

APPENDIX C

**WATERWAYS PERMIT APPLICATION COMPLETE WITH
SOIL LOGS**



Planning, Property and Development Department
 Service de l'urbanisme, des biens et de l'aménagement
 Unit 15 - 30 Fort Street • 30, rue Fort, unité 15 • Winnipeg, Manitoba • R3C 4X5

**APPLICATION FOR PERMISSION TO UNDERTAKE WORK UNDER
 THE CITY OF WINNIPEG WATERWAY BY-LAW**

Application No. _____

(PLEASE PRINT)

TEL: Res. N/A Bus. (204) 296-1209

APPLICANT: KGS Group on behalf of City of Winnipeg

ADDRESS: 3rd Floor 265 Winnipeg Street, Winnipeg, MB POSTAL CODE: R3T 5P4

REGISTERED OWNER: City of Winnipeg - Water and Waste Department Attn: Doug Berg

ADDRESS: 110-1199 Pacific Avenue, Winnipeg, MB POSTAL CODE: R3E 3S8

LOCATION OF PROPOSED WORK:

STREET ADDRESS: 1016 Dilworth Ave, Winnipeg, MB, R3G 1K3

LEGAL DESCRIPTION:

Lot _____ Block _____

Parcel _____ Plan _____

D.G.S. _____

DESCRIPTION OF PROPOSED WORK:

The proposed work consists of upgrading the Ashby wastewater Pumping Station. Upgrades include constructing a new and modified STP and connecting the underground power supply from the new STP to the flood pumping station and lift station. A new foreman will also be constructed from a nearby manhole to the lift station.

Minimum Horizontal Distance between Proposed Work and Water's Edge at Summer Level 25 m

Existing Ground Elevation at Rear of Building 231.5 mT (Geodetic Datum)

Proposed Ground Elevation at Rear of Building 231.5 mT (Geodetic Datum)

Elevation of River at Normal Summer Level _____ (Geodetic Datum)

Flood Protection Level (Office Use) _____

DEPOSITION OF MATERIAL:

Minimum Horizontal Distance between Material and Water's Edge at Summer Level N/A

Material to be Deposited N/A

Approx. Quantity (Cu Metres) 0 Maximum Depth of Material 0

METHOD OF WASTE DISPOSAL: Septic Field _____ Municipal Sewer Pump Out Tank _____

VALUE OF PROPOSED WORKS: \$ 2,000,000.00 FEE: \$ 6,840.00

FEE NON-REFUNDABLE

Cheque or Money Order,
 Payable to The City of Winnipeg

DATE: 03 OCT 2013

SIGNATURE OF APPLICANT: [Signature]

Note: See attached sheets for supporting material required, schedule of fees and other information.

Kontzamanis Graumann Smith MacMillan Inc.

October 8, 2013

File No. 13-0107-021



3rd Floor
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The City of Winnipeg
Planning, Property and Development Department
Waterways Section
Unit 15 - 30 Fort Street
Winnipeg, Manitoba
R3C 4X5

ATTENTION: Mr. Kendall Thiessen, P. Eng.
Riverbank Management Engineer

RE: Aubrey Wastewater Pumping Station Upgrade
Waterways Permit Application

Dear Mr. Thiessen:

This letter report is submitted in support of a Waterways Permit Application to complete upgrades to the Aubrey Wastewater Pumping Station in Winnipeg, Manitoba. This letter details the results of our background review, riverbank stability evaluation, design considerations for temporary shoring and the project impacts on riverbank stability.

The Waterway Application Form, in duplicate, is attached to this letter report. The City of Winnipeg Water and Waste Department will pay the required permit application fee separately. A copy of the respective tender package for the work that includes technical specifications and construction drawings will also be forwarded to your office separately by KGS Group as part of our Waterway Permit Application.

1.0 BACKGROUND INFORMATION

1.1 SITE LOCATION

The Aubrey Wastewater Pumping Station is located at the intersection of Aubrey Street and Palmerston Avenue along an inside bend of the north bank of the Assiniboine River, approximately 1.0 km± upstream of the Maryland Street Bridge. A general site plan of existing conditions is provided as Figure 01. Existing facilities at the site consist of a pump house, lift station, gate chamber, transformer, two outfall pipes extending to the river and a pipeline crossing the river on a bridge. The existing pump house is located approximately 42 m from the Regulated Summer River Level (RSRL). The gate chamber is nearest to the river and is approximately 32 m from the RSRL.

1.2 AERIAL PHOTOGRAPHY REVIEW

The historical performance of the riverbank has been reviewed based on stereo aerial photographs from 1988 to 1998. The air photo coverage used in the review included:

Flight Line	Photos	Date	Scale
AS88012	49, 50	April 23, 1988	1:5,000
FF98096	339, 340	October 23, 1998	1:5,000

1988 Photos – The 1988 photos were taken in April with a low Assiniboine River level prior to the spring freshet. There was no foliage present on the trees. The top of bank area near the pump station is relatively flat with a driveway leading up to the pump station. Excavation (offloading) during the original construction of the pump station is evident as the slope appears constant and relatively gradual from the top of bank to the lower bank and the area is sparsely treed. There are signs of active and ongoing erosion along the toe of the riverbank which recedes further into the bank at the outfall location. The riverbank is moderately treed upstream and downstream of the pump station location and the slope of the bank is considerably steeper.

1998 Photos – The 1998 photos were taken in October with little to no foliage on the trees and a relatively low river level. The geometry of the bank appears relatively unchanged from the 1988 photos at the pump station location.

2.0 SITE INVESTIGATIONS

The geotechnical site investigations consisted of a site visit by KGS Group geotechnical personnel on August 19, 2013 and a comprehensive background review of available site information. KGS Group has performed site investigations previously in 2004, including test hole drilling, at this site.

2.1 RIVERBANK GEOMETRY AND SITE FEATURES

The riverbank geometry consists of a relatively flat lying upper bank area at Elev. 231.5 m±. Below the upper bank area the riverbank slopes down a vertical drop of 3.75 m at approximately 3H:1V to Elev. 227.75 m±. There is a relatively flat bench from Elev. 227.75 m± which slopes down at 10H:1V to the Ordinary High Water Mark (OHWM) at Elev. 227.0 m± followed by a 2H:1V slope to the RSRL. The existing river channel bottom is assumed to be relatively flat lying varying from Elev. 221.3 to 222.9 m.

As part of the original Pumping Station construction in 1956 a significant amount of riverbank excavation (ie. offloading and regrading) was performed along the upper bank area. Based on the excavation limits shown on the 1956 construction drawings (City of Winnipeg Water and Waste Drawing R187A) approximately 160 m³ or 260,000 kg of material was removed. The previous excavation along the upper bank area is evident on the Figure 01 topographic ground contours at the station in comparison to the ground contours at the properties on either side.

Photos which were taken during the August 19, 2013 site visit are attached as Appendix A and discussed below. During the time of the site inspection, work on the pipeline and bridge crossing was underway (see Photo 1). As part of the work, an access road was cut upstream of the gate chamber (see Photo 2) and an excavation was cut around the pipeline with temporary

shoring between the pump house and lift station (see Photo 3). The upper bank area was covered with landscaped grass but is currently covered with granular fill (see Photo 4) due to the ongoing construction activities. There are occasional mature trees and brush along the mid bank area (see Photo 5) down to the flat bench which is covered in granular fill to facilitate site access. Limestone riprap erosion protection was observed along the shoreline around the pipe outlets (see Photo 6) and around the pipeline bridge supports. Minor shoreline erosion was observed beyond the limits of the existing riprap, which is typical of the Assiniboine River.

2.3 SITE STRATIGRAPHY

KGS Group drilled three test holes at this site in 2004. The site investigation was undertaken at that time in preparation for gate chamber expansion and transformer installation works. Detailed test hole logs from the 2004 drilling program are attached as Appendix B

In August 2004, KGS Group supervised the drilling of two test holes along the upper bank area close to the pumping station. The locations are shown on Figure 01. At test hole TH1 a standpipe piezometer was installed at 7.6 m depth within the alluvial clay. A standpipe was installed in the second test hole, PN-2, in the till.

In general, the stratigraphy at the site consisted of clay fill overlying alluvial clays, silts, and sands underlain by clay till. The clay fill extended to depths ranging from 1.0 to 1.5 m below ground surface and was likely placed during the original station construction.

Underlying the fill was a deposit of alluvial silty clay containing layers of silt and fine to coarse grained sand extended to depths ranging from 11.8 to 12.2 m below existing ground surface. In general, the clay was of low to intermediate plasticity, soft to firm in consistency, very silty and contained trace to some fine grained sand, rootlets and organics throughout the deposit. Below 6.2 m depth at test hole PN2, numerous layers of silt and fine to coarse grained sand ranging from 0.1 to 0.5 m thick were found within the alluvial clay. At test hole TH-1, sandy silt was found between 7.6 and 8.1 m depth.

During the test hole drilling, water infiltration and sloughing was observed within the silt and fine to coarse grained sand layers. Between the 11 and 12 m± depth at test hole TH-1 and PN2, sand blow-up occurred inside the hollow stem augers during removal of the split spoon sampler which prevented sample recovery in this zone. The alluvium was underlain by clay till at depths ranging from 11.9 to 12.3 m below ground surface.

Based on review of the Geological Engineering Maps and Report for Urban Development of Winnipeg, University of Manitoba 1983 the till stratum at the site likely ranges between 0.3 to 5.0 m thick and is underlain by carbonate bedrock.

2.4 GROUNDWATER CONDITIONS

Groundwater conditions at the site were monitored in 2004 following the drilling program and once in 2013 before the fall drawdown of the river. One standpipe piezometer was installed within the alluvial clay at TH-1 and one was installed within the clay till at PN2. A summary of the measured levels during 2004 and 2013 are outlined in Table 1 below. Groundwater levels vary seasonally and in response to river levels and precipitation. The current groundwater conditions at the site may vary from those shown below.

TABLE 1
2004 AND 2013 GROUNDWATER MONITORING SUMMARY

Date	PN1 (Alluvial Clay) Piezometric Level	PN2 (Clay Till) Piezometric Level	Assiniboine River Level <small>See Note 1</small>
Aug. 17 / 04	Dry	Not Installed	224.39 m
Sept. 15 / 04	224.57 m	Not Installed	224.36 m
Nov. 12 / 04	224.55 m	224.61 m	224.94 m
Oct. 07 / 13	224.08 m	-	224.42 m

Note 1: Assiniboine River Level is based on linear interpolation of recorded levels from City of Winnipeg gauges located at the Osborne St. Bridge and St. James Bridge.

3.0 PROPOSED DEVELOPMENT

The proposed upgrades to the Aubrey Wastewater Pumping Station consist of the following:

- Replacement of all electrical equipment within the lift station, including the main service power distribution equipment which will be removed from the outside wall of the lift station to a new pad mounted CSTE located approximately 2 meters east of the existing Manitoba Hydro pad mounted transformer.
- Connection of the underground power supply from the flood pumping station to the new pad mounted CSTE and a new underground power supply to the lift station which connects to the new pad mounted CSTE. Installation of the underground power supply will require a shallow excavation.
- The lift station will be provided with a manual transfer switch and receptacle panel to allow a generator to be quickly connected to provide power in case of an extended power outage.
- Abandoning the existing forcemain pipe and install approximately 5 m of new forcemain pipe from the lift station to the manhole north of the lift station. Installation of the forcemain will require a braced excavation due to the depth and close proximity to the lift station. The depth of excavation required ranges from approximately 3.0 m to 7.5 m below grade.

4.0 GEOTECHNICAL CONSIDERATIONS

4.1 Temporary Shoring

Temporary shoring will be required to support the side walls of the excavation from the lift station to the existing manhole. Due to the depth of the excavation and close proximity of the lift station, strutted or braced walls are considered a suitable type of shoring. The detailed design of the temporary shoring depends upon the final geometry of the excavation, the type of shoring utilized, and construction details. Design considerations should include as a minimum the following:

- The shoring should be designed to resist the lateral earth pressure of the clay fill and alluvium soils, groundwater pressures, surcharge load from construction equipment and

potential surcharge load from the existing lift station building. During the test hole drilling in 2004, caving and water infiltration was observed below 6.0 to 7.0 m depth from ground surface and should be expected during installation and removal of temporary shoring.

- An assessment of the potential for basal heave and blowout at the base of the excavation. Depending on the groundwater levels at the time of construction, measures are recommended to counteract the risk of blowout, such as temporarily dewatering below the base of the proposed excavation during construction to lower the pressure in the till and potential pressure in the underlying carbonate aquifer.
- The design of any required temporary construction dewatering measures should include an evaluation of the potential settlement implications below the adjacent structures which are supported by foundation bearing directly on the alluvium soils. This includes the gate chamber, lift station, underground piping, and pumping station building.
- The vertical spacing of the internal struts should be designed and installed to minimize the potential for lateral and vertical soil movement, which could be detrimental to the existing infrastructure at the site.
- The removal of the temporary shoring and backfilling between the existing manhole and the lift station should be completed to minimize the potential for lateral and vertical ground movements.
- No stockpiling of excavated materials should be permitted adjacent to the excavation.

A registered professional engineer who is experienced with the design of braced excavations and the related soil and groundwater considerations should complete the shoring design.

4.2 RIVERBANK STABILITY

The existing riverbank at the Aubrey Pumping Station is considered by KGS Group to be relatively stable with no evidence of ongoing or historic instability. Our interpretation of the existing stability conditions is based on a visual site inspection by KGS Group geotechnical personnel, a review of stereo aerial photography and our previous experience at the site in 2004.

As stated earlier, approximately 160 m³ or 260,000 kg of soil was removed along the upper bank area during the original station construction resulting in a significant improvement to overall bank stability. All excavated material shall be removed offsite during construction resulting in a net offloading. Backfilling the excavation will return the riverbank to its current geometry and overall bank stability condition. The proposed development work will have no detrimental impact on overall bank stability.

5.0 RECOMMENDATIONS

KGS Group concludes that the proposed development work will have no detrimental impact on current riverbank stability and that the work will result in no adverse hydraulic impact on Assiniboine River flows.

KGS Group endorses the proposed development as outlined in this letter and recommends that a Waterway Permit be granted provided the following is performed:

- No stockpiling of material is permitted on the riverbank.
- All excavated materials are immediately hauled off site.

6.0 STATEMENT OF LIMITATIONS AND CONDITIONS

Third Party Use of Report

This report has been prepared for The City of Winnipeg to whom this report has been addressed and any use a third party makes of this report, or any reliance on or decisions made based on it, are the responsibility of such third parties. KGS Group accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions undertaken based on this report.

Geotechnical Investigation Statement of Limitations

The geotechnical investigation findings and recommendations of this report were prepared in accordance with generally accepted professional engineering principles and practice. The findings and recommendations are based on the results of field and laboratory investigations, combined with an interpolation of soil and groundwater conditions found at and within the depth of the test holes drilled by KGS at this site. If conditions encountered during construction appear to be different from those shown by the test holes drilled by KGS or if the assumptions stated herein are not in keeping with the design, this office should be notified in order that the recommendations can be reviewed and modified if necessary.

Please contact the undersigned at (204) 896-1209 with questions or comments regarding the enclosed information. Your earliest attention to this project is greatly appreciated.

Prepared By:

Reviewed By:



for James Bartz, E.I.T.
Geotechnical Engineer-in-Training

Bruno Pierre Arpin, P.Eng.
Geotechnical Engineer

Approved By:



Dr. R.M. (Rob) Kenyon, Ph.D., P.Eng.
Manager - Geotechnical Services

JRB/BPA/RKe/jr



FIGURES

APPENDIX A

**Site Photos
(August 19, 2013)**



Photo 1. Construction activities on pipeline and bridge. Looking down slope from lift station.



Photo 2. Access road cut into bank. Looking down slope from upstream of gate chamber.



Photo 3. Shored excavation between pump house and lift station.



Photo 4. Flat upper bank area. Looking east from upstream extent of site.



Photo 5. Mature trees on mid bank. Looking downstream from upstream extent of site.



Photo 6. Riprap erosion protection. Looking upstream from downstream extent of site.

APPENDIX B

**Test Hole Logs
(KGS Group 2004 Drilling Program)**

CLIENT CITY OF WINNIPEG
PROJECT PROPOSED GATE CHAMBER EXPANSION
SITE AUBREY STREET PUMPING STATION
LOCATION 7 m West of Gate Chamber
DRILLING METHOD 125 mm ø Solid Stem Auger, RM 30 Drill Rig (Hollow Stem below 6.10 m)

JOB NO. 04-107-20
GROUND ELEV. 231.50 m±
TOP OF PIPE ELEV. 232.41 m±
WATER ELEV. 224.61 m±
DATE DRILLED 8-Nov-04
UTM (NAD83) N E

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG/ INCLINOM. LOG	DEPTH (m)	SAMPLE		Cu from Uncon. Comp. Test (kPa) ◇					
						TYPE	NUMBER	PL	MC	LL	% - (kPa)		
								20	40	60	80	kPa	
231.35			TOPSOIL - Black, organic. CLAY FILL - Black, moist, trace sand, trace concrete.										
	1		- Cinders below 1.22 m.										
229.98			ALLUVIAL SILTY CLAY - Brown, dry, hard, low plasticity, crumbly.										
	2					1							
	3		- Moist, stiff below 3.35 m.										
	4		- Rootlets at 3.96 m. - Intermediate plasticity below 3.96 m.										
228.62			SAND - Brown, moist, poorly graded, medium grained.										
228.47			ALLUVIAL SILTY CLAY - Brown, moist, soft, intermediate plasticity.										
	5												
	6												
225.25			CLAYEY SILT - Brown, moist.										
224.90			- Some sand below 6.49 m. SILT - Brown, moist, firm.										
	7												
224.40			- Wet, soft below 7.01 m. SAND - Grey, saturated, fine grained, trace silt, trace clay.										
	8												
223.88			SILTY SAND/SANDY SILT - Grey, saturated, soft.										
223.58			INTERLAYERED SILT AND CLAY - Grey, wet, firm, with fine grained sand.										
223.39			INTERLAYERED SILT AND SAND - Grey, wet, soft, fine grained sand.										
222.87			SAND - Grey, free water flowing, fine grained.										
222.78			ALLUVIAL SILTY CLAY - Grey, wet, firm, with sand.										
	9												
			- Fine grained sand layer (9.14 cm thick) at 9.45 m. - Dark grey, wet, stiff, intermediate plasticity at 9.63 m.										

SAMPLE TYPE Auger Grab Split Barrel

CONTRACTOR Paddock Drilling Ltd. **INSPECTOR** B. NICOLL

APPROVED **DATE** 17-11-04

ELEV. (m)	DEPTH (m)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG/ INCLINOM. LOG	DEPTH (m)	SAMPLE		Cu from Uncon. Comp. Test (kPa) <input type="checkbox"/>					
						TYPE	NUMBER	PL	MC	LL	% - (kPa)		
								20	40	60	80	kPa	
221.35							14						
221.14			SAND - Grey, free water, poorly graded, coarse grained.				15						
220.83			SILTY CLAY - Dark grey, wet, stiff, intermediate plasticity.		10.52		16						
220.68			SAND - Grey, free water, well graded.		10.82		17						
220.53			SILTY CLAY - Grey, wet, firm.				18						
220.34	11		GRAVEL - Grey, wet, hard drilling.										
			NO RECOVERY										
219.61					11.89								
219.31	12		CLAY TILL - Light grey, wet, soft.		12.19		19						
			END OF HOLE AT 12.19 m										
			Notes: 1. Testhole drilled after 3 tries (first two had refusal at 1.22 m, the third had refusal at 1.52 m). 2. Drilled to 12.19 m, sand blew up to 11.28 m. Lifted augers to 11.28 m, re-drilled to 12.19 m. 3. Casagrande piezometer (PN-2) installed at 12.19 m. Completed with above ground surface lockable protective steel casing. Stick up height is 0.91 m above existing grade. 4. Testhole caved below 10.82 m after augers were removed.										
	13												
	14												
	15												
	16												
	17												
	18												
	19												
	20												
	21												

SAMPLE TYPE Auger Grab Split Barrel

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
B. NICOLL

APPROVED

DATE 17-11-04

CLIENT CITY OF WINNIPEG
PROJECT PROPOSED TRANSFORMER INSTALLATION
SITE AUBREY PUMPING STATION
LOCATION 3 m South of SW Corner of Lift Station
DRILLING METHOD 200 mm ø Hollow Stem Auger, RM 30 Drill Rig, Continuous Sampling

JOB NO. 04-107-15
GROUND ELEV. 231.52 m
TOP OF PVC ELEV. 232.35 m
WATER ELEV.
DATE DRILLED 17-Aug-04

ELEVATION (m)	DEPTH (m) (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE NUMBER	RECOVERY %	SPT blows/0.15 mΔ	CONE blows/0.15 mΔ	Cu from Uncon. Comp. Test (kPa) ◇		
								20 40 60	20 40 60	PL	MC	LL
231.4			TOPSOIL									
231			CLAY FILL - Black, moist, stiff, low plasticity, trace gravel, trace silt, trace oxidation.		0.9	1						
230.5	1		SILTY CLAY (ALLUVIAL) - Brown, moist, stiff, intermediate plasticity (close to plastic limit), trace rootlets, trace silt seams (<1 mm thick), trace oxidation. - Trace rootlets from 1.5 to 2.03 m. - Trace organic matter from 2.03 to 2.54 m. - Trace silt nodules below 2.5 m. - Increased moisture content below 3.05 m. - Trace rootlets from 3.05 to 4.06 m. - Fine grained sand layer (light brown, loose, poorly graded) from 3.96 to 4.06 m. - Trace fine grained sand below 4.1 m. - Fine grained sand layer (light brown, loose, poorly graded) from 4.89 to 5.16 m. - Soft from 5.59 to 5.74 m. (Tv = 9.8 kPa) - Firm from 5.74 to 6.39 m. (Tv = 68.8 kPa) - Firm from 6.10 to 6.39 m. (Tv = 53.9 kPa) - Soft from 6.39 to 6.53 m. (Tv = 19.6 kPa) - Firm from 6.53 to 6.60 m. (Tv = 53.9 kPa) - Mottled grey-brown, soft, increased fine grained sand content below 6.40 m. - Firm from 7.11 to 7.62 m. - Fine grained sand lenses (~13 mm thick) at 7.21, 7.32, 7.40 and 7.47 m. Free water in the sand lenses. SANDY SILT - Brown, mottled grey-brown, moist, soft, trace rootlets, trace to no clay. Free water on entire sample. - Grey at 8.0 m. - Lean clay to sandy silt, grey, moist, soft, trace oxidation, trace organic matter below 8.13 m. SILTY CLAY (ALLUVIAL) - Dark grey, firm, intermediate plasticity. - Mottled black-grey from 8.84 to 9.14 m. - Dark grey to black, moist, stiff below 9.14 m. - Firm, trace fine grained sand, trace silt below 9.65 m. - Fine grained sand lens (black, loose, poorly graded) from 9.86 to 9.96 m.									
230	5			3	75							
228	2			4	20							
227	10			5	23							
226	3			6	80							
225	4			7	95							
224	15			8	100							
223	5			9	100							
222	20			10	100							
	25			11	100							
	25		12	100								
	25		13	100								
	25		14	100								
	25		15	100								
	25		16	100								
	25		17	100								
	25		18	100								
	25		19	15								
	25		20	100								

SPT FT. M. CALC P:\PROJECTS\2004\04-0107-15\GEOLOGS\04-107-15 LOGS.GPJ

SAMPLE TYPE Auger Grab Split Barrel Split Spoon

CONTRACTOR Paddock Drilling Ltd.

INSPECTOR D. ANDERSON

APPROVED

[Signature]

DATE 08-09-04

ELEVATION (m)	DEPTH (m) (ft)	GRAPHICS	DESCRIPTION AND CLASSIFICATION	PIEZ. LOG	DEPTH (m)	SAMPLE TYPE	NUMBER	RECOVERY %	SPT blows/0.15 m Δ	Cu from Uncon. Comp. Test (kPa)	Cu TORVANE (kPa)
									CONE blows/0.15 m Δ	20 40 60 80	PL MC LL
221			- Dark grey, mottled black-dark grey, soft, trace organic matter below 10.15 m.								
220.9	35		Grain Size Distribution: Gravel (0%), Sand (10.7%), Silt (63.5%) and Clay (25.8%) at 10.15 m.								
220.3	11		CLAYEY SAND - Black, free water, soft, low plasticity, well graded sand, trace clay, trace clam shell pieces.								
220			NO RECOVERY - Sample washing out.								
219.3	12										
219.2	40		SAND - Dark grey, free water, loose, well graded.								
219			CLAY TILL - Light grey, moist, soft, low plasticity, trace fine and coarse grained gravel, trace sand, trace silt.								
218.4	13		AUGER REFUSAL AT 13.11 m								
218	45		Notes: 1. Installed Casagrade standpipe piezometer 3.0 m southeast of TH-1.								
217	15										
216	50										
215	16										
214	55										
213	60										
212	17										
211	85										
210	70										

SAMPLE TYPE Auger Grab Split Barrel Split Spoon

CONTRACTOR
Paddock Drilling Ltd.

INSPECTOR
D. ANDERSON

APPROVED

DATE 08-09-04

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Planning, Property and Development Department
 Service de l'urbanisme, des biens et de l'aménagement
 Unit 15 - 30 Fort Street • 30, rue Fort, unité 15 • Winnipeg, Manitoba • R3C 4X5

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 Parcel _____ Plan _____
 D.G.S. _____

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Minimum Horizontal Distance between Proposed Work and Water's Edge at Summer Level 2.5 m

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Proposed Ground Elevation at Rear of Building 231.5 m (Geodetic Datum)

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Flood Protection Level (Office Use) _____

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FEE NON-REFUNDABLE

Cheque or Money Order,
 Payable to The City of Winnipeg

DATE: 03 Oct 2018

SIGNATURE OF APPLICANT: [Signature]

Note: See attached sheets for supporting material required, schedule of fees and other information.