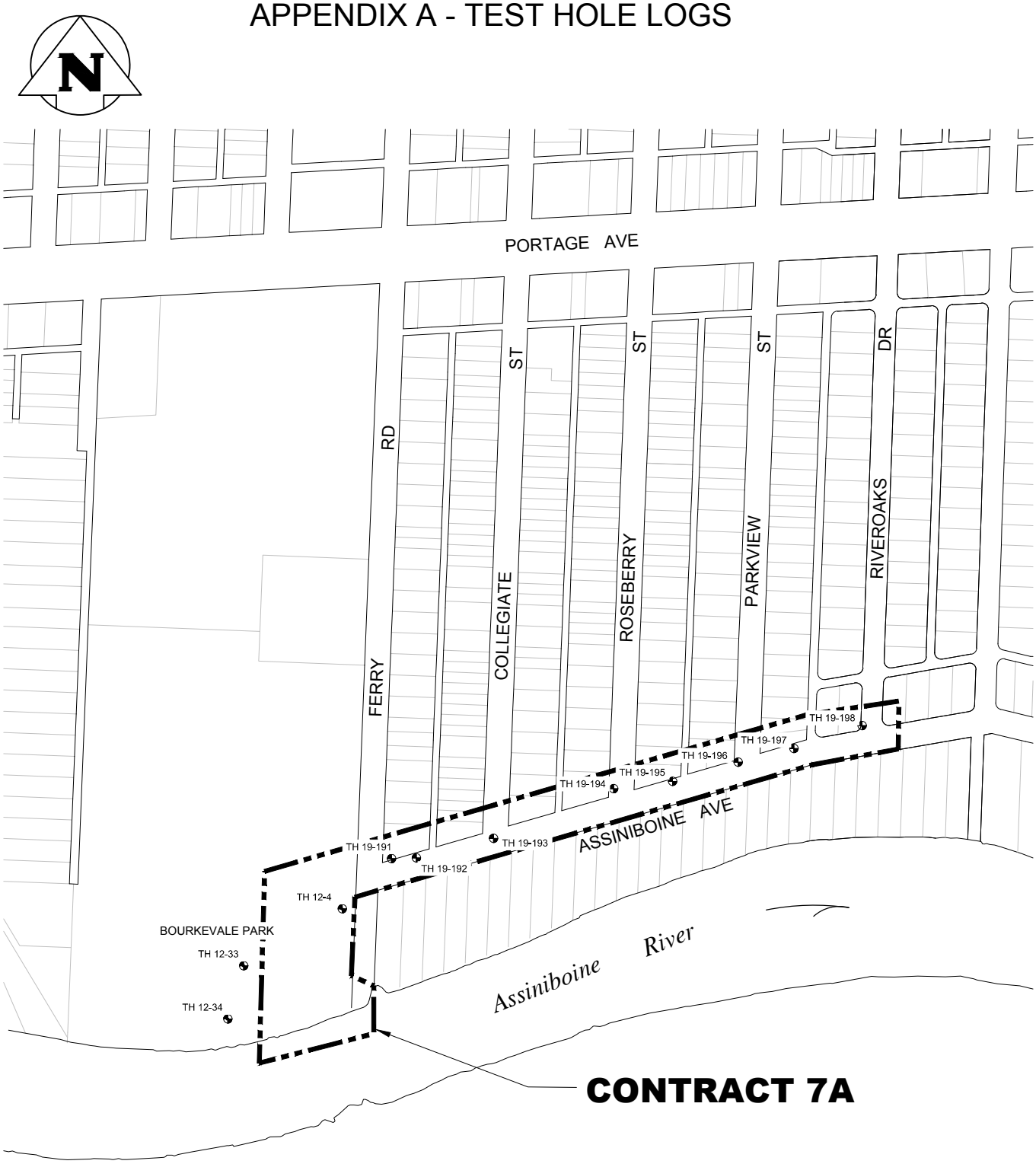
Appendix A

Test Hole Logs

APPENDIX A - TEST HOLE LOGS



DYREGROV ROBINSON INC.

CONSULTING GEOTECHNICAL ENGINEERS

AUTHORIZED BY: AUTHORIZED

DATE: 19.09.17

CLIENT DRAWING NO.

CLIENT

TETRA TECH

Complex World
Clear Solutions

DRAWING DESCRIPTION

TEST HOLE LOCATION FOR FERRY ROAD
CSR WORKS CONTRACT 7A

DESIGNED BY:	DRAWN BY: NL	DRAWING NO.	REV.
REVIEWED BY:	SCALE: NTS	FIGURE_1	A

\\TTS293FS2.TT.LOCAL\PROJECTS\A-G\CITY OF WINNIPEG - WATER & WASTE DEPARTMENT - 0012\10001203.00 - FERRY ROAD\CONTRACT 7\GEOTECH\CONTRACT 7A TEST HOLE LOCATIONS.DWG 19.09.17 2:10 PM

EXPLANATION OF TERMS & SYMBOLS

Description				TH Log Symbols	USCS Classification	Laboratory Classification Criteria			
						Fines (%)	Grading	Plasticity	Notes
COARSE GRAINED SOILS	GRAVELS (More than 50% of coarse fraction of gravel size)	CLEAN GRAVELS (Little or no fines)	Well graded gravels, sandy gravels, with little or no fines		GW	0-5	$C_U > 4$ $1 < C_C < 3$		Dual symbols if 5-12% fines. Dual symbols if above "A" line and $4<W_P<7$ $C_U = \frac{D_{60}}{D_{10}}$ $C_C = \frac{(D_{30})^2}{D_{10} x D_{60}}$
			Poorly graded gravels, sandy gravels, with little or no fines		GP	0-5	Not satisfying GW requirements		
		DIRTY GRAVELS (With some fines)	Silty gravels, silty sandy gravels		GM	> 12		Atterberg limits below "A" line or $W_P<4$	
			Clayey gravels, clayey sandy gravels		GC	> 12		Atterberg limits above "A" line or $W_P<7$	
	SANDS (More than 50% of coarse fraction of sand size)	CLEAN SANDS (Little or no fines)	Well graded sands, gravelly sands, with little or no fines		SW	0-5	$C_U > 6$ $1 < C_C < 3$		
			Poorly graded sands, gravelly sands, with little or no fines		SP	0-5	Not satisfying SW requirements		
		DIRTY SANDS (With some fines)	Silty sands, sand-silt mixtures		SM	> 12		Atterberg limits below "A" line or $W_P<4$	
			Clayey sands, sand-clay mixtures		SC	> 12		Atterberg limits above "A" line or $W_P<7$	
FINE GRAINED SOILS	SILTS (Below 'A' line negligible organic content)	$W_L<50$	Inorganic silts, silty or clayey fine sands, with slight plasticity		ML			Classification is Based upon Plasticity Chart	
		$W_L>50$	Inorganic silts of high plasticity		MH				
	CLAYS (Above 'A' line negligible organic content)	$W_L<30$	Inorganic clays, silty clays, sandy clays of low plasticity, lean clays		CL				
		$30<W_L<50$	Inorganic clays and silty clays of medium plasticity		CI				
		$W_L>50$	Inorganic clays of high plasticity, fat clays		CH				
	ORGANIC SILTS & CLAYS (Below 'A' line)	$W_L<50$	Organic silts and organic silty clays of low plasticity		OL				
		$W_L>50$	Organic clays of high plasticity		OH				
HIGHLY ORGANIC SOILS			Peat and other highly organic soils		Pt	Von Post Classification Limit		Strong colour or odour, and often fibrous texture	

	Asphalt		Glacial Till		Bedrock (Igneous)
	Concrete		Clay Shale		Bedrock (Limestone)
	Fill				Bedrock (Undifferentiated)

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FRACTION		PARTICLE SIZE (mm) Min.	Max.	RELATIVE PROPORTIONS (by weight) Percent	Descriptor
Boulders		>300			
Cobbles		75	300	>35%	main fraction
Gravel	Coarse	19	75	35 - 50	"and"
	Fine	4.75	19		
Sand	Coarse	2.0	4.75	20 – 35	Adjective e.g. silty, clayey
	Medium	0.425	2.0		
	Fine	0.075	0.425	10 – 20	"some"
Silt (non-plastic) or Clay (plastic)		< 0.075 mm		1 - 10	"trace"

Soil Classification Example

Clay 50% (main fraction), Silt 25%, Sand 17%, Gravel 8%

Clay – silty, some sand, trace gravel

TERMS and SYMBOLS

Laboratory and field tests are identified as follows:

Unconfined Comp.: undrained shear strength (kPa or psf) derived from unconfined compression testing.

Torvane: undrained shear strength (kPa or psf) measured using a Torvane

Pocket Pen.: undrained shear strength (kPa or psf) measured using a pocket penetrometer.

Unit Weight bulk unit weight of soil or rock (kN/m^3 or pcf).

SPT – N Standard Penetration Test: The number of blows (N) required to drive a 51 mm O.D. split barrel sampler 300 mm into the soil using a 63.5 kg hammer with a free fall drop height of 760 mm.

DCPT Dynamic Cone Penetration Test. The number of blows (N) required to drive a 50 mm diameter cone 300 mm into the soil using a 63.5 kg hammer with a free fall drop height of 760 mm.

M/C insitu soil moisture content in percent

PL Plastic limit, moisture content in percent

LL Liquid limit, moisture content in percent

The undrained shear strength (Su) of cohesive soil is related to its consistency as follows:

Su (kPa)	Su (psf)	CONSISTENCY
<12	250	very soft
12 – 25	250 – 525	soft
25 – 50	525 – 1050	firm
50 – 100	1050 – 2100	stiff
100 – 200	2100 – 4200	very stiff
200	4200	hard

The SPT - N of non-cohesive soil is related to compactness condition as follows:

N – Blows / 300 mm	COMPACTNESS
0 - 4	very loose
4 - 10	loose
10 - 30	compact
30 - 50	dense
50 +	very dense

References:

ASTM D2487 – Classification of Soils For Engineering Purposes (Unified Soil Classification System)

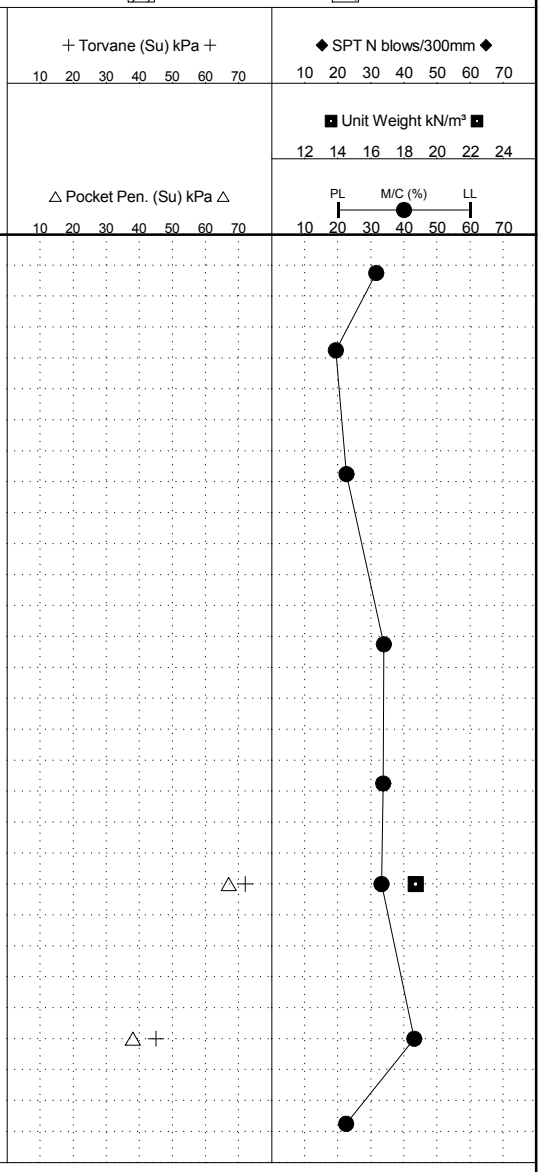
Canadian Foundation Engineering Manual, 4th Edition, Canadian Geotechnical Society, 2006

PROJECT: Ferry Road Riverbend CSR - Contract 7	CLIENT: Tetra Tech Canada Inc.	TEST HOLE NO: **19-191**
LOCATION:		PROJECT NO.: 143691
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Ranger 24 Drill Rig w/100mm SS augers	ELEVATION (m): 230.704

SAMPLE TYPE: GRAB, SHELBY TUBE, SPLIT SPOON, BULK, NO RECOVERY, CORE

BACKFILL TYPE: BENTONITE, GRAVEL, SLOUGH, GROUT, CUTTINGS, SAND

ELEVATION (m)	DEPTH (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #
		TOPSOIL (100 mm thick) - black, moist		
230		CLAY (ALLUVIAL) - silty - brown, moist, firm, high plasticity		G1
	1	SILT (ALLUVIAL) - brown, moist, loose		G2
229	2	CLAY (ALLUVIAL) - trace to some silt, trace sand - brown - moist, firm, high plasticity		G3
228	3			
227	4	- below 3.7 m; moist to wet, soft - AND SILT between 4 and 5.5 m		G4
226	5			
225	6	- grey below 5.5 m		G5
224				T6
	7	CLAY (LACUSTRINE) - silty - grey - moist, stiff, high plasticity - trace silt inclusions		
223	8			T7
222	9	- trace silt till inclusions below 8.2 m		G9



END OF TEST HOLE AT 9.1 m IN CLAY (LACUSTRINE)

NOTES:

1. Trace seepage observed below 6.1 m.
2. No sloughing observed during drilling.
3. Upon completion of drilling, test hole open to 6.4 m b/l grade and water level 4.9 m b/l grade.
4. Test hole backfilled with auger cuttings and bentonite chips.

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Consulting Geotechnical Engineers

LOGGED BY: CR	COMPLETION DEPTH: 9.14 m
REVIEWED BY: DRAFT	COMPLETION DATE: 10/7/19
PROJECT ENGINEER: Gil Robinson	Page 1 of 1

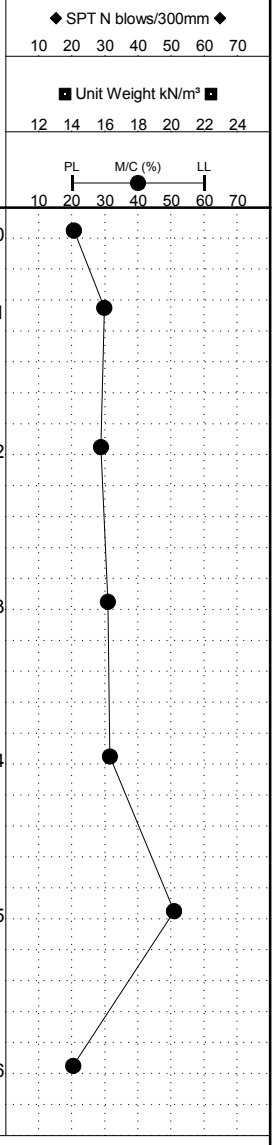
BH GEOTECH PLOTS-AUGUST 2013 143691_TETRA TECH_FERRY ROAD_CONTRACT 7.GPJ DATA TEMPLATE - AUGUST 2, 2013.GDT 14/8/19

PROJECT: Ferry Road Riverbend CSR - Contract 7	CLIENT: Tetra Tech Canada Inc.	TEST HOLE NO: **19-192**
LOCATION:		PROJECT NO.: 143691
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Ranger 24 Drill Rig w/100mm SS augers	ELEVATION (m): 230.522

SAMPLE TYPE: GRAB, SHELBY TUBE, SPLIT SPOON, BULK, NO RECOVERY, CORE

BACKFILL TYPE: BENTONITE, GRAVEL, SLOUGH, GROUT, CUTTINGS, SAND

ELEVATION (m)	DEPTH (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #
		TOPSOIL (50 mm thick) - black, moist		
230		CLAY (ALLUVIAL) - some silt - brown, moist, stiff, high plasticity		G10
	1			G11
229		- silty below 1.2 m		
	2			
228				G12
	3	- firm below 3 m		
227				
	4			G13
226				
	5	- grey below 5 m		
225				G14
	6			
224				
	7	CLAY (LACUSTRINE) - silty - grey - moist, stiff, high plasticity		G15
223		- trace silt till inclusions below 7.5 m		
	8			
222				G16
	9			



END OF TEST HOLE AT 9.1 m IN CLAY (LACUSTRINE)

NOTES:
1. Trace seepage observed below 4.6 m.
2. No sloughing observed during drilling.
3. Upon completion of drilling, test hole open to 8.2 m b/l grade and water level 4.3 m b/l grade.
4. Test hole backfilled with auger cuttings and bentonite chips.

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Consulting Geotechnical Engineers

LOGGED BY: CR	COMPLETION DEPTH: 9.14 m
REVIEWED BY: DRAFT	COMPLETION DATE: 10/7/19
PROJECT ENGINEER: Gil Robinson	Page 1 of 1

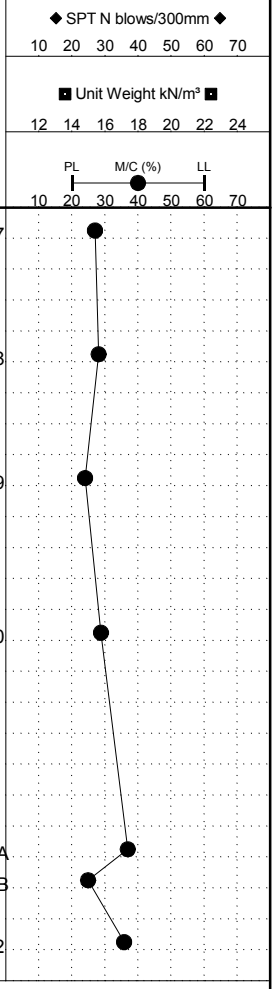
BH GEOTECH PLOTS-AUGUST 2013 143691_TETRA TECH_FERRY ROAD_CONTRACT 7.GPJ DATA TEMPLATE - AUGUST 2, 2013.GDT 14/8/19

PROJECT: Ferry Road Riverbend CSR - Contract 7	CLIENT: Tetra Tech Canada Inc.	TEST HOLE NO: **19-193**
LOCATION:		PROJECT NO.: 143691
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Ranger 24 Drill Rig w/100mm SS augers	ELEVATION (m): 230.83

SAMPLE TYPE: GRAB, SHELBY TUBE, SPLIT SPOON, BULK, NO RECOVERY, CORE

BACKFILL TYPE: BENTONITE, GRAVEL, SLOUGH, GROUT, CUTTINGS, SAND

ELEVATION (m)	DEPTH (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #
		CLAY (FILL) - trace sand, trace gravel - black, moist, stiff, high plasticity		G17
230	1	CLAY (ALLUVIAL) - silty, trace sand - brown - moist, stiff, intermediate plasticity		G18
229	2			
228	3	- soft below 3 m		G19
227	4			G20
226	5			
225	6	CLAY and SILT from 6.1 to 6.5 m: grey, wet, soft		T21A
224	7	150 mm thick layer of grey, wet, Sand at 6.5 m		T21B
				G22



END OF TEST HOLE AT 7.6 m IN CLAY (ALLUVIAL)

NOTES:
1. Trace seepage observed below 4.6 m.
2. No sloughing observed during drilling.
3. Upon completion of drilling, test hole open to 5.2 m b/l grade and water level 4.6 m b/l grade.
4. Test hole backfilled with auger cuttings and bentonite chips.

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LOGGED BY: CR	COMPLETION DEPTH: 7.62 m
REVIEWED BY: DRAFT	COMPLETION DATE: 10/7/19
PROJECT ENGINEER: Gil Robinson	Page 1 of 1

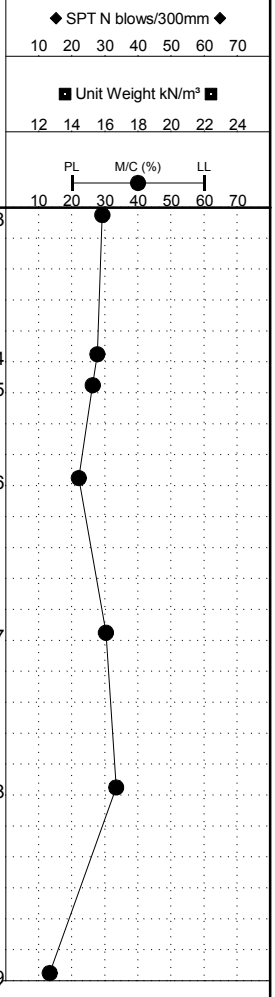
BH GEOTECH PLOTS-AUGUST 2013 143691_TETRA TECH_FERRY ROAD_CONTRACT 7.GPJ DATA TEMPLATE - AUGUST 2, 2013.GDT 14/8/19

PROJECT: Ferry Road Riverbend CSR - Contract 7	CLIENT: Tetra Tech Canada Inc.	TEST HOLE NO: **19-194**
LOCATION:		PROJECT NO.: 143691
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Ranger 24 Drill Rig w/100mm SS augers	ELEVATION (m): 231.109

SAMPLE TYPE: GRAB, SHELBY TUBE, SPLIT SPOON, BULK, NO RECOVERY, CORE

BACKFILL TYPE: BENTONITE, GRAVEL, SLOUGH, GROUT, CUTTINGS, SAND

ELEVATION (m)	DEPTH (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #
231		CLAY (FILL) - trace sand, trace gravel - black, moist, stiff, high plasticity		G23
		CLAY (ALLUVIAL) - silty - brown - moist, stiff, high plasticity		
230	1			
				G24
				G25
229	2			
		SAND and SILT - brown, moist		G26
228	3	CLAY (ALLUVIAL) - silty - brown - moist, stiff, high plasticity - trace silt inclusions		
227	4			G27
226	5	- grey below 5 m		
				G28
225	6			
224	7	- trace till inclusions below 6.7 m		
				G29



END OF TEST HOLE AT 7.6 m IN CLAY (ALLUVIAL)

NOTES:
1. Trace seepage observed below 4.9 m.
2. No sloughing observed during drilling.
3. Upon completion of drilling, test hole open to 6.4 m b/l grade and water level 3.5 m b/l grade.
4. Test hole backfilled with auger cuttings and bentonite chips.

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Consulting Geotechnical Engineers

LOGGED BY: CR	COMPLETION DEPTH: 7.62 m
REVIEWED BY: DRAFT	COMPLETION DATE: 10/7/19
PROJECT ENGINEER: Gil Robinson	Page 1 of 1

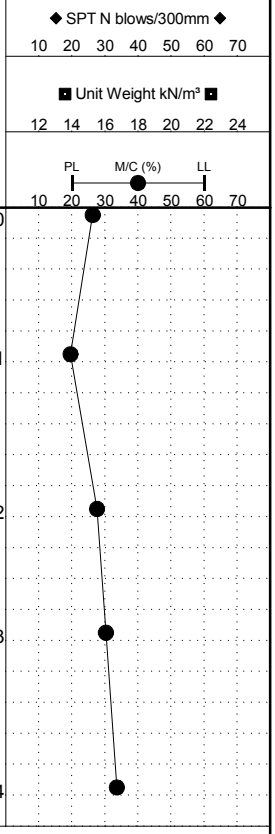
BH GEOTECH PLOTS-AUGUST 2013 143691_TETRA TECH_FERRY ROAD_CONTRACT 7.GPJ DATA TEMPLATE - AUGUST 2, 2013.GDT 14/8/19

PROJECT: Ferry Road Riverbend CSR - Contract 7	CLIENT: Tetra Tech Canada Inc.	TEST HOLE NO: **19-195**
LOCATION:		PROJECT NO.: 143691
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Ranger 24 Drill Rig w/100mm SS augers	ELEVATION (m): 231.26

SAMPLE TYPE: GRAB, SHELBY TUBE, SPLIT SPOON, BULK, NO RECOVERY, CORE

BACKFILL TYPE: BENTONITE, GRAVEL, SLOUGH, GROUT, CUTTINGS, SAND

ELEVATION (m)	DEPTH (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #
231		TOPSOIL (100 mm thick) - silty - black, moist		G30
		CLAY (ALLUVIAL) - silty - brown - dry to moist		
230	1			G31
229	2			
		SAND - brown, moist to wet		
228	3	CLAY (ALLUVIAL) - silty, trace sand - brown - moist, firm, high plasticity		G32
227	4			G33
226	5	- grey below 5 m		
	6			G34



END OF TEST HOLE AT 6.1 m IN CLAY (ALLUVIAL)

NOTES:
1. Trace seepage observed below 3 m.
2. No sloughing observed during drilling.
3. Upon completion of drilling, test hole open to 4.6 m b/l grade and water level 4 m b/l grade.
4. Test hole backfilled with auger cuttings and bentonite chips.

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Consulting Geotechnical Engineers

LOGGED BY: CR	COMPLETION DEPTH: 6.10 m
REVIEWED BY: DRAFT	COMPLETION DATE: 10/7/19
PROJECT ENGINEER: Gil Robinson	Page 1 of 1

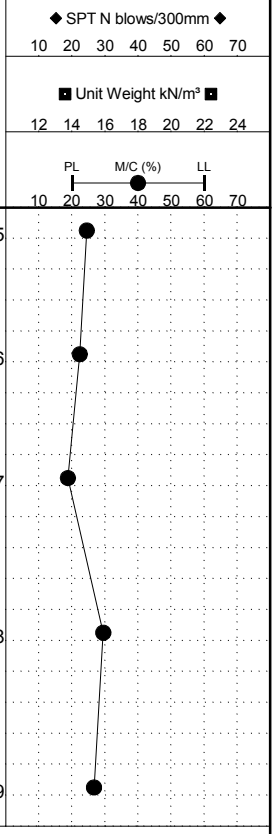
BH GEOTECH PLOTS-AUGUST 2013 143691_TETRA TECH_FERRY ROAD_CONTRACT 7.GPJ DATA TEMPLATE - AUGUST 2, 2013.GDT 14/8/19

PROJECT: Ferry Road Riverbend CSR - Contract 7	CLIENT: Tetra Tech Canada Inc.	TEST HOLE NO: **19-196**
LOCATION:		PROJECT NO.: 143691
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Ranger 24 Drill Rig w/100mm SS augers	ELEVATION (m): 231.116

SAMPLE TYPE: GRAB, SHELBY TUBE, SPLIT SPOON, BULK, NO RECOVERY, CORE

BACKFILL TYPE: BENTONITE, GRAVEL, SLOUGH, GROUT, CUTTINGS, SAND

ELEVATION (m)	DEPTH (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #
231		TOPSOIL - 50 mm thick		
		CLAY (FILL) - trace sand, trace gravel		
230	1	CLAY (ALLUVIAL) - silty, trace sand - brown - moist, stiff, intermediate plasticity		
229	2			
228	3	SILT (ALLUVIAL) - trace clay, trace sand - brown - moist to wet, loose		
227	4			
226	5	CLAY (ALLUVIAL) - silty - grey - moist, stiff, high plasticity - below 5.2 m; trace till inclusions, trace sand, trace gravel		
	6			



END OF TEST HOLE AT 6.1 m IN CLAY (ALLUVIAL)

NOTES:

1. Trace seepage observed below 4.6 m.
2. No sloughing observed during drilling.
3. Upon completion of drilling, test hole open to 4.2 m b/l grade and water level 4.2 m b/l grade.
4. Test hole backfilled with auger cuttings and bentonite chips.

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LOGGED BY: CR	COMPLETION DEPTH: 6.10 m
REVIEWED BY: DRAFT	COMPLETION DATE: 11/7/19
PROJECT ENGINEER: Gil Robinson	Page 1 of 1

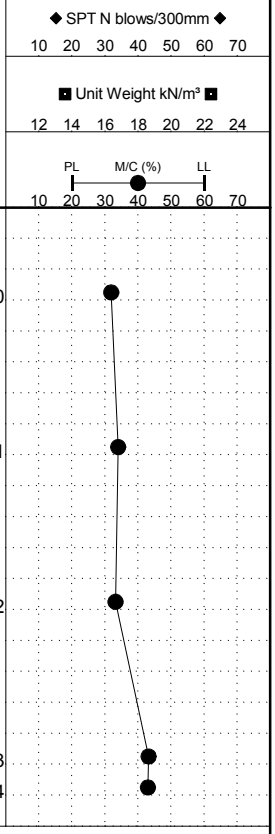
BH GEOTECH PLOTS-AUGUST 2013 143691_TETRA TECH_FERRY ROAD_CONTRACT 7.GPJ DATA TEMPLATE - AUGUST 2, 2013.GDT 14/8/19

PROJECT: Ferry Road Riverbend CSR - Contract 7	CLIENT: Tetra Tech Canada Inc.	TEST HOLE NO: **19-197**
LOCATION:		PROJECT NO.: 143691
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Ranger 24 Drill Rig w/100mm SS augers	ELEVATION (m): 231.555

SAMPLE TYPE: GRAB, SHELBY TUBE, SPLIT SPOON, BULK, NO RECOVERY, CORE

BACKFILL TYPE: BENTONITE, GRAVEL, SLOUGH, GROUT, CUTTINGS, SAND

ELEVATION (m)	DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #
			TOPSOIL - silty, trace organics, black, moist		
231			CLAY (LACUSTRINE) - trace organics, trace rootlets to 0.9 m		
			- black		
	1		- moist, stiff, high plasticity		G40
			- mottled brown and grey below 0.9 m		
230					
	2				
229					G41
	3				
228					
	4				G42
227			- grey below 4.6 m		
	5				
226					G43
					G44
	6		- trace till inclusions below 5.8 m		



END OF TEST HOLE AT 6.1 m IN CLAY (LACUSTRINE)

NOTES:

1. No sloughing or seepage observed during drilling.
2. Test hole backfilled with auger cuttings and bentonite chips.

DYREGROV ROBINSON INC.
Consulting Geotechnical Engineers

LOGGED BY: CR	COMPLETION DEPTH: 6.10 m
REVIEWED BY: DRAFT	COMPLETION DATE: 11/7/19
PROJECT ENGINEER: Gil Robinson	Page 1 of 1

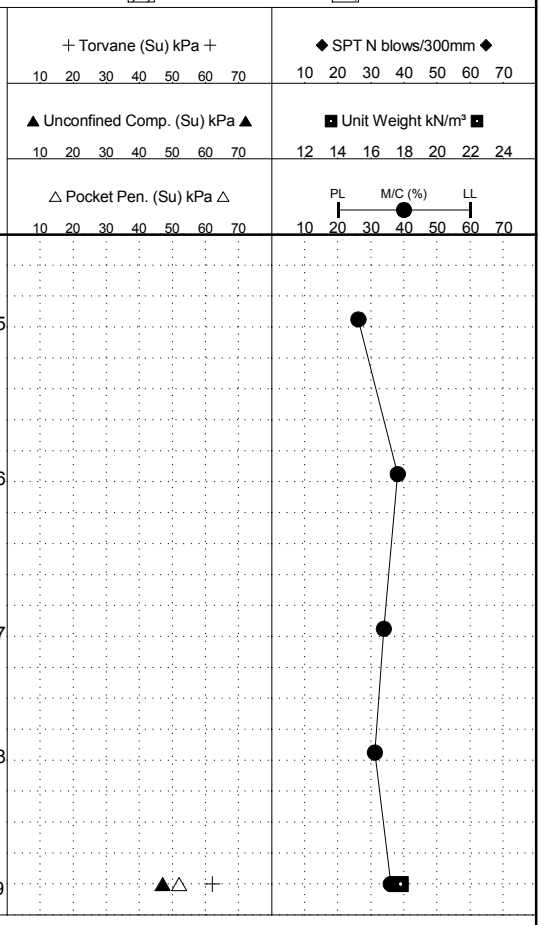
BH GEOTECH PLOTS-AUGUST 2013 143691_TETRA TECH_FERRY ROAD_CONTRACT 7.GPJ DATA TEMPLATE - AUGUST 2, 2013.GDT 14/8/19

PROJECT: Ferry Road Riverbend CSR - Contract 7	CLIENT: Tetra Tech Canada Inc.	TEST HOLE NO: **19-198**
LOCATION:		PROJECT NO.: 143691
CONTRACTOR: Paddock Drilling Ltd.	METHOD: Ranger 24 Drill Rig w/100mm SS augers	ELEVATION (m): 233.089

SAMPLE TYPE: GRAB, SHELBY TUBE, SPLIT SPOON, BULK, NO RECOVERY, CORE

BACKFILL TYPE: BENTONITE, GRAVEL, SLOUGH, GROUT, CUTTINGS, SAND

ELEVATION (m)	DEPTH (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #
233		CLAY (FILL) - trace sand, trace gravel - black, moist		
		CLAY (LACUSTRINE) - silty, trace organics to 1.2 m - black - moist, stiff, high plasticity - mottled brown and grey below 1.2 m		
232	1			G45
231	2			G46
230	3			
229	4			G47
228	5	- grey below 5 m		G48
227	6			T49



END OF TEST HOLE AT 6.7 m IN CLAY (LACUSTRINE)

NOTES:

1. No sloughing or seepage observed during drilling.
2. Test hole backfilled with auger cuttings and bentonite chips.

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Consulting Geotechnical Engineers

LOGGED BY: CR	COMPLETION DEPTH: 6.71 m
REVIEWED BY: DRAFT	COMPLETION DATE: 11/7/19
PROJECT ENGINEER: Gil Robinson	Page 1 of 1

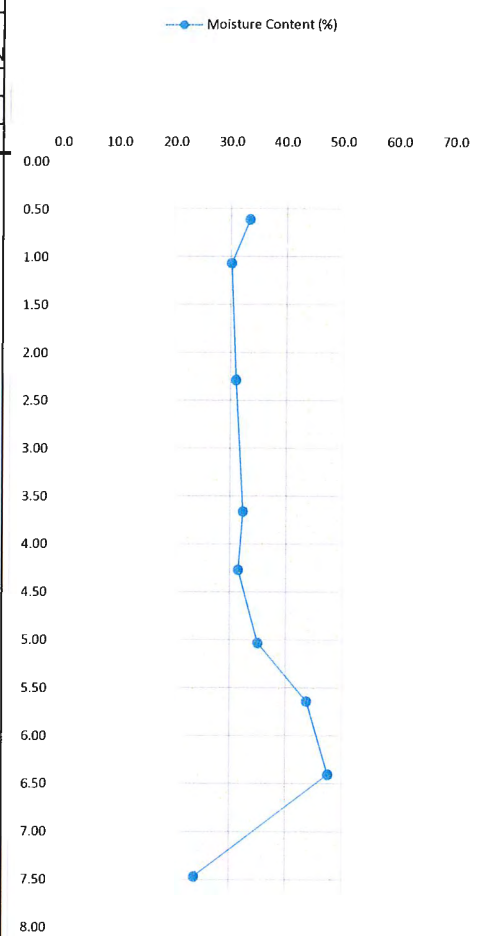
BH GEOTECH PLOTS-AUGUST 2013 143691_TETRA TECH_FERRY ROAD_CONTRACT 7.GPJ DATA TEMPLATE - AUGUST 2, 2013.GDT 14/8/19

DYREGROV ROBINSON INC. CONSULTING GEOTECHNICAL ENGINEERS	PROJECT # 113324	TEST HOLE NO. 12-4

PROJECT:	Ferry Road LDS	LOGGED BY:	RB
LOCATION:	AssiniboineAve. At Ferry Rd.	REVIEWED BY:	AOD
CONTRACTOR:	Paddock Drilling Ltd.	DRILL DATE:	April 17, 2012
METHOD:	Acker Soil Sentry - 125 mm SSA	DRILL DEPTH (m):	7.6

DEPTH (m)	ELEVATION (m)	SOIL SYMBOL	SOIL DESCRIPTION		UNDRAINED SHEAR STRENGTH Su QU UNCONFINED COMPRESSION TV TORVANE PP POCKET PEN. γ UNIT WEIGHT
0.00	230.82		0 - 0.076 m	SAND AND GRAVEL (Fill)	
0.50	230.32		0.076 - 0.9 m	CLAY (Fill) - silty, trace sand, trace gravel - dark brown - stiff, moist, high plasticity	
1.00	229.82		0.9 - 7.2 m	CLAY (Alluvial) - stratified with silt and sand - brown	
1.50	229.32			- stiff, moist, high plasticity	
2.00	228.82			- firm below 1.5 m	
2.50	228.32				
3.00	227.82				
3.50	227.32				PP = 37 kPa
4.00	226.82				
4.50	226.32				
5.00	225.82			- grey, soft below 5.3 m	
5.50	225.32				
6.00	224.82			- decomposed wood between 6.1 and 7.2 m	
6.50	224.32				
7.00	223.82				
7.50	223.32		7.2 - 7.6 m	SAND (Alluvial) - silty - grey, compact, wet, - fine to medium grained, poorly graded	
8.00	222.82		7.6 m	END OF TEST HOLE AT 7.6 m IN SAND Notes: 1. Seepage below 7.2 m from sand layer. Water level at 5.5 m 3 minutes after drilling. 2. Sloughing below 7.2 m in sand layer. 3. Test hole backfilled with auger cuttings.	

Test Results



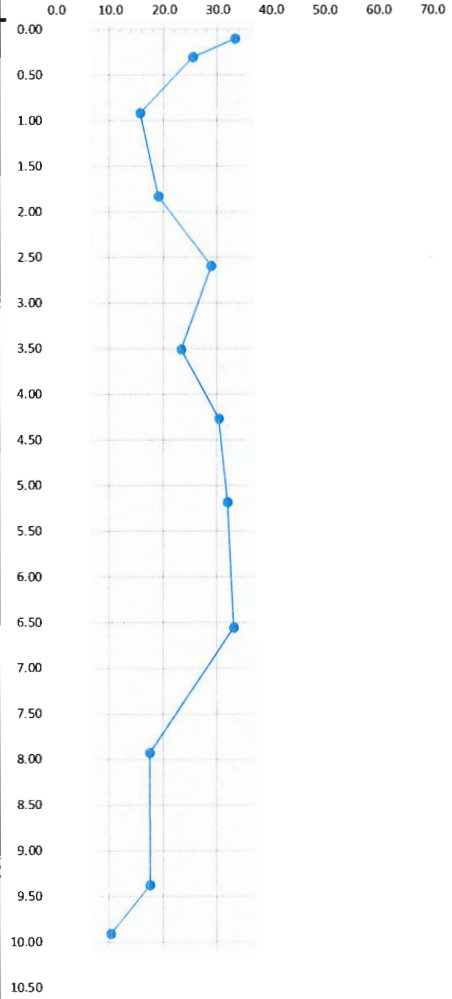
DYREGROV ROBINSON INC. CONSULTING GEOTECHNICAL ENGINEERS	PROJECT # 113324	TEST HOLE NO. 12-33

PROJECT:	Ferry Road LDS	**LOGGED BY:**	RB
LOCATION:	Bourkevale Park - Riverbank	**REVIEWED BY:**	AOD
CONTRACTOR:	Paddock Drilling Ltd.	**DRILL DATE:**	May 22, 2012
METHOD:	Acker Soil Sentry - 125 mm SSA	**DRILL DEPTH (m):**	10.4

DEPTH (m)	ELEVATION (m)	SOIL SYMBOL		SOIL DESCRIPTION	SPT (N) (blows / 300 mm)	UNDRAINED SHEAR STRENGTH Su	
0.00	231.10		0 - 0.2 m	CLAY (Topsoil) - silty, trace sand, trace rootlets - black, moist			
0.50	230.60		0.2 - 0.5 m	CLAY - silty, brown, stiff, moist, high plasticity			
1.00	230.10		0.5 - 1.5 m	SAND (Alluvial) - silty - brown, dry - fine grained			
1.50	229.60		1.5 - 6.7 m	CLAY (Alluvial) - stratified with silt and sand - brown - firm, moist, intermediate plasticity			
2.00	229.10						
2.50	228.60						
3.00	228.10					TV = 51 kPa PP = 58 kPa	
3.50	227.60						
4.00	227.10						
4.50	226.60						
5.00	226.10						
5.50	225.60			- grey below 5.6 m			
6.00	225.10					TV = 35 kPa PP = 25 kPa	
6.50	224.60						
7.00	224.10		6.7 - 9.9 m	SAND (Alluvial) - silty - grey - compact, wet - fine to medium grained - poorly graded			
7.50	223.60				11		
8.00	223.10			- light grey below 7.8 m			
8.50	222.60						
9.00	222.10						
9.50	221.60				15		
10.00	221.10		9.9 - 10.4 m	SILT (Till) - some sand, trace gravel - tan - dense, dry			
10.50	220.60		10.4 m	END OF TEST HOLE AT AUGER REFUSAL AT 10.4 m IN SILT TILL Notes: 1. Seepage below 6.1 m from sand layer. 2. Sloughing below 6.7 m in sand layer. 3. Water level at 6.1 m below ground surface immediately after drilling. 4. Sloughing below 6.1 m in sand layer. 5. Test hole backfilled with auger cuttings to 6.1 m and bentonite chips to ground surface.			

QU	UNCONFINED COMPRESSION
TV	TORVANE
PP	POCKET PEN.
γ	UNIT WEIGHT

Test Results

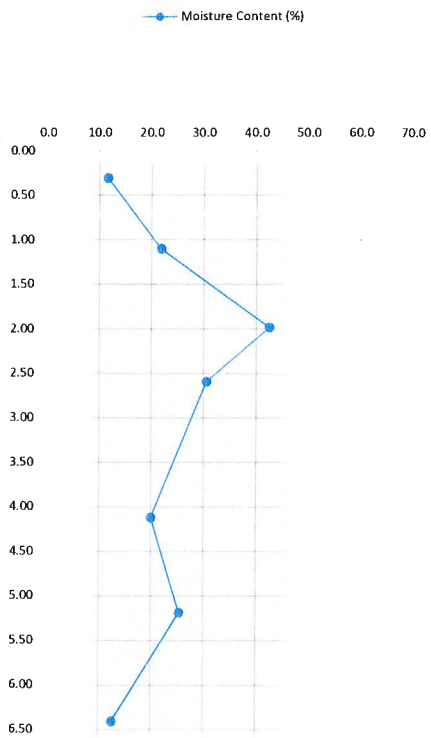


DYREGROV ROBINSON INC.
CONSULTING GEOTECHNICAL ENGINEERS

PROJECT #	TEST HOLE NO.
113324	12-34

PROJECT:	Ferry Road LDS	**LOGGED BY:**	RB
LOCATION:	Bourkevale Park - Riverbank	**REVIEWED BY:**	AOD
CONTRACTOR:	Paddock Drilling Ltd.	**DRILL DATE:**	May 22, 2012
METHOD:	Acker Soil Sentry - 125 mm SSA	**DRILL DEPTH (m):**	7.5

DEPTH (m)	ELEVATION (m)	SOIL SYMBOL	SOIL DESCRIPTION	SPT (N) (blows / 300 mm)	PIEZOMETER	UNDRAINED SHEAR STRENGTH Su (QU UNCONFINED COMPRESSION; TV TORVANE; PP POCKET PEN.; γ UNIT WEIGHT)
0.00	227.83		0 - 0.46 m SAND (Alluvial) - clayey, silty, trace gravel - black, moist			
0.50	227.33		0.46 - 3.0 m CLAY (Alluvial) - stratified with silt and sand - brown			
1.00	226.83		- stiff, moist, intermediate plasticity			
1.50	226.33		- grey, firm, wet below 1.5 m			Qu = 15 kPa TV = 38 kPa PP = 41 kPa γ = 17.4 kN/m³
2.00	225.83					
2.50	225.33					
3.00	224.83		3.0 - 6.6 m SAND (Alluvial) - silty, some gravel - trace cobbles			
3.50	224.33		- grey - loose, wet			
4.00	223.83					
4.50	223.33					
5.00	222.83		- compact below 5.3 m			
5.50	222.33					
6.00	221.83					
6.50	221.33			20		blows per 150 mm
7.00	220.83		6.6 - 7.5 m SILT (Till) - some sand, trace gravel - tan - dense, dry	24		blows per 75 mm refusal to penetration
7.50	220.33					
8.00	219.83		7.5 m END OF TEST HOLE AT AUGER REFUSAL AT 7.5 m IN SILT TILL			

Notes:
1. Seepage below 1.5 m from clay layer. Water level at 2.7 m immediately after drilling.
2. Sloughing below 3.0 m in sand layer.
3. No soil recovery in silt till.
4. Standpipe piezometer with Casagrande tip installed to 6.1 m.
5. Water level measured at 1.33 m below ground surface on June 12, 2012.
6. Test hole backfilled with sand to 5.3 m, bentonite chips to ground surface. Piezometer protected with a flushmount cover.

Test Results