



TABLE 1
LIST OF ATTERBERG LIMITS

SOIL TYPE	BOREHOLE NO.	SAMPLE NO.	DEPTH (m)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	MOISTURE CONTENT (%)
Clayey Silt	1	4	2.3 – 2.9	25	19	6	23
	2	2	0.8 – 1.4	25	19	6	25
	5	3	2.3 – 2.9	25	19	6	28
	7	4	2.3 – 2.9	24	20	4	25
	8	5	3.0 – 3.7	23	19	4	27
	9	4	2.3 – 2.9	25	19	6	29
	10	3	2.3 – 2.9	31	20	11	29
	11	6	3.8 – 4.4	22	17	5	24
	14	3	2.3 – 2.9	24	18	6	26
	16	2	0.8 – 1.4	30	19	11	26
	18	4	2.3 – 2.9	23	17	6	25
	19	3	2.3 – 2.9	23	19	4	25
Silty Clay	12	2	0.8 – 1.4	38	20	18	28
Silt	3	4	2.3 – 2.9	23	20	3	27
	4	3	1.5 – 2.1	22	19	3	24
	17	2	0.8 – 1.4	22	19	3	24



TABLE 2
ROCK CORE DESCRIPTION

CORE RECOVERY					CORE DESCRIPTION	
HOLE NO.	CORE NO.	DEPTH (m)	RECOVERY (%)	RQD (%)	DEPTH (m)	DESCRIPTION
2	4	1.9 – 3.4	100	76	1.9 – 4.9	GRANITIC GNEISS: Pink and grey, fine crystalline, high strength, slightly weathered to unweathered, close to moderate (locally very close) becoming wide (locally close) spaced flat to dipping cross joints, rough planar, tight to slightly altered with occasional scale, silt or sand on partings, good to excellent quality.
	5	3.4 – 4.9	95	90		
4	4	2.1 – 3.4	100	60	2.1 – 5.6	GRANITIC GNEISS: Pink and grey, fine to medium crystalline, high strength, unweathered, close to wide spaced flat to dipping cross joints, rough planar, tight, fair to excellent quality.
	5	3.4 – 5.0	98	90		
	6	5.0 – 5.6	100	100		
5	5	2.8 – 3.5	98	65	2.8 – 6.4	GRANITIC GNEISS: Pink and grey, fine to medium crystalline, high strength, slightly weathered to unweathered, close to moderate (locally very close) spaced flat to dipping cross joints, rough planar, tight to oxidized, with vertical fissures, poor to fair becoming good to excellent quality
	6	3.5 – 4.8	100	41		
	7	4.8 – 5.6	100	100		
	8	5.6 – 6.4	98	88		
7	6	3.2 – 4.5	100	89	3.2 – 6.5	GRANITIC GNEISS: Pink and grey, fine to medium crystalline, high strength, slightly weathered to unweathered, wide spaced flat to dipping cross joints, rough planar, tight, occasional vertical joints with yellow oxidation stains, good to excellent quality.
	7	4.5 – 5.9	100	99		
	8	5.9 – 6.5	100	100		

Originated: FP
 Compiled: JFW
 Checked: NR/CN



TABLE 2
 ROCK CORE DESCRIPTION

HOLE NO.	CORE RECOVERY				CORE DESCRIPTION	
	CORE NO.	DEPTH (m)	RECOVERY (%)	RQD (%)	DEPTH (m)	DESCRIPTION
8	7	4.3 – 5.0	100	100	4.3 – 7.6	GRANITIC GNEISS: Grey, fine crystalline, high strength, unweathered, close to moderate spaced dipping cross joints, smooth planar, typically up to 1 mm thick and infilled with dark green mineralization (possible serpentine), excellent quality.
	8	5.0 – 6.5	98	98		
	9	6.5 – 7.6	100	100		
9	6	4.4 – 4.8	100	100	4.4 – 7.4	GRANITIC GNEISS: Grey, fine to medium crystalline, high strength, unweathered, close to wide spaced flat to dipping cross joints, rough planar, tight to slightly oxidized, core separates readily on black biotite layers, excellent quality.
	7	4.8 – 6.4	100	100		
	8	6.4 – 7.4	100	100		
10	7	4.2 – 4.9	100	52	3.9 – 4.2 4.2 – 7.3	BOULDER GRANITIC GNEISS: Pink and grey, fine to medium crystalline, with dipping vein of pyrite, high strength, slightly weathered to unweathered, close to wide spaced flat to dipping cross joints, rough planar, tight, with vertical fissure up to 5 mm wide, infilled with silt, with oxidation stains, fair to excellent quality.
	8	4.9 – 6.4	97	97		
	9	6.4 – 7.3	96	96		

Originated: FP
 Compiled: JFW
 Checked: NR/CN

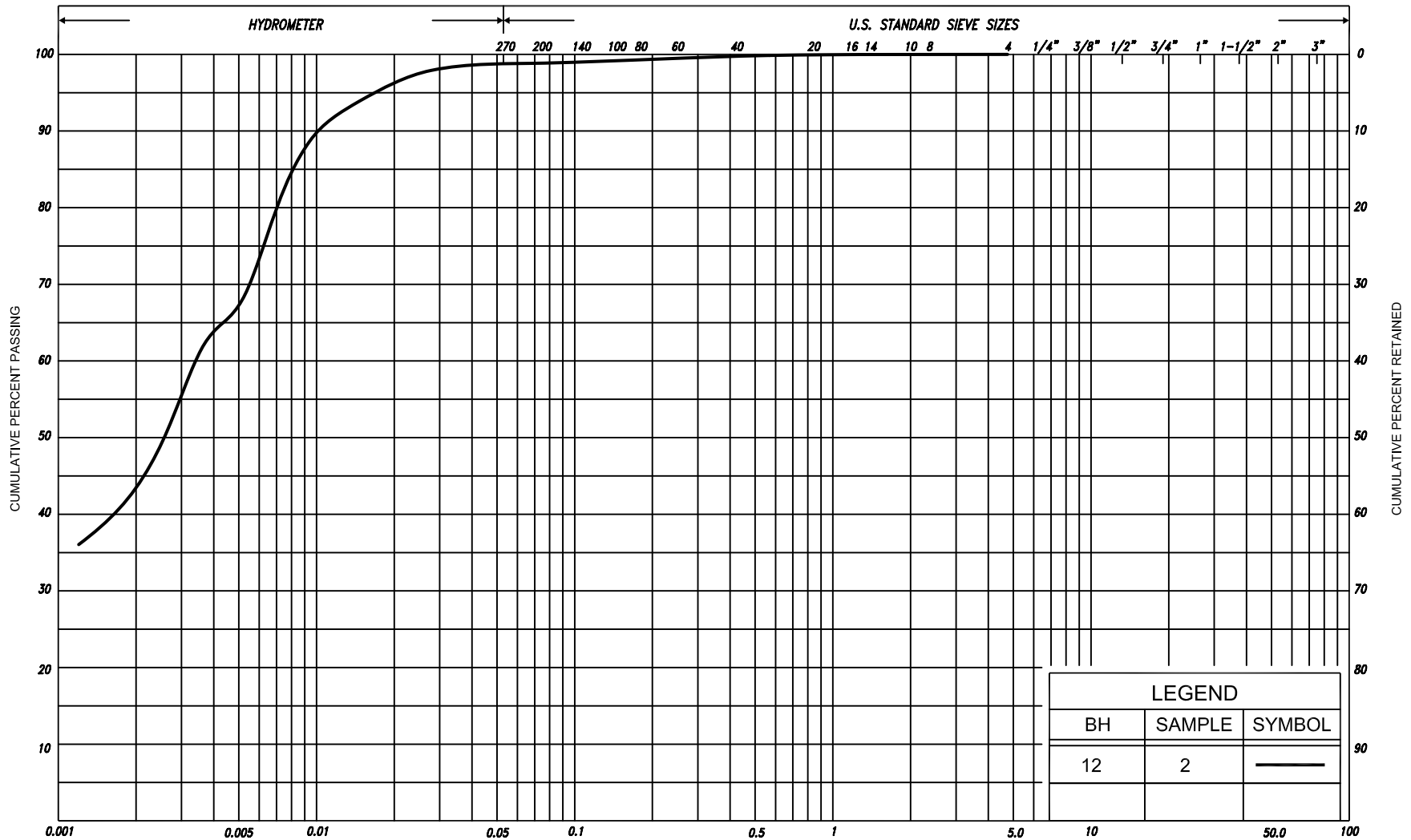


TABLE 2
ROCK CORE DESCRIPTION

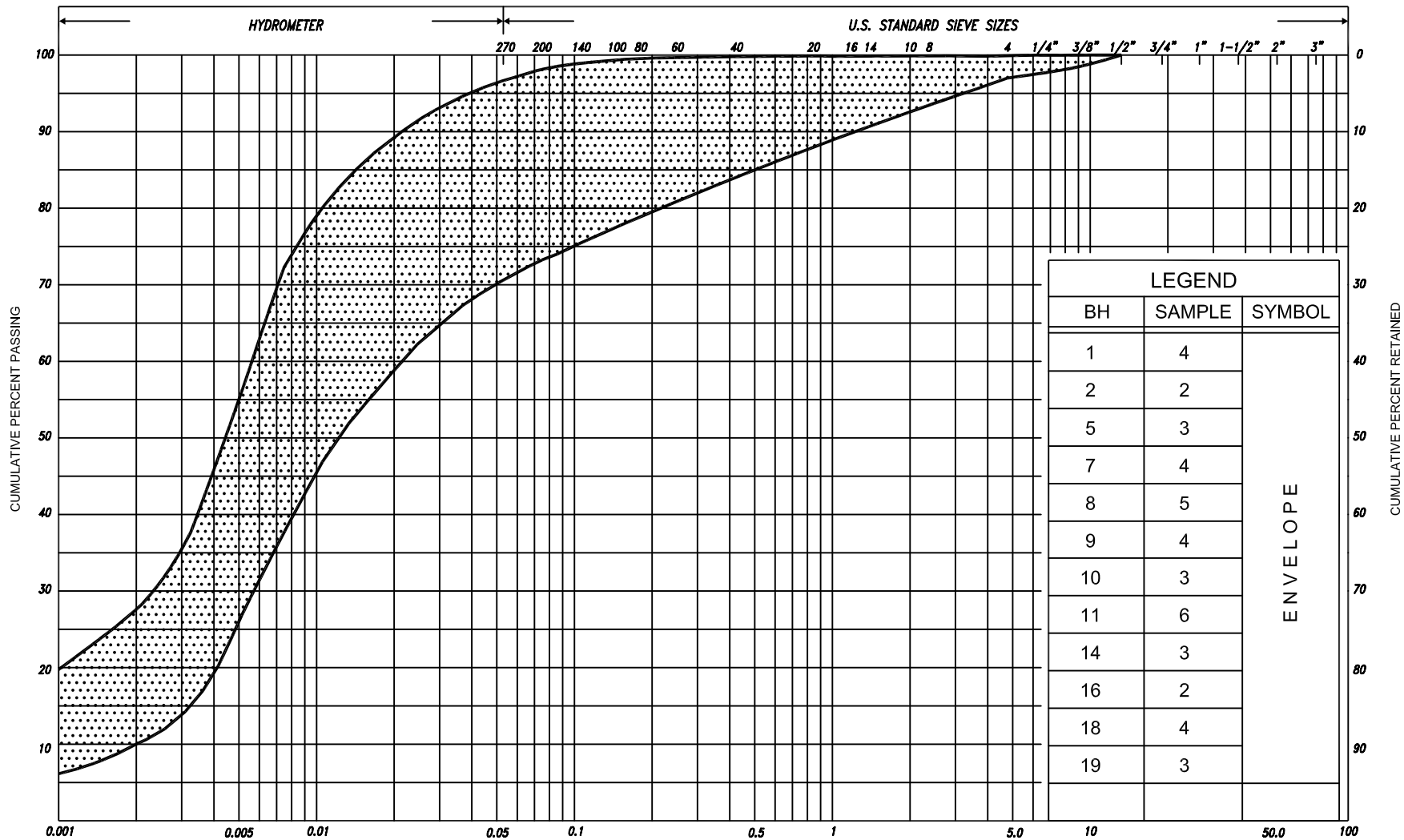
CORE RECOVERY					CORE DESCRIPTION	
HOLE NO.	CORE NO.	DEPTH (m)	RECOVERY (%)	RQD (%)	DEPTH (m)	DESCRIPTION
13	4	3.3 – 3.5	100	100	3.3 – 6.5	GRANITIC GNEISS: Pink and grey, fine to medium crystalline, high strength, slightly weathered to unweathered, moderate spaced flat cross joints, rough planar, tight to oxidized, occasional vertical joints with rust coloured oxidation stains, excellent becoming fair quality at depth.
	5	3.5 – 5.1	95	95		
	6	5.1 – 6.5	100	66		
15	5	3.9 – 4.6	96	96	3.9 – 4.6 4.6 – 7.9	PROBABLE BOULDER GRANITIC GNEISS: Grey, fine to medium crystalline, high strength, moderately weathered (based on low recovery), close to very close spaced flat cross joints (see note), excellent, becoming very poor quality at depth. NOTE: Difficulties with extracting core required recoring to be necessary affecting RQD and recovery values.
	6	4.6 – 6.4	68	15		
	7	6.4 – 7.9	80	22		
16	6	5.0 – 6.4	95	95	5.0 – 8.2	GRANITIC GNEISS: Grey, fine to medium crystalline, high strength, unweathered, wide (locally close) spaced flat cross joints, rough planar, tight, excellent quality.
	7	6.4 – 7.9	100	94		
	8	7.9 – 8.2	100	100		
18	5	5.2 – 5.5	67	67	5.2 – 8.5	GRANITIC GNEISS: Grey, medium crystalline, high strength, slightly weathered to unweathered, wide (locally close) spaced flat to dipping cross joints, rough planar, oxidation stains on partings, fair becoming excellent quality.
	6	5.5 – 7.1	100	100		
	7	7.1 – 8.5	100	100		

NOTE: RQD = Rock Quality Designation

Originated: FP
 Compiled: JFW
 Checked: NR/CN

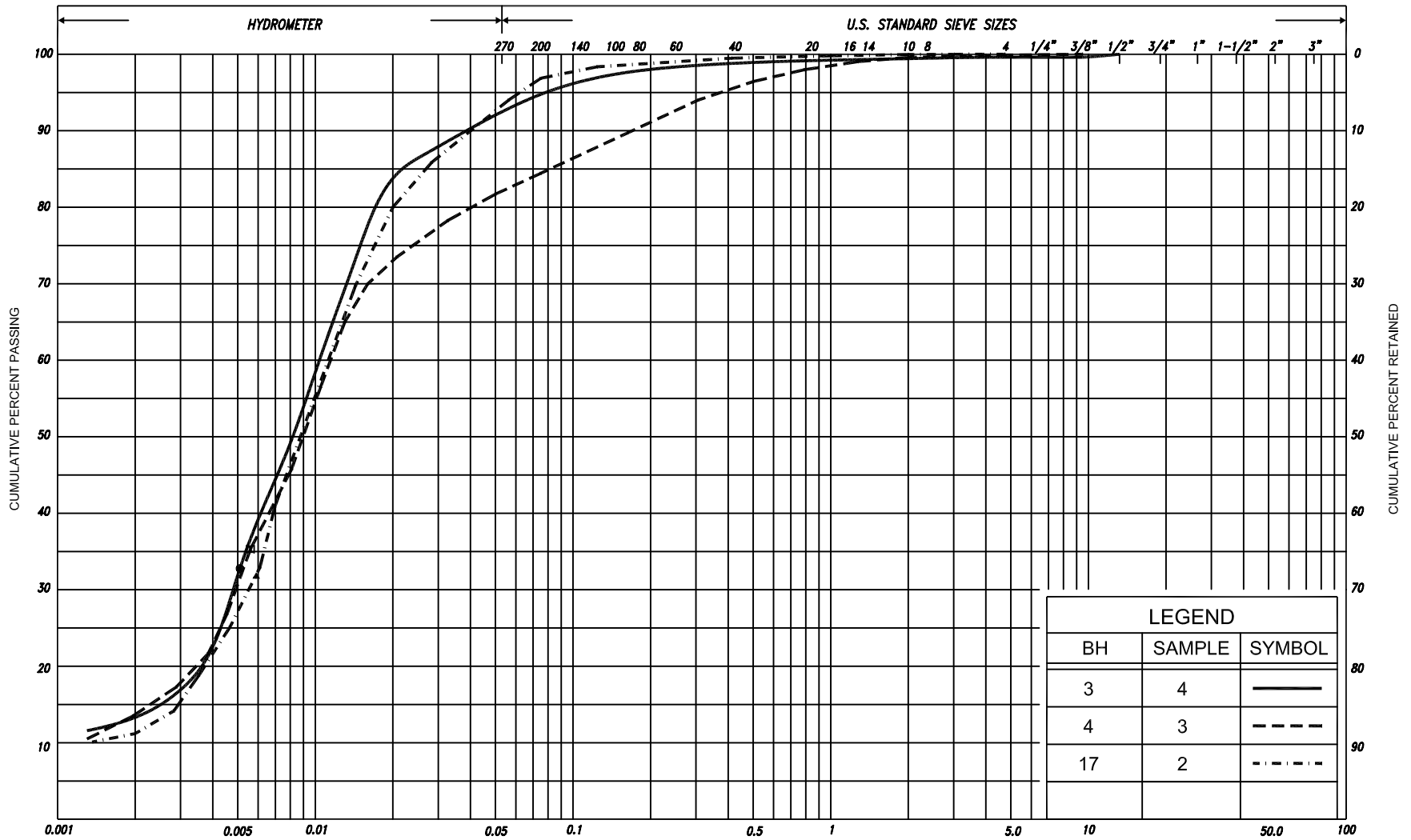


SILT & CLAY				FINE SAND			MEDIUM SAND		COARSE SAND		GRAVEL		COBBLES	UNIFIED
													COBBLES	M.I.T.
													COBBLES	U.S. BUREAU
													COBBLES	
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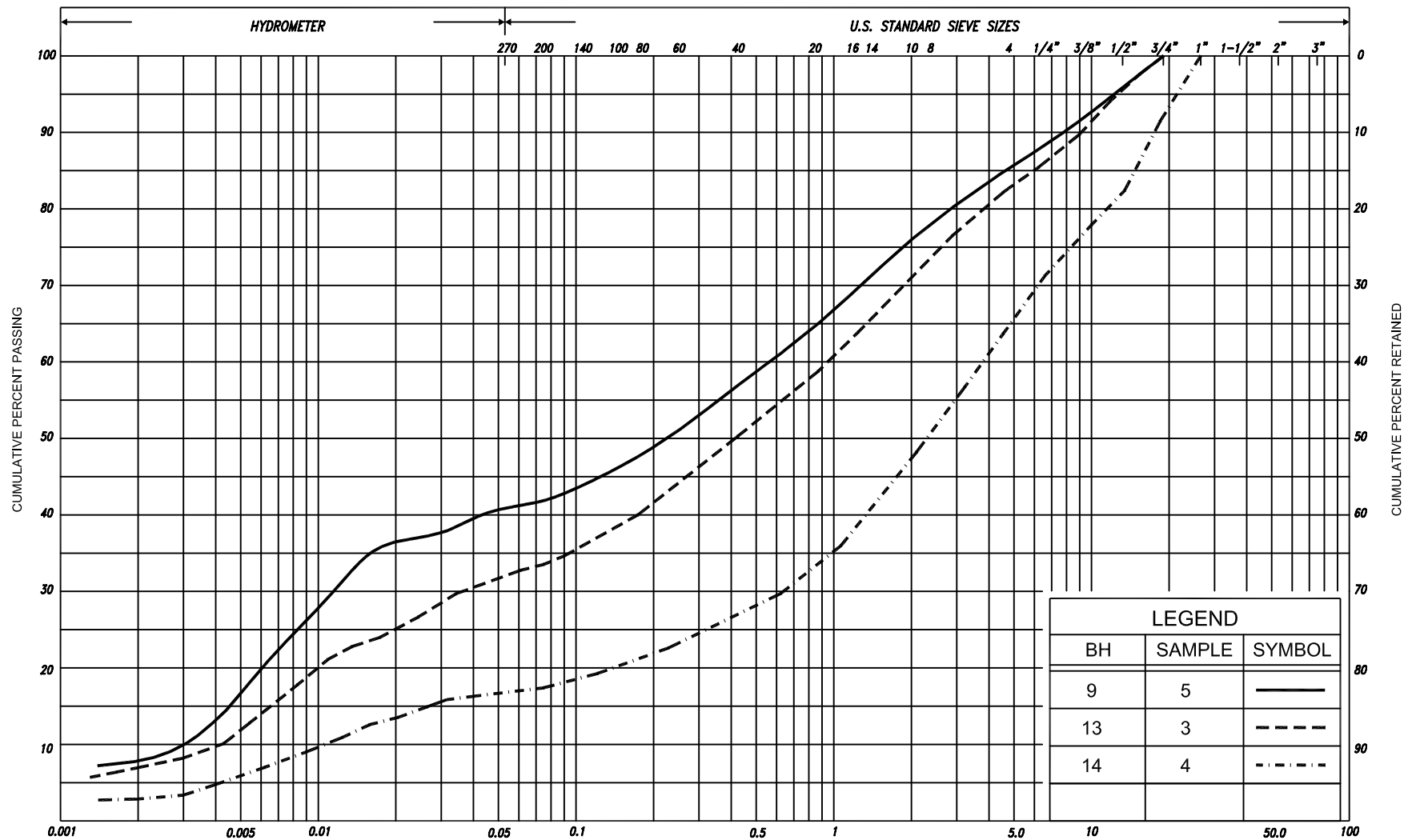


LEGEND		
BH	SAMPLE	SYMBOL
1	4	ENVELOPE
2	2	
5	3	
7	4	
8	5	
9	4	
10	3	
11	6	
14	3	
16	2	
18	4	
19	3	

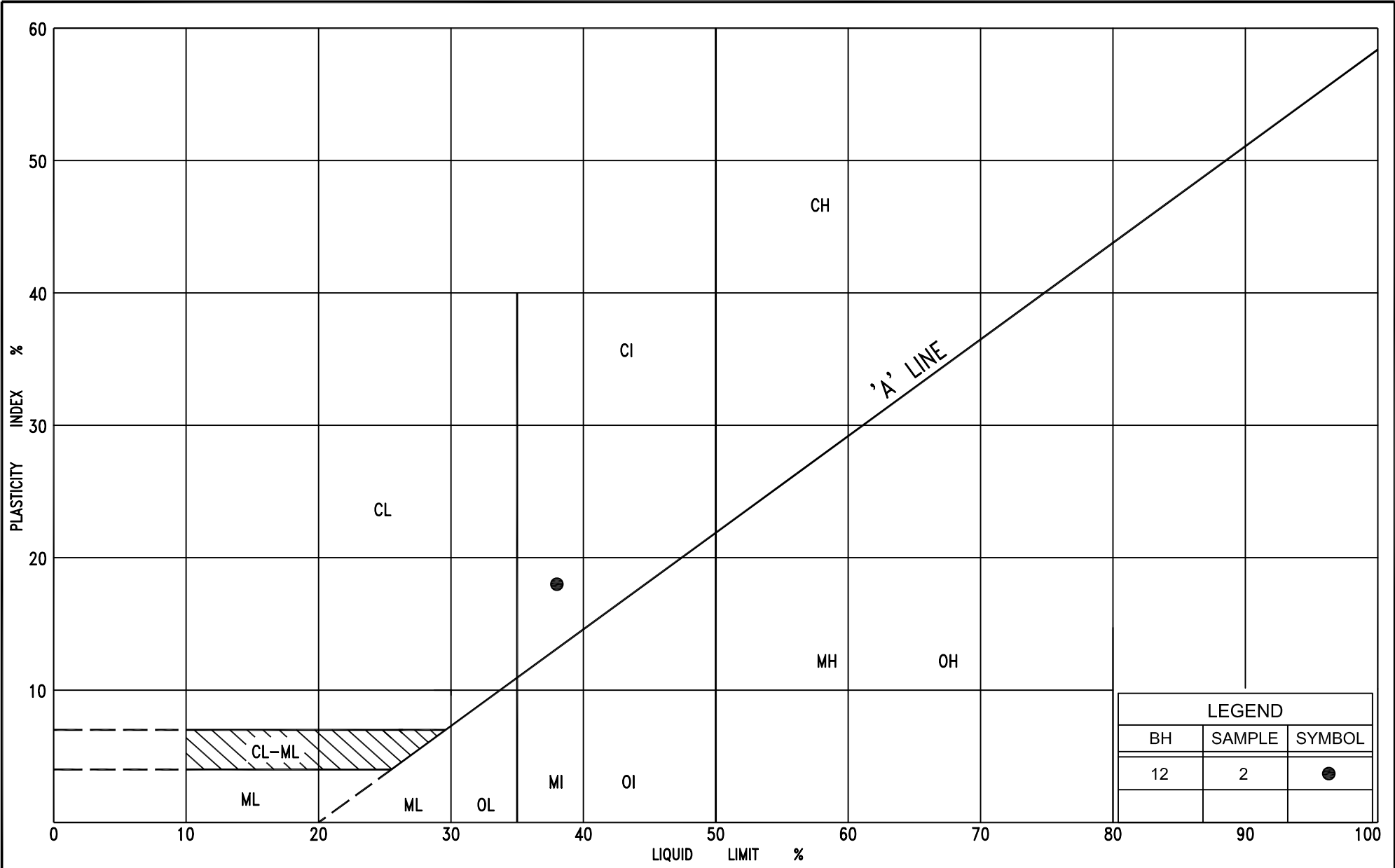
SILT & CLAY				FINE		MEDIUM		COARSE		GRAVEL			COB BLES	UNIFIED		
				SAND												
CLAY	FINE		MEDIUM		COARSE		FINE		MEDIUM		COARSE		GRAVEL		COBBLES	M.I.T.
	SILT						SAND									
CLAY		SILT			V. FINE	FINE	MED.	COARSE		GRAVEL						U.S. BUREAU
					SAND											



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												



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

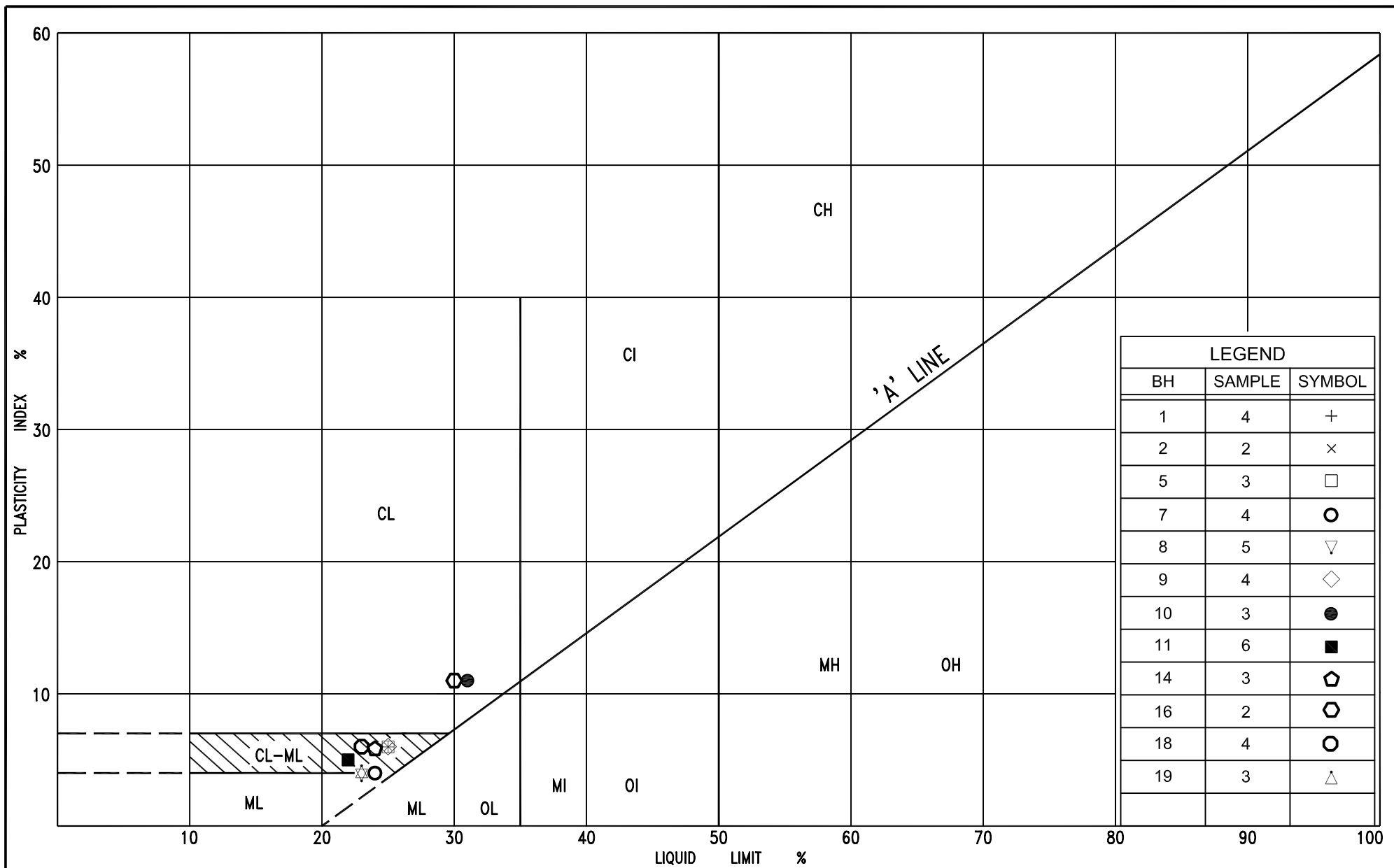


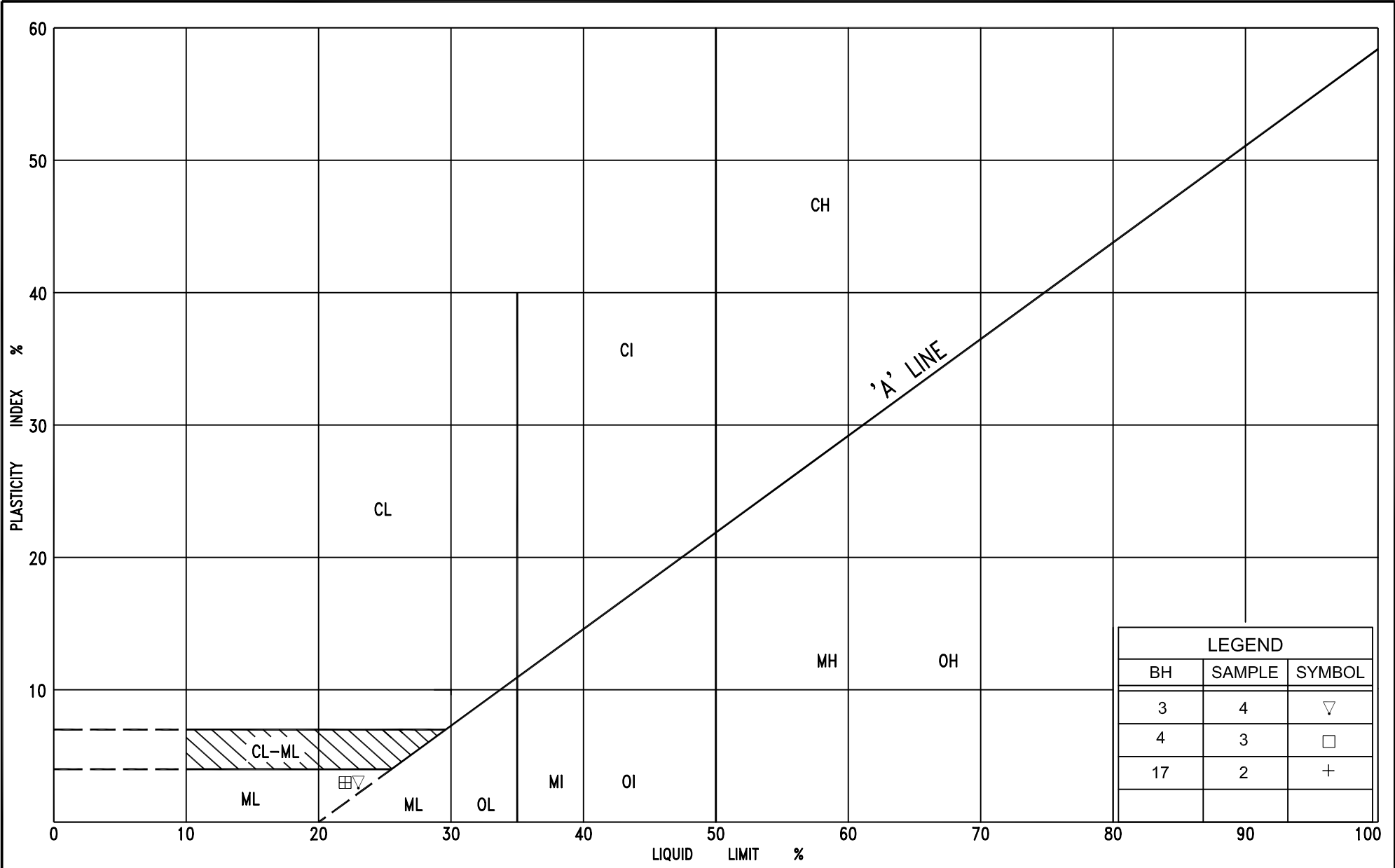
Ministry of
Transportation
Ontario

PLASTICITY CHART

SILTY CLAY, trace sand

FIG No.	SR-PC-1
HWY:	69
W.P. No.	5271-05-00





Ministry of
Transportation
Ontario

PLASTICITY CHART

SILT, some clay, trace to some sand, trace gravel

FIG No. SR-PC-3

HWY: 69

W.P. No. 5271-05-00

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 (R Q D), FOR MODIFIED RECOVERY, IS:

R Q D (%)	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
σ	kPa	TOTAL NORMAL STRESS
σ'	kPa	EFFECTIVE NORMAL STRESS
τ	kPa	SHEAR STRESS
$\sigma_1, \sigma_2, \sigma_3$	kPa	PRINCIPAL STRESSES
ϵ	%	LINEAR STRAIN
$\epsilon_1, \epsilon_2, \epsilon_3$	%	PRINCIPAL STRAINS
E	kPa	MODULUS OF LINEAR DEFORMATION
G	kPa	MODULUS OF SHEAR DEFORMATION
μ	1	COEFFICIENT OF FRICTION

MECHANICAL PROPERTIES OF SOIL

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

PHYSICAL PROPERTIES OF SOIL

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

RECORD OF BOREHOLE No 1

1 of 1

METRIC

W.P. 5271-05-01 LOCATION Coords: 5 096 904.0 N; 221 614.7 E ORIGINATED BY F.P.
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Solid Stem Augers COMPILED BY N.R.
 DATUM Geodetic DATE June 03, 2009 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 (%) GR SA SI CL				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	*N* VALUES			SHEAR STRENGTH kPa					w _p w w _L								
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					WATER CONTENT (%)								
208.9	Ground surface							20	40	60	80	100									
0.0	Topsoil																				
208.6	Silty clay, trace sand		1	SS	4																
0.3	Very stiff Brown Moist																				
			2	SS	13																
206.8			3	SS	6																
2.1	Clayey silt																				
	trace sand, trace gravel																				
	Very stiff		4	SS	24																
	Stiff		5	SS	8																
205.0																					
3.9	End of borehole		6	SS	10/8cm																
	Refusal on probable bedrock																				
	Sample 6: Sampler bouncing																				
	* Borehole dry																				
	■ Penetration test																				

METRIC

20
15 — 5 (%) STRAIN AT FAILURE
10

RECORD OF BOREHOLE No 3

1 of 1

METRIC

W.P. 5271-05-01 LOCATION Coords: 5 096 916.7 N; 221 601.7 E ORIGINATED BY F.P.
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Solid Stem Augers COMPILED BY N.R.
 DATUM Geodetic DATE June 03, 2009 CHECKED BY C.N.

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa					W _p W W _L								
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					WATER CONTENT (%)								
207.4	Ground surface						20	40	60	80	100										
0.0	Topsoil																				
207.2	Clayey silt		1	SS	5	∇^*	207														GR SA SI CL
0.2	trace sand, trace gravel						207														
	Very stiff Brown Moist		2	SS	11		206														
	Stiff	3	SS	6	206																
205.3	Silt, some clay				205																
2.1	trace sand, trace gravel		4	SS	14	205														1 4 82 13	
	Compact Brown Wet																				
	Sand seams																				
204.1	Grey Wet		5	SS	4/15cm																
3.3	End of borehole																				
	Refusal on probable bedrock																				
	Sample 5: Sampler bouncing																				
	* 2009 06 03																				
	∇ Water level observed during drilling																				
	■ Penetrometer test																				

RECORD OF BOREHOLE No 4

1 of 1

METRIC

W.P. 5271-05-01 LOCATION Coords: 5 096 908.8 N; 221 597.0 E ORIGINATED BY F.P.
 DIST 54 HWY 69 BOREHOLE TYPE C.F.S.S.A. and Rotary Diamond Coring COMPILED BY N.R.
 DATUM Geodetic DATE June 02, 2009 CHECKED BY C.N.

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa					WATER CONTENT (%)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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RECORD OF BOREHOLE No 5

1 of 1

METRIC

W.P. 5271-05-01 LOCATION Coords: 5 096 912.4 N; 221 596.5 E ORIGINATED BY F.P.
 DIST 54 HWY 69 BOREHOLE TYPE C.F.S.S.A. and Rotary Diamond Coring COMPILED BY N.R.
 DATUM Geodetic DATE June 02, 2009 CHECKED BY C.N.

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 γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE									
209.2	Ground surface						20	40	60	80	100						
0.0	Topsoil		1	SS	2												
209.0	Clayey silt trace sand, trace gravel organic inclusions Firm to Brown Wet stiff																
0.2			2	SS	12												
			3	SS	11												
			4	SS	5												
206.4	Sand seams		5	RC NQ	REC 98%												
2.8	Grey Granitic Gneiss bedrock		6	RC NQ	REC 100%												
	Slightly weathered to unweathered		7	RC NQ	REC 100%												
	High strength		8	RC NQ	REC 98%												
	Poor to fair becoming good to excellent quality.																
202.8	End of borehole																
6.4																	

METRIC

W.P.	5271-05-01	LOCATION	Coords: 5 096 907.7 N; 221 592.2 E	ORIGINATED BY	F.P.		
DIST	54	HWY	69	BOREHOLE TYPE	Continuous Flight Solid Stem Augers	COMPILED BY	N.R.
DATUM	Geodetic	DATE	June 03, 2009	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	REMARKS & GRAIN SIZE DISTRIBUTION (%)			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					W _p	W	W _L		WATER CONTENT (%)	GR	SA	SI
209.0 0.0	Ground surface Topsoil		1	SS	1	208														
208.8 0.2	Clayey silt trace sand, trace gravel organic inclusions																			
207.8 1.2	Firm Brown Moist End of borehole Refusal on probable bedrock		2	SS	10															
<div>* 2009 06 03</div> <div> Surface water observed during drilling</div> <div> Surface water runoff after drilling</div>																				

RECORD OF BOREHOLE No 7

1 of 1

METRIC

W.P. 5271-05-01 LOCATION Coords: 5 096 918.7 N; 221 597.2 E ORIGINATED BY F.P.
 DIST 54 HWY 69 BOREHOLE TYPE C.F.S.S.A. and Rotary Diamond Coring COMPILED BY N.R.
 DATUM Geodetic DATE June 01, 2009 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 _p	w	w _L			
								○ UNCONFINED	● QUICK TRIAXIAL	+ FIELD VANE	× LAB VANE	WATER CONTENT (%)						
209.0	Ground surface							20	40	60	80	100		20	40	60		GR SA SI CL
0.0	Topsoil		1	SS	8									○				
208.8	Clayey silt trace sand, trace gravel organic inclusions																	
0.2	Very stiff Brown Wet		2	SS	11								125	○				
	Firm Mottled grey/brown		3	SS	11				■					○				
	silt seams		4	SS	9									⊕				1 7 77 15
206.1	Sand, trace gravel		5	SS	20/5cm													
2.9	Compact Grey Wet																	
205.8	Granitic Gneiss bedrock		6	RC NQ	REC 100%													RQD 89%
	Slightly weathered to unweathered																	
	High strength		7	RC NQ	REC 100%													RQD 99%
	Good to excellent quality.																	
202.5	End of borehole		8	RC NQ	REC 100%													RQD 100%
6.5	Sample 5: Sampler bouncing																	
	* 2009 06 01																	
	▽ Water level observed during drilling																	
	■ Penetrometer test																	
	C.F.S.S.A. denotes Continuous Flight Solid Stem Augers																	

RECORD OF BOREHOLE No 8

1 of 1

METRIC

W.P. 5271-05-01 LOCATION Coords: 5 096 925.6 N; 221 553.1 E ORIGINATED BY F.P.
 DIST 54 HWY 69 BOREHOLE TYPE C.F.S.S.A. and Rotary Diamond Coring COMPILED BY N.R.
 DATUM Geodetic DATE June 03, 2009 CHECKED BY C.N.

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 γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									
								○ UNCONFINED	+ FIELD VANE								
								● QUICK TRIAXIAL	× LAB VANE								
209.5	Ground surface						20	40	60	80	100						
0.0 209.2	Topsoil		1	SS	3								○			Org. 5.8%	0 3 84 13
0.3	Silty clay, trace sand																
	Very stiff Brown Wet to firm		2	SS	9								○				
			3	SS	6								○				
	Silt seams		4	SS	6								○				
206.5	Clayey silt, trace sand		5	SS	8								○				
3.0	Stiff to Grey Wet hard		6	SS	4/15cm								○				
205.2	Granitic Gneiss bedrock		7	RC NQ	REC 100%												RQD 100%
4.3	Unweathered		8	RC NQ	REC 98%												RQD 98%
	High strength		9	RC NQ	REC 100%												RQD 100%
	Excellent quality.																
201.9	End of borehole																
7.6	Sample 6: Sampler bouncing																
	* 2009 06 03																
	▽ Surface water observed during drilling																
	▼ Surface water runoff after drilling																
	■ Penetrometer test																

RECORD OF BOREHOLE No 9

1 of 1

METRIC

W.P. 5271-05-01 LOCATION Coords: 5 096 936.6 N; 221 558.1 E ORIGINATED BY F.P.
 DIST 54 HWY 69 BOREHOLE TYPE C.F.S.S.A. and Rotary Diamond Coring COMPILED BY N.R.
 DATUM Geodetic DATE June 04, 2009 CHECKED BY C.N.





















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 γ kN/m ³	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			○								
						● QUICK TRIAXIAL			× LAB VANE											
209.6	Ground surface																			
0.0 209.3	Topsoil																			
0.3	Silty clay, trace sand		1	SS	7	209														
	Firm to Brown Moist stiff		2	SS	9							125		○						
208.1																				
1.5	Clayey silt trace sand, trace gravel		3	SS	7		208								○					
	Stiff Grey Wet		4	SS	7										○					
206.6					207										○					
3.0	Silty sand some gravel , trace clay		5	SS				24								○				
	Compact Grey Wet								206											
205.2	cobbles and boulders																			
4.4	Granitic Gneiss bedrock		6	RC NQ		REC 100%		205												
	Unweathered									204										
	High strength						203													
	Excellent quality.		7	RC NQ		REC 100%														
			8	RC NQ	REC 100%															
202.2																				
7.4	End of borehole																			

RECORD OF BOREHOLE No 10

1 of 1

METRIC

W.P. 5271-05-01 LOCATION Coords: 5 096 931.9 N; 221 553.7 E ORIGINATED BY F.P.
 DIST 54 HWY 69 BOREHOLE TYPE C.F.S.S.A. and Rotary Diamond Coring COMPILED BY N.R.
 DATUM Geodetic DATE June 03, 2009 CHECKED BY C.N.

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 γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									
								○ UNCONFINED		+ FIELD VANE							
						● QUICK TRIAXIAL	x LAB VANE				WATER CONTENT (%)						
209.4	Ground surface																
0.0 209.1	Topsoil		1	SS	2												
0.3	Clayey silt trace sand, trace gravel																
	Firm to Brown Moist stiff		2	SS	9												
																	
			3	SS	4												
																	
	Silt seams		4	SS	10												
																	
			5	SS	4												
																	
205.5			6	SS	10/0cm												
3.9 205.2	Sand seams																
4.2	Boulder																
	Granitic Gneiss bedrock		7	RC NQ	REC 100%											RQD 52%	
	Slightly weathered to unweathered																
	High strength		8	RC NQ	REC 97%											RQD 97%	
	Fair to excellent quality.																
			9	RC NQ	REC 96%											RQD 96%	
202.1																	
7.3	End of borehole																
	Sample 6: Sampler bouncing																

METRIC

20
15 — 5 (%) STRAIN AT FAILURE
10

METRIC

20
15 — 5 (%) STRAIN AT FAILURE
10

RECORD OF BOREHOLE No 13

1 of 1

METRIC

W.P. 5271-05-01 LOCATION Coords: 5 096 947.2 N; 221 505.7 E ORIGINATED BY F.P.
 DIST 54 HWY 69 BOREHOLE TYPE C.F.S.S.A. + Wash Boring and Rotary Diamond Coring COMPILED BY N.R.
 DATUM Geodetic DATE June 04, 2009 CHECKED BY C.N.

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 γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL		
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa											
								○ UNCONFINED	+ FIELD VANE										
						● QUICK TRIAXIAL	× LAB VANE				WATER CONTENT (%)								
210.8 0.0	Ground surface Topsoil					▽*		20	40	60	80	100							
210.6 0.2	Clayey silt, trace sand Stiff Brown Moist		1	SS	11										○				
			2	SS	12										○				
209.3 1.5	Sand with silt some gravel, trace clay Dense Brown Wet cobbles and boulders		3	SS	33										○				
207.5 3.3	Granitic Gneiss bedrock Slightly weathered to unweathered High strength Excellent becoming fair quality at depth.		4	RC NQ	REC 100%													18 48 27 7	
			5	RC NQ	REC 95%													RQD 100%	
			6	RC NQ	REC 100%													RQD 95%	
204.3 6.5	End of borehole																	RQD 66%	
* 2009 06 04																			
▽ Water level observed during drilling																			
C.F.S.S.A. denotes Continuous Flight Solid Stem Augers																			

RECORD OF BOREHOLE No 14

1 of 1

METRIC

W.P. 5271-05-01 LOCATION Coords: 5 096 958.3 N; 221 510.8 E ORIGINATED BY F.P.
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Solid Stem Augers COMPILED BY N.R.
 DATUM Geodetic DATE June 05, 2009 CHECKED BY C.N.

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 γ kN/m ³	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		● QUICK TRIAXIAL		x LAB VANE							
210.3	Ground surface																			
0.0	Topsoil																			
210.1	Clayey silt		1	SS	10															
0.2	trace sand, trace gravel																			
	Stiff Brown Wet		2	SS	14															
	silt seams		3	SS	8												1 4 81 14			
207.9																				
2.4	Gravelly sand		4	SS	25												35 48 14 3			
207.6	some silt, trace clay																			
2.7	Compact Brown Wet																			
	End of borehole																			
	Refusal on probable boulder																			

* 2009 06 05

▽ Water level observed
during drilling

▽* Water level measured
after drilling

■ Penetration test

RECORD OF BOREHOLE No 15

1 of 1

METRIC

W.P. 5271-05-01 LOCATION Coords: 5 096 953.5 N; 221 506.5 E ORIGINATED BY F.P.
 DIST 54 HWY 69 BOREHOLE TYPE C.F.S.S.A. and Rotary Diamond Coring COMPILED BY N.R.
 DATUM Geodetic DATE June 05, 2009 CHECKED BY C.N.

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 γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									
								○ UNCONFINED + FIELD VANE									
								● QUICK TRIAXIAL × LAB VANE									
					WATER CONTENT (%)												
210.5	Ground surface						20	40	60	80	100		20	40	60		
0.0	Topsoil																
210.3 0.2	Clayey silt, trace sand		1	SS	8				■					○			
	Stiff Brown Moist																
	silt layers		2	SS	12									○			

RECORD OF BOREHOLE No 16

1 of 1

METRIC

W.P. 5271-05-01 LOCATION Coords: 5 096 957.1 N; 221 505.9 E ORIGINATED BY F.P.
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Solid Stem Augers COMPILED BY N.R.
 DATUM Geodetic DATE June 09, 2009 CHECKED BY C.N.

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT			UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa					w _p	w	w _L			
210.5	Ground surface																	
0.0	Topsoil																	
210.3	Silty clay, trace sand		1	SS	7	▽*	210								o		1 4 68 27	
0.2																		
209.6	Firm to Brown Moist stiff		2	SS	10										o			
0.9	Clayey silt trace sand, trace gravel		3	SS	9													
	Stiff Brown Moist																	
	sand layers		4	SS	14/15cm													
207.9	Sand, trace gravel cobbles and boulders						208											
2.6	Very dense Brown Wet		5	SS	20/5cm		207											
							206											
							205											
205.5	Granitic Gneiss bedrock		6	RC NQ	REC 95%	204											RQD 95%	
5.0	Unweathered High strength Excellent quality.		7	RC NQ	REC 100%	203											RQD 94%	
202.3	End of borehole		8	RC NQ	REC 100%												RQD 100%	
8.2																		
	Samples 4 & 5: Sampler bouncing																	
	* 2009 06 09																	
	▽ Water level observed during drilling																	

RECORD OF BOREHOLE No 17

1 of 1

METRIC

W.P. 5271-05-01 LOCATION Coords: 5 096 949.3 N; 221 501.2 E ORIGINATED BY F.P.
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Solid Stem Augers COMPILED BY N.R.
 DATUM Geodetic DATE June 04, 2009 CHECKED BY C.N.

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 γ kN/m ³	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								○		
210.7 0.0	Ground surface Topsoil		1	SS	9	 210	210	20	40	60	80	100	20	40	60	0 4 85 11					
210.5 0.2	Clayey silt, trace sand																				
209.9 0.8	Stiff Brown Moist Silt some clay, trace sand		2	SS	12																
208.9 1.8	Compact Brown Wet Sand, trace gravel		3	SS	27	209	209														
208.4 2.3	Compact Brown Wet End of borehole Refusal on probable bedrock																				
<div>* 2009 06 02</div> <div> Water level observed during drilling</div> <div> Water level measured after drilling</div>																					

RECORD OF BOREHOLE No 18

1 of 1

METRIC

W.P. 5271-05-01 LOCATION Coords: 5 096 960.4 N; 221 506.3 E ORIGINATED BY F.P.
 DIST 54 HWY 69 BOREHOLE TYPE C.F.S.S.A. + Wash Boring and Rotary Diamond Coring COMPILED BY N.R.
 DATUM Geodetic DATE June 08, 2009 CHECKED BY C.N.

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 γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	*N* VALUES			SHEAR STRENGTH kPa										WATER CONTENT (%)		
								○ UNCONFINED		+ FIELD VANE								○		
								20	40	60	80	100								
								20	40	60	80	100								
210.4	Ground surface					V [*]	210										4 22 62 12			
0.0	Topsoil		1	SS	8															
210.2	Clayey silt																			
0.2	trace sand, trace gravel																			
	Stiff to Brown Moist		2	SS	15															
	very stiff																			
	silt seams		3	SS	15															
	with sand		4	SS	13															
207.6	Sand																			
2.8	trace silt, trace gravel																			
	cobbles and boulders																			
205.2	Granitic Gneiss bedrock		5	RC NQ	REC 67%	205											RQD 67%			
	Slightly weathered to unweathered																			
	High strength		6	RC NQ	REC 100%	204											RQD 100%			
	Fair becoming excellent quality.																			
			7	RC NQ	REC 100%	203											RQD 100%			
201.9	End of borehole					202														
8.5																				

METRIC

(%) STRAIN AT FAILURE

METRIC

+⁷, ×⁵: Numbers refer to Sensitivity

15 — 20 — 5
|
10
(%) STRAIN AT FAILURE

METRIC

+⁷, ×⁵: Numbers refer to Sensitivity

20
15 — ○ — 5
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No AP3

1 of 1

METRIC

W.P. 5271-05-01 LOCATION Coords: 5 096 951.1 N; 221 511.9 E ORIGINATED BY F.P.
 DIST 54 HWY 69 BOREHOLE TYPE Continuous Flight Solid Stem Augers COMPILED BY N.R.
 DATUM Geodetic DATE June 09, 2009 CHECKED BY C.N.

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 γ kN/m ³	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		● QUICK TRIAXIAL						× LAB VANE		
210.5	Ground surface							20	40	60	80	100								
0.0	Topsoil																			
210.2	Clayey silt, trace sand																			
0.3	Stiff Brown Moist																			
	silt layers																			
	sand layers																			
208.2	Sand, trace gravel																			
2.3	cobbles and boulders																			
207.6	Compact Brown Wet																			
2.9	End of borehole																			
	Refusal on probable boulder																			
						</														

METRIC

(%) STRAIN AT FAILURE

METRIC

+⁷, ×⁵: Numbers refer to Sensitivity

20
15 — ○ — 5
10

(%) STRAIN AT FAILURE

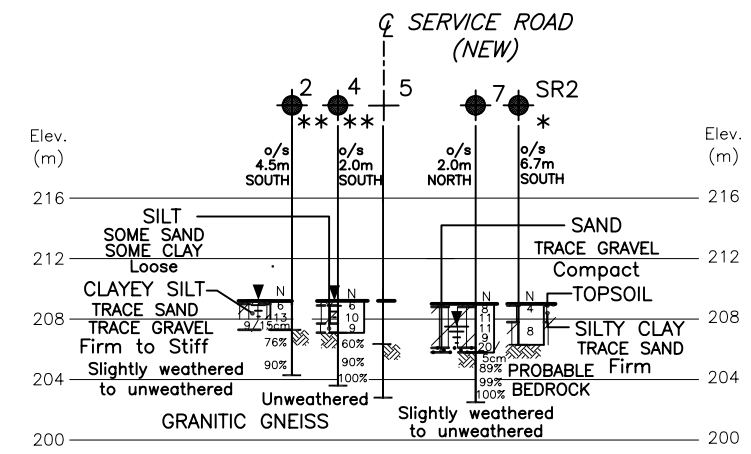
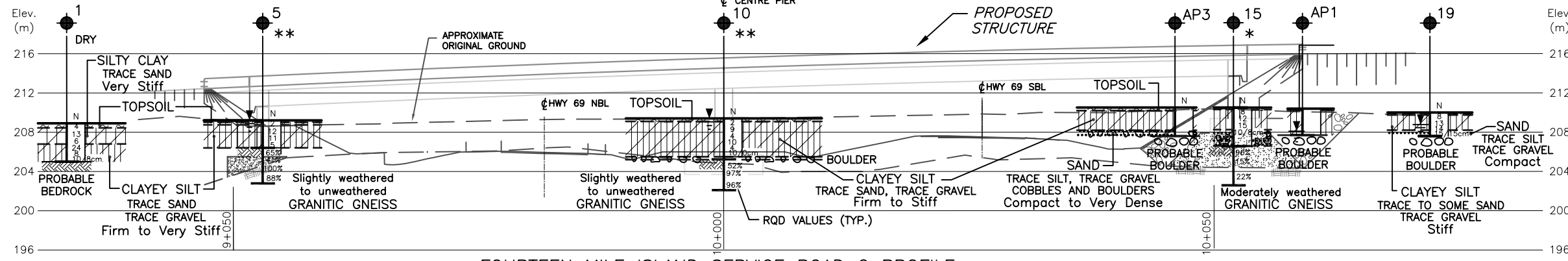
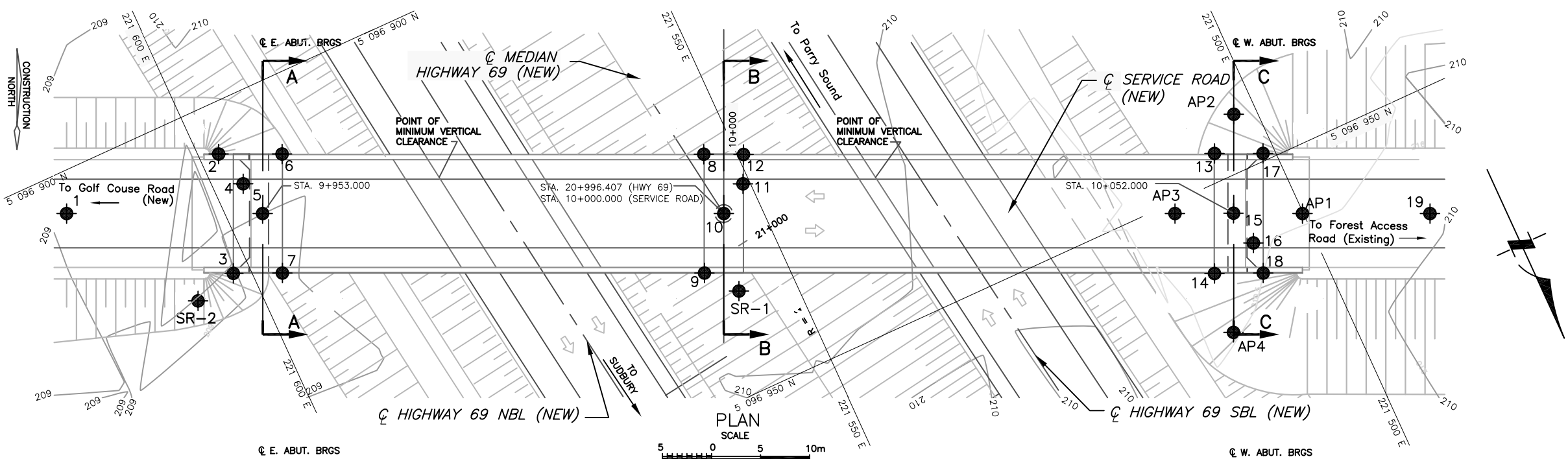
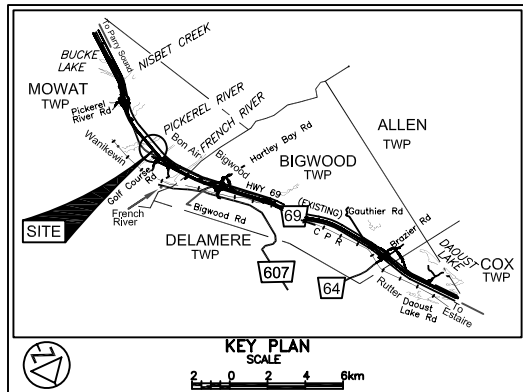
RECORD OF BOREHOLE No SR-2										1 of 1		METRIC	
W.P. <u>5271-05-01</u>		LOCATION <u>Service Road Underpass</u>		Co-ords. <u>5 096 917.7 N; 221 606.2 E</u>						ORIGINATED BY <u>M.R.</u>			
DIST <u>54</u> HWY <u>69</u>		BOREHOLE TYPE <u>Continuous Flight Hollow Stem Augers</u>								COMPILED BY <u>M.R.</u>			
DATUM <u>Geodetic</u>		DATE <u>May 26, 2004</u>								CHECKED BY <u>D.W.K.</u>			

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS *	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100	W _p	w	W _L		
209.0 0.0	Ground Surface	[diagonal lines]															
208.9 0.1	Topsoil	[diagonal lines]	1	SS	4												
	Silty clay, trace sand	[diagonal lines]															
	Firm Brown Moist	[diagonal lines]															
207.8 1.2	Clayey silt, trace sand	[diagonal lines]															
	Firm Brown Wet to stiff	[diagonal lines]	2	SS	8												
206.3 2.7	End of borehole	[diagonal lines]															
	Refusal on probable bedrock	[diagonal lines]															
	* Borehole dry on completion of drilling	[diagonal lines]															

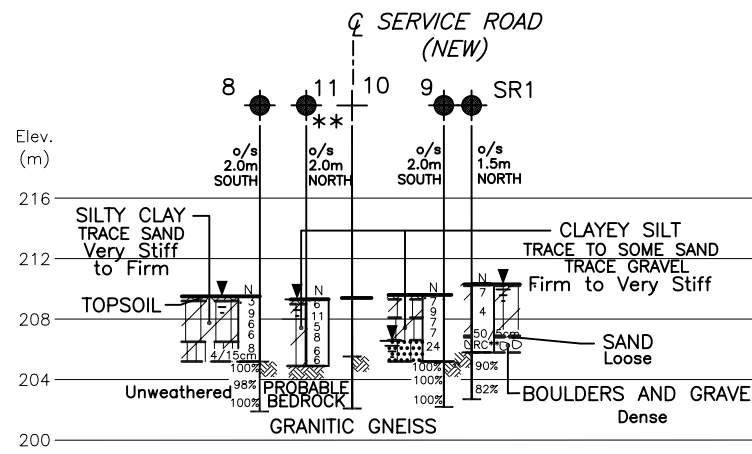
CONT No
WP No 5271-05-01

FOURTEEN MILE ISLAND
SERVICE ROAD UNDERPASS
HIGHWAY 69
BOREHOLE LOCATIONS AND SOIL STRATA

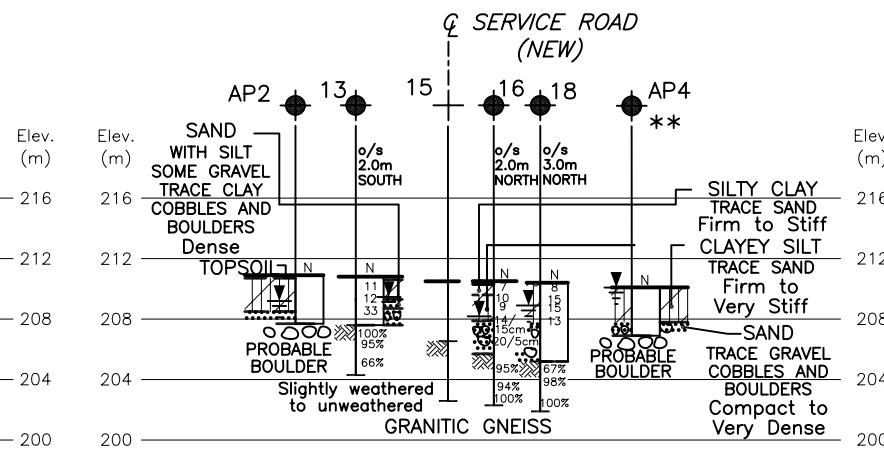
PMI Peto MacCallum Ltd.
CONSULTING ENGINEERS



SECTION A-A



SECTION B-B



SECTION C-C

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)
- W L at time of investigation: June 2009 and May 2004.
- * Water level not established
- ** Surface water observed
- Head
- ARTESIAN WATER
- Encountered
- PIEZOMETER

BH No	ELEVATION	CO-ORDINATES	
		NORTHINGS	EASTINGS
1	208.9	5 096 904.0	221 614.7
2	209.2	5 096 905.0	221 598.0
3	207.4	5 096 916.7	221 601.7
4	209.2	5 096 908.8	221 597.0
5	209.2	5 096 912.4	221 596.5
6	209.0	5 096 907.7	221 592.2
7	209.0	5 096 918.7	221 597.2
8	209.5	5 096 925.6	221 553.1
9	209.6	5 096 936.6	221 558.1
10	209.4	5 096 931.9	221 553.7
11	209.3	5 096 930.0	221 550.7
12	209.4	5 096 927.3	221 549.4
13	210.8	5 096 947.2	221 505.7
14	210.3	5 096 958.3	221 510.8

(Legend Continues)

- NOTES:
- DRAWING FMSR-1 SHOULD BE READ IN CONJUNCTION WITH THE TEXT AND RECORD OF BOREHOLE LOGS.
 - THIS DRAWING IS FOR SUBSURFACE INFORMATION ONLY. SURFACE DETAILS AND FEATURES ARE FOR CONCEPTUAL ILLUSTRATION.
 - COORDINATES OF BOREHOLES WERE PROVIDED BY MRC IN REFERENCED GENERAL ARRANGEMENT DRAWING.
 - ALL DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN. STATIONS ARE IN KILOMETRES + METRES.

Legend Continued

BH No	ELEVATION	CO-ORDINATES	
		NORTHINGS	EASTINGS
AP1	210.4	5 096 956.5	221 500.1
AP2	210.9	5 096 944.4	221 502.2
AP3	210.5	5 096 951.1	221 511.9
AP4	210.1	5 096 964.6	221 511.5
SR-1	210.3	5 096 939.8	221 555.6
SR-2	209.0	5 096 917.7	221 606.2

Legend Continued

BH No	ELEVATION	CO-ORDINATES	
		NORTHINGS	EASTINGS
15	210.5	5 096 953.5	221 506.5
16	210.5	5 096 957.1	221 505.9
17	210.7	5 096 949.3	221 501.2
18	210.4	5 096 960.4	221 506.3
19	210.0	5 096 961.9	221 488.3

(Legend Continues)



REF No. MRC Drawings;
S6454-330-001GA.dwg; dated JUN 2009 MODIFIED NOV. 20, 2009
and H6454xb2 contours zone 10

REVISIONS

DATE	BY	DESCRIPTION

Geocres No. 411-246

HWY No 69	DIST 54
SUBM'D MN	CHECKED NR
DATE NOV. 23, 2009	SITE 44-431
DRAWN NA	CHECKED CN
APPROVED BRG	DWG FMSR-1



APPENDIX A

Site Photographs



Photograph 1: Looking south from the west abutment, approximate Sta. 10+060. Flat ground heavily wooded to the west with a slight dip in ground elevation at west end of the west abutment is in view of the photograph. (May 27, 2009).

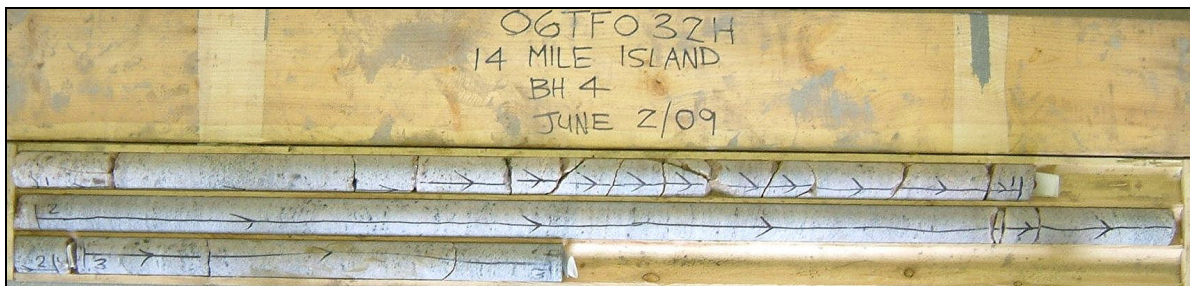


APPENDIX B

Rock Core Photographs



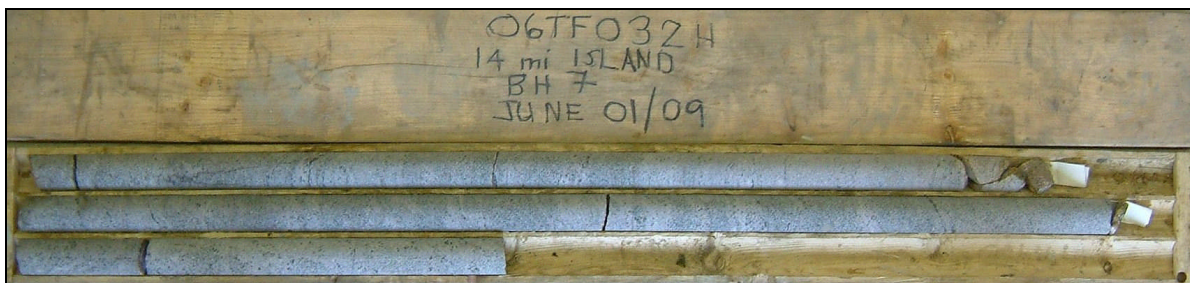
Photograph 1: Cores retrieved from borehole 2. RQD values obtained 76 and 90% for runs 4 and 5 from 1.9 to 4.9 m depth, respectively. Good to excellent rock quality.



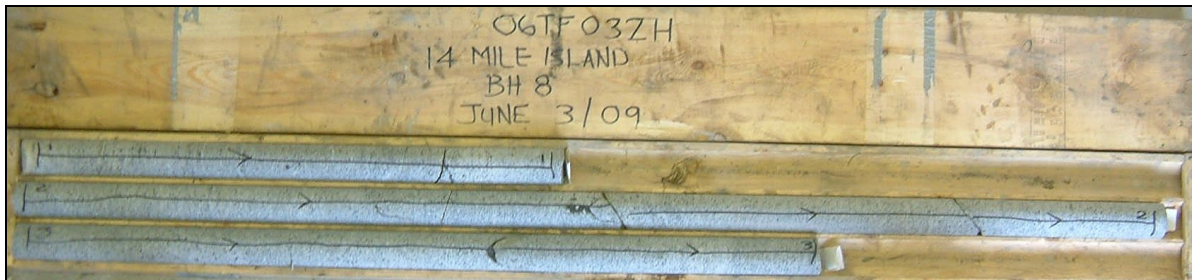
Photograph 2: Cores retrieved from borehole 4. RQD values obtained 60, 90 and 100% for runs 4 to 6, respectively, from 2.1 to 5.6 m depth. Rock quality is fair becoming excellent.



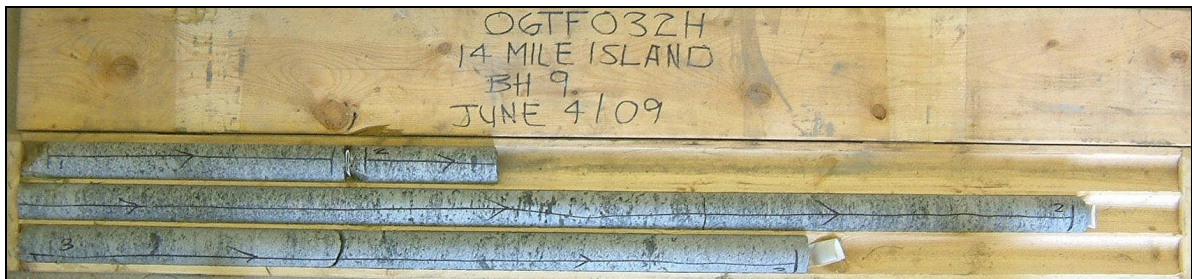
Photograph 3: Cores retrieved from borehole 5. RQD values obtained 65, 41, 100 and 88% for runs 5 to 8, respectively, from 2.8 to 6.4 m depth, indicating poor to fair becoming good to excellent rock quality.



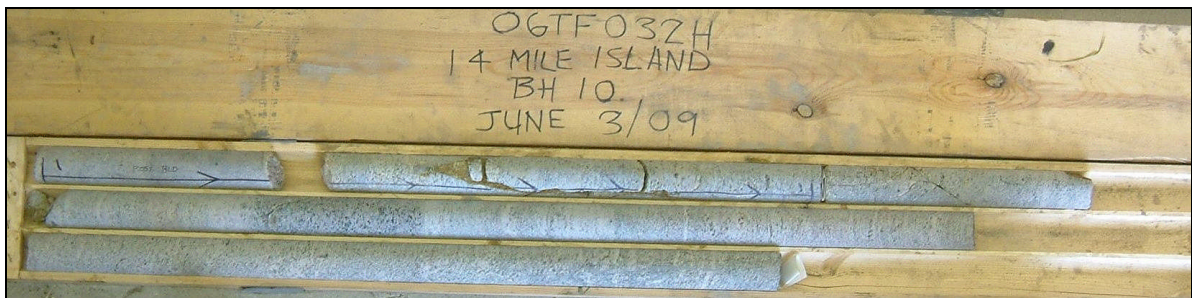
Photograph 4: Cores retrieved from borehole 7. Runs 6 to 8 from 3.2 to 6.5 m depth. RQD ranged from 89 to 100%, indicating good to excellent rock quality.



Photograph 5: Cores retrieved from borehole 8. Runs 7 to 9 from 4.3 to 7.6 m depth. RQD values obtained 98 to 100%, indicating excellent rock quality.



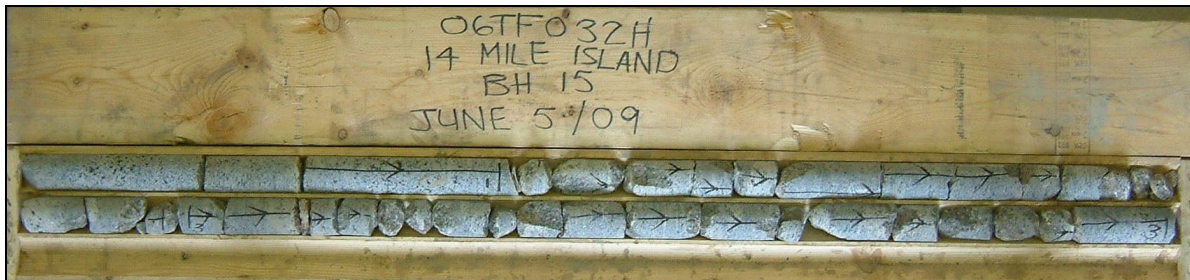
Photograph 6: Cores retrieved from borehole 9. Runs 6 to 8 from 4.4 to 7.4 m depth. RQD values obtained are 100%, indicating excellent rock quality.



Photograph 7: Cores retrieved from borehole 10. Runs 7 to 9 from 4.2 to 7.3 m depth. RQD values obtained are 52, 97 and 96%, indicating fair to excellent rock quality.



Photograph 8: Cores retrieved from borehole 13. RQD values obtained are 100, 95 and 66% for runs 4 to 6, respectively, from 3.3 to 6.5 m depth, indicating excellent rock quality becoming fair at depth.



Photograph 9: Cores retrieved from borehole 15. RQD value obtained 96% for run 5 in possible boulder from 3.9 to 4.6 m depth, and 15 and 22% for runs 6 and 7, respectively, from 4.6 to 7.9 m depth in Granitic Gneiss bedrock, indicating very poor rock quality. (Note: Technical difficulties with extracting cores required recoring, affecting recovery and RQD values of runs 6 and 7.)



Photograph 10: Cores retrieved from borehole 16. Runs 6 to 8 from 5.0 to 8.2 m depth. RQD values obtained ranged from 94 to 100%, indicating excellent rock quality.



Photograph 11: Cores retrieved from borehole 18. RQD values obtained 67, 100 and 100% for runs 5, 6 and 7, respectively, from 5.2 to 8.5 m depth, indicating fair becoming excellent rock quality.