-67	3	102.7

# GRAIN SIZE DISTRIBUTION TEST RESULT

## Surficial Clayey Silt

FIGURE 4



SILT AND CLAY SIZES	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE
FINE GRAINED	SAND SIZE			GRAVEL SIZE		SIZE

### LEGEND

SYMBOL	BOREHOLE	SAMPLE	ELEVATION (m)
●	W-18	1	94.4

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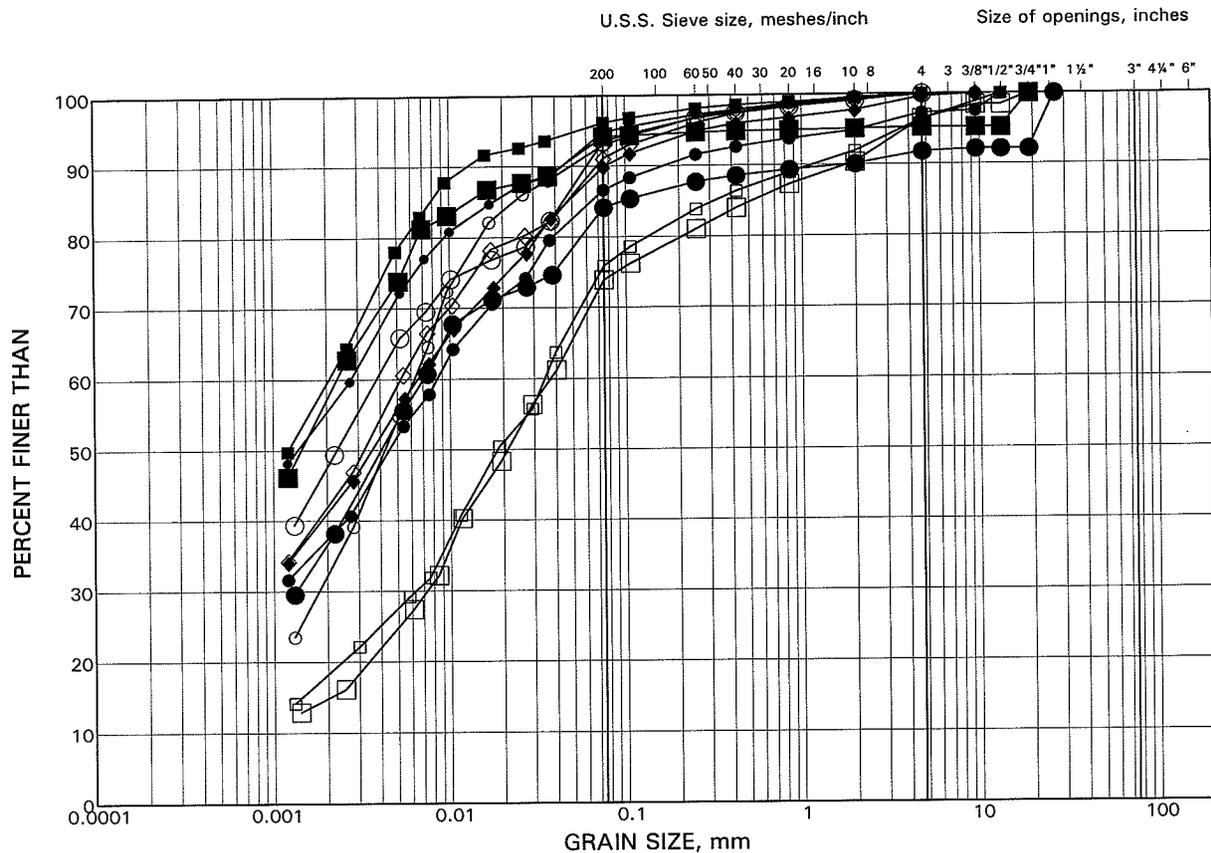
**Golder Associates**

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Checked by *llc*

# GRAIN SIZE DISTRIBUTION TEST RESULTS

## Clayey Silt to Silty Clay Till

FIGURE 5A



SILT AND CLAY SIZES		FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE
FINE GRAINED		SAND SIZE			GRAVEL SIZE		SIZE

### LEGEND

SYMBOL	BOREHOLE	SAMPLE	ELEVATION (m)
●	401	11	93.2
■	402	16	85.9
◆	403	9	96.3
○	403	19	81.1
□	404	20	79.9
◇	405	7	95.1
●	502	15	84.1
■	503	13	87.4
○	504	10	92.1
□	505	19	79.2
●	507	6	97.4

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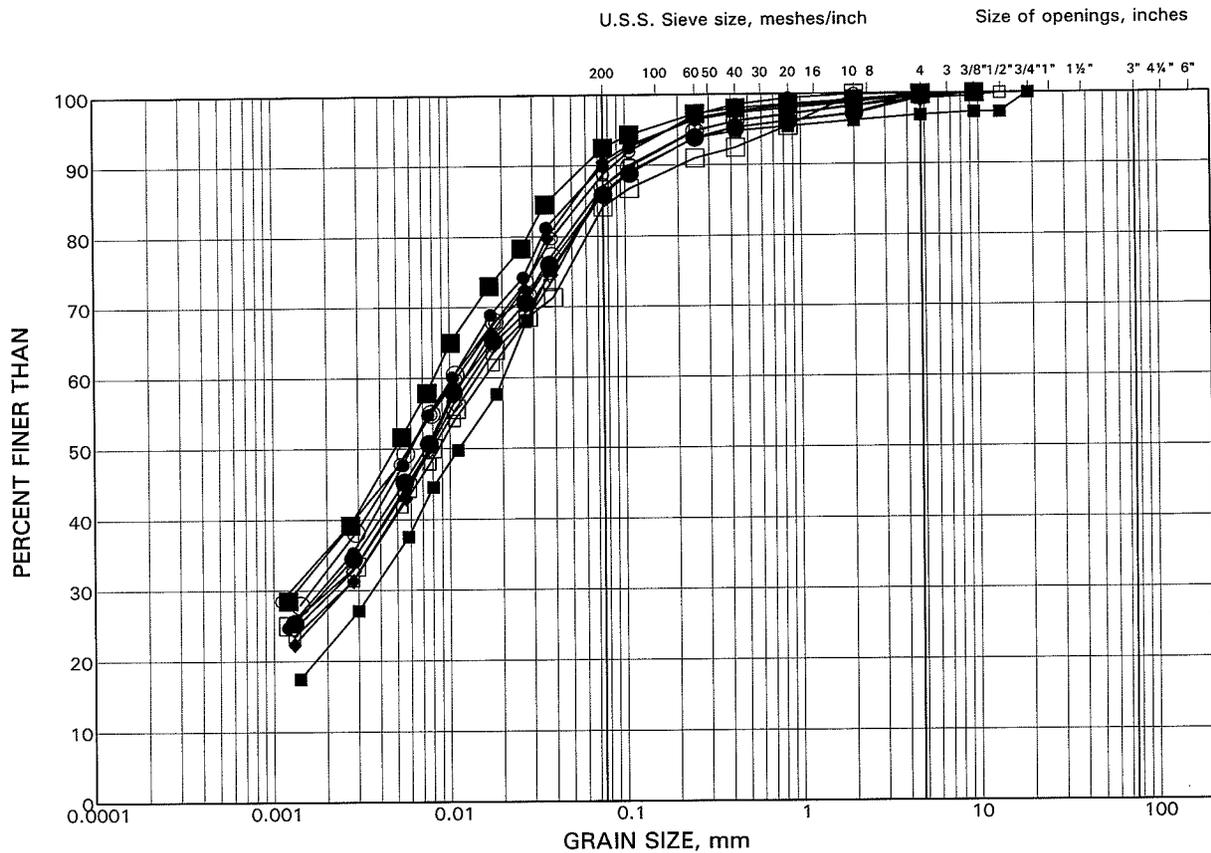
**Golder Associates**

Prepared by LG  
Checked by *[Signature]*

# GRAIN SIZE DISTRIBUTION TEST RESULTS

Clayey Silt to Silty Clay Till

FIGURE 5B



SILT AND CLAY SIZES		FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE
FINE GRAINED		SAND SIZE			GRAVEL SIZE		SIZE

### LEGEND

SYMBOL	BOREHOLE	SAMPLE	ELEVATION (m)
●	W-1	6	87.9
■	W-3	3	89.9
◆	W-4	4	90.2
○	W-6	2	91.9
□	W-8	5	90.3
◇	W-10	4	91.4
●	W-12	6	90.5
■	W-14	4	92.4
○	W-17	4	92.1
□	W-19	3	93.0

Date January, 2007  
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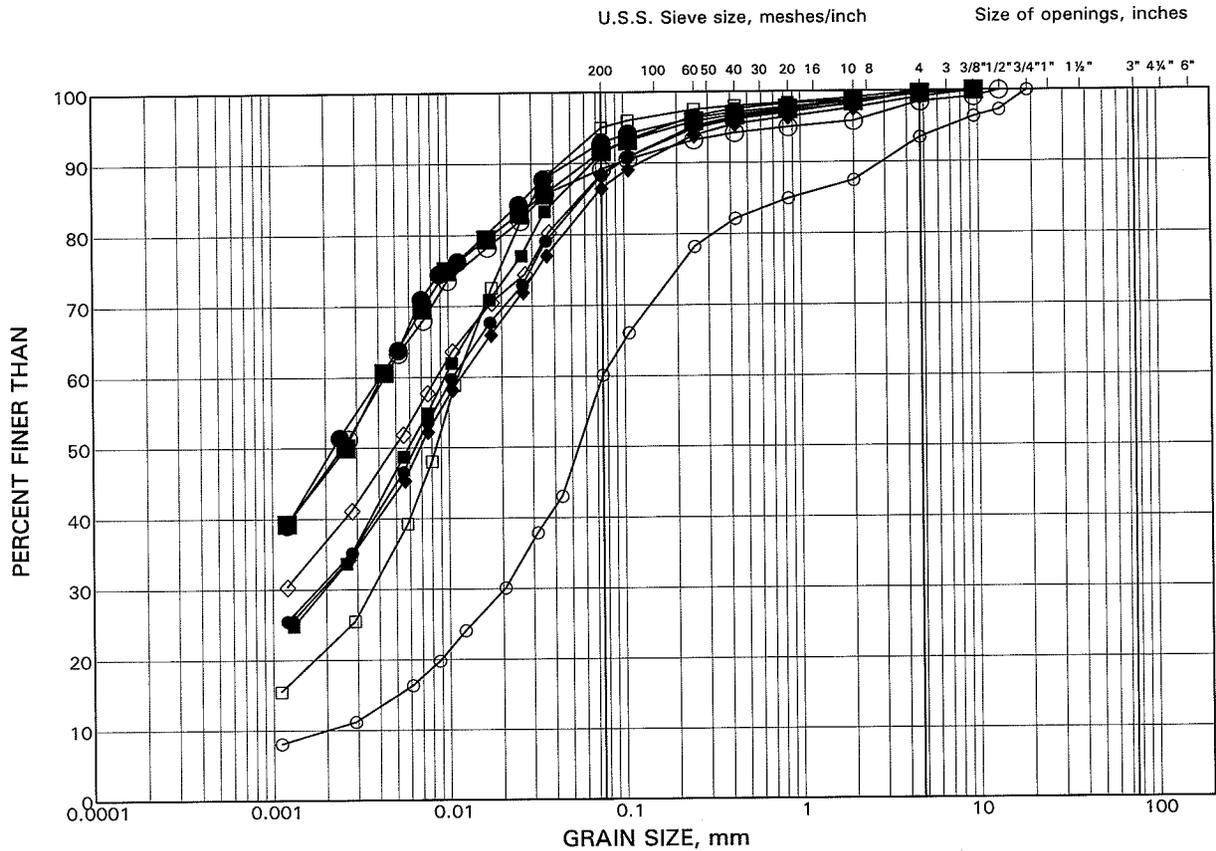
**Golder Associates**

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Checked by *ll*

# GRAIN SIZE DISTRIBUTION TEST RESULTS

## Clayey Silt to Silty Clay Till

FIGURE 5C



SILT AND CLAY SIZES		FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE
FINE GRAINED		SAND SIZE			GRAVEL SIZE		SIZE

### LEGEND

SYMBOL	BOREHOLE	SAMPLE	ELEVATION (m)
●	W-21	5	91.2
■	W-23	4	92.4
◆	W-25	6	90.4
○	W-26	6	90.3
□	W-30	3	94.2
◇	W-32	3	94.6
●	W-44	2	99.0
■	W-45	7	93.3
○	W-49	6	97.6

Date January, 2007  
 Project 04-1111-002-9

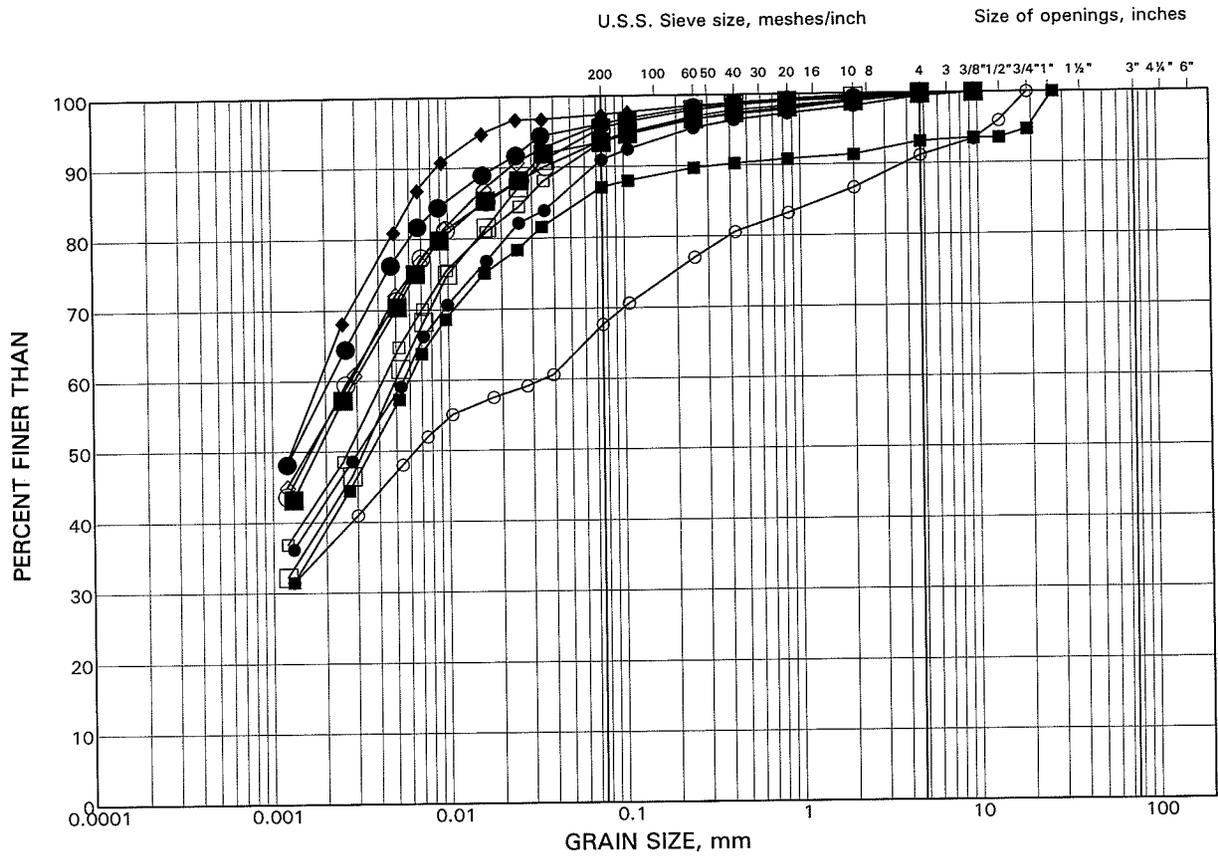
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# GRAIN SIZE DISTRIBUTION TEST RESULTS

Clayey Silt to Silty Clay Till

FIGURE 5D



SILT AND CLAY SIZES		FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE
FINE GRAINED		SAND SIZE			GRAVEL SIZE		SIZE

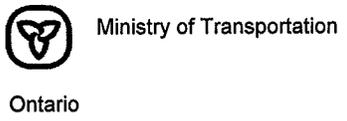
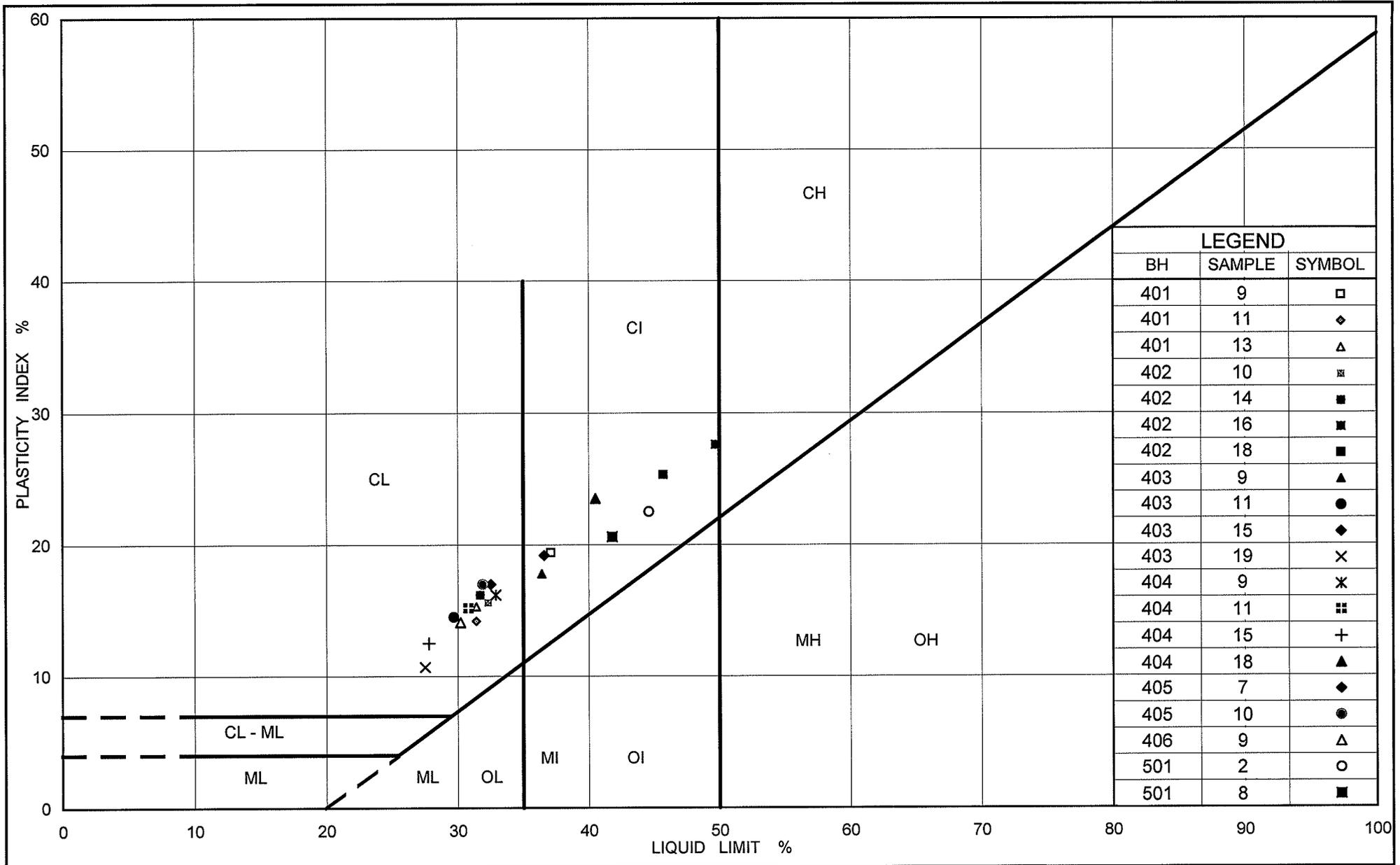
### LEGEND

SYMBOL	BOREHOLE	SAMPLE	ELEVATION (m)
●	W-53	8	92.6
■	W-56	4	98.3
◆	W-59	10	92.6
○	W-60	5	98.2
□	W-61	8	95.4
◇	W-64	8	95.0
●	W-69	5	97.4
■	W-75	5	96.8
○	W-79	7	97.6
□	W-82	4	98.7

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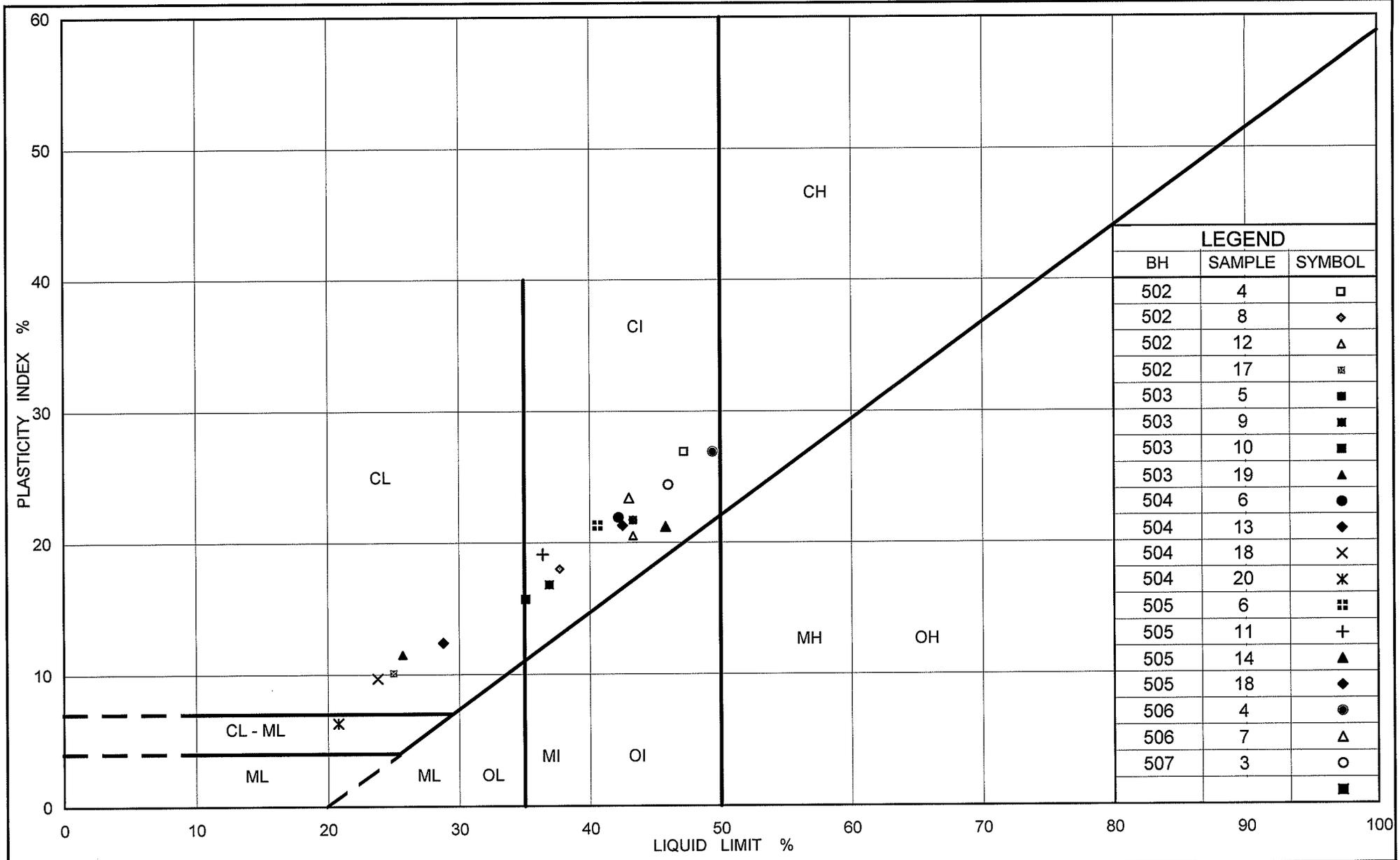
Prepared by LG  
 Checked by *ll*



### PLASTICITY CHART

Clayey Silt to Silty Clay Till

FIG No. 6A  
 Project No. 04-1111-002-9  
 Checked By: *ll*



Ministry of Transportation

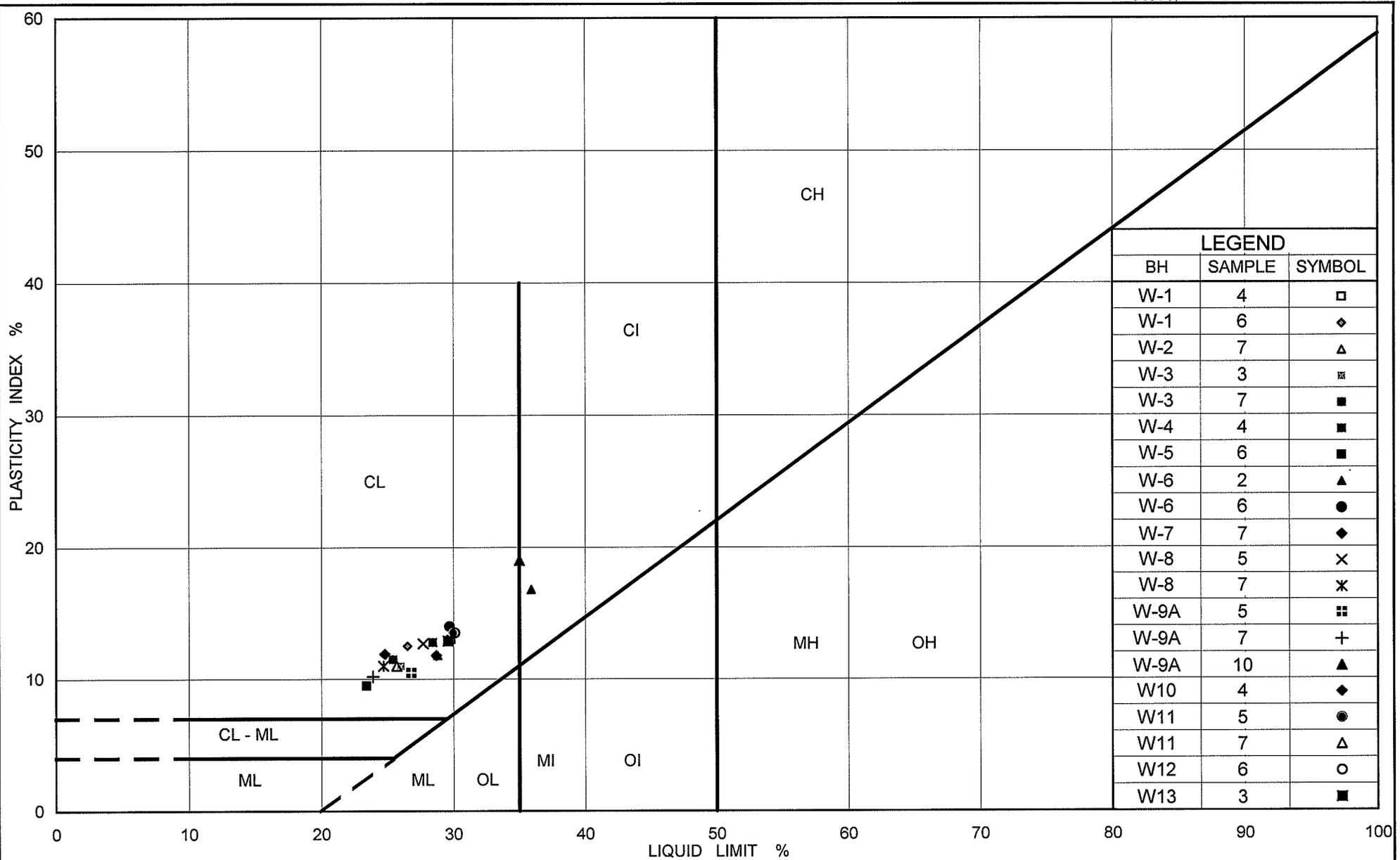
Ontario

### PLASTICITY CHART Clayey Silt to Silty Clay Till

FIG No. 6B

Project No. 04-1111-002-9

Checked By: *ul*



Ministry of Transportation

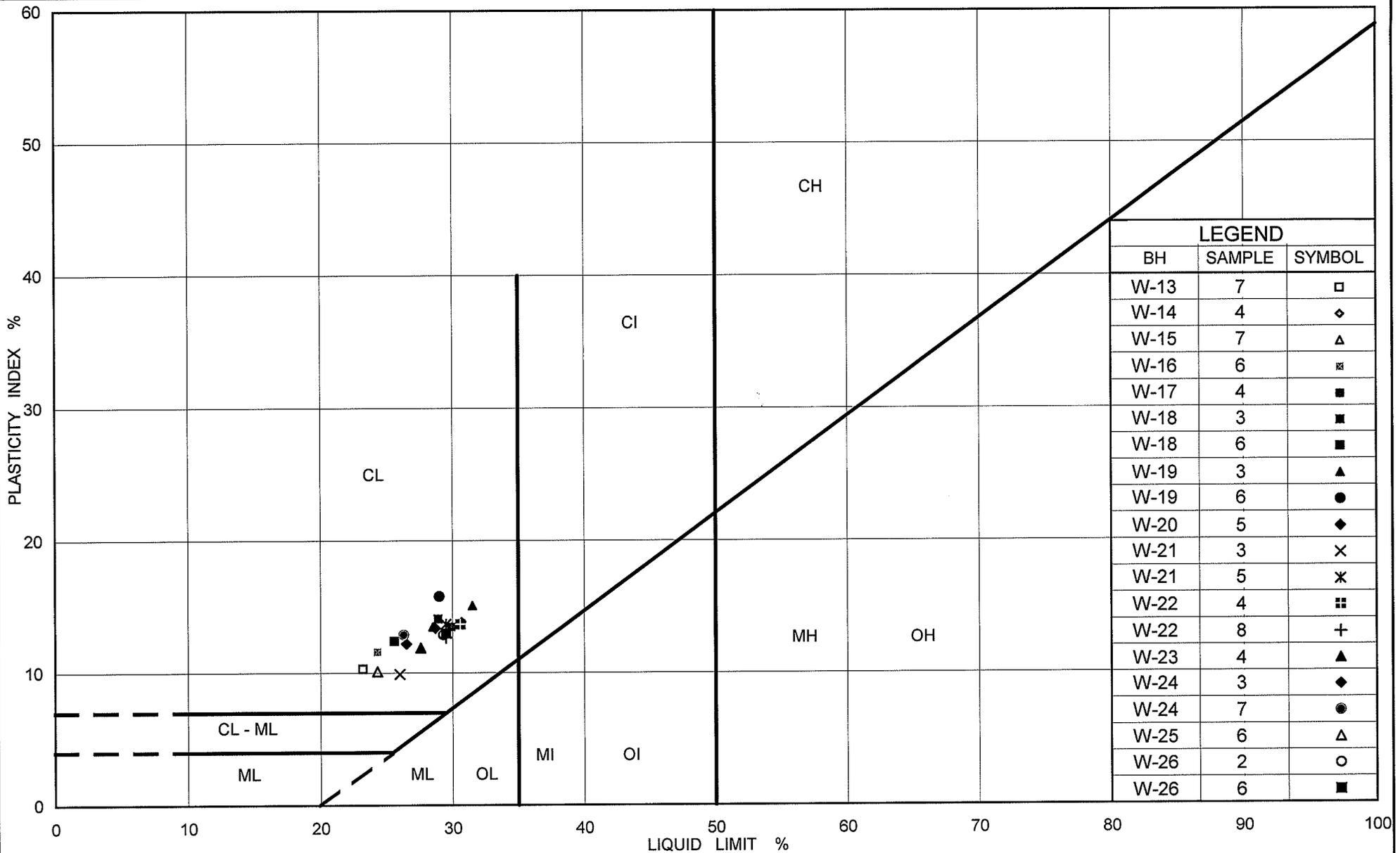
Ontario

### PLASTICITY CHART Clayey Silt to Silty Clay Till

FIG No. 6C

Project No. 04-1111-002-9

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Ministry of Transportation

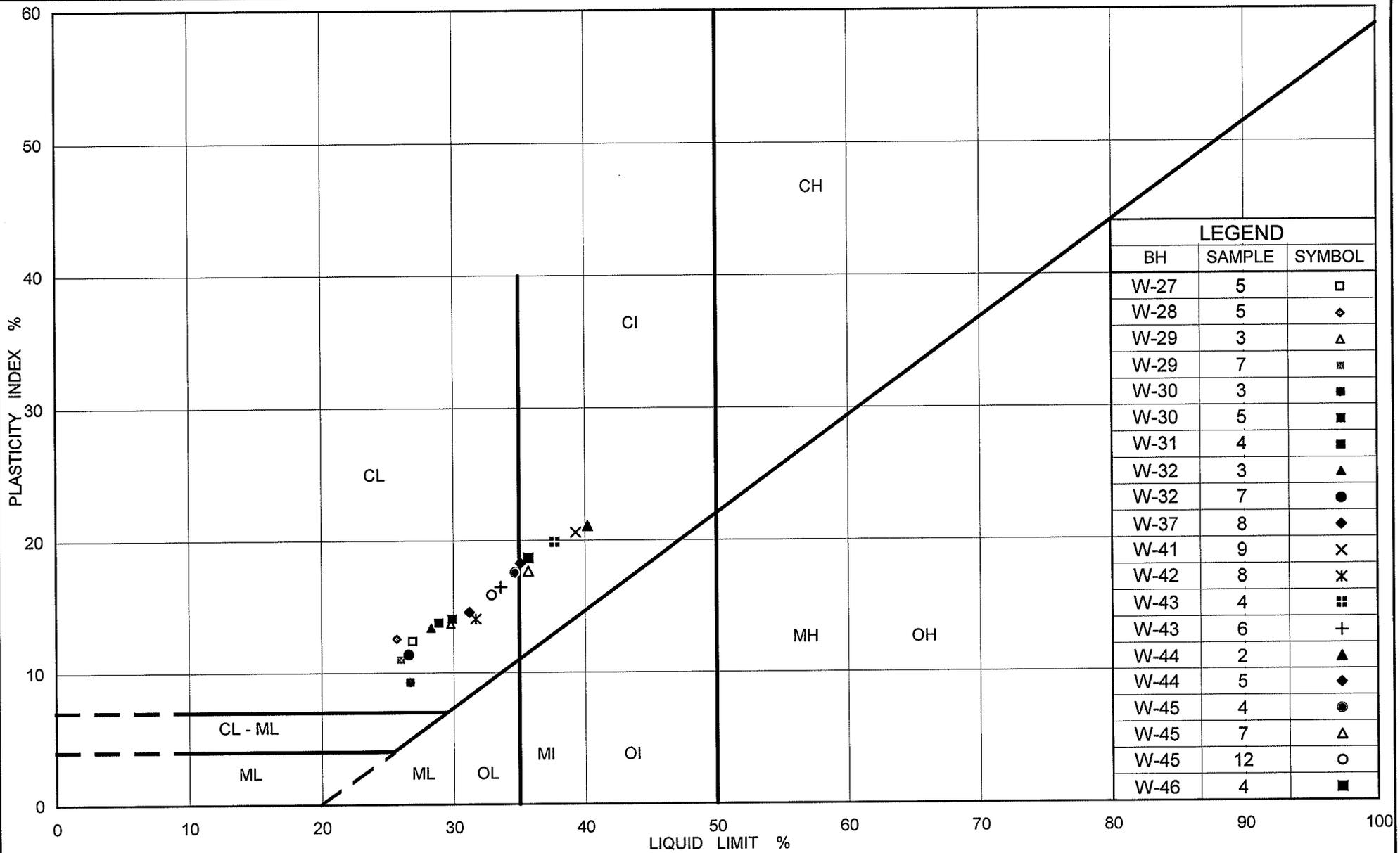
Ontario

### PLASTICITY CHART Clayey Silt to Silty Clay Till

FIG No. 6D

Project No. 04-1111-002-9

Checked By: *mu*



Ministry of Transportation

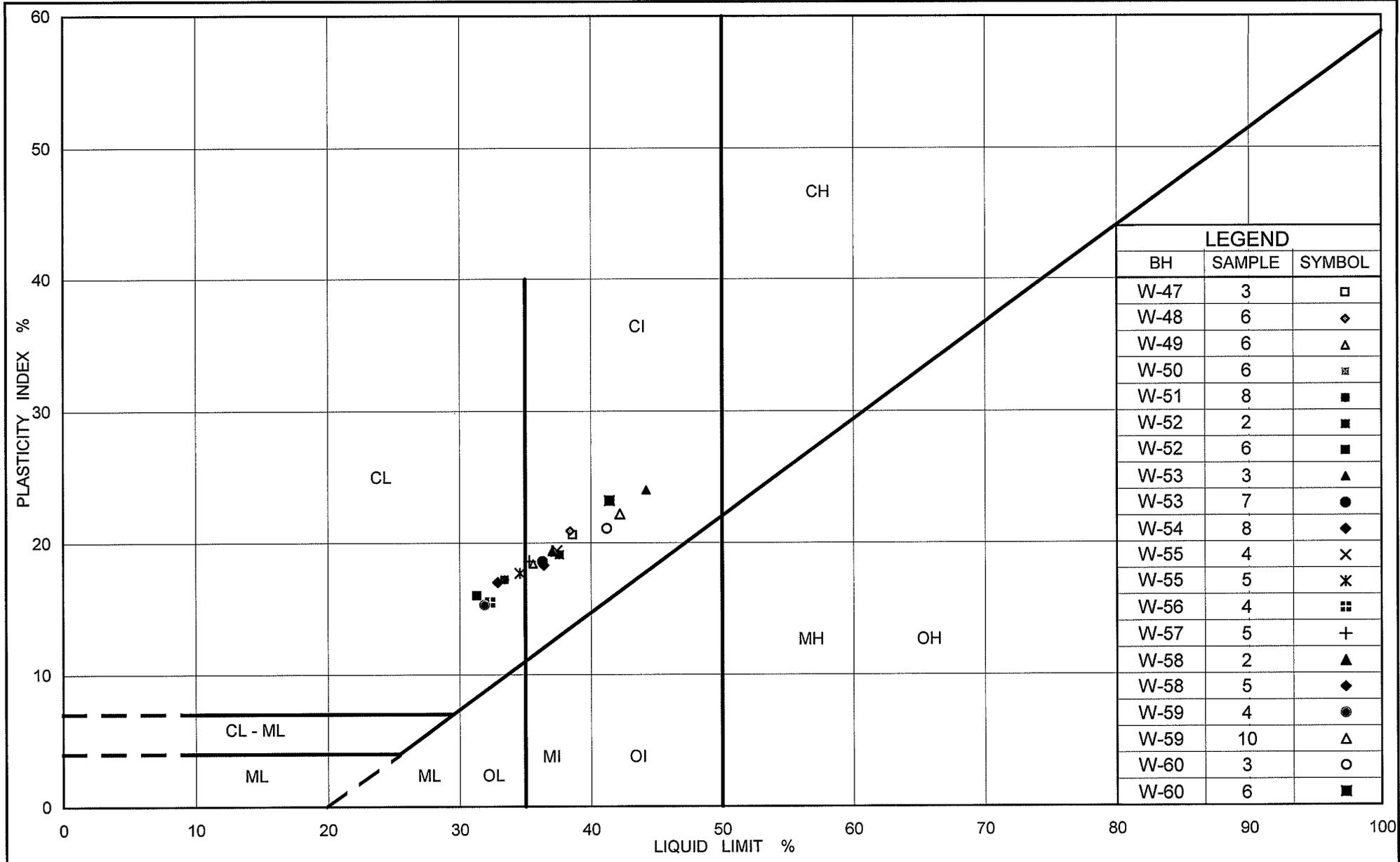
Ontario

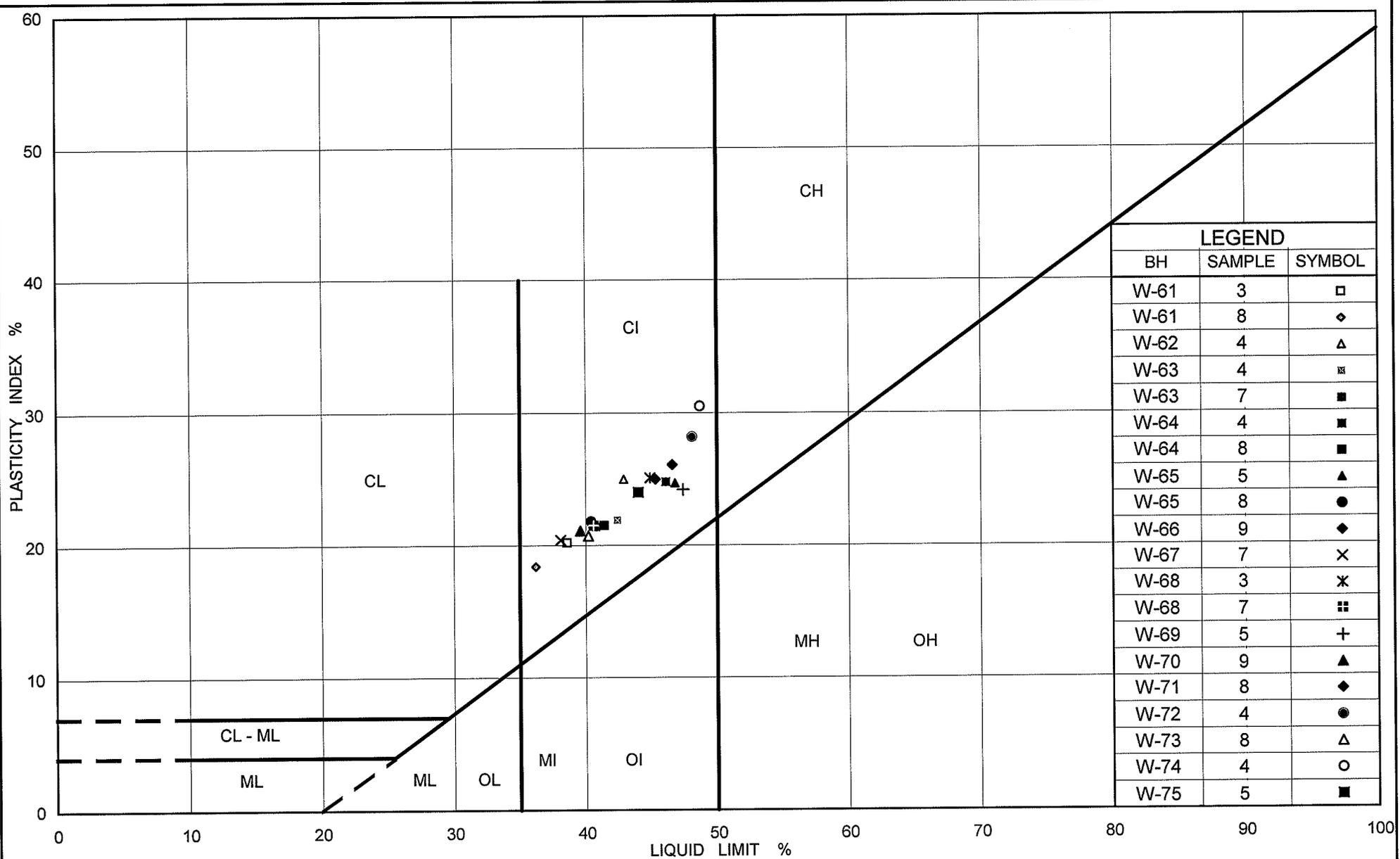
### PLASTICITY CHART Clayey Silt to Silty Clay Till

FIG No. 6E

Project No. 04-1111-002-9

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### PLASTICITY CHART

Clayey Silt to Silty Clay Till

FIG No. 6G

Project No. 04-1111-002-9

Checked By: *W*

