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Newfoundland and Labrador Hydro
Lower Churchill Project
Pre-Feed Engineering Services

AC1030 - Field Investigation & Construction Requirements

735 kV Transmission Line
Gull Island to Churchill Falls

FINAL

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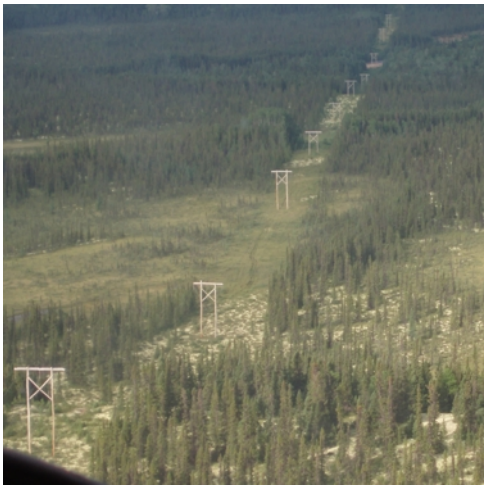

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Newfoundland & Labrador Hydro

LOWER CHURCHILL PROJECT

TECHNICAL REPORT

AC1030 – Field Investigation & Construction Requirements
735 kV Transmission Line
Gull Island to Churchill Falls

Document No: 722850-AC1030-40ER-0001-00

FINAL **February 2008**

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TABLE OF CONTENTS

Page No.

List of Figures

List of Tables

List of Drawings

Appendices

EXECUTIVE SUMMARY

This report presents the findings with respect to the location, number of camps, marshalling yards, access routes, and tote roads associated with the proposed construction of a 735 kV transmission line from Gull Island to Churchill Falls, approximately 203 km. Also presented are the results of a geotechnical investigation program along the route which included test pit excavation, anchor pull out tests, hand augering, bog probes and percolation tests at the proposed campsites.

Line Routing

The 735 kV line from Gull Island to Churchill Falls will parallel (approximately 85 m to the south) the existing 138 kV line running between Happy Valley-Goose Bay and Churchill Falls. As a result of other investigative work for the Lower Churchill Project, the converter station and switchyard were relocated from the south side of Churchill River to the north side. With the change in switchyard location and the fact the new 735 kV line will follow the existing 138 kV line corridor, it is recommended that the 735 kV line be routed from the switchyard in a generally north westerly direction up over the hill to adjoin the existing line, a distance of approximately 8.8 km. This routing is reflected on the report drawings, see Drawing # 722850-AC1030-43DD-0003.

Access Roads and Tote Roads

Throughout the proposed route of the 735 kV transmission line there is excellent access from the Trans Labrador Highway (TLH). In a number of instances, the proposed 735 kV line will cross the highway. The line is also adjacent to the existing 138 kV wood pole transmission line running between Churchill Falls and Happy Valley-Goose Bay.

Tote roads or access trails from the TLH suitable for the proposed transmission line were established as part of the original construction of the existing 138 kV transmission line. A total of five (5) existing access trails were identified and added to Hydro's fording location maps. Two (2) new access trails will be required and the locations are identified on the maps. Between West Wilson and East Metchin Rivers the old highway alignment is completely washed out at two (2) locations with less severe erosion in other locations. The old highway is no longer maintained and continues to deteriorate. The old highway will have to be repaired or new access trails will have to be established from the new highway alignment. It is anticipated that

heavier equipment will be used to construct the new 735 kV line versus the equipment used for construction of the existing 138 kV line. The decision as to the extent of upgrading/improvement required should be left to the transmission line contractor(s) to decide as part of the competitive bidding process. The best season for transmission line construction is winter when the ground is sufficiently hard to allow movement of heavy equipment, resulting in less environmental disturbance.

Camps

During construction of the Gull Island Hydroelectric Development, it is assumed that a main camp will be operational at the Gull Island site and some space may be available in that camp to accommodate transmission line construction personnel, depending on the schedule for constructing the transmission line. Since scheduling is critical for the transmission line, it is recommended that two (2) separate camps be provided in order to avoid any possible delays due to unavailability of accommodations at the Gull Island main camp. A two (2) camp set up is recommended with one (1) camp located approximately 49 km west of Gull Island switchyard and the second camp approximately 54 km east of Churchill Falls. The two (2) recommended campsites were used formerly as temporary construction campsites by the contractors engaged in upgrading the TLH and as such environmental permitting is not anticipated to be an issue provided that similar type facilities and camp layouts are utilized.

The scenario presented lends itself to owner or contractor supplied camps. For this particular transmission line, the most economic approach may be to have the contractor supply his own camps.

Marshalling Yards

The most likely scenario for delivery of materials and equipment would be by marine transport to Happy Valley-Goose Bay and then by road to Gull Island. An area of approximately 6.0 hectares would be required to marshall materials. It is proposed that the marshalling yard be located on a burnt over area near the intersection of the TLH and the access road to Gull Island. It is assumed a security gate for the Gull Island project would be located nearby and the marshalling yard be located just inside the gate.

Based on the assumption that Hydro will procure materials, it is recommended that Hydro provide a fully prepared marshalling yard, where materials can be received, sorted, and checked, prior to being turned over to the contractor at the start of construction.

Geotechnical

The geotechnical program included:

- Air photo interpretation combined with base map preparation and fieldwork preparation;
- Two (2) site reconnaissance trips: the first to assess the general outline of the route and the second to examine the ground in some of the remote areas;
- Site investigations: A total of fifty-nine (59) test pits, five (5) boreholes, twelve (12) percolation tests, seven (7) Standard Proctor Density tests, several hundred bog probes and twelve (12) anchor pull out tests were used to inventory the soil and rock conditions along the route;
- Laboratory testing: Index testing was performed on representative samples from along the route.

Transmission Line

The transmission line route begins at the switchyard in the Churchill River lowlands. For approximately the first kilometre, the soil comprises a mixed terrain of mostly glaciofluvial sand with some sand and gravel, overlying fine-grained, lacustrine silt and clay. The remainder of the route climbs up into a lowlands terrain dominated by glacial landforms comprising gently rolling hills with thin glacial till soils covering much of the countryside. Eskers are common in the area, often associated with the larger river valleys such as Cache, Wilson and Metchin.

The allowable bearing capacity is 250 kPa in the glaciofluvial sand and the sand and gravel deposits, 300 kPa in glacial till, 150 kPa in marine sediments, and 100 kPa in submerged high quality fill in bogs or other wet areas. Unit weights for properly compacted site soils ranged from 16 kN/m^3 for the sand to over 22 kN/m^3 for the glacial till.

Bedrock outcrops are abundant in the higher elevations, especially near Churchill Falls and on most hilltops along the route. The bedrock comprises crystalline metamorphic rocks composed of granite orthogneiss with some dark mafic material and numerous pegmatite stringers. The rock had excellent holding strength at all twelve (12) anchor pull out test locations along the route.

Marshalling Yard

The proposed marshalling yard is located near the intersection of the TLH and the entrance to the Gull Island site. Ten (10) test pits were excavated at the marshalling yard. This area is dominated by glaciofluvial sand with trace amounts of gravel and fines. An allowable bearing capacity of 250 kPa is recommended for any footing designs in the yard.

Campsites

Two (2) proposed campsite locations were investigated during the field program. Ten (10) test pits, one (1) borehole and six (6) percolation tests were performed at each site.

The first campsite is located south of the TLH in close proximity to the highway at coordinates 574300 E, 5882900 N (UTM NAD 83). The site comprises a glaciofluvial soil that is made up of mostly poorly graded sand and gravel with some fines. Other areas of the site may also contain glacial till and silty sands. The allowable bearing capacity is 250 kPa in the glaciofluvial soil deposits and 300 kPa in the glacial till soils.

The second campsite is also located in close proximity to the TLH near East Metchin River at coordinates 484350 E, 5920600 N (UTM NAD 83), south of the TLH. The site comprises glacial till consisting of well-graded sand and gravel with some silt to silty sand and gravel. Some areas of the site also contained silt and sand with trace gravel. The allowable bearing capacity in the glacial till soil deposits is 300 kPa.

Percolation tests conducted at the campsites, with the exception of one (1) test at the second campsite, indicate that the soils are suitable for construction of septic disposal fields with an application rate of approximately 0.1 $m^3/m^2/day$.

Drainage is not expected to be a problem at either site. Perimeter drainage ditches along with proper grading away from trailers will be required.

1 INTRODUCTION

1.1 TERMS OF REFERENCE

The Scope of Work included in this report was outlined by Work Task Order (WTO) No. AC1030 - Field Investigation and Construction Requirements - 735 kV Transmission Line – Gull Island to Churchill Falls.

In brief, the work includes the following:

- Assess the requirements for camps, marshalling yards, access routes, and tote roads necessary for the construction of the 735 kV transmission line from Gull Island to Churchill Falls;
- Recommend locations for camps, marshalling yards, and typical layout drawings for each;
- Conduct a field investigation program to confirm the geotechnical conditions along the transmission line route and in the area of the proposed supporting infrastructure;
- From the field investigation, establish the availability of construction materials along the route;
- Present data collected in an ArcGIS compatible format covering the entire line route, associated access routes and other related areas.

1.2 PREVIOUS STUDIES

Information and data for this report were obtained from a review of the 1999 Feasibility Study on Development of EHV Transmission Lines in Labrador[1] and from site visits carried out during the periods of July 24 to July 26, 2007 and September

[1] Feasibility Study on Development of EHV Transmission Lines in Labrador, RSW-EDM, February, 1999.

18 to September 21. Hydro's TL 240 fording location maps provided valuable information for assessing constructability issues.

1.3 CONTENT OF REPORT

The report presents the findings with respect to the location and number of camps, marshalling yards, access routes, and tote roads required. Also presented are the results of the geotechnical field investigation program which included boreholes, test pit excavation, anchor pull out tests, hand augering, bog probes, and percolation tests at the campsites.

Hard copies of drawings are included in Appendix A of the report and an electronic version of pertinent drawings, ArcGIS compatible, are being provided under separate cover.

2 LINE ROUTING

2.1 GENERAL

A comprehensive feasibility study on the development of EHV Transmission Lines in Labrador for the Lower Churchill Project (Gull Island and Muskrat Falls) was completed in February 1999[1]. The report included a proposed routing of the 735 kV line between Gull Island and Churchill Falls. Hydro has subsequently decided the 735 kV line routing would parallel (approximately 85 m to the south) the existing 138 kV line running between Happy Valley-Goose Bay and Churchill Falls. See Drawing #'s 722850-AC1030-43DD-0001 to 0011.

2.2 LINE ROUTING ADJUSTMENT

Originally the converter station and switchyard for the Gull Island Project were located on the south side of the Churchill River. As a result of other investigative work for the Lower Churchill Project, the converter station and switchyard were relocated from the south side of Churchill River to the north side. The 735 kV line will now be slightly shorter by about four (4) km. With the change in switchyard location and the fact the new 735 kV line will follow the existing 138 kV line, it is recommended that the 735 kV line be routed from the switchyard in a generally north westerly direction up over the hill to adjoin the existing 138 kV line as shown on Drawing # 722850-AC1030-43DD-0002.

[1] Ibid.

3 ACCESS ROUTES AND TOTE ROADS

3.1 ACCESS ROADS

Access to the proposed 735 kV transmission line is excellent, as the line is adjacent to the Trans Labrador Highway (TLH) throughout its length. In a number of instances, the proposed 735 kV line will cross the highway. It is also adjacent to the existing 138 kV wood pole transmission line running between Churchill Falls and Happy Valley-Goose Bay, see Drawing #'s 722850-AC1030-43DD-0002 to 0011.

3.2 TOTE ROADS

Access trails from the TLH to the proposed transmission line were established as part of the original construction of the existing 138 kV transmission line. The location of these access points together with information on fording locations were identified on Hydro's fording location maps. A site reconnaissance was used to look at the access points to determine their adequacy to construct the new 735 kV transmission line.

The maps were relatively accurate except for a few access points that were not identified. Existing access trails from the TLH to the transmission line were identified between approved fording locations #'s 15 & 16, 16 & 17, 18 & 19, and have been added to the maps, see Drawing # 722850-AC1030-43DD-0006.

There are access trails from the old highway alignment to the 138 kV transmission line between West Wilson and East Metchin Rivers, however, the old highway is completely washed out at two locations with less severe erosion in other locations. The old highway, shown as an existing road on Drawing No's 722850-AC1030-43DD-0008 and 0009, is no longer maintained and continues to deteriorate each season. The transmission line contractor will have to repair the washouts or establish access points from the new highway or some combination of both. It is possible to establish access trails from the new highway without having stream crossings. With time, the old highway may deteriorate to the point where it is not practical or economical to repair. Also, throughout this area the terrain is very rough

and it may be desirable to reroute the new 735 kV line to generally follow the existing 138 kV line but not necessarily parallel it. This should be a design detail when better contour mapping of the area is available.

Between approved fording locations #36 and #39, two (2) new existing access roads from the new highway to the transmission line have been added, see Drawing # 722850-AC1030-43DD-0009. These roads were established from the old highway to the new highway alignment during construction of the highway.

New access trails are required to be constructed just west of approved fording location #60 and east of fording location #62. These new access points are identified on Drawing # 722850-AC1030-43DD-0011. An existing access trail between stream crossings #63 and #64 has been added.

Between Gull Island switchyard and Churchill Falls, a total of sixteen (16) stream/river crossings were identified on the fording location maps as "no fording" locations. Five (5) of these crossings are the major rivers; namely, Bob's Brook, Cache River, West Wilson, East Metchin and West Metchin, and four (4) crossings are on a meandering section of East Wilson. Access points exist on either side of these river crossings so bridges will not be required at these crossings in order to construct the transmission line. Of the remaining seven (7) smaller streams, sufficient access points are available to avoid temporary crossings.

It is anticipated that heavier vehicles will be used to construct the new 735 kV line than the equipment used for construction of the existing 138 kV line. The existing access points will be upgraded, extended, or improved to handle the heavier traffic. The decision as to the extent of upgrading/improvement should be left to the transmission line contractor as part of the competitive bidding process. The contract specification should describe and define the environmental guidelines and restrictions the contractor has to follow. The contractor should choose the type and size of equipment he wants to use to construct the line. The best season for transmission line construction is winter when the ground is sufficiently hard to allow movement of heavy equipment resulting in less environmental disturbance.

4 CAMPS AND MARSHALLING YARDS

4.1 CAMP(S)

4.1.1 General

During the construction of the Gull Island Hydroelectric Development, it is assumed that a main camp will be operational at Gull Island to accommodate powerstation construction personnel and that some space may be available in that camp to accommodate transmission line construction personnel, depending on the scheduling for constructing the transmission line. No other accommodations would be available over the entire length between Gull Island and Churchill Falls. CFLCo officials have confirmed that they will not be able to accommodate any of the transmission line contractor's personnel in their staff facilities at Churchill Falls. There is a hotel in Churchill Falls with limited rooms and, other than short-term visits, no rooms would be available for construction workers.

Since scheduling is critical for the transmission line, it is recommended that separate camp(s) be provided in order to avoid any possible delays due to unavailability of accommodations at the Gull Island main camp.

4.1.2 Number of Camps

The preferred routing of the proposed 735 kV TL is parallel and adjacent to the existing 138 kV wood pole transmission line between Happy Valley-Goose Bay and Churchill Falls, as well as to the all weather TLH, hence, access to the line is excellent. In a number of instances, the proposed 735 kV line will cross the highway.

Considering that the length of highway between the Gull Island switchyard and Churchill Falls is approximately 211 km, a two (2) camp setup would appear reasonable. Camp 1 would be located approximately 49 km west of Gull Island at coordinates 574300 E, 5882900 N (UTM NAD83). See Drawing #'s 722850-AC1030-43DD-0004 and 0012. Camp 2 would be located approximately 54 km east of Churchill Falls at coordinates 484350 E, 5920600 N (UTM NAD83). See Drawing #'s 722850-AC1030-43DD-0009 and 0012. Photos of the two (2) campsites follow.

The average travel distance along the main road from each camp is 27 km. It is assumed some accommodations will be available at the main camp at Gull Island, however, with the first camp only 49 km from the switchyard, production will not be seriously impacted if only a few spaces are available at the main camp.

A number of scenarios were investigated with respect to camp location. If space could be guaranteed at the main camp at Gull Island, a camp halfway between Gull Island and Churchill Falls, and a camp at Churchill Falls would be reasonable. However, during discussions with CFLCo officials, wherein reluctance to a camp at Churchill Falls was expressed, the concept was dropped primarily because under any scenario a two (2) camp setup is required. It does not matter if a camp is at Churchill Falls or 54 km outside of Churchill Falls from a cost/efficiency perspective.

The two (2) campsites being recommended were formerly used as temporary construction campsites by the contractors engaged in upgrading the TLH and as such environmental permitting is not anticipated to be an issue provided similar type facilities and camp layouts are utilized.

Figures 4.1 and 4.2 depict the two (2) campsites.

Figure 4-1: Camp 1

Figure 4-2: Camp 2

4.1.3 Camp Layout

The number of construction workers will depend on the construction schedule. For a 735 kV TL in the terrain conditions encountered, an overall construction period of approximately twelve (12) calendar months plus clean-up time appears reasonable, allowing twelve (12) months for each of the three (3) overlapping major operations of foundation preparation, tower assembly and erection, and conductor installation.

Based on the schedule, a workforce of approximately 150 workers would be required to construct the line. A two (2) camp setup is recommended. There will be a requirement for lodging up to 150 workers for a relatively short period of time at

either one of the camps. Section 7.5, page 129 of the 1999 Feasibility Report[1]; refers to 150 workers at each camp yet, on Plate 7-0, the camp layout shows a 96-man camp. The actual scenario could be summarized as follows; Camp 1 would be established to house approximately 144 workers consisting of twelve (12) bunkhouse trailers. Camp 2 would initially be set up with four (4) bunkhouse trailers to house 48 workers and, as the advance teams are relocated forward from Camp 1 to Camp 2, their bunk trailers would be relocated forward from Camp 1 to Camp 2. Hence, the actual number of bunk trailer units required on setup would be sixteen (16), which would be comparable to the two (2) 96 worker camps.

The 96 person camp layout drawings contained in the 1999 Feasibility Report have been updated to show accommodations for 144 workers. The layout would be similar for both camps. See Drawing # 722850-AC1030-43DD-0013.

The scenario presented lends itself to owner or contractor supplied camps. For the construction of this particular transmission line the most economic approach may be to have the contractor supply his own camps. Under the marshalling yard scenario presented later in this report, the contractor may require some accommodations in the main camp at Gull Island for those personnel engaged to work in the marshalling yard, however, this should not be a deterrent to having the contractor supply his own camps.

4.1.4 Water Supply

For Camp 1, the selected site has a readily available water supply from an adjacent pond as shown on Figure 4-3. Camp 2 also has an available water supply from the East Metchin River as shown on Figure 4-4. Both of these water supplies were used by contractors engaged in reconstructing the TLH. Water can be supplied to both sites through an intake structure, which will deliver water to a constructed wetwell. Water will be pumped from the wetwell to a building where it can be treated and chlorinated to conform to the Canadian Drinking Water Quality Guidelines before distribution to the main camps. Water quality sampling was not undertaken for the purposes of this report but should be done prior to designing the treatment system.

[1] Ibid.

Type and size of infrastructure required for the camp water system will be governed by fire flows required for each site. To handle firewater, the main distribution line can be sized large enough to handle the flows, or an onsite storage tank will need to be provided. A design detail will be to ensure that fire flows are not depleted by the domestic usage. It is envisaged that each building will be provided with a standpipe and hose system for fire suppression.

Figure 4-3: Camp 1 Water Supply - Pond Adjacent to Campsite

Figure 4-4: Camp 2 Water Supply - East Metchin River

4.1.5 Sewer Services

For both Camps 1 and 2, sewage wastewater shall be discharged to a sewage disposal system for treatment before discharge to the environment. It is envisaged that sewage wastewater be discharged to a disposal field or to a packaged plant for treatment. In a camp setup, concentrations of biological oxygen demand (BOD), total suspended solids (TSS), and coliforms are quite high during peak times of the day. A disposal field required to treat these high concentrations would be quite large and require a significant area for construction.

A packaged treatment plant could be more favourable. These plants can be delivered to site, ready for use. Inlet and outlet distribution piping for the plant would require installation by the main camp contractor. These plants can be setup for the

type of treatment required such that discharge concentrations to the environment comply with The Environmental Control Water and Sewage Regulations, Schedule A, as set out by the Department of Environment.

4.1.6 Waste Disposal

Solid waste at the campsite would be stored in bear proof containers. As all waste must be disposed at an approved waste disposal site, it is envisaged that waste at each campsite would be trucked to the nearest municipal waste disposal site. For Camp 1, the closest site is at Happy Valley-Goose Bay and for Camp 2 the closest site is at Churchill Falls. A regular schedule for the pickup of waste would be put in place to minimize the storage on site.

4.2 MARSHALLING YARDS

4.2.1 Logistics

Both the Gull Island and Churchill Falls extremities of the line are situated along the all-weather TLH linking Baie Comeau, Quebec, to Happy Valley-Goose Bay, Labrador, hence all transmission line materials and equipment could be transported by road from points west. One (1) advantage of delivery by road would be just in time delivery that would reduce the requirement for marshalling areas.

The most likely scenario is that materials and equipment would be shipped via maritime transport to Goose Bay and then by road to Gull Island. Though it is generally more economical transporting by this method, it is limited to the period that the shipping channels are open, roughly between mid June and late November.

4.2.2 Yard Location

The proposed location for the marshalling yard is in the vicinity of coordinates N 5,904,100, E 648,226 and is as located on Drawing # 722850-AC1030-43DD-0002. The site was selected based on the following:

- The gateway to the project is Goose Bay, which is reached by road via the TLH, by air via major carriers, and by sea. Goose Bay is approximately 90 km by road from the Gull Island site.

- The marshalling yard is located on a burnt over area near the intersection of the TLH and the access road to the Gull Island site. It is assumed a security gate for the Gull Island project would be located nearby and the marshalling yard be located just inside the gate.

Based on a review of material requirements presented in the 1999 Feasibility Study[1], an area of approximately 6.0 hectares would be required to marshal materials. Drawing # 722850-AC1030-43DD-0014 shows a typical layout of the proposed marshalling area.

4.2.3 Preparation of the Site

It is recommended that Hydro provide a fully prepared, levelled, and fenced site to the transmission line contractor. The delivery schedule for Hydro supplied permanent line materials (i.e., foundation and tower steel, anchor rods, conductor insulators and accessories, etc.) will dictate whether Hydro or the transmission line contractor will undertake the receiving, sorting, checking, and storage of this material prior to the start of construction.

It is assumed that procurement will be done by Hydro, hence, it is preferable that the Owner receives, sorts, and checks all material at the marshalling yard and hands all materials over to the contractor prior to the start of construction.

[1] Ibid.

5 GEOTECHNICAL

5.1 GENERAL

The drawings in Appendix A show the specific test locations discussed in this report.

5.2 INVESTIGATION PROCEDURES

The geotechnical program was divided into several tasks.

5.2.1 Task 1 – Air Photo Interpretation/Base Map Preparation/Fieldwork Preparation

A series of stereo pairs, black and white air photos and colour air photo mosaics were obtained from Hydro. These were examined to obtain remote sensing data on the landforms and surficial geology along the route. Hydro also provided route strip maps that were prepared for their environmental studies. These maps contained the approved stream crossings and locations of access trails which aided in the planning for the work. During the study it was discovered that surficial geology and geomorphology mapping was being prepared by one of the environmental consultants, Jacques Whitford. Instead of producing a separate surficial geology map, it was decided to provide field information to Jacques Whitford so they could ground truth their air photo interpretation.

Published reports (see bibliography) of the area on surficial and bedrock geology were reviewed.

When the review of surficial and bedrock geology was completed, plans were finalized for the field investigation program. The program that was identified in the WTO Execution Plan was modified. A reduction was made in the intrusive investigations and more emphasis was placed on areas where varying conditions were expected including bogs and steep slopes.

5.2.2 Task 2 – Reconnaissance

Two (2) reconnaissance trips were made by helicopter. The first trip was made on July 25, 2007. The goal was to become more familiar with the route and to identify

any problems with access for the purpose of testing. The second trip was made on September 9, 2007 in order to examine the topographic features and soil conditions in remote locations. The route maps supplied by Hydro were used during this process to record the surficial geology of route. Soil/rock conditions in areas that represented a change in the surficial geology were examined more closely.

5.2.3 Task 3 – Permits

Hydro had in place permitted access trails and fording sites. Intrusive investigations were limited to those areas where permits were in place and in areas away from streams and water bodies where permits were not required.

5.2.4 Task 4 – Ground Truthing and Geotechnical Investigations

The fieldwork for this investigation was performed between July 25 and October 1, 2007 using helicopter support.

Areas of interest were examined on the ground and intrusive investigations were performed. Representative samples of the materials encountered were obtained and sent to the site laboratory for index testing. In total fifty-nine (59) test pits were excavated, five (5) boreholes were drilled, forty-two (42) areas of bog were probed and twelve (12) anchor pull out tests were performed. In addition, twelve (12) percolation tests were performed at the two (2) proposed campsites. Field logs are included in the corresponding appendices.

Test Pits

Fifty-nine (59) test pits were excavated in representative areas that provided coverage of the anticipated soil conditions along the route, two (2) potential campsite areas and the marshalling yard located near the entrance to the Gull Island site. Of these test pits, ten (10) were excavated in the proposed marshalling area to provide bearing capacity data for laydown of equipment and structures. A further twenty (20) test pits were excavated in the proposed campsite areas, ten (10) at each site. The remaining twenty-nine (29) test pits were excavated along the transmission line route from Gull Island to Churchill Falls. Samples were obtained from these areas and

transported to the project soils laboratory for further analysis. The test pit logs as well as laboratory results are presented in the corresponding appendices.

Boreholes

A total of five (5) boreholes were drilled, one (1) at each of the proposed campsites and three (3) at strategic points along the transmission line route. Samples from the boreholes were shipped to the project soils laboratory in Goose Bay for further testing. Borehole logs as well as laboratory testing results are presented in the appendices and are referenced to the corresponding site.

Bog Probes

Although bog probing was not specifically identified in the original WTO scope, forty-two (42) areas containing bog were identified during the reconnaissance trips that were close to the route and were probed to aid the designers in making decisions on the final routing. Some of the areas had more than one small bog and each bog was reported on individually. The probe results are included in Appendix B.

Anchor Pull Out Tests

Twelve (12) anchor pull out tests were performed along the proposed transmission line route where bedrock outcrops were visible at or just below the ground surface. The rock bolts were installed in bedrock (granite gneiss). The bolts were stressed to determine the ultimate holding capacity of the anchor rod only.

25 mm diameter utility pole rock bolt anchors with the cable eyes removed were used for testing.

The anchors were installed approximately 1.8 m into bedrock in 45 mm diameter drill holes. The anchor shells were 50 mm long and ribbed. The shell was anchored by torquing with a 0.6 m long pipe wrench to refusal. No grout was used as the holding resistance of the anchor in the rock was required.

The testing equipment was calibrated in imperial units and the results were reported in the same units. The anchor was then loaded to two (2) tons (short). Every two (2)

minutes a load of two (2) tons was added until either the anchor failed or the jack had reached its capacity. The test results are included in Appendix B.

5.2.5 Task 5 – Reporting

All of the material reviewed, field test results, and interpretations are assembled in this technical report.

5.2.6 Laboratory Testing

Soil samples were collected from both the test pit and borehole excavations. All samples were stored in sealed plastic sample bags and transported via pickup truck to the project laboratory in Goose Bay for testing. Laboratory results are presented in the appendices, referenced to the corresponding test site.

In addition, further samples were obtained along the route where outcrops of possible construction materials were noted. Seven (7) samples were collected and sent to the project lab for analysis including gradation and Standard Proctor density.

5.3 GEOLOGY

5.3.1 Surficial Geology

The route starts at the proposed switchyard on the Churchill River lowlands. Soil in this area and for the first kilometre of transmission line terrain is expected to be glaciofluvial sediment comprising sand or sand with some gravel overlying fine grained, lacustrine silt and clay. The remainder of the route climbs up into a lowlands terrain dominated by glacial landforms. The terrain comprises gently rolling hills with thin glacial till soils covering much of the countryside.

Eskers are common in the area, often associated with the larger river valleys such as Cache, Wilson and Metchin Rivers.

Bedrock outcrops are abundant in the higher elevations, especially near Churchill Falls and on most hilltops along the route.

5.3.2 Bedrock Geology

The 203 km long transmission line traverses a late paleoproterozoic age geology dominated by crystalline metamorphic rocks composed of granite orthogneiss with some dark mafic material and numerous pegmatite stringers. Bedrock is at or near the surface on the proposed transmission line route at twelve (12) locations as noted in the anchor pull out test logs in Appendix B.

5.4 INVESTIGATION RESULTS

Upon completion of the Air Photo Interpretation (API) and terrain analysis, calculations were made for the type of soil, bog and rock expected along the route. This calculation was further upgraded upon completion of the fieldwork for the project. The quantities may be summarized as follows:

• Bog lands	16.6%
• Water	4.4%
• Bare rock or rock concealed under thin organic soil	4.7%
• Areas of thin glacially produced soil	62.7%
• Colluvium	0.8%
• Fluvial sand	3.1%
• Fluvial sand and gravel	7.7%
	100.0%

5.4.1 Transmission Line

Twenty-nine (29) test pits, twelve (12) rock anchor pull out tests, three (3) boreholes and forty-two (42) bog probe areas were conducted on the 203 km long route of the proposed transmission line.

Glacial till was the dominant material encountered along the route with relatively thin layers from 0.5 m to > 4.5 m overlying bedrock. Glacial till may be as deep as 16 m as is evidenced in borehole TL-BH-04 located on Drawing # 722850-AC1030-43DD-0008 (Appendix A). This material generally ranges from a sandy gravel to a gravely sand with some cobbles. Bedrock was generally found underlying thin layers of glacial till and near the surface in boggy areas.

Twelve (12) rock anchor pull out tests were conducted along the route where bedrock outcrops were visible. All rock anchors were stressed to an axial load of 18 tons at which point the test was discontinued following overload of the jack. The tests required that each anchor hold without slipping at a load of twelve (12) tons. This requirement was met at all locations.

Fine to medium fluvial sands with trace gravel and trace fines were common near rivers and streams. Silty sands and sands containing some silt were encountered to a lesser degree.

Minor bog lands exist throughout the area; however, the route avoids most of the bogs.

Frost penetration in this area is expected to be 2.5 m based on data from the Canadian Foundation Engineering Manual, 3rd Edition. The susceptibility for frost action in glacial till and marine soil containing significant fines is moderate to objectionable. In clean sand and gravel, away from the water table, frost action will be slight.

The geotechnical parameters for soils expected along the route are presented in the following table:

Table 5-1: Summary of Geotechnical Design Parameters

Soil or Rock Type	Allowable Bearing Capacity kP_a	K_a	K_p	SG	γ kN/m^3	γ kN/m^3 submerged	ϕ Su	Recommended Anchoring Procedure
Fluvial Sand	250	0.33	3.00	NA	18	8	30°	Gravity
Fluvial Sand and Gravel	250	0.31	3.26	NA	19	9	32°	Gravity
Clay/Silt	50*	0.39	2.56	NA	NA	10	25 kPa	Gravity
Glacial Till [undisturbed]	300	0.24	4.20	NA	22	12	38°	Gravity
Submerged Fill in Bogs or Other Wet Areas	100	0.36	2.77	NA	11	9	28°	Gravity
Granite Gneiss	3000	NA	NA	2.6	25	15	45°	Rock Bolts

K_a, K_p – Rankine Assumptions; SG – Specific Gravity; γ - Unit Weight; ϕ - Friction Angle; S_u – Undrained Shear Strength (Clay/Silt only); NA – Not Applicable

*This bearing capacity is preliminary. Consolidation testing should be performed during the final design stage of the project to predict the settlement characteristics of this soil which would ultimately determine the bearing capacity.

5.4.2 Marshalling Yard

The proposed marshalling yard is located near the intersection of the TLH and the entrance to the Gull Island site. The area is relatively flat and has recently been burnt over. Ten (10) test pits were excavated in the area of the marshalling yard. Test pit logs and laboratory results can be found in Appendix C. This area is dominated by glaciofluvial sand with trace amounts of gravel and fines.

A bearing capacity of 250 kPa is recommended for any footing designs in the yard.

5.4.3 Campsites

There are two (2) campsite locations proposed for the project. Ten (10) test pits, one (1) borehole and six (6) percolation tests were performed at each campsite.

Campsite 1

Campsite 1 is located near coordinates 574300 E, 5882900 N (UTM NAD 83) south of the TLH. Geotechnical investigations indicate that the site soil is made up of mostly poorly-graded sand and gravel with some fines. This material is generally made up of sub angular to sub rounded particles, indicating a glaciofluvial origin. Other areas of the site may also contain glacial till and silty sands.

Percolation tests performed at six (6) locations on the site resulted in time (T) less than seven (7) minutes per 25 mm. These results, according to Guidelines for the Design, Construction and Operation of Water and Sewerage Systems by the Department of Environment and Conservation, indicate design application rates for a septic disposal field to be in the order of 0.103 m^3/m^2/day. This would indicate that the site is suitable for a septic disposal field. A recognized standard such as the Department of Environment and Conservation's guidelines should be consulted in the design of a septic disposal field for this site.

A bearing capacity of 250 kPa is recommended for any footing designs at the campsite.

It is anticipated that the preferred method of drainage will be open drainage ditches or swales along the perimeter of the campsite combined with galvanized steel culverts, where required. It is recommended that check dams be combined with ditching in areas where fine grained soils are encountered. Check dams may be constructed of well-graded blast rock and constructed to a recognized standard.

It is recommended that the site be graded to promote drainage to the perimeter ditches. In addition, the site must be graded to allow water to be channelled away from the trailers, particularly in areas of high foot traffic.

Should fine grained soils be encountered in cut areas, erosion prevention measures such as soil stabilization blankets and matting should be used. Shallow bank slopes alone will not prevent erosion of this material during high water flows. Ideally, a combination of seeding and mulching should be used. This would depend on the design life of the campsite as vegetation will take a while to become effective.

Based on the test pit logs from the site, cut slopes at 2H:1V are required. If fine grained soils are encountered, cut slopes of 2.5H:1V will be required.

Campsite 2

Campsite 2 is located near coordinates 484350 E, 5920600 N (UTM NAD 83) south of the TLH. Geotechnical investigations indicate that the site soil is made up of mostly glacial till consisting of well graded sand and gravel with some silt to silty sand and gravel. Some areas of the site also contain silt and sand with trace to some gravel. This material is generally made up of sub angular particles, indicating a glaciolfluvial origin. Other areas of the site may also contain glaciofluvial materials.

Percolation tests performed at six (6) locations on the site resulted in a wide range of time (T) from three (3) hours and forty-seven (47) minutes to as low as three (3) minutes for a drop of 50 mm. According to Guidelines for the Design, Construction and Operation of Water and Sewerage Systems by the Department of Environment and Conservation, times of 30 minutes and greater for a fall of 25 mm indicate that the soil is of questionable suitability for a septic disposal field. The soil near percolation test AC1030-CS2-PERC-1 would be considered questionable. The

remaining five (5) percolation tests yielded results generally less than seven (7) minutes per 25 mm drop in water level, corresponding to an application rate of approximately 0.1m^3/m^2/day. A septic disposal field could be designed for this site as long as it is located within a region with acceptable percolation results; otherwise imported fill would be required. A recognized standard such as the Department of Environment and Conservation's guidelines should be consulted in the design of a septic disposal field for this site.

A bearing capacity of 300 kPa is recommended for any footing designs at the campsite.

It is anticipated that the preferred method of drainage will be open drainage ditches or swales along the perimeter of the campsite combined with galvanized steel culverts, where required. It is recommended that check dams be combined with ditching in areas where fine grained soils are encountered. Check dams may be constructed of well graded blast rock and constructed to a recognized standard.

It is recommended that the site be graded to promote drainage to the perimeter ditches. In addition, the site must be graded to allow water to be channelled away from the trailers, particularly in areas of high foot traffic.

Should fine grained soils be encountered in cut areas, erosion prevention measures such as soil stabilization blankets and matting should be used. Shallow bank slopes alone will not prevent erosion of this material during high water flows. Ideally, a combination of seeding and mulching should be used. This would depend on the design life of the campsite as vegetation will take a while to become effective.

Based on the test pit logs from the site, cut slopes at 2H:1V are required. If fine grained soils are encountered, cut slopes of 2.5H:1V will be required.

5.5 CONSTRUCTION CONSIDERATIONS

5.5.1 Materials

Construction of the line and associated structures will require material for fill and aggregates.

Clean acceptable fill may be found over most of the line in the fluvial soils, near rivers, and thin veneers of glacial till that are abundant over most of the line. Several samples of possible fill sources were taken along the route for indexing. Gradations and proctor values obtained are included in Appendix B, Transmission Line.

5.5.2 Quality Specifications

The quality of construction must be assured. It is suggested that CSA A23.1-00 Concrete Materials and Methods of Construction/Methods of Test for Concrete be followed for any concrete design and the Newfoundland and Labrador Department of Transportation and Works Highways Specifications Book be followed for any road construction.

If grades are such that foundations are required on fill, the fill should be a high quality, well graded material, free from organics, with low fines content and placed at optimum moisture content. Granular B as specified by the Newfoundland Department of Transportation and Works would be acceptable. An alternative to Granular B may be used provided its quality is inspected and approved by qualified personnel prior to its use. The fill should be located away from steep embankments and protected from erosion. It must be placed in lifts not exceeding 150 mm thick on soil which has been proof rolled. The fill must be compacted to 100% of its corrected maximum dry density (ASTM D 698-78). Foundations placed on well compacted, engineered fill, may be designed based on an allowable bearing pressure of 150 kPa, provided its placement is inspected by qualified personnel.

Bog is not suitable for bearing, anchoring or reuse as fill. The bearing capacity of fills submerged in water, such as bog areas, is limited to 100 kPa.

In the case of imported fill for a septic disposal field, high quality, medium grained sand, with a low to medium fines content would be acceptable, provided that percolation tests are also acceptable.

5.6 CLOSURE

This report was prepared for the exclusive use of Hydro for specific application to the project site. The field investigations and analyses were performed using generally accepted geological and engineering practices in accordance with the work plan developed and verbal requests from the client. No other warranty expressed or implied is made. The limitations of this report are attached in Appendix E.

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Map 1986 - 60 NTS 13F/SE Goose Bay Area

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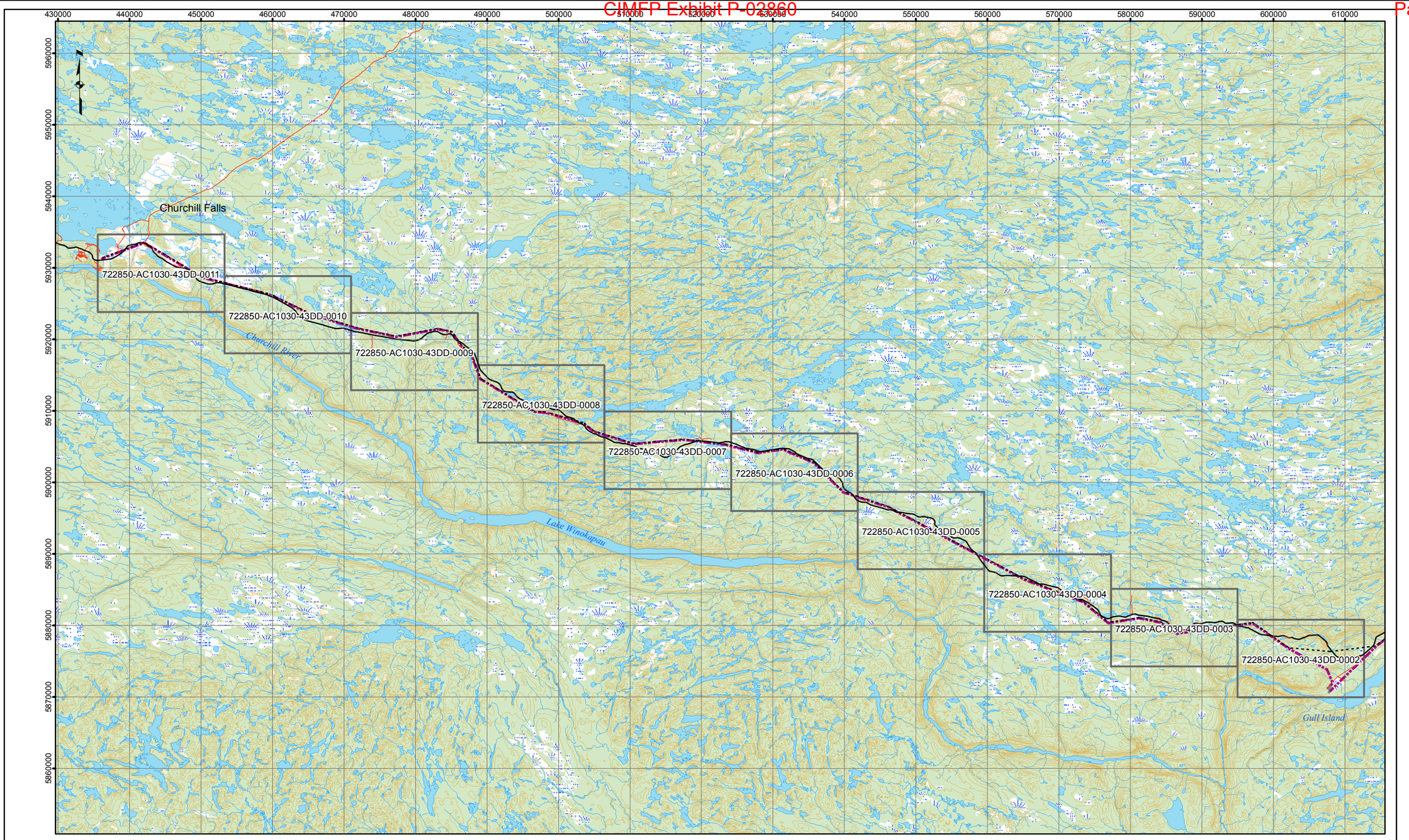
APPENDIX A

DRAWINGS



LEGEND

- Existing Road
- Trans Labrador Highway
- Existing Tranmission Line 138kV
- Proposed Transmission Line 230kV
- Proposed Transmission Line 735kV
- Index Grid

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DWG NO.	TITLE

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TELC.	APPROVED:	C. MILES

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HYDRO NEWFOUNDLAND AND LABRADOR HYDRO

PROJECT: FIELD INVESTIGATION AND CONSTRUCTION REQUIREMENTS
735 Kv TL - GULL ISLAND TO CHURCHILL FALLS

TITLE: TEST LOCATION INDEX MAP

W.O. NO.

DWG. NO. 722850-AC1030-43DD-0001

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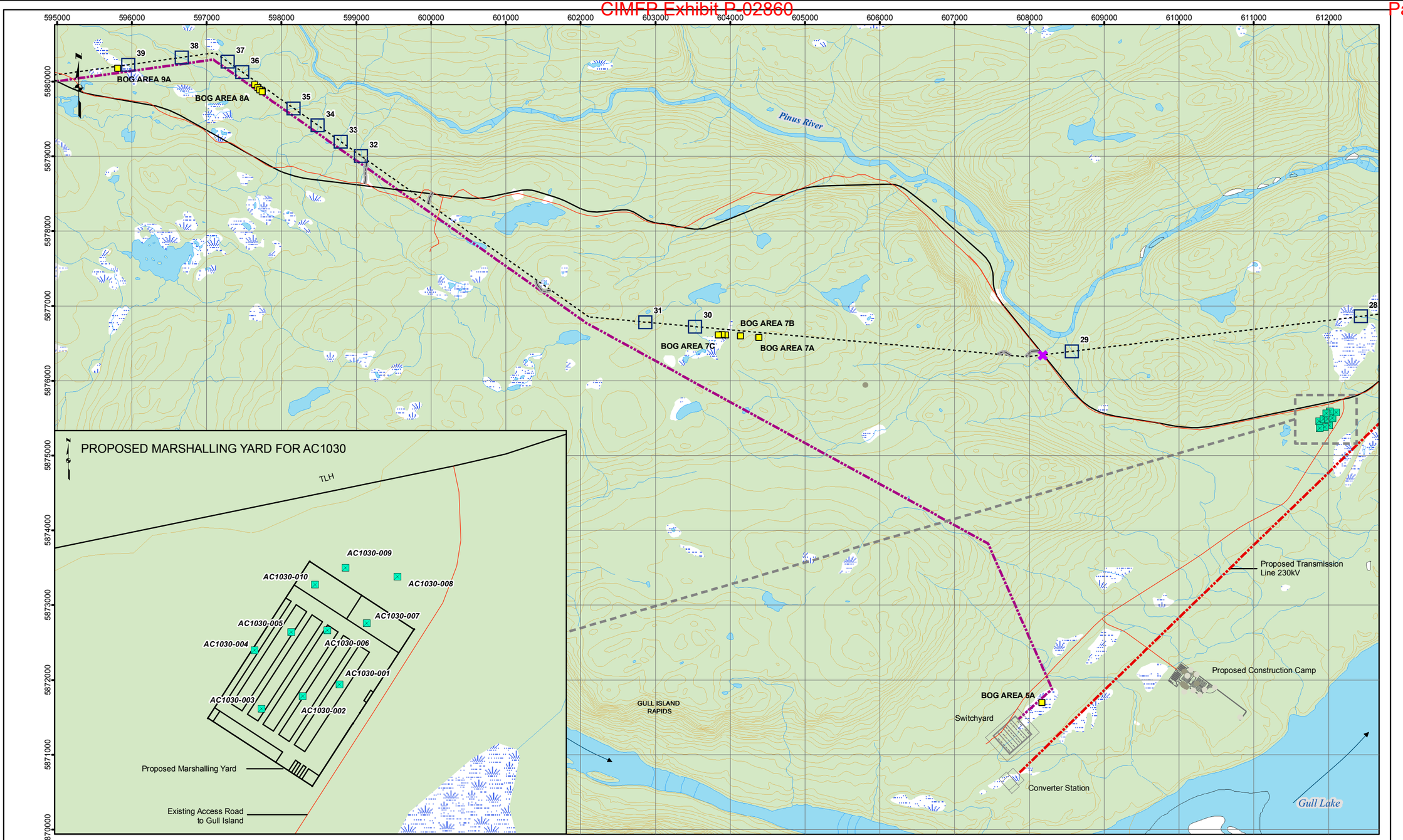

LEGEND

- Percolation Test
- Bog Probe Location
- Borehole
- Pull Out Test
- Test Pit
- Proctor Sample
- Access Point
- Approved Fording Location
- No Fording
- Access Trail
- Distribution Line
- Existing Road
- Trans Labrador Highway
- Proposed Transmission Line 735kv
- Existing Tranmission Line 138kV

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PROJECT:
FIELD INVESTIGATION AND CONSTRUCTION REQUIREMENTS
735 Kv TL - GULL ISLAND TO CHURCHILL FALLS

TITLE:
TEST LOCATION PLAN

W.O. NO.

DWG. NO. 722850-AC1030-43DD-0002

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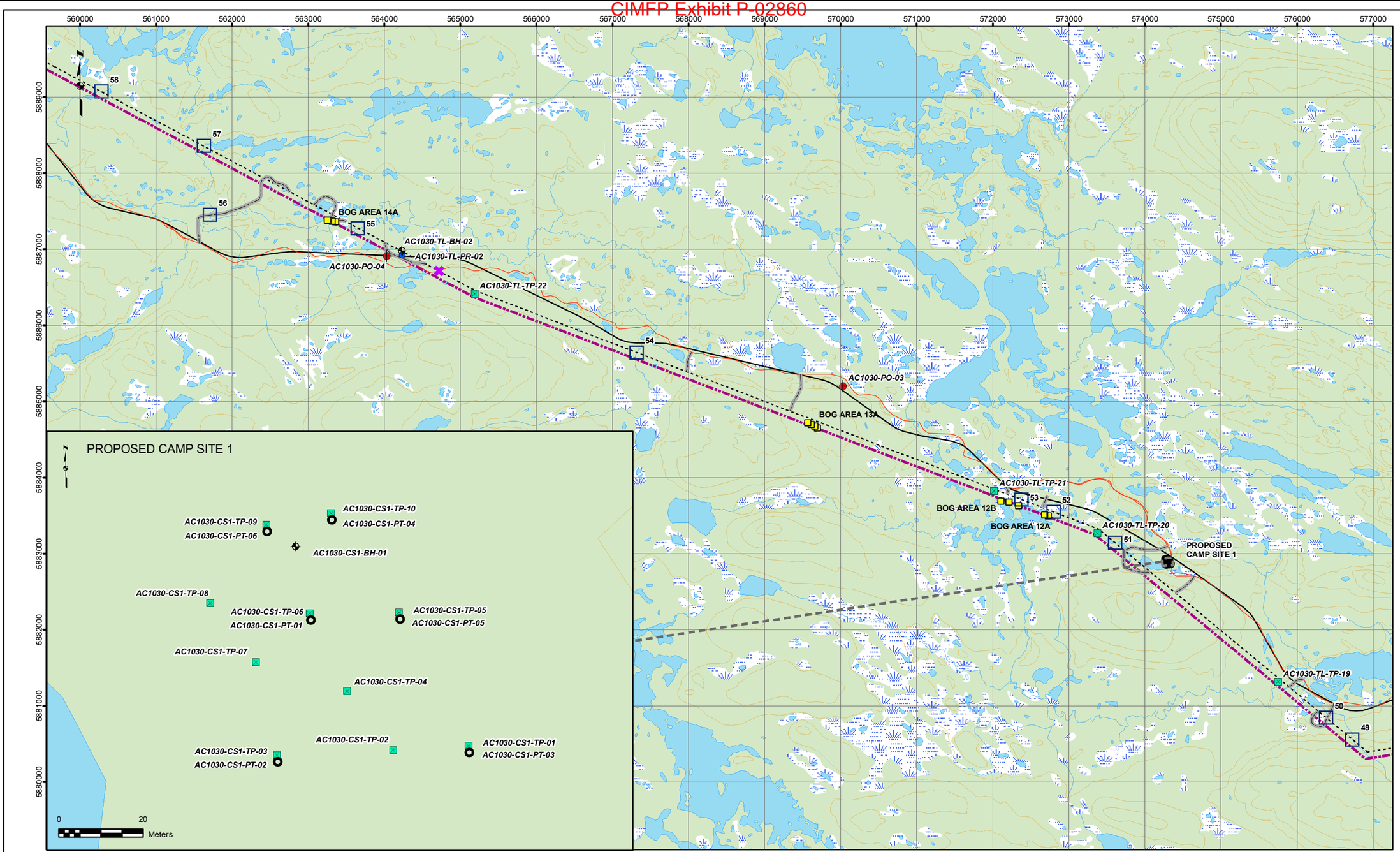

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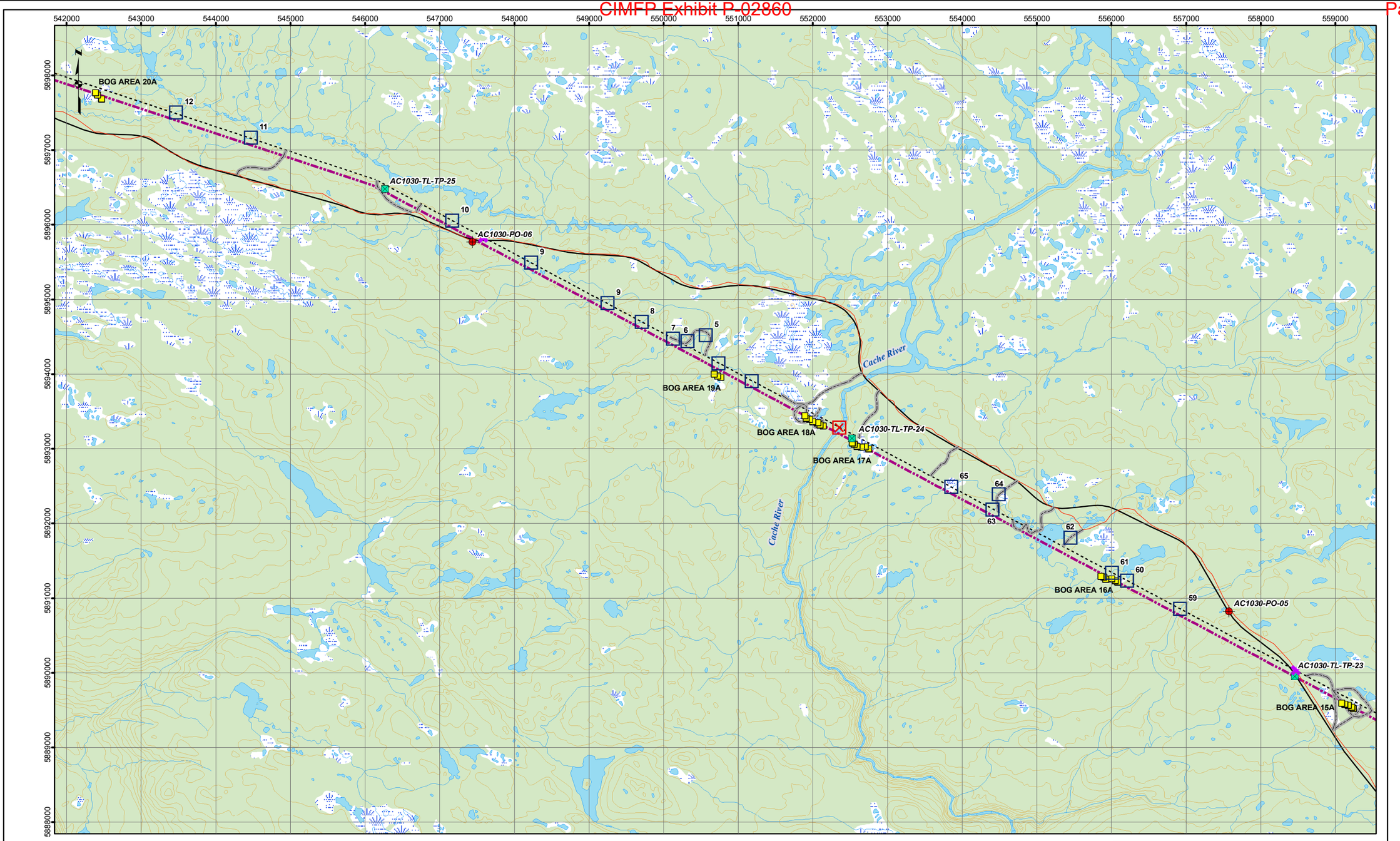

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TITLE: TEST LOCATION PLAN

W.O. NO.

DWG. NO. 722850-AC1030-43DD-0005

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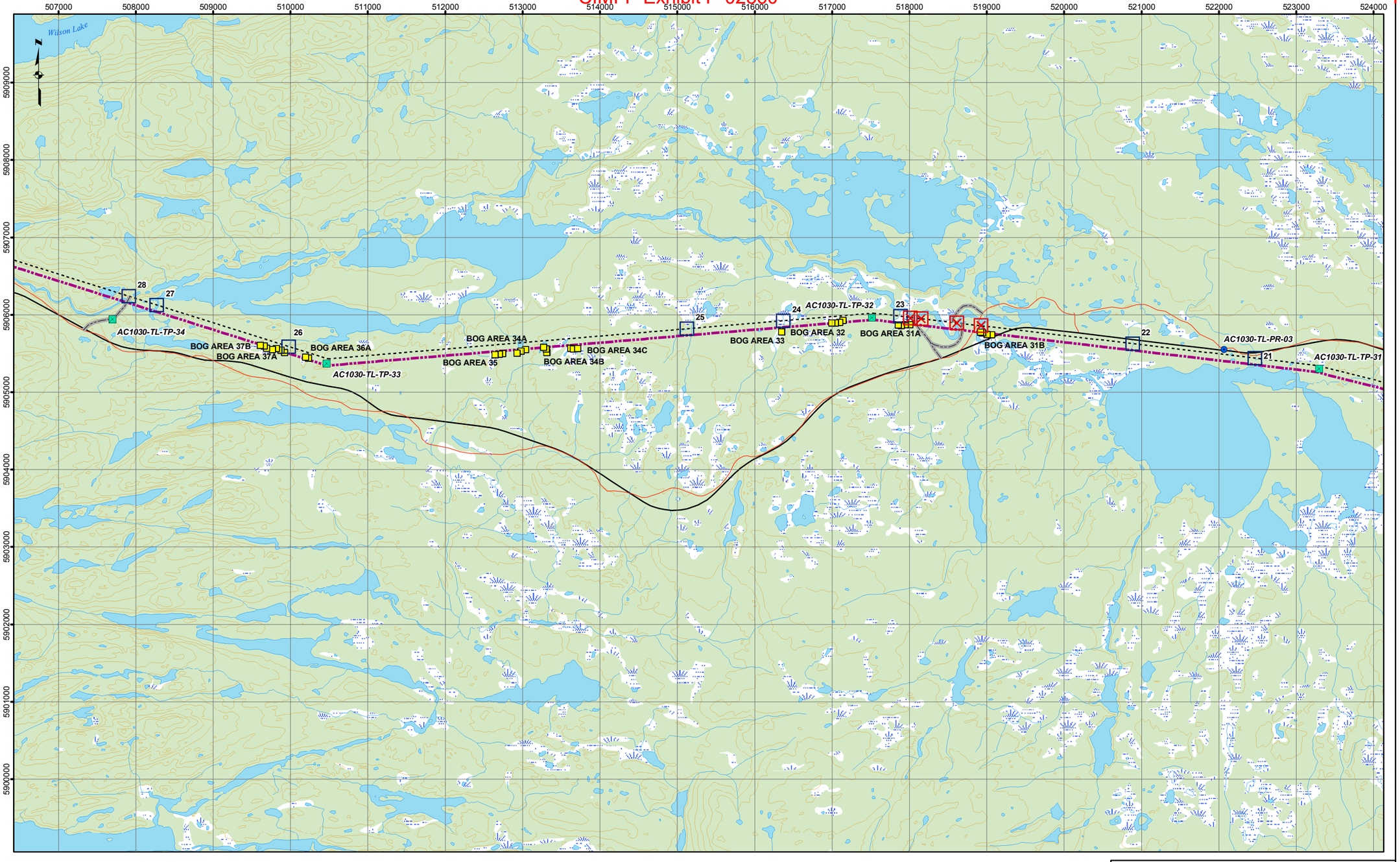

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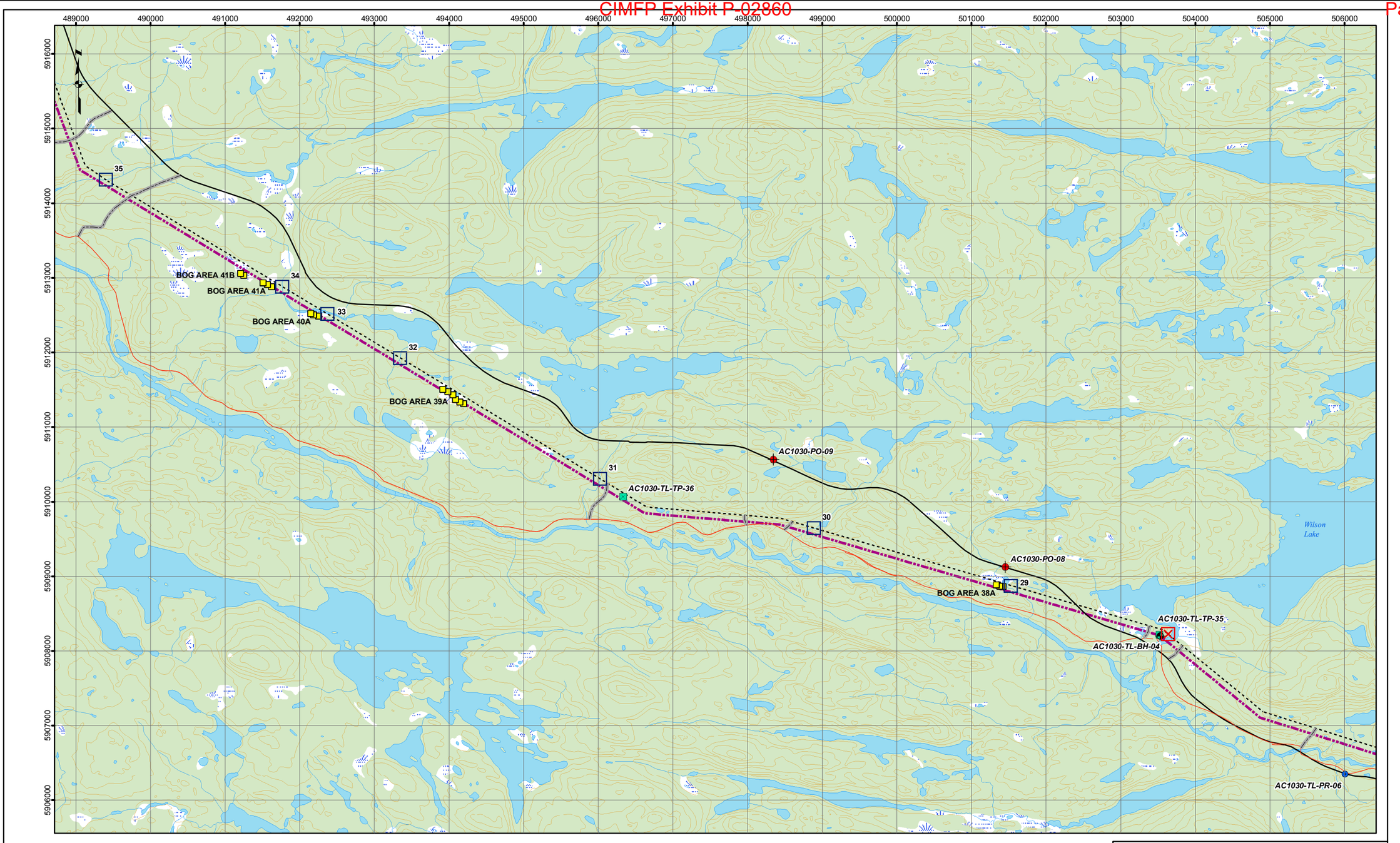

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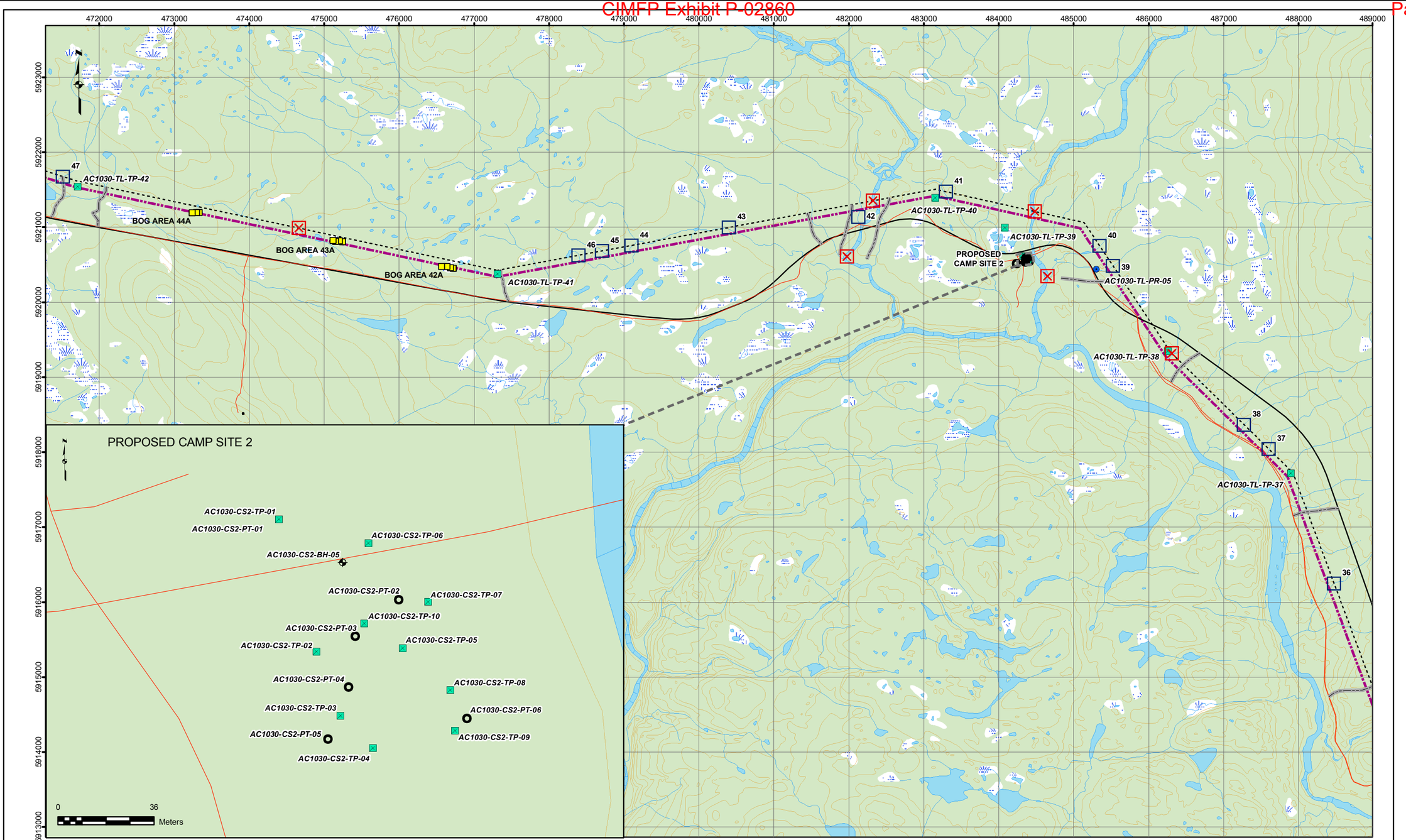

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- Proposed Transmission Line 735kV
- Existing Tranmission Line 138kV

0 250 500 750 1,000 Meters

1:50,000

DWG NO.	TITLE

REFERENCE DRAWINGS

NO.	DATE	DESCRIPTION	DWN.	DESIGN.	CHK.	APP'D
0	30/11/07	ISSUED FOR REVIEW	NG		GL	CM

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CIVIL	DESIGNED:	N. GRIFFIN
TRANS	DRAWN:	N. GRIFFIN
MECH	DATE:	JAN 23, 2008
P&C	CHECKED:	G.LAING
TELC.	APPROVED:	C. MILES

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BAE-Newplan Group Limited
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Pearl, NL, Canada
A1N 5G2

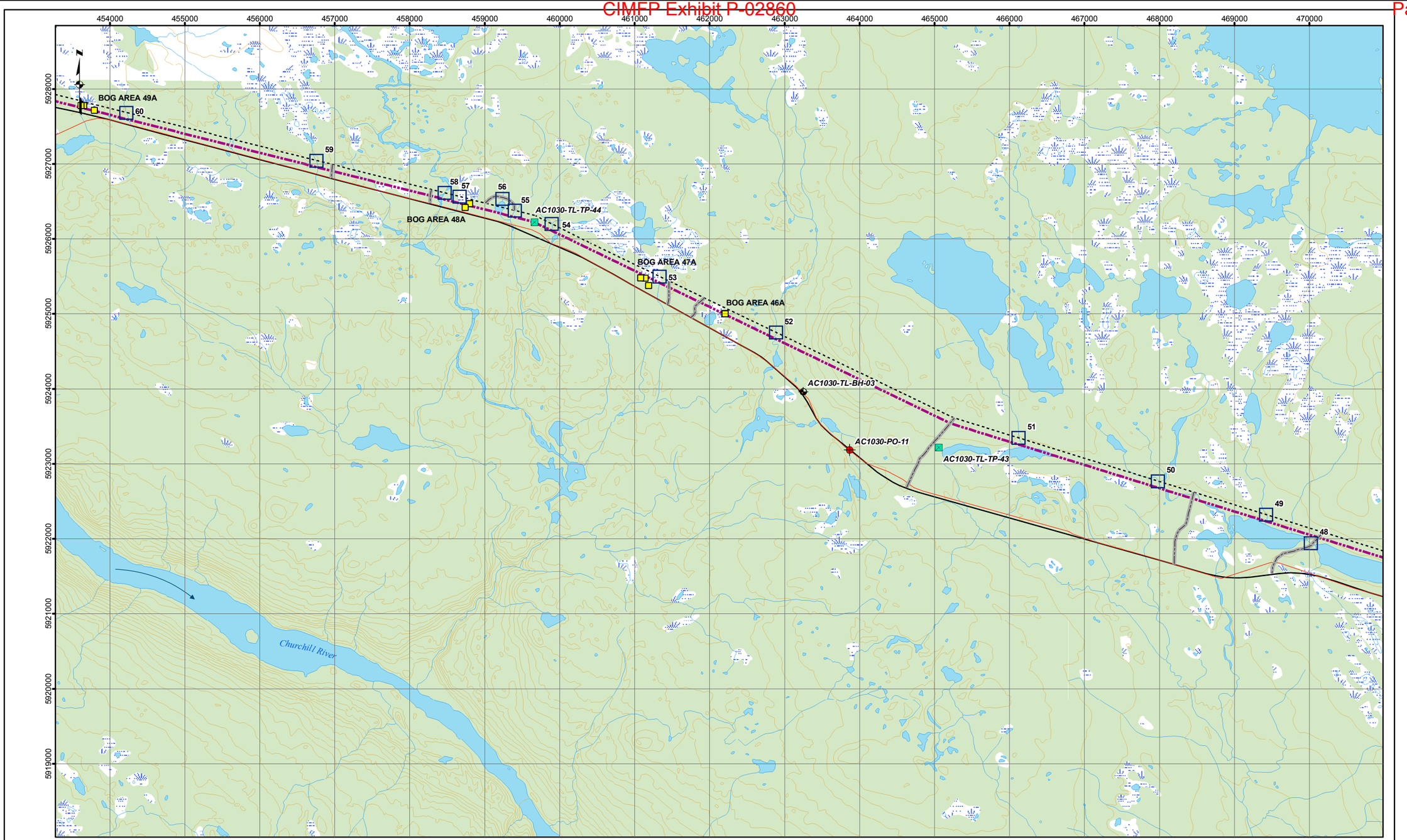
HYDRO

NEWFOUNDLAND AND LABRADOR HYDRO

PROJECT:
FIELD INVESTIGATION AND CONSTRUCTION REQUIREMENTS
735 Kv TL - GULL ISLAND TO CHURCHILL FALLS

TITLE:
TEST LOCATION PLAN

W.O. NO.	DWG. NO.	REV.
	722850-AC1030-43DD-0009	0



LEGEND

- Percolation Test
- Bog Probe Location
- Borehole
- Pull Out Test
- Test Pit
- Proctor Sample
- Access Point
- Approved Fording Location
- No Fording
- Access Trail
- Distribution Line
- Existing Road
- Trans Labrador Highway
- Proposed Transmission Line 735kV
- Existing Tranmission Line 138kV

0 250 500 750 1,000 Meters

1:50,000

DWG NO.	TITLE

REFERENCE DRAWINGS

NO.	DATE	DESCRIPTION	DWN.	DESIGN.	CHK.	APP'D
0	30/11/07	ISSUED FOR REVIEW	NG		GL	CM

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ELECT.	SCALE:	AS NOTED
CIVIL	DESIGNED:	N. GRIFFIN
TRANS	DRAWN:	N. GRIFFIN
MECH	DATE:	JAN 23, 2008
P&C	CHECKED:	G.LAING
TELC.	APPROVED:	C. MILES

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HYDRO

NEWFOUNDLAND AND LABRADOR HYDRO

PROJECT:
FIELD INVESTIGATION AND CONSTRUCTION REQUIREMENTS
735 Kv TL - GULL ISLAND TO CHURCHILL FALLS

TITLE:
TEST LOCATION PLAN

W.O. NO.

DWG. NO. 722850-AC1030-43DD-0010

REV. 0

LEGEND

- Percolation Test
- Bog Probe Location
- Borehole
- Pull Out Test
- Test Pit
- Proctor Sample
- Access Point
- Approved Fording Location
- No Fording
- Access Trail
- Distribution Line
- Existing Road
- Trans Labrador Highway
- Proposed Transmission Line 735kV
- Existing Tranmission Line 138kV

0 250 500 750 1,000 Meters

1:50,000

DWG NO.	TITLE

REFERENCE DRAWINGS

NO.	DATE	DESCRIPTION	NG DWN.	DESIGN.	GL CHK.	CM APP'D
0	30/11/07	ISSUED FOR REVIEW				

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ELECT.	SCALE: AS NOTED
CML	DESIGNED: N. GRIFFIN
TRANS	DRAWN: N. GRIFFIN
MECH	DATE: JAN 23, 2008
P&C	CHECKED: G.LAING
TELC.	APPROVED: C. MILES

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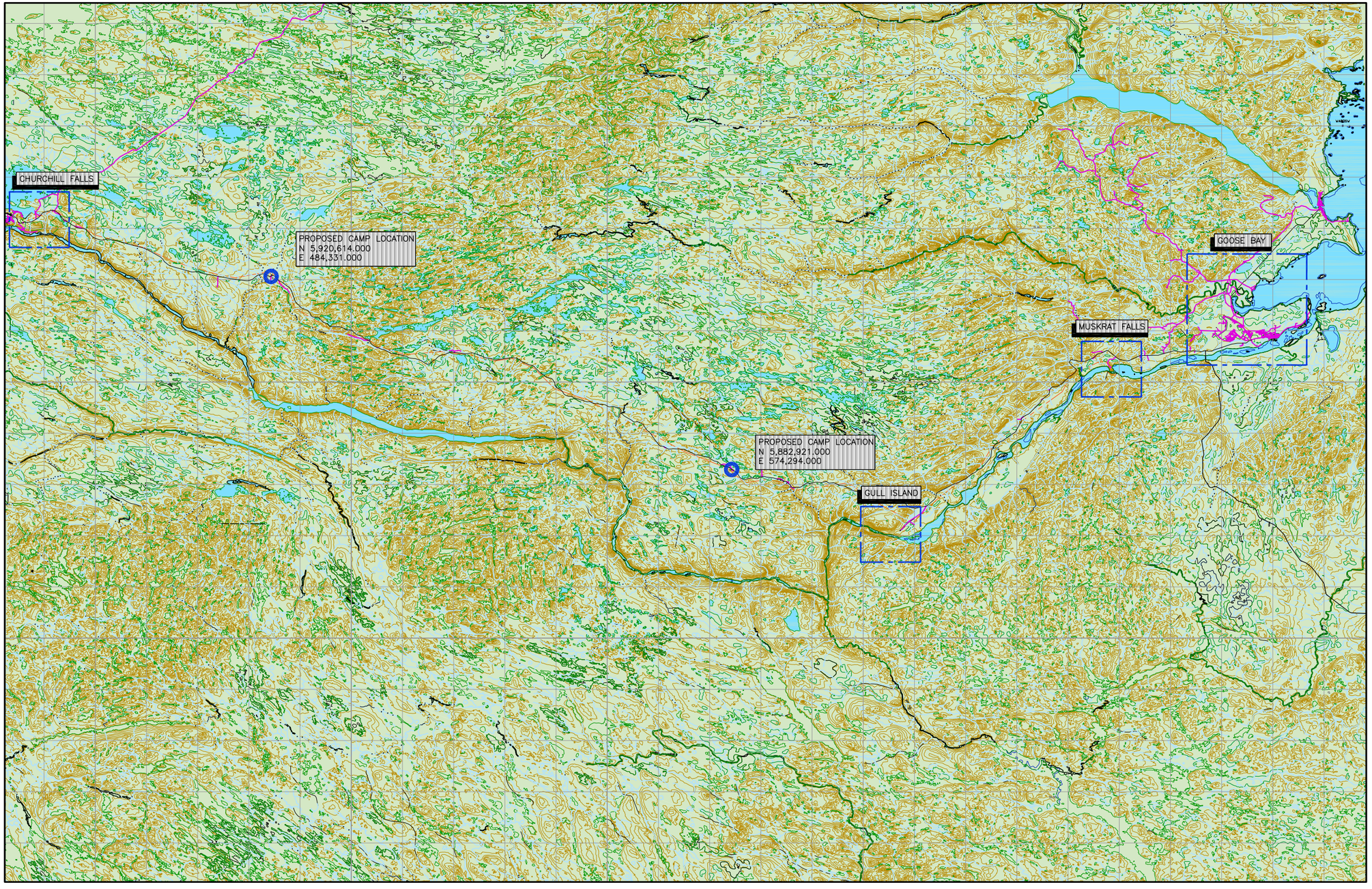
HYDRO

NEWFOUNDLAND AND LABRADOR HYDRO

PROJECT:
FIELD INVESTIGATION AND CONSTRUCTION REQUIREMENTS
735 Kv TL - GULL ISLAND TO CHURCHILL FALLS

TITLE:
TEST LOCATION PLAN

W.O. NO.	DWG. NO.	REV.
	722850-AC1030-43DD-0011	0



0 10KM 25KM

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DWG.NO.	TITLE
REFERENCE DRAWINGS	

NO.	DATE	DESCRIPTION	DWN.	DESIGN.	CHK.	APP'D
REVISIONS						

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HYDRO

NEWFOUNDLAND AND LABRADOR HYDRO

FIELD INVESTIGATION AND CONSTRUCTION REQUIREMENTS
735Kv TL - GULL ISLAND TO CHURCHILL FALLS
CAMP LOCATION PLAN

ELECT.	SCALE: AS NOTED
CIVIL	DESIGNED: G.L./T.M.
TRANS.	DRAWN: G.L./P.W.
MECH.	DATE: 08/02/07
P&C	CHECKED: T.M.
TELC.	APPROVED: B.C.

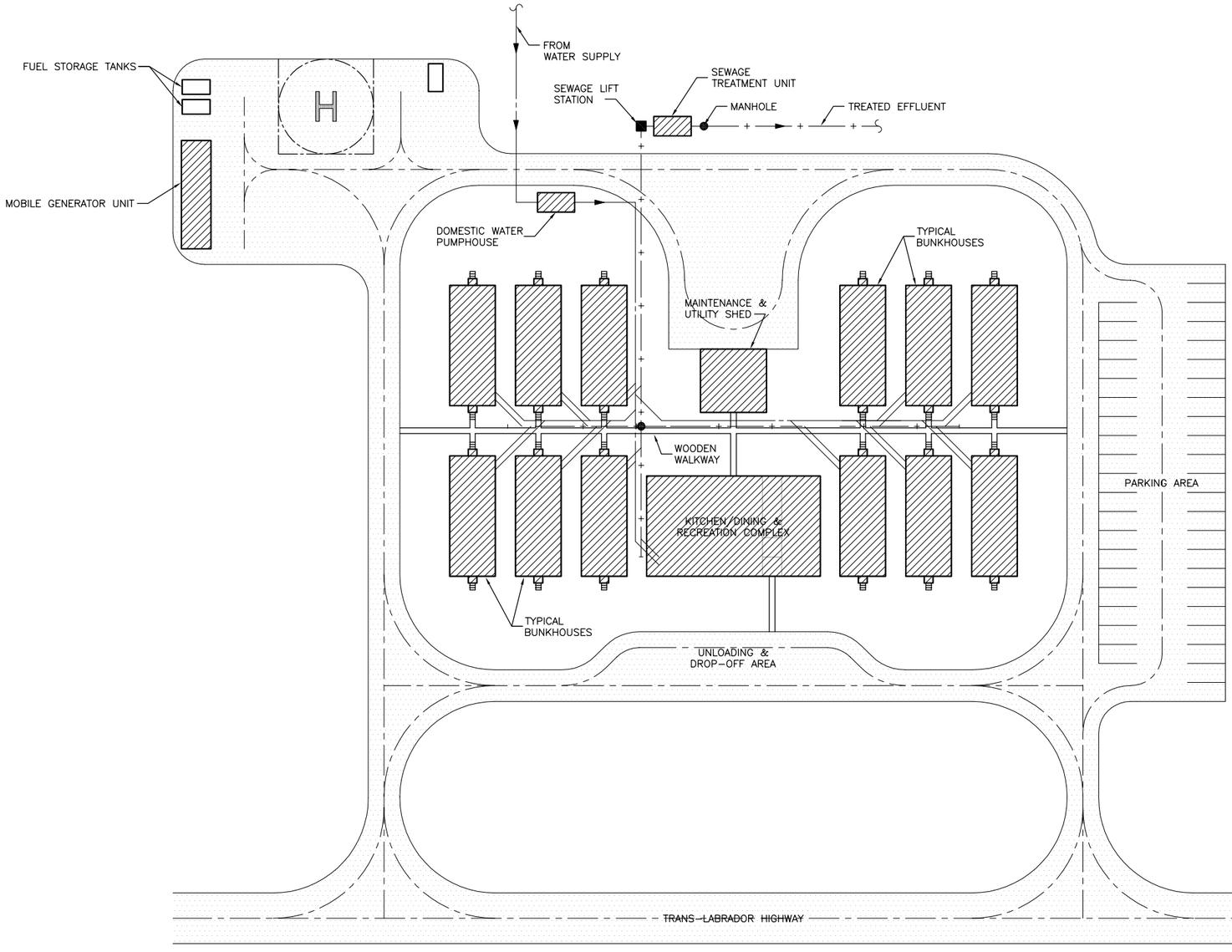
W.O. NO.

DWG. NO. 722850-AC1030-43DD-0012

REV. 0

Feb 07, 2008 - 1:49pm

C.A.D.



TYPICAL SATELLITE CAMP LAYOUT

1
000X|000X

0 5 10 15m
Scale 1:300

NOTES :

1. SITE AREA
   – 130m X 170m = 2.2ha (Approx.)

2. ACCOMMODATION
   – Bunkhouse trailers accommodate 12 persons with single rooms and common lavatory facilities.

3. AMENITIES
   – Private Rooms
   – Shared Bath
   – TV Room
   – Laundry Room
   – Common Recreational Area

4. FOOD SERVICE
   – Dining Hall to serve 140 persons.

NOTES :
1. ALL DIMENSIONS ARE NOTED IN METER UNITS.

DWG.NO.	TITLE

REFERENCE DRAWINGS

NO.	DATE	DESCRIPTION	DWN.	DESIGN.	CHK.	APP'D

REVISIONS

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ELECT.	SCALE:	AS NOTED
CIVIL	DESIGNED:	G.L./T.M.
TRANS.	DRAWN:	G.L./P.W.
MECH.	DATE:	08/02/07
P&C	CHECKED:	T.M.
TELC.	APPROVED:	B.C.

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HYDRO

NEWFOUNDLAND AND LABRADOR HYDRO

FIELD INVESTIGATION AND CONSTRUCTION REQUIREMENTS
735Kv TL - GULL ISLAND TO CHURCHILL FALLS
TYPICAL SATELLITE CAMP LAYOUT

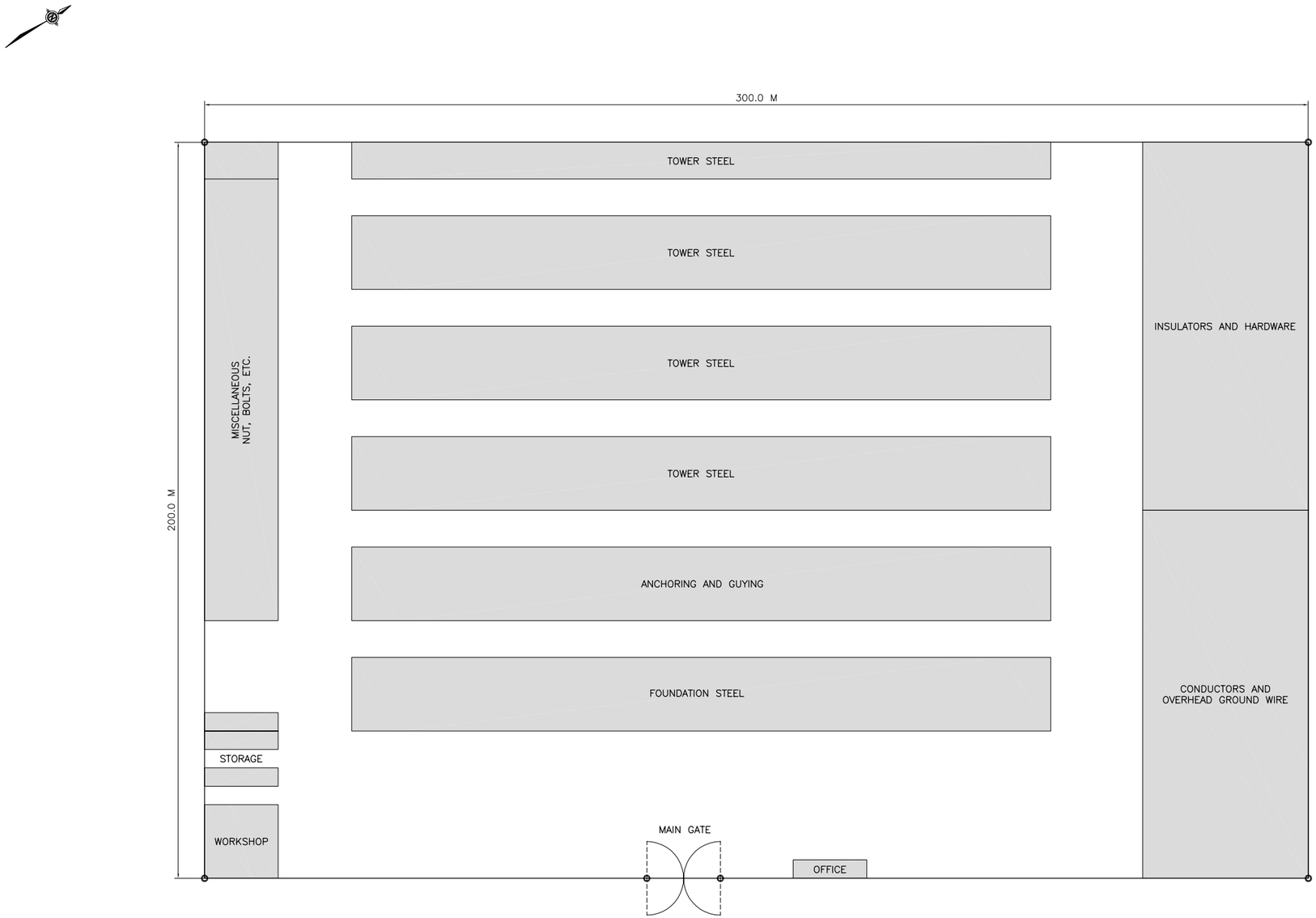
W.O. NO.

DWG. NO. 722850-AC1030-43DD-0013

REV. 0

C.A.D.

Feb 07, 2008 – 1:47pm



0 5 10m
Scale 1:250

NOTES :
1. ALL DIMENSIONS ARE NOTED IN METER UNITS.

DWG.NO.	TITLE

REFERENCE DRAWINGS

NO.	DATE	DESCRIPTION	DWN.	DESIGN.	CHK.	APP'D

REVISIONS

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ELECT.	SCALE:	AS NOTED	
CIVIL	DESIGNED:	G.L./T.M.	
TRANS.	DRAWN:	G.L./P.W.	
MECH.	DATE:	08/02/07	
P&C	CHECKED:	T.M.	
TELC.	APPROVED:	B.C.	

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HYDRO

NEWFOUNDLAND AND LABRADOR HYDRO

FIELD INVESTIGATION AND CONSTRUCTION REQUIREMENTS
735Kv TL - GULL ISLAND TO CHURCHILL FALLS
MARSHALLING YARD LAYOUT

W.O. NO.	DWG. NO.	REV.
	722850-AC1030-43DD-0014	0

C.A.D.

Feb 07, 2008 - 1:46pm

APPENDIX B

TRANSMISSION LINE DATA

SNC·LAVALIN

Test Pit: AC 1030 - 17					
Firm:	Newfoundland and Labrador Hydro				Date: 16-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC 1030	Location:	N 5879024	E 0586417	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.3	PEAT - black organic soil, rootlets, moist, loose.	NA	NA	NA
0.3	BEDROCK			

Estimated Cobbles (%) 0	Estimated Boulders (%) 0	Estimated Max Diameter (m): NA	
Start Time: 9:20 am	End Time: 9:30 am	Estimated Excavated Volume (m^3)	NA

General Notes

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

Water under peat layer and on top of bedrock.

SNC·LAVALIN

Test Pit: AC 1030 - 18					
Firm:	Newfoundland and Labrador Hydro				Date: 16-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC 1030	Location:	N 5878967	E 0586465	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.1	PEAT - black organic soil, rootlets, moist, loose.	NA	NA	NA
0.1 - 0.5	Topsoil SAND - trace fines, rootlets, moist, loose to compact, poorly graded, light brown to orange.	NA	NA	NA
0.5 - 2.0	Gravelly SAND - trace fines, some cobbles, some boulders, well graded, subangular, moist, compact, light grey.	1	1.0 - 2.0	Grab

Estimated Cobbles (%) 10 - 20	Estimated Boulders (%) 1 - 5	Estimated Max Diameter (m) 0.6	
Start Time: 11:00 am	End Time: 11:20 am	Estimated Excavated Volume (m^3)	10

General Notes

Moderate sloughing within test pit.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

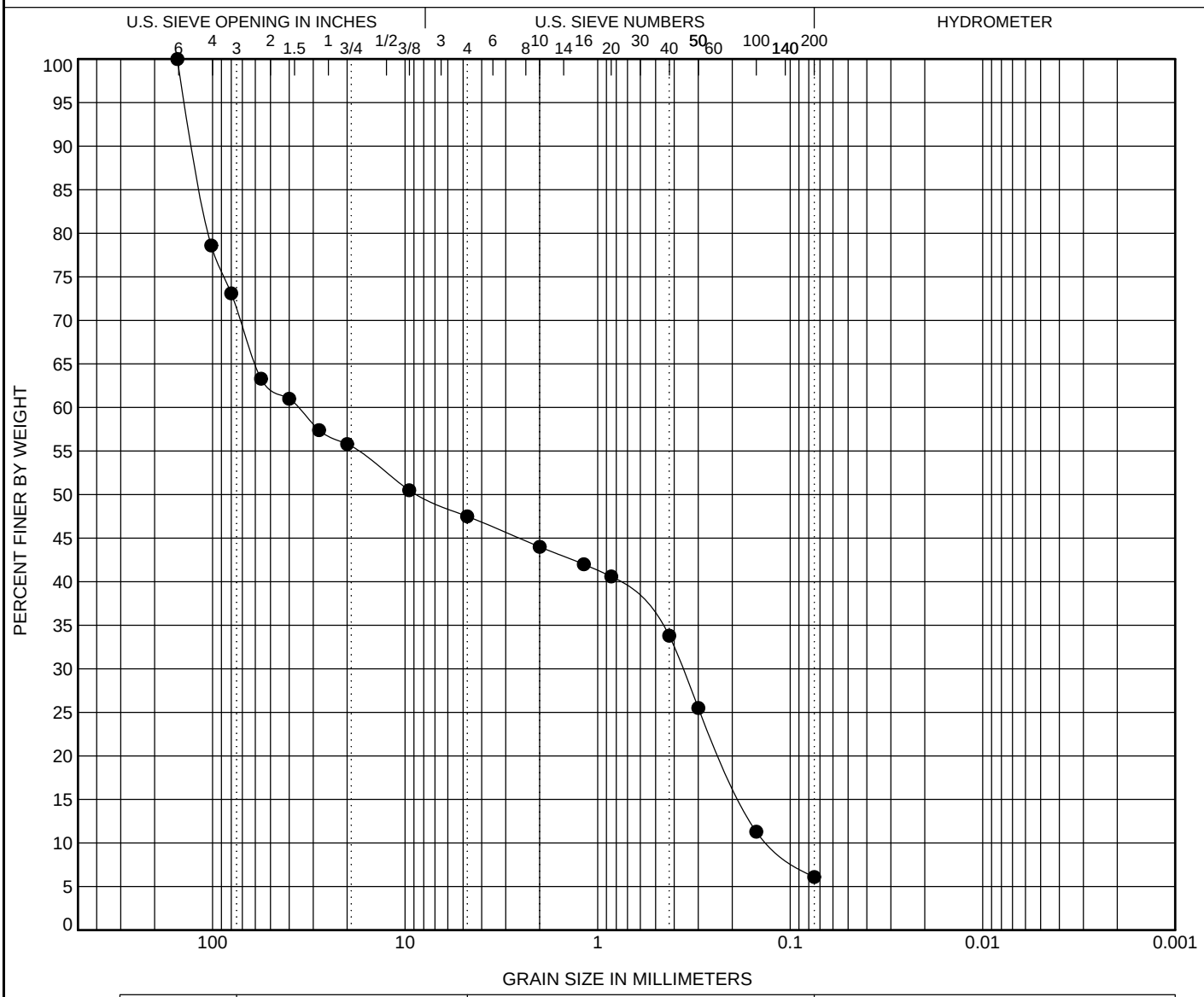
SNC·LAVALIN

TEST PIT AC1030-018

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-018**	**GB-1**	**1.00 - 2.00**	**23.8**	**41.4**	**6.1**	
⊠							
▲							
★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**73.1**	**63.3**	**61.0**	**57.4**	**55.8**	**50.5**	**47.5**	**44.0**	**40.6**	**33.8**	**25.5**	**11.3**	**6.1**
⊠													
▲													
★													
⊙													

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-018**	Cobbly, Gravelly SAND with trace Fines	**36.2**	**0.4**	**0.1**	**7.2**				**0.0**	**287.2**
⊠											
▲											
★											
⊙											

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: AC 1030 - 19					
Firm:	Newfoundland and Labrador Hydro				Date: 16-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5881316	E 0575755	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.2	PEAT - black organic soil, rootlets, moist, loose.	NA	NA	NA
0.2 - 0.3	Topsoil - fine SAND and FINES - rootlets, moist, loose to compact, poorly graded, light grey.	NA	NA	NA
0.3 - 2.5	Cobbles and Poorly Graded GRAVEL with SAND (GP) - some boulders, trace fines, subrounded, damp, light brown.	1	1.0 -2.0	Grab
2.5 - 4.5	Cobbles and Poorly Graded SAND with GRAVEL (SP) - some boulders, some cobbles, trace fines, subrounded, damp, light grey.	2	3.0 - 4.0	Grab

Estimated Cobbles (%) 20 - 40	Estimated Boulders (%) 10 - 15	Estimated Max Diameter (m) 0.6	
Start Time: 9:20 am	End Time: 10:00 am	Estimated Excavated Volume (m^3)	20

General Notes

Severe to moderate sloughing within test pit.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

Water entering test pit at 4.0 meter mark seeping slowly.

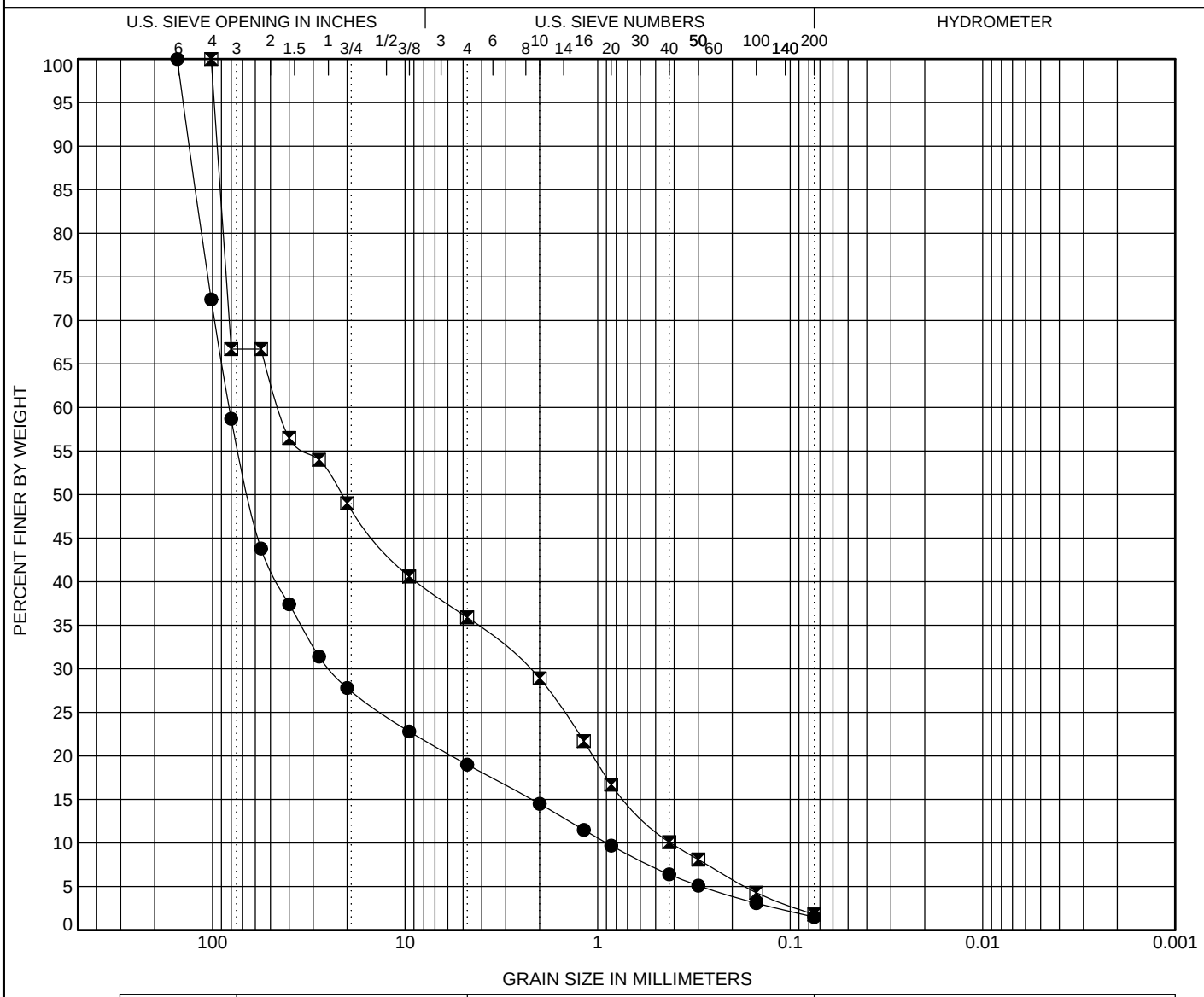
SNC·LAVALIN

TEST PIT AC1030-019

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	AC1030-019	GB-1	1.00 - 2.00	37.0	17.5	1.5	
⊠	AC1030-019	GB-2	3.00 - 4.00	30.8	34.1	1.8	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	58.7	43.8	37.4	31.4	27.8	22.8	19.0	14.5	9.7	6.4	5.1	3.1	1.5
⊠	66.7	66.7	56.5	54.0	49.0	40.6	35.9	28.9	16.7	10.1	8.1	4.3	1.8

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	AC1030-019	POORLY GRADED GRAVEL with SAND(GP)	81.8	24.6	0.9	7.7				8.2	91.2
⊠	AC1030-019	POORLY GRADED SAND with GRAVEL(SP)	44.9	2.3	0.4	5.9				0.3	107.5

GRAIN SIZE2 - TEST PIT TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-21

SNC·LAVALIN

Test Pit: AC 1030 - 20					
Firm:	Newfoundland and Labrador Hydro				Date: 16-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5883266	E 0573377	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.2	PEAT - black organic soil, rootlets, moist, loose.	NA	NA	NA
0.2 - 0.6	Topsoil SAND - some fines, trace gravel, poorly graded, damp, light brown.	NA	NA	NA
0.6 - 1.1	SAND and GRAVEL - some cobbles, trace fines, well graded, subrounded, damp, loose to compact, olive grey.	NA	NA	NA
1.1 - 2.0	Medium SAND - trace fines, loose to compact, moist, poorly graded, light grey.	NA	NA	NA
2.0 - 3.0	Poorly Graded SAND with GRAVEL (SP) - some cobbles, trace fines, subrounded, damp, loose to compact, grey.	1	2.0 - 3.0	Grab
3.0	BEDROCK	NA	NA	NA

Estimated Cobbles (%) 15 - 25	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 10:42 am	End Time: 11:20 am	Estimated Excavated Volume (m^3)	15

General Notes

Moderate sloughing within test pit.

Water entering test pit at 2.5 meter depth steady flow.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

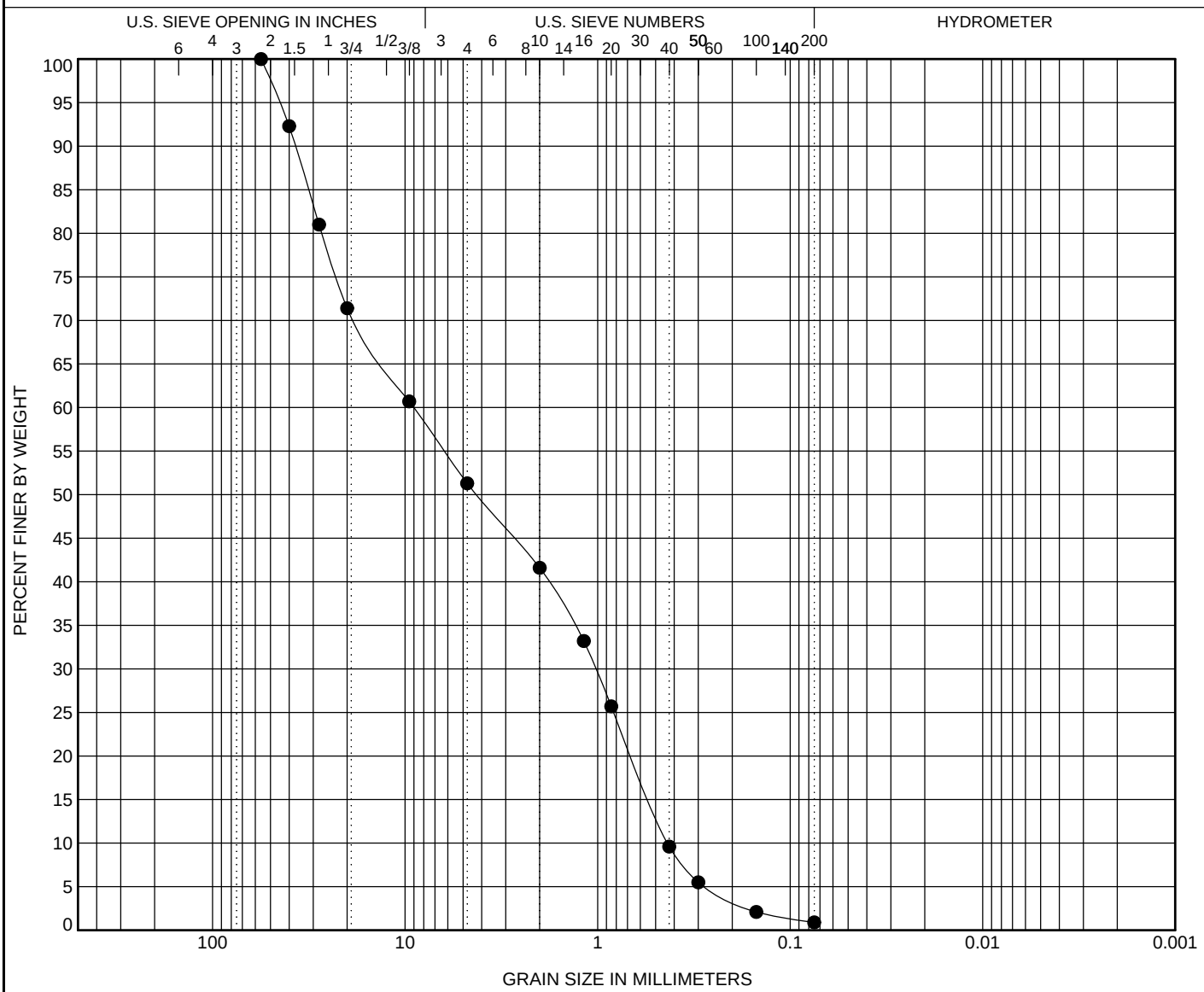
SNC·LAVALIN

TEST PIT AC1030-020

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-020**	**GB-1**	**2.00 - 3.00**	**48.7**	**50.4**	**0.9**	
⊠							
▲							
★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●		**100.0**	**92.3**	**81.0**	**71.4**	**60.7**	**51.3**	**41.6**	**25.7**	**9.6**	**5.5**	**2.1**	**0.9**
⊠													
▲													
★													
⊙													

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-020**	POORLY GRADED SAND with GRAVEL(SP)	**9**	**1**	**0.4**	**7.9**				**0.3**	**20.9**
⊠											
▲											
★											
⊙											

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-21

SNC·LAVALIN

Test Pit: AC 1030 - 21					
Firm:	Newfoundland and Labrador Hydro				Date: 16-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC 1030	Location:	N 5883819	E 0572021	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.1	PEAT - black organic soil, rootlets, moist, loose.	NA	NA	NA
0.1 - 0.2	Top Soil - Weathered SAND, some fines, trace cobbles, gravel, subrounded, damp, loose, grey and brown.	NA	NA	NA
0.2 - 2.0	SAND, GRAVEL and COBBLES - some fines, damp, loose to compact, well graded, subrounded, light brown.	NA	NA	NA
2.0 – 2.5	SAND – trace fines, moist, loose to compact, grey.	NA	NA	NA
2.5 – 4.0	SAND, GRAVEL and COBBLES - some fines, some boulders, damp, loose to compact, well graded, subrounded, light brown.	1	2.5 – 4.0	Grab

Estimated Cobbles (%) 20 - 30	Estimated Boulders (%) 1 - 5	Estimated Max Diameter (m) 1.0	
Start Time: 12:00 pm	End Time: 12:38 pm	Estimated Excavated Volume (m^3)	18

General Notes

Moderate sloughing within test pit.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

Water entering test pit at 3.5 meter mark, slow trickle.

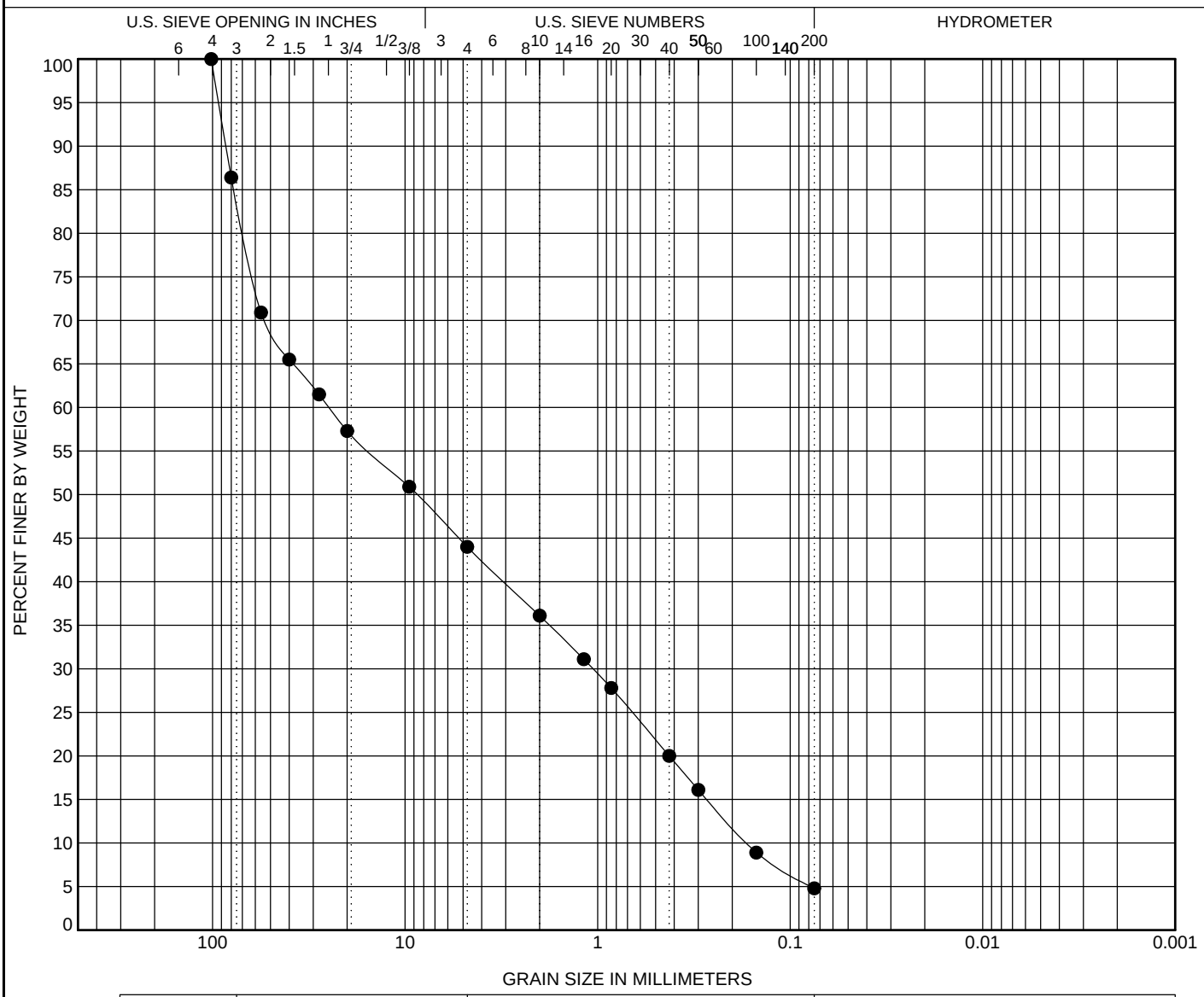
SNC·LAVALIN

TEST PIT AC1030-021

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-021**	**GB-SA1**	**2.50 - 4.00**	**39.6**	**39.2**	**4.8**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**86.4**	**70.9**	**65.5**	**61.5**	**57.3**	**50.9**	**44.0**	**36.1**	**27.8**	**20.0**	**16.1**	**8.9**	**4.8**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-021**	GRAVEL & SAND with some Cobbles, tr. Fines	**24.8**	**1.1**	**0.2**	**8.8**				**0.3**	**148.9**

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: AC 1030 - 22					
Firm:	Newfoundland and Labrador Hydro				Date: 16-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC 1030	Location:	N 5886412	E 0565189	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.1	PEAT - black organic soil, rootlets, moist, loose.	NA	NA	NA
0.1 - 0.5	Topsoil, SAND - some FINES, rootlets, moist, loose to compact, poorly graded, orange to light brown.	NA	NA	NA
0.5 – 4.0	Silty, Gravelly SAND - some cobbles, trace boulders, subangular to subrounded, wet, compact, well graded, grey.	1	3.0 - 4.0	Grab

Estimated Cobbles (%) 20 - 30	Estimated Boulders (%) 1 - 5	Estimated Max Diameter (m) 0.6	
Start Time: 1:45 pm	End Time: 2:10 pm	Estimated Excavated Volume (m^3)	18

General Notes

Moderate sloughing within test pit. Test pit was dry upon completion.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS

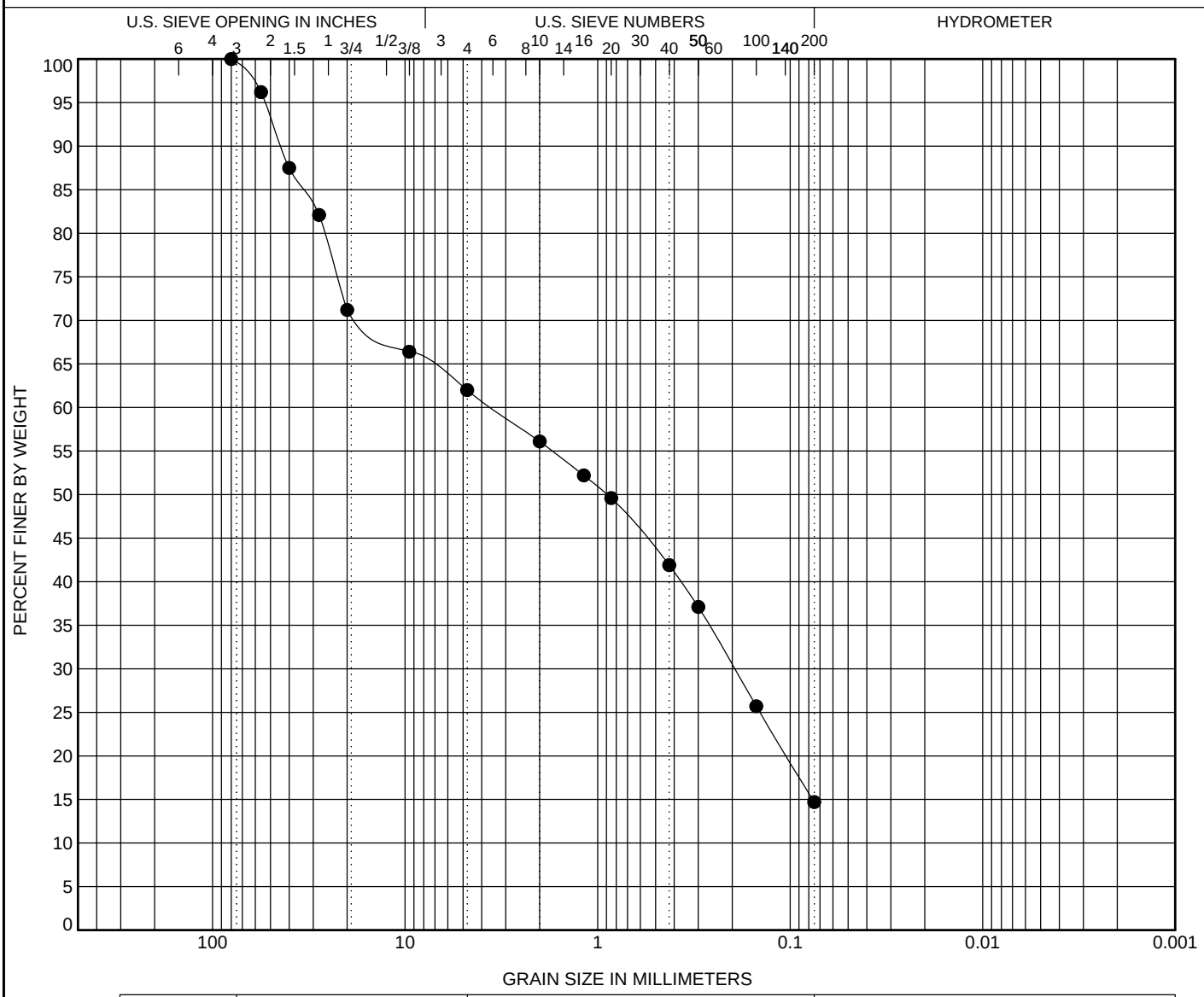
SNC·LAVALIN

TEST PIT AC1030-022

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-022**	**GB-1**	**3.00 - 4.00**	**37.3**	**47.3**	**14.7**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**100.0**	**96.2**	**87.5**	**82.1**	**71.2**	**66.4**	**62.0**	**56.1**	**49.6**	**41.9**	**37.1**	**25.7**	**14.7**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-022**	SAND and GRAVEL with some Fines	**3.5**	**0.2**		**6.7**					

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: AC 1030 - 23					
Firm:	Newfoundland and Labrador Hydro				Date: 17-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5889949	E 0558459	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.3	Topsoil, SAND - some fines, trace cobbles, boulders, damp, loose to compact, well graded to poorly graded, light brown.	NA	NA	NA
0.3 - 4.0	Silty Gravelly SAND - some cobbles, trace boulders, moist, compact, light grey.	1	3.0 - 4.0	Grab

Estimated Cobbles (%) 5 - 15	Estimated Boulders (%) 1 - 5	Estimated Max Diameter (m) 0.6	
Start Time: 12:45 pm	End Time: 1:10 pm	Estimated Excavated Volume (m^3)	18

General Notes

Slight sloughing within test pit. Test pit was dry upon completion.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

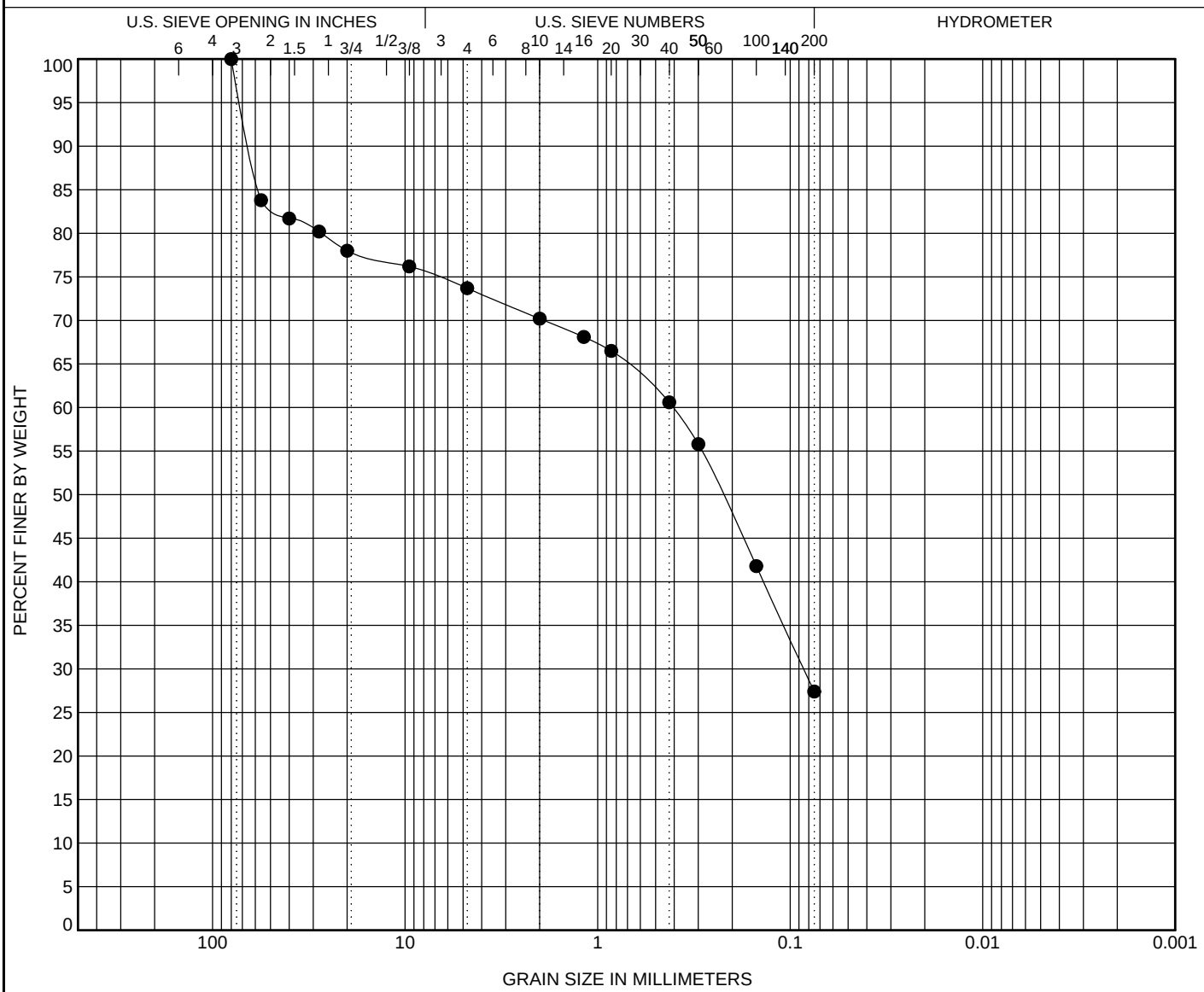
SNC·LAVALIN

TEST PIT AC1030-023

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-023**	**GB-1**	**3.00 - 4.00**	**23.4**	**46.3**	**27.4**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**100.0**	**83.8**	**81.7**	**80.2**	**78.0**	**76.2**	**73.7**	**70.2**	**66.5**	**60.6**	**55.8**	**41.8**	**27.4**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-023**	Silty, Gravelly SAND with trace Cobbles	**0.4**	**0.1**		**6.7**					

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: AC 1030 - 24					
Firm:	Newfoundland and Labrador Hydro				Date: 17-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5893137	E 0552524	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 – 0.5	PEAT - Dark brown organic soil, rootlets, moist, loose.	NA	NA	NA
0.5 - 0.7	Sandy GRAVEL - trace fines, wet, loose to compact, wet, grey.	1	0.5 - 0.6	Grab
0.7	BEDROCK			

Estimated Cobbles (%) 20 - 30	Estimated Boulders (%) 1 - 5	Estimated Max Diameter (m) 0.6	
Start Time: 2:45 pm	End Time: 3:10 pm	Estimated Excavated Volume (m^3)	1.5

General Notes

Moderate sloughing within test pit.

Another Test pit was done approximately 30 m away and the same results where obtained.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

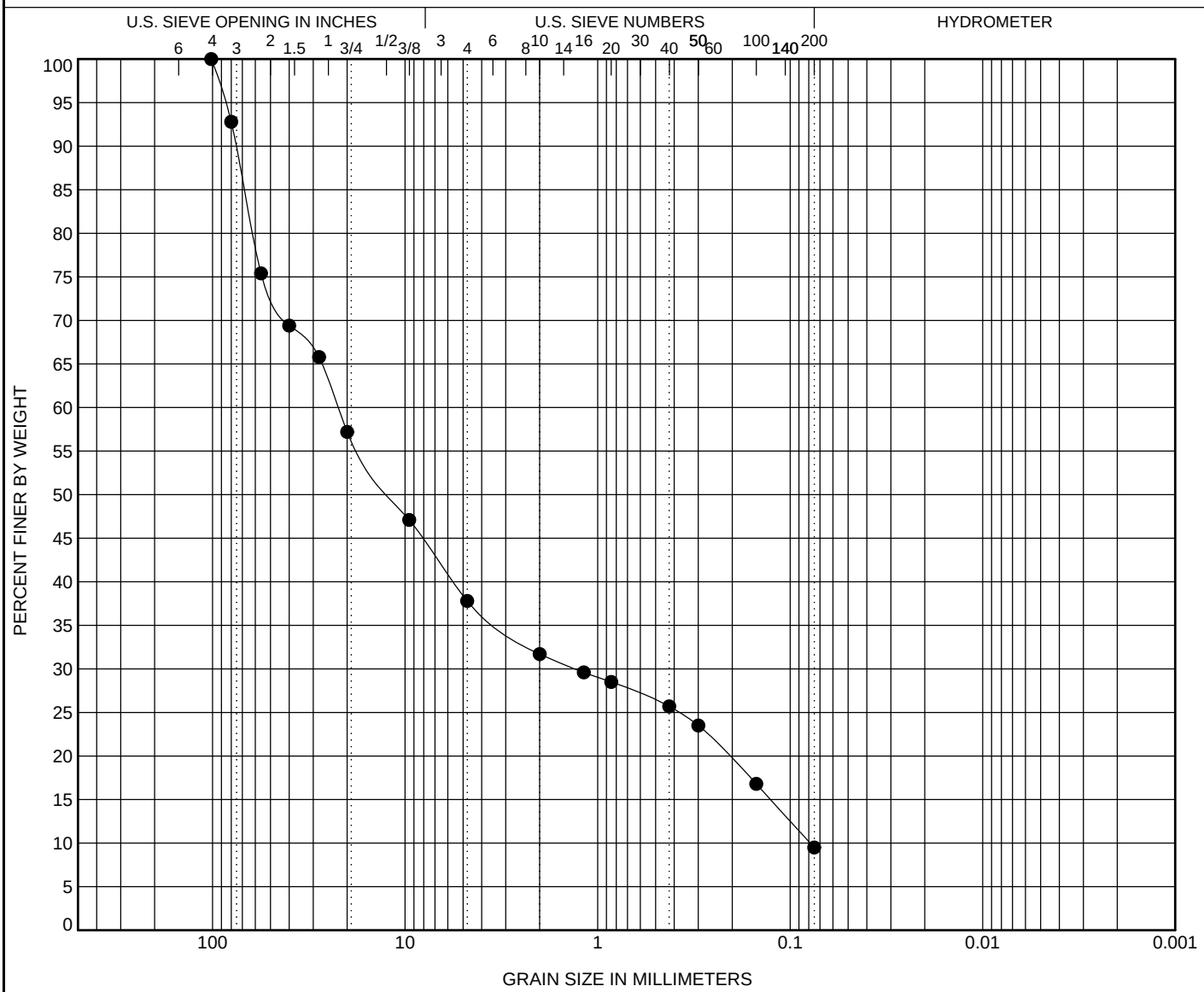
SNC·LAVALIN

TEST PIT AC1030-024

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-024**	**GB-1**	**0.50 - 0.55**	**51.9**	**28.3**	**9.5**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**92.8**	**75.4**	**69.4**	**65.8**	**57.2**	**47.1**	**37.8**	**31.7**	**28.5**	**25.7**	**23.5**	**16.8**	**9.5**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-024**	Sandy GRAVEL with some cobbles, tr. Fines	**22.3**	**1.3**	**0.1**	**14.4**				**1.0**	**283.7**

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: AC 1030 - 25					
Firm:	Newfoundland and Labrador Hydro				Date: 18-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 586479	E 0546263	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.2	PEAT - Dark brown organic soil, rootlets, moist, loose.	NA	NA	NA
0.2 - 0.5	SAND GRAVEL and COBBLES - some fines, some angular boulders, well graded, moist to wet, compact, light brown.	1	0.2 - 0.5	Grab
0.5	BEDROCK	NA	NA	NA

Estimated Cobbles (%) 5 - 15	Estimated Boulders (%) 10	Estimated Max Diameter (m) 0.6	
Start Time: 9:56 am	End Time: 10:10 am	Estimated Excavated Volume (m^3)	1.0

General Notes

No sloughing.

Another Test pit was done approximately 5 m away and the same results where obtained.

Water present in other test pit, where soil and bedrock meet.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

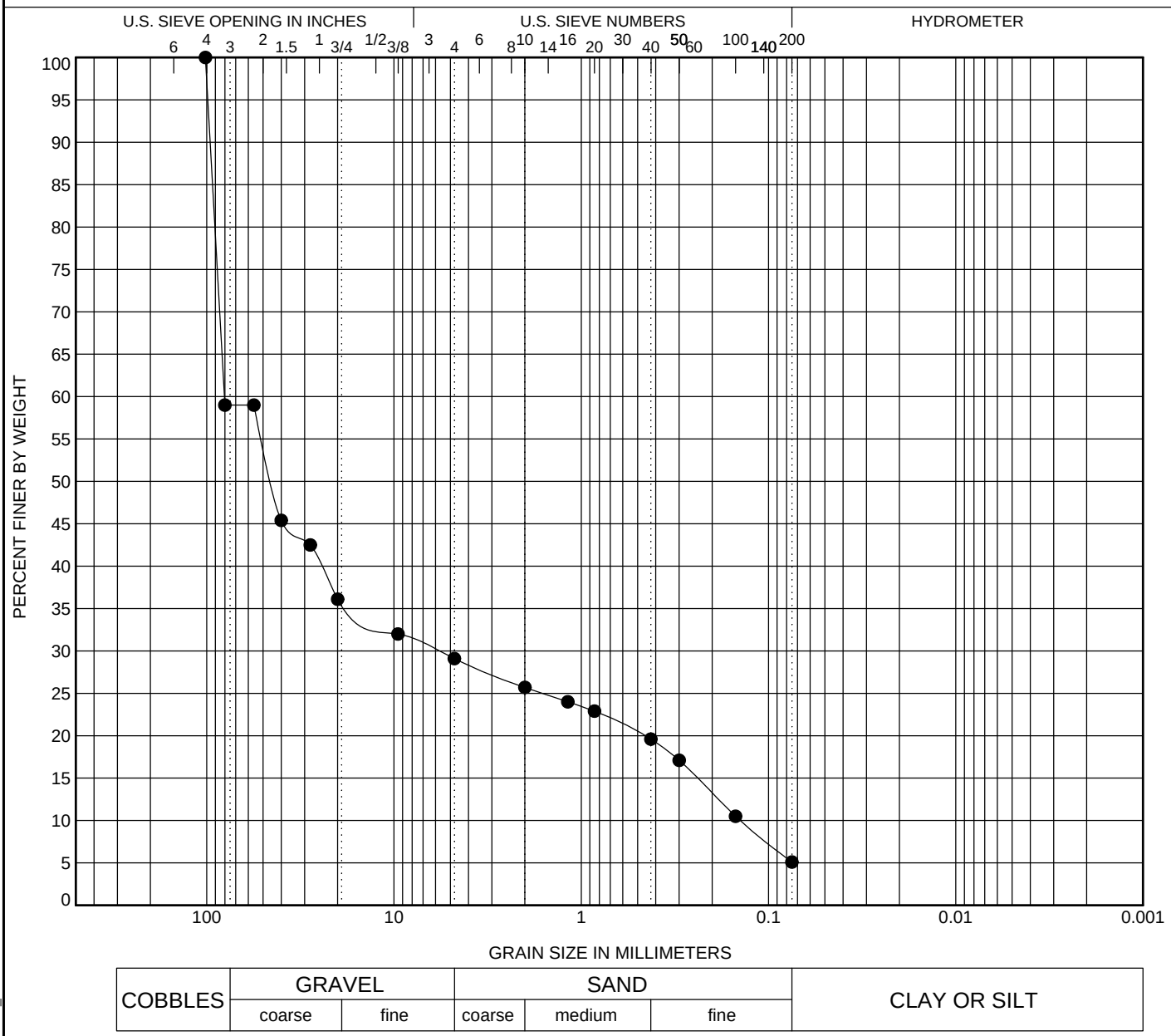
SNC·LAVALIN

TEST PIT AC1030-025

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-025**	**GB-1**	**0.20 - 0.50**	**29.9**	**24.0**	**5.1**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**59.0**	**59.0**	**45.4**	**42.5**	**36.1**	**32.0**	**29.1**	**25.7**	**22.9**	**19.6**	**17.1**	**10.5**	**5.1**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-025**	Gravelly, Sandy COBBLES with trace Fines	**80.5**	**5.9**	**0.1**	**16.3**				**3.1**	**572.0**

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: AC 1030 - 26					
Firm:	Newfoundland and Labrador Hydro				Date: 18-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5898601	E 0539791	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.1	PEAT - Dark brown organic soil, rootlets, moist, loose.	NA	NA	NA
0.1 - 0.5	Topsoil, fine SAND - some fines, gravel, moist, loose to compact, rootlets, moist, compact, poorly graded.	1	0.1 - 0.5	Grab
0.5 - 0.6	BEDROCK and fractured bedrock pieces.	NA	NA	NA

Estimated Cobbles (%) 5 - 15	Estimated Boulders (%) 1 - 5	Estimated Max Diameter (m) 0.6	
Start Time: 10:20 am	End Time: 10:30 am	Estimated Excavated Volume (m^3)	0.8

General Notes

No sloughing.

No gradation analysis was done on sample because it was mostly topsoil.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

SNC·LAVALIN

Test Pit: AC 1030 - 27					
Firm:	Newfoundland and Labrador Hydro				Date: 18-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5901291	E 0537168	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.2	PEAT - Dark brown organic soil, rootlets, moist, loose.	NA	NA	NA
0.2 - 0.3	Topsoil, SAND - some fines, gravel, rootlets, moist, compact, poorly graded, light grey.	NA	NA	NA
0.3 - 1.2	SAND - some fines, trace gravel, trace cobbles, trace boulders, gravel, subangular, moist, compact, poorly graded, light brown.	1	0.5 - 0.6	Grab
1.2	BEDROCK	NA	NA	NA

Estimated Cobbles (%) 1 - 5	Estimated Boulders (%) 1 - 5	Estimated Max Diameter (m) 0.6	
Start Time: 11:45 am	End Time: 12:00 pm	Estimated Excavated Volume (m^3)	5

General Notes

No sloughing.

This test pit was dug 5 meters north of transmission line. Could not get to the 85 m offset, due to wetlands

The third picture is taken from where test pit should have been dug. Soil appears to be similar on both sides of the wetland. Bedrock outcrop present and visible from where test pit should be.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

Water present at 1.0 m slow trickle.

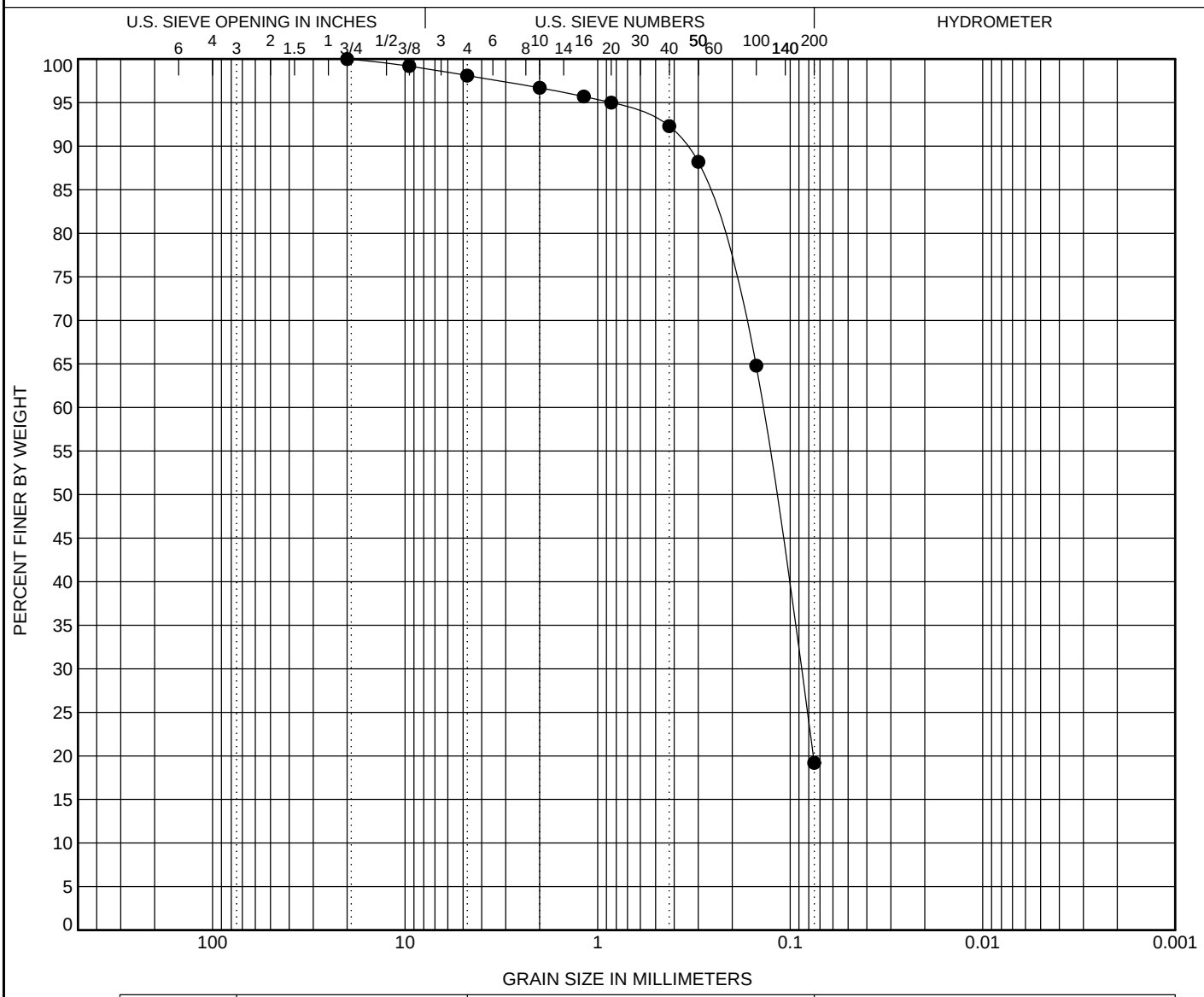
SNC·LAVALIN

TEST PIT AC1030-027

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-027**	**GB-1**	**0.50 - 0.55**	**1.9**	**78.9**	**19.2**	
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★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●					**100.0**	**99.2**	**98.1**	**96.7**	**95.0**	**92.3**	**88.2**	**64.8**	**19.2**
⊠													
▲													
★													
⊙													

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-027**	SAND with some Fines, trace Gravel	**0.1**	**0.1**		**23.0**					
⊠											
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GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: AC 1030 - 28					
Firm:	Newfoundland and Labrador Hydro				Date: 18-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5902708	E 0535714	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.1	PEAT - Dark brown organic soil, rootlets, moist, loose.	NA	NA	NA
0.1 - 0.3	Topsoil, some fines, rootlets, moist, loose to compact moist.	NA	NA	NA
0.3 - 1.0	Silty Gravelly Sand - wet, loose to compact, light grey, trace boulders (pieces of broken bedrock).	1	0.3 - 1.0	Grab
1.0	BEDROCK	NA	NA	NA

Estimated Cobbles (%) 5 - 15	Estimated Boulders (%) 1 - 5	Estimated Max Diameter (m) 1.2	
Start Time: 12:45 pm	End Time: 1:02 pm	Estimated Excavated Volume (m^3)	1.2

General Notes

No sloughing within test pit.

Trace water flowing between peat layer and topsoil.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS

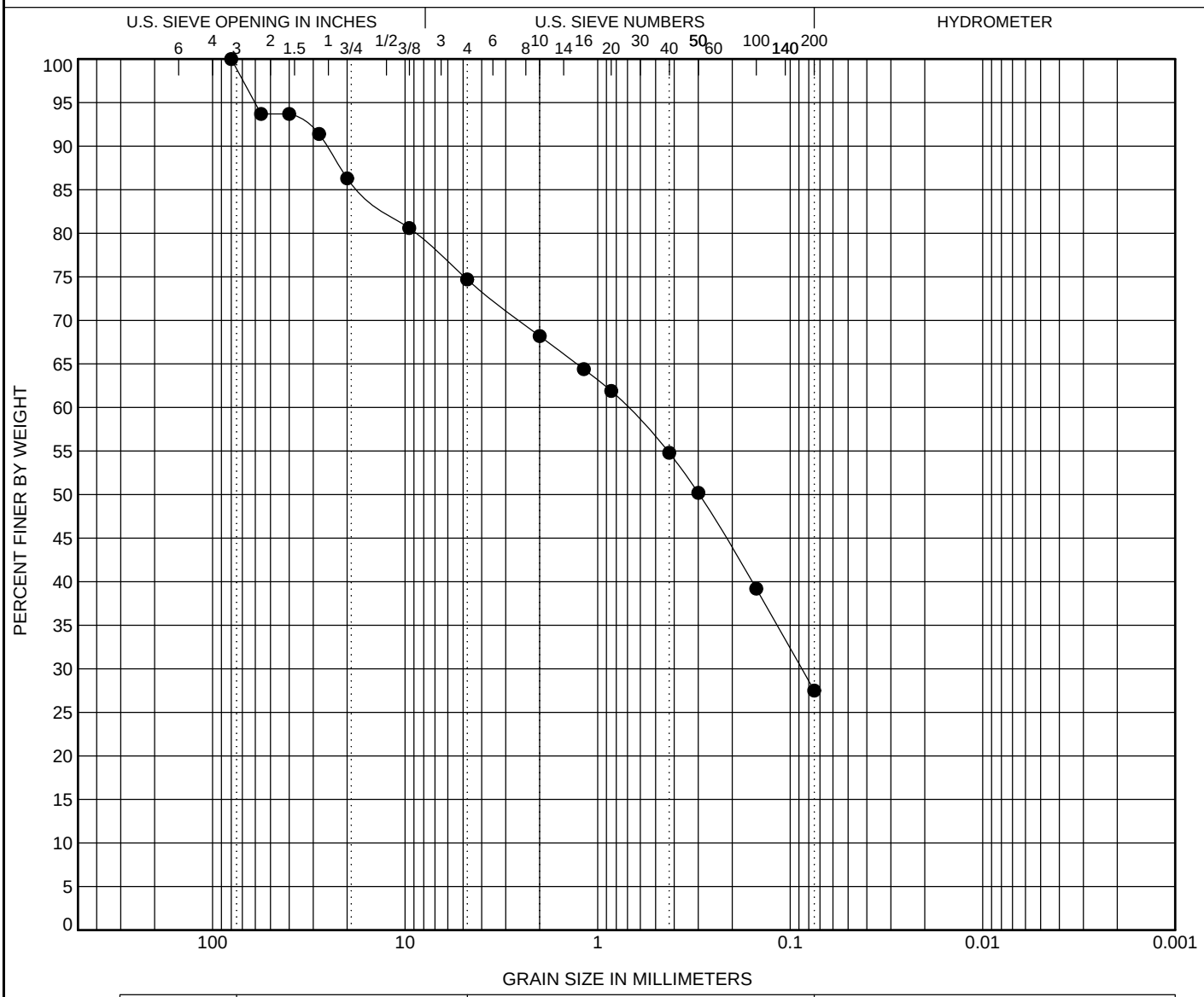
SNC·LAVALIN

TEST PIT AC1030-028

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-028**	**GB-1**	**0.30 - 1.00**	**24.2**	**47.2**	**27.5**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**100.0**	**93.7**	**93.7**	**91.4**	**86.3**	**80.6**	**74.7**	**68.2**	**61.9**	**54.8**	**50.2**	**39.2**	**27.5**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-028**	Silty, Gravelly SAND with trace Cobbles	**0.7**	**0.1**		**10.4**					

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: AC1030 - 29					
Firm:	Newfoundland and Labrador Hydro				Date: 18-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5904621	E 0531330	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.5	Topsoil, black to dark brown, organic soil, rootlets, wet, loose, some cobbles, subrounded.	NA	NA	NA
0.5 - 2.0	Gravelly Silty SAND – trace cobbles, trace boulders compact, wet, poorly graded, angular, light grey.	1	1.0 - 2.0	Grab
2.0	BEDROCK	NA	NA	NA

Estimated Cobbles (%) 10 - 15	Estimated Boulders (%) 5 - 10	Estimated Max Diameter (m) 0.6	
Start Time: 1:40 pm	End Time: 2:00 pm	Estimated Excavated Volume (m^3)	6

General Notes

No sloughing.

Trace water flowing at bottom of topsoil at 0.5 m.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

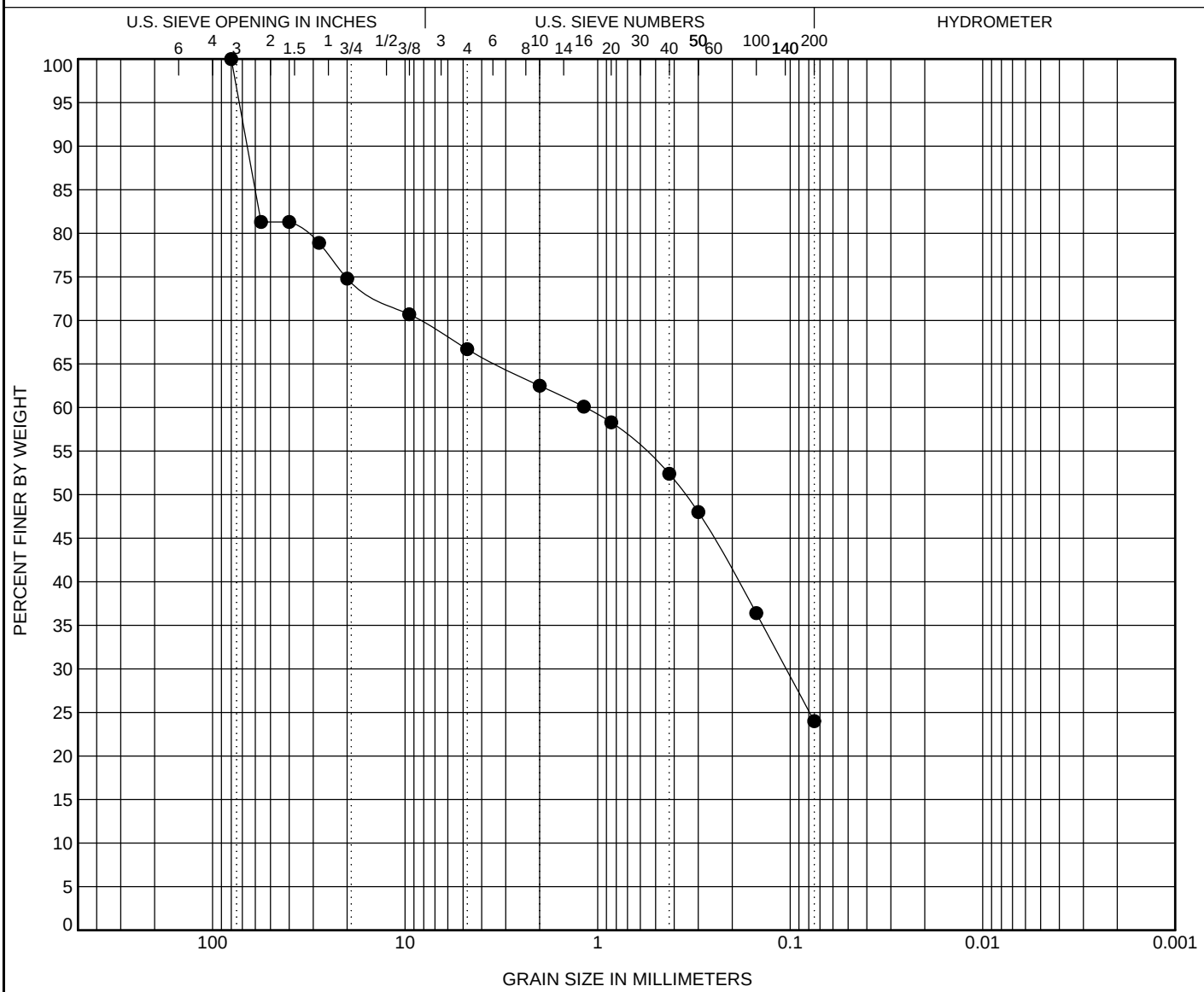
SNC·LAVALIN

TEST PIT AC1030-029

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-029**	**GB-1**	**1.00 - 2.00**	**29.9**	**42.7**	**24.0**	
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★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**100.0**	**81.3**	**81.3**	**78.9**	**74.8**	**70.7**	**66.7**	**62.5**	**58.3**	**52.4**	**48.0**	**36.4**	**24.0**
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	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-029**	Gravelly, Silty SAND with trace Cobbles	**1.2**	**0.1**		**10.1**					
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GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: AC 1030 - 30					
Firm:	Newfoundland and Labrador Hydro				Date: 18-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5904099	E 0527900	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.1	PEAT - Dark brown organic soil, rootlets, moist, loose.	NA	NA	NA
0.1 - 0.3	Topsoil, fine weathered sand, some rootlets, some fines, damp, poorly graded, light brown.	NA	NA	NA
0.3 - 3.0	Gravelly Silty SAND - some cobbles, trace boulders, damp, compact, well graded, till like material subangular, light grey.	1	1.0 – 3.0	Grab
3.0	BEDROCK	NA	NA	NA

Estimated Cobbles (%) 15 - 25	Estimated Boulders (%) 5 -10	Estimated Max Diameter (m) 1.0	
Start Time: 2:25 pm	End Time: 2:40 pm	Estimated Excavated Volume (m^3)	8

General Notes

Slight sloughing within test pit. Test Pit was dry upon completion.

At 3.0 m either bedrock or large boulders, could not dig any deeper.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

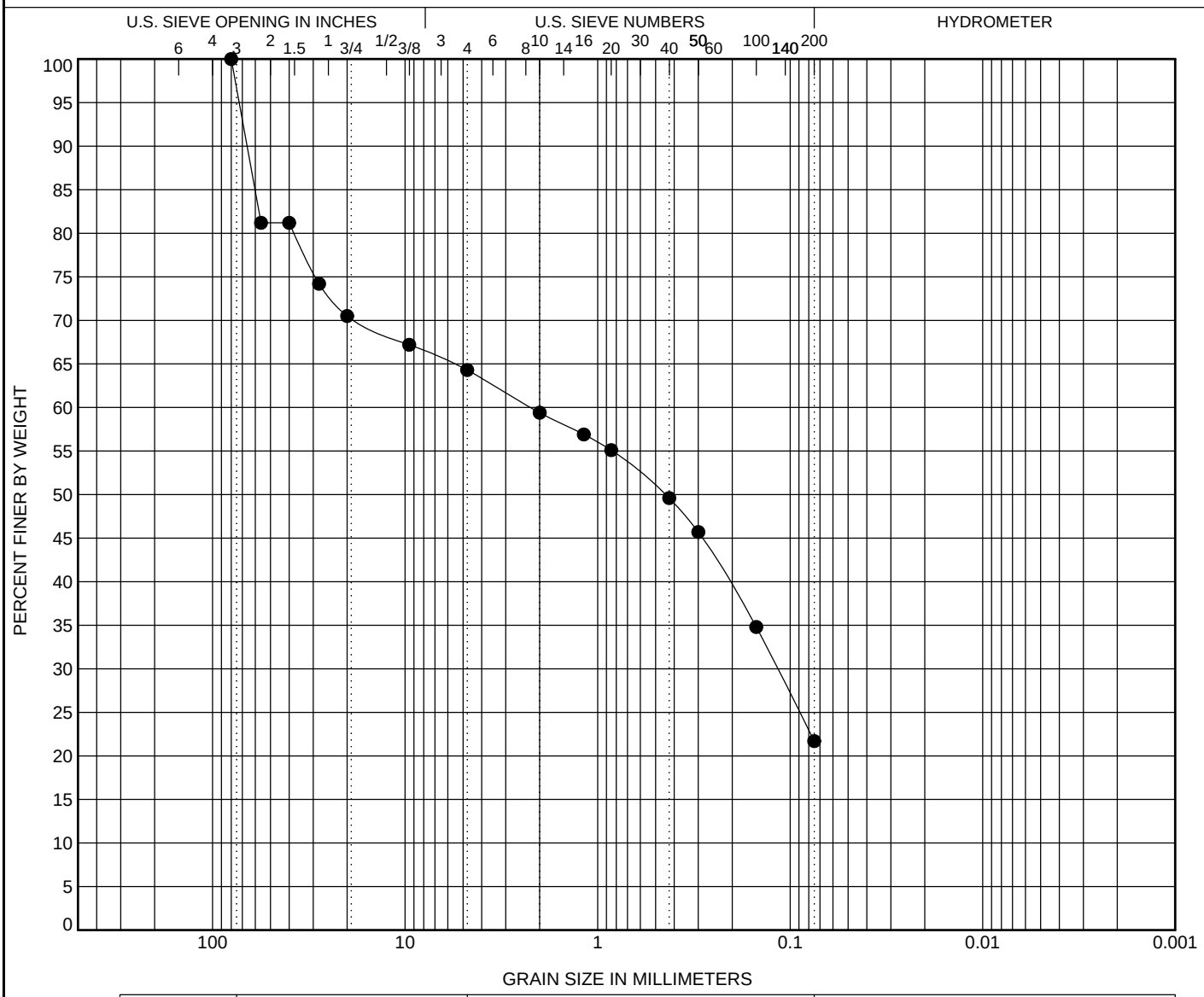
SNC·LAVALIN

TEST PIT AC1030-030

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-030**	**GB-1**	**1.00 - 3.00**	**32.3**	**42.6**	**21.7**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**100.0**	**81.2**	**81.2**	**74.2**	**70.5**	**67.2**	**64.3**	**59.4**	**55.1**	**49.6**	**45.7**	**34.8**	**21.7**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-030**	Gravelly, Silty SAND with trace Cobbles	**2.2**	**0.1**		**10.1**					

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: AC 1030 - 31					
Firm:	Newfoundland and Labrador Hydro				Date: 19-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5905300	E 0523294	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.1	PEAT - Dark brown organic soil, rootlets, moist, loose.	NA	NA	NA
0.1 - 0.5	Topsoil, fine SAND - some fines, gravel, moist, loose to compact, rootlets, moist, compact, poorly graded.	NA	NA	NA
0.5 - 0.6	Fine SAND and SILT - some fines, compact, moist, poorly graded, greenish grey.	NA	NA	NA
0.6 - 3.5	Poorly Graded SAND (SP) - moist, trace fines, trace gravel, trace cobbles, brown.	1	3.0	Grab

Estimated Cobbles (%) 1- 10	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 9:15 am	End Time: 9:40 am	Estimated Excavated Volume (m^3)	10

General Notes

Severe sloughing throughout.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

Water at 0.5 m entering freely, steady flow. Bottom of hole had about 1.5 m of saturated sand.

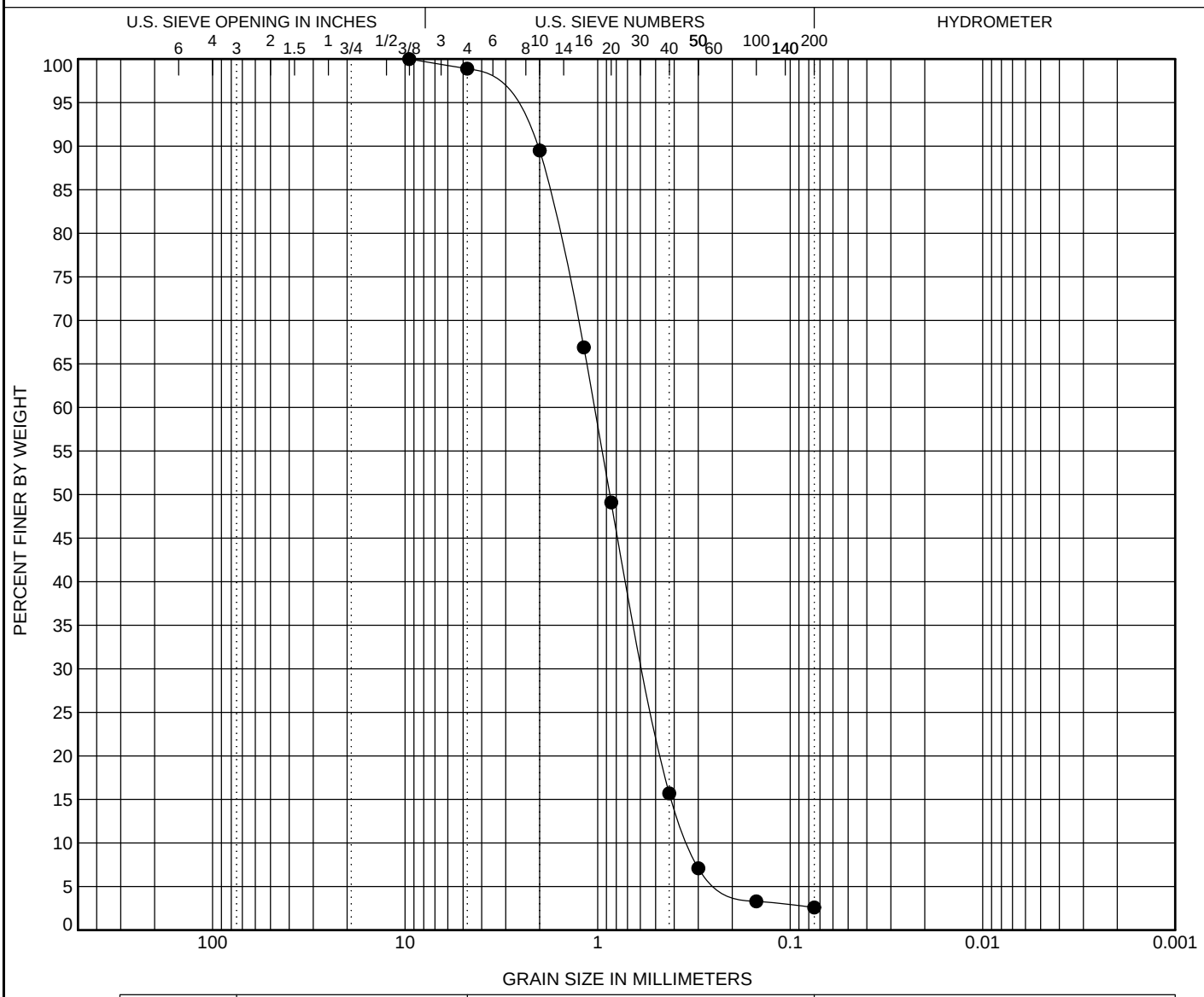
SNC·LAVALIN

TEST PIT AC1030-031

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-031**	**GB-1**	**3.00 - 3.50**	**1.1**	**96.3**	**2.6**	
⊠							
▲							
★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●						**100.0**	**98.9**	**89.5**	**49.1**	**15.7**	**7.1**	**3.3**	**2.6**
⊠													
▲													
★													
⊙													

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-031**	POORLY GRADED SAND(SP)	**1**	**0.6**	**0.3**	**15.2**				**0.9**	**3.1**
⊠											
▲											
★											
⊙											

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-21

SNC·LAVALIN

Test Pit: AC 1030 - 32					
Firm:	Newfoundland and Labrador Hydro				Date: 19-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5905964	E 0517518	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.1	PEAT - Dark brown organic soil, rootlets, moist, loose.	NA	NA	NA
0.1 - 0.3	Topsoil, fine SAND - some fines, gravel, moist, loose to compact, rootlets, moist, compact, poorly graded.	NA	NA	NA
0.3 - 2.5	Well-Graded GRAVEL with SAND (GW) - trace fines, some cobbles, subrounded, moist, compact, dark brown.	1	0.3 - 2.5	Grab
2.5 - 3.5	Silty Gravelly SAND - some cobbles, subrounded, moist, compact, well graded, light grey.	2	2.5 – 3.5	Grab

Estimated Cobbles (%) 15 - 25	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 10:55 am	End Time: 11:20 am	Estimated Excavated Volume (m^3)	12

General Notes

Moderate to slight sloughing near 1 m where water enters.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

Water at 1 m steady flow as bottom of hole is just about full by the time the bucket gets back in hole.

Very hard to dig through.

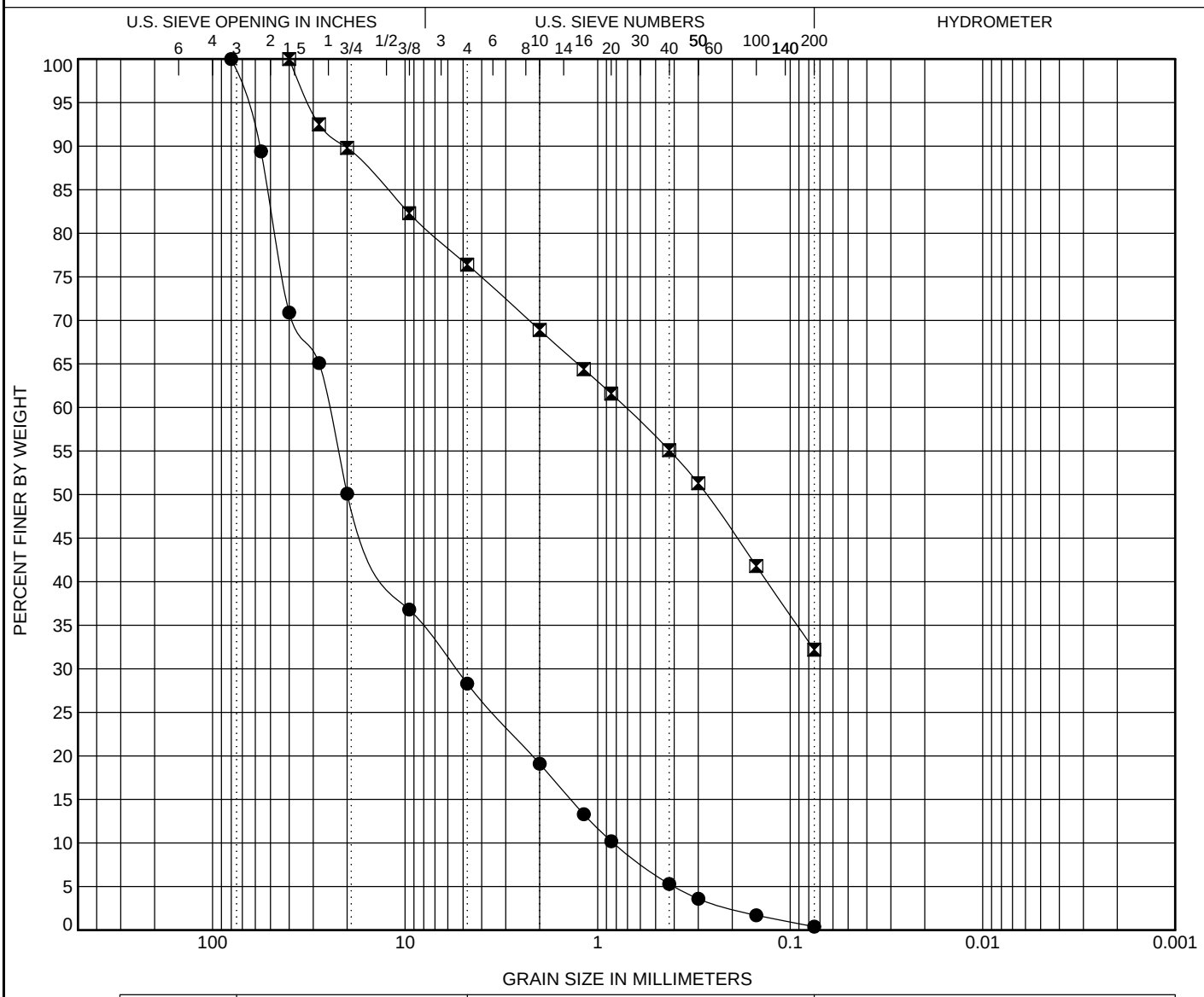
SNC·LAVALIN

TEST PIT AC1030-032

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	AC1030-032	GB-1	0.30 - 2.50	69.8	27.9	0.4	
⊠	AC1030-032	GB-2	2.50 - 3.50	23.6	44.2	32.2	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	100.0	89.4	70.9	65.1	50.1	36.8	28.3	19.1	10.2	5.3	3.6	1.7	0.4
⊠			100.0	92.5	89.8	82.3	76.4	68.9	61.6	55.1	51.3	41.8	32.2

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	AC1030-032	WELL-GRADED GRAVEL with SAND(GW)	25	5.5	0.8	9.6				1.4	30.2
⊠	AC1030-032	Silty, Gravelly SAND	0.7			10.4					

GRAIN SIZE2 - TEST PIT TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: AC 1030 - 33					
Firm:	Newfoundland and Labrador Hydro				Date: 19-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5905368	E 0510469	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.2	PEAT - Dark brown organic soil, rootlets, moist, loose.	NA	NA	NA
0.2 - 0.5	Till - SAND and GRAVEL - angular, some fines, some cobbles moist, compact, well graded, light brown.	1	0.2 - 0.5	Grab
0.5	BEDROCK and fractured bedrock pieces.	NA	NA	NA

Estimated Cobbles (%) 15 - 20	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 1:20 pm	End Time: 1:30 pm	Estimated Excavated Volume (m^3)	1.5

General Notes

No sloughing. Test Pit was dry upon completion.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

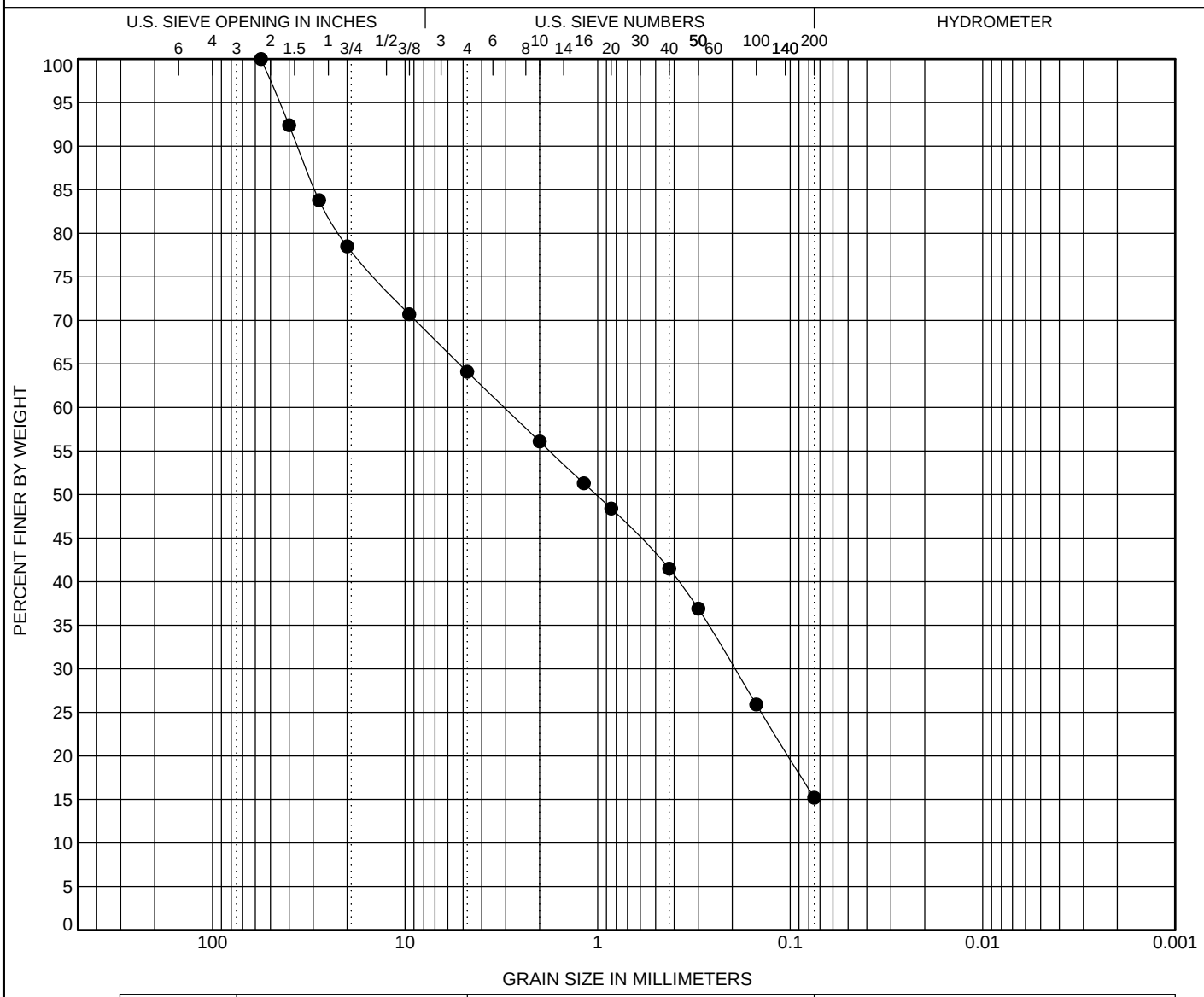
SNC·LAVALIN

TEST PIT AC1030-033

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-033**	**GB-1**	**0.20 - 0.50**	**35.9**	**48.9**	**15.2**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●		**100.0**	**92.4**	**83.8**	**78.5**	**70.7**	**64.1**	**56.1**	**48.4**	**41.5**	**36.9**	**25.9**	**15.2**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-033**	SAND and GRAVEL with some Fines	**3.1**	**0.2**		**15.3**					

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: AC 1030 - 34					
Firm:	Newfoundland and Labrador Hydro				Date: 19-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5905943	E 0507699	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.1	PEAT - Dark brown organic soil, rootlets, moist, loose.	NA	NA	NA
0.1 - 0.2	Topsoil, weathered SAND - some fines, gravel, trace cobbles, subrounded, moist, loose to compact, light grey, some rootlets.	NA	NA	NA
0.2 - 1.5	Poorly Graded GRAVEL with SAND - trace fines, trace cobbles, subrounded, damp, loose to compact, olive grey.	1	0.2 - 1.0	Grab
1.5 - 4.0	SAND – some gravel, trace fines, damp, loose to compact, grey.	2	2.0 - 4.0	Grab

Estimated Cobbles (%) 1 - 5	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 2:20 pm	End Time: 2:55 pm	Estimated Excavated Volume (m^3)	20

General Notes

Severe sloughing throughout.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

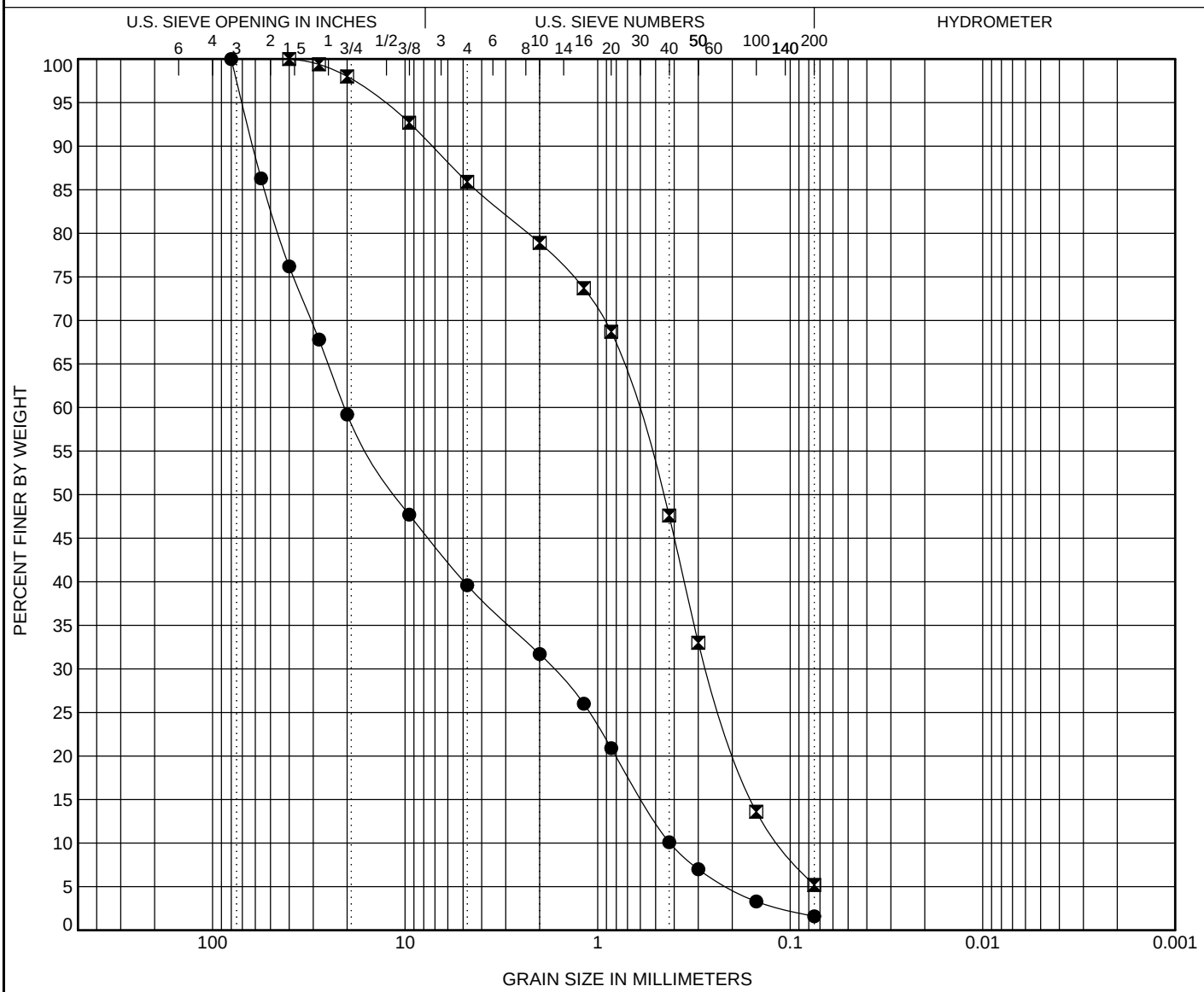
SNC·LAVALIN

TEST PIT AC1030-034

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	AC1030-034	GB-1	0.15 - 1.00	57.9	38.0	1.6	
⊠	AC1030-034	GB-2	2.00 - 4.00	14.1	80.7	5.2	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	100.0	86.3	76.2	67.8	59.2	47.7	39.6	31.7	20.9	10.1	7.0	3.3	1.6
⊠			100.0	99.4	98.0	92.7	85.9	78.9	68.7	47.6	33.0	13.6	5.2

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	AC1030-034	POORLY GRADED GRAVEL with SAND(GP)	20.6	1.7	0.4	5.4				0.3	49.1
⊠	AC1030-034	SAND with some Gravel, trace Fines	0.6	0.3	0.1	3.9				1.0	5.7

GRAIN SIZE2 - TEST PIT TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-24

SNC·LAVALIN

Test Pit: AC 1030 - 35					
Firm:	Newfoundland and Labrador Hydro				Date: 19-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5908215	E 0503521	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.1	PEAT - Dark brown organic soil, rootlets, moist, loose moss on top some weathered sand.	NA	NA	NA
0.1 - 0.2	Fine SAND - some fines, frequent rootlets, loose to compact, moist, poorly graded, light brown.	NA	NA	NA
0.2 - 4.0	Fines and SAND – trace gravel, loose to compact moist, poorly graded, trace cobbles, trace boulders at bottom of hole.	1	0.5 - 1.0	Grab

Estimated Cobbles (%) 1 - 5	Estimated Boulders (%) 1 - 5	Estimated Max Diameter (m) 0.5	
Start Time: 9:20 am	End Time: 9:45 am	Estimated Excavated Volume (m^3)	18

General Notes

Minor sloughing in first meter of sand. Test pit was dry upon completion.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

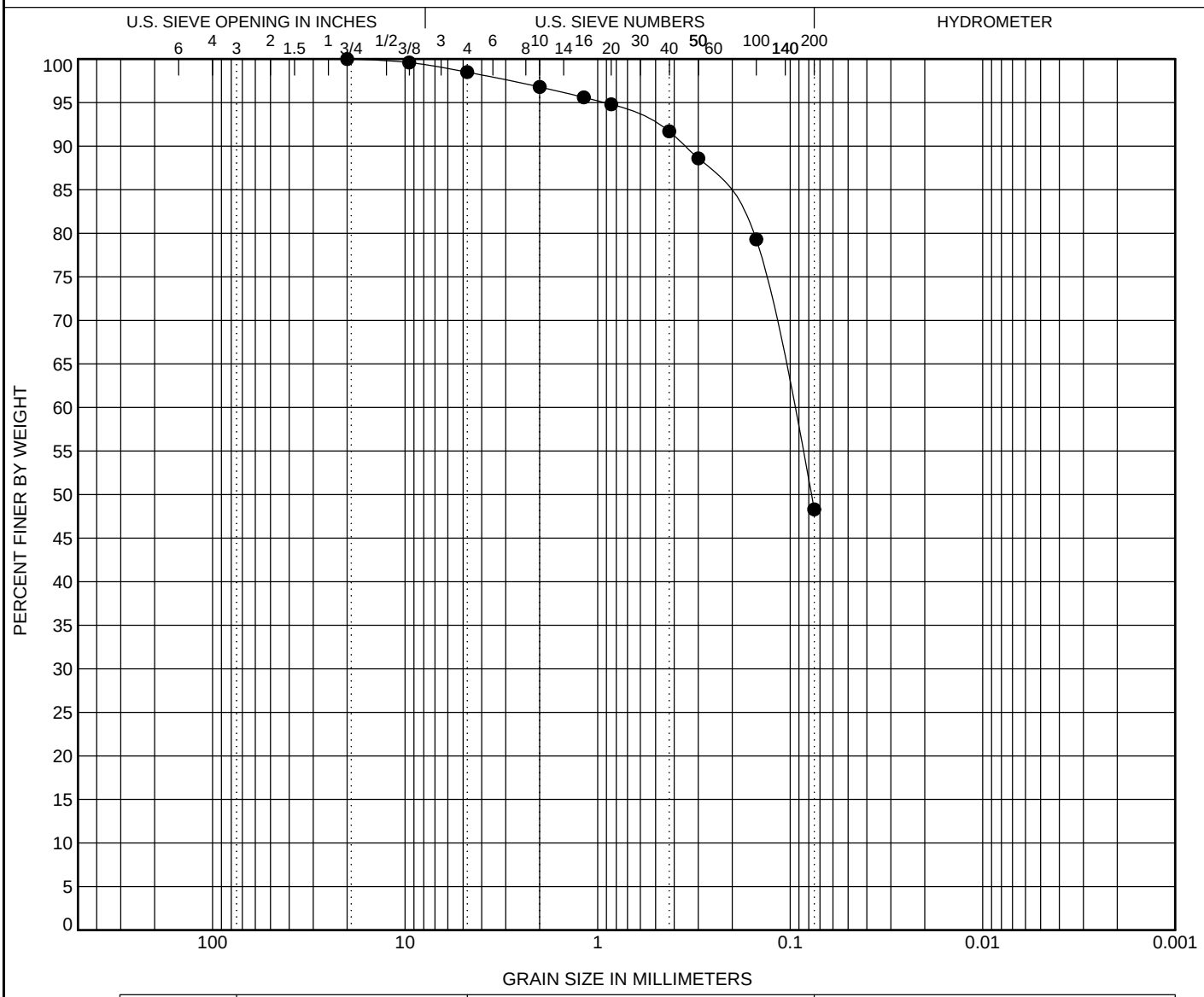
SNC·LAVALIN

TEST PIT AC1030-035

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-035**	**GB-1**	**0.50 - 1.00**	**1.5**	**50.2**	**48.3**	
⊠							
▲							
★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●					**100.0**	**99.6**	**98.5**	**96.8**	**94.8**	**91.7**	**88.6**	**79.3**	**48.3**
⊠													
▲													
★													
⊙													

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-035**	SAND and SILT with trace Gravel	**0.1**			**15.0**					
⊠											
▲											
★											
⊙											

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: AC 1030 - 36					
Firm:	Newfoundland and Labrador Hydro				Date: 20-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5910066	E 0496335	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.3	Root mat, peat, and moss, black, spongy, moist	NA	NA	NA
0.3 - 1.0	Poorly Graded SAND with GRAVEL (SP) - trace fines, compact, damp, light brown	1	0.5 - 1.0	Grab
1.0 - 1.5	Fine SAND - compact, damp, poorly graded, some fines, olive grey	NA	NA	NA
1.5 - 5.0	Poorly Graded SAND with GRAVEL (SP) - trace fines, compact, damp, light brown	NA	NA	NA
5.0	Fine SAND - compact, damp, poorly graded, some fines, olive grey	NA	NA	NA

Estimated Cobbles (%) 1 - 5	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 11:10 am	End Time: 11:30 am	Estimated Excavated Volume (m^3)	20

General Notes

Minor sloughing at 1.0 m

North and East coordinates obtained using Garmin Etrex Legend Cx GPS

Bedrock outcrop near test pit location as seen in picture 3 above

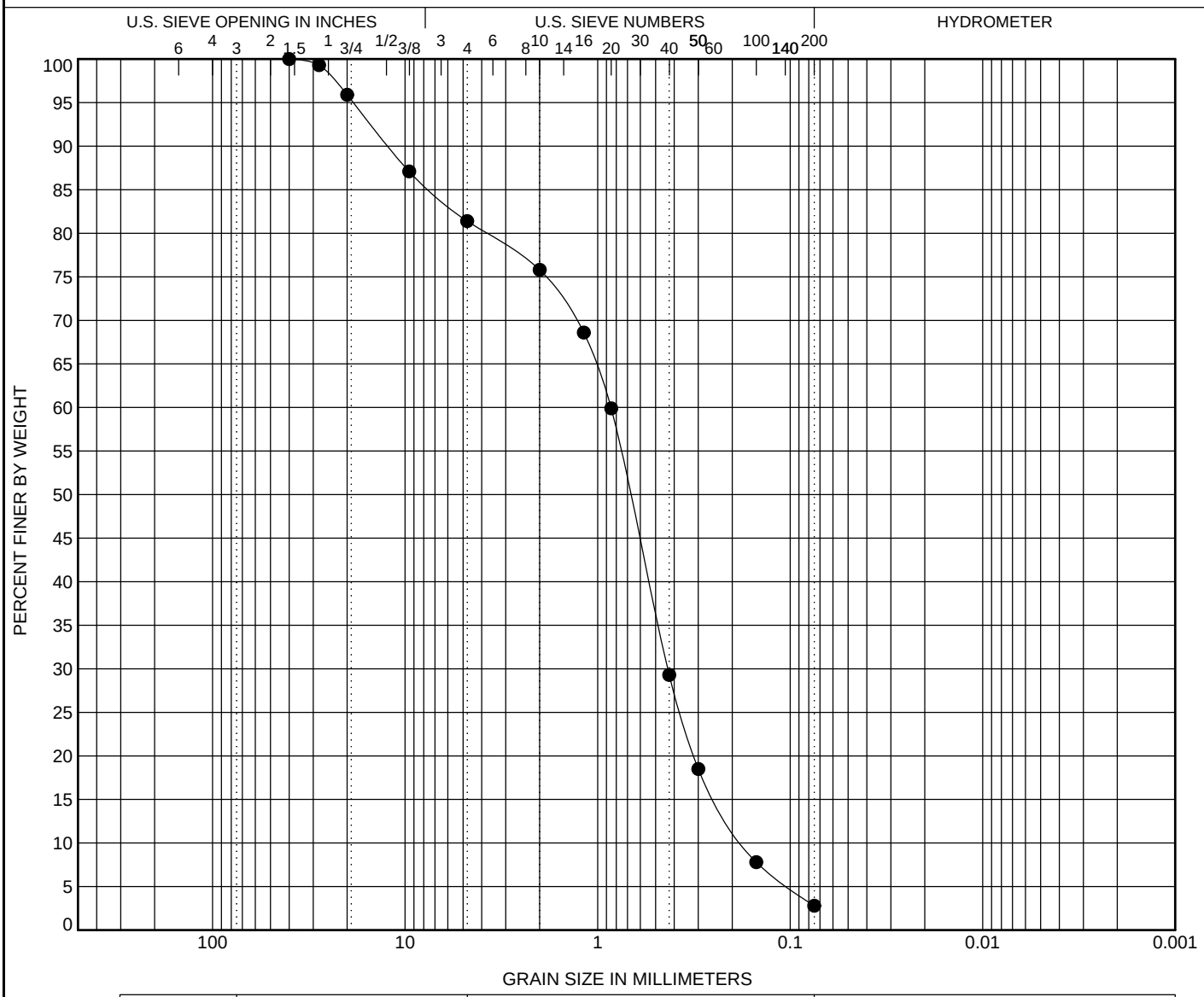
SNC·LAVALIN

TEST PIT AC1030-036

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-036**	**GB-1**	**0.50 - 1.00**	**18.6**	**78.6**	**2.8**	
⊠							
▲							
★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●			**100.0**	**99.3**	**95.9**	**87.1**	**81.4**	**75.8**	**59.9**	**29.3**	**18.5**	**7.8**	**2.8**
⊠													
▲													
★													
⊙													

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-036**	POORLY GRADED SAND with GRAVEL(SP)	**0.9**	**0.4**	**0.2**	**2.9**				**1.3**	**4.9**
⊠											
▲											
★											
⊙											

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-21

SNC·LAVALIN

Test Pit: AC 1030 - 37					
Firm:	Newfoundland and Labrador Hydro				Date: 19-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5917715	E 0487899	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.2	PEAT - Dark brown organic soil, rootlets, moist, loose.	NA	NA	NA
0.2 - 0.5	Fine SAND and SILT - some fines, wet compact, brown, frequent rootlets, some gravel, cobbles, well graded, minor sloughing, subangular cobbles.	NA	NA	NA
0.5 - 3.5	SAND and GRAVEL - trace fines, trace cobbles, trace boulders, wet, compact, olive grey.	1	1.0 - 3.0	Grab

Estimated Cobbles (%) 10 - 20	Estimated Boulders (%) 1 - 5	Estimated Max Diameter (m) 0.5	
Start Time: 1:08 pm	End Time: 1:35 pm	Estimated Excavated Volume (m^3)	10

General Notes

Severe sloughing in top layer at 0.5 m due to trickle of water flowing.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

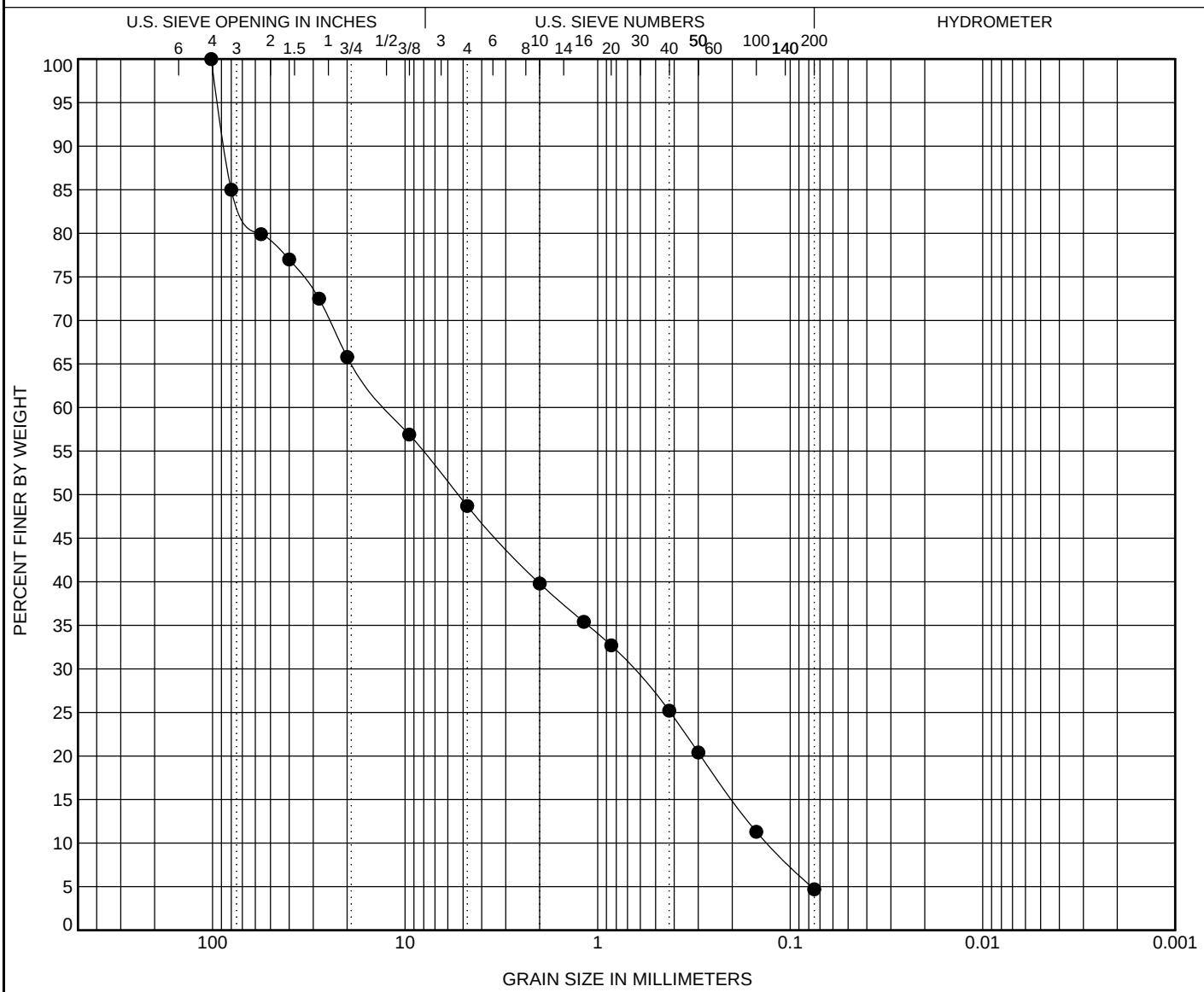
SNC·LAVALIN

TEST PIT AC1030-037

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-037**	**GB-1**	**1.00 - 3.00**	**35.4**	**44.0**	**4.7**	
⊠							
▲							
★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**85.0**	**79.9**	**77.0**	**72.5**	**65.8**	**56.9**	**48.7**	**39.8**	**32.7**	**25.2**	**20.4**	**11.3**	**4.7**
⊠													
▲													
★													
⊙													

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-037**	SAND & GRAVEL with some Cobbles, tr. Fines	**12.3**	**0.7**	**0.1**	**10.8**				**0.3**	**94.3**
⊠											
▲											
★											
⊙											

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: AC 1030 - 38					
Firm:	Newfoundland and Labrador Hydro				Date: 20-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5919345	E 0486259	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0	Boulders on top of moss and PEAT layer	NA	NA	NA
0.0 - 0.3	Weathered SAND and topsoil, damp, some fines, trace coarse gravel, loose to compact, poorly graded, mix of grey and brown.	NA	NA	NA
0.3 - 4.0	Gravely SAND - some cobbles, some fines, well graded, subangular, compact, moist, olive grey, trace boulders at 2.0 m.	1	2.0 - 3.0	Grab

Estimated Cobbles (%) 10 - 15	Estimated Boulders (%) 1 - 5	Estimated Max Diameter (m) 1.0	
Start Time: 2:05 pm	End Time: 2:20 pm	Estimated Excavated Volume (m^3)	18

General Notes

Moderate sloughing.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

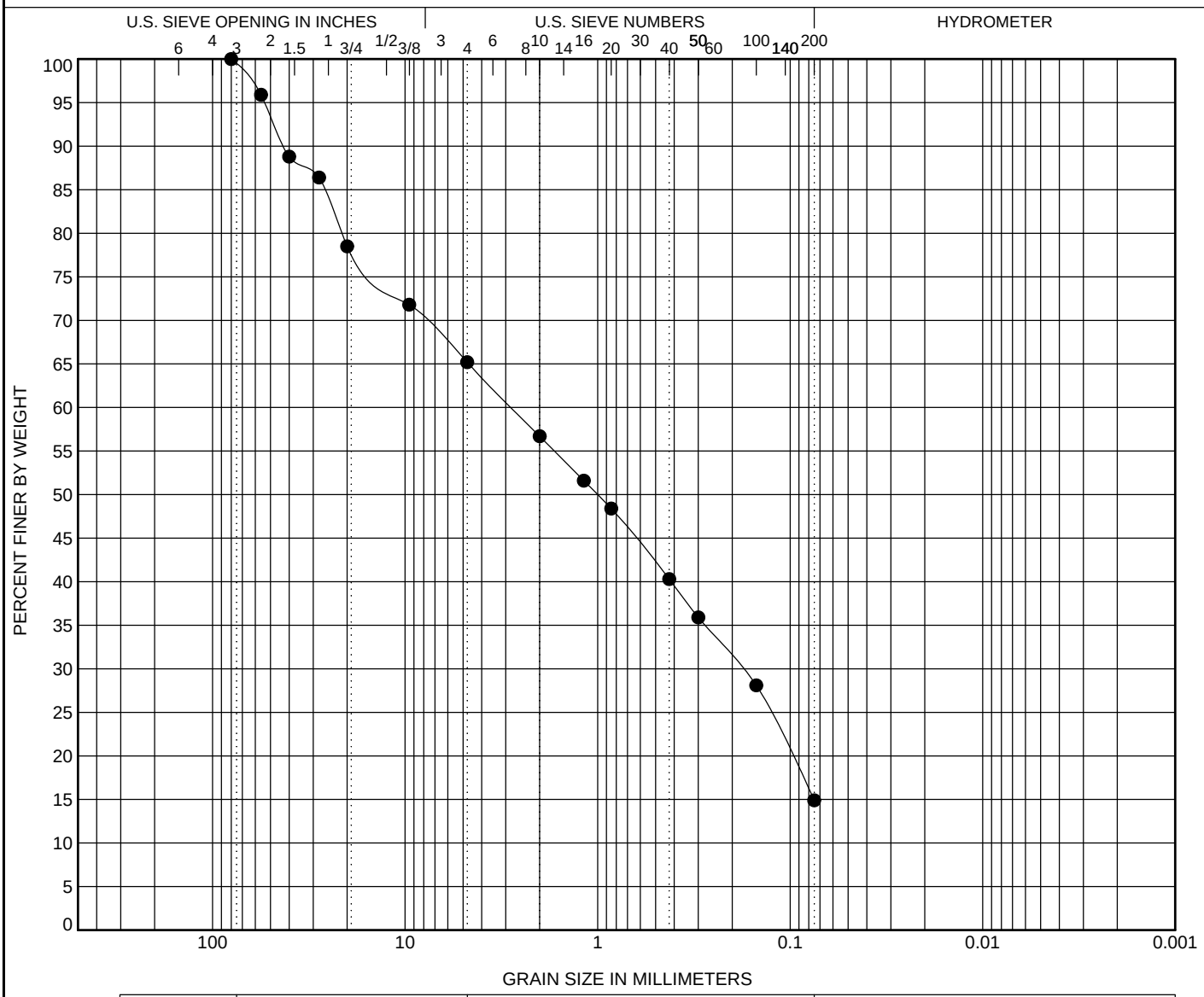
SNC·LAVALIN

TEST PIT AC1030-038

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-038**	**GB-1**	**2.00 - 3.00**	**34.1**	**50.3**	**14.9**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**100.0**	**95.9**	**88.8**	**86.4**	**78.5**	**71.8**	**65.2**	**56.7**	**48.4**	**40.3**	**35.9**	**28.1**	**14.9**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-038**	Gravelly SAND with some Fines, tr. Cobbles	**2.8**	**0.2**		**11.8**					

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: AC 1030 - 39					
Firm:	Newfoundland and Labrador Hydro				Date: 20-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5920992	E 0484084	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.2	PEAT - Dark brown organic soil, rootlets, moist, loose.	NA	NA	NA
0.2 - 0.7	SAND - some fines, frequent roots, wet, loose to compact, poorly graded , light brown.	NA	NA	NA
0.7 - 3.0	SILT with SAND (ML) – trace gravel, trace cobbles, trace boulders, moist, compact, light grey.	1	2.0 - 3.0	Grab

Estimated Cobbles (%) 5 - 10	Estimated Boulders (%) 5 - 10	Estimated Max Diameter (m) 0.5	
Start Time: 2:55 pm	End Time: 3:15 pm	Estimated Excavated Volume (m^3)	15

General Notes

No sloughing, slow steam of water flowing at 0.7 m.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

Stopped digging due to boulders at 3.0m.

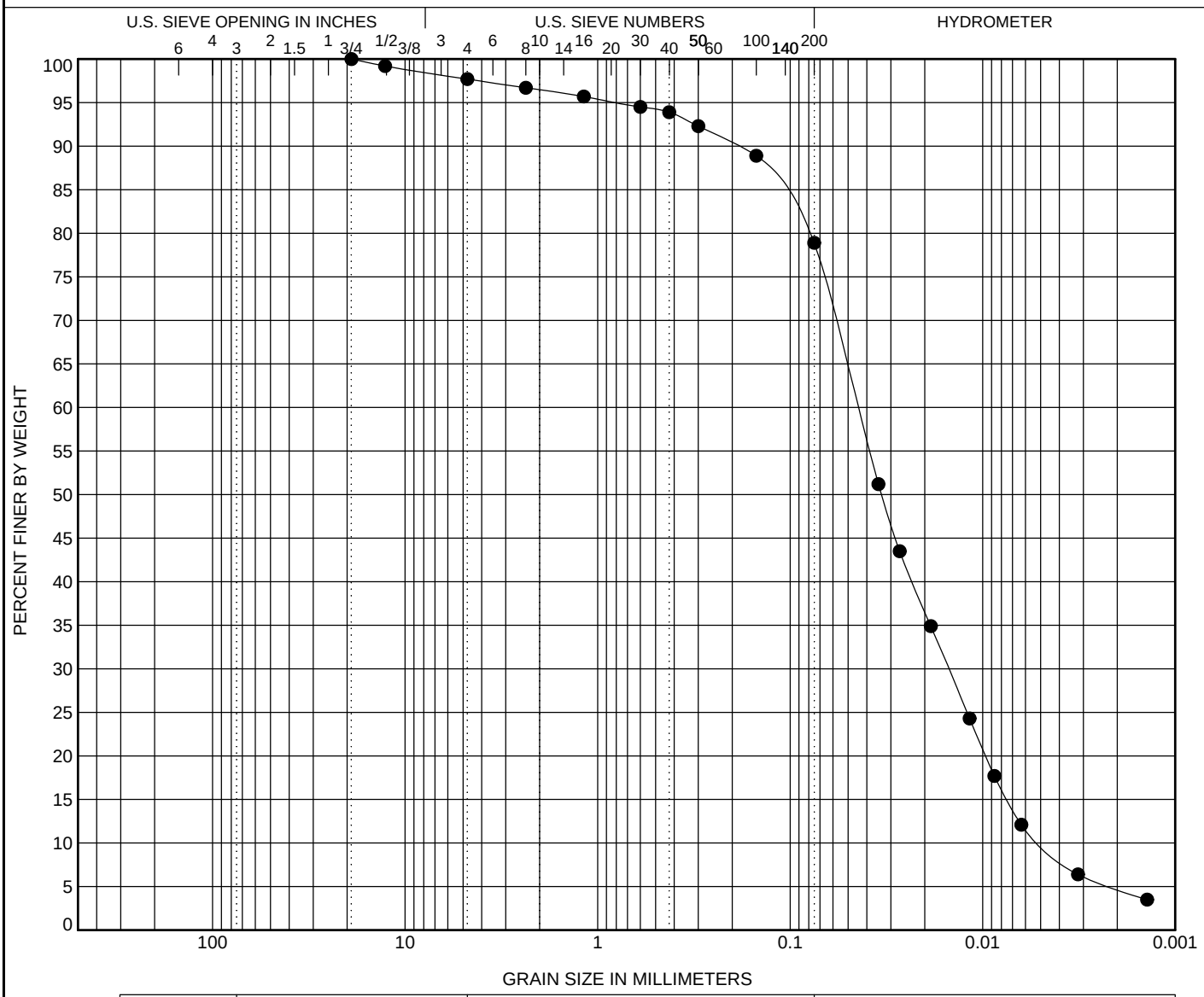
SNC·LAVALIN

TEST PIT AC1030-039

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-039**	**GB-1**	**2.00 - 3.00**	**2.3**	**18.8**	**74.1**	**4.8**
⊠							
▲							
★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●						**98.6**	**97.7**	**96.4**	**95.0**	**93.9**	**92.3**	**88.9**	**78.9**
⊠													
▲													
★													
⊙													

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-039**	SILT with some Sand, trace Clay, trace Gravel	**0**	**0**	**0**					**1.0**	**9.0**
⊠											
▲											
★											
⊙											

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: AC 1030 - 40					
Firm:	Newfoundland and Labrador Hydro				Date: 21-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5921391	E 0483155	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.1	PEAT - Dark brown organic soil, rootlets, moist, loose.	NA	NA	NA
0.1 - 0.3	Topsoil - frequent rootlets, some fines, sand, poorly graded, moist, loose, brown.	NA	NA	NA
0.3 - 1.0	SAND and GRAVEL - trace fines, trace cobbles, wet, compact, well graded, light grey.	1	0.3 - 1.0	Grab
1.0	BEDROCK	NA	NA	NA

Estimated Cobbles (%) 10 - 15	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 9:30 am	End Time: 9:45 am	Estimated Excavated Volume (m^3)	6

General Notes

No sloughing.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

Water entering at 0.8 m.

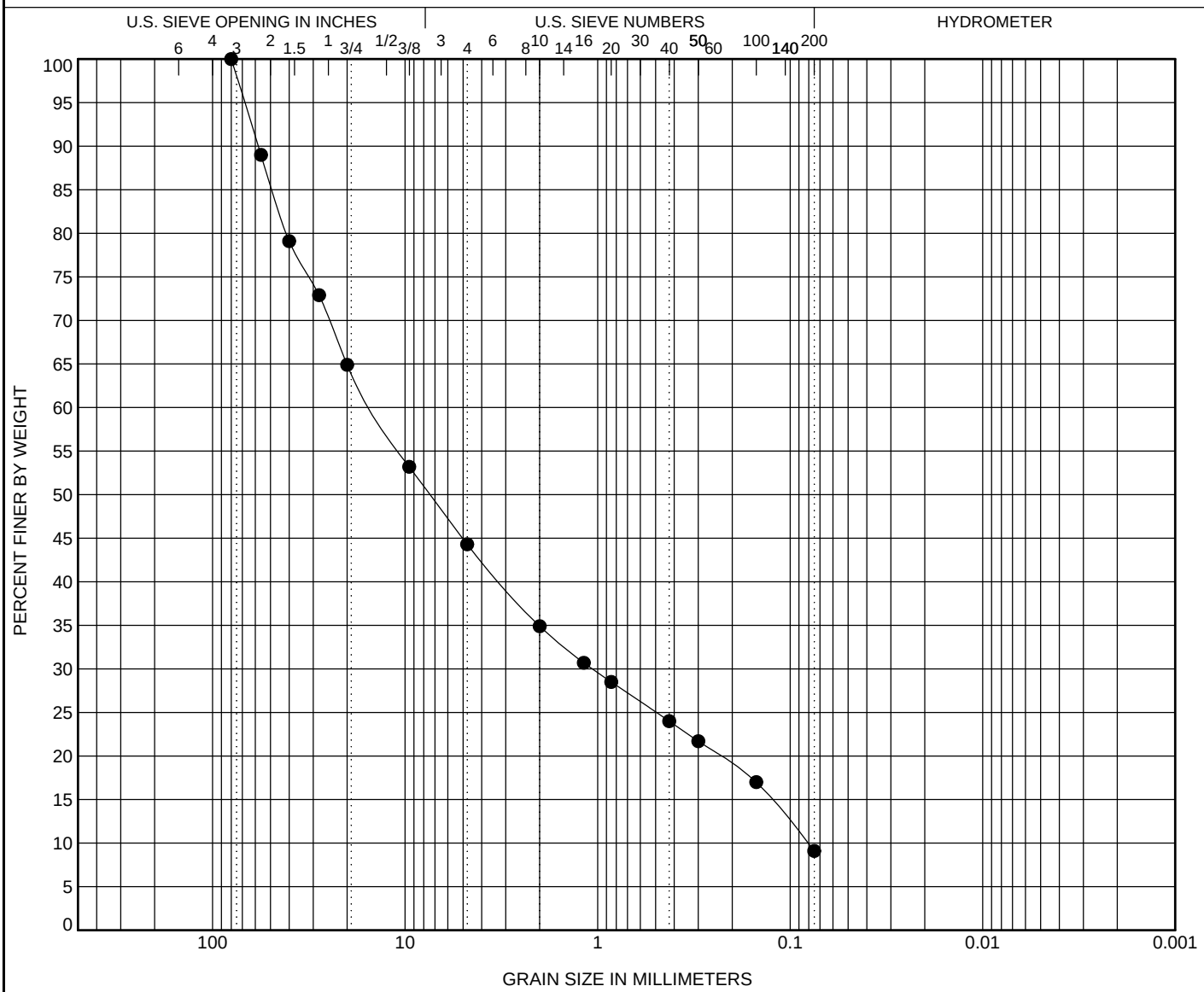
SNC·LAVALIN

TEST PIT AC1030-040

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-040**	**GB-1**	**0.30 - 1.00**	**53.7**	**35.2**	**9.1**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**100.0**	**89.0**	**79.1**	**72.9**	**64.9**	**53.2**	**44.3**	**34.9**	**28.5**	**24.0**	**21.7**	**17.0**	**9.1**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-040**	GRAVEL and SAND with tr. Fines & Cobbles	**14.7**	**1.1**	**0.1**	**8.4**				**0.9**	**180.6**

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: AC 1030 - 41					
Firm:	Newfoundland and Labrador Hydro				Date: 21-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5920374	E 0477313	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.1	PEAT - Dark brown organic soil, rootlets, moist, loose root mat.	NA	NA	NA
0.1 - 0.3	Topsoil, frequent rootlets, some fines, sand, poorly graded, wet, loose, brown.	NA	NA	NA
0.3 - 1.5	Gravelly SAND - some fines, some cobbles, angular, moist, well graded, compact, light grey.	1	0.5 - 1.5	Grab
1.5	BEDROCK	NA	NA	NA

Estimated Cobbles (%) 1 - 5	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 10:20 am	End Time: 10:40 am	Estimated Excavated Volume (m^3)	1.5

General Notes

No sloughing.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

Water flowing rapidly into test pit from beneath PEAT layer.

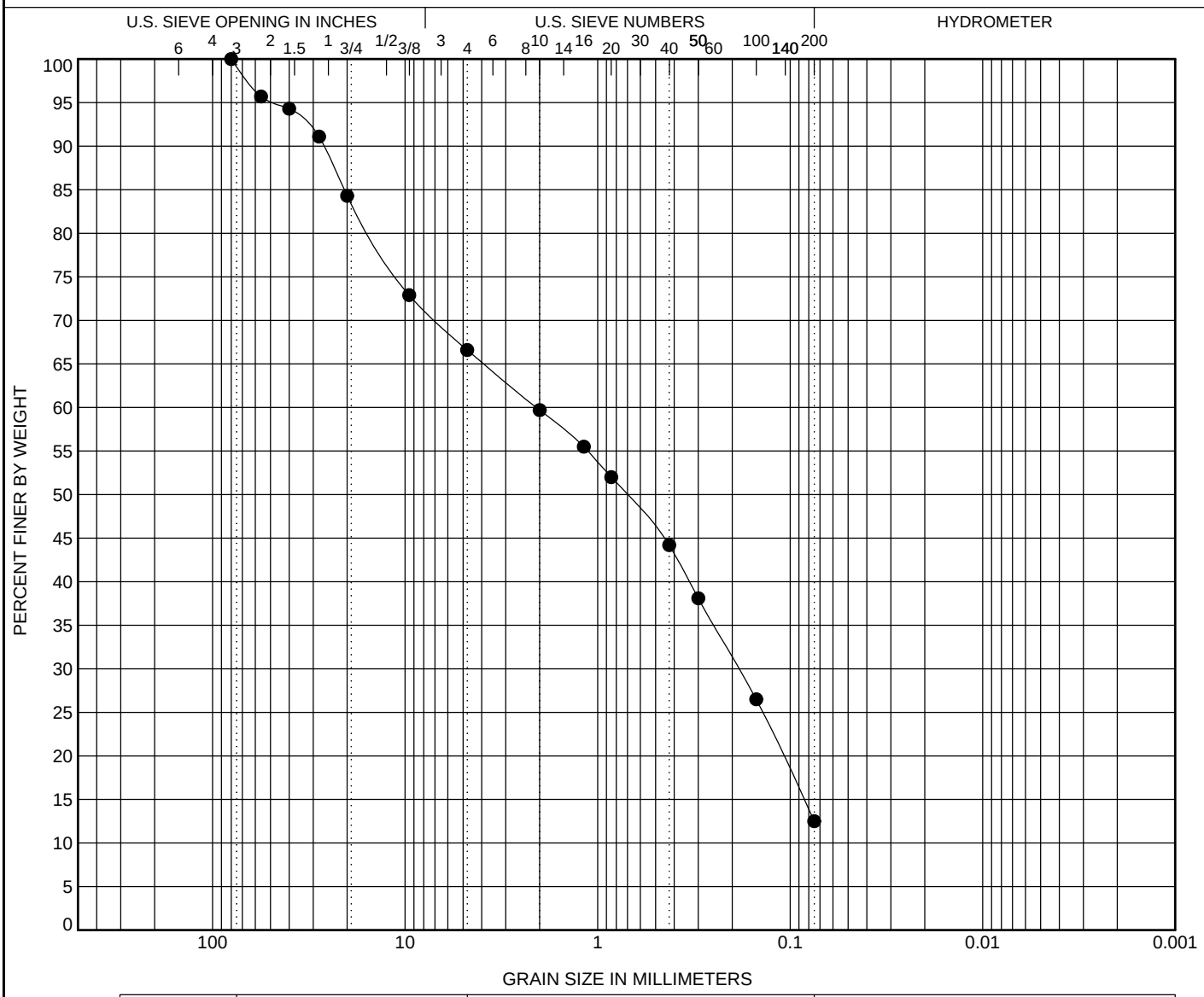
SNC·LAVALIN

TEST PIT AC1030-041

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-041**	**GB-1**	**0.50 - 1.50**	**32.6**	**54.1**	**12.5**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**100.0**	**95.7**	**94.3**	**91.1**	**84.3**	**72.9**	**66.6**	**59.7**	**52.0**	**44.2**	**38.1**	**26.5**	**12.5**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-041**	Gravelly SAND with some Fines, tr. Cobbles	**2.1**	**0.2**		**15.8**					

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: AC 1030 - 42					
Firm:	Newfoundland and Labrador Hydro				Date: 21-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5921538	E 0471714	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.2	PEAT - Dark brown organic soil, rootlets, moist, loose.	NA	NA	NA
0.2 - 0.7	Topsoil – black SAND and GRAVEL, wet. some subrounded cobbles.	NA	NA	NA
0.7 - 2.5	Gravelly Silty SAND - some cobbles, moist to damp, compact, well graded, light grey.	1	1.0 - 2.5	Grab
2.5	Bedrock	NA	NA	NA

Estimated Cobbles (%) 10 - 20	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 11:50 am	End Time: 12:05 pm	Estimated Excavated Volume (m^3)	6

General Notes

Minor sloughing where water enters test pit.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

Water flowing at 0.2 m between peat and topsoil layers.

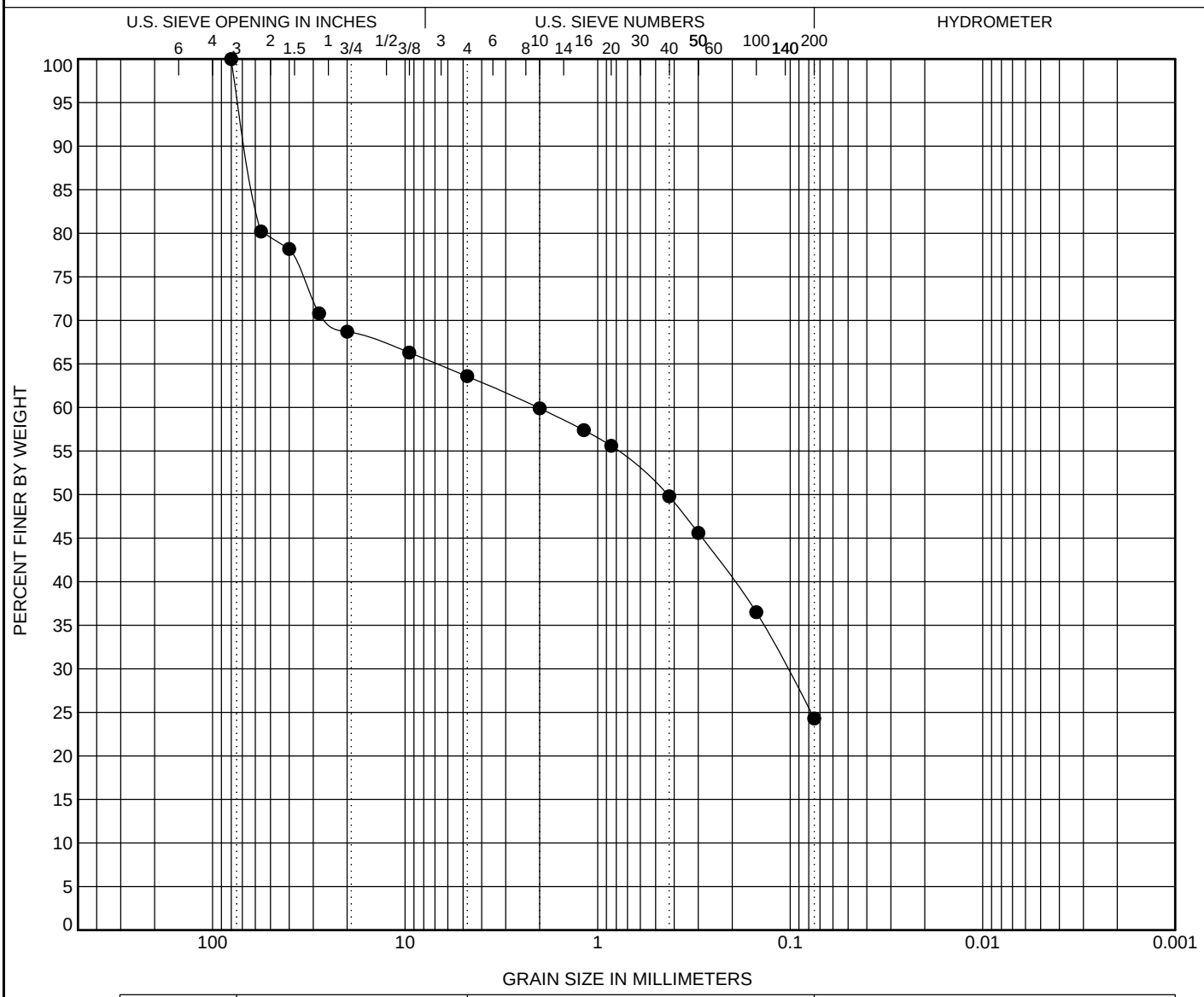
SNC·LAVALIN

TEST PIT AC1030-042

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-042**	**GB-1**	**1.00 - 2.50**	**32.8**	**39.3**	**24.3**	
⊠							
▲							
★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**100.0**	**80.2**	**78.2**	**70.8**	**68.7**	**66.3**	**63.6**	**59.9**	**55.6**	**49.8**	**45.6**	**36.5**	**24.3**
⊠													
▲													
★													
⊙													

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-042**	Gravelly, Silty, SAND with trace Cobbles	**2**	**0.1**		**10.7**					
⊠											
▲											
★											
⊙											

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: AC 1030 - 43					
Firm:	Newfoundland and Labrador Hydro				Date: 21-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5923218	E 0465058	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 – 1.2	Boulders – trace organics.	NA	NA	NA
1.2 – 2.0	SAND and GRAVEL with some fines, wet, dense.	NA	NA	NA

Estimated Cobbles (%) 0	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 1:05 pm	End Time: 1:10 pm	Estimated Excavated Volume (m^3)	5

General Notes

Water with bedrock and boulders.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

SNC·LAVALIN

Test Pit: AC 1030 - 44					
Firm:	Newfoundland and Labrador Hydro				Date: 21-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5926224	E 0459665	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.1	PEAT - Dark brown organic soil, rootlets, moist, loose.	NA	NA	NA
0.1 - 0.4	Topsoil, black to dark brown SAND and GRAVEL with organics, rootlets, moist, loose.	NA	NA	NA
0.4 - 1.4	Gravelly SILTY SAND - trace cobbles, occasional boulders, wet, compact, olive green.	1	0.5 - 1.4	Grab
1.4	Bedrock	NA	NA	NA

Estimated Cobbles (%) 1 - 5	Estimated Boulders (%) 0	Estimated Max Diameter (m)	NA
Start Time: 1:45 pm	End Time: 2:00 pm	Estimated Excavated Volume (m^3)	4

General Notes

No sloughing

North and East coordinates obtained using a Garmin Etrex Legend Cx GPS

Water trickle at 1.4 meters on top of bedrock

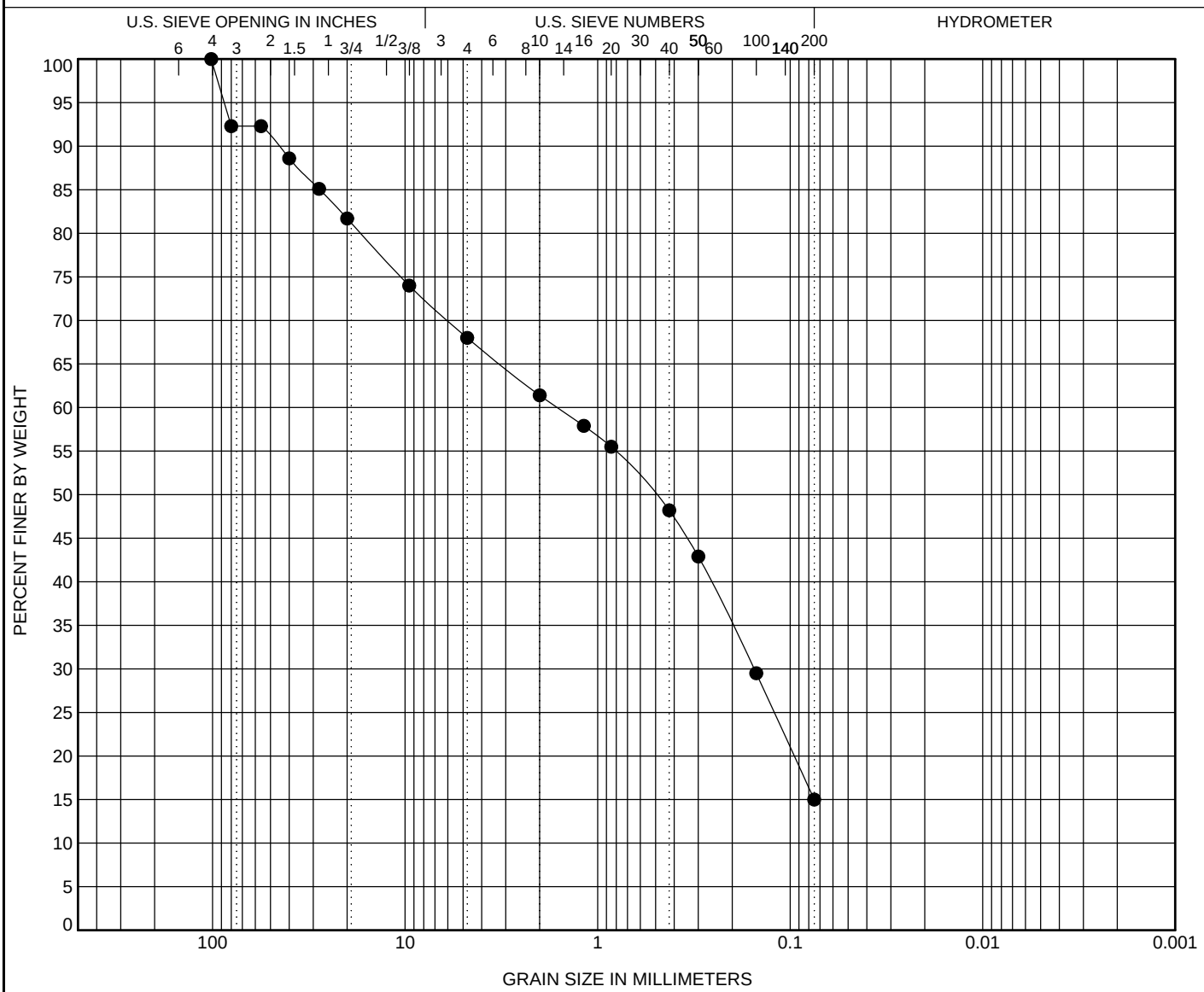
SNC·LAVALIN

TEST PIT AC1030-044

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-044**	**GB-1**	**0.50 - 1.40**	**24.3**	**53.0**	**15.0**	
⊠							
▲							
★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**92.3**	**92.3**	**88.6**	**85.1**	**81.7**	**74.0**	**68.0**	**61.4**	**55.5**	**48.2**	**42.9**	**29.5**	**15.0**
⊠													
▲													
★													
⊙													

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-044**	Gravelly SAND with some Fines, tr. Cobbles	**1.6**	**0.2**		**13.6**					
⊠											
▲											
★											
⊙											

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: AC 1030 - 45					
Firm:	Newfoundland and Labrador Hydro				Date: 21-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5933498	E 0442013	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.3	Root mat - some cobbles, and coarse gravel.	NA	NA	NA
0.3 - 1.0	Gravelly SAND – trace fines, trace cobbles, wet, compact, poorly graded , light grey with a 0.2 m brown sand layer on top.	1	0.3 - 1.0	Grab
1.0	BEDROCK with free water on top.	NA	NA	NA

Estimated Cobbles (%) 10 - 20	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 2:35 pm	End Time: 3:00 pm	Estimated Excavated Volume (m^3)	3

General Notes

No sloughing.

North and East coordinates obtained using a Garmin Etrex Legend Cx GPS.

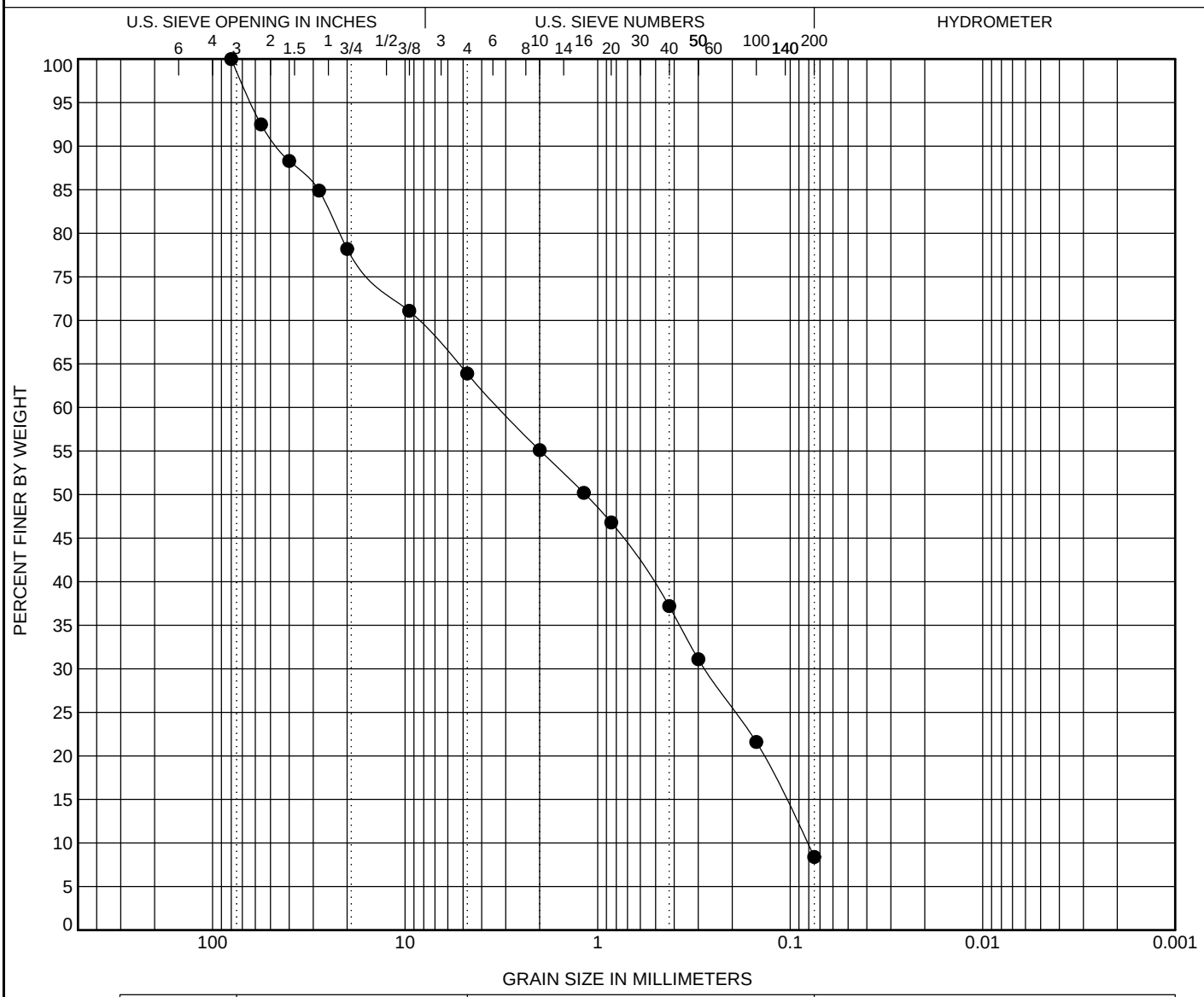
SNC·LAVALIN

TEST PIT AC1030-045

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-045**	**GB-1**	**0.30 - 1.00**	**34.8**	**55.5**	**8.4**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**100.0**	**92.5**	**88.3**	**84.9**	**78.2**	**71.1**	**63.9**	**55.1**	**46.8**	**37.2**	**31.1**	**21.6**	**8.4**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-045**	Gravelly SAND with trace Fines and Cobbles	**3.2**	**0.3**	**0.1**	**11.6**				**0.3**	**39.7**

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

BOREHOLE LOG

BOREHOLE TL-BH-02

PAGE 1 OF 1

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line

REFERENCE LEVEL: Geodetic (NAD 83) **DATE STARTED** 2007-10-04 **COMPLETED** 2007-10-04

COORDINATES: **NORTHING** 5886910.00 m **DRILLING METHOD** Diamond drill

EASTING 564239.00 m **CASING SIZE** NW

REFERENCE ELEVATION --- **CORING SIZE** NQ

NOTES: Borehole to confirm presence of bedrock. No RQD recorded **BEDROCK DEPTH:** 2.92 m **TOTAL DEPTH:** 5.03 m

GROUND WATER LEVELS:

AT TIME OF DRILLING 1.3 m **DATE** 2007-10-04

AFTER DRILLING Water table not measured **DATE** ---

HOLE ORIENTATION:

AZIMUTH (degrees):

PLUNGE (degrees): -90

SPT

HAMMER SIZE : 63.5 Kg

HAMMER DROP : 0.76 m

DEPTH (m)	ELEVATION (m)	MATERIAL DESCRIPTION	STRAT.	PIEZO LEVEL (m)	SAMPLE SIZE	SAMPLE TYPE	SAMPLE NUMBER	RECOVERY %	N or RQD	K (cm/s)	TESTS & RESULTS
0	0.00	SAND - Fine grained with trace gravel					AU-1				W = 6.9% Fines = 7.9%
							SS-2	75	38		W = 1.6% Fines = 11.5%
	1.83	SAND and GRAVEL					SS-3	96	54		W = 8.0% Fines = 8.6%
	2.92	BEDROCK					SS-4	78	50		W = 8.0% Fines = 18.1%
							RC-5	100			
5		Bottom of hole at 5.03 m.									

WATER CONTENT (%)

5 10 15 20 25

SPT N VALUE

10 20 30 40 50

LOGGED BY K.R. **CHECKED BY** C.S. **APPROVED BY**

GEOTECH BH PLOTS TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-21

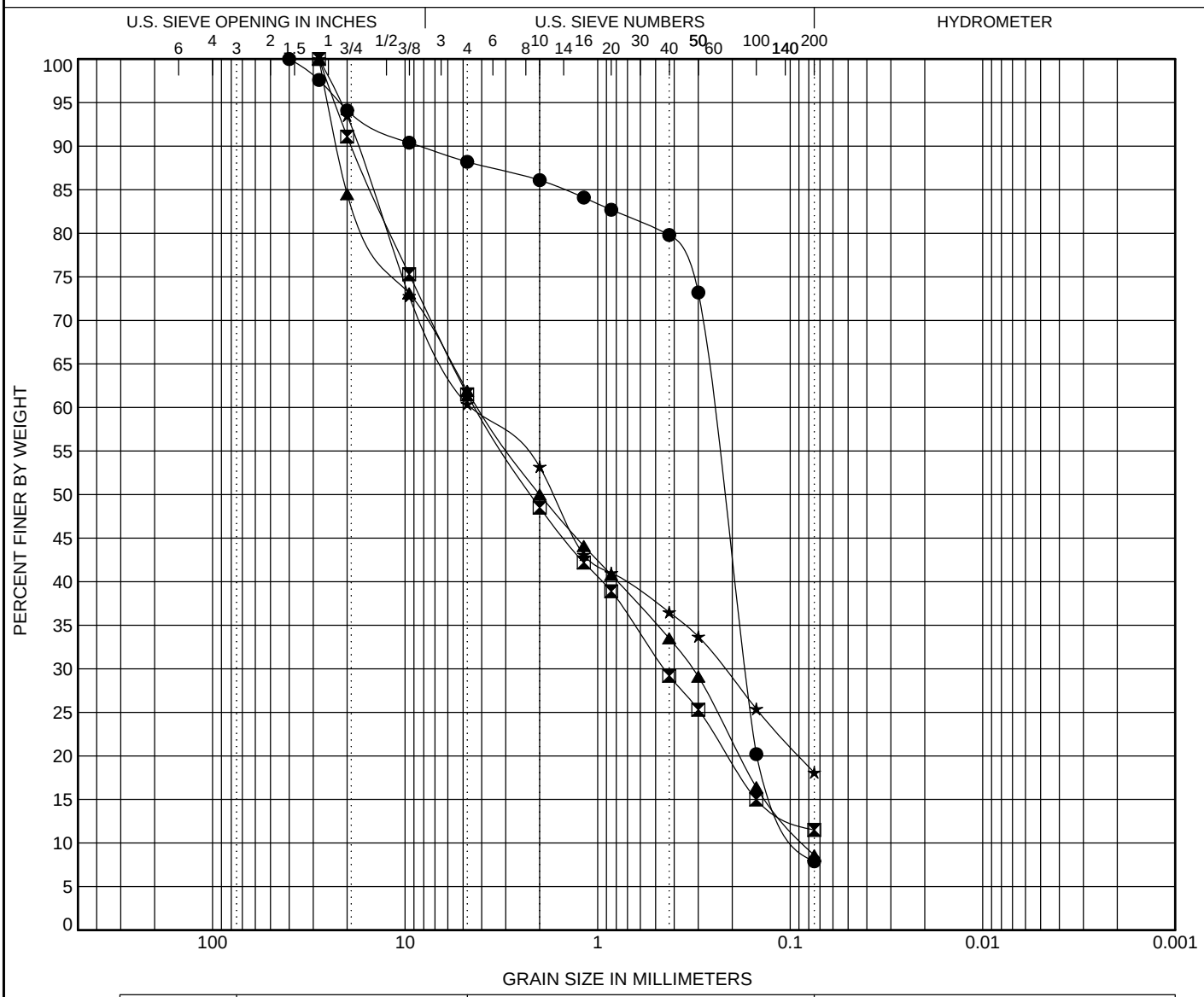
SNC·LAVALIN

BOREHOLE TL-BH-02

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Borehole no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	TL-BH-02	AU-1	0.00 - 0.76	11.8	80.3	7.9	
⊠	TL-BH-02	SS-2	1.22 - 1.83	38.5	50.0	11.5	
▲	TL-BH-02	SS-3	1.83 - 2.44	38.1	53.3	8.6	
★	TL-BH-02	SS-4	2.69 - 2.92	39.6	42.3	18.1	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●			100.0	97.6	94.1	90.4	88.2	86.1	82.7	79.8	73.2	20.2	7.9
⊠				100.0	91.1	75.3	61.5	48.5	38.9	29.2	25.3	15.0	11.5
▲				100.0	84.5	73.1	61.9	50.0	40.8	33.5	29.1	16.4	8.6
★				100.0	93.5	72.8	60.4	53.2	41.0	36.5	33.7	25.4	18.1

	Borehole no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	TL-BH-02	SAND with some Gravel, trace Fine	0.3	0.2	0.1	6.9				1.4	3.0
⊠	TL-BH-02	SAND and GRAVEL with some fines	4.3	0.5		1.6				0.8	77.3
▲	TL-BH-02	SAND and GRAVEL with trace fines	4.1	0.3	0.1	8.0				0.3	48.8
★	TL-BH-02	SAND and GRAVEL with some fines	4.5	0.2		8.0					

GRAIN SIZE2 - BOREHOLE TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-24

SNC·LAVALIN

BOREHOLE LOG

BOREHOLE TL-BH-03

PAGE 1 OF 1

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line

REFERENCE LEVEL: Geodetic (NAD 83) **DATE STARTED** 2007-10-08 **COMPLETED** 2007-10-09

COORDINATES: **NORTHING** 5923961.00 m **DRILLING METHOD** Diamond drill

EASTING 463251.00 m **CASING SIZE** NW

REFERENCE ELEVATION --- **CORING SIZE** NQ

NOTES: Borehole to confirm presence of Bedrock. No RQD recorded **BEDROCK DEPTH:** 7.39 m **TOTAL DEPTH:** 9.3 m

GROUND WATER LEVELS:

AT TIME OF DRILLING 4.6 m **DATE** 2007-10-08

AFTER DRILLING Water table not measured **DATE** ---

HOLE ORIENTATION:

AZIMUTH (degrees):

PLUNGE (degrees): -90

SPT

HAMMER SIZE : 63.5 Kg

HAMMER DROP : 0.76 m

DEPTH (m)	ELEVATION (m)	MATERIAL DESCRIPTION	STRAT.	PIEZO LEVEL (m)	SAMPLE SIZE	SAMPLE TYPE	SAMPLE NUMBER	RECOVERY %	N or RQD	K (cm/s)	TESTS & RESULTS
0	0.00	SAND and GRAVEL					AU-1				W = 9.0% Fines = 11.8%
	1.52	BOULDERS and COBBLES									
	3.35	SAND and GRAVEL					SS-2	60	30		W = 4.8% Fines = 5.8%
							SS-3	52	55		
5							SS-4	33	17		
							SS-5	83	19		W = 13.5% Fines = 3.3%
							SS-6	43	23		
							SS-7	24	21		
	7.39	BEDROCK									
		Bottom of hole at 9.30 m.									

WATER CONTENT (%)

5 10 15 20 25

SPT N VALUE

10 20 30 40 50

LOGGED BY K.R. **CHECKED BY** C.S. **APPROVED BY**

GEOTECH BH PLOTS TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-21

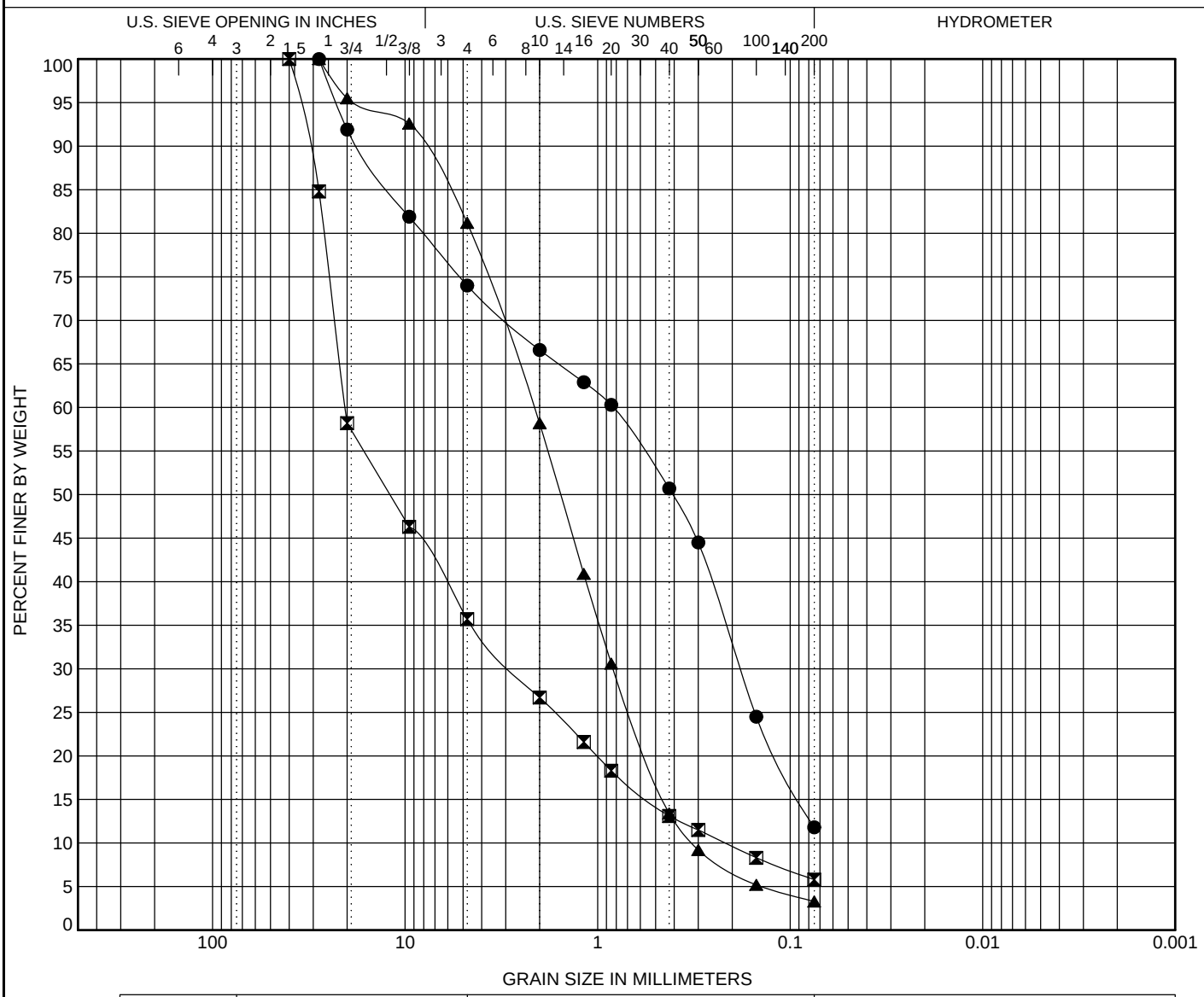
SNC·LAVALIN

BOREHOLE TL-BH-03

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Borehole no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	TL-BH-03	AU-1	0.00 - 0.61	26.0	62.2	11.8	
⊠	TL-BH-03	SS-2&3	3.35 - 4.57	64.3	29.9	5.8	
▲	TL-BH-03	SS-5	5.49 - 6.10	18.9	77.8	3.3	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●				100.0	91.9	81.9	74.0	66.6	60.3	50.7	44.5	24.5	11.8
⊠			100.0	84.8	58.2	46.3	35.7	26.7	18.3	13.1	11.5	8.3	5.8
▲				100.0	95.5	92.6	81.2	58.2	30.6	13.4	9.2	5.2	3.3

	Borehole no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	TL-BH-03	Gravely SAND with some Fines	0.8	0.2		9.0				0.6	12.2
⊠	TL-BH-03	Sandy GRAVEL with trace fines	20.5	2.7	0.2	4.8				1.7	94.4
▲	TL-BH-03	WELL-GRADED SAND with GRAVEL(SW)	2.1	0.8	0.3	13.5				1.0	6.7

GRAIN SIZE2 - BOREHOLE TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-24

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BOREHOLE LOG

BOREHOLE TL-BH-04

PAGE 1 OF 1

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line

REFERENCE LEVEL: Geodetic (NAD 83) **DATE STARTED** 2007-10-05 **COMPLETED** 2007-10-06

COORDINATES: **NORTHING** 5908198.00 m **DRILLING METHOD** Diamond drill

EASTING 503529.00 m **CASING SIZE** NW

REFERENCE ELEVATION --- **CORING SIZE** NQ

NOTES: Did not reach bedrock. **BEDROCK DEPTH:** --- **TOTAL DEPTH:** 16.46 m

GROUND WATER LEVELS:

AT TIME OF DRILLING 1.8 m **DATE** 2007-10-05

AFTER DRILLING Water table not measured **DATE** ---

HOLE ORIENTATION:

AZIMUTH (degrees):

PLUNGE (degrees): -90

SPT

HAMMER SIZE : 63.5 Kg

HAMMER DROP : 0.76 m

DEPTH (m)	ELEVATION (m)	MATERIAL DESCRIPTION	STRAT.	PIEZO LEVEL (m)	SAMPLE SIZE	SAMPLE TYPE	SAMPLE NUMBER	RECOVERY %	N or RQD	K (cm/s)	TESTS & RESULTS
	0.00	SILTY SAND					AU-1				W = 19.2%
							AU-2				Fines = 40.2% W = 11.8% Fines = 42.2%
	1.52	SANDY SILT					SS-3	100	8		W = 15.2% Fines = 49.5%
							SS-4	100	24		W = 12.2% Fines = 42.5%
							SS-5	100	26		W = 16.1% Fines = 66.1%
							SS-6	100	23		W = 10.6% Fines = 34.6%
	4.27	BOULDER					SS-7	100	64		W = 5.8% Fines = 5.8%
5	6.45	SAND and GRAVEL					SS-8	25	12		W = 10.8% Fines = 33.3%
							SS-9	100	28		
							SS-10	100	49		
	8.28	SILTY SAND- Trace gravel					SS-11	100	51		W = 10.5% Fines = 41.0%
							SS-12	100	49		
	9.50	BOULDER					SS-13	100	50		
10	10.52	SILTY SAND - Trace gravel					SS-14	100	43		
							SS-15	100	51		
	11.74	SILTY SAND					SS-16	100	10		
	12.34	SAND and SILT					SS-17	100	10		
	12.95	CLAY and SILT - Trace sand					SS-18	50	56		W = 17.5% Fines = 61.2%
15							SS-19	100	26		
	15.85	SAND and SILT					SS-20	100	47		W = 12.3% Fines = 28.2%
		Bottom of hole at 16.46 m.									

WATER CONTENT (%) 5 10 15 20 25

SPT N VALUE 10 20 30 40 50 >>

LOGGED BY K.R. **CHECKED BY** C.S. **APPROVED BY**

GEOTECH BH PLOTS TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-25

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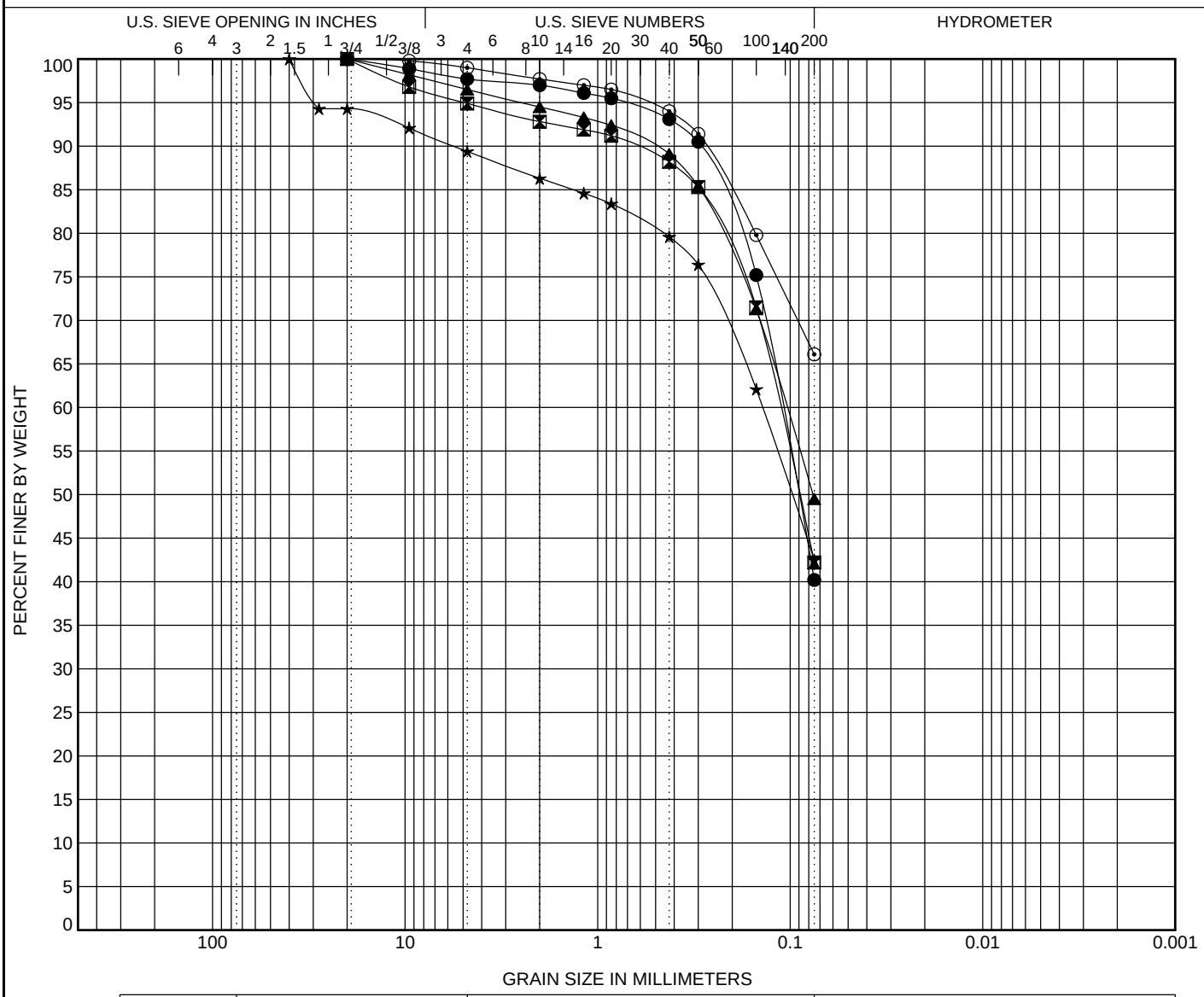
BOREHOLE TL-BH-04

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Borehole no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	TL-BH-04	AU-1	0.00 - 0.61	2.3	57.5	40.2	
⊠	TL-BH-04	AU-2	0.61 - 1.52	5.1	52.7	42.2	
▲	TL-BH-04	SS-3	1.52 - 2.13	3.5	47.0	49.5	
★	TL-BH-04	SS-4	2.13 - 2.74	10.6	46.9	42.5	
⊙	TL-BH-04	SS-5	3.05 - 3.66	1.0	32.9	66.1	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●					100.0	98.9	97.7	97.0	95.5	93.1	90.5	75.2	40.2
⊠					100.0	96.8	94.9	92.8	91.2	88.2	85.3	71.5	42.2
▲					100.0	98.2	96.5	94.5	92.4	89.1	85.4	71.3	49.5
★			100.0	94.3	94.3	92.1	89.4	86.3	83.4	79.6	76.4	62.1	42.5
⊙					100.0	99.8	99.0	97.7	96.5	94.0	91.4	79.8	66.1

	Borehole no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	TL-BH-04	SAND and SILT with trace Gravel	0.1			19.2					
⊠	TL-BH-04	SAND and SILT with trace Gravel	0.1			11.8					
▲	TL-BH-04	SILT and SAND with trace Gravel	0.1			15.2					
★	TL-BH-04	SAND and SILT with some Gravel	0.1			12.2					
⊙	TL-BH-04	SILT and SAND with trace Gravel				16.1					

GRAIN SIZE2 - BOREHOLE TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-25

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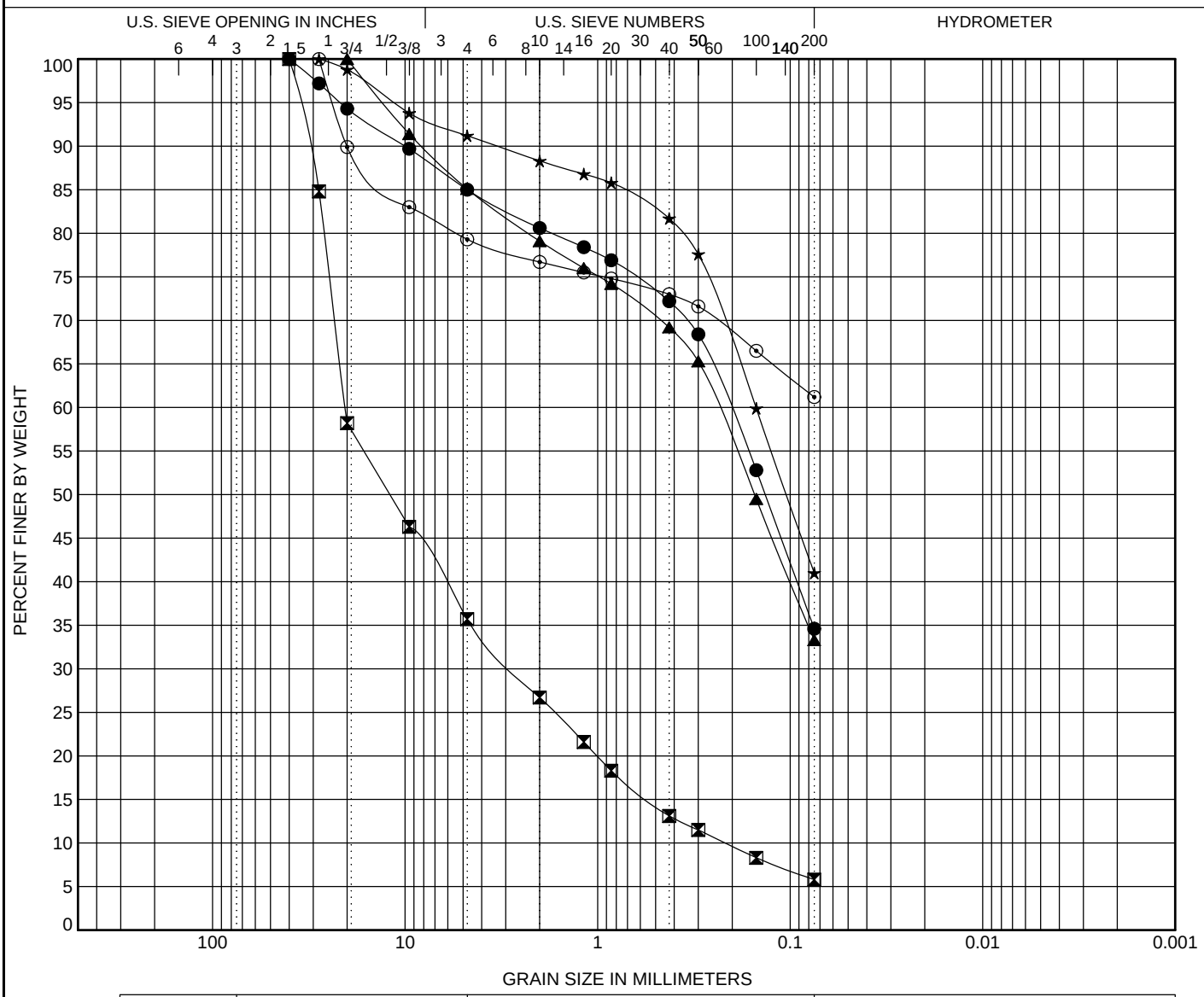
BOREHOLE TL-BH-04

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Borehole no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	TL-BH-04	SS-6	3.66 - 4.27	15.0	50.4	34.6	
⊠	TL-BH-04	SS-7	4.60 - 5.00	64.3	29.9	5.8	
▲	TL-BH-04	SS-8	6.45 - 7.06	14.9	51.8	33.3	
★	TL-BH-04	SS-11	8.28 - 8.89	8.8	50.2	41.0	
⊙	TL-BH-04	SS-18	13.72 - 14.33	20.7	18.1	61.2	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●			100.0	97.2	94.3	89.7	85.0	80.6	76.9	72.2	68.4	52.8	34.6
⊠			100.0	84.8	58.2	46.3	35.7	26.7	18.3	13.1	11.5	8.3	5.8
▲					100.0	91.4	85.1	79.1	74.2	69.2	65.3	49.5	33.3
★				100.0	98.8	93.8	91.2	88.3	85.8	81.7	77.6	59.9	41.0
⊙				100.0	89.9	83.0	79.3	76.7	74.8	73.0	71.6	66.5	61.2

	Borehole no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	TL-BH-04	Silty SAND with some Gravel	0.2			10.6					
⊠	TL-BH-04	Sandy GRAVEL with trace fines	20.5	2.7	0.2	5.8				1.7	94.4
▲	TL-BH-04	Silty SAND with some Gravel	0.2			10.8					
★	TL-BH-04	SAND and SILT with trace Gravel	0.2			10.5					
⊙	TL-BH-04	Gravelly SILT with some Sand				17.5					

GRAIN SIZE2 - BOREHOLE TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-25

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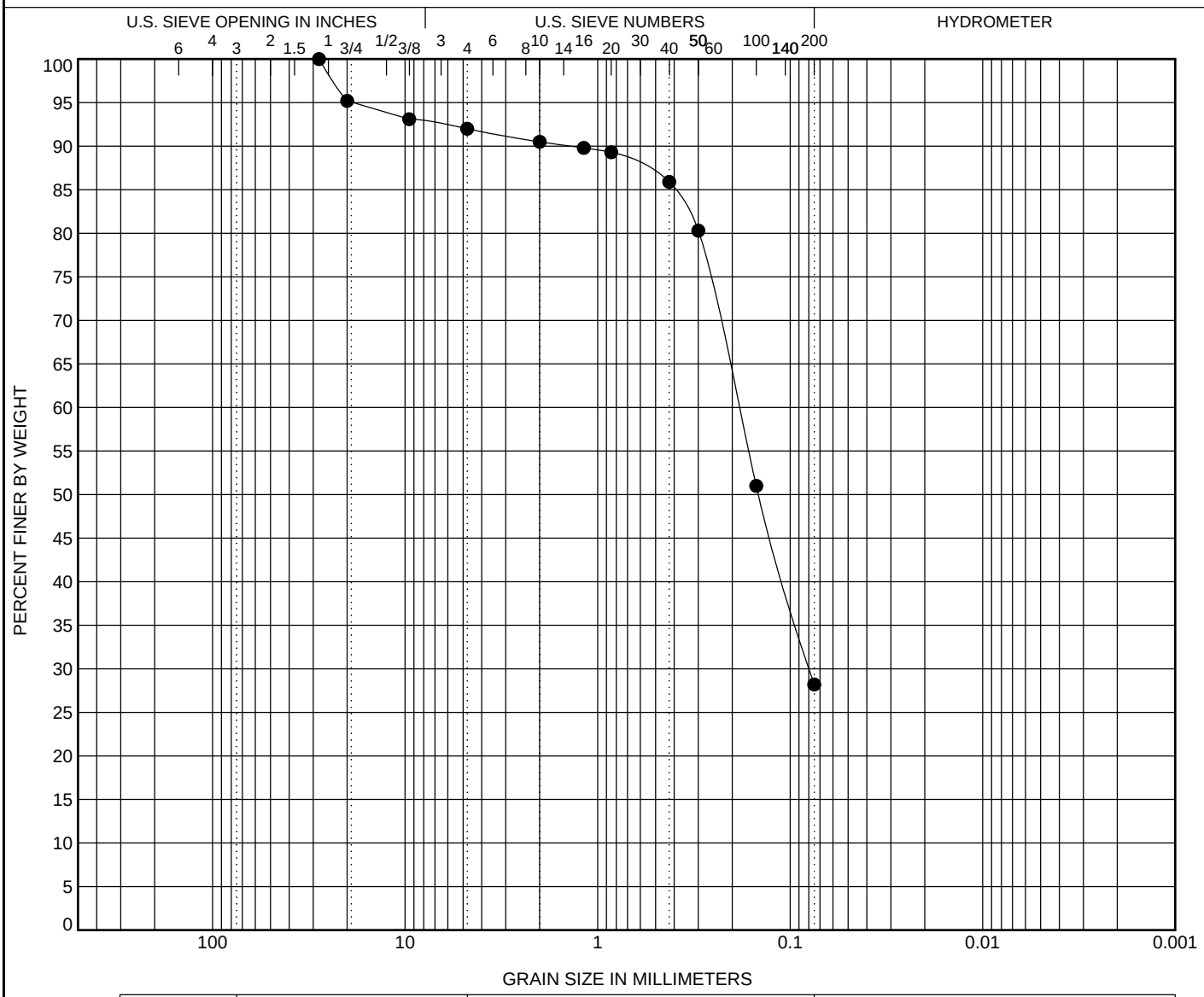
BOREHOLE TL-BH-04

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

Borehole no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
TL-BH-04	**SS-20**	**15.85 - 16.46**	**8.0**	**63.8**	**28.2**	

80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
			100.0	**95.2**	**93.1**	**92.0**	**90.5**	**89.3**	**85.9**	**80.3**	**51.0**	**28.2**

Borehole no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
TL-BH-04	Silty SAND with trace Fines	**0.2**	**0.1**		**12.3**					

GRAIN SIZE2 - BOREHOLE TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-25

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Bog Probing – Bog 7A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	27-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Northwest**	
1	604382	5876582	2.10		

Bog Probing – Bog 7B					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	27-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking West**	
2	604135	5876603	2.70		

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Bog Probing – Bog 7C					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	27-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking North**	
3	603936	5876615	0.77		
4	603890	5876619	1.10		
5	603838	5876613	0.92		

Bog Probing – Bog 8A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	27-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Southeast**	
1	597643	5879963	0.80		
2	597682	5879920	0.75		
3	597710	5879891	0.79		
4	597744	5879865	1.00		

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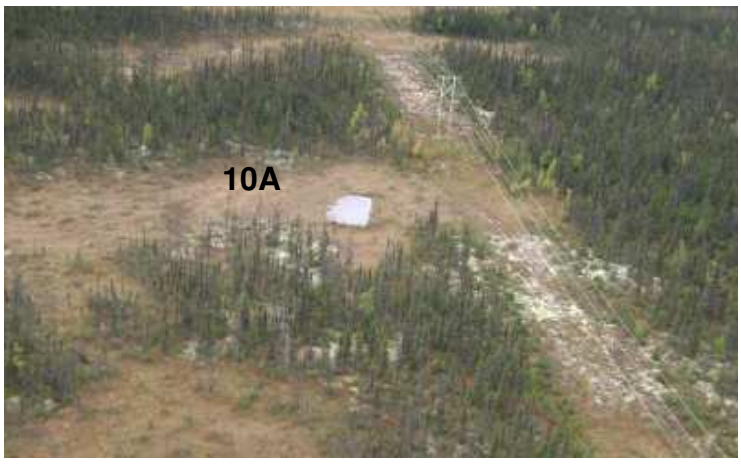
Bog Probing – Bog 9A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	27-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking West**	
1	595806	5880180	0.90		

Bog Probing – Bog 10A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	27-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking West**	
1	590392	5879410	0.47		
2	590377	5879412	0.88		

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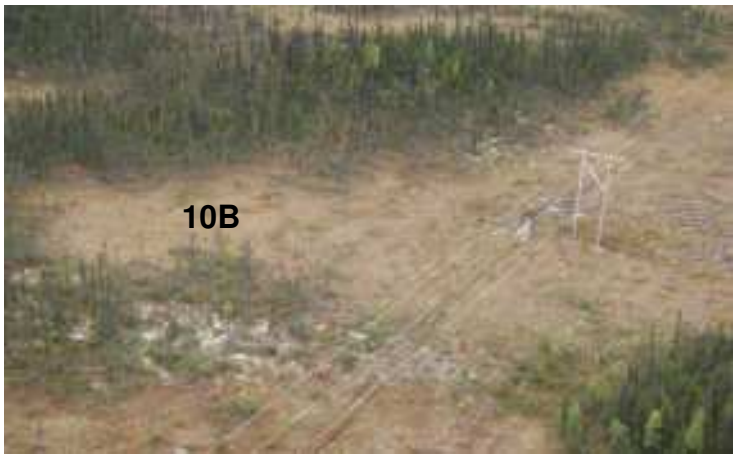
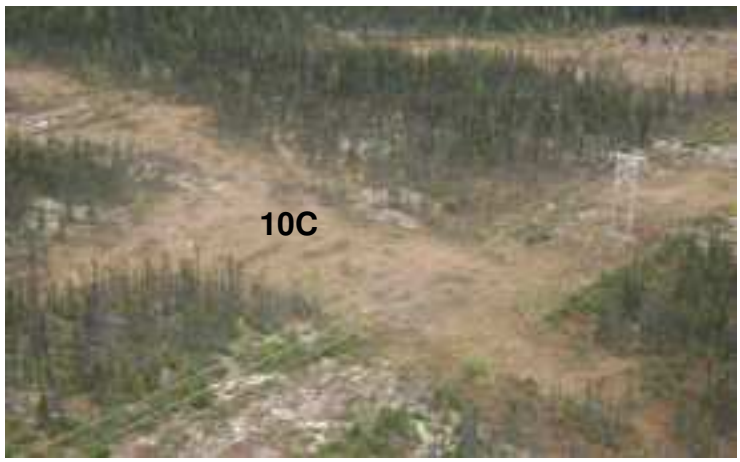
Bog Probing – Bog 10B					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	27-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Southwest**	
3	590175	5879363	0.40		
4	590150	5879360	0.37		

Bog Probing – Bog 10C					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	27-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Southwest**	
5	589767	5879308	0.43		
6	589739	5879307	0.46		

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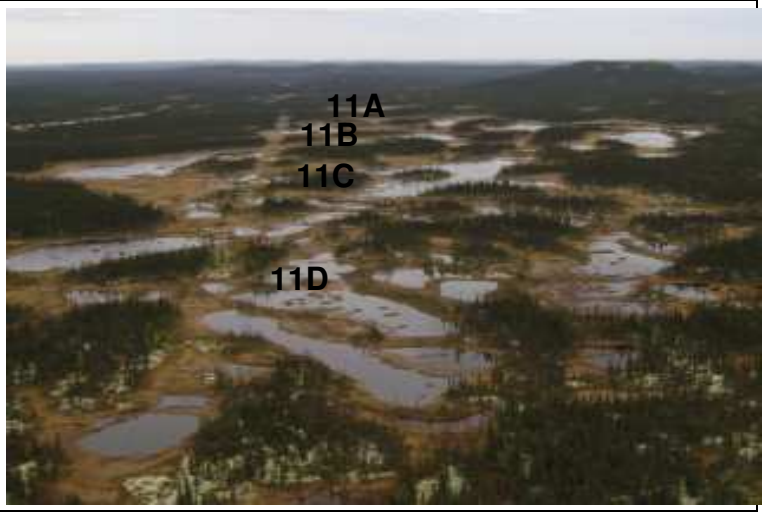
Bog Probing – Bog 10D					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	27-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Northeast**	
7	589614	5879826	0.40		
8	589581	5879274	0.40		

Bog Probing – Bog 11A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	27-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking East**	
1	581691	5880875	0.55		
2	581641	5880891	1.80		
3	581596	5880878	1.10		
4	581543	5880903	0.72		
5	581465	5880924	0.50		

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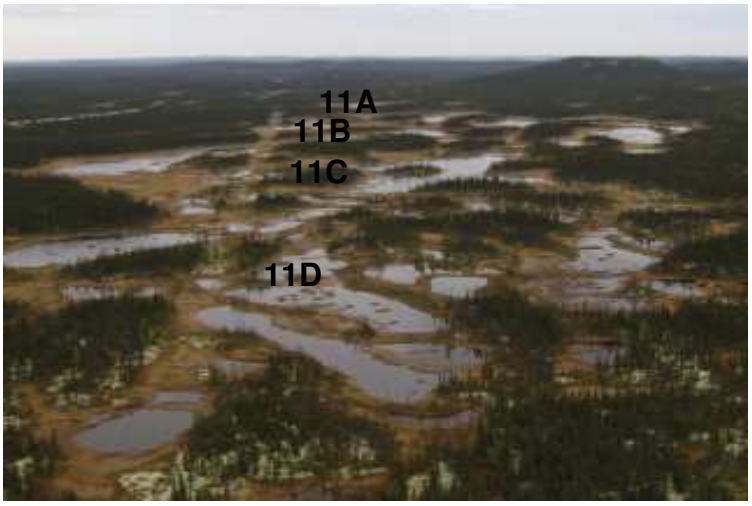
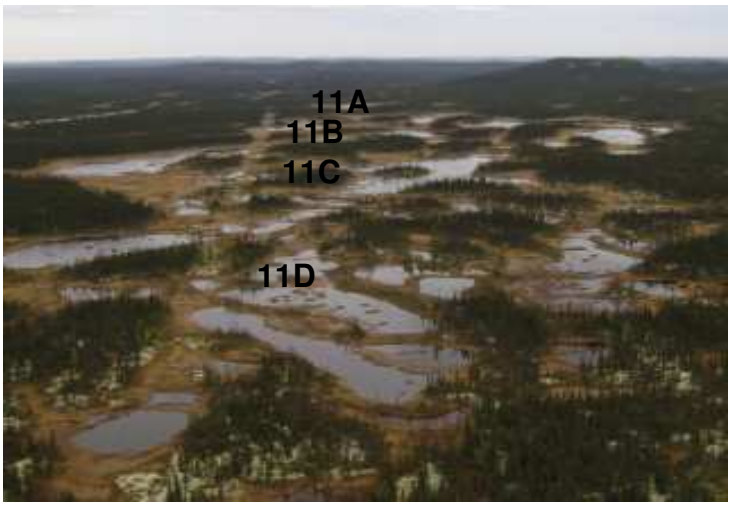
Bog Probing – Bog 11B					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	27-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking East**	
6	581217	5880969	0.41		
7	581174	5880972	0.52		
8	581127	5880988	0.40		
9	581073	5880994	0.90		
10	581026	5880993	1.00		
11	580945	5880948	0.50		
12	580886	5880889	0.66		
13	580840	5880894	0.55		

Bog Probing – Bog 11C					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	27-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking East**	
14	580740	5880906	0.43		
15	580684	5880916	1.33		
16	580615	5880915	1.05		
17	580581	5880876	0.64		

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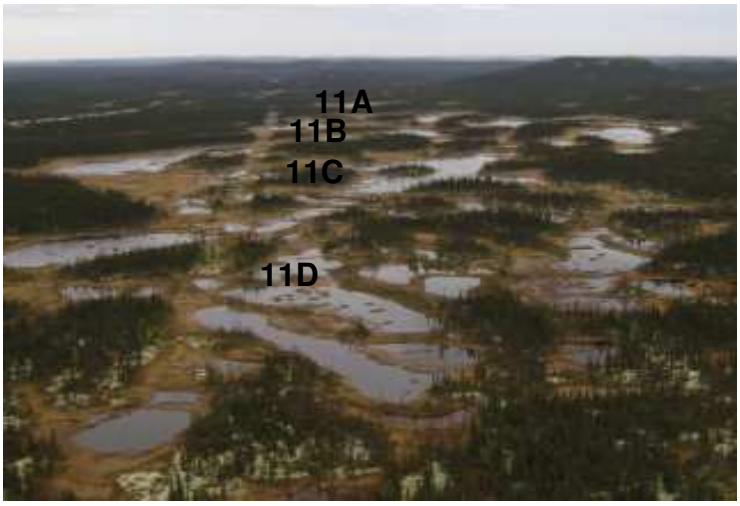
Bog Probing – Bog 11D					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	27-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking East**	
18	580402	5880860	0.56		
19	580297	5880841	0.66		
20	580228	5880826	0.83		
21	580109	5880827	1.00		
22	580043	5880789	0.56		
23	579937	5880759	0.60		
24	579883	5880744	0.87		
25	579819	5880736	1.40		
26	579720	5880742	0.70		

Bog Probing – Bog 12A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Northwest**	
1	572729	5883494	0.50		
2	572685	5883508	1.10		
3	572340	5883631	0.52		

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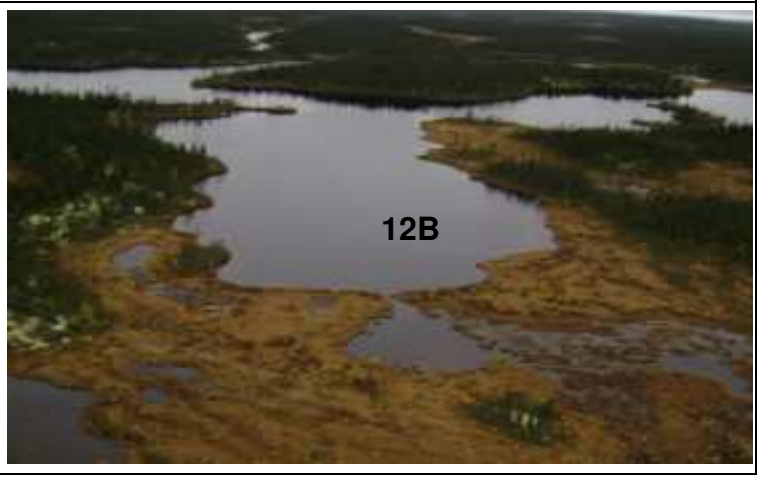
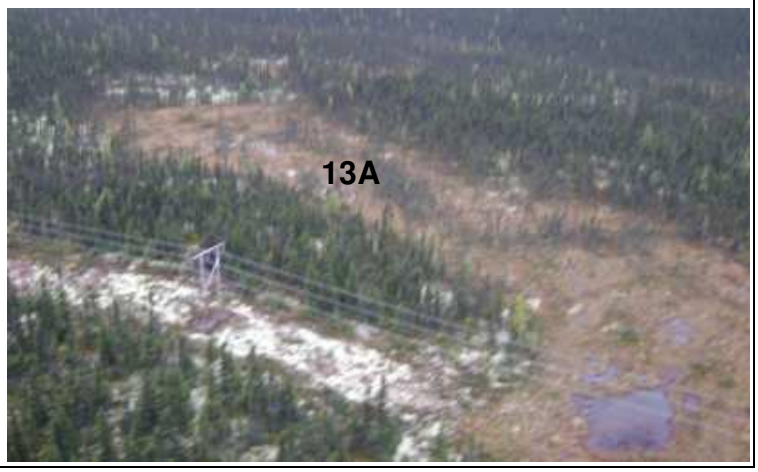
Bog Probing – Bog 12B					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Northwest**	
4	572214	5883677	0.75		
5	572107	5883691	0.76		

Bog Probing – Bog 13A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking South**	
1	569696	5884652	0.52		
2	569660	5884676	0.37		
3	569613	5884697	0.42		
4	569566	5884717	0.73		

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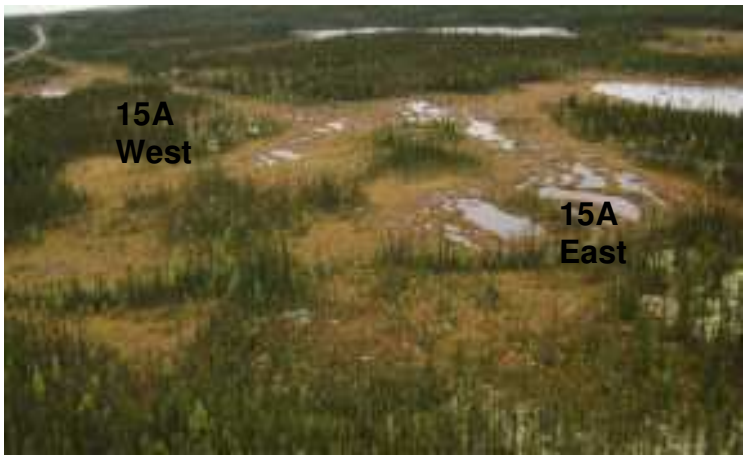
Bog Probing – Bog 14A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Southwest**	
1	563361	5887362	0.45		
2	563315	5887367	1.25		
3	563265	5887380	0.54		
4	563252	5887383	0.73		

Bog Probing – Bog 15A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Northwest**	
1	559242	5889522	0.38		
2	559219	5889537	0.45		
3	559175	5889564	0.47		
4	559127	5889576	0.40		
5	559083	5889593	0.65		

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Bog Probing – Bog 16A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Northwest**	
1	556083	5891213	1.77		
2	556048	5891233	1.20		
3	556003	5891258	1.00		
4	555923	5891252	1.12		
5	555895	5891281	0.97		
6	555858	5891292	0.55		

Bog Probing – Bog 17A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Northwest**	
1	552747	5892998	0.76		
2	552702	5893025	0.80		
3	552651	5893021	0.76		
4	552589	5893031	0.87		
5	552553	5893060	1.42		
6	552525	5893077	1.19		

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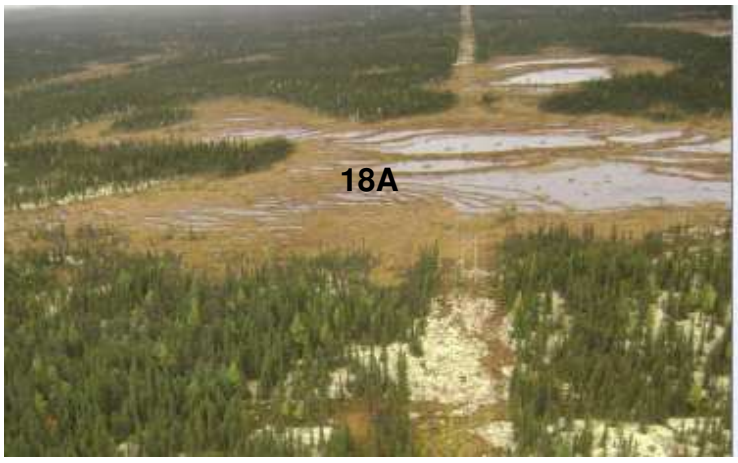
Bog Probing – Bog 18A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Northwest**	
1	552138	5893306	0.50		
2	552096	5893321	0.47		
3	552067	5893350	0.71		
4	551999	5893361	0.60		
5	551954	5893395	0.60		
6	551910	5893407	0.62		
7	551892	5893440	0.95		

Bog Probing – Bog 19A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Southwest**	
1	550767	5893959	0.50		
2	550721	5893977	1.00		
3	550678	5894002	0.72		

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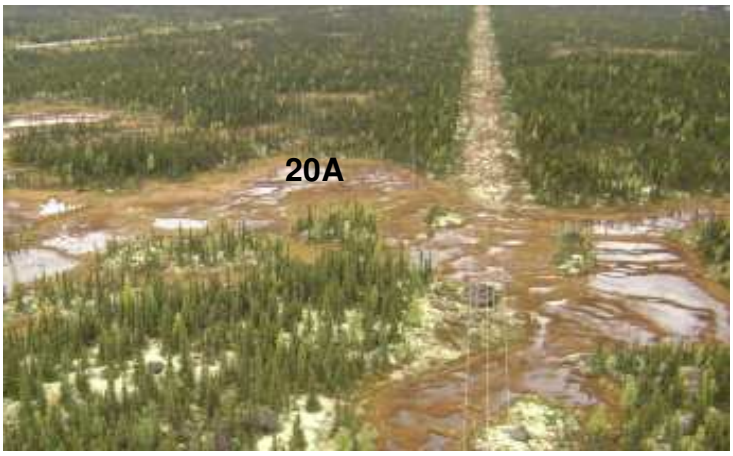
Bog Probing – Bog 20A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking West**	
1	542468	5897685	0.49		
2	542412	5897739	1.80		
3	542386	5897769	1.50		

Bog Probing – Bog 21A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Southwest**	
1	536538	5901876	0.42		
2	536511	5901906	0.63		

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Bog Probing – Bog 22A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Northwest**	
1	535846	5902601	0.76		
2	535810	5902614	0.59		
3	535762	5902649	0.81		
4	535712	5902683	0.44		
5	535656	5902691	0.75		
6	535620	5902742	0.76		

Bog Probing – Bog 23A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	01-Oct-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Northwest**	
1	534853	5903083	1.20		
2	534827	5903076	0.38		

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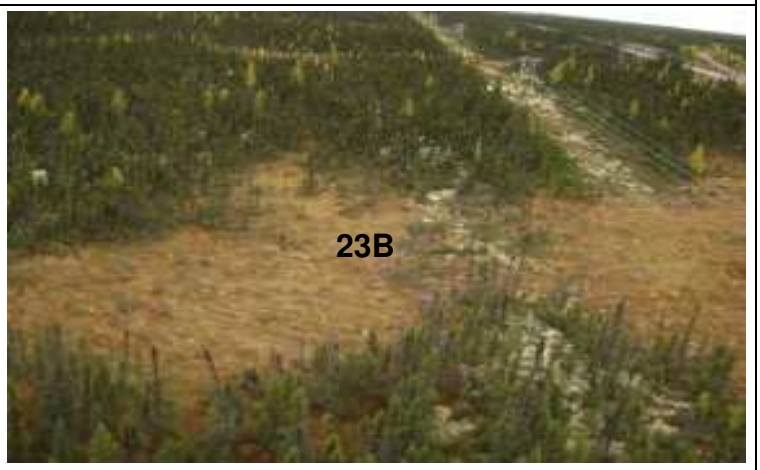
Bog Probing – Bog 23B					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	01-Oct-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Northwest**	
3	534519	5903256	0.3		

Bog Probing – Bog 24A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	01-Oct-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Northwest**	
1	534332	5903305	0.35		
2	534312	5903313	1.02		
3	534295	5903320	1.25		

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Bog Probing – Bog 24B					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	01-Oct-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Northwest**	
4	533953	5903295	0.45		
5	533966	5903344	1.13		
6	533940	5903413	1.11		

Bog Probing – Bog 25A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	01-Oct-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Northwest**	
1	533676	5903529	0.40		
2	533612	5903558	0.98		
3	533590	5903549	1.07		
4	533500	5903559	1.50		
5	533431	5903560	0.40		
6	533395	5903529	0.55		
7	533310	5903538	0.60		
8	533388	5903721	0.74		
9	533325	5903714	0.68		
10	533261	5903725	0.40		

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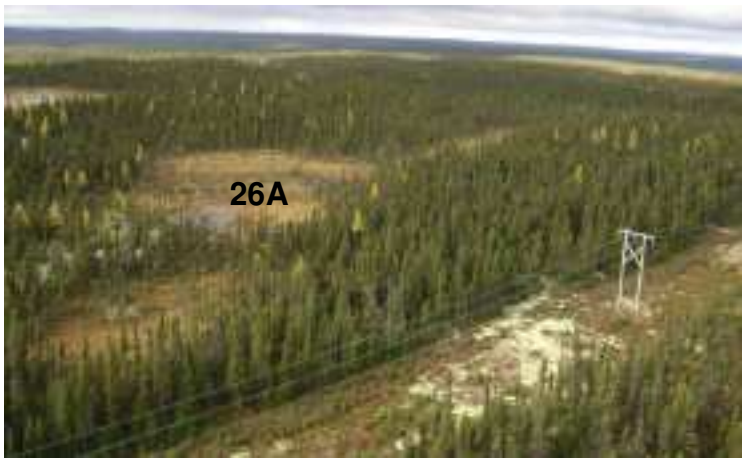
Bog Probing – Bog 25B					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	01-Oct-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking North**	
11	532970	5903905	0.42		
12	532923	5903923	0.40		
13	532856	5903949	0.76		
14	532802	5903985	0.46		
15	532746	5903967	0.56		

Bog Probing – Bog 26A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	01-Oct-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Southwest**	
1	532293	5904177	1.22		
2	532263	5904171	0.90		
3	532234	5904171	0.44		

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Bog Probing – Bog 28A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	01-Oct-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking West**	
1	530437	5904490	0.40		
2	530385	5904475	0.60		
3	530335	5904488	0.60		
4	530282	5904454	0.81		
5	530238	5904435	0.91		
6	530207	5904425	0.35		

Bog Probing – Bog 28B					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	01-Oct-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking West**	
7	529784	5904352	0.50		
8	529754	5904330	0.83		
9	529706	5904337	0.55		
10	529664	5904335	0.52		

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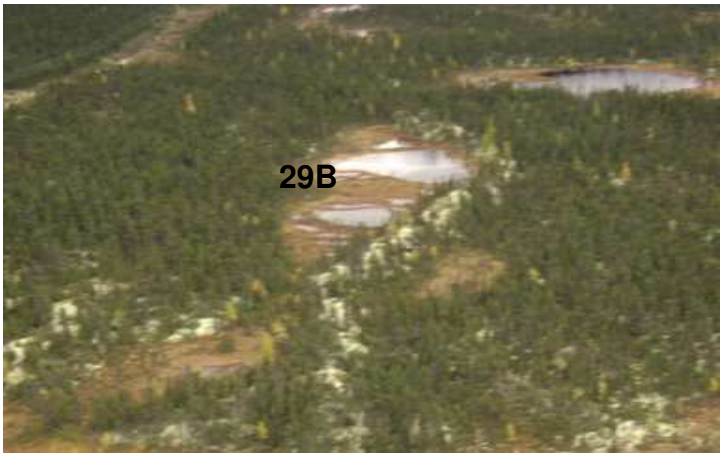
Bog Probing – Bog 29A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	01-Oct-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Northwest**	
1	527031	5904131	0.75		

Bog Probing – Bog 29B					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	01-Oct-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking East**	
2	526942	5904267	2.20		
3	526887	5904292	0.92		
4	526830	5904290	1.50		
5	526799	5904301	0.93		

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Bog Probing – Bog 29C					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	01-Oct-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking North**	
6	526698	5904352	0.85		
7	526669	5904378	2.15		

Bog Probing – Bog 30A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	01-Oct-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking West**	
1	525325	5904679	1.50		
2	525298	5904699	1.36		

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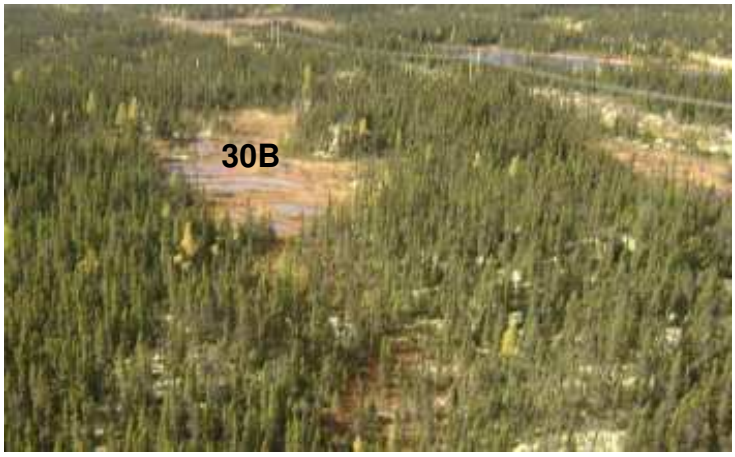
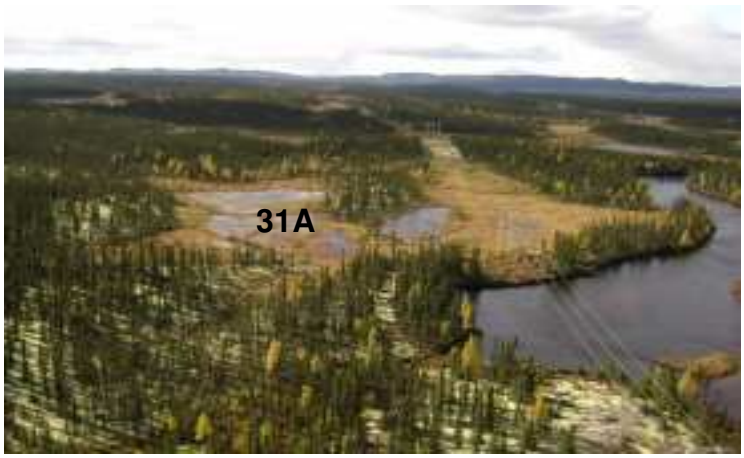
Bog Probing – Bog 30B					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	01-Oct-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Northwest**	
3	525945	5904551	1.92		
4	525911	5904555	1.65		
5	525865	5904569	1.10		
6	525826	5904595	0.62		

Bog Probing – Bog 31A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	01-Oct-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking West**	
1	518002	5905874	0.57		
2	517946	5905874	1.55		
3	517893	5905860	0.82		
4	517856	5905871	1.15		

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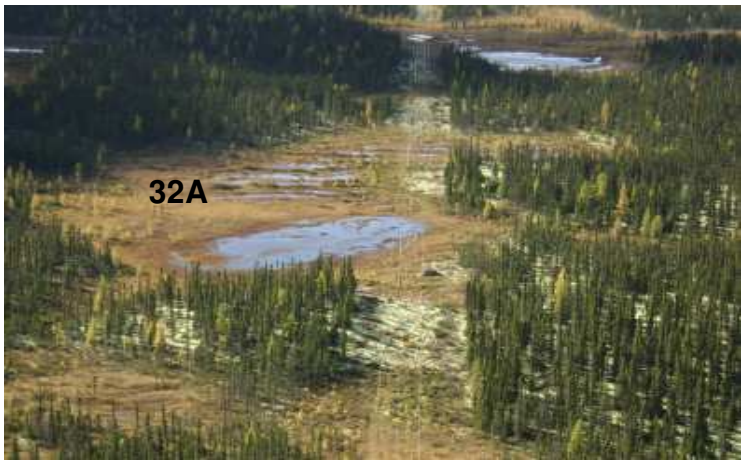
Bog Probing – Bog 31B					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	01-Oct-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Northwest**	
5	519061	5905744	0.55		
6	519003	5905748	0.50		
7	518943	5905767	0.83		
8	518918	5905774	0.72		

Bog Probing – Bog 32A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	01-Oct-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking West**	
1	517142	5905929	0.48		
2	517098	5905905	0.85		
3	517044	5905896	0.75		
4	516995	5905896	0.57		

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Bog Probing – Bog 33A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	01-Oct-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking North**	
1	516350	5905782	0.96		

Bog Probing – Bog 34A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	01-Oct-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking West**	
1	513037	5905550	0.60		
2	512979	5905532	0.56		
3	512928	5905507	0.80		

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Bog Probing – Bog 34B					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	01-Oct-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking West**	
4	513313	5905515	0.69		
5	513303	5905561	0.92		
6	51327	5905581	0.42		

Bog Probing – Bog 34C					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	01-Oct-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking West**	
7	513620	5905569	0.70		
8	513655	5905559	0.56		
9	513713	5905565	0.96		

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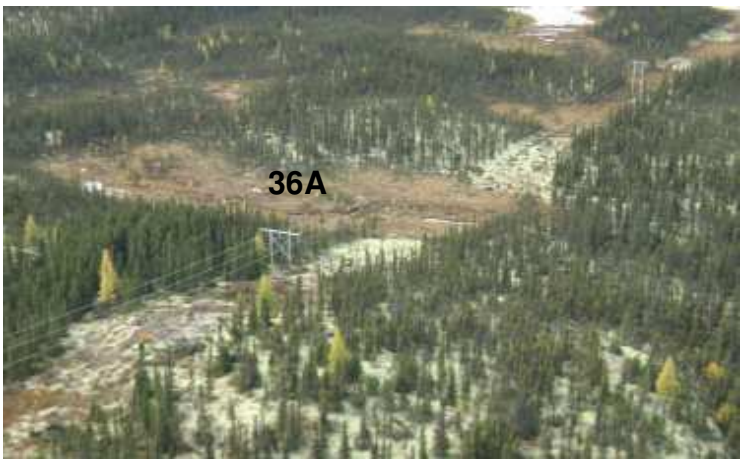
Bog Probing – Bog 35A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	01-Oct-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking West**	
1	512742	5905500	1.50		
2	512701	5905494	2.41		
3	512644	5905485	1.30		

Bog Probing – Bog 36A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	01-Oct-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Southwest**	
1	510232	5905441	0.78		
2	510194	5905453	2.00		

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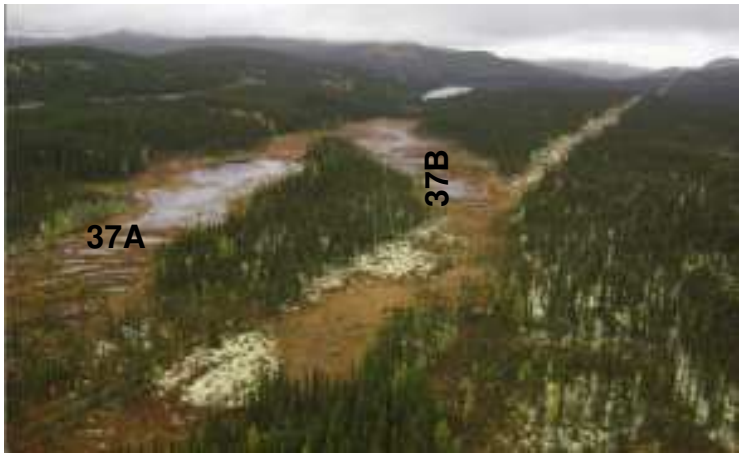
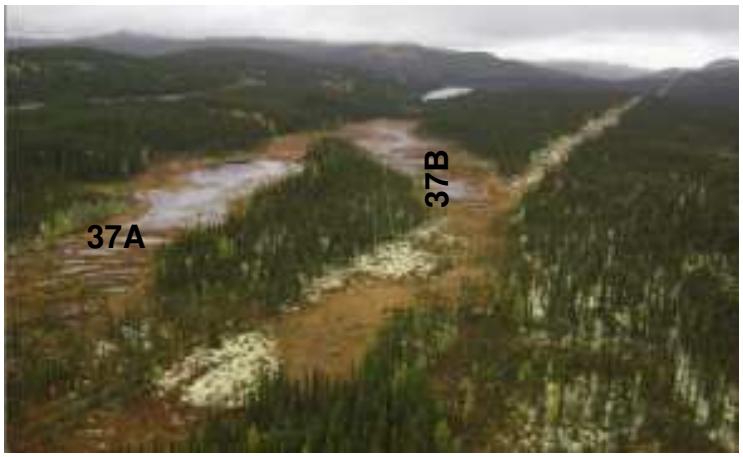
Bog Probing – Bog 37A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking West**	
1	509920	5905514	0.45		
2	509875	5905544	1.34		
3	509817	5905563	0.60		
4	509764	5905552	1.50		
5	509689	5905570	0.92		

Bog Probing – Bog 37B					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking West**	
6	509659	5905599	0.58		
7	509608	5905607	2.00		

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Bog Probing – Bog 38A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking North**	
1	501420	5908863	0.96		
2	501380	5908870	1.06		
3	501332	5908885	1.41		

Bog Probing – Bog 39A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Southeast**	
1	494197	5911314	1.24		
2	494143	5911337	1.30		
3	494086	5911371	1.61		
4	494049	5911433	0.93		
5	493983	5911478	0.76		
6	493914	5911507	1.83		

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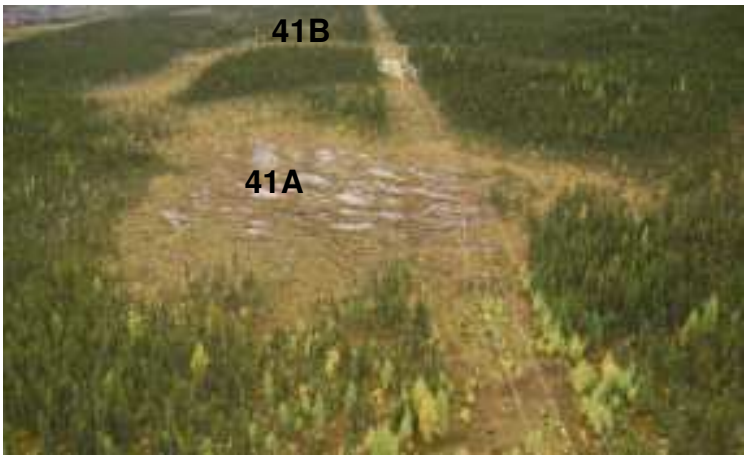
Bog Probing – Bog 40A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking East**	
1	492252	5912488	1.00		
2	492182	5912505	0.97		
3	492148	5912522	1.12		

Bog Probing – Bog 41A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking West**	
1	491621	5912882	0.70		
2	491566	5912912	0.94		
3	491508	5912934	0.70		

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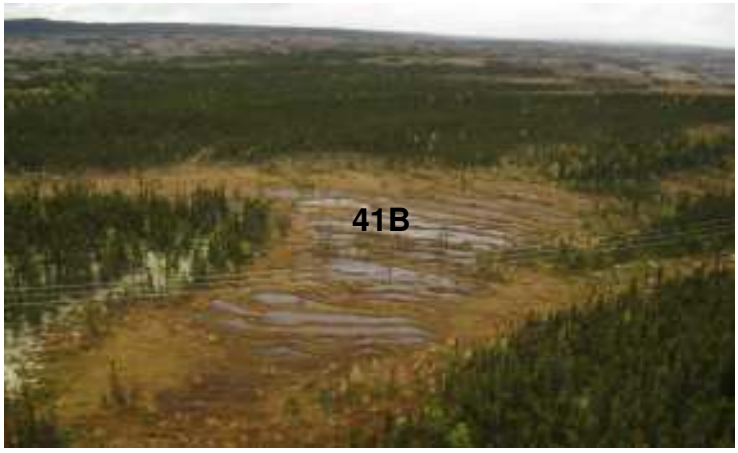
Bog Probing – Bog 41B					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking South**	
4	491248	5913036	0.50		
5	491205	5913061	0.56		

Bog Probing – Bog 42A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Northwest**	
1	476722	5920450	0.44		
2	476684	5920458	0.69		
3	476638	5920476	0.60		
4	476566	5920477	0.82		

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Bog Probing – Bog 43A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Northwest**	
1	475244	5920806	0.53		
2	475200	5920820	0.45		
3	475152	5920813	0.39		
4	475118	5920823	0.40		

Bog Probing – Bog 44A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Southwest**	
1	473329	5921195	1.48		
2	473296	5921195	1.07		
3	473235	5921191	2.20		

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Bog Probing – Bog 46A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Northwest**	
1	462206	5925004	0.67		
2	462157	5925029	0.90		
3	462102	5925022	0.51		
4	462057	5925032	1.43		
5	461989	5925028	0.66		

Bog Probing – Bog 47A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking Southwest**	
1	461185	5925378	0.50		
2	461139	5925479	0.70		
3	461081	5925483	0.60		

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Bog Probing – Bog 48A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking West**	
1	458795	5926473	0.95		
2	458739	5926423	1.16		

Bog Probing – Bog 49A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	29-Sept-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking West**	
1	453794	5927718	0.45		
2	453648	5927779	0.74		
3	453617	5927782	0.68		

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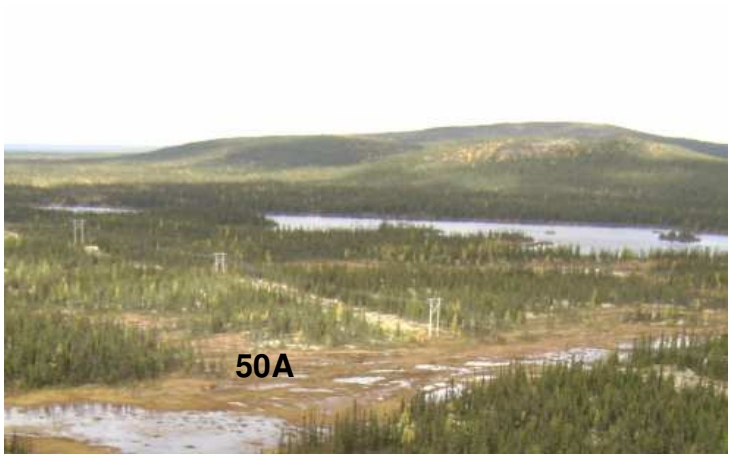
Bog Probing – Bog 50A					
Project:	Lower Churchill Project – 735kV TL - Muskrat Falls to Gull Island			**Tested By:**	Dave Oldford
Client:	Newfoundland and Labrador Hydro			**Date Test:**	01-Oct-07
Project No.:	722855				
Probe No.	**Easting**	**Northing**	**Depth Penetrated (m)**	**View Looking North**	
1	445548	5931283	0.77		
2	445489	5931308	0.97		

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ROCK ANCHOR PULLOUT TEST RECORD

Field Investigation and Construction Requirements 735 kV Transmission Line – Gull Island to Churchill Falls

WTO	AC 1030 (Gull to Churchill TL)	**TEST ID**		AC1030-PO-1	
DATE	18 Sept 2007	**START**	13:30	**FINISH**	15:20

TEST LOCATION			
Northing	5880030	**Easting**	585529
• Location marked with Garmin recreational grade GPS: S/N 36115779 (WPT No. 37) • Test conducted on rock out-crop, ~ 50 m south of TLH and ~ 50 m east of Bob's Brook.			

ROCK CONDITION OBSERVATIONS
• Rock out-crop predominated by fractured granite (rock sample collected for geological confirmation). • Difficult drilling from 0.0 m to 1.2 m (slightly fractured). • Hardest drilling from 1.2 m to 1.5 m. • Easier drilling from 1.5 m to 1.6 m (moderately fractured). • Steady seep of water in hole at 1.5 m.

PULL-OUT TEST RESULTS

TIME		**Applied Load (Tons)**	**Jack Rise (cm)**	**Notes**
From	**To**			
15:03	15:05	0 – 0.5	5.2	• Anchor setting into rock
15:05	15:06	3	nil	• Held at 3 Tons.
15:06	15:07	6	nil	• Increased load to 6 Tons with 3 pumps of jack. • Held at 6 Tons.
15:07	15:08	10	nil	• Increased load to 6 Tons with 2.5 pumps of jack. • Held at 10 Tons.
15:08	15:09	15	nil	• Increased load to 6 Tons with 2.25 pumps of jack. • Held at 10 Tons.
15:09	15:11	18	nil	• Increased load to 18 Tons with 2 pumps of jack. • Held at 18 Tons (start of pump overload). • End of Test

PHOTOS

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ROCK ANCHOR PULLOUT TEST RECORD

Field Investigation and Construction Requirements 735 kV Transmission Line – Gull Island to Churchill Falls

WTO	AC 1030 (Gull to Churchill TL)	**TEST ID**		AC1030-PO-2	
DATE	19 Sept 2007	**START**	10:00	**FINISH**	12:00

TEST LOCATION			
Northing	5880966	**Easting**	583676
• Location marked with Garmin recreational grade GPS: S/N 36115779 (WPT No. 38) • Test conducted on rock out-crop, ~ 20 m south of TLH.			

ROCK CONDITION OBSERVATIONS
• Rock out-crop predominated by granite (rock sample collected for geological confirmation). • Easy drilling from 0.0 m to 1.8 m. • No water in hole.

PULL-OUT TEST RESULTS				
TIME		**Applied Load (Tons)**	**Jack Rise (cm)**	**Notes**
From	**To**			
11:00	11:01	0 – 3.5	5.8	• Anchor setting into rock
11:01	11:02	5	nil	• Held at 5 Tons.
11:02	11:03	10	nil	• Increased load to 10 Tons with 4 pumps of jack. • Held at 10 Tons.
11:03	11:04	15	nil	• Increased load to 15 Tons with 3 pumps of jack. • Held at 15 Tons.
11:04	11:05	18	nil	• Increased load to 18 Tons with 1.5 pumps of jack. • Held at 18 Tons (start of pump overload). • End of Test

PHOTOS	
No Photo Available	No Photo Available

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ROCK ANCHOR PULLOUT TEST RECORD

Field Investigation and Construction Requirements 735 kV Transmission Line – Gull Island to Churchill Falls

WTO	AC 1030 (Gull to Churchill TL)	**TEST ID**		AC1030-PO-3	
DATE	19 Sept 2007	**START**	12:30	**FINISH**	14:30

TEST LOCATION			
Northing	5885200	**Easting**	570033
• Location marked with Garmin recreational grade GPS: S/N 36115779 (WPT No. 39) • Test conducted on rock out-crop, ~ 50 m north of TLH.			

ROCK CONDITION OBSERVATIONS

- Rock out-crop predominated by granite (rock sample collected for geological confirmation).
- Easy drilling from 0.0 m to 1.5 m.
- Difficult drilling from 1.5 m to 1.8 m.
- No water in hole.

PULL-OUT TEST RESULTS

TIME		Applied Load (Tons)	Jack Rise (cm)	Notes
From	To			
14:00	14:01	0 – 3	5.6	• Anchor setting into rock
14:01	14:02	5	nil	• Held at 5 Tons.
14:02	14:03	10	nil	• Increased load to 10 Tons with 5 pumps of jack. • Held at 10 Tons.
14:03	14:04	15	nil	• Increased load to 15 Tons with 4 pumps of jack. • Held at 15 Tons.
14:04	14:05	18	nil	• Increased load to 18 Tons with 2 pumps of jack. • Held at 18 Tons (start of pump overload). • End of Test

PHOTOS

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ROCK ANCHOR PULLOUT TEST RECORD

Field Investigation and Construction Requirements 735 kV Transmission Line – Gull Island to Churchill Falls

WTO	AC 1030 (Gull to Churchill TL)	**TEST ID**		AC1030-PO-4	
DATE	19 Sept 2007	**START**	15:00	**FINISH**	16:45

TEST LOCATION			
Northing	5886911	**Easting**	564035
• Location marked with Garmin recreational grade GPS: S/N 36115779 (WPT No. 40) • Test conducted on rock out-crop, ~ 10 m north of TLH.			

ROCK CONDITION OBSERVATIONS
• Rock out-crop predominated by granite (rock sample collected for geological confirmation). • Easy drilling from 0.0 m to 1.8 m. • No water in hole.

PULL-OUT TEST RESULTS				
TIME		**Applied Load (Tons)**	**Jack Rise (cm)**	**Notes**
From	**To**			
16:15	16:16	0 – 2.5	5.6	• Anchor setting into rock
16:16	16:17	5	nil	• Held at 5 Tons.
16:17	16:18	10	nil	• Increased load to 10 Tons with 2.5 pumps of jack. • Held at 10 Tons.
16:18	16:19	15	nil	• Increased load to 15 Tons with 3 pumps of jack. • Held at 15 Tons.
16:19	16:20	18	nil	• Increased load to 18 Tons with 2 pumps of jack. • Held at 18 Tons (start of pump overload). • End of Test

PHOTOS

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ROCK ANCHOR PULLOUT TEST RECORD

Field Investigation and Construction Requirements 735 kV Transmission Line – Gull Island to Churchill Falls

WTO	AC 1030 (Gull to Churchill TL)	**TEST ID**		AC1030-PO-5	
DATE	20 Sept 2007	**START**	09:00	**FINISH**	10:30

TEST LOCATION			
Northing	5890823	**Easting**	557572
• Location marked with Garmin recreational grade GPS: S/N 36115779 (WPT No. 41) • Test conducted on rock out-crop, ~ 10 m north of TLH.			

ROCK CONDITION OBSERVATIONS

- Rock out-crop predominated by fractured granite (rock sample collected for geological confirmation).
- Easy drilling from 0.0 m to 1.8 m.
- No water in hole.
- The anchor slipped in the hole probably due to a dust build up in the hole.

PULL-OUT TEST RESULTS

TIME		Applied Load (Tons)	Jack Rise (cm)	Notes
From	To			
10:00	10:01	0 – 6	3.2	• Anchor setting into rock
10:01	10:02	6	nil	• Held at 6 Tons.
10:02	10:03	10	4.5	• Increased load to 10 Tons with 10 pumps of jack. • Slipped back to 9 Tons.
10:03	10:04	16	5.5	• Increased load to 16 Tons with 16 pumps of jack. • Held at 16 Tons.
10:04	10:05	18	nil	• Increased load to 18 Tons with 1.5 pumps of jack. • Held at 18 Tons (start of pump overload). • End of Test

PHOTOS

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ROCK ANCHOR PULLOUT TEST RECORD

Field Investigation and Construction Requirements 735 kV Transmission Line – Gull Island to Churchill Falls

WTO	AC 1030 (Gull to Churchill TL)	**TEST ID**		AC1030-PO-6	
DATE	20 Sept 2007	**START**	10:45	**FINISH**	12:30

TEST LOCATION			
Northing	5895769	**Easting**	547439
• Location marked with Garmin recreational grade GPS: S/N 36115779 (WPT No. 42) • Test conducted on rock out-crop, ~ 60 m south of TLH.			

ROCK CONDITION OBSERVATIONS

- Rock out-crop predominated by granite (rock sample collected for geological confirmation).
- Easy drilling from 0.0 m to 1.8 m.
- No water in hole.

PULL-OUT TEST RESULTS

TIME		Applied Load (Tons)	Jack Rise (cm)	Notes
From	To			
12:00	12:01	0 – 4	5.3	• Anchor setting into rock
12:01	12:02	7	nil	• Held at 7 Tons.
12:02	12:03	11	nil	• Increased load to 11 Tons with 2 pumps of jack. • Held at 11 Tons.
12:03	12:04	15	nil	• Increased load to 15 Tons with 2 pumps of jack. • Held at 15 Tons.
12:04	12:05	18	nil	• Increased load to 18 Tons with 2 pumps of jack. • Held at 18 Tons (start of pump overload). • End of Test

PHOTOS

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ROCK ANCHOR PULLOUT TEST RECORD

Field Investigation and Construction Requirements 735 kV Transmission Line – Gull Island to Churchill Falls

WTO	AC 1030 (Gull to Churchill TL)	**TEST ID**		AC1030-PO-7	
DATE	20 Sept 2007	**START**	13:30	**FINISH**	15:00

TEST LOCATION			
Northing	5904757	**Easting**	531388
• Location marked with Garmin recreational grade GPS: S/N 36115779 (WPT No. 43) • Test conducted on rock out-crop, ~ 20 m north of TLH.			

ROCK CONDITION OBSERVATIONS

- Rock out-crop predominated by granite (rock sample collected for geological confirmation).
- Difficult drilling from 0.0 m to 1.8 m.
- Very hard rock.
- No water in hole.

PULL-OUT TEST RESULTS

TIME		Applied Load (Tons)	Jack Rise (cm)	Notes
From	To			
14:30	14:31	0 – 2	5.6	• Anchor setting into rock
14:31	14:32	6	nil	• Held at 6 Tons.
14:32	14:33	10.5	nil	• Increased load to 10.5 Tons with 2 pumps of jack. • Held at 10.5 Tons.
14:33	14:34	15	nil	• Increased load to 15 Tons with 2.5 pumps of jack. • Held at 15 Tons.
14:34	14:35	18	nil	• Increased load to 18 Tons with 1.5 pumps of jack. • Held at 18 Tons (start of pump overload). • End of Test

PHOTOS

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ROCK ANCHOR PULLOUT TEST RECORD

Field Investigation and Construction Requirements 735 kV Transmission Line – Gull Island to Churchill Falls

WTO	AC 1030 (Gull to Churchill TL)	**TEST ID**		AC1030-PO-8	
DATE	20 Sept 2007	**START**	15:30	**FINISH**	16:45

TEST LOCATION			
Northing	5909127	**Easting**	501454
• Location marked with Garmin recreational grade GPS: S/N 36115779 (WPT No. 43) • Test conducted on rock out-crop, ~ 10 m north of TLH.			

ROCK CONDITION OBSERVATIONS

- Rock out-crop predominated by granite (rock sample collected for geological confirmation).
- Easy drilling from 0.0 m to 1.8 m.
- Fractured rock for first 15 cm.
- Soft rock at 1.2 m depth for approximately 20 cm.
- Water in hole at 1.2 m depth.

PULL-OUT TEST RESULTS

TIME		Applied Load (Tons)	Jack Rise (cm)	Notes
From	To			
16:30	16:31	0 – 2.5	5.5	• Anchor setting into rock
16:31	16:32	6	nil	• Held at 6 Tons.
16:32	16:33	10	nil	• Increased load to 10 Tons with 2 pumps of jack. • Held at 10 Tons.
16:33	16:34	15	nil	• Increased load to 15 Tons with 2.5 pumps of jack. • Held at 15 Tons.
16:34	16:35	18	nil	• Increased load to 18 Tons with 2 pumps of jack. • Held at 18 Tons (start of pump overload). • End of Test

PHOTOS

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ROCK ANCHOR PULLOUT TEST RECORD

Field Investigation and Construction Requirements 735 kV Transmission Line – Gull Island to Churchill Falls

WTO	AC 1030 (Gull to Churchill TL)	**TEST ID**		AC1030-PO-9	
DATE	22 Sept 2007	**START**	11:15	**FINISH**	13:15

TEST LOCATION			
Northing	5910567	**Easting**	498350
• Location marked with Garmin recreational grade GPS: S/N 36115779 (WPT No. 48 • Test conducted on rock out-crop on north side of Trans Labrador Highway.			

ROCK CONDITION OBSERVATIONS

- Rock out-crop predominated by quartzite with frequent mica seams. Gneiss and granite at west and east ends of outcrop.
- Quartzite highly weathered along blast face, however, granite and gneiss materials appear unweathered. Sample collected for geological confirmation.
- Difficult drilling from 0.0 m to 1.8 m, with soft zones (typically 25 to 50 mm) at 0.3 m, 0.7 m and 0.9 m.
- Hardest drilling from 1.2 m to 1.5 m.
- No seepage encountered.

PULL-OUT TEST RESULTS

TIME		Applied Load (Tons)	Jack Rise (cm)	Notes
From	To			
12:59	13:00	0	5.4	• Anchor setting into rock
13:00	13:01	3	nil	• Held at 3 Tons.
13:01	13:02	6	nil	• Increased load to 6 Tons with 3 pumps of jack. • Held at 6 Tons.
13:02	13:03	10	nil	• Increased load with 3 pumps of jack. • Held at 10 Tons.
13:03	13:04	15	nil	• Increased load with 4 pumps of jack. • Held at 15 Tons.
13:04	13:05	18	nil	• Increased load to 18 Tons with 2.5 pumps of jack. • Held at 18 Tons (start of pump overload). • End of Test

PHOTOS

NOTE: Old borehole found at base of rock cut on south side of TLH, across from pull out test (N 5910538 E 498329)

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ROCK ANCHOR PULLOUT TEST RECORD

Field Investigation and Construction Requirements 735 kV Transmission Line – Gull Island to Churchill Falls

WTO	AC 1030 (Gull to Churchill TL)	**TEST ID**		AC1030-PO-10	
DATE	21 Sept 2007	**START**	14:20	**FINISH**	15:20

TEST LOCATION			
Northing	5929506	**Easting**	448425
• Location marked with Garmin recreational grade GPS: S/N 36115779 (WPT No. 47). • Test conducted on bedrock outcrop at southeast bank of East Mitchum River.			

ROCK CONDITION OBSERVATIONS
• Fairly hard drilling from 0.0 m to 1.8 m. • Seepage encountered at 1.4 m.

PULL-OUT TEST RESULTS				
TIME (sec)		**Applied Load (Tons)**	**Jack Rise (cm)**	**Notes**
From	**To**			
0	30	0 - 5	1.8	• Anchor setting into rock
30	60	10	2.2	• Increased load with 5 pumps of jack. • Held at 10 Tons.
60	90	15	2.7	• Increased with 8 pumps of jack. • Fell back to 13 Tons.
90	1200	18	3.2	• Increased load with 9 pumps of jack. • Fell back to 17.5 Tons (at pump overload). • End of Test .

PHOTOS

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ROCK ANCHOR PULLOUT TEST RECORD

Field Investigation and Construction Requirements 735 kV Transmission Line – Gull Island to Churchill Falls

WTO	AC 1030 (Gull to Churchill TL)	**TEST ID**		AC1030-PO-11	
DATE	21 Sept 2007	**START**	13:00	**FINISH**	14:00

TEST LOCATION			
Northing	5923187	**Easting**	463869
• Location marked with Garmin recreational grade GPS: S/N 36115779 (WPT No. 45). • Located at rock outcrop off Trans Labrador Highway, approximately 1 km east of Ozzie's Brook.			

ROCK CONDITION OBSERVATIONS
• Fairly easy drilling from 0.0 m to 1.8 m. • No seepage encountered.

PULL-OUT TEST RESULTS				
TIME (sec)		**Applied Load (Tons)**	**Jack Rise (cm)**	**Notes**
From	**To**			
0	30	0 – 5	5.6	• Anchor setting into rock
30	60	10	nil	• Increased load with 2 pumps of jack. • Held at 10 Tons.
60	90	15	nil	• Increased load with 2.5 pumps of jack. • Held at 15 tons.
90	120	18	nil	• Increased load with 1.5 pumps of jack. • Held at 18 Tons (start of pump overload). • End of Test .

PHOTOS

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ROCK ANCHOR PULLOUT TEST RECORD

Field Investigation and Construction Requirements 735 kV Transmission Line – Gull Island to Churchill Falls

WTO	AC 1030 (Gull to Churchill TL)	**TEST ID**		AC1030-PO-12	
DATE	21 Sept 2007	**START**	10:30	**FINISH**	12:45

TEST LOCATION			
Northing	5929506	**Easting**	448425
• Location marked with Garmin recreational grade GPS: S/N 36115779 (WPT No. 45).			

ROCK CONDITION OBSERVATIONS
• Hard drilling from 0.0 m to 1.8 m. • No seepage encountered.

PULL-OUT TEST RESULTS

TIME (sec)		**Applied Load (Tons)**	**Jack Rise (cm)**	**Notes**
From	**To**			
0	30	4	5.6	• Anchor setting into rock
30	60	8	nil	• Held at 8 Tons.
60	90	15	5.7	• Increased load to 15 Tons with 3.5 pumps of jack. • Fell back to 7.5 Tons.
90	1200	18	nil	• Increased load with 3 pumps of jack. • Held at 18 Tons (start of pump overload). • End of Test .

PHOTOS

MOISTURE DENSITY RELATIONSHIP

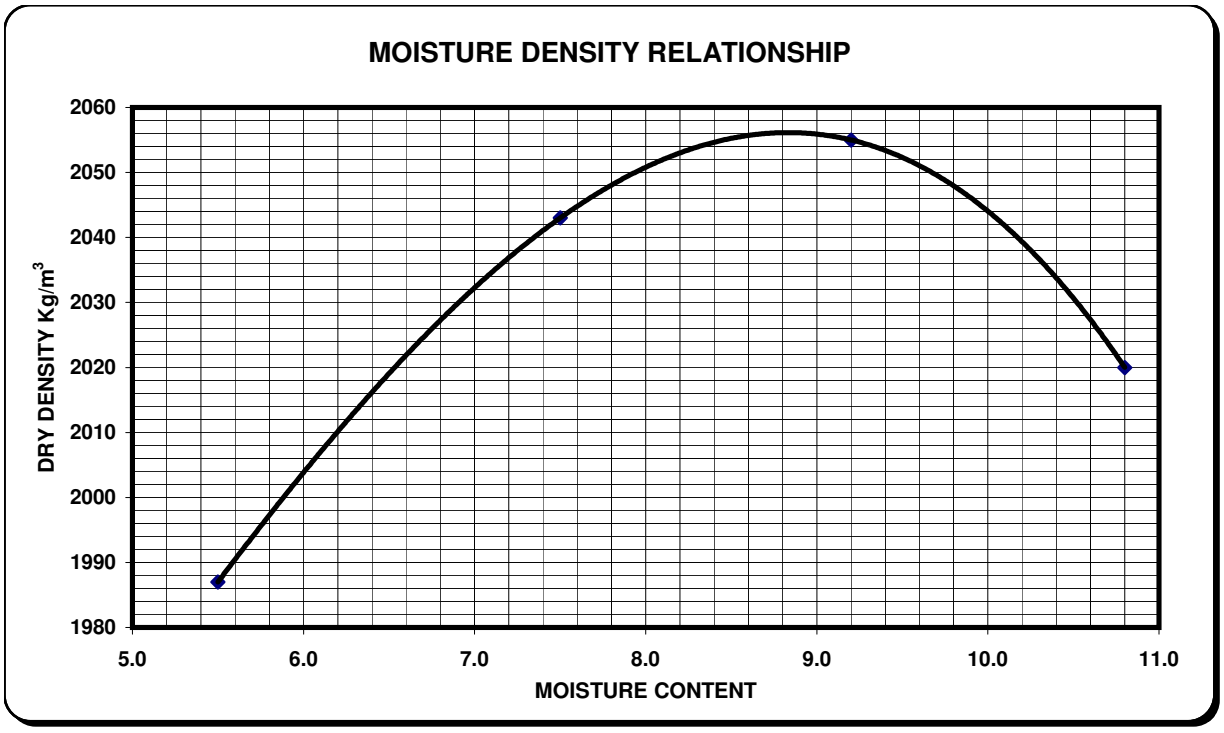
SNC·LAVALIN

Lab No: 713

Client:	Newfoundland and Labrador Hydro		
Project No:	722855		
Project:	AC1030 TL Gull Island to Churchill Falls		
Sample #	AC1030-TL-PR-01		
Location	N 5880124 E 0594735		
Sample Type / Source:	Gravelly Sand from TLH cut through esker - taken 1.5 m below top of esker		
Date Sampled:	September 28, 2007	**Sampled By**	Dwayne Druggett
Date Received:	September 28, 2007	**Preparation**	Moist

Percent Retained:	> 19mm = 20.4%

Compaction Std.	ASTM D698		**Method**	C
Moisture Content	5.5	7.5	9.2	10.8
Dry Density kg/m^3	1987	2043	2055	2020



Note : Oversized Material Correction > 19mm = 20.4%

Maximum Dry Density	2056 kg/m3	**Corrected Dry Density**	2128.6 kg/m3
Maximum Moisture	8.8 %	**Corrected Moisture**	7.3 %

Tested by, Ken Collier **Reviewed by,** _____

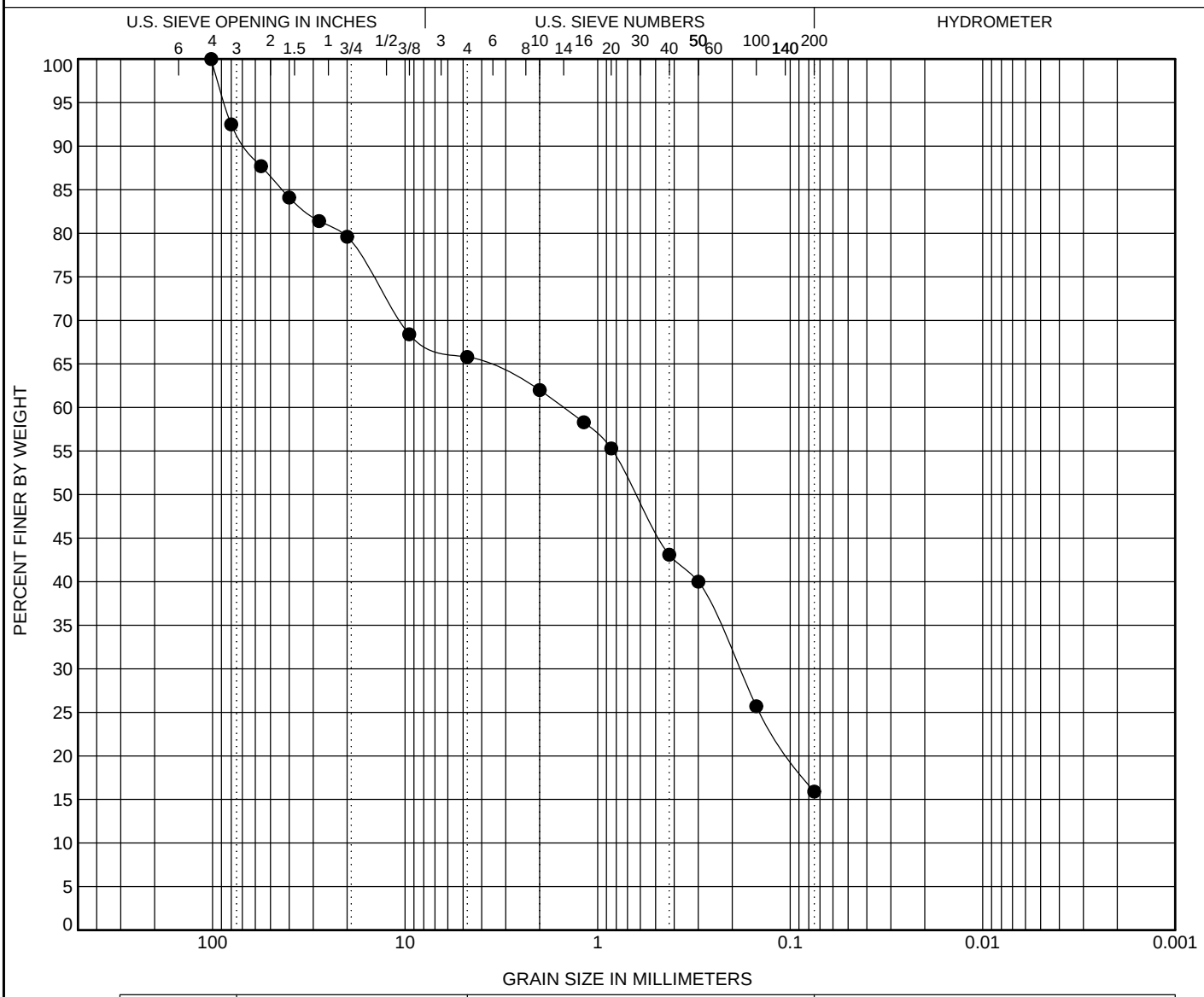
SNC·LAVALIN

TEST PIT TL-PR-01

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
TL-PR-01	**GB-1**	**0.00 - 0.00**	**25.8**	**49.9**	**15.9**	

80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
92.5	**87.7**	**84.1**	**81.4**	**79.6**	**68.4**	**65.8**	**62.0**	**55.3**	**43.1**	**40.0**	**25.7**	**15.9**

Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
TL-PR-01	Gravelly SAND with some Fines, trace Cobbles	**1.5**	**0.2**		**5.0**					

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

MOISTURE DENSITY RELATIONSHIP

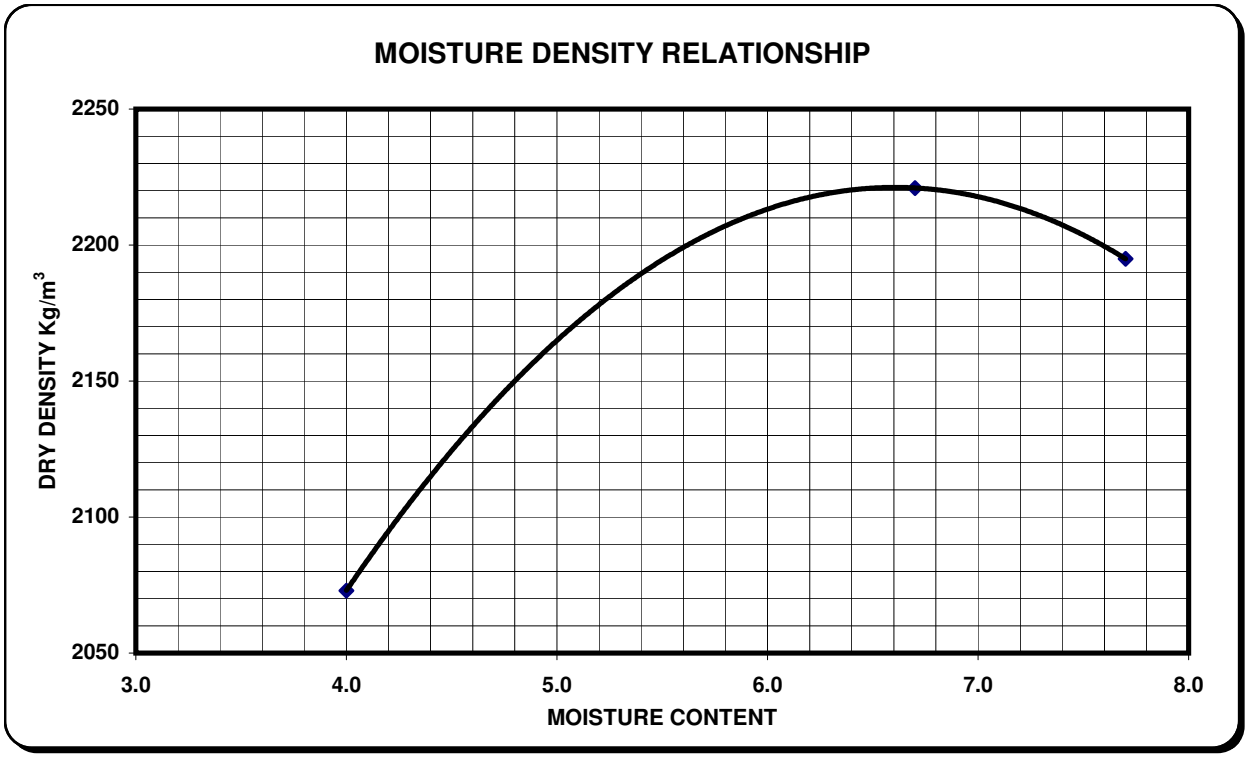
SNC·LAVALIN

Lab No: 714

Client:	Newfoundland and Labrador Hydro		
Project No:	722855		
Project:	AC1030 TL Gull Island to Churchill Falls		
Sample #	AC1030-TL-PR-02		
Location	N 5886923 E 0564234		
Sample Type / Source:	Till(Sand/Gravel) from TLH cut through esker - taken 1.5 m below top of esker		
Date Sampled:	September 30, 2007	**Sampled By**	Dwayne Druggett
Date Received:	September 30, 2007	**Preparation**	Moist

Percent Retained:	> 19mm = 44.3%

Compaction Std.	**ASTM D698**		**Method**	**C**
Moisture Content	4.0	6.7	7.7	
Dry Density kg/m^3	2073	2221	2195	



Note : Oversized Material Correction > 19mm = 44.3%

Maximum Dry Density	2230.0 kg/m3	**Corrected Dry Density**	2310.6 kg/m3
Maximum Moisture	6.0 %	**Corrected Moisture**	4.0 %

Tested by, Ken Collier **Reviewed by,**

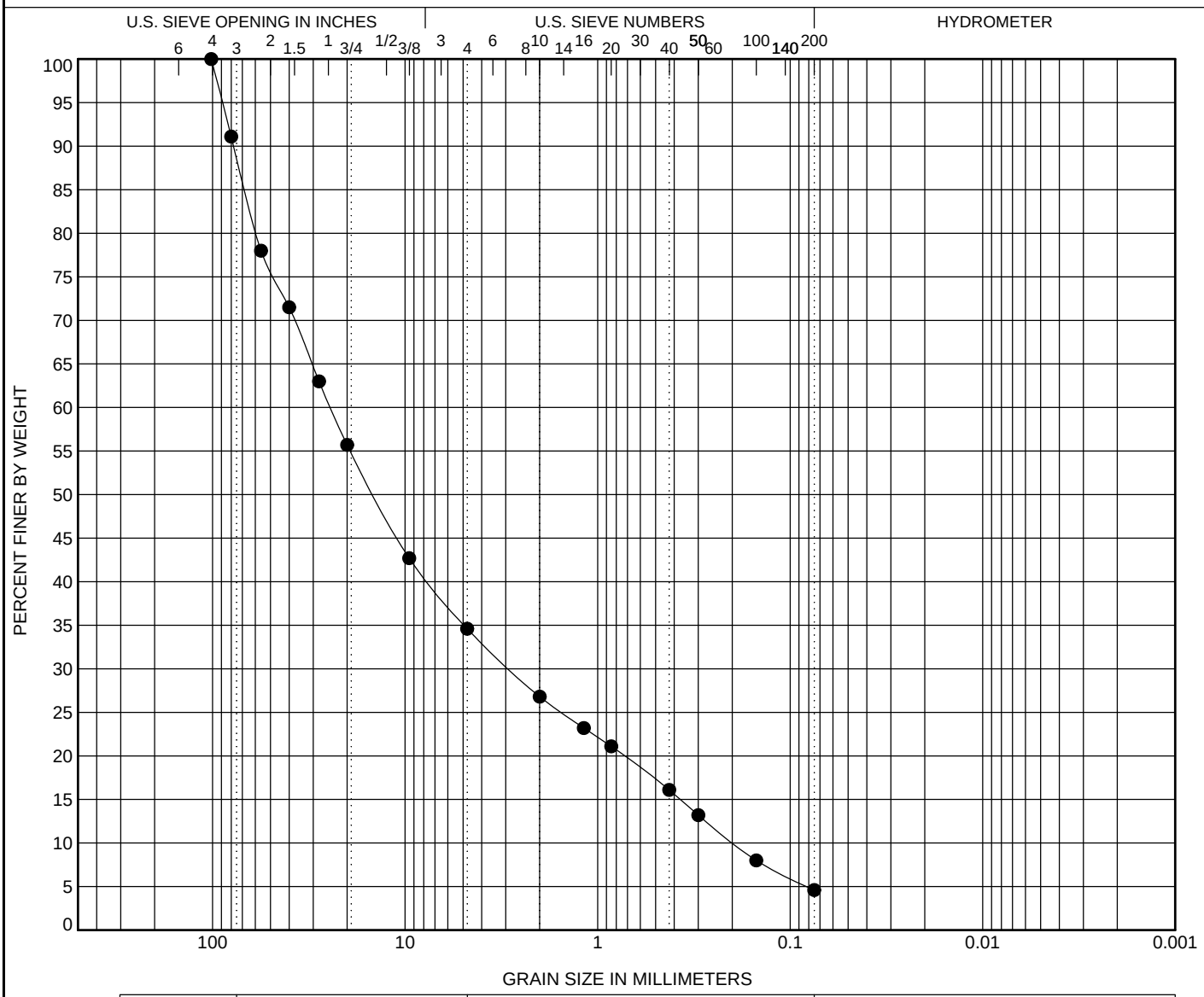
SNC·LAVALIN

TEST PIT TL-PR-02

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**TL-PR-02**	**GB-1**	**0.00 - 0.00**	**54.1**	**30.0**	**4.6**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**91.1**	**78.0**	**71.5**	**63.0**	**55.7**	**42.7**	**34.6**	**26.8**	**21.1**	**16.1**	**13.2**	**8.0**	**4.6**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**TL-PR-02**	Sandy GRAVEL with some Cobbles, tr. Fines	**24.4**	**2.9**	**0.2**	**4.9**				**1.7**	**124.5**

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

MOISTURE DENSITY RELATIONSHIP

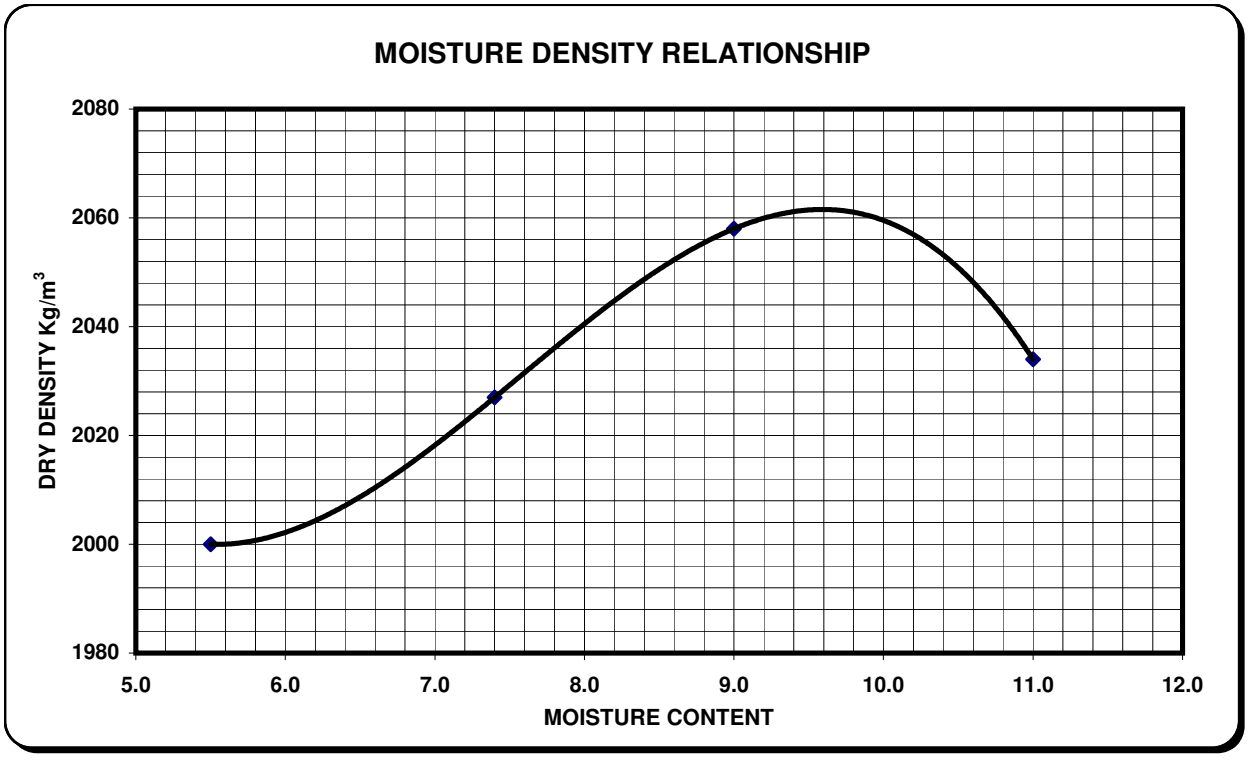
SNC·LAVALIN

Lab No: 715

Client:	Newfoundland and Labrador Hydro		
Project No:	722855		
Project:	AC1030 TL Gull Island to Churchill Falls		
Sample #	AC1030-TL-PR-03		
Location	N 5905553 E 0522066		
Sample Type / Source:	Gravely Sand from TLH cut through esker - taken 2.0 m below top of esker		
Date Sampled:	September 30, 2007	**Sampled By**	Dwayne Druggett
Date Received:	September 30, 2007	**Preparation**	Moist

Percent Retained:	> 19mm = 9.6%

Compaction Std.	**ASTM D698**		**Method**	**C**
Moisture Content	5.5	7.4	9.0	11.0
Dry Density kg/m^3	2000	2027	2058	2034



Note : Oversized Material Correction > 19mm = 9.6%

Maximum Dry Density	2062.0 kg/m3	**Corrected Dry Density**	2095.6 kg/m3
Maximum Moisture	9.6 %	**Corrected Moisture**	8.8 %

Tested by, Ken Collier **Reviewed by,** _____

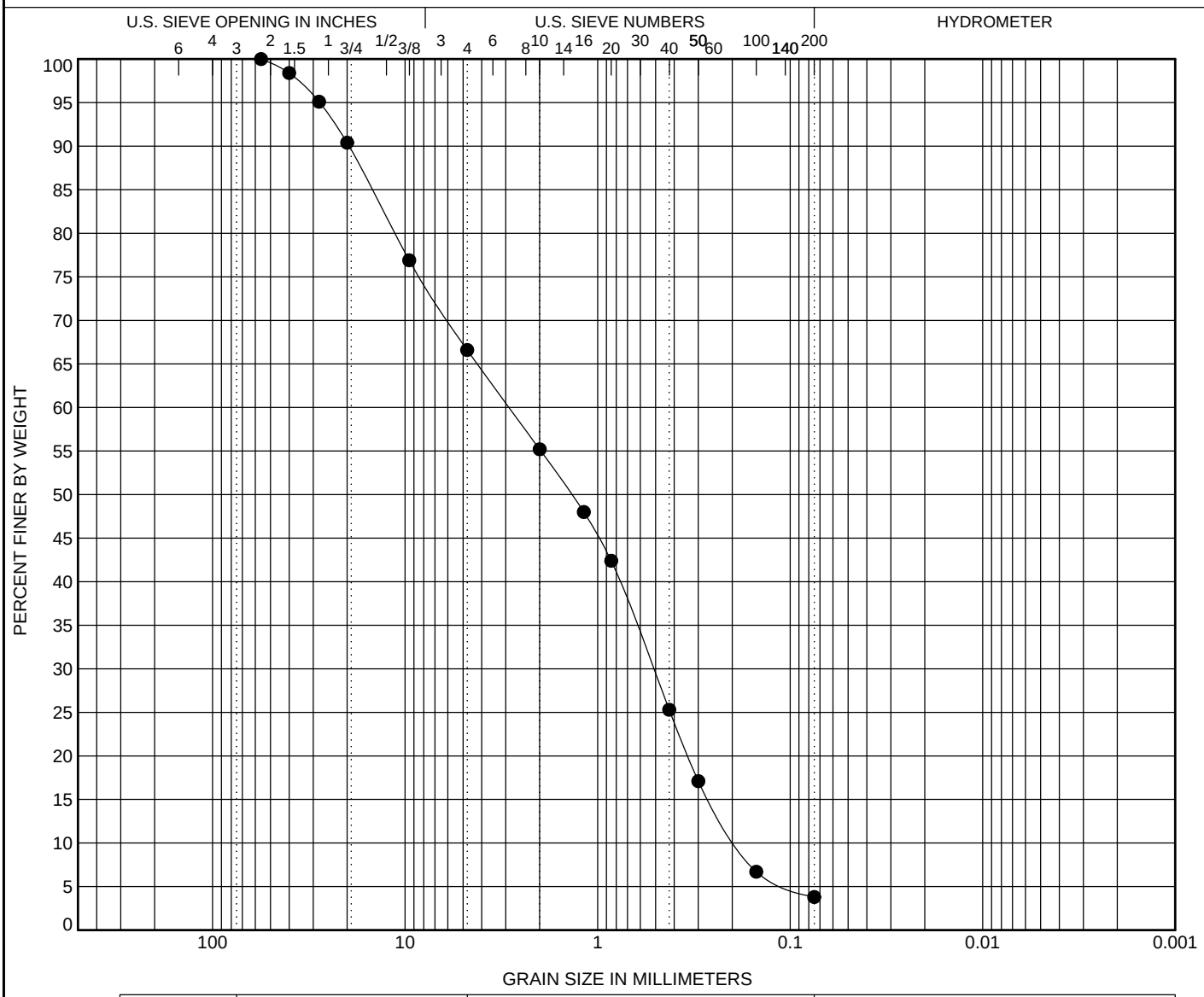
SNC·LAVALIN

TEST PIT TL-PR-03

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**TL-PR-03**	**GB-1**	**0.00 - 0.00**	**33.4**	**62.8**	**3.8**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●		**100.0**	**98.4**	**95.1**	**90.4**	**76.9**	**66.6**	**55.2**	**42.4**	**25.3**	**17.1**	**6.7**	**3.8**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**TL-PR-03**	Gravelly SAND with trace Fines	**2.9**	**0.5**	**0.2**	**3.7**				**0.5**	**15.4**

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

MOISTURE DENSITY RELATIONSHIP

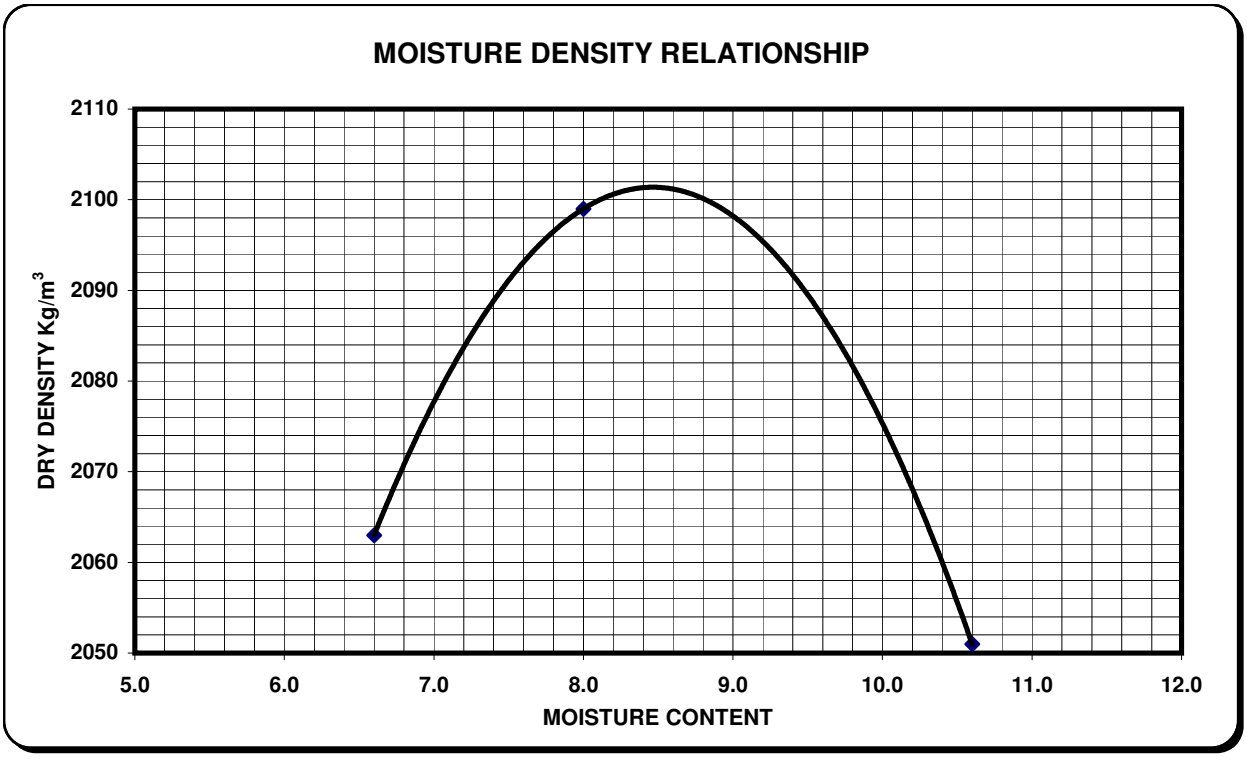
SNC·LAVALIN

Lab No: 716

Client:	Newfoundland and Labrador Hydro
Project No:	722855
Project:	AC1030 TL Gull Island to Churchill Falls
Sample #	AC1030-TL-PR-04
Location	N 5932491 E 0439266
Sample Type / Source:	Till(Sand/Gravel) adjacent to TLH in area of cut through till 1.5 m BGS
Date Sampled:	September 30, 2007 **Sampled By** Dwayne Druggett
Date Received:	September 30, 2007 **Preparation** Moist

Percent Retained:	> 19mm = 27.5%

Compaction Std.	**ASTM D698**		**Method**	**C**
Moisture Content	6.6	8.0	10.6	
Dry Density kg/m^3	2063	2099	2051	



Note : Oversized Material Correction > 19mm = 27.5%

Maximum Dry Density	2100.0 kg/m3	**Corrected Dry Density**	2185.8 kg/m3
Maximum Moisture	8.5 %	**Corrected Moisture**	6.2 %

Tested by, Ken Collier **Reviewed by,** _____

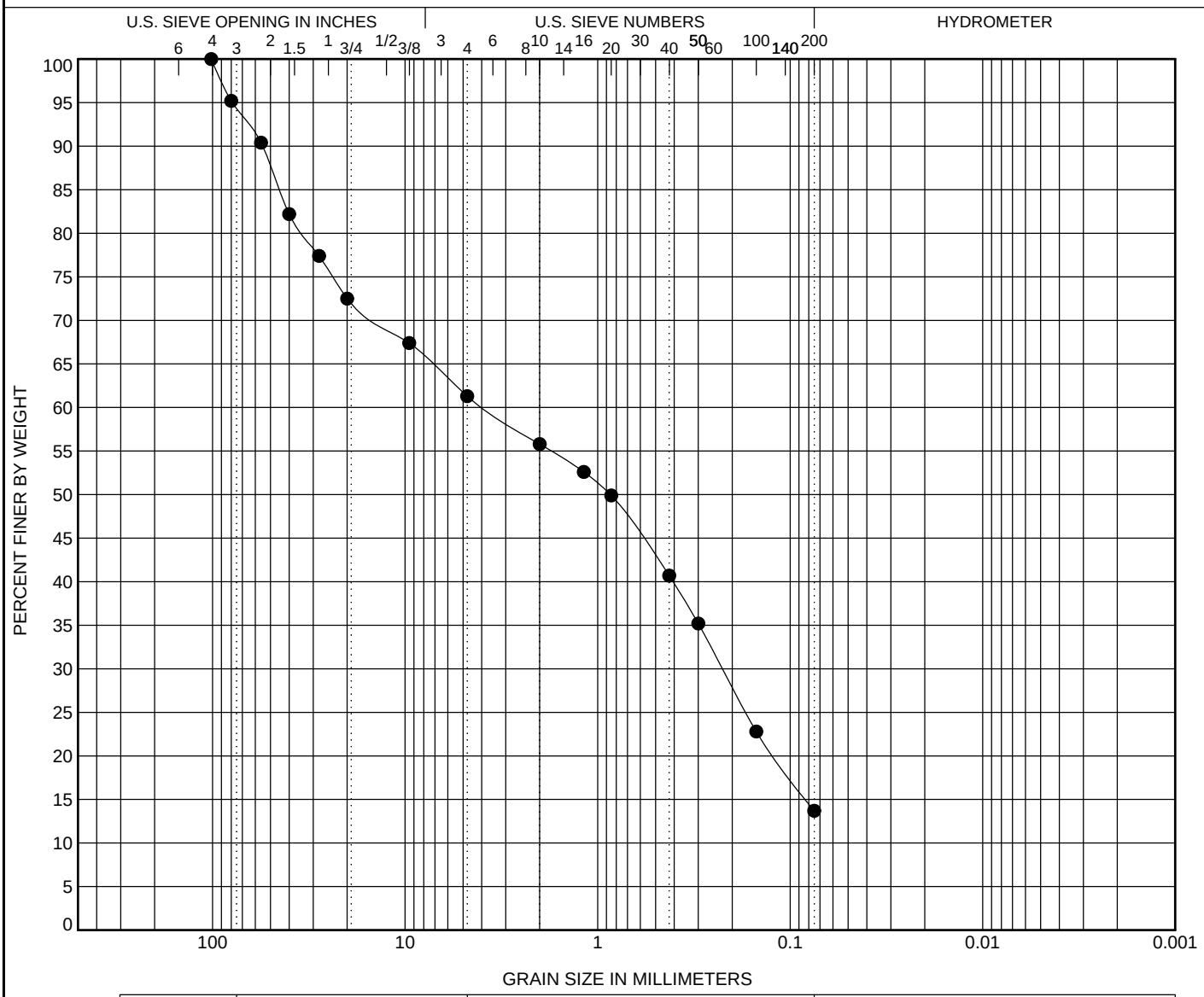
SNC·LAVALIN

TEST PIT TL-PR-04

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**TL-PR-04**	**GB-1**	**0.00 - 0.00**	**33.0**	**47.6**	**13.7**	
⊠							
▲							
★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**95.2**	**90.4**	**82.2**	**77.4**	**72.5**	**67.4**	**61.3**	**55.8**	**49.9**	**40.7**	**35.2**	**22.8**	**13.7**
⊠													
▲													
★													
⊙													

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**TL-PR-04**	Gravelly SAND with some Fines, trace Cobbles	**3.9**	**0.2**		**7.4**					
⊠											
▲											
★											
⊙											

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

MOISTURE DENSITY RELATIONSHIP

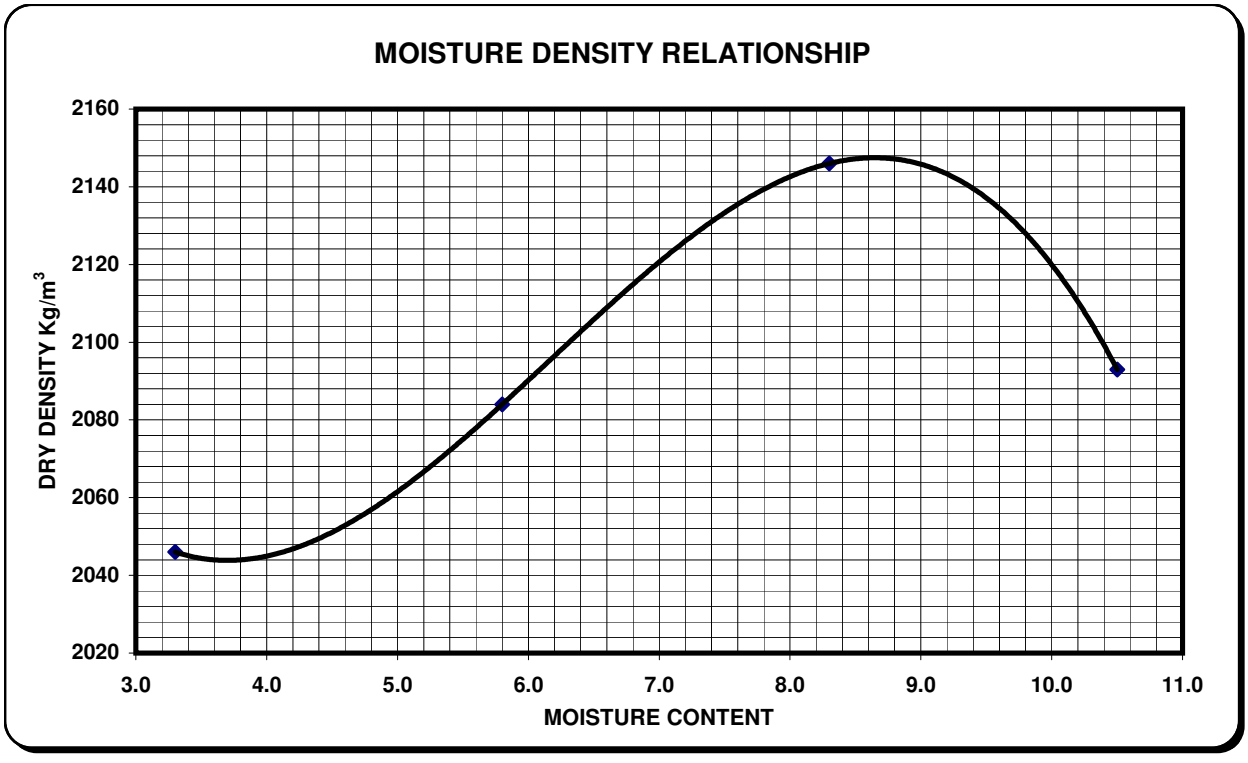
SNC·LAVALIN

Lab No: 717

Client:	Newfoundland and Labrador Hydro
Project No:	722855
Project:	AC1030 TL Gull Island to Churchill Falls
Sample #	AC1030-TL-PR-05
Location	N 5920440 E 0485299
Sample Type / Source:	Till(Sand/Gravel) adjacent to TLH in area of cut through till 2.5 m BGS
Date Sampled:	September 30, 2007 **Sampled By** Dwayne Druggett
Date Received:	September 30, 2007 **Preparation** Moist

Percent Retained:	> 19mm = 20.4%

Compaction Std.	**ASTM D698**		**Method**	**C**
Moisture Content	3.3	5.8	8.3	10.5
Dry Density kg/m^3	2046	2084	2146	2093



Note : Oversized Material Correction > 19mm = 20.4%

Maximum Dry Density	2148.0 kg/m3	**Corrected Dry Density**	2201.9 kg/m3
Maximum Moisture	8.6 %	**Corrected Moisture**	7.2 %

Tested by, Ken Collier **Reviewed by,** _____

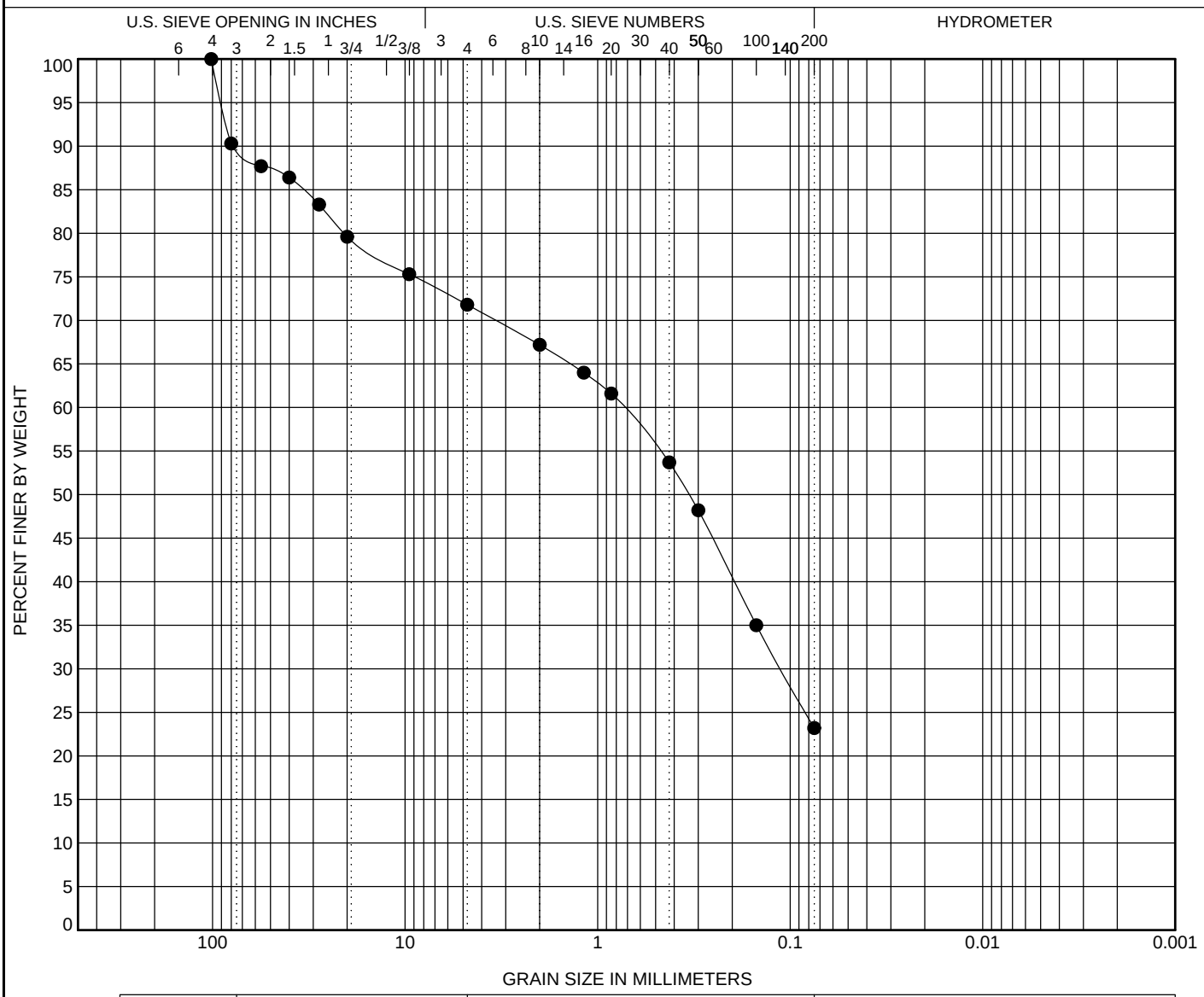
SNC·LAVALIN

TEST PIT TL-PR-05

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**TL-PR-05**	**GB-1**	**0.00 - 0.00**	**18.0**	**48.6**	**23.2**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**90.3**	**87.7**	**86.4**	**83.3**	**79.6**	**75.3**	**71.8**	**67.2**	**61.6**	**53.7**	**48.2**	**35.0**	**23.2**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**TL-PR-05**	Silty SAND with some Gravel, some Cobbles	**0.7**	**0.1**		**8.0**					

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

MOISTURE DENSITY RELATIONSHIP

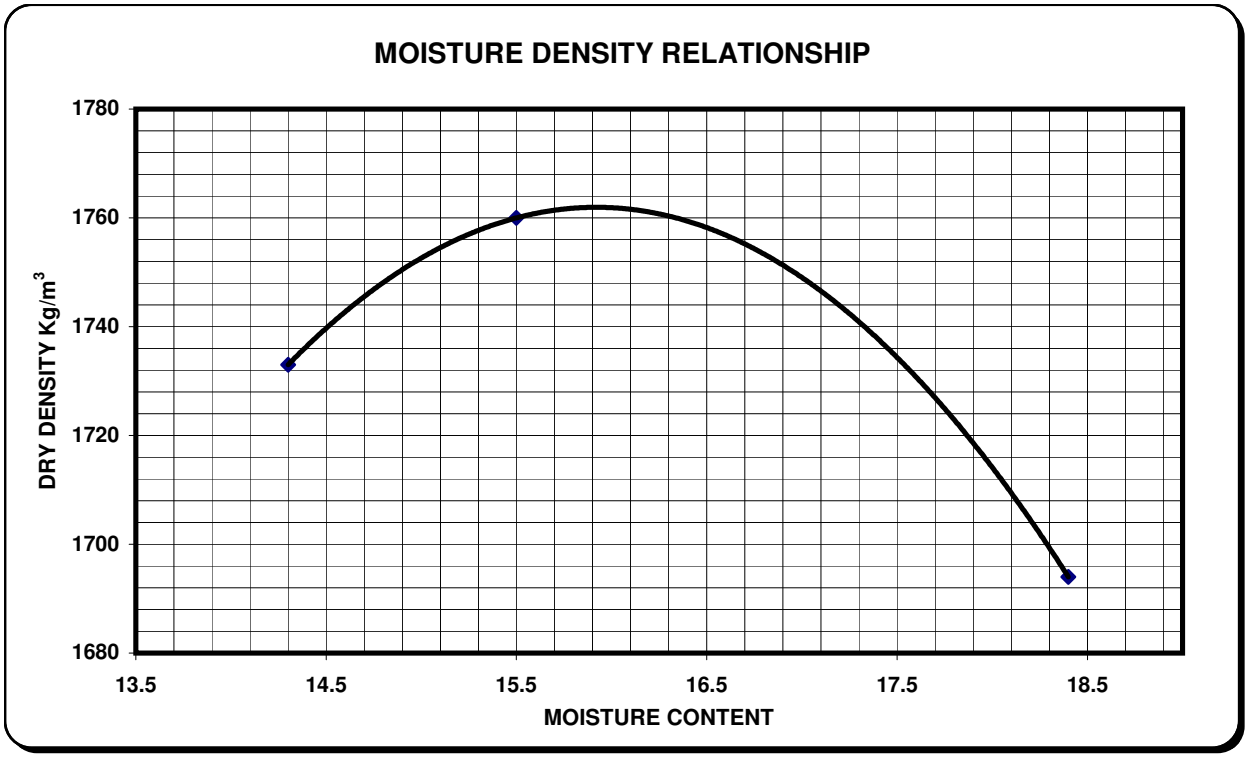
SNC·LAVALIN

Lab No: 718

Client:	Newfoundland and Labrador Hydro		
Project No:	722855		
Project:	AC1030 TL Gull Island to Churchill Falls		
Sample #	AC1030-TL-PR-06		
Location	N 5906348 E 0506003		
Sample Type / Source:	Sand from TLH cut throught esker 3 m below top of esker		
Date Sampled:	September 30, 2007	**Sampled By**	Dwayne Druggett
Date Received:	September 30, 2007	**Preparation**	Moist

Percent Retained:	> 19mm = 0.0%

Compaction Std.	**ASTM D698**		**Method**	**C**
Moisture Content	14.3	15.5	18.4	
Dry Density kg/m^3	1733	1760	1694	



Note : Oversized Material Correction > 19mm = 0.0%

Maximum Dry Density	1762.0 kg/m3	**Corrected Dry Density**	1762 kg/m3
Maximum Moisture	15.8 %	**Corrected Moisture**	18.8 %

Tested by, Ken Collier **Reviewed by,** _____

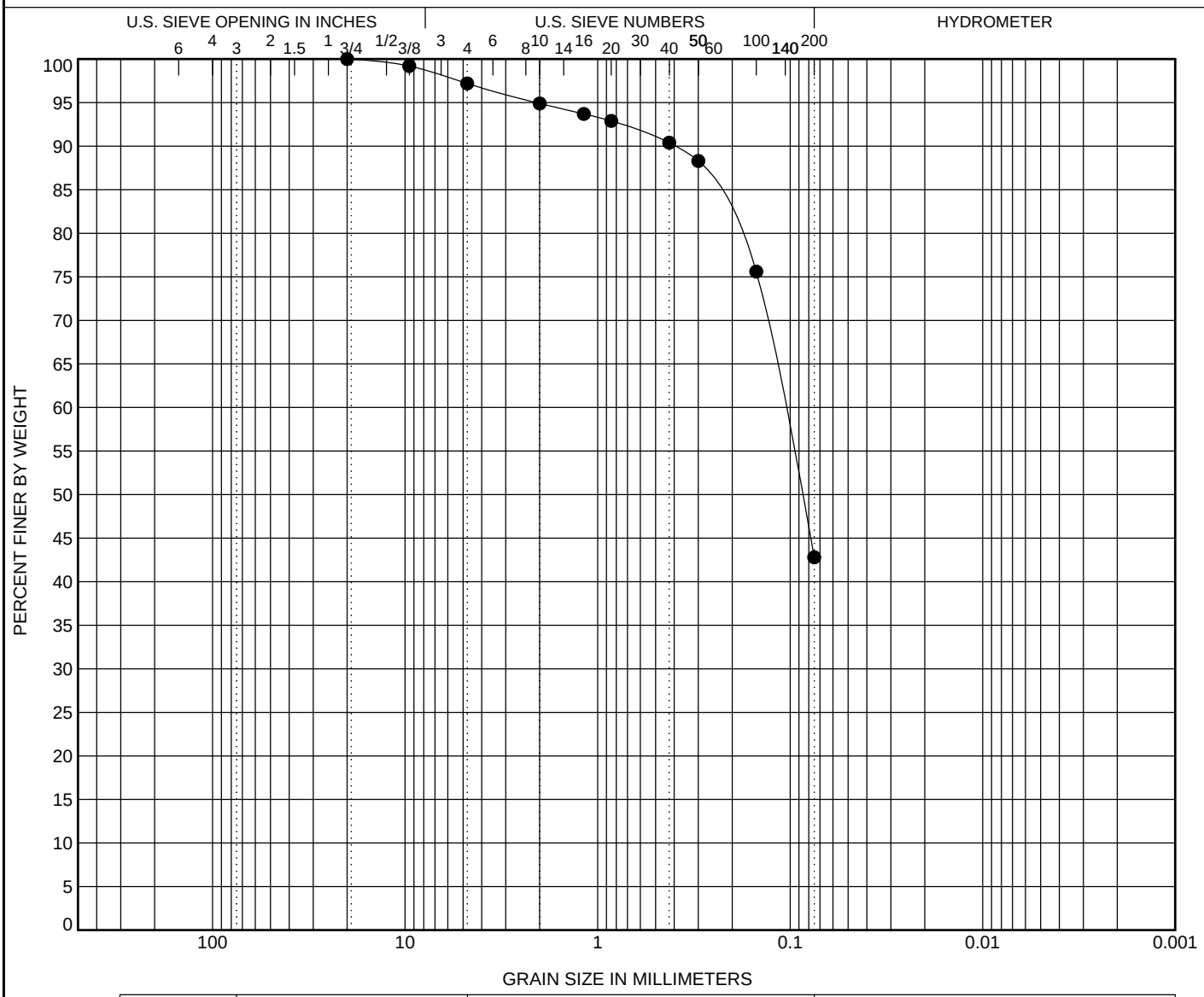
SNC·LAVALIN

TEST PIT TL-PR-06

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**TL-PR-06**	**GB-1**	**0.00 - 0.00**	**2.8**	**54.4**	**42.8**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●					**100.0**	**99.2**	**97.2**	**94.9**	**92.9**	**90.4**	**88.3**	**75.6**	**42.8**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**TL-PR-06**	SAND and FINES with trace Gravel	**0.1**			**19.0**					

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

MOISTURE DENSITY RELATIONSHIP

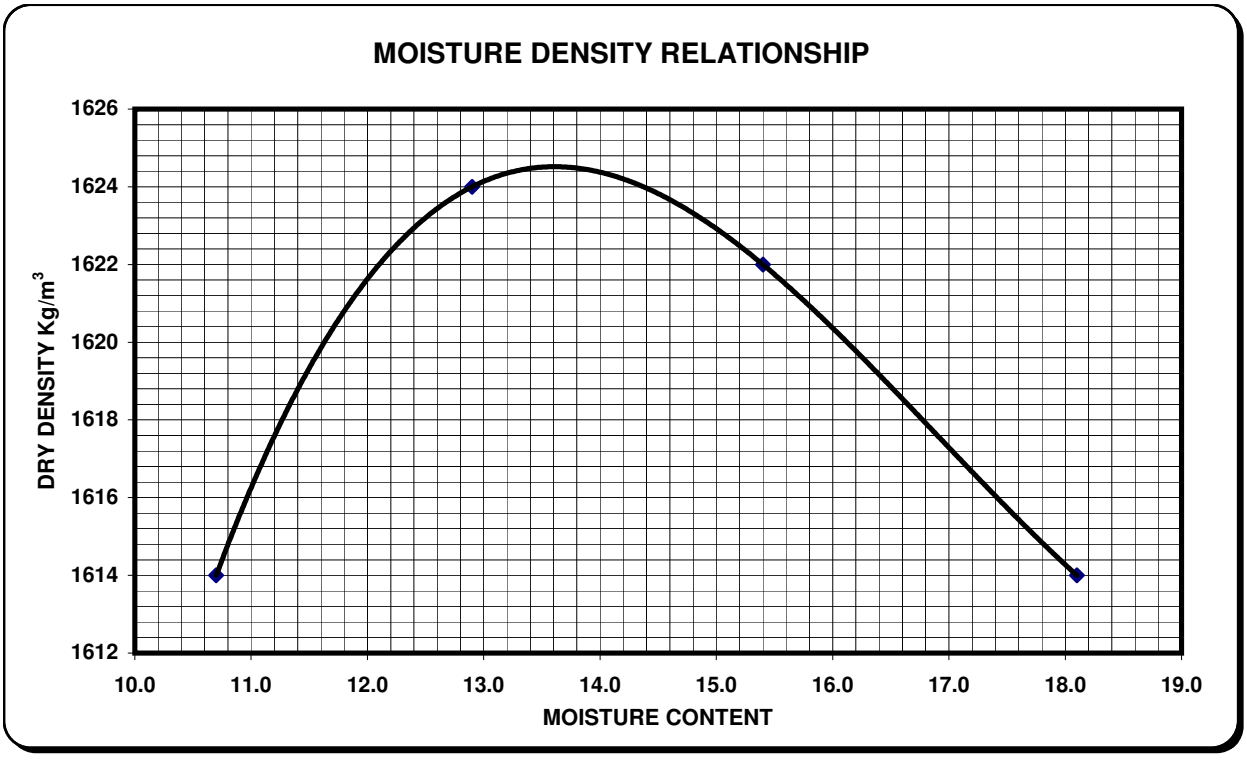
SNC·LAVALIN

Lab No: 719

Client:	Newfoundland and Labrador Hydro		
Project No:	722855		
Project:	AC1030 TL Gull Island to Churchill Falls		
Sample #	AC1030-TL-PR-07		
Location	N 5898164 E 0541205		
Sample Type / Source:	Till(Sand/Gravel) Adjacent to TLH 0.5 m below ground surface		
Date Sampled:	September 28, 2007	**Sampled By**	Dwayne Druggett
Date Received:	September 28, 2007	**Preparation**	Moist

Percent Retained:	> 19mm = 0.0%

Compaction Std.	**ASTM D698**		**Method**	**C**
Moisture Content	10.7	12.9	15.4	18.1
Dry Density kg/m^3	1614	1624	1622	1614



Note : Oversized Material Correction > 19mm = 0.0%

Maximum Dry Density	1624.6 kg/m3	**Corrected Dry Density**	1624.6 kg/m3
Maximum Moisture	13.5 %	**Corrected Moisture**	13.5 %

Tested by, Ken Collier **Reviewed by,** _____

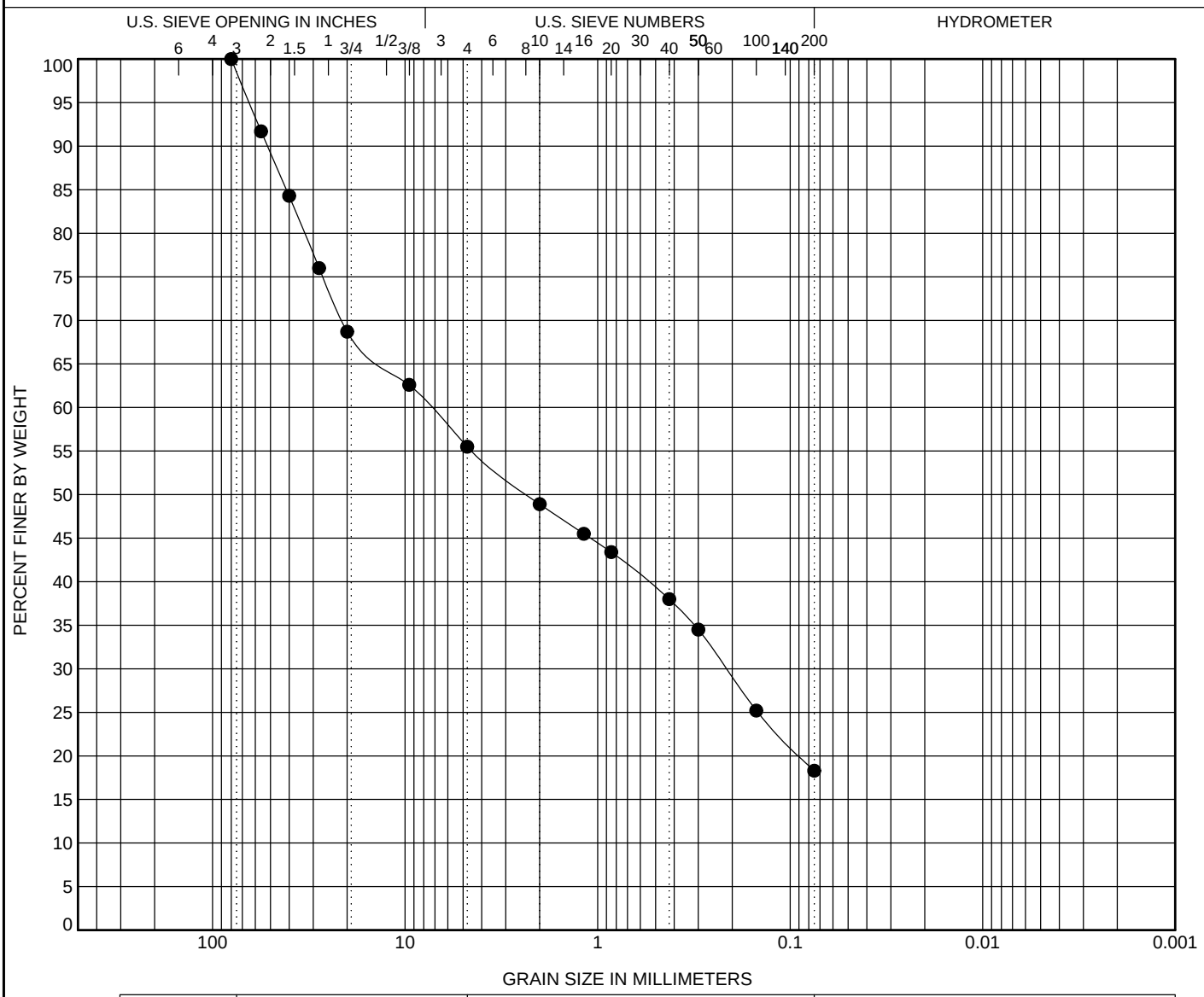
SNC·LAVALIN

TEST PIT TL-PR-07

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Transmission Line



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**TL-PR-07**	**GB-1**	**0.00 - 0.00**	**43.0**	**37.2**	**18.3**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**100.0**	**91.7**	**84.3**	**76.0**	**68.7**	**62.6**	**55.5**	**48.9**	**43.4**	**38.0**	**34.5**	**25.2**	**18.3**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**TL-PR-07**	GRAVEL & SAND with some Fines, tr. Cobbles	**7.4**	**0.2**		**8.2**					

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

APPENDIX C

MARSHALLING YARD DATA

SNC·LAVALIN

Test Pit: AC1030 - 1					
Firm:	Newfoundland and Labrador Hydro				Date: 13-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5875402	E 0612009	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.04	PEAT - black organic soil, rootlets, moist, loose	NA	NA	NA
0.04 - 0.3	Oxidized SAND - trace fines, trace rootlets poorly graded, loose to compact, orange to light brown.	NA	NA	NA
0.3 - 3.5	POORLY GRADED SAND (SP) - trace fines, trace gravels, trace cobbles, sub angular, loose to compact, moist, olive grey to light grey	1	0.3 - 3.5	Grab

Estimated Cobbles (%) 1 – 5	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 10:25 am	End Time: 11:10 am	Estimated Excavated Volume (m^3)	30

General Notes

Severe sloughing within test pit. Test Pit was dry upon completion

North and East coordinates obtained using Garmin Etrex Legend Cx GPS

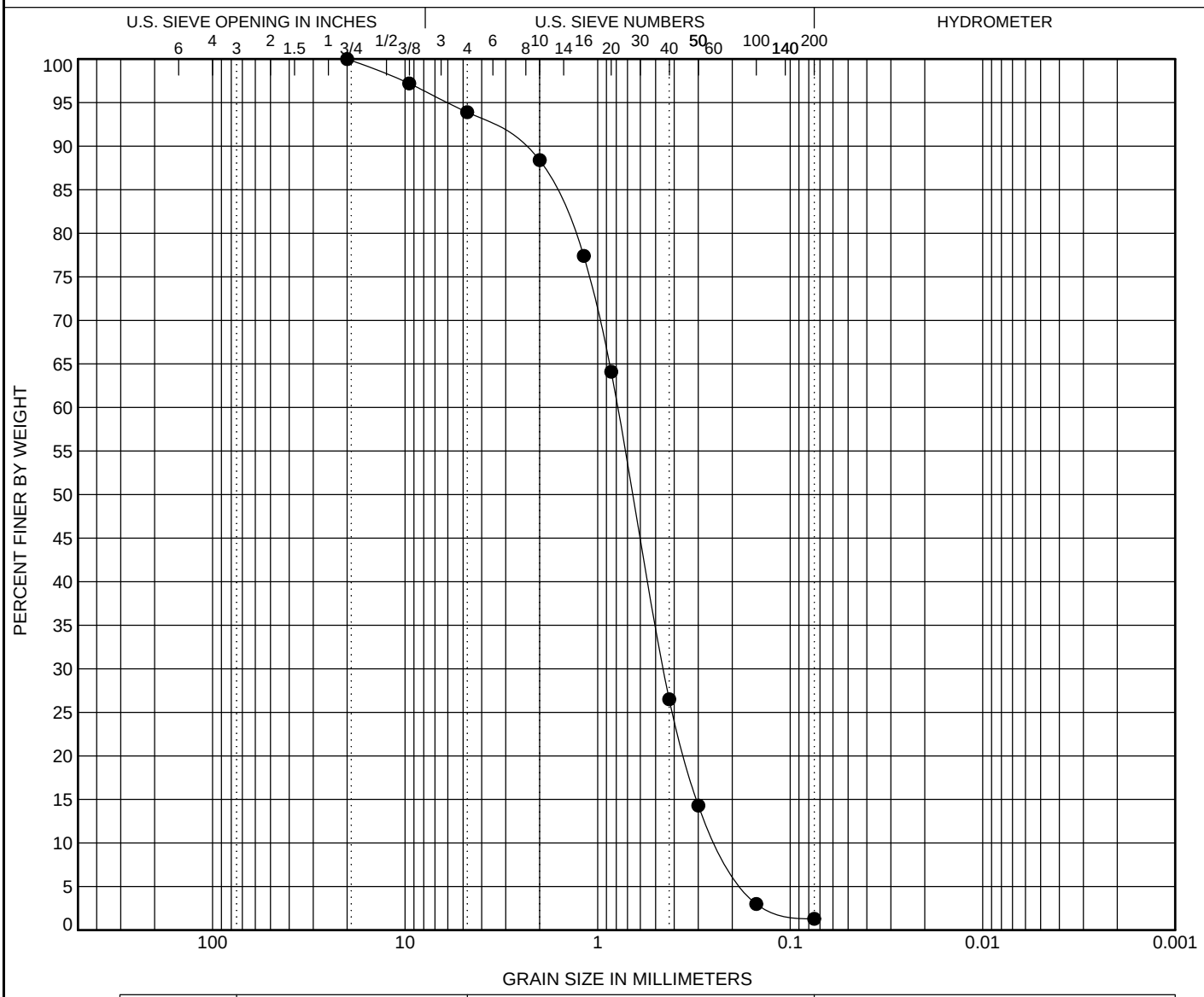
SNC·LAVALIN

TEST PIT AC1030-001

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Marshalling Yard



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-001**	**GB-1**	**0.30 - 3.50**	**6.1**	**92.6**	**1.3**	
⊠							
▲							
★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●					**100.0**	**97.2**	**93.9**	**88.4**	**64.1**	**26.5**	**14.3**	**3.0**	**1.3**
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★													
⊙													

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-001**	POORLY GRADED SAND(SP)	**0.8**	**0.5**	**0.2**	**3.6**				**1.1**	**3.4**
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GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-21

SNC·LAVALIN

Test Pit: AC1030 - 2					
Firm:	Newfoundland and Labrador Hydro				Date: 13-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5875383	E 0611950	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.03	PEAT - black organic soil, rootlets, moist, loose	NA	NA	NA
0.03 - 0.13	Oxidized SAND - trace fines, trace rootlets poorly graded, loose to compact, orange to light brown.	NA	NA	NA
0.13 - 3.5	POORLY GRADED SAND (SP) - trace fines, trace gravels, trace cobbles, sub angular loose to compact, moist, olive grey to light grey	1	1.2	Grab

Estimated Cobbles (%) 1	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 11:15 am	End Time: 11:45 am	Estimated Excavated Volume (m^3)	30

General Notes

Severe sloughing within test pit. Test Pit was dry upon completion

North and East coordinates obtained using Garmin Etrex Legend Cx GPS

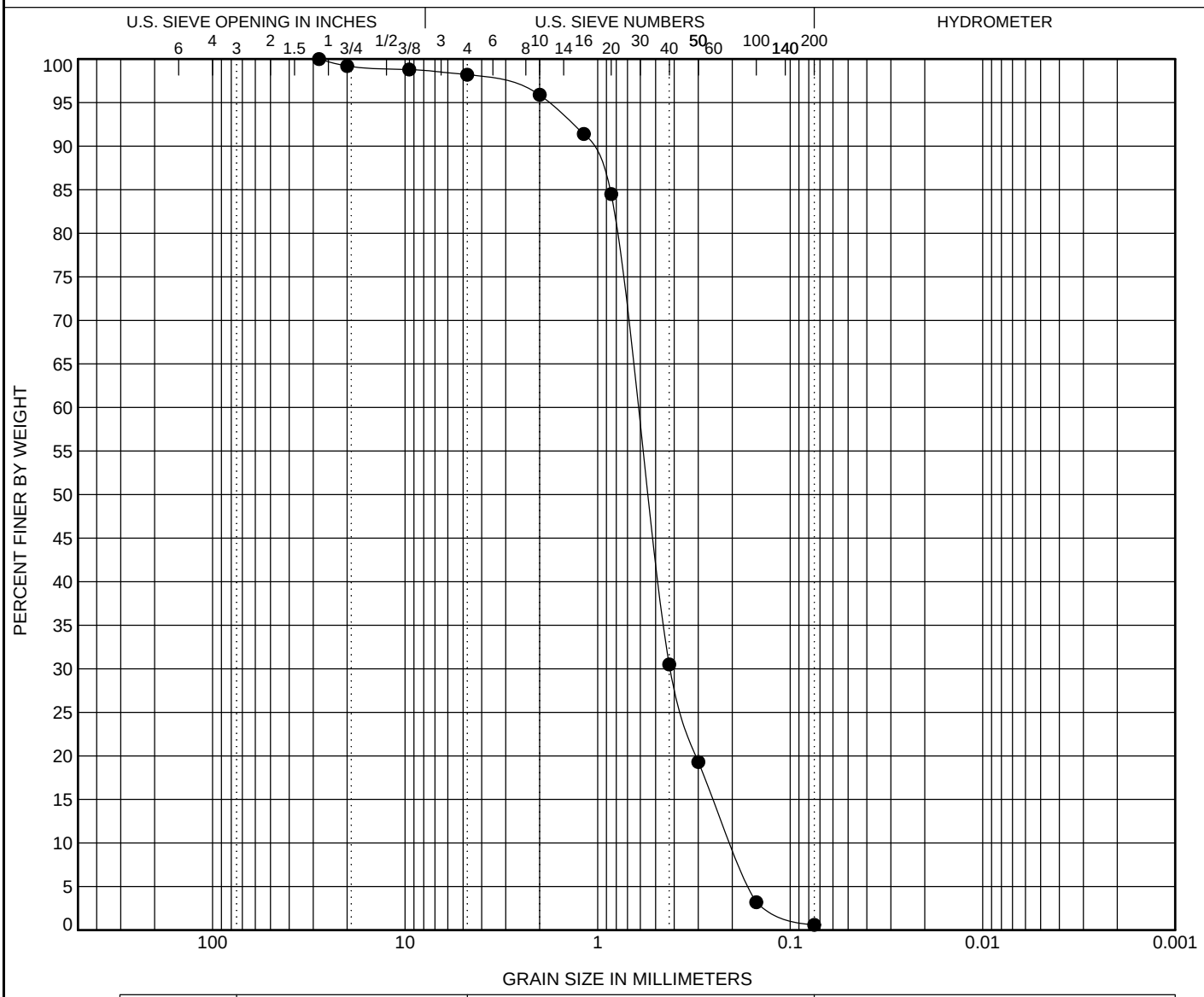
SNC·LAVALIN

TEST PIT AC1030-002

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Marshalling Yard



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-002**	**GB-1**	**1.20 - 1.70**	**1.8**	**97.6**	**0.6**	
⊠							
▲							
★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●				**100.0**	**99.2**	**98.8**	**98.2**	**95.9**	**84.5**	**30.5**	**19.3**	**3.2**	**0.6**
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★													
⊙													

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-002**	POORLY GRADED SAND(SP)	**0.6**	**0.4**	**0.2**	**2.9**				**1.4**	**3.1**
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▲											
★											
⊙											

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-21

SNC·LAVALIN

Test Pit: AC1030 - 3					
Firm:	Newfoundland and Labrador Hydro				Date: 13-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5875363	E 0611884	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.03	PEAT - black organic soil, rootlets, moist, loose	NA	NA	NA
0.03 - 0.13	Oxidized SAND - trace fines, trace rootlets poorly graded, loose to compact, orange to light brown.	NA	NA	NA
0.13 - 3.5	POORLY GRADED SAND (SP) - trace fines, trace gravels, trace cobbles, sub angular, loose to compact, moist, olive grey to light grey	1	1.0 - 3.0	Grab

Estimated Cobbles (%) 1	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 11:53 am	End Time: 12:30 pm	Estimated Excavated Volume (m^3)	30

General Notes

Severe sloughing within test pit. Test Pit was dry upon completion

North and East coordinates obtained using Garmin Etrex Legend Cx GPS

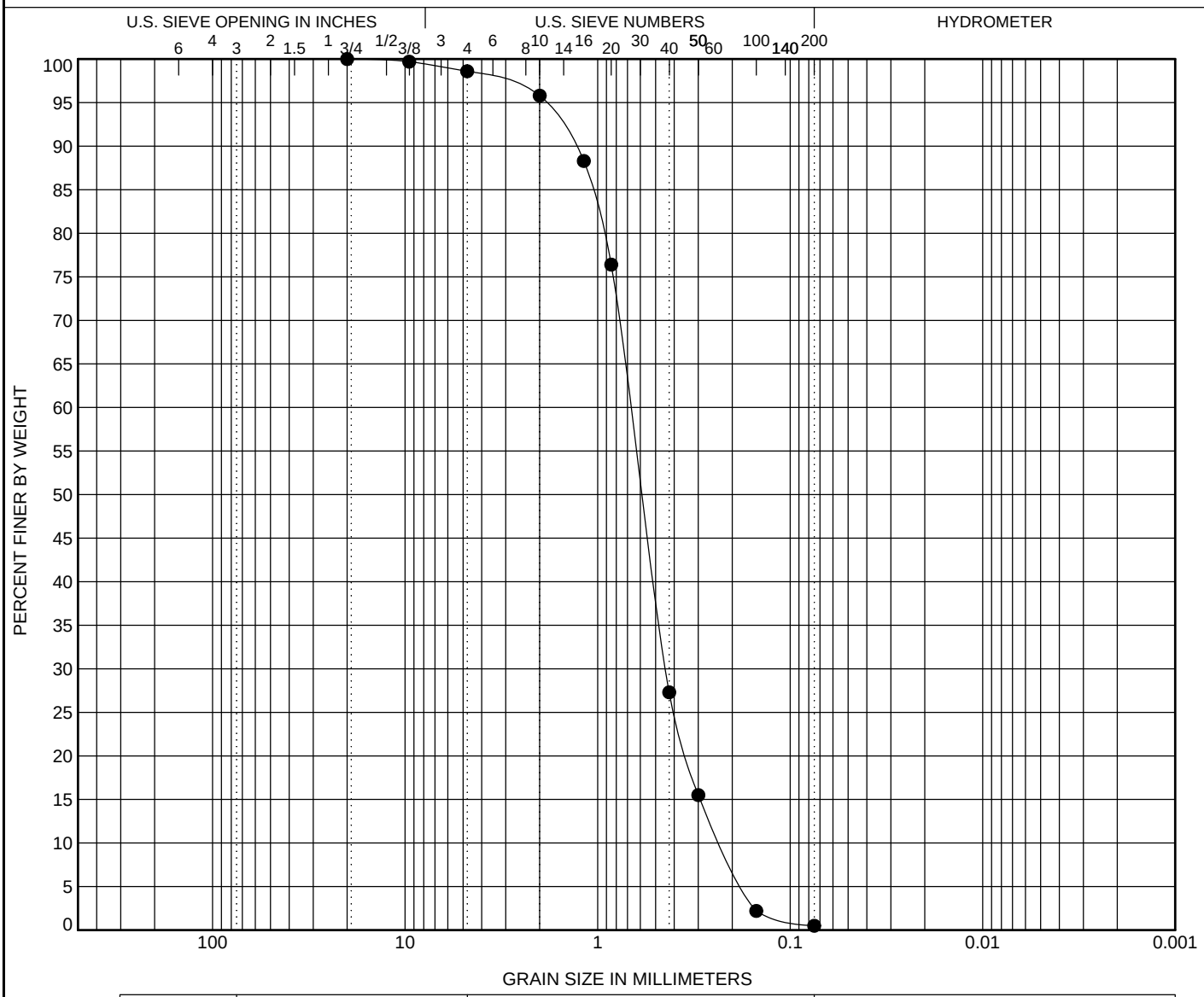
SNC·LAVALIN

TEST PIT AC1030-003

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Marshalling Yard



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-003**	**GB-1**	**1.00 - 3.00**	**1.4**	**98.1**	**0.5**	
⊠							
▲							
★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●					**100.0**	**99.7**	**98.6**	**95.8**	**76.4**	**27.3**	**15.5**	**2.2**	**0.5**
⊠													
▲													
★													
⊙													

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-003**	POORLY GRADED SAND(SP)	**0.7**	**0.4**	**0.2**	**3.1**				**1.3**	**3.0**
⊠											
▲											
★											
⊙											

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-21

SNC·LAVALIN

Test Pit: AC1030 - 4					
Firm:	Newfoundland and Labrador Hydro				Date: 13-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5875457	E 0611873	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.03	PEAT - black organic soil, rootlets, moist, loose	NA	NA	NA
0.03 - 0.6	POORLY GRADED SAND (SP) - trace fines, trace rootlets, loose to compact, moist, orange to light brown.	1	0.6	Grab
0.6 - 3.5	POORLY GRADED SAND (SP) - trace fines, trace gravels, trace cobbles, sub angular, loose to compact, moist, olive grey to light grey	2	3.0	Grab

Estimated Cobbles (%) 1	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 12:35 pm	End Time: 1:05 pm	Estimated Excavated Volume (m^3)	30

General Notes

Severe sloughing within test pit. Test Pit was dry upon completion

North and East coordinates obtained using Garmin Etrex Legend Cx GPS

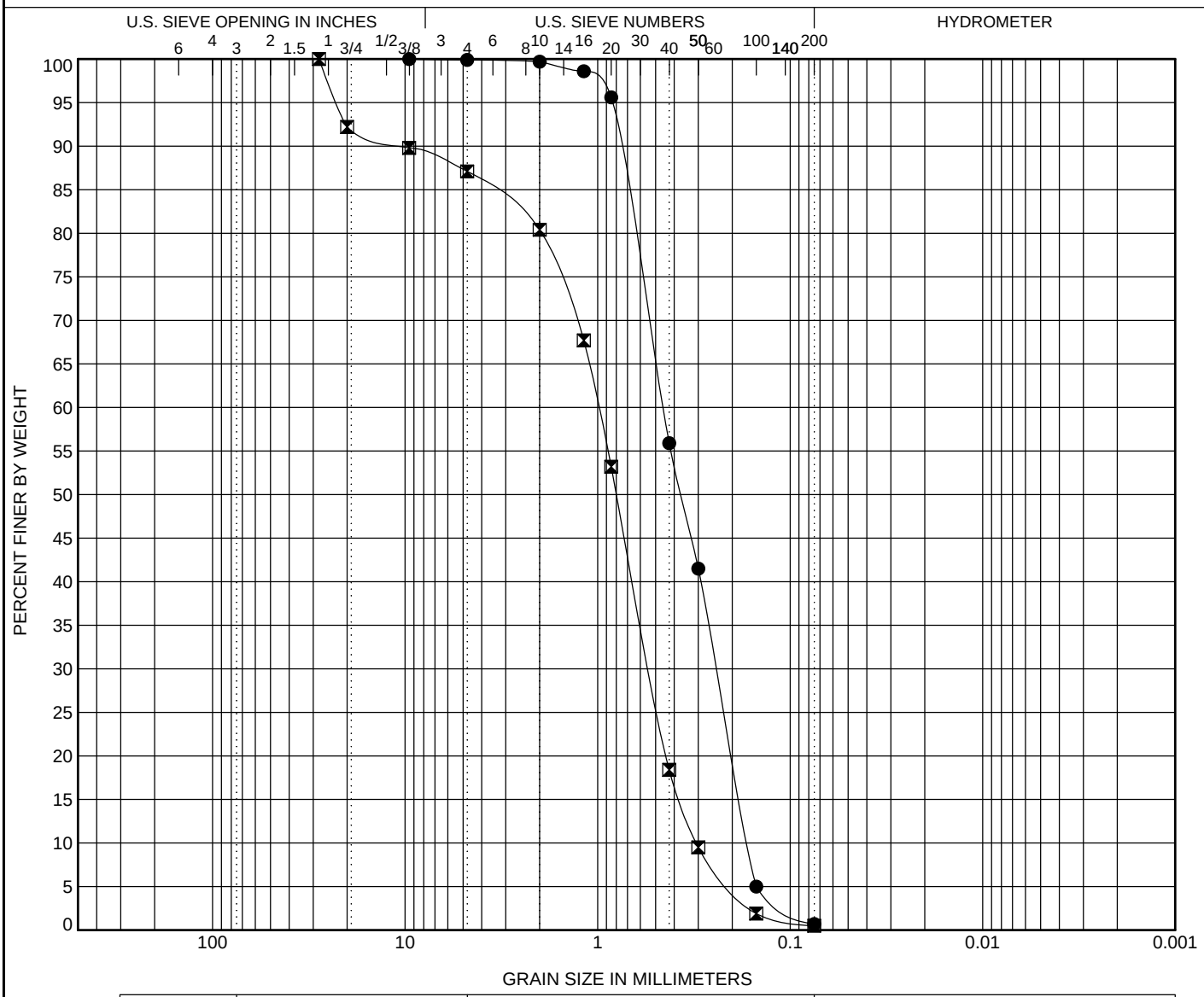
SNC·LAVALIN

TEST PIT AC1030-004

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Marshalling Yard



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-004**	**GB-1**	**0.50 - 0.60**	**0.1**	**99.2**	**0.7**	
⊠	**AC1030-004**	**GB-2**	**3.00 - 3.50**	**12.9**	**86.6**	**0.5**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●						**100.0**	**99.9**	**99.7**	**95.6**	**55.9**	**41.5**	**5.0**	**0.7**
⊠				**100.0**	**92.2**	**89.8**	**87.1**	**80.4**	**53.2**	**18.4**	**9.5**	**1.9**	**0.5**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-004**	POORLY GRADED SAND(SP)	**0.5**	**0.2**	**0.2**	**9.3**				**0.8**	**2.8**
⊠	**AC1030-004**	POORLY GRADED SAND(SP)	**1**	**0.5**	**0.3**	**6.7**				**0.9**	**3.2**

GRAIN SIZE2 - TEST PIT TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-21

SNC·LAVALIN

Test Pit: AC1030 - 5					
Firm:	Newfoundland and Labrador Hydro				Date: 13-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5875486	E 0611932	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.03	PEAT - black organic soil, rootlets, moist, loose	NA	NA	NA
0.03 - 0.3	Oxidized SAND - trace fines, trace rootlets poorly graded, loose to compact, orange to light brown.	NA	NA	NA
0.3 - 3.0	POORLY GRADED SAND (SP) - trace fines, trace gravels, trace cobbles, sub angular, loose to compact, moist, olive grey to light grey	1	3.0	Grab

Estimated Cobbles (%) 1	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 1:15 pm	End Time: 1:40 pm	Estimated Excavated Volume (m3)	28

General Notes

Severe sloughing within test pit, Test Pit was dry upon completion

North and East coordinates obtained using Garmin Etrex Legend Cx GPS

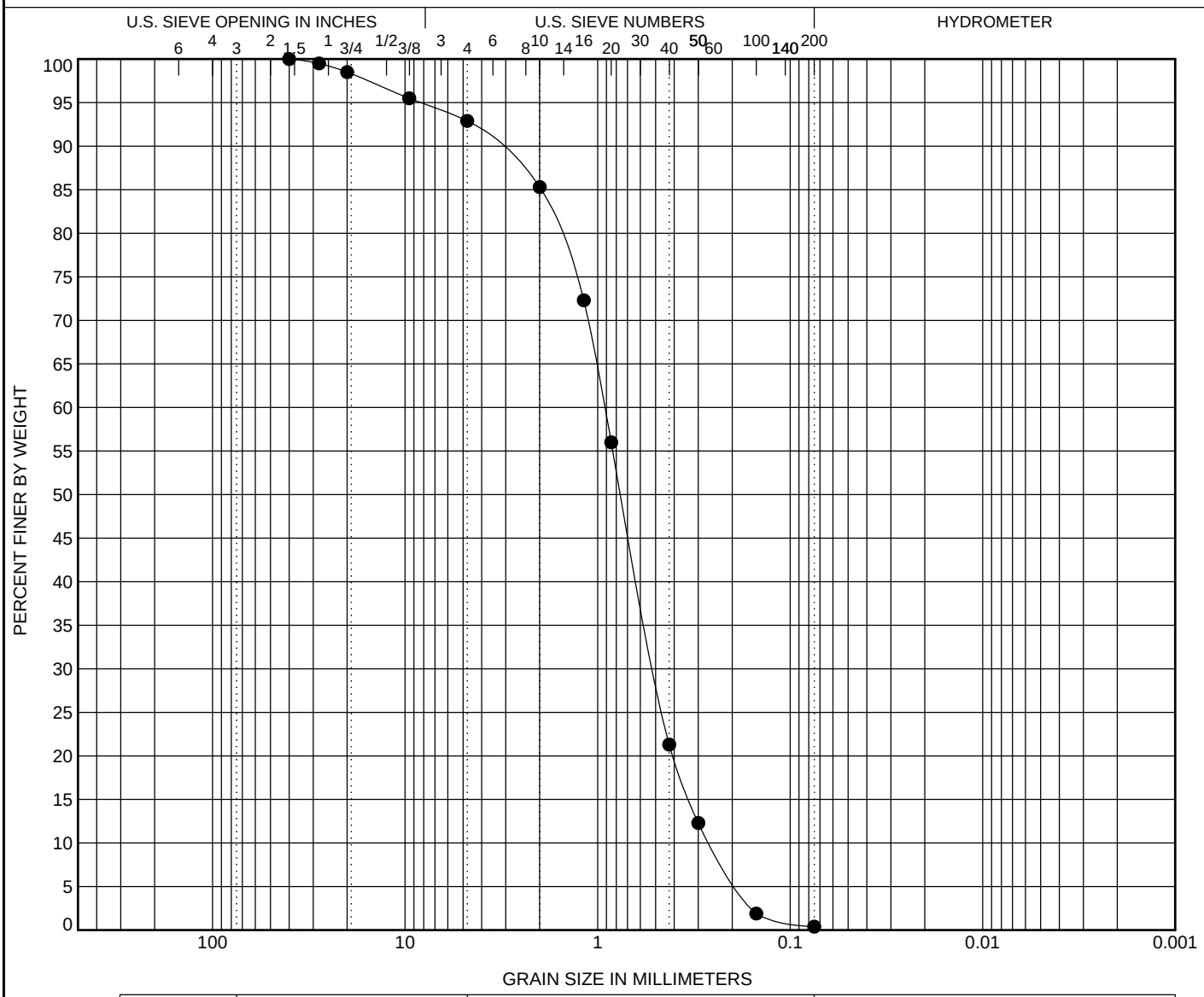
SNC·LAVALIN

TEST PIT AC1030-005

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Marshalling Yard



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-005**	**GB-1**	**2.80 - 3.00**	**7.1**	**92.5**	**0.4**	
⊠							
▲							
★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●			**100.0**	**99.5**	**98.5**	**95.5**	**92.9**	**85.3**	**56.0**	**21.3**	**12.3**	**1.9**	**0.4**
⊠													
▲													
★													
⊙													

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-005**	POORLY GRADED SAND(SP)	**0.9**	**0.5**	**0.3**	**3.6**				**1.1**	**3.6**
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★											
⊙											

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-21

SNC·LAVALIN

Test Pit: AC1030 - 6					
Firm:	Newfoundland and Labrador Hydro				Date: 13-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5875489	E 0611990	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.02	PEAT - black organic soil, rootlets, moist, loose	NA	NA	NA
0.02 - 0.25	Oxidized SAND - trace fines, trace rootlets poorly graded, loose to compact, orange to light brown.	NA	NA	NA
0.25 - 3.5	POORLY GRADED SAND (SP) - trace fines, trace gravels, trace cobbles, sub angular, loose to compact, moist, olive grey to light grey	1	3.5	Grab

Estimated Cobbles (%) 1	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 1:45 pm	End Time: 2:10 pm	Estimated Excavated Volume (m^3)	30

General Notes

Severe sloughing within test pit. Test Pit was dry upon completion

North and East coordinates obtained using Garmin Etrex Legend Cx GPS

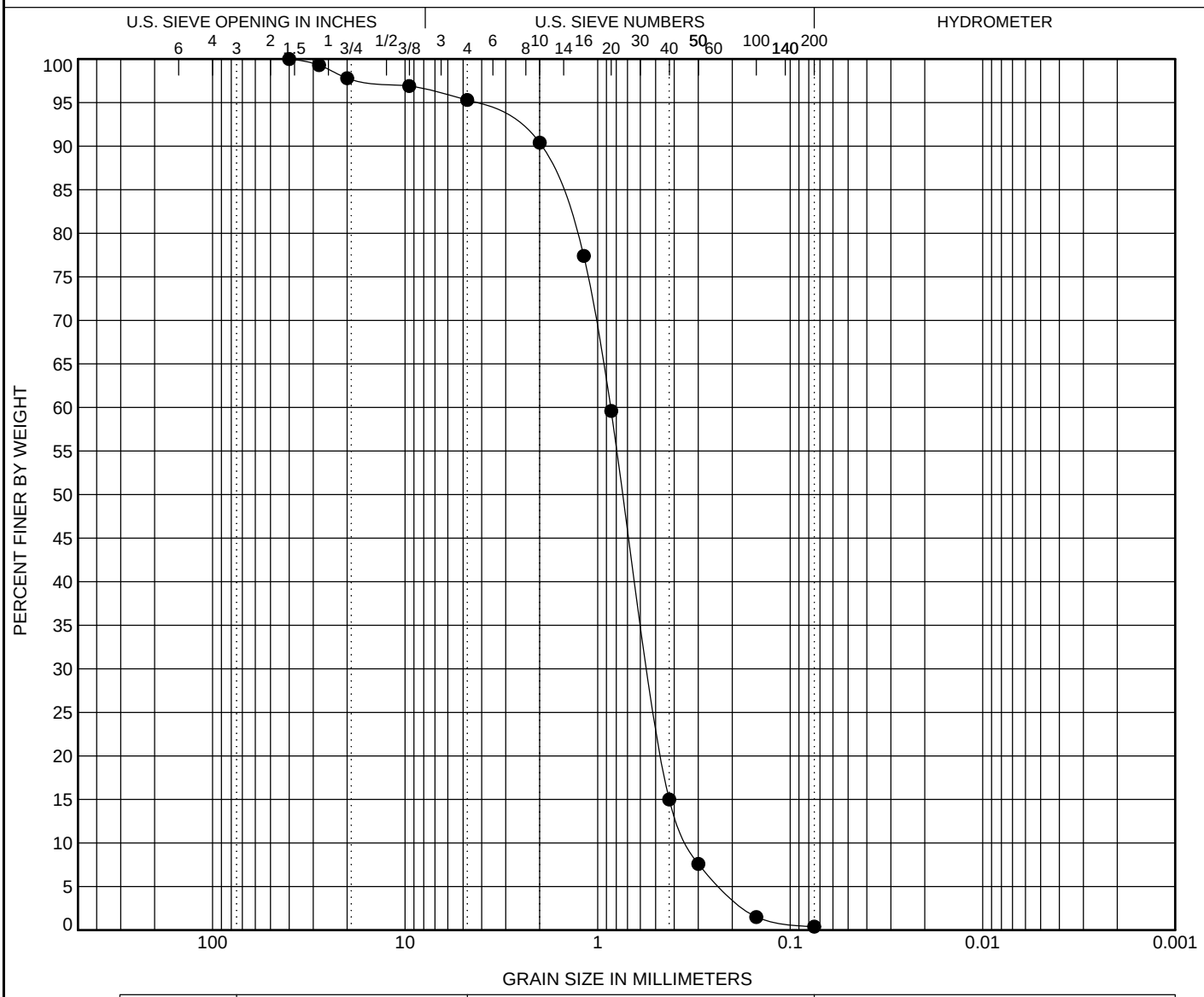
SNC·LAVALIN

TEST PIT AC1030-006

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Marshalling Yard



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-006**	**GB-1**	**3.30 - 3.50**	**4.7**	**94.9**	**0.4**	
⊠							
▲							
★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●			**100.0**	**99.3**	**97.8**	**96.9**	**95.3**	**90.4**	**59.6**	**15.0**	**7.6**	**1.5**	**0.4**
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▲													
★													
⊙													

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-006**	POORLY GRADED SAND(SP)	**0.9**	**0.5**	**0.3**	**2.9**				**1.0**	**2.5**
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GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-21

SNC·LAVALIN

Test Pit: AC1030 - 7					
Firm:	Newfoundland and Labrador Hydro				Date: 13-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5875500	E 0612053	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.04	PEAT - black organic soil, rootlets, moist, loose	NA	NA	NA
0.04 - 0.3	Oxidized SAND - trace fines, trace rootlets poorly graded, loose to compact, orange to light brown.	NA	NA	NA
0.3 - 3.5	POORLY GRADED SAND (SP) - trace fines, trace gravels, trace cobbles, sub angular, loose to compact, moist, olive grey to light grey	1	2.0	Grab

Estimated Cobbles (%) 1	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 2:11 pm	End Time: 2:35 pm	Estimated Excavated Volume (m^3)	30

General Notes

Severe sloughing within test pit. Test Pit was dry upon completion

North and East coordinates obtained using Garmin Etrec Legend Cx GPS

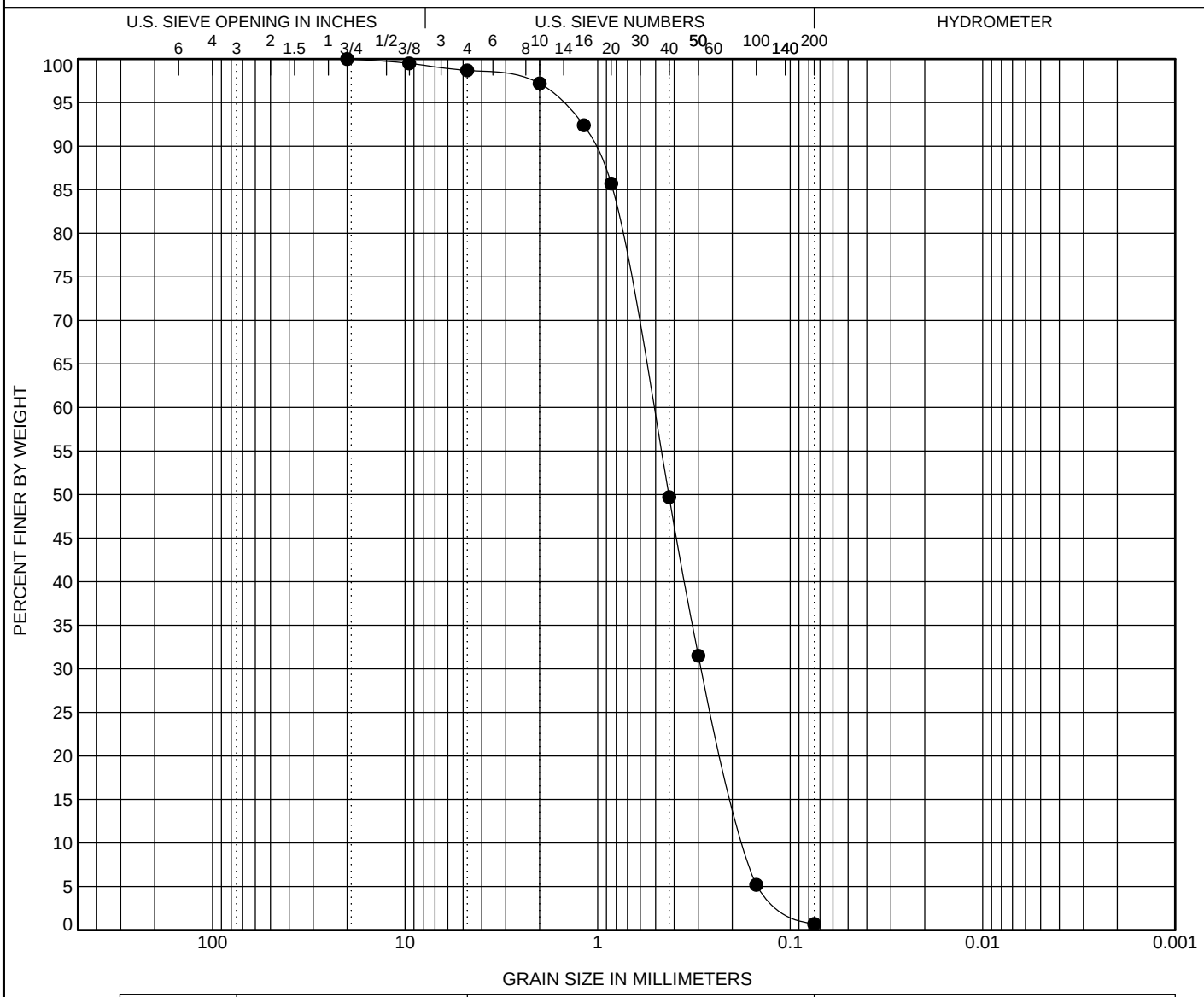
SNC·LAVALIN

TEST PIT AC1030-007

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Marshalling Yard



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-007**	**GB-1**	**2.00 - 2.50**	**1.3**	**98.0**	**0.7**	
⊠							
▲							
★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●					**100.0**	**99.5**	**98.7**	**97.2**	**85.7**	**49.7**	**31.5**	**5.2**	**0.7**
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★													
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	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-007**	POORLY GRADED SAND(SP)	**0.5**	**0.3**	**0.2**	**5.5**				**0.9**	**3.0**
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GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-21

SNC·LAVALIN

Test Pit: AC1030 - 8					
Firm:	Newfoundland and Labrador Hydro				Date: 13-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5875575	E 0612102	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.05	PEAT - black organic soil, rootlets, moist, loose	NA	NA	NA
0.05 - 0.15	Oxidized SAND - trace fines, trace rootlets poorly graded, loose to compact, orange to light brown.	NA	NA	NA
0.15 - 3.5	POORLY GRADED SAND (SP) - trace fines, trace gravels, trace cobbles, sub angular, loose to compact, moist, olive grey to light grey	1	1.0 - 3.0	Grab

Estimated Cobbles (%) 1	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 2:30 pm	End Time: 3:00 pm	Estimated Excavated Volume (m^3)	30

General Notes

Severe sloughing within test pit. Test Pit was dry upon completion

North and East coordinates obtained using Garmin Etrex Legend Cx GPS

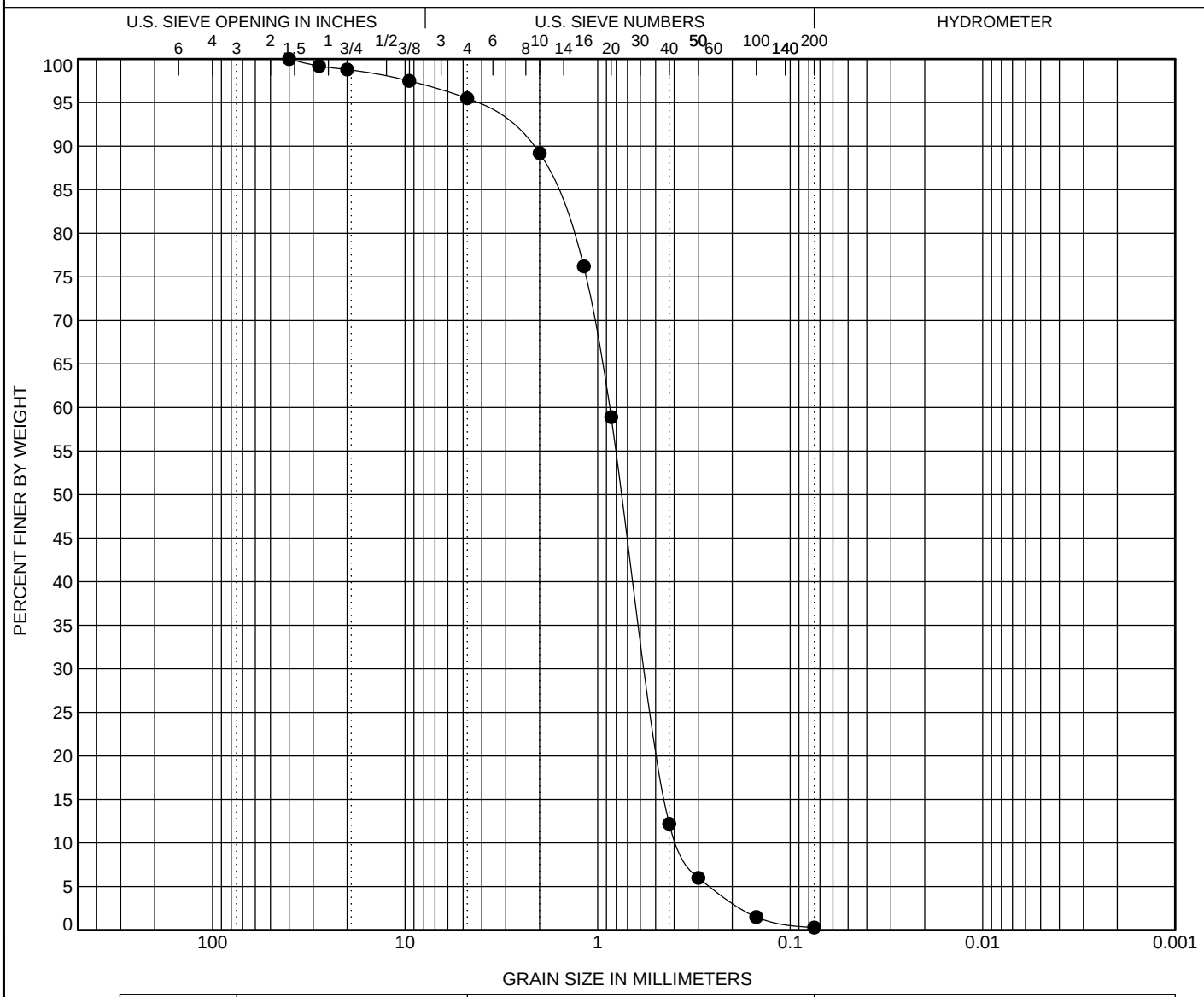
SNC·LAVALIN

TEST PIT AC1030-008

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Marshalling Yard



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-008**	**GB-1**	**1.00 - 3.00**	**4.5**	**95.2**	**0.3**	
⊠							
▲							
★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●			**100.0**	**99.2**	**98.8**	**97.5**	**95.5**	**89.2**	**58.9**	**12.2**	**6.0**	**1.5**	**0.3**
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	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-008**	POORLY GRADED SAND(SP)	**0.9**	**0.6**	**0.4**	**3.3**				**0.9**	**2.3**
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★											
⊙											

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-21

SNC·LAVALIN

Test Pit: AC1030 - 9					
Firm:	Newfoundland and Labrador Hydro				Date: 13-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5875589	E 0612019	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.06	PEAT - black organic soil, rootlets, moist, loose	NA	NA	NA
0.06 - 0.3	Oxidized SAND - trace fines, trace rootlets poorly graded, loose to compact, orange to light brown.	NA	NA	NA
0.3 - 3.0	POORLY GRADED SAND (SP) - trace fines, trace gravels, trace cobbles, sub angular, loose to compact, moist, olive grey to light grey	1	2.0 - 3.0	Grab

Estimated Cobbles (%) 1	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 3:10 pm	End Time: 3:45 pm	Estimated Excavated Volume (m^3)	28

General Notes

Severe sloughing within test pit. Test Pit was dry upon completion

North and East coordinates obtained using Garmin Etrex Legend Cx GPS

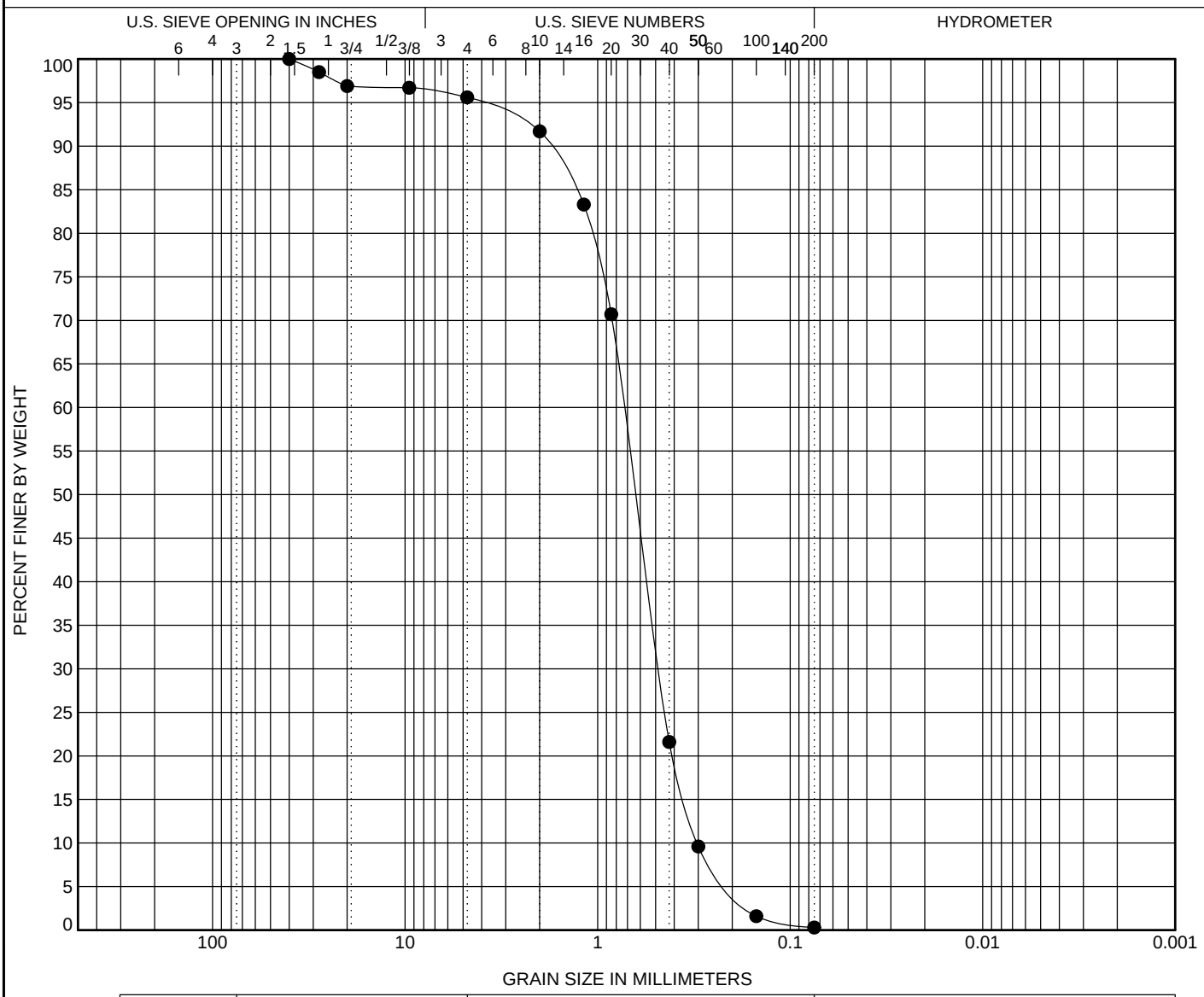
SNC·LAVALIN

TEST PIT AC1030-009

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Marshalling Yard



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-009**	**GB-1**	**2.00 - 3.00**	**4.4**	**95.3**	**0.3**	
⊠							
▲							
★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●			**100.0**	**98.5**	**96.9**	**96.7**	**95.6**	**91.7**	**70.7**	**21.6**	**9.6**	**1.6**	**0.3**
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★													
⊙													

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-009**	POORLY GRADED SAND(SP)	**0.7**	**0.5**	**0.3**	**3.3**				**1.0**	**2.4**
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GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-21

SNC·LAVALIN

Test Pit: AC1030 - 10					
Firm:	Newfoundland and Labrador Hydro				Date: 13-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5875562	E 0611970	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.06	PEAT - black organic soil, rootlets, moist, loose	NA	NA	NA
0.06 - 0.35	Oxidized SAND - trace fines, trace rootlets poorly graded, loose to compact, orange to light brown.	NA	NA	NA
0.35 - 3.5	POORLY GRADED SAND (SP) - trace fines, trace gravels, trace cobbles, sub angular, loose to compact, moist, olive grey to light grey	1	1.0 - 3.0	Grab

Estimated Cobbles (%) 1	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 4:15 pm	End Time: 3:45 pm	Estimated Excavated Volume (m^3)	30

General Notes

Severe sloughing within test pit. Test Pit was dry upon completion

North and East coordinates obtained using Garmin Etrex Legend Cx GPS

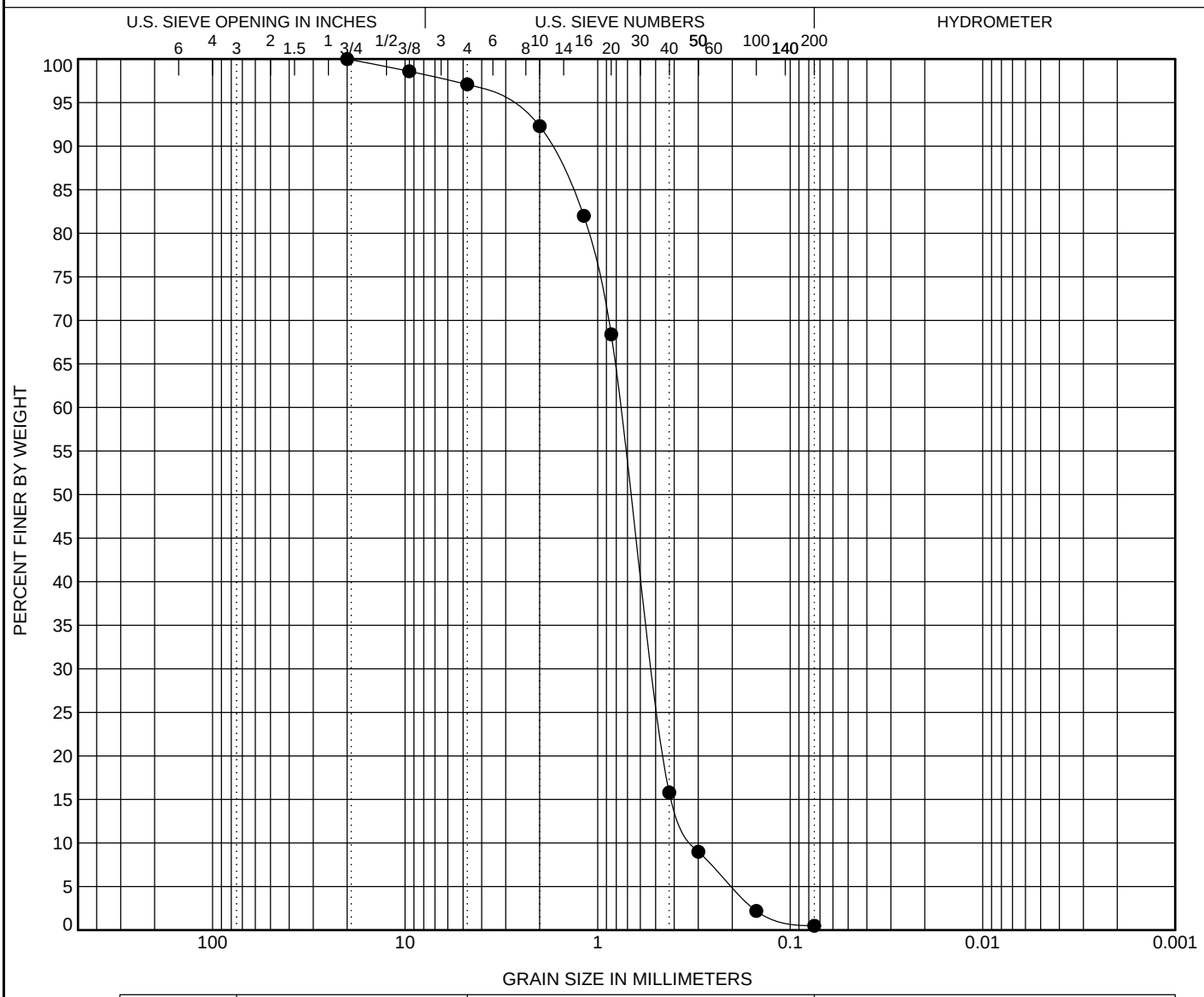
SNC·LAVALIN

TEST PIT AC1030-010

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Marshalling Yard



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030-010**	**GB-1**	**1.00 - 3.00**	**2.9**	**96.6**	**0.5**	
⊠							
▲							
★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●					**100.0**	**98.6**	**97.1**	**92.3**	**68.4**	**15.8**	**9.0**	**2.2**	**0.5**
⊠													
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★													
⊙													

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030-010**	POORLY GRADED SAND(SP)	**0.8**	**0.5**	**0.3**	**3.5**				**1.1**	**2.4**
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GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-21

APPENDIX D

CAMPSITES DATA

SNC·LAVALIN

Test Pit: CAMP 1 AC 1030 - 1 of 10					
Firm:	Newfoundland and Labrador Hydro				Date: 23-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5882869	E 0574331	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 2.5	Poorly Graded Gravel with Sand (GP) – some cobbles, some boulders, trace fines, subrounded, compact, moist, light brown.	1	1.0 - 2.0	Grab
2.5	Refusal due to Boulders or Bedrock.	NA	NA	NA

Estimated Cobbles (%) 25 - 35	Estimated Boulders (%) 5 - 10	Estimated Max Diameter (m) 1.0	
Start Time: 8:00 am	End Time: 8:20 am	Estimated Excavated Volume (m^3)	10

General Notes

Minor sloughing where boulders where removed and soil lost support.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

Water entering test pit at 2.3 m just above bedrock or large boulders.

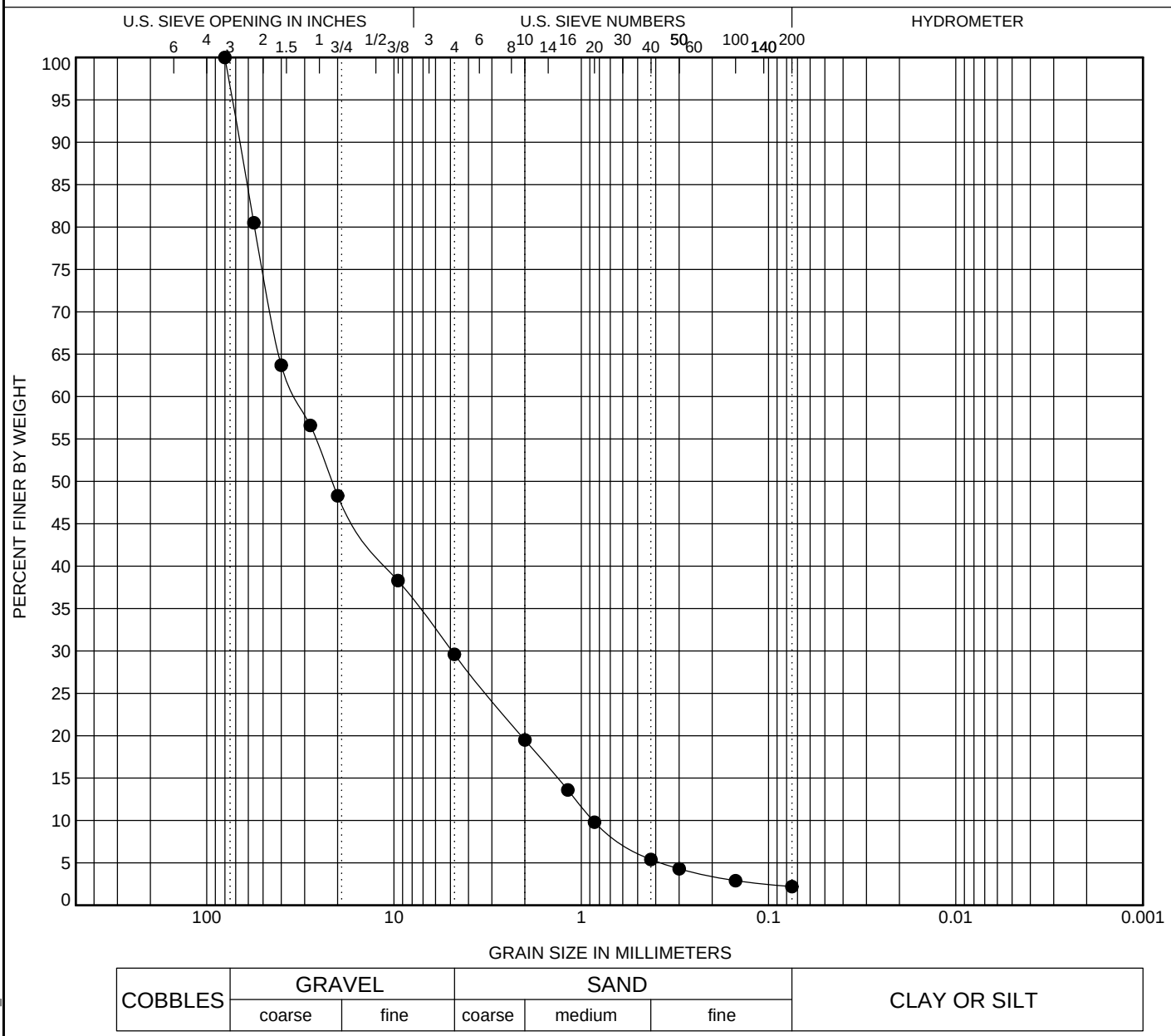
SNC·LAVALIN

TEST PIT AC1030 CS1-001

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Camp Site 1



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030 CS1-001**	**GB-1**	**1.00 - 2.00**	**66.9**	**27.4**	**2.2**	
⊠							
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	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**100.0**	**80.5**	**63.7**	**56.6**	**48.3**	**38.3**	**29.6**	**19.5**	**9.8**	**5.4**	**4.3**	**2.9**	**2.2**
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	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030 CS1-001**	Sandy GRAVEL with trace Cobbles, trace Fines	**33.2**	**4.9**	**0.9**	**5.3**				**0.8**	**38.4**
⊠											
▲											
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GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: CAMP 1 AC 1030 – 2 of 10					
Firm:	Newfoundland and Labrador Hydro				Date: 23-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5882868	E 0574313	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 1.4	WELL GRADED GRAVEL WITH SAND (GW) - some cobbles, some boulders, trace fines, subrounded, compact, moist, well graded light brown.	1	1.0	Grab
1.4	Refusal due to Bedrock or Boulders	NA	NA	NA

Estimated Cobbles (%) 25- 25	Estimated Boulders (%) 5 - 10	Estimated Max Diameter (m) 0.5	
Start Time: 8:22 am	End Time: 8:35 am	Estimated Excavated Volume (m^3)	10

General Notes

No sloughing. Test pit was dry upon completion.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

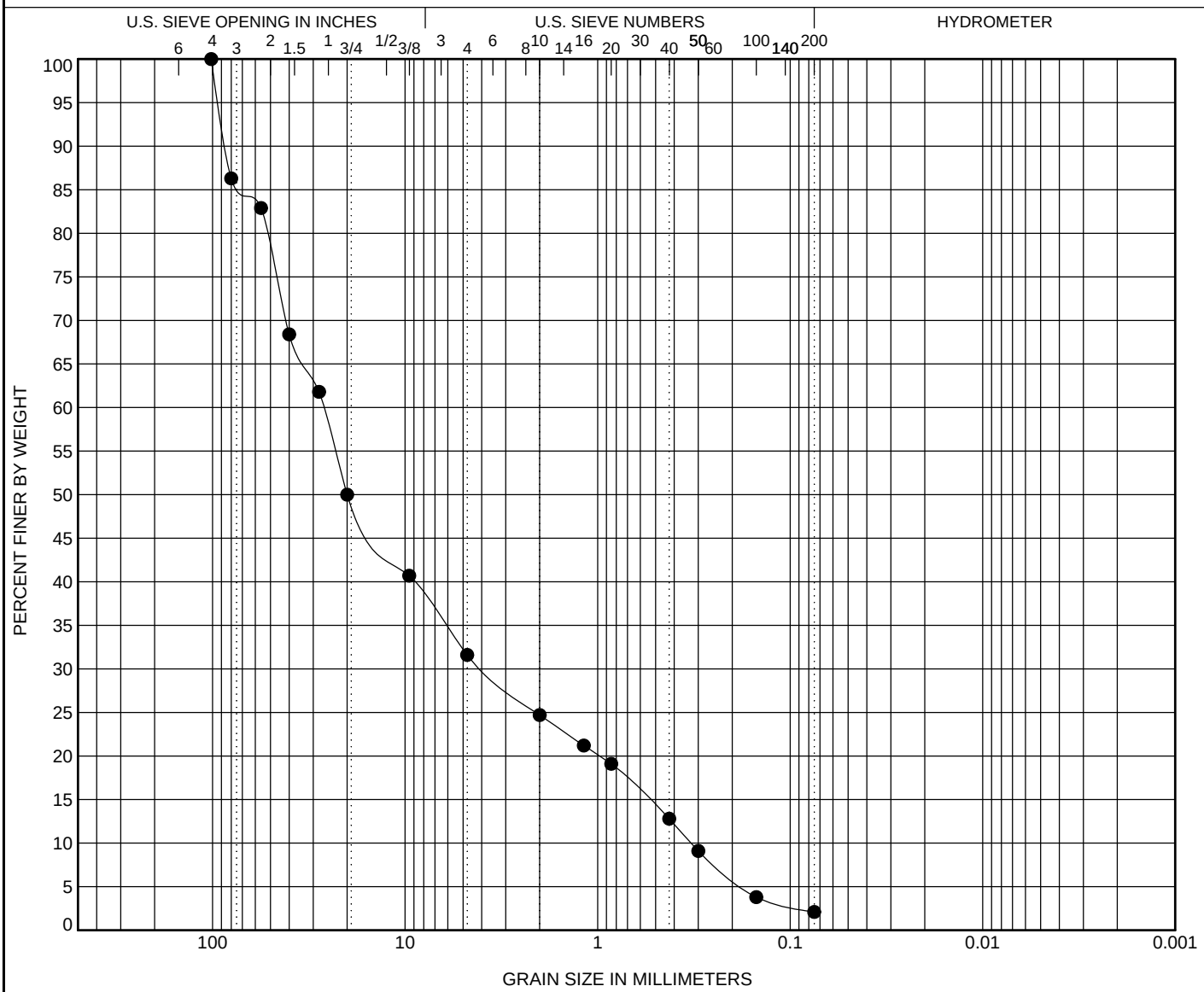
SNC·LAVALIN

TEST PIT AC1030 CS1-002

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Camp Site 1



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030 CS1-002**	**GB-1**	**1.00 - 1.30**	**54.1**	**29.5**	**2.1**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**86.3**	**82.9**	**68.4**	**61.8**	**50.0**	**40.7**	**31.6**	**24.7**	**19.1**	**12.8**	**9.1**	**3.8**	**2.1**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030 CS1-002**	Sandy GRAVEL with some Cobbles, trace Fines	**26.6**	**3.9**	**0.3**	**4.4**				**1.7**	**81.5**

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: CAMP 1 AC 1030 – 3 of 10					
Firm:	Newfoundland and Labrador Hydro				Date: 23-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5882863	E 0574302	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.45	SAND and GRAVEL - some fines, trace cobbles, moist, compact, well graded, subangular, light brown (fill zone).	NA	NA	NA
0.45 - 0.75	Natural Topsoil, some organics, oxidized sand, poorly graded, compact, moist, orange to light brown.	NA	NA	NA
0.75 - 2.5	SAND and GRAVEL - some fines, some cobbles, moist, compact, well graded, subangular, light brown.	NA	NA	NA
2.5 - 3.0	SANDY SILT – trace gravel, moist, compact, stiff to firm, light grey.	1	2.5 - 3.0	Grab

Estimated Cobbles (%) 20 - 25	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 8:30 am	End Time: 8:45 am	Estimated Excavated Volume (m^3)	24

General Notes

Moderate sloughing throughout.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

Water entering test pit at 2.8 m mark where old septic system was placed in old camp.

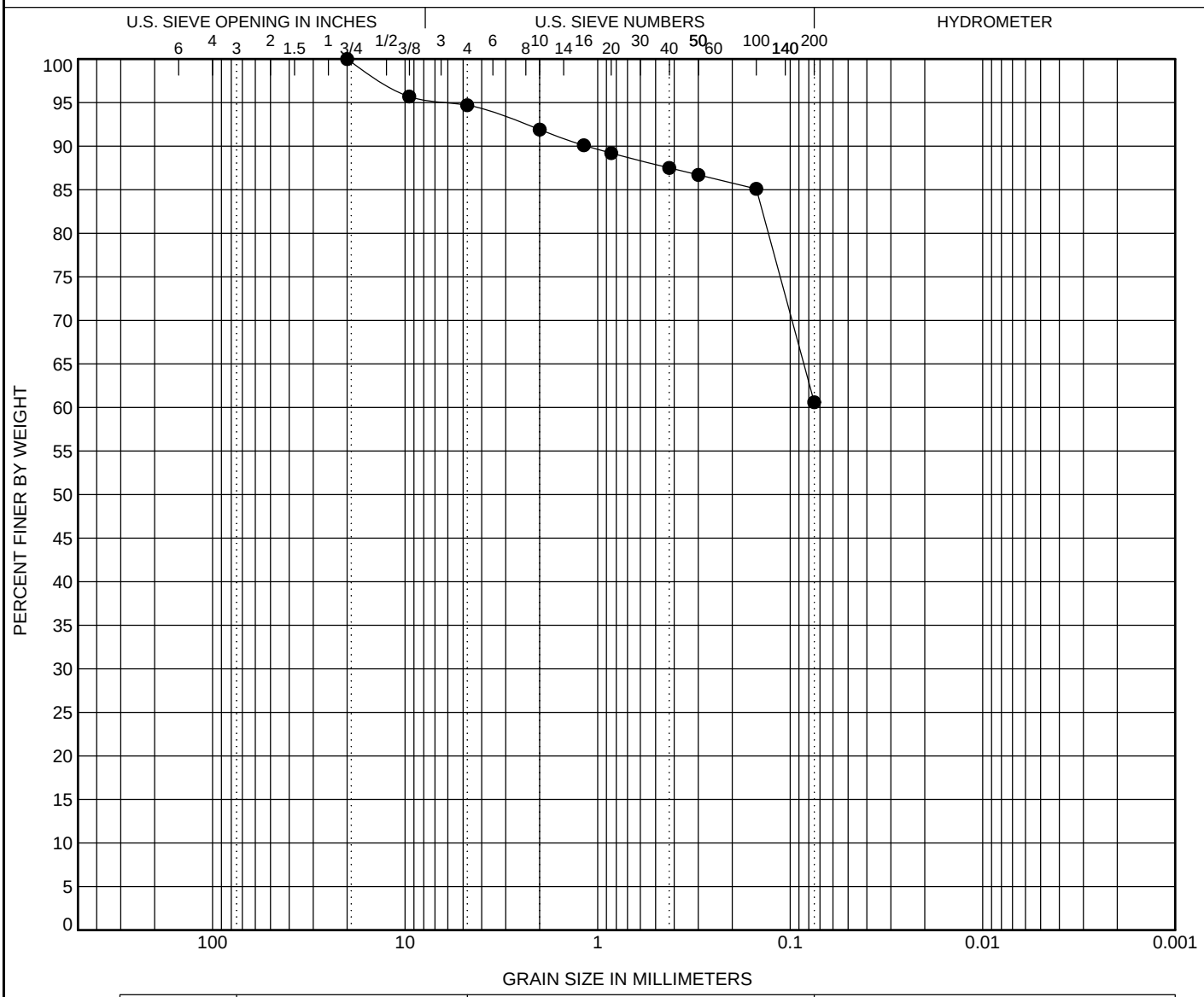
SNC·LAVALIN

TEST PIT AC1030 CS1-003

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Camp Site 1



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030 CS1-003**	**GB-1**	**2.50 - 3.00**	**5.3**	**34.1**	**60.6**	
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★							
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	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●					**100.0**	**95.7**	**94.7**	**91.9**	**89.2**	**87.5**	**86.7**	**85.1**	**60.6**
⊠													
▲													
★													
⊙													

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030 CS1-003**	Sandy SILT with trace Gravel				**21.8**					
⊠											
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★											
⊙											

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: CAMP 1 AC 1030 – 4 of 10					
Firm:	Newfoundland and Labrador Hydro				Date: 23-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5882881	E 0574301	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.3	SAND and GRAVEL - some fines, cobbles, subangular well graded, compact, moist, light brown (fill zone).	NA	NA	NA
0.3 - 0.4	Topsoil with oxidized sand, poorly graded, moist, loose to compact, yellowish orange.	NA	NA	NA
0.4 - 3.0	POORLY GRADED GRAVEL with SAND (GP) - some cobbles, some subangular to subrounded boulders, trace fines, compact, moist, greenish grey.	1	1.0 - 2.0	Grab

Estimated Cobbles (%) 20 - 25	Estimated Boulders (%) 1 - 10	Estimated Max Diameter (m) 0.5	
Start Time: 8:48 am	End Time: 9:00 am	Estimated Excavated Volume (m^3)	25

General Notes

Moderate to severe sloughing.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

Water entering test pit at 2.5 m slow to steady trickle.

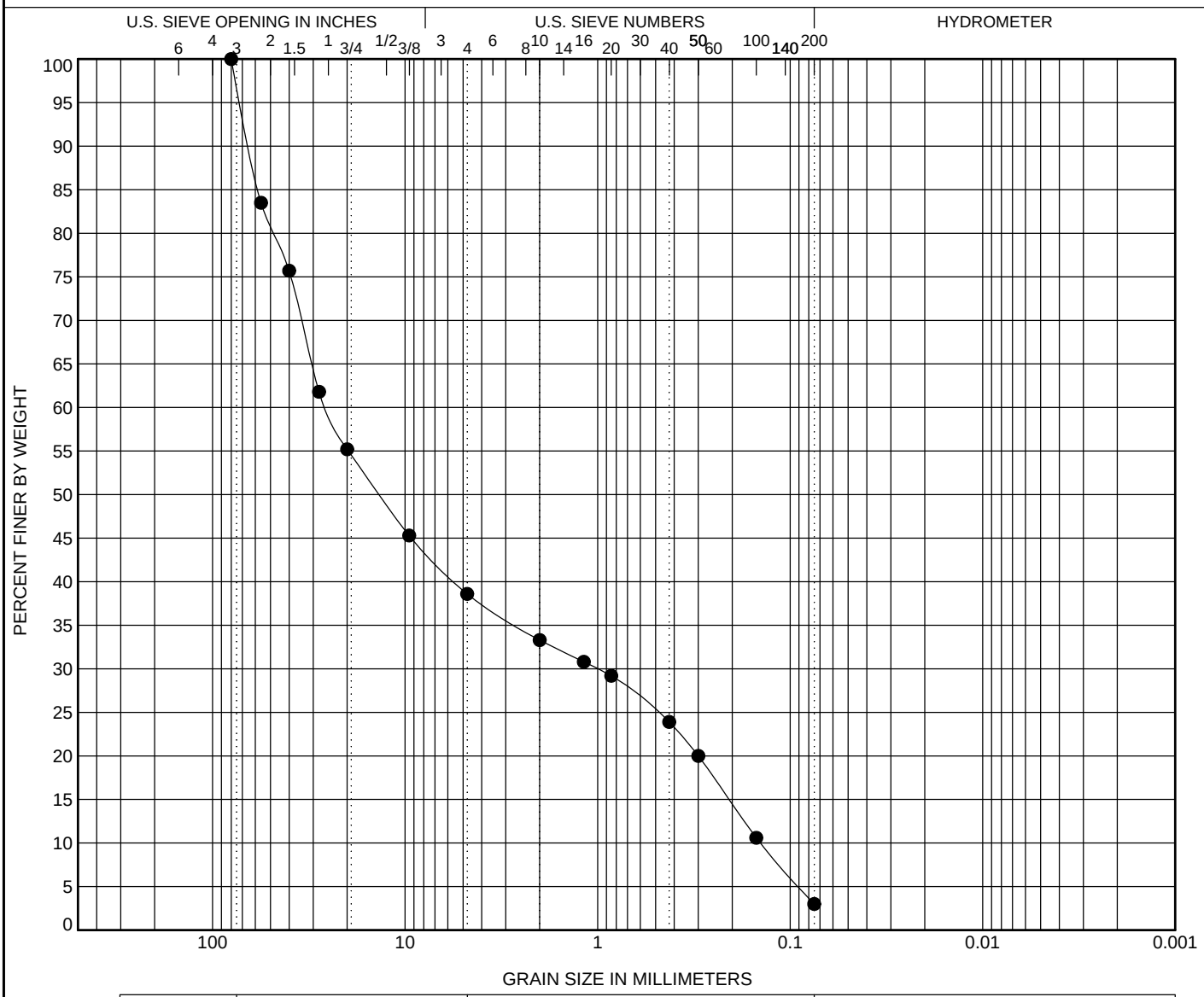
SNC·LAVALIN

TEST PIT AC1030 CS1-004

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Camp Site 1



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030 CS1-004**	**GB-1**	**1.00 - 2.00**	**58.4**	**35.6**	**3.0**	
⊠							
▲							
★							
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	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**100.0**	**83.5**	**75.7**	**61.8**	**55.2**	**45.3**	**38.6**	**33.3**	**29.2**	**23.9**	**20.0**	**10.6**	**3.0**
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	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030 CS1-004**	POORLY GRADED GRAVEL with SAND(GP)	**25.5**	**1**	**0.1**	**7.5**				**0.3**	**179.9**
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GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-21

SNC·LAVALIN

Test Pit: CAMP 1 AC 1030 – 5 of 10					
Firm:	Newfoundland and Labrador Hydro				Date: 23-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5882899	E 0574312	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.6	SAND and GRAVEL - some fines, cobbles, trace boulders, subrounded, well graded, moist, compact, light brown (fill zone).	NA	NA	NA
0.6 - 0.75	Topsoil - some grey weathered sand, with organic soil below, orange to light brown, poorly graded, moist, loose to compact.	NA	NA	NA
0.75 - 2.5	POORLY GRADED GRAVEL with SAND (GP) - some cobbles, some subrounded boulders, trace fines, compact, moist, light brown.	1	1.0 - 2.0	Grab

Estimated Cobbles (%) 15 - 25	Estimated Boulders (%) 1 - 10	Estimated Max Diameter (m) 0.7	
Start Time: 9:02 am	End Time: 9:15 am	Estimated Excavated Volume (m^3)	20

General Notes

Moderate sloughing as boulders get removed/moved.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

Refusal at 2.5 m due to bedrock or boulders.

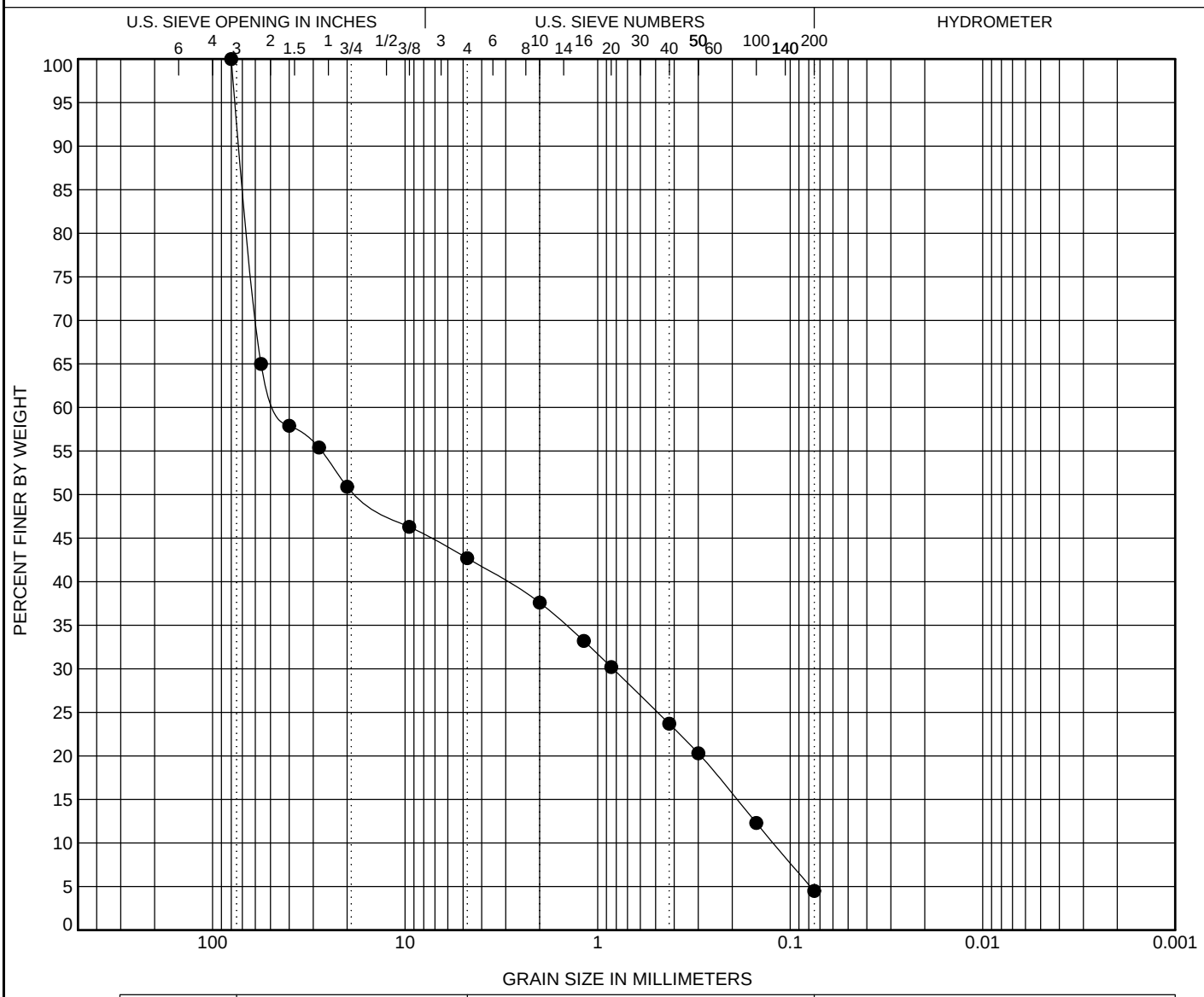
SNC·LAVALIN

TEST PIT AC1030 CS1-005

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Camp Site 1



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030 CS1-005**	**GB-1**	**1.00 - 2.00**	**51.0**	**38.2**	**4.5**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**100.0**	**65.0**	**57.9**	**55.4**	**50.9**	**46.3**	**42.7**	**37.6**	**30.2**	**23.7**	**20.3**	**12.3**	**4.5**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030 CS1-005**	POORLY GRADED GRAVEL with SAND(GP)	**44.2**	**0.8**	**0.1**	**12.1**				**0.1**	**361.4**

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-21

SNC·LAVALIN

Test Pit: CAMP 1 AC 1030 – 6 of 10					
Firm:	Newfoundland and Labrador Hydro				Date: 23-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5882897	E 0574291	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.4	SAND and GRAVEL - trace cobbles, some fines, subangular, compact, moist, well graded, light brown (fill).	NA	NA	NA
0.4 - 0.6	Topsoil - dark brown, some grey weathered sand, some oxidized orange to light brown sand, some fines, compact, moist, poorly graded.	NA	NA	NA
0.6 - 1.2	SAND with some fines, trace gravel, some cobbles, compact, moist, poorly graded, light grey.	1	0.6 - 1.2	Grab
1.2	Refusal bedrock or boulders.	NA	NA	NA

Estimated Cobbles (%) 10 - 20	Estimated Boulders (%) 0	Estimated Max Diameter (m)	NA
Start Time: 9:16 am	End Time: 9:30 am	Estimated Excavated Volume (m^3)	10

General Notes

No sloughing. Test pit was dry upon completion.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS

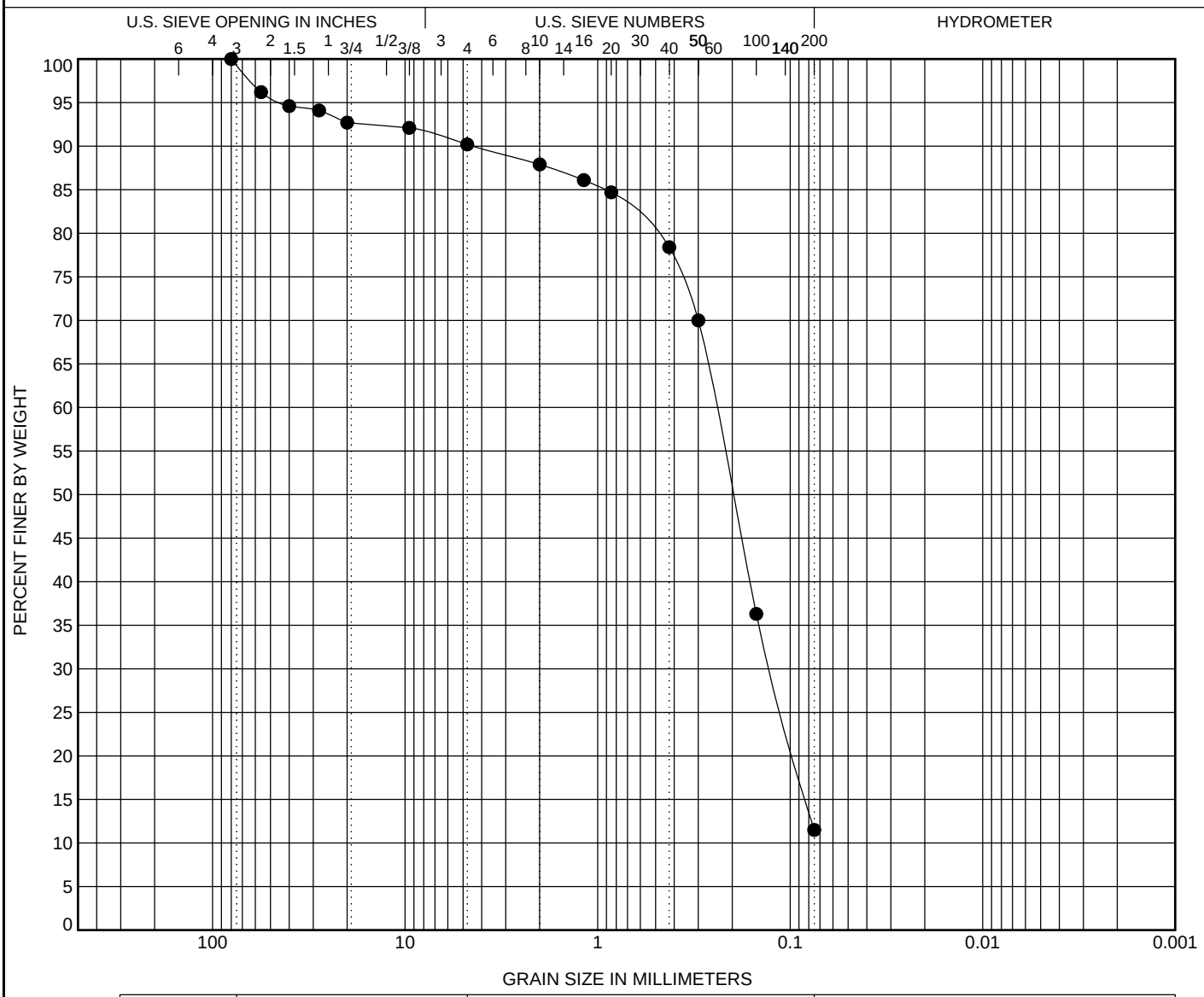
SNC·LAVALIN

TEST PIT AC1030 CS1-006

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Camp Site 1



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030 CS1-006**	**GB-1**	**0.60 - 1.70**	**9.1**	**78.7**	**11.5**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**100.0**	**96.2**	**94.6**	**94.1**	**92.7**	**92.1**	**90.2**	**87.9**	**84.7**	**78.4**	**70.0**	**36.3**	**11.5**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030 CS1-006**	SAND with some Fines, tr. Gravel & Cobbles	**0.2**	**0.1**		**12.3**				**0.9**	**3.4**

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: CAMP 1 AC 1030 – 7 of 10					
Firm:	Newfoundland and Labrador Hydro				Date: 23-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5882886	E 0574279	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.1	SAND and GRAVEL - trace cobbles, fines, subrounded, well graded, compact, moist, light brown.	NA	NA	NA
0.1 - 1.5	SAND - some fines, compact, moist, poorly graded, trace boulders subrounded, light grey.	NA	NA	NA
1.5 - 2.0	Bed of boulders.	NA	NA	NA
2.0 - 4.0	POORLY GRADED SAND with GRAVEL(SP) - trace fines, wet, compact, dark grey.	1	3.0 - 4.0	Grab

Estimated Cobbles (%) 5 - 15	Estimated Boulders (%) 5 - 15	Estimated Max Diameter (m) 0.5	
Start Time: 9:37 am	End Time: 10:10 am	Estimated Excavated Volume (m^3)	40

General Notes

Moderate to severe sloughing throughout test pit.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

Water entering test pit at 2.5 m.

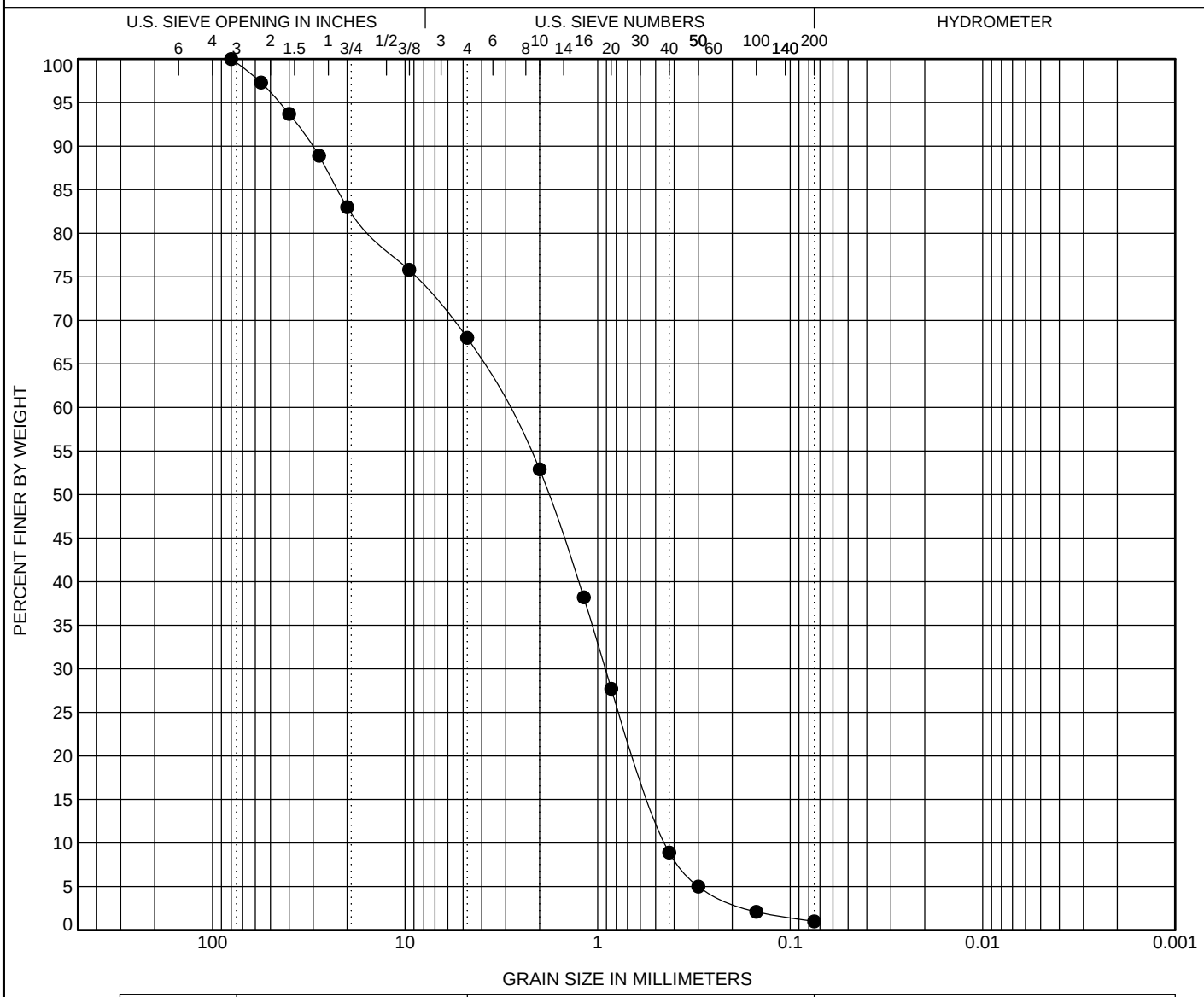
SNC·LAVALIN

TEST PIT AC1030 CS1-007

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Camp Site 1



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030 CS1-007**	**GB-1**	**3.00 - 4.00**	**31.5**	**67.0**	**1.0**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**100.0**	**97.3**	**93.7**	**88.9**	**83.0**	**75.8**	**68.0**	**52.9**	**27.7**	**8.9**	**5.0**	**2.1**	**1.0**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030 CS1-007**	POORLY GRADED SAND with GRAVEL(SP)	**3**	**0.9**	**0.4**	**10.7**				**0.6**	**6.8**

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-21

SNC·LAVALIN

Test Pit: CAMP 1 AC 1030 – 8 of 10					
Firm:	Newfoundland and Labrador Hydro				Date: 23-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5882899	E 0574267	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 2.0	POORLY GRADED GRAVEL with SAND - some subrounded cobbles, trace boulders, trace fines, moist, compact, light brown.	1	1.0 - 2.0	Grab
2.0 - 4.0	SAND and GRAVEL - trace fines, wet, compact, poorly graded, dark grey.	NA	NA	NA

Estimated Cobbles (%) 35 - 45	Estimated Boulders (%) 5 - 15	Estimated Max Diameter (m) 0.8	
Start Time: 10:30 am	End Time: 10:55 am	Estimated Excavated Volume (m^3)	30

General Notes

Moderate sloughing in first 2 meters of test pit.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

Water entering test pit at 2.8 m mark.

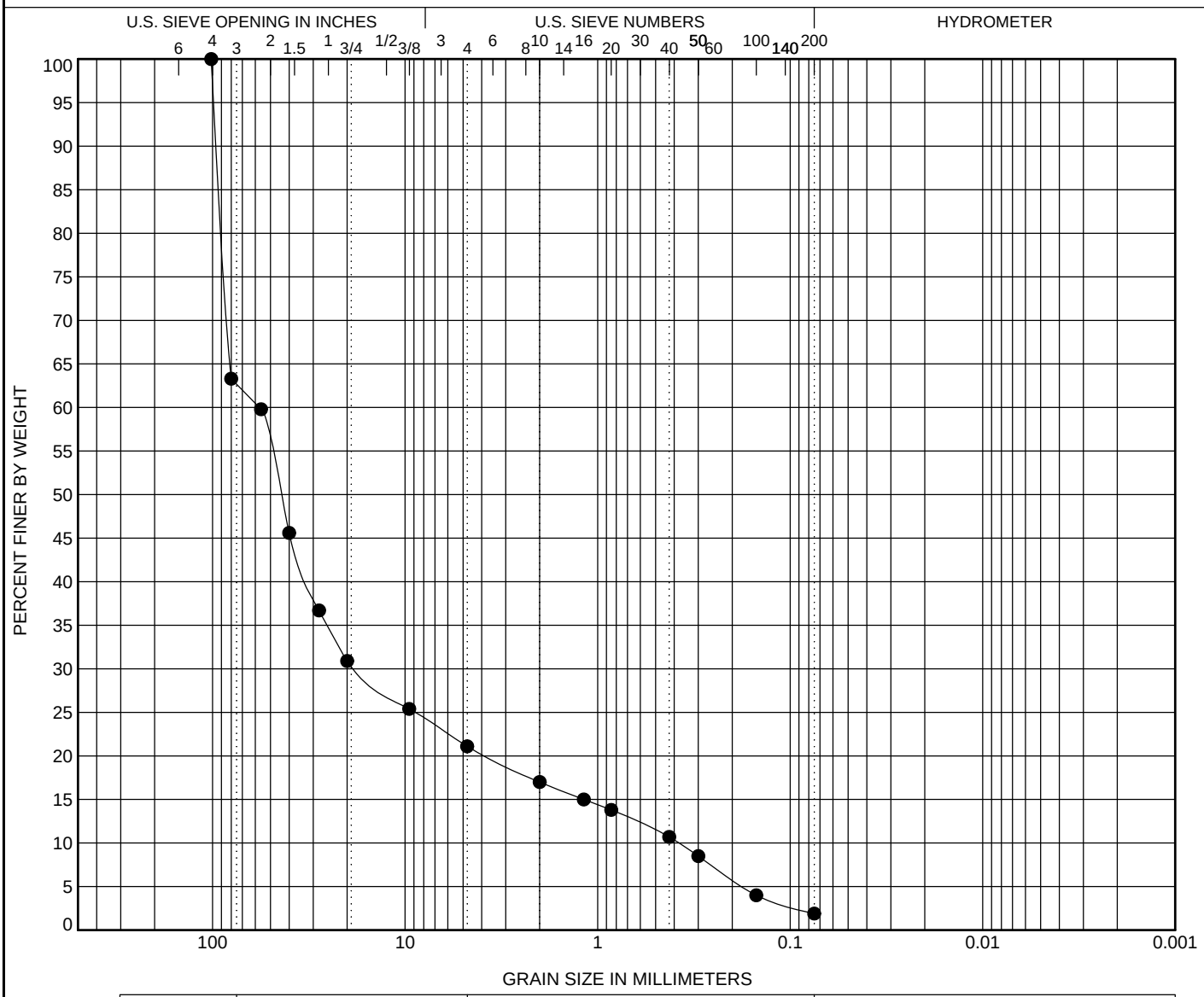
SNC·LAVALIN

TEST PIT AC1030 CS1-008

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Camp Site 1



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030 CS1-008**	**GB-1**	**1.00 - 2.00**	**41.6**	**19.2**	**1.9**	
⊠							
▲							
★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**63.3**	**59.8**	**45.6**	**36.7**	**30.9**	**25.4**	**21.1**	**17.0**	**13.8**	**10.7**	**8.5**	**4.0**	**1.9**
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	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030 CS1-008**	POORLY GRADED GRAVEL with SAND(GP)	**57.2**	**17.7**	**0.4**	**11.6**				**14.4**	**150.2**
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GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-21

SNC·LAVALIN

Test Pit: CAMP 1 AC 1030 – 9 of 10					
Firm:	Newfoundland and Labrador Hydro				Date: 23-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5882917	E 0574279	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 2.0	POORLY GRADED GRAVEL with SAND (GP) - some, cobbles, some boulders, trace fines, subrounded, moist, compact, light brown.	1	1.0 - 2.0	Grab
2.0	Refusal due to boulders or bedrock.	NA	NA	NA

Estimated Cobbles (%) 25 - 35	Estimated Boulders (%) 5 - 15	Estimated Max Diameter (m) 1.0	
Start Time: 11:00 am	End Time: 11:25 am	Estimated Excavated Volume (m^3)	10

General Notes

No sloughing. Test pit was dry upon completion.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

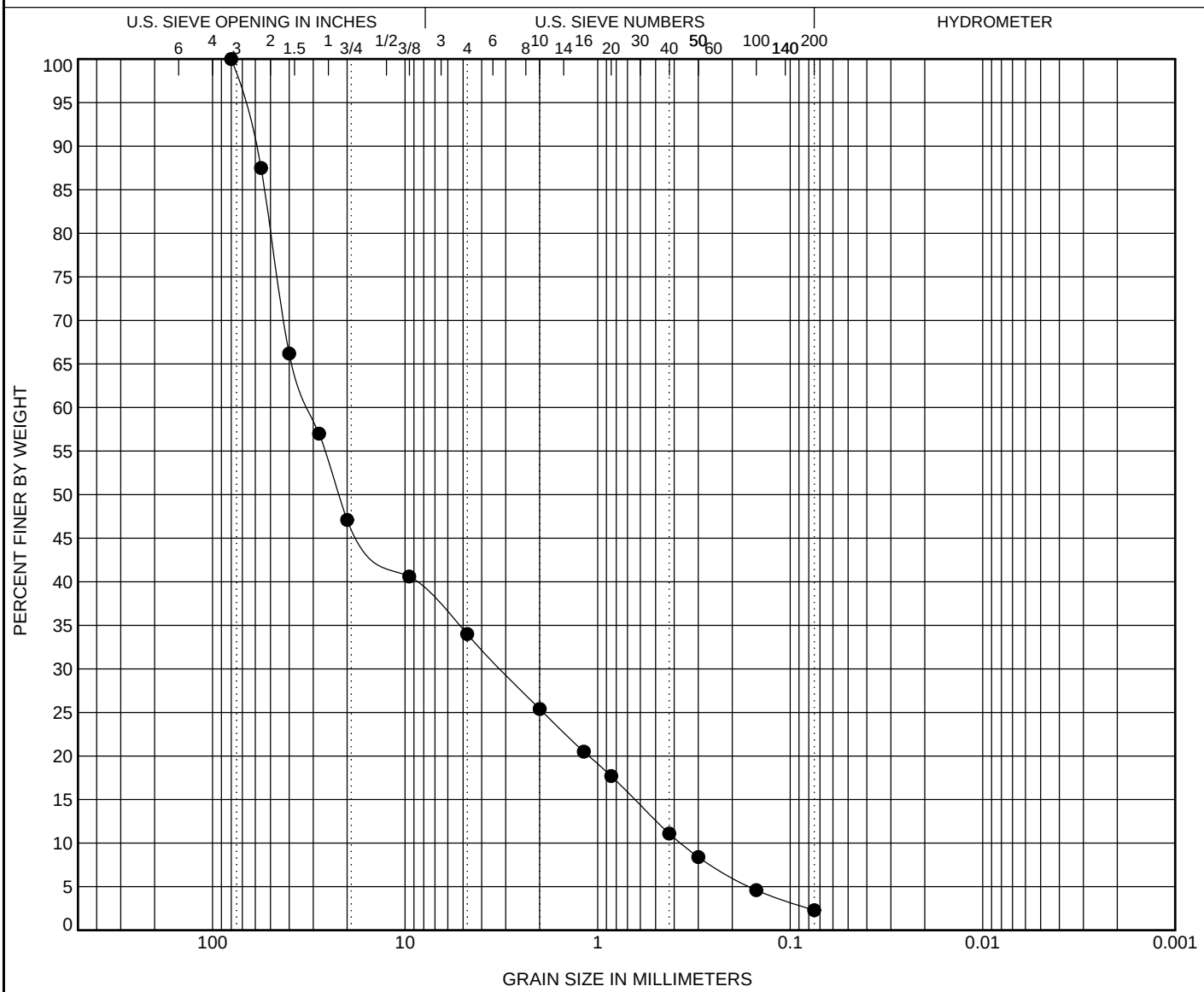
SNC·LAVALIN

TEST PIT AC1030 CS1-009

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Camp Site 1



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030 CS1-009**	**GB-1**	**1.00 - 2.00**	**63.8**	**31.7**	**2.3**	
⊠							
▲							
★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**100.0**	**87.5**	**66.2**	**57.0**	**47.1**	**40.6**	**34.0**	**25.4**	**17.7**	**11.1**	**8.4**	**4.6**	**2.3**
⊠													
▲													
★													
⊙													

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030 CS1-009**	POORLY GRADED GRAVEL with SAND(GP)	**31.5**	**3.2**	**0.4**	**5.0**				**0.9**	**85.3**
⊠											
▲											
★											
⊙											

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-21

SNC·LAVALIN

Test Pit: CAMP 1 AC 1030 – 10 of 10					
Firm:	Newfoundland and Labrador Hydro				Date: 23-Sep-07
Project:	Lower Churchill Project – 735 kV Transmission Line – Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5882921	E 0574294	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 2.5	WELL-GRADED GRAVEL with SAND (GW) – trace fines, some cobbles, trace boulders, subrounded, moist, compact, light brown.	1	1.0 - 2.0	Grab
2.5	Refusal due to bedrock or boulders.	NA	NA	NA

Estimated Cobbles (%) 30 – 40	Estimated Boulders (%) 5 - 10	Estimated Max Diameter (m) 0.6	
Start Time: 11:30 am	End Time: 12:00 pm	Estimated Excavated Volume (m^3)	10

General Notes

Minor sloughing in top meter of sand and gravel. Test pit was dry upon completion

North and East coordinates obtained using Garmin Etrex Legend Cx GPS

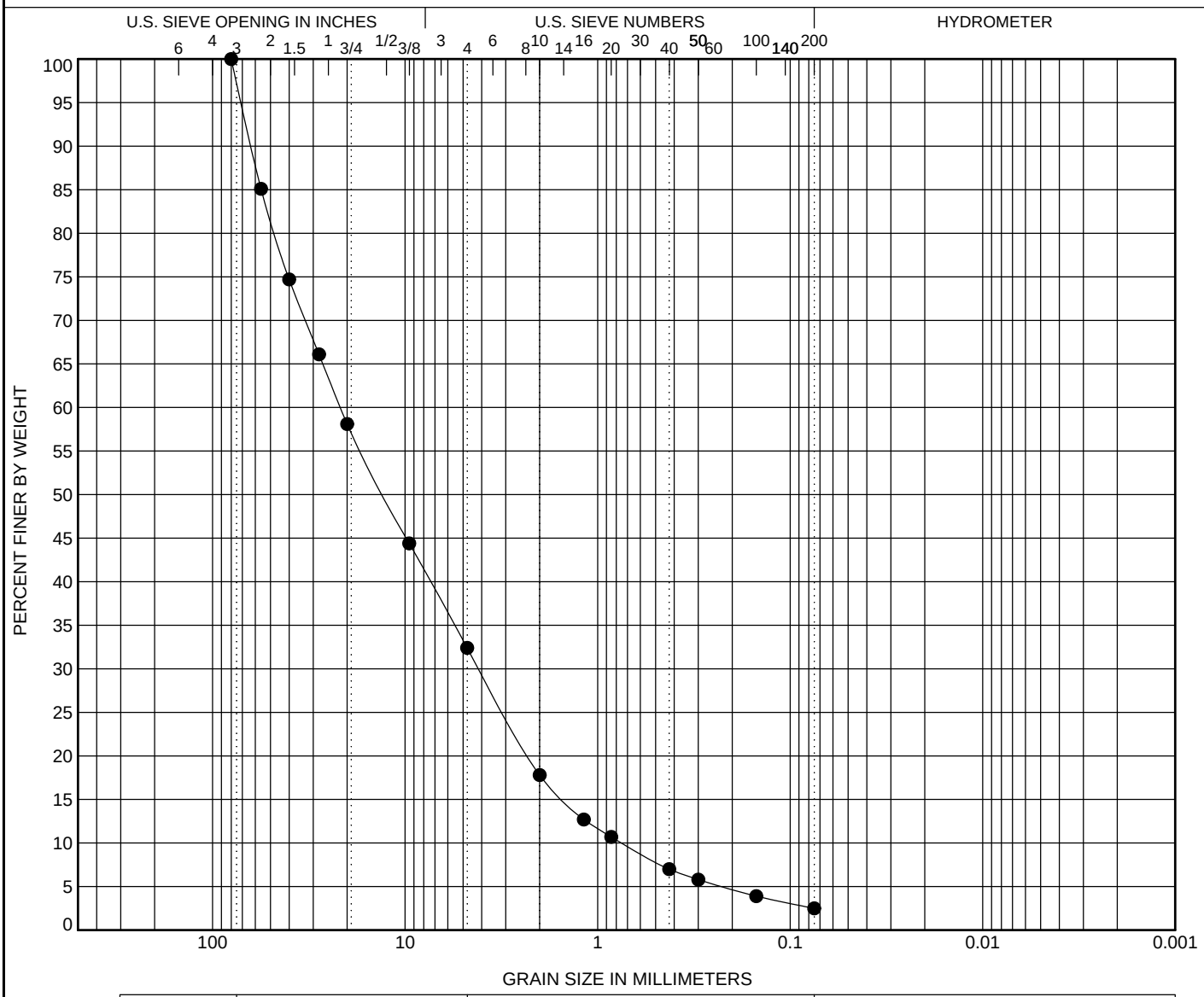
SNC·LAVALIN

TEST PIT AC1030 CS1-010

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Camp Site 1



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030 CS1-010**	**GB-1**	**1.00 - 2.00**	**64.9**	**29.9**	**2.5**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**100.0**	**85.1**	**74.7**	**66.1**	**58.1**	**44.4**	**32.4**	**17.8**	**10.7**	**7.0**	**5.8**	**3.9**	**2.5**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030 CS1-010**	WELL-GRADED GRAVEL with SAND(GW)	**21.7**	**4.1**	**0.7**	**4.3**				**1.1**	**29.1**

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-21

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BOREHOLE LOG

BOREHOLE CS1-BH-01

PAGE 1 OF 1

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Camp Site 1

REFERENCE LEVEL: Geodetic (NAD 83) **DATE STARTED** 2007-10-03 **COMPLETED** 2007-10-04

COORDINATES: **NORTHING** 5882914.00 m **DRILLING METHOD** Diamond drill

EASTING 574286.00 m **CASING SIZE** NW

REFERENCE ELEVATION --- **CORING SIZE** NQ

NOTES: Borehole to confirm presence of bedrock. No RQD recorded **BEDROCK DEPTH:** 5.79 m **TOTAL DEPTH:** 7.82 m

GROUND WATER LEVELS:

AT TIME OF DRILLING 2.6 m **DATE** 2007-10-04

AFTER DRILLING Water table not measured **DATE** ---

HOLE ORIENTATION:

AZIMUTH (degrees): ---

PLUNGE (degrees): -90

SPT

HAMMER SIZE : 63.5 Kg

HAMMER DROP : 0.76 m

DEPTH (m)	ELEVATION (m)	MATERIAL DESCRIPTION	STRAT.	PIEZO LEVEL (m)	SAMPLE SIZE	SAMPLE TYPE	SAMPLE NUMBER	RECOVERY %	N or RQD	K (cm/s)	TESTS & RESULTS
	0.00	SAND and GRAVEL					AU-1				W = 14.6%
							AU-2				Fines = 13.8% W = 6.0% Fines = 7.3%
	1.22	Removed boulders									
	3.20	SAND and GRAVEL					SS-3	42	17		W = 7.7% Fines = 3.2%
							SS-4	13	15		W = 15.9% Fines = 4.4%
5							SS-5	29	79		W = 7.6% Fines = 6.5%
							SS-6	21	20		W = 7.7%
	5.79	BEDROCK					SS-7	0	50		Fines = 3.1%
							RC-8	100			
		Bottom of hole at 7.82 m.									

WATER CONTENT (%) 5 10 15 20 25

SPT N VALUE 10 20 30 40 50 >>

LOGGED BY K.R. **CHECKED BY** C.S. **APPROVED BY** ---

GEOTECH BH PLOTS TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-21

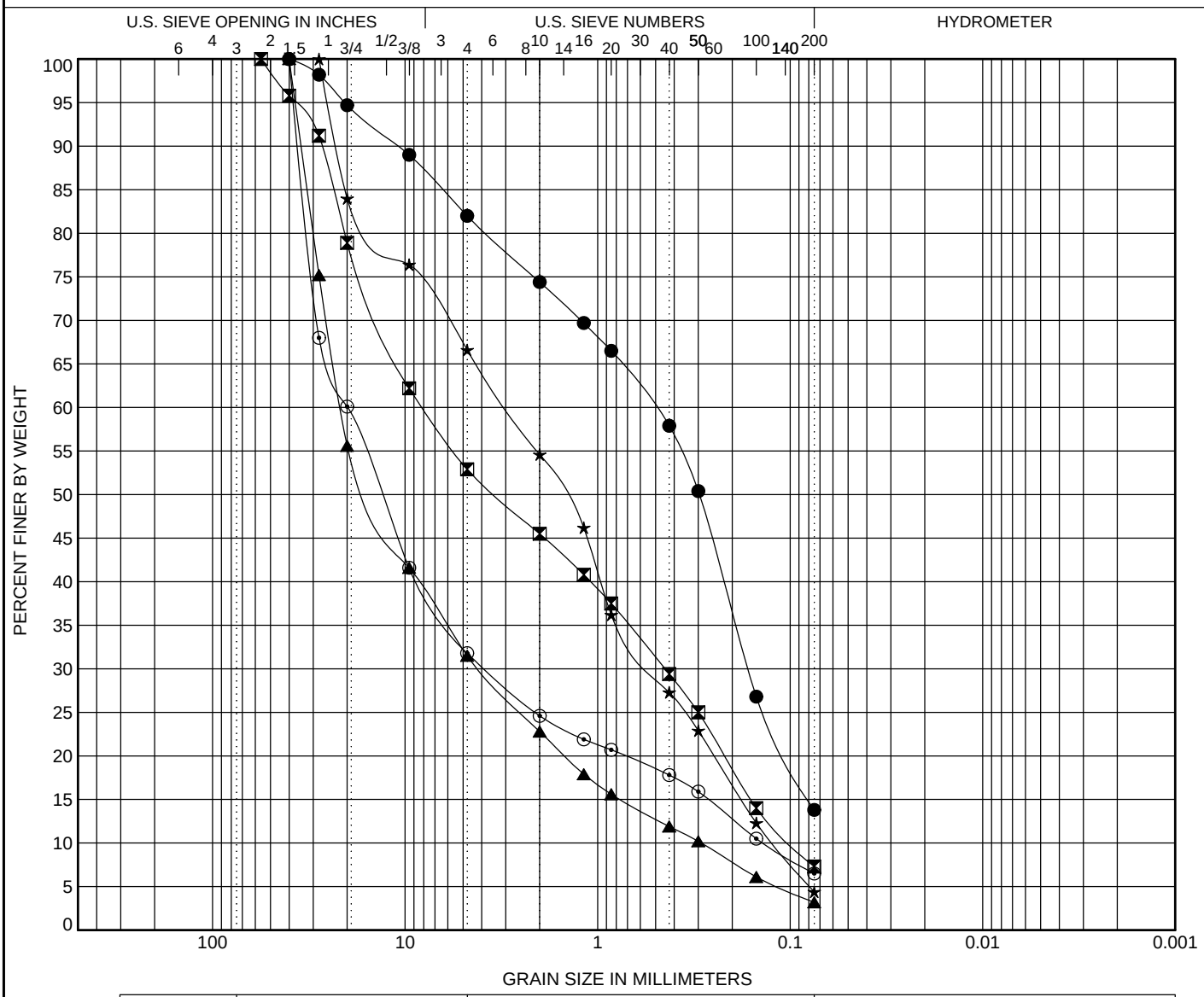
SNC·LAVALIN

BOREHOLE CS1-BH-01

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Camp Site 1



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Borehole no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	CS1-BH-01	AU-1	0.00 - 0.61	18.0	68.2	13.8	
⊠	CS1-BH-01	AU-2	0.61 - 1.22	47.1	45.6	7.3	
▲	CS1-BH-01	SS-3	3.20 - 3.81	68.5	28.3	3.2	
★	CS1-BH-01	SS-4	3.81 - 4.42	33.4	62.2	4.4	
⊙	CS1-BH-01	SS-5	4.57 - 5.18	68.2	25.3	6.5	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●			100.0	98.2	94.7	89.0	82.0	74.4	66.5	57.9	50.4	26.8	13.8
⊠		100.0	95.8	91.2	78.9	62.2	52.9	45.5	37.5	29.4	25.0	14.0	7.3
▲			100.0	75.2	55.6	41.6	31.5	22.8	15.6	11.9	10.2	6.1	3.2
★				100.0	84.0	76.4	66.6	54.6	36.2	27.3	22.9	12.3	4.4
⊙			100.0	68.0	60.1	41.6	31.8	24.6	20.7	17.8	15.9	10.5	6.5

	Borehole no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	CS1-BH-01	SAND with some Gravel, some Fines	0.5	0.2		14.6					
⊠	CS1-BH-01	GRAVEL and SAND with trace Fines	8.1	0.4	0.1	6.0				0.2	81.5
▲	CS1-BH-01	WELL-GRADED GRAVEL with SAND(GW)	21.6	4.1	0.3	7.7				2.7	74.4
★	CS1-BH-01	POORLY GRADED SAND with GRAVEL(SP)	3	0.5	0.1	15.9				0.8	24.1
⊙	CS1-BH-01	Sandy GRAVEL with trace Fines	19.9	3.8	0.1	7.6				5.4	144.8

GRAIN SIZE2 - BOREHOLE TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

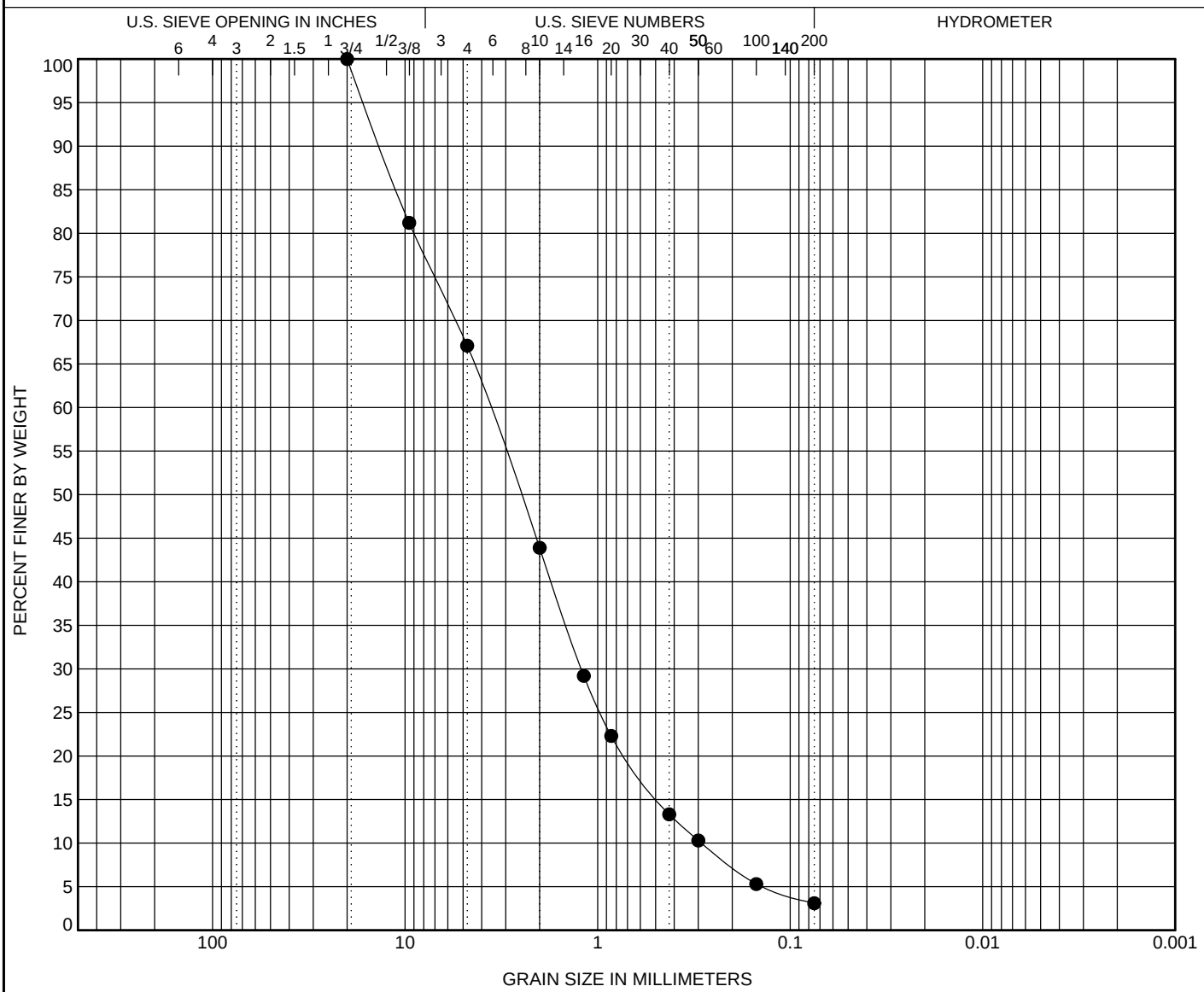
SNC·LAVALIN

BOREHOLE CS1-BH-01

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Camp Site 1



Borehole no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
CS1-BH-01	**SS-6**	**5.18 - 5.79**	**33.0**	**63.9**	**3.1**	

80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
				100.0	**81.2**	**67.1**	**43.9**	**22.3**	**13.3**	**10.3**	**5.3**	**3.1**

Borehole no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
CS1-BH-01	WELL-GRADED SAND with GRAVEL(SW)	**3.7**	**1.2**	**0.3**	**7.7**				**1.4**	**12.7**

GRAIN SIZE2 - BOREHOLE TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

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PERCOLATION TEST RECORD

Field Investigation and Construction Requirements 735 kV Transmission Line – Gull Island to Churchill Falls

WTO	AC1030 (Gull to Churchill TL)	**TEST ID**	AC1030-CS1-PT-01
DATE	23 Sept 2007	**TECHNOLOGIST**	DJD / JY
TEST LOCATION & DEPTH			
Northing	See Below	**Easting**	See Below

- Camp Site 1 – Former Camp on south side of TLH. 43 km passed Gull Island Turn Off.
- Test Completed in Test Pit AC1030-CS1-TP-6. See test pit log for coordinates.
- Percolation Test conducted from 0.7 to 1.0 m below ground surface.

STRATIGRAPHY & TEST DETAILS

- **STATIGRAPHY:** See Test Pit AC1030-CS1-TP-6:
  - 0 – 0.4: FILL (SAND & GRAVEL)
  - 0.4 – 0.6: TOPSOIL
  - 0.6 – 1.2 SAND
- **TEST DEPTH:** Performed in fine sand, trace to some fines at a depth of 0.7 to 1.0 m.
- **TEST HOLE DIMENSIONS:** 230 mm Ø x 300 mm deep.
- **TEST HOLE PREPERATION:** 50 mm of fine sand loosely placed at bottom of hole. Tap water used.

PERCOLATION TEST RESULTS

TIME	REFERENCE MEASUREMENT (mm)	WATER LEVEL DROP (mm)	Notes
09:47:00	696		• Filled hole 3 times. • Level dropping at constant rate.
09:49:50	696	0	• Start test.
09:50:03	703	7	•
09:50:30	720	24	•
09:51:00	731	35	•
09:51:30	735	39	•
09:52:00	741	45	•
09:52:28	746	50	• Dropped 50 mm. End of Test.
09:53:00	753	57	•
09:53:00	760	64	•
09:53:30	764	68	•
Total Time to Drop 50 mm = 2 min and 38 sec			

PHOTOS

SNC·LAVALIN

PERCOLATION TEST RECORD

Field Investigation and Construction Requirements 735 kV Transmission Line – Gull Island to Churchill Falls

WTO	AC1030 (Gull to Churchill TL)	**TEST ID**	AC1030-CS1-PT-02
DATE	23 Sept 2007	**TECHNOLOGIST**	DJD / JY
TEST LOCATION & DEPTH			
Northing	See Below	**Easting**	See Below

- Camp Site 1 – Former Camp on south side of TLH. 43 km passed Gull Island Turn Off.
- Test Completed next to Test Pit AC1030-CS1-TP-3. See test pit log for coordinates.
- Percolation Test conducted from 0.65 to 0.95 m below ground surface.

STRATIGRAPHY & TEST DETAILS

- **STATIGRAPHY:** See Test Pit AC1030-CS1-TP-3. Stratigraphy at perc test location:
  - 0 – 0.3: FILL (SAND & GRAVEL)
  - 0.3 – 0.4: TOPSOIL
  - 0.4 – 0.95 SAND, fine to medium grained, trace to some gravel, some fines
- **TEST DEPTH:** Performed in sand layer from a depth of 0.65 to 0.95 m.
- **TEST HOLE DIMENSIONS:** 290 mm Ø x 300 mm deep.
- **TEST HOLE PREPERATION:** 50 mm of fine to medium sand to fine gravel loosely placed at bottom of hole. Tap water used.

PERCOLATION TEST RESULTS

TIME	REFERENCE MEASUREMENT (mm)	WATER LEVEL DROP (mm)	Notes
10:05:07	722		• Filled hole 3 times. • Level dropping at constant rate.
10:05:50	722	0	• Start test.
10:06:00	733	11	•
10:06:30	745	23	•
10:07:00	762	40	•
10:07:16	772	50	• Dropped 50 mm. End of Test.
Total Time to Drop 50 mm = 1 min and 26 sec			

PHOTOS

SNC·LAVALIN

PERCOLATION TEST RECORD

Field Investigation and Construction Requirements 735 kV Transmission Line – Gull Island to Churchill Falls

WTO	AC1030 (Gull to Churchill TL)	**TEST ID**	AC1030-CS1-PT-03
DATE	23 Sept 2007	**TECHNOLOGIST**	DJD / JY
TEST LOCATION & DEPTH			
Northing	See Below	**Easting**	See Below

- Camp Site 1 – Former Camp on south side of TLH. 43 km passed Gull Island Turn Off.
- Test Completed next to Test Pit AC1030-CS1-TP-1. See test pit log for coordinates.
- Percolation Test conducted from 0.60 to 0.90 m below ground surface.

STRATIGRAPHY & TEST DETAILS

- **STATIGRAPHY:** See Test Pit AC1030-CS1-TP-1. Stratigraphy at per test location:
  - 0 – 0.9: SAND, fine to medium grained, trace to some gravel, some fines
- **TEST DEPTH:** Performed in sand layer from a depth of 0.60 to 0.90 m.
- **TEST HOLE DIMENSIONS:** 250 mm Ø x 300 mm deep.
- **TEST HOLE PREPERATION:** 50 mm of fine to medium sand to fine gravel loosely placed at bottom of hole. Tap water used.

PERCOLATION TEST RESULTS

TIME	REFERENCE MEASUREMENT (mm)	WATER LEVEL DROP (mm)	Notes
10:24:02	664		• Filled hole 3 times. • Level dropping at constant rate.
10:24:30	671	7	• Start test.
10:25:00	679	8	•
10:25:30	683	4	•
10:26:00	692	9	•
10:26:30	697	5	•
10:27:00	702	5	•
10:27:30	706	4	•
10:27:35	711	5	•
10:27:43	714	3	• Dropped 50 mm. End of Test.
Total Time to Drop 50 mm = 3 min and 41 sec			

PHOTOS

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PERCOLATION TEST RECORD

Field Investigation and Construction Requirements 735 kV Transmission Line – Gull Island to Churchill Falls

WTO	AC1030 (Gull to Churchill TL)	**TEST ID**	AC1030-CS1-PT-04
DATE	23 Sept 2007	**TECHNOLOGIST**	DJD / JY
TEST LOCATION & DEPTH			
Northing	See Below	**Easting**	See Below

- Camp Site 1 – Former Camp on south side of TLH. 43 km passed Gull Island Turn Off.
- Test Completed next to Test Pit AC1030-CS1-TP-10. See test pit log for coordinates.
- Percolation Test conducted from 0.7 to 1.0 m below ground surface.

STRATIGRAPHY & TEST DETAILS

- **STATIGRAPHY:** See Test Pit AC1030-CS1-TP-10. Stratigraphy at perc test location:
  - 0 – 1.0: SAND, fine to medium grained, trace to some gravel, some cobbles some fines
- **TEST DEPTH:** Performed in sand layer from a depth of 0.60 to 0.90 m.
- **TEST HOLE DIMENSIONS:** 300 mm Ø x 300 mm deep.
- **TEST HOLE PREPERATION:** 50 mm of fine to medium sand to fine gravel loosely placed at bottom of hole. Tap water used.

PERCOLATION TEST RESULTS

TIME	REFERENCE MEASUREMENT (mm)	WATER LEVEL DROP (mm)	Notes
10:47:15	666		• Filled hole 3 times. • Level dropping at constant rate.
10:47:32	668	2	• Start test.
10:48:30	672	4	•
10:49:30	680	8	•
10:50:30	684	4	•
10:51:30	688	4	•
10:53:00	694	6	•
10:54:00	699	5	•
10:58:00	709	10	•
11:00:10	716	7	• Dropped 50 mm. End of Test.
Total Time to Drop 50 mm = 12 min and 55 sec			

PHOTOS

SNC·LAVALIN

PERCOLATION TEST RECORD

Field Investigation and Construction Requirements 735 kV Transmission Line – Gull Island to Churchill Falls

WTO	AC1030 (Gull to Churchill TL)	**TEST ID**	AC1030-CS1-PT-05
DATE	23 Sept 2007	**TECHNOLOGIST**	DJD / JY
TEST LOCATION & DEPTH			
Northing	See Below	**Easting**	See Below

- Camp Site 1 – Former Camp on south side of TLH. 43 km passed Gull Island Turn Off.
- Test Completed next to Test Pit AC1030-CS1-TP-5. See test pit log for coordinates.
- Percolation Test conducted from 0.8 to 1.1 m below ground surface.

STRATIGRAPHY & TEST DETAILS

- **STATIGRAPHY:** See Test Pit AC1030-CS1-TP-5. Stratigraphy at percolation test location :
  - 0 – 1.0: SAND, fine to medium grained, trace to some gravel, some cobbles some fines
- **TEST DEPTH:** Performed in sand layer from a depth of 0.80 to 1.1 m.
- **TEST HOLE DIMENSIONS:** 300 mm Ø x 300 mm deep.
- **TEST HOLE PREPERATION:** 50 mm of fine to medium sand to fine gravel loosely placed at bottom of hole. Tap water used.

PERCOLATION TEST RESULTS

TIME	REFERENCE MEASUREMENT (mm)	WATER LEVEL DROP (mm)	Notes
11:25:00	635		• Filled hole 3 times. • Level dropping at constant rate.
11:25:15	639	4	• Start test.
11:26:00	645	6	•
11:27:00	654	9	•
11:27:30	660	6	•
11:28:00	665	5	•
11:28:30	672	7	•
11:29:30	677	5	•
11:30:00	682	5	•
11:30:07	685	3	• Dropped 50 mm. End of Test.
Total Time to Drop 50 mm = 4 min and 52 sec			

PHOTOS	
N/A	N/A

SNC·LAVALIN

PERCOLATION TEST RECORD

Field Investigation and Construction Requirements 735 kV Transmission Line – Gull Island to Churchill Falls

WTO	AC1030 (Gull to Churchill TL)	**TEST ID**	AC1030-CS1-PT-06
DATE	23 Sept 2007	**TECHNOLOGIST**	DJD / JY
TEST LOCATION & DEPTH			
Northing	See Below	**Easting**	See Below

- Camp Site 1 – Former Camp on south side of TLH. 43 km passed Gull Island Turn Off.
- Test Completed next to Test Pit AC1030-CS1-TP-9. See test pit log for coordinates.
- Percolation Test conducted from 0.6 to 0.9 m below ground surface.

STRATIGRAPHY & TEST DETAILS

- **STATIGRAPHY:** See Test Pit AC1030-CS1-TP-9. Stratigraphy at percolation test location :
  - 0 – 0.9: SAND, fine to medium grained, trace to some gravel, some cobbles some fines
- **TEST DEPTH:** Performed in sand layer from a depth of 0.6 to 0.9 m.
- **TEST HOLE DIMENSIONS:** 300 mm Ø x 300 mm deep.
- **TEST HOLE PREPERATION:** 50 mm of fine to medium sand to fine gravel loosely placed at bottom of hole. Tap water used.

PERCOLATION TEST RESULTS

TIME	REFERENCE MEASUREMENT (mm)	WATER LEVEL DROP (mm)	Notes
11:34:30	669		• Filled hole 3 times. • Level dropping at constant rate.
11:34:58	664	5	• Start test.
11:35:30	679	15	•
11:36:00	685	6	•
11:36:30	690	5	•
11:37:00	696	6	•
11:37:30	700	4	•
11:38:00	705	5	•
11:38:30	710	5	•
11:39:11	715	5	• Dropped 50 mm. End of Test.
Total Time to Drop 50 mm = 4 min and 41 sec			

PHOTOS

SNC·LAVALIN

Test Pit: CAMP 2 AC 1030 - 1 of 10						
Firm:	Newfoundland and Labrador Hydro				Date:	22-Sep-07
Project:	Lower Churchill Project - 735kV Transmission Line - Gull Island to Churchill Falls					
Contract No.	AC 1030	Location:	N 5920614	E 0484331	Inspector: Dave Oldford	

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.7	SAND and GRAVEL (fill) - some fines, damp, loose to compact, some cobbles, sub angular, light grey.	NA	NA	NA
0.7 - 0.8	Topsoil, light brown, frequent roots, some sand and gravel, fines, cobbles, sub angular, loose to compact, well graded.	NA	NA	NA
0.8 - 1.6	Till - Sand, gravel, cobbles, some fines, trace boulders, angular, compact, damp, well graded, light grey.	1	1.0 - 1.55	Grab
1.6	Refusal due to bedrock or boulders.	NA	NA	NA

Estimated Cobbles (%) 10 - 20	Estimated Boulders (%) 1 - 10	Estimated Max Diameter (m) 0.5	
Start Time: 8:50 am	End Time: 9:13 am	Estimated Excavated Volume (m^3)	15

General Notes

No sloughing. Test pit was dry upon completion.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

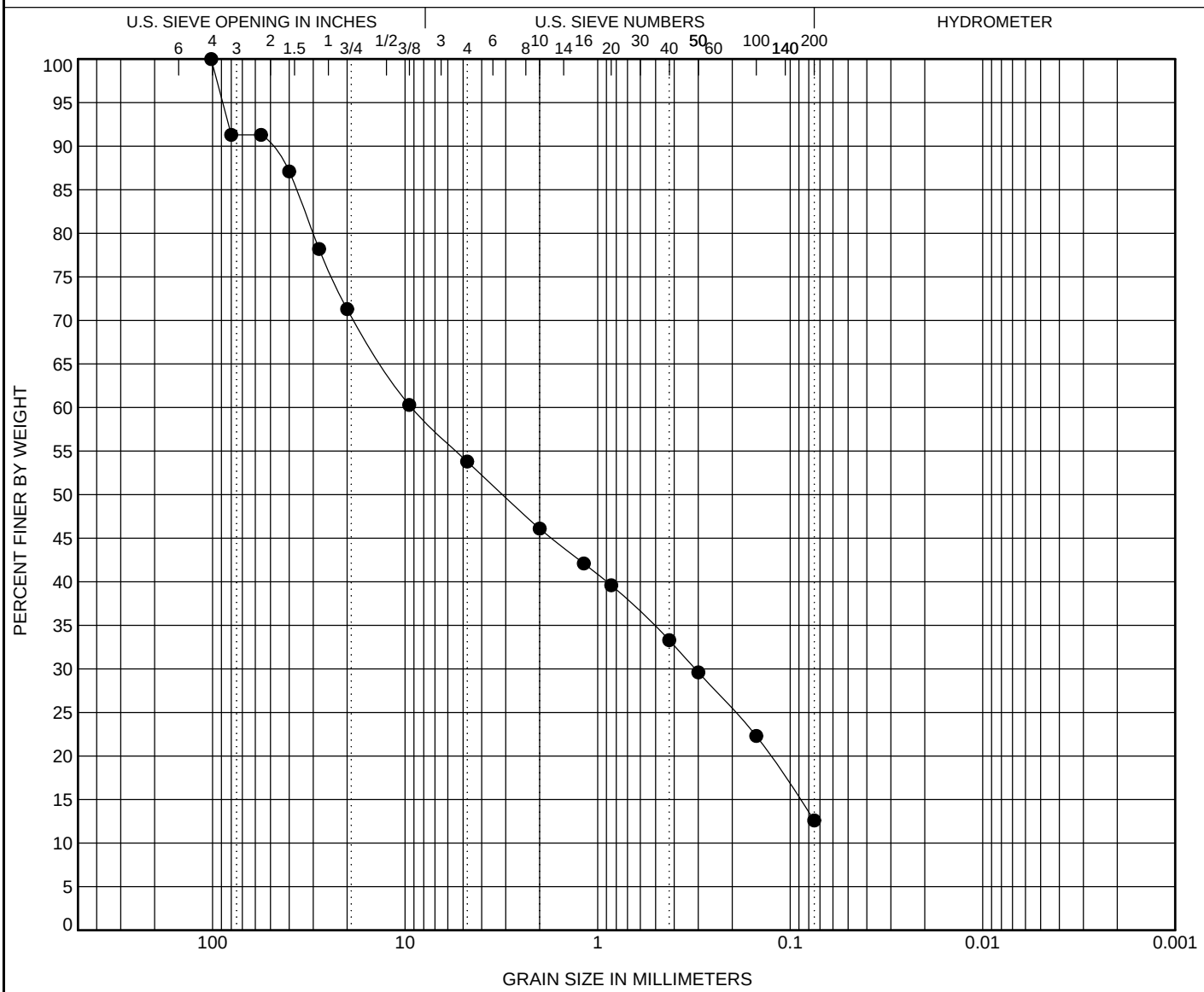
SNC·LAVALIN

TEST PIT AC1030 CS2-001

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Camp Site 2



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030 CS2-001**	**GB-1**	**1.00 - 1.55**	**37.5**	**41.2**	**12.6**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**91.3**	**91.3**	**87.1**	**78.2**	**71.3**	**60.3**	**53.8**	**46.1**	**39.6**	**33.3**	**29.6**	**22.3**	**12.6**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030 CS2-001**	SAND & GRAVEL with some Fines, tr. Cobbles	**9.2**	**0.3**		**10.3**					

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: CAMP 2 AC 1030 - 2 of 10					
Firm:	Newfoundland and Labrador Hydro				Date: 23-Sep-07
Project:	Lower Churchill Project - 735kV Transmission Line - Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5920566	E 0484349	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.3	Topsoil, some roots, sand, fines, trace cobbles, angular poorly graded, damp, compact, brown.	NA	NA	NA
0.3 - 1.2	SAND and GRAVLE - some fines, some cobbles, trace boulders, angular, compact, well graded, damp, light grey.	1	0.5 - 1.0	Grab
1.2	Refusal due to bedrock or boulders.	NA	NA	NA

Estimated Cobbles (%) 5 - 15	Estimated Boulders (%) 1 - 5	Estimated Max Diameter (m) 0.5	
Start Time: 9:15 am	End Time: 9:25 am	Estimated Excavated Volume (m^3)	10

General Notes

No sloughing. Test pit was dry upon completion.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

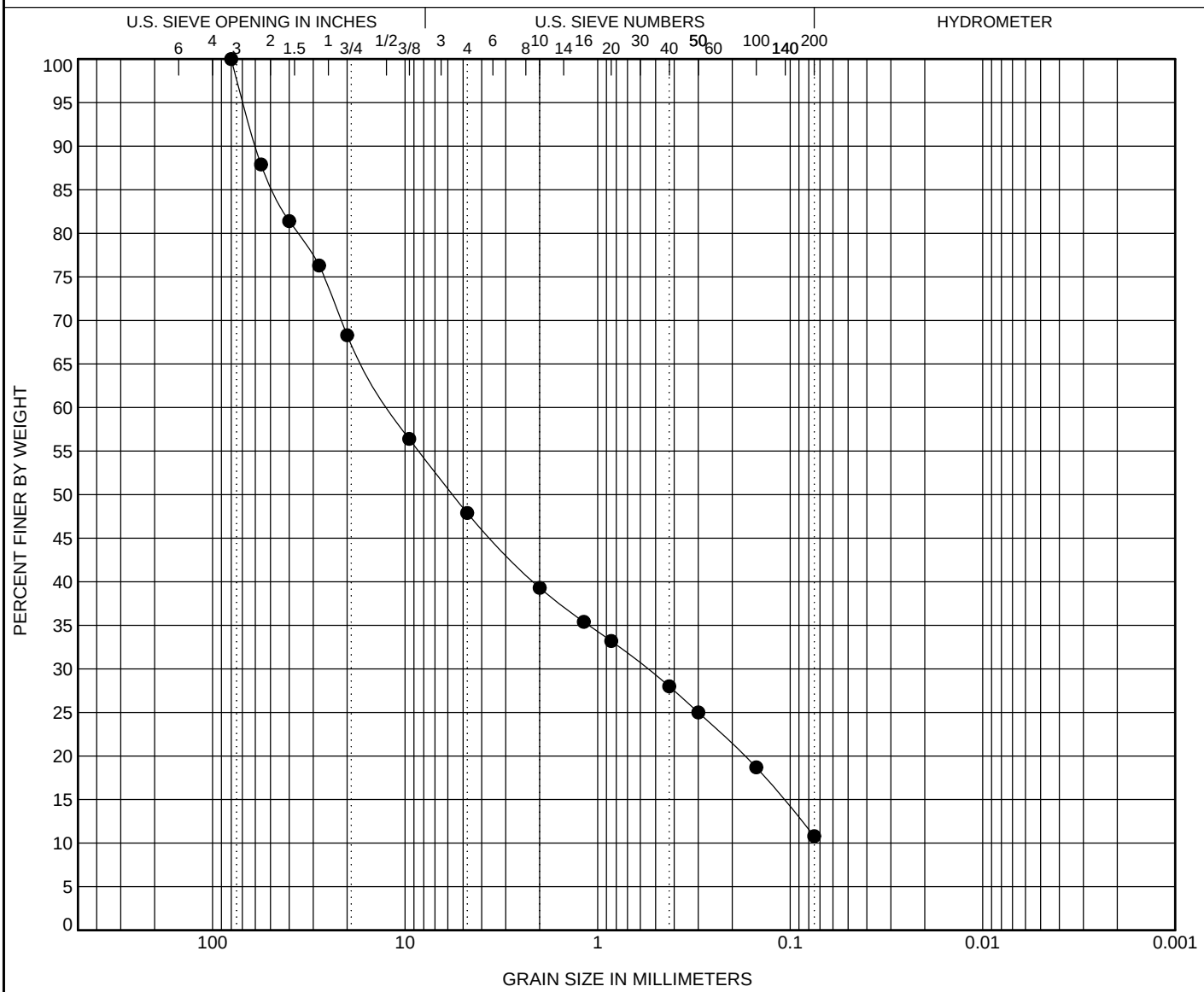
SNC·LAVALIN

TEST PIT AC1030 CS2-002

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Camp Site 2



	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030 CS2-002**	**GB-1**	**0.50 - 1.00**	**49.9**	**37.1**	**10.8**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**100.0**	**87.9**	**81.4**	**76.3**	**68.3**	**56.4**	**47.9**	**39.3**	**33.2**	**28.0**	**25.0**	**18.7**	**10.8**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030 CS2-002**	GRAVEL & SAND with some Fines, tr. Cobbles	**11.9**	**0.6**		**7.0**				**0.4**	**170.5**

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: CAMP 2 AC 1030 - 3 of 10					
Firm:	Newfoundland and Labrador Hydro				Date: 23-Sep-07
Project:	Lower Churchill Project - 735kV Transmission Line - Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5920543	E 0484360	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 1.2	SANDY FINES - some coarse gravel, some cobbles, trace boulders, roots frequent throughout, light grey, moist, compact.	NA	NA	NA
1.2	Refusal due to bedrock or boulders.	1	1.0	Grab

Estimated Cobbles (%) 5 - 15	Estimated Boulders (%) 1 - 5	Estimated Max Diameter (m) 0.5	
Start Time: 9:27 am	End Time: 9:40 am	Estimated Excavated Volume (m^3)	10

General Notes

No sloughing. Test pit was dry upon completion.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

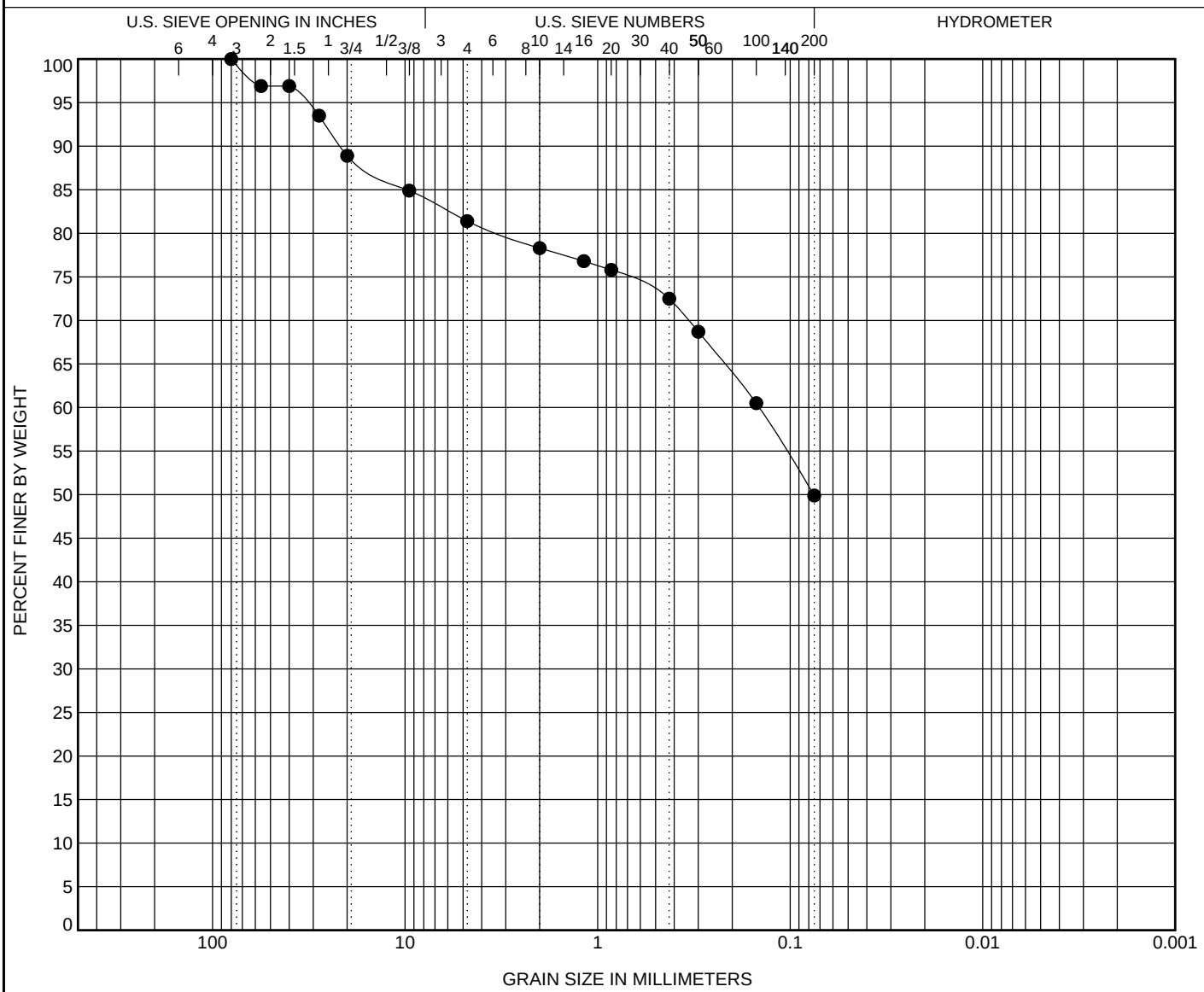
SNC·LAVALIN

TEST PIT AC1030 CS2-003

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Camp Site 2



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030 CS2-003**	**GB-1**	**1.00 - 1.20**	**18.0**	**31.5**	**49.9**	
⊠							
▲							
★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**100.0**	**96.9**	**96.9**	**93.5**	**88.9**	**84.9**	**81.4**	**78.3**	**75.8**	**72.5**	**68.7**	**60.5**	**49.9**
⊠													
▲													
★													
⊙													

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030 CS2-003**	Sandy FINES with some Gravel, trace Cobbles	**0.1**			**15.8**					
⊠											
▲											
★											
⊙											

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: CAMP 2 AC 1030 - 4 of 10					
Firm:	Newfoundland and Labrador Hydro				Date: 23-Sep-07
Project:	Lower Churchill Project - 735kV Transmission Line - Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5920532	E 0484373	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.1	FINE SAND - some fines, roots, trace coarse gravel, loose to compact, poorly graded, light brown.	NA	NA	NA
0.1 - 2.5	GRAVELLY SAND - some fines, compact, trace boulders, moist, some cobbles, light grey.	1	1.0 - 2.5	Grab

Estimated Cobbles (%) 10 - 20	Estimated Boulders (%) 1 - 10	Estimated Max Diameter (m) 0.4	
Start Time: 9:42 am	End Time: 9:58 am	Estimated Excavated Volume (m^3)	25

General Notes

No sloughing. Test pit was dry completion.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

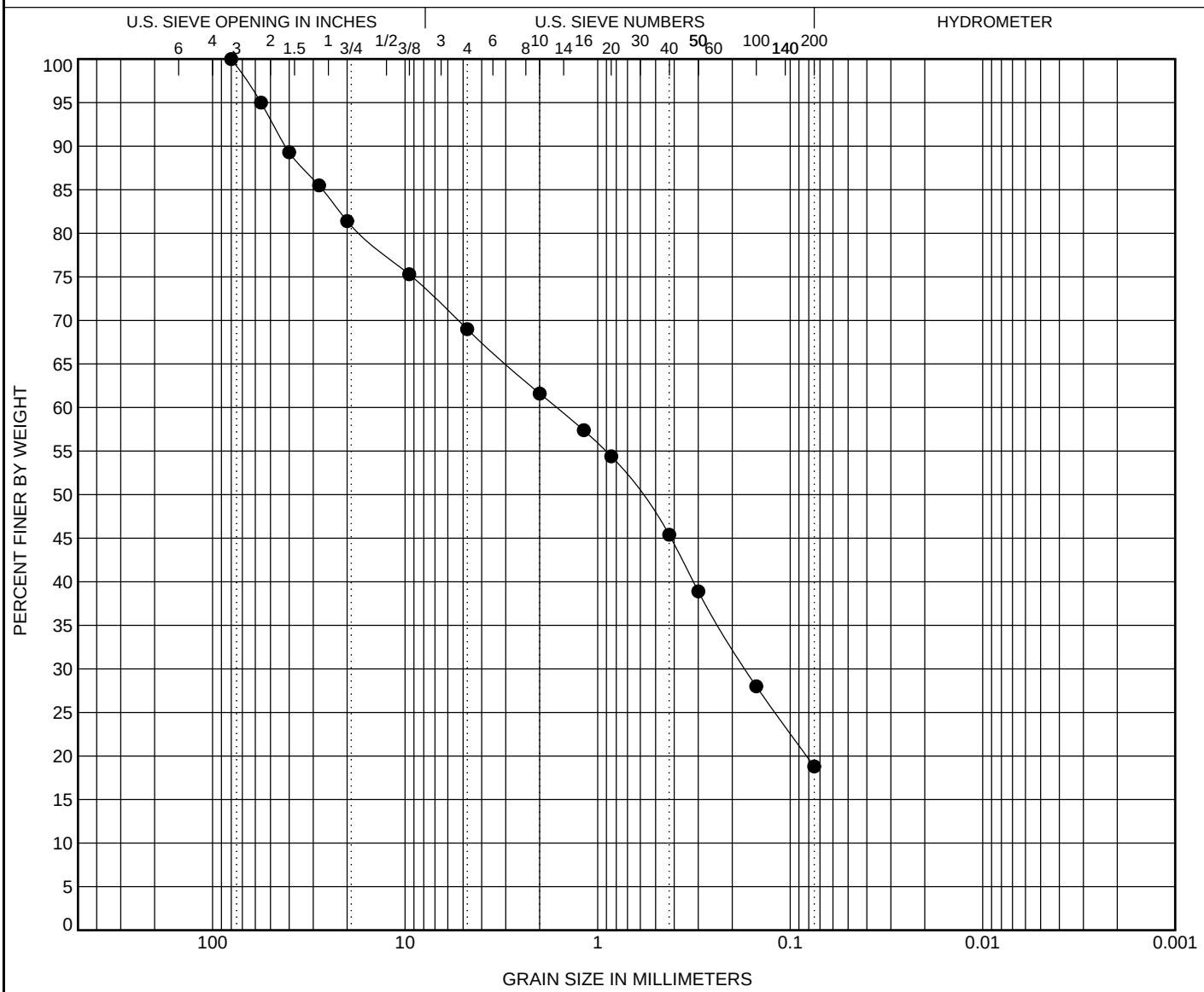
SNC·LAVALIN

TEST PIT AC1030 CS2-004

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Camp Site 2



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030 CS2-004**	**GB-1**	**1.00 - 2.50**	**30.1**	**50.2**	**18.8**	
⊠							
▲							
★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**100.0**	**95.0**	**89.3**	**85.5**	**81.4**	**75.3**	**69.0**	**61.6**	**54.4**	**45.4**	**38.9**	**28.0**	**18.8**
⊠													
▲													
★													
⊙													

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030 CS2-004**	Gravelly SAND with some Fines, trace Cobbles	**1.6**	**0.2**		**8.3**					
⊠											
▲											
★											
⊙											

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: CAMP 2 AC 1030 - 5 of 10					
Firm:	Newfoundland and Labrador Hydro				Date: 23-Sep-07
Project:	Lower Churchill Project - 735kV Transmission Line - Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5920570	E 0484381	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.5	Medium SAND - some gravel, fines, loose to compact some rootlets, damp, poorly graded, light brown.	NA	NA	NA
0.5 - 2.5	GRAVELY FINES and SAND – trace cobbles, damp, compact, olive grey.	1	1.0 - 2.5	Grab
2.5	Bedrock or large boulder.	NA	NA	NA

Estimated Cobbles (%) 1 - 5	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 10:00 am	End Time: 10:09 am	Estimated Excavated Volume (m^3)	15

General Notes

No sloughing. Test pit was dry upon completion.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

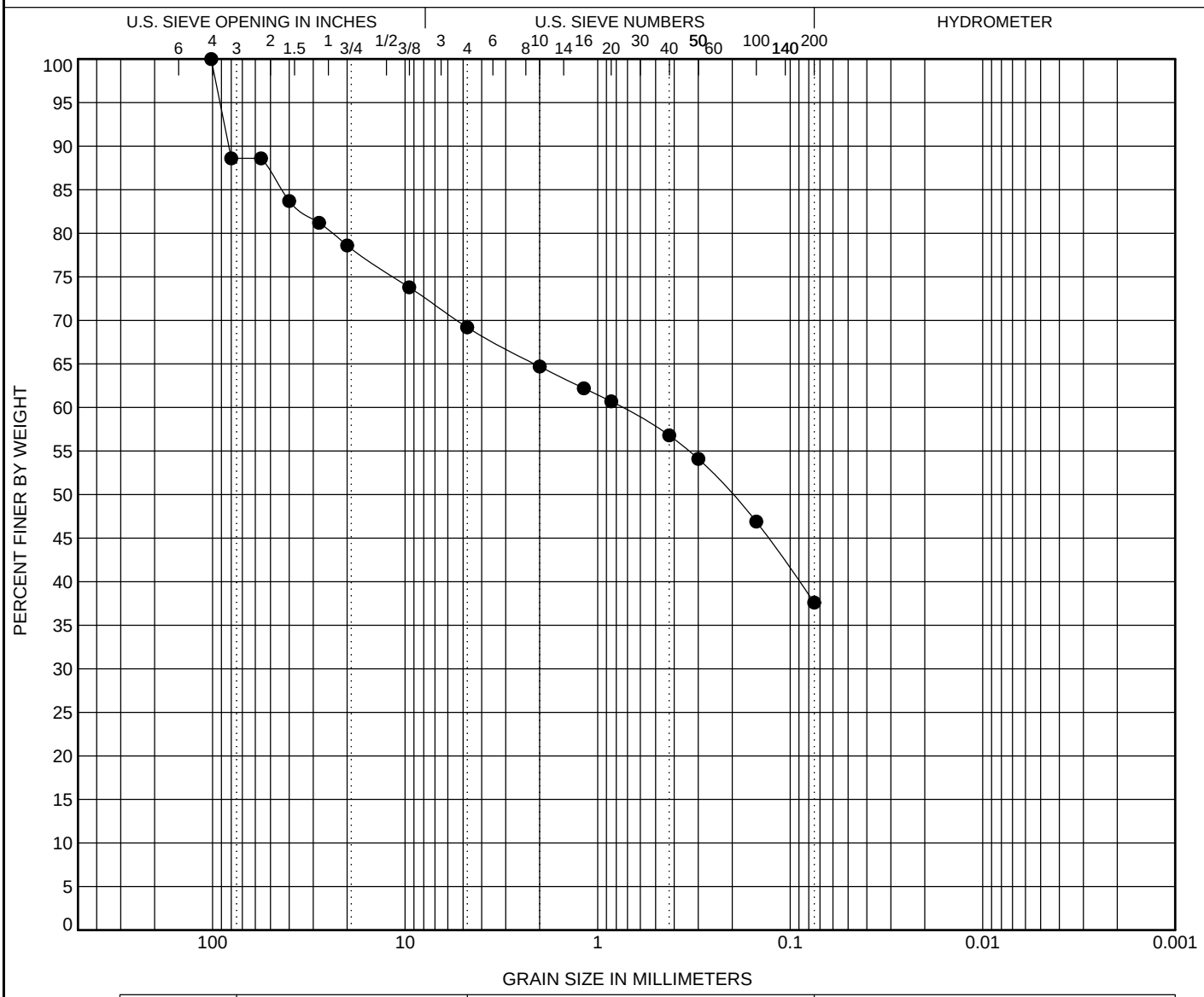
SNC·LAVALIN

TEST PIT AC1030 CS2-005

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Camp Site 2



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030 CS2-005**	**GB-1**	**1.00 - 2.50**	**19.4**	**31.6**	**37.6**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●	**88.6**	**88.6**	**83.7**	**81.2**	**78.6**	**73.8**	**69.2**	**64.7**	**60.7**	**56.8**	**54.1**	**46.9**	**37.6**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030 CS2-005**	Sandy SILT with some Gravel, trace Cobbles	**0.8**			**12.6**					

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: CAMP 2 AC 1030 - 6 of 10					
Firm:	Newfoundland and Labrador Hydro				Date: 23-Sep-07
Project:	Lower Churchill Project - 735kV Transmission Line - Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5920608	E 0484365	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 1.0	SAND and GRAVEL - some cobbles, fines, trace boulders, damp, loose, well graded, light brown.	NA	NA	NA
1.0 - 2.5	SAND – some gravel, some fines, fill placed over a old camp pipes between 0.8 m and 1.2 m.	1	1.0 - 2.5	Grab
2.5	Bedrock or boulders.	NA	NA	NA

Estimated Cobbles (%) 1- 10	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 10:10 am	End Time: 10:23 am	Estimated Excavated Volume (m^3)	20

General Notes

No sloughing. Test pit was dry upon completion.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

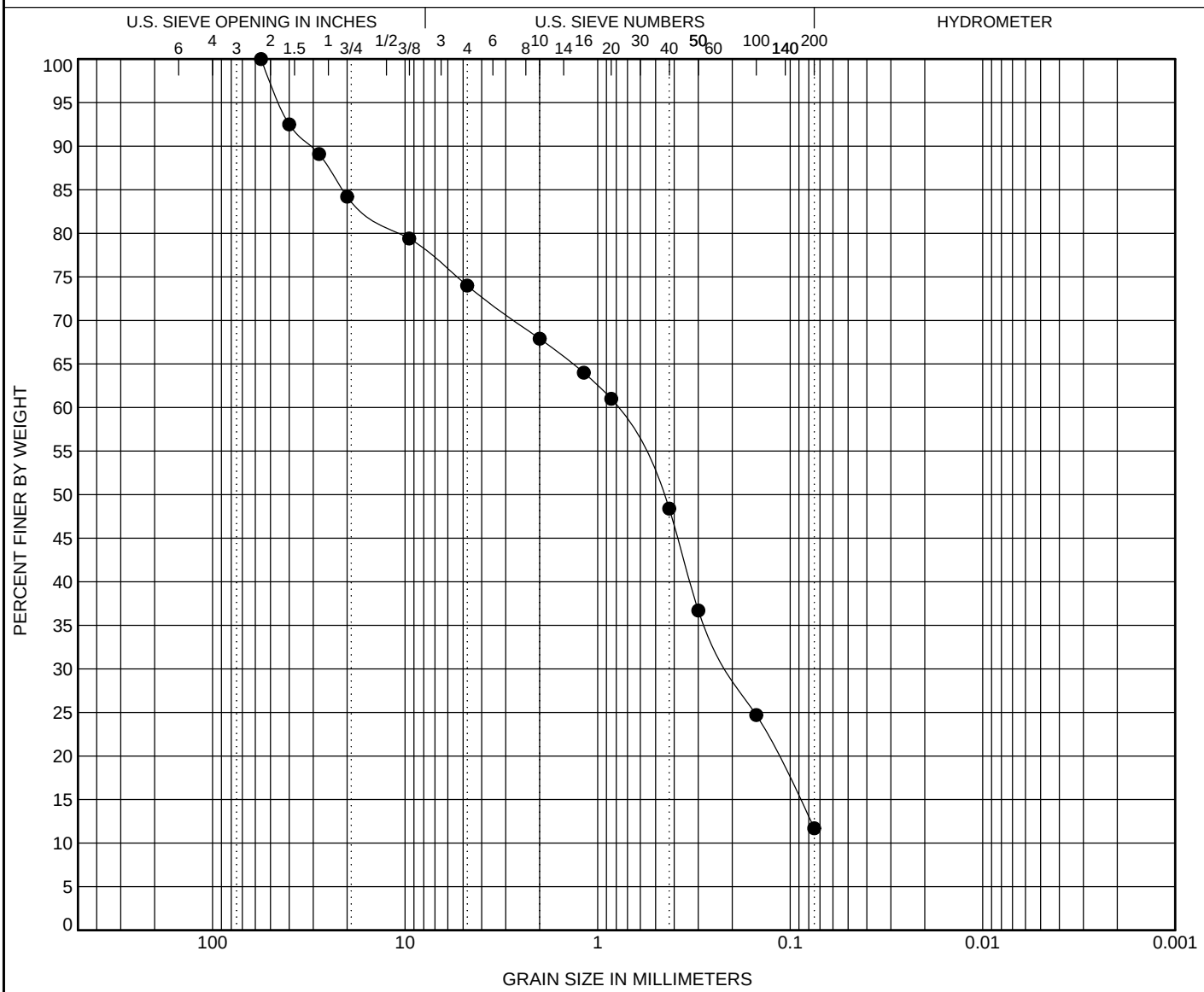
SNC·LAVALIN

TEST PIT AC1030 CS2-006

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Camp Site 2



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030 CS2-006**	**GB-1**	**1.00 - 2.50**	**26.0**	**62.3**	**11.7**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●		**100.0**	**92.5**	**89.1**	**84.2**	**79.4**	**74.0**	**67.9**	**61.0**	**48.4**	**36.7**	**24.7**	**11.7**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030 CS2-006**	Gravelly SAND with some Fines	**0.8**	**0.2**		**7.3**				**0.8**	**11.7**

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: CAMP 2 AC 1030 - 7 of 10					
Firm:	Newfoundland and Labrador Hydro				Date: 23-Sep-07
Project:	Lower Churchill Project - 735kV Transmission Line - Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5920588	E 0484389	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.6	FILL - place over original soil when old camp was built.	NA	NA	NA
0.6 - 0.8	Weathered SAND - grey with black organic soil on top and orange/brown oxidized sand below (0.2 m layer).	NA	NA	NA
0.8 - 1.5	SAND - some fines, trace cobbles, trace gravel, compact, poorly graded, damp, light grey.	NA	NA	NA
1.5 - 3.5	SILT and CLAY – trace sand, firm to stiff, moist, olive grey.	1	2.0 - 3.0	Grab

Estimated Cobbles (%) 1- 5	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 10:25 am	End Time: 10:38 am	Estimated Excavated Volume (m^3)	35

General Notes

No sloughing.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

Test pit was dry upon completion.

Stopped digging at 3.5 m due to bedrock or boulders.

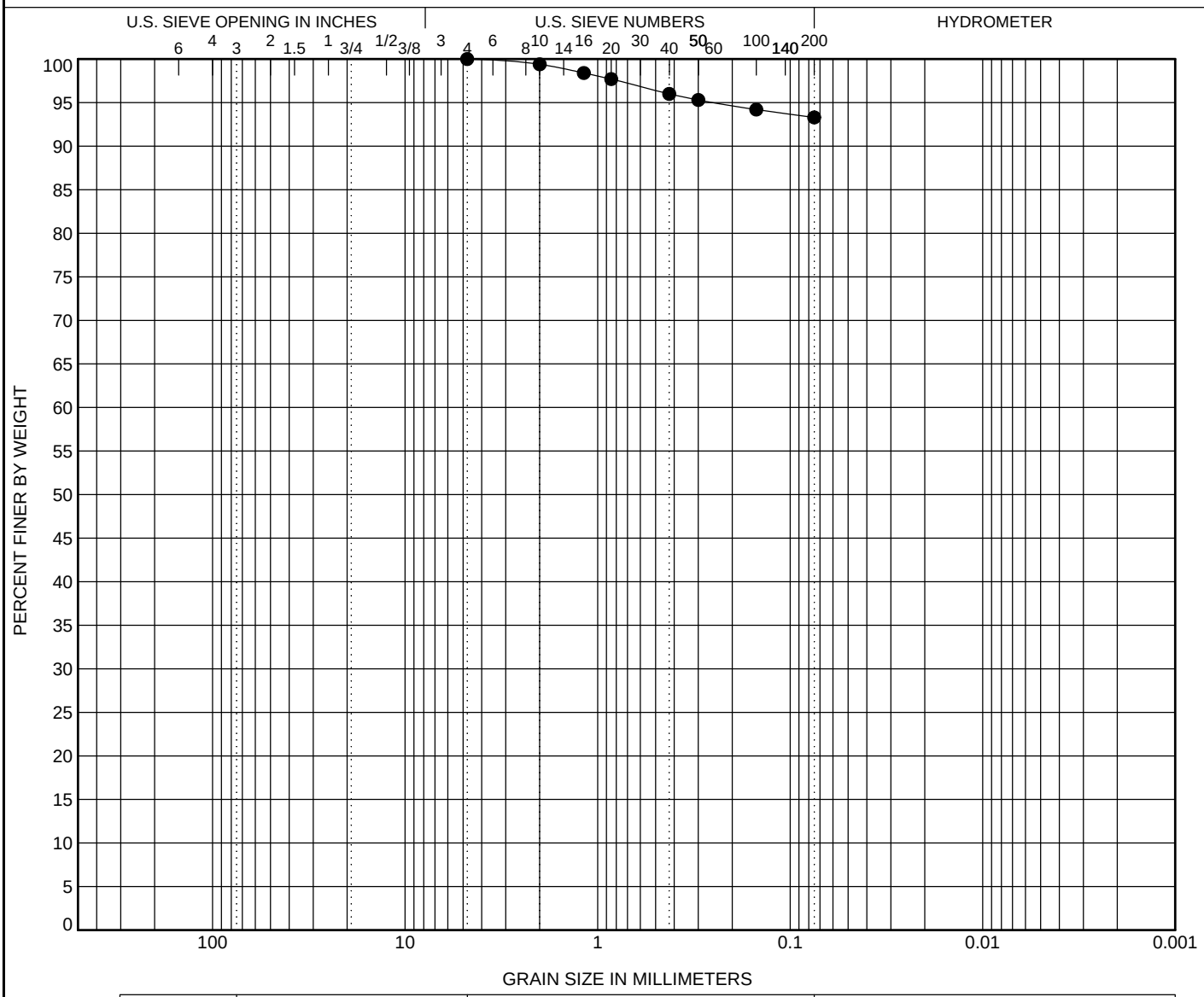
SNC·LAVALIN

TEST PIT AC1030 CS2-007

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Camp Site 2



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030 CS2-007**	**GB-1**	**2.00 - 3.00**	**0.0**	**6.7**	**93.3**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●							**100.0**	**99.4**	**97.7**	**96.0**	**95.3**	**94.2**	**93.3**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030 CS2-007**	FINES with trace Sand				**21.4**					

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: CAMP 2 AC 1030 - 8 of 10					
Firm:	Newfoundland and Labrador Hydro				Date: 23-Sep-07
Project:	Lower Churchill Project - 735kV Transmission Line - Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5920556	E 0484400	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 1.0	SAND - trace fines, loose to compact, moist, poorly graded, light grey.	NA	NA	NA
1.0 - 3.0	SANDY FINES - stiff to firm, moist, olive grey, very low plasticity.	1	1.0 - 3.0	Grab
3.0	Bedrock or large boulders.	NA	NA	NA

Estimated Cobbles (%) 0	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 10:45 am	End Time: 11:05 am	Estimated Excavated Volume (m^3)	30

General Notes

Test Pit was dry upon completion.

Minor sloughing within first meter of sand layer.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

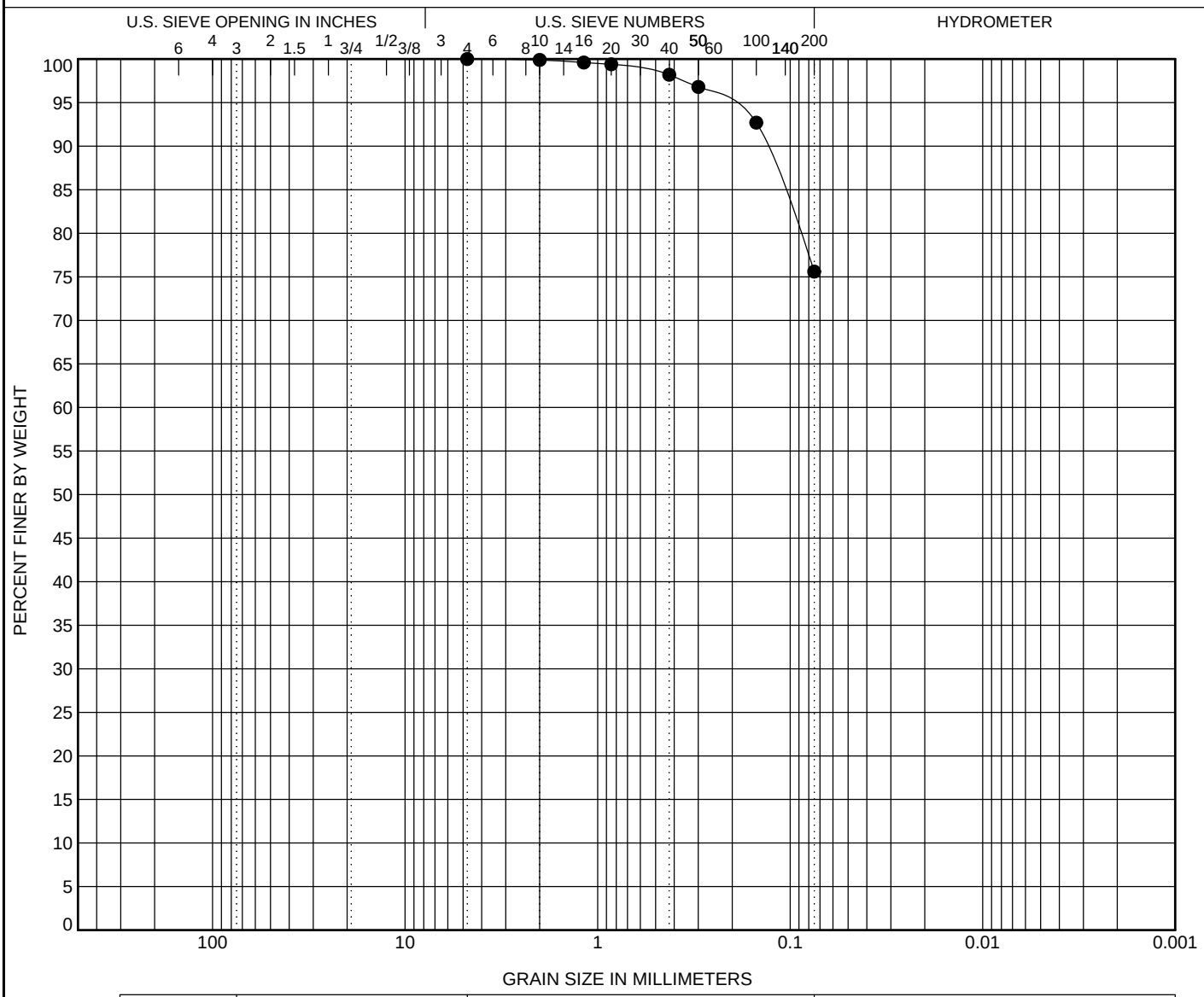
SNC·LAVALIN

TEST PIT AC1030 CS2-008

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Camp Site 2



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030 CS2-008**	**GB-1**	**1.00 - 3.00**	**0.0**	**24.4**	**75.6**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●							**100.0**	**99.9**	**99.4**	**98.2**	**96.8**	**92.7**	**75.6**

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030 CS2-008**	FINES with some Sand				**19.0**					

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: CAMP 2 AC 1030 - 9 of 10					
Firm:	Newfoundland and Labrador Hydro				Date: 23-Sep-07
Project:	Lower Churchill Project - 735kV Transmission Line - Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5920541	E 0484403	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.15	SAND and GRAVEL - some fines, cobbles, loose to compact, damp, light brown, well graded.	NA	NA	NA
0.15 - 3.0	SAND - trace fines, compact, moist, poorly graded, light grey.	1	1.0 - 2.0	Grab
3.0 - 4.0	SAND and FINES - stiff to firm, moist, olive grey, very low plasticity.	NA	NA	NA

Estimated Cobbles (%) 0	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 11:10 am	End Time: 11:20 am	Estimated Excavated Volume (m^3)	40

General Notes

Test Pit was dry upon completion.

Minor sloughing within 3m of sand layer .

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

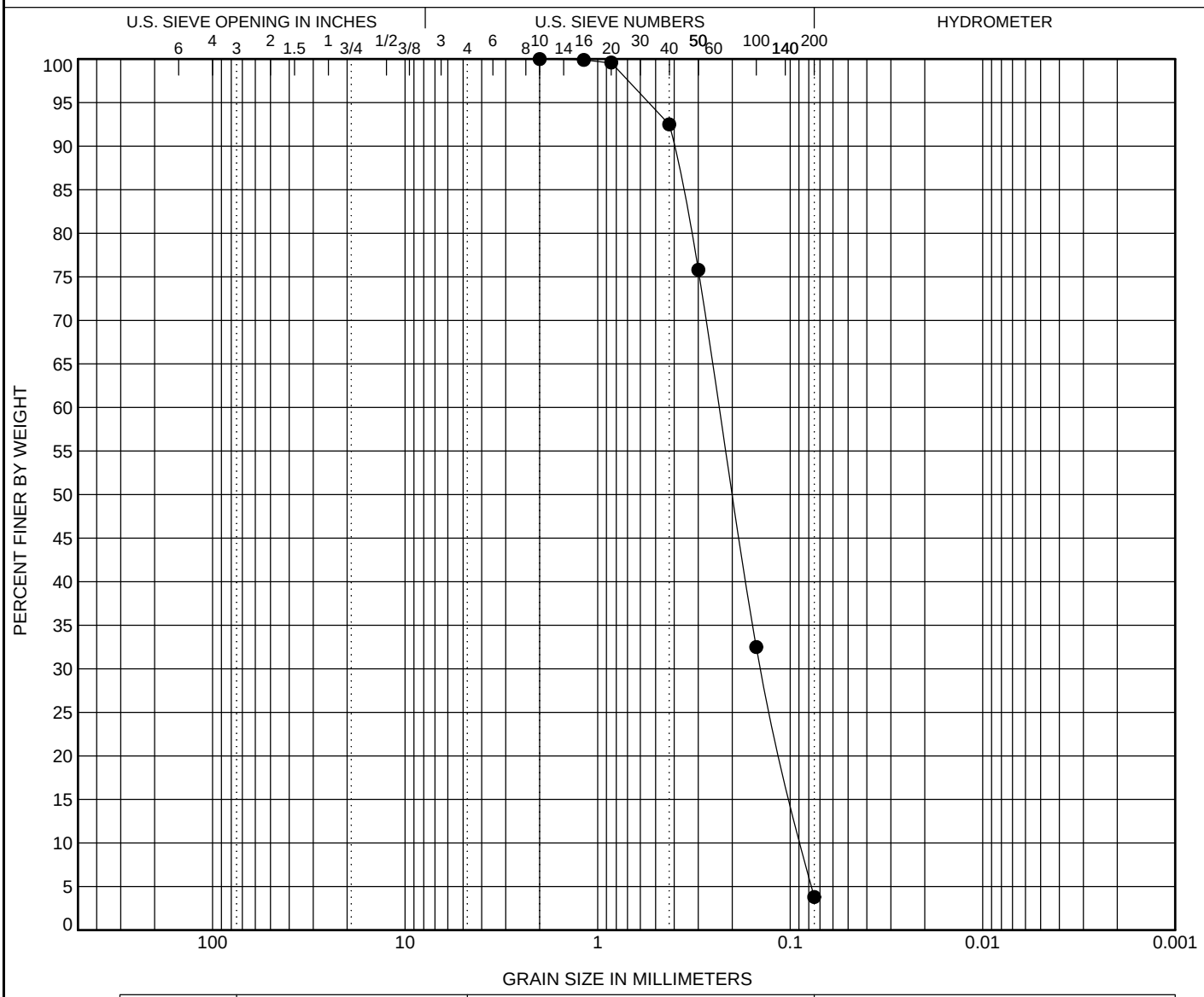
SNC·LAVALIN

TEST PIT AC1030 CS2-009

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Camp Site 2



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030 CS2-009**	**GB-1**	**1.00 - 2.00**	**0.0**	**96.2**	**3.8**	
⊠							
▲							
★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●								**100.0**	**99.6**	**92.5**	**75.8**	**32.5**	**3.8**
⊠													
▲													
★													
⊙													

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030 CS2-009**	POORLY GRADED SAND(SP)	**0.2**	**0.1**	**0.1**	**7.2**				**1.0**	**2.7**
⊠											
▲											
★											
⊙											

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

SNC·LAVALIN

Test Pit: CAMP 2 AC 1030 - 10 of 10					
Firm:	Newfoundland and Labrador Hydro				Date: 23-Sep-07
Project:	Lower Churchill Project - 735kV Transmission Line - Gull Island to Churchill Falls				
Contract No.	AC1030	Location:	N 5920578	E 0484366	Inspector: Dave Oldford

Soil and Groundwater Conditions

Depth (m) From - To	Description	Sample ID.	Sample Depth (m)	Sample Type
0.0 - 0.5	SAND and GRAVEL - some fines, some cobbles loose to compact, well graded, damp, light brown.	NA	NA	NA
0.5 - 2.5	FINES and SAND – trace gravel, moist, compact, light grey.	1	1.0 - 2.5	Grab
2.5	Bedrock or Boulders.	NA	NA	NA

Estimated Cobbles (%) 1 - 5	Estimated Boulders (%) 0	Estimated Max Diameter (m) NA	
Start Time: 11:25 am	End Time: 11:38 am	Estimated Excavated Volume (m^3)	18

General Notes

Test Pit was dry upon completion.

No sloughing.

North and East coordinates obtained using Garmin Etrex Legend Cx GPS.

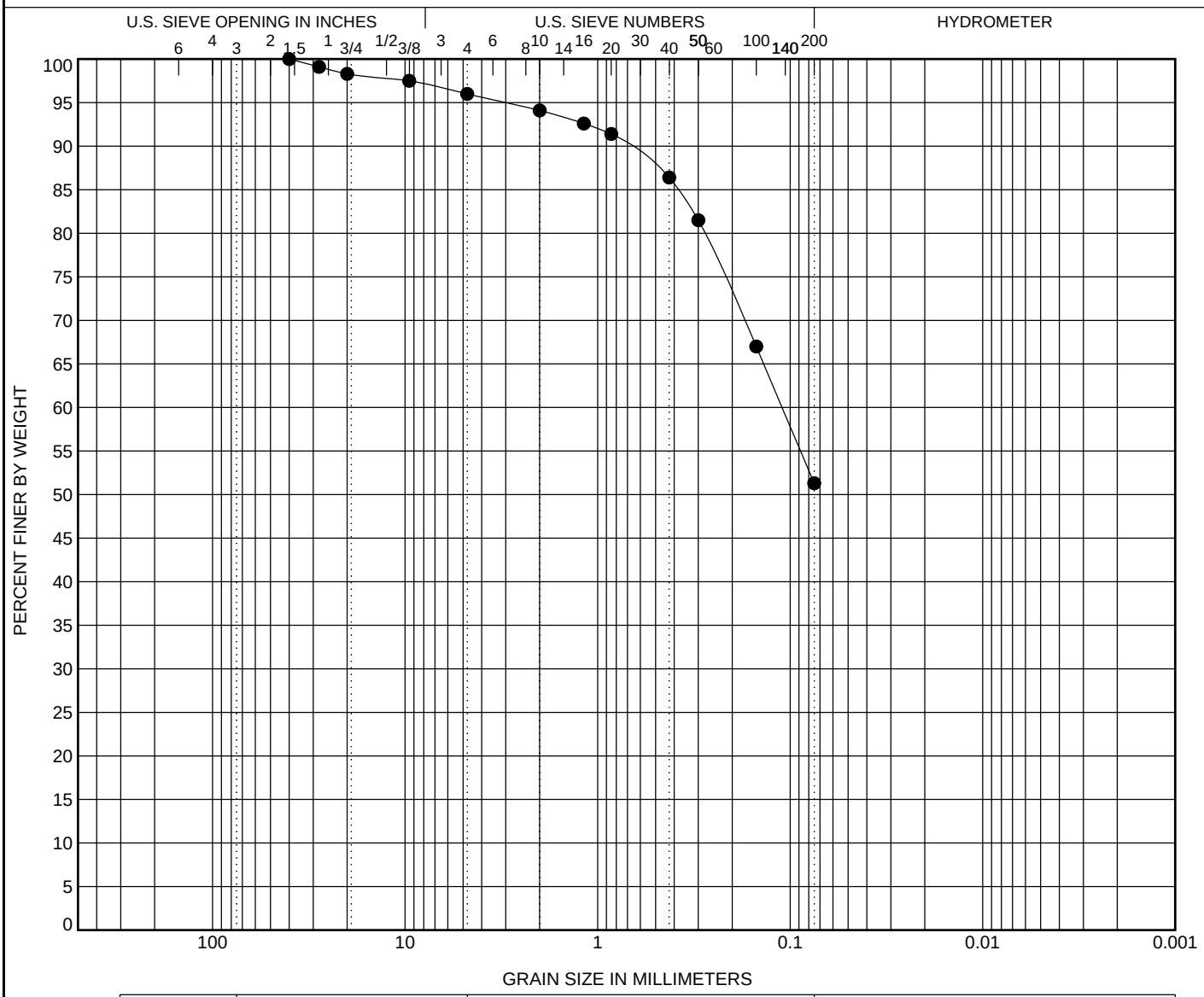
SNC·LAVALIN

TEST PIT AC1030 CS2-010

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Camp Site 2



COBBLES	GRAVEL		SAND			CLAY OR SILT
	coarse	fine	coarse	medium	fine	

	Test pit no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**AC1030 CS2-010**	**GB-1**	**1.00 - 2.50**	**4.0**	**44.7**	**51.3**	
⊠							
▲							
★							
⊙							

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●			**100.0**	**99.1**	**98.3**	**97.5**	**96.0**	**94.1**	**91.4**	**86.4**	**81.5**	**67.0**	**51.3**
⊠													
▲													
★													
⊙													

	Test pit no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**AC1030 CS2-010**	FINES and SAND with trace Gravel	**0.1**			**15.9**					
⊠											
▲											
★											
⊙											

GRAIN SIZE2 - TEST PIT 1 TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

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BOREHOLE LOG

BOREHOLE CS2-BH-01

PAGE 1 OF 1

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Camp Site 2

REFERENCE LEVEL: Geodetic (NAD 83) **DATE STARTED** 2007-10-06 **COMPLETED** 2007-10-07

COORDINATES: **NORTHING** 5920600.00 m **DRILLING METHOD** Diamond drill

EASTING 484356.00 m **CASING SIZE** NW

REFERENCE ELEVATION --- **CORING SIZE** NQ

NOTES: Borehole to confirm presence of bedrock. No RQD recorded. **BEDROCK DEPTH:** 1.91 m **TOTAL DEPTH:** 9.14 m

GROUND WATER LEVELS:

AT TIME OF DRILLING Water table not measured **DATE** ---

AFTER DRILLING Water table not measured **DATE** ---

HOLE ORIENTATION:

AZIMUTH (degrees):

PLUNGE (degrees): -90

SPT

HAMMER SIZE : 63.5 Kg

HAMMER DROP : 0.76 m

DEPTH (m)	ELEVATION (m)	MATERIAL DESCRIPTION	STRAT.	PIEZO LEVEL (m)	SAMPLE SIZE	SAMPLE TYPE	SAMPLE NUMBER	RECOVERY %	N or RQD	K (cm/s)	TESTS & RESULTS
0	0.00	SAND and GRAVEL					AU-1				
							AU-2				W = 7.7% Fines = 16.9%
							SS-3		51		
	1.91	BEDROCK									
5							RC-4				
		Bottom of hole at 9.14 m.									

WATER CONTENT (%) 5 10 15 20 25

SPT N VALUE 10 20 30 40 50

LOGGED BY K.R. **CHECKED BY** C.S. **APPROVED BY**

GEOTECH BH PLOTS TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-21

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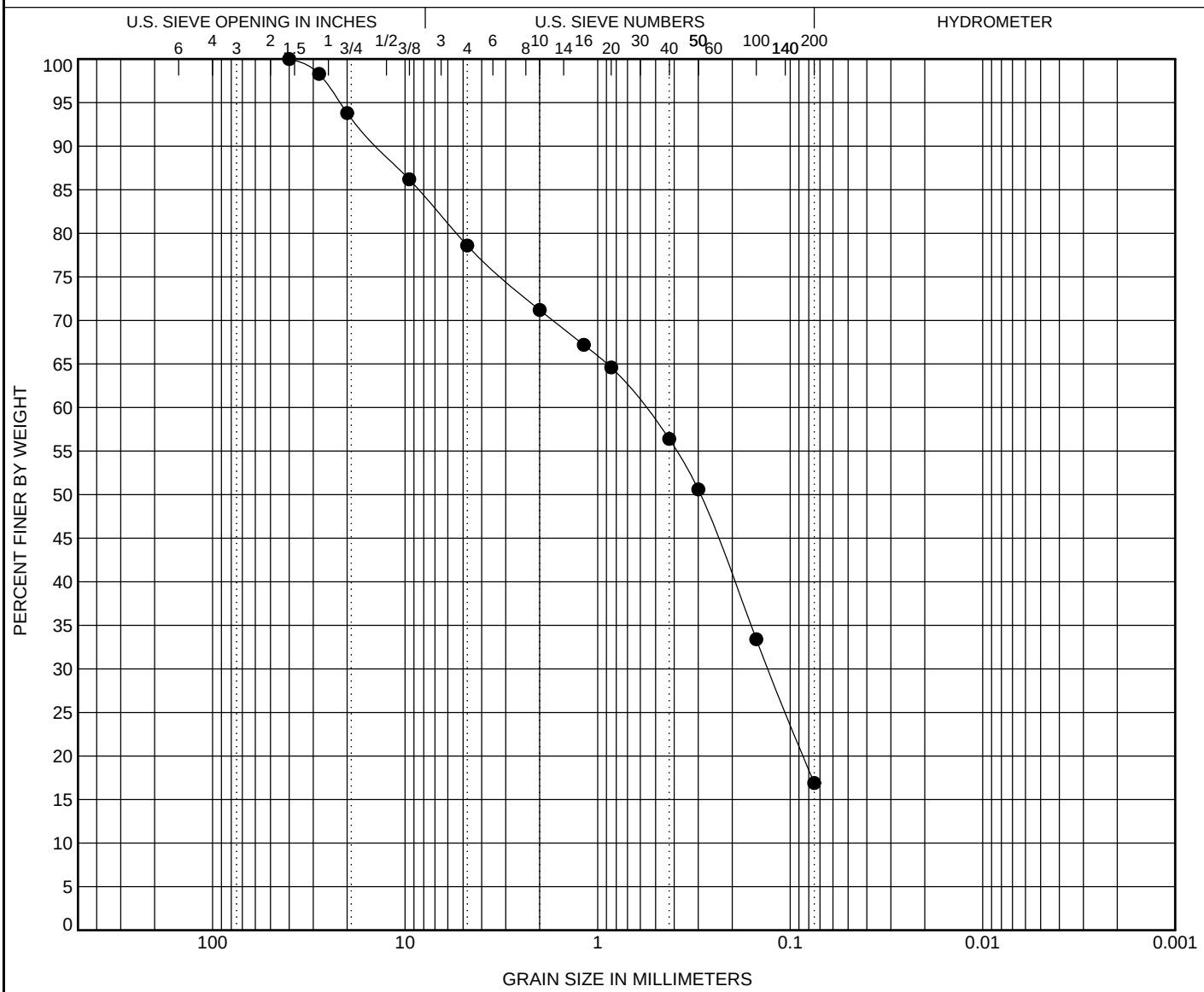
BOREHOLE CS2-BH-01

GRAIN SIZE DISTRIBUTION

CLIENT: Newfoundland and Labrador Hydro **SITE:** 735 kV Transmission Line - Gull Island to Churchill Falls

PROJECT: Lower Churchill Project **LOCATION:** Camp Site 2



	Borehole no.	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	**CS2-BH-01**	**AU-2**	**0.61 - 1.52**	**21.4**	**61.7**	**16.9**	

	80 mm	56 mm	40 mm	28 mm	20 mm	9.525 mm	4.76 mm	2 mm	0.85 mm	0.425 mm	0.3 mm	0.15 mm	0.075 mm
●			**100.0**	**98.3**	**93.8**	**86.2**	**78.6**	**71.2**	**64.6**	**56.4**	**50.6**	**33.4**	**16.9**

	Borehole no.	ASTM Classification	D60	D30	D10	W	LL	PL	PI	Cc	Cu
●	**CS2-BH-01**	Gravely SAND with some Fines	**0.6**	**0.1**		**7.7**					

GRAIN SIZE2 - BOREHOLE TRANSMISSION LINE_DATABASE_AC1030_2007.GPJ GINT STD CANADA.GDT 08-1-23

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PERCOLATION TEST RECORD

Field Investigation and Construction Requirements 735 kV Transmission Line – Gull Island to Churchill Falls

WTO	AC1030 (Gull to Churchill TL)	**TEST ID**	AC1030-CS2-PT-01
DATE	23 Sept 2007	**TECHNOLOGIST**	DJD / JY
TEST LOCATION & DEPTH			
Northing	5920609	**Easting**	484328

- Camp Site 2 – Former Camp Location at East Mitchum River (~57 km East of Churchill Falls Switchyard).
- Test Completed next to Camp Site Test Pit.
- Percolation Test conducted from 1.0 to 1.3m below ground surface.

STRATIGRAPHY & TEST DETAILS

- **STATIGRAPHY:**
  - 0 – 0.1: TOPSOIL
  - 0.2 – 0.95: SAND, grey, fine to medium grained, trace to some gravel, some cobbles, some fines, some organics (black, rootlets).
- **TEST DEPTH:** Performed in sand layer from a depth of 0.65 to 0.95 m.
- **TEST HOLE DIMENSIONS:** 250 mm Ø x 300 mm deep.
- **TEST HOLE PREPERATION:** 50 mm of fine to medium sand to fine gravel loosely placed at bottom of hole. Tap water used.

PERCOLATION TEST RESULTS

TIME	REFERENCE MEASUREMENT (mm)	WATER LEVEL DROP (mm)	Notes
11:31:00	720		• Filled hole 3 times. • Level dropping at constant rate.
11:32:03	720		• Start test.
14:20:30	740	20	•
14:44:30	755	15	•
15:13:00	765	10	•
15:18:37	770	5	• Dropped 50 mm. End of Test.
Total Time to Drop 50 mm = 3 hours 47 min and 37 sec			

PHOTOS

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PERCOLATION TEST RECORD

Field Investigation and Construction Requirements 735 kV Transmission Line – Gull Island to Churchill Falls

WTO	AC1030 (Gull to Churchill TL)	**TEST ID**	AC1030-CS2-PT-02
DATE	23 Sept 2007	**TECHNOLOGIST**	DJD / JY
TEST LOCATION & DEPTH			
Northing	5920588	**Easting**	484378

- Camp Site 2 – Former Camp Location at East Mitchum River (~57 km East of Churchill Falls Switchyard).
- Test Completed next to Camp Site Test Pit.
- Percolation Test conducted from 1.0 to 1.3m below ground surface.

STRATIGRAPHY & TEST DETAILS

- **STATIGRAPHY**:
  - 0 – 0.2: FILL
  - 0.2 – 0.4: TOPSOIL/PEAT
  - 0.4 – 1.3: SAND, grey, fine to medium grained, trace to some gravel, some cobbles, some fines (Possible FILL)
- **TEST DEPTH:** Performed in sand layer from a depth of 1.0 to 1.3 m.
- **TEST HOLE DIMENSIONS:** 270 mm Ø x 300 mm deep.
- **TEST HOLE PREPERATION:** 50 mm of fine to medium sand to fine gravel loosely placed at bottom of hole. Tap water used.

PERCOLATION TEST RESULTS

TIME	REFERENCE MEASUREMENT (mm)	WATER LEVEL DROP (mm)	Notes
13:59:50	34		• Filled hole 3 times. • Level dropping at constant rate.
14:01:00	46	12	• Start test.
14:02:00	62	8	•
14:03:00	70	8	•
14:04:00	79	9	•
14:04:56	86	7	• Dropped 50 mm. End of Test.
Total Time to Drop 50 mm = 5 min and 6 sec			

PHOTOS

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PERCOLATION TEST RECORD

Field Investigation and Construction Requirements 735 kV Transmission Line – Gull Island to Churchill Falls

WTO	AC1030 (Gull to Churchill TL)	**TEST ID**	AC1030-CS2-PT-03
DATE	23 Sept 2007	**TECHNOLOGIST**	DJD / JY
TEST LOCATION & DEPTH			
Northing	5920573	**Easting**	484363

- Camp Site 2 – Former Camp Location at East Mitchum River (~57 km East of Churchill Falls Switchyard).
- Test Completed next to Camp Site Test Pit.
- Percolation Test conducted from 0.75 to 1.05m below ground surface.

STRATIGRAPHY & TEST DETAILS

- **STATIGRAPHY:**
  - 0 – 1.05: SAND, brown, fine to medium grained, trace to some gravel, some cobbles, some fines
- **TEST DEPTH:** Performed in sand layer from a depth of 0.75 to 1.05 m.
- **TEST HOLE DIMENSIONS:** 300 mm Ø x 300 mm deep.
- **TEST HOLE PREPERATION:** 50 mm of fine to medium sand to fine gravel loosely placed at bottom of hole. Tap water used.

PERCOLATION TEST RESULTS

TIME	REFERENCE MEASUREMENT (mm)	WATER LEVEL DROP (mm)	Notes
15:02:00	700		• Filled hole 3 times. • Level dropping at constant rate.
15:03:00	700		• Start test.
15:04:30	722	22	•
15:06:30	750	28	• Dropped 50 mm. End of Test.
Total Time to Drop 50 mm = 3 min and 30 sec			

PHOTOS

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PERCOLATION TEST RECORD

Field Investigation and Construction Requirements 735 kV Transmission Line – Gull Island to Churchill Falls

WTO	AC1030 (Gull to Churchill TL)	**TEST ID**	AC1030-CS2-PT-04
DATE	23 Sept 2007	**TECHNOLOGIST**	DJD / JY
TEST LOCATION & DEPTH			
Northing	5920554	**Easting**	484362

- Camp Site 2 – Former Camp Location at East Mitchum River (~57 km East of Churchill Falls Switchyard).
- Test Completed next to Camp Site Test Pit.
- Percolation Test conducted from 0.6 to 0.9 m below ground surface.

STRATIGRAPHY & TEST DETAILS

- **STATIGRAPHY:**
  - 0 – 0.9: SAND, grey, fine to medium grained, trace to some gravel, some cobbles, some fines
- **TEST DEPTH:** Performed in sand layer from a depth of 0.6 to 0.9m.
- **TEST HOLE DIMENSIONS:** 300 mm Ø x 300 mm deep.
- **TEST HOLE PREPERATION:** 50 mm of fine to medium sand to fine gravel loosely placed at bottom of hole. Tap water used.

PERCOLATION TEST RESULTS

TIME	REFERENCE MEASUREMENT (mm)	WATER LEVEL DROP (mm)	Notes
13:25:00	600		• Filled hole 3 times. • Level dropping at constant rate.
13:25:30	600		• Start test.
13:32:00	630	30	•
13:39:25	550	20	• Dropped 50 mm. End of Test.
Total Time to Drop 50 mm = 14 min and 25 sec			

PHOTOS

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PERCOLATION TEST RECORD

Field Investigation and Construction Requirements 735 kV Transmission Line – Gull Island to Churchill Falls

WTO	AC1030 (Gull to Churchill TL)	**TEST ID**	AC1030-CS2-PT-5
DATE	23 Sept 2007	**TECHNOLOGIST**	DJD / JY
TEST LOCATION & DEPTH			
Northing	5920534	**Easting**	484375

- Camp Site 2 – Former Camp Location at East Mitchum River (~57 km East of Churchill Falls Switchyard).
- Test Completed next to Camp Site Test.
- Percolation Test conducted from 0.6 to 0.9m below ground surface.

STRATIGRAPHY & TEST DETAILS

- **STATIGRAPHY:**
  - 0 – 0.9: SAND, brown to grey, fine to medium grained, trace to some gravel, some cobbles, some fines
- **TEST DEPTH:** Performed in sand layer from a depth of 0.6 to 0.9m.
- **TEST HOLE DIMENSIONS:** 300 mm Ø x 300 mm deep.
- **TEST HOLE PREPERATION:** 50 mm of fine to medium sand to fine gravel loosely placed at bottom of hole. Tap water used.

PERCOLATION TEST RESULTS

TIME	REFERENCE MEASUREMENT (mm)	WATER LEVEL DROP (mm)	Notes
14:00:00			• Filled hole 3 times. • Level dropping at constant rate.
14:00:00	700		• Start test.
14:02:00	670	30	•
14:04:00	650	20	• Dropped 50 mm. End of Test.
Total Time to Drop 50 mm = 4 min and 00 sec			

PHOTOS

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PERCOLATION TEST RECORD

Field Investigation and Construction Requirements 735 kV Transmission Line – Gull Island to Churchill Falls

WTO	AC1030 (Gull to Churchill TL)	**TEST ID**	AC1030-CS2-PT-06
DATE	23 Sept 2007	**TECHNOLOGIST**	DJD / JY
TEST LOCATION & DEPTH			
Northing	5920546	**Easting**	484407

- Camp Site 2 – Former Camp Location at East Mitchum River (~57 km East of Churchill Falls Switchyard).
- Test Completed next to Camp Site Test Pit.
- Percolation Test conducted from 0.6 to 0.9m below ground surface.

STRATIGRAPHY & TEST DETAILS

- **STATIGRAPHY:**
  - 0 – 0.9: SAND, brown to grey, fine to medium grained, trace to some gravel, some cobbles, some fines
- **TEST DEPTH:** Performed in sand layer from a depth of 0.6 to 0.9 m.
- **TEST HOLE DIMENSIONS:** 300 mm Ø x 300 mm deep.
- **TEST HOLE PREPERATION:** 50 mm of fine to medium sand to fine gravel loosely placed at bottom of hole. Tap water used.

PERCOLATION TEST RESULTS

TIME	REFERENCE MEASUREMENT (mm)	WATER LEVEL DROP (mm)	Notes
15:03:00			• Filled hole 3 times. • Level dropping at constant rate.
15:03:00	700		• Start test.
15:02:00	680	20	•
15:06:00	650	30	• Dropped 50 mm. End of Test.
Total Time to Drop 50 mm = 3 min and 00 sec			

PHOTOS

APPENDIX E

LIMITATIONS

LIMITATIONS OF REPORT

The conclusions and recommendations given in this report are based on information determined at the test locations. The information contained herein in no way reflects on the environmental aspects of the project, unless otherwise stated. Subsurface and groundwater conditions between and beyond the test locations may differ from those encountered at the test locations, and conditions may become apparent during construction, which could not be detected or anticipated the time of the site investigation. It is recommended practice that a geotechnical consultant be retained during construction to confirm that the subsurface conditions throughout the site do not deviate materially from those encountered at the test locations. The elevations used in this report are primarily to establish relative elevation differences between the test locations and should not be used for other purposes, such as grading, excavating, planning development, etc.

The design recommendations given in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report. Since all details of the design may not be known, it is recommended that the final design be verified as being consistent with the recommendations, and that the assumptions made in this analysis are valid.

Any comments made in this report on potential construction problems and possible methods are intended only for the guidance of the designer. The number of test locations may not be sufficient to determine all the factors that may affect construction methods and costs. The contractors bidding on this project or undertaking the construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusions as to how the subsurface conditions may affect their work. This work has been undertaken in accordance with normally accepted geotechnical engineering practices. No other warranty is expressed or implied.

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