

CLIENT CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT Cockburn & Calrossie Sewer Relief
SITE TOILERS PARK
LOCATION ENTRANCE OF PARK
DRILLING METHOD 125 mm ø Solid Stem Auger, Acker MP8

JOB NO. 11-0107-18
GROUND ELEV. 231.65 m
TOP OF PVC ELEV.
WATER ELEV.
DATE DRILLED 10/18/2013
UTM (m) N 5,523,714
 E 633,160

ELEVATION (m)	DEPTH		GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲ DYNAMIC CONE (N) blows/ft △	Cu POCKET PEN (kPa) ★ Cu TORVANE (kPa) ◆		
	(m)	(ft)								PL	MC	LL
231	1		[Cross-hatch]	FILL - Dark brown, dry to damp, loose, non plastic, trace limestone cobbles, trace glass, trace organics.								
230.1	5		[Diagonal lines]	SILTY CLAY - Brown, damp, soft, low plasticity, trace fine to coarse grained sand, trace fine grained gravel								
229	2			- Grain Size Distribution: Gravel (2.7%), Sand (5.0%), Silt (59.8%) and Clay (32.5%) at 2.44 m.								
228	3	10		- Mottled grey and brown, stiff, high plasticity, trace silt pockets, trace oxidation below 3.05 m.								
227	4			- Increased oxidation below 3.81 m.								
226	5	15		- Grey, firm below 4.57 m.								
225	6			- No oxidation below 5.18 m.								
224	7	20		- Increased silt pockets below 6.40 m.								
223	8			- Moist below 7.62 m.								
222	9	30		- Soft at 8.08 m.								
				- Firm below 8.84 m.								

SAMPLE TYPE [Auger Grab] Auger Grab [Split Spoon] Split Spoon

CONTRACTOR **Paddock Drilling Ltd.**

INSPECTOR **J. WILCOX**

APPROVED **AMH**

DATE **11/4/13**

GEO-TECHNICAL - SOIL LOG P:\PROJECTS\2011\11-0107-18\DESIGN\GEO\LOGS\TOILERS PARK LOGS.GPJ

ELEVATION (m)	DEPTH		GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲ DYNAMIC CONE (N) blows/ft △	Cu POCKET PEN (kPa) ★ Cu TORVANE (kPa) ◆			
	(m)	(ft)								PL	MC	LL	
										%			
221	35	11		- Wet, soft below 11.58 m.									
220	40	12											
219	45	13				- Some fine to coarse grained sand below 13.10 m.							
218	45	14				- Grain Size Distribution: Gravel (2.8%), Sand (14.0%), Silt (34.3%) and Clay (48.9%) at 13.87 m.							
217.1				SILT TILL - Tan, damp to moist, dense, some fine to coarse grained sand, trace fine to medium grained gravel.									
216.7				AUGER REFUSAL at 14.93 m									
216	50	15		Notes: 1. Installed casagrande standpipe at 14.93 m below grade in silt till. 2. Backfilled testhole with silica sand from 14.93 m to 14.32 m. 3. Backfilled testhole with coated bentonite pellets from 14.32 to 13.72 m. 4. Backfilled testhole with bentonite pellets from 13.72 m to grade. 5. Refusal at 25 mm into first set. 6. Groundwater Elev. 224.40 m as measured on October 25, 2013 in TH13-01.									
215	55	16											
214	60	17											
213	65	18											
212	70	19											
211		20											
210		21											

SAMPLE TYPE Auger Grab Split Spoon

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
J. WILCOX

APPROVED
AMH

DATE
11/4/13

CLIENT CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT Cockburn & Calrossie Sewer Relief
SITE TOILERS PARK
LOCATION ENTRANCE OF PARK
DRILLING METHOD 125 mm ø Solid Stem Auger, Acker MP8

JOB NO. 11-0107-18
GROUND ELEV. 231.63 m
TOP OF PVC ELEV.
WATER ELEV.
DATE DRILLED 10/18/2013
UTM (m) N 5,523,714
 E 633,161

ELEVATION (m)	DEPTH		GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲ DYNAMIC CONE (N) blows/ft △	Cu POCKET PEN (kPa) ★ Cu TORVANE (kPa) ◆	
	(m)	(ft)								20	40
231	1		[Cross-hatch pattern]	FILL - Dark brown, dry to damp, loose, non plastic, trace limestone cobbles, trace glass, trace organics.	[Dotted pattern]						
230.1	5		[Diagonal lines pattern]	SILTY CLAY - Brown, damp, soft, low plasticity, trace fine to coarse grained sand, trace fine grained gravel	[Dotted pattern]						
229	10		[Diagonal lines pattern]	- Mottled grey and brown, stiff, high plasticity, trace silt pockets, trace oxidation below 3.05 m.	[Dotted pattern]						
228	15		[Diagonal lines pattern]	- Increased oxidation below 3.81 m.	[Dotted pattern]						
227	20		[Diagonal lines pattern]	- Grey, firm below 4.57 m.	[Dotted pattern]						
226	25		[Diagonal lines pattern]	- No oxidation below 5.18 m.	[Dotted pattern]						
225	30		[Diagonal lines pattern]	- Increased silt pockets below 6.40 m.	[Dotted pattern]	5.9					
224			[Diagonal lines pattern]	- Moist below 7.62 m.	[Dotted pattern]	6.1					
223			[Diagonal lines pattern]	- Soft at 8.08 m.	[Dotted pattern]						
222			[Diagonal lines pattern]	- Firm below 8.84 m.	[Dotted pattern]						

SAMPLE TYPE

CONTRACTOR Paddock Drilling Ltd. **INSPECTOR** J. WILCOX **APPROVED** AMH **DATE** 11/4/13

GEO:TECHNICAL-SOIL LOG P:\PROJECTS\2011\11-0107-18\DESIGN\GEO\LOGS\TOILERS PARK LOGS.GPJ

ELEVATION (m)	DEPTH		GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲ DYNAMIC CONE (N) blows/ft △	Cu POCKET PEN (kPa) ★ Cu TORVANE (kPa) ◆				
	(m)	(ft)									PL	MC	LL		
221	35			- Wet, soft below 11.58 m.											
220	40														
219															
218.5	13						END TESTHOLE at 13.11 m								
218	45						Notes: 1. Stratigraphy for TH13-01A has been projected 0.5 m from TH13-01 and is assumed representative. 2. Installed pneumatic piezometer (035519) at 6.10 m below grade in silty clay. 3. Installed pneumatic piezometer (035483) at 12.80 m below grade in silty clay. 4. Backfilled test hole with a bentonite grout mixture from 13.11 m to grade. 5. PN 035519 groundwater elevation 226.94 m as measured on October 25, 2013. 6. PN 035483 groundwater elevation 225.86 m as measured on October 25, 2013.								
217	50														
216															
215	55														
214	60														
213															
212	65														
211	70														
210															

SAMPLE TYPE

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
J.WILCOX

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CLIENT CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT Cockburn & Calrossie Sewer Relief
SITE TOILERS PARK
LOCATION LOWER BANK
DRILLING METHOD 125 mm ø Solid Stem Auger, Acker MP8

JOB NO. 11-0107-18
GROUND ELEV. 228.13 m
TOP OF PVC ELEV.
WATER ELEV.
DATE DRILLED 10/18/2013
UTM (m) N 5,523,752
 E 633,230

ELEVATION (m)	DEPTH		GRAPHICS	DESCRIPTION AND CLASSIFICATION	SAMPLE TYPE NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲ DYNAMIC CONE (N) blows/ft △	Cu POCKET PEN (kPa) ★ Cu TORVANE (kPa) ◆		
	(m)	(ft)						PL	MC	LL
228				FILL - Dry to damp, loose, some silty clay, trace glass, trace organics.	S1					
227.4	1			SILTY CLAY - Brownish grey, damp, firm, high plasticity, trace to some silt pockets, trace fine to coarse grained sand, trace fine grained gravel. - Grain Size Distribution: Gravel (2.9%), Sand (6.1%), Silt (34.9%) and Clay (56.1%) at 1.07 m. - Grey mottled brown, trace oxidation, trace silt pockets below 1.52 m.	S2					
226	2			- Organic pocket from 2.13 m to 2.29 m. - No oxidation below 2.29 m.	S3					
225	3	10		- Grey below 3.35 m. - Increased silt pockets below 3.65 m.	S4 S5					
224	4				S6					
223	5	15		- Moist below 4.72 m.	S7					
222	6	20		- Soft between 6.40 and 9.14 m.	S8 S9					
221	7				S10					
220	8	25		- Grain Size Distribution: Gravel (5.6%), Sand (8.3%), Silt (24.2%) and Clay (61.9%) at 8.08 m.	S11 S12					
219	9	30			S13					

SAMPLE TYPE  Auger Grab

CONTRACTOR **Paddock Drilling Ltd.**

INSPECTOR **J. WILCOX**

APPROVED **AMH**

DATE **11/4/13**

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ELEVATION (m)	DEPTH		GRAPHICS	DESCRIPTION AND CLASSIFICATION	SAMPLE TYPE NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲ DYNAMIC CONE (N) blows/ft △	Cu POCKET PEN (kPa) ★ Cu TORVANE (kPa) ◆		
	(m)	(ft)						PL	MC	LL
218				- Light grey below 10.06 m.						
217.5	35			SILT TILL - Greyish tan, moist to wet, loose, intermediate plasticity, some clay, some fine to medium gravel, trace fine to coarse grained sand.	S14			◆	●	
217	11				S15			◆	●	
216.5	12			- Damp to moist, dense below 12.04 m.	S16				●	
216	40			AUGER REFUSAL at 12.19 m						
215	13			Notes: 1. Water level at 8.10 m below grade at completion of drilling. 2. Backfilled testhole with benonite pellets from 12.19 m to 9.74 m 3. Backfilled testhole with auger cuttings from 9.74 m to grade.						
214	45									
213	15	50								
212	16									
211	17	55								
210	18	60								
209	19									
208	20	65								
207	21	70								

SAMPLE TYPE Auger Grab

CONTRACTOR
Paddock Drilling Ltd.

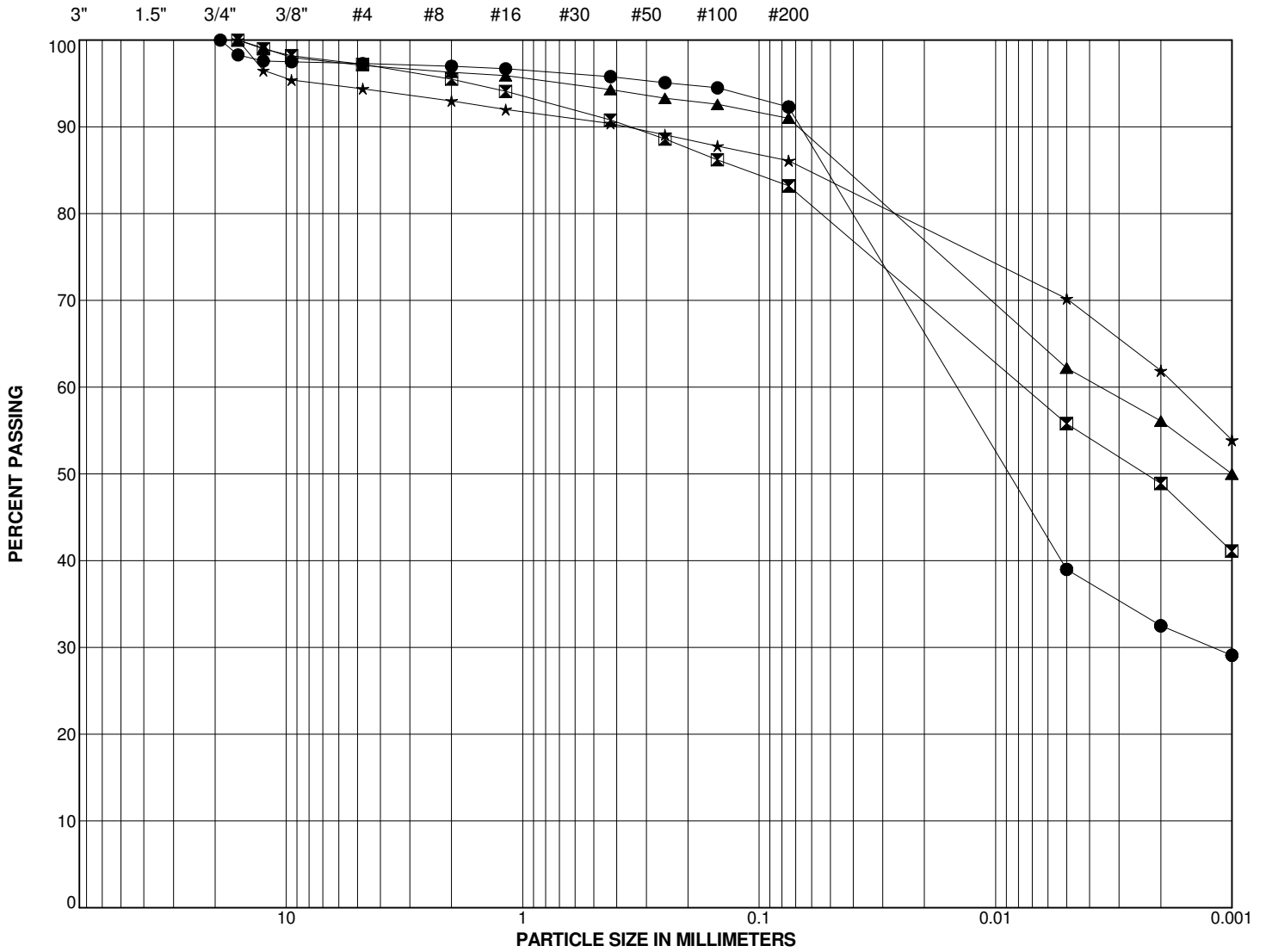
INSPECTOR
J. WILCOX

APPROVED
AMH

DATE
11/4/13

SIEVE ANALYSIS

HYDROMETER ANALYSIS

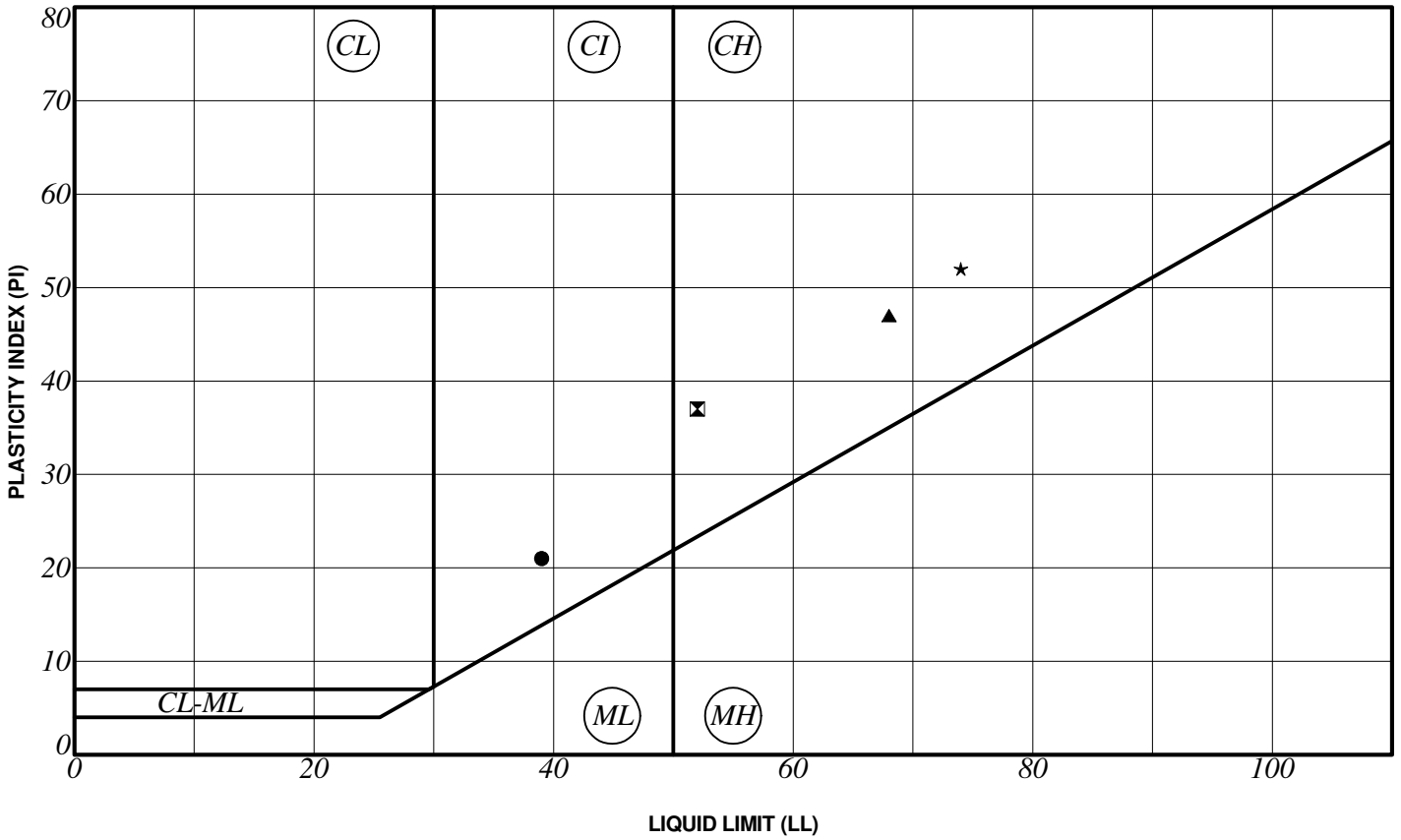


GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

SYMBOL	HOLE	DEPTH (m)	SAMPLE #	% GRAVEL	% SAND	% SILT	% CLAY	% SILT & CLAY	Cu	Cc	CLASSIFICATION
●	TH13-01	2.4	S3	2.7	5.0	59.8	32.5	92.3			CL
▲	TH13-01	13.9	S18	2.8	14.0	34.3	48.9	83.2			CH
■	TH13-02	1.1	S2	2.9	6.1	34.9	56.1	91.0			CH
★	TH13-02	8.1	S11	5.6	8.3	24.2	61.9	86.1			CH

SIEVE ANALYSIS P:\PROJECTS\2011\11-0107-18\DESIGN\GEOLOGS\TOILERS PARK LOGS.GPJ

	CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT	
	Cockburn & Calrossie Sewer Relief	
<h2>GRAIN SIZE ANALYSES</h2>		
November 2013	Figure 1	Page 1 of 1



SYMBOL	HOLE	DEPTH (m)	SAMPLE #	LL	PL	PI	% SAND	% SILT	% CLAY	% MC	CLASSIFICATION
●	TH13-01	2.4	S3	39	18	21	5.0	59.8	32.5	25.4	CL
⊠	TH13-01	13.9	S18	52	15	37	14.0	34.3	48.9	37.0	CH
▲	TH13-02	1.1	S2	68	21	47	6.1	34.9	56.1	32.6	CH
★	TH13-02	8.1	S11	74	22	52	8.3	24.2	61.9	54.9	CH

Notes:
 ML - Low Plasticity Silt
 MH - High Plasticity Silt
 CL-ML - Silty Clay
 CL - Low Plasticity Clay
 CI - Intermediate Plasticity Clay
 CH - High Plasticity Clay
 LL - Liquid Limit
 PL - Plastic Limit
 PI - Plasticity Index
 MC - Moisture Content
 NP - Non-Plastic

KGS GROUP	CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
Cockburn & Calrossie Sewer Relief	
A-LINE PLOT	
November 2013	Figure 2
Page 1 of 1	