APPENDIX 'A'

GEOTECHNICAL REPORT

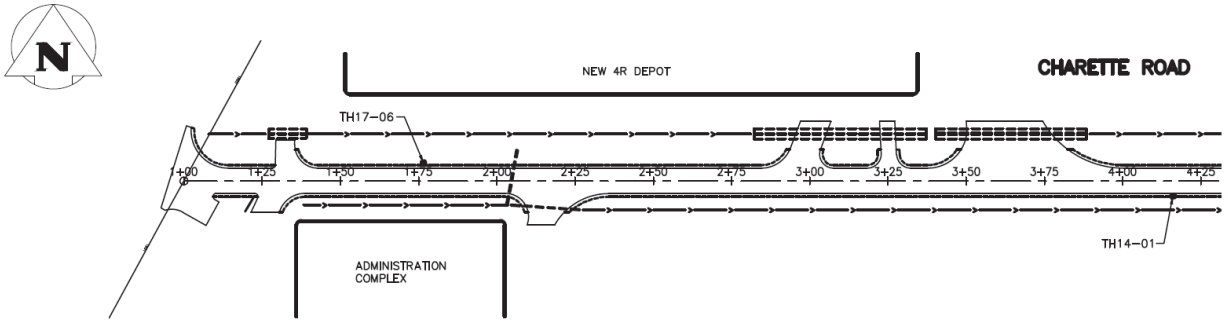
APPENDIX 'A' - GEOTECHNICAL REPORT

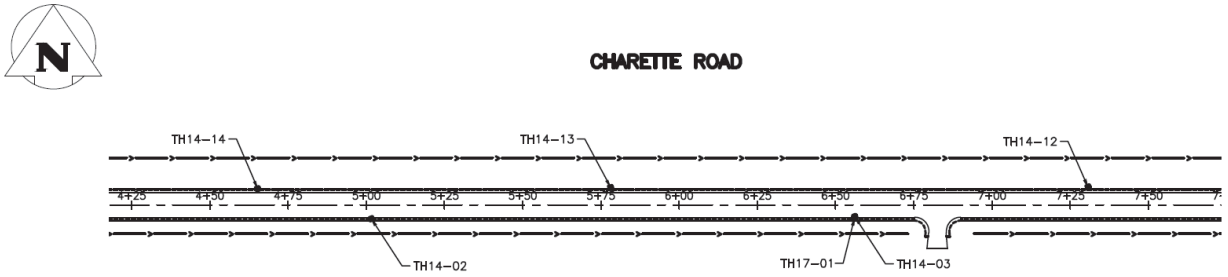
TABLE OF CONTENTS

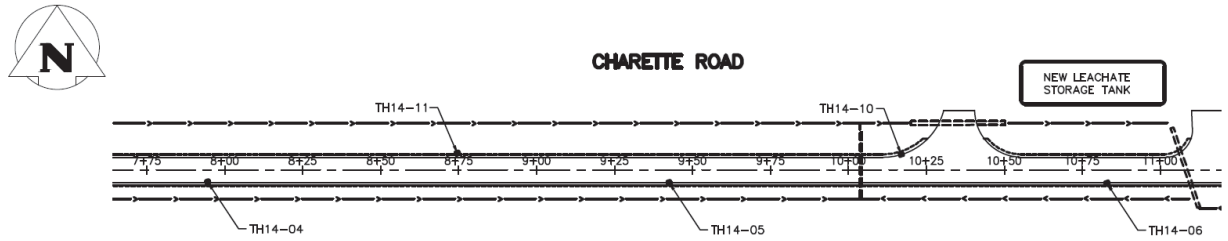
The geotechnical report is provided to aid in the Contractor's evaluation of the soil conditions. The information presented is considered accurate at the locations shown on the Drawings and at the time of drilling. However, variations in soil conditions may exist between test holes and fluctuations in groundwater levels can be expected seasonally and may occur as a result of construction activities. The nature and extent of variations may not become evident until construction commences.

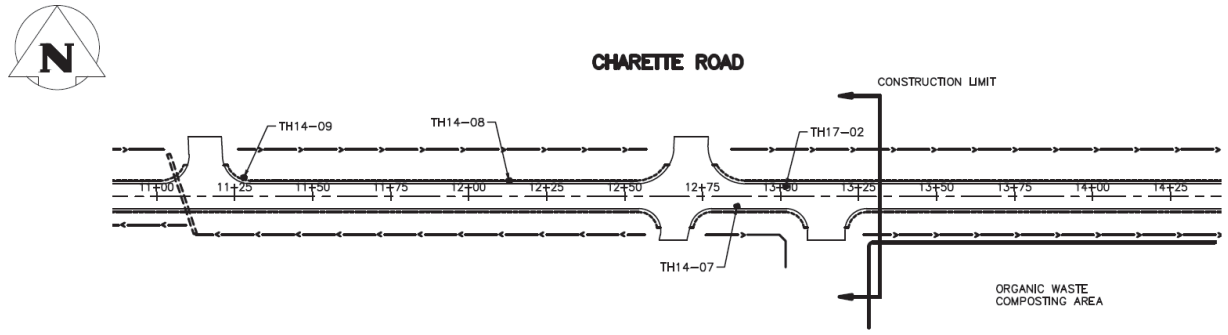
Geotechnical Report for Charette Road

Test Hole Locations









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Test Hole Log for TH14-01

KGS GROUP

SUMMARY LOG

REFERENCE NO.

HOLE NO. TH14-01

SHEET 1 of 1

CLIENT CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT 2014/15 Granular Roadway Renewal Program
SITE Brady Landfill
LOCATION Charette Road
DRILLING METHOD 125 mm ø Solid Stem Auger, Acker MP8

JOB NO. 14-0107-010
GROUND ELEV. 234.91
TOP OF PVC ELEV.
WATER ELEV.
DATE DRILLED 6/3/2014
UTM (m) N 5,512,934
E 628,950

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	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) ◆ / PL MC LL %
234.6	0			GRANULAR FILL (TRAFFIC GRAVEL) - Tan, dry, compact, fine to coarse grained sand, fine to coarse grained gravel, subangular to angular particles, mixed with clay fill.		S1			
234	1	5		CLAY FILL (CL) - Black, damp, stiff, low plasticity, trace silt pockets, trace rootlets, trace organics, trace oxidation.		S2			
233.1						S3			
233						S4			
232.8	2			SILTY CLAY (CI) - Brown, damp to moist, soft, low plasticity, trace clay, trace oxidation, high silt content.		S5			
232	3	10		SILTY CLAY (CH) - Mottled grey and brown, damp to moist, stiff, high plasticity, trace silt pockets.		S6			
231	4					S7			
230.3		15		END OF TEST HOLE at 4.57 m					
230	5			Notes:					
229	6	20		1. No groundwater encountered. 2. Backfilled TH14-01 with auger cuttings and bentonite chips to surface.					
228	7	25							
227	8								
226	9	30							
225									

SAMPLE TYPE Auger Grab

CONTRACTOR	INSPECTOR	APPROVED	DATE
Paddock Drilling Ltd.	J. WILCOX	TNG	9/3/14

Template Version: C420180115 - RW

Test Hole Log for TH14-02

KGS GROUP — **SUMMARY LOG** — REFERENCE NO. — HOLE NO. **TH14-02** — SHEET 1 of 1

CLIENT	CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT	2014/15 Granular Roadway Renewal Program
SITE	Brady Landfill
LOCATION	Charette Road
DRILLING METHOD	125 mm ø Solid Stem Auger, Acker MP8

JOB NO.	14-0107-010
GROUND ELEV.	234.69
TOP OF PVC ELEV.	
WATER ELEV.	
DATE DRILLED	6/3/2014
UTM (m)	N 5,512,977
	E 629,024

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	SAMPLE TYPE	NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲ / DYNAMIC CONE (N) blows/ft △ (20 40 60)	Cu POCKET PEN (kPa) ★ / Cu TORVANE (kPa) ◆ (20 40 60 80) / PL MC LL % (20 40 60 80)
234.4				GRANULAR FILL (TRAFFIC GRAVEL) - Brown, dry, compact, fine to coarse grained sand, fine to coarse grained gravel, subangular to angular particles, mixed with clay fill.		S1			
234	1			CLAY FILL (CL) - Black, damp, stiff, low plasticity, some silt pockets, trace rootlets, trace organics.		S2			
						S3			
233.2		5							
233				SILTY CLAY (CI) - Brown, frozen, low plasticity, high silt content.		S4			
232.9	2			-frozen from 1.52 m to 2.13 m.					
				SILTY CLAY (CH) - Mottled grey and brown, frozen, trace silt pockets, trace oxidation. - Moist, stiff, high plasticity below 1.83 m.		S5			
232	3	10							
231				- Trace to some oxidation below 3.65 m.		S6			
	4								
230.1		15				S7			
230				END OF TEST HOLE at 4.57 m					
	5			Notes:					
229				1. No ground water encountered.					
	6	20		2. Backfilled TH14-02 with auger cuttings and bentonite chips to surface.					
228									
	7								
227		25							
	8								
226									
	9	30							
225									

SAMPLE TYPE ⊠ Auger Grab

CONTRACTOR	INSPECTOR	APPROVED	DATE
Paddock Drilling Ltd.	J. WILCOX	TNG	9/3/14

Template Version: C420180115 - RW

Test Hole Log for TH14-03

KGS GROUP — **SUMMARY LOG** — REFERENCE NO. — HOLE NO. **TH14-03** — SHEET 1 of 1

CLIENT	CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT	2014/15 Granular Roadway Renewal Program
SITE	Brady Landfill
LOCATION	Charette Road
DRILLING METHOD	125 mm ø Solid Stem Auger, Acker MP8

JOB NO.	14-0107-010
GROUND ELEV.	234.44
TOP OF PVC ELEV.	
WATER ELEV.	
DATE DRILLED	6/3/2014
UTM (m)	N 5,513,054
	E 629,158

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	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) ◆ / PL MC LL %
234.4	0	0		GRANULAR FILL (TRAFFIC GRAVEL) - Tan, dry, compact, fine to coarse grained sand, fine to coarse grained gravel, subangular to angular particles, mixed with clay fill.		S1			
234	1	5		CLAY FILL (CH) - Black, damp, stiff, low to high plasticity, trace silt pockets, trace rootlets, trace organics, trace oxidation.		S2			
						S3			
232	2	10		SILTY CLAY (CI) - Brown, moist to wet, soft, low plasticity, high silt content. - Frozen from 1.82 m to 2.13 m.		S4			
						S5			
231.1	3	10		SILTY CLAY (CH) - Mottled grey and brown, moist, firm to stiff, high plasticity, trace silt pockets, trace oxidation.		S6			
230	4	15				S7			
				END OF TEST HOLE at 4.57 m					
229	5	20		Notes: 1. No groundwater encountered. 2. Backfilled TH14-03 with auger cuttings and bentonite chips to surface.					
228	6								
227	7	25							
226	8								
225	9	30							

SAMPLE TYPE Auger Grab

CONTRACTOR	INSPECTOR	APPROVED	DATE
Paddock Drilling Ltd.	J. WILCOX	TNG	9/3/14

Template Version: C420180115 - RW

Test Hole Log for TH14-04

KGS GROUP — **SUMMARY LOG** — REFERENCE NO. — HOLE NO. **TH14-04** — SHEET 1 of 1

CLIENT	CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT	2014/15 Granular Roadway Renewal Program
SITE	Brady Landfill
LOCATION	Charette Road
DRILLING METHOD	125 mm ø Solid Stem Auger, Acker MP8

JOB NO.	14-0107-010
GROUND ELEV.	234.53
TOP OF PVC ELEV.	
WATER ELEV.	
DATE DRILLED	6/3/2014
UTM (m)	N 5,513,123
	E 629,278

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	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) ◆ / PL MC LL %
234.2	0	0		GRANULAR FILL (TRAFFIC GRAVEL) - Brown, dry, compact, fine to coarse grained sand, some fine grained gravel, mixed with clay fill.		S1			
234				CLAY FILL (CL) - Brown to Black, damp, stiff, low plasticity, trace silt pockets, trace organics.		S2			
233.0	1	5				S3			
233				SILTY CLAY (CH) - Brown, damp to moist, stiff, high plasticity, trace fine grained sand.					
232	2					S4			
	3	10				S5			
231				- Mottled grey and brown, moist, trace silt pockets, trace oxidation below 3.35 m.		S6			
	4								
229.7		15				S7			
	5			END OF TEST HOLE at 4.57 m					
229				Notes:					
	6	20		1. No groundwater encountered.					
228				2. Backfilled TH14-04 with auger cuttings and bentonite chips to surface.					
	7								
227		25							
	8								
226									
	9	30							
225									

SAMPLE TYPE Auger Grab

CONTRACTOR	INSPECTOR	APPROVED	DATE
Paddock Drilling Ltd.	J. WILCOX	TNG	9/3/14

Template Version: C420180115 - RW

Test Hole Log for TH14-05

KGS GROUP — **SUMMARY LOG** — REFERENCE NO. — HOLE NO. **TH14-05** — SHEET 1 of 1

CLIENT	CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT	2014/15 Granular Roadway Renewal Program
SITE	Brady Landfill
LOCATION	Charette Road
DRILLING METHOD	125 mm ø Solid Stem Auger, Acker MP8

JOB NO.	14-0107-010
GROUND ELEV.	234.76
TOP OF PVC ELEV.	
WATER ELEV.	
DATE DRILLED	6/3/2014
UTM (m)	N 5,513,197
	E 629,406

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	SAMPLE TYPE	NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲ / DYNAMIC CONE (N) blows/ft △ (20 40 60)	Cu POCKET PEN (kPa) ★ / Cu TORVANE (kPa) ◆ (20 40 60 80) / PL MC LL % (20 40 60 80)
234.5				GRANULAR FILL (TRAFFIC GRAVEL) - Brown, dry, compact, fine to coarse grained sand, fine to coarse grained gravel, subangular to angular particles, mixed with clay fill.					
234	1			CLAY FILL (CL) - Black to grey, damp,stiff, low plasticity, trace fine grained sand, trace oxidation.		S1			
233.2		5				S2			
233	2			SILTY CLAY (CH) - Brown, Frozen, trace silt pockets.		S3			
				- Frozen from 1.52 m to 1.82 m.		S4			
232				- Damp to moist, stiff, high plasticity below 1.82 m.					
	3	10				S5			
231				- Mottled grey and brown, moist, trace oxidation, trace gypsum pockets below 3.35 m.		S6			
	4								
230.2		15				S7			
230				END OF TEST HOLE at 4.57 m					
	5			Notes:					
229				1. No groundwater encountered.					
	6	20		2. Backfilled TH14-05 with auger cuttings and bentonite chips to surface.					
228									
	7								
227		25							
	8								
226									
	9	30							
225									

SAMPLE TYPE ⊠ Auger Grab

CONTRACTOR	INSPECTOR	APPROVED	DATE
Paddock Drilling Ltd.	J. WILCOX	TNG	9/3/14

Template Version: C420180115 - RW

Test Hole Log for TH14-06

KGS GROUP — **SUMMARY LOG** — REFERENCE NO. — HOLE NO. **TH14-06** — SHEET 1 of 1

CLIENT	CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT	2014/15 Granular Roadway Renewal Program
SITE	Brady Landfill
LOCATION	Charette Road
DRILLING METHOD	125 mm ø Solid Stem Auger, Acker MP8

JOB NO.	14-0107-010
GROUND ELEV.	234.55
TOP OF PVC ELEV.	
WATER ELEV.	
DATE DRILLED	6/3/2014
UTM (m)	N 5,513,267
	E 629,528

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	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) ◆ / PL MC LL %
234.3				GRANULAR FILL (TRAFFIC GRAVEL) - Brown, dry, compact, fine to coarse grained sand, fine to coarse grained gravel, subangular to angular particles, mixed with clay fill.		S1			
234				CLAY FILL (CL) - Black, damp, stiff, low plasticity, trace silt pockets, trace rootlets, trace organics, trace oxidation.		S2			
233.0	1	5				S3			
233				SILTY CLAY (CI) - Brown, damp to moist, soft, low plasticity, trace clay, trace oxidation, high silt content.		S4			
232.3	2								
232				SILTY CLAY (CH) - Mottled grey and brown, moist, stiff, high plasticity, trace silt pockets.		S5			
231	3	10		- Trace oxidation below 3.65 m.		S6			
230.0	4					S7			
		15		END OF TEST HOLE at 4.57 m					
229	5			Notes: 1. No groundwater encountered. 2. Backfilled TH14-06 with auger cuttings and bentonite chips to surface.					
228	6	20							
227	7	25							
226	8								
225	9	30							

SAMPLE TYPE Auger Grab

CONTRACTOR	INSPECTOR	APPROVED	DATE
Paddock Drilling Ltd.	J. WILCOX	TNG	9/3/14

Template Version: C420180115 - RW

Test Hole Log for TH14-07

KGS GROUP

SUMMARY LOG

REFERENCE NO.

HOLE NO. TH14-07

SHEET 1 of 1

CLIENT CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT 2014/15 Granular Roadway Renewal Program
SITE Brady Landfill
LOCATION Charette Road
DRILLING METHOD 125 mm ø Solid Stem Auger, Acker MP8

JOB NO. 14-0107-010
GROUND ELEV. 234.65
TOP OF PVC ELEV.
WATER ELEV.
DATE DRILLED 6/3/2014
UTM (m) N 5,513,369
E 629,704

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	SAMPLE TYPE	NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲ / DYNAMIC CONE (N) blows/ft △ (20 40 60)	Cu POCKET PEN (kPa) ★ / Cu TORVANE (kPa) ◆ (20 40 60 80) / PL MC LL % (20 40 60 80)
234.3				GRANULAR FILL (TRAFFIC GRAVEL) - Brown, dry, compact, fine to coarse grained sand, fine to coarse grained gravel, subangular to angular particles, mixed with clay fill.		S1			
234	1			CLAY FILL (CL) - Black, damp, stiff, low plasticity, trace silt pockets, trace organics.		S2			
233.1		5				S3			
233	2			SILTY CLAY (CH) - Brown to grey, damp, stiff, intermediate plasticity, trace silt pockets. - Frozen from 1.52 m to 1.83 m		S4			
232				- Tan, block, increased silt content from 2.44 m to 3.05 m.		S5			
231	3	10		- Mottled grey and brown, moist, high plasticity, trace silt pockets, trace oxidation below 3.05 m.		S6			
230.1	4					S7			
230		15		END OF TEST HOLE at 13.41 m					
229	5			Notes: 1. No groundwater encountered. 2. Backfilled TH14-07 with auger cuttings and bentonite chips to surface.					
228	6	20							
227	7	25							
226	8								
225	9	30							

SAMPLE TYPE Auger Grab

CONTRACTOR Paddock Drilling Ltd.
INSPECTOR J. WILCOX
APPROVED TNG
DATE 9/3/14

Template Version: C420180115 - RW

Test Hole Log for TH14-08

KGS GROUP — **SUMMARY LOG** — REFERENCE NO. — HOLE NO. **TH14-08** — SHEET 1 of 1

CLIENT	CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT	2014/15 Granular Roadway Renewal Program
SITE	Brady Landfill
LOCATION	Charette Road
DRILLING METHOD	125 mm ø Solid Stem Auger, Acker MP8

JOB NO.	14-0107-010
GROUND ELEV.	234.62
TOP OF PVC ELEV.	
WATER ELEV.	
DATE DRILLED	6/3/2014
UTM (m)	N 5,513,339
	E 629,636

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	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) ◆ / PL MC LL %
234.4				**GRANULAR FILL (TRAFFIC GRAVEL)** - Brown, dry, compact, fine to coarse grained sand, fine to coarse grained gravel, subangular to angular particles, mixed with clay fill.		S1			
234	1			**CLAY FILL (CL)** - Black to brown, damp, stiff, low plasticity, trace silt pockets, trace rootlets, trace organics, trace oxidation.		S2			
233.1		5				S3			
233	2			**SILTY CLAY (CH)** - Mottled grey and brown, some silt pockets, trace fine grained gravel.					
				- Frozen from 1.52 m to 2.13 m. - Damp to moist, stiff, high plasticity below 2.13 m.		S4			
232.2				**SILTY CLAY (CI)** - Brown, moist, soft, non plastic, some oxidation, high silt content.					
232						S5			
231.6	3	10		**SILTY CLAY (CH)** - Mottled grey and brown, moist, firm to stiff, high plasticity.					
231				- Trace silt pockets below 3.65 m.		S6			
	4								
230.0		15				S7			
230				**END OF TEST HOLE at 4.57 m**					
	5			Notes: 1. No groundwater encountered. 2. Backfilled TH14-08 with auger cuttings and bentonite chips to surface.					
229									
	6	20							
228									
	7								
227		25							
	8								
226									
	9	30							
225									

SAMPLE TYPE ▯ Auger Grab

CONTRACTOR	INSPECTOR	APPROVED	DATE
Paddock Drilling Ltd.	J. WILCOX	TNG	9/3/14

Test Hole Log for TH14-09

KGS GROUP

SUMMARY LOG

REFERENCE NO.

HOLE NO. TH14-09

SHEET 1 of 1

CLIENT CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT 2014/15 Granular Roadway Renewal Program
SITE Brady Landfill
LOCATION Charette Road
DRILLING METHOD 125 mm ø Solid Stem Auger, Acker MP8

JOB NO. 14-0107-010
GROUND ELEV. 234.72
TOP OF PVC ELEV.
WATER ELEV.
DATE DRILLED 6/3/2014
UTM (m) N 5,513,298
E 629,562

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	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) ◆ / PL MC LL %
234.5				GRANULAR FILL (TRAFFIC GRAVEL) - Brown, dry, compact, fine to coarse grained sand, some fine grained gravel, mixed with clay fill.		S1			
234				CLAY FILL (CL) - Black, damp, stiff, low plasticity, trace silt pockets, trace rootlets, trace organics, trace oxidation.		S2			
233.6	1	5		SILTY CLAY (CI) - Brown, damp, soft, low plasticity, high silt content.		S3			
233				- Frozen from 1.52 m to 2.13 m.					
	2			- Trace oxidation, trace coarse grained sand, trace fine grained gravel, trace clay below 1.82 m.		S4			
232						S5			
231.5	3	10		SILTY CLAY (CH) - Mottled grey and brown, moist, stiff, high plasticity, trace silt pockets.					
231						S6			
	4			- Trace oxidation below 4.26 m.		S7			
230.1		15		END OF TEST HOLE at 4.57 m					
230	5			Notes:					
229				1. No groundwater encountered.					
	6	20		2. Backfilled TH14-09 with auger cuttings and bentonite chips to surface.					
228									
	7	25							
227									
	8								
226									
	9	30							
225									

SAMPLE TYPE Auger Grab

CONTRACTOR	INSPECTOR	APPROVED	DATE
Paddock Drilling Ltd.	J. WILCOX	TNG	9/3/14

Template Version: C420180115 - RW

Test Hole Log for TH14-10

KGS GROUP — **SUMMARY LOG** — REFERENCE NO. — HOLE NO. **TH14-10** — SHEET 1 of 1

CLIENT	CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT	2014/15 Granular Roadway Renewal Program
SITE	Brady Landfill
LOCATION	Charette Road
DRILLING METHOD	125 mm ø Solid Stem Auger, Acker MP8

JOB NO.	14-0107-010
GROUND ELEV.	234.50
TOP OF PVC ELEV.	
WATER ELEV.	
DATE DRILLED	6/3/2014
UTM (m)	N 5,513,242
	E 629,466

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	SAMPLE TYPE	NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲ / DYNAMIC CONE (N) blows/ft △ (20 40 60)	Cu POCKET PEN (kPa) ★ / Cu TORVANE (kPa) ◆ (20 40 60 80) / PL MC LL % (20 40 60 80)
234.4				GRANULAR FILL (TRAFFIC GRAVEL) - Brown, dry, compact, fine to coarse grained sand, some fine to coarse grained gravel, subangular to angular particles, mixed with clay fill.					
234				CLAY FILL (CL) - Black,damp, stiff, low plasticity, trace silt pockets, trace rootlets, trace organics, trace fine to medium grained sand.		S1			
	1					S2			
233		5				S3			
232.8				SILTY CLAY (CH) - Brown, damp, stiff, high plasticity.					
232	2					S4			
				- Mottled grey and brown below 2.60 m.		S5			
	3	10		- Trace silt pockets below 3.04 m.		S6			
231				- Trace oxidation below 3.65 m.					
	4			- Firm to stiff below below 4.26 m.		S7			
229.9		15		END OF TEST HOLE at 4.57 m					
	5			Notes:					
229				1. No groundwater encountered.					
	6	20		2. Backfilled TH14-10 with auger cuttings and bentonite chips to surface.					
228									
	7								
227		25							
	8								
226									
	9	30							
225									

SAMPLE TYPE Auger Grab

CONTRACTOR	INSPECTOR	APPROVED	DATE
Paddock Drilling Ltd.	J. WILCOX	TNG	9/3/14

Template Version: C420180115 - RW

Test Hole Log for TH14-11

KGS GROUP — **SUMMARY LOG** — REFERENCE NO. — HOLE NO. **TH14-11** — SHEET 1 of 1

CLIENT	CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT	2014/15 Granular Roadway Renewal Program
SITE	Brady Landfill
LOCATION	Charette Road
DRILLING METHOD	125 mm ø Solid Stem Auger, Acker MP8

JOB NO.	14-0107-010
GROUND ELEV.	234.34
TOP OF PVC ELEV.	
WATER ELEV.	
DATE DRILLED	6/3/2014
UTM (m)	N 5,513,171
	E 629,343

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	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) ◆ / PL MC LL %
234.3				GRANULAR FILL (TRAFFIC GRAVEL) - Brown, dry, compact, fine to coarse grained sand, fine to coarse grained gravel, subangular to angular particles, mixed with clay fill.					
234				CLAY FILL (CL) - Black, moist, stiff, low plasticity, trace silt pockets, trace rootlets, trace organics, trace silt.		S1			
	1					S2			
233						S3			
232.8		5		SILTY CLAY (CI) - Brown, frozen, trace clay, trace oxidation, high silt content.		S4			
232.2	2			- Frozen from 1.52 m to 2.13 m.					
232				SILTY CLAY (CH) - Mottled grey and brown, damp, stiff, high plasticity, trace silt pockets.		S5			
	3	10							
231				- Some oxidation pockets below 3.35 m.		S6			
	4								
230				- Firm to stiff below 4.26 m.		S7			
229.8		15		END OF TEST HOLE at 4.57 m					
	5			Notes:					
229				1. No groundwater encountered.					
	6	20		2. Backfilled TH14-11 with auger cuttings and bentonite chips to surface.					
228									
	7								
227		25							
	8								
226									
	9	30							
225									

SAMPLE TYPE Auger Grab

CONTRACTOR	INSPECTOR	APPROVED	DATE
Paddock Drilling Ltd.	J. WILCOX	TNG	9/3/14

Template Version: C420180115 - RW

Test Hole Log for TH14-12

KGS GROUP — **SUMMARY LOG** — REFERENCE NO. — HOLE NO. **TH14-12** — SHEET 1 of 1

CLIENT	CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT	2014/15 Granular Roadway Renewal Program
SITE	Brady Landfill
LOCATION	Charette Road
DRILLING METHOD	125 mm ø Solid Stem Auger, Acker MP8

JOB NO.	14-0107-010
GROUND ELEV.	234.36
TOP OF PVC ELEV.	
WATER ELEV.	
DATE DRILLED	6/3/2014
UTM (m)	N 5,513,100
	E 629,218

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	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) ◆ / PL MC LL %
234.2	0	0		**GRANULAR FILL (TRAFFIC GRAVEL)** - Brown, dry, compact, fine to coarse grained sand, fine to coarse grained gravel, subangular to angular particles, mixed with clay fill.		S1			
234				**CLAY FILL (CL)** - Black, damp, stiff, low plasticity, trace to some silt pockets, trace rootlets, trace organics, trace to some silt, trace clay.		S2			
233	1								
232.8		5				S3			
232	2			**SILTY CLAY (CH)** - Brown, damp, stiff, high plasticity, trace silt pockets, trace fine grained sand, fissured.		S4			
231	3	10				S5			
				- Mottled grey and brown, trace oxidation, moist below 3.65 m.		S6			
230	4					S7			
229.8		15		**END OF TEST HOLE at 4.57 m**					
229	5			Notes: 1. No groundwater encountered. 2. Backfilled TH14-12 with auger cuttings and bentonite chips to surface.					
228	6	20							
227	7								
		25							
226	8								
225	9	30							

SAMPLE TYPE ⊠ Auger Grab

CONTRACTOR	INSPECTOR	APPROVED	DATE
Paddock Drilling Ltd.	J. WILCOX	TNG	9/3/14

Template Version: C420180115 - RW

Test Hole Log for TH14-13

KGS GROUP — **SUMMARY LOG** — REFERENCE NO. — HOLE NO. **TH14-13** — SHEET 1 of 1

CLIENT	CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT	2014/15 Granular Roadway Renewal Program
SITE	Brady Landfill
LOCATION	Charette Road
DRILLING METHOD	125 mm ø Solid Stem Auger, Acker MP8

JOB NO.	14-0107-010
GROUND ELEV.	234.47
TOP OF PVC ELEV.	
WATER ELEV.	
DATE DRILLED	6/3/2014
UTM (m)	N 5,513,023
	E 629,086

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	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) ◆ / PL MC LL %
234.4	0	0		**GRANULAR FILL (TRAFFIC GRAVEL)** - Brown, dry, compact, fine to coarse grained sand, fine to coarse grained gravel, subangular to angular particles, mixed with clay fill.					
234	1	5		**CLAY FILL (CL)** - Black to brown, damp, stiff, low plasticity, trace silt pockets, trace fine grained sand, trace rootlets.		S1 S2 S3			
232	2	10		**SILTY CLAY (CH)** - Brown, damp, stiff, high plasticity, trace silt pockets. - Frozen from 1.52 m to 2.13 m. - Mottled grey and brown, damp, stiff, high plasticity below 2.13 m.		S4 S5			
231	3	10		- Trace oxidation below 3.35 m.		S6			
230	4	15				S7			
	4.57			**END OF TEST HOLE at 4.57 m**					
229	5	20		Notes: 1. No groundwater encountered. 2. Backfilled TH14-13 with auger cuttings and bentonite chips to surface.					
228	6	20							
227	7	25							
226	8	30							
225	9	30							

SAMPLE TYPE Auger Grab

CONTRACTOR	INSPECTOR	APPROVED	DATE
Paddock Drilling Ltd.	J. WILCOX	TNG	9/3/14

Template Version: C420180115 - RW

Test Hole Log for TH14-14

KGS GROUP — **SUMMARY LOG** — REFERENCE NO. — HOLE NO. **TH14-14** — SHEET 1 of 1

CLIENT	CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT	2014/15 Granular Roadway Renewal Program
SITE	Brady Landfill
LOCATION	Charette Road
DRILLING METHOD	125 mm ø Solid Stem Auger, Acker MP8

JOB NO.	14-0107-010
GROUND ELEV.	234.66
TOP OF PVC ELEV.	
WATER ELEV.	
DATE DRILLED	6/3/2014
UTM (m)	N 5,512,967
	E 628,988

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	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) ◆ / PL MC LL %
234.6	0			GRANULAR FILL (TRAFFIC GRAVEL) - Brown, dry, compact, fine to coarse grained sand, fine to coarse grained gravel, angular particles, mixed with clay fill.		S1			
234				CLAY FILL (CL) - Black, damp, stiff, low plasticity, trace silt pockets, trace fine grained sand.		S2			
233.4	1	5		SILTY CLAY (CI) - Brown, trace clay, trace oxidation, high silt content.		S3			
233				- Frozen from 1.22 m to 2.29 m.					
232.6	2			SILTY CLAY (CH) - Brown, frozen, trace silt pockets.		S4			
232				- Moist, stiff, high plasticity below 2.28 m.					
				- Mottled grey and brown below 2.43 m.		S5			
	3	10		- Trace to some oxidation pockets below 3.04 m.		S6			
231									
	4					S7			
230.1		15		END OF TEST HOLE at 4.57 m					
230	5			Notes:					
				1. No groundwater encountered.					
229				2. Backfilled TH14-14 with auger cuttings and bentonite chips to surface.					
	6	20							
228									
	7								
227		25							
	8								
226									
	9	30							
225									

SAMPLE TYPE Auger Grab

CONTRACTOR	INSPECTOR	APPROVED	DATE
Paddock Drilling Ltd.	J. WILCOX	TNG	9/3/14

Template Version: C420180115 - RW

Test Hole Log for TH17-01

KGS GROUP — **SUMMARY LOG** — REFERENCE NO. — HOLE NO. **TH17-01** — SHEET 1 of 1

CLIENT	CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT	Charette Road Paving Design
SITE	Brady Landfill
LOCATION	Charette Road
DRILLING METHOD	125 mm ø Solid Stem Auger, ACKER MP5 Drill Rig

JOB NO.	17-0107-010
GROUND ELEV.	234.49
TOP OF CASING ELEV.	
WATER ELEV.	N.E.
DATE DRILLED	6/26/2017
UTM (m)	N 5,513,054
	E 629,158

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	SAMPLE TYPE	NUMBER	RECOVERY %	SPT (N) blows/0.15 m ▲ / DYNAMIC CONE (N) blows/ft △ (20 40 60)	Cu POCKET PEN (kPa) ★ / Cu TORVANE (kPa) ◆ (20 40 60 80) / PL MC LL % (20 40 60 80)
234.2	0			GRANULAR FILL (GRAVEL SURFACING) - (305 mm) Tan, damp, compact, fine to coarse grained sand, fine to coarse grained gravel, subangular to angular particles, trace clay (fill).					
234				CLAY FILL (CH) - (1.22 m) Black, moist, stiff, medium to high plasticity, trace silt pockets, trace rootlet, trace organic, trace oxidation.					
	1					S1		●	●
		5		SILTY CLAY (CH) - (3.05 m) Dark brown, moist, stiff, medium to high plasticity, trace silt, trace fine grained sand pockets, trace fine grained gravel.		S2		●	●
232	2					S3			◆
		10		- Light brown, high silt contents, no fine grained sand pockets, below 2.74 m.		S4			◆
231	3			- Mottled grey and brown, firm to stiff, high plasticity, trace silt pockets, trace oxidation below 2.74 m.		S5			◆
	4					S6			◆
		15		END OF TEST HOLE at 4.57 m					
229	5			Notes: 1. No groundwater encountered. 2. Backfilled TH17-01 with auger cuttings and bentonite chips to surface.					
	6	20							
228	7								
227		25							
	8								
226									
	9	30							
225									

SAMPLE TYPE Auger Grab

CONTRACTOR	INSPECTOR	APPROVED	DATE
Maple Leaf Drilling, Ltd.	M. ALFARO	T. ERNST	12/8/17

Template Version: C420180115 - RW

Test Hole Log for TH17-02

KGS GROUP — **SUMMARY LOG** — REFERENCE NO. — HOLE NO. **TH17-02** — SHEET 1 of 1

CLIENT	CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT	Charette Road Paving Design
SITE	Brady Landfill
LOCATION	Charette Road
DRILLING METHOD	125 mm ø Solid Stem Auger, ACKER MP5 Drill Rig

JOB NO.	17-0107-010
GROUND ELEV.	234.71
TOP OF CASING ELEV.	
WATER ELEV.	N.E.
DATE DRILLED	6/26/2017
UTM (m)	N 5,513,382
	E 629,714

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	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) ◆ / PL MC LL %
234.4	0	0		GRANULAR FILL (GRAVEL SURFACING) - (305 mm) Brown, damp, compact, fine to coarse grained sand, fine to coarse grained gravel, subangular to angular particles, trace clay (fill).		S1		20 40 60	20 40 60 80
234	1			CLAY FILL (CH) - (1.22 m) Black, moist, stiff, high plasticity, trace silt pockets, trace organic.		S2			
233.2		5				S3			
233	2			SILTY CLAY (CH) - (3.05 m) Brown to grey, moist, stiff, intermediate to high plasticity, trace silt pockets.					
232	3	10				S4			
				- Mottled grey and brown, high plasticity, trace oxidation below 3.81 m.		S5			
231	4					S6			
230.1		15				S7			
230	5			END OF TEST HOLE at 4.57 m					
				Notes:					
				1. No groundwater encountered.					
229				2. Backfilled TH17-02 with auger cuttings and bentonite chips to surface.					
	6	20							
228	7								
227		25							
	8								
226									
	9	30							
225									

SAMPLE TYPE Auger Grab

CONTRACTOR	INSPECTOR	APPROVED	DATE
Maple Leaf Drilling, Ltd.	M. ALFARO	T. ERNST	12/8/17

Template Version: C420180115 - RW

Test Hole Log for TH17-06

KGS GROUP

SUMMARY LOG

REFERENCE NO.

HOLE NO. TH17-06

SHEET 1 of 1

CLIENT CITY OF WINNIPEG - WATER AND WASTE DEPARTMENT
PROJECT Charette Road Paving Design
SITE Brady Landfill
LOCATION Charette Road
DRILLING METHOD 125 mm ø Solid Stem Auger, ACKER MP5 Drill Rig

JOB NO. 17-0107-010
GROUND ELEV. 234.68
TOP OF CASING ELEV.
WATER ELEV. N.E.
DATE DRILLED 6/26/2017
UTM (m) N 5,512,823
E 628,737

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	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) ◆ / PL MC LL %
234.2	0	0		GRANULAR FILL (GRAVEL SURFACING) - (457 mm) Brown, moist, compact, fine to coarse grained sand, fine to coarse grained gravel, subangular to angular particles, some clay (fill).					
234	0.46	1.5		CLAY FILL (CH) - (1.68 m) Black to grey, moist, very stiff, intermediate to high plasticity, trace silt pockets, trace coarse grained sand, trace organic, trace oxidation.		S1			
233	1	5				S2			
232.5	2								
232	2.13	7		SILTY CLAY (CH) - (2.44 m) Grey, moist, stiff, high plasticity, trace coarse grained sand, trace gypsum nodules.		S3			
	2.74	9		- Mottled brown and grey, intermediate to high plasticity, increase in silt content, trace oxidation below 2.74 m.		S4			
231	3	10		- Brown, high plasticity, decrease in silt content, some gypsum nodules below 3.66 m.		S5			
	3.66	12		- Mottled brown and grey, trace gypsum nodules below 4.27 m.		S6			
230.1	4.27	14		END OF TEST HOLE at 4.57 m					
230	4.57	15		Notes: 1. No groundwater encountered. 2. Backfilled TH17-06 with auger cuttings and bentonite chips to surface.					
229	5	16							
228	6	20							
227	7	23							
226	8	25							
225	9	30							

SAMPLE TYPE Auger Grab

CONTRACTOR Maple Leaf Drilling, Ltd.
INSPECTOR M. ALFARO
APPROVED T. ERNST
DATE 12/8/17