

NGL PROJECT NO. NFS09711

GEOTECHNICAL INVESTIGATION
PROPOSED WASTE MANAGEMENT FACILITY
CENTRAL, NL

OCTOBER 2003

MM
3/10/28

NGL PROJECT NO. NFS09711

REPORT ON

GEOTECHNICAL INVESTIGATION
PROPOSED WASTE MANAGEMENT FACILITY
CENTRAL, NL

PREPARED FOR

BAE NEWPLAN GROUP LIMITED
1133 TOPSAIL ROAD
MOUNT PEARL, NF
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PREPARED BY

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October 20, 2003



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1.0 INTRODUCTION

Acting at the authorization of Mr. Wayne Manuel, P.Eng., of the BAE Newplan Group Limited (BNG), Newfoundland Geosciences Limited (NGL) has carried out a geotechnical investigation for a proposed waste management facility in the Norris Arm North area, approximately 3.5 km west of Lewisport Junction, Newfoundland. The purpose of the investigation was to determine the general subsurface conditions across the proposed site, to determine the suitability of the site for the proposed development.

The scope of the work included:

- Test pit excavations and mapping bedrock outcrops across the site. The number and location points was determined based on a four to five day time limitation as specified by BNG.
- Compilation of geotechnical data and laboratory testing of soil samples.
- A factual geotechnical report detailing the findings of the investigation.

This report has been prepared specifically and solely for the project described above. It contains all of the findings of the investigation, including the Test Pit Records, laboratory test results and a site plan.

2.0 SITE DESCRIPTION AND GEOLOGY

The proposed site is located in the Norris Arm North area, between the Lewisport Junction road and the Norris Arm North access road, approximately 45 km west of the community of Gander, NL. The area investigated is an irregular, rectangular-like shaped block of approximately 1.1 x 3.4 km (approximately 3.7 km²); see figure NFS09711-GE-01.

The site is accessed by old logging roads and trails, from the Trans Canada Highway in the south, and the Norris Arm North access road in the west. The site is undeveloped and consists of wooded (approx. 80%) and boggy (approx. 20%) areas. The site is gently sloped towards the north-northwest, with a maximum elevation difference of approximately 60 m across the site (elevation data acquired by GPS, and may vary significantly from actual elevation).

Based on existing geological mapping and previous experience in the area, the principal overburden material beneath surficial organic soils consists of glacial till which overlies bedrock. Inferred bedrock geology in the area is comprise of Late Ordovician to Early Silurian sedimentary rocks of the Badger Group, consisting of purple, grey and orange-brown sandstone to siltstone, and grey conglomerate. No surface bedrock exposure was found within the investigation area.

3.0 PROCEDURE

NGL personnel contacted the Provincial Department of Government Services and Lands, and notified the department of our planned geotechnical investigation. The Department of Government Services and Lands granted permission to access the area with certain restrictions. No stream crossings or travel on bogs were permitted.

The field work for this investigation was completed during the period of September 25 - 29, 2003. A total of thirty-eight (38) test were completed at the locations shown on the site location plan (Drawing No. NFS09711-GE-01) located in Appendix C.

The test pits were completed using a Hitachi EX200LC excavator, supplied by A and B Construction Limited, to depths ranging from approximately 2.0 to 5.5 m below ground surface. The field work was conducted under the supervision of an engineering geologist from NGL who maintained detailed logs and obtained representative samples of the various strata encountered. All soil samples were stored in moisture proof containers where they will be stored for a period of three months, at which time they will be discarded, unless instructions to the contrary are received.

Test pit locations were selected and established in the field by NGL personnel, based on a maximum, evenly-spaced coverage for a four to five day work program. The locations and elevations were provided with the aid of a Garmin 12XL GPS, aerial photographs and topographic maps. The GPS elevation and coordinate information is referenced to North American Datum 1983 (NAD83), UTM Zone 21, and location information has a probable accuracy of ± 25 m. Elevation data provided on the Test Pit Records may vary significantly from actual elevations.

4.0 SUBSURFACE CONDITIONS

The overall subsurface conditions consist of a layer of organic soils and silty sands overlying sandy glacial till and bedrock. The subsurface conditions are described below, and in detail on the Test Pit Records located in Appendix B. Laboratory test results are presented in Figures 1 to 8 and on the Test Pit Records.

4.1 Organics/Sand/Silt

A thin layer of dark brown to black, soft compressible peat and rootmat was encountered at the surface at all test pit locations. This stratum ranged in thickness from 0.1 m (thin rootmat) to 1.2 m (peat/bog).

At most test pit locations a variable layer of silt, sand and organic material was encountered beneath surficial peat, rootmat and bog. This stratum was noted to vary in colour (orange-brown, brown, grey), and contain

occasional to some cobbles and boulders. The thickness of these materials ranged from 0.3 to 1.3 m at the test pit locations, and based on direct inspection was classed as loose to compact.

4.2 Till

A layer of silty sand to silty sand with gravel glacial till, with occasional cobbles and boulders was found at all test pit locations, and noted to extend to depths of 5.5 m. Based on direct inspection in the test pits the relative density of this stratum is classed as compact to dense, with occasional very dense sections.

Gradation analyses completed on ten (19) representative samples of the till material obtained during this investigation indicated the following average group percentages: 17.4% gravel (range 0.9 to 39.9%); 47.7% sand (range 32.8 to 59.4%); and 34.8% silt/clay (range 20.5 to 59.4%). Atterburg Limits determinations completed on five (4) samples indicate the fines portion of the material non-plastic (high silt content). The average moisture content of the samples tested was approximately 10.9%.

4.3 Bedrock

Inferred bedrock was found at 20 of the 38 test pit sites at depths ranging from 0.6 to 5.2 m below surface. Bedrock was inferred by excavation refusal; no coring of the bedrock was completed. The bedrock is comprised of sandstone, siltstone and conglomerate of the Badger Group. In general, excavation of small surficial pieces of bedrock was possible, however at test pit TP3, excavation of the bedrock was possible to approximately 1.8 m below the bedrock surface. Based on limited visual inspection within the test pit excavations, the bedrock was observed to be severely fractured to moderately jointed.

5.0 GROUNDWATER

Groundwater was encountered at 31 of the 38 test pit locations at depths ranging from 0.4 to 4.4 m below ground surface. Test pits were not left open long enough for groundwater to stabilize. Groundwater levels may fluctuate seasonally and in response to precipitation events.

6.0 CLOSURE

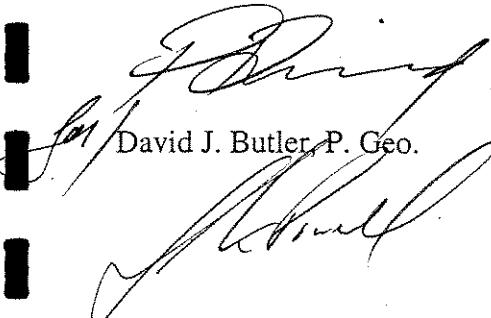
The purpose of this investigation was to determine the general site conditions necessary for assessing site suitability, and for preliminary planning. It is our understanding that geotechnical comments and recommendations are not required at this time. We would be pleased to provide additional assistance with this project as project planning and design proceeds.

A subsurface investigation is a limited sampling of a site. Variations throughout the site may differ significantly from data collected at the sample locations. The extent of the limited area depends on the soil and groundwater conditions, as well as the history of the site reflecting natural, construction and other activities.

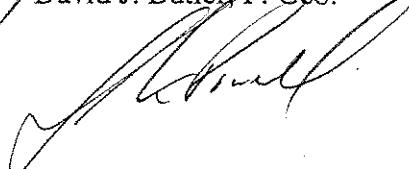
We trust that the report contains all of the information required at this time. If you have any questions please contact us at your convenience.

Yours truly,

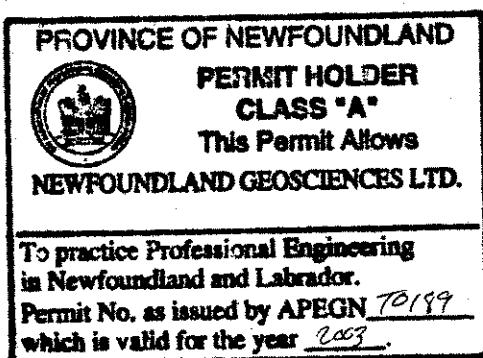
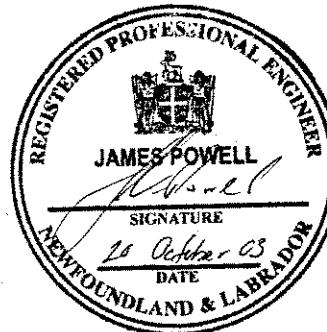
NEWFOUNDLAND GEOSCIENCES LIMITED



David J. Butler, P. Geo.



James Powell, P. Eng.



APPENDIX A

Symbols and Terms Used on the Test Pit Records

SYMBOLS AND TERMS USED ON BOREHOLE AND TEST PIT RECORDS

SOIL DESCRIPTION

Terminology Describing Common Soil Genesis

<i>Rootmat</i>	-	vegetation, roots and moss with organic matter and topsoil typically forming a mattress at the ground surface
<i>Topsoil</i>	-	mixture of soil and humus capable of supporting good vegetative growth
<i>Peat</i>	-	fibrous aggregate of visible and invisible fragments of decayed organic matter
<i>Loam</i>	-	silty sand or sand with silt mixed with organic matter
<i>Till</i>	-	unstratified glacial deposit which may range from clay to boulders
<i>Fill</i>	-	any materials below the surface identified as placed by humans (excluding buried services)

Terminology Describing Soil Structure

<i>Homogeneous</i>	-	same colour and appearance throughout
<i>Stratified</i>	-	composed of alternating successions of different soil types, e.g., silt and sand
<i>Lensed</i>	-	inclusion of small pockets of different soils
<i>Laminated</i>	-	alternating layers of varying material or colour with the layers less than 6 mm thick
<i>Layer</i>	-	thickness > 75 mm
<i>Seam</i>	-	thickness between 2 mm and 75 mm
<i>Parting</i>	-	thickness < 2 mm

Grain Size and Plasticity

Terminology describing soils on the basis of grain size and plasticity is based on the Unified Soil Classification System (USCS) (ASTM D-2487). The classification excludes particles larger than 76 mm (3 inches). This system provides a group symbol (e.g., SM) and group name (e.g., silty SAND) for identification. Note: terminology describing materials in the absence of laboratory analysis is based on the ASTM D-2488 visual method.

Terminology describing materials outside the USCS (e.g., particles larger than 76 mm, visible organic matter, construction debris) is based on the (visually estimated) proportion of these materials present:

<i>Trace, or occasional</i>	Less than approximately 10%
<i>Some</i>	approximately 10-20%
<i>Frequent</i>	Greater than approximately 20%

Standard Penetration Test 'N-Value'

The performance of the Standard Penetration Test provides an 'N-value'; the number of blows of a 140 pound (64 kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (51 mm) O.D. split spoon sampler one foot (305 mm) into the soil. For split spoon samples where insufficient penetration is achieved and 'N' values cannot be determined, the number of blows is reported over sampler penetration in millimetres (e.g., 50/75).

Density of Cohesionless Soils

The standard terminology to describe cohesionless soils includes the compactness (formerly "relative density"), as determined by laboratory test or by the Standard Penetration Test 'N- value'.

Density	N-Value	Compactness %
<i>Very Loose</i>	< 4	< 15
<i>Loose</i>	4-10	15-35
<i>Compact</i>	10-30	35-65
<i>Dense</i>	30-50	65-85
<i>Very Dense</i>	> 50	> 85

Consistency of Cohesive Soils

The standard terminology to describe cohesive soils includes the consistency, which is based on undrained shear strength as measured by *in situ* vane tests, penetrometer tests, unconfined compression tests, or occasionally by standard penetration tests.

Consistency	Undrained Shear Strength		N-Value
	ksf	kPa	
<i>Very Soft</i>	< 0.25	< 12.5	< 2
<i>Soft</i>	0.25-0.5	12.5-25	2-4
<i>Firm</i>	0.5-1.0	25-50	4-8
<i>Stiff</i>	1.0-2.0	50-100	8-15
<i>Very Stiff</i>	2.0-4.0	100-200	15-30
<i>Hard</i>	> 4.0	> 200	> 30



ROCK DESCRIPTION

Rock Quality Designation (RQD)

The classification is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be due to close shearing, jointing, faulting, or weathering in the rock mass and are not counted. RQD was originally intended to be applied to NW core; however, it can be used on different core sizes if most of the fractures caused by drilling stresses are easily distinguishable from *in situ* fractures.

RQD (%)	Rock Quality	
90-100	Excellent	intact, very sound
75-90	Good	moderately jointed, massive, sound
50-75	Fair	fractured, blocky and seamy
25-50	Poor	severely fractured, shattered and very seamy or blocky
0-25	Very poor	very severely fractured, crushed

Total Core Recovery (TCR)

Total core recovery is defined as the total cumulative length of all core recovered in the core barrel divided by the length drilled and is recorded as a percentage on a per run basis.

Weathering State

Term	Description
Slight	Weathering limited to the surface of major discontinuities. Typically iron stained.
Moderate	Weathering extends throughout rock mass. Rock is not friable.
High	Weathering extends throughout rock mass. Rock is friable (crumbles naturally or broken between fingers).

Terminology Describing Rock Mass

Spacing (mm)	Bedding, Laminations, Bands	Discontinuity
2000-6000	Very Thick	Very wide
600-2000	Thick	Wide
200-600	Medium	Moderately close
60-200	Thin	Close
20-60	Very Thin	Very close
< 20	Laminated	Extremely close
< 6	Thinly Laminated	

RECORD SYMBOLS AND ABBREVIATIONS

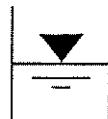
Sample Types

SS	Split spoon sample (obtained by performing the Standard Penetration Test)	WS	Wash sample	ST	Shelby tube or thin wall tube
		BS	Bulk sample	HQ, NQ, BQ, etc.	Rock core samples obtained using standard size diamond drilling bits.
		RC	Rock chip sample		

Laboratory Tests

S	Sieve analysis	H	Hydrometer analysis	A	Atterberg limits
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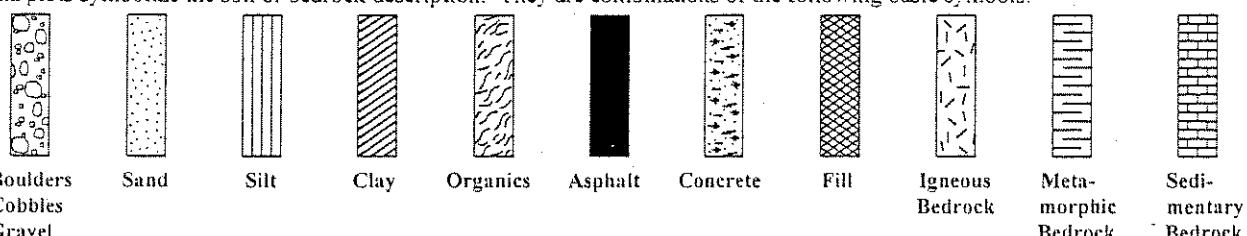
Water Level Measurement



Indicates recorded water level in a borehole, test pit or standpipe.

Strata Plot

Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols:



Solid lines between strata indicate the boundary between different strata. Dashed lines between strata indicate the boundary between strata is inferred.



APPENDIX B

Test Pit Records TP1 to TP38
Figures 1 to 8; Gradation Curves and Plasticity Charts

NEWFOUNDLAND
GEOSCIENCES

TEST PIT RECORD

LIMITED

CLIENT BAE - Newplan Group Ltd.

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North

N 5443175

E 635551

DATES (mm-dd-yy): DUG 9-28-03

WATER LEVEL

N/A

TEST PIT No.

TP1

PROJECT No.

NFS09711

DATUM UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa									
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	10	20	30	40	50	60
0	124.00																
1	123.7	Rootmat															
1	123.4	Loose to compact, orange - brown, silty SAND (SM); occasional cobbles															
1		Compact to dense, grey to yellow - grey, silty SAND with gravel (SM); occasional cobbles and boulders: TILL															
2																	
3																	
3.8	120.3																
4	120.2	Purple, sandstone/siltstone: BEDROCK															
4		End of Test Pit															
4		Slow groundwater seepage observed at 2.1 m depth.															
5		Refusal on probable bedrock at 3.8 m depth.															
6																	
7																	



NEWFOUNDLAND GEOSCIENCES

TEST PIT RECORD

LIMITED
CLIENT BAE - Newplan Group Ltd.

Proposed Waste Management Facility, Central Newfoundland

PROJECT Proposed Waste Management Facility, Central Newfoundland
LOCATION Norris Arm North N. 5143150

NOTIS AHN NORTH N 5443450 E 6355600

TEST PIT No.

TP2

DATES (mm-dd-yy): DUG 9-27-03

WATER LEVEL N/A

PROJECT NO.

NFS09711

DATUM 11

NAD83 Zone



NEWFOUNDLAND
GEOSCIENCES

TEST PIT RECORD

LIMITED

CLIENT BAE - Newplan Group Ltd.

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North

N 5444086

E 635543

DATES (mm-dd-yy): DUG 9-27-03

WATER LEVEL

N/A

TEST PIT No.

TP4

PROJECT No.

NFS09711

DATUM

UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES		UNDRAINED SHEAR STRENGTH - kPa				W _P	W	W _L		
					TYPE	NUMBER	OTHER TESTS	20	40	60					
0	65.00							10	20	30	40	50	60	70	80
0.0	64.7	Rootmat													
0.3	64.3	Loose to compact, orange - brown, silty SAND (SM); occasional cobbles													
1.0		Compact to dense, grey, silty SAND (SM); occasional cobbles and boulders: TILL													
2.0															
3.0															
4.0															
6.0	60.3														
6.0	60.2	Purple, sandstone/siltstone: BEDROCK													
6.0		End of Test Pit													
7.0		No groundwater seepage observed.													
7.0		Refusal on probable bedrock at 4.8 m depth.													



NEWFOUNDLAND
GEOSCIENCES

TEST PIT RECORD

LIMITED

BAE - Newplan Group Ltd.

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North

N 5444144

E 635966

TEST PIT No.

TP5

PROJECT No.

NFS09711

DATES (mm-dd-yy): DUG 9-27-03

WATER LEVEL

N/A

DATUM

UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa									
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	10	20	30	40	50	60
0	63.00																
0	62.7	Rootmat; peat															
0	62.2	Loose to compact, yellow - brown to brown, silty SAND (SM); occasional cobbles and boulders															
1		Compact to dense, grey to yellow - grey, silty SAND with gravel (SM); occasional cobbles and boulders: TILL															
2																	
3																	
4																	
5																	
5.78		End of Test Pit			BS	1	S										
6		Slow groundwater seepage observed at 1.8 m depth.															
6		Bedrock not encountered.															
7																	



NEWFOUNDLAND
GEOSCIENCES

TEST PIT RECORD

LIMITED

CLIENT BAE - Newplan Group Ltd.

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North

N 5444084

E 636289

DATES (mm-dd-yy): DUG 9-28-03

WATER LEVEL

N/A

TEST PIT No.

TP6

PROJECT No.

NFS09711

DATUM UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa 							
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	W _P	W	W _L	
0	66.00														
0.5	65.7	Very loose/soft, black PEAT (PT)													
1.0	65.5	Loose to compact, grey, SAND (SP); occasional cobbles													
1.5	65.0	Compact to dense, orange - brown, silty SAND (SM); occasional cobbles													
2.0		Compact to dense, grey - yellow, silty SAND (SM); occasional cobbles and boulders: TILL													
3.0															
4.0															
5.0															
6.0	60.5	End of Test Pit Slow groundwater seepage observed at 0.4 m depth. Bedrock not encountered.													
7.0															



NEWFOUNDLAND
GEOSCIENCES

LIMITED

CLIENT BAE - Newplan Group Ltd.

TEST PIT RECORD

PROJECT Proposed Waste Management Facility, Central Newfoundland
 LOCATION Norris Arm North N 5444135 E 636620
 DATES (mm-dd-yy): DUG 9-28-03 WATER LEVEL N/A DATUM UTM NAD83 Zone 21

TEST PIT No. TP7
 PROJECT No. NFS09711

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa ★									
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	10	20	30	40	50	
0	81.00																
0.8	80.8	Rootmat															
0.8	80.3	Loose to compact, brown to yellow - brown, silty SAND (SM); occasional cobbles and boulders															
1.0		Compact to dense, yellow - grey, silty SAND with gravel (SM); occasional cobbles and boulders: TILL															
2.0																	
3.0																	
4.0																	
7.61	76.1	End of Test Pit Slow groundwater seepage observed at 2.4 m and 4.6 m depth. Bedrock not encountered.			BS	1	S										
7																	



NEWFOUNDLAND
GEOSCIENCES

LIMITED

CLIENT BAE - Newplan Group Ltd.

TEST PIT RECORD

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North

N 5444089

E 637010

DATES (mm-dd-yy): DUG 9-28-03

WATER LEVEL

N/A

TEST PIT No.

TP8

PROJECT No.

NFS09711

DATUM UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa ★									
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	10	20	30	40	50	60
0	84.00	Very loose/soft, black PEAT (PT)	/\														
0.5	83.6	Loose to compact, brown, silty SAND (SM); occasional cobbles and boulders	▼														
1.0	83.3	Compact to dense, grey, silty SAND (SM); occasional cobbles and boulders: TILL	/\														
2.0																	
3.0																	
4.0																	
5.0	79.1	End of Test Pit															
5.5		Slow groundwater seepage observed at 0.5 m depth.															
6.0		Bedrock not encountered.															
7.0																	



NEWFOUNDLAND
GEOSCIENCES

TEST PIT RECORD

LIMITED

CLIENT BAE - Newplan Group Ltd.

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North

N 5443962 E 637321

DATES (mm-dd-yy): DUG 9-28-03

WATER LEVEL N/A

TEST PIT No.

TP9

PROJECT No.

NFS09711

DATUM UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa ★								
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	10	20	30	40	50
0	87.00															
0.86.8	Rootmat		/\													
0.86.3	Loose to compact, orange - brown, silty SAND (SM); occasional cobbles and boulders															
1	Compact to dense, grey to yellow - grey, silty SAND (SM); occasional cobbles and boulders: TILL															
2																
3																
4																
5	82.1	End of Test Pit														
		No groundwater seepage observed.														
		Bedrock not encountered.														
6																
7																



NEWFOUNDLAND
GEOSCIENCES

LIMITED

CLIENT BAE - Newplan Group Ltd.

TEST PIT RECORD

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North

N 5443661 E 637180

DATES (mm-dd-yy): DUG 9-28-03

WATER LEVEL N/A

TEST PIT No. TP10
PROJECT No. NFS09711
DATUM UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa ★							
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	W _P	W	W _L	
0	95.00														
0.94.7	Rootmat														
0.94.2	Loose to compact, yellow - brown, silty SAND (SM); occasional cobbles and boulders														
1	Compact to dense, very dense at bottom of stratum, grey to yellow - grey, silty SAND (SM); occasional cobbles and boulders: TILL														
2															
3															
4															
5	90.1	End of Test Pit													
5		No groundwater seepage observed.													
6		Bedrock not encountered.													
7															



NEWFOUNDLAND
GEOSCIENCES

TEST PIT RECORD

LIMITED CLIENT BAE - Newplan Group Ltd.

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North N 5443376 E 637043

DATES (mm-dd-yy): DUG 9-28-03

WATER LEVEL N/A

TEST PIT No. TP11

PROJECT No. NFS09711

DATUM UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa ★							
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	W _P	W	W _L	
0	102.00														
101.8	Rootmat														
101.3	Loose to compact, orange - brown, silty SAND (SM); occasional cobbles and boulders														
1	Compact to dense, grey - brown, silty SAND with gravel (SM); occasional cobbles and boulders: TILL														
2															
3															
98.4	Grey sandstone/siltstone: BEDROCK				BS	I	S								
98.3	End of Test Pit							O							
4	Very slow groundwater seepage observed at 2.1 m and 3.5 m depth.														
5	Refusal on probable bedrock at 3.7 m depth.														
6															
7															



NEWFOUNDLAND
GEOSCIENCES

TEST PIT RECORD

LIMITED CLIENT BAE - Newplan Group Ltd.

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North N 5443378 E 636679

DATES (mm-dd-yy): DUG 9-28-03

WATER LEVEL N/A

TEST PIT No. TP12

PROJECT No. NFS09711

DATUM UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa ★									
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	10	20	30	40	50	60
0	99.00																
0.7	98.7	Rootmat, boggy	/														
1.0	98.0	Loose to compact, yellow - brown, silty SAND (SM); occasional cobbles and boulders															
2.0		Compact to dense, very dense at bottom of stratum, grey to brown, silty SAND (SM); occasional cobbles and boulders: TILL															
3.0																	
4.0																	
4.7	94.7																
5.0		End of Test Pit															
5.3		Moderate groundwater seepage observed at 2.4 m and 3.3 m depth.															
6.0		Bedrock not encountered.															
7.0																	



NEWFOUNDLAND
GEOSCIENCES

TEST PIT RECORD

LIMITED

CLIENT BAE - Newplan Group Ltd.

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North

N 5443811

E 636766

TEST PIT No.

TP13

DATES (mm-dd-yy): DUG 9-28-03

WATER LEVEL

N/A

PROJECT No.

NFS09711

DATUM UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa ★							
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	W _P	W	W _L	
0	98.00							10	20	30	40	50	60	70	80
0.97.8	Rootmat		/\												
0.97.4	Loose to compact, brown to orange - brown, silty SAND (SM); occasional cobbles and boulders		/\												
1	Compact to dense, grey to yellow - grey silty SAND (SM): TILL														
2															
3															
4															
5															
5.92.8	End of Test Pit														
6	Moderate groundwater seepage observed at 2.7 m and 4.9 m depth.														
7	Bedrock not encountered.														



NEWFOUNDLAND
GEOSCIENCES

TEST PIT RECORD

LIMITED

CLIENT BAE - Newplan Group Ltd.

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North

N 5443426

E 636381

DATES (mm-dd-yy): DUG 9-28-03

WATER LEVEL

N/A

TEST PIT No.

TP14

PROJECT No.

NFS09711

DATUM UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa ★							
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	W _P	W	W _L	
0	106.00														
105.8	Rootmat		/\												
105.4	Loose to compact, orange - brown, silty SAND (SM); occasional cobbles and boulders														
1	Compact to dense, very dense at bottom of stratum, grey to yellow - grey, silty SAND with gravel (SM); occasional cobbles and boulders: TILL														
2															
3															
4															
101.4	End of Test Pit														
5	Moderate groundwater seepage observed at 3.3 m depth.														
6	Bedrock not encountered.														
7															



NEWFOUNDLAND
GEOSCIENCES

LIMITED

CLIENT BAE - Newplan Group Ltd.

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North

N 5443720

DATES (mm-dd-yy): DUG 9-28-03

E 635970

WATER LEVEL N/A

TEST PIT No.

TP15

PROJECT No.

NFS09711

DATUM UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa							
					TYPE	NUMBER	OTHER TESTS	20	40	60	80				
0	91.00														
0.907	Rootmat	Loose to compact, grey - brown, silty SAND with gravel (SM); occasional cobbles: TILL													
1.0															
89.5	Severely fractured, weathered, clay altered, purple sandstone/siltstone to conglomerate: BEDROCK	Severely fractured, weathered, clay altered, purple sandstone/siltstone to conglomerate: BEDROCK			BS	1	S								
2.0	89.0	End of Test Pit													
3.0		Slow to moderate groundwater seepage observed at 0.9 m depth.													
4.0		Refusal on probable bedrock at 2.0 m depth.													
5.0															
6.0															
7.0															



NEWFOUNDLAND
GEOSCIENCES

LIMITED

CLIENT BAE - Newplan Group Ltd.

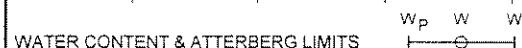
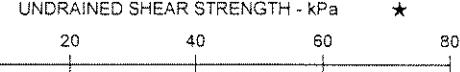
TEST PIT RECORD

PROJECT Proposed Waste Management Facility, Central Newfoundland
LOCATION Norris Arm North N 5443423 E 635929
DATES (mm-dd-yy): DUG 9-28-03 WATER LEVEL N/A DATUM UTM NAD83 Zone 21

TEST PIT No. TP16

PROJECT No. NFS09711

WATER CONTENT & ATTERBERG LIMITS



DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa								
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	10	20	30	40	50
0	101.00	Very loose/soft, black PEAT (PT)														
1	99.8	Loose to compact, grey, SAND (SP)														
2	99.4	Compact to dense, yellow - brown to grey, silty SAND with gravel (SM); occasional cobbles and boulders: TILL														
3																
4																
5	96.4															
6	96.3	Grey conglomerate: BEDROCK End of Test Pit														
7		Moderate groundwater seepage observed at 1.2 m depth. Refusal on probable bedrock at 4.6 m depth.														



NEWFOUNDLAND
GEOSCIENCES

TEST PIT RECORD

LIMITED

CLIENT BAE - Newplan Group Ltd.

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North N 5443723 E 636236

DATES (mm-dd-yy): DUG 9-28-03 WATER LEVEL N/A

TEST PIT No. TP17

PROJECT No. NFS09711

DATUM UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa ★									
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	10	20	30	40	50	60
0	90.00																
0.89.7	Rootmat																
1.89.0	Loose to compact, brown, silty SAND (SM); occasional cobbles and boulders																
2	Compact to dense, very dense at bottom of stratum, grey to yellow - grey, silty SAND (SM); occasional cobbles and boulders: TILL																
3																	
4																	
85.7	End of Test Pit																
5	Slow to moderate groundwater seepage observed at 1.8 m and 2.7 m depth.																
6	Bedrock not encountered.																
7																	



NEWFOUNDLAND
GEOSCIENCES

LIMITED

CLIENT BAE - Newplan Group Ltd.

TEST PIT RECORD

PROJECT Proposed Waste Management Facility, Central Newfoundland
LOCATION Norris Arm North N 5443885 E 636947
DATES (mm-dd-yy): DUG 9-28-03

TEST PIT No. TP18
PROJECT No. NFS09711
DATUM UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa ★							
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	W _P	W _L	W _L	
0	91.00							10	20	30	40	50	60	70	80
90.7	Rootmat														
90.2	Loose to compact, orange - brown, silty SAND (SM); occasional cobbles and boulders														
1	Compact to dense, very dense at bottom of stratum, grey, silty SAND with gravel (SM); occasional cobbles and boulders: TILL														
2															
3															
4															
86.1	End of Test Pit Moderate groundwater seepage observed at 4.3 m depth. Bedrock not encountered.				BS	1	S								
5															
6															
7															



NEWFOUNDLAND
GEOSCIENCES

TEST PIT RECORD

LIMITED

CLIENT BAE - Newplan Group Ltd.

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North

N 5442747 E 633889

DATES (mm-dd-yy): DUG 9-26-03

WATER LEVEL N/A

TEST PIT No.

TP19

PROJECT No.

NFS09711

DATUM

UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa ★							
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	W _P	W	W _L	
0	84.00														
0.83.8	Very loose/soft, black PEAT (PT)		/\												
0.83.6	Loose to compact, grey, silty SAND (SM); occasional cobbles		/\												
0.83.6	Compact to dense, yellow - grey, silty SAND (SM); occasional boulders: TILL		▼												
1															
2															
3															
4															
5	79.1														
5	79.0	Grey to purple, sandstone/siltstone: BEDROCK	/\												
		End of Test Pit													
		Slow to moderate groundwater seepage at 0.9 m depth.													
		Refusal on probable bedrock at 5.0 m depth.													
7															



NEWFOUNDLAND
GEOSCIENCES

TEST PIT RECORD

LIMITED

CLIENT BAE - Newplan Group Ltd.

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North

N 5442696

E 634211

DATES (mm-dd-yy): DUG 9-26-03

WATER LEVEL

N/A

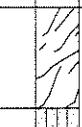
TEST PIT No.

TP20

PROJECT No.

NFS09711

DATUM UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa 							
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	W _P	W	W _L	
0	107.00	Very loose/soft, black PEAT (PT)													
1	106.5														
1	106.3	Loose to compact, brown, silty SAND (SM); occasional cobbles and boulders													
1		Compact to dense, grey to grey - brown, silty SAND with gravel (SM); occasional cobbles and boulders: TILL													
2															
3															
4															
4.3	102.7	End of Test Pit Slow groundwater seepage at 2.7 m and 3.4 m depth. Bedrock not encountered. Refusal on possible boulders at 4.3 m depth.													
5															
6															
7															



NEWFOUNDLAND
GEOSCIENCES

LIMITED

CLIENT BAE - Newplan Group Ltd.

TEST PIT RECORD

PROJECT Proposed Waste Management Facility, Central Newfoundland
LOCATION Norris Arm North N 5442708 E 634542
DATES (mm-dd-yy): DUG 9-26-03 WATER LEVEL N/A DATUM UTM NAD83 Zone 21

TEST PIT No. TP21
PROJECT No. NFS09711
DATUM UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa ★							
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	W _P	W	W _L	
0	112.00														
1	111.8	Rootmat													
1	111.4	Loose to compact, orange - brown, silty SAND (SM); occasional cobbles and boulders													
1		Compact to dense, grey to yellow - grey, silty SAND (SM); occasional cobbles and boulders: TILL													
2															
3															
3.5	108.6														
3.5	108.5	Grey, sandstone to siltstone: BEDROCK End of Test Pit													
4		No groundwater seepage observed.													
5		Refusal on probable bedrock at 3.5 m depth.													
6															
7															



NEWFOUNDLAND
GEOSCIENCES

LIMITED

CLIENT BAE - Newplan Group Ltd.

TEST PIT RECORD

PROJECT Proposed Waste Management Facility, Central Newfoundland
 LOCATION Norris Arm North N 5442728 E 634855
 DATES (mm-dd-yy): DUG 9-27-03 WATER LEVEL N/A DATUM UTM NAD83 Zone 21

TEST PIT No. TP22
 PROJECT No. NFS09711

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa 													
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	W _P	W	W _L	10	20	30	40	50	60	70
0	115.00																				
1	114.7	Very loose/soft, black PEAT (PT)																			
1	114.5	Loose to compact, brown - grey, silty SAND (SM); occasional cobbles																			
1		Compact to dense, grey to brown - grey, silty SAND (SM); occasional cobbles and boulders: TILL																			
2	112.9																				
2	112.8	Weathered, rusty orange to brown: BEDROCK End of Test Pit																			
3		Moderate groundwater seepage observed at 1.8 m depth.																			
4		Refusal on probable bedrock at 2.2 m depth.																			
5																					
6																					
7																					



NEWFOUNDLAND
GEOSCIENCES
LIMITED

TEST PIT RECORD

CLIENT BAE - Newplan Group Ltd.

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North N 5442977 E 635203

DATES (mm-dd-yy): DUG 9-27-03

WATER LEVEL N/A

TEST PIT No. TP23

PROJECT No. NFS09711

DATUM UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa ★							
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	W _P	W	W _L	
0	122.00														
121.8	Rootmat, very loose/soft, black PEAT (PT)		/\												
121.4	Loose to compact, brown, silty SAND (SM); occasional cobbles and boulders														
1	Compact to dense, grey to yellow - grey, silty SAND (SM); occasional cobbles and boulders: TILL														
2															
119.3															
119.1	Weathered, yellow - brown: BEDROCK		---												
3	End of Test Pit														
	Moderate groundwater seepage observed at 0.6 m and 2.1 m depth.														
4	Refusal on probable bedrock at 2.9 m depth.														
5															
6															
7															



NEWFOUNDLAND
GEOSCIENCES

LIMITED

CLIENT BAE - Newplan Group Ltd.

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North

DATES (mm-dd-yy): DUG 9-27-03

TEST PIT RECORD

TEST PIT No. TP24
PROJECT No. NFS09711
DATUM UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa							
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	W _P	W	W _L	
0	103.00														
1	102.8	Very loose/soft, black PEAT (PT)	/												
1	102.6	Loose to compact, brown, silty SAND (SM); occasional cobbles and boulders	/												
1		Compact to dense, grey to yellow - grey, sandy SILT (ML); occasional cobbles and boulders: TILL	▼												
2															
3															
3	99.6														
3	99.5	Grey, siltstone/sandstone: BEDROCK End of Test Pit	+												
4		Slow to moderate groundwater seepage observed at 0.9m, 2.4 m and 3.0 m depth.													
5		Refusal on probable bedrock at 3.5 m depth.													
6															
7															



NEWFOUNDLAND
GEOSCIENCES

LIMITED

CLIENT BAE - Newplan Group Ltd.

TEST PIT RECORD

PROJECT Proposed Waste Management Facility, Central Newfoundland
LOCATION Norris Arm North N 5443677 E 635304
DATES (mm-dd-yy): DUG 9-27-03 WATER LEVEL N/A

TEST PIT No. TP25

PROJECT No. NFS09711

DATUM UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa ★								
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	10	20	30	40	50
0	97.00															
96.8	Rootmat															
96.5	Loose to compact, orange - brown, silty SAND (SM); occasional cobbles and boulders Compact to dense, grey, silty SAND (SM); occasional cobbles and boulders: TILL															
1																
2																
3																
4																
92.7																
92.6	Grey to purple, sandstone/siltstone: BEDROCK															
	End of Test Pit															
5	Slow groundwater seepage observed at 3.7 m depth.															
6	Refusal on probable bedrock at 4.4 m depth..															
7																



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GEOSCIENCES

LIMITED

CLIENT BAE - Newplan Group Ltd.

TEST PIT RECORD

PROJECT Proposed Waste Management Facility, Central Newfoundland
 LOCATION Norris Arm North N 5444022 E 635254
 DATES (mm-dd-yy): DUG 9-27-03 WATER LEVEL N/A DATUM UTM NAD83 Zone 21

TEST PIT No. TP26

PROJECT No. NFS09711

TP26

NFS09711

TP26

NFS09711

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa							
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	W _P	W	W _L	
0	68.00	Very loose/soft, black PEAT (PT)													
1	67.6														
1	67.4	Loose to compact, brown to orange - brown, silty SAND (SM); occasional cobbles and boulders													
1		Compact to dense, grey to grey - brown, silty SAND (SM); occasional cobbles and boulders: TILL													
2															
3															
4															
4.3															
4.7															
5	63.3	Grey, siltstone: BEDROCK													
5	63.2	End of Test Pit													
6		Slow groundwater seepage observed at 3.0 m and 4.3 m depth.													
6		Refusal on probable bedrock at 4.7 m depth..													
7															



NEWFOUNDLAND
GEOSCIENCES

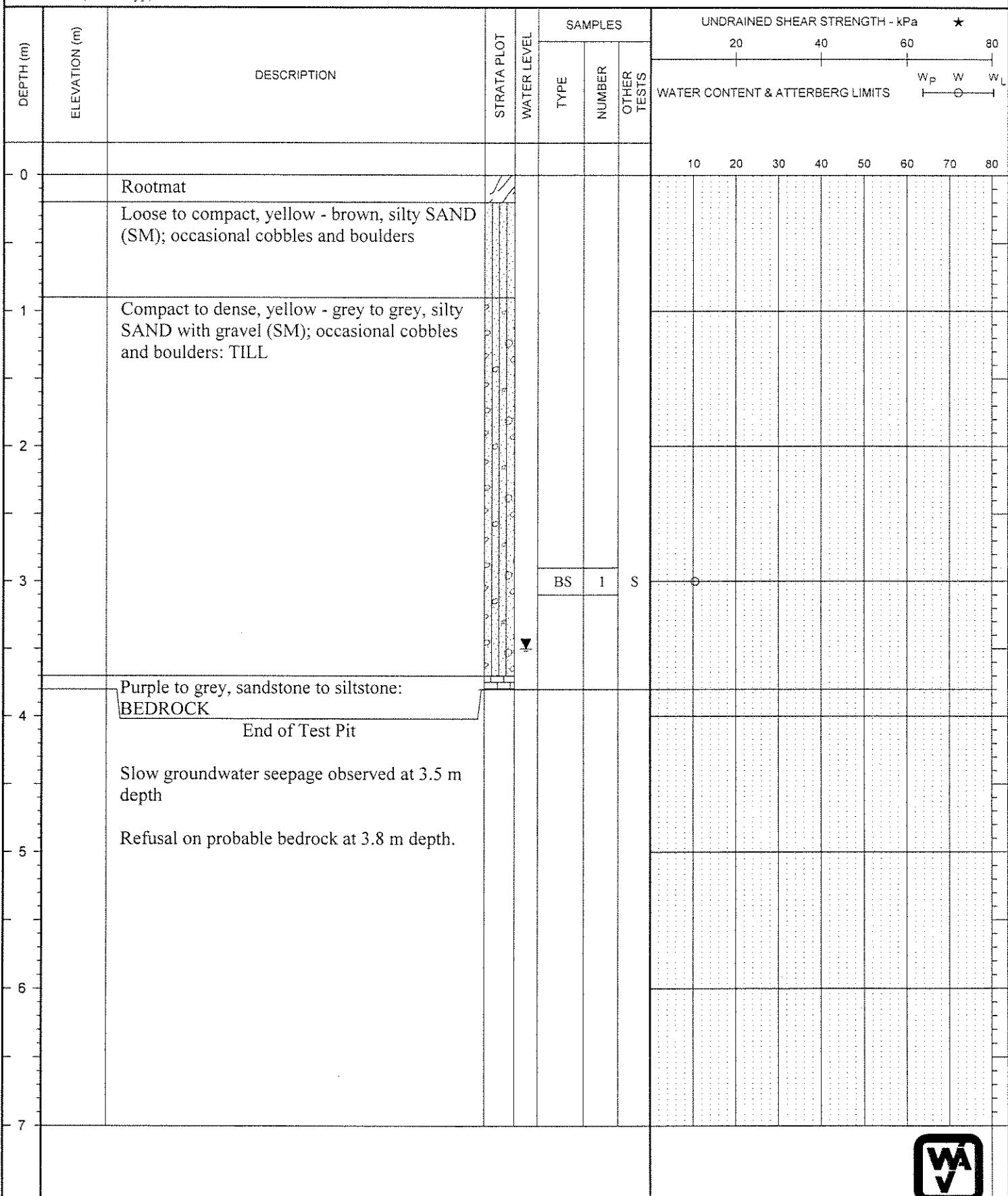
LIMITED

CLIENT BAE - Newplan Group Ltd.

TEST PIT RECORD

PROJECT Proposed Waste Management Facility, Central Newfoundland
 LOCATION Norris Arm North N 5443412 E 634846
 DATES (mm-dd-yy): DUG 9-27-03 WATER LEVEL N/A DATUM UTM NAD83 Zone 21

TEST PIT No. TP27
 PROJECT No. NFS09711



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GEOSCIENCES

TEST PIT RECORD

LIMITED

CLIENT BAE - Newplan Group Ltd.

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North

DATES (mm-dd-yy): DUG 9-27-03

N 5443739 E 634889

TEST PIT No. TP28

PROJECT No. NFS09711

DATUM UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa				W _P	W	W _L
					TYPE	NUMBER	OTHER TESTS	20	40	60	80			
0	71.00													
0.9	70.9	Rootmat Loose to compact, yellow - brown, silty SAND (SM); occasional cobbles and boulders												
1.0	70.2	Compact to dense, grey to yellow - grey, silty SAND with gravel (SM); occasional cobbles and boulders: TILL												
2.0														
3.0														
4.0														
6.64	66.4													
6.63	66.3	Purple, sandstone to siltstone: BEDROCK End of Test Pit												
5.0		Slow groundwater seepage observed at 4.4 m depth												
6.0		Refusal on probable bedrock at 4.7 m depth.												
7.0														



NEWFOUNDLAND
GEOSCIENCES

TEST PIT RECORD

LIMITED
CLIENT

BAE - Newplan Group Ltd.

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North

N 5443976 E 634902

DATES (mm-dd-yy): DUG 9-27-03

WATER LEVEL N/A

TEST PIT No. TP29

PROJECT No. NFS09711

DATUM UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa				W _P	W _L
					TYPE	NUMBER	OTHER TESTS	20	40	60	80		
0	66.00												
65.9	Rootmat Loose to compact, grey - brown, silty SAND (SM); occasional cobbles and boulders												
64.7	Compact to dense, very dense at bottom of stratum, grey, silty SAND with gravel (SM); occasional cobbles and boulders: TILL												
61.3	End of Test Pit Slow groundwater seepage observed at 0.9 m and 2.7 m depth. Bedrock not encountered. Refusal on very compact, very dense till.												
6													
7													



DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa							
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	W _P	W	W _L	
0	65.00														
0.64.8	Rootmat														
0.64.5	Loose to compact, orange - brown, silty SAND (SM); occasional to frequent cobbles and boulders														
1.0	Compact to dense, yellow - grey, silty SAND with gravel (SM); occasional cobbles and boulders: TILL														
2.0															
3.0															
4.0															
5.0															
5.59.8	Purple, sandstone to siltstone: BEDROCK														
5.59.7	End of Test Pit														
6.0	Slow groundwater seepage observed at 3.0 m depth.														
6.5	Refusal on probable bedrock at 5.3 m depth.														
7.0															

NEWFOUNDLAND
GEOSCIENCES
LIMITED

TEST PIT RECORD

CLIENT BAE - Newplan Group Ltd.

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North

N 5443558 E 634228

DATES (mm-dd-yy): DUG 9-25-03

WATER LEVEL N/A

TEST PIT No. TP31
PROJECT No. NFS09711
DATUM UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa							
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	W _P	W	W _L	
0	71.00														
0	70.7	Rootmat													
0	70.3	Loose to compact, yellow - brown to orange - brown, silty SAND (SM); occasional cobbles and boulders; occasional roots													
1		Compact to dense, very dense at bottom of stratum, yellow - grey, silty SAND (SM); occasional to frequent cobbles and boulders: TILL													
2															
3															
4	66.9				BS	1	S								
4	66.9	End of Test Pit													
5		No groundwater seepage observed.													
5		Bedrock not encountered.													
6															
7															



NEWFOUNDLAND GEOSCIENCES

TEST PIT RECORD

LIMITED BAE - Newplan Group Ltd.

Proposed Waste Management Facility, Central Newfoundland

PROJECT LOCATION

BAE - Newplan Group Ltd.

TEST PIT No.

TP32

LOCATION Norris Arm North

Z 54433

LOCATION REGISTRATION NOTATION

N 5443396 E 633849

NFS09711

DATES (mm-dd-yy): DUG 9-25-03

WATER LEVEL

NA

DATUM

NFS09711



NEWFOUNDLAND
GEOSCIENCES
LIMITED

TEST PIT RECORD

CLIENT BAE - Newplan Group Ltd.

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North

N 5443066 E 633854

DATES (mm-dd-yy): DUG 9-26-03

WATER LEVEL N/A

TEST PIT No. TP33
PROJECT No. NFS09711
DATUM UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa			
					TYPE	NUMBER	OTHER TESTS	20	40	60	80
0	62.00										
0.0	61.7	Rootmat									
0.0	61.2	Loose to compact, yellow - brown, silty SAND (SM); occasional cobbles and boulders									
1.0		Compact to dense, yellow - grey, silty SAND with gravel (SM); occasional cobbles and boulders: TILL									
2.0											
3.0											
4.0											
5.0											
5.7											
5.7	57.6	Grey, fine grained sandstone or siltstone: BEDROCK									
5.7		End of Test Pit									
5.7		Slow groundwater seepage observed at 1.1 m depth									
5.7		Refusal on probable bedrock at 4.4 m depth.									
6.0											
7.0											



NEWFOUNDLAND
GEOSCIENCES

LIMITED

CLIENT BAE - Newplan Group Ltd.

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North

N 5443110

E 634204

DATES (mm-dd-yy): DUG 9-26-03

WATER LEVEL N/A

TEST PIT No.

TP34

PROJECT No.

NFS09711

DATUM

UTM NAD83 Zone 21

TEST PIT RECORD

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa							
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	W _P	W	W _L	
0	91.00														
0	90.8	Rootmat	///												
1		Loose to compact, orange - brown to yellow - brown, silty SAND (SM); occasional gravel and cobbles; some boulders													
2	89.5	Compact to dense, grey, silty SAND with gravel (SM); occasional cobbles and boulders: TILL													
3					BS	1	S								
4															
5	86.1	End of Test Pit Slow groundwater seepage observed at 4.3 m depth Bedrock not encountered.													
6															
7															



NEWFOUNDLAND
GEOSCIENCES

TEST PIT RECORD

LIMITED CLIENT BAE - Newplan Group Ltd.

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North

N 5443316 E 634197

DATES (mm-dd-yy): DUG 9-25-03

WATER LEVEL N/A

TEST PIT No. TP35
PROJECT No. NFS09711
DATUM UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa							
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	W _P	W	W _L	1
0	81.00	Rootmat, peat													
0.7	80.7														
0.6	80.6	Loose to compact, orange - brown, silty SAND (SM); occasional cobbles and boulders													
1.0		Compact to dense, grey to yellow - grey, silty SAND with gravel (SM); occasional cobbles and boulders; very dense till at base of test pit: TILL													
2.0															
3.0															
4.0	76.9	End of Test Pit													
5.0		No groundwater seepage observed.													
6.0		Bedrock not encountered.													
7.0															



NEWFOUNDLAND
GEOSCIENCES

TEST PIT RECORD

LIMITED

CLIENT BAE - Newplan Group Ltd.

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North

N 5443045 E 634546

TEST PIT No.

TP36

DATES (mm-dd-yy): DUG 9-26-03

WATER LEVEL

N/A

PROJECT No.

NFS09711

DATUM UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa							
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	W _P	W	W _L	
0	99.00														
0.98.8	Rootmat														
0.98.4	Loose to compact, orange - brown, silty SAND (SM); occasional cobbles and boulders														
1	Compact to dense, grey to yellow - grey, silty SAND with gravel (SM); occasional cobbles and boulders: TILL														
2															
3															
4	95.6														
4.95.5	Fine grained purple to grey, sandstone to siltstone: BEDROCK														
4.5	End of Test Pit														
4.8	Moderate groundwater seepage observed at 1.8 m depth														
5	Refusal on probable bedrock at 3.5 m depth.														
6															
7															



NEWFOUNDLAND
GEOSCIENCES

TEST PIT RECORD

LIMITED

CLIENT BAE - Newplan Group Ltd.

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North

N 5443406

E 634584

TEST PIT No.

TP37

DATES (mm-dd-yy): DUG 9-27-03

WATER LEVEL

N/A

PROJECT No.

NFS09711

DATUM UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa								
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	10	20	30	40	50
0	84.00															
83.9	Rootmat Loose to compact, yellow - brown, silty SAND with gravel (SM); occasional cobbles and boulders															
82.9	Compact to dense, yellow - grey, silty SAND with gravel (SM); occasional cobbles and boulders: TILL															
79.7	Purple sandstone: BEDROCK															
79.5	End of Test Pit Moderate groundwater seepage observed at 4.0 m depth Refusal on probable bedrock at 4.5 m depth.															
7																



NEWFOUNDLAND
GEOSCIENCES

LIMITED

CLIENT BAE - Newplan Group Ltd.

TEST PIT RECORD

PROJECT Proposed Waste Management Facility, Central Newfoundland

LOCATION Norris Arm North

N 5443083 E 634942

TEST PIT No.

TP38

PROJECT No.

NFS09711

DATES (mm-dd-yy): DUG 9-27-03

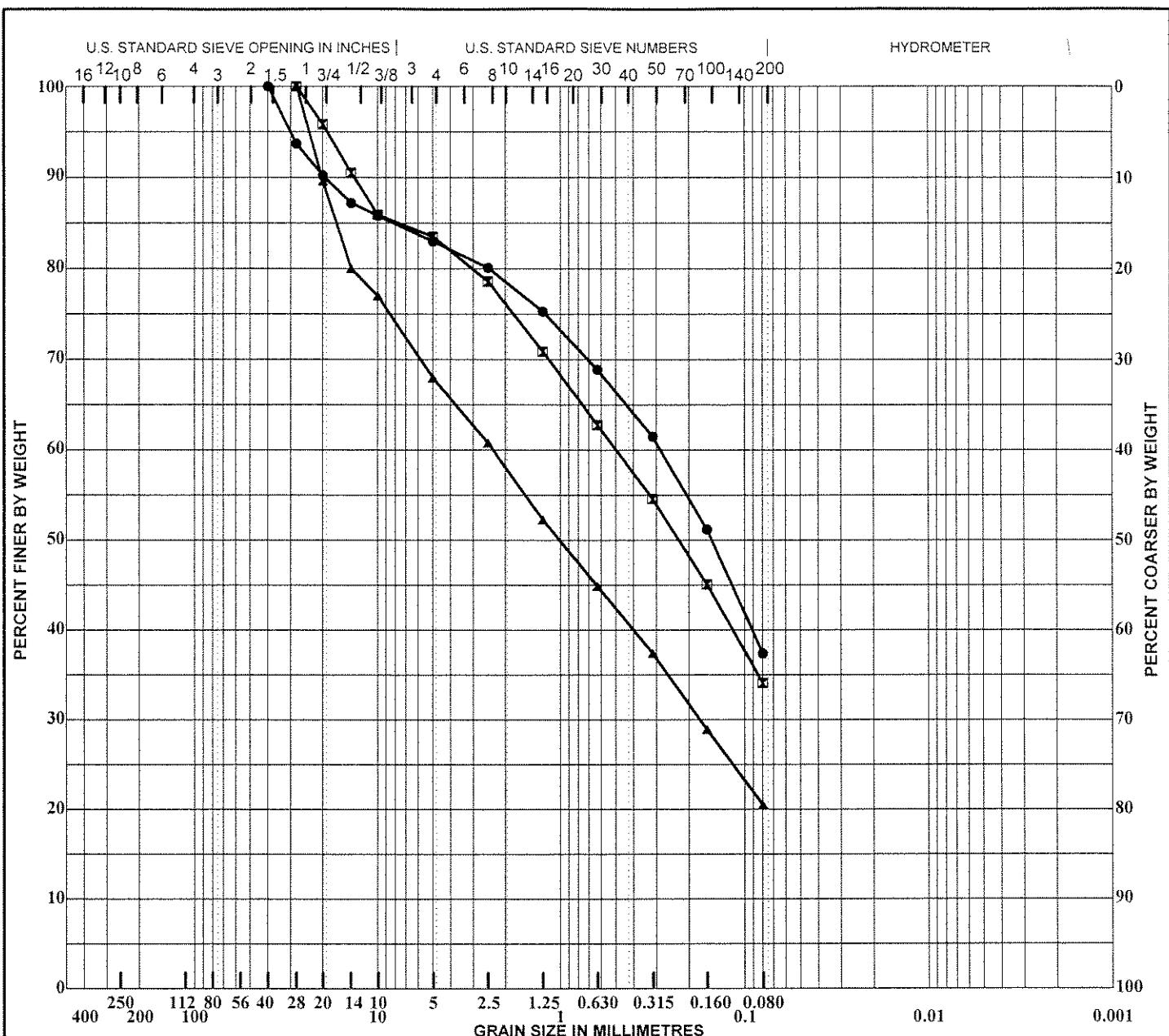
WATER LEVEL

N/A

DATUM UTM NAD83 Zone 21

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa							
					TYPE	NUMBER	OTHER TESTS	20	40	60	80	W _P	W	W _L	
0	106.00														
105.7	Very loose/soft, black PEAT (PT)		/\												
105.2	Loose to compact, yellow - brown, silty SAND (SM); occasional cobbles		/\												
1	Compact to dense, grey, silty SAND with gravel (SM); occasional cobbles and boulders: TILL		/\												
2			/\												
3	103.1	Purple, sandstone to siltstone: BEDROCK	/\												
103.0	End of Test Pit		/\												
4	Slow groundwater seepage observed at 1.8 m and 2.6 m depth.		/\												
5	Refusal on probable bedrock at 3.0 m depth..		/\												
6			/\												
7			/\												





COBBLE

GRAVEL

coarse

fine

SAND

coarse

medium

fine

SILT and CLAY

Sample	Depth (m)	Description				W%	W _L	W _P	I _P
		coarse	fine	coarse	medium	fine			
● TP1-BS1	3.60	Silty SAND with gravel (SM)				10.9			
■ TP11-BS1	3.50	Silty SAND with gravel (SM)				11.9			
▲ TP14-BS1	3.00	Silty SAND with gravel (SM)				9.7			
Sample	Depth (m)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● TP1-BS1	3.60	40.00	0.29			17.0	45.6	37.4	
■ TP11-BS1	3.50	28.00	0.50			16.5	49.4	34.1	
▲ TP14-BS1	3.00	28.00	2.34	0.175		32.0	47.5	20.5	

REMARKS:



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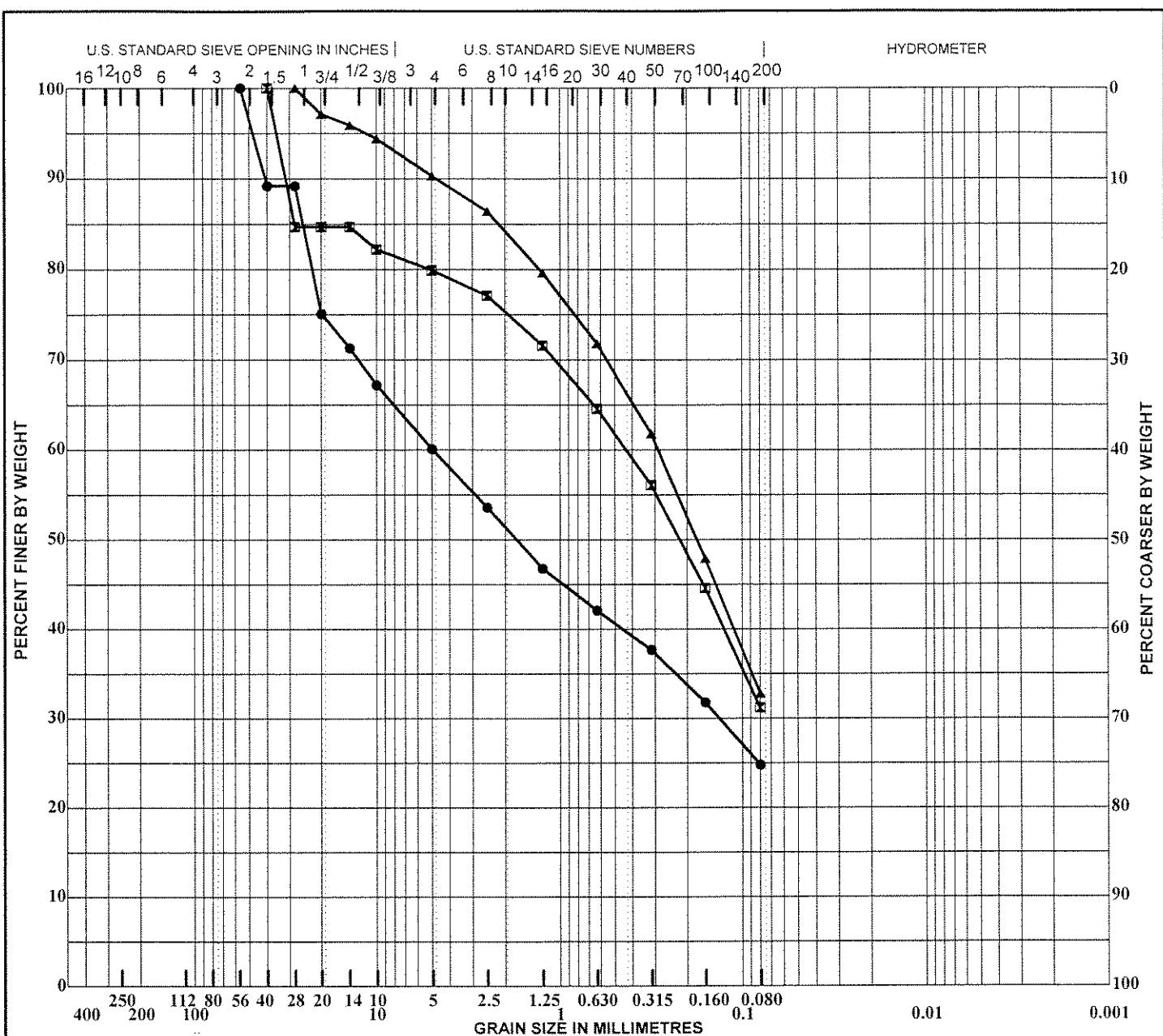
Project: Proposed Waste Management Facility, Central Newfoundland

Project No.: NFS09711

Location: Norris Arm North

FIGURE
1

GRADATION CURVES

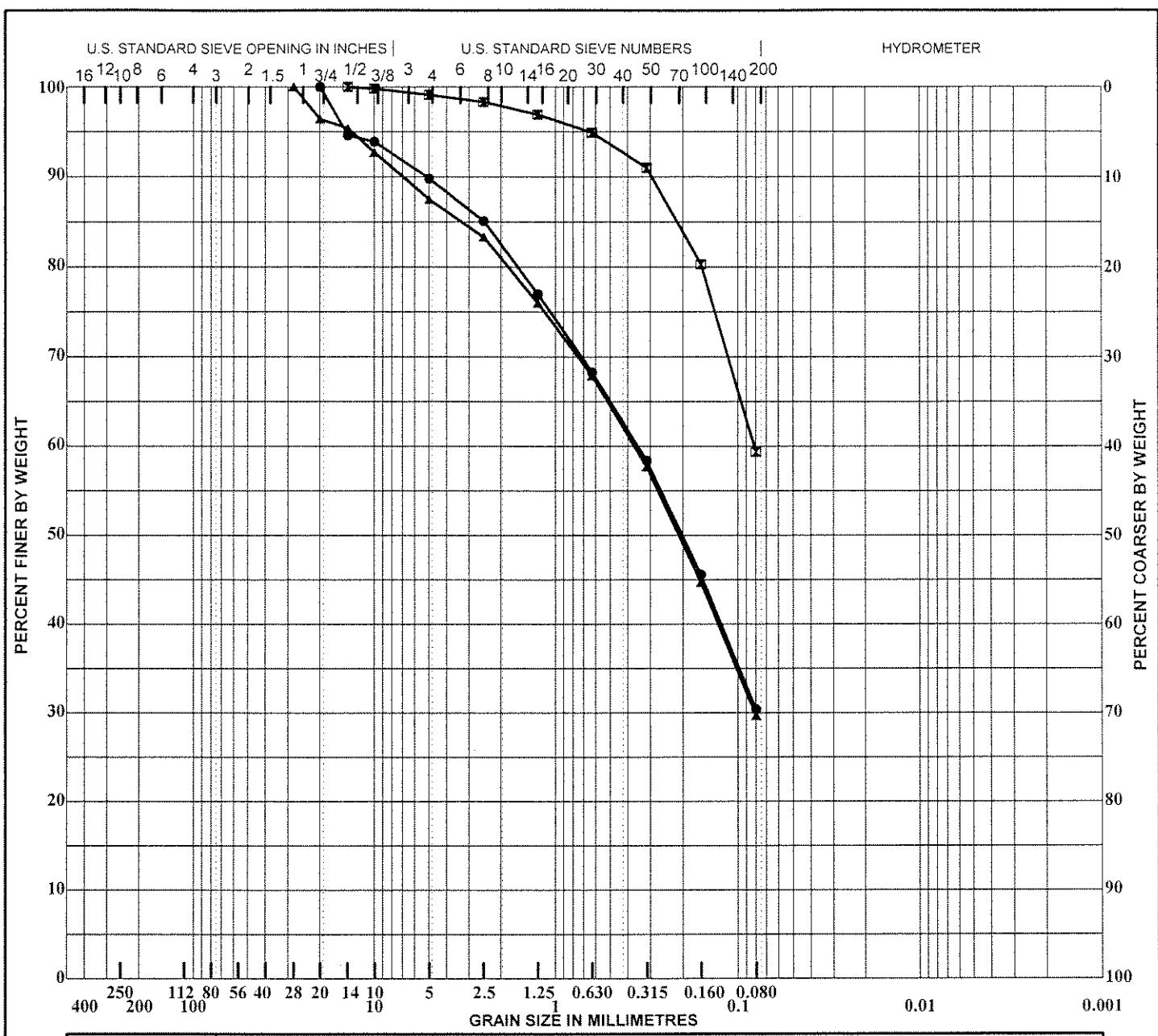


COBBLE	GRAVEL		SAND			SILT and CLAY		
	coarse	fine	coarse	medium	fine			

Sample	Depth (m)	Description				W%	W _L	W _P	I _P
● TP15-BS1	1.70	Silty GRAVEL with sand (GM)				10.7			
■ TP18-BS1	4.60	Silty SAND with gravel (SM)				10.0			
▲ TP19-BS1	2.40	Silty SAND (SM)				9.4			
Sample	Depth (m)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● TP15-BS1	1.70	56.00	4.95	0.134		39.9	35.3	24.8	
■ TP18-BS1	4.60	40.00	0.43			20.1	48.7	31.2	
▲ TP19-BS1	2.40	28.00	0.29			9.7	57.5	32.8	

REMARKS:

 NEWFOUNDLAND GEOSCIENCES LIMITED	Client: BAE - Newplan Group Ltd.
	Project: Proposed Waste Management Facility, Central Newfoundland
	Project No.: NFS09711
	Location: Norris Arm North
FIGURE 2 GRADATION CURVES	

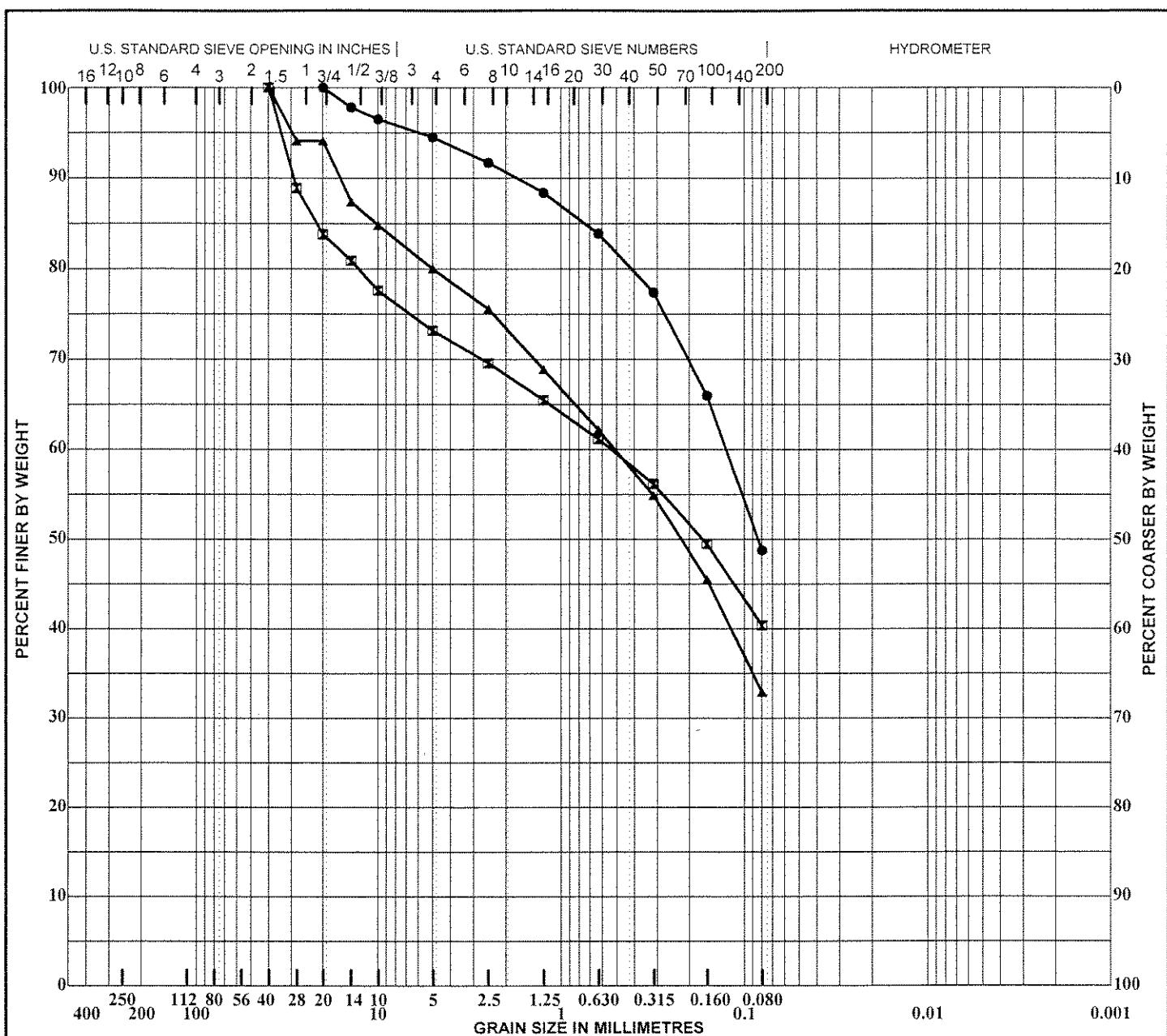


COBBLE	GRAVEL			SAND			SILT and CLAY		
	coarse	fine	coarse	medium	fine				

Sample	Depth (m)	Description				W%	W _L	W _P	I _P
● TP21-BS1	2.40	Silty SAND (SM)				13.8			
■ TP24-BS1	3.00	Sandy SILT (ML)				16.0	NP	NP	NP
▲ TP25-BS1	3.70	Silty SAND (SM)				8.9			
Sample	Depth (m)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● TP21-BS1	2.40	20.00	0.35			10.2	59.4		30.4
■ TP24-BS1	3.00	14.00	0.08			0.9	39.7		59.4
▲ TP25-BS1	3.70	28.00	0.37	0.081		12.5	57.8		29.7

REMARKS:

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	Project: Proposed Waste Management Facility, Central Newfoundland
	Project No.: NFS09711
	Location: Norris Arm North
FIGURE 3 GRADATION CURVES	

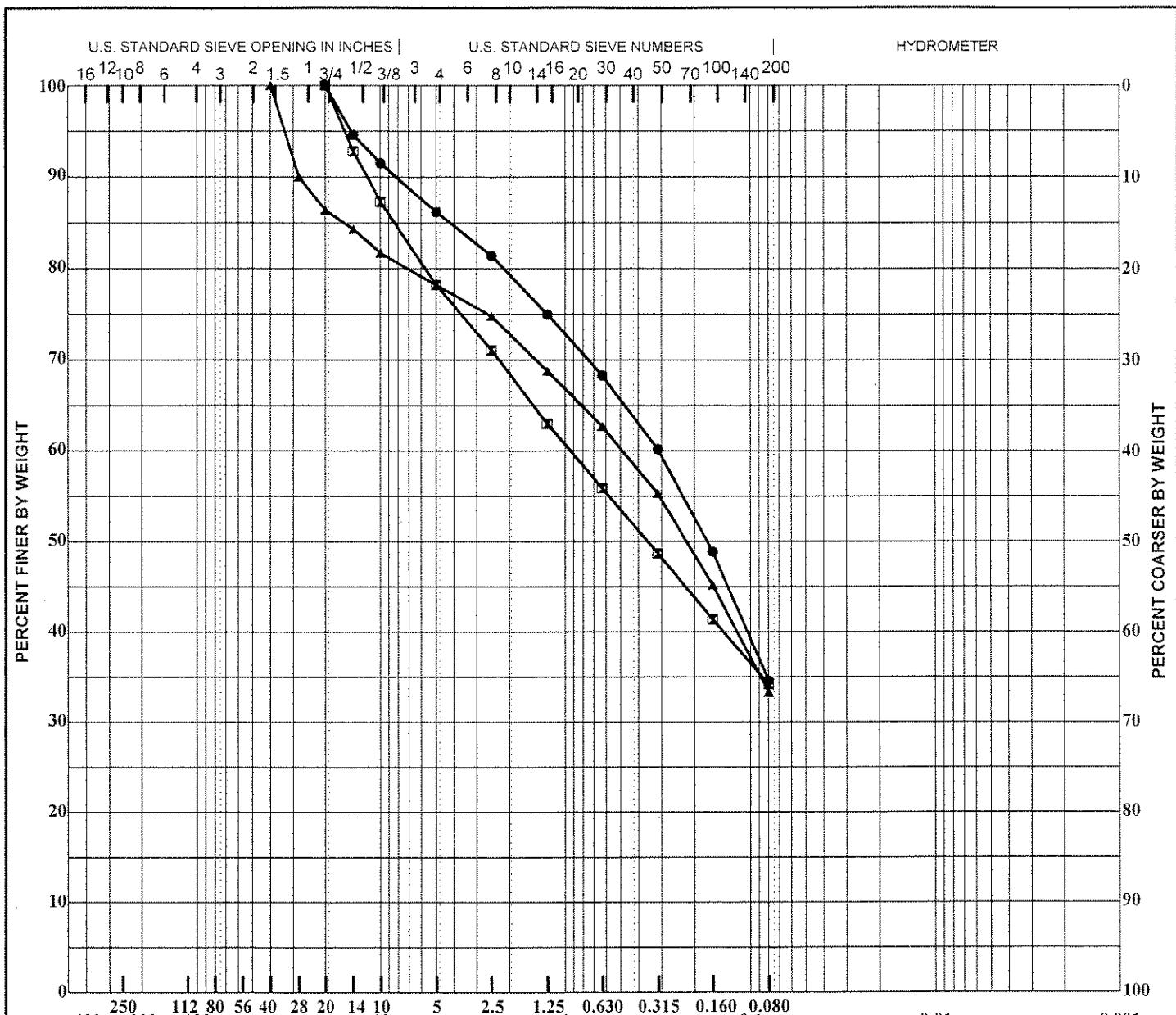


COBBLE	GRAVEL		SAND			SILT and CLAY		
	coarse	fine	coarse	medium	fine			

Sample	Depth (m)	Description				W%	W _L	W _P	I _P
● TP26-BS1	3.40	Silty SAND (SM)				12.3	NP	NP	NP
■ TP27-BS1	3.00	Silty SAND with gravel (SM)				10.4			
▲ TP30-BS1	3.70	Silty SAND with gravel (SM)				9.0			
Sample	Depth (m)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● TP26-BS1	3.40	20.00	0.13			5.5	45.7	48.8	
■ TP27-BS1	3.00	40.00	0.53			26.8	32.8	40.4	
▲ TP30-BS1	3.70	40.00	0.51			20.0	47.1	32.9	

REMARKS:

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	Project: Proposed Waste Management Facility, Central Newfoundland
	Project No.: NFS09711
	Location: Norris Arm North
FIGURE 4 GRADATION CURVES	



COBBLE

GRAVEL

SAND

SILT and CLAY

coarse

fine

coarse

medium

fine

Sample	Depth (m)	Description					W%	W _L	W _P	I _P
● TP31-BS1	4.00	Silty SAND (SM)					11.1			
■ TP32-BS1	3.20	Silty SAND with gravel (SM)					9.9	NP	NP	NP
▲ TP34-BS1	3.00	Silty SAND with gravel (SM)					10.6			
Sample	Depth (m)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	
● TP31-BS1	4.00	20.00	0.31				13.8	51.6	34.6	
■ TP32-BS1	3.20	20.00	0.94				21.8	44.0	34.2	
▲ TP34-BS1	3.00	40.00	0.49				21.8	44.9	33.3	

REMARKS:



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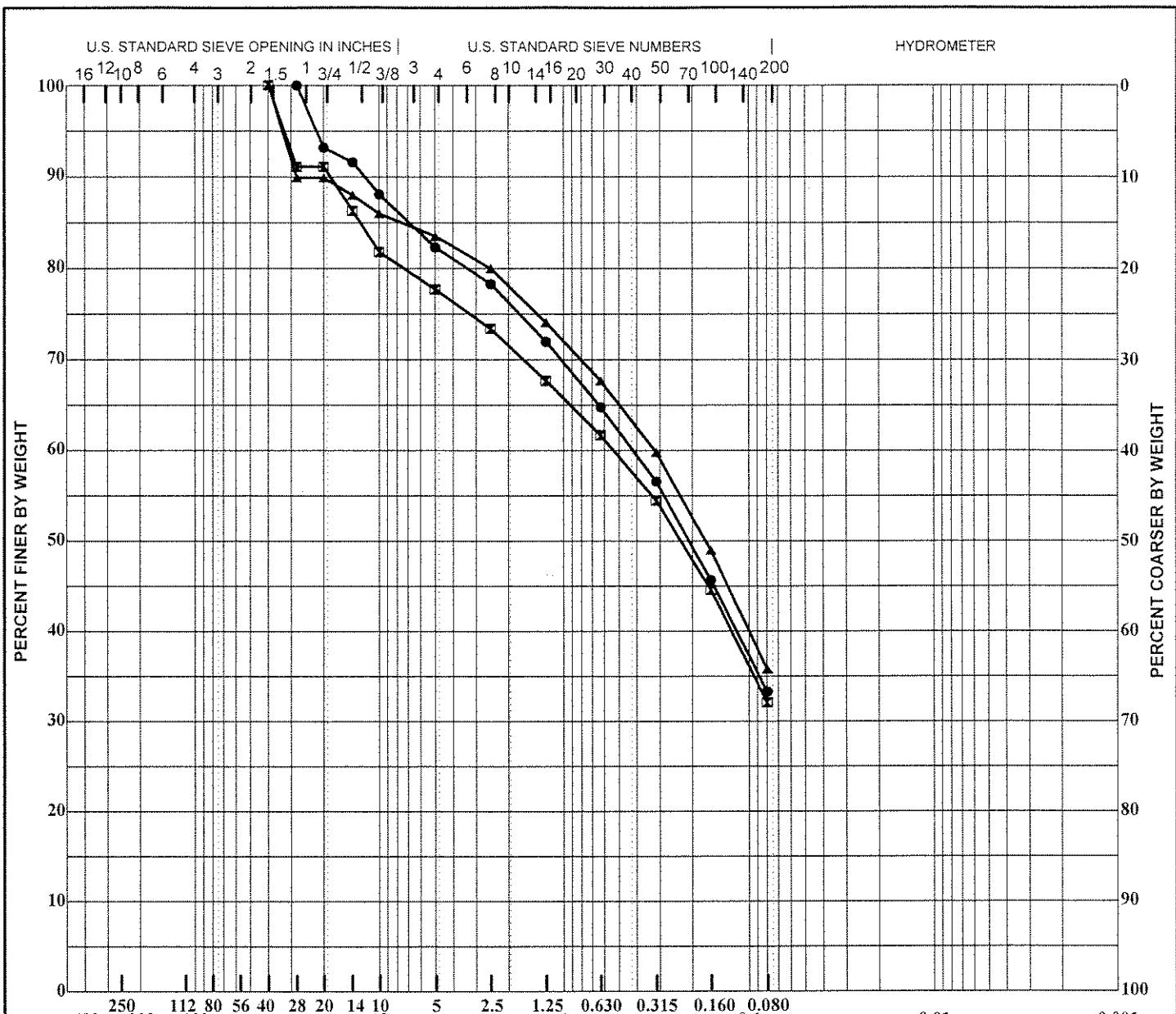
Project: Proposed Waste Management Facility, Central Newfoundland

Project No.: NFS09711

Location: Norris Arm North

**FIGURE
5**

GRADATION CURVES



COBBLE

GRAVEL

SAND

coarse fine coarse medium fine

SILT and CLAY

Sample	Depth (m)	Description					W%	W _L	W _P	I _P
●	TP38-BS1	2.40	Silty SAND with gravel (SM)					10.7		
■	TP5-BS1	5.10	Silty SAND with gravel (SM)					9.3		
▲	TP7-BS1	3.70	Silty SAND with gravel (SM)					11.0		
Sample	Depth (m)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	
●	TP38-BS1	28.00	0.42				17.7	49.0	33.3	
■	TP5-BS1	40.00	0.53				22.3	45.6	32.1	
▲	TP7-BS1	40.00	0.32				16.5	47.7	35.8	

REMARKS:



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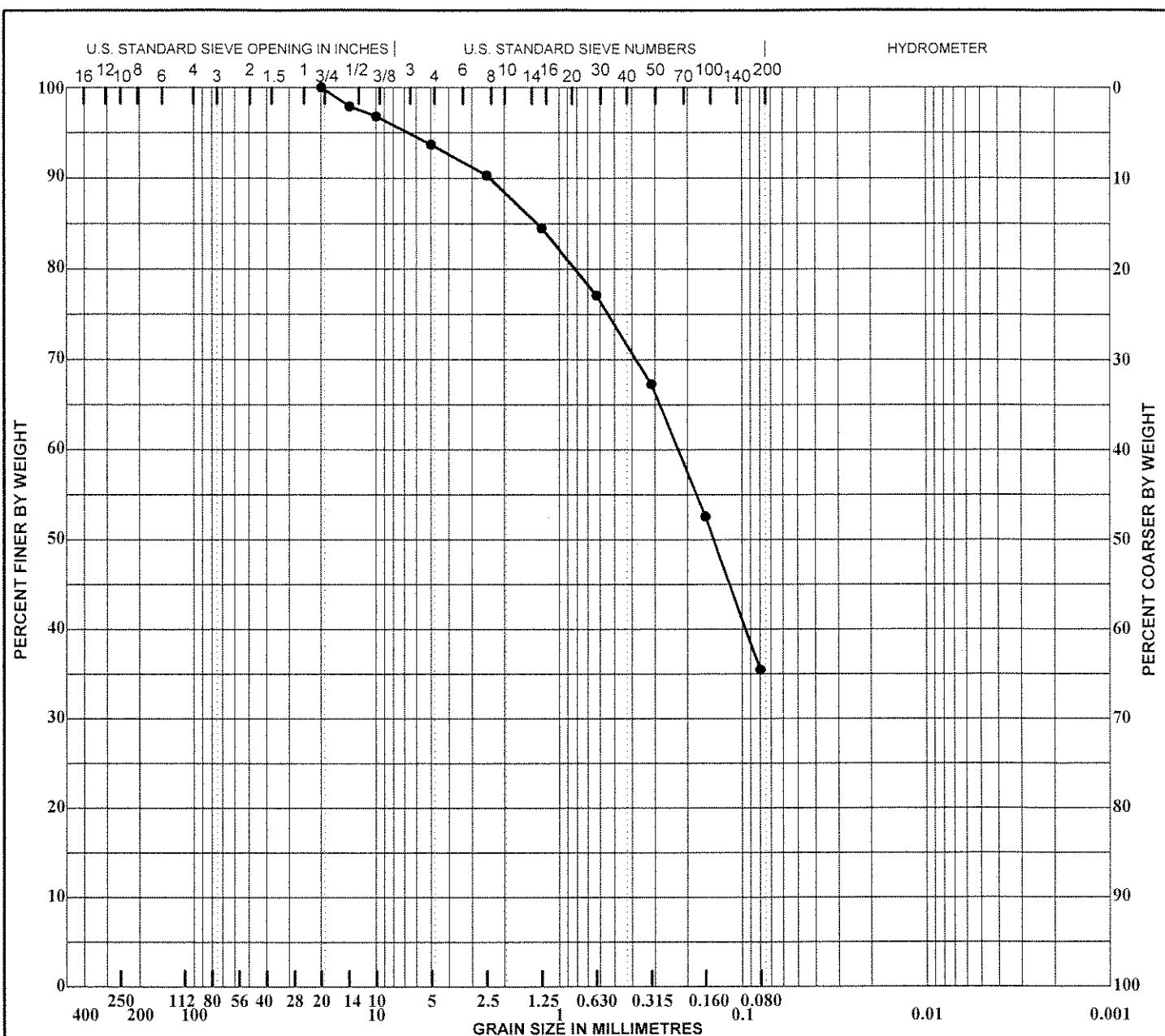
Project: Proposed Waste Management Facility, Central Newfoundland

Project No.: NFS09711

Location: Norris Arm North

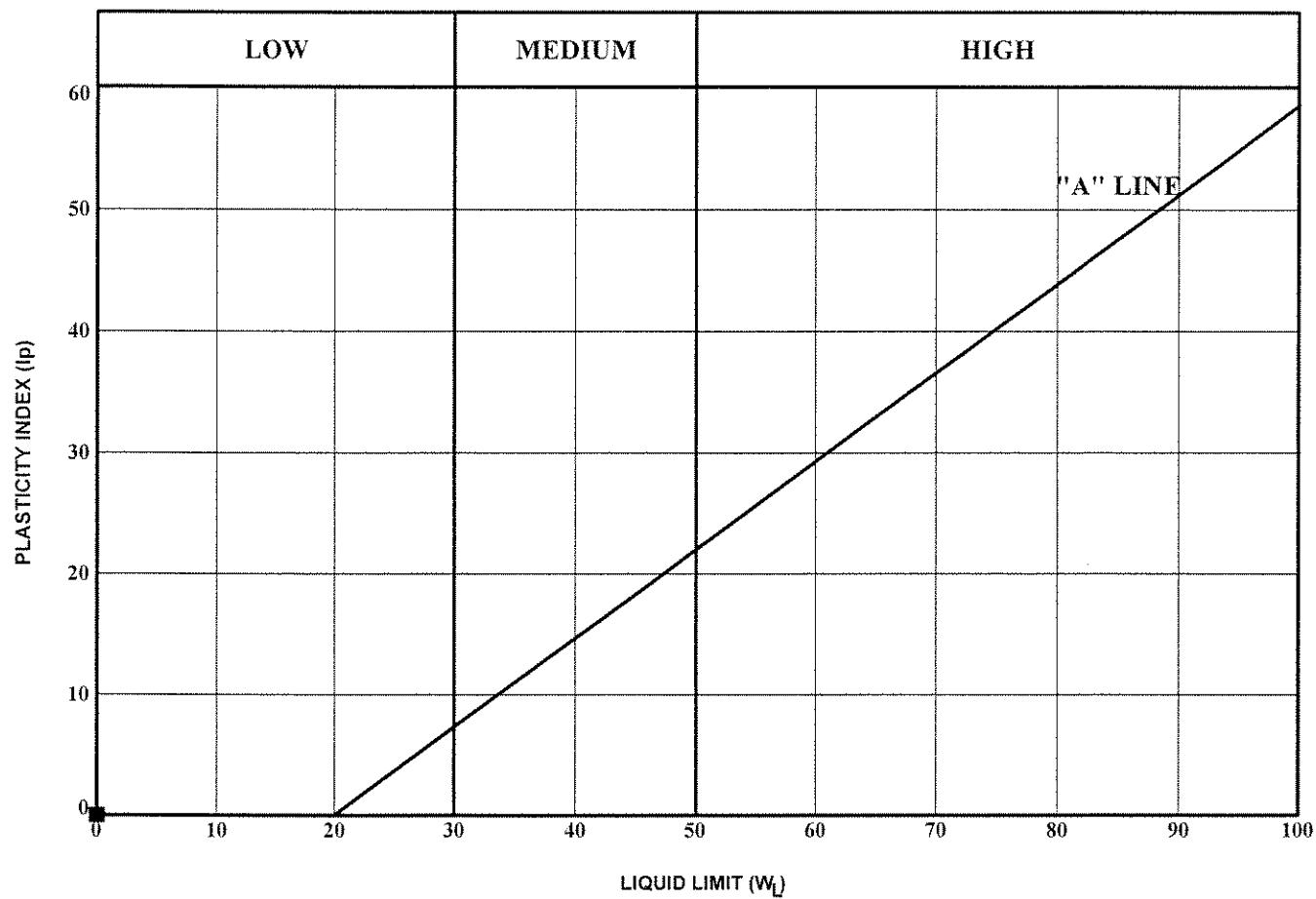
**FIGURE
6**

GRADATION CURVES



REMARKS:

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	Project: Proposed Waste Management Facility, Central Newfoundland
	Project No.: NFS09711
	Location: Norris Arm North
FIGURE 7 GRADATION CURVES	



Sample	Depth (m)	Description	$W\%$	W_L	W_P	I_p
● TP24-BS1	3.00	Sandy SILT (ML)	16.0	N/A	N/A	0
☒ TP26-BS1	3.40	Silty SAND (SM)	12.3	N/A	N/A	0
▲ TP32-BS1	3.20	Silty SAND with gravel (SM)	9.9	N/A	N/A	0
★ TP9-BS1	4.50	Silty SAND (SM)	13.0	N/A	N/A	0

REMARKS: Atterburg Limits tests indicate the fines content to be Non-Plastic.



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Project No.: NFS09711

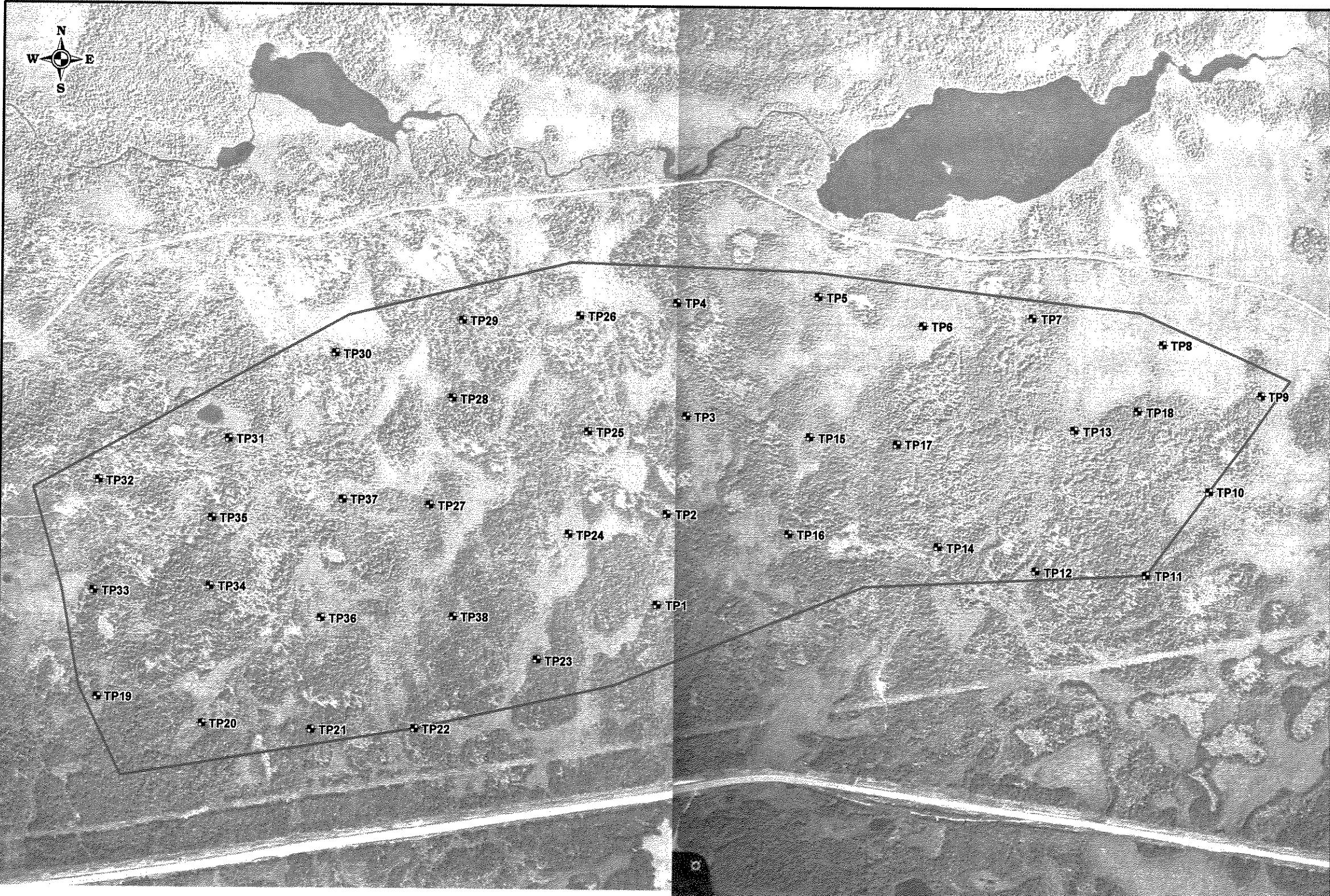
Location: Norris Arm North

FIGURE
8

PLASTICITY CHART

APPENDIX C

Drawing No. NFS09711-GE-01, Site Location Plan



LEGEND

TEST PIT

NOTE:

1. BASED ON DRAWINGS AND AIRPHOTOS PROVIDED BY BAE NEWPLAN GROUP LTD.
2. TEST PIT LOCATIONS PROVIDED BY NGL, AT AN APPROXIMATE 350 X 350 M GRID SPACING
3. AIRPHOTO MAY NOT BE TO SCALE;
DO NOT SCALE FROM DRAWING

BAE NEWPLAN GROUP LTD.

PROPOSED WASTE MANAGEMENT FACILITY
CENTRAL NEWFOUNDLAND

TEST PIT LOCATION PLAN

Newfoundland Geosciences Limited
CONSULTING ENGINEERS

DATE:	SCALE:	DRAWN BY:
17OCT03	AS SHOWN	D.J.B.



CHECKED BY:

DRAWING NO.

NFS09711-GE-01

[Back to Report](#)

250 0 250 500 750
Meters