Baffinland Iron Mines Corporation Mary River Project - Phase 2 Proposal Updated Application for Amendment No. 2 of Type A Water Licence 2AM-MRY1325

Attachment 8.12

Milne Port Ore Dock No. 1 Factual Geotechnical Report

(290 Pages)







Baffinland Iron Mines Corporation Mary River Project

Milne Ore Dock Geotechnical Investigation Factual Report

2014-02-21	Α	Internal/Client Review	C. Hannon	W. Hoyle	C. Rosner	N/A
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	•		■ HATCH	TM		CLIENT





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Disclaimer

This report was prepared by Hatch Ltd. (Hatch) for the sole and exclusive use of Baffinland Iron Mines Corporation (the 'Client') The report summarizes the results of a geotechnical site investigation performed at the Milne Ore Dock site at Milne Inlet Nunavut, with the objective to provide information on the soil and rock conditions at the site to support the design of the Milne Ore Dock and associated infrastructure. The report shall not (a) be used for any other purpose, or (b) be provided to or relied on by any third party.

The report is divided into three main parts. The first part, Sections 1 and 2, summarize background information, some of which is from various public domain sources. The information contained in these sections is general and approximate in nature and should be treated as such. The second part (Section 3) summarizes the investigation methodology. This section is a factual description of the equipment used and the procedures followed during the field work. The final part (Section 4) provides a factual summary of the soil data collected during the program comprising soil descriptions, laboratory test results and in situ test results. The tests and procedures used to compile the data were performed in accordance with applicable ASTM and CSA standards.

It is noted that a limited number of boreholes were advanced at the site; and as such, the information collected applies to the borehole locations only. The subsurface conditions between boreholes can change and accordingly any use of the data contained herein should take into consideration the nature of the material and potential variation between boreholes.

Finally, this report contains opinions conclusions and recommendations made by Hatch and others using professional judgement and reasonable care. Use of or reliance on this report by the Client is subject to the following conditions:

- a) The report being read as a whole, with sections or parts hereof read or relied upon in context.
- b) The conditions of the site may change over time or may have already changes sue to natural forces or human intervention, and Hatch takes no responsibility for the impact that such changes may have on the accuracy or validity of the observations, conclusions and recommendations set out in this report.
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1. Introduction

Hatch Ltd. (Hatch) was retained by Baffinland Iron Mines Corporation (BIM) to conduct geotechnical investigations for the design of a port facility including a fixed dock structure located at Milne Inlet in the Qikqtani Region of northern Baffin Island, Nunavut, Canada. The Milne Ore Dock will be used to load ships for export of iron ore mined at the Mary River Mine located 100 km to the south.

Geotechnical investigations for the Milne Ore Dock consisted of:

- A geotechnical drilling program which included in situ testing, Dynamic Cone Penetormeter Tests (DCPT), and installation of thermistors.
- A geophysics survey consisting of seismic reflection, seismic refraction, seismic resonance and Multichannel Analysis of Surface Waves (MASW).

The drilling program was carried out in two phases; the first phase was executed in December 2013, while the second phase was executed in January 2014.

2. Background Information

In August, 2013, Hatch undertook a preliminary review of available geotechnical information for the proposed Milne Ore Dock. This information included an AMEC Inc. (AMEC) report specific to the current proposed Milne Ore Dock location, and a Thurber Engineering Ltd. (Thurber) report prepared for a separate, nearby proposed dock location, as follows:

- AMEC report dated October 4, 2010, "Geotechnical Design Parameters for Ore Dock #1"
 This report includes Borehole PMSD-0001, completed by Knight Piesold in the area of
 the ore dock. This borehole is a rotary borehole with SPT samples. Recommendations
 for preliminary design are provided in this report.
- Thurber report dated November 9, 2011, "Steensby Inlet and Milne Inlet Port Offshore Geotechnical Investigation". This report includes Thurber drill holes MMFD-A through MMFD-I, completed in the area of the freight dock. Drill hole C is borehole with SPT only, drill holes D and E are borehole with SPT combined with a dynamic cone penetration test (DCPT), and remaining holes are DCPT only.

From the review, Hatch concluded that the preliminary design of the Milne Ore Dock could proceed based on the recommendations in the AMEC report, but recommended that a detailed, site specific marine geotechnical investigations be completed in support of the final design.







3. Field Investigations

3.1 Geotechnical Drilling Program

The drilling program for the Milne Ore Dock was completed in two phases: Phase 1 was undertaken between November 29, 2013 and December 16, 2013; Phase 2 was undertaken between January 12, 2014 and January 19, 2014. The borehole investigations and testing is summarized in Table 3-1 with the borehole locations and geophysical survey lines presented in Figure 1.

Table 3-1: Summary of Boreholes

Phase	BH ID	Location	Method	In Situ Test ¹	Lab Testing ²	Thermistors
	BH13-01	Onshore	_	SPT	PSD, Hydrometer	2
	BH13-01B	Onshore	Rotary – No Mud	SPT	None	0
	BH13-02	Onshore	Ž	SPT	PSD	5
	BH13-03	Offshore	otary	SPT, DCPT	PSD, Hydrometer	1
-	BH13-05	Offshore	Ľ.	SPT	PSD, Hydrometer	0
Phase 1	BH13-05B	Offshore	Mud ³	SPT, DCPT	PSD, Hydrometer	0
"	BH13-07	Offshore	ъ	SPT, DCPT	PSD, Hydrometer	0
	BH13-08	Offshore	Rotary – No Mud	SPT, DCPT	PSD	0
	BH13-09	Offshore	Ž 	SPT, DCPT	PSD	0
	BH13-11	Offshore	totary	SPT, DCPT	PSD	4**
	BH13-11B	Offshore	Ľ.	DCPT	None	0
	BH14-05C	Offshore	d ⁴	SPT	PSD, Hydrometer	4**
5	BH14-06	Offshore	.h Mu	SPT	PSD, Hydrometer	0
Phase	BH14-07B	Offshore	– Wit	SPT	PSD, Hydrometer	4*
₫	BH14-12	Offshore	Rotary – With Mud ⁴	SPT	PSD	4
	BH14-13	Offshore	Rc	SPT	PSD, Hydrometer	4

¹ Standard Penetration Test (SPT); Dynamic Cone Penetrometer Test (DCPT)

^{**}Readings indicate all BH13-11 and one BH14-5C thermistor(s) are non-functional



² Particle Size Distribution (PSD); Atterberg tests pending

³ New Zam D Mud Only

⁴ New Zam D Mud and Bentonite

^{*}Thermistors installed but lost under ice when pulling casing





Borehole investigations were advanced using a modified skid-mounted CME 55 drilling rig operated by Logan Drilling Group with field supervision carried out by Hatch. The drilling rig arrangement is shown in PHOTOGRAPH 1A and PHOTOGRAPH 2B. Onshore boreholes were advanced using a HQ 'wire line' coring method which allowed for continuous sampling of material. Offshore boreholes were advanced using H-casing, with a plug which was removed to conduct Standard Penetration Testing (SPT). With this arrangement cuttings from the drilling were not recoverable and sampling was only possible where SPTs were conducted.



PHOTOGRAPH 1A: Drilling rig arrangement



PHOTOGRAPH 2B: Interior of drilling shed





Soil samples were collected using a 50 mm (2 in.) OD split tube sampler, driven in accordance with the Standard Penetration Test (SPT) procedure (ASTM D-1586). In addition to facilitating the recovery of soil samples for examination and testing, the Standard Penetration Testing allowed an empirical determination of the density or consistency of the soil being penetrated. All soil samples were examined and logged in the field. On completion of the logging, all soil samples collected were stored in plastic bags to retain their natural moisture content.

The field supervisor recorded the materials encountered and determined in situ testing and sampling requirements. The description of soils as detailed in the geotechnical borehole reports are based on field visual classification and confirmatory laboratory testing in accordance with the explanatory notes included with these reports.

Investigation locations were staked by the project surveyors using accurate GPS survey equipment, the exact location of the as-drilled boreholes were subsequently surveyed. The elevation of the offshore investigations was corrected to account for the position of the tide at the time of the completion of the drilling for each borehole. Elevations were recorded in the local chart datum.

The detailed geotechnical borehole reports of boreholes, including DCPT results and photographs of select samples, are contained in the attached Appendix A and these should be referred to for a complete description of materials and the in situ testing and sampling performed. Appendix A also contains a set of explanatory notes detailing terminology used in the borehole reports.

3.1.1 Thermistor Installation

During the course of the drilling investigation thermistors were installed at select borehole locations in order to record the ground temperature at specific depths. PHOTOGRAPH 3A shows a thermistor string being installed and a completed thermistor installation is shown in PHOTOGRAPH 4B. The summary of the thermistor locations and depths is presented in Table 3-2. Temperature records from these thermistors are presented in Appendix C.



PHOTOGRAPH 3A: Installation of thermistor









PHOTOGRAPH 4B: PVC pipe with thermistors installed

Table 3-2: Thermistor Installation Details

Borehole ID	Depth of Thermistors
BH13-01	1.00 m, 2.50 m
BH13-02	0.50 m, 4.38 m, 9.38 m, 14.38 m, 19.37 m
BH13-03	10.00 m
BH13-11	2.50 m, 10.00 m, 20.00 m, 30.00 m
BH14-05C	7.50 m, 17.50 m, 27.50 m, 37.50 m
BH14-07B	Thermistors lost under ice.
BH14-12	2.40 m, 3.90 m, 13.90 m, 18.89 m
BH14-13	5.00 m, 10.00 m, 20.00 m, 30.00 m

3.2 Geophysics Survey

The geophysics survey for the Milne Ore Dock was undertaken by Geophysics GPR International Inc. (GPR). Five seismic profile lines, each 352.5 m in length, were surveyed during the investigation, three roughly parallel to the shoreline and two lines extending from the shore into Milne Inlet. The location of the geophysics survey lines are shown on Figure 1. PHOTOGRAPH 5A shows the geophysics technician setting off a seismic shot and in PHOTOGRAPH 6B the geophone line at Survey Line A is shown.







PHOTOGRAPH 5A: Setting of seismic shot



PHOTOGRAPH 6B: Geophone setup

The geophysics survey consisted of using a series of "shots" to create a seismic wave which propagated through the water and underlying soil. A series of 48 geophones spaced 7.5 m apart along the survey line picked up the initial seismic wave and the echoes of the wave which had been reflected at stratigraphic boundaries and refracted by the soil. Four separate techniques were used to interpret the response from the geophones including:

- Seismic reflection.
- · Seismic refraction.
- Seismic resonance.
- MASW.

For a detailed description of the methodology and analyses from the geophysics survey please refer to the GPR report attached as Appendix D.





4. Results of Field Investigation

The 2013 drilling program (Phase 1) encountered two significant challenges, both of which impacted drilling production as well as data quality. Prior to mobilization, the team was advised that, due to environmental permitting restrictions, the use of drilling mud was not allowed, and holes would need to be drilled using sea water as the drilling fluid. Throughout the drilling program, problems with extreme cold weather resulted in equipment freezing, delaying drilling and impacting the quality of the drilling. Despite the best efforts of the drill crew, the cold temperatures resulted in casing binding, loss of holes and heave into the casing. These drilling difficulties are common when drilling in a sandy, marine environment without drilling mud. This in turn resulted in several SPT sample locations where much lower than expected SPT blow counts were recorded. When these drilling difficulties arose, the restriction on drill mud was revisited and the restriction lifted, however by the time mud was mobilized to site, it was generally too late to make a significant difference in the program (i.e., New Zam D mud used at BH13-5B only in Phase 1).

In the case of very low blow counts where heave was suspected, the data was discounted. In other cases, low blow count data was considered suspect, but there was not sufficient basis to discount the data. Where practical, DCPT tests were used to supplement SPT data and to extend holes beyond the point where drilling could not advance. This data is useful; however blow counts within the first few meters below the point where the hole could not advance are suspect due to potential drilling disturbance or heave. In addition, in many cases the length of the DCPT drive is beyond the 10 m limit generally considered reliable for DCPT, and therefore some of the high blow counts or refusals are considered suspect.

Due to the difficulties in the drilling, and the slower than planned progress, drilling was completed at only eight (8) of the 11 proposed locations in Phase 1.

Following the completion of the 2013 drill program, the decision was made to undertake a second phase of drilling in early 2014. The intent of the 2014 drill program (Phase 2) was to complete some of the remaining drill holes (in particular Borehole 6), and to undertake further investigation of the identified problem, low SPT blow count zones from the 2013 program. The entire 2014 program was executed using drill mud (New Zam D and bentonite), and issues with heave, casing binding and loss of holes were minimised. Further, the SPT blow counts in the 2014 holes were found to be consistently better quality and higher than the corresponding 2013 boreholes. On this basis, the decision was made to re-drill at the borehole five (5) and borehole seven (7) locations. In both cases, the new SPT data obtained using mud as the drilling fluid confirmed that earlier low to very low SPT blow counts were the result of heave/loosening from the drilling. This, in turn, provided confirmation that the site did not include extensive zones of loose to very loose zones as indicated by the 2013 program.







4.1 Site Geology and Subsurface Conditions

As outlined in the Final Environmental Impact Statement (2012) by BIM, much of the physiographic terrain in the surrounding areas of Milne Inlet is typically a result of glacial activity. Surficial deposits are comprised of glacial marine sediments ranging from fines to coarse gravels.

Topographic features are dominated by marine features such as terraces and strands. Also present are sharp gullies along waterways likely formed by the action of surface water. It is likely that permafrost can account for some of the mechanically formed features.

The bedrock could not be confirmed during the investigations. The map of geology of Nunavut indicates that the bedrock is comprised of undivided gneiss of Archean age.

4.2 Laboratory Testing Results

Soil samples collected during the drilling program were sent to Hatch's geotechnical laboratory in Niagara Falls, Ontario for testing. The schedule of lab tests is presented in Table 4-1 and the results of the laboratory testing program are summarized in Table 4-2. In the case of salinity testing the equipment required for the ASTM standard test was not available; testing was carried out using a YSI Environmental Model 556 multi-probe/data logger by measuring conductivity of a solution of water and soil sample, as detailed in Appendix B. For complete testing results and laboratory testing reports please refer to Appendix B.

Table 4-1: Summary of Lab Testing

Test Type	Number of Tests	Standard
Grain Size Distribution	54	ASTM D-421
Hydrometer	16	ASTM D-422
Moisture Content	217	ASTM D-2216
Atterberg Limits	2	ASTM D-4318
Salinity	33	See Appendix B





Table 4-2: Summary of Select Laboratory Test Results

BH ID	Depth (m)	Sample	Water Content		Grain S	Size (%)			berg nits
			(%)	Gravel	Sand	Fines*	Clay**	Liquid Limit	Plastic Index
BH13-01	8.00	AS8	-	58	42	0	-		
	9.50	AS9	6.6	3	45	40	12		
	11.00	AS10	14.7	17	80	3	-		
BH13-02	6.10	AS4	17.8	3	90	7	-		
BH13-03	3.81	AS4	15.7	3	91	6	-		
	6.10	AS7	16.5	5	60	34	9		
	12.19	AS11	-	31	54	15	-		
	14.48	AS13	-	18	81	2	-		
BH13-05	1.52	AS2	-	6	57	30	8		
	4.57	AS4	17.0	7	86	7	-		
	6.10	AS5	-	0	38	54	8		
	12.19	AS9	-	1	75	24	-		
	13.72	AS10	0.0	2	91	7	-		
	20.72	AS13	-	11	89	1	-		
BH13-05B	20.11	AS3	-	0	92	5	3		
	33.53	AS6	22.5	0	95	5			
	39.62	AS8	-	0	93	7			
BH13-07	1.83	AS2	-	7	55	27	12		
	3.35	AS3	-	0	97	3	-		
	4.88	AS4	-	46	53	1	-		
	9.75	AS7	-	5	45	50	1		
	10.47	AS8	-	16	73	11	-		
	11.27	AS(-	7	69	24	-		
	14.63	AS11	-	2	97	1	-		





BH ID	Depth (m)	Sample	Water Content		Grain S	Size (%)			berg
			(%)	Gravel	Sand	Fines*	Clay**	Liquid Limit	Plastic Index
BH13-08	0.76	AS2	14.5	0	40	60	-		
	2.43	AS4	12.0	4	93	4	-		
	10.66	AS9	-	13	73	11	-		
	19.81	AS15	13.5	8	90	2	-		
	21.34	AS16	-	6	88	6	-		
BH13-09	0.30	AS1	17.0	9	53	38	-		
	9.14	AS4	-	2	91	7	-		
	9.75	Core	-	3	48	49	-		
BH13-11	2.13	AS2	9.4	10	88	2	-		
	3.66	AS3	-	5	79	16	-		
	8.22	AS6	-	6	92	3	-		
	12.80	AS9	-	50	48	2	-		
	14.32	AS10	-	13	61	26	-		
	18.75	AS13	17.7	3	84	13	-		
	27.13	AS17	9.3	8	90	2	-		
BH14-05C	36.88	AS15		0	83	14	3		
BH14-06	0.15	AS1	12.3	9	67	24	-		
	3.05	AS3		5	23	62	10		
	13.72	AS10		4	47	39	10		
	32.92	AS42		0	16	56	30	25	9
BH14-07B	0.91	AS1		22	53	20	5-		
	8.84	AS6	-	1	33	66			
	25.60	AS17		5	50	35	10		
	32.61	AS21	21.5	3	41	42	14	20	6
	40.84	AS26		0	32	52	16		





BH ID	Depth (m)	Sample	Water Content		Grain S	Size (%)		Atterberg Limits		
			(%)	Gravel	Sand	Fines*	Clay**	Liquid Limit	Plastic Index	
BH14-12	4.57	AS4	10.0	50	48	2	-			
	6.10	AS5	17.8	7	83	10	-			
	14.48	AS11	17.0	0	91	9	-			
BH14-13	5.49	AS4	15.8	6	55	32	7			
	13.10	AS9	13.1	35	63	2	-			

^{*}Where clay has been recorded this column represents silt content

4.3 Borehole Results

The results of the drilling investigation are presented below in general terms, for a complete description of materials encountered and information on in situ testing please refer to geotechnical borehole reports in the attached Appendix A. The results of laboratory testing for the drilling investigation are presented in the attached Appendix B. Please note that where clay particles are recorded in hydrometer results this reflects the particle size only, Atterberg Limits testing was carried out on selected samples to determine clay properties.

During the drilling program thermistors were installed in several of the boreholes as detailed in Table 3-1; results from the thermistors are presented in Appendix C. Salinity testing results are presented with the thermistor results where applicable.

4.3.1 Materials Encountered

4.3.1.1 Onshore

Borehole BH13-01, BH13- 02 and BH13-1B were advanced in the onshore locations. The majority of the material intersected during onshore investigations consisted of glaciofluvial outwash deposit, which essentially comprised of coarse beach sediments (sand and gravel to sand). In general, the sand varied from medium to coarse grained for all the onshore borehole locations. Investigation in BH13- 01 encountered approximately 0.5 m of material with a significant silt content at an elevation of -5.17 m. Whereas the soil in the onshore borehole locations was in frozen state for BH13-01 and BH13-01B throughout the depth of boreholes, it was in partially frozen state in BH13-02 and BH14-12 (nearshore).

All onshore investigations encountered varying degree of permafrost. Permafrost was encountered in BH13-01 and BH13-01B up to the full drilling depth whereas it was encountered partially BH2013-02 and BH14-12. Continuous frozen soil samples were retrieved wherever frozen soil conditions were encountered for the onshore boreholes.



^{**}Indicates clay size particle where not confirmed by Atterberg Limits





4.3.1.2 Offshore

Offshore drilling encountered loose to compact silty sand underlain by sand containing varying amount of gravel and possibly cobbles. Without exception, silt containing soil was encountered in the upper sediments of the seabed. In several cases, silt containing soil layers were encountered at depth.

Generally dense to very dense sand was found at depth in BH14-5C, BH14-6 and BH14-7B. Please see detailed information in the borehole reports, Appendix A.

4.3.2 Material Properties

4.3.2.1 Clay

Clay was intersected in a minority of offshore investigations, when encountered it was found to be interbedded with soils that are primarily sand or silt. Where testing occurred, Atterberg Limit testing indicates that clays were of low plasticity.

4.3.2.2 Silt and Sand

Offshore investigations intersected soil layers comprised of silt and sand. Where encountered this soil was noted to vary in composition from silty sand to sandy silt, with sand and silt interbedding observed in some samples. Where encountered with silt as a major component sand was generally found to have fine or fine to medium grain size.

SPT testing indicated that this material was generally of a loose to compact density for sand or the equivalent of a firm to stiff silt, but in general density was found to increase with depth. Please refer to individual borehole logs for the density at a given depth and location.

4.3.2.3 Sand

Sand was encountered in all investigations, where intersected, sand was found to vary in grain size distribution between fine to coarse.

In offshore investigations the inferred density from the SPT testing was generally loose to compact at shallow depths with dense to very dense sand encountered in lower portions of boreholes. For density data at a specific location please refer to the borehole reports in Appendix A.

Based on SPT blow counts, all onshore locations indicated the presence of very dense sand. However, the high SPT blow counts observed for the onshore locations could be due to the frozen soil conditions. In general, the sand was medium to coarse grained for the onshore borehole locations.

4.3.2.4 Sand and Gravel

Strata of gravelly sand to sandy gravel were encountered in approximately half of the offshore boreholes. In general, the sand was found to be medium to coarse when encountered with gravel. Gravel was generally fine when encountered in layers with sand as the secondary or primary component; Gravel was noted to be subangular to subrounded with some rounded material encountered.







In some instances where sand and gravel were intersected samples contained some angular gravel or gravel with some angular and some subrounded/subangular facets. Based on these observations it was inferred that cobble or cobbles *may* be present in the soil which were fragmented by the drilling process.

Similar to the sand, where encountered in offshore investigations, the sand and gravel soil was found to generally increase in density from loose to compact at shallow depths to dense at greater depths. For density data at a specific location please refer to the borehole reports in Appendix A.

Deposits of gravelly sand to sandy gravel were intersected in all onshore investigations. Based on the SPT blow counts, the gravelly sand to sandy gravel deposit was in very dense state, similar to the sand this may be a reflection of the frozen nature of the material rather than the actual density (e.g., see BH14-12)

4.3.2.5 Gravel

Material which was predominantly gravel was only intersected in a few locations, namely BH13-02, BH13-08, BH13-11, BH14-7B and BH14-12. Gravel was generally noted to be subangular to subrounded with some rounded gravel encountered and ranging in grain size from fine to coarse. Where the rock type of gravel was noted, it was primarily identified visually as granite or limestone.

In some samples angular gravels were noted but it was inferred that these facets had been fragmented by the drilling process.

4.4 Geophysics Survey Results

The primary objective of the geophysics survey was to identify the top of bedrock with interpretation of readings indicating that the soil/rock interface lies approximately 90 to 140 m below sea level. Shear wave velocities in the bedrock layer were found to be in the order of 3900 to 5100 m/s indicating that the bedrock is competent.

Based upon the interpretation of seismic reflection data taken in conjunction with the results from borehole investigations GPR has identified six (6) layers within the overburden:

- Layer 1: Loose silty sand; shear velocities between 175 to 250 m/s
- Layer 2: Compact sand with silt and gravel layers; shear velocities between 175 to 275 m/s
- Layer 3: Dense to very dense sand with some silt and gravel; shear velocities between 250 to 375 m/s
- Layer 4: Dense to very dense sand; shear velocities between 400 to 460 m/s
- Layer 5: Dense sand; shear velocities between 460 to 600 m/s
- Layer 6: Dense sediments; shear velocities between 525 to 760 m/s







Detailed descriptions of the identified overburden layers can be found in the GPR report found in Appendix D.

5. Summary of Geotechnical Findings

The field component of the 2013/2014 drilling program was completed on January 19, 2014. Hatch's primary findings from this investigation are as follows:

- The marine sediments at the dock location predominantly consist of layered sandy silts, sands and sands and gravels. Soil containing some clay was encountered as thin layers in the minority of boreholes.
- In offshore investigations the inferred density from the SPT testing was generally loose to compact at shallow depths with dense to very dense soil encountered in lower portions of boreholes.
- SPT testing indicated that permafrost was present in all onshore investigations, while occasional zones of permafrost may be present in offshore investigation locations.
- No bedrock or other "hard bottom" was encountered in the marine sediments during drilling investigations. This is consistent with the depth to bedrock interpreted from the geophysical investigation.
- Geophysics survey indicates competent bedrock is present 90 to 140 m below the seabed.

6. References

AMEC Inc., October 4 2010. Geotechnical Design Parameters for Ore Dock #1. Prepared for Baffinland Iron Mines Corporation.

Thurber Engineering Ltd., November 9, 2011. Steensby Inlet and Milne Inlet Port Offshore Geotechnical Investigation. Prepared for Baffinland Iron Mines Corporation.

Canada-Nunavut Geoscience Office, Government of Canada. Geology of Nunavut Map.

Baffinland Iron Mines Corporation, February 2012. Mary River Project – Final Environmental Impact Statement.







Figure 1 Site Location Plan

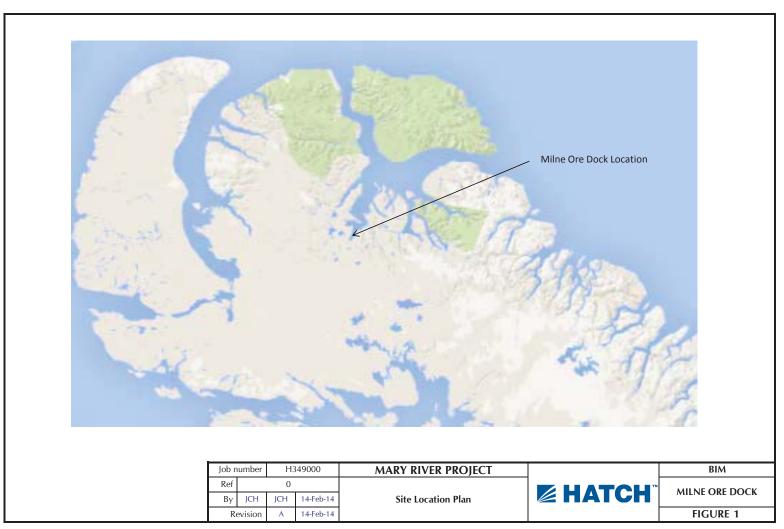
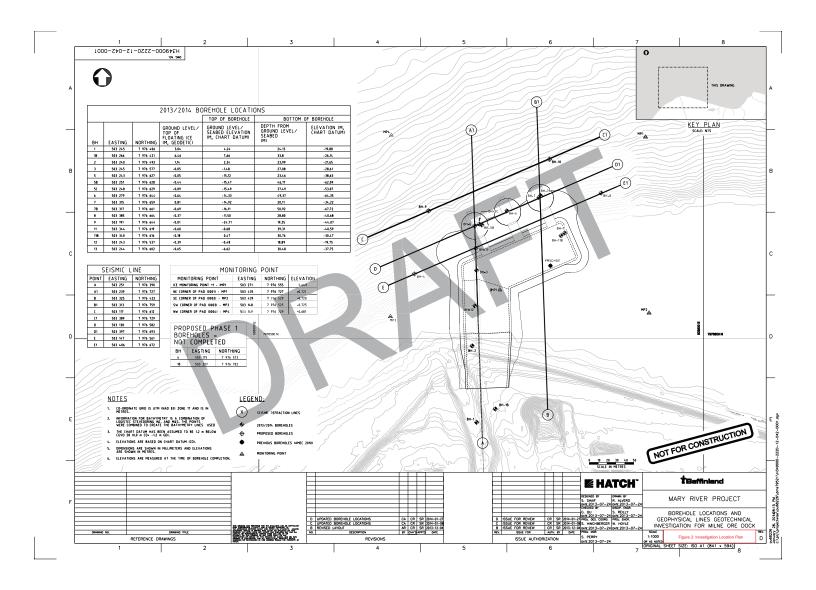






Figure 2 Investigation Location Plan







Appendix A Geotechnical Borehole Reports

MATCH BOREHOLE REPORT HOLE: **BH13-01 CLIENT: Baffinland Iron Mines Corporation** PAGE: 1 **PROJECT:** Mary River Project SITE: Milne Inlet Beach **COORDINATES:** 7976406 CONTRACTOR: Logan Drilling Group STARTED: 03/12/2013 DRILL TYPE: Skid mounted CME 55 FINISHED: 04/12/2013 503245 **METHOD SOIL:** Wash Boring **INSPECTOR:** C.S.S/W.R.H **DIP DIRECTION:** ROCK: LOGGED BY: C.S.S DIP: 90 NA **CASING: HWT-Casing REVIEWED:** W.R.H **ELEVATIONS** DATUM: **Ground Surface** DATE: January, 2014 PLATFORM: CORE: HQ (Frozen Soil) **GROUND:** 4.24 **END OF HOLE:** -19.89 HYDRAULIC CONDUCTIVITY (m/s) SPT N-VALUES (kg/m3) SAMPLE or RUN > DYNAMIC CONE PENETRATION ELEV. REMARKS PIEZOMETER INSTALLATION $10^{6} \quad 10^{5} \quad 10^{4}$ **BLOW COUNT** 40 60 80 AND DEPTH **DESCRIPTION** DENSITY (mm) (E GRAIN SIZE (m) TYPE/ NUMBER REC'Y(%) DISTRIBUTION (%) DEPTH (☐ UNCONFINED WATER CONTENT & DEPTH RECY ATTERBERG LIMITS GR SA SI CL 100 15 30 45 (%) 4.24 150 200 0.0 0 SAND, trace to some silt, 0.23 AS01 203 100 trace fine, rounded gravel. Borehole location approximately 50m from the shoreline. 75 mm gravel at the 0.61 0.61 m: Trace to some silt, tip of spoon. AS02 381 100 26 some subrounded to sub \bullet 0 angular multicolored gravel Trace of free water in 0.99 with size up to 37.5 mm x AS02,AS03 and 25 mm x 15 mm. AS04. 1.21 5 38 Introduce sea water 87 38 50 for 25 mm AS03 330 as drillling fluid; Advance casing to 1.21 m. Sand in the tip of spoon; Advance core 221 AS04 100 70 for 100 mm barrel to 1.98 m to retrieve frozen core. Casing getting 2.43 m: Some gravel with 2.43 AS05 152 80 for 152mm 0 jammed in frozen soil; size up to 25 mm x 12.5 . Calcium cloride mm x 12.5 mm. added to drilling water to supress the freezing point of water; Casing advanced to 4.87 m. 3 3.04 m: Subrounded to subangular multicolored gravel with size up to 50 mm x 25 mm x 15 mm in corebarrel indicating possible cobble(s). 21 127 **56** for 76mm 4.6 AS06 SAMPLING METHOD SHIPPING CONTAINER Constant Head Test A - Split Tube N - Insert R - Cloth Bag B - Thin Wall Tube F - Wash O - Tube S - Plastic Bag Variable Head Test G - Shovel Grab P - Water Content Tin

U - Wooden Box

Core Box

X - Plastic & PVC Sleeve Z - Discarded

C - Piston Sample

(sonic or diamond drill)

K - Slotted

Q - Jar

D - Core Barrel

Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation HOLE: <u>BH13-01</u>

PROJECT: Mary River Project **PAGE:** 2 **OF:** 5

	-		<i>y</i>				_					_		_
ELEV.			SAN	1PLE	or	Rl	ĴΜ		SPT N-VALU DYNAMIC CO	ES DNE PENETRATIO	HYDRAULIC CONDUCTIVITY (m/s)	,m3)	REMARKS	
DEPTH	Ъ	DESCRIPTION					Ľ	<u></u>	20 40	60 80	10 ⁶ 10 ⁵ 10 ⁴	DENSITY (kg/m3)	AND	PIEZOMETER
(m)	SYMBOL	DESCRIPTION		e.	REC'Y (mm)	(%)	BLOW COUNT	DЕРТН (m)		RENGTH (kPa)		SIT	GRAIN SIZE DISTRIBUTION (%)	MET
	S		DEPTH	Ä MBE	2	REC'Y (%)	×	ΡŢ	☐ UNCONFINED ■ QUICK TRIAXIA	FIELD VANE LAB VANE POCKET PEN	WATER CONTENT & ATTERBERG LIMITS			ZOZ
			DEF	TYPE/ NUMBER	RE	RE	BLC	DE	50 100	T TOOKETTEN	15 30 45 (%)	DRY	GR SA SI CL	= :
	::::													
								6	ļ					
			6.53	4.007	407	70 fe	o r 12 7	7mm					Trace of free water observed in	
			8:53	A507	127	98							corebarrel sample at	
													6.5m depth.	
								7					Advance core barrel	
													to 6.55 m; Advance casing to 6.55 m;	
													SPT conducted at	
													6.55 m, Intermittent hard drilling.	
													naid dilling.	
				1000	0	80 fe	o r 127	7mn 8			<u></u>		50 40 0	
		8.07 m: Subrounded to	8.93	AS08	0	U					T i i i		58 42 0	
		subangular gravel with size up to 50 mm.												
		ap 15 00											Lab testing	
													completed on the silty layer; Frozen core	
													recovered; No	
								9					recovery, Gravel at the tip of spoon	
													sample(Refusal).	
						75 fo	v r 15 2	Pmm						
			9.5 9.65	AS09	152	100					∳ ○		3 45 40 12 Some free water	
													observed in AS09.	
								10					Advance core barrel	
-5.97								10					from 9.6 m to 11.1 m;	
10.21		SILT and SAND,	1										Frozen core recovered; Drive a	
		grey,frozen, trace clay, trace fine, rounded gravel.											spoon at 11.12 m.	
-6.43		adoo mio, roundou gravoi.												
10.67		SAND, light brown, medium												
		to coarse grained, some fine to medium grained,				80 fo	or 102	^{2mm} l 1						
		rounded to subrounded multicolored gravel.	11111	AS10	102	100					•		17 80 3	
		mullicolored gravel.											Trace free water	
	<u> -</u>					Ш			<u> </u>	1 1		_	observed in AS10.	_
^ ~		PLING METHOD		N: -			PPI	NG (CONTAINER	PLAST	IC NATURAL LIQUID		Constant Head Te	est
B - T		ll Tube F - Wash		N - II O - T	ube	:			R - Cloth B S - Plastic	Bag	MOISTURE LIMIT CONTENT		Variable Head Tes	st
	Piston S Core Ba					r Co	nte	nt Tin	U - Woode Y - Core Bo		W _N W _L		Lab. Permeability	
		diamond drill)				ic &	PV	C Sle	eve Z - Discard					
				Q - J X - F		ic &	PV	C Sle					Project: H/3	

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

HOLE: **BH13-0**1

PROJECT: Mary River Project

PAGE: 3 **OF:** 5

		PROJECT:	Mary R	liver	Pro	oject								PA	GE	: 3 OF : 5	
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION		ЛРLE	l (i	က		` 20	MIC COI	NE PENE 60 ENGTH	ETRATION 80 (kPa)			/ITY (m/s)	(kg/r	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	IETER LATION
	IXS		DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	DEРТН (m)	□ UNCON ■ QUICK	FINED TRIAXIAL 100	* FIEL * LAB * POC 150	D VANÉ VANE KET PEN. 200	WATE ATTE	RBERG	ATENT & GLIMITS 45 (%)	DRY DENSITY	GR SA SI CL	PIEZOMETER INSTALLATION
							12										
			/12.6	3													
			12.9	AS11	381	14 100 38 53 for 7	6mm 13						0			Advance core barrel and casing to 14.17 m; Frozen core retreived.	
		14.30 m: Some granitic gravel.	×14.2	AS12	102	70 for 10 100	14 ⁰² mm				•	• •				Some free water observed in AS12.	
		gravei.					15										
			×166.11	8 AS13	76	100 for 1	16					• 0				Sand in the tip of spoon.	
		16.77 m: Gravel zones 300 mm thick, bedded sand.					17										
						300 for 1	02mm										
B - T C - P D - C	plit Tub hin Wa Piston S Core Ba	II Tube F - Wash sample G - Shovel Grab		Q - J	nser ube Vate ar	t r Cont	ent Tin	S - P u U - V	loth Ba lastic B Vooden ore Bo	Bag Box x	PLASTIC LIMIT W _P	NATURA MOISTUI CONTEN	AL LIQUI RE LIMIT IT W			Constant Head Tes Variable Head Tes Lab. Permeability	

BOREHOLE REPORT

HOLE: **BH13-01**PAGE: 4 OF: 5 **CLIENT:** Baffinland Iron Mines Corporation

		PROJECT: M	ary	/ K	iver	PIC	ojec	CL					: 4 UF : 5	
ELEV.			S	SAN	1PLE	or				SPT N-VALUES DYNAMIC CONE PENETRATION	HYDRAULIC CONDUCTIVITY (m/s) 10 ⁵ 10 ⁵ 10 ⁴ WATER CONTENT & ATTERBERG LIMITS	/m3)	REMARKS	z
DEPTH (m)	SYMBOL	DESCRIPTION			l _{cc}	mm)	(%	BLOW COUNTS	(E)	20 40 60 80 SHEAR STRENGTH (kPa)	10 10 10	SITY (kg	AND GRAIN SIZE	PIEZOMETER INSTALLATION
	SYI			DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	OWC	DЕРТН (m)	☐ UNCONFINED ★ FIELD VANE ■ QUICK TRIAXIAL ◆ POCKET PEN.	WATER CONTENT & ATTERBERG LIMITS	Y DENS	DISTRIBUTION (%)	EZOM
			×	当 17.9	≧ AS14	102	꾼 100	В	DE	50 100 150 200	15 30 45 (%)	DRY	GR SA SI CL	₫Z
									18					
									19					
							50 fc	or 76	mm					
				19946	AS15	0	0							
									20					
									_					
				20.03 21.03	AS16	130	130		_{mm} 21		0			
									22					
							50.6	407						
			X	22.5	AS17	127	50 fe 98		mm		0			
									23					
-19.89				23.9 24.13	AS17	0	500 fc	23 or 76	mm 24		<u> </u>			
24.13														
A - S	Split Tu	PLING METHOD be E - Auger			N - Ir			PI	NG (CONTAINER R - Cloth Bag PLASTIK LIMIT	NATURAL LIQUID MOISTURE LIMIT CONTENT		Constant Head Tes	st
B - T C - F	hin Wa Piston S	all Tube F - Wash Sample G - Shovel Grab			O - T P - V	ube Vate		ntei	nt Tin	S - Plastic Bag U - Wooden Box W _P	W _N W _L		Variable Head Tes Lab. Permeability	st
	Core Ba sonic o	arrel K - Slotted r diamond drill)			Q - J X - P	ar lasti	c &	PV	C Sle	Y - Core Box eve Z - Discarded	- 1		Lab. Permeability	

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

HOLE: **BH13-01**

		PROJECT:						C	orporation					PA			F: 5	•
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	DEPTH DEPTH	TYPE/ NUMBER	(a)	REC'Y (%)	2	/\	SPT N-VALUES DYNAMIC CON 20 40 SHEAR STRE UNCONFINED QUICK TRIAXIAL 50 100	60 NGT X FI	80 TH (kPa) IELD VANE AB VANE POCKET PEN.	10 WATE ATTEI	10 ⁻⁵ R CON	ULIC /ITY (m/s) 10 ⁴ NTENT & G LIMITS 45 (%)	DRY DENSITY (kg/m3)	REMA ANE GRAIN DISTRIE	SIZE SUTION (%)	PIEZOMETER INSTALLATION
		24.13 m: End of borehole					_	_	BOREHOL		200	10	- 00	40 (10)				
		NOTES: 1. Thermistors installed at 1.00 m and 2.50 m below ground surface.																
A - Sp B - Th C - Pis D - Co	lit Tuk in Wa ston S ore Ba	II Tube F - Wash sample G - Shovel Grab		Q - J	nser ube /ate ar	t r Con	tent Ti	in	ONTAINER R - Cloth Bag S - Plastic Ba U - Wooden I Y - Core Box ve Z - Discarded	ag Box	PLASTIC LIMIT W _P	NATURALI MOISTUR CONTENT WN	E LIMIT			Vari	stant Head Te able Head Te Permeability	est



BH-2013-01 Bulk Sample (16.15m - 17.83m) 1 of 2



BH-2013-01 Bulk Sample (16.15m - 17.83m) 2 of 2





BH-2013-01 Bulk Sample (17.98m - 19.35m) 1 of 2



BH-2013-01 Bulk Sample (17.98m - 19.35m) 2 of 2



■ HATCH BOREHOLE REPORT HOLE: **BH13-01B CLIENT: Baffinland Iron Mines Corporation** PAGE: 1 **PROJECT:** Mary River Project SITE: Milne Inlet Beach **COORDINATES:** 7976420.955 CONTRACTOR: Logan Drilling Group STARTED: 14/12/2013 503265.866 **DRILL TYPE:** Skid mounted CME 55 FINISHED: 15/12/2013 **METHOD SOIL:** Wash Boring **INSPECTOR:** C.S.S/W.R.H **DIP DIRECTION: ROCK:** C.S.S LOGGED BY: DIP: 90 NA **CASING: HWT-Casing REVIEWED:** W.R.H **ELEVATIONS** DATUM: **Ground Surface** DATE: January, 2014 PLATFORM: CORE: HQ (Frozen Soil) **GROUND:** 7.66 **END OF HOLE:** -26.17 HYDRAULIC CONDUCTIVITY (m/s) SPT N-VALUES (kg/m3) SAMPLE or RUN > DYNAMIC CONE PENETRATION ELEV. REMARKS PIEZOMETER INSTALLATION $10^{6} \quad 10^{5} \quad 10^{4}$ **BLOW COUNT** 20 40 60 80 AND DEPTH **DESCRIPTION** DENSITY (E) (mm) GRAIN SIZE SHEAR STRENGTH (kPa) (m) TYPE/ NUMBER REC'Y(%) DISTRIBUTION (%) DEPTH (☐ UNCONFINED WATER CONTENT & REC'Y (ATTERBERG LIMITS GR SA SI CL 7.66 100 15 30 45 (%) 150 200 0.0 SAND, some subrounded gravel, light brown, frozen, coarse to medium grained Soil samples retrieved by sand. advancing the corebarrel in frozen soil. Calcium Cloride 1 DS1 400 26 solution used to prevent the freezing of driling fluid. Trace free water 1.82 observed in DS01. DS2 1500 100 0 • Gravelly SAND, light 3 brown, frozen, coarse to medium grained sand, subrounded, multicolored gravel. 3.35 DS3 1500 100 0 SAND, some gravel, light brown, frozen, coarse to medium grained sand, round to subrounded gravel. Some free water 4.87 observed in DS04 SAMPLING METHOD SHIPPING CONTAINER Constant Head Test A - Split Tube N - Insert R - Cloth Bag B - Thin Wall Tube F - Wash O - Tube S - Plastic Bag Variable Head Test G - Shovel Grab P - Water Content Tin U - Wooden Box C - Piston Sample Lab. Permeability D - Core Barrel K - Slotted Q - Jar Core Box X - Plastic & PVC Sleeve Z - Discarded (sonic or diamond drill)

BOREHOLE REPORT

CLIENT: **Baffinland Iron Mines Corporation** HOLE: <u>BH13-01B</u>

PROJECT: Mary River Project

PAGE: 2 **OF**: 6

4.88 m: Grave washed section 4.80 m: Some subrounded to grave washed section 5.80 m: Some subrounded to grave washed section 6.80 m: Some subrounded to grave washed section 6.80 m: Some subrounded to grave washed section 7.92 miles washed section 8.00 m: Some subrounded to grave washed section 9.45 m: Fine subrounded to grave washed wa	PROJECT: M	1ary R	River	Pro	oject				PA	GE	:: 2 OF : 6
4.88 m: Grave washed section 4.88 m: Grave washed section 7.92 Gravelly SAN brown, frozen coarse graine subrounded to gravel. 8.00 m: Some subrounded subrounded section 9.45 m: Fine of grained sand. SAND, some cobbles, light coarse sand, subangular grained sand. 2.14 SAND, some cobbles (lime presence of a sized particles)		SAN	MPLE	or	RUN		SPT N-VALUE DYNAMIC CO	ONE PENETRATIO	HYDRAULIC CONDUCTIVITY (m/s)	(kg/m3)	REMARKS AND
-0.26 7.92 Gravelly SAN brown, frozen coarse graine subrounded to gravel. 8.00 m: Some 9.45 m: Fine grained sand. 2.14 9.80 SAND, some cobbles, light coarse sand, subangular grobbles (limer presence of a sized particles)	ESCRIPTION	DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%) BLOW COUNT	DEPTH (m)		RENGTH (kPa) ** FIELD VANE ** LAB VANE AL ** POCKET PEN	WATER CONTENT &	DRY DENSITY (GRAIN SIZE DISTRIBUTION (%)
9.45 m: Fine of grained sand. 2.14 9.80 SAND, some cobbles, light coarse sand, subangular greent due to presence of a sized particles.	Gravel loose from section.		DS4	400	26				0		
9.45 m: Fine of grained sand. 2.14 9.80 SAND, some cobbles, light coarse sand, subangular greent due to presence of a sized particles.		6.4				6					
brown, frozen coarse graine subrounded to gravel. 8.00 m: Some 9.45 m: Fine of grained sand. 2.14 9.80 SAND, some cobbles, light coarse sand, subangular gr cobbles (lime: presence of a sized particles		6.4				7					No recovery in the core barrel; sample thawed (likely).
brown, frozen coarse graine subrounded to gravel. 8.00 m: Some 9.45 m: Fine of grained sand. 2.14 9.80 SAND, some cobbles, light coarse sand, subangular gr cobbles (lime: presence of a sized particles			DS5	0	0	•					
9.45 m: Fine of grained sand. 9.80 SAND, some cobbles, light coarse sand, subangular grobbles (limet present due to presence of a sized particles	rozen, medium to	7.92				8					
9.43 III. Filled grained sand. 9.80 SAND, some cobbles, light coarse sand, subangular gracobbles (limeter present due to presence of a sized particles.	Some gravel.		DS6	1100	60	9			0		
cobbles, light coarse sand, subangular gr cobbles (lime: present due to presence of a		9.44 9.44									
Iouliu to suba	sand, rounded to ular gravel, some (limestone) likely		DS7	1200	80	10			0		
10.97 m:	: limestone, angular	10.9 10.9	7			11					Some free water observed in DS08.
SAMPLING METHO	THOD			5	SHIPP	ING (CONTAINER		O MATURAL COMME		Constant Hood Tost
B - Thin Wall Tube F - V C - Piston Sample G -	E - Auger F - Wash G - Shovel Grab K - Slotted		Q - J	ube Vate ar	r Conte		R - Cloth I S - Plastic U - Woode Y - Core E eve Z - Discare	en Box W _P Box	C NATURAL LIQUID MOISTURE LIMIT CONTENT WN WL		Constant Head Test Variable Head Test Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

PROJECT: Mary River Project

HOLE: <u>BH13-01B</u>

PAGE: 3 **OF**: 6

ELEV. DEPTH (m)	SYMBOL	DESCRIPTION		TYPE/ NUMBER THE)	SHEAR STR	ES ONE PENETRATIO 60 80 RENGTH (kPa) ** FIELD VANE	10 10 10	DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	LLATION
	S		DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	DEPTH (m)	□ UNCONFINED ■ QUICK TRIAXIA 50 100	LAB VANE POCKET PEN	WATER CONTENT & ATTERBERG LIMITS 15 30 45 (%)	DRY DEN	GR SA SI CL	INSTAI
			12.4	DS8	400	26	12			0			
		12.5 m: Medium grained sand.	12.49		1524	100	13			0		Some free water observed in DS09.	
		14.02 m: Gravel changed to round/subround	14.0°	DS10	0	0	14						
			15.53 15.53	DS11	1524	100	16			0		Fine material washed out from the top 0.3 m of run. Free water observed in DS13	
		17.07 m: Medium to coarse grained sand, some fine to medium grained, rounded gravel,some angular coarse gravel(cobbles likely).	17.09	DS12	1524	100				0		in DS13.	
		PLING METHOD				SHIPI	PING (IC NATURAL LIQUID		Constant Head Test			
B - T C - P D - C	iston S ore Ba	ıll Tube F - Wash Sample G - Shovel Grab		Q - J	ube Vate ar	r Cont	ent Tin	R - Cloth B S - Plastic U - Woode Y - Core Bo eve Z - Discard	Bag n Box W _P ox	MOISTURE LIMIT CONTENT W _N W _L		Variable Head Test Lab. Permeability	

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

	PROJECT:	Mary	' Ri	ver	Pro	oject									PA	GE	: 4 C)F : 6	;	
ELEV. DEPTH (m)	DESCRIPTION			TYPE/ JI	(i	REC'Y (%))		₹ DYNA 20	40 R STRE	60 ENGT	NETRATIOI 80 H (kPa) ELD VANE AB VANE OCKET PEN: 200	CON 10	10 10 ER CON	VITY (m/s)	DRY DENSITY (kg/m3)	REMA ANI GRAIN DISTRIE	D I SIZE BUTIO	N (%) CL	PIEZOMETER INSTALLATION
	17.37 m: Brownish/grey, fine to medium grained sand.		18.57 18.57				1:	\forall			100	230			40 (10)					
	18.59 m: Light brown, medium to coarse grainer sand, some round, fine to medium grained gravel, some angular,coarse gravel(cobbles likely).	. II	10.37	DS13	1524	100	19	9					0							
		<u>2</u>	20.09 20.09				20	0									Trace free observed			
				DS14	1524	100	2	1					0							
			21.61 21.61				2:	2												
			2 <u>3.13</u> 23.13	DS15	1524	100	23	3					0							
	23.16 m: Gravel changed to medium to coarse grained, rounded. some angular coarse gravel(cobbles likely).			DS16	1524	100	24	4					0							
	PLING METHOD					Chin.			ONTA	NED	:	:	<u> </u>	:	:					
A - Split Tub B - Thin Wa C - Piston S D - Core Ba	pe E - Auger Ill Tube F - Wash Sample G - Shovel Grab			Q - J	nser ube Vate ar	t r Conf	ent Ti	in	S - P U - V	Cloth Ba lastic B Vooden	ag Box x	PLASTI LIMIT	W _N	RE LIMIT	r		Var	iable H	ead Te	st

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

HOLE: <u>BH13-01B</u>

		PROJECT: N	lary R	iver	Pro	ject		·		PA	GE	: 5	OF : 6	
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	SAM	TYPE/ JA	(F)	REC'Y (%) BLOW COUNTS (QUICK TRIAXIAL	80	HYDRAULIC CONDUCTIVITY (m/s) 10 ⁶ 10 ⁵ 10 ⁴ WATER CONTENT & ATTERBERG LIMITS 15 30 45 (%)	DRY DENSITY (kg/m3)	AI GRA DISTR	IARKS ND IN SIZE IIBUTION (%)	PIEZOMETER INSTALLATION
		24.68 m: Medium grained sand.	<u>24.65</u> 24.65	5			25						ee water d in DS17.	
		26 24: Madium to coorea	<u>26.17</u> 26.17		1524	100	26			0				
		26.21: Medium to coarse grained sand, some fine gravel, subround to round.		DS18	1524	100	27			Ο				
			<u>27.69</u> 27.69		1524	100	28							
		29.26 m: Light brown sand, trace angular coarse gravel	<u>29.2</u> 1	1	1524	100	29							
		in otherwise round to subround gravel(cobbles likley).		DS20	1524	100	30			0				
		DI INC METUCS	Ш			LUDI		CONTAINED	:					
B - T C - P D - C	plit Tul hin Wa iston S ore Ba	all Tube F - Wash Sample G - Shovel Grab		Q - J	nsert ube Vater ar	Cont	ent Tin	R - Cloth Bag S - Plastic Bag U - Wooden Box Y - Core Box eve Z - Discarded	LIMIT	C NATURAL LIQUID MOISTURE LIMIT CONTENT WN WL		U Va	ariable Head Te	est

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation HOLE: <u>BH13-01B</u>

PROJECT: Mary River Project **PAGE:** 6 **OF:** 6

	PROJECT: Ma	ary River Project		PAGE	E: 6 OF : 6
ELEV. DEPTH (m)	DESCRIPTION	DEPTH TYPE/ NUMBER RECY (mm) RECY (%) BLOW COUNTS	● SPT N-VALUES \$ DYNAMIC CONE PENETRATION 20 40 60 80 SHEAR STRENGTH (KPa) □ UNCONFINED ■ QUICK TRIAXIAL 50 100 150 200	HYDRAULIC CONDUCTIVITY (m/s) 10 10 10 10 10 10 10 10 10 10 10 10 10 1	
30.78	SAND, trace gravel, medium to coarse grained sand, fine grained, round to subrounded gravel.	DS21 1524100 32.25 32.25 DS22 0 0 33		O	Some free water observed in DS22. DS21 and DS22 similar; samples collected in 1 large bag.
<u>-26.17</u> ;; 33.83	NOTES: 1. Borehole terminated at a depth of 33.83 m as targetted drilling depth acheived. 2. Thermistors not installed.	END OF	BOREHOLE		
A - Split B - Thin C - Pisto D - Core	Wall Tube F - Wash on Sample G - Shovel Grab	SHIPPING (N - Insert O - Tube P - Water Content Tir Q - Jar X - Plastic & PVC Sle	S - Plastic Bag U - Wooden Box W _P Y - Core Box	NATURAL LIQUID MOISTURE LIMIT CONTENT WN WL	Constant Head Test Variable Head Test Lab. Permeability Project: H/349000

■ HATCH BOREHOLE REPORT HOLE: **BH13-02 CLIENT: Baffinland Iron Mines Corporation PROJECT:** Mary River Project PAGE: 1 SITE: Milne Inlet Beach **COORDINATES:** 7976491.693 CONTRACTOR: Logan Drilling Group STARTED: 05/12/2013 **DRILL TYPE:** Skid mounted CME 55 FINISHED: 503240.396 06/12/2013 **METHOD SOIL:** Wash Boring **INSPECTOR:** C.S.S/W.R.H **DIP DIRECTION:** C.S.S ROCK: LOGGED BY: DIP: 90 NA **CASING: HWT-Casing REVIEWED:** W.R.H **ELEVATIONS** DATUM: **Ground Surface** DATE: January, 2014 PLATFORM: CORE: Not Applicable **GROUND:** 2.34 **END OF HOLE:** -21.65 HYDRAULIC CONDUCTIVITY (m/s) SPT N-VALUES (kg/m3) SAMPLE or RUN > DYNAMIC CONE PENETRATION **ELEV** REMARKS PIEZOMETER INSTALLATION $10^{6} \quad 10^{5} \quad 10^{4}$ **BLOW COUNT** 40 60 80 AND DEPTH **DESCRIPTION** (E) DENSITY (mm) GRAIN SIZE SHEAR STRENGTH (kPa) (m) TYPE/ NUMBER RECY(%) DISTRIBUTION (%) DEPTH (UNCONFINED WATER CONTENT & REC'Y (ATTERBERG LIMITS GR SA SI CL 100 15 30 45 (%) 2.34 150 200 0.0 SAND, trace to some gravel, frozen, light brown, very dense, medium to coarse grained sand. 1 11.58 AS1 26 32 Bulk Sample taken 0 1.5 m: With gravel, 1.5 to 3.0 m. interbedded sand and gravel, coarse sand. 2 /3.05 3.05 m: Medium to coarse 46 16 200 for 127mm 0 AS2 grained sand. 3.38 m: Trace of fine gravel. Poor recovery from core. 4.57 m: Some free 4.57 water observed in 10 5 10 50 AS03. 47 AS3 SAMPLING METHOD SHIPPING CONTAINER Constant Head Test A - Split Tube N - Insert R - Cloth Bag B - Thin Wall Tube F - Wash O - Tube S - Plastic Bag Variable Head Test G - Shovel Grab P - Water Content Tin U - Wooden Box C - Piston Sample Lab. Permeability

Core Box

X - Plastic & PVC Sleeve Z - Discarded

D - Core Barrel

(sonic or diamond drill)

K - Slotted

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation HOLE: BH13-02

PROJECT: Mary River Project **PAGE:** 2 **OF:** 5

		PROJECT: WI	ily ixivei r	TOJECT		PAGE	E. 2 O F. 5
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	SAMPLE HTVBE/NUMBER	RECY (mm) Q RECY (%) A BLOW COUNTS C	SPT N-VALUES DYNAMIC CONE PENETRATIO 20 40 60 80 SHEAR STRENGTH (kPa) UNCONFINED A FIELD VANE QUICK TRIAXIAL DOCKET PEN 50 100 150 200	10° 10° 10° E	GR SA SI CL
		5.03 m: Fine to medium sand, gravel layer is 100 mm thick.		6			Does not appear to be frozen.
		6.10 m: Trace gravel and silt, wet.6.7 m: Very thinly to thinly bedded.	6.1 AS4	70 11 12 135 135 for 150mm		• 0	3 90 7
		Gravelly SAND, light brown, very dense, wet, fine grained granitic gravel.	7.01 AS5 7.16 AS5 8.53 AS6 8.98	0 0 150 135 for 150mm 9		• 0	Some free water observed in AS05. Sample does not appear to be frozen.
		gravel, trace silt. 10.52 m: Gravelly SAND as above.	\/	42 9 120 172 for 150mm		• 0	
B - Tr C - Pi D - C	plit Tub nin Wal iston S ore Bal	l Tube F - Wash ample G - Shovel Grab	Q - Ja	sert ibe ater Content Tin r	R - Cloth Bag S - Plastic Bag	IC NATURAL LIQUID MOISTURE LIMIT CONTENT WN WL	Constant Head Test Variable Head Test Lab. Permeability Project: H/34900

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation HOLE: BH13-0

PROJECT: Mary River Project **PAGE:** 3 **OF:** 5

		PROJECT: Ma	ary R	ıver	Pro	ojec	ct		PAGE:	3 OF : 5
ELEV.	3OL	DESCRIPTION	SAM	IPLE		(တ္၊		SPT N-VALUES DYNAMIC CONE PENETRATION 20 40 60 80 10 10 10 10 10 10 10 10 10 10 10 10 10	REMARKS AND HILL GRAIN SIZE
(m)	SYMBOL		DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNT	DEPTH (m)	QUICK THE POCKET PEN.	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
		11.58 m: Not frozen, medium brown, dense, wet, coarse grained sand.	11.58	AS8	60	10 j	26 18 28 r 150r	_{mr} 12	• 0	
			13.11	AS9	10	1.6	10 29 72 for 15	13		Washed sample, only gravel retained.
<u>-12.29</u> 14.63		SAND, some subrounded gravel, trace of silt, medium to coarse grained sand.	15.24	AS10		57 : 38 for	9 20 30 150m	14 15		
		16.15 m: Trace silt, trace fine, subrounded gravel.	16.15	AS11	500	82	5 9 10 150m	16	• •	
			17.67					17		No recovery in SPT.
B - Ti C - Pi D - C	plit Tub hin Wa iston S ore Ba	Il Tube F - Wash sample G - Shovel Grab		N - Ir O - T P - W Q - Ja X - P	isert ube /atei ar	t r Cor	nten	t Tin	ONTAINER R - Cloth Bag LIMIT MOISTURE LIMIT CONTENT S - Plastic Bag U - Wooden Box Y - Core Box ve Z - Discarded	Constant Head Test Variable Head Test Lab. Permeability Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation H

PROJECT: Mary River Project **PAGE:** 4 **OF:** 5

		PROJECT: M	lary	/ R	ıver l	٦rc	ojec	ct				PAC	jΕ	: 4 OF : 5	
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION		ОЕРТН МА	TYPE/ JAIN	REC'Y (mm)		BLOW COUNTS Z	DEPTH (m)	SPT N-VALUES DYNAMIC CONE PENETRATIOI 20 40 60 80 SHEAR STRENGTH (kPa) UNCONFINED # IEBU VANE UNCONFINED # LAB VANE QUICK TRIAXIAL 50 100 150 200	10 10 WATER CON ATTERBERG	JLIC ITY (m/s) 10 TENT & LIMITS 45 (%)	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	PIEZOMETER INSTALLATION
<u>-16.86</u> 19.20		GRAVEL, multicoloured, fine to coarse up to 50 mm, subrounded to subangular.		19.2 19.48	AS12	0	0 25 for 50 fo	15 17 21 r 150	18 Dmm						
<u>-18.38</u> 20.72		SAND, some fine gravel, medium brown, wet, medium to coarse grained sand, subangular to subrounded gravel.	$\left \right\rangle$	20.72 21.33	AS14	300	50 12 for	5 15 14 r 150	21 Dmm		O				
-19.91 22.25		Gravelly SAND, medium brown, coarse sand, multicoloured subrounded gravel up to 25 mm in size.	X	22.25 22.68	AS15	300	70 50 for	5 15 r 127	22 7mm 23		O				
<u>-21.65</u> 23.99		NOTES:	X	23.77 24	AS16	200	87 50 fo			BOREHOLE	D .				
B - T C - P D - C	plit Tub hin Wa iston S ore Ba	Il Tube F - Wash ample G - Shovel Grab			N - In O - T P - W Q - Ja X - Pl	ser ube ate	t r Co	nte	nt Tin	S - Plastic Bag	C NATURAL LIQUID CONTENT UNIT CONTENT WN WI			Constant Head Tes Variable Head Tes Lab. Permeability Project: H/34	

BOREHOLE REPORT

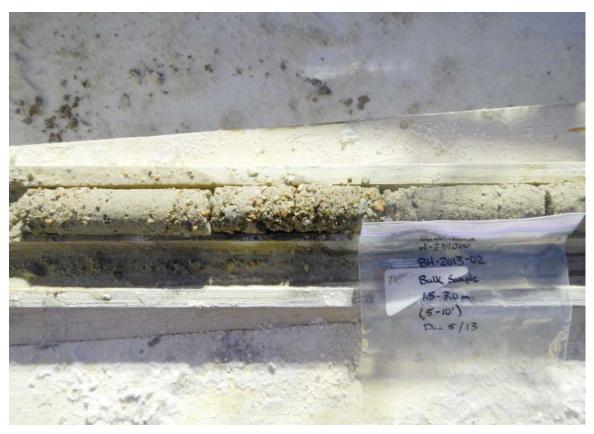
CLIENT: Baffinland Iron Mines Corporation

HOLE: <u>BH13-02</u>

PROJECT: Mary River Project

PAGE: 5 **OF**: 5

SAMPLING METHOD SAMPLING METHOD SAMPLING CONTAINER SAMPLING METHOD SAMPLIN			PROJECT: Ma	агу К	iver I	-rc	oject				PA	GE	:: 5 UF : 5	
SAMPLING METHOD		ار	DECODIDATION	SAN	ЛРLE 	_	လ		> DYNAMIC CO	NE PENETRATION		(kg/m3)	REMARKS AND	NO NO
1. Five thermistors installed at 15. 35 m. 14.	(m)	SYMBC	DESCRIPTION	ЭЕРТН	TYPE/ JUMBER	REC'Y (mm)	REC'Y (%)	JEPTH (m)	SHEAR STRE UNCONFINED QUICK TRIAXIAL	ENGTH (kPa) X FIELD VANE LAB VANE POCKET PEN.	ATTERBERG LIMITS	RY DENSITY	GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETI
A - Split Tube E - Auger N - Insert R - Cloth Bag B - Thin Wall Tube F - Wash O - Tube S - Plastic Bag C - Piston Sample G - Shovel Grab D - Core Barrel K - Slotted Q - Jar Y - Core Box (sonic or diamond drill) A - Split Tube E - Auger N - Insert R - Cloth Bag I - Insert Moistruse Limit Content Tim U - Wooden Box W N W W W W W W W W W W W W W W W W W			at 19.38 m, 14.38 m, 9.38 m, 4.38 m, 0.50 m below	DEP	TYPE NUM	REC	REC BLOI	DEP				DRY	GR SA SI CL	PIEZ
A - Split Tube E - Auger N - Insert R - Cloth Bag B - Thin Wall Tube F - Wash O - Tube S - Plastic Bag C - Piston Sample G - Shovel Grab D - Core Barrel K - Slotted Q - Jar Y - Core Box (sonic or diamond drill) A - Split Tube E - Auger N - Insert R - Cloth Bag I - Insert Moistruse Limit Content Tim U - Wooden Box W N W W W W W W W W W W W W W W W W W														
Project: H/349000	B - TI C - P D - C	plit Tul hin Wa iston S ore Ba	be E - Auger all Tube F - Wash Sample G - Shovel Grab arrel K - Slotted		O - Ti P - W Q - Ja	serf ube /ate	t r Conte	ent Tin	R - Cloth Ba S - Plastic B U - Wooden Y - Core Bo	ag LIMIT Bag I Box W _P X	MOISTURE LIMIT CONTENT	-	Variable Head Te Lab. Permeability	est /



BH-2013-02 Bulk Sample (1.5m - 3.0m) 1 of 3

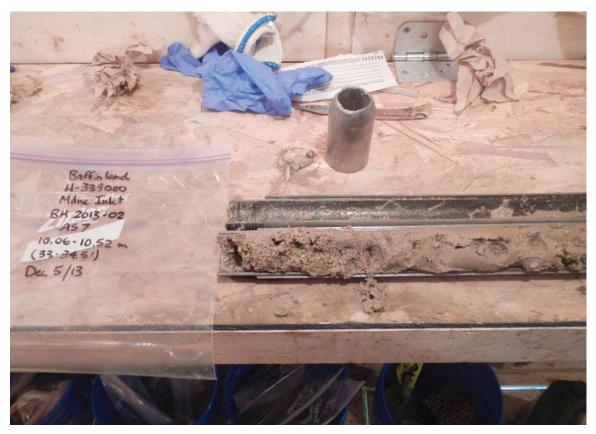


BH-2013-02 Bulk Sample (1.5m - 3.0m) 2 of 3





BH-2013-02 Bulk Sample (1.5m - 3.0m) 3 of 3



BH-2013-02 AS-7 (10.06m - 10.52m)





BH-2013-02 AS-10 (14.63m - 15.24m)



BH-2013-02 AS-11 (16.15m - 16.76m)





BH-2013-02 AS-13 (19.20m - 19.81m)



BH-2013-02 AS-14 (20.73m - 21.34m)





BH-2013-02 AS-16 (23.77m - 24.38m)



MATCH BOREHOLE REPORT HOLE: **BH13-03 CLIENT: Baffinland Iron Mines Corporation PROJECT:** Mary River Project PAGE: 1 SITE: Milne Inlet Bay **COORDINATES:** 7976576.523 CONTRACTOR: Logan Drilling Group STARTED: 06/12/2013 **DRILL TYPE:** Skid mounted CME 55 FINISHED: 503245.059 07/12/2013 **METHOD SOIL:** Wash Boring **INSPECTOR:** C.S.S/W.R.H **DIP DIRECTION:** ROCK: LOGGED BY: C.S.S DIP: 90 NA **CASING: HWT-Casing REVIEWED:** W.R.H **ELEVATIONS** DATUM: Seabed DATE: January, 2014 PLATFORM: CORE: Not Applicable **GROUND:** -1.48 **END OF HOLE:** -28.30 HYDRAULIC CONDUCTIVITY (m/s) SPT N-VALUES (kg/m3) SAMPLE or RUN > DYNAMIC CONE PENETRATION **ELEV** REMARKS PIEZOMETER INSTALLATION $10^{6} \quad 10^{5} \quad 10^{4}$ 40 60 **BLOW COUNT** AND DEPTH **DESCRIPTION** DENSITY (E) GRAIN SIZE (mm) SHEAR STRENGTH (kPa) (m) TYPE/ NUMBER REC'Y(%) DISTRIBUTION (%) DEPTH (UNCONFINED WATER CONTENT & DEPTH RECY ATTERBERG LIMITS GR SA SI CL -1.48 100 15 30 45 (%) 150 200 Drill set up on ice 0.0 SAND, some silt, medium 0 surface; casing brown, loose to compact, extended to seabed; 4 5 6 fine to medium grained 60 Ö AS1 10 soil sampling started sand. 10 for 150mm -2.08 0.6 • SAND, trec of gravel, medium brown, loose to compact, coarse grained Water depth sand 1 measured periodically during drilling. Poor recovery, gravel 1.5 fragments only. 10 13 13 AS₂ 5 1 3 3.05 100 100 100 100 100 100 100 100 Silty SAND, loose, very 4 5 5 O AS3 46 8 wet. 6 fo 150mm 3 66 Gravelly SAND, trace silt. 3 81 brown, compact, wet, coarse grained sand, fine AS4 60 10 Ö . 0 : 12 for 150mm Sand becoming fine with depth. 4.57 Silty SAND, some gravel, some shell fragments, AS5 10 2 \bigcirc SAMPLING METHOD SHIPPING CONTAINER Constant Head Test PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT A - Split Tube N - Insert R - Cloth Bag B - Thin Wall Tube F - Wash O - Tube S - Plastic Bag Variable Head Test G - Shovel Grab P - Water Content Tin U - Wooden Box C - Piston Sample Lab. Permeability D - Core Barrel K - Slotted Core Box X - Plastic & PVC Sleeve Z - Discarded (sonic or diamond drill)

H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation HOLE: BH13-03

		PROJECT: Ma	ary F	River	Pro	jec	t								PA	GE	: 2	2 (F:	5	
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	SA	TYPE/ JAM	REC'Y (mm)	REC'Y (%) NO INTEGRAL)	\$	DYNAM 20 HEAF	40 R STRE	60 ENGTH * FIE	NETRATION 80 H (kPa) ELD VANE B VANE DCKET PEN.	10°	10 ⁵	ITY (m/s)	DENSITY (kg/r	D		D I SIZE BUTIC	N (%)	PIEZOMETER INSTALLATION
-6.66 5.18	sia in . sia in .	brown, loose, wet, fine grained sand.	5. ´	18	R	2 for 1			50	100	150	200	15	30	45 (%)	DRY	GR	SA	SI	CL	۵≧
		SAND, some silt, some fine gravel, brown with very closely spaced dark brown	5.7	AS6	65	11 4 6 for 1	:	•					0								
-7.58 6.1	ru n	bands along bedding, (possibly organics) loose, wet, medium to coarse grained sand.	6.				6														
	11101 11101 11101 11101 11101	5.60 m: Coarsed grained sand, becoming gravelly.	6.7	AS7	60	10 4 2 for 1		•					0				5	60	34	9	
	1001 1001 1001 1001 1001 1001	Silty SAND, trace clay, trace of gravel, medium brown, loose to compact, wet.	(0.1				7														
	\$10 10 \$10 60 \$10 60 \$10 60 \$10 60 \$10 60 \$10 60 \$10 60 \$10 60	7.62 m: Dark greyish brown, compact.	8.2	AS8	40	7 1 8 for 1	2 0 0 8 8 50mm		•												
	1000 1000 1000 1000 1000 1000 1000 100						9														
9.14		SAND and GRAVEL, light brown, loose to compact, medium to coarse grained sand, fine grained gravel.	9.7	AS9	40	7	5 5 5 5 7						0								
,							10	0													
,			10.	67 AS10	0	0 3 5 for 1	3 "	1													
,			11.	28																	
^ ^		PLING METHOD		NI ·			PING					PLASTIC LIMIT	C NATURAL	. LIQUII E LIMIT				Con	stant	Head Te	st
B - Ti C - Pi D - C	iston S ore Ba	all Tube F - Wash Sample G - Shovel Grab		Q - J	ube /atei ar	Con	tent Ti VC Sle	n	S - Pla U - W Y - Co	oth Ba astic B ooden ore Boo scarde	ag Box	W _P	W _N	W	L					Head Tean	

BOREHOLE REPORT

CLIENT: **Baffinland Iron Mines Corporation**

PAGE: 3 **OF**: 5 **PROJECT:** Mary River Project

	PROJECT: M	ary R	iver	Pro	ojeo	ct			PAG	βE:	3 (DF : 5	
ELEV. DEPTH (m)	DESCRIPTION	SAM	TYPE/ NUMBER T	(-		BLOW COUNTS Z	DЕРТН (m)	SPT N-VALUES DYNAMIC CONE PENETRATION 10° 10° 10°	ENT & IMITS	DRY DENSITY (kg/m3)	AN GRAII DISTRI	ARKS D N SIZE BUTION (%)	PIEZOMETER
	12.19 m: Gravel decreasing to some, brown, compact. SILT and SAND, dark greyish brown, loose to compact, wet to saturated, fine grained sand.	12.15	AS11	20	3 5 for	6 8 7 1500	12 mmm			3	31 54	15	
	SAND, some fine gravel, light brown, loose to compact, coarse grained sand, subangular to subrounded gravel.	14.48	AS12	46	6 for	4 4	14 _{mm}			11	8 81	2	
		16.76	AS14	0	0	5 5 7	16	•					
SAMP A - Split Tube B - Thin Wall C - Piston Sa D - Core Barr	Tube F - Wash mple G - Shovel Grab	17.37	N - Ir O - T P - W Q - J;	serfube /ater	6 for	7 150 PPI	NG (PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT Wp W _N W _L Y - Core Box e Z - Discarded			Vai	nstant Head Te riable Head Te o. Permeability	est

BOREHOLE REPORT

CLIENT: **Baffinland Iron Mines Corporation**

PAGE: 4 **OF:** 5 **PROJECT:** Mary River Project

		PROJECT: M	lary R	iver l	Pro	ojec [.]	t				PA	GE	: 4 OF : 5	
LEV. EPTH	JC TC	DESCRIPTION	SAN	IPLE	ı	O	າ		SPT N-VALUES DYNAMIC CON 20 40		HYDRAULIC CONDUCTIVITY (m/s)	(kg/r	REMARKS AND	ER
(m)	SYMBOL	DESCRIPTION	DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	DEDTH (m)		SHEAR STRE UNCONFINED QUICK TRIAXIAL 50 100	NGTH (kPa) * FIELD VANE * LAB VANE * POCKET PEN. 150 200	WATER CONTENT & ATTERBERG LIMITS 15 30 45 (%)	DRY DENSITY	GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER
							1	18						
			18.9				- 1	19						
				AS15	0	0 3 8 for 1	3 5 50mm							
			19.51											
							2	20						
			20.42	2										
				AS16	0	0	3 7 2		•					
			21.03	3			15 0 mm	21						
			21.94	1			7	22						
				AS17	0	0 8 9 for 1	7 3 3 50mm		•					
			22.55	5		0.07								
							2	23						
		23.46 m: Medium brown.	23.46			00	9							
				AS18	170	9	50mm	24			0			
5.55 .07	* * * *	DCPT was carried out.	/ \24.07											
		PLING METHOD					PING	G C	CONTAINER	PLASTI	C NATURAL LIQUID	'	Constant Head Te	st
3 - T	plit Tub hin Wa iston S	ll Tube F - Wash		N - In O - T P - W	ube		tent T	Γin	R - Cloth Bag S - Plastic Ba U - Wooden I	ag	C NATURAL LIQUID MOISTURE LIMIT CONTENT WN WL		Variable Head Te	
D - C	ore Ba	rrel K - Slotted diamond drill)		Q - Ja	ar				Y - Core Box eve Z - Discarded	:	—)''		Lab. Permeability	

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation HOLE

PROJECT: Mary River Project PAGE: 5 OI

		PROJECT: Ma	ary R	iver	Pro	ject								PA	GE	: 5 (OF : 5		
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	SAN	TYPE/ NUMBER T	(F)	REC'Y (%) NOW COUNTS IN	DEPTH (m)	₹ DYNA	40 R STRE IFINED TRIAXIAL	NE PEN 60 ENGTH * FIE • LAE	LD VANE 3 VANE CKET PEN.	UATE ATTER	10°	ULIC (ITY (m/s) 10 ITENT & LIMITS 45 (%)	RY DENSITY (kg/	AN GRAII	N SIZE BUTION		PIEZOMETER INSTALLATION
		24.07 m: DCPT start.																	
							25												
							26												
-28.30 26.82		26.82 m: DCPT end.				EN	D OF	BOR	ЕНО	LE									
		NOTES: 1. Single thermistor installed at 10 m below the seabed.																	
B - Ti C - Pi D - C	plit Tul nin Wa iston S ore Ba	all Tube F - Wash Sample G - Shovel Grab		Q - J	nsert ube /atei ar	Cont	ent Tin	S - P u U - V	Cloth Ba Plastic B Vooden Core Bo	Bag i Box x	PLASTIC LIMIT	NATURAL MOISTUR CONTENT	LIQUI E LIMIT			Va	nstant Heriable He	ead Tes	st



DYNAMIC CONE PENETROMETER TEST

BH03-DCPT

Sheet 1 of 1

TEST PIT No.

TEST Id.

SURFACE ELEVATION -1.48

December 6, 2013

Client: Baffinland

Project: Milne Inlet Ore Dock

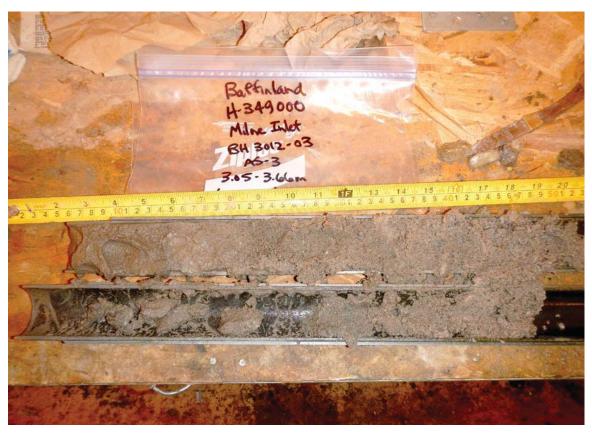
Project No: H/349000

GENERAL DETAILS BLOWS PER 150mm mm PER BLOW Depth From Blows/ mm/ Blow 150mm (m) 23 23 24.08 24.23 9 17 24.38 9 17 24.53 9 17 24.68 2 75 24.83 2 75 24 24 24.98 2 75 25.13 2 75 25.28 9 17 25.43 13 12 25.58 14 11 25 25 25.73 9 17 25.88 17 9 26.03 16 9 26.18 14 11 26.33 14 11 Depth (m) 26 Depth (m) 26 26.48 15 10 26.63 10 15 26.78 13 12 26.93 10 15 27 28 28 29 29 0 20 40 80 60 20 40 60 80 Blows/150mm Blows/mm Remarks:

2/2014 \\m



BH-2013-03 AS-1 (0.0m - 0.60m)



BH-2013-03 AS-3 (3.05m - 3.66m)





BH-2013-03 AS-4 (3.81m - 4.42m)



BH-2013-03 AS-6 (5.79m - 6.40m)





BH-2013-03 AS-7 (?m - ?m)



BH-2013-03 AS-8 (7.62m - 8.22m)





BH-2013-03 AS-18 (23.47m - 24.08m)



■ HATCH BOREHOLE REPORT HOLE: **BH13-05 CLIENT: Baffinland Iron Mines Corporation PROJECT:** Mary River Project PAGE: 1 SITE: Milne Inlet Bay **COORDINATES:** 7976626.922 **CONTRACTOR:** Logan Drilling Group STARTED: 07/12/2013 **DRILL TYPE:** Skid mounted CME 55 FINISHED: 503242.678 08/12/2013 **METHOD SOIL:** Wash Boring **INSPECTOR:** C.S.S/W.R.H **DIP DIRECTION: ROCK:** C.S.S LOGGED BY: DIP: 90 NA **CASING: HWT-Casing REVIEWED:** W.R.H **ELEVATIONS** DATUM: Seabed DATE: January, 2014 PLATFORM: CORE: Not Applicable **GROUND:** -15.12 **END OF HOLE:** -38.58 HYDRAULIC CONDUCTIVITY (m/s) SPT N-VALUES (kg/m3) SAMPLE or RUN > DYNAMIC CONE PENETRATION ELEV. REMARKS PIEZOMETER INSTALLATION $10^{6} \quad 10^{5} \quad 10^{4}$ **BLOW COUNT** 40 60 80 AND DEPTH **DESCRIPTION** DENSITY (E) (mm) GRAIN SIZE SHEAR STRENGTH (kPa) (m) TYPE/ NUMBER REC'Y(%) DISTRIBUTION (%) DEPTH (☐ UNCONFINED WATER CONTENT & DEPTH REC'Y (ATTERBERG LIMITS GR SA SI CL 100 15 30 45 (%) -15.12150 200 Drill set up on ice 0.0 0 Silty SAND, trace of fine surface; casing gravel, organics along extended to seabed; 7 7 8 8 bedding laminations, 65 11 $\dot{\bigcirc}$ AS1 soil sampling started alternating brown and black laminations, loose to 0.61 compact, wet, fine to medium grained sand. Water depth 1 measured periodically during drilling. <u>-16.69</u> 1.57 1.52 SAND, some silt, trace gravel, grey, loose, wet. AS2 30 5 57 30 8 2 -18.17 3.05 3 3.05 SAND, trace silt, trace sandstone gravel, light 6 6 7 brown, compact, wet to 450 450 Ö AS3 saturated, fine to medium grained sand. 3 66 4.57 m: Medium to coarse 4.57 grained sand. AS4 56 9 O 86 SAMPLING METHOD SHIPPING CONTAINER Constant Head Test A - Split Tube N - Insert R - Cloth Bag B - Thin Wall Tube F - Wash O - Tube S - Plastic Bag Variable Head Test G - Shovel Grab P - Water Content Tin U - Wooden Box C - Piston Sample Lab. Permeability D - Core Barrel K - Slotted Q - Jar Core Box

X - Plastic & PVC Sleeve Z - Discarded

(sonic or diamond drill)

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

HOLE: <u>BH13-05</u>

		PROJECT: N			iver				,5 (,01	poi	ıaı	1011								P	AG	iF:		F: 4	4	I
ELEV.			_		IPLE		RU	JN				NAM	VALUI	ES ONE P	ENE ⁻	TRATI	ION	CON 10	1DU			_		REMA ANI	RKS		₽ N
DEPTH (m)	SYMBOL	DESCRIPTION		DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNT	DEPTH (m)		SHE	AR ONFI	STR	ENG	TH (kPa) VANE ANE ET PE	Ξ	WAT	ER (CON' ERG	TENT LIMITS		DRY DENSITY (kg/m3)	GRAIN DISTRIE	SIZE BUTIC		PIEZOMETER INSTALLATION
-20.17 5.05		SAND, with gravel, trace of silt, contains organics, dark grey to dark brown, saturated, fine grained sand.		5.18																				Washout h		ng	
			\\	6.71	AS5	10	2	3 5 6 6	6		•													38	54	8	
				7.62					7																		
				8.23	AS6	0	0	4 4 2 1	8)																
4		SAND and GRAVEL, light brown, very loose, wet, coarse to medium grained sand, fine gravel.	X	9.14	AS7	20	3	N.A N.A 3 4	9										0					SPT attern results not the soil is disturbed drilling.	valid likely	d as	
•		10.67 m: Loose to complact, gravel decreasing to some.		10.67	AS8	40	7	4 5 5 7	11		•							C)								
B - Ti C - Pi D - C	SAM plit Tul nin Wa iston S ore Ba	all Tube F - Wash Sample G - Shovel Grab			N - II O - T P - V Q - J X - F	nser Tube Vate Iar	t er Coi	ntei	nt Tin	n	R - S - U - Y -	Clo Pla Wo	oth Bastic I soder re Bo	Bag n Box ox	(PLA LIMI	IT	NATUR MOISTI CONTE	JRE I	LIQUID LIMIT			[Vari	able l Pern	Head Te Head Te neability H/3	est

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation HOLE: B

PROJECT: Mary River Project **PAGE:** 3 **OF:** 4

		PROJECT: Ma	ary	/ Ri	iver	Pro	oje	ct								PA	GE	: 3	0	F: 4	
ELEV.	٦.		S	SAN	IPLE	or		S		1 .			ENETRATION 80	CONI		ULIC 'ITY (m/s)	(kg/m3)	F	REMAI AND	RKS	NO NO
DEPTH (m)	SYMBOL	DESCRIPTION		DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNT	DEPTH (m)	SHE	AR STRI	ENGT	TH (kPa) FIELD VANE AB VANE POCKET PEN.	WATE	ER CON	ITENT & LIMITS	DRY DENSITY (kg/m3)	DIS	SRAIN STRIB	SIZE BUTION (%)	PIEZOMETER INSTALLATION
-27.31 12.19		SAND, with silt, contains some organics, light to dark brown,wet, fine to medium grained.		12.19	AS9	18	3	4 14 14 10	12		•							1	75	24	
<u>-29.32</u> 14.20		13.72 m: trace silt, light brown, compact. Silty SAND, dark grey, compact, wet, fine grained.	$\left \right $	13.72 14.33 14.32	AS10		8	6 7 5 6	14	•)				2	91	7	
	,000 ,000 ,000 ,000 ,000 ,000 ,000 ,00			14.93					15												
									17												
	+ + + +										<u> </u>	:	:	:	:						
B - T C - P D - C	plit Tub hin Wa Piston S Core Ba	Il Tube F - Wash ample G - Shovel Grab			Q-J	nser ube /ate ar	t r Co	onte	nt Tin	S - 1 U - Y -	Cloth Bath Plastic Electric Wooder Core Both Discarde	Bag n Box ox		NATURA MOISTUR CONTEN	L LIQUII			Pro	Varia	stant Head Te able Head Te Permeability	est

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

HOLE: <u>BH13-05</u>

PROJECT: Mary River Project

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						_										
			SAI	MPLE	or	RL	ĬΝ		SPT N-VALUES DYNAMIC CON			RAULIC TIVITY (m/s)	m3)		DI (O	
ELEV. DEPTH	7	DESCRIPTION		1	_		NTS		20 40	60 80		0 ⁵ 10 ⁴	DENSITY (kg/m3)	REMA AND)	PIEZOMETER
(m)	SYMBOL	DESCRIPTION		<u>~</u>	REC'Y (mm)	(%	Ω	DEPTH (m)	SHEAR STRE	NGTH (kPa)			SITY	GRAIN	I SIZE BUTION (%)	I T
	SΥ		DEPTH	,E/	<u>}</u>) 	<u> </u>	Ţ	☐ UNCONFINED ■ QUICK TRIAXIAL	➤ FIELD VANE • LAB VANE	WATER CO	ONTENT & RG LIMITS		DIOTIVIE	7011014 (70)	102
				TYPE/ NUMBER	REC	REC'Y (%)	BLOW COUNT	DEF		• POCKET PEN. 150 200	15 30	0 45 (%)	DRY	GR SA	SI CL	PE
		SAND, some gravel, trace silt, light to medium brown, wet, medium to coarse grained sand, subrounded to rounded gravel.	19.3	2 AS12 31	0	0)18 8678 5658	18 19 20		150 200	15 3(0 45 (%)	DRY	11 89	SI CL	
		22.86 m: Trace to some	22.2 22.8 22.8	AS14	0		5 6 10 10	22	•					very diffict binding wi casing. Sand heave into the case not done as	ving 1.5 m asing, DCPT as flowing uld have	
-38.58		gravel, subrounded.	23.4	AS15	550		5 7 11 13	23	•		0			affected b	low counts.	
23.46		NOTES:	V.3.4	**		E	ND	OF	BOREHOL	E						
		No thermistors installed.						0.								
	SAM	PLING METHOD				SHIF	PPII	NG C	CONTAINER	1 1	:	<u> </u>			otant Haad T-	ot.
A - S	plit Tul	pe E - Auger		N - II					R - Cloth Bag	PLASTIC	NATURAL LIC MOISTURE LIC CONTENT	QUID MIT			stant Head Te	
		Ill Tube F - Wash Sample G - Shovel Grab		O - T P - V			nter	nt Tin	S - Plastic Ba U - Wooden I	ag	W_N	W _L		=	able Head Te	
	ore Ba			Q - J	lar				Y - Core Box	'		⊣ -		Lab	. Permeability	,
									eve Z - Discarded							



BH-2013-05 AS-1 (0.0m - 0.60m) 1 of 2

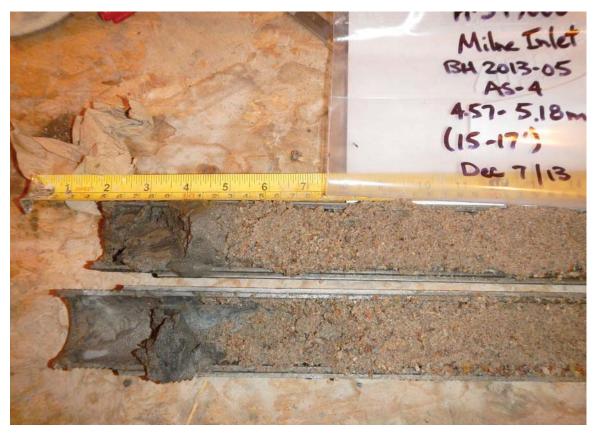


BH-2013-05 AS-1 (0.0m - 0.60m) 2 of 2





BH-2013-05 AS-4 (4.57m - 5.18m) 1 of 2



BH-2013-05 AS-4 (4.57m - 5.18m) 2 of 2





BH-2013-05 AS-8 (10.67m - 11.28m)



BH-2013-05 AS-10 (13.72m - 14.32m)





BH-2013-05 AS-13 (20.73m - 21.34m)



BH-2013-05 AS-15 (22.86m - 23.47m)



■ HATCH BOREHOLE REPORT HOLE: **BH13-05B CLIENT: Baffinland Iron Mines Corporation** PAGE: 1 **OF**: 8 **PROJECT:** Mary River Project SITE: Milne Inlet Bay **COORDINATES:** 7976628.297 CONTRACTOR: Logan Drilling Group STARTED: 15/12/2013 **DRILL TYPE:** Skid mounted CME 55 FINISHED: 503250.552 16/12/2013 **METHOD SOIL:** Wash Boring **INSPECTOR:** C.S.S/W.R.H **DIP DIRECTION:** LOGGED BY: C.S.S ROCK: DIP: 90 NA **CASING: HWT-Casing REVIEWED:** W.R.H **ELEVATIONS** DATUM: Seabed DATE: January, 2014 PLATFORM: CORE: Not Applicable **GROUND:** -15.47 **END OF HOLE:** -61.49 HYDRAULIC CONDUCTIVITY (m/s) SPT N-VALUES (kg/m3) SAMPLE or RUN > DYNAMIC CONE PENETRATION **ELEV** REMARKS **BLOW COUNTS** PIEZOMETER INSTALLATION $10^{6} \quad 10^{5} \quad 10^{4}$ 40 60 AND DEPTH **DESCRIPTION** DENSITY (E) (mm) GRAIN SIZE SHEAR STRENGTH (kPa) (m) TYPE/ NUMBER RECY(%) DISTRIBUTION (%) DEPTH (☐ UNCONFINED WATER CONTENT & ATTERBERG LIMITS REC'Y (GR SA SI CL 100 15 30 45 (%) -15.47 150 200 Drill set up on ice 0.0 Borehole advanced to surface; casing 17.67 m without sampling. extended to seabed; Soil not logged untill 17.67 soil sampling started m depth. See BH2013-05 for lithology above this depth. Water depth measured periodically during drilling. SAMPLING METHOD SHIPPING CONTAINER Constant Head Test R - Cloth Bag A - Split Tube N - Insert B - Thin Wall Tube F - Wash O - Tube S - Plastic Bag Variable Head Test G - Shovel Grab P - Water Content Tin U - Wooden Box C - Piston Sample Lab. Permeability D - Core Barrel K - Slotted Core Box X - Plastic & PVC Sleeve Z - Discarded (sonic or diamond drill)

BOREHOLE REPORT ■ HATCH

CLIENT: **Baffinland Iron Mines Corporation**

PAGE: 2 **OF**: 8 **PROJECT:** Mary River Project

		TICOLOT. WE	y				,	_												_ `	_ `		
			S	AM	PLE	or	RU	N			SPTN				COI	HYDI	RAULIC TIVITY (m/s)	13)					
ELEV. DEPTH	٦			1			9	SO		<	DYNA 20	MIC C 40	ONE	E PENETRATION 60 80	1	o 1	0 ⁵ 10 ⁴	DENSITY (kg/m3)		REMA ANI)		R N
(m)	SYMBOL	DESCRIPTION			œ	mm (@ ;		DEPTH (m)				REN	NGTH (kPa)		l		SITY	G	RAIN	SIZE	N (%)	PIEZOMETER INSTALLATION
	SYI			DEPTH	E/ ABEI	REC'Y (mm)	REC'Y (%)	S ≤	TH		UNCON QUICK		٨١	✗ FIELD VANE♣ LAB VANE♠ POCKET PEN.	WAT	TER C	ONTENT &	DENS	Dis	S I KIE	0110	IN (70)	ZOM
			i		TYPE/ NUMBER	REC	REC	BLOW COUNT	DEF	_	50	100		 POCKET PEN. 150 200 			0 45 (%)	DRY	GR	SA	SI	CL	PE
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									7														
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									11														
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		PLING METHOD			NI !		HIP	PII	VG C	0	NTAII			PLASTI	C NATUR MOIST CONTE	RAL LI	QUID			Cons	stant l	lead Te	st
	nin Wa	all Tube F - Wash			N - In O - T	ube					R - C S - P	lastic	Ba	g						Vari	able F	lead Tes	st
D - C	ore Ba	Sample G - Shovel Grab arrel K - Slotted			P - W Q - Ja	ar					U - W Y - C	Voode ore B	en E Box	Sox W _P	W _N		W _L					neability	
(so	onic o	r diamond drill)			X - P	astic	& F	PVC	Slee	eve	Ż - D												
																			Dua	ioct:		11/0	40000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

HOLE: **BH13-05E**

PROJECT: Mary River Project

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		PROJECT: M	lary	/ Ri	ver	Pro	ojec	ct						PA	GE	: 3 OF : 8	
ELEV.	۲		S	AM	PLE	or	RL	JN		SPT N		S NE PENETRATION 60 80	HYDRA CONDUCTIV	/ITY (m/s)	(kg/m3)	REMARKS AND	N N
(m)	SYMBOL	DESCRIPTION		DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNTS	DEPTH (m)		R STRE	NGTH (kPa)	WATER CON ATTERBERG	NTENT & G LIMITS	DRY DENSITY (kg/m3)	GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
					· <u> </u>				_	30	100	130 200	13 30	43 (70)			
									12								
									13								
									14								
									15								
									16								
									17							Polymer NewZam D	
																drilling mud added to drill fluid.	
-33.14 17.67		SAND, trace of silt and	M	17.67				\dashv									
		PLING METHOD	VV				SHIF	PIN	IG C	ONTAIN	NER	* * *	<u> </u>	•		Constant line of Tax	
A - S B - Ti	plit Tul hin Wa	all Tube F - Wash			N - Ir O - T					S - Pl	loth Ba astic B	ag	C NATURAL LIQU MOISTURE LIMIT CONTENT	ID ·		Constant Head Tes Variable Head Tes	
C-P D-C	iston S ore Ba	Sample G - Shovel Grab arrel K - Slotted			P - W Q - J	ar				U - W	ooden ore Bo	Box W _P	W _N W	/ _L		Lab. Permeability	
(S	OHIC OI	diamond drill)			л - Р	เสริโ	υάl	rvC	SIE6	ve Z - Di	scarde	u				Project: H/34	19000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation HOLE: **BH13-0**

PROJECT: Mary River Project PAGE: 4 OF: 8

			SA	MPLE	E or	·Rl	JN			SPT N				CONE	IYDRA	ULIC /ITY (m/s)	13)					
ELEV.	_			1	1	1	က			20 DYNAI	40	NE PEN	NETRATION 80		10 ⁵		DENSITY (kg/m3)	F	REMA ANI	RKS		~ Z
DEPTH (m)	SYMBOL	DESCRIPTION			Ē	<u></u>	BLOW COUNT	Œ	H	1					- 10	10		G	RAIN	SIZE		PIEZOMETER INSTALLATION
()	λ×		ب	- _ -	T,	۲ (%	ŏ	E		UNCONF	INED	X FIE	H (kPa) ELD VANE B VANE OCKET PEN	WATE	R CON	NTENT & S LIMITS	ENS	DIS	STRIE	BUTIC	ON (%)	ALL ME
	0)		TEDT	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	8	DЕРТН (m)		QUICK T	RIAXIAL	P LA	IB VANE OCKET PEN.	ATTE	RBERG	LIMITS						EZ(
				ΓŽ	2	꼾		□		50	100	150	200	15	30	45 (%)	DRY	GR	SA	SI	CL	⊒≥
		clay, some indications of	M	AS1	400	66	10 10	18						0								
		bedding light brown very	X				10 10															
		loose to compact, wet, fine to medium grained sand.	/ \18	.28																		
		to medidin granied sand.																				
								19														
		19.20 m: Trace fine gravel,	19	9.2																		
		fine grained sand.	W	AS2	50	8	0 3 4		١.													
			$ \Lambda $	ASZ	30	0	4		'	•						O						
			/ /19	.81			Ü															
								20														
			20	.11																		
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			$ \Lambda $	AS3	50	8		,	T									SPT.	atten	npted	; 3	
			/ \box	.72														resul	s no	t vali	d.	
								21														
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	666	DI NO METUOS					-				, <u> </u>	•	:	1	:							
A - S	SAM plit Tul	PLING METHOD be E - Auger		N - I			PΡ	NG (C	<i>ONTAIN</i> R - C	<i>IER</i> oth Ba	ıa	PLASTI LIMIT	C NATURAL MOISTUR CONTENT	. LIQUI	ID.			Con	stant	Head Te	est
B - T	hin Wa	all Tube F - Wash		0 -	Γube			T:		S - Pl	astic B	ag	\\\						Vari	able l	Head Te	st
D - C	ore Ba			Q	Jar			nt Tin		Y - C	ooden ore Bo	X	vv _P	W _N		'L			Lab	. Perr	neability	
(s	onic or	diamond drill)		X - I	Plast	ic &	PV	C Sle	ev	e Z - Di	scarde	:d										

BOREHOLE REPORT

CLIENT: **Baffinland Iron Mines Corporation**

PAGE: 5 **OF:** 8 **PROJECT:** Mary River Project

PROJECT	: Mary	RIV	er i	-ro	jeci			PAG	E : 5 OF : 8
TH O DESCRIPTION	SA	AMF	PLE	1	Ç.)	SPT N-VALUES DYNAMIC CONE PENETRATIO 20 40 60 80	HYDRAULIC CONDUCTIVITY (m/s) 10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴	REMARKS AND
DESCRIPTION DESCRIPTION	- - - - - - -	DEPTH	I YPE/ NUMBER	REC'Y (mm)	REC'Y (%)	DEPTH (m)	SHEAR STRENGTH (kPa) UNCONFINED QUICK TRIAXIAL SOURCE TPEN 100 150 200	CONDUCTIVITY (m/s) 10	
* * * * * * * * * * * * * * * * * * *									
						25			
						26			
						27			
		7.27	A C 4	50	8 N.	A			SPT attempted; results not
		7.88	AS4	50	0				valid;sampler advanced 600mm under the weight of
	, .	7.00				28			rods.
						29			
						30			
	30	0.32			N.	A			
OMBUNO METUOD			AS5		0				
SAMPLING METHOD A - Split Tube E - Auger B - Thin Wall Tube F - Wash			N - In: O - Tu	sert	niPl	-ING (CONTAINER R - Cloth Bag S - Plastic Bag	IC NATURAL LIQUID MOISTURE LIMIT CONTENT	Constant Head Test Variable Head Test
C - Piston Sample G - Shovel Gra			9 - W		_			W_N W_L	variable nead 16St

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation HOLE: <u>BH13-05B</u>

PROJECT: Mary River Project **PAGE:** 6 **OF:** 8

			, ,				-,									
			S	SAN	1PLE	or	·RL	JN		SPT N-VALUES		HYDRAULIC CONDUCTIVITY (m/s)	13)			
ELEV.	_			-		1		တ္၊		DYNAMIC CONE PEN 20 40 60	NETRATION 80	10 ⁶ 10 ⁵ 10 ⁴	DENSITY (kg/m3)	REMARI	KS	N O
DEPTH (m)	SYMBOL	DESCRIPTION				Ē	()	ál	(m)	SHEAR STRENGTH		10 10 10	Ĭ	AND GRAIN S	IZE	ATE
()	SYN			Ξ	3ER	۲ ا	\ \ \	ŏ	Ξ	UNCONFINED X FIE	ELD VANE	WATER CONTENT &	ENS	DISTRIBU	TION (%)	ALL
	0,			DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNT	DEPTH (m)	QUICK TRIAXIAL P PC	B VANE OCKET PEN.	ATTERBERG LIMITS			N	PIEZOMETER INSTALLATION
					ĹΞ	~	₩	岡		50 100 150	200	15 30 45 (%)	DRY	GR SA S	SI CL	≥ ۵
				30.93												
				50.50				\exists	31					SPT attemp	ted;	
														results not	ar	
														valid;sample advanced 6	00mm	
														under the w	eight of	
														rods.		
									32							
											:					
											:					
											•					
									33							
									33							
											:					
											•					
		33.53 m: Dense, fine to		33.53				\dashv								
		medium grained sand.	$\parallel \parallel$					9								
			ΙX		AS6	610	100	13		•	:	0		0 95 5		
		33.90 m: Fine grained sand.	//	h				23	34							
		Saild.		34.14				\exists								
									35							
									•							
											:					
									36							
											:					
		36.53 m: Compact, coarse grained sand.		36.58												
		graniou bunu.	1		AS7	610	100	2 6								
-52.47		O 4. OII T . ! . !	//		MOI	010	100	4 3	37			0				
37		Sandy SILT, dark grey,	/\	1						1 1 1	1					
		PLING METHOD						PIN	VG C	CONTAINER	PLASTIC	NATURAL LIQUID		Consta	nt Head Te	est
	plit Tu hin Wa	be E - Auger all Tube F - Wash			N - II O - T					R - Cloth Bag S - Plastic Bag	LIMIT	NATURAL LIQUID MOISTURE LIMIT CONTENT		=	le Head Te	
C-P		Sample G - Shovel Grab			P - V Q - J	Vate		nten	t Tin	U - Wooden Box Y - Core Box	W _P	W _N W _L		=	ermeability	
		r diamond drill)					ic & I	PVC	Slee	y - Core Box eve Z - Discarded		<u> </u>		Lav. F		
														Project:	H/3	349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

PROJECT: Mary River Project

HOLE: <u>BH13-05E</u>

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			_				_									
			8	SAN	1PLE	or	RI	JN		SPT N-VALUE	ES INE PENETRATION	HYDRAULIC CONDUCTIVITY (m/s)	n3)			
ELEV. DEPTH)L	DECODIDITION			I			BLOW COUNTS		20 40	60 80	10 ⁶ 10 ⁵ 10 ⁴	DENSITY (kg/m3)	REMARKS AND GRAIN SIZI		PIEZOMETER INSTALLATION
(m)	SYMBOL	DESCRIPTION			E.	mm)	(%)	Sou	m) +		ENGTH (kPa)		ISITY	GRAIN SIZE	≣ ON (%)	JET LAT
	SΥ			DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	WC	DЕРТН (m)	☐ UNCONFINED■ QUICK TRIAXIAL	- LAD VANE	WATER CONTENT & ATTERBERG LIMITS			()	ZON
				DE	₽ĕ	RE	RE	BL(DE	50 100	150 200	15 30 45 (%)	DRY	GR SA SI	CL	E S
		loose to dense.	\times	37.19												
		loose to delise.														
									38							
									39							
-55.09 39.62																
39.62		SAND, trace silt, brown, dense, wet, fine grained.	\mathbb{N}	39.62	2											
		donos, wor, into grantou.	X.		AS8	400	66	15 17 28 33	40	•				0 93 7		
			$ \rangle$	40.00				33	40					Rods advance into the soil un		
				40.23										self weight	idei ilie	
									41							
									40							
									42							
-58.14 42.67			-													
42.07		DCPT was carried out.														
		42.67 m: DCPT start.							43	ļ <u>i</u>						
			L							<u> </u>						
Δ - 9	SAM plit Tu	PLING METHOD be E - Auger			N - Ir			PPI	NG (CONTAINER R - Cloth Ba	PLASTI PLASTI	NATURAL LIQUID MOISTURE LIMIT CONTENT		Constant	Head Te	st
B - T	hin Wa	all Tube F - Wash			O - T	ube		nto	nt Ti∽	S - Plastic E	Bag			Variable	Head Tes	st
D - C	ore Ba	arrel K - Slotted			Q - J	ar			nt Tin	Y - Core Bo	×	$\stackrel{W_N}{\longrightarrow}$		Lab. Per	meability	
(s	onic o	diamond drill)	_		X - P	ıasti	c &	۲V(Sle	eve Z - Discarde	ea					

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation HOLE: BH13-05B

PROJECT: Mary River Project PAGE: 8 OF: 8

		PROJECT: Ma	ary Ki	iver F	10	jeci					8 OF : 8
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION		TYPE/ NUMBER T	(ح	REC'Y (%) BLOW COUNTS		SPT N-VALUES DYNAMIC CONE PENETRA 20 40 60 80 SHEAR STRENGTH (kPa UNCONFINED QUICK TRIAXIAL 50 100 150 200	10 10 10 10 a) NE WATER CONTENT & ATTERBERG LIMITS		REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
<u>-61.49</u> 46.02		46.02 m: DCPT end. NOTES: 1. No thermistors installed.						BOREHOLE			
B - TI C - P D - C	plit Tu hin Wa iston S ore Ba	all Tube F - Wash Sample G - Shovel Grab		N - Ins O - Tu P - Wa Q - Ja X - Pla	sert ibe ater r	Conte	ent Tin	S - Plastic Bag	ASTIC NATURAL LIQUID MOISTURE LIMIT CONTENT WN WL	[Constant Head Test Variable Head Test Lab. Permeability Project: H/3490



Baffinland

H/349000

Milne Inlet Ore Dock

Client:

Project:

Project No:

DYNAMIC CONE PENETROMETER TEST

EST Id.

BH05B-DCPT

Sheet 1 of 1

TEST PIT No.

BH05B

SURFACE ELEVATION:

DATE:

			1			DATE:		
GENERAL DI	TAILS		I	BLOWS PER 150mm		mm PER BLOV	V	
Depth From (m)	Blows/ 150mm	mm/ Blow						
42.67	13	12	42.00		42.00			
42.82	16	9	-					
42.97	23	7	_					
43.13	25	6	-	♦		٨		
43.28	38	4	-	- ₩		\mathbf{X}		
43.43	22	7	43.00 -	- ₩	43.00	7		
43.58	20	7	_	Ŷ .	4	7		
43.74	26	6	_		l Î	7		
43.89	118	1	_	Į, ,		Ĺ		
44.04	34	4			4	4		
44.19	29	5	44.00	<u>.</u>	44.00	7		
44.35	29	6	44.00	J.	44.00			
44.50	31	5		Ĺ				
44.65	36	4	Ī			<u>,</u>		
44.80	36	4		₩	4			
44.96	37	4		Î	<u> </u>			
45.11	54	3	<u></u> 45.00	L	€ 45.00			
45.26	37	4	Depth (m)	↓	Oepth (m)			
45.41	52	3		└─	l q 🟋			
45.57	65	2	-	←	<u> </u>			
45.72	70	2	-	Ĭ	<u> </u>			
45.87	65	2	46.00	<u>~</u>	46.00			
46.02	135	1	_	·	10.00			
			-		-			
			47.00		47.00			
			48.00	20 40 60 80 Blows/150mm	48.00	20 40 Blows/mm	60	80

Remarks

BH05B Dynamic Cone Penetrometer Testing performed adjacent to BH05. At BH05 borehole was terminated due to heaving sand, BH05B was drilled to target depth and the DCPT was performed at the bottom of the borehole

114 \misdat

MATCH BOREHOLE REPORT HOLE: **BH13-07 CLIENT: Baffinland Iron Mines Corporation PROJECT:** Mary River Project PAGE: 1 SITE: Milne Inlet Bay **COORDINATES:** CONTRACTOR: 7976659.101 Logan Drilling Group STARTED: 09/12/2013 **DRILL TYPE:** Skid mounted CME 55 FINISHED: 10/12/2013 503315.279 **METHOD SOIL:** Wash Boring **INSPECTOR:** C.S.S/W.R.H **DIP DIRECTION:** C.S.S ROCK: LOGGED BY: DIP: 90 NA **CASING: HWT-Casing REVIEWED:** W.R.H **ELEVATIONS** DATUM: Seabed DATE: January, 2014 PLATFORM: CORE: Not Applicable -14.92 **GROUND: END OF HOLE:** -34.88 HYDRAULIC CONDUCTIVITY (m/s) SPT N-VALUES (kg/m3) SAMPLE or RUN > DYNAMIC CONE PENETRATION **ELEV** REMARKS PIEZOMETER INSTALLATION $10^{6} \quad 10^{5} \quad 10^{4}$ 40 60 80 **BLOW COUNT** AND DEPTH **DESCRIPTION** DENSITY (E) GRAIN SIZE SHEAR STRENGTH (kPa) (m) TYPE/ NUMBER REC'Y(%) DISTRIBUTION (%) DEPTH (☐ UNCONFINED WATER CONTENT & RECY ATTERBERG LIMITS GR SA SI CL 100 150 15 30 45 (%) -14.92200 Drill set up on ice 0.0 Silty SAND, contains surface; casing organics, thinly laminated extended to seabed; bedding, brown, wet. 0.3 soil sampling started 10 AS1 60 SPT attempted; results not 0.91 valid;sampler advanced 800mm under the weight of Water depth measured periodically during drilling. 1.83 m: Laminates of 2 organics. N.A AS2 22 4 55 27 12 SPT attempted; results not valid;sampler advanced 700mm under the weight of rods. -18.27 3.35 3.35 SAND, light brown, loose, wet, fine to medium uniform N.A sand. AS3 25 4 97 3 SPT attempted; results not 3.96 valid:sampler advanced 800mm under the weight of rods. -19.80 SAND and GRAVEL 4.88 SAMPLING METHOD SHIPPING CONTAINER Constant Head Test A - Split Tube N - Insert R - Cloth Bag B - Thin Wall Tube F - Wash O - Tube S - Plastic Bag Variable Head Test G - Shovel Grab P - Water Content Tin U - Wooden Box C - Piston Sample Lab. Permeability D - Core Barrel K - Slotted Core Box X - Plastic & PVC Sleeve Z - Discarded (sonic or diamond drill)

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

HOLE: <u>BH13-07</u>

	PROJECT: M	ary Ri	ver l	Pro	ject								PA	GE	: 2	2 C	OF: 4	4	
ELEV. DEPTH (m)	DESCRIPTION	DEРТН МАS	TYPE/ J	آج	REC'Y (%) SINTS IN INTERIOR COLINATS)	DYN. 20 SHEA □ UNCO	AR STRI INFINED (TRIAXIAL	ENGTH FIEL FIEL POO	LD VANE 3 VANE CKET PEN.	10 WATE	10 ⁵ R CON RBERG	TENT & LIMITS	DRY DENSITY (kg/m3)	DI	REMA ANI GRAIN ISTRIE	D N SIZE BUTIC	ON (%)	PIEZOMETER INSTALLATION
w fir su gr	rown, loose to compact, ret, coarse grained sand, ne, rounded to ubrounded, multicolored ravel, few pieces of red ngular coarse gravel idicating possible cobbles.	5.49	AS4	20	3 3 2 3 3 2 2		•	100	150	200	15	30	45 (%)	<u> </u>	46	53	1		
m sa gr	.40 m: Light brown, nedium to coarse grained and, coarse angular red ravels indicate possible obbles.	7.01	AS5	200	33 9 8 3		•												
: : : m	AND, some gravel, nedium brown, wet, oarse, red and white ounded to angular gravel.	7.92	AS6	200	33 14 6 5		•				0								
7 in in gr 7 in in cc 7 in in 7 in in 7 in in 7 in in 7 in in 7 in in	AND and SILT, trace ravel, brown, fine to oarse grained sand.	10.36	AS7	200	33 8 7 6	'`	•								5	45	50	1	
gr	AND; some silt, some ravel, brown, fine to oarse sand.	11.08	AS8	300	49 7 49 6 5		•								16	73	11		
1	1.27 m: Trace gravel,	11.27					001:2:		*	:	:								
A - Split Tube B - Thin Wall Tu C - Piston Samp D - Core Barrel (sonic or dial	ple G - Shovel Grab K - Slotted		Q - Ja	sert ube /ater ar	Cont	ent Tir	S - I 1 U - 1	Cloth Ba Plastic E Wooden Core Bo	Bag n Box ox	PLASTIC LIMIT	NATURAL MOISTUR CONTENT	E LIMIT				Var	iable I	Head Te Head Te meability	st

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

PROJECT: Mary River Project

		TROOLOT: W	ary r	(1701		٠,٠	<u> </u>								
			SAI	MPLE	or	·Rl	JN		SPT N-VALUES HYDRAULIC CONFEDENCE PATION CONDUCTIVITY (m/s) P						
ELEV.				1	ı		တ		DYNAMIC CONE PENETRATION 20 40 60 80 10 10 10 10 10 AND REMARKS AND	N N					
DEPTH (m)	SYMBOL	DESCRIPTION			Œ	<u></u>	BLOW COUNT	Œ	SHEAR STRENGTH (kPa)	PIEZOMETER INSTALLATION					
()	λ×			TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	$\frac{1}{2}$	DЕРТН (m)	SHEAR STRENGTH (kPa) J UNCONFINED LAB VANE ATTERBERG LIMITS GRAIN SIZE DISTRIBUTION (%)	AL,					
	0)		DEPTH	18 R	5	2	δ.	F	QUICK TRIAXIAL	EZ(
				ĹΞ	2	8	_		50 100 150 200 15 30 45 (%) GR SA SI CL	ੋਂ≧					
		some silt.	\mathbb{N}	AS9	140	23	7 8		7 69 24						
			X				6 8								
			/ 11.8	88											
								12							
-27.72			1						1 large piece of						
12.8		SAND, trace of gravel, brown, wet, medium to	12.8	8				40	fragment indicating cobbles						
		coarse grained sand, trace	<u> </u>	AS10	170	28	21 21 18	13	• O						
		of red rounded to angular gravel possibly indicating	/\				18 19								
		cobbles.	13.4	1					High resistance,						
									flowing sands likely.						
								14							
	Very high resistance														
	Very high resistance														
	Very high resistance to drilling.														
	to drilling.														
			15.2				9								
			115.2	24											
								40							
								16							
	::::														
	:::														
								17	sand heaved into the casing; Casing pullled						
									out by 9.1 m and						
									readvanced to 17.67 m below seabed						
									before driving the						
-32.59 17.67		DCPT was carried out.							cone						
	SAM	PLING METHOD				SHII	PPI	NG (ONTAINER Constant Hand Task						
	Split Tul	be E - Auger		N - Ir	nser	t			R - Cloth Bag LIMIT Moisture LIMIT CONTENT CONT						
		all Tube F - Wash Sample G - Shovel Grab		O - T P - V			nte	nt Tin	S - Plastic Bag U - Wooden Box W _D W _N W _L Variable Head Test	t					
	Core Ba	arrel K - Slotted r diamond drill)		Q - J X - P		ic &	P\/r	C Sle	Y - Core Box Lab. Permeability to Z - Discarded						
		,				- ~			***						

HOLE: **BH13-07**

PAGE: 3 **OF:** 4

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

		PROJECT: Ma	ary	KIV	err	110	ojec	į		PAGE: 4 OF: 4				
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	SA		NUMBER 37	ر ا	(BLOW COUNIS'	DЕРТН (m)	● SPT N-VALUES DYNAMIC CONE PENETRATION 20 40 60 80 10 10 10 10 10 10 10 10 10 10 10 10 10	PIEZOMETER INSTALLATION			
-34.88		17.67 m: DCPT start.							18	Continuous high resistance to drilling;flowing sands likely				
19.96	19.96 m: DCPT end. NOTES: 1. No thermistors installed.													
B - T C - P D - C	plit Tu hin Wa Piston S Core Ba	all Tube F - Wash Sample G - Shovel Grab		F	ົງ - Ja	sert ibe atei	Cor	nter	nt Tin	CONTAINER R - Cloth Bag S - Plastic Bag U - Wooden Box Y - Core Box Ve Z - Discarded PLASTIC NATURAL LIQUID CONSTANT Head Tes Whist Missture Limit Constant Head Tes Whist Missture Limit Constant Head Tes Variable Head Tes Lab. Permeability				



Baffinland

H/349000

Milne Inlet Ore Dock

Client:

Project:

Project No:

DYNAMIC CONE PENETROMETER TEST

TEST Id.

BH07-DCPT

Sheet 1 of 1 TEST PIT No.

BH07

SURFACE ELEVATION:

DATE:

August 25, 2008 **GENERAL DETAILS BLOWS PER 150mm** mm PER BLOW Depth From Blows/ mm/ Blow 150mm (m) 17 17 17.67 17.82 9 17 17.97 8 19 18.13 6 25 18.28 4 38 18.43 38 18 18 5 18.58 30 7 18.74 22 18.89 7 22 19.04 24 6 19.19 27 6 19 19 19.35 31 5 19.50 57 3 19.65 69 2 19.80 81 2 19.96 100 2 Depth (m) 20 Depth (m) 20 \misdata\Projects\BAFFINLAND\349000\SPECIALIST_APPS\GeoTechnica\\[IDCPT Logs.xlsx]BH07 21 21 22 22 23 23 0 20 40 80 60 20 40 60 80 Blows/150mm Blows/mm

BH07 was drilled to target depth and DCPT was performed at the bottom of the borehole.



BH-2013-07 AS-2 (1.83m - 2.44m)



BH-2013-07 AS-3 (3.35m - 3.96m)





BH-2013-07 AS-5 (6.40m - 7.01m)



BH-2013-07 AS-6 (7.93m - 8.53m)





BH-2013-07 AS-8 (10.36m - 10.97m)



BH-2013-07 AS-10 (12.82m - 13.41m)





BH-2013-07 AS-11 (14.63m - 15.24m)



■ HATCH BOREHOLE REPORT HOLE: **BH13-08 CLIENT: Baffinland Iron Mines Corporation** PAGE: 1 **OF**: 5 **PROJECT:** Mary River Project SITE: Milne Inlet Bay **COORDINATES:** 7976663.502 CONTRACTOR: Logan Drilling Group STARTED: 12/12/2013 **DRILL TYPE:** Skid mounted CME 55 **FINISHED:** 503384.56 13/12/2013 **METHOD SOIL:** Wash Boring **INSPECTOR:** C.S.S/W.R.H **DIP DIRECTION:** C.S.S ROCK: LOGGED BY: DIP: 90 NA **CASING: HWT-Casing REVIEWED:** W.R.H **ELEVATIONS** DATUM: Seabed DATE: January, 2014 PLATFORM: CORE: Not Applicable **GROUND:** -11.50 **END OF HOLE:** -40.15 HYDRAULIC CONDUCTIVITY (m/s) SPT N-VALUES (kg/m3) SAMPLE or RUN > DYNAMIC CONE PENETRATION **ELEV** REMARKS PIEZOMETER INSTALLATION $10^{6} \quad 10^{5} \quad 10^{4}$ 40 60 AND **BLOW COUNT** DEPTH **DESCRIPTION** (E) DENSITY (mm) GRAIN SIZE SHEAR STRENGTH (kPa) (m) TYPE/ NUMBER REC'Y(%) DISTRIBUTION (%) DEPTH (☐ UNCONFINED WATER CONTENT & ATTERBERG LIMITS DEPTH REC'Y (GR SA SI CL 100 15 30 45 (%) -11.50 150 200 Drill set up on ice 0.0 SAND and SILT, trace of surface; casing subrounded gravel up to 25 extended to seabed; 0 0 1 2 mm particle size, 0 0 AS1 soil sampling started brown/grey, very loose. 0.76 1 1 2 1 AS2 300 49 Ô 40 60 Water depth measured periodically during drilling. 1.52 AS3 400 66 2 -13.93 2.43 SAND, trace of subrounded gravel, medium brown, 3 loose to compact, medium 370 61 0 AS4 93 to coarse grained sand. 3.04 3 4.75 SAMPLING METHOD SHIPPING CONTAINER Constant Head Test A - Split Tube N - Insert R - Cloth Bag O - Tube P - Water Content Tin B - Thin Wall Tube F - Wash S - Plastic Bag Variable Head Test G - Shovel Grab U - Wooden Box C - Piston Sample Lab. Permeability D - Core Barrel K - Slotted Core Box X - Plastic & PVC Sleeve Z - Discarded (sonic or diamond drill)

H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation HOLE:

PROJECT: Mary River Project **PAGE:** 2 **OF:** 5

SAMPLE or RUN DESCRIPTION			PROJECT: M	lary	Ri	ver l	Pro	oje	ct						PA	GE	: 2 OF : 5	
A55 0 0 0 2 3		JC To	DESCRIPTION	Si	AM	IPLE	I				> DYN	AMIC CO	NE PENETRATIO	N CON	DUCTIVITY (m/s)	(kg/m3)	AND	ER 10N
As 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			DESCRIPTION	! !	DEPTH					DEPTH (m	□ UNCOI ■ QUICK	NFINED TRIAXIAL	✗ FIELD VANÉ♣ LAB VANE♣ POCKET PEN	ATTE	RBERG LIMITS		DISTRIBUTION (%)	PIEZOMET INSTALLAT
Ass to 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0				Ę	5.36	AS5	0	0	2 3 2 2									
GRAVEL, red and grey, subrounded, fine to coarse, with some angular gravels possibly fragments of cobbles broken by drilling. 22.16 SAND, some gravel, some silt, brown, moist, fine to medium sand, rounded gravel, three red grantle pieces (angular) up to 50 mm particle size, possible cobbles. SAMPLING METHOD A - Spilt Tube B - Huger B - Thin Wall Tube B - Huger B - Thin Wall Tube C - Piston Sample C - Shovel Grab D - Core Barrel K - Slotted C - Jar S - V - Core Box C - Piston Sample C - Shovel Grab D - Core Barrel K - Slotted C - Jar S - V - Core Box C - Piston Sample C - Shovel Grab D - Core Barrel K - Slotted C - Jar S - V - Core Box C - Piston Sample C - Shovel Grab D - Core Barrel K - Slotted C - Jar S - V - Core Box C - Piston Sample C - Slotted C - Jar S - V - Core Box C - Piston Sample C - Slotted C - Jar S - V - Core Box C - Piston Sample C - Slotted C - Jar S - V - Core Box C - Piston Sample C - Slotted C - Jar S - V - Core Box C - Piston Sample C - Slotted C - Jar S - V - Core Box C - Disconded C - Jar S - V - Core Box C - Disconded C - Jar S - V - Core Box C - Disconded C - Jar S - V - Core Box C - Disconded C - Jar S - V - Core Box C - Disconded C - Jar S - V - Core Box C - Disconded C - Jar S - V - Core Box C - Disconded C - Jar S - V - Core Box C - Disconded C - Jar S - V - Core Box C - Disconded C - Jar S - V - Core Box C - Disconded C - Jar S - V - Core Box C - Disconded C - Jar S - V - Core Box C - Jar						AS6	0	0	6		•						crushed angular gravel pieces in the	
ASB 0 0 0 13 7 7 9.99 ASB 0 0 0 13 13 7 7 10 10	<u>-19.27</u> 7.77		subrounded, fine to coarse, with some angular gravels possibly fragments of			AS7	50	8	5 4 3 4	8	•						(Sand may have	
-22.16 SAND, some gravel, some silt, brown, moist, fine to medium sand, rounded gravel, three red granite pieces (angular) up to 50 mm particle size, possible cobbles. SAMPLING METHOD SHIPPING CONTAINER A - Split Tube E - Auger B - Thin Wall Tube F - Wash C - Piston Sample G - Shovel Grab D - Core Barrel K - Slotted (sonic or diamond drill) SAMPLING METHOD SHIPPING CONTAINER N - Insert R - Cloth Bag S - Plastic Bag V - Core Box Y - Core Box X - Plastic & PVC Sleeve Z - Discarded Constant Head Test Variable Head Test Liquid Moisruight Limit Counter Limit Limit Counter Limit Counter Limit Counter Limit Counter Limit Co						AS8	0	0	13 7	9								
Silt, brown, moist, fine to medium sand, rounded gravel, three red granite pieces (angular) up to 50 mm particle size, possible cobbles. SAMPLING METHOD SHIPPING CONTAINER A - Split Tube E - Auger B - Thin Wall Tube F - Wash C - Piston Sample G - Shovel Grab D - Core Barrel K - Slotted (Sonic or diamond drill) SHIPPING CONTAINER PLASTIC NATURAL LIQUID LIMIT MOISTRAT LIMIT CONTENT Variable Head Test Variable Head Test Content Tin U - Wooden Box Y - Core Box (Sonic or diamond drill) Variable Head Test Lab. Permeability	-22.16									10	,							
SAMPLING METHOD SHIPPING CONTAINER A - Split Tube	10.66		silt, brown, moist, fine to medium sand, rounded gravel, three red granite pieces (angular) up to 50 mm particle size, possible				200	33	6	11	•						13 76 11	
A - Split Tube E - Auger N - Insert R - Cloth Bag B - Thin Wall Tube F - Wash O - Tube S - Plastic Bag C - Piston Sample G - Shovel Grab P - Water Content Tin U - Wooden Box C - Diston Sample K - Slotted Q - Jar Y - Core Box (sonic or diamond drill) X - Plastic & PVC Sleeve Z - Discarded N - Insert R - Cloth Bag LIMIT MOISTURE LIMIT CONTENT Variable Head Test Lab. Permeability		SAMF					- 5	SHII	PPI	ING (CONTA	INER	DI 100	IC NATUR	N HOUR		Constant Head Tos	et
Project: H/3490	B - T C - P D - C	hin Wal iston Sa ore Bar	I Tube F - Wash ample G - Shovel Grab rel K - Slotted			O - To P - W Q - Ja	ube /ate ar	r Co			S - F 1 U - V 1 - V	Plastic E Wooder Core Bo	ag LIMIT Bag I Box W _P X	CONTEN	RE LIMIT IT		Variable Head Tes Lab. Permeability	st

BOREHOLE REPORT

HOLE: <u>BH13-08</u> **CLIENT: Baffinland Iron Mines Corporation**

		PROJECT:	Mary F	River	Pro	ject		•	PAGE	: 3	OF : 5	
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	SAI DEPTH	TYPE/ AM	<u></u>	BLOW COUNTS 1		O SPT N-VALUES DYNAMIC CONE PENETRATION 20 40 60 80 SHEAR STRENGTH (kPa) UNCONFINED ★ FIELD VANE QUICK TRIAXIAL O POCKET PEN. 50 100 150 200	HYDRAULIC CONDUCTIVITY (m/s) 10.6 10.5 10.4 EVEN THE CONTENT & ATTERBERG LIMITS 15 30 45 (%)		EMARKS AND RAIN SIZE TRIBUTION (%)	PIEZOMETER INSTALLATION
-23.69 12.19		SAND, trace of fine rounded gravel, light	/12.1	9			12					
		brown, compact, wet, medium to coarse grained sand.	12.	AS10	280 4	3 5 8 11	13	•	0			
			13.7	AS11	0	0 4 112 7	14					
			15.2	4 AS12	0	0 16 0 18 16 16		•				
			15.8				16					
			17.3	AS13	600 9	98 3 4 8	17	•	0			
B - T C - P D - C	plit Tub hin Wa riston S ore Ba	II Tube F - Wash cample G - Shovel Grab		Q - J	isert ube /ater ar	Conte	ent Tin	R - Cloth Bag S - Plastic Bag	NATURAL LIQUID MOISTURE LIMIT CONTENT WN WL	Proi	Constant Head Tes Variable Head Tes Lab. Permeability	st

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

PAGE: 4 OF: 5

PROJECT: Mary River Project

ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	SAM	TYPE/ NUMBER T	(-	REC'Y (%) BI OW COINTS IN)	20 40	ONE PENETRATION 60 80 ENGTH (kPa) FIELD VANE	HYDRAULIC CONDUCTIVITY (m/s) 10 ⁵ 10 ⁵ 10 ⁴ WATER CONTENT & ATTERBERG LIMITS	DENSITY (kg/ı	GF	EMARKS AND RAIN SIZI TRIBUTIO	≣	PIEZOMETER INSTALLATION
		18.29 m: Fine to coarse grained sand, some coarse angular gravel.	18.29	AS14		8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	18	•		15 30 45 (%)	DRY	GR	SA SI	CL	32
			20.42	AS15	200	33 1: 1: 1:	20			0		8 9	90 2		
		21.34 m: Brown, fine grained sand, trace of gravel, possible sandstone cobble(s).	21.34	AS16	200	33 1: 1: 1:	21	•				6 4	88 6		
<u>-34.97</u> 23.47		DCPT was carried out. 23.47 m: DCPT start.	-				23								
		PLING METHOD					24 PING (CONTAINER	PLASTI	> NATURAL LIQUID			Constant	Head Te	est
B - T C - P D - C	iston S ore Ba	ıll Tube F - Wash Sample G - Shovel Grab		Q - Ja	ube ′ater ar	Con	ent Tin	R - Cloth Ba S - Plastic B U - Wooder Y - Core Bo eve Z - Discarde	ag ⊔міт Bag n Box W _P ox	WN WL			Variable Lab. Per	Head Te	st

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

HOLE: <u>BH13-08</u>

PROJECT: Mary River Project

PAGE: 5 **OF:** 5

									• SPT N	I-VALUE			Н	YDRAI	ULIC						
ELEV.			SAN	1PLE	or	RU	N 2		> DYNA	MIC CO	NE PEN	IETRATION		UCTIV 10 ⁵	ULIC 'ITY (m/s)	DENSITY (kg/m3)	F	REMA	RKS		~Z
DEPTH (m)	SYMBOL	DESCRIPTION		~	(mr	REC'Y (%)		(E	SHFA	40 R STRE	60 NGTI	80 H (kPa)	10	10	10	× E	G	ANE RAIN	SIZE		PIEZOMETER INSTALLATION
()	SYN		Ŧ	E/ 1BEF	REC'Y (mm)	© } }	პ _	DEPTH (m)	□ UNCON	FINED	X FIE	ELD VANE B VANE OCKET PEN.	WATE	R CON	ITENT &	DENS	DIS	STRIE	BUTIC	N (%)	ZOMI
			DEPTH	TYPE/ NUMBER	REC	REC	BLO	DEF	50		₽ PC				45 (%)	DRY I	GR	SA	SI	CL	PIEZ INS
									:			:									
								25													
									:												
												:									
								26													
									:												
								27													
												:									
								28													
												:									
-40.15										- :			:	- :							
28.00										EHO	LE	•									
		NOTES:																			
		No thermistors installed.																			
												:									
									:												
									:	:	:			:	<u> </u>						
		PLING METHOD					PIN	G C	ONTAI			PLASTIC	NATURAL	LIQUII	D		\Box	Cons	stant	Head Te	st
B - Ti		ıll Tube F - Wash		N - Ir O - T	ube				S - P	loth Ba lastic B	ag		MOISTURI CONTENT							Head Te	
D-C	ore Ba	Sample G - Shovel Grab arrel K - Slotted		P - W Q - J	ar				U - V Y - C	Vooden ore Bo	Box	W _P	W _N	W	L					neability	
(s	onic oi	diamond drill)	Slee	ve Z - D	ıscarde	d															



Baffinland

H/349000

Milne Inlet Ore Dock

Client:

Project:

Project No:

DYNAMIC CONE PENETROMETER TEST

TEST Id.

BH08-DCPT

Sheet 1 of 1

TEST PIT No.

BH08

SURFACE ELEVATION:

DATE: **August 25, 2008**

			1	1	August 25, 2008
GENERAL DE	TAILS		BLOWS PER 150mm		mm PER BLOW
Depth From (m)	Blows/ 150mm	mm/ Blow			
23.47	4	38	23	23	
23.62	5	30		_	
23.77	10	15			^
23.93	8	19	 	-	<u>,⊸</u> I
24.08	5	30		_	☆── 丛
24.23	4	38	24	24 -	☆ .
24.38	3	51	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	_	
24.54	12	13	5		<u>_</u>
24.69	16	10		_	<u>↓</u>
24.84	19	8	1 %	1	<u>*</u>
24.99	13	12	25	25 - 1	√
25.15	14	11		25	Ž
25.30	16	10	🗄	4	<u> </u>
25.45	20	8	I	4	2
25.60	26	6			
25.76	27	6			
25.91	17	9	€ 26 + ★	<u>E</u> 26	* }
26.06	12	13	© 26 C C C C C C C C C C C C C C C C C C	26 P	4
26.21	11	14		Î	-∆
26.37	21	7	Ĭ Ť		
26.52	26	6			
26.67	45	3	27	27 -	
26.82	36	4		4	
26.98	36	4		1	
27.13	40	4	↓		
27.28	31	5	∤	<u> </u>	
27.43	46	3	28	28	
27.58	69	2	→	20	
27.74	72	2	↓	Ţ	
27.89	71	2	 	Ī	
28.04	68	2		4	
28.19	52	3	29	Δ	
28.35	70	2	0 20 40 60 80	29	20 40 60 00
26.06 26.21 26.37 26.52 26.67 26.82 26.98 27.13 27.28 27.43 27.58 27.74 27.89 28.04 28.19 28.35 28.50 28.65	69	2	Blows/150mm	0	20 40 60 80
28.65	77	2	DIOWS/130IIIII		mm/Blow

Remarks:

BH08 was drilled to target depth and DCPT was performed at the bottom of the borehole.

16/01/2014



BH-2013-08 AS-2 (0.76m - 1.37m)



BH-2013-08 AS-3 (1.52m - 2.10m)





BH-2013-08 AS-4 (2.43m - 3.04m)



BH-2013-08 AS-9 (10.66m - 11.27m)





BH-2013-08 AS-10 (12.19m - 12.80m)



BH-2013-08 AS-13 (16.76m - 17.37m)





BH-2013-08 AS-15 (19.81m - 20.42m)



BH-2013-08 AS-16 (21.34m - 21.94m)



MATCH BOREHOLE REPORT HOLE: **BH13-09 CLIENT: Baffinland Iron Mines Corporation PROJECT:** Mary River Project PAGE: 1 SITE: Milne Inlet Bay **COORDINATES:** 7976644.027 CONTRACTOR: Logan Drilling Group STARTED: 08/12/2013 503190.859 **DRILL TYPE:** Skid mounted CME 55 **FINISHED:** 09/12/2013 **METHOD SOIL:** Wash Boring **INSPECTOR:** C.S.S/W.R.H **DIP DIRECTION:** ROCK: LOGGED BY: C.S.S DIP: 90 NA **CASING: HWT-Casing REVIEWED:** W.R.H **ELEVATIONS** DATUM: Seabed DATE: January, 2014 PLATFORM: CORE: Not Applicable **GROUND:** -24.71 **END OF HOLE:** -43.90 HYDRAULIC CONDUCTIVITY (m/s) SPT N-VALUES (kg/m3) SAMPLE or RUN > DYNAMIC CONE PENETRATION ELEV. REMARKS **BLOW COUNTS** PIEZOMETER INSTALLATION $10^{6} \quad 10^{5} \quad 10^{4}$ 40 60 80 AND DEPTH **DESCRIPTION** DENSITY (E) (mm) GRAIN SIZE SHEAR STRENGTH (kPa) (m) TYPE/ NUMBER REC'Y(%) DISTRIBUTION (%) DEPTH (UNCONFINED WATER CONTENT & REC'Y (♣ LAB VANE ♠ POCKET PEN. ATTERBERG LIMITS ■ QUICK TRIAXIAL GR SA SI CL 100 30 45 (%) -24.71150 200 Drill set up on ice 0.0 Silty SAND, trace gravel, surface; casing greyish brown, very loose extended to seabed; to loose, wet, fine grained sand, trace of shells in the 0.3 soil sampling started upper 100 mm, trace of 0 0 0 11 70 \bigcirc 9 53 38 Rods advanced organics, thin silt-rich beds. AS1 under selfweight;SPT 0.91 invalid. 1 Water depth measured periodically during drilling. Casing advanced 1.83 under the self weight 2 to 4.88 m below 5 4 5 4 2 \odot seabed AS2 10 -29.59 Flowing sand in the 4.88 4.88 m: No recovery other 4.88 casing, ream out with SHIPPING CONTAINER SAMPLING METHOD Constant Head Test A - Split Tube N - Insert R - Cloth Bag O - Tube P - Water Content Tin B - Thin Wall Tube F - Wash S - Plastic Bag Variable Head Test G - Shovel Grab U - Wooden Box C - Piston Sample Lab. Permeability D - Core Barrel K - Slotted Q - Jar Core Box X - Plastic & PVC Sleeve Z - Discarded (sonic or diamond drill)

BOREHOLE REPORT

		CLIENT: PROJECT:						es C	orpo	ration	-						: BH13-09 : 2 OF : 4	
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION		SAM		or	REC'Y (%) NBLOW COUNTS (T)	DEPTH (m)	SHI	EAR STR CONFINED CK TRIAXIAL	ENGTI	ELD VANE B VANE OCKET PEN.	UATE ATTER	10 ⁵ R CONT RBERG	TENT & LIMITS	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	PIEZOMETER INSTALLATION
		than large 40mm granitic fragments, freshly broken(likely cobble).		5.47	AS3	5 RE		6 8	•	50 100	150	200	15	30	45 (%)	AU	GR SA SI CL tricone;Casing flushed and advanced to 9.14 m.	āZ
<u>-33.85</u> 9.14 <u>-34.10</u> 9.39		SAND, Light brown, wet, medium, trace fine and coarse angular gravel up 38 mm. SILT AND SAND, trace clay, trace fine gravel, dar grey, black silt, very soft to very loose.	/	9.14 9.75 9.75	AS4		1 1	9									2 91 7 3 48 49	
B - T C - P D - C	plit Tul hin Wa iston S ore Ba	Ill Tube F - Wash Sample G - Shovel Grab		11.27	N - Ir O - T P - V Q - J	nsert ube Vater ar	: r Conte	PING (CONT R S U Y	AINER - Cloth Ba - Plastic Ba - Wooder - Core Ba - Discarde	Bag n Box ox	PLASTIC LIMIT	NATURAL MOISTUR CONTENT WN	LIQUID E LIMIT WL			Drill bouncing, hard drilling. Constant Head Te Variable Head Te Lab. Permeability	st

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation HOLE: BH

PROJECT: Mary River Project **PAGE:** 3 **OF:** 4

EL E\ /			SAM	1PLE	or	Rl	JN		• SPT				IETRATION	CONE	IYDRA DUCTI\	ULIC /ITY (m/s)	n3)					
ELEV. DEPTH	7	DECODIDATION					NTS		20	0 4	40	60	80		105		DENSITY (kg/m3)		REMA AND)		PIEZOMETER INSTALLATION
(m)	SYMBOL	DESCRIPTION		24	REC'Y (mm)	(%)	BLOW COUNT	DЕРТН (m)	SHE	AR S	TRE	NGTH	H (kPa) ELD VANE B VANE				ISITY	G DIS	RAIN	SIZE	N (%)	I-FI
	SΥ		DEPTH	vE/	7.	REC'Y (%)	\geq	PŢ	□ UNCC	ONFINE K TRIA	ED XIAL	+ LAI	ELD VANE B VANE OCKET PEN.	WATE ATTER	R CON	NTENT & S LIMITS		Die	,,,,,	,0110	(70)	ZON
			DE	TYPE/ NUMBER	RE	RE(BLC	DE	50			150		15	30	45 (%)	DRY	GR	SA	SI	CL	ESS.
								12														
			12.19				\dashv															
							7															
				AS6	0	0	7 8 12 14		•													
			12.8				14															
								4.0														
								13														
									:					:								
																		A	!	:		
			13.71															Adva beco	ming	diffic	ult;	
				AS7	0	0	6 8 12	14										frictio			al asing	
				/ 1.0.			12 14											likely	; Drill	max	ing out	
			14.31				_											on to	ing d	own		
									:									frequ	ently	•		
								15														
			15.28																			
				AS8	0	0	3 5 6		•													
							5 6															
<u>-40.55</u> 15.84	11111	DCPT was carried out.	15.84																			
		15.84 m: DCPT start.						16														
		10.04 III. DOI 1 Start.																				
								17														
								17														
											:	:	:		:							
_		PLING METHOD					PPI	NG C	CONTA				PLASTIC	C NATURAL	. LIQUI	D	1		Cons	stant I	Head Te	st
B - T		all Tube F - Wash		N - Ir O - T	ube				S-	Clotl Plas	tic B	ag	LIMIT	MOISTURAL MOISTUR CONTENT	E LIMIT		,				lead Te	
	iston S ore Ba	Sample G - Shovel Grab arrel K - Slotted		P - W Q - J		r Co	nte	nt Tin	U -	Woo	den	Box	W _P	W _N	W	L					neability	
		r diamond drill)				с&	PV	C Slee	eve Ž -													

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation HOLE: BH13-09

PROJECT: Mary River Project PAGE: 4 OF: 4

			SAN	/IPLE	or	RL	JN			N-VALUE			CONF	IYDRA	ULIC /ITY (m/s)	13)					
ELEV.	٦			ı					Z DYI	NAMIC CC 0 40	NE PEI	NETRATION 80			10-4	(kg/n	F	REMAF AND	RKS		S.O N
DEPTH (m)	SYMBOL	DESCRIPTION		<u>۳</u>	mm)	@	0	Œ			ENGT	H (kPa)				DENSITY (kg/m3)	G	RAIN STRIB	SIZE	NI (0/)	ATE
	SYI		Ŧ	E/ 18EI		<u>></u>	S 	Ŧ	UNC	ONFINED K TRIAXIAI	X FI	H (kPa) ELD VANE AB VANE OCKET PEN.	WATE	R CON	NTENT & S LIMITS	DEN	Dis	DIKID	UHO	IN (70)	ZON
			DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	320	DEPTH (m)		0 100					45 (%)	≿	GR	SA	SI	CL	PIEZOMETER INSTALLATION
				ļ. —						0 100	100	200	10	- 00	40 (70)						
								18													
								19													
-43.90 19.19		19.19 m: DCPT end.										:		- :	- :						
		10.10 III. DOI 1 Clid.				E	ND	OF	BO	REHO	LE										
		NOTES:																			
		No thermistors installed.																			
		1. No alemiotore metalloa.																			
													:								
													:								
													:								
													:								
													:	- 1							
											<u> </u>	:	:	<u> </u>							
		PLING METHOD					PI	NG (CONTA			PLASTIC	NATURAL	. LIQUI	D	١		Cons	tant F	lead Te	st
A - S B - TI	plit Tul	be E - Auger all Tube F - Wash		N - In O - T					R - S -	Cloth Bar	ag 3ag	LIMIT	MOISTURAL MOISTUR CONTENT	E LIMIT						lead Te	
C - P		Sample G - Shovel Grab		P - W Q - Ja	/atei		nte	nt Tin	U -	Wooder Core Bo	n Box	W _P	W _N	W	L.					neability	
		r diamond drill)				c &	PV	C Slee		Discard								Lab.	. 0111	Joannity	



Baffinland

H/349000

Milne Inlet Ore Dock

Client:

Project:

Project No:

DYNAMIC CONE PENETROMETER TEST

TEST Id.

BH09-DCPT

Sheet 1 of 1

TEST PIT No.

SURFACE ELEVATION:

DATE:

BH09

August 25, 2008 **GENERAL DETAILS BLOWS PER 150mm** mm PER BLOW Depth From Blows/ mm/ Blow 150mm (m) 15 15 15.84 15.99 2 76 16.14 2 76 16.30 2 76 16.45 2 76 16.60 3 51 16 16 16.75 4 38 16.91 4 38 17.06 6 25 9 17.21 17 17.36 11 14 17 17.52 14 11 17.67 19 8 17.82 22 17.97 20 8 18.13 22 Depth (m) 18 Depth (m) 18 18.28 27 6 18.43 4 35 /misdata/Projects\BAFFINLAND\349000\SPECIALIST_APPS\GeoTechnica|\{|DCPT Logs.x|sx||BH07 18.58 33 5 18.74 12 13 18.89 10 15 19.04 8 19 19 19 19.19 9 17 20 20 21 21 0 20 40 80 60 20 40 60 80 Blows/150mm Blows/mm

BH09 was drilled to target depth and DCPT was performed at the bottom of the borehole.



BH-2013-09 AS-1 (0.3m - 0.91m) 1 of 2



BH-2013-09 AS-1 (0.3m - 0.91m) 2 of 2





BH-2013-09 AS-4 (9.14m - 9.75m)



MATCH BOREHOLE REPORT HOLE: **BH13-11 CLIENT: Baffinland Iron Mines Corporation** PAGE: 1 **OF**: 7 **PROJECT:** Mary River Project SITE: Milne Inlet Bay **COORDINATES:** 7976618.93 CONTRACTOR: Logan Drilling Group STARTED: 10/12/2013 **DRILL TYPE:** Skid mounted CME 55 FINISHED: 503343.566 12/12/2013 **METHOD SOIL:** Wash Boring **INSPECTOR:** C.S.S/W.R.H **DIP DIRECTION:** C.S.S ROCK: LOGGED BY: DIP: 90 NA **CASING: HWT-Casing REVIEWED:** W.R.H **ELEVATIONS** DATUM: Seabed DATE: January, 2014 PLATFORM: CORE: Not Applicable **GROUND:** -0.68 **END OF HOLE:** -39.84 HYDRAULIC CONDUCTIVITY (m/s) SPT N-VALUES (kg/m3) SAMPLE or RUN > DYNAMIC CONE PENETRATION **ELEV** REMARKS PIEZOMETER INSTALLATION $10^{6} \quad 10^{5} \quad 10^{4}$ 40 60 **BLOW COUNT** AND DEPTH **DESCRIPTION** (E) DENSITY (mm) GRAIN SIZE SHEAR STRENGTH (kPa) (m) TYPE/ NUMBER RECY(%) DISTRIBUTION (%) DEPTH (☐ UNCONFINED WATER CONTENT & REC'Y (ATTERBERG LIMITS GR SA SI CL -0.68 100 15 30 45 (%) 150 200 Drill set up on ice 0.0 SAND, medium to fine surface; casing grained. extended to seabed; soil sampling started SILTY SAND, dark grey, 0.76 compact, fine grained Water depth 1 sand. AS1 460 62 0 measured periodically during drilling. SAND, brown, compact, wet, medium to coarse grained sand. 2 2.13 2.13 m: Some gravel (10-30 mm), loose to 2 4 6 compact, fine to medium 0 AS2 450 0 10 88 2 grained sand. 3 -4.34 3.66 SAND, some silt, trace of subrounded to rounded 3 3 3 gravel, grey, loose, wet, AS3 380 66 79 16 4 fine grained sand, some organics, some black laminations along bedding at 10 to 20 degrees. SAMPLING METHOD SHIPPING CONTAINER Constant Head Test A - Split Tube N - Insert R - Cloth Bag B - Thin Wall Tube F - Wash O - Tube S - Plastic Bag Variable Head Test G - Shovel Grab P - Water Content Tin U - Wooden Box C - Piston Sample Lab. Permeability D - Core Barrel K - Slotted Core Box X - Plastic & PVC Sleeve Z - Discarded (sonic or diamond drill)

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

HOLE: <u>BH13-11</u>

		PROJECT: M	lary	/ Ri	iver	Pro	oje	ct										PA	GE	: 2	C)F: 7	7	
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	S	DЕРТН ЛР	TYPE/ NUMBER	<u> </u>		BLOW COUNTS Z	DЕРТН (m)	;	DYNA 20 SHEAI UNCON QUICK	40 R STR IFINED TRIAXIAL	60 ENG *	TH (FIELD	VANE /ANE (ET PEN.	10° WATE	10°	ITY (m/s) 10 ITENT & LIMITS	DRY DENSITY (kg/m3)	G	STRIE	O SIZE BUTIC	:)N (%) CL	PIEZOMETER INSTALLATION
				5.18	AS4		75	4 4 4 2 2	6		50	100	150	0 2	200	15	30	45 (%)	0	GK	34	31		
-7.38 6.70 -7.99 7.31		Silty SAND, thin silt laminations, greyish brown, loose, wet, fine grained sand. SAND, trace gravel, brown, loose, wet, medium to coarse grained sand.		7.31	AS5	400	25	3 3 4 6	7		·····)							
				8.22	AS6	460	43	3 3 3 4	9	•										6	92	3		
<u>-10.43</u> 9.75		SAND AND GRAVEL, greyish brown, loose, wet, coarse garined sand.	$\left \right\rangle$	9.75	AS7	150	74	4 3 4 4	10							0								
	SAM	11.29 m: Light brown,	X	11.28				PPI	11 'NG (COL	NTAII				PLASTIC	NATURA	_ LIQUI	D			Cons	stant I	Head Te	est
B - T C - F D - C	Piston S Core Ba	all Tube F - Wash Sample G - Shovel Grab			Q	Γube Vate Jar	r Co		nt Tin		S - P U - V Y - C	Cloth Ba Plastic E Vooder Core Bo Piscarde	Bag n Box x	(W _P	MOISTUR CONTENT	W W	L		Pro		. Pern	Head Teneability	

SYMBOL

•/-

-16.26

•

ELEV

DEPTH

(m)

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

BLOW COUNTS

%

41

REC'Y (REC'Y (

260 AS8

SAMPLE or RUN

TYPE/ NUMBER

12.8

AS9 450 16

AS10 250 16

AS11 100 0

AS12 100 33

N - Insert

O - Tube

P - Water Content Tin

15.85

/17.45

PROJECT: Mary River Project

DESCRIPTION

compact, coarse grained

sand, fine grained gravel.

GRAVEL, possible

cobble(s), subrounded gravel, some subangular granite fragments.

SAND AND GRAVEL, light

coarse grained sand, fine

Sandy SILT, grey, firm to

SAND, some gravel, light brown, loose, wet, coarse

grained sand.

GRAVEL, possible

particle size.

cobbles, sand possibly washed out, red and white,

angular to subrounded

coarse gravel up to 38 mm

brown, compact, wet,

grained gravel.

HOLE: **BH13-11 PAGE:** 3 **OF:** 7 SPT N-VALUES HYDRAULIC CONDUCTIVITY (m/s) (kg/m3) > DYNAMIC CONE PENETRATION REMARKS PIEZOMETER INSTALLATION $10^{6} \quad 10^{5} \quad 10^{4}$ 40 60 AND GRAIN SIZE Ξ DENSITY SHEAR STRENGTH (kPa)

UNCONFINED

UNCONFINED

LAB VANE

O POCKET PEN. DISTRIBUTION (%) DEPTH (WATER CONTENT & ATTERBERG LIMITS GR SA SI CL 50 100 150 200 15 30 45 (%) 12 13 48 13 61 26 Washed sample. 16 36 mm rock fragment in the spoon tip SHIPPING CONTAINER Constant Head Test R - Cloth Bag S - Plastic Bag Variable Head Test

F - Wash

SAMPLING METHOD

A - Split Tube

B - Thin Wall Tube

Lab. Permeability

H/349000

U - Wooden Box

Core Box

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation HOLE: BH13-11

		PROJECT:							0	,,,,	poration					PA	GE)F: 7		
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION			TYPE/ JAMBER AT	or	·RI	JN	DEРТН (m)	,	` 20 40	REN	E PENETRATION 60 80 IGTH (kPa) # FIELD VANE LAB VANE POCKET PEN. 150 200	UAT ATTE	ER CC	AULIC IVITY (m/s) 10 10 DNTENT & RG LIMITS 45 (%)	RY DENSITY (kg/		D I SIZE BUTION		PIEZOMETER INSTALLATION
			2	18.06				11	18	В								Switch to casing an the casing below sea	d adva	nce 89 m	
<u>-19.57</u> 18.89		SAND, some silt, trace of coarse gravel, brownish grey, medium to coarse grained sand.		18.79	AS13	450	49	13 12 11 12	19	9	•				Ö			3 84 Silty sand spoon.	13 I in the	tip of	
									20	D								Advancing difficult; drout on tor	ill maxi	ming ng	
									21	1											
									22	2											
		22.78 m: Trace fine grave trace silt, brown, wet, fine to medium grained sand.	I,	23.39	AS14	200	33	24 26 28 16	23	3)	0							
-24.91	SAM	PLING METHOD		×			SHI	PPI	24 ING (NTAINER										
B - TI C - P D - C	plit Tul hin Wa iston S ore Ba	pe E - Auger Ill Tube F - Wash Eample G - Shovel Grab			Q - J	nser ube Vate ar	t er Co	onte	nt Tin	in	R - Cloth S - Plastic U - Wood Y - Core E e Z - Discar	Bag Bag en E Box	LIMIT g	W _N	JRE LIM NT	WL		Var	stant He iable He b. Perme	ad Tes	

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation HOLE: BH13-11

		PROJECT: N	lary R	iver l	Proje	ect		ı		PA	GE	: 5	DF : 7	'
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	ОЕРТН		REC'Y (mm) ou	JNTS	DEPTH (m)	● SPT N-VALUE DYNAMIC CO 20 40 SHEAR STRI UNCONFINED QUICK TRIAXIAL 50 100	NE PENETRATION 60 80 ENGTH (kPa) FIELD VANE	HYDRAULIC CONDUCTIVITY (m/s) 10 ⁵ 10 ⁵ 10 ⁴ WATER CONTENT & ATTERBERG LIMITS 15 30 45 (%)	DRY DENSITY (kg/m3)	AN GRAII DISTRI	ARKS ID N SIZE BUTION (%)	PIEZOMETER INSTALLATION
24.23		SAND AND GRAVEL, trace angular granitic gravel, possible cobble fragments, medium to light brown, wet, medium to coarse sand, rounded to angular gravel up to 38 mm.	24.23	AS15	300 66	3 5 6 10	25	•		0				
			26.06	AS16	200 0	16 10 8 9	26	•		0				
<u>-27.81</u> 27.13		SAND, trace rounded to subrounded gravel, possible cobble(s), light brown, compact, wet, medium to coarse grained sand.	27.13	AS17	400 36	7 8 14 17	27	•		0		8 90	2	
			30.17	AS18	0	10 11 14 14	30	•						
B - T C - P D - C	plit Tub hin Wa iston S ore Ba	Il Tube F - Wash ample G - Shovel Grab		Q - Ja	sert ube ′ater C ar	onte	nt Tin	R - Cloth Ba S - Plastic E U - Wooden Y - Core Bo eve Z - Discarde	ag LIMIT Bag I Box W _P X	C NATURAL LIQUID MOISTURE LIMIT CONTENT WN WL		Var	nstant Head Teriable Head Teb. Permeability	est

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation HOLE: BH13-11

	PROJECT:	Mary River Project	PAGE: 6 OF: 7
ELEV. DEPTH (m)	DESCRIPTION	SAMPLE or RUN SUNDO NOTICE TO THE PRINT THE P	TENT & LIMITS & Z
	31.09 m: One granite fragment (angular) about 40 mm diameter, dense.	31.7 AS19 220 12 15 17 17 17 31.7	
-32.98 · · · · · · · · · · · · · · · · · · ·	DCPT was carried out. 32.3 m: DCPT start.	33	
		34	
		36	
A - Split To B - Thin W C - Piston D - Core E	/all Tube F - Wash Sample G - Shovel Grab	SHIPPING CONTAINER N - Insert R - Cloth Bag O - Tube S - Plastic Bag P - Water Content Tin U - Wooden Box Q - Jar Y - Core Box X - Plastic & PVC Sleeve Z - Discarded	Variable Head Test

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

HOLE: **BH13-11**

PROJECT: Mary River Project

PAGE: 7 **OF**: 7

		TICOLOT. IVI	٠.	,			٠,٠	•		17.021	01.7
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	S	DEPTH NE	TYPE/ NUMBER T	REC'Y (mm) o		BLOW COUNTS Z	DЕРТН (m)	20 40 60 80 10 10 10 HEAR STRENGTH (kPa) NCONFINED FIELD VANE HEAB VANE HEAR VANE H	REMARKS AND GRAIN SIZE ISTRIBUTION (%) SA SI CL IN
_39.84 39.16		39.16 m: DCPT end.							38		
		NOTES: 1. Four thermistors installed at 2.5m,10m,20m and 30m below seabed.							O	DREHOLE	
B-T C-P D-C	plit Tu hin Wa iston S ore Ba	all Tube F - Wash Sample G - Shovel Grab			N - Ir O - T P - W Q - J X - P	iseri ube /ate ar	t r Co	ntei	nt Tin	TAINER R - Cloth Bag	Constant Head Test Variable Head Test Lab. Permeability



Baffinland

H/349000

Milne Inlet Ore Dock

Client:

Project:

Project No:

DYNAMIC CONE PENETROMETER TEST

TEST Id.

BH11-DCPT

Sheet 1 of 2

TEST PIT No.

SURFACE ELEVATION:

DATE:

August 25, 2008

BH11

GENERAL DETAILS BLOWS PER 150mm mm PER BLOW Depth From Blows/ mm/ Blow 150mm (m) 32 32 32.30 30 32.45 18 8 32.60 5 30 32.76 3 51 32.91 2 76 33.06 3 51 33 33 4 33.21 38 33.37 5 30 33.52 5 30 33.67 5 30 33.82 5 30 34 33.98 6 25 34.13 7 22 34.28 6 25 34.43 5 30 34.59 2 76 Depth (m) 35 Depth (m) 35 34.74 0 34.89 0 35.04 2 76 35.20 3 51 35.35 3 51 35.50 1 152 36 35.65 1 152 35.81 0 35.96 0 36.11 0 36.26 0 37 37 36.41 1 152 36.57 6 25 36.72 16 10 36.87 8 19 37.02 22 38 38 37.18 33 5 0 20 80 40 60 0 20 40 60 80 37.33 25 6 Blows/150mm Blows/mm 37.48 30 5 Remarks:



Client: **Project:**

Project No:

Baffinland

H/349000

Milne Inlet Ore Dock

DYNAMIC CONE PENETROMETER TEST

TEST Id.

BH11-DCPT

Sheet 2 of 2

TEST PIT No.

BH11

SURFACE ELEVATION:

DATE:

GENERAL DE	TAILS		BL	OWS PER 150mm	mm PER BLOW		
Depth From (m)	Blows/ 150mm	mm/ Blow					
37.63	26	6	37	❤ .		37	
37.79	22	7	-				
37.94	25	6	-	<u>F</u>			
38.09	59	3	_	₩		T <mark>.</mark>	
38.24	49	3	_	☆		- -	
38.40	45	3	38 -	~		38	
38.55	35	4	-			**	
38.70	42	4	_	₩ .		Ţ	
38.85	38	4		} ⊸		<u>~</u>	
39.01	50	3	-	\Longrightarrow		<u> </u>	
39.16	55	3	39			39	
			Depth (m)		Depth (m)	40	
			41 -			41	
			42			42	
			43 0	20 40 60 80 Blows/150mm		43 0 20 40 60 Blows/mm	80

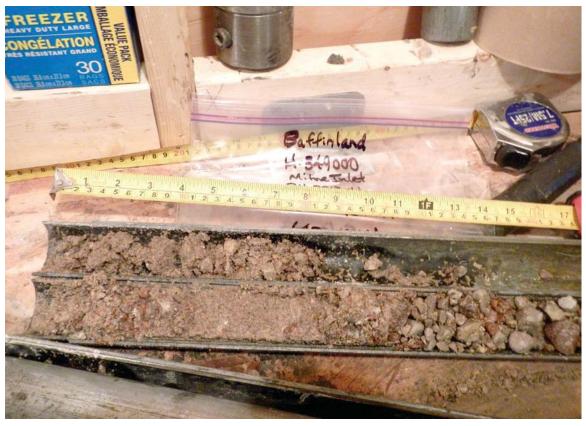


BH-2013-11 AS-1 (0.76m - 0.91m)



BH-2013-11 AS-8 (11.28m - 11.89m)





BH-2013-11 AS-9 (?m - ?m)



BH-2013-11 AS-10 (14.32m - 14.93m)





BH-2013-11 AS-13 (18.75m - 19.96m)



BH-2013-11 AS-15 (24.23m - 24.54m)





BH-2013-11 AS-15 (25.43m - 26.04m)



■ HATCH BOREHOLE REPORT HOLE: **BH13-11B CLIENT: Baffinland Iron Mines Corporation** PAGE: 1 **OF**: 6 **PROJECT:** Mary River Project SITE: Milne Inlet Bay **COORDINATES:** 7976615.955 CONTRACTOR: Logan Drilling Group STARTED: 12/12/2013 **DRILL TYPE:** Skid mounted CME 55 **FINISHED:** 503340.336 12/12/2013 **METHOD SOIL:** Wash Boring **INSPECTOR:** C.S.S/W.R.H **DIP DIRECTION:** LOGGED BY: C.S.S ROCK: DIP: 90 NA **CASING: HWT-Casing REVIEWED:** W.R.H **ELEVATIONS** DATUM: Seabed DATE: January, 2014 PLATFORM: CORE: Not Applicable 0.47 **GROUND: END OF HOLE:** -30.29 HYDRAULIC CONDUCTIVITY (m/s) SPT N-VALUES (kg/m3) SAMPLE or RUN > DYNAMIC CONE PENETRATION **ELEV** REMARKS **BLOW COUNTS** PIEZOMETER INSTALLATION $10^{6} \quad 10^{5} \quad 10^{4}$ 20 40 60 AND DEPTH **DESCRIPTION** (E) DENSITY GRAIN SIZE SHEAR STRENGTH (kPa) (m) TYPE/ NUMBER RECY(%) DISTRIBUTION (%) DEPTH (☐ UNCONFINED WATER CONTENT & ATTERBERG LIMITS REC'Y (GR SA SI CL 100 15 30 45 (%) 0.47 150 200 Drill set up on ice 0.0 DCPT was carried out. surface; casing extended to seabed; 0 m: DCPT start. soil sampling started Water depth measured periodically during drilling. SAMPLING METHOD SHIPPING CONTAINER Constant Head Test R - Cloth Bag A - Split Tube N - Insert O - Tube P - Water Content Tin B - Thin Wall Tube F - Wash S - Plastic Bag Variable Head Test G - Shovel Grab U - Wooden Box C - Piston Sample Lab. Permeability D - Core Barrel K - Slotted Core Box X - Plastic & PVC Sleeve Z - Discarded (sonic or diamond drill)

CLIENT: Baffinland Iron Mines Corporation

PROJECT: Mary River Project **PAGE:** 2 **OF:** 6

		PROJECT: Ma	aly in	ivei i	-10	jeci		PAGE: 2	OF: 0
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	SAN	TYPE/ JUMBER T	<u></u>	REC'Y (%) BLOW COUNTS (I	DEPTH (m)	20 40 60 80 10 10 10	IARKS ND NO SIZE IBUTION (%) OZ SIZE IBUTION (%) OZ SIZE IBUTION (%) OZ SIZE IN OZ SIZE IN OZ SIZE IN OZ SIZE
			<u> </u>	Z∃	RE	BL(50 100 150 200 15 30 45 (%) GR SA	SI CL
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							10		
	SAM	PLING METHOD		1		HIPP	ING (CONTAINER	1
A - Sp B - Th C - Pi D - C	plit Tu nin Wa iston S ore Ba	be E - Auger all Tube F - Wash Sample G - Shovel Grab		Q - Ja	sert ube 'ater ar	Cont	ent Tin	R - Cloth Bag S - Plastic Bag U - Wooden Box W _D PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT Va Va	nstant Head Test viriable Head Test vib. Permeability t: H/34900

CLIENT: Baffinland Iron Mines Corporation

PROJECT: Mary River Project **PAGE:** 3 **OF:** 6

		PROJECT: Ma	ary r	ivei i	F10 ₁	Jeci		PAGE: 3 OF: 6	
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	SAN HLAG	TYPE/ NUMBER T		RECY (%) BLOW COUNTS C	DEPTH (m)	● SPT N-VALUES DYNAMIC CONE PENETRATION 20 40 60 80 10 10 10 10 10 10 10 10 10 10 10 10 10	PIEZOMETER INSTALLATION
			DE	ΣÑ	뀖	BL(DE	50 100 150 200 15 30 45 (%) GR SA SI CL	H S
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							13		
							14		
							15		
							16		
							17		
	SAII	IPLING METHOD				HIDD	ING (ONTAINER	
B - T C - P D - C	plit Tu hin Wa diston S	be E - Auger all Tube F - Wash Sample G - Shovel Grab		Q - Ja	isert ube /ater ar	Conte	ent Tin	R - Cloth Bag S - Plastic Bag U - Wooden Box Y - Core Box eve Z - Discarded PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT MOISTURE LIMIT LIQUID LIMIT MOISTURE LIMIT CONTENT VAINABLE LIMIT LOUID VARIABLE HEAD Tes Variable Head Tes Lab. Permeability	

CLIENT: Baffinland Iron Mines Corporation HOLE: <u>BH13-11B</u>

PROJECT: Mary River Project **PAGE:** 4 **OF:** 6

ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	SAN	JPLE BER	or (سس) کر	RUNCON (%) A.	DEPTH (m)	-	` 20 SHEAF UNCONF	MIC CON 40 R STRE	60 NGT	NETRATION 80 H (kPa) ELD VANE AB VANE	106	105	ULIC /ITY (m/s) 10 ⁴ ITENT & GLIMITS	DENSITY (kg/m3)	F G DIS	REMA AND RAIN STRIE	RKS) SIZE BUTIC	: DN (%)	PIEZOMETER INSTALLATION
			DEP.	TYPE	REC	REC' BLOV	DEP		QUICK T	RIAXIAL 100		AB VANE OCKET PEN. 200			45 (%)	DRY D	GR	SA	SI	CL	PIEZ
							18	3				200			40 (10)						
							19	9													
							20														
							21	1													
							22	2													
							23														
							24	1													
B - Ti C - Pi D - C	plit Tul nin Wa iston S ore Ba	all Tube F - Wash Sample G - Shovel Grab		Q - J	sert ube /ater ar	· Conte	ent Tin	n	S - Pla U - W	oth Ba astic B ooden ore Bo	ag Box	PLASTIC LIMIT W _P	NATURAL MOISTURE CONTENT	LIQUII E LIMIT W				Vari	able l	Head Te Head Te neability	st

CLIENT: Baffinland Iron Mines Corporation HOLE: BH13-11B

PROJECT: Mary River Project **PAGE:** 5 **OF:** 6

		PROJECT:	Mai	ry R	iver	Pro	ject								PA	GE	: 5	C)F: (6	
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION		SAM	MPLE	or (mm)	REC'Y (%) A	DEPTH (m)	₹ DYN/ 20	40 R STR	60 ENGT	NETRATION 80 H (kPa) ELD VANE	100	10 ⁵	ULIC /ITY (m/s) 10 ITENT & G LIMITS	DRY DENSITY (kg/m3)	G	REMA ANI GRAIN STRIE	SIZE	: DN (%)	PIEZOMETER INSTALLATION
	0)			DEPT	TYPE	REC	REC')	DEPT	QUICK			AB VANE OCKET PEN. 200			45 (%)	ORY DE	GR	SA	SI	CL	PIEZ(INST/
									00	100	100	200	10	- 00	40 (%)						
								25													
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	SAM	IPLING METHOD				S	SHIPP	ING (CONTAI	NER	:	*	<u> </u>	<u>:</u>	:					Use 4 T	
A - S B - T	plit Tu				N - Ir O - T	sert			R - 0	Cloth Ba Plastic E	ag Bag	PLASTIC LIMIT	MOISTURAL MOISTUR CONTENT	LIQUI E LIMIT	D					Head Te Head Te	
C - P D - C	iston S ore Ba	Sample G - Shovel Grab arrel K - Slotted			P - W Q - J	/ater ar	Conte		U - \ Y - (Vooder Core Bo	n Box ox	W _P	W _N		L					nead Te	
(s	onic o	r diamond drill)			X - P	lasti	c & PV	C Sle	eve Z - [Discarde	ed						Pro	iect:		LI/2	49000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

HOLE: <u>BH13-11B</u>

	PROJECT: Ma	ary R	iver l	⊃roj	ect					PA	GE	: 6 O	OF : 6	
SYMBOL SYMBOL	DESCRIPTION	DEPTH DEPTH	TYPE/ NUMBER 37	RECY (mm) o	BLOW COUNTS C	DЕРТН (m)	SHEAR STRENGTH	80 (kPa) D VANE VANE CKET PEN.	MATER CO		DRY DENSITY (kg/m3)	REMA ANE GRAIN DISTRIE	O I SIZE BUTION (%)	PIEZOMETER INSTALLATION
-30.29 30.76	30.76 m: DCPT end.						BOREHOLE							
	NOTES: 1. No thermistors installed.				END	OF	BOREHOLE							
A - Split Tu B - Thin W C - Piston S D - Core B	all Tube F - Wash Sample G - Shovel Grab		Q - Ja	sert ube 'ater (ar	Conte	nt Tin	CONTAINER R - Cloth Bag S - Plastic Bag U - Wooden Box Y - Core Box eve Z - Discarded	PLASTIC LIMIT	C NATURAL LIC MOISTURE LIN CONTENT	RUID NIT WL		Vari	stant Head Tead Tead Tead Tead Tead Tead Tead T	



Client: Project:

16/01/2014

Project No:

Baffinland

H/349000

Milne Inlet Ore Dock

DYNAMIC CONE PENETROMETER TEST

TEST Id.

BH11B-DCPT

Sheet 1 of 6

TEST PIT No.

SURFACE ELEVATION:

DATE:

August 25, 2008

BH11B

GENERAL DE	IAILS	,	1	BLOWS PER 150mm		mm PER BLOW
Depth From (m)	Blows/ 150mm	mm/ Blow				
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1.35	6	25	1	†		☆
1.50	6	25	1	∤ ∤		. ^
1.66	6	27	1	ŀ		i i
1.81	7	21	1	- \		- 4
1.96	8	19	2	2 -		2
2.11	7	21	1	.		<u> </u>
2.27	10	16	1	Ŷ		↑
2.42	10	15	1	l 🏅		
2.57	7	21	1	\bigsig		
2.72	7	21	Ι,	∳		ightharpoonup
2.88	9	18	3	' † *		3
3.03	7	21	1			``
3.18	8	19	1	† \(\)		
3.33	7	21	1	. ♦		3
3.49	7	23	1	· >		- 4
3.64	9	17	€ 4	t - 📞	Ē	4 -
3.79	8	19	Depth (m)		Depth (m)	1 2.
3.94	6	25		ŀ 	പ്	<u> </u>
4.10	6	27	1	ℴ		<u> </u>
4.25	5	30	1	*		☆ ──── <u></u>
4.40	5	30	5	; X		5
4.55	3	50	1	Å `	-	3
4.71	7	23	1	\		Ţ
4.86	11	14	1	 		☆- Å
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5.62	4	38	1			- 🔥
5.77	5	30	1	i X		- ↑ .
5.92	5	30	1	. .		† * 3
6.08	13	12	7			7
6.23	9	17	1	0 20 40 60 80		0 20 40 60 80
6.38	11	14	1	Blows/150mm		Blows/mm



Client: **Project:**

Project No:

Baffinland

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Milne Inlet Ore Dock

DYNAMIC CONE PENETROMETER TEST

TEST Id.

BH11B-DCPT

Sheet 2 of 6

TEST PIT No.

BH11B

SURFACE ELEVATION:

DATE: August 25, 2008

		1			1		August 25, 2008
GENERAL DI	ETAILS			BLOWS PER 150mm			mm PER BLOW
Depth From (m)	Blows/ 150mm	mm/ Blow					
6.53	11	14		⁶ [& →		6	<u> </u>
6.69	10	16		☆		_	<u> </u>
6.84	11	14		- ♦		_	^
6.99	11	14		ł 🔏		_	Ĵ.
7.14	12	13		. .			\mathcal{A}
7.30	7	23		7 - 💠		7 -	Ţ
7.45	9	1 <i>7</i>		. ♦		an.	A
7.60	8	19		↓		_	<u></u>
7.75	12	13		\			
7.91	11	15		፟፟፟፟፟፟			4
8.06	10	15		8 -		8 -	Å
8.21	11	14		° ?		0	A
8.36	12	12		X		-	*
8.52	10	16				-	T .
8.67	12	13		∳ *		-	$\overline{\lambda}$
8.82	10	15	<u> </u>	i 🕉		-	4
8.97	7	21	Depth (m)	9 💸	Depth (m)	9 -	
9.12	13	12)ept		ebtţ	_	
9.28	15	11					<u>L</u> ,
9.43	11	14		† †		_	4
9.58	9	17		\		an.	Ť.
9.73	10	15		10		10 -	7
9.89	9	18		. ♦		_	Ĭ
10.04	8	19		. Ŷ .			☆
10.19	8	19		T T			*
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10.80	10	15		1		-	Å
10.95	12	12		🚶		-	%
11.11	11	15		↓		-	1
9.28 9.43 9.58 9.73 9.89 10.04 10.19 10.34 10.50 10.65 10.80 10.95 11.11 11.26 11.41 11.56 11.72 Remarks:	10	15		4		-	$\overline{\mathcal{A}}$
11.41	9	17		0 20 40 60 80		12	20 40 60 00
11.56	8	19		Blows/150mm		0	20 40 60 80
11.72	7	23		blows/150mm			Blows/mm
Remarks:						·	



Baffinland

H/349000

Milne Inlet Ore Dock

Client:

Project:

Project No:

DYNAMIC CONE PENETROMETER TEST

EST IO.

BH11B-DCPT

Sheet 3 of 6

TEST PIT No.

BH11B SURFACE ELEVATION:

DATE: **August 25, 2008**

GENERAL DETAILS BLOWS PER 150mm mm PER BLOW Depth From Blows/ mm/ Blow 150mm (m) 12 12 11.87 19 12.02 9 17 12.17 8 19 12.33 11 15 12.48 10 15 12.63 10 15 13 12.78 9 16 12.93 20 8 13.09 18 9 8 13.24 19 13.39 7 22 14 13.54 23 7 13.70 11 14 13.85 14 11 14.00 14 11 14.15 15 10 Depth (m) 15 Depth (m) 15 14.31 15 11 8 14.46 18 14.61 12 12 14.76 17 9 14.92 19 8 15.07 17 9 16 16 15.22 12 13 15.37 14 11 15.53 12 13 15.68 9 16 15.83 17 9 17 17 15.98 20 8 16.14 21 8 16.29 20 16.44 8 18 16.59 8 18 18 16.74 18 19 8 0 20 40 80 60 20 40 60 80 16.90 9 18 Blows/150mm Blows/mm 17.05 25 Remarks:



Baffinland

H/349000

Milne Inlet Ore Dock

Client:

16/01/2014

Project:

Project No:

DYNAMIC CONE PENETROMETER TEST

TEST Id.

BH11B-DCPT

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TEST PIT No.

BH11B

SURFACE ELEVATION:

DATE:

August 25, 2008

GENERAL DE	IAILS			BLOWS PER 150mm		mm PER BLOW
Depth From (m)	Blows/ 150mm	mm/ Blow				
17.20	22	7	1 <i>7</i>	[¹⁷ [🔼
17.35	21	7		*		†
1 <i>7</i> .51	13	12				t t.
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17.81	16	9		→		F 🚡
17.96	21	7	18	. ₩		18 - 🕰
18.12	18	9		r C		<u> </u>
18.27	21	7		ļ X		ļ j r
18.42	22	7		↓		
18.57	20	7		└		<u> </u>
18.73	28	6	19	∤		10
18.88	23	7	19	T T		19
19.03	29	5		Ľ,		\forall
19.18	26	6		,		
19.34	32	5		†		†
19.49	31	5				- ☆
19.64	32	5	Depth (m)		Depth (m)	20
19.79	30	5)ept	→	epth	
19.95	23	7		†	Ĭ	- ♣
20.10	31	5		<u> </u>		- 4
20.25	30	5		\mathcal{X}		1
20.40	30	5	21	₽		21 - 🛣
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20.71	29	6		ł 🌣		
20.86	26	6		. X		1
21.01	27	6		Į.		🛣
21.16	29	5	22	. ₩		32 X
21.32	25	6		\		22
21.47	27	6		<u> </u>		†
21.62	23	7		Ţ		†
21.77	21	7		∤		T K
21.93	26	6		† ∀ j		- ⊼
22.08	27	6	23	0 20 40 60 80		23
22.23	27	6		Blows/150mm		0 20 40 60 80
22.38	30	5		DIOWS/ LOUIIIII		Blows/mm



Client: Project:

Project No:

Baffinland

H/349000

Milne Inlet Ore Dock

DYNAMIC CONE PENETROMETER TEST

TEST Id.

BH11B-DCPT

Sheet 5 of 6

TEST PIT No.

BH11B SURFACE ELEVATION:

DATE:

August 25, 2008

								August 25, 20	800
GENERAL DI	ETAILS			BL	OWS PER 150mm			mm PER BLOW	
Depth From	Blows/	mm/ Blow							
(m)	150mm			22			22		
22.54	30	5		22	Ŷ		22 [}	
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22.84	30	5			\}		ĮĮ		
22.99	28	5			XX		- 4	<u>}</u>	
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23.30	28	5					- 4	Y	
23.45	29	5		_	\sim		- 1	Ţ	
23.60	33	5		_	₩		- 4		
23.76	28	6		_	C		- 4	}	
23.91	33	5		24 -			24 -	7	
24.06	29	5		-	%		4		
24.21	33	5		_	\		Ţ		
24.36	34	4			<u>.</u>		Į		
24.52	35	5		25 -			25	7	
24.67	35	4		23	₩.		23	\$	
24.82	28	5	<u> </u>				- fr	<u> </u>	
24.97	26	6	Depth (m)	_	♦	Depth (m)	1		
25.13	23	7)ept	_	\$	ept	- 4	7	
25.28	30	5	_	26	₩		26 - 1	7	
25.43	29	5		_	\$		- 4	Ţ.	
25.58	30	5		_			1	Δ	
25.74	31	5			.		Ţ		
25.89	29	5		27	j		4		
26.04	22	7		27	Å .		27		
26.19	23	7		-			Ā		
26.35	35	5		-	Ų		Ţ		
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26.80	50	3		_			Ţ		
26.96	45	4		_			Ą		
27.11	42	4		-	☆		<u>\$</u>		
27.26	50	3		-			-		
27.41	50	3		29 0	20 40 60 80		29 👃		
27.57	54	3		U	Blows/150mm		0	20 40 60 80	
25.28 25.28 25.28 25.43 25.58 25.74 25.89 26.04 26.19 26.35 26.65 26.65 26.65 26.80 27.11 27.26 27.41 27.57 27.72 Remarks:	60	2			PIOMS/130IIIII			Blows/mm	
Remarks:									



Baffinland

H/349000

Milne Inlet Ore Dock

Client:

Project:

Project No:

DYNAMIC CONE PENETROMETER TEST

BH11B-DCPT

Sheet 6 of 6

TEST PIT No.

BH11B

SURFACE ELEVATION:

DATE: August 25, 2008

■ HATCH BOREHOLE REPORT HOLE: **BH14-05C CLIENT: Baffinland Iron Mines Corporation** PAGE: 1 **OF**: 7 **PROJECT:** Mary River Project SITE: Milne Inlet Bay **COORDINATES:** 7976628.703 CONTRACTOR: Logan Drilling Group STARTED: 18/01/2014 **DRILL TYPE:** Skid mounted CME 55 **FINISHED:** 19/01/2014 503247.852 **METHOD SOIL:** Wash Boring **INSPECTOR:** C.S.S/W.R.H **DIP DIRECTION:** LOGGED BY: C.S.S ROCK: DIP: 90 NA **CASING: HWT-Casing REVIEWED:** W.R.H **ELEVATIONS** DATUM: Seabed DATE: January, 2014 PLATFORM: CORE: Not Applicable **GROUND:** -15.49 **END OF HOLE:** -52.98 HYDRAULIC CONDUCTIVITY (m/s) SPT N-VALUES (kg/m3) SAMPLE or RUN > DYNAMIC CONE PENETRATION **ELEV** REMARKS **BLOW COUNTS** PIEZOMETER INSTALLATION $10^{6} \quad 10^{5} \quad 10^{4}$ 40 60 AND DEPTH **DESCRIPTION** DENSITY (E) (mm) GRAIN SIZE SHEAR STRENGTH (kPa) (m) TYPE/ NUMBER RECY(%) DISTRIBUTION (%) DEPTH (☐ UNCONFINED WATER CONTENT & ATTERBERG LIMITS REC'Y (GR SA SI CL 100 15 30 45 (%) -15.49150 200 Drill set up on ice 0.0 Borehole advanced to surface; casing depth of 14.02 m without extended to seabed; sampling. See BH2013-05 soil sampling started for lithology above this depth. Water depth measured periodically during drilling. SAMPLING METHOD SHIPPING CONTAINER Constant Head Test R - Cloth Bag A - Split Tube N - Insert B - Thin Wall Tube F - Wash O - Tube S - Plastic Bag Variable Head Test G - Shovel Grab P - Water Content Tin U - Wooden Box C - Piston Sample Lab. Permeability D - Core Barrel K - Slotted Core Box X - Plastic & PVC Sleeve Z - Discarded (sonic or diamond drill)

CLIENT: Baffinland Iron Mines Corporation **HOLE**:

PROJECT: Mary River Project PAGE: 2 OF: 7

SAMPLE or RUN SEPTH SO DESCRIPTION SAMPLE or RUN SEPTH SO DESCRIPTION SAMPLE OF RUN SEPTH SO DESCRIPTION SAMPLE OF RUN SEPTH SO DESCRIPTION SEPTH SO DESCRIPTION SAMPLE OF RUN SEPTH SO DESCRIPTION SEPTH SO DESC	
	N N
SAMPLE or RUN DESCRIPTION SAMPLE or RUN (E) H DESCRIPTION DESCRIPTION SAMPLE or RUN (E) H DESCRIPTION SHEAR STRENGTH (kPa) UNCONFINED SHEAR STRENGTH (kPa) UNCONFINED SHEAR STRENGTH (kPa) UNCONFINED OUICK TRIAXIAL OUICK TRIAXIAL OUICK TRIAXIAL OUICK TRIAXIAL SAMPLE OR RUN SHEAR STRENGTH (kPa) OUICK TRIAXIAL OUICK TRIAXIAL OUICK TRIAXIAL SAMPLE OR RUN SHEAR STRENGTH (kPa) OUICK TRIAXIAL OUICK TRIAXIAL SAMPLE OR RUN SHEAR STRENGTH (kPa) OUICK TRIAXIAL OUICK TRIAXIAL SAMPLE OR RUN SHEAR STRENGTH (kPa) OUICK TRIAXIAL OUICK TRIAXIAL SAMPLE ON TOTAL OUICK TRIAXIAL SAMPLE OR RUN SAMPLE CONDUCTIVITY (m/s) SAMPLE OR RUN SA	PIEZOMETER INSTALLATION
	<u> </u>
7	
8	
10 10 10 10 10 10 10 10 10 10 10 10 10 1	
SAMPLING METHOD SHIPPING CONTAINER	
A - Split Tube E - Auger N - Insert R - Cloth Bag Plastic Natural Liquid Constant Head Test	
B - Thin Wall Tube F - Wash O - Tube S - Plastic Bag Variable Head Test C - Piston Sample G - Shovel Grab P - Water Content Tin U - Wooden Box W _P W _N W _L D - Core Barrel K - Slotted Q - Jar Y - Core Box Lab. Permeability	
(sonic or diamond drill) X - Plastic & PVC Sleeve Z - Discarded Project: H/34	9000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

PROJECT: Mary River Project

HOLE: **BH14-05C**

PAGE: 3 **OF**: 7

ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	S		IPLE	l		BLOW COUNTS Z	(m)	SHEAR STRE	NE PENETRATION 60 80 ENGTH (kPa)	HYDRAULIC CONDUCTIVITY (m/s) 10 ⁵ 10 ⁵ 10 ⁴	DENSITY (kg/m3)	REMA ANI GRAIN DISTRIE)	PIEZOMETER INSTALLATION
	SY			DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW (DEPTH (m)	□ UNCONFINED ■ QUICK TRIAXIAL 50 100	* FIELD VANE LAB VANE POCKET PEN. 150 200	WATER CONTENT & ATTERBERG LIMITS 15 30 45 (%)	DRY DEN	GR SA		PIEZON
									12							
									13							
-29.51 14.02 -29.74 14.25	100 100 100 100 100 100 100 100 100	Silty SAND, trace gravel, brown to greyish, compact. 14.10 - 14.25 m: Black mottling.		14.02	AS1	380	62	12 11 14 11	14	•		0		Trace of fi AS01.	ee water in	
<u>-31.03</u> 15.54				45.54					15							
15.54		SAND, trace gravel, light brown, compact, wet, medium grained sand, gravel size up to 30 mm.		15.54 16.15	AS2	450	74	8 18 17 28	16			0				
		17.07-18.59 m: Gravel size up to 10 mm.		17.07	AS3	420	69	5 5 7 7	17	•		О				
	SAM	PLING METHOD					SHI	PPI	NG C	CONTAINER				7 0	otont Used T	ot
B - T C - F D - C	plit Tu hin Wa Piston S Ore Ba	be E - Auger all Tube F - Wash Sample G - Shovel Grab			Q - J	nser ube /ate ar	t r Co	ontei	nt Tin	R - Cloth Ba S - Plastic B	sag i Box	C NATURAL LIQUID MOISTURE LIMIT CONTENT	 	Vari	stant Head Te able Head Te . Permeability	st

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

PROJECT: Mary River Project

PAGE: 4 **OF:** 7

			S	AM	IPLE	or	RI				SPT N-			IETRATION	CONDI	YDRA UCTI\	ULIC /ITY (m/s)	m3)					
ELEV. DEPTH	7	DECODIDATION				_	l	BLOW COUNTS			20	40	60	80	106			DENSITY (kg/m3)		REMA AND)		PIEZOMETER INSTALLATION
(m)	SYMBOL	DESCRIPTION			22	REC'Y (mm)	(%)	l S	DEPTH (m)		SHEAR		NGTI	l (kPa)	,		-	SITY		RAIN		N (%)	I-FA
	S			DEPTH	TYPE/ NUMBER	CZ	REC'Y (%)	N N	ΡŢ		UNCONF		♣ LA	ELD VANE B VANE OCKET PEN.			NTENT & G LIMITS					(,	ZON
				DEI	ΞĪ	RE	RE(BLO	DE		50	100		200	15	30	45 (%)	DRY	GR	SA	SI	CL	E S
									18														
		18.59-20.12 m: Fine,		18.59																			
		limestonic/granitic gravel.	M					6															
			١X١		AS4	600	98	9 12 11	19		•				0								
			$/\!\!/$	19.2				11															
									20														
		20.12-21.64 m: Trace fine		20.12																			
		gravel.	M					16															
			X		AS5	600	98	10 10			•				0								
			$/ \setminus$	20.73				10							:								
									21	. .													
		21.64-21.80 m: Fine to		21.64											:								
-37.29 21.80	រាជជា រាជជា	medium grained sand.	tVI					16															
		21.80-21.90 m: Brown, silty	M		AS6	600	98	17 17 24	22			•			0								
	រាជបា. វាជបា.	fine grained sand with	/	22.25				24															
	1000 1000 1000	black,horizontally bedded laminations.																					
	Fig.																						
	10 (d.)																						
	描寫																						
-38.65									23														
	1111	SAND, trace gravel, light	1	23.16																			
		brown, dense, wet, medium to coarse grained sand,	W		AS7	600	00	11 13															
		gravel is mostly	M		ASI	000	90	20 16			'												
		limestone/granite with size upto 10mm.		23.77				Ш							:								
		•																					
									24	1													
											:	:			:	:	*						
		PLING METHOD						PPI	NG (CC	ONTAIN			PLASTIC	NATURAL	LIQU	ID			Cons	stant l	Head Te	st
B - T		ıll Tube F - Wash			N - Ir O - T	ube					R - Clo S - Pla	astic B	ag	LIMIT	MOISTURE CONTENT					Vari	able F	lead Te	st
	iston S ore Ba	Sample G - Shovel Grab arrel K - Slotted			P - W Q - Ja		r Co	onte	nt Tin	1	U - Wo Y - Co			W _P	W _N		/ _L					neability	
		diamond drill)					ic &	PV	C Sle	ev	e Z - Dis												
													Пис	ioct:			40000						

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

HOLE: **BH14-05C PAGE:** 5 **OF:** 7

PROJECT: Mary River Project

		PROJECT: Ma	aı y	IXIV	51 I I	oje	υL			FA	J L	5 OF. /
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	SA		NUMBER T		BLOW COUNTS Z	DEРТН (m)	SPT N-VALUES DYNAMIC CONE PENETRATIO 20 40 60 80 SHEAR STRENGTH (kPa) UNCONFINED QUICK TRIAXIAL DOCKT PEN 50 100 150 200	WATER CONTENT &	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
-40.34 24.85		24.67-26.23 m: Brown, very dense, fine to medium grained sand. sandy SILT,grey to greyish brown, mottled black. SAND, light brown, dense, wet, medium to coarse		1.67	.S8 60	0 98	25 25 25 44 21	25		0		
-41.72 26.23 -41.94 26.45		SAND, some silt, brown, some black mottling and black horizontol laminations, compact, wet, fine grained sand.		3.25 A	.S9 60	0 98	17 20 20 25	26		O		Sand heaved into casing;wash hole
-43.23 27.74 -43.74 28.25		SAND, brown, dense to very dense, wet, medium to coarse grained sand. SILT and SAND, dark greyish brown, very dense.		7.74 A\$	S10 60	0 98	26 28 28 41	28		0		No free water in AS10.
<u>-44.75</u> 29.26		SAND, trace gravel, trace silt, medium brown, dense, fine to medium grained sand.		9.26 A:	S11 61		11 18 21 25	29 30		0		
B - T C - F D - C	Split Tul hin Wa Piston S Core Ba	all Tube F - Wash Sample G - Shovel Grab		O P Q	- Inse - Tub - Wat ! - Jar - Plas	rt e er Co	nter	nt Tin	R - Cloth Bag S - Plastic Bag	C NATURAL LIQUID MOISTURE LIMIT CONTENT WN WL		Partial recovery: Constant Head Test Variable Head Test Lab. Permeability Project: H/3490

BOREHOLE REPORT

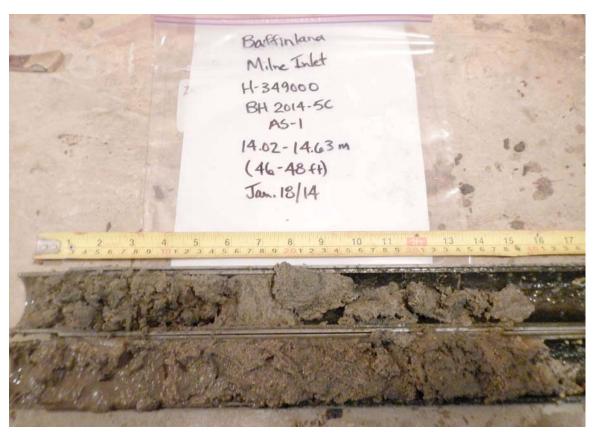
CLIENT: Baffinland Iron Mines Corporation

PROJECT: Mary River Project **PAGE:** 6 **OF:** 7

		PROJECT: IV	iai y ix	ivei	FIUJ	eci			FA	GE	. 0 O F. /	
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	DEPTH	TYPE/ NUMBER 37	<u></u>	BLOW COUNTS (%)		SPT N-VALUES DYNAMIC CONE PENETRA 20 40 60 80 SHEAR STRENGTH (kPa UNCONFINED QUICK TRIAXIAL 50 100 150 200	10 ⁵ 10 ⁵ 10 ⁴ NE WATER CONTENT & ATTERBERG LIMITS	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL angular gravel in the	PIEZOMETER INSTALLATION
		30.78-32.56m:Some silt mixed with organics, trace gravel,medium brown, very dense, fine sand,grey silt	31.39	AS12	250 4	17 36 37 35	31	•	0		tip of spoon.	
		32.56-32.83 m: Greyish brown, dense, fine sand. Silty SAND, greyish brown, very dense, fine sand.	32.3	AS13	610 1	00 12 13 21 23	33		Ο			
<u>-49.42</u> 33.93		SAND, light brown, very dense, fine to medium grained.	33.83	AS14	500 8	32 23 28 28	34		0		Silty sand at the tip of spoon.	
							36					
-52.48 36.99	7 1.1 1.1 7 1.1 1.1	Silty SAND, dark brown,	36.88	3			37					
		-	<i>V</i> V			18 UIDD	INC	CONTAINED				
A - Sp B - Th C - Pi D - C	olit Tub nin Wal ston S ore Ba	ll Tube F - Wash ample G - Shovel Grab		Q - J	nsert lube /ater ar	Conte	ent Tin	R - Cloth Bag ^u S - Plastic Bag	ASTIC NATURAL LIQUID MIT MOISTURE LIMIT CONTEXT		Constant Head Tes Variable Head Tes Lab. Permeability Project: H/3	st

CLIENT: Baffinland Iron Mines Corporation HOLE: BH14-05C

		PROJECT: Ma	ary R	iver	Pro	jec	t							PA	GE	: 7	OF:	7	
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	SAN HIAG	TYPE/ NUMBER T	REC'Y (mm)	REC'Y (%)	BLOW COUNIS	DЕРТН (m)	OYN,	40 R STRE IFINED TRIAXIAL	NE PENETRATION 60 80 ENGTH (kPa)	WATE ATTE	10 ⁵ ER CON RBERG	'ITY (m/s)	DRY DENSITY (kg/m3)		MARKS AND AIN SIZE RIBUTIO	E DN (%) CL	PIEZOMETER INSTALLATION
50.00	រាជបា. រាជបា. រាជបា. រាជបា.	very dense.		AS15	610	100 2	24 28 27				•		0			0 83	3 14	3	
<u>-52.98</u> 37.49	F1119	NOTES:	/ \37.49			EN	۱D	OF	BOR	ЕНО	LE								
		1. Four thermistors installed at depths 37.5 m, 27.5 m, 17.5 m and 7.5 m below seabed.						UF	BUR										
									<u> </u>					:					
B - T C - F D - C	plit Tul hin Wa Piston S Core Ba	all Tube F - Wash Sample G - Shovel Grab		N - Ir O - T P - W Q - J X - P	isert ube /ater ar	· Cor	nten	ıt Tin	S - F U - V	Cloth Ba Plastic E Vooden Core Bo	ag Limit Bag ∟Box W _P x	TIC NATURAL MOISTUR CONTENT	L LIQUII				/ariable	Head Tead Tead Tead Tead	

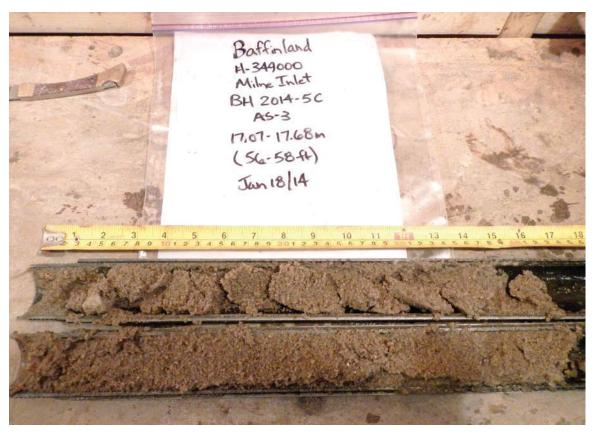


BH-2014-05C AS-1 (14.02m - 14.63m)



BH-2014-05C AS-2 (15.54m - 16.05m)





BH-2014-05C AS-3 (17.07m - 17.68m)

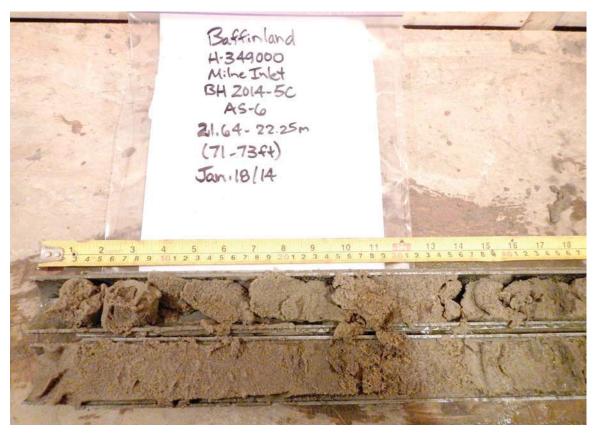


BH-2014-05C AS-4 (18.59m - 19.20m)





BH-2014-05C AS-5 (20.12m - 20.73m)



BH-2014-05C AS-6 (21.64m - 22.25m) 1 of 2





BH-2014-05C AS-6 (21.64m - 22.25m) 2 of 2



BH-2014-05C AS-7 (23.16m - 23.77m)





BH-2014-05C AS-8 (24.67m - 25.30m) 1 of 2



BH-2014-05C AS-8 (24.67m - 25.30m) 2 of 2





BH-2014-05C AS-9 (26.23m - 26.82m)



BH-2014-05C AS-10 (27.74m - 28.35m)





BH-2014-05C AS-12 (30.78m - 31.39m)



BH-2014-05C AS-14 (33.83m - 34.44m)



■ HATCH BOREHOLE REPORT HOLE: **BH14-06 CLIENT: Baffinland Iron Mines Corporation** PAGE: 1 **PROJECT:** Mary River Project SITE: Milne Inlet Bay **COORDINATES:** 7976644.444 CONTRACTOR: Logan Drilling Group STARTED: 14/01/2014 **DRILL TYPE:** Skid mounted CME 55 FINISHED: 16/01/2014 503279.184 **METHOD SOIL:** Wash Boring **INSPECTOR:** C.S.S/W.R.H **DIP DIRECTION: ROCK:** C.S.S LOGGED BY: DIP: 90 NA **CASING: HWT-Casing REVIEWED:** W.R.H **ELEVATIONS** DATUM: Seabed DATE: January, 2014 PLATFORM: Not Applicable CORE: **GROUND:** -14.33**END OF HOLE:** -63.70 HYDRAULIC CONDUCTIVITY (m/s) SPT N-VALUES (kg/m3) SAMPLE or RUN > DYNAMIC CONE PENETRATION ELEV. REMARKS PIEZOMETER INSTALLATION $10^{6} \quad 10^{5} \quad 10^{4}$ 40 60 **BLOW COUNT** AND DEPTH **DESCRIPTION** DENSITY (E GRAIN SIZE (mm) SHEAR STRENGTH (kPa) (m) TYPE/ NUMBER REC'Y(%) DISTRIBUTION (%) DEPTH (UNCONFINED WATER CONTENT & ATTERBERG LIMITS DEPTH RECY ♣ LAB VANE ♠ POCKET PEN. ■ QUICK TRIAXIAL GR SA SI CL 30 45 (%) -14.33100 150 200 Drill set up on ice 0.0 Silty SAND, trace of fine surface; casing gravel, trace of sea 0 15 extended to seabed; shells/organics, greyish soil sampling started brown silty interbeds. AS1 300 49 0 67 SAND, trace of fine to 0.76 coarse grained gravel, grey, fine to medium grained sand. Water depth 1 measured periodically during drilling. -15.85 1.52 Sandy SILT, trace to some 1.52 gravel, dark greyish brown with some black laminated AS2 360 59 $\dot{\bigcirc}$ beds, loose, wet. 2 3 3.05 AS3 500 83 Ö 62 10 -17.73 3.40 CLAY, some silt, greyish brown, soft, high plasticity. No soil in the casing 4.57 SAND, some gravel, light at the end of brown, compact, wet, advance. medium to coarse grained AS4 350 57 \circ sand, subrounded gravel SAMPLING METHOD SHIPPING CONTAINER Constant Head Test PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT A - Split Tube N - Insert R - Cloth Bag B - Thin Wall Tube F - Wash O - Tube S - Plastic Bag Variable Head Test G - Shovel Grab P - Water Content Tin U - Wooden Box C - Piston Sample Lab. Permeability D - Core Barrel K - Slotted Q - Jar Core Box (sonic or diamond drill) X - Plastic & PVC Sleeve Z - Discarded

BOREHOLE REPORT

HOLE: <u>BH14-06</u> **CLIENT:** Baffinland Iron Mines Corporation

		PROJECT: M	ary R	iver	Pro	jec	t								PA	GE	: 2 C)F : 8		
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	SAM HLAGO	TYPE/ J	(i	Ç	2	DEPTH (m)	` 20	MIC COI 40 R STRE	NE PEN 60 ENGTH X FIE	NETRATION 80 H (kPa) ELD VANE B VANE DCKET PEN. 200	10 ⁶ WATE	10 ⁵	VITY (m/s) 10 10 NTENT & G LIMITS	DRY DENSITY (kg/m3)	REMA ANI GRAIN DISTRIE	O I SIZE BUTION	(%) CL	PIEZOMETER INSTALLATION
		upto 40 mm.	5.18				7													
-20.43 6.10		SAND and GRAVEL, light brown, loose, wet, medium to coarse grained sand, some angular gravel, coarse grained (possible cobble).	6.71	AS5	170	28	3 3 3 4 4	7	•				C				0.15 m of casing at advance;	the end	of	
-21.95 7.62		SAND, some fine gravel, light brown, loose to compact, fine to medium grained sand, subrounded gravel upto 10 mm, possible granitic-subrounded broken cobbles.	7.62	AS6	180	30	5 5 5 4 4 6 6	8					0							
		9.14 m: Some coarse grained sand, trace angular gravel up to 60 mm (possible cobble).	9.14	AS7	340	56	6 9 10 10	10	•				0							
		10.67-11.28 m: Trace fine to coarse gravel.	10.67	AS8	350	57 1	10 10 10 10 12	11	•				O.				Approximate of soil in control		15 m	
B - T C - P D - C	plit Tub hin Wa riston S ore Ba	Il Tube F - Wash ample G - Shovel Grab		N - Ir O - T P - W Q - J X - P	nsert ube /atei ar	Cor	nten	t Tin	S - PI U - W	loth Ba lastic B looden ore Bo	Bag Box x	PLASTII LIMIT W _P	NATURAL MOISTUR CONTENT	E LIMIT	r		Vari	stant Headalle Headal	ad Tes	

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation HOLE: BH14-06

PROJECT: Mary River Project **PAGE:** 3 **OF:** 8

	PROJECT: M	iai y Ki	veri	-10je	eCt.			PAG	E: 3 OF: 8
ELEV.	DESCRIPTION	SAM			က		SPT N-VALUES DYNAMIC CONE PENETRATIC 20 40 60 80	HYDRAULIC CONDUCTIVITY (m/s)	REMARKS NO HILLY GRAIN SIZE
DEPTH (m)		DEPTH	TYPE/ NUMBER	REC'Y (mm)	BLOW COUNT	DEPTH (m)	SHEAR STRENGTH (kPa) UNCONFINED LAB VANE QUICK TRIAXIAL 50 100 150 200		REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	12.19 m: Trace silt,	\ /12.19				12			Approximately 0.15 m of soil in casing.
	subrounded to rounded gravel up to 30 mm.	12.8	AS9	460 75	8 10 10 10	40		0	or con an eaching.
-28.05 13.72						13			
-28.43	SILT and SAND, some clay, greyish brown silt and sand with black, horizontally bedded clayey lamiantions, slight black mottling, compact, wet.	13.72		500 82	2 4 8 8	14	•	0	Approximately 0.15 m of soil in casing. 4 47 39 10
	SAND, some silt, brown, compact, wet, uniform, fine to medium grained sand.					15			
	15.24 m: Some sea shells, medium to coarse grained sand.	15.24	AS11	520 85	7 7 7 8		•	O	
						16			
	16.76 m: Fine to medium grained sand.	17.37	AS12	610 10	0 10 0 10 11 14	17	•	0	Approximately 0.15 m of soil in casing.
A - Split To B - Thin W C - Piston D - Core E	/all Tube F - Wash Sample G - Shovel Grab		Q - Ja	sert ube 'ater C ar	Conte	nt Tin	S - Plastic Bag	IC NATURAL LIQUID MOISTURE LIMIT CONTENT WN WL	Constant Head Test Variable Head Test Lab. Permeability Project: H/349000

BOREHOLE REPORT

HOLE: <u>BH14-06</u> **CLIENT:** Baffinland Iron Mines Corporation

		PROJECT:	Maı	уR	iver	Pro	oje	ct										PA	GE	: 4	OF:	8	
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION			/IPLI	<u> </u>		က	1 (m)		SPT N DYNA 20 SHEAF	MIC CC 40 R STR	NE PE 60 ENG	80	a)	106	105	ULIC /ITY (m/s)	DENSITY (kg/m3)	AI GRA	IARKS ND N SIZI		PIEZOMETER INSTALLATION
	λS			DEPTH	TYPE/	REC'Y (mm)	REC'Y (%)	BLOW COUNT	DEPTH (m)		UNCONI QUICK 1		• [AB VANE POCKET I	E PEN.	WATER ATTER	BERG	NTENT & G LIMITS 45 (%)	DRY DEN	GR SA		CL	PIEZON
		18.29 m: Light brown,		18.29	9				18	3													
		compact, fine to medium grained sand, some fine gravel.	/	18.9		3 550	90	10 12 12 12			•					0							
									19														
		19.81m: Dense fine to medium grained sand.		19.8	AS1	4 600	98	12 18 16 17	20)		•				Ο							
		21.33 m: Trace of silt.		21.33	3				21	ļ. ļ. ·													
		21.00 111. 11.000 01 011.		21.94		5 600	98	15 17 17 18	22	2		•				0							
		22.86 m: Uniform, fine to		22.86	6																		
		medium grained sand.	/	23.47	AS1	6 520	85	13 15 17 17	23	3		•				С							
									24														
B - T C - P D - C	plit Tul hin Wa iston S ore Ba	all Tube F - Wash Sample G - Shovel Grab			O - P - ' Q -	Inser Tube Wate Jar	t er Co	ntei	nt Tin	า	S - PI U - W	loth Balastic B Vooder	Bag n Box ox			NATURAL MOISTURE CONTENT	LIQU LIMIT W			U Va	ıriable ıb. Per	Head Te	est

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

HOLE: <u>BH14-06</u>

		PROJECT:	Mar	y Ri	ver l	Pro	jec	ct		-					PA	GE	: 5	OF	: 8	'
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION		DEPTH NAS	TYPE/ 10 NUMBER 11	<u></u>		BLOW COUNTS Z	DEPTH (m)	20	MIC COI 40 R STRE	NE PENETRATION 60 80 ENGTH (kPa) FIELD VANE	10° WATE	10 ⁵ ER CON RBERG	ITY (m/s)	DRY DENSITY (kg/m3)	GR.		ZE TION (%)	PIEZOMETER INSTALLATION
-39.23 24.90		24.38 m: Compact, fine to medium grained sand. Sandy SILT, contains organics, dark greyish brown with black mottling.		24.38	AS17	420	69	8 12 12 23	25	•			0							
_40.23 _25.90 _40.33 _26		SAND, trace fine gravel, brown, dense, wet, fine to medium grained sand. Sandy SILT, greyish brow with black lamination and mottling.	-/	25.9	AS18	600	98	15 15 15 15 15	26		•		C							
<u>-41.76</u> 27.43		SAND, trace silt, brown, dense, wet, medium to coarse grained sand. Sandy SILT, dark greyish brown.		27.43	AS19	600	98	20 21 23 25	28		•		C							
<u>-43.29</u> 28.96		SAND, brown, dense, fine to medium grained sand.		28.96	AS20	610 1	102	13 20 22 22 28	29		•		C							
B - TI C - P D - C	plit Tub hin Wa iston S ore Ba	III Tube F - Wash Sample G - Shovel Grab			N - In O - T P - W Q - Ja X - Pl	isert ube /ater ar	Сог	nten	ıt Tin	S - PI U - W	loth Ba lastic B looden ore Bo	ag ⊔imit Bag Box W _P x	C NATURAI MOISTUR CONTENT	E LIMIT				/ariabl	nt Head Te le Head Te ermeability	st

BOREHOLE REPORT

HOLE: <u>BH14-06</u> **CLIENT: Baffinland Iron Mines Corporation**

PROJECT: Mary River Project **PAGE**: 6 **OF**: 8

	TROJECT. IVIA	,	,				
ELEV.	SCRIPTION		E or RUN		SPT N-VALUES DYNAMIC CONE PENETRATION 20 40 60 80	10 10 10	REMARKS ZO AND JIE GRAIN SIZE
DEPTH ON DE		DEPTH TYPE/ NUMBER	REC'Y (mm) REC'Y (%) BLOW COUNT	DEРТН (m)	SHEAR STRENGTH (kPa) UNCONFINED LAB VANE LAB VANE POCKET PEN. 50 100 150 200	WATER CONTENT & ZATTERBERG LIMITS LIM	
compact	t, light brown, , wet, fine to grained sand.	31.09	1 600 98 8 8 10		•	0	
organics with redo mottling	SILT, possible , greyish brown dish brown to black laminations, stiff. ght brown, fine	32.92 AS22	2 610 100 8 10 22		•	0	0 16 54 30
49.38 silty CLA	Y, greyish brown.	35.05 BO23 35.66	3	35		0	Shelby tube pushed into silty clay.
SAMPLING ME A - Split Tube B - Thin Wall Tube C - Piston Sample D - Core Barrel (sonic or diamond dr	E - Auger F - Wash G - Shovel Grab K - Slotted	O - ⁻ P - \ Q - ,	Insert Tube Water Conte Jar	ent Tin	CONTAINER R - Cloth Bag S - Plastic Bag U - Wooden Box Y - Core Box Eve Z - Discarded	C NATURAL LIQUID MOISTURE LIMIT CONTENT WN WL	Constant Head Test Variable Head Test Lab. Permeability

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation HOLE: <u>BH14-06</u>

PROJECT: Mary River Project **PAGE:** 7 **OF:** 8

SAMPLE or RUN DESCRIPTION Example SAMPLE or RUN Example Sample			PROJECT: Ma	ary R	iver	Pro	ojed	ct								PA	GE	: 7	OF: 8	3	
Mail		_		SAN	//PLE	or		တြ		> DYNAN	AIC CON	NE PEN		COND	UCTIV	ITY (m/s)	(kg/m3)				~ N N
Silty SAND, some slit, trace Silty SAND, some slit, brown Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand Sand		SYMBO	DESCRIPTION	PTH	PE/ MBER	C'Y (mm)	C'Y (%)	NUOO WC	PTH (m)	SHEAR	STRE	NGTH X FIE	I (kPa) LD VANE B VANE	WATE	R CON	TENT &		GRA	IN SIZE	N (%)	STALLATION STALLATION
37.16 Silty SAND, some silt, brown with substitution of the provided by th	E4 E4	7777		ᆷ	ΣΞ	RE	R	BL	DE	50	100			15	30	45 (%)	DR	GR SA	\ SI	CL	ΞΞ
39.32 SAND, some slit, brown with some black laminates of silt up to 10 mm thick, very dense, wef, fine to medium grained sand. 41.45 m: Trace silt, some gravel, brown, fine to medium grained sand, subrounded gravel up to 50 mm. 43.28 m: Trace silt, some gravel brown, fine to medium gravel brown, fine to medium gravel brown, fine to medium gravel up to 50 mm. 43.28 m: Trace silt, some gravel up to 50 mm. 54.328 m: Trace silt, some gravel up to 50 mm. 54.328 m: Trace silt, some gravel up to 50 mm. 54.328 m: Trace silt, some gravel up to 50 mm. 54.328 m: Trace silt, some gravel up to 50 mm. 54.328 m: Trace silt, some gravel up to 50 mm. 54.328 m: Trace silt, some gravel up to 50 mm. 54.328 m: Trace silt, some gravel up to 50 mm. 54.328 m: Trace silt, some gravel up to 50 mm. 54.328 m: Trace silt, some gravel up to 50 mm. 54.328 m: Trace silt, some gravel up to 50 mm. 55.308 m: Trace silt, some gravel up to 50 mm. 55.308 m: Trace silt, some gravel up to 50 mm. 56.328 m: Trace silt, some gravel up to 50 mm. 57.508 mm. 58.328 m: Trace silt, some gravel up to 50 mm. 58.328 m: Trace silt, some gravel up to 50 mm. 58.328 m: Trace silt, some gravel up to 50 mm. 59.328 m: Trace silt, some gravel up to 50 mm. 59.328 m: Trace silt, some gravel up to 50 mm. 59.328 m: Trace silt, some gravel up to 50 mm. 59.328 m: Trace silt, some gravel up to 50 mm. 59.328 m: Trace silt, some gravel up to 50 mm. 59.328 m: Trace silt, some gravel up to 50 mm. 59.328 m: Trace silt, some gravel up to 50 mm. 59.328 m: Trace silt, some gravel up to 50 mm. 59.328 m: Trace silt, some gravel up to 50 mm. 59.328 m: Trace silt, some gravel up to 50 mm. 59.328 m: Trace silt, some gravel up to 50 mm. 59.328 m: Trace silt, some gravel up to 50 mm. 59.328 m: Trace silt, some gravel up to 50 mm. 59.328 m: Trace silt, some gravel up to 50 mm. 59.328 m: Trace silt, some gravel up to 50 mm. 59.328 m: Trace silt, some gravel up to 50 mm. 59.328 m: Trace silt, some gravel up to 50 mm. 59.328 m: Trace silt, some gravel up	37.18	//////////////////////////////////////	clay, brown with black silt/clay laminates, compact to dense, wet, fine grained		AS24	600	98	15 15 15 15						0							
SAND, some slift, brown with some black laminates of silf up to 10 mm thick, very dense, well, fine to medium grained sand. 41.45 m: Trace slift, some gravel, brown, fine to medium grained sand. 41.45 m: Trace slift, some gravel, brown, fine to medium grained sand, subrounded gravel up to 50 mm. 41.45 m: Trace slift, some gravel, brown, fine to medium grained sand, subrounded gravel up to 50 mm. 43.28 m: Trace slift, medium brown, fine to medium grained sand. 43.28 m: Trace slift, medium brown, fine to medium brown, f	1 -53.65																				
41.45 m: Trace silt, some gravel, brown, fine to gravel, brown, fine to subrounded gravel up to 50 mm. 43.28 m: Trace silt, medium brown, fine to SAMPLING METHOD A Split Tube E - Auger B - Thin Wall Tube F - Wash C - Fleston Sample G - Shovel Grab D - Core Barrel (Sonic or diamond drill) N - Insert R - Cloth Bag S - Plastic Bag C - Tube S -	39.32		with some black laminates of silt up to 10 mm thick, very dense, wet, fine to		AS25	520	85	26 30 36 25	40			•		0							
### ### ##############################			gravel, brown, fine to medium grained sand,	41.45		240	39	11 15	41		•			0							
#3.28 m: Trace silt, medium brown, fine to #43.28 m: Trace silt, medium brown, fi				42.00				20 21													
SAMPLING METHOD SHIPPING CONTAINER A - Split Tube			43 28 m [.] Trace silt	43.28	8		H	\dashv													
A - Split Tube E - Auger N - Insert R - Cloth Bag B - Thin Wall Tube F - Wash O - Tube S - Plastic Bag C - Piston Sample G - Shovel Grab D - Core Barrel K - Slotted Q - Jar Y - Core Box (sonic or diamond drill) X - Plastic & PVC Sleeve Z - Discarded N - Insert R - Cloth Bag S - Plastic Moterna Luduit Moterna Lumit Content Constant Head Test Variable Head Test Variable Head Test Lab. Permeability				X.				10			<u> </u>	<u>:</u>	:	:	<u> </u>						
A - Split Tube E - Auger N - Insert R - Cloth Bag LIMIT MOISTURE LIMIT CONTENT B - Thin Wall Tube F - Wash O - Tube S - Plastic Bag C - Piston Sample G - Shovel Grab P - Water Content Tin U - Wooden Box V P W W U Lab. Permeability (sonic or diamond drill) X - Plastic & PVC Sleeve Z - Discarded Variable Head Test Lab. Permeability		SAM	PLING METHOD				SHIF	PIN	VG C	CONTAIN	IER		DI ASTIC	NATURAL	יייוסנו				onstant l	Head Te	st
	B - T C - P D - C	hin Wa iston S ore Ba	II Tube F - Wash sample G - Shovel Grab rrel K - Slotted		O - T P - V Q - J	ube Vate ar	er Co			S - Pla U - W Y - Co	astic B ooden ore Box	ag Box x	W _P					Va	ariable H ab. Pern	Head Tean	st

BOREHOLE REPORT

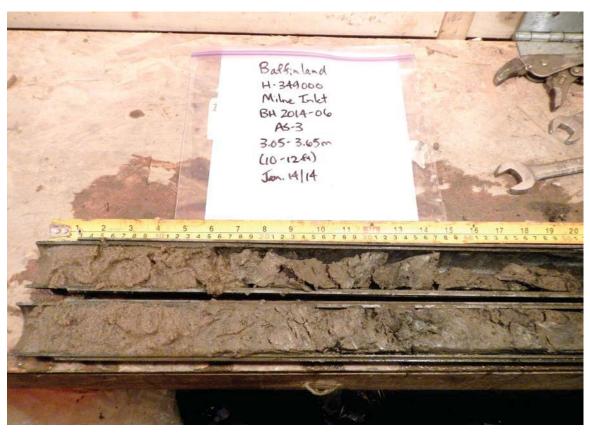
HOLE: <u>BH14-06</u> CLIENT: **Baffinland Iron Mines Corporation**

PROJECT: Mary River Project **PAGE**: 8 **OF**: 8

		PROJECT:	Mary R	iver i	-roj	ject			PAG	E : 8 OF : 8
ELEV.			SAM	1PLE	or I	S		SPT N-VALUES DYNAMIC CONE PENETRATION 20 40 60 80	HYDRAULIC CONDUCTIVITY (m/s)	REMARKS ZC
EPTH (m)	SYMBOL	DESCRIPTION	DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%) BLOW COUNT	DЕРТН (m)	SHEAR STRENGTH (KPa) UNCONFINED FIELD VANE QUICK TRIAXIAL 50 100 150 200	WATER CONTENT & ATTERBERG LIMITS	REMARKS AND GRAIN SIZE DISTRIBUTION (%) USA GRASA SI CL
		medium grained sand.	43.89	AS27	610 1	00 23 28 25		30 100 130 200	15 30 45 (%)	3 3.7 3.7
							44			
			44.8	AS28	610 1	35 00 41 47 45	45	•	0	
			45.41							
			46.02	2			46			
			46.63	AS29	610 1	00 28 37 53		•	О	
			10.00				47			
			47.24			5				
			47.85	AS30	610 1	00 11 19 16		•	0	
							48			
		49.37 m: Trace silt,	/ _{48.76}							
		medium brown, very dense, fine to medium sand.		AS31	610 1	3 24 43 55	49	•	0	
63.70 19.37		NOTES: 1. No thermistors installed	. 49.37			ENC) OF	BOREHOLE		
		PLING METHOD				HIPPI	NG C	CONTAINER	NATURAL LIQUID	Constant Head Test
B - T C - F D - C	Piston S Core Ba	III Tube F - Wash Sample G - Shovel Grab		Q - Ja	ube ater ar	Conte		R - Cloth Bag S - Plastic Bag U - Wooden Box Y - Core Box eve Z - Discarded	C NATURAL LIQUID MOISTURE LIMIT CONTENT WN WL	Variable Head Test Lab. Permeability



BH-2014-06 AS-2 (1.52m - 2.13m)

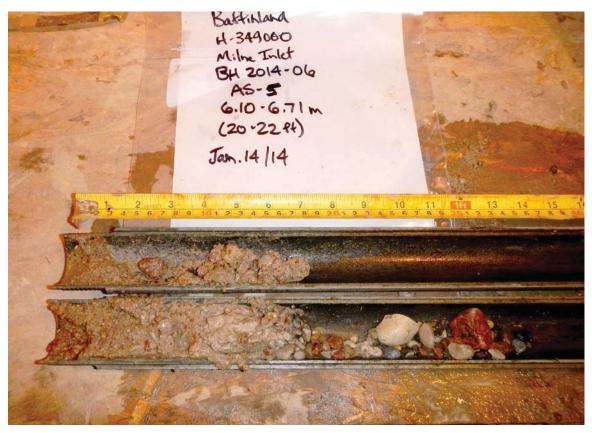


BH-2014-06 AS-3 (3.05m - 3.65m)





BH-2014-06 AS-4 (4.57m - 5.18m)



BH-2014-06 AS-5 (6.10m - 6.71m)





BH-2014-06 AS-6 (7.62m - 8.23m)



BH-2014-06 AS-7 (9.14m - 9.75m)





BH-2014-06 AS-8 (10.67m - 11.28m)



BH-2014-06 AS-9 (12.19m - 12.80m)





BH-2014-06 AS-11 (15.24m - 15.85m)



BH-2014-06 AS-12 (16.76m - 17.37m)





BH-2014-06 AS-13 (18.29m - 18.90m)



BH-2014-06 AS-14 (19.81m - 20.42m)





BH-2014-06 AS-15 (21.33m - 21.94m)



BH-2014-06 AS-16 (22.86m - 23.47m)





BH-2014-06 AS-17 (24.38m - 24.99m)



BH-2014-06 AS-18 (25.90m - 26.52m)





BH-2014-06 AS-19 (27.43m - 28.04m)



BH-2014-06 AS-20 (28.96m - 29.56m)



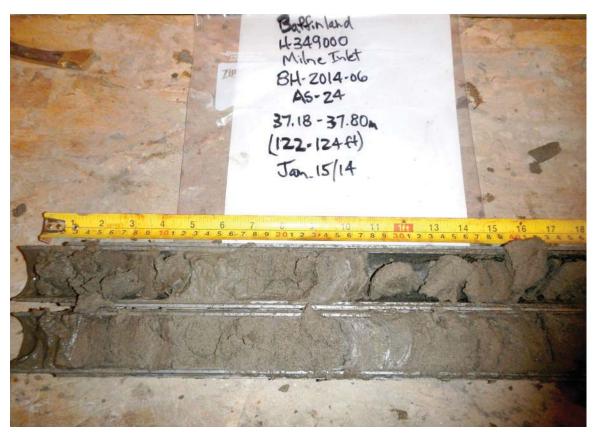


BH-2014-06 AS-21 (31.09m - 31.70m)



BH-2014-06 AS-22 (32.92m - 33.53m)





BH-2014-06 AS-24 (37.18m - 37.80m) 1 of 2



BH-2014-06 AS-24 (37.18m - 37.80m) 2 of 2





BH-2014-06 AS-25 (39.32m - 39.93m)



BH-2014-06 AS-30 (48.76m - 49.37m)



MATCH BOREHOLE REPORT HOLE: **BH14-07B CLIENT: Baffinland Iron Mines Corporation** PAGE: 1 **OF**: 9 **PROJECT:** Mary River Project SITE: Milne Inlet Bay **COORDINATES:** 7976661.322 CONTRACTOR: Logan Drilling Group STARTED: 12/01/2014 **DRILL TYPE:** Skid mounted CME 55 FINISHED: 13/01/2014 503316.941 **METHOD SOIL:** Wash Boring **INSPECTOR:** C.S.S/W.R.H **DIP DIRECTION:** C.S.S ROCK: LOGGED BY: DIP: 90 NA **CASING: HWT-Casing REVIEWED:** W.R.H **ELEVATIONS** DATUM: Seabed DATE: January, 2014 PLATFORM: CORE: Not Applicable **GROUND:** -16.11 **END OF HOLE:** -67.03 HYDRAULIC CONDUCTIVITY (m/s) SPT N-VALUES (kg/m3) SAMPLE or RUN > DYNAMIC CONE PENETRATION **ELEV** REMARKS PIEZOMETER INSTALLATION $10^{6} \quad 10^{5} \quad 10^{4}$ **BLOW COUNT** 40 60 AND DEPTH **DESCRIPTION** (E) DENSITY (mm) GRAIN SIZE SHEAR STRENGTH (kPa) (m) TYPE/ NUMBER RECY(%) DISTRIBUTION (%) DEPTH (UNCONFINED WATER CONTENT & REC'Y (■ QUICK TRIAXIAL ■ LAB VANE • POCKET PEN. ATTERBERG LIMITS GR SA SI CL -16.11 100 15 30 45 (%) 150 200 Drill set up on ice 0.0 SAND, some silt, trace of surface; casing clay, some gravel, greyish extended to seabed; brown with black mottling soil sampling started and horizontol laminations along bedding, very loose, wet to saturated. 0.91 Water depth 1 measured periodically guring drilling. 5 AS1 500 82 O 2 2.44 AS2 480 79 SAND, some gravel, light brown, loose to compact, wet, fine to coarse grained 3.05 3 sand, granitic and limestone gravel up to 20 4 560 93 O AS3 SAMPLING METHOD SHIPPING CONTAINER Constant Head Test A - Split Tube N - Insert R - Cloth Bag B - Thin Wall Tube F - Wash O - Tube S - Plastic Bag Variable Head Test G - Shovel Grab P - Water Content Tin U - Wooden Box C - Piston Sample Lab. Permeability D - Core Barrel K - Slotted Core Box X - Plastic & PVC Sleeve Z - Discarded (sonic or diamond drill)

H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

PROJECT: Mary River Project

HOLE: <u>BH14-07B</u>

PAGE: 2 **OF**: 9

		PROJECT: Ma	ary	/ R	iver	Pro	oje	ct				PA	GE	: 2 OF : 9	
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	S	SAN	IPLE	<u> </u>		က		20 40	ES ONE PENETRATION 60 80 ENGTH (kPa)	HYDRAULIC CONDUCTIVITY (m/s)	DENSITY (kg/m3)	REMARKS AND GRAIN SIZE	ETER ATION
()	SYM			DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNT	DEPTH (m)	UNCONFINED QUICK TRIAXIAI	FIELD VANE LAB VANE POCKET PEN.	WATER CONTENT & ATTERBERG LIMITS 15 30 45 (%)	DRY DENSI	DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
-21.60															
5.49		SAND and GRAVEL, light brown, loose, wet, medium to coarse grained sand, subrounded granitic and limestone gravel up to 30 mm, some angular gravel (possible cobbles)		5.49	AS4	600	98	3 3 3 3	6	•		0			
<u>-23.12</u> 7.01		SAND, some gravel, light		7.01					7					Sand trap in good condition.	
		brown, loose, wet, fine to medium grained sand, subrounded gravel.		7.62	AS5	0	0	4 4 4 6		•					
-24.95									8					Approximately 0.15m	
8.84		Sandy Clayey SILT, greyish brown with black mottling and black horizontal lamination along bedding, loose, wet.		8.84 9.44	AS6	500	82	8 8 5 7	9	•				of soil in casing.	
-26.78									10)				Approximately 0.15m	
10.67 10.67 -27.39 11.28		SAND, trace silt, brown, compact, wet, fine grained sand. SAND, light brown, fine to medium grained.		10.67	AS7	600	98	8 6 5 6	11	. •		Ō		of soil in casing.	
B - T C - F D - C	plit Tul hin Wa iston S ore Ba	all Tube F - Wash Sample G - Shovel Grab			Q - J	nser Γube Vate Jar	t r Co	onte	nt Tin	CONTAINER R - Cloth B S - Plastic I U - Wooder Y - Core Boseve Z - Discard	Bag n Box W _P ox ⊢	C NATURAL LIQUID MOISTURE LIMIT CONTENT WN WL		Constant Head Test Variable Head Test Lab. Permeability Project: H/34	

BOREHOLE REPORT

CLIENT: **Baffinland Iron Mines Corporation**

PROJECT: Mary River Project

PAGE: 3 **OF**: 9

		TROOLOT. W	ıcı y		•0.		٠,٠	•											. 0				
			s	AM	IPLE	or	Rl	JN				VALUE				HYDF	RAULIC FIVITY (m/s)	13)					
ELEV.	_			ı		ı		တ			ynan 20	ис со 40	NE PE 60	NETRATIC 80	ON	10 1		kg/m	F	REMA ANI			₽ O
DEPTH (m)	SYMBOL	DESCRIPTION			~	m((9)	BLOW COUNT	DЕРТН (m)		1	1		H (kPa)		10 1		DENSITY (kg/m3)		RAIN	I SIZE		PIEZOMETER INSTALLATION
,	SYN			Ξ	TYPE/ NUMBER	REC'Y (mm	REC'Y (%)	ŏ	프	□ UN	CONF	INED	X FI	IELD VANE AB VANE	١	NATER CO	ONTENT &	ENS	DI	STRI	BUTIC	ON (%)	OMI ALL
	• • •			DEPTH	M M	EC	EC	0	ЕБ			RIAXIAL	• P	OCKET PEN	N.		RG LIMITS	DRY D	CD.	SA	CI	CL	ST
	ПП		+		⊢Z	æ	œ	В		-	50	100	150	200		15 30) 45 (%)		GK	SA	01	OL	ш=
		Sandy SILT, greyish brown with black mottling and black horizontal lamination, loose to compact.																					
20 20									12														
-28.30 12.19	:::	SAND, some fine gravel,	1	12.19																			
		light brown, compact, wet, fine to medium grained	V					4															
		sand, angular gravel.	$ \Lambda $		AS8	200	33	5 5 5		•						0							
		possible subrounded	V	12.8				5															
	\vdots	granitic cobbles.		12.0																			
									13														
	\vdots																						
			1	13.72																			
	\vdots		W		AS9	600	00	8 8 8	14							0							
			$ \Lambda $		A59	600	90	8 12	•	"													
			1	14.33																			
	\vdots								15														
		15.24 m: Trace fine gravel, medium to coarse grained	1/	15.24																			
		sand, subrounded gravel	V		AS10	300	49	8								0							
		up to 30 mm.	$ \Lambda $					7															
			1	15.85																			
									16														
	\vdots																						
		47.07 T		17.07					17														
		17.07 m: Trace of silt, medium brown, medium to	1//	17.07																			
		coarse grained sand.			AS11	610	100									0							
			$ \rangle $					11 15															
			1	17.68																			
	<u>::::</u>	1									:	*	:	:		:							
		MPLING METHOD						PPI	NG (CONT					STIC N	ATURAL LIC				Con	stant l	Head Te	st
	plit Tu hin W	ube E - Auger all Tube F - Wash			N - Ir O - T							oth Ba astic E		LIMIT	C M	OISTURE LIF						Head Tes	
C - P	iston	Sample G - Shovel Grab			P-W	/ate		nte	nt Tin	U	- W	ooden	Box	W _P		W _N	W _L						
	ore B	arrel K - Slotted or diamond drill)			Q - J X - P		c &	PV	C Sle			ore Bo scarde		1		-	1			Lab	. rem	neability	
		•																	Dro	nioct:		11/2	40000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation HOLE: BH14-07B

PROJECT: Mary River Project **PAGE:** 4 **OF:** 9

		PROJECT: IVI											FA	GL	. 4 '	JI .	9								
ELEV.						ΓN-V			ENET	RATION			RAULIC		(kg/m3)	REM	ARKS		7						
DEPTH	30L	DESCRIPTION				(F		BLOW COUNT	<u>ا</u>	L	20		40	60		1	10) 1	0 ⁵ 1(Ō [†]	۲ (kg	AN GRAI	D	:	PIEZOMETER INSTALLATION
(m)	SYMBOL			Ξ	/ 3ER	r (m	۲ (%)	8	E.			AR S			FIELD	VANE	WAT	ER C	ONTEN	IT &	DENSITY	DISTR	BUTIC	ON (%)	OME ALLA
	0)			DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	P	DЕРТН (m)	-		K TRI		•		ET PEN.			RG LIM		DRY D	GR SA	SI	CL	PIEZ(NST,
	::::					-	-	ш			50	U	100	150) 2	00	10) 3() 45	(70)		0.1			
									18	1															
																:									
																:						No sand	in the	casing	
		18.89-19.5 m: Loose	\mathbb{N}	18.89					19							<u>.</u>						at the en	d of		
			IX.		AS12	390	64	2 4 6		(•)				auvance			
			\mathbb{N}	19.5				10																	
				13.5																					
									20																
		20.42 m: Trace of fine to coarse grained gravel,	∇	20.42																					
		coarse grained graver, compact.	I)		AS13	610	100	5 11				•					C)							
			\mathbb{N}					10																	
				21.03					21																
		21.64 m: Some fine gravel,		21.64												:									
		dense.	\mathbb{V}					9																	
					AS14	610	100	17 17 15	22))							
			\triangle	22.25																					
		22.86-24.07 m: Medium brown, compact, medium	\mathbb{N}	22.86					23							<u> </u>									
		to coarse grained sand, rounded to subrounded	I)		AS15	610	100	7 12 17				•					0								
		gravel.	\mathbb{N}	23.47				15								:									
				_0.41																					
									24																
		24.07-25.60 m: Medium	\bigvee	24.07				-	24																
	24.07-25.60 m: Medium grained sand, trace fine SAMPLING METHOD SHIPPING CONT													<u>:</u>			:		:						
A-S	plit Tul	be E - Auger			N - Ir	nser	t	" "	NG (JUI	R-	Clot	h Ba	ag		PLASTIC LIMIT	MOISTU CONTE	AL LIC	QUID			Coi	nstant	Head Te	st
B-T	B - Thin Wall Tube F - Wash O - Tube C - Piston Sample G - Shovel Grab P - Water Content Tin												stic E	Bag Box		W _P	CONTE		W _L			_		Head Te	
D-C	ore Ba				Q-J	ar			C Sle		Υ -	Cor	е Во	Х		r			⊣-			La	o. Perr	neability	
	31	,						-														Proiect		H/3	49000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

HOLE: <u>BH14-07B</u>

		PROJECT: M	ary R	liver	Pro	jec	t							PA	GE	: 5	C) F : 9	9	
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	SAN	TYPE/ dV	<u></u>	REC'Y (%) NO INTEGRAL	2	SHE UNC	T N-VALUNAMIC COMMISSION AND ADDRESS TO THE COMMISSION AND ADDRESS	ONE PEI 60 RENGT X FI LAL P	NETRATION 80 H (kPa) ELD VANE AB VANE OCKET PEN. 200	10 WATER	10 ⁵ R CONT BERG I	TY (m/s) 10 ⁻⁴ ENT &	DRY DENSITY (kg/m3)	DI	REMA ANI BRAIN STRIE SA	O SIZE BUTIC	N (%)	PIEZOMETER INSTALLATION
		gravel.	24.6	AS16			1 1			130	200	0		43 (10)						
		Silty CLAY, trace of fine gravel, grey to black. Silty SAND, brown, fine grained sand. 26.21 m: Trace of silt, trace of fine gravel, medium brown, fine to medium sand.	25.6	AS17	610	100 1 1 1 2	2 5 6 0 20	•				0				5	50	35	10	
<u>-43.54</u> 27.43		SAND, trace to some silt, brown, fine grained sand.	27.4	AS18	400	66 2 2 2 2	77 33 55 33 28			•		0								
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Sandy GRAVEL, brown, fine to coarse grained sand, fine subrounded gravel. Silty SAND, brown, fine grained.	28.9	AS19	610	100 2 3 2 2 2	29			•		0								
A - S B - T C - P D - C	SAMI plit Tub nin Wa iston S ore Ba	ll Tube F - Wash ample G - Shovel Grab		Q - J	isert ube /ater ar	Con	tent Ti	R S n U Y	AINER - Cloth E - Plastic - Woode - Core B - Discard	Bag n Box ox	PLASTI LIMIT	C NATURAL MOISTURE CONTENT WN	LIQUID LIMIT W _L				Vari	able l	Head Te Head Te neability	st

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation HOLE: BH14-07B

PROJECT: Mary River Project **PAGE:** 6 **OF:** 9

		PROJECT: Ma	ary R	iver	Pro	ojeo	ct			PAG	ΞE	: 6 OF : 9
ELEV.	ioL	DESCRIPTION	SAN	лРLE 	_		S	<u></u>	SPT N-VALUES DYNAMIC CONE PENETRATION 20 40 60 80	HYDRAULIC CONDUCTIVITY (m/s)	DENSITY (kg/m3)	REMARKS Z AND YO
(m)	SYMBOL	DESCRIPTION	DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNT	DEPTH (m)	SHEAR STRENGTH (kPa) □ UNCONFINED ■ QUICK TRIAXIAL 50 100 150 200	WATER CONTENT & ATTERBERG LIMITS 15 30 45 (%)	DRY DENSIT	REMARKS AND GRAIN SIZE DISTRIBUTION (%)
30.78 -47.17 31.06		Sandy GRAVEL, brown, medium to coarse sand, subrounded fine gravel. SILT and SAND, with	30.78	AS20	610	102	38 29 18 18	31	•	O		
		interbeds of sandy gravel, greyish brown, angular gravel up to 30 mm (possible cobble)	/ \31.39					32				
<u>-48.72</u> 32.61		SAND and SILT, some clay, trace gravel, brownish grey.	33.22	AS21	610	100	11 14 16 22	33		Ο		No sand in the casing at the end of advance. 3 41 42 14
_50.55 34.44		CAND trace of ells brown	34.44	1				34				
34.44		SAND, trace of silt, brown, medium grained sand.	35.05	AS22	300	49	15 27 21 20	35		Ο		No sand in the casing at the end of advance.
<u>-52.07</u> 35.96		SILT and SAND with clay interbeddings, brown to greyish brown with clayey black, laminated bands and reddish brown and black mottling, compact to dense, wet.	35.96	AS23	600	98	15 14 14 18	36	•	0		
B - T C - F D - C	plit Tub hin Wa Piston S Core Ba	Il Tube F - Wash ample G - Shovel Grab	.	Q - J	nsert ube Vater ar	t r Co	nter	nt Tin	R - Cloth Bag S - Plastic Bag	NATURAL LIQUID MOISTURE LIMIT CONTENT WN WL		Constant Head Test Variable Head Test Lab. Permeability
												Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation HOLE: <u>BH14-07B</u>

PROJECT: Mary River Project **PAGE:** 7 **OF:** 9

		PROJECT: Ma	ary R	iver	Pro	ojec	Œ			PAGE	E: / OF : 9
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	SAM	TYPE/ NUMBER 31	REC'Y (mm)		BLOW COUNTS Z	DEPTH (m)	SPT N-VALUES DYNAMIC CONE PENETRATION 20 40 60 80 SHEAR STRENGTH (kPa) UNCONFINED LAB VANE QUICK TRIAXIAL 50 100 150 200	HYDRAULIC CONDUCTIVITY (m/s) (% 10 10 10 10 10 10 10 10 10 10 10 10 10	GRAIN SIZE DISTRIBUTION (%)
<u>-53.60</u> 37.49		SAND, trace silt, brown, compact to dense, wet, fine to medium grained.	37.49	AS24	400	66	N.A	38		0	Push shelby tube;No recovery;push Split spoon; SPT values not valid due to disturbed soil.
		39.01-39.62 m: Dense sand.	39.01	AS25	600		15 15 16 20	39	•	0	Approximately 0.30m of soil in casing.
<u>-56.34</u> 40.23		Sandy SILT, some clay, brown to greyish brown with bands with black horizontal laminations, dense, wet, fine sand.	40.84					40			Approximately 0.15m of soil in casing.
<u>-57.56</u> 41.45		SAND, some gravel, brown with bands with black horizontal laminations and reddish brown mottling, dense, wet, fine to medium grained sand, subrounded gravel.	41.45 41.45 42.06	AS26 AS27		98	20 20 20	41	•	0	0 32 52 16 Approximately 0.15m of soil in casing.
		41.45-41.55 m: Some rounded to subrounded gravel with size upto 5mm. 42.75-42.98 m: Slight black mottling and few horizontal black laminations.	42.98	AS28	600	:	28 23 23 23 25	43	•	O	
B - TI C - P D - C	plit Tub hin Wa iston S ore Ba	ll Tube F - Wash ample G - Shovel Grab		N - In O - T P - W Q - Ja X - Pl	serf ube /ate ar	t r Cor	nten	nt Tin	S - Plastic Bag	NATURAL LIQUID MOISTURE LIMIT CONTENT WN WL	Constant Head Test Variable Head Test Lab. Permeability Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation HO

PROJECT: Mary River Project PAGE: 8 OF: 9

	PROJECT: M	ary R	iver	Proj	ect		PAC	GE:	8 OF : 9	
ELEV. DEPTH (m) ONE OF THE OF	DESCRIPTION	SAM	TYPE/ NUMBER T	RECY (mm) o	JNTS	DEPTH (m)	● SPT N-VALUES DYNAMIC CONE PENETRATION CONDUCTIVITY (m/s)	DRY DENSITY (kg/m3)	REMARKS AND GRAIN SIZE DISTRIBUTION (%)	PIEZOMETER INSTALLATION
	SAND, brown with closely spaced black laminations, dense, moist to wet, fine to medium sand, silty around laminations. 42.98 m: Brown, dense, sand, increasing silt content around laminations. SAND, light brown, very dense, wet, fine to medium. 44.50 m: Light brown, very dense, medium grained sand, increasing fine sand with depth.	44.5	AS29			44	• 0		Approximately 0.15m of soil in casing.	
	SAND, light brown, very dense, fine to medium. 46.02 m: Brown, fine to medium grained sand.	46.02	AS30	420 6	9 30 30 40	46	• 0			
		47.24	AS31	610 10	00 8 22 33 43	48	• 0			
						49				
	IPLING METHOD			C1	IIPP	ING (ONTAINER			
A - Split Tu B - Thin Wa C - Piston S D - Core Ba	be E - Auger all Tube F - Wash Sample G - Shovel Grab		Q - J	isert ube /ater (ar	Conte	ent Tin	R - Cloth Bag S - Plastic Bag U - Wooden Box Y - Core Box ve Z - Discarded]]]	Constant Head Tes Variable Head Tes Lab. Permeability Project: H/3	

BOREHOLE REPORT ■ HATCH

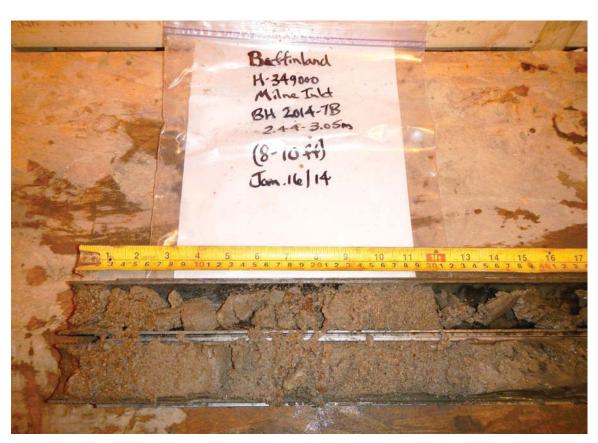
CLIENT: Baffinland Iron Mines Corporation

HOLE: <u>BH14-07B</u>

		PROJECT: N	lary R	liver	Pro	ojec	t								PA	GE	: 9	OF:	9	
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	SAN	TYPE/ TYPE/ NUMBER		 	· ^	DEPTH (m)	SPT N DYNAI 20 SHEAF UNCONI QUICK T 50	MIC CON 40 R STRE	NE PEN 60 ENGTH * FIE	ELD VANE B VANE OCKET PEN.	10 ⁶ WATER	10 ⁵ R CON BERG	ULIC //ITY (m/s) 10 ITENT & GLIMITS 45 (%)	DRY DENSITY (kg/m3)	A GRA		E ON (%)	PIEZOMETER INSTALLATION
-67.03 50.92		50.29 m: Trace silt, dense, fine to medium grained sand.	50.2	AS32	610	100 2	33	OF	BORI	• EHO	LE		0							
		Four thermistors installed; lost under the ice when pulling casing.																		
B - TI C - P D - C	plit Tub hin Wa iston S ore Ba	ll Tube F - Wash ample G - Shovel Grab		N - Ir O - T P - W Q - J X - P	nseri ube /ate ar	t r Cor	ntent	t Tin	S - PI U - W	loth Ba lastic B looden ore Bo	Bag Box x	PLASTIC LIMIT	NATURAL MOISTURE CONTENT W _N	LIQUII LIMIT				ariable	Head Te Head Te meability	st



BH-2014-07B AS-1 (0.91m - 1.52m)



BH-2014-07B AS-2 (2.44m - 3.05m)





BH-2014-07B AS-3 (3.96m - 4.57m)



BH-2014-07B AS-4 (5.49m - 6.10m)





BH-2014-07B AS-6 (8.84m - 9.44m)



BH-2014-07B AS-7 (10.67m - 11.28m)



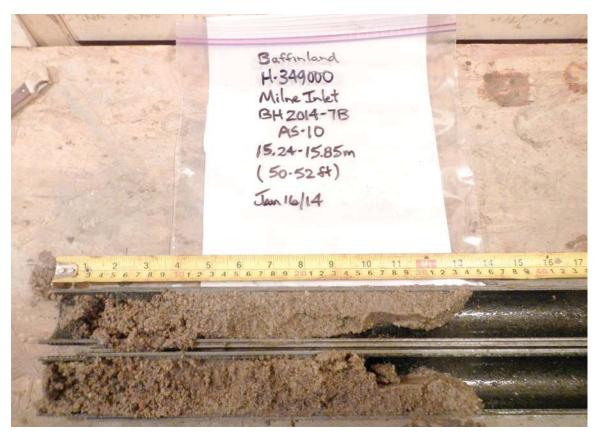


BH-2014-07B AS-8 (12.14m - 12.80m)



BH-2014-07B AS-9 (13.72m - 14.33m)





BH-2014-07B AS-10 (15.24m - 15.85m)



BH-2014-07B AS-11 (17.07m - 17.68m)





BH-2014-07B AS-12 (18.89m - 19.50m)

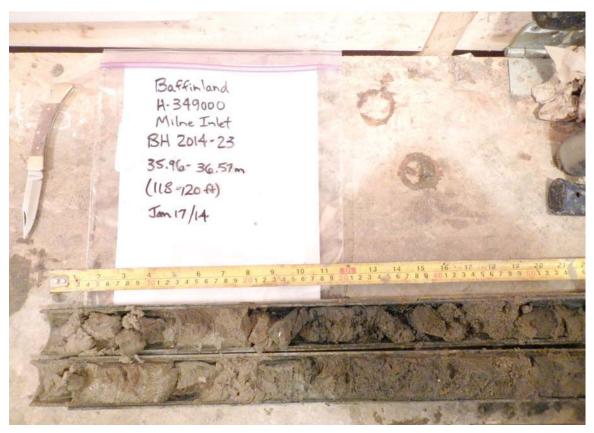


BH-2014-07B AS-16 (24.07m - 24.68m)





BH-2014-07B AS-17 (25.60m - 26.21m)



BH-2014-07B AS-23 (35.96m - 36.57m)



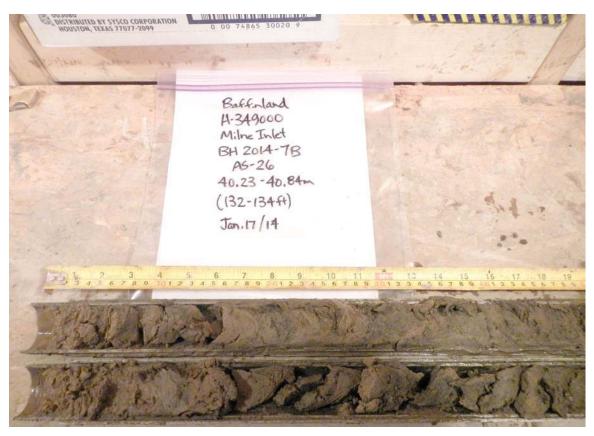


BH-2014-07B AS-24 (37.49m - 38.10m)



BH-2014-07B AS-25 (39.01m - 39.62m)





BH-2014-07B AS-26 (40.23m - 40.84m)



BH-2014-07B AS-27 (41.45m - 42.06m)



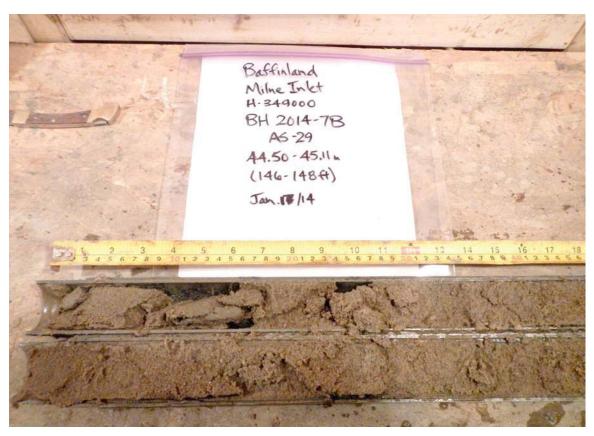


BH-2014-07B AS-28 (42.98m - 43.59m) 1 of 2



BH-2014-07B AS-28 (42.98m - 43.59m) 2 of 2





BH-2014-07B AS-29 (44.50m - 45.11m)



BH-2014-07B AS-30 (46.22m - 46.63m) 2 of 2



BOREHOLE REPORT MATCH HOLE: **BH14-12 CLIENT: Baffinland Iron Mines Corporation** PAGE: 1 **PROJECT:** Mary River Project SITE: Milne Inlet Bay **COORDINATES:** 7976537.16 CONTRACTOR: Logan Drilling Group STARTED: 13/01/2014 **DRILL TYPE:** Skid mounted CME 55 FINISHED: 14/01/2014 503242.708 **METHOD SOIL:** Wash Boring **INSPECTOR:** C.S.S/W.R.H **DIP DIRECTION: ROCK:** C.S.S LOGGED BY: DIP: 90 NA **CASING: HWT-Casing REVIEWED:** W.R.H **ELEVATIONS** DATUM: Seabed DATE: January, 2014 PLATFORM: CORE: Not Applicable **GROUND:** -0.48 **END OF HOLE:** -19.37 HYDRAULIC CONDUCTIVITY (m/s) SPT N-VALUES (kg/m3) SAMPLE or RUN > DYNAMIC CONE PENETRATION ELEV. REMARKS PIEZOMETER INSTALLATION $10^{6} \quad 10^{5} \quad 10^{4}$ 40 60 **BLOW COUNT** AND DEPTH **DESCRIPTION** DENSITY (E) (mm) GRAIN SIZE SHEAR STRENGTH (kPa) (m) TYPE/ NUMBER REC'Y(%) DISTRIBUTION (%) DEPTH (UNCONFINED WATER CONTENT & ATTERBERG LIMITS DEPTH REC'Y (■ QUICK TRIAXIAL LAB VANE POCKET PEN. GR SA SI CL -0.48 100 15 30 45 (%) 150 200 Drill set up on ice 0.0 SAND, some silt, some surface; casing gravel, light brown, extended to seabed; compact, wet, fine to soil sampling started medium grained sand, AS1 340 45 Ö coarse subrounded gravel. 0.76 Water depth 1 measured periodically during drilling. -2.00 1.52 -2.13 No soil in the casing 1.52 at the end of Gravelly SAND, brown, advance. loose, wet, sand with 1.65 subrounded to AS2 360 59 Ó -2.38 subangular, fine to coarse 2 grained gravel SAND, some angular gravel, possible cobbles, light brown, loose, medium to coarse grained sand. Sandy SILT, trace clay, dark brown, with black -3.53 3.05 3 laminations along sea bed. 3.05 Sandy GRAVEL, possible 4 5 5 260 0 AS3 43 cobbles, brown, compact, saturated, angular to subround gravel. 3 66 SAND and GRAVEL, some 4.57 angular cobbles fragments of limestones and granite, AS4 400 66 0 50 48 brown, loose, wet to SAMPLING METHOD SHIPPING CONTAINER Constant Head Test A - Split Tube N - Insert R - Cloth Bag B - Thin Wall Tube F - Wash O - Tube S - Plastic Bag Variable Head Test G - Shovel Grab P - Water Content Tin U - Wooden Box C - Piston Sample Lab. Permeability D - Core Barrel K - Slotted Core Box X - Plastic & PVC Sleeve Z - Discarded (sonic or diamond drill)

H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

HOLE: <u>BH14-12</u>

		PROJECT: M	ct											PA	GE	: :	2	OF:	4						
ELEV.	JL	DESCRIPTION	l _	RI	JN		\$ D.		VALUE: MIC CON		NETRAT	ΓΙΟΝ	CON	NDUC	-	IC Y (m/s) 10 ⁻⁴	(kg/m3)		A١			ER 10N			
(m)	SYMBOL	DESCRIPTION		DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNT	DЕРТН (m)	□ UN ■ QU	CONF		X FI	H (kPa IELD VAN AB VANE OCKET F	νÉ	ATT	ERBE	RG L	ENT & IMITS 45 (%)	DRY DENSITY (kg/m3)		ISTR	N SIZE IBUTIO SI	ON (%)	PIEZOMETER INSTALLATION
		saturated,medium to coarse grained sand.	X	5.18				4	6		30	100	130	200				,	+3 (1/9)						
<u>-6.58</u> 6.10	700 700 700 700 700 700 700 700 700 700	SAND, some silt, trace gravel, light brown, loose, wet, fine to medium grained sand, fine to medium grained, round to subangular gravel. 6.50 m: Some coarse sand,		6.71	AS5	330	54	2 3 5 3		•							0				7	83	10		
-8.10 7.62		some gravel. SAND, trace		7.62					7																
		gravel/cobbles, light brown, compact, wet, medium to fine grained sand reddish, coarse angular gravel.	X	8.23	AS6	230	38	4 5 7 7	8	•							0								
		9.14 m: Light brown, compact, medium to coarse grained sand, trace rounded, fine to medium grained gravel.		9.14	AS7	460	75	6 7 9	9	•	•						0								
		10.67 m: Loose, some gravel, possible cobbles, some angular rock fragments with subrounded sides.		10.67	AS8	600	98	2 4 4 4	11							C)								
	SAM	PLING METHOD		<u> </u>	SHI	PPI	ING (CONT	ΓΔΙΝ	IER	:					:	:								
B - T C - F D - C	plit Tub hin Wa Piston S Core Ba	pe E - Auger Il Tube F - Wash ample G - Shovel Grab			Q-J	iser ube /ate ar	t r Co	onte	nt Tin	R S n U Y	R - Clo 5 - Pla 1 - Wo 7 - Co	oth Ba astic B ooden ore Boo	ag Box x	PL LIF W _P	ASTIC	W _N	AL L JRE L NT	W _L				Va	riable	Head Te Head Te neability	st

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

HOLE: <u>BH14-12</u>

PROJECT: Mary River Project

PAGE: 3 **OF**: 4

		PROJECT: M	iry River	Pro	ojec	[PAGI	E: 3 OF : 4
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	DEPTH TYPE/	l c	E)	SPT N-VALUES DYNAMIC CONE PENETRATIC 20 40 60 80 SHEAR STRENGTH (kPa) UNCONFINED QUICK TRIAXIAL 50 100 150 200	10° 10° 10° E	GRAIN SIZE DISTRIBUTION (%) OX
<u>-12.67</u> 12.19		Sandy GRAVEL, some subrounded to subangular, fine to coarse grained limestone and granite gravel, greyish brown, compact, wet.	12.19 ASS	350	57	5	•	0	
-14.19 13.71 -14.68 14.20	1000 1000 1000 1000 1000 1000 1000 100	SAND, some gravel, possible cobbles, brown, compact, fine to medium grained sand. SAND, trace of silt, frozen, medium dense, fine grained.	14.32	0 460	3	3 20 33		• 0	Partially frozen sample at the bottom end of spoon;refusal. Likely frozen. 0 91 9
<u>-15.88</u> 15.40		SAND, fine to medium grained sand, not frozen, very dense.	15.24	2 380	62 8 2!	16		• 0	
<u>-17.24</u> 16.76		SAND AND GRAVEL, brown, frozen, medium to coarse grained sand, subround to angular, fine to coarse, granitic and limestone gravel.	16.76 AS1:	3 600	98 11 11 11 22	60		••	Frost noted along bedded layers and fine sand.
B - T C - P D - C	plit Tub hin Wa iston S ore Ba	ll Tube F - Wash ample G - Shovel Grab	O - P - ' Q -	Inser Tube Wate Jar	t r Con	tent Tir	S - Plastic Bag	IC NATURAL LIQUID MOISTURE LIMIT CONTENT WN WL	Constant Head Test Variable Head Test Lab. Permeability Project: H/349000

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation HOLE: BH14-12

•		CLIENT: B	affinla	and Ir	on l	Mine	es C	orporation	HOLE	:: <u>BH14-12</u>	
		PROJECT: M	ary R	iver F	Proj	ect			PAGE	: 4 OF : 4	
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	SAN DEPTH	TYPE/ NUMBER T		BLOW COUNTS S		SPT N-VALUES DYNAMIC CONE PENETRATION 20 40 60 80 SHEAR STRENGTH (KPa) UNCONFINED QUICK TRIAXIAL DOUBLE TO THE TENDER TO T	HYDRAULIC CONDUCTIVITY (m/s) (Fig. 5) (Fig. 5) (Fig. 7) (REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
<u>-18.76</u> 18.28		gravelly SAND, medium brown, fine to medium grained sand, fine, rounded to subrounded gravel, partially frozen.	18.2		500 8		18		• 0		
<u>-19.37</u> 18.89		NOTES: 1. Four thermistors installed at depths 18.89 m, 13.9 m, 3.9 m and 2.4 m below seabed.	/ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	3		ENG	OF	BOREHOLE			
B - T C - F D - C	plit Tub hin Wa Piston S Core Ba	ıll Tube F - Wash Sample G - Shovel Grab		N - In O - Tu P - W Q - Ja X - Pl	sert ube ater (ar	Conte	ent Tin	R - Cloth Bag S - Plastic Bag	D NATURAL LIQUID MOISTURE LIMIT CONTENT WN WL	Constant Head Test Variable Head Test Lab. Permeability	



BH-2014-12 AS-1 (0.0m - 0.76m)

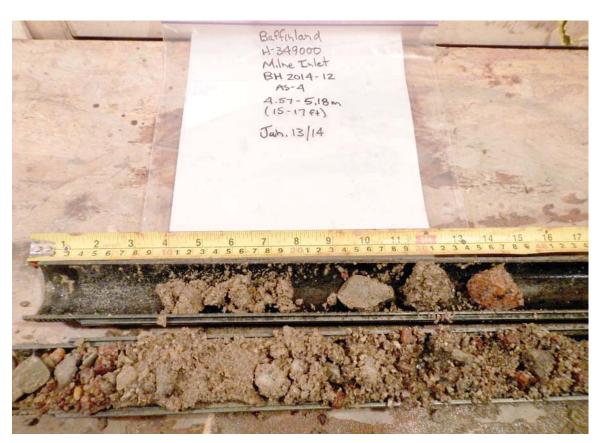


BH-2014-12 AS-2 (1.52m - 2.13m)





BH-2014-12 AS-3 (3.05m - 3.66m)



BH-2014-12 AS-4 (4.57m - 5.18m)





BH-2014-12 AS-5 (6.10m - 6.71m)



BH-2014-12 AS-6 (7.62m - 8.23m)





BH-2014-12 AS-8 (10.67m - 11.28m)



BH-2014-12 AS-9 (12.19m - 12.80m)





BH-2014-12 AS-10 (13.71m - 14.30m)



BH-2014-12 AS-11 (14.48m - 15.09m)





BH-2014-12 AS-12 (15.24m - 15.85m)



BH-2014-12 AS-13 (16.76m - 17.37m)



MATCH BOREHOLE REPORT HOLE: **BH14-13 CLIENT: Baffinland Iron Mines Corporation** PAGE: 1 **PROJECT:** Mary River Project SITE: Milne Inlet Bay **COORDINATES:** 7976601.64 **CONTRACTOR:** Logan Drilling Group STARTED: 12/01/2014 **DRILL TYPE:** Skid mounted CME 55 FINISHED: 13/01/2014 503243.863 **METHOD SOIL:** Wash Boring **INSPECTOR:** C.S.S/W.R.H **DIP DIRECTION: ROCK:** C.S.S LOGGED BY: DIP: 90 NA **CASING: HWT-Casing REVIEWED:** W.R.H **ELEVATIONS** DATUM: Seabed DATE: January, 2014 PLATFORM: CORE: Not Applicable **GROUND:** -6.62 **END OF HOLE:** -37.10 HYDRAULIC CONDUCTIVITY (m/s) SPT N-VALUES (kg/m3) SAMPLE or RUN > DYNAMIC CONE PENETRATION **ELEV** REMARKS PIEZOMETER INSTALLATION $10^{6} \quad 10^{5} \quad 10^{4}$ **BLOW COUNT** 40 60 80 AND DEPTH **DESCRIPTION** DENSITY (E) (mm) GRAIN SIZE SHEAR STRENGTH (kPa) (m) TYPE/ NUMBER RECY(%) DISTRIBUTION (%) DEPTH (☐ UNCONFINED WATER CONTENT & ATTERBERG LIMITS REC'Y (GR SA SI CL 100 15 30 45 (%) -6.62150 200 Drill set up on ice -6.74 SILT, black, organic silt. surface; casing extended to seabed; Silty SAND, trace gravel, soil sampling started brown, mottled black, fine grained sand. -7.52Sandy SILT, trace gravel, Water depth 1 dark brown, very loose, wet measured periodically silt, some gravel, rounded during drilling. AS1 300 48 Ó to subangular, fine to medium grained gravel, 1.52 small shell fragments. No heaving sand in SAND, some silt, some the casing at the end gravel, brown, loose, wet, fine to medium grained 3 of advance AS2 440 72 0 sand, subrounded to subangular, fine to medium 3 3.05 grained gravel with size upto 20mm. No heaving sand in the casing at the end of advance 4 4.05 m: Black band of silty sand with organics. 330 54 AS3 SAMPLING METHOD SHIPPING CONTAINER Constant Head Test A - Split Tube N - Insert R - Cloth Bag B - Thin Wall Tube F - Wash O - Tube S - Plastic Bag Variable Head Test G - Shovel Grab P - Water Content Tin U - Wooden Box C - Piston Sample Lab. Permeability D - Core Barrel K - Slotted Core Box X - Plastic & PVC Sleeve Z - Discarded (sonic or diamond drill)

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

HOLE: <u>BH14-13</u>

		PROJECT: M	lary	/ Ri	iver	Pro	oje	ct									PA	GE	: 2 C)F : 6	6	
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION		ОЕРТН МА	TYPE/ JAN	_		BLOW COUNTS S	DEPTH (m)	}	` 20	MIC CO 40 R STRE	NE PEI 60 ENGT * FI • L	NETRATIO 80 H (kPa) ELD VANE AB VANE OCKET PEN 200	10°	10 ⁵ ER CON	/ITY (m/s)	DRY DENSITY (kg/m3)	REMA AN GRAIN DISTRII	D I SIZE BUTIO		PIEZOMETER INSTALLATION
-12.11 5.49		Silty SAND, trace of clay,		5.49															300 mm of heaved in casing at	to the		
		laminations on bedding, some gravel in sand beds brown to dark brown, very loose, wet.	$\left \right $	6.1	AS4	520	85	0 2 1 1	6						0				advance. 6 55	32	7	
<u>-13.63</u> 7.01		SAND, trace gravel, light	1	7.01					7													
		brown, compact, fine to medium grained sand, subrounded, medium grained limestone gravel.	X A	7.62	AS5	240	39	4 8 7 8	8		•					0						
		8.53 m: Medium to coarse grained sand, some gravel, subrounded to rounded, fine to medium grained limestone and granite gravel.	$\left \right $	8.53 9.14	AS6	380	62	5 9 9 12	9		•					D			No heavir the casing of advanc	at th	nd in e end	
				10.06	AS7	0	0	5 4 7 8	10)	•								No heavir the casing of advance trap in go condition.	g at the e; Sar od	e end	
									11	 									Biodegrad bentonite the mud p reduce th	mixec olyme	er to	
B - T C - P D - C	plit Tub hin Wa iston S ore Ba	III Tube F - Wash Sample G - Shovel Grab			Q - u	nser Fube Vate Jar	t r Co	onte	nt Tir	า	S - PI U - W	loth Ba astic E looden ore Bo	ag Box x	PLASTI LIMIT	C NATURAL MOISTUR CONTENT	E LIMIT		•	Var	iable H	Head Te	est

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

HOLE: <u>BH14-13</u>

		PROJECT: M						,5 0	orporation		PAGE	3 OF : 6	
ELEV.			+	SAMPLE or RUN					SPT N-VALUES DYNAMIC CONE PENE 20 40 60	HYDRAUI CONDUCTIVIT	IC -		
DEPTH (m)	SYMBOL	DESCRIPTION	DEPTH	TYPE/ NUMBER	REC'Y (mm)	REC'Y (%)	BLOW COUNT	DEPTH (m)	SHEAR STRENGTH UNCONFINED QUICK TRIAXIAL DO NOT	(kPa) D VANE VANE KET PEN. WATER CONT ATTERBERG L	ENT &	GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	PIEZOMETER INSTALLATION
		11.58 m: Loose, medium to coarse grained sand, trace of reddish/brown, subangular to angular limestone and granite gravel.	11.5	AS8	300	49	1 2 3 3 3	12		ρ		disturbance in fine sands. Low blow counts likely due to washing at the end of last casing advance.	
<u>-19.72</u> 13.1		13.1: Gravel increasing to Gravelly.	13.1	AS9	260	43	2 4 5 6	13		0		No heaving sand in the casing at the end of advance. 35 63 2	
			14.6	AS10	0	0	5 4 5 6	15				Washing done after casing advanced due to some heaving sand in the casing.	
-22.77 16.15 -23.38		SILT, SAND AND GRAVEL, possible cobbles, brownish grey, silt and fine sand, angular gravel up to 40 mm.	16.1	AS11	40	7	5 11 19 17	16	•	0			
16.76		SAND, trace gravel, light brown, fine to medium grained sand, reddish, fine grained, rounded gravel	17.6					17					
B - T C - P D - C	plit Tul hin Wa Piston S Core Ba	all Tube F - Wash Sample G - Shovel Grab		Q - J	nser ube Vate ar	t r Co	nter	nt Tin	R - Cloth Bag S - Plastic Bag U - Wooden Box Y - Core Box eve Z - Discarded	PLASTIC NATURAL LIQUID LIMIT CONTENT LIMIT		Constant Head Tes Variable Head Tes Lab. Permeability Project: H/34	

BOREHOLE REPORT

HOLE: <u>BH14-13</u> **CLIENT: Baffinland Iron Mines Corporation**

		PROJECT:	Mary F	River I	Proj∈	ect			PAG	E: 4	OF : 6	
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	DEPTH	TYPE/ JUMBER T	REC'Y (mm) o	JNTS	DEPTH (m)	● SPT N-VALUES	a) NE WATER CONTENT & E ATTERBERG LIMITS	GI DIS	EMARKS AND RAIN SIZE TRIBUTION (%)	PIEZOMETER INSTALLATION
			18.2		400 66	10 11 13 15	18	•	0			
		19.2 m: Fine sand, trace silt.	19.	AS13	500 82	14 12 11 13	19		0			
		20.42 m: Trace silt, trace gravel and cobbles, dark brown to brown, fine to medium grained sand, fin to coarse rounded to angular gravel up to 30 mm.	e /20.4	AS14	600 98	11 13 10 12	. 21		0			
-28.56 21.94 -28.71 22.09		Sandy SILT, trace fine rounded gravel, dark grey SAND, trace fine rounded gravel, light brown, fine to medium grained sand.		AS15	500 82	13 2 11 11 11 12	22		O			
-30.08 23.46		SAND AND GRAVEL, brown, medium to coarse grained sand, rounded to subrounded fine gravel.	23.4	AS16	610 100	6 0 13 15 16	23	•	0			
B - Ti C - Pi D - C	plit Tul nin Wa iston S ore Ba	all Tube F - Wash Sample G - Shovel Grab		Q - Ja	sert ube ater C	onte	nt Tin	R - Cloth Bag S - Plastic Bag	PLASTIC NATURAL LIQUID MINIT MOISTURE LIMIT CONTENT WN WL		Constant Head Te Variable Head Tes Lab. Permeability iect: H/3	st

BOREHOLE REPORT ■ HATCH

HOLE: <u>BH14-13</u> **CLIENT: Baffinland Iron Mines Corporation**

		PROJECT:	Mar	y R	iver	Pro	oje	ct								PA	GE	: 5	C	F:	6	
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	•	DEPTH	TYPE/ NUMBER	<u></u>		BLOW COUNTS S	DEPTH (m)	SHEAR S UNCONFIN QUICK TRI	C CON 40 STRE	60 NGTh X FIE	80 H (kPa) ELD VANE B VANE OCKET PEN.	UATER	10 ⁵ R CON RBERG	'ITY (m/s)	RY DENSITY (kg/r	DI	REMA ANI GRAIN ISTRIE SA	D I SIZE BUTIO	E DN (%) CL	PIEZOMETER INSTALLATION
		24.99m: Sand becoming finer, fine gravel decreasing to about 35% by weight.		24.99	AS17	610	100	15 11 14 13	25	•				0								
		26.51 m: Medium to fine grained sand, some fine, rounded gravel.		26.51	AS18	610	100	18 12 16 17	27	•				O								
				28.34 28.95	AS19			10 14 15 17	28	•				0								
-37.10 30.48		NOTES:		29.48				15 11	30 OF	BORE	4 0)								
	_										•			:	:							
B - T C - P D - C	plit Tul hin Wa iston S ore Ba	All Tube F - Wash Sample G - Shovel Grab			Q - J	nser ube Vate ar	t r Cc	ontei	nt Tin	R - Clot S - Plas U - Woo Y - Cord eve Z - Disc	th Bag stic B oden e Box	ag Box	PLASTIC LIMIT W _P	MATURAL MOISTURE CONTENT	LIQUII E LIMIT				Vari	iable l	Head Te Head Tes	st

BOREHOLE REPORT

CLIENT: Baffinland Iron Mines Corporation

HOLE: <u>BH14-13</u>

		PROJECT: N	lary F	River	Pro	ojeo	ct								PA	GE	: 6	OF:	6	
ELEV. DEPTH (m)	SYMBOL	DESCRIPTION	SAN NAC	TYPE/ NUMBER	<u>_</u>		BLOW COUNTS Z	DEРТН (m)	SHEAF UNCONI	MIC COI 40 R STRE FINED	60 8 ENGTH (I FIELD LAB V POCK	kPa) VANE VANE KET PEN.	10° WATE	10 ⁵ R CON RBERG	TENT &	RY DENSITY (kg/r	A GRA	MARKS ND IN SIZE RIBUTIO	E ON (%)	PIEZOMETER INSTALLATION
		1. Four thermistors installed at depths 30 m, 20 m,10 m and 5 m below seabed.							50	100	150 2				45 (%)					
B - T C - P D - C	plit Tul hin Wa iston S ore Ba	all Tube F - Wash Sample G - Shovel Grab		Q - J	nser Tube Vate Iar	t r Co	nter	nt Tin	S - PI U - W	loth Ba astic B looden ore Bo	ag Box x	PLASTIC LIMIT	NATURAL MOISTURI CONTENT WN	LIQUIE LIMIT				ariable ab. Peri	Head Te Head Te meability	st



BH-2014-13 AS-1 (0.9m - 1.52m)



BH-2014-13 AS-2 (2.44m - 3.05m)





BH-2014-13 AS-3 (3.96m - 4.57m)



BH-2014-13 AS-4 (5.49m - 6.10m)





BH-2014-13 AS-5 (7.01m - 7.62m)



BH-2014-13 AS-6 (8.53m - 9.14m)





BH-2014-13 AS-8 (11.58m - 12.19m)



BH-2014-13 AS-9 (13.10m - 13.71m)





BH-2014-13 AS-11 (16.15m - 16.76m)



BH-2014-13 AS-17 (24.99m - 25.60m)

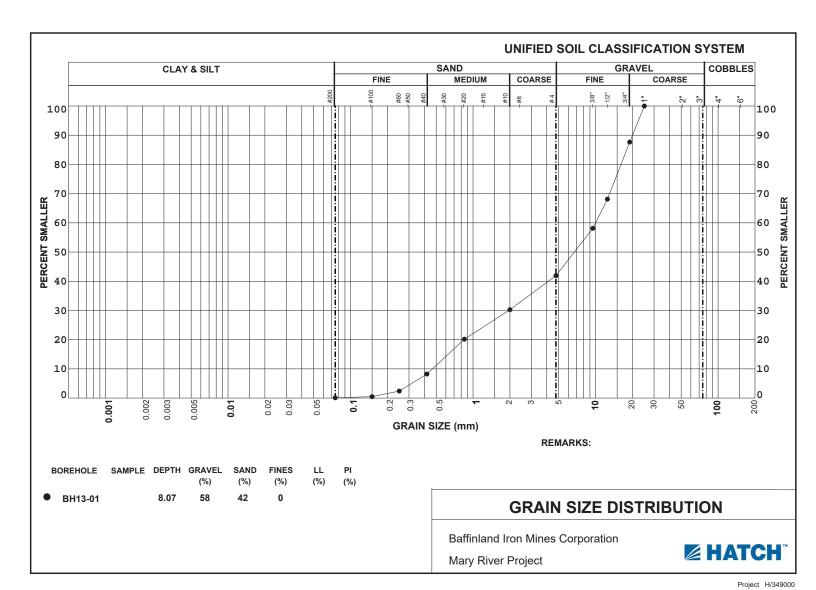


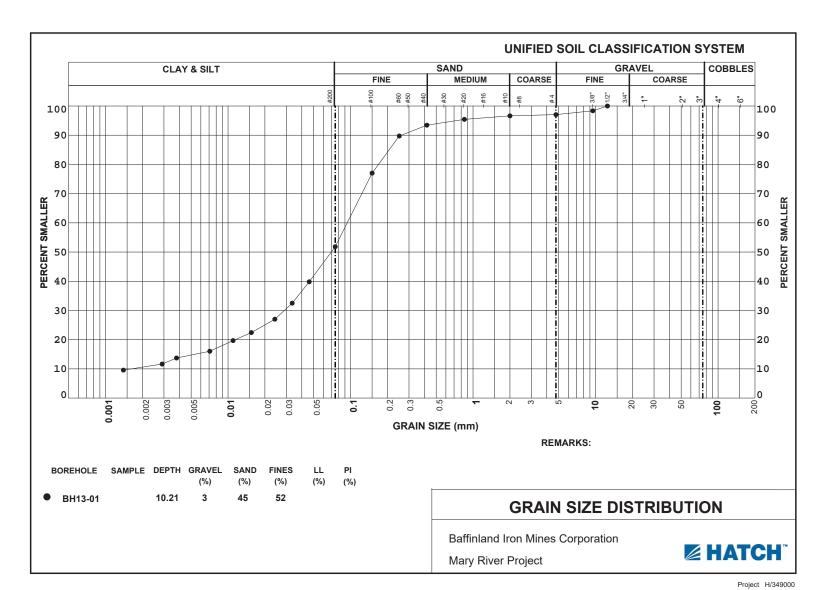


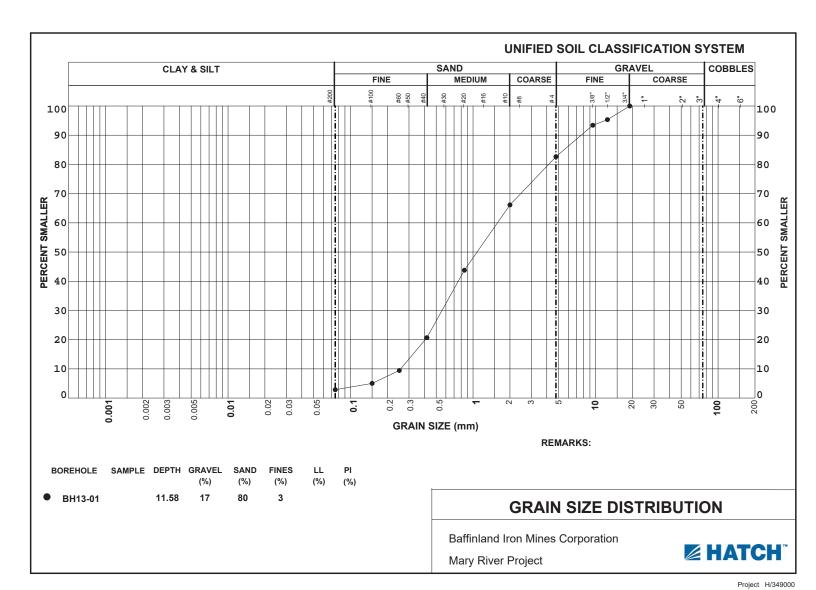


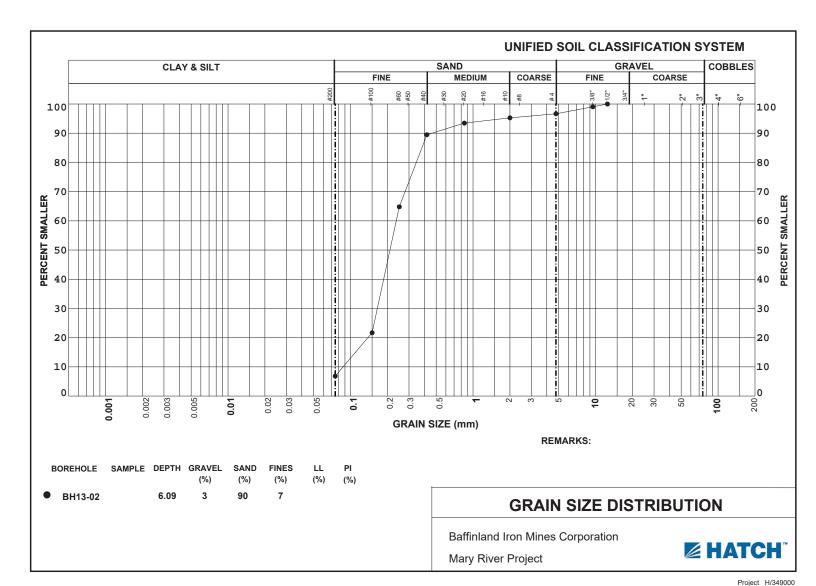
Baffinland Iron Mines Corporation - Mary River Project
Milne Ore Dock Geotechnical Investigation Factual Report - February 21, 2014

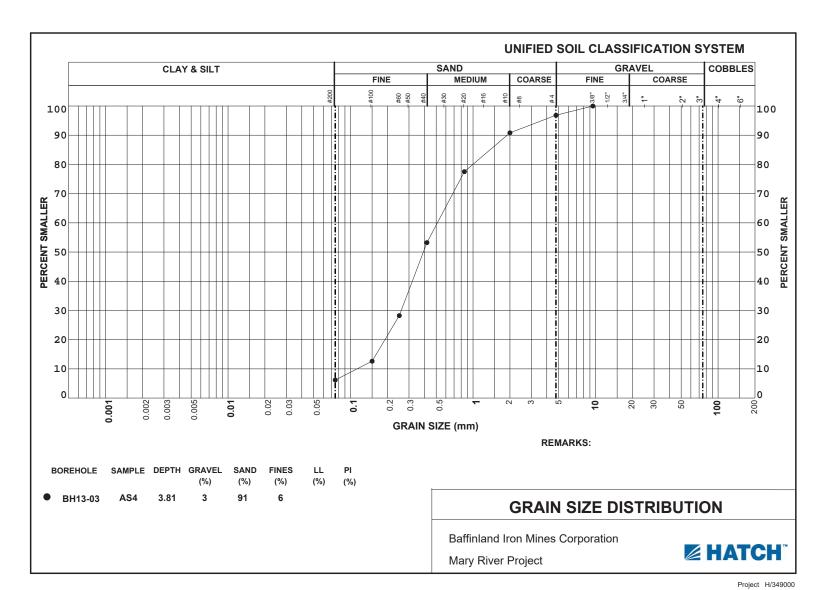
Appendix B Laboratory Test Results

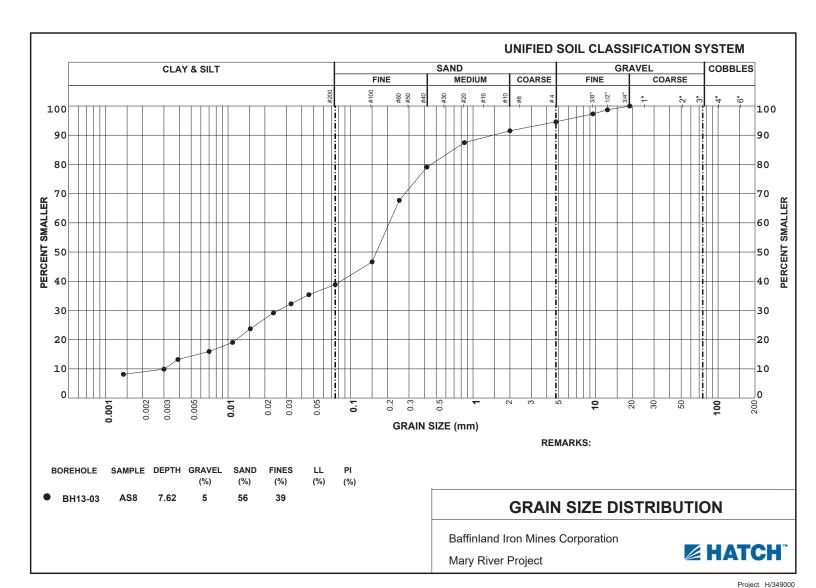


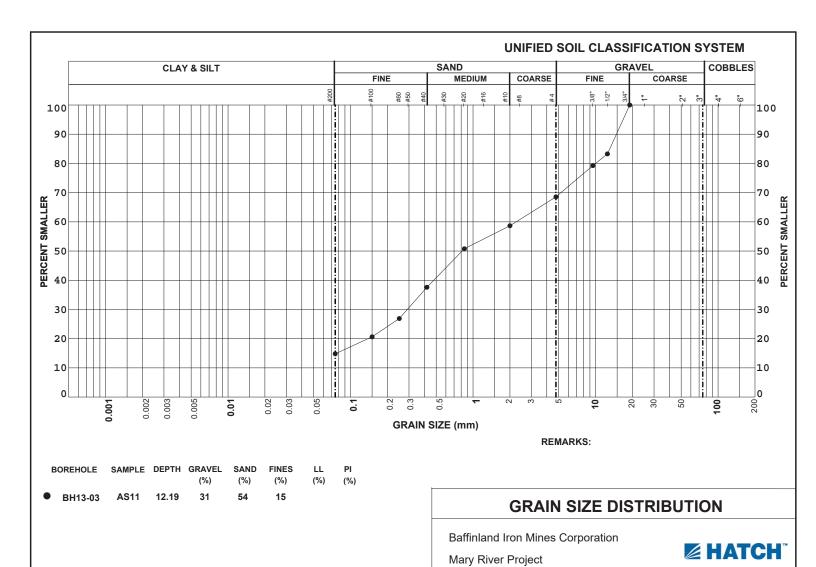




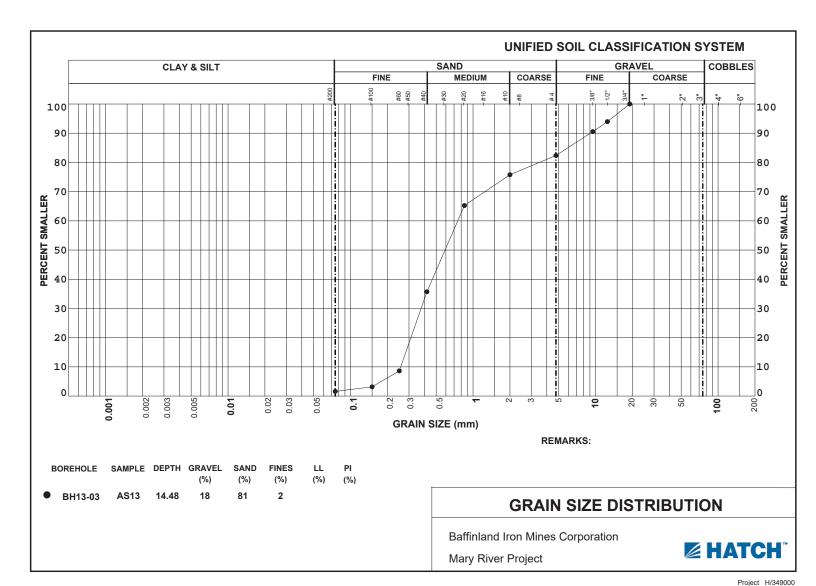


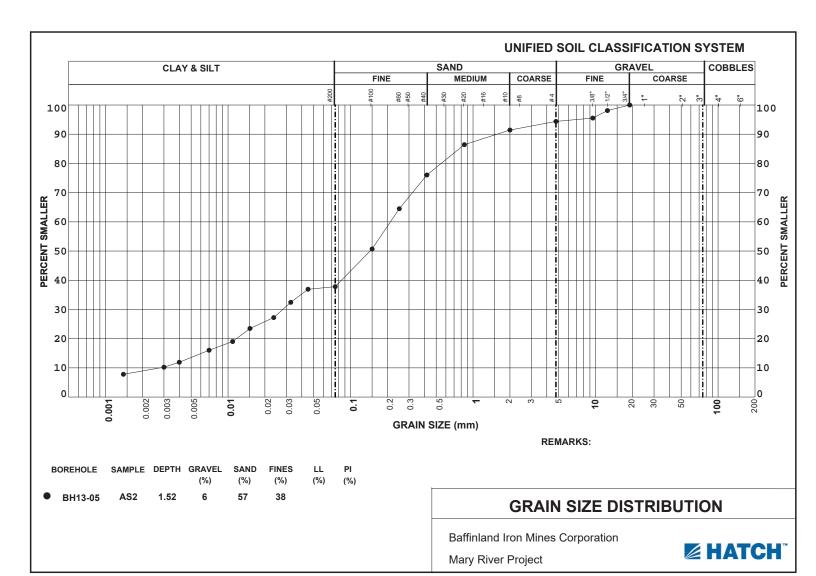


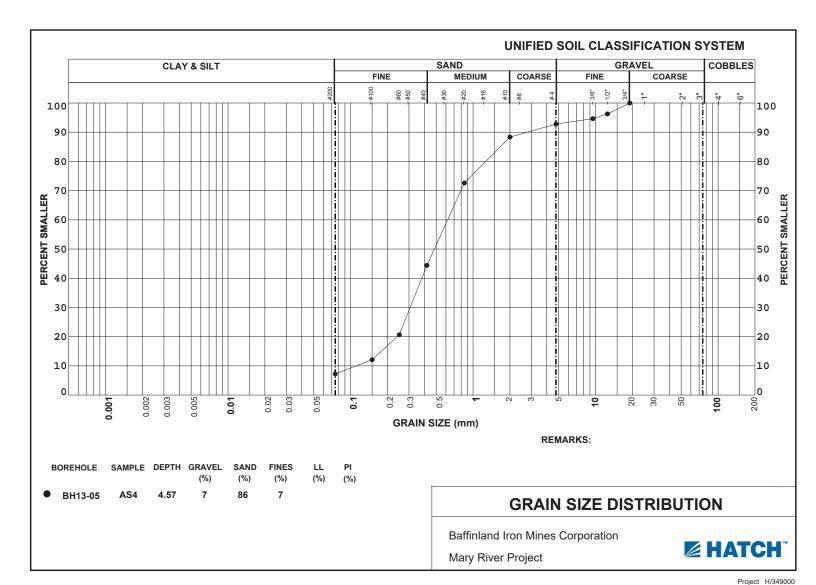


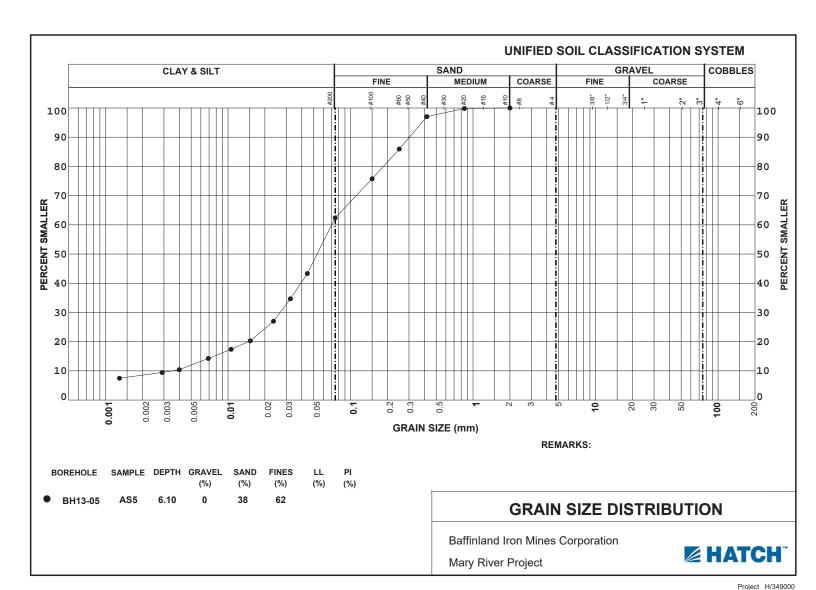


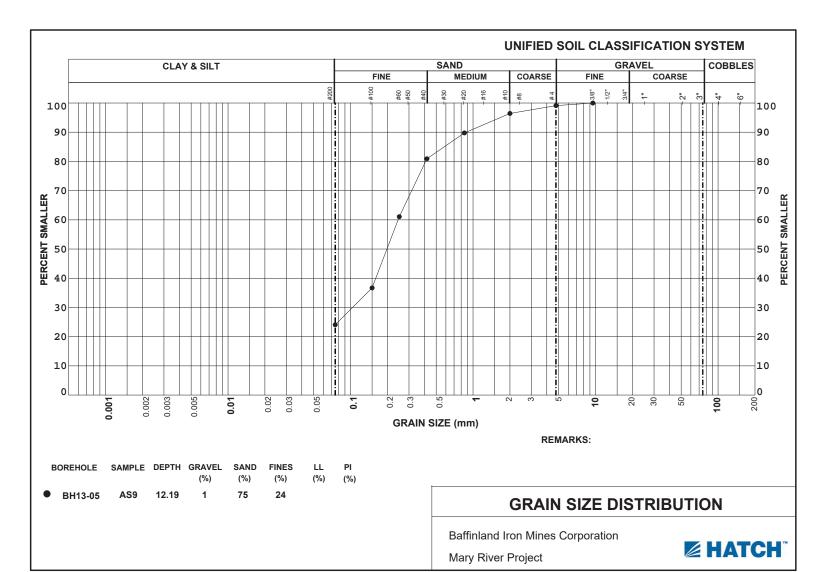
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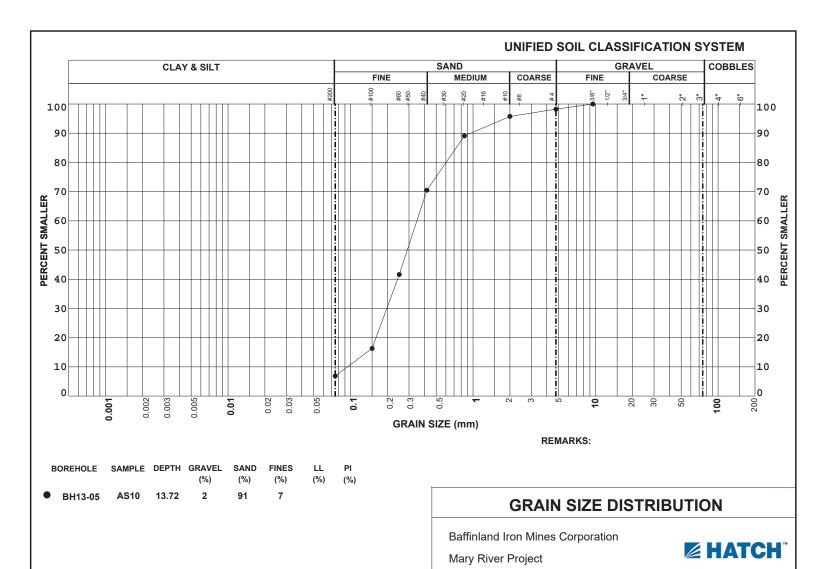




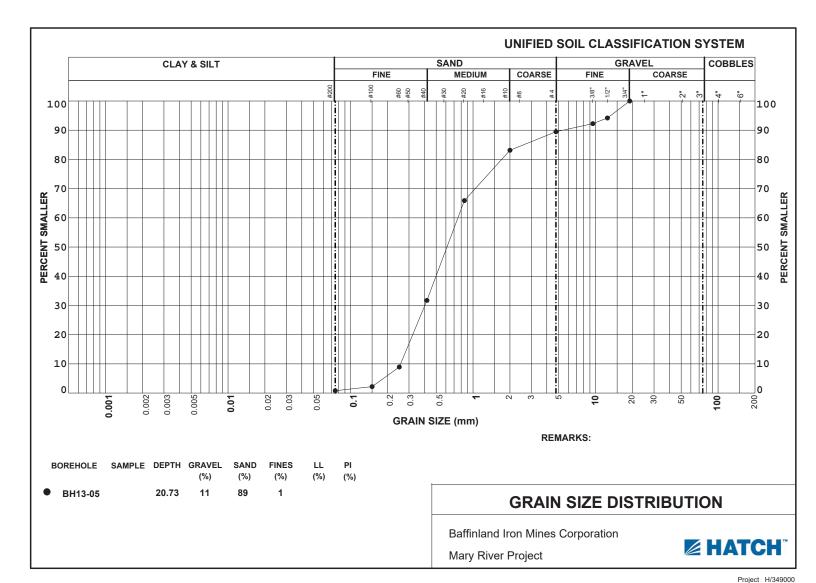


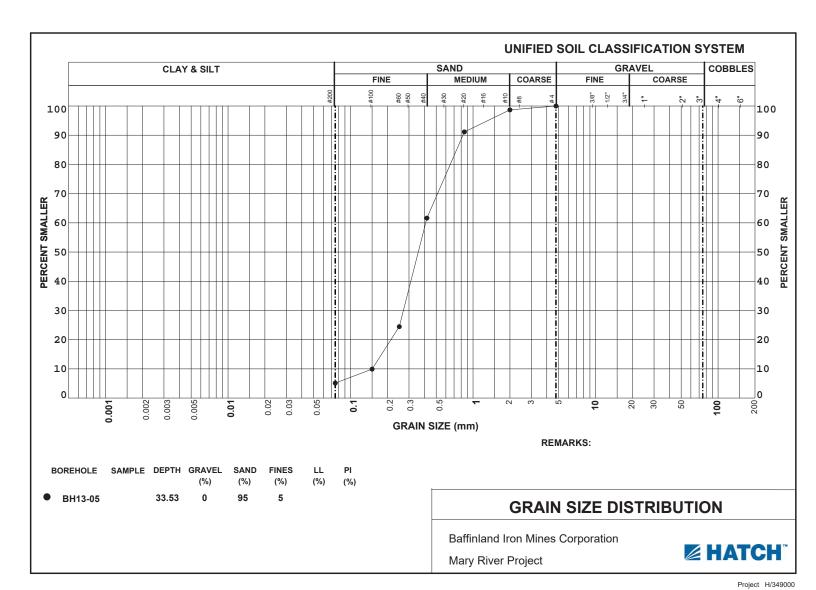


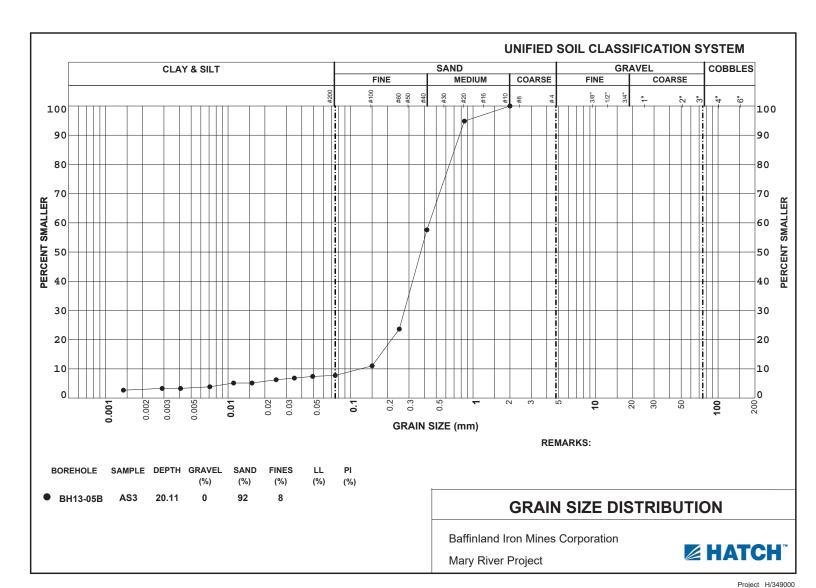
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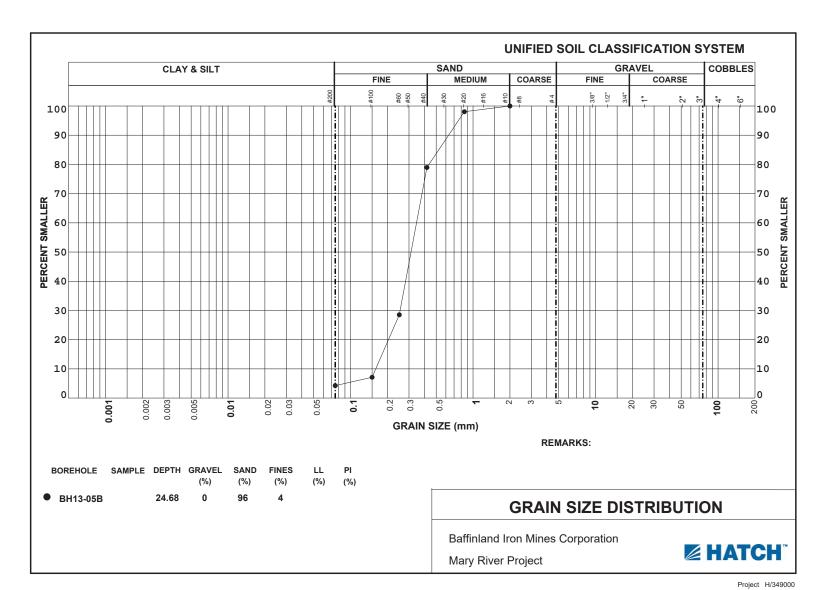


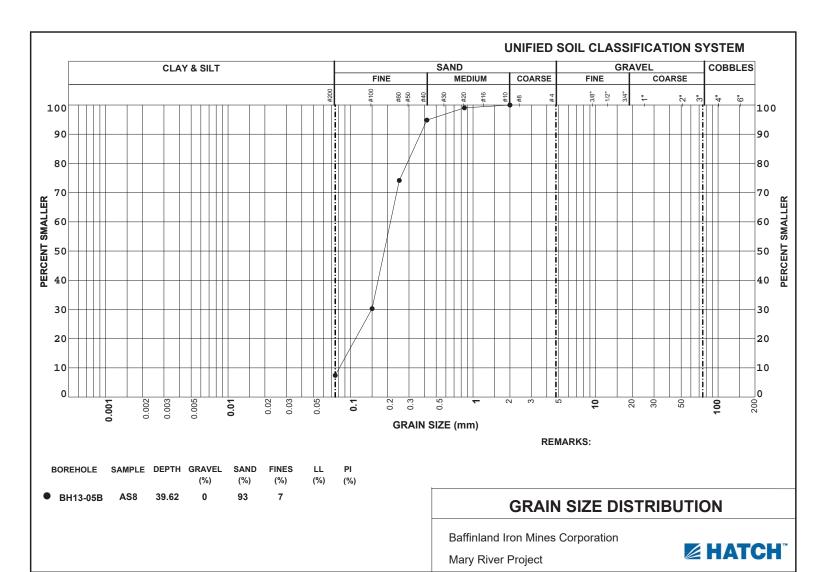
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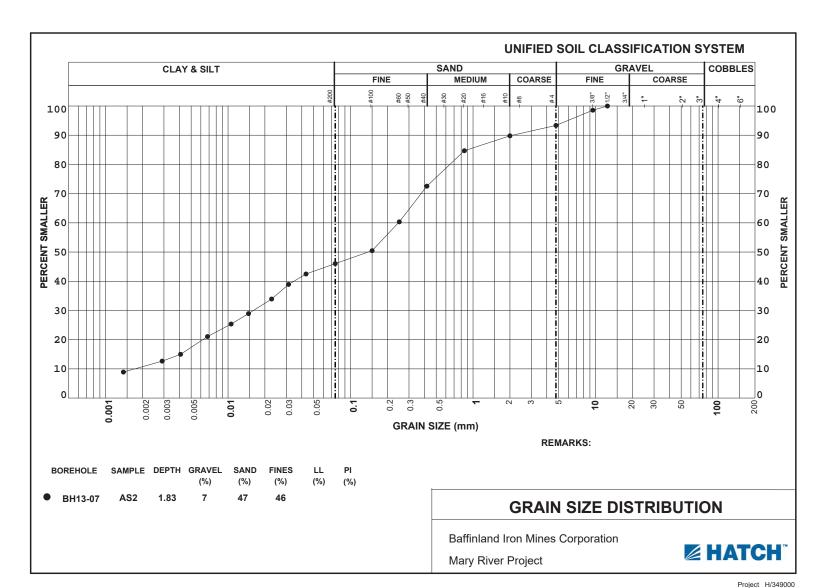


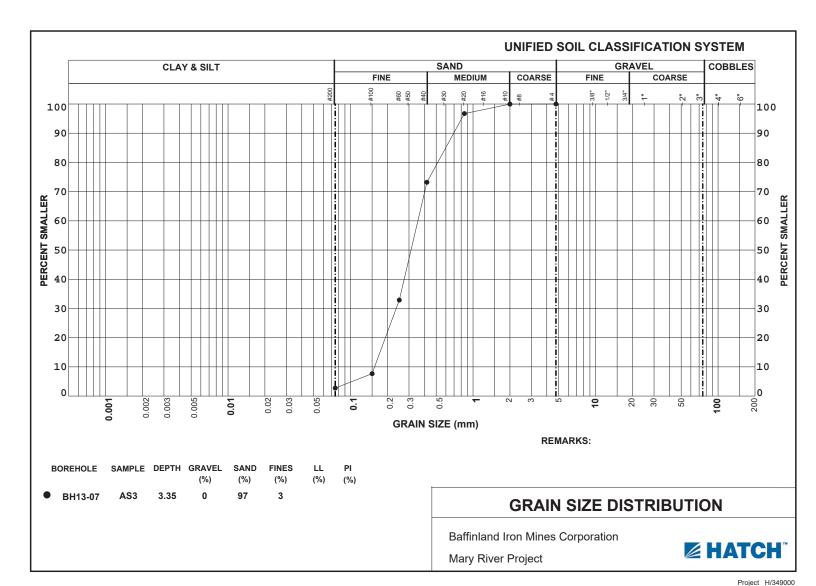


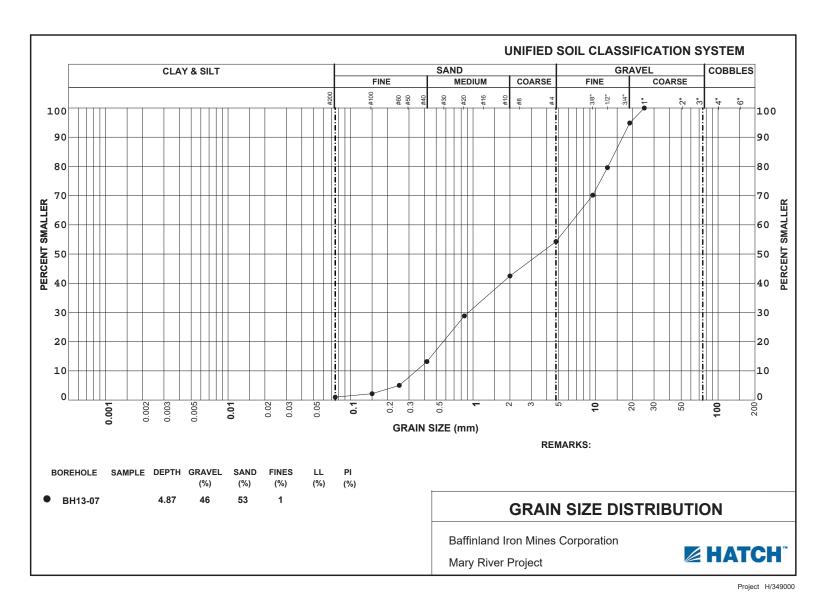


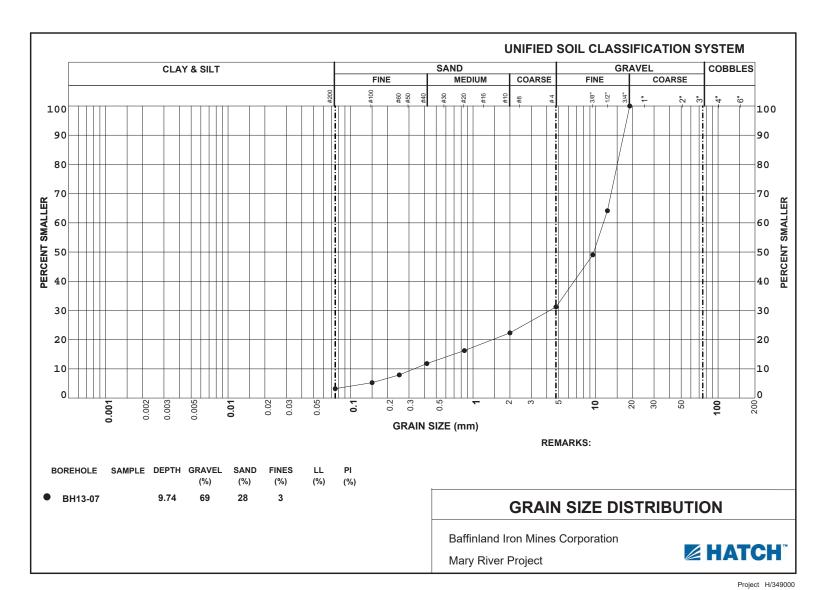


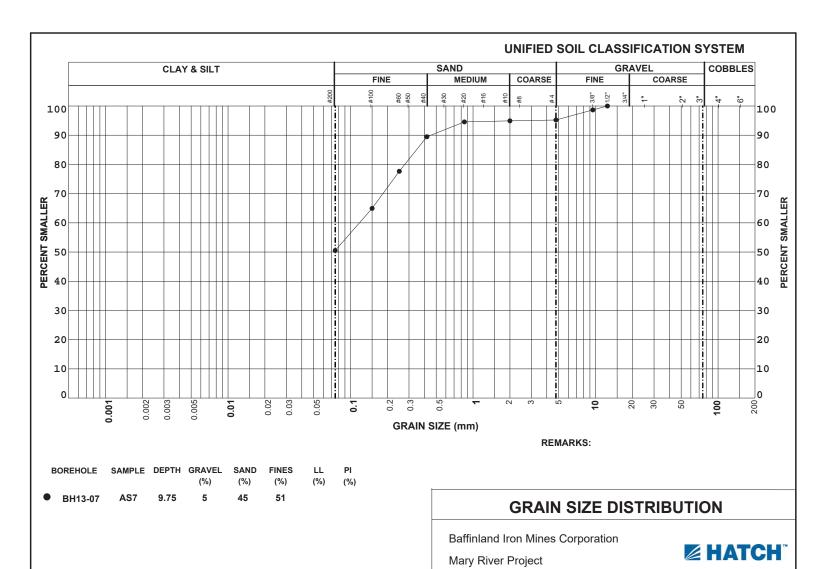


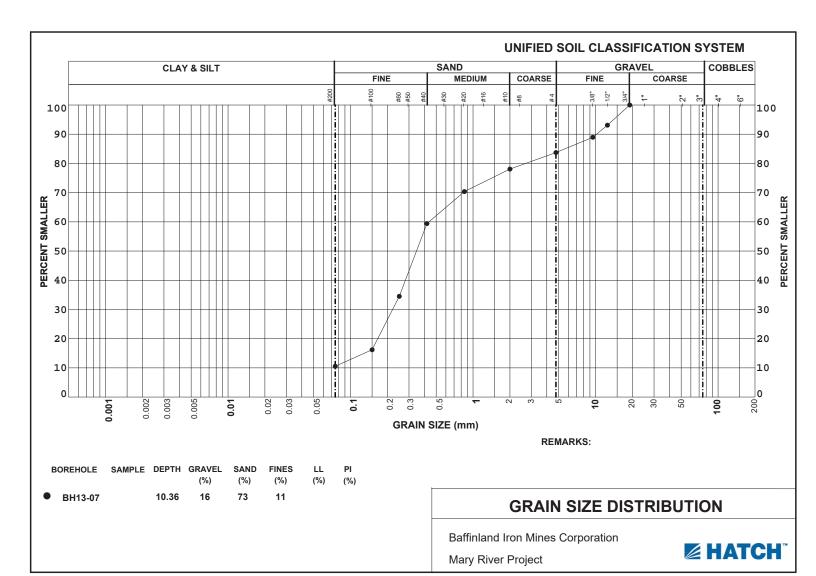


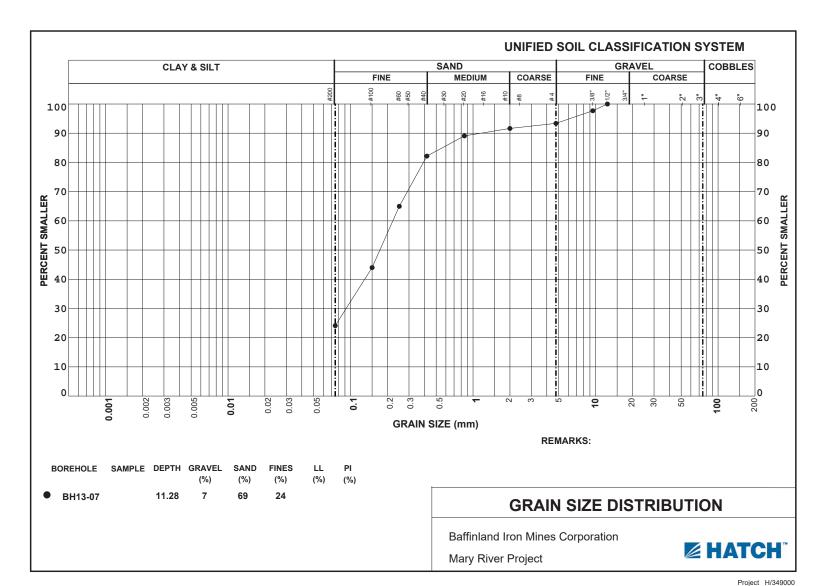


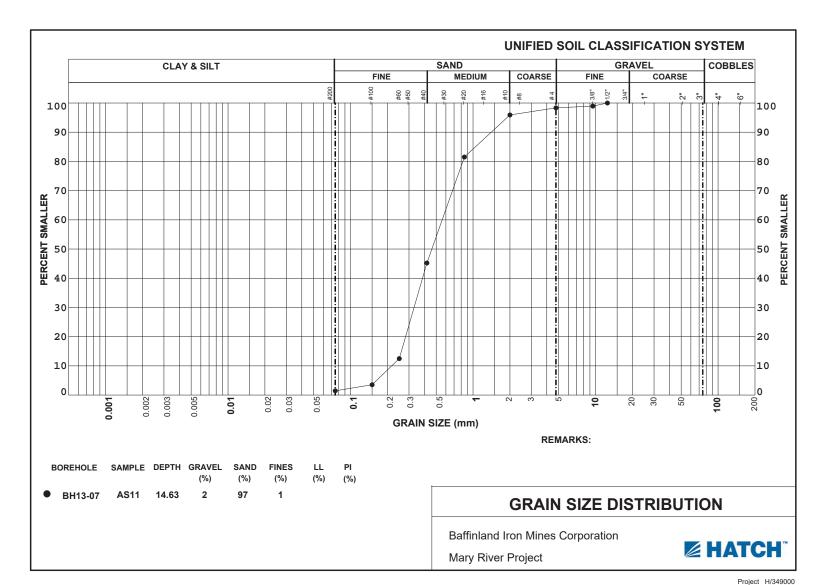


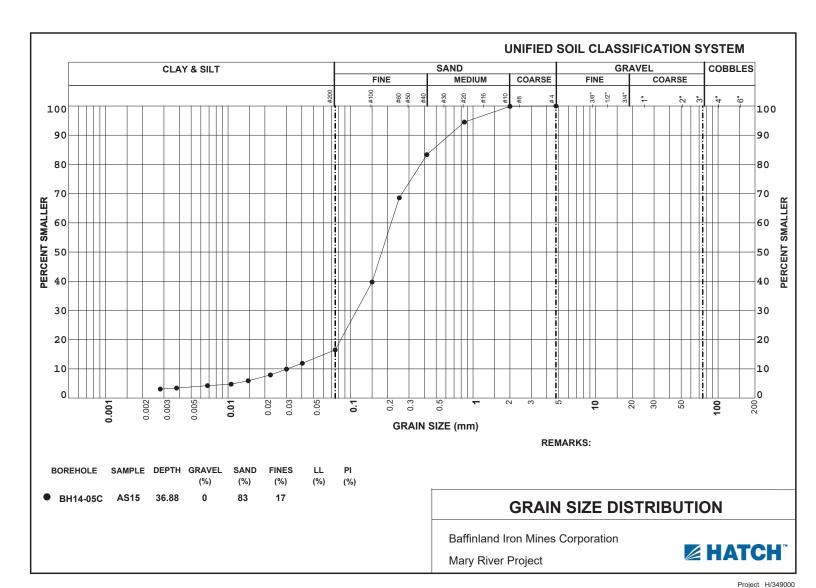


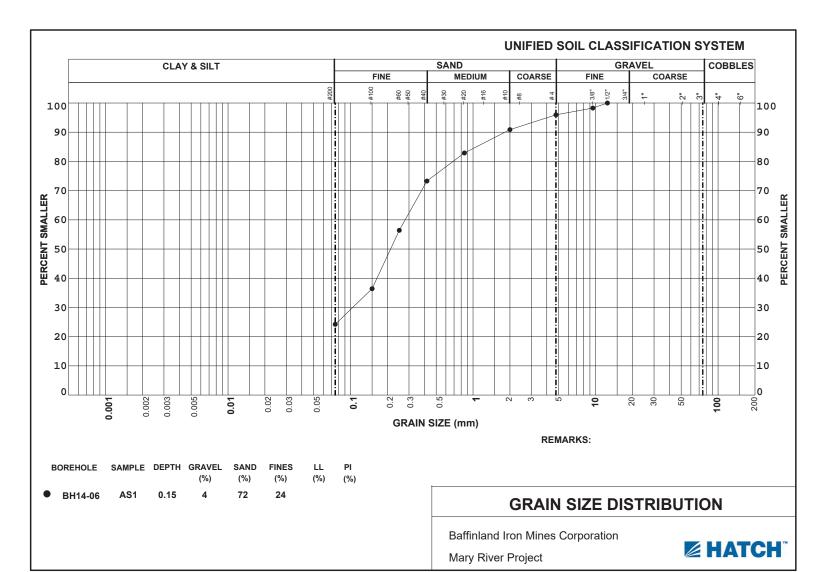


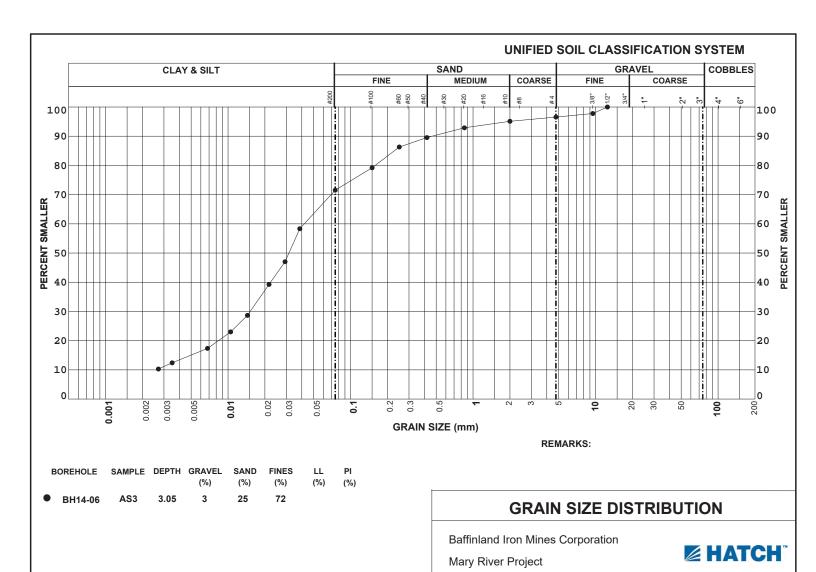


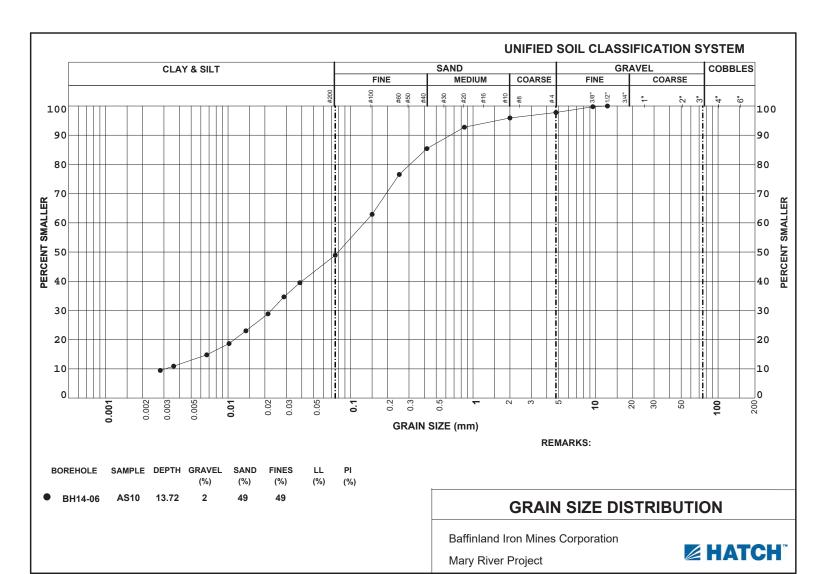


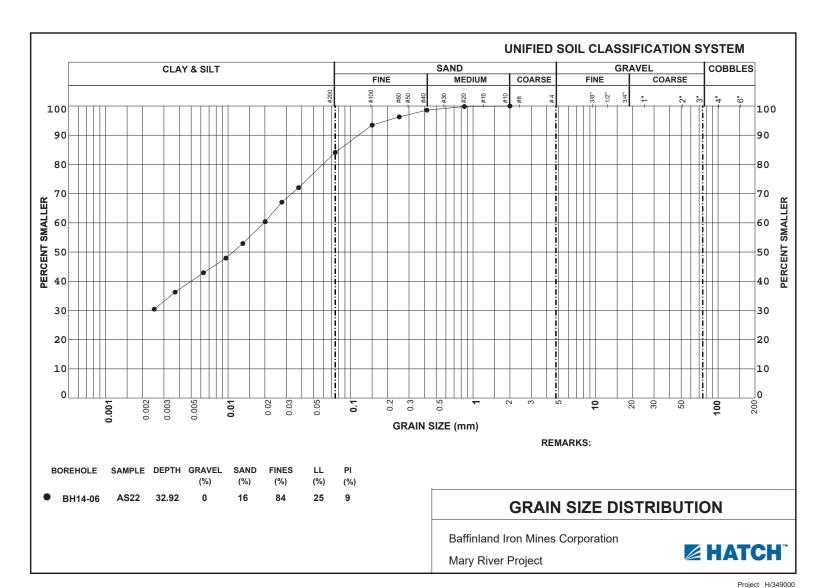


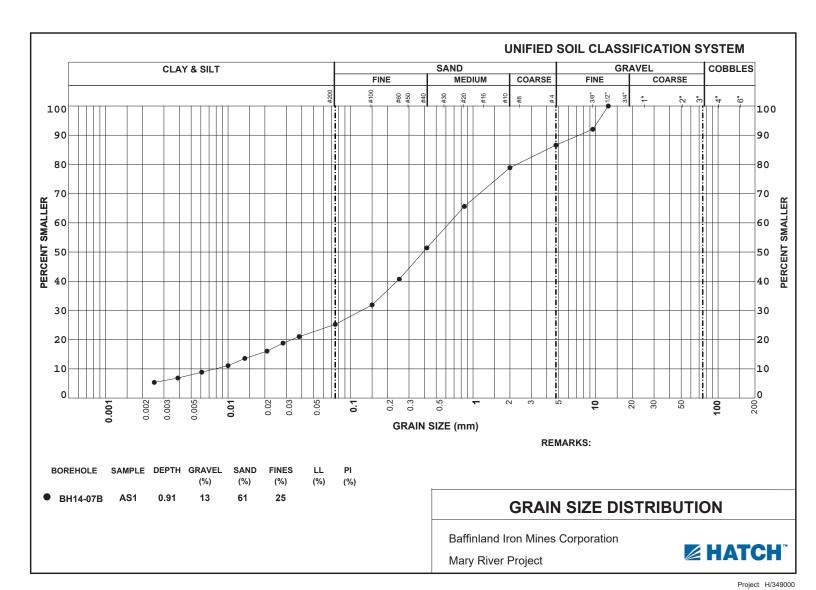


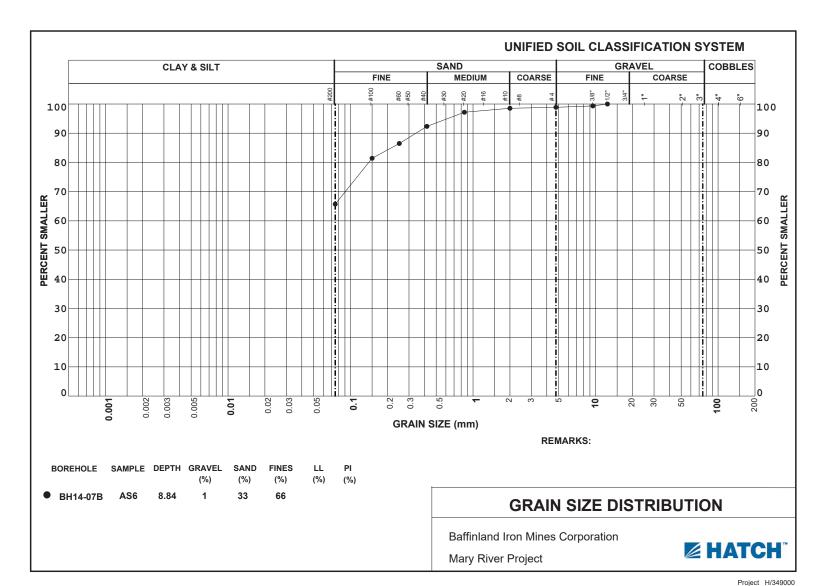


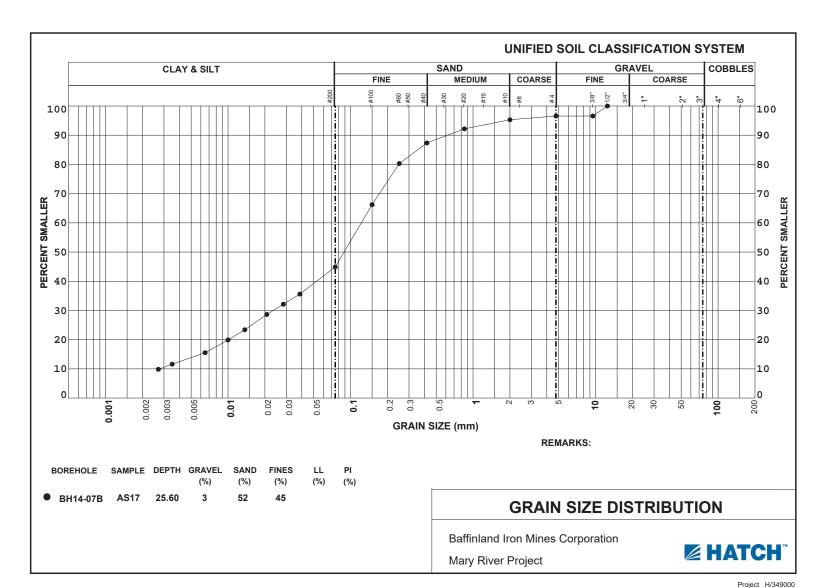


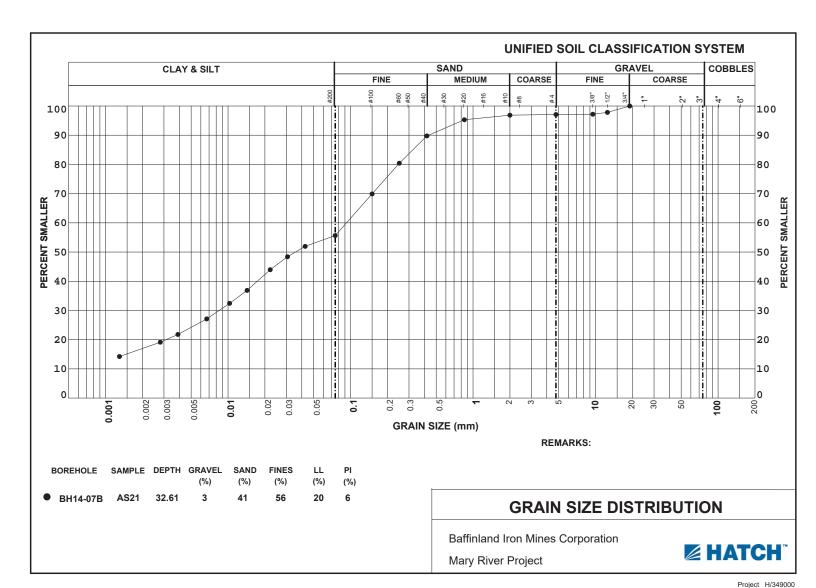


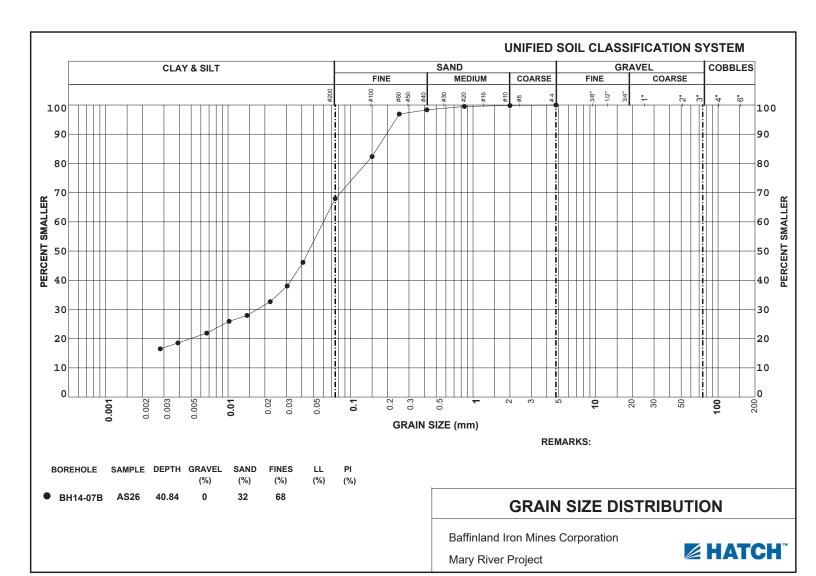


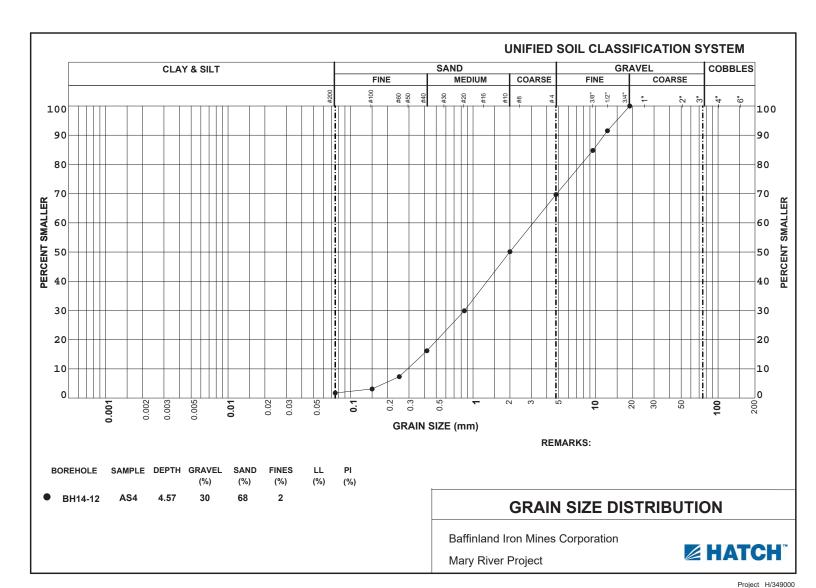


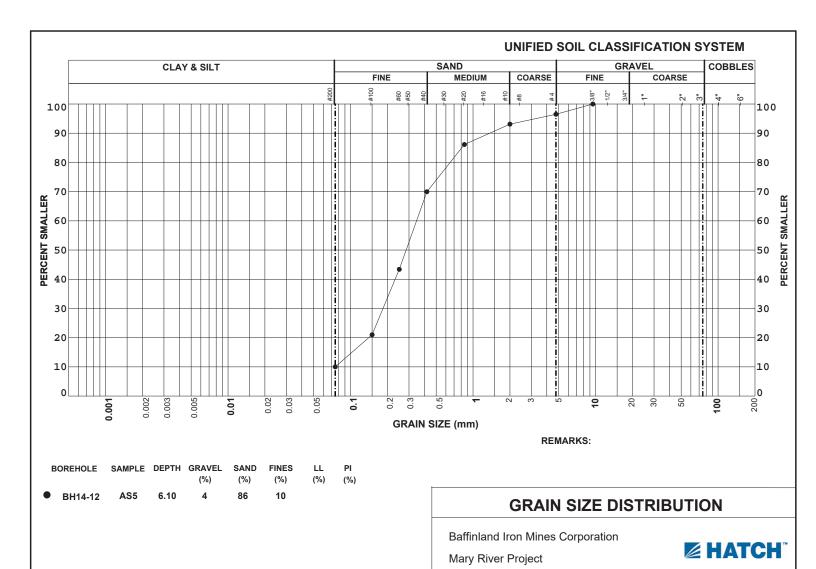


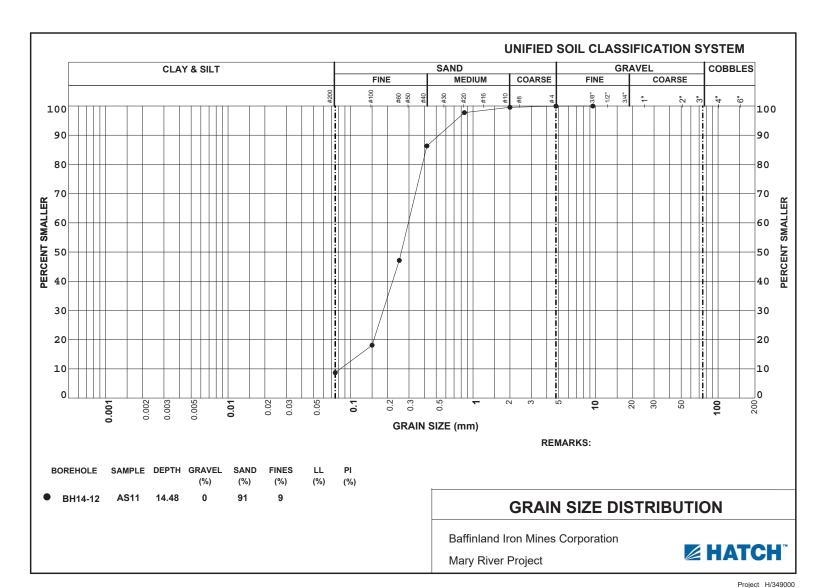


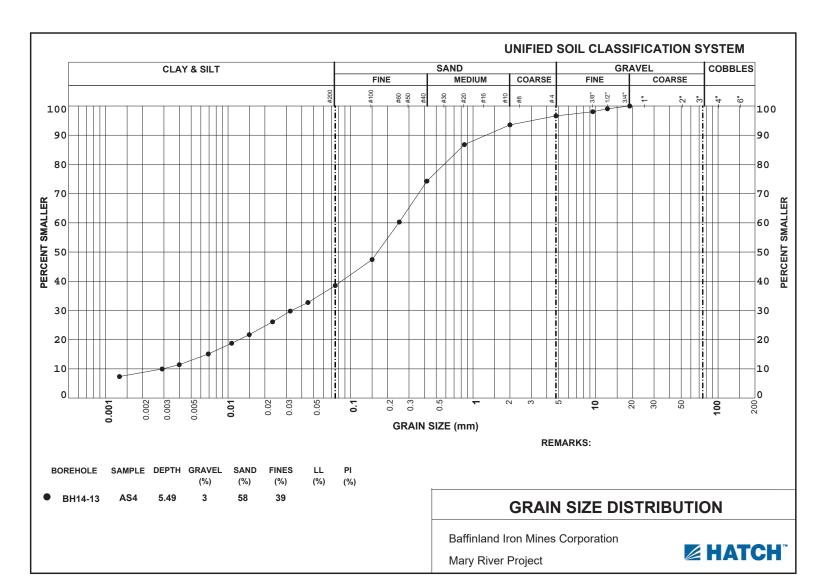


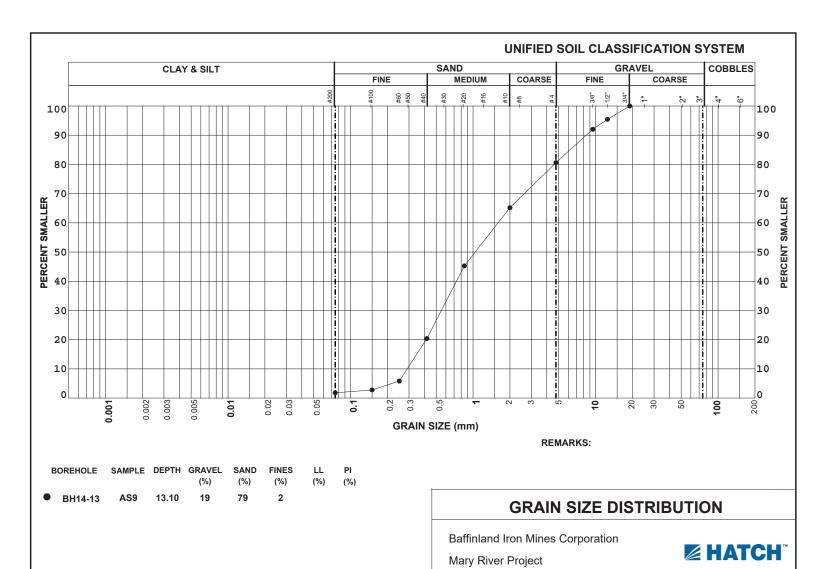


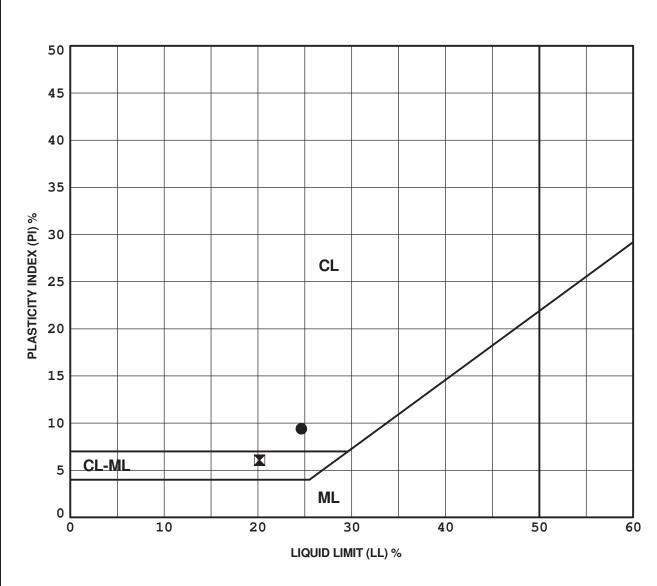












LEGEND	BOREHOLE	SAMPLE	DEPTH (m)	LL %	PI %
•	BH14-06	AS22	32.92	25	9
	BH14-07B	AS21	32.61	20	6

PLASTICITY CHART

NP - Non-Plastic

Baffinland Iron Mines Corporation
Mary River Project





Test Salinity Test Results

Methodology of Salinity Testing

- 1. Take a soil sample and leave it to dry as long as possible (leave the sample bag open to let moisture escape).
- 2. Crush the air dried sample so there are no large aggregates (clods of soil). You may need to crush these aggregates with a rolling pin or hammer. Soil particles should be no larger than 2 mm. Remove asmuch foreign matter, plant material and stones from the sample as you can.
- 3. The test involves adding one part soil for every five parts water. So if you put 50g of soil (weighed on scales) into the container, then you need to add 250ml of the rainwater or distilled water.
- 4. Shake the container vigorously for three minutes to make sure the salts dissolve. In clay loam to clay soils, more shaking (for one minute every three minutes repeated three times) will bring more salts into the solution and increase the accuracy of the test.
- 5. Allow the solution to settle for at lest one minute before testing.
- 6. Place the salinity meter in the solution (but not in the soil at the bottom of the jar) and read the display once it has stabilised.
- 7. Wash the meter electrodes and sample jar with distilled or rainwater, and dry.
- 8. Convert your salinity meter readings to soil salinity (ECe) by multiplying the value by the Conversion Factor in Table C9 based on the texture of the soil sample.



Certificate of Calibration

This certifies that YSI 556 Serial Number <u>134107001</u> has been calibrated following the Manufacturer's published specifications and methods.

3-Point pH

Spec. Cond.

ORP

DO

4.00, 7.00, 10.00

1413uS/cm

240mV

100.0% @ 20 Deg. C

pH 4.00 lot # 3AL369

lot # 10115

lot # 3160

pH 7.00 lot # A3023

@ 25 deg C

pH 10.00 lot # A3150

JAN. 20,

Calibrated

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Test Salinity Test Results

Borehole	Sample ID	Depth	Salinity (ppt)	рН
BH13-01	AS1	0.00	0.06	9.03
	AS3	1.21	0.40	9.05
	AS5	2.43	0.56	8.89
	Core	19.35	0.30	8.76
	AS1	1.50	0.75	8.35
	AS2	3.05	0.76	8.74
BH13-02	AS3	4.57	1.92	8.70
B1113 02	AS4	6.10	1.24	8.49
	AS7	10.05	0.30	8.87
	AS15	22.25	1.55	8.83
	AS1	0.00	1.03	8.78
BH13-03	AS5	4.57	1.12	8.93
B1113 03	AS9	9.14	1.02	9.01
	AS10	10.67	1.31	8.58
	AS3	17.07	1.51	9.08
BH14-05C	AS10	27.74	1.05	9.30
	AS15	36.88	1.31	8.67
	AS2	1.52	1.30	9.00
	AS8	10.67	1.40	9.68
BH14-06	AS17	24.38	1.20	9.08
	AS22	32.92	1.91	8.16
	AS30	47.24	1.21	9.12
	AS1	0.91	1.43	8.60
BH14-07B	AS9	13.72	1.54	9.65
B1114-07B	AS16	24.07	1.41	9.31
	AS22	34.44	1.69	9.23
DH12 00	AS1	0.30	1.30	8.80
BH13-09	AS4	9.14	1.60	8.44
	AS1	0.76	1.19	9.23
	AS5	6.70	1.59	9.09
BH13-11	AS7	9.75	0.75	9.23
	AS17	27.13	0.95	9.09
	AS19	31.09	1.19	9.04



BH ID	Depth*	Water Content (%)
	0.12	16.11
	0.61	6.36
	1.21	13.66
	2.21	11.75
	2.43	7.22
	6.53	12.11
	6.55	8.65
	9.5	6.64
	9.6	14.01
	11	14.65
	11.13	13.86
BH13-01	11.58	18.46
	12.6	20.75
	12.65	15.64
	14.1	14.48
	14.63	17.96
	14.7	9.50
	14.8	7.87
	16.1	8.70
	16.15	1.24
	17.8	3.10
	20.9	7.14
	22.4	7.48



BH ID	Depth*	Water
DITID	Бериі	Content (%)
	0.3	5.74
	1.82	6.20
	3.35	6.40
	4.87	10.27
	7.92	10.05
	9.44	4.58
	10.97	2.19
	12.49	9.88
BH13-01B	15.53	16.51
	17.05	20.43
	18.57	6.51
	20.09	6.84
	21.61	8.04
	23.13	3.92
	24.65	12.70
	26.17	2.44
	29.21	9.13
	30.73	16.58
	1.5	7.87
	3.05	9.05
	4.57	17.73
	6.1	17.84
	7.01	12.32
BH13-02	10.06	10.50
вп13-02	11.58	11.76
	14.63	10.47
	16.15	16.23
	20.72	15.94
	22.25	13.16
	23.77	3.70



BH ID	Depth*	Water
ВПІО	Deptil	Content (%)
	0	15.84
	3.05	17.23
	3.81	15.70
BH13-03	4.57	19.63
B1113 03	5.18	16.54
	6.1	16.54
	9.14	14.46
	23.46	10.23
	0	14.97
	3.05	16.90
	4.57	17.02
BH13-05	9.14	21.94
	10.67	13.93
	13.72	0.00
	22.86	15.71
	17.67	13.94
BH13-05B	19.2	46.67
	33.53	22.48
	36.58	17.45
BH13-07	7.92	2.99
	12.8	13.78
	0.76	14.54
	2.43	12.03
BH13-08	12.19	16.84
	16.76	13.59
	19.81	13.47
	0.3	17.04
BH13-09	1.83	15.29
	9.39	16.83



BH ID	Donth*	Water	
внір	Depth*	Content (%)	
	0.76	12.59	
	2.13	9.43	
	6.7	18.13	
	9.75	9.46	
	11.28	6.99	
BH13-11	18.75	17.65	
	22.78	11.20	
	24.23	11.35	
	25.45	7.29	
	27.13	9.27	
	31.09	10.42	
	14.02	21.01	
	15.54	20.00	
	17.07	20.67	
	18.59	13.57	
	20.12	18.30	
	21.64	18.75	
	23.16	16.05	
D1114 OF C	24.67	19.39	
BH14-05C	26.25	18.41	
	27.74	10.77	
	29.26	21.40	
	30.78	22.63	
	32.3	18.97	
	33.83	20.49	
	36.88	23.59	
	36.99	25.39	



BH ID	Depth*	Water	
טו חם	Deptil	Content (%)	
	0.15	12.31	
	0.35	15.70	
	1.52	15.75	
	3.05	18.32	
	3.4	19.06	
	4.57	12.24	
	6.1	10.39	
	7.62	13.56	
	9.14	17.47	
	10.67	15.48	
	12.19	16.05	
	13.72	16.96	
	14.1	19.57	
	15.24	19.41	
	16.76	17.03	
	17.25	20.00	
	18.29	15.98	
	19.81	16.85	
BH14-06	21.33	17.83	
D1114 00	22.86	17.12	
	24.38	17.60	
	24.9	15.55	
	25.9	15.10	
	26	15.17	
	27.43	15.97	
	28.96	16.43	
	31.09	20.82	
	32.92	23.73	
	33.4	19.23	
	37.18	20.73	
	39.32	15.30	
	41.45	20.21	
	43.28	18.10	
	44.8	18.60	
	46.02	18.67	
	47.24	21.20	
	48.76	22.02	



DILID	Double #	Water
BH ID	Depth*	Content (%)
	0.91	16.13
	2.44	25.20
	2.7	16.38
	3.96	16.38
	5.49	10.28
	8.95	60.94
	10.67	15.09
	12.19	19.34
	13.72	19.33
	15.24	14.53
	17.07	19.05
	18.89	16.73
	20.42	14.97
	21.64	16.67
	22.86	12.20
	24.07	17.37
	24.35	20.33
	25.6 25.84	18.13 22.44
D114.4.07D	27.43	19.30
BH14-07B	28.95	19.44
	29.19	19.57
	30.78	14.88
	31.08	19.16
	32.61	21.46
	32.9	17.68
	34.44	19.77
	35.96	10.19
	36.3	18.45
	37.49	21.05
	39.01	17.27
	40.84	20.23
	41.45	17.39
	42.98	18.55
	44.5	16.67
	46.02	24.97
	47.24	7.97
	50.29	17.96



BH ID	Depth*	Water
ВНІВ	Deptil	Content (%)
	0	15.79
	1.52	14.66
	3.05	8.12
	4.57	9.97
	6.1	17.84
	7.62	18.23
BH14-12	9.14	21.04
51114 12	10.67	13.43
	12.19	9.15
	13.71	12.33
	14.48	17.02
	15.24	16.30
	16.76	5.93
	18.28	18.46
	0.9	15.24
	2.44	16.83
	3.96	15.83
	5.49	15.76
	7.01	19.34
	8.53	19.17
	11.58	1.55
	13.1	13.13
	16.15	24.47
BH14-13	17.67	19.31
	19.2	20.17
	20.42	22.22
	21.94	26.67
	22.09	20.35
	23.46	13.73
	24.99	13.14
	26.51	12.86
	28.34	8.49
	28.87	13.43





Baffinland Iron Mines Corporation - Mary River Project
Milne Ore Dock Geotechnical Investigation Factual Report - February 21, 2014

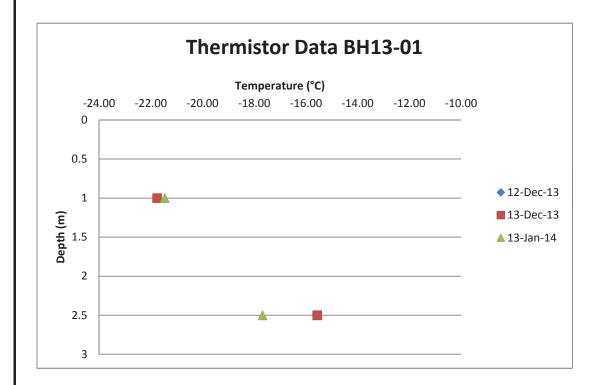
Appendix C Thermistor Results





Client Baffinland Iron Mines Project H349000 **Test** Combined Thermistor and Salinity Results

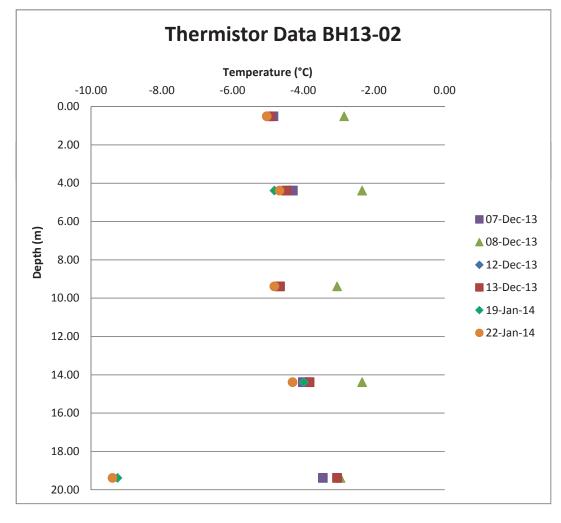
Borehole	Sample ID	Depth	Salinity (ppt)	рН
BH13-01	AS1	0.00	0.06	9.03
	AS3	1.21	0.40	9.05
	AS5	2.43	0.56	8.89
	Core	19.35	0.30	8.76





Client Baffinland Iron Mines Project H349000 **Test** Combined Thermistor and Salinity Results

Borehole	Sample ID	Depth	Salinity (ppt)	рН
BH13-02	AS1	1.50	0.75	8.35
	AS2	3.05	0.76	8.74
	AS3	4.57	1.92	8.70
	AS4	6.10	1.24	8.49
	AS7	10.05	0.30	8.87
	AS15	22.25	1.55	8.83



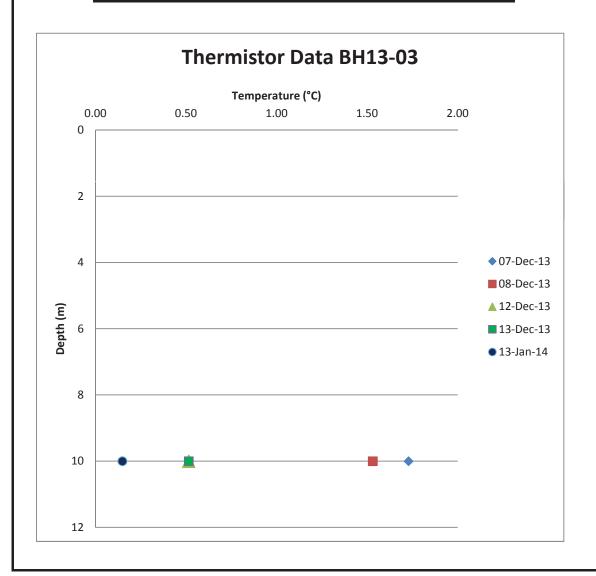


BH13-03



Client Baffinland Iron Mines Project H349000 **Test** Combined Thermistor and Salinity Results

Borehole	Sample ID	Depth	Salinity (ppt)	рН
BH13-03	AS1	0.00	1.03	8.78
	AS5	4.57	1.12	8.93
	AS9	9.14	1.02	9.01
	AS10	10.67	1.31	8.58

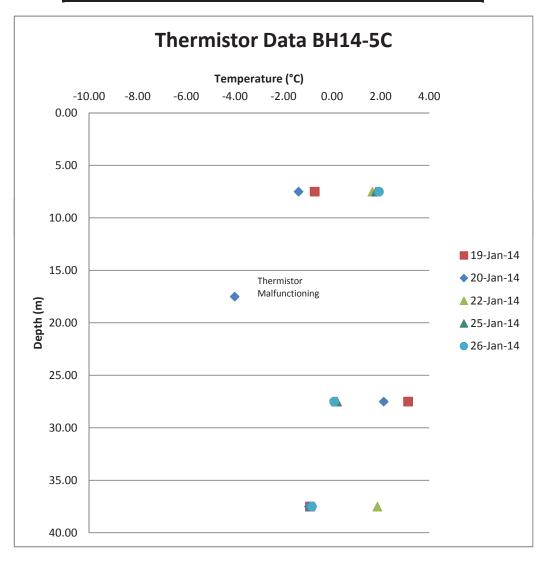




Client Baffinland Iron Mines Project H349000

Test Thermistor Results

Borehole	Sample ID	Depth	Salinity (ppt)	рН
BH14-05C	AS3	17.07	1.51	9.08
	AS10	27.74	1.05	9.30
	AS15	36.88	1.31	8.67

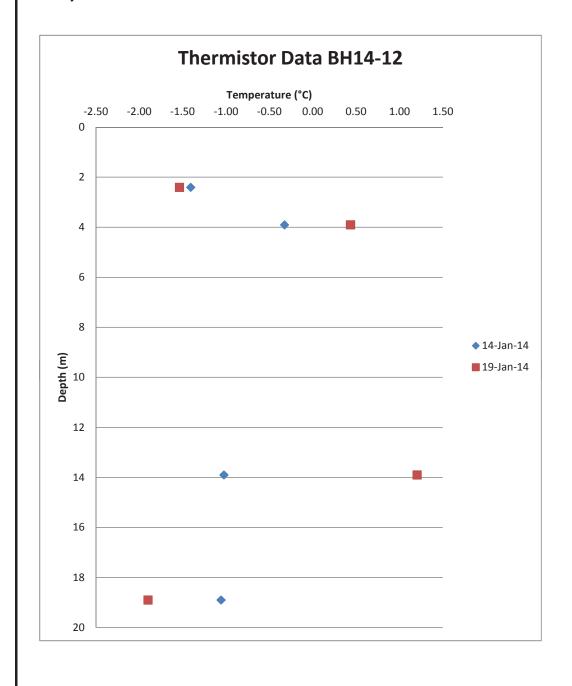




BH14-12



Client Baffinland Iron Mines Project H349000 **Test** Thermistor Results

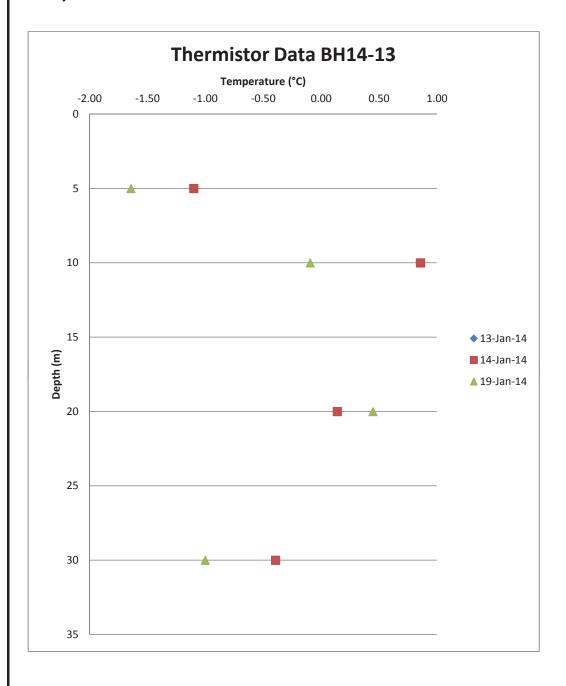




Borehole

BH14-13

Client Baffinland Iron Mines Project H349000 **Test** Thermistor Results







Baffinland Iron Mines Corporation - Mary River Project
Milne Ore Dock Geotechnical Investigation Factual Report - February 21, 2014

Appendix D Geophysics Report

GEOPHYSICAL SEISMIC SURVEY FOR A PROPOSED FIXED DOCK, MARY RIVER PROJECT, MILNE INLET, NUNAVUT

DRAFT

Presented to: **Baffinland Iron Mines Corporation**2275 Upper Middle Road East, Suite 300,
Oakville, Ontario
L6H 0C3

Presented by: **Geophysics GPR International Inc.**6741 Columbus Road, Unit 14
Mississauga, Ontario
L5T 2G9

February 2014 T13615

GEOPHYSICAL SEISMIC SURVEY FOR A PROPOSED FIXED DOCK, MARY RIVER PROJECT, MILNE INLET, NUNAVUT

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T13615



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1. Introduction

Geophysics GPR International Inc. was requested by Baffinland Iron Mines Corporation to carry out a geophysical survey to aid in projection and planning of a proposed fixed dock for the Mary River Project, Milne Inlet, Nunavut. The aim of the investigation was to map the depth to bedrock and provide details of the overburden material.

Seismic profiles were collected approximately parallel with the shoreline as well as lines going from land perpendicularly out to sea (Figure 1). The start and end of line coordinates are outlined in Table 1.

Profile UTM UTM Chainage Chainage Start End Start End A-A' 503251E 7976390N 503238E 7976742N 0+0000 + 352.5B-B' 503325E 7976422N 503312E 7976774N 0+0000 + 352.5C-C' 7976740N 0 + 352.5503091E 7976600N 503415E 0+000D-D' 503105E 7976568N 503430E 7976707N 0+0000 + 352.5E-E' 503114E 503439E 7976547N 7976686N 0+0000+352.5

Table 1: Profile Line UTM Coordinates and Chainage

Geophysics GPR field personnel involved in this project and the dates that they were onsite are outlined in Table 2.

Employee	Title	Dates On-Site
Cameron Coatsworth	Field Supervisor	Nov. 26 to Dec. 5, 2013
Benoit Maille	Senior Tech	Nov. 26 to Dec. 5, 2013
Nicolas Beaulieu	Geophysicist	Nov. 26 to Dec. 5, 2013

Table 2: Geophysics GPR Field Personnel

The seismic reflection, refraction, TISAR and shear-wave velocity analysis methods were applied to collect the data along the alignments shown in Figure 1. Approximately 1.76 km of profiled data was collected.

The following report describes the survey design, the principles of the seismic methods, the methodology for interpreting the data and finally a culmination of the results in the form of interpreted bedrock profiles.





Figure 1: Approximate seismic profile locations, Milne Inlet, Nunavut



2. Methodology

2.1. Positioning, Topography and Units of Measurement

The locations of the seismic profiles were oriented to encompass the area and to align with the design of the proposed fixed dock location.

The positioning data (northing and easting) were collected by Monteith & Sutherland Limited at the start and end of each line as well as every 15 m along the lines.

The GPS coordinates and field observations were then converted to project chainage based on site plans provided by Baffinland and Hatch.

The geophones were installed on the ice surface. The elevation of the geophones varied with the tides. Ice elevation data provided by Monteith & Sutherland Limited from December 2^{nd} and 3^{rd} indicate a range of approximate 0.9m to -1.1 m over the course of the survey day. An average elevation of the geophones on the ice has been assumed to be 0m.

The topography for the land portions of the Line A and B has been estimated using field observations and borehole elevation data.

All geophysical measurements were collected in SI units.

2.2. Seismic Methods

Seismic methods for geologic mapping involve measuring/recording the response of vibration sensors. Multiple techniques and methodologies are available for analysis of the data depending on the ultimate goal of the investigation. The profiles were collected using a standard stationary geophone arrangement. Several different seismic sources were applied including; propelled elastic generator (PEG) hammer, buffalo gun and explosives. After initial testing, it was determined that the buffalo gun and explosives were the most suitable sources for this particular site.

Several essentially independent techniques were used to analysis the resulting data; namely, seismic reflection, seismic refraction, TISAR and surface wave analysis.

Each of the seismic techniques has strengths and weaknesses primarily related to the depth of interest and local geology. After initial testing, it was determined that the seismic reflection method was likely going to be the primary methodology supplemented with seismic refraction and TISAR and surface wave analysis.



2.2.1. Seismic Reflection

Basic Theory

The seismic reflection method relies on measuring the transit time of an acoustic energy wave that travels from the energy source location to a reflective event (i.e. change in acoustic impedance) and back to a receiver (geophone). The fastest seismic waves are the compressional (P) or acoustic waves. Figure 2 is a basic geometric layout for reflection ray paths.

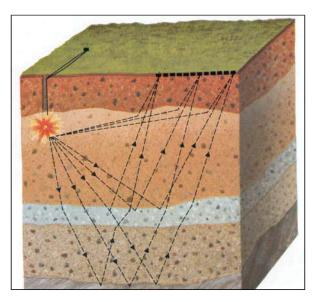


Figure 2: Simple Geometry of reflected pulse ray paths

Survey Design

A seismic spread consisted of 48 vibration monitoring devices (geophones) connected in line (spread) to a seismograph (ABEM Terraloc Pro) by connector cables. A seismic pulse (shot) is generated at a known location relative to the spread with a trigger system linked with the seismograph to begin the recording of the time-arrivals of the various seismic waves (shot record).

This investigation used 48 - 4.5Hz geophones with a spacing of 7.5m between geophones for a total individual profile length of 352.5 m.

The spacing between shots was 15m with the shot inline with the seismic spread. Typically single shots were taken for each shot record, stacking was not needed to improve the signal to noise ratio.

The combination of geophone spacing and shot interval used for this investigation results in a varied-fold data set. Where fold refers to the multiplicity of the common-midpoint data. The highest fold was in the middle of the spread and decreased toward the ends.



The fold may be less for some shot gathers depending on geometry and individual geophone trace quality.

The seismic sources selected for this survey were devices called a "buffalo gun" and a "propelled elastic generator" (PEG). The "buffalo gun" was designed to fire a 12-gauge shotgun shell into a 2-inch diameter hole drilled through the ice. The PEG is a weight drop accelerated by elastic bands. The PEG was determined to be inadequate. It could not generate enough energy to transmit to the depths required of the geology. The "buffalo gun" source was determined to be the best option due to the prohibited use of explosives for the marine portion of this site.

Processing of Reflection Data

There are some common processing steps for every reflection dataset. These are purely mathematical or systematic steps that account for site conditions. There are also processing steps that serve to enhance the appearance of reflectors. Some of the more common steps include the removal of traces that are unusually noisy (trace kills) or correction of topography (statics corrections). In the processing sequence used for this project, there is flexibility in the order and the settings used in some optional processing steps.

It is important to note that there is no one correct processing sequence, as the processing steps and sequence are dependent on the geology and method of data collection. The following is a list of the processing steps and the order in which they were applied for this project.

- 1) Input seg2 data
- 2) time cut to 600ms
- 3) trace editing (remove noisy traces)
- 4) Interpolation of removed traces
- 5) Gain correction
- 6) Filtering (bandpass and frequency-wave number)
- 7) Velocity Analysis
- 8) Normal move-out corrections
- 9) Common mid-point (CMP) Stacking
- 10) Time to depth conversion
- 11) Visual gain adjustments, horizontal filtering and contouring

Interpretation Method and Accuracy of Results

The reflection profile is essentially an image which must be interpreted. Without corroborating data, the true source or nature of a reflector can only be assumed. Interpretation of the data involves identifying reflectors and assigning a geologic context to them.



The two main sources of uncertainty in the results of a seismic reflection survey are in the velocity analysis and the assigning of reflectors to given geologic units.

2.2.2. Seismic Refraction

Basic Theory

The seismic refraction method relies on measuring the transit time of the wave that takes the shortest time to travel from the shot-point to each geophone. The fastest seismic waves are the compressional (P) or acoustic waves, where displaced particles oscillate in the direction of wave propagation. The energy that follows this first arrival, such as reflected waves, transverse (S) waves and resonance, is not considered under routine seismic refraction interpretation. Figure 3 illustrates the basic operating principle for refraction surveys.

Survey Design

The seismic spread setup utilized for seismic reflection was also used for seismic refraction. The seismic source was mainly buffalo gun. Explosives were used for the end and far shots on the land portion of the Line A and Line B.

This investigation used 48 - 4.5Hz geophones with a spacing of 7.5m between geophones for a total individual profile length of 352.5 m.

Typically, seven or more shots are executed per seismic spread; three to five shots within the profile to obtain the lateral velocity variation in the overburden and two shots on either side of the spread to provide the true velocity of the bedrock surface. The spacing between shots was generally every 45 m with the shot inline with the seismic spread. Typically single shots were taken for each shot record, stacking was not needed to improve the signal to noise ratio.

Interpretation Method and Accuracy of Results

Interpretation of the seismic data was primarily done using the critical distance method. Ideally, the Hawkins' method is the preferred method as it allows the computation of the rock depth to every geophone, information on the thickness of the various overburden layers, depth to bedrock and rock quality. At this particular site, the depth of the rock was greater than expected, performing a full Hawkins' interpretation would have required the use of explosives in the water which was not permissible. Accordingly the critical distance and partial Hawkins' method were employed.

A full description of the strengths and limitations of the refraction seismic method is presented in Appendix A.

The seismic refraction method typically allows the determination of the bedrock profile with a precision of 10% or better for depths greater than 10 m and a precision of 1 m for depths less than 10 m. The precision in the determination of rock velocities is plus or minus 3%.



The two most significant problem areas for refraction mapping are the "hidden" layer and effect of velocity inversions.

A "hidden" layer or "blind zone" is a stratigraphic layer that is not possible to discern from the arrival time data due to insufficient velocity variation or thickness. The unknown presence of a hidden layer has the effect of making the interpreted bedrock depth too shallow. The presence of a "hidden" layer is typically revealed through borehole or test-pit data and calculations can be made to compensate for the presence of such a layer.

Velocity inversions occur when the velocity does not increase with depth. The velocity inversion can result from the presence of a low or high velocity layer. Refractions from low-velocity layers cannot be determined from the arrival time data. The unknown presence of a low velocity layer has the effect of making the interpreted depths deeper than actual depths.

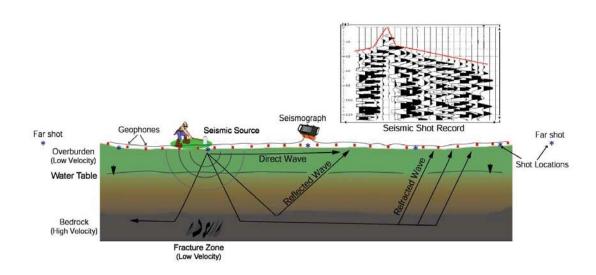


Figure 3: Seismic Refraction Operating Principle

2.2.3. Seismic Resonance (TISAR)

Basic Theory

The seismic resonance, or TISAR (Testing & Imaging using Seismic Acoustic Resonance), method is based on the frequency analysis of seismic records. It considers the seismic resonance within the signal. The method was originally developed for geological sub-surface profiling (1 to 15m deep); however it has been shown to be effective for ranges smaller than 0.1m for testing of concrete/asphalt structures, as well as for deep (100m) geological investigations. Figure 4 is a combination figure showing



applications for the method and a small sample of an output that is interpreted for geologic contacts.

The method uses the information from an induced seismic signal in the frequency domain instead of the direct time domain as with classic seismic reflection. For both methods, however, the principal physical parameter involved remains the acoustic impedance contrast, which is the product of the seismic velocity and the volumetric mass of the investigated materials. At the interface between two materials with different acoustic impedance, the seismic signal is partially reflected back to the surface. Under specific conditions, the repetition of such reflections leads to the build-up of a resonance signal, whose frequency is related to the depth of the interface and the seismic velocity of the upper material. The resonance frequency is inversely proportional to the reflection time. The first advantage of the use of frequencies instead of reflection times is the amplitude and the repetitive signal, which is less sensitive to the ambient noise and produces a resolution that increases with shallow depths. The second advantage of using resonance frequencies is the ability to resolve very thin layers (contrary to standard reflection).

Survey Design

The seismic spread setup utilized for seismic reflection and seismic refraction was also used for TISAR. A buffalo gun was used as the primary energy source. The buffalo gun was a good energy source for the resonance survey. The TISAR data was primarily used to supplement the reflection data in the shallow on-land portions.

Interpretation Method and Accuracy of Results

The seismic resonance method requires adequate geological models and seismic velocities. These parameters are typically derived from seismic refraction measurements. The accuracy of the depths of TISAR reflectors is related to the accuracy of the layer velocities and thicknesses of the geological model. It may be possible that velocities vary by approximately 10% or more resulting in a similar variation in depth to a given reflector. Layer thicknesses estimated in the model could vary by a few metres resulting in variations of 20 to 30% in the resonance reflector depth. Resonance has the advantage of a vertical resolution that cannot be obtained from conventional seismic methods.

TISAR resonators can occur from geologic contacts, fractures and/or voids. As with seismic reflection and ground penetrating radar, the true nature/source of the resonators cannot be certain. Interpretation involves identifying trends in the relative amplitude of resonators.

The use of the word "relative" is the operative word. The vibration response of each geophone is normalized to itself and then a gain curve is applied to the entire geophone spread to compensate for the decrease in signal amplitude with depth (this is similar to ground radar). The gain curves are kept similar between profiles; however, changes in near surface geology and the resulting geophone coupling and hammer signal amplitude and frequency requires individual adjustment of the gain curves for each profile. Accordingly, discretion must be used when comparing the relative amplitudes of the resonators between profiles and depths.



The same colour palette (blue through violet) has been applied in all the data sets presented in this report. The TISAR values are unitless. The blue has "relatively" little or no acoustic impedance contrast when compared to the red within an entire data set. A geologic contact such as a fracture should appear in yellow to red unless there is a stronger contact such as a larger void within the data set in which case a subtle stratigraphic contact may not be visible.

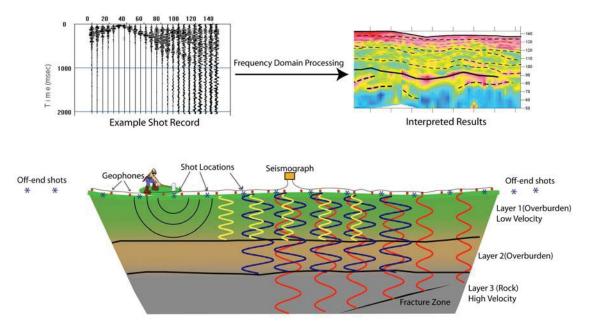


Figure 4: TISAR operating principle.

2.2.4. Multichannel Analysis of Surface Waves (M.A.S.W.)

Basic Theory

The Multi-channel Analysis of Surface Waves (MASW) is a seismic method used to evaluate the shear-wave velocities of subsurface materials through the analysis of the dispersion properties of Rayleigh surface waves ("ground roll"). The dispersion properties are measured as a change in phase velocity with frequency. Surface wave energy will decay exponentially with depth. Lower frequency surface waves will travel deeper and thus be more influenced by deeper velocity layering than the shallow higher frequency waves. Inversion of the Rayleigh wave dispersion curve yields a shear-wave (V_s) velocity depth profile (sounding). Figure 5 outlines the basic operating procedure for the MASW method. Figure 6 is an example image of a typical MASW record and resulting 1D V_s model. A more detailed description of the method can be found in the paper *Multi-channel Analysis of Surface Waves*, Park, C.B., Miller, R.D. and Xia, J. Geophysics, Vol. 64, No. 3 (May-June 1999); P. 800–808.



Survey Design

The geometry of an MASW survey is similar set to that of a seismic reflection investigation (i.e. 48 geophones in a linear array). The fundamental principle involves intentionally generating an acoustic wave at the surface and digitally recording the surface waves from the moment of source impact with a linear series of geophones on the surface. This is referred to as an "active source" method. Unlike the reflection method, which produces a data point beneath each geophone, the shear-wave depth profile is the average of the bulk area within the entirety of the geophone spread.

Interpretation Method and Accuracy of Results

The main processing sequence involved plotting, picking, and 1-D inversion of the MASW shot records using the SeisimagerSWTM software package. The results of the inversion process are inherently non-unique and the final model must be judged geologically realistic. The inversion modelling also assumes that all layering is flat/horizontal and laterally uniform.

Typically the accuracy of the shear-wave velocities modelled from the MASW method is on the order of +/- 10 to 15% for overburden material. The estimated error is typically higher for shear-wave velocities within rock formations.

At this particular site, the geology was not ideal for MASW soundings. The permafrost, ice and water layers will complicate the dispersion images. The method also assumes that the geology is laterally homogenous. The most suitable profile for MASW analysis was SL-E as the water depth was relatively shallow and uniform; however, analysis of the dispersion images for SL-D and SL-C appear to yield reasonable results. Ideally for marine MASW surveys, the geophones/hydrophones are placed on or as close as possible to the sea-floor.



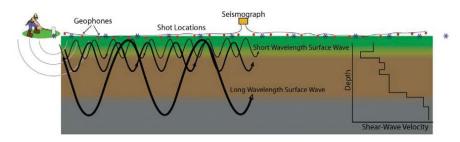


Figure 5: MASW Operating Principle

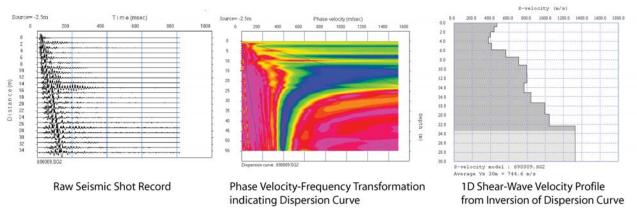


Figure 6: Example of a typical MASW shot record, phase velocity/frequency curve and resulting 1D shear-wave velocity model.



3. Results

The combined results of the seismic reflection, refraction, TISAR and MASW interpretations are presented in Appendix C in the form of interpreted cross-sections (Drawing T13615_A1). The interpreted contacts are based on the combined results of the shear-wave modelling, reflection images, critical distance calculations and borehole data.

The overall quality of the seismic records was very good.

Initial testing indicated that the seismic reflection method was most suitable to this particular site.

The primary objective of the survey was to identify the top of rock. It has been represented by a thick red line from the reflection interpretation and a magenta line based on the refraction analysis. Additional overburden contacts interpreted from the reflection and TISAR images are indicated by blue and grey lines respectively.

S-wave velocities can be used as an indicator of overburden types and bedrock competence. Appendix A contains a table of soil and rock classification based on S-wave velocities. MASW shear-wave data were analyzed for SL-C, SL-D and SL-E. The shear-wave models have been overlain on the cross-sections of drawing T13615_A1. As discussed above, the conditions for MASW analysis were not ideal at this particular site. The S-wave velocities determined through the MASW method are modelled velocities as opposed to true velocities measured using standard in-situ measuring methodology. The modelled velocities are typically within +/-10 to 15% of the true velocities of the overburden material; however, the added complications of the ice/water layers and multiple dispersion modes likely increase this error for this particular survey.

The seismic reflection and resonance (TISAR) data are primarily imaging tools. Alone, the methods do not provide indications of the material type. In addition, a velocity must be applied to convert the vertical scale of the images to a depth scale. The velocity can be estimated by correlation with borehole data. Interpretation of the data involves visually identifying reflector trends and corroborating with borehole data.

Interpretation of the seismic reflection data has identified 6 layers based on relatively stronger reflectors. These 6 layers have very good correlation at the intersection points of the seismic lines. The identification of the layers does not necessarily indicate uniform material within the layer. Gradual changes or thin layers may not generate a clear detectable reflection.

Relatively weaker reflectors have also been identified. The correlation of the weaker reflectors between the seismic profiles has not been systemically analyzed.

Comparison with the borehole logs suggest the following summaries for the defined overburden layers:



Layer 1: Layer 1 the upper most layer and represents materials from the sea floor to an elevation of approximately -10 m (onshore) to -32 m (offshore at SL-C). Offshore, in the vicinity of Line C, and based on borehole BH-13-09, this layer is interpreted as loose silty sand. Towards the shore there appears to be an increase in coarser grained materials; however the layer remains loose (BH-13-05 and MASW data). At the shoreline, boreholes indicate that this layer is fully (BH-13-01) to partially frozen (BH-13-02).

MASW S-wave velocities were modelled to be between 175 to 250m/s for this layer.

Layer 2: Layer 2 is defined by a strong upper reflector. Borehole 13-09, along SL-C, suggests that this layer is characterized by compact silt and sand. Boreholes along SL-D indicate the layer is dominated by relatively uniform compact sand. Boreholes along SL-E indicate predominately compact sand (BH-13-08) with some silt and gravel layers (BH-14-13 and BH-13-11).

MASW S-wave velocities were modelled to be between 175 to 275m/s for this layer.

Layer 3: The top of Layer 3 is best defined along SL-D.

BH-14-07b indicates primarily sand with some gravel and silt layers. The SPT N-Values are higher than the overlying layers.

BH-14-06 indicates more silt content than BH-14-07b.

BH-14-05C indicates primarily dense to very dense sand with some silt layers. As with BH-14-07b, the SPT N-Values are higher than the overlying layers.

BH-13-05b indicates very loose sand. This conflicts with the nearby BH-14-05C.

BH-13-09 intersects with the top of Layer 3 on SL-C. There is no sample logging; however, the DCPT indicates an increase (followed by a decrease) in blows near the top of Layer 3.

BH-14-13 along SL-E extends into the top of this layer and indicates sand and gravel for the upper 7m.

No boreholes on-shore extend to this layer.

MASW S-wave velocities were modelled to be between 250 to 375m/s for this layer.

Layer 4: The top of layer 4 is well defined along SL-C; however there are no boreholes that extend to it along the line nor along SL-E. Along SL-D BH-13-05B, BH-14-05C, BH-14-06 and BH-14-07B extend into this interpreted layer at an elevation of approximately -53m. The boreholes indicate primarily dense to very dense sand.

MASW S-wave velocities were modelled to be between 400 to 460 m/s for this layer.



No on-shore boreholes extended into this interpreted layer.

Layer 5: A single borehole (BH-14-07b) extends to the top of Layer 5 at an elevation of -66m. The borehole indicates dense sand with trace silt, less dense than the material immediately overlying it.

MASW S-wave velocities were modelled to be between 460 to 600 m/s for this layer.

Layer 6: MASW S-wave velocities were modelled to be between 525 to 760 m/s for this layer indicating the potential for dense sediments.

No boreholes extend to layer 6.



4. Conclusions & Recommendations

A total of approximately 1.76 km of seismic data were collected along five profiles in the vicinity of the proposed fixed dock, Mary River Project, Milne Inlet, Nunavut (Figure 1).

The data are presented in the form of cross-sectional figures in drawing T13615_A1.

Bedrock depths have been interpreted from a combination of seismic reflection and refraction data. The interpreted bedrock elevation ranged from approximately 90 to 140 m below sea-level. There was no borehole data available to corroborate the bedrock depth. P-wave velocities in the order of 3900 to 5100m/s suggest the bedrock is competent.

Interpretation of the reflection data identifies 6 overburden layers overlying the bedrock based on relatively stronger, continuous reflectors. Borehole data for 16 boreholes were provided by Hatch Ltd. to aid in the interpretation of the seismic data. Brief descriptions of the bulk layer properties based on borehole data have been provided above. The reader is referred to the geotechnical report by Hatch Ltd. for the analysis of borehole and geotechnical data.

Interpretation of the TISAR data identifies a number of resonators that could represent geologic overburden contacts. In general the TISAR method provides a higher resolution than the seismic reflection method. The TISAR contacts are interpreted to represent the various sand/gravel contacts identified in the borehole logs. As mentioned above, the TISAR data requires an accurate velocity model. At this particular site, due to the permafrost, assumptions had to be made regarding the velocity model. Variations in the thickness or seismic velocity of the permafrost layers will have a large effective in the overall accuracy of the interpreted results.

The velocity model, and thus interpreted images, for the on-shore portions are likely less accurate than the off-shore profiles. This is due to the irregularly/discontinuous frozen soil as indicated in BH-13-01/b, BH-13-02 and BH-14-12. The combined TISAR and reflection images for SL-A and SL-B do suggest however, that the geologic layers interpreted off-shore, can be interpreted continuing on-shore.

Line SL-E was the most suitable data set for MASW processing due to the shallow water and unfrozen sediments. The frozen ground on/near the shore created a large velocity inversion and contrast at surface, which does not allow adequate frequency dispersion. The water was shallow for SL-E and the sediments unfrozen. Lines SL-C and SL-D had deep water and unfrozen sediments. The overall accuracy of the shear-wave velocity measurements is not certain due to water depths and ice.

Shear strength data can be more reliably measured in marine conditions using data collected with hydrophones on or near the water bottom and a seismic source such as an air gun. On-shore, intrusive, e.g. downhole, methods can accurately measure the shearwave velocity beneath the permafrost.



Processing and interpretation of the seismic data was performed by Ben McClement
P.Eng. and Olivier Létourneau. This report has been written by Milan Situm, P.Geo. and
reviewed by Ben McClement, P.Eng.

Ben McClement, P.Eng.
Geophysicist
Milan Situm, P.Geo.
Manager



APPENDIX A

SEISMIC EQUIPMENT AND METHODOLOGY FACT SHEETS



TERRALOC PRO FEATURES





Terraloc Pro - Your guarantee for high-quality fieldwork

A STAND-ALONE SEISMOGRAPH, RUGGED FOR DEMANDING ENVIRONMENTS:

A self-contained instrument, designed to cope with rough field conditions.

VERSATILE & FUTURE-PROOF: You don't know what your next job will demand, with the Terraloc Pro you are equipped to successfully take on a wide range of seismic surveys.

SAVES VALUABLE FIELD TIME: Terraloc Pro offers built-in diagnostics and remote management as well as vendor assisted support over the net.

HIGH QUALITY DATA: Don't compromise, return from the field with superior data, Terraloc Pro delivers top class performance.

SECURE INVESTMENT: Terraloc Pro is a product for the future, it allows for add-on of new functionality and seamless expansion.

The ABEM Terraloc line of seismographs has a long and well-known reputation for ease of use and reliability under the toughest field conditions. With this brand new Terraloc Pro instrument, ABEM has stretched the specification and incorporated several new features. Well

working software functionality has been inherited from its predecessor in order to save time and effort for the user. All together, this new instrument is a high quality product, designed to meet demanding field requirements.





39 x 21 x 32 cm

36 0001 96

General

No. of channels 12, 24 and 48 Additional channels Easily obtained by linking two or more units together Up-hole channel Yes, 2 additional independent Sampling rate (selectable) 100 sps - 50 ksps (20 µs - 10 ms) Record length (selectable) Up to 480 k samples / ch. equivalent to: 5,1 ms - 80 min Pre-trig record (selectable) 0 - 100 % of record length Delay time Up to 2 minutes 32 bits, up to 999 impacts Stacking Unstack Remove last shot from stack Trigger coil, make/break, Trigger inputs geophone, TTL A/D converter resolution 24 bits Dynamic range (theoretical / measured)

Input voltage range (selectable)

Input gain (selectable)

Input impedance (selectable) Frequency range Total harmonic distortion Crosstalk Noise monitor Anti-alias filters

Connectors GPS

144 dB / >120 dB 0,5 Vpp, 5 Vpp, 12,5 Vpp 0 dB, 12 dB, 24 dB, 36 dB, 48 dB 3 kΩ, 20 kΩ, 20 MΩ DC to 20 kHz 0.0005%

-120 dB Amplitude Set automatically based on sampling rate NK-27 / KPT 55

Post recording features

Digital filters	Band-, low-, high- pass
50.77	band-reject, remove DC offset
Spectrum analysis	Any single trace, FFT analysis
Velocity Analysis	On-screen analysis of refractor velocity
First arrivals picking	Automatic or manual
The second of the second	Times can be saved with record
Pre-stack correlation	Yes, cross correlation with reference or any other ch.

Processor, RAM and hard disk

Processor Operating System Internal RAM Hard disk capacity Display

External display port I/O port

Network interfaces

Low power Intel Atom, 1,6 GHz Windows XP Pro 2GB (DDR SO-DIMM module) 100 GB or greater 8,4* Active TFT LCD, full colour, daylight visible, 800x600 res. VGA output 3 x USB 2.0 ports 1 x IEEE 802.3 TP-10/100/1000

RJ-45 IP 67 2 x TP-10/100 KPT 08 WLAN antenna

Power 10 - 34 V DC external power 12 V internal battery 30/60 W (man/acq) Power consumption -20 to + 55 °C Ambient temp (operating) Ambient temp (storage) -30 to + 70 °C Casing Rugged Al alloy, meets IEC IP 66 Weight, 24 channels 10 kg Weight, 48 channels 11 kg

To order, please specify_

Terraloc Pro, 12 CHANNEL UNIT	33 7000 12
Terraloc Pro, 24 CHANNEL UNIT	33 7000 14
Terraloc Pro, 48 CHANNEL UNIT	33 7000 16

Each unit includes:

Dimensions (W x L x H)

- Terraloc Pro instrument (of chosen type)
- Trigger cable 250 m on reel, Office power supply (charger), Trigger coil, Accessories & Tools kit
- Windows XP compatible USB keyboard and mouse
- Software SeisTW and sample records

Saismic cable 24 take-outs at 5 m

- Transport case (plywood)

Field Accessories (ordered separately)

Seisiffic Cable 24 take outs at 5 iff	20 000 1 20
Extension cable 160 m (for 24 take-out cable)	36 0001 97
Seismic cable 12 take-outs at 12.5 m	36 0001 26
Extension cable, 160 m (for 12 take-out cable)	36 0001 28
(other cable configurations also available)	
Portable reel	38 3001 52
10 Hz vertical geophone	39 1000 61
10 Hz horizontal geophone	39 1000 93
4.5 Hz vertical geophone	39 1000 63
4.5 Hz horizontal geophone	39 1000 64
4.5 Hz 3-D geophone	39 1000 85
100 Hz vertical geophone (land)	39 1000 77
100 Hz vertical geophone (marsh)	39 1000 78
Shock plate	33 0010 18
Hi-voltage CB 20 VA shotbox	39 9000 23

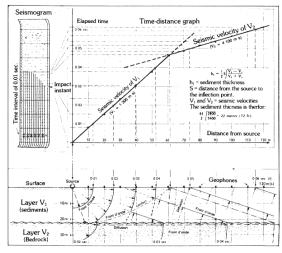
20121025



SEISMIC REFRACTION

Seismic refraction consists of recording the length of time taken for an artificially provoked surface vibration to propagate through the earth. By processing the data, the seismic velocities and depths of the underlying rock layers can be determined. These velocities are characteristic of the nature and quality of the bedrock; a fissured, fractured or sheared rock will be characterized by reduced seismic velocities.

The method is generally used to obtain a better geological analysis of the sub-surface and to determine the following characteristics: the quality, profile and depth of bedrock, its nature, degree of alteration and any other physical contrasts. Seismic refraction ensures that maximum information may be gained from geological field work, and that direct investment costs (drilling, excavation), will be reduced.



PRINCIPLE OF SEISMIC REFRACTION

FEATURES

- Precise determination of soil thickness.
- Precise determination of the seismic velocities (rock type and quality).
- Localization and identification of geological units.
- Detailed analysis of soil.
- Year-round use.
- Sea and land surveys (above and below ground).
- Great accessibility possible to rough terrain and remote regions.

AREAS OF APPLICATION

 $\label{lem:civil-Engineering-Mining-Exploration-Exploitation/Petroleum and Gas Sectors/\ Geotechnology/\ Geology/\ Hydrology.$

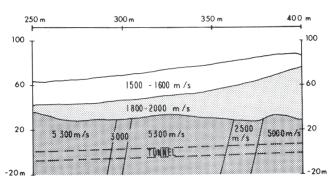
- Identification of faults, fractures, shear zones.
- Detection of rock differences (veins, dykes, cavities, etc.).
- lacktriangle Determination of rock topography.
- Evaluation of volume of soil present or to be excavated.
- Excellent complement to geological mapping.
- Recognition of geophysical anomalies such as VLF, gravimetry, etc.
- Drill site selection, better target identification.
- Evaluation of the size, thickness and condition of surface shafts (mining exploitation).
- Mass Rock Quality Determination (MRQD).
- Detection of rock irregularities and breaks.
- Hydrogeology (detection of water tables, veins, reservoirs).
- Excellent complement to any geological analysis.



AREAS OF APPLICATION

Civil Engineering/Mining Exploration - Exploitation/Petroleum and Gas Sectors/ Geotechnology/Geology/ Hydrology.

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Interpretation results of a seismic profile

ADDITIONAL REMARKS

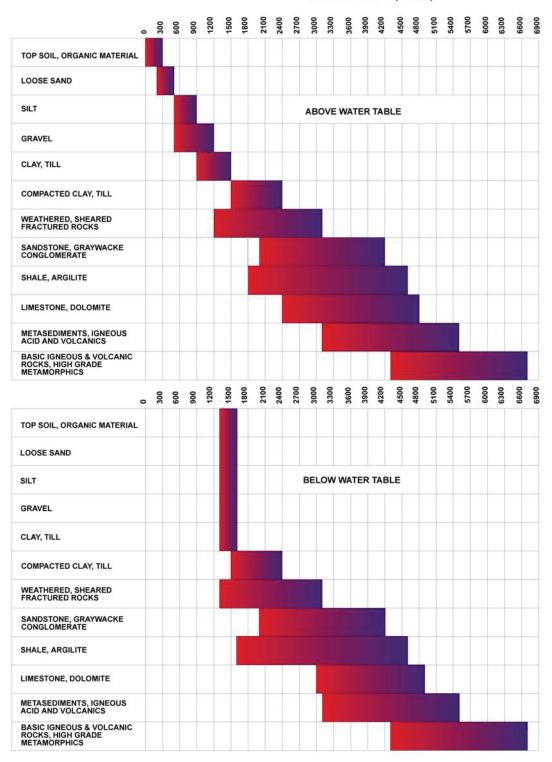
Geophysics GPR International Inc. has been recognized for the past fifteen years as a leader in both the application and the development of seismic methods. Seismic refraction is currently used in both civil and mining engineering; the use of lighter high-performance equipment and better tomographical interpretation of the results have contributed to its growing popularity.



GEOPHYSICS G P R INTERNATIONAL INC.



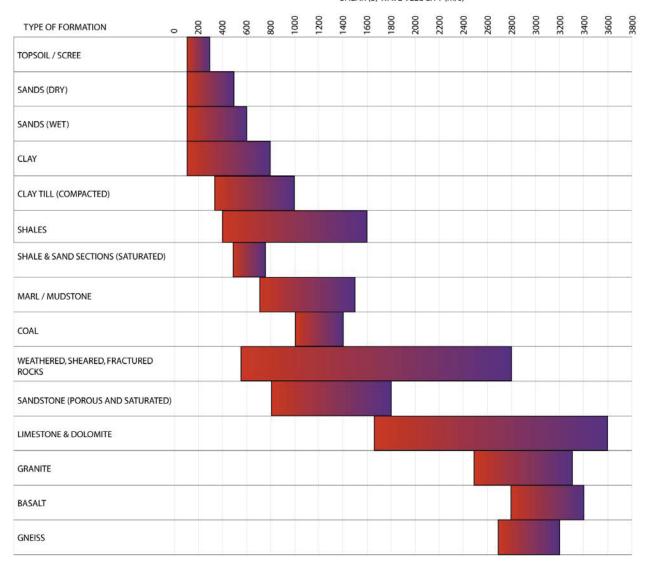
SEISMIC VELOCITY (m / sec)



SOIL AND ROCK CLASSIFICATION BASED ON SEISMIC VELOCITIES



SHEAR (S) WAVE VELOCITY (m/s)



Typical rock velocities, Based on Bourbie, Coussy and Zinszner, Acoustics of Porous Media, 1987 with modifications by Geophysics GPR. Rev A.1 July 2011



APPENDIX B

SITE PHOTOS





Photo 1: Seismic line setup with buffalo gun



Photo 2: Seismic line setup, with seismograph shelter



APPENDIX C

DRAWING T13615_A1

