June 29, 2012

GIANT MINE REMEDIATION PROJECT

Tailings Investigation, Giant Mine, Yellowknife, NWT

Submitted to:
Northern Contaminated Sites, Western Region
Public Works and Government Services Canada
4th Floor Greenstone Building, 5101 - 50th Ave.
P.O. Box 518 Yellowknife, NT
X1A 2N4

REPORT

Project Number: 09-1427-0006/2100
AECOM Doc. No.: 307-Tailings-7-RPT-0001-Rev1_20120629
GAL Doc. No.: 058

Distribution:

2 Copies - Public Works and Government Services Canada

1 Copy - AECOM

2 Copies - Golder Associates Ltd.

Golder Associates

IMPORTANT INFORMATION AND LIMITATIONS OF THIS REPORT

Standard of Care: Golder Associates Ltd. (Golder) has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practicing in British Columbia, subject to the time limits and physical constraints applicable to this report. No other warranty, express or implied is made.

Basis and Use of the Report: This report has been prepared for the specific site, design objective, development and purpose described to Golder by the Client. The factual data, interpretations and recommendations pertain to a specific project as described in this report and are not applicable to any other project or site location. Any change of site conditions, purpose, development plans or if the project is not initiated within eighteen months of the date of the report may alter the validity of the report. Golder cannot be responsible for use of this report, or portions thereof, unless Golder is requested to review and, if necessary, revise the report.

The information, recommendations and opinions expressed in this report are for the sole benefit of the Client. No other party may use or rely on this report or any portion thereof without Golder's express written consent. Golder will consent to any reasonable request by the Client to approve the use of this report by other parties as Approved Users. The report, all plans, data, drawings and other documents as well as all electronic media prepared by Golder are considered its professional work product and shall remain the copyright property of Golder, who authorizes only the Client and Approved Users to make copies of the report, and only in such quantities as are reasonably necessary for the use of the report by those parties. The Client and Approved Users may not give, lend, sell, or otherwise make available the report or any portion thereof to any other party without the express written permission of Golder. The Client acknowledges that electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore the Client cannot rely upon the electronic media versions of Golder's report or other work products.

The report is of a summary nature and is not intended to stand alone without reference to the instructions given to Golder by the Client, communications between Golder and the Client, and to any other reports prepared by Golder for the Client relative to the specific site described in the report. In order to properly understand the suggestions, recommendations and opinions expressed in this report, reference must be made to the whole of the report. Golder cannot be responsible for use by any party of portions of the report without reference to the entire report.

Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the Client in the design of the specific project. The extent and detail of investigations, including the number of test holes, necessary to determine all of the relevant conditions which may affect construction costs, techniques and equipment choice, scheduling and sequence of operations would normally be greater than has been carried out for design purposes. Contractors bidding on, or undertaking the work, should rely on their own investigations, as well as their own interpretations of the factual data presented in the report, as to how subsurface conditions may affect their work.

Soil, Rock and Groundwater Conditions: Classification and identification of soils, rocks, and geologic units have been based on commonly accepted methods employed in the practice of geotechnical engineering and related disciplines. Classification and identification of the type and condition of these materials or units involves judgment, and boundaries between different soil, rock or geologic types or units may be transitional rather than abrupt. Accordingly, Golder does not warrant or guarantee the exactness of the descriptions.

Special risks occur whenever engineering or related disciplines are applied to identify subsurface conditions and even a comprehensive investigation, sampling and testing program may fail to detect certain conditions. The environmental, geologic, geotechnical, geochemical and hydrogeologic conditions that Golder interprets to exist between sampling points may differ from those that actually exist.

Groundwater conditions shown in the factual data and described in the report are the observed conditions at the time of their measurement. Groundwater conditions may vary between reported locations and can be affected by annual, seasonal and special meteorological conditions or tidal fluctuations. Groundwater conditions may also be altered by construction activity on or in the vicinity of the project site.

Sample Disposal: All contaminated samples and materials shall remain the property and responsibility of the Client for proper disposal. Golder will dispose of all uncontaminated soil and/or rock samples 90 days following issue of this report or, upon written request of the Client, will store uncontaminated samples and materials at the Client's expense.

Follow-Up and Construction Services: All details of the design and proposed construction may not be known at the time of submission of Golder's report. Golder should be retained to review the final design, project plans and documents prior to construction, to confirm that they are consistent with the intent of Golder's report.

During construction, Golder should be retained to perform sufficient and timely observations of encountered conditions to confirm and document that the subsurface conditions do not materially differ from those interpreted conditions considered in the preparation of Golder's report and to confirm and document that construction activities do not adversely affect the suggestions, recommendations and opinions contained in Golder's report. Adequate field review, observation and testing during construction are necessary for Golder to be able to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

Table of Contents

APPENDICES

APPENDIX A
Borehole Logs

APPENDIX B
Laboratory Test Results

Atterbergs

Consolidation

Hydrometers

Soil-water Characteristic Curve

Unit Weight Determination

1.0 INTRODUCTION

Golder Associates Ltd. (Golder) has been retained by Public Works and Government Services Canada to conduct an investigation for borrow materials within the Giant Mine site (Site), Yellowknife, Northwest Territories (NWT). The Site incorporates a large mine lease area (see Figure 1) upon which tailings ponds and dams were constructed. The tailings are impounded by a series of dams, designed to contain the tailings and minimize seepage. There are approximately 16 million tonnes of tailings stored in ponds, covering an area of about 95 hectares. There are an additional nine hectares covered by water treatment sludge stored in a settling and polishing pond. Both the tailings and sludge contain moderate amounts of arsenic, and are subject to wind erosion and direct contact by animals.

Tailings and sludge areas are to be covered with a layer of quarried rock and second layer of fine-grained soil. The layer of quarried rock prevents the upward migration of contamination from the tailings, and inhibits the downward penetration of plant roots. The upper layer will allow for re-vegetation and promote runoff and limit seepage into the tailings. The surface will be graded to limit erosion and allow water to run off of the cover without contacting the tailings.

In March 2011, Golder carried out an assessment of four tailings pond areas. The purpose of the investigation was to identify the existing material characteristics for input to the tailings ponds cover design as part of the Giant Mine Remediation Project. The information collected during this assessment is provided in the following sections.

This letter shall be read in conjunction with **"Important Information and Limitations of this Report"** which precedes this text. The reader's attention is specifically drawn to this information for the proper use and interpretation of this report.

2.0 PREVIOUS INVESTIGATIONS

Several investigations have been carried out previously to identify the site conditions in and around the tailings ponds at the Site. Those reports reviewed in this assessment have included the following:

- "Phase 1 – Tailings Investigation Giant Mine Remediation Project" (Golder 2011)
- "Giant Mine Remediation Implementation Plan" (Merit 2009)
- "As-built Report for the Tailings Cover Trails, Giant Mine, NWT" (SRK 2009)
- "Giant Mine Remediation Plan: 2008 Seismic Studies Related to Tailings Dam Safety – FINAL" (SRK 2008)
- "Giant Mine Remediation Plan" (SRK 2007a)
- "Tailings and Settling Pond Field Investigations, Giant Mine, Yellowknife, NWT, Canada" (SRK 2007b)
- "Giant Mine - Field Program Characterisation of Tailings" (SRK 2005a)"Giant Mine Remediation Plan: Tailings and Sludge Containment Areas" (SRK 2005b)
- "Characterization of Soil and Groundwater in the Calcine and Mill Areas, Giant Mine" (SRK 2004)"Tailings Retreatment Plant Information Brochure" (Giant 1990)

3.0 SCOPE OF WORK

The Giant Mine Remediation Plan specifies the closure objectives for the site. The objectives relevant to the closure of the tailings and sludge areas are:

- To remediate the surface of the site to the industrial standard guidelines under the NWT *Environmental Protection Act,* recognizing that portions of the site will be suitable for other land uses with appropriate restrictions; and
- To minimize the release of contaminants from the site to the surrounding environment.

Specifically related to the cover of the tailings and settling/polishing ponds, the objective is to design a cover that minimises contact between the tailings or tailings pore water and people or animals and to reduce infiltration to the groundwater. The cover design will be dependent on the tailing materials and their engineering properties.

The current task for remediation of the tailings and settling/polishing ponds consists of the following:

- Investigation of the tailings in the South Pond, North Pond and Northwest Pond, which have been under water in the summer months and have not been fully investigated to date;
- Complete model of pond, to design dewatering program to result in zone at center with sufficient strength to support cover design (in flooded areas of pond);
- Complete Preliminary Design of tailings covers;
- Complete Preliminary Design of settling/polishing pond covers;
- Complete a design for tailings surface preparation, including re-grading the surface of the tailings (taking into account design to drain and consolidate the central, soft portions of the ponds currently under water);
- Evaluate long term stability of each dam, including provisions to re-slope or buttress any dams that may need this re-contouring for long term stability (specifically related to long term seismic events); and
- Develop long term maintenance plans for the ponds, including provisions to repair damage to the covers and to manage long term seepage from the ponds.

The first task, the investigation program, is presented in this report. The remaining tasks will be presented in a Preliminary Design Report, under separate cover.

3.1 Tailings Investigation Sites

The tailings investigation has been carried out on the following tailings ponds:

- South Pond;
- Central Pond;
- North Pond; and
- Northwest Pond.

This investigation did not include investigation of the settling pond or polishing pond downstream of the existing water treatment plant. The sludges in the settling pond have been investigated previously, and the sludge in the bottom of the polishing pond is expected to be too thin to investigate with conventional methods.

3.2 Methodology

To provide the required geotechnical data for the tailings cover and re-grading design, a borehole drilling program was recommended to collect soil samples and provide in-situ soil density information.

The borehole drilling was carried out using an M5 – track mounted auger drill rig supplied by Mobile Augers and Research Ltd., from Edmonton, Alberta. Drilling was conducted from March 8-10, March 12-15 and March 20, 2011. There were fifteen (15) boreholes drilled to depths ranging from 7.16 m to 20.57 m (see Figures 2). There is no borehole record for GA11-T-03, GA11-T-05 or GA11-T-07 as this portion of the Central Pond was investigated by AECOM Canada Ltd. under a separate program related to investigation for potential landfill locations.

Samples were collected at regular intervals (4-5 ft or 1.2-1.5 m) or at changes in material type, and then bagged, labelled and transported to Golder's geotechnical laboratory facility in Edmonton, Alberta. Summary borehole records are provided in Appendix A. The temperature of the soil on the augers was measured using a hand held thermistor immediately after the auger was removed from the ground, where possible. These temperatures are recorded on the borehole records in the additional lab testing column.

3.2.1 Instrumentation

Standpipes were installed in three of the boreholes (GA11-T-01, GA11-T-04 and GA11-T-13) to a depth of 6 m below ground surface. A standpipe was also installed in GA11-T-11 to a depth of 9.6 m. The standpipes were constructed with 10 feet (3.1 m) of 2" (50 mm) slotted PVC pipe at the bottom and then solid 2" (50 mm) PVC to the surface of the borehole. The slotted portion of the standpipe was backfilled using manufactured silica sand up to approximately 0.3 m above the slotted section, where a bentonite seal was developed over the 0.6 m of standpipe above the sand. The remaining upper section of the standpipe was backfilled with soil cuttings produced from the drilling. Approximately 1.0 m of stick-up above the ground surface was left in place and the top of the pipe was sealed using a standard J-plug.

4.0 RESULTS

4.1 Field Results

Based on the visual assessment of material types in the field, the soils encountered have been generally described as;

- Clayey silt (tailings);
- Silt (tailings);
- Peat;
- Silty clay (till);
- Sand; and
- Gravel.

Frost penetration was measured in each of the boreholes and ranged from 0.8 m to 2.0 m below ground level.

Possible bedrock contact was identified in Borehole GA11-T-02, and it was observed that this borehole is in close proximity (approximately 100 m) to a bedrock outcrop that is exposed at the north end of the South Tailings Pond.

Groundwater was not identified in any of the boreholes drilled during this investigation, but one borehole in each of the tailings pond areas was developed as a groundwater monitoring well. Water levels were read June 17, 2011 in 3 of the 4 boreholes where the standpipes were installed. The standpipe in Borehole GA11-T-13 located in the Northwest Tailings Pond was underwater at the time of sampling. It is anticipated that the water levels have essentially stabilized since the standpipes were installed and the results are provided in the table below:

Table 1: Results of Groundwater Measurements, June 17, 2011

Borehole No.	Time of Test	Stickup Above Ground	Depth to Water Level
GA11-T-11	11:17	0.99 m	10.51 m
GA11-T-04	11:31	0.97 m	6.52 m
GA11-T-01	11:53	1.04 m	6.35 m
GA11-T-13	UNDERWATER		

4.2 Laboratory Results

All samples collected during the borehole drilling program were tested for moisture content. Selected samples were tested for particle size (sieve) analysis, Atterberg Limits, hydrometers, soil-water characteristics and consolidation characteristics. The selected samples are considered to be representative of the soil type from which they were collected. The number of tests conducted on the samples provided, are as follows:

- 180 moisture contents;
- 48 particle size analyses;
- 67 Atterberg Limits;
- 9 Soil-Water Characteristic Curves; and
- 2 Consolidation – Falling Head Hydraulic Conductivity tests.

Individual laboratory test result sheets are provided in Appendix B. Select test results are also provided on the borehole records. A summary of index laboratory test results are provided below.

Table 2: Soil Parameters – Tailings Ponds – Giant Mine

Borehole	Depth (ft)	Sample ID	Soil Type	Moisture Content (%)	Sand Content (%)	Silt Content (%)	Clay Content (%)	Liquid Limit	Plastic Limit
GA11-T-01 (Central Pond)	1-2	SA1	Silty - Sand	9.9	61.1	32.3	6.6		NP
	2.5-4	SA2	(Clayey Silt)	24.2					
	5-6	SA3	Clayey - Silt	27.4	2.1	82.8	15.2	25	22
	7.5-9	SA4	Clayey - Silt	27.6	0.2	83.9	15.9		NP
	10.5-11.5	SA5	Sandy-Silt	31.2	29.7	58.4	11.9		NP
	12.5-14	SA6	(Clayey Silt)	25.8					
	15-15.5	SA7	Clayey - Silt	41.7	0.5	79.6	19.9	32	25
	17.5-19	SA8	(Clayey Silt)	33.7					
	20-21	SA9	Sandy - Silt	23.4	15.5	73.8	10.7		NP
	22.5-24	SA10	(Clayey Silt)	29.2					
	25-26	SA11	Sandy - Silt	23.7	13.8	75.5	10.7		NP
	25-26	SA12	(Clayey Silt)	24.2					
	35-36	SA13	Clayey - Silt	29.0	2.4	79.2	18.4	27	23
	37.5-39	SA15	(Clayey - Silt)	29.9				23	17
	41-42	SA16	(Clayey - Silt)	27.9					
	47.5-49	SA17	(Clayey - Silt)	27.5					
	49.5-50	SA18	(Peat)	45.7					
	52.5-54	SA19	(Silty Clay)	24.9					
	54.5-56	SA20	(Silty Clay)	27.5					
GA11-T-02 (Central Pond)	1-2	SA1	(Silt)	44.3					
	3-5	SA2	Sand and Silt		55.5	39.1	5.4		NP
	10-11	SA5	Clayey - Silt	22.5	11.5	75.0	13.5		NP
	15-16	SA7	Clayey - Silt	34.6	3.8	79.0	17.2	24	20
	17.5-19	SA8	(Silt)	35.4					
	20-21	SA9	Sandy, Clayey - Silt	26.6	16.7	69.5	13.8		NP
	22.5-24	SA10	(Silt)	24.8					
	25-26	SA11	Sand and Silt	23.2	46.9	42.1	11.0		NP
	29-30	SA13	(Silt)	30.8					
	30-31	SA14	BR	17.9					
GA11-T-04 (Central Pond)	1-2	SA1	(Sand and Silt)	28.2					
	2.5-4	SA2	(Sand and Silt)	20.0					
	5-6	SA3	(Sand and Silt)	15.2					
	7.5-9	SA4	(Sand and Silt)	9.7					
	10-11	SA5	Sandy, Clayey - Silt	27.5	18.9	66.0	15.0		NP
	13-14	SA6	Sandy, Clayey - Silt		15.4	71.6	13.0		NP
	15-17	SA7	Silt	19.7				26	23
	17.5-19	SA8	Clayey, Sand and Silt	24.8	51.8	35.9	12.2		NP

Borehole	Depth (ft)	Sample ID	Soil Type	Moisture Content (%)	Sand Content (%)	Silt Content (%)	Clay Content (%)	Liquid Limit	Plastic Limit
	20-21	SA9	(Silt)	20.0					
	22.5-24	SA10	Sandy-Silt	19.1	32.1	60.6	7.3		NP
	25-26	SA11	(Silt)	27.6					
	27.5-28	SA12	Sandy- Silt	23.7	28.7	63.6	7.7		NP
	35-36	SA13	(Silt)	28.5					
	37.5-39	SA14	(Silt)	30.9					
	45-46	SA15	Sandy-Silt	22.8	28.1	60.0	11.9		NP
	47.5-49	SA16	(Silt)	30.5					
	54-55	SA17	(Silt)	23.6					
	61-63	SA18	(Silt)	32.5					NP
	65.5-67	SA19	(Peat)	116.2					
GA11-T-06 (Central Pond)	15-16	SA6	(Clayey Silt)	38.2					
	17.5-19	SA7	Sandy-Silt	24.0	38.1	55.0	6.9		
	20-21	SA8	(Clayey Silt)	29.9					
	22.5-24	SA9	Silt	25.1	11.1	85.7	3.2		NP
	25-26	SA10	(Clayey Silt)	34.7					
	27.5-29	SA11	Sandy-Silt	23.6	27.2	71.5	1.3		NP
	34-35	SA12	Sandy - Silt	29.3	14.2	74.9	10.9		NP
	44-45	SA14	(Clayey Silt)	16.8					
	47.5-49	SA15	Silty-Sand	24.3	67.3	26.9	5.8		NP
	54.5-55.5	SA16	(Clayey Silt)	22.8					
	64-65	SA17	(Peat)	25.1					
	65.5-66.5	SA18	(Sand)	18.4					
GA11-T-08 (North Pond)	1-2	SA1	(Silt)	21.0					
	4.5-5.5	SA2	(Silt)	23.7					
	7.5-9	SA3	(Silt)	27.1					
	10-11	SA4	(Silt)	20.6					
	12.5-14	SA5	(Silt)	22.4					NP
	15-16	SA6	(Silt)	20.1					
	17.5-19	SA7	(Silt)	21.5					NP
	20.21	SA8	(Silt)	20.2					
	22.5-23.5	SA9A	(Silt)	29.1				23	18
	23.5-24	SA9B	(Sand & Gravel)	14.6					
	25-26	SA10	(Silty Clay)	17.6					NP

Borehole	Depth (ft)	Sample ID	Soil Type	Moisture Content (%)	Sand Content (%)	Silt Content (%)	Clay Content (%)	Liquid Limit	Plastic Limit
GA11-T-09 (North Pond)	1-2	SA1	(Silt)	27.9					
	4-5	SA2	Sand		74.0	20.5	5.5		NP
	6-7	SA3	(Silt)	21.2					NP
	10-11	SA5	(Silt)	26.8				24	23
	15-16	SA7	(Silt)	32.0					
	17-18	SA8	(Sand and Gravel)	11.2					
	20.5-21.5	SA9	(Clayey Silt)	20.9				25	24
	24-25	SA10	(Clayey Silt)	23.0					
	27.5-29	SA11	(Clayey Silt)	33.0					
	29.5-30.5	SA12	(Peat)	26.7					
	31.5-32.5	SA13	(Silty Clay)	40.9					
GA11-T-10 (North Pond)	1-2	SA1	(Silt and Sand)	24.0					
	5-6	SA2	(Silt and Sand)	22.2					NP
	7.5-9	SA3	(Silt and Sand)	31.6					
	10-11	SA4	(Clayey Silt)	29.4					NP
	15-16	SA6	(Clayey Silt)	26.4					NP
	17.5-19	SA7	(Clayey Silt)	30.6					
	20-21	SA8	(Clayey Silt)	25.6					
	22.5-24	SA9	(Clayey Silt)	29.6					
	25-26	SA10	(Clayey Silt)	38.9				32	27
	27.5-29	SA11	(Silty Clay)	11.3					
GA11-T-11 (North Pond)	1-2	SA1	(Clayey Silt)	42.3					
	4-5	SA2	(Clayey Silt)	32.3					
	5-7.5	SA3	Sandy - Silt		19.8	68.9	11.3		NP
	10.5-11.5	SA4	(Sandy Silt)	8.4					
	12.5-14	SA5	Clayey - Silt	34.5	1.2	81.5	17.3		
	15-16	SA6	(Clayey Silt)	39.2					
	17.5-19	SA7	Clayey - Silt	40.3	0.5	85.2	14.2		NP
	20-21	SA8	(Clayey Silt)	36.5					
	22.5-24	SA9	Clayey - Silt	34.5	0.6	86.4	13.0	26	24
	25-26	SA10	(Clayey Silt)	39.2					
	27.5-29	SA11	Clayey - Silt	41.0	0.6	85.6	13.9		NP
	34-35	SA12	(Clayey Silt)	34.6					
	37.5-39	SA13	Clayey - Silt	35.8	0.3	82.6	17.1		NP
	41-42	SA14	(Peat)	63.9					
	44-45	SA15	(Silty Clay)	33.8					
	46-47	SA16	(Silty Sand)	31.5					

Borehole	Depth (ft)	Sample ID	Soil Type	Moisture Content (%)	Sand Content (%)	Silt Content (%)	Clay Content (%)	Liquid Limit	Plastic Limit
GA11-T-12 (Northwest Pond)	16.5-17.5	SA6	Sandy-Silt	23.2	22.2	75.4	2.4		NP
	17.5-19	SA7	(Silty Sand)	13.9					
	20-21	SA8	Silt	31.9	2.0	91.1	6.9		NP
	22.5-24	SA9	(Silt)	23.9					
	25-26	SA10	Silt	29.7	3.2	89.2	7.6		NP
	34-35	SA12	(Silt)	26.6					
	39-40	SA13	Sandy-Silt	19.0	30.3	67.7	2.0		NP
	44-45	SA14	(Silt)	18.3					
	49-50	SA15	Sandy-Silt	21.6	32.6	47.4	20.0		NP
	54.5-55.5	SA16	(Silt)	24.0					
	59-60	SA17	Sandy - Silt	20.2	14.0	83.6	2.4		NP
	65-66	SA18	(Clay)	37.6					
GA11-T-13 (Northwest Pond)	1-2	SA1	(Clayey Silt)	22.3					
	5-6	SA2	(Clayey Silt)	31.5					
	6-8	SA3	Clayey - Silt		0.0	83.2	16.8		
	10-11	SA4	(Clayey Silt)	29.5					
	12.5-14	SA5	(Clayey Silt)	32.1					
	15-16	SA6	(Clayey Silt)	25.1					NP
	17.5-19	SA7	(Clayey Silt)	29.0					
	20-21	SA8	(Clayey Silt)	24.4					NP
	22.5-24	SA9	(Clayey Silt)	29.7					
	25-26	SA10	(Clayey Silt)	26.6					NP
	27.5-29	SA11	(Clayey Silt)	30.5					
	30-31	SA12	(Clayey Silt)	31.4					NP
	35-36	SA13	(Clayey Silt)	30.3					
	40-41	SA14	(Silty Clay)	29.6					
GA11-T-14 (Northwest Pond)	15-16	SA6	Clayey - Silt	29.9	0.2	85.1	14.7	29	24
	17.5-19	SA7	(Clayey Silt)	31.3					
	20-21	SA8	Clayey - Silt	32.3	0.0	85.6	14.4		NP
	22.5-24	SA9	(Clayey Silt)	28.7					
	25-26	SA10	Clayey - Silt	36.4	0.3	85.0	14.7	31	25
	27.5-29	SA11	(Clayey Silt)	38.7					
	34-35	SA12	Clayey-Silt	22.1	3.5	67.2	27.5	27	17
	37.5-39	SA13	(Clayey Silt)	27.6					
	43-44	SA14	Clayey - Silt	31.1	2.1	80.3	17.7		NP
	47.5-49	SA15	(Silty Clay)	30.0					
	54-55	SA16	(Clayey Silt)	29.1					

Borehole	Depth (ft)	Sample ID	Soil Type	Moisture Content (%)	Sand Content (%)	Silt Content (%)	Clay Content (%)	Liquid Limit	Plastic Limit
GA11-T-15 (Northwest Pond)	1-2	SA1	(Clayey Silt)	14.9					
	6-7	SA2	(Clayey Silt)	29.0					
	7.5-9	SA3	(Clayey Silt)	24.4					
	9.5-10.5	SA4	(Clayey Silt)	25.2					
	12.5-14	SA5	(Silty Sand)	18.5					
	15-16	SA6	(Silty Sand)	21.0					
	17.5-18	SA7	(Silty Sand)	33.6					
	18.5-19	SA8	(Silty Clay)	33.2					
	20-21	SA9	(Silty Clay)	18.7					
GA11-T-16 (Northwest Pond)	1-2	SA1	(Clayey Silt)	22.1					
	5-6	SA2	(Clayey Silt)	27.2					
	7.5-9	SA3	(Clayey Silt)	34.7					NP
	10-11	SA4	(Clayey Silt)	28.3					
	15-16	SA6	(Clayey Silt)	41.0				25	24
	17.5-19	SA7	(Clayey Silt)	26.8					
	20-21	SA8	(Clayey Silt)	24.4					NP
	22.5-24	SA9	(Clayey Silt)	36.9					
	25-26	SA10	(Clayey Silt)	29.4					NP
	27.5-29	SA11	(Clayey Silt)	39.1					
	35-36	SA12	(Clayey Silt)	39.3					NP
	37.5-39	SA13	(Clayey Silt)	38.5					
	42-43	SA14	(Silty Clay)	41.5					
GA11-T-17 (Northwest Pond)	1-2	SA1	(Clayey Silt)	27.3					
	6-7	SA2	(Clayey Silt)	27.7					
	7.5-9	SA3	Sandy, Clayey - Silt	26.4	18.4	67.7	13.9		
	10-11	SA4	(Clayey Silt)	20.5					
	12.5-14.0	SA5	Sandy, Clayey - Silt	24.0	16.3	71.1	12.6		NP
	15-16	SA6	(Clayey Silt)	23.0					
	17.5-19	SA7	(Clayey Silt)	23.8					
	20-21	SA8	(Clayey Silt)	31.8					
	22.5-24	SA9	Sandy - Silt	23.5	19.1	69.0	11.9		NP
	25-26	SA10A	Clayey - Silt	24.4	4.2	82.5	13.3		NP
	27.5-29	SA10B	(Clayey Silt)	28.1					
	34-35	SA11	(Clayey Silt)	26.1					
	37.5-39	SA12	Clayey - Silt	21.6	0.1	84.1	15.8		NP
	44-43	SA13	(Clayey Silt)	31.6					
	50-51	SA14	(Silty Clay)	24.1					

NP = non-plastic

Blank box = no test carried out

() = Visual field identification

Generally the soils sampled are classified as clayey silt, sandy silt or silt with little to some sand or clay. Thin (<1 m) sand or sand and gravel seams were identified in Boreholes GA11-T-08 and GA11-T-09 located in the North Tailings Pond. It is assumed that some segregation of the tailings has occurred resulting in the loss of fines at these locations and only the sand or sand and gravel sized materials are left. A thin (<1 m) peat seam has also been identified above a layer of silty clay assessed as "Till" in several of the boreholes. This indicates that the ponds were likely constructed directly over the in-situ soils.

The range and average Atterberg limits for each of the soil types encountered are indicated as follows:

Clayey-Silt:	Plastic Limit Range -	17 to 27	Average – 23
	Liquid Limit Range -	25 to 32	Average – 27
Sandy-Silt:	Plastic Limit Range -	NP	
	Liquid Limit Range -	NP	
Silt:	Plastic Limit Range -	17 to 24	Average – 22
	Liquid Limit Range -	23 to 32	Average – 26

Falling head hydraulic conductivity tests were carried out on two mixed samples from GA11-T-14 samples 2 and 3. The two samples were tested twice; once on May 4, 2011 and secondly on May 26, 2011. Hydraulic conductivity's (m/s) were recorded as 1.8×10^{-8} (May 4) at a maximum effective stress of 501 kPa and 1.8×10^{-8} at 1251 kPa (May 26). The summary laboratory results are provided in Appendix B.

Soil-water characteristic curves were measured for samples from GA11-T-06 (Sample 3), GA11-T-12 (Sample 2) and GA11-T-14 (Samples 2 and 3 mixed together). Water content (gravimetric and volumetric) was measured over a suction range from 0.25 kPa to 295,000 kPa for samples from GA11-T-06 and GA11-T-12. For the samples from GA11-T-14 the suction range was from 0.25 kPa to 400 kPa. Results for these tests are provided in Appendix B.

Soil temperatures were recorded on the summary borehole logs in Appendix A. The temperatures were measured to assess whether the soils were frozen (permafrost impacted) or not. Frozen soils will be difficult to excavate during the tailing pond remediation and may require ripping prior to excavation with conventional excavating equipment.

5.0 CLOSURE

We trust this report provides you with the information you require at this time. Should you have any questions regarding the contents of this report, or require any further information, please do not hesitate to contact the undersigned.

GOLDER ASSOCIATES LTD.

ORIGINAL SIGNED

Rob Buchanan, M.A., P.Geo.
Senior Geoscientist

ORIGINAL SIGNED AND SEALED

Dave Caughill, M.Sc., P.Eng.
Associate, Senior Geotechnical Engineer

RB/DC/rs

o:\final\2009\1427\09-1427-0006\3. correspondence\2 issued documents\word\phase 2\doc 058 rep 0906_11\307-tailings-7-rpt-0001-rev1_20120629.docx

REFERENCES

Giant Yellowknife Mines Ltd., 1990. *Tailings Retreatment Plant Information Brochure.* May 14, 1990.

Golder Associates Ltd., 2011. *Phase 1 – Tailings Investigation Giant Mine Remediation Project.* Report prepared for Public Works and Government Services Canada (PWGSC); January 18, 2011. AECOM Doc. No. 7-R.014204.307-RPT-0001-Rev0_20110118. GAL Doc. No. 034.

Merit Consultants International Inc., 2009. Giant Mine Remediation Implementation Plan. Prepared for Public Works and Government Services Canada; September 2009. Draft 4 Revision 1.

SRK (Steffen Robertson and Kirsten (Canada) Inc.), 2004. *Characterization of Soil and Groundwater in the Calcine and Mill Areas, Giant Mine*. Report prepared for Indian and Northern Affairs Canada; March 2004.

SRK (SRK Consulting (Canada) Inc.), 2005a. *Giant Mine - Field Program Characterisation of Tailings.* Report prepared for Department of Indian Affairs and Northern Development; August 2005. Project 1CP001.037.B02.01.

SRK (SRK Consulting (Canada) Inc.), 2005b. *Giant Mine Remediation Plan: Tailings and Sludge Containment Areas*. Report prepared for Indian Affairs and Northern Development; December, 2005.

SRK (SRK Consulting (Canada) Inc.), 2007a. *Giant Mine Remediation Plan*: Report prepared for Giant Mine Remediation Project Team, Department of Indian Affairs and Northern Development; July 2007. (SRK Project Number 1CI001.013).

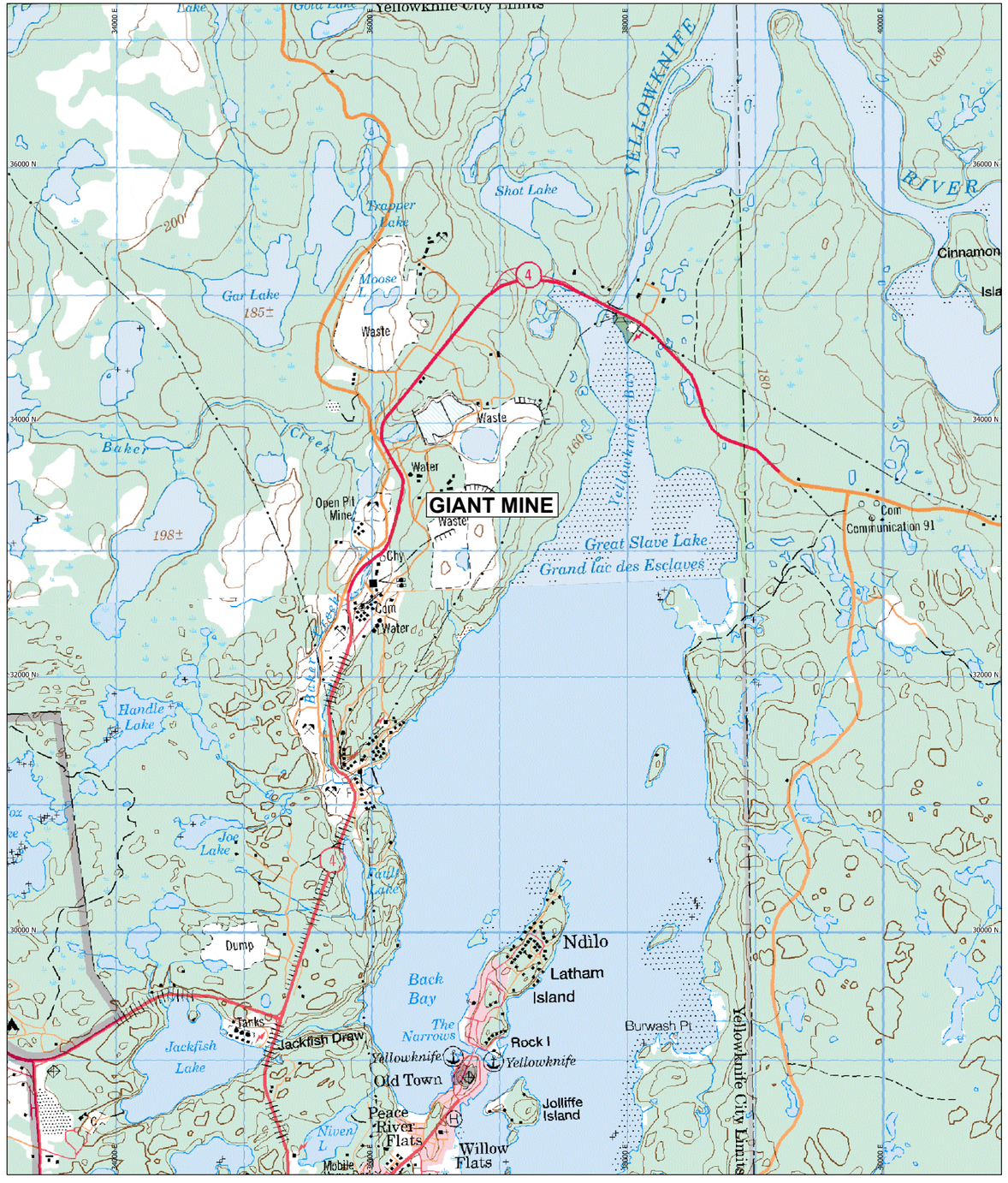
SRK (SRK Consulting (Canada) Inc.), 2007b. *Tailings and Settling Pond Field Investigations, Giant Mine, Yellowknife, NWT, Canada.* Report prepared for Department of Indian Affairs and Northern Development; June 2007. Project 1CP001.037.

SRK (SRK Consulting (Canada) Inc.), 2008. *Giant Mine Remediation Plan: 2008 Seismic Studies Related to Tailings Dam Safety – FINAL.* Prepared for Indian and Northern Affairs Canada (INAC); August 2008. Project 1CP001.037.A302.

SRK (SRK Consulting (Canada) Inc.), 2009. *As-Built Report for the Tailings Cover Trails, Giant Mine, NWT.* Report prepared for Department of Indian and Northern Affairs Canada; February 2009. Project 1CP001.037.

KEY PLAN

SCALE: N.T.S.



PLAN

SCALE: 1:40000

0 400 800 1200 1600 2000

SCALE IN METRES

NOTES

COORDINATES SHOWN ARE IN METRES GPRM GRID.

REFERENCE

TOPOGRAPHIC MAPS 85J08 AND 85J09 © 2002 HER MAJESTY THE QUEEN IN RIGHT OF CANADA. DEPARTMENT OF NATURAL RESOURCES. ALL RIGHTS RESERVED. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD83 COORDINATE SYSTEM: UTM ZONE 11.

Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

REAL PROPERTY SERVICES
Western Region
SERVICES IMMOBILIERS
Région de l'ouest

PRELIMINARY
NOT FOR CONSTRUCTION

Golder Associates

DO NOT SCALE DRAWINGS

1	ISSUED WITH RPT-0003-REV1	2012-06-29
0	ISSUED WITH RPT-0001-REV0	2011-09-06
0	ISSUED WITH RPT-0001-REV0	2011-08-25
Revision/ Révision	Description/Description	Date/Date

Client/client

PUBLIC WORKS GOVERNMENT SERVICES CANADA

Project title/Titre du projet

GIANT MINE REMEDIATION PROJECT YELLOWKNIFE, N.W.T.

TAILINGS AREAS AND SLUDGE PONDS

Approved by/Approuvé par: DC

Designed by/Concept par:

Drawn by/Dessiné par: JEF

PWGSC Project Manager/Administrateur de Projets TPSGC: PWGSC

PWGSC, Architectural and Engineering Resources Manager/ Ressources Architectural et de Directeur d'ingénierie, TPSGC:

Client/client: PWGSC

Drawing title/Titre du dessin

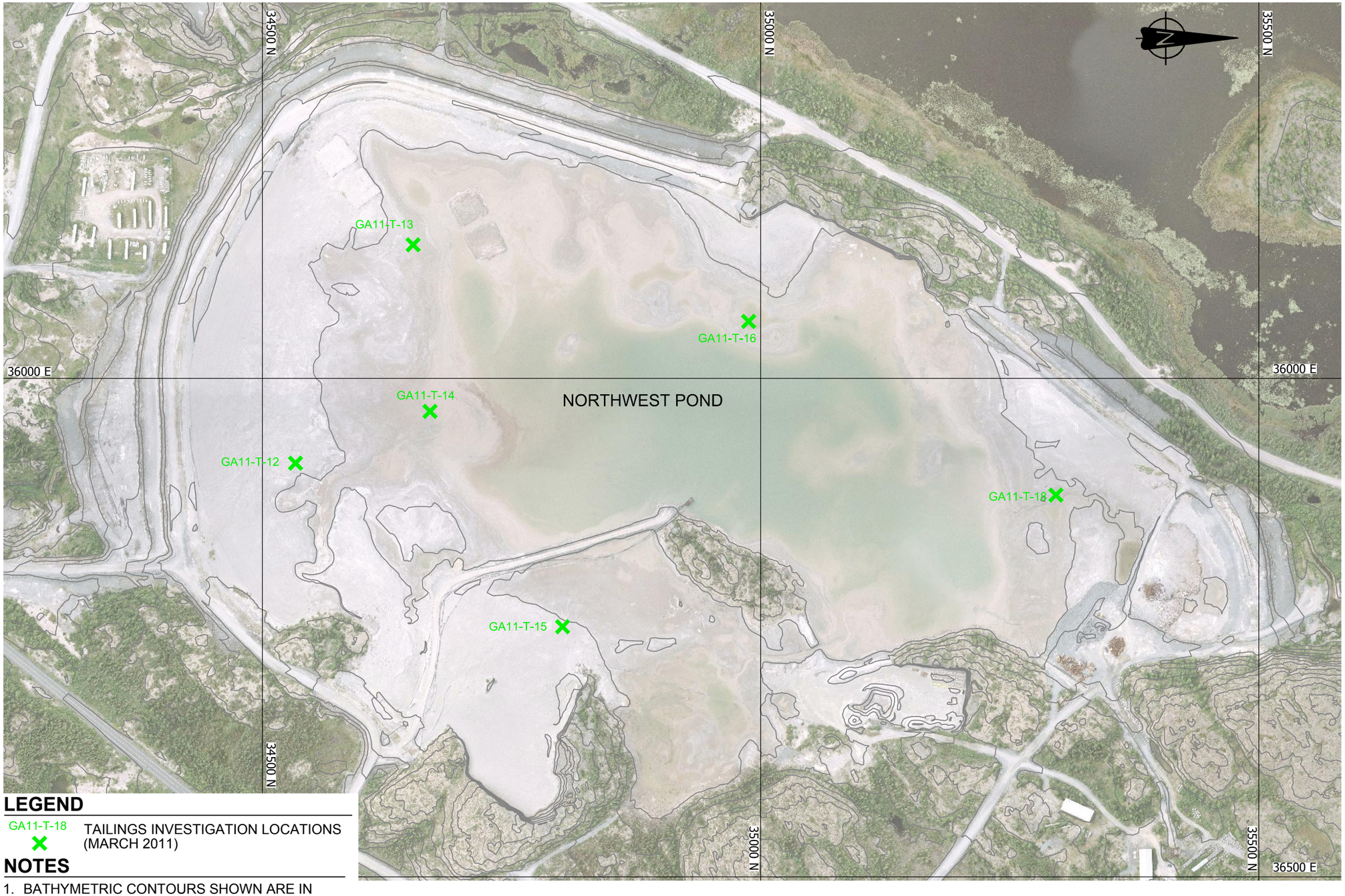
SITE LOCATION PLAN

Project No./No. du projet	Sheet/Feuille	Revision no./ La Révision no.
R.014204.307	FIGURE 1 OF 4	1

SITE LOCATION PLAN

Drawing File: N:\Bur-Graphics\Projects\2009\1427\09-1427-0006\Drafting\2100\2110\Figures\SITE LOCATION PLAN.dwg LayoutR-014204.307_RPT-0001_CF01-R1 Wednesday, June 27, 2012 9:30:48 AM By: rherlyck

A0 - PWGSC - ANSI B-L1 - 11X17



LEGEND

GA11-T-18 ✕ TAILINGS INVESTIGATION LOCATIONS (MARCH 2011)

NOTES

1. BATHYMETRIC CONTOURS SHOWN ARE IN METRES TO GMRP DATUM AT 2.5m INTERVALS.
2. COORDINATES SHOWN ARE IN METRES GMRP GRID.

REFERENCES

1. PWGSC, CAD FILE: GIANT MINE - CONTOURS (0.5m) - 2009 - GMRP.dwg, DATE RECEIVED: JANUARY 10, 2011
2. PWGSC, CAD FILE: GiantMine_GRP.sid, DATE RECEIVED: JANUARY 10, 2011

0 40 80 120 160 200
SCALE IN METRES

Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

REAL PROPERTY SERVICES
Western Region
SERVICES IMMOBILIERS
Région de l'ouest

PRELIMINARY
NOT FOR CONSTRUCTION

Golder Associates

DO NOT SCALE DRAWINGS

Revision/ Revision	Description/Description	Date/Date
1	ISSUED WITH RPT-0001-REV1	2012-06-29
0	ISSUED WITH RPT-0001-REV0	2011-09-06
0	ISSUED WITH RPT-0001-REV0	2011-08-25

Client/client

PUBLIC WORKS GOVERNMENT SERVICES CANADA

Project title/Titre du projet

GIANT MINE REMEDIATION PROJECT YELLOWKNIFE, N.W.T.

TAILINGS AREAS AND SLUDGE PONDS

Approved by/Approuve par: DC

Designed by/Concept par: DC

Drawn by/Dessine par: MR

PWGSC Project Manager/Administrateur de Projets TPSGC:

PWGSC, Architectural and Engineering Resources Manager/ Ressources Architectural et de Directeur d'ingénierie, TPSGC:

Client/client: PWGSC

Drawing title/Titre du dessin

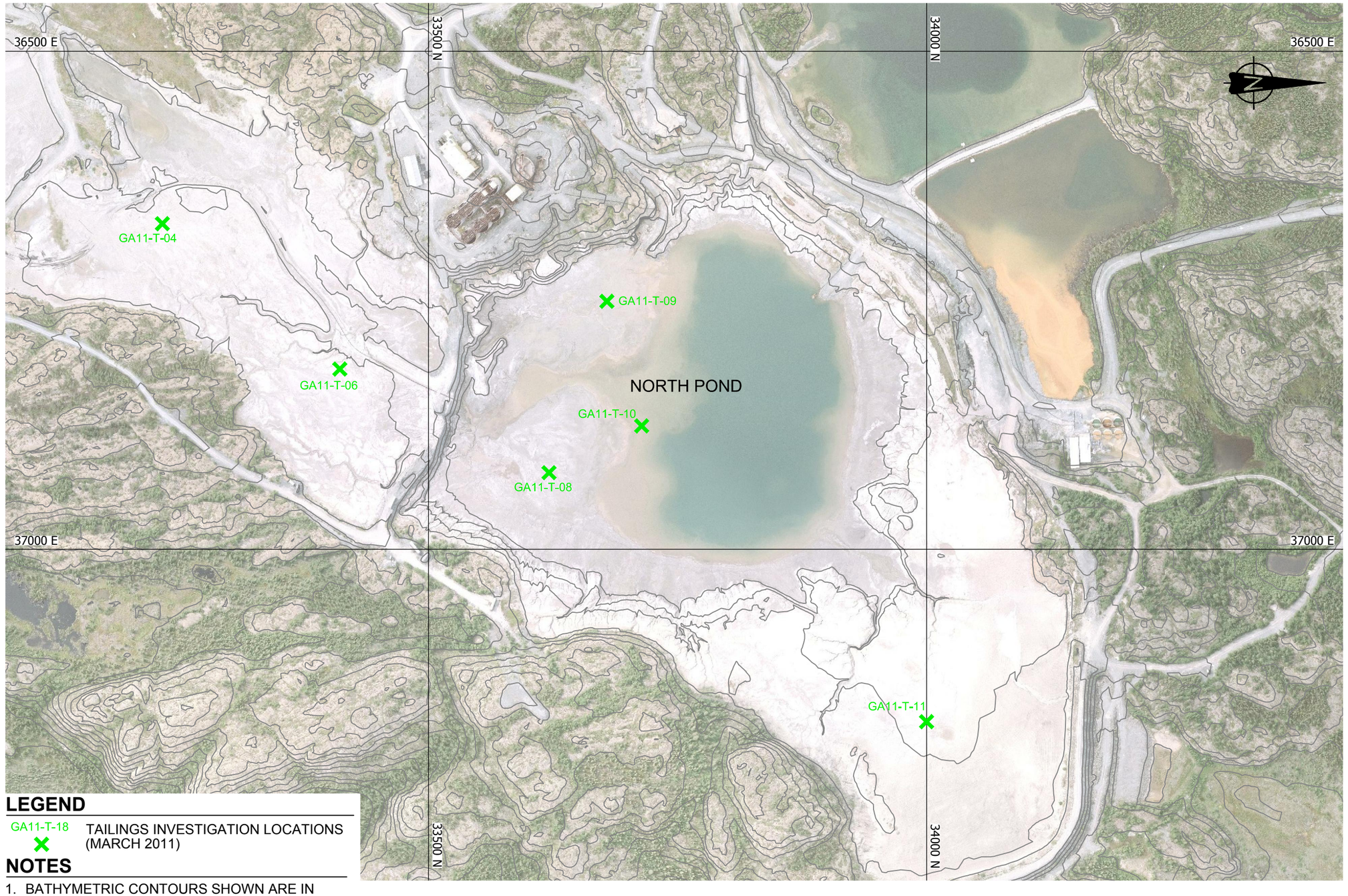
AUGER DRILLING INVESTIGATION LOCATIONS AT NORTHWEST POND

Project No./No. du projet	Sheet/Feuille	Revision no./ La Révision no.
R.014204.307	FIGURE 2 OF 4	1

R-014204-307-RPT-0001-CF02-R1

Drawing File: N:\Bur—Graphics\Projects\2009\1427\08-1427-0006\Drafting\2100\2110\AUGER DRILLING INVESTIGATION LOCATIONS AT THE NORTHWEST POND.dwg LayoutR—014204.307_RPT—0001_CF02—R1 Wednesday, June 27, 2012 9:30:51 AM By: rhodyak

A0 — PWGSC — ANSI B—L1 — 11X17



LEGEND

GA11-T-18 ✕ TAILINGS INVESTIGATION LOCATIONS (MARCH 2011)

NOTES

1. BATHYMETRIC CONTOURS SHOWN ARE IN METRES TO GMRP DATUM AT 2.5m INTERVALS.
2. COORDINATES SHOWN ARE IN METRES GMRP GRID.

REFERENCES

1. PWGSC, CAD FILE: GIANT MINE - CONTOURS (0.5m) - 2009 - GMRP.dwg, DATE RECEIVED: JANUARY 10, 2011
2. PWGSC, CAD FILE: GiantMine_GRP.sid, DATE RECEIVED: JANUARY 10, 2011

0 40 80 120 160 200
SCALE IN METRES

Public Works and Government Services Canada
Travaux publics et Services gouvernementaux Canada

REAL PROPERTY SERVICES
Western Region
SERVICES IMMOBILIERS
Région de l'ouest

PRELIMINARY
NOT FOR CONSTRUCTION

Golder Associates

DO NOT SCALE DRAWINGS

Revision/ Revision	Description/Description	Date/Date
1	ISSUED WITH RPT-0001-REV1	2012-06-29
0	ISSUED WITH RPT-0001-REV0	2011-09-06
0	ISSUED WITH RPT-0001-REV0	2011-08-25

Client/client

PUBLIC WORKS GOVERNMENT SERVICES CANADA

Project title/Titre du projet

GIANT MINE REMEDIATION PROJECT YELLOWKNIFE, N.W.T.

TAILINGS AREAS AND SLUDGE PONDS

Approved by/Approuvé par: DC

Designed by/Concept par: DC

Drawn by/Dessiné par: MR

PWGSC Project Manager/Administrateur de Projets TPSGC:

PWGSC, Architectural and Engineering Resources Manager/ Ressources Architectural et de Directeur d'Ingénierie, TPSGC:

Client/client: PWGSC

Drawing title/Titre du dessin

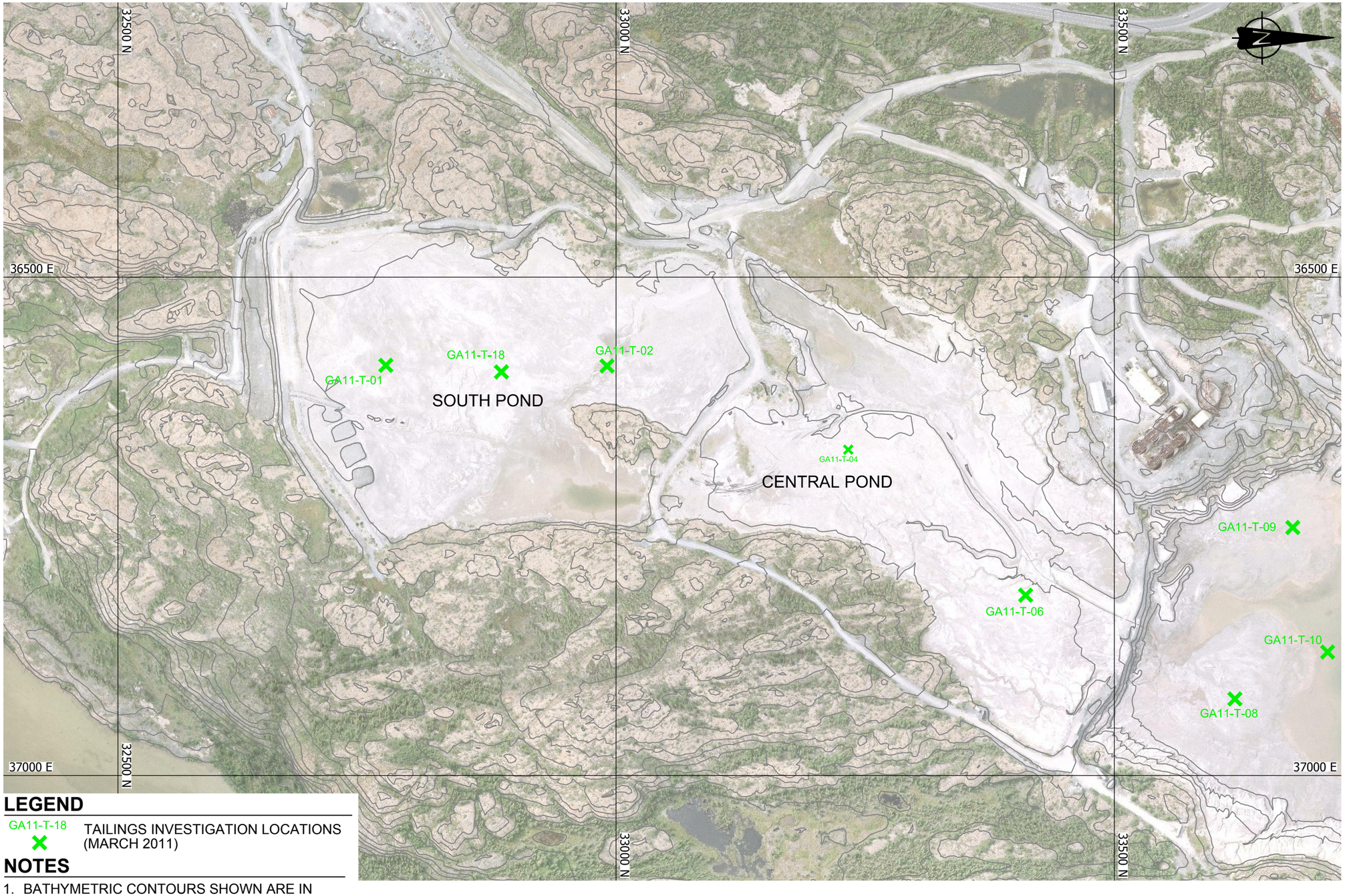
AUGER DRILLING INVESTIGATION LOCATIONS AT THE NORTH POND

Project No./No. du projet	Sheet/Feuille	Revision no./ La Révision no.
R.014204.307	FIGURE 3 OF 4	1

Drawing File: N:\Bur-Graphics\Projects\2009\1427\09-1427-0006\Drafting\2100\2110\AUGER DRILLING INVESTIGATION LOCATIONS AT THE NORTH POND.dwg Layout:R-014204.307_RPT-0001_CF03-R1 Wednesday, June 27, 2012 9:30:50 AM By: rhorlyck

A0 - PWGSC - ANSI B-L1 - 11X17

R-014204-307-RPT-0001-CF03-R1



LEGEND

GA11-T-18 ✕ TAILINGS INVESTIGATION LOCATIONS (MARCH 2011)

NOTES

1. BATHYMETRIC CONTOURS SHOWN ARE IN METRES TO GMRP DATUM AT 2.5m INTERVALS.
2. COORDINATES SHOWN ARE IN METRES GMRP GRID.

REFERENCES

1. PWGSC, CAD FILE: GIANT MINE - CONTOURS (0.5m) - 2009 - GMRP.dwg, DATE RECEIVED: JANUARY 10, 2011
2. PWGSC, CAD FILE: GiantMine_GRP.sid, DATE RECEIVED: JANUARY 10, 2011

0 40 80 120 160 200
SCALE IN METRES

Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

REAL PROPERTY SERVICES
Western Region
SERVICES IMMOBILIERS
Région de l'ouest

PRELIMINARY
NOT FOR CONSTRUCTION

Golder Associates

DO NOT SCALE DRAWINGS

Revision/ Revision	Description/Description	Date/Date
1	ISSUED WITH RPT-0001-REV1	2012-06-29
0	ISSUED WITH RPT-0001-REV0	2011-09-06
0	ISSUED WITH RPT-0001-REV0	2011-08-25

Client/client

PUBLIC WORKS GOVERNMENT SERVICES CANADA

Project title/Titre du projet

GIANT MINE REMEDIATION PROJECT YELLOWKNIFE, N.W.T.

TAILINGS AREAS AND SLUDGE PONDS

Approved by/Approuvé par: DC

Designed by/Concept par: DC

Drawn by/Dessiné par: MR

PWGSC Project Manager/Administrateur de Projets TPSGC:

PWGSC, Architectural and Engineering Resources Manager/ Ressources Architectural et de Directeur d'ingénierie, TPSGC:

Client/client: PWGSC

Drawing title/Titre du dessin

AUGER DRILLING INVESTIGATION LOCATIONS AT SOUTH AND CENTRAL PONDS

Project No./No. du projet	Sheet/Feuille	Revision no./ La Révision no.
R.014204.307	**FIGURE 4** OF 4	1

Drawing File: N:\Bur-Graphics\Projects\2009\1427\09-1427-0006\Drafting\2100\2110\AUGER DRILLING INVESTIG LOCATIONS AT THE SOUTH AND CENTRAL PONDS.dwg LayoutR-014204.307_RPT-0001_CF04-R1 Thursday, June 28, 2012 11:53:53 AM By: rhorlyck

A0 – PWGSC – ANSI B-L1 – 11X17

R-014204-307-RPT-0001-CF04-R1

APPENDIX A

Borehole Logs

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-01

SHEET 1 OF 2

LOCATION: See Location Plan

BORING DATE: March 8, 2011

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface									Stick-up= 0.97 m
0	M5 - Track Mounted Mobile Augers and Research Ltd.	SILTY SAND, little to some sand, grey (Tailings)		0.00	1	AS				Gravel = 0% Sand = 61.1% Silt = 32.3% Clay = 6.6% non-plastic	
1					2	SS	48				Cuttings
		Sandy CLAYEY SILT, grey, soft to firm (Tailings) --- Frost penetration to 1.4 m		1.40	3	AS				-0.2 °C Gravel = 0% Sand = 2.1% Silt = 82.8% Clay = 15.2% I_p = 2	
2											
					4	SH				Gravel = 0% Sand = 0.2% Silt = 83.9% Clay = 15.9% I_p = 6	Bentonite Seal
3					5	AS				Gravel = 0% Sand = 29.7% Silt = 58.4% Clay = 11.9% non-plastic	18 Mar 2012
4					6	SS	7				Sand
											Screen Section
5					7	AS				+2.0 °C Gravel = 0% Sand = 0.5% Silt = 79.6% Clay = 19.9% I_p = 7	
					8	SS	4				Slough
6					9	AS				+1.9 °C Gravel = 0% Sand = 15.5% Silt = 73.8% Clay = 10.7% non-plastic	
7					10	SS	4				
					11	AS				+1.6 °C Gravel = 0% Sand = 13.8% Silt = 75.5% Clay = 10.7% non-plastic	
8					12	SS	4				Slough
9											
		SILT, little to some sand, little clay, grey, soft to firm		9.45							
10					13	AS				+0.8 °C	
		CONTINUED NEXT PAGE									

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-01

SHEET 2 OF 2

LOCATION: See Location Plan

BORING DATE: March 8, 2011

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (10 20 30 40) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (10 20 30 40) Wp W Wl	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	M5 - Track Mounted	SILT, little to some sand, little clay, grey, soft to firm *(continued)*								Gravel = 0% Sand = 2.4% Silt = 79.2% Clay = 18.4% I_p = 4	
11					14	AS					
					15	SS	6			Gravel = 0% Sand = 8.3% Silt = 77.5% Clay = 14.2% I_p = 6	
12											
					16	AS				+0.3 °C	
13											
	M5 - Track Mounted Mobile Augers and Research Ltd.										Slough
14											
					17	SS	16				
15		PEAT, dark brown-black, fibrous		15.09	18	AS					
16		SILTY CLAY, trace gravel, light brown, (TILL)		15.85	19	AS					
					20	AS					
17											
		End of BOREHOLE. Notes: Sloughing to 4.6 m. Standpipe installed to 6.1 m. Groundwater level measured at 3.8 mbgs on March 18, 2012.		17.53							
18											
19											
20											

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-02

SHEET 1 OF 2

LOCATION: See Location Plan

BORING DATE: March 9, 2011

DATUM: Geodetic

N: 6932991 E: 636589

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface									
0	M5 - Track Mounted Mobile Augers and Research Ltd.	SILTY SAND, some clay, very soft to firm (Tailings)		0.00	1	AS					
1		--- Frost penetration to 0.9 m			2	SH				Gravel = 0% Sand = 55.5% Silt = 39.1% Clay = 5.4% non-plastic	
					3	AS					
2		CLAYEY SILT, some sand, very soft to firm (Tailings)		2.07	4	SS				1 blow for 450 mm	
3					5	AS				1.1 °C Gravel = 0% Sand = 11.5% Silt = 75.0% Clay = 13.5% non-plastic	
4					6	SS				1 blow for 450 mm	
5					7	AS				1.0 °C Gravel = 0% Sand = 3.8% Silt = 79.0% Clay = 17.2% I_p = 3	
					8	SS	5				
6					9	AS				1.4 °C Gravel = 0% Sand = 16.7% Silt = 69.5% Clay = 13.8% non-plastic	
7					10	SS	5				
		SAND and SILT, some clay, firm (Tailings)		7.19	11	AS				1.7 °C Gravel = 0% Sand = 46.9% Silt = 42.1% Clay = 11% non-plastic	
8					12	SS	7				
9					13	AS					
		CLAYSHALE, weathered (BEDROCK)		9.14	14	AS					
		End of BOREHOLE.		9.45							
10		Refusal of auger at 9.8 m.									
		CONTINUED NEXT PAGE									

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-02

SHEET 2 OF 2

LOCATION: See Location Plan

BORING DATE: March 9, 2011

DATUM: Geodetic

N: 6932991 E: 636589

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	SOIL PROFILE: STRATA PLOT	SOIL PROFILE: ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (10 20 30 40) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		Notes: Borehole backfilled with cuttings upon completion.									
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-04

SHEET 1 OF 3

LOCATION: See Location Plan

BORING DATE: March 10, 2011

DATUM: Geodetic

N: 6933233 E: 636673

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface									Stick-up= 0.96 m
0	M5 - Track Mounted Mobile Augers and Research Ltd.	Sandy CLAYEY SILT, little clay, grey (Tailings)		0.00	1	AS					
1					2	SS				Refusal (frozen)	Cuttings
					3	AS				-0.4 °C	
2		--- Frost penetration to 1.8 m			4	SS	9			non-plastic	Bentonite Seal
3					5	AS				0.4 °C Gravel = 0% Sand = 18.9% Silt = 66% Clay = 15% non-plastic	
4					6	TO				Gravel = 0% Sand = 15.4% Silt = 71.6% Clay = 13.0%	Screen Section
5					7	AS				0.0 °C	18 Mar 2012 ▽
					8	SS	13			Gravel = 0% Sand = 51.8% Silt = 35.9% Clay = 12.2% non-plastic	
6		SANDY SILT, some clay, grey (Frozen Tailings)		5.94	9	AS				-0.1 °C	
7					10	SS	48			Gravel = 0% Sand = 32.1% Silt = 60.6% Clay = 7.3% non-plastic	
					11	AS				-0.1 °C	
8					12	SS	27			Gravel = 0% Sand = 28.7% Silt = 63.6% Clay = 7.7%	Cuttings
9											
10		*CONTINUED NEXT PAGE*									

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-04

SHEET 2 OF 3

LOCATION: See Location Plan

BORING DATE: March 10, 2011

DATUM: Geodetic

N: 6933233 E: 636673

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		SANDY SILT, some clay, grey (Frozen Tailings) *(continued)*									
11					13	AS				-0.3 °C	
					14	SS	27				
12											
13	M5 - Track Mounted Mobile Augers and Research Ltd.	SANDY SILT, some clay, medium to dark grey (Tailings)		12.80							
					15	AS				0.0 °C Gravel = 0% Sand = 28.1% Silt = 60% Clay = 11.9% I_p = 0	
14					16	SS	6				
15											Cuttings
16											
					17	AS				0.1 °C	
17											
18											
					18	AS				Gravel = 0% Sand = 0.4% Silt = 80.1% Clay = 19.5% non-plastic	
19											
20		PEAT, dark to light brown, fibrous		19.66							
		CONTINUED NEXT PAGE									

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-04

SHEET 3 OF 3

LOCATION: See Location Plan

BORING DATE: March 10, 2011

DATUM: Geodetic

N: 6933233 E: 636673

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (10 20 30 40) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (10 20 30 40) Wp W Wl	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20		PEAT, dark to light brown, fibrous *(continued)*			19 19	AS AS			116.2		Cuttings
		End of BOREHOLE.		20.57							
21		Notes: Standpipe installed to 6.1 m. Groundwater level measured at 5.4 mbgs on March 18, 2011.									
22											
23											
24											
25											
26											
27											
28											
29											
30											

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

DATA ENTRY: AD

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-06

SHEET 1 OF 3

LOCATION: See Location Plan

BORING DATE: March 10, 2011

DATUM: Geodetic

N: 6933411 E: 636819

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface									
0	M5 - Track Mounted Mobile Augers and Research Ltd.	SANDY SILT, some clay, grey (Tailings)		0.00	1	AS				Gravel = 0% Sand = 26% Silt = 69% Clay = 5%	
1											
2		SILT, some clay, grey (Tailings) --- Frost penetration to 2.0 m		1.71	2	AS				Gravel = 0% Sand = 3% Silt = 88% Clay = 9%	
3					3	TO				Gravel = 0% Sand = 7% Silt = 89% Clay = 4%	
4					4	AS				Gravel = 0% Sand = 4% Silt = 87% Clay = 9%	
					5	SS	6				
5		SANDY SILT, trace clay, grey (Tailings)		4.51	6	AS					
6		--- Frozen to 5.6 m			7	SS	17			Gravel = 0% Sand = 38.1% Silt = 55.0% Clay = 6.9%	
7					9	SS	28			Gravel = 0% Sand = 11.1% Silt = 85.7% Clay = 3.2% non-plastic	
					8	AS					
					10	AS					
8					11	SS	32			Gravel = 0% Sand = 27.2% Silt = 71.5% Clay = 1.3% non-plastic	
9											
10		*CONTINUED NEXT PAGE*									

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-06

SHEET 2 OF 3

LOCATION: See Location Plan

BORING DATE: March 10, 2011

DATUM: Geodetic

N: 6933411 E: 636819

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	M5 - Track Mounted Mobile Augers and Research Ltd.	SANDY SILT, trace clay, grey (Tailings) *(continued)* --- Dark grey at 10.0 m			12	AS			W	Gravel = 0% Sand = 14.2% Silt = 74.9% Clay = 10.9% non-plastic	
11											
12					13	SS	13				
13											
14		SILTY SAND, some clay, grey (Tailings)		13.47	14	AS			W		
15					15	SS	7		W	Gravel = 0% Sand = 67.3% Silt = 26.9% Clay = 5.8% non-plastic	
16											
17		--- Light grey at 17.0 m			16	AS			W		
18											
19		PEAT, light-dark brown to black, fibrous		18.59	17	AS			W		
20				19.81							
		CONTINUED NEXT PAGE									

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-06

SHEET 3 OF 3

LOCATION: See Location Plan

BORING DATE: March 10, 2011

DATUM: Geodetic

N: 6933411 E: 636819

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (10 20 30 40) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (10 20 30 40) Wp W Wl	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20		SAND, medium to coarse, medium to dark grey *(continued)*			18 18	AS AS			W ○ at 20		
		End of BOREHOLE.		20.57							
21		Note: Borehole backfilled with cuttings upon completion.									
22											
23											
24											
25											
26											
27											
28											
29											
30											

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-08

SHEET 1 OF 1

LOCATION: See Location Plan

BORING DATE: March 15, 2011

DATUM: Geodetic

N: 6933621 E: 636923

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface									
0	M5-Track Mounted Mobile Augers and Research Ltd.	SANDY SILT, some clay, medium to dark grey, very soft to soft (Tailings)		0.00	1	AS			○		
1		--- Frost penetration to 0.9 m			2	AS			○	+0.4 °C	
2										+1.9 °C	
					3	SS	2		○	Gravel = 1.5% Sand = 19.8% Silt = 67.1% Clay = 11.5%	
3					4	AS			○	+2.0 °C	
4					5	SS	3		○	Gravel = 0% Sand = 28.1% Silt = 65.0% Clay = 6.9% non-plastic	
					6	AS			○	+3.0 °C	
5					7	SS	3		○	Gravel = 0% Sand = 35.8% Silt = 54.5% Clay = 9.8% non-plastic	
6					8	AS			○	+3.8 °C	
7					9A	SS			○	Gravel = 0% Sand = 9.1% Silt = 80.5% Clay = 10.4% I_p = 5	
		SAND and GRAVEL		7.16	9B	SS	11		○		
8		SILTY CLAY, some gravel, some fine to medium sand, suspected cobbles, light brown, (TILL)		7.92	10	AS			○		
		End of BOREHOLE. Note: Borehole backfilled with cuttings upon completion.		8.38							
9											
10											

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-09

SHEET 1 OF 2

LOCATION: See Location Plan

BORING DATE: March 14, 2011

DATUM: Geodetic

N: 6933679 E: 636751

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface									
0	M5-Track Mounted Mobile Augers and Research Ltd.	SANDY SILT, some clay, grey (Tailings)		0.00	1	AS			○		
1					2	TO				Gravel = 0% Sand = 74.0% Silt = 20.5% Clay = 5.5% non-plastic	
2					3	AS			○	+2.0 °C Gravel = 0% Sand = 15.6% Silt = 72.8% Clay = 11.6% non-plastic	
					4	SS	3				
3					5	AS			H ○	+3.2 °C Gravel = 0% Sand = 25.6% Silt = 64.1% Clay = 10.3% I_p = 1	
4					6	SS	0				
					7	AS			○		
5		SAND and GRAVEL, some silt, grey (Tailings)		5.03	8	AS			○		
6		Clayey SANDY SILT, grey, soft to stiff (Tailings)		5.79	9	AS			○ H	Gravel = 0.4% Sand = 10.0% Silt = 75.3% Clay = 14.3% I_p = 1	
7											
					10	AS			○	+4.7 °C Gravel = 1.1% Sand = 14.3% Silt = 68.5% Clay = 16.1% non-plastic	
8	M5-Track Mounted Mobile Augers and Research Ltd.	--- Trace to some organic soil at 8.5 m			11	SS	10				
									○		
9		PEAT, dark brown to black, fibrous		9.14	12	AS			○		
		SILTY CLAY, trace to little gravel, grey, (TILL)		9.45							
10					13	AS					
		CONTINUED NEXT PAGE									

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-09

SHEET 2 OF 2

LOCATION: See Location Plan

BORING DATE: March 14, 2011

DATUM: Geodetic

N: 6933679 E: 636751

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	SOIL PROFILE: STRATA PLOT	SOIL PROFILE: ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (10 20 30 40) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10											
		End of BOREHOLE. Note: Borehole backfilled with cuttings upon completion.		10.21							
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-10

SHEET 1 OF 1

LOCATION: See Location Plan

BORING DATE: March 15, 2011

DATUM: Geodetic

N: 6933714 E: 636876

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (10 20 30 40) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface									
0	M5-Track Mounted Mobile Augers and Research Ltd.	SILT and SAND, some clay, grey (Tailings)		0.00	1	AS					
1		--- Frost penetration to 1.4 m			2	AS				+1.1 °C Gravel = 0% Sand = 49.4% Silt = 40.9% Clay = 9.7% non-plastic	
2					3	SS	1				
3		Clayey SANDY SILT, little to some fine sand, (Tailings)		2.90	4	AS				Gravel = 0% Sand = 16.9% Silt = 71.4% Clay = 11.8% non-plastic	
4					5	SS	1				
5					6	AS				+3.4 °C Gravel = 0% Sand = 16.9% Silt = 71.4% Clay = 11.8% non-plastic	
6					7	SS	4				
7					8	AS				+2.4 °C	
8		--- Trace organics at 7.9 m			9	SS	0				
		CLAYEY SILT, trace gravel, grey, (TILL)		8.23	10	AS				+4.7 °C Gravel = 0% Sand = 1.4% Silt = 82.7% Clay = 15.9% I_p = 5	
9		End of BOREHOLE. Note: Borehole backfilled with cuttings upon completion.		8.84	11	SS	13				
10											

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

DATA ENTRY: AD

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-11

SHEET 1 OF 2

LOCATION: See Location Plan

BORING DATE: March 15, 2011

DATUM: Geodetic

N: 6934000 E: 637173

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface									Stick-up= 0.92 m
0	M5 - Track Mounted Mobile Augers and Research Ltd.	CLAYEY SILT, grey, soft to firm (Tailings)		0.00	1	AS					
1		--- Frost penetration to 0.8 m			2	AS				+0.5 °C	
2										+1.7 °C	
3		SANDY SILT, some clay, light grey (Tailings)		2.29	3	TO				Gravel = 0% Sand = 19.8% Silt = 68.9% Clay = 11.9% I_p = 3	Cuttings
4					4	AS				+3.4 °C	
		CLAYEY SILT, grey to brown, soft (Tailings)		3.66	5	SS	3			Gravel = 0% Sand = 1.2% Silt = 81.5% Clay = 17.3%	
5					6	AS					
					7	SS	5			Gravel = 0% Sand = 0.5% Silt = 85.2% Clay = 14.2% I_p = 4	
6					8	AS				+4.1 °C	Bentonite Seal
7					9	SS	4			Gravel = 0% Sand = 0.6% Silt = 86.4% Clay = 13.0% I_p = 2	
					10	AS				+4.2 °C	
8											Screen Section
					11	SS	4			Gravel = 0% Sand = 0.6% Silt = 85.6% Clay = 13.9% non-plastic	
9											18 Mar 2011 ▽
10		*CONTINUED NEXT PAGE*									Cuttings

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-11

SHEET 2 OF 2

LOCATION: See Location Plan

BORING DATE: March 15, 2011

DATUM: Geodetic

N: 6934000 E: 637173

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		CLAYEY SILT, grey to brown, soft (Tailings) *(continued)*									
					12	AS			W: 32	+4.4 °C	
11											
					13	SS	7		W: 32	Gravel = 0% Sand = 0.3% Silt = 82.6% Clay = 17.1% non-plastic	
12	M5 - Track Mounted Mobile Augers and Research Ltd.	PEAT, brown, stiff, fibrous		12.19							Cuttings
					14	AS			$k = 63.9 \times 10^{-6}$ cm/s		
13		SILTY CLAY, trace gravel, brown, (TILL)		13.11							
					15	AS			W: 31		
14		SILTY SAND, fine to medium, trace to little clay, grey		14.02	16	AS			W: 30		
		End of BOREHOLE.		14.48							
15		Notes: Standpipe installed to 9.7 m. Groundwater level measured at 9.2 mbgs on March 18, 2011.									
16											
17											
18											
19											
20											

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-12

SHEET 1 OF 3

LOCATION: See Location Plan

BORING DATE: March 12, 2011

DATUM: Geodetic

N: 6934533 E: 636085

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface									
0	M5 - Track Mounted Mobile Augers and Research Ltd.	SANDY SILT, light grey, soft to firm (Tailings)		0.00	1	AS				-3.2 °C Gravel = 0% Sand = 24% Silt = 68% Clay = 8%	
1											
2		SILT and SAND to SILTY SAND, soft to firm (Tailings) --- Frost penetration to 1.5 m		1.49	2	AS				+1.5 °C Gravel = 0% Sand = 54% Silt = 42% Clay = 4%	
					3	SS	6			Gravel = 0% Sand = 73% Silt = 24% Clay = 3%	
3					4	AS				Gravel = 0% Sand = 23% Silt = 72% Clay = 5%	
		SILT to SANDY SILT, some clay, light to dark grey, very soft to firm (Tailings)		3.66							
4					5	TO				Gravel = 0% Sand = 47% Silt = 51% Clay = 2%	
					6	AS			○	Gravel = 0% Sand = 22.2% Silt = 75.4% Clay = 2.4% non-plastic	
5					7	SS	2		○		
6					8	AS			○	Gravel = 0% Sand = 2.0% Silt = 91.1% Clay = 6.9% non-plastic	
7		--- Soft at 7.0 m			9	SS	3		○		
					10	AS			⊢⊕	Gravel = 0% Sand = 3.2% Silt = 89.2% Clay = 7.6% I_p = 4	
8		--- Firm at 8.5 m			11	SS	5		○		
9											
10		*CONTINUED NEXT PAGE*									

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-12

SHEET 2 OF 3

LOCATION: See Location Plan

BORING DATE: March 12, 2011

DATUM: Geodetic

N: 6934533 E: 636085

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (10 20 30 40) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	M5 - Track Mounted Mobile Augers and Research Ltd.	SILT to SANDY SILT, some clay, light to dark grey, very soft to firm (Tailings) *(continued)*			12	AS					
11											
12					13	AS				Gravel = 0% Sand = 30.3% Silt = 67.7% Clay = 2.0% non-plastic	
13											
14					14	AS					
15					15	AS				Gravel = 0% Sand = 32.6% Silt = 47.4% Clay =20.0% non-plastic	
16											
17					16	AS					
18					17	AS				Gravel = 0% Sand = 14.0% Silt = 83.6% Clay = 2.4% non-plastic	
19		CLAY, trace silt, trace gravel, interbedded fine to medium sand layers, brown, (TILL)		19.20							
20		*CONTINUED NEXT PAGE*			18	AS					

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-12

SHEET 3 OF 3

LOCATION: See Location Plan

BORING DATE: March 12, 2011

DATUM: Geodetic

N: 6934533 E: 636085

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
20		CLAY, trace silt, trace gravel, interbedded fine to medium sand layers, brown, (TILL) *(continued)*			18	AS					
		End of BOREHOLE.		20.57							
21		Note: Borehole backfilled with cuttings upon completion.									
22											
23											
24											
25											
26											
27											
28											
29											
30											

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-13

SHEET 1 OF 2

LOCATION: See Location Plan

BORING DATE: March 12, 2011

DATUM: Geodetic

N: 6934651 E: 635866

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface									Stick-up= 0.96 m
0	M5 - Track Mounted Mobile Augers and Research Ltd.	CLAYEY SILT, trace to some fine sand, grey, very soft (Tailings)		0.00	1	AS		○			
1		--- Frost penetration to 1.1 m			2	AS		○			Cuttings
2					3	TO				Gravel = 0% Sand = 0.0% Silt = 83.2% Clay = 16.8%	
3					4	AS		○			Bentonite Seal
4					5	SS	1	○			18 Mar 2011 ▽
5					6	AS		○		Gravel = 0% Sand = 11.6% Silt = 74.9% Clay = 13.5% non-plastic	Screen Section
6					7	SS	2	○			
7		--- Soft at 7.1 m			8	AS		○		Gravel = 0% Sand = 2.5% Silt = 86.7% Clay = 10.8% non-plastic	
					9	SS	4	○			
8					10	AS		○		Gravel = 0% Sand = 3.2% Silt = 81.7% Clay = 15.1% non-plastic	Cuttings
9		--- Firm at 8.5 m			11	SS	6	○			
					12	AS		○		Gravel = 0% Sand = 1.0% Silt = 83.1% Clay = 15.9% non-plastic	
10		*CONTINUED NEXT PAGE*									

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-13

SHEET 2 OF 2

LOCATION: See Location Plan

BORING DATE: March 12, 2011

DATUM: Geodetic

N: 6934651 E: 635866

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	M5 - Track Mounted Mobile Augers and Research Ltd.	CLAYEY SILT, trace to some fine sand, grey, very soft (Tailings) *(continued)*									Cuttings
11					13	AS					
12		SILTY CLAY, trace to little gravel, light to medium brown, (TILL)		11.89	14	AS					
13		End of BOREHOLE. Notes: Standpipe installed to 6.1 m. Groundwater level measured at 4.1 mbgs on March 18, 2011.		12.95							
14											
15											
16											
17											
18											
19											
20											

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-14

SHEET 1 OF 2

LOCATION: See Location Plan

BORING DATE: March 13, 2011

DATUM: Geodetic

N: 6934668 E: 636033

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface									
0	M5 - Track Mounted Mobile Augers and Research, Ltd.	CLAYEY SILT, trace sand, grey, very soft (Tailings)		0.00	1	AS					
1		--- Frost penetration at 1.4 m			2	AS					
2					3	SS	1			AS2+SS3 Gravel = 0% Sand = 4% Silt = 90% Clay = 6%	
3					4	AS				+2.6 °C	
4					5	SS	2				
5		--- Soft at 5.5 m			6	AS				+1.2 °C Gravel = 0% Sand = 0.2% Silt = 85.1% Clay = 14.7% I_p = 5	
6					7	SS	4				
7					8	AS				+1.7 °C Gravel = 0% Sand = 0% Silt = 85.6% Clay = 14.4% non-plastic	
8					9	SS	4				
9		--- Very soft at 8.5 m			10	AS				+1.6 °C Gravel = 0% Sand = 0.3% Silt = 85.0% Clay = 14.7% I_p = 6	
10					11	SS	2				
		CONTINUED NEXT PAGE									

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-14

SHEET 2 OF 2

LOCATION: See Location Plan

BORING DATE: March 13, 2011

DATUM: Geodetic

N: 6934668 E: 636033

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (10 20 30 40) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (10 20 30 40) Wp W Wl	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	M5 - Track Mounted Mobile Augers and Research, Ltd.	CLAYEY SILT, trace sand, grey, very soft (Tailings) *(continued)*									
					12	AS			W	+3.0 °C Gravel = 1.8% Sand = 3.5% Silt = 67.2% Clay = 27.5% I_p = 10	
11		--- Firm at 11.6 m			13	SS	5		W		
12											
13					14	AS			H W	+3.0 °C Gravel = 0.0% Sand = 2.1% Silt = 80.3% Clay = 17.7% I_p = 1	
14		SILTY CLAY to CLAY, trace gravel, brown, (TILL)		14.33							
					15	AS			W	+4.3 °C	
15											
16											
		CLAYEY SILT, light grey		16.46	16	AS			W		
17											
		End of BOREHOLE.		17.68							
18		Note: Borehole backfilled with cuttings upon completion.									
19											
20											

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-15

SHEET 1 OF 1

LOCATION: See Location Plan

BORING DATE: March 13, 2011

DATUM: Geodetic

N: 6934801 E: 636249

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface									
0	M5 - Track Mounted Mobile Augers and Research Ltd.	Sandy CLAYEY SILT, mottled brown and grey, firm (Tailings)		0.00	1	AS			○		
1											
		--- Frost penetration at 1.5 m			2	AS			○	+3.0 °C	
2					3	SS	8		○	Gravel = 0% Sand = 21.6% Silt = 69.7% Clay = 8.6%	
3					4	AS			○	+2.4 °C	
		SANDY SILT, some clay, grey, firm (Tailings)		3.20							
4					5	SS	7		○	Gravel = 0% Sand = 40.7% Silt = 52.0% Clay = 7.4%	
					6	AS			○	+4.2 °C	
5					7A	SS	5		○	Gravel = 0% Sand = 19.7% Silt = 65.6% Clay = 14.6%	
					7B	SS			○		
6		SILTY CLAY, trace to some fibrous peat, little to some gravel, grey to brown, (TILL)		5.72							
					8	AS			○		
7		End of BOREHOLE. Note: Borehole backfilled with cuttings upon completion.		7.16							
8											
9											
10											

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-16

SHEET 1 OF 2

LOCATION: See Location Plan

BORING DATE: March 14, 2011

DATUM: Geodetic

N: 6935455 E: 635750

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (10 20 30 40) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface									
0	M5 - Track Mounted Mobile Augers and Research Ltd.	SILTY SAND, some clay, grey, very soft to soft (Tailings)		0.00	1	AS					
1											
		--- Frost penetration at 1.4 m			2	AS					+0.6 °C
2											
					3	SS	1				Gravel = 0% Sand = 58.5% Silt = 30.4% Clay = 11.1% non-plastic
3					4	AS					
4					5	SS	3				
		CLAYEY SILT, some sand, grey, soft (Tailings)		4.42							
					6	AS			H		+1.9 °C Gravel = 0% Sand = 4.5% Silt = 82.0% Clay = 13.5% I_p = 0
5											
					7	SS	3				
6											
					8	AS					+2.0 °C Gravel = 0% Sand = 14.4% Silt = 75.6% Clay = 10.0% non-plastic
7											
					9	SS	3				
					10	AS					+0.6 °C Gravel = 0% Sand = 6.7% Silt = 80.0% Clay = 13.3% non-plastic
8											
					11	SS	4				
9											
10		*CONTINUED NEXT PAGE*									

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-16

SHEET 2 OF 2

LOCATION: See Location Plan

BORING DATE: March 14, 2011

DATUM: Geodetic

N: 6935455 E: 635750

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (10 20 30 40) nat V. + Q - ● rem V. ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (10 20 30 40) Wp W Wl	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10											
11	M5 - Track Mounted Mobile Augers and Research Ltd.	CLAYEY SILT, some sand, grey, soft (Tailings) *(continued)*			12	AS			W	Gravel = 0% Sand = 1.0% Silt = 83.9% Clay = 15.0% non-plastic	
					13A	SS			W		
12		SILTY CLAY, trace gravel, brown, (TILL)		11.58	13B	SS	34		W		
		End of BOREHOLE. Refusal of auger at 12.3 m. Notes: Borehole backfilled with cuttings upon completion.		12.34							
13											
14											
15											
16											
17											
18											
19											
20											

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-17

SHEET 1 OF 2

LOCATION: See Location Plan

BORING DATE: March 13, 2011

DATUM: Geodetic

N: 6935296 E: 636117

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface									
0	M5 - Track Mounted Mobile Augers and Research Ltd.	Sandy CLAYEY SILT, grey, very soft to soft (Tailings)		0.00							
1					1	AS					
2		--- Frost penetration to 1.7 m			2	AS				+1.0 °C	
					3	SS	4			Gravel = 0% Sand = 18.4% Silt = 67.7% Clay = 13.9%	
3					4	AS				+2.6 °C	
4					5	SS	2			Gravel = 0% Sand = 16.3% Silt = 71.1% Clay = 12.6% non-plastic	
					6	AS				+3.4 °C	
5					7	SS	4			Gravel = 0% Sand = 34.7% Silt = 58.7% Clay = 6.6%	
6					8	AS					
7					9	SS	2			Gravel = 0% Sand = 19.1% Silt = 69.0% Clay = 11.9% non-plastic	
					10A	AS				+3.5 °C I_p = 0	
8					10B	SS	4			Gravel = 0% Sand = 4.2% Silt = 82.5% Clay = 13.3%	
9											
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-17

SHEET 2 OF 2

LOCATION: See Location Plan

BORING DATE: March 13, 2011

DATUM: Geodetic

N: 6935296 E: 636117

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10	M5 - Track Mounted Mobile Augers and Research Ltd.	Sandy CLAYEY SILT, grey, very soft to soft (Tailings) *(continued)*									
					11	AS			W	+2.7 °C	
11											
		--- Firm at 11.6 m			12	SS	6		W	Gravel = 0% Sand = 0.1% Silt = 84.1% Clay = 15.8% I_p = 2	
12											
13					13	AS			W	+3.6 °C	
14											
		SILTY CLAY, medium sand pockets, mottled brown and grey		14.48							
15					14	AS			W		
16											
		End of BOREHOLE.		16.31							
		Note: Borehole backfilled with cuttings upon completion.									
17											
18											
19											
20											

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

DATA ENTRY: AD

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-18

SHEET 1 OF 2

LOCATION: See Location Plan

BORING DATE: March 20, 2011

DATUM: Geodetic

N: 6932885 E: 636595

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface									
0	M5 - Track Mounted Mobile Augers and Research Ltd.	SILT, little to some clay, trace to some sand, light to dark grey, very soft (Tailings)		0.00							
					1	AS					
1											
		--- Frost penetration to 1.7 m									
2					2	AS				+0.9 °C	
					3	SS	2				
3											
					4	AS				+1.4 °C	
4											
					5	SS	1				
5					6	AS					
					7	SS	0				
6											
					8	AS				+2.2 °C	
7											
					9	SS	1				
8					10	AS				+1.7 °C	
9					11	SS	0				
					12	AS				+2.9 °C	
10		*CONTINUED NEXT PAGE*									

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

DATA ENTRY: AD

PROJECT No.: 09-1427-0006

RECORD OF BOREHOLE: GA11-T-18

SHEET 2 OF 2

LOCATION: See Location Plan

BORING DATE: March 20, 2011

DATUM: Geodetic

N: 6932885 E: 636595

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (10 20 30 40)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp ⊖W WI) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10											
	M5 - Track Mounted Mobile Augers and Research Ltd.	SILT, little to some clay, trace to some sand, light to dark grey, very soft (Tailings) *(continued)*			13	SS	0				
11					14	AS				+2.4 °C	
12					15A	SS	8				
					15B	SS					
13		PEAT, dark brown to black, fibrous		12.65							
		SILTY CLAY, trace organic fibers, trace wood chips, light to dark brown		13.26	16	AS				+3.4 °C	
14											
		End of BOREHOLE.		14.78							
15		Note: Borehole backfilled with cuttings upon completion.									
16											
17											
18											
19											
20											

BOREHOLE - EXPANDED ADD. LAB TESTING DRAFT GIANT MINE LOGS.GPJ CALGARY.GDT 6/15/12

DEPTH SCALE

1 : 50

Golder Associates

LOGGED: JJB

CHECKED: HK

APPENDIX B

Laboratory Test Results

June 29, 2012
Project No. 09-1427-0006/2100
Doc. No. 058

Atterbergs

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2100

Short Title: Giant Mine

Tested By: HVD Date: 10-May-11

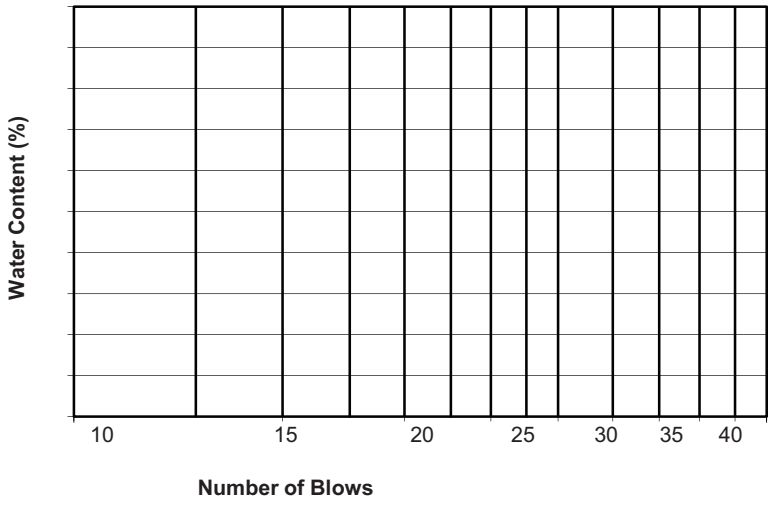
Borehole: GA11-T-01 Sample # : SA1 Depth:

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.13 14:39:27 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2100

Short Title: Giant Mine

Tested By: LM Date: 8-May-11

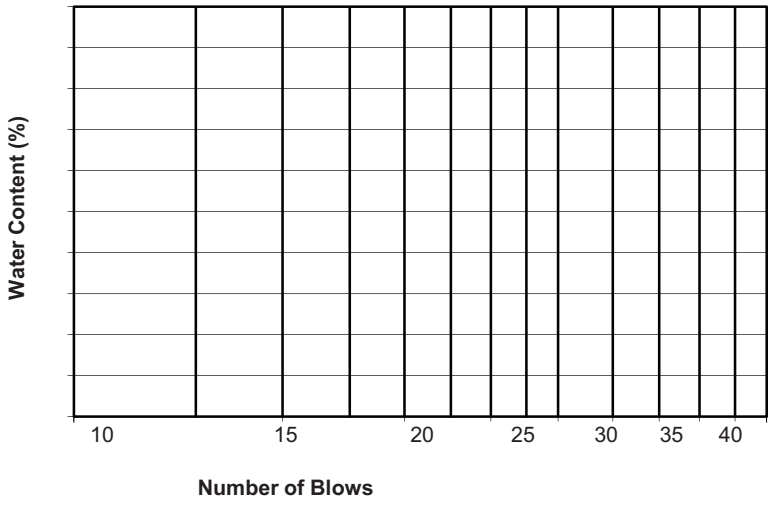
Borehole: GA11-T-01 Sample # : 3 Depth:

Plastic Limit Determination:

Tare #	A						
Mass of wet sample + tare (g)	21.72						
Mass of dry sample + tare (g)	20.36						
Mass of water (g)	1.36						
Mass of tare (g)	14.25						
Mass of dry soil (g)	6.11						
Water content (%)	22.26						

Liquid Limit Determination:

Number of Blows	35	33					
Tare #	B	C					
Mass of wet sample + tare (g)	43.47	39.18					
Mass of dry sample + tare (g)	37.63	34.40					
Mass of water (g)	5.84	4.78					
Mass of tare (g)	13.32	14.55					
Mass of dry soil (g)	24.31	19.85					
Water content (%)	24.02	24.08					
Correction factor	1.022	1.022					
Corrected Limit	24.55	24.61					



Plastic Limit: 22

Liquid Limit: 25

Plasticity Index: 2

Comments:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.09 13:59:03 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	LM	Date:	10-May-11

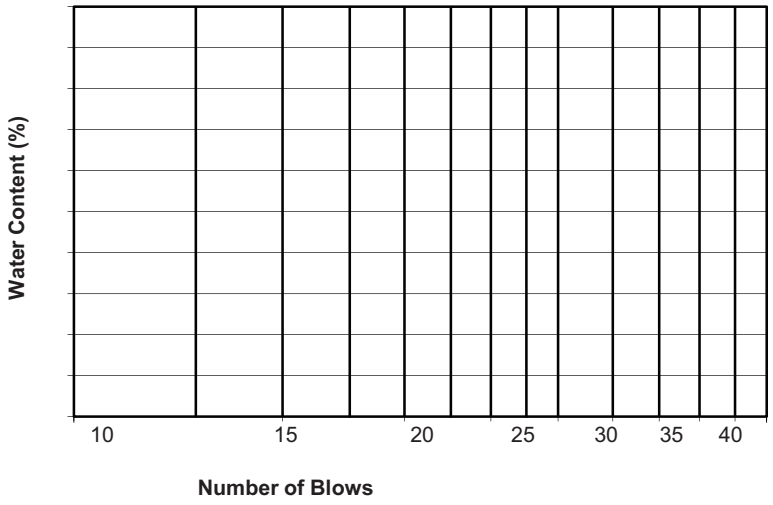
Borehole: GA11-T-01 Sample # : 4 Depth: 7.5-10'

Plastic Limit Determination:

Tare #	A						
Mass of wet sample + tare (g)	20.51						
Mass of dry sample + tare (g)	19.21						
Mass of water (g)	1.30						
Mass of tare (g)	14.26						
Mass of dry soil (g)	4.95						
Water content (%)	26.26						

Liquid Limit Determination:

Number of Blows	15	16					
Tare #	PG-27	PG-25					
Mass of wet sample + tare (g)	65.77	70.68					
Mass of dry sample + tare (g)	56.94	60.47					
Mass of water (g)	8.83	10.21					
Mass of tare (g)	31.17	30.21					
Mass of dry soil (g)	25.77	30.26					
Water content (%)	34.26	33.74					
Correction factor	1.066	1.066					
Corrected Limit	32.14	31.65					



Plastic Limit: 26

Liquid Limit: 32

Plasticity Index: 6

Comments:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.13 14:39:13 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	HVD	Date:	16-May-11

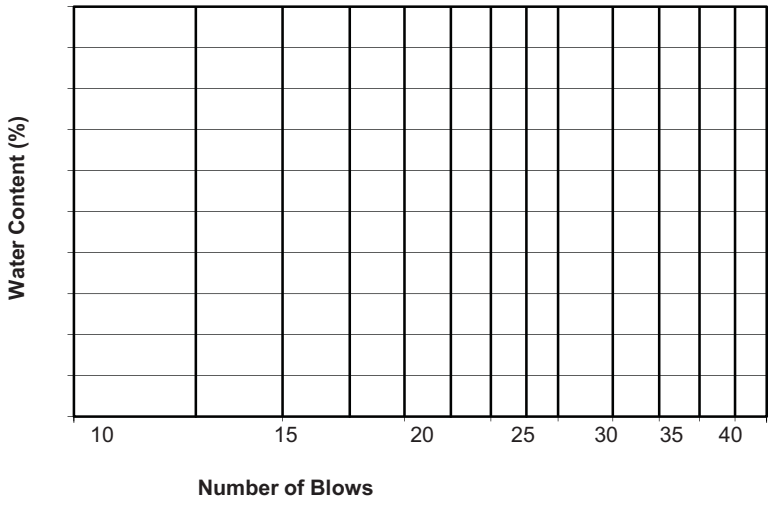
Borehole: GA11-T-01 Sample # : 5 Depth:

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.14 15:39:14 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	LM	Date:	8-May-11

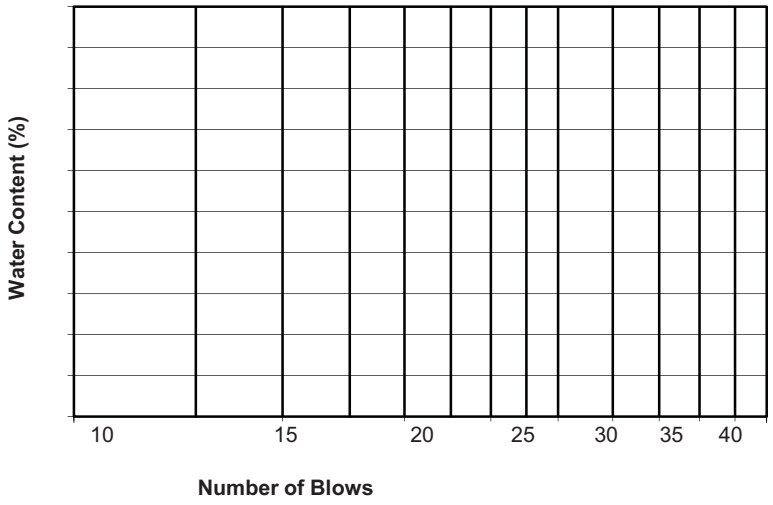
Borehole: GA11-T-01 Sample # : 7 Depth:

Plastic Limit Determination:

Tare #	114						
Mass of wet sample + tare (g)	22.53						
Mass of dry sample + tare (g)	20.88						
Mass of water (g)	1.65						
Mass of tare (g)	14.24						
Mass of dry soil (g)	6.64						
Water content (%)	24.85						

Liquid Limit Determination:

Number of Blows	17	17					
Tare #	17	88					
Mass of wet sample + tare (g)	36.03	40.85					
Mass of dry sample + tare (g)	30.59	34.26					
Mass of water (g)	5.44	6.59					
Mass of tare (g)	14.39	14.48					
Mass of dry soil (g)	16.20	19.78					
Water content (%)	33.58	33.32					
Correction factor	1.050	1.050					
Corrected Limit	31.98	31.73					



Plastic Limit: 25

Liquid Limit: 32

Plasticity Index: 7

Comments:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.09 13:58:44 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2100

Short Title: Giant Mine

Tested By: LM Date: 8-May-11

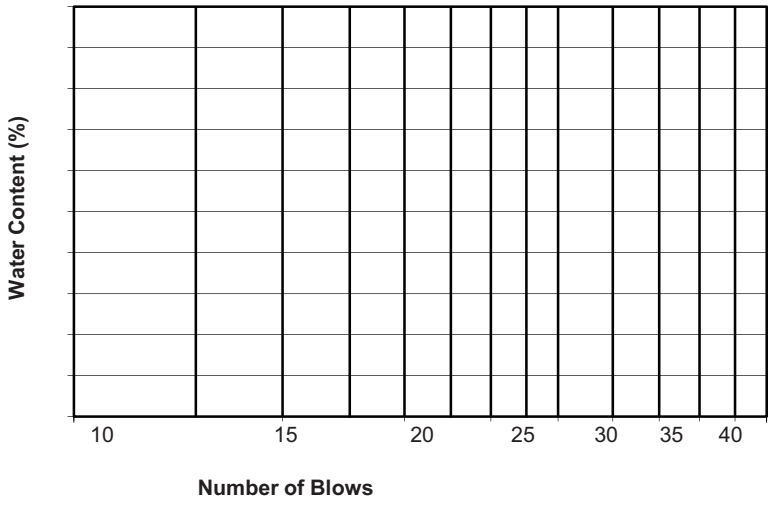
Borehole: GA11-T-01 Sample # : 9 Depth:

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.09 13:48:48 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2100

Short Title: Giant Mine

Tested By: LM Date: 8-May-11

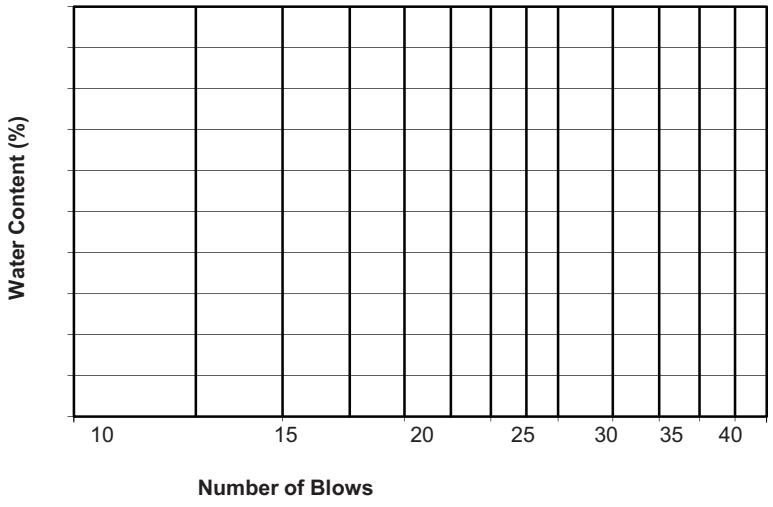
Borehole: GA11-T-01 Sample # : 11 Depth:

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.09 13:32:10 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-.1427-0006 Phase: 2100

Short Title: Giant Mine

Tested By: HVD Date: 28-May-11

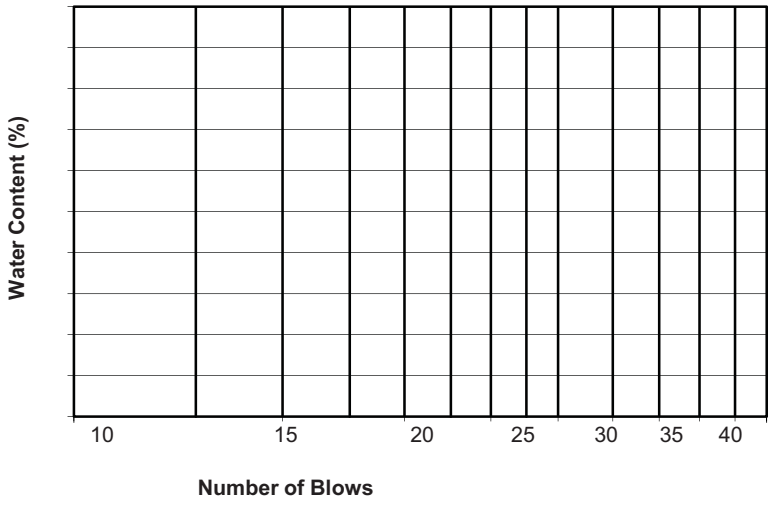
Borehole: GA11-T-01 Sample # : SA15 Depth: 37.5-39'

Plastic Limit Determination:

Tare #	PG-37						
Mass of wet sample + tare (g)	33.08						
Mass of dry sample + tare (g)	32.74						
Mass of water (g)	0.34						
Mass of tare (g)	30.68						
Mass of dry soil (g)	2.06						
Water content (%)	16.50						

Liquid Limit Determination:

Number of Blows	21	21					
Tare #	202	207					
Mass of wet sample + tare (g)	53.65	53.85					
Mass of dry sample + tare (g)	50.07	50.23					
Mass of water (g)	3.58	3.62					
Mass of tare (g)	34.56	34.50					
Mass of dry soil (g)	15.51	15.73					
Water content (%)	23.08	23.01					
Correction factor	0.979	0.979					
Corrected Limit	22.60	22.53					



Plastic Limit: 17

Liquid Limit: 23

Plasticity Index: 6

Comments:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.30 16:21:14 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	HVD	Date:	10-May-11

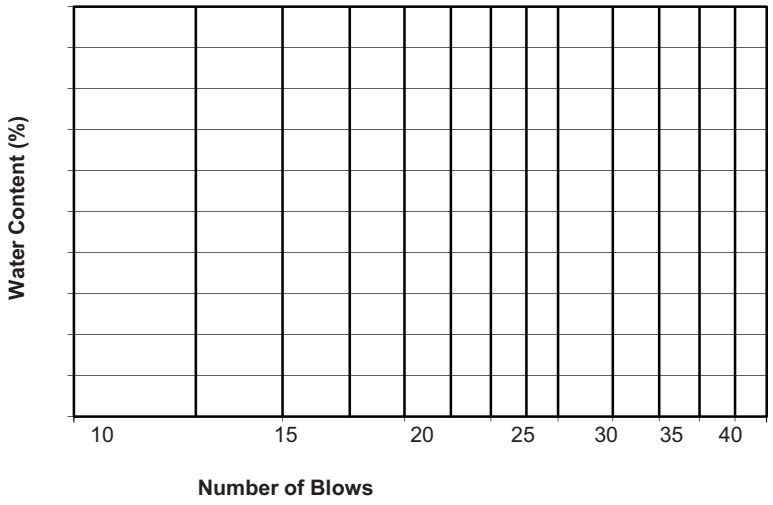
Borehole: GA11-T-02 Sample # : 2 Depth:

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.11 14:31:56 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	HVD	Date:	16-May-11

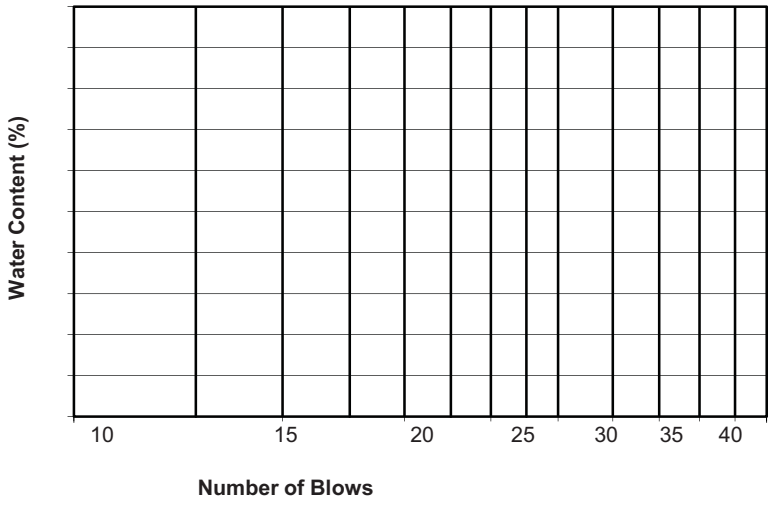
Borehole: GA11-T-02 Sample # : 5 Depth: 10-11'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.14 15:38:56 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	LM	Date:	8-May-11

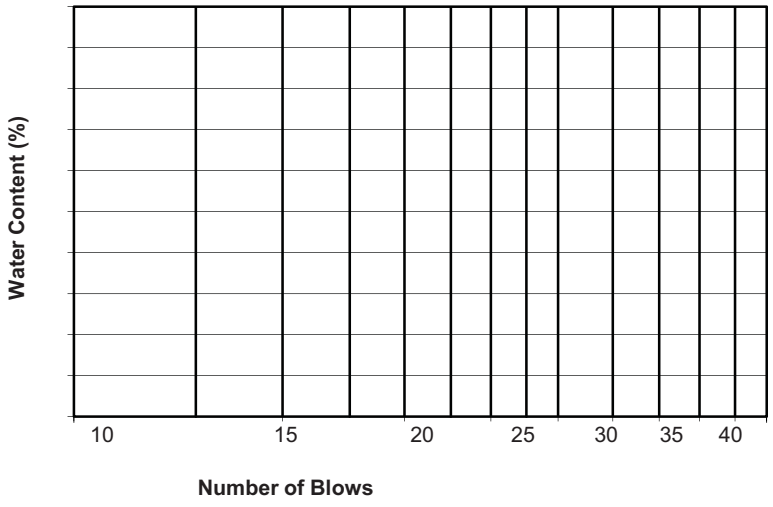
Borehole: GA11-T-02 Sample # : 7 Depth: 15-16'

Plastic Limit Determination:

Tare #	1						
Mass of wet sample + tare (g)	21.70						
Mass of dry sample + tare (g)	20.32						
Mass of water (g)	1.38						
Mass of tare (g)	14.39						
Mass of dry soil (g)	5.93						
Water content (%)	23.27						

Liquid Limit Determination:

Number of Blows	20	20					
Tare #	2	3					
Mass of wet sample + tare (g)	35.32	48.27					
Mass of dry sample + tare (g)	30.88	41.21					
Mass of water (g)	4.44	7.06					
Mass of tare (g)	14.28	14.46					
Mass of dry soil (g)	16.60	26.75					
Water content (%)	26.75	26.39					
Correction factor	0.973	0.973					
Corrected Limit	26.02	25.68					



Plastic Limit: 23

Liquid Limit: 26

Plasticity Index: 3

Comments:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.09 14:01:23 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2100

Short Title: Giant Mine

Tested By: HVD Date: 16-May-11

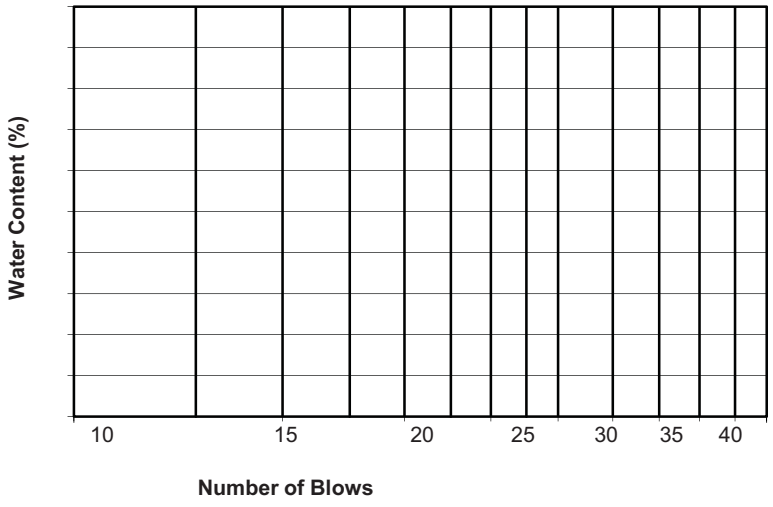
Borehole: GA11-T-02 Sample # : SA7 Depth: 15-16'

Plastic Limit Determination:

Tare #	240						
Mass of wet sample + tare (g)	45.56						
Mass of dry sample + tare (g)	43.91						
Mass of water (g)	1.65						
Mass of tare (g)	35.84						
Mass of dry soil (g)	8.07						
Water content (%)	20.45						

Liquid Limit Determination:

Number of Blows	21	22					
Tare #	256	434					
Mass of wet sample + tare (g)	63.36	65.67					
Mass of dry sample + tare (g)	57.78	59.64					
Mass of water (g)	5.58	6.03					
Mass of tare (g)	35.13	34.81					
Mass of dry soil (g)	22.65	24.83					
Water content (%)	24.64	24.29					
Correction factor	0.979	0.985					
Corrected Limit	24.12	23.92					



Plastic Limit: 20

Liquid Limit: 24

Plasticity Index: 4

Comments:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.24 15:38:59 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2100

Short Title: Giant Mine

Tested By: HVD Date: 16-May-11

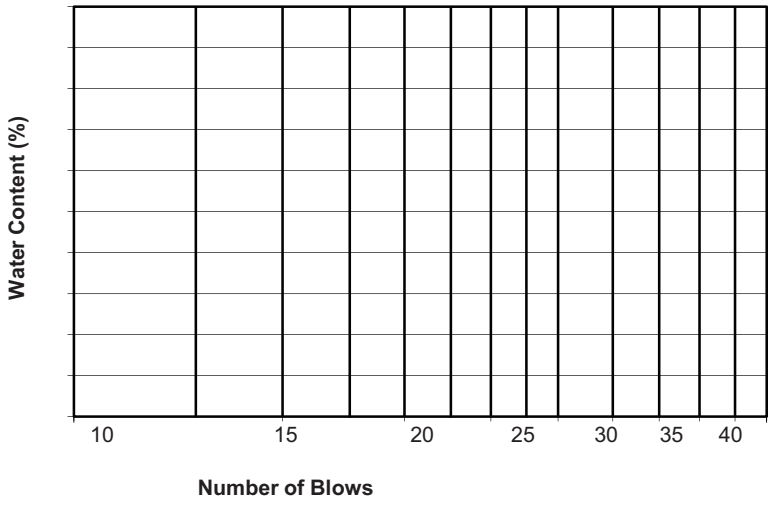
Borehole: GA11-T-02 Sample # : 9 Depth: 20-21'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.14 15:38:23 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	HVD	Date:	16-May-11

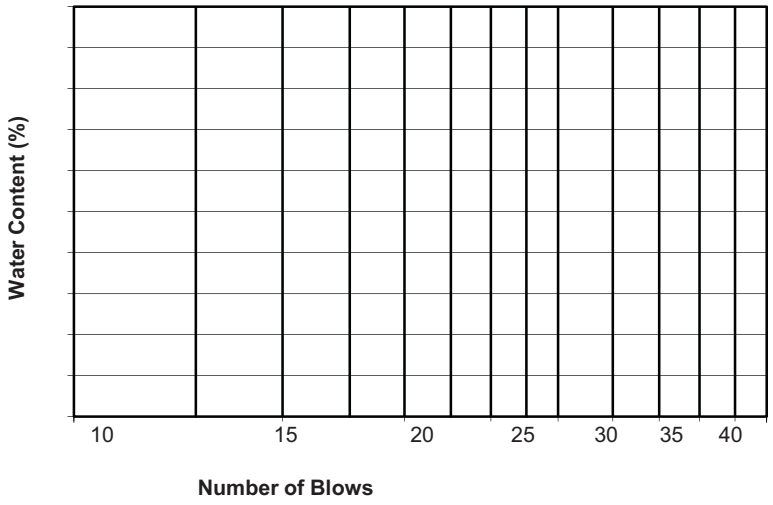
Borehole: GA11-T-02 Sample # : 11 Depth:

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.14 15:37:51 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	HVD	Date:	16-May-11

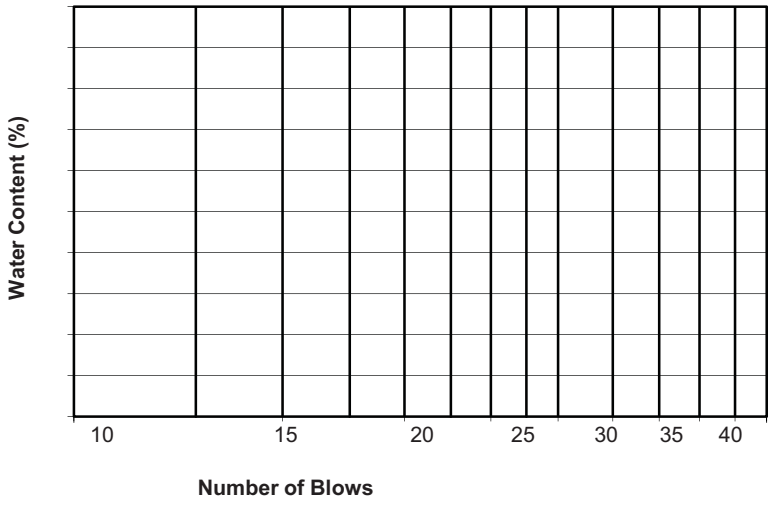
Borehole: GA11-T-04 Sample # : 5 Depth: 10-11'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.14 15:40:57 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2500

Short Title: Giant Mine

Tested By: HVD Date: 24-May-11

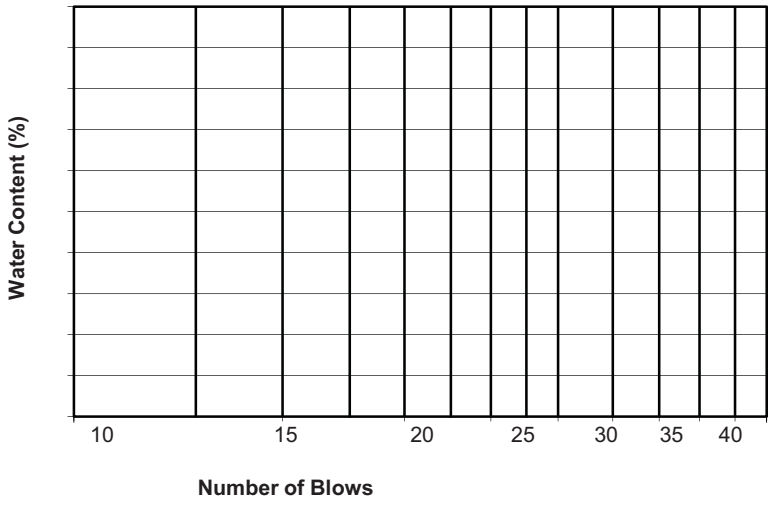
Borehole: GA11-T-04 Sample # : SA6 Depth:

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 10:51:04 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	LM	Date:	8-May-11

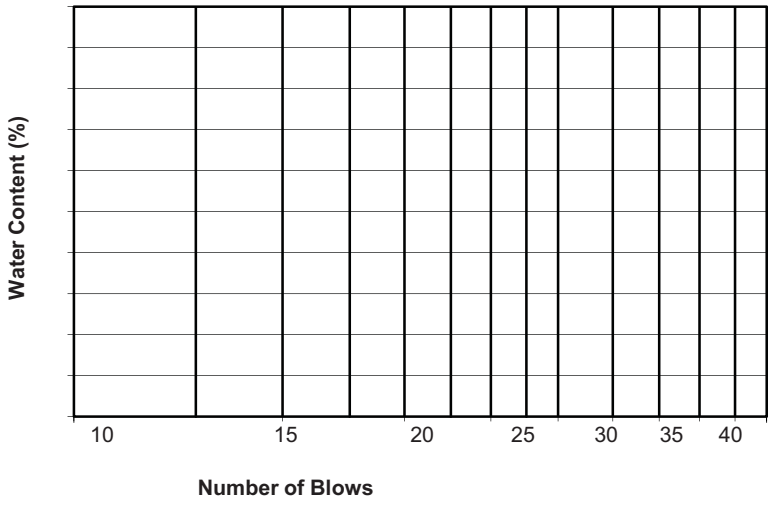
Borehole: GA11-T-04 Sample # : 8 Depth: 17.5-19'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.09 14:03:38 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2100

Short Title: Giant Mine

Tested By: LM Date: 10-May-11

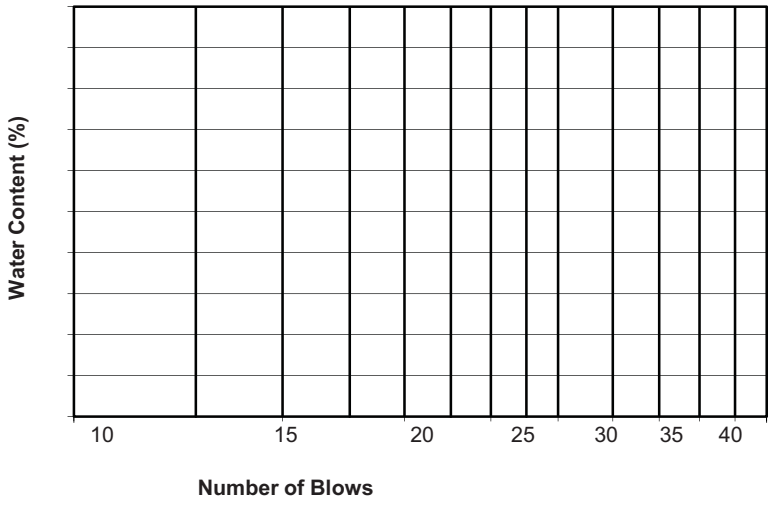
Borehole: GA11-T-04 Sample # : 10 Depth: 22.5-24'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.13 14:51:10 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	DM	Date:	29-Apr-11

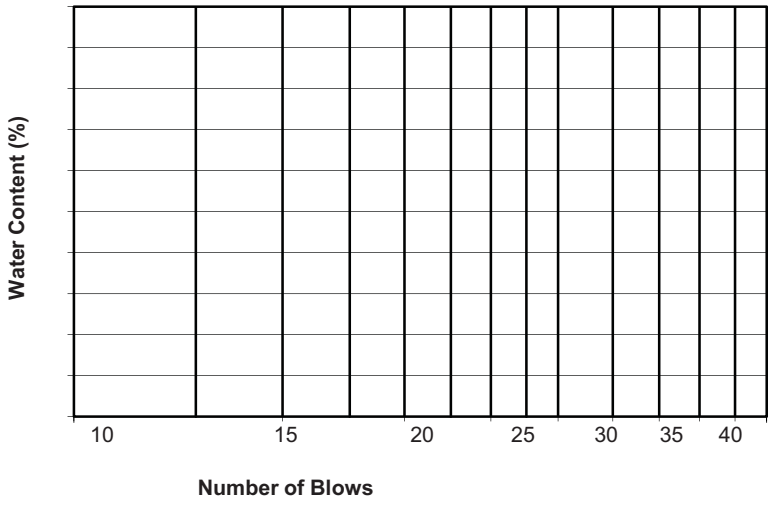
Borehole: GA11-T-04 Sample # : 15 Depth: 45-46'

Plastic Limit Determination:

Tare #	411						
Mass of wet sample + tare (g)	51.19						
Mass of dry sample + tare (g)	48.26						
Mass of water (g)	2.93						
Mass of tare (g)	34.99						
Mass of dry soil (g)	13.27						
Water content (%)	22.08						

Liquid Limit Determination:

Number of Blows	15	15					
Tare #	250	252					
Mass of wet sample + tare (g)	76.86	80.10					
Mass of dry sample + tare (g)	69.02	74.51					
Mass of water (g)	7.84	6.47					
Mass of tare (g)	34.47	47.98					
Mass of dry soil (g)	34.55	26.53					
Water content (%)	22.69	24.39					
Correction factor	1.066	1.066					
Corrected Limit	21.29	22.88					



Plastic Limit: 22

Liquid Limit: 22

Plasticity Index: 0

Comments:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.09 14:03:13 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	LM	Date:	5-May-11

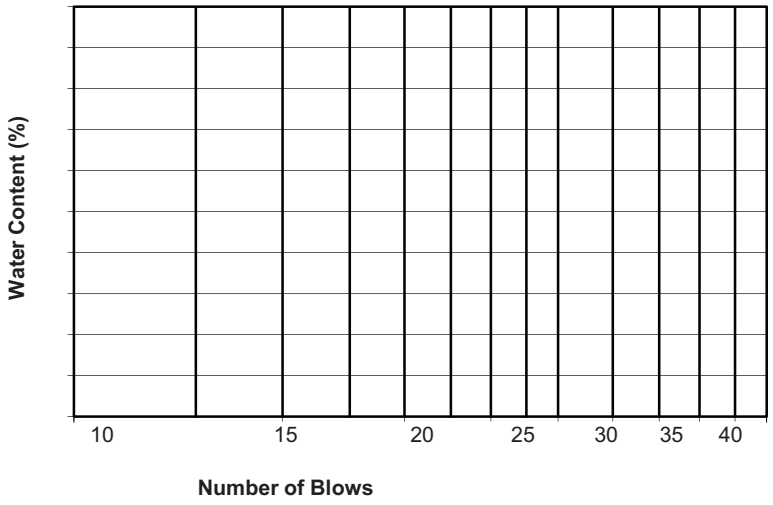
Borehole: GA11-T-06 Sample # : 9 Depth: 22.5-24'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.09 14:54:06 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	DM	Date:	29-Apr-11

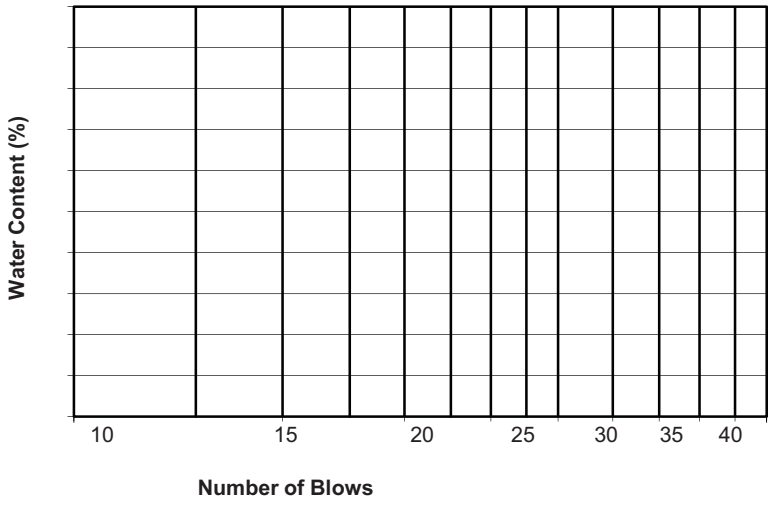
Borehole: GA11-T-06 Sample # : 11 Depth: 27.5-29.6'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.09 14:03:43 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2100

Short Title: Giant Mine

Tested By: LM Date: 5-May-11

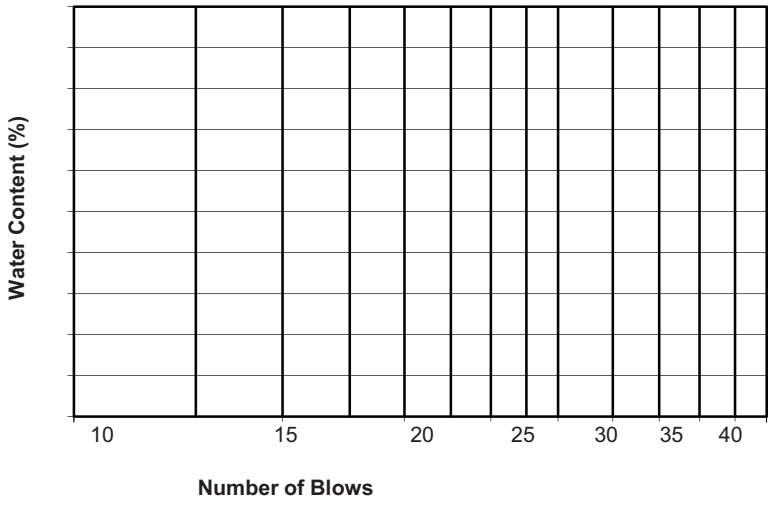
Borehole: GA11-T-06 Sample # : 12 Depth: 34-35'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.09 14:03:36 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2100

Short Title: Giant Mine

Tested By: HVD Date: 10-May-11

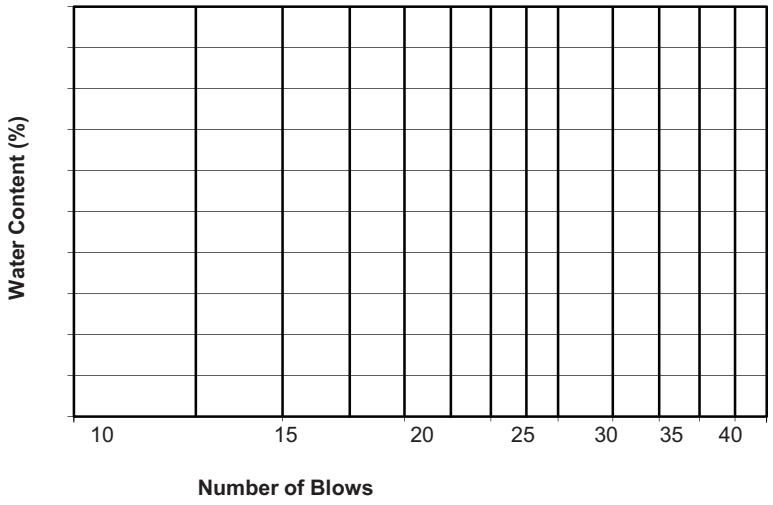
Borehole: GA11-T-06 Sample # : SA15 Depth: 47.5-49'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.13 14:30:30 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2500

Short Title: Giant Mine

Tested By: HVD Date: 1-Jun-11

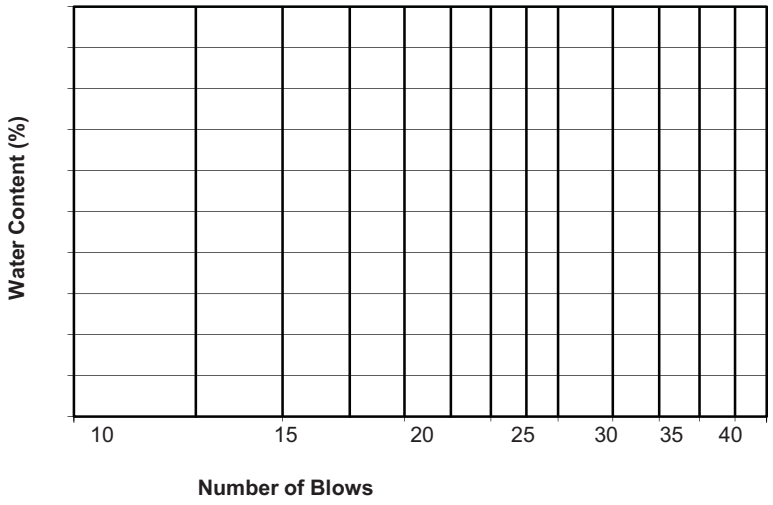
Borehole: GA11-T-08 Sample # : SA3 Depth:

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Not enough of sample to do atterberg lim

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 10:39:59 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2100

Short Title: Giant Mine

Tested By: MA Date: 25-May-11

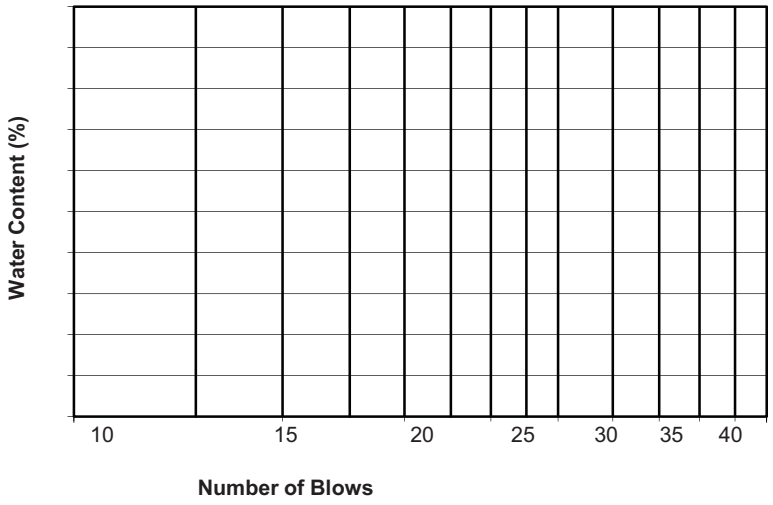
Borehole: GA11-T-08 Sample # : SA05 Depth: 12.5-14'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.30 16:30:56 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2500

Short Title: Giant Mine

Tested By: HVD Date: 24-May-11

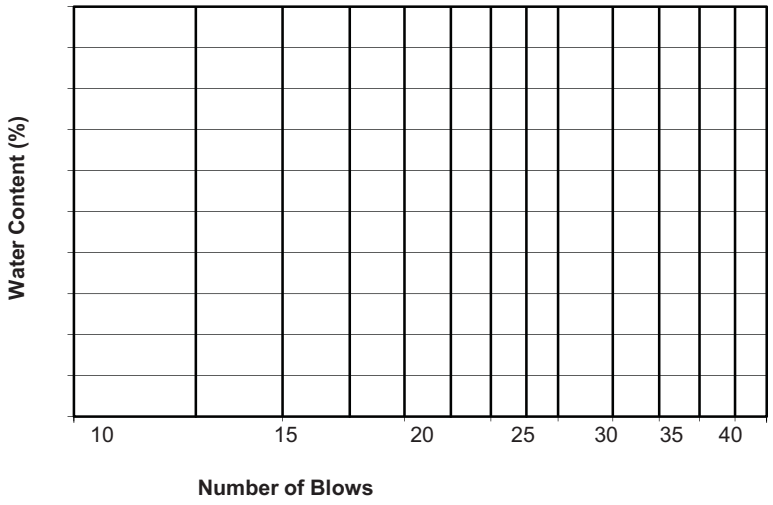
Borehole: GA11-T-09 Sample # : SA6 Depth: 2.5-5'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 10:29:30 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	HVD	Date:	2-Jun-11

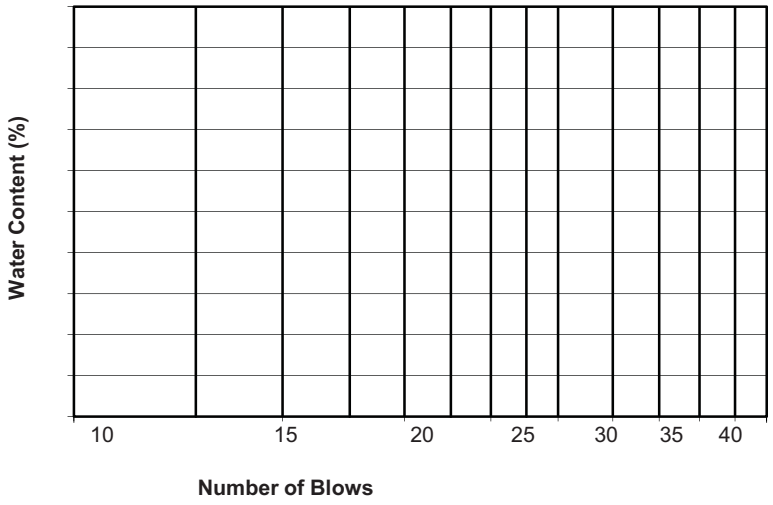
Borehole: GA11-T-08 Sample # : SA7 Depth: 17.5-19'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.06 09:13:10 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2100

Short Title: Giant Mine

Tested By: HVD Date: 4-Jun-11

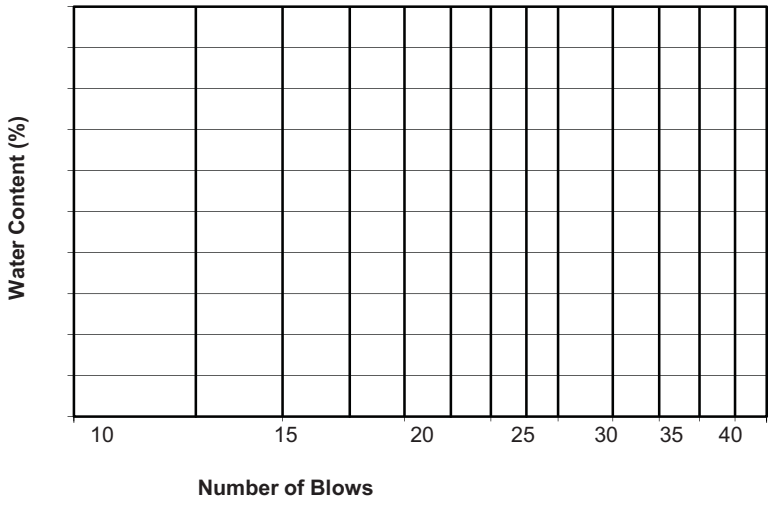
Borehole: GA11-T-08 Sample # : SA9A Depth: 22.5-23.5'

Plastic Limit Determination:

Tare #	PG-33						
Mass of wet sample + tare (g)	32.98						
Mass of dry sample + tare (g)	32.59						
Mass of water (g)	0.39						
Mass of tare (g)	30.39						
Mass of dry soil (g)	2.20						
Water content (%)	17.73						

Liquid Limit Determination:

Number of Blows	28	28					
Tare #	432	403					
Mass of wet sample + tare (g)	54.48	52.42					
Mass of dry sample + tare (g)	50.98	48.90					
Mass of water (g)	3.50	3.52					
Mass of tare (g)	35.27	33.13					
Mass of dry soil (g)	15.71	15.77					
Water content (%)	22.28	22.32					
Correction factor	1.014	1.014					
Corrected Limit	22.59	22.63					



Plastic Limit: 18

Liquid Limit: 23

Plasticity Index: 5

Comments:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.06 09:13:26 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2500
Short Title:	Giant Mine		
Tested By:	HVD	Date:	7-Jun-11

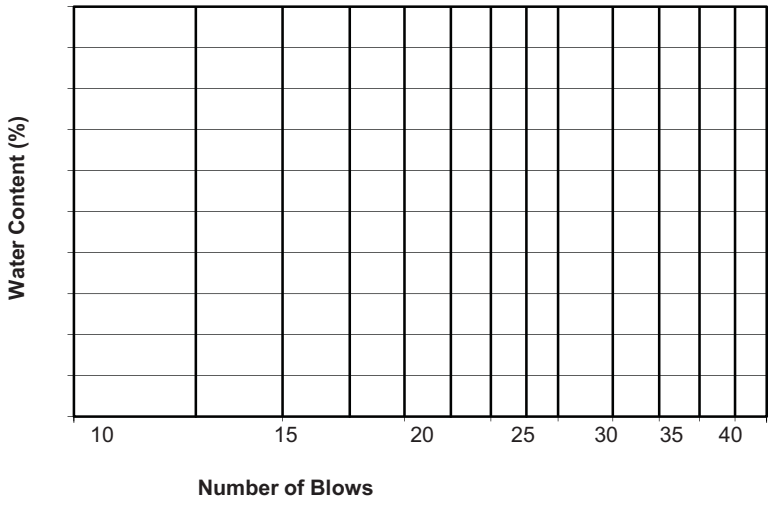
Borehole: GA11-T-09 Sample # : SA3 Depth: 6-7'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 10:29:02 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2500

Short Title: Giant Mine

Tested By: HVD Date: 8-Jun-11

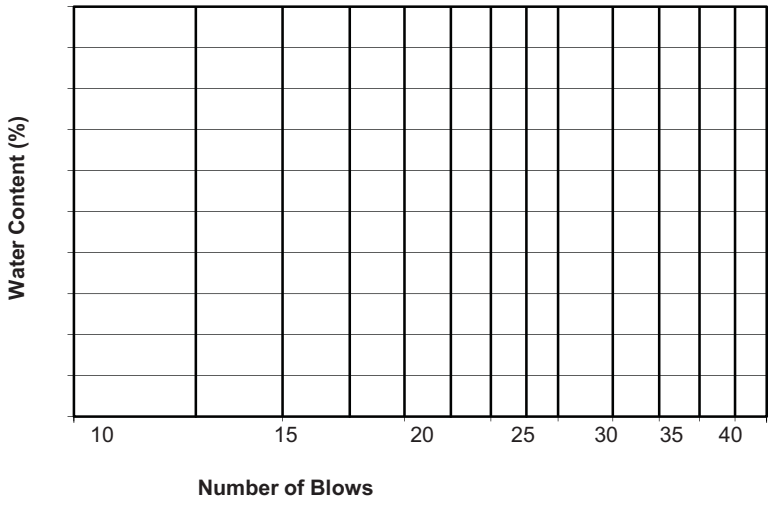
Borehole: GA11-T-09 Sample # : SA5 Depth: 10-11'

Plastic Limit Determination:

Tare #	PG-14						
Mass of wet sample + tare (g)	43.25						
Mass of dry sample + tare (g)	42.86						
Mass of water (g)	0.39						
Mass of tare (g)	41.13						
Mass of dry soil (g)	1.73						
Water content (%)	22.54						

Liquid Limit Determination:

Number of Blows	21	20					
Tare #	408	234					
Mass of wet sample + tare (g)	53.72	57.07					
Mass of dry sample + tare (g)	50.03	52.90					
Mass of water (g)	3.69	4.17					
Mass of tare (g)	34.73	35.78					
Mass of dry soil (g)	15.30	17.12					
Water content (%)	24.12	24.36					
Correction factor	0.979	0.973					
Corrected Limit	23.61	23.70					



Plastic Limit: 23

Liquid Limit: 24

Plasticity Index: 1

Comments:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 10:28:16 -06'0

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2500

Short Title: Giant Mine

Tested By: HVD Date: 8-Jun-11

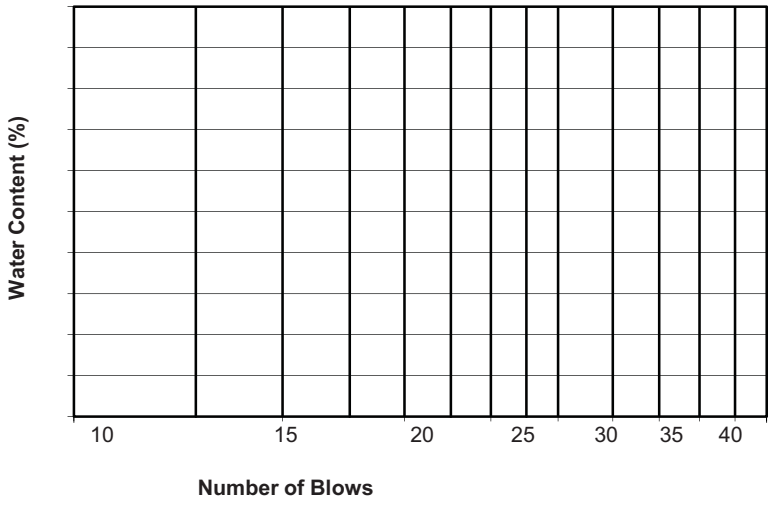
Borehole: GA11-T-09 Sample # : SA9 Depth: 20.5-21.5'

Plastic Limit Determination:

Tare #	PG-30						
Mass of wet sample + tare (g)	33.88						
Mass of dry sample + tare (g)	33.37						
Mass of water (g)	0.51						
Mass of tare (g)	31.25						
Mass of dry soil (g)	2.12						
Water content (%)	24.06						

Liquid Limit Determination:

Number of Blows	20	20					
Tare #	245	217					
Mass of wet sample + tare (g)	58.32	57.89					
Mass of dry sample + tare (g)	53.58	53.21					
Mass of water (g)	4.74	4.68					
Mass of tare (g)	35.36	35.28					
Mass of dry soil (g)	18.22	17.93					
Water content (%)	26.02	26.10					
Correction factor	0.973	0.973					
Corrected Limit	25.31	25.40					



Plastic Limit: 24

Liquid Limit: 25

Plasticity Index: 1

Comments:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 10:22:30 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	HVD	Date:	2-Jun-11

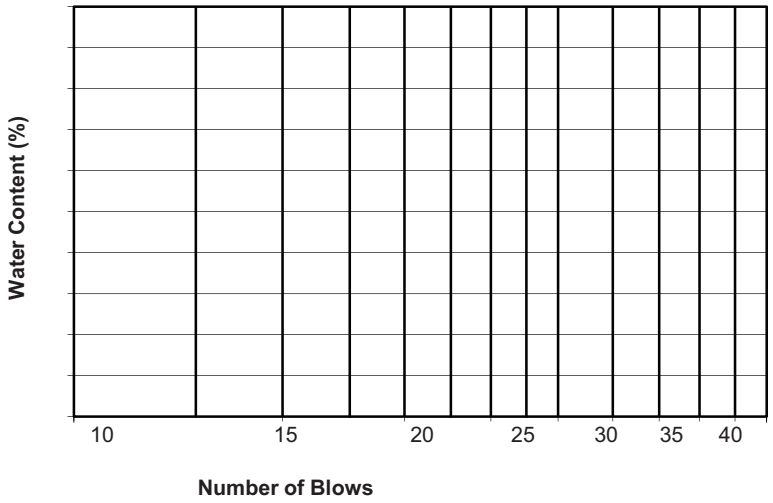
Borehole: GA11-T-09 Sample # : SA10 Depth: 24-25'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.06 09:08:07 -08'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2500

Short Title: Giant Mine

Tested By: HVD Date: 7-Jun-11

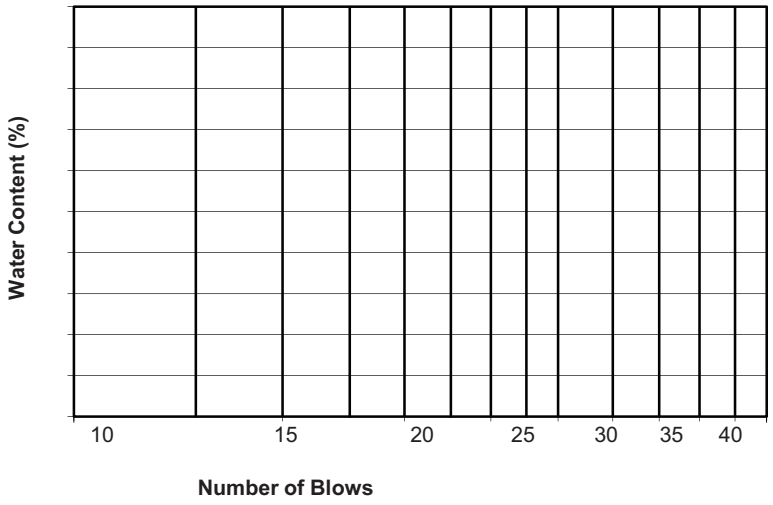
Borehole: GA11-T-10 Sample # : SA2 Depth: 5-6'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 10:36:10 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2500
Short Title:	Giant Mine		
Tested By:	HVD	Date:	7-Jun-11

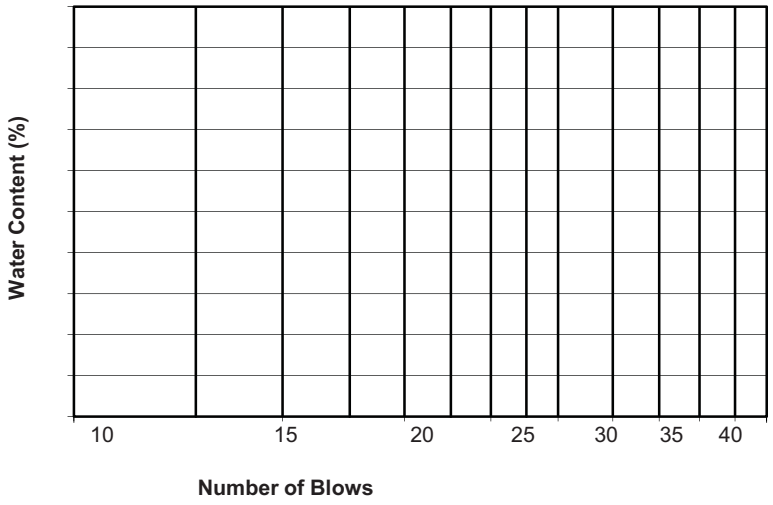
Borehole: GA11-T-10 Sample # : SA4 Depth: 10-11'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 10:26:38 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2500

Short Title: Giant Mine

Tested By: HVD Date: 7-Jun-11

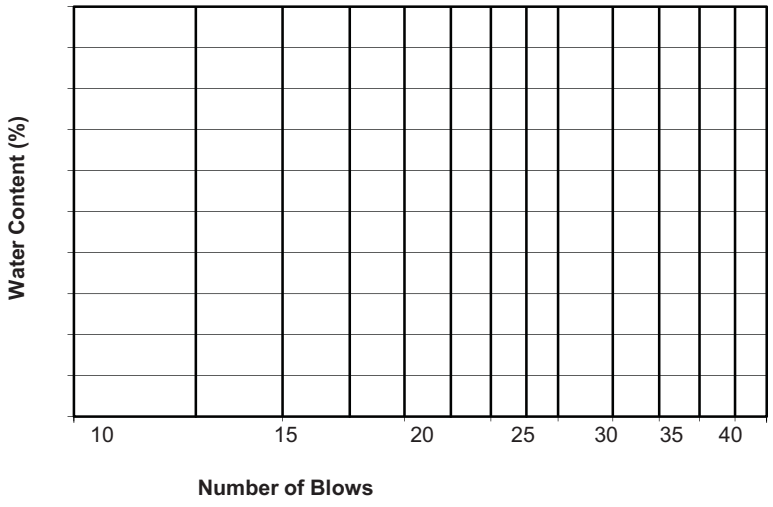
Borehole: GA11-T-10 Sample # : SA6 Depth: 15-16'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 10:25:59 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2500

Short Title: Giant Mine

Tested By: HVD Date: 1-Jun-11

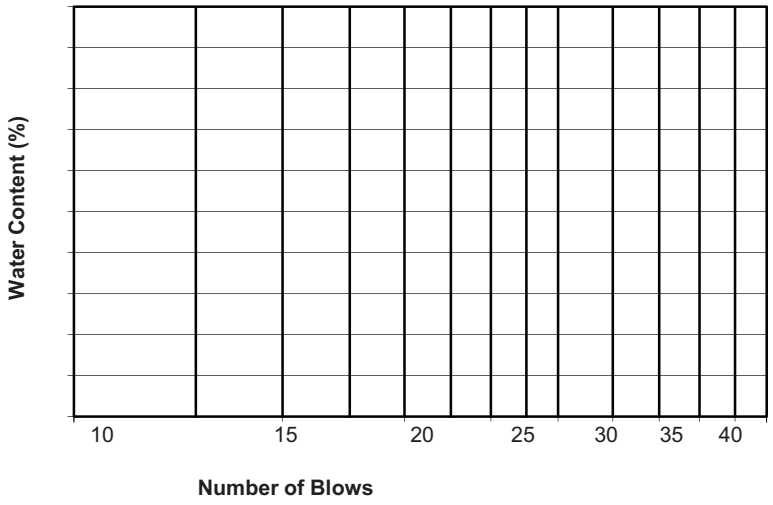
Borehole: GA11-T-10 Sample # : SA8 Depth:

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Samples not located

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 10:22:30 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2500

Short Title: Giant Mine

Tested By: HVD Date: 8-Jun-11

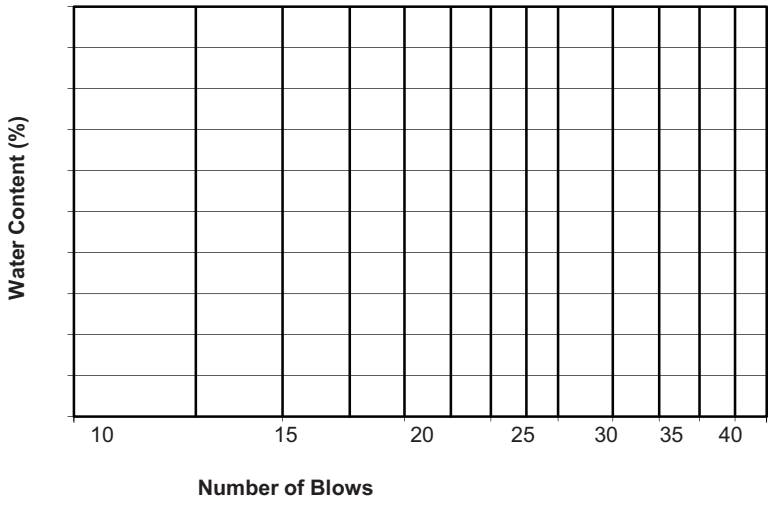
Borehole: GA11-T-10 Sample # : SA10 Depth: 25-26'

Plastic Limit Determination:

Tare #	PG-40						
Mass of wet sample + tare (g)	32.85						
Mass of dry sample + tare (g)	32.40						
Mass of water (g)	0.45						
Mass of tare (g)	30.74						
Mass of dry soil (g)	1.66						
Water content (%)	27.11						

Liquid Limit Determination:

Number of Blows	21	22					
Tare #	204	241					
Mass of wet sample + tare (g)	54.44	53.84					
Mass of dry sample + tare (g)	49.39	49.22					
Mass of water (g)	5.05	4.62					
Mass of tare (g)	33.83	35.01					
Mass of dry soil (g)	15.56	14.21					
Water content (%)	32.46	32.51					
Correction factor	0.979	0.985					
Corrected Limit	31.77	32.02					



Plastic Limit: 27

Liquid Limit: 32

Plasticity Index: 5

Comments:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 10:34:27 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	LM	Date:	10-May-11

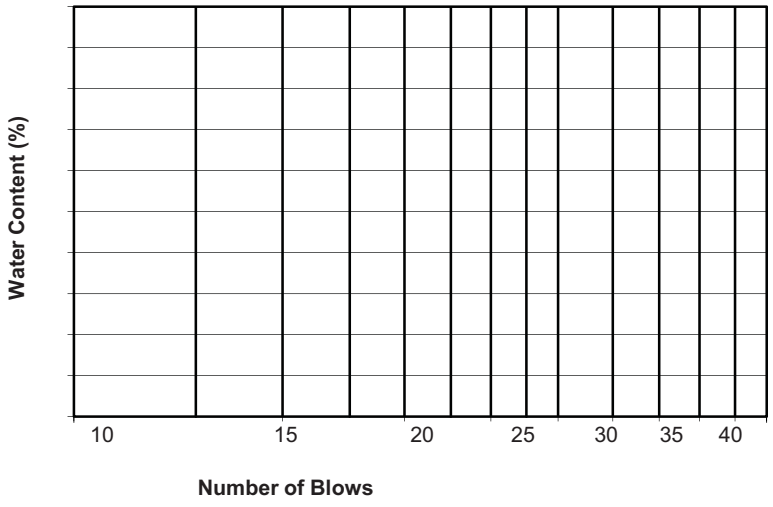
Borehole: GA11-T-11 Sample # : 3 Depth: 5-7.5'

Plastic Limit Determination:

Tare #	1						
Mass of wet sample + tare (g)	19.82						
Mass of dry sample + tare (g)	18.72						
Mass of water (g)	1.10						
Mass of tare (g)	14.42						
Mass of dry soil (g)	4.30						
Water content (%)	25.58						

Liquid Limit Determination:

Number of Blows	27	29					
Tare #	PG-22	PG-24					
Mass of wet sample + tare (g)	58.50	56.27					
Mass of dry sample + tare (g)	51.88	50.55					
Mass of water (g)	6.62	5.72					
Mass of tare (g)	30.32	31.17					
Mass of dry soil (g)	21.56	19.38					
Water content (%)	30.71	29.51					
Correction factor	1.066	1.066					
Corrected Limit	28.80	27.69					



Plastic Limit: 26

Liquid Limit: 28

Plasticity Index: 3

Comments:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.13 13:44:45 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	LM	Date:	10-May-11

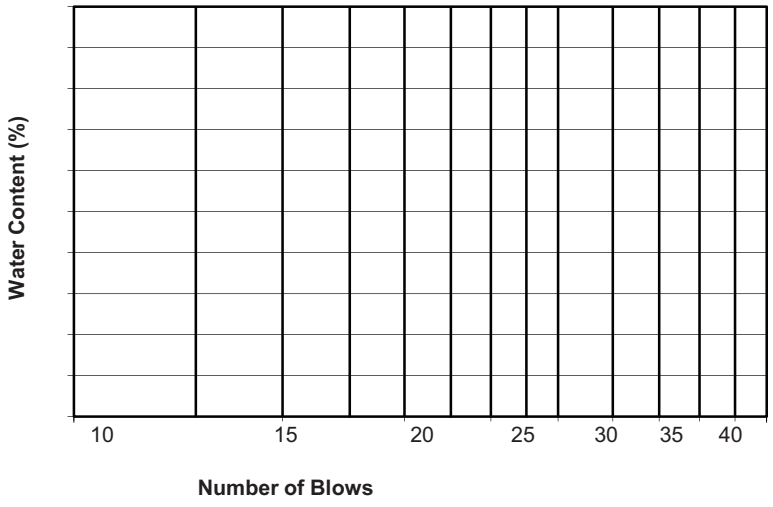
Borehole: GA11-T-11 Sample # : 7 Depth: 17.5-19

Plastic Limit Determination:

Tare #	5						
Mass of wet sample + tare (g)	38.69						
Mass of dry sample + tare (g)	36.95						
Mass of water (g)	1.74						
Mass of tare (g)	31.30						
Mass of dry soil (g)	5.65						
Water content (%)	30.80						

Liquid Limit Determination:

Number of Blows	20	20					
Tare #	35	25					
Mass of wet sample + tare (g)	84.79	70.32					
Mass of dry sample + tare (g)	73.05	59.42					
Mass of water (g)	11.74	10.90					
Mass of tare (g)	41.52	30.08					
Mass of dry soil (g)	31.53	29.34					
Water content (%)	37.23	37.15					
Correction factor	1.066	1.066					
Corrected Limit	34.93	34.85					



Plastic Limit: 31

Liquid Limit: 35

Plasticity Index: 4

Comments:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.13 08:38:03 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2100

Short Title: Giant Mine

Tested By: LM Date: 6-May-11

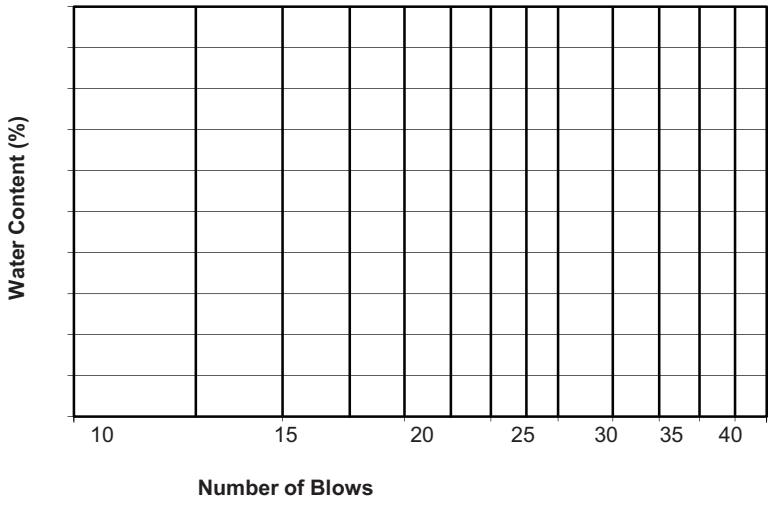
Borehole: GA11-T-11 Sample # : 9 Depth: 22.5-24'

Plastic Limit Determination:

Tare #	PG-27						
Mass of wet sample + tare (g)	38.45						
Mass of dry sample + tare (g)	37.06						
Mass of water (g)	1.39						
Mass of tare (g)	31.18						
Mass of dry soil (g)	5.88						
Water content (%)	23.64						

Liquid Limit Determination:

Number of Blows	15	15					
Tare #	PG-08	PG-25					
Mass of wet sample + tare (g)	63.12	62.36					
Mass of dry sample + tare (g)	55.89	55.44					
Mass of water (g)	7.23	6.92					
Mass of tare (g)	29.99	30.17					
Mass of dry soil (g)	25.90	25.27					
Water content (%)	27.92	27.38					
Correction factor	1.066	1.066					
Corrected Limit	26.19	25.69					



Plastic Limit: 24

Liquid Limit: 26

Plasticity Index: 2

Comments:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.13 08:12:17 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	LM	Date:	5-May-11

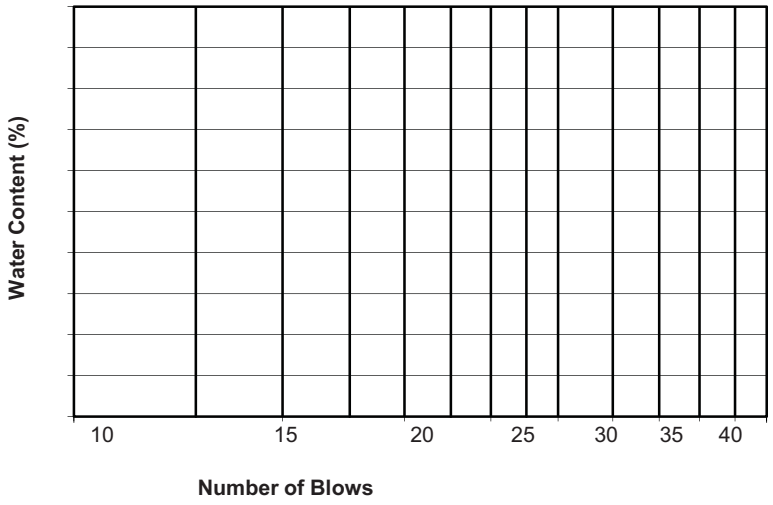
Borehole: GA11-T-11 Sample # : 11 Depth: 27.5-29'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.13 08:11:59 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2100

Short Title: Giant Mine

Tested By: LM Date: 5-May-11

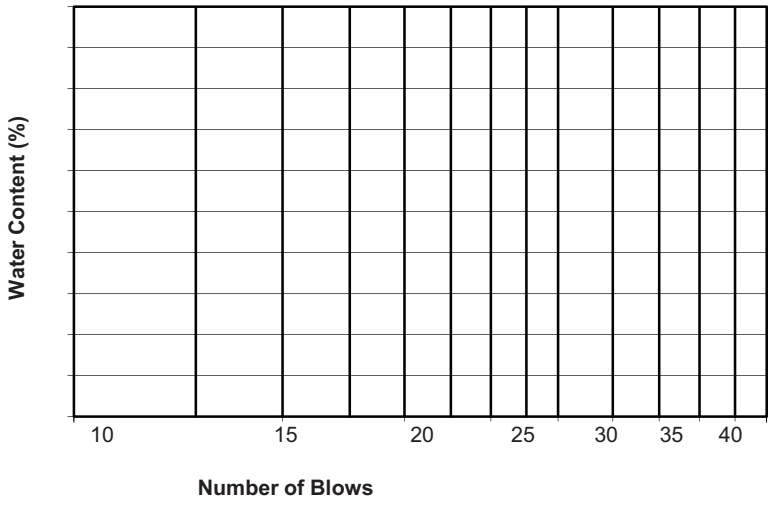
Borehole: GA11-T-11 Sample # : 13 Depth: 37.5-39'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.13 08:11:56 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	DM	Date:	29-Apr-11

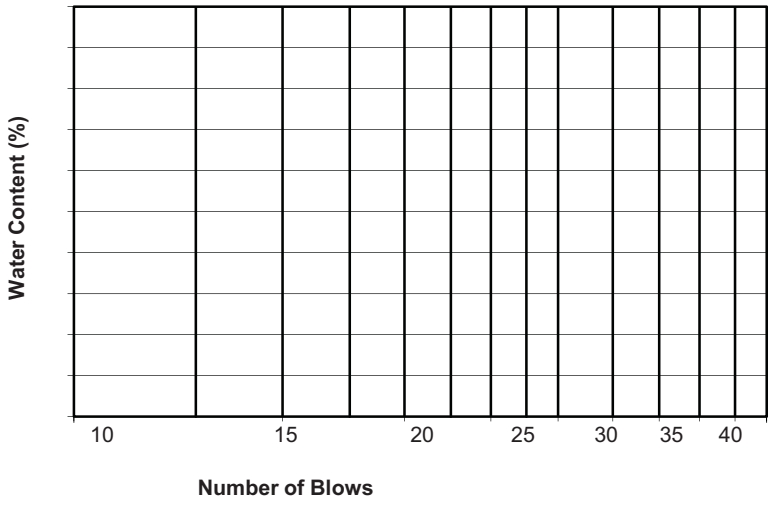
Borehole: GA11-T-12 Sample # : 6 Depth: 16.5-17.5'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.13 13:47:38 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	AC/KC	Date:	13-Apr-11

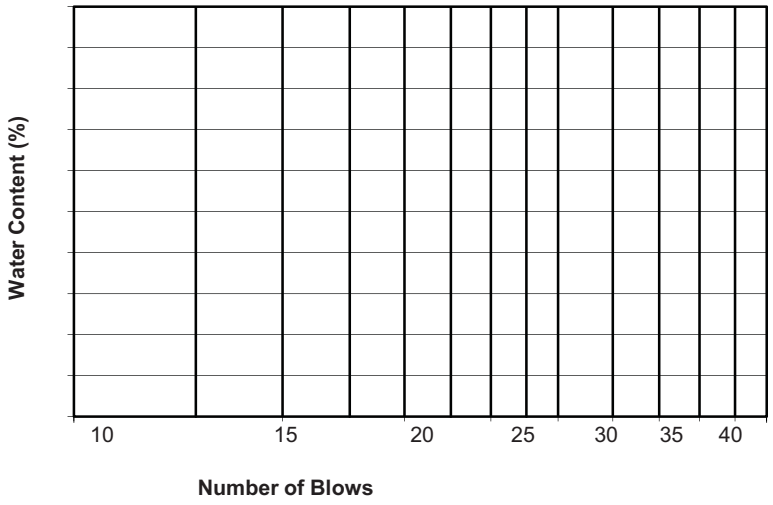
Borehole: GA11-T-12 Sample # : 8 Depth: 20-21'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.13 13:47:09 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	AC	Date:	13-Apr-11

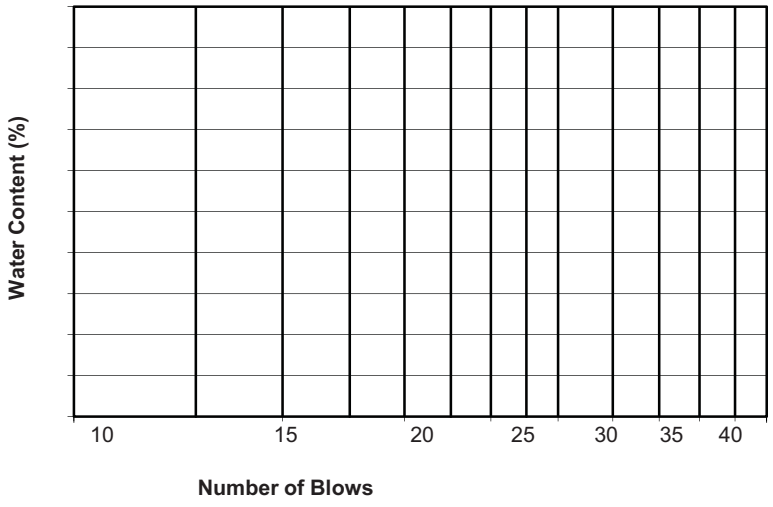
Borehole: GA11-T-12 Sample # : 10 Depth: 25-26'

Plastic Limit Determination:

Tare #	PG-34						
Mass of wet sample + tare (g)	38.47						
Mass of dry sample + tare (g)	36.98						
Mass of water (g)	1.49						
Mass of tare (g)	31.26						
Mass of dry soil (g)	5.72						
Water content (%)	26.05						

Liquid Limit Determination:

Number of Blows	15	15					
Tare #	PG-08	412					
Mass of wet sample + tare (g)	66.82	64.89					
Mass of dry sample + tare (g)	57.81	57.52					
Mass of water (g)	9.01	7.37					
Mass of tare (g)	29.92	34.80					
Mass of dry soil (g)	27.89	22.72					
Water content (%)	32.31	32.44					
Correction factor	1.066	1.066					
Corrected Limit	30.31	30.43					



Plastic Limit: 26

Liquid Limit: 30

Plasticity Index: 4

Comments:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.13 13:46:52 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	DM	Date:	29-Apr-11

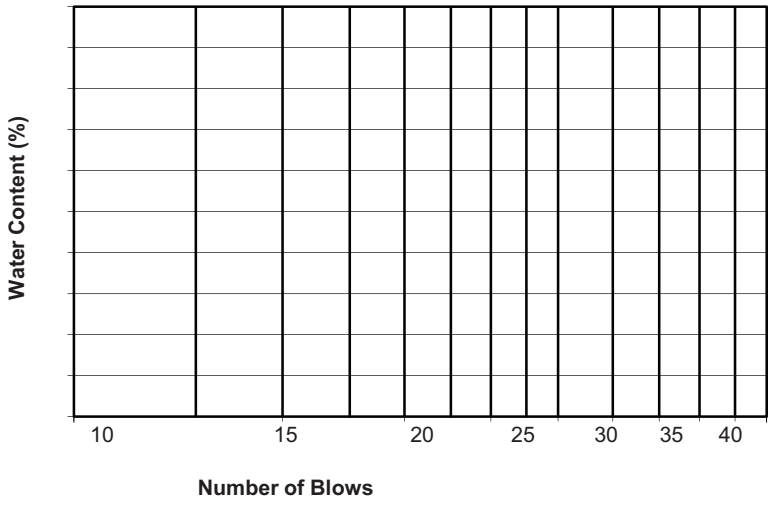
Borehole: GA11-T-12 Sample # : 13 Depth: 39-40'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.13 13:46:56 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2100

Short Title: Giant Mine

Tested By: LM Date: 5-May-11

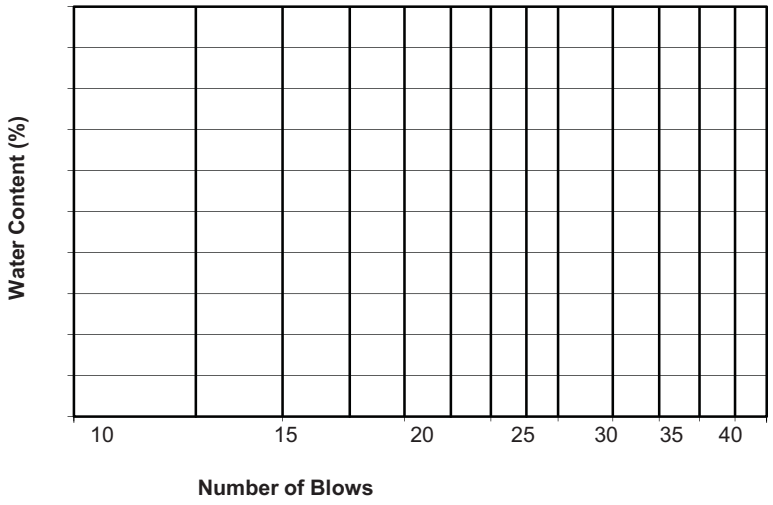
Borehole: GA11-T-12 Sample # : 15 Depth: 49-50'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.13 13:46:11 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2100

Short Title: Giant Mine

Tested By: LM Date: 5-May-11

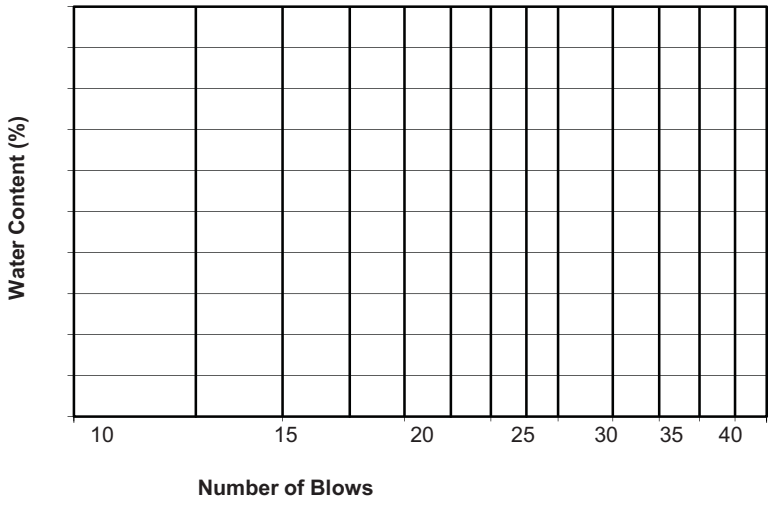
Borehole: GA11-T-12 Sample # : 17 Depth: 59-60'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.13 13:45:52 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2500
Short Title:	Giant Mine		
Tested By:	HVD	Date:	1-Jun-11

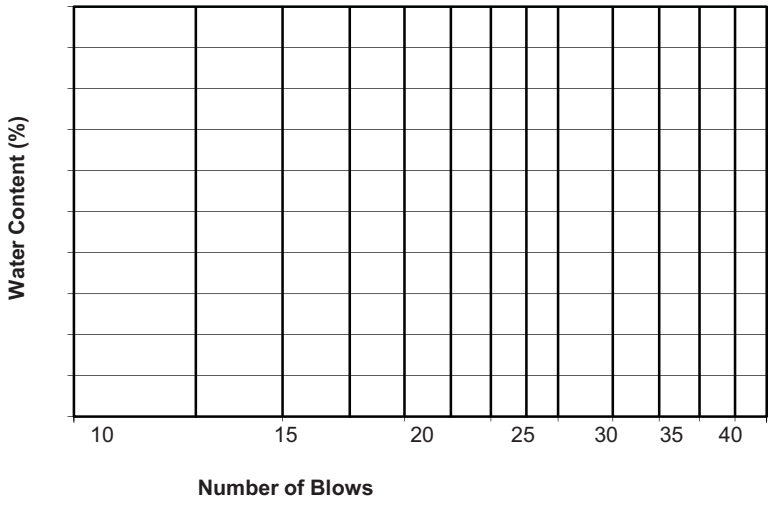
Borehole: GA11-T-13 Sample # : SA3 Depth:

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Not enough of sample to do atterberg lim

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 10:21:40 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2500

Short Title: Giant Mine

Tested By: HVD Date: 7-Jun-11

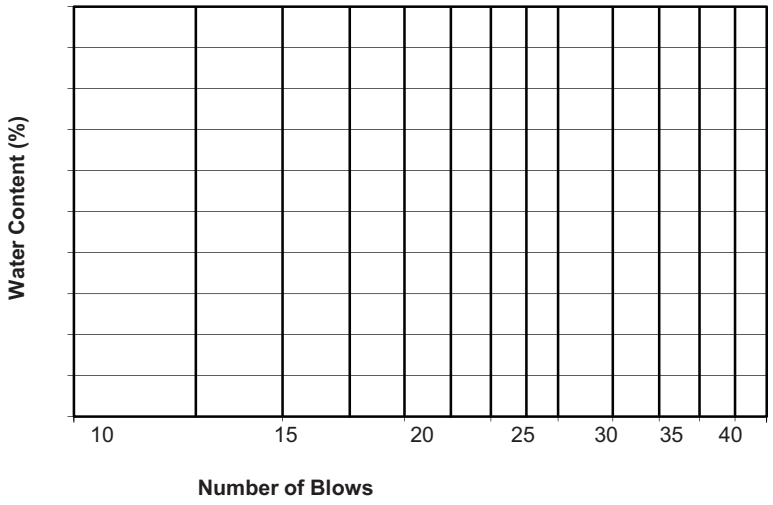
Borehole: GA11-T-13 Sample # : SA6 Depth: 15-16'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 10:21:00 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2500

Short Title: Giant Mine

Tested By: HVD Date: 7-Jun-11

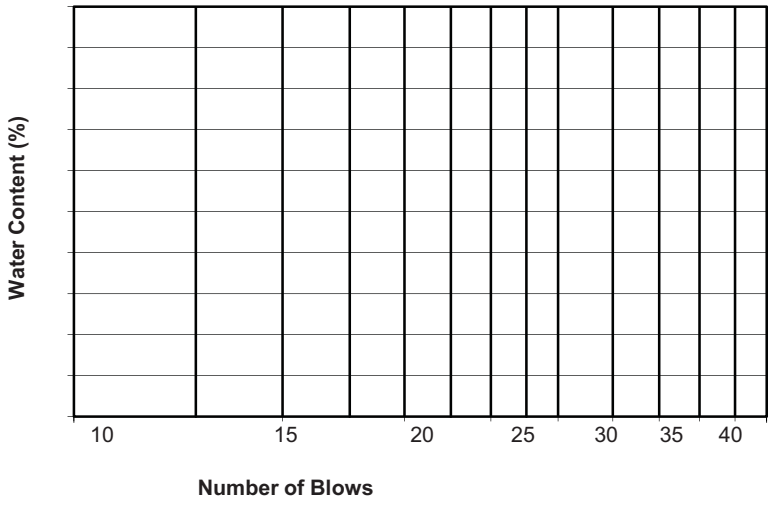
Borehole: GA11-T-13 Sample # : SA8 Depth: 10-11'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 10:30:30 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2500

Short Title: Giant Mine

Tested By: HVD Date: 7-Jun-11

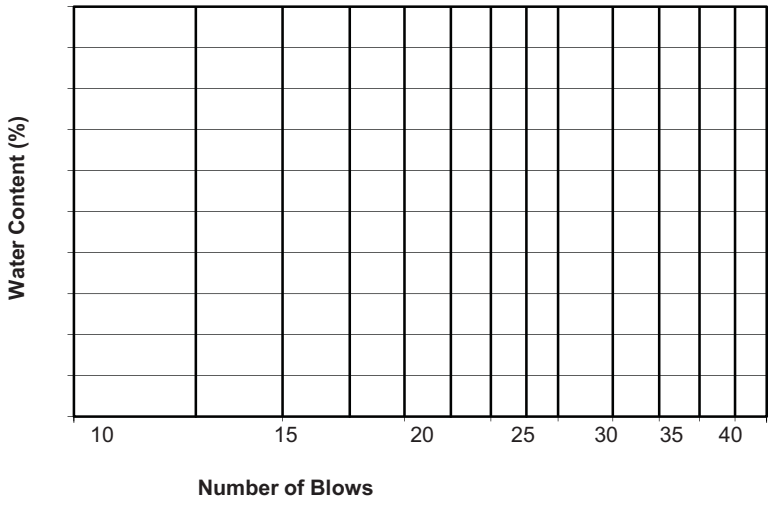
Borehole: GA11-T-13 Sample # : SA10 Depth: 25-26'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 10:35:01 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2500

Short Title: Giant Mine

Tested By: HVD Date: 7-Jun-11

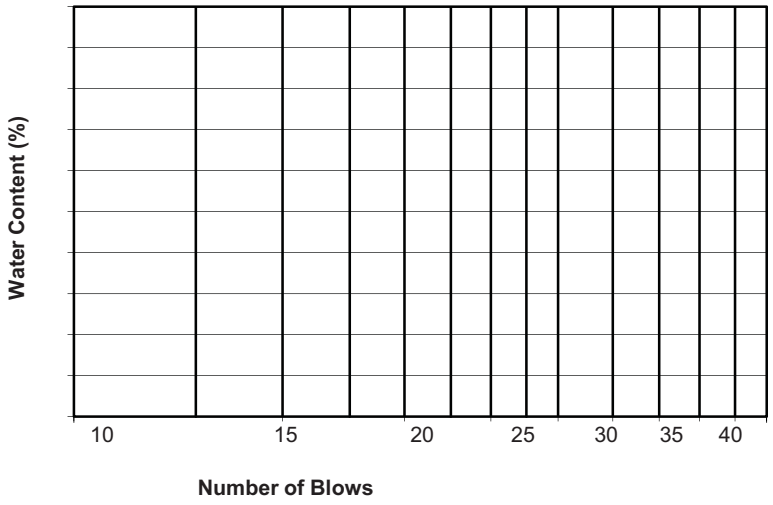
Borehole: GA11-T-13 Sample # : SA12 Depth: 30-31'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 10:19:30 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	LM	Date:	8-May-11

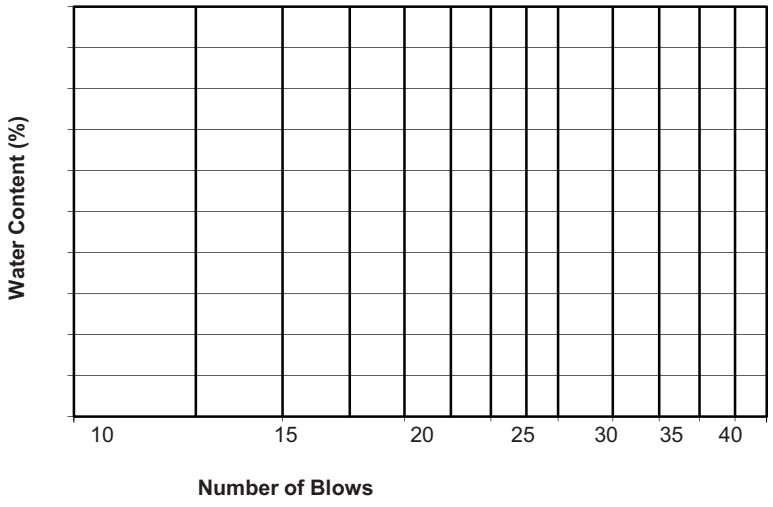
Borehole: GA11-T-14 Sample # : 6 Depth: 15-16'

Plastic Limit Determination:

Tare #	105						
Mass of wet sample + tare (g)	20.78						
Mass of dry sample + tare (g)	19.55						
Mass of water (g)	1.23						
Mass of tare (g)	14.45						
Mass of dry soil (g)	5.10						
Water content (%)	24.12						

Liquid Limit Determination:

Number of Blows	18	20					
Tare #	PG-13	A74					
Mass of wet sample + tare (g)	30.80	53.52					
Mass of dry sample + tare (g)	25.90	44.76					
Mass of water (g)	4.90	8.76					
Mass of tare (g)	9.94	14.32					
Mass of dry soil (g)	15.96	30.44					
Water content (%)	30.70	28.78					
Correction factor	1.043	0.973					
Corrected Limit	29.44	28.00					



Plastic Limit: 24

Liquid Limit: 29

Plasticity Index: 5

Comments:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.13 13:50:10 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	AC/KC	Date:	13-Apr-11

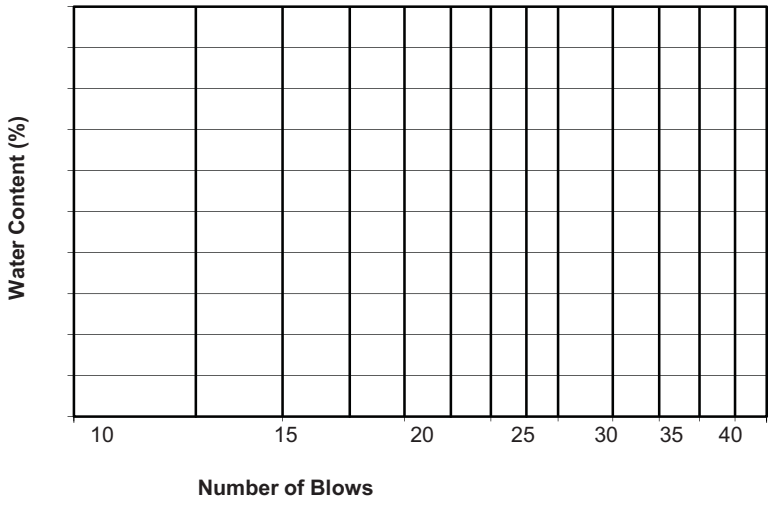
Borehole: GA11-T-14 Sample # : 8 Depth: 20-21'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.13 13:48:51 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2100

Short Title: Giant Mine

Tested By: LM Date: 8-May-11

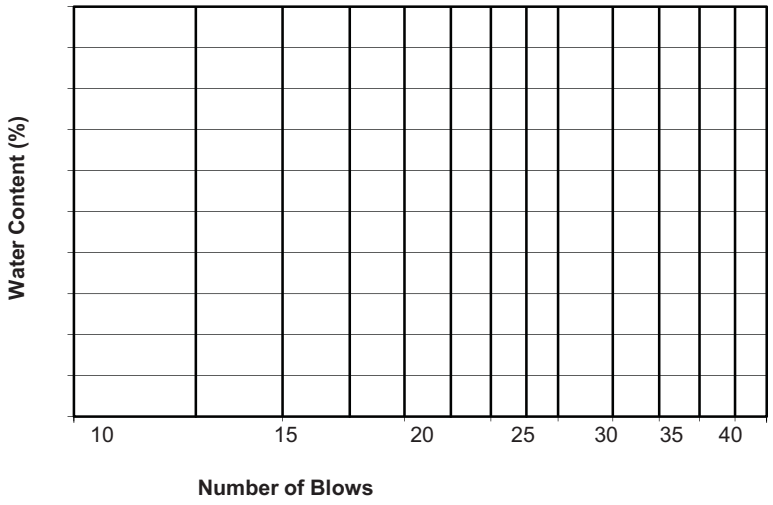
Borehole: GA11-T-14 Sample # : 10 Depth: 25-26'

Plastic Limit Determination:

Tare #	X19						
Mass of wet sample + tare (g)	20.40						
Mass of dry sample + tare (g)	19.20						
Mass of water (g)	1.20						
Mass of tare (g)	14.40						
Mass of dry soil (g)	4.80						
Water content (%)	25.00						

Liquid Limit Determination:

Number of Blows	21	19					
Tare #	PG-27	A46					
Mass of wet sample + tare (g)	36.86	46.85					
Mass of dry sample + tare (g)	30.45	39.35					
Mass of water (g)	6.41	7.50					
Mass of tare (g)	10.18	14.29					
Mass of dry soil (g)	20.27	25.06					
Water content (%)	31.62	29.93					
Correction factor	0.979	1.036					
Corrected Limit	30.96	31.01					



Plastic Limit: 25

Liquid Limit: 31

Plasticity Index: 6

Comments:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.13 13:49:38 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2100

Short Title: Giant Mine

Tested By: HVD Date: 10-May-11

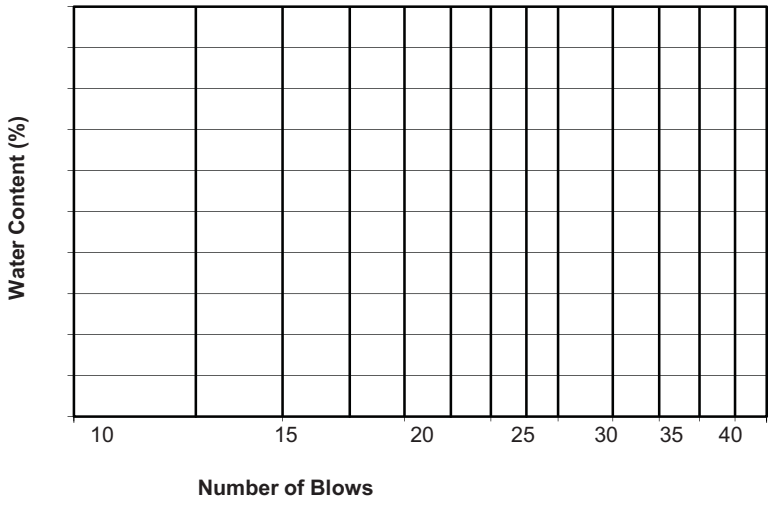
Borehole: GA11-T-14 Sample # : SA14 Depth: 43-44'

Plastic Limit Determination:

Tare #	241						
Mass of wet sample + tare (g)	53.17						
Mass of dry sample + tare (g)	49.19						
Mass of water (g)	3.98						
Mass of tare (g)	34.98						
Mass of dry soil (g)	14.21						
Water content (%)	28.01						

Liquid Limit Determination:

Number of Blows	22	22					
Tare #	PG-36	PG-12					
Mass of wet sample + tare (g)	61.42	63.04					
Mass of dry sample + tare (g)	54.65	56.04					
Mass of water (g)	6.77	7.00					
Mass of tare (g)	31.03	31.34					
Mass of dry soil (g)	23.62	24.70					
Water content (%)	28.66	28.34					
Correction factor	0.985	1.036					
Corrected Limit	28.23	29.36					



Plastic Limit: 28

Liquid Limit: 29

Plasticity Index: 1

Comments:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.13 13:48:46 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2100

Short Title: Giant Mine

Tested By: AC Date: 13-Apr-11

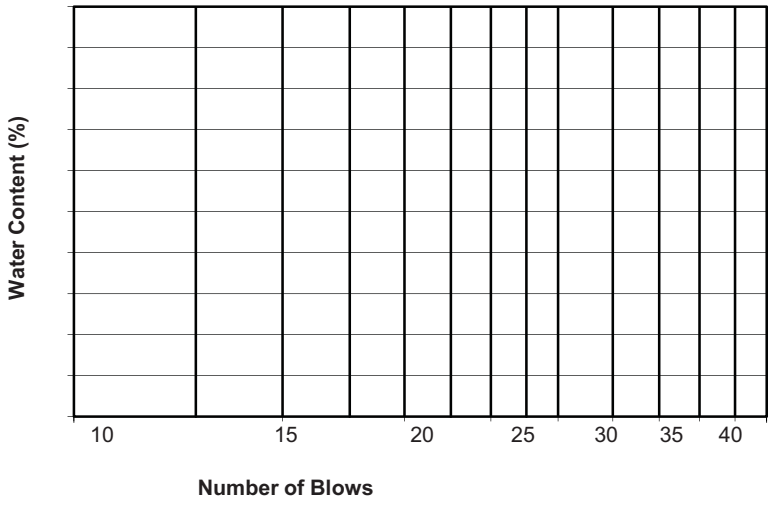
Borehole: GA11-T-14 Sample # : SA16 Depth: 54-55

Plastic Limit Determination:

Tare #	PG-10						
Mass of wet sample + tare (g)	47.96						
Mass of dry sample + tare (g)	46.84						
Mass of water (g)	1.12						
Mass of tare (g)	40.31						
Mass of dry soil (g)	6.53						
Water content (%)	17.15						

Liquid Limit Determination:

Number of Blows	23	30					
Tare #	418	229					
Mass of wet sample + tare (g)	69.85	72.49					
Mass of dry sample + tare (g)	62.01	64.58					
Mass of water (g)	7.84	7.91					
Mass of tare (g)	33.57	34.92					
Mass of dry soil (g)	28.44	29.66					
Water content (%)	27.57	26.67					
Correction factor	0.990	1.022					
Corrected Limit	27.29	27.26					



Plastic Limit: 17

Liquid Limit: 27

Plasticity Index: 10

Comments: CL

Reviewed by:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 11:52:12 -06'00'

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	HVD	Date:	25-May-11

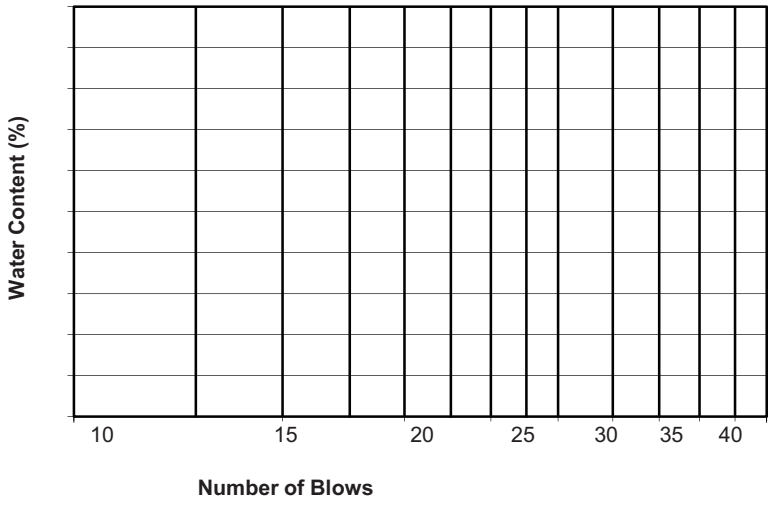
Borehole: GA11-T-16 Sample # : SA03 Depth: 7.5-9'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.30 16:30:57 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	HVD	Date:	2-Jun-11

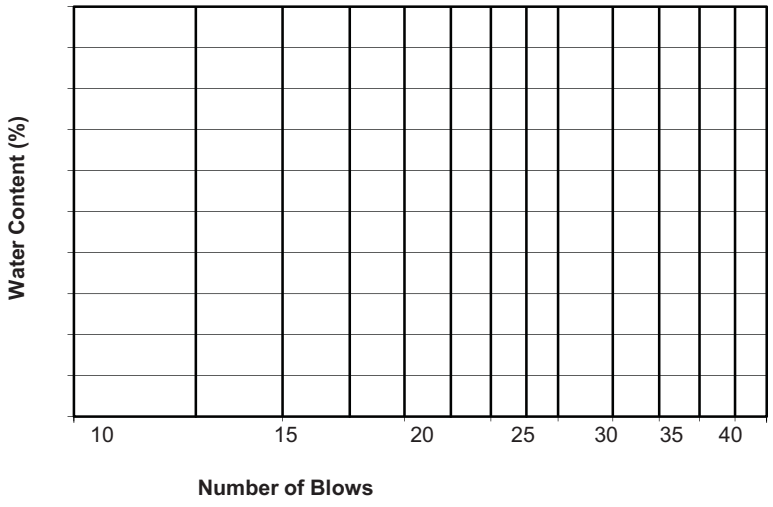
Borehole: GA11-T-16 Sample # : SA6 Depth: 15-16'

Plastic Limit Determination:

Tare #	PG-06						
Mass of wet sample + tare (g)	33.20						
Mass of dry sample + tare (g)	32.78						
Mass of water (g)	0.42						
Mass of tare (g)	31.06						
Mass of dry soil (g)	1.72						
Water content (%)	24.42						

Liquid Limit Determination:

Number of Blows	26	26					
Tare #	217	253					
Mass of wet sample + tare (g)	54.01	51.61					
Mass of dry sample + tare (g)	50.33	48.33					
Mass of water (g)	3.68	3.28					
Mass of tare (g)	35.27	35.08					
Mass of dry soil (g)	15.06	13.25					
Water content (%)	24.44	24.75					
Correction factor	1.005	1.005					
Corrected Limit	24.56	24.88					



Plastic Limit: 24

Liquid Limit: 25

Plasticity Index: 0

Comments:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.06 09:08:24 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	HVD	Date:	2-Jun-11

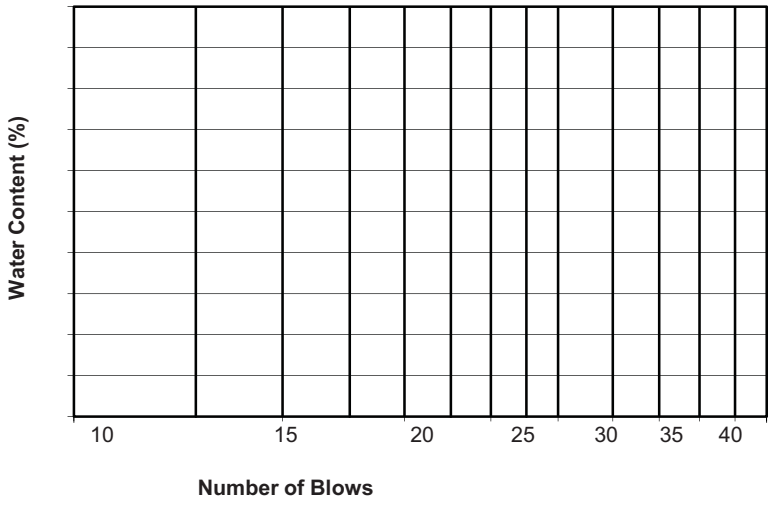
Borehole: GA11-T-16 Sample # : SA8 Depth:

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.06 09:06:49 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2500

Short Title: Giant Mine

Tested By: HVD Date: 7-Jun-11

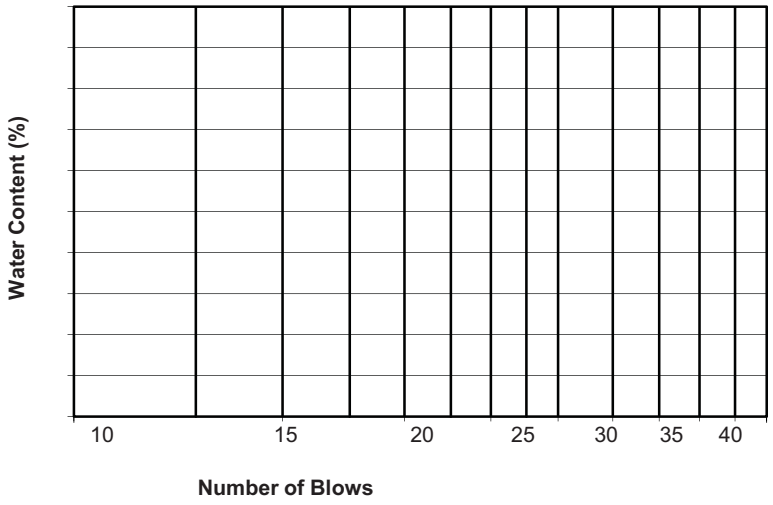
Borehole: GA11-T-16 Sample # : SA10 Depth: 25-26'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 10:18:45 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2500

Short Title: Giant Mine

Tested By: HVD Date: 7-Jun-11

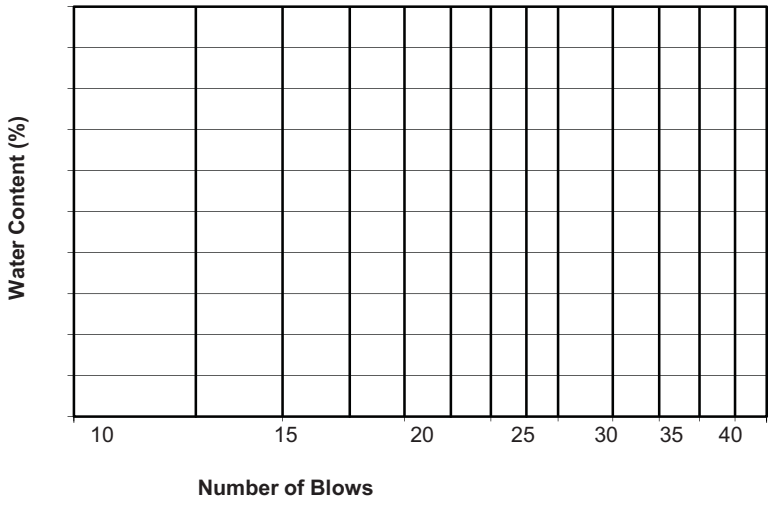
Borehole: GA11-T-16 Sample # : SA12 Depth: 35-36'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 10:17:55 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2100

Short Title: Giant Mine

Tested By: HVD Date: 10-May-11

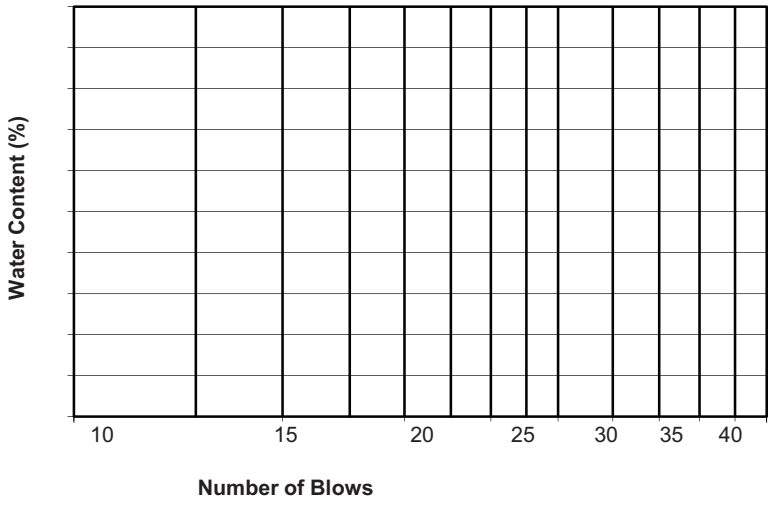
Borehole: GA11-T-17 Sample # : SA5 Depth: 12.5-14'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.13 13:54:51 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	LM	Date:	8-May-11

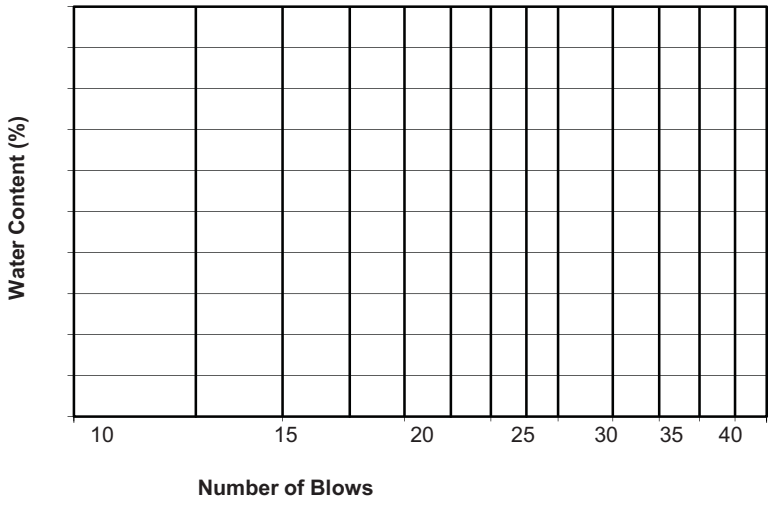
Borehole: GA11-T-17 Sample # : 9 Depth: 22.5-24'

Plastic Limit Determination:

Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							

Liquid Limit Determination:

Number of Blows							
Tare #							
Mass of wet sample + tare (g)							
Mass of dry sample + tare (g)							
Mass of water (g)							
Mass of tare (g)							
Mass of dry soil (g)							
Water content (%)							
Correction factor							
Corrected Limit							



Plastic Limit: 0

Liquid Limit: 0

Plasticity Index: 0

Comments: Non-plastic

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.13 14:36:56 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2100

Short Title: Giant Mine

Tested By: DM Date: 29-Apr-11

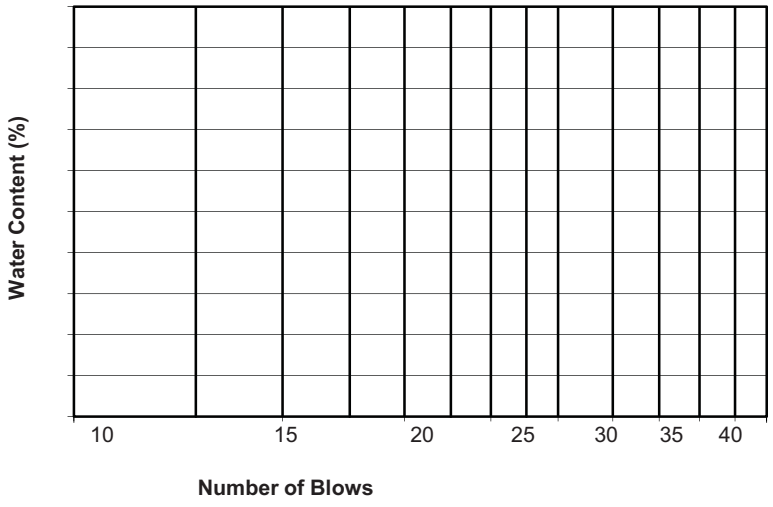
Borehole: GA11-T-17 Sample # : 10A Depth: 25-26'

Plastic Limit Determination:

Tare #	PG15						
Mass of wet sample + tare (g)	47.95						
Mass of dry sample + tare (g)	44.67						
Mass of water (g)	3.28						
Mass of tare (g)	30.57						
Mass of dry soil (g)	14.10						
Water content (%)	23.26						

Liquid Limit Determination:

Number of Blows	15	15					
Tare #	233	417A					
Mass of wet sample + tare (g)	65.76	66.42					
Mass of dry sample + tare (g)	59.60	59.95					
Mass of water (g)	6.16	6.47					
Mass of tare (g)	34.57	34.39					
Mass of dry soil (g)	25.03	25.56					
Water content (%)	24.61	25.31					
Correction factor	1.066	1.066					
Corrected Limit	23.09	23.75					



Plastic Limit: 23

Liquid Limit: 23

Plasticity Index: 0

Comments:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.13 14:36:09 -06'00'

Reviewed by:

Atterberg Limits Determination

Golder Associates

Project #:	09-1427-0006	Phase:	2100
Short Title:	Giant Mine		
Tested By:	DM	Date:	29-Apr-11

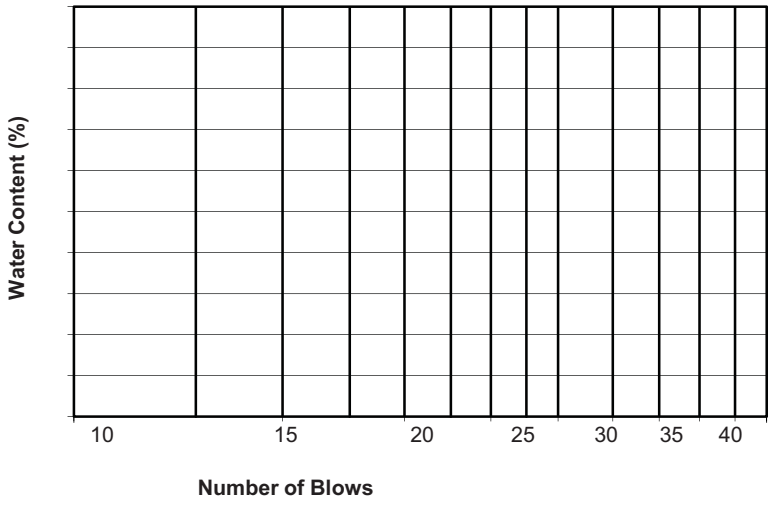
Borehole: GA11-T-17 Sample # : 12 Depth: 37.5-39'

Plastic Limit Determination:

Tare #	PG-09						
Mass of wet sample + tare (g)	41.60						
Mass of dry sample + tare (g)	39.13						
Mass of water (g)	2.47						
Mass of tare (g)	31.08						
Mass of dry soil (g)	8.05						
Water content (%)	30.68						

Liquid Limit Determination:

Number of Blows	15	15					
Tare #	402	421					
Mass of wet sample + tare (g)	67.82	72.54					
Mass of dry sample + tare (g)	59.47	62.45					
Mass of water (g)	8.35	10.09					
Mass of tare (g)	35.44	34.39					
Mass of dry soil (g)	24.03	28.06					
Water content (%)	34.75	35.96					
Correction factor	1.066	1.066					
Corrected Limit	32.60	33.73					



Plastic Limit: 31

Liquid Limit: 33

Plasticity Index: 2

Comments:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.13 14:32:14 -06'00'

Reviewed by:

Consolidation

CONSOLIDATION - FALLING HEAD HYDRAULIC CONDUCTIVITY TEST

Project #: 09-1427-0006 Phase: 2000
Short Title: AECOM / Engineering Services / Giant Mine, NWT
Tested By: D.B Date: May 4, 2011
Sample: GA11-T-14 SA2, SA3 (mix together)

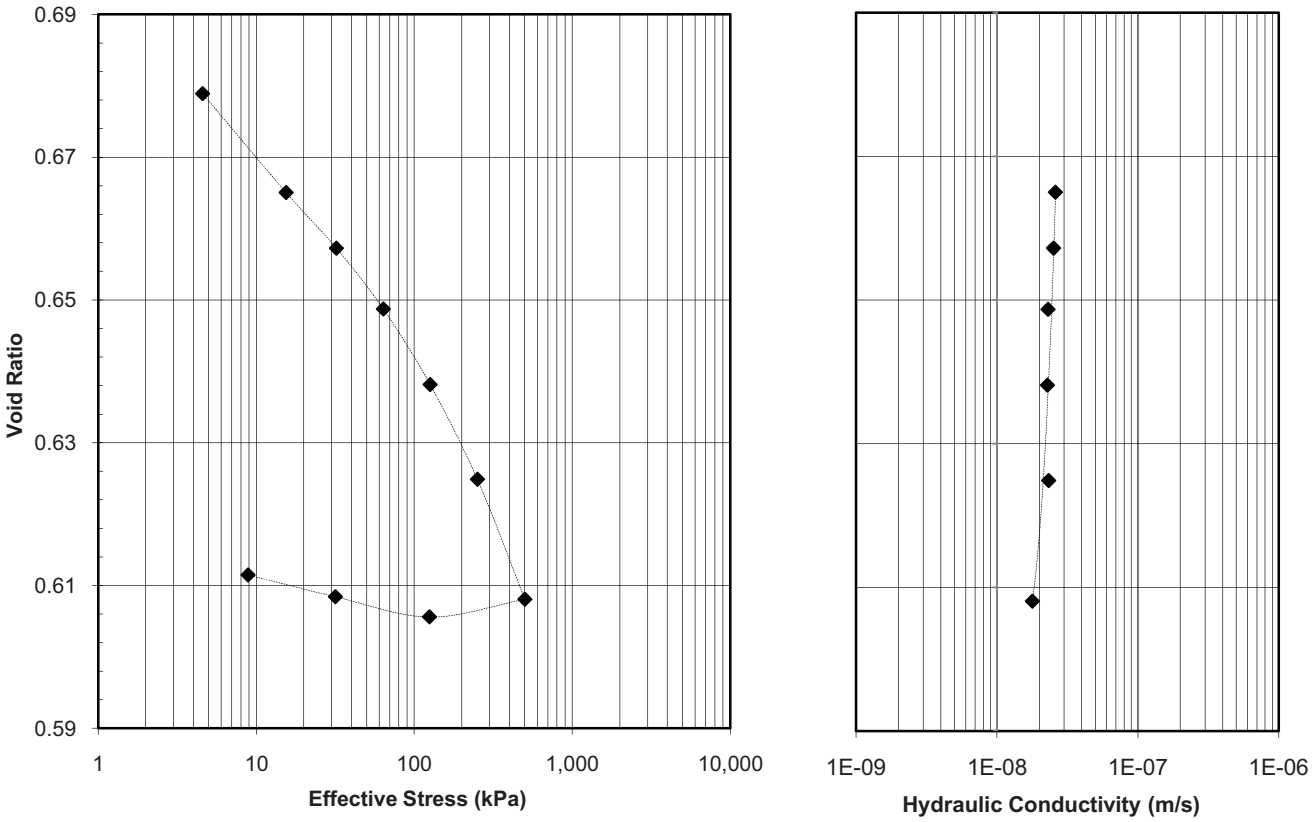
Test Results:

Effective Stress (kPa)	Void Ratio	Hydraulic Conductivity (m/s)
4.6	0.68	
15	0.67	2.6E-08
32	0.66	2.5E-08
64	0.65	2.3E-08
126	0.64	2.3E-08
251	0.62	2.3E-08
501	0.61	1.8E-08
125	0.61	
32	0.61	
8.9	0.61	

Sample Data:

Specific gravity:	2.85	(measured)
Diameter:	63.4	mm
Initial height:	27.2	mm
Initial water content:	25.9	% (prior to saturation)
Initial dry density:	1698	kg/m^3 (prior to loading)
Initial void ratio:	0.68	(prior to loading)
Final water content:	21.6	%
Final dry density:	1770	kg/m^3

Comments:



1721 8th Street E.,
Saskatoon, Saskatchewan, S7H 0T4

Reviewed by:

CONSOLIDATION - FALLING HEAD HYDRAULIC CONDUCTIVITY TEST

Project #: 09-1427-0006 Phase: 2000
Short Title: AECOM / Engineering Services / Giant Mine, NWT
Tested By: D.B. Date: May 26, 2011
Sample: GA11-T-14 SA2, SA3 (Mix Together)

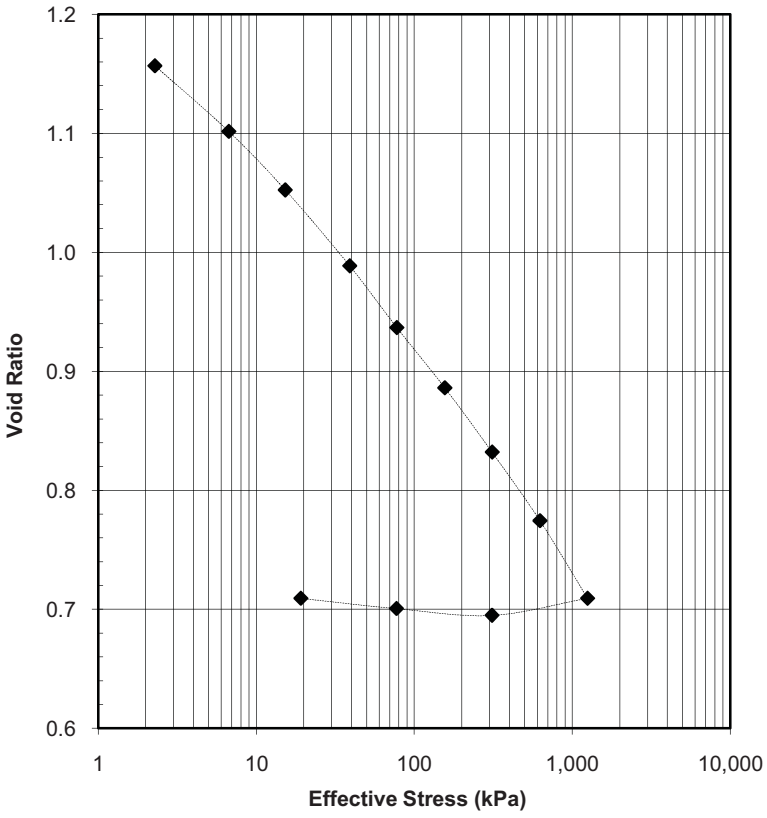
Test Results:

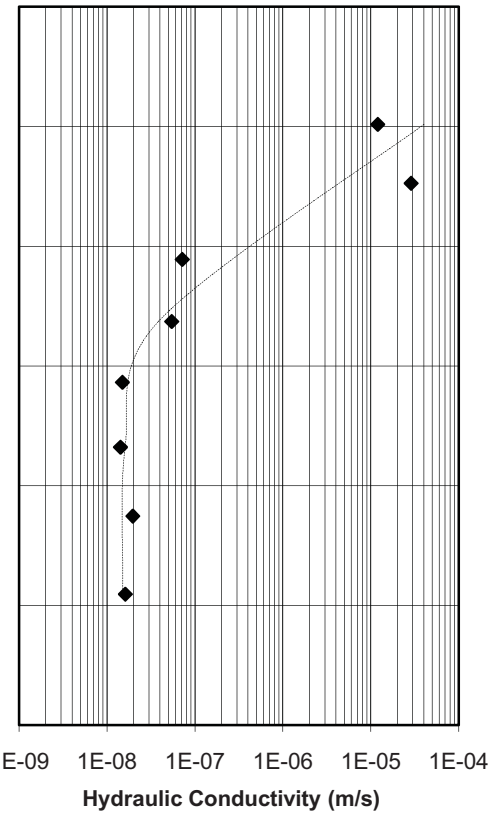
Effective Stress (kPa)	Void Ratio	Hydraulic Conductivity (m/s)
2.3	1.16	
6.7	1.10	1.2E-05
15	1.05	2.9E-05
39	0.99	7.2E-08
77	0.94	5.4E-08
156	0.89	1.5E-08
311	0.83	1.4E-08
625	0.77	2.0E-08
1251	0.71	1.6E-08
311	0.69	
77	0.70	
19	0.71	

Sample Data:

Specific gravity:	2.85	(measured)
Diameter:	63.6	mm
Initial height:	28.5	mm
Initial water content:	27.2	% (prior to saturation)
Initial dry density:	1321	kg/m^3 (prior to loading)
Initial void ratio:	1.16	(prior to loading)
Final water content:	25.8	%
Final dry density:	1669	kg/m^3

Comments:





1721 8th Street E.,
Saskatoon, Saskatchewan, S7H 0T4

Reviewed by:

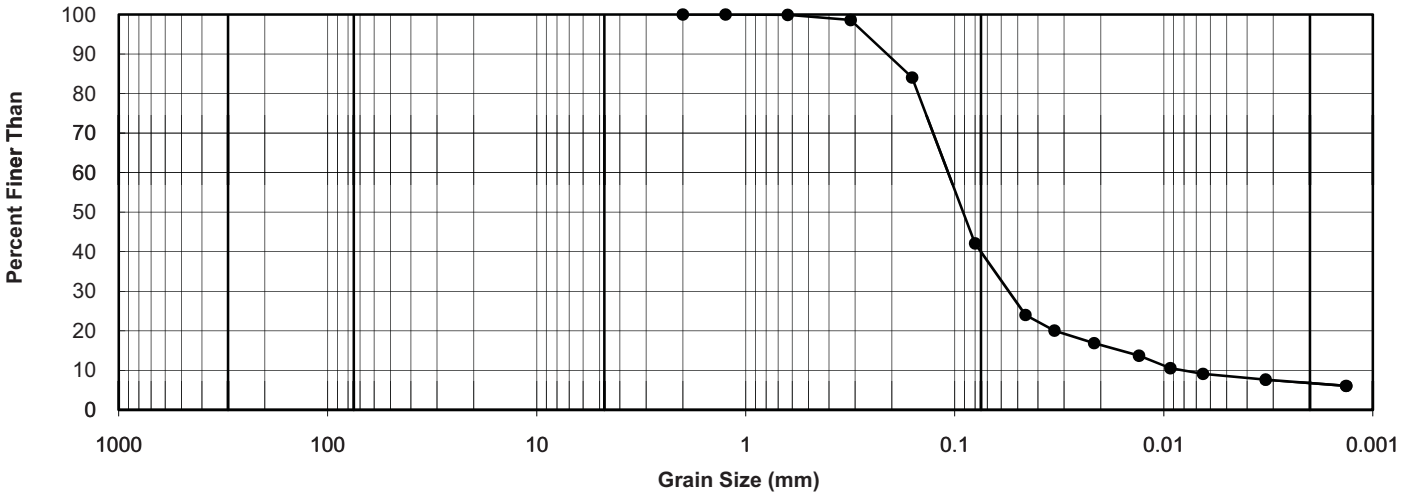
Hydrometers

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	GAINT MINE				
Client:	AECOM	Date Sampled:	April 4, 2011		

Sample Number	GA11-T-01, SA1
Sample Location	GIANT MINE
Sampled By	0.0
Source	INSITU
Sample Description	See Borehole Logs
In situ Water Content	10.6
Date Tested	Tuesday, May 10, 2011
Tested By	RB
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
1.25	100.0	
0.6	99.9	
0.32	98.6	
0.16	84.1	
0.080	42.1	
0.046	24.0	Hydrometer
0.033	20.0	
0.022	16.9	
0.013	13.7	
0.009	10.5	
0.006	9.1	
0.003	7.7	
0.001	6.1	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 61.1 Silt% 32.3 Clay% 6.6

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.12 11:52:11 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

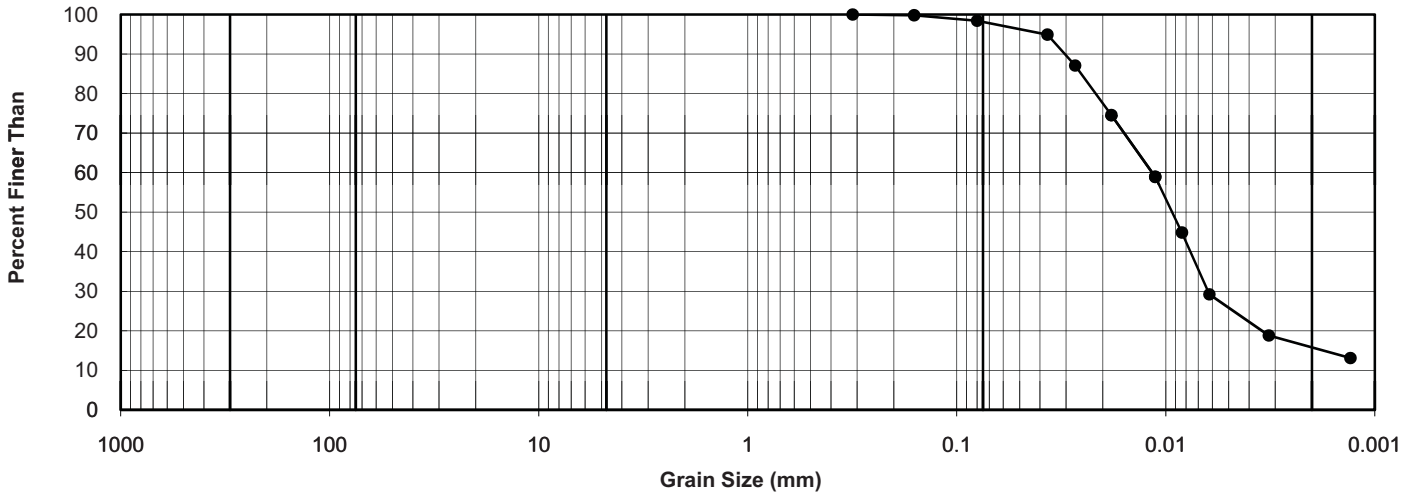
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	GAINT MINE				
Client:	AECOM	Date Sampled:	April 4, 2011		

Sample Number	GA11-T-01, SA3
Sample Location	GIANT MINE
Sampled By	0.0
Source	INSITU
Sample Description	See Borehole Logs
In situ Water Content	28.4
Date Tested	Tuesday, May 10, 2011
Tested By	RB
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.32	100.0	
0.16	99.8	
0.080	98.4	
0.037	94.9	Hydrometer
0.027	87.1	
0.018	74.6	
0.011	58.9	
0.008	44.9	
0.006	29.2	
0.003	18.8	
0.001	13.1	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 2.1 Silt% 82.8 Clay% 15.2

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.12 11:50:57 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

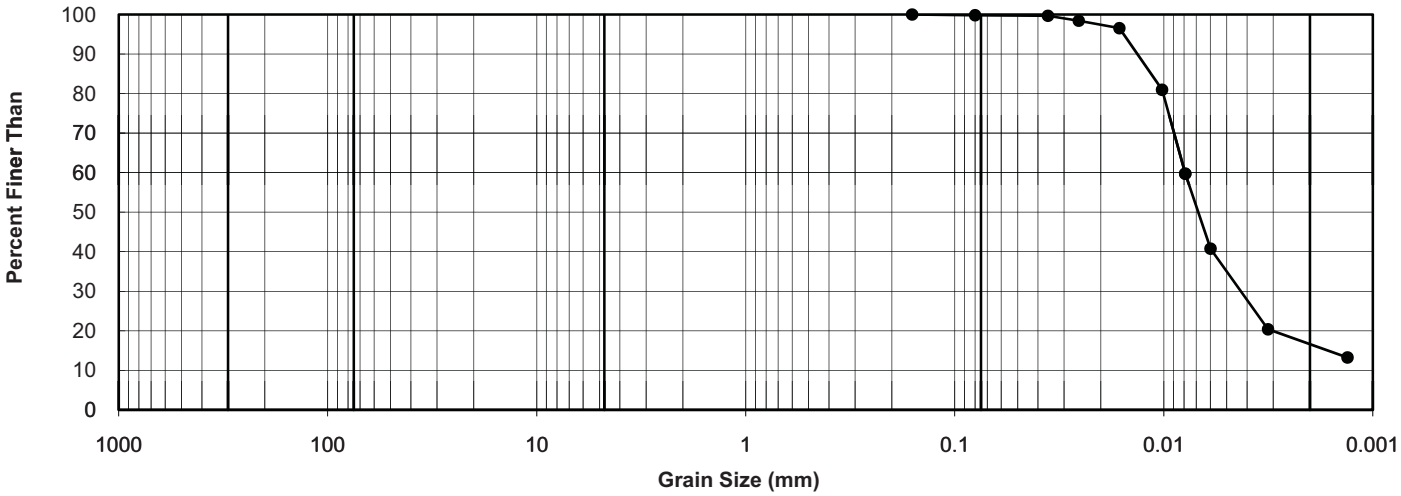
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2622
Short Title:	Giant Mine				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-01, SA4
Sample Location	Giant Mine
Sampled By	JB
Source	
Sample Description	
In situ Water Content	37.1
Date Tested	Wednesday, April 20, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.16	100.0	
0.080	99.8	
0.036	99.7	Hydrometer
0.026	98.4	
0.016	96.5	
0.010	81.0	
0.008	59.7	
0.006	40.8	
0.003	20.4	
0.001	13.2	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel %	0.0	Sand %	0.2	Silt%	83.9	Clay%	15.9

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 11:08:43 -06'00'

Reviewed By:

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

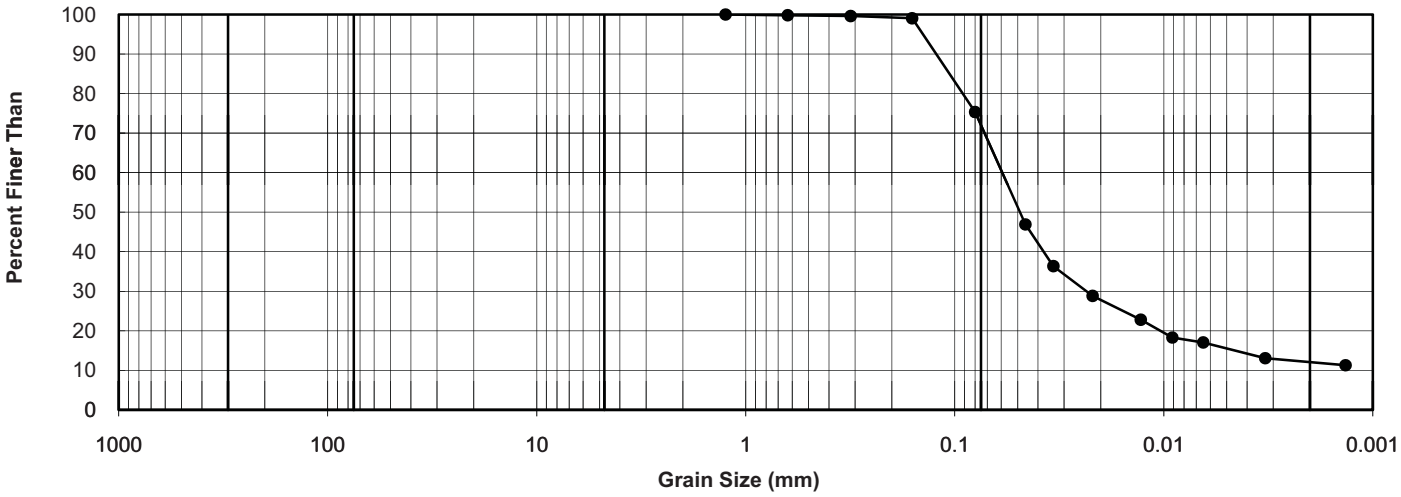
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	GAINT MINE				
Client:	AECOM	Date Sampled:	April 4, 2011		

Sample Number	GA11-T-01, SA5
Sample Location	GIANT MINE
Sampled By	0.0
Source	INSITU
Sample Description	See Borehole Logs
In situ Water Content	27.4
Date Tested	Tuesday, May 10, 2011
Tested By	RB
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
1.25	100.0	
0.6	99.8	
0.32	99.6	
0.16	99.1	
0.080	75.3	
0.046	46.9	Hydrometer
0.034	36.4	
0.022	28.8	
0.013	22.8	
0.009	18.3	
0.006	17.0	
0.003	13.1	
0.001	11.3	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 29.7 Silt% 58.4 Clay% 11.9

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.12 11:47:54 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

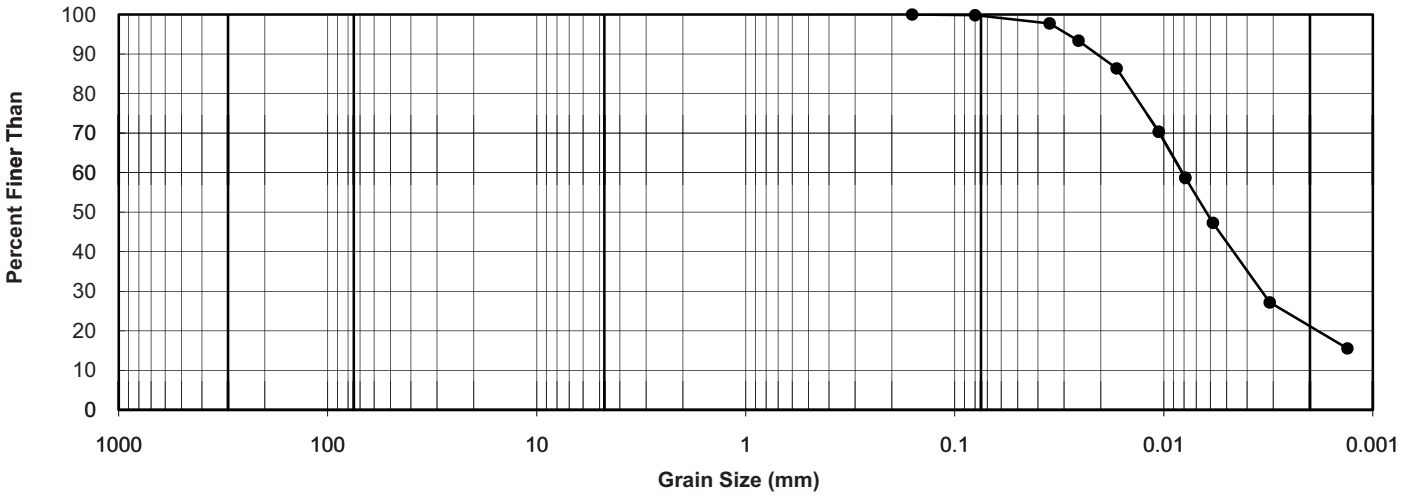
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	GAINT MINE				
Client:	AECOM	Date Sampled:	April 4, 2011		

Sample Number	GA11-T-01, SA7
Sample Location	GIANT MINE
Sampled By	0.0
Source	INSITU
Sample Description	See Borehole Logs
In situ Water Content	34.4
Date Tested	Tuesday, May 10, 2011
Tested By	RB
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.16	100.0	
0.080	99.8	
0.035	97.7	Hydrometer
0.026	93.4	
0.017	86.4	
0.011	70.3	
0.008	58.7	
0.006	47.3	
0.003	27.2	
0.001	15.5	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 0.5 Silt% 79.6 Clay% 19.9

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.12 11:33:33 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

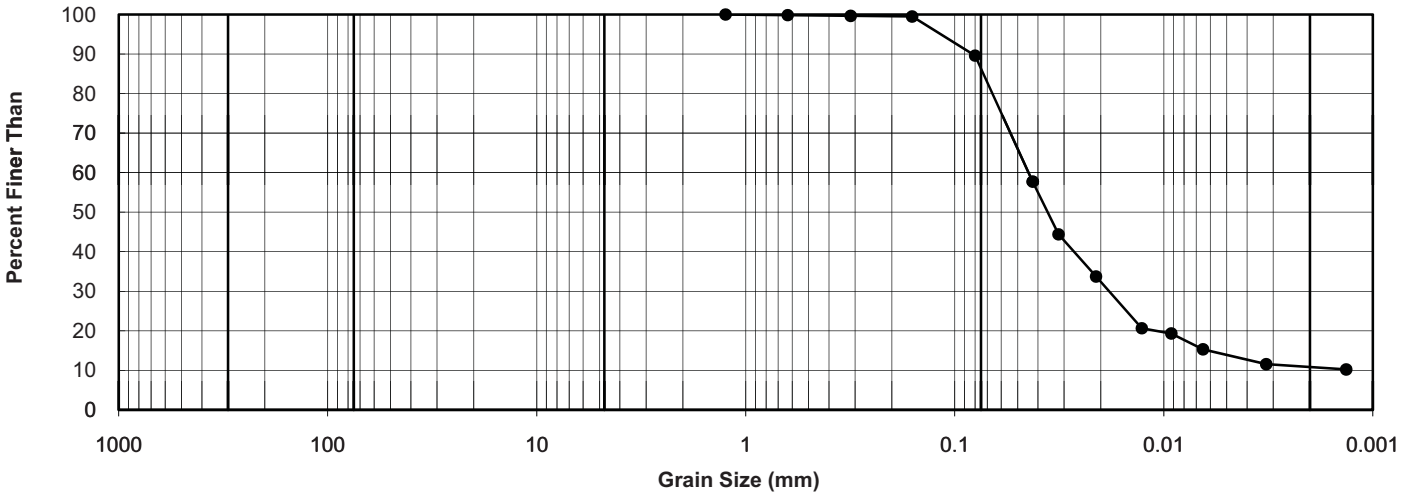
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	GAINT MINE				
Client:	AECOM	Date Sampled:	April 4, 2011		

Sample Number	GA11-T-01, SA9
Sample Location	GIANT MINE
Sampled By	0.0
Source	INSITU
Sample Description	See Borehole Logs
In situ Water Content	23.0
Date Tested	Tuesday, May 10, 2011
Tested By	RB
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
1.25	100.0	
0.6	99.8	
0.32	99.7	
0.16	99.5	
0.080	89.6	
0.042	57.7	Hydrometer
0.032	44.4	
0.021	33.7	
0.013	20.6	
0.009	19.3	
0.006	15.3	
0.003	11.6	
0.001	10.2	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 15.5 Silt% 73.8 Clay% 10.7

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.12 11:32:34 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

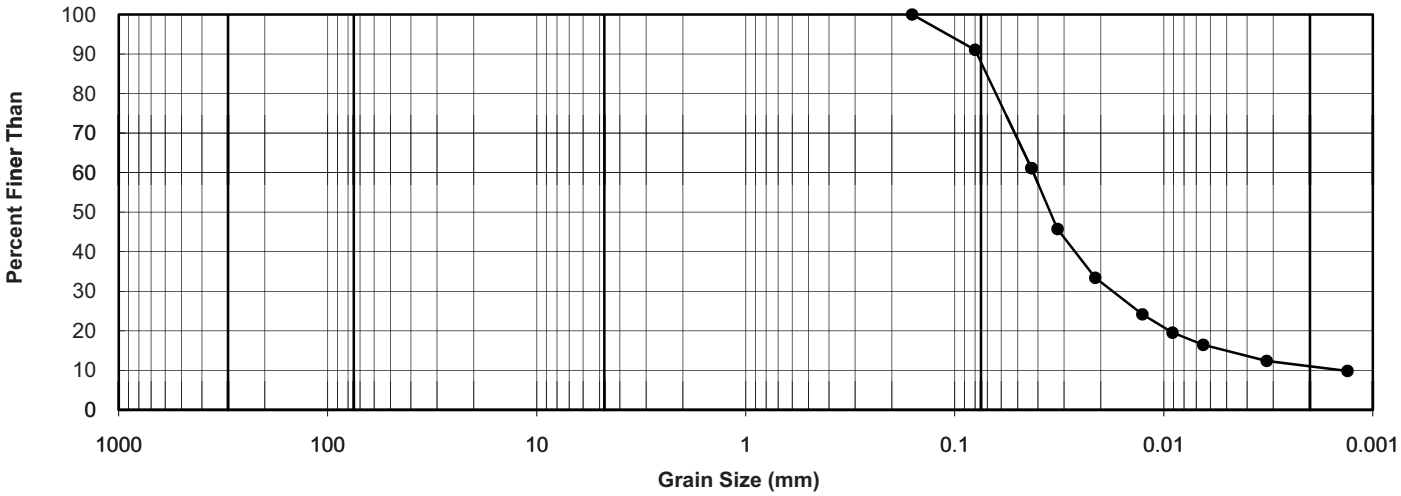
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	GAINT MINE				
Client:	AECOM	Date Sampled:	April 4, 2011		

Sample Number	GA11-T-01, SA11
Sample Location	GIANT MINE
Sampled By	0.0
Source	INSITU
Sample Description	See Borehole Logs
In situ Water Content	23.6
Date Tested	Tuesday, May 10, 2011
Tested By	RB
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.16	100.0	
0.080	91.1	
0.043	61.1	Hydrometer
0.032	45.7	
0.021	33.4	
0.013	24.2	
0.009	19.5	
0.006	16.4	
0.003	12.4	
0.001	9.8	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 13.8 Silt% 75.5 Clay% 10.7

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.12 11:54:34 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

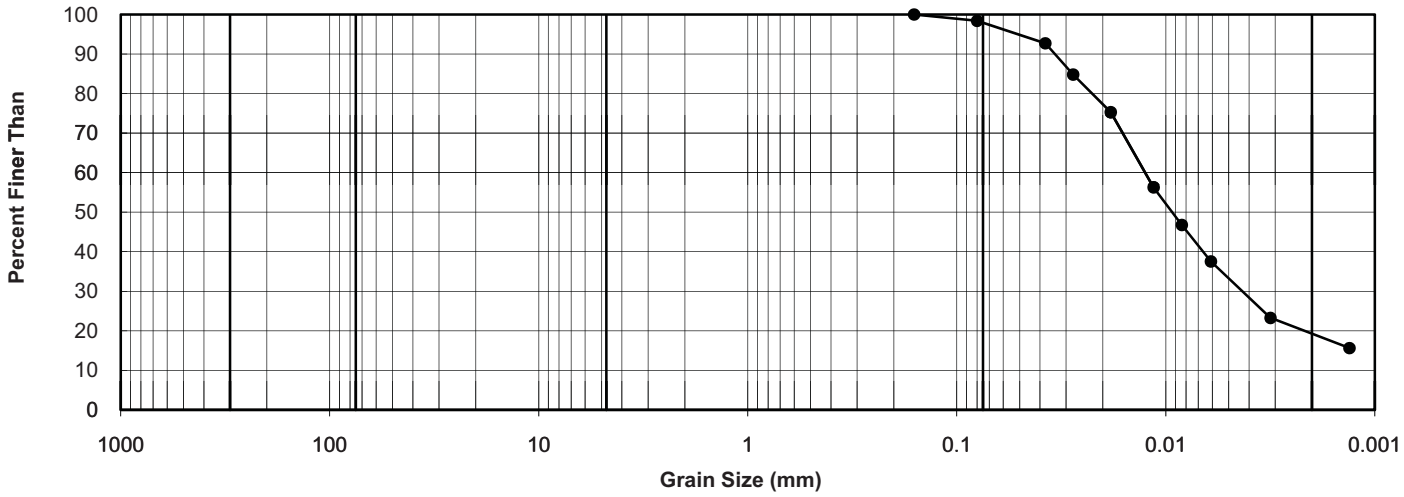
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	GAINT MINE				
Client:	AECOM	Date Sampled:	April 4, 2011		

Sample Number	GA11-T-01, SA13
Sample Location	GIANT MINE
Sampled By	0.0
Source	INSITU
Sample Description	See Borehole Logs
In situ Water Content	25.7
Date Tested	Tuesday, May 10, 2011
Tested By	RB
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.16	100.0	
0.080	98.4	
0.038	92.7	Hydrometer
0.028	84.8	
0.018	75.3	
0.011	56.3	
0.008	46.7	
0.006	37.5	
0.003	23.3	
0.001	15.6	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 2.4 Silt% 79.2 Clay% 18.4

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.12 11:53:46 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

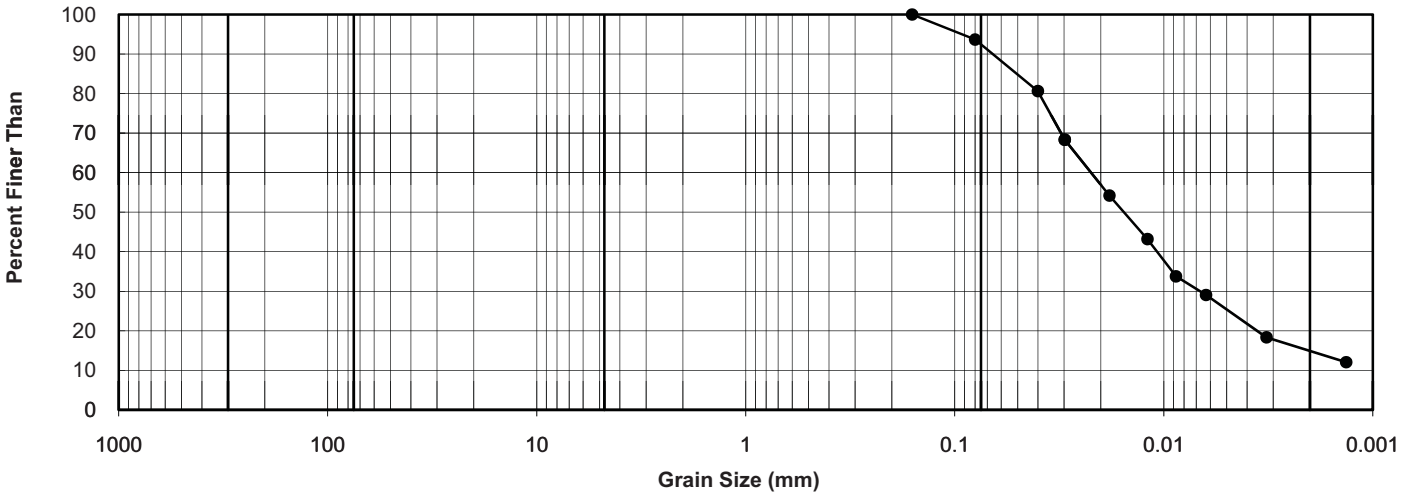
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	GAINT MINE				
Client:	AECOM	Date Sampled:	April 4, 2011		

Sample Number	GA11-T-01, SA15
Sample Location	GIANT MINE
Sampled By	0.0
Source	INSITU
Sample Description	See Borehole Logs
In situ Water Content	27.2
Date Tested	Tuesday, May 10, 2011
Tested By	RB
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.16	100.0	
0.080	93.7	
0.040	80.6	Hydrometer
0.030	68.3	
0.018	54.2	
0.012	43.2	
0.009	33.8	
0.006	29.1	
0.003	18.3	
0.001	12.1	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel %	0.0	Sand %	8.3	Silt%	77.5	Clay%	14.2

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.12 11:52:49 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

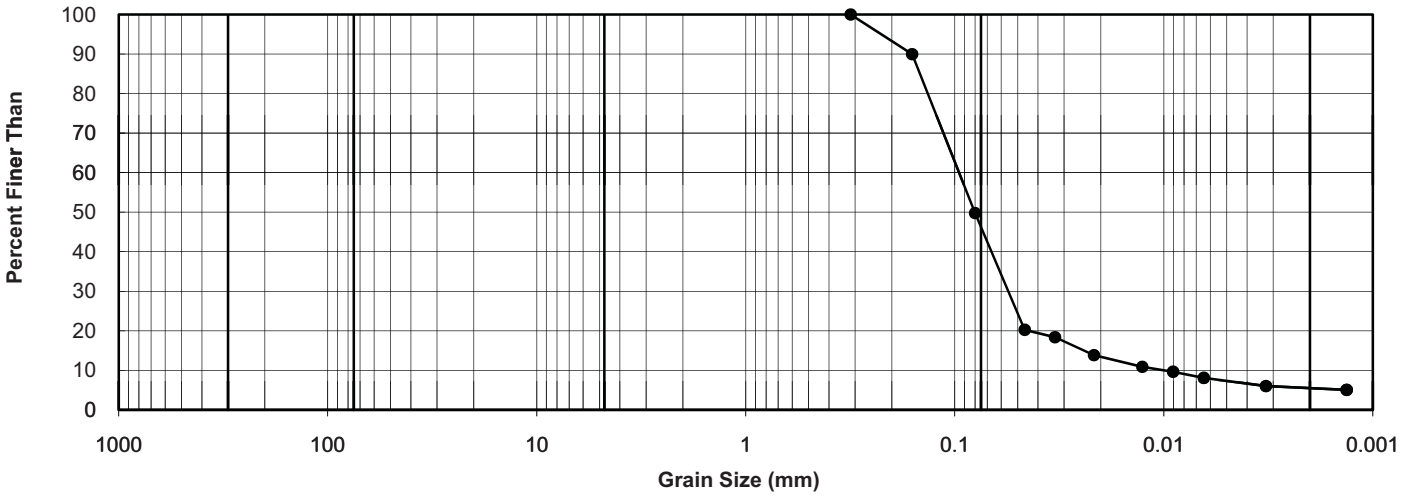
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2622
Short Title:	Giant Mine				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-02, SA2
Sample Location	Giant Mine
Sampled By	JB
Source	
Sample Description	
In situ Water Content	14.8
Date Tested	Wednesday, April 20, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.32	100.0	
0.16	90.0	
0.080	49.8	
0.046	20.2	Hydrometer
0.033	18.4	
0.022	13.8	
0.013	10.9	
0.009	9.6	
0.006	8.1	
0.003	6.0	
0.001	5.1	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 55.5 Silt% 39.1 Clay% 5.4

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 11:07:54 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

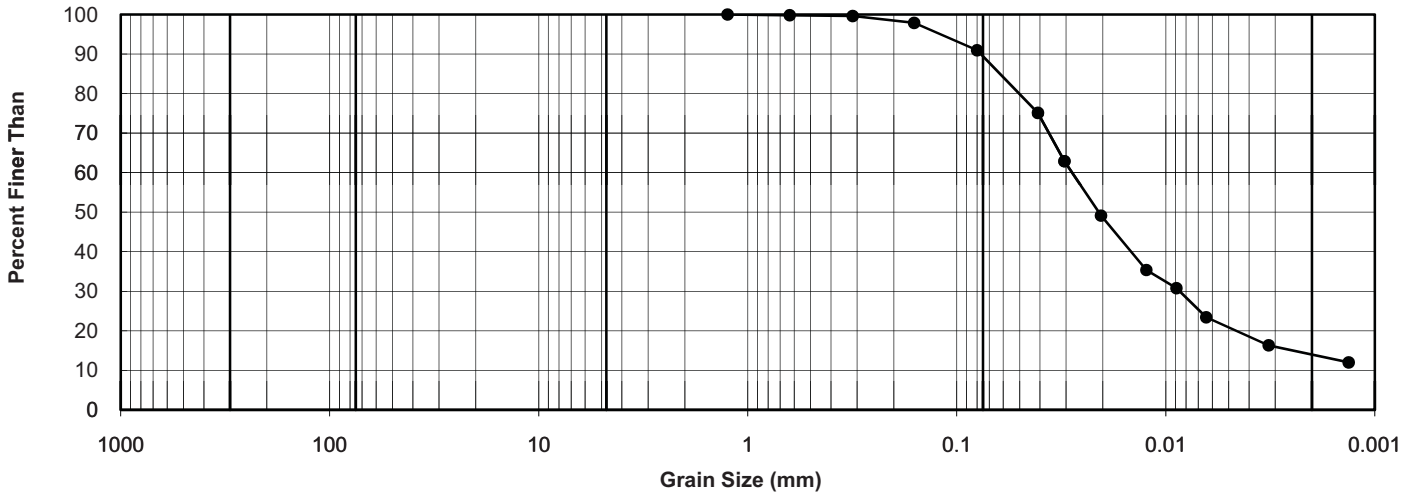
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	GAINT MINE				
Client:	AECOM	Date Sampled:	April 4, 2011		

Sample Number	GA11-T-02, SA5
Sample Location	GIANT MINE
Sampled By	0.0
Source	INSITU
Sample Description	See Borehole Logs
In situ Water Content	21.0
Date Tested	Tuesday, May 10, 2011
Tested By	RB
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
1.25	100.0	
0.6	99.8	
0.32	99.6	
0.16	97.9	
0.080	91.0	
0.041	75.1	Hydrometer
0.031	62.9	
0.020	49.1	
0.012	35.4	
0.009	30.8	
0.006	23.4	
0.003	16.3	
0.001	12.0	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel %	0.0	Sand %	11.5	Silt%	75.0	Clay%	13.5

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.12 11:31:50 -06'00'

Reviewed By:

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

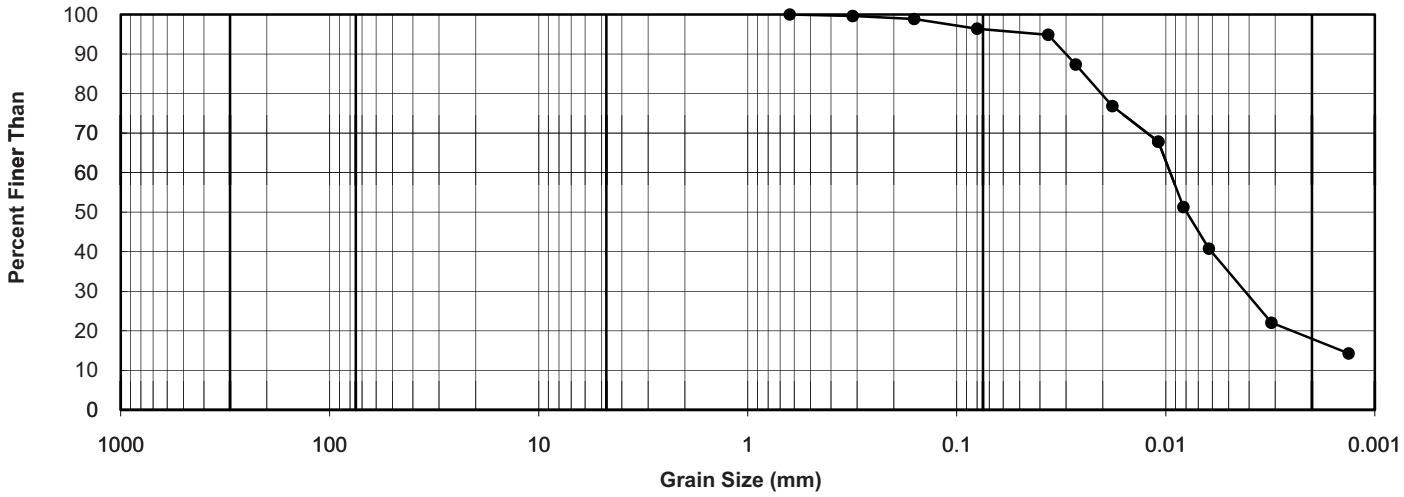
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	GAINT MINE				
Client:	AECOM	Date Sampled:	April 4, 2011		

Sample Number	GA11-T-02, SA7
Sample Location	GIANT MINE
Sampled By	0.0
Source	INSITU
Sample Description	See Borehole Logs
In situ Water Content	32.0
Date Tested	Tuesday, May 10, 2011
Tested By	RB
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.6	100.0	
0.32	99.6	
0.16	98.9	
0.080	96.4	
0.037	94.9	Hydrometer
0.027	87.4	
0.018	76.8	
0.011	67.8	
0.008	51.3	
0.006	40.8	
0.003	22.0	
0.001	14.3	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 3.8 Silt% 79.0 Clay% 17.2

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.12 11:30:54 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

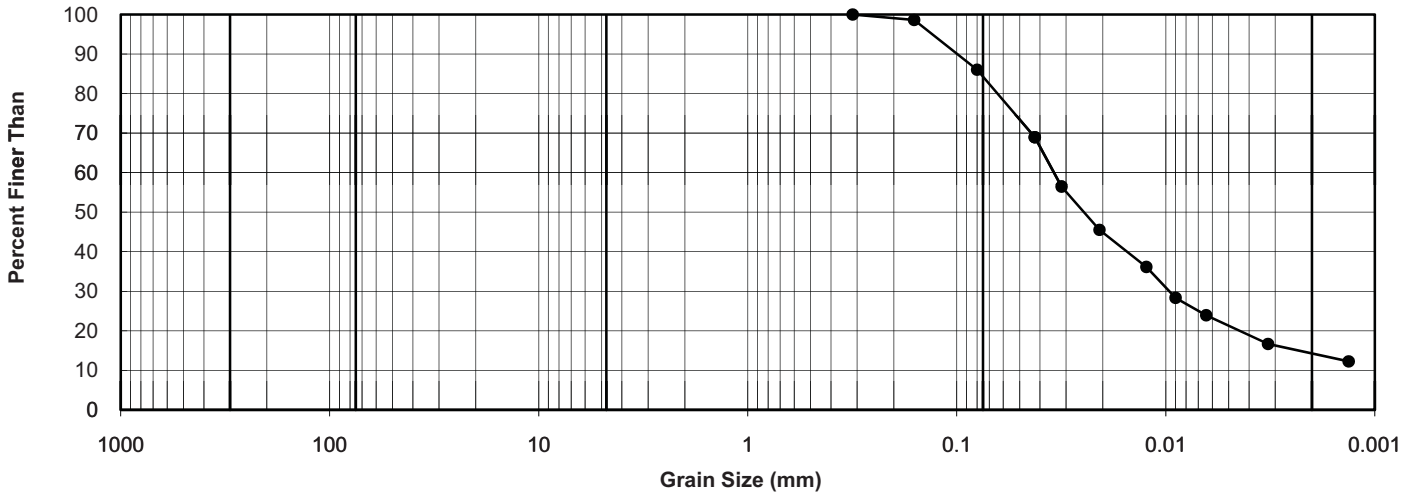
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	GAINT MINE				
Client:	AECOM	Date Sampled:	April 4, 2011		

Sample Number	GA11-T-02, SA9
Sample Location	GIANT MINE
Sampled By	0.0
Source	INSITU
Sample Description	See Borehole Logs
In situ Water Content	29.0
Date Tested	Tuesday, May 10, 2011
Tested By	RB
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.32	100.0	
0.16	98.6	
0.080	86.0	
0.042	69.0	Hydrometer
0.032	56.5	
0.021	45.5	
0.012	36.1	
0.009	28.3	
0.006	23.9	
0.003	16.7	
0.001	12.3	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 16.7 Silt% 69.5 Clay% 13.8

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.12 11:29:43 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

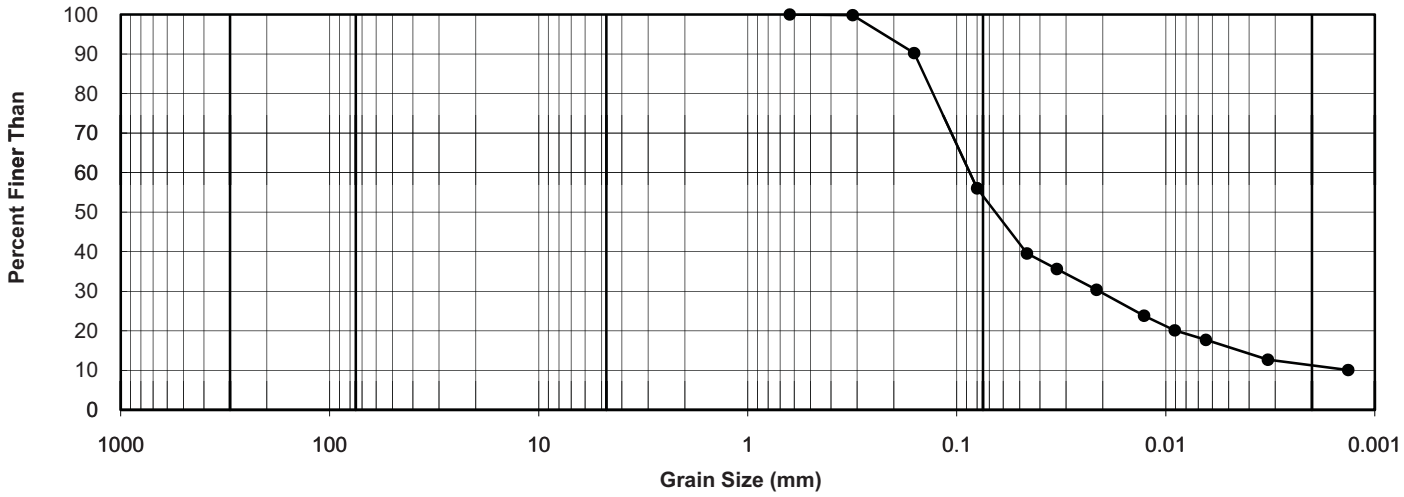
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	GAINT MINE				
Client:	AECOM	Date Sampled:	April 4, 2011		

Sample Number	GA11-T-02, SA11
Sample Location	GIANT MINE
Sampled By	0.0
Source	INSITU
Sample Description	See Borehole Logs
In situ Water Content	22.0
Date Tested	Tuesday, May 10, 2011
Tested By	RB
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.6	100.0	
0.32	99.8	
0.16	90.2	
0.080	56.0	
0.046	39.6	Hydrometer
0.033	35.6	
0.021	30.4	
0.013	23.8	
0.009	20.1	
0.006	17.7	
0.003	12.7	
0.001	10.1	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel %	0.0	Sand %	46.9	Silt%	42.1	Clay%	11.0

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.05.12 11:28:49 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

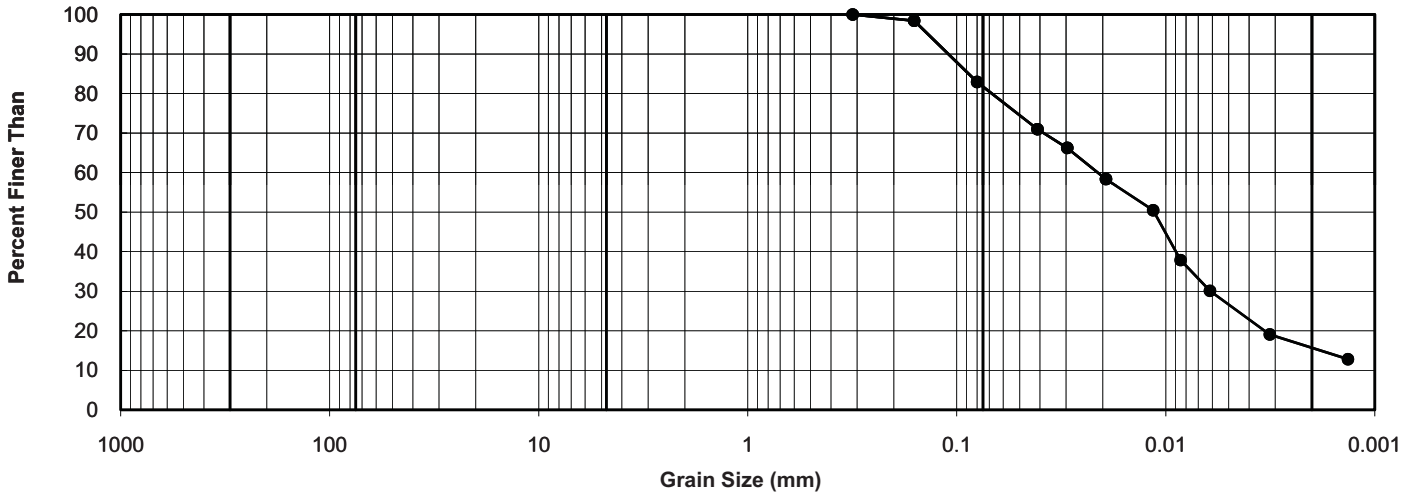
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-04, SA5
Sample Location	Giant Mine
Sampled By	JB
Source	
Sample Description	
In situ Water Content	31.0
Date Tested	Friday, April 08, 2011
Tested By	AC/JF
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.32	100.0	
0.16	98.4	
0.080	82.9	
0.041	71.0	Hydrometer
0.030	66.3	
0.019	58.4	
0.012	50.5	
0.009	37.9	
0.006	30.1	
0.003	19.1	
0.001	12.8	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 18.9 Silt% 66.0 Clay% 15.0

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.19 16:41:39 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

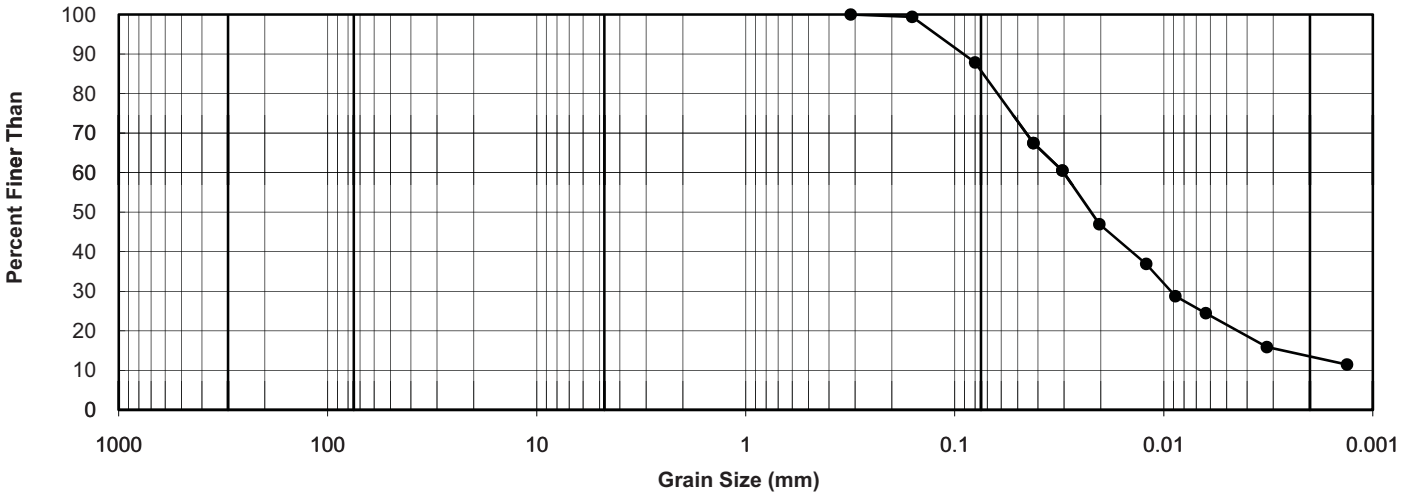
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2622
Short Title:	Giant Mine				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-04, SA6
Sample Location	Giant Mine
Sampled By	JB
Source	
Sample Description	
In situ Water Content	25.4
Date Tested	Wednesday, April 20, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.32	100.0	
0.16	99.4	
0.080	87.9	
0.042	67.5	Hydrometer
0.031	60.5	
0.020	47.0	
0.012	36.9	
0.009	28.8	
0.006	24.4	
0.003	15.9	
0.001	11.5	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 15.4 Silt% 71.6 Clay% 13.0

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 11:11:35 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

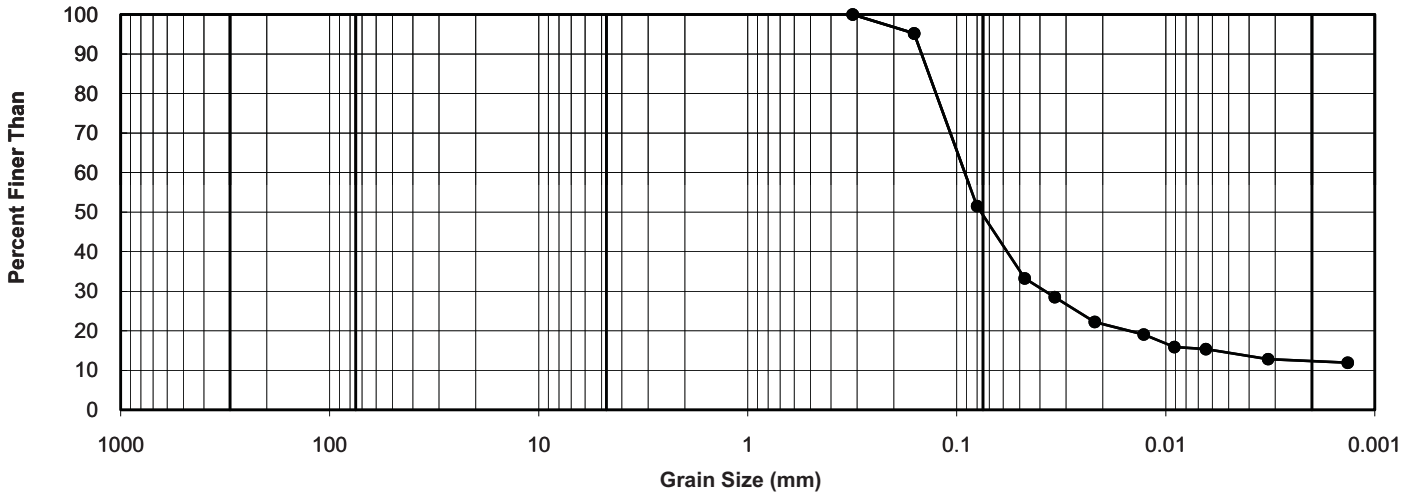
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-04, SA8
Sample Location	Giant Mine
Sampled By	JB
Source	
Sample Description	
In situ Water Content	24.9
Date Tested	Friday, April 08, 2011
Tested By	AC/JF
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.32	100.0	
0.16	95.2	
0.080	51.5	
0.047	33.3	Hydrometer
0.034	28.5	
0.022	22.2	
0.013	19.1	
0.009	15.9	
0.006	15.4	
0.003	12.8	
0.001	11.9	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 51.8 Silt% 35.9 Clay% 12.2

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.18 09:35:20 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

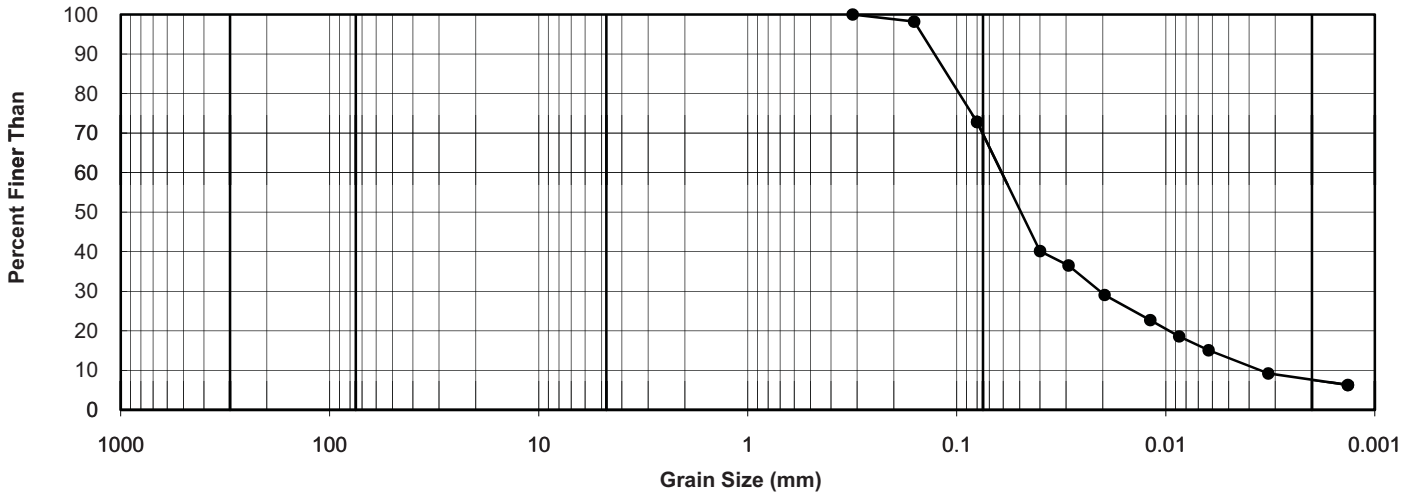
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Tailings Pond				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-4 SA10
Sample Location	Giant Mine
Sampled By	0.0
Source	
Sample Description	
In situ Water Content	21.6
Date Tested	Wednesday, April 13, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.32	100.0	
0.16	98.2	
0.080	72.8	
0.040	40.2	Hydrometer
0.029	36.5	
0.020	29.0	
0.012	22.7	
0.009	18.6	
0.006	15.1	
0.003	9.2	
0.001	6.3	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 32.1 Silt% 60.6 Clay% 7.3

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 15:22:37 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

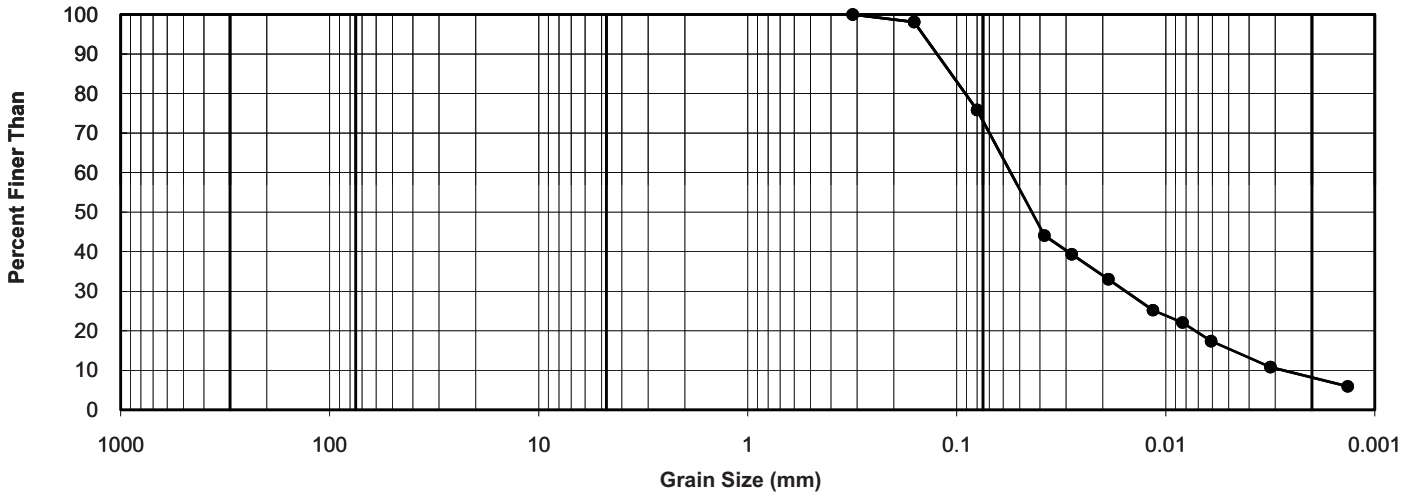
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-04, SA12
Sample Location	Giant Mine
Sampled By	JB
Source	
Sample Description	
In situ Water Content	24.3
Date Tested	Friday, April 08, 2011
Tested By	AC/JF
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.32	100.0	
0.16	98.1	
0.080	75.9	
0.038	44.1	Hydrometer
0.028	39.4	
0.019	33.0	
0.012	25.2	
0.008	22.1	
0.006	17.4	
0.003	10.8	
0.001	5.9	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 28.7 Silt% 63.6 Clay% 7.7

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.18 09:34:48 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

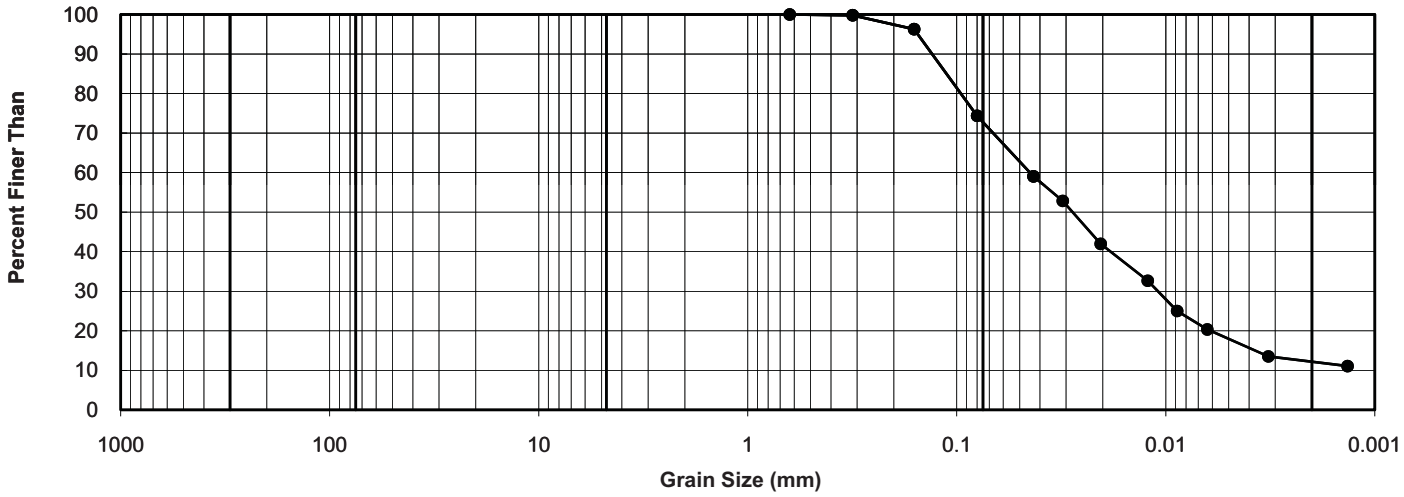
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-04, 15
Sample Location	Giant Mine
Sampled By	JB
Source	
Sample Description	
In situ Water Content	21.3
Date Tested	Friday, April 08, 2011
Tested By	AC/JF
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.6	100.0	
0.32	99.8	
0.16	96.3	
0.080	74.4	
0.043	59.1	Hydrometer
0.031	52.8	
0.020	42.0	
0.012	32.7	
0.009	25.0	
0.006	20.3	
0.003	13.5	
0.001	11.1	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel %	0.0	Sand %	28.1	Silt%	60.0	Clay%	11.9

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.19 16:40:55 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

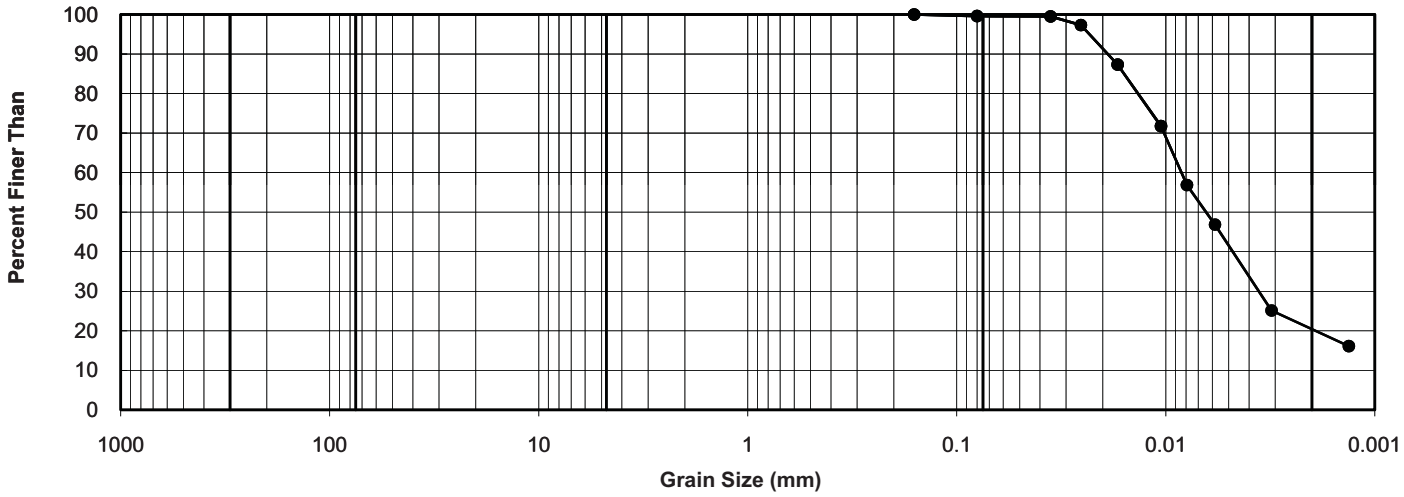
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-04, SA18
Sample Location	Giant Mine
Sampled By	JB
Source	
Sample Description	
In situ Water Content	30.8
Date Tested	Friday, April 08, 2011
Tested By	AC/JF
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.16	100.0	
0.080	99.6	
0.036	99.5	Hydrometer
0.025	97.3	
0.017	87.3	
0.011	71.8	
0.008	56.9	
0.006	46.9	
0.003	25.1	
0.001	16.1	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 0.4 Silt% 80.1 Clay% 19.5

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.18 09:34:12 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

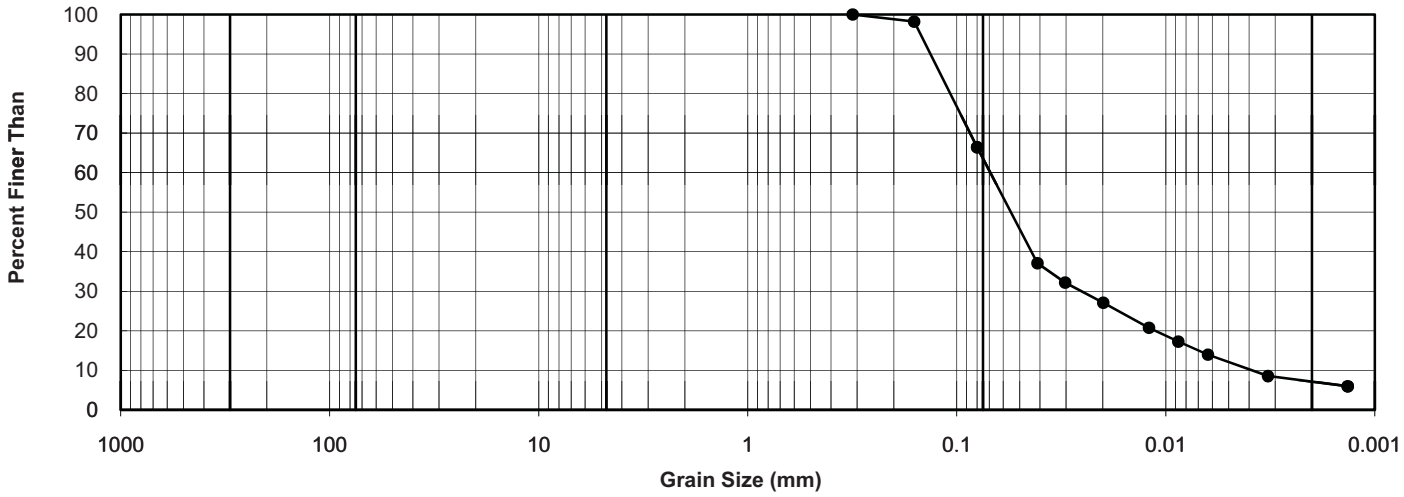
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Tailings Pond				
Client:	AECOM	Date Sampled:	January 0, 1900		

Sample Number	GA11-T-6 SA7
Sample Location	Giant Mine
Sampled By	0.0
Source	0.0
Sample Description	0
In situ Water Content	23.0
Date Tested	Wednesday, April 13, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.32	100.0	
0.16	98.2	
0.080	66.4	
0.041	37.1	Hydrometer
0.030	32.2	
0.020	27.1	
0.012	20.8	
0.009	17.3	
0.006	14.0	
0.003	8.6	
0.001	6.0	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 38.1 Silt% 55.0 Clay% 6.9

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 10:59:25 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

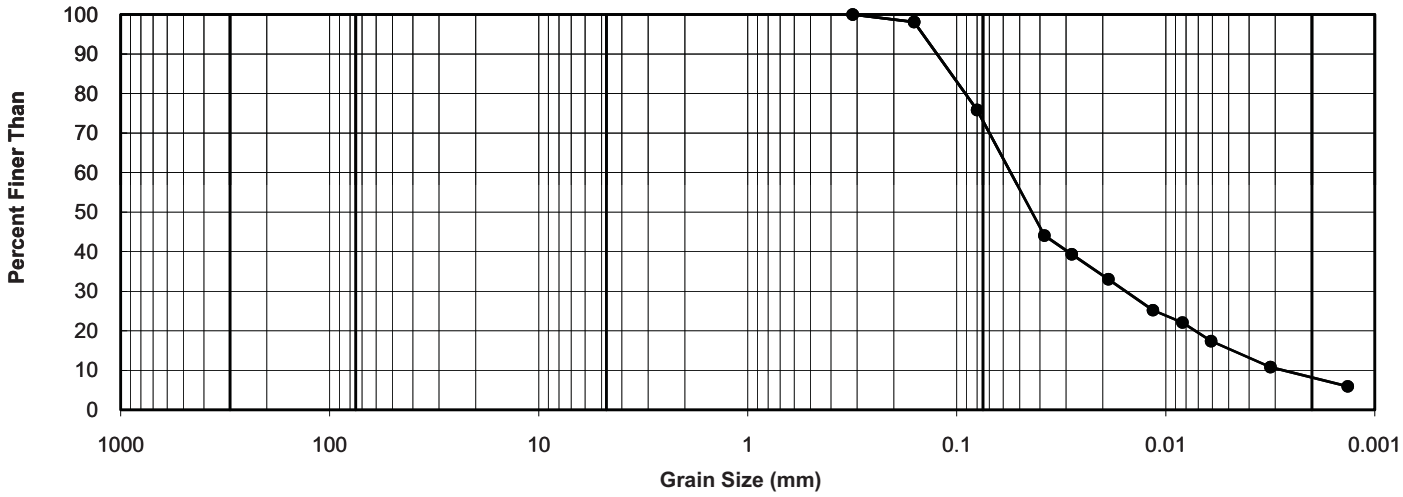
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-06, SA09
Sample Location	Giant Mine
Sampled By	JB
Source	
Sample Description	
In situ Water Content	26.3
Date Tested	Friday, April 08, 2011
Tested By	AC/JF
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.9	100.0	
0.43	99.9	
0.15	99.8	
0.075	88.9	
0.036	60.2	Hydrometer
0.023	53.9	
0.014	41.2	
0.010	28.6	
0.007	22.3	
0.005	15.0	
0.004	7.6	
0.002	3.2	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 11.1 Silt% 85.7 Clay% 3.2

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.19 11:11:07 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

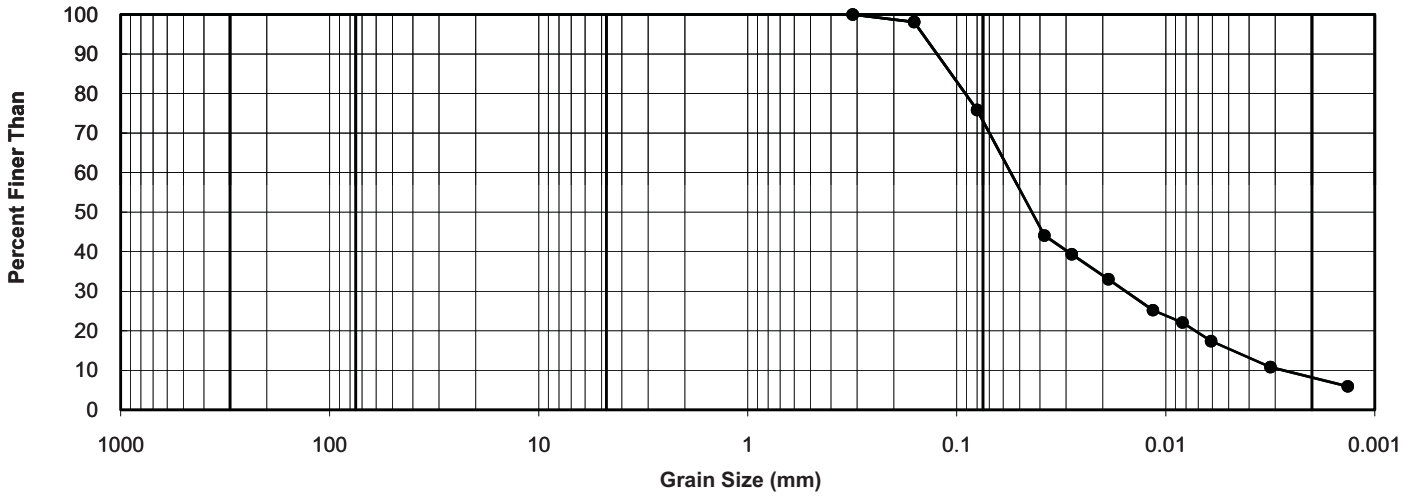
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-06, SA11
Sample Location	Giant Mine
Sampled By	JB
Source	
Sample Description	
In situ Water Content	24.0
Date Tested	Friday, April 08, 2011
Tested By	AC/JF
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.43	100.0	
0.15	98.9	
0.075	72.8	
0.038	50.8	Hydrometer
0.024	43.6	
0.015	32.7	
0.011	22.0	
0.008	16.0	
0.005	13.5	
0.004	5.1	
0.002	1.3	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 27.2 Silt% 71.5 Clay% 1.3

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.19 15:34:33 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

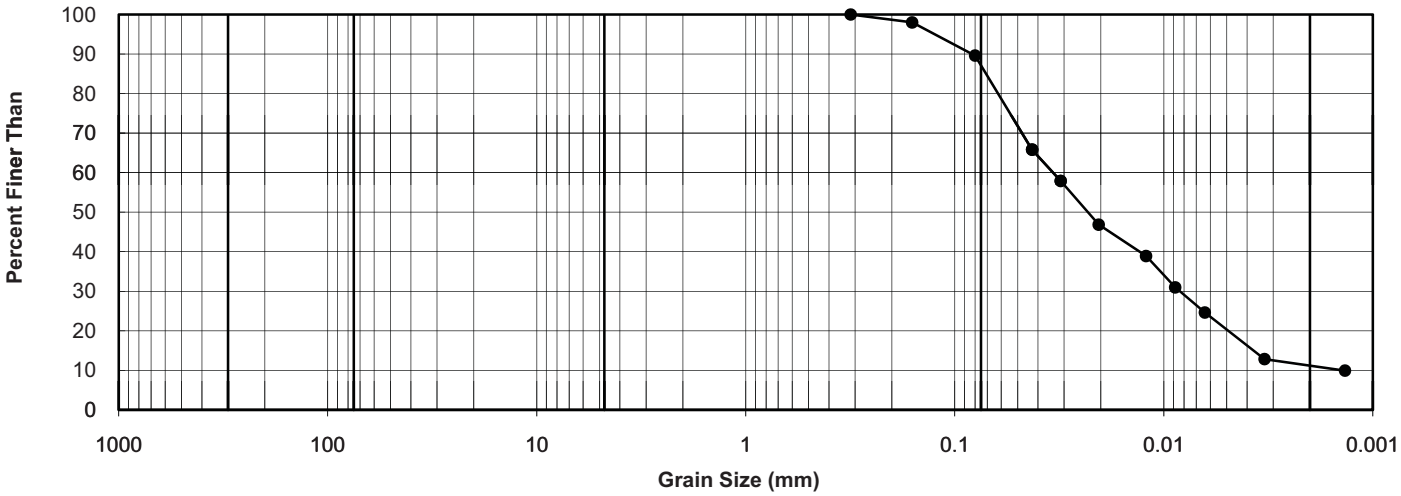
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Tailings Pond				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-06 SA12
Sample Location	Giant Mine
Sampled By	0.0
Source	
Sample Description	
In situ Water Content	29.3
Date Tested	Thursday, April 14, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.32	100.0	
0.16	98.0	
0.080	89.6	
0.043	65.8	Hydrometer
0.031	57.9	
0.020	46.8	
0.012	38.9	
0.009	31.0	
0.006	24.6	
0.003	12.8	
0.001	9.9	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 14.2 Silt% 74.9 Clay% 10.9

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 15:21:58 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

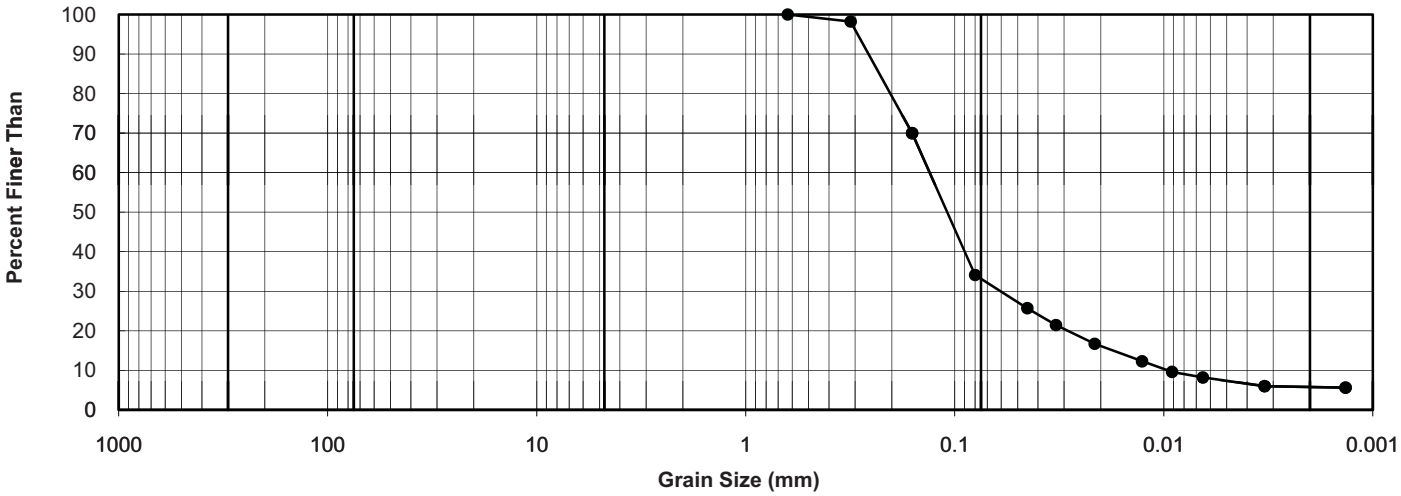
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Tailings Pond				
Client:	AECOM	Date Sampled:	January 0, 1900		

Sample Number	GA11-T-6 SA15
Sample Location	Giant Mine
Sampled By	0.0
Source	0.0
Sample Description	0
In situ Water Content	26.3
Date Tested	Wednesday, April 13, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.6	100.0	
0.32	98.2	
0.16	70.0	
0.080	34.1	
0.045	25.7	Hydrometer
0.033	21.4	
0.021	16.7	
0.013	12.3	
0.009	9.6	
0.007	8.2	
0.003	6.0	
0.001	5.6	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel %	0.0	Sand %	67.3	Silt%	26.9	Clay%	5.8

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 10:58:16 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

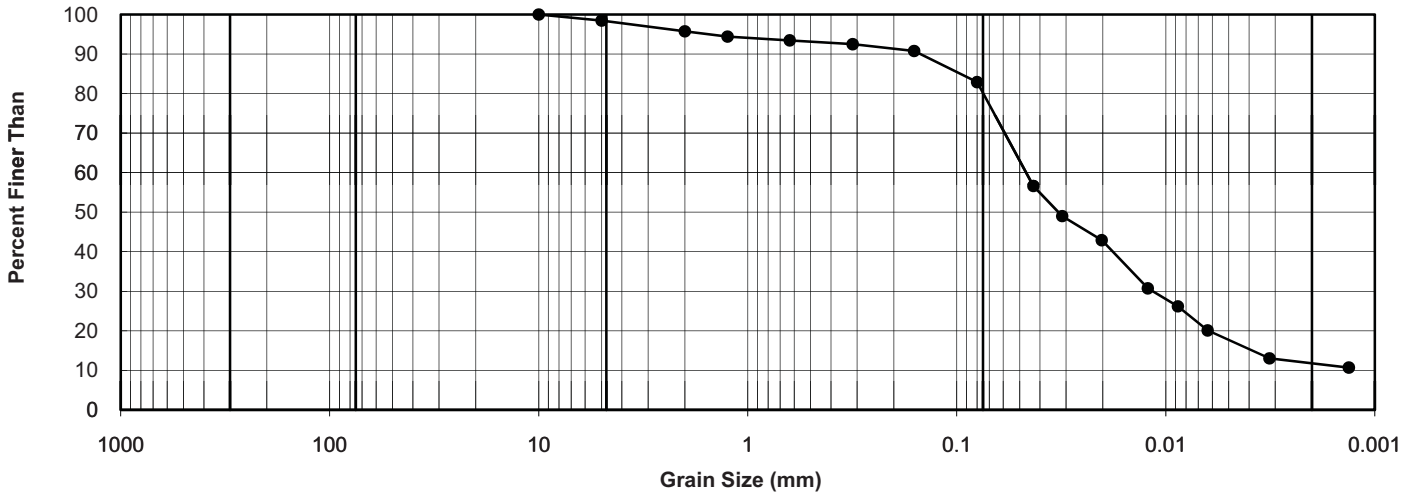
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM Canada	Date Sampled:			

Sample Number	SA3
Sample Location	GA11-T-08
Sampled By	JB
Source	Insitu
Sample Description	See bore logs
In situ Water Content	27.1
Date Tested	Friday, May 27, 2011
Tested By	HVD
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
10	100.0	
5	98.5	
2.0	95.7	
1.25	94.4	
0.6	93.4	
0.32	92.5	
0.16	90.8	
0.080	82.9	
0.043	56.6	Hydrometer
0.031	49.0	
0.020	42.9	
0.012	30.7	
0.009	26.2	
0.006	20.1	
0.003	13.0	
0.001	10.7	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel %	1.5	Sand %	19.8	Silt%	67.1	Clay%	11.5

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.03 15:03:34 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

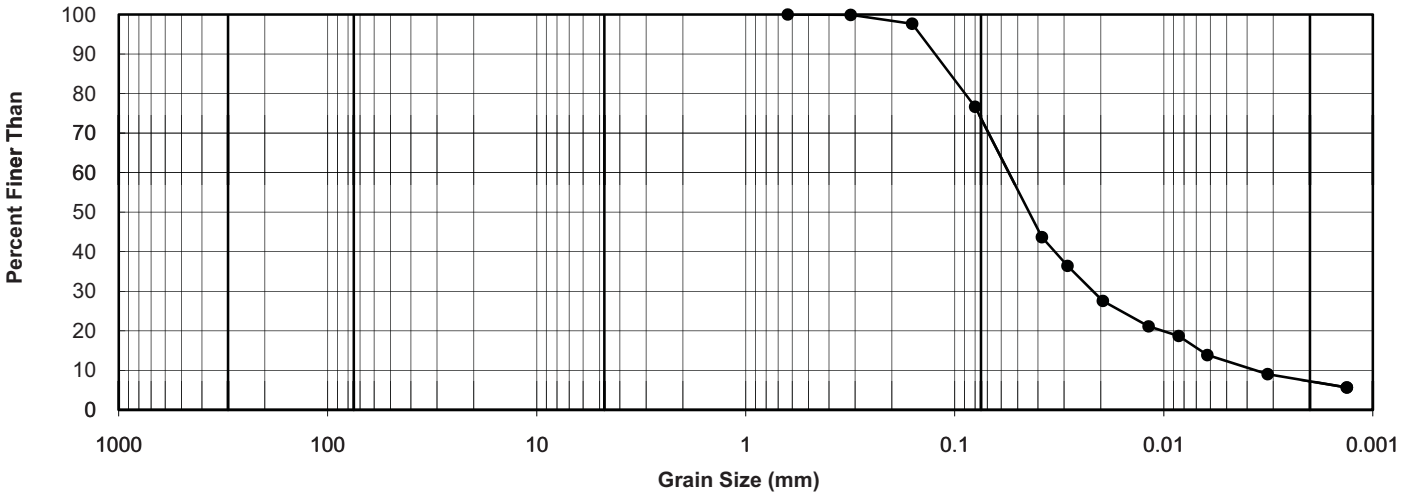
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM Canada	Date Sampled:			

Sample Number	SA5
Sample Location	GA11-T-08
Sampled By	JB
Source	Insitu
Sample Description	See bore logs
In situ Water Content	22.4
Date Tested	Friday, May 27, 2011
Tested By	HVD
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.6	100.0	
0.32	99.9	
0.16	97.7	
0.080	76.7	
0.038	43.7	Hydrometer
0.029	36.4	
0.020	27.6	
0.012	21.1	
0.008	18.7	
0.006	13.9	
0.003	9.0	
0.001	5.7	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 28.1 Silt% 65.0 Clay% 6.9

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.03 15:14:05 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

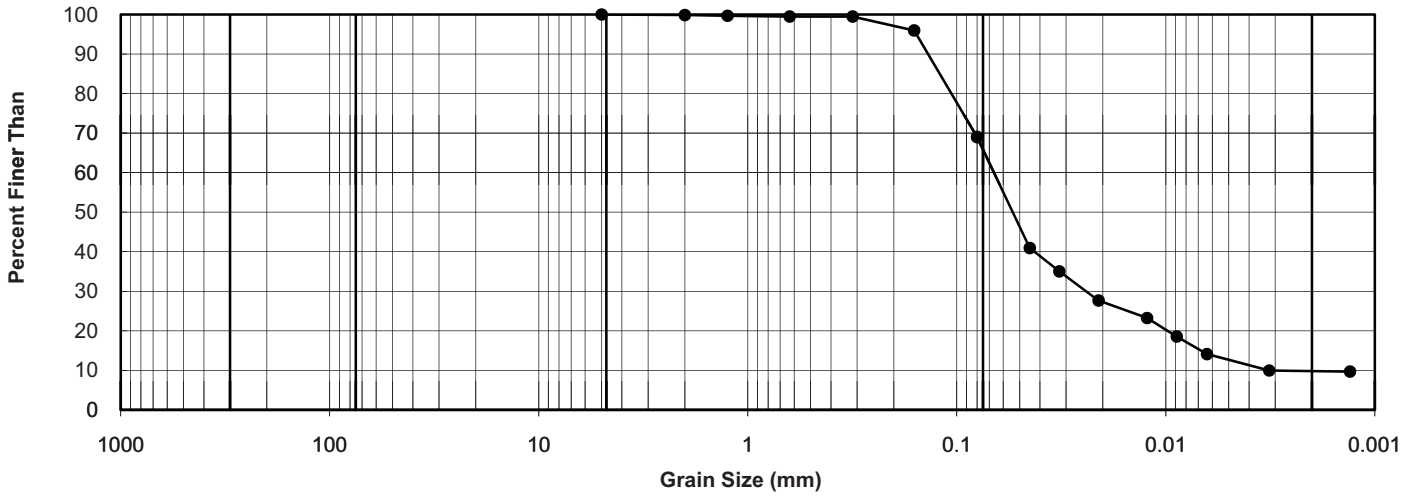
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM Canada	Date Sampled:			

Sample Number	SA7
Sample Location	GA11-T-08
Sampled By	JB
Source	Insitu
Sample Description	See bore logs
In situ Water Content	21.5
Date Tested	Friday, May 27, 2011
Tested By	HVD
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
5	100.0	
2.0	99.9	
1.25	99.7	
0.6	99.5	
0.32	99.5	
0.16	96.0	
0.080	69.0	
0.045	40.9	Hydrometer
0.032	35.0	
0.021	27.7	
0.012	23.2	
0.009	18.5	
0.006	14.1	
0.003	9.9	
0.001	9.7	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 35.8 Silt% 54.5 Clay% 9.8

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.03 15:12:33 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

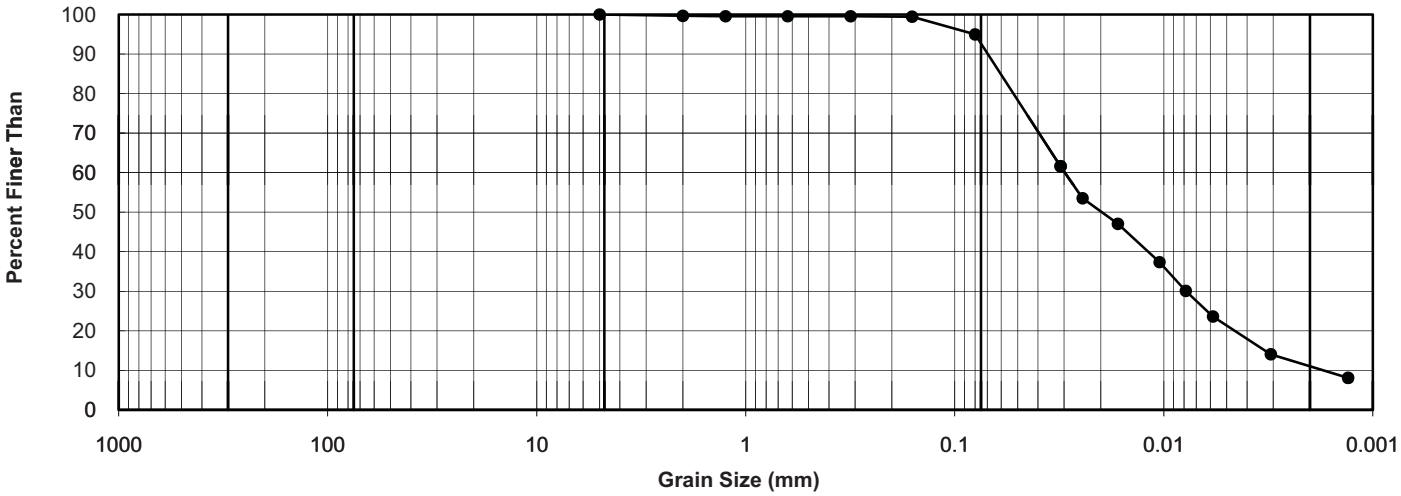
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM Canada	Date Sampled:			

Sample Number	9A
Sample Location	GA11-T-08
Sampled By	0.0
Source	Insitu
Sample Description	See bore logs
In situ Water Content	29.1
Date Tested	Friday, May 27, 2011
Tested By	HVD
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
5	100.0	
2.0	99.7	
1.25	99.6	
0.6	99.6	
0.32	99.5	
0.16	99.4	
0.080	95.0	
0.031	61.6	Hydrometer
0.024	53.5	
0.017	47.0	
0.010	37.3	
0.008	30.1	
0.006	23.6	
0.003	14.1	
0.001	8.1	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 9.1 Silt% 80.5 Clay% 10.4

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.03 15:01:15 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

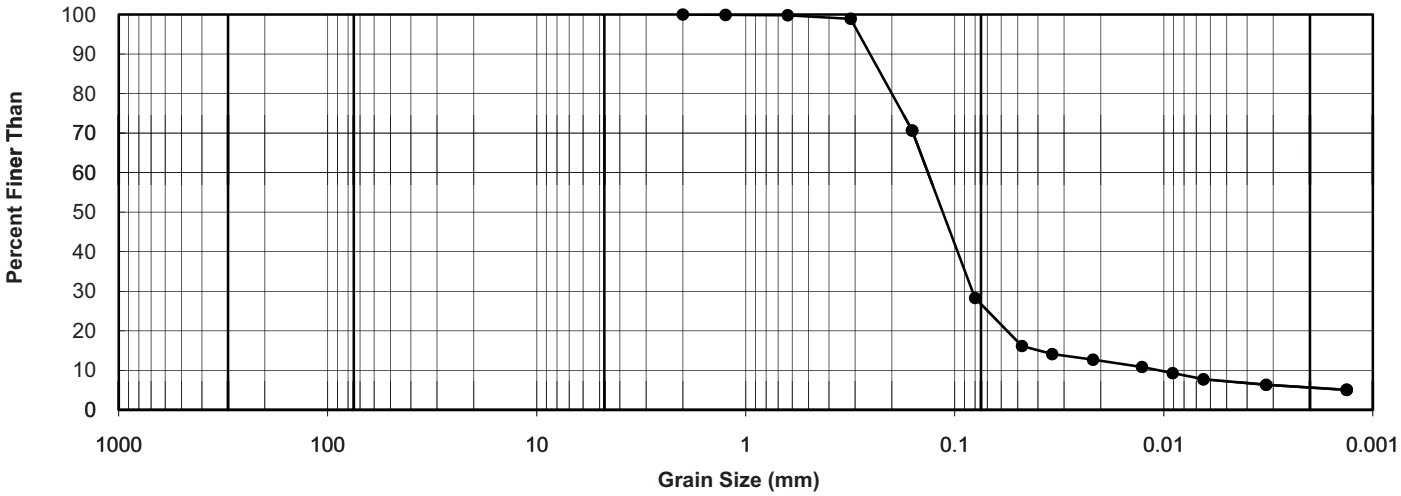
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2622
Short Title:	Giant Mine				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-09, SA2
Sample Location	Giant Mine
Sampled By	JB
Source	
Sample Description	
In situ Water Content	17.9
Date Tested	Wednesday, April 20, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
2.0	100.0	
1.25	99.9	
0.6	99.8	
0.32	98.9	
0.16	70.7	
0.080	28.3	
0.048	16.1	Hydrometer
0.034	14.1	
0.022	12.7	
0.013	10.8	
0.009	9.3	
0.006	7.8	
0.003	6.4	
0.001	5.1	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 74.0 Silt% 20.5 Clay% 5.5

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 11:06:59 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

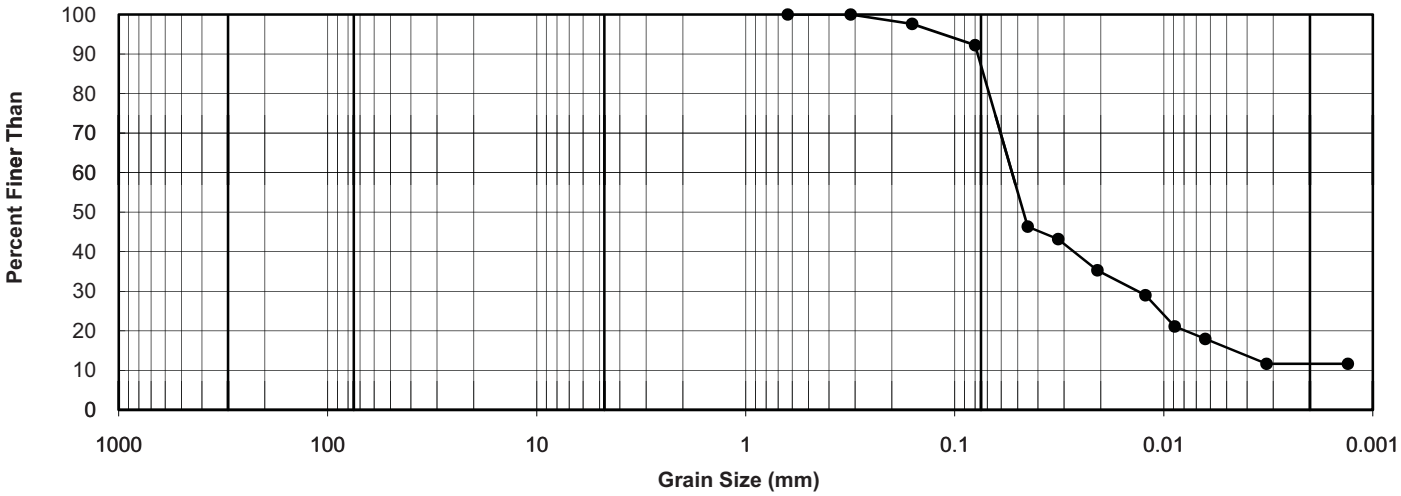
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM Canada	Date Sampled:			

Sample Number	SA3
Sample Location	GA11-T-09
Sampled By	JB
Source	Insitu
Sample Description	See bore logs
In situ Water Content	21.2
Date Tested	Tuesday, June 07, 2011
Tested By	TR
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.6	100.0	
0.32	100.0	
0.16	97.6	
0.080	92.3	
0.045	46.3	Hydrometer
0.032	43.2	
0.021	35.3	
0.012	29.0	
0.009	21.1	
0.006	18.0	
0.003	11.6	
0.001	11.6	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 15.6 Silt% 72.8 Clay% 11.6

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 10:10:13 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

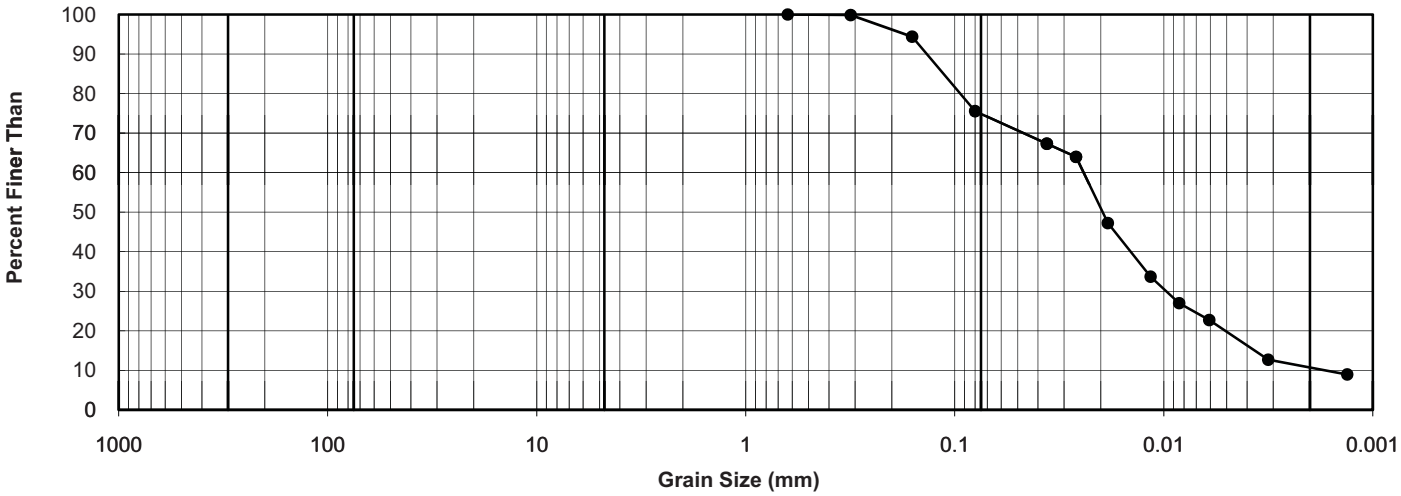
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM Canada	Date Sampled:			

Sample Number	SA5
Sample Location	GA11-T-09
Sampled By	JB
Source	Insitu
Sample Description	See bore logs
In situ Water Content	26.8
Date Tested	Tuesday, June 07, 2011
Tested By	TR
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.6	100.0	
0.32	99.9	
0.16	94.4	
0.080	75.6	
0.036	67.3	Hydrometer
0.026	64.0	
0.019	47.3	
0.012	33.7	
0.008	27.0	
0.006	22.7	
0.003	12.7	
0.001	8.9	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 25.6 Silt% 64.1 Clay% 10.3

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 10:08:52 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

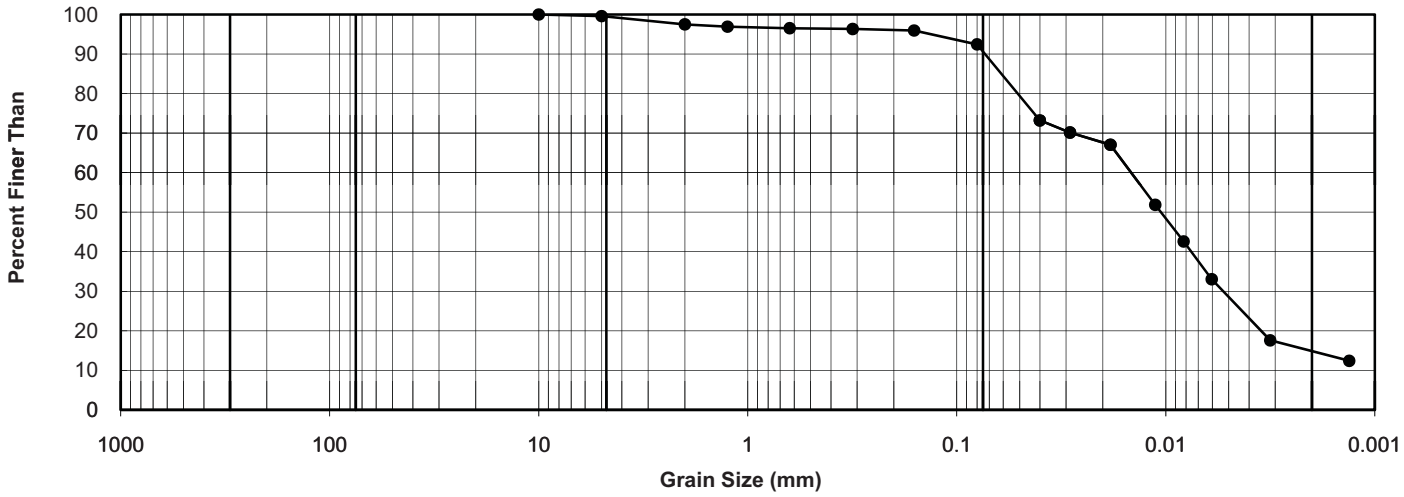
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM Canada	Date Sampled:			

Sample Number	SA9
Sample Location	GA11-T-09
Sampled By	JB
Source	Insitu
Sample Description	See bore logs
In situ Water Content	20.9
Date Tested	Tuesday, June 07, 2011
Tested By	TR
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
10	100.0	
5	99.6	
2.0	97.5	
1.25	96.9	
0.6	96.5	
0.32	96.3	
0.16	95.9	
0.080	92.4	
0.040	73.2	Hydrometer
0.029	70.1	
0.018	67.0	
0.011	51.9	
0.008	42.6	
0.006	33.0	
0.003	17.6	
0.001	12.4	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel %	0.4	Sand %	10.0	Silt%	75.3	Clay%	14.3

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 10:04:08 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

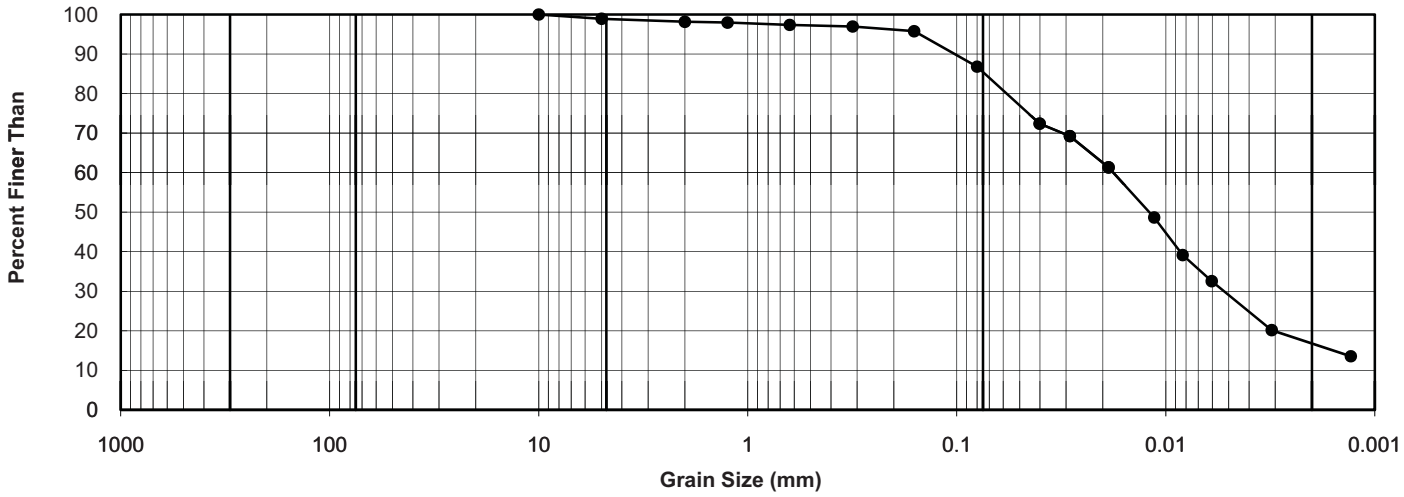
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM Canada	Date Sampled:	January 0, 1900		

Sample Number	SA10
Sample Location	GA11-T-09
Sampled By	JB
Source	Insitu
Sample Description	See bore logs
In situ Water Content	23.0
Date Tested	Tuesday, May 31, 2011
Tested By	HVD
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
10	100.0	
5	98.9	
2.0	98.2	
1.25	98.0	
0.6	97.4	
0.32	97.0	
0.16	95.8	
0.080	86.8	
0.040	72.4	Hydrometer
0.029	69.2	
0.019	61.3	
0.011	48.7	
0.008	39.2	
0.006	32.5	
0.003	20.2	
0.001	13.6	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 1.1 Sand % 14.3 Silt% 68.5 Clay% 16.1

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.03 14:48:46 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

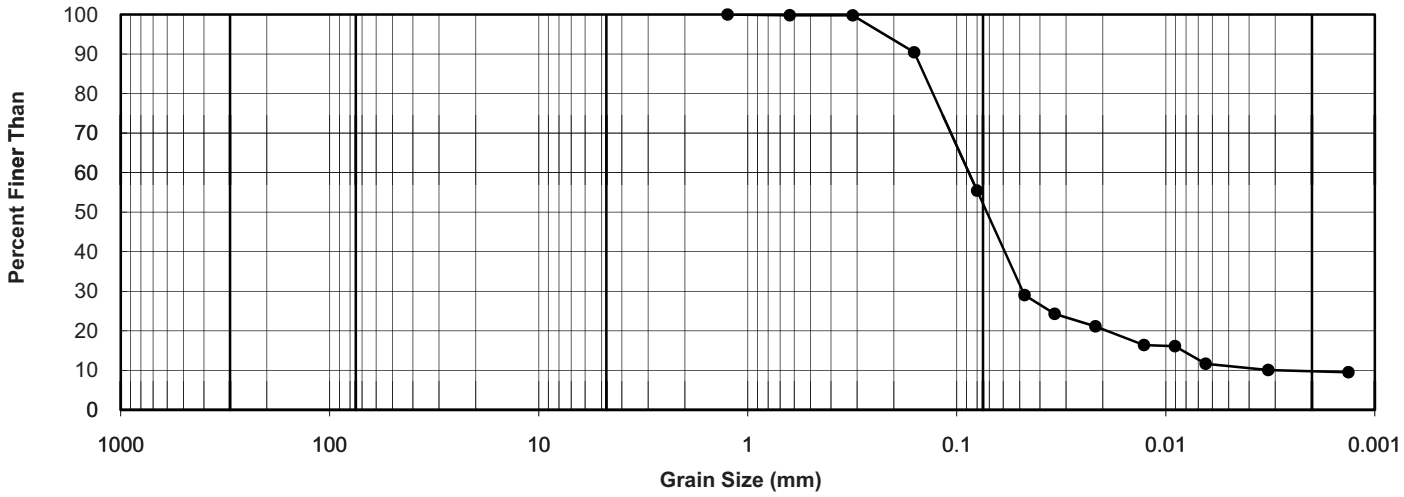
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM Canada	Date Sampled:			

Sample Number	SA2
Sample Location	GA11-T-10
Sampled By	JB
Source	Insitu
Sample Description	See bore logs
In situ Water Content	22.2
Date Tested	Tuesday, June 07, 2011
Tested By	TR
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
1.25	100.0	
0.6	99.8	
0.32	99.8	
0.16	90.5	
0.080	55.4	
0.047	29.0	Hydrometer
0.034	24.3	
0.022	21.1	
0.013	16.4	
0.009	16.1	
0.006	11.7	
0.003	10.1	
0.001	9.5	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 49.4 Silt% 40.9 Clay% 9.7

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 10:03:13 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

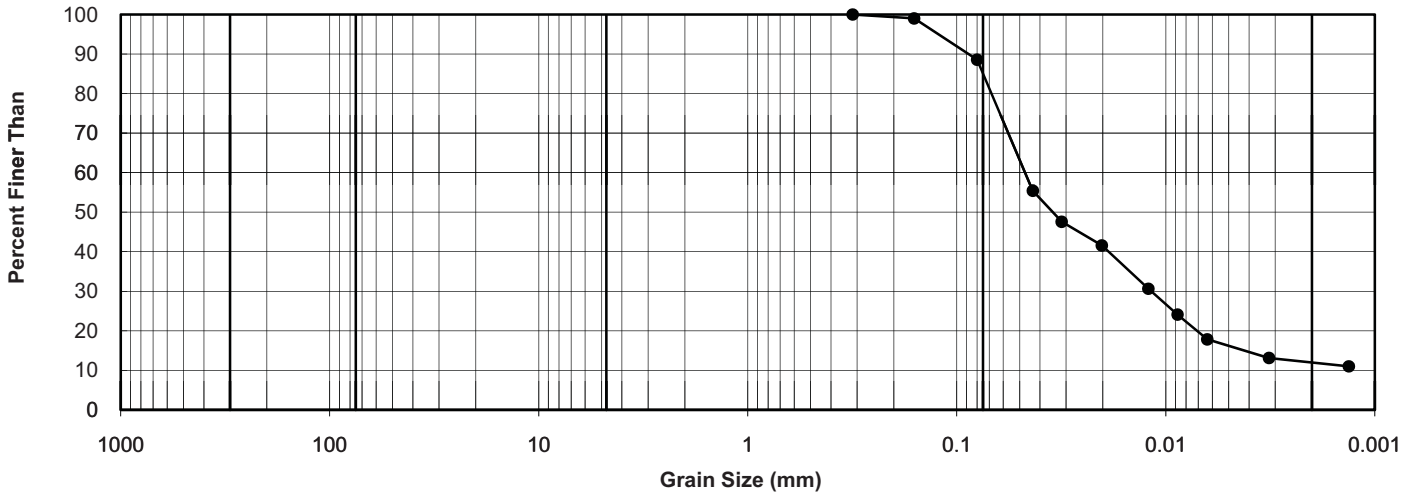
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM Canada	Date Sampled:			

Sample Number	SA6
Sample Location	GA11-T-10
Sampled By	JB
Source	Insitu
Sample Description	See bore logs
In situ Water Content	26.4
Date Tested	Tuesday, June 07, 2011
Tested By	TR
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.32	100.0	
0.16	99.0	
0.080	88.6	
0.043	55.4	Hydrometer
0.032	47.6	
0.020	41.6	
0.012	30.6	
0.009	24.1	
0.006	17.8	
0.003	13.1	
0.001	11.0	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 16.9 Silt% 71.4 Clay% 11.8

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 10:01:53 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

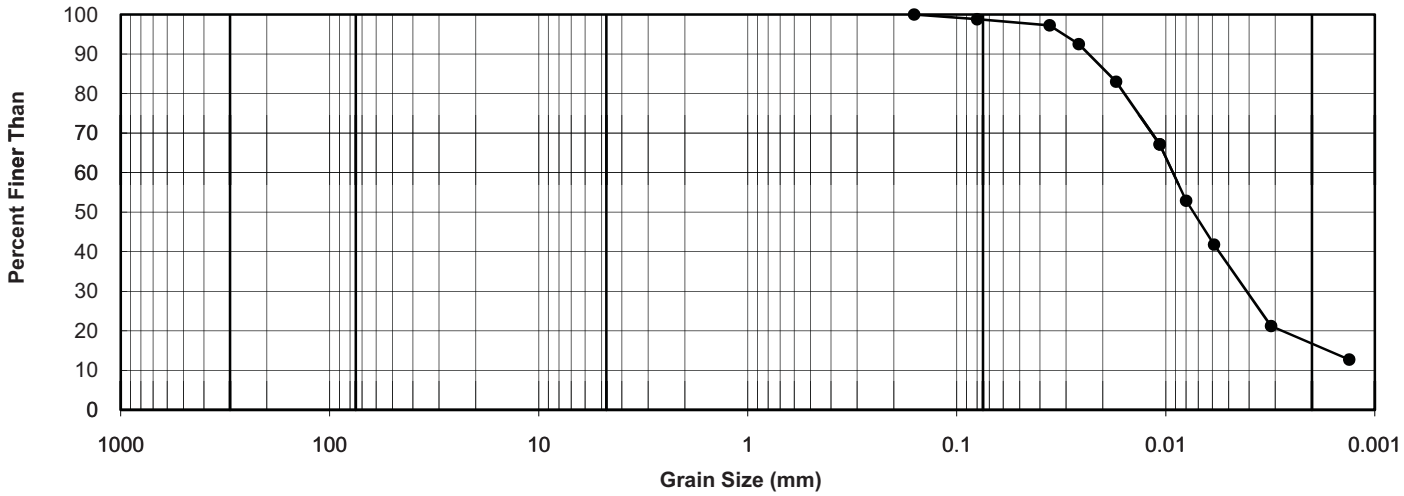
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM Canada	Date Sampled:			

Sample Number	SA10
Sample Location	GA11-T-10
Sampled By	JB
Source	Insitu
Sample Description	See bore logs
In situ Water Content	38.9
Date Tested	Tuesday, June 07, 2011
Tested By	TR
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.16	100.0	
0.080	98.8	
0.036	97.3	Hydrometer
0.026	92.5	
0.017	83.0	
0.011	67.2	
0.008	52.9	
0.006	41.8	
0.003	21.2	
0.001	12.7	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 1.4 Silt% 82.7 Clay% 15.9

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 09:59:54 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

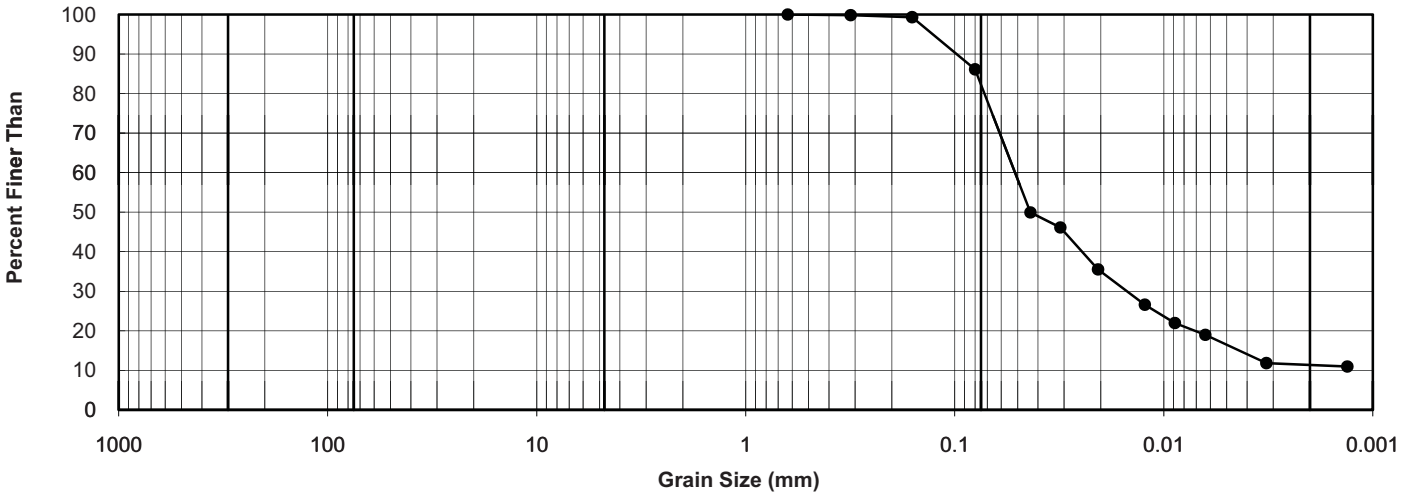
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2622
Short Title:	Giant Mine				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-11, SA3
Sample Location	Giant Mine
Sampled By	JB
Source	
Sample Description	
In situ Water Content	14.1
Date Tested	Wednesday, April 20, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.6	100.0	
0.32	99.8	
0.16	99.3	
0.080	86.1	
0.043	49.9	Hydrometer
0.031	46.1	
0.021	35.5	
0.012	26.6	
0.009	22.0	
0.006	19.0	
0.003	11.8	
0.001	11.0	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 19.8 Silt% 68.9 Clay% 11.3

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 11:06:22 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

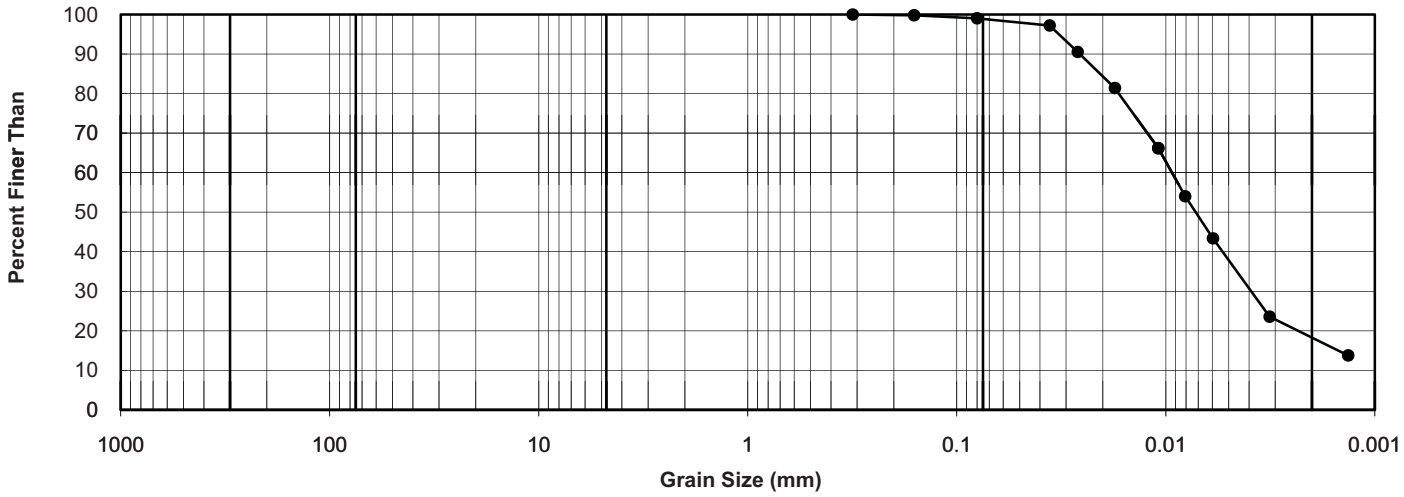
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Tailings Pond				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-11 SA5
Sample Location	Giant Mine
Sampled By	0.0
Source	
Sample Description	
In situ Water Content	32.4
Date Tested	Thursday, April 14, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.32	100.0	
0.16	99.8	
0.080	99.0	
0.036	97.2	Hydrometer
0.026	90.5	
0.018	81.4	
0.011	66.2	
0.008	54.0	
0.006	43.4	
0.003	23.6	
0.001	13.8	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel %	0.0	Sand %	1.2	Silt%	81.5	Clay%	17.3

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 15:23:54 -06'00'

Reviewed By:

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

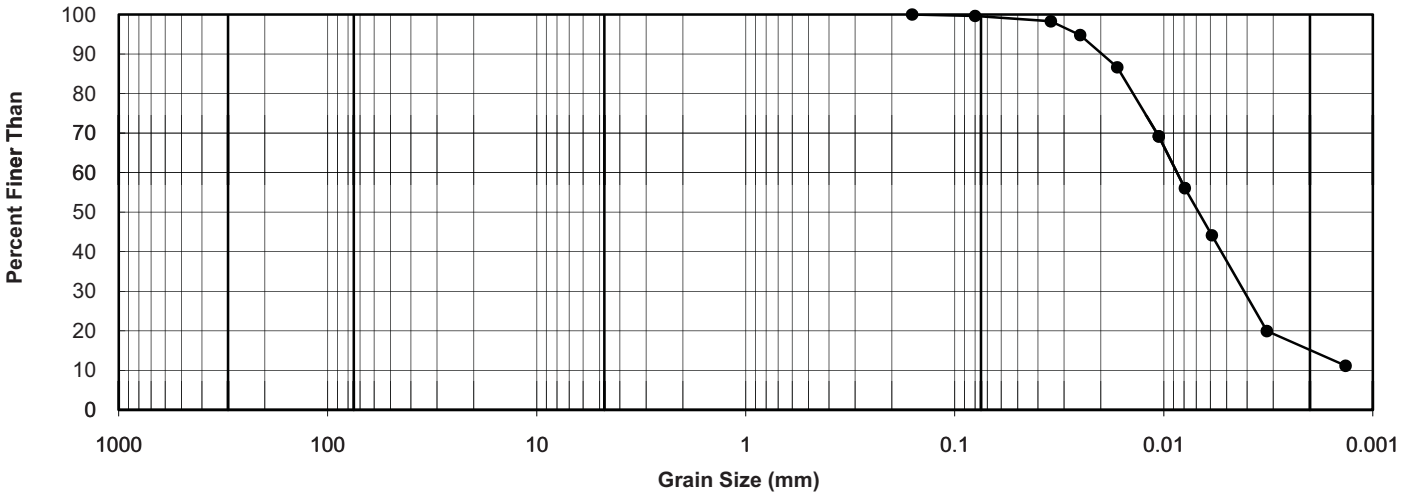
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Tailings Pond				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-11 SA7
Sample Location	Giant Mine
Sampled By	0.0
Source	
Sample Description	
In situ Water Content	40.6
Date Tested	Thursday, April 14, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.16	100.0	
0.080	99.6	
0.035	98.3	Hydrometer
0.025	94.8	
0.017	86.6	
0.011	69.2	
0.008	56.1	
0.006	44.1	
0.003	19.9	
0.001	11.1	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 0.5 Silt% 85.2 Clay% 14.2

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 15:19:28 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

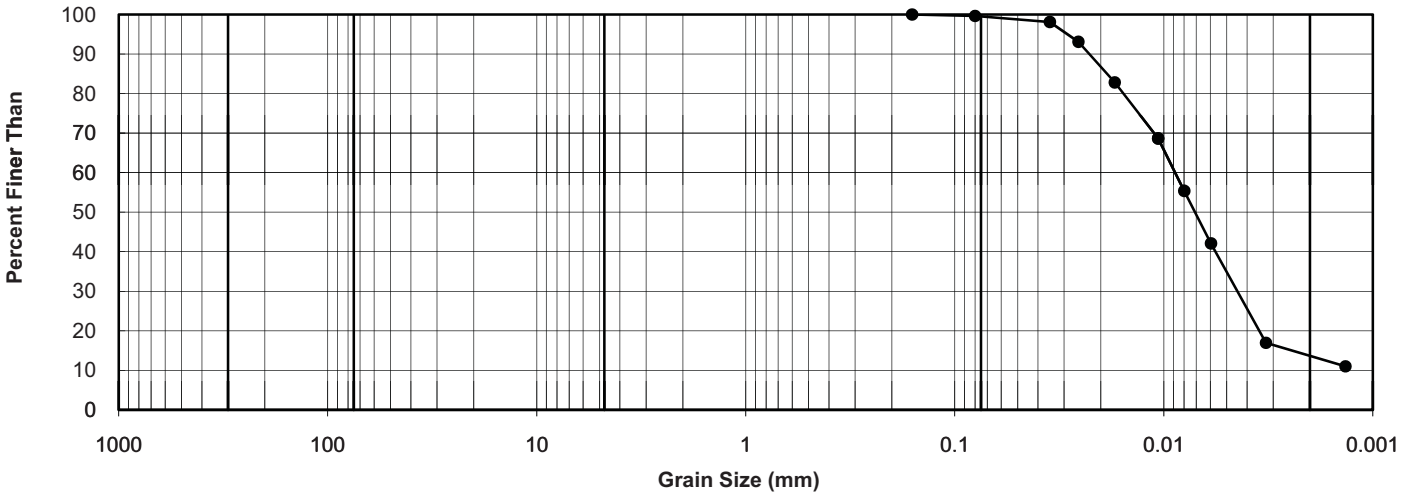
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Tailings Pond				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-11 SA9
Sample Location	Giant Mine
Sampled By	0.0
Source	
Sample Description	
In situ Water Content	33.3
Date Tested	Wednesday, April 13, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.16	100.0	
0.080	99.6	
0.035	98.1	Hydrometer
0.026	93.1	
0.017	82.8	
0.011	68.7	
0.008	55.4	
0.006	42.1	
0.003	17.0	
0.001	11.0	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 0.6 Silt% 86.4 Clay% 13.0

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 15:22:19 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

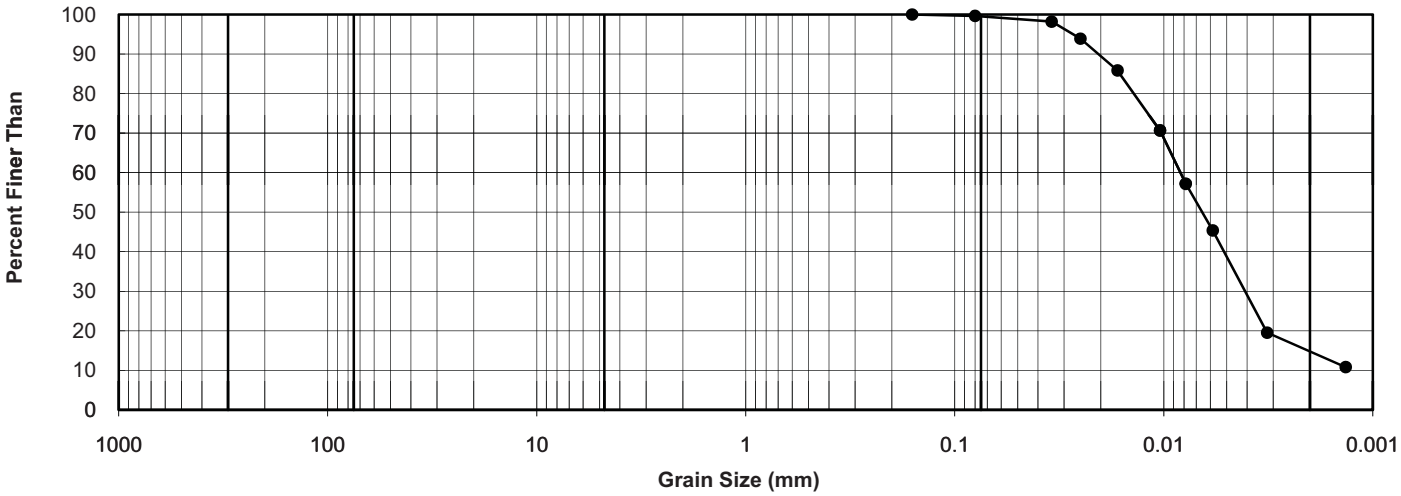
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Tailings Pond				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-11 SA11
Sample Location	Giant Mine
Sampled By	0.0
Source	
Sample Description	
In situ Water Content	39.1
Date Tested	Wednesday, April 13, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.16	100.0	
0.080	99.6	
0.034	98.2	Hydrometer
0.025	93.9	
0.017	85.8	
0.010	70.7	
0.008	57.2	
0.006	45.4	
0.003	19.5	
0.001	10.8	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel %	0.0	Sand %	0.6	Silt%	85.6	Clay%	13.9

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 15:23:16 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

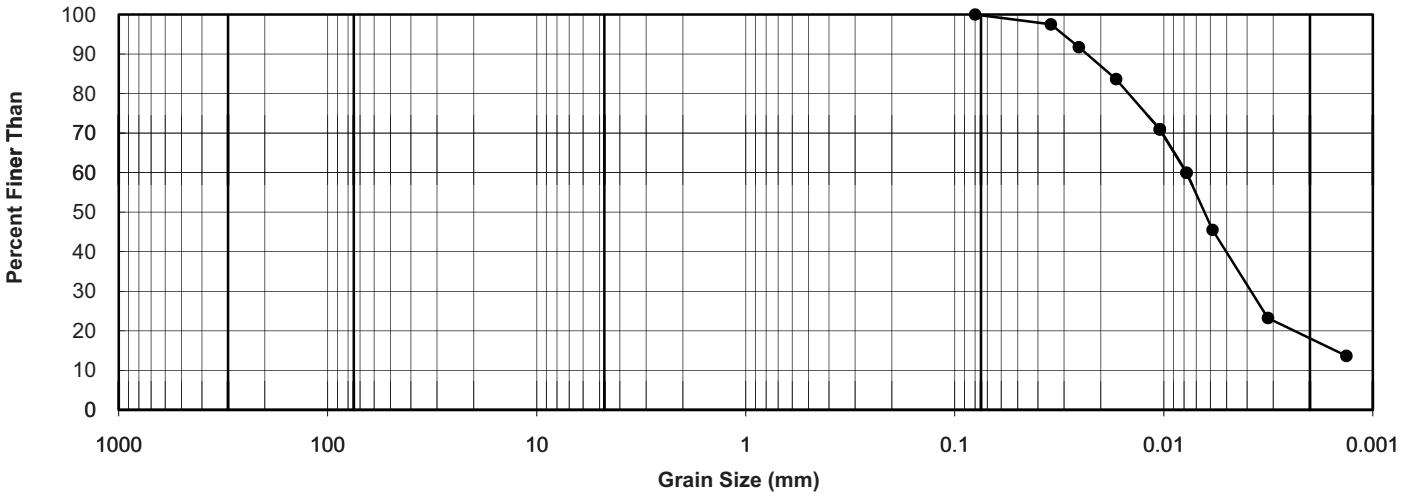
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Tailings Pond				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-11 SA13
Sample Location	Giant Mine
Sampled By	0.0
Source	
Sample Description	
In situ Water Content	35.1
Date Tested	Thursday, April 14, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.080	100.0	
0.035	97.5	Hydrometer
0.025	91.7	
0.017	83.7	
0.010	70.9	
0.008	60.0	
0.006	45.5	
0.003	23.2	
0.001	13.7	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 0.3 Silt% 82.6 Clay% 17.1

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 15:21:13 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

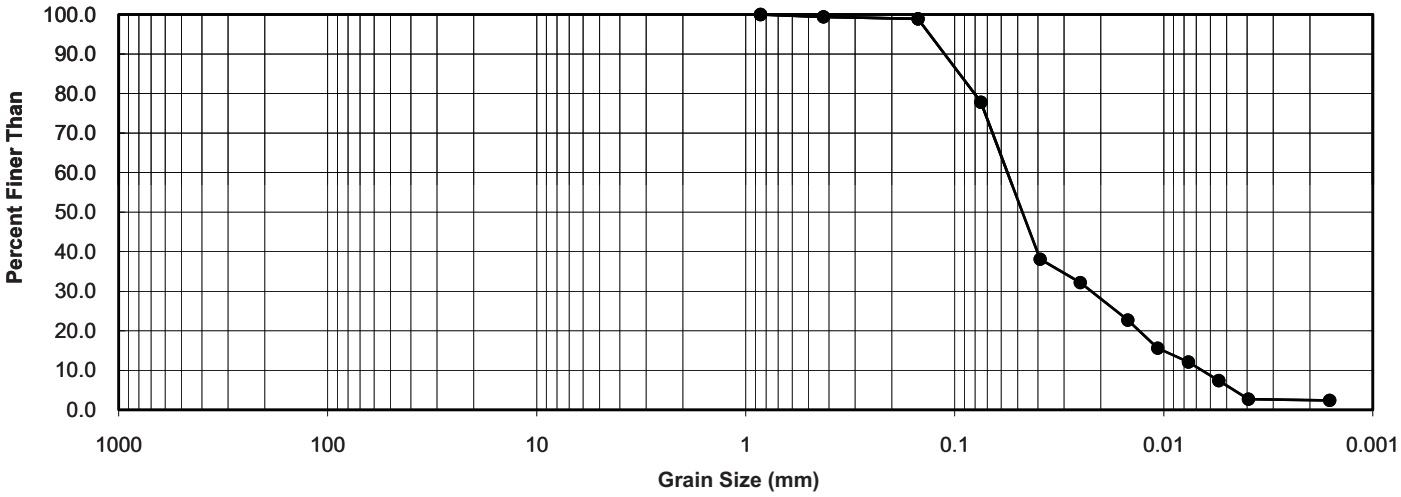
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	Report Number: A2615
Short Title:	Giant Mine Tailings Pond		
Client:	AECOM	Date Sampled:	

Sample Number	GA11-T-12, SA6
Sample Location	Giant Mine
Sampled By	JB
Source	
Sample Description	
In situ Water Content	28.9
Date Tested	Tuesday, April 05, 2011
Tested By	JF/AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.9	100.0	
0.43	99.4	
0.15	98.9	
0.075	77.8	
0.039	38.1	Hydrometer
0.025	32.2	
0.015	22.7	
0.011	15.6	
0.008	12.1	
0.005	7.4	
0.004	2.7	
0.002	2.4	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 22.2 Silt% 75.4 Clay% 2.4

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.19 08:33:51 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

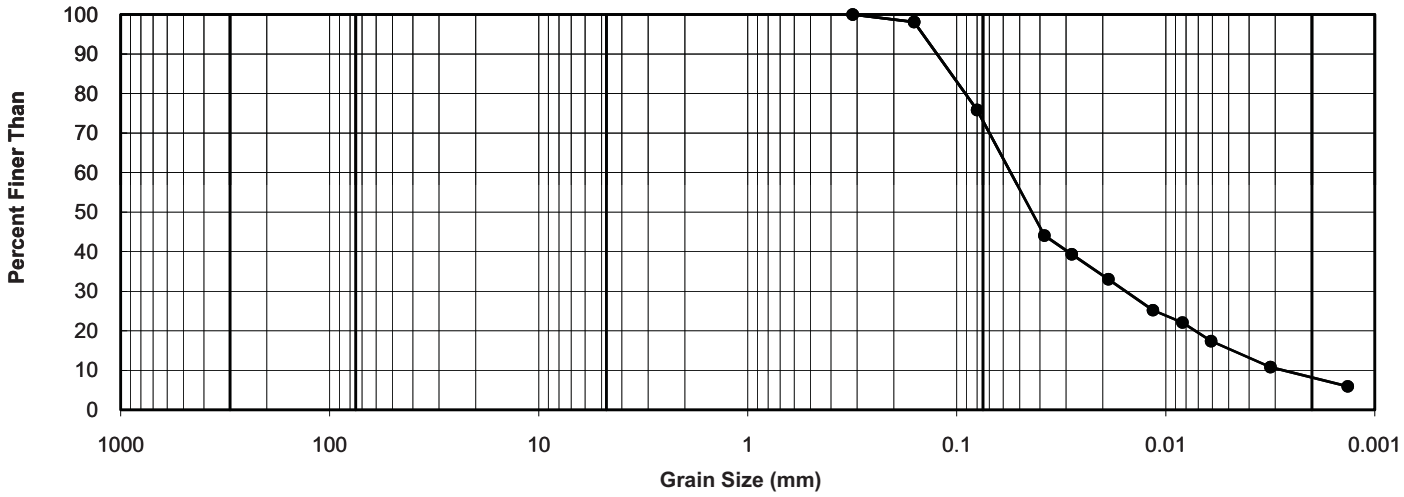
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-12, SA8
Sample Location	Giant Mine
Sampled By	JB
Source	
Sample Description	
In situ Water Content	30.7
Date Tested	Friday, April 08, 2011
Tested By	AC/JF
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.9	100.0	
0.43	99.8	
0.15	99.1	
0.075	98.0	
0.032	95.6	Hydrometer
0.021	86.5	
0.012	77.4	
0.009	70.6	
0.007	54.7	
0.005	38.9	
0.004	18.5	
0.002	6.9	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 2.0 Silt% 91.1 Clay% 6.9

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.19 16:32:39 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

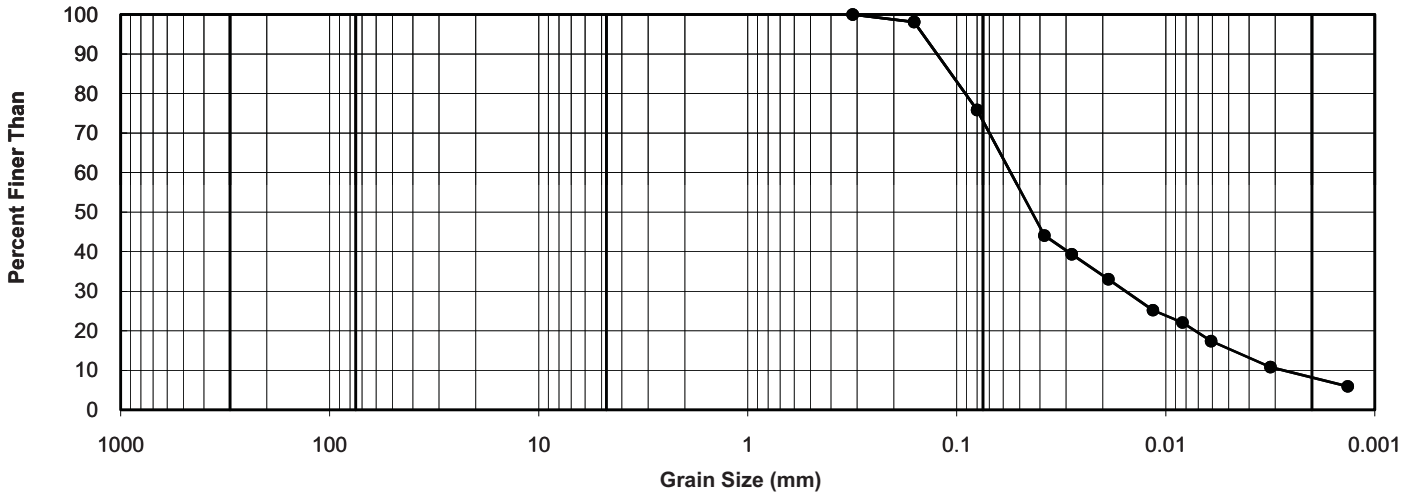
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-12, SA10
Sample Location	Giant Mine
Sampled By	JB
Source	
Sample Description	
In situ Water Content	32.4
Date Tested	Friday, April 08, 2011
Tested By	AC/JF
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.43	100.0	
0.15	99.1	
0.075	96.8	
0.032	90.6	Hydrometer
0.020	86.3	
0.012	79.8	
0.009	65.9	
0.007	54.0	
0.005	41.1	
0.004	17.5	
0.002	7.6	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel %	0.0	Sand %	3.2	Silt%	89.2	Clay%	7.6

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.19 16:36:53 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

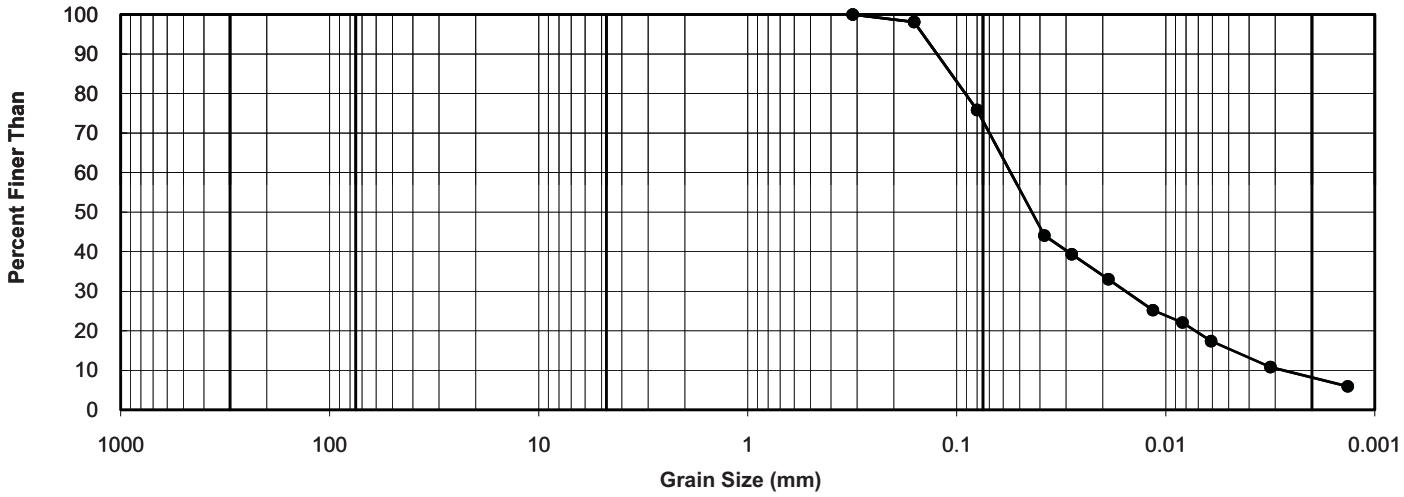
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number: A2615
Short Title:	Giant Mine			
Client:	AECOM	Date Sampled:		

Sample Number	GA11-T-12, SA13
Sample Location	Giant Mine
Sampled By	JB
Source	
Sample Description	
In situ Water Content	19.2
Date Tested	Friday, April 08, 2011
Tested By	AC/JF
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.43	100.0	
0.15	94.7	
0.075	69.7	
0.037	45.1	Hydrometer
0.024	38.3	
0.014	28.6	
0.010	21.7	
0.007	18.9	
0.005	13.0	
0.004	4.2	
0.002	2.0	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 30.3 Silt% 67.7 Clay% 2.0

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.19 16:06:44 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

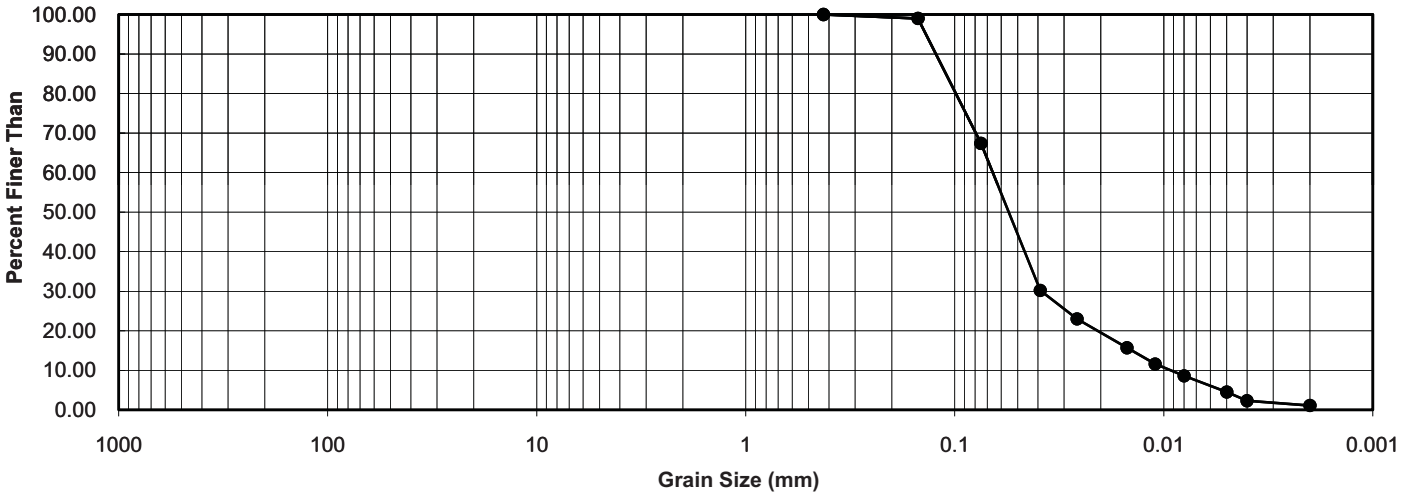
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine- Tailing pond				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-12, SA15
Sample Location	Giant Mine
Sampled By	0.0
Source	
Sample Description	
In situ Water Content	21.0
Date Tested	Tuesday, April 05, 2011
Tested By	AC/JF
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.43	100.0	
0.15	99.0	
0.075	67.4	
0.039	30.2	Hydrometer
0.026	23.0	
0.015	15.7	
0.011	11.6	
0.008	8.6	
0.005	4.5	
0.004	2.3	
0.002	1.1	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 32.6 Silt% 47.4 Clay% 20.0

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.18 09:58:29 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

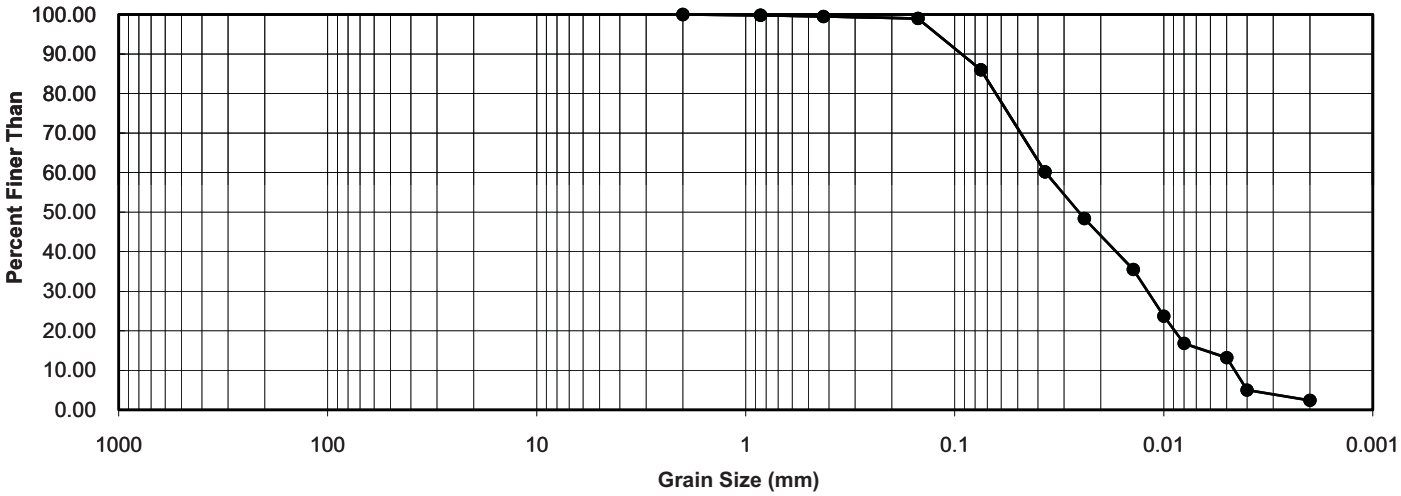
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine- Tailing pond				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-12, SA17
Sample Location	Giant Mine
Sampled By	0.0
Source	
Sample Description	
In situ Water Content	26.3
Date Tested	Tuesday, April 05, 2011
Tested By	AC/JF
Remarks:	2.4
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
2.00	100.0	
0.85	99.8	
0.43	99.5	
0.15	99.0	
0.075	86.0	
0.037	60.2	Hydrometer
0.024	48.4	
0.014	35.5	
0.010	23.7	
0.008	16.8	
0.005	13.2	
0.004	5.0	
0.002	2.4	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 14.0 Silt% 83.6 Clay% 2.4

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.19 08:29:33 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

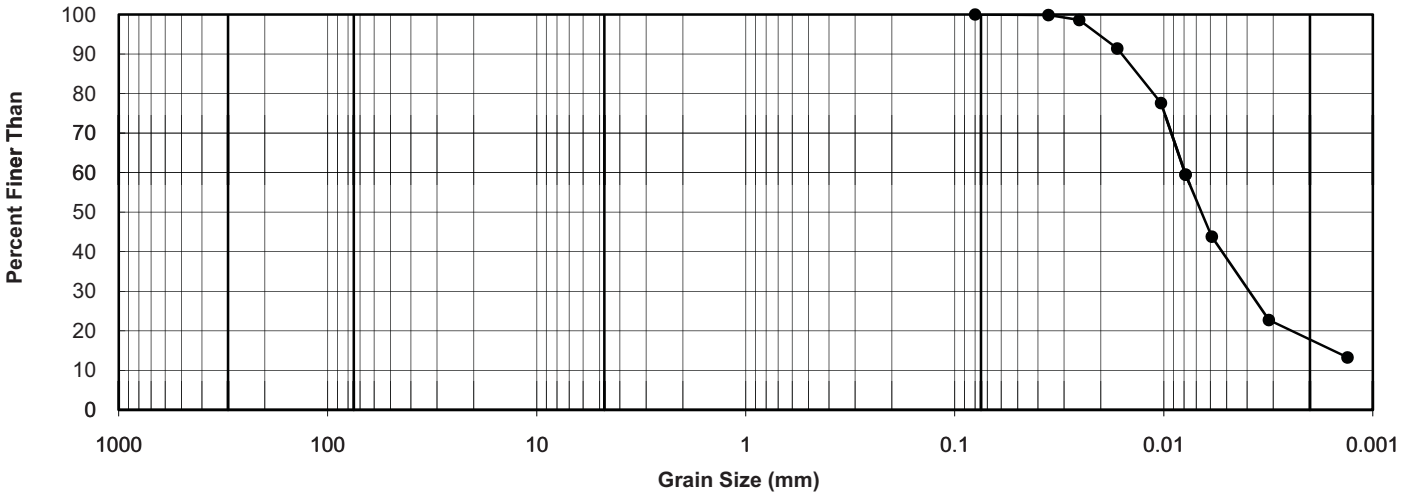
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2622
Short Title:	Giant Mine				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-13, SA3
Sample Location	Giant Mine
Sampled By	JB
Source	
Sample Description	
In situ Water Content	40.5
Date Tested	Wednesday, April 20, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.080	100.0	
0.036	99.9	Hydrometer
0.025	98.6	
0.017	91.4	
0.010	77.6	
0.008	59.5	
0.006	43.8	
0.003	22.7	
0.001	13.3	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel %	0.0	Sand %	0.0	Silt%	83.2	Clay%	16.8

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 11:05:25 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

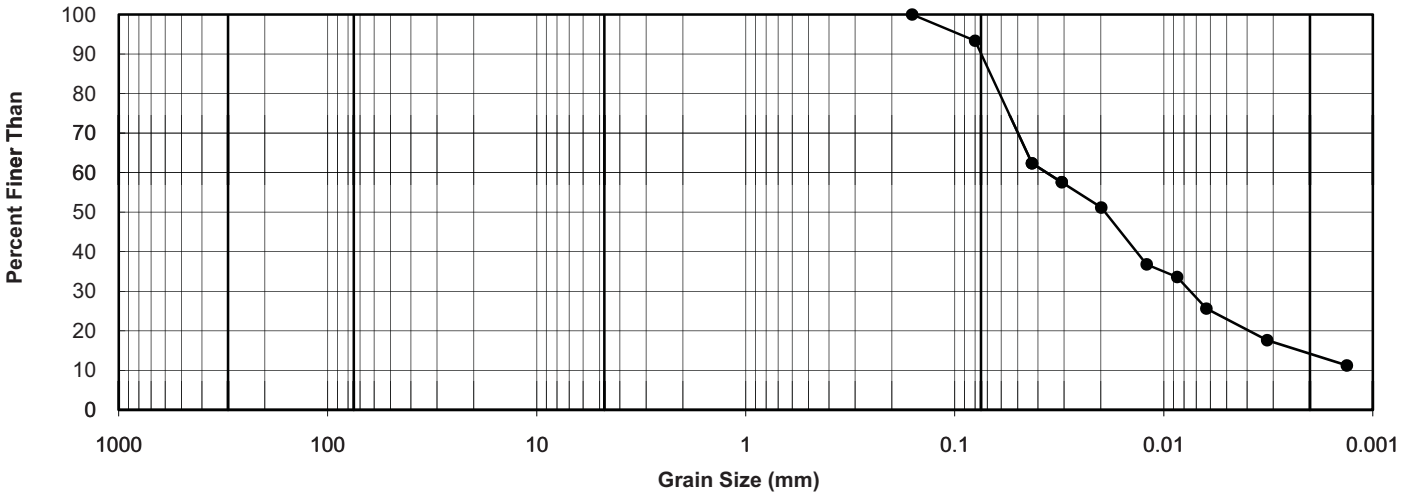
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM Canada	Date Sampled:			

Sample Number	SA06
Sample Location	GA11-T-13
Sampled By	JB
Source	Insitu
Sample Description	See bore logs
In situ Water Content	25.1
Date Tested	Wednesday, June 08, 2011
Tested By	TR
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.16	100.0	
0.080	93.4	
0.043	62.4	Hydrometer
0.031	57.6	
0.020	51.2	
0.012	36.8	
0.009	33.6	
0.006	25.6	
0.003	17.6	
0.001	11.2	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 11.6 Silt% 74.9 Clay% 13.5

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 15:20:35 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

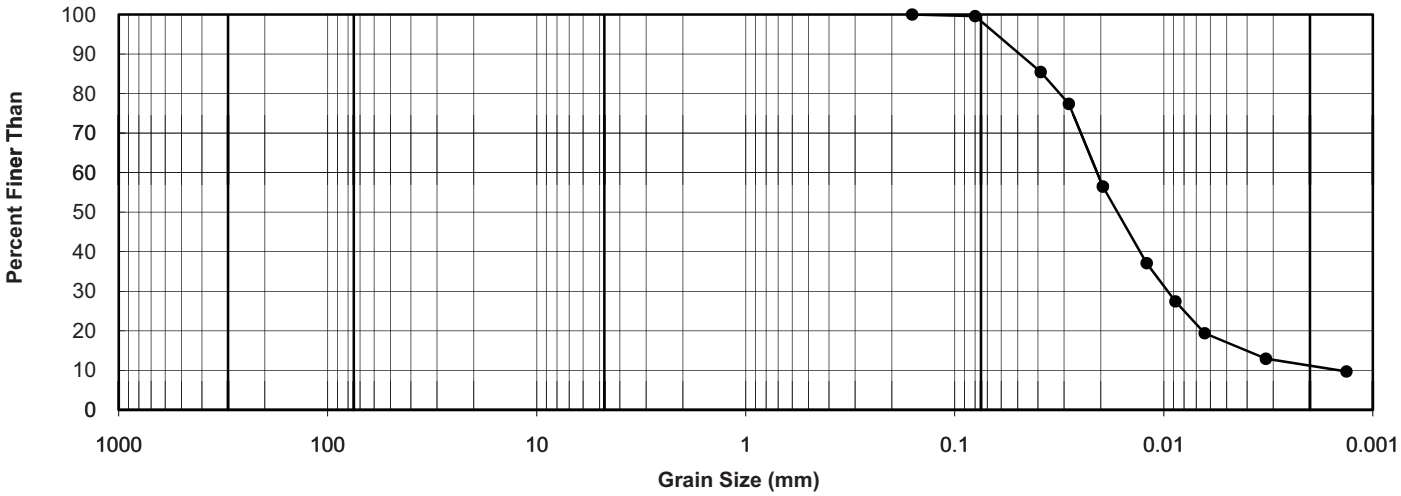
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM Canada	Date Sampled:			

Sample Number	SA08
Sample Location	GA11-T-13
Sampled By	JB
Source	Insitu
Sample Description	See bore logs
In situ Water Content	24.4
Date Tested	Wednesday, June 08, 2011
Tested By	TR
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.16	100.0	
0.080	99.6	
0.039	85.5	Hydrometer
0.028	77.4	
0.020	56.4	
0.012	37.1	
0.009	27.4	
0.006	19.4	
0.003	12.9	
0.001	9.7	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 2.5 Silt% 86.7 Clay% 10.8

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 15:19:39 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

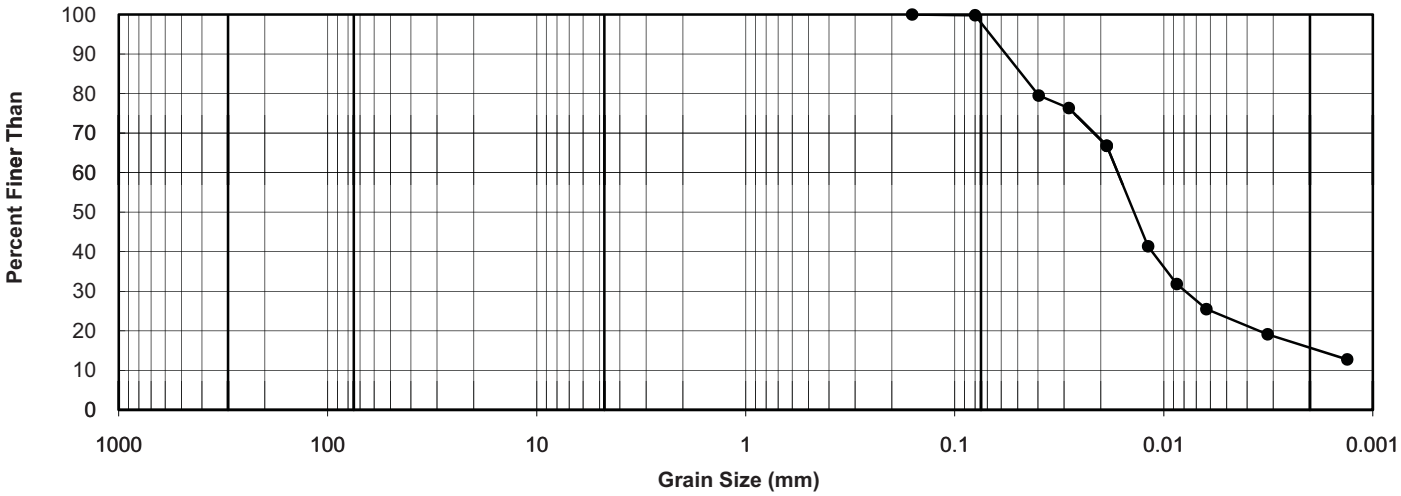
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM Canada	Date Sampled:			

Sample Number	SA10
Sample Location	GA11-T-13
Sampled By	JB
Source	Insitu
Sample Description	See bore logs
In situ Water Content	26.6
Date Tested	Wednesday, June 08, 2011
Tested By	TR
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.16	100.0	
0.080	99.8	
0.040	79.5	Hydrometer
0.028	76.3	
0.019	66.8	
0.012	41.4	
0.009	31.8	
0.006	25.5	
0.003	19.1	
0.001	12.8	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 3.2 Silt% 81.7 Clay% 15.1

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 15:18:38 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

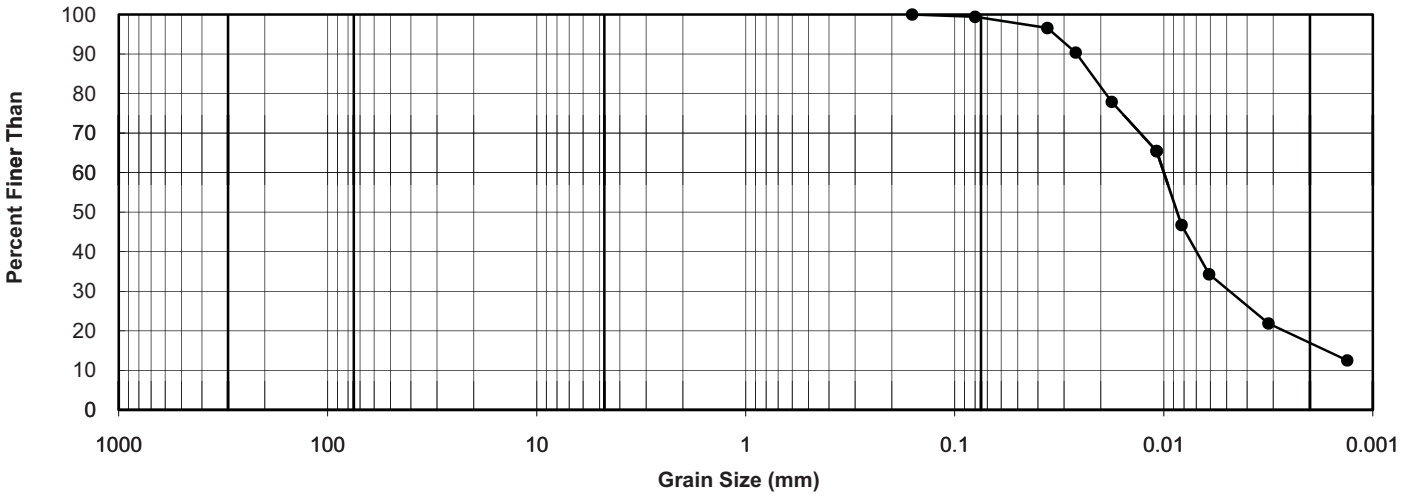
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM Canada	Date Sampled:			

Sample Number	SA12
Sample Location	GA11-T-13
Sampled By	JB
Source	Insitu
Sample Description	See bore logs
In situ Water Content	31.4
Date Tested	Wednesday, June 08, 2011
Tested By	TR
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.16	100.0	
0.080	99.4	
0.036	96.6	Hydrometer
0.026	90.4	
0.018	77.9	
0.011	65.4	
0.008	46.8	
0.006	34.3	
0.003	21.8	
0.001	12.5	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 1.0 Silt% 83.1 Clay% 15.9

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 15:17:38 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

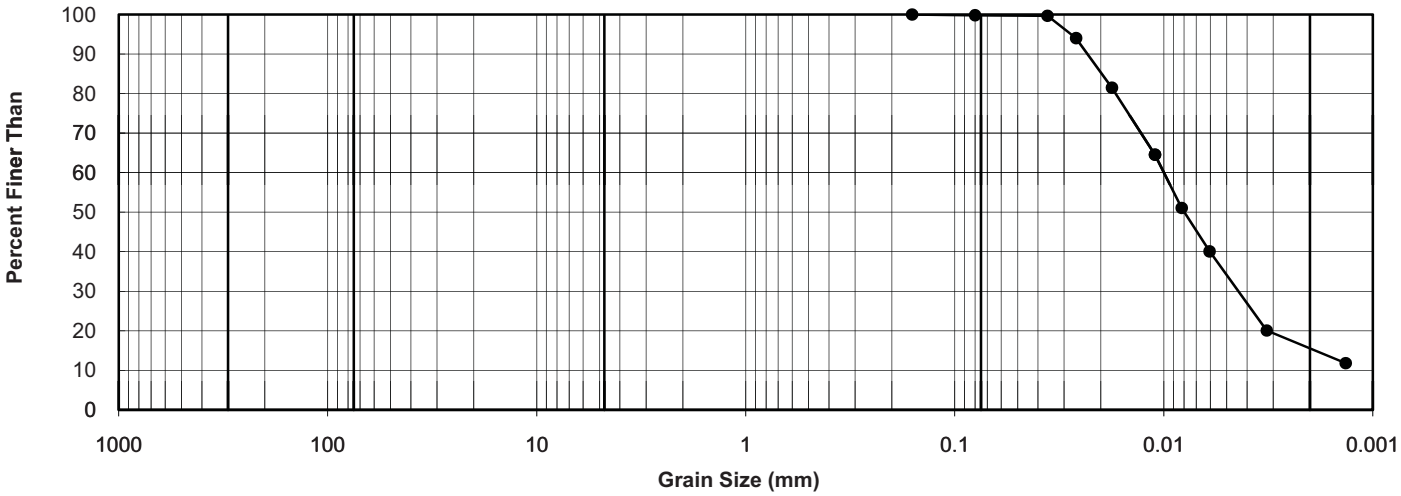
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Tailings Pond				
Client:	AECOM	Date Sampled:	January 0, 1900		

Sample Number	GA11-T-14 SA6
Sample Location	Giant Mine
Sampled By	0.0
Source	0.0
Sample Description	0
In situ Water Content	31.1
Date Tested	Wednesday, April 13, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.16	100.0	
0.080	99.8	
0.036	99.7	Hydrometer
0.026	94.0	
0.018	81.5	
0.011	64.5	
0.008	51.1	
0.006	40.1	
0.003	20.1	
0.001	11.8	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel %	0.0	Sand %	0.2	Silt%	85.1	Clay%	14.7

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 10:59:56 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

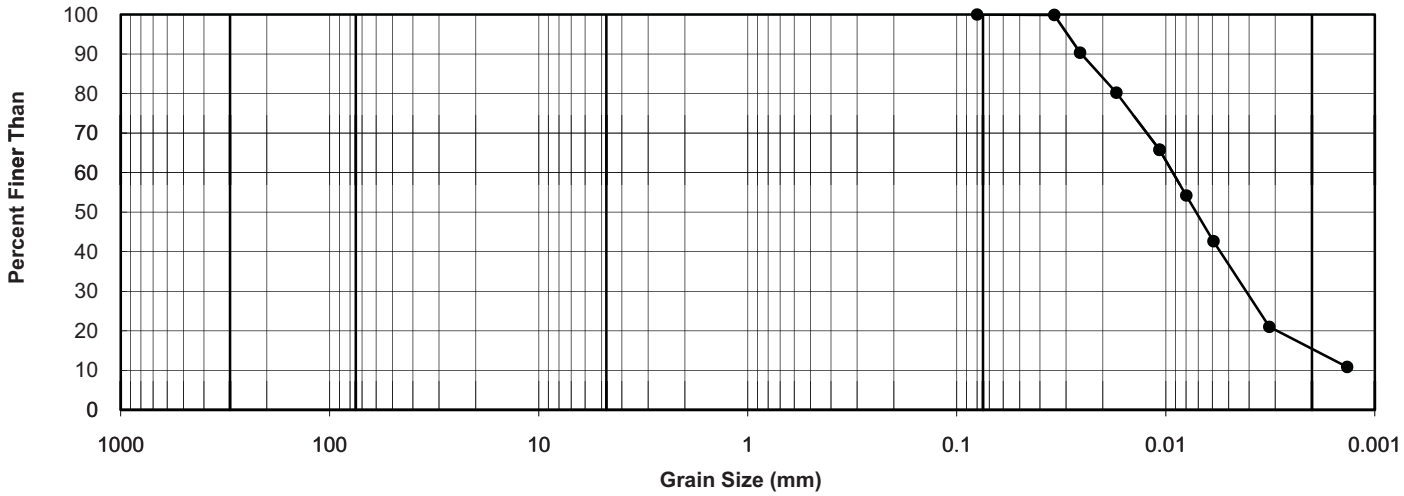
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Tailings Pond				
Client:	AECOM	Date Sampled:	January 0, 1900		

Sample Number	GA11-T-14 SA8
Sample Location	Giant Mine
Sampled By	0.0
Source	0.0
Sample Description	0
In situ Water Content	32.9
Date Tested	Friday, April 15, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.080	100.0	
0.034	99.9	Hydrometer
0.026	90.4	
0.017	80.2	
0.011	65.8	
0.008	54.2	
0.006	42.7	
0.003	21.0	
0.001	10.9	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 0.0 Silt% 85.6 Clay% 14.4

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 10:56:45 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

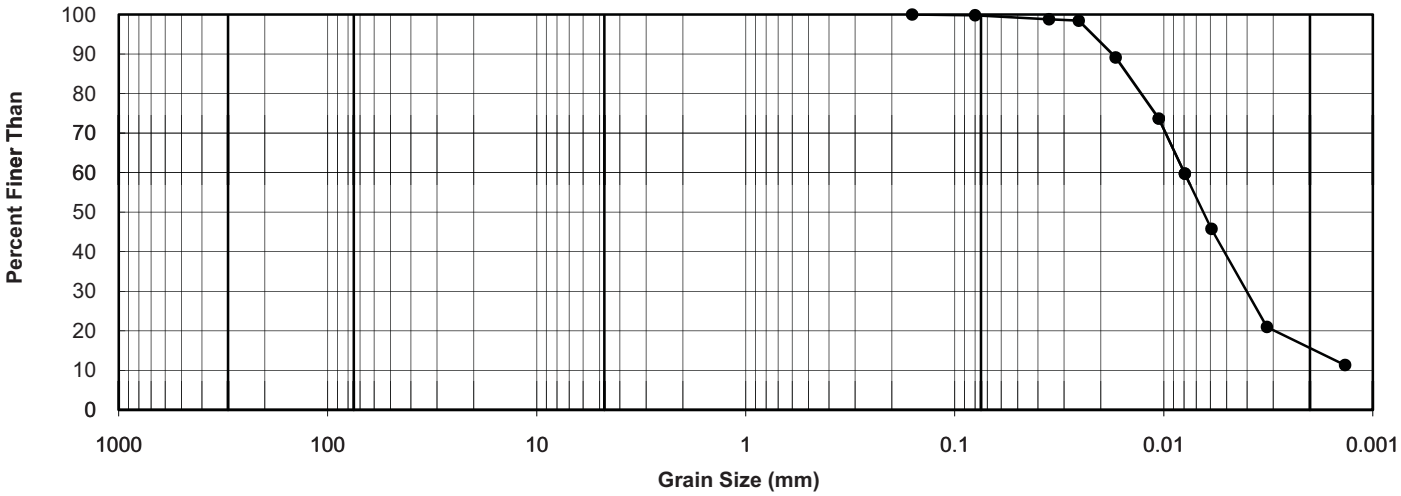
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Tailings Pond				
Client:	AECOM	Date Sampled:	January 0, 1900		

Sample Number	GA11-T-14 SA10
Sample Location	Giant Mine
Sampled By	0.0
Source	0.0
Sample Description	0
In situ Water Content	36.4
Date Tested	Friday, April 15, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.16	100.0	
0.080	99.8	
0.035	98.8	Hydrometer
0.026	98.4	
0.017	89.1	
0.011	73.7	
0.008	59.7	
0.006	45.8	
0.003	21.0	
0.001	11.3	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel %	0.0	Sand %	0.3	Silt%	85.0	Clay%	14.7

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 10:55:49 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

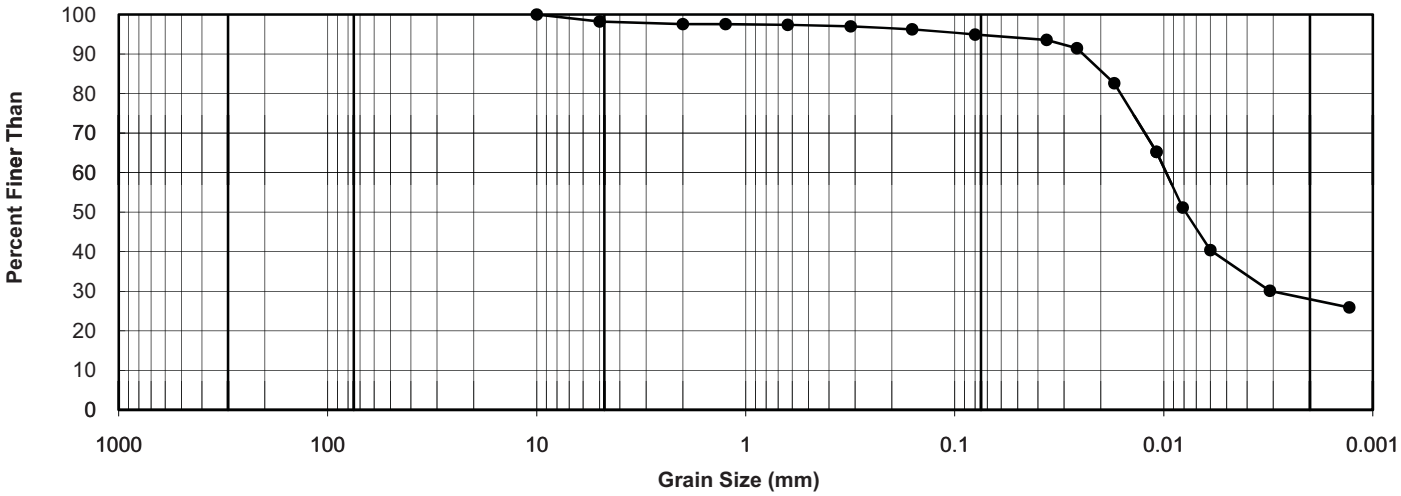
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-14, SA12
Sample Location	Giant Mine
Sampled By	JB
Source	
Sample Description	
In situ Water Content	26.3
Date Tested	Friday, April 15, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
10	100.0	
5	98.2	
2.0	97.6	
1.25	97.6	
0.6	97.4	
0.32	97.0	
0.16	96.2	
0.080	94.9	
0.036	93.6	Hydrometer
0.026	91.5	
0.017	82.6	
0.011	65.2	
0.008	51.2	
0.006	40.4	
0.003	30.1	
0.001	25.9	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 1.8 Sand % 3.5 Silt% 67.2 Clay% 27.5

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 11:04:26 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

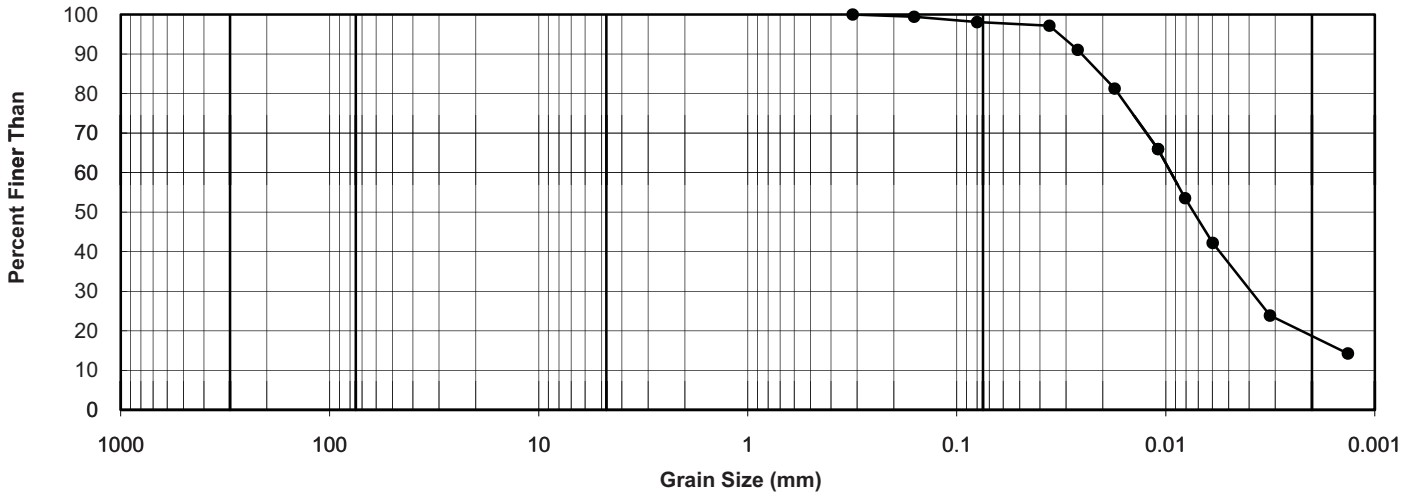
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Tailings Pond				
Client:	AECOM	Date Sampled:	January 0, 1900		

Sample Number	GA11-T-14 SA14
Sample Location	Giant Mine
Sampled By	0.0
Source	0.0
Sample Description	0
In situ Water Content	32.1
Date Tested	Friday, April 15, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.32	100.0	
0.16	99.4	
0.080	98.1	
0.036	97.2	Hydrometer
0.026	91.0	
0.018	81.3	
0.011	66.0	
0.008	53.5	
0.006	42.2	
0.003	23.9	
0.001	14.2	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel %	0.0	Sand %	2.1	Silt%	80.3	Clay%	17.7

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 11:09:17 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

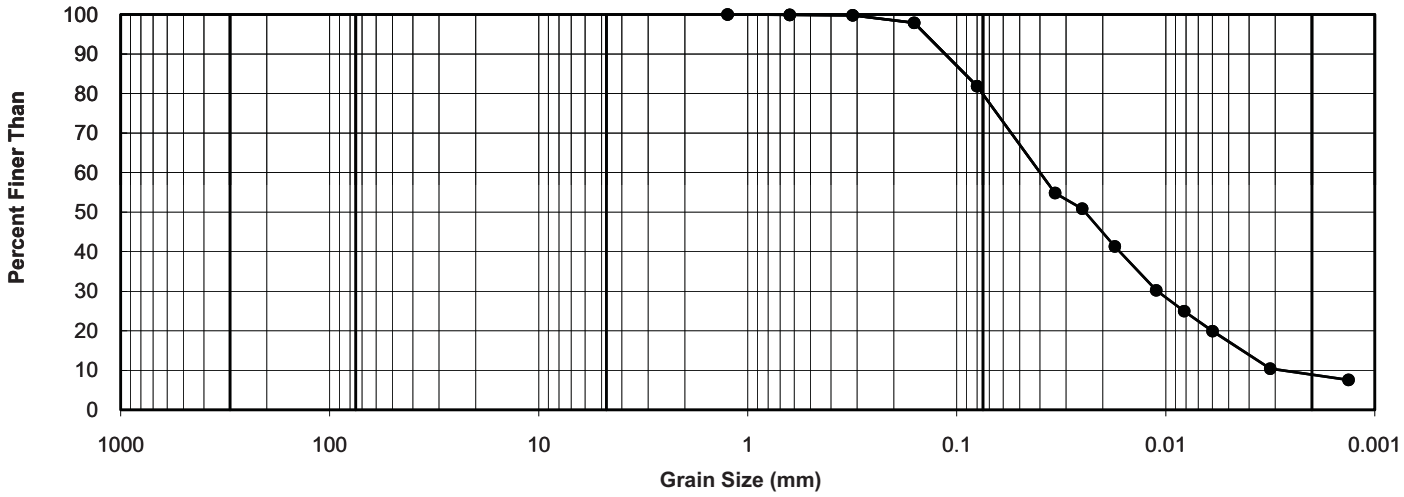
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-15, SA3
Sample Location	Giant Mine
Sampled By	JB
Source	
Sample Description	
In situ Water Content	21.9
Date Tested	Friday, April 08, 2011
Tested By	AC/JF
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
1.25	100.0	
0.6	99.9	
0.32	99.8	
0.16	97.9	
0.080	81.9	
0.034	54.9	Hydrometer
0.025	50.9	
0.018	41.3	
0.011	30.2	
0.008	25.0	
0.006	19.9	
0.003	10.4	
0.001	7.6	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 21.6 Silt% 69.7 Clay% 8.6

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.18 09:35:36 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

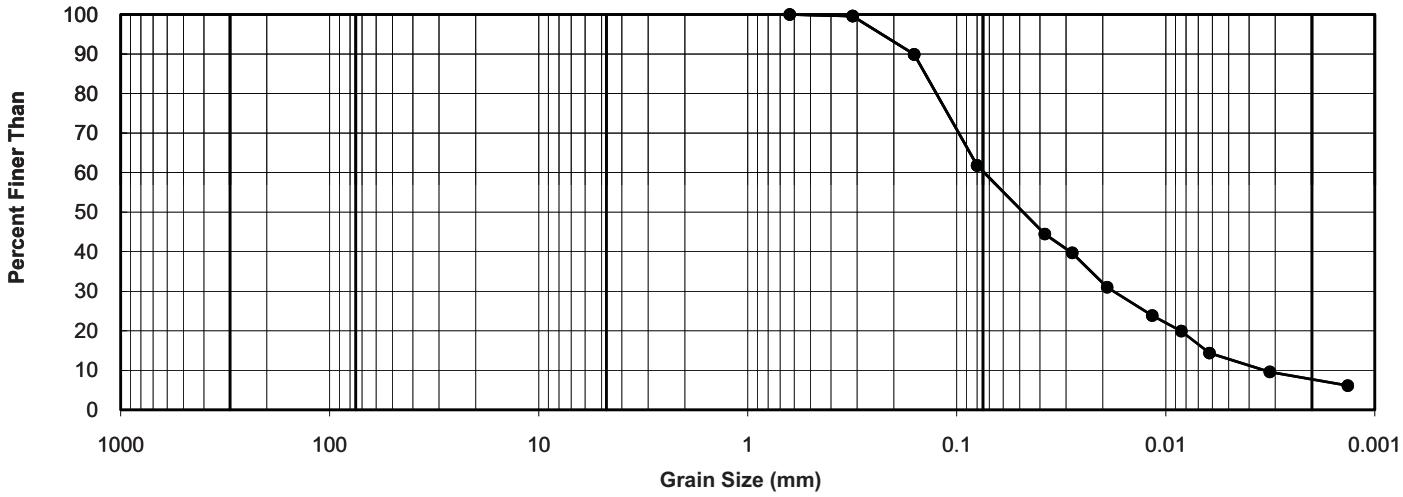
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-15, SA5
Sample Location	Giant Mine
Sampled By	JB
Source	
Sample Description	
In situ Water Content	18.2
Date Tested	Friday, April 08, 2011
Tested By	AC/JF
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.6	100.0	
0.32	99.6	
0.16	89.9	
0.080	61.8	
0.038	44.5	Hydrometer
0.028	39.7	
0.019	31.0	
0.012	23.9	
0.008	19.9	
0.006	14.4	
0.003	9.6	
0.001	6.1	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel %	0.0	Sand %	40.7	Silt%	52.0	Clay%	7.4

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.19 16:42:39 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

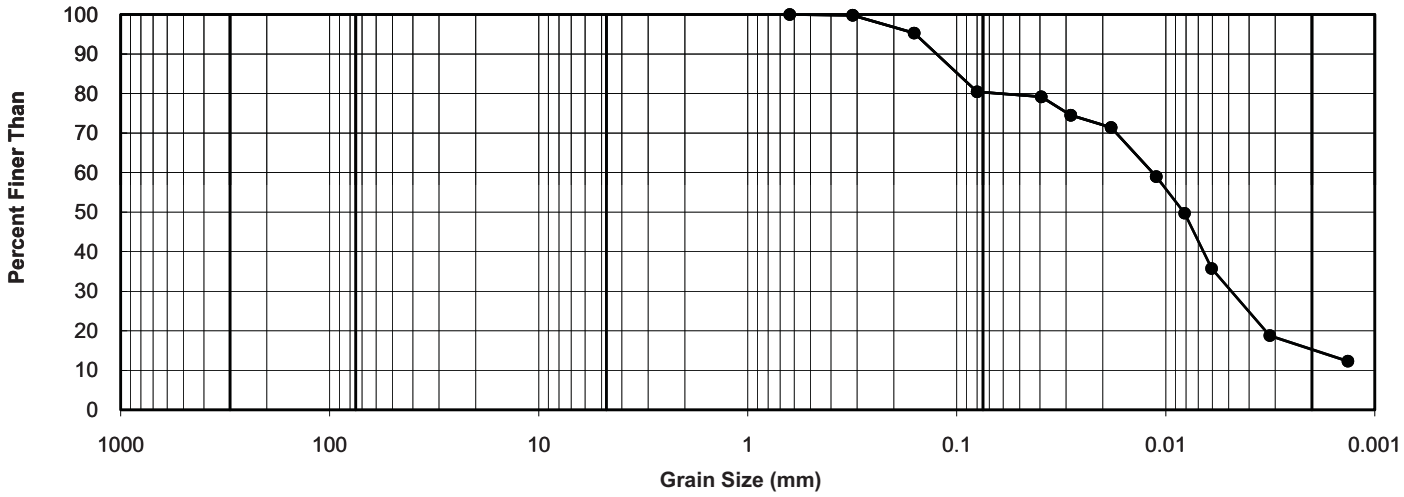
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-15, 7A
Sample Location	Giant Mine
Sampled By	JB
Source	
Sample Description	
In situ Water Content	31.3
Date Tested	Friday, April 08, 2011
Tested By	AC/JF
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.6	100.0	
0.32	99.8	
0.16	95.3	
0.080	80.4	
0.039	79.2	Hydrometer
0.029	74.5	
0.018	71.4	
0.011	59.0	
0.008	49.7	
0.006	35.8	
0.003	18.8	
0.001	12.3	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 19.7 Silt% 65.6 Clay% 14.6

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.18 09:35:50 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

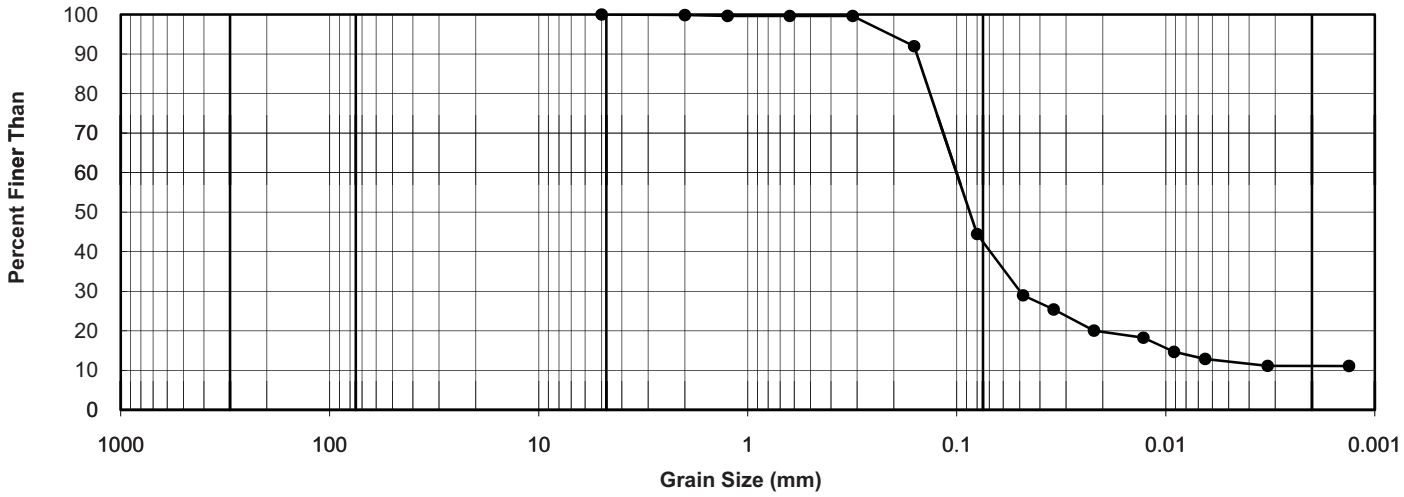
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM Canada	Date Sampled:			

Sample Number	SA3
Sample Location	GA11-T-16
Sampled By	JB
Source	Insitu
Sample Description	See Bore Logs
In situ Water Content	24.4
Date Tested	Monday, May 30, 2011
Tested By	HVD
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
5	100.0	
2.0	99.9	
1.25	99.6	
0.6	99.6	
0.32	99.6	
0.16	92.0	
0.080	44.5	
0.048	29.0	Hydrometer
0.034	25.4	
0.022	20.0	
0.013	18.2	
0.009	14.7	
0.006	12.9	
0.003	11.1	
0.001	11.1	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 58.5 Silt% 30.4 Clay% 11.1

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.03 14:47:31 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

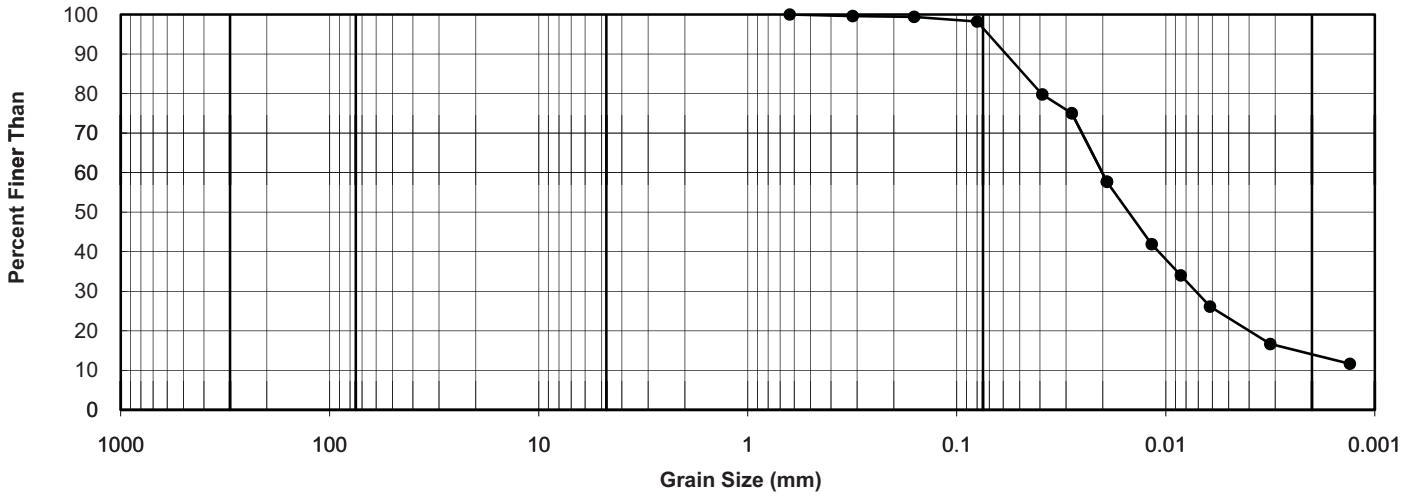
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM Canada	Date Sampled:			

Sample Number	SA6
Sample Location	GA11-T-16
Sampled By	JB
Source	Insitu
Sample Description	See Bore Logs
In situ Water Content	49.7
Date Tested	Tuesday, May 31, 2011
Tested By	HVD
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.6	100.0	
0.32	99.6	
0.16	99.4	
0.080	98.2	
0.039	79.8	Hydrometer
0.028	75.0	
0.019	57.7	
0.012	41.9	
0.008	34.0	
0.006	26.1	
0.003	16.7	
0.001	11.6	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 4.5 Silt% 82.0 Clay% 13.5

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.03 13:38:33 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

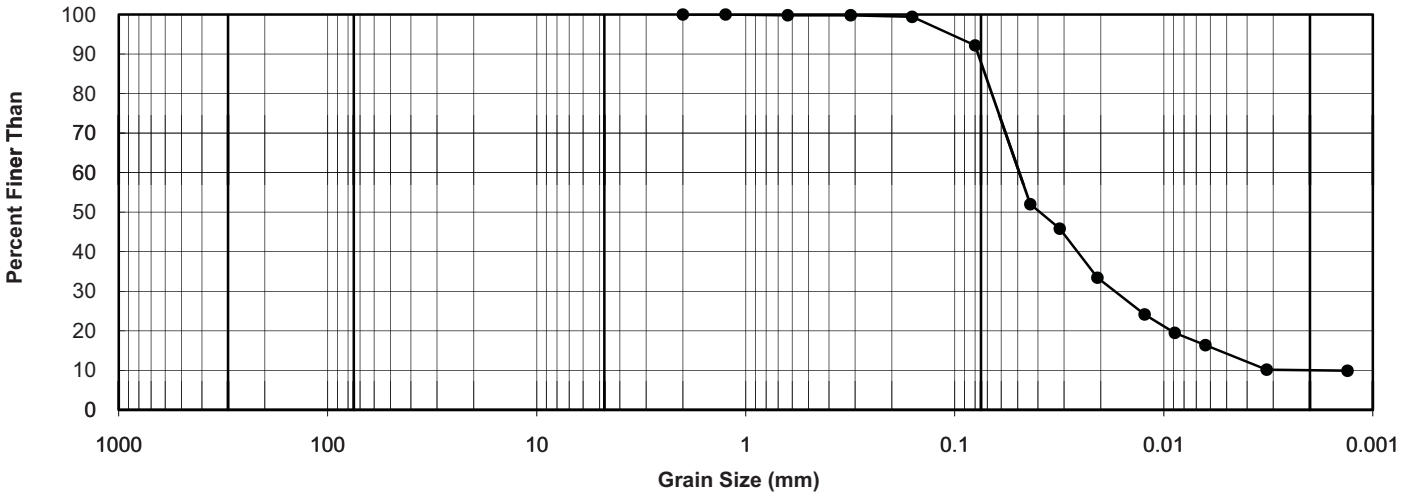
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM Canada	Date Sampled:			

Sample Number	SA8
Sample Location	GA11-T-16
Sampled By	JB
Source	Insitu
Sample Description	See Bore Logs
In situ Water Content	24.4
Date Tested	Tuesday, May 31, 2011
Tested By	HVD
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
2.0	100.0	
1.25	100.0	
0.6	99.8	
0.32	99.8	
0.16	99.4	
0.080	92.2	
0.044	52.0	Hydrometer
0.031	45.8	
0.021	33.4	
0.012	24.1	
0.009	19.5	
0.006	16.4	
0.003	10.2	
0.001	9.9	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 14.4 Silt% 75.6 Clay% 10.0

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.03 15:34:40 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

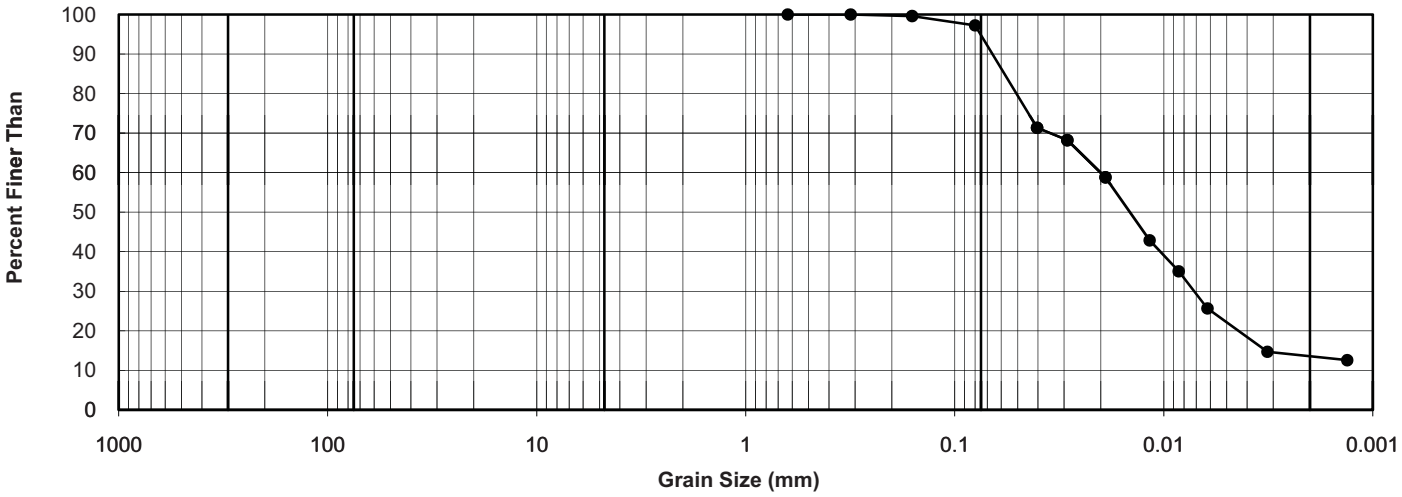
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM Canada	Date Sampled:			

Sample Number	SA10
Sample Location	GA11-T-16
Sampled By	JB
Source	Insitu
Sample Description	See bore logs
In situ Water Content	29.4
Date Tested	Tuesday, June 07, 2011
Tested By	TR
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.6	100.0	
0.32	100.0	
0.16	99.6	
0.080	97.2	
0.040	71.3	Hydrometer
0.029	68.2	
0.019	58.8	
0.012	42.9	
0.008	35.0	
0.006	25.7	
0.003	14.7	
0.001	12.6	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 6.7 Silt% 80.0 Clay% 13.3

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 09:58:22 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

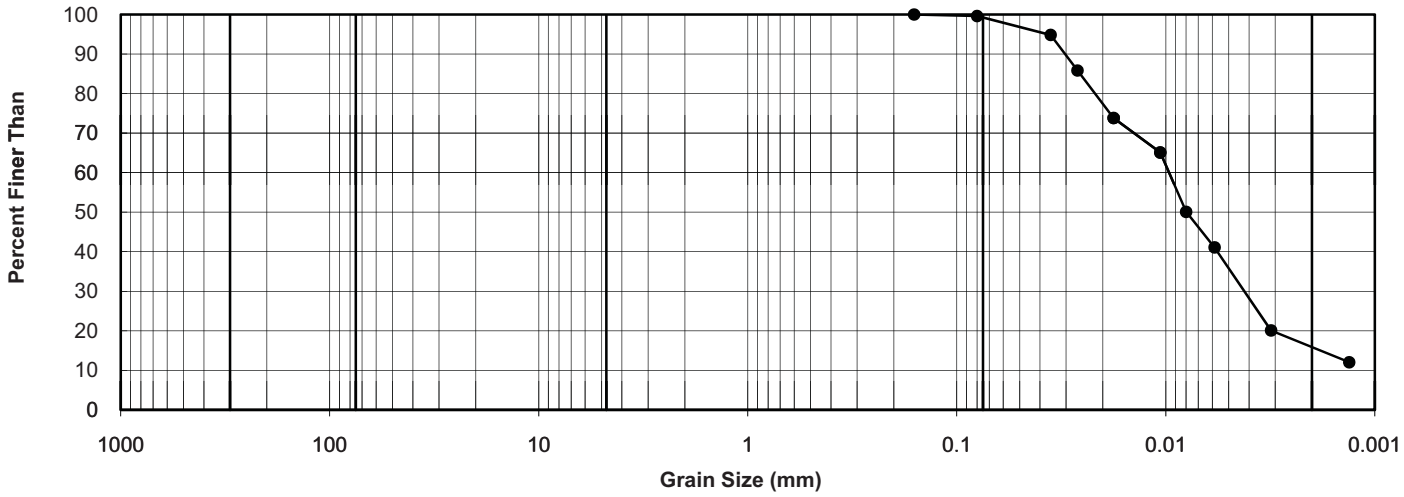
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Giant Mine				
Client:	AECOM Canada	Date Sampled:			

Sample Number	SA12
Sample Location	GA11-T-16
Sampled By	JB
Source	Insitu
Sample Description	See bore logs
In situ Water Content	39.3
Date Tested	Tuesday, June 07, 2011
Tested By	TR
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.16	100.0	
0.080	99.6	
0.036	94.8	Hydrometer
0.026	85.8	
0.018	73.8	
0.011	65.1	
0.008	50.1	
0.006	41.1	
0.003	20.1	
0.001	12.0	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 1.0 Silt% 83.9 Clay% 15.0

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.06.09 09:47:26 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

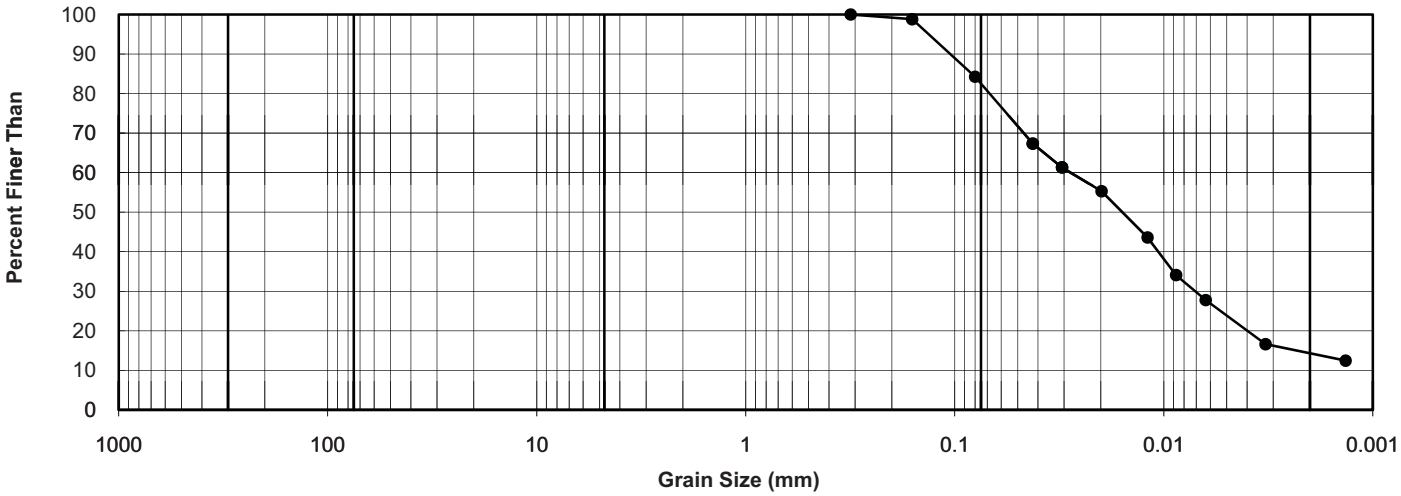
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Tailings Pond				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-17 SA3
Sample Location	Giant Mine
Sampled By	0.0
Source	
Sample Description	
In situ Water Content	27.5
Date Tested	Thursday, April 14, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.32	100.0	
0.16	98.8	
0.080	84.2	
0.042	67.3	Hydrometer
0.031	61.3	
0.020	55.3	
0.012	43.6	
0.009	34.1	
0.006	27.8	
0.003	16.6	
0.001	12.4	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 18.4 Silt% 67.7 Clay% 13.9

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 15:20:17 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

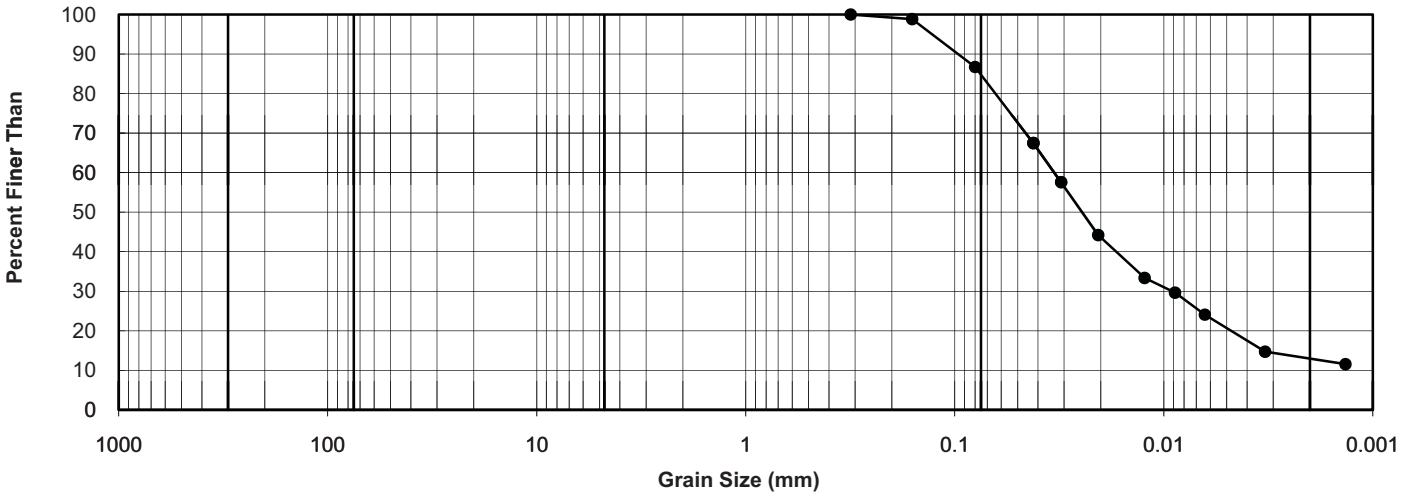
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Tailings Pond				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-17 SA5
Sample Location	Giant Mine
Sampled By	0.0
Source	
Sample Description	
In situ Water Content	21.5
Date Tested	Thursday, April 14, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.32	100.0	
0.16	98.8	
0.080	86.7	
0.042	67.5	Hydrometer
0.031	57.6	
0.021	44.2	
0.012	33.4	
0.009	29.7	
0.006	24.1	
0.003	14.7	
0.001	11.6	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 16.3 Silt% 71.1 Clay% 12.6

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 15:20:40 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

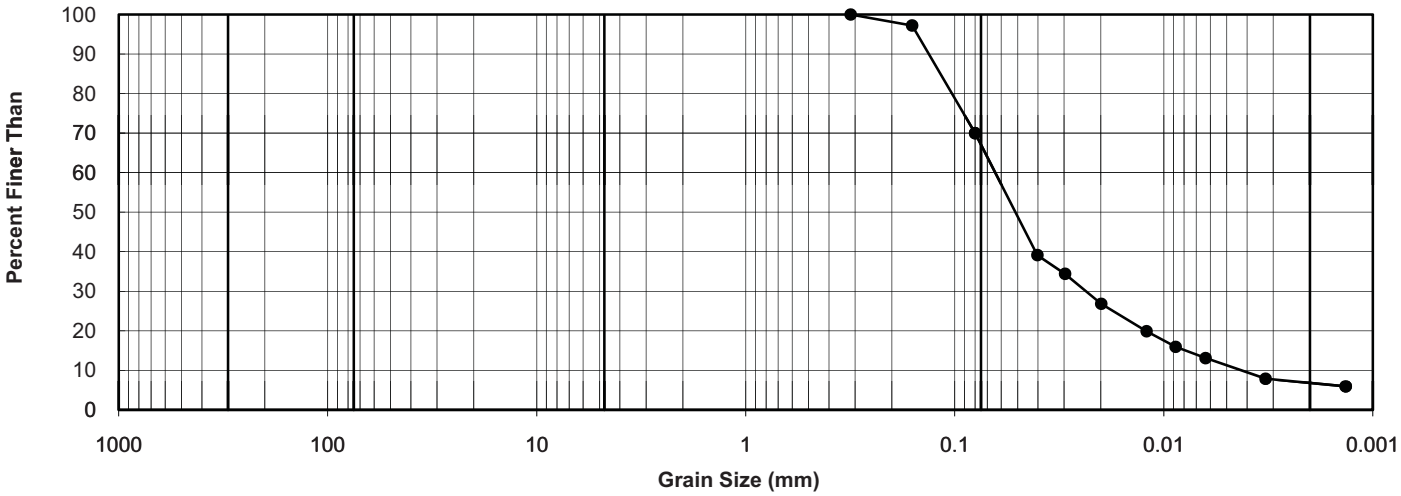
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Tailings Pond				
Client:	AECOM	Date Sampled:	January 0, 1900		

Sample Number	GA11-T-17 SA7
Sample Location	Giant Mine
Sampled By	0.0
Source	0.0
Sample Description	0
In situ Water Content	26.6
Date Tested	Wednesday, April 13, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.32	100.0	
0.16	97.2	
0.080	70.0	
0.040	39.1	Hydrometer
0.030	34.4	
0.020	26.8	
0.012	19.9	
0.009	15.9	
0.006	13.1	
0.003	7.9	
0.001	5.9	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel %	0.0	Sand %	34.7	Silt%	58.7	Clay%	6.6

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 11:03:19 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

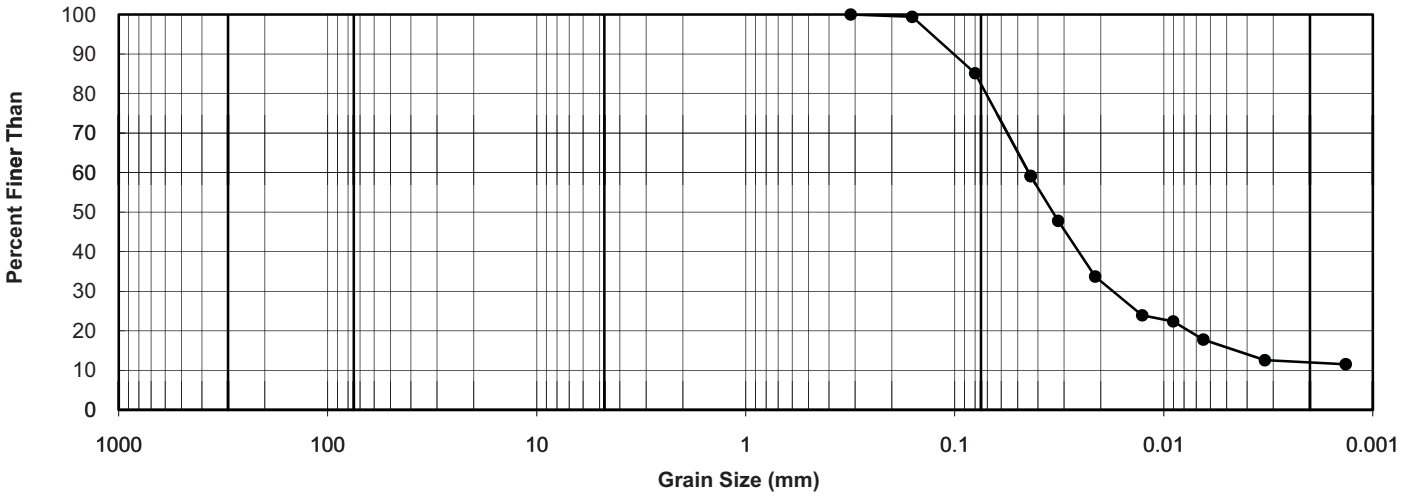
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Tailings Pond				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-17 SA9
Sample Location	Giant Mine
Sampled By	0.0
Source	
Sample Description	
In situ Water Content	22.4
Date Tested	Wednesday, April 13, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.32	100.0	
0.16	99.4	
0.080	85.1	
0.043	59.2	Hydrometer
0.032	47.8	
0.021	33.7	
0.013	23.9	
0.009	22.4	
0.006	17.8	
0.003	12.6	
0.001	11.5	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 19.1 Silt% 69.0 Clay% 11.9

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 15:22:57 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

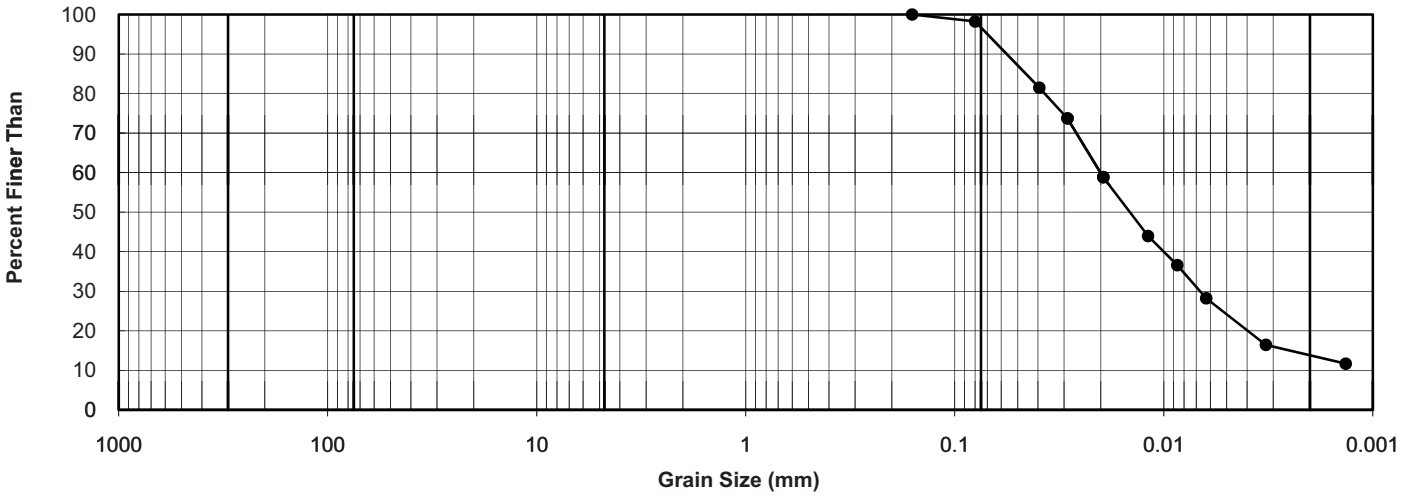
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Tailings Pond				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-17 SA10a
Sample Location	Giant Mine
Sampled By	0.0
Source	
Sample Description	
In situ Water Content	26.7
Date Tested	Wednesday, April 13, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.16	100.0	
0.080	98.2	
0.039	81.5	Hydrometer
0.029	73.7	
0.019	58.9	
0.012	44.0	
0.009	36.6	
0.006	28.2	
0.003	16.4	
0.001	11.7	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel %	0.0	Sand %	4.2	Silt%	82.5	Clay%	13.3

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 15:23:35 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

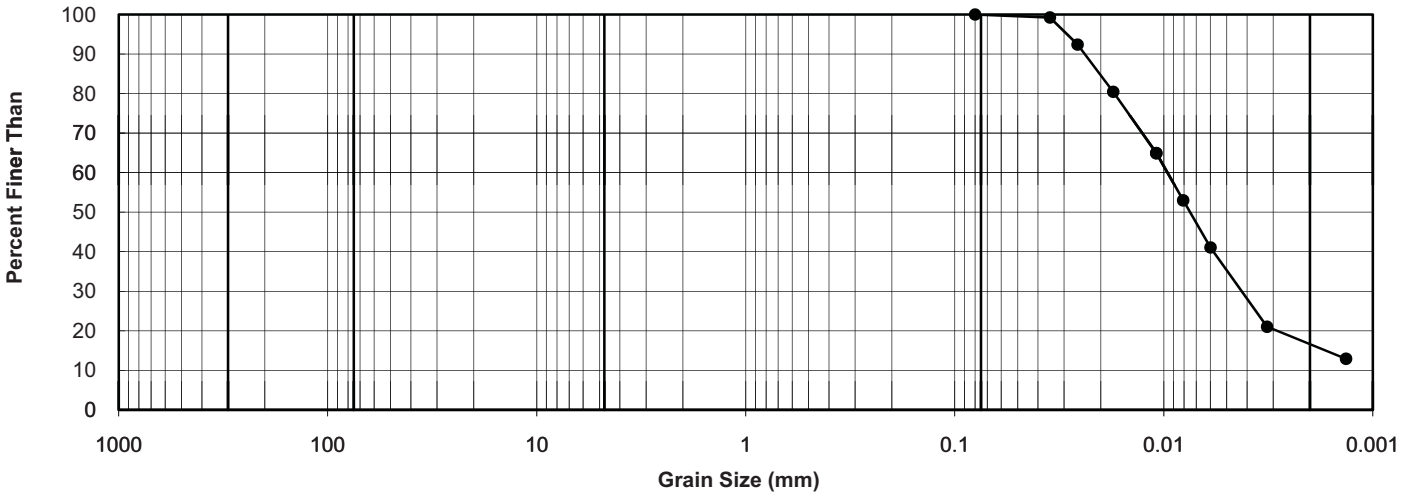
Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

Particle Size Analysis of Soils
ASTM D422

Project #:	09-1427-0006	Phase:	2100	Report Number:	A2615
Short Title:	Tailings Pond				
Client:	AECOM	Date Sampled:			

Sample Number	GA11-T-17 SA12
Sample Location	Giant Mine
Sampled By	0.0
Source	
Sample Description	
In situ Water Content	35.1
Date Tested	Thursday, April 14, 2011
Tested By	AC
Remarks:	
Distribution	

Gradation Size (mm)	Percent Passing	
		Sieve
0.080	100.0	
0.035	99.2	Hydrometer
0.026	92.4	
0.017	80.4	
0.011	64.9	
0.008	53.0	
0.006	41.1	
0.003	21.0	
0.001	12.9	



Boulders	Cobbles	Gravel		Sand			Silt	Clay
		Coarse	Fine	Coarse	Medium	Fine		

Gravel % 0.0 Sand % 0.1 Silt% 84.1 Clay% 15.8

Reviewed By:

Digitally signed by Dave
DN: cn=Dave, o=Golder Associates Ltd., ou=McDonald, email=Dave_McDonald@Golder.com, c=CA
Date: 2011.04.27 15:21:34 -06'00'

Golder Associates Ltd

#300 10525 170th Street, Edmonton Alberta T5P 4W2

Tel (780) 483-3499 Fax (780) 483-1574 www.golder.com

GRAIN SIZE ANALYSIS - ASTM D422

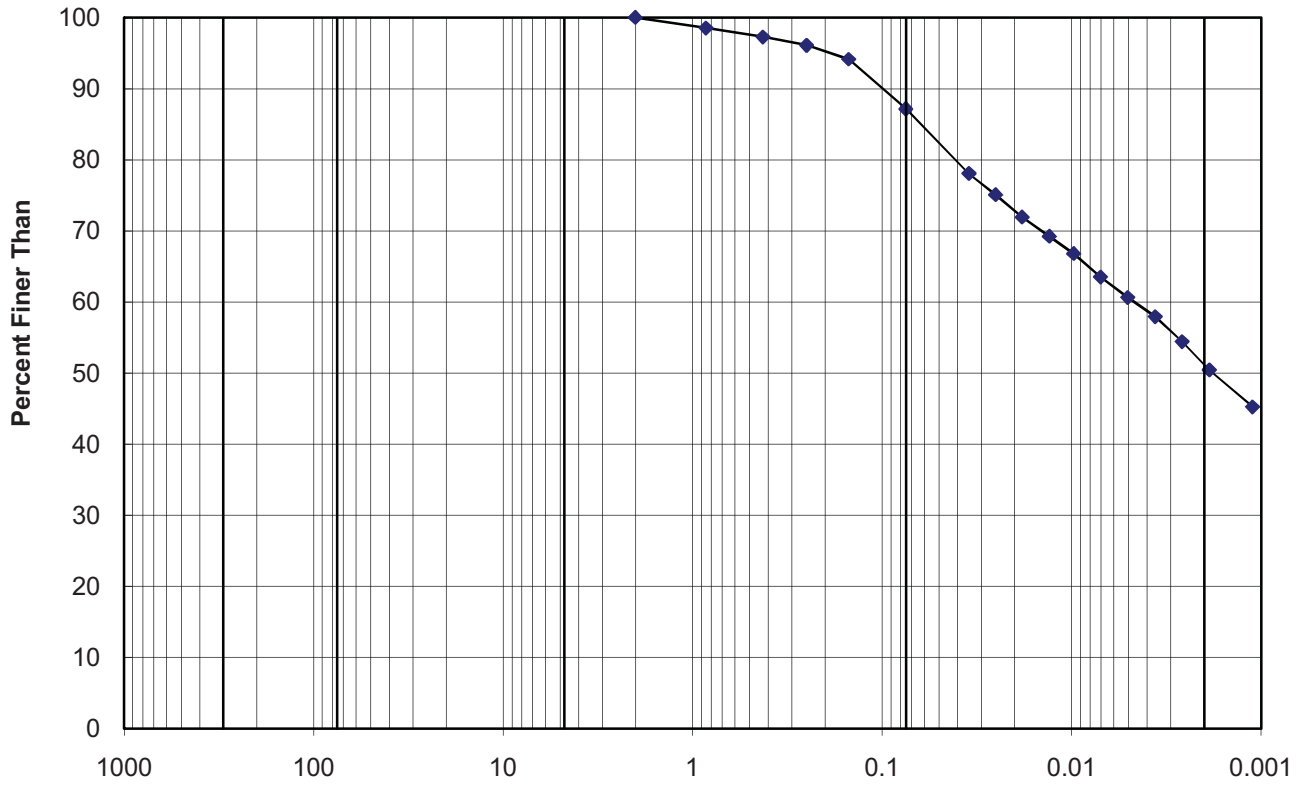
(Mechanical & Hydrometer)

Project #: 09-1427-0006
Short Title: AECOM / Engineering Services / Giant Mine, NWT
Tested by: K.N. / R.G.

Phase: 2000
Date: April 25, 2011

Borehole #: GA11-B-11 Sample #: SA3,4
Source:
Date Sample Received: April 5, 2011

Graphical Analysis



BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		Coarse	Fine	Coarse	Medium	Fine		

Grain Size Analysis Results:

Opening (mm)	Percent Passing (%)
152	100
76	100
38	100
19	100
9.5	100
4.75	100
2.00	100
0.850	99
0.425	97
0.250	96
0.150	94
0.075	87
0.035	78
0.025	75
0.018	72
0.013	69
0.010	67
0.007	63
0.005	61
0.004	58
0.003	54
0.002	50
0.001	45

Comments:
Samples GA11-B-11 SA3 and SA4 were mixed together before testing.

1721 8th Street E.,
Saskatoon, Saskatchewan, S7H 0T4

Reviewed by:

GRAIN SIZE ANALYSIS - ASTM D422

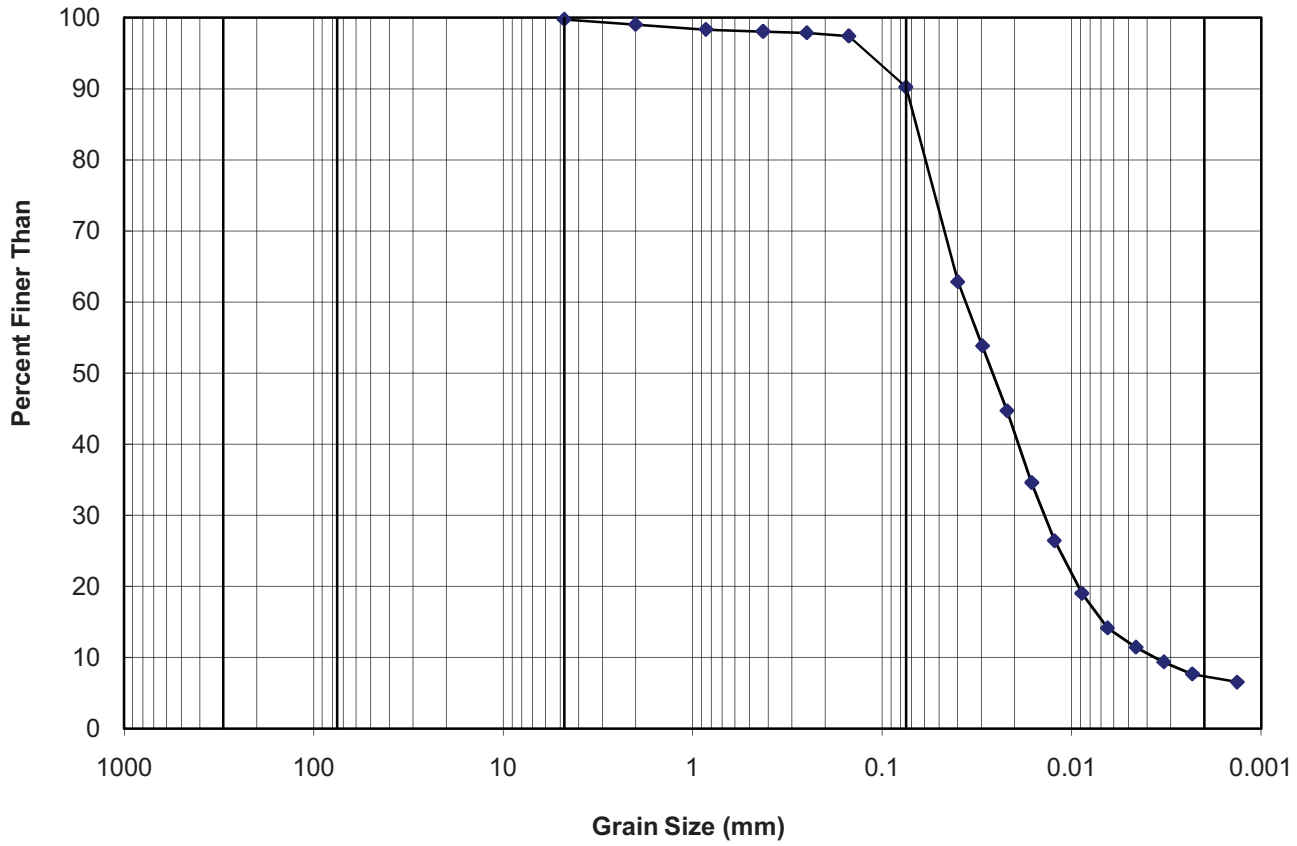
(Mechanical & Hydrometer)

Project #: 09-1427-0006
Short Title: AECOM / Engineering Services / Giant Mine, NWT
Tested by: K.N. / R.G.

Phase: 2000
Date: April 8, 2011

Borehole #: GA11-B-14 Sample #: SA4,5
Source:
Date Sample Received: April 5, 2011

Graphical Analysis



BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		Coarse	Fine	Coarse	Medium	Fine		

Grain Size Analysis Results:

Opening (mm)	Percent Passing (%)
152	100
76	100
38	100
19	100
9.5	100
4.75	100
2.00	99
0.850	98
0.425	98
0.250	98
0.150	97
0.075	90
0.040	63
0.030	54
0.022	45
0.016	35
0.012	26
0.009	19
0.006	14
0.005	11
0.003	9.4
0.002	7.7
0.001	6.6

Comments:
Samples GA11-B-14 SA4 and SA5 were mixed together before testing.

1721 8th Street E.,
Saskatoon, Saskatchewan, S7H 0T4

Reviewed by:

GRAIN SIZE ANALYSIS - ASTM D422

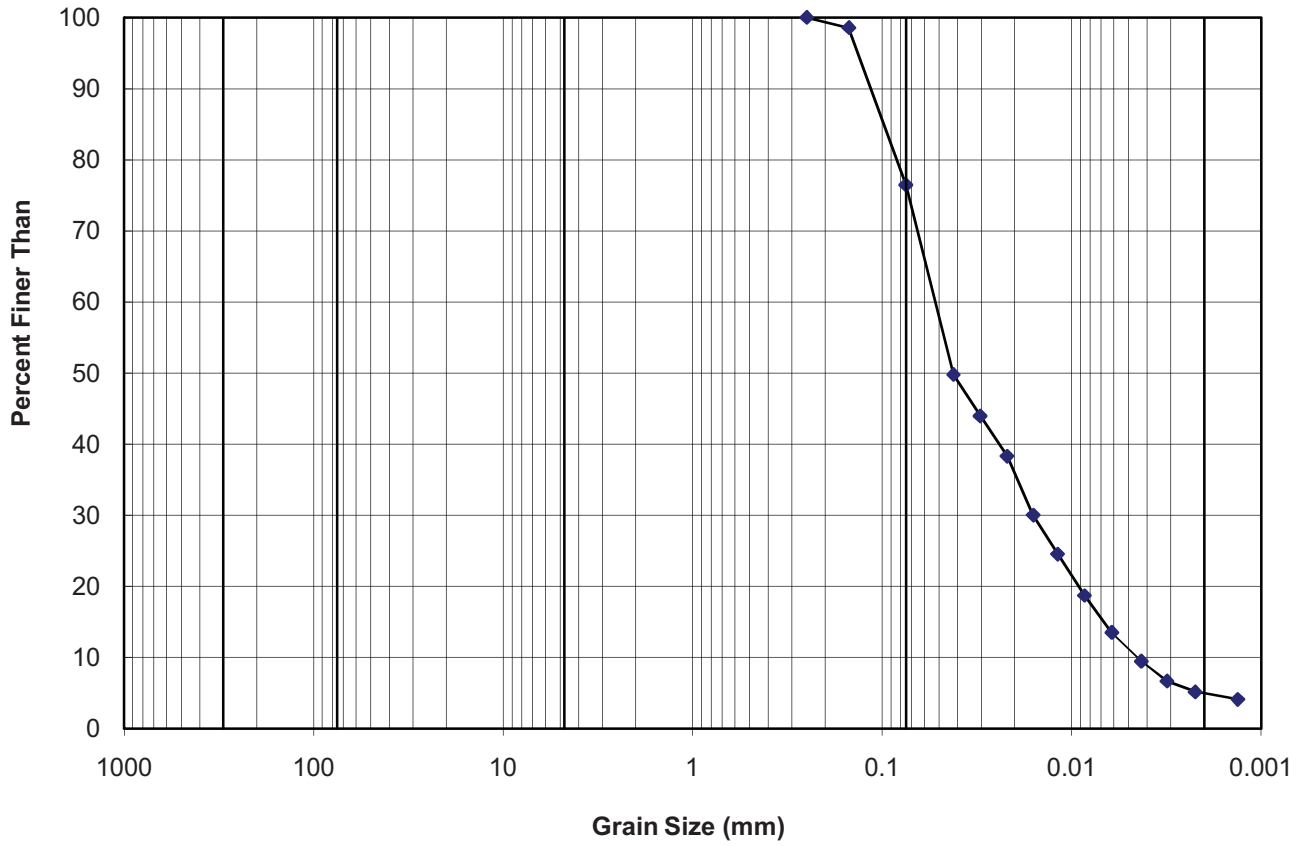
(Mechanical & Hydrometer)

Project #: 09-1427-0006
Short Title: AECOM / Engineering Services / Giant Mine, NWT
Tested by: K.N. / R.G.

Phase: 2000
Date: April 8, 2011

Borehole #: GA11-T-06 Sample #: SA1
Source:
Date Sample Received: April 5, 2011

Graphical Analysis



BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		Coarse	Fine	Coarse	Medium	Fine		

Grain Size Analysis Results:

Opening (mm)	Percent Passing (%)
152	100
76	100
38	100
19	100
9.5	100
4.75	100
2.00	100
0.850	100
0.425	100
0.250	100
0.150	99
0.075	76
0.042	50
0.030	44
0.022	38
0.016	30
0.012	25
0.009	19
0.006	14
0.004	10
0.003	6.7
0.002	5.2
0.001	4.2

Comments:

1721 8th Street E.,
Saskatoon, Saskatchewan, S7H 0T4

Reviewed by:

GRAIN SIZE ANALYSIS - ASTM D422

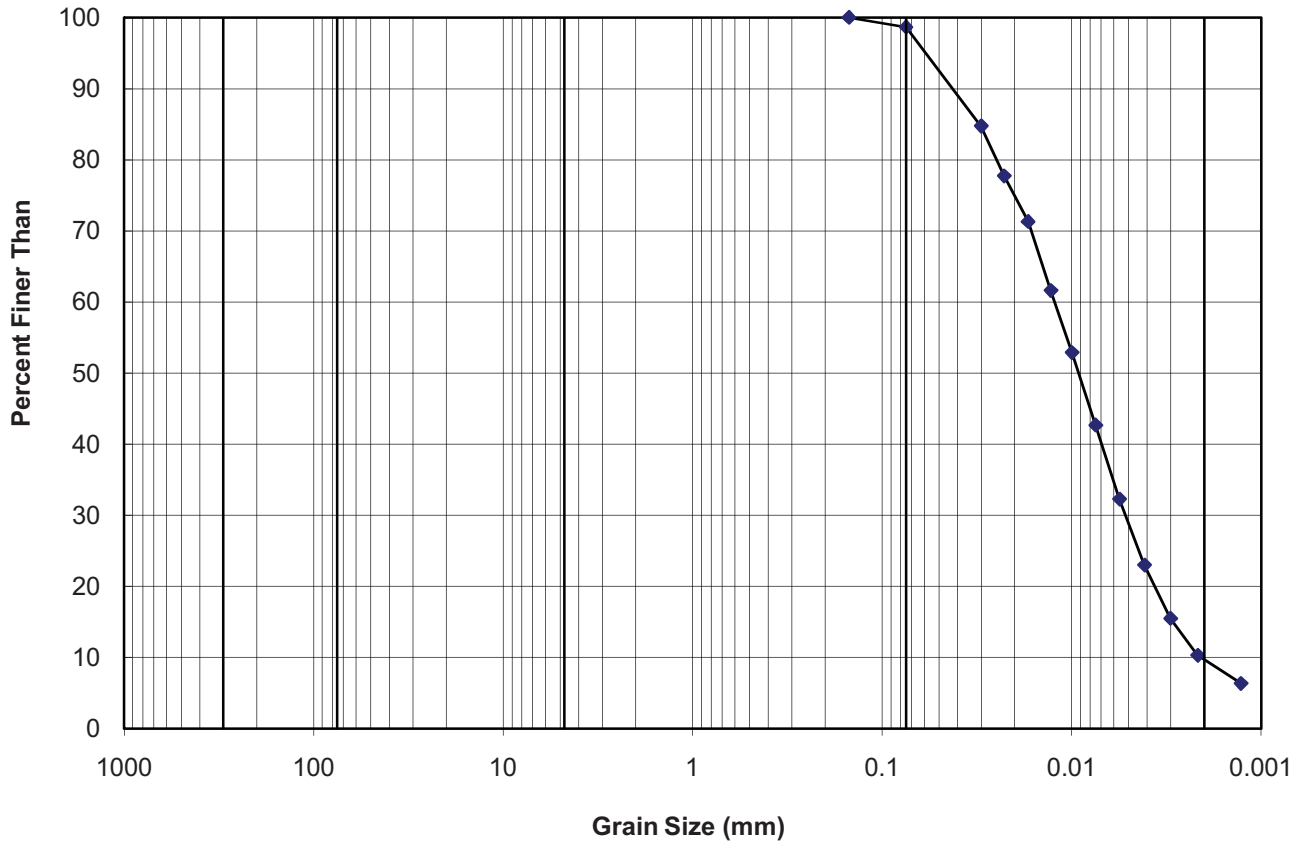
(Mechanical & Hydrometer)

Project #: 09-1427-0006
Short Title: AECOM / Engineering Services / Giant Mine, NWT
Tested by: K.N. / R.G.

Phase: 2000
Date: April 8, 2011

Borehole #: GA11-T-06 Sample #: SA2
Source:
Date Sample Received: April 5, 2011

Graphical Analysis



BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		Coarse	Fine	Coarse	Medium	Fine		

Grain Size Analysis Results:

Opening (mm)	Percent Passing (%)
152	100
76	100
38	100
19	100
9.5	100
4.75	100
2.00	100
0.850	100
0.425	100
0.250	100
0.150	100
0.075	99
0.030	85
0.023	78
0.017	71
0.013	62
0.010	53
0.007	43
0.006	32
0.004	23
0.003	16
0.002	10
0.001	6.4

Comments:

1721 8th Street E.,
Saskatoon, Saskatchewan, S7H 0T4

Reviewed by:

GRAIN SIZE ANALYSIS - ASTM D422

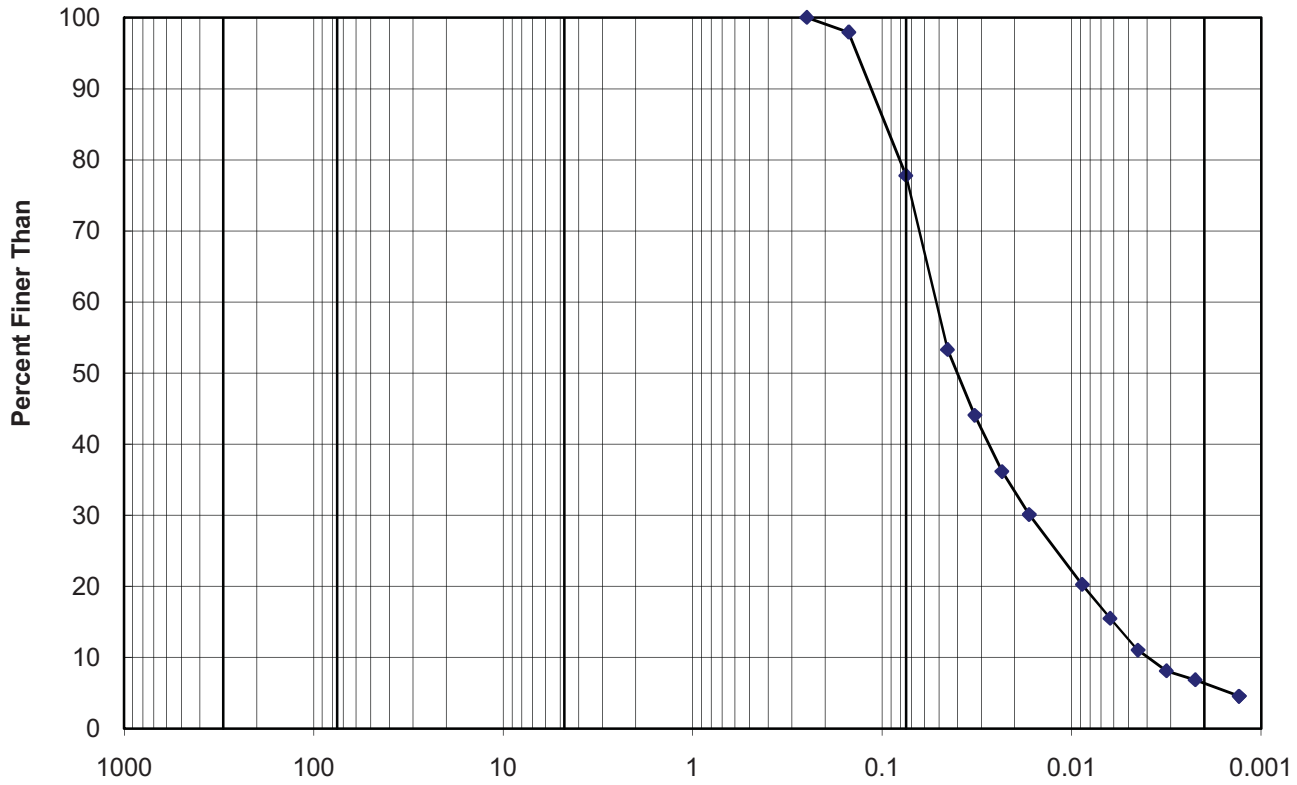
(Mechanical & Hydrometer)

Project #: 09-1427-0006
Short Title: AECOM / Engineering Services / Giant Mine, NWT
Tested by: K.N. / R.G.

Phase: 2000
Date: April 8, 2011

Borehole #: GA11-T-06 Sample #: SA3 (Bag)
Source:
Date Sample Received: April 5, 2011

Graphical Analysis



BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		Coarse	Fine	Coarse	Medium	Fine		

Grain Size Analysis Results:

Opening (mm)	Percent Passing (%)
152	100
76	100
38	100
19	100
9.5	100
4.75	100
2.00	100
0.850	100
0.425	100
0.250	100
0.150	98
0.075	78
0.045	53
0.033	44
0.023	36
0.017	30
0.009	20
0.006	16
0.004	11
0.003	8.1
0.002	6.9
0.001	4.6

Comments:

1721 8th Street E.,
Saskatoon, Saskatchewan, S7H 0T4

Reviewed by:

GRAIN SIZE ANALYSIS - ASTM D422

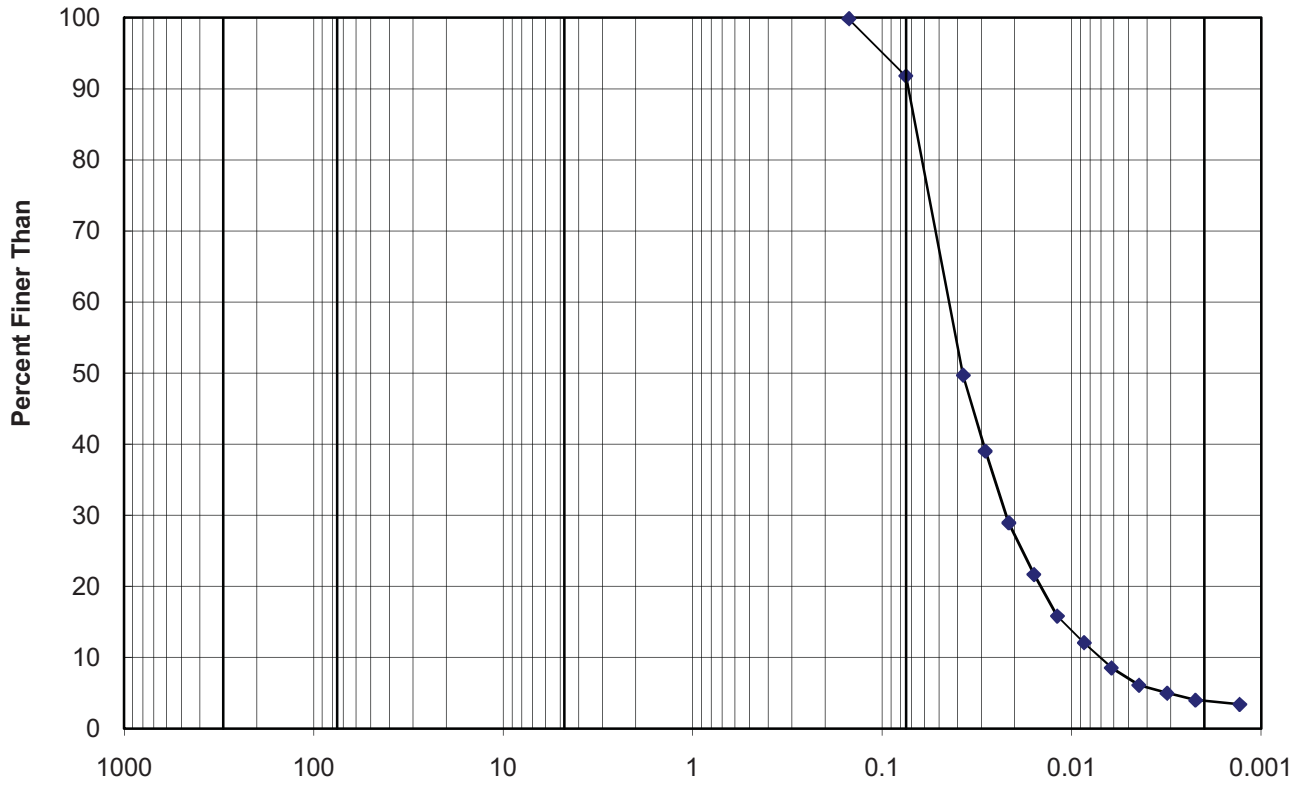
(Mechanical & Hydrometer)

Project #: 09-1427-0006
Short Title: AECOM / Engineering Services / Giant Mine, NWT
Tested by: K.N.

Phase: 2000
Date: April 14, 2011

Borehole #: GA11-T-06 Sample #: SA3 (Shelby tube)
Source:
Date Sample Received: April 5, 2011

Graphical Analysis



BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		Coarse	Fine	Coarse	Medium	Fine		

Grain Size Analysis Results:

Opening (mm)	Percent Passing (%)
152	100
76	100
38	100
19	100
9.5	100
4.75	100
2.00	100
0.850	100
0.425	100
0.250	100
0.150	100
0.075	92
0.037	50
0.029	39
0.021	29
0.016	22
0.012	16
0.009	12
0.006	8.6
0.004	6.1
0.003	5.0
0.002	4.0
0.001	3.4

Comments:
Sample was taken from shelby tube.

1721 8th Street E.,
Saskatoon, Saskatchewan, S7H 0T4

Reviewed by:

GRAIN SIZE ANALYSIS - ASTM D422

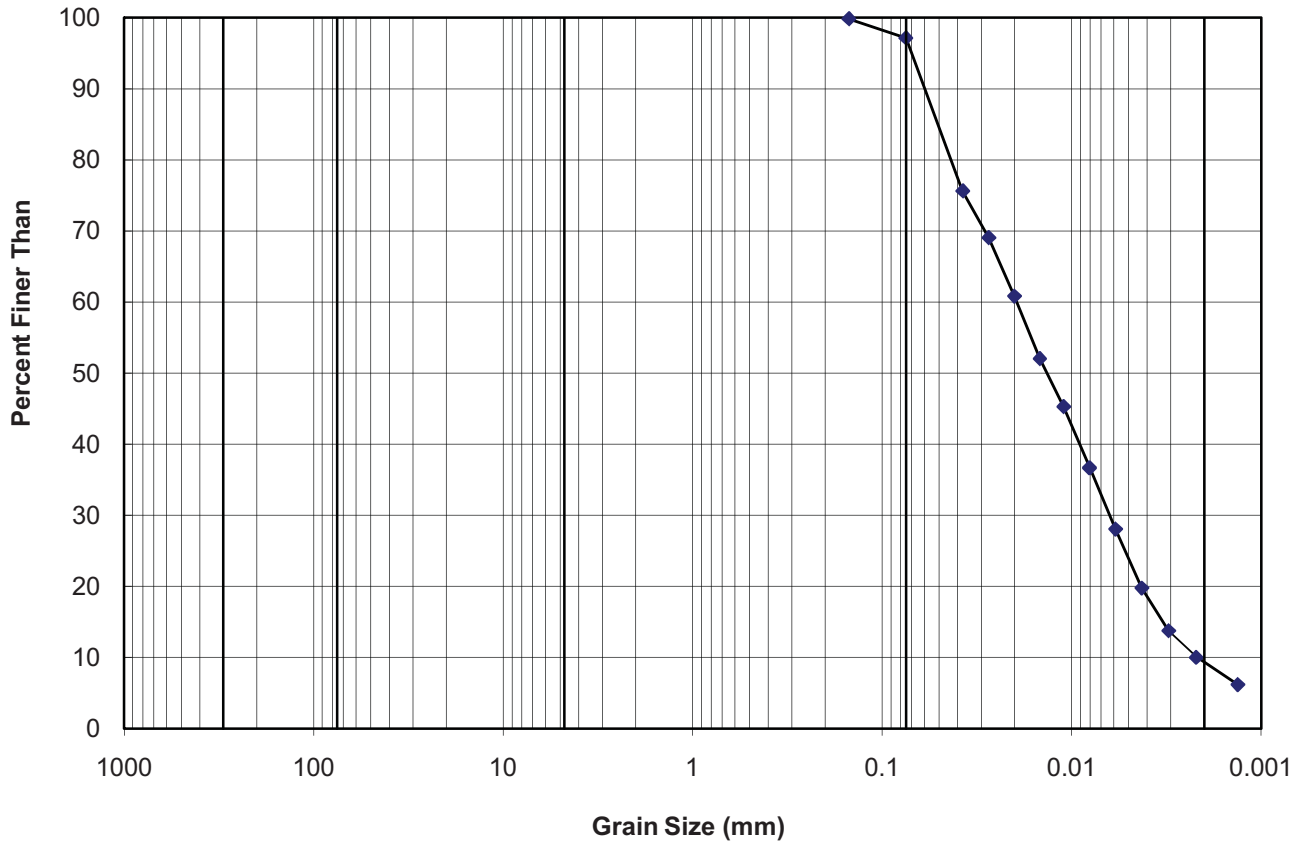
(Mechanical & Hydrometer)

Project #: 09-1427-0006
Short Title: AECOM / Engineering Services / Giant Mine, NWT
Tested by: K.N. / R.G.

Phase: 2000
Date: April 8, 2011

Borehole #: GA11-T-06 Sample #: SA4
Source:
Date Sample Received: April 5, 2011

Graphical Analysis



BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		Coarse	Fine	Coarse	Medium	Fine		

Grain Size Analysis Results:

Opening (mm)	Percent Passing (%)
152	100
76	100
38	100
19	100
9.5	100
4.75	100
2.00	100
0.850	100
0.425	100
0.250	100
0.150	100
0.075	97
0.038	76
0.027	69
0.020	61
0.015	52
0.011	45
0.008	37
0.006	28
0.004	20
0.003	14
0.002	10
0.001	6.2

Comments:

1721 8th Street E.,
Saskatoon, Saskatchewan, S7H 0T4

Reviewed by:

GRAIN SIZE ANALYSIS - ASTM D422

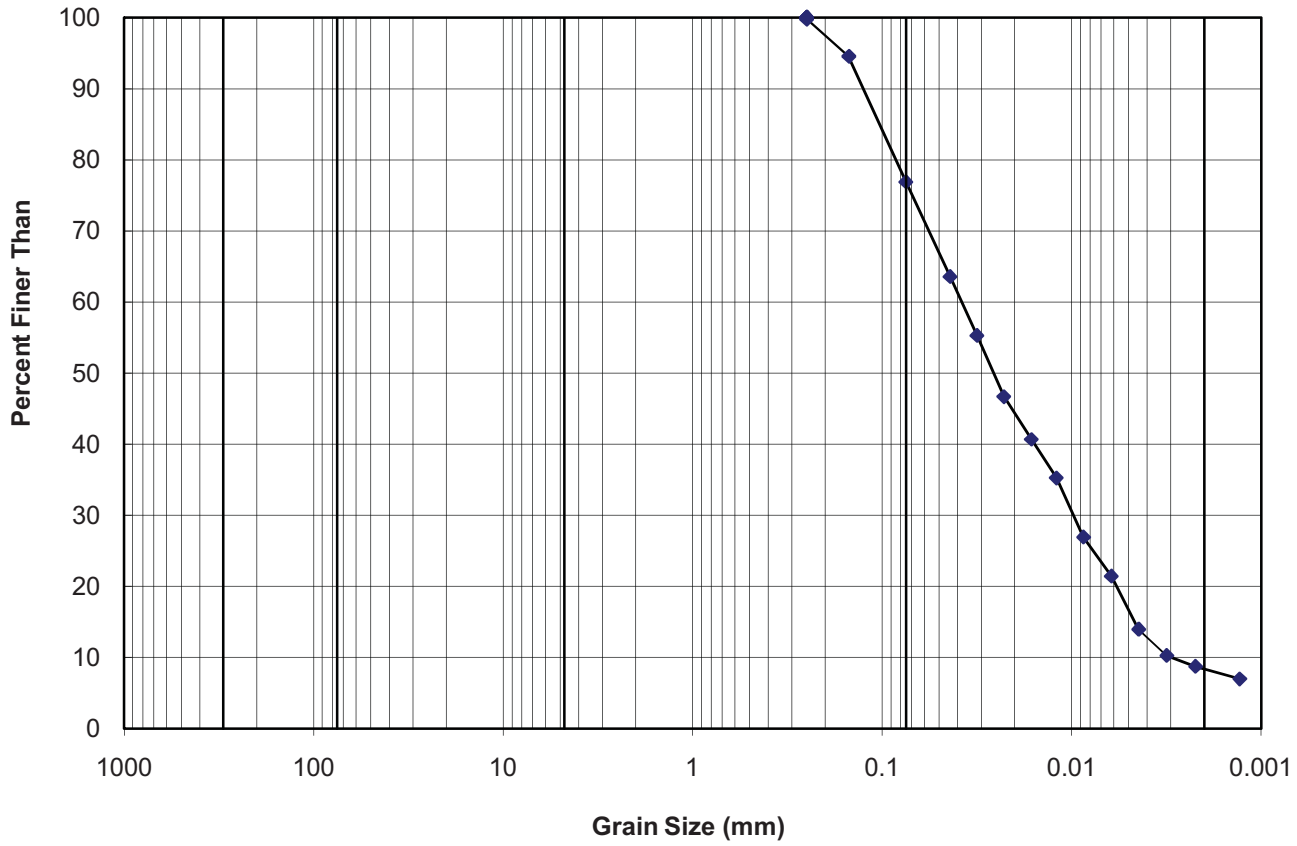
(Mechanical & Hydrometer)

Project #: 09-1427-0006
Short Title: AECOM / Engineering Services / Giant Mine, NWT
Tested by: K.N. / R.G.

Phase: 2000
Date: April 8, 2011

Borehole #: GA11-T-12 Sample #: SA1
Source:
Date Sample Received: April 5, 2011

Graphical Analysis



BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		Coarse	Fine	Coarse	Medium	Fine		

Grain Size Analysis Results:

Opening (mm)	Percent Passing (%)
152	100
76	100
38	100
19	100
9.5	100
4.75	100
2.00	100
0.850	100
0.425	100
0.250	100
0.150	95
0.075	77
0.044	64
0.032	55
0.023	47
0.016	41
0.012	35
0.009	27
0.006	21
0.004	14
0.003	10
0.002	8.8
0.001	7.0

Comments:

1721 8th Street E.,
Saskatoon, Saskatchewan, S7H 0T4

Reviewed by:

GRAIN SIZE ANALYSIS - ASTM D422

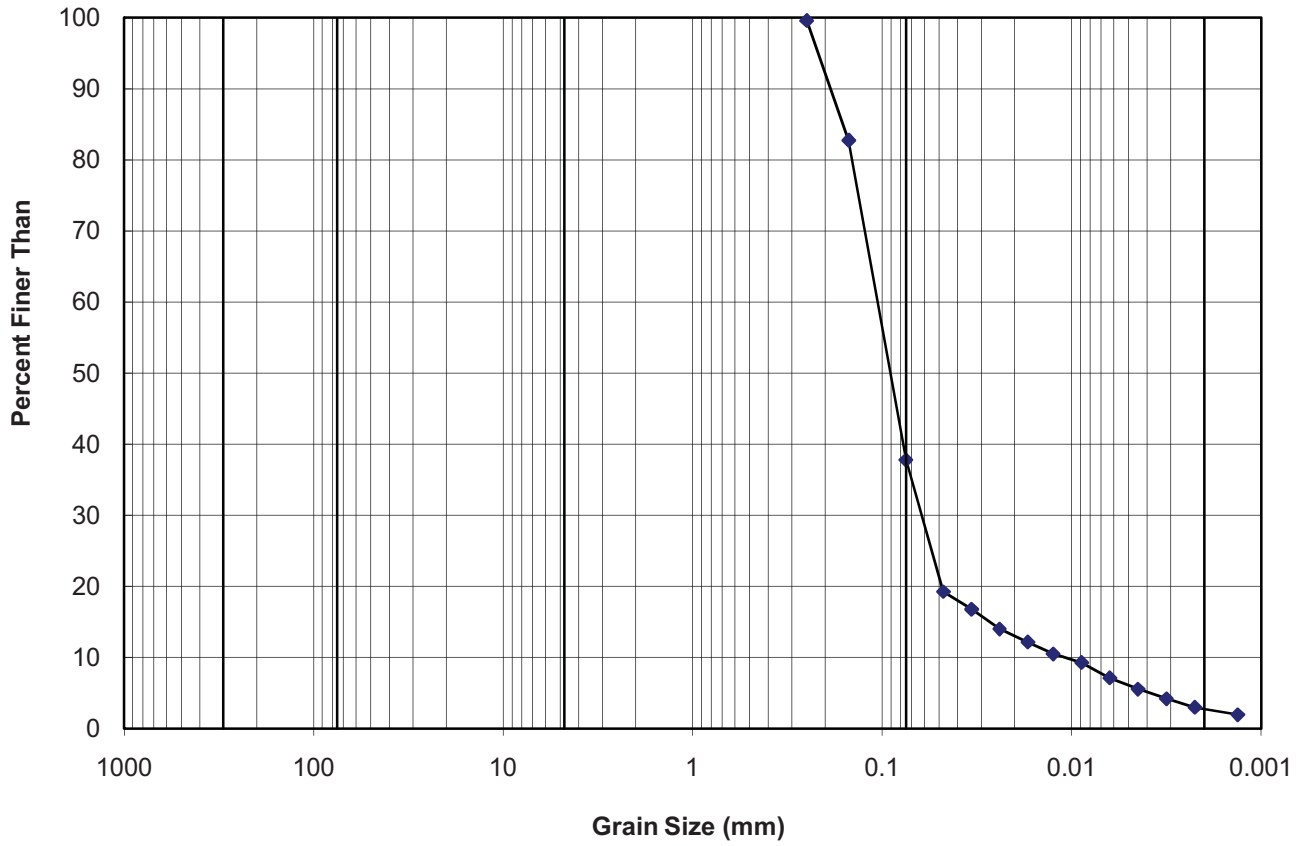
(Mechanical & Hydrometer)

Project #: 09-1427-0006
Short Title: AECOM / Engineering Services / Giant Mine, NWT
Tested by: J.K. / R.G.

Phase: 2000
Date: April 25, 2011

Borehole #: GA11-T-12 Sample #: SA2
Source:
Date Sample Received: April 5, 2011

Graphical Analysis



BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		Coarse	Fine	Coarse	Medium	Fine		

Grain Size Analysis Results:

Opening (mm)	Percent Passing (%)
152	100
76	100
38	100
19	100
9.5	100
4.75	100
2.00	100
0.850	100
0.425	100
0.250	100
0.150	83
0.075	38
0.048	19
0.034	17
0.024	14
0.017	12
0.012	11
0.009	9.3
0.006	7.1
0.004	5.6
0.003	4.2
0.002	3.0
0.001	2.0

Comments:

1721 8th Street E.,
Saskatoon, Saskatchewan, S7H 0T4

Reviewed by:

GRAIN SIZE ANALYSIS - ASTM D422

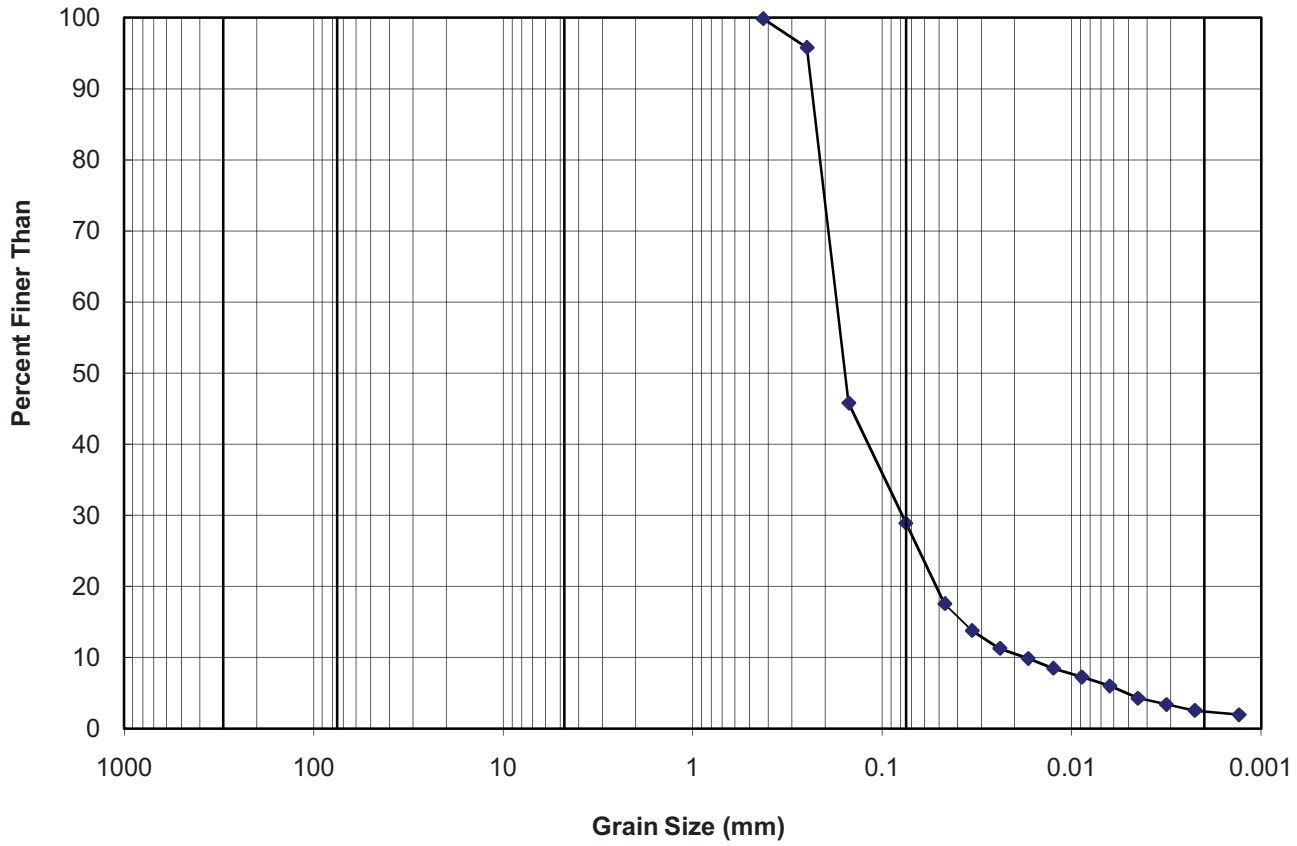
(Mechanical & Hydrometer)

Project #: 09-1427-0006
Short Title: AECOM / Engineering Services / Giant Mine, NWT
Tested by: K.N. / R.G.

Phase: 2000
Date: April 8, 2011

Borehole #: GA11-T-12 Sample #: SA3
Source:
Date Sample Received: April 5, 2011

Graphical Analysis



BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		Coarse	Fine	Coarse	Medium	Fine		

Grain Size Analysis Results:

Opening (mm)	Percent Passing (%)
152	100
76	100
38	100
19	100
9.5	100
4.75	100
2.00	100
0.850	100
0.425	100
0.250	96
0.150	46
0.075	29
0.047	18
0.034	14
0.024	11
0.017	10
0.012	8.5
0.009	7.3
0.006	6.0
0.004	4.3
0.003	3.4
0.002	2.6
0.001	2.0

Comments:

1721 8th Street E.,
Saskatoon, Saskatchewan, S7H 0T4

Reviewed by:

GRAIN SIZE ANALYSIS - ASTM D422

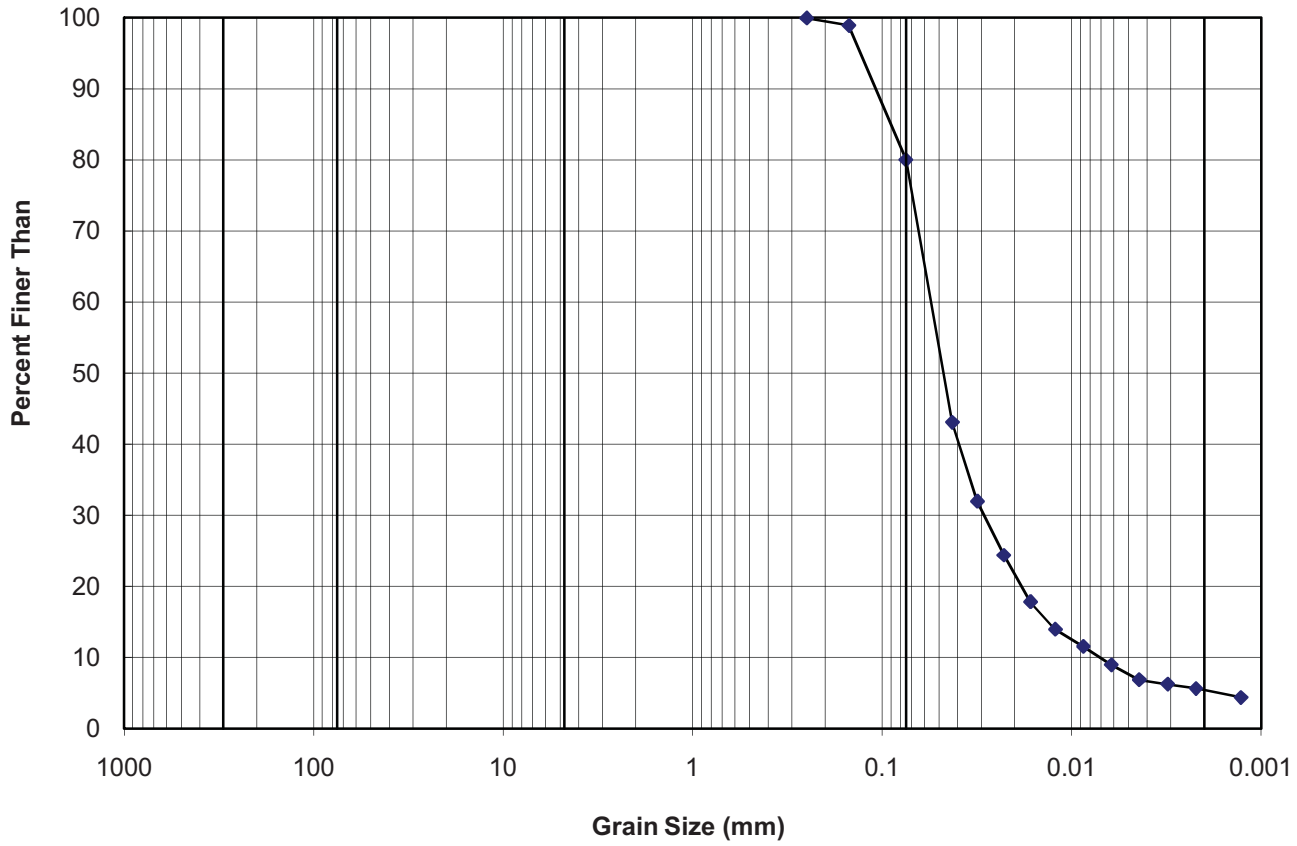
(Mechanical & Hydrometer)

Project #: 09-1427-0006
Short Title: AECOM / Engineering Services / Giant Mine, NWT
Tested by: K.N. / R.G.

Phase: 2000
Date: April 25, 2011

Borehole #: GA11-T-12 Sample #: SA4
Source:
Date Sample Received: April 5, 2011

Graphical Analysis



BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		Coarse	Fine	Coarse	Medium	Fine		

Grain Size Analysis Results:

Opening (mm)	Percent Passing (%)
152	100
76	100
38	100
19	100
9.5	100
4.75	100
2.00	100
0.850	100
0.425	100
0.250	100
0.150	99
0.075	80
0.043	43
0.031	32
0.023	24
0.016	18
0.012	14
0.009	12
0.006	9.0
0.004	6.9
0.003	6.2
0.002	5.6
0.001	4.4

Comments:

1721 8th Street E.,
Saskatoon, Saskatchewan, S7H 0T4

Reviewed by:

GRAIN SIZE ANALYSIS - ASTM D422

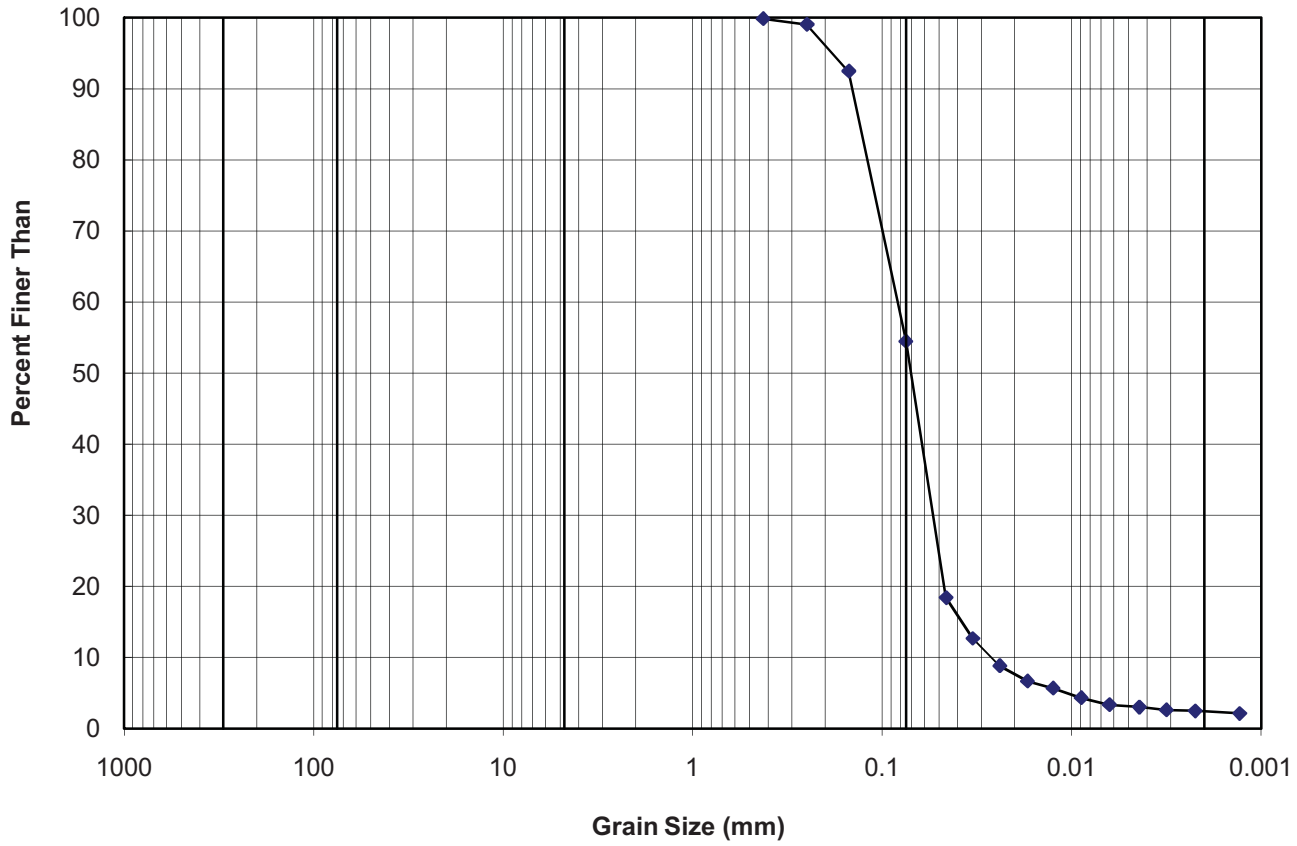
(Mechanical & Hydrometer)

Project #: 09-1427-0006
Short Title: AECOM / Engineering Services / Giant Mine, NWT
Tested by: K.N. / R.G.

Phase: 2000
Date: April 14, 2011

Borehole #: GA11-T-12 Sample #: SA5
Source:
Date Sample Received: April 5, 2011

Graphical Analysis



BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		Coarse	Fine	Coarse	Medium	Fine		

Grain Size Analysis Results:

Opening (mm)	Percent Passing (%)
152	100
76	100
38	100
19	100
9.5	100
4.75	100
2.00	100
0.850	100
0.425	100
0.250	99
0.150	92
0.075	54
0.046	18
0.033	13
0.024	8.8
0.017	6.7
0.013	5.7
0.009	4.3
0.006	3.4
0.004	3.0
0.003	2.6
0.002	2.5
0.001	2.1

Comments:

1721 8th Street E.,
Saskatoon, Saskatchewan, S7H 0T4

Reviewed by:

GRAIN SIZE ANALYSIS - ASTM D422

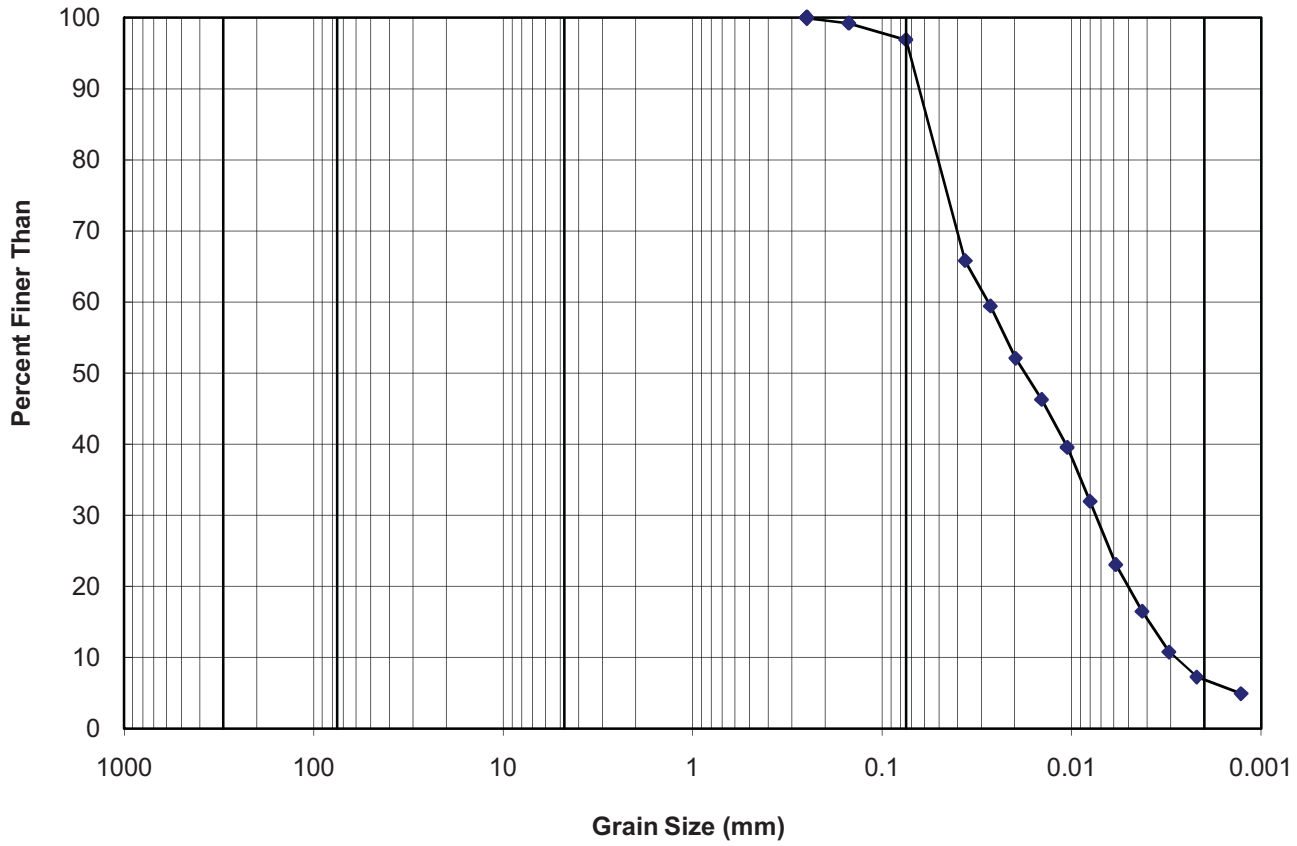
(Mechanical & Hydrometer)

Project #: 09-1427-0006
Short Title: AECOM / Engineering Services / Giant Mine, NWT
Tested by: K.N. / R.G.

Phase: 2000
Date: April 8, 2011

Borehole #: GA11-T-14 Sample#: SA2,3
Source:
Date Sample Received: April 5, 2011

Graphical Analysis



BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		Coarse	Fine	Coarse	Medium	Fine		

Grain Size Analysis Results:

Opening (mm)	Percent Passing (%)
152	100
76	100
38	100
19	100
9.5	100
4.75	100
2.00	100
0.850	100
0.425	100
0.250	100
0.150	99
0.075	97
0.036	66
0.027	59
0.020	52
0.014	46
0.011	40
0.008	32
0.006	23
0.004	17
0.003	11
0.002	7.3
0.001	5.0

Comments:
Samples GA11-T-14 SA2 and SA3 were mixed together before testing.

1721 8th Street E.,
Saskatoon, Saskatchewan, S7H 0T4

Reviewed by:

Soil-water Characteristic Curve

SOIL-WATER CHARACTERISTIC CURVE

Project #:	09-1427-0006	Phase:	2000
Short Title:	AECOM / Engineering Services / Giant Mine, NWT		
Tested By:	D.B.	Date:	May 30, 2011
Sample:	GA11-T-06 SA3		

Test Results:

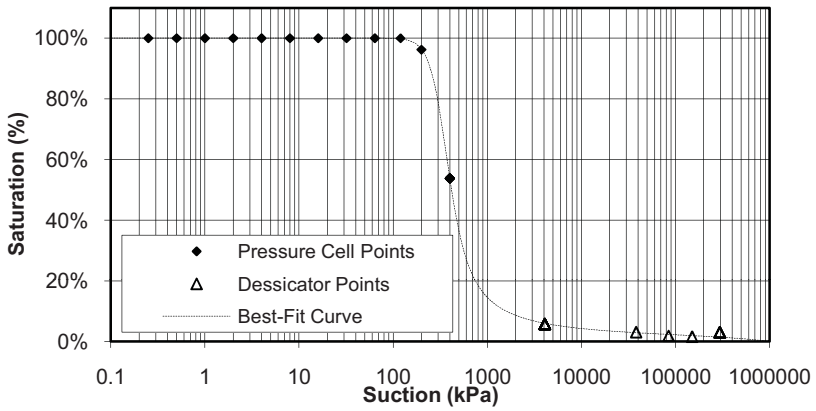
Suction	Water Content	
(kPa)	Gravimetric	Volumetric
0.25	0.307	0.466
0.5	0.307	0.466
1	0.308	0.467
2	0.302	0.462
4	0.306	0.466
8	0.306	0.466
16	0.304	0.464
32	0.300	0.461
64	0.293	0.455
120	0.285	0.448
200	0.265	0.423
400	0.148	0.236
4100	0.016	0.025
38200	0.008	0.013
84350	0.005	0.008
150300	0.004	0.007
295000	0.008	0.013

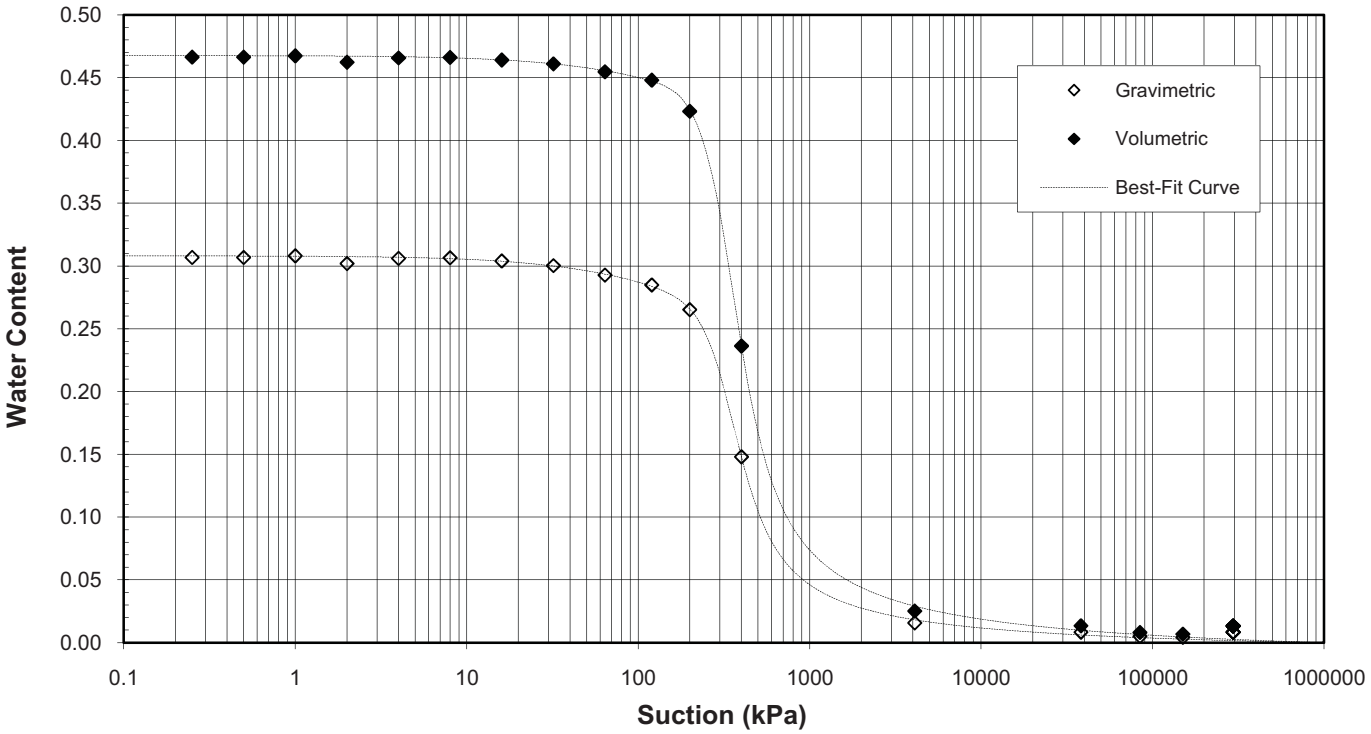
Sample Data:

Diameter:	63.88	mm (initial)
Height:	31.55	mm (initial)
Initial Water Content:	29.0	% (gravimetric)
Dry Density:	1556	kg/m^3 (initial)
Material used passing:	4.75	mm sieve

Comments:

Specimen trimmed from Shelby tube sample.





1721 8th Street E.,
Saskatoon, Saskatchewan, S7H 0T4

Reviewed by:

SOIL-WATER CHARACTERISTIC CURVE

Project #:	09-1427-0006	Phase:	2000
Short Title:	AECOM / Engineering Services / Giant Mine, NWT		
Tested By:	D.B.	Date:	May 31, 2011
Sample:	GA11-T-06 SA3		

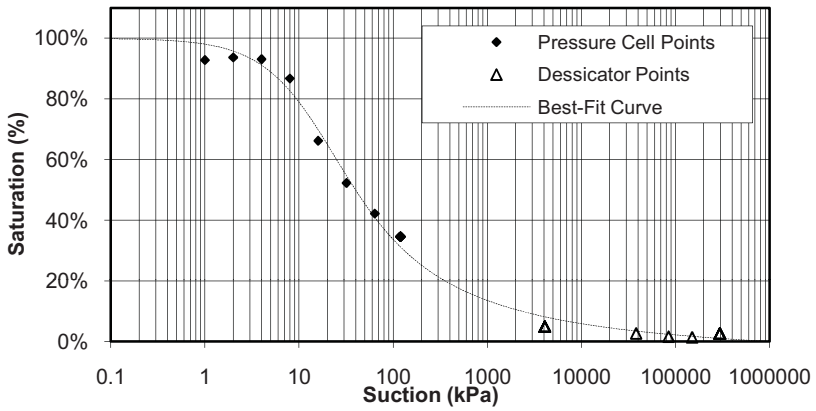
Test Results:

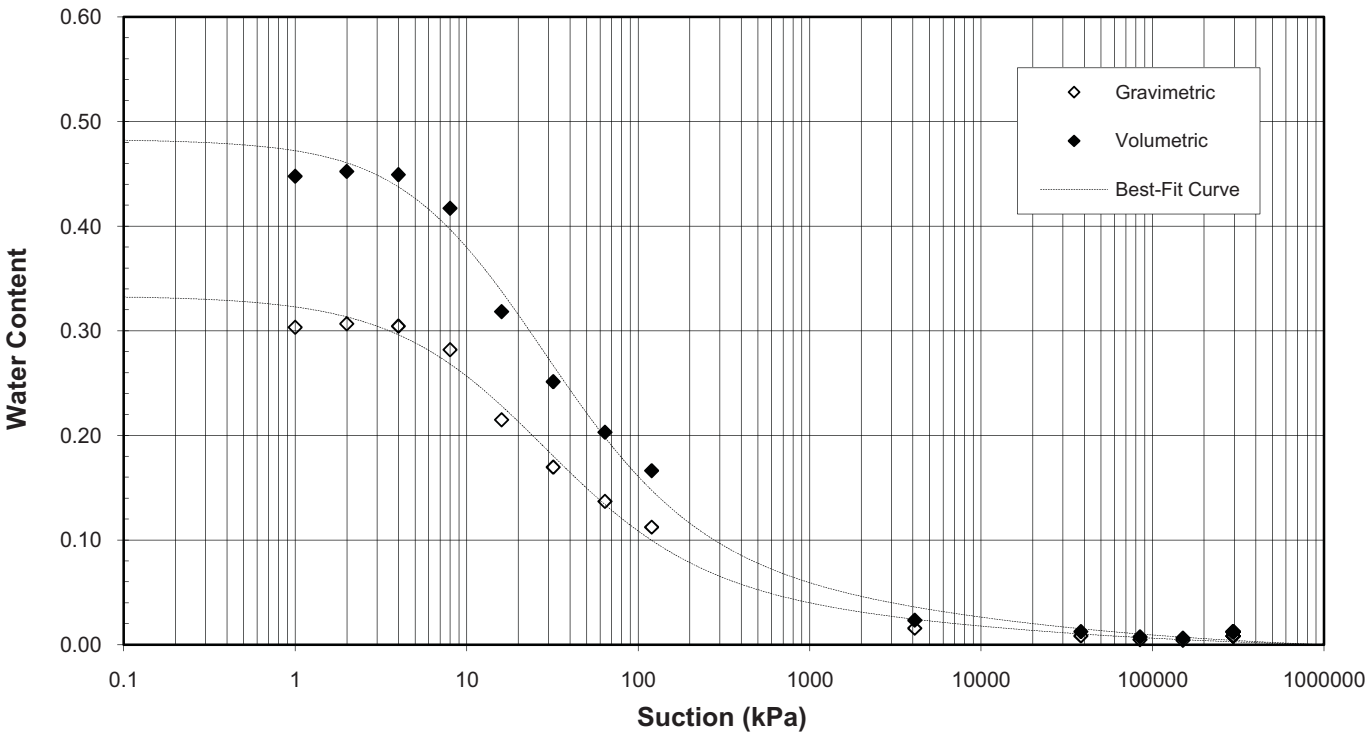
Suction	Water Content	
(kPa)	Gravimetric	Volumetric
1	0.303	0.447
2	0.307	0.452
4	0.305	0.449
8	0.282	0.417
16	0.215	0.318
32	0.170	0.251
64	0.137	0.203
120	0.112	0.166
4100	0.016	0.023
38200	0.008	0.012
84350	0.005	0.007
150300	0.004	0.006
295000	0.008	0.012

Sample Data:

Diameter:	63.87	mm (initial)
Height:	32.21	mm (initial)
Initial Water Content:	16.5	% (gravimetric)
Dry Density:	1462	kg/m^3 (initial)
Material used passing:	4.75	mm sieve

Comments:





1721 8th Street E.,
Saskatoon, Saskatchewan, S7H 0T4

Reviewed by:

SOIL-WATER CHARACTERISTIC CURVE

Project #:	09-1427-0006	Phase:	2000
Short Title:	AECOM / Engineering Services / Giant Mine, NWT		
Tested By:	D.B.	Date:	June 2, 2011
Sample:	GA11-T-12 SA2		

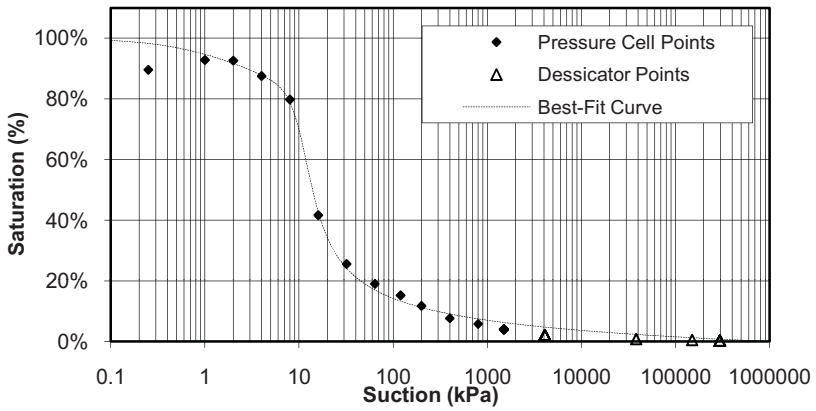
Test Results:

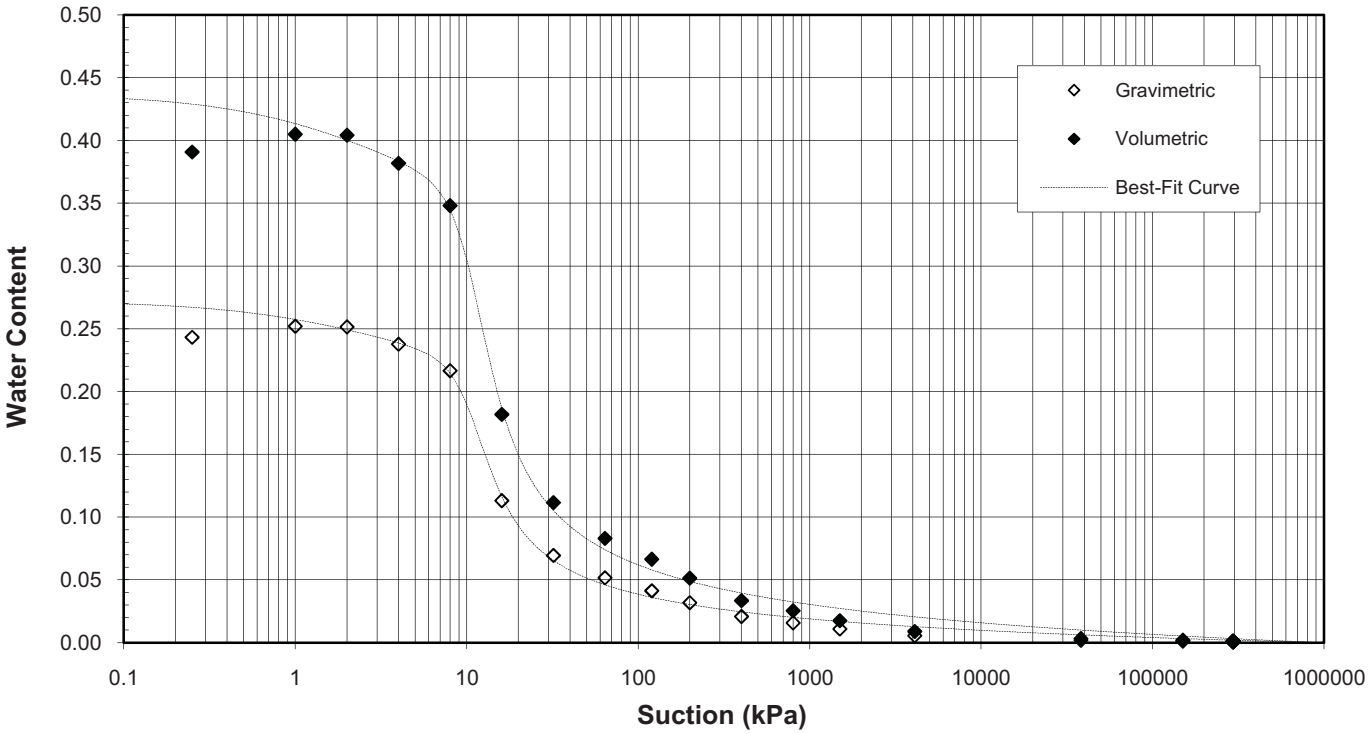
Suction	Water Content	
(kPa)	Gravimetric	Volumetric
0.25	0.243	0.391
1	0.252	0.405
2	0.252	0.404
4	0.238	0.382
8	0.217	0.348
16	0.113	0.182
32	0.069	0.112
64	0.052	0.083
120	0.041	0.067
200	0.032	0.051
400	0.021	0.033
800	0.016	0.025
1500	0.011	0.017
4100	0.006	0.009
38200	0.002	0.003
150300	0.001	0.002
295000	0.001	0.001

Sample Data:

Diameter:	63.98	mm (initial)
Height:	31.33	mm (initial)
Initial Water Content:	4.2	% (gravimetric)
Dry Density:	1606	kg/m^3 (initial)
Material used passing:	4.75	mm sieve

Comments:





1721 8th Street E.,
Saskatoon, Saskatchewan, S7H 0T4

Reviewed by:

SOIL-WATER CHARACTERISTIC CURVE

Project #:	09-1427-0006	Phase:	2000
Short Title:	AECOM / Engineering Services / Giant Mine, NWT		
Tested By:	D.B.	Date:	May 31, 2011
Sample:	GA11-T-14 SA2, SA3 (Mix Together)		

Test Results:

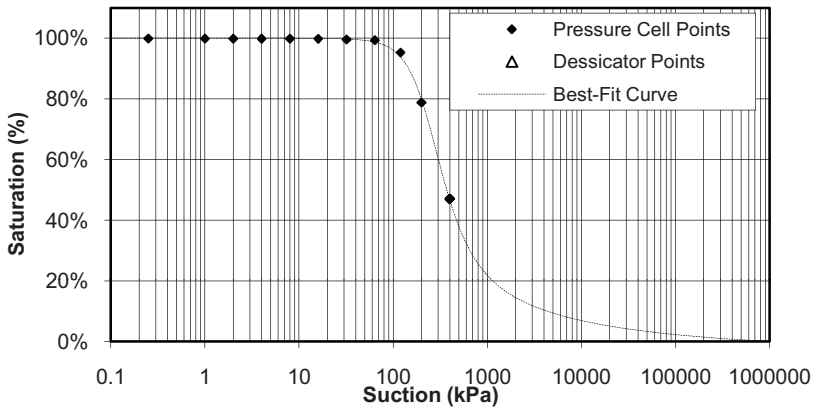
Suction	Water Content	
(kPa)	Gravimetric	Volumetric
0.25	0.266	0.431
1	0.265	0.430
2	0.263	0.428
4	0.262	0.427
8	0.262	0.427
16	0.260	0.426
32	0.252	0.417
64	0.247	0.412
120	0.219	0.377
200	0.177	0.307
400	0.106	0.184

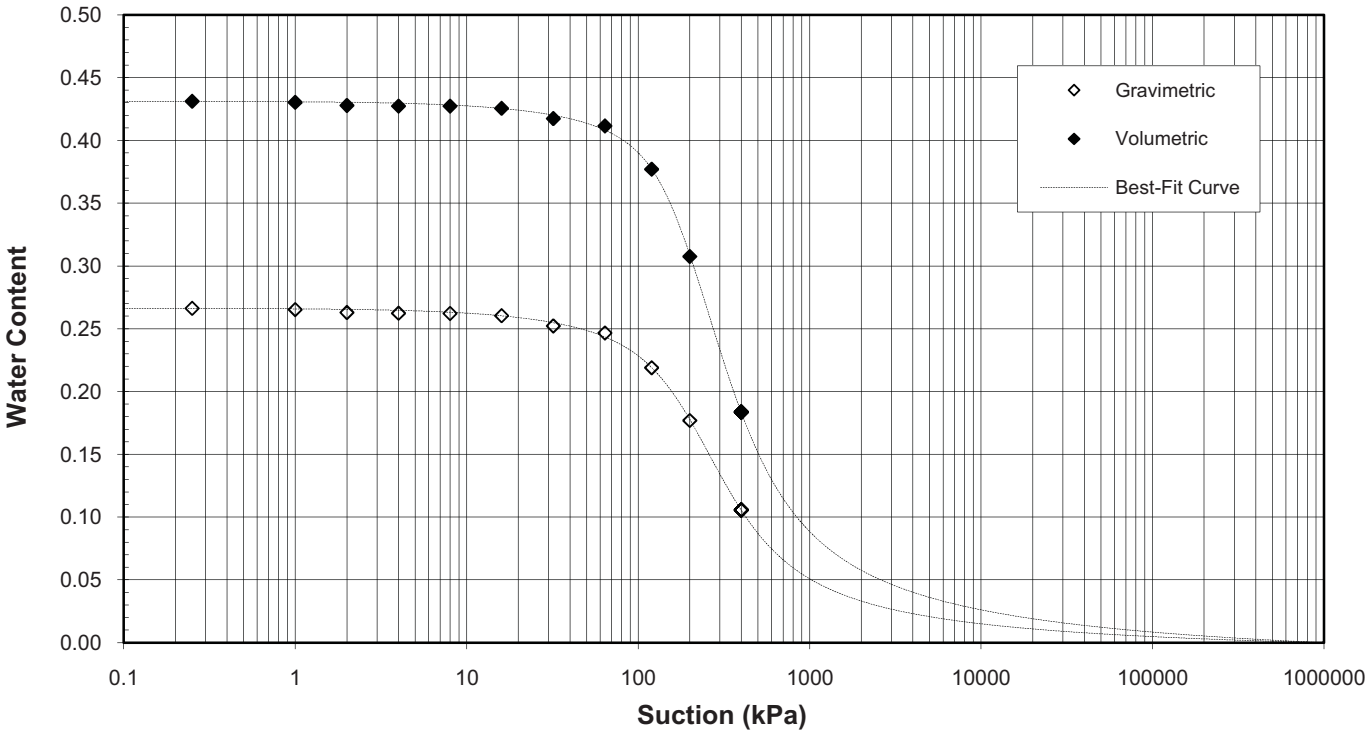
Sample Data:

Diameter:	63.94	mm (initial)
Height:	29.02	mm (initial)
Initial Water Content:	29.6	% (gravimetric, prior to consolidation)
Dry Density:	1651	kg/m^3 (after consolidation)
Material used passing:	4.75	mm sieve

Comments:

Specimen consolidated at 25 kPa prior to testing.





1721 8th Street E.,
Saskatoon, Saskatchewan, S7H 0T4

Reviewed by:

Unit Weight Determination

Dry Density Determination

Golder Associates

Project #: 09-1427-0006 Phase: 2100

Short Title: Giant Mine

Tested By: AC/DS Date: 18-Apr-11

Sample Identification:

Borehole #	GA11-T13	GA11-T11	GA11-T04	GA11-T01	GA11-T02	GA11-T09
Sample #	3	3	6	4	2	2
Sample depth (ft)	5.0-7.5	7.5-10.0	12.5-15.0	7.5-10.0	2.5-5.0	2.5-5.0
Water Content Determination:						
Tare #	P02	24D	PG-51	2E	25B	2C
Mass of wet soil + tare (g)	349.00	419.40	456.70	402.10	410.80	452.30
Mass of dry soil + tare (g)	304.20	390.70	409.10	337.40	364.80	397.90
Mass of water (g)	44.80	28.70	47.60	64.70	46.00	54.40
Mass of tare (g)	199.60	194.50	196.60	195.30	199.50	198.70
Mass of dry soil (g)	104.60	196.20	212.50	142.10	165.30	199.20
Water content (%)	42.8	14.6	22.4	45.5	27.8	27.3
Unit Weight Determination:						
Mass of sample in air = M_s (g)	340.60	289.40	286.60	360.00	221.30	270.80
Mass of sample + wax in air (g)	358.00	303.90	300.80	375.10	241.30	286.80
Mass of sample + wax in water (g)	152.20	123.50	143.40	160.80	103.90	131.80
Mass of wax (g)	17.40	14.50	14.20	15.10	20.00	16.00
Volume of sample + wax (cc)	205.80	180.40	157.40	214.30	137.40	155.00
Volume of wax (cc) = $\frac{\text{Mass of wax}}{0.78}$	22.31	18.59	18.21	19.36	25.64	20.51
Volume of sample = V_s (cc)	183.49	161.81	139.19	194.94	111.76	134.49
Wet density = (M_s / V_s) x 1000 (kg/m^3)	1856	1789	2059	1847	1980	2014
Dry density (kg/m^3)	1300	1560	1682	1269	1549	1582

Comments:

GA11-T13-03 : Vane Shear Reading - 27.8 Kpa; Pocket Pen Reading, tons/ft² : Bot. - 1.25, Mid. - 0 , Top - 0.25

GA11-T11-03 : Vane Shear Reading - 18.5 Kpa; No pocket pen reading. Sample cracks.

GA11-T04-06 : Vane Shear Reading - 8 Kpa; No pocket pen reading. Sample cracks.

GA11-T01-04 : Vane Shear Reading - 18 Kpa; Pocket Pen Reading, tons/ft² : Bot. - 0, Mid. - 0 , Top - 0.5

GA11-T02-02 : Vane Shear Reading - 16 Kpa; No pocket pen reading. Sample cracks.

GA11-T09-02 : Vane Shear Reading - 29 Kpa; No pocket pen reading on top & bottom, sample cracks. Mid - 0.75

Reviewed by:

At Golder Associates we strive to be the most respected global company providing consulting, design, and construction services in earth, environment, and related areas of energy. Employee owned since our formation in 1960, our focus, unique culture and operating environment offer opportunities and the freedom to excel, which attracts the leading specialists in our fields. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees who operate from offices located throughout Africa, Asia, Australasia, Europe, North America, and South America.

Africa	+ 27 11 254 4800
Asia	+ 86 21 6258 5522
Australasia	+ 61 3 8862 3500
Europe	+ 356 21 42 30 20
North America	+ 1 800 275 3281
South America	+ 55 21 3095 9500

solutions@golder.com
www.golder.com

Golder Associates Ltd.
500 - 4260 Still Creek Drive
Burnaby, British Columbia, V5C 6C6
Canada
T: +1 (604) 296 4200

Golder Associates