

**FOUNDATION INVESTIGATION AND DESIGN REPORT
SWAMP CROSSINGS AND HIGH FILL EMBANKMENTS
HIGHWAY 69 FOUR-LANING
FROM THE SOUTH JUNCTION OF HIGHWAY 529 NORTHERLY 15 KM
G.W.P. 5076-06-00
SOUTH SECTION – HIGHWAY 529 TO NAISCOOT LAKE
VOLUME 2 OF 2**

Geocres Number: 41H-96

Report to

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H:\19\5161\21 Hwy69 N of Hwy529\Reports & Memos\Embankments\Section 1 - HWY 529 to Naiscoot\Swamp Crossings & High Fills
South Section Final FIDR.doc

Appendix B

**Hwy 69 NBL & SBL
Sta. 17+425 to 17+560 Township of Harrison**

**Boreholes 01-01 to 01-16
DCPTs D01-01R to D01-07R**

**Record of Borehole Sheets
Laboratory Test Results
Borehole Locations and Soil Strata Drawings**

SYMBOLS, ABBREVIATIONS AND TERMS USED ON RECORDS OF BOREHOLES

1. TEXTURAL CLASSIFICATION OF SOILS

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

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

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

3. TERMS DESCRIBING CONSISTENCY (COHESIVE SOILS ONLY)

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

NOTE: Hierarchy of Soil Strength Prediction

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

4. TERMS DESCRIBING DENSITY (COHESIONLESS SOILS ONLY)

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

5. LEGEND FOR RECORDS OF BOREHOLES

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

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



Water Level

C_{pen}






Shear Strength Determination by Pocket Penetrometer

- (1) SPT 'N' Value Standard Penetration Test 'N' Value – refers to the number of blows from a 63.5kg hammer free falling a height of 0.76m to advance a standard 50 mm outside diameter split spoon sampler for 0.3 m depth into undisturbed ground.
- (2) DCPT Dynamic Cone Penetration Test – Continuous penetration of a 50 mm outside diameter, 60° conical steel point attached to "A" size rods driven by a 63.5 kg hammer free falling a height of 0.76 m. The resistance to cone penetration is the number of hammer blows required for each 0.3 m advance of the conical point into undisturbed ground.

UNIFIED SOILS CLASSIFICATION

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

EXPLANATION OF ROCK LOGGING TERMS

ROCK WEATHERING CLASSIFICATION		SYMBOLS	
Fresh (FR)	No visible signs of weathering.		
Fresh Jointed (FJ)	Weathering limited to the surface of major discontinuities.		CLAYSTONE
Slightly Weathered (SW)	Penetrative weathering developed on open discontinuity surfaces, but only slight weathering of rock material.		SILTSTONE
Moderately Weathered (MW)	Weathering extends throughout the rock mass, but the rock material is not friable.		SANDSTONE
Highly Weathered (HW)	Weathering extends throughout the rock mass and the rock is partly friable.		COAL
Completely Weathered (CW)	Rock is wholly decomposed and in a friable condition, but the rock texture and structure are preserved.		Bedrock (general)

DISCONTINUITY SPACING		STRENGTH CLASSIFICATION			
Bedding	Bedding Plane Spacing	Rock Strength	Approximate Uniaxial Compressive Strength		Field Estimation of Hardness*
			(MPa)	(psi)	
Very thickly bedded	Greater than 2m	Extremely Strong	Greater than 250	Greater than 36,000	Specimen can only be chipped with a geological hammer
Thickly bedded	0.6 to 2m				
Medium bedded	0.2 to 0.6m	Very Strong	100-250	15,000 to 36,000	Requires many blows of geological hammer to break
Thinly bedded	60mm to 0.2m				
Very thinly bedded	20 to 60mm	Strong	50-100	7,500 to 15,000	Requires more than one blow of geological hammer to break
Laminated	6 to 20mm				
Thinly Laminated	Less than 6mm	Medium Strong	25.0 to 50.0	3,500 to 7,500	Breaks under single blow of geological hammer.
TERMS					
Total Core Recovery: (TCR)	Core recovered as a percentage of total core run length.	Weak	5.0 to 25.0	750 to 3,500	Can be peeled by a pocket knife with difficulty
Solid Core Recovery: (SCR)	Percent Ratio of solid core of full cylindrical shape recovered. Expressed with respect to the total length of core run.	Very Weak	1.0 to 5.0	150 to 750	Can be peeled by a pocket knife, crumbles under firm blows of geological pick.
Rock Quality Designation: (RQD)	Total length of sound core recovered in pieces 0.1m in length or larger as a percentage of total core run length.	Extremely Weak (Rock)	0.25 to 1.0	35 to 150	Indented by thumbnail
Uniaxial Compressive Strength (UCS)	Axial stress required to break the specimen				
Fracture Index: (FI)	Frequency of natural fractures per 0.3m of core run.				

METRIC

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		
198.5	Ground Surface						SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100						GR SA SI C

ONTMT4S 6121.GPJ 12/11/12

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH01-02L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+443.5 O/S 13.4L, NBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Visual Assessment and Manual Excavation COMPILED BY LG
 DATUM Geodetic DATE 2009.02.11 - 2009.02.11 CHECKED BY RPR

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 (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	SHEAR STRENGTH kPa			WATER CONTENT (%)							
197.1	Ground Surface								20 40 60 80 100							
0.0	ORGANICS with sand: (300mm)						197		20 40 60 80 100					kn/m ³		
196.8																
0.3	BEDROCK AT 0.3m.															




+³, X³: Numbers refer to
Sensitivity

20
15
10
5
(%) STRAIN AT FAILURE

METRIC

[illegible]

METRIC


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 (%) GR SA SI C
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES				w p w w L		
								SHEAR STRENGTH kPa	WATER CONTENT (%)		
194.8	Ground Surface						 <p>○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE</p>				

[illegible]

ONTMT4S 6121.GPJ 12/11/12

+ 3, X 3: Numbers refer to Sensitivity

METRIC

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		
195.1	Ground Surface										20 40 60		GR SA SI CL
							SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100						


[illegible]

RECORD OF BOREHOLE No BH01-06

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+465 C/L, SBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Portable Split Spoon Sampling Equipment COMPILED BY AN
 DATUM Geodetic DATE 2010.11.10 - 2010.11.10 CHECKED BY MRA

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						
194.1	Ground Surface							20 40 60 80 100								
0.0	ORGANICS, fibrous (200mm)		1	SS	18/		194	20 40 60 80 100				20 40 60				
0.2	END OF BOREHOLE AT 0.2m UPON REFUSAL ON PROBABLE BEDROCK.				0.050											

+³, ×³: Numbers refer to
Sensitivity

20
15 5
10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH01-07R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+477.5 O/S 19.0R, SBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Portable Split Spoon Sampling Equipment COMPILED BY AN
 DATUM Geodetic DATE 2010.11.09 - 2010.11.09 CHECKED BY MRA

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)						
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa												
195.0	Ground Surface							20	40	60	80	100								
0.0	ORGANICS: (50mm) SAND , trace gravel, trace to some silt Loose to Dense Brown Moist		1	SS	6		195													
			2	SS	32															
193.9			3	SS	187		194													
1.1	END OF BOREHOLE AT 1.1m UPON REFUSAL ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING.				0.050															

+³, ×³: Numbers refer to
Sensitivity

20
15
10
5
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH01-08

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+490 C/L, SBL ORIGINATED BY SLL
HWY 69 BOREHOLE TYPE Portable Split Spoon Sampling Equipment COMPILED BY AN
DATUM Geodetic DATE 2010.11.10 - 2010.11.10 CHECKED BY MRA

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					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							PLASTIC LIMIT w _p NATURAL MOISTURE CONTENT w LIQUID LIMIT w _L
195.4	Ground Surface														
0.0	ORGANICS: (100mm)														
0.1	Silty SAND, trace clay Loose Brown Moist		1	SS	8		195								
194.3			2	SS	36/ 275										8 63 22 7
1.1	END OF BOREHOLE AT 1.1m UPON REFUSAL ON PROBABLE BEDROCK.														

+³ . x³ : Numbers refer to
Sensitivity

20
15 10 5
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH01-09

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+490 C/L, NBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Portable Split Spoon Sampling Equipment COMPILED BY AN
 DATUM Geodetic DATE 2010.11.09 - 2010.11.09 CHECKED BY MRA

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				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						
								20 40 60 80 100		PLASTIC LIMIT W _P NATURAL MOISTURE CONTENT W LIQUID LIMIT W _L				
						○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	WATER CONTENT (%)							
195.0	Ground Surface						20 40 60 80 100	20 40 60						
0.0 0.1	ORGANICS, fibrous: (75mm)		1	SS	8	▽	195							
	SAND, trace silt Loose to Compact Brown Moist													
194.1			2	SS	13		194							
0.9	Silty CLAY, sandy Stiff Grey Moist		3	SS	11									
193.1														
1.9	Sandy SILT, trace clay and gravel Compact Grey Wet		4	SS	19		193							
192.6														
2.4	SAND, trace to some silt, trace gravel Loose Grey Wet		5	SS	9	192								
			6	SS	6									
191.2			7	SS	18/ .100									
3.8	END OF BOREHOLE AT 3.8m UPON REFUSAL ON PROBABLE BEDROCK. BOREHOLE CAVED TO 3.2m AND WATER LEVEL AT 0.4m ON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 0.1m, THEN CUTTINGS TO SURFACE.													

RECORD OF BOREHOLE No BH01-10L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+502.5 O/S 15.0L, SBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Portable Split Spoon Sampling Equipment COMPILED BY AN
 DATUM Geodetic DATE 2010.11.10 - 2010.11.10 CHECKED BY MRA

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 x LAB VANE							
195.0	Ground Surface						20	40	60	80	100				
0.0	ORGANICS, fibrous: (175mm)						20	40	60	80	100				
0.2	SAND, some silt to silty Loose to Compact Brown Moist		1	SS	3										
194.2															
0.8	Clayey SILT, with sand seams Stiff Brown Moist		2	SS	14										
			3	SS	14										
193.2															
1.8	SAND, some silt Loose to Compact Brown-Grey Wet		4	SS	8										
			5	SS	17										
191.9			6	SS	18/										
3.1	END OF BOREHOLE AT 3.1m UPON REFUSAL ON PROBABLE BEDROCK OR BOULDERS. BOREHOLE OPEN TO 2.6m AND WATER LEVEL AT 0.3m UPON COMPLETION. BOREHOLE BACKFILLED WITH HOLEPLUG TO SURFACE.				075										

+³, X³: Numbers refer to
Sensitivity





20
15 10 5
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH01-11R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+502.5 O/S 17.0R, NBL ORIGINATED BY SLL
HWY 69 BOREHOLE TYPE Portable Split Spoon Sampling Equipment COMPILED BY AN
DATUM Geodetic DATE 2010.11.09 - 2010.11.09 CHECKED BY MRA

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					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							
								20 40 60 80 100							
197.7	Ground Surface														
0.0	ORGANICS, fibrous: (150mm)														
0.2	SAND, some silt Loose Brown Wet		1	SS	4		197								
196.9															
0.8	Clayey SILT, some sand to sandy Stiff to Very Stiff Brown to Grey Moist		2	SS	15										
			3	SS	14										
			4	SS	30				196						
195.5			5	SS	18/										
2.2	END OF BOREHOLE AT 2.2m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 0.3m AND BOREHOLE CAVED AT 1.6m UPON COMPLETION.				.075										

+³ . x³ Numbers refer to
Sensitivity

20
15 5
10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH01-12

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+515 C/L, SBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Portable Split Spoon Sampling Equipment COMPILED BY AN
 DATUM Geodetic DATE 2010.11.10 - 2010.11.10 CHECKED BY MRA

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					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							
196.4	Ground Surface		1	SS	21/ 0.275	20 40 60 80 100					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT w _p w w _L				
0.0	ORGANICS, fibrous: (175mm)					○ UNCONFINED + FIELD VANE					WATER CONTENT (%)				
0.2	SAND, trace to some silt Brown Moist					● QUICK TRIAXIAL × LAB VANE									
196.0						20 40 60 80 100					20 40 60				
0.4	END OF BOREHOLE AT 0.4m UPON REFUSAL ON PROBABLE BEDROCK OR BOULDER.														

+³, ×³: Numbers refer to
Sensitivity


20
15 5
10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH01-13

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+515 C/L, NBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Portable Split Spoon Sampling Equipment COMPILED BY AN
 DATUM Geodetic DATE 2010.11.09 - 2010.11.09 CHECKED BY MRA

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										WATER CONTENT (%)
195.9	Ground Surface																	
0.0	ORGANICS: (150mm)																	
0.1	Silty SAND , some clay Loose to Dense Brown Moist		1	SS	5	▽	195											
			2	SS	36													
194.5		3	SS	18/ 150														
1.4	END OF BOREHOLE AT 1.4m UPON REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 0.9m ON COMPLETION.																	

+³, ×³: Numbers refer to
Sensitivity

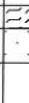
20
15 10 5
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH01-14R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+527.5 O/S 19.0R, SBL ORIGINATED BY SLL
HWY 69 BOREHOLE TYPE Portable Split Spoon Sampling Equipment COMPILED BY AN
DATUM Geodetic DATE 2010.11.10 - 2010.11.10 CHECKED BY MRA

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					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						
197.4	Ground Surface		1	SS	36/ 225			20 40 60 80 100						
0.0	ORGANICS , fibrous: (150mm)							DYNAMIC CONE PENETRATION RESISTANCE PLOT						
0.2	SAND , trace to some silt							SHEAR STRENGTH kPa						
197.0	Brown							○ UNCONFINED + FIELD VANE						
0.4	Moist							● QUICK TRIAXIAL x LAB VANE						
END OF BOREHOLE AT 0.4m UPON REFUSAL ON PROBABLE BEDROCK.														

+³ . x³ : Numbers refer to
Sensitivity

20
15 5
10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH01-15

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+540 C/L, SBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Portable Split Spoon Sampling Equipment COMPILED BY AN
 DATUM Geodetic DATE 2010.11.10 - 2010.11.10 CHECKED BY MRA

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE LIQUID CONTENT LIMIT			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 (%)				
198.4	Ground Surface							20 40 60 80 100						
0.0	ORGANICS, fibrous: (125mm)		1	SS	18/			20 40 60 80 100						
0.1	Silty SAND				0.050									
0.2	Brown Moist													
	END OF BOREHOLE AT 0.2m UPON REFUSAL ON PROBABLE BEDROCK.													

+³, ×³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH01-16

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+540 C/L, NBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Portable Split Spoon Sampling Equipment COMPILED BY AN
 DATUM Geodetic DATE 2010.11.09 - 2010.11.09 CHECKED BY MRA

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					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 (%) w _P w w _L			
199.6	Ground Surface							20	40	60	80	100		20	40	60		
0.0	ORGANICS: (100mm)		1	SS	18/			20	40	60	80	100		20	40	60		
0.1	SAND, trace cobbles Grey Moist				150													
0.2																		
	BEDROCK AT 0.2m.																	

+³, ×³: Numbers refer to
Sensitivity

20
15 5
10 (%) STRAIN AT FAILURE

METRIC

[illegible]

METRIC

+ 3, X 3: Numbers refer to Sensitivity

RECORD OF BOREHOLE No D01-03L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+477.5 O/S 15.0L, SBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Visual Assessment and Manual Excavation COMPILED BY AN
 DATUM Geodetic DATE 2010.11.10 - 2010.11.10 CHECKED BY MRA

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 (%)					
194.8	Ground Surface													
0.0	DCPT from surface.													
194.1	END OF DCPT AT 0.6m UPON REFUSAL ON PROBABLE BEDROCK.													
0.7														

ONTMT4S 6121.GPJ 12/12/12

METRIC

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No D01-05R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+502.5 O/S 19.0R, SBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2010.11.10 - 2010.11.10 CHECKED BY MRA

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						
195.2	Ground Surface						20	40	60	80	100			
0.0	DCPT from surface.						20	40	60	80	100			
194.6						195								
0.6	END OF DCPT AT 0.5m UPON REFUSAL ON PROBABLE BEDROCK.													

RECORD OF BOREHOLE No D01-06L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+527.5 O/S 15.0L, SBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2010.11.10 - 2010.11.10 CHECKED BY MRA

SOIL PROFILE		SAMPLES				GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			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		
197.8	Ground Surface													
0.0	DCPT from surface													
197.2	END OF DCPT AT 0.6m UPON REFUSAL ON PROBABLE BEDROCK													
0.6														

+³.X³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No D01-07R

1 OF 1

METRIC

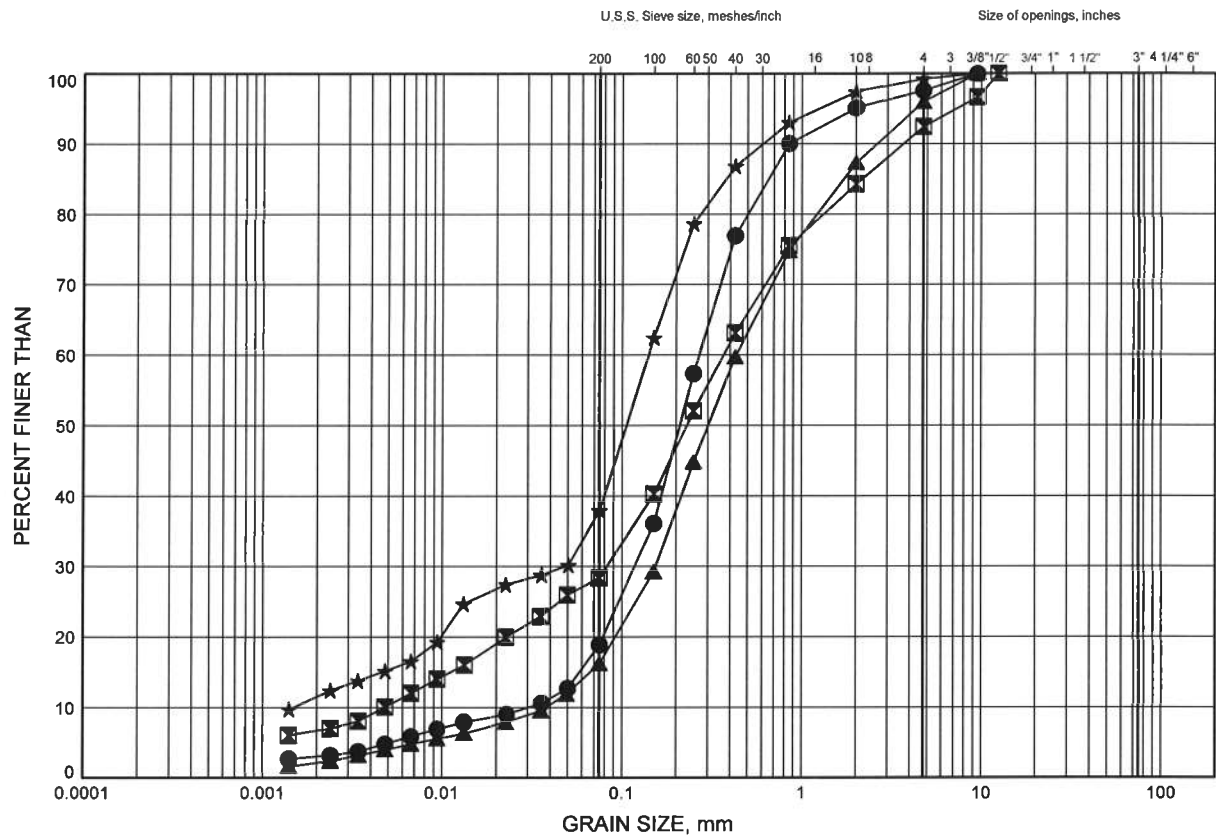
GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+527.5 O/S 17.0R, NBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2010.11.09 - 2010.11.09 CHECKED BY MRA

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			20	40	60	80	100					
200.7	Ground Surface																
0.0	DCPT from surface																
199.8							200										
0.9	END OF DCPT AT 0.9m UPON REFUSAL ON PROBABLE BEDROCK																

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE B1

SAND to Silty SAND



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH01-07R	0.30	194.70
■	BH01-08	0.84	194.56
▲	BH01-09	2.74	192.26
★	BH01-13	0.84	195.06

Date December 2012
GWP# 5076-06-00

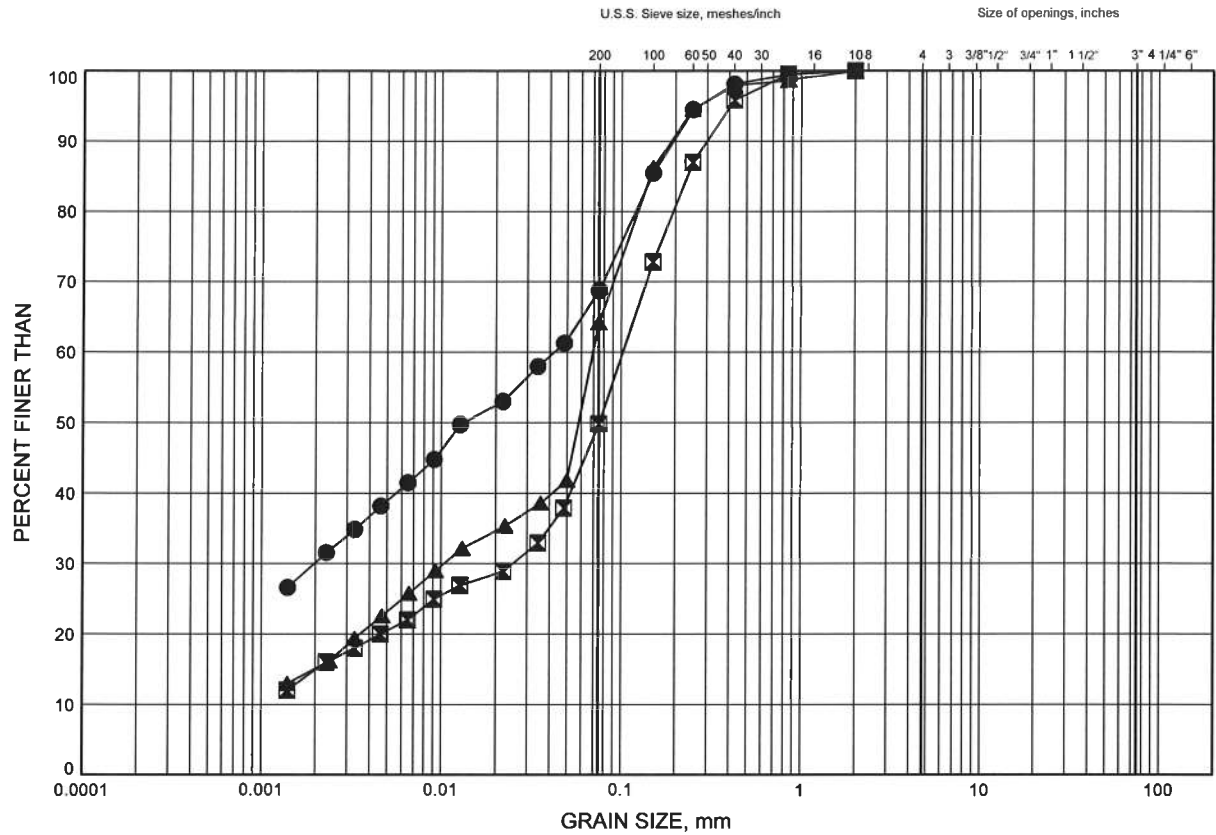


Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE B2

Silty CLAY to Clayey SILT



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH01-09	1.52	193.48
⊠	BH01-10L	1.52	193.48
▲	BH01-11R	1.45	196.25

Date December 2012

GWP# 5076-06-00



Prep'd MFA

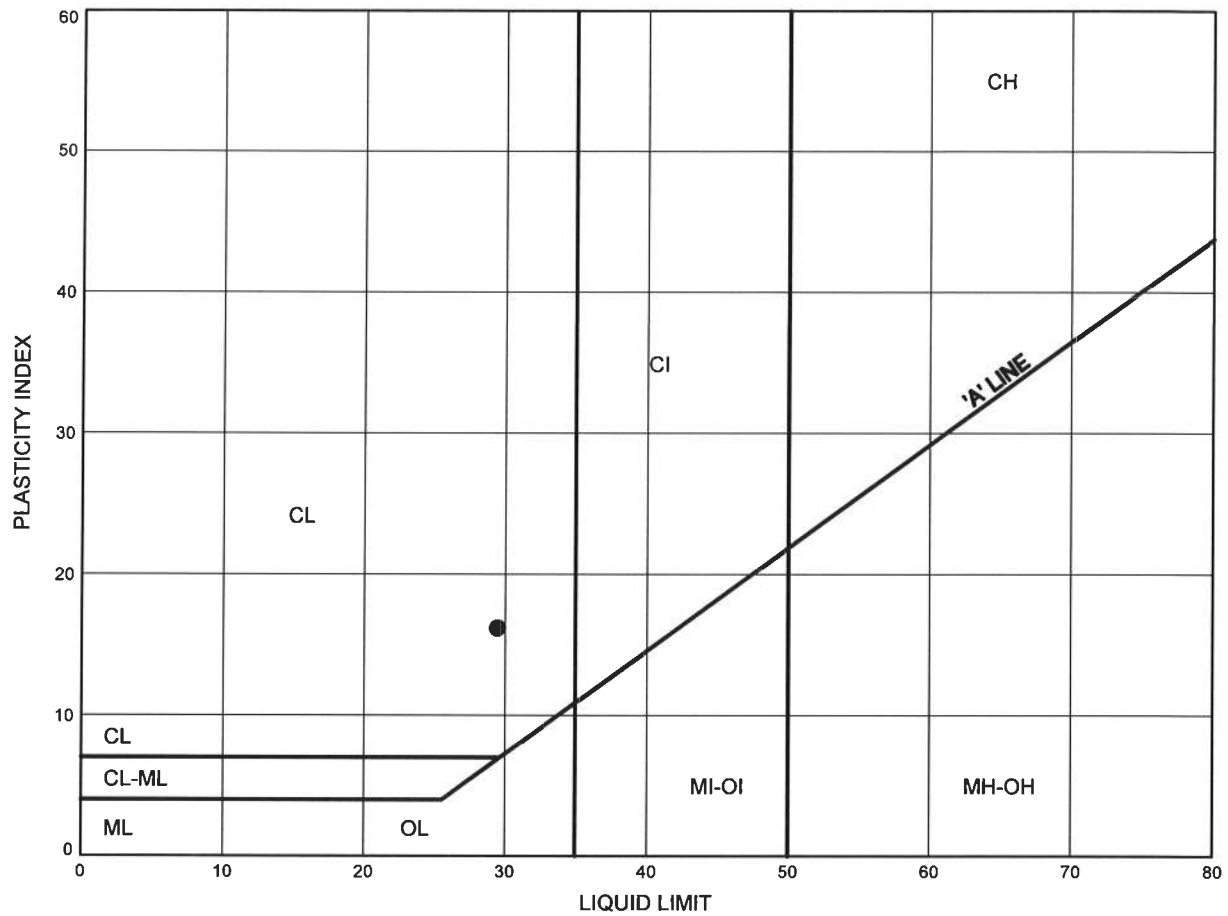
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529

ATTERBERG LIMITS TEST RESULTS

FIGURE B3

Silty CLAY to Clayey SILT



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH01-09	1.52	193.48

Date December 2012
GWP# 5076-06-00

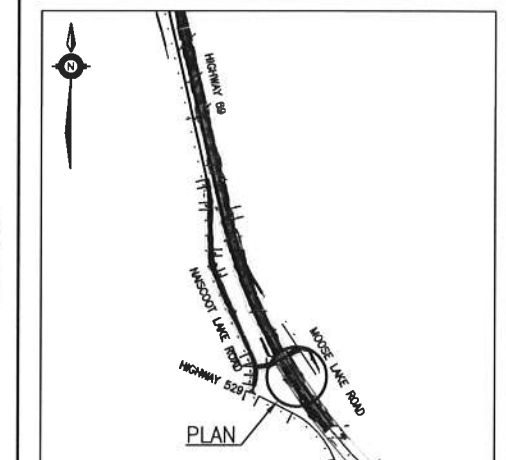


Prep'd MFA
Chkd. MRA






LICENSED PROFESSIONAL ENGINEER
P. K. Chatterji
 P. K. CHATTERJI
 Du 13/12
 PROVINCE OF ONTARIO

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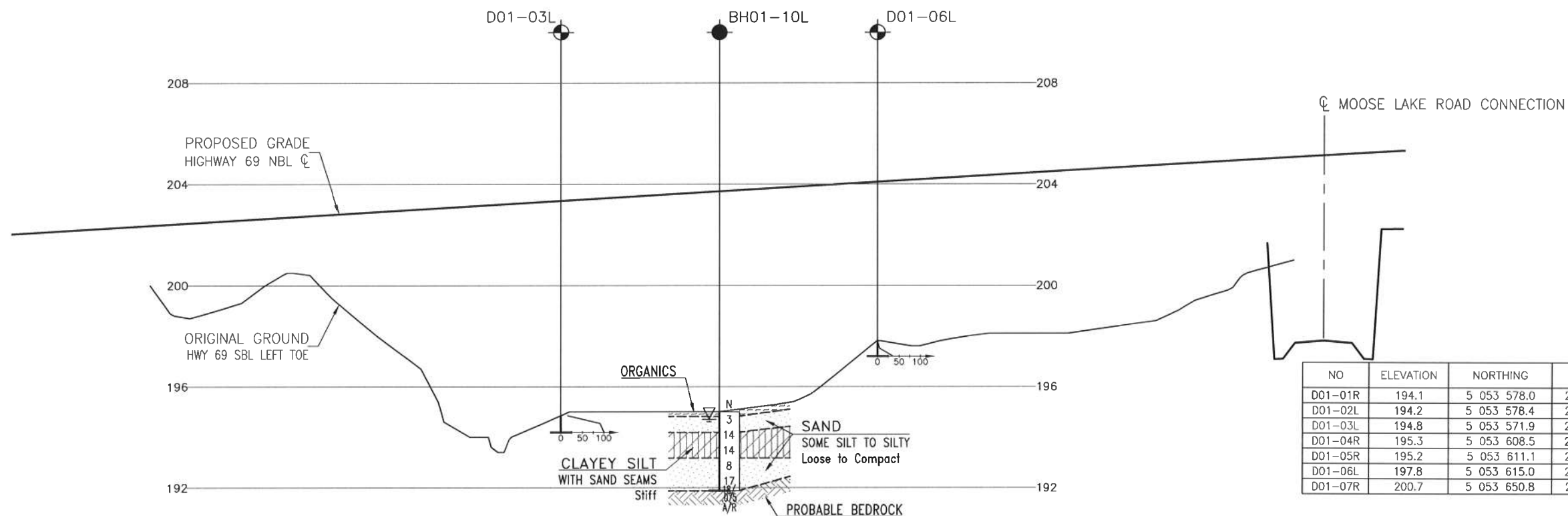
KEYPLAN
LEGEND

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

NO	ELEVATION	NORTHING	EASTING
BH01-01	198.5	5 053 556.2	235 667.6
BH01-02L	197.1	5 053 563.7	235 647.0
BH01-03	193.7	5 053 577.2	235 654.3
BH01-04R	194.8	5 053 597.0	235 662.6
BH01-05	195.1	5 053 589.8	235 646.4
BH01-06	194.1	5 053 569.1	235 615.1
BH01-07R	195.0	5 053 589.8	235 624.6
BH01-08	195.4	5 053 590.5	235 601.9
BH01-09	195.0	5 053 610.1	235 633.8
BH01-10L	195.0	5 053 593.5	235 582.5
BH01-11R	197.7	5 053 629.6	235 641.9
BH01-12	196.4	5 053 612.0	235 588.8
BH01-13	195.9	5 053 631.4	235 620.9
BH01-14R	197.4	5 053 632.5	235 598.7
BH01-15	198.4	5 053 633.5	235 575.9
BH01-16	199.6	5 053 652.7	235 608.1

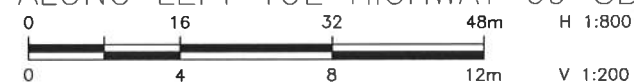
- 1) The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- 2) This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

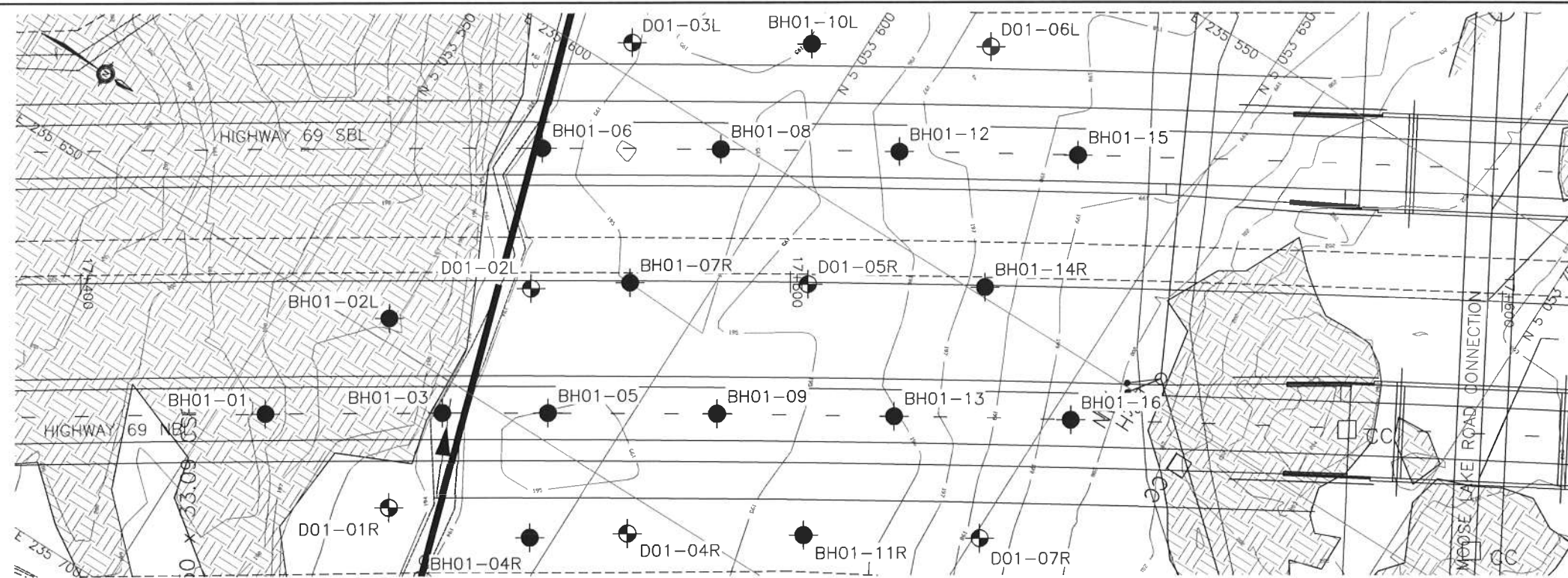
GEOCRES No. 41H-96



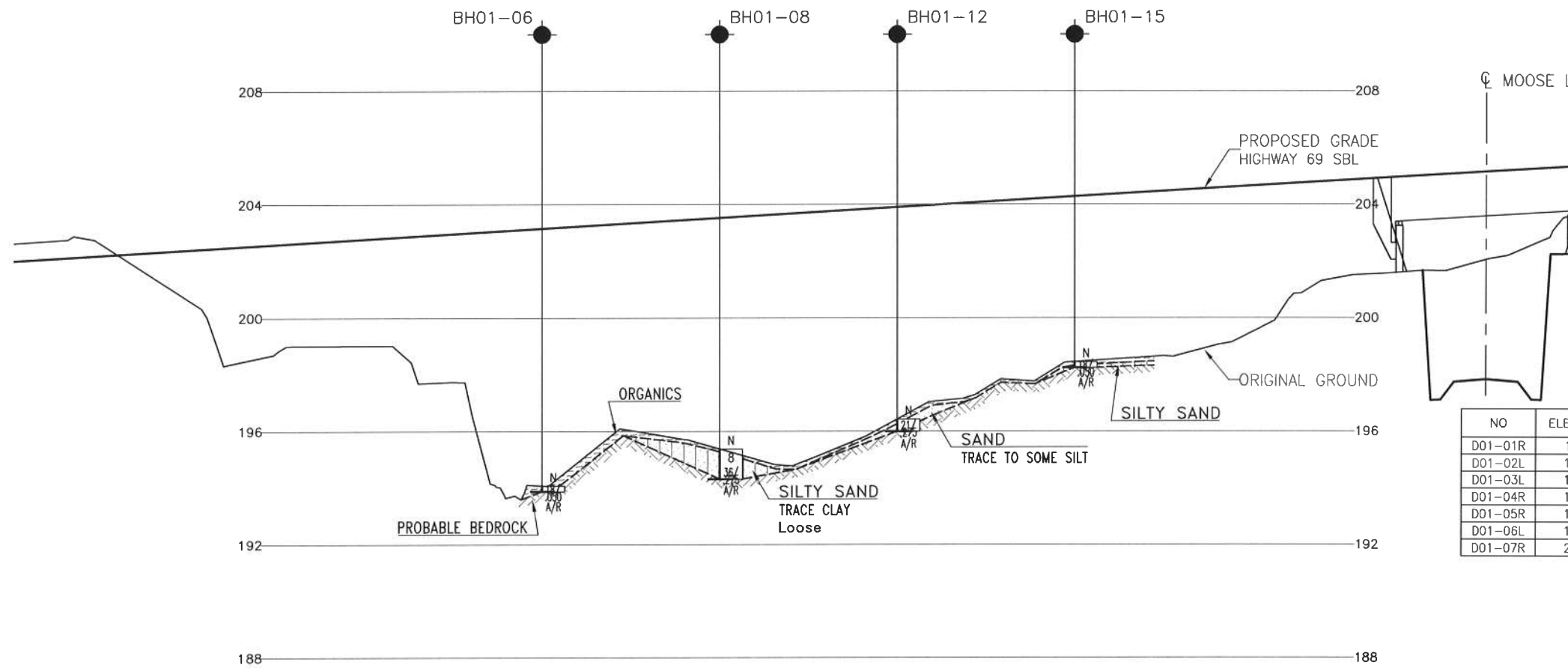
NO	ELEVATION	NORTHING	EASTING
D01-01R	194.1	5 053 578.0	235 669.6
D01-02L	194.2	5 053 578.4	235 632.8
D01-03L	194.8	5 053 571.9	235 595.7
D01-04R	195.3	5 053 608.5	235 654.8
D01-05R	195.2	5 053 611.1	235 611.5
D01-06L	197.8	5 053 615.0	235 569.5
D01-07R	200.7	5 053 650.8	235 629.1

PROFILE ALONG LEFT TOE HIGHWAY 69 SBL

[illegible]



PLAN

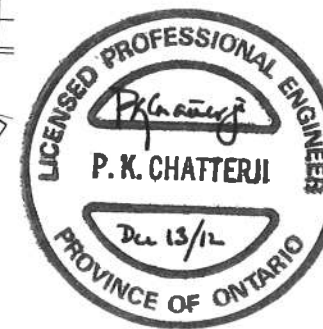
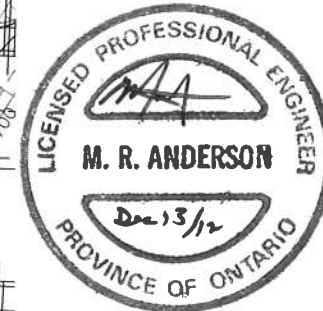


PROFILE ALONG C HIGHWAY 69 SBL



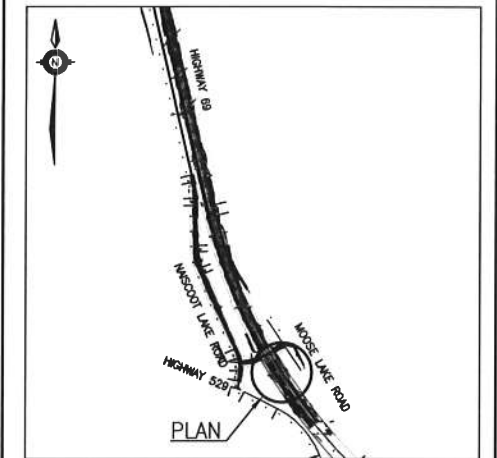
H 1:800
V 1:200

METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



CONT No
GWP No 5076-06-00

HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 SBL-C
(STA 17+425 - 17+560)
BOREHOLE LOCATIONS AND SOIL STRATA



KEYPLAN

LEGEND

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

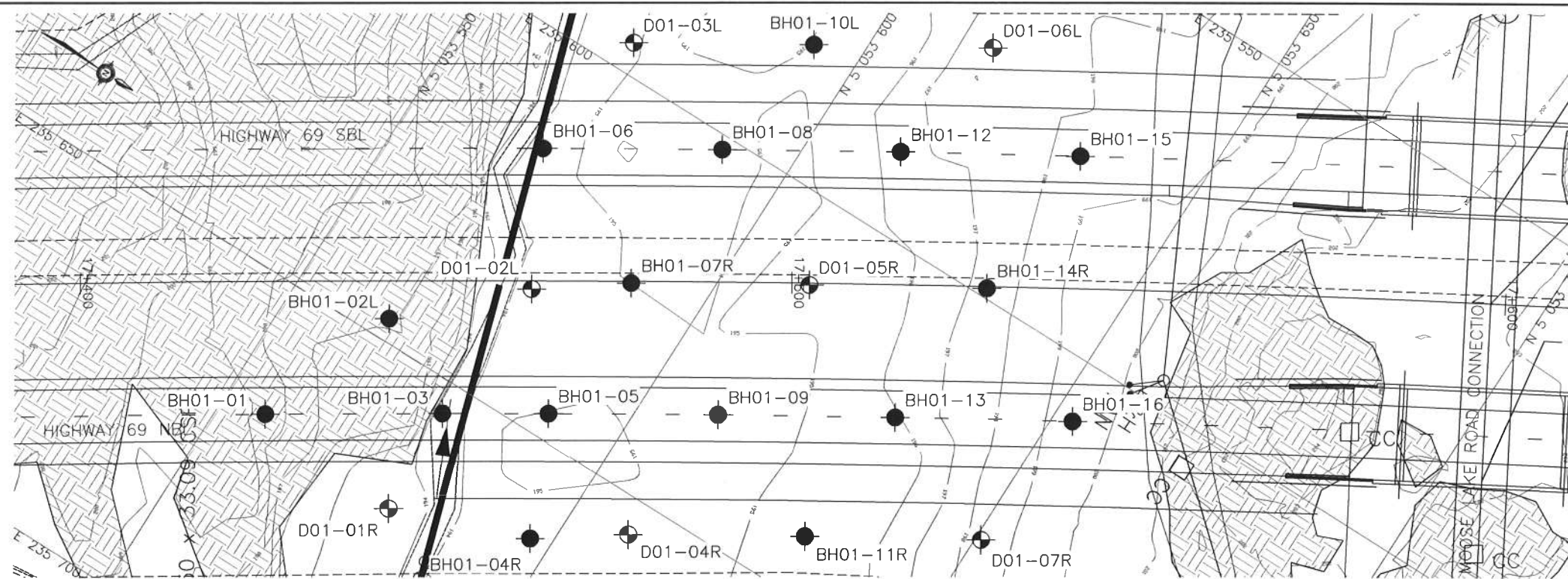
NO	ELEVATION	NORTHING	EASTING
BH01-01	198.5	5 053 556.2	235 667.6
BH01-02L	197.1	5 053 563.7	235 647.0
BH01-03	193.7	5 053 577.2	235 654.3
BH01-04R	194.8	5 053 597.0	235 662.6
BH01-05	195.1	5 053 589.8	235 646.4
BH01-06	194.1	5 053 569.1	235 615.1
BH01-07R	195.0	5 053 589.8	235 624.6
BH01-08	195.4	5 053 590.5	235 601.9
BH01-09	195.0	5 053 610.1	235 633.8
BH01-10L	195.0	5 053 593.5	235 582.5
BH01-11R	197.7	5 053 629.6	235 641.9
BH01-12	196.4	5 053 612.0	235 588.8
BH01-13	195.9	5 053 631.4	235 620.9
BH01-14R	197.4	5 053 632.5	235 598.7
BH01-15	198.4	5 053 633.5	235 575.9
BH01-16	199.6	5 053 652.7	235 608.1

-NOTES-

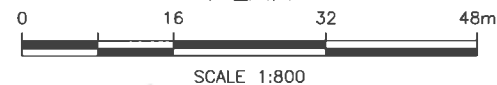
- The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
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GEOCRES No. 41H-96

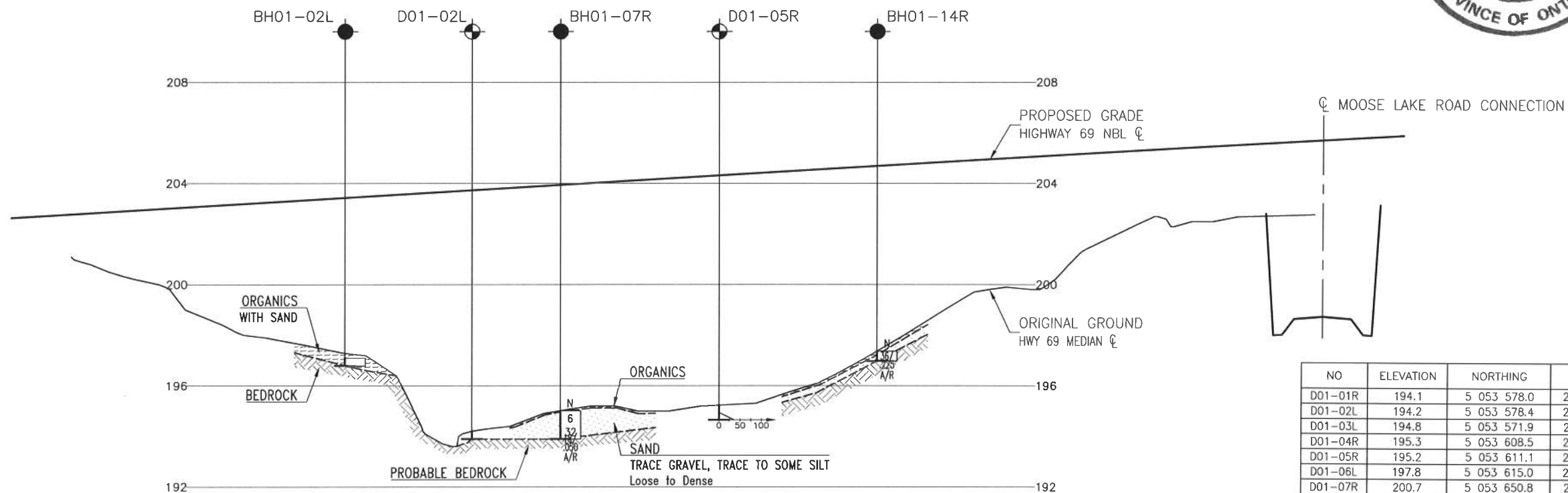
REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
LOAD	DATE	DEC. 2012	DWG



PLAN



SCALE 1:800



PROFILE ALONG MEDIAN CL HIGHWAY 69



H 1:800

V 1:200

METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

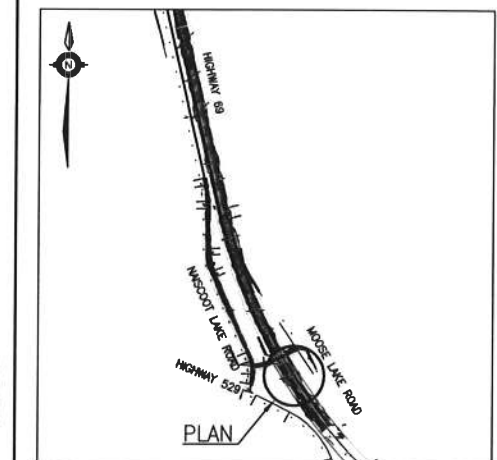


CONT No
GWP No 5076-06-00

HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 MEDIAN CL
(STA 17+425 - 17+560)
BOREHOLE LOCATIONS AND SOIL STRATA

MMM GROUP

THURBER ENGINEERING LTD.



KEYPLAN

LEGEND

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

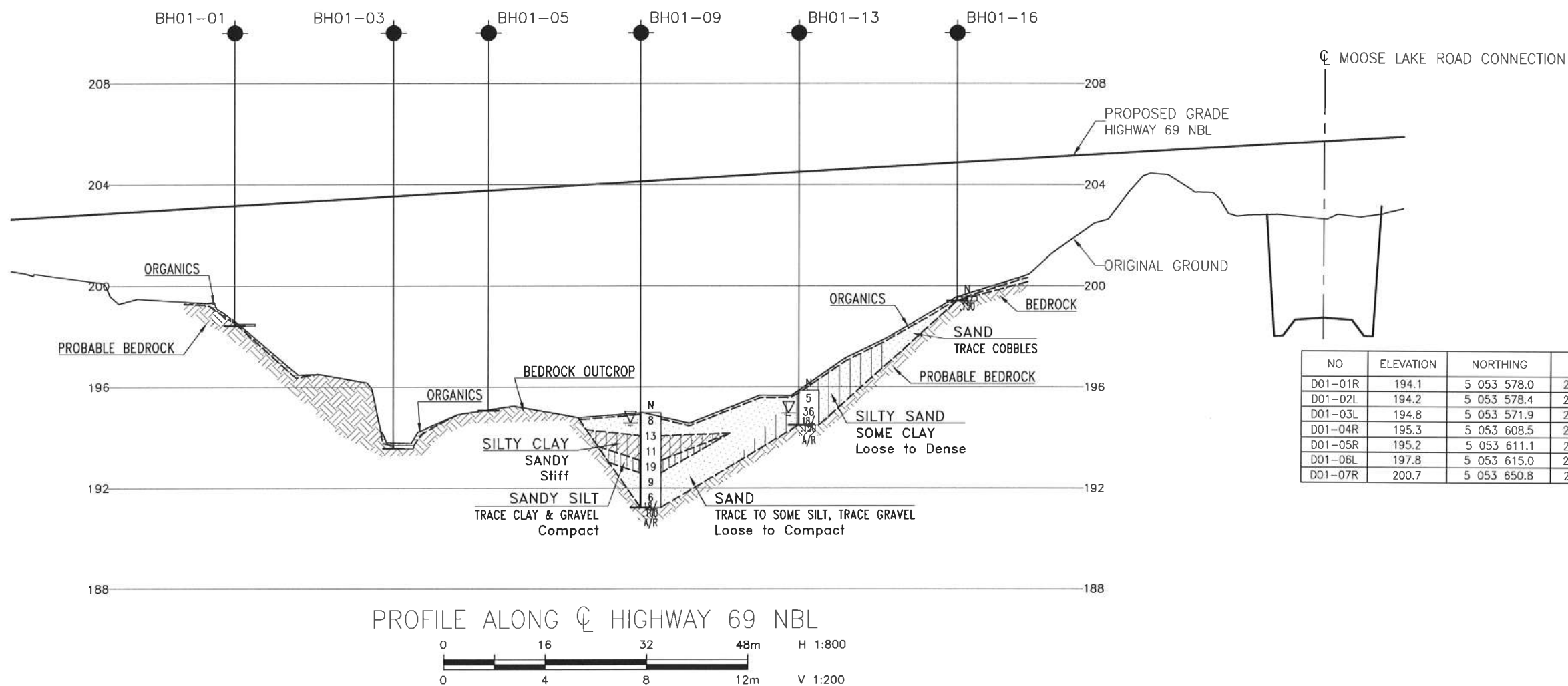
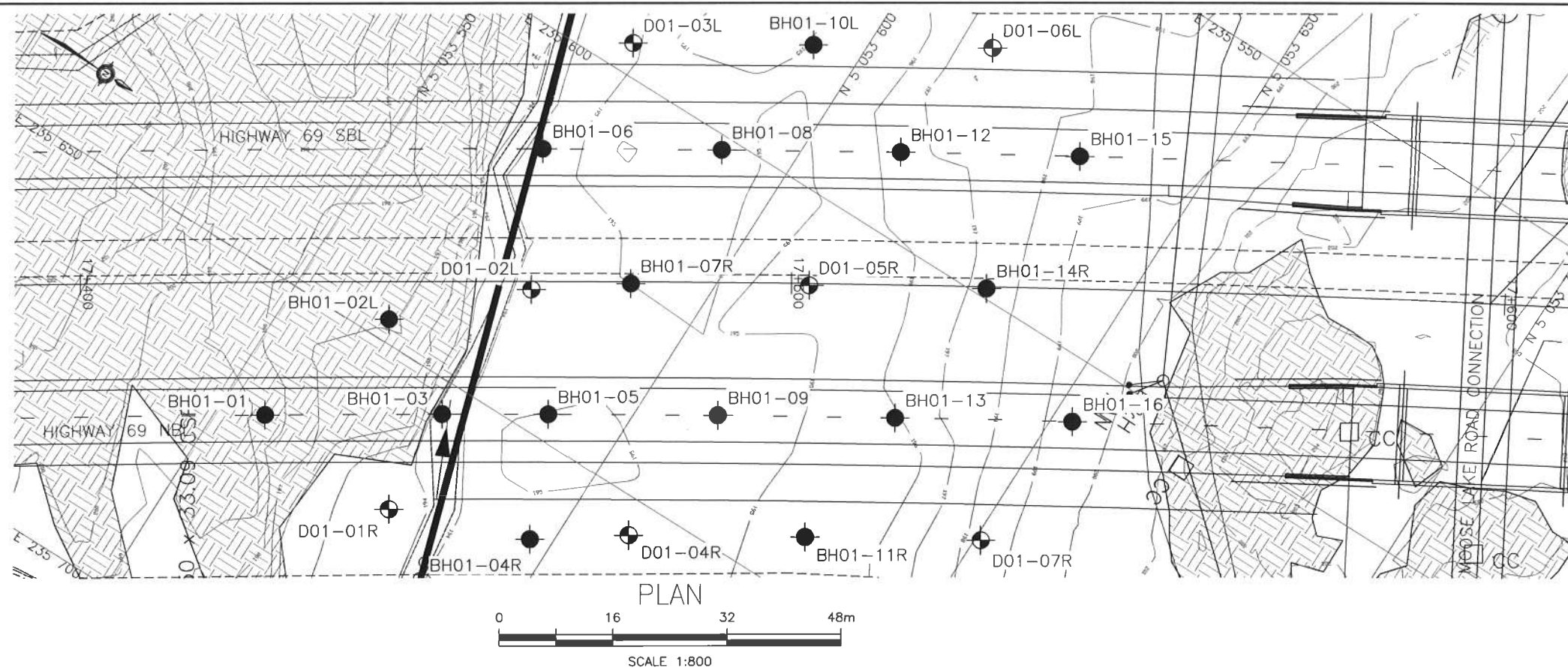
NO	ELEVATION	NORTHING	EASTING
BH01-01	198.5	5 053 556.2	235 667.6
BH01-02L	197.1	5 053 563.7	235 647.0
BH01-03	193.7	5 053 577.2	235 654.3
BH01-04R	194.8	5 053 597.0	235 662.6
BH01-05	195.1	5 053 589.8	235 646.4
BH01-06	194.1	5 053 569.1	235 615.1
BH01-07R	195.0	5 053 589.8	235 624.6
BH01-08	195.4	5 053 590.5	235 601.9
BH01-09	195.0	5 053 610.1	235 633.8
BH01-10L	195.0	5 053 593.5	235 582.5
BH01-11R	197.7	5 053 629.6	235 641.9
BH01-12	196.4	5 053 612.0	235 588.8
BH01-13	195.9	5 053 631.4	235 620.9
BH01-14R	197.4	5 053 632.5	235 598.7
BH01-15	198.4	5 053 633.5	235 575.9
BH01-16	199.6	5 053 652.7	235 608.1
D01-01R	194.1	5 053 578.0	235 669.6
D01-02L	194.2	5 053 578.4	235 632.8
D01-03L	194.8	5 053 571.9	235 595.7
D01-04R	195.3	5 053 608.5	235 654.8
D01-05R	195.2	5 053 611.1	235 611.5
D01-06L	197.8	5 053 615.0	235 569.5
D01-07R	200.7	5 053 650.8	235 629.1

-NOTES-

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GEOCRES No. 41H-96

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012



METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

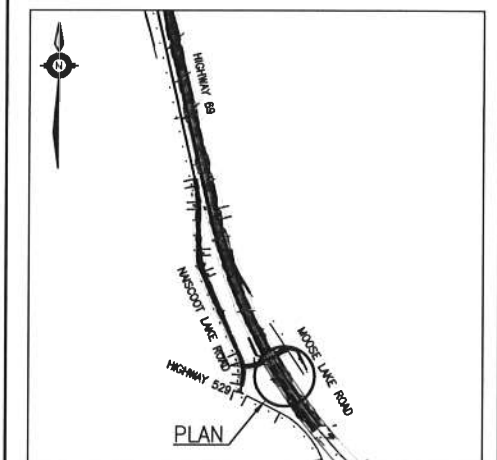


CONT No
GWP No 5076-06-00

HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 NBL-CL
(STA 17+425 - 17+560)
BOREHOLE LOCATIONS AND SOIL STRATA

MMM GROUP

THURBER ENGINEERING LTD.



KEYPLAN LEGEND

●	Borehole
○	Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60' Cone, 475J/blow)
PH	Pressure, Hydraulic
W	Water Level
HA	Head Artesian Water
P	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
BH01-01	198.5	5 053 556.2	235 667.6
BH01-02L	197.1	5 053 563.7	235 647.0
BH01-03	193.7	5 053 577.2	235 654.3
BH01-04R	194.8	5 053 597.0	235 662.6
BH01-05	195.1	5 053 589.8	235 646.4
BH01-06	194.1	5 053 569.1	235 615.1
BH01-07R	195.0	5 053 589.8	235 624.6
BH01-08	195.4	5 053 590.5	235 601.9
BH01-09	195.0	5 053 610.1	235 633.8
BH01-10L	195.0	5 053 593.5	235 582.5
BH01-11R	197.7	5 053 629.6	235 641.9
BH01-12	196.4	5 053 612.0	235 588.8
BH01-13	195.9	5 053 631.4	235 620.9
BH01-14R	197.4	5 053 632.5	235 598.7
BH01-15	198.4	5 053 633.5	235 575.9
BH01-16	199.6	5 053 652.7	235 608.1
D01-01R	194.1	5 053 578.0	235 669.6
D01-02L	194.2	5 053 578.4	235 632.8
D01-03L	194.8	5 053 571.9	235 595.7
D01-04R	195.3	5 053 608.5	235 654.8
D01-05R	195.2	5 053 611.1	235 611.5
D01-06L	197.8	5 053 615.0	235 569.5
D01-07R	200.7	5 053 650.8	235 629.1

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GEOCRES No. 41H-96

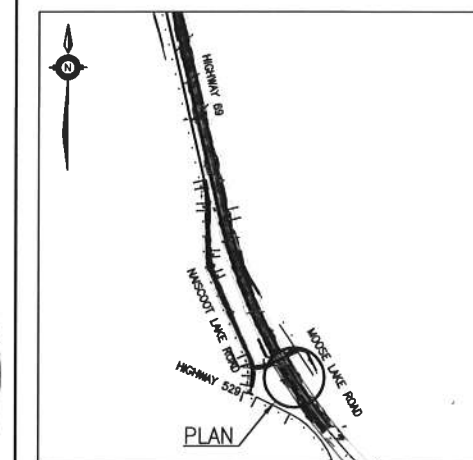
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DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012

A circular professional seal for a Licensed Professional Engineer in the Province of Ontario. The outer ring contains the text "LICENSED PROFESSIONAL ENGINEER" at the top and "PROVINCE OF ONTARIO" at the bottom. In the center, the name "P. K. CHATTERJI" is printed. Above the name is a stylized signature "P. K. Chatterji". Below the name is a semi-circular emblem containing the text "Du 13/12".

HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 NBL-RT TOE
(STA 17+425 - 17+560)
BOREHOLE LOCATIONS AND SOIL STRATA







MMM GROUP

THURBER ENGINEERING LTD



KEYPLAN

LEGEND

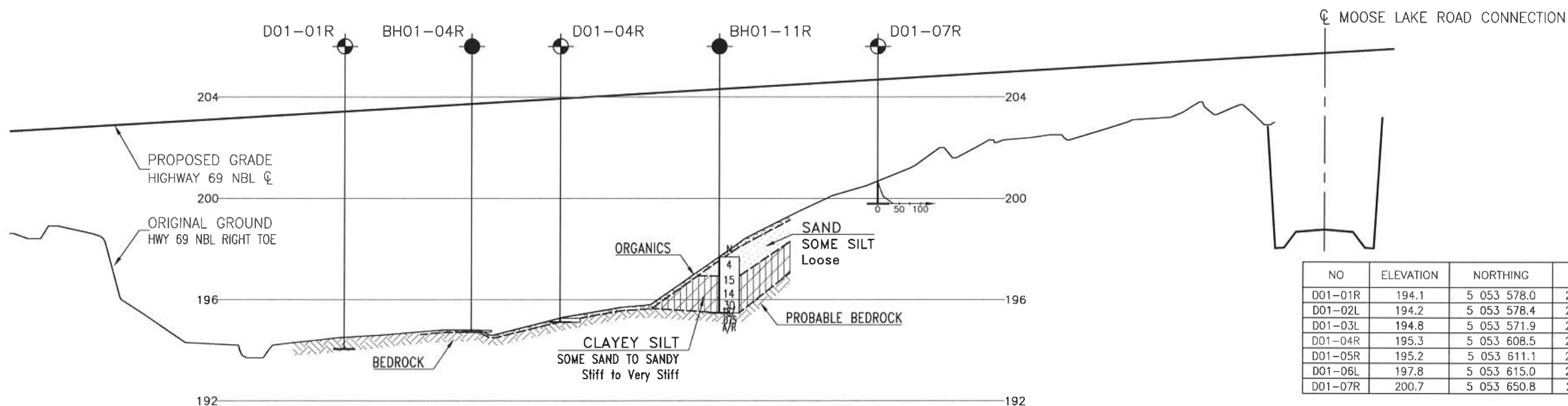
- | | |
|---|---------------------------------------|
|  | Borehole |
|  | Cone |
| N | Blows /0.3m (Std Pen Test, 475J/blow) |
| CONE | Blows /0.3m (60° Cone, 475J/blow) |
| PH | Pressure, Hydraulic |
|  | Water Level |
|  | Head Artesian Water |
|  | Piezometer |
| 90% | Rock Quality Designation (RQD)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

NO	ELEVATION	NORTHING	EASTING
BH01-01	198.5	5 053 556.2	235 667.6
BH01-02L	197.1	5 053 563.7	235 647.0
BH01-03	193.7	5 053 577.2	235 654.3
BH01-04R	194.8	5 053 597.0	235 662.6
BH01-05	195.1	5 053 589.8	235 646.4
BH01-06	194.1	5 053 569.1	235 615.1
BH01-07R	195.0	5 053 589.8	235 624.6
BH01-08	195.4	5 053 590.5	235 601.9
BH01-09	195.0	5 053 610.1	235 633.8
BH01-10L	195.0	5 053 593.5	235 582.5
BH01-11R	197.7	5 053 629.6	235 641.9
BH01-12	196.4	5 053 612.0	235 588.8
BH01-13	195.9	5 053 631.4	235 620.9
BH01-14R	197.4	5 053 632.5	235 598.7
BH01-15	198.4	5 053 633.5	235 575.9
BH01-16	199.6	5 053 652.7	235 608.1

-NOTES-

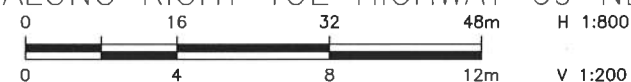
- 1) The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- 2) This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 41H-96



NO	ELEVATION	NORTHING	EASTING
D01-01R	194.1	5 053 578.0	235 669.
D01-02L	194.2	5 053 578.4	235 632.
D01-03L	194.8	5 053 571.9	235 595.
D01-04R	195.3	5 053 608.5	235 654.
D01-05R	195.2	5 053 611.1	235 611.
D01-06L	197.8	5 053 615.0	235 569.
D01-07R	200.7	5 053 650.8	235 629.

PROFILE ALONG RIGHT TOE HIGHWAY 69 NBL



REV	DATE	BY	DESCRIPTION					
DESIGN	RPR	CHK	AEG	CODE	LOAD		DATE	DEC. 2017
DRAWN	MFA	CHK	PKC	SITE	STRUCT	DWG		

Appendix C

**Hwy 69 NBL & SBL
Sta. 17+900 to 18+000 Township of Harrison**

**Boreholes 02-01 to 02-05, 02-07L, 02-08, 04-01 to 04-07L
DCPTs D02-01R to D02-03, D04-01R, D04-02L and D04-05**

**Record of Borehole Sheets
Laboratory Test Results
Borehole Locations and Soil Strata Drawings**

METRIC

[illegible]

RECORD OF BOREHOLE No BH02-02L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+925 O/S 6.6L, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2009.01.27 - 2009.01.27 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
205.9	Pond Surface													
0.0	ICE and WATER: (760mm)													
205.1														
0.8	PEAT, fibrous Very Soft Black to Dark Brown Wet		1	SS	1		205						336	
204.5														
1.4	SAND, trace gravel, some peat Very Loose Black to Dark Brown Wet		2	SS	0		204							
203.9														
2.0	Silty SAND, some clay Very Loose Grey		3	SS	0									0 59 26 15
202.9							203							
3.0	END OF BOREHOLE (SAMPLER BOUNCING) AT 3.0m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.													

+ 3, x 3: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH02-03

1 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+926 C/L, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2009.01.27 - 2009.01.27 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
205.9	Pond Surface													
0.0	ICE and WATER: (760mm)													
205.1														
0.8	PEAT, fibrous, trace gravel Very Soft Black Wet		1	SS	0		205	3.2					761	
			2	SS	0		204	3					687	
			3	SS	0		203							
			4	SS	0		202						791	
			5	SS	0		201						375	
200.6							200							
5.3	Silty SAND, some clay Very Loose Grey Wet		6	SS	1		199							0 55 31 14
							198							
	Cobble at 7.2m Compact		7	SS	10		197							
196.8														
9.1	END OF BOREHOLE (SAMPLER BOUNCING) AT 9.1m UPON AUGER REFUSAL ON PROBABLE BEDROCK. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe													

Continued Next Page

+ 3, X 3: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH02-03

2 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+926 C/L, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2009.01.27 - 2009.01.27 CHECKED BY RPR

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 (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa					WATER CONTENT (%)			
							20	40	60	80	100	W _p	W	W _L		
	Continued From Previous Page with a 1.52m slotted screen.															
	WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Apr 21/09 Site Flooded Jun 05/09 Ground Surface Aug 20/09 Ground Surface Aug 25/09 Ground Surface Oct 27/09 Ground Surface Nov 20/09 Ground Surface															

RECORD OF BOREHOLE No BH02-04R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+938.5 O/S 8.6R, NBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2009.01.27 - 2009.01.27 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					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						
205.8	Pond Surface							20	40	60	80	100		
0.0	ICE and WATER: (760mm)													
205.0														
0.8	PEAT, fibrous Very Soft to Firm Black to Dark Brown Wet		1	SS	0		205						670	
			2	SS	5		204						312	
203.6														
2.2	END OF BOREHOLE (SAMPLER BOUNCING) AT 2.2m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.													

RECORD OF BOREHOLE No BH02-05

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+941 C/L, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2009.01.27 - 2009.01.27 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
205.6	Pond Surface													
0.0	ICE and WATER: (760mm)													
204.8							205							
0.8	PEAT, fibrous Very Soft Black Wet		1	SS	0									
203.9			2	SS	3/		204							
1.7	END OF BOREHOLE (SAMPLER BOUNCING) AT 1.7m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.				.075									

+³, ×³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH02-07L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+947.5 O/S 12.0L, NBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Portable Split Spoon Sampling Equipment COMPILED BY AN
 DATUM Geodetic DATE 2010.11.10 - 2010.11.10 CHECKED BY MRA


SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
204.8	Ground Surface													
0.0	PEAT, fibrous Soft Black Wet		1	SS	1									
203.7			2	SS	1		204							
1.1	END OF BOREHOLE AT 1.0m UPON REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT GROUND SURFACE UPON COMPLETION.													

RECORD OF BOREHOLE No BH02-08

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+955 C/L, NBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Portable Split Spoon Sampling Equipment COMPILED BY AN
 DATUM Geodetic DATE 2010.11.10 - 2010.11.10 CHECKED BY MRA

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		W P W W L				
204.8	Ground Surface							20 40 60 80 100						
0.0	PEAT, fibrous Black Wet		1	SS	4		204							
			2	SS	0		203						621	
			3	SS	1		202						755	
	Some sand		4	SS	1		201						674	
			5	SS	1								472	
200.5			6	SS	0								775	
4.3	END OF BOREHOLE AT 4.3m UPON REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT GROUND SURFACE UPON COMPLETION.													

METRIC

[illegible]

+³, ×³: Numbers refer to Sensitivity


METRIC

[illegible]

ONTMT4S 6121.GPJ 12/12/12

+ 3 × 3 Numbers refer to Sensitivity

METRIC

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				<p>w_p w w_L</p> <p>WATER CONTENT (%)</p> <p>20 40 60</p>		
205.9	Ground Surface						SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100				GR SA SI C

[illegible]

ONTMT4S 6121.GPJ 12/12/12

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No BH04-01

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+938 C/L, SBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2009.01.27 - 2009.01.27 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			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					
205.8 0.0	Pond Surface ICE and WATER: (760mm)												
205.0 0.8	PEAT, fibrous Very Soft Black to Dark Brown Wet		1	SS	1								
			2	SS	0								
			3	SS	0								
202.6 3.2	END OF BOREHOLE (SAMPLER BOUNCING) AT 3.2m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.		4	SS	1/ .125								

RECORD OF BOREHOLE No BH04-02L

1 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+943.5 O/S 8.7L, SBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2009.01.28 - 2009.01.28 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa					
205.9	Pond Surface							20 40 60 80 100					
0.0	ICE and WATER: (760mm)							20 40 60 80 100					
205.1													
0.8	PEAT, fibrous Very Soft Black Wet		1	SS	0		205						
			2	SS	0		204						
			3	SS	0		203					415	
			4	SS	0		202					593	
	some sand						201					505	
200.9			5	SS	0		200						
5.0	Silty SAND, some clay Very Loose Brown to Grey Wet		6	SS	0		199						0 59 24 17
			7	SS	4		198						
197.8													
8.1	Gravelly SAND, some silt, trace clay												
197.5	Loose												
8.4	Grey Moist												
END OF BOREHOLE (SAMPLER BOUNCING) AT 3.2m UPON AUGER REFUSAL ON PROBABLE BEDROCK. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m)													

Continued Next Page

+ 3, x 3: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH04-02L

2 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+943.5 O/S 8.7L, SBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2009.01.28 - 2009.01.28 CHECKED BY RPR

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			20	40	60	80	100		
	Continued From Previous Page												
	Apr 21/09 Ground Surface												
	Jun 05/09 Ground Surface												
	Aug 20/09 Ground Surface												
	Aug 25/09 Ground Surface												
	Oct 27/09 Ground Surface												
	Nov 20/09 Ground Surface												

+³, X³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH04-03

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+951 C/L, SBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2009.01.28 - 2009.01.28 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
205.6	Pond Surface													
0.0	ICE and WATER: (700mm)													
204.9														
0.7	PEAT, fibrous Very Soft Black Wet		1	SS	0								425	
			2	SS	0									
			3	SS	0								1175	
			4	SS	0								830	
201.8														
3.8	Silty SAND, occasional peat Very Loose Brown Wet		5	SS	0									
199.5														
6.1	END OF BOREHOLE (SAMPLER BOUNCING) AT 6.1m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.		6	SS	1/.012									

+³, X³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH04-04R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+963.5 O/S 8.5R, SBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2009.01.28 - 2009.01.28 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
205.7	Pond Surface													
0.0	ICE and WATER: (760mm)													
204.9							205							
0.8	PEAT, fibrous Very Soft Black to Dark Brown Wet		1	SS	0									
			2	SS	0		204							
203.3			3	SS	1/									
2.4	END OF BOREHOLE (SAMPLER BOUNCING) AT 2.4m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.				150									

+³, ×³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH04-05

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+971 C/L, SBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2009.01.28 - 2009.01.28 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					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						
205.5	Pond Surface							20 40 60 80 100						
0.0	ICE and WATER: (600mm)													
204.9							205							
0.6	PEAT, fibrous Very Soft Black to Dark Brown Wet		1	SS	0									
			2	SS	2		204						338	
203.2														
2.3	END OF BOREHOLE (SAMPLER BOUNCING) AT 2.3m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.													

RECORD OF BOREHOLE No BH04-06R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+940 O/S 9.0R, SBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Portable Split Spoon Sampling Equipment COMPILED BY AN
 DATUM Geodetic DATE 2010.11.10 - 2010.11.10 CHECKED BY MRA

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
205.0	Ground Surface													
0.0	PEAT, fibrous Very Soft Black Wet		1	SS	1		205							
			2	SS	1		204							
			3	SS	0		203						635	
			4	SS	0		202						804	
			5	SS	1		201						771	
			6	SS	0		200						807	
199.9			7	SS	0									
5.1	SAND, some silt Compact Grey Wet		8	SS	21									2 69 26 3
199.2														
5.8	END OF BOREHOLE AT 5.8m UPON REFUSAL TO PORTABLE EQUIPMENT. WATER LEVEL AT GROUND SURFACE UPON COMPLETION.													

+³, ×³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH04-07L

1 OF 1

METRIC

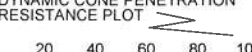


GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+980 O/S 9.0L, SBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Portable Split Spoon Sampling Equipment COMPILED BY AN
 DATUM Geodetic DATE 2010.11.10 - 2010.11.10 CHECKED BY MRA

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			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE		WATER CONTENT (%) w _P w w _L				
204.8	Ground Surface						20	40	60	80	100			
0.0	PEAT, fibrous Black Wet		1	SS	1									
			2	SS	1									
			3	SS	0									
			4	SS	1									
202.1														
2.7	SAND, trace silt Loose to Very Loose Grey Wet		5	SS	5									
			6	SS	0									
201.0														
3.8	Silty CLAY, trace to some sand Very Soft Grey Wet		7	SS	0									
200.2														
4.6	Sandy SILT, some clay Very Loose Grey Wet		8	SS	1									
199.6														
5.2	SAND, some silt, trace gravel, occasional cobbles Compact Grey Moist to Wet		9	SS	13									
199.0														
5.8	END OF BOREHOLE AT 5.8m. WATER LEVEL AT SURFACE UPON COMPLETION. BOREHOLE BACKFILLED WITH HOLEPLUG TO 0.3m, THEN CUTTINGS TO SURFACE.													

+³, ×³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

METRIC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT  SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	 PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT w _P w w _L WATER CONTENT (%)	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI C	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES							
206.1	Pond Surface						206					
0.0	ICE and WATER: (1100mm)											
205.0	DCPT starts from 1.1m						205					
1.1							204					
							203					
							202					
							201					
							200					
							199					
							198					
							197					

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No D04-01R

2 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+938.5 O/S 8.7R, SBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
DATUM Geodetic DATE 2009.01.28 - 2009.01.28 CHECKED BY RPR

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 (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE		WATER CONTENT (%) w _p w w _L				
	Continued From Previous Page							20 40 60 80 100		20 40 60				
							196							
							195							
							194							
193.5														
12.6	END OF DCPT AT 12.6m UPON REFUSAL ON PROBABLE BEDROCK.													

METRIC

[illegible]

+ 3, × 3: Numbers refer to Sensitivity

RECORD OF BOREHOLE No D04-05

1 OF 1

METRIC

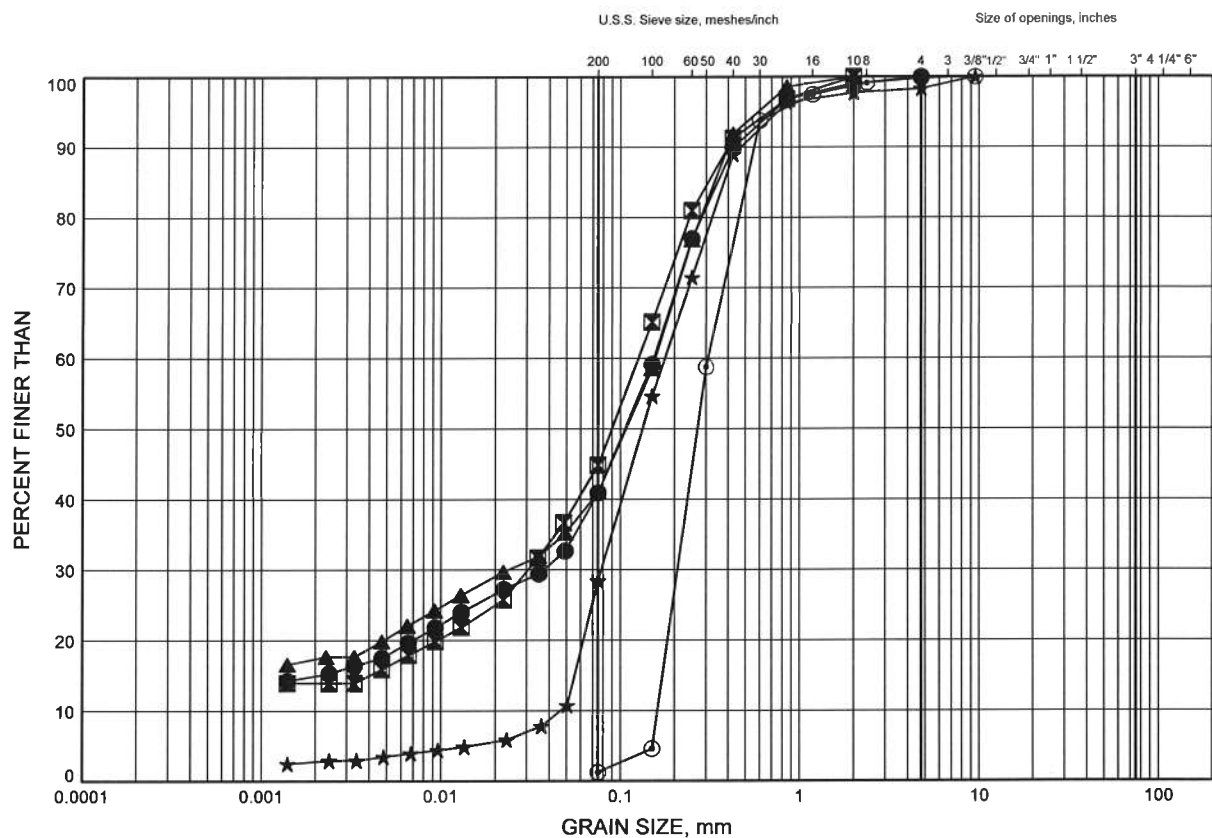
GWP# 5076-06-00 LOCATION Harrison Twp., Station 17+971 O/S 0.6R, SBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2009.01.28 - 2009.01.28 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE LIMIT CONTENT LIQUID LIMIT			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 (%)				
205.5	Pond Surface							20 40 60 80 100		20 40 60				
0.0	ICE and WATER: (600mm)								○ UNCONFINED + FIELD VANE					
									● QUICK TRIAXIAL × LAB VANE					
204.9	DCPT starts from 0.7m							20 40 60 80 100		20 40 60				
0.6														
203.2														
2.3	END OF DCPT AT 2.3m UPON REFUSAL ON PROBABLE BEDROCK.													

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE C1

Silty SAND to SAND



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH02-02L	2.59	203.31
⊠	BH02-03	6.40	199.50
▲	BH04-02L	6.32	199.58
★	BH04-06R	5.49	199.51
⊙	BH04-07L	3.05	201.75

Date December 2012

GWP# 5076-06-00



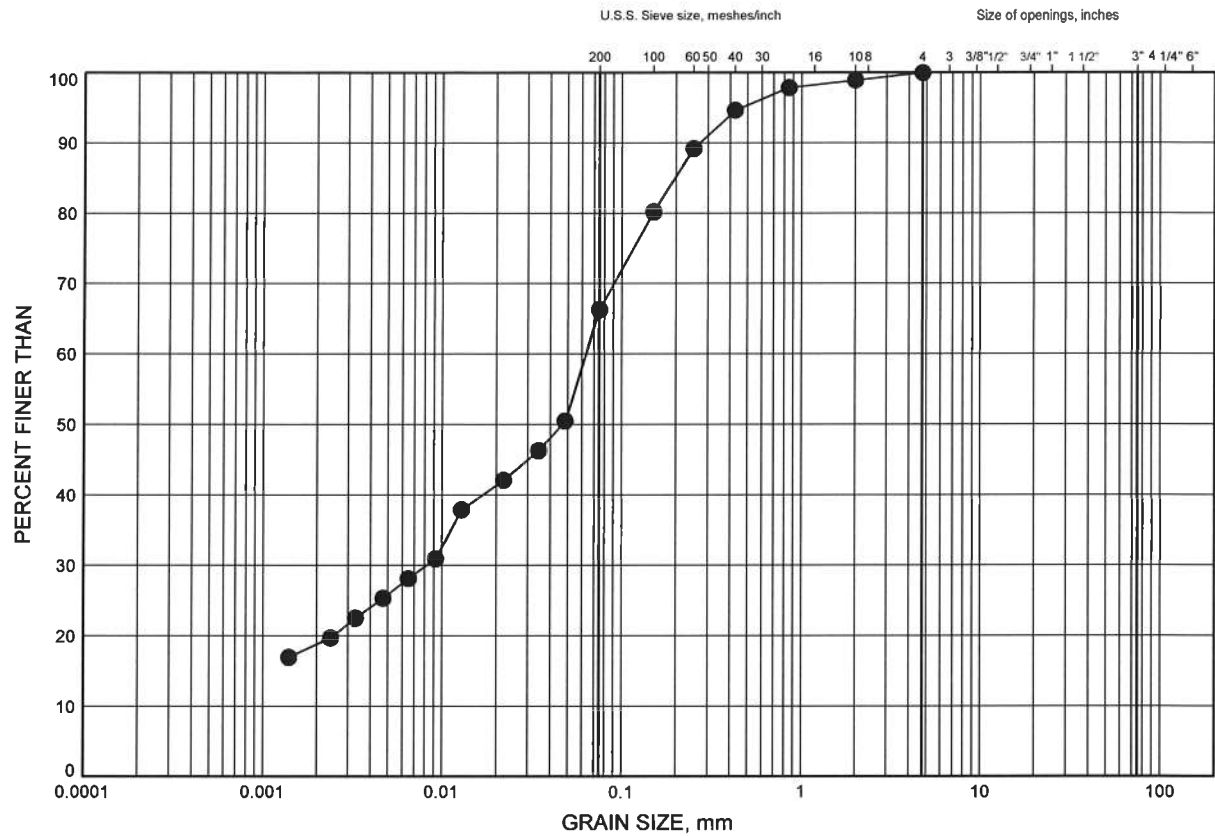
Prep'd MFA

Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE C2

Sandy SILT



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH04-07L	4.88	199.92

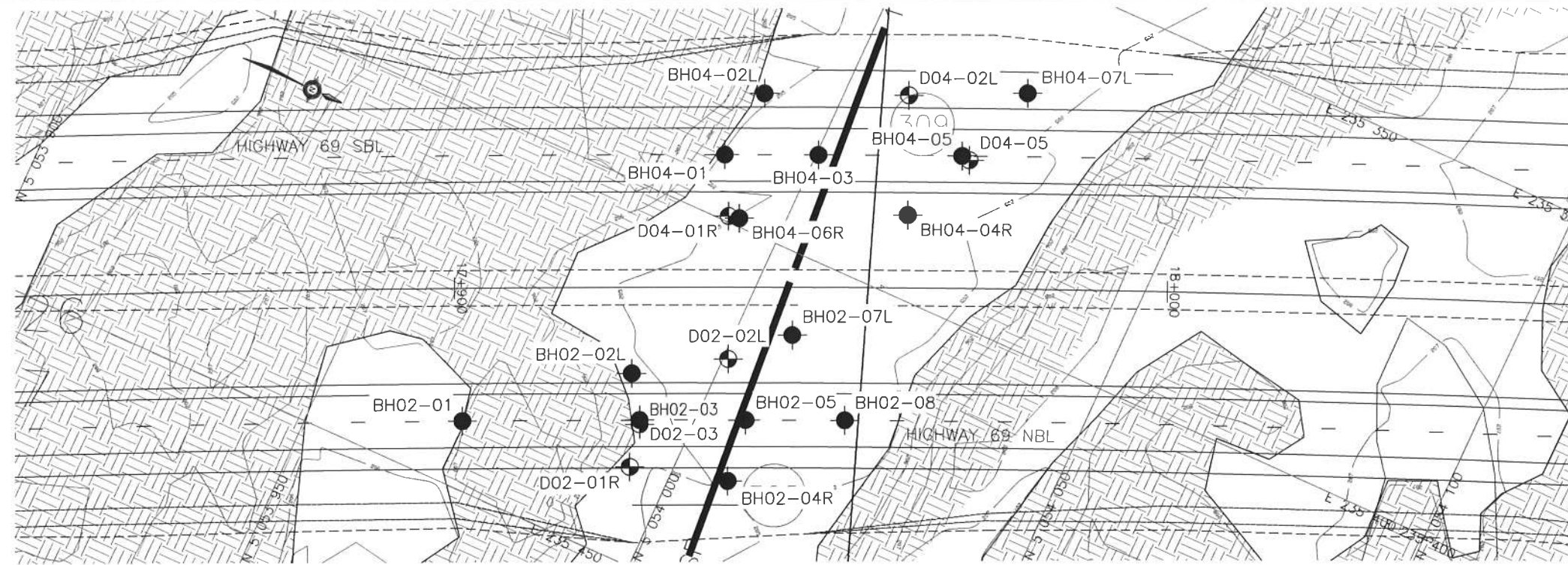
Date December 2012

GWP# 5076-06-00

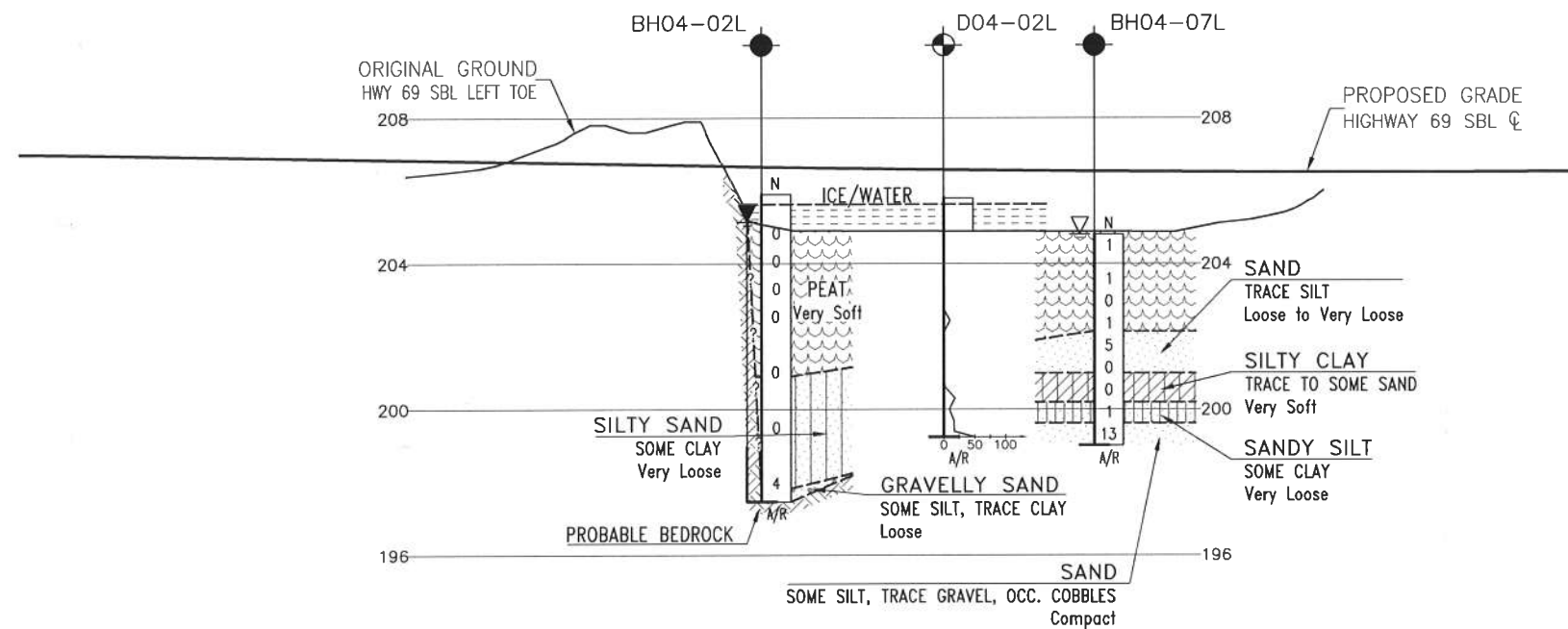
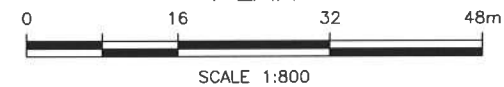


Prep'd MFA

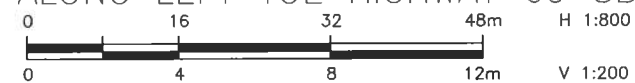
Chkd. MRA



PLAN



PROFILE ALONG LEFT TOE HIGHWAY 69 SBL



METRIC
DIMENSIONS ARE IN METRES
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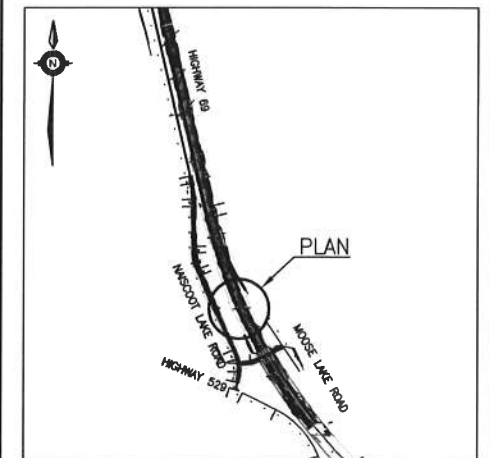
CONT No	GWP No 5076-06-00
HIGHWAY 69 FOUR-LANING HARRISON HWY 69 SBL-LT TOE (STA 17+900 - 18+000) BOREHOLE LOCATIONS AND SOIL STRATA	



SHEET |








THURBER ENGINEERING LTD.



KEYPLAN

LEGEND

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

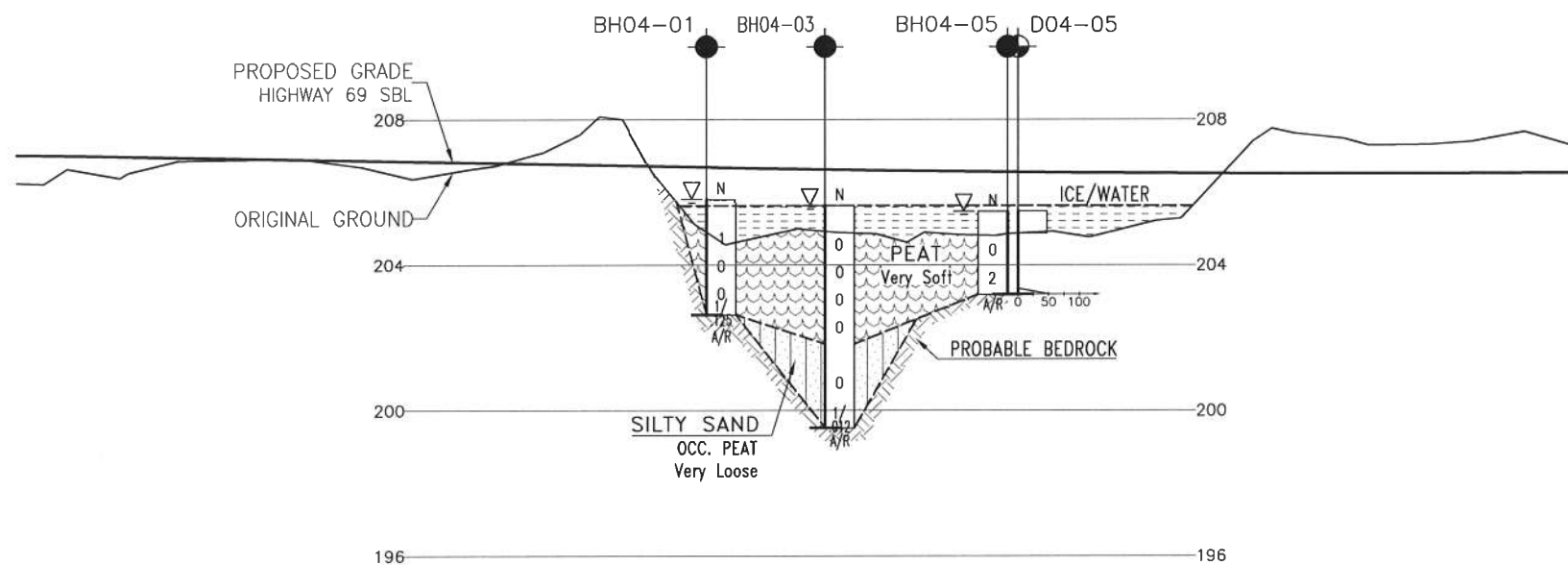
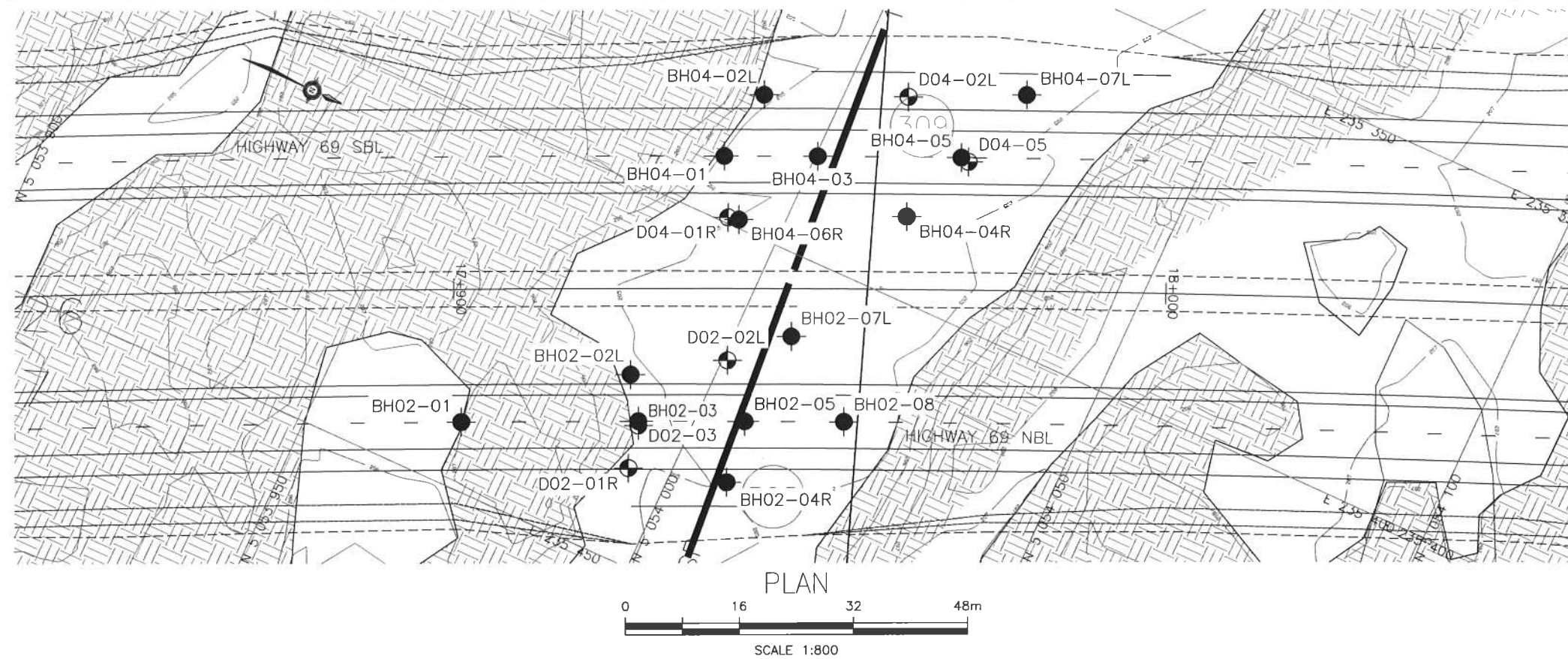
NO	ELEVATION	NORTHING	EASTING
BH04-01	205.8	5 053 988.3	235 391.5
BH04-02L	205.9	5 053 989.8	235 381.3
BH04-03	205.6	5 054 000.3	235 386.1
BH04-04R	205.7	5 054 015.2	235 388.8
BH04-05	205.5	5 054 018.7	235 378.0
BH04-06R	205.0	5 053 993.9	235 398.8
BH04-07L	204.8	5 054 023.4	235 366.1
DD4-01R	206.1	5 053 992.4	235 399.2
D04-02L	205.8	5 054 008.4	235 373.2
D04-05	205.5	5 054 019.9	235 378.1

-NOTES-

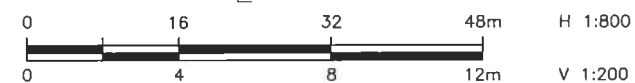
- 1) The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- 2) This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 41H-96

[illegible]



PROFILE ALONG CL HIGHWAY 69 SBL

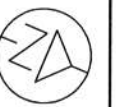


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DIMENSIONS ARE IN METRES
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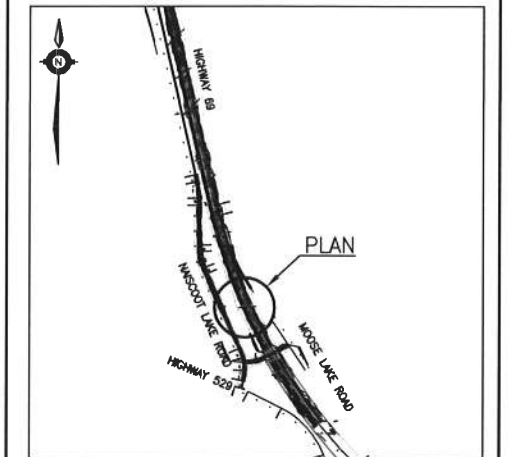


CONT No
GWP No 5076-06-00

HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 SBL-CL
(STA 17+900 - 18+000)
BOREHOLE LOCATIONS AND SOIL STRATA



SHEET



KEYPLAN
LEGEND

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

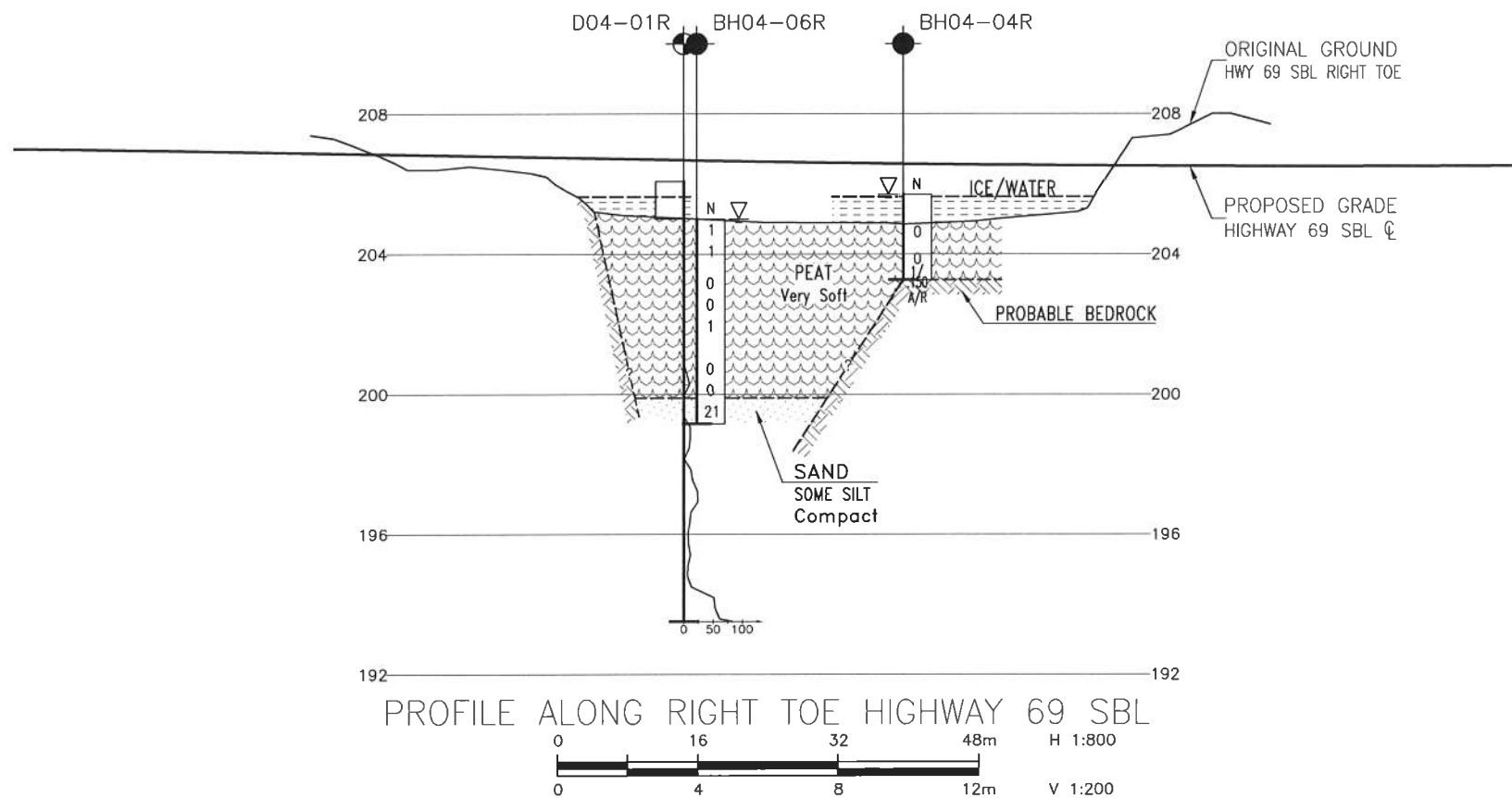
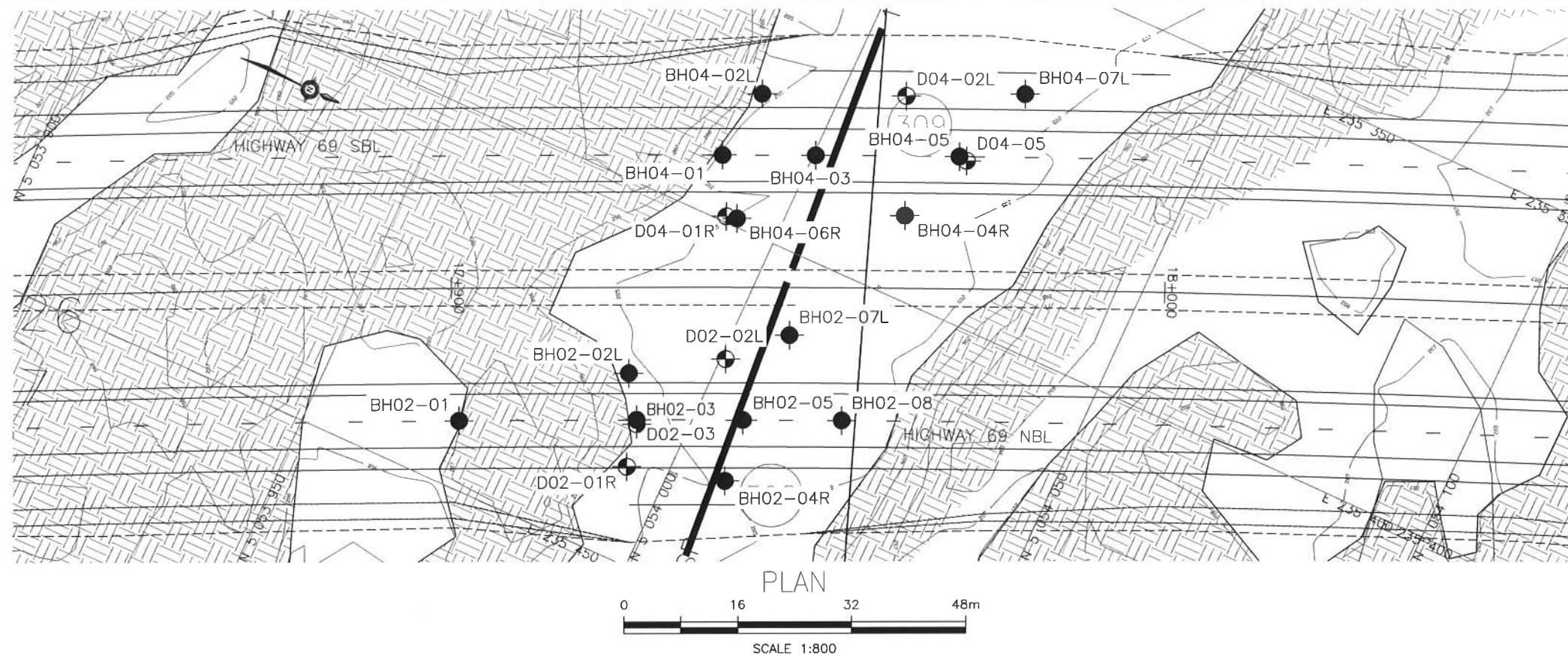
NO	ELEVATION	NORTHING	EASTING
BH04-01	205.8	5 053 988.3	235 391.5
BH04-02L	205.9	5 053 989.8	235 381.3
BH04-03	205.6	5 054 000.3	235 386.1
BH04-04R	205.7	5 054 015.2	235 388.8
BH04-05	205.5	5 054 018.7	235 378.0
BH04-06R	205.0	5 053 993.9	235 398.8
BH04-07L	204.8	5 054 023.4	235 366.1
D04-01R	206.1	5 053 992.4	235 399.2
D04-02L	205.8	5 054 008.4	235 373.2
D04-05	205.5	5 054 019.9	235 378.1

-NOTES-

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GEOCRES No. 41H-96

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			DATE DEC. 2012
			STRUCT
			DWG



METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

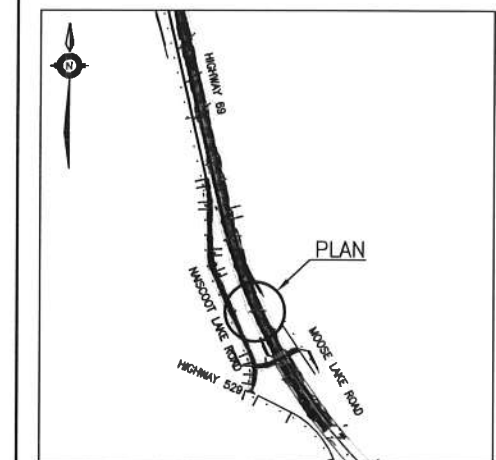


CONT No
GWP No 5076-06-00

HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 SBL-RT TOE
(STA 17+900 - 18+000)
BOREHOLE LOCATIONS AND SOIL STRATA



SHEET



KEYPLAN
LEGEND

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

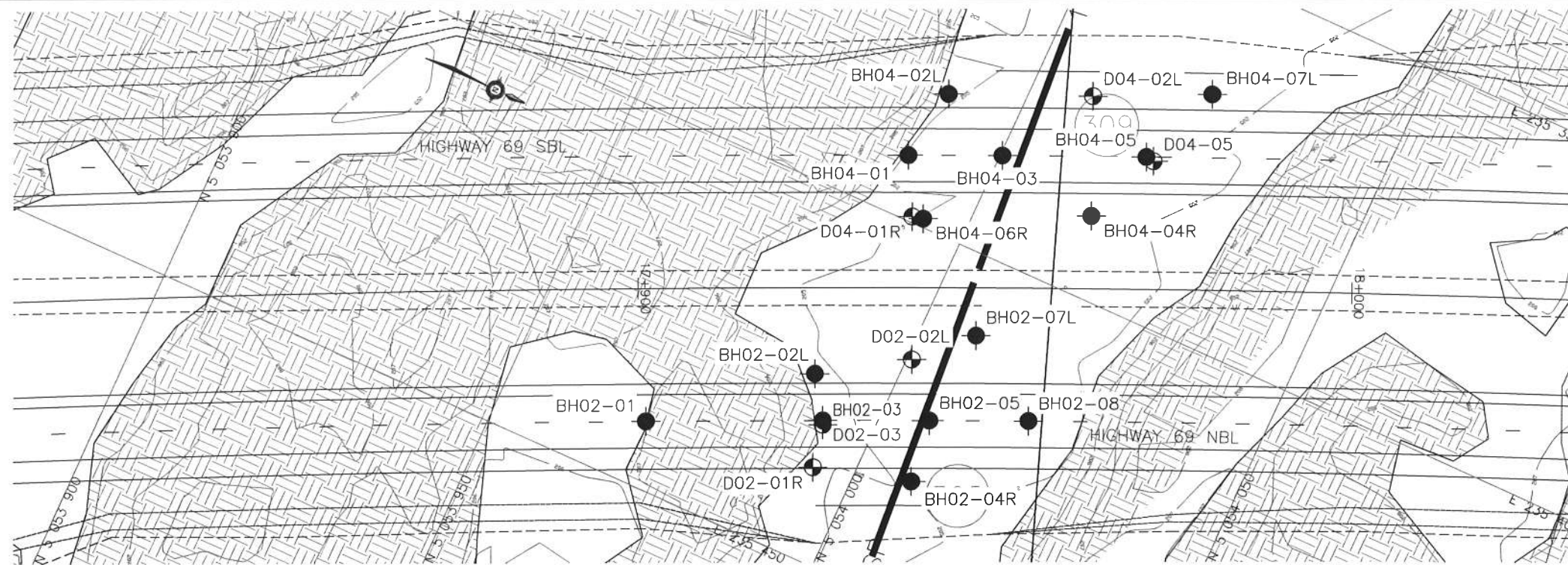
NO	ELEVATION	NORTHING	EASTING
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BH04-02L	205.9	5 053 989.8	235 381.3
BH04-03	205.6	5 054 000.3	235 386.1
BH04-04R	205.7	5 054 015.2	235 388.8
BH04-05	205.5	5 054 018.7	235 378.0
BH04-06R	205.0	5 053 993.9	235 398.8
BH04-07L	204.8	5 054 023.4	235 366.1
D04-01R	206.1	5 053 992.4	235 399.2
D04-02L	205.8	5 054 008.4	235 373.2
D04-05	205.5	5 054 019.9	235 378.1

-NOTES-

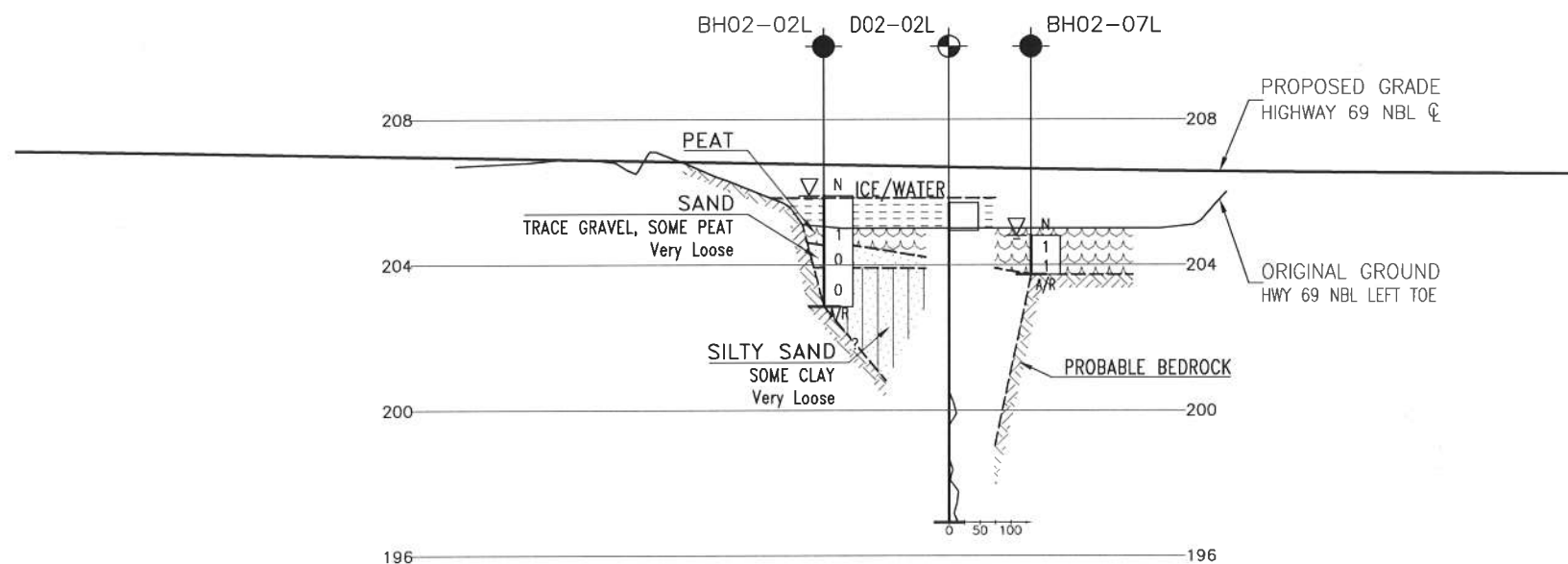
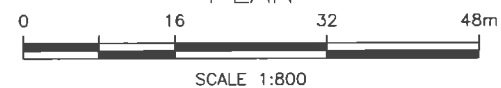
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GEOCRES No. 41H-96

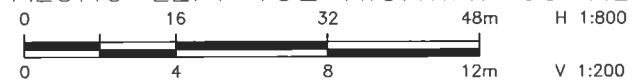
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DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			OWG
			DATE DEC. 2012



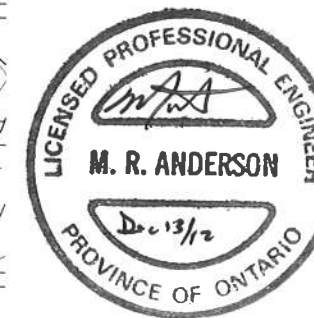
PLAN



PROFILE ALONG LEFT TOE HIGHWAY 69 NBL

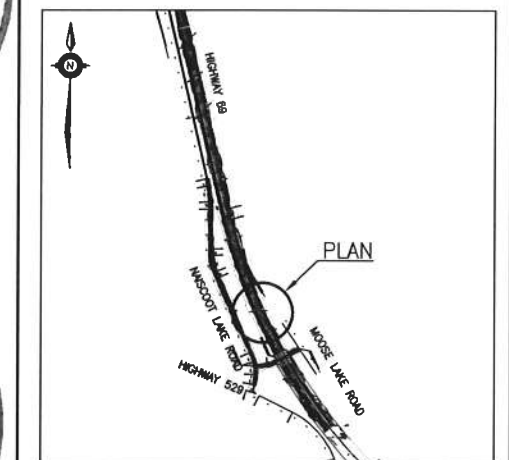


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DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



CONT No
GWP No 5076-06-00

HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 NBL-LT TOE
(STA 17+900 - 18+000)
BOREHOLE LOCATIONS AND SOIL STRATA

KEYPLAN
LEGEND

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

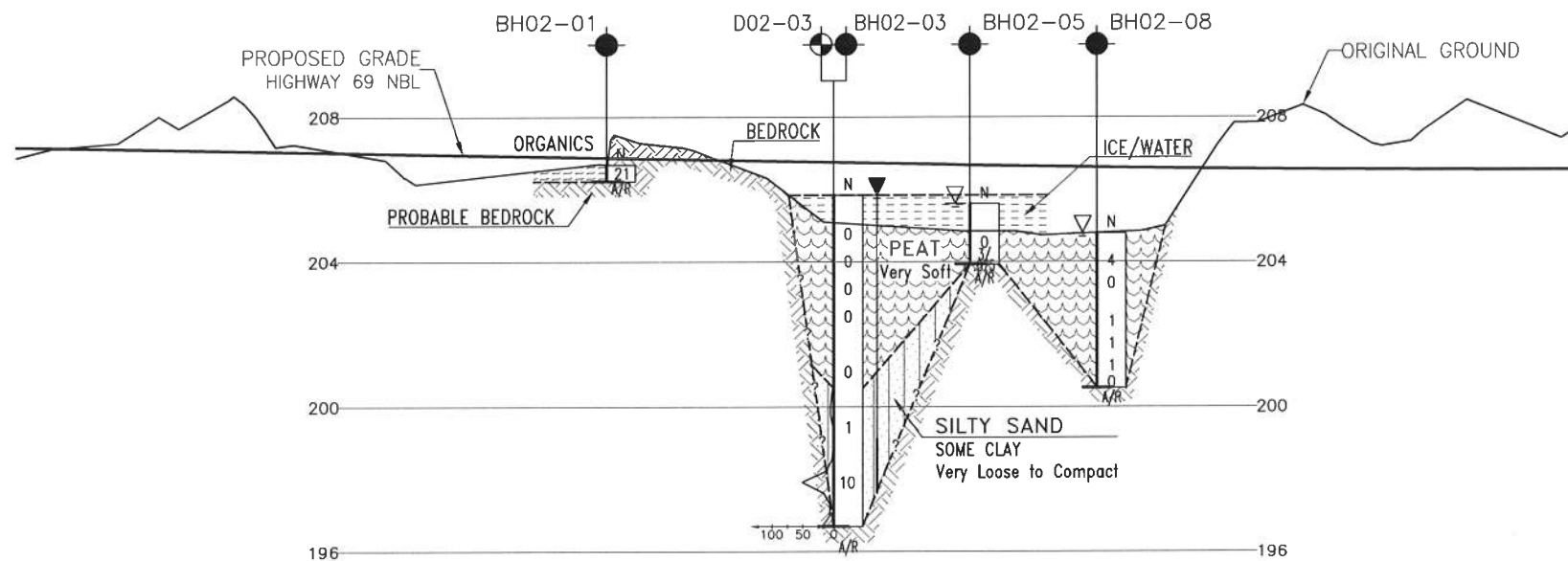
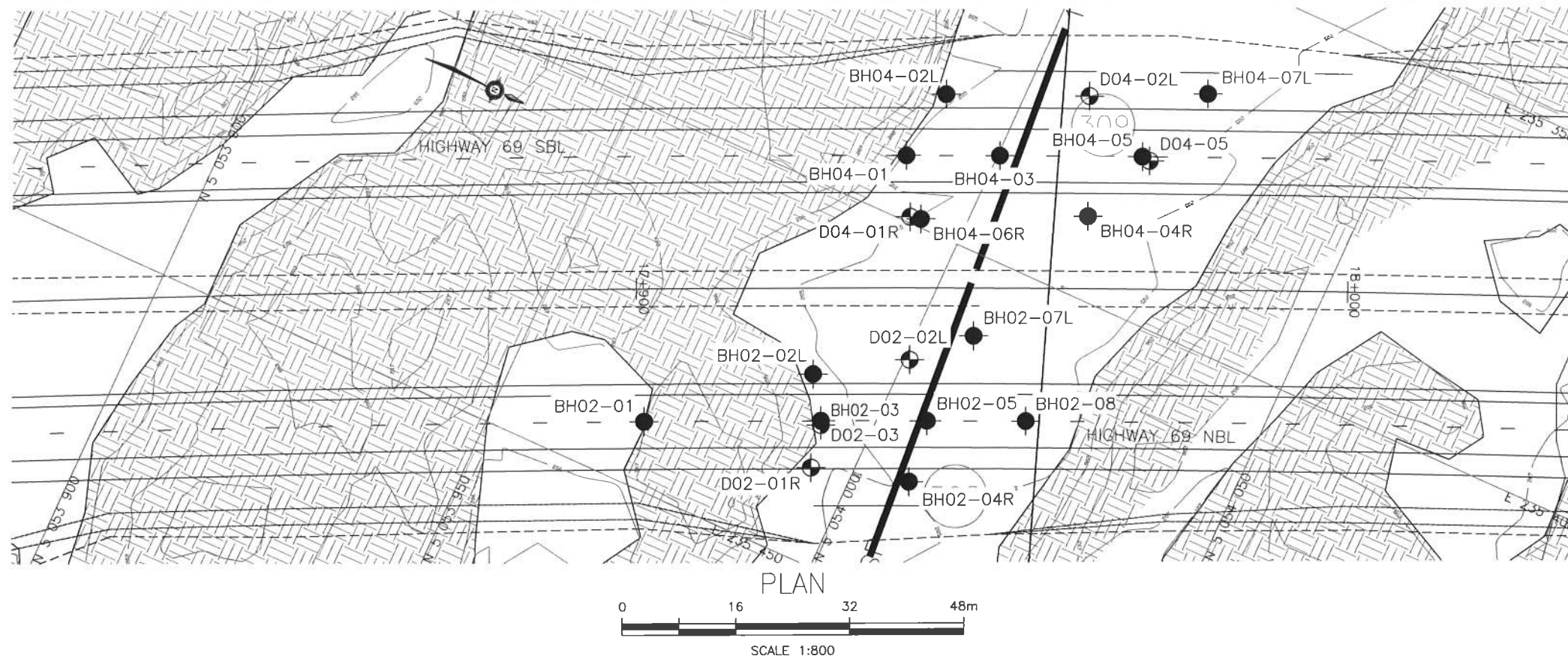
NO	ELEVATION	NORTHING	EASTING
BH02-01	206.7	5 053 970.3	235 440.9
BH02-02L	205.9	5 053 989.1	235 425.0
BH02-03	205.9	5 053 992.9	235 430.6
BH02-04R	205.8	5 054 007.7	235 433.3
BH02-05	205.6	5 054 006.5	235 424.4
BH02-07L	204.8	5 054 007.5	235 410.8
BH02-08	204.8	5 054 019.2	235 418.7
D02-01R	205.8	5 053 994.3	235 437.1
D02-02L	205.7	5 054 000.7	235 417.6
D02-03	205.9	5 053 993.1	235 431.1

-NOTES-

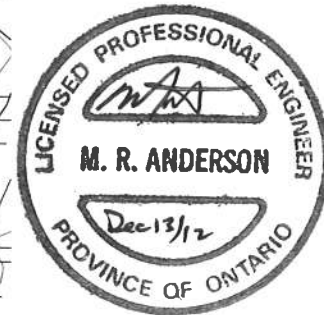
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GEOCRES No. 41H-96

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012

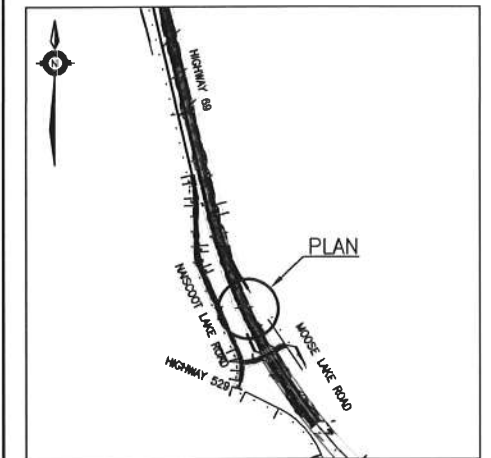


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CONT No
GWP No 5076-06-00

HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 NBL-CL
(STA 17+900 - 18+000)
BOREHOLE LOCATIONS AND SOIL STRATA



KEYPLAN
LEGEND

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

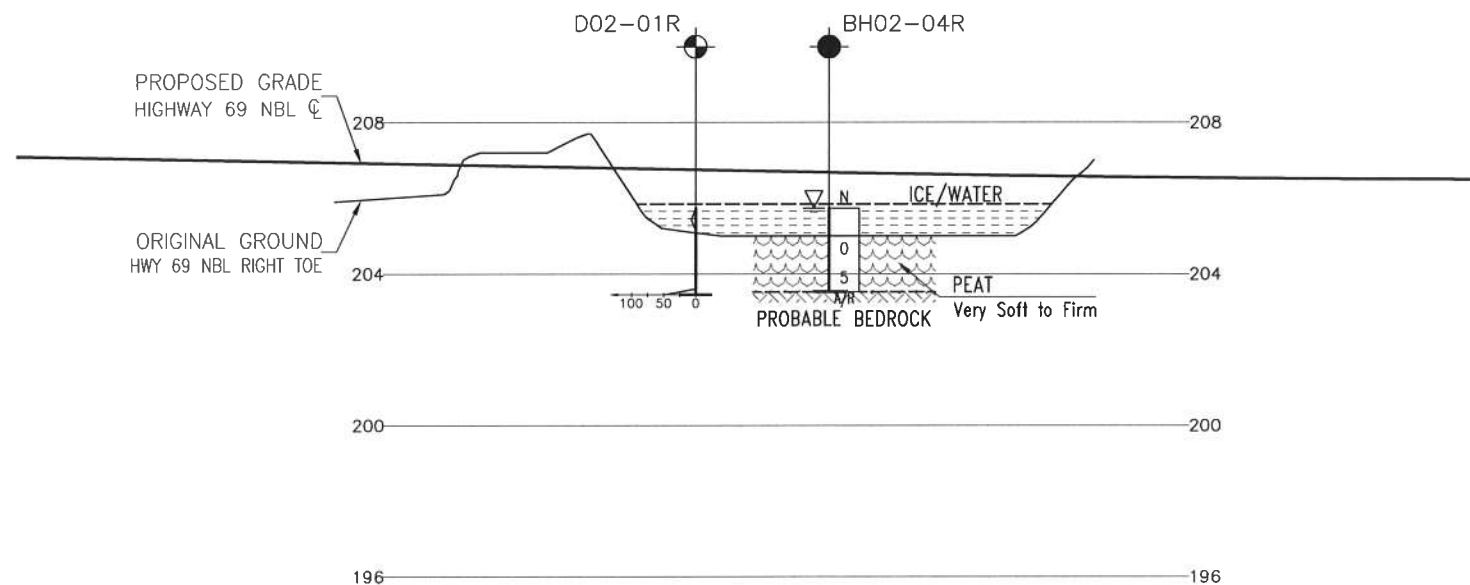
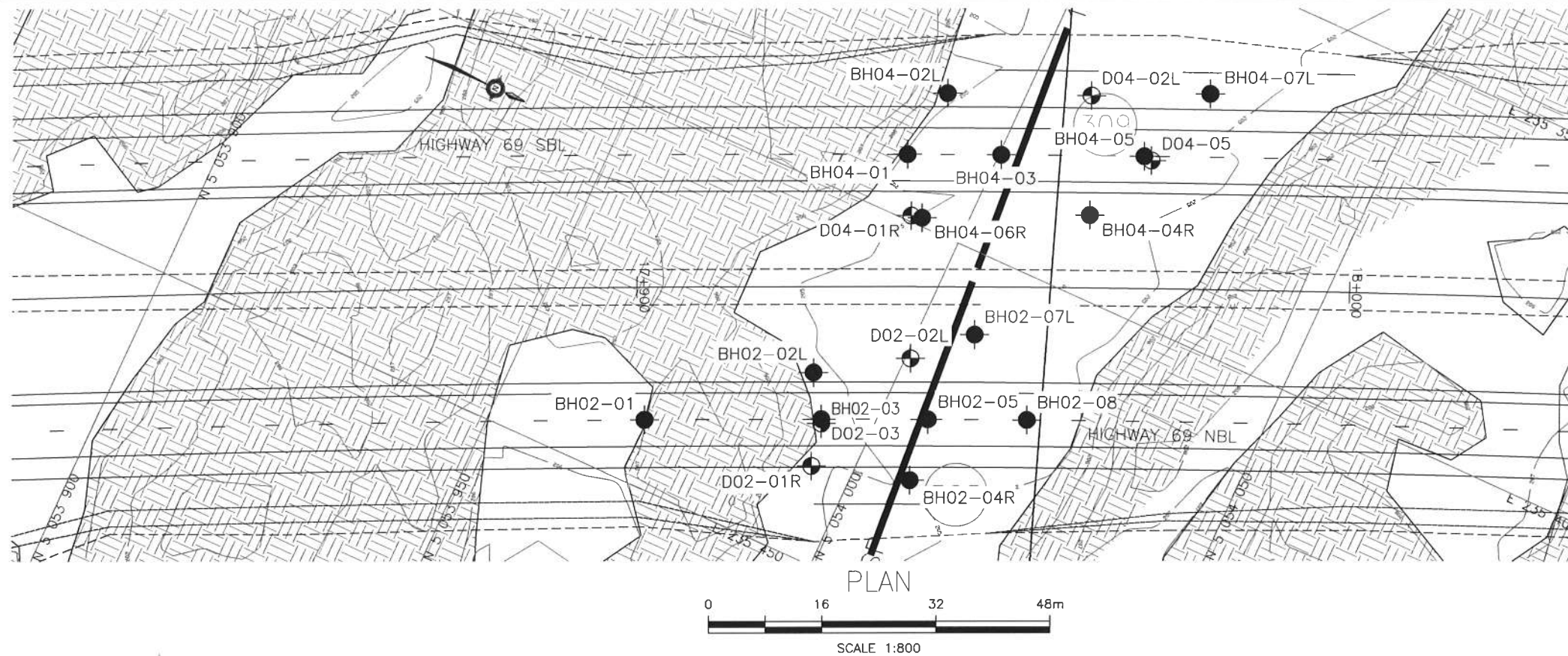
NO	ELEVATION	NORTHING	EASTING
BH02-01	206.7	5 053 970.3	235 440.9
BH02-02L	205.9	5 053 989.1	235 425.0
BH02-03	205.9	5 053 992.9	235 430.6
BH02-04R	205.8	5 054 007.7	235 433.3
BH02-05	205.6	5 054 006.5	235 424.4
BH02-07L	204.8	5 054 007.5	235 410.8
BH02-08	204.8	5 054 019.2	235 418.7
D02-01R	205.8	5 053 994.3	235 437.1
D02-02L	205.7	5 054 000.7	235 417.6
D02-03	205.9	5 053 993.1	235 431.1

-NOTES-

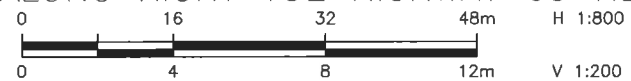
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GEOCRES No. 41H-96

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012



PROFILE ALONG RIGHT TOE HIGHWAY 69 NBL

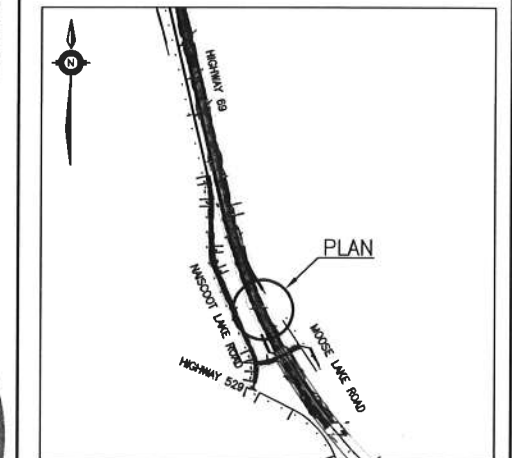


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AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



CONT No
GWP No 5076-06-00

HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 NBL-RT TOE
(STA 17+900 - 18+000)
BOREHOLE LOCATIONS AND SOIL STRATA



KEYPLAN
LEGEND

●	Borehole
⊙	Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60' Cone, 475J/blow)
PH	Pressure, Hydraulic
W	Water Level
HA	Head Artesian Water
P	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
BH02-01	206.7	5 053 970.3	235 440.9
BH02-02L	205.9	5 053 989.1	235 425.0
BH02-03	205.9	5 053 992.9	235 430.6
BH02-04R	205.8	5 054 007.7	235 433.3
BH02-05	205.6	5 054 006.5	235 424.4
BH02-07L	204.8	5 054 007.5	235 410.8
BH02-08	204.8	5 054 019.2	235 418.7
D02-01R	205.8	5 053 994.3	235 437.1
D02-02L	205.7	5 054 000.7	235 417.6
D02-03	205.9	5 053 993.1	235 431.1

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- This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 41H-96

DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG
DRAWN	MFA	CHK PKC
LOAD	DATE	DEC. 2012
SITE	STRUCT	DWG

Appendix D

**Hwy 69 NBL
Sta. 18+180 to 18+230 Township of Harrison**

**Boreholes 03-01 to 03-05
DCPTs D03-01R, D03-02L**

**Record of Borehole Sheets
Laboratory Test Results
Borehole Locations and Soil Strata Drawings**

RECORD OF BOREHOLE No BH03-01

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+180 C/L, NBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2009.01.29 - 2009.01.29 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100	PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L		
207.3	Ground Surface		1	AS										
0.0 0.1	ORGANICS: (75mm) Dark Brown BEDROCK AT 0.075m.													

RECORD OF BOREHOLE No BH03-02L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+192.5 O/S 7.6L, NBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2009.01.29 - 2009.01.29 CHECKED BY RPR

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			20	40	60	80	100		
209.4	Ground Surface		1	AS									
0.0	ORGANICS: (100mm)												
0.1	Dark Brown												
	BEDROCK AT 0.10m												

RECORD OF BOREHOLE No BH03-03

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+205 C/L, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2009.01.29 - 2009.01.29 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
205.9	Ground Surface													
0.0	PEAT, fibrous Very Soft Black Wet (900mm)		1	SS	2									
205.0														
0.9	Silty CLAY Very Soft Grey		2	SS	0		205							
204.5														
1.4	SAND and SILT, some clay Very Loose Grey Moist to Wet		3	SS	0		204							
203.7														
2.2	SAND, some gravel, trace silt Loose Grey Moist to Wet		4	SS	6									
203.5														
2.4	END OF BOREHOLE (SAMPLER BOUNCING) AT 2.4m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 0.8m UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Apr 21/09 Ground Surface Jun 05/09 Ground Surface Aug 20/09 Ground Surface Aug 25/09 Ground Surface Oct 27/09 Ground Surface Nov 20/09 Ground Surface													

+³, ×³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH03-04R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+217 O/S 5.0R, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2009 01 29 - 2009 01 29 CHECKED BY RPR

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						
206.1	Ground Surface							20 40 60 80 100						
0.0	SAND and SILT , trace clay, trace gravel Compact Brown Moist		1	SS	13		206							GR SA SI CL
205.4			2	SS	6/									5 54 38 3
0.7	END OF BOREHOLE (SAMPLER BOUNCING) AT 0.7m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.				.075									

RECORD OF BOREHOLE No BH03-05

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+230 O/S 2 0L, NBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2009 01 29 - 2009 01 29 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			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		
206.1	Ground Surface													
0.0	PEAT, fibrous, trace sand Brown (550mm)		1	SS	9		206							
205.5														
0.6	END OF BOREHOLE (SAMPLER BOUNCING) AT 0.6m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.													

RECORD OF BOREHOLE No D03-01R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+192.5 O/S 7.6R, NBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
DATUM Geodetic DATE 2009.01.29 - 2009.01.29 CHECKED BY RPR

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			20	40	60	80	100					
206.0	Ground Surface						206										
0.0	DCPT from surface																
205.0	END OF DCPT AT 1.0m UPON REFUSAL ON PROBABLE BEDROCK																
1.0																	

+³, ×³: Numbers refer to Sensitivity 20 15 10 5 0 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No D03-02L

1 OF 1

METRIC

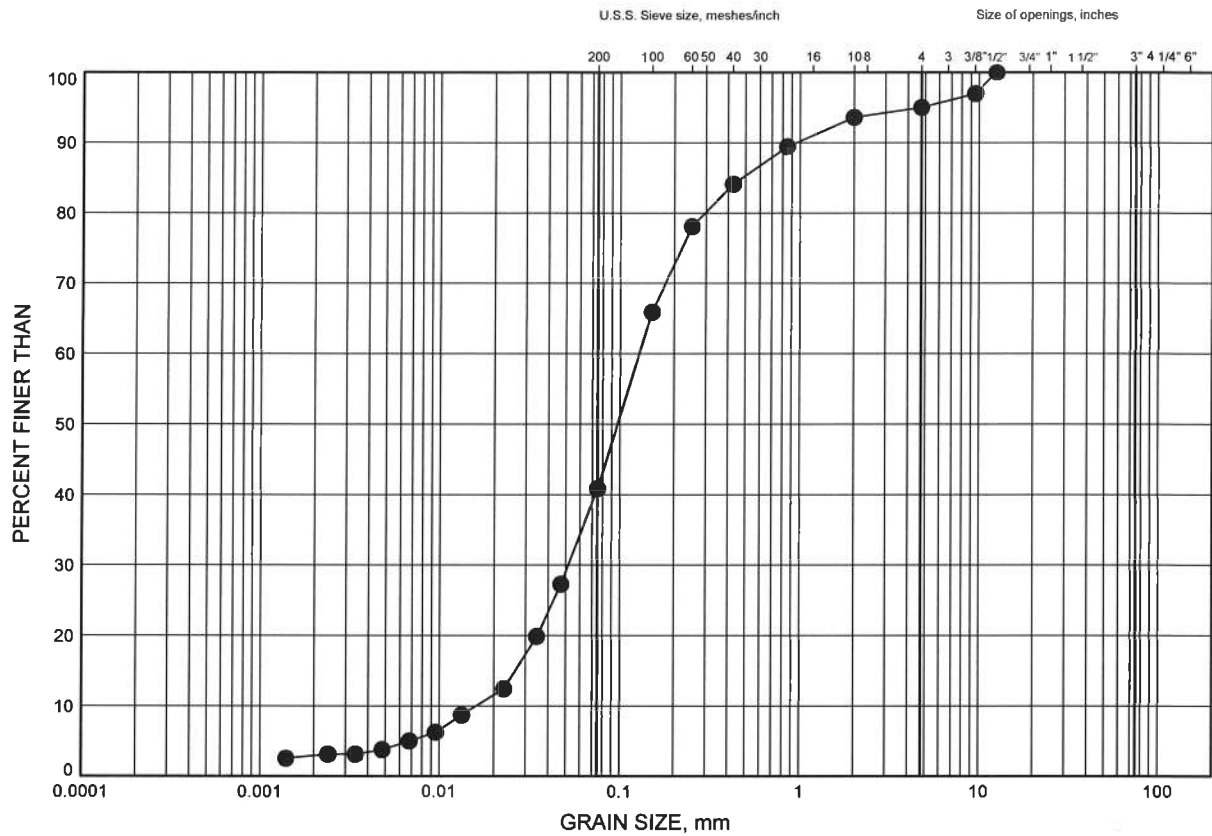
GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+217 O/S 8.0L, NBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
DATUM Geodetic DATE 2009.01.29 - 2009.01.29 CHECKED BY RPR

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 (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa					WATER CONTENT (%)				
							20	40	60	80	100	W _p	W	W _L			
206.8	Ground Surface																
0.0	DCPT from surface																
205.0	END OF DCPT AT 1.8m UPON REFUSAL ON PROBABLE BEDROCK																
1.8																	

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE D1

SAND and SILT



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH03-04R	0.46	205.64

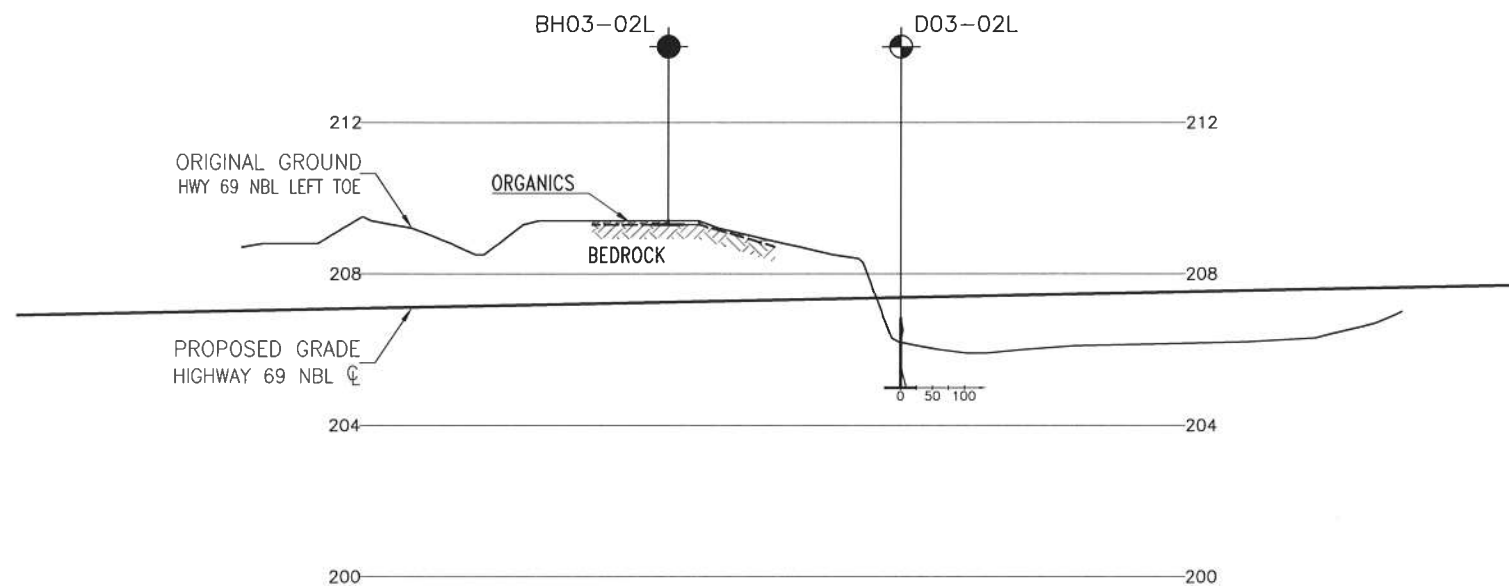
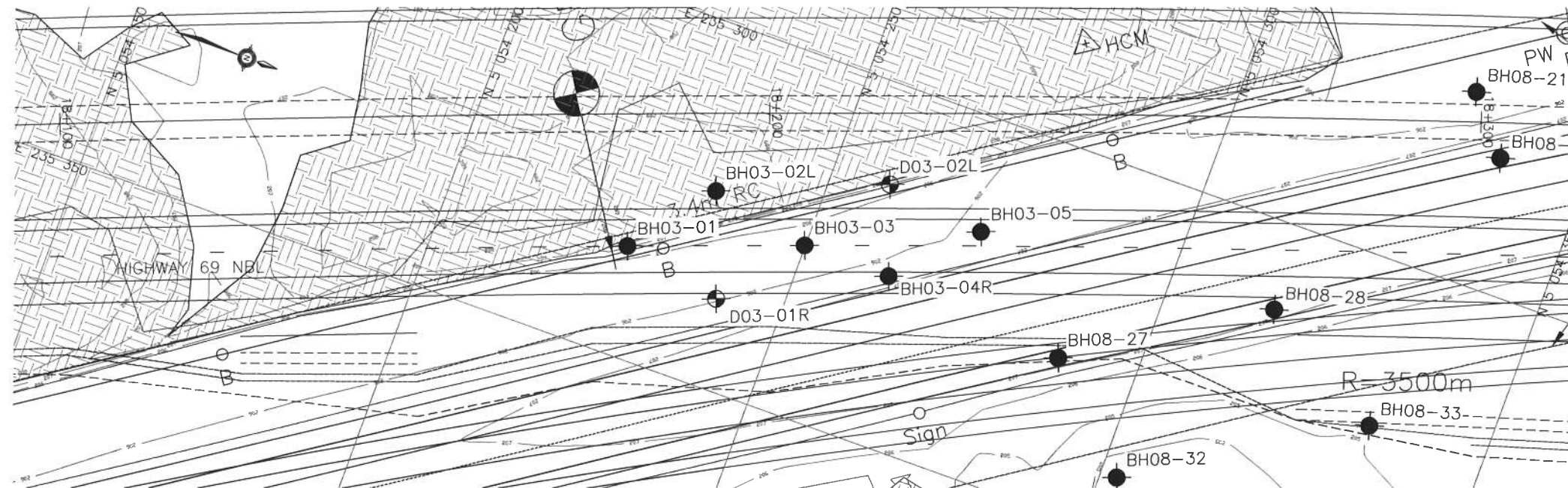
Date December 2012

GWP# 5076-06-00

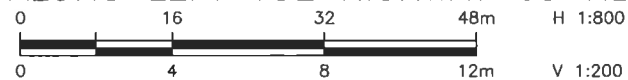


Prep'd MFA

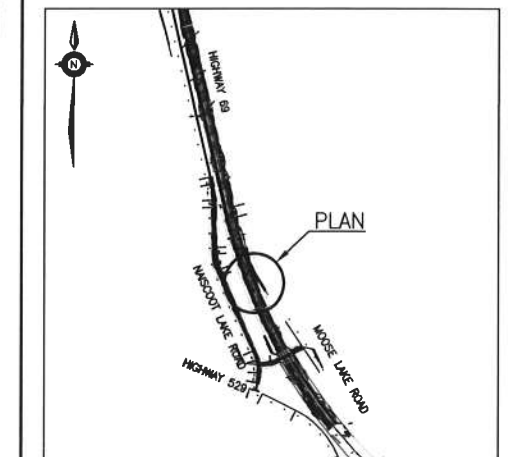
Chkd. MRA



PROFILE ALONG LEFT TOE HIGHWAY 69 NBL



METRIC

DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWNCONT No
GWP No 5076-06-00HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 NBL-LT TOE
(STA 18+180 - 18+230)
BOREHOLE LOCATIONS AND SOIL STRATA

KEYPLAN

LEGEND

●	Borehole
○	Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60' Cone, 475J/blow)
PH	Pressure, Hydraulic
W	Water Level
↑	Head Artesian Water
—	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
BH03-01	207.3	5 054 226.5	235 334.6
BH03-02L	209.4	5 054 235.6	235 323.1
BH03-03	205.9	5 054 249.9	235 326.1
BH03-04R	206.1	5 054 262.5	235 326.2
BH03-05	206.1	5 054 272.6	235 315.9
D03-01R	206.0	5 054 240.8	235 337.4
D03-02L	206.8	5 054 258.2	235 313.9

-NOTES-

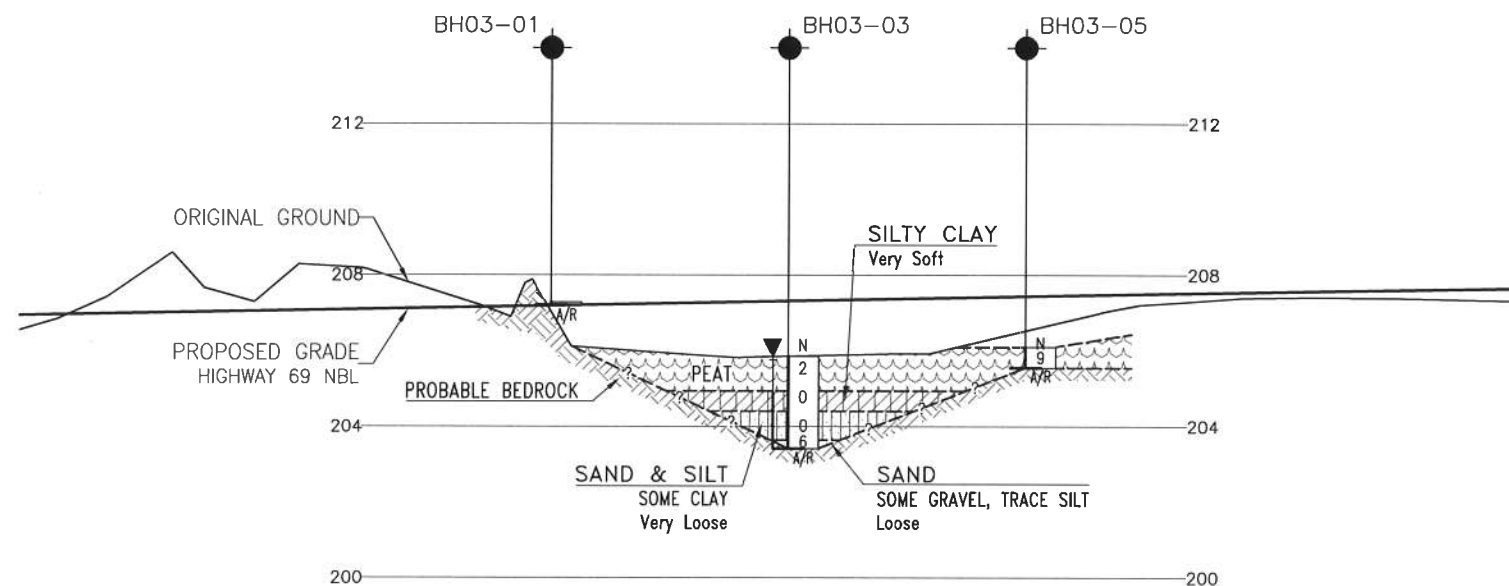
- 1) The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- 2) This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCREs No. 41H-96

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012

0 16 32 48m

SCALE 1:800



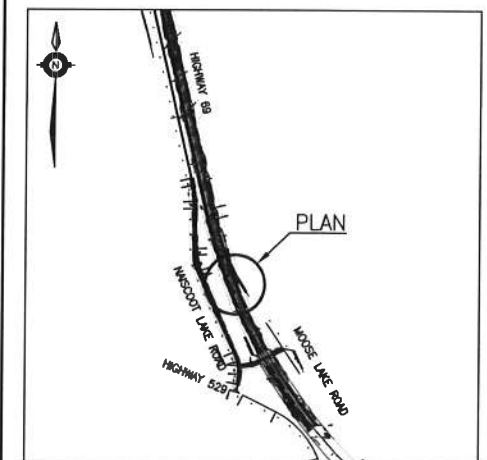
PROFILE ALONG C HIGHWAY 69 NBL



DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN








HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 NBL-CL
(STA 18+180 - 18+230)
BOREHOLE LOCATIONS AND SOIL STRATA



KEYPLAN

LEGEND

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

NO	ELEVATION	NORTHING	EASTING
BH03-01	207.3	5 054 226.5	235 334.6
BH03-02L	209.4	5 054 235.6	235 323.1
BH03-03	205.9	5 054 249.9	235 326.1
BH03-04R	206.1	5 054 262.5	235 326.2
BH03-05	206.1	5 054 272.6	235 315.9
D03-01R	206.0	5 054 240.8	235 337.4
D03-02L	206.8	5 054 258.2	235 313.9

-NOTES-

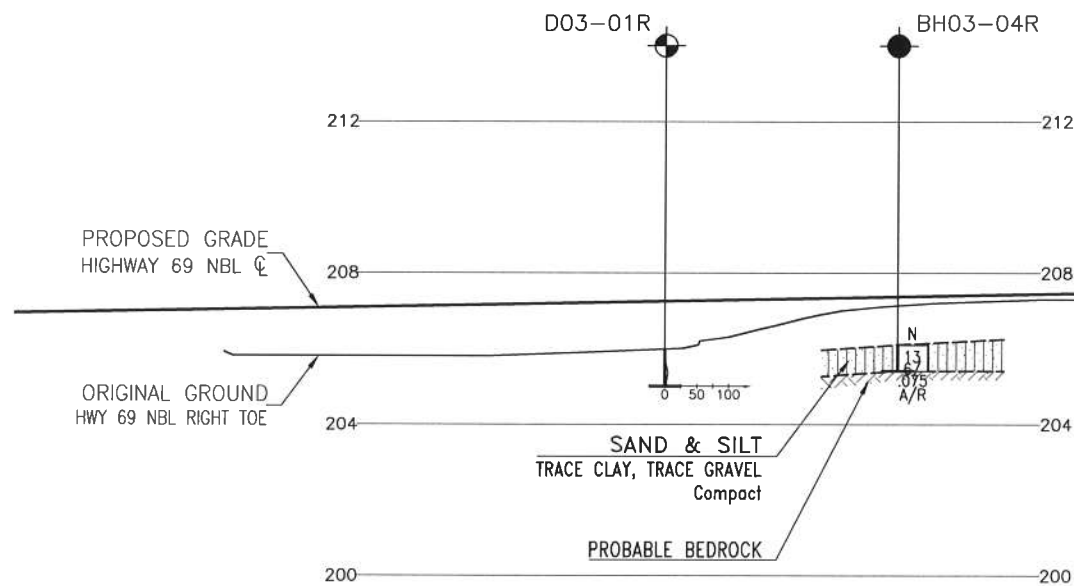
- 1) The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- 2) This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 41H-96

[illegible]



PLAN
0 16 32 48m
SCALE 1:800



PROFILE ALONG RIGHT TOE HIGHWAY 69 NBL

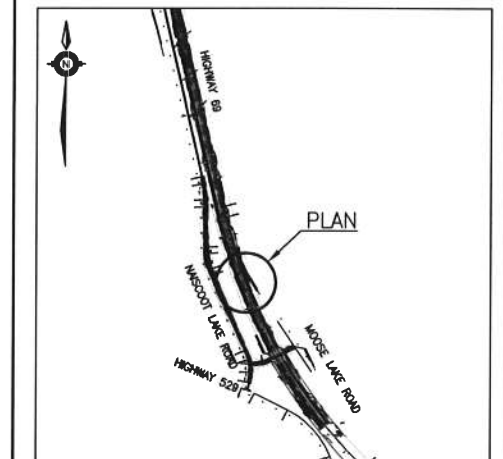
0 16 32 48m H 1:800
0 4 8 12m V 1:200

METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



CONT No
GWP No 5076-06-00

HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 NBL-RT TOE
(STA 18+180 - 18+230)
BOREHOLE LOCATIONS AND SOIL STRATA



KEYPLAN
LEGEND

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

NO	ELEVATION	NORTHING	EASTING
BH03-01	207.3	5 054 226.5	235 334.6
BH03-02L	209.4	5 054 235.6	235 323.1
BH03-03	205.9	5 054 249.9	235 326.1
BH03-04R	206.1	5 054 262.5	235 326.2
BH03-05	206.1	5 054 272.6	235 315.9
D03-01R	206.0	5 054 240.8	235 337.4
D03-02L	206.8	5 054 258.2	235 313.9

-NOTES-

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

GEOCREs No. 41H-96

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE LOAD
DRAWN	MFA	CHK PKC	SITE STRUCT DWG

Appendix E

**Naiscoot Access Road
Sta. 10+555 to 10+590**

**Boreholes 05-01 to 05-04
DCPT D05-01R**

**Record of Borehole Sheets
Laboratory Test Results
Borehole Locations and Soil Strata Drawings**

RECORD OF BOREHOLE No BH05-01

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Naiscoot Lake Rd., Station 10+555 C/L ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2009.01.28 - 2009.01.28 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					WATER CONTENT (%)			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									
						20 40 60 80 100 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL X LAB VANE					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT w _p w w _L						
205.8	Pond Surface																
0.0	ICE and WATER: (680mm)																
205.1																	
0.7	SAND, trace gravel, occasional peat Loose Dark Brown to Grey Wet		1	SS	7												
204.4																	
1.4	END OF BOREHOLE (SAMPLER BOUNCING) AT 1.4m UPON REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.																

+ 3, X 3; Numbers refer to
Sensitivity

20
15 10 5
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH05-02L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Naiscool Lake Rd., Station 10+562.5 O/S 9.0L ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2009.01.28 - 2009.01.28 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
204.6	Ground Surface													
0.0	PEAT, fibrous Soft Black Wet (600mm)		1	SS	3									
204.0														
203.8			2	SS	58/		204							
0.8	SAND, some gravel Dark Brown Wet				200									
END OF BOREHOLE (SAMPLER BOUNCING) AT 0.8m UPON REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT SURFACE UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.														

RECORD OF BOREHOLE No BH05-03

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Naiscoot Lake Rd., Station 10+575 C/L ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2009.01.28 - 2009.01.28 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100	PLASTIC LIMIT W _P	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L		
205.7	Pond Surface													
0.0	ICE and WATER: (600mm)													
205.1														
205.0	PEAT, fibrous, some gravel, trace sand Black Wet		1	SS	1/.075									
0.7	END OF BOREHOLE (SAMPLER BOUNCING) AT 0.7m UPON REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.													

+³, ×³: Numbers refer to Sensitivity 20 15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH05-04

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Naiscote Lake Rd., Station 10+590 C/L ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2009.01.28 - 2009.01.28 CHECKED BY RPR

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									
205.9	Ground Surface																
0.0	SAND, some gravel		1	AS													
205.5	Black to Brown																
0.4	Moist																
	END OF BOREHOLE (SAMPLER BOUNCING) AT 0.4m UPON REFUSAL ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.																

RECORD OF BOREHOLE No D05-01R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Naiscoot Lake Rd., Station 10+562.5 O/S 9.0R ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2009.01.28 - 2009.01.28 CHECKED BY RPR

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 (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL X LAB VANE					WATER CONTENT (%) w _p w w _L				
205.4	Pond Surface																
0.0	ICE AND WATER: (800mm)						205										
204.6																	
0.8	REFUSAL AT 0.8m ON BEDROCK.																

ONTMT4S 6121 GPJ 12/12/12

PLAN

0 16 32 48m

SCALE 1:800


METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

CONT No
GWP No 5076-06-00

HIGHWAY 69 FOUR-LANING
NAISCOOT LAKE ROAD-LEFT TOE
(STA 10+555 - 10+590)
BOREHOLE LOCATIONS AND SOIL STRATA








THURBER ENGINEERING LTD.



KEYPLAN

LEGEND

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

[illegible]

-NOTES-


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

GEOCRES No. 41H-96

PROFILE ALONG LEFT TOE NAISCOOT LAKE ROAD

0 16 32 48m H 1:800
0 4 8 12m V 1:200

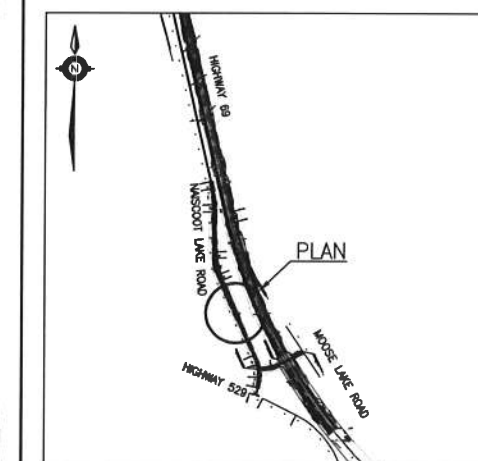
[illegible]



A circular professional engineer seal for the Province of Ontario. The outer ring contains the text "LICENSED PROFESSIONAL ENGINEER" at the top and "PROVINCE OF ONTARIO" at the bottom. In the center, there is a stylized signature "MRA" above the name "M. R. ANDERSON". Below the name is a date stamp "Dec 13/12".







MMM GROUP

THURBER ENGINEERING LTD



KEYPLAN

LEGEND

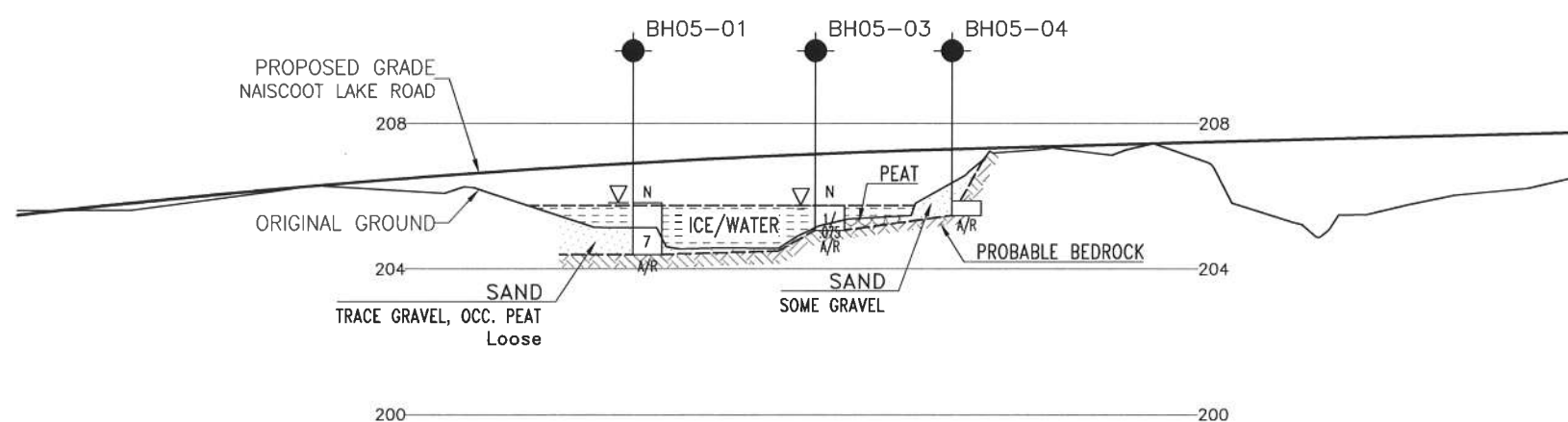
	Borehole
	Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60° Cone, 475J/blow)
PH	Pressure, Hydraulic
	Water Level
	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
BH05-01	205.8	5 053 990.0	235 237.1
BH05-02L	204.6	5 053 993.1	235 225.8
BH05-03	205.7	5 054 008.2	235 228.9
BH05-04	205.9	5 054 021.9	235 222.7
D05-01R	205.4	5 054 000.5	235 242.2

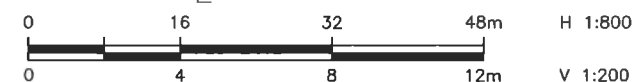
-NOTES-

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- 2) This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 41H-96

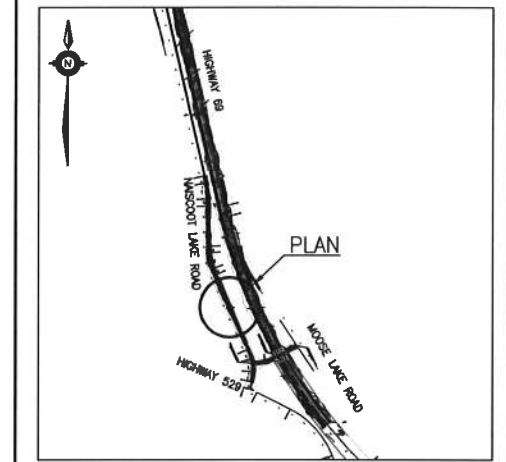
[illegible]

PROFILE ALONG C NAISCOOT LAKE ROAD










THURBER ENGINEERING LTD.



KEYPLAN

LEGEND

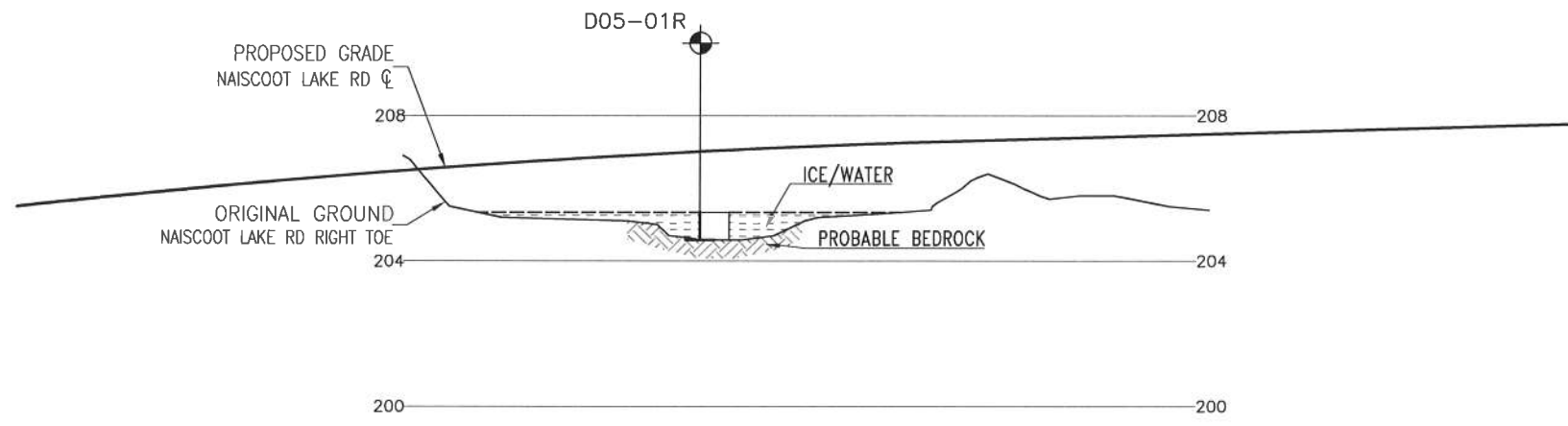
	Borehole
	Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60° Cone, 475J/blow)
PH	Pressure, Hydraulic
	Water Level
	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

[illegible]

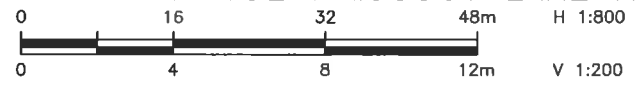
-NOTES-

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

GEOCRES No. 41H-96



PROFILE ALONG RIGHT TOE NAISCOOT LAKE ROAD

[illegible]

Appendix F

**Hwy 69 NBL & SBL
Sta. 18+240 to 18+500 Township of Harrison**

**Boreholes 08-01 to 08-33
DCPTs D08-01R to D08-08L**

**Record of Borehole Sheets
Laboratory Test Results
Borehole Locations and Soil Strata Drawings**

RECORD OF BOREHOLE No BH08-01

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+301 C/L, NBL ORIGINATED BY ES
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2009.08.25 - 2009.08.25 CHECKED BY RPR

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			SHEAR STRENGTH kPa		WATER CONTENT (%)				
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	W _P W W _L					
207.2	Ground Surface							20 40 60 80 100		20 40 60			GR SA SI CL	
0.0	ASPHALT: (85mm)													
0.1	SAND, trace gravel, trace silt, trace clay Compact to Loose Brown Damp (FILL)		1	SS	13	▽	207			○			6 84 10 (SI+CL)	
			2	SS	8		206			○				
205.6														
1.6	SAND, coarse grained, trace gravel to gravelly, trace silt, trace clay, occasional cobbles Loose to Compact Brown Moist (FILL)		3	SS	7			205			○			
			4	SS	30						○		27 64 9 (SI+CL)	
	Dark Brown to Grey		5	SS	14			204			○			
			6	SS	19			203			○		0 94 6 (SI+CL)	
			7	SS	10					○				
202.1														
5.1	PEAT, fibrous Dark Brown Moist						202							
201.1														
6.1	SAND, trace gravel Brown Wet		8	SS	102/ 250		201			○				
200.7														
6.5	END OF BOREHOLE (SAMPLER BOUNCING) AT 6.5m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 0.9m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH HOLEPLUG TO 0.1m, THEN ASPHALT TO SURFACE.													

+ 3 × 3 : Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-02L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+313.5 O/S 7.5L, NBL ORIGINATED BY ES
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2009.08.25 - 2009.08.25 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	
207.3	Ground Surface											
0.0	ASPHALT: (85mm)											
0.1	SAND, some silt, trace clay, trace gravel Compact to Loose Brown Damp (FILL)		1	SS	13		207					4 77 19 (SI+CL)
			2	SS	8		206					
	occasional bedrock fragments		3	SS	29		205					
205.2												
2.1	BEDROCK, granitic gneiss Grey Coring started at 2.1m		1	RUN			205					RUN #1 TCR=100% SCR=100% RQD=100%
							204					
203.6												
3.7	END OF BOREHOLE (SAMPLER BOUNCING) AT 3.7m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG TO 0.1m, THEN ASPHALT TO SURFACE.											

+³, ×³: Numbers refer to Sensitivity 20 15 10 (% STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-03

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+326 C/L, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
 DATUM Geodetic DATE 2009.02.02 - 2009.02.02 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				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 (%)								
205.6	Ground Surface															
0.0	PEAT, fibrous Very Soft Dark Brown Wet		1	SS	0		205							181		
													745			
													415			
													508			
													525			
201.2	Silty CLAY, trace sand, trace gravel Very Soft Grey		7	TW	PH		201							0 8 39 53		
4.4																
200.6	SAND, some silt, trace clay Very Loose Grey Moist						200									
5.0																
																0 88 12 (SI+CL)
198.0	END OF BOREHOLE (SAMPLER BOUNCING) AT 7.6m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 0.6m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH HOLEPLUG UPON COMPLETION.						199									
7.6																

+ 3 X 3 Numbers refer to
Sensitivity 20 15 10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-04R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+338.5 O/S 8.9R, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
 DATUM Geodetic DATE 2009.02.02 - 2009.02.02 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100	20 40 60 80 100	20 40 60 80 100		
205.4 0.0	Ground Surface												
	PEAT, fibrous Very Soft Dark Brown Wet		1	SS	0		205					412	
			2	SS	0		204					475	
			3	SS	0		203						
			4	SS	0		202					605	
			5	SS	0		201						
200.8 4.6	Silty CLAY, trace sand Very Soft to Firm Grey		6	SS	0		200						
			7	TW	PH		199						0 8 33 59
198.9 6.5	END OF BOREHOLE (SAMPLER BOUNCING) AT 6.5m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT SURFACE UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH HOLEPLUG UPON COMPLETION.		8	SS	8								0 8 40 52

+ 3, x 3 Numbers refer to
Sensitivity 20
15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-05

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+351 C/L, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
 DATUM Geodetic DATE 2009.02.02 - 2009.02.02 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	
205.5	Ground Surface											
0.0	PEAT, fibrous Very Soft Dark Brown Wet		1	SS	0		205				508	
			2	SS	0		204				728	
			3	SS	0		203				651	
			4	SS	0		202				705	
			5	SS	0		201					
			6	SS	0		200					
200.3	Silty CLAY, trace sand Very Soft Grey		7	SS	0		199					0 3 32 65
5.2							198					
			9	SS	0							
197.4	Silty SAND, some clay Grey Moist to Wet											0 45 38 17
8.1												
197.2												
8.3	END OF BOREHOLE (SAMPLER BOUNCING) AT 8.3m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 0.7m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH HOLEPLUG UPON COMPLETION.											

+³, x³: Numbers refer to Sensitivity 20 15 10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-06L

1 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+363.5 O/S 9.2L, NBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
DATUM Geodetic DATE 2009.02.02 - 2009.02.02 CHECKED BY RPR

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			SHEAR STRENGTH kPa							w _p w w _L		
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE							WATER CONTENT (%)		
206.1	Pond Surface							20	40	60	80	100	20	40	60		
0.0	ICE and WATER: (500mm)						206										
205.6																	
0.5	PEAT, fibrous, some silt, occasional organic clay Very Soft Black Wet		1	SS	0		205										
			2	SS	0		204									356	
			3	SS	0		203									297	
202.6			4	SS	0		202									197	
3.5	Sandy SILT, trace to some clay Very Loose Grey Moist						201										0 16 45 39
201.5			5	SS	1		200										
4.6	Silty CLAY, trace to some sand Very Soft Grey		6	SS	0		199										
			7	TW	PH		198										0 7 39 54
199.4			8	SS	0		197										
6.7	Silty SAND, some clay Very Loose Grey Moist		9	SS	0												
			10	SS	7												
196.2																	
9.9	END OF BOREHOLE (SAMPLER																

Continued Next Page

+³, ×³: Numbers refer to Sensitivity
20
15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-06L

2 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+363.5 O/S 9.2L, NBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
DATUM Geodetic DATE 2009.02.02 - 2009.02.02 CHECKED BY RPR

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 (%) GR SA SI CL
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa					WATER CONTENT (%)			
							20	40	60	80	100	W _p	W	W _L		
	Continued From Previous Page															
	BOUNCING) AT 9.9m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG UPON COMPLETION.															

RECORD OF BOREHOLE No BH08-07

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+376 C/L, NBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
DATUM Geodetic DATE 2009.02.01 - 2009.02.01 CHECKED BY RPR

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	20	40	60					
205.6	Ground Surface															
0.0	PEAT, fibrous Very Soft Dark Brown Wet		1	SS	2											
			2	SS	0											
			3	SS	0											
			4	SS	0											
			5	SS	0											
201.2																
4.4	Silty CLAY, trace sand Very Soft Grey		6	SS	0											0 8 40 52
198.8																
6.8	END OF BOREHOLE (SAMPLER BOUNCING) AT 9.9m UPON AUGER REFUSAL ON PROBABLE BEDROCK WATER LEVEL AT 0.5m UPON COMPLETION OF DRILLING Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Apr 21/09 0.2 205.4 Jun 04/09 Ground Surface Aug 17/09 Ground Surface Aug 25/09 Ground Surface Oct 27/09 Ground Surface Nov 20/09 Ground Surface															

+ 3, X 3: Numbers refer to 20
Sensitivity 15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-08R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+388.5 O/S 9.4R, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Auger COMPILED BY LG
 DATUM Geodetic DATE 2009.02.01 - 2009.02.01 CHECKED BY RPR

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 (%) 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								
206.3	Pond Surface						20	40	60	80	100	20	40	60		
0.0	ICE and WATER: (800mm)															
205.5																
0.8	PEAT, fibrous, trace organic clay Very Soft Black Wet		1	SS	0											
			2	SS	0										77%	
			3	SS	0										68%	
			4	SS	0										68%	
202.0																
4.3	Silty CLAY, trace sand Very Soft Grey		5	SS	0											0 3 34 63
			6	SS	0											
200.1																
6.2	END OF BOREHOLE (SAMPLER BOUNCING) AT 6.2m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG UPON COMPLETION.															

+³, X³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-09

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+401 C/L, NBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
DATUM Geodetic DATE 2009.02.01 - 2009.02.01 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			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 (%)		
								20 40 60 80 100					20 40 60		
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					w _p w w _L		
206.1	Pond Surface														
0.0	ICE and WATER: (600mm)						206								
205.5															
0.6	PEAT, fibrous Very Soft Black Wet		1	SS	1		205								
			2	SS	0						563				
			3	SS	0		204								
			4	SS	0						1067				
			5	SS	0		203								
											747				
							202								
											743				
							201								
200.0															
6.1	Silty CLAY, some sand Very Soft Grey		6	SS	0		200								
199.1															
7.0	END OF BOREHOLE (SAMPLER BOUNCING) AT 7.0m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG UPON COMPLETION.														

+ 3, X 3: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-10L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+413.5 O/S 9.4L, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
 DATUM Geodetic DATE 2009.02.03 - 2009.02.03 CHECKED BY RPR

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 (%) GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa			WATER CONTENT (%)					
								○ UNCONFINED + FIELD VANE			w _p w w _L					
205.5	Ground Surface						● QUICK TRIAXIAL X LAB VANE									
0.0	PEAT, fibrous, occasional organic clay Very Soft Black to Dark Brown Wet		1	SS	0									1085		
																734
																1210
						</										

+³, X³: Numbers refer to Sensitivity
 20
 15
 10
 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-11

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+426 C/L, NBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2009.01.30 - 2009.01.30 CHECKED BY RPR

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 (%) 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							
206.2	Pond Surface														
0.0	ICE and WATER: (800mm)						206								
205.4															
0.8	PEAT, fibrous Very Soft Black Wet		1	SS	0		205								
			2	SS	0		204								
			3	SS	0								145		
			4	SS	0		203						805		
			5	SS	0		202						1035		
201.1							201						1235		
5.1	Silty CLAY, trace sand Very Soft to Stiff Grey		6	SS	0		200							0 9 40 51	
			7	TW	PH		199								
			8	SS	14										
198.3															
7.9	END OF BOREHOLE (SAMPLER BOUNCING) AT 7.9m ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS TO SURFACE.														

ONTMT4S 6121 GPJ 12/11/12

+ 3 × 3: Numbers refer to
Sensitivity 20
15 10 5 0 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-12R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+438.5 O/S 9.4R, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2009.01.30 - 2009.01.30 CHECKED BY RPR

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 (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa			WATER CONTENT (%)				
								20 40 60 80 100	20 40 60	w _p w w _L					
206.3	Pond Surface														
0.0	ICE and WATER: (760mm)						206								
205.5															
0.8	PEAT, fibrous Very Soft Dark Brown Wet		1	SS	0		205								
			2	SS	0								83		
							204								
			3	SS	0								94		
			4	SS	0		203								
			5	SS	0								83		
201.8							202						96		
4.5	Silty SAND, occasional peat Very Loose Wet		6	SS	0										
201.0	Auger grinding														
5.3	END OF BOREHOLE AT 5.3m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS TO SURFACE.														

+ 3 x 3 : Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-13

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+451 C/L, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2009.01.30 - 2009.01.30 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			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				
206.2	Pond Surface											
0.0	ICE and WATER: (800mm)											
205.4												
0.8	PEAT, fibrous, trace gravel Very Soft Dark Brown to Black Wet		1	SS	0							
			2	SS	0							
			3	SS	0							
			4	SS	0							
			5	SS	0							
201.9												
4.3	Silty SAND, some to trace clay Very Loose Grey Wet		6	SS	0							
200.8												
5.4	END OF BOREHOLE (SAMPLER BOUNCING) AT 5.4m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS TO SURFACE.											

+ 3 . X 3 Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-14L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+463.5 O/S 9.3L, NBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2009.01.30 - 2009.01.30 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			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 x LAB VANE					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT w _p w w _L WATER CONTENT (%)						
206.0	Pond Surface							20	40	60	80	100							
0.0	ICE and WATER: (600mm)						206												
205.4																			
0.6	PEAT, fibrous Very Soft Dark Brown to Black Wet		1	SS	0		205												
			2	SS	0		204											79	
			3	SS	0		203											1342	
202.4			4	SS	0		202											1435	
3.6	Silty CLAY, trace sand Very Soft Grey																	845	
			1	TW	PH		202												
201.5																			
4.5	END OF BOREHOLE (SAMPLER BOUNCING) AT 4.5m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS TO SURFACE.																		



+ 3 x 3 Numbers refer to 20
Sensitivity 15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-15

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+476 C/L, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2009.01.30 - 2009.01.30 CHECKED BY RPR

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 (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE							
205.0	Pond Surface						205	20	40	60	80	100			
0.0	ICE and WATER: (600mm)														
204.4															
0.6	PEAT, fibrous Very Soft Black Wet		1	SS	0		204							525	
203.5															
1.5	END OF BOREHOLE (SAMPLER BOUNCING) AT 1.5m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.														

+ ³ , × ³ : Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-16R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+488.5 O/S 9.0R, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2009.01.30 - 2009.01.30 CHECKED BY RPR

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			SHEAR STRENGTH kPa		WATER CONTENT (%)				
206.3	Pond Surface							20 40 60 80 100		20 40 60				
0.0	ICE and WATER: (700mm)						206							
205.6														
0.7	PEAT, fibrous, trace gravel, trace to some silt Very Soft Black Wet		1	SS	0		205					138		
204.9														
1.4	SAND, some clay, some silt, trace gravel Loose Grey Wet		2	SS	7								3 80 17 (SI+CL)	
							204							
			3	SS	4									
203.5														
2.8	END OF BOREHOLE (SAMPLER BOUNCING) AT 2.8m UPON REFUSAL ON PROBABLE BEDROCK. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Apr 21/09 Ground Surface Jun 04/09 Ground Surface Aug 17/09 Ground Surface Aug 25/09 Ground Surface Oct 27/09 Ground Surface													

+ 3 x 3 Numbers refer to
Sensitivity 20
15 10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-17

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+501 C/L, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Visual Assessment and Manual Excavation COMPILED BY AN
 DATUM Geodetic DATE 2009.01.30 - 2009.01.30 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100	PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L		
205.9	Ground Surface		1	AS										
0.0	PEAT, fibrous: (50mm) Dark Brown													
0.0	BEDROCK AT 0.05m													

+ ³ , × ³ : Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

METRIC

[illegible]

RECORD OF BOREHOLE No BH08-19

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp, Station 18+278 O/S 16.5L, SBL ORIGINATED BY SLL
 HWY 6969 BOREHOLE TYPE Continuous Split Spoon (50lb Hammer) COMPILED BY AN
 DATUM Geodetic DATE 2012.06.20 - 2012.06.20 CHECKED BY LRB

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				WATER CONTENT (%)				
205.4	Ground Surface							20	40	60	80	100				
0.0	PEAT, fibrous Very Soft Black Wet						205									
204.2			1	SS	3											
1.2	SAND, trace silt and clay Very Loose to Loose Grey Wet		2	SS	6		204									
203.2			3	SS	50/											
2.2	END OF BOREHOLE AT 2.2m UPON REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 0.1m, THEN CUTTINGS TO SURFACE.				0.100											

+³, x³: Numbers refer to
Sensitivity

20
15
10
5
0
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-20

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp, Station 18+288 CL, SBL ORIGINATED BY SLL
 HWY 6969 BOREHOLE TYPE Continuous Split Spoon (50lb Hammer) COMPILED BY AN
 DATUM Geodetic DATE 2012.06.20 - 2012.06.20 CHECKED BY LRB

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							
205.3	Ground Surface														
0.0	PEAT, fibrous Very Soft Black Wet		1	SS	0		205								
							204								
203.4			2	SS	3										
1.9	SAND, some silt, trace to some gravel, trace clay Very Loose Grey Wet		3	SS	2		203								
202.5	Silty clay seam at 2.6m		4	SS	50/										13 65 19 3
2.8	END OF BOREHOLE AT 2.8m UPON REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH CUTTINGS TO SURFACE.				0.075										

+ 3, × 3 : Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-21

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp, Station 18+299 O/S 14.5R, SBL ORIGINATED BY SLL
HWY 6969 BOREHOLE TYPE Continuous Split Spoon (50lb Hammer) COMPILED BY AN
DATUM Geodetic DATE 2012.06.20 - 2012.06.20 CHECKED BY LRB

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	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							
								20 40 60 80 100	w _p w w _L						
205.7	Ground Surface														
0.0	PEAT, fibrous Very Soft Black Wet		1	SS	0		205								
			2	SS	1		204								
203.3	SAND, trace silt and clay Loose to Very Loose Grey Wet		3	SS	3										
2.4			4	SS	9		203								
			5	SS	1		202								
201.6															
4.1	END OF BOREHOLE AT 4.1m UPON REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 0.3m, THEN CUTTINGS TO SURFACE.														

+ 3, X 3 : Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-22

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp, Station 18+372 CL, SBL ORIGINATED BY SLL
 HWY 6969 BOREHOLE TYPE Continuous Split Spoon (50lb Hammer) COMPILED BY AN
 DATUM Geodetic DATE 2012.06.20 - 2012.06.20 CHECKED BY LRB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				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					
205.5 0.0	Ground Surface PEAT, fibrous Very Soft to Soft Black Wet												
			1	SS	1							734	
			2	SS	0							721	
			3	SS	1							1052	
			4	SS	1							825	
			5	SS	3							247	
201.8 3.7	SAND, some silt, trace clay Loose to Very Loose Grey Wet		6	SS	4						○		0 86 11 3
			7	SS	2						○		
200.3 5.2	END OF BOREHOLE AT 5.2m UPON REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 0.1m, THEN CUTTINGS TO SURFACE.		8	SS	50/ 0.125						○		

RECORD OF BOREHOLE No BH08-23

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp, Station 18+411 O/S 15.0L, SBL ORIGINATED BY SLL
 HWY 6969 BOREHOLE TYPE Continuous Split Spoon (50lb Hammer) COMPILED BY AN
 DATUM Geodetic DATE 2012.06.19 - 2012.06.19 CHECKED BY LRB

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 (%) 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 (%) W _P W W _L				
205.4	Ground Surface															
0.0	PEAT, fibrous Very Soft Black Wet		1	SS	1											
			2	SS	0											
203.1			3	SS	1											
2.3	Silty CLAY, with sand seams Very Soft to Soft Grey Wet															
			4	SS	2											
202.2																
3.2	PEAT, fibrous, with wood fragments Soft Dark Brown to Black Wet		5	SS	3											
			6	SS	2											
201.1																
4.3	Silty CLAY Stiff Grey															
			7	SS	9											
200.4																
5.0	SAND, trace silt and clay, trace gravel Loose Grey Wet															
			8	SS	3											
199.9																
5.5	Silty CLAY Soft Grey															
			9	SS	3											
198.9																
6.5	SAND, some silt, trace gravel Very Loose Grey Wet		10	SS	3											
198.1			11	SS	50/ 0.125											
7.3	END OF BOREHOLE AT 7.3m UPON REFUSAL ON PROBABLE BEDROCK. Piezometer installation consists of 25mm diameter Schedule 40 PVC pipe with a 1.6m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Jun 28/12 0.0 205.4															

ONTMT4S 6121.GPJ 12/13/12

RECORD OF BOREHOLE No BH08-24

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp, Station 18+303 O/S 14 0L, NBL ORIGINATED BY ES
 HWY 6969 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2012.06.24 - 2012.06.24 CHECKED BY LRB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT NATURAL MOISTURE LIQUID CONTENT LIMIT			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 x LAB VANE			WATER CONTENT (%) w _p w w _L				
207.5	Ground Surface														
0.0	ASPHALT: (50mm)														
206.9	SAND, some gravel Dark Brown Damp (FILL)		1	GS											
0.6	SAND, fine grained, trace silt, trace gravel Compact to Loose Brown Damp (FILL)		1	SS	16										1 89 10 (SI+CL)
			2	SS	4										
205.3	PEAT, some sand Loose Dark Brown Wet		3	SS	4										
2.2															
204.6	SAND, some gravel to gravelly Compact Dark Brown Wet		4	SS	11										
2.9	Occasional cobble		5	SS	12										
	Peat (75mm)		6	SS	10										
201.5	END OF BOREHOLE AT 6.0m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 2.1m, CUTTINGS TO 0.05m, THEN ASPHALT TO SURFACE.														
6.0															

+³, x³: Numbers refer to Sensitivity 20 15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-25

1 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp, Station 18+397 CL, SBL ORIGINATED BY ES
 HWY 6969 BOREHOLE TYPE Hollow Stem Augers/NW Casing/NQ Coring COMPILED BY AN
 DATUM Geodetic DATE 2012.06.24 - 2012.06.28 CHECKED BY LRB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	
207.4	Ground Surface											
0.0	ASPHALT: (50mm)											
206.6	SAND, some gravel Dark Brown Damp (FILL)		1	GS			207					
0.8	SAND, fine grained, trace silt, trace gravel Compact Brown Damp (FILL)		1	SS	13		206					
205.3			2	SS	25							
2.1	Gravelly SAND Compact to Loose Dark Grey Wet (FILL)		3	SS	19		205					
	Occasional cobble		4	SS	8		204					
203.3			1	RUN			203					
4.1	ROCK FILL		2	RUN			202					
201.1							201					
6.3	PEAT, trace sand Very Loose to Loose Dark Brown Wet		5	SS	2		200					
			6	SS	3							
			7	SS	3		199					
			8	SS	10							
198.0							198					
9.4	SAND, fine grained, trace gravel Very Loose Grey Saturated		9	SS	0							

Continued Next Page

+³, ×³: Numbers refer to
Sensitivity

20
15
10




(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-25

2 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp, Station 18+397 CL, SBL ORIGINATED BY ES
HWY 6969 BOREHOLE TYPE Hollow Stem Augers/NW Casing/NQ Coring COMPILED BY AN
DATUM Geodetic DATE 2012.06.24 - 2012.06.28 CHECKED BY LRB

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	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									
	Continued From Previous Page							20	40	60	80	100					
								○ UNCONFINED									
								● QUICK TRIAXIAL									
									+	FIELD VANE							
									×	LAB VANE							
								WATER CONTENT (%)									
								20	40	60	80	100	20	40	60		
197.2																	
197.2	Silty CLAY , trace sand		10	SS	100/												
197.0	Grey				0.225												
10.4	Gravelly SAND Grey Moist																
	END OF BOREHOLE AT 10.4m UPON REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 2.4m, CUTTINGS TO 0.1m, THEN ASPHALT TO SURFACE.																

RECORD OF BOREHOLE No BH08-26

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp, Station 18+426 O/S 4.0L, SBL ORIGINATED BY ES
HWY 6969 BOREHOLE TYPE Hollow Stem Augers/NW Casing/NQ Coring COMPILED BY AN
DATUM Geodetic DATE 2012.06.24 - 2012.06.27 CHECKED BY LRB

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			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE		WATER CONTENT (%) w _p w w _L				
207.4	Ground Surface							20	40	60	80	100		
0.0	ASPHALT: (50mm)													
	SAND, some gravel Dark Brown Damp (FILL)		1	GS			207						○	
206.6														
0.8	SAND and GRAVEL, trace silt, occasional cobbles Compact Brown Damp to Moist (FILL)		1	SS	10		206						○	
	Dark Brown Wet		2	SS	23								○	
							205						○	52 45 3 (SI+CL)
			3	SS	14									
			4	SS	10		204						○	
203.0							203							
4.4	ROCK FILL		1	RUN			202							
201.2							201						○	
6.2	SAND, trace to some gravel Very Dense Grey Moist (FILL)		5	SS	50/ 0.150								○	
200.8														
200.9														
6.7	PEAT, mixed with sand Dark Brown Wet		2	RUN			200							RUN #2 TCR=100% SCR=100% RQD=100%
	BEDROCK, granitic gneiss Grey													
199.6														
7.8	END OF BOREHOLE AT 7.8m. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 1.2m, CUTTINGS TO 0.07m, THEN ASPHALT TO SURFACE.													

+ 3, x 3 : Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-27

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp, Station 18+240 O/S 15.0R, NBL ORIGINATED BY ES
 HWY 6969 BOREHOLE TYPE Hollow Stem Augers/NW Casing/NQ Coring COMPILED BY AN
 DATUM Geodetic DATE 2012.06.23 - 2012.06.27 CHECKED BY LRB

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			SHEAR STRENGTH kPa				WATER CONTENT (%)				
								○ UNCONFINED ● QUICK TRIAXIAL	+ FIELD VANE × LAB VANE							
207.1	Ground Surface							20	40	60	80	100	20	40	60	GR SA SI CL
0.0	ASPHALT: (50mm)															
	SAND, trace to some gravel Brown Damp (FILL)		1	GS												
206.1	Dense		1	SS	50/											
1.0	Occasional cobbles				0.050											
	Gravelly SAND, trace organics Compact Brown Moist (FILL)		2	SS	12											
204.9																
2.2	Silty CLAY, some sand Very Soft															
204.5	Grey		3	SS	2											0 13 47 40
2.6	SAND, trace silt, trace gravel Loose															
204.0	Grey to Brown		4	SS	100/											
3.1	Wet				0.075											RUN #1 TCR=100% RQD=100%
	BEDROCK, granitic gneiss Grey		1	RUN												
203.4																
3.7	Quartz Pink, white and grey															RUN #2 TCR=100% RQD=100%
			2	RUN												
202.0																
5.1	Granitic Gneiss Grey															
201.5																
5.6	END OF BOREHOLE AT 5.6m. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 2.1m, CUTTINGS TO 0.1m, THEN ASPHALT TO SURFACE.															

+³, x³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-28

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp, Station 18+272 O/S 8.5R, NBL ORIGINATED BY ES
HWY 6969 BOREHOLE TYPE Hollow Stem Augers/NW Casing/NQ Coring COMPILED BY AN
DATUM Geodetic DATE 2012.06.27 - 2012.06.27 CHECKED BY LRB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L		
207.1	Ground Surface												
0.8	ASPHALT: (50mm)						207						
206.4	SAND, some gravel Dark Brown Damp (FILL)		1	GS									
0.7	SAND, fine grained, trace gravel Loose to Dense Brown Damp (FILL)		1	SS	9		206						
			2	SS	50/ 0.100								
204.9	ROCK FILL		1	RUN			205						
2.2			2	RUN			204						
			3	RUN			203						
202.0	Wood fibres						202						
5.1	BEDROCK, quartz Pink, with white and grey												
201.6	Granitic gneiss Grey		4	RUN			201						
5.5													
199.9	Quartz band (50mm)						200						
7.2	END OF BOREHOLE AT 7.2m. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 0.9m, CUTTINGS TO 0.1m, THEN ASPHALT TO SURFACE.												

+ ³, x ³: Numbers refer to
Sensitivity

20
15 5
10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-29

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp, Station 18+331 O/S 6.0L, NBL ORIGINATED BY ES
HWY 6969 BOREHOLE TYPE Hollow Stem Augers/NW Casing/NQ Coring COMPILED BY AN
DATUM Geodetic DATE 2012.06.23 - 2012.06.25 CHECKED BY LRB

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			SHEAR STRENGTH kPa		WATER CONTENT (%)				
207.0	Ground Surface							20	40	60	80	100		
0.0	ASPHALT: (50mm)													
	SAND, trace silt, trace gravel Compact Dark Brown to Grey Damp (FILL)		1	GS										
			1	SS	11									4 85 11 (SI+CL)
			2	SS	16									
204.8														
2.2	ROCK FILL													
			1	RUN										
			2	RUN										
			3	SS	50/ 0.125									
			3	RUN										
200.7														
200.8	PEAT Dark Brown Wet													
6.4	BEDROCK, granitic gneiss Grey with pink bands		4	RUN										RUN #4 TCR=100% RQD=100%
199.0														
8.0	END OF BOREHOLE AT 8.0m. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 1.2m, CUTTINGS TO 0.1m, THEN ASPHALT TO SURFACE.													

ONTMT4S 6121 GPJ 12/13/12

RECORD OF BOREHOLE No BH08-30

1 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp, Station 18+360 O/S 12.5L, NBL ORIGINATED BY ES
 HWY 6969 BOREHOLE TYPE Hollow Stem Augers/NW Casing/NQ Coring COMPILED BY AN
 DATUM Geodetic DATE 2012.06.23 - 2012.06.26 CHECKED BY LRB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	PLASTIC LIMIT W _P	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	
207.0	Ground Surface						207					
0.0	ASPHALT: (50mm)											
206.3	SAND, some gravel Dark Brown Damp (FILL)		1	GS								
0.7												
205.4	SAND, fine grained, trace gravel Loose Brown Damp to Wet (FILL)		1	SS	9		206					
1.6												
	ROCK FILL		2	SS	100/							
			1	RUN	0.050							
							205					
			2	RUN								
							204					
			3	RUN			203					
							202					
			4	RUN								
							201					
			5	RUN			200					
							199					
			6	RUN								
198.5												
8.6	PEAT, fibrous Dark Brown Wet											
198.0												
9.0	Silty CLAY Grey		3	SS	3		198					
	Silty SAND, some clay Loose to Compact Grey Moist											

Continued Next Page

+ 3, x 3; Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-30

2 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp, Station 18+360 O/S 12.5L, NBL ORIGINATED BY ES
 HWY 6969 BOREHOLE TYPE Hollow Stem Augers/NW Casing/NQ Coring COMPILED BY AN
 DATUM Geodetic DATE 2012.06.23 - 2012.06.26 CHECKED BY LRB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT NATURAL LIMIT MOISTURE LIQUID CONTENT LIMIT			UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa			WATER CONTENT (%)				
	Continued From Previous Page							20 40 60 80 100							
								○ UNCONFINED + FIELD VANE							
								● QUICK TRIAXIAL x LAB VANE							
								20 40 60 80 100							
								20 40 60							
196.7			4	SS	15		197								
10.3	SAND, some gravel														
196.3	Compact		5	SS	100										
10.7	Grey Wet				0.050										
	END OF BOREHOLE AT 10.7m UPON REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 1.2m, CUTTINGS TO 0.1m, THEN ASPHALT TO SURFACE.														

ONTMT4S 6121.GPJ 12/13/12

RECORD OF BOREHOLE No BH08-31

1 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp, Station 18+388 O/S 18.5L, NBL ORIGINATED BY ES
 HWY 6969 BOREHOLE TYPE Hollow Stem Augers/NW Casing/NQ Coring COMPILED BY AN
 DATUM Geodetic DATE 2012.06.23 - 2012.06.26 CHECKED BY LRB

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	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa				WATER CONTENT (%)				
206.9	Ground Surface							○ UNCONFINED	+	FIELD VANE						
0.0	ASPHALT: (50mm)		1	GS				● QUICK TRIAXIAL	x	LAB VANE						
206.1	SAND, some gravel Dark Brown Damp (FILL)															
0.8	SAND, fine grained Loose Brown Damp (FILL)		1	SS	6		206									
205.6	Gravelly SAND Very Loose Dark Grey Wet (FILL)		2	SS	2		205									
204.7	ROCK FILL		1	RUN			204									
2.2			2	RUN			203									
			3	RUN			202									
							201									
200.4	50mm of peat						200									
6.5	SAND, trace gravel, occasional cobbles Very Loose Dark Brown Wet (FILL)		3	SS	2		199									
199.9	PEAT Dark Brown Damp		4	SS	3		199									
7.0	SILT and SAND, trace gravel, trace clay Very Loose to Loose Dark Brown to Grey Wet		5	SS	8		198									1 58 38 3
199.6							197									
7.3	Silty CLAY, some sand Very Soft Grey		6	SS	1		197									
197.9	SAND, trace gravel Very Loose		7	SS	1		197									
197.3																
9.6																

Continued Next Page

+ 3, x 3: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-31

2 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp, Station 18+388 O/S 18.5L, NBL ORIGINATED BY ES
 HWY 6969 BOREHOLE TYPE Hollow Stem Augers/NW Casing/NQ Coring COMPILED BY AN
 DATUM Geodetic DATE 2012.06.23 - 2012.06.26 CHECKED BY LRB

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									
								20 40 60 80 100									
	Continued From Previous Page																
	Grey Wet																
196.2																	
10.7	END OF BOREHOLE AT 10.7m UPON REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 0.9m, CUTTINGS TO 0.1m, THEN ASPHALT TO SURFACE.		8	SS	100/ 0.00												






ONTMT4S 6121.GPJ 12/13/12

RECORD OF BOREHOLE No BH08-32

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp, Station 18+249 O/S 32.5R, NBL ORIGINATED BY SLL
HWY 6969 BOREHOLE TYPE Continuous Split Spoon (50lb Hammer) COMPILED BY AN
DATUM Geodetic DATE 2012.06.21 - 2012.06.21 CHECKED BY LRB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				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						
								20 40 60 80 100						
205.0	Ground Surface													
0.0	PEAT, fibrous Very Soft Black Wet		1	SS	0									
			2	SS	0									
			3	SS	0									
			4	SS	0									
			5	SS	0									
			6	SS	0									
200.4	Silty CLAY, trace sand Very Soft Grey		7	SS	1									
4.6			8	SS	0									
			9	SS	0									
198.7	Occasional sand seams													
6.3	Silty SAND, trace clay, trace gravel Compact Grey Wet		10	SS	10									
			11	SS	28									
197.5	END OF BOREHOLE AT 7.5m UPON REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO SURFACE.													
7.5														

+ 3, X 3: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH08-33

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp, Station 18+286 O/S 25.5R, NBL ORIGINATED BY SLL
 HWY 6969 BOREHOLE TYPE Continuous Split Spoon (50lb Hammer) COMPILED BY AN
 DATUM Geodetic DATE 2012.06.21 - 2012.06.21 CHECKED BY LRB

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT NATURAL LIMIT MOISTURE CONTENT LIQUID LIMIT			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							
205.1	Ground Surface															
0.0	PEAT , fibrous Very Soft Black Wet		1	GS									1012			
			2	SS	1									821		
			3	SS	1									865		
			4	SS	1									730		
			5	SS	0									750		
			6	SS	0									1262		
			7	SS	0									714		
200.6																
4.5	Silty CLAY , some sand Soft Grey		8	SS	2											
200.3																
4.8	END OF BOREHOLE AT 4.8m UPON REFUSAL ON PROBABLE BEDROCK. Piezometer installation consists of 25mm diameter Schedule 40 PVC pipe with a 1.5m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Jun 28/12 0.0 205.1															

+ 3, × 3: Numbers refer to 20
Sensitivity 15 10 5 (%) STRAIN AT FAILURE

METRIC

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT W _P W 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 20 40 60 80 100				
205.5	Ground Surface							WATER CONTENT (%) 20 40 60			GR SA SI C	

[illegible]

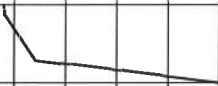
+ 3, X 3: Numbers refer to Sensitivity

RECORD OF BOREHOLE No D08-01R

2 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+313.5 O/S 7.5R, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY LG
 DATUM Geodetic DATE 2009.02.02 - 2009.02.02 CHECKED BY RPR

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						
	Continued From Previous Page							20 40 60 80 100						
195.0														
10.5	END OF DCPT AT 10.5m UPON REFUSAL ON PROBABLE BEDROCK.													

METRIC

[illegible]

RECORD OF BOREHOLE No D08-03R





1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+363.5 O/S 9.2R, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY LG
 DATUM Geodetic DATE 2009.02.02 - 2009.02.02 CHECKED BY RPR

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								
205.4 0.0	Ground Surface DCPT from surface.												
							205						
							204						
							203						
							202						
							201						
200.1 5.3	END OF DCPT AT 5.3m UPON REFUSAL ON PROBABLE BEDROCK.												

METRIC

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 (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE						
205.5	Ground Surface						SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 	WATER CONTENT (%) 		

[illegible]

ONTMT4S 6121.GPJ 12/12/12

+³, ×³: Numbers refer to Sensitivity

METRIC

[illegible]

ONTMT4S 6121.GPJ 12/12/12

(%) STRAIN AT FAILURE

METRIC

SOIL PROFILE			SAMPLES		GROUND WATER CONDITIONS	ELEVATION SCALE	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	20 40 60 80 100	W _P W W _L	WATER CONTENT (%)			
205.6	Ground Surface						SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100						

[illegible]

ONTMT4S 6121.GPJ 12/12/12

+ 3, × 3: Numbers refer to Sensitivity

RECORD OF BOREHOLE No D08-07R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+463.5 O/S 9.3R, NBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
DATUM Geodetic DATE 2009.01.30 - 2009.01.30 CHECKED BY RPR

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											
205.5	Ground Surface																
0.0	DCPT from surface																

RECORD OF BOREHOLE No D08-08L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+488.5 O/S 9.4L, NBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
DATUM Geodetic DATE 2009.01.30 - 2009.01.30 CHECKED BY RPR

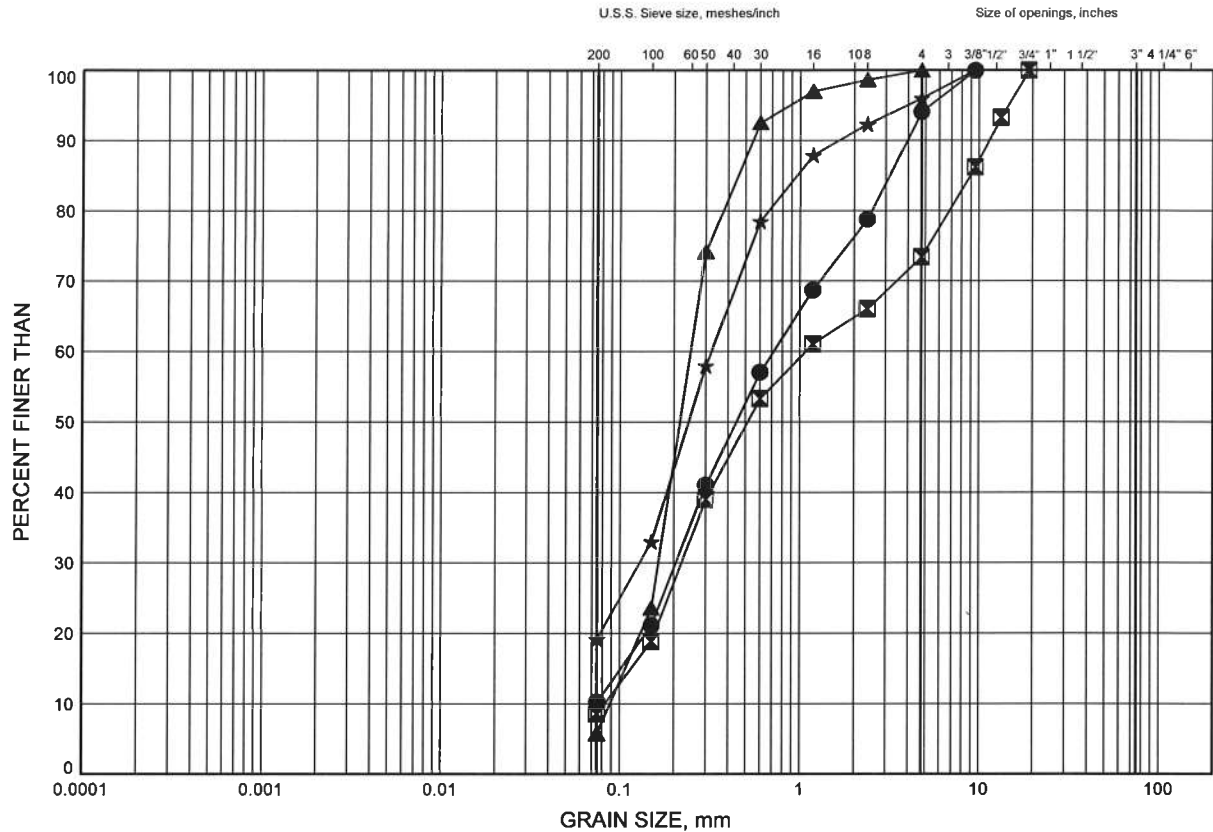
SOIL PROFILE			SAMPLES				GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE			20	40	60	80	100					
205.3	Ground Surface																	
0.0	DCPT from surface.																	
204.5																		
0.8	END OF DCPT AT 0.8m UPON REFUSAL ON PROBABLE BEDROCK.																	

ONTMT4S 6121.GPJ 12/12/12

Hwy 69 Four-Laning North of Hwy 529
GRAIN SIZE DISTRIBUTION

FIGURE F1

SAND FILL



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH08-01	1.07	206.13
■	BH08-01	2.59	204.61
▲	BH08-01	4.11	203.09
★	BH08-02L	1.07	206.23

Date December 2012
 GWP# 5076-06-00

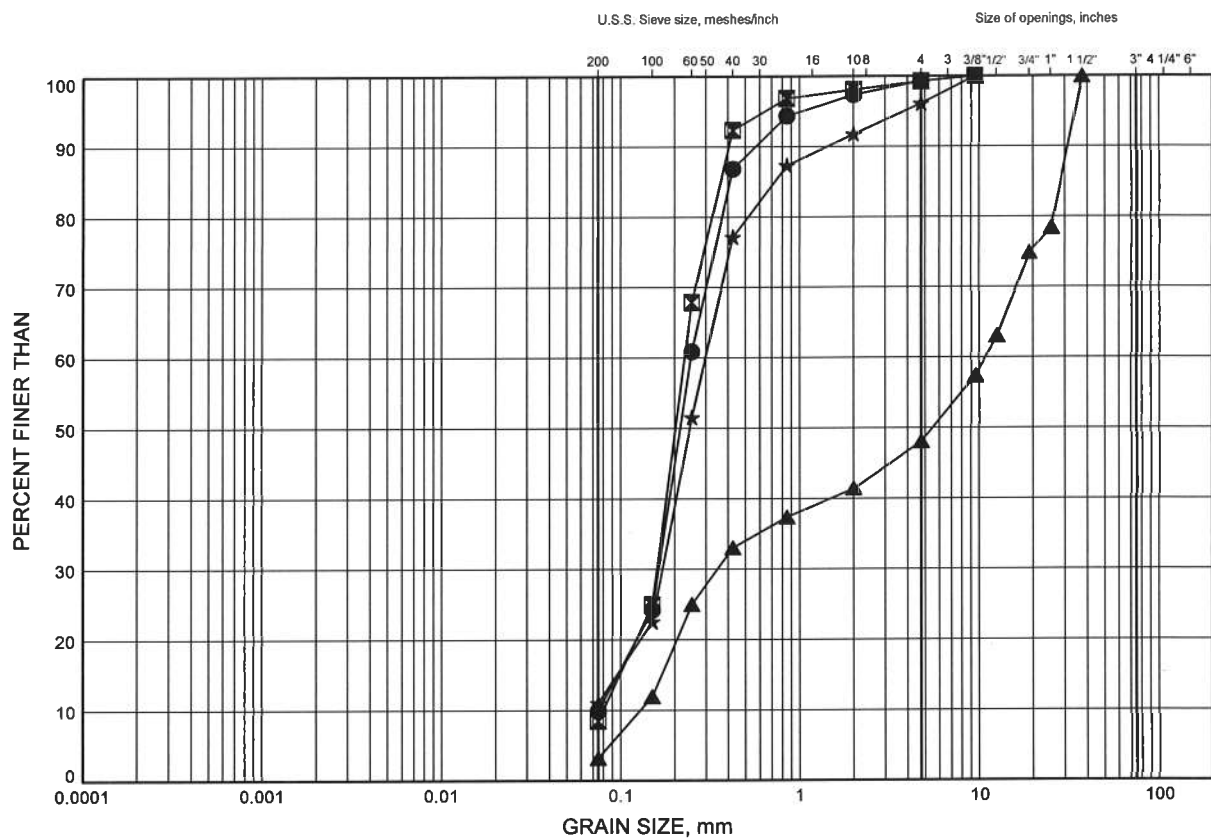


Prep'd MFA
 Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE F2

SAND FILL



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH08-24	1.07	206.43
⊠	BH08-25	1.83	205.57
▲	BH08-26	2.44	204.96
★	BH08-29	1.07	205.93

Date December 2012

GWP# 5076-06-00



Prep'd MFA

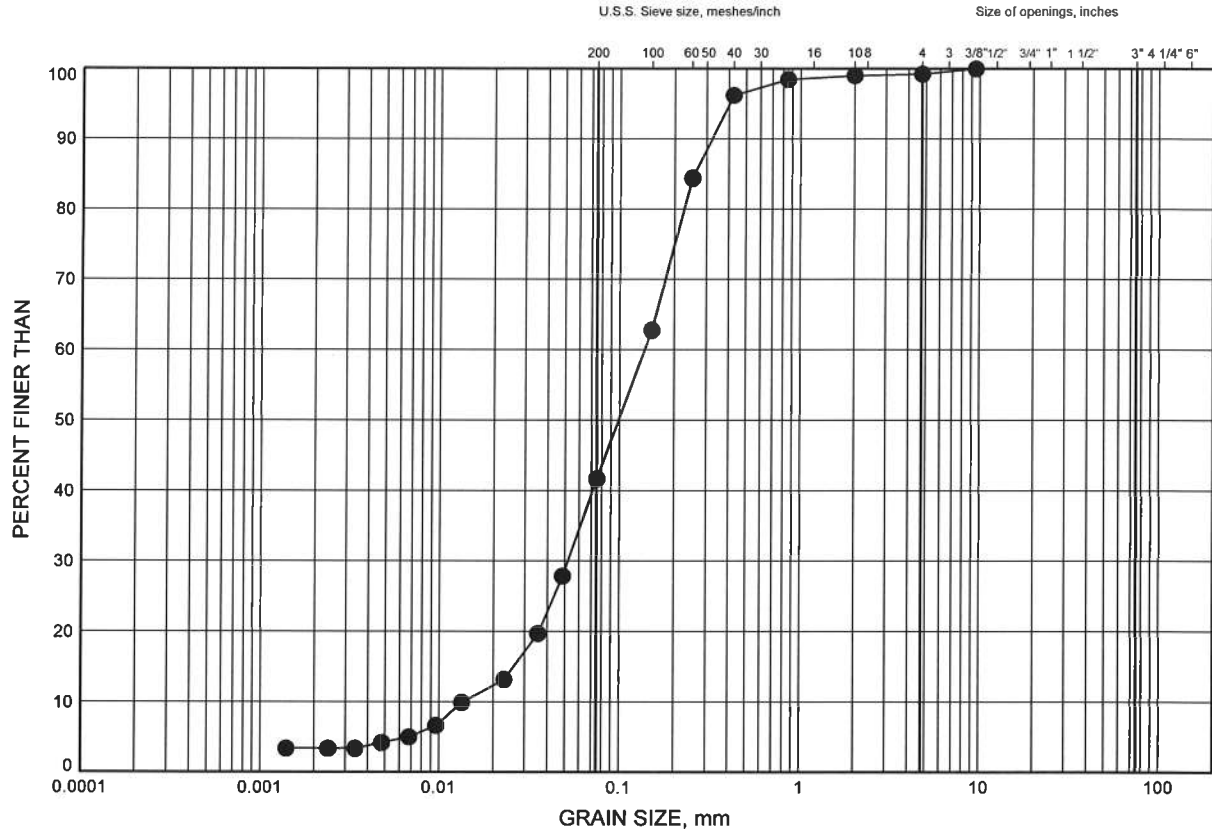
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529

GRAIN SIZE DISTRIBUTION

FIGURE F3

SILT and SAND



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH08-31	8.38	198.52

Date December 2012

GWP# 5076-06-00

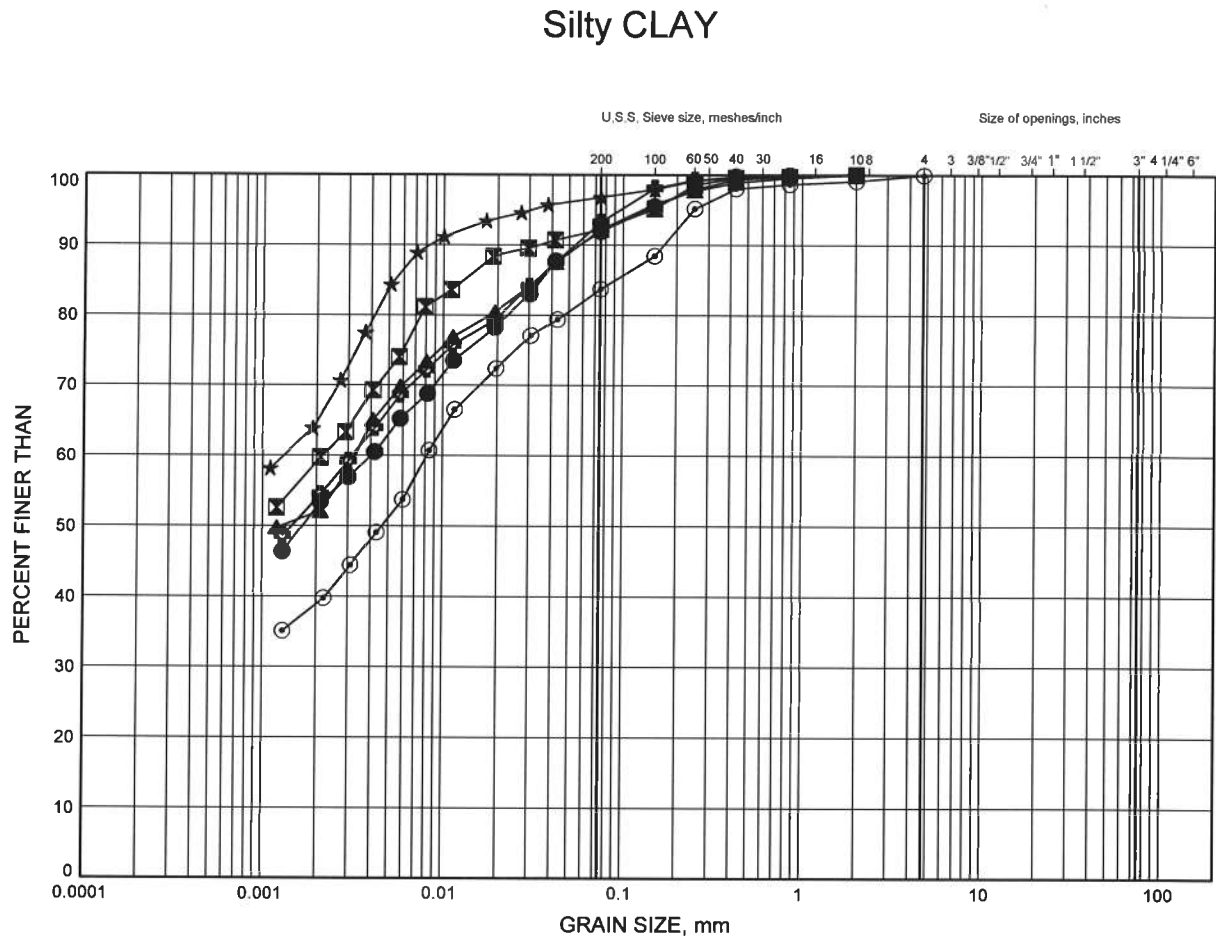


Prep'd MFA

Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE F4



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH08-03	4.32	201.28
⊠	BH08-04R	5.64	199.76
▲	BH08-04R	6.25	199.15
★	BH08-05	5.64	199.86
⊙	BH08-06L	4.88	201.22
⊕	BH08-06L	6.40	199.70

Date December 2012

GWP# 5076-06-00

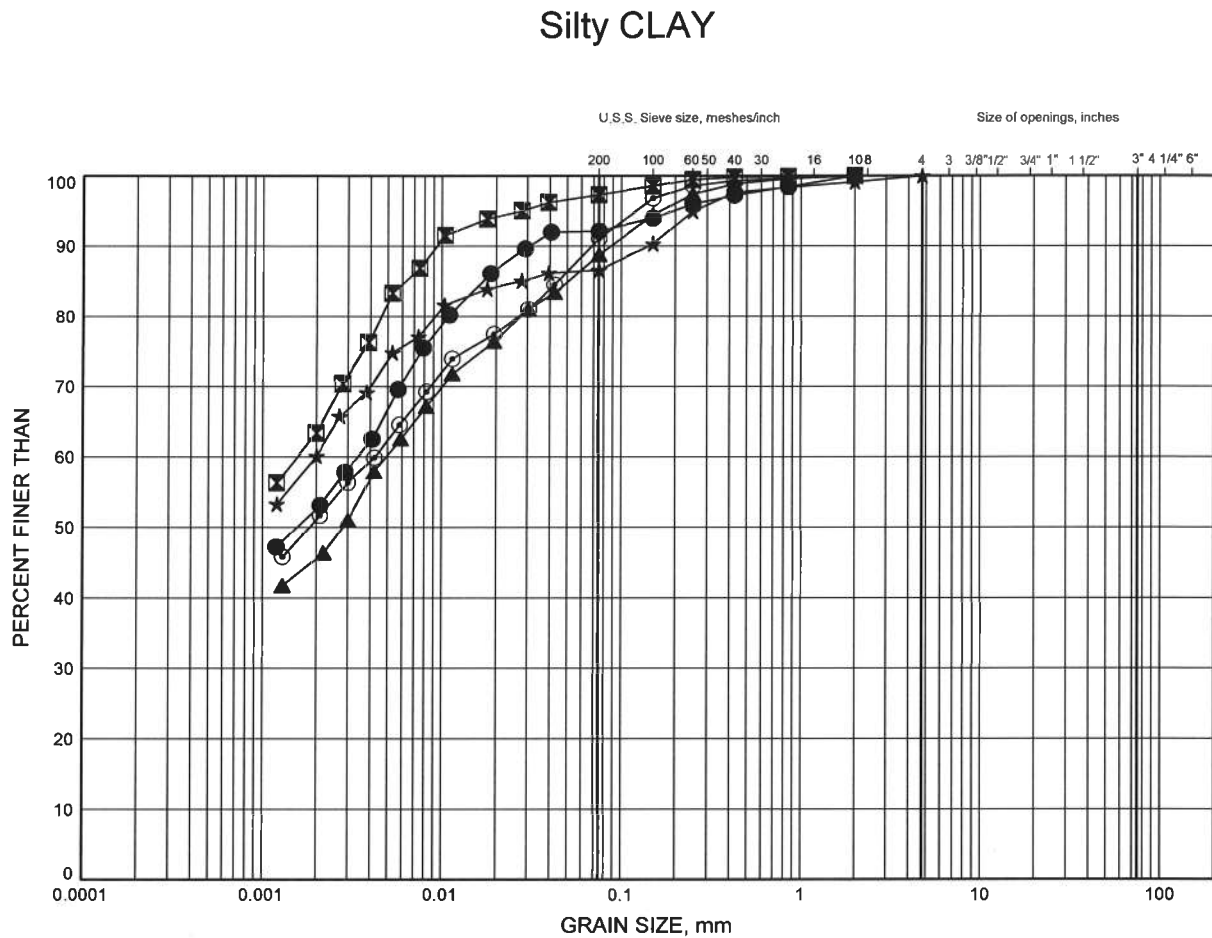


Prep'd MFA

Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE F5



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH08-07	4.88	200.72
⊠	BH08-08R	4.88	201.42
▲	BH08-09	6.40	199.70
★	BH08-10L	6.19	199.31
⊙	BH08-11	6.40	199.80

Date December 2012

GWP# 5076-06-00



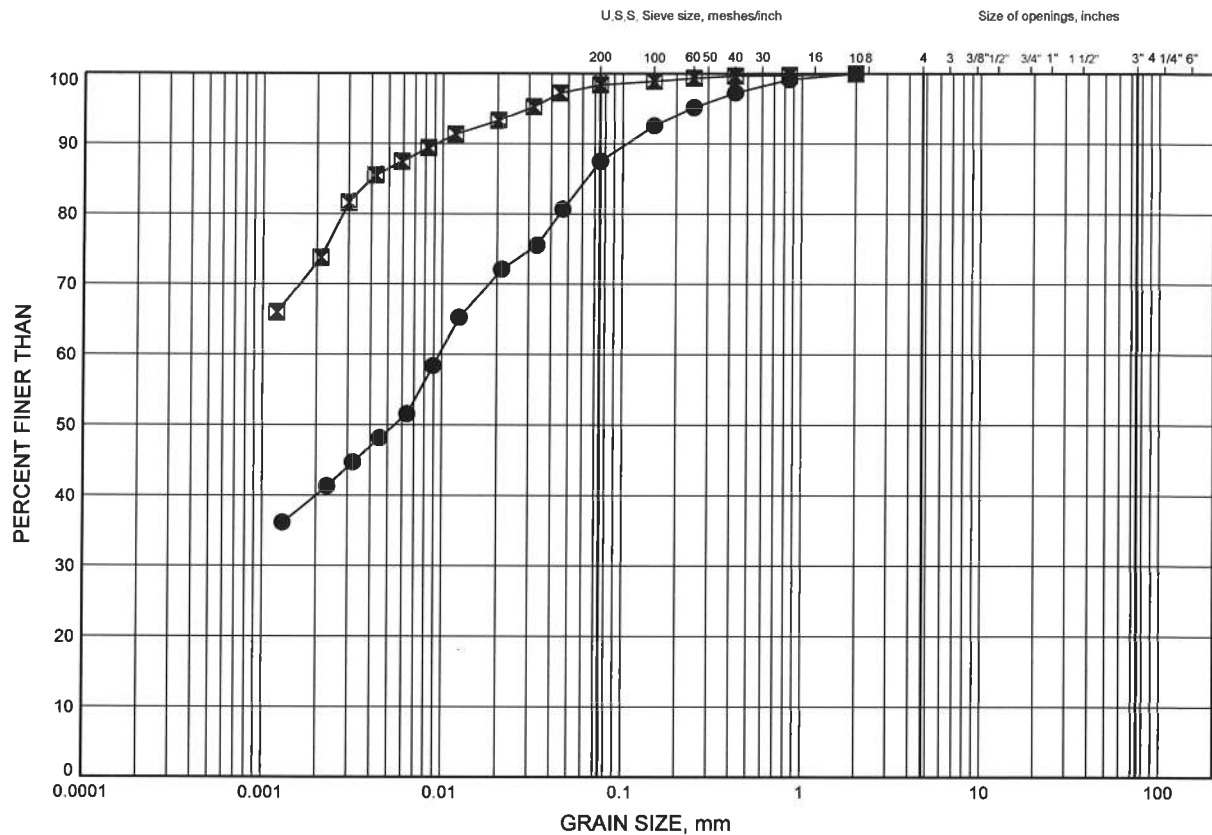
Prep'd MFA

Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE F6

Silty CLAY



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH08-27	2.46	204.64
■	BH08-32	5.49	199.51

Date December 2012
GWP# 5076-06-00

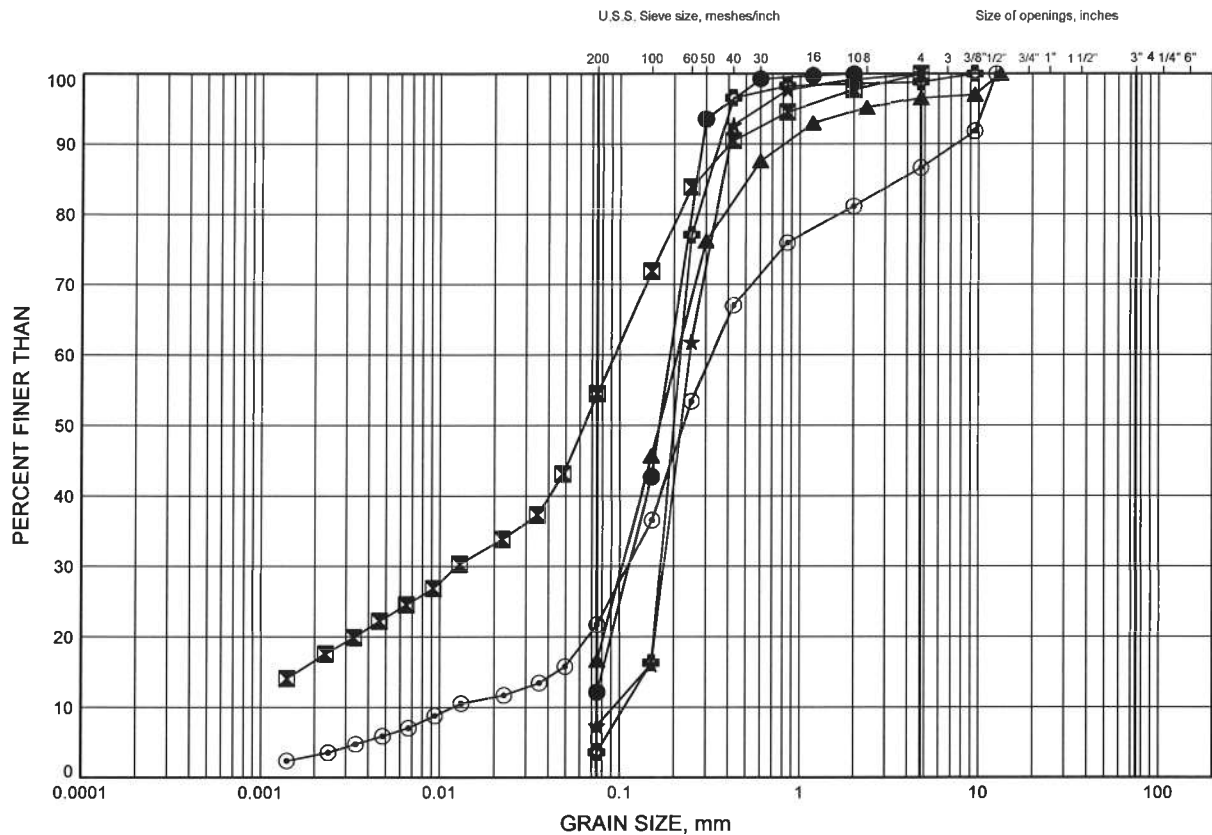


Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE F7

SAND to Silty SAND



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH08-03	6.40	199.20
■	BH08-05	8.15	197.35
▲	BH08-16R	1.83	204.47
★	BH08-19	1.83	203.57
⊙	BH08-20	2.44	202.86
⊕	BH08-21	3.05	202.65

Date December 2012

GWP# 5076-06-00



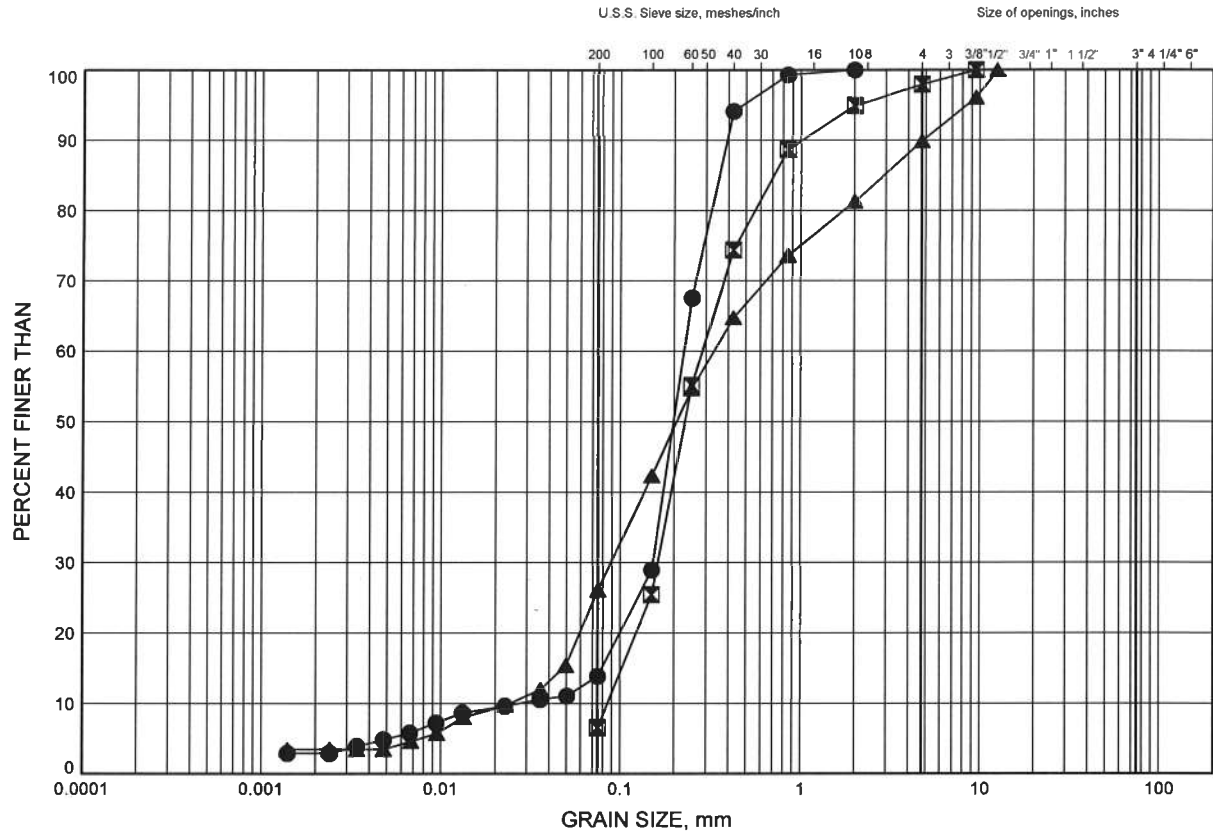
Prep'd MFA

Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529
GRAIN SIZE DISTRIBUTION

FIGURE F8

SAND to Silty SAND



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH08-22	4.11	201.39
■	BH08-23	5.33	200.07
▲	BH08-32	7.26	197.74

Date December 2012
GWP# 5076-06-00

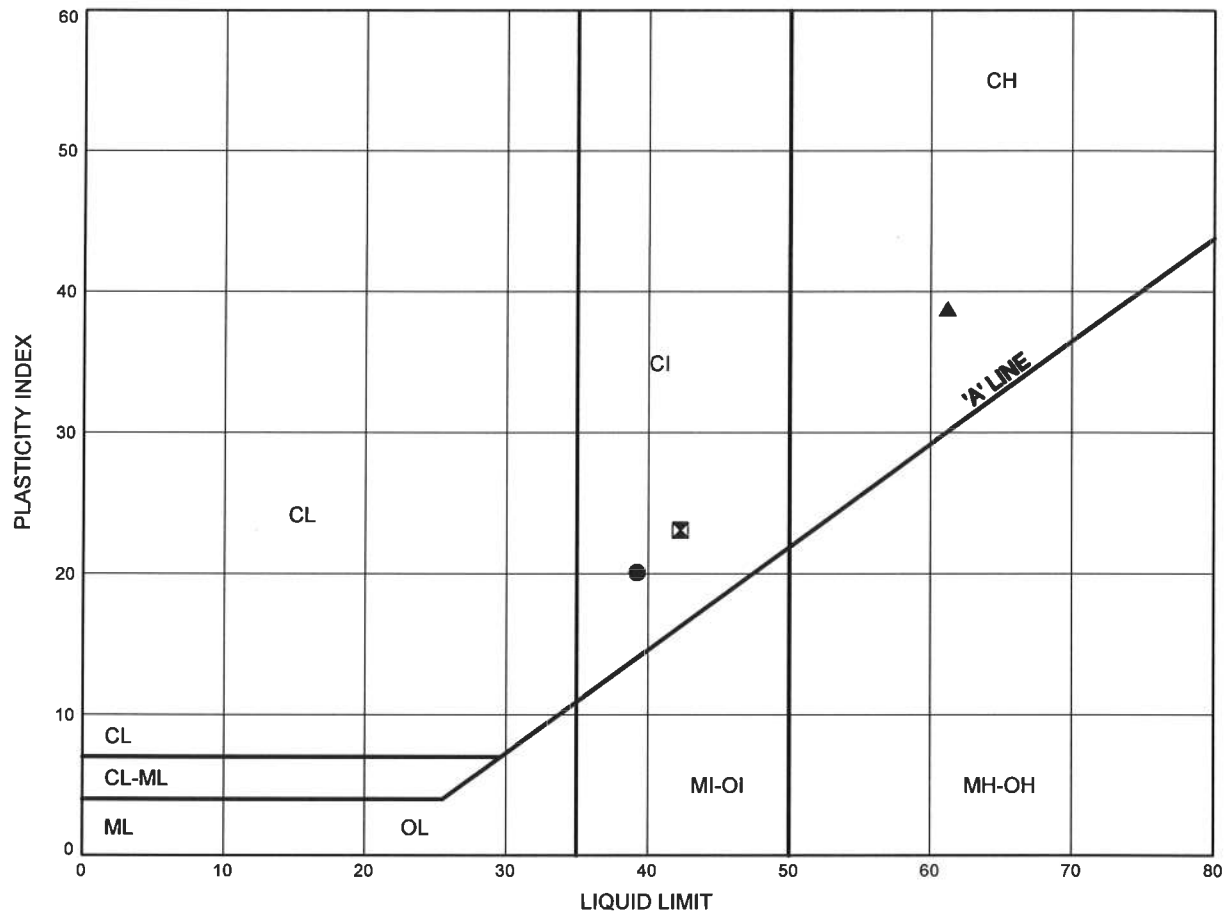


Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529
ATTERBERG LIMITS TEST RESULTS

FIGURE F9

Silty CLAY



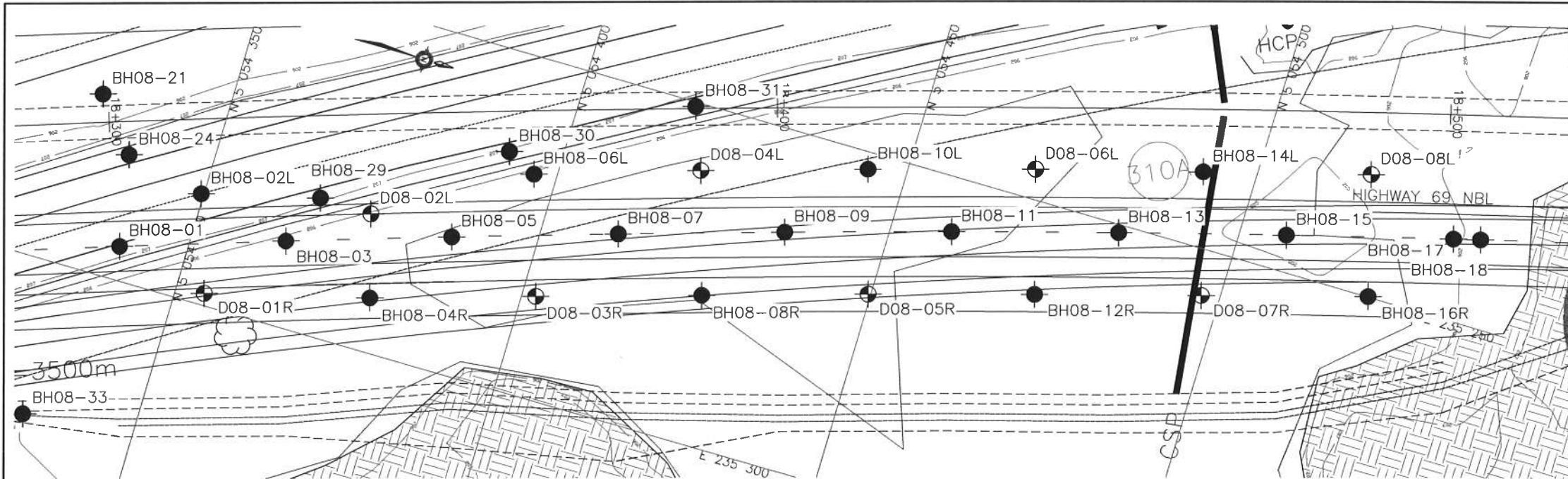
LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH08-06L	6.40	199.70
⊠	BH08-09	6.40	199.70
▲	BH08-10L	6.19	199.31

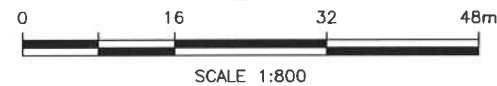
Date December 2012
 GWP# 5076-06-00



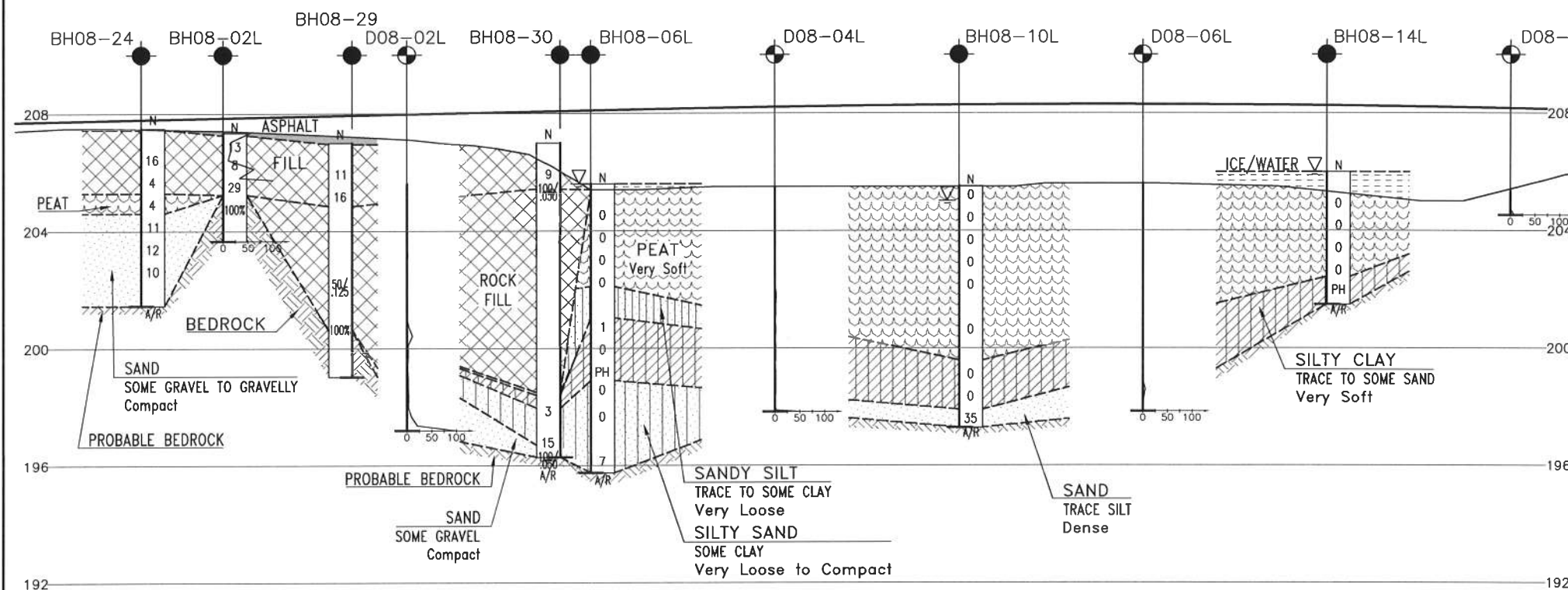
Prep'd MFA
 Chkd. MRA



PLAN



SCALE 1:800



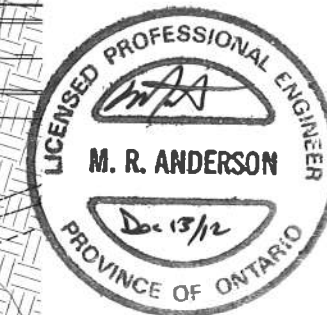
PROFILE ALONG LEFT TOE HIGHWAY 69 NBL



H 1:800

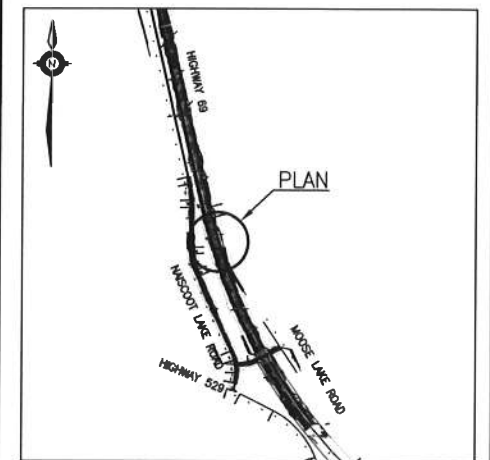
V 1:200

METRIC

DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWNCONT No
GWP No 5076-06-00HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 NBL-LT TOE
(STA 18+300 - 18+500)
BOREHOLE LOCATIONS AND SOIL STRATA

MMM GROUP

THURBER ENGINEERING LTD.



KEYPLAN

LEGEND

●	Borehole
○	Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60' Cone, 475J/blow)
PH	Pressure, Hydraulic
W	Water Level
HA	Head Artesian Water
P	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING	NO	ELEVATION	NORTHING	EASTING
BH08-17	205.9	5 054 530.7	235 238.0	BH08-01	207.2	5 054 340.1	235 294.9
BH08-18	206.2	5 054 534.6	235 237.0	BH08-02L	207.3	5 054 349.6	235 283.9
D08-01R	205.5	5 054 354.3	235 298.2	BH08-03	205.6	5 054 363.8	235 287.2
D08-02L	205.6	5 054 374.9	235 279.7	BH08-04R	205.4	5 054 378.3	235 291.9
D08-03R	205.4	5 054 402.1	235 284.8	BH08-05	205.5	5 054 387.5	235 279.7
D08-04L	205.5	5 054 420.4	235 259.7	BH08-06L	205.6	5 054 396.6	235 267.2
D08-05R	205.5	5 054 449.6	235 270.6	BH08-07	205.6	5 054 411.2	235 272.3
D08-06L	205.6	5 054 468.2	235 245.6	BH08-08R	206.3	5 054 425.8	235 277.7
D08-07R	205.5	5 054 497.3	235 256.8	BH08-09	206.1	5 054 435.0	235 265.1
D08-08L	205.3	5 054 516.3	235 232.2	BH08-10L	205.5	5 054 444.3	235 252.5
BH08-21	205.7	5 054 331.2	235 273.6	BH08-11	206.2	5 054 458.9	235 258.1
BH08-24	207.5	5 054 337.6	235 281.3	BH08-12R	206.3	5 054 473.4	235 263.6
BH08-29	207.0	5 054 367.0	235 279.5	BH08-13	206.2	5 054 482.8	235 251.2
BH08-30	207.0	5 054 392.1	235 264.9	BH08-14L	206.0	5 054 492.2	235 238.9
BH08-31	206.9	5 054 417.0	235 250.6	BH08-15	205.0	5 054 506.7	235 244.5
BH08-33	205.1	5 054 333.3	235 323.1	BH08-16R	206.3	5 054 521.1	235 249.9

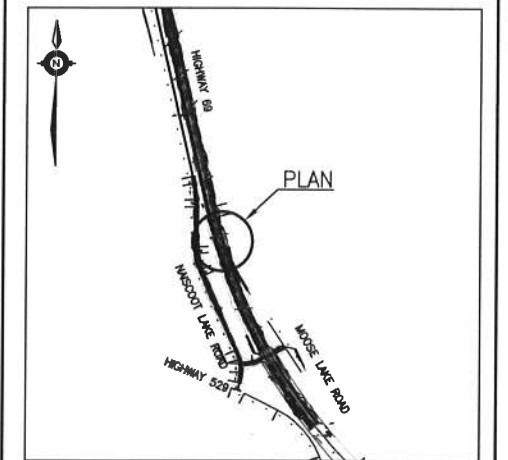
-NOTES-

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






GEOCRES No. 41H-96

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE
			DEC. 2012

SHEET |

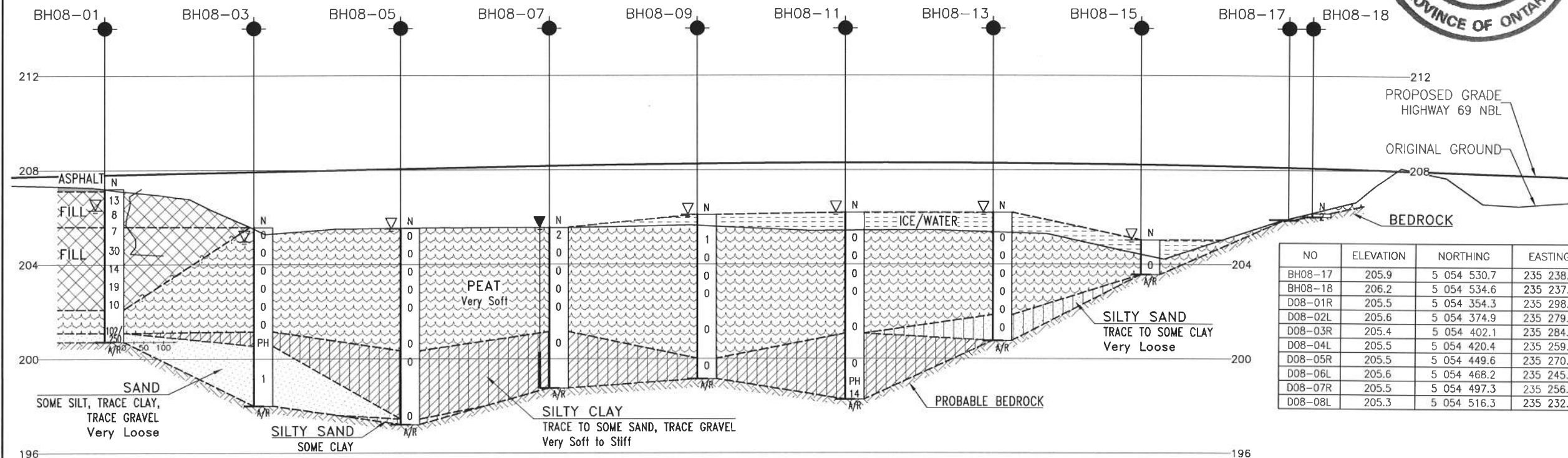


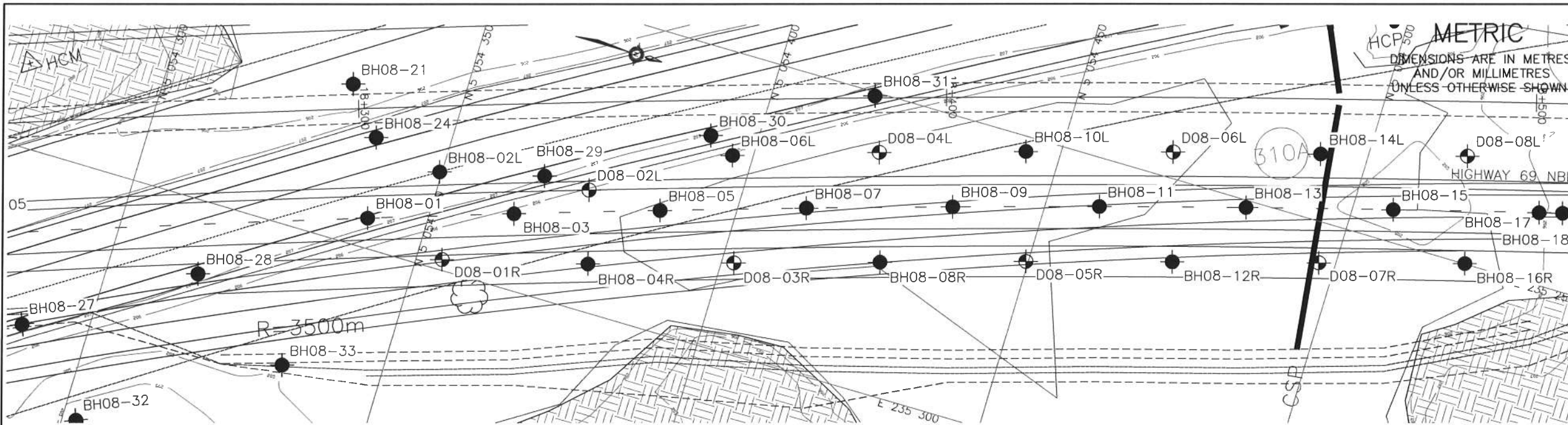
LEGEND

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

NO	ELEVATION	NORTHING	EASTING	NO	ELEVATION	NORTHING	EASTING
BH08-17	205.9	5 054 530.7	235 238.0	BH08-01	207.2	5 054 340.1	235 294.9
BH08-18	206.2	5 054 534.6	235 237.0	BH08-02L	207.3	5 054 349.6	235 283.9
D08-01R	205.5	5 054 354.3	235 298.2	BH08-03	205.6	5 054 363.8	235 287.2
D08-02L	205.6	5 054 374.9	235 279.7	BH08-04R	205.4	5 054 378.3	235 291.9
D08-03R	205.4	5 054 402.1	235 284.8	BH08-05	205.5	5 054 387.5	235 279.7
D08-04L	205.5	5 054 420.4	235 259.7	BH08-06L	205.6	5 054 396.6	235 267.2
D08-05R	205.5	5 054 449.6	235 270.6	BH08-07	205.6	5 054 411.2	235 272.3
D08-06L	205.6	5 054 468.2	235 245.6	BH08-08R	206.3	5 054 425.8	235 277.7
D08-07R	205.5	5 054 497.3	235 256.8	BH08-09	206.1	5 054 435.0	235 265.1
D08-08L	205.3	5 054 516.3	235 232.2	BH08-10L	205.5	5 054 444.3	235 252.5
				BH08-11	206.2	5 054 458.9	235 258.1
				BH08-12R	206.3	5 054 473.4	235 263.6
				BH08-13	206.2	5 054 482.8	235 251.2
				BH08-14L	206.0	5 054 492.2	235 238.9
				BH08-15	205.0	5 054 506.7	235 244.5
				BH08-16R	206.3	5 054 521.1	235 249.9

GEOCRES No. 41H-96

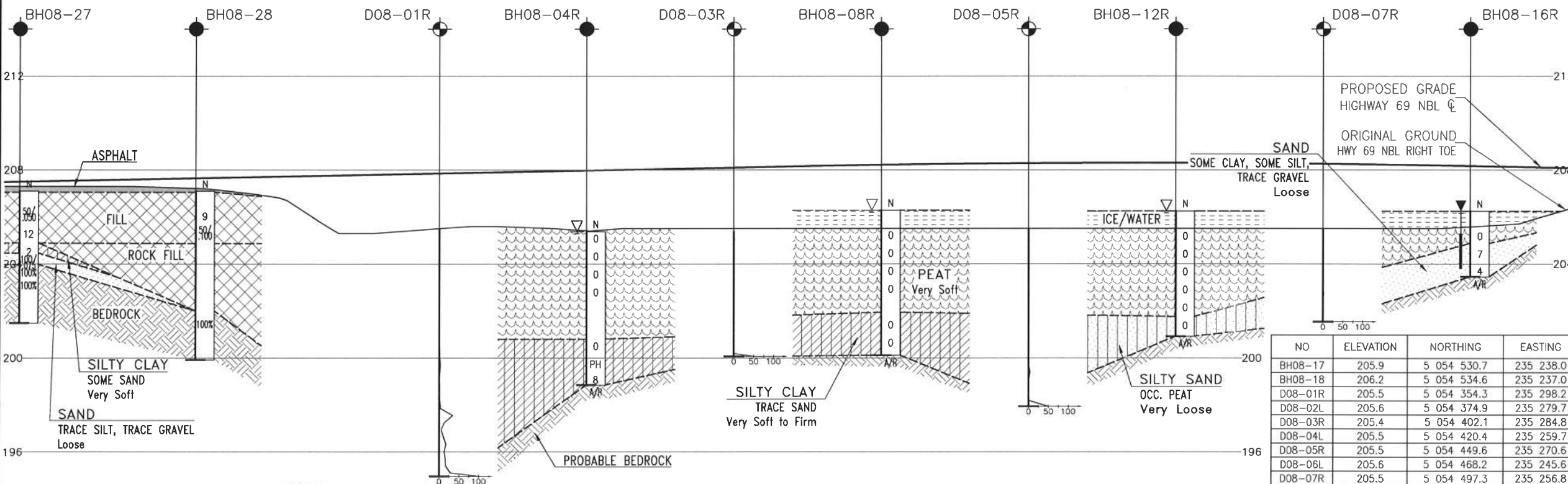
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PLAN



SCALE 1:800



PROFILE ALONG RIGHT TOE HIGHWAY 69 NBL



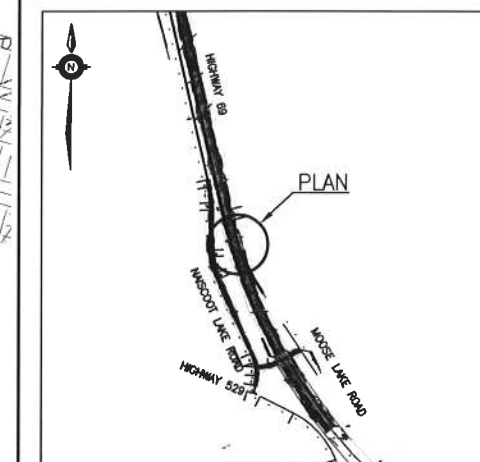
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V 1:200



CONT No
GWP No 5076-06-00

HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 NBL-RT TOE
(STA 18+300 - 18+500)
BOREHOLE LOCATIONS AND SOIL STRATA



KEYPLAN

LEGEND

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

NO	ELEVATION	NORTHING	EASTING
BH08-01	207.2	5 054 340.1	235 294.9
BH08-02L	207.3	5 054 349.6	235 283.9
BH08-03	205.6	5 054 363.8	235 287.2
BH08-04R	205.4	5 054 378.3	235 291.9
BH08-05	205.5	5 054 387.5	235 279.7
BH08-06L	205.6	5 054 396.6	235 267.2
BH08-07	205.6	5 054 411.2	235 272.3
BH08-08R	206.3	5 054 425.8	235 277.7
BH08-09	206.1	5 054 435.0	235 265.1
BH08-10L	205.5	5 054 444.3	235 252.5
BH08-11	206.2	5 054 458.9	235 258.1
BH08-12R	206.3	5 054 473.4	235 263.6
BH08-13	206.2	5 054 482.8	235 251.2
BH08-14L	206.0	5 054 492.2	235 238.9
BH08-15	205.0	5 054 506.7	235 244.5
BH08-16R	206.3	5 054 521.1	235 249.9

-NOTES-

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

GEOCRES No. 41H-96

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG

Appendix G

**Hwy 69 SBL
Sta. 18+890 to 18+990 Township of Harrison**

**Boreholes 09-01 to 09-08L
DCPTs D09-01R to D09-04R**

**Record of Borehole Sheets
Laboratory Test Results
Borehole Locations and Soil Strata Drawings**

RECORD OF BOREHOLE No BH09-01

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+926 C/L, SBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Visual Assessment and Manual Excavation COMPILED BY LG
DATUM Geodetic DATE 2009 02 03 - 2009 03 02 CHECKED BY RPR

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 (%) 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 (%) w _P w w _L				
198.4	Ground Surface		1	GS										
0.0	ORGANICS: (150mm)													
0.2	BEDROCK AT 0.2m.													
									</					

+³, ×³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH09-02L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+938.5 O/S 16.8L, SBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
DATUM Geodetic DATE 2009.02.03 - 2009.02.03 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			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		
195.5	Ground Surface													
0.0	SAND, trace gravel, trace roots		1	AS										
195.0	Brown Moist													
0.5	END OF BOREHOLE AT 0.5m UPON AUGER REFUSAL ON PROBABLE BEDROCK BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.													

RECORD OF BOREHOLE No BH09-03

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+951 C/L, SBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
DATUM Geodetic DATE 2009 02 03 - 2009 02 03 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
194.1	Ground Surface													
0.0	ORGANICS: (600mm) Dark Brown		1	SS	4		194							
193.5														
0.6	SAND, some gravel, some silt, trace clay Dense Brown Moist		2	SS	32		193							
192.2			3	SS	50/ 100									
1.9	END OF BOREHOLE AT 1.9m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.													13 62 25 (SI+CL)

+³, ×³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH09-04R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+963.5 O/S 17.9R, SBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
DATUM Geodetic DATE 2009.02.03 - 2009.02.03 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100	PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L		
196.2	Ground Surface													
0.0	SAND , trace to some gravel, occasional roots		1	SS	5		196							
195.7	Loose													
	Brown													
0.5	Moist													
	END OF BOREHOLE AT 0.5m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.													

RECORD OF BOREHOLE No BH09-05

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+976 C/L, SBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Auger COMPILED BY LG
DATUM Geodetic DATE 2009.02.03 - 2009.02.03 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
194.3	Ground Surface													
0.0	ORGANICS , trace sand: (600mm) Soft Dark Brown Frozen		1	SS	4		194						193	
0.6	SAND , some gravel, some silt, trace clay, occasional roots Dense Brown		2	SS	35									15 63 22
193.1	Moist													(SI+CL)
1.2	END OF BOREHOLE AT 1.2m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.													

+³, ×³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

METRIC

[illegible]

RECORD OF BOREHOLE No BH09-07R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+913.5 O/S 18.0R, SBL ORIGINATED BY SLL
HWY 69 BOREHOLE TYPE Portable Split Spoon Sampling Equipment COMPILED BY AN
DATUM Geodetic DATE 2010.11.11 - 2010.11.11 CHECKED BY MRA

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
197.8	Ground Surface													
0.0	ORGANICS, fibrous: (125mm)													
0.1	Silty CLAY, trace to some sand Firm to Very Stiff Brown Moist		1	SS	6									
			2	SS	18		197							0 6 37 57
			3	SS	23/ 0.225									
196.2														
1.6	END OF BOREHOLE AT 1.6m UPON REFUSAL ON PROBABLE BEDROCK. BOREHOLE OPEN AND WATER LEVEL AT 0.25m UPON COMPLETION. BOREHOLE BACKFILLED WITH HOLEPLUG TO SURFACE.													

+ ³ . X ³ : Numbers refer to 20
Sensitivity 15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH09-08L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+963.5 O/S 18.0L, SBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Portable Split Spoon Sampling Equipment COMPILED BY AN
 DATUM Geodetic DATE 2010.11.11 - 2010.11.11 CHECKED BY MRA

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
192.5	Ground Surface													
0.0	ORGANICS, fibrous: (100mm)													
0.1	Silty CLAY, some sand to sandy Very Soft to Very Stiff Brown Moist		1	SS	1		192							
			2	SS	25									
			3	SS	25		191							0 15 36 49
190.8														
1.7	END OF BOREHOLE AT 1.7m UPON REFUSAL TO PORTABLE EQUIPMENT ON PROBABLE BOULDER.													

+³, ×³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No D09-01R

1 OF 1


METRIC

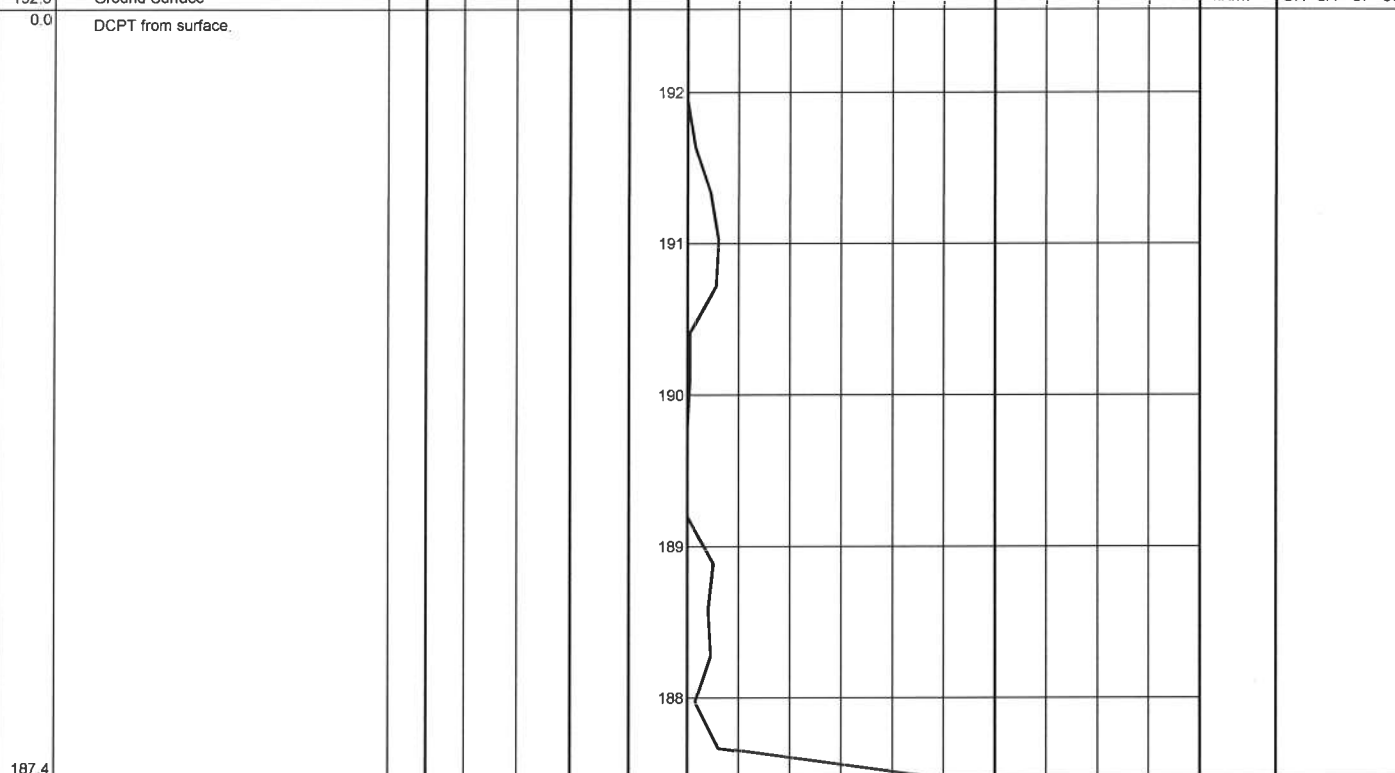
GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+938.5 O/S 16.8R, SBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY LG
DATUM Geodetic DATE 2009.02.03 - 2009.02.03 CHECKED BY RPR

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 (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	SHEAR STRENGTH kPa			WATER CONTENT (%)							
197.8	Ground Surface								20 40 60 80 100							
0.0	DCPT from surface.								20 40 60 80 100							
196.9	END OF DCPT AT 0.9m UPON REFUSAL ON PROBABLE BEDROCK.						197									
0.9																

1 OF 1

METRIC

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			
192.5	Ground Surface						SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE 20 40 60 80 100	WATER CONTENT (%) 20 40 60		GR SA SI CL

[illegible]

METRIC

[illegible]

RECORD OF BOREHOLE No D09-04R

1 OF 1

METRIC

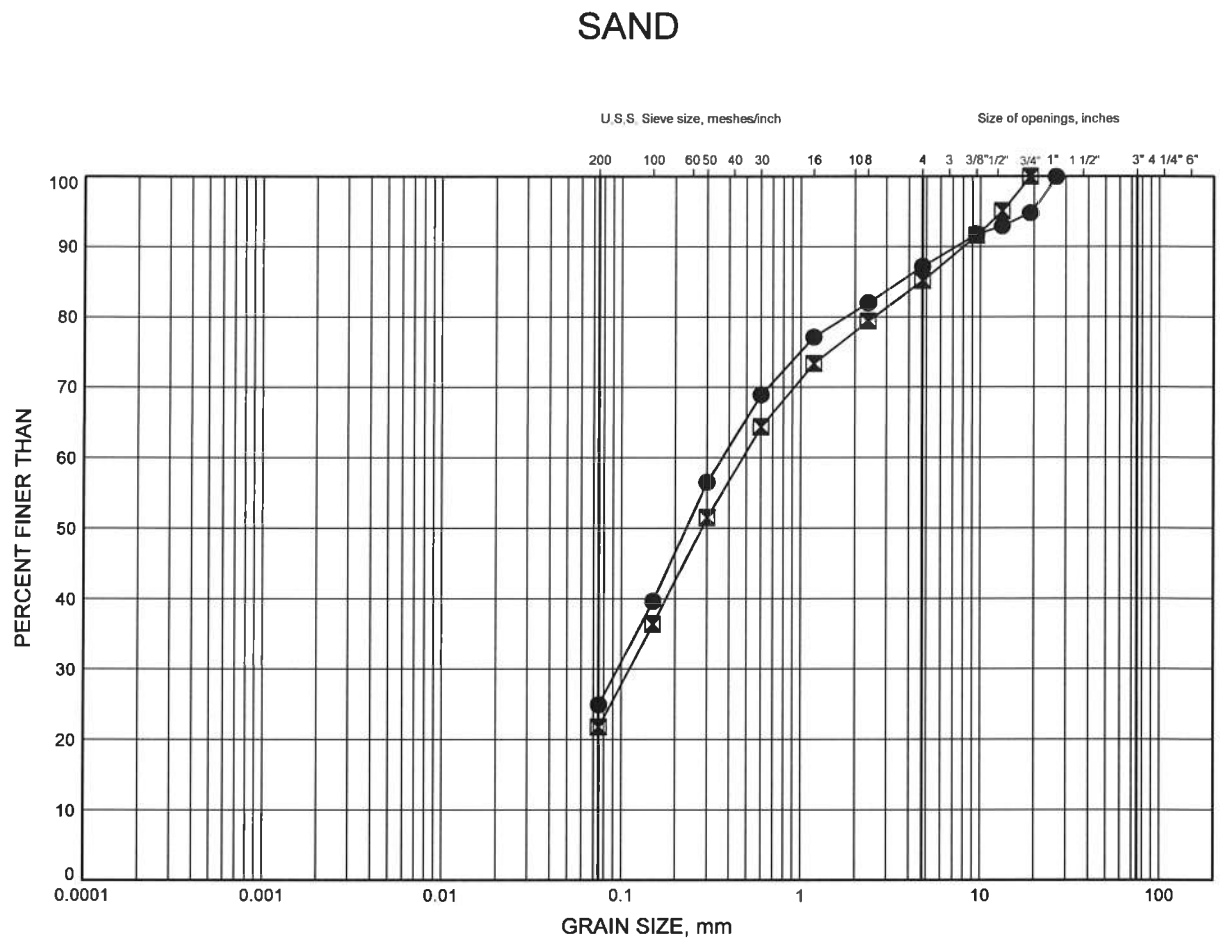
GWP# 5076-06-00 LOCATION Harrison Twp., Station 18+888.5 O/S 18.0R, SBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2010.11.11 - 2010.11.11 CHECKED BY MRA

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE LIQUID CONTENT LIMIT			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		W _p W W _L WATER CONTENT (%)				
198.2	Ground Surface							20 40 60 80 100						
0.0	DCPT from surface.							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE						
							198							
							197							
196.6														
1.6	END OF DCPT AT 1.5m UPON REFUSAL ON PROBABLE BEDROCK.													

+³, ×³: Numbers refer to Sensitivity
 20
15
10
5
0
(%) STRAIN AT FAILURE

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE G1



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH09-03	1.73	192.37
⊠	BH09-05	1.07	193.23

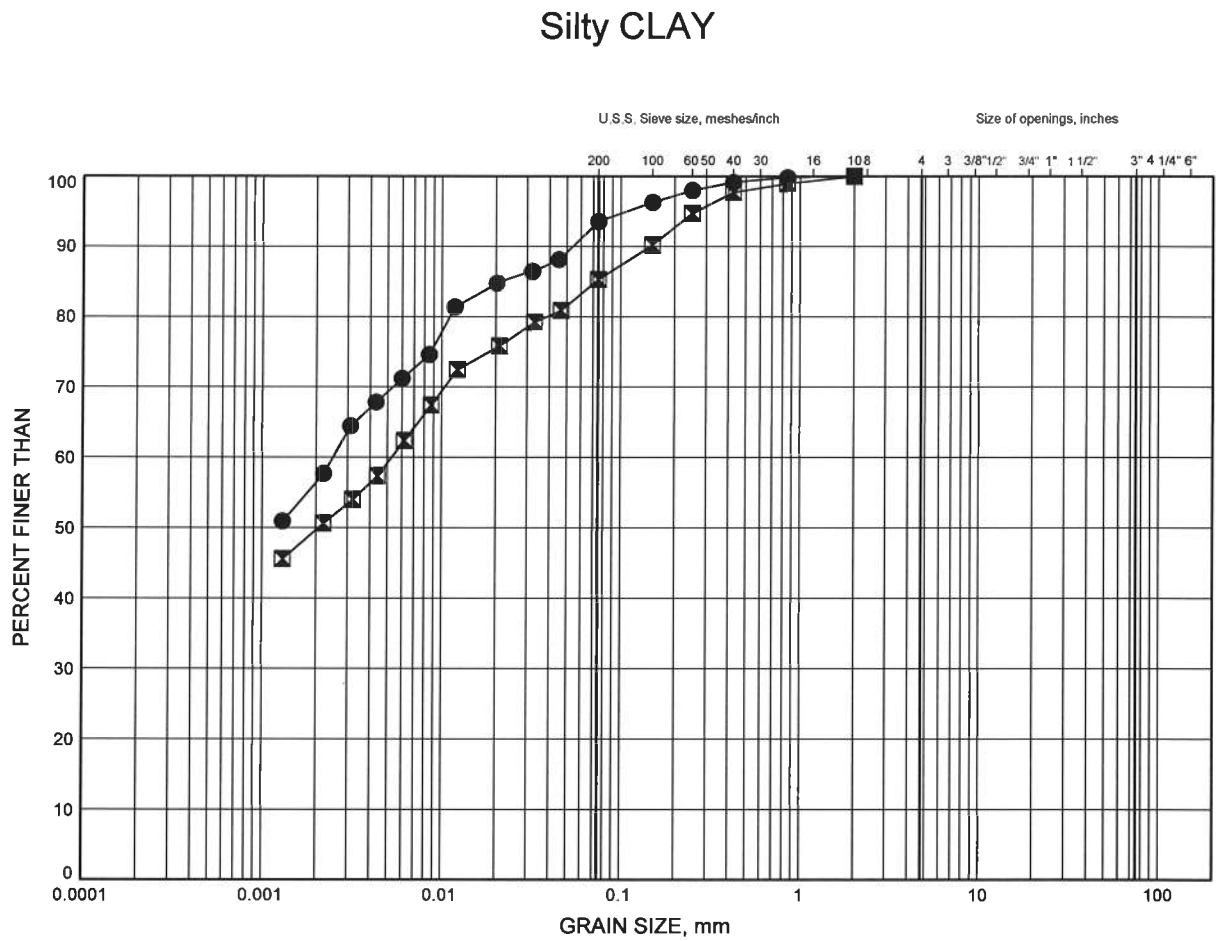
Date December 2012
GWP# 5076-06-00



Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE G2



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH09-07R	0.91	196.89
■	BH09-08L	1.45	191.05

Date December 2012
GWP# 5076-06-00

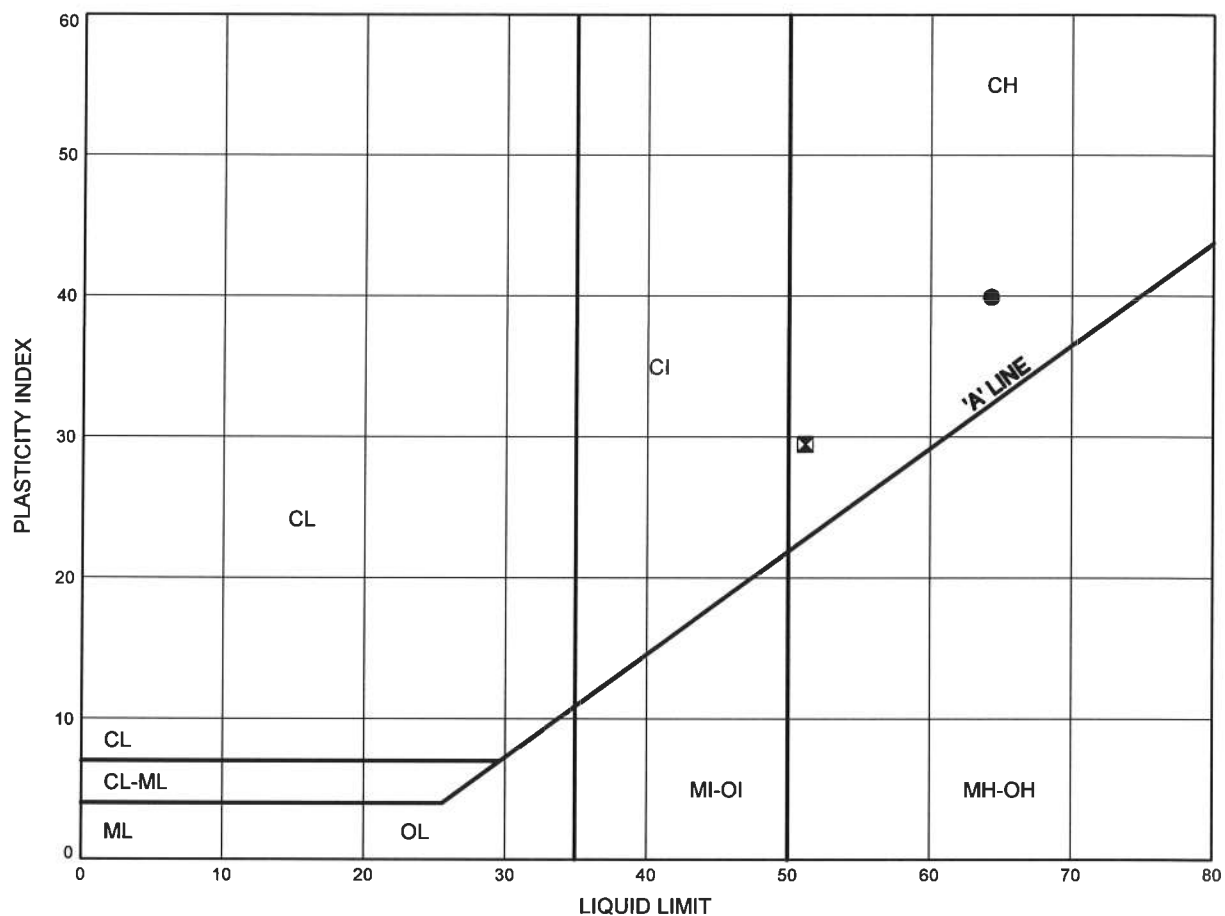


Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 ATTERBERG LIMITS TEST RESULTS

FIGURE G3

Silty CLAY



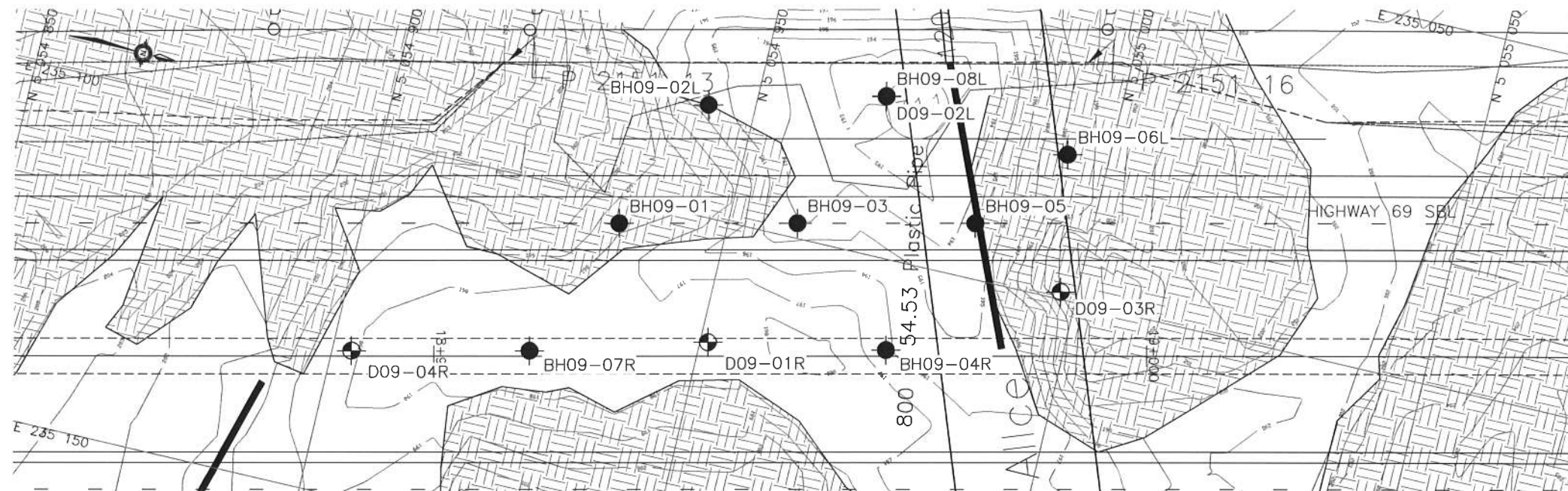
LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH09-07R	0.91	196.89
⊠	BH09-08L	1.45	191.05

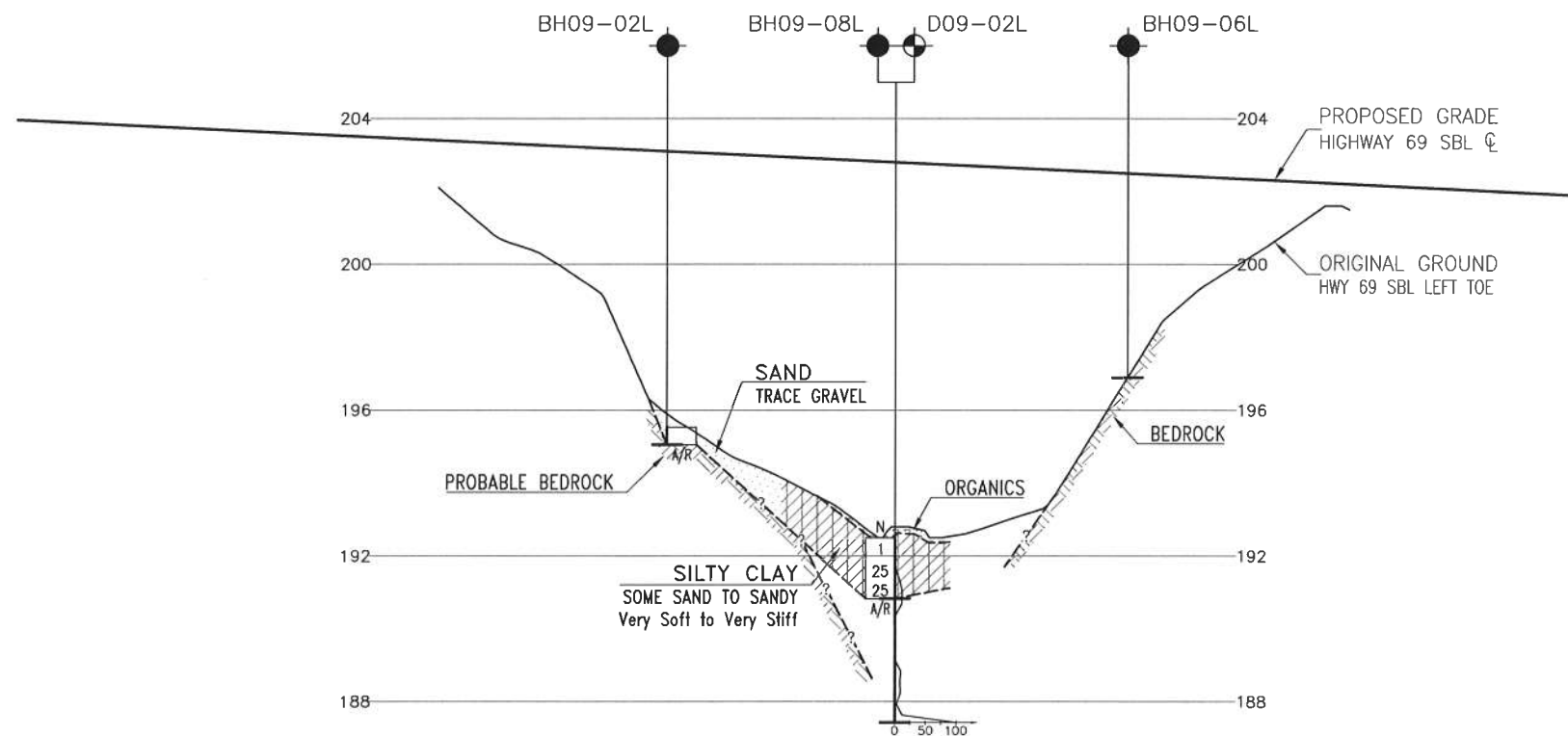
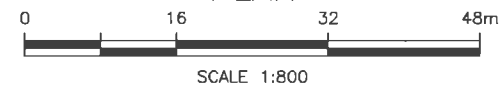
Date December 2012
GWP# 5076-06-00



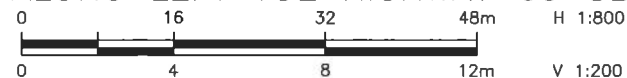
Prep'd MFA
Chkd. MRA



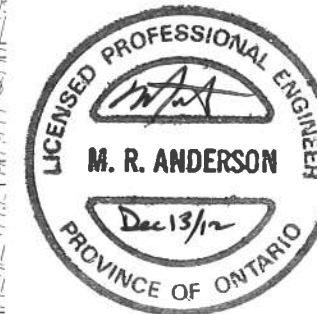
PLAN



PROFILE ALONG LEFT TOE HIGHWAY 69 SBL

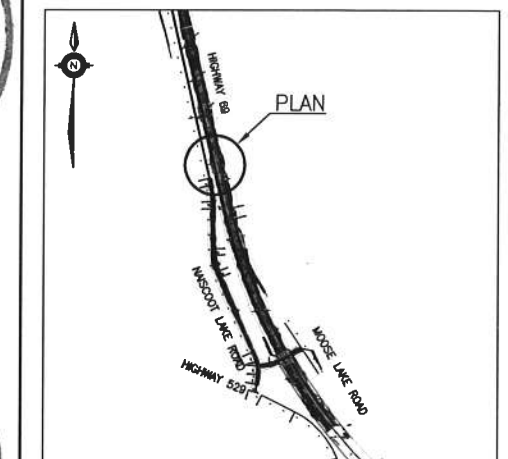


METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



CONT No
GWP No 5076-06-00

HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 SBL-LT TOE
(STA 18+890 - 18+990)
BOREHOLE LOCATIONS AND SOIL STRATA



KEYPLAN

LEGEND

●	Borehole
◆	Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60' Cone, 475J/blow)
PH	Pressure, Hydraulic
W	Water Level
HA	Head Artesian Water
P	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

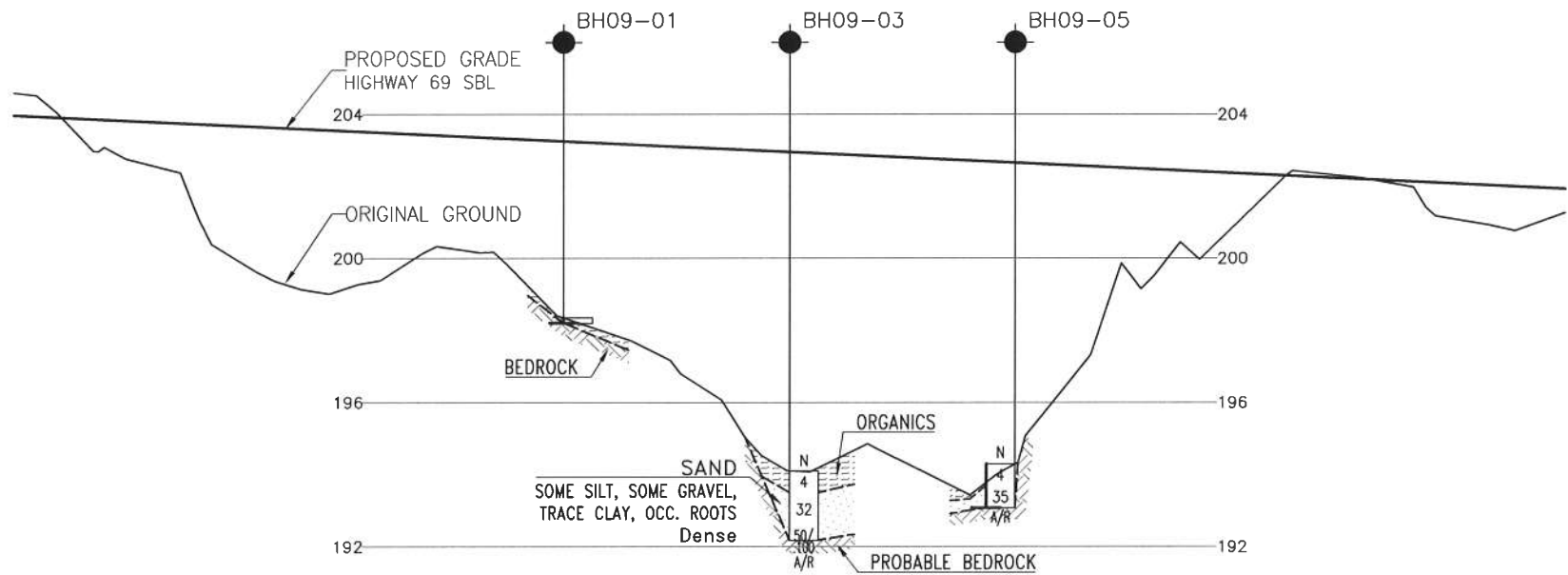
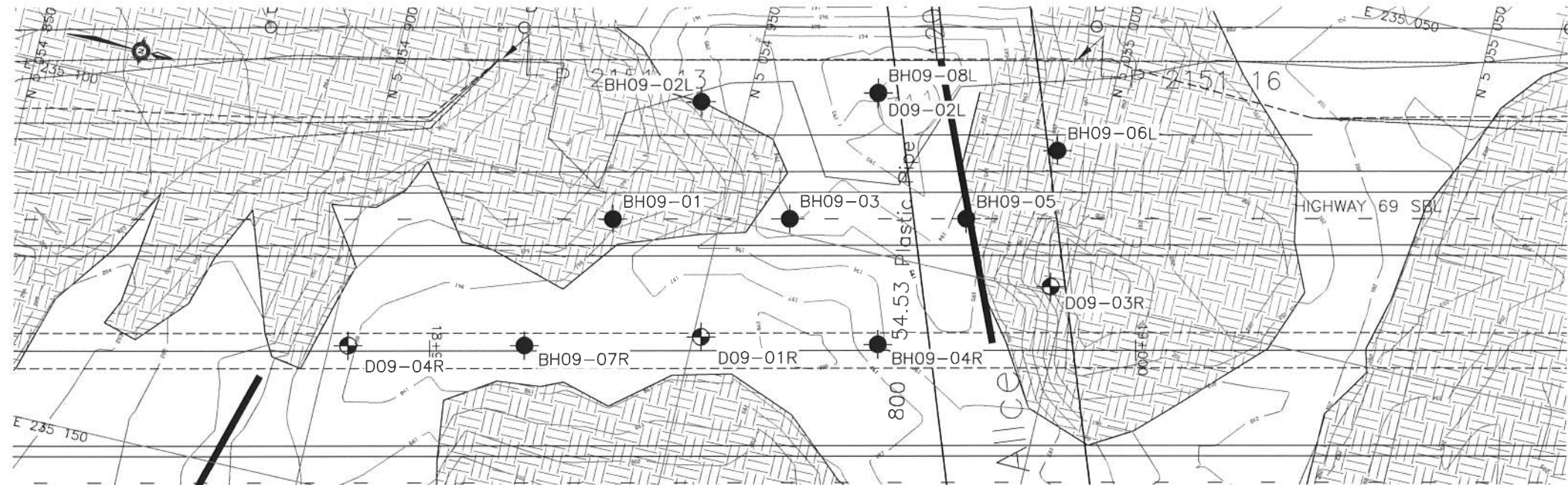
NO	ELEVATION	NORTHING	EASTING
BH09-01	198.4	5 054 935.1	235 103.5
BH09-02L	195.5	5 054 943.5	235 084.4
BH09-03	194.1	5 054 959.5	235 097.9
BH09-04R	196.2	5 054 975.7	235 112.5
BH09-05	194.3	5 054 983.8	235 092.2
BH09-06L	196.9	5 054 994.2	235 079.8
BH09-07R	197.8	5 054 927.0	235 123.9
BH09-08L	192.5	5 054 967.6	235 077.5
D09-01R	197.8	5 054 951.1	235 117.1
D09-02L	192.5	5 054 967.6	235 077.6
D09-03R	199.5	5 054 997.7	235 098.9
D09-04R	198.2	5 054 902.7	235 129.5

NOTES

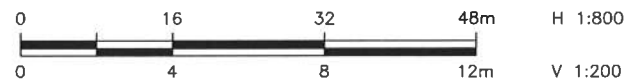
- The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCREs No. 41H-96

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012



PROFILE ALONG CL HIGHWAY 69 SBL

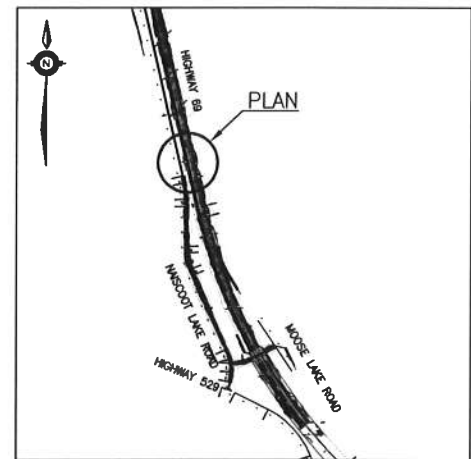


METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



CONT No
GWP No 5076-06-00

HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 SBL-CL
(STA 18+890 - 18+990)
BOREHOLE LOCATIONS AND SOIL STRATA



KEYPLAN

LEGEND

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

NO	ELEVATION	NORTHING	EASTING
BH09-01	198.4	5 054 935.1	235 103.5
BH09-02L	195.5	5 054 943.5	235 084.4
BH09-03	194.1	5 054 959.5	235 097.9
BH09-04R	196.2	5 054 975.7	235 112.5
BH09-05	194.3	5 054 983.8	235 092.2
BH09-06L	196.9	5 054 994.2	235 079.8
BH09-07R	197.8	5 054 927.0	235 123.9
BH09-08L	192.5	5 054 967.6	235 077.5
D09-01R	197.8	5 054 951.1	235 117.1
D09-02L	192.5	5 054 967.6	235 077.6
D09-03R	199.5	5 054 997.7	235 098.9
D09-04R	198.2	5 054 902.7	235 129.5

-NOTES-

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

GEOCRES No. 41H-96

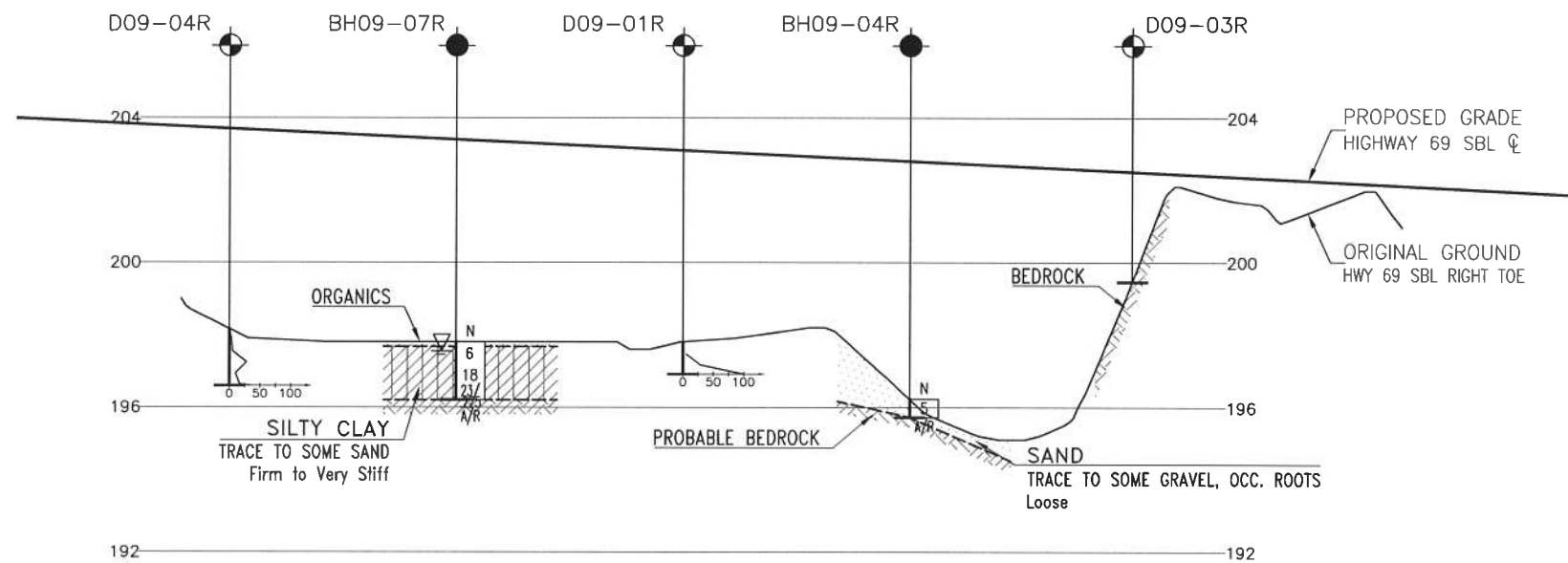
REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012



PLAN

0 16 32 48m

SCALE 1:800



PROFILE ALONG RIGHT TOE HIGHWAY 69 SBL

0 16 32 48m

H 1:800

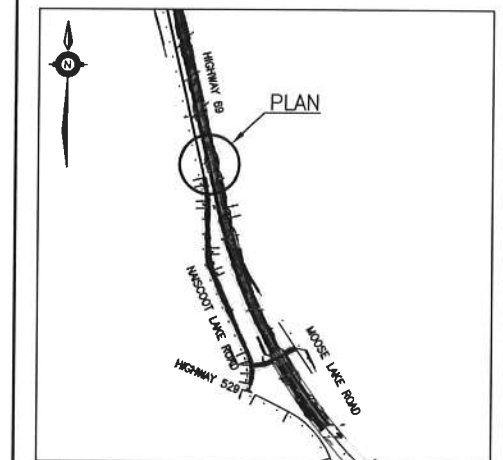
0 4 8 12m

V 1:200

METRIC

DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWNCONT No
GWP No 5076-06-00HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 SBL-RT TOE
(STA 18+890 - 18+990)
BOREHOLE LOCATIONS AND SOIL STRATA

SHEET

MMM GROUP **THURBER ENGINEERING LTD.**

KEYPLAN

LEGEND

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

NO	ELEVATION	NORTHING	EASTING
BH09-01	198.4	5 054 935.1	235 103.5
BH09-02L	195.5	5 054 943.5	235 084.4
BH09-03	194.1	5 054 959.5	235 097.9
BH09-04R	196.2	5 054 975.7	235 112.5
BH09-05	194.3	5 054 983.8	235 092.2
BH09-06L	196.9	5 054 994.2	235 079.8
BH09-07R	197.8	5 054 927.0	235 123.9
BH09-08L	192.5	5 054 967.6	235 077.5
D09-01R	197.8	5 054 951.1	235 117.1
D09-02L	192.5	5 054 967.6	235 077.6
D09-03R	199.5	5 054 997.7	235 098.9
D09-04R	198.2	5 054 902.7	235 129.5

-NOTES-

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

GEOCRETS No. 41H-96

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			STRUCT
			DWG
			DATE DEC. 2012

Appendix H

**Hwy 69 NBL & SBL
Sta. 19+285 to 19+350 Township of Harrison**

**Boreholes 10-01 to 10-06, 11-01 to 11-06, C313-1 to C313-3, C314-1, C314-2
DCPTs D10-01R, D10-02L, D11-01R, D11-02L**




**Record of Borehole Sheets
Laboratory Test Results
Borehole Locations and Soil Strata Drawings**

RECORD OF BOREHOLE No BH10-01

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+286 C/L, NBL ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Wash Boring COMPILED BY AN
DATUM Geodetic DATE 2009.03.01 - 2009.03.01 CHECKED BY RPR

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	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	SHEAR STRENGTH kPa											
193.2	Pond Surface								20	40	60	80	100				
0.0	ICE and WATER: (900mm)						193										
192.3																	
0.9	Silty CLAY, some sand, occasional roots Very Soft Grey		1	SS	0		192										
191.7																	
1.5	PEAT, fibrous, clayey, some sand Very Soft Brown Wet		2	SS	2		191										
190.3																	
2.9	END OF BOREHOLE (SAMPLER BOUNCING) AT 2.9m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS UPON COMPLETION.		3	SS	45/												

+³, ×³: Numbers refer to Sensitivity 20 15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH10-02

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+301 C/L, NBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Wash Boring COMPILED BY AN
 DATUM Geodetic DATE 2009.03.01 - 2009.03.01 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L		
193.2	Pond Surface												
0.0	ICE and WATER: (1500mm)						193						
191.7							192						
1.5	Silty CLAY, some sand, some peat Very Soft Grey		1	SS	0								
191.0							191						
2.2	PEAT, fibrous Very Soft Brown Wet		2	SS	0								
							190						
189.5			3	SS	0								
3.7	Silty CLAY, some sand Very Soft Grey		4	SS	0		189						
188.7													
4.5	SAND, trace gravel, trace silt Loose Grey Wet		5	SS	5								
188.0			6	SS	50/ .000								
5.2	END OF BOREHOLE (SAMPLER BOUNCING) AT 5.2m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS UPON COMPLETION.												

+ ³ , × ³ : Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH10-03L

1 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+313.5 O/S 15.3L, NBL ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Wash Boring COMPILED BY AN
DATUM Geodetic DATE 2009.03.05 - 2009.03.05 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	PLASTIC LIMIT W _P	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	
193.2	Pond Surface											
0.0	ICE and WATER: (1500mm)						193					
191.7	PEAT, clayey, trace sand Very Soft Brown		1	SS	0		192					
1.5			2	SS	0		191					
			3	SS	0		190					
188.8	Silly CLAY, trace sand Very Soft Grey		4	SS	0		189					
4.4							188					
							187					
186.0	GRAVEL, some sand Loose to Very Dense Grey Wet		5	SS	10		186					
7.2							185					
			6	SS	65		184					
183.3												
9.9												

Continued Next Page

+ 3, X 3: Numbers refer to
Sensitivity 20
15 5
10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH10-03L

2 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+313.5 O/S 15.3L, NBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Wash Boring COMPILED BY AN
 DATUM Geodetic DATE 2009.03.05 - 2009.03.05 CHECKED BY RPR

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 (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		WATER CONTENT (%)				
							20 40 60 80 100	20 40 60 80 100	W _p W W _L	20 40 60				
	Continued From Previous Page													
	END OF BOREHOLE (SAMPLER BOUNCING) AT 9.9m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS UPON COMPLETION.													

RECORD OF BOREHOLE No BH10-04

1 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+326 C/L, NBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Wash Boring COMPILED BY AN
 DATUM Geodetic DATE 2009.02.28 - 2009.02.28 CHECKED BY RPR

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 x LAB VANE		WATER CONTENT (%) w _p w w _L				
193.2	Pond Surface												kN/m ³	GR SA SI CL
0.0	ICE and WATER: (1500mm)						193							
							192							
191.7							191							
1.5	PEAT, clayey, some sand Very Soft Dark Brown Wet		1	SS	0		190						35%	
			2	SS	0								36%	
	Layer of organic clay, peaty Very Soft Grey (1.3m Thick)		3	SS	0								17%	
								5						
							189							
			4	SS	0								34%	
							188	8						
187.4														
5.8	Silty CLAY, trace sand Very Soft Grey		5	SS	0		187						○	
								8						
							186							
			6	SS	0								○	0 7 35 58
							185							
			7	SS	0		184						○	
								4						

Continued Next Page

+³, x³, Numbers refer to
Sensitivity 20 15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH10-04

2 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+326 C/L, NBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Wash Boring COMPILED BY AN
 DATUM Geodetic DATE 2009 02 28 - 2009 02 28 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	
	Continued From Previous Page											
182.1	Silty CLAY , trace sand Very Soft to Soft Grey		8	SS	3		183					
11.1	SAND , trace gravel, trace silt Compact Grey Wet						182					
			9	SS	28		181					
							180					
			10	SS	25		179					
178.4	GRAVEL , some sand Compact Grey Wet						178					
14.8			11	SS	26		177					
177.4	DCPT from 15.8m to 13.8m to verify probable bedrock.						176					
15.8							175					
174.9	END OF BOREHOLE (SAMPLER BOUNCING) AT 18.3m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS TO SURFACE.											
18.3												

RECORD OF BOREHOLE No BH10-05R

1 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+338.5 O/S 15.1R, NBL ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Wash Boring COMPILED BY AN
DATUM Geodetic DATE 2009 03.05 - 2009 03.05 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	
193.2	Pond Surface							SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE				
0.0	ICE and WATER: (1800mm)						193					
							192					
191.4							191					
1.8	PEAT, clayey, trace sand Very Soft Brown Wet		1	SS	0		190					
			2	SS	0							
			3	SS	0							
			4	SS	0		189					
			5	SS	0		188					
187.4							187					
5.8	Silty CLAY, trace sand Very Soft Grey		6	TW	PH		186					
			7	TW	PH		185					
			8	TW	PH		184					

Continued Next Page

+ 3 X 3 Numbers refer to
Sensitivity 20
15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH10-05R

2 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+338.5 O/S 15.1R, NBL ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Wash Boring COMPILED BY AN
DATUM Geodetic DATE 2009.03.05 - 2009.03.05 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			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 (%)			
								20 40 60 80 100	○ UNCONFINED + FIELD VANE	● QUICK TRIAXIAL × LAB VANE			PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	
Continued From Previous Page							183									
	Silty CLAY Very Soft Grey		9	SS	0		182									
	Sandy							181								
			10	SS	0											
179.9							180									
13.3	GRAVEL , some sand, trace silt Loose Grey Wet		11	SS	9		179									
178.4																
14.8	Gravelly SAND , trace silt, trace clay Dense Grey Wet		12	SS	30		178									
177.4																
15.8	DCPT from 15.8m to 18.3m.						177									
							176									
174.9							175									
18.3	END OF BOREHOLE (SAMPLER BOUNCING) AT 18.3m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS TO SURFACE.															

+³, X³: Numbers refer to Sensitivity
20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH10-06

1 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+341 C/L, NBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Wash Boring COMPILED BY AN
 DATUM Geodetic DATE 2009.03.27 - 2009.03.28 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	
193.2	Pond Surface											
0.0	ICE and WATER: (1300mm)						193					
			1	SS	0							
191.9							192					
1.3	PEAT, clayey, some sand, trace gravel Very Soft to Soft Brown Wet		2	SS	3							
							191					
			3	SS	0							
							190					
			4	SS	2							
							189					
			5	SS	1							
187.7							188					
5.5	Silty CLAY, trace sand, occasional roots Very Soft Grey		6	SS	0		187					
							186					
			7	SS	0							
185.0							185					
8.2	SAND, some silt, some clay, trace gravel Loose Brown Wet		8	SS	5		184					

Continued Next Page

+³, X³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH10-06

2 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+341 C/L, NBL ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Wash Boring COMPILED BY AN
DATUM Geodetic DATE 2009.03.27 - 2009.03.28 CHECKED BY RPR

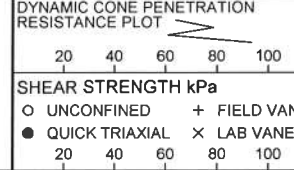
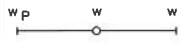
SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa							
	Continued From Previous Page							20 40 60 80 100							
183.0															
10.2	Silty SAND Dense Grey Moist		9	SS	31										
	DCPT from 12.8m to 13.7m.		10	SS	43										
179.5															
13.7	END OF BOREHOLE (SAMPLER BOUNCING) AT 13.7m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS TO SURFACE.														

RECORD OF BOREHOLE No D10-01R

1 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+313.5 O/S 15.3R, NBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2009.03.02 - 2009.03.02 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 	WATER CONTENT (%) 	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
193.2	Pond Surface						193				
0.0	ICE and WATER: (1500mm)						192				
191.7	DCPT starts from 1.5m.						191				
1.5							190				
							189				
							188				
							187				
							186				
							185				
							184				
183.2											

Continued Next Page

+³ ×³: Numbers refer to Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No D10-01R

2 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+313.5 O/S 15.3R, NBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2009.03.02 - 2009.03.02 CHECKED BY RPR

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 (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		WATER CONTENT (%)				
	Continued From Previous Page							20 40 60 80 100	○ UNCONFINED + FIELD VANE	20 40 60				
								● QUICK TRIAXIAL × LAB VANE						
10.0	END OF DCPT AT 10.0m UPON REFUSAL ON PROBABLE BEDROCK.													

ONTMT4S 6121.GPJ 12/12/12

METRIC

[illegible]

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No D10-02L

2 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+338.5 O/S 15.1L, NBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2009.03.04 - 2009.03.04 CHECKED BY RPR

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 (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	20 40 60 80 100			20 40 60 80 100	W _p W W _L					
	Continued From Previous Page														
177.9							183								
							182								
							181								
							180								
							179								
15.3	END OF DCPT AT 15.3m UPON REFUSAL ON PROBABLE BEDROCK.						178								

RECORD OF BOREHOLE No BH11-01

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+291 C/L, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Wash Boring COMPILED BY AN
 DATUM Geodetic DATE 2009.03.02 - 2009.03.02 CHECKED BY RPR

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 (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE									
193.2	Pond Surface							20	40	60	80	100					
0.0	ICE and WATER: (450mm)						193										
192.7																	
0.5	BEDROCK AT 0.5m.																

RECORD OF BOREHOLE No BH11-02

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+301 C/L, SBL ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Wash Boring COMPILED BY AN
DATUM Geodetic DATE 2009.03.04 - 2009.03.04 CHECKED BY RPR

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 (%) 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 (%) w _P w w _L					
193.2	Pond Surface							20	40	60	80	100				
0.0	ICE and WATER: (1500mm)						193									
191.7							192									
1.5	Silty SAND, occasional peat and roots Very Loose Brown Wet		1	SS	3		191									
190.6			2	SS	115/ 175											
2.6	END OF BOREHOLE (SAMPLER BOUNCING) AT 2.6m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS UPON COMPLETION.															

+³, X³ Numbers refer to Sensitivity 20 15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH11-03L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+313.5 O/S 15.3L, SBL ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Wash Boring COMPILED BY AN
DATUM Geodetic DATE 2009.03.04 - 2009.03.04 CHECKED BY RPR

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			20 40 60 80 100	W _P W W _L	WATER CONTENT (%)					
193.2	Pond Surface														
0.0	ICE and WATER: (1800mm)														
191.4															
1.8	PEAT, fibrous, some sand, trace clay Very Soft Brown Wet		1	SS	0										
190.8															
2.4	SAND, some silt, some peat, occasional roots, clay seams Very Loose Brown Wet		2	SS	3										
190.2															
3.0	Silty SAND, trace clay Very Loose to Loose Grey Wet		3	SS	4										
			4	SS	3										
	Clay seams		5	SS	7										
187.8															
5.4	END OF BOREHOLE (SAMPLER BOUNCING) AT 5.4m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS UPON COMPLETION.														

+³, X³: Numbers refer to Sensitivity 20 15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH11-04

1 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+326 C/L, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Wash Boring COMPILED BY AN
 DATUM Geodetic DATE 2009.03.03 - 2009.03.03 CHECKED BY RPR

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			SHEAR STRENGTH kPa		WATER CONTENT (%)				
								○ UNCONFINED ● QUICK TRIAXIAL	+ FIELD VANE x LAB VANE	w _p	w	w _L		
193.2	Pond Surface						20 40 60 80 100						GR SA SI CL	
0.0	ICE and WATER: (1800mm)						20 40 60 80 100							
191.4														
1.8	PEAT, fibrous, trace sand, trace clay Very Soft Brown Wet		1	SS	0							30		
			2	SS	0									
			3	SS	0							55		
189.5														
3.7	Silty CLAY, some sand, trace peat Very Soft Grey		4	SS	0									
	Layer of gravelly sand (300mm)													
188.6														
4.6	Silty SAND, trace gravel, trace clay Very Loose Grey Wet		5	SS	2									
187.6														
5.6	Silty CLAY, trace sand Very Soft Grey		6	SS	0							85	1 5 37 57	
185.9			1	TW	PH									
7.3	Gravelly SAND, trace silt Compact to Dense Grey Wet		7	SS	25									
			8	SS	30									

Continued Next Page

+³, X³: Numbers refer to Sensitivity 20 15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH11-04

2 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+326 C/L, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Wash Boring COMPILED BY AN
 DATUM Geodetic DATE 2009.03.03 - 2009.03.03 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			PLASTIC LIMIT NATURAL MOISTURE LIMIT LIQUID CONTENT LIMIT			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 (%) w _p w w _L				
	Continued From Previous Page							20 40 60 80 100							
181.9	Gravelly SAND, trace silt Dense Grey Wet		9	SS	46		183								
11.3	END OF BOREHOLE AT 11.3m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS UPON COMPLETION.						182								

RECORD OF BOREHOLE No BH11-05R

1 OF 2

METRIC

GWP# 5076-06-00 LOCATION Hamison Twp., Station 19+338.5 O/S 15.1R, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Wash Boring COMPILED BY AN
 DATUM Geodetic DATE 2009.03.04 - 2009.03.04 CHECKED BY RPR

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 (%) 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										
193.2	Pond Surface						20 40 60 80 100				20 40 60							
0.0	ICE and WATER: (1800mm)																	
191.4																		
1.8	PEAT, clayey, trace sand Very Soft Brown Wet		1	SS	0													
			2	SS	0													
189.5																		
3.7	Silty SAND, some clay, trace gravel, occasional peat, occasional layer of silty clay Very Loose Grey Wet		3	SS	0													
			4	SS	0													
	Layer of silty clay (300mm)																	
187.1																		
6.1	Gravelly SAND Loose to Compact Grey Wet		5	SS	5													
			6	SS	12													
			7	SS	28													

Continued Next Page

+ 3, X 3: Numbers refer to
Sensitivity

20
15
10


(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH11-05R

2 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+338.5 O/S 15.1R, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Wash Boring COMPILED BY AN
 DATUM Geodetic DATE 2009.03.04 - 2009.03.04 CHECKED BY RPR

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			20 40 60 80 100	SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE							
Continued From Previous Page																
182.4	Gravelly SAND Grey Wet		8	SS	50/		183									
10.8	END OF BOREHOLE (SAMPLER BOUNCING) AT 10.8m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS UPON COMPLETION.				.100											

RECORD OF BOREHOLE No BH11-06

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+341 C/L, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Wash Boring COMPILED BY AN
 DATUM Geodetic DATE 2009.02.27 - 2009.02.27 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa				
193.2	Pond Surface											
0.0	ICE and WATER: (900mm)						193					
192.3												
0.9	PEAT, trace sand Very Soft Brown Wet		1	SS	3		192					
191.7												
1.5	SAND, some silt, trace gravel, trace clay, occasional roots Loose to Compact Brown Wet		2	SS	18							
							191					
			3	SS	9							
			4	SS	26/ 200		190					
189.8												
3.4	END OF BOREHOLE AT 3.4m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS UPON COMPLETION.											

+³, ×³: Numbers refer to Sensitivity 20 15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No D11-01R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+313.5 O/S 15.3R, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2009.03.04 - 2009.03.04 CHECKED BY RPR

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 (%) GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE			w _P	w	w _L			
193.2	Pond Surface						20	40	60	80	100	20	40	60		
0.0	ICE and WATER: (1800mm)															
191.4																
1.8	DCPT starts from 1.8m.															

RECORD OF BOREHOLE No D11-02L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+332.5 O/S 15.1L, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2009.03.02 - 2009.03.02 CHECKED BY RPR

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 (%) 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						W _p	W
193.2	Ground Surface																	
0.0	DCPT from surface.																	

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 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	WATER CONTENT (%)				
193.2	Pond Surface												

[illegible]

(%) STRAIN AT FAILURE

ONTMT4S 6121(CULVERTS),GPJ 12/13/12

RECORD OF BOREHOLE No C313-1

2 OF 2

METRIC

WP# 5134-12-01 LOCATION N 5 055 317.8 E 235 075.4 ORIGINATED BY ES
HWY 69 BOREHOLE TYPE Wash Boring COMPILED BY AN
DATUM Geodetic DATE 2011.02.26 - 2011.02.26 CHECKED BY RPR

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 (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL X LAB VANE					WATER CONTENT (%) w _p w w _L				
	Continued From Previous Page BACKFILLED WITH HOLEPLUG AND CUTTINGS TO SURFACE.																

ONTMT/4S 6121(CULVERTS).GPJ 12/13/12

RECORD OF BOREHOLE No C313-2

1 OF 1

METRIC

WP# 5134-12-01 LOCATION N 5 055 311.2 E 235 056.3 ORIGINATED BY ES
 HWY 69 BOREHOLE TYPE Wash Boring COMPILED BY AN
 DATUM Geodetic DATE 2011.02.26 - 2011.02.26 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	PLASTIC LIMIT W _P	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	
193.2	Pond Surface											
0.0	ICE: (300mm)											
192.9												
0.3	WATER											
191.8												
191.7	PEAT: (25mm)											
1.5	Silty CLAY, trace sand Very Soft Grey		1	SS	0							
190.6			2	SS	2							
2.6	PEAT, trace sand Very Soft Dark Brown Wet		3	SS	1							
189.5			4	SS	2							
3.7	Silty CLAY, some sand Very Soft Grey Wet		5	SS	50/							
188.4												
4.8	END OF BOREHOLE AT 4.8m UPON REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG AND CUTTINGS TO SURFACE.											

RECORD OF BOREHOLE No C313-3

1 OF 1

METRIC

WP# 5134-12-01 LOCATION N 5 055 304.7 E 235 037.1 ORIGINATED BY ES
HWY 69 BOREHOLE TYPE Wash Boring COMPILED BY AN
DATUM Geodetic DATE 2011.02.25 - 2011.02.25 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	
193.2	Pond Surface											
0.0	ICE: (300mm)											
192.9												
0.3	WATER											
192.0												
1.2	Silty CLAY, some sand Soft Grey		1	SS	2							
191.4												
191.8	SAND											
1.9	PEAT, trace sand Very Soft Dark Brown Wet		2	SS	2							
190.7												
2.5	SILT and SAND, trace clay Loose Grey Wet		3	SS	7							
189.7												
3.5	SAND, some gravel to gravelly Compact Grey Wet		4	SS	17							
189.2												
4.0	END OF BOREHOLE AT 4.0m UPON REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG AND CUTTINGS TO SURFACE.											

RECORD OF BOREHOLE No C314-1

1 OF 1

METRIC

WP# 5134-12-02 LOCATION N 5 055 298.7 E 235 019.2 ORIGINATED BY ES
 HWY 69 BOREHOLE TYPE Wash Boring COMPILED BY AN
 DATUM Geodetic DATE 2011.02.25 - 2011.02.25 CHECKED BY RPR

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 (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		WATER CONTENT (%)				
193.2	Pond Surface							20 40 60 80 100						
0.0	ICE: (300mm)													
192.9							193							
0.3	WATER													
191.9							192							
191.8	PEAT: (50mm)													
191.6	Silty CLAY, trace sand, occasional roots and rootlets		1	SS	4									
1.6	Soft Grey													
191.1			2	SS	66/									
2.1	SAND, fine grained Loose Grey Wet				0.025									
END OF BOREHOLE AT 2.1m UPON REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.														

+³ . X³ : Numbers refer to Sensitivity

20
15 5
10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No C314-2

1 OF 1

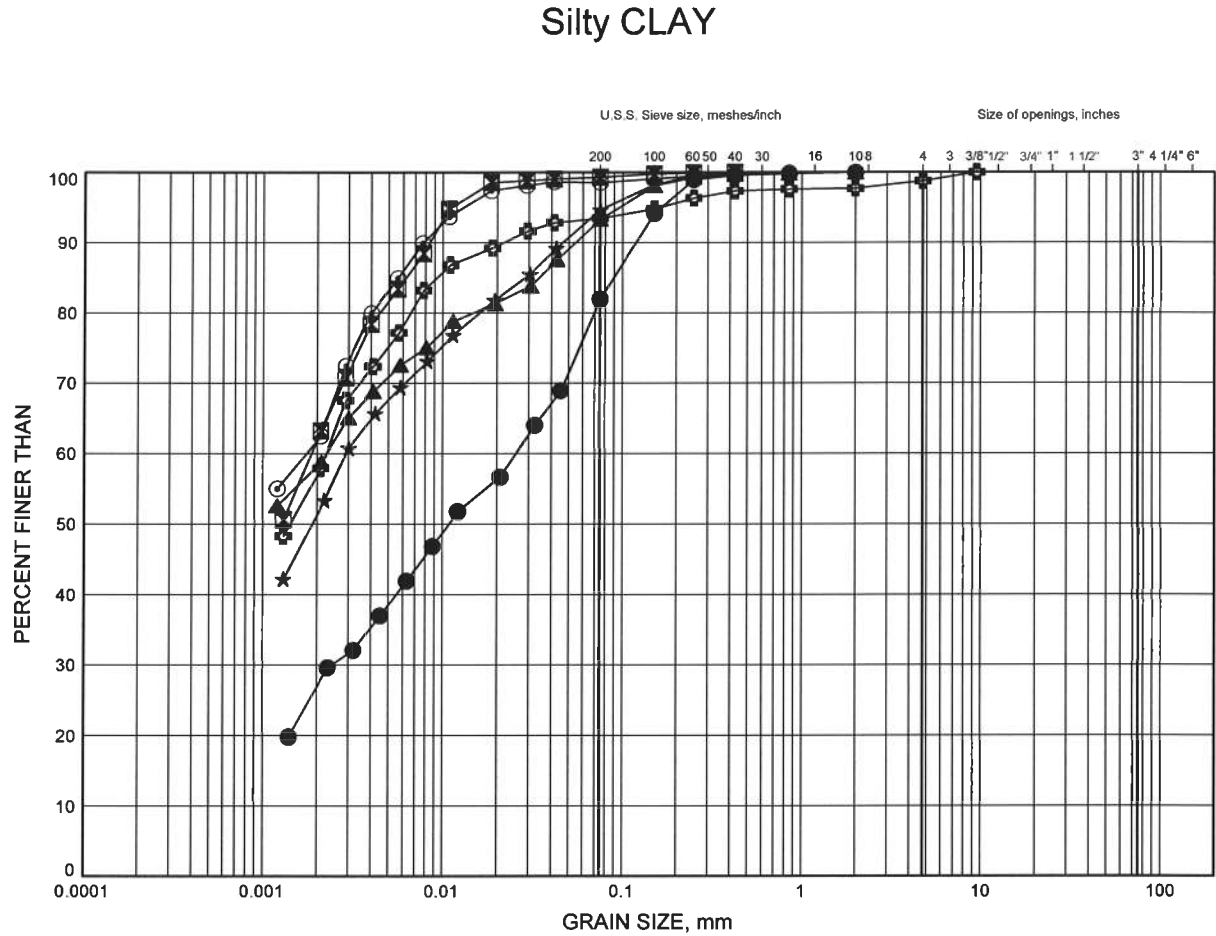
METRIC

WP# 5134-12-02 LOCATION N 5 055 291.4 E 234 998.4 ORIGINATED BY ES
 HWY 69 BOREHOLE TYPE Wash Boring COMPILED BY AN
 DATUM Geodetic DATE 2011.02.25 - 2011.02.25 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	PLASTIC LIMIT w _p	NATURAL MOISTURE CONTENT w	LIQUID LIMIT w _L	
193.2	Pond Surface											
0.0	ICE: (300mm)											
192.9												
0.3	WATER											
191.6												
191.8	PEAT: (50mm)											
1.7	SAND, some silt, trace gravel, trace clay Loose to Compact Grey Wet		1	SS	7							
			2	SS	16							5 73 20 2
190.2												
3.0	SAND and GRAVEL, trace silt Very Dense Brown Wet		3	SS	61/ 0.275							53 40 7 (SI+CL)
189.4												
3.8	END OF BOREHOLE AT 3.8m UPON REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG AND CUTTINGS TO SURFACE.											

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE H1



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH10-02	4.11	189.09
⊠	BH10-03L	4.88	188.32
▲	BH10-04	7.92	185.28
★	BH10-05R	7.92	185.28
⊙	BH10-06	6.40	186.80
⊕	BH11-04	6.40	186.80

Date December 2012

GWP# 5076-06-00

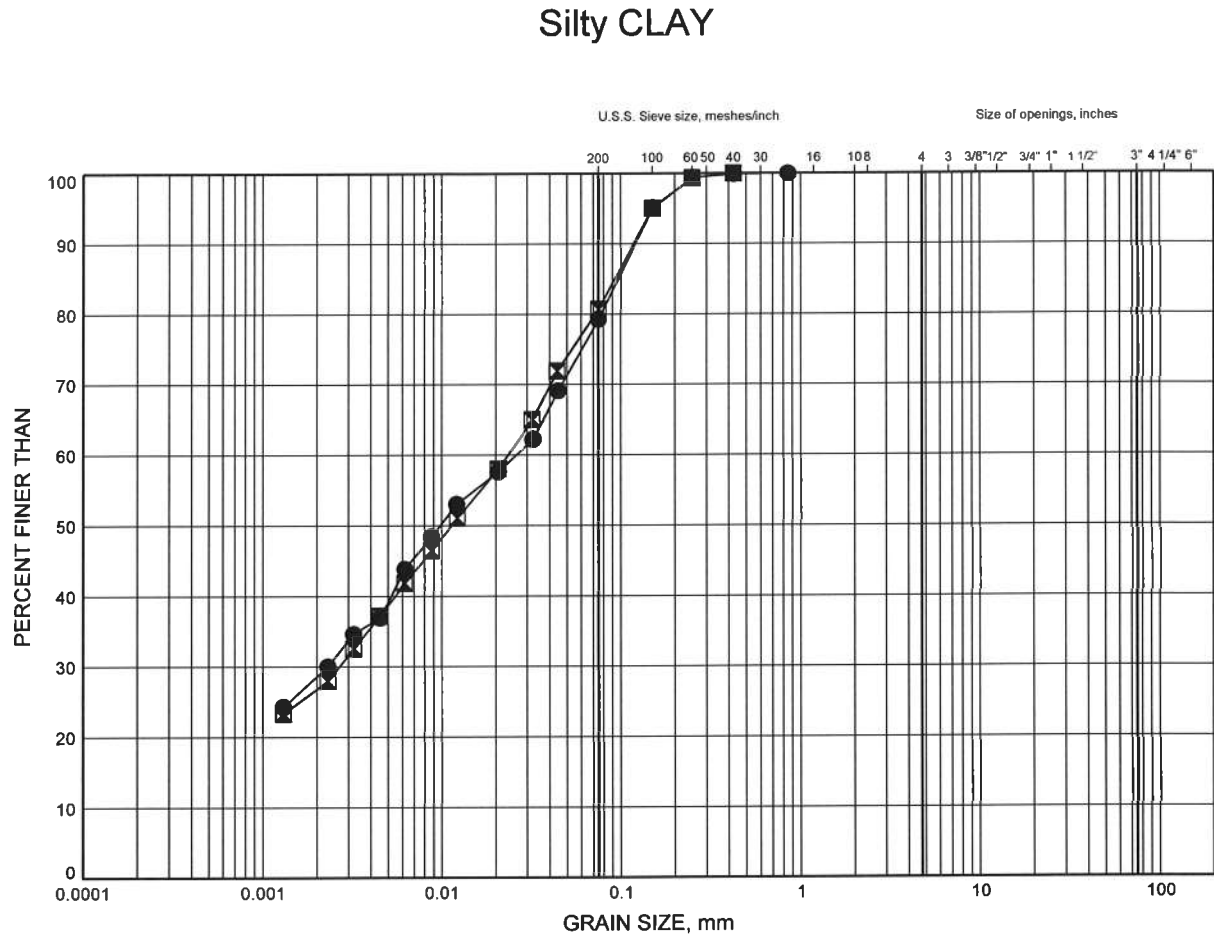


Prep'd MFA

Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE H2



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	C313-1	4.78	188.42
⊠	C313-2	4.04	189.16

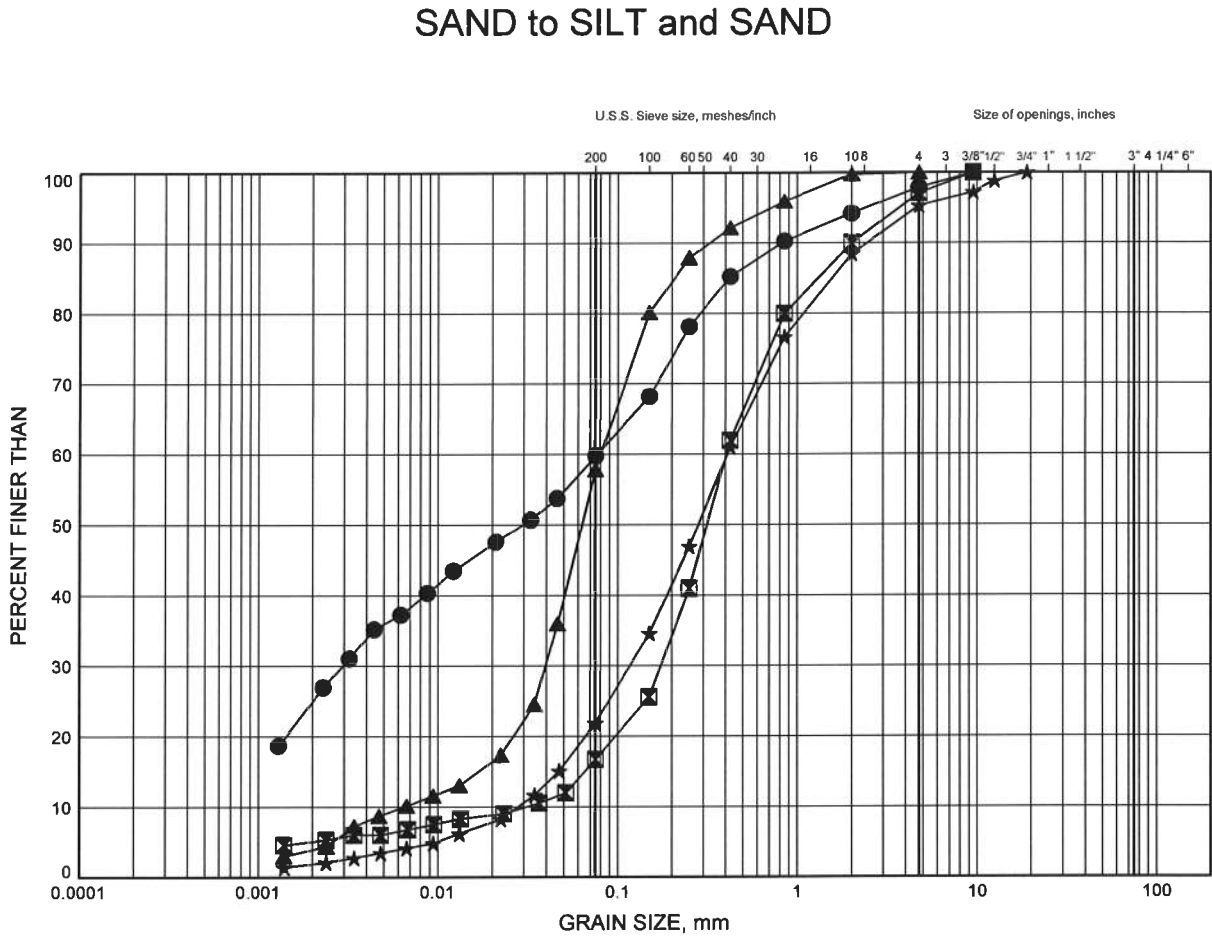
Date December 2012
GWP# 5076-06-00



Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529
GRAIN SIZE DISTRIBUTION

FIGURE H3



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH11-05R	4.11	189.09
⊠	BH11-06	1.83	191.37
▲	C313-3	3.05	190.15
★	C314-2	2.69	190.51

GRAIN SIZE DISTRIBUTION - THURBER 6121.GPJ 12/13/12

Date December 2012
 GWP# 5076-06-00

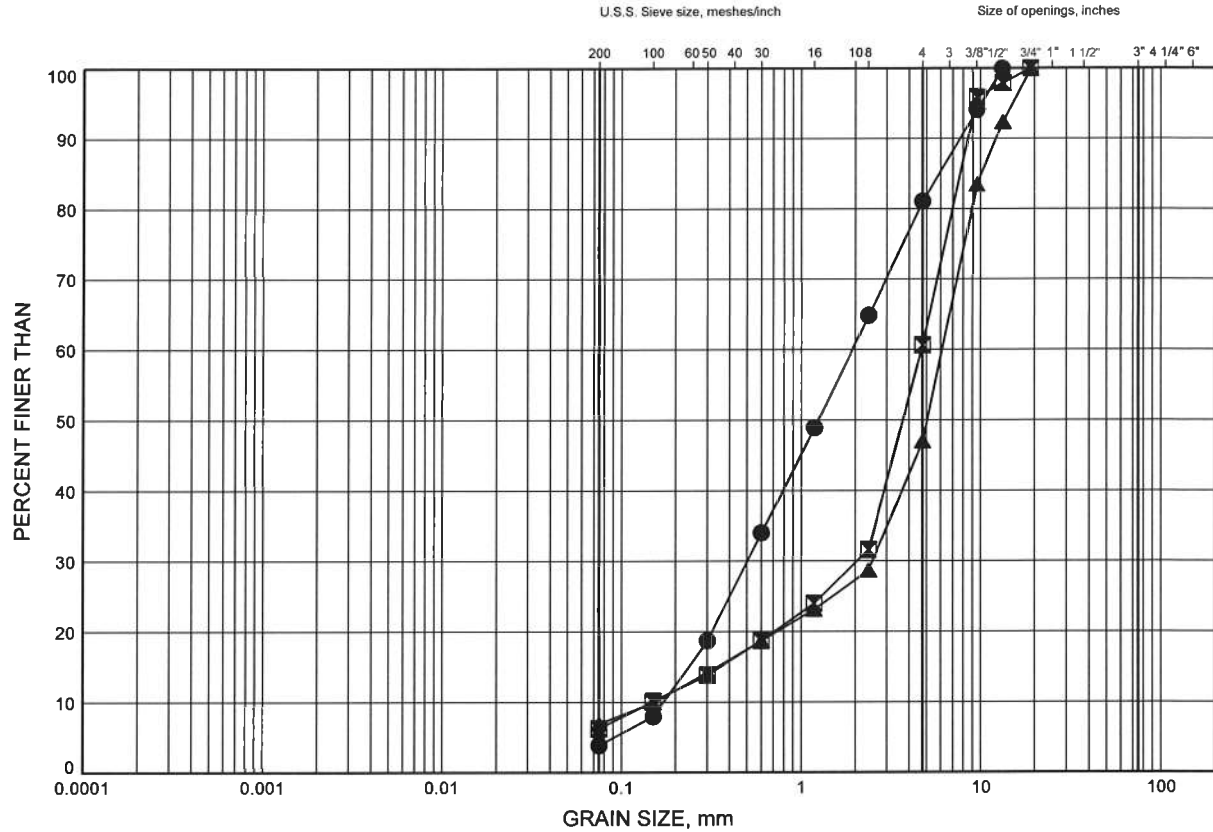


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 Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529
GRAIN SIZE DISTRIBUTION

FIGURE H4

Gravelly SAND to SAND and GRAVEL



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH10-05R	15.54	177.66
⊠	C313-1	9.22	183.98
▲	C314-2	3.36	189.84

Date December 2012

GWP# 5076-06-00



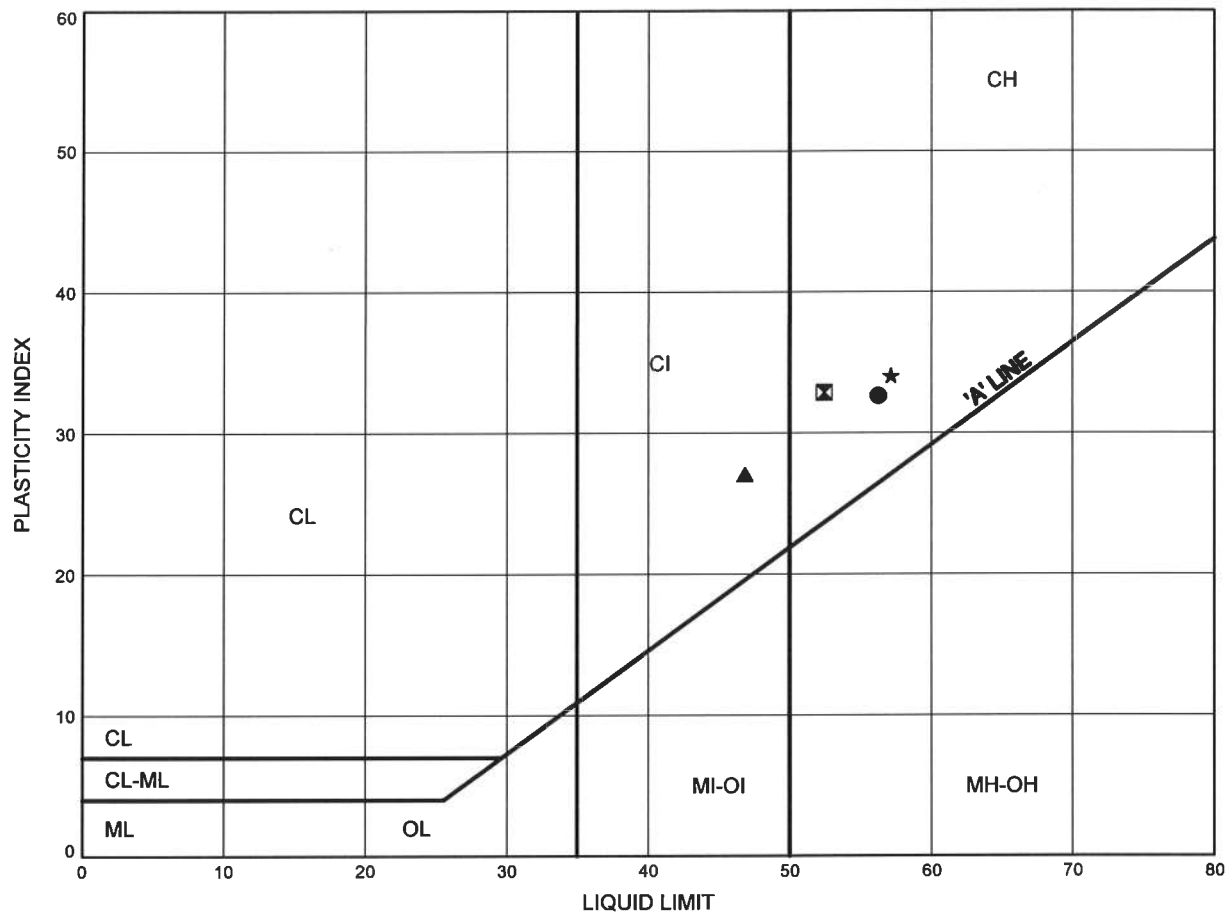
Prep'd MFA

Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529
ATTERBERG LIMITS TEST RESULTS

FIGURE H5

Silty CLAY



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH10-03L	4.88	188.32
⊠	BH10-04	7.92	185.28
▲	BH10-05R	7.92	185.28
★	BH10-06	6.40	186.80

Date December 2012
 GWP# 5076-06-00



Prep'd MFA
 Chkd. MRA



THURBER ENGINEERING LTD.
GEOTECHNICAL • ENVIRONMENTAL • MATERIALS

Consolidation Test Report

CLIENT: **MMM GROUP LIMITED**

FILE NUMBER: **19-5161-21**

PROJECT: **Hwy 69 N. of Hwy 529**

REPORT DATE: **15-Jun-10**

TEST DATES: **May 06, 2009 - May 20, 2009**

SAMPLE: **BH10-05R-TW7 (25'-27')**
Silty Clay, trace Sand, Dark Grey, (Cl), 51% Clay, 43% Silt, 6% Sand

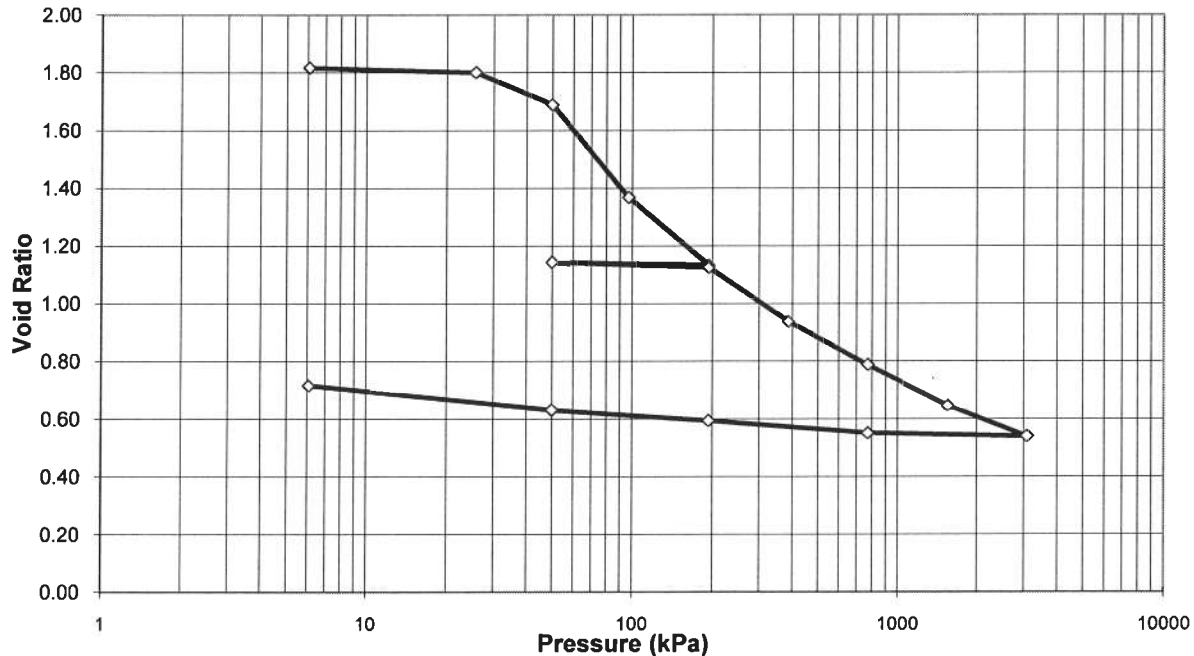
PROCEDURE: **Test carried out in accordance with Standard Test Method for One-Dimensional Consolidation Properties of Soils, ASTM D 2435-04, method B**

	<u>Start of Test</u>	<u>End of Test</u>
Wet Dens. (kg/m ³)	1631.4	2135.6
Dry Dens. (kg/m ³)	986.7	1619.1
Moisture Cont. (%)	65.4	31.9
Void Ratio	1.818	0.717
Saturation (%)	100.0	

Note: A Specific Gravity of 2.78 was assumed for the void ratio and saturation calculations.

Void Ratio vs Pressure

Project #: 19-5161-21
Client: MMM Group Ltd.
Project Name: Hwy 69 N. of Hwy 529
Sample: BH10-05R-TW7 (25'-27')
Oedometer Consolidation Test



TEST DONE BY: LT
REVIEWED BY: JPL



Consolidation Test Report

Hwy 69 N. of Hwy 529
19-5161-21

BH10-05R-TW7 (25'-27')

TRIMMING: The Specimen was manually trimmed to the size of consolidation ring, then mounted in a fixed ring consolidometer

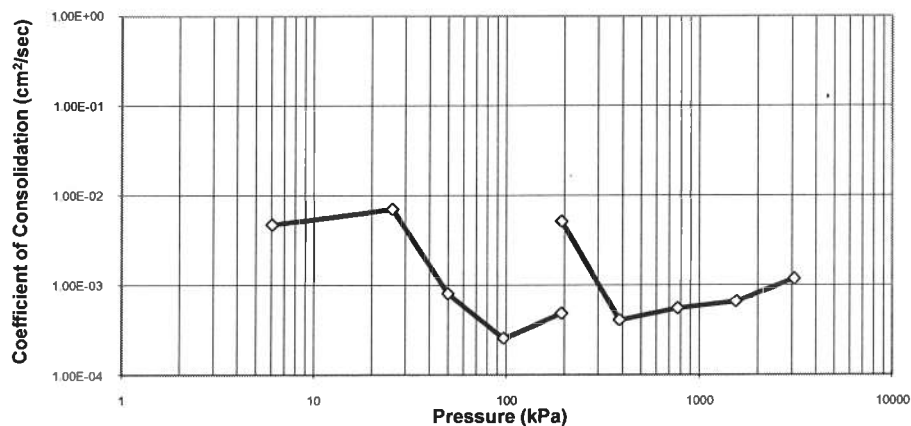
LOADING: A seating load of 6.1 kPa was applied and the consolidometer was flooded with distilled water. Sample was monitored to ensure no swelling effect occurred before the start of the test. Subsequent loads were applied after 100% primary consolidation was reached.

CALCULATIONS: Coefficients of Consolidation were calculated by the square root time method.

Pressure (kPa)	Corr. H. (mm)	Avg. H. (mm)	d ₉₀ (mm)	t ₉₀ (min)	C _v (cm ² /s)	Void Ratio	m _v (m ² /kN)	k (cm/s)
0.0	25.500					1.818		
6.1	25.496	25.498	0.015	4.84	4.75E-03	1.817	2.58E-05	1.20E-08
25.7	25.353	25.425	0.222	3.24	7.05E-03	1.801	2.86E-04	1.98E-07
49.9	24.342	24.848	0.290	27.04	8.07E-04	1.690	1.65E-03	1.30E-07
96.6	21.434	22.888	2.020	72.25	2.56E-04	1.368	2.55E-03	6.42E-08
193.2	19.306	20.370	1.501	30.25	4.85E-04	1.133	1.03E-03	4.89E-08
49.9	19.402	19.354				1.144		
193.2	19.230	19.316	0.268	2.56	5.15E-03	1.125	6.19E-05	3.12E-08
385.7	17.540	18.385	1.175	29.16	4.10E-04	0.938	4.56E-04	1.83E-08
770.7	16.192	16.866	1.000	18.06	5.56E-04	0.789	2.00E-04	1.09E-08
1540.7	14.926	15.559	0.880	12.96	6.60E-04	0.649	1.02E-04	6.57E-09
3081.4	13.947	14.437	0.662	6.25	1.18E-03	0.541	4.26E-05	4.92E-09
770.7	14.049	13.998				0.552		
193.2	14.440	14.245				0.596		
49.9	14.775	14.608				0.633		
6.1	15.540	15.158				0.717		

Coefficient of Consolidation vs. Pressure

Project #: 19-5161-21
Client: MMM Group Ltd.
Project Name: Hwy 69 N. of Hwy 529
Sample: BH10-05R-TW7 (25'-27')
Oedometer Consolidation Test



Notes: C_v and k calculated using t₉₀ values

TEST DONE BY: LT
REVIEWED BY: JPL



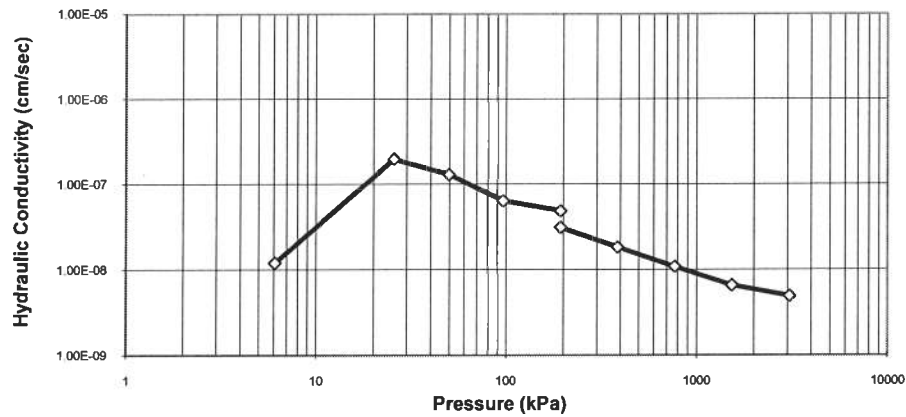
Consolidation Test Report

Hwy 69 N. of Hwy 529
19-5161-21

BH10-05R-TW7 (25'-27')

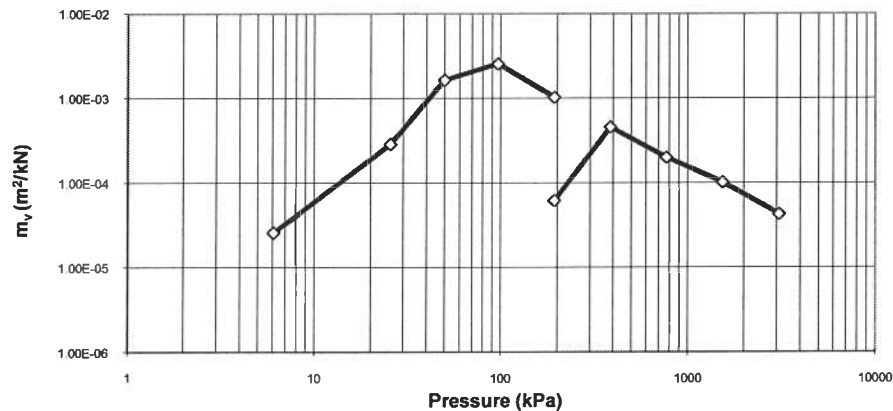
Hydraulic Conductivity vs. Pressure

Project #: 19-5161-21
Client: MMM Group Ltd.
Project Name: Hwy 69 N. of Hwy 529
Sample: BH10-05R-TW7 (25'-27')
Oedometer Consolidation Test



m_v vs. Pressure

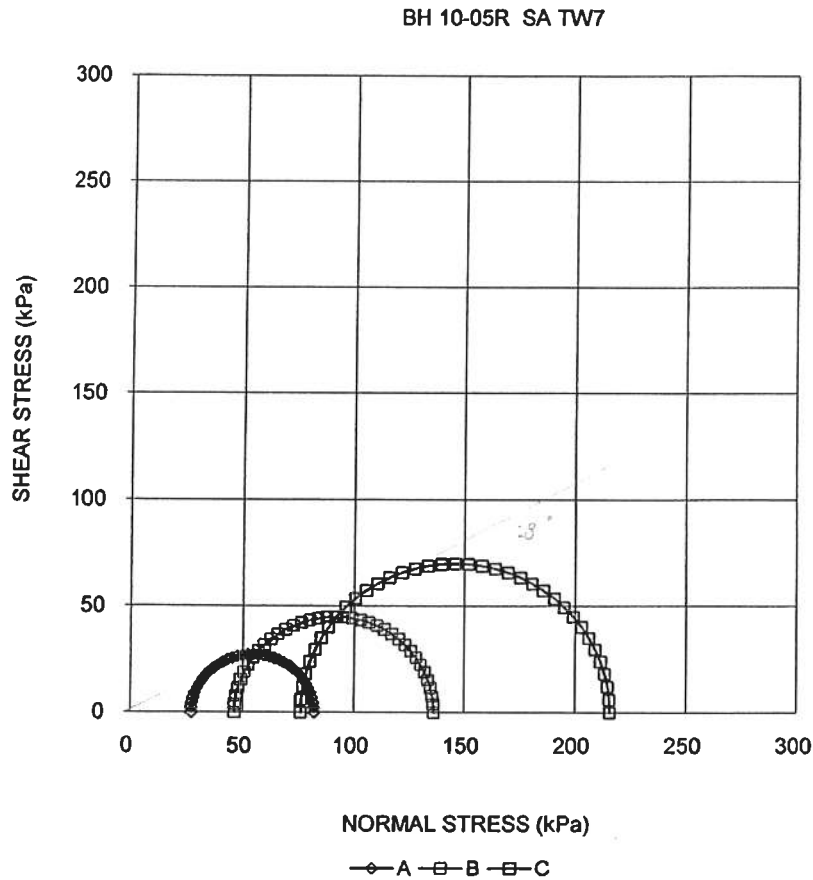
Project #: 19-5161-21
Client: MMM Group Ltd.
Project Name: Hwy 69 N. of Hwy 529
Sample: BH10-05R-TW7 (25'-27')
Oedometer Consolidation Test



CONSOLIDATED UNDRAINED TRIAXIAL WITH PORE PRESSURE MEASUREMENTS SHEET 1 OF 4			FIGURE
TEST STAGE	A	B	C
BOREHOLE NUMBER	10-05R	10-05R	10-05R
SAMPLE	TW7	TW7	TW7
SPECIMEN DIAMETER, cm	5.03	5.06	5.11
SPECIMEN HEIGHT, cm	10.17	10.17	10.12
WATER CONTENT BEFORE CONSOLIDATION, %	59.8	61.6	63.9
CELL PRESSURE, σ_3 , kPa	350.0	355.0	455.0
BACK PRESSURE, kPa	275.0	205.0	205.0
PORE PRESSURE PARAMETER "B"	0.96	0.96	0.96
CONSOLIDATION PRESSURE, σ_c , kPa	75.0	150.0	250.0
VOLUMETRIC STRAIN DURING CONSOLIDATION, %	14.7	18.9	23.2
WATER CONTENT AFTER CONSOLIDATION, %	45.9	43.3	40.6
AVERAGE RATE OF STRAIN, %/hr	0.5	0.5	0.5
TIME TO FAILURE, DAYS	1	1	1
WATER CONTENT AFTER TEST, %	47.8	40.8	37.1
MAX. DEVIATOR STRESS, $(\sigma_1 - \sigma_3)$, kPa	54.5	89.9	140.1
AXIAL STRAIN AT $(\sigma_1 - \sigma_3)$ MAXIMUM, %	3.2	4.7	8.5
MAX EFFECTIVE PRINCIPAL STRESS RATIO, (σ_1 / σ_3) MAXIMUM	3.7	3.4	3.1
DEVIATOR STRESS AT (σ_1 / σ_3) MAXIMUM, kPa	49.5	84.4	130.7
AXIAL STRAIN AT (σ_1 / σ_3) MAXIMUM, %	10.0	10.6	16.7
PORE PRESSURE PARAMETER, A_f , AT $(\sigma_1 - \sigma_3)$ MAXIMUM	0.88	1.15	1.25
PORE PRESSURE PARAMETER, A_f , AT (σ_1 / σ_3) MAXIMUM	1.14	1.36	1.45
NATURAL WATER CONTENT, %	57.8	57.7	61.8
DRY DENSITY, Mg/m^3	1.06	1.04	1.00
FILTER DRAINS USED, y/n	y	y	y
TEST NOTES:			
CHANGED RATE OF STRAIN, %/hr	-	-	-
AXIAL STRAIN WHERE RATE OF STRAIN WAS CHANGED, %	-	-	-
FAILURE PLANE NUMBER	-	-	-
ANGLE OF FAILURE, DEGREES	bulged	bulged	bulged
<div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div> Date: 05/27/2009 Project No. 09-1116-0015 </div> <div> Golder Associates </div> <div> Prepared By MM Checked By: <i>RO</i> </div> </div>			

CONSOLIDATED UNDRAINED TRIAXIAL
WITH PORE PRESSURE MEASUREMENTS
SHEET 2 OF 4

FIGURE



Date: 05/27/2009
Project No. 09-1116-0015

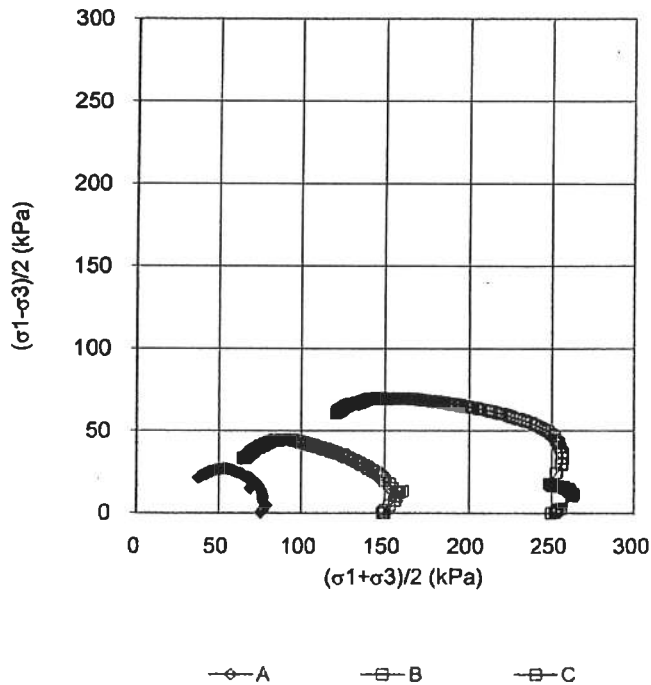
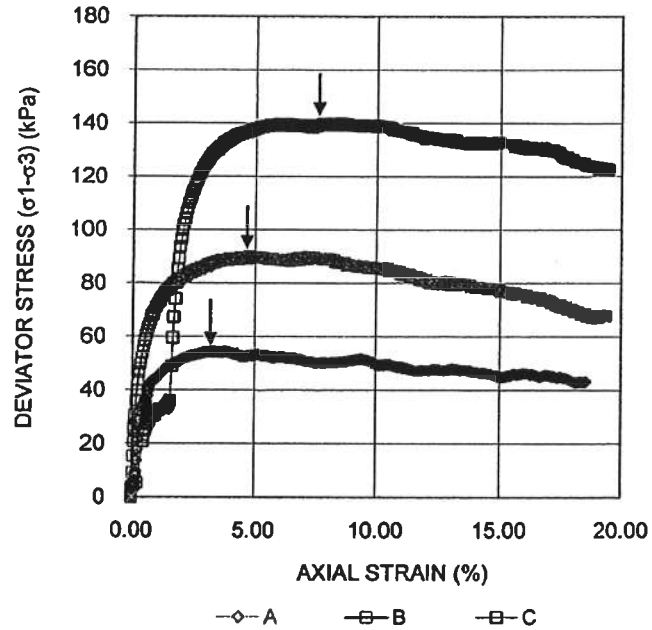
Golder Associates

Prepared By MM
Checked By: R0

**CONSOLIDATED UNDRAINED TRIAXIAL
WITH PORE PRESSURE MEASUREMENTS
SHEET 3 OF 4**

FIGURE

BH 10-05R SA TW7



Date: 05/27/2009
Project No. 09-1116-0015

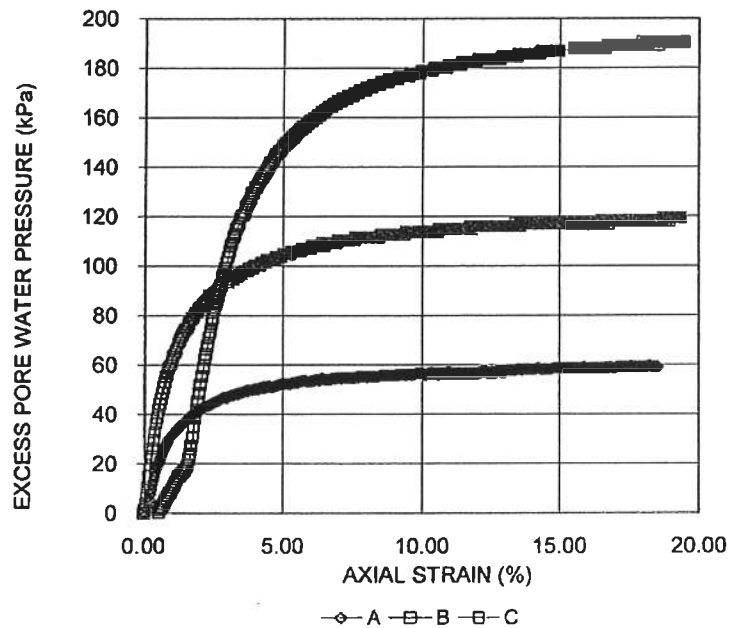
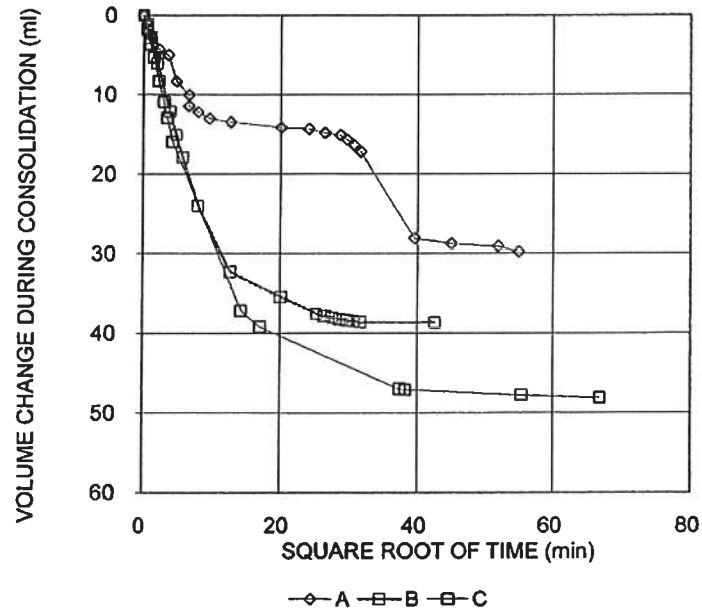
Golder Associates

Prepared By MM
Checked By: *RO*

**CONSOLIDATED UNDRAINED TRIAXIAL
WITH PORE PRESSURE MEASUREMENTS
SHEET 4 OF 4**

FIGURE

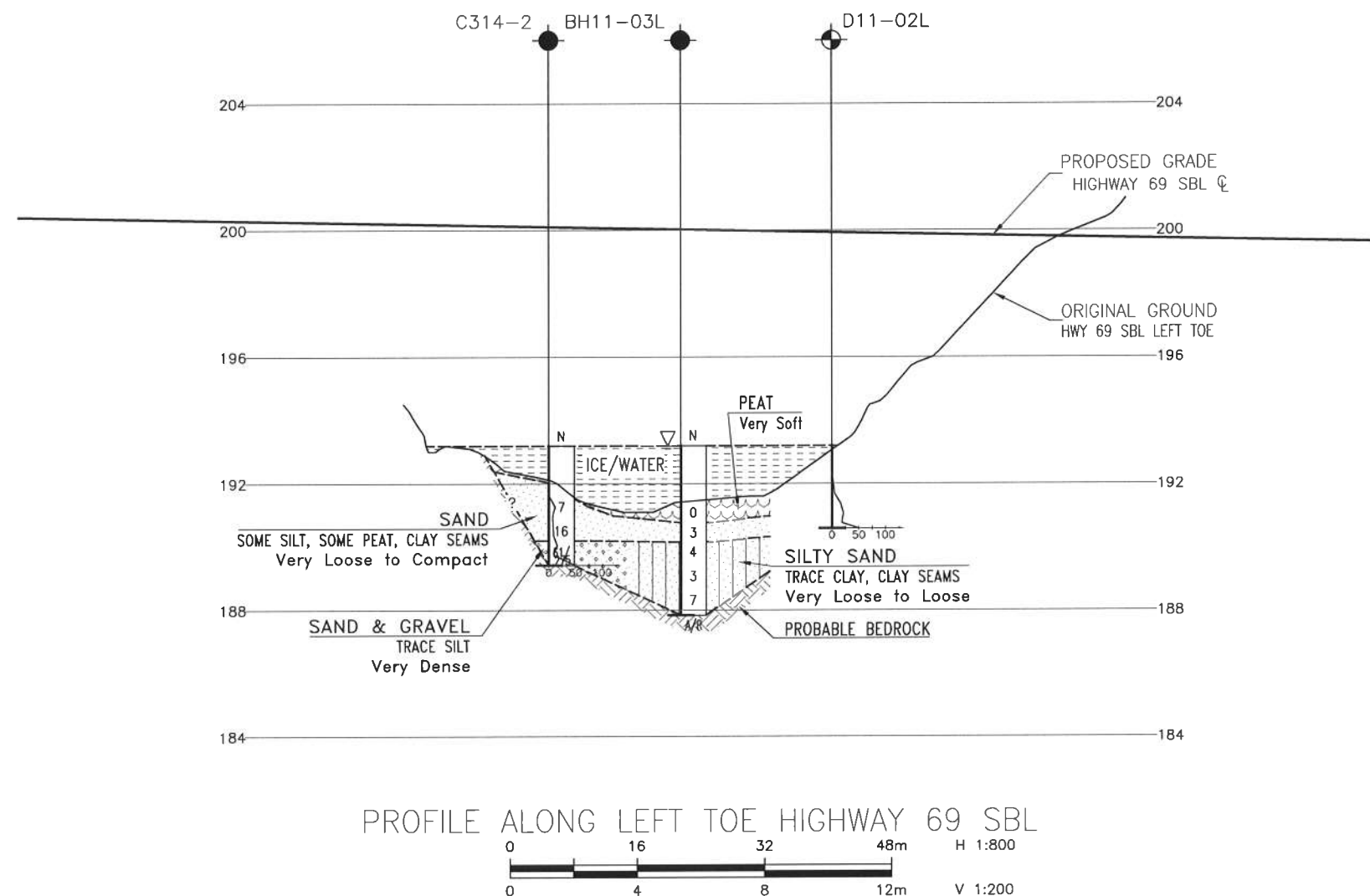
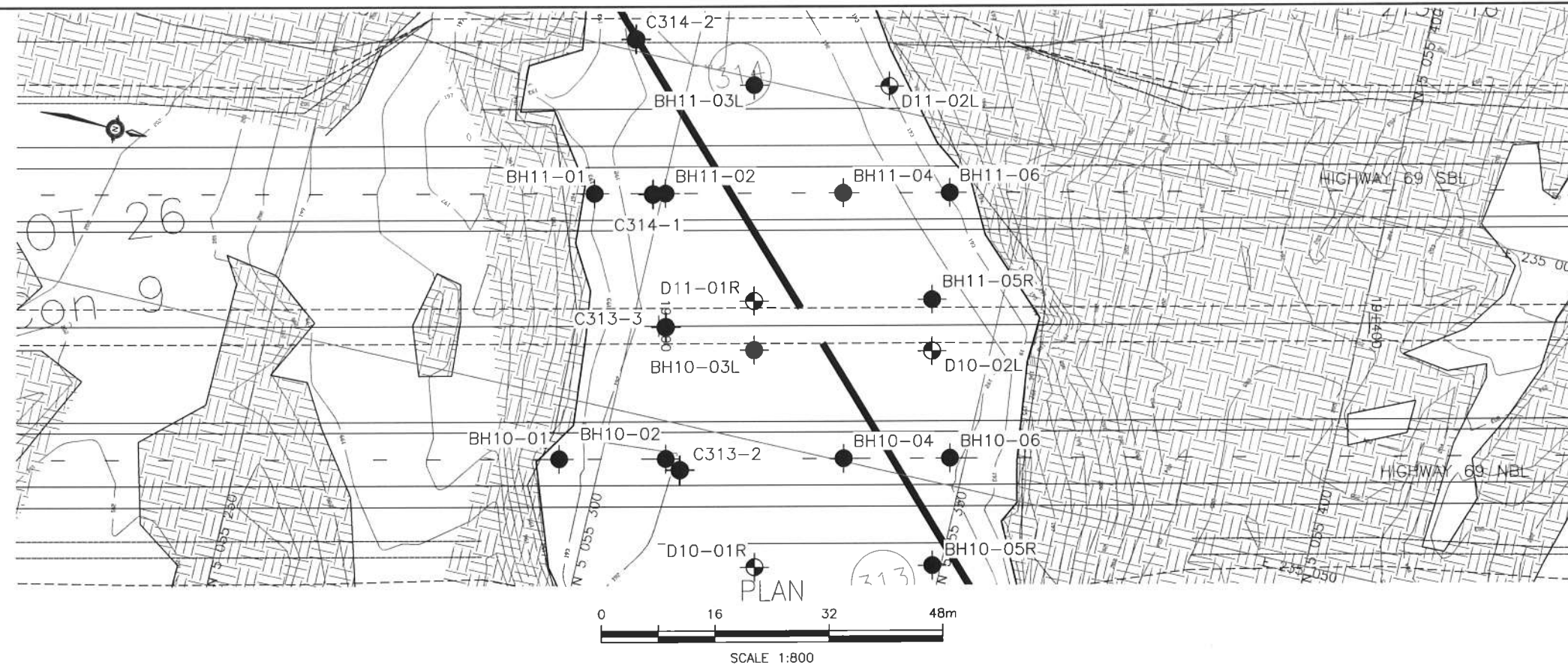
BH 10-05R SA TW7



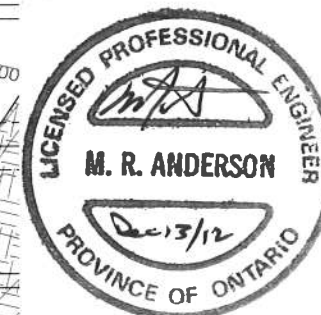
Date: 05/27/2009
Project No. 09-1116-0015

Golder Associates

Prepared By MM
Checked By: RW



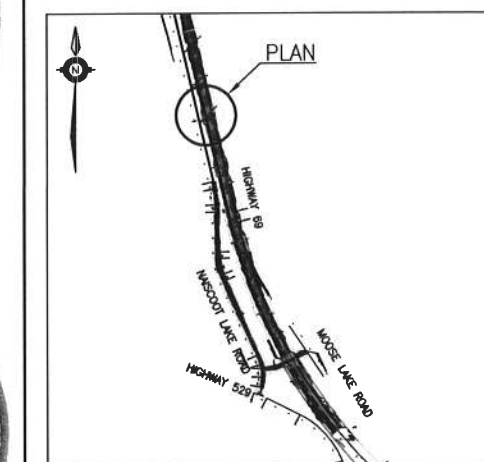
METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



CONT No
GWP No 5076-06-00






HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 SBL-LT TOE
(STA 19+285 - 19+350)
BOREHOLE LOCATIONS AND SOIL STRATA

SHEET



KEYPLAN

LEGEND

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

NO	ELEVATION	NORTHING	EASTING
BH11-01	193.2	5 055 290.7	235 020.9
BH11-02	193.2	5 055 300.4	235 018.7
BH11-03L	193.2	5 055 309.1	235 000.9
BH11-04	193.2	5 055 324.8	235 013.0
BH11-05R	193.2	5 055 340.4	235 024.9
BH11-06	193.2	5 055 339.4	235 009.6
D11-01R	193.2	5 055 316.1	235 030.8
D11-02L	193.2	5 055 327.7	234 996.8
C314-1	193.2	5 055 298.7	235 019.2
C314-2	193.2	5 055 291.4	234 998.4

-NOTES-

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

GEOCRES No. 41H-96

[illegible]

METRIC

DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

CONT No
GWP No 5076-06-00

HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 SBL-CL
(STA 19+285 - 19+350)
BOREHOLE LOCATIONS AND SOIL STRATA








THURBER ENGINEERING LTD



LICENSED PROFESSIONAL ENGINEER
 P. K. CHATTERJI
 2413/12
 PROVINCE OF ONTARIO

KEYPLAN
LEGEND

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

NO	ELEVATION	NORTHING	EASTING
BH11-01	193.2	5 055 290.7	235 020.9
BH11-02	193.2	5 055 300.4	235 018.7
BH11-03L	193.2	5 055 309.1	235 000.9
BH11-04	193.2	5 055 324.8	235 013.0
BH11-05R	193.2	5 055 340.4	235 024.9
BH11-06	193.2	5 055 339.4	235 009.6
D11-01R	193.2	5 055 316.1	235 030.8
D11-02L	193.2	5 055 327.7	234 996.8
C313-2	193.2	5 055 311.2	235 056.3
C313-3	193.2	5 055 304.7	235 037.1
C314-1	193.2	5 055 298.7	235 019.2

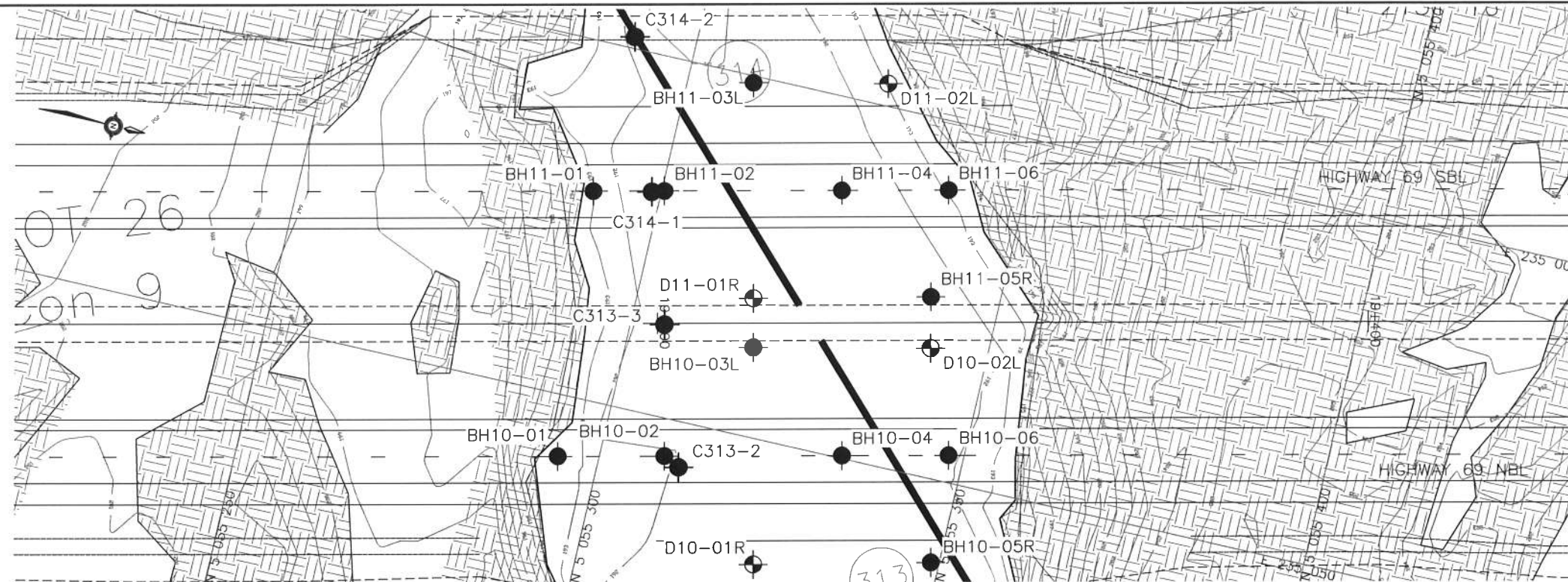
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GEOCRES No. 41H-96

PROFILE ALONG C HIGHWAY 69 SBL

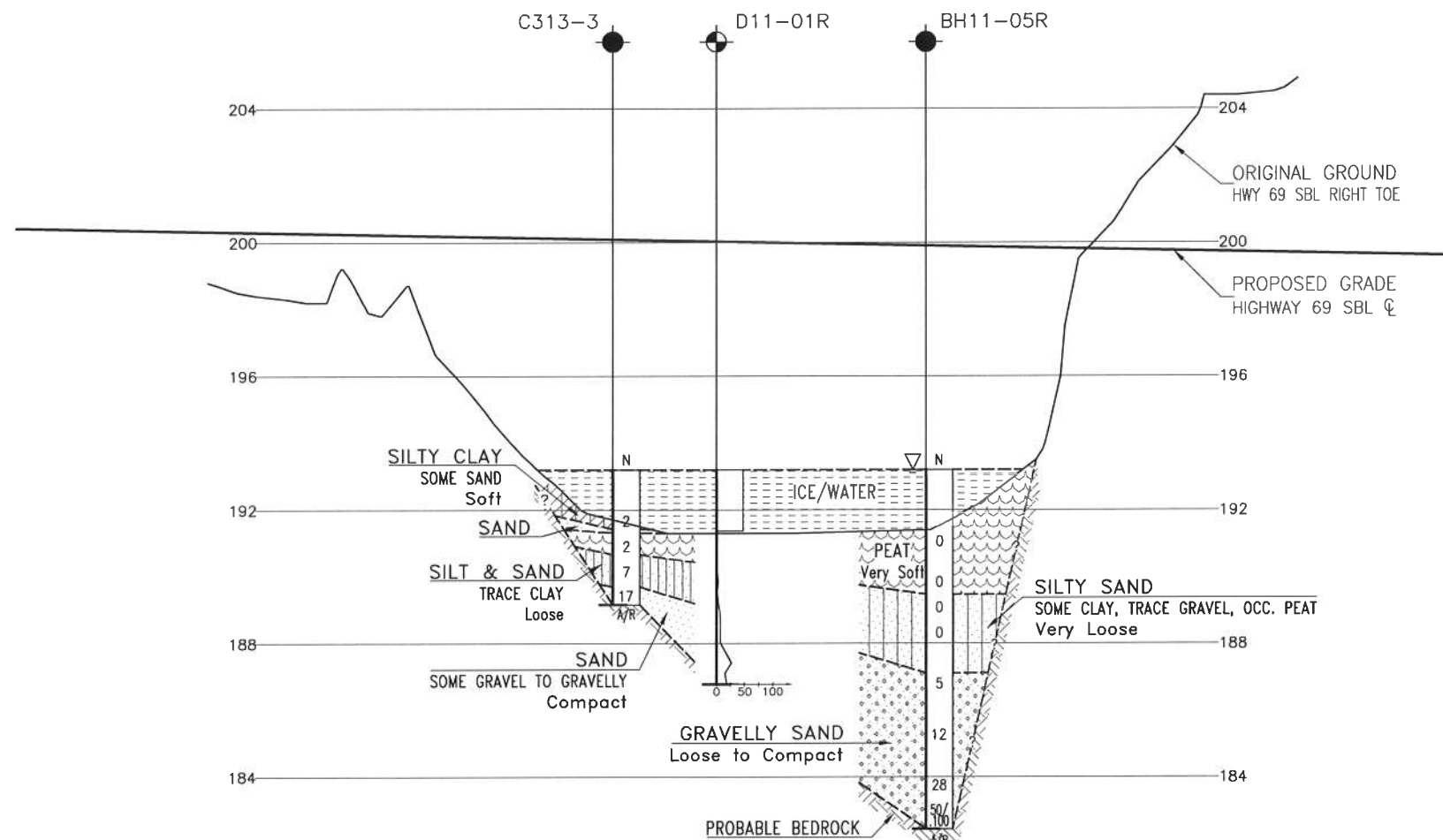
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PLAN



SCALE 1:800



PROFILE ALONG RIGHT TOE HIGHWAY 69 SBL



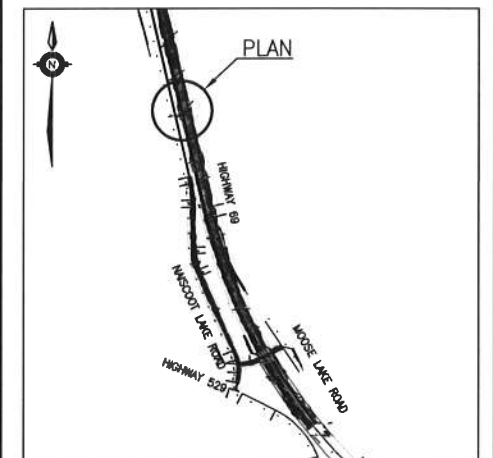
H 1:800

V 1:200

METRIC

DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWNCONT No
GWP No 5076-06-00HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 SBL-RT TOE
(STA 19+285 - 19+350)
BOREHOLE LOCATIONS AND SOIL STRATA

SHEET



KEYPLAN

LEGEND

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

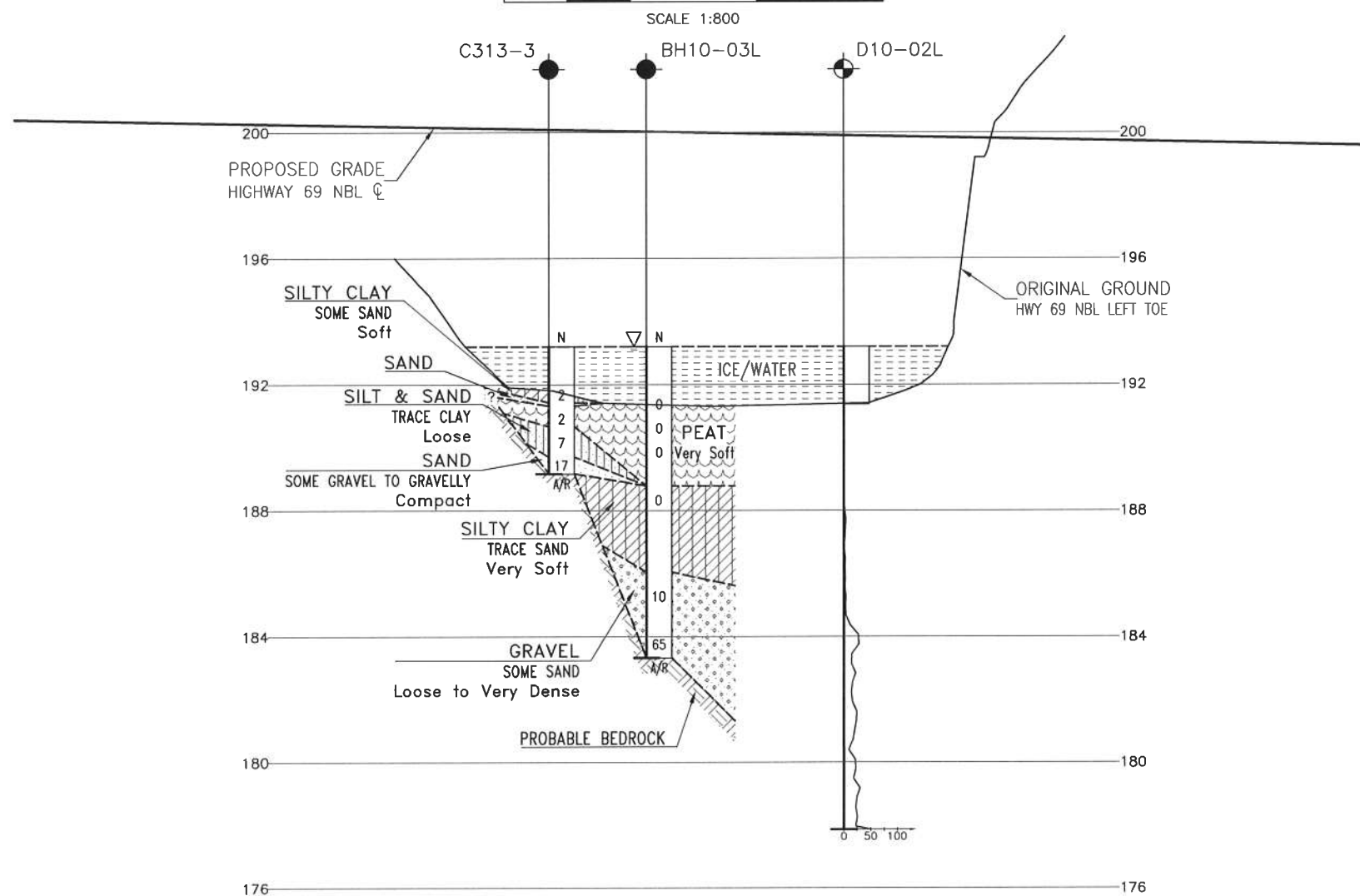
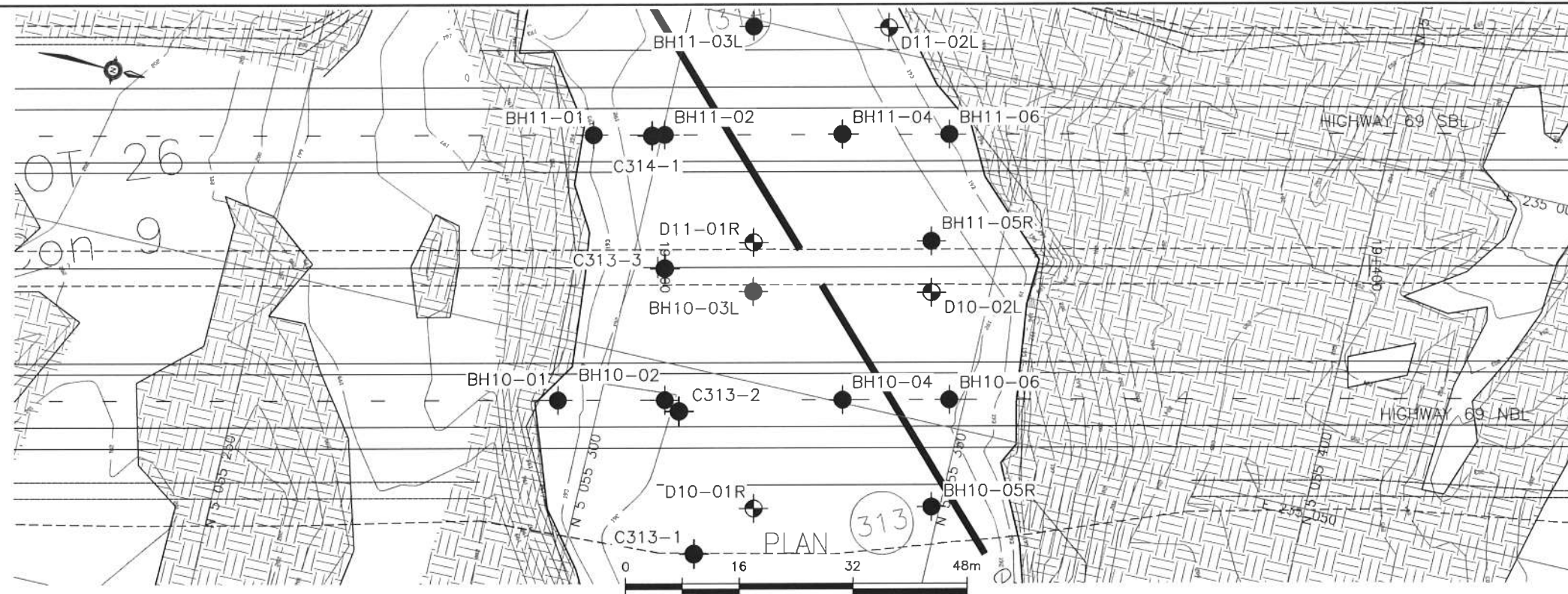
NO	ELEVATION	NORTHING	EASTING
BH11-01	193.2	5 055 290.7	235 020.9
BH11-02	193.2	5 055 300.4	235 018.7
BH11-03L	193.2	5 055 309.1	235 000.9
BH11-04	193.2	5 055 324.8	235 013.0
BH11-05R	193.2	5 055 340.4	235 024.9
BH11-06	193.2	5 055 339.4	235 009.6
D11-01R	193.2	5 055 316.1	235 030.8
D11-02L	193.2	5 055 327.7	234 996.8
C313-2	193.2	5 055 311.2	235 056.3
C313-3	193.2	5 055 304.7	235 037.1
C314-1	193.2	5 055 298.7	235 019.2
C314-2	193.2	5 055 291.4	234 998.4

-NOTES-

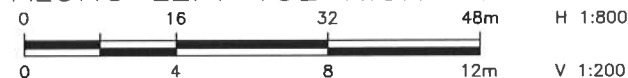
- The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCRES No. 41H-96

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012



PROFILE ALONG LEFT TOE HIGHWAY 69 NBL



METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

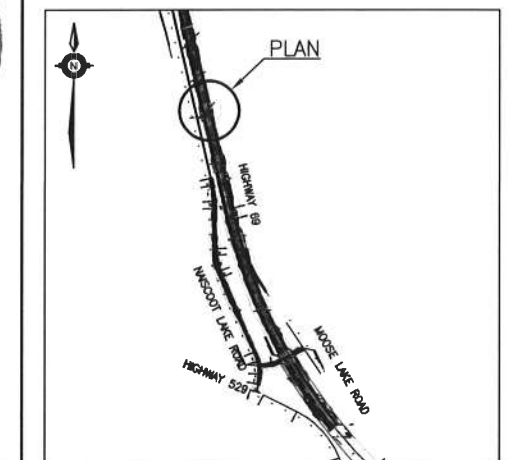


CONT No
GWP No 5076-06-00

HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 NBL-LT TOE
(STA 19+285 - 19+350)
BOREHOLE LOCATIONS AND SOIL STRATA



SHEET

KEYPLAN
LEGEND

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

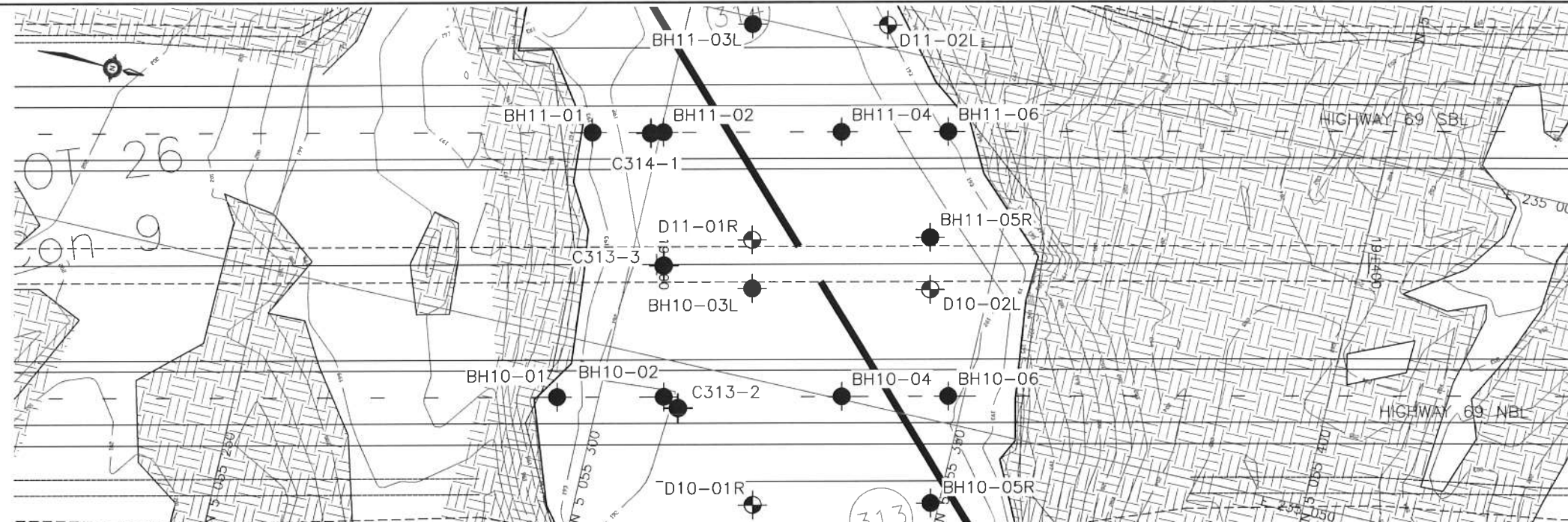
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BH10-02	193.2	5 055 308.9	235 055.2
BH10-03L	193.2	5 055 317.6	235 037.5
BH10-04	193.2	5 055 333.3	235 049.5
BH10-05R	193.2	5 055 348.8	235 061.4
BH10-06	193.2	5 055 347.9	235 046.2
D10-01R	193.2	5 055 324.5	235 067.3
D10-02L	193.2	5 055 342.0	235 032.0
C313-1	193.2	5 055 317.8	235 075.4
C313-2	193.2	5 055 311.2	235 056.3
C313-3	193.2	5 055 304.7	235 037.1

-NOTES-

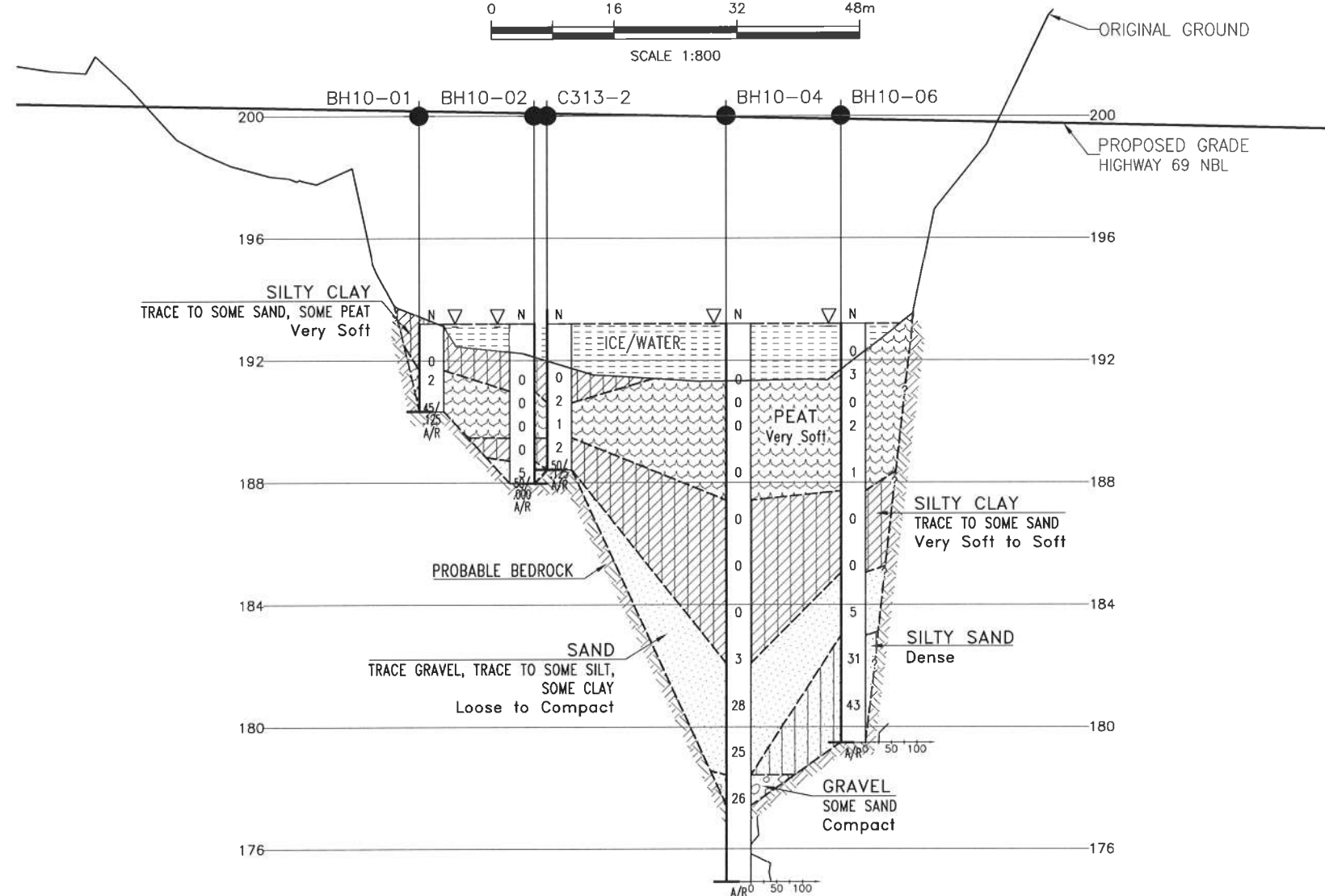
- 1) The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
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GEOCRES No. 41H-96

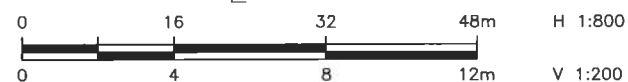
REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012



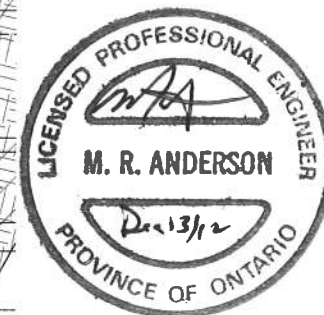
PLAN



PROFILE ALONG CL HIGHWAY 69 NBL



METRIC
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CONT No
GWP No 5076-06-00

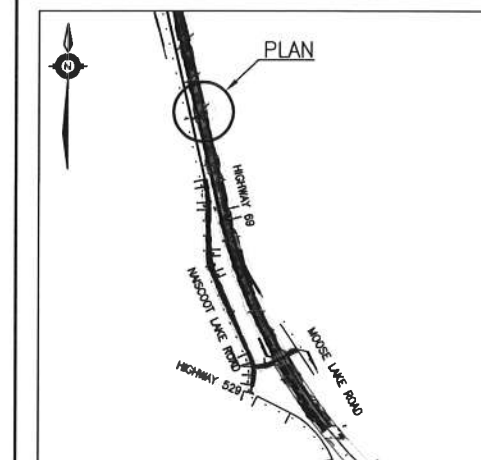
HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 NBL-CL
(STA 19+285 - 19+350)
BOREHOLE LOCATIONS AND SOIL STRATA



SHEET



THURBER ENGINEERING LTD.



KEYPLAN

LEGEND

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

NO	ELEVATION	NORTHING	EASTING
BH10-01	193.2	5 055 294.3	235 058.6
BH10-02	193.2	5 055 308.9	235 055.2
BH10-03L	193.2	5 055 317.6	235 037.5
BH10-04	193.2	5 055 333.3	235 049.5
BH10-05R	193.2	5 055 348.8	235 061.4
BH10-06	193.2	5 055 347.9	235 046.2
D10-01R	193.2	5 055 324.5	235 067.3
D10-02L	193.2	5 055 342.0	235 032.0
C313-2	193.2	5 055 311.2	235 056.3
C313-3	193.2	5 055 304.7	235 037.1
C314-1	193.2	5 055 298.7	235 019.2

-NOTES-

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GEOCRES No. 41H-96

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012

A circular professional engineer seal for the Province of Ontario. The outer ring contains the text "LICENSED PROFESSIONAL ENGINEER" at the top and "PROVINCE OF ONTARIO" at the bottom. Inside the ring, the name "M. R. ANDERSON" is printed in the center. Above the name is a stylized signature. Below the name is a date stamp that reads "Dec 13/12".

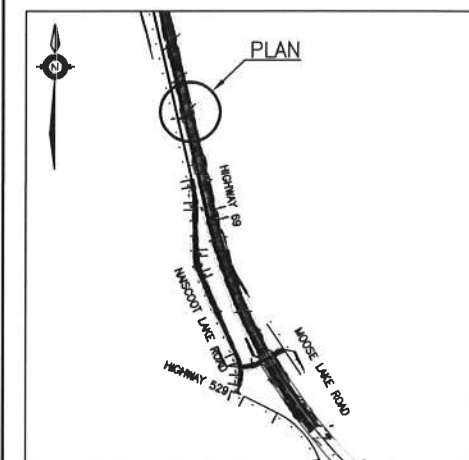
LICENSED PROFESSIONAL ENGINEER
 P.K. CHATTERJI
 12345
 PROVINCE OF ONTARIO
 Dec 13/14








SHEET



THURBER ENGINEERING LTD



KEYPLAN
LEGEND

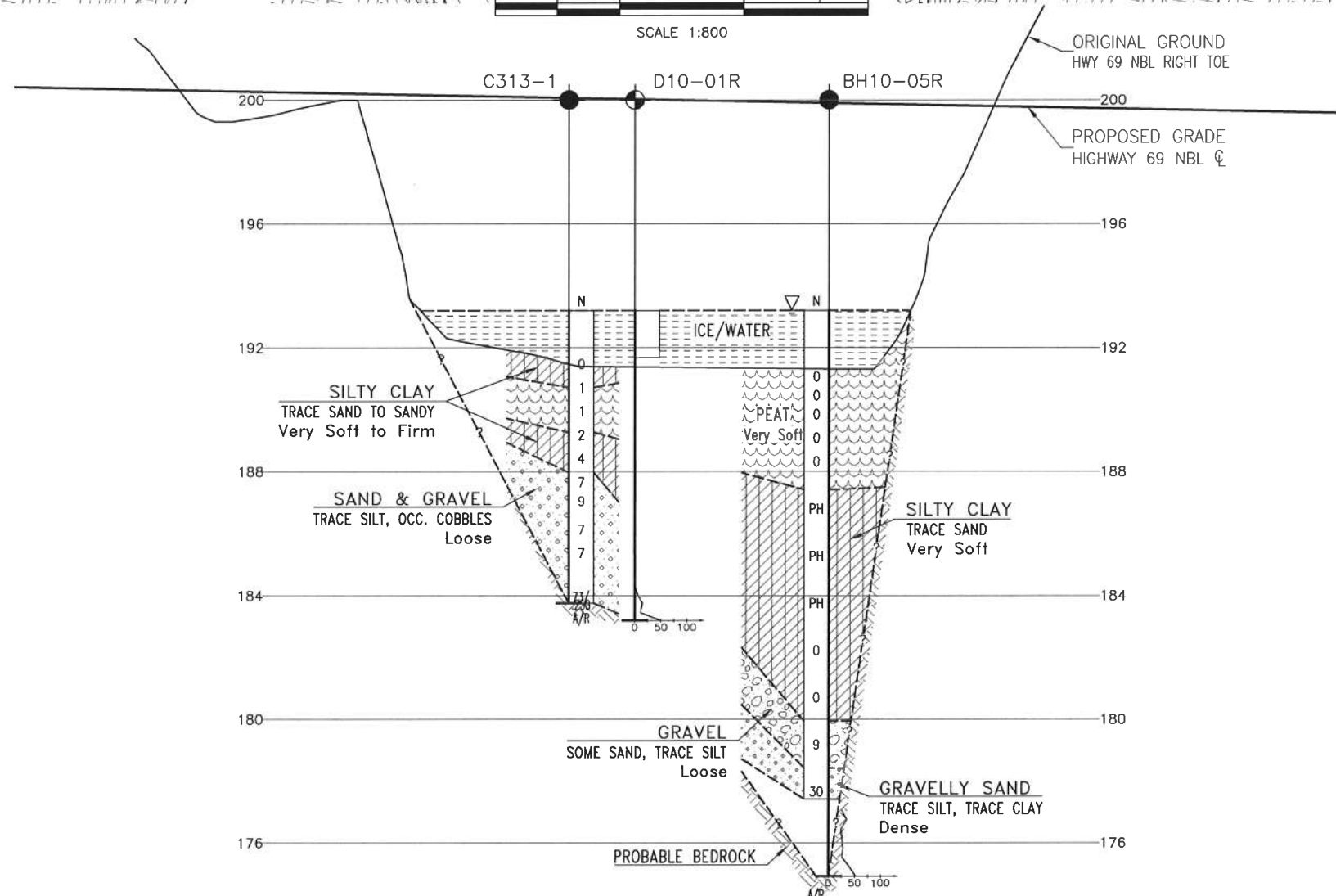
	Borehole
	Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60° Cone, 475J/blow)
PH	Pressure, Hydraulic
	Water Level
	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
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BH10-02	193.2	5 055 308.9	235 055.
BH10-03L	193.2	5 055 317.6	235 037.
BH10-04	193.2	5 055 333.3	235 049.
BH10-05R	193.2	5 055 348.8	235 061.
BH10-06	193.2	5 055 347.9	235 046.
D10-01R	193.2	5 055 324.5	235 067.
D10-02L	193.2	5 055 342.0	235 032.
C313-1	193.2	5 055 317.8	235 075.
C313-2	193.2	5 055 311.2	235 056.
C313-3	193.2	5 055 304.7	235 037.

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GEOCRES No. 41H-96



PROFILE ALONG RIGHT TOE HIGHWAY 69 NBL

[illegible]

Appendix I

**Hwy 69 SBL
Sta. 19+455 to 19+555 Township of Harrison**

**Boreholes 12-01 to 12-09
DCPTs D12-01R to D12-04L**


**Record of Borehole Sheets
Laboratory Test Results
Borehole Locations and Soil Strata Drawings**

METRIC

[illegible]

+³, ×³: Numbers refer to Sensitivity

METRIC

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
199.2	Ground Surface								SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100					W _P W W _L WATER CONTENT (%) 20 40 60		GR SA SI C

[illegible]

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No BH12-03

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+476 C/L, SBL ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
DATUM Geodetic DATE 2009.02.11 - 2009.02.11 CHECKED BY RPR

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 (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		WATER CONTENT (%)				
198.4	Pond Surface							20 40 60 80 100						
0.0 0.1	ICE: (50mm)		1	SS	1		198							
	PEAT, fibrous Very Soft to Firm Brown Moist Layer of sand mixed with peat (600mm)		2	SS	6		197							
			3	SS	2									
196.2														
2.2	Silly SAND, some clay, occasional organics Very Loose Grey Wet		4	SS	2		196							
195.7														
2.7	END OF BOREHOLE AT 2.7m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.													

RECORD OF BOREHOLE No BH12-04R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+488.5 O/S 6.3R, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
 DATUM Geodetic DATE 2009.02.11 - 2009.02.11 CHECKED BY RPR

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 (%)
198.4	Pond Surface							20	40	60	80	100				
0.0	ICE and WATER															
197.8							198									
0.6	Silly CLAY, trace sand Soft Grey		1	SS	3	▽										0 4 30 66
197.0																
1.4	Silty SAND, some gravel Loose Grey Wet		2	SS	6		197									
196.2																
2.2	END OF BOREHOLE AT 2.2m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.															

+³, ×³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH12-05

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+496 C/L, SBL ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
DATUM Geodetic DATE 2009.02.11 - 2009.02.11 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100	PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	
198.4	Pond Surface												
0.0	ICE and WATER		1	SS			198						
			2	SS									
197.0							197						
1.4	Silly CLAY, trace sand Very Soft Grey												
196.2													
2.2	Gravelly SAND, trace clay, occasional roots												
195.9	Grey												
2.5	Wet												
	END OF BOREHOLE AT 2.5m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.												

+³, ×³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH12-06L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+513.5 O/S 7.5L, SBL ORIGINATED BY WB
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
DATUM Geodetic DATE 2009.02.11 - 2009.02.11 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100		
198.4	Pond Surface													
0.0	ICE and WATER													
197.0														
1.4	Sandy SILT, trace gravel Loose Grey Wet		1	SS	7									
196.2														
2.2	Silty CLAY, trace sand Very Soft Grey		2	SS	1									
			3	TW	PH									
193.9														
4.5	END OF BOREHOLE AT 4.5m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS UPON COMPLETION.													

+³, X³: Numbers refer to
Sensitivity

20
15 10 5
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH12-07

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+526 C/L, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
 DATUM Geodetic DATE 2009.02.11 - 2009.02.11 CHECKED BY RPR

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			SHEAR STRENGTH kPa		WATER CONTENT (%)			
198.4	Pond Surface							20 40 60 80 100	○ UNCONFINED + FIELD VANE	W _P W W _L			
0.0	ICE and WATER							20 40 60 80 100	● QUICK TRIAXIAL × LAB VANE				
			1	SS									
197.0													
1.4	Silty CLAY , trace sand, occasional peaty organics Very Soft Grey		2	SS	0								
			3	SS	0								
194.6													
3.8	END OF BOREHOLE AT 3.8m UPON AUGER REFUSAL ON PROBABLE BEDROCK. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Apr 21/09 Ground Surface Jun 04/09 0.05 196.9 Aug 17/09 Ground Surface Aug 25/09 Ground Surface Oct 27/09 Ground Surface Nov 20/09 Ground Surface												

+³, ×³: Numbers refer to Sensitivity
 20
 15-10
 10 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH12-08R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+546.5 O/S 6.5R, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
 DATUM Geodetic DATE 2009.02.11 - 2009.02.11 CHECKED BY RPR

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 (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100	W _p W W _L				
198.4	Pond Surface													
0.0	ICE and WATER: (500mm)													
197.9														
199.5	PEAT: (100mm)		1	SS	50/		198							
0.6	END OF BOREHOLE AT 0.6m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.				.000									

RECORD OF BOREHOLE No BH12-09

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+546 C/L, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
 DATUM Geodetic DATE 2009.02.11 - 2009.02.11 CHECKED BY RPR

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 (%)					
198.4	Pond Surface													
0.0	ICE and WATER: (300mm)													
198.1														
0.3	PEAT: (200mm)		1	SS	50/									
197.9														
0.5	END OF BOREHOLE AT 0.5m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.				.000									

METRIC

[illegible]

RECORD OF BOREHOLE No D12-02L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+488.5 O/S 6.3L, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY LG
 DATUM Geodetic DATE 2009.02.12 - 2009.02.12 CHECKED BY RPR

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 (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	SHEAR STRENGTH kPa			WATER CONTENT (%)					
197.0	Ground Surface													
0.0	DCPT from surface.													

RECORD OF BOREHOLE No D12-03R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+513.5 O/S 7.5R, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY LG
 DATUM Geodetic DATE 2009.02.12 - 2009.02.12 CHECKED BY RPR

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 (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	SHEAR STRENGTH kPa			WATER CONTENT (%)							
197.1	Ground Surface								20 40 60 80 100	○ UNCONFINED + FIELD VANE	20 40 60	w _p w w _L				
0.0	DCPT from surface.								20 40 60 80 100	● QUICK TRIAXIAL × LAB VANE						
							197									
							196									
							195									
							194									
							193									
192.1																
5.0	END OF DCPT AT 5.0m UPON REFUSAL ON PROBABLE BEDROCK.															

RECORD OF BOREHOLE No D12-04L

1 OF 1

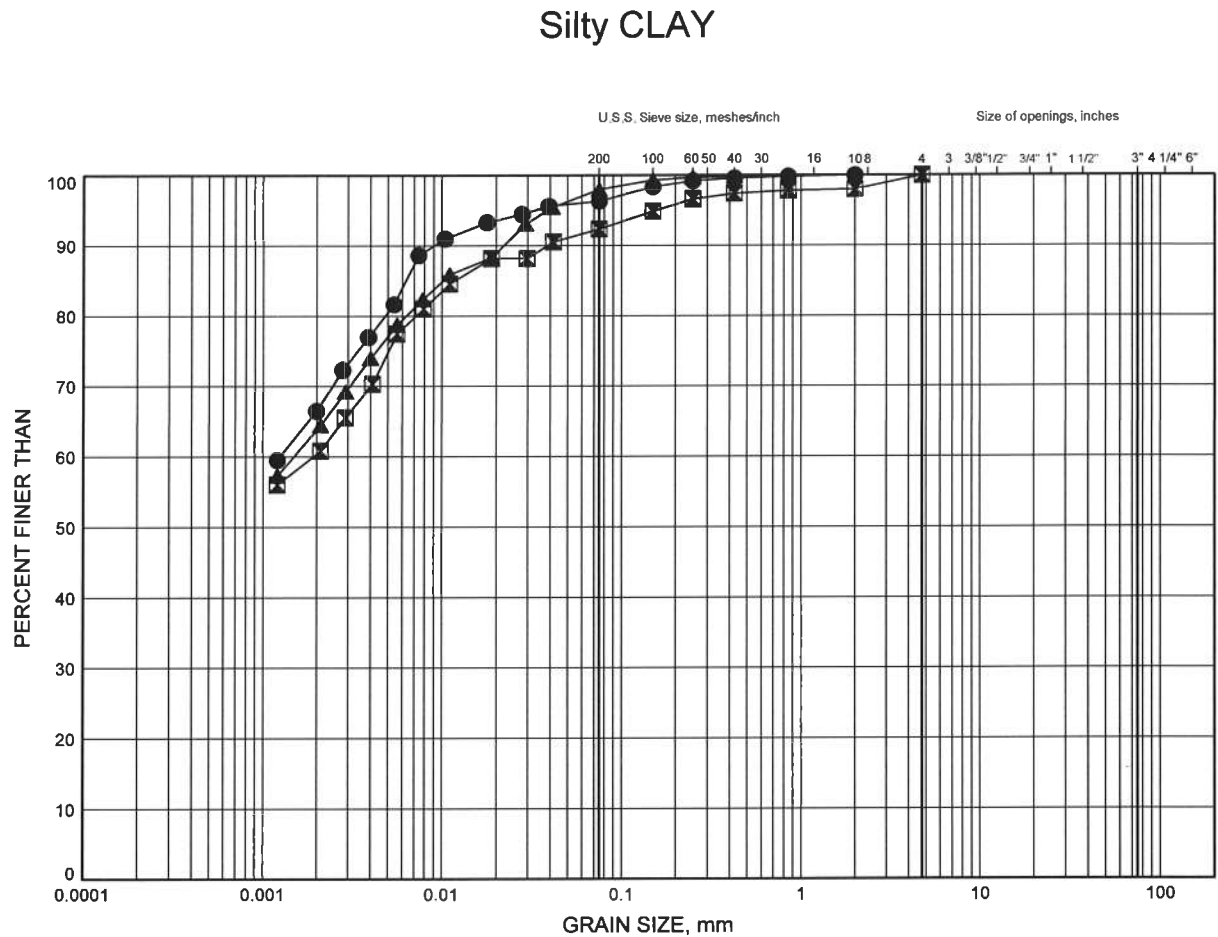
METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+538.5 O/S 6.5L, SBL ORIGINATED BY WB
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY LG
 DATUM Geodetic DATE 2009.02.12 - 2009.02.12 CHECKED BY RPR

SOIL PROFILE				SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			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							
197.2	Ground Surface												
0.0	DCPT from surface.												
										</			

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE 11



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH12-04R	1.07	197.33
■	BH12-06L	2.59	195.81
▲	BH12-07	1.83	196.57

Date December 2012

GWP# 5076-06-00



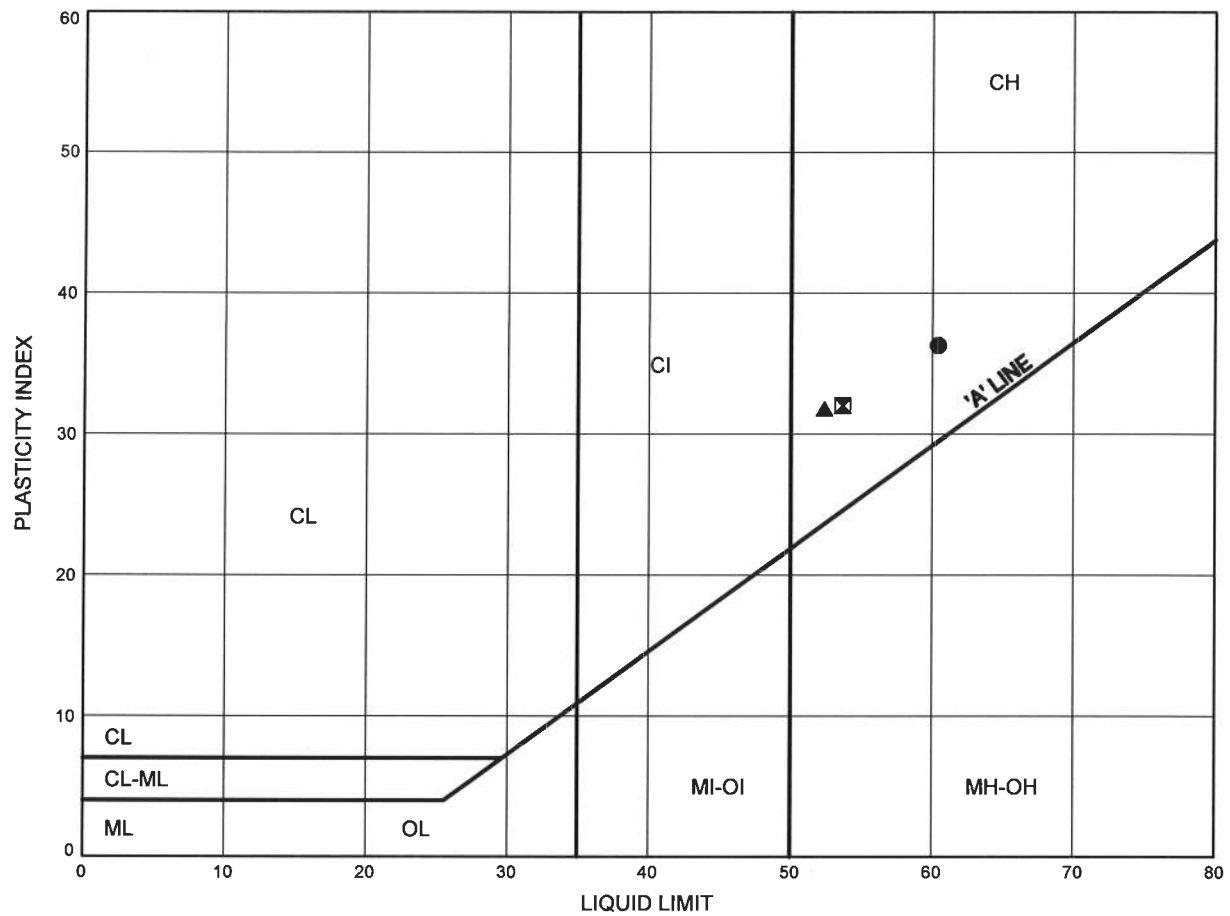
Prep'd MFA

Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529
ATTERBERG LIMITS TEST RESULTS

FIGURE 12

Silty CLAY



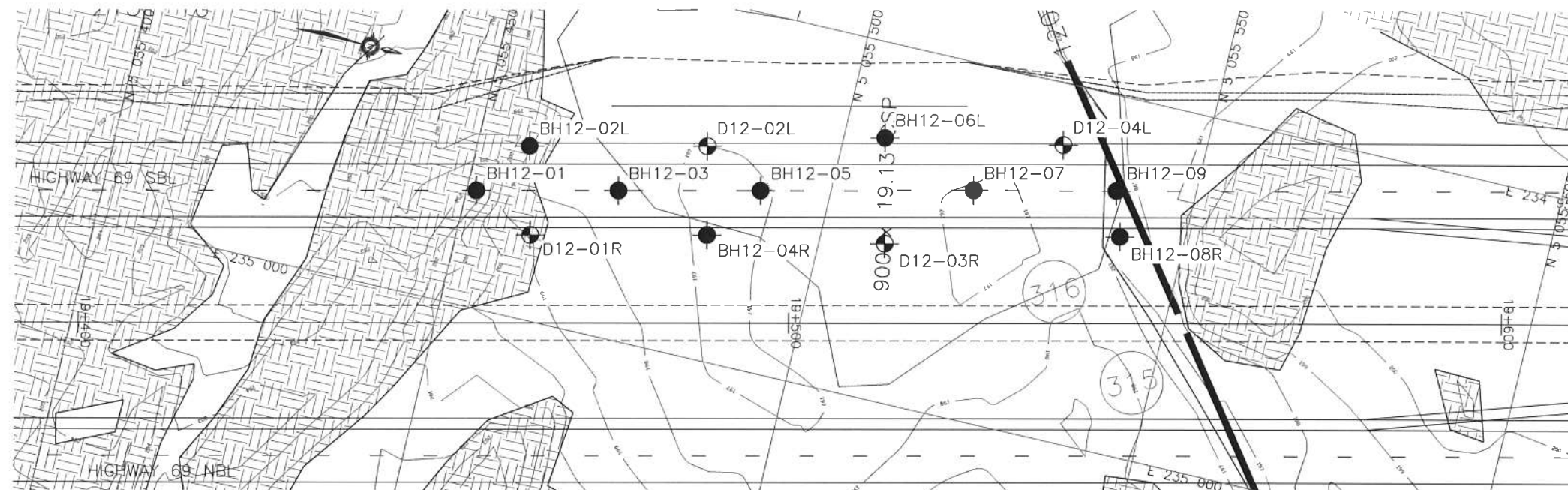
LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH12-04R	1.07	197.33
⊠	BH12-06L	2.59	195.81
▲	BH12-07	1.83	196.57

Date December 2012
 GWP# 5076-06-00



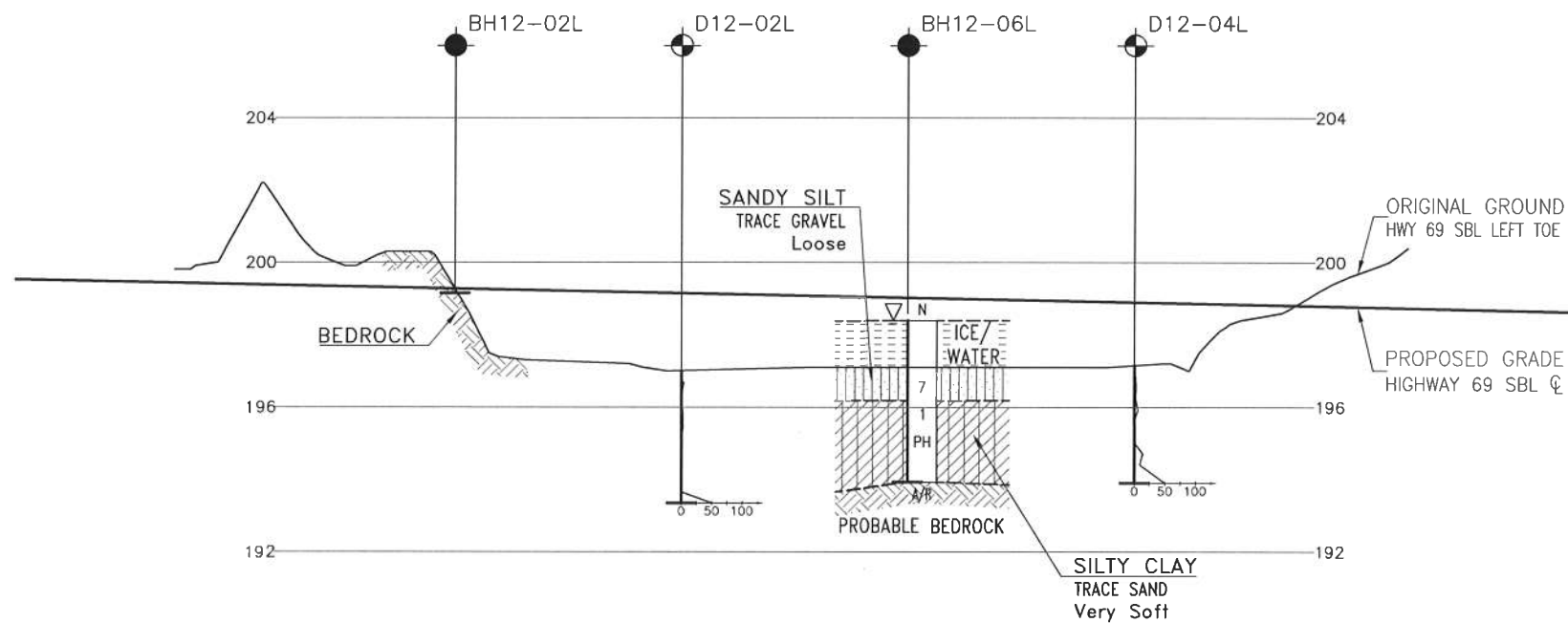
Prep'd MFA
 Chkd. MRA



PLAN



SCALE 1:800



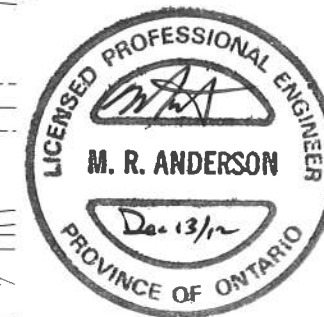
PROFILE ALONG LEFT TOE HIGHWAY 69 SBL



H 1:800

V 1:200

METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

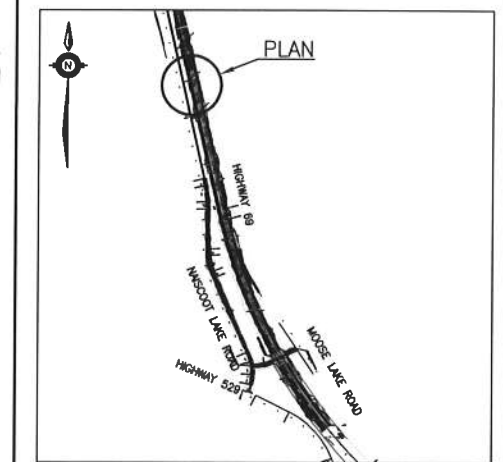


CONT No
GWP No 5076-06-00

HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 SBL-LT TOE
(STA 19+455 - 19+555)
BOREHOLE LOCATIONS AND SOIL STRATA

MMM GROUP

THURBER ENGINEERING LTD.



KEYPLAN

LEGEND

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

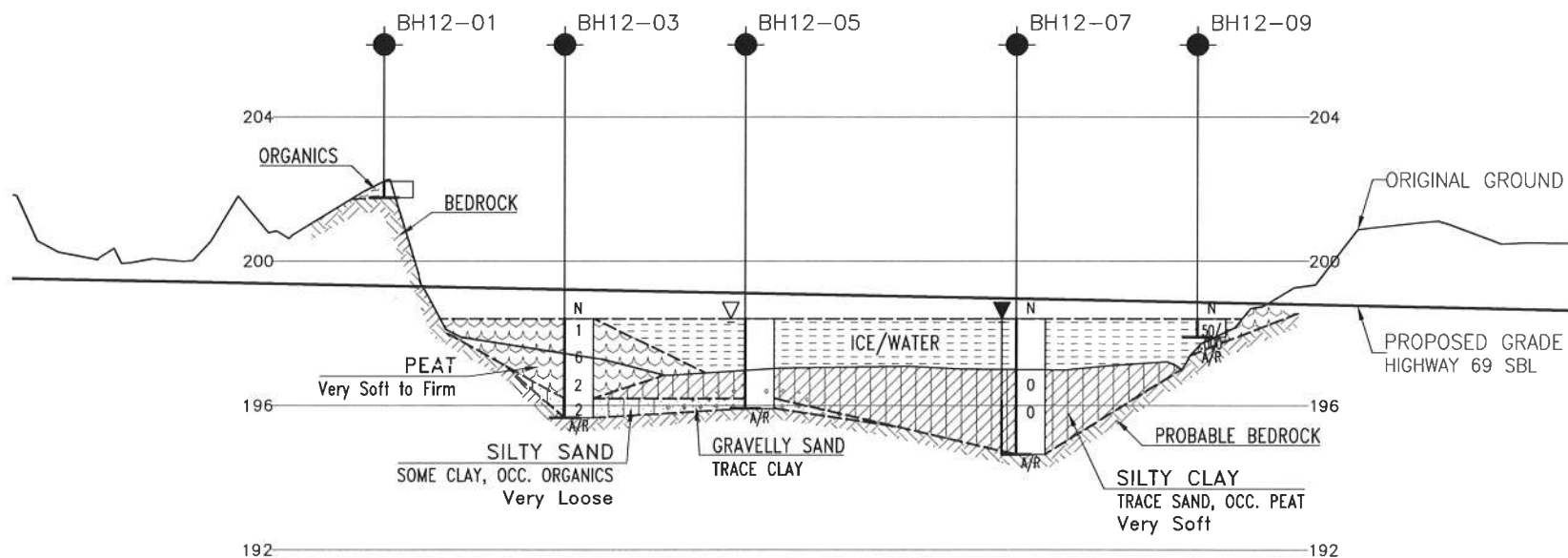
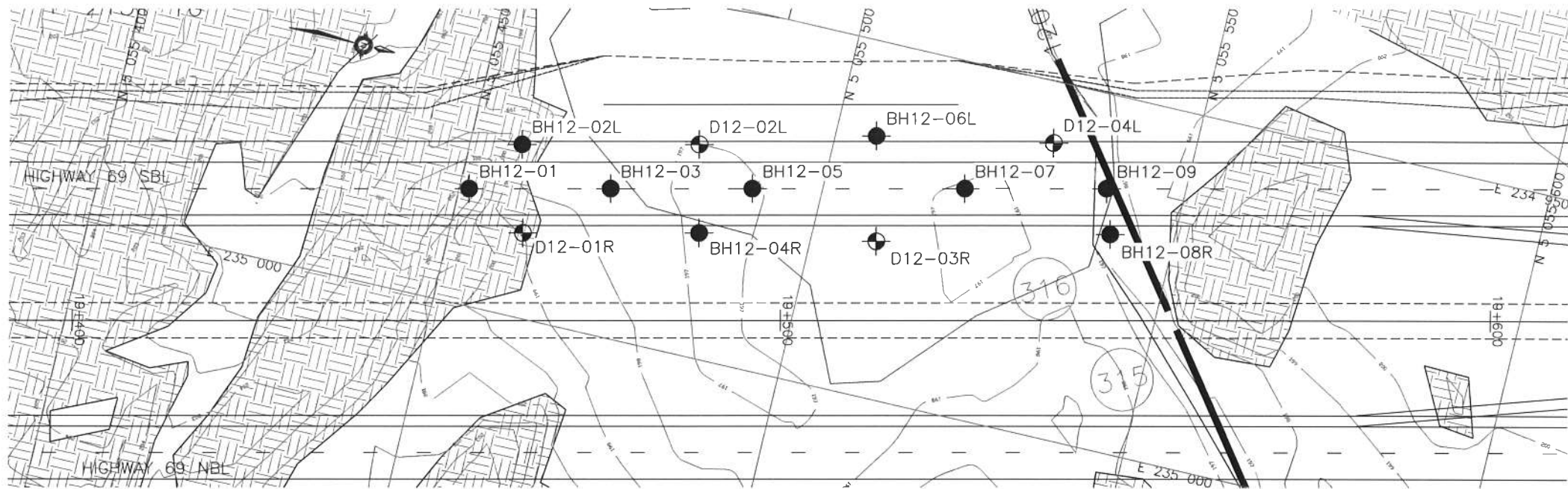
NO	ELEVATION	NORTHING	EASTING
BH12-01	202.2	5 055 451.4	234 983.6
BH12-02L	199.2	5 055 457.3	234 975.8
BH12-03	198.4	5 055 470.9	234 979.1
BH12-04R	198.4	5 055 484.5	234 982.4
BH12-05	198.4	5 055 490.4	234 974.6
BH12-06L	198.4	5 055 505.7	234 963.3
BH12-07	198.4	5 055 519.6	234 967.8
BH12-08R	198.4	5 055 541.0	234 969.5
BH12-09	198.4	5 055 539.1	234 963.2
D12-01R	199.0	5 055 460.2	234 988.0
D12-02L	197.0	5 055 481.6	234 970.1
D12-03R	197.1	5 055 509.1	234 977.9
D12-04L	197.2	5 055 530.3	234 958.6

NOTES-

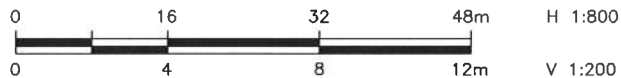
- The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCREs No. 41H-96

DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG
DRAWN	MFA	CHK PKC
DATE	DEC. 2012	



PROFILE ALONG CL HIGHWAY 69 SBL

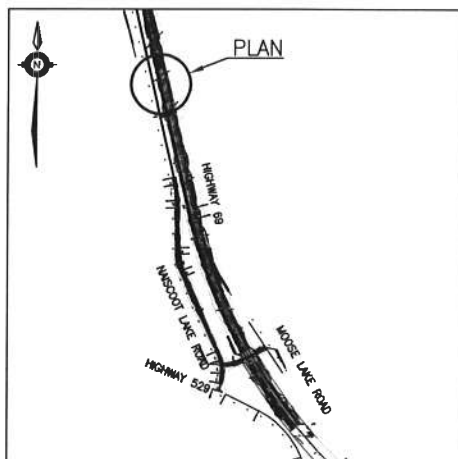


METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



CONT No
GWP No 5076-06-00

HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 SBL-CL
(STA 19+455 - 19+555)
BOREHOLE LOCATIONS AND SOIL STRATA



KEYPLAN

LEGEND

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

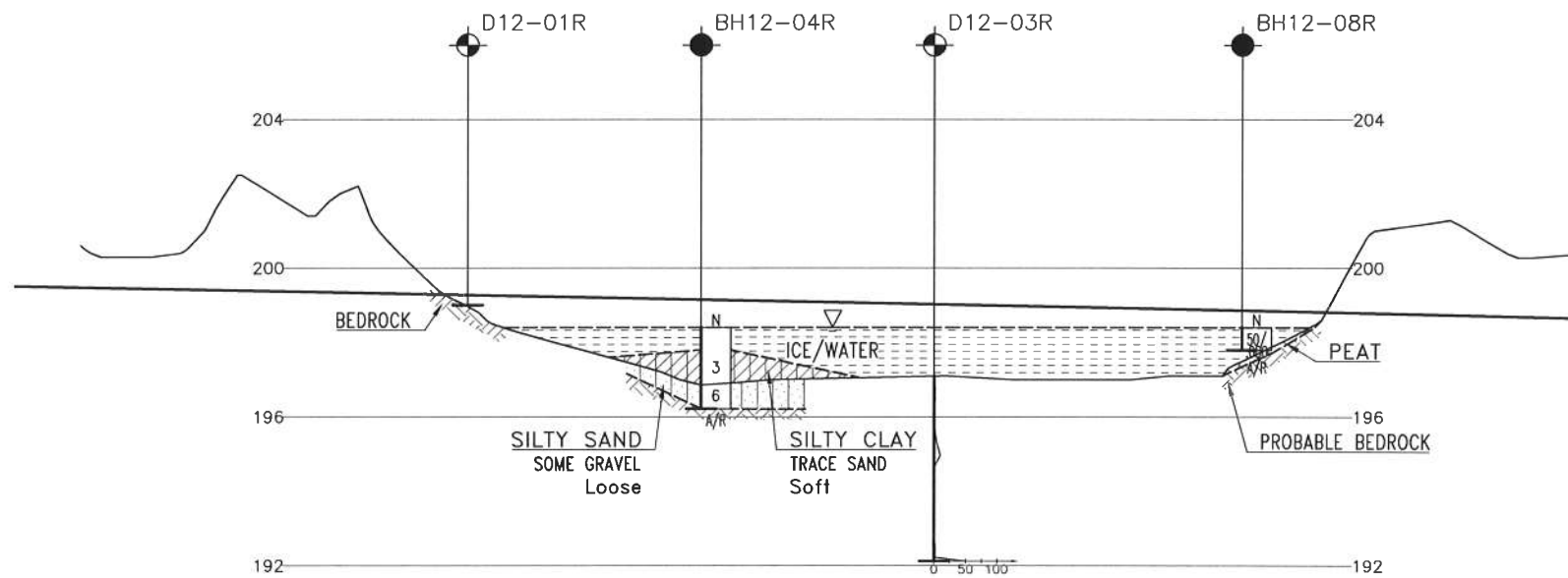
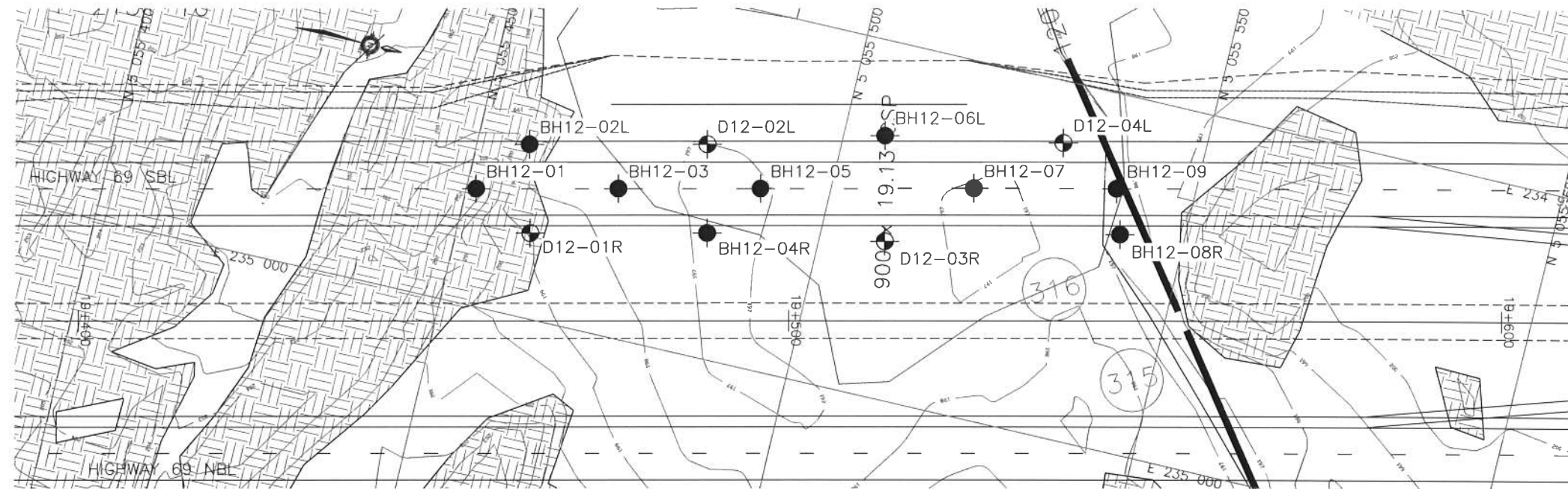
NO	ELEVATION	NORTHING	EASTING
BH12-01	202.2	5 055 451.4	234 983.6
BH12-02L	199.2	5 055 457.3	234 975.8
BH12-03	198.4	5 055 470.9	234 979.1
BH12-04R	198.4	5 055 484.5	234 982.4
BH12-05	198.4	5 055 490.4	234 974.6
BH12-06L	198.4	5 055 505.7	234 963.3
BH12-07	198.4	5 055 519.6	234 967.8
BH12-08R	198.4	5 055 541.0	234 969.5
BH12-09	198.4	5 055 539.1	234 963.2
D12-01R	199.0	5 055 460.2	234 988.0
D12-02L	197.0	5 055 481.6	234 970.1
D12-03R	197.1	5 055 509.1	234 977.9
D12-04L	197.2	5 055 530.3	234 958.6

-NOTES-

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

GEOCRES No. 41H-96

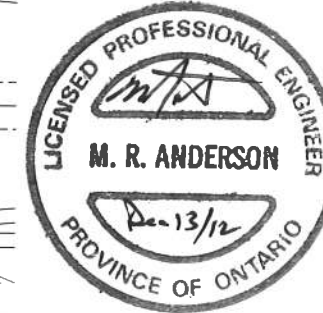
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DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012



PROFILE ALONG RIGHT TOE HIGHWAY 69 SBL

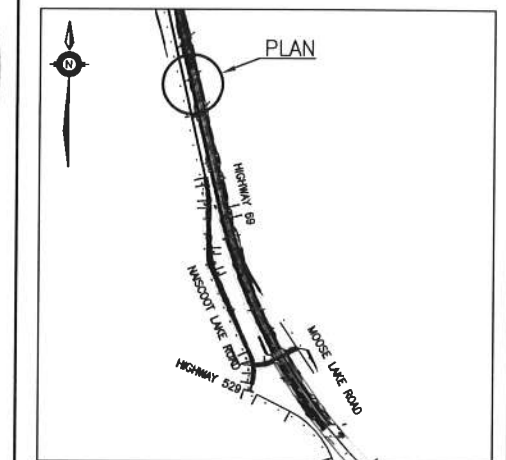


METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



CONT No
GWP No 5076-06-00

HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 SBL-RT TOE
(STA 19+455 - 19+555)
BOREHOLE LOCATIONS AND SOIL STRATA



KEYPLAN

LEGEND

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

NO	ELEVATION	NORTHING	EASTING
BH12-01	202.2	5 055 451.4	234 983.6
BH12-02L	199.2	5 055 457.3	234 975.8
BH12-03	198.4	5 055 470.9	234 979.1
BH12-04R	198.4	5 055 484.5	234 982.4
BH12-05	198.4	5 055 490.4	234 974.6
BH12-06L	198.4	5 055 505.7	234 963.3
BH12-07	198.4	5 055 519.6	234 967.8
BH12-08R	198.4	5 055 541.0	234 969.5
BH12-09	198.4	5 055 539.1	234 963.2
D12-01R	199.0	5 055 460.2	234 988.0
D12-02L	197.0	5 055 481.6	234 970.1
D12-03R	197.1	5 055 509.1	234 977.9
D12-04L	197.2	5 055 530.3	234 958.6

NOTES

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

GEOCRES No. 41H-96

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012

Appendix J

**Hwy 69 NBL & SBL
Sta. 19+680 to 19+870 Township of Harrison**

**Boreholes 13-01 to 13-15R, 14-01 to 14-14R, C317-1, C317-2, C318-1
DCPTs D13-01R to D13-07L, D14-01R to D14-07L**





**Record of Borehole Sheets
Laboratory Test Results
Borehole Locations and Soil Strata Drawings**

RECORD OF BOREHOLE No BH13-01

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+756 C/L, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
 DATUM Geodetic DATE 2009.02.11 - 2009.02.11 CHECKED BY RPR

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			SHEAR STRENGTH kPa		WATER CONTENT (%)				
192.8	Ground Surface							20 40 60 80 100		20 40 60			GR SA SI CL	
0.0	PEAT, fibrous Very Soft Dark Brown Wet (800mm)		1	SS	0			○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE						
192.0							192							
0.8	Silty SAND, some clay, trace gravel Loose Brown Moist		2	SS	7									
191.3														
1.5	Silty CLAY, trace sand Soft to Firm Grey		3	SS	7		191						0 7 46 47	
			4	SS	4								0 2 37 61	
189.8							190							
3.0	SAND and GRAVEL, trace silt Loose Brown Moist to Wet		5	SS	8		189							
188.4														
4.4	END OF BOREHOLE AT 4.4m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT SURFACE UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS UPON COMPLETION.													

+³, X³: Numbers refer to
Sensitivity 20
15 10 5 0 (%) STRAIN AT FAILURE

METRIC

[illegible]




+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No BH13-03

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+776 C/L, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
 DATUM Geodetic DATE 2009.02.10 - 2009.02.10 CHECKED BY RPR

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			SHEAR STRENGTH kPa		W _P W W _L			
193.0	Ground Surface							20 40 60 80 100					
0.0	PEAT, fibrous Very Soft Dark Brown Wet (800mm)		1	SS	0		193					205	0 17 39 44
192.2													
0.8	Silly SAND, trace to some clay Loose Brown Moist		2	SS	7		192						
191.5													
1.5	Silty CLAY, some sand Firm to Very Soft Grey		3	SS	7		191						
			4	SS	2								
							190						
189.2								14 +					
3.8	END OF BOREHOLE AT 3.8m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT SURFACE UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS UPON COMPLETION.												

+³, ×³: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH13-04R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+788.5 O/S 12.8R, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
 DATUM Geodetic DATE 2009.02.10 - 2009.02.10 CHECKED BY RPR

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 x LAB VANE									
193.8	Ground Surface																
0.0	PEAT , fibrous Very Soft Dark Brown		1	SS	1												
0.5	Wet (500mm)																
193.3																	
193.0																	
0.8	Silty SAND , trace gravel Very Loose Brown		2	SS	55		193										
192.7	Wet																
1.1	SAND , trace to some silt Brown Moist to Wet																
	END OF BOREHOLE AT 1.1m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 0.6m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.																

+³, ×³: Numbers refer to Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH13-05

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+801 C/L NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
 DATUM Geodetic DATE 2009.02.12 - 2009.02.12 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				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					
192.4	Ground Surface												
0.0	PEAT , fibrous, trace to some sand Very Soft Dark Brown Wet (800mm)		1	SS	0		192						
191.6													
0.8	Silty CLAY , some sand to sandy Very Soft to Firm Grey		2	SS	7		191						0 25 38 37
			3	SS	5								
			4	SS	2		190						0 11 47 42
189.4													
3.0	Silty SAND , some gravel, trace clay Loose Brown Wet		5	SS	8		189						
188.5													
3.9	END OF BOREHOLE AT 3.9m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT SURFACE UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS UPON COMPLETION.												

RECORD OF BOREHOLE No BH13-06L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+813.5 O/S 12.6L, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
 DATUM Geodetic DATE 2009.02.12 - 2009.02.12 CHECKED BY RPR

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			SHEAR STRENGTH kPa		WATER CONTENT (%)			
192.0	Ground Surface							20 40 60 80 100	20 40 60				GR SA SI CL
0.0	PEAT, fibrous Very Soft Dark Brown Moist (600mm)		1	SS	0		192						
191.4													
0.6	Silty CLAY, trace to some sand Soft Grey		2	SS	4		191						
			3	SS	4		190						0 9 44 47
			4	SS	4								
188.4			5	SS	2		189						0 3 38 59
3.6	Silty SAND, trace to some clay Brown to Grey Moist												
187.7							188						
4.3	END OF BOREHOLE AT 4.3m UPON AUGER REFUSAL ON PROBABLE BEDROCK. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Apr 21/09 Ground Surface Jun 04/09 Ground Surface Aug 17/09 Ground Surface Aug 25/09 Ground Surface Oct 27/09 Ground Surface Nov 20/09 Ground Surface												

RECORD OF BOREHOLE No BH13-07

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+826 C/L, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
 DATUM Geodetic DATE 2009.02.12 - 2009.02.12 CHECKED BY RPR

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								
192.7	Ground Surface							20	40	60	80	100				
0.0 0.1	PEAT: (100mm) Dark Brown Moist		1	SS	2		192									0 6 40 54
	Silty CLAY, trace sand Soft to Stiff Grey		2	SS	11											
191.2																
1.5 190.9	Silty SAND, some clay, trace gravel Grey to Brown		3	SS	53		191									
1.8	Moist															
	END OF BOREHOLE AT 1.8m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 0.5m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.															

+³, X³: Numbers refer to Sensitivity 20 15 10 5 0 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH13-08R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+836 O/S 12.4R, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
 DATUM Geodetic DATE 2009 02.12 - 2009 02.12 CHECKED BY RPR

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			WATER CONTENT (%)					
192.8	Ground Surface							20	40	60	80	100				
0.0	<div>PEAT, fibrous Very Soft Dark Brown Wet (200mm)</div> <div>Silty SAND, trace gravel Loose to Compact Brown Moist</div>		1	SS	1	▽	192									
0.2																
			2	SS	14											1 53 34 12
191.3																
1.5	END OF BOREHOLE AT 1.5m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 0.5m UPON COMPLETION OF DRILLING BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.															

+³ . X³ : Numbers refer to
Sensitivity



20
15 10 5
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH13-09

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+846 C/L, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2009.02.12 - 2009.02.12 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			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 X LAB VANE					WATER CONTENT (%) PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT w _p w w _L						
193.0	Ground Surface		1	SS	6		193												
0.0	TOPSOIL: (200mm) Dark Brown Moist						192												
0.2	Silty SAND, trace gravel, trace to some clay Loose to Compact Brown Moist		2	SS	24														
	Cobble (125mm diameter)		3	SS	9			191											
			4	SS	30														
			5	SS	75		190												
189.7																			
3.3	END OF BOREHOLE AT 3.3m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 1.2m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS UPON COMPLETION.																		

+³ . X³ : Numbers refer to
Sensitivity

20
15 10 5
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH13-10

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+681 C/L, NBL ORIGINATED BY SLL
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
DATUM Geodetic DATE 2011.02.11 - 2011.02.11 CHECKED BY RPR

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			SHEAR STRENGTH kPa		WATER CONTENT (%)				
194.0	Ground Surface							20 40 60 80 100		w _p	w	w _L		GR SA SI CL
0.0	PEAT, fibrous: (150mm)						194							
0.2	SAND, some silt, some gravel, trace clay Compact Brown Moist													
			1	SS	28		193							16 64 16 4
192.6														
1.4	END OF BOREHOLE AT 1.4m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.													

RECORD OF BOREHOLE No BH13-11R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+693.5 O/S 13.0R, NBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2011.02.10 - 2011.02.10 CHECKED BY RPR

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	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20	40	60	80	100					
194.5	Ground Surface																
0.0	PEAT, fibrous: (100mm)																
0.1	SAND, trace gravel Very Dense Brown Moist						194										
193.6			1	SS	50/												
0.9	END OF BOREHOLE AT 0.8m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.				0.125												

RECORD OF BOREHOLE No BH13-12



1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+706 C/L, NBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2011.02.10 - 2011.02.10 CHECKED BY RPR

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							
193.2	Ground Surface														
0.0	PEAT, fibrous: (175mm)														
0.2	Silty CLAY, trace sand Stiff Brown		1	SS	8										
191.4			2	SS	50/										
1.8	END OF BOREHOLE AT 1.8m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.				0.150										

METRIC

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT MOISTURE CONTENT			UNIT WEIGHT	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV. DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	20 40 60 80 100	W _P W W _L	WATER CONTENT (%)	20 40 60		
192.9	Ground Surface												
							SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE						
							20 40 60 80 100						

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL MOISTURE LIQUID CONTENT LIMIT		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	W _p	W	W _L		
192.9	Ground Surface												
0.0	PEAT, fibrous: (300mm)												
192.6	Black												
0.3	Wet												
	Silty CLAY , trace sand, wood fragments Very Soft to Soft Brown		1	SS	2								
			2	SS	0								
			3	SS	4								
			4	SS	0								
	trace gravel, occasional cobbles		5	SS	100/								
188.3													
4.6	END OF BOREHOLE AT 4.6m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 2.2m UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Feb 22/11 0.2 192.7 Mar 01/11 0.2 192.7 Mar 13/11 Ground Surface Apr 27/11 0.2 192.7				0.050								

+³, ×³: Numbers refer to Sensitivity

RECORD OF BOREHOLE No BH13-14

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+731 C/L, NBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2011 02 10 - 2011 02 10 CHECKED BY RPR

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 (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
192.7	Ground Surface													
0.0	PEAT, fibrous: (175mm)													
0.2	Silty CLAY, some sand Stiff Brown		1	SS	10		192							0 11 59 30
191.0			2	SS	100/									
1.7	END OF BOREHOLE AT 1.6m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 1.0m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS TO SURFACE.				0.125									

+³, ×³: Numbers refer to
Sensitivity


20
15 10 5
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH13-15R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+743.5 O/S 12.8R, NBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2011.02.10 - 2011.02.10 CHECKED BY RPR

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	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									
193.4	Ground Surface							20	40	60	80	100					
0.0	PEAT, fibrous: (200mm)								○ UNCONFINED	+	FIELD VANE						
0.2	SAND, trace to some gravel								● QUICK TRIAXIAL	x	LAB VANE						
192.8	Brown						193										
0.6	Moist																
	END OF BOREHOLE AT 0.5m UPON AUGER REFUSAL ON PROBABLE BEDROCK.																

ONTMT4S 6121 GPJ 12/11/12

+³, x³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No D13-01R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+763.5 O/S 13.0R, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY LG
 DATUM Geodetic DATE 2009.02.10 - 2009.02.10 CHECKED BY RPR

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	SHEAR STRENGTH kPa			WATER CONTENT (%)			GR	SA		SI	CL		
193.8	Pond Surface																	
0.0	ICE AND WATER TO 0.5m.																	
191.3	END OF DCPT AT 2.5m UPON REFUSAL ON PROBABLE BEDROCK.																	
2.5																		

RECORD OF BOREHOLE No D13-02L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+788.5 O/S 12.8L, NBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY LG
DATUM Geodetic DATE 2009.02.10 - 2009.02.10 CHECKED BY RPR

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 (%) GR SA SI CL		
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	SHEAR STRENGTH kPa			WATER CONTENT (%)								
191.8	Pond Surface							20	40	60	80	100	w _p	w	w _L		
0.0	ICE AND WATER TO 0.5m.							20	40	60	80	100					

+³, ×³: Numbers refer to Sensitivity 20 15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No D13-03R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+813.5 O/S 12.6R, NBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Visual Assessment and Manual Excavation COMPILED BY LG
 DATUM Geodetic DATE 2009.02.12 - 2009.02.12 CHECKED BY RPR

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										WATER CONTENT (%)
193.3	Ground Surface							20	40	60	80	100		20	40	60	kN/m ³	GR SA SI CL
0.0																		
193.0																		
0.3	BEDROCK AT 0.3m.																	

+ 3 . x 3 : Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No D13-04L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+836 O/S 12.4L, NBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY LG
DATUM Geodetic DATE 2009.02.12 - 2009.02.12 CHECKED BY RPR

SOIL PROFILE				SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			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 (%) w _p w w _L				
192.1 0.0	Pond Surface ICE AND WATER TO 0.6m.												
189.3 2.8	END OF DCPT AT 2.8m UPON REFUSAL ON PROBABLE BEDROCK.												

RECORD OF BOREHOLE No D13-05L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+693.5 O/S 14.0L, NBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2011.02.10 - 2011.02.10 CHECKED BY RPR

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 (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES	SHEAR STRENGTH kPa			WATER CONTENT (%)						
193.0	Ground Surface														
0.0	DCPT from surface						193								
							192								
191.5															
1.5	END OF DCPT AT 1.5m UPON REFUSAL ON PROBABLE BEDROCK.														

+³, ×³: Numbers refer to
Sensitivity

20
15 10 5
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No D13-06R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+718.5 O/S 13.0R, NBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2011.02.10 - 2011.02.10 CHECKED BY RPR

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	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
193.8	Ground Surface												
0.0	DCPT from surface												
191.5	END OF DCPT AT 2.2m UPON REFUSAL ON PROBABLE BEDROCK												
2.3													

RECORD OF BOREHOLE No D13-07L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+742.5 O/S 13.0L, NBL ORIGINATED BY ES
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2011.02.13 - 2011.02.13 CHECKED BY RPR

SOIL PROFILE				SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			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							
192.3	Ground Surface												
0.0	DCPT from surface												
											</		

+ 3, × 3: Numbers refer to
Sensitivity

20
15 10 5
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH14-01

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+746 C/L, SBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Auger COMPILED BY LG
DATUM Geodetic DATE 2009.02.11 - 2009.02.11 CHECKED BY RPR

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 x LAB VANE							
192.8	Ground Surface							20 40 60 80 100							
0.0	PEAT, fibrous, trace clay Dark Brown														
192.3	Wet														
0.5	(500mm)														
	END OF BOREHOLE AT 0.5m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.														

RECORD OF BOREHOLE No BH14-02

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+751 C/L, SBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
 DATUM Geodetic DATE 2009.02.11 - 2009.02.11 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT NATURAL LIMIT MOISTURE CONTENT LIQUID 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 (%)				
192.5	Ground Surface							20 40 60 80 100		20 40 60			GR SA SI CL	
0.0	PEAT, fibrous Very Soft Dark Brown Wet (750mm)		1	SS	0		192					268		
191.7														
0.8	Silty CLAY, trace to some sand Very Soft to Firm Grey		2	SS	2		191							
			3	SS	5								0 18 49 33	
			4	SS	3		190							
			5	SS	3								0 10 33 57	
							189							
			7	SS	1		188						0 1 33 66	
187.2														
5.3	END OF BOREHOLE AT 5.3m UPON AUGER REFUSAL ON PROBABLE BEDROCK. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Apr 21/09 Ground Surface Jun 04/09 Ground Surface Aug 17/09 Ground Surface Aug 25/09 Ground Surface Oct 27/09 Ground Surface Nov 20/09 Ground Surface													

+ 3, × 3: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH14-03L

1 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+763.5 O/S 13.1L, SBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
 DATUM Geodetic DATE 2009.02.10 - 2009.02.10 CHECKED BY RPR

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						
191.8	Ground Surface							20 40 60 80 100						
0.0	PEAT, fibrous Very Soft Dark Brown Wet (800mm)		1	SS	0			○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE						
191.0								20 40 60 80 100						
0.8	Silty CLAY, trace to some sand Very Soft to Soft Brown to Grey		2	SS	1		191							
			3	SS	4		190							0 19 49 32
			4	SS	2		189							
			5	SS	0		188							0 15 33 52
			6	SS	0		187							
							186							
			8	SS	0		185							0 1 23 76
							184							
			10	SS	0		183							
							182							
	Stiff		12	SS	13									
181.8														

Continued Next Page

+³, ×³: Numbers refer to Sensitivity 20 15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH14-03L

2 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+763.5 O/S 13.1L, SBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
DATUM Geodetic DATE 2009.02.10 - 2009.02.10 CHECKED BY RPR

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			SHEAR STRENGTH kPa									
	Continued From Previous Page							20	40	60	80	100					

RECORD OF BOREHOLE No BH14-04

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+776 C/L, SBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
DATUM Geodetic DATE 2009.02.11 - 2009.02.11 CHECKED BY RPR

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	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60 80 100					
191.7	Ground Surface													
0.0	PEAT, fibrous Very Soft Dark Brown Wet (800mm)		1	SS	0									
190.9							191							
0.8	Silty CLAY, trace sand Soft to Firm Brown to Grey		2	SS	2									
							190							
			3	SS	5									
			4	SS	5		189							0 7 41 52
			5	SS	3		188							0 4 26 70
			6	TW	PH		187							
186.1	END OF BOREHOLE AT 5.6m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT SURFACE UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS UPON COMPLETION.													
5.6														

+ 3, X 3: Numbers refer to
Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH14-05R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+788.5 O/S 13.0R, SBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
 DATUM Geodetic DATE 2009.02.09 - 2009.02.09 CHECKED BY RPR

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	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
191.8	Ground Surface							20 40 60 80 100						
0.0	PEAT, fibrous Very Soft Dark Brown Wet (800mm)		1	SS	0			○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL x LAB VANE						
191.0								20 40 60 80 100						
0.8	Silty CLAY, trace sand Very Soft to Firm Brown to Grey		2	SS	1		191							
			3	SS	6		190							
			4	TW	PH		189							
			5	SS	2									
							188							
			7	SS	0		187							
							186							
			8	SS	7									
							185							
184.4														
7.4	END OF BOREHOLE AT 7.4m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT SURFACE UPON COMPLETION OF BOREHOLE. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS UPON COMPLETION.													

+³, X³: Numbers refer to
Sensitivity

20
15
10




(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH14-06

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+801 C/L, SBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
DATUM Geodetic DATE 2009.02.09 - 2009.02.09 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			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	W _P W W _L						
191.8	Ground Surface						20 40 60 80 100	20 40 60							
0.0	PEAT, fibrous Very Soft Dark Brown Wet (800mm)		1	SS	0							113			
191.0															
0.8	Silly CLAY, some sand Soft Grey		2	SS	4		191								
			3	SS	4		190						0 12 48 40		
			4	SS	3										
188.8							189								
3.0	SAND and GRAVEL Compact Grey Moist to Wet		5	SS	16										
188.0															
3.8	END OF BOREHOLE AT 3.8m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT SURFACE UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS UPON COMPLETION.														

+³, ×³: Numbers refer to Sensitivity

20
15
10

(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH14-07L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+813.5 O/S 12.9L, SBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
 DATUM Geodetic DATE 2009.02.09 - 2009.02.09 CHECKED BY RPR

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	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
191.9	Ground Surface							20 40 60 80 100						
0.0	PEAT, fibrous Very Soft Dark Brown Wet (800mm)		1	SS	0									
191.1														
0.8	Silty CLAY, trace sand Soft to Firm Brown to Grey		2	SS	3		191							
			3	SS	5		190							0 4 71 25
189.6														
2.3	END OF BOREHOLE (SAMPLER BOUNCING) AT 2.3m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT SURFACE UPON COMPLETION OF BOREHOLE. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.		4	AS										

+ 3, x 3: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH14-08

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+826 C/L, SBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
DATUM Geodetic DATE 2009.02.12 - 2009.02.12 CHECKED BY RPR




SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				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 (%) w _p w w _L
191.9	Ground Surface													
0.0	PEAT , fibrous, trace sand Very Soft Dark Brown Wet (300mm) Silty CLAY , trace sand Very Soft to Soft Brown to Grey		1	SS	1									
191.6														
0.3														
			2	SS	4									
			3	SS	4									
			4	SS	2									
188.5			5	SS	6									
3.4	Silty SAND , trace clay Loose Grey Moist Occasional cobbles													
187.1			6	SS	50/ 100									
4.8	END OF BOREHOLE AT 4.8m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT SURFACE UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS UPON COMPLETION.													

RECORD OF BOREHOLE No BH14-09R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+838.5 O/S 12.0R, SBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
DATUM Geodetic DATE 2009.02.12 - 2009.02.12 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa				
192.1	Ground Surface							20 40 60 80 100				
0.0	PEAT: (500mm) Very Soft Dark Brown Wet		1	SS	0		192					111
191.6												
0.5	Silty CLAY, trace sand Very Soft to Firm Brown to Grey		2	SS	4		191					
			3	SS	6		190					
			4	SS	2		189					
			5	SS	0		188					
187.5												
4.6	Gravelly SAND, trace silt Loose Brown Moist		6	SS	9		187					
186.4												
5.7	END OF BOREHOLE AT 5.7m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT SURFACE UPON COMPLETION OF BOREHOLE. BOREHOLE BACKFILLED WITH HOLEPLUG AND AUGER CUTTINGS UPON COMPLETION.											




+ 3 X 3 Numbers refer to
Sensitivity 20 15 10 5 (%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH14-10

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+851 C/L, SBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
DATUM Geodetic DATE 2009.02.13 - 2009.02.13 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
192.6	Ground Surface							20 40 60 80 100						
0.0	PEAT, fibrous, trace sand Very Soft Dark Brown Wet (800mm)		1	SS	0		192						62	
191.8	Silly CLAY, trace sand Very Soft to Soft Brown to Grey		2	SS	7									
0.8							191							
			3	SS	13									0 6 43 51
	Sandy Very Stiff		4	SS	21		190							1 47 24 28
189.8	END OF BOREHOLE AT 2.8m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 1.5m UPON COMPLETION OF BOREHOLE. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.													
2.8														

+³, ×³: Numbers refer to
Sensitivity

20
15 10 5
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No BH14-11L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+863.5 O/S 10.9L, SBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
 DATUM Geodetic DATE 2009 02 13 - 2009 02 13 CHECKED BY RPR

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 (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa		WATER CONTENT (%)				
							20 40 60 80 100		W _p W W _L	20 40 60				
193.6	Ground Surface													
0.0	TOPSOIL, occasional clay		1	SS	10									
0.1	Dark Brown Moist (100mm)													
192.9	SAND, trace to some silt													
0.7	Loose Brown Moist													
END OF BOREHOLE AT 0.7m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 0.6m UPON COMPLETION OF BOREHOLE. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.														

RECORD OF BOREHOLE No BH14-12

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+871 C/L, SBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY LG
 DATUM Geodetic DATE 2009.02.12 - 2009.02.12 CHECKED BY RPR


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			SHEAR STRENGTH kPa		WATER CONTENT (%)				
194.5	Ground Surface							20 40 60 80 100						
0.0	TOPSOIL , trace sand Brown Moist (100mm) SAND , some silt, trace clay, trace gravel Loose to Very Dense Brown Moist		1	SS	9		194							
0.1														
			2	SS	22		193							
			3	SS	52									
			4	SS	76		192							
191.6	END OF BOREHOLE AT 3.0m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 2.4m UPON COMPLETION OF BOREHOLE. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.													
2.9														

RECORD OF BOREHOLE No BH14-13

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+726 C/L, SBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2011.02.10 - 2011.02.10 CHECKED BY RPR

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							
193.5	Ground Surface														GR SA SI CL
0.0	PEAT, fibrous: (200mm)														
0.2	Silty CLAY, sandy Very Stiff Brown		1	SS	18		193								
192.1															
1.4	Silty SAND														
191.8	Dense Brown		2	SS	50/		192								
1.7	Wet				0.150										
END OF BOREHOLE AT 1.7m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.															

RECORD OF BOREHOLE No BH14-14R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+735.5 O/S 13.1R, SBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Hollow Stem Augers COMPILED BY AN
 DATUM Geodetic DATE 2011.02.10 - 2011.02.10 CHECKED BY RPR

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					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						
192.6	Ground Surface							20	40	60	80	100		
0.0	PEAT, fibrous: (125mm)							20	40	60	80	100		
0.1	Silty CLAY, occasional rootlets, sand seams Stiff Brown		1	SS	13		192							
190.9							191							
1.7	Silty SAND, trace clay Compact Brown		2	SS	16									0 38 53 9
190.5	Moist													
2.1	END OF BOREHOLE AT 2.1m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 1.3m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH AUGER CUTTINGS UPON COMPLETION.													

+³, X³: Numbers refer to
Sensitivity

20
15 5
10 (%) STRAIN AT FAILURE

METRIC

[illegible]

ONTMT4S 6121.GPJ 12/12/12

RECORD OF BOREHOLE No D14-01R

2 OF 2

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+763.5 O/S 13.1R, SBL ORIGINATED BY JM
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY LG
 DATUM Geodetic DATE 2009.02.10 - 2009.02.10 CHECKED BY RPR

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 (%)					
	Continued From Previous Page							20 40 60 80 100 ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL X LAB VANE	20 40 60					
180.8							182							
11.4	END OF DCPT AT 11.4m UPON REFUSAL ON PROBABLE BEDROCK.						181							

+³ X³: Numbers refer to
Sensitivity

20
15 10 5
(%) STRAIN AT FAILURE

METRIC

[illegible]

RECORD OF BOREHOLE No D14-03R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+813.5 O/S 12.9R, SBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY LG
DATUM Geodetic DATE 2009.02.12 - 2009.02.12 CHECKED BY RPR

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 (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa	W _p	W	W _L	WATER CONTENT (%)		
192.0	Ground Surface						192	20 40 60 80 100	20 40 60					
0.0	DCPT from surface						191							
							190							
							189							
188.1	END OF DCPT AT 3.9m UPON REFUSAL ON PROBABLE BEDROCK													
3.9														

+³, X³: Numbers refer to
Sensitivity

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

METRIC[illegible]

RECORD OF BOREHOLE No D14-05R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+863.5 O/S 10.9R, SBL ORIGINATED BY JM
HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY LG
DATUM Geodetic DATE 2009.02.12 - 2009.02.12 CHECKED BY RPR

SOIL PROFILE				SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			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							
194.0	Ground Surface												
0.0	DCPT from surface.												

+³ X³: Numbers refer to
Sensitivity

20
15 10 5
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No D14-06R

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+713.5 O/S 13.1R, SBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2011.02.10 - 2011.02.10 CHECKED BY RPR

SOIL PROFILE		SAMPLES				GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	PLASTIC LIMIT W _P	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L		
193.1	Ground Surface						193						
0.0	DCPT from surface.						192						
							191						
190.4	END OF DCPT AT 2.7m UPON REFUSAL ON PROBABLE BEDROCK.												
2.7													

RECORD OF BOREHOLE No D14-07L

1 OF 1

METRIC

GWP# 5076-06-00 LOCATION Harrison Twp., Station 19+738.5 O/S 13.0L, SBL ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Dynamic Cone Penetration Test (DCPT) COMPILED BY AN
 DATUM Geodetic DATE 2011.02.10 - 2011.02.10 CHECKED BY RPR





SOIL PROFILE				SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				PLASTIC LIMIT NATURAL MOISTURE LIQUID CONTENT LIMIT			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 (%)							
193.0	Ground Surface																
0.0	DCPT from surface																
190.1	END OF DCPT AT 2.8m UPON REFUSAL ON PROBABLE BEDROCK.																
2.9																	

RECORD OF BOREHOLE No C317-1

1 OF 1

METRIC

WP# 5134-12-05 LOCATION N 5 055 827.6 E 234 950.3 ORIGINATED BY SLL
HWY 69 BOREHOLE TYPE Hollow Stem Augers (CME 45) COMPILED BY AN
DATUM Geodetic DATE 2011.02.11 - 2011.02.11 CHECKED BY RPR

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 x LAB VANE								
192.7	Ground Surface															
0.0	PEAT															
0.2	SAND, trace to some silt, trace gravel, occasional cobbles Brown Moist to Wet															
191.4			1	SS	59/ 0.200		192							○		
1.2	END OF BOREHOLE AT 1.2m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 0.9m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH CUTTINGS TO SURFACE.															

RECORD OF BOREHOLE No C317-2

1 OF 1

METRIC

WP# 5134-12-05 LOCATION N 5 055 819.8 E 234 916.4 ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Hollow Stem Augers (CME 45) COMPILED BY AN
 DATUM Geodetic DATE 2011.02.11 - 2011.02.11 CHECKED BY RPR

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	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES								
192.4	Ground Surface												
0.0	PEAT												
0.2	Black Wet												
	Silty CLAY, sandy to trace sand Soft to Stiff Brown		1	SS	3								0 22 54 24
	Sand seams		2	SS	9								
			3	SS	3								0 9 49 42
	Very Soft		4	SS	0								
188.1													
4.3	END OF BOREHOLE AT 4.3m UPON AUGER REFUSAL ON PROBABLE BEDROCK. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) Feb 22/11 0.0 192.4 Mar 01/11 0.0 192.4 Mar 13/11 0.0 192.4 Apr 27/11 0.1 192.3												

+³, X³: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

RECORD OF BOREHOLE No C318-1

1 OF 1

METRIC

WP# 5134-12-06 LOCATION N 5 055 811.7 E 234 881.7 ORIGINATED BY SLL
 HWY 69 BOREHOLE TYPE Hollow Stem Augers (CME 45) COMPILED BY AN
 DATUM Geodetic DATE 2011.02.11 - 2011.02.11 CHECKED BY RPR

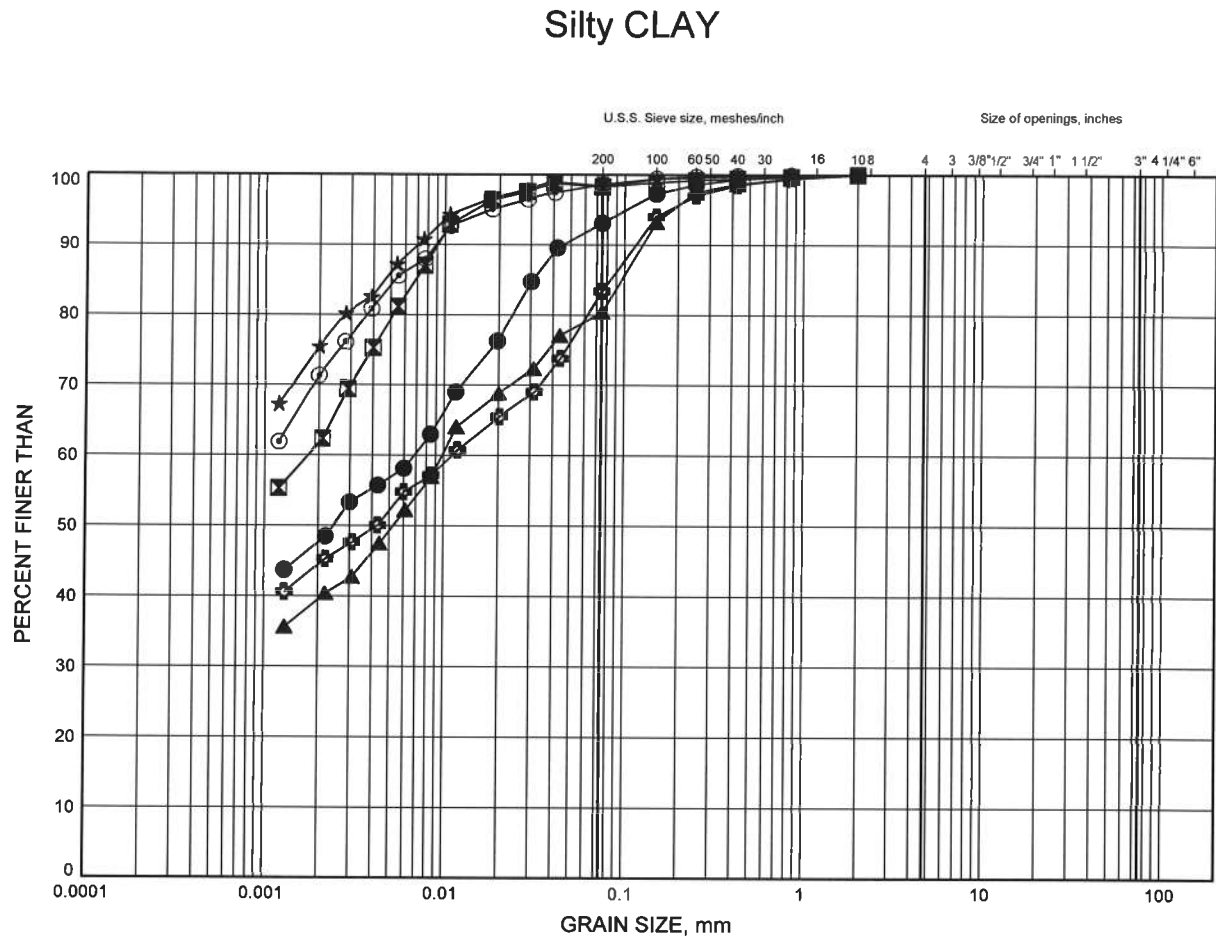
SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)								
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					PLASTIC LIMIT w _p NATURAL MOISTURE CONTENT w LIQUID LIMIT w _L WATER CONTENT (%)							
192.9	Ground Surface							20	40	60	80	100								
0.0	PEAT Black																			
0.2	Silty CLAY, trace sand Stiff Brown																			
			1	SS	9		192													
			2	SS	8		191													
190.7																				
190.7	SAND, trace silt and gravel Brown Wet		3	SS	50/															
2.4	END OF BOREHOLE AT 2.4m UPON AUGER REFUSAL ON PROBABLE BEDROCK. WATER LEVEL AT 0.6m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH CUTTINGS TO SURFACE.				0.075															

+ 3, x 3: Numbers refer to
Sensitivity

20
15
10
(%) STRAIN AT FAILURE

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE J1



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH13-01	1.83	190.97
⊠	BH13-01	2.59	190.21
▲	BH13-02L	1.83	190.37
★	BH13-02L	4.88	187.32
⊙	BH13-02L	6.40	185.80
⊕	BH13-03	1.83	191.17

Date December 2012
GWP# 5076-06-00

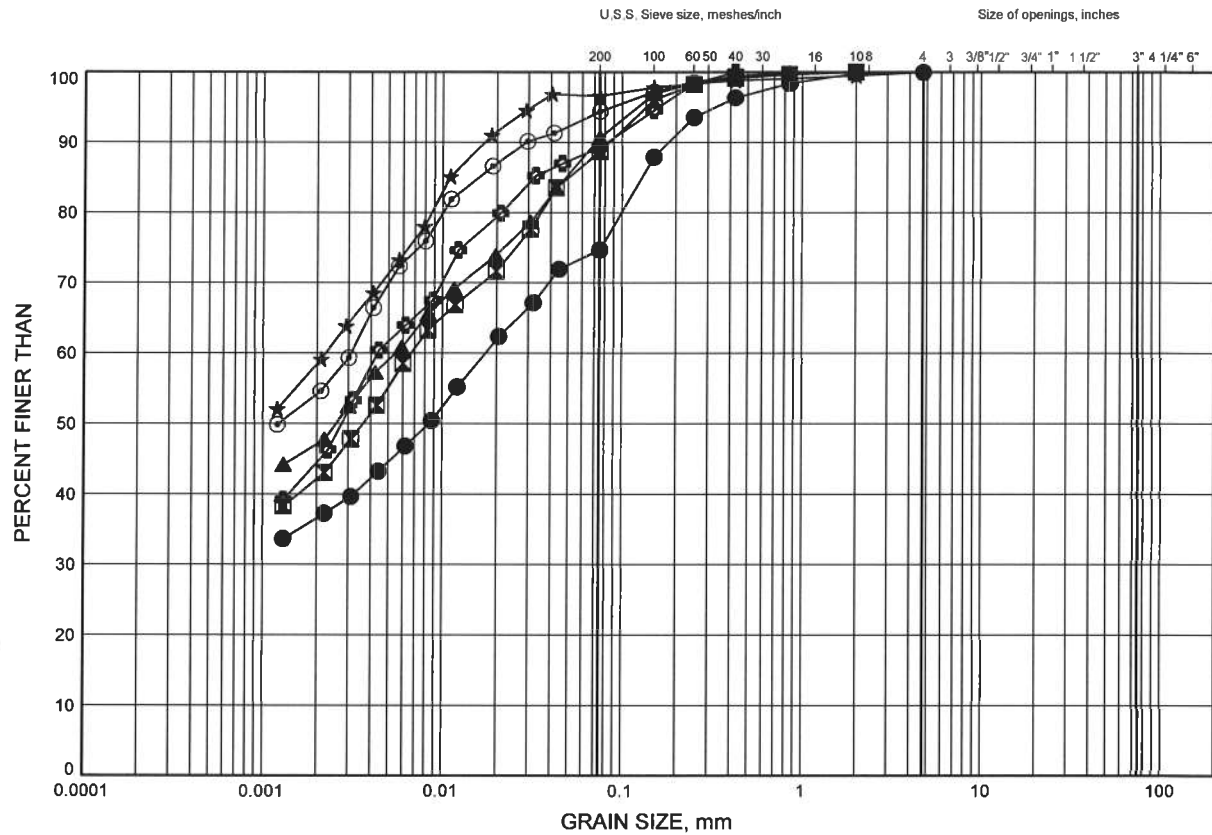


Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE J2

Silty CLAY



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH13-05	1.07	191.33
⊠	BH13-05	2.59	189.81
▲	BH13-06L	1.83	190.17
★	BH13-06L	3.31	188.69
⊙	BH13-07	1.07	191.63
⊕	BH13-12	1.07	192.13

Date December 2012
GWP# 5076-06-00

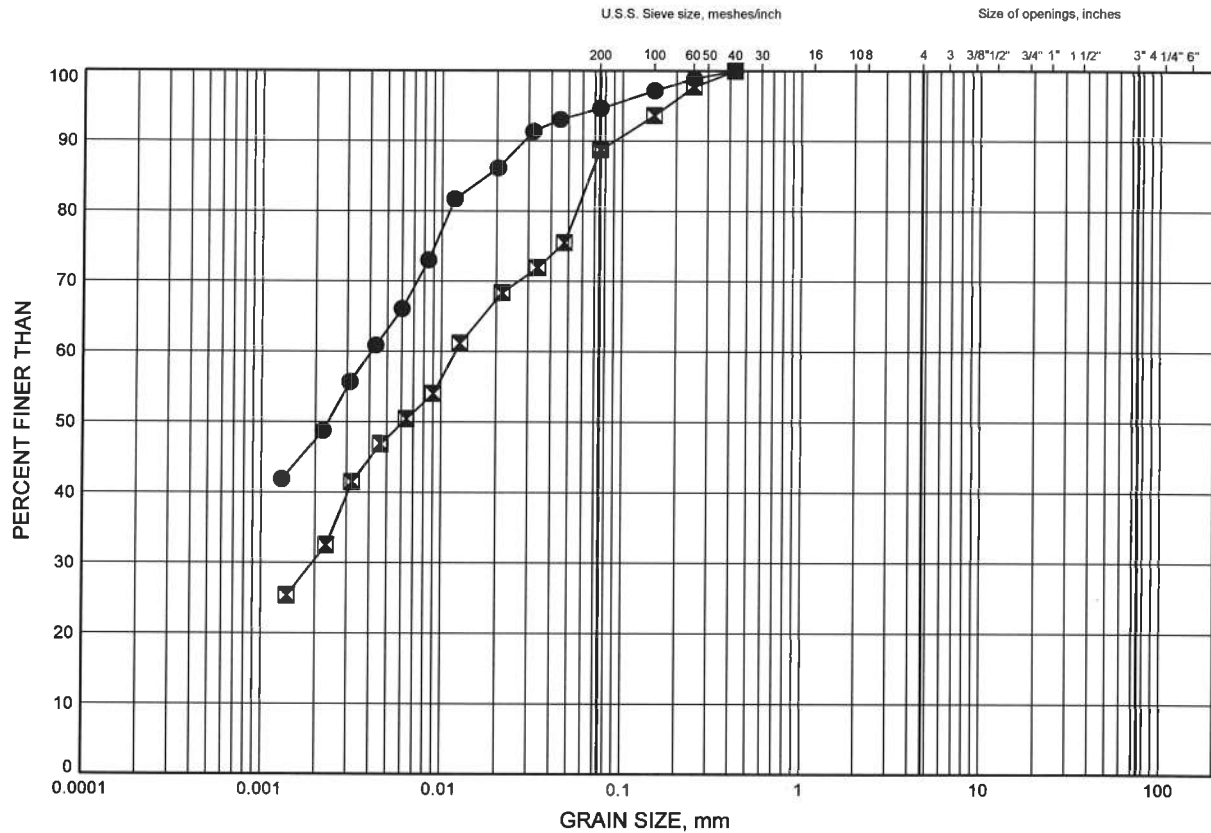


Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE J3

Silty CLAY



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH13-13L	3.35	189.55
■	BH13-14	1.07	191.63

Date December 2012
GWP# 5076-06-00



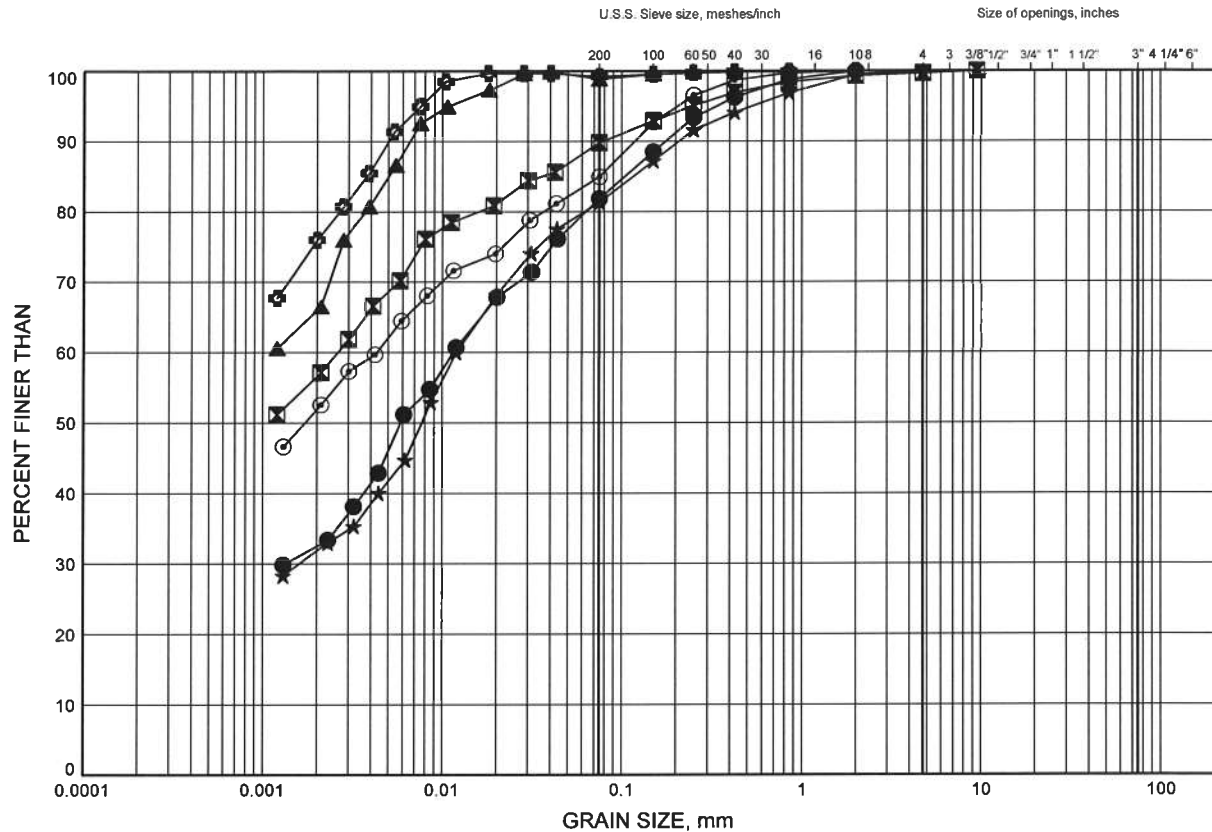
Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529

GRAIN SIZE DISTRIBUTION

FIGURE J4

Silty CLAY



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH14-02	1.83	190.67
■	BH14-02	3.35	189.15
▲	BH14-02	4.88	187.62
★	BH14-03L	1.83	189.97
⊙	BH14-03L	3.35	188.45
⊕	BH14-03L	6.40	185.40

Date December 2012

GWP# 5076-06-00

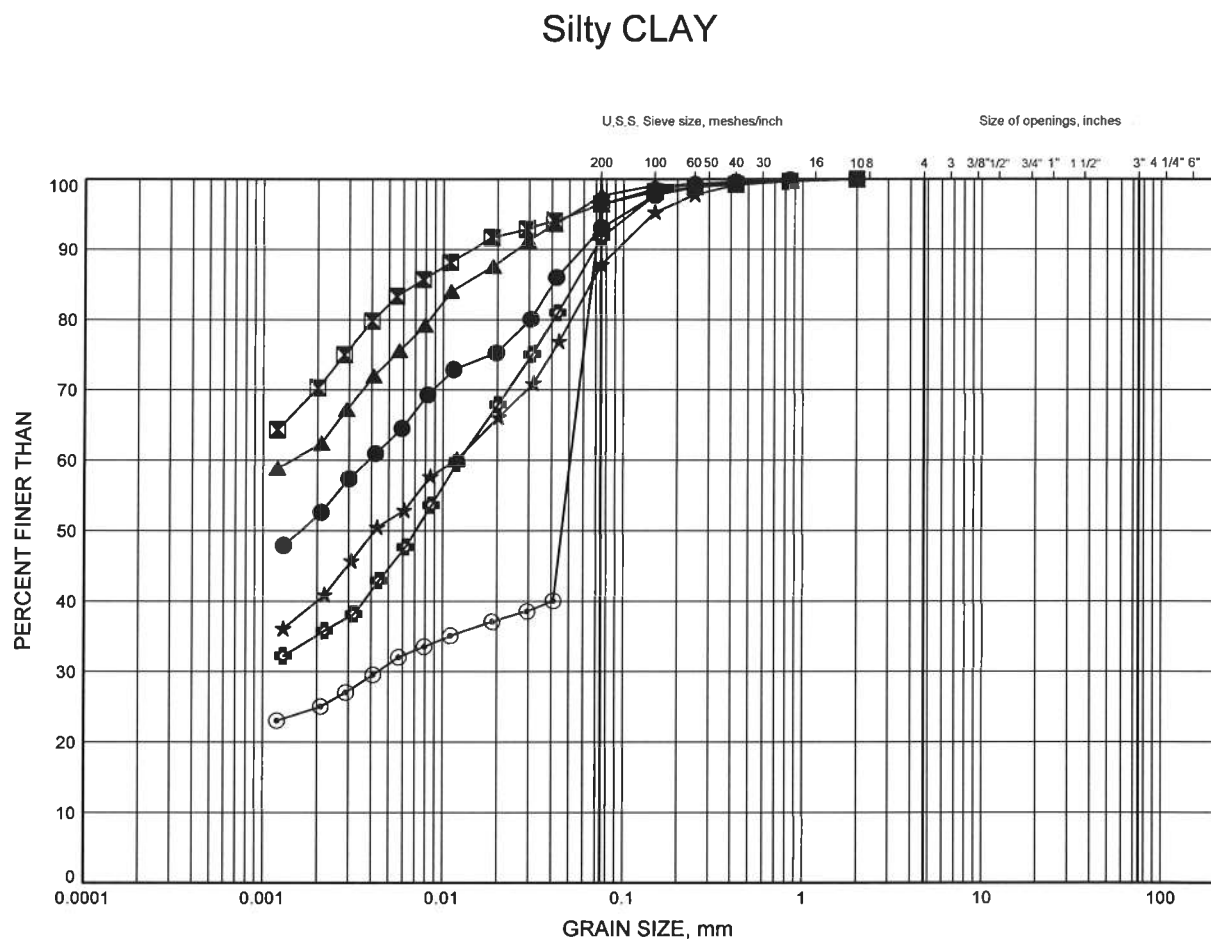


Prep'd MFA

Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE J5



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH14-04	2.59	189.11
⊠	BH14-04	3.35	188.35
▲	BH14-05R	3.35	188.45
★	BH14-06	1.83	189.97
⊙	BH14-07L	1.83	190.07
⊕	BH14-08	1.07	190.83

Date December 2012

GWP# 5076-06-00



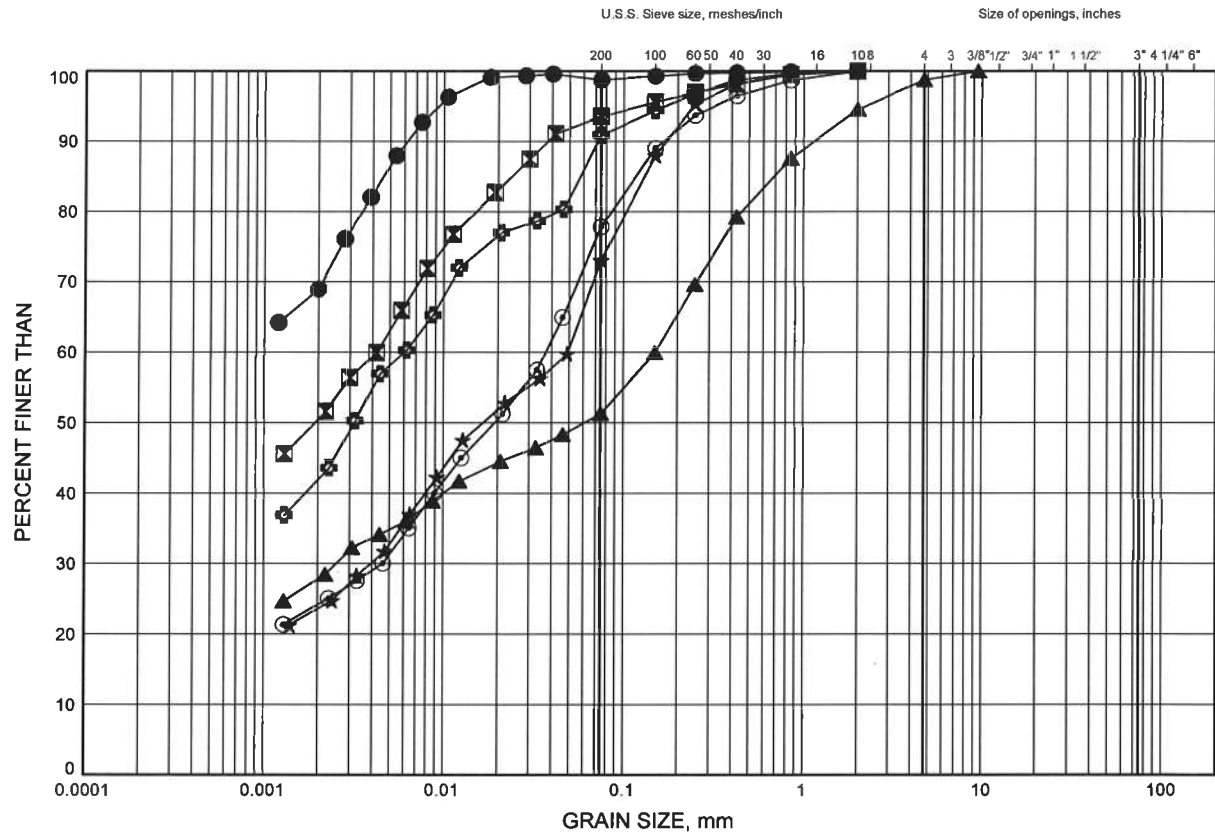
Prep'd MFA

Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE J6

Silty CLAY



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH14-09R	3.35	188.75
⊠	BH14-10	1.83	190.77
▲	BH14-10	2.59	190.01
★	BH14-13	1.07	192.43
⊙	C317-2	1.07	191.33
⊕	C317-2	2.59	189.81

Date December 2012
GWP# 5076-06-00

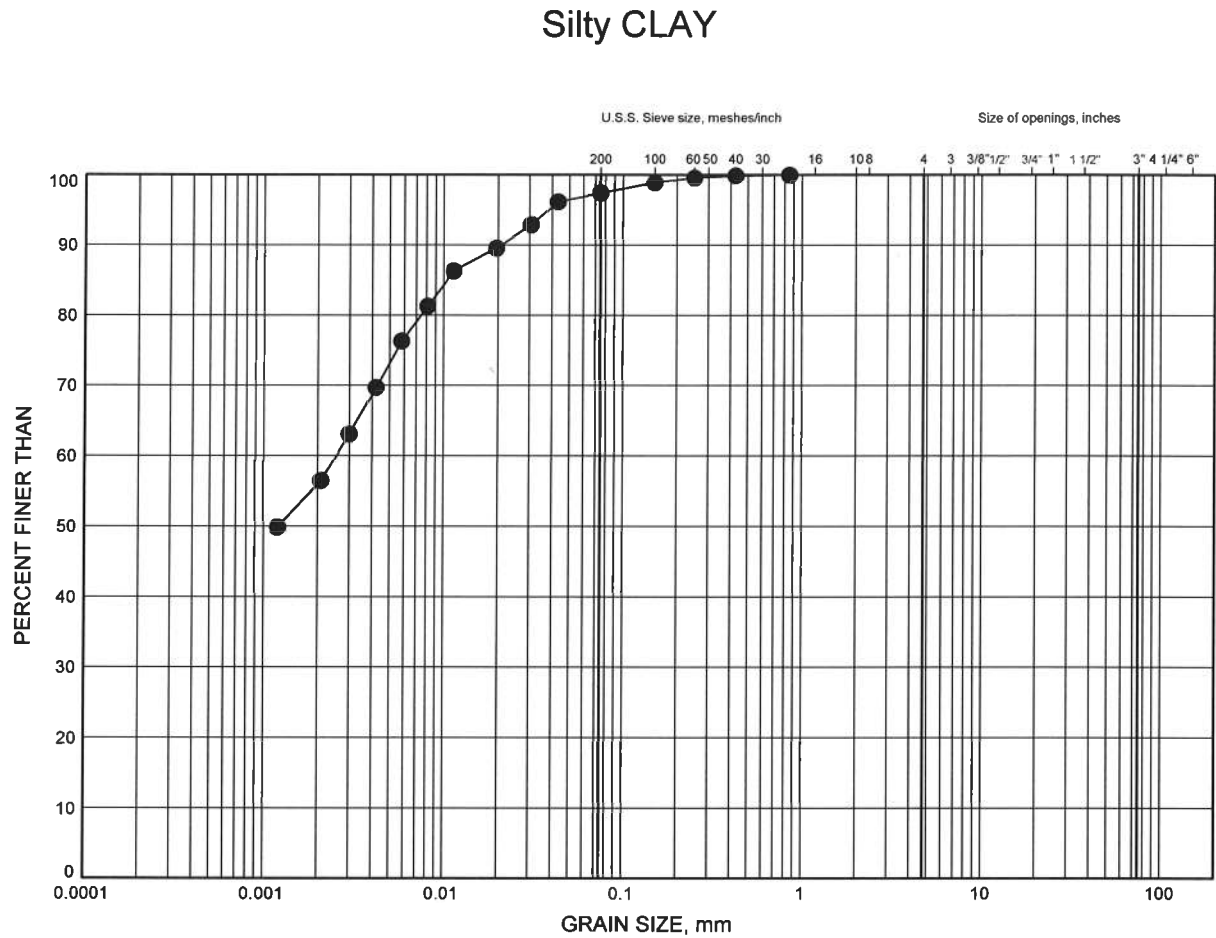


Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529

GRAIN SIZE DISTRIBUTION

FIGURE J7



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	C318-1	1.83	191.04

Date December 2012

GWP#



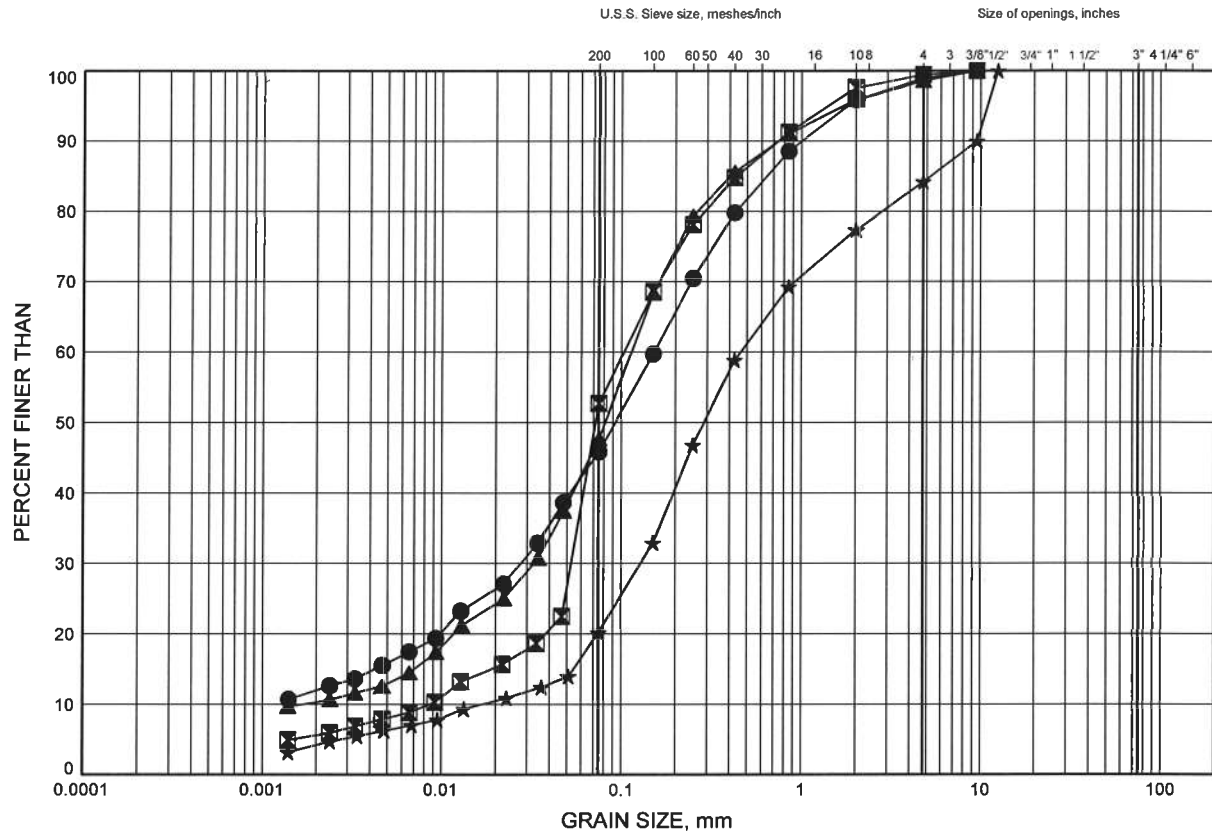
Prep'd MFA

Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529 GRAIN SIZE DISTRIBUTION

FIGURE J8

Silty SAND to SAND



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH13-08R	1.07	191.73
■	BH13-09	1.07	191.93
▲	BH13-09	2.59	190.41
★	BH13-10	1.07	192.93

Date December 2012
GWP# 5076-06-00

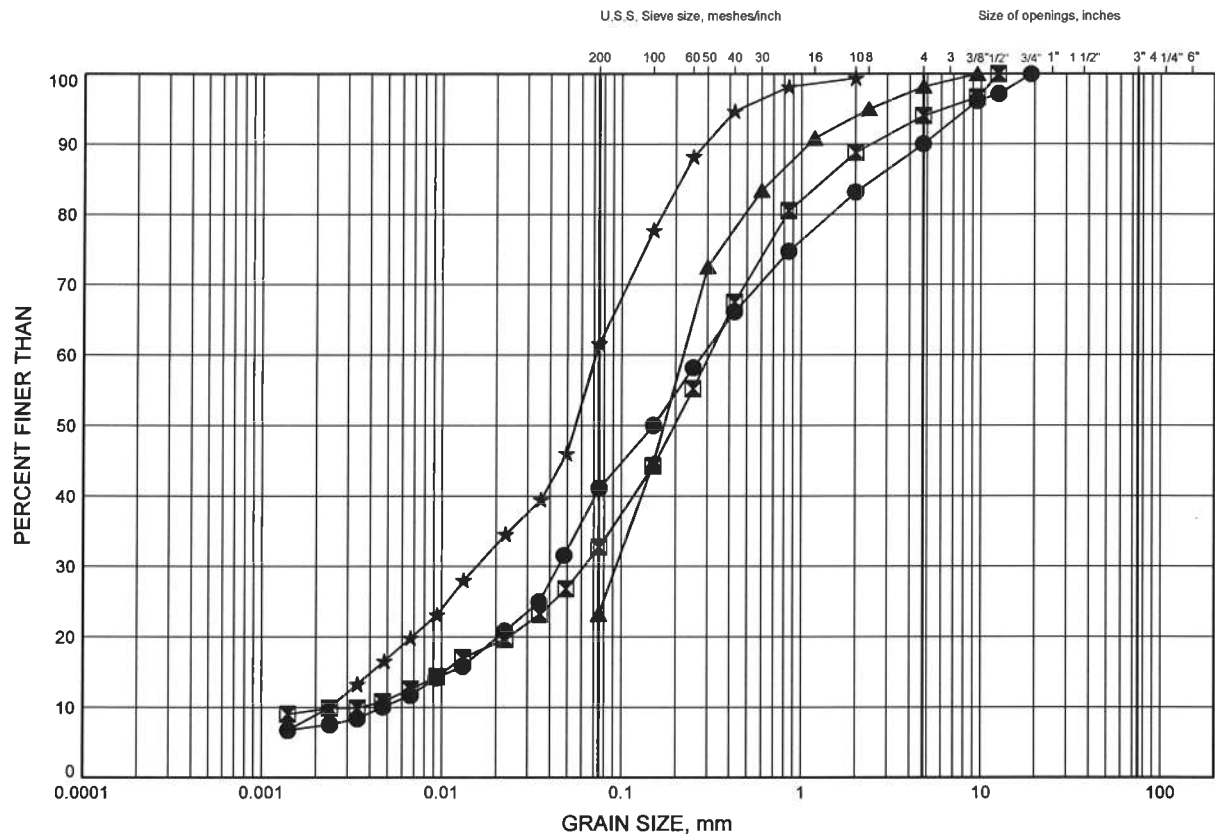


Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529
GRAIN SIZE DISTRIBUTION

FIGURE J9

Silty SAND to SAND



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

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH14-03L	10.97	180.83
■	BH14-08	3.51	188.39
▲	BH14-12	1.83	192.67
★	BH14-14R	1.75	190.85

Date December 2012
GWP# 5076-06-00

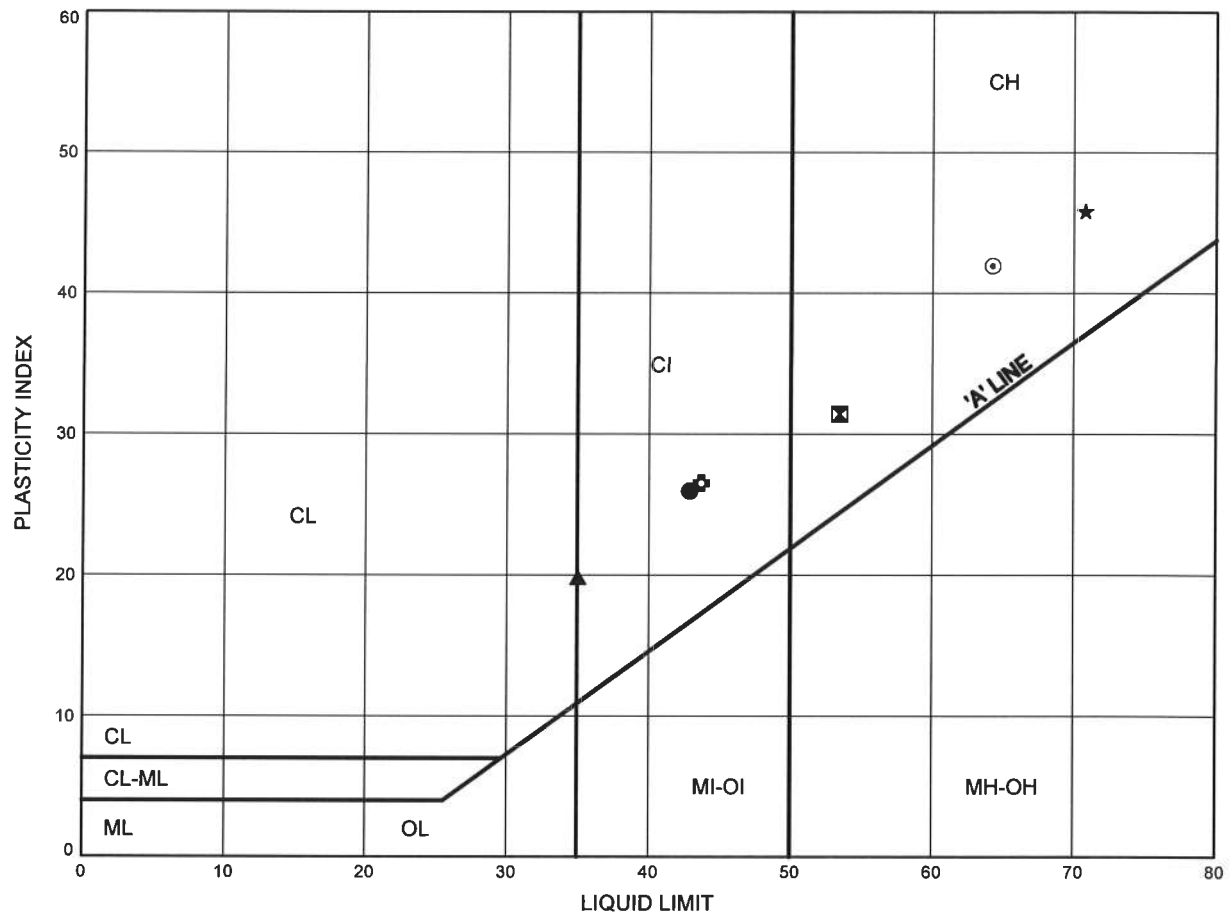


Prep'd MFA
Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529
ATTERBERG LIMITS TEST RESULTS

FIGURE J10

Silty CLAY



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH13-01	1.83	190.97
⊠	BH13-01	2.59	190.21
▲	BH13-02L	1.83	190.37
★	BH13-02L	4.88	187.32
⊙	BH13-02L	6.40	185.80
⊕	BH13-03	1.83	191.17

Date December 2012

GWP#



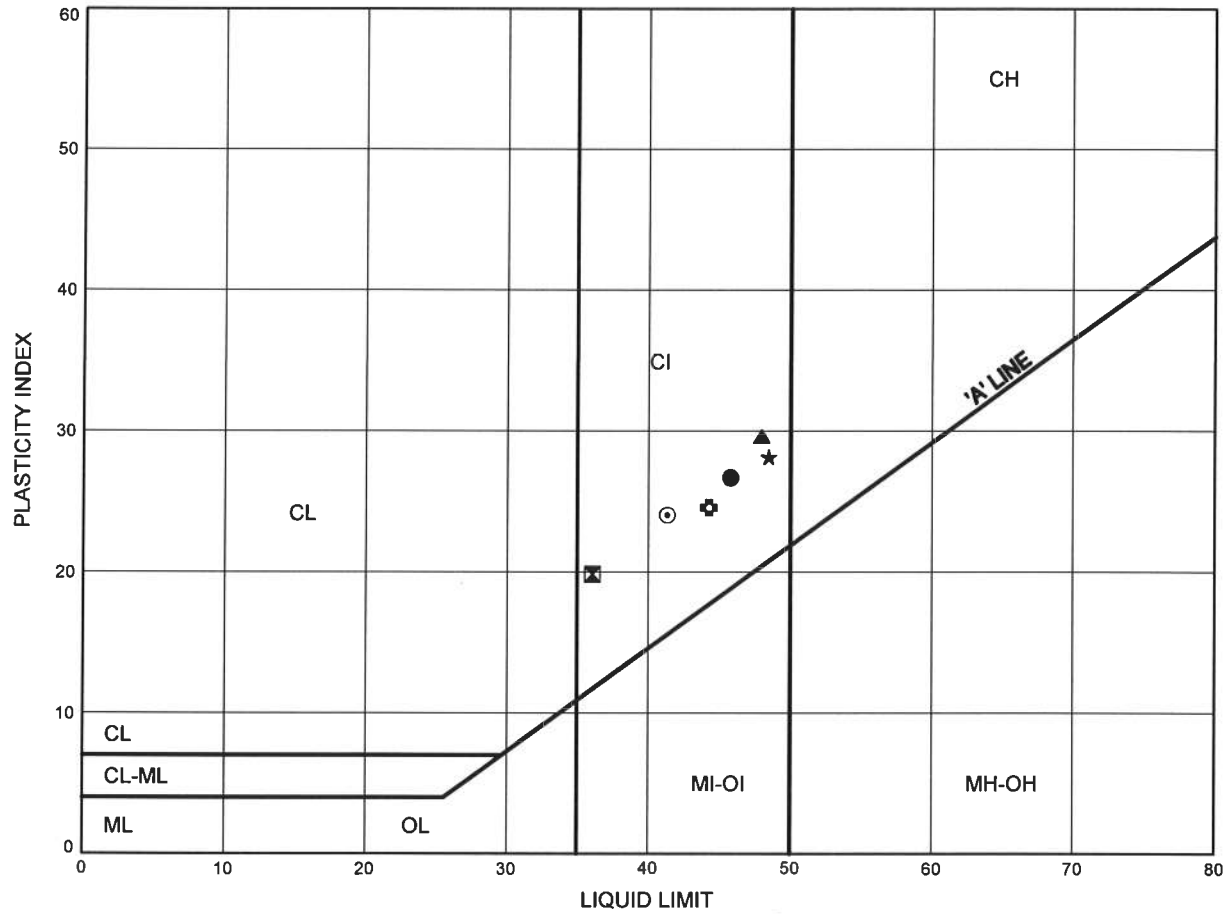
Prep'd MFA

Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529
ATTERBERG LIMITS TEST RESULTS

FIGURE J11

Silty CLAY



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH13-05	2.59	189.81
⊠	BH13-06L	1.83	190.17
▲	BH13-06L	3.31	188.69
★	BH13-07	1.07	191.63
⊙	BH13-12	1.07	192.13
⊕	BH13-13L	3.35	189.55

Date December 2012
 GWP# 5076-06-00

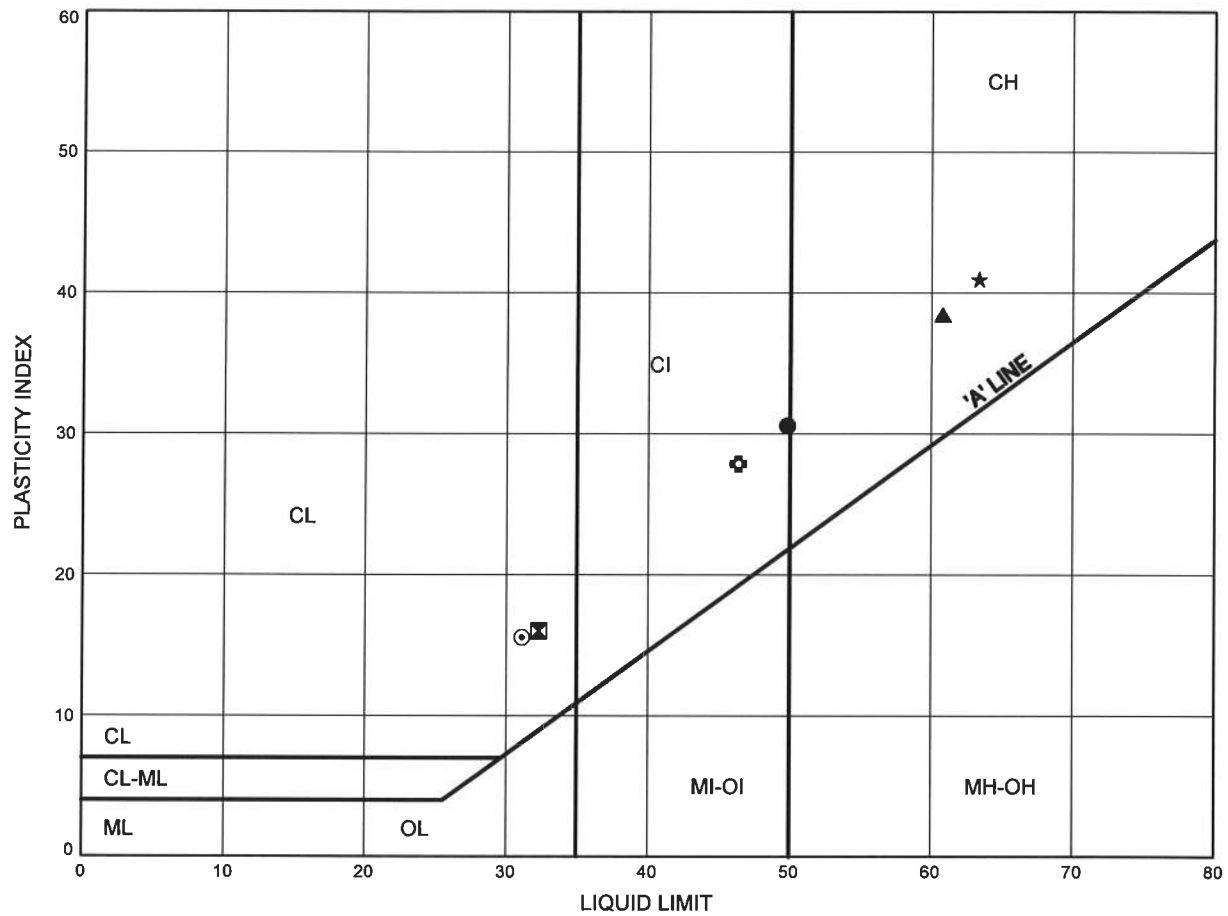


Prep'd MFA
 Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529
ATTERBERG LIMITS TEST RESULTS

FIGURE J12

Silty CLAY



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH13-14	1.07	191.63
⊠	BH14-02	1.83	190.67
▲	BH14-02	3.35	189.15
★	BH14-02	4.88	187.62
⊙	BH14-03L	1.83	189.97
⊕	BH14-03L	3.35	188.45

Date December 2012

GWP# 5076-06-00



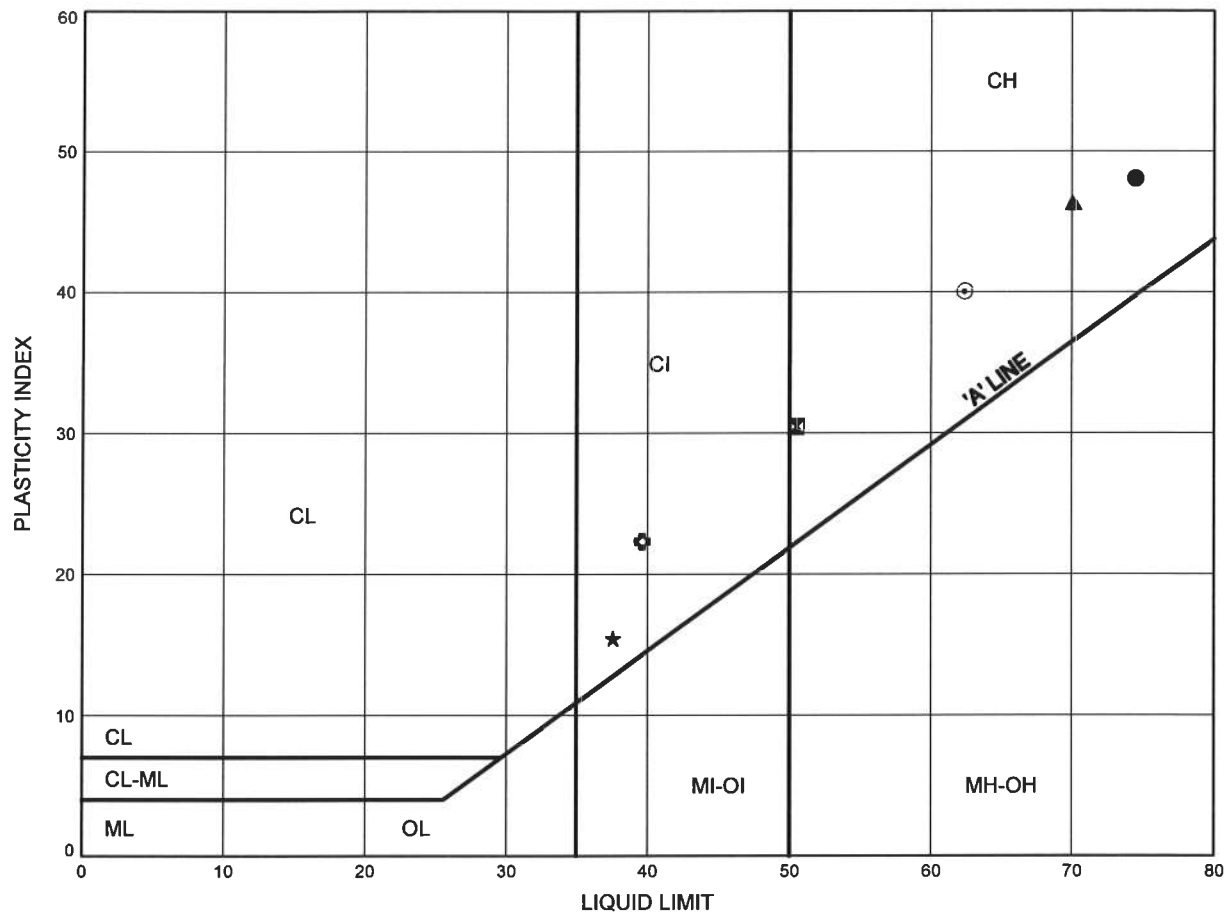
Prep'd MFA

Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529
ATTERBERG LIMITS TEST RESULTS

FIGURE J13

Silty CLAY



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH14-03L	6.40	185.40
⊠	BH14-04	2.59	189.11
▲	BH14-04	3.35	188.35
★	BH14-05R	1.07	190.73
⊙	BH14-05R	3.35	188.45
⊕	BH14-06	1.83	189.97

Date December 2012
 GWP# 5076-06-00



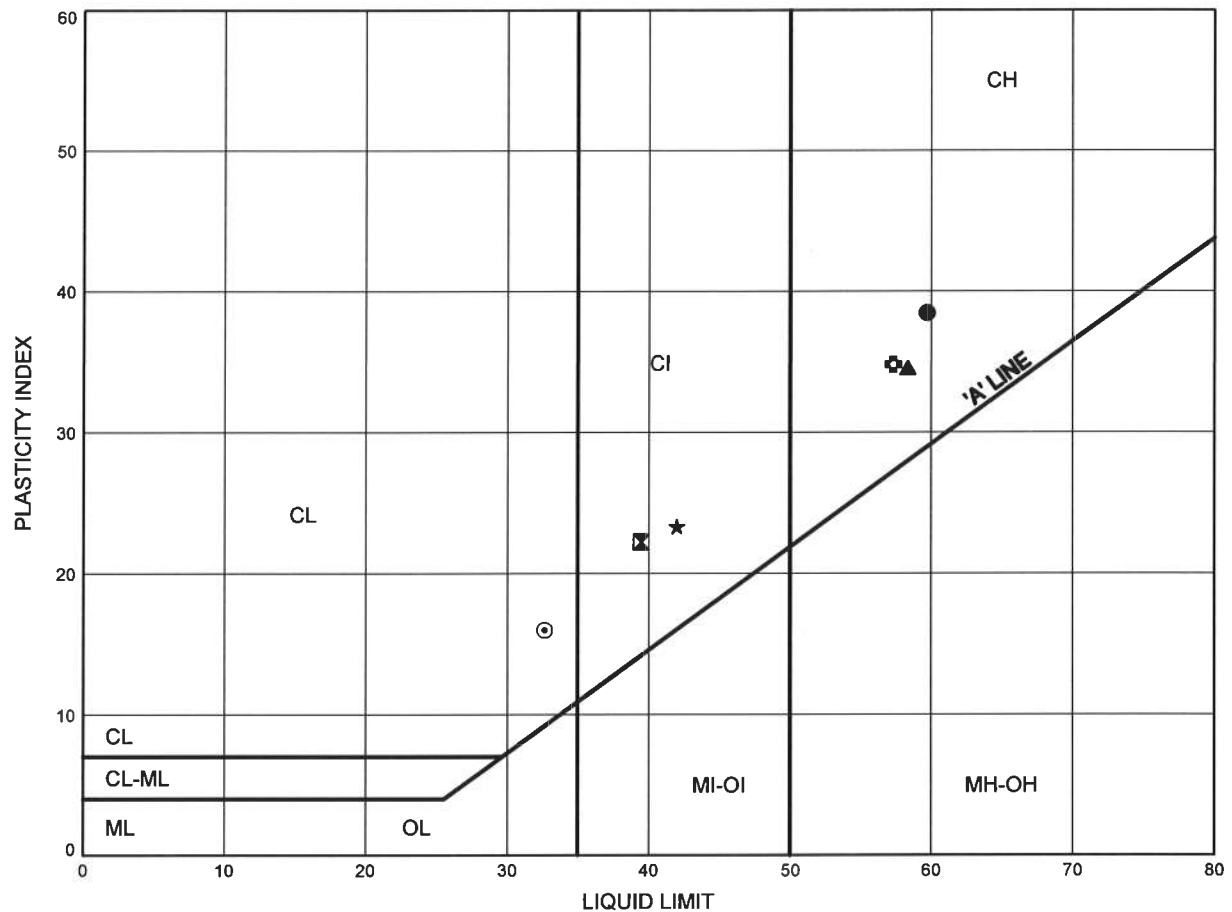
Prep'd MFA
 Chkd. MRA

Hwy 69 Four-Laning North of Hwy 529

ATTERBERG LIMITS TEST RESULTS

FIGURE J14

Silty CLAY



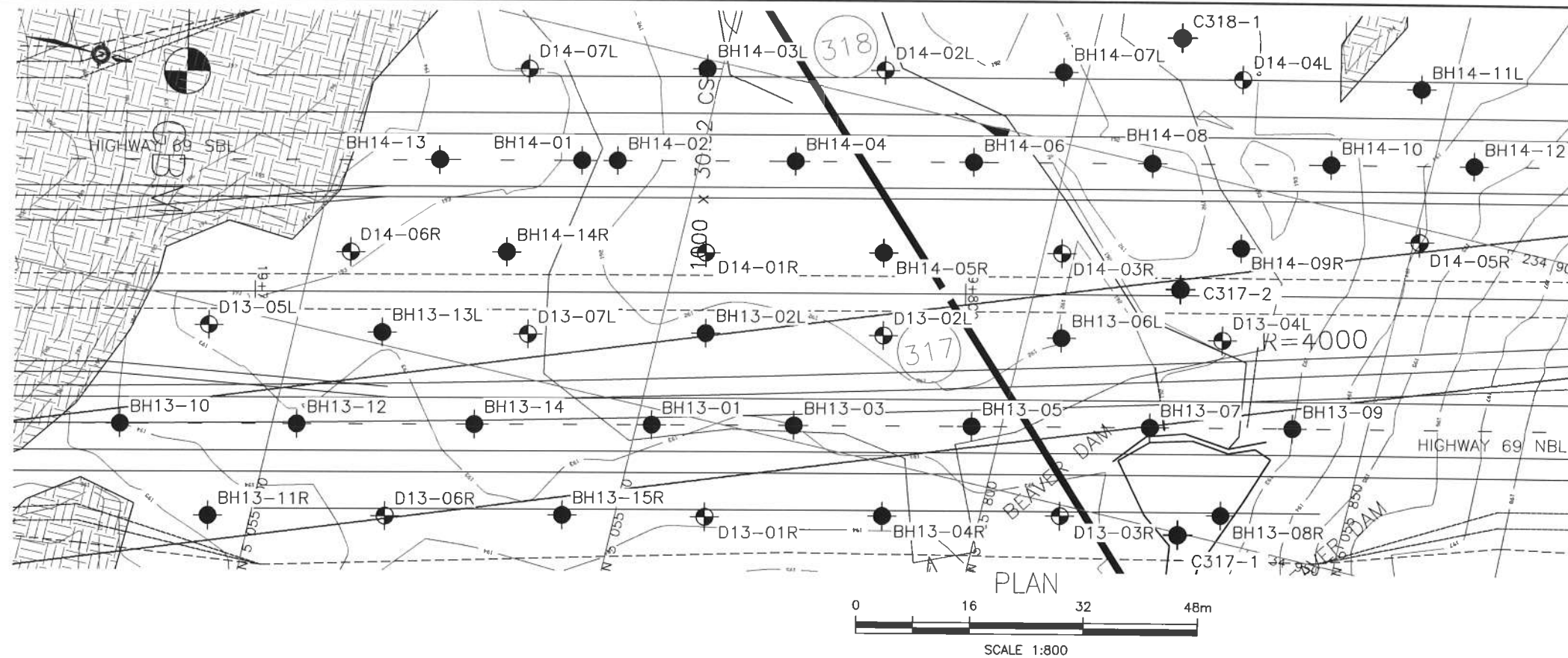
LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	BH14-07L	1.83	190.07
⊠	BH14-08	1.07	190.83
▲	BH14-09R	3.35	188.75
★	BH14-10	1.83	190.77
⊙	C317-2	1.07	191.33
⊕	C318-1	1.83	191.04

Date December 2012
GWP# 5076-06-00



Prep'd MFA
Chkd. MRA



METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

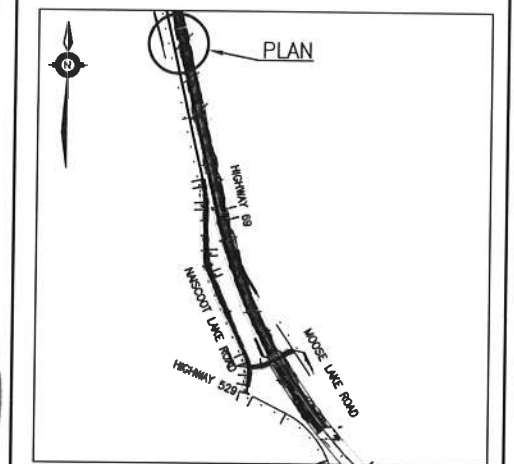


CONT No
GWP No 5076-06-00

HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 SBL-LT TOE
(STA 19+680 - 19+870)
BOREHOLE LOCATIONS AND SOIL STRATA



SHEET



KEYPLAN LEGEND

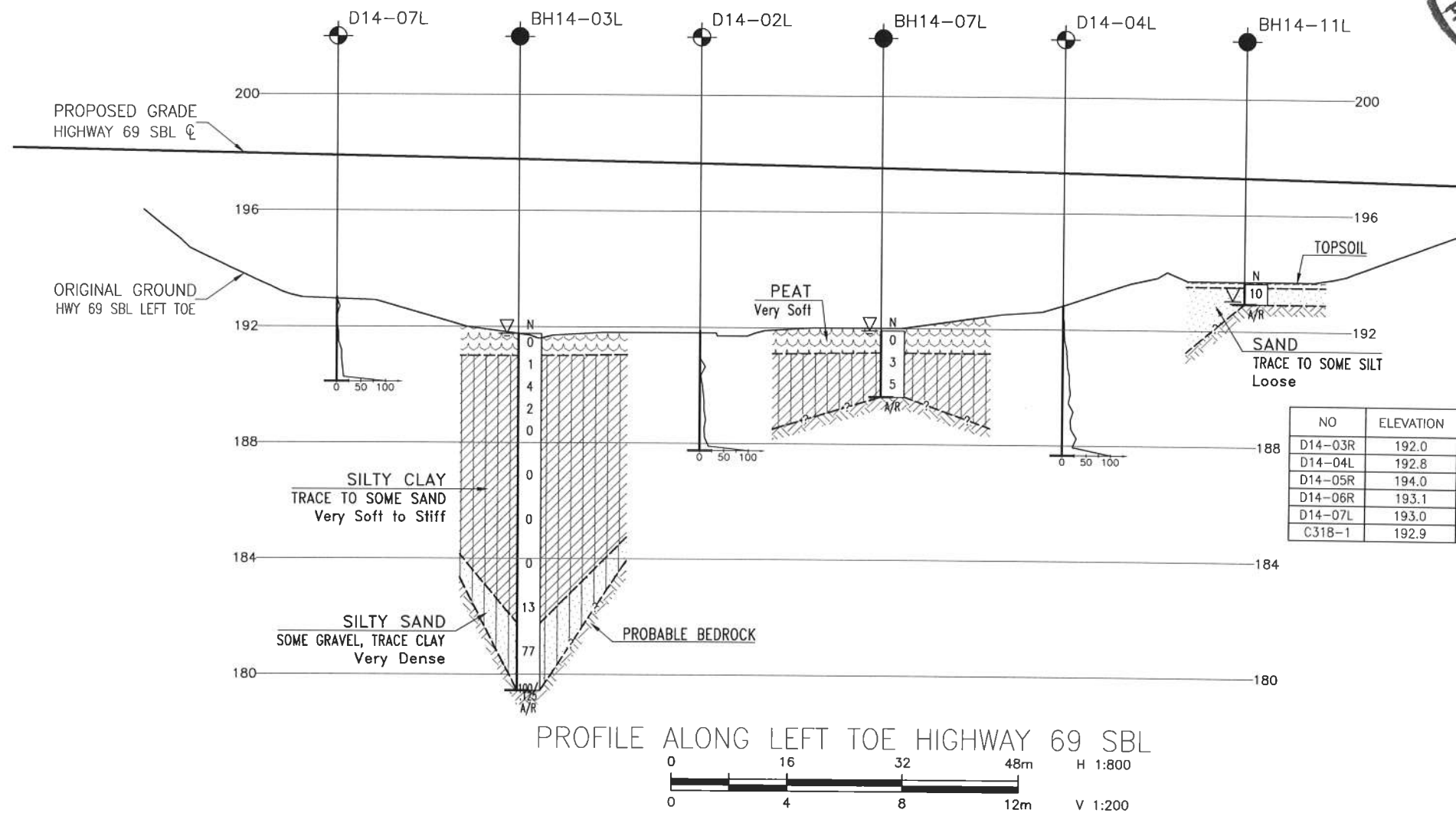
◆	Borehole
◆	Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60' Cone, 475J/blow)
PH	Pressure, Hydraulic
W	Water Level
HA	Head Artesian Water
P	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
BH14-01	192.8	5 055 733.9	234 918.0
BH14-02	192.5	5 055 738.8	234 916.9
BH14-03L	191.8	5 055 748.0	234 901.3
BH14-04	191.7	5 055 763.1	234 911.2
BH14-05R	191.8	5 055 778.2	234 921.1
BH14-06	191.8	5 055 787.5	234 905.6
BH14-07L	191.9	5 055 796.7	234 890.2
BH14-08	191.9	5 055 811.8	234 899.9
BH14-09R	192.1	5 055 826.7	234 908.8
BH14-10	192.6	5 055 836.2	234 894.2
BH14-11L	193.6	5 055 845.9	234 880.8
BH14-12	194.5	5 055 855.6	234 889.7
BH14-13	192.5	5 055 714.4	234 922.5
BH14-14R	192.6	5 055 726.6	234 933.1
D14-01R	192.2	5 055 753.9	234 926.8
D14-02L	191.9	5 055 772.3	234 895.7

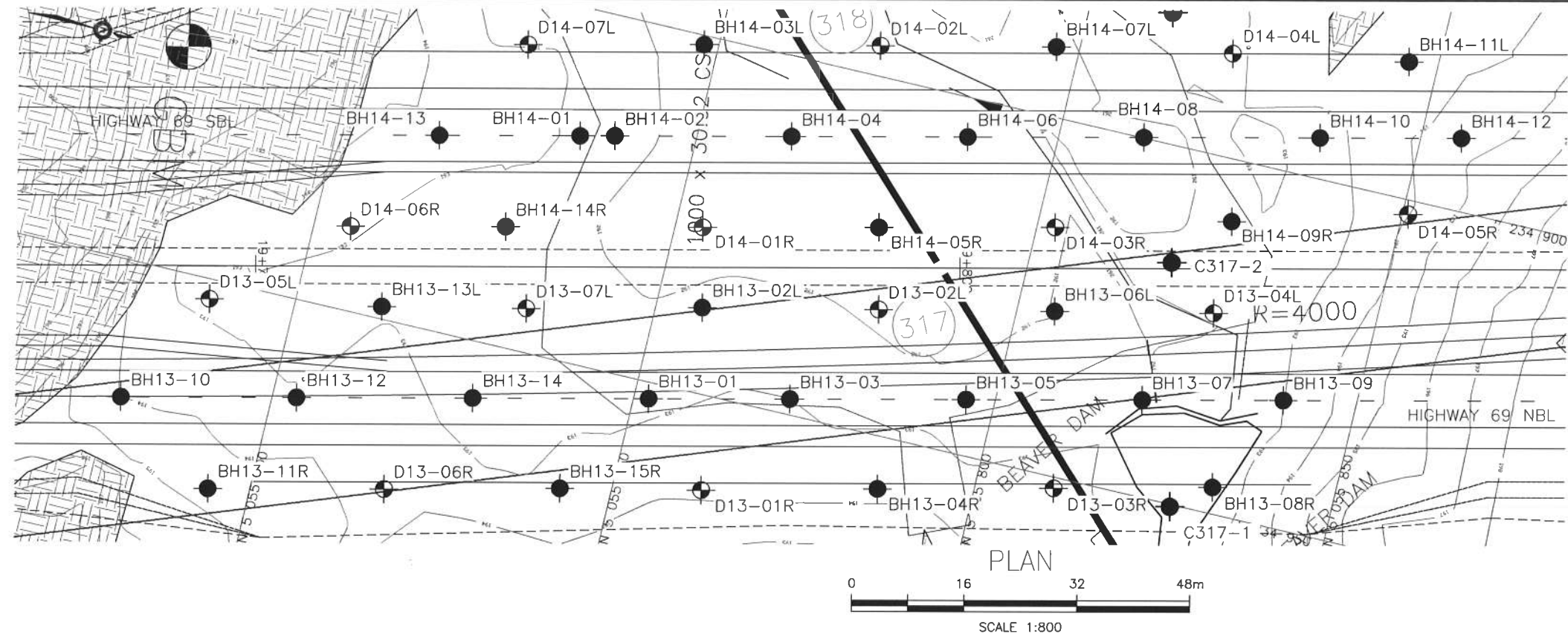
NOTES

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

GEOCRES No. 41H-96



REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE
			DEC. 2012

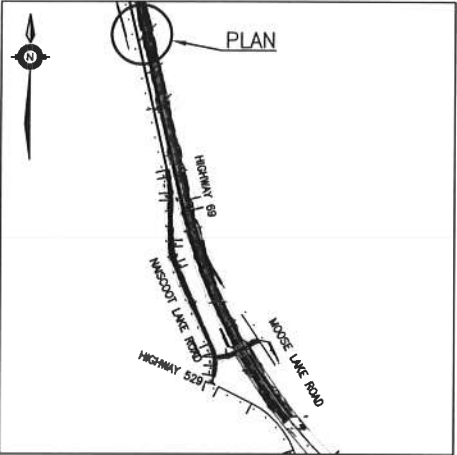


METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



CONT No
GWP No 5076-06-00

HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 SBL-CL
(STA 19+680 - 19+870)
BOREHOLE LOCATIONS AND SOIL STRATA



KEYPLAN

LEGEND

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

NO	ELEVATION	NORTHING	EASTING
BH14-01	192.8	5 055 733.9	234 918.0
BH14-02	192.5	5 055 738.8	234 916.9
BH14-03L	191.8	5 055 748.0	234 901.3
BH14-04	191.7	5 055 763.1	234 911.2
BH14-05R	191.8	5 055 778.2	234 921.1
BH14-06	191.8	5 055 787.5	234 905.6
BH14-07L	191.9	5 055 796.7	234 890.2
BH14-08	191.9	5 055 811.8	234 899.9
BH14-09R	192.1	5 055 826.7	234 908.8
BH14-10	192.6	5 055 836.2	234 894.2
BH14-11L	193.6	5 055 845.9	234 880.8
BH14-12	194.5	5 055 855.6	234 889.7
BH14-13	192.5	5 055 714.4	234 922.5
BH14-14R	192.6	5 055 726.6	234 933.1
D14-01R	192.2	5 055 753.9	234 926.8
D14-02L	191.9	5 055 772.3	234 895.7

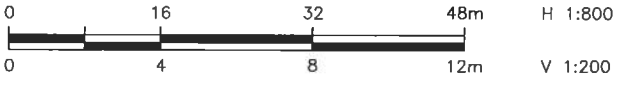
NOTES

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- This drawing is for subsurface information only. Surface details and features are for conceptual illustration.

GEOCREs No. 41H-96

NO	ELEVATION	NORTHING	EASTING
D14-05R	194.0	5 055 850.8	234 902.0
D14-03R	192.0	5 055 802.5	234 915.3
D14-04L	192.8	5 055 821.3	234 885.4
D14-05R	194.0	5 055 850.8	234 902.0
D14-06R	193.1	5 055 705.2	234 938.1
D14-07L	193.0	5 055 723.6	234 907.0
C317-1	192.7	5 055 827.6	234 950.3
C317-2	192.4	5 055 819.8	234 916.4

PROFILE ALONG CL HIGHWAY 69 SBL



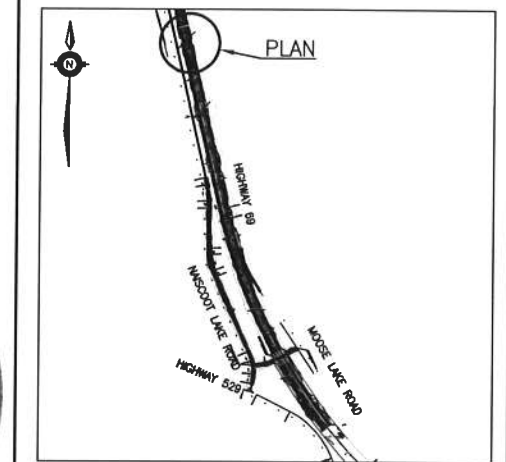
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DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012






LICENSED PROFESSIONAL ENGINEER
M. R. ANDERSON
PROVINCE OF ONTARIO
12345
Dec 13/12

LICENSED PROFESSIONAL ENGINEER
P. K. Chatterji
 P. K. CHATTERJI
 123456789
 PROVINCE OF ONTARIO
 Dec 13/12



THURBER ENGINEERING LTD.



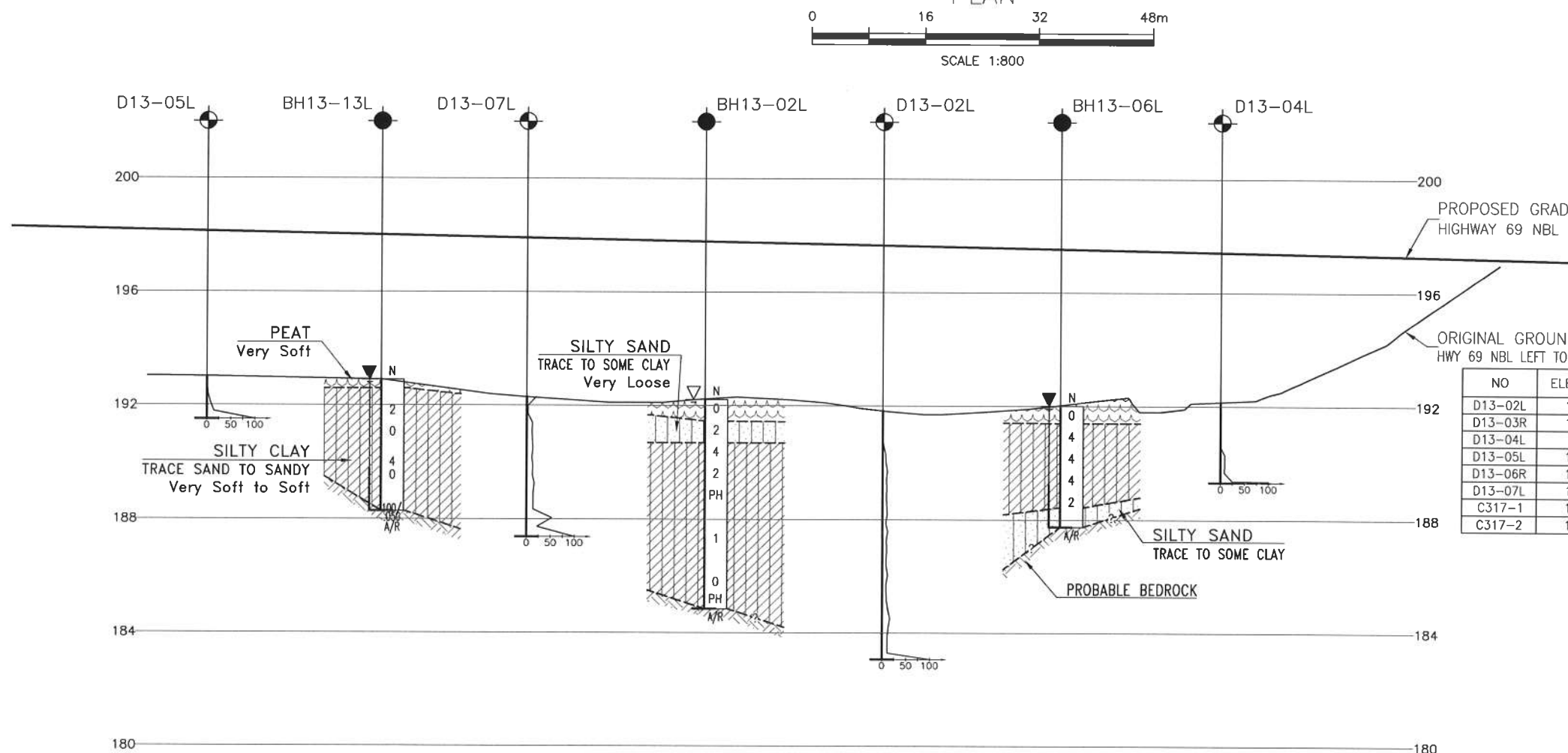
	Borehole
	Cone
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60' Cone, 475J/blow)
PH	Pressure, Hydraulic
	Water Level
	Head Artesian Water
	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING	NO	ELEVATION	NORTHING	EASTING
D13-02L	191.8	5 055 780.9	234 932.4	BH13-01	192.8	5 055 752.1	234 952.3
D13-03R	193.3	5 055 811.0	234 951.5	BH13-02L	192.2	5 055 756.5	234 937.9
D13-04L	192.1	5 055 827.2	234 922.1	BH13-03	193.0	5 055 771.6	234 947.7
D13-05L	193.0	5 055 688.1	234 952.8	BH13-04R	193.8	5 055 786.6	234 957.3
D13-06R	193.8	5 055 718.5	234 973.4	BH13-05	192.4	5 055 795.9	234 942.1
D13-07L	192.3	5 055 732.2	234 943.8	BH13-06L	192.0	5 055 805.3	234 927.0
C317-1	192.7	5 055 827.6	234 950.3	BH13-07	192.7	5 055 820.3	234 936.4
C317-2	192.4	5 055 819.8	234 916.4	BH13-08R	192.8	5 055 832.8	234 946.2
				BH13-09	193.0	5 055 839.8	234 931.9
				BH13-10	194.0	5 055 679.0	234 969.2
				BH13-11R	194.5	5 055 694.2	234 979.1
				BH13-12	193.2	5 055 703.4	234 963.6
				BH13-13L	192.9	5 055 712.1	234 948.2
				BH13-14	192.7	5 055 727.7	234 957.9
				BH13-15R	193.4	5 055 742.8	234 967.6
				D13-01R	193.8	5 055 762.4	234 963.2

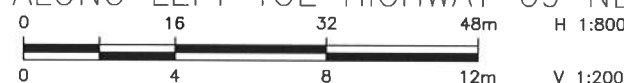
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[illegible]

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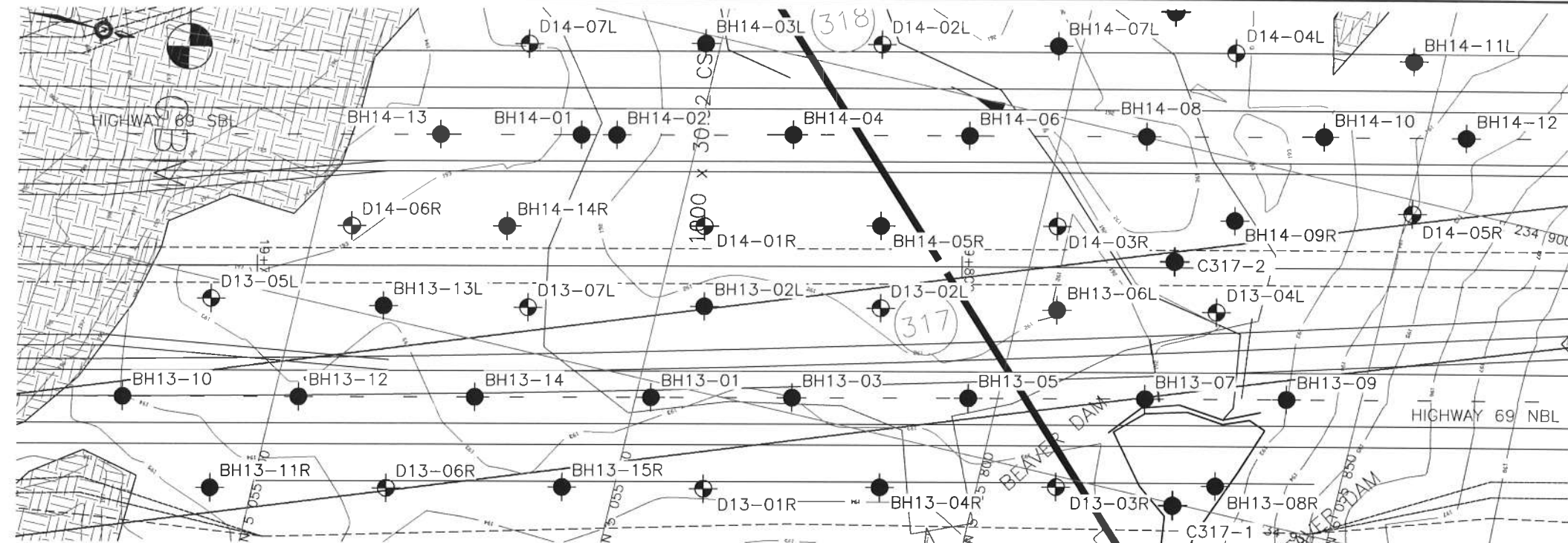


PROFILE ALONG LEFT TOE HIGHWAY 69 NBL

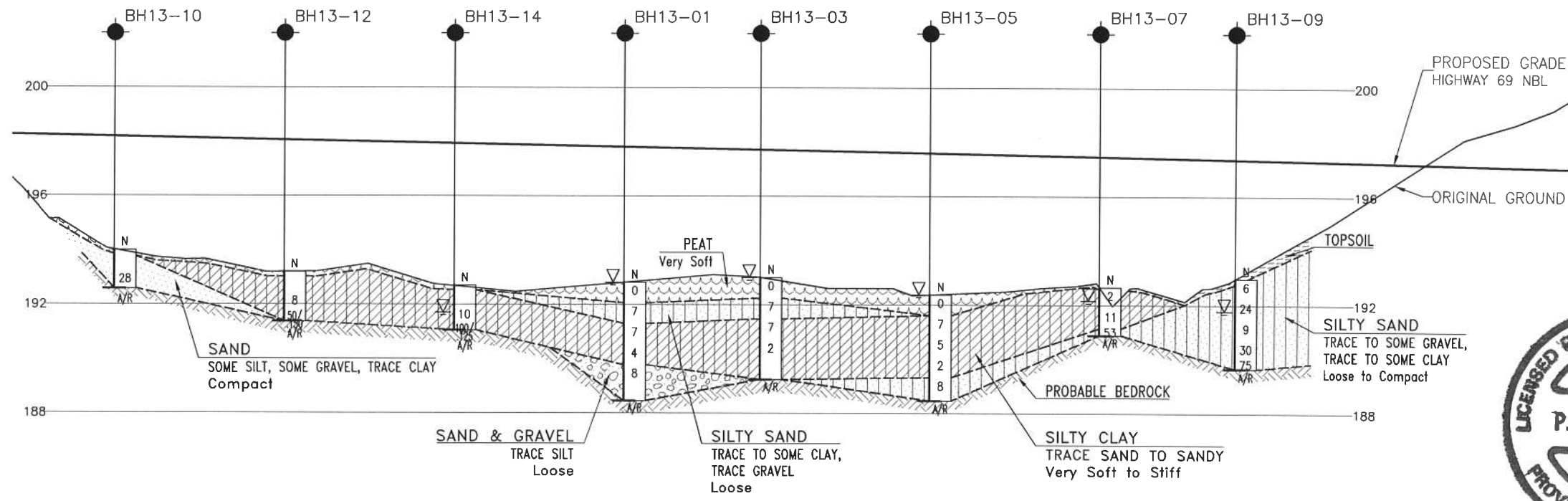


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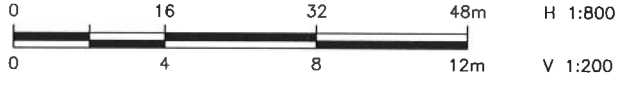
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PLAN



PROFILE ALONG C HIGHWAY 69 NBL

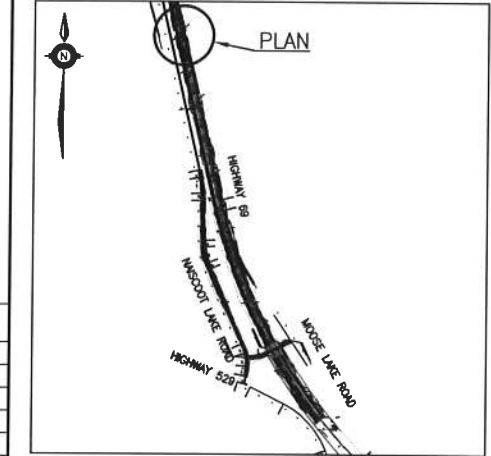


METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



CONT No
GWP No 5076-06-00

HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 NBL-C
(STA 19+680 - 19+870)
BOREHOLE LOCATIONS AND SOIL STRATA



KEYPLAN

LEGEND

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

NO	ELEVATION	NORTHING	EASTING
BH13-01	192.8	5 055 752.1	234 952.3
BH13-02L	192.2	5 055 756.5	234 937.9
BH13-03	193.0	5 055 771.6	234 947.7
BH13-04R	193.8	5 055 786.6	234 957.3
BH13-05	192.4	5 055 795.9	234 942.1
BH13-06L	192.0	5 055 805.3	234 927.0
BH13-07	192.7	5 055 820.3	234 936.4
BH13-08R	192.8	5 055 832.8	234 946.2
BH13-09	193.0	5 055 839.8	234 931.9
BH13-10	194.0	5 055 679.0	234 969.2
BH13-11R	194.5	5 055 694.2	234 979.1
BH13-12	193.2	5 055 703.4	234 963.6
BH13-13L	192.9	5 055 712.1	234 948.2
BH13-14	192.7	5 055 727.7	234 957.9
BH13-15R	193.4	5 055 742.8	234 967.6
D13-01R	193.8	5 055 762.4	234 963.2

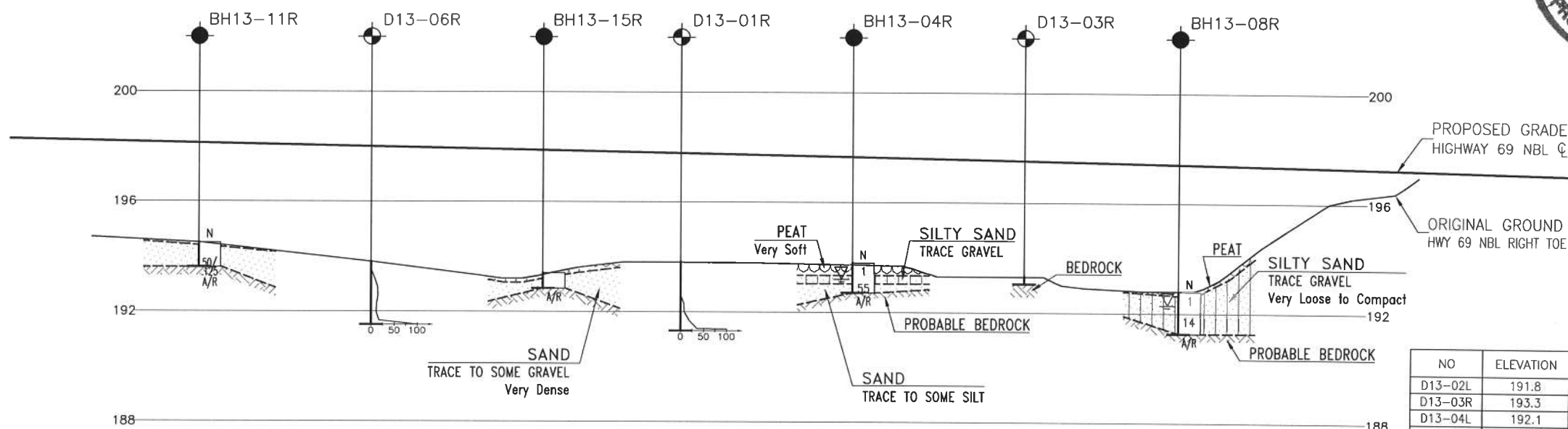
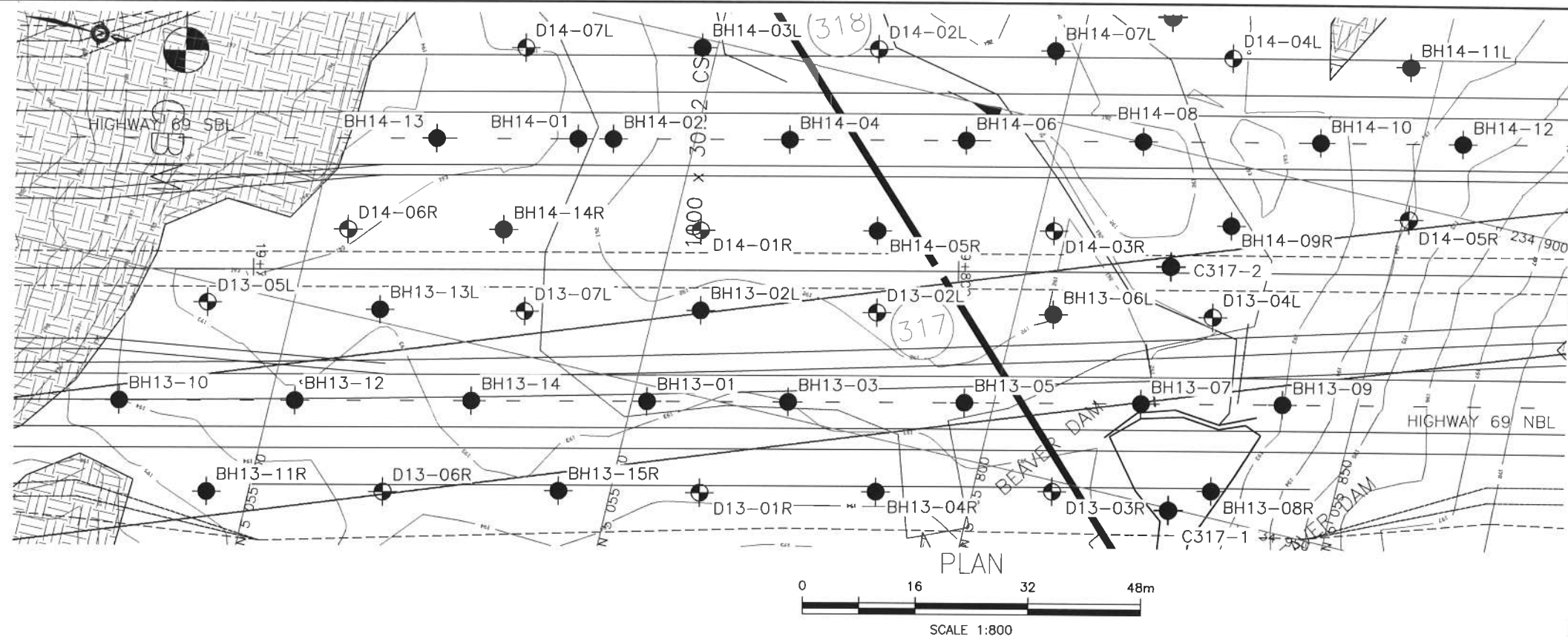
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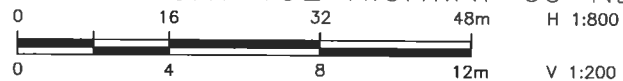
GEOCRES No. 41H-96



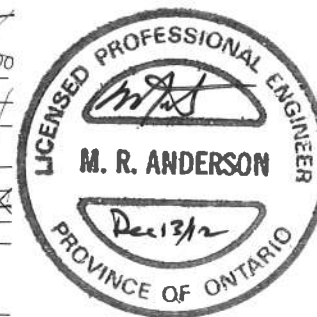
DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG CODE
DRAWN	MFA	CHK PKC SITE
LOAD	STRUCT	DWG
DATE	DEC. 2012	



PROFILE ALONG RIGHT TOE HIGHWAY 69 NBL



METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN

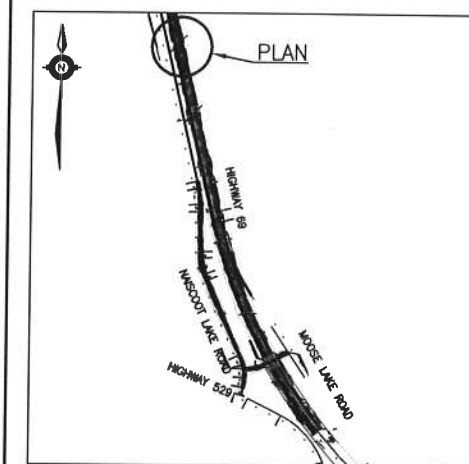


CONT No
GWP No 5076-06-00

HIGHWAY 69 FOUR-LANING
HARRISON HWY 69 NBL-RT TOE
(STA 19+680 - 19+870)
BOREHOLE LOCATIONS AND SOIL STRATA

MMM GROUP

THURBER ENGINEERING LTD.



KEYPLAN

LEGEND

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

NO	ELEVATION	NORTHING	EASTING
BH13-01	192.8	5 055 752.1	234 952.3
BH13-02L	192.2	5 055 756.5	234 937.9
BH13-03	193.0	5 055 771.6	234 947.7
BH13-04R	193.8	5 055 786.6	234 957.3
BH13-05	192.4	5 055 795.9	234 942.1
BH13-06L	192.0	5 055 805.3	234 927.0
BH13-07	192.7	5 055 820.3	234 936.4
BH13-08R	192.8	5 055 832.8	234 946.2
BH13-09	193.0	5 055 839.8	234 931.9
BH13-10	194.0	5 055 679.0	234 969.2
BH13-11R	194.5	5 055 694.2	234 979.1
BH13-12	193.2	5 055 703.4	234 963.6
BH13-13L	192.9	5 055 712.1	234 948.2
BH13-14	192.7	5 055 727.7	234 957.9
BH13-15R	193.4	5 055 742.8	234 967.6
D13-01R	193.8	5 055 762.4	234 963.2

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GEOCREs No. 41H-96

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	RPR	CHK AEG	CODE
DRAWN	MFA	CHK PKC	SITE
			LOAD
			STRUCT
			DWG
			DATE DEC. 2012