APPENDIX “B”

GEOTECHNICAL REPORT

GEMTEC

Geotechnical Investigation
Proposed Multipurpose Building
Project No. R.043939.001

Dorchester, New Brunswick
April 22, 2013

Prepared for: Public Works and Government Services
Project No. 6489.19 – R01

GEMTEC
CONSULTING ENGINEERS AND SCIENTISTS

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April 22, 2013

File: 6489.19 – R01

Public Works and Government Services Canada
1045 Main Street, Unit 100
Moncton, New Brunswick
E1C 1H1

Attention: Nathalie Sears, P.Eng

Re: Geotechnical Investigation, Proposed Multipurpose Building
Westmorland Institute, Dorchester, New Brunswick

Enclosed is our geotechnical report for the above noted site.

Contact the undersigned should you have questions or require additional information.

Adrian Thompson, M.Sc.E, P.Eng
GEMTEC Limited

(N:\Files\6400\6489.19\2013tds0403R01.doc)

Geotechnical Investigation
Proposed Multipurpose Building
Westmorland Institute, Dorchester, NB

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Proposed Multipurpose Building
Westmorland Institute, Dorchester, NB

1.0 Introduction

GEMTEC Limited is pleased to provide the following results of our geotechnical investigation carried out at the Westmorland Institute on behalf of Public Works and Government Services Canada (PWGSC). We understand that the project involves the construction of one building along with associated parking and driveway areas. We further understand that the building will be founded on conventional spread footings with a slab-on-grade.

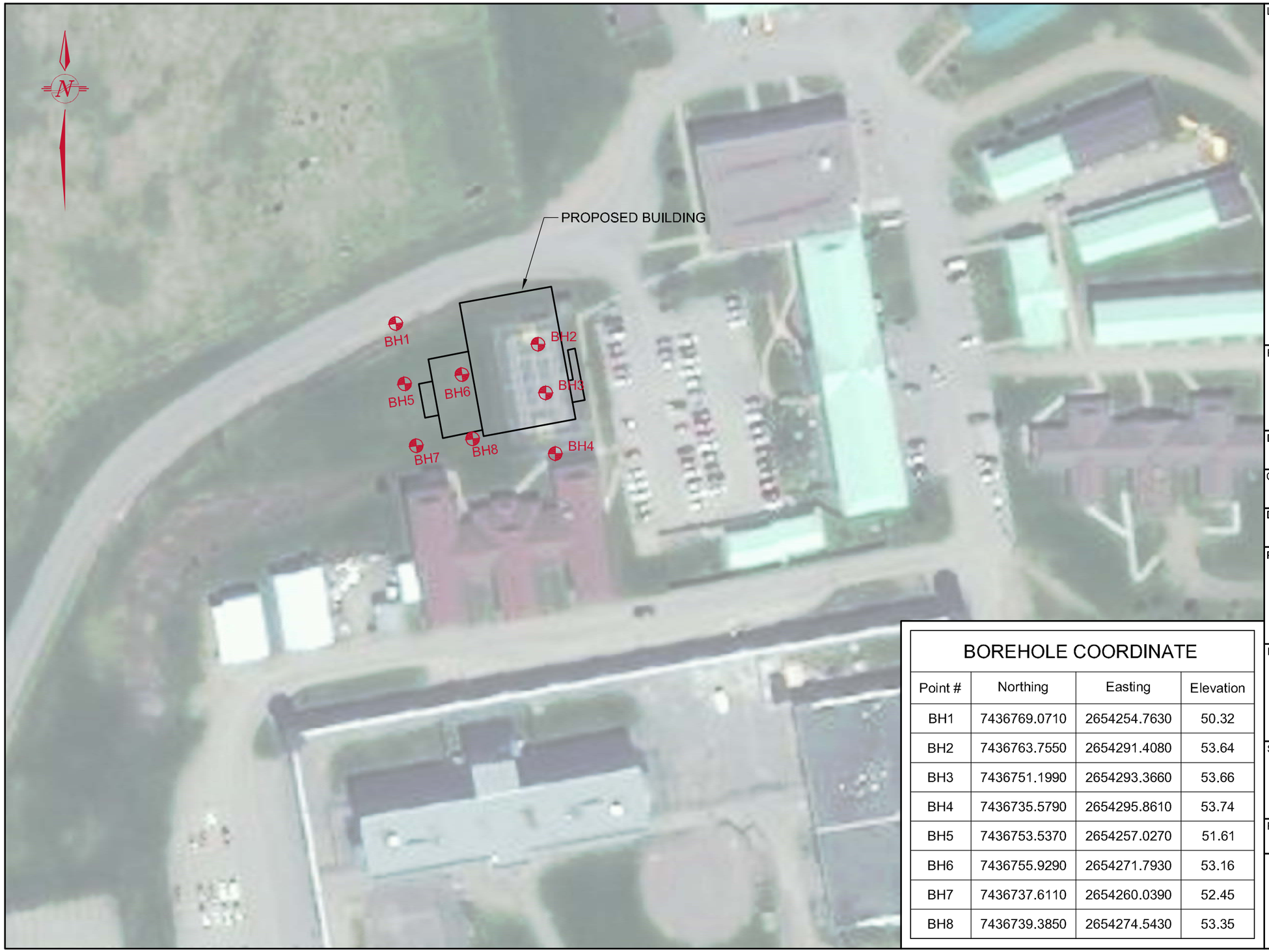
The purpose of the geotechnical investigation was to assess the subsurface conditions in the area of the proposed multipurpose building. A detailed description of the soil, bedrock, and groundwater conditions encountered during our fieldwork is presented herein, along with project specific geotechnical recommendations relating to foundation design and earthwork construction.

The investigation was carried out by GEMTEC, following the RFP provided by Public Works and Government Services Canada. Based on the RFP, boreholes were to be a minimum of six metres into soil or three metres into bedrock. In addition, radon and rock sulfate tests were to be undertaken.

Eight boreholes (BH) were put down at the site on April 1 and 2, 2013 in the presence of one of our geotechnical technologists. The work was performed using a track-mounted drill rig subcontracted to Logan Drilling Limited.

GEMTEC Limited located the borehole locations in the field referencing a borehole plan provided by PWGCS. Borehole elevations were surveyed by GEMTEC referencing NBMON 3705, with a published elevation of 29.142 metres. A site plan with borehole locations is presented in Figure 1.

Detailed borehole logs and laboratory testing results (including radon and rock sulfate test results) are appended in Appendix A and B, respectively.



Legend

BH BOREHOLE LOCATION

Reference

NB MONUMENT #3705
Northing: 7436064.97
Easting: 2653997.57
Elevation: 29.142m

Drawn By	Checked By
CHG	AT
Calculations By	**Checked By**
---	---

Date: APRIL 2013

Project: GEOTECHNICAL INVESTIGATION NEW BUILDING AT WESTMORLAND INSTITUTION, DORCHESTER, NB

Drawing: BOREHOLE LOCATION PLAN

Scale: 1:1000

0 20 40 60m

File No.	Drawing	Revision No.
64891901	FIGURE 1	0

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Consulting Engineers and Scientists

BOREHOLE COORDINATE

Point #	Northing	Easting	Elevation
BH1	7436769.0710	2654254.7630	50.32
BH2	7436763.7550	2654291.4080	53.64
BH3	7436751.1990	2654293.3660	53.66
BH4	7436735.5790	2654295.8610	53.74
BH5	7436753.5370	2654257.0270	51.61
BH6	7436755.9290	2654271.7930	53.16
BH7	7436737.6110	2654260.0390	52.45
BH8	7436739.3850	2654274.5430	53.35

N:\drawings\64001\64891901\64891901.dwg

2.0 Site Conditions

The site of the proposed building is located on the north side of the prison, in the area of the existing tennis courts. This area is currently grass covered.

The building area is bound by a roadway and ditch to the north, a tennis court and parking lot to the east, and existing buildings to the south.

The area of the proposed building slopes at about a 3% grade from east to west. Beyond the western building footprint, the slope increases to 5 to 10%.

3.0 Soil and Groundwater Conditions

3.1 General

The borehole logs indicate the subsurface conditions at the specific borehole locations only. Boundaries between zones on the logs are often not distinct, but rather are transitional and have been interpreted. Subsurface conditions may vary between test locations. The soil descriptions in this report are based on commonly accepted methods of classification and identification employed in geotechnical practice. Classification and identification of soil and bedrock types involves judgement and GEMTEC does not guarantee descriptions as exact, but infers accuracy to the extent that is common in current geotechnical practice.

The groundwater conditions described in this report refer only to those observed at the location and date of observation noted in the report and on the borehole logs. Groundwater conditions may vary seasonally, or may be affected by construction activities on or in the vicinity of the site.

3.2 Summary

The soil and bedrock conditions encountered generally consist of fill underlain by a thin layer of glacial till, which in turn is underlain by bedrock. Bedrock was encountered at all borehole locations, at relatively shallow depths.

Groundwater seepage was not encountered within the borehole depths where conventional split spoon and augering was undertaken. It should be noted that due to the addition of water for bedrock core sampling, determination of groundwater within the bedrock is not possible without the installation of wells.

A summary of the soil and groundwater conditions encountered is presented in Table 3.1.

Table 3.1: Soil and Bedrock Summary

BH	Borehole Elevation (m)	Borehole Depth (m)	Fill Thickness (m)	Depth to Glacial Till (m)	Depth to Bedrock (m)	Bedrock Elevation (m)
1	50.32	1.80	0.45	0.45	1.01	49.31
2	53.64	4.67	0.35	0.35	1.32	52.32
3	53.66	4.67	1.37	--	1.37	52.29
4	53.74	4.67	0.30	--	0.30	53.44
5	51.61	4.67	--	0.05	0.71	50.90
6	53.16	1.22	0.71	--	0.71	52.45
7	52.45	4.78	--	0.15	0.48	51.97
8	53.35	4.67	0.50	0.50	1.37	51.98

3.3 Fill

The fill encountered at the site generally consists of a silty sand and gravel or glacial till. Due to the relatively thin layer of fill, the standard penetration test (SPT) N-values also influenced the layers below. Based on the information collected, the compactness of the fill ranges from loose to medium.

3.4 Glacial Till

Undisturbed glacial till was encountered at five of the eight borehole locations. The glacial till consists of red to brown silty sand with some gravel and trace clay. The compactness of the glacial till is loose to medium based on the SPT N-values range from 6 to 23.

3.5 Bedrock

Sandstone and conglomerate bedrock were encountered within the proposed multipurpose building footprint. The bedrock recovery during drilling was generally low, indicating weak layers within the bedrock. Three unconfined compressive strength tests were undertaken on the more competent zones of the bedrock, with strengths ranging from 22.7 to 43.2 MPa. Laboratory test results are appended.

4.0 Discussions and Recommendations

4.1 General

This section of the report provides engineering guidelines on the geotechnical design aspects of the project based on our interpretation of the borehole information and the project requirements. It is stressed that the information in the following sections is provided for the guidance of the designers and is intended for this project only. Contractors bidding on or undertaking the works should examine the factual results of the investigation, satisfy themselves as to the adequacy of the information for construction, and make their own interpretation of the factual data as it affects their construction techniques, schedule, safety and equipment capabilities.

4.2 Introduction

The site is generally suitable for the proposed development provided that the recommendations outlined in this report are followed. We understand that the building will be founded on spread footings with slab-on-grade. GEMTEC was not provided with a finished floor elevation (FFE) of the building.

Based on the depth to bedrock, we anticipate that bedrock excavation will be required in some areas of the site. Extensive bedrock excavation may be required if the FFE of the building is lower than existing site grades.

We offer the following recommendations for construction and design:

4.3 Foundation

- The proposed structures may be safely supported on conventional spread footings founded on the medium dense undisturbed glacial till or bedrock at a serviceability limit state (SLS) resistance of 150 kPa for a total maximum settlement of 25 mm.
- If footings will be placed on the medium dense undisturbed glacial till, excavation should undertaken by excavators equipped with a smooth ditching bucket. This will help preserve the sensitive glacial till soils. It should be noted that a smooth ditching bucket would not easily excavate the bedrock encountered at the site.
- Bedrock excavation will likely be required for footing areas. Based on the bedrock encountered, bedrock excavation for the footings should be achievable provided that site grades are not lowered (i.e. bedrock excavation of 1 metre is achievable using a suitably sized excavator equipped with a general purpose bucket provided that more competent zones are not encountered).

- Exterior footings of a heated structure must be founded at least 1.5 metres below final grade for frost protection. Isolated footings or footings for an unheated structure should be founded at least 1.8 metres below the final grade.

- A design freezing index of 1,150 Degree C-days may be used for the area.

- The site classification for seismic site response may be taken as Site Class C (Table 4.1.8.4.A NBCC 2010).

- Perimeter frost walls should be backfilled with a clean granular material having less than 10 % fines (percent passing the 0.080 mm sieve size) in order to prevent adfreezing.

4.4 Structural Fill

- Structural fill should consist of a well-graded, granular material meeting NBDOT subbase specifications (i.e. 75 mm minus crushed rock or approved alternate). A geotechnical engineer, or their representative, should approve the structural fill material before being placed on the site.

- Structural fill required underneath the footings and slab-on-grade should be placed in lifts not exceeding 300 mm in loose thickness and compacted to 95 % of the maximum dry density as determined by the latest version of ASTM D1557 (Modified Proctor). Compaction should be verified in the field with a nuclear density gauge on a regular basis.

- Placement limits for the structural fill should extend 0.5 metres beyond the edge of the footing, and extend downward at a 1H:1V slope to the approved subgrade.

4.5 Slab-on-Grade

The slab-on-grade area should be built up from the undisturbed glacial till or bedrock. A geotechnical engineer should assess the subgrade conditions prior to the placement of structural fill. Any soft areas encountered should be undercut and repaired as per the recommendation of a geotechnical engineer.

The slab-on-grade make-up should be as follows:

- Concrete slab
- Vapour barrier with permeance of less than 0.3 perms
- 300 mm thick layer of NBDOT Base (i.e. 31.5 mm minus crushed rock)
- Approved subgrade

4.6 Pavement Structure

The pavement areas should be cut down to the proposed subgrade elevation. Further excavation will be required if organic and unsuitable fill soils are encountered at the subgrade elevation. After the subgrade is exposed, a geotechnical engineer should assess the subgrade conditions before the pavement structure is placed.

The following is a typical pavement structure for light traffic and car parking areas:

- Asphalt concrete surface course (Type D) 75 mm
- Granular base (NBDOT 31.5 mm minus crushed rock) 150 mm
- Granular subbase (NBDOT 75 mm minus crushed rock) 300 mm
- Approved subgrade

The following is a typical pavement structure for heavy traffic areas (i.e. entrance and roadway areas)

- Asphalt concrete surface course (Type D) 40 mm
- Asphalt concrete surface course (Type B) 60 mm
- Granular base (NBDOT 31.5 mm minus crushed rock) 150 mm
- Granular subbase (NBDOT 75 mm minus crushed rock) 450 mm
- Approved subgrade

5.0 Radon and Rock Sulfate Laboratory Results

Samples were sent to an independent laboratory to conduct tests for radon and rock sulfate. The results are appended (Appendix B).

The Radon test results show an indoor air potential for radon of 12 Bq/m^3. This is much below the allowable limit of 200 Bq/m^3.

The rock sulfate test result show a total sulfur of less than 0.005%, and a acid production potential of less than 0.2.

6.0 Conclusion

The boreholes put down at this site are widely scattered and subsurface conditions may vary from those encountered at the borehole locations. GEMTEC Limited should be contacted immediately if the soil and groundwater conditions encountered during excavation are different than those encountered in our geotechnical investigation to ensure that the recommendations presented in this report are still applicable.

The investigation outlined in this report is strictly geotechnical in nature and should not be viewed as an environmental assessment of the site.

Appendix A

Descriptive Terms and Detailed Borehole Logs

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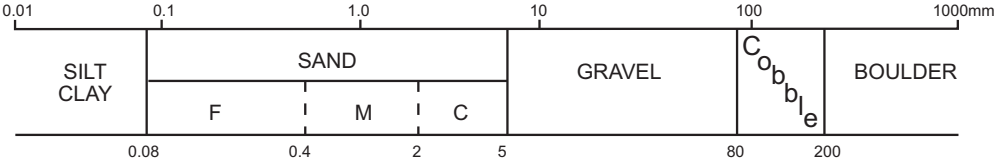
FREDERICTON, MONCTON, BATHURST, GRAND FALLS, SAINT JOHN, NB

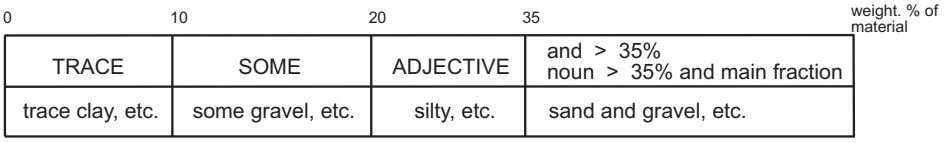
DESCRIPTIVE TERMS- BOREHOLE/TEST PIT LOG

SOILS

GRAIN SIZE



DESCRIPTIVE TERMINOLOGY



TRACE	SOME	ADJECTIVE	and > 35% noun > 35% and main fraction
trace clay, etc.	some gravel, etc.	silty, etc.	sand and gravel, etc.

COMPACTNESS gravels, sands, tills

N, RANGE	0 - 4	4 - 10	10 - 30	30 - 50	> 50
DENSITY	V. LOOSE	LOOSE	MEDIUM	DENSE	V. DENSE

CONSISTENCY silt, clay

S, KPa	< 12.5	12.5 - 25	25 - 50	50 - 100	100 - 200
CONSISTENCY	V. SOFT	SOFT	MEDIUM	STIFF	V. STIFF

ROCK

RQD	OVERALL QUALITY	FRACTURE SPACING
0 - 25	VERY POOR	VERY CLOSE 20 - 60 mm
25 - 50	POOR	CLOSE 60 - 200 mm
50 - 75	FAIR	MODERATE 200 - 600 mm
75 - 90	GOOD	WIDE 600 - 2000 mm
90 - 100	EXCELLENT	VERY WIDE 2 - 6 m

COMP. STR. MPa	1 - 5	5 - 25	25 - 50	50 - 100	100 - 250
DESCRIPTION	V. WEAK	WEAK	MODERATE	STRONG	V. STRONG

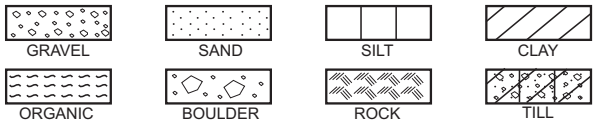
SAMPLE TYPES (location to scale on log)

S	SPLIT TUBE	G	SHOVEL
T	SHELBY TUBE	H	CARVED BLOCK
P	PISTON	K	SLOTTED
F	AUGER	V	IN SITU VANE
W	WASH	NR	NO RECOVERY

ROCK CORES

A(30mm); B(41mm); N(54mm)

LOG SYMBOLS



WELL SYMBOLS

N - standard penetration test; blows by 475 J drop hammer to advance Std. 50mm O.D. split tube sampler 0.3m

RQD - percent of core consisting of hard, sound pieces in excess of 100mm long (excluding machine breaks)

RECOVERY - sample recovery expressed as percent or length

S - shear strength , kPa; vane ⊕ ; penetrometer ■; unconfined ○ ; Uc unconfined compressive strength

Sr - shear strength, remoulded; vane ⊗ ; penetrometer □

Dd - dry density; t/m^3

W - natural moisture content, percent ✳

PL - plastic limit, percent ⊢

LL - liquid limit, percent ⊣

ND - non detect, total petroleum hydrocarbons (TPH) not detected in soil

Groundwater Level ⧩ ; Seepage ⧩

Revised Oct, 2009

BHDESCRM-2009.CDR

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BOREHOLE LOGS

Client	Public Works and Goverment Services Canada	Proj No. 6489.19	BOREHOLE 1
Project	Westmorland Institute Project No. R.043939.01	Date Drilled 1.April.2013	Page 1 of 1
Location	Dorchester, New Brunswick		
Ground Level, m 50.32	Datum: Geodetic	Logged By TD	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION
0						Silty SAND and GRAVEL
	1	S	8	450		
					0.45 / 49.87	Red to brown silty sand and gravel with trace clay (GLACIAL TILL)
1	2	S	101	300	1.01 / 49.31	Red to brown SANDSTONE/CONGLOMERATE Bedrock
	3	S	101	220		
					1.80 / 48.52	End of borehole at 1.80 metres Groundwater seepage not encountered

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GEOTG 6489.19.GPJ GEMTEC 2004.GDT 4-19-13

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BOREHOLE LOGS

Client	Public Works and Goverment Services Canada	Proj No. 6489.19	BOREHOLE 2
Project	Westmorland Institute Project No. R.043939.01	Date Drilled 2.April.2013	Page 1 of 1
Location	Dorchester, New Brunswick		
Ground Level, m 53.64	Datum: Geodetic	Logged By TD	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION	
0						0.08 ASPHALT CONCRETE	53.56
						Crushed Rock FILL	
						0.35	53.29
	1	S	5	350		Red to brown silty sand and gravel with trace clay (GLACIAL TILL)	
1	2	S	20	500		1.32	52.32
						Red to brown SANDSTONE/CONGLOMERATE Bedrock	
	3	NQ	0	0			
2							
3							
	4	NQ	0	812			
4						4.67	48.97
						End of borehole at 4.67 metres Groundwater seepage not encountered	

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BOREHOLE LOGS

Client	Public Works and Goverment Services Canada	Proj No. 6489.19	BOREHOLE 3
Project	Westmorland Institute Project No. R.043939.01	Date Drilled 2.April.2013	Page 1 of 1
Location	Dorchester, New Brunswick		
Ground Level, m 53.66	Datum: Geodetic	Logged By TD	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION	
0						0.08 ASPHALT CONCRETE	53.58
						0.25 Crushed Rock FILL	53.41
	1	S	5	350		Glacial Till and Congolmerate bedrock FILL	
1	2	S	20	500		1.37	52.29
	3	S	101	400		Red to brown fine grained CONGOLMERATE Bedrock	
2	4	NQ	0	170			
3	5	NQ	24	1450			
4						4.67	48.99
						End of borehole at 4.67 metres Groundwater seepage not encountered	

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BOREHOLE LOGS

Client	Public Works and Goverment Services Canada	Proj No. 6489.19	BOREHOLE 4
Project	Westmorland Institute Project No. R.043939.01	Date Drilled 2.April.2013	Page 1 of 1
Location	Dorchester, New Brunswick		
Ground Level, m 53.74	Datum: Geodetic	Logged By TD	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION	
0						0.08 ASPHALT CONCRETE	53.66
					F F F F F F	Brown silty sand FILL	
						0.30	53.44
	1	S	101	300		Red to brown SANDSTONE/CONGLOMERATE Bedrock	
1	2	NQ	0	0			
2	3	NQ	0	0			
3	4	NQ	0	0			
4						4.67	49.07
						End of borehole at 4.67 metres Groundwater seepage not encountered	

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BOREHOLE LOGS

Client	Public Works and Goverment Services Canada	Proj No. 6489.19	BOREHOLE 5
Project	Westmorland Institute Project No. R.043939.01	Date Drilled 2.April.2013	Page 1 of 1
Location	Dorchester, New Brunswick		
Ground Level, m 51.61	Datum: Geodetic	Logged By TD	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION	
0	1	S	22	550		0.05 Brown TOPSOIL	51.56
						Red to brown silty sand and gravel with trace clay (GLACIAL TILL)	
	2	S	101	200		0.71	50.90
1						Red to brown SANDSTONE/CONGLOMERATE Bedrock	
	3	S	101	220			
	4	NQ	0	80			
2							
3	5	NQ	0	1295			
4						4.67	46.94
						End of borehole at 4.67 metres Groundwater seepage not encountered	

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BOREHOLE LOGS

Client	Public Works and Goverment Services Canada	Proj No. 6489.19	BOREHOLE 6
Project	Westmorland Institute Project No. R.043939.01	Date Drilled 1.April.2013	Page 1 of 1
Location	Dorchester, New Brunswick		
Ground Level, m 53.16	Datum: Geodetic	Logged By TD	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION	
0	1	S	8	500		Brown TOPSOIL	
					0.25		52.91
						Red to brown silty sand and gravel with some crushed rock and trace clay (GLACIAL TILL FILL)	
	2	S	29	425	0.71		52.45
1						Red to brown SANDSTONE/CONGLOMERATE Bedrock	
					1.22		51.94
						End of borehole at 1.22 metres Groundwater seepage not encountered	

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BOREHOLE LOGS

Client	Public Works and Goverment Services Canada	Proj No. 6489.19	BOREHOLE 7
Project	Westmorland Institute Project No. R.043939.01	Date Drilled 1.April.2013	Page 1 of 1
Location	Dorchester, New Brunswick		
Ground Level, m 52.45	Datum: Geodetic	Logged By TD	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m ★
Standard Penetration Test, blows/0.3m ●
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION
0	1	S	23	610		Brown TOPSOIL
					0.15 / 52.30	
						Red to brown silty sand and gravel with trace clay (GLACIAL TILL)
					0.48 / 51.97	
1	2	NQ	0	0		Red to brown SANDSTONE/CONGLOMERATE Bedrock
2	3	NQ	0	0		
3	4	NQ	0	200		
4					4.78 / 47.67	
						End of borehole at 4.78 metres Groundwater seepage not encountered

GEOTG 6489.19.GPJ GEMTEC 2004.GDT 4-19-13

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BOREHOLE LOGS

Client	Public Works and Goverment Services Canada	Proj No. 6489.19	BOREHOLE 8
Project	Westmorland Institute Project No. R.043939.01	Date Drilled 2.April.2013	Page 1 of 1
Location	Dorchester, New Brunswick		
Ground Level, m 53.35	Datum: Geodetic	Logged By TD	

Undrained Shear Strength - kPa
0 25 50 75 100
○ Unconfined Compression ■ Pocket Penetrometer
⊕ Field Vane Test ⊗ Remoulded
Water Content & Atterburg Limits w_P w w_L
Dynamic Penetration Test, blows/0.3m
Standard Penetration Test, blows/0.3m
0 10 20 30 40 50 60 70 80 90 100

DEPTH m	SAMPLE No	TYPE	N (RQD)	REC (mm)	LOG	DESCRIPTION
0	1	S	13	500		Brown TOPSOIL
					0.25 / 53.10	
						Silty sand, gravel and crushed rock FILL
					0.50 / 52.85	
	2	S	6	300		Red to brown silty sand and gravel with trace clay (GLACIAL TILL)
1	3	S	34	450	1.37 / 51.98	
						Red to brown SANDSTONE/CONGLOMERATE Bedrock
	4	NQ	0	200		
2						
	5	NQ	0	450		
3						
4					4.67 / 48.68	
						End of borehole at 4.67 metres Groundwater seepage not encountered

Appendix B

Laboratory Testing Results

GEMTEC
Consulting Engineers and Scientists

Client: Public Works and Government Services Canada

Project: Geotechnical Investigation, New Building at Westmorland Institution, Dorchester, N

Project #: 0648919

Rock Core Compressive Strength

Date/Time Sampled: 13-04-04 1:11:00 PM	Date/Time Tested: 13-04-04 1:12:36 PM

BH	Sample No	Depth	Description	Diameter, mm	Area, mm^2	Length After Capping, mm	L/D	Load, kN	Comp. Str., MPa
3	1	3.90 m	Sandstone Bedrock	47.2	1750	71	1.49	55.500	30.5
5	1	3.20 m	Conglomerate Bedrock	47.1	1742	60	1.28	41.100	22.7
10	1	2.80 m	Conglomerate Bedrock	47.2	1750	71	1.51	78.600	43.2

Report ID: 151500-IAS
Report Date: 15-Apr-13
Date Received: 05-Apr-13

CERTIFICATE OF ANALYSIS
for
Gemtec Limited
77 Rooney Crescent
Moncton, NB E1E 4M4

RECEIVED APR 1 8 2013

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Todd Stewart
Project #: ~~763.10~~ 6489.19 AT.
Location: Dorchester

Modified Acid-Base Accounting
Results based upon Total Sulfur

RPC ID	Client ID	Paste pH	Total Sulfur	Acid Production Potential	Neutralizing Potential pH 8.3	Net NP pH 8.3	NP/AP
			%	Kg $CaCO_3$/tonne			
151500-1	S4 April 02/13	9.8	< 0.005	< 0.2	79.4	79.4	-

The modified acid/base accounting was determined by the Sobek method.
A negative value for Net Neutralizing Potential indicates that the material is a net acid producer.

A. Ross Kean, M.Sc.
Department Head
Inorganic Analytical Chemistry

Peter Crowhurst, B.Sc., C.Chem.
Analytical Chemist
Inorganic Analytical Chemistry

rpc

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Reference Number: 151476 - AQS

Date: April 5, 2013

Client:

Sara Boyce
Gemtec Limited
77 Rooney Crescent
Moncton, NB
E1E 4M4

RADON ANALYSIS

One (1) E-PERM Electret Ion Chamber was used for radon soil testing conducted at a site in Dorchester by Gemtec Limited. The sample was collected over a 24-hour time period. The results can be found in Table 1.

Table 1: Radon Results

Sample Identification	Electret #	Radon (Bq/m^3)
Dorchester Pen (Westmorland) Below Surface	LO 5661	1,196

This report relates only to the sample and information provided to the laboratory

The concentration of radon found within the soil is approximately 100 times higher than that found in indoor air.

I trust that this information is useful to you and encourage you to call if you have any questions regarding this report.

Darren Tarr
Air Quality Technician

Thelma Green
Air Quality Manager