

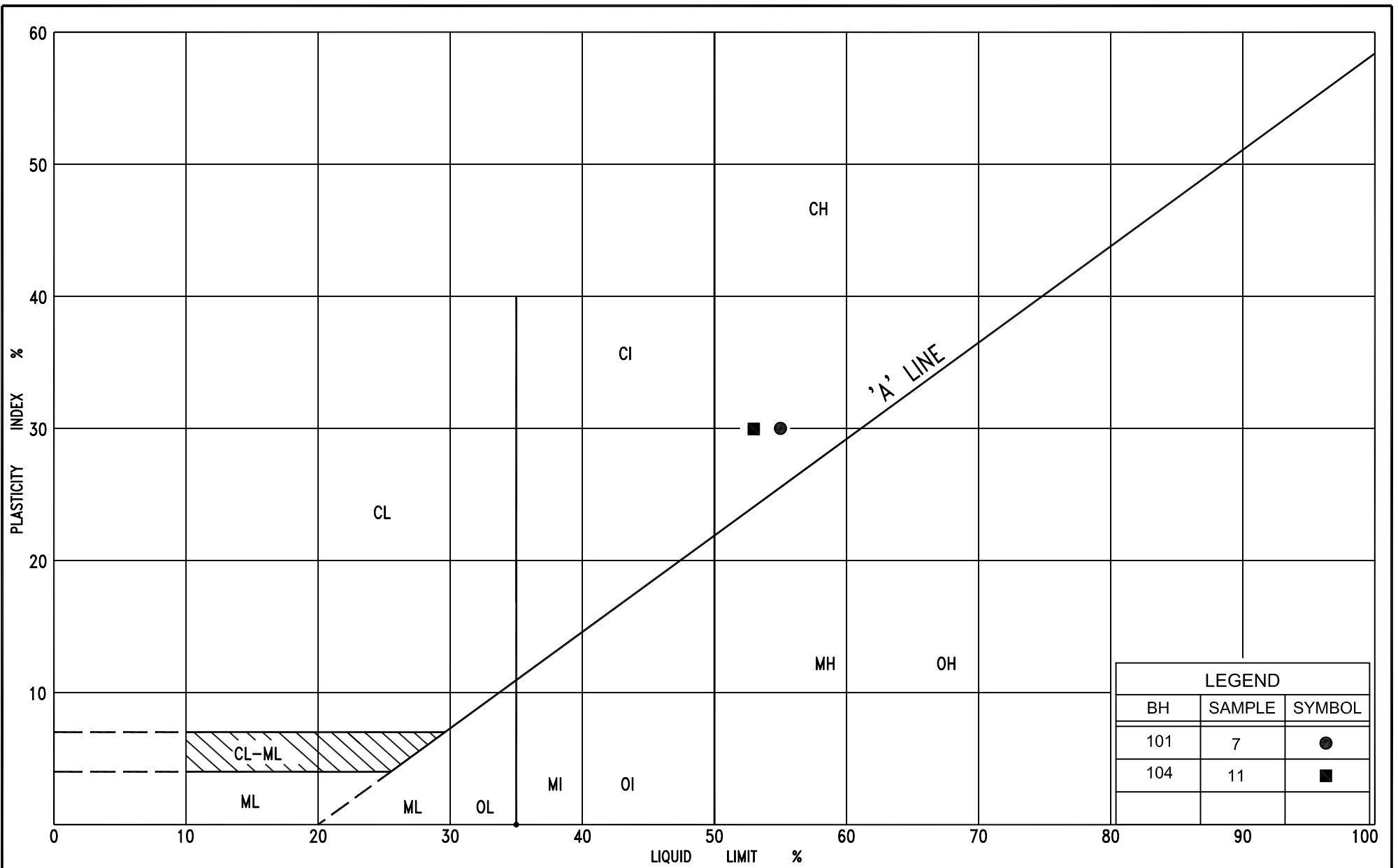
Ministry of  
Transportation  
Ontario

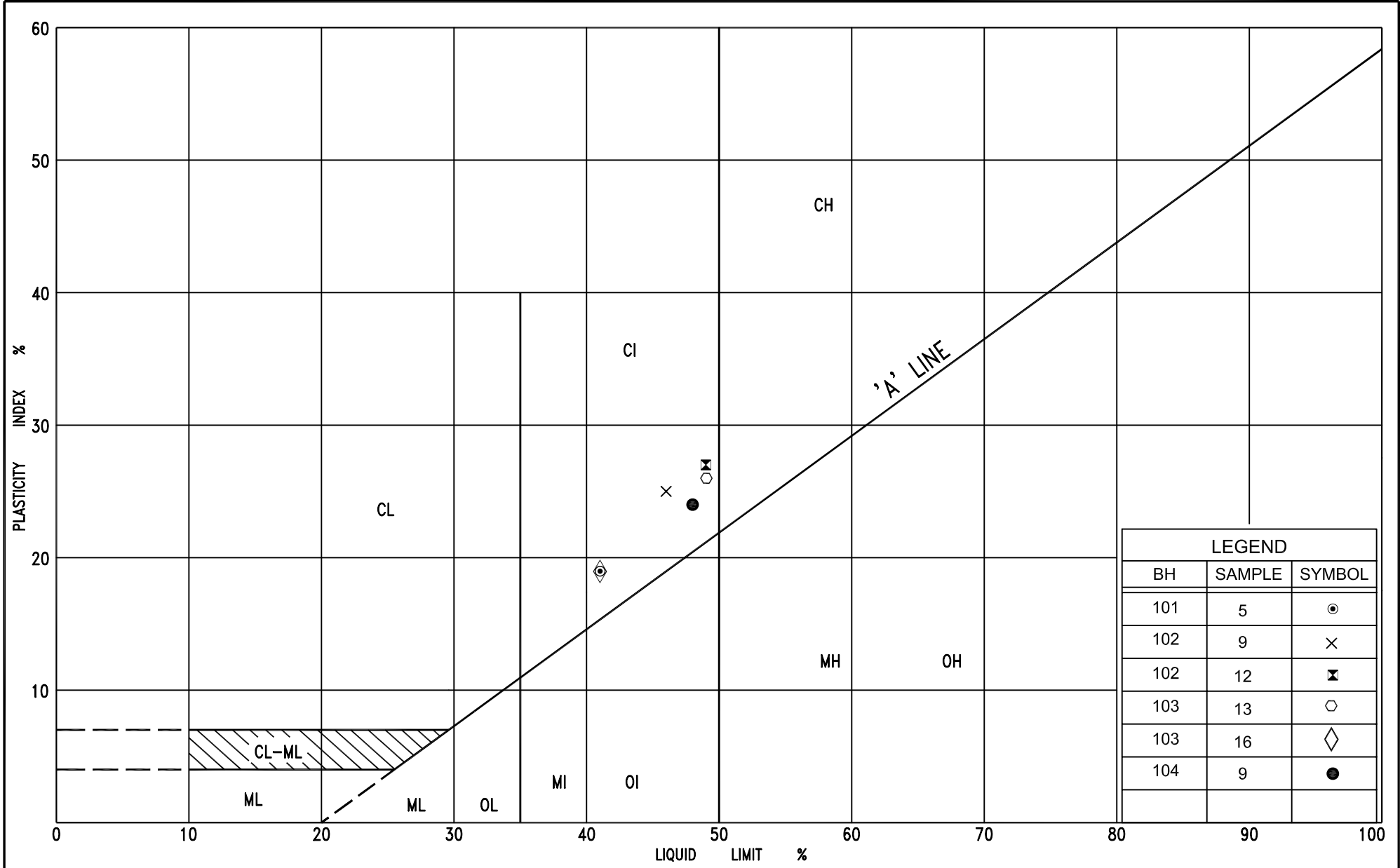
PLASTICITY CHART  
CLAY / SILTY CLAY, trace sand  
(FILL)

FIG No. PC-1-1

HWY: 577

G.W.P. No. 181-92-00





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Ontario

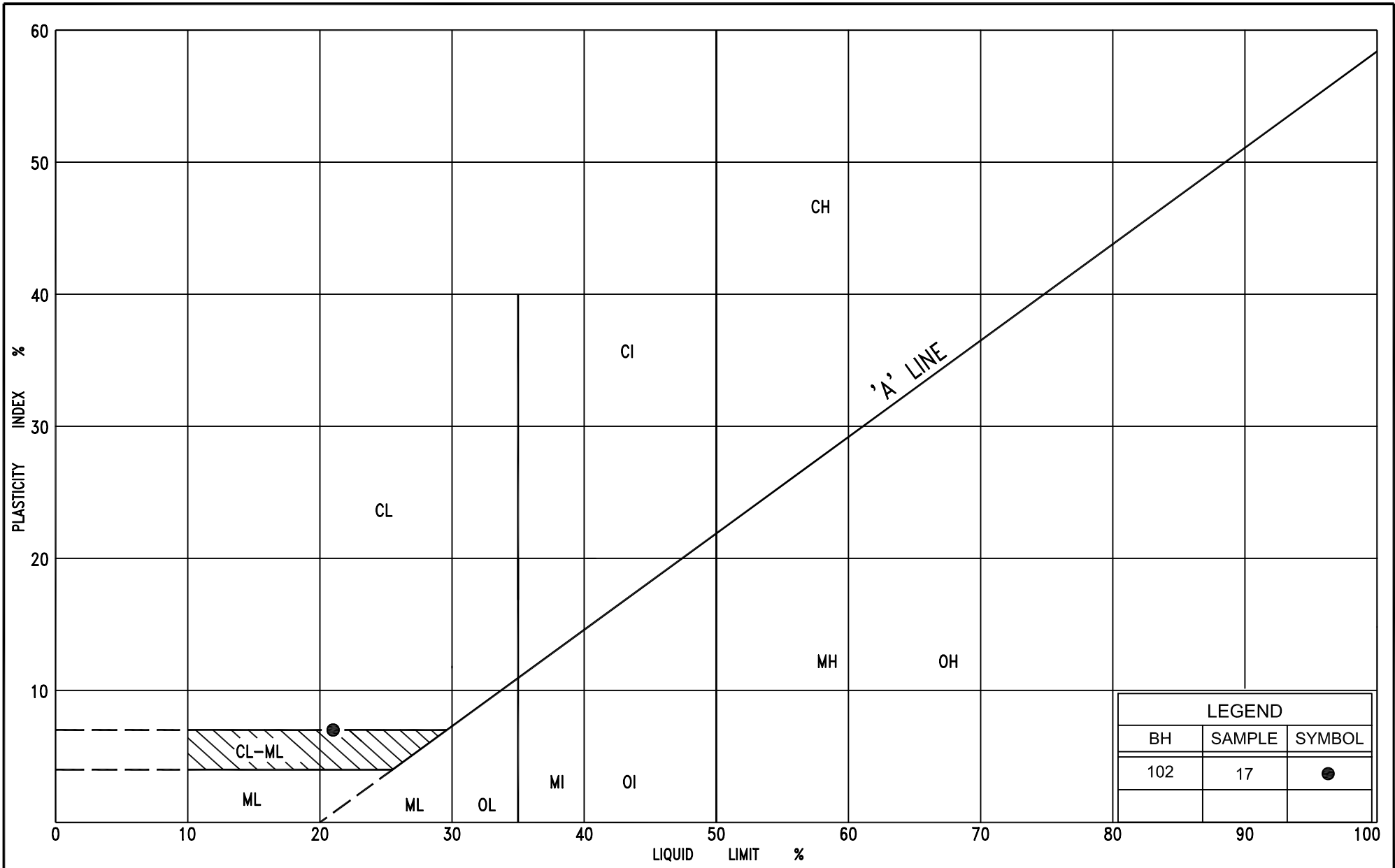
## PLASTICITY CHART

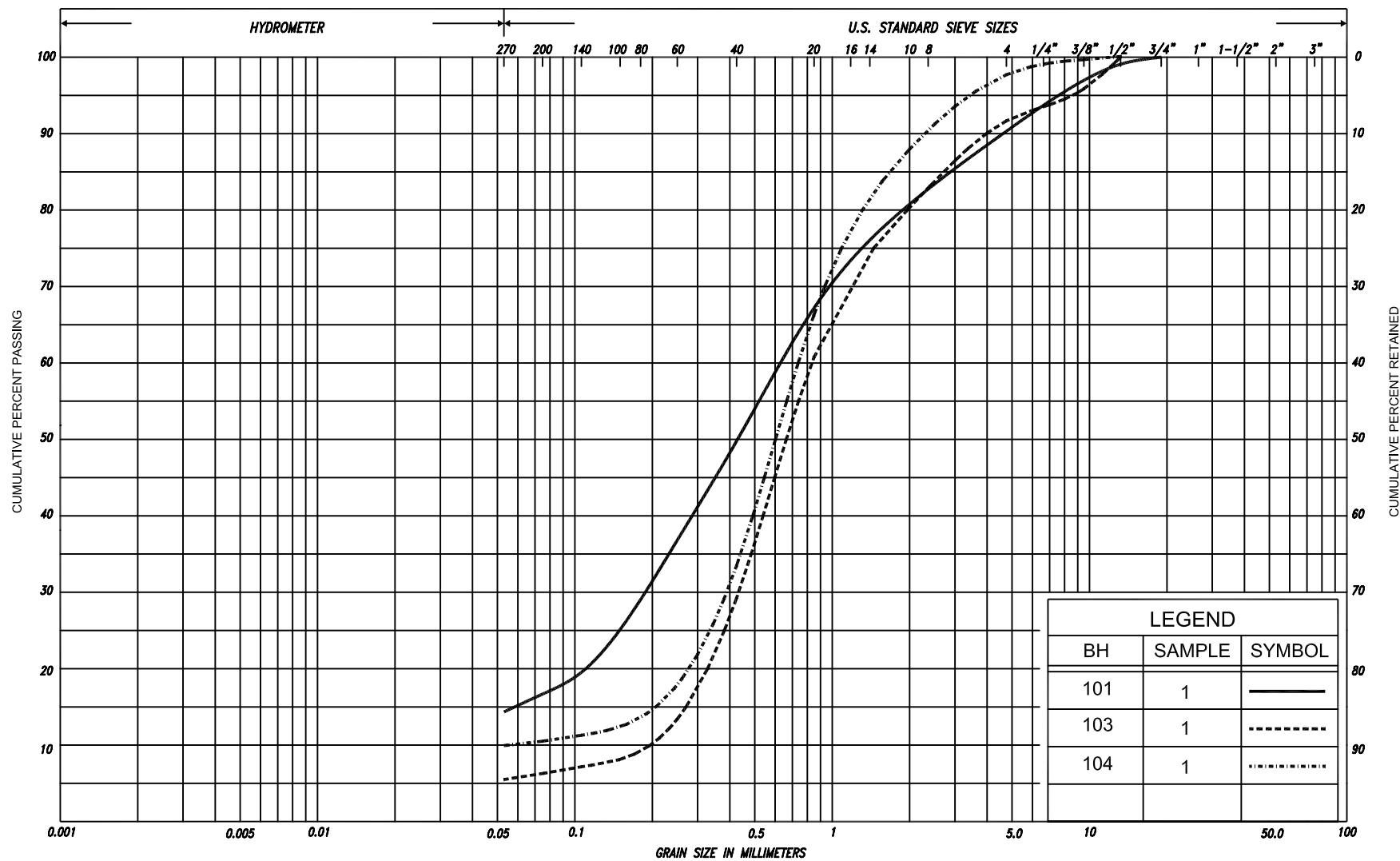
SILTY CLAY, trace sand

FIG No. PC-1-3

HWY: 577

G.W.P. No. 181-92-00





SILT & CLAY					FINE		MEDIUM		COARSE	GRAVEL			COBBLES	UNIFIED	
					SAND										
CLAY	FINE		MEDIUM		COARSE	FINE		MEDIUM		COARSE		GRAVEL		COBBLES	M.I.T.
	SILT														
CLAY		SILT			V. FINE	FINE	MED.	COARSE	GRAVEL						U.S. BUREAU
					SAND										



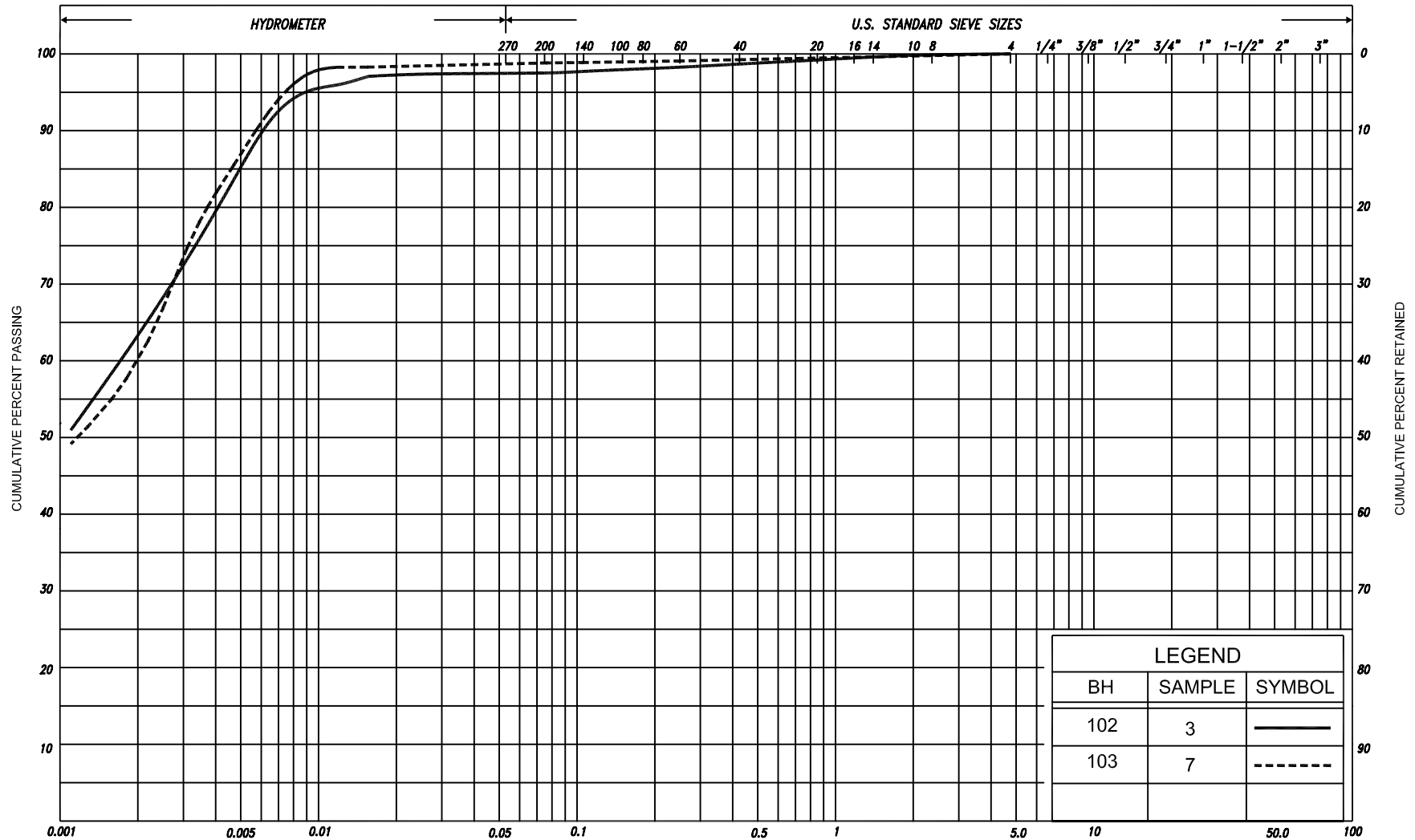
Ministry of  
Transportation  
Ontario

**GRAIN SIZE DISTRIBUTION**  
SAND, trace to some silt, trace gravel  
(FILL)

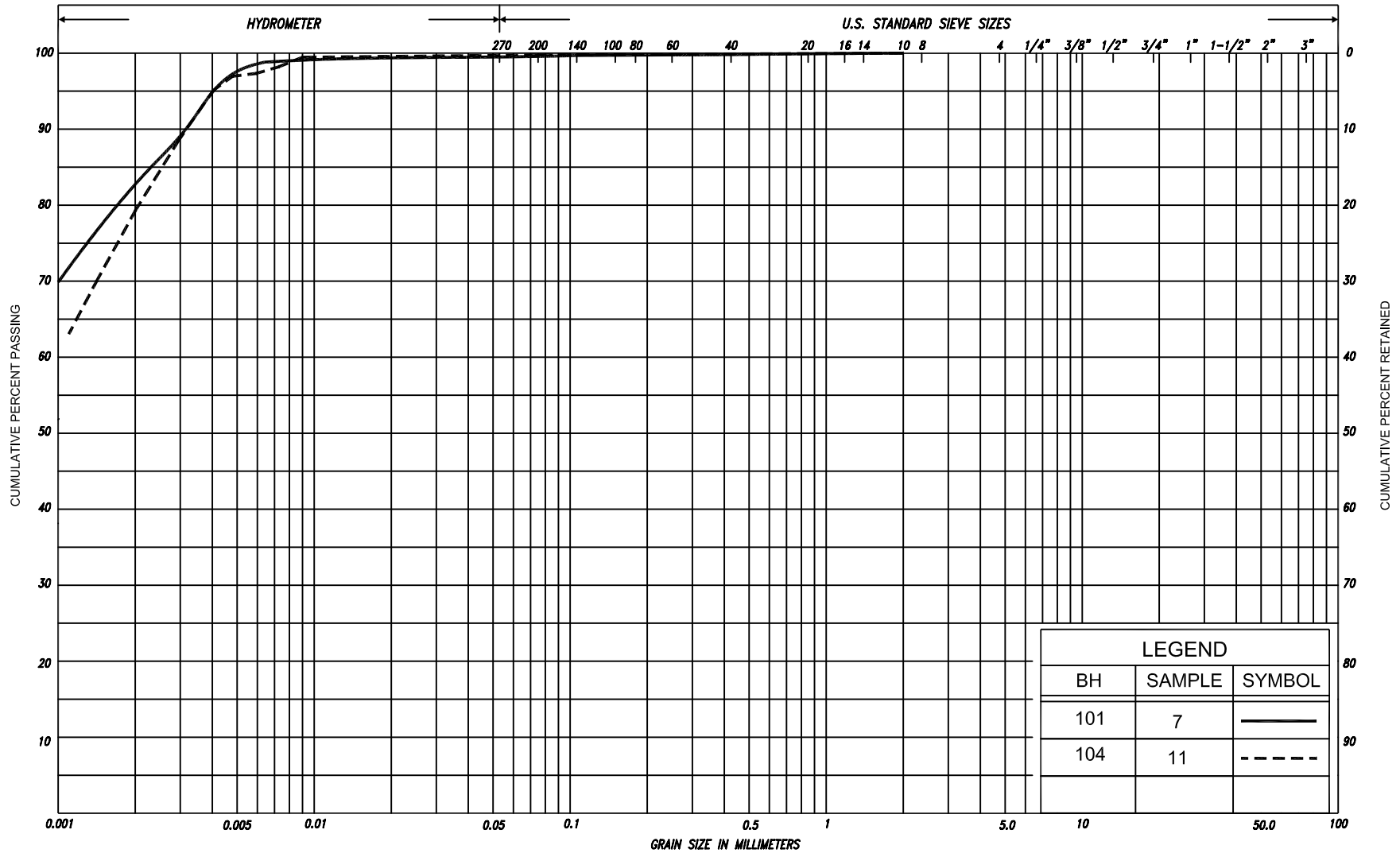
FIG No. GS-1-1

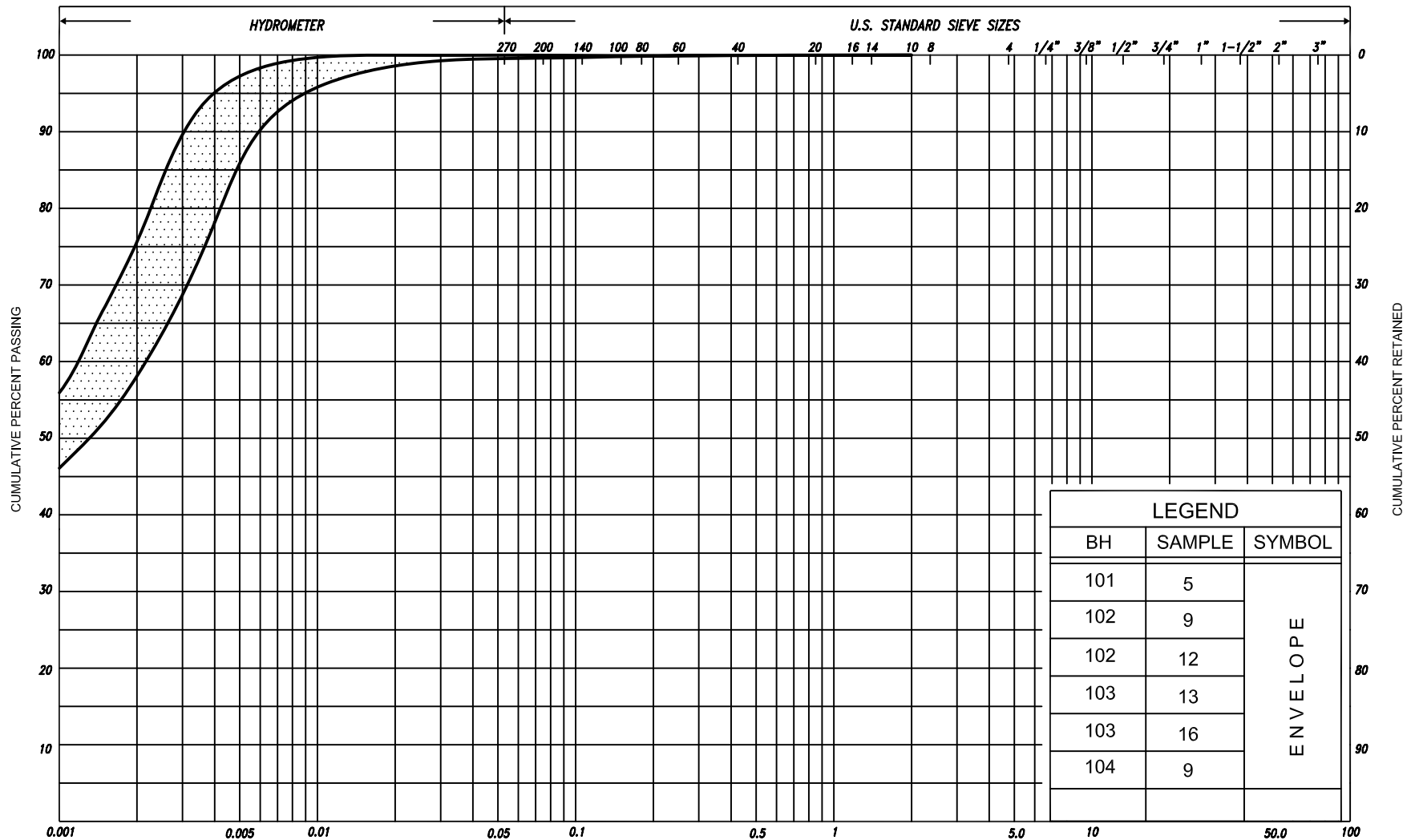
HWY: 577

G.W.P. No. 181-92-00



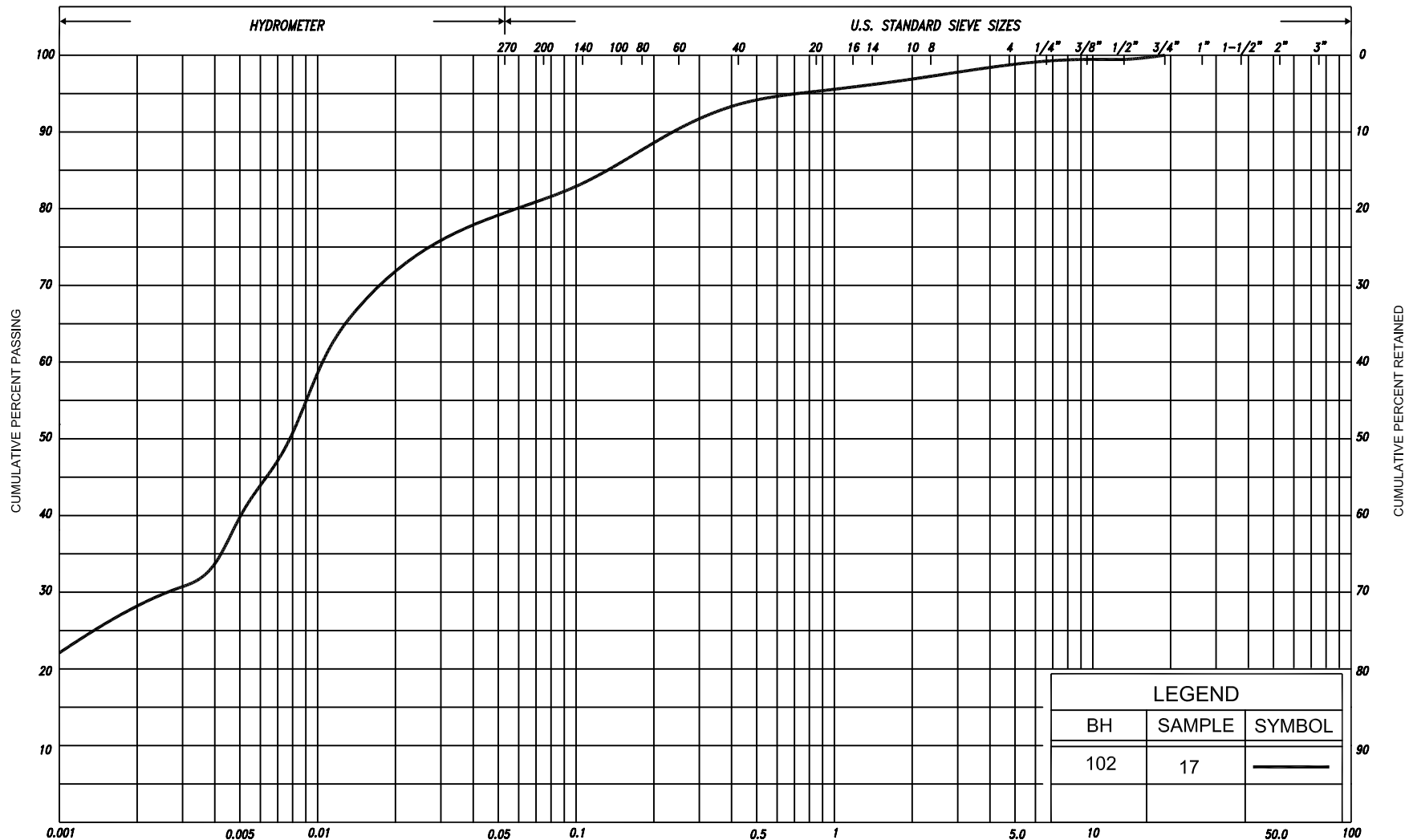
SILT & CLAY				FINE SAND			MEDIUM SAND		COARSE SAND	GRAVEL		COBBLES	UNIFIED
													M.I.T.
CLAY	FINE	MEDIUM SILT	COARSE	FINE	MEDIUM SAND	COARSE							
CLAY		SILT		V. FINE	FINE	MED.	COARSE			GRAVEL			U.S. BUREAU
				SAND									





SILT & CLAY				FINE		MEDIUM		COARSE		GRAVEL				COBBLES	UNIFIED	
CLAY	FINE		MEDIUM		COARSE		FINE		MEDIUM		COARSE		GRAVEL		COBBLES	M.I.T.
	SILT				FINE		MEDIUM		SAND		COARSE		GRAVEL		COBBLES	M.I.T.
CLAY		SILT			V. FINE		FINE		MED.		COARSE		GRAVEL			U.S. BUREAU





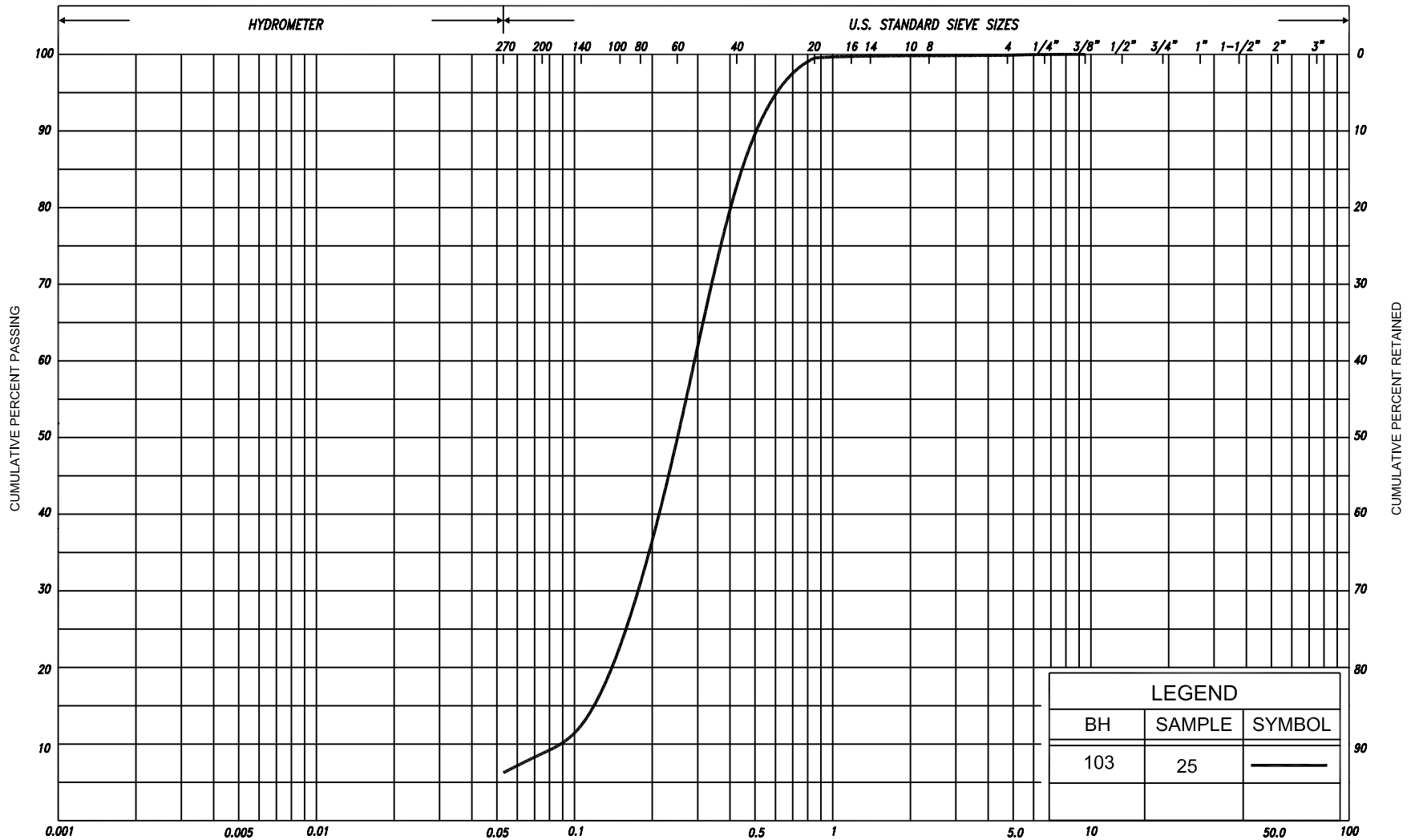
SILT & CLAY				FINE		MEDIUM		COARSE		GRAVEL			COBBLES	UNIFIED		
				SAND												
CLAY	FINE		MEDIUM		COARSE		FINE		MEDIUM		COARSE		GRAVEL		COBBLES	M.I.T.
	SILT															
CLAY		SILT			V. FINE	FINE	MED.	COARSE		GRAVEL						U.S. BUREAU
					SAND											

# GRAIN SIZE DISTRIBUTION CLAYEY SILT, some sand, trace gravel

FIG No. GS-1-5

HWY: 577

G.W.P. No. 181-92-00

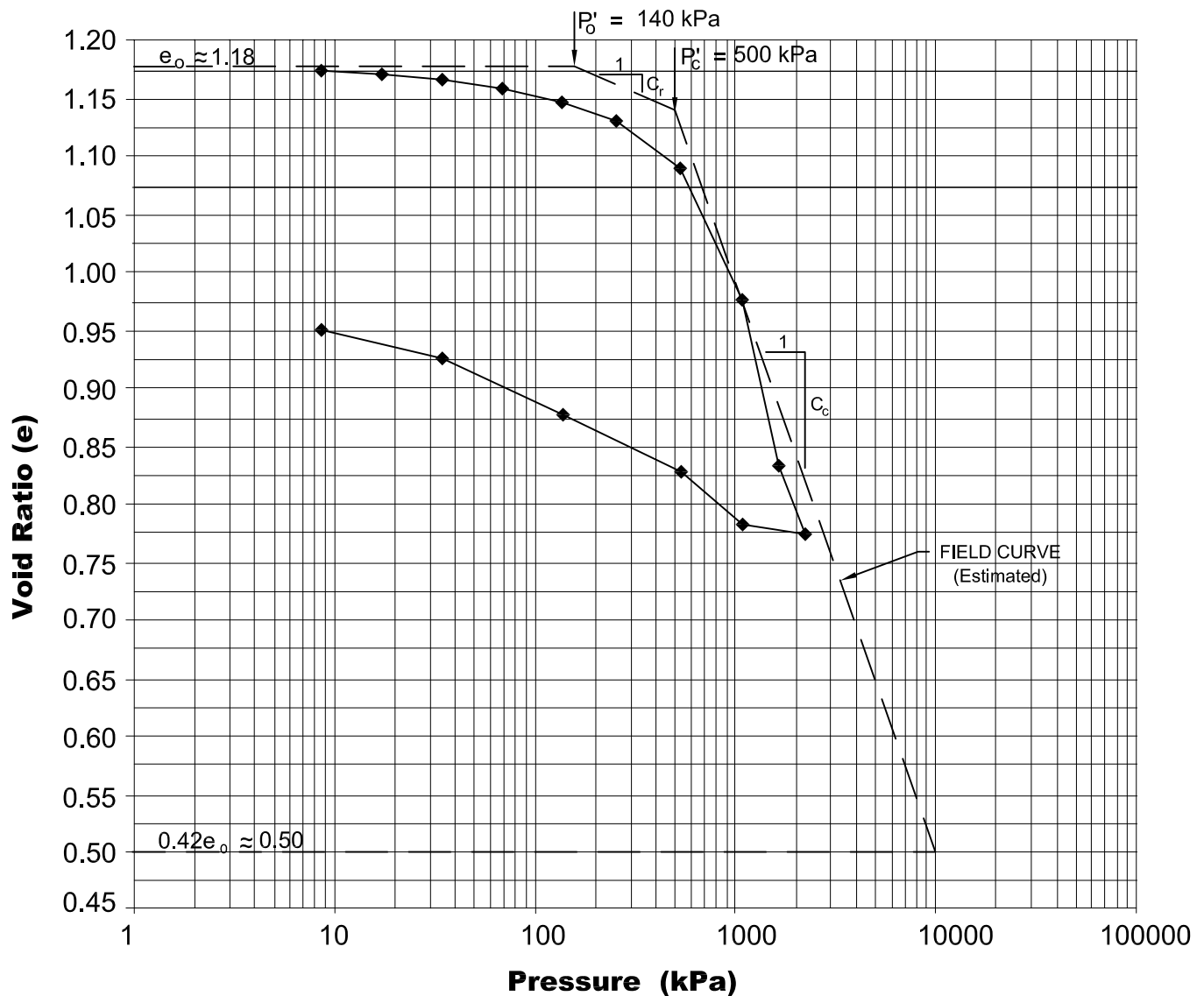


SILT & CLAY				FINE		MEDIUM		COARSE	GRAVEL			COBBLES	UNIFIED		
				SAND											
CLAY	FINE		MEDIUM		COARSE		FINE		MEDIUM		COARSE	GRAVEL		COBBLES	M.I.T.
	SILT														
CLAY		SILT			V. FINE	FINE	MED.	COARSE	GRAVEL						U.S. BUREAU
				SAND											

Laboratory Consolidation Test Results

Meadow Creek Bridge  
District Cochrane, Ontario

Borehole 102, Sample 12,  
Depth 12.2 - 12.8 m (El.239.0 to 238.4)



SOIL TYPE: SILTY CLAY

$e_o \approx 1.18$

$W_o = 45\%$

$\gamma = 18.2 \text{ kN/m}^3$

$P'_o = 140 \text{ kPa}$

$P'_c = 500 \text{ kPa}$

$C_c = 0.50$

$C_r = 0.08$

$W_L = 49$

$W_P = 22$

$PI = 27$

FIGURE No: C-1-1

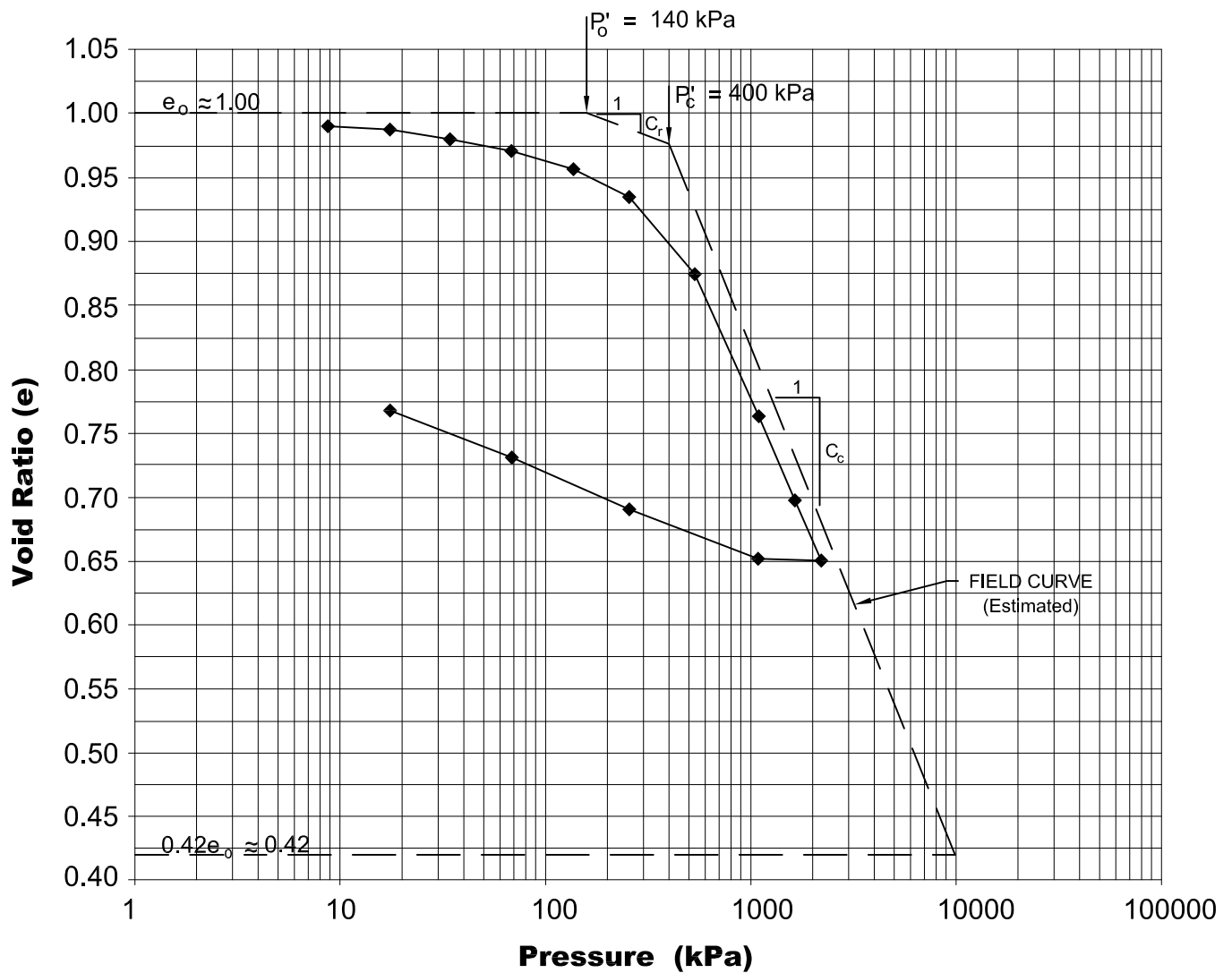
HIGHWAY: 577

G.W.P. 181-92-00

# Laboratory Consolidation Test Results

Meadow Creek Bridge  
District Cochrane, Ontario

Borehole 103, Sample 16,  
Depth 12.2 - 12.8 m (El. 239.3 to 238.7)



SOIL TYPE: SILTY CLAY, trace sand

$e_0 \approx 1.00$

$W_0 = 39\%$

$\gamma = 18.4 \text{ kN/m}^3$

$P'_0 = 140 \text{ kPa}$

$P'_c = 400 \text{ kPa}$

$C_c = 0.40$

$C_r = 0.06$

$W_L = 41$

$W_P = 22$

$PI = 19$

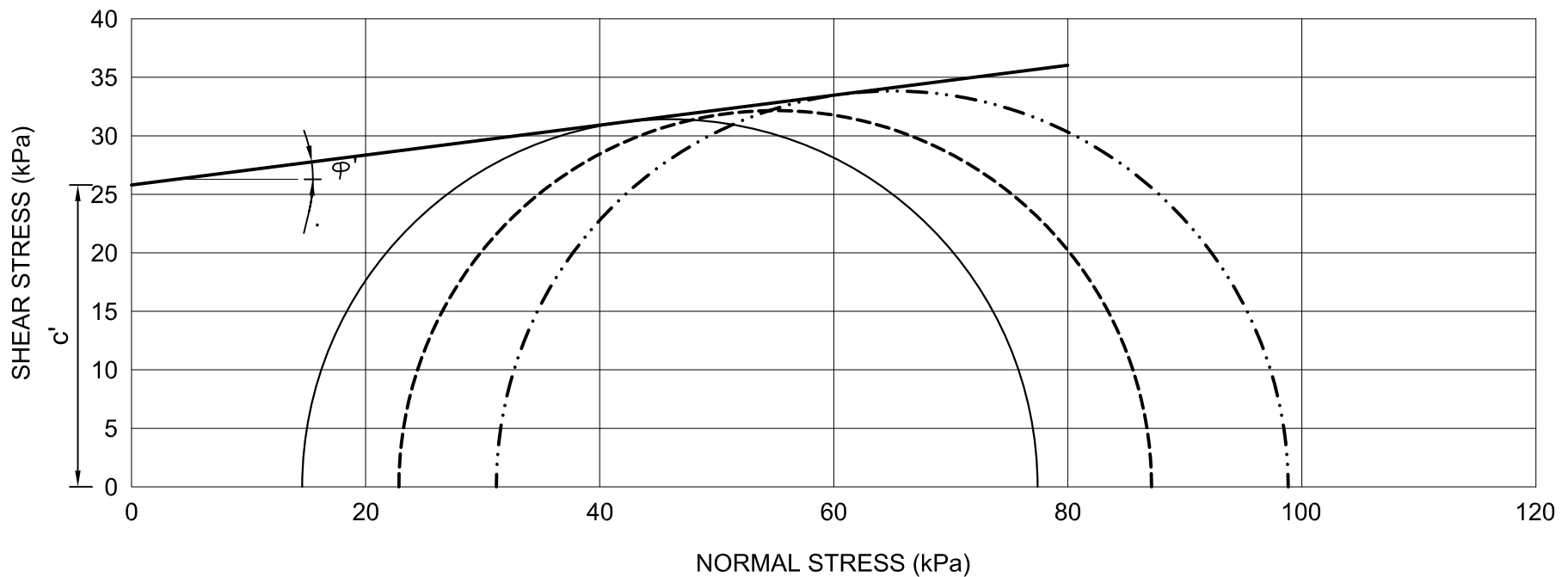
FIGURE No: C-1-2

HIGHWAY: 577

G.W.P. 181-92-00

### EFFECTIVE STRESS MOHR CIRCLES

Borehole 102, Sample 12  
Depth 12.2 - 12.8 m (El. 239.0 to 238.4)



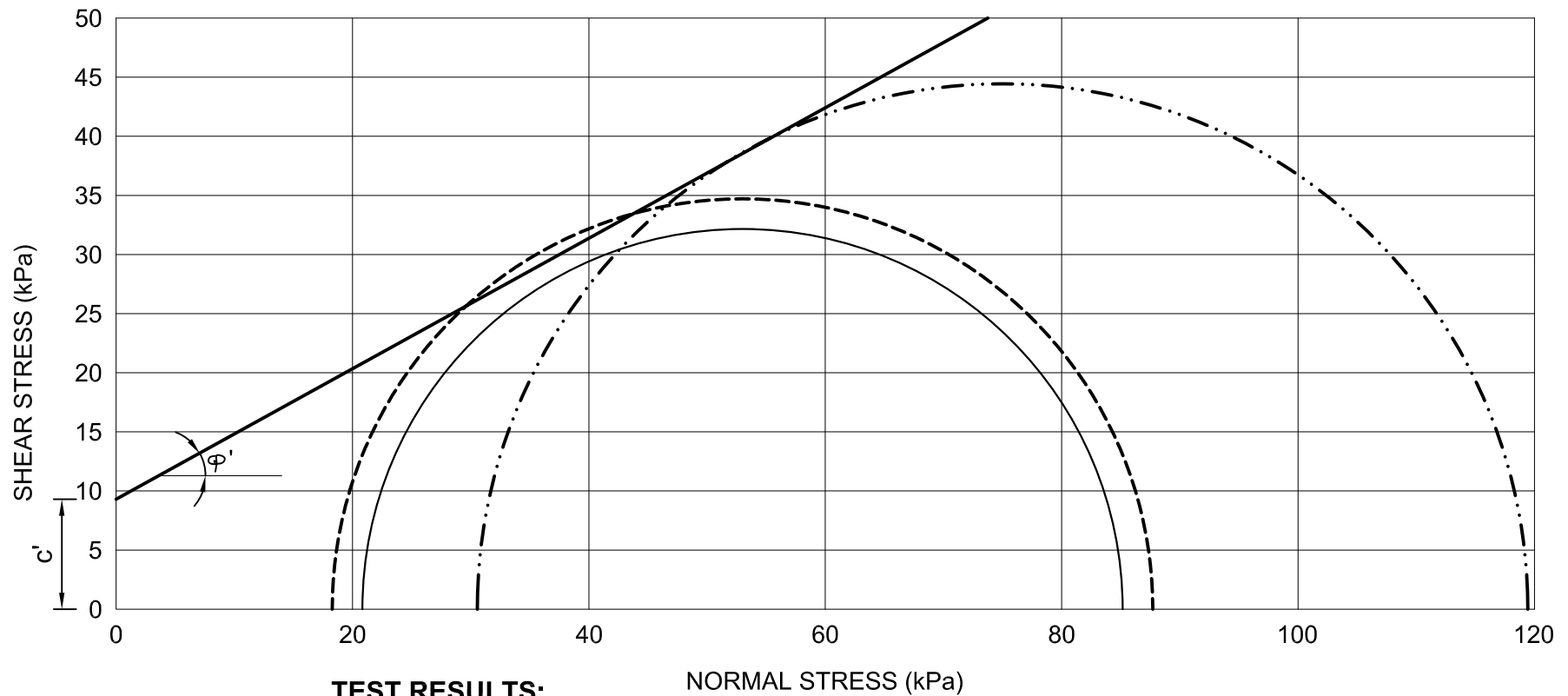
### TEST RESULTS:

	CONSOLIDATION PRESSURE (kPa)	PORE PRESSURE (kPa)	UNIT WEIGHT (kN/m <sup>3</sup> )	VOID RATIO	MOISTURE CONTENT (%)
————	15	1	18.8	0.49	37.7
-----	30	7	19.0	0.49	38.4
- · - · -	60	29	18.4	0.51	36.3

SOIL TYPE: SILTY CLAY  $C' = 26$ kPa ; $\phi' = 7^\circ$	FIGURE No: CU-1-1
	HIGHWAY: 577 / MEADOW CREEK
	G.W.P. 181-92-00

**EFFECTIVE STRESS MOHR CIRCLES**

Borehole 103, Sample 16  
Depth 12.2 - 12.8 m (El. 239.3 to 238.7)



**TEST RESULTS:**

	CONSOLIDATION PRESSURE (kPa)	PORE PRESSURE (kPa)	UNIT WEIGHT (kN/m <sup>3</sup> )	VOID RATIO	MOISTURE CONTENT (%)
————	15	-6	18.2	0.52	41.0
-----	30	12	18.5	0.51	40.9
- . . -	60	29	18.2	0.52	38.2

SOIL TYPE: SILTY CLAY	FIGURE No: CU-1-2
C' = 9 kPa ;     ϕ' = 29 <sup>0</sup>	HIGHWAY: 577 / MEADOW CREEK
	G.W.P. 181-92-00

## EXPLANATION OF TERMS USED IN REPORT

**N VALUE:** THE STANDARD PENETRATION TEST (SPT) N VALUE IS THE NUMBER OF BLOWS REQUIRED TO CAUSE A STANDARD 51mm O.D. SPLIT BARREL SAMPLER TO PENETRATE 0.3m INTO UNDISTURBED GROUND IN A BOREHOLE WHEN DRIVEN BY A HAMMER WITH A MASS OF 63.5kg, FALLING FREELY A DISTANCE OF 0.76m. FOR PENETRATIONS OF LESS THAN 0.3m N VALUES ARE INDICATED AS THE NUMBER OF BLOWS FOR THE PENETRATION ACHIEVED. AVERAGE N VALUE IS DENOTED THUS  $\bar{N}$ .

**DYNAMIC CONE PENETRATION TEST:** CONTINUOUS PENETRATION OF A CONICAL STEEL POINT (51mm O.D. 60° CONE ANGLE) DRIVEN BY 475 J IMPACT ENERGY ON 'A' SIZE DRILL RODS. THE RESISTANCE TO CONE PENETRATION IS MEASURED AS THE NUMBER OF BLOWS FOR EACH 0.3m ADVANCE OF THE CONICAL POINT INTO THE UNDISTURBED GROUND.

SOILS ARE DESCRIBED BY THEIR COMPOSITION AND CONSISTENCY OR DENSENESS.

**CONSISTENCY:** COHESIVE SOILS ARE DESCRIBED ON THE BASIS OF THEIR UNDRAINED SHEAR STRENGTH ( $c_u$ ) AS FOLLOWS:

$c_u$ (kPa)	0 - 12	12 - 25	25 - 50	50 - 100	100 - 200	> 200
	VERY SOFT	SOFT	FIRM	STIFF	VERY STIFF	HARD

**DENSENESS:** COHESIONLESS SOILS ARE DESCRIBED ON THE BASIS OF DENSENESS AS INDICATED BY SPT N VALUES AS FOLLOWS:

N (BLOWS/0.3m)	0 - 5	5 - 10	10 - 30	30 - 50	> 50
	VERY LOOSE	LOOSE	COMPACT	DENSE	VERY DENSE

ROCKS ARE DESCRIBED BY THEIR COMPOSITION AND STRUCTURAL FEATURES AND / OR STRENGTH.

**RECOVERY:** SUM OF ALL RECOVERED ROCK CORE PIECES FROM A CORING RUN EXPRESSED AS A PERCENT OF THE TOTAL LENGTH OF THE CORING RUN.

**MODIFIED RECOVERY:** SUM OF THOSE INTACT CORE PIECES, 100mm+ IN LENGTH EXPRESSED AS A PERCENT OF THE LENGTH OF THE CORING RUN. THE ROCK QUALITY DESIGNATION (RQD), FOR MODIFIED RECOVERY, IS:

RQD (%)	0 - 25	25 - 50	50 - 75	75 - 90	90 - 100
	VERY POOR	POOR	FAIR	GOOD	EXCELLENT

**JOINTING AND BEDDING:**

SPACING	50mm	50 - 300mm	0.3m - 1m	1m - 3m	> 3m
JOINTING	VERY CLOSE	CLOSE	MOD. CLOSE	WIDE	VERY WIDE
BEDDING	VERY THIN	THIN	MEDIUM	THICK	VERY THICK

## ABBREVIATIONS AND SYMBOLS

### FIELD SAMPLING

S S	SPLIT SPOON	T P	THINWALL PISTON
W S	WASH SAMPLE	O S	OSTERBERG SAMPLE
S T	SLOTTED TUBE SAMPLE	R C	ROCK CORE
B S	BLOCK SAMPLE	P H	T W ADVANCED HYDRAULICALLY
C S	CHUNK SAMPLE	P M	T W ADVANCED MANUALLY
T W	THINWALL OPEN	F S	FOIL SAMPLE
F V	FIELD VANE		

### STRESS AND STRAIN

$u_w$	kPa	PORE WATER PRESSURE
$u$	1	PORE PRESSURE RATIO
$\sigma$	kPa	TOTAL NORMAL STRESS
$\sigma'$	kPa	EFFECTIVE NORMAL STRESS
$\tau$	kPa	SHEAR STRESS
$\sigma_1, \sigma_2, \sigma_3$	kPa	PRINCIPAL STRESSES
$\epsilon$	%	LINEAR STRAIN
$\epsilon_1, \epsilon_2, \epsilon_3$	%	PRINCIPAL STRAINS
E	kPa	MODULUS OF LINEAR DEFORMATION
G	kPa	MODULUS OF SHEAR DEFORMATION
$\mu$	1	COEFFICIENT OF FRICTION

### MECHANICAL PROPERTIES OF SOIL

$m_v$	$\text{kPa}^{-1}$	COEFFICIENT OF VOLUME CHANGE
$C_c$	1	COMPRESSION INDEX
$C_s$	1	SWELLING INDEX
$C_\alpha$	1	RATE OF SECONDARY CONSOLIDATION
$c_v$	$\text{m}^2/\text{s}$	COEFFICIENT OF CONSOLIDATION
H	m	DRAINAGE PATH
$T_v$	1	TIME FACTOR
U	%	DEGREE OF CONSOLIDATION
$\sigma'_{vo}$	kPa	EFFECTIVE OVERBURDEN PRESSURE
$\sigma'_p$	kPa	PRECONSOLIDATION PRESSURE
$\tau_f$	kPa	SHEAR STRENGTH
$c'$	kPa	EFFECTIVE COHESION INTERCEPT
$\phi'$	-°	EFFECTIVE ANGLE OF INTERNAL FRICTION
$c_u$	kPa	APPARENT COHESION INTERCEPT
$\phi_u$	-°	APPARENT ANGLE OF INTERNAL FRICTION
$\tau_R$	kPa	RESIDUAL SHEAR STRENGTH
$\tau_r$	kPa	REMOULDED SHEAR STRENGTH
$S_t$	1	SENSITIVITY = $\frac{c_u}{\tau_r}$

### PHYSICAL PROPERTIES OF SOIL

$\rho_s$	$\text{kg}/\text{m}^3$	DENSITY OF SOLID PARTICLES	n	1, %	POROSITY	$e_{\max}$	1, %	VOID RATIO IN LOOSEST STATE
$\gamma_s$	$\text{kN}/\text{m}^3$	UNIT WEIGHT OF SOLID PARTICLES	w	1, %	WATER CONTENT	$e_{\min}$	1, %	VOID RATIO IN DENSEST STATE
$\rho_w$	$\text{kg}/\text{m}^3$	DENSITY OF WATER	$S_r$	%	DEGREE OF SATURATION	$I_D$	1	DENSITY INDEX = $\frac{e_{\max} - e}{e_{\max} - e_{\min}}$
$\gamma_w$	$\text{kN}/\text{m}^3$	UNIT WEIGHT OF WATER	$w_L$	%	LIQUID LIMIT	D	mm	GRAIN DIAMETER
$\rho$	$\text{kg}/\text{m}^3$	DENSITY OF SOIL	$w_p$	%	PLASTIC LIMIT	$D_n$	mm	n PERCENT - DIAMETER
$\gamma$	$\text{kN}/\text{m}^3$	UNIT WEIGHT OF SOIL	$w_s$	%	SHRINKAGE LIMIT	$C_u$	1	UNIFORMITY COEFFICIENT
$\rho_d$	$\text{kg}/\text{m}^3$	DENSITY OF DRY SOIL	$I_p$	%	PLASTICITY INDEX = $w_L - w_p$	h	m	HYDRAULIC HEAD OR POTENTIAL
$\gamma_d$	$\text{kN}/\text{m}^3$	UNIT WEIGHT OF DRY SOIL	$I_L$	1	LIQUIDITY INDEX = $\frac{w - w_p}{I_p}$	q	$\text{m}^3/\text{s}$	RATE OF DISCHARGE
$\rho_{\text{sat}}$	$\text{kg}/\text{m}^3$	DENSITY OF SATURATED SOIL	$I_C$	1	CONSISTENCY INDEX = $\frac{w_L - w}{I_p}$	v	m/s	DISCHARGE VELOCITY
$\gamma_{\text{sat}}$	$\text{kN}/\text{m}^3$	UNIT WEIGHT OF SATURATED SOIL	DTPL		DRIER THAN PLASTIC LIMIT	i	1	HYDRAULIC GRADIENT
$\rho'$	$\text{kg}/\text{m}^3$	DENSITY OF SUBMERGED SOIL	APL		ABOUT PLASTIC LIMIT	k	m/s	HYDRAULIC CONDUCTIVITY
$\gamma'$	$\text{kN}/\text{m}^3$	UNIT WEIGHT OF SUBMERGED SOIL	WTPL		WETTER THAN PLASTIC LIMIT	j	$\text{kN}/\text{m}^2$	SEEPAGE FORCE
e	1, %	VOID RATIO						

# RECORD OF BOREHOLE No 101

1 of 2

**METRIC**

G.W.P. 181-92-00 LOCATION Meadow Creek/ HWY 577  
Co-ords: 5 401 261 N; 328 281 E ORIGINATED BY F.P.  
DIST 54 HWY 577 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY G.D.  
DATUM Geodetic DATE October 15, 2008 CHECKED BY C.N.

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									
253.0	Ground Surface							20	40	60	80	100					
0.0	Sand some silt, trace gravel		1	SS	5												10 73 (17)
252.3	Loose Brown Wet (FILL)		2	SS	5		252										
0.7	Silty clay		3	SS	3		251										
	Stiff Brown Moist to firm		4	SS	2		250										
	Grey		5	SS	2		249										0 0 42 58
			FV				248										
			6	SS	2		247										
			FV				246										
247.3	Clay, trace sand		7	TW	PH		245										
5.7	Firm Grey Wet		FV				244										
			8	SS	1		243										
			FV														
			9	TW	PH												
			FV														
242.9	End of borehole																
10.1																	

\* 2008 10 15

\*\* 2008 10 31 (Piez.)

▽

Water level observed during drilling

▼

Water level measured in piezometer

■ Penetrometer test

Piezometer Legend :

Bentonite seal

Native cuttings

Cont'd

\* 2008 10 15  
\*\* 2008 10 31 (Piez.)  
▽ Water level observed during drilling  
▼ Water level measured in piezometer  
■ Penetrometer test  
Piezometer Legend :  
Bentonite seal  
Native cuttings

Cont'd



<b>RECORD OF BOREHOLE No 101</b>										<b>2 of 2</b>		<b>METRIC</b>																												
G.W.P. 181-92-00			LOCATION Meadow Creek/ HWY 577			Co-ords: 5 401 261 N; 328 281 E			ORIGINATED BY F.P.																															
DIST 54 HWY 577			BOREHOLE TYPE Continuous Flight Hollow Stem Augers						COMPILED BY G.D.																															
DATUM Geodetic			DATE October 15, 2008						CHECKED BY C.N.																															
SOIL PROFILE			SAMPLES			DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT		REMARKS & GRAIN SIZE DISTRIBUTION (%)																										
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					W <sub>p</sub> — W — W <sub>L</sub> WATER CONTENT (%)			γ	GR SA SI CL																							
238.0								20	40	60	80	100	20	40	60	kN/m <sup>3</sup>																								
	<div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; border: 1px solid black; margin-right: 5px;"></div> <div>Filter sand</div> </div> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; border: 1px solid black; margin-right: 5px;"></div> <div>Screen</div> </div> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; border: 1px solid black; margin-right: 5px;"></div> <div>Sand bed</div> </div> <p>Water Level Readings:</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Date</th> <th>Depth (m)</th> <th>Elev.</th> </tr> </thead> <tbody> <tr><td>10/22/2008</td><td>9.1</td><td>243.9</td></tr> <tr><td>10/25/2008</td><td>9.0</td><td>244.0</td></tr> <tr><td>10/26/2008</td><td>8.8</td><td>244.2</td></tr> <tr><td>10/27/2008</td><td>8.8</td><td>244.2</td></tr> <tr><td>10/28/2008</td><td>8.7</td><td>244.3</td></tr> <tr><td>10/30/2008</td><td>8.6</td><td>244.4</td></tr> <tr><td>10/31/2008</td><td>8.4</td><td>244.6</td></tr> </tbody> </table>	Date	Depth (m)	Elev.	10/22/2008	9.1	243.9	10/25/2008	9.0	244.0	10/26/2008	8.8	244.2	10/27/2008	8.8	244.2	10/28/2008	8.7	244.3	10/30/2008	8.6	244.4	10/31/2008	8.4	244.6															
Date	Depth (m)	Elev.																																						
10/22/2008	9.1	243.9																																						
10/25/2008	9.0	244.0																																						
10/26/2008	8.8	244.2																																						
10/27/2008	8.8	244.2																																						
10/28/2008	8.7	244.3																																						
10/30/2008	8.6	244.4																																						
10/31/2008	8.4	244.6																																						

**RECORD OF BOREHOLE No 102**

1 of 3

**METRIC**

G.W.P. 181-92-00 LOCATION Meadow Creek/ HWY 577  
Co-ords: 5 401 283 N; 328 269 E ORIGINATED BY F.P.  
DIST 54 HWY 577 BOREHOLE TYPE C.F.H.S.A. and Dynamic Cone Penetration Test COMPILED BY G.D.  
DATUM Geodetic DATE October 27 to 30, 2008 CHECKED BY C.N.

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											
								○ UNCONFINED      + FIELD VANE											
								● QUICK TRIAXIAL    × LAB VANE											
					WATER CONTENT (%)														
251.2	0.0	Ground Surface					20	40	60	80	100	20	40	60		GR	SA	SI	CL
		50mm asphaltic concrete over sand and gravel		1	SS	5													
		Loose      Brown																	
		Clay, trace sand		2	SS	7													
		Stiff to    Brown      Moist																	
		firm		3	SS	5													
		organic inclusions																	
		Brown/ grey		4	SS	4													
		(FILL)		5	SS	3													
				6	SS	3													
				7	SS	3													
					FV														
				8	TW	PH													
					FV														






Cont'd

**RECORD OF BOREHOLE No 102**

2 of 3

**METRIC**

G.W.P. 181-92-00 LOCATION Meadow Creek/ HWY 577  
Co-ords: 5 401 283 N; 328 269 E ORIGINATED BY F.P.  
DIST 54 HWY 577 BOREHOLE TYPE C.F.H.S.A. and Dynamic Cone Penetration Test COMPILED BY G.D.  
DATUM Geodetic DATE October 27 to 30, 2008 CHECKED BY C.N.

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT   NATURAL MOISTURE CONTENT   LIQUID LIMIT			UNIT WEIGHT  γ  kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%)					
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							W <sub>p</sub> w                      W <sub>L</sub>				
								○ UNCONFINED                      + FIELD VANE							WATER CONTENT (%)				
								● QUICK TRIAXIAL                      × LAB VANE											
236.2							20	40	60	80	100	20	40	60					
233.4 17.8	clayey silt seams		14	SS	6														
				FV															
			15	SS	6														
	Clayey silt some sand, trace gravel silt seams  Firm to Grey Wet stiff																		
			16	SS	5														
229.4 21.8	Silty sand, trace gravel cobbles and boulders  Compact Grey Wet to dense		17	SS	47											1	18	53	28
18			RC NQ	-															
228.3 22.9	Sand trace silt, trace gravel cobbles and boulders  Compact Grey Wet to dense		19	SS	50/15cm														
20			SS	50/13cm															
			21	SS	21														
			22	SS	35														



**RECORD OF BOREHOLE No 103**

1 of 3

**METRIC**

G.W.P. 181-92-00 LOCATION Meadow Creek/ HWY 577  
Co-ords: 5 401 387 N; 328 274 E ORIGINATED BY F.P.  
DIST 54 HWY 577 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY G.D.  
DATUM Geodetic DATE October 21 to 24, 2008 CHECKED BY C.N.

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT  $\gamma$  kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa					w <sub>p</sub>	w	w <sub>L</sub>		GR	SA	SI	CL
251.5	Ground Surface							20	40	60	80	100								
0.0	Sand trace silt, trace gravel Very loose Brown Moist		1	SS	2		251							o					8	86 (6)
	Silty clay, trace sand organic inclusions Firm to Grey Moist stiff		2	SS	4		250							o						
	(FILL)		3	SS	4		249								o					
			4	SS	4		248							o						
			5	SS	9		247							o						
			6	SS	8		246							o						
			7	SS	7		245								o					
			8	SS	5		244							o						
			9	SS	6		243							o						
			10	SS	4		242							o						
			11	SS	4		241							o						
			12	SS	7		240							o						
242.4	Silty clay, trace sand Stiff Grey Moist to wet		13	SS	8		242								o					
9.1																				
			14	TW	PH		241								o					
				FV																
			15	SS	5		240								o					
				FV																
			16	TW	PH		239													
				FV																
			17	SS	1		238								o					
				FV																
							237													

**METRIC**

SOIL PROFILE				SAMPLES		GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 	PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT 	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						
236.5											

[illegible]

RECORD OF BOREHOLE No 103										3 of 3		METRIC						
G.W.P. 181-92-00			LOCATION Meadow Creek/ HWY 577			Co-ords: 5 401 387 N; 328 274 E			ORIGINATED BY F.P.									
DIST 54 HWY 577			BOREHOLE TYPE Continuous Flight Hollow Stem Augers						COMPILED BY G.D.									
DATUM Geodetic			DATE October 21 to 24, 2008						CHECKED BY C.N.									
SOIL PROFILE			SAMPLES			DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT		REMARKS & GRAIN SIZE DISTRIBUTION (%)				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	 SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					W <sub>p</sub>	W	W <sub>L</sub>	γ	GR SA SI CL	
221.5																		
220.2			24	SS	50/5cm		221											
31.3	Sand, trace silt Compact Grey Wet						220											
219.0			25	SS	29		219										0	91 (9)
32.5	End of borehole Refusal on probable boulder  Samples 23 & 24: Sampler bouncing  * 2008 10 21  ▽ Water level observed during drilling																	

**RECORD OF BOREHOLE No 104**

1 of 2

**METRIC**



G.W.P. 181-92-00 LOCATION Meadow Creek/ HWY 577  
Co-ords: 5 401 417 N; 328 274 E ORIGINATED BY F.P.  
DIST 54 HWY 577 BOREHOLE TYPE Continuous Flight Hollow Stem Augers COMPILED BY G.D.  
DATUM Geodetic DATE October 24 & 25, 2008 CHECKED BY C.N.

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									
253.3 0.0	Ground Surface																
	Sand some silt, trace gravel		1	SS	1												2 87 (11)
	Very loose Brown Moist																
	Silty clay, trace sand		2	SS	3												
	Firm Brown Moist																
	organic inclusions		3	SS	5												
	Brown/ grey (FILL)		4	SS	6												
250.3 3.0	Silty clay		5	SS	9												
	Stiff Brown Moist to firm to wet																
			6	SS	5												
			7	SS	2												
				FV													
	Grey		8	SS	2												
				FV													
			9	TW	PH											19.0	0 0 26 74
				FV													
			10	TW	PH												
				FV													
244.6 8.7	Clay																
	Stiff Grey Moist to wet		11	SS	4												0 0 21 79
243.2 10.1	End of borehole																

Cont'd



**METRIC**

SOIL PROFILE				SAMPLES		GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT $w_p$	NATURAL MOISTURE CONTENT $w$	LIQUID LIMIT $w_L$	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					
238.3							 <p>○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE</p> <p>20 40 60 80 100</p>	 <p>WATER CONTENT (%)</p> <p>20 40 60</p>					

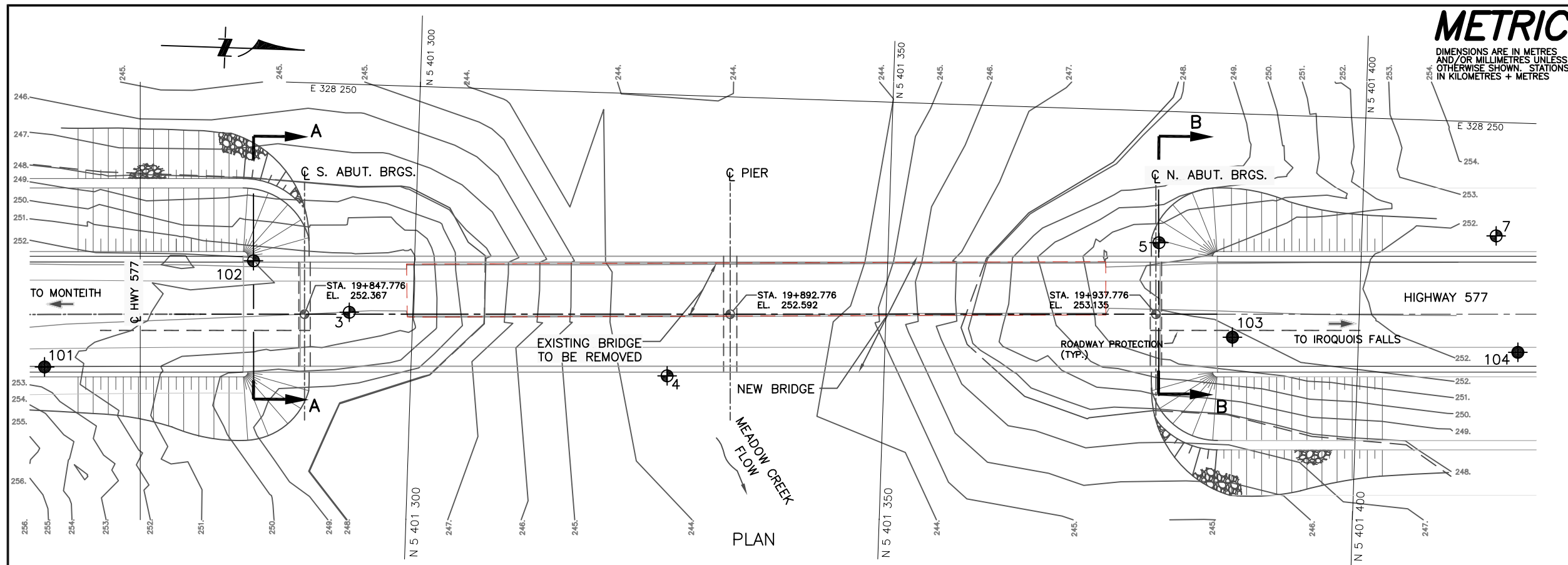
Filter sand

Screen

Sand bed

Water Level Readings:

Date	Depth (m)	Elev.
10/26/2008	2.2	251.1
10/27/2008	1.6	251.7
10/28/2008	1.8	251.5
10/30/2008	2.0	251.3
10/31/2008	2.0	251.3

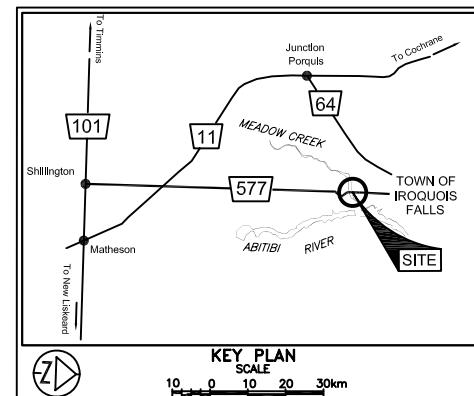


**METRIC**  
DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES UNLESS  
OTHERWISE SHOWN. STATIONS  
IN KILOMETRES + METRES

CONT No  
GWP No 181-92-00

**MEADOW CREEK BRIDGE**  
HIGHWAY 577  
BOREHOLE LOCATIONS AND SOIL STRATA

**PMI** **Peto MacCallum Ltd.**  
CONSULTING ENGINEERS



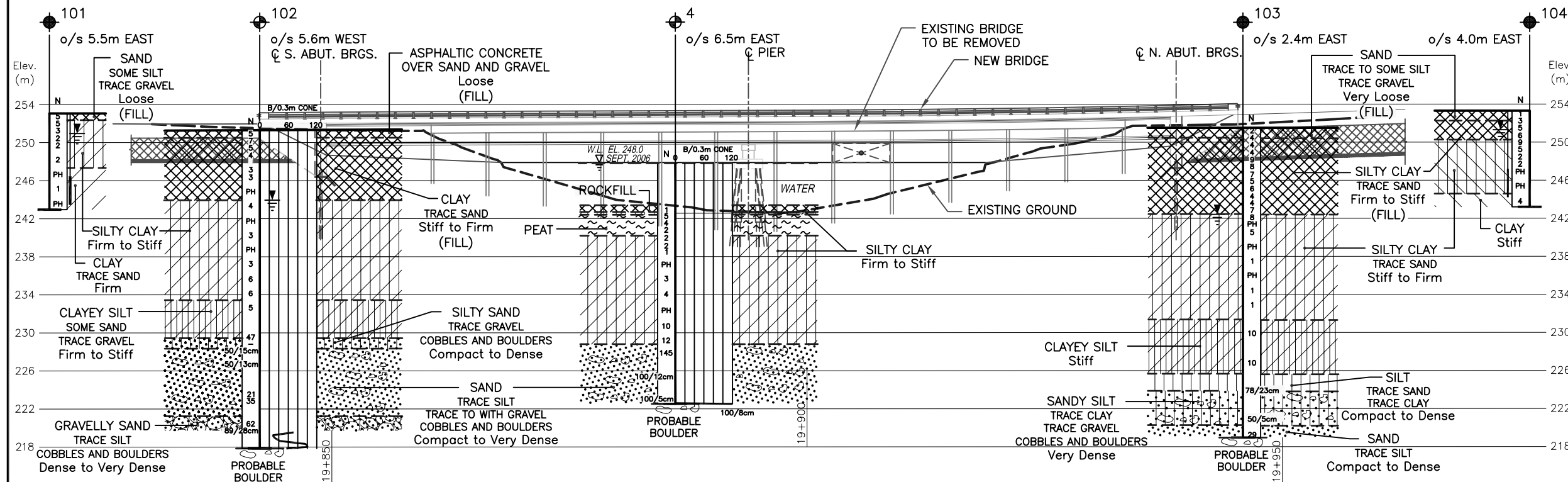
**LEGEND**

- Borehole
- Dynamic Cone Penetration Test (Cone)
- Borehole & Cone
- N Blows/0.3m (Std. Pen Test, 475 J/blow)
- CONE Blows/0.3m (60° Cone, 475 J/blow)
- PH Thinwall Sample - Advanced Hydraulically
- W L at time of investigation Oct 2008 and Aug-Sept 2006
- Head
- ARTESIAN WATER Encountered
- PIEZOMETER

BH No	ELEVATION	CO-ORDINATES	
		NORTHINGS	EASTINGS
101	253.0	5 401 261	328 281
102	251.2	5 401 283	328 269
103	251.5	5 401 387	328 274
104	253.3	5 401 417	328 274
3	251.5	5 401 293.3	328 274.1
4	247.8	5 401 327.1	328 279.7
5	251.5	5 401 378.6	328 263.9
7	253.6	5 401 414.2	328 262.0

**NOTE -**

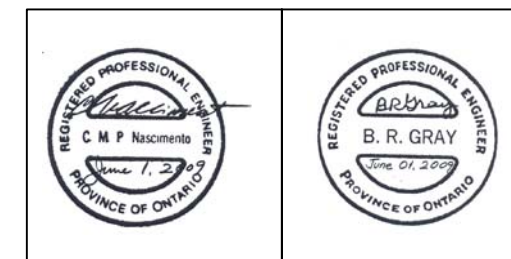
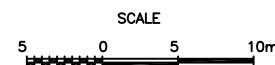
The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.



**PROFILE (HIGHWAY 577)**

**NOTES:**

- REFER TO DRAWING 2 FOR SECTIONS A-A AND B-B.
- THIS DRAWING IS FOR SUBSURFACE INFORMATION ONLY. SURFACE DETAILS AND FEATURES ARE FOR CONCEPTUAL ILLUSTRATION.
- BOREHOLES 3,4,5,7 WERE DRILLED FOR THE PRELIMINARY INVESTIGATION IN 2006 BY SHAHEEN & PEAKER (GEOCRE No. 42A-66)

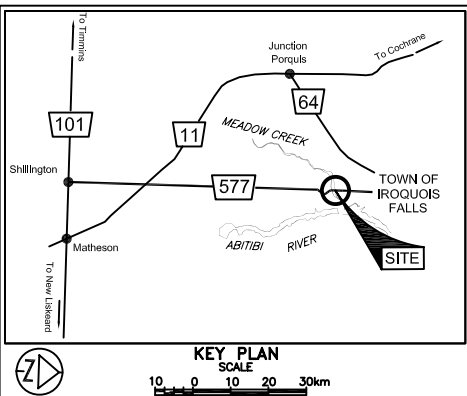


REF No. STANTEC DRAWING: 165000672\_MeadowCreek-GA.dwg;  
DATED DECEMBER 2008

REVISIONS	DATE	BY	DESCRIPTION

Geocres No. 42A-75

HWY No	577	DIST	COCHRANE
SUBM'D	GD	CHECKED	GD
DRAWN	NA	CHECKED	CN
DATE	JUNE 01, 2009	SITE	39E-077
APPROVED	BRG	DWG	1-1

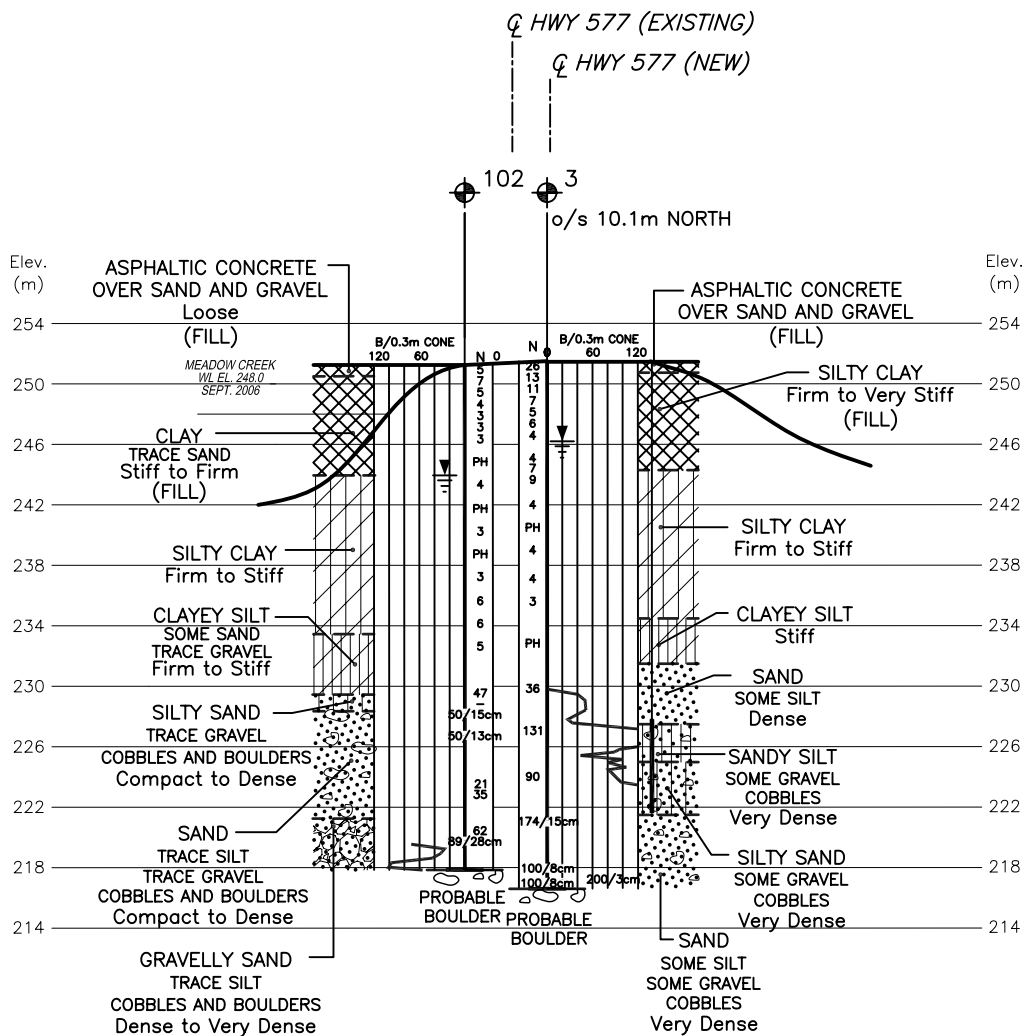


LEGEND			
	Borehole		
	Dynamic Cone Penetration Test (Cone)		
	Borehole & Cone		
N	Blows/0.3m (Std. Pen Test, 475 J/blow)		
CONE	Blows/0.3m (60° Cone, 475 J/blow)		
PH	Thinwall Sample - Advanced Hydraulically		
	W L at time of investigation Oct 2008 and Aug-Sept 2006		
	Head		
	ARTESIAN WATER Encountered		
	PIEZOMETER		
BH No	ELEVATION	CO-ORDINATES	
		NORTHINGS	EASTINGS
SEE DRAWING 1 FOR DETAILS			

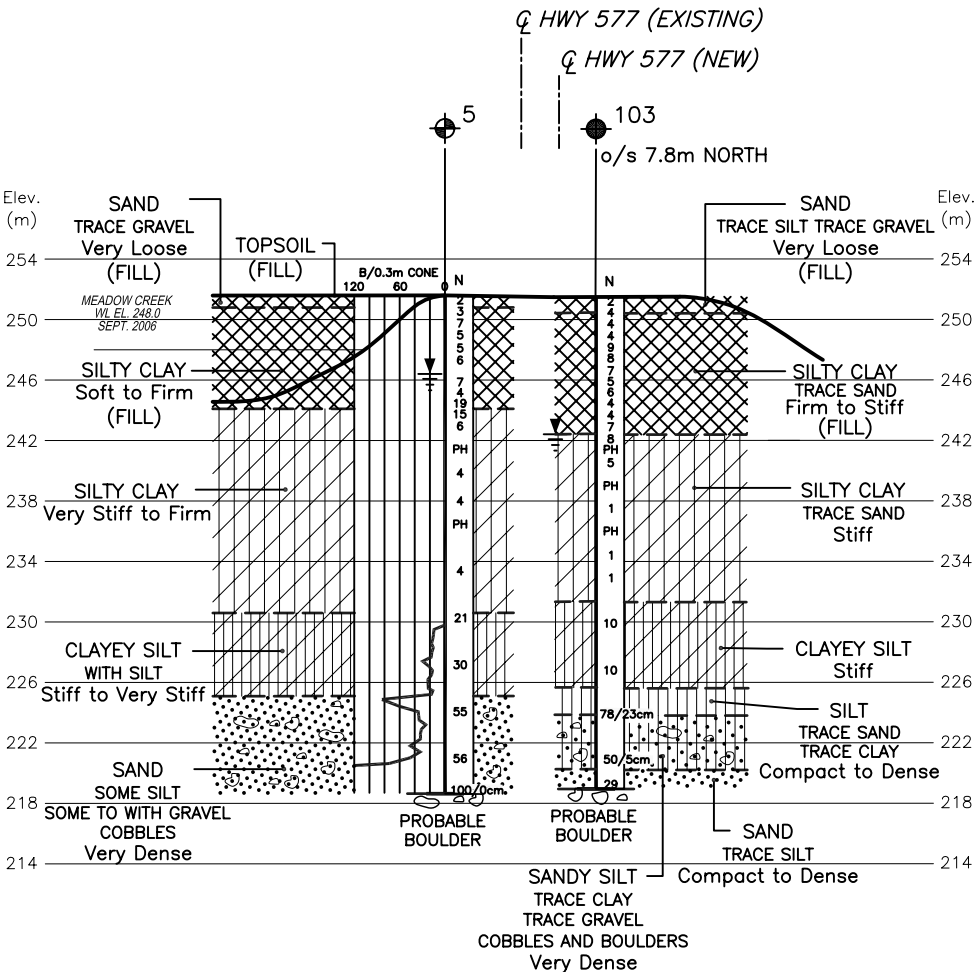
**NOTE**  
The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.

REVISIONS	DATE	BY	DESCRIPTION

Geocres No. 42A-75			
HWY No	577	DIST	COCHRANE
SUBM'D	GD	CHECKED	GD
DATE	JUNE 01, 2009	SITE	39E-077
DRAWN	NA	CHECKED	CN
APPROVED	BRG	DWG	1-2



SECTION A-A



SECTION B-B

NOTES:

- REFER TO DRAWING 1 FOR BOREHOLE LOCATIONS PLAN AND CENTRELINE PROFILE.
- THIS DRAWING IS FOR SUBSURFACE INFORMATION ONLY. SURFACE DETAILS AND FEATURES ARE FOR CONCEPTUAL ILLUSTRATION.
- BOREHOLES 3 AND 5 WERE DRILLED FOR THE PRELIMINARY INVESTIGATION IN 2006 BY SHAHEEN & PEAKER (GEOCRES No. 42A-66)





## **APPENDIX A**

RECORD OF BOREHOLE SHEETS AND  
DRAWINGS FROM PRELIMINARY INVESTIGATION  
CARRIED OUT BY SHAHEEN & PEAKER LTD. (GEOCRES NO. 42A-66)

GWP 181-92-00

LOCATION Meadow Creek Bridge, Iroquois Falls, ON. Coords: N 5 401 293.3; E 328 274.1

ORIGINATED BY GI

DIST HWY 577

BOREHOLE TYPE Hollow Stem Augers, N - Casing & Wash Boring

COMPILED BY JZ

DATUM Geodetic

DATE 8/23/2006

CHECKED BY RM

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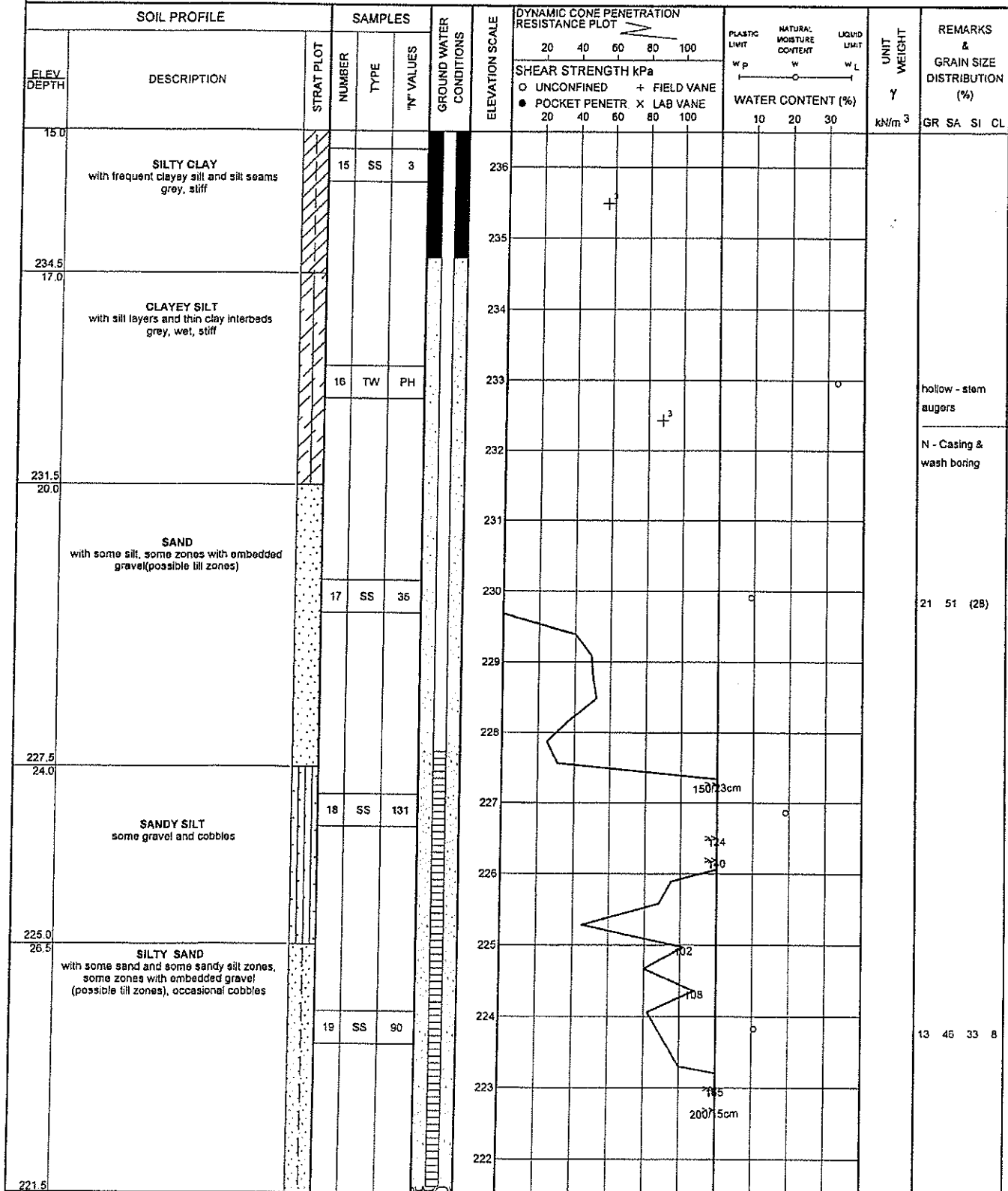
+ 3. x 3: Numbers refer to Sensitivity

RECORD OF BOREHOLE No 3

2 OF 3

METRIC

GWP 181-92-00 LOCATION Meadow Creek Bridge, Iroquois Falls, ON, Coords: N 5 401 293 3; E 328 274 1 ORIGINATED BY GI  
DIST HWY 577 BOREHOLE TYPE Hollow Stem Augers, N - Casing & Wash Boring COMPILED BY JZ  
DATUM Geodetic DATE 8/23/2006 CHECKED BY RM



SPT1167

## 3 OF 3

METRIC

GWP 181-92-00

LOCATION Meadow Creek Bridge, Iroquois Falls, ON. Coords: N 5 401 293.3; E 328 274.1

ORIGINATED BY GI

DIST HWY 577

BOREHOLE TYPE    Hollow Stem Augers, N - Casing & Wash Boring

COMPILED BY JZ

DATUM Geodetic

DATE 8/23/2006

CHECKED BY RM

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								WATER CONTENT (%)
								○ UNCONFINED	+ FIELD VANE	● POCKET PENETR. × LAB VANE						
30.0	SAND some silt, gravel, occasional cobbles		20	SS	174/15	221									Sample 21: No recovery, bouncing on a cobble	
216.6			21	SS	100/8	218									Sample 22: No recovery, bouncing (probably boulder)	
34.9	End of Borehole		22	SS	100/3	217										
	Sampler bouncing, refusal to casing advance and tricone.  Dynamic Cone Penetration Test (DCPT) from 21.8 to 24.2m from 24.8 to 27.2m from 27.8 to 28.8m from 30.5 to 31.2m from 33.7 to 34.9m  Water level at 5.2m(not stabilized) and hole open to 23.5m upon completion  Piezometer installed to 29.8m Date W.L.m.Piezometer 8/25/06 5.2m(EL.246.3m) 8/26/06 5.2m(EL.246.3m) 9/04/06 5.6m(EL.245.9m) 9/06/06 5.4m(EL.246.1m) 9/07/06 5.5m(EL.246.0m) 9/09/06 5.5m(EL.246.0m) 9/09/06 5.3m(EL.246.0m) 9/12/06 5.3m(EL.246.2m) 9/14/06 5.3m(EL.246.2m)															

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15  $\phi$   
10

{%} STRAIN AT FAILURE

RECORD OF BOREHOLE No 4

1 OF 2

METRIC

GWP 181-92-00 LOCATION Meadow Creek Bridge, Iroquois Falls, ON, Coords: N 5 401 327.1; E 328 279.7 ORIGINATED BY GI  
DIST HWY 577 BOREHOLE TYPE N-casing and Wash Boring COMPILED BY HL  
DATUM Geodetic DATE 9/7/2006 CHECKED BY RM

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			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 ○ UNCONFINED + FIELD VANE ● POCKET PENETR × LAB VANE					WATER CONTENT (%) W <sub>P</sub> W W <sub>L</sub>
247.8 0.0	Water Surface							20 40 60 80 100					
	Water												
243.4 4.4	ROCK FILL with silt & sand infill		1	SS	1		247						
242.7 5.1	SILTY CLAY somewhat organic dark grey, firm		2	SS	5		246						
242.4 5.4	PEAT with ORGANIC SILT/CLAY some silty clay layers, dark grey/blackish soft to firm, wet		3	SS	4		245						
			4	SS	2		244						
240.2 7.6	trace of organic		5	SS	2		243						
	darkish grey		6	SS	2		242						
	grey		7	SS	1		241						
	SILTY CLAY grey, firm to stiff		8	TW	PH		240						
			9	SS	3		239						
			10	SS	4		238						
	some clayey silt layers						237						
232.8							236						
							235						
							234						
							233						

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Sensitivity  
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(%) STRAIN AT FAILURE



SPT1167

RECORD OF BOREHOLE No 4

2 OF 2

METRIC

GWP 181-92-00 LOCATION Meadow Creek Bridge, Iroquois Falls, ON, Coords: N 5 401 327.1; E 328 279.7 ORIGINATED BY GI  
DIST HWY 577 BOREHOLE TYPE N - casing and Wash Boring COMPILED BY HL  
DATUM Geodetic DATE 9/7/2006 CHECKED BY RM

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 ○ UNCONFINED + FIELD VANE ● POCKET PENETR. × LAB VANE								WATER CONTENT (%)
15.0	SILTY CLAY some clayey silt layers grey, firm to stiff		11	TW	PH		232									
			12	SS	10			231								
			13	SS	12		230									
228.6 19.0	SAND with GRAVEL, COBBLES and BOULDERS grey, very dense, wet						229									
			14	SS	145			228								
								227								
								226								
			15	SS	100/12		225									
							224									
222.6 25.2	Refusal to casing penetration and tricone (Possible bedrock or boulder).  Dynamic Cone Penetration Test (DCPT) performed from 25.2m, 100 blows for 8cm penetration		16	SS	100/5		223									

× 3 Numbers refer to  
Sensitivity

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15 5  
10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 5

1 OF 3

METRIC

GWP 181-92-00 LOCATION Meadow Creek Bridge, Iroquois Falls, ON, Coords: N 5 401 378.6; E 328 263.9 ORIGINATED BY GI  
DIST HWY 577 BOREHOLE TYPE Hollow Stem Augers, N-casing and Wash Boring COMPILED BY JZ  
DATUM Geodetic DATE 8/14/2006 to 8/15/2006 CHECKED BY RM

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	UNIT WEIGHT Y kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
FILEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100	20 40 60 80 100					
251.6	Ground Surface														
0.0	0.15m Sandy TOPSOIL FILL: SAND trace gravel brown, moist, very loose		1	SS	2		251								
250.8			2	SS	3										
0.8	FILL: SILTY CLAY trace organics & rootlets brown/ greyish brown soft to firm		3	SS	7		250								
249.4			4	SS	5		249								
2.2	FILL: SILTY CLAY with Clayey Silt Zones brown and grey some dark grey to blackish, slightly organic to organic zones, occasional thin peat seams/lenses firm		5	SS	5		248								
			6	SS	5		247								
			7	SS	6		246								
			8	SS	7		245								
			9	SS	4		244								
244.1	SILTY CLAY somewhat organic, some peat and decayed wood dark grey to black, very stiff		10	SS	19		243								
7.5			11	SS	15		242								
243.2	clayey silt zone stiff		12	SS	6		241								
8.4			13	TW	PH		240								
	brown grey		14	SS	4		239								
	SILTY CLAY occasional clayey silt & silt seams firm to stiff		15	SS	4		238								
							237								
236.6															

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(%) STRAIN AT FAILURE

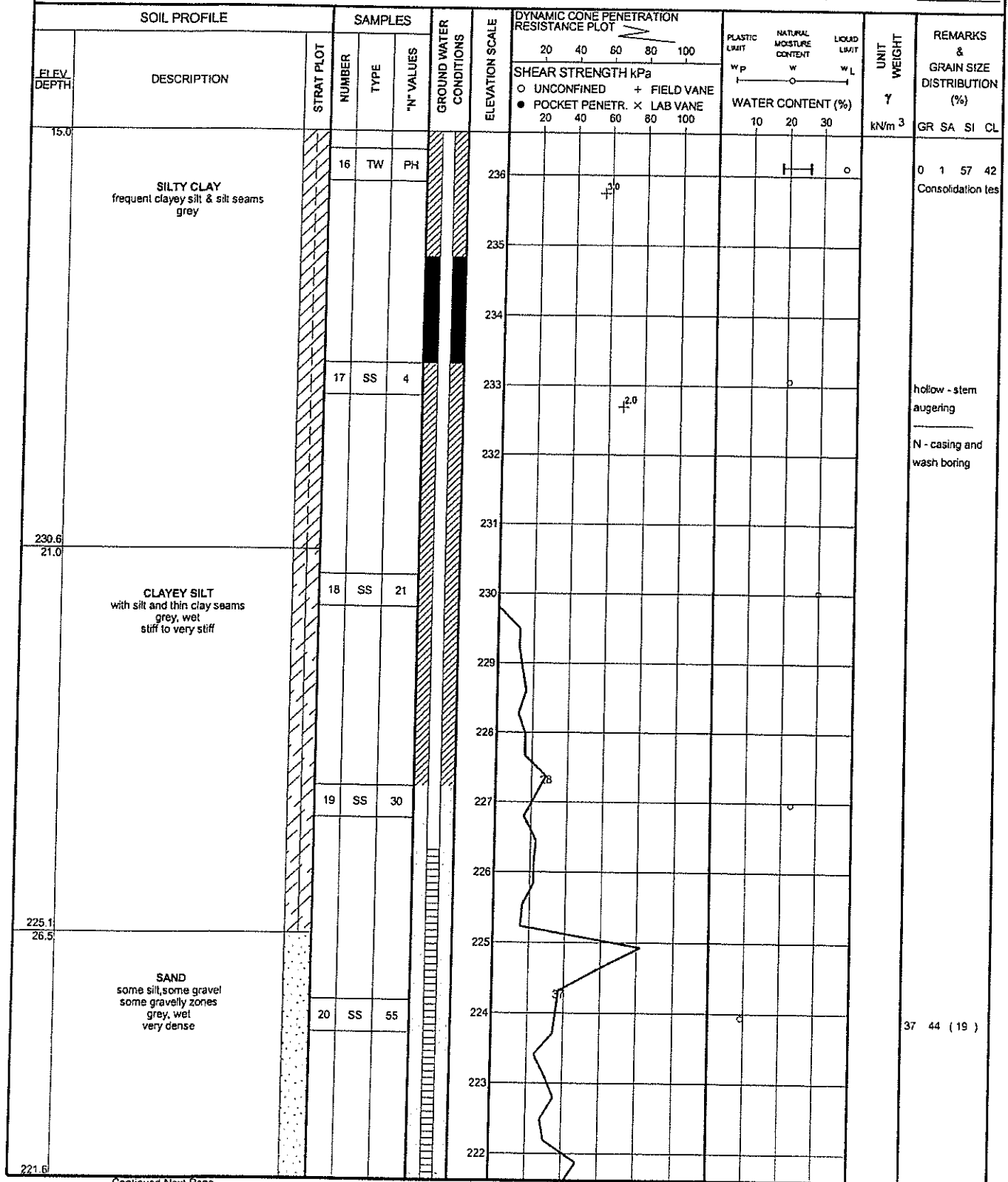
SPT1167

RECORD OF BOREHOLE No 5

2 OF 3

METRIC

GWP 181-92-00 LOCATION Meadow Creek Bridge, Iroquois Falls, ON, Coords: N 5 401 378.6; E 328 253.9  
DIST HWY 577 BOREHOLE TYPE Hollow Stem Augers, N-casing and Wash Boring  
DATUM Geodetic DATE 8/14/2006 to 8/15/2006  
ORIGINATED BY GI  
COMPILED BY JZ  
CHECKED BY RM



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Numbers refer to  
Sensitivity

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(%) STRAIN AT FAILURE

# RECORD OF BOREHOLE No 5

3 OF 3

METRIC

GWP 181-92-00 LOCATION Meadow Creek Bndge, Iroquois Falls, ON, Coords: N 5 401 378.6; E 328 263.9  
DIST HWY 577 BOREHOLE TYPE Hollow Stem Augers, N-casing and Wash Boring  
DATUM Geodetic DATE 8/14/2006 to 8/14/2006  
ORIGINATED BY GI  
COMPILED BY JZ  
CHECKED BY RM

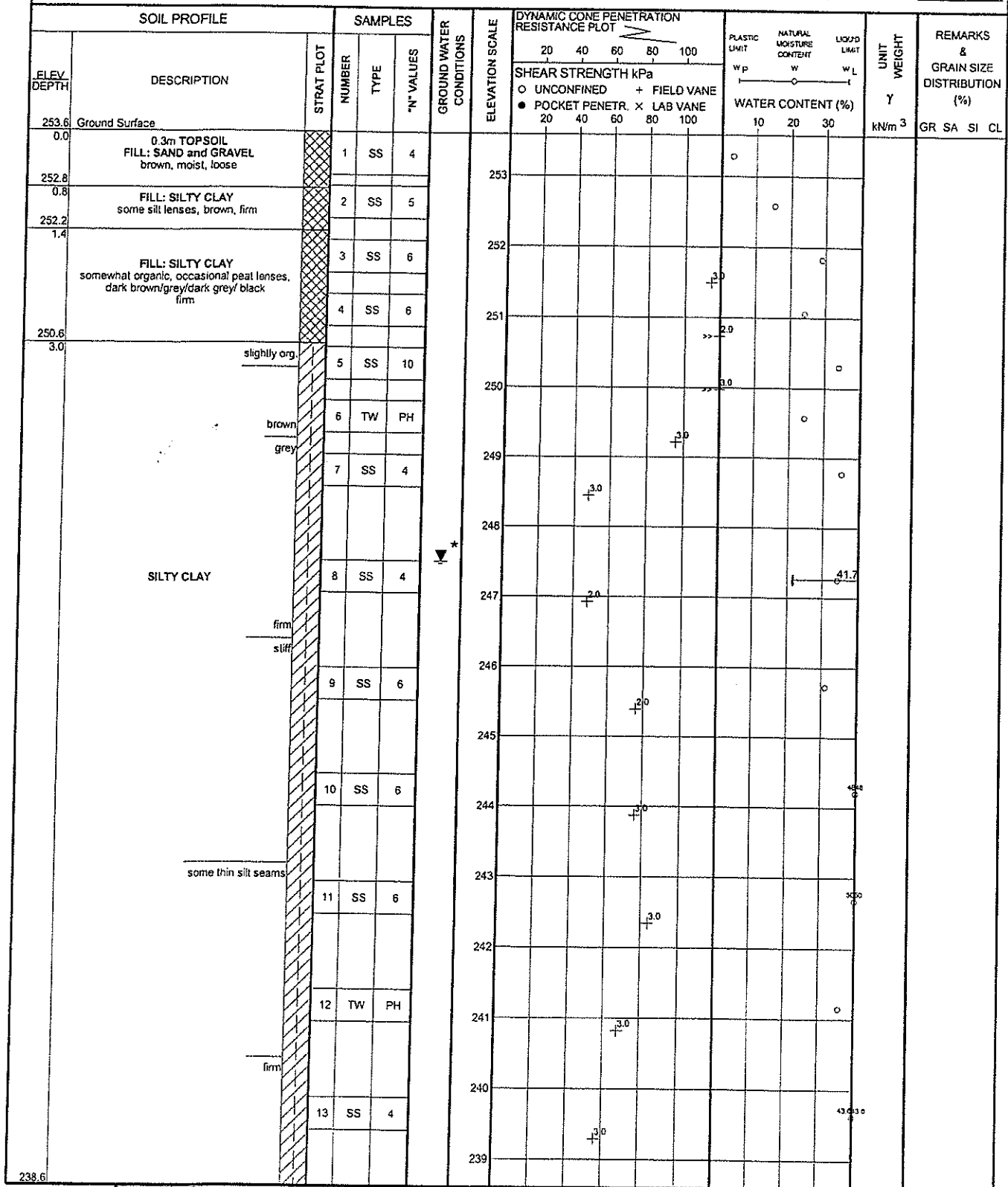
SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT	PLASTIC LIMIT W <sub>P</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
30.0	SAND with gravel, some silt, some cobbles grey, wet very dense		21	SS	56		221						
218.7			22	SS	100/0		220						
32.9	End of Borehole Sample bouncing, refusal to advancing with casing and Tricone on a boulder or on bedrock  Dynamic Cone Penetration Test (DCPT) conducted: from 21.7 to 24.4m from 24.7 to 27.4m from 27.8 to 30.4m from 31.0 to 31.8m  Water level in open borehole at 5.2m (not stabilized) and hole open to 32m upon completion Date Water Level(m) Pizometer 8/16/06 5.2m (El. 246.4m) 8/18/06 5.3m (El. 246.3m) 8/23/06 5.2m (El. 246.4m) 8/25/06 5.2m (El. 246.4m) 8/26/06 5.2m (El. 246.4m) 9/04/06 5.2m (El. 246.4m) 9/05/06 5.3m (El. 246.3m) 9/07/06 5.2m (El. 246.4m) 9/09/06 5.1m (El. 246.5m) 9/12/06 5.4m (El. 246.2m) 9/14/06 5.2m (El. 246.4m)												

RECORD OF BOREHOLE No 7

1 OF 3

METRIC

GWP 181-92-00 LOCATION Meadow Creek Bridge, Iroquois Falls, ON, Coords: N 5 401 414.2; E 328 262.0 ORIGINATED BY GI  
DIST HWY 577 BOREHOLE TYPE Hollow Stem Augers & Wash Boring COMPILED BY JZ  
DATUM Geodetic DATE 8/16/2005 to 8/18/2005 CHECKED BY RM



Continued Next Page

+ 3, x 3. Numbers refer to  
Sensitivity

20  
15  
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 7

2 OF 3

METRIC

GWP 181-92-00 LOCATION Meadow Creek Bridge, Iroquois Falls, ON, Coords: N 5 401 414.2, E 328 262.0 ORIGINATED BY GI  
DIST HWY 577 BOREHOLE TYPE Hollow Stem Augers & Wash Boring COMPILED BY JZ  
DATUM Geodetic DATE 8/16/2006 to 8/18/2006 CHECKED BY RM

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● POCKET PENETR. x LAB VANE	PLASTIC LIMIT W <sub>P</sub> NATURAL MOISTURE CONTENT W LIQUID LIMIT W <sub>L</sub> WATER CONTENT (%) 10 20 30	UNIT WEIGHT γ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
FLYV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
15.0	SILTY CLAY grey		14	SS	5		238	2.0			
							237				
							236				
							235	3.0		43 243.5	
					15	SS	4				
	CLAYEY SILT with some silt and silty clay seams, traces of embedded sand and gravel grey, stiff		16	SS	10		232	2.0			
							231				
							230				
							229	3.0			
					17	SS	12				
227.6 26.0	CLAYEY SILT with some silt and silty clay seams, traces of embedded sand and gravel grey, stiff		18	SS	10		226	2.0			
							225				
							224				
							223				
							222				
224.1 29.5	SAND, some gravel						221				

Continued Next Page

Numbers refer to  
Sensitivity  
20  
15  
10  
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No 7

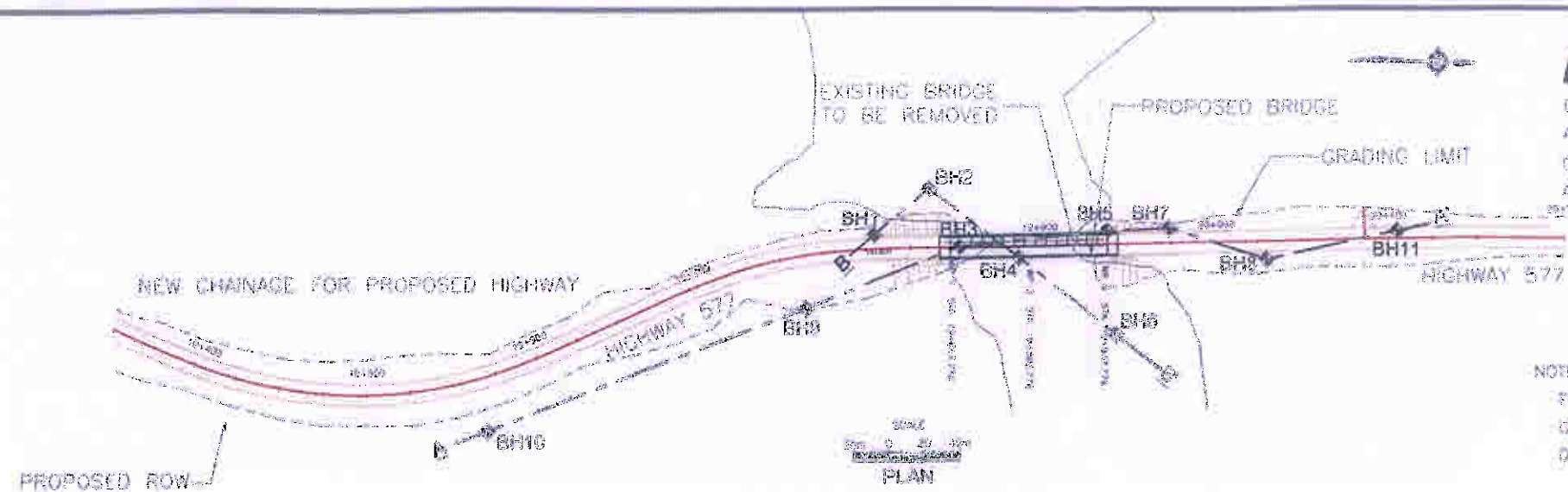
3 OF 3

METRIC

GWP 181-92-00 LOCATION Meadow Creek Bridge, Iroquois Falls, ON, Coords: N 5 401 414.2; E 328 262.0 ORIGINATED BY GI  
DIST HWY 577 BOREHOLE TYPE Hollow Stem Augers & Wash Boring COMPILED BY JZ  
DATUM Geodetic DATE 8/16/2005 to 8/18/2005 CHECKED BY RM

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● POCKET PENETR. × LAB VANE 20 40 60 80 100	PLASTIC LIMIT W <sub>P</sub> NATURAL MOISTURE CONTENT W LIQUID LIMIT W <sub>L</sub>	WATER CONTENT (%) 10 20 30	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							
220.0	SAND with some silt and gravel, occasional cobbles grey, wet, very dense		19	SS	118		223					16 73 ( 11 )
219.7							222					
219.7							221					
33.6	Sampler bouncing on probable boulder.		20	SS	100/5		220					
33.9	End of borehole		21	RC								
<p>Dynamic Cone Penetration Test (DCPT) conducted from 28.0m to 30.5m. DCPT conducted from 30.9 to 31.5m.</p> <p>* Water level at 6.0m (not stabilized) and hole open to 27m upon completion</p>												





**METRIC**

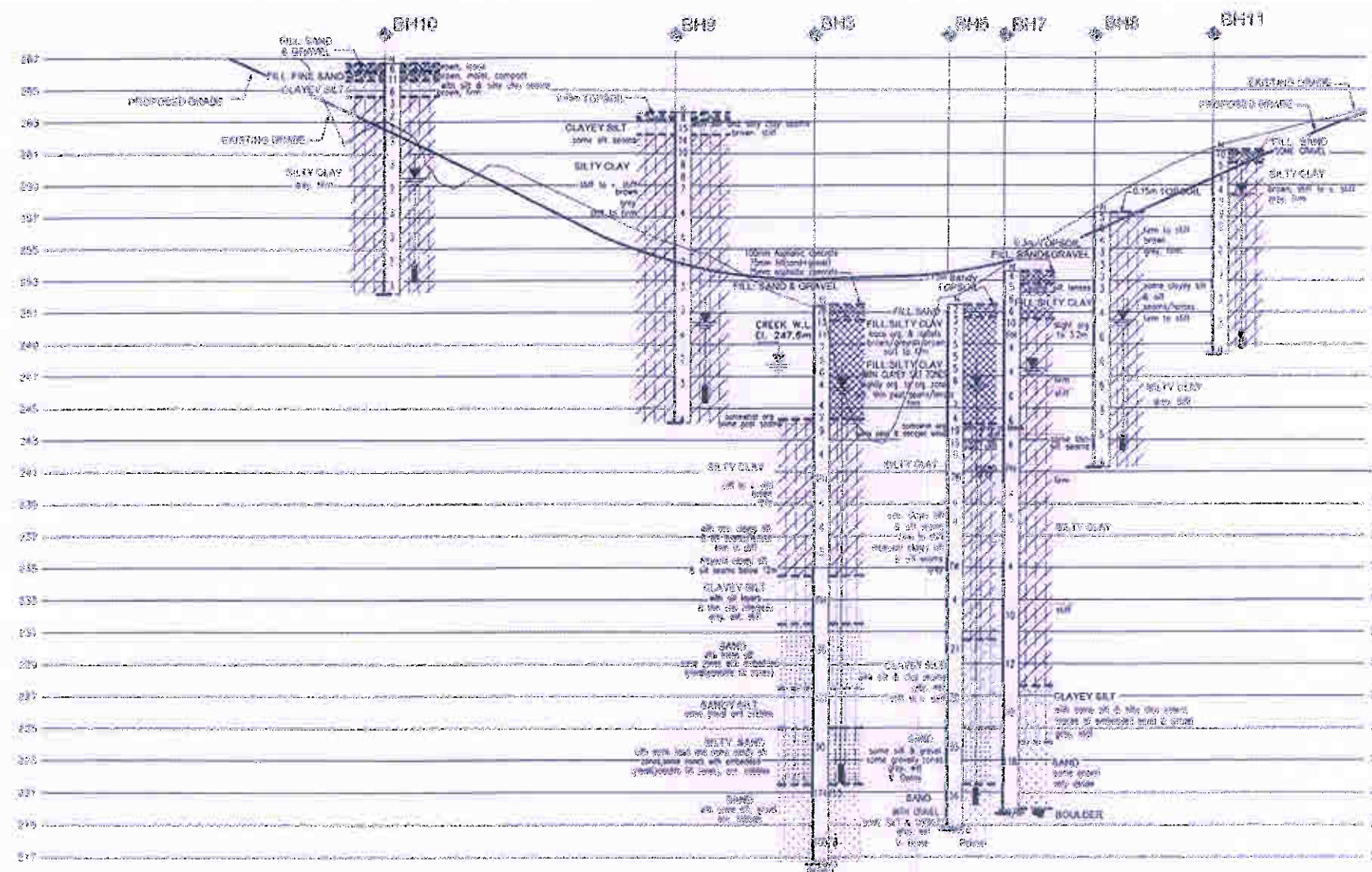
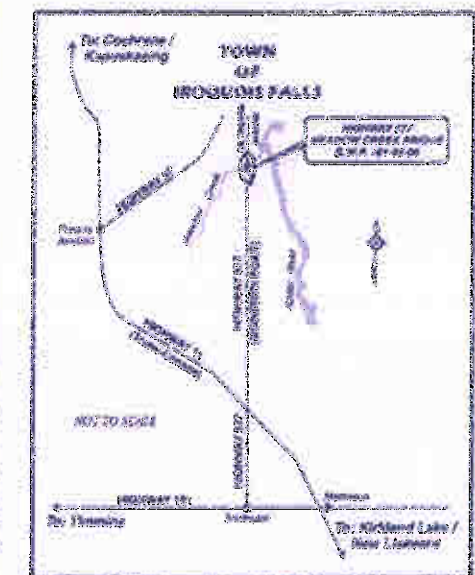
DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES UNLESS  
OTHERWISE SHOWN. STATIONS  
ARE IN KILOMETRES+METRES

NOTE:  
FOR DETAILED SUBSURFACE  
CONDITIONS REFER TO RECORD  
OF BOREHOLE SHEETS

CONT No.  
GWP: 181-92-00

Meadow Creek Bridge, Iroquois Falls  
SECTION AT STA. 19+600 TO 20+100  
BORE HOLE LOCATIONS & SOIL STRATA

**SHAHEEN & PEAKER LIMITED**



# LEGEND

- Borehole
- Blows/G.3m (Std. Pen. Test, 475 J/blow)
- Water Level at time of investigation  
Sept. 2006 (not stabilized)
- Water Level in Piezometer
- Piezometer

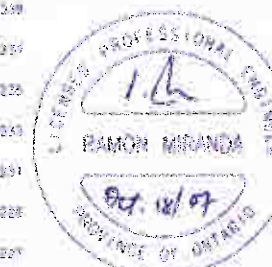
No.	ELEV.	CO-ORDINATES	
		NORTH	EAST
BH 3	281.5	5 401 193.3	328 274.7
BH 5	281.8	5 401 378.6	328 263.9
BH 7	253.9	5 401 414.2	328 262.0
BH 8	257.3	5 401 470.6	328 278.8
BH 9	263.6	5 401 206.7	328 310.6
BH 10	266.7	5 401 025.4	328 392.8
BH 11	261.2	5 401 545.4	328 281.7

## NOTE:

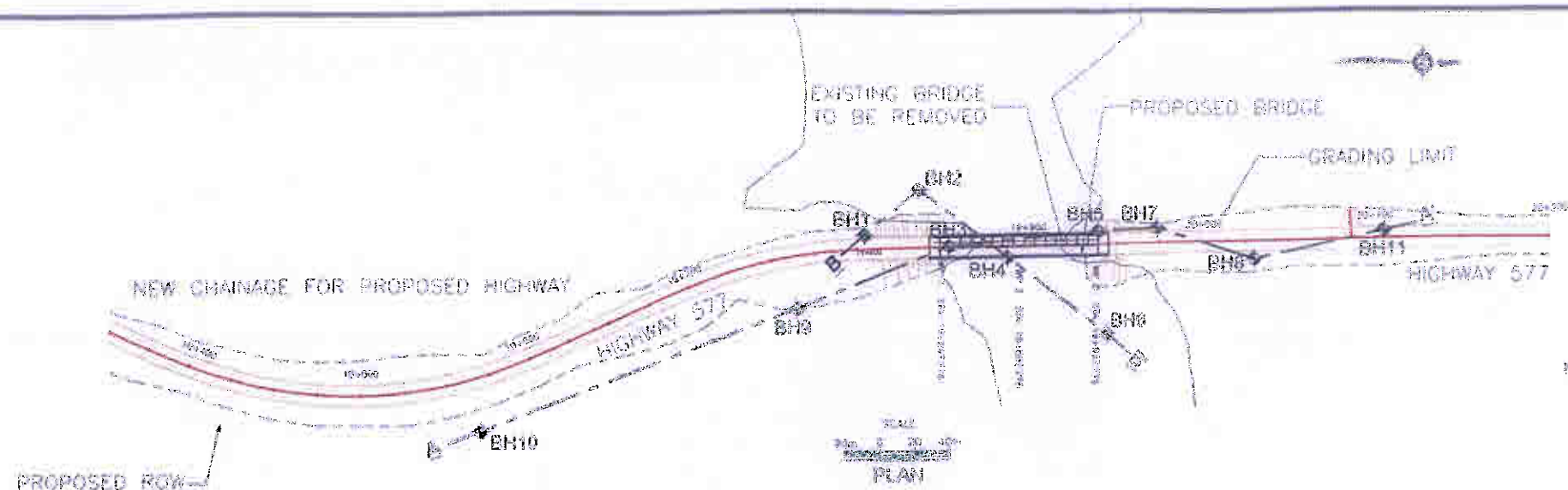
The boundaries between soil strata have been established only at Bore Hole locations. Between Bore holes the boundaries are assumed from geological evidence.

NOTE: 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 are specifically excluded in accordance with the conditions of Section GC 2.01 of OPS Gen. Cond.

DATE	BY	DESCRIPTION
2006.09.18	RM	Geocres. No. 42A-58
2006.11.01	RM	MEADOW CREEK BRIDGE-HWY577
2006.11.01	RM	SUBM'D TO CHECKED RM
2006.11.01	RM	DATE Nov.2006 SITE 39E-073
2006.11.01	PS	DRAWN KS CHECKED PS
2006.11.01	PS	APPROVED 20 DWG 1







**METRIC**

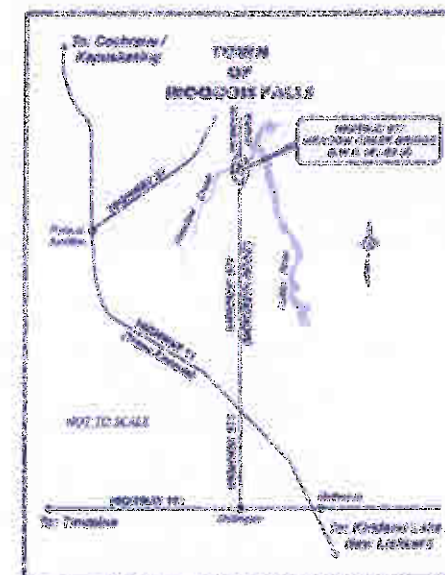
DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES UNLESS  
OTHERWISE SHOWN. STATIONS  
ARE IN KILOMETRES+METRES.

NOTE:  
FOR DETAILED SUBSURFACE  
CONDITIONS REFER TO RECORD  
OF BOREHOLE SHEETS

CONT No.  
GWP: 181-92-00

Meadow Creek Bridge, Ingersoll Falls  
SECTION AT STA. 10+501 TO 20+149  
BORE HOLE LOCATIONS & SOIL STRATA

**SHAHEEN & PEAKER LIMITED**



KEY PLAN (N. T. S.)

**LEGEND**

- Borehole
- Borehole/0.3m (Std. Pen. Test, 475 J/blow)
- ▽ Water Level at Time of Investigation  
Sept. 2006 (Not Stabilized)
- ▽ Water Level in Piezometer
- Piezometer

No.	ELEV.	CO-ORDINATES	
		NORTH	EAST
BH 1	253.3	5 401 244.2	328 258.2
BH 2	247.8	5 401 275.1	328 241.6
BH 4	247.8	5 401 327.1	328 279.7
BH 6	246.1	5 401 365.1	328 322.5

**NOTE:**

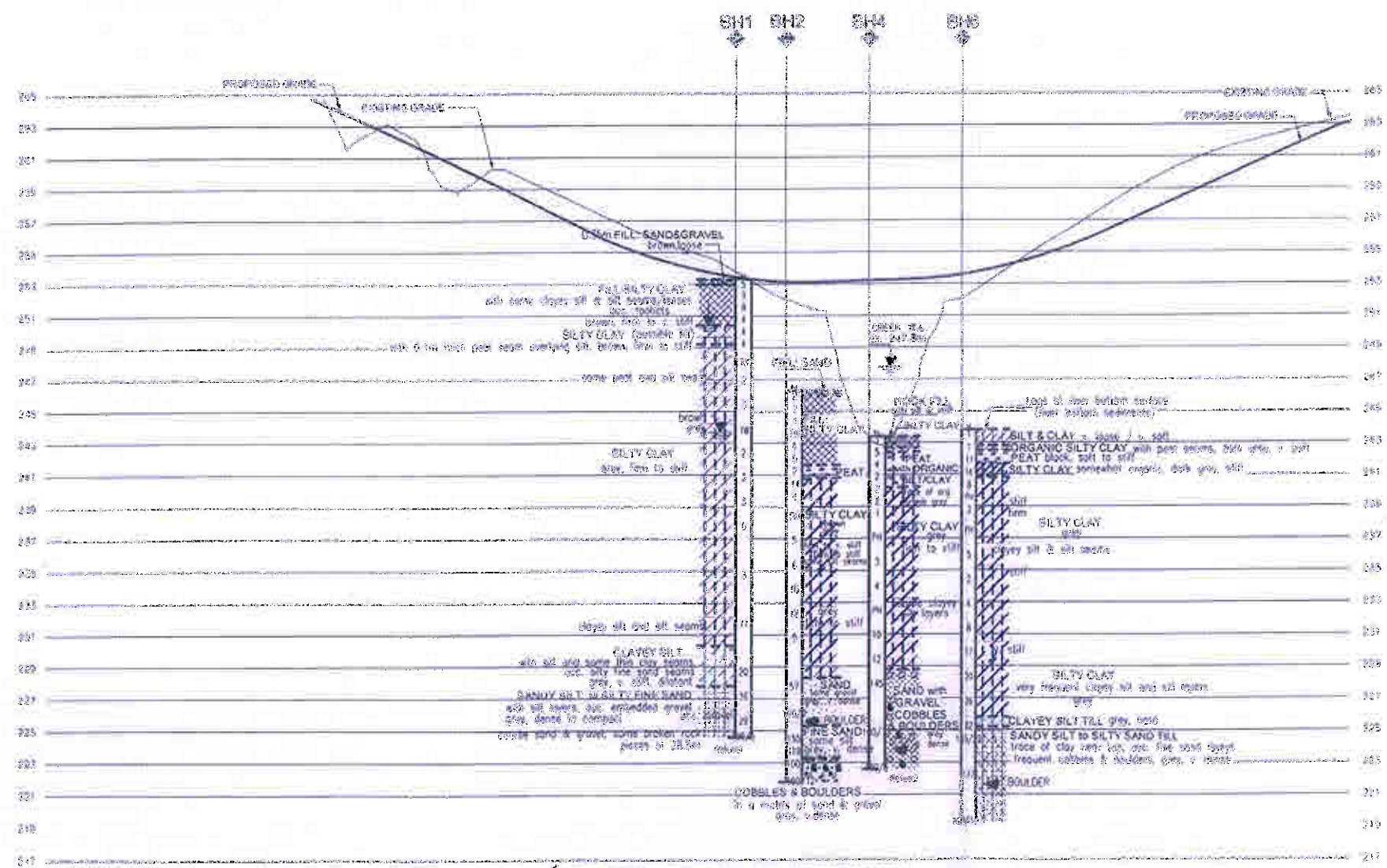
The boundaries between soil strata have been established  
only at Bore Hole locations. Between Bore Holes the  
boundaries are assumed from geological evidence.

NOTE: 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 are  
specifically excluded in accordance with the conditions of Section  
20.1 of GPS Gen. Cond.

DATE	BY	DESCRIPTION
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Geocres No. 42A-66

MEADOW CREEK BRIDGE-HWY 577		DIST	
SUBM'D ZO	CHECKED RM	DATE Nov.2006	SITE 39E-077
DRAWN XS	CHECKED FS	APPROVED ZO	DWG 2



STRATIGRAPHIC PROFILE ALONG SECTION B-B

