

APPENDIX 'A'

GEOTECHNICAL REPORT

APPENDIX 'A' - GEOTECHNICAL REPORT

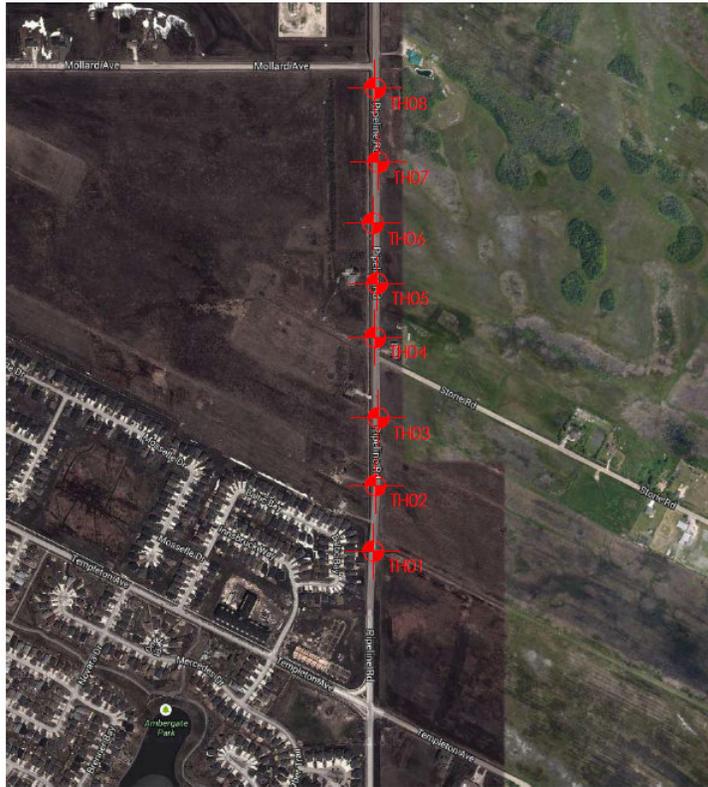
TABLE OF CONTENTS

GEOTECHNICAL REPORT FOR PIPELINE ROAD	1
Test Hole Locations	1
Summary of Core Samples	2
Test Hole Log for TH01	3
Test Hole Log for TH02	4
Test Hole Log for TH03	5
Test Hole Log for TH04	6
Test Hole Log for TH05	7
Test Hole Log for TH06	8
Test Hole Log for TH07	9
Test Hole Log for TH08	10
Particle Size Analysis for Pipeline Road	11

The geotechnical report is provided to aid in the Contractor's evaluation of the existing pavement structure and/or soil conditions. The information presented is considered accurate at the locations shown on the Drawings and at the time of drilling. However, variations in pavement structure and/or 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 Pipeline Road

Test Hole Locations



	Project No.123311237	Drawn by:SB	Figure: 1	Testhole Location Plan Pipeline Road between Templeton Avenue and the Perimeter Highway Winnipeg, Manitoba
	Date: June 3, 2014	Reviewed by: GL	Scale: NTS	

Test Hole Log for TH01

TESTHOLE TH01



Project Name: Pipeline Road between Templeton Ave and the Perimeter Hwy
Project Location: Winnipeg, MB
Client: KGS Group Inc.
Drilling Contractor: Paddock Drilling Ltd.
Drilling Method: 150 mm Solid Stem Auger
UTM Coordinates: 14U 631884.0 m E, 5536592.0 m N

Date Drilled: May 28, 2014
Depth of Testhole: 3.0 m
Logged by: Sothea Bun
Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
0.0 - 0.2		Granular Fill - 20 mm maximum aggregate size	BS	4			
0.2 - 0.9		Clay Fill - black, firm, moist, medium plasticity - silty - trace fine to coarse sand - trace fine gravel	BS	21			
0.9 - 1.0		Silty Clay - black, firm, moist, medium plasticity - trace fine to coarse sand - grey below 0.9 m	BS	34			
1.0 - 1.1			BS	41			
1.1 - 2.0		Silt - tan, soft, moist, low plasticity - trace fine to coarse sand	BS	22			
2.0 - 2.1			BS	22			
2.1 - 2.2			BS	24			
2.2 - 3.0		Clay - brown, stiff, moist, high plasticity	BS	40			
3.0 - 3.1			BS	39			
3.1 - 3.2			BS	45			
3.2 - 3.3			BS	46			
		<ul style="list-style-type: none"> • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 3.0 m. 					

Test Hole Log for TH02

TESTHOLE TH02



Project Name: Pipeline Road between Templeton Ave and the Perimeter Hwy
 Project Location: Winnipeg, MB
 Client: KGS Group Inc.
 Drilling Contractor: Paddock Drilling Ltd.
 Drilling Method: 150 mm Solid Stem Auger
 UTM Coordinates: 14U 631879.0 m E, 5536712.0 m N

Date Drilled: May 28, 2014
 Depth of Testhole: 3.0 m
 Logged by: Sothea Bun
 Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	Water Content (%)			
				25	50	75	100
1		Granular Fill - 20 mm maximum aggregate size	BS	4			
		Clay Fill - black, firm, moist, medium plasticity - silty - trace fine to coarse sand - trace fine gravel	BS	24			
			BS	31			
			BS	25			
			BS	35			
2		Silty Clay - black, firm, moist, medium plasticity - trace fine to coarse sand	BS	31			
		Silt - tan, soft, moist, low plasticity - trace fine to coarse sand	BS	27			
			BS	24			
			BS	22			
			BS	33			
3		Clay - brown, firm, moist, high plasticity	BS	25			
		Silt - tan, soft, moist, low plasticity - clayey below 2.7 m	BS	25			

- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 3.0 m.

Test Hole Log for TH03

TESTHOLE TH03



Project Name: Pipeline Road between Templeton Ave and the Perimeter Hwy
 Project Location: Winnipeg, MB
 Client: KGS Group Inc.
 Drilling Contractor: Paddock Drilling Ltd.
 Drilling Method: 150 mm Solid Stem Auger
 UTM Coordinates: 14U 631879.0 m E, 5536838.0 m N

Date Drilled: May 28, 2014
 Depth of Testhole: 3.0 m
 Logged by: Sothea Bun
 Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	Water Content (%)			
				25	50	75	100
0 0.5 1 1.5 2 2.5 3		Granular Fill - 20 mm maximum aggregate size Clay Fill - black, firm, moist, medium plasticity - silty - trace fine to coarse sand - trace fine gravel Silty Clay - black, firm, moist, medium plasticity - trace fine to coarse sand Silt - tan, soft, moist, low plasticity - trace fine to coarse sand Clay - brown, stiff, moist, high plasticity	BS	4			
			BS	22			
			BS	32			
			BS	23			
			BS	25			
			BS	23			
			BS	29			
			BS	35			
			BS	39			
			BS	40			
			BS	46			
		<ul style="list-style-type: none"> No groundwater seepage or soil sloughing was observed during or upon completion of drilling. Testhole terminated at a depth of 3.0 m. 					

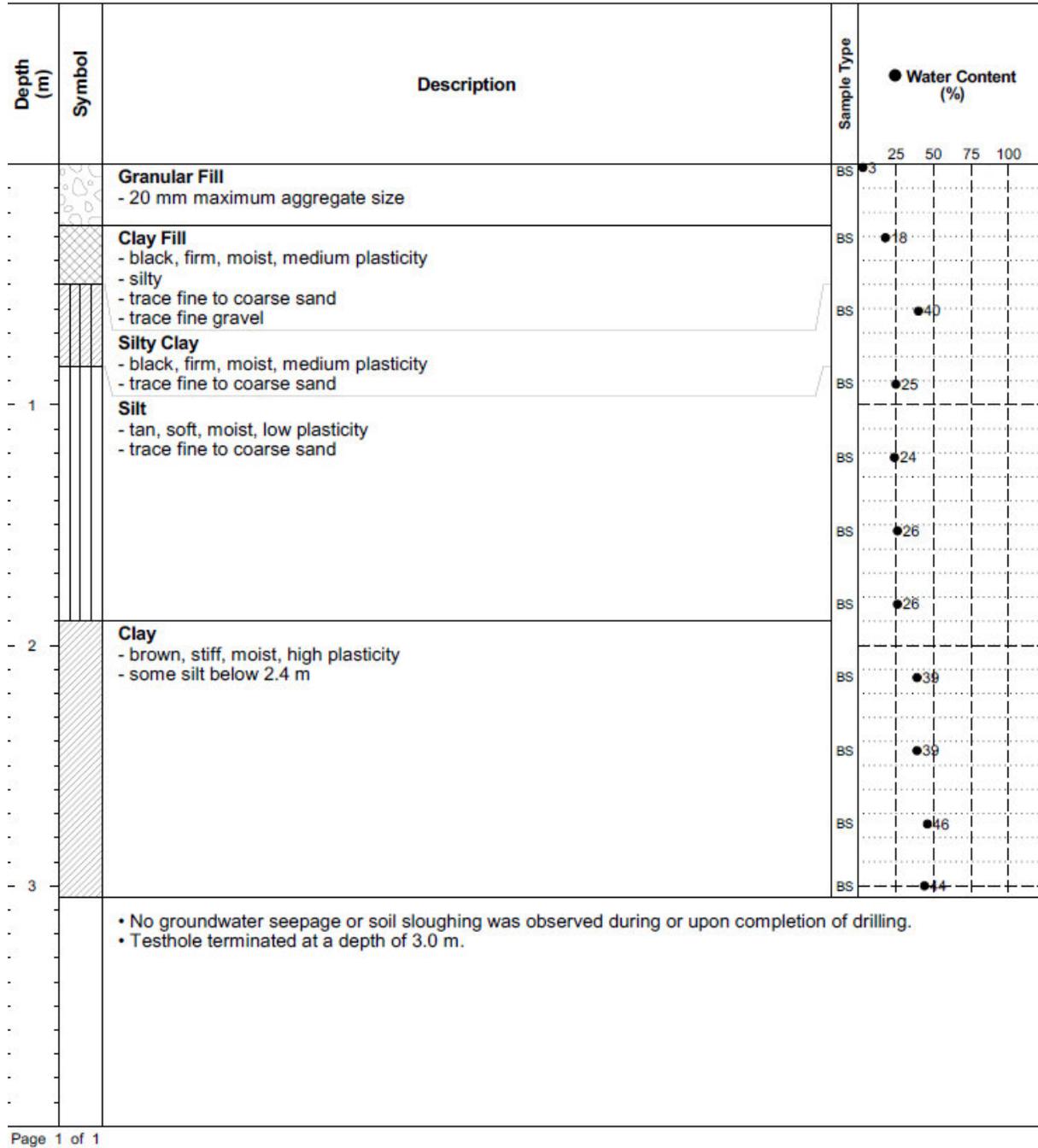
Test Hole Log for TH05

TESTHOLE TH05



Project Name: Pipeline Road between Templeton Ave and the Perimeter Hwy
Project Location: Winnipeg, MB
Client: KGS Group Inc.
Drilling Contractor: Paddock Drilling Ltd.
Drilling Method: 150 mm Solid Stem Auger
UTM Coordinates: 14U 631874.0 m E, 5537091.0 m N

Date Drilled: May 28, 2014
Depth of Testhole: 3.0 m
Logged by: Sothea Bun
Reviewed by: German Leal



Test Hole Log for TH06

TESTHOLE TH06



Project Name: Pipeline Road between Templeton Ave and the Perimeter Hwy
Project Location: Winnipeg, MB
Client: KGS Group Inc.
Drilling Contractor: Paddock Drilling Ltd.
Drilling Method: 150 mm Solid Stem Auger
UTM Coordinates: 14U 631866.0 m E, 5537210.0 m N

Date Drilled: May 28, 2014
Depth of Testhole: 3.0 m
Logged by: Sothea Bun
Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	Water Content (%)			
				25	50	75	100
0.0 - 0.5		Granular Fill - 20 mm maximum aggregate size	BS	3			
0.5 - 1.5		Clay Fill - black, firm, moist, medium plasticity - silty - trace fine to coarse sand - trace fine gravel	BS	11			
1.5 - 2.0		Silty Clay - black, firm, moist, medium plasticity - trace fine to coarse sand	BS	28			
2.0 - 2.5		Clay - brown, stiff, moist, high plasticity	BS	33			
2.5 - 3.0		Clay - brown, stiff, moist, high plasticity	BS	35			
3.0		Clay - brown, stiff, moist, high plasticity	BS	32			
3.0		Clay - brown, stiff, moist, high plasticity	BS	29			
3.0		Clay - brown, stiff, moist, high plasticity	BS	31			
3.0		Clay - brown, stiff, moist, high plasticity	BS	39			
3.0		Clay - brown, stiff, moist, high plasticity	BS	43			
3.0		Clay - brown, stiff, moist, high plasticity	BS	48			
<ul style="list-style-type: none"> No groundwater seepage or soil sloughing was observed during or upon completion of drilling. Testhole terminated at a depth of 3.0 m. 							

Test Hole Log for TH07

TESTHOLE TH07



Project Name: Pipeline Road between Templeton Ave and the Perimeter Hwy
 Project Location: Winnipeg, MB
 Client: KGS Group Inc.
 Drilling Contractor: Paddock Drilling Ltd.
 Drilling Method: 150 mm Solid Stem Auger
 UTM Coordinates: 14U 631868.0 m E, 5537343.0 m N

Date Drilled: May 28, 2014
 Depth of Testhole: 3.0 m
 Logged by: Sothea Bun
 Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	Water Content (%)			
				25	50	75	100
0.0 - 0.8		Granular Fill - 20 mm maximum aggregate size	BS	4			
0.8 - 2.0		Silt - tan, soft, moist, low plasticity - trace fine to coarse sand	BS	7			
0.8 - 1.0			BS	7			
1.0 - 2.0			BS	25			
2.0 - 2.2			BS	20			
2.2 - 2.4			BS	18			
2.0 - 2.8		Clay - brown, stiff, moist, high plasticity	BS	36			
2.8 - 3.0			BS	39			
3.0 - 3.2			BS	43			
3.2 - 3.4			BS	52			
3.4 - 3.6			BS	50			
<ul style="list-style-type: none"> Minor groundwater seepage was observed at a depth of 0.8 m. Soil sloughing observed in the silt at a depth of 0.8 m. Testhole terminated at a depth of 3.0 m. 							

Test Hole Log for TH08

TESTHOLE TH08



Project Name: Pipeline Road between Templeton Ave and the Perimeter Hwy
Project Location: Winnipeg, MB
Client: KGS Group Inc.
Drilling Contractor: Paddock Drilling Ltd.
Drilling Method: 150 mm Solid Stem Auger
UTM Coordinates: 14U 631860.0 m E, 5537476.0 m N

Date Drilled: May 28, 2014
Depth of Testhole: 3.0 m
Logged by: Sothea Bun
Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)				
				25	50	75	100	
1		Granular Fill - 20 mm maximum aggregate size	BS	4				
		Clay Fill - black, firm, moist, medium plasticity - silty - trace fine to coarse sand - trace fine gravel	BS	21				
		Silty Clay - black, firm, moist, medium plasticity - trace fine to coarse sand	BS	42				
			Silt - tan, soft, moist, low plasticity - trace fine to coarse sand	BS	31			
				Clay - brown, stiff, moist, high plasticity	BS	22		
BS	22							
BS	29							
2		Clay - brown, stiff, moist, high plasticity	BS	39				
			BS	43				
			BS	44				
3		Clay - brown, stiff, moist, high plasticity	BS	52				
			BS					
		<ul style="list-style-type: none"> No groundwater seepage or soil sloughing was observed during or upon completion of drilling. Testhole terminated at a depth of 3.0 m. 						

Particle Size Analysis for Pipeline Road



LABORATORY
 199 Henlow Bay
 Winnipeg MB R3Y 1G4
 Tel: (204) 488-6999

PARTICLE SIZE ANALYSIS
ASTM D422

KGS Group Inc.
 3rd Floor - 865 Waverley Street
 Winnipeg, Manitoba
 R3T 5P4

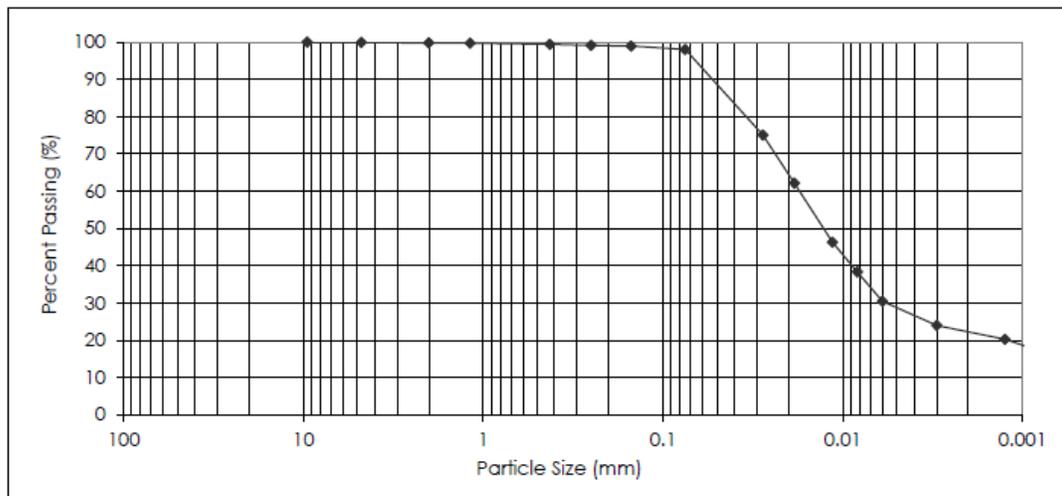
PROJECT: Pipeline Road between
 Templeton Avenue and the
 Perimeter Highway

Attention: Michael Turko

PROJECT NO.: 123311237

SAMPLED BY: Sothea Bun
 SAMPLE ID: TH04 @ 0.9 m

DATE RECEIVED: May 28, 2014
 TESTED BY: Sothea Bun



PARTICLE SIZE		PERCENT PASSING		PARTICLE SIZE		PERCENT PASSING	
37.50 mm		100.0		1.18 mm		99.8	
25.00 mm		100.0		0.425 mm		99.4	
19.00 mm		100.0		0.250 mm		99.2	
16.00 mm		100.0		0.150 mm		99.0	
12.50 mm		100.0		0.075 mm		98.1	
9.50 mm		100.0		0.005 mm		28.3	
4.75 mm		100.0		0.002 mm		21.8	
2.00 mm		99.9		0.001 mm		18.6	
Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 mm	Colloids, % < 0.001 mm	
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm				
0.0	0.1	0.5	1.3	76.3	21.8	18.6	

June 16, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.