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# APPENDIX 'A' GEOTECHNICAL REPORT



## **KGS** Group

## 2017 Industrial Street Rehabilitation **Sub-Surface Investigation**

#### Prepared for:

KGS Group 3<sup>rd</sup> Floor, 865 Waverley Street Winnipeg, MB R3T 5P4 Attention: Jarrod Boscow

## **Project Number:**

0012-006-00

#### Date:

May 25, 2017 Final Report



#### Quality Engineering | Valued Relationships

May 25, 2017

Our File No. 0012-006-00

Jarrod Boscow, P.Eng. KGS Group 3rd Floor, 865 Waverley Street Winnipeg, MB R3T 5P4

RE: 2017 Industrial Street Rehabilitation

**Sub-Surface Investigation Report** 

TREK Geotechnical Inc. is pleased to submit our report for the sub-surface investigations for the 2017 Industrial Street Rehabilitation project.

Please contact the undersigned if you have any questions. Thank you for the opportunity to serve you on this assignment.

Sincerely,

TREK Geotechnical Inc.

Per:

Nelson John Ferreira, Ph.D., P. Eng. Geotechnical Engineer, Principal

Tel: 204.975.9433 ext. 103

cc: Shane Broderick, Assistant Lab and Field Services Manager, (TREK Geotechnical)

### **Revision History**

Revision No.	Author	Issue Date	Description
0	SGBR	May 25, 2017	Final Report

## **Authorization Signatures**

Prepared By:

Shane Broderick, Assistant Lab and Field Services Manager.



Reviewed By:

Nelson John Ferreira, Ph.D., P.Eng. Geotechnical Engineer



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Appendix B Test Hole Logs, Lab Testing Summary & Pavement Core Photos – St Matthews Avenue



#### 1.0 Introduction

This report summarizes the results of the sub-surface investigation completed for the 2017 Industrial Street Rehabilitation Program. The streets investigation includes Bournais Drive, Beghin Avenue, De Baets Street and Paquin Road in the St. Boniface Industrial Park area and St Matthews Avenue. The information collected describes the pavement structure of the existing road as well as the soil stratigraphy beneath the pavement structure.

#### 2.0 Sub-Surface Investigation and Laboratory Program

For each street, test holes were drilled approximately every 50 m of street length with specific locations shown in Figure 1 and Figure 2. The test holes were drilled to determine sub-surface conditions for use in design and construction of the roads.

The sub-surface investigation was conducted between April 24<sup>th</sup> and April 27, 2017. The test holes were drilled to a depth of 3.1 m below road surface by Paddock Drilling Ltd. using a Canterra CT 250 truck mounted drill rig equipped with 125 mm diameter solid stem augers. The pavement structure (asphalt or concrete) was cored by Paul Bevel of Trek Geotechnical, using a portable coring press equipped with a hollow 150 mm diameter diamond core drill bit. The sub-surface conditions were observed during drilling were visually classified by Shane Broderick of TREK. Other pertinent information such as groundwater and drilling conditions were also recorded during drilling. Disturbed (auger cuttings) samples retrieved during the sub-surface investigation were transported to TREK's material testing laboratory for further testing. Core samples were also retrieved and logged at TREK's material testing laboratory.

The laboratory testing program consisted of moisture content determination, Atterberg limits, and grain size analysis (mechanical sieve and hydrometer methods). Information gathered for the St. Boniface Area (Appendix A) and St. Matthews Avenue (Appendix B) are included in separate appendices. The information provided in the Appendices includes test hole logs, laboratory testing summary tables, and photos of the pavement cores.

Test hole locations are noted on the test hole logs and shown on Figure 01 and Figure 02 based on measured distances from the nearest address, edge of pavement or other permanent features.

#### 3.0 Closure

The geotechnical information provided in this report is in accordance with current engineering principles and practices (Standard of Practice). The findings of this report were based on information provided (field investigation and laboratory testing). Soil conditions are natural deposits that can be highly variable across a site. If subsurface conditions are different than the conditions previously encountered on-site or those presented here, we should be notified to adjust our findings if necessary.

All information provided in this report is subject to our standard terms and conditions for engineering services, a copy of which is provided to each of our clients with the original scope of work, or a mutually executed standard engineering services agreement. If these conditions are not attached, and you are not already in possession of such terms and conditions, contact our office and you will be promptly provided with a copy.

This report has been prepared by TREK Geotechnical Inc. (the Consultant) for the exclusive use of KGS Group (the Client) and their agents for the work product presented in the report. Any findings or recommendations provided in this report are not to be relied upon by any third parties, except as agreed to in writing by the Client and Consultant prior to use.



**Figures** 



BOURNAIS DR. TH17-03 TH17-02 TH17-05 BEGHIN AVE. TH17-07 TH17-08 18 20 8 800 B B 81C 0 18 TH17-09 PROJECT LOCATION Winnipeg [115] TH17-14
PAQUIN RD. TH17-13 0 KEYPLAN SCALE N.T.S.

100 150 m SCALE = 1 : 3 000 (279 mm x 432 mm)

LEGEND: TEST HOLE (TREK, 2017)

NOTES: 1. AERIAL IMAGE FROM CITY OF WINNIPEG 2016.





0 50 100 150 m SCALE = 1 : 2 500 (279 mm x 432 mm) LEGEND: TEST HOLE (TREK, 2017)

NOTES: 1. AERIAL IMAGE FROM CITY OF WINNIPEG 2016.

Figure 02
Test Hole Location Plan



## EXPLANATION OF FIELD AND LABORATORY TESTING

#### **GENERAL NOTES**

- 1. Classifications are based on the United Soil Classification System and include consistency, moisture, and color. Field descriptions have been modified to reflect results of laboratory tests where deemed appropriate.
- 2. Descriptions on these test hole logs apply only at the specific test hole locations and at the time the test holes were drilled. Variability of soil and groundwater conditions may exist between test hole locations.
- 3. When the following classification terms are used in this report or test hole logs, the primary and secondary soil fractions may be visually estimated.

Ma	jor Div	isions	USCS Classi- fication	Symbols	Typical Names		Laboratory Classifica	ation Criteria		ပ္ပ			
	action	gravel no fines)	GW	36	Well-graded gravels, gravel-sand mixtures, little or no fines		$C_U = \frac{D_{60}}{D_{10}}$ greater than 4;	$C_{\rm C} = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3		ASTM Sieve sizes	#10 to #4	#40 to #10	< #200
sieve size)	Gravels (More than half of coarse fraction is larger than 4.75 mm)	Clean gravel (Little or no fines)	GP	.A.	Poorly-graded gravels, gravel-sand mixtures, little or no fines	urve, 200 sieve) 1bols*	Not meeting all gradation r	requirements for GW	0	STMS	#10	#40 t	* V
No. 200 s	Gravels than half of co	rith fines ciable of fines)	GM		Silty gravels, gravel-sand-silt mixtures	rain size c r than No. g dual sym	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are border-	Particle Size	⋖			
ained soils larger thar	-Graine	Gravel with fines (Appreciable amount of fines)	GC		Clayey gravels, gravel-sand-silt mixtures	vel from g on smaller llows: W, SP SM, SC SM, SC	Atterberg limits above "A" line or P.I. greater than 7	line cases requiring use of dual symbols	Part		2	00 %	9
Soarse-Granaterial is I		sands no fines)	SW	****	Well-graded sands, gravelly sands, little or no fines	nd and graines (fracti sified as fo W, GP, SV GM, GC, S	$C_U = \frac{D_{60}}{D_{10}}$ greater than 6;	$C_{\rm C} = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3		E E	2.00 to 4.75	0.425 to 2.00	< 0.075
half the n	Sands (More than half of coarse fraction is smaller than 4.75 mm)	Clean sands (Little or no fines)	SP		Poorly-graded gravels, gravel-sand mixtures  Silty gravels, gravel-sand-silt mixtures  Silty gravels, gravel-sand-silt mixtures  Clayey gravels, gravel-sand-silt mixtures  Well-graded sands, gravelly sands, little or no fines  Poorly-graded sands, gravelly sands, little or no fines  Poorly-graded sands, gravelly sands, little or no fines  Clayey sands, sand-silt mixtures  Clayey sands, sand-silt mixtures  Clayey sands, sand-clay mixtures  Not meeting all gradation requirements for GW  Atterberg limits below "A" line with P.I. between 4 and 7 are bord line cases requiring use of dual symbols  Atterberg limits above "A" line or P.I. less than 4  Not meeting all gradation requirements for GW  Atterberg limits above "A" line or P.I. less than 4  Above "A" line with P.I. between 4 and 7 are bord line cases requiring use of dual symbols  Not meeting all gradation requirements for GW  Atterberg limits below "A" line or P.I. less than 4  Above "A" line with P.I. between 4 and 7 are bord line cases requiring use of dual symbols  Atterberg limits below "A" line or P.I. less than 4  Above "A" line with P.I. between 4 and 7 are bord line cases requiring use of dual symbols						.,	0 0	5
(More than	Sar than half o	Sands with fines (Appreciable amount of fines)	SM		Silty sands, sand-silt mixtures	e percenta ig on perce rained soil han 5 perc than 12 pe	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are border-	rial				Clay
	(More than half is smaller t Sands with fines (Annershale	spues SC Clayey sands, sand			Clayey sands, sand-clay mixtures	Determin dependin coarse-gr Less t More i	Atterberg limits above "A" line or P.I. greater than 7	line cases requiring use of dual symbols	Material	7000	Coarse	Medium	Silt or Clay
size)	s/		ML		Inorganic silts and very fine sands, rock floor, silty or clayey fine sands or clayey silts with slight plasticity	80 Plasticity	Plasticity C	Chart		Sizes	. <u>e</u>	ï	. <u>.</u> .e.
. 200 sieve	ts and Clay	(Liquid limit less than 50)	CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	70 – 60 –		"7" INF	9	ASTM Sieve Sizes	3 in. to 12 in.	2/2 ci 2/2 ci 2/2	3/4 III. (0 3 III #4 to 3/4 in.
soils er than No	Silts	<u>ө</u>	OL		Organic silts and organic silty clays of low plasticity	INDEX (%)	QH (	CAN CAN	Particle Size	ASI		_	_
S-Grained a	, se	MH		Ш	Inorganic silts, micaceous or distomaceous fine sandy or silty soils, organic silts	PLASTICITY INDEX				mm > 300	75 to 300		19 to 75 4.75 to 19
Fine the materia	(More than half the material is smaller than No. 200 sieve size) ghly Silts and Clays (Liquid limit oils greater than 50) less than 50)		СН		Inorganic clays of high plasticity, fat clays	20 -	6	MH or OH		۲	75 to		191
than half t			ОН	<b>***</b>	Organic clays of medium to high plasticity, organic silts	7 4 0 10	ML OR OL 16 20 30 40 50 6 LIQUID LIMI	30 70 80 90 100 110 T (%)	rial	Ş	Single		
(More	Highly	Organic Soils	Pt	6 46 46 46 47 4	Peat and other highly organic soils	Von Post Class		rong colour or odour, d often fibrous texture	Material	701100	Cobbles	Gravel	Fine

<sup>\*</sup> Borderline classifications used for soils possessing characteristics of two groups are designated by combinations of groups symbols. For example; GW-GC, well-graded gravel-sand mixture with clay binder.

#### Other Symbol Types

	Asphalt	Bedrock (undifferentiated)	Cobbles
\$ 4 A	Concrete	Limestone Bedrock	Boulders and Cobbles
	Fill	Cemented Shale	Silt Till
		Non-Cemented Shale	Clay Till



## EXPLANATION OF FIELD AND LABORATORY TESTING

#### **LEGEND OF ABBREVIATIONS AND SYMBOLS**

PL - Plastic Limit (%)
PI - Plasticity Index (%)

▼ Water Level at End of Drilling

MC - Moisture Content (%)

▼ Water Level After Drilling as Indicated on Test Hole Logs

RQD- Rock Quality Designation
Qu - Unconfined Compression

SI - Slope Inclinometer

Su - Undrained Shear Strength VW - Vibrating Wire Piezometer

#### FRACTION OF SECONDARY SOIL CONSTITUENTS ARE BASED ON THE FOLLOWING TERMINOLOGY

TERM	EXAMPLES	PERCENTAGE
and	and CLAY	35 to 50 percent
"y" or "ey"	clayey, silty	20 to 35 percent
some	some silt	10 to 20 percent
trace	trace gravel	1 to 10 percent

#### TERMS DESCRIBING CONSISTENCY OR COMPACTION CONDITION

The Standard Penetration Test blow count (N) of a non-cohesive soil can be related to compactness condition as follows:

<b>Descriptive Terms</b>	SPT (N) (Blows/300 mm)
Very loose	< 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very dense	> 50

The Standard Penetration Test blow count (N) of a cohesive soil can be related to its consistency as follows:

<b>Descriptive Terms</b>	<u>SPT (N) (Blows/300 mm)</u>
Very soft	< 2
Soft	2 to 4
Firm	4 to 8
Stiff	8 to 15
Very stiff	15 to 30
Hard	> 30

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

Descriptive Terms	Undrained Shear <u>Strength (kPa)</u>
Very soft	< 12
Soft	12 to 25
Firm	25 to 50
Stiff	50 to 100
Very stiff	100 to 200
Hard	> 200



<b>A</b> ppend	lix	A
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Test Hole Logs, Lab Testing Summary & Pavement Core Photos - Bournais Drive, Beghin Avenue, De Baets Street and Paquin Road

1 of 1



Logg	ed Bv.	Shane Broder	rick	Reviewed	d By: Nelson Fe	erreira	_ P	rojec	t Engine	er: Nelsor	n Ferreir	а	
-1.5- -2.0- -3.0-		i. / iii east iiom	1 west curp. (332010311	IN 040092	<u>c)</u>		_	_	_		_	_	
		1) No sloughing 2) Test hole bac surface. 3) Test hole loc	g or seepage observed. ckfilled with auger cuttin cated on Bournais Drive n west curb. (5528105m	, 340 m no	rth from Dugald F		ıne,						
		END OF TEST Notes:	HOLE AT 3.1 m IN CLA	ΥY									
-3.0-								G15					
<u> </u>													
-2.5-								014				2.5	
								G14				\ <b>\</b>	
-2.0-													
							4	G13	•				
1.5		- high plas	sticity					G12	•			_	•
_1 5-		<ul> <li>mottled d</li> <li>moist, sti</li> </ul>	and 1.7 m, silt inclusior lark brown to green ff to very stiff	is (<20 mn	1 dia.) below 1.2 i	n		G11	•			Δ	•
		CLAY - silty, tra	ace sand, trace precipita	ites (sulph	ates, <20 mm dia	.), trace organics							
-1.0-								G10	•				
			plack to grey Iff to very stiff sticity					G09	•			Δ	•
			ty, trace sand, trace gra	vel (<20 m	m dia.), trace org	anics							
-0.5-			aded fine sand to fine g					G08	•				
		SAND and GRA	AVEL (FILL) - trace clay	, trace silt	sub-rounded								
	D & 4	CONCRETE (1	90 mm THICK)					တ C01	0 20 4	40 60 80	100 0	50 100	150 2002
Depth (m)	Soil Symbol		MATER	RIAL DESC	RIPTION		Sample Type	ample l	0 20 4 PL	MC LL	100	Pocket  Qu O Field V	Pen. <b>Ф</b> ⊠
# (c	loqm/		N44.TET	NAL DEGG	DIDTION		Type	Sample Number		(kN/m³) 18 19 20 cle Size (%)	21	Strength  Test Today	(kPa) vpe
	Particle	Size Legend:	Fines	Clay	Silt	Sand		Gra	B	Cobble	es 🔽	Boulde	
	Sample	Туре:	Grab (G)		Shelby Tube (T)	Split Spoon (	SS)	Sp	olit Barrel	(SB)	Core (	C)	
Meth			Stem Auger, Canterra CT-250	Truck Moun	<u> </u>	Date Drilled:	26 Ap						
-	ct Nam	e: 2017 Indust Paddock Dr		:e			UTMN-640592, E-5528105 :: Existing Ground						
	Project Name: 2017 Industrial Streets - St. Boniface					Project Number:	U012-006-00 LITM N-640592 E-5528105						

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Client:		KGS Group					Project Number:	0012-00						
-		2017 Industr		- St. Bonifac	e		Location:	UTM N-640576, E-5528022						
Contrac	tor:	Paddock Dri					Ground Elevation:			ıd				
Method	:	125 mm Solid S	Stem Auger, Ca	anterra CT-250	Truck Mount		Date Drilled:	26 April	2017					
Sa	ample <sup>-</sup>	Гуре:	Gr	ab (G)		Shelby Tube (T)	Split Spoon (S	SS)	Split E	Barrel (SB	3) <b>[</b> C	ore (C)		
Pa	article S	Size Legend:	Fir	nes ///	Clay	Silt	Sand		Gravel	57	Cobbles		Boulde	rs
Depth (m)	Soil Symbol	ONODETE (M	20 sassa T.I.II		RIAL DESC	RIPTION		Sample Type	16	PL MC	m <sup>3</sup> ) 19 20 2 Size (%) 60 80 10	1 Si	drained strength (Interpretate   Test Type Torvan Pocket P	kPa) <u>oe</u> e ∆ en. <b>♣</b> ≾
10	*	ONCRETE (19	90 mm 1HI0	JK)				C	02					
-0.5		AND and GRA - light brow - poorly gra  LAY (Fill) - sor - mottled da	n, moist, co aded fine sa ne silt	ompact, sub- and to fine g	-angular to	sub-rounded mm dia.), "pit ru	n"	G0	1a •	•			2	
		- motited da - moist, stif - high plast silty below 0.9	f to very stif icity	f				G	02				<b>△ •</b>	
-1.0		siny bolom c.o						G	03	•			<b>△•</b>	
-1.5-								G		•			△ •	
-2.0-	C	LAY - some sil ace oxidation - mottled bi - moist, firn	rown	d, trace gra	vel, trace μ	orecipitates (sulp	hates, <10 mm dia.),							
-25-		- high plast	icity					GO	06					
								G	77					
-3.0-								G						
	N 1) 2) si 3)	urface.	or seepage ekfilled with	e observed. auger cuttir urnais Drive	ngs, bentor , 250 m no	rth from Dugald	old patch asphalt to Road, northbound lar	ne,						
Logged	By: _:	Shane Broderi	ck		Reviewed	I By: Nelson F	erreira	Pro	ject E	ngineer:	Nelson F	erreira		



1 of 1

## GENTECHNICOL

Clien	t:	KGS Group				Project Number:	_0012-006-00						
Proje	ct Nam	e: 2017 Industri	ial Streets - St. Bo	niface		Location:	UTM N-	640571, E-55	527937				
Contr	ractor:	Paddock Dril	lling Ltd.			Ground Elevation:	Existing	Ground					
Metho	od:	125 mm Solid S	tem Auger, Canterra C	T-250 Truck Mount		Date Drilled:	26 April	2017					
	Sample	е Туре:	Grab (G)	S	helby Tube (T)	Split Spoon (S	S)	Split Barrel (	SB) Core	e (C)			
	Particle	e Size Legend:	Fines	Clay	Silt	Sand		Gravel 57	Cobbles	Boulders	3		
Depth (m)	Soil Symbol			TERIAL DESCI	RIPTION		Sample Type	16 17 18 Particl		Undrained SI Strength (kf  Test Type  △ Torvane  Pocket Pe  ⊠ Qu ⊠  ○ Field Vand  50 100 150	Pa) <u>≩</u> ∆ n. <b>•</b> e ○		
	4 A A	- light brow	VEL (FILL) - trace	sub-angular to	sub-rounded		CC G1	03					
-0.5		- poorly gra  CLAY (FILL) - si - black - moist, stiff	ded fine sand to fi lty, some sand, tra f to very stiff	ne gravel (<20 r	nm dia.), "pit rur		G1	<i>(((((((((((((((((((((((((((((((((((((</i>		ΔΦ			
-1.0-		- high plasti	icity				G1			A 0			
		CLAY - silty, trac	ce precipitates (sul	phates <15 mm	dia.), trace oxid	ation, trace organics	G1			ΔΦ			
AL.GDT 25/5/17		- moist, stiff - high plasti	f to very stiff				G2			Δ •			
0.08PJ TREK GEOTECHNICAL, GDT 25/6/17													
							G2	22 •		<b>10</b>			
FACE 0 A SGB							G2	23	•	۵۰			
SUB-SURFACE LOG LOGS 20170428 ST. BONIFACE 0.4 SGBR 0012-006-		Notes: 1) No sloughing 2) Test hole bac surface. 3) Test hole local	_	ved. cuttings, bentoni Drive, 170 m nor	th from Dugald F	ld patch asphalt to Road, southbound land	e,						
Logg	ed By:	Shane Broderic	ck	Reviewed	By: Nelson Fe	erreira	_ Pro	ject Engineer	: Nelson Ferro	eira			

1 of 1



Clien	ıt:	KGS Group				Project Number:	0012-0	006-00				
Proje	ct Nam	e: 2017 Industr	rial Streets - St. Bonifa	ace		Location:	1 MTU	N-64057	4, E-552	7843		
Conti	ractor:	Paddock Dri	lling Ltd.			Ground Elevation:	Existin	g Groun	nd			
Meth	od:	125 mm Solid S	Stem Auger, Canterra CT-2	50 Truck Mount		Date Drilled:	26 Apr	il 2017				
	Sample	е Туре:	Grab (G)	She	elby Tube (T)	Split Spoon (S	SS)	Split E	Barrel (SE	B) Cor	e (C)	
	Particle	e Size Legend:	Fines	//// Clay	Silt	Sand		Gravel		Cobbles	Bou	lders
Depth (m)	Soil Symbol	CONCRETE (21		ERIAL DESCRI	PTION		Sample Type	Sample Number	Particle S	m³) 19 20 21 Size (%) 60 80 100 C LL	Streng  Test  △ Tor  Pocke  © C	ed Shear th (kPa)  Type vane △ et Pen.  Qu ⊠  Vane ○  150 200 25
E	9 4 4 9 4 4 9 4 4	00.10.1.2.2						C04				
-0.5-		- light brow - poorly gra CLAY (FILL) - si - black - moist, stiff	NVEL (FILL) - trace class, moist, compact, sunded fine sand to fine sald to fine sald, trace sald, trace fine sald trace sald,	b-angular to su gravel (<20 mi	m dia.), "pit ru	<b>1"</b>	4	G24 • G25 G26			•	
-1.0-		SILT - clayey - brown - moist, sof - low plastic	city					G27		0		
		CLAY - silty, trac - light to da - moist, stift - high plast	irk brown f to very stiff					G28 G29	•		Δ	•
		- trace silt inclus	sions (<30 mm dia.) b	elow 2.0 m				G30	•		e e	
-3.0-								G31	•		4	
2005-2017-ACE LOG LOGS 2017-0428 ST. BONIFACE U. 3. SGBK 0012-001		Notes: 1) No sloughing 2) Test hole bac surface. 3) Test hole local	HOLE AT 3.1 m IN CI or seepage observed ckfilled with auger cut ated on Bournais Driv west curb. (5527843	d. tings, bentonite re, 75 m north f	rom Dugald R	old patch asphalt to load, northbound lane	÷,					
Logg	jed By:	Shane Broderi	ick	Reviewed B	y: Nelson F	erreira	_ Pı	roject E	ngineer:	Nelson Fer	reira	

1 of 1



Cilent:		KGS Group				Project Number:	0012-0	00-00					
Project	Name	: 2017 Industr	rial Streets - St. Bonifa	ce		Location:	MTU_	N-6405	67, E-5	527756			
Contra	ctor:	Paddock Dri	illing Ltd.			Ground Elevation:	Existin	g Grou	ınd				
Method	l:	125 mm Solid S	Stem Auger, Canterra CT-25	0 Truck Mount		Date Drilled:	26 Apr	il 2017					
S	ample	Туре:	Grab (G)		Shelby Tube (T)	Split Spoon (	SS)	Split	Barrel (	SB)	Core (	C)	
P	article	Size Legend:	Fines	Clay	Silt	Sand		Grave	1 57	Cobb	les 🚡	Во	ulders
Depth (m)	Soil Symbol		MATE	RIAL DESC	RIPTION		Sample Type	Sample Number	Partic	le Size (%)	0 100	Strer  Te  A Te  Pool  Fiel	ined Shear ligth (kPa) st Type orvane △ ket Pen. ♣ I Qu ⊠ Id Vane ○ 0 150 200
		ASPHALT (110	· · · · · · · · · · · · · · · · · · ·					C05					
- 4	\$ 4 g	CONCRETE (19	90 mm THICK)					C05					
-0.5		CLAY - silty, sor - light brow - moist, stif - high plast	ff	(<25 mm d	a.)			G32	•			△•	
		trace sand, tra	ice gravel between 0.9	m and 1.2	m			G33	•			Δ	•
1.0								G34	•			<b>△</b> •	
-1.5			sions (<50 mm dia.) be					G35	•			4	
·		<ul><li>light brow</li><li>moist, sof</li><li>intermedia</li></ul>	ft to firm ate plasticity					G36	•		•	7	
			It, trace sand, trace ox ght brown to brown	idation, trac	e silt inclusions (	<25 mm dia.)							
2.0		- moist, stiḟ - high plast	Ť					G37		•		<b>20</b>	
-2.5-													
-3.0-		silty below 2.7	m					G38		•		<b>△₽</b>	
0.0	N 1 2 s 3	Notes:  ) No sloughing  ) Test hole bac surface.  ) Test hole loca	HOLE AT 3.1 m IN CL or seepage observed ckfilled with auger cutti ated on Beghin Avenu west curb. (5527756n	ngs, bentor e, 25 m sou	th from Dugald F		ne,						
Logged	By: _	Shane Broderi	ick	Reviewed	I By: Nelson Fe	rreira	Pr	roject l	Enginee	r: Nelso	n Ferreir	 а	

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Client:	KGS Group	<u> </u>		Project Number:	0012-00	<u> </u>					
Project Na	<b>ne:</b> 2017 Indust	trial Streets - St. Bonifac	ce	Location:	UTM N	l-6405	78, E-552	7672			
Contractor	Paddock Dr	rilling Ltd.		Ground Elevation:	Existing	Grou	nd				
Method:	125 mm Solid	Stem Auger, Canterra CT-250	) Truck Mount	Date Drilled:	26 April	2017					
Samr	ole Type:	Grab (G)	Shelby Tube	(T) Split Spoon (S	SS)	Snlit	Barrel (SE	3) <b>T</b> Co	ore (C)		
-	ele Size Legend:	Fines				Grave		Cobbles		Soulder	
railio	T Size Legena.	MAN Filles	Z Clay IIII S	iii 🌼 🚉 Saliu		Glave	' b∠_ Bulk '			rained S	
					g  .	ا <u>ا و</u>	(kN/ 17 18	m³) 19 20 21		ength (k	
Depth (m) Soil Symbol					Sample Type	Sample Number	Particle 9			Test Typ	
Depth (m) ii Syml		MATER	RIAL DESCRIPTION		l l l l	9 o	20 40	60 80 100	<b>₽</b> Po	ocket Pe	en. 🗭
S					Sar	am	PL M		O F	ield Var	ne O
52.0 K.04.	CONCDETE (4	IOO TUICK)			<u> </u>	<b>ω</b> 0	20 40	60 80 100	0 50	100 15	50 2002
	CONCRETE(I	190 mm THICK)				06					
- 💥		AVEL (FILL) - trace clay			- 17						
			o-angular to sub-rounded gravel (<20 mm dia.), "pi		9	647	•				
💥	ď	•	, ,								
-0.5-	CLAY (FILL)- si - high plas		ravel, mottled dark grey,	moist, stiff to very stiff	G	348	•		4		
	CLAY - silty, tra	ace sand, trace oxidation	n, trace silt inclusions (<	<20 mm dia.)	$\overline{1}$	$\neg$					
	- mottled g	greenish brown to dark o iff to very stiff	grey		9	349	•			<b>4</b> •	
	- high plas										
-1.0-					- 14						
					G	550			.	4	
						351					_
						100				4 9	.
-1.5-											
						652				Δ	•
						-				7-1	_
-2.0-					$\vdash$	_					
						353					
	OUT				$\perp$						
-2.5-	SILT - clayey, to	race oxidation wn to brown, moist to we	et, soft, low plasticity		G	G54	•	<u> </u>			
	SILT and CLAY	Y - trace oxidation, trace	e silt inclusions (<30 mm	ı dia.)							
	<ul> <li>light to da</li> <li>moist, sti</li> </ul>					-				+-+	
	- high plas	sticity			G	355			<b>∠</b>		
-3.0-						_					
		HOLE AT 3.1 m IN SIL	T and CLAY								
	Notes: 1) No sloughing	g or seepage observed.									
	2) Test hole ba		ngs, bentonite, sand, an	d cold patch asphalt to							
	surface. 3) Test hole loc	cated on Beghin Avenue	e, 100 m north from Duç	gald Road, northbound la	ne,						
	5.9 m west fron	m east curb. (5527672m	ı N 640578m E)								
Logged By	: Shane Broder	rick	Reviewed By: Nelso	n Ferreira	_ Pro	oject E	Engineer:	Nelson Fe	rreira		

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## GENTECHNICOL

Cilent	•	KGS Group	<u> </u>			Project Number:	0012-00	J <del>0-00</del>				
Projec	t Name		trial Streets - St. Bonifa	ice		Location:	UTM N	I-64056	67, E-55276	605		
Contra	actor:	Paddock Dr	rilling Ltd.			Ground Elevation:	: Existing	Grour	nd			
Metho	d:	125 mm Solid	Stem Auger, Canterra CT-25	0 Truck Moun	<u>t</u>	Date Drilled:	26 April	2017				
5	Sample	Type:	Grab (G)		Shelby Tube (T)	Split Spoon (	SS)	Split I	Barrel (SB)	Co	re (C)	
F	Particle	Size Legend:	Fines	Clay	Silt	Sand		Gravel	[2]	Cobbles	Bou	ders
Depth (m)	Soil Symbol		MATE	RIAL DESC	CRIPTION		Sample Type	Sample Number 0 0 0	Bulk Ur (kN/m) 17 18 Particle Siz 20 40 6 PL MC 20 40 6	3) 19 20 21 ze (%)	Streng  Test △ Tor Pock  □ () ○ Field	ed Shear th (kPa)  Type vane △ et Pen.  Qu ⊠  Vane ○  150 2000
3	9 4 4 (	CONCRETE (1	75 mm THICK)				C	07				
-0.5-			- some sand wn, soft to firm, loose liate plasticity				G	639	1			
		CLAY - silty, tra - mottled c - moist, sti - high plas		(<20 mm dia	a.) , trace silt inclu	usions (<25 mm dia.)	1 4	640			•	
-1.0 -							G	641	•		Δ	•
-1.5-								642	•		Δ	•
		- trace precipita	ates (sulphates, <10 m	m dia.) belo	w 1.8 m			643			Δ	•
-2.0-							G	644	•			
 -		<ul> <li>light to da</li> <li>moist, sti</li> </ul>	iff	ion, trace si	It inclusions (<30	mm dia.)		645			Δ •	
-2.5- -		CLAY - silty, tra		mm dia.)								
-3.0-							G	646	•		•	
		Notes: 1) No sloughing 2) Test hole ba surface. 3) Test hole loo	HOLE AT 3.1 m IN CL g or seepage observed ckfilled with auger cutt cated on Beghin Avenu st from west curb. (552	I. ings, bentor ie, 175 m so	outh from Dugald							
Logge	d By:	Shane Broder	rick	Reviewed	d <b>By</b> : _Nelson Fe	erreira	Pro	oject E	ngineer:	Nelson Fer	reira	

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Clien	t:	KGS Group				Project Number:	0012-	006-0	00						
Proje	ct Nam	e: 2017 Industr	rial Streets - St. Boni	face		Location:	UTM	N-64	0565, I	E-552750	04				
Contr	ractor:	Paddock Dril	lling Ltd.			Ground Elevation:	Existi	ng Gı	ound						
Meth	od:	125 mm Solid S	Stem Auger, Canterra CT-	250 Truck Mount		Date Drilled:	26 Ap	ril 20	17						
	Sample	: Туре:	Grab (G)	S	helby Tube (T)	Split Spoon (S	SS)	S	olit Barı	el (SB)	Co	re (C	;)		
	Particle	Size Legend:	Fines	///// Clay	Silt	Sand		Gra	vel	77 c	obbles	• 🗙	Boul	ders	
Depth (m)	Soil Symbol		MAT	ERIAL DESCI	RIPTION		Sample Type	Sample Number	16 17	•	20 21 (%) 0 80 100	•	△ Ton Pocke	th (kPa Type vane ∠ et Pen Qu⊠ Vane	2 . •
	D 5 4	CONCRETE (18	80 mm THICK)					C08							
-0.5		<ul> <li>light brown</li> </ul>	NVEL (FILL) - trace of m, moist, compact, s aded fine sand to fine	ub-angular to				G56	•				•		
-1.0-		<ul><li>light brown</li><li>moist, stiff</li><li>high plast</li></ul>						G57		•			△Φ		
		Oll T. Alavavi						G58					Δ	۰	
-1.5-	- - -	SILT - clayey - light to da - moist, sof - low plastio	<sup>†</sup> t					G59	•			ΔΦ	•		
20-2.0-		CLAY - silty - light to da - moist, stiff - high plast	f					G60		•			Δ	4	<b> </b>
-2.0-			tes (sulphates, <10 r	mm dia.), mottl	led dark grey be	elow 2.0 m		G61		•			Δ •	1	
		SILT - clayey, tra - light brow - soft, low p	n, moist				4	G62		•		•			
-3.0-		CLAY - silty, trac - light to da - moist, stifi - high plast	f	hates<10 mm	dia.)			G63		•			<b>C</b> e		
2.5 — 2.5 — 3.0 — 3.0 — 3.0 — 3.0 — 4.1 — 4.1 —		Notes: 1) No sloughing 2) Test hole bac surface. 3) Test hole loca	HOLE AT 3.1 m IN Coor seepage observe or seepage observe ckfilled with auger cu ated on De Baets Struth curb. (5527504m	ed. ttings, bentoni reet, 30 m eas	t from Beghin A	old patch asphalt to we, eastbound lane, 1	1.7			1 1					
Logg	ed By:	Shane Broderi	ick	Reviewed	By: Nelson F	erreira	_ F	Projec	ct Engi	neer: _N	lelson Fe	rreira			

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Cilen	L-	KGS Group				Project Number:	0012-0							
Proje	ct Name	: 2017 Industr	rial Streets - St. Bonifa	ce		Location:	UTM	N-640	664, E-55	27472				
Contr	actor:	Paddock Dri	illing Ltd.			Ground Elevation:	Existin	ig Gro	und					
Metho	od:	125 mm Solid S	Stem Auger, Canterra CT-25	Truck Moun	<u> </u>	Date Drilled:	27 Apr	ril 201	7					
	Sample	Туре:	Grab (G)		Shelby Tube (T)	Split Spoon (S	SS)	Spl	it Barrel (	SB)	Core (C	C)		
	Particle	Size Legend:	Fines	Clay	Silt	Sand		Grav	el 🐬	Cobbles		Во	ulder	s
Depth (m)	Soil Symbol			RIAL DESC	CRIPTION		Sample Type	Sample Number	Particl	k Unit Wt N/m³) 19 20 e Size (%) 60 80 1 MC LL	00	Te △ To ♣ Poo ⊠ ○ Fie	ngth (k st Typ orvand ket Pe l Qu ⊠ ld Var	:Pa) <u>e</u> e ∆ en. <b>Ф</b>
-	P 4 4 (	CONCRETE (17	70 mm THICK)					C09						
-0.5		<ul><li>light brow</li><li>poorly gra</li><li>"pit run"</li><li>CLAY - silty, sor</li></ul>	AVEL (FILL) - trace clay  In, moist, compact, sub- aded fine sand to fine g  me sand, trace gravel to  In to dark green  In to stiff	-angular to ravel (<20	mm dia.)		_4	G104 G105	•		Δ		•	
-1.0		<ul> <li>high plast</li> </ul>		9 m				G106	•			Δ	•	
-		trace oxidation	n, trace silt inclusions (·	<35 mm dia	a.) below 1.2 m			G107	•			Δ		•
-1.5 <del>-</del>								G108 G109	•			Δ	•	•
2.0		SILT - clayey, tr - light brow - moist, sof - low plasti	n ft					G110	•					
-		- IOW Plasti	aty				7	G111	•					
-2.5 <del>-</del>								G112						
-3.0 <del>-</del>								0112						
	!	Notes: 1) No sloughing 2) Test hole bac surface. 3) Test hole loca	HOLE AT 3.1 m IN SIL or seepage observed ckfilled with auger cutti ated on De Baets Stre m north curb. (5527472	ngs, bentor	ast from Beghin A		<u>-</u>	,						
Logge	ed By:	Shane Broderi	ick	Reviewed	d By: Nelson Fe	rreira	P	roject	Engineer	: Nelson	Ferreira	<b>1</b>		



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## GENTECHNICAL

Clien	ıt:	KGS Group				Project Number:	0012-0	006-0	0				
Proje	ct Nam	e: 2017 Industr	ial Streets - St. Bo	niface		Location:	UTM	N-640	795, E-5	527416	6		
Cont	ractor:	Paddock Dril	ling Ltd.			Ground Elevation:	Existin	ng Gro	und				
Meth	od:	125 mm Solid S	tem Auger, Canterra C	T-250 Truck Mount		Date Drilled:	26 Apı	ril 201	7				
	Sample	е Туре:	Grab (G)	S	Shelby Tube (T)	Split Spoon (S	SS)	Sp	lit Barrel	(SB)	Core	e (C)	
	Particle	e Size Legend:	Fines	Clay	Silt	Sand		Grav	rel 5	<u>~</u> C₀	bbles	Bould	ders
Depth (m)	Soil Symbol			TERIAL DESC	RIPTION		Sample Type	ample Nun	PL	sulk Unit \(\text{(kN/m}^3\)\) 18	20 21	Undraine Strengtl  Test  △ Torv  Pocke  □ Q  ○ Field  50 100	n (kPa) Type ane ∆ t Pen. <b>∳</b> u ⊠
-	2 4 4 A	CONCRETE (16	60 mm THICK)					C10					
		- light brow - poor grad	VEL (FILL) - trace n, moist, compact, ed, fine sand to gr lty, some sand, tra	Sub angular to avel (<20 mm d	Sub rounded ia.), "pit run"			G64	•				
-0.5-		<ul><li>black</li><li>moist, stiff</li></ul>	f	ce graver			4	G65					
		- high plast - mottled greenis		(precipitates (s	ulphates) (<5 m	m dia.) below 0.6 m		G66	•				
-1.0- !								G67	•			•	
- 1.5-		dia.)	n to dark grey	phates, <50 mr	n dia.), some silf	inclusions (<25 mm		G68	•			٥	
0.06PJ TREK GEOTECHNICAL GDT 25/6/17								G69		•		<b>2</b>	
-2.0-								G70		•		A •	
- 3.0-								G71		•		٥	
SUB-SURFACE LOG LOGS 20170426 ST. BONIFACE 0. A SGBR 0012-006-		Notes: 1) No sloughing 2) Test hole bac surface. 3) Test hole local	_	ved. cuttings, benton Street, 270 m ea	st from Beghin	old patch asphalt to Ave, eastbound lane,			1				
Logg	ed By:	Shane Broderi	ck	Reviewed	By: Nelson Fe	erreira	_ P	roject	Engine	er: <u>Ne</u>	elson Ferr	eira	



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Clien	nt:	KGS Group				Project Number:	0012-	006-0	00					
Proje	ect Nam	e: 2017 Industr	rial Streets - St. Bonifa	ce		Location:	UTM	N-64	0920, E	-55273	375			
Cont	ractor:	Paddock Dri	illing Ltd.			Ground Elevation:	Existin	ng Gr	ound					
Meth	od:	125 mm Solid S	Stem Auger, Canterra CT-25	0 Truck Mount		Date Drilled:	27 Ap	ril 20	17					
	Sample	е Туре:	Grab (G)		Shelby Tube (T)	Split Spoon (S	SS)	Sp	olit Barr	el (SB)	Co	re (C)		
	Particle	e Size Legend:	Fines	/// Clay	Silt	Sand		Gra	vel		Cobbles	В	oulde	ers
Depth (m)	Soil Symbol		MATE	RIAL DESC	RIPTION		Sample Type	Sample Number	16 17	Bulk Ur (kN/m 18 1 article Siz 40 6 MC	3) 19 20 21 2e (%) 60 80 100	Stre	ength  est Ty  Torvai  ocket I  Qu  ield Va	<u>rpe</u> ne ∆ Pen. <b>♣</b>
	D 5 4	CONCRETE (18	85 mm THICK)					C11						
-		- light brow - poorly gra	AVEL (FILL) - trace cla n, moist, compact, sub aded fine sand to fine o	o-angular to gravel (<20	mm dia.), "pit rui	ח"		G96						
-0.5-		CLAY - silty, sor - mottled br SILT and CLAY	me sand, trace gravel rown to dark brown, m	(<20 mm dia oist, stiff, hi	a.) gh plasticity		4	G97		•		<b>△ €</b>	Þ	
-		<ul><li>light to da</li><li>moist, sof</li><li>high plast</li></ul>	ark brown ft to firm ticity					G98		•		40		
-1.0-		<ul><li>light brow</li><li>moist, stiff</li></ul>	ce oxidation, trace silt on to brown If to very stiff ate plasticity	inclusions (	<30 mm dia.)			G99		•			7	•
 - - - - - - 1.5-								G100		•		Δ	۰	
0.673 TREK GEOTECHNICAL.GD. 29977	-	SILT - clayey, tra - light brow - moist, sof - low plastic	n ft to firm city					G101	•			Δ •		
5 -2.0-		<ul> <li>light to da</li> <li>moist, stiff</li> </ul>	ff	es, <25 mm	ı dia.)									
		- high plast	ticity					G102		•		△•	1	
SGBK UU														
5 -  -3.0−								G103	•			40		
SUB-SURFACE LOG LOGS 20170428 ST. BONIFACE 0. A. SGBR 0012-006.		Notes: 1) No sloughing 2) Test hole bac surface. 3) Test hole local	HOLE AT 3.1 m IN CL g or seepage observed ckfilled with auger cutti ated on De Baets Stre m north curb. (552737	ngs, benton et, 400 m ea	ast from Beghin				,			,		
Logg	ged By:	Shane Broderi	ick	Reviewed	I By: Nelson Fe	erreira	P	Projec	t Engin	eer: _	Nelson Fer	reira		

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Clien	ıt:	KGS Group				Project Number:	0012-	006-0	0					
Proje	ct Nam	e: 2017 Industri	ial Streets - St. Bo	niface		Location:	UTM	N-64	0927, E	-552732	27			
Contr	ractor:	Paddock Dril	ling Ltd.			Ground Elevation:	Existir	ng Gr	ound					
Metho	od:	125 mm Solid S	tem Auger, Canterra C	T-250 Truck Mount		Date Drilled:	26 Ap	ril 20	17					
	Sample	е Туре:	Grab (G)	S	helby Tube (T)	Split Spoon (S	S)	Sp	lit Barre	el (SB)	Co	re (C)		
	Particle	e Size Legend:	Fines	Clay	Silt	Sand		Gra	vel	7月 c	obbles	В	oulders	
Depth (m)	Soil Symbol		MA	TERIAL DESCI	RIPTION		Sample Type	Sample Number	16 17	Bulk Unit (kN/m³) 18 19 rticle Size 40 60 MC	20 21	Stre	ained Shingth (kPlest Type Forvane Acket Pen Qu Deld Vane	a) △ n. •
		CONCRETE (20	00 mm THICK)	vel (<25 mm dia	.) to 0.9 m		Ţ	C12	0 20	40 60	80 100	0 50 1		200 250
-0.5-		- mottled lig - moist, stiff - high plasti	ght brown to dark g f icity	reen				G72 G73		•		2		
-1.0-								G74	'	•		•		
								G75 G76						
CAL.GDT 25/5/17		- trace oxidation	below 1.5 m					G77		•				
0.05PJ TREK GEOTECHNICAL GDT 25/5/17		- trace precipitat	tes (sulphates, <15	5 mm dia.) belov	v 1.8 m			G78		•		<b>2</b>		
-3.0								G79		•		•		
SUB-SURFACE LOG LOGS 20170426 ST. BONIFACE 0. A. SGBR 0012-006-		Notes: 1) No sloughing 2) Test hole bac surface. 3) Test hole local	_	ved. cuttings, bentoni ad, 40 m south	from DeBaets S	old patch asphalt to treet, southbound land	e,							
Logg	ed By:	Shane Broderic	ck	_ Reviewed	By: Nelson Fe	erreira	P	Projec	t Engin	eer: N	elson Fer	reira		



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Client	:	KGS Group	0			Project Number:	0012	-006-0	00							_
Projec	ct Name	e: 2017 Indus	strial Streets - St. Bonit	ace		Location:	UTM	N-64	0892, E	-55272	21					_
Contra	actor:	Paddock D	rilling Ltd.			Ground Elevation:	Existi	ing Gr	ound							_
Metho	d:	125 mm Solid	Stem Auger, Canterra CT-2	250 Truck Moun	t	Date Drilled:	27 Ap	oril 20	17							_
;	Sample	Туре:	Grab (G)		Shelby Tube (T)	Split Spoon (SS	S) <b></b>	Sp	olit Barr	el (SB)	С	ore (0	C)			
	Particle	Size Legend:	Fines	Clay	Silt	Sand		Gra	vel		Cobbles		Во	ulder	s	
Depth (m)	Soil Symbol		MAT	ERIAL DESC	CRIPTION		Sample Type	Sample Number	16 17	Bulk Un (kN/m 18 1 article Siz 40 6 MC 40 6	9 20 21 Se (%) GO 80 100		Strer  Te  Te  To  Pool	I Qu ⊠ ld Van	Pa) e e △ en. <b>♣</b> l ne ○	0 25
	D 4 4		210 mm THICK)  RAVEL (FILL) - trace cl	av trace silt				C13								
-0.5		- light bro - poorly g	wn, moist, compact, si raded fine sand to fine silty, trace sand, trace	ub-angular to gravel (<20	sub-rounded mm dia.), "pit ru	n"		G87								
		<ul> <li>mottled</li> </ul>	dark green to black rm to very stiff		,			G88 G89	-	•						
-1.0								G90	-	<b>-</b>			Δ	•		
		CLAY - silty, tr	race silt inclusions (<50	) mm dia.), ti	race organics											
1.5		- moist, fil - high pla	rm to stiff					G91	_	•			7		•	
00.GPJ TREK GEOTECHNICAL.GDT 25/5/17		· trace oxidatio	on below 1.8 m					G92					Δ	4	<b>þ</b>	
-2.0-								G93					Δ	۰		
-2.5—		SILT - some cl - light bro - moist, so - low plas	oft					G94	•			Δ	•			
-3.0		<ul><li>light bro</li><li>moist, st</li><li>high pla</li></ul>	sticity		m dia.)			G95		•			ΔΦ	ı		
SUB-SURFACE LOG LOGS 20170426 ST. BONIFACE 0.A. SGBR 0012-006-	N 1 2 9 3	Notes: 1) No sloughin 2) Test hole ba surface. 3) Test hole lo	Γ HOLE AT 3.1 m IN C ng or seepage observe ackfilled with auger cu cated on Paquin Roac m east edge.(5527221	d. tings, bento	th from DeBaets	old patch asphalt to Street, northbound lan	ie,									
Logge	ed By:	Shane Brode	erick	Reviewe	d By: Nelson F	erreira		Projec	ct Engin	eer: _	Nelson Fe	erreira	ì			

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## GENTECHNICOL

Clier	nt:	KGS Group				Project Number:	0012-006	-00			
Proje	ect Nam	e: 2017 Industr	rial Streets - St. Bo	niface		Location:	UTM N-6	40853, E-552	27131		
Cont	tractor:	Paddock Dri	lling Ltd.			Ground Elevation:	Existing G	Ground			
Meth	nod:	125 mm Solid S	Stem Auger, Canterra C	T-250 Truck Mount		Date Drilled:	27 April 2	017			
	Sample	е Туре:	Grab (G)	S	Shelby Tube (T)	Split Spoon (S	SS) S	Split Barrel (S	B) Cor	e (C)	
	Particle	e Size Legend:	Fines	Clay	Silt	Sand	Gr	avel 🔀	Cobbles	Bould	ders
Depth (m)	Soil Symbol			ATERIAL DESC	RIPTION		Sample Type Sample Number	Particle 0 20 40 PL N 0 20 40	Unit Wt //m³) 20 21 – Size (%) 60 80 100 100 100 100 100 100 100 100 100	Undraine Strengti  Test  △ Torv  Pocket  ② Qr  ○ Field V	n (kPa) Type ane ∆ t Pen. <b>∳</b> u ⊠
ŀ	D 5 4	ASPHALT (55 m CONCRETE (19					C14	7			
-0.5-		CLAY - silty, sor - mottled gr - moist, firm - high plast	me sand, some gra reenish to dark bro n to very stiff	wn			G80			ΔΦ	•
-1.0-		- trace sand bet	ween 0.9 m and 1.	2 m			G82	2 •		Δ 6	<b>)</b>
rechnical GDT 25/5/17		- trace precipitat	tes (sulphates, <5	mm dia.) betwe	en 1.5 m and 1.8	3 m	G83			Δ •	
06-00-00 TREK GEO							G85	5	•	•	
-ACE 0_A_SGBR 0012-0							G86	;	•	9	
SUB-SURFACE LOG LOGS 20170426 ST. BONIFACE 0 A SGBR 0012-006-00 GPJ. TREK GEOTECHNICAL GDT 25/6/17		Notes: 1) No sloughing 2) Test hole bac surface. 3) Test hole local	_	ved. cuttings, benton ad, 250 m soutl	n from DeBaets S	old patch asphalt to Street, southbound					
Logg	ged By:	Shane Broderi	ck	Reviewed	By: Nelson Fe	erreira	Proje	ect Engineer:	Nelson Feri	eira	



Test Hole		Paveme	ent Surface	Pavement St	ructure Material		Sample	Depth (m)	Moisture		Grain Siz	e Analysi:	S	Α	tterberg L	imits
No.	Test Hole Location	Туре	Thickness (mm)	Туре	Thickness (mm)	Subgrade Description	Top (m)	Bottom (m)	Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid	Plastic	Plasticity Index
		Concrete	190													
						Sand and Gravel Fill	3.0	0.6	4.4							
	U14 (5528105m N					Clay Fill	0.6	0.9	25.6							
	640592m E)					Clay Fill	0.9	1.2	33.2							
TH17-01	Bournais Drive, 340 m north from Dugald Road,					Clay	1.2	1.5	30.8							
	southbound lane, 1.7 m					Clay	1.5	1.7	34.0							
	east from west curb			1		Clay	1.7	1.8	21.4							
						Clay	2.3	2.6	23.2							
				1		Clay	2.7	3.0	39.2							
		Concrete	190			•										
						Sand and Gravel Fill	0.3	0.5	5.8							
	U14 (5528022m N					Clay Fill	0.5	0.6	21.1							
	640576m E)					Clay Fill	0.6	0.9	32.2							
TH17-02	Bournais Drive, 250 m					Clay Fill	0.9	1.2	34.8							
	north from Dugald Road, northbound lane, 1.7 m					Clay Fill	1.2	1.5	34.2							
	west from east curb					Clay Fill	1.5	1.8	31.6							
						Clay	2.0	2.3	43.8							
						Clay	2.7	3.0	47.2							
		Concrete	210			J.I.I.										
						Sand and Gravel Fill	0.3	0.5	6.2							
	U14 (5527937m N					Clay Fill	0.5	0.6	15.6	1	16	43	40	48	15	33
	640571m E)			1		Clay Fill	0.6	0.9	26.5							
TH17-03	Bournais Drive, 170 m			1		Clay Fill	0.9	1.2	25.8							
	north from Dugald Road, southbound lane, 1.7 m			1		Clay	1.2	1.5	35.5							
	east from west curb			1		Clay	1.5	1.8	36.2							
				1		Clay	2.3	2.6	35.3							
				1		Clay	2.7	3.0	44.5							
		Concrete	210			Oldy	2	0.0	11.0							
		301101010	2.10	1		Sand and Gravel Fill	0.3	0.5	7.4		<del>                                     </del>	1				$\vdash$
	U14 (5527843m N					Clay Fill	0.5	0.6	21.8	1	13	42	44	49	19	30
	640574m E)			1	+	Clay Fill	0.6	0.9	44.6	<u> </u>	<del>- `</del>	<del>- '-</del>	<del>-                                    </del>			<del> </del>
TH17-04	Bournais Drive, 75 m					Silt	0.0	1.2	26.0	0	4	62	34	38	15	23
54	north from Dugald Road,					Clay	1.2	1.5	35.2	0	_	02	0,7	- 55	10	25
	northbound lane, 5.5 m west from east curb					Clay	1.5	1.8	39.3							
				<del>                                     </del>	+	Clay	2.3	2.6	24.8		<b> </b>					
				<del>l                                      </del>	+	Clay	2.3	3.0	26.5		<del>                                     </del>			1		-
						Clay	2.1	3.0	20.5							



Test Hole No.	Test Hole Location	Paveme	ent Surface	Pavement Structure Material			Sample I	Depth (m)	Moisture					Atterberg Limits		
		Туре	Thickness (mm)	Туре	Thickness (mm)	Subgrade Description	Top (m)	Bottom (m)	Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid	Plastic	Plasticity Index
		Asphalt	110	Concrete	190											
	U14 (5527756m N					Clay	0.3	0.6	25.6							
	640567m E)					Clay	0.6	0.9	30.0							
TH17-05	Beghin Avenue, 25 m south from Dugald					Clay	0.9	1.2	30.3							
1117-05	Road, southbound lane,					Clay	1.2	1.5	32.9							
	6.0 m east from west					Silt	1.5	1.8	27.8							
	curb					Clay	2.0	2.3	50.5							
						Clay	2.7	3.0	47.2							
		Concrete	180													
						Sand and Gravel Fill	0.3	0.5	28.0							
	U14 (5527672m N					Clay Fill	0.5	0.6	32.0							
TH17-06	640578m E) Beghin Avenue, 100 m north from Dugald Road, northbound lane, 5.9 m west from east curb					Clay	0.6	0.9	32.0							
						Clay	0.9	1.2	31.0							
						Clay	1.2	1.5	30.9							
						Clay	1.5	1.8	28.1							
						Clay	2.0	2.3	31.5							
						Silt	2.4	2.6	27.0							
						Silt and Clay	2.7	3.0	38.4							
	U14 (5527605m N 640567m E) Beghin Avenue, 175 m south from Dugald Road, southbound lane, 6.0 m east from west curb	Concrete	175													
						Silt and Clay	0.3	0.6	18.7	1	19	44	37	44	15	29
						Clay	0.6	0.9	32.6							
						Clay	0.9	1.2	28.9							
TH17-07						Clay	1.2	1.5	28.2							
						Clay	1.5	1.8	30.1							
						Clay	2.0	2.3	40.0							
						Silt and Clay	2.3	2.4	52.8							
						Clay	2.7	3.0	51.1							
		Concrete	190													
	U14 (5527504m N 640565m E) De Baets Street, 30 m east from Beghin Ave, eastbound lane, 1.7 m					Sand and Gravel Fill	0.3	0.6	14.6							
						Clay Fill	0.6	0.9	30.0							
						Clay Fill	0.9	1.2	26.8							
TH17-08						Silt	1.2	1.5	22.1							
						Clay	1.5	1.8	29.3							
	north from south curb					Clay	2.0	2.3	44.9							
						Silt	2.4	2.6	36.1							
						Clay	2.7	3.0	54.6							



Test Hole No.		Paveme	nt Surface	Pavement Str	ructure Material	Sample Depth (m) Moisture Grain Size Analy					e Analysis	sis Atterberg Limits				
	Test Hole Location	Туре	Thickness (mm)	Type	Thickness (mm)	Subgrade Description	Top (m)	Bottom (m)	Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid	Plastic	Plasticity Index
		Concrete	170													
				1		Sand and Gravel Fill	0.3	0.5	8.3							
	U14 (5527472m N					Clay	0.5	0.6	25.7							1
	640664m E)					Clay	0.6	0.9	30.9							1
TH17-09	De Baets Street, 135 m					Clay	0.9	1.2	24.8							1
TH17-09	east from Beghin Ave,					Clay	1.2	1.5	26.9							
	westbound lane, 1.7 m					Clay	1.5	1.8	29.2							1
	south from north curb					Silt	1.8	2.1	29.0							
						Silt	2.1	2.4	27.0							
						Silt	2.7	3.0	25.0							
		Concrete	160													
						Sand and Gravel Fill	0.3	0.5	11.1							
	U14 (5527416m N					Clay Fill	0.5	0.6	20.7							
TH17-10	640795m E) De Baets Street, 270 m east from Beghin Ave, eastbound lane, 1.7 m north from south curb					Clay Fill	0.6	0.9	32.4							
						Clay Fill	0.9	1.2	33.7							
						Clay	1.2	1.5	33.3							
						Clay	1.5	1.8	40.8							
						Clay	2.0	2.3	52.9							
						Clay	2.7	3.0	49.4							
		Concrete	185													
						Sand and Gravel Fill	0.3	0.5	9.6	35	54	11	.2*			
	U14 (5527375m N					Clay	0.5	0.6	33.2							
	640920m E)					Silt and Clay	0.6	0.9	35.1							
TH17-11	De Baets Street, 400 m east from Beghin Ave,					Clay	0.9	1.2	36.9							
	westbound lane, 1.7 m					Clay	1.2	1.5	36.3							
	south from north curb					Silt	1.5	1.8	20.9							
						Clay	2.0	2.3	47.1							
						Clay	2.7	3.0	19.5							
		Concrete	200													
TH17-12	U14 (5527327m N					Clay	0.3	0.4	33.7							
	640927m E)					Clay	0.4	0.6	35.1							
	Paquin Road, 40 m					Clay	0.6	0.9	34.1							
	south from De Baets					Clay	0.9	1.5	33.5							
	Street, southbound lane,					Clay	1.2	1.5	41.1							
	1.7 m east from west					Clay	1.5	1.8	41.2							
	curb					Clay	2.0	2.3	52.3							
						Clay	2.7	3.0	48.6							

<sup>\*</sup>Last Sieve Test Completed and fines noted



Test Hole No.	Test Hole Location	Paveme	nt Surface	Pavement Stru	ment Structure Material			Depth (m)	Moisture	Grain Size Analysis				A <sup>-</sup>	Atterberg Limits		
		Туре	Thickness (mm)	Туре	Thickness (mm)	Subgrade Description	Top (m)	Bottom (m)	Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid	Plastic	Plasticity Index	
		Concrete	210														
						Sand and Gravel Fill	0.3	0.5	10.0								
	U14 (5527221m N					Clay Fill	0.5	0.6	27.1								
	640892m E) Paquin Road, 140 m south from De Baets Street, northbound lane, 1.5 m west from east edge					Clay Fill	0.6	0.9	34.0								
TH17-13						Clay Fill	0.9	1.2	29.9								
11117-13						Clay	1.2	1.5	33.8								
						Clay	1.5	1.8	31.4								
						Clay	2.0	2.3	28.3								
						Silt	2.4	2.7	22.2								
						Clay	2.7	3.0	45.4								
	U14 (5527131m N 640853m E) Paquin Road, 250 m south from De Baets	Asphalt	55	Concrete	195												
						Clay	0.3	0.6	30.9	2	23	24	51	65	25	40	
						Clay	0.6	0.9	25.5								
TH17-14						Clay	0.9	1.2	32.8								
11117-14	Street, southbound lane,					Clay	1.2	1.5	33.3								
	1.7 m east from west					Clay	1.5	1.8	41.2								
	curb		•			Clay	2.0	2.3	53.6								
			•			Clay	2.7	3.0	54.0			,	,				





Photo 1: Pavement Core Sample at Test Hole TH17-01



Photo 2: Pavement Core Sample at Test Hole TH17-02





Photo 3: Pavement Core Sample at Test Hole TH17-03



Photo 4: Pavement Core Sample at Test Hole TH17-04





Photo 5: Pavement Core Sample at Test Hole TH17-05



Photo 6: Pavement Core Sample at Test Hole TH17-06





Photo 7: Pavement Core Sample at Test Hole TH17-07



Photo 8: Pavement Core Sample at Test Hole TH17-08





Photo 9: Pavement Core Sample at Test Hole TH17-09



Photo 10: Pavement Core Sample at Test Hole TH17-10





Photo 11: Pavement Core Sample at Test Hole TH17-11



Photo 12: Pavement Core Sample at Test Hole TH17-12





Photo 13: Pavement Core Sample at Test Hole TH17-13



Photo 14: Pavement Core Sample at Test Hole TH17-14



<b>Append</b> i	ix B
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Test Hole Logs, Lab Testing Summary & Pavement Core Photos – St Matthews Avenue

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Client:	_	KGS Group					Project Number:	0012-0	006-0	00					
Project N	Name: _	2017 Industr	ial Stree	ts - St. Ma	tthews Street	_	Location:	UTM	N-62	8850, E	-55280	10			
Contract	or:	Paddock Dril	ling Ltd.				Ground Elevation:	Existin	ng Gr	ound					
Method:	_	125 mm Solid S	tem Augei	r, Canterra C	Γ-250 Truck Mou	int	Date Drilled:	27 Ap	ril 20	17					
Sar	mple Ty	/ре:		Grab (G)		Shelby Tube (T)	Split Spoon (S	S)	Sp	olit Barre	el (SB)	С	ore (C	;)	
Par	rticle Si	ze Legend:		Fines	Clay	Silt	Sand		Gra	vel	77 c	obbles		Bou	lders
Depth (m)	, AS	PHALT (45 m		:K)	TERIAL DES	CRIPTION		—/  <b> </b>	C01M,	16 17	Bulk Uni (kN/m³ 18 19 rticle Size 40 60 40 60	20 2 <sup>2</sup> (%) 80 100	0	Streng  Tes  △ Tor  Pock  □ ()  ○ Field	ed Shear tth (kPa) t Type vane △ et Pen. • Qu ⊠ I Vane ○ 150 200
-0.5	4	AY (Fill) - silty - mottled lig - moist, firm - high plast	/, trace s tht grey	sand, trace	gravel (<20 ı	mm dia), trace oxi	dation		G85 G86	•			<b>Q</b>		
1.0		T - clayey - mottled lig - moist, firm - low plastic	ity						G87	•					
1.5-1.5-1.5-1.5-1.5-1.5-1.5-1.5-1.5-1.5-	CL	<ul><li>light brown</li><li>moist, soft</li><li>low plastic</li></ul>	n t to firm city ce sand, n to gree	trace prec	ipitate (sulph	ate, <20 mm dia),	trace silt inclustion (2	5	G88 G89	•	•		<b>2</b>	7	•
	- tra	ace oxidation	, trace s	ilt inclusior	ns (<15 mm d	ia.) below 2.0 m			G90		•			^ <b>•</b>	
-3.0-									G91		•			<b>4</b>	
2.5—2.5—2.5—2.5—2.5—2.5—2.5—2.5—2.5—2.5—	No 1) I 2) <sup>-</sup> sur 3) <sup>-</sup>	face.	or seep kfilled w	age observith auger of	/ed. uttings, bento		old patch asphalt to 5.5 m north of south								
Logged E	<b>By</b> : _S	hane Broderi	ck		_ Reviewe	ed By: N.J Ferre	ira	_ P	rojec	t Engin	eer: _N	lelson Fe	erreira		

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Client:	KGS Group				Project Number:	0012-006-	.00				
Project Nan	ne: 2017 Indust	rial Streets - St. Matthe	ws Street		Location:	UTM N-62	28786, E-5	5528018			
Contractor:	Paddock Dr	illing Ltd.			Ground Elevation:	Existing G	round				
Method:	125 mm Solid S	Stem Auger, Canterra CT-250	Truck Mount		Date Drilled:	24 April 20	)17				
Samp	е Туре:	Grab (G)	Sh	elby Tube (T)	Split Spoon (S	SS) S	plit Barrel	(SB)	Core (C	C)	
Particl	e Size Legend:	Fines	Clay	Silt	Sand	Gra		Cobble	es 📉	Boul	ders
Depth (m) Soil Symbol			RIAL DESCR	IPTION		Sample Type Sample Number	16 17 Parti 0 20 PL 0 20	Bulk Unit Wt (kN/m³) 20 18 19 20 18 19 20 18 19 20 18 19 20 18 19 19 19 19 19 19 19 19 19 19 19 19 19		Streng  Test  △ Ton  Pocke  □ C  ○ Field	ed Shear th (kPa) Type vane △ et Pen. ♣ tu ⊠ Vane ○
4 4 4	ASPHALT (40 r CONCRETE (1					C02M C02M	71				
-0.5	,	ty, some sand, some gr ark grey m	avel (<20 mn	n dia.)		G01	•			Δ •	<b>,</b>
			es, <30 mm	dia.)		G02	•			△Φ	
1.0-						G03	•			Δ	•
1 5-						G04	•		4	5	
	SILT - clayey - mottled li - moist, so - low plasti					G05	•				
2.0-	CLAY - silty, tra - brown - moist, firr - high plas	ice precipitates (sulphat m ticity	es, <30 mm	dia.)		G06		•			
2.5-											
						G07		•		<b>4</b> ^	
3.0-	Notes: 1) No sloughing 2) Test hole bac surface. 3) Test hole loc	HOLE AT 3.1 m IN CLA g or seepage observed. ckfilled with auger cuttin tated 780 m east of Ber m N 628786m E)	ngs, bentonite								
.ogged By:	Shane Broder	ick	Reviewed E	sy: N.J Ferrei	ra	Proje	ct Engine	er: Nelsor	n Ferreira		

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Clie	nt:	KGS Group Project Numb	er:	0012-	006-0	00							
Proj	ect Nam	e: 2017 Industrial Streets - St. Matthews Street Location:	-	UTM	N-62	8738,	E-5528	8010					
Con	tractor:	Paddock Drilling Ltd. Ground Eleva	tion:	Existi	ng Gr	ound							
Meti	hod:	125 mm Solid Stem Auger, Canterra CT-250 Truck Mount Date Drilled:	-	25 Ap	ril 20	17							
	Sample	e Type: Grab (G) Shelby Tube (T) Split Spo	on (S	S)	S	olit Bar	rel (SB	)	Co	re (C	;)		
	Particle	e Size Legend: Fines Clay Silt San	d		Gra	vel		Cobb	oles		Во	ulders	
Depth (m)	Soil Symbol	MATERIAL DESCRIPTION		Sample Type	Sample Number	16 17		n <sup>3</sup> ) 19 Size (%) 60	20 21 ) 80 100	•	Stren  Tes  A To  Poc  S  O Fiel	ned Sh gth (kF st Type rvane ket Per Qu ⊠ d Vane	Pa) : ∆ n. <b>Ф</b>
	4 4 7	ASPHALT (45 mm THICK) CONCRETE (210 mm THICK)		—'I∎I'	C03M								
- - - -0.5		CLAY (Fill) - some silt, some gravel (<20 mm dia.), trace sand - mottled light brown to black - moist, soft - high plasticity			G92 G93	•				Δ	Δ	•	
-1.0·		SILT and CLAY - trace sand, trace gravel, trace oxidation below 1.6 m - mottled light brown to black - moist, soft to firm - low plasticity			G94						<b>^</b>		
0.0597   Kek Geolechincal. Gall 25/37/2					G95 G96	-	•			<b>△</b> •			
-2.0		CLAY - silty, trace silt inclusions (<25 mm dia.) - grey - moist, soft to firm - low plasticity			G97		•				<b>b</b>		
원 - - - - - - - - - - - - - - - - - - -		SILT - clayey - light brown - moist to wet, soft - low plasticity											
SGBK 0012-1					G98	•							
∀CE 0 -3.0 -3.0	<u> </u>												
SUB-SURFACE LOG LOGS 20170428 ST. BONIFACE 0.4 SGBR 0012-006-		END OF TEST HOLE AT 3.1 m IN SILT Notes:  1) No sloughing or seepage observed.  2) Test hole backfilled with auger cuttings, bentonite, sand, and cold patch asphalt surface.  3) Test hole located 190 m east of Berry Street, eastbound lane, 1.7 m north of socurb. (5528010m N 628738m E)											
Log	ged By:	Shane Broderick Reviewed By: N.J Ferreira		_ F	rojec	t Engi	neer:	Nels	on Fe	rreira			

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Client:		KGS Group				Project Number:	0012-0	J06-C	10						
Project	Name:	2017 Industr	rial Streets - St. Matth	ews Street		Location:	UTM	N-62	8688, E-5	5528026					
Contrac	ctor:	Paddock Dri	illing Ltd.			Ground Elevation:	Existin	ig Gr	ound						
Method	:	125 mm Solid S	Stem Auger, Canterra CT-2	50 Truck Mour	nt	Date Drilled:	24 Apr	ril 20	17						
Sa	ample 1	Гуре:	Grab (G)		Shelby Tube (T)	Split Spoon (S	SS)	Sp	lit Barrel	(SB)	Cor	re (C	;)		
Pa	article S	Size Legend:	Fines	Clay	Silt	Sand		Gra		Cobb	les	```	ч	Iders	
	<u>_</u>						<u>B</u>	Jber	□B	ulk Unit Wt (kN/m³) 18 19 2	20 21		Streng	ned Shea gth (kPa)	
Depth (m)	ymb		МАТ	ERIAL DES	∩DIDTI∩N		e Ty	Nun	Parti	cle Size (%)			△ Tor	<u>t Type</u> vane ∆	
De	Soil Symbol		WAT	INIAL DES	CINII TION		Sample Type	Sample Number	0 20 4 PL	40 60 8 MC LL	30 100		⊠ (	et Pen. ∙ Qu ⊠	
	S						S	San	<b>⊢</b>	•	30 100 0			d Vane ( 150	
		SPHALT (35 r						C04M							$\top$
	CI	ONCRETE (1	90 mm THICK)					C04M							
	∭CI	LAY (Fill) - silt - light to da	y, some sand, some ( ark brown	gravel											
		- moist, sof	ft to frim					G08	•			Δ	•		
-0.5-		- high plast	испу												
<b>├</b> 📆								G09	•				Δ	•	
	XXX	LT - clayey													
-1.0-		- light brow - moist, stif	n to brown				- 14	G10	•				<b>△ •</b>		+
		- low plasti													
															+
								G11	•			4		•	
-1.5-	CI	LAY - siltv. tra	ce precipitates (sulph	ate. 15 mm	dia.)										+
		- light to da - moist, firr	ark brown	a.c, .c	u.u.,			G12		•			Δ	٠	
		- high plast													+
-2.0-															+
								G13		•			٥		+
-2.5-														_	+
														_	+
								G14		•		•			
-3.0-		UD OF TEST	HOLE ATO 4 PLO	A)/											$\perp$
-1.5- -2.0- -2.5- -3.0-	No	otes:	HOLE AT 3.1 m IN C												
			or seepage observe ckfilled with auger cut		nite, sand, and co	ld patch asphalt to									
	SL	ırface.	ated 140 m east of Be	_											
			m N 628688m E)	y OO,		III SOGGI OI HOIGI									
Logaed	Bv: S	Shane Broder	ick	Reviewe	d By: N.J Ferrei	ra	P	roiec	t Engine	er: Nelso	on Ferr	reira			
39-4	-7					-		-,		· · · · · · · · · · · · · · · · · · ·		•			

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Client:	KGS Group			Project Number:	0012-006-00
Project Na	<b>ne</b> : 2017 Indust	rial Streets - St. Matthe	ews Street	Location:	UTM N-628651, E-5528012
Contractor	Paddock Dr	illing Ltd.		Ground Elevation:	: Existing Ground
Method:	125 mm Solid S	Stem Auger, Canterra CT-25	0 Truck Mount	Date Drilled:	_27 April 2017
Samp	ole Type:	Grab (G)	Shelby Tu	be (T) Split Spoon (S	SS) Split Barrel (SB) Core (C)
Partio	ele Size Legend:	Fines	Clay	Silt Sand	Gravel Cobbles Boulders
Depth (m) Soil Symbol	ASPHALT (50 r	mm THICK)	RIAL DESCRIPTION		Bulk Unit Wt (kN/m³)   Undrained Shear Strength (kPa)
-0.5-	- light brow - moist, stii - high plas	some silt, some sand, s vn to brown ff		dia.)	G122  G123  G124  G124  G124
-1.5-	- light brow - moist, so		sions (<50 mm dia.) b	elow 1.2 m	G125 • ΔΦ
-2.0-	CLAY - silty, tra - mottled li - moist, so - high plas		on, trace silt inclusion	s (<25 mm dia.)	G127 • •
3.0-	Notes: 1) No sloughing 2) Test hole barsurface. 3) Test hole loc	· ·	ings, bentonite, sand	and cold patch asphalt to lane, 1.7 m north of south	G128
Logged By	: Shane Broder	ick	Reviewed By: N.	J Ferreira	Project Engineer: Nelson Ferreira

1 of 1

# GENTECHNICOL

Clien	t:	KGS Group				Project Number:	0012-006	-00				
Proje	ct Nam	e: 2017 Industr	ial Streets - St. Ma	tthews Street		Location:	UTM N-6	28604, E-55	28025			
Contr	actor:	Paddock Dri	lling Ltd.			Ground Elevation:	Existing C	Ground				
Metho	od:	125 mm Solid S	tem Auger, Canterra C	T-250 Truck Mount		Date Drilled:	24 April 2	017				
	Sample	е Туре:	Grab (G)	S	helby Tube (T)	Split Spoon (S	SS) S	Split Barrel (	SB)	Core (C)	)	
	Particle	e Size Legend:	Fines	Clay	Silt	Sand	Gr	avel 57	Cobbles		Bould	iers
Depth (m)	Soil Symbol			ATERIAL DESCI	RIPTION		Sample Type	16 17 18  Particl 0 20 40  PL 0 20 40	k Unit Wt (N/m³) 19 20 e Size (%) 60 80 1	21	⊠ Qι ⊃ Field \	n (kPa) <u>Type</u> ane △ : Pen. <b>♣</b> J ⊠ √ane ○
-	0 4 4	ASPHALT (45 m CONCRETE (21					C06N					
-0.5		SAND and GRA - light brow - poorly gra - "pit run"	VEL (FILL) - trace n, moist, compact, ded fine sand to c	sub-angular oarse gravel (<5	50 mm dia.), pit ı	run	G15					
		CLAY (FILL) - si - mottled da - moist, stiff - high plast SILT - clayey,	f	ce gravel			G16	5				
-1.0- -		- light brow - moist, sof - low plastic	t to firm				G17	•				
-1.5							G18	<b>3</b>				
ECHINICAL: GL	///	CLAY - silty, trac	ce precipitates (sul	phate, <20 mm	dia.)		G19			<u> </u>	•	
2.0		- moist, firm - high plast	า				G20				^•	
-2.5												
-30E - 3.0E - 3.0E - 3.0E							G21		•	•		
Sub-Surf-Actions Loss 20170428 51, Bonni-Action 1, 258217		Notes: 1) No sloughing 2) Test hole bac surface.	ated 50 m east of E	ved. cuttings, bentoni		old patch asphalt to 6 m south of north cu	urb.		1 1			. 1
Logg	ed By:	Shane Broderi	ck	Reviewed	By: N.J Ferre	ra	Proje	ect Engineer	: Nelson	Ferreira		

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Client:	KGS Group			Project Number:	0012-006-00	)			
Project Nar	ne: 2017 Industr	rial Streets - St. Matthey	ws Street	Location:	UTM N-628	3567, E-552801	5		
Contractor	Paddock Dri	illing Ltd.		Ground Elevation:	Existing Gro	ound			
Method:	125 mm Solid S	Stem Auger, Canterra CT-250	Truck Mount	Date Drilled:	27 April 201	7			
Samp	le Type:	Grab (G)	Shelby Tu	be (T) Split Spoon (S	SS) Spli	it Barrel (SB)	Core (	C)	
	le Size Legend:	Fines		Silt Sand	Grave		obbles •	Bould	ers
Depth (m) Soil Symbol		MATER	RIAL DESCRIPTION		Num	Bulk Unit (kN/m³) 16 17 18 19  Particle Size 0 20 40 60  PL MC 0 20 40 60	20 21 80 100 LL	Undrained Strength  Test T  △ Torva  Pocket  □ Qu  ○ Field V  50 100	n (kPa) Type ane ∆ Pen. <b>♣</b> J ⊠ /ane ○
	ASPHALT (40 n	mm THICK)			C07M				
2 4 4	CONCRETE (24	40 mm THICK)			C07M				
-0.5-	CLAY (FILL) - s - dark gree - moist, firn - high plast	n	ravel to 1.8 m		G115	•	•		
	× × × × × × × × × ×				G116	•	-	•	
-1.0	× × × × ×				G117	•	2	<b>\</b>	
-1.5-	× × × ×				G118	•		<b>4</b>	
	CLAY - silty, tra	ce precipitates (sulphat	e, <20 mm dia.)		G119	•		A•	
-2.0-	- mottled bi - moist, firn - high plast				G120	•		<b>40</b>	
-2.5					G121	•	4		
-3.0-									
	Notes: 1) No sloughing 2) Test hole bac surface.	ated 20 m east of Berry	ngs, bentonite, sand,	, and cold patch asphalt to ane, 1.7 m north of south cu	rb.				
Logged By	: Shane Broderi	ick	Reviewed By: N.	J Ferreira	Project	Engineer: N	elson Ferreir	a	

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Clien	ıt:	KGS Group				Project Number:	0012-006	5-00					
Proje	ct Nam	e: 2017 Industri	ial Streets - St. Ma	tthews Street		Location:	UTM N-6	62851	5, E-552	28032			
Cont	ractor:	Paddock Dril	lling Ltd.			Ground Elevation:	Existing (	Ground	d				
Meth	od:	125 mm Solid S	Stem Auger, Canterra C	T-250 Truck Mount		Date Drilled:	24 April 2	2017					
	Sample	е Туре:	Grab (G)	S	helby Tube (T)	Split Spoon (S	S)	Split B	Barrel (S	iB)	Core (	C)	
	Particle	e Size Legend:	Fines	Clay	Silt	Sand	G	ravel	6°/	Cobbl	es 🚡	Bould	ers
		-					e e		□ Bulk	Unit Wt		Undrained Strength	
	Soil Symbol						Sample Type	16		19 20 Size (%)	21	Test T	уре
Depth (m)	Syl		MA	ATERIAL DESC	RIPTION		el le	0	20 40		100	△ Torva	Pen.
	Soi						San			MC LL		⊠ Qu O Field V	/ane ○
-		ASPHALT (45 m	om THICK)				/H C08	ľ	20 40	60 80	0 100 0	50 100	150 200 250
ŀ		CONCRETE (20					C09	_					
<u> </u>	9 4 9	•	·				009	, ivi					
Ė	₩	CLAY (FILL) - so - dark grey	ome silt, trace sand	d, trace gravel (	<20 mm dia.)								
-0.5-	$\bowtie$	- moist, firm	n				G2	2	•			<b>^</b> ₽	
ŀ	$\bowtie$	- high plasti	icity					_					
<u> </u>							G2	3					
-	$\otimes \otimes$												
[ -1 0-	₩						7						
							G2	4	•				
Ē.	<b>XXX</b>												
-							G2	5					
21/2/2 1 5-	$\bowtie$												
1.5	₩						7						
0.GPJ TREK GEOTECHNICAL GDT 25/5/17	₩						G2	6	•			4	•
S E		CLAY - silty trac	ce precipitate (sulp	hate <10 mm d	ia \			_					
		- brown		mate, To min d	ia.)								
95 - 2.0-		<ul><li>moist, firm</li><li>high plasti</li></ul>											
<u> </u>													
GP.							G2	7		•		٥	
								_					
o -2.5-  - 													
8R.0													
S													
o'. 빗							G2	8		•	Δ	•	
ĕ <b>⊢</b> 3.0−		FND OF TEST F	HOLE AT 3.1 m IN	CLAY									
H. BC		Notes:	or seepage obser										
426 S		2) Test hole bac			ite, sand, and co	old patch asphalt to							
20170				Berry Street, we	stbound lane, 1	7 m south of north cu	rb.						
SSC		(5528032m N 62	28515m E)										
) 90 1													
CELC													
URFA													
SUB-SURFACE LOG LOGS 20170428 ST. BONIFACE 0_A_SCBR 0012-006-	ed By:	Shane Broderic	ck	Reviewed	By: N.J Ferre	ira	Proj	ect En	ngineer:	Nelso	n Ferreir	a	

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# GENTECHNICOL

Client	t:	KGS Group				Project Number:	0012-00	6-00			
Proje	ct Nam	e: 2017 Industri	rial Streets - St. Ma	tthews Street		Location:	UTM N-	628465, E-	-5528024		
Contr	ractor:	Paddock Dril	lling Ltd.			Ground Elevation:	Existing	Ground			
Metho	od:	125 mm Solid S	Stem Auger, Canterra C	T-250 Truck Mount		Date Drilled:	24 April 2	2017			
	Sample	е Туре:	Grab (G)	S	helby Tube (T)	Split Spoon (S	S)	Split Barre	el (SB) Co	re (C)	
	Particle	Size Legend:	Fines	Clay	Silt	Sand Sand	G	Gravel 6	Cobbles	Boulde	ers
Depth (m)	Soil Symbol			TERIAL DESCI	RIPTION		Sample Number	16 17 Par 0 20 PL	Bulk Unit Wt (kN/m³) 18 19 20 21- ticle Size (%) 40 60 80 100  MC LL 40 60 80 100	Undrained Strength  Test Ty  △ Torva  Pocket  ☑ Qu  ○ Field V	(kPa) <u>ype</u> ne ∆ Pen. <b>Φ</b> ⊠
<u> </u>		CONCRETE (21	10 mm THICK)				C09	9М			
-0.5		CLAY (FILL) - si - mottled br - moist, firm - high plasti	n	es (sulphates, <	:20 mm dia.)		G4			Δ •	
		OLAN - the tra-									
-1.0		CLAY - silty, trac - mottle ligh - moist, firm - high plasti	ht brown to black n to stiff				G4	45	•	△ <b>•</b>	
GDT 25/5/17		- trace gravel (<	:20 mm dia.) betwe	en 1.5 m and 1.	8 m		G4 G4		•	A 0	
00.GPJ TREK GEOTECHNICAL.GDT 25/5/17				(aulahatan 10	2 die Vhaleur	20.4					
		- trace oxidation	n, trace precipitates	(suipnates, <20	o mm dia.) below	7 Z. 1 M	G4	48	•	2	
11FACE 0 A SGBR			HOLE AT Q 4 IN	OLAY			G44	49	•	ΔΦ	
SUB-SURFACE LOG LOGS 20170426 ST. BONIFACE 0.4. SGBR 0012-006-		Notes: 1) No sloughing 2) Test hole bac surface.		ved. cuttings, bentoni		ld patch asphalt to m north of south curl	b.				
Logge	ed By:	Shane Broderic	ick	Reviewed	By: N.J Ferrei	ra	_ Pro	ject Engine	eer: Nelson Fer	reira	

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Cilent		KGS Group				Project Number:	0012-	-000-0	10						
Projec	ct Name	: 2017 Indust	rial Streets - St. Matthe	ws Street		Location:	UTM	N-62	8417,	E-552803	31				
Contr	actor:	Paddock Dr	illing Ltd.			Ground Elevation:	Existi	ng Gr	ound						
Metho	od:	125 mm Solid S	Stem Auger, Canterra CT-250	Truck Mour	nt	Date Drilled:	24 Ap	oril 20	17						
	Sample	Type:	Grab (G)	П	Shelby Tube (T)	Split Spoon (S	S)	Sr	olit Bar	rel (SB)		ore (C	 C)		
						Sand						7) 510		ıldoro	
	Particle	Size Legend:	Fines	Clay	Silt	Sanu		Gra		Bulk Unit	obbles		Undrai	ulders	
	_						g	ıber	16 17	(kN/m <sup>3</sup> )	20 2	1		gth (kF	
£ (c	Soil Symbol		NAA TE	DIAL DEC	CDIDTION		Sample Type	Nun	F	Particle Size		1		st Type orvane	
Depth (m)	ie S		IVIATE	KIAL DES	CRIPTION		J J	ple	0 20				Pocl	ket Pe Qu ⊠	n. 🗭
	Sc						Sa	Sample Number	0 20	L MC	LL     80 100		O Fiel	ld Van	
		ASPHALT (55 r	mm THICK)					C10M	0 20	40 60	80 100	0 5	0 100	J 150	2002
			00 mm THICK)					C10M							
- 1	* * * * * * * * * * * * * * * * * * *		some silt, trace sand, tra	ann araval	(<20 mm dia ) tro	noo oilt inglusions (<1)	- I	-							_
[ ]		nm dia.)		ace graver	( <b>\2</b> 0 mm dia.), ira	ice siit iriciusions (~1:	°   [								
-0.5		<ul> <li>dark grey</li> <li>moist, firr</li> </ul>	/ to black m					G29		•			•		
: :		- high plas													
[ ]								G30					Δ		
. :								G30					Δ •		
F1.0-								G31		•			_ <b>_</b>		
: :															
[ ]								G32		•				•	
-1.5-															
: :								G33							
[]										-			-		
		CLAY - silty, tra	ice precipitates (sulpha	tes, <10 m	ım dia.)										
2.0-		- moist, firr													_
: :		- high plas	ticity												
								G34				A			_
[ ]								004				-			
-2.5															
: :							- 14	005				_			
-3.0-								G35				4			
3.0	E	ND OF TEST	HOLE AT 3.1 m IN CLA	ΑΥ											
		Notes:	g or seepage observed.												
	2	2) Test hole ba	ckfilled with auger cutting	ngs, bento	nite, sand, and co	ld patch asphalt to									
-2.5- -3.0-	3		ated 135 m west of Be	ry Street,	westbound lane, 5	5.6 m south of north									
	C	curb. (5528031	m N 628417m E)												
Locar	od Pve	Shano Broder	rick	Povious	d By: N   Earrai	ra		Droine	t Engl	noor: N	alson Fr	arroiro			
Logge	ғи <b>Б</b> у: _	Shane Broder	IUN	Reviewe	d By: N.J Ferrei	ıa	_ '	riojec	ı ⊏ııgı	neer: N	CISUII F	en en a	<u> </u>		_

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Cilent:	KGS Group				Project Number:	0012-006-	00		
Project Nam	e: 2017 Industr	rial Streets - St. Matthe	ws Street		Location:	UTM N-62	28377, E-5528023		
Contractor:	Paddock Dri	illing Ltd.			Ground Elevation:	Existing G	round		
Method:	125 mm Solid S	Stem Auger, Canterra CT-250	Truck Mount		Date Drilled:	27 April 20	)17		
Sample	е Туре:	Grab (G)	S	helby Tube (T)	Split Spoon (	SS) S	plit Barrel (SB)	Core (C)	
Particle	e Size Legend:	Fines	Clay	Silt	Sand	Gra	avel Cot	obles Boulders	3
Depth (m) Soil Symbol			RIAL DESCF	RIPTION		Sample Type Sample Number	PL MC	20 21 Strength (kF	Pa) ≧ △ n. <b>Φ</b>
A 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	CONCRETE (20	05 mm THICK)				C11M			
- 💥		ilty, trace sand, trace g	avel (<20 m	nm dia.), trace o	ganics	G107		40	
- <del>}</del>	<ul> <li>moist, firn</li> </ul>					7	1 1		
-0.5-	- high plast	ticity				G108		△ <b>•</b>	
	CLAY - silty, tra - mottle bro - moist, stif - high plast	own ff				G109		•	
-1.0-						G110	•	•	
-1.5	trace precipites	too (culphotoo <15 mp	, dia ) balay	, 1 5 m		G111	•	20	
	- trace precipita	tes (sulphates, <15 mn	i dia.) below	/ I.3 III		G112	-	۰	
-2.0-						G113	•	<b>0</b> \triangle	
-2.5-									
-3.0-						G114	. •		
	Notes: 1) No sloughing 2) Test hole bac surface. 3) Test hole local	HOLE AT 3.1 m IN CLA or seepage observed. ckfilled with auger cutting ated 175 m west of Ber m N 628377m E)	ngs, bentoni			_			- 1
 Logged By:	Shane Broderi	ick	Reviewed	By: N.J Ferrei	ra	Proje	ct Engineer: Nel	son Ferreira	

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Client	:	KGS Group				Project Number:	0012-006	-00					
Projec	ct Nam	e: 2017 Industr	rial Streets - St. Ma	tthews Street		Location:	UTM N-6	28308,	E-5528039	)			
Contra	actor:	Paddock Dril	lling Ltd.			Ground Elevation:	Existing C	Ground					
Metho	d:	125 mm Solid S	Stem Auger, Canterra C	T-250 Truck Mount		Date Drilled:	25 April 2	017					
Ş	Sample	е Туре:	Grab (G)	S	helby Tube (T)	Split Spoon (S	S) S	Split Ba	rrel (SB)	Cor	e (C)		
F	Particle	Size Legend:	Fines	Clay	Silt	Sand	Gr	avel	67 Co	bbles	В	oulders	3
	_						pe per	16 17	□ Bulk Unit V (kN/m³) 7 18 19	Vt 20 21		rained Sl ength (kl	
£ (	Soil Symbol						Sample Type Sample Number	10 17	Particle Size (			est Type Torvane	₹ ^
Depth (m)	S lic		MA	ATERIAL DESCI	RIPTION		mple I	0 20		80 100	<b>₽</b> Po	ocket Pe ⊠ Qu ⊠	n. 💠
	Š						Sam	0 20	PL MC 0 40 60	LL -1 80 100 0	OF	ield Van	e 〇 200 250
	(	ASPHALT (45 m	nm THICK)				C12I		40 00	00 100 0	30	100 150	200230
		CONCRETE (19	90 mm THICK)				C12I	М					
		CLAY (FILL) - tra	ace sand, trace gr	avel (<20 mm di	a.)								
		<ul> <li>dark grey</li> <li>moist, firm</li> </ul>	n				G36	5	•		△ <b>◆</b>		
-0.5	$\bowtie$	- high plast	icity										
		CLAY - silty, trac	ce precipitates (su	phates, <10 mn	n dia.)		7						
		- moist, firm	reenish to black n				G37	7	•		Δ	•	
		- high plast	icity					-					
-1.0-							G38	3			40		
21/3							G39	9			4	0	
1.5								+					
[GD]							G40		•		Δ.	<b>.</b>	
00.GPJ TREK GEOTECHNICAL.GDT 2556/17													
된 :													
2.0-													
X [ ]													
							G41	1	•		Δ	<b>F</b>	
0-7E -2.5-													
0 N8													
N N N N N N N N N N N N N N N N N N N													
이 :							G42	2	•				
4 <u>−3.0−</u>		END OF TEST I	HOLE AT 3.1 m IN	CLAY									
T. BC		Notes:	or seepage obser										
9426 8		2) Test hole bac			ite, sand, and co	ld patch asphalt to							
2017(				f Berry Street, w	estbound lane,	1.7 m south of north							
Sec		curb. (5528039n	m N 628308m E)										
1 90 1													
ACE L													
SURF.													
SUB-SURFACE LOG LOGS 20170426 ST. BONIFACE 0_A_SGBR 0012-006-	ed By:	Shane Broderi	ck	Reviewed	By: N.J Ferrei	ra	Proje	ect Eng	jineer: Ne	Ison Ferr	eira		

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Client:	KGS Group				Project Number:	0012-0	JU6-U	U					
Project Na	me: 2017 Industi	rial Streets - St. Matth	ews Street		Location:	UTM I	N-628	3248, E-	552803	0			
Contracto	r: Paddock Dri	illing Ltd.			Ground Elevation:	Existin	ig Gro	ound					
Method:	125 mm Solid S	Stem Auger, Canterra CT-25	0 Truck Mount		Date Drilled:	27 Apr	ril 201	17					
Sam	ple Type:	Grab (G)	Shell	by Tube (T)	Split Spoon (S	S)	Sp	lit Barre	(SB)	Co	ore (C)	)	
Parti	cle Size Legend:	Fines	Clay	Silt	Sand		Grav	_		bbles		Boul	ders
Depth (m) Soil Symbol			RIAL DESCRIP	TION		Sample Type	amb	16 17 Par 0 20	MC	20 21	•	Strengt  Test  △ Ton Pocke  □ C  Field	ed Shear th (kPa)  Type vane △ et Pen. ♣  Vane ○  150 20
	CONCRETE (2)	05 mm THICK)					C13M						
-0.5-	CLAY (FILL) - s - dark grey - moist, firr - high plas	m to stiff	race gravel				G78	•			2	10	
							G79						
-1.0						4	G80	•	,			Δ	•
-1.5-							G81		•		<u></u>		•
	CLAY - silty, tra	ce sand, trace gravel,	trace silt inclusion	ons (<30 mm	dia.), trace precipital		G82		•			Δ	•
-2.0-	(sulphate, <10 r - mottled li - moist, firr - high plast		cs				G83		•		4		•
-2.5-													
-3.0-							G84		•		Δ	•	
	Notes: 1) No sloughing 2) Test hole bac surface.	HOLE AT 3.1 m IN CL g or seepage observed ckfilled with auger cutt sated 240 m east of Fe s28248m E)	l. ings, bentonite, s			rb.							- 1
Logged By	y: Shane Broder	ick	Reviewed By:	: N.J Ferrei	ra	_ P	rojec	t Engine	er: Ne	elson Fe	rreira		

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Client:	KGS Group				Project Number:	0012-006-	-00		
Project Nam	ne: 2017 Indust	trial Streets - St. Matthe	ws Street		Location:	UTM N-62	28217, E-5528039		
Contractor:	Paddock Dr	illing Ltd.			Ground Elevation:	Existing G	round		
Method:	125 mm Solid	Stem Auger, Canterra CT-250	Truck Mour	nt	Date Drilled:	25 April 20	017		
Sampl	le Type:	Grab (G)		Shelby Tube (T)	Split Spoon (S	S) S	Split Barrel (SB)	Core (C)	
Particl	e Size Legend:	Fines	Clay	Silt	Sand	Gra	avel	bles E	Boulders
							Bulk Unit W	J	drained Shear
						ype	16 17 18 19	20 21	rength (kPa) <u>Test Type</u>
Depth (m) ii Symbol		MATER	RIAL DES	CRIPTION		Ne Ze	Particle Size (9	<sup>(</sup> 6)	Torvane △ Pocket Pen. •
Soil						Sample Type Sample Number		<del> </del>	⊠ Qu ⊠ Field Vane ○
						Sa	0 20 40 60		100 150 200250
P 6 4	ASPHALT (30					C14N	_		
2 4 4	CONCRETE (2	200 mm THICK)				C14M	1		
<b>├ -</b>	CLAY (FILL) - s	some silt, trace sand, tra	ace gravel	(<20 mm dia.),					
	- mottle lig	ht grey to black oft to firm				G50	•		
-0.5-	- high plas	ticity							
† <b>₩</b>	- silty below 0.6	S m					1		
<b>├</b> -₩						G51	•	Δ•	<b>-</b>
[ <b>※</b>									
-1.0-	CLAY - silty, tra	ace precipitates (sulpha	tes, <20 m	ım dia.)					
	- moist, fir		grey			G52		A 4	<b>&gt;</b>
	- high plas	ticity					_		
						052		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	_
2/17						G53			<b>"</b>
00.GPJ TREK GEOTECHNICAL.GDT 25/5/17							_		
9						G54			•
<b>H</b>							7		
2.0	- trace oxidatio	n, light brown to brown	below 2.0	m					
지 인 :		, 3				G55		•	
FI -									
9.6									
900-2.5-									
3BR (									
0 🖽						G56			
₹ -3.0-	END OF TEST	HOLE AT 3.1 m IN CLA	^~						
BOI	Notes:								
26 ST		g or seepage observed. ckfilled with auger cuttir		nite, sand. and co	ld patch asphalt to				
1704	surface.	· ·							
38 20	curb. (5528039	cated 210 m east of Fer Im N 628217m E)	ry Nodu, V	งองเมษนาณ เสท <b>ย</b> , 5.	o m 50um oi 110im				
JOI									
507									
-ACE									
Pogged By:									
Logged By:	Shane Broder	ick	Reviewe	d By: N.J Ferrei	ra	_ Proje	ct Engineer: Nel	son Ferreira	

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Client:	KGS Group				Project Number:	0012-006-						
-		rial Streets - St. Matthe	ws Street		Location:	UTM N-6		E-552803	1			
Contracto	-				Ground Elevation:							
Method:	125 mm Solid S	Stem Auger, Canterra CT-250	Truck Mount		Date Drilled:	27 April 20	)17					
Sam	ple Type:	Grab (G)	SI	nelby Tube (T)	Split Spoon (	SS) S	plit Barr	el (SB)	Co	re (C)		
Parti	cle Size Legend:	Fines	Clay	Silt	Sand	Gr		للكا	obbles		Boulde	ers
Depth (m) Soil Symbol	CONCRETE (2'		RIAL DESCF	RIPTION		Sample Type Sample Number	16 17	_	20 21	• · · · · · · · · · · · · · · · · · · ·	ndrained Strength ( Test Ty	(kPa) <u>/pe</u> ne ∆ Pen. <b>Φ</b> ⊠
1 A	CONCRETE (2	15 IIIII THICK)				C15N	1					
· - XX		AVEL (FILL) - trace clay				G99						
-0.5-	CLAY (Fill) - silt	aded fine sand to coars y, trace sand, trace gra ark green to black				G100					•	
	- high plast	ticity				G101	_				70	
-1.0-						G102	2	•		<b>△</b> •		
-1.5-	CLAV ailty tra	ce silt inclusions (<25 r	nm dia \ tra	aa avidation		G103		•		•		
	- light brow - light brow - moist, firn - high plast	n n	nm dia.), tra	ce oxidation		G104		•			•	
2.0-						G105		•		<b>6</b>		
							1					
-2.5- <b>///</b> <b>////</b>						G106		•		•		
-3.0-												
	Notes: 1) No sloughing 2) Test hole bac surface.	HOLE AT 3.1 m IN CLA y or seepage observed. ckfilled with auger cutting ated 140 m east of Fern 28152m E)	ngs, bentonit			urb.						
Logged By	r: _Shane Broderi	ick	Reviewed	<b>By:</b> N.J Ferrei	ra	Proje	ct Engir	neer: Ne	elson Fei	reira		

1 of 1



Clien		KGS Group				Project Number:	0012-006-0	00			
Proje	ect Nam	e: 2017 Indust	rial Streets - St. Mat	thews Street		Location:	UTM N-62	28116, E-552	28046		
Cont	ractor:	Paddock Dr	illing Ltd.			Ground Elevation:	Existing Gr	round			
Meth	od:	125 mm Solid	Stem Auger, Canterra CT	-250 Truck Mou	<u>nt</u>	Date Drilled:	25 April 20	17			
	Sample	е Туре:	Grab (G)		Shelby Tube (T)	Split Spoon (S	SS) SI	plit Barrel (S	iB) 🔳 (	Core (C)	
	Particle	e Size Legend:	Fines	Clay	Silt	Sand	Gra	vel 🥱	Cobbles	В	oulders
							e e	□ Bulk	(Unit Wt	04	ained Shear ngth (kPa)
_	Symbol						Sample Type Sample Number		V/m³) 19 20 2	41	est Type
Depth (m)	Syn		MA	TERIAL DES	CRIPTION		e Z	0 20 40	Size (%) 60 80 10		orvane ∆ cket Pen. <b>Ф</b>
	Soil						Sam		MC LL	<b>⊣</b> □	☑ Qu ☑ eld Vane ○
									60 80 10		00 150 200250
-	p & 4	ASPHALT (55 )	mm THICK) 75 mm THICK)				C16M	1			
Ŀ.		`	<u> </u>				C16M				
[ ]	$\mathbb{R}$	CLAY (FILL) - s - mottle lia	silty, trace sand, trac ht grey to black	e gravel (<20	mm dia.), trace o	ganics	14				
ļ		- moist, so - high plas	ft to firm				G57			△◆	
-0.5	$\longrightarrow$	- High plas	dicity								
-											
	₩						G58	•			
E		CLAV - cilty tra	ice precipitates (sulp	hates <15 n	am dia )			_			
-1.0-		<ul> <li>mottled g</li> </ul>	reenish to grey	mates, < 15 H	iiii uia.)		G59			45	
-		- moist, firi - high plas					000				
F -			,				7				
-							G60				•
1.5-								_			
135 135							G61				•
8							Gol			<u> </u>	~
H.											
00.GPJ TREK GEOTECHNICAL.GDT 25/5/17		- trace oxidation	n, light brown to brow	wn below 2 0	m						
픘 교		traco chiadro	i, iigiit bioiii to bio	50.011 2.0			G62		•		
<u></u>											
9.GP											
SGBR 0012-006											
GBR -											
							000				
3 n-							G63				
NO J.O			HOLE AT 3.1 m IN	CLAY							
ST. B		Notes:  1) No sloughing	g or seepage observ	red.							
9426			ckfilled with auger c		nite, sand, and co	ld patch asphalt to					
20170		3) Test hole loc	cated 110 m east of	Ferry Road, v	vestbound lane, 1.	7 m south of north					
OGS		curb. (5528046	m N 628116m E)								
90											
CEL											
URFA											
SUB-SURFACE LOG LOGS 20170426 ST. BONIFACE 0.A.	ged By:	Shane Broder	rick	Reviewe	d By: N.J Ferrei	ra	Projec	ct Engineer:	Nelson F	erreira	



1 of 1

# GENTECHNICOL

Cli	ent:	KGS Group				Project Number:	0012-0	006-0	00						
Pro	oject Nam	e: 2017 Indust	trial Streets - St. Matth	ews Street		Location:	UTM	N-62	8064,	E-552	28038				
Co	ntractor:	Paddock Dr	rilling Ltd.			Ground Elevation:	Existin	ng Gr	ound						
Me	thod:	125 mm Solid	Stem Auger, Canterra CT-2	50 Truck Moun	t	Date Drilled:	25 Apı	ril 20	17						
	Sample	e Type:	Grab (G)		Shelby Tube (T)	Split Spoon (S	S)	Sp	olit Ba	rrel (S	B) <b>T</b>	Core	(C)		
	-	e Size Legend:		Clay	Silt	Sand		Gra		5-2				oulde	
-	Farticit	s Size Legeriu.	MM rines	/// Clay	ШШЗііі	Sanu			VEI		Unit Wt	163		rained	
	-						g	per	16 17	(kN	l/m <sup>3</sup> \	.0 21		ength (	
<b> </b> € ⁄	(m) Symbol		N 4 A T.F.	DIAL DEG	DIDTION		Sample Type	Nun			Size (%)			est Ty Torvan	
Depth	r)   i		MATE	RIAL DESC	CRIPTION		nple	ble	0 20		60 8		Po	cket F	en. 春
	Soil						Sal	Sample Number		_	O LL		ΟF	ield Va	ine O
$\vdash$	D 8 4	CONCRETE (2	200 mm THICK)				+		0 20	40	60 8	100 0	50	100 1	50 200 250
ŀ	9 4 4	0011011212 (2						C17M							
ŀ	- 1	CLAY (FILL) - s	silty, trace sand, trace	gravel (<20	mm dia.), trace o	oxidation	П								
ŀ		<ul> <li>mottle gr</li> <li>moist, fir</li> </ul>	eenish to black					074						_	
-0.	5	- high plas						G71					Δ	•	
"															
Ŀ		<ul> <li>mottled I</li> </ul>	ace sand, trace orangion ight green to black	cs				070							
E		- moist, sti - high plas	iff to very stiff					G72		•				•	
ļ.		- High plas	sucity												
F <sup>1.0</sup>	0-///						- 14	G73		•			Δ		•
E															
ŀ		CLAY (TILL) - 9	silty, some gravel, trace	e sand			$\Box$								
-		- moist, fir						G74		•				4	•
1.	5-1999	- intermed	liate to high plasticity												
DS:							-   1	075							
SPL.	- 200							G75		<u> </u>				7	•
Ž.															
00.GPJ TREK GEOTECHNICAL.GDT 25/5/17							$\vdash$								
Ā								G76							
¥E.								GIO							
GPJ															
	_ 1000														
075	5-1000														
SGBR 0012-006															
SGI															
								G77	$  \bullet  $				△ •		
-3.	~ V/77/X														
BON		END OF TEST Notes:	HOLE AT 3.1 m IN CL	AY Till											
.6 ST.		1) No sloughing	g or seepage observed ockfilled with auger cutt		nite sand and a	old natch aenhalt to									
7042		surface.	•	_											
S 201		<ol> <li>Test hole loc (5528038m N 6</li> </ol>	cated 60 m east of Fer 628064m E)	ry Road, ea	stbound lane, 5.6	om north of south curb	).								
POO		,	,												
00															
ACE															
J. N.															
SUB-SURFACE LOG LOGS 20170426 ST. BONIFACE 0.A.	gged By:	Shane Brode	rick	Reviewe	d By: N.J Ferre	eira	Р	rojec	t Eng	ineer:	Nelso	n Ferre	ira		

1 of 1



Client	:	KGS Group				Project Number:	0012-006-00
Projec	ct Nam	e: 2017 Industri	ial Streets - St. Ma	tthews Street		Location:	UTM N-628023, E-5528048
Contr	actor:	Paddock Dril	ling Ltd.			Ground Elevation:	: Existing Ground
Metho	od:	125 mm Solid S	tem Auger, Canterra C	Γ-250 Truck Mount		Date Drilled:	25 April 2017
	Sample	е Туре:	Grab (G)	S	helby Tube (T)	Split Spoon (S	SS) Split Barrel (SB) Core (C)
	Particle	e Size Legend:	Fines	Clay	Silt	Sand	Gravel Cobbles Boulders
Depth (m)	Soil Symbol	ASPHALT (210		TERIAL DESC	RIPTION		□ Bulk Unit Wt (kN/m³) 20 21 □ Particle Size (%) □ 0 20 40 60 80 100 □ PL MC LL □ O 20 40 60 80 100 □ PL MC LL □ O 20 40 60 80 100 □ PL MC LL □ O 20 40 60 80 100 □ PL MC LL □ O 20 40 60 80 100 □ PL MC LL □ O 20 40 60 80 100 0 50 100 150 200 25
		CONCRETE (21					C18M
-0.5		<ul><li>light brown</li><li>poorly gra</li><li>"pit run"</li></ul>	VEL (FILL) - trace n, moist, compact, ded fine sand to co	sub-angular parse gravel (<	, ,		G64 •
		oxidation	ht brown to brown		tates (sulphates	, <15 mm dia.), trace	G65 • A •
-1.0-							G66
1.5							G67
-20-20-							G68
TEN OF THE PRINCIPLE OF							G69
2.5							
3.0							G70 • •
1.5 - 1.5 -		Notes: 1) No sloughing 2) Test hole bac surface.	ated 10 m east of F	ved. auttings, benton		old patch asphalt to	ırb.
Logge Logge	ed By:	Shane Broderic	ck	_ Reviewed	By: N.J Ferrei	ra	Project Engineer: Nelson Ferreira



Test Hole		Paveme	ent Surface	Pavement Str	ucture Material		Sample	Depth (m)	Moisture		Grain Siz	e Analysis	3	A <sup>-</sup>	tterberg L	imits
No.	Test Hole Location	Туре	Thickness (mm)	Туре	Thickness (mm)	Subgrade Description	Top (m)	Bottom (m)	Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid	Plastic	Plasticity Index
		Asphalt	45	Concrete	225											
	U14 (5528010m N					Clay Fill	0.3	0.6	21.0							
	628850m E)					Clay Fill	0.6	0.9	24.2							
TH17-01	300 m east of Berry					Silt	0.9	1.2	25.3							
11117-01	Street, eastbound					Silt and CLAY	1.2	1.5	24.3							
	median lane, 5.5 m north of south curb					Clay	1.5	1.8	31.5							
	HOLLI OF SOULT CUID					Clay	2.0	2.3	40.9							
						Clay	2.7	3.0	49.9							
		Asphalt	40	Concrete	185											
	U14 (5528018m N					Clay Fill	0.3	0.6	16.2							
	628786m E)					Clay	0.6	0.9	28.0							
TH17-02	240 m east of Berry					Clay	0.9	1.2	26.9							
1117-02	Street, westbound					Clay	1.2	1.5	28.0							
	median lane, 5.6 m					Silt	1.5	1.8	21.5							
	south of north curb					Clay	1.8	2.1	48.4							
						Clay	2.7	3.0	49.4							
		Asphalt	45	Concrete	210											
	U14 (5528010m N					Clay Fill	0.3	0.6	21.2							
	628738m E)					Clay Fill	0.6	0.9	23.5							
TH17-03	190 m east of Berry					Silt and Clay	0.9	1.2	22.7	0	11	55	34	45	19	26
11117-03	Street, eastbound curb					Silt and Clay	1.2	1.5	30.1							
	lane, 1.7 m north of south curb					Silt and Clay	1.5	1.8	30.8							
	South curb					Clay	1.8	2.1	28.4							
						Silt	2.4	2.7	22.3							
		Asphalt	35	Concrete	190											
	U14 (5528026m N					Clay Fill	0.3	0.6	25.7							
	628688m E)					Clay Fill	0.6	0.9	25.0							
TH17-04	140 m east of Berry					Silt	0.9	1.2	29.9							
1017-04	Street, westbound curb					Silt	1.2	1.5	34.0							
	lane, 1.7 m south of					Clay	1.5	1.8	37.6							
	north curb					Clay	2.1	2.4	51.9							
						Clay	2.7	3.0	51.1							



Test Hole		Paveme	ent Surface	Pavement Str	ucture Material		Sample	Depth (m)	Moisture		Grain Siz	e Analysis	3	A	tterberg L	imits
No.	Test Hole Location	Туре	Thickness (mm)	Туре	Thickness (mm)	Subgrade Description	Top (m)	Bottom (m)	Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid	Plastic	Plasticity Index
		Asphalt	50	Concrete	210											
	U14 (5528012m N					Clay Fill	0.3	0.6	31.2							
	628851m E)					Clay Fill	0.6	0.9	26.6	8	22	42	28	54	24	30
TH17-05	100 m east of Berry					Clay Fill	0.9	1.2	22.6							
1117-03	Street, eastbound curb					Silt	1.2	1.5	25.0							
	lane, 1.7 m north of					Silt	1.5	1.8	19.2							
	south curb					Clay	2.0	2.3	53.9							
						Clay	2.7	3.0	56.3							
		Asphalt	45	Concrete	210											
	U14 (5528025m N					Sand and Gravel Fill	0.3	0.6	17.7							
	628604m E)					Clay Fill	0.6	0.9	38.7							
TH17-06	50 m east of Berry					Silt	0.9	1.2	27.7							
11117-00	Street, westbound					Silt	1.2	1.5	27.4							
	median lane, 5.6 m					Silt	1.5	1.8	24.8							
	south of north curb					Clay	1.8	2.1	43.0							
						Clay	2.7	3.0	57.4							
		Asphalt	40	Concrete	240											
	U14 (5528015m N					Clay Fill	0.3	0.6	25.0							
	628567m E)					Clay Fill	0.6	0.9	24.5							
TH17-07	20 m east of Berry					Clay Fill	0.9	1.2	33.5							
1017-07	Street, eastbound curb					Clay Fill	1.2	1.5	36.0							
	lane, 1.7 m north of					Clay Fill	1.5	1.8	33.8							
	south curb					Clay	2.0	2.3	48.3							
						Clay	2.4	2.7	57.0							
		Asphalt	45	Concrete	205											
	U14 (5528032m N					Clay Fill	0.3	0.6	34.0							
	628515m E)					Clay Fill	0.6	0.9	35.2							
TH17-08	40 m west of Berry					Clay Fill	0.9	1.2	35.4							
1017-08	Street, westbound curb					Clay Fill	1.2	1.5	28.0							
	lane, 1.7 m south of					Clay Fill	1.5	1.8	32.8							
	north curb					Clay	2.1	2.4	50.4							
						Clay	2.7	3.0	56.9							



Test Hole		Paveme	nt Surface	Pavement Str	ucture Material		Sample	Depth (m)	Moisture		Grain Siz	e Analysis	3	A	tterberg L	imits
No.	Test Hole Location	Туре	Thickness (mm)	Туре	Thickness (mm)	Subgrade Description	Top (m)	Bottom (m)	Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid	Plastic	Plasticity Index
		Concrete	210													
	U14 (5528024m N					Clay Fill	0.3	0.6	28.3	0	0	31	69	56	22	34
	628465m E)					Clay Fill	0.6	0.9	31.4							
TH17-09	90 m west of Berry					Clay	0.9	1.2	37.5							
11117-09	Street, eastbound					Clay	1.2	1.5	39.8							
	median lane, 5.7 north of					Clay	1.5	1.8	37.9							
	south curb					Clay	2.1	2.4	56.2							
						Clay	2.7	3.0	54.3							
		Asphalt	55	Concrete	200											
	U14 (5528031m N					Clay Fill	0.3	0.6	34.4							
	628417m E)					Clay Fill	0.6	0.9	35.3							
TH17-10	135 m west of Berry					Clay Fill	0.9	1.2	36.6							
1017-10	Street, westbound					Clay Fill	1.2	1.5	40.1							
	median lane, 5.6 m					Clay Fill	1.5	1.8	43.1							
	south of north curb					Clay	2.1	2.4	52.0							
						Clay	2.7	3.0	53.3							
		Concrete	205													
						Clay Fill	0.2	0.3	17.9							
	U14 (5528023m N					Clay Fill	0.3	0.6	34.5							
	628377m E) 175 m west of Berry					Clay	0.6	0.9	35.8							
TH17-11	Street, eastbound curb					Clay	0.9	1.2	39.2							
i	lane, 1.7 m north of					Clay	1.2	1.5	38.5							
i	south curb					Clay	1.5	1.8	40.9							
i	oouii ouib					Clay	2.0	2.3	51.2							
						Clay	2.7	3.0	50.5							
		Asphalt	45	Concrete	190											
	U14 (5528039m N					Clay Fill	0.3	0.6	37.5							
	628308m E)					Clay	0.6	0.9	39.4							
T1147 40	230 m west of Berry					Clay	0.9	1.2	42.7							
TH17-12	Street, westbound curb					Clay	1.2	1.5	41.5							
	lane, 1.7 m south of					Clay	1.5	1.8	42.0							
	north curb					Clay	2.1	2.4	51.3							
						Clay	2.7	3.0	59.7							



Test Hole		Paveme	nt Surface	Pavement Str	ucture Material		Sample	Depth (m)	Moisture		Grain Siz	e Analysis	3	A	tterberg L	imits
No.	Test Hole Location	Туре	Thickness (mm)	Туре	Thickness (mm)	Subgrade Description	Top (m)	Bottom (m)	Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid	Plastic	Plasticity Index
		Concrete	205													
	U14 (5528030m N					Clay Fill	0.3	0.6	29.0							
	628248m E)					Clay Fill	0.6	0.9	36.4							
TH17-13	240 m east of Ferry					Clay Fill	0.9	1.2	31.6							
1117-13	Road, eastbound					Clay Fill	1.2	1.5	37.5							
	median lane, 5.7 m					Clay Fill	1.5	1.8	37.4							
	north of south curb					Clay	2.0	2.3	41.7							
						Clay	2.7	3.0	52.8							
		Asphalt	30	Concrete	200											
	U14 (5528039m N					Clay Fill	0.3	0.6	23.4							
	628217m E)					Clay Fill	0.6	0.9	45.0							
TH17-14	210 m east of Ferry					Clay	0.9	1.2	37.3							
TH17-14	Road, westbound					Clay	1.2	1.5	41.8							
	median lane, 5.6 m					Clay	1.5	1.8	40.1							
	south of north curb					Clay	2.0	2.3	56.5							
						Clay	2.7	3.0	44.1							
		Concrete	215													
	114.4 (5500004 N					Sand and Gravel Fill	0.2	0.3	15.6							
	U14 (5528031m N 628152m E)					Clay Fill	0.3	0.6	19.0							
	140 m east of Ferry					Clay Fill	0.6	0.9	27.3							
TH17-15	Road, eastbound curb					Clay Fill	0.9	1.2	52.1							
	lane, 1.7 m north of					Clay Fill	1.2	1.5	39.3							
	south curb					Clay	1.5	1.8	36.9							
						Clay	2.0	2.3	55.4							
						Clay	2.4	2.7	56.4							
		Asphalt	55	Concrete	175											
	U14 (5528046m N					Clay Fill	0.3	0.6	28.7							
	628116m E)					Clay Fill	0.6	0.9	43.2							
TH17-16	110 m east of Ferry					Clay	0.9	1.2	38.1							
11117-10	Road, westbound curb					Clay	1.2	1.5	34.4							
	lane, 1.7 m south of					Clay	1.5	1.8	40.9							
	north curb					Clay	2.0	2.3	49.7							
<u> </u>						Clay	2.7	3.0	57.4							



T411-1-		Paveme	ent Surface	Pavement Stru	ucture Material		Sample	Depth (m)	Moisture		Grain Siz	e Analysis	3	A	tterberg L	imits
Test Hole No.	Test Hole Location	Туре	Thickness (mm)	Туре	Thickness (mm)	Subgrade Description	Top (m)	Bottom (m)	Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid	Plastic	Plasticity Index
		Concrete	200													
	U14 (5528038m N					Clay Fill	0.3	0.6	30.3							
	628064m E)					Clay	0.6	0.9	36.2							
TH17-17	60 m east of Ferry Road,					Clay	0.9	1.2	33.2							
11117-17	eastbound median lane,					Clay Till	1.2	1.5	31.5							
	5.6 m north of south					Clay Till	1.5	1.8	19.9							
	curb					Clay Till	2.0	2.3	15.1							
						Clay Till	2.7	3.0	12.2							
		Asphalt	70	Concrete	210											
	U14 (5528038m N					Sand and Gravel Fill	0.3	0.6	12.3							
	628023m E)					Clay	0.6	0.9	22.2							
TH17-18	10 m east of Ferry Road,					Clay	0.9	1.2	40.6	0	12	28	60	78	32	46
11117-10	westbound curb lane,					Clay	1.2	1.5	38.6							
	1.7 m south of north					Clay	1.5	1.8	38.9							
	curb					Clay	2.0	2.3	24.2							
						Clay	2.7	3.0	36.5			, and the second second				





Photo 1: Pavement Core Sample at Test Hole TH17-01



Photo 2: Pavement Core Sample at Test Hole TH17-02





Photo 3: Pavement Core Sample at Test Hole TH17-03



Photo 4: Pavement Core Sample at Test Hole TH17-04





Photo 5: Pavement Core Sample at Test Hole TH17-05



Photo 6: Pavement Core Sample at Test Hole TH17-06





Photo 7: Pavement Core Sample at Test Hole TH17-07



Photo 8: Pavement Core Sample at Test Hole TH17-08





Photo 9: Pavement Core Sample at Test Hole TH17-09



Photo 10: Pavement Core Sample at Test Hole TH17-10

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Photo 11: Pavement Core Sample at Test Hole TH17-11



Photo 12: Pavement Core Sample at Test Hole TH17-12





Photo 13: Pavement Core Sample at Test Hole TH17-13



Photo 14: Pavement Core Sample at Test Hole TH17-14





Photo 15: Pavement Core Sample at Test Hole TH17-15



Photo 16: Pavement Core Sample at Test Hole TH17-16





Photo 17: Pavement Core Sample at Test Hole TH17-17



Photo 18: Pavement Core Sample at Test Hole TH17-18