

13 November 2006

AMEC Project No. WX15309

Number Ten Architectural Group 310 – 115 Bannatyne Avenue Winnipeg, Manitoba R3B 0R3

Dear Mr. Henry Bakker, CET

Project Manager

Re: Supplemental Geotechnical Investigation

East District Police Station St. Boniface Industrial Park

INTRODUCTION

As authorized by Mr. Henry Bakker of Number Ten Architectural Group, AMEC Earth and Environmental, a division of AMEC Americas Limited (AMEC), completed additional test hole drilling and geotechnical analysis for the proposed East District Police Station to be located in the St Boniface Industrial Park area of Winnipeg, Manitoba.

The additional work was requested by Crosier Kilgour & Partners Limited, based on requirements set out in the new National Building Code (NBC) which was adopted by the Province of Manitoba subsequent to completion of AMEC's initial geotechnical report. Based on the requirements of the new NBC, classification of the site as per the code was required so that the structural design of the building could be completed. Specifically, AMEC was requested to determine if the soils should be classified as Class D (stiff) or Class E (soft) with respect to response to seismic activity. In order to meet the Class D site classification, it was necessary to show that:

- The average undrained shear strength (S_u) of the clay soils, to a maximum depth of 30 m, lies between 50 and 100 kPa;
- That there was not a soil zone greater than 3 m in thickness having the following attributes:
 - o A Plasticity Index (PI) greater than 20%;
 - o Moisture contents greater than 40%; and
 - o Average undrained S_u less than 25 kPa.

Subsequent to a further review of the NBC by AMEC, it was determined that it was also necessary to verify that the soils were not Class F (Other Soils). Although there are a number of stipulations which can classify a site as having Class F soils, a review of the site conditions

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determined that it was necessary only to verify that there was not a 8 m soil zone containing soils with a PI greater than 75% or shear strengths less than 25 kPa.

FIELD AND LABORATORY INVESTIGATION

A field drilling program was conducted on October 2, 2006. Two test holes (THV1 and THV2) were advanced using a truck mounted drill rig provided by Paddock Drilling Ltd. THV1 was advanced to auger refusal which occurred at 18.0 m below grade. THV2 was advanced to a depth of 11.4 m from grade (with vane shear testing completed to a depth of 12.2 m). The test hole locations are shown on Figure 1 and the test hole logs are provided as Figures 2 and 3.

During drilling, soils were classified according to the modified unified soil classification system. In-situ vane shear testing was completed at 1.5 m intervals, beginning at a depth of 3 m from grade. On completion of drilling, the test holes were backfilled with the auger cuttings.

Two samples, one from 4.5 m and one from 12.2 m, collected during the original geotechnical investigation, were tested to determine Atterberg limit values.

CONCLUSIONS

Based on the in-situ vane shear tests conducted during the test hole drilling program, the average undrained shear strength of the soils was determined to be 75 kPa. Furthermore, there was not a 3 m soil zone having a shear strength of less than 25 kPa and the Atterberg Limit values indicated a PI ranging from 47 to 75% (TH3 @ 4.6 m = 75% and TH1 @ 12.2 m = 47%). On this basis, the soils at this site are considered to meet the NBC requirements for classification as a Class D (stiff soil) site.

Further to the above testing, allowable skin friction values, for drilled cast-in-place concrete friction piles can be modified to the values shown in the following Table:

Depth Interval From Grade	Allowable Skin Friction				
0 – X m	Compressive Loading 0 kPa				
X m – 13.0 m	18 kPa				

where X = depth of fill; or,

= 1.5 m for interior heated piles; or

= 2.4 m for exterior or unheated piles; whichever is deeper

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The remaining recommendations for drilled, cast-in-place piles are as outlined in AMEC's geotechnical report, dated 30 June 2006.

CLOSURE

If you have any questions or concerns, please contact the undersigned at your convenience. This report should be read in conjunction with AMEC's geotechnical report for the site, dated 30 June 2006.

Robert Brown, B.Eng.

Sincerely,
AMEC Earth & Environmental

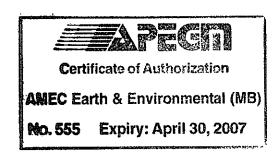
H. D.
PANKRATZ

Harley Pankratz, P.Eng
Vice President: Manitoba/Saskatchewan

Reviewed By:

Brad Wiebe, M. Sc., P. Eng.

cc: George Graham, CET; Crosier Kilgour & Partners



PRO.	JECT: East District Polic	e Station		DRILLED BY: Paddo	DRILLED BY: Paddock Drilling Limited		BORE HOLE NO: THV1		
CLIE	NT: Number Ten Archite	ctural Gro	up		DRILL TYPE: MP5-T		PROJECT NO: WX15309		
LOCA	ATION: Durand Road, W	/lanite	oba DRILL METHOD: 12	5 mm Solid Stem Auger		ELEV	ATION:		
SAMI	PLE TYPE She	lby Tube		No Recovery SPT (N)	Grab Sample]	Split-Po	en 🚺 Core	
BAC				Pea Gravel Drill Cuttin	gs Grout		∭Slough	Sand	
Depth (m)	NICONFINED COMPRESSION 100 200 300 40 40 40 40 40 40	SOIL SYMBOL	MUSCS	SOIL DESCRIP		SAMPLE TYPE	SAMPLE NO SPT (N)	COMMENTS	Depth (m)
annualmentalmentalment			OH	ORGANIC CLAY - high plastic, mois covered, trace rootlets CLAY - high plastic, moist, very stiff, - some silt inclusions from 0.6 m to 0 - dark brown from 0.9 m to 1.4 m - occasional sulphate inclusions from	brown 0.9 m		1 2 3 4 5	Field Vane @ 3.1 m: 90 kPa	2
4 5 6	≡		C.	- gradual transition to grey from 4.3 i - stiff below 4.6 m - occasional silt inclusions below 4.9			7	Field Vane @ 4.6 m: 100 kPa Field Vane @ 6.1 m: 96 kPa	ուհուսահարհուն 6
8 10 10			СН				8	Field Vane @ 7.6 m: 66 kPa	7 8 8
E E 11	=					7000	9	Field Vane @ 9.1 m: 67 kPa Field Vane @ 10.7 m: 77 kPa	10 10 11
12				CLAVEV CILT (THTV lave alastic ar			2	Field Vane @ 12.2 m: 70 kPa Field Vane @ 13.7 m: 62 kPa	12 13 13
14			ML	CLAYEY SILT (TILL) - low plastic, m some medium grained sand - some fine grained gravel below 14.			4	Avg Shear Strength = 79 kPa	15
Eliment				Auger refusal at 18.0 m below grade NOTES:	•	***************************************	5		17 18
= 19 = 20				Water seepage encountered at 13.9 sloughing encountered at 14.2 m bel level was 12.3 m below ground surfa completion. Test hole backfilled with	ow ground surface. Water ce 10 minutes after drilling	***************************************	CUMDI	ETION DEDTH: 19 m	E-19
				Earth and Environmental			COMPLETION DEPTH: 18 m COMPLETION DATE: 2 October 2006		06
	amec		1	Winnipeg, Manitoba	Figure No. 2		- 4··· 11 ha	***************************************	1 of 1

PRO.	ECT: East District Police	e Station		DRILLED BY: Padd	ock Drilling Limited		BORI	E HOLE NO: THV2		
	CLIENT: Number Ten Architectural Group			***************************************	DRILL TYPE: MP5-T			PROJECT NO: WX15309		
	TION: Durand Road, W		/lanite		25 mm Solid Stem Auger			/ATION:		
		elby Tube		No Recovery SPT (N)	Grab Sample		Split-P			
BACK	FILL TYPE Ber AUNCONFINED COMPRESSION	ntonite	1	Pea Gravel Drill Cuttin	gs Grout	U	∭Slough	Sand		
Depth (m)	100 200 300 41 POCKET PENETROMETER (100 200 300 41 PLASTIC M.C. LIQU 1	NO KPa	MUSCS	SOII DESCRIF		SAMPLE TYPE	SAMPLE NO SPT (N)	COMMENTS	Depth (m)	
0			СН	CLAY (FILL) - high plastic, moist, vendrass covered CLAY - high plastic, moist, very stiff	1		1 2	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	The state of the s	
- 1				 silty from 0.3 m to 0.9 m fissured, slickensided from 0.3 m t 			3	1	1	
-2				m			4		<u>-</u> 2	
3				- stiff below 3 m			5	Field Vane @ 3.1 m: 82 kPa	3	
3 				- occasional sulphate inclusions from	n 4.0 m to 7.3 m		6	Field Vane @ 4.6 m: 81 kPa	114 5 5	
6			СĦ	- grey below 6.7 m			7	Field Vane @ 6.1 m: 85 kPa	6 7	
-8				- occasional fine grained gravel belo	w 7.3 m		В	Field Vane @ 7.6 m: 67 kPa	9 8	
-9 -10							9	Field Vane @ 9.1 m: 73 kPa	10 10	
-11				Test hole terminated at 11.4 m belov	w grade in soft clay.	1	0	Field Vane @ 10.7 m: 52 kPa	E 11 E 11 E	
-12 -13 -14 -15 -16 -17 -18 -19 20			***************************************	NOTES: No soil sloughing or seepage encou backfilled with auger cuttings. Vane pushed to 12.2 m for final test				Field Vane @ 12.2 m: 58 kPa	12	
-14								Avg Shear Strength = 71 kPa	14	
-15									15	
-16									16	
-17									E-17	
-18									18	
-19 20							THE RESERVE THE PARTY OF THE PA		19	
	A		MEC	Earth and Environmental	LOGGED BY: RB		COMPL	ETION DEPTH: 11.5 m	<u> </u>	
_	amec			Earth and Environmental Vinnipeg, Manitoba	REVIEWED BY: HP			ETION DATE: 2 October 200)6	
		l			Figure No. 3			Page	1 of	