

G.I.F-30 SEPT. 1976

GEOCRES No. 31E-142DIST. 52 REGION W.P. No. GWP 217-89-00(c)CONT. No. W. O. No. STR. SITE No. HWY. No. 69LOCATION Cranberry Marsh Rd.West Swamp CrossingsNo of PAGES - =====OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. REMARKS:

**FOUNDATION INVESTIGATION AND DESIGN REPORT
EMBANKMENT OVER SWAMP AREA
CRANBERRY MARSH ROAD WEST, STATION 12+360 TO 12+660
HIGHWAY 69 FOUR LANING, FROM 0.4 KM SOUTH
OF THE MUSQUASH RIVER, NORTHERLY 8.9 KM
WP 217-89-00, DISTRICT 52, HUNTSVILLE**

PREPARED FOR:

**R.V. ANDERSON ASSOCIATES LTD.
2001 Sheppard Avenue East, Suite 400
Willowdale, Ontario
M2J 4Z8**

**TROW CONSULTING ENGINEERS LTD.
Brampton, Cambridge, Hamilton, London, Markham
North Bay, Ottawa, Sudbury, Thunder Bay, Winnipeg**

**Project: S07657G/B
Date: October 27, 1998**

**1074 Webbwood Drive
Sudbury, Ontario P3C 3B7
Phone: (705) 674-9681
Fax: (705) 674-8271**

PREFACE:

Work Project 217-89-00 is one of a series of projects for the four lane expansion of Highway 69. This project is located from 0.4 km south of the Musquash River, Northerly 8.9 km to Tower Road, in the Northern Region of the MTO, District 52, Huntsville.

This project is located in the former Township of Gibson and Freeman, and on the Wahta Mohawk First Nation Lands, in the present Township of Georgian Bay, District of Muskoka. This work project includes the construction of new Southbound Lanes; rehabilitation of the existing highway to divided freeway standards to become the Northbound Lanes; construction of a replacement bridge over the Musquash River for the Northbound Lanes; construction of a structure over the Musquash River for the Southbound Lanes; construction of a diamond interchange at the intersection of Cranberry Marsh Road and Highway 69; construction of a diamond interchange at the intersection of Muskoka Road 12 and Highway 69; construction of a structure over the Moon River for the Southbound Lanes; construction of two truck layby areas; and construction of associated side roads resulting from the creation of the controlled access highway.

The following report addresses the foundation investigation and design implications of an embankment over a swamp area, along the proposed Cranberry Marsh Road West. Other reports prepared by Trow Consulting Engineers Ltd. address the geotechnical and foundation concerns of the other portions of this project.

**FOUNDATION INVESTIGATION AND DESIGN REPORT
EMBANKMENT OVER SWAMP AREA
CRANBERRY MARSH ROAD WEST, STATION 12+360 TO 12+660
HIGHWAY 69 FOUR LANING, FROM 0.4 KM SOUTH
OF THE MUSQUASH RIVER, NORTHERLY 8.9 KM
WP 217-89-00, DISTRICT 52, HUNTSVILLE**

PART 1 FOUNDATION INVESTIGATION

1.1 INTRODUCTION:

This submission presents the results of a geotechnical foundation report completed by Trow Consulting Engineers Ltd. for the design and construction of an embankment over top of a swamp/muskeg area between approximate stations 12+360 to 12+660, along the proposed Cranberry Marsh Road West, as part of the four lane expansion of Highway 69 from Musquash River to Tower Road. The exact area of investigation was modified from the original terms of reference, based upon the results of hand auger probes advanced as part of the pavement investigation, which, more precisely identified the swamp areas. This part of the report contains factual information (obtained from the field investigation) pertaining to the design parameters required for the embankment foundations and related earthworks, while the second part details the proposed recommendations.

1.2 SITE LOCATION, DESCRIPTION AND GEOLOGICAL SETTING

1.2.1 Site Location

The site is located in the former Gibson Township, now located within the Township of Georgian Bay, in the District of Muskoka and is contained within the Ministry of Transportation Huntsville District (52). This investigation focused on an area approximately 90 metres west of the existing Highway 69, between station 12+360 to 12+660, of the proposed Cranberry Marsh Road West.

1.2.2 Site Description

The terrain within the investigation area is relatively flat and swampy with intermittent outcrops of bedrock in the general area. The ground rises steeply to the south of station 12+350. Mature trees also surround the swamp area in all directions. The investigation area was centered along the eastern boundary of a significant swamp area.

1.2.3 Geological Setting

According to OGS Maps 2544 and 2556, the site is located in what is known as the central gneiss belt. The surface soils in the area are expected to consist of shallow organic deposits (peat, and muck), between intermittent shallow muck with some glaciofluvial deposits (i.e. gravel and sand).

1.3 INVESTIGATION PROCEDURES

1.3.1 Field Investigation

The field work for this investigation was carried out between August 18 and 20, 1998, and consisted of three (3) sampled boreholes (BH-1B, BH-3B & BH-4B) and two (2) hand auger probes (AP-2B, AP-5B). The boreholes and auger probes were advanced to depths ranging from 1.07 to 5.79 metres, and all, except BH-1B were terminated upon auger refusal on assumed cobbles or bedrock. All boreholes and auger probes, except BH-1B, were advanced along the centreline of the proposed Cranberry Marsh Road West alignment. Borehole BH-1B was advanced at a 5 m eastward offset to the centreline, as shown on Drawing 1, after an initial unsampled auger probe advanced along the centreline, at the same station, encountered refusal at an approximate depth of 1.0 m. Borehole elevations were obtained from the profile provided by R.V. Anderson Associates Ltd. and are referenced to the geodetic datum.

Two of the boreholes, (BH-3B and BH-4B) were advanced through the overburden soils using a track mounted CME-55 drill rig equipped with solid and hollow stem augers. Soil samples were obtained using a 51 mm O.D. split spoon sampler in conjunction with Standard Penetration Tests (ASTM D1586). The Standard Penetration (N) values were recorded and used to provide an assessment of the relative denseness of the overburden soils at the site and the soil samples were used for identification and laboratory testing.

A third borehole, (BH-1B) was advanced using continuous hand sampling equipment, equipped with a 51 mm O.D. split spoon sampler since access to the site was restricted as a result of wet, soft, spongy site conditions preventing the access of a heavier track mounted hydraulic drill.

The auger probes, (AP-2B & AP-5B) were also located within the area of the swamp with restricted access, and were advanced with hand power equipment.

1.3.3 Laboratory Testing

The laboratory testing program for select soil samples consisted of the following:

- Natural Moisture Content
- Grain Size Distributions

The natural moisture content results are summarized on the attached Borehole Logs, while the grain size distribution are presented on Figure 1.

1.4 SUBSURFACE CONDITIONS

The locations of the boreholes and auger probes are noted on the enclosed logs and the attached site plan, Drawing 1. Details of the soil strata encountered in the boreholes and interpreted in the adjacent probes, are also included on the logs. Further information on soil descriptions are contained on Drawing 2A and 2B. Based on the borehole information, the following soils layers were encountered at this site:

- Organics
- Sand
- Silty Fine Sand
- Bedrock

A summary for the description of the various soil strata encountered in the boreholes is presented below.

1.4.1 Organics

All boreholes contained an overlying organic layer.

The depth of organics, which comprise mostly peat at various stages of decomposition, was measured to be in the order of 150 to 910 mm thick.

1.4.2 Sand

A layer of brown to grey sand was found to underlie the organic layer in Borehole 1B, extending to a maximum depth of approximately 800 mm below the original ground elevation. The sand contains traces of gravel in the upper portion. The standard penetration resistance 'N' values was 8 blows/300 mm, indicating a loose state.

1.4.3 Silty Fine Sand

Below the organics in Boreholes 3B and 4B, and Auger Probes 2B and 5B, and underlying the sand layer in Borehole 1B, a layer of brown to grey silty fine sand was encountered, extending to a maximum depth of 5 m below the original ground elevation. The standard penetration resistance 'N' values ranged from 16 to 40 blows/300 mm, indicating a compact to dense state.

1.4.4 Bedrock

Assumed bedrock was encountered in Boreholes 2B, 3B & 4B at depths of 1.1 m, 5.79 m & 5.64 m respectively. In addition, intermittent shallow bedrock is apparent in other locations.

1.5 GROUNDWATER CONDITIONS

Information regarding the groundwater levels at the site was obtained by measuring the water levels in the open boreholes after the completion of drilling. Free standing water was observed in all of the boreholes at surface. The swamp is located in a low lying area and is poorly drained. It is presumed that in the spring and other wet periods of the year, the ground will be inundated with ponding water.

PART 2 ENGINEERING DISCUSSIONS AND RECOMMENDATIONS

The proposed height of the embankment through this section is approximately 1 metre or less. No underlying clay deposits or other weak materials were encountered within these sections, and thus the design of the proposed fill embankment should be straight forward. It is recommended that the upper organics be excavated down to the underlying non-cohesive, granular silty fine sand, i.e. at a depth of approximately 1.5 metres. However, this depth may need to increase in a westerly direction, as you move towards the centre of the swamp where the organic layer is expected to be thicker. Additional sub-excavation of the underlying sand may be required in order to provide the required depth of granular material, as recommended in the Pavement Design Report. As such, no stability problems are expected, and any settlement of the subsoil should be minimal and should take place during construction.

2.1 Embankment Design

It is recommended that the fill embankments be constructed of Granular 'B' Type II material, due to the relatively low fill heights (less than 1 m), at a maximum side slope of 2.0 H:1V. As stated above, settlement of the fill material should be minimal.

2.2 Construction Considerations

It is expected that temporary excavations in the topsoil and sand overburden soil will be temporarily stable at slopes of 1.5 H:1V. Excavation work should start from the downstream end (i.e. North end) to facilitate drainage of the swamp area. Excavation and backfilling operations should be carried out concurrently and under water, if necessary. The Granular 'B' Type II material maybe placed below the groundwater level within the embankment excavation, by end dumping. However, once the granular material is 0.3 m above any standing water in the excavation, placement and compaction of the fill material should be completed according to O.P.S.S. standards and MTO practices.

3.0 CLOSURE

The field investigation was supervised by Mr. D.R. Thompson, P.Eng., Project Engineer. The report was written by Mr. D.R. Thompson, P.Eng. and reviewed by Mr. I.W. Gore, P.Eng. Principal Geotechnical Engineer and Mr. E.A. Gonneau, P.Eng., Project Manager.



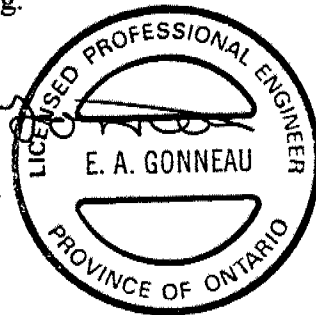
We trust the findings in the preceding report will enable you to proceed with the final design. Please contact the undersigned at this office if you have any questions.

Yours truly,

TROW CONSULTING ENGINEERS LTD.



D.R. Thompson, P.Eng.
Project Engineer

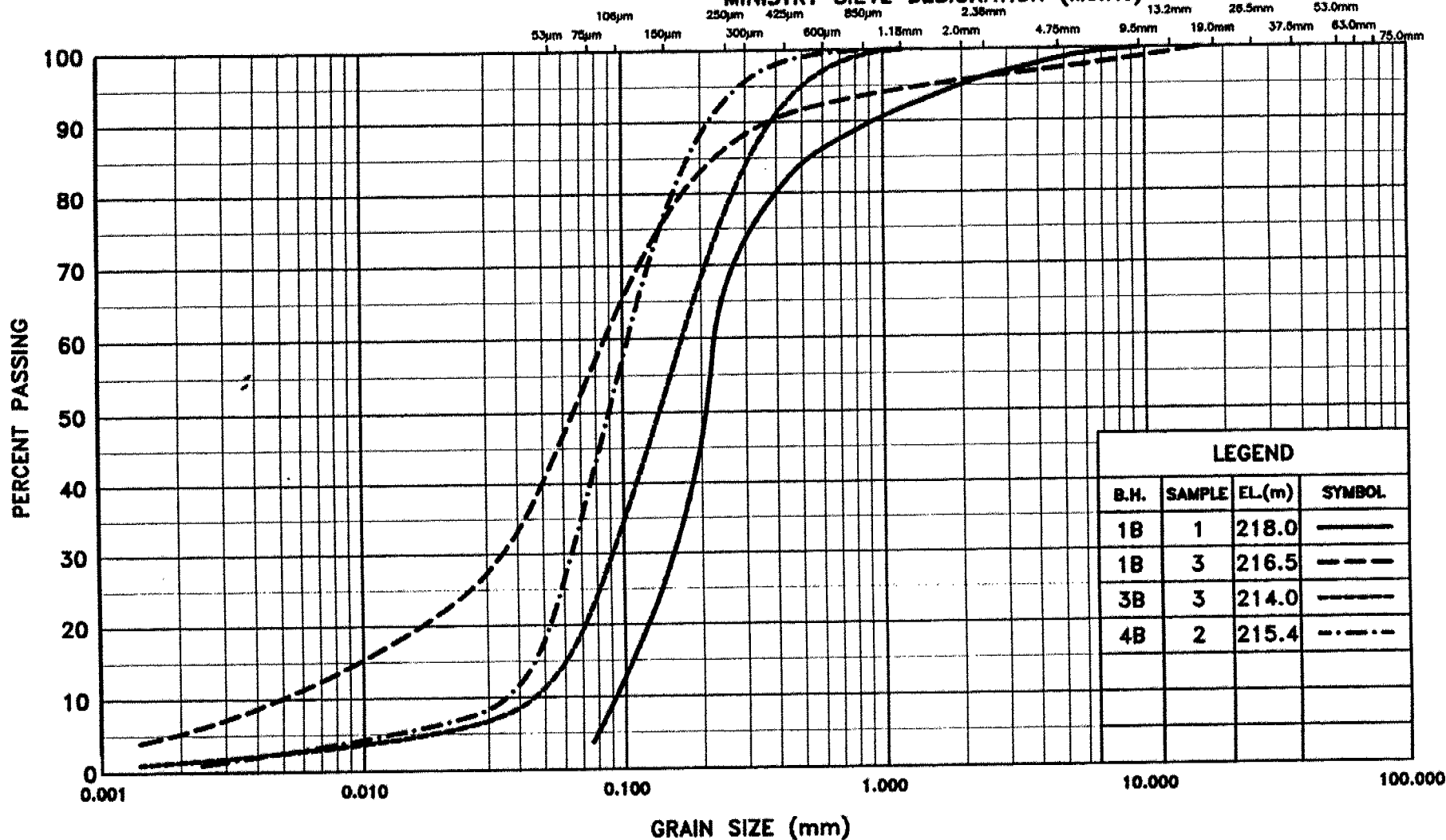

E.A. Gonneau, P.Eng.
Project Manager
I.W. Gore, P.Eng.
Principal

DRT:rw/wd/draftfoundationinvestigation

UNIFIED SOIL CLASSIFICATION

CLAY AND SILT	SAND			GRAVEL	
	FINE	MEDIUM	COARSE	FINE	COARSE

MINISTRY SIEVE DESIGNATION (Metric)



Ministry of
Transportation

METRIC

GRAIN SIZE DISTRIBUTION

BH-1B, SS-1
BH-1B, SS03; BH-3B, SS-3; BH-4B, SS-2 SAND
SILTY FINE SAND

FIGURE 1

W.P 217-89-00



PROJ. No. S07657GB

NOTES ON SAMPLE DESCRIPTIONS

1. All descriptions included in this report follow the I.S.S.M.F.E. as suggested in the Canadian Foundation Manual. The laboratory grain-size analysis also follows this classification system. Others may designate the unified classification system as their source; a comparison of the two is shown for your information. Please note that, with the exception of those samples where the grain-size analysis has been carried out, all samples are classified visually and the accuracy of visual examination is not sufficient to differentiate between the classification systems or exact grain sizing.

UNIFIED SOIL CLASSIFICATION	Fines (silt or clay)				Sand			Gravel		Cobbles																					
					Fine	Medium	Coarse	Fine	Coarse																						
	Clay	Silt			Sand			Gravel																							
		Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse																					
		Sieve Sizes																													
		Particle Size (mm)																													
	0.001	0.002	0.003	0.004	0.006	0.008	0.01	0.02	0.03	0.04	0.06	0.075	0.08	0.1	0.2	0.3	0.4	0.6	0.8	1.0	2.0	3.0	4.0	6.0	8.0	10	20	30	40	60	80

2. **FILL:** Where fill is designated on the borehole log, it is defined as indicated by the sample recovered during the boring process. The reader is cautioned that fills are heterogeneous in nature and variable in density or degree of compaction. The borehole description may therefore not be applicable as a general description of the site fill material. All fills should be expected to contain obstructions such as large concrete pieces of subsurface basements, floors, tanks, etc.; none of these may have been encountered in the borehole. Since boreholes cannot accurately define the contents of fill, test pits are recommended to provide supplementary information. Despite the use of test pits, the heterogeneous nature of fill will leave some ambiguity as to the exact and correct composition of the fill. Most fills contain pockets, seams, or layers of organically contaminated soil. This organic material can result in the generation of methane gas and/or significant on-going and future settlements. Some fill material may be contaminated by toxic waste that renders it unacceptable for deposition in any but designated land fill sites. Unless specifically stated, the fill on this site has not been tested for contaminants that may be considered hazardous. This testing and a potential hazard study can be carried out if you so request. In most residential/commercial areas undergoing reconstruction, buried oil tanks are common but are not detectable using conventional geotechnical procedures.
3. **TILL:** The term till on the borehole logs indicate that the material originates from a geological process associated with glaciation. As a result of this geological process, the till must be considered heterogeneous in composition and, as such, may contain pockets and/or seams of material such as sand, gravel silt or clay. As till often contains cobbles (60 to 200 mm) or boulders (over 200 mm), contractors may encounter them during excavation, even if they are not indicated by the borings. It should be appreciated that normal sampling equipment cannot differentiate the size, or type of any obstruction. Because of the horizontal and vertical variability of till, the sample description may be applicable to a very limited areas; caution is therefore essential when dealing with sensitive excavations or dewatering programs in till material.

NOTES ON SAMPLE DESCRIPTIONS (Cont'd)



Project No: S07657G

Drawing No: 2B

4. The following table gives a description of the soil based on particle sizes. With the exception of those samples where grain-size analyses have been performed, all samples are classified visually. The accuracy of visual examination is not sufficient to differentiate between this classification system or exact grain size.

Soil Classification		Terminology	Proportion
Clay	< 0.002 mm	"trace" (eg. trace sand)	1% - 10%
Silt	0.002 to 0.06 mm	"some" (eg. some sand)	10% - 20%
Sand	0.06 to 2 mm	adjective (eg. sandy)	20% - 35%
Gravel	2 to 60 mm	and (eg. and sand)	> 35%
Cobbles	60 to 200 mm	noun (eg. boulders)	> 35% and
Boulders	> 200 mm		main fraction

Classification system as suggested in the Canadian Foundation Engineering Manual, 3rd Edition, unless otherwise noted.

The compactness of cohesionless soils and the consistency of cohesive soils are defined by the following:

Cohesionless Soil		Cohesive Soil	
Compactness	Standard Penetration Resistance "N" Blows/0.3 m	Consistency	Undrained Shear Strength (kPa)
Very Loose	0 to 4	Very Soft	< 12
Loose	4 to 10	Soft	12 - 25
Compact	10 to 30	Firm	25 - 50
Dense	30 to 50	Stiff	50 - 100
Very Dense	Over 50	Very Stiff	100 - 200
		Hard	> 200

5. Rock Coring

Where rock drilling was carried out, the term RQD (Rock Quality Designation) is used. The RQD is an indirect measure of the number of fractures and soundness of the rock mass. It is obtained from the rock cores by summing the length of core recovered, counting only those pieces of sound core that are 100 mm or more in length. The RQD value is expressed as a percentage and is the ratio of the summed core lengths to the total length of core run. The classification based on the RQD value is given below.

RQD Classification	RQD
Very poor quality	< 25
Poor quality	25 - 50
Fair quality	50 - 75
Good quality	75 - 90
Excellent quality	90 - 100

$$\text{Recovery Designation \% Recovery} = \frac{\text{Length of Core Per Run} \times 100}{\text{Total Length of Run}}$$

RECORD OF BOREHOLE BH-1B

1 OF 1

METRIC

W.P. 217-89-00

LOCATION Station 12+392, 5 m right of centreline of Cranberry Marsh Road West

ORIGINATED BY S.A.

DIST 52 HWY 69

BOREHOLE TYPE Continuous sampling / Hand sampler

COMPILED BY M.D.

DATUM Geodetic

DATE August 20, 1998

CHECKED BY D.T.

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE (metres)	SPT TEST (N-Value) CONE PENETRATION TEST				PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT				UNIT WEIGHT kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION
ELEV. DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS/0.3m			20	40	60	80	wp	w	wl			
218.35	GROUND SURFACE																
0.00	PEAT, 150 mm over SAND, with a trace of GRAVEL, brown, wet.		1	SS			218									1% 95% 4%	
217.55	(loose)		2	SS	8												
0.60	SILTY FINE SAND, grey, wet. (loose to compact)		3	SS	9		217									4% 40% 56%	
216.52			4	SS	20												
1.83	END OF BOREHOLE AS A RESULT OF CAVING																
Notes: 1) This borehole forms part of Highway 69 Service Road Foundation Investigation. 2) Borehole drilled at U.T.M. coordinates 4 989 764.3 N, 282 794.0 E. 3) Water level was at surface on completion. 4) An unsampled auger probe was initially advanced on centreline at this station. Refusal on cobble or bedrock was encountered at 1.0 m depth.																	



RECORD OF BOREHOLE AP-2B

1 OF 1

METRIC

W.P. 217-89-00

LOCATION Station 12+475, on centreline Cranberry Marsh Road West.

ORIGINATED BY S.A.

DIST 52 HWY 69

BOREHOLE TYPE / Power hand auger

COMPILED BY M.D.

DATUM Geodetic

DATE August 20, 1998

CHECKED BY D.T.

SOIL PROFILE		SAMPLES		GROUND WATER CONDITIONS	ELEVATION SCALE (metres)	SPT TEST (N-Value) CONE PENETRATION TEST				PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT				UNIT WEIGHT kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION
ELEV. DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS/0.3m	20	40	60	80	wp	w	wl			
219.23	GROUND SURFACE														
0.00	PEAT, ~300 mm over Probable SILTY FINE SAND														
218.16	END OF AUGER PROBE DUE TO REFUSAL TO HAND AUGER ON ASSUMED BEDROCK														
1.07	Notes: 1) This auger probe forms part of Highway 69 Service Road Foundation Investigation. 2) Auger probe drilled at U.T.M. coordinates 4 989 843.1 N, 282 566.1 E. 3) Water level was at surface & hole was open to ~0.3 m depth on														



RECORD OF BOREHOLE BH-3B

1 OF 1

METRIC

W.P. 217-89-00

LOCATION Station 12+565 on centreline of Cranberry Marsh Road West

ORIGINATED BY S.M.

DIST 52 HWY 69

BOREHOLE TYPE Standard augers / CME-55

COMPILED BY M.D.

DATUM Geodetic

DATE August 20, 1998

CHECKED BY D.T.

SOIL PROFILE		SAMPLES		GROUND WATER CONDITIONS	ELEVATION SCALE (metres)	SPT TEST (N-Value) CONE PENETRATION TEST				PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			UNIT WEIGHT kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION	
ELEV. DEPTH	DESCRIPTION	STRATA PLOT	NUMBER			TYPE	BLOWS/0.3m	20	40	60	80	wp			w
218.77 0.00	GROUND SURFACE														
217.86 0.91	PEAT, black, wet. (very soft)														
	SILTY FINE SAND, brown, changing to grey with depth, wet. (compact)		1	SS	24										
			2	SS	36										
			3	SS	40										
212.98 5.79	END OF BOREHOLE DUE TO REFUSAL TO AUGER ON BEDROCK OR BOULDER														
<p>Notes:</p> <p>1) This borehole forms part of Highway 69 Service Road Foundation Investigation.</p> <p>2) Borehole drilled at U.T.M. coordinates 4 989 925.7 N, 282 530.4 E.</p> <p>3) Water level was at surface & hole was open to 1.0 m depth on completion.</p>															



RECORD OF BOREHOLE BH-4B

1 OF 1

METRIC

W.P. 217-89-00

LOCATION Station 12+580, on centreline of Cranberry Marsh Road West

ORIGINATED BY S.M.

DIST 52 HWY 69

BOREHOLE TYPE Standard augers / CME-55

COMPILED BY M.D.

DATUM Geodetic

DATE August 19, 1998

CHECKED BY D.T.

SOIL PROFILE			SAMPLES		GROUND WATER CONDITIONS	ELEVATION SCALE (metres)	SPT TEST (N-Value) CONE PENETRATION TEST				PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	UNIT WEIGHT kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION GR SA (SI & CL)
ELEV. DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE			BLOWS/0.3m	20	40	60					
218.71	GROUND SURFACE														
0.00	PEAT, black, wet. (very soft)														
218.10	SILTY FINE SAND, brown, changing to grey with depth, wet. (compact to dense)														
0.61			1	SS	25										
			2	SS	30										
			3	SS	16										
213.07	END OF BOREHOLE DUE TO REFUSAL TO AUGER ON BEDROCK OR BOULDER														
5.64	Notes: 1) This borehole forms part of Highway 69 Service Road Foundation Investigation. 2) Borehole drilled at U.T.M. coordinates 4 989 939 4 N, 282 524.3 E. 3) Water level was at surface & hole was open to 0.8 m depth on														



RECORD OF BOREHOLE AP-5B

1 OF 1

METRIC

W.P. 217-89-00
 DIST 52 HWY 69
 DATUM Geodetic

LOCATION Station 12+640, on centreline Cranberry Marsh Road West.
 BOREHOLE TYPE / Power hand auger
 DATE August 20, 1998

ORIGINATED BY S.A.
 COMPILED BY M.D.
 CHECKED BY D.T.

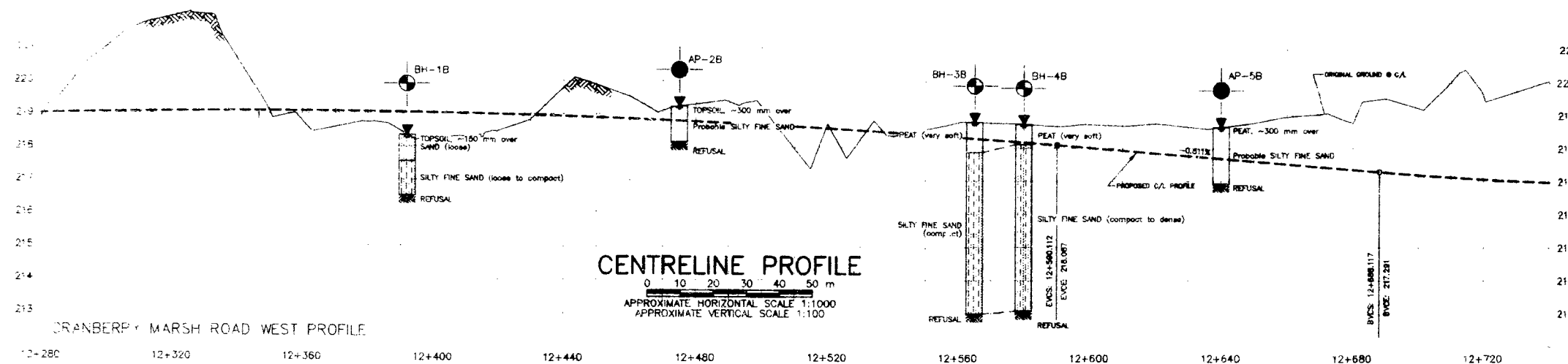
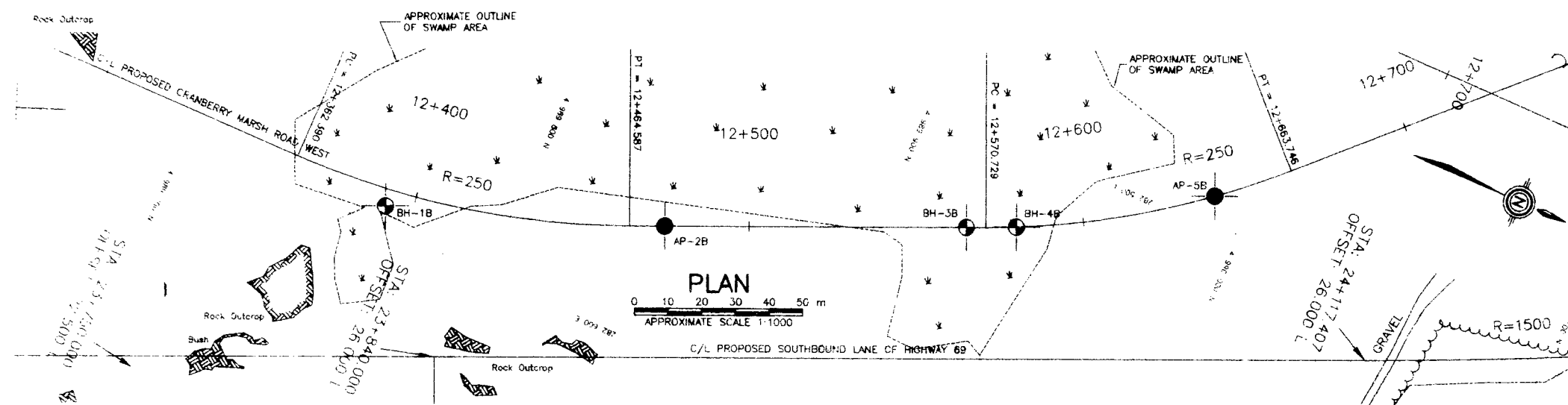
SOIL PROFILE			SAMPLES		GROUND WATER CONDITIONS	ELEVATION SCALE (metres)	SPT TEST (N-Value) CONE PENETRATION TEST				PLASTIC LIMIT	NATURAL MOISTURE CONTENT	LIQUID LIMIT	UNIT WEIGHT kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION
ELEV. DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE			20	40	60	80					
218.62	GROUND SURFACE														
0.00	PEAT, ~ 300 mm over														
	Probable SILTY FINE SAND					218									
216.92						217									
1.70	END OF AUGER PROBE DUE TO REFUSAL TO HAND AUGER ON ASSUMED BEDROCK														
	Notes: 1) This auger probe forms part of Highway 69 Service Road Foundation Investigation. 2) Auger probe drilled at U.T.M. coordinates 4 989 990.0 N, 282 492.2 E. 3) Water level was at surface & hole was open to ~0.3 m depth on														



OVERSIZE DRAWING(S)

PLATE No.
 DRAWING No.
 CONT No.
 WP No. 217-89-00

SHEET



METRIC
 DIMENSIONS ARE IN METRES
 AND/OR MILLIMETRES
 UNLESS OTHERWISE SHOWN

TROW CONSULTING ENGINEERS LTD. SUDBURY, ONTARIO PROJ. NO. S0765108 DWG. No.		
MINISTRY OF TRANSPORTATION ENGINEERING OFFICE SURVEYS AND PLANS SECTION		
SITE PLAN & SOIL PROFILE		
CRANBERRY MARSH ROAD WEST		
SWAMP CROSSING		
GEOG. TYP. GIBSON LOT 13	DIST. OF MURKINIA CON. 13	
SCALE AS SHOWN	DISTRICT 52. HUNTSVILLE	REGION NORTHERN
SURVEY DATE		PLAN DATE 97/10
SITE	PLAN	