

GEOTECHNICAL SITE STUDY REPORT (PHASE 3)

VOLUME 1 OF 2

# **RABASKA LIMITED PARTNERSHIP**

Rabaska – LNG Receiving Terminal West Option Site Levis, Quebec

Our File : T-1050-C (604238)

May 2006



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## 1. INTRODUCTION

The services of Terratech, a Division of SNC-Lavalin Environment Inc., were retained by Rabaska Limited Partnership to carry out a Phase 3 geotechnical site study at the proposed Rabaska - LNG Receiving Terminal, specifically at the selected West Option Site located in Levis, Quebec.

The reader is informed of the existence of four earlier geotechnical reports, namely:

- **Terratech Report T-1050 (603794)** issued on 30 July 2004 "Rabaska-LNG Receiving terminal, Levis / Beaumont, Quebec, Preliminary Geotechnical Consultation Report". This document provided early and readily available information in terms of topography, hydrometry, bathymetry, geological soil and rock data, groundwater conditions and seismicity.
- Terratech Report T-1050-A (603333-RABA) issued on 10 March 2005 "Rabaska-LNG Receiving terminal, Levis / Beaumont, Quebec, Geotechnical Site Investigation Report (Phase 1)". This document provided factual information from boreholes and seismic refraction surveys carried out during the fall of 2004, at four option sites initially considered for the project, together with the results of laboratory testing of soil and rock samples retrieved from the boreholes, including the boreholes of the W Series carried out at the West Option Site.
- Terratech Report T-1050-B (603333-KELL) issued on 4 May 2005 "Rabaska-LNG Receiving Terminal, West Option Site, Levis, Quebec, Geotechnical Site Investigation Report (Phase 2)". This report is presented in two volumes: Volume 1 and 2. The document provided all factual information gathered at the selected West Option Site, and thus included the results of boreholes of the W Series (carried out in fall 2004) and boreholes of the BH-101-05 to BH-401-05 Series (put down during winter and spring 2005), and comprised seismic refraction surveys carried out during the fall of 2004, including down-hole seismicity data obtained in April 2005. The report also provided recommendations for the preliminary design of foundations of the proposed facilities.

 Terratech Report T-1050-B (603333-KELL) / Addendum to Volumes 1 and 2 issued on 9 September 2005 "Rabaska-LNG Receiving Terminal, West Option Site, Levis, Quebec, Addendum to Volumes 1 and 2 / Geotechnical Site Investigation Report (Phase 2)". This document provides additional information and recommendations based on readily available geotechnical and geological data, in response to comments from M. W. Kellogg Limited and the Industrial Division of SNC-Lavalin Inc.

This Phase 3 geotechnical study **Report T-1050-C** gathers all geological and geotechnical data previously obtained at the retained West Option Site, and thus includes all pertinent information previously provided in the aforementioned reports T-1050, T-1050-A, T-1050-B and T-1050-B (Addendum). This document also provided new input information from recently carried out (Fall 2005) boreholes, exploration trenches, trial rock excavations, additional down-hole seismic survey, electric soundings, and laboratory testing of soil and rock.

Subsurface investigations in the St. Lawrence River (at the site of the proposed Jetty) were not included in the scope of works of Terratech. These were performed by Laboratoires d'expertises de Québec Ltée (working for Roche Ltée Groupe-conseil) and by Procean Environnement inc. (SNC-Lavalin). At the specific request of Rabaska Limited Partnership, the results and technical reports relevant to these investigations were inserted in Appendix IX and Appendix X of Volume 2 of this report. A stratigraphic cross section of the entire project site, from the proposed docking facilities in the St. Lawrence River to the contemplated LNG Process Area is presented on the very last drawings inserted in Appendix III of this report (Volume 1).

Phase 3 subsurface exploration works at the West Option Site were carried out with the objective of specifically investigating the proposed LNG Process Area (and Lay-Down Area), Unloading Lines (Deep Rock Cut to the Jetty), and Access Roads and Paved Areas. The investigations were also aimed at determining rock features and anomalies by means of special trial rock excavations.

### 2. <u>PROCEDURES</u>

#### 2.1 <u>General information</u>

Detailed procedures for Phases I through 3 of the geotechnical site study carried out at the selected West Option Site of the proposed Rabaska - LNG Receiving Terminal, are outlined in the following sections.

Subsurface investigations, soil description, and in-situ and laboratory testing of soil and rock were performed in compliance to the recognized standards listed in Appendix II. Standards applicable to chemical testing of groundwater are given at the end of Appendix II.

During the Phase 1 geotechnical site investigation, the West Option Site, was investigated by means of 7 boreholes, identified as W-001-04 to W-006-04, and W-008-04, totalling 104 m of drilling works. The boreholes were carried out during the period of 22 to 30 September 2004. Also, geophysical investigations involving 4 seismic refraction survey lines for a total of 3.4 km were carried out at and close to the West Option Site on 4 October 2004, from 18 to 21 October and from 11 to 13 November 2004.

During the Phase 2 geotechnical site investigation, the West Option Site was investigated by means of 23 boreholes, identified as BH-101-05 to BH-110-05, BH-111A-05, BH-116A-05, BH-116B-05, BH-117A-05, BH-117B-05, BH-301-05 to BH-307-05, and BH-401-05, totalling 637 m of drilling works. The site investigation also included 2 down-hole seismic surveys in open holes (BH-101-05 and BH-109-05) to determine soil and rock shear wave velocities and small strain dynamic properties. The Phase 2 subsurface investigations were carried out during the period of 8 February 2005 to 15 April 2005.

During the Phase 3 geotechnical site investigation, the West Option Site was investigated by means of 7 boreholes, identified as BH-501-05 to BH-507-05, totalling 121 m of drilling works. The site investigation also included 3 test pits, named TP-503-05 to TP-505-05, extending in the overburden to depths ranging from 1.5 to 1.7 m below existing grade, 2 trial excavations into rock (TE-A-05 and TE-B-05), and 2 vertical electric soundings (RT-1-05 and RT-2-05), and one down-hole seismic survey in an open hole (BH-501-05) to determine soil and rock shear wave velocities and small

strain dynamic properties. The Phase 3 subsurface investigations were carried out during the period of 30 September to 4 November 2005.

The boreholes, exploration trenches, trial excavations, electric soundings and geophysical survey lines were located on site by Terratech personnel with respect to the SCOPQ-NAD83 system of coordinates. The elevation of the existing ground surface at the location of the field exploration works was determined in reference to the geodetic datum.

The location of the boreholes and geophysical lines is shown on Drawing T-1050-C-0000-4GDD-0001 included in Appendix III.

#### 2.2 Borehole Drilling and Sampling

The boreholes of Phase 1 (W-Series) and of Phase 3 investigations (BH-501-05 to BH-507-05 Series) were carried out using a track mounted CME 55 rotary drill rig.

The boreholes of the Phase 2 investigation (BH-100-05 to BH-401-05 Series) were accomplished by means of two track mounted rotary drill rigs, although inclined boreholes (BH-116A-05 and BH-117A-05) were carried out with a rotary drill rig mounted on skids. The inclined boreholes BH-116A-05 and BH-117A-05 were put down with an inclination of about 50° from the horizontal. They were oriented towards the Northwest. During the course of the inclined holes, the inclination (from the horizon) was monitored by means of the Tropari Apparatus, which gave inclination and magnetic azimuth. The Tropari Apparatus, designated as Tropari/PDSI, was supplied by Pajari Instruments Ltd. (Ref.: Section 7.0).

The drill rigs were equipped with drill casing of sizes NW, HW and PW. The boreholes were terminated at depths ranging from 4.7 to 79.5 m below existing ground surface. Water was used as drilling fluid in all of the boreholes whose results are presented in Appendix I of this report.

Remolded soil samples were recovered from the boreholes using a standard 51 mm O.D. standard split-spoon sampler and a procedure that allowed the simultaneous determination of Standard Penetration Test N-values. A hammer of the "automatic and safety" type was used to drive the split-spoon sampler into the ground. Clayey or

cohesive and stiff to very stiff soils were encountered only sparsely, very locally and within thin layers at the investigated site. Therefore, only disturbed soil samples were taken in the boreholes by means on the standard split spoon sampler.

The soil sampling by means of the standard split-spoon sampler (and SPT testing) was generally carried out at depth intervals of 0.8 m. However locally in Boreholes BH-401-04, BH-501-05, BH-503-05 and W-004-04, soil samples were taken at 0.8 m intervals down to depths ranging from 6.0 to 10.7 m below existing ground surface, and at intervals of 1.5 m thereafter. No soil sample was retrieved from the inclined boreholes (BH-116A-05 and BH-117A-05). In some boreholes, core drilling techniques were used to sample and traverse dense to very dense soils containing cobbles and boulders.

All recovered soils samples were visually examined in the field by Terratech senior soil technicians. They were placed in plastic bags and sent to Terratech Laboratory in Montreal for laboratory testing and storage. Visual description of soils was done in compliance to the classification and terminology provided in Appendix I (see: Explanation of the Form Boring Log). Applicable test standards are listed in Appendix II of this report.

Bedrock was encountered and core drilled in all boreholes, except in Boreholes BH-401-05, BH-504-05 and BH-506-05 which were terminated in the overburden. In most of the boreholes, the bedrock was drilled in NQ-3 size core barrel. Locally (Boreholes W-004-04, BH-102-05, BH-104-05, BH-106-05, BH-110-05, and BH-111A-05), HQ or HQ3 core barrels were used for rock core drilling. In Boreholes BH-101-05, BH-109-05 and BH-501-05, the bedrock was drilled in PQ size core barrel, and the said boreholes were provided with 63.5 mm internal diameter and bottom capped PVC lining grouted in place with a ciment-bentonite mixture, to allow down-hole seismicity tests to be performed.

After completion of the boreholes, bottom perforated plastic standpipes were inserted in the boreholes drilled in NW / NQ3 size, to allow groundwater level observations. In Boreholes drilled in HW / HQ or HQ3 size (W-004-04, BH-102-05, BH-104-05, BH-106-05, BH-110-05, and BH-111A-05), 50 mm diameter PVC tubes were inserted in the completed holes. Each PVC tube was provided with a slotted bottom portion 6.1 m in length. A peripheral sand jacket was placed at the outset of the slotted portion of the

tube, and bentonite seal was provided above the slotted portion, as to convert the borehole into an observation well (or piezometer) for groundwater sampling and monitoring. Borehole BH-503-05 was equipped with a 20 mm size open end Casagrande type piezometer tube. Schematic information on the main components of the above groundwater observation wells and piezometer is shown on the Boring Logs included in Appendix I.

The detailed description of the various soil layers and bedrock encountered in the boreholes are presented on the boring logs included in Appendix I.

The soil and rock samples retrieved from boreholes and exploration trenches during Phases 1 to 3, that were not used for testing purposes, will be stored at Terratech Laboratory in Montreal until 31 December 2008, which is considered as a practical foreseeable future. At that time, Rabaska Limited Partnership or its representatives shall be consulted about future use or disposal of the said samples.

### 2.3 Exploration Trenches / Test Pits

Three shallow exploration trenches or test pits, numbered TP-503-05 through TP-505-05, were put down in the overburden to depths ranging from 1.5 to 1.7 m below existing grade. They were carried out on 14 October 2005, by means of a backhoe (Caterpillar 430), at the site of a potential lay-down area. The purpose of this investigation was to retrieve large size soil samples mainly for Proctor compaction and CBR testing. The test pits were put down respectively in the immediate vicinity of Boreholes BH-503-05 through BH-505-05.

The detailed description of the various soil layers encountered in the test pits are presented on test pit logs inserted at the very end of Appendix I (after the boring logs).

#### 2.4 <u>Trial Excavations</u>

Two trial excavations, identified TE-A-05 and TE-B-05, were carried out at the project site during the period of 12 to 21 October 2005, for the main purpose of assessing the rock cartography and the bedrock structure. The location of the trial excavations is shown on Drawing T-1050-C-0000-4GDD-0001 in Appendix III.

Trial Excavation TE-A-05 is situated at the crest of the rock plateau some 200 m south of the St. Lawrence shoreline and is oriented in a SE to NW direction (N  $135^{\circ}$  / N  $315^{\circ}$ ). The position of this trial excavation corresponds to the south limit of a proposed Deep Rock Cut leading to a future Harbour Facility or Jetty. The trench has a width of about 3 m, a length of 10.0 m and an average depth 2.5 m below existing ground surface. It was extended in depth to about 2.0 to 2.3 m into the bedrock. The excavation was performed by means of a Caterpillar 225 LC Excavator using a 1 m<sup>3</sup> size bucket.

Trial Excavation TE-B-05 is located near the proposed West Storage Tank, at the site of an inferred rock anomaly, and is oriented in SE to NW direction (N  $135^{\circ}$  / N  $315^{\circ}$ ). The location of this trial excavation was selected on the basis of site accessibility for the excavator (to limit damage to the property), further to be within the alignment of rock anomalies previously assessed by the geophysical survey lines. The excavation has a bottom width of about 2.5 to 3.0 m and a length of 45 m. With an average depth of 4 m below existing ground surface, the excavation was extended approximately 0.6 to 3.0 m into the overburden and some 0.5 to 2.0 m into bedrock. The excavation was performed by means of a Caterpillar 235 Excavator equipped with a 1.7 m<sup>3</sup> size bucket.

The main objectives of the trial excavations were to investigate, within the upper strata of the bedrock, specific and detailed rock features, such as folds, dips, anomalies, closely jointed stratigraphy, rock quality. The excavations were also used to assess the performance of standard excavators into the shallow layers of bedrock.

The observed overburden and bedrock features at the trial excavations are shown on Drawings T-1050-C-0000-4GDD-0005 and T-1050-C-0000-4GDD-0006 in Appendix III.

#### 2.5 <u>Geophysical Investigations</u>

Geophysical investigations were carried out by Geophysics GPR International Inc. at the West Option Site. These included 4 seismic refraction survey lines, 3 down-hole seismic surveys in Boreholes BH-101-05, BH-109-05 and BH-501-05, and 2 vertical electric soundings.

# 2.5.1 Seismic Refraction Surveys

The seismic refraction survey lines varied in length from 600 to 1200 m, for a total of 3.4 km. They are located within or close to the West Option Site, at the following locations:

•	Beyond southeast sector:	Line GW-002-04;
	Northeast limit:	Line GN-001-04:

- Northeast sector: Line GN-001A-04;
- Southwest sector: Line GN-001B-04.

The purpose of the seismic refraction surveys was to produce depth profiles for layers of overburden and for bedrock, and also to identify zones of alteration or weaknesses within the bedrock, in order to verify or/and locate possible fault zones, as expected from available regional geological maps.

Geophysical seismic refraction lines GW-002-04 and GN-001-04 were carried out on 4 October and during the period of 18 to 21 October 2004. Geophysical Lines GN-001A-04 and GN-001B-04 were accomplished from 11 to 13 November 2004. The conventional seismic refraction method, which is in reference to the usual practice for soils and bedrock surface, was applied to all four survey lines. For details, the reader should refer to Appendix VII (section 4.1 of the report by Geophysics GPR International Inc., dated 2 March 2005). However, with survey lines GN-001A-04 and GN-001B-04, special on-site testing and interpretation designated as seismic resonance or "TISAR" were also performed. The term "TISAR" is an acronym for Testing & Imaging using Seismic Acoustic Resonance. Procedures related to "TISAR" interpretation are discussed in Appendix VII (section 4.2 of the report by Geophysics GPR International Inc., dated 2 March 2005).

Detailed procedures, results and limitations relevant to the seismic refraction surveys are presented in Appendix VII, in Report M-04958 issued in March 2005 by Geophysics GPR International Inc.

# 2.5.2 Down-Hole Seismic Surveys

Down-hole seismic tests were performed by Geophysics GPR International Inc. in Boreholes BH-101-05 and BH-109-05, to the maximum borehole depth of 25 m, and also in Borehole BH-501-05 to a depth of 19 m. The objective of the down-hole surveys was to determine soil and bedrock shear wave velocities as well as low strain dynamic parameters. The surveys were carried out on 3 April 2005 (BH-101-05 and BH-109-05) and on 3 and 4 November 2005 (BH -501-05). There was a 0.6 to 1.0 month difference between the installation of the casing (with peripheral bentonite-cement grouting) and the doing the down-hole tests. This is believed to have a negligible impact on the test results from delamination of the grout.

Detailed procedures, results and limitations relevant to the down-hole seismic surveys are presented in Appendix VIII, in Report M-05043 issued on 22 April 2005 an in Report M-05128 issued on 29 November 2005 by Geophysics GPR International Inc.

# 2.5.3 Vertical Electric Soundings

Two vertical electric soundings, identified TR-1-05 and TR-2-05, were carried out at the site of the proposed LNG Process Plant. The soundings were performed on 3 and 4 November 2005 by Geophysics G.P.R. International inc.

Detailed procedures, results and limitations relevant to the vertical electric soundings are presented in Appendix VIII, in Report M-05128 issued on 29 November 2005 by Geophysics GPR International Inc.

# 2.6 Laboratory Testing

# 2.6.1 Soil Testing

Laboratory testing of soil and rock were performed in compliance to the recognized standards listed in Appendix II of this report. Standards applicable to chemical testing of groundwater are given at the end of Appendix II.

On selected and representative soil samples recovered from the boreholes, grain size analyses, and moisture content determinations were carried out in the laboratory of Terratech, to complement the visual soils descriptions. Moisture content and Atterberg limits determinations were also done on clay soil samples recovered from the boreholes. The results of the moisture content and Atterberg limit determinations on soil samples are shown on borehole logs in Appendix I. Grain size curves and tabulated results of moisture content and Atterberg limits are presented in Appendix II. On representative soil samples retrieved from the Test Pits TP-503-05 to TP-505-05, the following set of laboratory testing was performed: natural moisture content, Modified Proctor compaction test, and California Bearing Ratio (CBR) determinations following a 96 hour soaking period. The detailed results of this testing are presented in Appendix II.

### 2.6.2 Rock Testing

All rock cores retrieved from the boreholes were visually examined on site by the senior geotechnical technician supervising the drilling. Later in the laboratory, the recovered rock cores were submitted to a detailed structural description performed by Terratech licensed geologists.

Also on selected and rather intact or suitable rock cores originating from the West Option Site, unit weight and uniaxial compressive strength determinations were carried out in the laboratory.

Unit weights were measured on rock cores retrieved from Boreholes of the W-002-04 to W-008-04 Series and subsequently submitted to compressive strength determinations. In boreholes of the BH-102-05 to BH-110-05 Series and of the W-002-04 to W-008-04 Series, the rock compressive strength determinations were not performed in true compliance to the applicable standards (ASTM D 2938 "Standard Test Method for Unconfined Compressive Strength of Intact Rock Core Specimens"). The tests were carried out on an hydraulic press normally used to perform compression tests on concrete cylinders. In general, the tested rock cores were grinded and capped with high resistance sulfur compound before being submitted to the compression tests. This procedure, which somewhat deviates from the standard test protocol, is inferred to yield test results that would be on the low margin of standard test results. With due consideration to the generally very poor to poor quality of the rock, which allowed only the best segments of rock cores to be submitted to the testing, this deviation from the standard test procedure is considered acceptable.

On Boreholes BH-505-05 and BH-507-05, uniaxial unconfined compressive strength determinations were carried out as per ASTM Standard D 2938 on rather best quality rock cores. The tested cock cores are inferred to belong to the good or excellent quality bedrock, as rock cores originating from very poor to fair quality rock could not be tested for compressive strength.

Pyrite detection tests in compliance to the Quebec Standard NQ 2560-500 Procedure were undertaken on 3 rock cores sampled at shallow depth in boreholes of the W Series, and also on 18 rock core segments retrieved from boreholes of the BH-101-05 to BH-401-05 Series at depth ranging from 7 to 13 m below ground surface. The purpose of the testing was to assess the rock swelling potential due to the presence of pyrite. Results of the pyrite detection tests are presented in Appendix II.

Photographs were taken of all rock cores. On the rock core photographs of boreholes of the W-Series, depths are given in feet. The reader should therefore refer to the tables of the structural description of bedrock (Appendix V) to obtain a direct depth conversion in meters. Photographs of the rock cores of the boreholes of the BH-Series are given in meters. Photographs of all rock cores are included in Appendix IV.

The detailed structural description of the bedrock is presented in Appendix V.

### 2.6.3 Groundwater Testing

Groundwater samples were taken on 14 April 2005 from Boreholes BH-102-05, BH-104-05, BH-106-05 and BH-110-05. The said boreholes, which were converted in observation wells, were purged prior to the groundwater sampling. The following chemical analyses were performed on groundwater by Maxxam Analytics inc.:

- pH
- Sulfur anion (S=)
- Alkalinity (Total as CaCO3) pH 4.5
- Bicarbonates (HCO<sub>3</sub> as CaCO<sub>3</sub>)
- Carbonate (CO<sub>3</sub> as CaCO<sub>3</sub>)
- Chloride (Cl)
- Sulfates (SO<sub>4</sub>)

The results of the testing are presented and discussed in Section 5 of this report. Analytical Report pertaining to the chemical testing of groundwater are inserted at end of Appendix II.

# 3. <u>GEOLOGY AND SEISMICITY</u>

In reference to published soil and bedrock geological and seismic information, as outlined in Section 7 of this report, and with due consideration to soils and bedrock features recently observed at the site, the following sections are provided.

# 3.1 <u>Soil Deposits</u>

In LaSalle 1978, soils or overburden on the project site were designated as high terrace well sorted marine sand. Based on that publication, the overburden at the contemplated West Option Site was inferred to vary from less than 3 m in thickness, although to the west the soils were believed to exceed 3 m. Locally within the northeastern part of the project site, a poorly drained marsh area was inferred to contain some peat, with bedrock at shallow depth. At the site of the Hydro-Quebec power line and within about 0.5 km north of the said line, investigations carried out in 1963 by Terratech indicated the presence of compact to dense silty sand with gravel, with bedrock at depths of about 1 to 2 m, or locally at 5 m.

Investigations, recently carried out within the project site and adjacent area, generally indicated, under 0.1 to 0.3 m of topsoil (and locally under 0.5 to 0.9 m of surface peat), the presence of compact sand with silt and gravel, extending to about 1 to 6 m below existing grade. These are locally underlain by a layer of stiff to very stiff clay soils some 0.4 to 1.7 m in thickness and extending no deeper than 0.9 to 4.9 m below grade. Dense to very dense glacial till consisting of sand with some silt and gravel and occasional cobbles and boulders, is encountered beyond 1.2 to 6.1 m depth, generally extending down to depths of the order of 2.7 to 13.2 m (and locally to 24 m), where bedrock was encountered.

A drawing showing the elevation of bedrock is presented in Appendix I. Based on this drawing, two rock depressions were found some 150 m southwest and 270 m south of the proposed West Storage Tank, i.e. near Borehole BH-503-05 and Seismic Line GN-001B-04 (at metric point 0+729).

A poorly drained and peat covered (marsh) zone is present within the eastern sector of the project site, expanding some 250 m northeast of the proposed East Storage Tank.

#### 3.2 <u>Bedrock</u>

#### 3.2.1 Regional geological context

In the region of the project area, the sedimentary rocks overlying the Precambrian crystalline basement belong to the Appalachian Geological Province and are of lower Paleozoïc age. Based on Saint-Julien 1995, these rocks form a lithotectonic domain called the Bacchus Nappe. This structural domain, is limited in the northwest by the overthrust Logan Fault which runs through the St. Lawrence River and marks the front on the Appalachian Mountain Belt.

The Bacchus Nappe is in faulted contact with the adjacent nappes and overlies younger rock formations. For example, its Cambrian base overlies the Lower and Middle Ordovician terranes west of the site (Levy Nappe and Quebec Nappe).

Generally, the geology on the south shore of the St. Lawrence River in front of Quebec City consists mainly of thinly folded and faulted strata, imbricated and piled together along large, deep and reversed fault planes, gently dipping with depth, toward the southeast. During the taconian orogeny, the sediments were pushed over the continental platform approximately from the southeast to the northwest, thus forming stacking lithostratigraphic units piles called nappes. This mechanism could be compared, at a very large scale, to a sliding card deck.

In the vicinity (5 km SW) of the project site, the total thickness of the piled nappes covering the Grenville sub-basement is estimated at 4 km approximately. The Bacchus Nappe lies on top of the sequence and its stratigraphic sequence reaches a thickness of approximately 1 km as mentioned in the available governmental geological documents. The reader is invited to review some of the references listed in Section 7 of this report.

#### 3.2.2 Local geology

The Bacchus Nappe, which outcrops locally within a short range of the project site, is composed, from base to summit, of the following three rock formations (St-Julien, 1995):

- The L'Anse Maranda Formation;
- The Lauzon Formation;

• The Pointe de la Martinière Formation.

The above Lower Cambrian to Lower Ordovician lithostratigraphic units are mainly composed of shales and multicolor mudstones interbedded with siltstones, sandstones and calcareous conglomerates. Except locally, the contacts between the three formations do not show angular discordance.

The main body of the Bacchus nappe is characterized by the presence of numerous imbricated overthrust faults which repeat the stratigraphy inside the nappe. They are oriented NNE-SSW to N-S on the south shore, and dip toward east and southeast. In addition, the formations are folded (asymmetric folds).

At the project site, the underlying bedrock belongs to the Pointe de la Martinière Formation. It generally consists of thinly bedded (20 to 300 mm thick) red and green shales and mudstones, dolomitic mudstones, black micaceous shales, grey shales, siltstones, some limestones (less than 300 mm thick) interbedded with grey shales and finally, calcareous conglomerates. The total thickness of the formation is estimated at 350 m (St-Julien 1995).

The beddings are generally oriented NNE-SSW, and dip to the east. This pattern is often disturbed by the presence of folds which locally form series of anticlines (or antiforms) and synclines (or synforms) generally plunging 10 to 20° to the south.

The mudstones are usually massive, whereas the shales remain more fissile. The mudstone and shale locally present a slaty cleavage parallel to the axial planes of folds.

Investigations carried out at the project site by means of seismic refraction geophysical surveys and diamond core drilling have provided valuable information concerning the quality of the rock and in some extent its structure. Subsurface investigations carried out at the project site by boreholes, have also revealed the nature and properties of soils and the true position of bedrock. Two trial excavations were carried out to assess the rock cartography and also the bedrock structure with respect to rock anomalies, folds, faults, and synforms.

The detailed rock core description are presented in Appendix V, whereas the photographs of rock cores are inserted in Appendix IV. The seismic refraction geophysical report is included in Appendix VII.

The main geological features of the rock are outlined and discussed in the following sections.

### 3.2.2.1 Geophysical surveys

From the seismic refraction geophysical surveys, the bedrock profile and the rock seismic velocities were determined. Based on the results of the surveys, the rock quality was found to vary substantially, thus ranging from anomalous to sound rock. The heterogeneity noticed in the bedrock velocities seems to reflect the lithological pattern observed on site.

Some anomalous targets were specifically investigated by means of diamond core drilling. In these cases (see Boreholes W-003-04 and W-005-04), the core recovery indicated a poor quality rock with very low RQD values, especially near the bedrock surface. This finding is compatible with the geophysical results.

The seismic resonance survey highlighted some planar features, which may be interpreted in some cases as shear zones or fault zones. The seismic resonance also showed some bedding trends and some folding features such as the synform shape interpreted on Seismic Line GN-001A-04. In all, the geophysical surveys reflect the general structure of the bedrock.

Trial excavations were carried out (see Section 3.2.2.3) to assess the bedrock structure with respect to rock anomalies, folds, faults, and synforms.

#### 3.2.2.2 Rock core drilling

From the close examination of the rock cores retrieved from the boreholes, the rock facies intersected at the site were found to be similar to those described in the literature (ref.: Appendix I and Section 4.3 of this report).

Based on RQD values, the rock quality may be described as very poor to fair in general, and occasionally ranging from good to excellent. It is worth to remind the reader that, in

this type of rock, especially in laminated or thinly layered sections such as shales, where parting along the bedding planes occurs easily, the RQD evaluation is influenced by the number of lithologic joints and their features, i.e. whether they are induced or natural. The judgment of the geologist is therefore required. For this reason, RQD values are often underevaluated.

In this study, the RQD values do not reflect completely and thoroughly the rock quality. Therefore, the RQD should be used as a guide to discriminate the relative rock quality over sections within a same borehole.

Few targets identified by means of the geophysical surveys, were investigated particularly to verify the presence of faults, or inferred faults. Also boreholes were performed at the project site to determine the quality of the bedrock.

Two boreholes, one inclined towards the northwest and one vertical hole (Boreholes BH-117A-05 and BH-117B-05) were located along Seismic Refraction Line GN-001-04 close to borehole W-003-04. At this location, the rock in the inclined hole (BH-117A-05) shows evidences of folding near 16.2 m depth, and at a deeper depth the rock is fragmented and silty. Microfolds and minor movements in the sediments are also reported. At a deeper depth in the hole, calcite veins and hairy veinlets are present.

In the vertical borehole (Borehole BH-117B-05), the lithology is similar down to 28.5 m below existing grade, whereas it is followed by a red mudstone which is not intercepted in the adjacent incline hole.

These holes were drilled close to a narrow fold hinge as shown on the St-Julien map. Based on scarce evidences, the presence of a fault is not clearly determined. However, in the area, as shown on sections by St-Julien, the narrow folds are usually faulted, and this could therefore be the case here. Meanwhile, the predominant structures encountered in the holes are believed to be in relation with the folding. Nevertheless, the presence of a faulted fold remains highly possible. Additional information concerning past fault activity is provided at end of Section 3.2.2.3.

In borehole BH-108-05, between depths of 52 m and 64 m approx., the rock is anomalous, of poor quality and probably faulted. Calcite veinlets and veins, frequent slickensides and fault striations on joint surfaces are described. At a depth of 62 m, a

probable fault breccia (cemented with calcite) is reported. The nature of this perturbed rock section is not fully understood. However, on the photographs, the fault breccia appears to be healed.

### 3.2.2.3 Trial Excavations

Two trial excavations, identified TE-A-05 and TE-B-05, were carried out at the project site for the main purposes of assessing the rock cartography and the bedrock structure. The location of the trial excavations is shown on Drawing T-1050-C-0000-4GDD-00001 in Appendix III.

The following sections depict soil and bedrock conditions and features, as observed in the trial excavations.

#### • Trial Excavation TE-A-05

Trial Excavation TE-A-05 is situated at the crest of the rock plateau some 200 m south of the St. Lawrence shoreline. The detailed results Trial Excavation TE-A-05 are shown on Drawing no T-1050-C-0000-4GDD-0005 in Appendix III.

This excavation was about 3 m in width and 10 m in length. It was extended, by means of a Caterpillar 225 LC Excavator using a 1  $m^3$  size bucket, to an average depth 2.5 m below existing ground surface, and to depths of the order of 2.0 to 2.3 m into the bedrock. This equipment was able to easily complete the excavation within a 2.5 hour period.

In this excavation, the overburden averages a thickness of 0.2 to 0.5 m. It is exclusively composed of brown reddish sand and silt with some gravel, with also some roots close to the natural ground surface.

At the exposed bottom of the excavation, the bedrock is fragmented and slightly weathered within its first 0.3 m, whereas at greater depth it becomes of relative good quality. The bedrock consists of a succession of green and red mudstones beds (some 10 to 300 mm thick), mostly slaty with traces of dark shale interbeds (10 mm thick). Along the entire length of the excavation, rock beddings are typically oriented N 30°, with dips ranging from 58° to 64°. Numerous joints were observed, belonging to three main families (see Drawing no T-1050-C-0000-4GDD-0005, in Appendix III).

Very minor water inflows were observed at the bottom of the excavation, originating mainly from the bedrock. These were easily controlled and evacuated by pumping .

#### • Trial Excavation TE-B-05

Trial Excavation TE-B-05 is located near the proposed West Storage Tank at the site of an inferred rock anomaly. The location of this trial excavation was selected with the deliberate intention of intercepting the potential alignment of rock anomalies previously assessed by the geophysical survey lines. Positioning the trial excavation was also done on the basis of practical site accessibility for the excavator, mainly to limit damage to the property and with due consideration of access limitations to the project site. The reader is reminded that the "possible faults" shown on the appended Drawing T-1050-C-0000-4GDD-0001 (Appendix III) were directly transcripted from the geological maps. These "possible fault" lines, which are located at least some 0.2 to 0.5 km from the contemplated LNG facilities, have provided no specific or clear signs of rock anomalies during the geophysical surveys. However, signs of rock anomalies were locally disclosed elsewhere along the geophysical survey lines. In view of this, it has become desirable to have a direct look at the rock anomalies by stretching out Trial Excavation TE-B-05 some 20 to 25 m on each side of the alignment of anomalous rock features previously assessed by the geophysical survey lines. The detailed results of Trial Excavation TE-B-05 are shown on Drawing no T-1050-C-0000-4GDD-0006, in Appendix III.

The excavation has a bottom width close to 2.5 or 3.0 m and a length of 45 m. The excavation was performed by means of a Caterpillar 235 Excavator using a  $1.7 \text{ m}^3$  size bucket, and was extended to an average depth of 4 m below the existing ground surface. The excavation generally comprises some 0.6 to 3.0 m of overburden, plus 0.5 to 2.0 m of bedrock, as these depths were deemed sufficient to observe shallow rock anomalies and possible movement or disturbance in the soils that could be related fault activity.

During the field work related to this trial excavation, which lasted about 4 days, water inflows due the high ground water condition concurred to flood the excavation as limited on-site pumping equipment was then available. In spite of this, it was estimated that the excavator would have been able to complete the excavation (soil and rock) within

about a 5 hour (half day) period with adequate pumping equipment. Pumping of the water, to lower the groundwater table down to the exposed bottom of the excavation, was achieved by means of a high capacity pump. To completely dry-out the flooded excavation with a high capacity pump took about 2 hours. During the rather short time period needed to draw-down of the water table, limited silt and sloughings were observed on the exposed 1.5 (H) : 1.0 (V) sand and silt and clayey slopes of the excavation.

Numerous water inflows were observed in the open excavation, often originating from the bedrock and generally associated with fissile rock partings. The water inflows were continuous but their intensity decreased after two days (upon uninterrupted pumping).

In this trial excavation, the depth of the overburden typically reaches 3 m, consisting of variable thicknesses of sand, silt and gravel, atop of a 1 m thick layer of grey clay itself overlaying a rather continuous and very stiff reddish horizon of silt some 0.5 m in thickness. This basal deposit is underlain by bedrock.

As observed on the total length of the excavation and specifically along its western side, the bedrock surface is irregular and undulating. This, in some extent, highlights the presence of folds hinges and steep rock beddings. The bedrock is usually fragmented and slightly to moderately weathered from the surface to a depth of 1.5 m where it becomes sounder. In some areas of the trench, the exposed rock was also found in very fragmented, softer and highly weathered conditions, at least within 1 m depth.

The observed bedrock consists essentially of alternating greenish grey and pale to dark grey mudstones, sometimes sandy and slaty, and interbedded with generally thin layers of dark grey to black shales. The shales occur in variable proportions (see the legend on Drawing T-1050-C-0000-4GDD-0006). Occasionally, thin (approximately 30 mm) calcareous and siltstone or fine grained sandstone horizons are present. Some sparse calcite veinlets are also observed.

The rock formation is typically folded with trends roughly northeast / southwest (N 035° / N 215°), in reference to True North. Along the trench, successions of minor synforms and antiforms were noticed. Evidences of movement such as striations (almost parallel to the dip direction of the beddings) and polished rock faces, are often visible over softer rock facies bedding surfaces, especially in the very fine grain rock and in the

black shale. These movement features appear to be linked to the general folding process.

One of the main objectives for digging Trial Excavation TE-B-05 was to locate within a short distance from the Storage Tanks, and also whenever possible to investigate, the rock anomaly previously assessed from the geophysical survey. Based on the results of the survey, the projection of the anomaly along a northeast - southwest line is expected to cross the trench alignment at a distance of 30 measured from the southeast end of the trial excavation. However, the position of the anomaly remains then somewhat approximate, although probable.

In Trial Excavation TE-B-05, at distances ranging from 30 to 35 m from the southeast end of the trench, the bedrock is sheared and consists of weathered and well fragmented greenish mudstone and schitose black shale. This feature is visible, in an equal proportion especially on the west side of the trench. Some "hairy calcite veinlets" without definite pattern and few closely spaced joints steeply dipping to the north are also present. This poor rock quality formation is stacked between more competent formations.

The above features could indicate a rock anomaly related to a limited shear zone associated with foldings and parallel to the bedding planes. Similar features were also observed in Boreholes BH-507-05, BH-103-05 and BH-104-05, and in Borehole BH-108-05 which presents evidences of minor faulting such as secondary calcite fillings. The rock appeared to be healed.

Trial Excavation TE-B-05 was carried out in the glacial deposit to observe rock features and any movement or disturbance in the soils that could be related to a fault activity since the drawback of the glacier (-12 to -9.5 ky), whereas the aforementioned rock foldings and shear zones are believed to be related to the Appalachian Front (-450 My to -400 My). In this respect, while this excavation was being carried out, attention paid to the overburden has provided no clear evidence that the soil materials were disturbed to the bedrock otherwise that by human activity.

### 3.3 <u>Seismicity</u>

A site specific hazard assessment study is presently underway, and shall be inserted in a Seismic Hazard Report to be issued in a near future. This incoming report is intended to cover items such as earthquake history, local faults and fault activity, seismic hazard, and soil liquefaction potential.

# 4. SOIL AND BEDROCK DESCRIPTION

#### 4.1 <u>General consideration</u>

The description of the various soil layers and of the bedrock encountered in the boreholes are presented in the Boring Logs included in Appendix I. The bedrock contour elevation are shown on Drawing # T-1050-C-0000-4GDD-0001 inserted in Appendix I.

Tabulated soil  $N_{SPT}$  values, and also rock RQD and compressive strength values are shown on the boreholes logs with respect to the depth and elevation. This information is presented in Appendix 1.

It should be noted that the subject site investigation was carried out for geotechnical purposes only. Thus, an environmental characterization of the site was beyond the scope of this mandate and as such, the soil descriptions provided herein shall not be used to ascertain the presence, or absence of contamination.

Soil and bedrock conditions are summarized in the following sections specifically for the contemplated West Option Site.

# 4.2 <u>Soils</u>

A summary of the soil conditions at the site is presented below.

# 4.2.1 Topsoil or Peat

Topsoil varying in thickness from 0.10 to 0.30 m was generally encountered in the vicinity of the West Storage Tank (Boreholes BH-101-05 to BH-105-05, BH-116B-05), at the site of the proposed Unloading Lines (Boreholes BH-301-05 to BH-307-05, and BH-507-05) and also at the location and in the near vicinity of the LNG Process Area (Boreholes BH-401-05, BH-501-05 to BH-506-05, W-001-04, W-002-04 and W-006-04, and test Pits TP-503-05 to TP-505-05). Locally (Boreholes BH-303-05 and BH-305-05 and W-004-04), no topsoil but only fill materials were found at ground surface.

At the site of the East Storage Tank, peat locally combined with top soils or overlain by fill materials was encountered, extending to depths of about 0.5 to 0.9 m below existing ground surface (Boreholes BH-106-05 to BH-111A-05). North and east of the East Storage Tank area (Boreholes W-003-04, BH-117B-05 and W-005-04), peat, covered by 0.3 to 0.6 m of fill, was found to extend to depths in the range 1.2 to 2.1 m below existing grade. The peat is generally fibrous at shallow depth and becomes amorphous with depth.

#### 4.2.2 Generally Compact Sand with silt and gravel

At the site of the West Storage Tank (BH-101-05 to BH-105-05) and in its vicinity (W-002-04 and W-004-04), compact sand and gravel with some silt was identified below the topsoil (or locally peat) down to depths ranging from 1.4 to 2.3 m.

This same soil, or locally sand with some or trace of silt and gravel, was also found, in a compact to locally loose state of relative density, under the topsoil or fill covered peat at the site of the East Storage Tank and some distance north, east and west thereof (BH-106-05 to BH-111A-05, BH-116B-05, BH-117B-05, W-003-04 and W-005-04), extending to depths in the range of 1.5 to 5.0 m below grade.

Within the proposed LNG Process Area (BH-401-05, BH-501-05 to BH-506-05, W-002-04, W-004-04, W-006-04), compact sand with silt and gravel was generally encountered, extending to depths ranging from 0.8 to 6.1 m below existing ground surface.

Generally along the proposed unloading lines (BH-301-05 to BH-307-05, and BH-507-05), loose to compact sand with some silt and gravel was identified down to depths of the order of 0.6 to 3.1 m below grade, and locally to bedrock (BH-303-05, BH-305-05 to BH-307-05, and BH-507-05).

Results of laboratory testing obtained on this stratum are be summarized in Table 4-1.

Table 4-1
Results of Laboratory Testing
<b>Compact Sand with Silt and Gravel</b>

Tests	Number	Unit	Results			
10000	of tests		Minimum	Maximum	Average	
Grain size analyses (gravel, 5 to 80 mm)	13	%	4.0	54.9	24.4	
Grain size analyses (sand, 0.08 to 5 mm)	13	%	21.0	65.0	45.4	
Grain size analyses (fines, < 0.080 mm)	13	%	8.0	59.2	30.1	
Grain size analyses (clay size, < 0.002 mm)	6	%	4.8	18.8	9.8	
Moisture content	12	%	9.6	14.5	11.7	
Modified Proctor (Maximum dry unit weight)	3	kN/m <sup>3</sup>	20.4	21.5	20.8	
Modified Proctor (Optimum moisture	3	%	7.8	8.5	8.2	
content)						
California Bearing Ratio following a 96 hour	9	%	1	22	13	
soaking period (at moisture content varying						
from 0.8 to 4.5 % above the optimum						
moisture, and within a degree of						
compaction of 92 to 98 % of the Modified						
Proctor maximum dry density)						

#### 4.2.3 Firm to Very Stiff Clayey Soils

Clayey soils were encountered locally (BH-101-05, BH-103-05, BH-104-05, BH-106-05 to BH-108-05, BH-111A-05, BH-501-05, BH-502-05, and W-003-04), generally at depths of the order of 1.5 to 2.7 m, and extending to depths ranging from 1.8 to 5.2 m below existing ground surface. They ranged from stiff to very stiff sandy and clayey silt, to firm to stiff clay with some silt and gravel.

Very locally at the site of the Unloading Lines (BH-301-05), stiff to very stiff clay was identified below topsoil and down to 0.9 m below existing grade, where bedrock was encountered.

Results of laboratory testing obtained on this stratum are be summarized in Table 4-2.

Tosts	Number	Unit	Results			
16313	of tests		Minimum	Maximum	Average	
Grain size analyses (gravel, 5 to 80 mm)	6	%	0	12	4	
Grain size analyses (sand, 0.08 to 5 mm)	6	%	3	52	20	
Grain size analyses (fines, < 0.080 mm)	6	%	36	97	76	
Grain size analyses (clay size, < 0.002 mm)	6	%	12	37	26	
Natural moisture content	10	%	10	24	18	
Limit of plasticity	5	%	13	19	17	
Limit of liquidity	5	%	25	34	30	
Plasticity Index	5	%	10	15	13	

# Table 4-2Results of Laboratory TestingFirm to Very Stiff Clayey Soils

### 4.2.4 Dense to Very Dense and Well Graded Gravely Sand with Some Silt

At the site of the West Storage Tank (BH-101-05 to BH-105-05), dense to very dense soils were identified at depths of the order of 1.7 to 4.2 m, varying in gradation from gravely silt and sand, to sand with some gravel and silt, or sand and silt. They were found to extend to depths 7.7 to 11.1 m, where bedrock was encountered. Close to West Tank (W-004-04), dense to very dense sand with some silt and gravel, and silt and sand with trace of gravel and clay and occasional cobbles and boulders were found between depths of 1.8 and 11.3 m, underlain by bedrock.

Within the footprint of the East Storage Tank and its neighbouring area (BH-106-05 to BH-111A-05, BH-116B-05, BH-117B-05 and W-003-04) dense to very dense gravely sand with some silt and occasional cobbles, and silty and gravely sand were encountered at depths ranging from 3.4 to 5.0 m below ground surface. They were found to extend to depths of the order of 5.1 to 7.3 m (BH-106-05 to BH-110-05), and to depths of about 5.6 to 12.5 m below grade (BH-111A-05, BH-116B-05, BH-117B-05 and W-003-04).

Very dense sand with silt and gravel was found locally at the site of the Unloading Lines (BH-302-05 and BH-304-05) at depths of 3.1 and 2.1 m, and down to 4.6 and 2.7 m where bedrock was met.

Within the proposed LNG Process Area and the adjacent area (BH-401-05, BH-501-05, BH-503-05, BH-504-05, BH-506-05 and W-004-04), dense soils were found at depths of the order of 1.2 to 6.1 below existing grade, consisting of sand with some silt and gravel, and occasional cobbles and boulders, and locally sand and silt with trace and occasional gravel. In Boreholes BH-501-05, BH-503-05, W-004-04, dense and very dense soils reached bedrock at depths of the order of 11.3 to 24.0 m below grade. In Borehole BH-401-04, dense silt and gravel was encountered between depths of 4.6 to 10.7 m, followed by silty sand with occasional gravel presumably to about 17.5 m below grade and underlain by dense soils extending at least to 20.1 m depth where dynamic penetration tests were terminated on refusal, without formal rock determination. Boreholes BH-504-05 and BH-506-05 were also terminated within the dense to very dense soils respectively at depths of 6.5 and 6.6 m below grade, without encountering bedrock.

Results of laboratory testing obtained on this stratum are be summarized in Table 4-3.

	Number of tests	Unit	Results			
Tests			Minimum	Maximum	Average	
Grain size analyses (gravel, 5 to 80 mm)	17	%	5.0	57.1	23.1	
Grain size analyses (sand, 0.08 to 5 mm)	17	%	27.9	65.5	43.8	
Grain size analyses (fines, < 0.080 mm)	17	%	8.1	66.2	33.0	
Grain size analyses (clay size, < 0.002 mm)	6	%	3.1	26.4	11.5	
Moisture content	17	%	7.8	15.8	10.3	

Table 4-3Results of Laboratory TestingDense to Very Dense Gravely Sand with Some Silt

# 4.3 <u>Bedrock</u>

Bedrock was encountered in all boreholes (BH and W Series) carried out at the site, except in Boreholes BH-401-05, BH-504-05 and BH-506-05. In Borehole BH-401-05, bedrock was not proven, as this last borehole was terminated at a depth of 15.9 m without rock coring and was extended from 15.9 to 20.1 m below existing grade only by cone dynamic penetration tests.

At the site of the West Storage Tank (BH-101-05 to BH-105-05), bedrock was encountered (and proven by core drilling) at depths ranging from 7.7 to 11.1 m below existing ground surface or between (geodetic) elevations 64.6 and 68.1 m. In the vicinity of the West Tank (W-002-04 and W-004-04), bedrock was met at depths of 1.8 and 11.3 m or at elevations 74.6 and 63.9 m respectively.

At the site of the East Storage Tank (BH-106-05 to BH-110-05), bedrock was encountered and proven by core drilling at depths ranging from 5.1 and 7.3 m below existing grade or between elevations 68.8 and 71.3 m. Within a close range of this structure (BH-111A-05, BH-116B-05, BH-117B-05, W-003-04 and W-005-04), bedrock was found at depths ranging from 2.3 to 12.5, or between elevations 63.2 and 75.3 m.

At the site of the proposed LNG Process Area, bedrock was encountered at depths varying from 0.6 to 24.0 m below existing grade at the location of Boreholes BH-501-05 to BH-503-05, and BH-505-05, and Test Pit TP-505-05. Locally at the site of Borehole BH-401-05, bedrock is inferred to be somewhat beyond 20.1 m depth, whereas at the location of Boreholes BH-504-05 and BH-506-05, bedrock is a depths greater than 6.5 and 6.6 m. Within distances of 200 to 300 m from the center of the LNG Process Plant (W-001-04, W-002-04, W-004-04 and W-006-04), bedrock is at depths ranging from 0.2 and 11.3 m below grade.

At the site of the Unloading Lines or at the location of Boreholes BH-301-05 to BH-307-05, and BH-507-05, bedrock was found at depths ranging from 0.6 to 4.6 m below ground surface.

Based on the results of the boreholes, the following general bedrock features were identified at the project site:

- Red and green mudstones or shales;
- Pale to dark grey, greenish grey and black shales or mudstones, with some sandstone, siltstone and calcareous horizons;
- Red mudstones.

The reader should refer to the borehole logs (Appendix I) and also to Section 3.2 of this report for detailed information about the bedrock.

Results of laboratory testing obtained on rock cores are be summarized in Table 4-4. The reader is reminded that the test results included in Table 4-4 are inferred to belong to relatively good quality bedrock since, as stated in Section 2.6.2, compressive strength determinations could not be achieved on very poor to fair quality rock. The compressive strength of the rock varied from 4 to 100 MPa, with average values ranging from 23 to 44 Mpa.

Tests	Number	Unit	Results			
10000	of tests	onic	Minimum	Maximum	Average	
Uniaxial unconfined compressive strength on rock cores (not complying to ASTM D 2938) / Boreholes BH-102-05 to BH-110-05 Series and W-002-04 to W-008 Series	24	MPa	3	99	23	
Uniaxial unconfined compressive strength on rock cores (complying to ASTM D 2938) / Boreholes BH-505-05 and BH-507-05	6	MPa	12	100	44	
Unit weight of rock / Boreholes W-002-04 to W-008-04 Series	12	kN/m <sup>3</sup>	26.0	27.2	26.5	

Table 4-4Results of Laboratory Testing Bedrock

Based on the RQD values, the bedrock condition may be summarized as follows within the project site:

- West Storage Tank (Boreholes BH-101-05 to BH-105-05): The bedrock varies from very poor to poor quality down to a depth range of 23 to 38 m below existing grade, and generally becomes good to excellent thereafter.
- East Storage Tank (Boreholes BH-106-05 to BH-110-05, and BH-111A-05): The bedrock varies from very poor to poor quality down to a depth range of 22 to 24 m below grade, and generally becomes good or excellent thereafter.
- LNG Process Plant (Boreholes BH-501-05 to BH-503-05, BH-505-05, W-001-04, W-002-04, W-004-04 and W-006-04): The bedrock varies from very poor to fair quality down to a depth range of 1 to 20 m below grade, and generally becomes good to excellent thereafter.

Unloading Lines (BH-301-05 to BH-307-05, and BH-507-05): In general the bedrock varies from very poor to fair quality at least down to depths ranging from 3.4 to 6.2 m below existing ground surface. Locally in Borehole BH-302-05, good quality rock is encountered down to 7.3 m depth. In borehole BH-507-05 carried out to 41 m below grade close to the site of a proposed Deep Rock Cut to the jetty, fair to good quality rock was encountered, with also intermittently and locally very poor to poor quality rock between depths of 1.3 to 3.4 m, 12.2 to 14.0 m, 20.3 to 24.5 m and 27.7 to 32.1 m.

In addition to the laboratory testing stated in Table 4-4, petrographic examination for pyrite determination was performed on 20 selected rock cores and 1 split spoon sample (i.e. 18 rock cores from boreholes of the BH Series and 2 rock cores and I split-spoon sample from boreholes of the W Series). The results of this testing are included at the end of Appendix II. They are summarized as follows with respect to the main rock facies, and also in reference to the boreholes and sample depths:

- Black shale (Boreholes BH-102-05 at 10.5 m and W-002-04 at 2.3 m), black shale / light grey mudstone (Borehole BH-102-05 at 12.5 m), and black shale / calcareous sandstone (Borehole BH-102-05 at 11.5 m): with SPPI (Swelling Potential Petrographic Index) values in the range of 39 to 56 and equivalent pyrite contents varying from 0.54 % to 2.60 %, the rock is considered as having a high swelling potential due to the presence of pyrite.
- Light grey, grey or red mudstones: with SPPI (Swelling Potential Petrographic Index) values in the range of 12 to 50 and equivalent pyrite contents varying from 0.02 % to 0.11 %, the rock is considered as stable and is not presenting any swelling potential due to the presence of pyrite.
### 5. GROUNDWATER CONDITIONS AND CHEMICAL ANALYSES

To allow groundwater level observations, perforated plastic standpipes were installed in most the boreholes of the BH and W Series. Boreholes BH-102-05, BH-104-05, BH-106-05, BH-107-05, BH-110-05, BH-111A-05 and W-004-04 were converted into monitoring wells by the intrusion of a 50 mm diameter PVC and base slotted tube. Borehole BH-503-05 is equipped with a 25 mm size piezometer tube. Boreholes BH-101-05, BH-109-05 and BH-501-05 are provided with a capped bottom PVC liners, and thus cannot serve to monitor the groundwater.

Groundwater was measured in the boreholes of the W Series during Fall of 2004 (6 October 2004). The boreholes of the BH-102-05 through BH-401-05 Series were monitored in early Spring of 2005 (15 April 2005), whereas boreholes of the BH-502-05 to BH-507-05 Series were surveyed for groundwater in Fall of 2005 (14 October 2005). Groundwater levels were thus observed from 1 to 59 days after completion of drilling.

Groundwater readings in the boreholes are summarized on Table 5-1. Artesian conditions were observed in three boreholes (BH-102-05, BH-116B-05, and BH-503-05).

It should be noted that the elevation of the groundwater table is usually not stable as it generally fluctuates with the seasons or subsequent to modifications to the environment. Thus, the groundwater may be found at or very close to the ground surface at certain times of the year, namely during the spring thaw or after periods of heavy precipitations.

Representative groundwater samples were subjected to chemical testing to assess their aggressiveness to concrete. The analytical report for the groundwater is included at the end of Appendix II. The results of chemical analyses performed on water samples retrieved from boreholes of the BH Series are summarized in Table 5-2. An hydrological study of the project site was carried out during the period of July through September 2005 by SNC-Lavalin Environment inc.

Table 5-1
<b>Groundwater Levels</b>

Boreholes	Level of Ground Surface	Date of Groundwater Measuremen	Depth of groundwater (below ground surface)	Groundwater Level	Note
	m	L	Μ	m	
BH-102-05	75.52	15-Apr-05	-0.20	75.72	Well
BH-103-05	75.67	15-Apr-05	0.22	75.45	Standpipe
BH-104-05	75.72	15-Apr-05	0.46	75.26	Well
BH-105-05	75.41	15-Apr-05	0.20	75.21	Standpipe
BH-106-06	76.25	15-Apr-05	0.51	75.74	Well
BH-107-05	75.79	15-Apr-05	0.07	75.72	Well
BH-108-05	76.19	15-Apr-05	0.33	75.86	Standpipe
BH-110-05	76.20	15-Apr-05	0.39	75.81	Well
BH-111A-05	75.74	15-Apr-05	0.17	75.57	Well
BH-116B-05	75.44	15-Apr-05	-0.35	75.79	Standpipe
BH-117B-05	77.38	15-Apr-05	1.50	75.88	Standpipe
BH-301-O5	76.79	15-Apr-05	0.07	76.72	Standpipe
BH-302-05	77.19	15-Apr-05	1.28	75.91	Standpipe
BH-303-05	71.50	15-Apr-05	0.96	70.54	Standpipe
BH-304-05	66.06	15-Apr-05	0.70	65.36	Standpipe
BH-305-05	64.06	15-Apr-05	0.50	63.56	Standpipe
BH-306-05	61.48	15-Apr-05	0.76	60.72	Standpipe
BH-307-05	52.81	15-Apr-05	3.25	49.56	Standpipe
BH-401-05	76.58	n/a	n/a	n/a	Standpipe
BH-502-05	75.75	14-Oct-05	0.75	75.00	Standpipe
BH-503-05	75.33	14-Oct-05	-0.39	75.72	Piezometer
BH-504-05	75.92	14-Oct-05	0.63	75.29	standpipe
BH-505-05	77.44	14-Oct-05	0.50	76.94	standpipe
BH-506-05	76.77	14-Oct-05	0.40	76.37	standpipe
BH-507-05	54.17	14-Oct-05	4.30	49.87	standpipe
W-001-04	78.14	6-Oct-04	2.50	75.64	standpipe
W-002-04	76.40	6-Oct-04	1.00	75.40	standpipe
W-003-04	77.53	6-Oct-04	2.20	75.33	standpipe
W-004-04	75.15	6-Oct-04	0.64	74.51	well
W-005-04	77.55	6-Oct-04	1.30	76.25	standpipe
W-006-04	79.84	6-Oct-04	0.85	78.99	standpipe
W-008-04	78.60	6-Oct-04	2.74	75.86	standpipe

Table 5-2	
Results from Chemical Testing on Groundwater Samples	5

Baramatara	Unito	Test Results						
Parameters	Units	BH-102-05	BH-104-05	BH-106-05	BH-110-05			
рН	pН	8.6	8.8	8.8	11			
					(doubtful)			
Sulfur anion (S=)	mg/L	ND	ND	ND	ND			
Alkalinity (Total as								
CaCO <sub>3</sub> ) pH 4.5	mg/L	320	260	350	200			
Bicarbonates (HCO <sub>3</sub> as								
CaCO <sub>3</sub> )	mg/L	300	230	320	ND			
Carbonate (CO <sub>3</sub> as								
CaCO <sub>3</sub> )	mg/L	16	29	29	130			
Chloride (CI)	mg/L	50	180	5.5	5.6			
Sulfates (SO <sub>4</sub> )	mg/L	11	22	34	36			
<u>Notes</u> :								
ND = Not detected								
N/A = Not applicable								
DL = Detection Limit								

Based solely on the above results of chemical analyses, i.e. the pH values and sulfates (SO<sub>4</sub>), the groundwater is inferred to constitute a low level of aggressiveness to concrete.

However, in recent years it has become a general and common practice to recommend the use of sulphate resistant Type 50 cement, or cement with silica fume, for concrete foundations installed in the St. Lawrence River Low Lands. This recommendation should be implemented on the Rabaska Project, in order to avoid long term sulfatation of the concrete foundations and floor-slab-on-grades, as the process is initiated by two sources: the low sulfate content in the groundwater, and the sulfate generation from the oxidation of the pyrite enclosed in the dark shale beddings within the mudstone and shale bedrock.

### 6. <u>CONCLUSIONS AND RECOMMENDATIONS</u>

### 6.1 <u>General</u>

Rabaska Limited Partnership is contemplating the construction of a LNG Receiving Terminal, in Levis, Quebec. The project is located close to the eastern limit of the Municipality of Levis, between the south shore of the St. Lawrence River and a main project area situated some 1.4 km to the southeast or between Hydro-Quebec power lines and Highway 20 (see Drawing T-1050-B-0000-4GDD-0001 in Appendix III).

Based on available information, the project comprises the construction of the following industrial components and facilities:

- LNG Storage Tanks;
- LNG Process Area;
- Unloading Lines (Deep Rock Cut);
- Access Road and Paved Areas.

Comments and preliminary recommendations, from a geotechnical point of view, are included in the following sections of this report, to assist in the early design of earthworks and foundations, slab-on-grades, roads and paved zones, and lay-down area, within the proposed facilities. Geotechnical recommendations given herein will likely need to be adjusted and reviewed in the future, as conceptual details and project features and layout get more advanced. Dynamic response of foundations will also be addressed in the future within the detailed engineering phase.

### 6.2 LNG Storage Tanks

### 6.2.1 Structural Features and Subsurface Conditions

As indicated on Drawing T-1050-B-0000-4GDD-0001 (Appendix III), the construction of two LNG Storage Tanks are contemplated at the site of Boreholes BH-101-05 to BH-110-05. The tanks will be 90 m in diameter and some 46 m in height (with dome). Each tank will be installed within a 150 m x 150 m permanent depressed enclosure with its base at a depth of approximately 10 m below the existing ground surface, or at about

elevation 65 m. Center and edge static bearing pressures induced by the storage tanks are expected respectively not exceed 170 and 280 kPa during operation, or 250 and 320 kPa during initial water testing.

The storage tanks will be seated on circular mat type foundations. The mat foundations will be provided with thermal insulation and underlying heating cables, to avoid the formation of permafrost due to the extreme low temperature of the LNG containment.

Subsurface investigations recently carried out at the sites of the LNG Storage Tanks indicated the following soil and bedrock conditions:

- West Storage Tank: Under about 0.2 m of topsoil, compact sand and gravel was encountered down to about 1.4 to 2.3 m below grade, locally followed by firm to very stiff clayey soils extending to 2.7 or 4.2 m depth. These are underlain, at depths ranging from 1.7 to 4.1, by dense to very dense gravely silt and sand that extends to 7.7 or 11.1 m below existing ground surface, where bedrock was encountered. Bedrock, found at about elevations 64.6 to 68.1 m, generally consisted (Boreholes BH-101-05 to BH-104-05) of very poor to poor quality light grey mudstone or (locally) sandstone, with about 5 to 10 % layers of greenish grey and dark grey shale. Locally (BH-105-05), very poor to fair quality red mudstone was encountered.
- East Storage Tank: Under about 0.5 to 0.9 m of topsoil or 0.6 m of peat, compact (and locally dense) sand and gravel or sand and silt with some or trace of gravel was encountered down to about 1.5 to 3.3 m below grade, locally followed by stiff to very stiff clayey soils extending to 3.7 or 4.9 m depth. These are underlain, at depths ranging from 2.7 to 4.9 m by dense to very dense gravely sand with some silt and occasional cobbles and boulders, or silty and gravely sand that extends to 5.1 or 7.3 m below existing ground surface, where bedrock is met. Bedrock, found at about elevations 68.8 to 71.4 m, generally consisted (BH-106-05 to BH-108-05) of very poor to fair quality dark grey shale, grey mudstone with 10-15 % of black shale layers, or greenish grey shale or mudstone with black shale layers. Locally (BH-109-05 and BH-110-05), very poor to good quality red mudstone, with dark shale layers was identified.

Groundwater was observed (15 April 2005) between 0 and 0.5 m depth. Groundwater levels are subject to seasonal fluctuations and modifications to the environment.

#### 6.2.2 Excavation

The proposed Storage Tanks will be installed within two depressed enclosures, extending to a depth of about 10 m below the existing ground surface.

Based on the known subsurface conditions, and in view of the general design schemes and layouts already contemplated at the project site, the following comments and preliminary recommendations are given concerning the excavation of the depressed enclosures of the LNG Storage Tanks:

- (1) In view of the soil stratigraphy prevailing at the site, and the high groundwater conditions observed namely at thaw, permanent side slopes of 2.5 (H): 1 (V) within the generally well graded and dense to very dense soils are considered to be at risk of experimenting seasonal or intermittent slope erosion and sand/silt sloughing problems. In this perspective, the surface and the toe of the slope within the overburden should be covered and protected with an inverted granular filter pad. This granular slope protection and pad will consist of a geotextile fabric covered by coarse clean crushed stone, eventually combined with inclined perforated drains located a short distance from the exposed face of the slopes. This feature should be implemented with a drainage system installed at the crown of slope to intercept runoff. Furthermore, a drainage trench should be provided a short distance "upstream" of the toe of the slope, as to allow systematic draw-down of the water table, and thus prevent toe erosion. At the toe of the overburden slope, a minimum 1.5 m wide horizontal berm should be provided at the bedrock surface.
- (2) Although the bedrock encountered at the site within the proposed excavation depths was generally found to vary from very poor to fair quality, further to generally being thin bedded, it is believed that excavation thereof will require hydraulic breaking process and blasting locally. Ripping is not considered practical, except maybe locally in the very poor to poor rock surface (often most severely fractured and weathered). The reader is reminded that bedrock at the site of Trial Excavation TE-B-05 (Section 3.2.2.3) could be easily excavated at

least down to about 2 m below the bedrock surface by means of an excavator equipped with a  $1.7 \text{ m}^3$  size bucket.

- (3) Permanent pumping will be required in the excavations due to the high groundwater conditions prevailing at the project site. This situation was observed in October 2005 in Trial Excavation TE-B-05 (Section 3.2.2.3) where pumping was also needed to draw-down the water table at the bottom of the excavation. Recommended drainage features at the bottom of the depressed enclosures consist of a layer of clear and uniform crushed stone entrapped between unwoven geotextile fabrics and traversed by perforated pipes. This system should be connected to sumps.
- (4) In view of the inclination of the bedrock beddings and the bedrock layered structure, the permanent excavated rock surface should generally be provided with a side slope of 1 (H) : 1 (V). Exposed rock surfaces will undergo alteration and weathering due to the exposition to air, and frost action. To limit the consequences of long term rock weathering and alteration and retain future rock scaling, the excavated and exposed rock surfaces should be covered with a steel wire mesh connected to closely spaced anchors. As the bedrock is likely dipping in one direction, i.e. towards the southeast, rock bolting may also be locally contemplated. Where dipping would permit it, steeper rock slopes close to 2.5 (V) : 1 (H) and generally no higher than 6 m may be contemplated if duly protected from weathering and alteration by shotcrete covered wire mesh adequately retained by closely spaced rock anchors, and provided with underdrainage.
- (5) Exposed bedrock, at or below the foundation level, should be protected against alteration and weathering due to oxidation and/or frost action. In this perspective it should be sealed without delay by means of a thin layer (100 mm) of concrete. The concrete sealing should be placed immediately after excavation and after approval by a qualified technician, of the exposed rock surfaces. Also rock surfaces (under foundations) should be protected against frost action, if the excavations are carried out during winter.
- (6) In addition to the above recommendations, and to prevent the rock swelling process that could be initiated by the oxidation of the dark mudstone and/or

shale beddings of the bedrock, the exposed bedrock bearing surface under foundation should be permanently maintained at least 0.5 m below groundwater. This could therefore require deeper excavation within the bedrock, with respect to what was needed to comply to recommendations stated in (5). In this perspective, drainage within the depressed enclosures of Storage Tanks should be achieved accordingly.

(7) Because of inferred and locally proven swelling properties and weathering characteristics, the excavated rock shall not be reused as fill material under structures or floor-slabs-on-grade.

#### 6.2.3 Foundations

The LNG Storage Tanks may be founded on circular mat type foundations, in compliance to the following recommendations:

- (1) An allowable net bearing pressure of 500 kPa is recommended for large size mat foundations seated on the poor quality bedrock, or on a layer of concrete in direct contact with the bedrock. This allowable bearing pressure was determined essentially from judgment based on the bedrock descriptions performed at the foundation levels on the rock cores and also at shallow depth in the trial excavations. As the frequently encountered very poor to poor quality bedrock is thinly bedded and shows closely spaced discontinuities, it may be considered in many instances to be as good or better than a thoroughly compacted and well interlocked granular fill. The above recommended allowable bearing pressure is consistent with suggested lower bearing values stated in typical building codes for comparative poor quality rock (schist, slate and shale). As the center and edge static bearing pressures induced by the storage tanks are expected respectively not exceed 170 and 280 kPa during operation, or 250 and 320 kPa during initial water testing, the aforementioned allowable bearing pressure is deemed sufficient.
- (2) For transient loadings due to wind or seismic events, the above net allowable bearing pressure may be increased by 30 percent.

- (3) As the dark grey and black mudstone / shale will likely show swelling properties in addition to be prone to undergo quick alteration and weathering process when exposed to air, it is recommended in zones where this type of rock is encountered, that bedrock be excavated to comply to recommendations stated in 6.2.2. (Items 5 and 6). This is aimed at permanently maintaining the exposed rock (under the tank) below groundwater to avoid oxidation that could generate swelling and weathering. All excavated and exposed rock surfaces should then be immediately covered with fill materials, or with concrete to limit alteration and weathering, as outlined in Section 6.2.2. (Item 6).
- (4) Based on a freezing index of about 1250°C. days typical for the Quebec City / Levis area, the mat foundation of the tanks should normally be provided with a soil cover of at least 2.0 m at its periphery. It is inferred that frost action may take place at the outset of the said mat foundation during winter, even in consideration of the partially heated environment provided (by heating cable) below the tank bottom. If required, a portion of the soil cover may be replaced by a suitable thickness of thermal insulation adequately and horizontally placed at shallow depth at the periphery of the mat foundation.
- (5) Due to the very low temperature of the LNG containment within the Storage Tanks, thermal insulation and heating cables are essential to prevent the formation of permafrost within the bearing bedrock.

### 6.3 LNG Process Area

### 6.3.1 Structural Features and Subsurface Conditions

The proposed LNG Process Area will comprise equipment and compressor foundations, footings to support lightly loaded steel columns, and small buildings. These will likely be situated within a distance of 500 m southwest of the West Storage Tank.

The area was investigated by means of Boreholes BH-401-5 and BH-501-05 to BH-506-05 and Test Pits TP-503-05 to TP-505-05. Compact sand with gravel and silt was encountered generally down to depths of about 0.8 to 6.1 m, followed by dense to very dense sand with gravel and occasional cobbles and boulders. Bedrock was found at depths ranging from 5.2 to 13.2 m (BH-501-05 and BH-502-05), or beyond 6.5 or

6.6 m (BH-504-05 and BH-506-05) or at depth greater than 20.1 m (BH-401-05 and BH-503-05), whereas it was also locally identified at shallow depths i.e. between 0.6 or 0.8 m (TP-505-05 and BH-505-05). Bedrock varies from very poor to poor quality and consists of light grey or siltstone or mudstone. Soil and bedrock data and properties are summarized in Table 6-1, together with recommended design parameters.

Typical Soil o	Properties			Recommended Parameters								
Soil / Bedrock Type	Depth Range	Stratum Thickness	Unit Weight γ	N <sub>SPT</sub> Values	q <sub>u</sub> (6)	c'	φ'	E	Poisson Ratio ν	Ko	Ka	Кр
	m	m	KN/m <sup>3</sup>	Blows / 0.3 m	MPa	kPa	(°)	MPa	-	-	-	-
Topsoil (2)	0 to 0.15 or 0.30	0.2 to 0.3	18 to 20	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Compact sand with silt and gravel (2)	0.2 to 0.8 or 6.1	0.6 to 6.0	20 to 21	13 to 30 (1)	n/a	0	30	10 to 28	0.35	0.5	0.30	3.3
Dense to very dense sand with gravel and occasional cobbles (3)	1.2 or 4.6 to 6.1+	1.5 to 4.9+	21.5 to 22.3	34 - 60+ refusal	n/a	0	34	95 to 200	0.30	0.5	0.28	3.6
Very severely and fractured bedrock (4)	0.8 to 1.5	0.7	26.0	refusal	n/a	0	36	150 to 300	0.30	n/a	0.26	3.8
Poor to good quality bedrock (4)	1.5 to 4.7+	3.2+	26.5	n/a	12 to 40	n/a	42	5000 to 20000	0.30	n/a	n/a	n/a
Fair to good quality bedrock (5)	5.2+	0.9+	26.5	n/a	20 to 50	n/a	42	10000 to 25000	0.30	n/a	n/a	n/a

# Table 6-1 Soil and Bedrock properties and parameters (LNG Process Area)

Notes : 1 - Excluding the first 0.5 m depth

2 - General soil feature (BH-401-05, and BH-501-05 to BH-506-05)

3 - Frequent soil feature (BH-401-05, BH-502-05 to BH-504-05, and BH-506-05)

4 - Local bedrock feature (BH-505-05)

5 - Local bedrock feature (BH-502-05)

6 - Rock unconfined compressive strength

A temporary Lay-down Area is contemplated in the vicinity of Boreholes BH-503-05 to BH-505-05 and Test Pits TP-503-05 to TP-505-05. Subsurface investigation works performed in this area, indicated the presence of 0.1 to 0.3 m of topsoil followed by silty sand with some gravel in a compact state of relative density at depths smaller than 1.6 to 2.0 m (BH/TP-503-05 and BH/TP-504-05) and locally (BH/TP-504-05) comprising a thin clayey silt layer. Locally at the site of BH/TP-505-05 rock is encountered at 0.6 or 0.8 m below existing grade.

Groundwater was observed (14 October 2005) between 0 and 0.5 m depth. Groundwater levels are subject to seasonal fluctuations and modifications to the environment.

### 6.3.2 Foundations

Isolated or strip shallow footings may be contemplated for structures and equipments within the proposed LNG Process Area. They should be designed and constructed to comply to the following recommendations:

- (1) Based on the borehole results and the soil N<sub>SPT</sub> index values, the net allowable bearing pressures applicable to shallow footings are given in Table 6-2. These may be considered for footings seated on intact natural soils, in view of limiting total settlements to less than 20 mm, and differential settlements to less than 15 mm between adjacent columns typically spaced at 5 m or more (to limit angular distortion to 1:330). Static spring constant for foundation are given in Table 6-3.
- (2) Footings seated on (poor quality) bedrock may be designed for an allowable net bearing pressure of 500 kPa. The bedrock surface should be cleared of severely fragmented rock, prior to footing installation.
- (3) For transient loadings due to wind or seismic events, the above allowable bearing pressures may be increased by 30 percent.
- (4) All topsoil, peat and organic soils, as well as remoulded, soft or frozen soils and uncontrolled fill should be excavated prior to the installation of a footing on intact natural soils.

- (5) Protection and sealing of exposed rock should be carried out as outlined in Section 6.2.2. and in Section 6.2.3. Item (1).
- (6) To limit differential movements for cases where some of the footings belonging to a same structure would be partly seated on rock, and on fill or soil, a well compacted and non swelling crushed stone cushion, at least 300 mm in thickness, should be provided under any footing that otherwise would have been on rock.
- (7) The minimum width of footings (on soil or on rock) should be 1 m. Settlements are expected to be less than 3 to 5 mm for shallow foundations seated on bedrock, whereas settlements of the order of 15 to 20 mm may occur with footings installed on compacted granular fill (seated on rock), or on compact to dense natural soils.
- (8) Footings (on soil or rock) exposed to freezing conditions must be protected against frost action. Based on a freezing index of about 1250 C° days typical for the Quebec City / Levis area, exterior foundations of heated structures should be provided with a soil cover of at least 2.0 m. For unheated structures, the soil cover should be increased to 2.4 m. Thermal insulation may be contemplated to reduce frost penetration during winter.

~	Anowable bearing r ressure for r ootings seated on Natural oon of on bedrock									
Deptl	h (m)	Approx elevation	kimate on (m)	Net allowable bearing pressure (kPa)						
from	to	From	to	Borehole BH-401-05	Borehole BH-501-05	Borehole BH-502-05	Borehole BH-503-05	Borehole BH-504-05	Borehole BH-505-05	Borehole BH-506-05
0	1.0	76.3	75.3	30	60	70	100	50	200	60
1.0	2.0	75.3	74.3		170		200	200		
2.0	3.0	74.3	73.3			270	200		500 (on	
3.0	5.2	73.3	71.1	300	200			300	bedrock)	250
5.2	6.1	71.1	70.2		200	500 (on bedrock)	500 (on 300 bedrock)		Seal Ook)	

Table 6-2

#### Allowable Bearing Pressure for Footings seated on Natural Soil or on Bedrock

#### Table 6-3

Proposed Static Spring Values for Footings seated on Natural Soil or on Bedrock

Deptl	h (m)	Approx elevation	kimate on (m)	Approximate range of modulus of subgrade reaction (MN/m <sup>3</sup>					l/m³)	
from	to	From	to	Borehole BH-401-05	Borehole BH-501-05	Borehole BH-502-05	Borehole BH-503-05	Borehole BH-504-05	Borehole BH-505-05	Borehole BH-506-05
0	1.0	76.3	75.3	2 – 3	5 – 8	6– 9	6 - 14	3 - 7	13 - 20	4 - 9
1.0	2.0	75.3	74.3		11 – 21		13 - 25	13 - 20		
2.0	3.0	74.3	73.3			20 - 40		50 - 120		
3.0	5.2	73.3	71.1	27 - 42					(on	25 - 40
5.2	6.1	71.1	70.2		13 – 20	50 - 120 (on bedrock)	25 - 50	20 - 38	bedrock)	20 40

### 6.3.3 Floor Slabs-on-grade

The following recommendations are applicable to floor slabs-on-grade, within heated structures:

- (1) All organic, remoulded, soft or frozen soils, and uncontrolled fill materials should be excavated prior to the installation of a floor slab-on-grade.
- (2) The floor slabs-on-grade should be underlain by at least 300 mm of crushed stone of size 20-0 mm compacted to at least 95% of the Modified Proctor maximum dry density. The crushed stone must be tested prior to placement (in accordance with the SPPI procedure - Standard NQ 2560-500) to ensure that it is non-swelling. This crushed stone pad combined with the underlaying soil is believed to yield a subgrade modulus ranging from 25 to 40 MN/m<sup>3</sup>.
- (3) Construction joints should be provided in the floor slabs-on-grade especially at the face of foundation walls and columns, to allow small differential settlements to occur without damage.

(4) Constant vibratory loadings applied to floor slabs warrant detailed dynamic analysis, which are considered outside the scope of this mandate.

#### 6.3.4 Temporary Lay-down Area

The proposed temporary Lay-down Area will be provided with a granular fill cover to enable the free traffic of heavy delivery vehicles, further to allow the storage, handling and assembling of structural components, specialized industrial equipment, and temporary facilities needed during the construction and commissioning of the LNG Receiving Terminal.

In view of the existing subsurface and groundwater conditions, the following recommendations are provided:

- (1) All topsoil, peat, large roots and stumps, loose or soft soil, or soil remolded by the construction activities should be removed prior to the placement of the granular fill cover within the contemplated lay-down area. At this stage of the site preparation, peripheral drainage ditches should be provided at the outset of the lay-down areas and the exposed bottom of the stripped area should, whenever possible, be profiled towards the ditches.
- (2) The granular fill cover within the contemplated lay-down area should consist of the following sub-base and base materials:
  - Sub-base (crushed or granular material, fragmented rock): 500 mm
  - Base course (crushed stone):
     400 mm

The sub-base material should essentially be well draining and consist of well graded crushed or granular material (typically complying to MG 112 of Ministère des Transports du Québec) with less than 10 % of fines particles smaller than 0.080 mm. Excavated rock fragmented to less than 50 - 200 size particles could also be used as sub-base material if adequately rolled with a dozer.

The base course materials should comply to MG 20 gradation (Ministère des Transports du Québec) or be composed of MG 56 materials topped with MG 20, with less than 8 % of fines particles smaller than 0.080 mm.

(3) Periodic profiling and maintenance of the finished base course surface is essential during the service life of the temporary lay-down area, to maintain traficability and surface runoff evacuation towards the ditches.

#### 6.4 Unloading Lines

#### 6.4.1 Structural Features and Subsurface Conditions

Unloading conduits are contemplated between the south shore of the St. Lawrence River and the LNG Storage and Process Facilities, at the site of Borehole BH-507-05, and Boreholes BH-307-05 to BH-301-05.

Sand in loose to compact state of compactness and with silt was generally found between ground surface and a depth of approximately 0.6 to 1.5 m in most of the above boreholes, whereas locally (BH-302-05) loose sand extends to 3.1 below grade. Also locally (BH-301-05) a stiff to very stiff clay stratum was encountered down to 0.9 m below grade. In Boreholes BH-302-05 to BH-305-05, the loose soils are underlain by compact to very dense sand extending to 2.4 or 4.6 m below ground surface. Bedrock was proven at shallow depths of 0.6 to 0.9 m (BH-301-05, BH-307-05 and BH-507-05) and at depths ranging from 1.3 to 4.6 m below grade (BH-302-05 to BH-306-05).

Groundwater was observed (15 April 2005) in Boreholes BH-301-05 to 306-05 between 0 and 1.0 m depth, whereas in Boreholes BH-307-05 and BH-507.05, groundwater was found (April and October 2005) at depths ranging from 3.3 to 4.3 m. Groundwater levels are subject to seasonal fluctuations and modifications to the environment.

#### 6.4.2 Foundations

The following allowable net bearing pressures may be considered for footings seated at depths of about 2.0 to 2.4 m below grade:

- Borehole BH-301-05: 250 kPa on very severely fractured bedrock
- Borehole BH-302-05:
- Borehole BH-303-05:
- Borehole BH-304-05:
- 30 kPa on soil (or 200 kPa on soil at 3.1 m) 100 kPa on soil (or 500 kPa on rock at 2.4 m)
- 100 kPa on soil (or 500 kPa on rock at 2.7 m)

- Borehole BH-305-05: 500 kPa on bedrock
- Borehole BH-307-05:
- Borehole BH-507-05: 500 kPa on bedrock

Settlements are expected to be less than 3 to 5 mm for shallow foundations seated on bedrock, whereas settlements of the order of 10 to 20 mm may occur for footings installed on intact natural soils. Differential settlements of adjacent footings seated on soils may range from 8 to 15 mm thus limiting angular distortion to 1:350 between columns typically spaced at 3 to 5 m or more.

500 kPa on bedrock

Recommendations, already provided in Sections 6.2.2, 6.2.3. and 6.3.2 concerning the minimum width of footings, and the protection against rock alteration to air and swelling process, and frost protection are applicable to the installation of the Unloading Lines, if they are routed or founded at shallow depth in the overburden or within the upper layer of bedrock.

### 6.4.3 Deep Rock Cut to the Jetty

Between the south shore of the St. Lawrence River and a point located at least some 100 m SE of the locus of Boreholes BH-307-05 and BH-507-05 and Trial Excavation TE-A-05, a 300 m long open Rock Cut with a maximum depth of 22 m is presently contemplated for (i) LNG unloading lines originating from the ship docking facilities, and (ii) an access road. The Rock Cut will be oriented in a NW-SE direction.

Based on the local geology and in reference to the results of the subsurface investigations, that are valid only near the southeastern part of the Rock Cut, the bedrock consists of a succession of relatively thin (10 to 300 mm thick) mudstone and siltstone beds with shale interbeds (10 mm thick). In general the rock beddings are dipping from 58 to 62°. However, from local direct visual observations performed at shallow depth in Trail Excavation TE-A-05, the orientations of the beddings were found to be at 30°. Although the bedding orientations observed in TE-A-05 are considered favorable with respect to the lateral rock stability of the proposed deep linear rock cut aligned in a NW to SE direction, the local geology also provides indications that unfavorable bedding orientations would also exist.

In view of the above, the following general comments are provided:

- (1) According to the usual practice and the standards of Ministère des Transports du Québec, which are normally applied to road construction, rock cuts to a maximum depth of 6 m into sedimentary rocks would normally be provided with 1.0 (H) to 2.5 (V) rock slopes. Deeper rock cuts, may warrant special geological studies. As a general rule, pending more detailed studies, the rock cuts should be provided with 6 m wide benches at vertical intervals of no more than 12 m. A rock catch ditch is also recommended for falling rocks alongside the roadway.
- (2) In view of the above standards, several benches will be required with the contemplated deep and steep-sloping Rock Cut. Furthermore, with due consideration the poor quality of the rock, which is thinly bedded and could locally also be dipping unfavorably, the extensive weathering and scaling process which will likely be worsen by frost action and seasonal groundwater seepage remains a major concern, with permanently exposed rock slopes, even if they are no steeper than 1.0 (H) to 2.5 (V).
- (3) In this perspective and as the project gets more advanced towards developing open Rock Cut schemes, slope protection by means of wire mesh, rock bolting, rock mass drainage, etc,. will need to be addressed and optimized from a rock mechanic point of view.
- (4) The bedrock encountered at the site (Borehole BH-507-05) within the proposed excavation depth of the Deep Rock Cut was found to vary from poor to excellent quality, further to generally being thin bedded. It is believed that excavation thereof will require hydraulic breaking process or blasting. Ripping is not considered practical, except maybe locally in the very poor to poor rock encountered at shallow depths.

### 6.4.4 Rock Cut on the cliff near the Jetty

The steep rocky cliff along the south shore of the St. Lawrence River near the proposed Jetty appears to be the site of only local and limited surface rock scaling. Seismic events would not aggravate the situation.

It is presently envisaged to route the LNG unloading lines originating from the ship docking facilities on a sustaining vertical steel frame structure. This structure, which will be founded on a granular fill placed at the toe of the cliff, shall reach at least the top of the 21 m high steepest section (2.3V:1.0H) of the cliff. In this perspective, rock excavation in the immediate vicinity of the sustaining structure should comply to the general recommendations already outlined in Section 6.4.3.

#### 6.5 Access Roads and Paved Areas

The following recommendations apply to the design and construction of access roads and paved areas:

- (1) All topsoil, peat, uncontrolled fill, loose or soft soil, or soil remolded by the construction activities should be removed prior to the construction of access roads and paved areas.
- (2) For local traffic of heavy and light vehicles, the following sub-base, base and pavement layers may be considered:
  - Heavy vehicles:
    - Sub-base (sand or crushed stone) : 300 mm
    - Base course (crushed stone) : 450 mm
    - Wearing course (asphalt) : 55 mm (EB-14) + 40 mm
      - (EB-10S)

Light vehicles:

$\triangleright$	Sub-base (sand or crushed stone)	: 300 mm
≻	Base course (crushed stone)	: 300 mm

- ➢ Wearing course (asphalt) : 60 mm (EB-10S)
- (3) All materials should comply with the Ministère des Transports du Québec (MTQ) standards, in terms of gradation, soundness and compaction. The above EB-14 and EB-10S pavement denominations are as per MTQ Standards.
- (4) To ensure proper performance of the access roads and paved areas, all sub-base and base course materials should be implemented at the subgrade.

(5) Long term performance and good behavior of access roads paved areas rely on good drainage. Therefore, adequate drainage ditches should be provided to maintain groundwater below the base course and sub-base layers.

#### 6.6 Soil and Bedrock Dynamic Properties

The dynamic parameters of the overburden soil and of the bedrock were determined on-site by means of down-hole seismicity surveys recently carried out by Geophysics GPR International Inc. in Boreholes BH-101-05, BH-109-05, and BH 501-05. The detailed results of the testing are gathered and discussed in Appendix VIII of this report, and are summarized hereafter in Table 6-4.

Dambah	Depth	Decembration	Assumed Mass	Poisson Ratio		Gs		E	s
Borenole		Description	Density	min.	max.	min.	max.	min.	max.
	m		kg/m <sup>3</sup>		-	GF	Pa	G	Pa
BH 101 05	2.2 - 9.7	Dense to very dense sand with some gravel and silt	1 900	0.36	0.46	0.46	0.87	1.30	2.41
BI-101-05	9.7 - 23.4	Poor to good quality mudstone	2 600	0.33	0.48	0.91	3.93	2.71	11.31
	2.3 - 5.1	Compact to dense sand and silt	1 900	n/a	n/a	0.14	0.18	n/a	n/a
BH-109-05	5.1 - 7.3	Very severely fractured and weathered red mudstone	1 900	n/a	n/a	0.39	0.79	n/a	n/a
	7.3 - 20.8	Fair to good quality red and greenish grey mudstone	2 600	0.40	0.48	0.87	1.90	2.53	5.52
	20.8 - 23.2	Fair to good quality grey shale	2 600	0.43	0.45	2.45	3.80	7.14	10.85
	0.0 - 2.1	Loose to compact silty sand, some gravel	1 900	n/a	n/a	n/a	n/a	n/a	n/a
	2.1 - 6.1	Compact silt and sand, trace of gravel	1 900	0.37	0.46	0.14	0.63	0.39	1.81
BH-501-05	6.1 - 13.2	Dense to very dense silt and sand, trace of gravel and clay	1 900	0.40	0.47	0.44	0.73	1.25	2.11
	13.2 - 19.8	Very poor to fair quality limestone	2 600	0.42	0.45	1.51	2.46	4.36	7.05

Table 6-4Dynamic Parameters of Soils and Bedrock

### 6.7 Ground Apparent Electrical Resistivity

Vertical electrical soundings were carried out in October 2005 by Geophysics GPR International Inc. to determine the ground apparent electrical resistivity for grounding purposes. The electrical soundings were performed at two locations (RT-1-05 and RT-2-05) using the Wenner four electrode array. The procedure and the detailed results of the in-situ testing are provided in Appendix VIII.

### 6.8 General Conditions and Limitations

The use of this report is subjected to the following General Conditions and Limitations, Sections A through F, applicable to geotechnical report:

### A. USE OF THE REPORT

- A.1 The factual data, interpretations and recommendations contained in this report pertain to a specific project as described in the report and are not applicable to any other project or site location. If the project is modified in concept, location or elevation or if the project is not initiated within eighteen months of the date of the report TERRATECH should be given an opportunity to confirm that the recommendations are still valid.
- A.2 The recommendations given in this report are intended only for the guidance of the design engineer. The number of test holes to determine all the relevant underground conditions which may affect construction costs, techniques and equipment choice, scheduling and sequence of operations would normally be greater than has been carried out for design purposes. Contractors bidding on, or undertaking the work, should rely on their own investigations, as well as their own interpretations of the factual test hole data, as to how subsurface conditions may affect their work.

### B. FOLLOW-UP

- B.1 All details of the design and proposed construction may not be known at the time of submission of TERRATECH's report. It is recommended that TERRATECH be retained during the final design stage to review the design drawings and specifications related to foundations, earthworks, retaining systems and drainage, to determine that they are consistent with the intent of TERRATECH's report.
- B.2 Retention of TERRATECH during construction is recommended to confirm and document that the subsurface conditions throughout the site do not materially differ from those given in TERRATECH's report and to confirm and document

that construction activities did not adversely affect the design of TERRATECH's recommendations.

#### C. SOIL AND ROCK CONDITIONS

- C.1 Soil and rock descriptions in this report are based on commonly accepted methods of classification employed in professional geotechnical practice. Classification and identification of soil and rock involves judgement and TERRATECH does not guarantee descriptions as exact, but infers accuracy only to the extent that is common in current geotechnical practice.
- C.2 The soils and rock conditions described in this report are those observed at the time of the study. Unless otherwise noted, those conditions form the basis of the recommendations in the report. The condition of the soil and rock may be significantly altered by construction activities (traffic, excavation, pile driving, blasting, etc.) on the site or on adjacent sites. Excavation may expose the soils to changes due to wetting, drying or frost. Unless otherwise indicated the soil and rock must be protected from these changes or disturbances during construction.

### D. LOGS OF TEST HOLES AND SUBSURFACE INTERPRETATIONS

- D.1 Soil and rock formations are variable to a greater or lesser extent. The test hole logs indicate the approximate subsurface conditions only at the location of the test holes. Boundaries between zones on the logs are often not distinct, but rather are transitional and have been interpreted. The precision with which subsurface conditions are indicated depends on the method of boring, the frequency of sampling, the method of sampling and the uniformity of subsurface conditions. The spacing of test holes, frequency of sampling and type of boring also reflect budget and schedule considerations.
- D.2 Subsurface conditions between test holes are inferred and may vary significantly from conditions encountered at the test holes.
- D.3 Groundwater conditions described in this report refer only to those observed at the place and time of observation noted in the report. These conditions may

vary seasonally or as a consequence of construction activities on the site or adjacent sites.

#### E. CHANGED CONDITIONS

Where conditions encountered at the site differ significantly from those anticipated in this report, either due to natural variability of subsurface conditions or construction activities, it is a condition of the use or reliance by the client of this report that TERRATECH is notified of the changes and provided with an opportunity to review the recommendations of this report. Recognition of changed soil and rock conditions requires experience and it is recommended that an experienced geotechnical engineer be employed to visit the site with sufficient frequency to detect if conditions have changed significantly.

#### F. DRAINAGE

Drainage of subsurface water is commonly required either for temporary or permanent installations for the project. Improper design or construction of drainage can have serious consequences. TERRATECH can take no responsibility for the effects of drainage unless TERRATECH is specifically involved in the detailed design and follow-up site services during construction of the system.

#### 7. <u>REFERENCES</u>

- LaSalle, P. 1978 "Géologie des sédiments de surface de la région de Québec". Ministère des Richesses Naturelles – Québec, Direction générale des Mines. Report DPV-565, March 1978, 22 maps : Map 21 L/14 SE (pp 8 and 20).
- *Pajari Instruments Ltd.* "Tropari/PDSI". (available from <u>http://www.pajari.com</u> as of 24 March 2006)
- Saint-Julien, P. and Osborne, F.F. 1973 "Géologie de la région de la ville de Québec". Ministère des Richesses Naturelles - Québec, Direction générale des Mines, Service de l'exploration géologique. Report DP-205, 1973, 30 p. + maps : Map 21 L/14 a-b.
- *Saint-Julien, P. 1995* "Géologie de la région de Québec", Ministère des Ressources naturelles Québec. Report MB-94-40.

#### 8. PERSONNEL

The subsurface investigations (boreholes and test pits) were carried out under the close supervision of Mr. Hugues Chouinard, Mr. Alain Périard, and Mr. Denis Désaulniers, Senior Technicians of Terratech. The trial excavations into bedrock were performed in the presence of Mr. Jean-Jacques Hébert, Geologist, and Mr. Yves Boulianne, Eng.

The detailed description of the recovered rock cores was performed by Mr. Christian Boucher, Geologist, Mrs. Isabelle Robillard, Geologist, and Mr. Martin Labelle, Geologist in training, and by Mr. Alain Blanchette, Geologist, M.A.Sc.

Sections 1 to 3.1, and 4 to 8 of this report were prepared by Mr. Raymond Bousquet, Eng., M.A.Sc. Section 3.2 of the report was written by Mr. Jean-Jacques Hébert, Geologist, and Mr. Yves Boulianne, Eng. The document was reviewed (ISO Conformity) by Mr. Henri Madjar, Eng., M.A.Sc.

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Jean-Jacques Hébert, B.Sc., Geologist Senior Geologist

Yves Boulianne, Eng. Project Engineer



Reviewed for conformity with ISO 9001 by :

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Henni Madjar

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## APPENDIX I Boring and Test Pit logs

Explanation of the Form Boring Log Explanation of the Term Rock Quality Designation (RQD)

> Boring Logs: Boreholes BH Series Boring Logs; Boreholes W Series

Test Pit Logs: Test Pits TP Series



#### EXPLANATION OF THE FORM BORING LOG

This form summarizes both field information and selected laboratory test results obtained from each boring. An explanation of the various columns of the form follows.

#### DEPTH

This column gives the depth scale of the boring.

#### **STRATIGRAPHY**

#### ELEVATION AND DEPTH

This column gives the elevation and depth of inferred geologic contacts. The elevation is referred to the datum shown in the general heading.

#### DESCRIPTION

This column gives a description of the soil based on visual examination of the samples and laboratory tests. Each stratum is described according to the following classification and terminology :

<u>Classification</u>	<u>Particle Size</u>
Clay	less than 0 002 mm
Silt	from 0,002 to 0,080 mm
Gravel	from 5 to 80 mm
Cobbles	from 80 to 200 mm
Boulders	larger than 200 mm
<u>Terminology</u>	Proportion
Trace	less than 10%
Some	10 to 20%
Adjective (e.g. silty or sandy)	20 to 35%
And (e.g. sand and gravel)	35 to 50%

The compactness condition of cohesionless soils is defined as follows :

Compactness	SPT N-Index
Condition	Blows/0.3 m or Blows/foot
Very loose	0 to4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very dense	over 50

The consistency of cohesive soils is defined as follows :

<b>Consistency</b>	Undrained S	Shear Strength
	<u>kPa</u>	<u>psf</u>
Very soft	0 to 12	0 to 250
Soft	12 to 25	250 to 500
Firm	25 to 50	500 to 1000
Stiff	50 to 100	1000 to 2000
Very stiff	100 to 200	2000 to 4000
Hard	over 200	over 4000

#### SYMBOL

This column represents, using standard symbols, the soil and rock stratigraphy at the borehole location.



Contraction of the sol









Gravel

Cobbles or boulders

Clay

Bedrock



#### WATER LEVEL

This column shows the groundwater level in the boring measured on the date indicated. In impervious soils the accurate determination of groundwater elevations by standpipe, casing or open-hole readings is not possible within the normal time frame of the completion of the site work, and the true groundwater level may be higher or lower than indicated. Where both pervious and impervious soil strata are penetrated, the groundwater levels in each layer may be at different levels and sealed piezometers or standpipes within the individual layers are required to establish true groundwater conditions. Water levels determined by a piezometer can be considered as representative groundwater levels for the layer in which the piezometer tip is located.



#### SAMPLES

The first three columns describe the type and number, the condition, as well as the percentage recovery, of each sample obtained from the boring. The location and condition of each sample is plotted to scale. The legends for sample condition and type of sampler used are explained on the top left side of the form.

The fourth column shows the SPT N-Index of the soil as determined by the Standard Penetration Test or the RQD value of the rock. The "N" value corresponds to the number of blows from a 63.5 kg hammer, falling from a height of 760 mm, required to drive the last 300 mm of a 51 mm diameter standard split spoon sampler. The Standard Penetration Test is carried out according to NQ 2501-140. The RQD value of rock is defined as the modified percentage of rock cores recovered by diamond core drilling, counting only those pieces of sound rock that are 100 mm or more in length.

The soil and rock samples will be stored for a one year period after which they will be discarded unless otherwise instructed.

#### WATER CONTENT AND LIMITS

The central section of the boring log forms a graph which is used to plot the water content and Atterberg limits test results obtained in the laboratory, at the elevation of the samples on which they have been carried out.

#### **OTHER TESTS**

This column shows the results or abbreviations of other laboratory or field tests which have been performed. An explanation of the abbreviations is given at the top of the form. The results of other tests not plotted on the form are appended to the report.

#### DYNAMIC CONE PENETRATION TEST, UNDRAINED SHEAR STRENGTH

The last column on the right side of the form presents graphically, and at the elevation at which they were carried out, the results of the dynamic cone penetration test (i.e., the number of blows of a 63.5 kg hammer having a free fall of 760 mm, required to drive in the soil, for a depth of 300 mm, a standard 51 mm diameter cone point). This test is carried out from the ground surface or beyond the cased depth of the borehole according to NQ 2501-145.

This column also presents graphically the results of the shear strength measurements as obtained by the Field Vane test (NQ 2501-200) or in laboratory by the Swedish Fall-Cone test (NQ 2501-110).



#### **EXPLANATION OF THE TERM**

#### ROCK QUALITY DESIGNATION (RQD)

The Rock Quality Designation (**RQD**) is an indirect measure of the number of fractures and of the degree of softening or alteration in a rock mass. The RQD values are used to assess the overall quality of the rock mass.

The Rock Quality Designation is determined on rock cores which have been recovered using double or triple diamond core barrels of at least NQ size (minimum rock core diameter of 45 mm). For a given rock core, the lengths of those pieces that are 100 mm or more are added. The RQD is then obtained by dividing this sum by the total length drilled and expressing the result as a percentage.

Rock cores broken during drilling or by handling are fitted together and counted as one piece. Such broken cores are readily identified by their fresh fracture surfaces which consist of irregular breaks and are unaltered.

This method of rock quality evaluation is not applicable in the case of thinly bedded sedimentary rocks and foliated metamorphic rocks. For such cases, the rock quality for a particular engineering application should be evaluated by a qualified geologist.

The RQD values may be used to describe and classify the rock quality as follows:

Description of Rock Quality	RQD (%)
Very poor / Very severely fractured	< 25
Poor / Severely fractured	25 – 50
Fair / Fractured	50 – 75
Good / Moderately jointed	75 – 90
Excellent / Sound	90 – 100

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	-	=1	STR/		ε		SAM	PLES							6	DYN	I. CO	NE	PEN	I. TE	ST		
Ę		ΞE						۲ %	0	and	ATER CONTENT			OR	ESTS	(blows/0.3m)							
Ē	Ē	E E			BOL	LEV	BEF	OITIO	ER)	RQI	unu		• (/	•)	RAT		50 100						
L H			DE	SCRIPTION	SΥM	ER	YPE	COND	co Co	l or	w <sub>P</sub> ww <sub>L</sub>			ABO.							R		
	ū					-MM			RE	-	 20	 40 €	80 08	  0	ב	Z		50	)	10	0		
F			Poor quality lig								+						$\rightarrow$		+	+			
Ē			mudstone, laye dark grey shale	ers of greenish grey and e, 5% of calcareous			DC-16		44	100													
Ē	3		sandstone (less thick). Occasion	s than 140mm nal veinlets of calcite,																			
Ē			layers at 45° fro	om borehole axis, rite in joints (in greenish			DC-17		100	50													
Ē			and dark shale	).																			
<b>1</b>	4							_												-	-		
Ē																							
Ē.	5						DC-18		82	62													
Ē	5																						
E	5 1	9.93 <b>5.60</b>	Fair to good qu	ality greenish grey																			
E 1	6		mudstone, laye layers of dark s	ers of light grey mudstone, shale (less than 10mm								-	-					_	+	+	$\rightarrow$		
E			thick). 15-20% than 35mm thic	of sandstone beds (less ck). Beddings at 40° from			DC-19		90	63													
Ē,	_		borenole axis.							_													
E	<b>'</b>						DC-20		66	6													
E																							
<b>1</b> 1	8						DC-21		92	77		-	-					_	+	+	$\rightarrow$		
Ē	5	6.89																					
É.	1	8.64	Poor quality gre	eenish grey mudstone, rey mudstone and dark																			
Ē			shale (1-40mm	thick).			DC-22		93	23								T		T	T		
E																							
- 2	0 5	<u>5.3</u> 4					DC-23		98	48									_	$\rightarrow$	-		
8:55hrs	2	0.19	Fair to good qu sandstone laye	ality calcareous ers (350mm thick), layers																			
11-23 0			of greenish gre dark grey slate	y mudstone, thin layers of (1-5mm thick), beddings			DC-24		97	72													
2002-	1		at 35° from bor	ehole axis.					•••														
OTTED																							
12 As	2										$\vdash$	-	-					-+	+	$\dashv$	+	—	
-A-BH.							DC-25		100	76													
eT-105(	2																						
Z4/Style	3							┝╋															
Seotec							DC-26		98	77													
2  -  -																							

				PR	OJECT	: Rabas	ska Pr	oject	BOREHOLE : BH-101-05												
			manata alla	sn	ſE :	West	Optio	n Site					PAG	3							
	▼	jj ie	rratech	FIL	.E NO :	<u>T-105</u>	0-B (	(60333	33-KELL)				CAS	NG :	PW						
	•			вс	RING I	DATE :		2005	03-15	тс	)	2005-03-	<u>16</u> COR	CORE BARREL : PQ							
	]	BORIN	G LOG	DA	DATUM : Geodetic COORDINATES : _										5186835.66 N 261816.10 E						
SAM	IPLE CC	NDITION	TYPE OF SAMPLER			LABOF	RY AI	Field Vane	d Vane (Su) ⇔ intact												
	Rem	oulded			GS G	Grain size analysis							(	(Sur) ♦ remould							
	Lost	sturbed	PS Piston sampler	e		D Ui	nit we	ight (k	N/m³)				Swedish con	e ((	Cu) Cur)	⊽ i ▼	intact remo	í ulded			
	Rock	core	DC Diamond core barrel			CP Co	ompre	ssive	strength	(MPa)			Dyn. Cone P	en. Te	st	<u>×</u>		×			
	<b>C</b>	STR	ATIGRAPHY		ε		SAMPL		PLES					DYN	I. CO	NE F	PEN.	TEST			
ε	и-и - И				ЕГ.	0.4	z	%	-	WATE			ORY STS		(blo	)ws/(	).3m	1)			
Ξ	TIOI			BOL	LEV	ANI BER	10 E	ERY	RQD	anu		3(%)	RAT Ind J TE		50 100						
DEP	EVA	DE	SCRIPTION	ЗYМ	TER	TYPE NUM		SOV	l or	w <sub>P</sub> ww <sub>L</sub>				UN			D SH				
					ΓΑW		ŭ	RE	2	⊢ 20			Z L	5	50 100			ra)			
<u> </u>		Good quality ca	alcareous sandstone with								+	++++		+	$\neg$	-	+	-			
Ē		layers of green	ish grey mudstone.																		
Ē								•													
- 25	50.16					DC-27		100	84				-								
	25.38	END OF BORE	EHOLE																		
- 26													-			+	+				
Ē																					
Ē																					
- 27													-								
Ē																					
- 28											_		-			$\rightarrow$	$\perp$				
- 29													-			+	-				
E 30													_								
Ē																					
- 31													_			-		_			
Ē																					
- 																					
F 32																	T				
- 33										$\vdash$			-	$\left  - \right $	$\dashv$	+	+	+			
- 34													1		+	+	+				
- 35											_		-		$\square$	$\perp$	$\perp$				
Ŀ																					

				PROJECT : Rabaska Project (Phase 2), Levis, Quebec												BOREHOLE : BH-102-05							
		Т	matach	si	E :	West	Optior	n Site							PAGE:1 OF3								
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-B (	6033	33-KELL)						CASING : <u>HW</u>								
	•			вс	BORING DATE :2005-02-19 TO2005-02-22									_ CORE BARREL : HQ									
		BORIN	G LOG	DA	TUM :Geodetic COORDINATES : 5							5186804.92 N 261805.33 E											
SAN	IPLE C	ONDITION	TYPE OF SAMPLER		LABORATORY AND IN SITU TEST								Field	ield Vane (Su) ⇔ intact									
$\geq$	Ren	noulded	SS Split spoon			GS G	rain si	ze ar	alysis	_	-						(?	Sur)	♦ r	emoul	lded		
	Undisturbed SI Thin walled Shelby tube						onsoli nit wei	datior aht (I	ו (N/m³)						Swedi	ish cone	) (	Cu)		ntact	1.1		
	Roc	k core	DC Diamond core barrel			CP C	ompre	ssive	strength	(MPa	)				Dyn. (	Cone Pe	) n. Teء	ur) st ≻	▼ r ←	emoul	Ided -×		
		STR	ATIGRAPHY		٤		SAMPI		PLES		· ·			,	DYN. CONE PEN TEST								
_ ا	<u>ء</u> '				Ļ			%		WATER CONTENT and LIMITS (%)				RY	STS	(blows/0.3m) 50 100							
ι.Ξ	NO - H			ОГ	EVE	UND ER	NOL	RΥ	QD					АТО	TES								
I III	VAT			'MB	R L	PE A	١ <u>ק</u>	OVE	or R				or an ITU	an ITU	UN	EAR							
□		DE		ATE	l∑ J	CO	N RC		w <sub>P</sub> w w <sub>L</sub> ⊢──────			LAB IN S		STRENGTH (kPa)									
	75.52	GROUND SUF	RFACE		3			4		2	04	06	0 8	)				50		100	-		
Ē	0.00	Topsoil. Compact sand	and gravel (trace of			SS-1	$\ge$	38	2														
Ē	0.15	organics from	0.15 to 0.3m).	0 Q		c																	
<b>F</b> 1				.00		SS-2		12	16									+		+			
Ē				0 0 0		•																	
Ē	73.84 <b>1.68</b>	Dense gravelly	silt and sand.			SS-3	$\ge$	38	27														
<b>2</b>				9 9		s s																	
Ē				0 0		SS-4	$\boxtimes$	58	43	$\odot$													
Ē 3					s														$\perp$				
Ē		NOTE ON WA Water level at	a 0		SS-5	$\boxtimes$	54	44															
Ē		2005-04-15.		\$  -  -		¢																	
<u></u>						SS-6	$\ge$	42	39									+		+			
Ē				a   a.	D 0 0 0 D 0 0 D 0 0 0	s																	
Ē.						SS-7	$\mathbb{N}$	75	29														
<b>۴</b>	70.22				$ \begin{array}{c c}                                    $	c																	
Ē	5.30	Very dense bro	own gravelly sand and silt.	9 1	D0 D0 D0 D0 D0 D0	SS-8	$\square$	83	117														
<b>6</b>				Ø		ė												$\rightarrow$		+			
Ē				<i>6</i> 0		SS-9	$\geq$	77	105/18cm	$\odot$													
Ē				0 7 0	0 0 0 0 D	s																	
F 7				0 0		, SS-10	$\geq$	75	50/5cm									-		+			
Ē						5																	
Ē,				<b>}</b> 	$ \begin{array}{c c}                                    $	SS-11	$\geq$	50	50/10cm														
				9.0		c c																	
				9 B		SS-12	$\mid$	100	89/15cm														
9				0		s												+		+			
- - -				0 8		SS-13	$\boxtimes$	58	83														
				0																			
10	65.28					6												+	+	+	+		
	10.23	Bedrock: Poor calcareous sar	quality light grey ndstone, layers of grey		00 00 00 0 00 00	DC-14		100	42														
- - 11		calcareous mu greenish grey	astone, some layers of and dark grey shale.			e e											$\square$	$\square$	$\perp$	$\perp$			
					0 0 0 0 • 0 0 0 0 0 0	DC-15		93	48														
						DC-16		100	۵R														
<u>_</u>				ŔŔ		100-10		100	90														

					PR	OJECT	: Rabas	ska Pi	roject (	Phase 2	BOREHOLE : BH-102-05										
			То	matach	SIT	Έ:	West	Optio	n Site						:: _	2	OF	3			
				rratech	FIL	E NO :	<u>T-105</u>	0-В	(60333	3-KELL)	)			CASING : HW							
	•	•			во	RING [	DATE :	02-19	-22 CORE BARREL : HQ												
		ł	BORIN	G LOG	DA	DATUM : Geodetic							COORDINATES : 5186804.92 N 261								
SAN	IPLE	co	NDITION	TYPE OF SAMPLER		LABORATORY AND IN SITU TEST									Field Vane (Su) ♢ intact						
$\geq$	] R	lemo	ulded	SS Split spoon			GS G	rain s	ize ana	alysis				1		(?	Sur)	♦ 1	remo	ulded	
	Undisturbed ST Thin walled Shelby tube							onsoli nit we	idation eight (k	N/m³)				Swedis	h cone	; ((	Cu)	⊽ i	intact		
	Lost         PS         Piston sampler           Rock core         DC         Diamond core barrel						CP C	ompre	essive	strength	(MPa)			Dyn. C	one Pe	) n. Te	Sur) st	▼ I ×	emoi	ulded · - ×	
	STRATIGRAPHY					٦	;	SAM	PLES	;	-						. ca		PEN.	TEST	
Ε	<u>ع</u>	٤			- 	_	-	%		WATER CONTENT			JRΥ	STS	(blows/0.3m)						
Ē	NOI-	- H		öL	Ĕ	AND ØER			gD	and	LIMIT	S (%)	ATC	Ц Ц		50 100					
EPT	VAT					MB SI	PE /	ĪQ	OVE	or R				30R	"ITI	UN	DRA	INE	D SH	IEAR	
	Ш					ATE	Łź		REC	z	w <sub>P</sub> w w <sub>L</sub> ⊢ ⊙ ⊣			IN S		S	TRE	H (k	kPa)		
			Door quality ligh	ht arou colooroouo		<b>S</b>			_		20 4	<b>) 40 60 80</b>				L_+	50	' ————————————————————————————————————	100		
Ē			sandstone, laye	ers of grey calcareous		0.0 00 00 00 00 00	DC 17		100	0											
Ē			mudstone, som and dark grey s	le layers of greenish grey shale. Beddings at 30-50°	XX	$ \begin{array}{c c} \mathcal{D}_{A} & \mathcal{D}_{A} \\ \mathcal{D}_{B} & \mathcal{D}_{A} \\ \mathcal{D}_{A} & \mathcal{D}_{A} \\ \mathcal{D}_{A} & \mathcal{D}_{A} \\ \end{array} $	DC-17		100	U											
- 13			from borehole a Local presence	axis. Veinlets of calcite.		0.0 00 00 00 0.0 00	DC 18		100	05				-			-	-			
Ē			pyrite.	· · · · · · · · · · · · · · · · · · ·		DA DA DA DA DA DA	DC-10		100	30											
Ē "						$   \begin{array}{c c}                                    $	50.40			05											
E '*						DC-19		100	25												
Ē						D D D D D D D D D D D D D D D D D D D															
- 15						$ \begin{bmatrix}                                    $	DC-20		100	42				-			$\rightarrow$	+			
Ē						PA . D.D D															
Ē						D D D D D D D D D D D D D D D D D D D	DC 21		100	45											
- 16						P.0 .D.0 P.0 P.0 .D.0 P.0	DC-21		100	45				-			-	-		_	
Ē						R p. D.p R p. D.p R p. D.p	DC-22		100	50											
- 17						.D. 0.0 D.0 0.0 D.0 0.0	DC-23		100	50				_							
Ē							00 20		- 100	00											
Ē							DC-24		100	39											
- 18	57. <b>18</b> .	42 10	Poor quality cal	Icareous sandstone										-				-	_		
Ē			(500mm thick),	with greenish grey			DC-25		100	36											
Ē 👝			(1-20mm) of bla	ack shale. Bedding at 45°			2010														
ŧ "			from borehole a joints. Occasior	axis. Presence of pyrite in nal calcite veins.			DC-26		100	33											
Ē							00 20		100	00											
- 20							DC-27		100	24				_				_	_		
					X		DC-28		100	77											
F 21							DC-29		91	41							$\top$	$\top$	Τ		
Ē																					
- 22							DC-30		100	51				-		$\mid \mid \mid$	$\rightarrow$	-+	+		
Ē	52. 22	74																			
23		-	sandstone (max mudstone laver	x. 400mm thick), greenish rs. 10-15% dark shale													+	+	+		
			layers (1-20mm	thick).			DC-31		100	89											
Ē																					
				PR	ROJECT	: Rabas	ska Pr	roject	Phase 2	), Levis,	Quebe	C		I	BORE	HOLE	: E	3H-1	02-0	5	
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		Т	matach	si	TE :	West	Optio	n Site						I	PAGE	:	3	OF	3	5	
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-B (	(6033:	33-KELL)					(	CASIN	IG :	HW				
	•			вс		DATE :		2005-	02-19	т	·o _	2005	-02-2	22	CORE	BAR	REL	: нс	2		
	-	BORIN	G LOG	DA	тим :		Geod	letic			coo	RDINA	TES	: _ 518	6804.	92 N		2618	05.33	Е	
SAN	IPLE CO	ONDITION	TYPE OF SAMPLER			LABOR	RATO	RY AI	ND IN SI	TU TES	т			Field Va	ne	(S	u)	ni 🛇	ntact		
	Rem	oulded	SS Split spoon			GS G	rain si	ize an	alysis							(S	ur)	♦ r	emoul	lded	
	Lost	sturded	PS Piston sampler	e		D Ur	nit we	ight (k	N/m³)					Swedish	cone	(C (C	u) ur)	⊽ ir ▼ r	ntact emoui	Ided	
	Rock	core	DC Diamond core barrel			CP Co	ompre	essive	strength	(MPa)				Dyn. Co	ne Pe	n. Tes	<u>t ×</u>	<u> </u>	<u></u>	- X	
	C I	STR	ATIGRAPHY		ε		SAM	PLES	6							DYN.	CO	NE P	EN.	TEST	
ε	ч - Е				L	<u>م</u>	z	% /	•	WAI		JNTE TS (%		ORY	STS		(blo	ws/0	.3m)		
Ξ.	ETIO			BOL	LEV	ANI BER	110	ΈRΥ	RQD	an		10 (70	,	RAT	Ë						
DEP	EVA	DE	SCRIPTION	sΥM	E	YPE		COV	l or	w	5 W	w	L	NBOI	SITI	UNI					
				•••	MA		Ŭ	RE	2	⊢ 20	⊙ 40		)	2	Z	0.	50	ion.	100	α,	
-		Layers of good	quality calcareous									+ + +					+	-	+		
Ē		sandstone (ma mudstone laye	x. 400mm thick), greenish rs, 10-15% dark shale																		
25	F0 07	layers (1-20mn	n thick).			DC-32		100	82												
Ē	50.37 25.15	END OF BORE	EHOLE		·.:H:::																
Ē																					
- 26															-		+	+	+		
Ē																					
L 27																					
<b>– – – – – – – – – –</b>																					
- 28															-		+	+	+		
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- 32															-		+	_	_		
33															ŀ	+	+	+	+		
34															ŀ	$\square$	$\perp$	$\perp$	$\perp$		
- 35															ŀ	-+	+	+	+		

		_		PR	OJECT	: Rabas	ska Pr	oject	(Phase 2)	), Lev	is, Qu	ebec	:			BORE	EHOL	.E :	BH-	103	-05	
		Т	annataah	SIT	E:	West	Option	i Site								PAGE	E: _	1	_ 0	F _	7	
			erratech	FIL	.E NO :	<u>T-105</u>	0-B (	6033	33-KELL)	)						CASI	NG :	NW	1			
	•			вс	RING	DATE :		2005	-03-23		то		2005-	03-3	51	CORE	EBAF	REL	١	VQ3		
		BORIN	IG LOG	DA	тим :		Geod	etic			C	OOR		FS	• 5'	186802	.02 1	ч ч	26	1849	.13 E	_
SAN											ет					/202	.02 .	· ·		into		
	Rei	moulded	SS Split spoon			GS G	rain si	ze an	alysis						Field V	ane	(	Su) Sur)	$\diamond$	rem	ct iould:	ed
	Un	disturbed	ST Thin walled Shelby tu	be			onsolio	datior	) N ( 2)						Swedia	sh cone	э (	Cu)	$\nabla$	inta	ct	
		st sk.core	DC Diamond core barrel			CP C	nit wei ompre	gnt (r ssive	strenath	(MPa	)				Dvn C	one Pr	( en Te	Cur)	•	rem	oulde	эd
		ST	RATIGRAPHY		_	;	SAM	PLES	8		,				<u> </u>						<u> </u>	<u>`</u>
_	E				2			%		WA	TER	co	NTEN	т	ž	TS	DYN	1. CC (bl-	JNE ows	PEF /0.3/	ч. н. m)	:51
μ- -	No -			Ъ	NEI N	S R	NOI	۲ ،	Q	a	nd L	іміт	S (%)			TES		5	٥ ,	10	0	
НЦ	TTA TTA			MBC	R LE	E A MBE	DIT	NEI VEI	r R(						ORA			חחו				
B		;	DESCRIPTION	SΥ	TEI	T ₹ J	CON	ы	No	v	V <sub>₽</sub> ∟	w	w	L	AB.	N SI	S	TRE	ING	TH (	kPa	)
	<b>ш</b> 75.67	GROUND S	URFACE		Š			R		2	0 4	ິ້	0 80		_	-		5	ο.	10	0	
-	0.00	Topsoil.			4	SS-1	$\ge$	50	18													
	0.15	gravel to gra	velly, some silt, cobbles.	•¢	4-15	001		00	10													
- 1					005-0	55-2	$\boxtimes$	52	87													
	74 15	5			on 2	002		02	01													
	1.52	Compact to	loose gravel and sand, some		.45m	<b>66</b> 2	$\boxtimes$	E 0	17													
- 2		311, 3116113.			ev. 75	33-3		50	17	0			-									
-					at el	SS 4	$\ge$	17	0													
	72.93 <b>2.74</b>	Firm to stiff g	grey clay, some silt,		r leve	33-4		17	0												1	
- 3		occasional s	and beds, shells.		Water	00.5	$\bigtriangledown$	07	2													
						55-5		67	3		9										1	
- 4	71.56	5																	_			
	4.11	Dense grey	and reddish sand, some silt			SS-6		0	9												1	
-		occasional c	obbles and boulders.				$\ge$															
- 5						SS-7	_	46	48	$\odot$		_	-						-	_		
-				0		DC-8	$\ge$	100														
				•		SS-9		38	34												1	
<b>°</b>				.⇔° Io		DC-10	$\times$	33														
				<b>A</b> (		SS-11		58	40												1	
7																			-+		$ \rightarrow $	
						DC-12		16													1	
Ē				<u>.</u>			$\searrow$														1	
- 8						SS-13		62	35			_	-						_	-		
-				a g																	1	
ŧ,				ч () 6 ()		DC-14		44														
- 9				R			$\searrow$															
F						SS-15	$\leq$	58	32													
- 10				₽													$\left  - \right $		$\dashv$	-	$ \rightarrow $	
Ē						DC-16		25														
						SS-17	$\times$	21	58/25cm													
- 11	64.55	Bodroek: V-	ny noor quality groonish area			33-17		51	JOIZOCIN				+						$\dashv$	$\neg$		
Ē		mudstone.	ry poor quality greenish grey			DC-18		92	20													
-																						

				PR	OJECT	r: <u>Rabas</u>	ska Pi	roject	Phase 2	), Levis	s, Qu	ebec				BORE	HOL	E: /	BH-	103	-05	_
		То	***atach	SIT	Έ:	West	Optio	n Site								PAGE	: _	2	_ 0	F _	7	_
	✓		Tratech	FIL	E NO :	<u>T-105</u>	0-B	(60333	33-KELL	)						CASI	NG :	NW	/			_
	•			во	RING I	DATE :		2005-	03-23		то		2005-0	3-31		CORE	EBAF	RREL	.: <u>۱</u>	1Q3		_
		BORIN	G LOG	DA	TUM :		Geoc	letic			С	OOR	DINAT	ES :	518	86802	.02 N	1	261	849.	13 E	
SAN	IPLE CO	NDITION				LABOR	RATO	RY AI	ND IN SI	TU TES	ST			Fi	eld Va	ane	(	Su)	$\diamond$	inta	ct	
	Remo	bulded	SS Split spoon ST Thin walled Shelby tub	e		C C	rain s onsoli	ize an: dation	aiysis					S	wedisl	h cone	() e ()	Sur) Cu)	<ul> <li>♦</li> <li>□</li> </ul>	rem inta	oulde	əd
	Lost		PS Piston sampler			D U	nit we	ight (k	N/m³)								(	Cur)	Ť	rem	oulde	ed
	Rock	core STRA	ATIGRAPHY			CP C	ompre		strength	(MPa)				D	yn. Co	one Pe	en. Te	st	× - ·		>	<
	E		-		Е		-			WA	TER	со	NTEN	т	≿	S	DYN	l. CC ble)	)NE ows	PEN /0.3r	N. TE m)	EST
а Н	- u NO +			Ч	INEL	ON R	NO	۲ %	g	ar	nd Ll	МІТ	S (%)			TES		5	0	10	0	
L L	ATI PTF			MBC	R LE	PE A	<b>IDI</b>	OVEF	or RC						ORA and	Ē	UN			-0.5	HFA	AR
ä	DE	DE	SCRIPTION	SΥ	ATE	IY I	CO	RECC	ž	V	Р	••	‴∟ —⊣		LAB	N S	S	TRE	NG	TH (	kPa	)
				<u> </u>	3			Ľ		20	) 40	) 6	0 80					5	0 <del></del> +	10	0	
Ē		mudstone, 5-10	0% of thin black shale			DC-19		100	31													
Ē		12.50m. Freque	ent calcite veinlets,																			
- 13		beddings at 45	° from borehole axis.			DC-20		74	0													
Ē	62.01					2020																
- 14	73.00	greenish grey n	nudstone beds, 10-15%			50.01		100	44					_					-+	-		_
Ē		5% silghtly calc	ack shale (1-10mm thick), careous sandstone beds			DC-21		100	11													
Ē.		(max. 40mm th vienlets, beddir	ick), occasional calcite			DC-22		Q1	0													
- 15		axis.				00 22		•	Ū													
Ē						DC-23		95	20													
- 16						DC 24		100	12					_					$\dashv$	$\dashv$		$\neg$
Ē						00-24		100	15													
E 17						DC 25		80	28													
Ē						DC-23		09	20													
Ē						DC-26		97	14													
- 18																			-	-		_
Ē						DC-27		94	14													
- 19	56.80 18.87	Fair quality red	and greenish grey											_					_	$\square$		_
Ē		mudstone layer beds at 20.3m,	rs, undulated mudstone occasional calcite veins,			DC-28		88	55													
Ē		local presence from borehole a	of pyrite. Beddings at 45° axis.																			
- 20																			$\neg$			
						DC-29		92	44													
- 21														_					$\neg$	$\neg$		
						DC-30		93	40													
<b>E *</b>							┝╋															
						DC-31		100	46													
- 23							┝╋			$\vdash$									$\dashv$	$\dashv$		$\neg$
						DC-32		100	54													

		_		PR	OJECT	r: <u>Raba</u> s	ska P	roject	(Phase 2	!), Lev	is, Qı	lepec	;			BORE	HOL	E: /	BH-	103	-05	
		Т	matach	SIT	Έ:	West	Optio	n Site								PAGE	: _	3	_ 0	F _	7	
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-B	(6033	33-KELL	)						CASI	NG :	NW	1			
	•			во	RING I	DATE :		2005	-03-23		то		2005	5-03-3	31	CORE	EBAF	RREL	١	VQ3		
	]	BORIN	G LOG	DA	TUM :		Geod	detic			c	OOR		TES	: 5	186802	.02 N	J	261	1849.	.13 E	
SAN	IPLE CO	NDITION	TYPE OF SAMPLER			LABOR	RATO	RY A	ND IN SI	TU TE	ST			-	Field \	/ane	(	Su)	$\wedge$	inta	ct	
$\geq$	Remo	oulded	SS Split spoon			GS G	rain s	ize an	alysis	-	-					ano	(	Sur)	٠ ا	rem	ioulde	ed
	Undis	sturbed	ST Thin walled Shelby tub	e			onsol nit we	idatior	N/m³)						Swedi	sh cone	) (	Cu)	$\bigtriangledown$	inta	ct	
	Rock	core	DC Diamond core barrel			CP C	ompre	essive	strength	(MPa	)				Dyn. C	one Pe	) en. Te	cur) est	▼ ×	rem 	oulde	ed ×
		STR	ATIGRAPHY		F		SAM	PLES	3						-		DYN		)NF	PFI	. т	EST
_	۲ - ۲				÷			%		WA	<b>ATEF</b>	R CO	NTE	NT	RY	TS	<b>_</b>	(ble	ows	/0.31	m)	-0.
	NOL H			Ы	EVE	UN R		RY	BD	a	nd L	ІМІТ	'S (%	)	ÅT0	TES T		50	)	10	0	
E	/AT			MB	RL	NB A	1 1 1	OVE	r R		.,				OR/		UN		AINE	ED S	HE/	AR
ā	DE LE	DE	SCRIPTION	۶	ATE	Σĭ	0 S	ECC ECC	ž	v	<sup>▼</sup> Р 	•• 		"L	LAB	SN	S	TRE	NG	TH (	kPa	)
					3			Ľ.		2	04	06	08	0				50	) (	10	0	
Ē	24.01	Layers of poor grey mudstone	quality red and greenish					1													1	
Ē						DC-33		93	37												1	
- 25	50.40					DC-34		75	18										_	$\neg$		
Ē	<b>25.27</b>	Layers of fair to	good quality red and																		1	
Ē		greenish grey r mudstone are l	nudstone. Layers of red ocally fissile at 26.7, 28.2			DC-35		100	87													
- 26		calcareous mu	th and contain layers of dstone (5mm thick).					-											-			
Ē		Layers of grey of thin layers of	mudstone contain 15-20% f dark shale. Beddings at			DC-36		100	17													
27		45° from boreh	ole axis.					1														
Ē						DC-37		93	87													
Ē																					1	
- 28						<b>DO 00</b>		100											_			
Ē						DC-38		100	41												1	
Ē								1													1	
- 29						DC-39		100	44													
Ē						DC-33		100													1	
E 30	45.77 <b>29.90</b>	Eair quality gre	enish arev mudstone					-														
Ē		15% thin dark s	shale layer. Beddings at			DC-40		96	46												1	
Ē		50 Hom boren			لکا			-													1	
- 31	44.72 30.95	Layers of poor	to fair quality red and			DC 41		100	42										_	_		
Ē		greenish grey r breccia) in gree	nudstone. Breccia (fault enish grey mudstone from			DC-41		100	43												1	
Ē		32.78 to 33.20r	n depth. Calcite veinlets.			<b>DO</b> 10															1	
- 32		Deddings at 40				DC-42		89	20										-			
						DC-43		100	59													
33							┝╋	-														
Ē						DC-44		100	59													
							┝╋	-														
- 34						DC-45		100	55	$\left  - \right $									$\dashv$	$\dashv$	$ \rightarrow $	
Ē								4														
Ē																						
F <sup>35</sup>						DC-46		100	71										-			
Ē	40.21 35.46	Layers of fair q	uality greenish grey																			
		mudstone.		××			$\vdash$															

		_		PR	OJECT	: Rabas	ska Pi	oject (	Phase 2	), Levis, Q	uebec	;		BORE	HOLE	:: <b>E</b>	3H-10	13-05	5
		Т	matach	SIT	Έ:	West	Optio	n Site						PAGE	:	4	OF	7	
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-B	(60333	3-KELL)	)				CASIN	IG :	NW			
	•			во	RING [	DATE :		2005-	03-23	то		2005-03-	31	CORE	BAR	REL	NQ	3	
	]	BORIN	G LOG	DA	TUM :		Geoc	letic			COOF		<b>3</b> : _51	86802.	02 N		26184	9.13 E	Ξ
SAN	IPLE CO	NDITION	TYPE OF SAMPLER			LABOF	RATO	RY AN	ID IN SI	TU TEST			Field V	ane	(S	Su)	♦ in	tact	
	Rem	oulded	SS Split spoon			GS G	rain s	ize ana	alysis				]		(S	sur)	🔶 re	mould	ded
	Lost	sturbed	PS Piston sampler	e			nit we	ight (k	N/m³)				Swedis	sh cone	(C (C	;u) ;ur)	⊽ in ▼ re	tact mould	led
	Rock	core	DC Diamond core barrel			CP Co	ompre	essive	strength	(MPa)			Dyn. C	one Pe	n. Tes	st >	<u>+</u>		×
	<b>C</b> 1	STR/	ATIGRAPHY		ε		SAM	PLES	6						DYN.	. <b>CO</b> I	NE PI	EN. T	EST
ε	Ϊ				Ľ	۵~	z	% /	•	and		NIENI S (%)	ORY	ESTS		(blo	ws/0.	3m)	
Ē	E H			BOL	ΓEΛ	BEF	OL	ER)	RQD	una		0 (70)	RAT	U TE					
ШШ	DEP	DE	SCRIPTION	NΧ	LER	YPE		cov	l or	w <sub>P</sub>	w	wL	""	SIT	UN			SHE/	AR
	비				MA		Ŭ	RE	2	20 4		 0 80	1	Z	•	50		100	~)
-		Layers of fair qu	uality greenish grey	ŚŚ													+	+	
Ē		mudstone, 20% (1-30mm thick)	o of dark shale layers , few slightly calcareous			DC-47		100	77										
- 37		sandstone beds occasional calc	s (max. 40mm thick), ite veinlets. Beddings at				-												
5,		30-45° from bo	rehole axis.			DC-48		95	51										
Ē																			
- 38						DC-49		100	51				_		_		+	+	
Ē	37.12					DC-50		100	39										
Ē	38.55	Layers of good mudstone, beds	to excellent quality red s of greenish grey																
- 39		mudstone, few (1-40mm thick)	layers of dark shale . Small calcite vienlets.			DC-51		100	97										
Ē		Beddings at 30	-45° from borenole axis.																
- 40											-		_		_		+	+	
Ē																			
Ē.						DC-52		97	90										
- 41																			
Ē																			
- 42						DC-53		100	84		-		_		_		—	+	
Ē						00 00		100	04										
Ē.																			
- 43																			
Ē						DC-54		100	70										
- 44											-		_				+	—	
						DC-55		100	63										
45																		-	
						DC-56		100	76										
46							┝╋				-		-			+	+	–	
						DC-57		100	85										
47													1			+	+	1	
							┝╋	$\left  \right $											
2				ŴŇ															

				PR	OJECI	: Rabas	ska Pi	oject (	Phase 2	), Levis,	Quebe	С		BOR	EHOL	E: /	BH-	103	-05	_
		Т	matach	SIT	Е:	West	Optio	n Site						PAGE	E: _	5	OF	: _	7	_
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-B	(60333	33-KELL)	)				CASI	NG :	NW				
	•			во	RING	DATE :		2005-	03-23	т	o	2005-0	3-31		E BAF	REL	.: N	Q3		
	-	BORIN	G LOG	DA	TUM :		Geoc	letic			cool		ES :	5186802	.02 N	1	261	849.	13 E	_
SAN	IPLE CO	NDITION	TYPE OF SAMPLER			LABOR	RATO	RY AN	ND IN SI	TU TEST	•		Field	l Vane	(	Su)	$\diamond$	intac	ct	
$\geq$	Rem	oulded	SS Split spoon			GS G	rain s	ize ana	alysis						(	Sur)	٠ ۲	remo	oulde	d
	∬ Undi ∎ Lost	sturbed	ST Thin walled Shelby tub PS Piston sampler	e			onsoli hit we	dation ight (k	N/m³)				Swe	dish cone	e) é	Cu)	$\bigtriangledown$	intac	x	
	Rock	core	DC Diamond core barrel			CP Co	ompre	essive	strength	(MPa)			Dyn.	Cone Pe	) en. Te	est	▼ ×	remo	ouide ×	; ;
		STR/	ATIGRAPHY		E		SAM	PLES	5						DYN	I. CC	DNE '	PEN	I. TE	ST
ε	ع <u>'</u>				Ē		-	%		WAT	ER CO	ONTEN	r   ∑	STS		(blo	ows/	0.3n	n)	-
Ē	NOI- H			öL	ĒČĒ	AND	10	RΥ	gD	and	LIMI	ſS (%)	ATC	д ТЕ		50	) 	10	0	
EPT	VAT	DE		ΥMB	R L	PE /	Ī	OVE	or R	w_	w	w.	30R	ar	UN	IDR/	AINE	DS	HEA	R
				Ś	ATE	Żź	ပ္ပ	REC	z			— I	LA E	Z	S	TRE	NGT	'H (I	κPa)	'
			welity red mudetene, hade		5			_		20	40 6	50 80			L-	50	) —+	10	0 	
Ē		of greenish gre	ey mudstone.			DC-58		100	57											
Ē																				
- 49																	+	_		
Ē						DC-59		100	69											
Ē	25.89 <b>49.78</b>	Fair to good qu	ality red and greenish																	
F 50		grey mudstone layers and san	, few dark mudstone dstone beds (max. 80mm			DC-60		100	65											
Ē		thick). Occasio	nal calcite veinlets.																	
- 51		Deddings at 40											_			_	$\rightarrow$		$\rightarrow$	
Ē						DC-61		100	68											
Ē																				
52																	-+			
Ē						DC-62		100	77											
53																				
= ~																				
Ē						DC-63		100	70											
54											_		_				$\rightarrow$	_		
Ē	21.24	Good to ovcolle	ant quality groonish grov																	
Ē	54.45	and dark muds	tone, sandstone beds			DC-64		100	100											
- 55 -		(max. 10mm th microfolds. Bec	lick). Presence of ddings at 35° from														+			
Ē		borehole axis.																		
56						DC-65		100	86											
Ē																				
Ē	19.06 <b>56.61</b>	Good quality re	ed and greenish grey																	
57		mudstone, 5% (1-7mm thick).	dark mudstone layers few sandstone beds							$\vdash$		+	_		$\vdash$	$\rightarrow$	+	+	+	—
ŧ		(max. 30mm th	ick). Beddings at 45° from			DC-66		100	86											
Ē		DOIGHUIG AND.																		
58							┝╋									$ \uparrow$	$\top$	$\top$	$\uparrow$	
Ē																				
59						DC-67		100	84	┝─┤─			_		$\mid \mid \mid$	$ \rightarrow$	-+	$\dashv$	$\downarrow$	
ŧ																				
Ē							┝╋	$\left  \right $												
t				KKK																

					PR	OJECT	: Raba	ska P	roject (	Phase 2	), Levis,	Quebe	ec			BORE	HOL	E: /	BH-	103	-05	
			То	matach	SIT	Έ:	West	Optio	n Site							PAGE	: _	6	_ 0	F_	7	
				rratech	FIL	E NO :	<u>T-105</u>	0-B	(60333	3-KELL)						CASI	NG :	NW	/			
					во	RING I	DATE :		2005-	03-23	т	o _	2005	-03-3	31	CORE	EBAF	RREL	.: <u>۱</u>	1Q3		
		F	BORIN	G LOG	DA	TUM :		Geod	letic			coo	RDINA	TES	: 5	186802	.02 N	I	261	1849.	13 E	
SAM	PLE	CO	NDITION	TYPE OF SAMPLER			LABO	RATO	RY AN		TU TES	Г			Field \	/ane	(	Su)	$\diamond$	inta	ct	
	]R ℤU	lemo Indisi	ulded turbed	SS Split spoon ST Thin walled Shelby tub	е		C C	raın s onsol	ize ana dation	alysis					Swedi	sh cone	() • ()	Sur) Cui)	<ul> <li>♦</li> <li>□</li> </ul>	rem	oulde	ed
	L	ost		PS Piston sampler			D U	nit we	ight (k	N/m³)					e noui		· ()	Cur)	▼	rem	oulde	ed
	] R	lock	core	DC Diamond core barrel			CP C		essive	strength	(MPa)				Dyn. C	Cone Pe	en. Te	st	<u>×</u>		>	<
	ε		3117			Ε				•	WAT	ER CO		ΝТ	≻	S	DYN	l. CC	)NE	PEN	N. TE	EST
Е	- N	Ē			_	VEL	₽∞	z	Х %	Δ	and	LIMI	TS (%	)	TOR	EST		(Die 5(	0	10.31 10	0	
РТН	ATIC	PTH			ABO	Ш Г С	E AN MBE	Ē	VER	RQ					RA'		'				ı	
DE	ΓE	Ē	DE	SCRIPTION	SYI	TER	ΝU	NO	0 Si	ō N	w <sub>P</sub>	, w	w	L	ABC				AINE ENG	:D S TH (	HE/ kPa	AR )
	Ш					Ā	-		R		20	40	60 80	)		=		5	0	10	0	
_			Good quality re	d and greenish grey dark mudstone lavers																		
							DC-68		100	80												
61												_							_			
	14.3 61.3	34 33	Layers of fair qu	uality greenish grey and																		
			black mudstone of calcareous s	e (locally fissile), 10-15% andstone layers. (max.			DC-69		100	92												
- 62			400mm thick). I borehole axis. (	Beddings at 35-55° from Occasional calcite																		
			veinlets. Local	presence of pyrite.																		
63							DC 70		100	75		_							_			
							DC-70		100	75												
- 64																						
-							DC-71		100	69												
65																			_			
- 66							DC-72		95	83												
-																						
67																			_	_		
							DC-73		100	95												
60							2010		100	50												
- 00																						
- 69							DC-74		97	68	$\vdash$	+	+						$\dashv$	$\dashv$		
Ē																						
È																						
- 70							DC-75		100	70												
							/ 0															
- 71											$\vdash$		+						$\dashv$	$\dashv$		
							DC-76		96	82												
														_								

				PR	OJECT	: Rabas	ska Pr	roject	(Phase 2	), Levi	is, Qu	iebec	:			BORE	HOL	E: /	BH-	103	-05	_
		То	matach	SIT	E :	West	Optio	n Site								PAGE	: _	7	0	F _	7	_
	▼		rratech	FIL	E NO :	<u>T-105</u>	)-В (	(6033:	33-KELL)	)						CASI	NG :	NW	1			
	•			во	RING	DATE :		2005	03-23		то		2005-0	)3-3	1	CORE	BAF	REL	.: <u>^</u>	1Q3		
	]	BORIN	G LOG	DA	TUM :		Geod	letic			с	OOR		ES :	51	186802	.02 N	I	261	1849.	13 E	
SAM	IPLE CO	NDITION	TYPE OF SAMPLER			LABOF	RATO	RY AI	ND IN SI	TU TE	ST				Field V	/ane	(	Su)	$\diamond$	inta	ct	
	] Rem ℤ Undi	oulded sturbed	SS Split spoon ST Thin walled Shelby tub	е		GS GI C Co	ain si onsoli	ize an dation	alysis						Swedie	sh cone	()	Sur)	<b>♦</b>	rem	oulde	;d
	Lost		PS Piston sampler			D Ur	nit we	ight (k	N/m³)						onean		. (	Cur)	▼	rem	oulde	ed :
	Rock	core	DC Diamond core barrel			CP Co	ompre	essive	strength	(MPa	)			_	Dyn. C	one Pe	en. Te	st	<u>×</u>		X	:
	٤I	0110			E				-	WA	TER	co	NTEN	т	≿	Ś	DYN	. CC	)NE		۱. TE m)	ST
<u>ع</u>	- NC			_	VEL	9 8	NO	۲%	Q	a	nd L	міт	S (%)		TOR	EST		50	0	10	0	
PTH	ATIC PTH			MBO	s LE	E Al	Π	VER	r RQ						DRA							
DE	DE	DE	SCRIPTION	SYI	ATEF	ΝU	CON	ECO	o Z		P	w		-	-AB(	N SI	S	TRE	:NG	TH (	kPa)	
	ш				Š		_	R		2	0 4	0 6	0 80				1	50	) 	10	0	
		Layers of excel and black muds	lent quality greenish grey stone (locally fissile),																			
		10-15% of calc (max. 400mm t	areous sandstone layers. hick). Beddings at 35-55°			DC-77		100	96													
- 73		from borehole a veinlets.	axis. Occasional calcite											_					_		-	-
Ē		,						-														
74																						
						DC-78		100	88													
	0.72																					
- 75	74.95	Layers of good	to excellent quality																_		-	-
Ē		of light grey cal	careous sandstone layers																			
- 76		from borehole a	axis. Occasional calcite			DC-79		100	97													
Ē		veinlets.																				
- 77 -						DC-80		100	89											-	-	_
Ē																						
- 78								-											_	$ \rightarrow $	_	_
						DC-81		97	80													
- 79																						
Ē	-3.86 <b>79.53</b>	END OF BORE	HOLE																			
- 80																			_	$ \rightarrow$	_	_
81																					$\uparrow$	
- 82											_		_					_	$\dashv$	$\dashv$	$\dashv$	-
- - - -																						
																					$\top$	
ŀ																						

				PR	OJECT	: Raba	ska Pr	oject	(Phase 2)	), Levis	, Que	bec			BORE	HOLE	≡: <b>B</b>	H-10	4-05	
		То	matach	SIT	E :	West	Optior	n Site							PAGE	:: _	1	OF	3	
	✓		Tratech	FIL	E NO :	<u>T-105</u>	0-B (	6033	33-KELL)						CASI	NG :	HW			
	•			во	RING	DATE :		2005	-03-17		ю	2	005-03-	20	CORE	E BAR	REL :	HQ		
	]	BORIN	G LOG	DA	TUM :		Geod	etic			со	ORD	INATES	: _51	186802	.14 N		26189	4.45 E	:
SAN	IPLE CO	NDITION	TYPE OF SAMPLER			LABO	RATO	RY A	ND IN SIT	TU TES	БТ			Field V	/ane	(5	Su)	♦ int	act	
	Remo	oulded	SS Split spoon	he		GS G	rain si onsoli	ze an datior	alysis					Quadia	ob 0004	(8	Sur)	♦ re	mould	ed
	Lost	sturbed	PS Piston sampler			DU	nit wei	ght (k	:N/m³)					Swedis	sn cone	; (C (	Cur)	∨ int ▼ re	.act mould <sup>,</sup>	ed
	Rock	core	DC Diamond core barrel			CP C	ompre	ssive	strength	(MPa)				Dyn. C	one Pe	en. Tes	st ×	<u></u>	>	×
	۶ı	STR	ATIGRAPHY		E		SAM	PLES	5	14/4-		00N			<i>(</i> 0	DYN	. coi	NE PE	:N. TI	EST
ε	- N E				ĒĽ.		z	۲ %	0	an			(%)	OR	ESTS		(blov 50	ws/0.:	3 <b>m)</b> 100	
Ē	THO TH.			BOI	Ē	E AN	DITIO	/ER	RQI				(,,,,	RAT					<u> </u>	L
DEP	EVA DEP	DE	SCRIPTION	SYM	TER	YPE NUN	OND	00	N or	w	Ρ١	w	wL	ABO	SIT	UN S	DRAI	INED	SHE/ (kPa	AR
	Щ				M	н –	U U	RE	-	⊢ 20	40	⊛ 60		ב	Z		50		100	,
-	15.72 0.00	Topsoil.		Di fi fi		SS-1	$\mathbf{\mathbf{x}}$	60	8										+ +	
	0.15 75.26	Loose silty san	d and gravel, cobbles.	ه. ه ه. ه		00-1		00	0											
Ē 1	0.46	at 1.5m).		0. 4	04-15		$\ge$		40											
Ē					2005	55-2		38	49											
Ē				₽. ¢		SS 2	$\boxtimes$	50	20											
- 2	73 43			•••••	75.26	33-3		50	20		-		_	-					-	$\vdash$
Ē	2.29	Very stiff grey	clayey silt, traces of sand		elev.	55-1	$\ge$	33	40											
Ė,	72.98 2.74	Compact to ver	y dense brown silty sand		vel at	00 4		00	40											
Ē		and gravel or s	lity and gravelly sand.	8 9 2 9	d d d d d d d d d d d d d d d d d d d	SS-5	$\boxtimes$	50	27	$\odot$										
Ē				0. C	D D D D D															
- 4				о 0		SS-6		0	75		+	_		-		$\vdash$	—	<u> </u>	+	$\left  - \right $
Ē				.0																
Ē,				6 0		SS-7	$\times$	33	97											
ʰ				0. 0.0																
Ē				<ul> <li>₽</li> <li>₽</li></ul>		SS-8		0	27											
- 6				0 a 6							-	_		-		$\vdash$	—	<u> </u>	+	$\left  - \right $
Ē				¢ 0.	$ \begin{array}{c c}         D_{I} & D_{I} \\         D_{I} & D_{I} \\         D_{I} & D_{I} \end{array} $	SS-9	X	42	41											
Ē,				о 0																
Ḗ				a. 0.0		SS-10	$\land$	50	28											
Ē	68.05	De des els: ) /em :		@ \ <u>\</u>		SS-11		50	10/5cm											
- 8	7.07	greenish grey r	nudstone with light grey								_		_	-						$\vdash$
		thick), thin laye	s at 30° from borehole		$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	DC-12		94	0											
		axis. Pyrite in j	pints.			DC-13		89	35											
9						10	┝╋													
				Ň																
- 10					$ \begin{array}{c c}         D \\         D \\         D \\         $	DC-14		59	12		_	_	_			$\vdash$	+		+	⊢┤
	64.87					DC-15		85	100											
11 1	10.00	⊢air quality red grey mudstone	muastone, 20% greenish									$\top$					$\top$			
						DC-16		100	72											
2																				

				PR	OJECT	: Raba	ska P	roject (	Phase 2	), Levis,	Quebe	ec	B	OREH	IOLE :	BH	1-104	1-05	
		То	matach	SIT	Έ:	West	Optio	n Site					P	AGE :	2	_ (	DF_	3	_
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-B	(60333	33-KELL	)			c	ASINC	3: <u>⊬</u>	w			
	•			во	RING D	DATE :		2005-	03-17	т	۰_	2005-03-	20 C	ORE E	BARRI	EL :	HQ		
	]	BORIN	G LOG	DA	TUM :		Geod	detic			coo	RDINATES	<b>3</b> : _ 5180	6802.1 <sub>-</sub>	4 N	26	31894	.45 E	
SAN		NDITION	TYPE OF SAMPLER			LABO	RATO	RY AN	ND IN SI	TU TEST	Г		Field Var	ne	(Su	) 🔿	inta	ict	
	Remo	oulded sturbed	SS Split spoon ST Thin walled Shelby tub	e		GS G C C	rain s onsol	ize ana idation	alysis				Swedish	cone	(Su	r) 🔶	rem	10ulde	эd
	Lost		PS Piston sampler			D U	nit we	eight (k	N/m³)					Conc	(Cu	) ∨ r) ▼	ren	noulde	ed
	Rock	core	DC Diamond core barrel			CP C	ompro	essive	strength	(MPa)			Dyn. Cor	ie Pen.	. Test	<u>× -</u>	<u> </u>	<u> ×</u>	(
_	<u>ا</u>	0110			۲ -					WAT	ER CO	ONTENT	3	D D	'YN. ( (!	CONE blow	3 PEI s/0.3	N. TE m)	EST
	NOI - H			Ы	EVEI	UN R	NOI.	RY %	gD	and	LIMI	TS (%)	ATOI d	TES		50	10	00	
Ľ.	VATI EPTI			MB	R L	PE A JMBI		OVE	or R(		w/	\ <b>A</b> /	an an	<u></u>	UND	RAIN	ED S	SHEA	٩R
□	DI	DE	SCRIPTION	S	АТЕ	Σĭ	CO CO	REC	z	<sup>₩</sup> ₽		•••∟ ——-	LAB	S Z	STF	RENC	ЭTН (	(kPa)	)
		Eair to good au	ality rad mudatana 20%		<b>S</b>			-		20	40	60 80				50	10	0	
		greenish grey r	nudstone, layers of light		$ \begin{array}{c c} D_0 & D_0 \\ \hline D_0 & D_0 \\ \hline D_0 & D_0 \end{array} $			-											
-		thick). Bedding	s at 35° from borehole		$ \begin{array}{cccccccccccccccccccccccccccccccccccc$														
- 13 -		axis. Calcile ve	amets and pyrite in joints.			DC-17		100	76				_						
-																			
- 14													-	_			<u> </u>	$\vdash$	
_																			
L 15	60.92 <b>14.80</b>	Fair to good qu	ality greenish grey		00 00 Di Di Di Di	DC-18		100	92										
		mudstone, laye Sedimentary br	ers of light grey mudstone. reccia at 1.5m.																
		Slickenside at from borehole a	1.5m. Beddings at 40° axis.		0 0 0 0 0 D 0 0 0 D 0 0 0														
- 16					·Di Di Di Di Di Di Di Di	DC-19		100	48		_		-	_					
					00 00 100 00 00 00														
- - 17	<u>58.8</u> 8 <b>16.84</b>	Very poor quali	ity greenish grey		$   \begin{array}{ccc}     D_{0} & D_{0} \\     D_{0} & D_{0} \\     D_{0} & D_{0}   \end{array} $	DC-20		100	0				_						
_		mudstone, 15% Tectonic (?) bre	6 of red mudstone layers. eccia from 18.5 to 20.0m.																
_		Veinlets of calc	are.			DC-21		52	8										
- 18														_					
- 19						DC-22		51	0				_	_	_		<u> </u>	$\vdash$	
Ē.	55.73					DC-23	I	76	0										
E 20	19.99	Poor quality red greenish grey r	d mudstone, 20-25% mudstone layers, and					$\left \right $					1						
Ē		layers of light g (5-10mm thick)	rey calcareous mudstone . Beddings at 55° from			DC-24		91	28										
- 21		borehole axis.	Calcite veinlets and veins.								_	+ $+$	-	┝	—	+	+	$\vdash$	
- _ "																			
ŧ "						DC-25		100	30										
Ē																			
- 23							┝╋	$\left  \right $				+	-	-		+	+	$\vdash$	
						DC-26		84	10										
Ē				××															

				PF	ROJECT	: Rabas	ska Pr	oject	Phase 2	), Levi	is, Qu	ebec	:			BORE	HOL	E: /	BH-	104	-05	
		То	matach	sr	TE :	West	Optior	n Site								PAGE	:: _	3	_ 0	F _	3	
	▼		rratech	FI	LE NO :	<u>T-105</u>	0-B (	(60333	33-KELL)							CASI	NG :	нw	/			
	•			в		DATE :		2005-	03-17		то		2005	-03-2	20	CORE	BAF	₹REL	.: <u>t</u>	łQ		
		BORIN	G LOG	DA	TUM :		Geod	letic			с	OOR		TES	: _51	86802	.14 N	1	261	1894.	45 E	
SAN	IPLE C	ONDITION	TYPE OF SAMPLER			LABOF	RATO	RY AI	ND IN SIT	ΓU ΤΕ	ST				Field V	ane	(;	Su)	$\diamond$	inta	ct	
	Ren	noulded	SS Split spoon	P		GS G	rain si onsoli	ize an dation	alysis						Curadia	h conc	(	Sur)	•	rem	oulde	эd
	Los	t	PS Piston sampler	0		D Ui	nit we	ight (k	N/m³)						Sweuis	in cone	· ()	Cur)	V	inta rem	ct Ioulde	əd
	Roc	k core	DC Diamond core barrel		1	CP C	ompre	essive	strength	(MPa)	)				Dyn. C	one Pe	n. Te	st	<u>×</u>		>	<
	۶I	SIR	ATIGRAPHY		ε			PLES	5	\A/ A	TED			лт	~	6	DYN	I. CC	)NE	PE	₹. TE	EST
ε	Ξ z z			_	Ē	<u> </u>	z	Υ%	0	a	nd Ll		S (%)	)	<b>TOR</b>	EST	ĺ	(blo 5(	ows. 0	/ <b>0.3r</b> 10	n) 10	
H	ATIO TH			IBOI	Ē	E AN	E	/ER	RQI				•	,	RAT	II D						
Ë		DE	SCRIPTION	sγn	TER	NUN PE	ONE	CO!	N or	N	P	w	w	L	ABO	I SIT	UN		AINE Eng	ED S TH (	HEA kPa	AR )
	Π				MA		0	RE		20	0 40	) 6	0 80	)	1	2	ĺ	50	D	10	0	
Ē		Poor quality ree	d mudstone, 20-25%							- 1								-				
Ē		layers of light g	rey calcareous mudstone																			
- 25		(5-10mm thick)				DC-27		80	0									$\square$	_			
Ē	50.47 25.25	END OF BORE	EHOLE		:::⊟:::																	
Ē																						
- 26																		-				
Ē																						
- 27																		$ \rightarrow$	_	_		
Ē																						
Ē																						
- 28																		$\neg$				
Ē																						
- 29																		$\square$	$ \rightarrow $	$\square$		
Ē																						
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- 30																		$\neg$				
Ē																						
- 31																		$\rightarrow$	$ \rightarrow$	$ \rightarrow $		
Ē																						
Ē																						
- 32																		+				
33																	$\vdash$	$\dashv$	$\neg$	$\dashv$		
- 34 -											$\neg$							+	$\neg$	$\neg$		
- 35																	$\square$	$\dashv$	$\dashv$	$\dashv$	-+	
-																	╘━━━┥					

		、		PR	OJECT	: Rabas	ka Pr	oject	(Phase 2)	), Levis,	Quebe	ec			BORE	HOL	E: /	BH-	105	-05	
		Т	matash	SIT	Е:	West	Optior	n Site							PAGE	:	1	_ 0	F_	3	
	✓		Tratech	FIL	E NO :	<u>T-105</u>	)-В (	6033	33-KELL)						CASI	NG :	NW	<u> </u>			
	•			во	RING	DATE :		2005	-03-23	т	o _	200	5-04-(	05	CORE	EBAF	REL	.: <u>^</u>	1Q3		
	]	BORIN	G LOG	DA	TUM :		Geod	etic			coo	RDIN	ATES	: _5	186770	.94 N	1	261	1880.	10 E	
SAN	IPLE CO	NDITION	TYPE OF SAMPLER			LABOR	ATO	RY A	ND IN SIT	TU TES	Г			Field \	/ane	(	Su)	$\diamond$	inta	ct	
	Remo	oulded sturbed	SS Split spoon ST Thin walled Shelby tub	e		GS GI C Co	ain si onsolio	ze an datior	alysis 1					Swedi	sh cone	() 	Sur)	<ul> <li>♦</li> <li>□</li> </ul>	rem	oulde	əd
	Lost		PS Piston sampler			D Ur	nit wei	ght (I	⟨N/m³)					onou		(	Cur)	▼	rem	oulde	ed
	Rock	core	DC Diamond core barrel			CP Co	ompre	ssive	strength	(MPa)				Dyn. C	Cone Pe	en. Te	st	<u>×</u>		>	<
	8	0110			۳ :					WAT	ER C	ΟΝΤΕ	INT	۲۲	ึง	DYN	i. CC (ble	)NE ows	PEN /0.3	√. TE m)	EST
а -	- N - H			Ч	SVEL	D K	NOI	۲۶ %	a	and	I LIMI	тѕ (%	6)	TOF	r ES1		5(	0	10	0	
E.	PTH			MBC	R LE	NBE	IDIT	OVEF	or RC					ORA	and	UN			-0.5		AR
	DE	DE	SCRIPTION	SΥ	АТЕ	ξŊ	CON	RECO	N	₩ <sub>P</sub>	, w —⊙		∾∟ ⊣	LAB	IN SI	S	TRE	ING	TH (	kPa	)
	75.41	GROUND SUR	RFACE		3			<u> </u>		20	40	60 E	80				50	0	10	0	
Ē	0.00 75.26 0.15	Sandy topsoil, t Compact to der	trace of silt (frozen).	0.0	<u>م</u>	SS-1	$\mid$	58	22												
Ē		gravel, some si	lt.	6 . 6	5-04-1		X														
				a 6	on 200	SS-2		21	41												
Ē	73.89 <b>1.52</b>	Compact grey s	sand, trace of gravel,	i je	21m c		$\times$														
É 2		cobbles.	-	Q	v. 75.	SS-3		17	25		_							_			
Ē	73.12 2.29	Very dense red	ldish brown sand and silt,		l at ele	SS 4	$\mathbf{\mathbf{x}}$	64	55												
Ē,		trace of gravel,	cobbles.		r leve	33-4		04	55												
					Wate	SS-5	X	100	50/10cm												
Ē	71.60																				
<b>⊨</b> 4	3.81	Very dense red some gravel, co	ldish brown sandy silt, obbles.	0.0		SS-6	$\times$	71	63									_	-		
Ē																					
5						SS-7	imes	50	55												
Ē	70.00		ldich harve couch silf	• • •		SS-8		0	50/8cm												
Ē	5.41	some gravel, co	bbles and boulders.	. <b>5</b> .																	
6				> 🖓 o		SS-9		0	50/0cm		-	-									
Ē				0.0 .0.0		SS-10		0	50/0cm												
- 7						SS-11		0	50/5cm		_							_	_		
Ē				• • ©•		33-12		0	50/0Cm												
Ē,																					
8				1 e . e																	
E	66.82 <b>8.59</b>	Bedrock: Very	poor quality red			SS-13		0	50/2cm												
- 9		mudstone, lave calcareous san	rs of grey mudstone and dstone, beds of black			DC-14		38	0			+	-				$\rightarrow$	$\dashv$	$\dashv$	-+	
ŧ	65.78	shale.				DC-15		86	0												
E 10	9.63	Poor to excelle layers of grey n	nt quality red mudstone, nudstone and sandstone.			DC 16		100	85												
Ē						00-10		100	00												
Ē																					
- 11						DC-17		100	34				-				$\neg$	$\dashv$	$\neg$		
Ē																					
E						DC-18		100	100												

				PR	OJECT	: Rabas	ka Pi	oject (	Phase 2	), Levis	, Quet	bec			BORE	EHOLI	E: <b>/</b>	BH-	105	-05	_
		То	matach	SIT	Έ:	West	Optio	n Site							PAGE	£: _	2	0		3	_
	✓		Tratech	FIL	E NO :	<u>T-105</u>	)-В	(60333	3-KELL)	)					CASI	NG :	NW				_
	•			во	RING I	DATE :		2005-	03-23	1	r <b>o</b> _	200	5-04-	05	CORE	E BAR	REL	: <u>N</u>	Q3		
		BORIN	G LOG	DA	TUM :		Geoc	letic			со	ORDIN	ATES	: 5	186770	.94 N		261	880.	10 E	
SAN	IPLE CO	NDITION		1			ATO	RY AN	ID IN SI	TU TES	т			Field \	/ane	(\$	Su)	$\diamond$	intac	ct	
	Remo	sturbed	SS Split spoon ST Thin walled Shelby tub	e		C C	onsoli	dation	aiysis					Swedi	sh cone	3) )) e	Sur) Cu)	<ul> <li>♦</li> <li>□</li> </ul>	remo	oulde	۶d
	Lost		PS Piston sampler			D Ur	nit we	ight (k	N/m³)							((	Cur)	Ť	remo	oulde	эd
	Rock	core STR/	ATIGRAPHY			CP Co	SAM	PLES	strength	(мРа)				Dyn. C	Cone Pe	en. Te	st :	<u>×</u>	<u> </u>	<u>×</u>	<u>:</u>
_	٤				Е					WAT	ER C	ONTI	ENT	ž	IS	DYN	. CO blc)	)NE ows/	PEN '0.3r	i. TE n)	ST
а -	NO T			Ч	IN	QN RI	NO	RY %	g	an	d LIN	IITS (%	%)	TOF	TES'		50	)	10	0	
Ē	ITATI EPTF			'MB(	R LE	PE A	<b>TDI</b>	OVEI	or R(					OR	E	UN	DRA		DS	HEA	
ā		DE	SCRIPTION	Ś	ATE	Σĭ	5 C	RECO	ž	<sup>₩</sup>     ⊢	P V	• •	""∟ ⊣	LAB	S N	S	TRE	NG	Γ <b>Η</b> (Ι	kPa)	)
		Eair to availlan	at quality rad mudatana		3			-		20	40	60	B0				50	) 	10	0	
Ē		layers of grey r	mudstone and sandstone.																		
Ē		Beddings at 50	-40 Irom borehole axis.																		
- 13						DC-19		100	93												_
Ē																					
- 14								-			_							$\rightarrow$			_
Ē																					
						DC-20		98	65												
Ē																					
Ē						DC-21		100	89												
- 16											-							+		-	_
Ē						DC-22		100	75												
E 17						00 22		100	70												
Ē						DC-23		100	66												
Ē						00 20		100	00												
- 18 -						DC-24		100	54								-	+	_	-	-
Ē							_														
- 19											_							_	_	_	
Ē						DC-25		100	71												
ŧ.	55.42																				
- 20	<b>19.99</b> 54.99	Very poor qual	ity red mudstone.			DC-26		100	23												
	20.42	Fair to good qu	ality red mudstone, layers																		
21		sandstone, bec	ds of black shale.			DC-27		100	84		_							+	$\rightarrow$	$\rightarrow$	
Ē																					
Ē "						DC-28		100	55												
ŧ "							┝╋╋														
Ē						DC-29		100	79												
- 23	52.42 22.99	Poor quality red	d mudstone.				┝╋╋			$\vdash$						$\vdash$	+	+	+	+	$\neg$
		-				DC-30		70	35												
E				XX																	

				PR	OJECT	: Rabas	ska Pi	roject	Phase 2	), Levi	s, Que	ebec		В	OREH	OLE :	BH	-105	i-05
		Т	matach	SIT	ſE :	West	Optio	n Site						P.	AGE :	3	_ (	)F _	
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-B	(6033	33-KELL)	)				c	ASINC	3: <u>N</u>	w		
	•			вс	RING I	DATE :		2005	03-23		то	2	2005-04-	05 <b>c</b>	ORE F	3ARRF	5L :	NQ3	
	]	BORIN	G LOG	DA	TUM :		Geoc	letic			СС	OORD	INATES	: 5186	5770.9 <sup>.</sup>	4 N	26	1880.	.10 E
SAM	PLE CC	NDITION	TYPE OF SAMPLER			LABOF	RATO	RY AI	ND IN SI	τυ τε:	ѕт			Field Van	e	(Su)	) 🔷	inta	ct
	Rem Indi	oulded	SS Split spoon ST Thin walled Shelby tub	e		GS GI	rain si onsoli	ze an	alysis					Swodiab		(Sur	·) 🔶	rem	oulded
	Lost	Starbea	PS Piston sampler			D Ur	nit we	ight (k	N/m³)					Sweuisn	Solie	(Cu) (Cu	) ∨ 1) ▼	inta rem	ct noulded
	Rock	core	DC Diamond core barrel			CP Co	ompre	ssive	strength	(MPa)	)			Dyn. Con	e Pen.	. Test	× -		×
	ε	316			E	•		PLES	)	wa	TFR	CON	ITENT	~	o م	YN. C	ONE		N. TEST
E	- W-			_	VEL	₽∝	N	۲ %	Δ	ar	nd Ll	MITS	5 (%)	TOR	ESI	(1	50	5/U.31 1(	т) )0
РТН	ATIC PTH			ABO	L E	e an Mbe	DITIO	VER	RQ					RA <sup>-</sup> and	2				
DEI	DEI	DE	SCRIPTION	SYN	TER	NUΝ	NOX	СО Ш	IO N	w	P	W	wL	ABC		UNDE	RAIN	ED S STH (	HEAR (kPa)
	ш				đΜ			8		20	40	60	80		-		50	10	00
-		Poor quality re mudstone and	d mudstone, layers of grey calcareous sandstone,																
-		beds of black s	shale.			DC-31		100	76										
- 25					$\boxtimes$			-				_			-	—	+		
-	19 75					DC-32		100	41										
26	25.66	END OF BORE	EHOLE																
- 20																			
- 27													_		⊢	—	+	-	
- 28																			
_ 20																			
-																			
- 29												-			-				
- 30													_		L				
Ē																			
Ē																			
- 31										$\vdash$		+			⊢	+	+		
32										$\square$					L		$\perp$		
- 33										$\vdash$	+	+			╞		+		
- - - -																			
34										$\square$					L		_		
- 35										$\vdash$		+			┢	+	+		

				PF	ROJECT	: Rabas	ska Pr	oject (	Phase 2	!), Levis,	Queb	ес			BORE	HOLE	: <b>B</b>	H-10	6-05	_
		Т	matach	sr	ГΕ:	West	Optior	n Site							PAGE	:	1	OF	3	
			rratecn	FII	E NO :	<u>T-105</u>	0-B (	60333	3-KELL	)					CASIN	IG:	HW			
	•			во	ORING I	DATE :		2005-	02-10	т	o _	200	5-02-	22	CORE	BAR	REL :	HQ		
		BORIN	G LOG	DA	TUM :		Geod	etic			coc		ATES	: 5	186973.	53 N		26196	2.58 E	_
SAN		ONDITION	TYPE OF SAMPLER			LABOR	RATO	RY AN	ND IN SI	TU TES	r			Field V	/ane	(S	u) 4		act	_
$\geq$	Re	moulded	SS Split spoon			GS G	rain si	ze ana	alysis						uno	(S	ur)	♦ rei	moulde	d
	∭ Un ∎ Lo:	disturbed	ST Thin walled Shelby tub	be			onsoli nit we	dation iaht (k	N/m³)					Swedi	sh cone	(C	u)	⊘ int	act	
	Ro	ck core	DC Diamond core barrel			CP C	ompre	essive	strength	(MPa)				Dyn. C	one Pe	n. Tes	ur) t ,×	▼ rei	moulde	d
		STR	ATIGRAPHY	1	F		SAM	PLES	5	_						DYN.	col		N. TE	ST
Γ	E _ 8				- 		-	%		WAT	ER C	ONTE	ENT	JRΥ	STS		(blo	ws/0.3	3m)	-
Ē				ğ	E A	AND SER	10	RΥ	gD	and		TS (%	%)	ATC	ΤĘ		50	1	00	
EPT	VAT			ΥMB	R L	PE /	.iq	OVE	or R	w_	w	, I	w.	30R	ar SITU	UNE	RA	NED	SHEA	R
<b>^</b>				Ś	ATE	Żź	ပ္ပ	RC	z				4	LAB	N	ST	REN	IGTH	(kPa)	
	76.2	GROUND SUF	RFACE		5			_		20	40	60 8	BO				50	1 	00	
Ē	0.00	Topsoil.				SS-1	$\sim$	33	2											
Ē	75.34	L			150 0 0															
₽ 1	0.91	Compact to de	nse grey gravelly sand,		5-04-	SS-2	$\bowtie$	67	13	$\vdash$	+	+	-			+	+	+	+	
Ē		some sit.		0 0	0. 200	2														
ŧ,				•	4m 0	SS-3	$\frown$	29	60	$\odot$										
Ē	73.9	3			. 75.7															
-	73.5	Compact grey	gravelly silt and sand.	•• ••	t elev	SS-4	$\mid$	58	29											
- 3	2.74	Stiff to very stif	f silt, some clay.	K	evel a	2					_	_	-				_	_	+	
Ē				K,	ater	SS-5	$\mid$	75	28	0	1									
Ē				K	DD DR DD DR DD DR															
<b>4</b>				K		SS-6	$\boxtimes$	75	44									+		
Ē	71.6	}	own and grow growelly			*														
- 5	4.07	sand, some sil	t, occasional cobbles.	0 0 0		SS-7	$\bowtie$	50	68			_							$\square$	
Ē				* ( *																
-				a .a .		SS-8	$\bowtie$	67	46	$\odot$										
F 6	70.1	Bedrock: Very	poor quality grey to dark	• 0 \//\/						$\vdash$	+	-				+	+	+	+	
Ē		grey shale, sm traces of pyrite	all veinlets of calcite, local			DC-9		79	0											
Ė,					D 0 0 0															
ŧ '						DC-10		69	20											
ŧ	68.5		ity grou obele with 40.45%																	
- 8	1.12	of black shale	layers (5-30mm thick),			DC-11		83	0		-	-	-					_	+	
		occasional thin undulating laye	i (1-3mm thick) and ers of dark shale, small			>	T													
		occasional veir	nlets of calcite.			DC-12		100	12											
9						2								1		$\uparrow$		1	$\uparrow \uparrow$	
						DC-13		100	0											
10							┝╋												+	
						DC-14		100	0											
	65.5 <b>10.7</b>	Very poor qual	ity black shale.																	
- 11  -		Sedimentary b	reccia (100-150mm thick)			DC-15		100	20	$\vdash$	+	+				+		+	+	
						DC 40	╞╋╋		~											
				XX		DC-16		93	U											

				PR	OJECT	: Rabas	ska Pr	oject (	Phase 2	), Levis, C	Quebeo	C		BORE	HOLI	E: <b>B</b>	3H-10	6-05	;
		То	matach	SIT	Έ:	West	Optio	n Site						PAGE	:: _	2	OF	3	
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-B (	(60333	3-KELL)					CASI	NG :	HW			
	•			во	RING	DATE :		2005-	02-10	то		2005-02	-22	CORE	BAR	REL :	HQ		
	]	BORIN	G LOG	DA	TUM :		Geod	letic			COOF		<b>S</b> : _5	186973	.53 N		26196	2.58 E	:
SAN	IPLE CO	NDITION	TYPE OF SAMPLER			LABOF	RATO	RY AN	ID IN SI	TU TEST			Field	Vane	(5	Su)		act	
	Remo	bulded	SS Split spoon ST Thin walled Shelby tub	)e		GS G	rain si onsoli	ize ana dation	alysis				Swodi	ich conc	(8	Sur)	♦ re	mould	ed
	Lost	suibeu	PS Piston sampler			D U	nit we	ight (k	N/m³)				Sweu	ISH CONE	)) ÷	Su) Sur)	∨ int ▼ re	act mould	ed
	Rock	core	DC Diamond core barrel			CP C	ompre	essive	strength	(MPa)			Dyn. (	Cone Pe	en. Te	st ×	<u> </u>	>	×
	<b>E</b>	518/	AIIGRAPHY		E	;		PLES	•	WATE	RCC	NTENT	≻	S	DYN	. CO	NE PE	:N. TI	EST
ε	- E			_	ÆL	₽₩	N	γ %	۵	and		S (%)	<b>TOR</b>	EST		(DIO) 50	ws/0.	sm) 100	
E	ATIC PTH			<b>IBO</b>	Ē	E AN	Ĕ	VER	RQ				RA	and 'U T				<u> </u>	L
E		DE	SCRIPTION	SYN	TER	NUN	NO:	í C C	N or	w <sub>P</sub>	W	wL	ABC	LIS N	UN	DRA TREI		SHE/ (kPa	AR I)
	Π				M	•		R		20	40 6	50 80		=		50	ſ	1 <b>00</b>	
E		Very poor quali	ity black shale, 10% of																
		45° from boreh	ole axis.																
- 13						DC-17		75	19									+	
Ē																			
Ē.	62 25					DC-18		90	0										
- 14	14.00	Very poor quali	ity grey shale, occasional			DC 10	Т	100	15										
Ē		thick), at 45° fro	om borehole axis, veilets			DC-19		100	15										
- 15		or calcite.				DC-20		100	0				_					+	
_				X		DC-20		100	U										
_						DO 04			20										
- 16	60.10 <b>16.15</b>	Layers of poor	to locally good grey shale,			DC-21		90	20		-						-		
Ē		with calcareous	s light grey mudstone, k shale lavers, occasional			DC-22		100	83										
- 17		sandstone bed	s (10-100mm thick), at 45° axis. Veinlets of calcite			00 22			00		-		_					+	
Ē		local trace of p	yrite.			DC-23		100	24										
Ē																			
- 18 -						DC-24		100	31								+		
Ē																			
- 19						DC-25		100	40				-			-+	—	+	
Ē																			
Ē						DC-26		100	88										
- 20																	+		
Ē						DC 6=		105	~~										
- 21						DC-27		100	28				-		$\square$	-+		+	
Ē	54.84 21 41						┝┛┫	100	50										
Ē	21.41	calcareous mu	dstone, with 15-20% of			00-20	╞╋╋	100	52										
- 22 -		sandstone bed	s (3-5mm thick).										1				+	+	
Ē						DC-29		100	80										
23													-		$\square$	$\square$		$\square$	
ŧ																			
ŧ						DC-30		100	77										
<b></b>													1						

		_		PF	ROJECT	: Rabas	ska Pi	oject	Phase 2	), Levi	is, Qu	ebec			BORE	HOL	E:/	BH-	106	-05
			manata alla	sr	TE :	West	Optio	n Site							PAGE	:: _	3	_ 0	F_	3
			rratecn	FIL	E NO :	<u>T-105</u>	0-B	(60333	33-KELL)	)					CASI	NG :	HW	1		
	•			во		DATE :		2005-	02-10		то		2005-02	-22	CORE		REL	+	łQ	
		BORIN	G LOG	DA	TUM :		Geoc	letic			C	OOR	DINATE	s: _5	5186973	.53 N	I	261	962.	58 E
SAM	IPLE C	ONDITION	TYPE OF SAMPLER			LABOF	RATO	RY AI	ND IN SI	TU TE	ST			Field	Vane	(!	Su)	$\diamond$	inta	
	Rem	ioulded	SS Split spoon	0		GS G	rain si	ize an	alysis						•	(\$	Sur)	٠	rem	oulded
	Lost	Isturbed	PS Piston sampler	C		D Ur	nit we	ight (k	N/m³)					Swed	isn cone	)) ( ()	Cur)	▽	intao rem	:t oulded
	Roc	k core	DC Diamond core barrel			CP Co	ompre	essive	strength	(MPa)	)			Dyn. (	Cone Pe	en. Te	st	<u>×</u>		<u>×</u>
	۶ı	STR/	ATIGRAPHY		ε		SAM	PLES	5		TED	~~~			~	DYN	i. CC	)NE	PEN	I. TEST
E	žε				EL		z	۲ %	0	ar	nd Ll	MITS	NIENI S (%)	OR)	ESTS		(blo 5(	ows 0	/ <b>0.3r</b> / 10	n) 0
TH	ET .		BOL	ГЦ	E AN	DITIC	/ER	RQI				- (/-)	RAT	and U TE	1					
DEP	DEP	DE	SCRIPTION	SYM	TER	YPE NUN	OND	co	N or	v	V <sub>P</sub>	w	wL	ABO		UN S		AINE ENG	:DS TH(	HEAR kPa)
	Щ				.WM	F -	U U	RE		20	0 40			L 1	Z		50	0	10	0
-		Layers of fair q	uality grey shale.																	
- 25						DC-31		100	57					_					_	
	51.03 25.22	END OF BORE	EHOLE					-												
-																				
- 26																	-			
- 27														_			$\square$			
-																				
-																				
- 28														-			+			
-																				
- 29														_			$\square$	$\square$	$\square$	
-																				
-																				
- 30														-			$\rightarrow$			
-																				
- 31														_			$\square$	_	$\square$	
-																				
-																				
- 32																	$\neg$			
33														_		$\square$	$\square$	$\square$		
- 34											+	+		-		$\vdash$	+	$\dashv$	$\neg$	
- 35														_		$\square$	$\downarrow$	$\square$		
· <b>E</b>		L			I			L								لمسط				

				PR	OJECT	: Rabas	ska Pr	oject	(Phase 2)	), Lev	is, Qı	uebec	5			BORE	HOL	.E : _	BH-	.107	-05	_
		Т	matach	SIT	E :	West	Optior	n Site								PAGE	£: _	1	_ 0	F_	3	_
			rratech	FIL	E NO :	<u>T-105</u>	0-B (	6033	33-KELL)							CASI	NG :	HW	1			
	•			вс	RING	DATE :		2005	-02-08		то		2005	-02-1	16	CORE	E BAF	REL	.: ١	NQ3		
		BORIN	G LOG	DA	TUM :		Geod	etic			c	:00F		TES	: _5	186941	.02 1	١	26	1948.	.72 E	:
SAN	IPLE C	ONDITION	TYPE OF SAMPLER			LABOF	RATO	RY A	ND IN SIT	TU TE	ST				Field \	/ane	(	Su)	$\diamond$	inta	ct	
	Rer	moulded	SS Split spoon			GS G	rain si	ze an	alysis								(	Sur)	•	rem	ould	ed
	Los	t	PS Piston sampler	e			nit wei	ight (k	ı xN/m³)						Swedi	sh cone	) ( (	Cu)	$\nabla$	inta rem	ct ould	ed
	Ro	ck core	DC Diamond core barrel			CP C	ompre	ssive	strength	(MPa	)				Dyn. (	Cone Pe	en. Te	est.	× -		>	×
	C	STR	ATIGRAPHY		ε		SAMI	PLES	6								DYN	I. CC	ONE	PE	N. TI	EST
ε					Ľ	<u>م</u> م	Z	ر %	•	WA	AIEF nd I	K CO IMIT	NIE S (%	N I )	ORY	STS		(ble	ows	/0.3i	m)	
Ξ	I H			BOL	ГĘ	AN	ITIO	ER)	RQL	u			0(/0	,	RAT		1					
ШШ	EVA DEP	DE	SCRIPTION	SYM	<b>LER</b>	YPE		SOV	l or	v	v <sub>P</sub>	w	v	′L	BOI	SIT	UN		AINE =NG	ED S	HE/	AR
				••	MA	⊢ <b>~</b>	Ŭ	R	~	2				)	Ľ	Z		5	0	10	)0	,
	75.79 <b>0.00</b>	GROUND SUF Topsoil.	RFACE	$\sum_{i=1}^{n}$			$\times$						$\left  \right $								-	
Ē	75.33 <b>0.46</b>	Compact brow	n and reddish sand some	 R( 1	04-15	SS-1		25	2/46cm													
Ė,		silt and gravel.			2005-		$\bigtriangledown$															
ŧ'	74.07			0 0	0	SS-2	$\leq$	67	13													
Ē	1.52	Loose to comp	act grey clayey silt, trace		75.72		$\ge$	50	-													
÷ 2		or sand and gra	avei.		elev.	55-3		50	/													_
Ē					vel at	SS 4	$\boxtimes$	E0	24													
Ē,					ter le	33-4		50	24													
Ē				Ŷ	Ma	SS-5	$\boxtimes$	67	21													
Ē	72.13	O arrest to us			$\Im [c]$	000		01	21													
- 4	3.00	silty and grave	lly sand.	о а. ь		SS-6	$\bigtriangledown$	75	55													
Ē																						
Ē.				P		SS-7	$\boxtimes$	67	48													
5				0																		
Ē				ø		SS-8	$\bowtie$	67	21	$\odot$												
- 6				0.0																		
Ē				\$• • •		SS-9	$\frown$	55	50/8cm													
Ē	68 78			.0 		SS 10		0	100/12om													
- 7 - 7	7.01	Bedrock: Succ	ession of very poor quality			DC-11		58	0													
Ē		at 45° from bor	rehole axis.			DC-12		65	0													
- 8						DC-13		100	0													
Ē						DC-14		96	30													
Ē						DC-15		100	48													
- 9	<u> </u>	Layers of poor	quality grey and dark grey			50.40			0.5													
Ē		thick) at 45° fro	om borehole axis,			DC-16		100	25													
E 10		occasional veir	nlets of calcite.		38				_											$\vdash$		
Ē						DC-17		100	0													
ŧ					$\exists \mathbb{R}$																	
- 11 					38	DC-18		94	46								$\left  \right $					
E																						
E				N.	2110																	

					PF	ROJEC	T: Raba	ska Pr	oject (	Phase 2	), Levis	, Quel	bec			_ во	REHO	LE :	BH	-107	'-0 <u>5</u>	
			То	matach	SI	TE :	West	Optio	n Site							_ PA	GE:	2	_ C	)F _	3	_
		◄		rratech	FI	LE NO	: <u>T-105</u>	0-В (	(60333	33-KELL)						_ CA	SING	: <u>HV</u>	v			
		•			в	ORING	DATE :		2005-	02-08	1	<b>o</b> _	2	2005-0	2-16	_ co	RE BA	RRE	L: ļ	NQ3		
		]	BORIN	G LOG	DA	атим	:	Geod	letic			со	ORE	DINATI	S :	51869	41.02	N	26	1948.	.72 E	
SA	M	PLE CO	NDITION	TYPE OF SAMPLER			LABO	RATO	RY AN	ND IN SI	TU TES	т			Fiel	d Vane		(Su)	$\diamond$	inta	ct	
	<	Remo	oulded	SS Split spoon			GS G	rain si onsoli	ize ana dation	alysis					0			(Sur)	•	rem	ioulde	эd
		Lost	sturbeu	PS Piston sampler				nit we	ight (k	N/m³)					Swe	eaisn co	ne	(Cu) (Cur)	$\nabla$	inta rem	.ct 1ould€	ed
	Ļ	Rock	core	DC Diamond core barrel		r –	CP C	ompre	essive	strength	(MPa)				Dyn	. Cone	Pen. T	Test	× -		×	:
PTH - M		ATION - m PTH - m	SIRA	MBOL	s LEVEL - m	E AND MBER		VERY %	r RQD	WAT and	ER ( d LIN		ITEN <sup>-</sup> 6 (%)	DRATORY	and TU TESTS	DY	N. C (bl	ONE lows	: PEN ;/0.3i 10	N. TE m) )0	ST	
造	5		DE	SCRIPTION	SΥΙ	ATE!	T ₹P	CON	ECO	o N	w <sub>i</sub>	P V	N 		AB(	S N		STR	ENG	iTH (	(kPa)	)
						Ś			8		20	40	60	80				5	50 	10	0	
Ē			Layers of poor shale, 5% of sa	quality grey and dark grey Indstone layers (5-50mm			DC-19		65	12												
ŧ			thick) at 45° fro occasional vein	m borehole axis, llets of calcite.			]															
	13								59	31			+									
Ē							DC-20		50	51												
Ē,	14						DC-21		100	0												
Ē							DC-22		100	0												
Ē																						
E 1	5						DC-23		92	22			+									
Ē																						
Ē,	16	59.89 <b>15.90</b>	Lavers of verv	poor to poor quality grey																		
			shale and light	grey calcareous			DC-24		100	15												
Ē			veinlets of calci	ite at 16.7m. Sedimentary																		
	17			7.0 to 17.5mj.									+									
Ē							DC-25		92	48												
Ē	18																					
Ē																						
Ē		56.97					DC-26		100	15												
	9	18.82	Layers of very shale, 25% of c	poor to poor quality grey lark shale (1-20mm thick)					100	58			+					+				
Ē			at 40° from bor	ehole axis.			DC-27		100	56												
	20																					
office in the second se							DC-28		100	12												
23 08:5																						
2	21						DC-29		100	18			+					+	$\vdash$			
TTED: 2		54.15					DC-30		98	0												
	22	21.64	Layers of poor shale, with 25%	quality grey and black of sandstone layers			DC-31		96	46					_			<u> </u>			⊢	
-BH.st			(5-50mm thick) axis, local trace	, at 40° from borehole e of pyrite.				┢╋╋														
-1050-7							DC-32		76	22												
AStyle T	23						1						+					+	$\vdash$			
sotec74							DC-33		100	33												
V:/0					XX																	

		_		PR	ROJECT	: Rabas	ska Pr	oject	Phase 2	), Levis	s, Que	ebec			BORE	HOLI	E: /	BH-	107	-05	
		Т	manata alla	sn	TE :	West	Optio	n Site							PAGE	: _	3	_ 0	F _	3	
		jj ie	rratech	FIL	E NO :	<u>T-105</u>	0-B (	(6033:	33-KELL)						CASIN	NG :	HW				_
	•			вс		DATE :		2005	02-08		то	2	2005-02-	16	CORE	BAR		.: N	1Q3		
		BORIN	G LOG	DA	TUM :		Geod	letic			СС	DORD	INATES	: 51	86941	.02 N	I	261	1948.	72 E	
SAN	IPLE CO	ONDITION	TYPE OF SAMPLER			LABOF	RATO	RY AI	ND IN SI		ST			Field Va	ane	(5	Su)	$\diamond$	inta	ct	
	Rem	oulded	SS Split spoon			GS G	rain si	ize an	alysis							(5	Sur)	٠	rem	oulde	эd
	Lost	sturbed	PS Piston sampler	e		D Ur	nit we	ight (k	N/m³)					Swedis	n cone	· (0	Cur)	$\nabla$	intao rem	ct oulde	he
	Rocl	< core	DC Diamond core barrel		-	CP Co	ompre	essive	strength	(MPa)				Dyn. Co	one Pe	n. Te	st	× - ·		×	,u (
		STR	ATIGRAPHY		ε		SAM	PLES	6							DYN	. CC	)NE	PEN	<b>1.</b> ТЕ	ST
ε	Ξ - Ε			-	н. Ш	0.4	z	%	-	WA				оку	STS		(blo	ows/	/0.3r	n)	
Ξ	Θ.Η			BOL		ANI	E	ERY	RQD	a		WII 1 3	( /0)	RAT	Ë		50	,		<u> </u>	
DEP	EVA DEP	DE	SCRIPTION	УM	ËR	YPE	<b>D</b>	SOV	lor	w	Р	w	wL	BOF	SITI	UN			ED S		١R
	-⊒				MAI	⊢ <u>~</u>	ŭ	RE	2	 20	) 40	⊙ 60		LA	Z	J	50	)	10	KF a)	'
		Layers of fair o	uality calcareous	XX								++	++++				$\dashv$		$\neg$	-	
Ē		mudstone and calcite.	dark shale, veinlets of		R	50.04		100	-7												
Ē	50.77					DC-34		100	57												
F 29	25.02	END OF BORE	EHOLE																		
Ē																					
- 26														-		$\vdash$	_				
Ē																					
Ē																					
- 27														-							
Ē																					
- 28														-		$\vdash$	$\rightarrow$	$\rightarrow$			
Ē																					
Ē																					
- 29														-			-				
Ē																					
- 30														-		┝──┼	$\rightarrow$	_			
Ē																					
Ē																					
- 31														-			-				
Ē																					
- 32																$\vdash$	$\downarrow$	$\square$	$\square$	$\square$	
- 33												+		-			+	-	$\neg$	+	
- 34														-		$\mid \downarrow \downarrow$	$\square$			$\square$	
- 35										$\vdash$		+		-			+	+	$\dashv$	+	

				PR	OJECT	: Rabas	ska Pr	oject	(Phase 2)	), Levis	s, Qu	iebec	:			BORE	HOL	E: /	BH-	108	-05	-
			matach	SIT	E:	West	Optior	n Site								PAGE	:: _	1	_ 0	F _	7	_
	▼		rratecn	FIL	E NO :	<u>T-105</u>	0-B (	6033	33-KELL)							CASI	NG :	NW	1			_
	•			вс	RING	DATE :		2005	-02-16		то		2005-0	)2-2	5	CORE	E BAF	REL	١	1Q3		
	]	BORIN	G LOG	DA	TUM :		Geod	etic			с	OOR		ES :	51	86938	.62 N	1	261	1994.	91 E	-
SAN	IPLE CO	NDITION	TYPE OF SAMPLER			LABOR	RATO	RY A	ND IN SIT		ST				Field V	'ane	(	Su)	$\wedge$	inta	ct	-
$\geq$	Rem	oulded	SS Split spoon			GS G	rain si	ze an	alysis		-						(	Sur)	<b>♦</b>	rem	oulded	
	Undis	sturbed	ST Thin walled Shelby tub	be			onsolio nit wei	datior	N/m³)						Swedis	sh cone	; ((	Cu)	$\bigtriangledown$	inta	ct	
	Rock	core	DC Diamond core barrel			CP C	ompre	ssive	strength	(MPa)					Dyn. C	one Pe	) n. Te؛	cur) st	▼ ×	rem	oulded ×	
		STR	ATIGRAPHY		F	:	SAMI	PLE	3										)NF	PEN		т
_ ح	۳ ۲						_	%		WA	TER	co	NTEN	т	RY	ŝTS		(bl	ows	/0.3r	n)	
L T	NOI H - H			Ъ	EVE	AND ER	LION	RΥ	g	an	nd Ll	іміт	S (%)		ATO	ΞĔ		5	)	10	0	
EPT	VAT EPT	DE	SCRIPTION	/MB	R L	PE / JMB	IDN	OVE	or R	w		w	w		NOR.	IT U	UN	IDR/	AINE	ED S	HEAR	2
	D	DE	SCRIPTION	Ś	ATE	∑ ĭ	CO	SEC	z		Р		—	-	LAE	N N	S	TRE	:NG	TH (	kPa)	
	76.19	GROUND SUR	RFACE		3					20	) 4(	0 6	0 80				L_	5	) 	10	0	
Ē	0.00	Peat and topso	il.			SS-1	$\ge$	62	1/15cm													
-	75.58 <b>0.61</b>	Compact browr	n sand, some silt and	$\tilde{\mathbf{G}}$	4-15																	
- 1		gravel.		<b>a</b>	005-0	SS-2	$\ge$	67	12										$\rightarrow$	-		
-					0																	
-				¢	.86m	SS-3	$\left  \right\rangle$	71	16													
- 2				۵ ٥	ev. 75																	
-	73.75 <b>2.44</b>	Compact grey s	silt, traces of sand and		atel	SS-4		12	17													
- 3		clay, occasiona	al gravel.		level																	
				۰.	Water	SS-5	$\mathbb{N}$	75	22	•	4											
-				.9	38																	
- 4						SS-6		8	29					_					$\rightarrow$	—		
-																						
Ē.	71.31					SS-7	$\ge$	72	82													
- 5	4.00	Dense to very of and gravel, to g	dense grey sand, some silt gravel and sand trace of	Ø 0		SS-8	$\times$	80	25/13cm													
		SIII.		.0																		
- 6				.0 . 0 . 6															$ \rightarrow $			
Ē				00		SS-9	$\bigtriangleup$	89	86	$\odot$												
-				0		SS-10	$\frown$	82	60/13cm													
- 7	68 88			0 0															-			
-	7.32	Bedrock: Layer	s of fair to poor quality			SS-11 DC-12	$\geq$	80 100	100/13cm <i>0</i>													
È e		grey mudstone	, with 10-15% undulated			20.2																
Ē		Beddings at 40	° from borehole axis.			DC-13		100	49													
-		pyrite. Slikensio	des from 11.7 to 12.0m																			
- 9		depth.				DC-14		100	13										_			
Ē						00-14		100	15													
Ē					$\exists \mathbb{R}$																	
- 10 -					$\langle   \rangle$	DC-15		90	59										$\dashv$	$\neg$		_
-																						
E 11					$\exists \mathbb{R}$																	
ŧ ''					$\Im \mathbb{R}$	DC-16		91	26													
ŧ																						
-				XX	2110	DC-17		100	0													

				PR	OJECT	: Rabas	ska Pr	oject (	Phase 2	), Levis	s, Que	ebec			BORE	HOL	E: /	BH-	108	-05	
		Т	matach	SIT	Έ:	West	Optio	n Site							PAGE	: _	2	_ 0	F_	7	_
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-B (	60333	3-KELL)	)					CASI	NG :	NW				
	•			во	RING D	OATE :		2005-	02-16		то	20	005-02-	25	CORE	EBAF	REL	.: N	IQ3		
		BORIN	G LOG	DA	TUM :		Geod	etic			СС	DORD	NATES	: 5	186938	.62 N	I	261	994.	91 E	
SAN	IPLE CO	NDITION	TYPE OF SAMPLER			LABOF	RATO	RY AN	ID IN SI	TU TES	ST			Field \	/ane	(	Su)	$\diamond$	inta	ct	
	Remo	bulded	SS Split spoon			GS G	rain si	ze ana	alysis							(	Sur)	٠	rem	oulde	ed
	Lost	luibea	PS Piston sampler			D U	nit we	ight (k	N/m³)					Swedi	sh cone	e (	Cu) Cur)	▽	intao rem	ct oulde	ed
	Rock	core	DC Diamond core barrel			CP C	ompre	essive	strength	(MPa)				Dyn. C	Cone Pe	en. Te	st	<u>×</u>		<u>×</u>	<
		STR	ATIGRAPHY		ε	:	SAM	PLES	;							DYN	I. CC	)NE	PEN	N. TE	EST
ε	ΪE				ĒĽ.	۵~	z	% /	•	WA an	IER Id I II		(%)	OR	STS		(blo	ว <b>พร</b> / า	0.3r	n)	
Ē	TIO TH-			BOL	LEV	BEF	DE	'ER)	RQL				(70)	RAT							
Ш	DEP	DE	SCRIPTION	SΥM	rer	YPE		co Co	N or	w	Р	w	wL	ABO	SIT	UN			DS	HEA kPa`	۱R
				•	WAJ	⊢ ~	Ŭ	RE	2	⊢ 20	40	⊖ 60		Ľ	Z		50	)	10	in a,	'
-	12 12	Succession of y	very poor to fair quality red	XX	30													+	+	-	
Ē	12.12	and greenish g	rey mudstone layers at		38	DC-18		100	40												
E 13		45° from boren	ole axis.		$\langle \rangle \langle \rangle$																
Ē					38	DC-19		96	16												
Ē					$\exists \mathbb{N}$																
F 14					38								_	-				$\dashv$	_		
Ē						DC-20		62	0												
Ē.					38																
- 15					$\exists \mathbb{N}$																
Ē																					
- 16						DC-21		96	56				_	-				$\dashv$	$\dashv$	_	
Ē																					
Ē																					
- 17  -						DC-22		100	49									+			
Ē				XX	$\langle \rangle \langle \rangle$																
- 18				X	$\langle   \rangle$								_	-				$\rightarrow$	_		
Ē	57.69			XX	$\exists \mathbb{N}$																
Ē	18.50	Succession of f and red mudsto	fair quality greenish grey one layers at 45° from			DC-23		96	72												
- 19 -		borehole axis, v shale layers, th	with light grey calcareous in layers of black shale		$\mathbb{X}$													+			
Ē		(1-5mm thick),	Clacite veinlets.		38																
- 20					$\langle   \rangle$								_	-				_		_	
Ē	55.79				$\exists \mathbb{N}$	DC-24		98	49												
Ē	20.40	Layers of fair to grey mudstone	poor quality greenish , with 10-15% of light grey																		
- 21		of dark shale. E	Beddings at 45° from		$\langle \rangle \langle \rangle$													+	$\neg$		
Ē		pyrite.	Laichte venniets, trace of			DC-25		95	46												
E ,,																					
ŧ "							┝╋╸														
Ē	53.49	Succession of	availant quality rad and			DC-26		100	26												
- 23	22.70	greenish grey r	nudstone layers, with 15%							$\vdash$		_	+				-+	+	+	$\dashv$	
E		thick). Bedding	s at 45° from borehole nlets, local traces of		38	DC-27		96	78												
		pyrite.																			

				PR	OJECT	: Rabas	ska Pi	roject (	Phase 2	), Levis	s, Quet	bec			BORE	HOL	E: /	BH-	108	-05	
		Т	matach	SIT	Έ:	West	Optio	n Site							PAGE	:: _	3	_ 0	F _	7	
			rratech	FIL	E NO :	<u>T-105</u>	0-B	(60333	33-KELL	)					CASI	NG :	NW	·			
	•			во	RING [	DATE :		2005-	02-16	1	то	200	5-02-2	25	CORE	BAF	₹REL	.: N	IQ3		
		BORIN	G LOG	DA	TUM :		Geoc	letic			со	ORDIN	ATES	: 5	186938	.62 N	1	261	994.	91 E	
SAN	IPLE C		TYPE OF SAMPLER			LABOF	RATO	RY AN	ND IN SI	TU TES	ST			Field \	/ane	(	Su)	$\diamond$	inta	ct	
$\geq$	Ren	oulded	SS Split spoon			GS G	rain s	ize ana	alysis							(*	Sur)	٠	rem	oulde	ed
	∬ Und ∎ Lost	isturbed	ST Thin walled Shelby tub PS Piston sampler	be			onsoli nit we	idation	N/m³)					Swedi	sh cone	; ((	Cu)	$\bigtriangledown$	inta	ct	od
	Roc	k core	DC Diamond core barrel			CP C	ompre	essive	strength	(MPa)				Dyn. C	Cone Pe	en. Te	st	▼ ×-·	rem 		эа <
		STR	ATIGRAPHY		Ľ	1	SAM	PLES	5							DYN	I. CC	DNE	PE	N. TE	EST
F	ے <sup>اع</sup>				Ē		_	%		WAT	TER C	CONTE	NT	RY	STS	_ · · ·	(blo	ows	/0.3r	n)	
Ē	NO! - H			Ъ	EVE	AND	0	RY	g	an	d LIN	IITS (%	6)	ATC	¤≚		50	)	10	' <b>0</b>	
T T	VAT			MB	R L	PE /	IQ	OVE	or R	w	v	w 1	N	NOR.		UN	IDR/	AINE	D S	HE	٩R
		DE	SCRIPTION	Ś	ATE	Σ Σ	0 C	SEC.	z	H	P •		۰L ۱	LAE	N Z	S	TRE	NG	TH (	kPa)	)
					3					20	40	60 8	0 				50	)	10	0	
-		Succession of e greenish grey r	excellent quality red and mudstone layers, with 15%																		
		of thin layers of thick). Bedding	f black shale (1-10mm s at 45° from borehole		38																
- 25		axis, calcite vei	inlets, local traces of			DC-28		100	100								$\rightarrow$	-	_		
-		pynte.																			
-																					
- 26																	-	-			
-						DC-29		100	92												
27																					
	48.81																				
-	27.38	Succession of f greenish grey r	fair to good red and mudstone, with calcareous																		
- 28		layers (5-50mm layers of black	n thick) and 5-10% of shale (1-10mm thick)			DC-30		100	72			_					$\rightarrow$	-	_		
-		Beddings at 45	<sup>°</sup> from borehole axis.			DC-30		100	72												
					38																
- 29																		-			
-						DC 21		100	79												
- 30						DC-31		100	70												
-																					
- 31						DC 22		100	77								$\rightarrow$		_		
-						DC-32		100	//												
Ē																					
- 32																					
_						50.00															
- 33						DC-33		100	70												
	42 71																				
Ē	33.48	Succession of e	excellent to good quality					1													
- 34		calcareous mu	dstone (10 to 80mm thick)		$\left  \right  \right $					$\vdash$						$\vdash$	$\dashv$	_	$\dashv$		
		and 5-10% of the Disseminated p	nin layers of black shale. byrite, occasional calcite			DC-34		100	86												
Ē		veinlets. Beddings at 40	° from borehole axis.																		
- 35 -					$\langle \rangle \rangle \langle$			1									+	-	$\neg$		
Ē						DC-35		100	91												
-																					

		_		PF	ROJECT	: Rabas	ska Pr	oject (	Phase 2	), Levis, Q	luebec		B	OREHC	)LE :	BH-	108	-05	
		Т	matach	sr	TE :	West	Optio	n Site					P/	AGE :	4	_ 0	F _	7	
	▼		rratech	FI	LE NO :	<u>T-105</u>	0-B (	(60333	3-KELL				C.	ASING	: <u>NV</u>	v			
	•			вс		DATE :		2005-	02-16	то		2005-02-	25 <b>C</b>	ORE B/	ARREI	∟: ַ	VQ3		
	]	BORIN	G LOG	DA	TUM :		Geod	letic			COOR	DINATES	: 5186	938.62	N	26	1994.	.91 E	
SAN	PLE CO	NDITION	TYPE OF SAMPLER			LABOF	RATO	RY AN	ID IN SI	TU TEST			Field Van	e	(Su)	$\diamond$	inta	ct	
	Remo	oulded	SS Split spoon			GS G	rain si	ze ana	alysis						(Sur)	٠	rem	oulde	əd
	Lost	sluibea	PS Piston sampler			D Ui	nit we	ight (k	N/m³)				Swedish	cone	(Cu) (Cur)	$\nabla$	inta rem	ct ioulde	ed
	Rock	core	DC Diamond core barrel	_	1	CP Co	ompre	essive	strength	(MPa)			Dyn. Con	e Pen.	Test	<u>×-</u>		>	<
	c I	STR/	ATIGRAPHY	1	ε		SAM	PLES						DY	N. CO	ONE	PE	N. TE	EST
ε	- N E			Ι.	Ľ.	<u>م</u> م	z	۲ %	~	and I		NIENI S (%)	OR	i Si Si	(bl 5	iows	/ <b>0.3r</b> 10	m) 10	
Ē	TH -		BOL		BEF	E E	ER)	RQI	unu		<b>c</b> (70)	RAT	-		Ľ				
DEP	DEP	DE	SYM	ER	YPE		co/	N or	w <sub>P</sub>	w	wL	ABO 012	ຼົ່	INDR. STRI		EDS	HEA	۹R	
	ЩI				.YM	F -	U U	RE		20 4			יכ	≤	5	;0	10	00	,
<u> </u>		Succession of I	ayers of good quality red								+								
Ē	39.67 36.52	and greenish gr calcareous laye	rey mudstone, some ers.														1	1	
37	00.02	Succession of l quality red and	ayers of good to poor greenish grey mudstone,																
Ē		occasional light mudstone and	t grey calcareous sandstone layers			DC-36		100	63									1	
Ē		(5-20mm thick) (1-10mm thick)	, 5% of black shale layers . Beddings at 45° from														1	1	
- 38		borenole axis.										_			+				
Ē																	1	1	
- 39						DC-37		100	81										
Ē																	1	1	
Ē																	1	1	
<u></u>																			
Ē						DC-38		100	31										
E 41																			
Ē						DC-39		96	48										
Ē	34.43																		
- 42	41.70	and greenish g	ayers of good quality red rey mudstone, some			DC-40		100	88				-						
Ē		shale (1-5mm ti	hick), occasional beds of dstone (5-50mm thick)															1	
43		Occasional to fi	requent slikenside																
Ē		Beddings at 50	° from borehole axis.			DC-41		100	71									1	
Ē																		1	
- 44													-						
-																		1	
45						DC-42		100	73										
-																		1	
							┝╋												
- 46														$\vdash$					
Ē						DC-43		100	82										
47																Щ			
							╞╋╋												
						DC-44		97	84										
t					V///														

				PR	ROJECT	: Rabas	ska Pi	roject (	Phase 2	), Levis	s, Qu	ebec			E	ORE	HOL	E:	BH-	108	-05	
		Т	matach	sr	TE :	West	Optio	n Site							P	AGE	: _	5	_ 0	F _	7	
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-B	(60333	3-KELL	)					c	ASIN	IG :	NW	<u> </u>			
	•			вс	ORING [	DATE :		2005-	02-16		то		2005-0	2-25	c	ORE	BAF	REL	. : 1	1Q3		
	]	BORIN	G LOG	DA	TUM :		Geoc	letic			C	OOR	DINAT	ES :	518	6938.	62 N	1	261	1994.	.91 E	
SAM	PLE CO	NDITION	TYPE OF SAMPLER			LABOR	RATO	RY AN	ID IN SI	TU TES	ST			Fi	eld Var	пе	(!	Su)	$\diamond$	inta	ct	
	Remo	oulded	SS Split spoon			GS G	rain s	ize ana	alysis								(\$	Sur)	٠	rem	oulde	ed
	Lost	sluibea	PS Piston sampler			D Ui	nit we	ight (k	N/m³)					SI	vedish	cone	() ()	Cu) Cur)	▽	inta rem	ct ould	ed
	Rock	core	DC Diamond core barrel		-	CP Co	ompre	essive	strength	(MPa)				D	/n. Cor	ie Pe	n. Te	st	<u>×</u>		>	×
	<u>c</u> ı	STRA	ATIGRAPHY		ε	:	SAM	PLES	5			~~		_	_	<i>(</i> )	DYN	i. CC	)NE	PE	N. TE	EST
ε	ΣE				Ľ Ľ		z	۲ %	~	an	ier nd Ll	MIT	NTEN S (%)		OR	ESTS		(ble 5(	ows 0	/0.3r 10	m) 10	
TH .	THO.			BOL		BEF	DE	ER)	RQI				- (///		RAT	Π						
DEP	EVA DEP	DE	SCRIPTION	SΥM	TER	YPE NUN		co/	N or	w	Р	w	wL		ABO	SIT	UN S			EDS TH(	HE/	AR )
	ЩI				.WM	н –	ပ	RE	-	⊢ 20	40	······································			ב	Z	-	5(	0	10	)0	,
-		Succession of I	ayers good quality red								-+							_	$\neg$	$\neg$		
-		and greenish g	rey mudstone.																			
- 49	27.28 <b>48.91</b>	Poor quality are	enish arev mudstone																			
		some light grey	calcareous layers, kenside surfaces and fault			DO 15		100	00													
-		striations in join borehole axis.	nts. Layers at 50° from			DC-45		100	20													
- 50	25.95										-					-			-			
-	50.24	Very poor quali thin layers of da	ty grey shale, with some ark shale (1-15mm thick).																			
- 51		Frequent slicke along joints. Ca	nsides and fault striations alcite veinlets and veins.			DC-46		100	7													
		Local presence	of pyrite. Layers at 50°																			
- 52						DC-47		92	0		_					-	-		-	-	_	
- 53						DC-48		100	0													
-						DC-49		100	0													
-																						
- 54						DC-50		53	0		-					F	-		-	_		
-						DC-51		48	0													
- 55																r	$\square$					
-						DC-52		100	0													
-						DC-53		84	0													
- 56																-			-			
-						DC-54		100	18													
- 57																ļ	$\square$	$\square$	$\square$	$\square$	$ \rightarrow $	
	18.94 <b>57.25</b>	Layers of very	poor to poor quality grey																			
Ē		shale, 10% of the shale, 10% of the shale	hin layers of black shale. beccias. Slickensides and			DC-55		82	22													
- 58		fault striations a from borehole a	along joints. Layers at 50° axis. Frequent calcite							$\vdash$						-	$\dashv$		$\neg$	$\neg$		
		veinlets.				DC-56		100	36													
- 59																ļ	$\square$	$\square$	$\square$	$\square$	$ \square$	
Ē						DC 77	╞╋	100														
						DC-57		100	41													
t i					V///																	

			_		PF	ROJECT	: Rabas	ka Pr	oject (	Phase 2	), Levis, (	Quebe	с			BORE	HOL	E:	BH-	108	-05	
			То	matach	sr	TE :	West	Optior	n Site							PAGE	: _	6	0	F_	7	_
		▼		rratecii	FIL	LE NO :	<u>T-105</u>	)-В (	60333	3-KELL)	)					CASI	NG :	NW				
		•			вс	DRING D	DATE :		2005-	02-16	т	<b>)</b> _	2005	5-02-2	25	CORE	BAR	REL	: 1	IQ3		
		]	BORIN	G LOG	DA	TUM :		Geod	etic			coo	RDINA	TES	: _5	186938	.62 N		261	994.	91 E	
s	AM	PLE CO	NDITION	TYPE OF SAMPLER			LABOR	ATO	RY AN	ID IN SI	TU TEST				Field \	/ane	(\$	Su)	$\diamond$	inta	ct	
	×	Remo	oulded sturbed	SS Split spoon ST Thin walled Shelby tub	e		GS GI C Co	ain si onsoli	ze ana dation	alysis					Swedi	sh cone	()	Sur)	<b>♦</b>	rem	oulde ot	эd
		Lost		PS Piston sampler			D Ur	nit wei	ight (k	N/m³)					owear		. ((	Sur)	▼	rem	oulde	эd
		Rock	core	DC Diamond core barrel	-		CP Co		ssive	strength	(MPa)				Dyn. C	Cone Pe	n. Te	st	<u>×</u>	<u> </u>	×	:
	Ē	<b>E</b>	0117			Ē	````				WATE	ER CO	ONTE	NT	¥	Ś	DYN	. CO	)NE	PEN /0 31	1. TE m)	ST
	E	- <sup>M</sup> -			۲.	VEL	9 8	NO	۲%	ē	and	LIMI	rs (%	)	TOR	'EST		50	)	10	0	
	2	PTH			MBC	S LE	E AI MBE	DITI	VEF	r RG					DRA							
	5		DE	SCRIPTION	SΥ	ATEI	ΝU	CON	ECC	N	₩ <sub>P</sub>	₩ —⊙	v	′L	LAB	IS N	S	TRE	NG	TH (	kPa)	,
						Ś			œ		20	40	50 8	0				50	)	10	0	
Ē			Layers of very p shale, 10-15% of	ooor to poor quality grey of dark shale layers			DC-58		98	13												
Ē			(1-10mm thick). 62m. Frequent	. Probable fault breccia at calcite veins (20-30mm																		
F	61		thick). Layers a Local presence	t 50° from borehole axis. of pyrite.	X													-				
Ē							DC-59		100	45												
F	62						2000					_						$ \rightarrow$	-	_		
Ē																						
Ē							DC-60		100	52												
Ē	63						2000											1				
Ē																						
F	64						DC-61		100	0		_						_	_		_	
Ē		11.70	<u> </u>																			
Ē		04.49	Good to excelle 10-15% of dark	shale layers (5-10mm			DC 62		100	77												
Ē	65		mudstone layer	s (10-20mm thick). Local ite. calcite veinlets.			DC-02		100	//												
Ē			, , <b>,</b> ,																			
F	66								07	100								-	_			
Ē		9.49					DC-03		97	100												
Ē	67	66.70	Good quality gr 25-30% of red r	eenish grey mudstone, mudstone lavers.															$\square$			
Ē			Beddings at 50°	° from borehole axis.																		
Ē							DC-64		100	70												
rs I	68																	1				
8 08:57h								_														
111-23	69																	_	_			
ED: 200							DC-65		92	77												
PLOTT	70	6 14																				
BH.stv	10	70.05	Good to excelle	ent quality red mudstone																		
1050-A-			grey mudstone Beddings at 45°	layers (5-10mm thick). ° from borehole axis.					100	75												
Style T-	71		Pyrite in joints.				00-00		100	70	$\vdash$							+	$\dashv$	$\dashv$	$\dashv$	_
otec74\.																						
V:\Ge						$\langle     \rangle$																

			PRO	JECT	: Rabas	ka Pr	oject	Phase 2	), Levis, Q	uebec	;	BORI	EHOLE	: B	H-10	8-05	
		Torratach	SITE	≣:	West 0	Optior	n Site					PAGI	≣:	7	OF	7	_
	◄	Terratech	FILE	NO :	<u>T-1050</u>	)-В (	60333	3-KELL)				CASI	NG :	NW			
	•		BOR	RING D	ATE :		2005-	02-16	то		2005-02-	25 CORI	E BARI	REL :	NQ	5	
	-	BORING LOG	DAT	-UM :		Geod	etic			COOR		5186938	.62 N		26199	4.91 E	
SAN		ONDITION TYPE OF SAMPLER				ATO	RY AI	ND IN SIT	U TEST			Field Vane	(S	ju)	♦ int	act	
	Undi	sturbed ST Thin walled Shelby tube			C Co	onsoli	dation	aryoio				Swedish cone	(S e (C	Sur) Su)	♦ rei ∇ inf	moulde act	эd
	Lost	PS Piston sampler			D Ur	iit wei	ght (k	N/m³) strength	(MPa)			Dun Cono D	(C	Cur)	▼ re	moulde	ed
		STRATIGRAPHY		_	50 100	SAM	PLES		(ivii a)			Dyn. Cone Po	en. res			×	<u>(</u>
	٤ ـ			 -		_	%		WATE	R CO	NTENT	RY	DTN.	(blo	ws/0.	:n. 16 3m)	:51
- H	NOI - H		5	EVE	AND	TION	ERY "	ð	and I		S (%)	ATO Id TES		50	1	00	
EPT	EPT	DESCRIPTION	ΥMB	ERL	'PE / UMB	.IQN	OVE	or R	w	w	w,	BOR ar SITU	UNI	DRA	INED	SHEA	٩R
			S	VAT	Γz	ö	REC	z				IN LA	S	IREN	IGTH	(kPa)	)
-		Good to excellent quality red mudstone								+0 0			+				
Ē		layers, 5% of green mudstone beds, light grey mudstone layers (5-10mm thick).			DC-67	L	100	88									
- 73		Beddings at 45° from borehole axis. Pyrite in joints.				L						_					
Ē						T											
						L	07	07									
- 74					00-00	L	51	57				-					
Ē						╇											
- 75						L						-		$\rightarrow$			
Ē					DC-69		76	49									
Ē																	
- 76				$\left  \right  \right $		L											
Ē				$\left  \right  \right $	DC-70	L	97	70									
- 77				$\langle \rangle \rangle$		L						-					
Ē						T											
- 78				$\langle \rangle \rangle$	DC-71	L	100	04				-		$\perp$			
-					DC-11	L	100	34									
Ē																	
- 79	_3.24			$\langle \rangle \rangle$	DC-72		0	-				-		+			
Ē	79.42	END OF BOREHOLE	<u>, 7117</u>														
E 80												-	$\vdash$	+			
81												_					
- 82												-	$\vdash$	+			
83												-	$\mid \mid$				

					PR	OJECT	: Rabas	ska Pr	oject	(Phase 2)	), Levis	, Que	ebec			BORE	HOL	E: /	BH-	109	-05	_
			То	matach	SIT	Έ:	West	Optior	n Site							PAGE	:: _	1	_ 0	F _	3	_
				rratech	FIL	E NO :	<u>T-105</u>	0-B (	6033	33-KELL)						CASI	NG :	PW	·			_
					во	RING	DATE :		2005	-02-28		го	2	2005-03-	07	CORE	E BAF	REL	.: <u>F</u>	۶Q		
		F	BORIN	G LOG	DA	TUM :		Geod	etic			С	DORE	INATES	: <u>5</u>	5186941	.04 N	1	262	2038.	73 E	
SAN	IPLE	COI	NDITION	TYPE OF SAMPLER			LABOF	RATO	RY A	ND IN SIT	TU TES	ST			Field	Vane	(*	Su)	$\diamond$	inta	ct	
	] R	emo	ulded	SS Split spoon			GS G	rain si	ze an	alysis							(	Sur)	٠	rem	oulde	۶d
	Lu Lu	naisi ost	lurbed	PS Piston sampler	e			nit wei	ght (k	ı xN/m³)					Swed	ish cone	; (i	Cu) Cur)	$\nabla$	inta rem	ct Ioulde	be
	R	ock	core	DC Diamond core barrel			CP C	ompre	ssive	strength	(MPa)				Dyn.	Cone Pe	n. Te	st:	<u>× -</u>		X	
	L I		STRA	ATIGRAPHY		Ε	:	SAMI	PLES	6			001			(0	DYN	I. CC	)NE	PEN	۱. TE	ST
ε	- N	ε		ION ANGLE: <u>90°</u>		ĒĽ.	<u>م</u> م	N	۲ %	0	an	d Ll		(%)	OR	ESTS		(blo 50	ows 0	/ <b>0.3r</b> 10	n) 10	
Ē	TI0	Ē	AZIMOTT	· <u>·</u>	BOL	ΓE	AN	ITIC	ER)	RQI				(,,,,)	RAT	u TE						
DEP	¶ A B	DEP	DE	SCRIPTION	SΥM	TER	YPE VUN		cov	N or	w	Р	w	wL	ABO	SIT	UN		AINE Eng	EDS	HEA	R
	Щ					-MA		Ū	RE	-	⊢ 20	40	⊙ 60	 80	2	Z		50	0	10		
<u> </u>	76.4 <b>0.0</b>	43 90	Topsoil.	FACE	$\widetilde{\sim}$			$\times$				+									-	
Ē	75 /	~7					SS-1		25	1												
Ē,	75.6 <b>0.7</b>	07 76	Compact to loo	se brown gravelly and				$\mathbf{\mathbf{x}}$	-0	10												
Ē			slity sand.		o p		55-2		58	10												
Ē	74.7	75 5 <b>8</b>	Compact grey s	and and silt trace of	0 0		<b>66</b> 2	$\bigtriangledown$	75	0					<u></u>							
- 2	-		gravel.				33-3		75	9	0		-		63							
Ē					a		SS-4	$\bigtriangledown$	75	24												
Ė,					₽		001		10						_							
Ē	73.0	08					SS-5	$\boxtimes$	58	18												
Ē	3.3	5	Dense to very d silt and gravel.	lense brown sand, some	<u>а</u> о																	
<b>₽</b> 4					0.0		SS-6	$\boxtimes$	58	36	0		-	_	GS			$\rightarrow$			$\rightarrow$	-
Ē					6 0																	
Ē,	71 3	35			о. р		SS-7	$\ge$	62	50												
Ē	5.0	8	Bedrock: Very s	severely fractured																		
Ē			(weathered) ree				SS-8	$\bowtie$	50	33												
- 6													-		-					_		
Ē							SS-9	$\frown$	38	24												
Ė,							SS-10		0	60/5cm												
Ē	69. <sup>-</sup> 7.2	17 26	Lavers of fair to																			
Ē			mudstone, occa mudstone and o	asional greenish grey dark shale lavers			DC-11		92	58												
- 8			(10-60mm thick calcareous light	), 5-10% slightly t grey mudstone layers									-	_	Pyrite	•		$\rightarrow$			$\rightarrow$	
_			(1-10mm thick). borehole axis.	. Beddings at 50° from											detec	tion 14						
Ē.							DC-12		97	62												
Ē																						_
			NOTE:	n the herebole was											CP=5	.1						
- 10			provided with a	bottom capped 63.5mm			DC-13		80	70	$\vdash$	-			-		$\vdash$	$\rightarrow$		-	+	
Ē			diameter PVC t cement bentoni	upe grouted in place with te, to allow down-hole			00-13		09	19												
Ē,			seismicity tests																			
E 11															]							
Ē							DC-14		90	83					Pyrite	; tion						
Ł															uetec	u011						

				PR	OJECT	: Rabas	ska Pi	oject (	Phase 2	), Levis	, Que	bec			BORE	HOL	E: /	BH-	109	-05	
		Т	matach	SIT	Е:	West	Optio	n Site							PAGE	:: _	2	OF		3	
	▼	<i>j</i>	rratech	FIL	E NO :	<u>T-105</u>	0-B	(60333	3-KELL)						CASI	NG :	PW				
	•			во	RING	DATE :		2005-	02-28	1	o.	20	05-03-	07	CORE	E BAF	REL	: P	Q		
	]	BORIN	G LOG	DA	TUM :		Geod	letic			со	ORDI	NATES	: 5	186941	.04 N	1	262	038.	73 E	
SAN	IPLE CO	NDITION	TYPE OF SAMPLER			LABOR	RATO	RY AN	ID IN SI	TU TES	т			Field \	/ane	(	Su)	$\diamond$	intac	ct	
	Remo	oulded	SS Split spoon			GS G	rain s	ize ana	alysis							(	Sur)	٠	rem	oulde	ed
	Lost	sturbed	PS Piston sampler	e			nit we	ight (k	N/m³)					Swedi	sh cone	) ( (	Cu) Cur)	$\nabla$	intao rem	ct oulde	ed
	Rock	core	DC Diamond core barrel			CP C	ompre	essive	strength	(MPa)				Dyn. C	Cone Pe	n. Te	st	<u>×</u>		×	<
	C I	STR/	ATIGRAPHY		ε		SAM	PLES	6							DYN	I. CC	NE	PEN	I. TE	EST
ε	- N N				Ę	<u>م</u>	z	% /	•	WAI		CON I	ENI %)	ORY	STS		(blo	ງws/ າ	0.3n	n) ^	
Ξ	THOI			BOL	ΓE	ANI	E E	ĒRY	RQD	an			70)	RAT				, 			
ШШ	EVA DEP	DE	SCRIPTION	SYM	<b>TER</b>	YPE		cov	l or	w	Ρ١	N	wL	BOI	SITI	UN			DS TH (	HEA kPaì	۱R
				••	MA		ŭ	RE	2	⊢ 20	40	€ 60	 80	Ľ	Z		50	)	10	0 U	,
		Succession of	layers of fair quality red								-	<u> </u>	Ť					-	+	+	
Ē		mudstone and local traces of	greenish grey mudstone, pyrite.																		
Ė 12																					
	62.02					DC-15		87	69												
Ē	13.50	Layers of fair q	uality red mudstone,																		
- 14		(10-30mm thick	<) at 45° from borehole								_	_	-					$\rightarrow$	$\rightarrow$	—	
Ē		axis.																			
Ē						DC-16		100	86												
- 15 -																					
Ē	60.89 <b>15.54</b>	Layers of fair to	excellent quality red and			DC-17		100	100												
- 16		greenish muds (1-5mm thick) a	tone, layers black shale at 50° from borehole axis.									_	-	-				$\rightarrow$	$\dashv$	$\rightarrow$	
Ē						DC-18		97	70												
Ē																					
E 17																					
Ē																					
- 18						DC-19		100	100			_	_	-				$\rightarrow$	$\dashv$	-	
Ē	<u>57.9</u> 3																				
Ē.	18.50	Layers of fair q layers of black	uality grey shale, 5% of shale (5-25mm thick) at																		
- 19		45° from boreh and fault striation	ole axis, with slickensides ons. Pyrite in joints and			DC 20		100	E 4												
Ē		beddings, calci	te veinlets.			DC-20		100	51												
- 20												_	_	-				_	$\dashv$	-	
Ē																					
Ē						DC-21		97	61												
- 21												-	-					-	+		
Ē							╢														
- 22													_					-+	$\dashv$	$\downarrow$	
Ē	54.17 22.26	Layers of red a	nd grey shale.			DC-22		95	71												
Ē	22.49 22.49	Good quality gr shale (1-5mm t	rey shale, 5-10% black																		
23							┝╋				+	+	+				$\neg$	+	+	$\dashv$	
Ē						DC-23		90	65												
								-													

				PR	OJECT	: Rabas	ska Pr	oject	Phase 2	), Levi	s, Que	ebec		В	OREH	IOLE	Bŀ	1-109	<b>∂-05</b>
			matach	SIT	ſE :	West	Optior	n Site						P	AGE :	3	<u> </u>	OF _	3
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-B (	(60333	3-KELL)					c	ASING	G: <u></u>	w		
	•			вс	RING	DATE :		2005-	02-28		то	2	2005-03-	07 <b>c</b>	ORE	BARR	EL :	PQ	
	]	BORIN	G LOG	DA	TUM :		Geod	letic			С	DORD	INATES	: 5186	3941.0	4 N	2	62038	.73 E
SAM	IPLE CC	NDITION	TYPE OF SAMPLER			LABOF	RATO	RY AI	ND IN SIT	TU TE	ST			Field Var	e	(Sı	i) 🗘	, inta	act
	Rem	oulded	SS Split spoon	ρ		GS GI	rain si onsoli	ize an dation	alysis					Quadiab		(Su	ir) 🔶	ren	noulded
	Lost	sturbed	PS Piston sampler	•		D Ur	nit we	ight (k	N/m³)					Swedish	cone	(CL (Cl	ı) ∨ ır) ▼	ren	noulded
	Rock	core	DC Diamond core barrel	- 1		CP Co	ompre	essive	strength	(MPa)	)			Dyn. Con	e Pen	. Test	× -		×
	<b>E</b>	518/			E		SAM	PLES	)	wv	TED	CON		<b>&gt;</b>	ω L	)YN.	CON		N. TEST
ε	- u N				/EL	<u> </u>	z	Υ%	0	ar		MITS	5 (%)	<b>O</b> R'	EST	(	50 blow	<b>s/0.3</b> 1(	<b>m)</b> 00
TH	ATIO TH.			IBOI	LE/	AN	DEC	/ER	RQI				( )	RAT	⊢   				
DEF	DEF	DE	SCRIPTION	SYN	TER	NUN	ONE	CO!	N or	w	P	w	wL	ABO	ISI	UND ST	RAIN	IED S GTH (	3HEAR (kPa)
	Ш				MA		0 U	RE		20	0 40		 80		≤		5 <u>0</u>	10	<b>00</b>
	52.17															+		+	
Ē	24.26	Layers of good shale, thin laye	quality red and grey ers of black shale (1-3mm																
- 25		thick)				DC-24		100	87						_	_			
	51.13 <b>25.30</b>	END OF BORE	EHOLE					-											
-																			
- 26												-				-		+	
-																			
- 27															_				
Ē																			
- 28											-							+	
- 29															_				
- 30												-	_			-			
- 31															_				
-																			
- 32																_			
- 33																			
- 34													_		$\vdash$	+	-	+	
- 35																			
Ł																			

				PR	OJECT	: Rabas	ska Pr	oject	Phase 2	), Levi	s, Que	ebec		В	OREH	IOLE	Bŀ	1-109	<b>∂-05</b>
			matach	SIT	ſE :	West	Optior	n Site						P	AGE :	3	<u> </u>	OF _	3
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-B (	(60333	3-KELL)					c	ASING	G: <u></u>	w		
	•			вс	RING	DATE :		2005-	02-28		то	2	2005-03-	07 <b>c</b>	ORE	BARR	EL :	PQ	
	]	BORIN	G LOG	DA	TUM :		Geod	letic			С	DORD	INATES	: 5186	3941.0	4 N	2	62038	.73 E
SAM	IPLE CC	NDITION	TYPE OF SAMPLER			LABOF	RATO	RY AI	ND IN SIT	TU TE	ST			Field Var	e	(Sı	i) 🗘	, inta	act
	Rem	oulded	SS Split spoon	ρ		GS GI	rain si onsoli	ize an dation	alysis					Quadiab		(Su	r) ♦	ren	noulded
	Lost	sluibed	PS Piston sampler	•		D Ur	nit we	ight (k	N/m³)					Swedish	cone	(CL (Cl	ı) ∨ ır) ▼	ren	noulded
	Rock	core	DC Diamond core barrel	- 1		CP Co	ompre	essive	strength	(MPa)	)			Dyn. Con	e Pen	. Test	× -		×
	<b>E</b>	518/			E		SAM	PLES	)	wv	TED	CON		<b>&gt;</b>	ω L	)YN.	CON		N. TEST
ε	- u N				/EL	<u> </u>	z	Υ%	0	ar		MITS	5 (%)	<b>O</b> R'	EST	(	50 blow	<b>s/0.3</b> 1(	<b>m)</b> 00
TH	ATIO TH.			IBOI	LE/	AN	DEC	/ER	RQI				( )	RAT	⊢   				
DEF	DEF	DE	SCRIPTION	SYN	TER	NUN	ONE	CO!	N or	w	P	w	wL	ABO	ISI	UND ST	RAIN	IED S GTH (	3HEAR (kPa)
	Ш				MA		0 U	RE		20	0 40		 80		≤		5 <u>0</u>	10	<b>00</b>
	52.17															+		+	
Ē	24.26	Layers of good shale, thin laye	quality red and grey ers of black shale (1-3mm																
- 25		thick)				DC-24		100	87						_	_			
	51.13 <b>25.30</b>	END OF BORE	EHOLE					-											
-																			
- 26												-				-		+	
-																			
- 27															_				
Ē																			
- 28											-							+	
- 29															_				
- 30												-	_			-			
- 31															_				
-																			
- 32																_			
- 33																			
- 34													_		$\vdash$	+	-	+	
- 35																			
Ł																			

				PR	OJECT	: Raba	ska Pr	oject	(Phase 2)	), Levi	is, Qu	ebec				BORE	EHOL	E: <u></u>	3 <i>H-</i>	110-	-05	
		Т	matach	SIT	ΓE :	West	Optior	n Site								PAGE	E: _	1	OF		3	_
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-В (	6033	33-KELL)	)						CASI	NG :	HW				
	•			вс	RING [	DATE :		2005	-02-22		то		2005	02-2	25	CORE	E BAF	REL	: <u>H</u>	Q		
		BORIN	G LOG	DA	TUM :		Geod	etic			C	OOR	DINA	TES	: 5	186908	.14 N	1	262	022.8	31 E	
SAN	IPLE C	ONDITION	TYPE OF SAMPLER			LABO	RATO	RY A	ND IN SIT	TU TE	ST				Field	/ane	(	Su)	$\diamond$	intac	ct	
	Rer	noulded	SS Split spoon			GS G	rain si	ze an	alysis								(	Sur)	٠	remo	oulde	:d
	Los	t	PS Piston sampler			DU	nit wei	ight (k	N/m³)						Swedi	sn cone	) ( )	Cu) Cur)	▼	intac remo	∶t oulde	ed
	Roc	k core	DC Diamond core barrel			CP C	ompre	ssive	strength	(MPa)	)				Dyn. (	Cone Pe	<u>en. Te</u>	st ;	<u>+</u>		<u> x</u>	
	<u>ج</u>	STR	ATIGRAPHY		Ε			PLES	5	\A/A	TED	<u> </u>	NTE	лт	~	6	DYN	I. CO	NE	PEN	I. TE	ST
ε				_	/EL	≘∝	Z	γ %	۵	ar	nd Ll	міт	S (%)		lor,	EST		(DIC) 50	ws/	0.3n 10(	л) 0	
E	ATIC TH			1BO	Ē	E AN	I	VER	RQ						RA <sup>-</sup>		'					
Ē		DE	SCRIPTION	SYN	TER	IΥΡΙ	INO:	í C C	N or	N N	P	W	w	L	ABC	N SIT	UN	IDRA	INE NG1	D SI TH (I	HEA kPa)	R
	<b>፲</b>		REACE		MM	•		R		20	0 40	) 6 <u> </u>	0 80			=		50		10	0	
Ē	0.00	Topsoil.				SS-1	>	12	2										+			
Ē					12°0 15°0	001	$\sim$	12	2													
È 1	75.29 <b>0.91</b>	Compact brow	n gravelly sand, some silt.	 ۲: ه	0.04- 0.04-	SS-2	$\square$	54	21			_							+		_	
Ē				0. 0 .d	00 20	55-3	$\boxtimes$	50	15													
Ē				6 0 0	81m	00-0		50	15													
2   2	74.07 <b>2.13</b>	Dense grey sa	ndy silt.	0 . A	0 0 0 9 0 0 9 0 0	SS-4	$\square$	50	34										+			
Ē	73.46				at ele				•													
- 3	2.74	Compact to de some gravel.	nse brown sand and silt,			SS-5	$\square$	50	45	0									+			
Ē				. 0	Vater																	
Ē						SS-6		58	27													
<b>4</b>	71.93			0															+			
Ē	4.27	Very dense bro silt.	own sandy gravel, some	0.0	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	SS-7	$\times$	50	52	$\odot$												
- 5					0,0,00 0,0,0,0,0 0,0,0,0,0,0,0,0,0,0,0,														+	_		
Ē	70.82 5.38	Bedrock: Verv	severely fractured	: • • • ****	$ \begin{array}{c c}         D_{4} & P_{4} \\         P_{4} & P_{4} \\         D_{4} & P_{4$	SS-8		50	35													
Ē		(weathered) re	d mudstone.			SS-9		0	25/0cm													
6					. Da - Da Da - D. D . Da - Da	000		Ū	20/00										+			
Ē																						
- 7	69.27 <b>6.93</b>	Very poor qual	ity dark grey shale.																+			
Ē		Beddings at 30	)° from borehole axis.		P P. P. P. D A D P D A D P D A D P	DC-10		59	19													
Ē	68.45 <b>7.75</b>	Succession of	very poor quality red and																			
- 8		dark grey mud from borehole	stone. Beddings at 50° axis.																+			
Ē						DC-11		32	0													
<b>–</b> 9	67.00				D														$\rightarrow$	_	_	
Ē	9.20	Good quality re	ed mudstone, occasional																			
Ē		layers (5-10mn	n thick) at 50° from																			
10					PR PP PR PP	DC-12		100	79		+		+					$\square$	+	$\uparrow$	+	
Ē					PR P.P																	
<b>E</b> 11													_					$ \rightarrow $	$\downarrow$	$\dashv$	$\dashv$	
Ē					V.D. R.P. .D. D. D. D. D. D. D. D. D. D. D. D. D.	DC-13		97	84													
Ē					. DA . D.D R. D. D. D. D. P. A D. D. D. D. D. D.																	
ſ				K/////	RRIDP		Ĺ										┶──┥					

				PR	OJECT	: Rabas	ska P	roject (	Phase 2	), Levis	, Quet	Dec			BORE	HOL	E: /	BH-	110	-05	
		То	matach	SIT	E :	West	Optio	n Site							PAGE	:: _	2	_ 0	F_	3	
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-B	(60333	3-KELL)	)					CASI	NG :	HW	/			
	•			во	RING	DATE :		2005-	02-22	1	го _	200	5-02-2	25	CORE	BAF	REL	.: <u>+</u>	IQ		
	]	BORIN	G LOG	DA	TUM :		Geod	detic			co	ORDIN	ATES	: _5	186908	.14 N	1	262	2022.	81 E	
SAN	PLE CO	NDITION	TYPE OF SAMPLER			LABOR	RATO	RY AN	ID IN SI	TU TES	т			Field \	/ane	(	Su)	$\diamond$	inta	ct	
	Remo	oulded	SS Split spoon ST Thin walled Shelby tub	be		GS G C C	rain s onsol	ize ana idation	alysis					Swodi	sh conc	(	Sur)	•	rem	oulde	ed
	Lost	Juibeu	PS Piston sampler			D U	nit we	eight (k	N/m³)					Sweul		; (	Cur)	V	rem	ct oulde	ed
	Rock	core	DC Diamond core barrel			CP C	ompre	essive	strength	(MPa)				Dyn. C	Cone Pe	en. Te	st	<u>×</u>		<u>×</u>	<
	εı	5184	AIIGRAPHI		Ε			PLES	•	WAT			NT	×	S	DYN	I. CC	)NE	PEN	4. TE	EST
ε	- E			_	ΈL	≘∝	z	۲ %	۵	an	d LIM	IITS (%	6)	ror	EST		(Die 5)	) J	10.3r	n) 10	
E	ATIC PTH			1BO	Ē	E AN	DITIC	VER	RQ					RA	ana -U T						
E		DE	SCRIPTION	SYN	TER	NUN		í C C	N or	w	P V	v v	۷ <sub>L</sub>	ABC	LIS N		IDR/	AINE NG	:DS TH(	HEA kPa	AR )
	Ш				M			R		20	40	60 E	1 80		=		5(	)	10	0	
_		Good quality re	ed mudstone, occasional		Po Ro Ro Po																
		layers (5-10mm	n thick) at 50° from		PA PA R. P. P. P PA D. P																
- 13		DOLETIOIE AXIS.			D.D. D.D. D.D. D.D. D.D. D.D. D.D. D.D	DC-14		97	92		_	_						_			
Ē					PA . Dp P P. P.P P.A . Dp																
Ē	62.51 <b>13.69</b>	Very poor to fai	ir quality red mudstone,		0 0 0 0 0 0 0 0 0 0 0 0 0		┢														
- 14		some slightly ca mudstone layer	alcareous light grey rs (5-10mm thick) at 50°		$ \begin{array}{c c} P \\ P \\$	DC-15		100	26												
		from borenole a	axis.		D	2010		100													
- 15					. Da D. D D D. D D D D. D D D D D	DC-16		100	55		_	_						_			
	60.89 <b>15.31</b>	Poor quality rec	and grey mudstone		DR D.D. DA DR DR D.D.																
_		layers, some ca thick).	alcareous layers (1-3mm		. Da Da D.a. R.a. . Da Da	DC-17		100	15												
- 16					D.D P.D Ra .Da D.D P.D																
_					00.00 00.00 00.00	DC-18		100	37												
- 17					D D D D D D D D D D D D D D D D D D D D							_									
-					PA DO DD DD PA DO DD DD	DC-19		100	48												
					D.D. D.R .D. D.R D.D D.R D.D D.R																
- 18	<u>57.9</u> 0					DC-20		90	68												
	18.30	Layers of poor 30-40% greenis	quality red mudstone, sh grey shale layers																		
- 19		(1-10mm thick) axis.	at 50° from borehole			DC-21		97	32			_									
							┝╋														
Ē	56.30					DC-22		100	23												
- 20	19.90	Very poor to fai mudstone layer	ir quality red and grey rs. Beddings at 60° from																		
Ē		borehole axis.				DC-23		100	19												
- 21											_	_							_		
Ē	54.79 21 41		t quality rad mudators			DC-24		100	75												
	21.71	occasional laye	n quality red mudstone, ers of greenish grey Jmm thick) lavers at 60°																		
- 22		from borehole a	axis.			DC-25		95	70			+						+	$\neg$		
Ē																					
23							╞╋╋			$\vdash$		_	-					-+	$\dashv$	$ \rightarrow $	
Ē						DC-26		100	93												
É						2020			50												
-				KIKK		1		1													

				PF	ROJECT	: Rabas	ska Pi	roject	Phase 2	), Levi	is, Qu	ebec			BORE	HOLE	E: [	BH-	110	-05	
		Т	matach	SI	TE :	West	Optio	n Site							PAGE	: _	3	_ 0	F _	3	
	▼		rratech	FI	LE NO :	<u>T-105</u>	0-B	(6033	33-KELL)						CASI	NG :	HW				
	•			в		DATE :		2005	02-22		то		2005-02-	25	CORE	BAR	REL	: <u>H</u>	IQ		
	]	BORIN	G LOG	DA	TUM :		Geoc	letic			C	OORI	DINATES	<b>5:</b> _51	86908	.14 N		262	2022.	81 E	
SAM	PLE CC	NDITION	TYPE OF SAMPLER			LABOF	RATO	RY AI	ND IN SI	ΓU ΤΕ	ST			Field V	ane	(5	Su)	$\diamond$	inta	ct	
	Rem	oulded	SS Split spoon	ē		GS GI	rain si onsoli	ize an	alysis					Curedia	h conc	(8	Sur)	•	rem	oulde	эd
	Lost	sluibed	PS Piston sampler			D Ui	nit we	ight (k	N/m³)					Swedis	sn cone	· ((	Su) Sur)	V	intao rem	ct Ioulde	ed
	Rock	core	DC Diamond core barrel		1	CP Co	ompre	ssive	strength	(MPa)	)			Dyn. C	one Pe	n. Tes	st	<u>×</u>		×	:
	<b>E</b> 1	518/	ATIGRAPHY		Ε		SAM	PLES	)	w.^	TED	col		~	S	DYN	. CC	)NE	PEN	۹. TE	ST
ε	- E			_	Ē	<u> </u>	z	۲ %	0	a	nd Ll	MITS	S (%)	OR	EST(		(blc 5(	) )	0.3r/ 10	n) 10	
TH	ATIO PTH			IBO	Ē	E AN	DITIC	VER	RQ					RAT						I	
DEF	DEF	DE	SCRIPTION	sγn	TER	NUN	ONI	ico i	N or	N.	V <sub>P</sub>	W	wL	ABO	N SIT	UN S	DRA TRE	AINE NG	:DS TH(	HEA kPa)	۱R )
	ΠI				M	•		R		20	0 40	) 60	80		2		50	)	10	0	
-		Excellent qualit	ty greenish grey and dark														_				
		borehole axis.						-													
- 25						DC-27		100	90			_		-			$ \rightarrow$				
	50.52 25.68	END OF BORE	EHOLE		:.:⊟:::			-													
- 26														-							
- 27														_			_			$\rightarrow$	
-																					
- 28																					
-																					
- 29												_		_			$\rightarrow$				
- 30														-							
- 31												_		_			_				
- 32												+		1			$\uparrow$	+	$\neg$	+	_
- 33												_		-			$\dashv$	$\dashv$	$\dashv$	$\dashv$	
- 34												+		1			+	+	$\neg$	+	
- 35												_					$\dashv$	$\dashv$	$\dashv$	$\dashv$	
-																					

				PR	OJECT	: Raba	ska Pr	oject (	Phase 2	), Levis,	Quebe	ec			BORE	EHOL	E : <i>E</i>	3 <b>H-</b> 1	111/	4-05	5
		То	matach	sr	ΓE :	West	Optior	n Site							PAGE	£: _	1	_ 0	F_	2	
	▼		rratecii	FIL	E NO :	<u>T-105</u>	0-В (	60333	3-KELL)						CASI	NG :	HW	1			
	•			вс	RING [	DATE :		2005-	03-07	т	o _	200	5-03-	14	CORE	E BAF	REL	.: <u>+</u>	łQ		
	]	BORIN	G LOG	DA	TUM :		Geod	etic			coo	RDIN	ATES	: 5	186872	.61 N	1	261	1927.	.58 E	
SAN	PLE CO	ONDITION	TYPE OF SAMPLER			LABO	RATO	RY AN	ID IN SI	TU TEST	7			Field	Vane	(;	Su)	$\diamond$	inta	ct	
	] Rem	oulded sturbed	SS Split spoon ST Thin walled Shelby tub	)e		GS G C C	rain si onsoli	ze ana dation	alysis					Swodi	ob oon	()	Sur)	•	rem	oulde	ed
	Lost		PS Piston sampler	-		D U	nit wei	ght (k	N/m³)					Sweul		; (( ()	Cur)	▼	rem	ct Iould#	ed
	Rock	core	DC Diamond core barrel			CP C	ompre	ssive	strength	(MPa)				Dyn. (	Cone Pe	en. Te	st	×		>	<
	<b>E</b>	5164			E			FLE3	)	WAT	ER C	ONTE	INT	≻	S	DYN	l. CC	)NE	PEN	N. TE	EST
ε	z ε			_	VEL	₽₩	NO	۲ %	0	and	LIMI	TS (%	6)	TOR	EST		(Did 5(	0	10.31	<b>11)</b> )0	
PTH	PTH			MBO	S LE	e ar Mbe	DITIO	VER	r RQ					DRA.	and TU T						
B		DE	SCRIPTION	SΥΙ	<b>TEF</b>	TΥΡ NUI	CON	ECO	o N	W <sub>P</sub>	w	۱ ۱	∧ <sub>L</sub>	-AB(	IS N	S	TRE		:D S TH (	kPa	лк )
	<b>ш</b> т 75.74	GROUND SUR	FACE		ŕM			R		20	40	60 E	30	_	-		50	ט י	10	0	
-	<b>0.00</b> 75.28	Topsoil.				SS-1	$\times$	25	17												
	0.46	Compact brown	gravelly and silty sand.		04-1	<u> </u>	$\succ$	FO	20												
- 1				\$ 9 9	0 4 0 1 2005	55-2		50	28			_		-				_	_		
				0 0	D D D D D D D D D D D D D D D D D D D	SS-3	$\ge$	50	20												
Ļ,	73.86 <b>1.88</b>	Compact brown	a aravelly sand some silt		75.5																
Ē		Compact brown	gravely band, borne bit.	0.0	at elev	SS-4	$\sim$	25	16												
	73.00	O anno at anno a	:14		P P P																
- 3	2.74	sand and grave	l.	1.	Vater	SS-5	$\bowtie$	50	15					-				-	-		
-				•	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$																
4					$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	SS-6	$\square$	50	23	•				-							
_					$ \begin{array}{c c} D \\ D \\ \hline \end{array} $		$\bigtriangledown$														
_						SS-7		58	21												
- 5	70.71 <b>5.03</b>	Dense to very d	lense brown gravelly sand	000			$\bigtriangledown$	50													
		and slit.		0		55-8		58	55												
- 6				8		SS-9	$\boxtimes$	54	62		_			-			_	_	$\square$		
Ē					$D_{0}$ $D_{1}$ $D_{0}$ $D_{1}$ $D_{0}$ $D_{1}$			0.	02												
				6 0	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	SS-10	$\boxtimes$	50	37												
- 7				e e	DA .DE D'D D A DA DE									-							
Ē				0		SS-11	$\geq$	29	101												
- 8				ه. ه ه	DA .DA D-D D D DA DA									-			_	_	-		
-				0	8	SS-12	$\leq$	56	42												
Ē				0 	$\begin{array}{ccc} D_{A} & D_{A} \\ D & D & D_{A} \\ \hline D & D & D_{A} \\ \hline D & D & D_{A} \end{array}$																
F 9				6		SS-13	$\bowtie$	50	61					1							
Ē	66.14 <b>9.60</b>	Verv dense arev	y silt, some sand.				$\bigtriangledown$														
- 10		,				SS-14	$\bowtie$	75	57		_			-		$\left  - \right $	$\dashv$	$\dashv$	$\neg$		
Ē	65.38 <b>10.36</b>	Dense to very d	lense brown gravelly sand				$\bigtriangledown$														
È 11		and silt.				SS-15		62	41												
ŧ ''				₽ 0 > 4		QQ 46	$\bigtriangledown$	75	00								Ţ		Ī		_
Ē				0.0		33-10	$\vdash$	15	90												
-					DD DD		$\succ$														

			PRO	JECT	: Rabas	ska Pr	oject	(Phase 2)	, Levis, C	Quebe	0	B	OREH	IOLE :	BH-	111/	4-05		
		Torratoch	SITE	:	West	Optio	n Site					Р	AGE :	2	_ c	)F _	2		
	◄	Terratech	FILE	NO :	<u>T-105</u>	0-В	6033	33-KELL)				c	ASINC	3: <u>H</u> \	N				
	•		BOR	RING E	OATE :		2005	-03-07	то		2005-03-	- <u>14</u> C	ORE E	<b>3ARRE</b>	L: !	HQ			
	]	BORING LOG	DAT	UM :		Geod	etic			COOF	RDINATES	<b>3</b> : _ 5186	3872.6	1 N	26	1927.	58 E		
SAN		NDITION TYPE OF SAMPLER	1			RATO	RY A	ND IN SIT	U TEST			Field Var	ie	(Su)	$\diamond$	inta	ct		
	Undis	sturbed ST Thin walled Shelby tube	e		C C	onsoli	datior	aiysis I				Swedish	cone	(Sur) (Cu)	/ ◆ ▽	rem inta	oulded ct		
	Lost	PS Piston sampler			D U	nit we	ight (k	(N/m³)					_	(Cur	) 🔻	rem	oulded		
		STRATIGRAPHY		_		SAM		Strength S	(MPa)			Dyn. Cor	le Pen.	. Test	<u>× -</u>		<u>×</u>		
	٤			ш -			Ŷ		WATE	RCC	NTENT	۲	TS D	YN. C) (b)	ONE lows	PEN 5/0.3	I. TEST n)		
	NO - H		Ы	EVEI	UN H	NOI.	RY %	ap	and	LIMIT	S (%)	ATOI d	TES		50	10	0		
EPT	VATI EPTI	DECODIDITION	MB	R LI	PE A JMBI	NDIT	OVE	or R(	w	w	w	sor/ an	E	UNDF		ED S	HEAR		
□		DESCRIPTION	S	ΙATE	Γ N	CO	REC	z	••Р ⊢		"L —⊣	LAE	N N	STR	ENG	TH (	kPa)		
		le l	- Al	<b>×</b>	<u>SS-17</u>		100	4/10cm	20	40 6	60 80			; 	50	10	0		
	63.22	Very dense gravelly sand and silt.	0 0 P	>1 Da a D.D >1 Da	00-17		100	+/ TOCIN											
Ē	12.52	Bedrock: Succession of layers of very poor quality red and greenish grey		0 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0	SS-18		50	50/5cm											
- 13		mudstone, layers of black shale (1-10mm thick) at 50° from borehole axis.			DC-19		67	0				-	_						
Ē	61.00			4 #4															
- 14	13.84	Succession of fair quality red and				Т				_		_	_		<u> </u>				
Ē		grey calcareous mudstone (10-20mm thick). Reddings, at 40,50° from boroholo			DC-20		77	0											
Ē , 6		axis.			DC-20			Ū											
Ē	60.45																		
Ē	10.25	calcareous mudstone layers, 50-55%																	
- 16	<u>59.7</u> 9 <b>15.95</b>	from borehole axis.										_	_						
Ē		mudstone and greenish grey mudstone,																	
Ē 17		Beddings at 45° from borehole axis.			DC-21		100	21				_							
Ē																			
Ē																			
- 18 -												_							
Ē																			
- 19					DC-22		100	57				_							
Ē					00 22		100	0,											
Ē.	55.88																		
- 20	19.00	END OF BOREHOLE																	
- 21										-		-	┝		+	$\left  \right $			
E																			
- 																			
<b>f</b> "																			
- 23										+		-	┝		+	$\left  \right $			
Ē																			
				PR	OJECT	: Rabas	ska Pr	oject	Phase 2	), Levis	, Quebe	ec	BO	REHOL	.E_: <u></u>	<b>3H-</b> 1	116/	4-05	;
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		Т	matach	SIT	Έ:	West	Optior	n Site					PAG	€:_	1	_ 0	F _	5	
	▼		rratecn	FIL	E NO :	<u>T-105</u>	)-В (	6033	3-KELL)				CAS	SING :	NN	/			
				во	RING [	DATE :		2005-	03-19	г	ю	2005-03	- <u>22</u> co	RE BA	RREL	_: N	VQ3		
		BORIN	G LOG	DA	TUM :		Geod	etic			coo	RDINATE	<b>S:</b> 51869 <sup>-</sup>	14.80	N	261	1894.	79 E	
SAN	IPLE CO	ONDITION	TYPE OF SAMPLER			LABOR	ATO	RY AI		TU TES	т		Field Vane		(Su)	$\diamond$	inta	ct	_
$\geq$	Rem	oulded	SS Split spoon			GS G	ain si	ze an	alysis					í	(Sur)	٠	rem	oulde	d
	Undi	sturbed	PS Piston sampler	e		D Ur	nsoii nit we	dation ight (k	N/m³)				Swedish co	ne	(Cur)	$\bigtriangledown$	inta	ct	b.d
	Rocl	< core	DC Diamond core barrel			CP Co	ompre	essive	strength	(MPa)			Dyn. Cone	Pen. To	est	×		<u>×</u>	;u (
	_	STR	ATIGRAPHY		ε		SAM	PLES	;					DYI	N. C(	ONE	PE	I. TE	ST
ε	μ - Ε				Ľ.		z	%	_	WAT			DRY STS		(bl	ows	/0.3r	n)	
Ξ	θΞ-Ξ			ЗÖГ	Ш	ANC	0E	ERΥ	gD	an		13 (%)	RAT( nd J TE	_	5	U	10	0	
Ē	EP'	DE	SCRIPTION	Μ	ĒR	YPE	QN	NOC	or	w	5 W	wL	BOF a	U			ED S		R
Γ				0	NAT	μz	ö	REC	z	⊢ 20			Ľ Ľ		5	- NG	іп ( 10	кга) 0	1
	75.44 <b>0.00</b>	GROUND SUR Topsoil (see Bl	RFACE H-116B-05).	~~	-						+0			_					
	<u>75.26</u> <b>0.23</b>	Compact brown	n sand, some silt to silty,																
Ξ.		Some graver (S	ee bii-110b-03).	7 															
				0.0															
				9 															
- 2				9									_	_		⊢			
Ē				е															
- 3	73.00	Compact grove	silt trace of sand and																
		gravel (see BH	-116B-05).	о. с 1 а															
- 4				•									_						_
Ē				000															
Ē	71.78	Donso to vonu	donso roddish and grov																
- 5	4.70	sand, some silt	and gravel, occasional and gravel, occasional outline (see BH-116B-05)	<b>0</b> .														-	
				о <i>в</i>															
- 6				ଟ. ଏ ପ୍ରି ଅ									_			⊢			
				°.															
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- 7				÷ .															
- 8				•									_						_
				≷¶.∘ 7															
9				• •									1					+	
10				5									_		$\square$	⊢	-	$\square$	_
				P O O															
- 11										$\vdash$			1					+	$\neg$
				0															

					PR	OJECI	: Rabas	ska Pr	oject (	Phase 2	), Levis,	Quebe	с			BORE	HOL	E : <i>B</i>	3H-1	116/	4-0	5
				matach	SIT	Е:	West	Optio	n Site							PAGE	: _	2	_ 0	F_	5	
		▼		rratech	FIL	E NO :	<u>T-105</u>	)-В (	(60333	3-KELL)	)					CASI	NG :	NW				
		•			во	RING	DATE :		2005-	03-19	т	<b>)</b> _	2005	5-03-2	22	CORE	BAR		.: N	1Q3		
		]	BORIN	G LOG	DA	TUM :		Geod	letic			cool		TES	: 5	186914	.80 N		261	1894.	.79 E	:
SA	MF	PLE CC	NDITION	TYPE OF SAMPLER			LABOF	ATO	RY AN	ID IN SI	TU TEST			-	Field \	/ane	()	Su)	<u> </u>	inta	loct	
$\triangleright$	<	Rem	oulded	SS Split spoon			GS G	ain si	ze ana	alysis						ano	(	Sur)	<b>\</b>	rem	nould	ed
		Undi	sturbed	ST Thin walled Shelby tub	e			onsoli nit wa	dation	N/m <sup>3</sup> )					Swedi	sh cone	• ((	Cu)	$\bigtriangledown$	inta	ct	
		Rock	core	DC Diamond core barrel			CP Co	ompre	essive	strength	(MPa)				Dyn. C	Cone Pe	)) n. Te	Cur) st	▼ ×	rem	ioulde	ed ×
			STR	ATIGRAPHY		c		SAM	PLES	i										DEI		Бет
_		۲ - ۲	INCLINAT	FION ANGLE: 50°		÷			%		WATE	ER CO	ONTE	NT	RY	TS		blo)	ows	/0.3	m)	-51
		NON-	AZIMUTH	l: <u>315°</u>	Ч	Ň	dr R	NO	RY	B	and	LIMI	rs (%	<b>b</b> )	ATO	TES		50	י	10	0	
١ <u>Ē</u>		PTF			MB	R L	A BI	1 I I I	NE	r R(					OR/	ITU				- - - - -	SHE/	ΔR
۱ä			DE	SCRIPTION	sγ	<b>A</b> TE	ΣN	0 S	ECC	z	₩ <sub>P</sub>		v	VL	AB	N N	S	TRE	NG	TH (	kPa	i)
						Š		-	2		20	40 6	50 8	0	_	-		50	, נ	10	0	
Ē		12.12	Bedrock: Very	poor to poor quality			DC-1		57	0												
Ē			greenish grey r mudstone laye	mudstone, few dark rs (1-10mm thick), 5% red	X		DC-2		75	28												
E 1:	3		mudstone beds Beddings at 85	s (max. 30mm thick). s° from borehole axis.															_			
Ē																						
Ē		04 70																				
<b>1</b>	4	<u>64.7</u> 2 13.99	Layers of poor	to fair quality red			DC-3		100	63										_		
Ē			mudstone, 10-1 mudstone layer	15% of greenish grey rs, light grey calcareous																		
ŧ.	_		mudstone beds	s. Beddings at 85° from																		
Ē	5																					
Ē							DC-4		100	54												
- 1	6																					
Ē																						
Ē																						
- 1'	7						DC-5		94	60									_			<u> </u>
Ē																						
Ē.																						
E 1	8						DC-6		100	57												
Ē							000		100	0,												
- 19	9																					
Ē																						
53hrs									08	27												
	0						00-7		90	27								ו	[ropa inc	ıri at linati	19.8 on =	1m: 48°
005-11																						
1 ED: 2																						
2 1 1	1						DC-8		100	47												
94-P9	2																					
							DC-9		100	63												
1050-B																						
	3																		$\dashv$	-		
tec74\S							DC 40			20												
V:\Geo							DC-10		98	38												
>-																						

				PR	OJECT	: Rabas	ska P	roject (	Phase 2	), Levis, C	luebeo	<b>c</b>		BORE	EHOL	E : <i>B</i>	H-1	16A	-05	_
		То	matach	SIT	Έ:	West	Optio	n Site						PAGE	: _	3	OF	:	5	_
	✓		Tratech	FIL	E NO :	<u>T-105</u>	0-B	(60333	3-KELL	)				CASI	NG :	NW				
	•			во	RING I	DATE :		2005-	03-19	то		2005-03	-22	CORE	EBAF	REL	: <u>N</u>	Q3		
	]	BORIN	G LOG	DA	TUM :		Geod	detic			COOF		<b>S</b> : _5	186914	.80 N	1	2618	394.7	79 E	_
SAN	IPLE CO	NDITION	TYPE OF SAMPLER			LABOR	RATO	RY AN	ID IN SI	TU TEST			Field	Vane	(	Su)	$\diamond$	intac	xt	
	Remo	oulded sturbed	SS Split spoon ST Thin walled Shelby tub	e		GS GI C Co	rain s onsol	ize ana idation	alysis				Swedi	ish cone	) = (	Sur) Cui)		remo	oulde	d
	Lost		PS Piston sampler			D Ur	nit we	eight (k	N/m³)						(	Cur)	▼	remo	,r oulde	d:
	Rock	core	DC Diamond core barrel			CP Co	ompro	essive	strength	(MPa)			Dyn. (	Cone Pe	en. Te	st :	<u> </u>		<u>x</u>	
	E	0110			۲ :					WATE	R CC	NTENT	≿	പ	DYN	i. CO (blc	NE F	PEN 0.3n	i. TE n)	ST
а 	- <sup>m</sup>			Ч	VEL	Q K	NO	۲ %	Ð	and	LIMIT	'S (%)	TOF.	I TEST		50	)	100	0	
PTH	ATI			MBC	RLE	E AI MBE	IDIT	VEF	r RG				ORA	and						P
	DE	DE	SCRIPTION	SΥ	ATEI	TYF NU	CON	ECC	N N	₩ <sub>P</sub> 	₩ —⊙-		LAB	IS N	S	TRE	NGT	Ή (ዞ	(Pa)	
					Š			œ		20	40 6	0 80				50	) 	100	0	
Ē	56.68																			
Ē	24.49	Poor to good que layers of reddis	uality red mudstone, sh green-grey mudstone,																	
- 25		5% of thin layer mudstone beds	rs of light grey calcareous s. Beddings at 80° from			DC-11		100	46								-	_	-	
Ē		borehole axis.				DO-TT		100	40											
- 26													_				_	_	_	
Ē																				
Ē						DC-12		100	85											
- 27																			-	
Ē	54.29 27.61																			
- 28	27.07	mudstone, few	black mudstone beds,										_				$\rightarrow$	_	$\rightarrow$	
Ē		mudstone beds borehole axis. S	s. Beddings at 85° from Scarce calcite veinlets.			DC-13		100	72											
Ē.		Local presence pyrite.	of finely disseminated																	
- 29								-					-							
Ē																				
- 30						DC-14		100	57				_				+	+	+	
Ē																				
E ,,																				
Ē																				
Ē						DC-15		100	41											
- 32													_				-	-	-	
								1												
- 33						DC 40		100	70							$\square$		$\square$	$\downarrow$	
Ē						00-16		100	13											
- 34													-			+	+	+	+	_
Ē						DC-17		100	27											
- 35													_			$\square$		$\downarrow$	$\downarrow$	
-				XX																

				PR	OJECT	: Rabas	ska Pr	oject (	Phase 2	), Levis, C	Quebeo	2		BORE	HOLE	: <b>BH</b>	-116	A-05	5
		То	matach	SIT	Έ:	West	Optio	n Site						PAGE	:	<u>+</u>	OF _	5	_
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-В (	60333	3-KELL)	)				CASIN	IG : _!	NW			
	•			во	RING	DATE :		2005-	03-19	то		2005-03-	22	CORE	BARR	EL :	NQ3		
	]	BORIN	G LOG	DA	TUM :		Geod	etic			COOF	RDINATES	: <u>5</u>	186914.	80 N	2	:61894	.79 E	
SAN	IPLE CO	NDITION	TYPE OF SAMPLER			LABO	RATO	RY AN	ID IN SI	TU TEST			Field	/ane	(Sı	ې (۲	> inta	act	
	☐ Remo Ø Undis	oulded sturbed	SS Split spoon ST Thin walled Shelby tub	e		GS G C C	rain si onsoli	ze ana dation	alysis				Swedi	sh cone	(Su	● (n.	rem	noulde	əd
	Lost		PS Piston sampler			D U	nit we	ight (k	N/m³)					Sil conc	(Ci	ur) 🗸	ren	noulde	ed
	Rock	core	DC Diamond core barrel			CP C	ompre	ssive	strength	(MPa)			Dyn. (	Cone Pe	n. Test	×	<u></u>	>	<
	<b>E</b>	5117			Ē				•	WATE	RCO	NTENT	≿	Ś	DYN.		E PE	N. TE	EST
Ę	× ×			Ļ	VEL	₽∝	N	۲ %	Q	and	LIMIT	S (%)	TOR	EST		50	10.3 1	, п, ро	
PTH	ATIC PTH			MBO	S LE	e ar Mbe	E	VER	r RQ				DRA.	anu TU T					
B	БĽ	DE	SCRIPTION	SΥΙ	LEF	TΥΡ	NOS	С С С	o N	W <sub>P</sub>	W	w <sub>L</sub>	ABC	.IS N	ST	REN	GTH	(kPa	лк )
	ш				Ň			R		20	40 6	0 80		-		50	1(	<b>30</b>	
Ē		Poor to fair qua mudstone, few	lity red and greenish grey black mudstone beds,			DC-18		100	46										
Ē		some thin layer mudstone beds	s light green calcareous . Beddings at 85° from																
- 37		borehole axis. S	Scarce calcite veinlets.								-						+		
Ē		pyrite.		XX															
- 38						DC-19		100	21										
Ē																			
Ē																			
- 39																			
Ē	45.21 <b>39.46</b>	Succession of p	poor to fair quality			DC-20		100	44										
- 40		greenish grey a of calcareous s	nd black mudstone, 5% andstone beds (max.																
Ē		80mm thick). Be borehole axis. F	eddings at 85° from Presence of pyrite in																
Ē		fractures. Occa	sional calcite veinlets.			50.04													
- 41 -						DC-21		98	62								pari at	41 1	5m <sup>.</sup>
Ē																ir	nclinati	ion =	48°
42																	<u> </u>		
Ē						DC-22		100	38										
Ē						00 22		100	00										
- 43																	+		_
Ē																			
- 44						DC-23		100	30								—		
Ē																			
Ē.,																			
- 45																			
E						DC-24		100	63										
- 46											-		-			+	+	$\left  \right $	
E	39.91 <b>46.38</b>	Layers of fair qu	uality greenish grey				╞╢╋												
Ē 47		mudstone, laye mudstone. Bed	rs of red and light grey dings at 85° from																
<b>€</b> *′		borehole axis.				DC-25		100	56				]						
Ē																			
E				ŔŔ															

		_			PR	OJECT	: Rabas	ska Pi	oject	Phase 2	), Levi	is, Qu	ebec			BORI	EHOL	E : <b>B</b>	3 <b>H-</b> 1	116/	4-05	;
			T	nnata a <b>l</b> a	si	ſE :	West	Optio	n Site							PAGE	=: _	5	_ 0	F _	5	
	▼	//	le	rratecn	FIL	.E NO :	<u>T-105</u>	0-B	(6033:	33-KELL)	)					CASI	NG :	NW				
	•				вс	RING I	DATE :		2005-	03-19		то		2005-0	3-22	_ CORI	E BAF	REL	.: •	1Q3		
		BOR	RIN(	G LOG	DA	TUM :		Geoc	letic			с	OOR	DINATI	S :	5186914	.80 N	1	261	1894.	79 E	
SAN	IPLE C	ONDITION		TYPE OF SAMPLER			LABOF	RATO	RY AI		TU TE	ST			Fiel	d Vane	(*	Su)	$\diamond$	inta	ct	
	Rei	noulded		SS Split spoon	0		GS G	rain si	ize an dation	alysis							(	Sur)	٠	rem	oulde	эd
	Los	it		PS Piston sampler	C		D Ur	nit we	ight (k	N/m³)					Swe	edish cone	) é	Cu) Cur)	▽	intao rem	ct ioulde	ed
	Ro	ck core		DC Diamond core barrel			CP Co	ompre	essive	strength	(MPa)	)			Dyr	1. Cone Pe	en. Te	st	<u>×</u>		×	(
	C		STRA	TIGRAPHY		Ε		SAM	PLES	6							DYN	i. co	)NE	PEN	N. TE	EST
ε						בר	<u>م</u>	z	% /	•	WA	ndII		NIEN S (%)	a C	STS		(blo	ows/ 1	/0.3r 10	<b>n)</b>	
Ξ					BOL	LEV	ANI BER	OE	ΈRΥ	RQD	a1			0 (70)	ΔT	nd .					<u> </u>	
DEP		i	SΥM	rer	YPE		COV	l or	v	V <sub>P</sub>	w	wL	BOI	SITI S	UN			EDS	HEA	١R		
		-			•,	WAT		Ŭ	RE	2	20	0 40			-	i Z		50	)	10	ini u)	,
-		BLayer	rs of fair o	quality greenish grey													$\vdash$	-	-	-	-	
Ē		mudsto mudsto	one, layei one. Bedo	rs of red and light grey dings at 85° from																		
Ē 🕫		boreho	le axis.				DC-26		100	63												
- <b>4</b> 3	37.5/																					
Ē	49.48	END O	F BORE	HOLE	11/217																	
- 50														_					-	_		
-																						
Ē																						
- 51																				-		
- 52																			_			_
Ē																						
- 53																			-			
Ē																						
- 54																			_			
- 55																			_			
-																						
- 56																						
57											$\vdash$	-+	$\rightarrow$		_		$\vdash$	+	+	$\dashv$	$\dashv$	
58																					$\neg$	
59															_		$\left  \right $	$ \rightarrow $	$\square$	$\dashv$	$\dashv$	
		1					1		1						1							

				PR	OJECT	: Rabas	ska Pr	oject (	Phase 2	), Levi	s, Qu	ebec			BOR	EHOL	.E : <i>E</i>	3 <b>H-</b> 1	1161	3-05	;
		То	matach	SIT	Έ:	West	Optior	n Site							PAGE	E: _	1	_ 0	F _	5	_
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-B (	60333	3-KELL)						CASI	NG :	NW	1			
	•			во	RING [	DATE :		2005-	02-25		то		2005-03	8-04		E BAF	REL	.: <u>۱</u>	1Q3		
	]	BORIN	G LOG	DA	TUM :		Geod	etic			с	OOR	DINATE	s: _	5186914	.80 1	١	261	1897.	.19 E	
SAN	IPLE CO	NDITION	TYPE OF SAMPLER			LABOR	RATO	RY AN	ND IN SI	ΓU ΤΕ	ST			Field	d Vane	(	Su)	$\diamond$	inta	ct	
	Remo	oulded	SS Split spoon ST Thin walled Shelby tub	e		GS GI	rain si onsoli	ze ana dation	alysis					Sura	dich con	(	Sur)	•	rem	oulde	ed .
	Lost		PS Piston sampler			D Ui	nit wei	ight (k	N/m³)					Swe		) ء (	Cu) Cur)	V	inta rem	ct Ioulde	ed
	Rock	core	DC Diamond core barrel			CP Co	ompre	ssive	strength	(MPa)	)			Dyn.	Cone Pe	en. Te	st	<u>×</u>		×	
H- m	TION - m TH - m	5184		30L	-EVEL - m	AND BER	NOIT	ERY %	sap	WA ar	TER	COI	NTEN1 S (%)	RATORY	nd J TESTS	DYN	I. CC (blo 50	)NE ows/ 0	PEN /0.3i	1. TE m) )0	ST
EP	EVA.	DE	SCRIPTION	ЗYМЕ	ER I	YPE			lor	v	/ <sub>P</sub>	w	wL	BOF	a SITL	UN			ED S		R
-				0,	WAT	μz	ö	RE(	Z	20	0 40			LA	Z		5		іп ( 10	кга) 10	!
<u> </u>	75.44 <b>0.00</b>	GROUND SUR Topsoil.	FACE	é ré														-			
-	0.18	Compact brown some gravel.	а 5 0 б		SS-1		71	13													
- 1				0		SS-2	$\square$	62	11					_							
2			РА 		SS-3	$\ge$	54	22	$\odot$								_				
	73.00 <b>2.44</b>	Compact grey s gravel.	silt, trace of sand and	स		SS-4		0	15												
- 3			• • • •		SS-5	$\times$	67	23													
- - - 4	71.78 <b>3.66</b>	Dense to very c sand, some silt			SS-6	$\times$	33	76									_				
-							$\bigtriangledown$														
- 5				°.		SS-7		71	33									-			
- - - 6		NOTE ON WAT Water level at 7 2005-04-15.	FER LEVEL: 75.79m (artesian) on	• € ∢ ¢		SS-8		71	27									_			
-				0 0 0		SS-9	$\times$	58	49												
- 7 -				0000		SS-10	$\left \right $	75	36												
- 8				0		SS-11	X	75	62									_			
	67.11 8.33	Bedrock: Very p and dark grey n	poor quality greenish grey nudstone, 15-20% light	. <u>r.</u> 1.																	
- 9 -		grey calcareous (5-25mm thick) (5mm thick). Be	s mudstone beds , some sandstone beds eddings at 50° from Calcite veinlets			DC-12		74	26												
E						DC-13		100	0												
- 10						DC-14		100	0		-	-+		-		$\left  - \right $		$\dashv$	-	$\rightarrow$	—
						DC-15		100	46												
- - 11						DC-16		100	0					-				_			
						DC-17		100	15												

Γ					PR	OJECI	r: <u>Rabas</u>	ska Pr	oject (	Phase 2	), Levis, (	Quebe	с			BORE	HOLE	: <b>B</b>	H-1	16B	-05
I			То	matach	SIT	Е:	West	Optior	n Site							PAGE	: _	2	OF		5
I	•	▼		rratech	FIL	E NO :	T-105	)-В (	(60333	3-KELL)						CASI	IG :	NW			
I		•			вс	RING	DATE :		2005-	02-25	т	<b>)</b>	2005	5-03-0	)4	CORE	BAR	REL	: <u>N</u>	23	
I		]	BORIN	G LOG	DA	TUM :		Geod	letic			cool		TES	: 5	186914.	80 N		2618	397.1	9 E
E	SAM	PLE CO	NDITION	TYPE OF SAMPLER			LABOR	RATO	RY AN	ND IN SI	IU TEST				Field V	/ane	(5	Su)	$\diamond$	intact	t
I	$\geq$	] Remo	oulded	SS Split spoon	he		GS GI	ain si	ize ana dation	alysis					Swadi		(8	Sur)	•	remo	ulded
		Lost	sturbeu	PS Piston sampler			D Ur	nit we	ight (k	N/m³)					Sweak	sn cone	(0	Cur)		intact remo	: ulded
┟		Rock	core	DC Diamond core barrel			CP Co	ompre	essive	strength	(MPa)				Dyn. C	Cone Pe	n. Te	st ;	<u> </u>		×
I		۶ı	STR/	ATIGRAPHY		ε		SAM	PLES	<b>i</b>	14/A T		NITE		~	(0	DYN	. co	NE	PEN.	TEST
I	ε	žε				ĒĽ	<u>م</u> م	z	۲ %	0	and		TS (%	ын ")	OR)	EST(		(blc 50	ws/(	<b>).3m</b> 100	i)
I	Η	THO			BOI	ΓĒ	E AN	DITIO	/ER	RQI				,	RAT	ana U TE	I	Ĩ			
I	БЩ	DEF DEF	DE	SCRIPTION	SYN	TER	NUN	ONE	CO.	N or	w <sub>P</sub>	w	v	'L	ABO	I SIT	UN S	DRA TRE		D SH H (k	IEAR (Pa)
I		ШI				M		0	RE		20	40 e	50 8	0	Ĺ	2		50	)	100	)
Ē			Very poor quali	ity greenish grey and dark			DC-18		100	0									+	1	
Ē			calcareous mu	dstone beds (5-25mm																	
E	- 13		thick), some sa thick). Bedding	ndstone beds (5mm s at 50° from borehole			DC-19		100	18		_							$\rightarrow$	$\perp$	
Ē			axis, Calcite ve	inlets.			DC-20		100	0											
ŧ							DC-21		100	0											
Ē	- 14						DC-22		91	14									-		
Ē																					
E	- 15	60.34					DC-23		100	43									_	$\perp$	
Ē		15.10	Very poor quali greenish grey	ity red mudstone and mudstone. Beddings at			DC-24		100	0											
Ē			50° from boreh	ole axis.			DC-25		100	0											
Ē	- 16											+									
Ē		<u>58.7</u> 5					DC-26		100	20											
Ē	- 17	16.69	Very poor to fai and greenish g	ir quality red mudstone rey mudstone. Beddings			DC-27		100	45		_							$\rightarrow$	$\perp$	
Ē			at 50° from bor	ehole axis.																	
Ē					XX		DC-28		100	57											
Ē	- 18																		-		
Ē		56.90 <b>18.54</b>	Fair to good qu	ality red mudstone and																	
Ē	- 19		greenish grey r	nudstone, beds of light s mudstone (1-3mm			DC-29		78	53									_	_	
Ē			thick), thin beds	s of black shale. Beddings																	
Ē			at 50 nom bor																		
s	- 20																		-	-	
08:57h							DC-30		100	38											
5-11-23	- 21																		+	_	
D: 200																					
LOTTE							DC-31		100	26											
H.stv F	- 22									-		+					$\neg$	$\square$	+	+	+
50-A-B							DC 33	╞╋╋	06	20											
vleT-10	- 23						00-32	┝╋	90	28		_					_		$\perp$	$\downarrow$	
ec74/St							DC-33		100	67											
/:\Geote		51.77 <b>23.67</b>	(see next page	)				┝╋╋													
>E			\ I 0	,																	

				PR	OJECI	: Rabas	ska Pr	oject (	Phase 2	), Levis	s, Que	ebec			BORE	HOL	E : <b>B</b>	H-1	16B	-05
			matach	SIT	E :	West	Optio	n Site							PAGE	: _	3	OF	: _	5
	▼		rratech	FIL	E NO :	<u>T-105</u>	)-В	60333	3-KELL)						CASI	NG :	NW			
	•			во	RING	DATE :		2005-	02-25		то		2005-03	-04	CORE	E BAF	REL	: N	Q3	
	]	BORIN	G LOG	DA	TUM :		Geod	etic			СС	DOR		<b>3</b> : 5	186914	.80 N	1	2618	897.1	19 E
SAM	IPLE CO	NDITION	TYPE OF SAMPLER			LABOF	RATO	RY AN	ID IN SI	TU TES	эт			Field	/ane	(;	Su)	$\overline{\diamond}$	intac	
$\boxtimes$	Remo	oulded	SS Split spoon			GS G	ain si	ze ana	alysis					1		(?	Sur)	٠	remo	oulded
	Undis	sturbed	ST Thin walled Shelby tub	е			onsoli nit we	dation ight (k	N/m³)					Swedi	sh cone	) (	Cu)	$\bigtriangledown$	intac	,t
	Rock	core	DC Diamond core barrel			CP C	ompre	ssive	strength	(MPa)				Dyn. 0	Cone Pe	) n. Teء	Sur) st	▼	remo	×
		STR/	ATIGRAPHY		E		SAM	PLES	;										PFN	TEST
	۲ ۲				÷			%		WA	TER	CON	NTENT	RY	TS	5	(blc	ws/	0.3n	n)
				Ы	Ň	S R		RY °	B	an	d Lll	MITS	S (%)	ATO	TES		50	) 	100	)
ΕPT	/AT			MB	R	PE A		OVE	л В					OR/	an ITU	UN			D SI	HEAR
ā	ELE,	DE	SCRIPTION	S	ATE	Σĭ	0 S	EC(	ž	- VV	Р	•• ⊙—		LAB	N S	S	TRE	NGT	Ή (k	(Pa)
					3			Ľ.		20	40	60	80				50	)	100	)
Ē		Good to fair qu 5% of greenish	ality red mudstone with grey mudstone layers,			50.04		100	00											
Ē		and thin dark g Bedddings at 4	rey shale (2-10mm thick).			DC-34		100	93											
- 25		Doddanigo at 1										-		-			$\rightarrow$	+	_	
Ē						D0 05			70											
						DC-35		84	78											
- 26												-						+	-	
27						DC-36		97	80											
Ē																				
Ē																				
- 28												_		-			$\rightarrow$	+	_	
						DC-37		100	86											
- 29																		+	+	
- 30					×	DC-38		94	69											
	44.01				X															
Ē	30.53	Layers of fair to	o good quality red																	
- 31		mudstone, 15-2 mudstone beds	20% greenish grey s and 5% light grey									-		-			$\rightarrow$	+	_	
		calcareous mue 40° from boreh	dstone beds. Beddings at ole axis. Occasional			DC-39		100	66											
Ē		calcite veinlets																		
- 32																		-	+	
-																				
33						DC-40		100	78									$\square$	$\square$	
							╞╋╋													
- 34										$\vdash$	+	+		-		$\vdash$	+	+	+	+
						DC-41		100	64											
35							╞╋╋										$\top$	$\top$	$\uparrow$	
						DC-42		93	76											

				PR	OJECT	: Rabas	ska Pi	roject (	Phase 2	), Levis, C	Quebeo	0		BORE	HOLI	E : <b>B</b>	3H-1	16E	3-05	;
		То	matach	SIT	Е:	West	Optio	n Site						PAGE	: _	4	_ 0	F_	5	_
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-B	(60333	3-KELL)					CASI	1G :	NW	I			_
	•			во	RING	DATE :		2005-	02-25	то		2005-03	-04	CORE	BAR		.: <u>N</u>	IQ3		
	]	BORIN	G LOG	DA	TUM :		Geod	letic			COOF	RDINATE	<b>S</b> : _51	86914.	.80 N		261	897.	19 E	
SAM	PLE CC	NDITION	TYPE OF SAMPLER				RATO	RY AN		TU TEST			Field V	ane	(\$	Su)	$\diamond$	intac	ct	
	Undi:	sturbed	ST Thin walled Shelby tub	e		C C	onsoli	dation	aiysis				Swedis	sh cone	?) )) :	Sur) Cu)	◆ ▽	rem inta	oulde ct	эd
	Lost		PS Piston sampler			D Ur	nit we	ight (k	N/m³)					_	(0	Cur)	V	rem	oulde	ed
	Rock	core STR	ATIGRAPHY				SAM	PLES	strengtn	(MPa)			Dyn. C	one Pe	n. Te	st	<u>×</u>		×	<u>.                                    </u>
	E				Е			%		WATE	RCC	NTENT	2	TS	DYN	. CO (blc)	)NE ows/	PEN /0.3r	J. TE n)	EST
μ- -	NON-H			Ы	EVEI	N R	NOI.	RY %	g	and	LIMIT	ſS (%)	ATO	TES		50	3	10	0	
EPT	VATI EPTI			MB	R L	PE A JMBI		DVE	or R(	w/	w/	\A/	OR/	<sup>3</sup> L	UN	DR/	AINE	D S	HE	٩R
□	ELE	DE	SCRIPTION	S	ATE	Σĭ	CO CO	REC	z	•••P ⊢		•••∟ ——I	LAB	S NI	S	TRE	:NG	TH (	kPa)	)
		Lavors of good	quality rod mudstono	(1)((1)(	\$			_		20	40 6	50 80 				50	) —+	10	0	
		15-20% greeni	sh grey mudstone beds																	
		beds. Beddings	s at 40° from borehole																	
- 37		axis. Occasion	al calcite veiniets.			DC 42		100	70											
						DC-43		100	70											
- 38	37.32												_			_				
Ē	38.12	mudstone, 15-2	20% greenish grey																	
- 39		calcareous mu	dstone beds. Beddings at			DC-44		100	100											
		40° from boreh	ole axis.																	
Ē																				
- 40													_			-		_		
						DC-45		100	90											
- 41													_					_		
Ē																				
- 42						DC-46		100	92				_							
- 43													_			$\rightarrow$		_	_	
Ē						DC-47		100	66											
- 44																				
								-												
- 45						DC-48		100	80				_			-		_		
46													_		$\mid$	$\dashv$	$\square$	$\square$	$\square$	
								400	00											
						DC-49		100	82											
47	28.12															$\dashv$			$\neg$	_
	47.32	Fractured layer (cont.)	rs of red mudstone			DC-50		100	48											
E																				

				PR	OJECT	: Rabas	ska Pi	roject (	Phase 2	), Levis, C	Quebeo	0	B <sup>.</sup>	OREH	OLE :	BH-	116	B-05	;
		Т	matach	si	ſE :	West	Optio	n Site					P/	AGE :	5	_ c	)F _	5	
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-B	(60333	33-KELL)				C.	ASING	: <u>N</u>	N			_
	•			вс	RING I	DATE :		2005-	02-25	то		2005-03	-04 <b>c</b>	ORE B	ARRE	:L: [	NQ3		
		BORIN	G LOG	DA	TUM :		Geoc	letic			COOF		<b>S</b> : _ 5186	914.80	) N	26	1897.	.19 E	
SAM	IPLE C	ONDITION					RATO	RY A		IU TEST			Field Van	е	(Su)	$\diamond$	inta	ıct	
	Rem Und	isturbed	SS Split spoon ST Thin walled Shelby tub	e		C C	rain s onsoli	dation	aiysis				Swedish	cone	(Sur) (Cu)	) 🔶	rem inta	ioulde act	эd
	Lost		PS Piston sampler			D Ur	nit we	ight (k	N/m³)						(Cur	) 🔻	rem	noulde	эd
		k core	ATIGRAPHY				ompre SAM	PLES	strengtn	(мРа)			Dyn. Con	e Pen.	Test	× -		<u>×</u>	<u>.                                    </u>
	ε				е -			<b>、</b> 。		WATE	RCO	NTENT	2	מ מ	YN. C (Ե	ONE lows	: PEI 5/0.3	N. TE m)	ST
- u	NO T- M			ЭL	EVEI	QN R	NOI	RY %	B	and	LIMIT	<sup>-</sup> S (%)		2 E	, ,	50	10	00	
EPT	VATI EPTI			/MB(	R LE	PE A JMBI	<b>VDIT</b>	OVE	or R(	.w/	w	\w/	an an		UNDF	RAIN	ED S	HEA	AR
Ē		DE	SCRIPTION	۶	ATE	Σĭ	CO	RECO	ž	<sup>₩</sup> ₽	••• —⊙–	""∟ ——-		2 Z	STR	ENG	iTH (	(kPa)	)
			uplity rod mudatana with	(11/11/	3			_		20	40 6	0 80			; 	50	10	)0  +	
Ē		some greenish	grey mudstone beds and																
		(5-40mm thick)	).																
- 49						DC-51		100	34						+	1			
-						0001		100	0,										
- 50	25.32												-	_	—	<u> </u>			
-	50.12	END OF BORE	EHOLE																
51																			
- 52													_						
- 53													_		_	<u> </u>			
- 54															+	+			
-																			
- 55													_	_	<u> </u>	<u> </u>			
- 56																			
																		T	_
57											-			┢	+	+			
1																			
58											_		_			_		$\vdash$	
- 59 -														F	+	1			

				PR	OJECT	: Rabas	ska Pr	oject (	Phase 2	), Levis,	Quebe	C			BORE	HOL	E : <i>B</i>	3H-1	117/	4-05	5
		Т	matach	SIT	Έ:	West	Optior	n Site							PAGE	:: _	1	_ 0	F _	5	_
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-B (	60333	3-KELL)						CASI	NG :	NW				
	•			во	RING [	DATE :		2005-	03-15	т	o _	2005	-03-1	19	CORE	E BAF	REL	.: N	1Q3		
	]	BORIN	G LOG	DA	TUM :		Geod	etic			coo	RDINA	TES	: 51	87110	.81 N	1	262	2036.	.32 E	
SAN	IPLE CO	NDITION	TYPE OF SAMPLER			LABOR	RATO				-			Field V	ane	(	Su)	$\diamond$	inta	ct	
	Remo	oulded	SS Split spoon			GS G	rain si	ze ana	alysis							(	Sur)	•	rem	oulde	əd
	Lost	sturbea	PS Piston sampler	e			nit wei	ght (k	N/m³)					Swedis	sh cone	; (	Cur)	$\nabla$	inta rem	ct	hed
	Rock	core	DC Diamond core barrel			CP Co	ompre	ssive	strength	(MPa)				Dyn. C	one Pe	n. Te	st.	<u>×</u>		>	<
	c I	STR/	ATIGRAPHY		Ε	:	SAMI	PLES	5							DYN	I. CC	ONE	PE	N. TE	EST
ε	ν Ζ				ĨĽ.	<u>م</u> م	z	۲ %	0	and		JNTEI TS (%	N I )	OR)	ESTS		(blo 5(	ows 0	10.3r/ 10	m) 10	
Ē	THO.		BOL	ΓE	: AN	DITIO	/ER)	RQI				,	RAT								
DEP	EV/	DE	SYM	TER	YPE NUN		CO/	N or	w <sub>P</sub>	w	W	L	ABO	SIT	UN			:DS TH(	HEA	AR )	
	Щ			.WM	<b>F</b> -	U U	RE	_	⊢ 20	<del>0</del>		)	ב	Z		5(	5	10	00	,	
-	77.38 <b>0.00</b>	Fill: Grey silt, so	FACE	$\boxtimes$								+							-		
Ē		BH-117B-05).		$\bigotimes$																1	
Ē 1	76.77 <b>0.80</b>	Brown peat (se	e BH-117B-05).	$\sum_{i=1}^{n}$																	
Ē																				1	
Ē	76.16 <b>1.59</b>	Light brown pea	at, wood, small roots (see																	1	
- 2		BH-117B-05).															$\rightarrow$	_			_
Ē																				1	
Ė,	75.25 <b>2.78</b>	Dense grey sar	nd, some silt and gravel																		
Ē		(see BH-117B-0	05).	в.																1	
Ē	74.64 <b>3.58</b>	Compact to der	nse grey silt, trace of clay	¢																1	
- 4		(see BH-117B-0	05).														$\rightarrow$				-
Ē																				1	
5				$\mathbb{M}$																	
Ē	73.29			<b>B</b>																1	
Ē	5.54	Dense to very c and gravel, occ	asional cobbles and																	1	
- 6		boulders (see E	л-тт <i>в</i> -0э).	0 . V							_						-		-		_
Ē				•																1	
Ę,				0 0																	
Ē				0 0																1	
Ē				> 0°.																1	
- 8	71.23 <b>8.03</b>	Bedrock: Very	poor to poor quality light			DC-1		61	0								-		_		
		grey mudstone, shale. Calcite v	, thin layers of dark grey einlets. Joints filled with				T		-												
		silt and gravel				DC-2		83	0												
. 9						DC-3		38	0												
						DC-4		77	29												
- 10								20	0		+	+				$\vdash$	$\dashv$	-+	$\dashv$	$ \rightarrow $	
						DC-5		38	0												
	69.13 <b>10.77</b>	Very poor quali	ty grey mudstone and			DC-6	┝╋╸	79	57												
11		dark grey shale Calcite veinlets	. Sedimentary breccia.			DC-7	┝╋╸	89	39												
						DC-8		86	0												
				XX																	

				PR	OJECI	: Rabas	ska Pr	oject (	Phase 2	), Levis, C	Quebeo	<b>b</b>		BORE	HOL	E : <i>E</i>	<b>3H-</b> 1	117/	4-0:	5
		Т	matash	SIT	Е:	West	Optio	n Site						PAGE	: _	2	_ 0	F _	5	
	▼		rratech	FIL	E NO :	<u>T-105</u>	)-В (	(60333	3-KELL)					CASI	NG :	NW	1			
	•			во	RING	DATE :		2005-	03-15	то		2005-03	-19	CORE	E BAF	RREL	١	VQ3		
	]	BORIN	G LOG	DA	TUM :		Geod	letic			COOF		s:	5187110	.81 1	1	262	2036.	.32 E	
SAN	IPLE CO	NDITION	TYPE OF SAMPLER			LABOR	RATO	RY AN	ID IN SI	TU TEST			Field	Vane	(	Su)	$\wedge$	inta	ct	
$\geq$	Remo	oulded	SS Split spoon			GS G	ain si	ze ana	alysis					Vano	(	Sur)	•	rem	iould	ed
	Undis	sturbed	ST Thin walled Shelby tub	е			onsoli nit we	dation	N/m³)				Swed	lish cone	) (	Cu)	$\bigtriangledown$	inta	ct	
	Rock	core	DC Diamond core barrel			CP Co	ompre	essive	strength	(MPa)			Dyn.	Cone Pe	) en. Te	Cur) est	▼ × -	rem	ould:	ed ×
		STRA	ATIGRAPHY		F		SAM	PLES	;									PFI		FST
۶	۲ ۲				Ē		_	%		WATE	RCC	NTENT	RY	ŝTS		(bl	ows	/0.3	m)	
ι. Ξ	NON-			Ы	ШŇ	UN ER	NOL N	RY	gD	and	LIMIT	'S (%)	ATO	TES		5	0	10	0	
I I I	VAT EPT			МВ	R	PE 4 JMB	<b>F</b>	ЭVЕ	or R	w	w	\w/	OR.	an ITU	UN	IDR/	AINE	ED S	HE/	AR
□		DE	SCRIPTION	S	ATE	∑ ĭ	0 S	SEC(	z	•*•P   ⊢			LAE	N N	S	TRE	ING	TH (	kPa	1)
					3			"		20	40 6	0 80				5	0	10	0	
-	67 70	Very poor quali Sedimentary br	ity calcareous mudstone. reccia.			DC-9		42	0											
-	12.52	Poor quality cal	Icareous grey mudstone,	XX																
- 13		Beddings at 70-	-90° from borehole axis.										_				_			-
-		Calcite veinlets				DC-10		100	25											
-	66.75																			
- 14	13.87	Very poor to po layers of calcar	eous mudstone and																	
-		sandstone, darl Presence of mi	k grey shale beds. crofolds and minor			DC-11		99	15											
- 15		discontinuity in	the beddings. Calcite																	
Ē		vennets.																		
Ē						DC-12		100	27											
- 16						00 12		100	27				_				_	_		
-																				
Ē						DC-13		70	15											
- 17 -																				
_						DC-14		100	36											
- - 18						DC-15		87	0				_							
						DC-16		85	0											
Ē	63.06 18.69	Very poor to po	por quality grev mudstone			DC-17	┝╋	91	0											
- 19	. 5.00	layers of calcar	reous mudstone and dark			DC-18	┝╋	100	0		-		_		$\vdash$		_	$\neg$		
		grey shale. Bec borehole axis.	ddings at 70-90° from			DC-19		100	0											
Ē						0020		100	Ū											
- 20 -						DC-21		90	11				-							
-																				
- 21						DC-22		97	40											
Ē	60.98																			
Ē	21.41	Good quality gr	ey mudstone.			DC-23		100	84								 Tropa	ari at	21.6	4m:
- 22	60.49 <b>22.05</b>	Very noor to no					┝╋						_		$\left  - \right $	-	_inc	linati	on =	50°_
Ē		layers of calcar	eous mudstone and dark			DC-24		100	0								 Tropa	ari at	22.4	0m:
Ē		borehole axis.	20														inc	linati	on =	50°
- 23						DC-25		100	45											
É																				
Ē				XX XX			$\vdash$													

				PR	OJECI	r: <u>Rabas</u>	ska Pr	oject (	Phase 2	), Levis, C	Quebec	>		BORE	HOLI	E : <i>B</i>	3 <b>H-1</b>	117/	4-05	:
		То	matach	SIT	Е:	West	Optio	n Site						PAGE	:: _	3	_ 0	F _	5	_
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-B (	(60333	3-KELL)					CASI	NG :	NW				_
	•			во	RING	DATE :		2005-	03-15	то		2005-03-	19	CORE	BAR	REL	.: <u>۱</u>	1Q3		_
	]	BORIN	G LOG	DA	TUM :		Geod	letic			COOF		: 5	187110	.81 N	1	262	2036.	32 E	_
SAM	IPLE CO	NDITION	TYPE OF SAMPLER			LABOF	RATO	RY AN	ND IN SI	TU TEST			Field V	/ane	(\$	Su)	$\diamond$	inta	ct	
	Remo	oulded	SS Split spoon	۵		GS G	rain si onsoli	ize ana dation	alysis				Ourselin		(8	Sur)	٠	rem	oulde	d
	Lost	suideu	PS Piston sampler	C		D Ur	nit we	ight (k	N/m³)				Swedis	sn cone	) : ((	Cur)	▽	intao rem	ct oulde	ed
	Rock	core	DC Diamond core barrel			CP Co	ompre	essive	strength	(MPa)			Dyn. C	one Pe	n. Te	st	<u>×-·</u>		×	-
	۶	STR/	ATIGRAPHY		ε		SAM	PLES	<b>i</b>				~	(0	DYN	I. CC	)NE	PEN	1. TE	ST
ε	ΞE				ĒĽ	<u> </u>	z	۲ %	0	and		S (%)	<b>TOR</b>	EST(		(blo 5(	ows: )	/0.3r/ 10	n) /0	
H	THO			BOI	Ē	E AN	E	/ER	RQI			- ()	RAT			î				
DEF	EV/	DE	SCRIPTION	SYN	TER	ΥPE NUN	ONE	CO.	N or	w <sub>P</sub>	w	wL	<b>ABO</b>		UN	DR/		ED S	HEA kPa)	R
	Щ				MA		U U	RE		 20	 40 6	0 80	ב	Z		5(	J	10	0	
-		Very poor to po	oor quality grey mudstone.			DC-26		91	0		+ -					$\neg$	$\neg$		-	_
-	58.51	from borehole a	axis and with signs of																	
25	24.63	displacement of Poor to fair qua	f beds. lity grey mudstone, layers										-							
		of calcareous m 70-90° from bor	nudstone. Beddings at rehole axis.			DC-27		100	57											
-																				
- 26																-				_
- 27						DC-28		97	40				-							
-																				
						DC-29		100	0											
- 28																+	_	_	-	_
						DC-30		89	38											
- 29													-							
	<u>55.0</u> 3 <b>29.18</b>	Excellent qualit	y grey mudstone, layers																	
		of calcareous m 70-90° from bol	rehole axis.																	
- 30						DC-31		100	96							$\neg$	_			_
- 31													-							
-						DC-32		100	100											
	52.00																			
- 32	<u>31.95</u>	Fair to excellen	t quality dark grey										-			+	_	_		-
		breccia texture.																		
- 33						DC-33		100	68				-							
Ē							┝╋													
- 34													-		$\vdash$	+	$\dashv$	$\dashv$	+	-
Ē						DC-34		100	99											
- 35																				
							┝╋╋									T		T		
						DC-35		100	84											
Ē																				

				PR	OJECT	: Rabas	ska Pi	roject (	Phase 2	), Levis, C	Quebeo	0		BORE	HOLE	: BI	H-11	7A-0	5
		Т	matach	SIT	E :	West	Optio	n Site						PAGE	::	4	OF	5	
	▼		rratech	FIL	.E NO :	<u>T-105</u>	0-B	(60333	33-KELL)					CASI	NG :	NW			
	•			во	RING	DATE :		2005-	03-15	то		2005-03	-19	CORE	BAR	REL :	NQ	3	
		BORIN	G LOG	DA	TUM :		Geod	letic			COOF		<b>S</b> : 5	187110	.81 N		26203	6.32 E	Ξ
SAN	IPLE C		TYPE OF SAMPLER			LABOR	RATO	RY AN	ND IN SI	TU TEST			Field	Vane	(S	Su)	 ∧ in	tact	
$\geq$	Ren	noulded	SS Split spoon			GS G	rain s	ize ana	alysis						(S	sur)	♦ re	mould	bed
	Und Und	isturbed	ST Thin walled Shelby tube	е			onsoli nit we	idation	N/m³)				Swedi	ish cone	; (C	u) '		act	
	Roc	k core	DC Diamond core barrel			CP C	ompre	essive	strength	(MPa)			Dyn. (	Cone Pe	U) n. Tes	str) st ×	▼ re ÷	mould	ied ×
		STR	ATIGRAPHY		۶		SAM	PLES	6							coi		-м т	FST
2	<u>ء</u> '				÷		_	%		WATE	R CO	NTENT	RY	STS		(blo	ws/0.	3m)	_0.
Ι÷.	NOI - H			Ь	ĒVĒ	AND ER	NOI	RY	gD	and	LIMIT	'S (%)	ATO .	TES		50		100	
I L L	VAT EPT			MB	R	PE A	١ ٩	OVE	or R	w	w	\w/	OR.	an ITU	UNI	DRA	INED	SHE	AR
□		DE	SCRIPTION	S	ATE	Σĭ	0 0	<b>REC</b>	z	•**P ├──	••• —⊙–	"L ——∣	LAB	N S	SI	<b>FREN</b>	IGTH	(kPa	a)
					3			"		20	40 6	0 80				50		100	
Ē		Good quality da	ark grey mudstone.																
Ē	<u>49.1</u> 9																		
- 37	36.80	Fair to good qu Beddings at 80	ality dark grey mudstone. ° from borehole axis.								-		-			+	_	—	
Ē						50.00													
Ē						DC-36		100	89										
- 38 -																-	-		
Ē																			
- 39	47.47												_						
Ē	39.04	Good quality da sedimentary br	ark grey mudstone, eccia texture, numerous			DC-37		100	65										
Ē		calcite veinlets.																	
- 40											-		-			Tr	opari a	it 39.9	)3m:-
Ē						DC-38		100	78										. 51
Ē.,																			
- 41																			
Ē						50.00		400	05										
- 42	45.10					DC-39		100	85				_						_
Ē	42.14	Good to excelle mudstone, lave	ent quality dark grey																
Ē		borehole axis.																	
- 43						DO 40		100	70				-			-			
Ē						DC-40		100	78										
Ē 44																			
-						50.44		400	100										
- 45						DC-41		100	100		-		_			+	—	+	
								1											
- 46											+		1			+	+	1	
						DC-42		100	93										
47													_			$\perp$			
Ē																			
						DC-43		100	100										
E				XX															

			PR	OJECT	: Rabas	ska Pr	oject	(Phase 2)	), Lev	ris, Qu	iebec			BORE	HOLI	E : <b>B</b>	3H-1	17/	4-05	;
		Torretoch	SIT	Έ:	West 0	Optior	n Site							PAGE	:: _	5	_ 01	F_	5	_
	▼	Terratech	FIL	E NO :	<u>T-105</u>	D-B (	(6033	33-KELL)						CASI	NG :	NW				_
	•		во	RING	DATE :		2005	03-15		то		2005-0	3-19	CORE	BAR	REL	.: <u>N</u>	IQ3		_
	]	BORING LOG	DA	TUM :		Geod	etic			с	OOR	DINATI	s: _	5187110	.81 N	i	262	2036.	32 E	
SAN		ONDITION TYPE OF SAMPLER				ATO	RY A	ND IN SIT	Γυ τε	ST			Field	Vane	(5	Su)	$\diamond$	intac	ct	
	Undi	sturbed ST Thin walled Shelby tube			C C	onsoli	dation	aiysis					Swed	lish cone	3) )) (	Sur) Cu)	◆ ▽	rem inta	oulde ct	эd
	Lost	PS Piston sampler			D Ur	nit we	ight (k	N/m³)	(MDa				Dur	0 D-	((	Cur)	▼	rem	oulde	əd
		STRATIGRAPHY		_		SAM	PLE	silengin S	(IVIF a	()			Dyn.	Cone Pe	n. Tes	st ;	<u>×</u>		<u>×</u>	<u>&lt;</u>
	۳- ۲			۲ ۲			%		WA	ATER	col	NTEN	<b>™</b>	TS	DYN	. CO (blc	)NE ows/	PEN /0.3r	1. TE n)	<u>-</u> ST
г - т	NOI H		Ч	EVE	LND ER	NOI	RY %	B	a	nd L	IMIT	S (%)	ATO	d TES		50	)	10	0	
EPT	VAT	DESCRIPTION	YMB	IR L	PE ∉ JMB	IDN	OVE	or R	v	N_	w	w.	30R	an SITU	UN	DRA	AINE	DS	HEA	١R
		DESCRIPTION	Ś	VATE	Σ Σ	00	REC	z		-р 	•		LAE	N	S	TRE	NG	<b>FH (</b>	kPa)	)
<u> </u>		Good to excellent quality dark grey	7757	5					2	0 40	0 60	0 80			$\vdash$	50	) —†	10	0	
Ē		mudstone, layers at 80-90° from																riot	10 11	Grave:
Ē.																	incl	inatio	+0.40 on = {	53°
- 49																				
Ē					DC-44		100	78												
- 50	38.89																+			-
Ē	50.24	END OF BOREHOLE																		
- 51																				
Ē																				
Ē																				
- 52																	+			
Ē																				
- 53															$\vdash$	_	$\rightarrow$	_		_
Ē																				
Ē																				
E 54																				
Ē																				
- 55											-		_		$\vdash$	+	+	+	$\dashv$	
Ē																				
56													_			$\square$	$\square$		$\square$	
- 57												+	_			+	+	$\neg$	$\neg$	_
- 58													_		$\vdash$	-+	$\dashv$	$\dashv$	$\dashv$	
- 																				
59																				
Ł																				

		_		PR	OJECI	: Raba	ska Pr	oject	(Phase 2)	), Levis	s, Qu	ebec				BORE	HOL	E : <i>B</i>	H-1	17E	3-05	5
		Т	matach	SIT	Έ:	West	Optio	n Site								PAGE	: _	1	<b>O</b>	F_	5	_
	▼	jj ie	rratech	FIL	E NO :	<u>T-105</u>	0-В (	6033	33-KELL)	)						CASI	NG :	NW				
	•			во	RING I	DATE :		2005	-03-04		то		2005-0	)3-1	4	CORE	E BAF	REL	: N	IQ3		
	]	BORIN	G LOG	DA	TUM :		Geod	etic			C	OOR	DINAT	ES	: 5'	187110	.11 N	1	262	2037.	03 E	
SAN	IPLE CO	NDITION	TYPE OF SAMPLER			LABO	RATO	RY A	ND IN SIT		ST				Field V	/ane	(	Su)	$\diamond$	inta	ct	
$\geq$	Rem	oulded	SS Split spoon			GS G	rain si	ze an	alysis								(	Sur)	٠	rem	ould	ed
	Undis	sturbed	ST Thin walled Shelby tub	e			onsoli nit we	datior ight (l	N/m³)						Swedis	sh cone	) (	Cu)	$\bigtriangledown$	inta	ct	
	Rock	core	DC Diamond core barrel			CP C	ompre	essive	strength	(MPa)					Dyn. C	Cone Pe	) n. Teء	cur) est	▼ × - ·	rem		ed K
		STR/	ATIGRAPHY		۶		SAM	PLE	3								DYN		NF	PF	יד ו	FST
2	۳ ۲						_	%		WA	TER	со	NTEN	т	RY	STS	5	(blo	ows	/0.3r	n)	.01
	NOI H			Ъ	ĒVE	AND ER	0	RY	gD	an	nd Ll	MIT	S (%)		ATO	ц		50	)	10	0	
EPT	VAT EPT	DE	SCRIPTION	/MB	IR L	PE / JMB	IQ	OVE	or R	w		w	w		SOR.		UN	IDRA	AINE	D S	HE/	٩R
	ELE	DE	SCRIPTION	Ś	ATE	Żĭ	S	SEC.	z		Р	•	—–i	-	LAE	N N	S	TRE	NG	ГН (	kPa	)
	77.38	GROUND SUR	FACE		3			-		20	40	) 6	0 80					50	, 	10	0	
Ē	0.00	Fill: Grey silt, so	ome sand and gravel.	$\bigotimes$		SS-1	$ \times$	83														
Ē	76.77 <b>0.61</b>	Brown peat.		$\sum_{i=1}^{n}$																		
<b>⊨</b> 1	76.16					SS-2	$\times$	38	8		-							$\rightarrow$	+	_	_	
Ē	1.22	Light brown pea	at, wood, small roots.																			
Ē					4-15	SS-3	$\left \right\rangle$	79	0/46cm													
E <sup>2</sup>	75.25 <b>2.13</b>	Dense grev sar	nd, some silt and gravel.	$\tilde{\tilde{c}}$	02-07																	
Ē	74.64	0,		0 0	on 2(	SS-4	$\times$	58	44													
- 3	2.74	Compact to ver	y dense grey silty and	ар 1	.88m						_								$ \rightarrow$			
Ē		Salidy gravel.		\$ 8 8	ev. 75.	SS-5	$\geq$	62	28	$\odot$												
Ē				5 8 6 8 8	at ele																	
Ê 4	73.27	Dense to una		· @ · @	level	SS-6	$\ge$	62	45		-	_							-			
Ē	4.77	and gravel, occ	asional cobbles and	9 9 0	Water																	
ŧ,		boulders.		D. D		SS-7	$\times$	58	67													
Ē																						
Ē				Ø.8		SS-8	$\times$	57	32													
- 6	71.21			۵							_								_	_	_	
Ē	6.17	Bedrock: Very p mudstone, lave	poor to poor quality grey ers of dark clayey shale.			SS-9 DC-10		33 83	50/8cm 0													
Ē		Beddings at 80	° from borehole axis.	XX		DC-11		92	0													
7						2011			Ū										-			
Ē				X		DC-12		92	41													
- 8																						
						DC-13		100	41													
- 9										$\vdash$	-						$\vdash$	$\rightarrow$	+	$\dashv$	$\dashv$	—
E							╞╋															
Ē.,						DC-14		95	15													
E 10	67.25 <b>10.13</b>	Poor to very po	or quality grey mudstone.				┝╋												$\uparrow$			
		Sedimentary br veins.	eccia structures. Calcite			DC-15		100	51													
<b>–</b> 11		-					┝╋┝			$\mid \downarrow \mid$	_						-	$\rightarrow$	$\square$	$\downarrow$	$\square$	
						DC-16	┝┻	100	72													
Ē						DC-17		98	0													
Ł				XXX																		

				PR	OJECT	: Rabas	ska Pr	oject (	Phase 2	), Levi	is, Qu	iebec	;			BORE	HOL	E: <b>B</b>	3H-1	17E	3-05	5
			matach	SIT	Έ:	West	Optior	n Site								PAGE	:: _	2	_ <b>O</b> I	F _	5	
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-B (	60333	3-KELL	)						CASI	NG :	NW				
	•			во	RING I	DATE :		2005-	03-04		то		2005	-03-1	4	CORE	E BAF	REL	.: N	IQ3		
	]	BORIN	G LOG	DA	тим :		Geod	etic			с	OOR		TES	: 5	187110	.11 N	I	262	2037.	.03 E	
SAM	PLE CO	NDITION	TYPE OF SAMPLER			LABOF	RATO	RY AN	ID IN SI	TU TE	ST				Field V	/ane	(;	Su)	$\diamond$	inta	ct	
$\geq$	Rem	oulded	SS Split spoon			GS G	rain si	ze ana	alysis								(	Sur)	٠	rem	ould	ed
	Undis	sturbed	ST Thin walled Shelby tub PS Piston sampler	e			onsoli nit we	dation iaht (k	N/m³)						Swedi	sh cone	; ((	Cu)	$\bigtriangledown$	inta	ct	od
	Rock	core	DC Diamond core barrel			CP Co	ompre	essive	strength	(MPa)	)				Dyn. C	one Pe	י) n. Te	st	▼ ×-·	rem 		эа ×
		STR/	ATIGRAPHY		E		SAM	PLES	5								DYN	. cc	)NE	PE	N. TI	EST
ε	ш 				- 		-	%		WA	TER	CO	NTE	NT	JRΥ	STS		(blo	ows	/0.3r	n)	
- H	NOI- H			ğ	ĒVĒ	AND	10	RΥ	gD	ar	nd L	IMIT	'S (%	)	ATC	pŭ		50	)	10	0	
EPT	VAT	DE		ΥMB	I. R	JME /	.iq	OVE	or R	w	<b>/</b> _	w	v	1.	30R		UN	DRA	١NE	D S	HE/	٩R
	ELE		SCRIPTION	Ś	ATE	, ⊊ z	<b>S</b>	REC	z	ŀ	-р 			L	ΓĂΕ	N N	S	TRE	NG	ГН (	kPa	)
		Desete			<pre></pre>			_		20	0 40	0 6	0 8	)				50	) <del></del> +	10	0	
-		mudstone. Sed	limentary breccia																			
-		structures. Cal	cite veins.			DC-18		100	34													
- 13	64.05					00-10		100	54										_			
-	<u>13.33</u>	Fair quality gre	y mudstone, beds of																			
È .		Beddings at 70	ustone, shale beds. 1-90° from borehole axis.																			
- 14						DC-19		95	39													
-																						
- 15				X															_	_	_	
-																						
-						DC-20		100	61													
- 16																			-			
- - 17																						
- "						DC-21		100	50													
-																						
- 18																			_			_
-																						
				X		DC-22		100	54													
- 19 -																						
_																						
- 20																						
_	50.00					DC-23		100	69													
-	20.58 26.58	Fair quality gre	y mudstone. Breccia																			
- 21	20.80	Fair to very poo	veins or quality grey mudstone								_											
- 						DC-24		100	73													
ŧ "																						
Ē																						
- 23						DC CT			<i>.</i>	$\left  - \right $							$\vdash$	-+	$\dashv$	$\dashv$	$\rightarrow$	
Ē	<u>53.8</u> 8					DC-25		69	1/													
Ē	23.50	(see next page	).																			
Ľ.				K//K/K		I																

				PR	OJECT	: Rabas	ska Pi	oject (	Phase 2	), Levis, (	Quebe	с			BORE	HOL	E : <i>B</i>	3 <b>H-</b> 1	171	B-05	5
		Лт	'annatach	SIT	Έ:	West	Optio	n Site							PAGE	:: _	3	0	F_	5	_
		// 1	erratech	FIL	E NO :	<u>T-105</u>	0-B	(60333	33-KELL)						CASI	NG :	NW	/			
	•			во	RING	DATE :		2005-	03-04	тс	)	2005-0	03-14	4	CORE	BAF	REL	.: <u>۱</u>	1Q3		
		BORI	NG LOG	DA	TUM :		Geod	letic			cool	RDINAT	ES :	51	87110	.11 N	1	262	2037.	.03 E	:
SAN	IPLE C	ONDITION	TYPE OF SAMPLER			LABOR	RATO	RY AN	ND IN SIT	TU TEST				Field V	'ane	(*	Su)	$\diamond$	inta	ct	
	Rem	noulded	SS Split spoon	20		GS G	rain s	ize ana	alysis					o "		(\$	Sur)	٠	rem	oulde	ed
	Lost	isturbed	PS Piston sampler			D Ur	nit we	ight (k	N/m³)					Swedis	sh cone	: ((	Cu) Cur)	$\nabla$	inta rem	ct ould	ed
	Roc	k core	DC Diamond core barrel			CP Co	ompre	essive	strength	(MPa)				Dyn. C	one Pe	n. Te	st	<u>× - ·</u>		· >	×
	C I	S'	TRATIGRAPHY		Ε	:	SAM	PLES	6				-			DYN	I. CC	)NE	PE	N. TE	EST
ε	ΞE				ĒĽ	<u>م</u>	z	% /	•	and		)NIEN [S (%)	1	ORY	ESTS	ĺ	(blo	ows/ n	10.3۱/ ۱۲	m) 10	
Ē	E E			BOL	ΓEΛ	AN BEF	DITIO	'ER)	RQI	una				RAT							
DEP	DEP		DESCRIPTION	SYM	TER	YPE		cov	l or	w <sub>P</sub>	w	w	_	ABOI	SITI	UN			EDS	HE/	AR
	Щ				MAT	F -	Ŭ	RE	2	⊢ 20	<del>0</del>			ב	Z		50	ມ. ບ	10	)0	,
-		Good to exe	cellent quality grey mudstone,								+		-						-		
Ē		layers of ca beds. Bedd	alcareous mudstone, shale lings at 70° from borehole			DC-26		100	93												
25		axis.																			
Ē																					
Ē																					
- 26						DC-27		100	94		-					$\vdash$		_	_		
Ē																					
- 27								-													
Ē 1																					
Ē						DC-28		100	80												
- 28											+		_			$\vdash$	-+	$\rightarrow$	_		
Ē	49.01 28.37	Excellent q	uality red mudstone. Beddings																		
F		at 60-70° fr	om borehole axis.																		
<b>F 29</b>						DC-29		98	95												
Ē																					
- 30																$\vdash$		-			
Ē					$\bigotimes$																
24						DC-30		100	100												
Ē																					
- 32																	-				$\square$
-						DC-31		100	89												
- 22																					
, 33 								1									Ţ	T			
						D.C.C.															
- 34						DC-32		100	91		-		-			$\vdash$	+	$\dashv$	-		-
- 25								1													
- 35						DC-33		100	100												
E																					

				PR	OJECT	: Rabas	ska Pi	oject (	Phase 2	), Levis, C	Quebec	;		BORE	HOL	E : <b>B</b>	H-1	17B	-05	_
		Т	matach	si	E :	West	Optio	n Site						PAGE	: _	4	OF	: _	5	_
	▼		rratecn	FIL	.E NO :	<u>T-105</u>	0-B	(60333	33-KELL)	)				CASI	NG :	NW				_
	•			вс	RING	DATE :		2005-	03-04	то		2005-03-	14	CORE	E BAF	REL	: N	Q3		
	]	BORIN	G LOG	DA	TUM :		Geod	letic			COOF		<b>3:</b> 51	187110	.11 N	J	262(	337.0	)3 E	_
SAM	IPLE CO	NDITION	TYPE OF SAMPLER			LABOR	RATO	RY AN		TU TEST			Field V	/ane	(	Su)	$\diamond$	intac	t	_
$\geq$	Rem	oulded	SS Split spoon			GS G	rain s	ize ana	alysis						(\$	Sur)	٠	remo	oulded	d
	Undis	sturbed	ST Thin walled Shelby tub PS Piston sampler	be			onsoli nit we	dation ight (k	N/m³)				Swedis	sh cone	) (	Cu)	$\bigtriangledown$	intac	:t	
	Rock	core	DC Diamond core barrel			CP Co	ompre	essive	strength	(MPa)			Dyn. C	one Pe	י) n. Teء	st :	▼ ×	remc	ouideo ×	נ
		STR	ATIGRAPHY		E		SAM	PLES	5						DYN	I. CO	NE I	PEN	. TE	ST
ε	ш 				L		-	%		WATE	R CO	NTENT	JRΥ	STS		(blc	)ws/	0.3m	n)	
- H	NOIT			SOL	Ë	AND BER	10	RΥ	gD	and	LIMIT	S (%)	ATC	ĭŭ ⊐⊑		50	۱ 	100	)	
EPT	VA1 EPT	DE		ΥME	R L	PE /	Ĩ	OVE	orF	w_	w	w.	30R		UN	IDRA		D SI	HEA	R
				Ś	ĂTI	ŹŻ	ပ္ပ	REC	z	⊢ P		L	LA	Z	S	TRE	NGT	Ή (k	(Pa)	
		Excellent queli	ty rod mudatopo		5			_		20	40 6	0 80			$ \rightarrow$	50	, 	100	) 	
-	40. <u>9</u> 3																			
	36.45	Good quality gi Sedimentary bi	rey mudstone. reccia texture. Calcite																	
- 37		veins.				DC-34		100	86				-				+	-		
- ,																				
- 30	39.01																			
	38.47	Excellent qualit	ty grey calcareous			DC-35		100	89											
- 39		calcareous san	ndstone.										-				+	+		
-																				
- 40						DC-36		100	98				-				+	-		
41													_							
Ē																				
-						DC-37		100	94											
42													-				+	_		
- 43						DC-38		100	100				-				-			
-																				
44																		$\downarrow$		
-						DC-39		100	83											
- 45													-				-			
						DC-40		100	100											
46													1					$\uparrow$	$\top$	
	30.77 46 61	Excellent qualit	ty grev mudstone				┝╢┫													
47	-0.01	Sedimentary b	reccia texture. Calcite										_		-	$ \rightarrow $	+	$\downarrow$	$\downarrow$	_
		veins.				DC-41		100	100											
Ł																				

				PR	OJECT	: Rabas	ska Pr	roject	Phase 2	), Levis, C	Quebeo	0		BORE	IOLE_	: <b>BH</b>	-117	B-05	;
		Т	matach	SI	ΓE :	West	Optio	n Site					I	PAGE	: _5	<u>;</u>	OF _	5	_
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-B (	(60333	3-KELL)				(	CASIN	G: <u>1</u>	١W			_
	•			вс	RING I	DATE :		2005-	03-04	то		2005-03	-14	CORE	BARR	EL :	NQ3		
		BORIN	G LOG	DA	TUM :		Geod	letic			COOF	RDINATE	<b>S</b> : 518	37110.1	1 N	20	62037	.03 E	
SAN	IPLE C	ONDITION	TYPE OF SAMPLER			LABOR	RATO	RY AI	ND IN SIT	TU TEST			Field Va	ne	(Sı	(r	inta	act	
	] Ren ∅ Und	oulded sturbed	SS Split spoon ST Thin walled Shelby tub	e		GS GI C Co	rain si onsoli	ize an: dation	alysis				Swedish	cone	(Su	ur) ◆	ren	noulde	эd
	Los		PS Piston sampler			D Ur	nit we	ight (k	N/m³)				Owedian	COLLE	(CL (CL	ע (ג ע (זג	' ren	noulde	ed
	Roc	core	DC Diamond core barrel			CP Co	ompre	essive	strength	(MPa)			Dyn. Co	ne Pen	I. Test	× -		<u> ×</u>	:
	<b>E</b>	511			E				,	WATE	R CO	NTENT	≻	ο Γ	)YN. (		E PE	N. TE	EST
ε	۲ ۲			Ļ	VEL	₽₽	NO	۲ %	Q	and	LIMIT	S (%)	TOR	EST	ſ	50	5/0.3 1(	00 0	
PTH	ATIC PTH			MBO	s LĘ	e an Mbe	Ĩ	VER	r RQ				DRA and	1 1					-
B		DE	SCRIPTION	sγι	<b>LTEF</b>	TΥΡ NUI	NOC	ECO	0 N	W <sub>P</sub>	W	wL	ABC	IS N	ST	REN	GTH (	(kPa)	(R )
	ш				Ŵ			R		20	40 6	60 80		-	I	50	10	00	
Ē		Excellent quali Sedimentary b	ty grey mudstone. reccia texture. Calcite																
Ē		veins.				DC-42		100	100										
- 49													_	_		_	+		
Ē							-	-											
50	27.26					DC-43		100	100										
Ē	50.12	END OF BORE	EHOLE			-		-											
Ē																			
- 51													_	_			+		
Ē																			
52													_	_			<u> </u>		
Ē																			
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- 53													_			+	+		
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- 55 -													1	-		+	+		—
ŧ																			
- 56													_	╞		+	+	$\mid \mid \mid$	
- 57											1				+	+	+		
58													_			+	–	$\vdash$	
- 59 -																+	+		

					PR	OJECT	: Rabas	ska Pr	oject	(Phase 2)	, Levi	is, Qu	lebec			BORE	HOLI	E: [	BH-	<u>301</u>	-05	_
			To	matach	si	ſE :	West	Optior	n Site							PAGE	: _	1	OF	F	1	
	▼	]]	Ie	rratech	FIL	E NO :	<u>T-105</u>	)-В (	6033	33-KELL)						CASI	NG :	NW	1			
	•				вс	RING E	DATE :		2005	-04-06		то		2005-04	-06	CORE	E BAF	REL	.: N	IQ3		
		BO	RIN	G LOG	DA	TUM :		Geod	etic			с	OOR		<b>S</b> : _5	5187040	.50 N	I	261	822.:	36 E	
SAN	IPLE C	ONDIT	ION	TYPE OF SAMPLER			LABOR	ATO	RY A	ND IN SIT	UTE	ST			Field	Vane	(;	Su)	$\diamond$	intac	ct	
	Re	moulded	1	SS Split spoon			GS G	ain si	ze an	alysis							(\$	Sur)	٠	remo	oulde	эd
	Los	sturbe	a	PS Piston sampler	e		D Ur	nit wei	ight (l	ı (N/m³)					Swed	ish cone	)) (	Cu) Cur)	$\nabla$	intac rem	st oulde	be
	Ro	ck core		DC Diamond core barrel			CP Co	ompre	ssive	strength	(MPa)	)			Dyn. (	Cone Pe	en. Te	st	×		×	(
			STRA	TIGRAPHY		ε	\$	SAM	PLE	6							DYN	I. CC	)NE	PEN	I. TE	EST
ε						ĒĽ.	<u>م</u>	z	%		WA	NTER nd I	IMIT	NTENT S (%)	ORY	STS		(blo	ows/	0.3n	n) ^	
Ξ					BOL	LEV	BER	0E	ΈRΥ	RQD	a			0(/0)	RAT	U TE						
E E		i	DE	SCRIPTION	sүм	TER	YPE		co Co	l or	v	V <sub>P</sub>	w	wL	BOI	SITI	UN			D S	HEA kPaì	١R
		-			•	MAT	⊢ <b>~</b>	ŏ	R	2	 20	0 40		 0 80	2	Z		50	0	10	(1 a) 0	'
-	76.79		ROUND SURE psoil.	FACE		-												Ť	-	+	-	
Ē	0.15	Stit	ff to very stiff ne silt to silty	brown and grey clay, , trace of sand.		04-15	SS-1	$\bigtriangleup$	79	5												
Ē,	75.88	3		, 		2005-	SS-2	$\ge$	100	50/8cm												
Ē	0.91	Be	drock: very p idstone, layer	oor quality dark grey		u ou																
Ē		50°	° from boreho	ble axis.		76.72	SS-3 DC-4	Î	59 100	80/13cm 0												
- 2						elev.	DC-5		88	0					_			$\rightarrow$	-	-+	+	
-						vel at																
Ē,						ter le	DC-6		100	0												
Ē						Wa																
-							DC-7		96	21												
- 4							DC-8		100	o								$\rightarrow$	-	+	+	
	72.35	; EN								-												
Ē,			D OF DOILE																			
Ē																						
-																						
- 6															_			$\rightarrow$	$\rightarrow$	+	+	
Ē,																						
Ē (																						
Ē																						
- 8																		$\rightarrow$	+	+	$\rightarrow$	
9																		$\uparrow$	$\neg$	$\neg$	$\neg$	_
10															-			$\dashv$	-+	$\dashv$	$\dashv$	
- 11															1			+	+	$\uparrow$	+	
2																						

				PR	OJECT	: Raba	ska Pr	oject	Phase 2	), Levis, C	Quebeo	C	BOF	EHOLE	: Bł	1-302	2-05
		То	matach	SIT	E :	West	Optior	n Site					PAG	iE:	<u>1</u>	OF _	_1
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-B (	60333	33-KELL)	)			CAS	ING :	NW		
	•			во	RING	DATE :		2005-	04-06	то		2005-04-	06 COF	RE BARF	REL :	NQ3	
	]	BORIN	G LOG	DA	TUM :		Geod	etic			COOF		518728	5.22 N	20	61760.	.44 E
SAN	IPLE CC	NDITION	TYPE OF SAMPLER			LABO	RATO	RY AI	ND IN SI	TU TEST			Field Vane	(Si	u) 🔿	, inta	.ct
	Rem	oulded	SS Split spoon	0		GS G	rain si	ze an	alysis					(Si	ur) 🔶	• rem	oulded
	Lost	sluibeu	PS Piston sampler	C		D U	nit we	ight (k	N/m³)				Swedish col	1e (Ci (C <sup>i</sup>	u) ▽ ur) ▼	inta rem	ct ioulded
	_ Rock	core	DC Diamond core barrel			CP C	ompre	essive	strength	(MPa)			Dyn. Cone F	en. Test	t ×-		×
	εı	STR/	ATIGRAPHY		Ε		SAM	PLES	6					DYN.	CON	E PEI	N. TEST
ε	- E				ĒĽ.	<u>م</u>	z	% /	~	and		S (%)	OR		(blow 50	s/0.3i	m) 10
Ē	TH -			BOL	LEV	AN	DE	ER)	RQI	unu		<b>C</b> (70)	RAT and U TE			Ĩ	
DEP	DEP	DE	SCRIPTION	SYM	rer	YPE		cov	N or	w <sub>P</sub>	w	wL	ABO SIT	UNE	)RAIN	IED S GTH (	HEAR
	ЩI				-MA	F -	Ō	RE	-	 20			N L		50	10	)0
-	77.19 0.00	GROUND SUR	RFACE	<u>F</u>			$\bigtriangledown$				+				+	+	
Ē	0.10	Loose brown sa	and, some silt and gravel.	a		SS-1	$\square$	83	8								
Ē 1				.0		<u></u>	$\bigtriangledown$	67	0				-				
Ē	75.67			 		<u> 33-2</u>		07	9								
Ē	1.52	Very Loose gre	y sand, some silt and	0.0	04-15	<b>CC</b> 3	$\sim$	17	3								
- 2		gravei.		e.	2005-	33-3		17	3		-		-			+	
Ē				0. 0	u ou	SS-4	$\ge$	42	3								
Ė,	74.14			•	75.91	00 1		.~	0								
Ē	3.05	Very dense red silty, some gray	ldish sand, some silt to vel. occasional cobbles.	Þ	elev.	SS-5	$\square$	83	67								
Ē		,, g		0 Q	vel at												
- 4				.0 5	ter le	SS-6	$\mathbb{N}$	91	72		-				—	+	
Ē	72.62			0 8 0 0	Wa												
Ē,	4.57	Bedrock: Good mudstone, laye	to excellent quality grey ers of light grey calcareous														
Ē		mudstone. Bed borehole axis.	dings at 30° from			DC-7		90	75								
Ē																	
- 6						DC-8		100	100				_			-	
Ē																	
Ę,						DC-9		100	100								
Ē	69.93 <b>7.26</b>		HOLE		8	-											
Ē																	
- 8											-		-		—	+	
Ē																	
- 10													-	$\vdash$	+	+	
- 11																	

		-			PR	OJECT	: Rabas	ska Pr	oject	(Phase 2	), Levi	s, Qu	lebec	:			BORE	HOLI	E: [	3 <i>H-</i>	303	-05	_
1			Т-	matach	SIT	E :	West	Optior	n Site								PAGE	: _	1	0	F_	1	_
1			jj ie	rratech	FIL	E NO :	<u>T-10</u> 5	0-B_(	(6033	33-KELL)							CASIN	IG :	NW				
1		-			во	RING	DATE :		2005	-04-11		то		2005-0	04-1	1	CORF	BAP		. N	IQ3		
1		1	BORIN	G LOG		тим ·	-	Geod	letic			~				. 51	87430	64 N		· <u>·</u>	726	57 F	-
644										יים או סיי		ст ст	JUR		-3:	Eicle M	01-100.		<u> </u>				-
	мР (1	Rem	oulded	SS Split spoon			GS G	rain si	ze an	alysis		51				Field V	ane	() ()	Su) Sur)	♦	intao rem	ct oulded	
		Undi	sturbed	ST Thin walled Shelby tub	е		СС	onsoli	datior	1						Swedis	sh cone	. (0	Cu)	$\nabla$	inta	ct	
		Lost	core	PS Piston sampler				nit we ompre	ight (ł essive	«N/m³) strenath	(MPa)	)				Dyn C	ono Po	)) n Te	Cur)	▼	rem	oulded	
	Γ	TUCK	STR	ATIGRAPHY				SAM	PLE	S	(	,				Dyn. C		II. IC	51 )	<u>×</u>		x	_
		E				Ē					WA	TER	co	NTEN	т	ž	LS	DYN	. CO (blc	)NE ows/	PEN /0.3r	l. TES n)	Л
3   		- m			Ч	<u>V</u> EL	Q K	NO	۲ %	Q	ar	nd L	іміт	S (%)		jo ,	LES'		50	)	10	0	
H	i	PTH			ИВС	2 LE	E A MBE	E	VEF	r RG						DRA							_
B	i		DE	SCRIPTION	SΥΙ	Ë	ΝU	NON		° Z	w	P	W	w,	-	ABC	N SI	S	TRE		:D 5 TH (i	hean kPa)	
		<b>Ш</b>   71 50		REACE		Ň	-		8		20	) 4(	0 6	0 80			=		50	)	10	0	
E	ľ	0.00	Probable fill: Br	rown silt, some sand or	$\bigotimes$		CC 1	$\bigtriangledown$	07	24										$\neg$			_
Ē			sandy, some gi	lavel.	$\bigotimes$		55-1	$\square$	07	24													
Ē 1	Ŀ	70.59 <b>0.91</b>	Compact to loo	se brown sand some silt	$\left  \right\rangle$	¥.	ee 0	$\bowtie$	E0										$\square$				
Ē			to silty, gravel.	So srown sand, some sin	4 6	4-15	33-2		50	29													
Ē					0	005-0		$\boxtimes$															
- 2	2				0.0	on 2	55-3		46	8									$\rightarrow$	_	-		
Ē	6	69.06	De des els Marson	n an ta fair analita anan		.54m	SS-4	$\ge$	67	50/8cm													
Ē		2.77	mudstone, light	t grey calcareous		ev. 70																	
- 3	3		5.0m depth). C	alcite veins and veinlets.		at ele	<b>D D D D D D D D D D</b>												-	+			-
Ē						level	DC-5		100	52													
Ē						Vater																	
Ē							DC-6		100	0													
Ē							200			Ŭ													
- 5	5						DC-7		100	29		_							—	_	_		
Ē	6	66.06			XX	$\otimes$	-		-														
Ē		0.40	END OF BORE	HOLE																			
6	5																			+			-
-																							
Ę,	,																						
Ē																							
Ē																							
- 8	3											_							$\rightarrow$	+	$\dashv$		
9	"																		$\top$	$\uparrow$	1		-
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Ē																							
- 11												_							+	+	$\dashv$		_
L	1								I														

				PR	OJECT	: Rabas	ska Pr	oject	(Phase 2)	), Levis	, Queb	ес			BORE	HOLE	≡: <b>B</b>	3H-3	04-0	15
		Т	matach	SIT	E:	West	Optio	n Site							PAGE	: _	1	OF	1	1
,	▼		rratech	FIL	.E NO :	<u>T-105</u>	0-B (	(6033	33-KELL)						CASI	NG :	NW			
	•			во	RING	DATE :		2005	-04-07	T	ю_	2005-	04-0	)7	CORE	BAR	REL	: NC	23	
		BORIN	G LOG	DA	TUM :		Geod	letic			cod		TES	: 51	187608	.64 N		2616	85.01	Е
SAN	IPLE CO	ONDITION	TYPE OF SAMPLER			LABOF	RATO	RY A	ND IN SIT	TU TES	т			Field V	/ane	(5	Su)		ntact	
$\geq$	Rem	oulded	SS Split spoon			GS G	rain si	ze an	alysis						ano	(5	Sur)	♦ r	emou	Ided
	∬ Undi ∎ Lost	sturbed	ST Thin walled Shelby tub PS Piston sampler	е			onsoli nit we	datior iaht (k	N/m³)					Swedis	sh cone	e (0	Cur)	⊽ ii	ntact	Idad
	Rock	core	DC Diamond core barrel			CP C	ompre	essive	strength	(MPa)				Dyn. C	one Pe	n. Tes	st ×			-×
		STRA	ATIGRAPHY		Ε	;	SAM	PLES	3							DYN	. co	NE P	EN.	TEST
ε	μ - Ε				Ë		z	%		WAT			IT	JRY	STS		(blo	ws/0	.3m)	1
Ξ	е -			ЗÕГ	μ	ANC	10 E	ERY	R	an		115 (%)		RATC 22			50		100	
E D	EVA.	DE	SCRIPTION	ΥME	ERI	PE UMI	DN	NOX	or F	w,	- W	, w		BOF	SITL	UN	DRA		) SH	EAR
				S	VAT	μz	U S	REC	z	⊢ 20			-	LA	Z	3	I REI	NGII	1 (KP	'a)
-	66.06 <b>0.00</b>	GROUND SUR	RFACE	~~							40								+	+
Ē	\ <u>65.86</u> <b>0.20</b>	Compact brown	n silt, some sand and			SS-1	$\boxtimes$	83	18											
-		gravei.		⊜ •⊽	₩.															
	64.84			وأيا ا	-04-15	SS-2	$\bowtie$	67	13										_	
Ē	1.22	gravel.	n sand, some silt and	ي. م	2005															
- 2					u ou	SS-3		50	10								$\square$			
Ē	63.62				65.36															
Ē	<b>2.44</b> <u>63.32</u>	Very dense bro gravel.	own sand, some silt and	8 12/1	elev.	SS-4	$\bowtie$	100	48											
- 3	2.74	Bedrock: Very mudstone, laye	poor to poor quality grey ers of calcareous	XX	vel at	SS-5		0	50/8cm											
Ē		mudstone and 60-80° from bo	dark shale. Beddings at rehole axis.	XX	ater le															
Ē				X	Ř	DC-6		100	44											
Ē																				
Ē	61.41 <b>4.65</b>	Fair quality gree	v mudstone lavers of																	
- 5		calcareous mu Beddings at 60	dstone and dark shale. -80° from borehole axis.									+ +								
Ē				XX		DC-7		100	65											
ŧ,																				
ǰ	59.84 <b>6.22</b>	END OF BORE	HOLE	ŔŔ				-												
Ē																				
Ē 7												+					+	+	+	+
É																				
Ē,																				
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Ē																				
<b>–</b> 9												+						+	+	+
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Ē																				
É 11																	$\perp$		$\perp$	$\square$
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					PR	OJECT	: Rabas	ska Pr	oject	(Phase 2)	), Levis,	Queb	ес			BORE	HOL	E: /	BH-	305	-05	_
			Т	nnata a <b>l</b> a	SIT	Έ:	West	Optior	n Site							PAGE	:: _	1	_ 0	F _	1	
			jj ie	rratecn	FIL	E NO :	T-105	0-B (	6033	33-KELL)						CASI	NG :	NW	,			
		•			во	RING [	DATE :		2005	-04-11	т	o	2005	5-04- <sup>-</sup>	11	CORF	BAF	REI	- N	103		_
		1	BORINO	G LOG		тим∙		Geod	etic				אוחפר	TES	. 51	87745	35 N	J	. <u></u> 261	584	61 F	-
S 4 1		<u> </u>												ATE 3		01140		<u> </u>				—
	1	Remo	oulded	SS Split spoon			GS G	rain si	ze an	alysis	IU IES	1			Field V	ane	(; (;	Su) Sur)	$\diamond$	rem	ct oulde	ed.
	2	Undis	sturbed	ST Thin walled Shelby tube	е		C C	onsoli	datior	1					Swedis	sh cone	÷ ((	Cu)	$\nabla$	intac	ct	-
		Lost	core	PS Piston sampler			D UI CP C	nit we	ight (ł ssive	(N/m³) strenath	(MPa)				Dvn C	ono Pr	)) T T C	Cur)		remo	oulde	ed .
		TUCK	STRA	ATIGRAPHY				SAM	PLE	S	(ini u)				Dyn. C		iii. Te	51	<u>×</u>		x	:
	ε					Е					WAT	ER C	ONTE	NT	≿	S	DYN	i. CC (ble	)NE ows/	PEN /0.3r	1. TE n)	ST
<u>з</u>	Z	Ξ <u>Ξ</u>			2	VEL	D R	NO	۲ %	Q	and	d LIM	ITS (%	)	Ď.	ES]		50	)	10	o´	
PTH	ATIC	PTH			MBC	S LE	e al Mbe	E	VER	r RG					DRA	2 E T			'			_
B	2	١Ľ	DE	SCRIPTION	SYI	Ξ	T ₹ NU	NON NO	S:	No	w,	, w	V	L	ABC	N SI	S	TRE	NG1	. D S ГН (I	неа kPa)	)
	LL 6	<b>J</b>		FACE		Ň			В		20	40	60 8	0		=		50	)	10	0	
-	6	<b>7.00</b> 4 01	Asphalt (50mm)	).			SS-1	$\bigtriangledown$	82	12									$\neg$	$\neg$		
Ē	Ğ	0.05	Compact brown to silty, gravel.	and grey sand, some silt	<i></i>	-	33-1		02	12												
Ē,				-	5 G	04-15		$\bigtriangledown$		10												
Ē	6	2.77	De dre els Merer			5005-(	SS-2	$\square$	83	18												
Ē	'	.23	brecciated) gree	enish grey mudstone,	X	UO UO	SS-3	$\geq$	67	60/15cm												
Ē 2			fissile from 2.0	to 3.1m).	X	3.56m														$\dashv$		
Ē					××	ev. 6	DC-4		73	0												
Ē						late																
- 3	6	0.94 3. <b>12</b>	Fair quality dark	k grev mudstone beds of		r leve	DC-5		83	0										+		
Ē			greenish grey n	nudstone (2-10mm thick).		Wate																
Ē,			Beddings at 50°	° from borehole axis.			DC-6		96	50												
F 4					XX																	
Ē																						
- 5							DC-7		100	67		_						_		$ \rightarrow$		
Ē	5	8.67			XX																	
Ē			END OF BORE	nole																		
F 6																				+		
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					PR	OJECT	: Rabas	ska Pr	oject	(Phase 2)	), Levis, (	Quebeo	;		BORE	HOLE	: <b>E</b>	3H-3	06-0	05
		N	Т	nnata a <b>l</b> a	SIT	Е:	West	Optior	n Site						PAGE	: _	1	OF		1
		2		rratecn	FIL	E NO :	T-105	0-B (	6033	33-KELL)	I				CASI	NG :	NW			
	•				во		DATE :		2005	-04-08	тс	)	2005-04	-08	CORE	DAD	DEI	• NC	23	
		B	ORINO	G LOG		тим.		Geod	etic	0100				<b>e</b> . 5	187802	27 N		2615	30.86	3 F
						10M .						COOF	RDINATE	<b>5</b> :	107002	27 11		2013	50.80	<u> </u>
		emoul	Ided	SS Split spoon			GS G	rain si	<b>RY A</b> ze an	alysis	IUTEST			Field	/ane	(S	Sur)	♦ 1	ntact	ılded
	Ur	ndistu	irbed	ST Thin walled Shelby tube	е		C Co	onsoli	datior	1				Swedi	sh cone	(C	Cu)	v i	ntact	
		st ok or		PS Piston sampler				nit we	ight (l	(N/m³)	(MPa)			Dum		(C	Cur)	▼ r	emou	ulded
			STRA					SAM	PLE	Sucingui				Dyn. C	Jone Pe	n. res	<u>, x</u>	<		-×
	ε					Е					WATE		NTENT	≿	S	DYN.	. CO (blo	NE F ws/(	'EN. ).3m`	TEST
В -	NO 1	E			Ļ	VEL	9 ¥	NO	۲ %	Q	and	LIMIT	S (%)	TOF	ESI		50		100	,
HH	ATIC				1BO	Ē		E	VER	RQ				DRA	and LU T					
Ш			DE	SCRIPTION	SYN	TER	ΝŪΝ	NO.	Ő	N ol	w <sub>P</sub>	W	wL	ABC	IS N	UN	DRA TREI		) SH H (ki	EAR Pa)
		_		5405		MA		0	R		20	40 6	0 80	<b>ن</b> ـ	2		50		100	-
-	61.4	8	Topsoil.	FACE	<u> I</u>							+					-	+	-	
	0.10	2	Compact to loos to silty, some gr	se brown sand, some silt	0		SS-1	$\square$	79	11										
Ē,			<i>,,</i> , , , , , , , , , , , , , , , , , ,		\$	¥.		$\bigtriangledown$												
						-04-1	SS-2		54	9										
	59.9 <b>1.5</b> 2	6 2	Very poor to fair	r quality light grey		2005	SS-3	T	33	60/8cm										
- 2			mudstone, layer mudstone, few o	rs of calcareous dark shale beds.	××	u ou	<b>DO</b> 4		100					_				_		
-			Beddings at 60°	° from borehole axis.		50.72	DC-4		100	24										
						elev. (														
- 3						el at e								_				-	_	
-						er lev	DC-5		100	59										
-						Wate	200													
E 4	57.1	6			××															
-	4.32	2	END OF BORE	HOLE																
- 5														_			$\square$			
- 6														-			+	+	+	
- 7																		-		
Ē																				
- 8																				
9											- -			-		$\vdash$	+	+	+	
- 10														-		$\square$	+	+	+	
														1			$\top$			
Ł																				

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				F	OJECI	: Rabas	ska Pr	oject	(Phase 2)	), Levis	, Que	ebec			BORE	EHOL	.E : _/	BH-	307	-05	_
			mataah	SIT	Е:	West	Optior	n Site							PAGE	E: _	1	_ 0	F _	1	
	◄	j ie	rratecn	FIL	E NO :	<u>T-105</u>	0-B (	6033	33-KELL)						CASI	NG :	NW	/			
	•			во	RING	DATE :		2005	-04-08		го		2005-04	-08	CORE	E BAF	REL	.: N	IQ3		
	]	BORIN	G LOG	DA	TUM :		Geod	etic			С	DORI		s: _5	5187922	.39 N	١	261	1417.	47 E	
SAMP	LE CO	NDITION	TYPE OF SAMPLER			LABOF	RATO	RY A	ND IN SIT	TU TES	бт			Field	Vane	(	Su)	$\diamond$	inta	ct	
	Remo	oulded	SS Split spoon			GS G	rain si	ze an	alysis							(	Sur)	•	rem	oulde	эd
	Lost	sturbed	PS Piston sampler	е			nit we	ight (k	N/m³)					Swed	ish cone	e (	Cu)	$\bigtriangledown$	inta rem	ct oulde	h-
	Rock	core	DC Diamond core barrel			CP C	ompre	essive	strength	(MPa)				Dyn. (	Cone Pe	en. Te	est	× - ·		×	,u <
	-	STR	ATIGRAPHY		ε	:	SAM	PLES	3							DYN	I. CC	ONE	PEN	I. TE	EST
ε	ב 2 ב				EL .	0 ~	z	%	•	WA	TER สาม	COI MITS	NTENT	ORY	STS		(bl	ows	10.3r/	n) ^	
L 두   중				BOL	LEV	ANI Ber	E E	ERΥ	RQD	an			J ( 70)	<b>TAT</b>	л Щ					U	
		DE	SCRIPTION	MΥS	<b>TER</b>	YPE		So	l or	w	Р	w	wL	BOI	SITI	UN			ED S	HEA kPa	١R
_   ī	╝╴			"	MAT	<u> ۲</u>	ŏ	RE	2	⊢ 20	40	⊖ 60	80	LA	Z		5	0	10	n a, 0	,
5	52.81 0.00	GROUND SUR Topsoil.	FACE	 7-1-1	2						+						Ĩ		_		
	<u>52.66</u> 0.15	Loose brown sa	and, some silt to silty,		5-04-1	55-1	$\square$	85	9												
	0.61	Poor to fair qua	lity red mudstone, layers		n 200	SS-2		0	30/3cm												
E '		calcareous silts	stone. Beddings at 40-70°		em o																
					. 49.5	DC-3		85	54												
2					it elev						_	_		_							
				X	evel a																
					later I																
- 3					Z Z	DC-4		100	56												
4											_	_		_							
						DC-5		100	43												
	48.06 <b>4.75</b>	END OF BORE	HOI F	ŔŔ	X																
- 5														-							
- 6												_		_				$\square$			
- 7														-							
- 8														_							
- 9											-	+		-		$\vdash$					
											T	T						$\top$	Ī		
- 11												-+		-		$\vdash$		$ \rightarrow$			

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		<u> </u>		PR	OJECI	: Rabas	ska Pro	oject	(Phase 2)	), Levis,	Quebe	ес			BORE	HOL	E: /	BH-	401	-05	_
		Т	matach	SIT	Έ:	West	Option	Site							PAGE	£: _	1	_ 0	F _	2	_
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-B (	6033	33-KELL)						CASI	NG :	NW	!			
	•			во	RING I	DATE :		2005	-04-12	T(	o _	200	5-04-′	13	CORE	E BAR	REL	.: _	<u> </u>		
		BORIN	G LOG	DA	TUM :		Geod	etic			coo	RDIN	ATES	: _5	186551	.27 N	1	261	610.	76 E	
SAN	IPLE CO	ONDITION	TYPE OF SAMPLER			LABOR	RATO	RY A	ND IN SIT	U TEST	•			Field \	/ane	(?	Su)	$\diamond$	inta	ct	
	_ Rem ∅ Undi	ioulded isturbed	SS Split spoon ST Thin walled Shelby tub	be		C C	rain siz onsolio	ze an Iatior	alysis i					Swedi	sh cone	3) -	Sur) Cu)	<ul> <li>♦</li> <li>□</li> </ul>	rem	oulde ct	эd
	Lost		PS Piston sampler			D Ur	nit wei	ght (k	(N/m³)							((	Cur)	▼	rem	oulde	ed
	Rocl	k core	DC Diamond core barrel	<u> </u>		CP Co	ompre SAMF	ssive	strength	(MPa)				Dyn. C	Cone Pe	≱n. Te	st	<u>×</u>	<u> </u>	×	(
	E				۲ :				-	WAT	ER C	ONTE	NT	۲۲	S	DYN	<b>CC .</b> ble)	)NE ows	PEN /0.3r	√. TE m)	ST
а Н	- u NO +			Ч	NEL	Q K	NO	۲۶ %	Q	and	LIMI	TS (%	6)	TOF	TESI		50	0	10	0	
	E T T			MBC	R LE	PE A	<b>IDIT</b>	OVE	or R(				•,	ORA	ITU -	UN		AINE	D S	HEA	AR
		DE	SCRIPTION	sγ	ATE	IYF NU	co	SECC	Z	••• <sub>P</sub> ⊢	₩ —⊙		<sup>v</sup> ∟ ∤	LAB	N S	S	TRE	NG	TH (	kPa)	)
	76.58	GROUND SUF	RFACE		3			<u> </u>		20	40	60 E	0 				50	) —+	10	0	
Ē	0.00 76.38 0.20	Topsoil. Compact to de	nse brown sand, some silt	11		SS-1	$\ge$	71	3												
Ē		to silty, some g boulders.	ravel, cobbles, occasional	o ⊙ () o																	
				0 g		SS-2	$\wedge$	62	45												
Ē				4.0			$\bigtriangledown$														
- 2						SS-3		62	37			-						_			
Ē	74.14	Donso to vonu	donso roddish grov sandy			SS-4	$\ge$	89	50/8cm												
Ę,		gravel, cobbles	and boulders.			DC-5		43													
ǰ				· · · · ·		SS-6	$\times$	74	82/28cm												
Ē						DC-7		91													
<b>4</b>						SS-8	$\geq$	89	50/8cm			-						_			
Ē	72.01	Duration	1	•. <b>•</b>		DC-9		67													
5	4.57	some silt and g	ravel, occasional cobbles	• •		SS-10	imes	62	54			_							_		
E																					
Ē				∘₀℃		SS-11	imes	75	38												
6				<b>0</b>			$\overline{}$														
Ē						SS-12		62	34												
- 7				Ø ⊲							_						$\rightarrow$	-+	_		
Ē				1																	
Ē.				0.0 0.0		SS-13		8	29												
ǰ				De o																	
						DC-14		17													
- 9						SS-15		٥	25/0cm		+	+				$\vdash$	$\neg$	+	$\dashv$	-+	_
						DC-16		100													
- 10						SS-17		42	31		_	_				$\square$	$\square$	$\square$	$\square$	$\square$	
				a ()		DC-18		33													
	65.91 <b>10.67</b>	Compact reddi	sh grey silty sand,				$\searrow$														
- 11 -		occasional grav	vel.			SS-19	$\land$	67			+	1				H	+	+	$\neg$	+	
E																					

					PR	OJECT	: Rabas	ska Pr	oject (	Phase 2	), Levi	is, Qu	iebec				BORE	HOL	E: /	BH-	401	-05	_
		M	То	matach	SIT	'E :	West	Optior	1 Site								PAGE	:: _	2	_ 0	F _	2	
				rratech	FIL	E NO :	<u>T-105</u>	0-B (	60333	3-KELL)							CASI	NG :	NW	1			
					во	RING	DATE :		2005-	04-12		то		2005-	04-1	13	CORE	E BAF	REL	.: :			
		B	ORIN	G LOG	DA	TUM :		Geod	etic			с	OOR	DINA.	TES	: _ 51	86551	.27 N	1	261	1610.	76 E	
SAN	IPLE	COND	ITION	TYPE OF SAMPLER			LABOR	RATO			Γυ τε	ST				Field V	ane	(1	Su)	$\diamond$	intar	ct	
	] Re	emould	ed	SS Split spoon	0		GS G	rain si	ze ana	alysis								(	Sur)	٠	rem	oulde	۶d
	Lc	ost	Jeu	PS Piston sampler	C			nit wei	ight (k	N/m³)						Swedis	sh cone	; (i (	Cu) Cur)	▽	intao rem	ct oulde	ed
	R	ock cor	e	DC Diamond core barrel			CP Co	ompre	ssive	strength	(MPa)	)				Dyn. C	one Pe	n. Te	st	<u>×-·</u>		X	<u></u>
	E		STRA	ATIGRAPHY		E		SAM	PLES	;		TEE				~	~	DYN	I. CC	)NE	PEN	1. TE	ЗST
ε	- N	ε				ĒĽ.	<u>م</u>	z	% /	0	WA ai	nd L		NIEF S (%)		OR)	ESTS		(blo	ows: n	/0.3r/ 10	n) 10	
Ē	I O	Ē			BOL	LEV	AN	OITIO	ER)	RQI	- u			• (70)		RAT		·					
БР	E V P	DEP	DE	SCRIPTION	SYM	TER	ΥΡΕ		S S	N or	v	V <sub>P</sub>	w	w	L	ABO.	SIT	UN			:DS TH(	HEA kPa)	R
	□□□					M		U	RE	-	20	040		 D 80		ב	Z		5(	0	10	0	
<u> </u>		(	Compact reddis	sh grey silty sand,																		+	
Ē		C	occasional grav	/el.	ø		SS-20	$\bowtie$	46	25													
- 13					0																		
Ē																							
Ē					a 0			$ \sim$															
- 14					9		SS-21	$\bowtie$	58	15			_									-	
Ē					6																		
- 15					-0																		
Ē						8		$\succ$															
Ē	60.7	'3					SS-22		38	15													
- 16	15.8	85 E	END OF SAMP DYNAMIC PEN	LING and start of														*	(	_	_	_	
Ē		F	Probably: Com	pact sand.														× '					
E 17																		*					
Ē	59.0	8																ĺ	``*				
Ē	17.5	50 F	Probably: Dens pravel. occasio	e to very dense sand with nal cobbles.															×.				
- 18			, ,																	–×	<u> </u>	-	
Ē																					×		
- - 19																				$\square$	<u>x^1</u>		
Ē																					X	``.	
E																						X	Ę
- 20	56.4 <b>20.1</b>	16 1 <b>2</b> F	END OF DYNA											+					$\neg$	$\dashv$	$\neg$	+	×
		1	TEST																				
- 21																			$ \rightarrow$	$\square$	$\square$	$\square$	
- 22														+						+		+	
23																			$\square$	$\square$	$\square$	$\square$	
Ē																							
t																							

					PR	OJECT	: Rabas	ska Pr	oject	(Phase 1)	), Levis /	Beaum	iont	ВО	REHOI	LE :	W-0	)01-	-04	
			Т	nnata a <b>l</b> a	SIT	Έ:	West	Optior	n Site					PAG	3E:_	1	_ 0	F_	1	
			j ie	rratecn	FIL	E NO :	<u>T-105</u>	0-A (	6033	33-RABA	)			CA	SING :	<u> </u>				
		•			во	RING I	DATE :		2004	-09-29	то	)	2004-09-	29 <b>CO</b>	RE BA	RREL	.: N	IQ3		
		ł	BORIN	G LOG	DA	TUM :		Geod	etic			COOF		51867	43.66	N	261	454.	50 E	_
SAN	/PLE	CO		TYPE OF SAMPLER			LABOF	RATO	RY A	ND IN SIT	U TEST			Field Vane		(Su)	<u> </u>	inta	ct	_
	J F	Remo	ulded	SS Split spoon			GS G	rain si	ze an	alysis	• -=••					(Sur)	•	rem	oulde	ed
	∭ ι ■ ι	Jndis	turbed	ST Thin walled Shelby tube	е			onsoli ait wa	datior	N/m <sup>3</sup> )				Swedish co	ne	(Cu)	$\bigtriangledown$	intad	ct	
	■ └   F	Rock	core	DC Diamond core barrel			CP C	ompre	essive	strength	(MPa)			Dyn. Cone	Pen. T	(Cur) est	▼ ×-·	rem	oulde	ed ≥d
			STR/	ATIGRAPHY		c		SAM	PLE	6										:ет
_	5								%		WATE	RCO	NTENT	RY TS		(bl	ows	/0.3r	n)	.51
	NO	- T			Ъ	EVE	UN R	NO	RY	ap	and	LIMIT	'S (%)	ATO d TES		5	0	10	0	
L L	/ATI	ΕL			MB	RL	PE A	1 1 1	OVE	or R(				an OR/	u	NDR	AINE	DS	HEA	٩R
۵ I	Ē	ä	DE	SCRIPTION	S	ATE	Σ Σ	5 C	ы	z	<sup>w</sup> P ⊢	₩ —⊙-		LAB N S		STRE	ENG	TH (	kPa)	)
	<b>11</b> 78.	.14	GROUND SUR	FACE		Ň			œ		20	40 6	0 80			5	0	10	0	
Ē	<b>0.</b> 78.	<b>00</b> .04	Topsoil.	mo silt and gravel			SS-1	$\geq$	83	50/15cm										
Ē	0. 77	<b>10</b> .91	Bedrock: Poor	quality grey clayey			DC-2		100	0										
Ē 1	0.2	23	limestone with a layers (1 to 10n	20-25% undulated shale nm thick) at 60° from			DC-3		96	0		-		-			$\vdash$	$\rightarrow$		_
Ē	76.	77	borehole axis.																	
Ē	"		with 20-25% u	ndulated black shale																
<u></u>			borehole axis.	Infinite at our norm			DC-4		100	82				-						-
Ē																				
ŧ,						0-06														
Ē						004-1														
Ē						on 2														
Ē 4						5.64m	DC-5		98	91		_		-			$\vdash$	$\rightarrow$		_
ŧ						ev. 75														
Ē						l at el														
5						r leve						-		-	-					-
Ē						Wate	DC-6		100	100										
Ē,	70	00																		
Ē	6.	.02 12	END OF BORE	HOLE	(11/2/17															
Ē																				
F 7														-		$\left  \right $		-		_
Ē																				
Ē																				
, <b>−</b> 8														-						
140.0																				
	1																ļ			
10														-		+		-		
11												-		-	$\vdash$	+	$ \dashv$	+	+	$\neg$

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					PR	OJECT	: Raba	ska Pi	roject	(Phase 1)	), Levis	s / Bea	umont		В	OREHC	LE :	W-	002-	04
			То	matach	SIT	Έ:	West	Optio	n Site						P/	AGE :	1	_ c	)F _	2
				rratech	FIL	E NO :	<u>T-105</u>	0-A	(6033	33-RABA	.)				C/	SING	: <u>NV</u>	٧		
		•			во	RING I	DATE :		2004	-09-22	_ ·	то	200	)4-09-	23 CO	DRE B	ARRE	L: !	NQ3	
		I	BORIN	G LOG	DA	TUM :		Geod	letic			со	ORDIN	IATES	5186	907.61	N	26	1713.	80 E
SAN	MPI	LE CO	NDITION	TYPE OF SAMPLER			LABO	RATO	RY A	ND IN SIT	TU TES	ST			Field Van	e	(Su)	$\diamond$	inta	ct
		Remo	oulded	SS Split spoon	•		GS G	rain s	ize an	alysis							(Sur)	•	rem	oulded
		Lost	aurbed	PS Piston sampler	e			nit we	ight (k	ı xN/m³)					Swedish o	one	(Cu) (Cur)		intao rem	ct oulded
		Rock	core	DC Diamond core barrel			CP C	ompre	essive	strength	(MPa)				Dyn. Cone	Pen.	Test	× -		×
			STR/	ATIGRAPHY		ε		SAM	PLES	6						נס	N. C	ONE	PEN	I. TEST
ε		2 2				EL	<u>م</u>	z	%	•	WA	TER (	CONT	ENT	ORY 0510	010	(b) ,	iows	;/ <b>0.3r</b>	n) 0
Ξ	Ē	탈			BOL	ΓEΛ	ANI BER	E	ERY	RQD	a			/0)	RAT					U
E E			DE	SCRIPTION	MΥ	ER	YPE		So	l or	w	ΡV	v	wL	BOI	π, U			ED S	HEAR kPa)
	ū				•,	MA		Ŭ	RE	~	⊢ 20	40	)	-  80	23	2	E I I	50	10	0
-	7	6.40	GROUND SUR	FACE				$\geq$				-	<u> </u>	+-			+	+		-
Ē		0.25 0.15	Loose to compa to silty sand, so	act brown sand, some silt ome gravel.	0.		SS-1		33	6										
Ē,				5	0			$\triangleright$												
Ē	7	5.00				-90	SS-2		42	14										
Ē	7	<b>1.40</b> 4.57	Dark brown gra	ivel and sand, some silt.		04-10		$\bigtriangledown$												
- 2	2	1.83	Bedrock: Very   mudstone	poor quality dark grey		on 20	SS-3		79	34	$\odot$				GS	_	+			
Ē						40m	SS-4	$\bowtie$	81	90/25cm					Pyrite					
Ē,	7	3.50	Deer quelity de			ev. 75	DC-5		75	0					detection					
	<b>`</b>	2.90	calcareous, lay	ers at 40° from borehole		l at el	DC-6		100	33										
Ē			axis, readily cle pyrite.	avable, presence of		r leve	DC-7		100	53										
F 4	L					Wate						_	_	-		$\vdash$	+	<u> </u>	$\left  \right $	
Ē							DC-8		100	32										
Ē																				
- 5	7	1.04					DC-9		100	32										
Ē	1	5.36	Good to excelle mudstone, sligh	ent quality dark grey ntly calcareous, layers at			50.40		400											
- 6	;		40° from boreh presence of py	ole axis, readily cleavable, rite.			DC-10		100	80		_	_	-		$\vdash$	+	<u> </u>	$\left  \right $	
Ē									1						D = 26.2					
Ē.							DC-11		100	75					CP=4.5					
Ē																				
Ē							DC-12		100	100										
- 8	3												_	-			+	<u> </u>		
							DC-13		67	28										
2							2010		01	20										
9	2																+			
10							DC-14		100	97	-			-		$\vdash$	+	$\left  - \right $	$\mid \mid$	
							DC 15		22	0										
- 11 							00-15		. 03	U			+	+			+			
							DC-16		100	100										
															D = 26.5					

					PR	OJECT	: Rabas	ska Pi	oject	(Phase 1)	), Levi	is / Be	eaumo	ont		BORE	HOLE	. 1	<i>w-oc</i>	)2-04	1
			То	rratach	sn	ΓE :	West	Optio	n Site							PAGE	:	2	OF	2	
				rratech	FIL	E NO :	<u>T-105</u>	0-A	(6033	33-RABA	)					CASIN	1G :	NW			
		• /			вс	oring i	DATE :		2004	09-22		то		2004-09	-23	CORE	BARI	REL :	: <u>NC</u>	13	
		ŀ	BORINO	G LOG	DA	TUM :		Geoc	letic			с	OOR	DINATE	<b>3</b> : _51	86907.	.61 N		2617	13.80	<u>E</u>
SAN				TYPE OF SAMPLER	1				RY AI	ND IN SIT	ΓU ΤΕ	ST			Field V	ane	(S	u)	🔷 ir	ntact	
	ן ד ∑ נ	Jndis <sup>.</sup>	uided turbed	ST Thin walled Shelby tube	е			onsoli	dation	aiysis					Swedis	h cone	(S (C	ur) Cu)	<ul><li>♦ n</li><li>∇ in</li></ul>	emoule ntact	ded
		ost		PS Piston sampler			D U	nit we	ight (k	N/m³)		、				_	(C	ur)	v ▼ r	emoul	ded
	F	KOCK	core STRA			_		SAM		strengtn S	(IVIPa	)			Dyn. Co	one Pe	n. Tes	<u>t ×</u>	<u> </u>	<u></u>	- ×
	ε					Е -			6		WA	TER	col	NTENT	RY	TS	DYN.	CO (blo	NE P ws/0	EN. T .3m)	rest
	NO	ε - -			οг	EVEI	N N N N	NOI.	RY %	g	a	nd Ll	IMIT	S (%)	ATO	TES.		50		100	1
EPT	VATI	EPTI	DE		/MB(	R LI	PE A JMBI	NDIT	OVE	or R(	v	v	w	w	SOR/	, DTi	UNI	DRA	INEC	) SHE	EAR
□	Ē	ā	DE	SCRIPTION	S	IATE	Σĭ	CO	REC	z		•Р 	•		LAE	S N	SI	RE	NGT	┨(kPa	a)
			Excellent quality	v dark grev mudstone	7.17.1	\$			_		2	0 40	0 60	80	CP=22	0		50		100	
Ē			slightly calcared	ous, layers at 40° from					-						07-22	.9					
Ē			presence of pyr	ite.																	
- 13							DC-17		100	87										_	
Ē																					
- 14															-			+			
Ē							50.40			100											
- 						8	DC-18		100	100											
Ē'	61.	.01																			
Ē	15.	.39	END OF BORE	HOLE																	
- 16															_			+		_	
Ē																					
E 17															_						
Ē																					
Ē																					
- 18 -															_	·		+			
Ē																					
- 19															_		┢──┼╴	+			
Ē																					
Ē																					
F 20																		+	+	1	
- 21													-+		_		$ \rightarrow$	+	+	+	+
-																					
F 22																		1	╡		
- 23													_		_		$ \square +$	+	+	+	+
Ē																					

		_		PR	OJECT	: Rabas	ska Pr	oject	(Phase 1)	), Levis	/ Bea	umont			BORE	HOL	E :	W-C	)03-	04	_
		Т	matach	SIT	Έ:	West	Optio	n Site							PAGE	: _	1	0	F_	2	_
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-A	6033	33-RABA	)					CASIN	IG :	NW				
	•			во	RING I	DATE :		2004	-09-30	т	·o _	200	04-09-3	30	CORE	BAF	REL	.: N	IQ3		
	]	BORIN	G LOG	DA	тим :		Geod	etic			со	ORDIN	ATES	: 51	87142.	.54 N	1	262	011.	73 E	
SAM	PLE CO	NDITION	TYPE OF SAMPLER			LABOR	RATO	RY A	ND IN SIT	TU TES	т			Field Va	ane	()	Su)	$\diamond$	inta	ct	_
$\geq$	Remo	oulded	SS Split spoon			GS G	rain si	ze an	alysis							(?	Sur)	٠ ا	rem	oulde	ed
	Undis	turbed	ST Thin walled Shelby tub PS Piston sampler	e			onsoli nit we	datior iaht (k	N/m³)					Swedis	h cone	((	Cu)	$\bigtriangledown$	intad	ct	
	Rock	core	DC Diamond core barrel			CP C	ompre	essive	strength	(MPa)				Dyn. Co	one Pe	n. Te	est	▼ ×	rem	ouide – – ×	ea <
		STRA	ATIGRAPHY		۶		SAM	PLES	6									)NF		J TF	ST
	ے <sup>اع</sup>				Ē		-	%		WAT	ER C	CONT	ENT	JRΥ	STS		(blo	ows/	0.3r	n)	
- H	NOI - H			Ъ	EVE	AND	10	RΥ	QD	and	d LIN	NITS (S	%)	ATC	TES	1	50	)	10	0	
EPT	VAT	DE		ΥMB	К	PE / JMB	Ī	OVE	or R	w	. v	N	w.	30R ar	ITU	UN	IDR/	INE	DS	HEA	R
		DE	SCRIPTION	Ś	ATE	Żĭ	S	SEC.	z			• •—	L -	LAE	N S	S	TRE	NG	<b>ГН (</b>	kPa)	)
	77.53	GROUND SUR	RFACE	~ ~	3			-		20	40	60	80			+	50	<b>)</b>	10	0	
Ē	0.00	Fill: Crushed st Fill: Sand, grav	one			SS-1	$\times$	58	32												
	76.92	Peat.																			
- 1						SS-2	$\ge$	58	2			_						$\rightarrow$	+		
Ē																					
	75.70	0		~~ Ti 111		SS-3	$\ge$	33	1/46cm												
- 2 -	1.05	occasional grav	silt, trace to some sand, vel.	a																	
Ē				•	0-06	SS-4	$\ge$	62	15												
- 3				•	004-1																
				•	on 2	SS-5	$\boxtimes$	62	16												
	73.83	Compost arous	ailt with some alove	.,	5.33m																
- 4	0.70	Compact grey s	siit with some day.	КJ	ev. 7!	SS-6	$\mathbb{N}$	79	15	•				GS					-		
	73.14 <b>4.39</b>	Dense grey silt	, gravel, cobbles and		l at el																
		occasional bou	lders.		r leve	DC-7		0													
5				ە ھ ە	Wate	DC-8A		0													
Ē	71.89					200,1		Ũ													
- 6	<b>J.04</b>	Bedrock: Very mudstone, sligh	poor quality grey htly calcareous, layers of			DC-8B		78	0		_	_							_		
	71.10	borehole axis, t	trace of pyrite locally.			DC-9		100	0												
Ē	6.43	calcareous, lay	ers of light grey mudstone																		
- 7		(1 to 10mm thic axis, trace of py	ck) at 45° from borehole yrite locally.			DC-10		88	64										$\neg$		
Ē		,																			
ŧ.							Т														
F °						DC-11		100	77					D - 00	0						
						DO-III		100	,,					D = 26. CP=52.	3 .8						
- 9												_							_		
E																					
						DC-12		97	85												
- 10												-				$\rightarrow$	$\rightarrow$	+	+	$\neg$	
Ē	66.94						L.														
Ē "	10.59	Good to excelle slightly calcared	ent quality grey mudstone, out, layers of light grey																		
		mudstone (1 to borehole axis, t	10mm thick) at 45° from trace of pyrite locally.			DC-13		100	100										Τ		
Ē			-																		
Ē																					

					PR	OJECT	: Rabas	ska Pi	oject (	Phase 1	), Levis / I	Beaum	ont	BO	REHOLE	: I	N-00	3-04	_
			То	matach	sr	ſE :	West	Optio	n Site					PA0	€:	2	OF	2	_
				rratech	FIL	E NO :	<u>T-105</u>	0-A	(60333	33-RABA	)			CA:	SING :	NW			
		•			вс	RING I	DATE :		2004-	09-30	то		2004-09-	. <u>30</u> <b>CO</b> I		REL :	: <u>NQ</u>	3	
		I	BORIN	G LOG	DA	TUM :		Geoc	letic			COOF	RDINATES	<b>3</b> : 518714	2.54 N		26201	1.73 E	<u> </u>
SAN	1PL	E CO	NDITION				LABOR	RATO	RY A		IU TEST			Field Vane	(S	ŝu)	♦ in	tact	
		Undis	turbed	SS Split spoon ST Thin walled Shelby tub	е			rain s onsoli	dation	aiysis				Swedish co	(S ne (C	sur) Su)	♦ re ∇ in	mould tact	ed
		Lost		PS Piston sampler			D UI	nit we	ight (k	N/m³)					(C	Cur)	▼ re	mould	ed
		Rock	core STRA	TIGRAPHY				ompre SAM	PLES	strengtn	(мРа)			Dyn. Cone	<sup>2</sup> en. Tes	st ×	<u> </u>	>	×
	5					Е -			<b>,</b>		WATE	R CO	NTENT	۲S	DYN.	. COI (blo	NE PE /ws/0.	ΞΝ. ΤΙ 3m)	EST
l ₽ ¦	N N C	, E			ЭΓ	EVEI	N R	NOI	RY %	B	and	LIMIT	'S (%)	ATOF d TES'		50		100	1
I L		Ш			/MB(	R LI	PE A JMBI		OVE	or R(	w/	w	\A/	an an	UNI	DRA	INED	SHE	AR
□	Ц Ц		DE	SCRIPTION	s)	ATE	Σĭ	CO	REC	z	•*P 		"L —	LAB	S	TREM	NGTH	(kPa	1)
			Cood to overla	nt quality gray mudatana		3			_		20	40 6	0 80			50		100	
Ē			slightly calcared	bus, layers of light grey															
Ē	64	4.70	borehole axis, t	race of pyrite locally.			DO 44		100	05									
- 13	<i>'</i>	2.03	with layers of g	rey mudstone and black			DC-14		100	85							-		
Ē			shale, trace of p	pyrite.															
- 14														D = 26.6 CP=99.4			_		
Ē							DC-15		100	88									
Ē.							00 10		100	00									
- 15	62	2.22																	
Ē	1	5.32	END OF BORE	HOLE															
- 16														_			+		
E																			
E 17														_					
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Ē																			
- 22														1		+	$\top$		
Ē																			
- 23														-		+	+		$\vdash$

Signed Partner         PAGE:         1         OF         2           PIE:         Well-Option Bite         PIE:         2004:03-24         CARNES:         MM           BORNIC LOG         DESCRIPTION         Streamber Stre				_		PF	ROJECT	: Rabas	ska Pr	oject	(Phase 1)	), Levis /	Beaun	nont		В	OREI	HOLE :	W	<i>'-004</i>	-04
FLEND:         [1090.4]         (000331.R364)						si	TE :	West	Optior	n Site						P/	٩GE	: _1		OF _	2
DRING LOG         DRING ADTE         204-09-21         1         2000 NOT 15:         519886.10 N         20102/51E           ALTUN:         Condition         Statuscole         St				jj ie	erratecn	FI	LE NO :	<u>T-105</u>	0-A (	6033	33-RABA	)				C/	ASIN	G: <u>H</u>	W		
BORING LOG         DATUM:         Concentration         CORRENANCE I:         0100001 (1)         211025.54 E           AMPLE CONDITION         IV VE OF SAMPLER         LOG Contraction         IV VE OF SAMPLER         LOG Contraction         IV VE OF SAMPLER         LOG Contraction         IV VE OF SAMPLER         Vertice IV VE OF SAMPLER         Vertice IV VERON         VertiV VERON         VertiV VERON			•			в		DATE :		2004	-09-24	то	)	200	4-09-	28 <b>C</b> (	ORE	BARRE	EL :	HQ3	
SAMPLE CONDITION         TYPE OF SAMPLER         LABORATORY AND IN STUTIEST         Field Varie         (50)         Initial           Instance         3         Staff spoon         GS         GR         GR<			]	BORIN	G LOG		ATUM :		Geod	etic			000		ATES	· 5186	686.′	10 N	. <u> </u>	61925	.54 E
Becode         Soft apon         S	SA	MPI	LE CO	NDITION	TYPE OF SAMPLER		-	LABOR	RATO	RY A	ND IN SIT					Field Van		(Su)		ints	
C         Constrained PS         ST Thin valies Shelly tube PS         C         Consolidation         Swellshow         Swellshow         Swellshow         Consolidation           Rev core         D         Diamond core barrel         D         Units on participation         D         Units on participation         D         Units on participation         Swellshow         Swellshow         Swellshow         D         Diamond core barrel         D         Units on participation         D         Units on participation         D         Units on participation         D	$\triangleright$	$\triangleleft$	Rem	oulded	SS Split spoon			GS G	rain si	ze an	alysis	• -=••						(Sur	) 🍝	ren	noulded
No.c. core         DC: Damond core barrel         CP         Compressive stronght (MPa)         Dyn. Cone Pen. Test           E         STRATICRAPHY         SAMPLES         WATER CONTENT         E         Dyn. Cone Pen. Test         Phys. Cone Pen. Test           Fig. H         E         E         OP         Sample S         Dyn. Cone Pen. Test         Phys. Cone Pen. Test           7         Fig. H         E         OP         Sample S         Dyn. Cone Pen. Test         Phys. Cone Pen. Test           7         Sample S         OP         Sample S         Dyn. Cone Pen. Test         Phys. Cone Pen. Test           7         OP         OP         Sample S         Dyn. Cone Pen. Test         Phys. Cone Pen. Test           7         OP         OP         Sample S         Dyn. Cone Pen. Test         Phys. Cone Pen. Test           7         OP         OP         Sample S         Dyn. Cone Pen. Test         Phys. Cone Pen. Test           7         OP         Compact brown and come stand some			Undi	sturbed	ST Thin walled Shelby tu PS Piston sampler	ıbe			onsoli nit wei	datior ight (k	N/m³)					Swedish o	one	(Cu)		'inta	act
STRATIGRAPHY         E         SAMPLES         WATER CONTENT and LIMTS (%)         August biological state         OWN COLE PEN. TES (blows0.3m)           r         DESCRIPTION         00         1         1         00         1         1         00         1         1         00         1         1         00         1			Rock	core	DC Diamond core barrel			CP C	ompre	essive	strength	(MPa)				Dyn. Cone	e Per	נCur ו. Test	▼ (' × √	ren	10ulded
E         I				STR	ATIGRAPHY		F		SAM	PLES	3							DYN. C	:ON	E PE	N. TES
III Control       G       III Control       III Control       G       G       III Control       G	EPTH - m		EPTH - m			MBOL	er level - 1	PE AND JMBER	NDITION	OVERY %	or RQD	WATE and	R CC LIMIT	DNTI FS (%	ENT %)	SORATORY and		(b UNDF		s/0.3	m) DO SHEAR
75.15       GROUND SUBFACE       5       C       20       40       60       80       50       100         1       0.040       Fig. Compact brown and reddsh sand, some silt and grave to silt and grav					SCRIPTION	ŝ	ATE	Σ Σ	S	SEC.	z	••р 			L -		Z	STR	ENG	GTH (	(kPa)
1       0.000       Fill: Compact brown and reddish sand, some sill and gravel.       58-1       58       16         1       0.94       Compact brown and reddish sand, some sill and gravel.       58       12       46       12         2       7.8.5       Dense to very dense brown and reddish sand, some sill and gravel.       58       58       16       12         3       Dense to very dense brown and reddish sand, some sill and gravel to sill and gravel.       58       58       58       56         3       Dense to very dense brown and reddish sand, some sill and gravel.       58       56       56       56         4       Dense to very dense brown and reddish sand, some sill and gravel.       58       56       56       56         3       Dense to very dense brown and reddish.       56       56       56       56       56         4       Dense to very dense brown and reddish.       56       56       56       56       57         5       Dec.4       56       57       56       57       56       57       57         6       Dec.4       SS-11       SS-11       54       33       54       33       55         7       Dec.42       SS-13       78       77       71/20m		7	5.15	GROUND SUF	RFACE		<b>Š</b>					20	40 6	50 i	B0		$\square$		50	10	00
74.24       Compact brown and reddish sand, some sitt and gravel.       55.2       46       12         73.35       Dense to vary dense brown and reddish sand, some sitt and gravel is sitt and gravel is sitt and reddish and, some sitt and with trace of gravel and trace of clay, accasional cobdes and boulders.       95          3             4             5             6             6             7             8             8             8             9             8             8             8             8 <td></td> <td>  '</td> <td>0.00</td> <td>Fill: Compact b gravel.</td> <td>prown sand, some silt and</td> <td></td> <td></td> <td>SS-1</td> <td><math>\mid</math></td> <td>58</td> <td>16</td> <td></td>		'	0.00	Fill: Compact b gravel.	prown sand, some silt and			SS-1	$\mid$	58	16										
1       0.91       Compact brown and reddish sand, some sitt and gravel.         2       1.80       Dense to very dense brown and reddish and with trace of gravel and trace of cley, occasional obbies and boulders.       0.004         3		7	4.24																		
1       23.55       1.60       Dense to very dense brown and reddish sand with trace of gazwal and boulders.       0.2.3       95          3       1       0.2.4       58        58          4       0.2.4       0.2.4       0.2.4       0.2.4       0.2.4       0.2.4         5       0.2.4       0.2.4       0.2.4       0.2.4       0.2.4       0.2.4         6       0.2.4       0.2.4       0.2.4       0.2.4       0.2.4       0.2.4         6       0.2.4       0.2.4       0.2.4       0.2.4       0.2.4       0.2.4         7       0.2.7       0.2.7       0.2.7       0.2.7       0.2.8       0.2.8         7       0.2.8       0.2.8       0.2.7       0.2.8       0.2.8       0.2.8         8       0.2.8       0.2.8       0.2.8       0.2.8       0.2.8       0.2.8       0.2.8         8       0.2.8       0.2.7       0.2.8       0.2.8       0.2.8       0.2.8       0.2.8       0.2.8       0.2.8       0.2.8       0.2.8       0.2.8       0.2.8       0.2.8       0.2.8       0.2.8       0.2.8       0.2.8       0.2.8 <td>-</td> <td>1</td> <td>0.91</td> <td>Compact brow</td> <td>n and reddish sand, some</td> <td></td> <td>-10-06</td> <td>SS-2</td> <td><math>\bowtie</math></td> <td>46</td> <td>12</td> <td></td> <td></td> <td>+</td> <td>-</td> <td>-</td> <td> </td> <td></td> <td>+</td> <td>+</td> <td></td>	-	1	0.91	Compact brow	n and reddish sand, some		-10-06	SS-2	$\bowtie$	46	12			+	-	-			+	+	
2       7.80 sand, some sit and grave to suit and sand, some sit and some sit and sand, some sit and some sit and sand, some sit and grave to suit and sand, some sit and grave to suit and sand, some sit and some sit and sand, some sit and				- and gravel.		8	2004														
sand. some att and gravel to att and cisy. occasional cobbies and boulders.       5       0C-3       95          1       5       0C-4       58        58          5       0C-6       91       50/13cm       95          6       0C-7       0C-7       0C-7       91       50/13cm         7       0C-7       0C-7       0C-7       0C-7       0C-7         8        0C-7       0C-7       0C-7       0C-7         9       5        0C-7       0C-7       0C-7         9       0C-7       0C-7	-	2	<u>3.35</u> 1.80	Dense to very	dense brown and reddish		D 0 0									-					
3       3       5       0C-4       5       5-7       5       5-7       5       5-7       5       5-7       5       5-7       5       5-7       5       5-7       5       5-7       5       5-7       5       5-7       5       5-7				sand, some sil sand with trace clay, occasiona	t and gravel to silt and e of gravel and trace of al cobbles and boulders.	0	7 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	DC-3		95											
4       55-5       91       50/13cm         5       0C-7       69          6       69          7       0C-8       78          8       55-9       67       33       0       GS         9       55-9       67       33       0       GS         9       55-9       67       33       0       GS         9       55-13       79       71/23cm       0       0         10       85       50/3cm       0       0       0         11       63.90       55-13       79       71/23cm       0       0         11       53.90       Bedrock: Succession of layers of fair quality red and grey mudstone at 50° motor beak as.       55-13       79       71/23cm       0       0	-	3				9 <b>0</b> 9	∀. ∀. ∀ ₽ 0. ₽ evel a	DC-4		58						-	-		-		
4       bC-6       B3          5       bC-7       bC-7       bC-7         6       bC-7       bC-7       bC-7         7       bC-7       bC-7       bC-7         8       bC-7       bC-7       bC-7         9       bC-7       bC-7       bC-7         10       bC-7       bC-7       bC-7         11       bC-7       bC-7       bC-7         12       bC-7       bC-7       bC-7         13       bC-7       bC-7       bC-7         14       bC-7       bC-7       bC-7         15       bC-7       bC-7       bC-7         14       bC-7       bC-7       bC-7         15       bC-7       bC-7       bC-7         16       bC-7       bC-7       bC-7         16       bC-7       bC-7       bC-7         17.25       bC-7       bC-7       bC-7         10       bC-7       bC-7       bC-7         10       bC-7       bC-7       bC-7         100       bC-7       bC-7       bC-7         100       bC-7       bC-7       bC-7							d d d	SS-5	$\geq$	91	50/13cm										
5       6       69       69       69         7       69       78       78       78         8       54       33       67       33         9       54       33       67       33         9       54       33       67       10         10       58-10       54       33       10         11       63.90       58-11       85       50/3cm         10       58-11       85       50/3cm       10         11       63.90       54       33       10         11       53.90       56       50/3cm       10         10       85       50/3cm       10       85		4				e De	0 0 0 10 00 0 0 0 0			83											
5       0C-7       69          6       0C-8       78          7       0C-8       67       33       0       GS         8       55-9       67       33       0       GS         9       55-10       54       33       0       0       0         10       55-11       85       50/3cm       0       0       0         11       63.90       0       10       85       50/3cm       0       0         11       63.90       0       10       85       10       85       0       0								00-0		00											
6       0C-8       78          7       0C-8       78          8       67       33       0       GS         9       55-10       54       33       0       0         10       55       50/3cm       0       0       0         11       63.90       0       78        0         11       63.90       0       85       0       0       0         10       85       50/3cm       0       0       0       0         10       85       50/3cm       0       0       0       0						0 0		DC-7		69											
6       0C-8       78          7       58-9       67       33       0         8       58-9       54       33          9       58-10       54       33          10       58-11       85       50/3cm          11       63.90       58-13       79       71/23cm          11       63.90       56       100       85       50/3cm          10       0C-12       39             10       65       0C-14       100       85		5				0								-		-	┝		+		$\vdash$
6       7       33       0       65         7       8       67       33       0       65         8       9       67       33       0       65         10       54       33       0       0       0         11       63.90       67       33       0       0         11       63.90       67       33       0       0         10       85       50/3cm       0       0       0         10       85       50/3cm       0       0       0         10       85       50/3cm       0       0       0         10       85       0       0       0       0       0						0 0				70											
7       33       0       GS         8       54       33       0       GS         9       54       33       0       0         10       54       33       0       0         11       63.00       0       0       67       79         71.25       Bedrock: Succession of layers of fair quality red and grey mudstone at 50° more basis       79       71/23cm       100       85								DC-0		70											
7       8       67       33       0       68         9       55-10       54       33       0       65         10       54       33       0       0       0         11       63.90       67       39        0         11       63.90       54       33       79       71/23cm         10       79       71/23cm       79       71/23cm       100       85	-	°																			
7       8       54       33         9       54       33         10       54       33         11       63.90       50/3 cm         11.25       Bedrock: Succession of layers of fair quality red and grey mudstone at 50° from borehole axis.       55-11         10       85       50/3 cm         10       85       50/3 cm         11       63.90       56-11						U		SS-9	$\mid$	67	33	$\odot$				GS					
8       54       33         9       54       33         10       55       50/3cm         11       63.90       55       50/3cm         11       63.90       55       50/3cm         11       63.90       55       50/3cm         11       55       50/3cm       50/3cm         10       55       50/3cm       50/3cm         11       55       50/3cm       50/3cm         10       55       50/3cm       50/3cm         11       55       50/3cm       50/3cm         11       55       50/3cm       50/3cm         11       55       50/3cm       50/3cm         10       55       50/3cm       50/3cm		7				a a a							+	-		-	╞		+	+	$\vdash$
8       54       33         9       54       33         9       54       33         10       54       54       33         10       55       56       56         11       63.90       56       56       56         11       63.90       56       56       56																					
8       30       30       30       30         9       34       50       35       35         10       39       50       39       50       39         11       63.90       50       50       50       10       10         11       63.90       50       50       50       10       10       85       50/3 cm         11       63.90       50       50       50       50       10       10       85       50         11       63.90       50       50       50       50       10       10       85       10       10       10       85       10       10       10       85       10								SS-10	$\ge$	51	33										
9       39       39       50/3cm         10       39          11       63.90       50/3cm       50/3cm         100       85       60/3cm		8						00-10		94	55										
9       10       85       50/3cm         10       10       10       10       10       10         11       63.90       63.90       11.25       Bedrock: Succession of layers of fair quality red and grey mudstone at 50° from borehole axis.       10       10       85       100         11       63.90       11.25       Bedrock: Succession of layers of fair quality red and grey mudstone at 50°       10       85       100       85																					
$10   11   \\ 63.90   \\ \hline 11.25   Bedrock: Succession of layers of fair quality red and grey mudstone at 50° from borehole axis. \\ \hline 11   \\ 63.90   \\ \hline 11.25   Bedrock: Succession of layers of fair quality red and grey mudstone at 50° from borehole axis. \\ \hline 11   \\ 11 $		9														-	╞		+	<u> </u>	$\vdash$
10       Image: state of the s						9 9		SS-11	¥	85	50/3cm										
10       Image: state of the s																					
11     63.90       11.25     Bedrock: Succession of layers of fair quality red and grey mudstone at 50° from borehole axis.	1	0				0 0		DC-12		39			1			-			+	+	
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63.90     11.25     Bedrock: Succession of layers of fair quality red and grey mudstone at 50°     10     10     85	1	1				9.0 9		QC 12	$\searrow$	70	71/22000		_			-	ļ		$\perp$	<u> </u>	$\square$
quality red and grey mudstone at 50°	-	6 1	3.90 <b>1.25</b>	Bedrock: Succ	ession of layers of fair			33-13	F	79	/ 1/∠3CM										
				quality red and from borehole	l grey mudstone at 50° axis.			DC-14		100	85										

				PR	OJECT	: Raba	ska Pr	roject (	Phase 1	), Levi	s / Be	eaumo	ont		BOR	HOLE	:: <b>b</b>	N-00	4-04			
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	▼	jj ie	rratecn	FIL	E NO :	<u>T-105</u>	0-A (	(60333	3-RABA	.)					CASI	NG :	нw					
				вс		DATE :		2004-	09-24		то		2004-09-	28	CORE	BARI	RFI ·	• но:	3			
	1	BORIN	G LOG		тим ·		Geod	letic			C	008		. 5	186686	10 N		26192	25 54 F	=		
SAN							2470				ст ет		DINATES		/	.10 14						
	Rem	oulded	SS Split spoon			GS G	rain si	ize ana	alysis	IUTE	51			Field	/ane	(S (S	u) sur)	♦ in	tact mould	led		
	Undi	sturbed	ST Thin walled Shelby tub	e		сс	onsoli	dation						Swedi	sh cone	) ÷	;u)	⊽ in	tact			
	Lost	core	PS Piston sampler			D U CP C	nit we ompre	ight (k essive	N/m³) strenath	(MPa)					one Pa	C) on Tes	ur)	▼ re	mould	led		
		STR	ATIGRAPHY		_	0. 0	SAM	PLES	)	(				Dyn. C			<u>. x</u>		;	×		
_	8				<u>۳</u>			、。		WA	TER	co	NTENT	2	ß	DYN.	COI (blo	NE PI ws/0.	ΞΝ. ΤΙ 3m)	EST		
3 <u>-</u>	- u			۲	NEL	DN R	NO	۲ %	ð	ar	nd Ll	міт	S (%)	DI.	ES.		50		100			
HE	ATI( PTH			МВС	S LE	e ai Mbe	E	VEF	r RG					DRA	anc							
B	DE	DE	SCRIPTION	SYI	TEF	ΝUI	NON	00	ō N	w	P	W	wL	ABC	N SI	UNI S7		NGTH	SHE/ I (kPa	AR 3)		
	ш				٨v			R		20	) 40	) 6	) 80		=		50		100			
E		Succession of	layers of fair quality red															-				
Ē		anu grey muds axis.	IONE AL SU ITOM DOFENOIE			DC-15		100	33													
- 13				XX																		
Ē				XX		DC-16		98	71													
Ē						20.0																
- 14					D0 D0 D0 D0 ·D0 D0					$\vdash$	_			-			+	+	+			
Ē														D = 26	5.3							
Ē						DC-17		100	82					CP=2	2.0							
- 15																	+	+	+			
Ē	59.68 <b>15.47</b>	Succession of	lavers of good to excellent																			
E 16		quality red and from borehole a	grey mudstone at 50° axis.																			
ŧ "						DC-18		100	85													
Ē																						
- 17														-				_	—			
Ē																						
Ē						DC-19		100	100													
- 18																	+	+	+			
Ē							┝┛															
E 10														D = 2 CP=1	7.2 9.5							
						DC-20		100	92	[												
ŧ																						
- 20							┝┛			$\vdash$	-+			-		$\vdash$	+	+	+	$\square$		
Ē																						
ŧ						DC-21		95	95													
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Ē																						
E ,,																						
ŧ"						DC-22		100	100	[												
Ē	52.20																					
23	22.29 22.86	END OF BORE	EHOLE	<u>111/11</u>	··· ( ··· ·					$\vdash$				-		$\vdash$	+	+	+			
Ē																						
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Ľ	1			I			1	1			1			1		┶──└─			_			
					PR	OJECI	「: <u>R</u> aba	ska P	roject	(Phase 1	), Levi	is / Be	eaumo	ont		BORE	EHOL	.E :	W-	<u>005</u>	-04	
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			Т	matach	SIT	Е:	West	Optio	n Site							PAGE	E: _	1	_ 0	F_	2	
		▼		erratech	FIL	E NO :	<u>T-105</u>	60-A	(6033	33-RABA	.)					CASI	NG :	NW	1			
		•			во	RING	DATE :		2004	-09-29		то		2004-09-	29	CORE	Е ВАГ	REL	. 1	NQ3		
			BORIN	G LOG	DA	тим :		Geod	detic			0	OOR			186934	.47 1	۰– ۱	26	2210	.95 E	_
9/	M							PATO				ст ст			Eiold V	/200		· ·		into		
$\square$	$\leq$	Ren	noulded	SS Split spoon			GS G	irain s	ize ar	alysis		31				/ane	(	Su) Sur)	$\diamond$	rem	ct 10uldr	ed
		Und	listurbed	ST Thin walled Shelby tub	be		СС	onsol	idatior	1					Swedi	sh cone	э (	Cu)	$\nabla$	inta	ct	
		Lost	t k core	PS Piston sampler DC Diamond core barrel				nit we	eight (I essive	«N/m³) e strenath	(MPa)	)			Dyn (	one Pr	) an Te	Cur)	▼	rem	oulde	əd
		] 1.00	STF	RATIGRAPHY		_		SAM	PLE	S	( u)	,			Dyn. C				<u>*-</u>		,	<u></u>
		<b>E</b>				Е					WA	TER	R COI	NTENT	ž	S	DYN	1. CC (bl/	)NE ows	. PEI ;/0.3:	ч. те m)	EST
ع ا -		NO L			Ч	<u>V</u> EI	DZ K	NO	۲ %	Q	aı	nd L	іміт	S (%)	ĮŌ.	LES.		50	0	10	0	
L H		PTH			ИВС	2 LE	E A MBE	E	VEF	r RG					ORA	and TU						
믭			D	ESCRIPTION	SΥΙ	Ë	NUN	NO NO		o Z	N	P	W	wL	AB(	N SI.	S	TRE	ENG	=D S TH (	kPa	лк )
		<b>□</b>   77.55				M		10	R		20	04	0 60	80		=		5	0	10	0	
-	1	0.00 77.25	Fill: Loose gre	ey sand, gravel and silt.	$\otimes$			$\bigtriangledown$														
Ē		0.30	Peat.				SS-1		62	4												
Ē								$\geq$														
Ē	1	76.33 <b>1.22</b>	Loose brown	and reddish silty and	1 1 - 1 - 1		SS-2		25	2												
Ē			gravelly sand		. 6	-90-																
Ē	2				0 9	04-10	SS-3		46	8	$\odot$				GS							
	╞	75.26 <b>2.29</b>	Bedrock: Suc	cression of layers of very		on 20			7													
Ē			poor quality re	ed and grey mudstone with black clavey shale at 40°		25m	SS-4	$\mid$	88	100/28cm												
F	3		from borehole	e axis.		. 76.2			-						_							
						t elev	DC-5		90	13					Pyrite	ion						
Ē						evel a									ueleci							
Ē	4	73 01				ater le	DC-6		86	10					-							
Ē	F	4.34	Succession o	f layers of poor quality red		Ě																
Ē	5		black clayey s	shale at 40° from borehole			DC-7		100	47					D = 26 CP=6	5.4 5						
Ē	<b>]</b>	72.27	axis.												01 -01	.0						
Ē		5.20	and grey muc	dstone with thin layers of																		
È.	6		axis.	shale at 40 from borehole			DC-8		100	87												
Ē																						
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Ē																						
E																						

					PR	OJECT	: Rabas	ska Pi	roject	(Phase 1	), Levis	s / Bea	umon	t		BORE	HOLE	: I	<i>N-0</i> (	)5-04	4
1		N	Т	matach	sr	ΓE :	West	Optio	n Site							PAGE	:	2	OF	2	2
				rratecn	FIL	E NO :	<u>T-105</u>	0-A	(6033	33-RABA	.)					CASIN	1G :	NW			
1					вс	ORING I	DATE :		2004	09-29	1	то	20	04-09-	29	CORE	BAR	REL :	: <u>N</u> C	23	
		E	BORIN	G LOG	DA	TUM :		Geod	letic			со	ORDI	NATES	: 51	86934.	.47 N		2622	10.95	Ε
SAN	IPLE	CO	NDITION	TYPE OF SAMPLER			LABOF	RATO	RY A	ND IN SI	TU TES	БТ			Field Va	ane	(S	Su)	○ i	ntact	
	] R ℤ ⊔	lemo	ulded	SS Split spoon	۵		GS G	rain s onsoli	ize an	alysis					Ourselie		(S	Sur)	♦ r	emou	lded
	L	ost	uibeu	PS Piston sampler	C		D Ui	nit we	ight (k	N/m³)					Sweals	1 cone	(C (C	;u) Cur)	⊽ ii ▼ r	ntact emou	Ided
	R	lock	core	DC Diamond core barrel			CP C	ompre	essive	strength	(MPa)				Dyn. Co	one Pe	n. Tes	st ×	<u> </u>		- ×
	٤		5184			E			PLE	)	w۵٦		CONT	FNT	~	S	DYN.		NE P	EN.	TEST
ε	- N	ε			_	VEL	₽∝	z	Υ%	Δ	an	d LIN	NITS	(%)	TOR	EST		(DIO) 50	ws/u	.3 <b>m</b> ) 100	
H	ATIC	PTH			ЛВО	ГĒ У ГĒ	e an Mbe	DITIO	VER	RQ					RA.	5					
B	ΓE	Ū	DE	SCRIPTION	SΥΝ	TER	ΝU	NOC	С С С	о И	w	P V	N	w <sub>L</sub>	ABC	IS N		DRA [REI		) SHI H (kP	EAR 'a)
	ш					Ŵ			R		20	40	 	80	-	-		50		100	
_			Succession of la and grey mudst	ayers of good quality red											D - 26	5					
-			black clayey sh	ale at 40° from borehole			DC-13		97	85					CP=4.4	5					
- 13													_		-						
-																					
Ē																					
Ē							DC-14		100	91											
Ē																					
- 15	62. <b>15</b> .	54 01	END OF BORE	HOLE			-		-				-	_	-			_	_	_	
Ē																					
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Ē																					
20														_	-		$\vdash$	$\perp$	$\perp$	$\perp$	
21												+	+				$\rightarrow$	+	+	+	+
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22														_	-			$\downarrow$	$\perp$	$\perp$	
- 23												+	+				$\rightarrow$	+	+	+	+

				PR	OJECT	: Rabas	ska Pi	roject	(Phase 1)	, Levis /	Beaum	ont	во	REHOL	.E :	W-(	006-	04	_
		То	matach	SIT	Έ:	West	Optio	n Site					PA	€:_	1	_ 0	F _	2	_
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-A	(6033	33-RABA	)			CA	SING :	NW	/			
	•			во	RING	DATE :		2004	-09-28	то		2004-09-2	<sup>29</sup> co	RE BAI	RREL	.: <u>1</u>	VQ3		_
		BORIN	G LOG	DA	TUM :		Geod	letic			COOR	DINATES	51863	72.84 1	N	26′	1810.	50 E	
SAN	IPLE CO	ONDITION	TYPE OF SAMPLER			LABOR	RATO	RY A	ND IN SIT	U TEST			Field Vane	(	(Su)	$\diamond$	intac	ct	
	Rem	oulded	SS Split spoon	0		GS G	rain s	ize an	alysis					(	Sur)	٠	rem	oulde	d
	Lost	siurbeu	PS Piston sampler	C			nit we	ight (k	' (N/m³)				Swedish co	ne (	Cu) (Cur)	▽	intac rem	ct oulde	ed
	Rocl	core	DC Diamond core barrel			CP C	ompre	essive	strength	(MPa)			Dyn. Cone	Pen. Te	est	× -		X	
	u I	STR	ATIGRAPHY		Ε		SAM	PLES	6					DYM	1. CC	ONE	PEN	I. TE	ST
ε	Σ z ε				ĒĽ.	<u>م</u> م	z	% /	0	and		NIENI S (%)	OR) ESTS		(ble	ows 0	/0.3n	n) 0	
Ē	E H			BOL	ΓĒ	ANBEF	0E	ER)	RQI	unu		e (70)	RAT and U TE					<b>.</b>	
ШШ		DE	SCRIPTION	SYM	TER	YPE NUM		Sov	l or	w <sub>P</sub>	w	wL	ABO SIT	UN		AINE -NG	ED SI	HEA kPa)	R
					MAT	F -	Ŭ	RE	-	⊢ 20	<del>0</del>	 D 80	ĭ z		5	0	10	0	
	79.84 0.00	GROUND SUF Topsoil.	RFACE				$\bigtriangledown$				+ + +				$\vdash$		$\rightarrow$		
Ē	0.15	Loose brown s occasional grav	and, some silt (to silty), vel.			SS-1		75	9										
Ē,	79.00 <b>0.84</b>	Bedrock: Succ	ession of verv poor quality		-	SS-2	$\geq$	80	50/13cm										
Ē		grey mudstone black, red and	with subordinate layers of light grey, slightly	X	10-06	DC-3		98	0				Pyrite						
Ē		calcareous mu 50° from boreh	dstone. Beddings at 45° to ole axis. Calcite veinlets.		2004-								detection						
÷ 2				X	uo u							_							
Ē					78.99	DC-4		100	15										
Ė,					elev.														
Ē					vel at														
Ē					ter le														
<b>4</b>					Ŵ	DC-5		100	18										_
Ē																			
Ē,	74 81					DC-6		100	0										
Ē	5.03	Succession of	poor quality grey										D = 26 CP=18 7						
Ē		black, red and	light grey, slightly			DC-7		100	27				01 - 10.7						
- 6	73 50	50° from boreh	ole axis. Calcite veinlets.																_
Ē	6.25	Succession of	good quality grey																
Ē_		black and red r	nudstone. All layers at 45°																
Ḗ						DC-8		100	100										
Ē																			
- 8																			_
Ē						50.0		100											
Ē						DC-9		100	92										
- 9																			
Ē																			
- 10						DC-10		100	88				-						_
Ē						00-10													
Ē																			
F 11																	$\uparrow$		-
Ē						DC-11		100	100										
E				ŴŇ															

			PRC	JECT	: Rabas	ka Pr	oject (	Phase 1	), Levis / E	Beaum	ont	ВС	REHOL	.E :	W-0	06-0	04
		Torret	site	Ξ:	West 0	Optior	n Site					PA	.GE: _	2	_ OF	: _	2
	▼			E NO :	<u>T-105</u>	)-A (	(60333	3-RABA	)			CA	SING :	NW	/		
	•		BOF	RING E	DATE :		2004-	09-28	то		2004-09-	<sup>29</sup> co	REBA	RREL	.: <u>N</u>	Q3	
	]	BORING LC		TUM :		Geod	letic			COOR		<b>5186</b>	72.84 I	N	2618	810.5	50 E
SAM	PLE CO	NDITION TYPE OF	SAMPLER			АТО	RY AN		TU TEST			Field Vane		(Su)	$\diamond$	intac	t
	_ Rem ∬ Undi	sturbed ST Thin v	walled Shelby tube		C C	ain si onsoli	dation	aiysis				Swedish c	one	(Sur) (Cu)	◆ ▽	remo intac	oulded
	Lost	PS Pistor	n sampler		D Ur	nit we	ight (k	N/m³)						(Cur)	Ť	remo	oulded
	Rock	STRATIGRAPH				SAM	PLES	strengtn	(мра)			Dyn. Cone	Pen. Te	est	×		×
	<u></u> ۲			Е -			<b>`</b> 0		WATE	R CO	NTENT	7 2 7		<b>۱. CC</b> ble)	)NE I ows/	PEN 0.3m	. TEST 1)
- m	NO T		Ы	EVEI	UN B	NOI	RY %	B	and I		S (%)	ATOF d TES	1	50	0	100	ָּרָ רַ
EPT	VATI EPTI	DECODIDEIO	MB	R LI	PE A JMBI	NDIT	OVE	or R(	w	w	w	SOR/	) : UI	NDR/	AINE	D Sł	IEAR
		DESCRIPTIO	N ÍS	IATE	N	co	RC	z	"Р 				;   \$	STRE	ENGT	'H (k	(Pa)
				\$			_		20 4	40 6	0 80		_	50	0 	100	)
	67.44	Succession of poor quality s	slightly														
	12.40	calcareous grey mudstone,	layers of red														
- 13		borehole axis. Calcite veinle	ets.		DC-12		100	33				D = 26.7 CP=44.6					
- 14	65.92 <b>13.92</b>	END OF BOREHOLE		8								-		+		-+	
- 15																	
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- 21												-	-	$\vdash$	$\rightarrow$	+	+
- 22																	
<b>É 1</b>															T		
- 23												-	-	+	$\rightarrow$	+	+
Ē																	

				PR	OJECT	: Rabas	ska Pr	oject	Phase 1	), Levi	is / B	eaum	ont		I	BORE	HOLE	:: <b>I</b>	N-00	)8-04	1
		То	matach	SIT	E :	West	Optio	n Site							I	PAGE	::	1	OF	2	<u>.                                    </u>
	▼		rratech	FIL	E NO :	<u>T-105</u>	0-A (	60333	33-RABA	.)					(	CASIN	NG :	NW			
	•			во	RING I	DATE :		2004-	09-23		то		2004-0	)9-23	3(	CORE	BAR	REL :	: <u>NC</u>	23	
	]	BORIN	G LOG	DA	TUM :		Geod	etic			c	OOR	DINAT	ES :	518	6310.	.70 N		2622	88.52	E
SAM		NDITION		-		LABO	RATO	RY AI	ND IN SI	TU TE	ST			F	Field Va	ne	(S	su)	♦ in	ntact	
	Rem Undi:	oulded sturbed	SS Split spoon ST Thin walled Shelby tub	e			rain si onsoli	ze an dation	aiysis					5	Swedish	i cone	(S + (C	sur) Su)	♦ r ⊽ i	emoul ntact	ided
	Lost		PS Piston sampler			D U	nit we	ight (k	N/m³)								(C	Sur)	▼ r	emoul	lded
	Rock	core	ATIGRAPHY			CP C	ompre SAM		strength	(MPa	)			[	Dyn. Co	ne Pe	n. Tes	it ×	<u>;</u>		- ×
	<u>ا</u>		-		Е			<b>`</b> 0		WA	TEF	s co	NTEN	т	2	ΓS	DYN.	. COI (blo	NE P ws/0	'EN. 1 .3m)	TEST
- m	- No - M			Ч	IN	Q H	ION	RY %	g	a	nd L	ІМІТ	S (%)		4TOF	TES <sup>-</sup>		50	1	100	
ΞΡŢ	VATI EPTI			(MB(	RLE	PE A JMBI		OVE	or R(		v	w	w		an an	. NTI	UNI		INE	) SHE	EAR
□	DI	DE	SCRIPTION	S	ATE	Σĭ	CO	REC	z		╹Р 	•• 	∣	-	LAB	IN S	S	<b>FREN</b>	١GTI	┨ (kP	'a)
	78.60	GROUND SUR	RFACE	~~	\$			-		2	04	06	0 80					50	-+-	100	
-	\ <u>78.45</u> 0.15	Loose to compa	act brown sand, some silt			SS-1	$\mid$	58	7												
Ē		(IO SIITY), SOME	yiavei.	0 0																	
- 1	77.38	Bodrock: Succe	assion of yony poor quality			SS-2	$\frown$	61	22										1		
-		grey mudstone mudstone, lave	and slightly calcareous ers at 30° to 35° from																		
- 2		borehole axis, o	cleavable locally.					40	0								$\vdash$	+	+	+	
-						DC-3		49	U												
- 3					و	56.4		100													
	75.40 <b>3.20</b>	Succession of v	very poor quality grey		4-10-0	DC-4		100	0												
-		mudstone and a mudstone, laye	slightly calcareous ers at 30° to 35° from		n 200	DC-5		100	20												
- 4		borehole axis, o	cleavable locally.		86m c													-	+		
-	73.88				ev. 75.	DC-6		100	0												
5	4.72	Succession of p mudstone and	poor quality grey slightly calcareous		l at ele												$\vdash$	_	+	_	
		mudstone, laye borehole axis, o	ers at 30° to 35° from cleavable locally.		er leve	DC-7		100	53					[	D = 26.4	Ļ					
			-		Wate									(	CP=5.9						
- 6																					
_						DC-8		100	78												
- 7																	$\vdash$	+	+	+	
-																					
- 8						DC-9		100	61												
						000		100	01												
-																					
- 9						DC-10		100	73									+	+	+	+
Ē	68.92																				
- 10	9.68	Succession of mudstone and	very poor quality grey			DC-11		100	0								$\mid$	$\downarrow$	$\downarrow$	+	
	68.26 <b>10.34</b>	mudstone, laye	ers at 30° to 35° from cleavable locally.			DC 40	╞╋		44												
		Succession of f and slightly cal	fair quality grey mudstone careous mudstone, layers			DC-12	┝╋	94	41												
		at 30° to 35° fro cleavable locall	bri borenole axis, ly.					100	~~									+	+	$\top$	
						DC-13		100	62												
Ē				XX																	

					PR	OJECT	: Rabas	ska Pi	roject	Phase 1	), Levi	is / Be	eaumo	ont		BORE	HOL	E :	W-C	)08-	04	_
			То	**atoch	SIT	ſE :	West	Optio	n Site							PAGE	: _	2	_ 0	F _	2	_
				rratech	FIL	E NO :	<u>T-105</u>	0-A	(6033	33-RABA	.)					CASI	NG :	NW				_
		•			во	RING I	DATE :		2004	09-23		то		2004-09	-23	CORE	BAR	REL	.: <u>N</u>	iQ3		
		ł	BORIN	G LOG	DA	TUM :		Geod	letic			С	OOR	DINATES	<b>S</b> : _5	186310	.70 N	I	262	.288.5	52 E	
SAN	IPL	E CO		TYPE OF SAMPLER				RATO	RY A		ΓU ΤΕ	ST			Field	/ane	(\$	Su)	$\diamond$	intac	ct	
		Undis	uided turbed	ST Thin walled Shelby tub	е			onsoli	idation	aiysis					Swedi	sh cone	;) ;) (	Sur) Cu)	◆ ▽	remo intac	oulde ct	؛d
		Lost		PS Piston sampler				nit we	ight (k	N/m³)		、					_((	Cur)	¥	remo	oulde	ŧd
		ROCK	core STRA			_		SAM	PLES	strengtn S	(IMPa)	)			Dyn. (	Cone Pe	en. Te	st	<u>×</u>		×	·
	- m					- u -			6		WA	TER	CO	NTENT	R	TS	DYN	l. CO (blc	)NE ows/	PEN /0.3n	l. TE n)	ST
	NO				ОГ	EVEI	ND R	NOI.	RY %	g	aı	nd Ll	MIT	S (%)	ATOI	TES		50	)	100	0	
EPTI	VAT	EPTI	DE	SCRIPTION	/MB	ir LI	PE A JMB		OVE	or R	~	v_	w	w.	30R/	an iTU	UN	DR/	AINE	D SI	HEA	R
	ELE		DE	SCRIPTION	ŝ	/ATE	Σĭ	CO	REC	z		•Р 	•		LAE	S N	S	TRE	NG	Г <b>Н (</b> И	kPa)	)
			Succession of f	air quality grey mudstope		\$			_		20	0 40	) 60	) 80 				50	) —+	100	0	
Ē			and slightly cal	careous mudstone, layers					-													
Ē			cleavable local	y.			DC-14		92	65												
- 13							-															
Ē	65 13	5.09 <b>3.51</b>	Succession of g	good quality grey																		
- 14			mudstone and s mudstone, laye	slightly calcareous rs at 30° to 35° from											_			_	$\rightarrow$	_		_
Ē			borenole axis, c	licavable locally.		$\overline{\mathbf{x}}$	DC-15		100	90					D = 20	6.6						
E 15	63	3 54													CP=1	5.9						
Ē	1:	5.06	END OF BORE	HOLE			-															
- 16																		-	+	-		-
Ē																						
- - 17															_			$ \rightarrow$	$ \rightarrow$	$\square$		
Ē																						
Ē																						
- 18																			-			
Ē																						
- 19																		_	$\rightarrow$	_		_
Ē																						
Ē																						
Ē															1			$\neg$	$\neg$			
- 21															-		$\vdash$	+	+	+	+	$\neg$
- 22																						
- 23															1		$\vdash$	+	+	+	+	—

					PR	OJECT	: Rabas	ska Pr	oject	(Phase 3)	), Levis,	Quebe	C			BORE	HOL	E:/	3H-(	501·	-05
			Т	matash	SIT	E :	Levis,	Queb	ec							PAGE	: _	1	OF	• _	2
				rratech	FIL	E NO :	<u>T-105</u>	0-C (	6042	38)						CASI	NG :	PW	<u>, HW</u>		
		•			во	RING	DATE :		2005	-09-30	т	o	2005-	-10-0	4	CORE	BAR		: Р	Q	
		I	BORIN	G LOG		тим :		Geod	etic			<u> </u>		TES	. 5	186611	14 N		261	 760. <sup>-</sup>	12 E
SAN		-										- <del></del>		123		/222					
		Remo	oulded	SS Split spoon			GS G	rain si	ze an	alysis	10 123	1			Field	vane	(;	Su) Sur)	$\diamond$	rem	rt oulded
	υ	Indis	turbed	ST Thin walled Shelby tub	е		C C	onsoli	datior	1					Swed	ish cone	e ((	Cu)	$\nabla$	intac	ct
		ost	0070	PS Piston sampler				nit wei	ight (k ssive	(N/m <sup>3</sup> )	(MPa)						() 	Cur)	▼	remo	oulded
		COCK	STR					SAM	PLES	Suengui	(IVIF a)				Dyn. (	Jone Pe	en. re	st	<u>×</u>		X
	٤		INCLINAT	ION ANGLE: 90°		Ē				-	WAT	ER CO		т	≿	Ś	DYN	. CC		PEN 0 3r	l. TEST
Ę	ż	ε	AZIMUTH	: 0°	_	Ъ	≘∝	z	γ %	Δ	and		TS (%)	)	lor	EST		50	) )	10.31	0
E	110	Ŧ			BO	Ē	IBEI	I	/ER	RQ					RA.	and U T					
Ë	EV.	Ш	DE	SCRIPTION	SΥΝ	ER	Y PE		ŝ	l or	w <sub>F</sub>	, w	w	L	ABO	SIT	UN			D SI	HEAR
					•••	MA	F -	Ŭ	RE	-	⊢ 20	 40			ב	Z				10	n,
_	76.	09 <b>70</b>	GROUND SURF.	ACE	$\sim$	-							++					$\dashv$	-+	<u> </u>	
Ē	\ <u>75.</u> 9 <b>0.1</b>	94 / 15	Loose to compac	t brown silty sand, some	.a		SS-1	igarpoints	79	6											
-			shells. Becoming	grey at 0.6m and then																	
- 1			reduisit at 0.9m.		ÅR.		SS-2	igwedge	67	29		-									
Ē	74.	57	0																		
ŧ,	1.0	,2	trace of gravel.	siit and sand, some clay,	1 0 /		SS-3	X	83	17											
Ē					/																
Ē							SS-4	$ \times $	79	24	$\odot$				GS						
<b>–</b> 3	73.	09			/														$\square$		
Ē	3.0	00	Compact grey sill and clay.	t and sand, trace of gravel	e//		SS-5	$\boxtimes$	67	24											
Ē					A .																
- 4							SS-6	$\boxtimes$	67	20		_	+ +						$\rightarrow$	$\dashv$	
Ē					0		00-0		07	20											
Ē					• 2		ee 7	$\bigtriangledown$	02	22					<u></u>						
5					× 0		55-7	$\square$	03	22		_			65				-		
Ē								$\bigtriangledown$													
Ē.							SS-8	$\bigtriangleup$	92	21											
<b>F</b> 6	<u>69.</u> 6.1	99 10	Dense to very de	nse reddish silt and sand,				$\bigtriangledown$													
Ē			trace of gravel ar	nd clay.			SS-9	$\sim$	62	47											
Ę,								$\bigtriangledown$											$\square$	$\square$	
Ē					/ <sub>•</sub>		SS-10	riangle	75	46	$\odot$				GS						
Ē	68.4 7.6	47 5 <b>2</b>	Very dense grey	silt and sand, trace of gravel	, /a																
- 8			and clay.		8		SS-11	$\square$	72	136		_							+	$\rightarrow$	
17hrs					• .																
-12 13.																					
9002-12					الجر ا			$ \vdash $				+	+					+	+	+	
TED: 2							55-12	$\vdash$	83	65/15cm											
PLOT																					
																			$\top$		
50-C-E							DC-13		100												
-19 -11 -11																			$\downarrow$	$\square$	
74/St																					
Geotec							DC-14		27												
Ś																					

				PR	ROJECT	: Rabas	ka Pr	oject	(Phase 3	), Levis	s, Que	ebec				BORE	HOLI	E: /	BH-	501	-05	
		То	matach	sr	TE :	Levis,	Queb	ec								PAGE	:	2	_ 0	F_	2	
	▼		Tratech	FIL	E NO :	<u>T-105</u>	)-C (	(6042	38)							CASI	IG :	PW	<u>, HW</u>	·		
	•			вс	DRING I	DATE :		2005-	09-30	_ ·	то		2005-	10-0	4	CORE	BAR	REL	.: <u>P</u>	ŶQ		
	]	BORIN	G LOG	DA	TUM :		Geod	etic			С	OOR	DINA	res	: _ 51	86611	.14 N		261	760.	12 E	
SAN	IPLE CO	NDITION	TYPE OF SAMPLER			LABOR	ATO	RY AI	ND IN SI	TU TES	ST				Field V	ane	(8	Su)	$\diamond$	inta	ct	
	Rem	oulded sturbed	SS Split spoon ST Thin walled Shelby tub	e		GS GI C Co	ain si onsoli	ze an: dation	alysis						Swedis	sh cone	(8	Sur) Cu)	<b>♦</b>	rem	oulde	əd
	Lost		PS Piston sampler			D Ur	nit wei	ight (k	N/m³)						onouic		(0	Sur)	▼	rem	oulde	ed
	Rock	core	DC Diamond core barrel			CP Co		essive	strength	(MPa)					Dyn. C	one Pe	n. Te	st	<u>×</u>		>	<
	ε	INCLINAT	TION ANGLE: 90°		E	```			•	WA <sup>-</sup>	TER	со	NTEN	т	≿	လ	DYN	. CC	)NE	PEN /0.3i	I. ТЕ n)	EST
<u>ع</u>	NO E	AZIMUTH	: <u>0°</u>	F	VEL	9 2	NO	۲%	Q	an	d Ll	МΙΤ	S (%)		TOR	EST		5	)	10	0	
PTH	PTH			MBO	S LE	e al MBE	DITI	VER	r RQ						<b>DRA</b>							
B		DE	SCRIPTION	SΥΙ	ATE!	TΥΡ	CON	ECO	o Z	w L	Р	W	w	L	-AB(	N SI	S	TRE	NG	TH (	kPa	лк )
	ш				'n		•	R		20	40	6	0 80	1		_	1	50	)	10	0	
Ē		Very dense grey and clay.	silt and sand, trace of gravel	8 1 1																		
Ē		and oldy.		Þ																		
- 13	62.89			0		DC-15		72				_	-					-	+			
Ē	13.21	Bedrock: Layers grey limestone, 4	of very poor to fair quality 0% of dark shale layers			DC-15A		100	0													
Ē 14		(1-9mm thick). Be borehole axis.	edding at 30-40° from																			
Ē						DC-16		88	48													
Ē																						
- 15											-							+	+			
Ē						DC-17		100	74													
- 16							-												$\square$			
Ē						DC-18		100	66													
Ē						DC-19		100	32													
- 17							_												+			
E																						
- 18						DC-20		70	27		_							$\rightarrow$	$\rightarrow$	_		
Ē																						
ŧ																						
- 19  -						DC-21		100	18										+			
Ē	56.26																					
20	19.84	END OF BOREH	IOLE	KITKITI							_							-+	$\rightarrow$			
3:17hrs																						
2-12 1																						
1-5002		NOTE: Upon completion	, the borehole was provided															1	1			
011ED:		with a bottom cap	pped 63.5mm diameter PVC																			
22 45		to allow down-ho	le seismicity tests.							$\vdash$	-							$\dashv$	$\dashv$	$\dashv$	-	
LC-BH																						
-1-105C																						
74/Style											T							Ţ	T			
Geotec																						
5-																						

					PR	OJEC	T: Rabas	ska Pr	oject	(Phase 3)	), Levis	s, Qı	lepec	;			BORE	HOL	E:	BH-	502	-05	
			То	##atach	SIT	E :	Levis,	Queb	ec								PAGE	::	1	_ 0	F _	2	
				rratech	FIL	E NO	: <u>T-105</u>	0-C	(6042	38)							CASI	NG :	NW	/			
		•			во	RING	DATE :		2005	-09-28		то		2005-	09-2	29	CORE	EBAF	RREL	.: <u>1</u>	1Q3		
		]	BORIN	G LOG	DA	тим :		Geod	letic			c	OOR		res	: _5	186576	.98 N	١	26 <sup>,</sup>	1829.	.00 E	:
SAI	MPL	E CO	NDITION	TYPE OF SAMPLER			LABOR	RATO	RY A			ST				Field \	/ane	(	Su)	$\diamond$	inta	ct	
		Remo	oulded	SS Split spoon			GS G	rain si	ize an	alysis								(	Sur)	٠	rem	ould	ed
		Lost	sturbed	PS Piston sampler	e			nit we	ight (l	ı «N/m³)						Swedi	sh cone	e (	Cur)	$\bigtriangledown$	inta rem	ct	ьd
		Rock	core	DC Diamond core barrel			CP C	ompre	essive	strength	(MPa)					Dyn. (	Cone Pe	en. Te	est	▼ × -		>	×
			STRA	ATIGRAPHY		ε	:	SAM	PLE	5								DYN	I. CC	ONE	PE	N. TI	EST
Ε		Ξ.	INCLINAT	ION ANGLE: 90°		Ë		z	%		WA	TEF			IT	овγ	STS		(ble	ows	/0.31	m)	
Ξ		Ē	AZIMUTH	: <u>0°</u>	ЗОГ	μ	ANC	10	ERY	gD	ar			5 (%)		RATC.	D T T		50	)	10	/0 	L
EP			DE	SCRIPTION	ΥME	ERI	DE UMI	Q	NO NO	or	w	P	w	w		BOF	SITL	UN		AINE	ED S	HE/	ĄR
1	ū	3 -			S	VAT	Γz	ပိ	REC	z	ŀ				-	ΓA	Z	2		:NG	IH (	кРа	)
	7	5.75	GROUND SURF	ACE	$\sim$	~					20	) 4	06	0 80					50	) —	10	0	-
Ē	7	5.60 5.15	Compact to dens	e brown reddish silty sand,			SS-1	$\bowtie$	67	7													
Ē			some gravel and and boulders.	clay, occasional cobbles	9	¥																	
E 1						10-14	SS-2	$\bowtie$	67	64										_	_		
Ē						2005-	SS-3	$\times$	80	50/13cm													
Ë,						5	DC-4		96														
Ē						5 000																	
Ē					•/ •	7 Vale	SS-5	$\square$	79	47	0	1				GS							
È 3	3				D A	ol at c														_			
Ē					0 ₽0	er lev	SS-6	$\bowtie$	67	36													
Ē,						Wat																	
Ē '							SS-7	$\bigtriangleup$	67	25													
Ē					Ĭ.			$\times$															
Ę۹	7	0.59			ø =		SS-8		17	28										_			
Ē	5	5.16	Bedrock: Layers siltstone, 15% of	of fair to good quality grey red mudstone, 10% of dark			DC-9		100	38													
Ē			shale, some calca Bedding at 30-45	areous millimetric beds. ° from borehole axis. Top of																			
Ē	5		rock severely frac	ctured on a meter length.			DC-10		100	83													
Ē																							
ŧ,	,																			_			
Ē							DC-11		100	92													
Ē																							
μ - ε	8						DC-12		100	89										_			
							DC-13		100	82													
Ē																							
- 10							DC-14		100	73	$\vdash$									-	-		
								╞╋╋															
							DC-15		100	88													
2 - 11 2 - 2 -																							
									1														
																							1

					PR	ROJECT	: Rabas	ska P	roject	(Phase 3	), Levi	is, Qu	ebec			BORE	HOL	E:,	BH-	502	-05	
			То	***ataah	sn	TE :	Levis,	Quel	bec							PAGE	£: _	2	_ 0	F _	2	_
		┛		rratecii	FIL	E NO :	<u>T-105</u>	0-C	(60423	38)						CASI	NG :	NW	<u> </u>			_
		•			вс	DRING I	DATE :		2005	09-28		то	:	2005-09-	29	CORE	E BAF	REL	.: <u>۱</u>	1Q3		_
		]	BORIN	G LOG	DA	TUM :		Geod	letic			C	OORI	DINATES	<b>5</b> : 51	86576	.98 N	1	261	1829.	00 E	
SAN	ЛР		NDITION		1		LABOR	RATO	RY A		ΓU ΤΕ	ST			Field V	ane	(	Su)	$\diamond$	inta	ct	
		Rem Undi	ouided sturbed	ST Thin walled Shelby tub	e			onsol	idation	alysis					Swedis	h cone	;) €) €	Sur) Cu)	◆ ▽	rem inta	oulde ct	əd
		Lost		PS Piston sampler			D U	nit we	ight (k	N/m³)						_	(	Cur)	Ť	rem	oulde	ed
		Rock	core	TIGRAPHY			CP C	ompre SAM	PLE	strength	(MPa	)			Dyn. C	one Pe	n. Te	st	× - ·		×	<
		E	INCLINAT	ION ANGLE: 90°		Е					WA	TER	CON	NTENT	¥	IS	DYN	i. CC bl/	)NE ows	PEN /0.3i	√. TE m)	EST
l ₽ +	1		AZIMUTH	: <u>0°</u>	Ъ		Q H	NO	RY %	g	a	nd Ll	мітя	S (%)	VIOF	TES'		5(	0	10	0	
	H N				MB(	RLE	PE A		OVEI	or R(			147	14/	OR4	E	UN		AINE		HE	AR
<b>a</b>	ĺ		DE	SCRIPTION	SΥ	ATE	NL TY	CO	RECO	z		<sup>♥</sup> Р 	•• ••	L	LAB	S NI	S	TRE	ING	TH (	kPa)	)
						3	DC 16		100	74	2	0 40	) 60	80			L	50	0 	10	0	
Ē			Layers of fair to g 15% of red muds	lood quality grey siltstone, tone, 10% of dark shale,			DC-16		100	74												
Ē			some calcareous at 30-45° from bc	millimetric beds. Bedding brehole axis.					-													
- 13							DC-17		100	79										_	_	
Ē									-													
- 14													_		-				-			
Ē							DC-18		100	83												
Ē	6	60.91 <b>14.84</b>	END OF BOREH	OL E			-		-													
- 15 -			END OF BOREI																			
Ē																						
E 16	;												-		-			_	$\dashv$	_	-	_
Ē																						
E 17	,																					
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- 18													-						-			_
Ē																						
E - 19																			_			
Ē																						
Ē																						
- 20 ⊈	1												+		1		$\square$		$\neg$		$\neg$	$\neg$
21												_			-		$\mid$	$ \rightarrow$	$\dashv$	-	$\dashv$	-
<b>1</b> 22															1				$\neg$		$\neg$	
23												-+					$\vdash$	$ \rightarrow $	$\dashv$	-	$\dashv$	-

					PR	OJEC	<b>r</b> : <u>Raba</u>	ska Pr	oject	(Phase 3	), Lev	ris, Qı	uebec	;			BORE	HOL	E: /	BH-	-503	-05	_
			То	matach	si	TE :	Levis	, Queb	ес								PAGE	: _	1	_ 0	F_	3	
			j ie	rratech	FIL	E NO	<u>T-105</u>	50-C (	6042	38)							CASI	NG :	NW	<u> </u>			_
					вс	RING	DATE :		2005	-09-30		то		2005	-10-0	06	CORE	E BAF	REL	.: <u>1</u>	VQ3		
			BORIN	G LOG	DA	TUM :		Geod	etic			c	:006		TES	: 5	186711	.11 N	1	26 <sup>-</sup>	1741.	31 E	
SAN	IPLE	co	NDITION	TYPE OF SAMPLER			LABO	RATO	RY A	ND IN SI	τυ τε	ST				Field	Vane	(:	Su)	$\diamond$	inta	ct	
	] Re Ø Un	emc Idis	oulded sturbed	SS Split spoon ST Thin walled Shelby tub	e		GS G	irain si ionsoli	ze an datior	alysis 1						Swod	ish cone	;)	Sur)	<b>♦</b>	rem	oulde	эd
	Lo	st		PS Piston sampler			DU	nit we	ight (ł	⟨N/m³)						Oweu		· ((	Cur)	▼	rem	ci oulde	ed
	Rc	ck	core	DC Diamond core barrel		[	CP C	ompre	ssive	strength	(MPa	I)				Dyn. (	Cone Pe	en. Te	st	× -		×	:
	εı					Ę			PLE	s 	w	<b>LTFF</b>	s CO	NTE	т	≻	S	DYN	. CC	)NE	PEN	N. TE	ST
ε	NO S	=	AZIMUTH	: 0°	_	VEL	₽∝	z	Х %	۵	a	nd L	.IMIT	S (%)	)	TOR	EST		(Did 5(	Dws D	70.31 10	п) 0	
HH					ABO	LE L	E AN	III	VER	RQ						RA'	and TU T					'	
B		ב	DE	SCRIPTION	SYN	TER	IVN	NO	С Ш С О	ō N	v	N <sub>P</sub>	W	w	L	ABC	IS N	UN	DR/		ED S TH (	HEA kPa)	\R )
	<b>ш</b>   75.3	3	GROUND SURF	ACE		Ŵ		ľ	R		2	04	0 6	0 80			=		50	0	10	0	
Ē	<b>0.00</b> 75.1	) 7/	Topsoil.	ilty agend, some gravel			SS-1	$\boxtimes$	62	13													
Ē	0.15	5	occasional cobble	es, shells. Becoming grey at	0																		
Ē 1			0.011.		. ¶ ⊘. ⊘		SS-2	$\ge$	42	30													
Ē	73.8	1			\$ •																		
Ē.	1.52	2	Compact grey gra of clay, occasiona	avelly and sandy silt, trace al cobbles.			SS-3		0	40													
- 2																							
Ē							SS-4	$ \times $	79	21													
- 3																			_				
Ē							SS-5	$\square$	58	74						GS							
Ē	71.5	2	Donso to vony do	ase (locally compact)			DC-6		67														
- 4	0.01	, 	reddish sand, sor	ne silt to silty, some gravel,	)   		SS-7	$\square$	50	60													
Ē					0 1																		
- 5					6		SS-8	$\square$	71	52									-				
Ē					9		DC-9		84														
Ē						888	SS-10		33	54													
6			NOTE ON WATE	R LEVEL: 72m (artesian) on	¢																		
Ē			2005-10-14.		0 0		SS-11		62	34													
- 7					Ø														-				
Ē					• • ♥																		
Ē					• •		CC 12	$\square$	50	31													
- 8					0 0 0		33-12		50	51													
					4		DC-13		24														
- 9					74 14														_				
					Γ		SS-14 DC-15		0 43	30/0cm 													
					D D		DC-16		84														
- 10  -					<b>a</b>		SS-17		50	67								$\square$	$\neg$				
						$\langle \rangle \rangle \langle$	UC-18		42														
- 11					۵ ۵	$\langle \rangle \rangle$	SS-19		46	13								-	$\square$				
					2																		
t					¢.	////																	

STE:       Levis, Quebec       PAGE:         FILE NO:       T-1050-C       (604238)       CASING:         BORING LOG       BORING LOG       CORE BAF         DATUM:       Geodetic       COORDINATES:       5186711.11 N         SAMPLE CONDITION       TYPE OF SAMPLER       LABORATORY AND IN SITU TEST       Field Vane       (i)         Cost       SS Split spoon       GS Grain size analysis       Consolidation       Swedish cone       (i)         Lost       DC Diamond core barrel       OC Diamond core barrel       O Unit weight (K/M*)       WATER CONTENT       Xet Super Supe	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
FILE NO:       T-1050-C (604238)       CASING:         BORING LOG       CORE BAF         BORING LOG       TYPE OF SAMPLER       LABORATORY AND IN SITU TEST       TO       2005-10-06       CORE BAF         SAMPLE CONDITION       TYPE OF SAMPLER       LABORATORY AND IN SITU TEST       Field Vane       (C)         Remoulded       SS Split spoon       GS Grain size analysis       Coordinates       Sileon (C)         Notification       DE Diamond core barrel       C Compressive strength (MPa)       Dyn. Cone Pen. Te         Notification       Stratigraphy       Matter content       Matter content       Matter content         Undisturbed       STRATIGRAPHY       Notification       Sampler       Dr. Cone Pen. Te         Undistrubal       DESCRIPTION       Notification       Sampler       Dim Name       Sampler         Image: Notification       Dense to very dense (locally compact))       Tedish sand, some sitt to sitly, some gravel, occasional cobbles and boulders.       SS-20       42       35       47         Image: Notification       SS-20       42       35       47       47	NW REL: NQ3 261741.31 E Su) $\diamond$ intact Sur) $\diamond$ remoulded Sur) $\forall$ remoulded Sur) $\forall$ remoulded
BORING LOG       TO2005-10-06 CORE BAR         BORING DATE :2005-09-30TO2005-10-06CORE BAR         DATUM :GeodeticCOORDINATES :5186711.11 N         SAMPLE CONDITION TYPE OF SAMPLER       LABORATCRY AND IN SITU TEST       Field Vane (()         Remoulded       ST       ST plit spoon       GS       Grain size analysis       GC       Consolidation       Swedish cone (()         Lost       PS       Piston sampler       D       Unit weight (kN/m³)       Dyn. Cone Pen. Te         Nock core       DC Diamond core barrel       Mathematical size analysis       Mathematical size analysis       Mathematical size analysis       Dyn. Cone Pen. Te         TO200*:00 // Diamond core barrel       O Unit weight (kN/m³)       Dyn. Cone Pen. Te         With Hand       Mathematical size analysis       Mathematical size analysis <td>REL: <u>NQ3</u> 261741.31 E Su) ◇ intact Sur) ◆ remoulded Cu) ▽ intact</td>	REL: <u>NQ3</u> 261741.31 E Su) ◇ intact Sur) ◆ remoulded Cu) ▽ intact
BORING LOG       DATUM:      Gedetic       COORDINATES:      5186711.11 N         SAMPLE CONDITION       TYPE OF SAMPLER       LABORATORY AND IN SITU TEST       Field Vane       (()         Remoulded       SS Split spoon       GS Grain size analysis       C       ()         Undisturbed       ST Thin walled Shelby tube       GS Grain size analysis       Swedish cone       ()         Lost       PS Piston sampler       DC Diamond core barrel       C Consolidation       D Unit weight (kN/m³)       Dyn. Cone Pen. Te         V       STRATIGRAPHY       Unit weight (kN/m³)       CP Compressive strength (MPa)       Dyn. Cone Pen. Te         V       NOLLYAR       DESCRIPTION       NS       N	261741.31 E Su) ◇ intact Sur) ◆ remoulded
SAMPLE CONDITION       TYPE OF SAMPLER       LABORATORY AND IN SITU TEST       Field Vane       (()         Remoulded       SS Split spoon       SS Grain size analysis       () <th>Su) ◇ intact Sur) ◆ remoulded</th>	Su) ◇ intact Sur) ◆ remoulded
Verificatived       SS opin spont       SS opin spont<	Sur) ♦ remoulded Cu) ▽ intect
Lost PS Piston sampler DC Diamond core barrel DC Compressive strength (MPa) Dyn. Cone Pen. Te SAMPLES WATER CONTENT and LIMITS (%) Pum	
Reduction       Concentration       Concentratin Concentration       Concentratin Concentration	Cur) <b>v</b> remoulded
Image: second	st ××
Image: Section of the section of t	. CONE PEN. TEX (blows/0.3m)
Lag     DESCRIPTION     No     Lag     No	50 100
$\begin{bmatrix} 1 \\ 1 \end{bmatrix} \begin{bmatrix} 1 $	DRAINED SHEAF
13     Dense to very dense (locally compact) reddish sand, some silt to silty, some gravel, occasional cobbles and boulders.     SS-20     42     35       13     DC-21     19	TRENGTH (kPa)
13       Dense to very dense (locally compact)         reddish sand, some silt to silty, some gravel, occasional cobbles and boulders.       SS-20       42       35         13       DC-21       19        19	
SS-23 67 73	
17 SS-24 58 30	
DC-25 23	
DC-27	
<b>20</b> SS-28 <b>54</b> 26	
23 SS-30 SS-30 SS-30	

					PF	ROJECT	: Rabas	ska Pr	oject	(Phase 3)	), Levis	s, Qu	ebec			ВО	REHOL	.E :	BH-	503	-05	
			Т	matach	sr	TE :	Levis,	Queb	ec							PA0	BE:_	3	_ 0	F _	3	
		▼		rratech	FI	LE NO :	<u>T-105</u>	0-C	(6042	38)						CAS	SING :	NM	/			
		•			в	ORING I	DATE :		2005-	-09-30		то		2005-1	0-06	coi	RE BA	RREL	_: <u>^</u>	1Q3		
		]	BORIN	G LOG	DA	TUM :		Geod	etic			C	OOR	DINAT	ES :	51867 <sup>-</sup>	1.11	٧	261	1741.	.31 E	:
SA	MF	PLE CO	ONDITION	TYPE OF SAMPLER			LABOR	ATO	RY AI	ND IN SIT	TU TES	ST			Fie	ld Vane		(Su)	$\diamond$	inta	ct	
		Rem Undi	oulded sturbed	SS Split spoon ST Thin walled Shelby tub	e		GS GI C Co	ain si onsoli	ze an dation	alysis					SIM	edish co	ne	(Sur)	<b>♦</b>	rem	oulde	ed
		Lost		PS Piston sampler			D Ur	nit we	ight (k	:N/m³)					000	euisii co		(Cur)	$\mathbf{v}$	rem	iould	ed
		Rock	core	DC Diamond core barrel		1	CP Co	ompre	ssive	strength	(MPa)				Dy	n. Cone	Pen. Te	est	×		>	×
	┢	εı				Ξ			PLE	>	w۵	TFR	CO		г >	- ທ	DY	1. C(	ONE	PEN	N. TR	EST
Ę		z E	AZIMUTI	H: 0°	_	ΈL	≘∝	Z	γ %	Δ	an	d Ll	MIT	S (%)		EST		(D) 5	ows 0	/U.31 10	л) )0	
H		PTHC			<b>ABO</b>	Ē	E AN ABE	DITIC	VER	. RQ						and T U		l			1	
Image: Second se			D	ESCRIPTION	SYN	TER	ΝŪΝ	NO NI	CO.	N or	w	Ρ	W	wL				IDR/ STRI	AINE ENG	ED S TH (	HE/	AR J)
		<b>Ⅲ</b> ↓ 51.33				MA M			RI		20	40	) 60	080	-			5	0	10	0	
Ē	T	24.00	Bedrock: Laye	ers of fair to excellent			SS-33		0	20/0cm												
Ē			limestone and	5% of dark shale. Bedding			DC-34		100	85												
- 2	5		except betwee fold pattern wa	en 24.7m and 25m where a as observed.											_				<u> </u>			
Ē			-																			
Ē							DC-35		100	69												
- 26	6						· ·															
Ē							DC-36		100	100												
27	7	48.20					0000		100	100					_				$\vdash$			<b> </b>
Ē		27.13	END OF BOR	EHOLE																		
Ē																						
- 28	В																					
Ē																						
- 29	9														_				⊢	_		
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- 30	D																					
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- 31	1											_			_				$\vdash$			<u> </u>
Ē																						
1.12hrs																						
2 - 32 2	2																					
1																						
33	3											_			$\dashv$			$\left  - \right $	⊢┤	-		
1 1 1 1																						
-500 H	4											+	$\uparrow$									
50-C-B																						
7	5											_							$\vdash$	-		
90/4/5																						
7:1Geoft																						
> -																						

					PR	OJECT	r: <u>Raba</u> s	ska Pr	oject	(Phase 3)	), Levis	, Quel	bec			BORE	HOL	E: /	BH-	504	-05
			То	matach	si	ΓE :	Levis,	Queb	ес							PAGE	: _	1	_ 0	F _	1
	▼	//	16	rratecii	FIL	E NO	<u>T-105</u>	0-C (	6042	38)						CASI	NG :	NW	/		
	•				вс	RING	DATE :		2005	-10-06	_ 1	r <b>o</b> _	2	005-10-0	07	CORE	EBAF	RREL	.: <u>۱</u>	١Q	
		BOR	RIN(	G LOG	DA	TUM :		Geod	etic			со	ORDI	INATES	: _5	186591	.03 N	1	261	1551.	93 E
SAN		ONDITION		TYPE OF SAMPLER			LABOR	RATO	RY A	ND IN SIT	TU TES	т			Field	Vane	(	Su)	$\diamond$	inta	ct
	_ Ren ∅ Und	isturbed		SS Split spoon ST Thin walled Shelby tub	e			rain si onsoli	ze an datior	aiysis 1					Swedi	sh cone	) e (	Sur) Cu)	<ul> <li>♦</li> <li>□</li> </ul>	rem inta	oulded
	Losi			PS Piston sampler			D U	nit wei	ght (k	⟨N/m³)							(	Cur)	▼	rem	oulded
	Roc	k core	STRA	DC Diamond core barrel			CP C	ompre	ssive	strength	(MPa)				Dyn. (	Cone Pe	en. Te	st	× - ·		X
	٤	IN		ION ANGLE: 90°		<b>u</b> -				-	WAT	ER (	CON	TENT	≿	S	DYN	l. CC bla	)NE ows	PEN /0.3r	N. TES n)
E L	- u - u -	A			Ъ	SVEL	DZ K	NO	۲۶ %	Q	an	d LIN	IITS	(%)	TOF.	r ES1		5	0	10	0
PTH I	ATI PTH				MBC	R LE	NBE	EIQ	OVEF	or RQ					ORA	and				-0.5	HFAR
			DE	SCRIPTION	SΥ	ATE	TYF NU	CO	<b>ECC</b>	N	w <sub>l</sub>	р V ——(	v >	w∟ 	LAB	IN SI	S	TRE	ING	TH (	kPa)
	75.92	GROUN	D SURF	ACE		Ň			<u>u</u>		20	40	60	80				5	0	10	0
Ē	0.00 75.61 0.30	Topsoil.	ddish cla	vev silt, some sand trace	Г~. ГИІ		SS-1		83	5					GS						
Ē	75.32 0.60	of gravel	t reddish	silty sand some gravel		<b></b>															
		trace of o	clay, occa	asional cobbles and		5-10-1	SS-2	$\bowtie$	54	21									-		
Ē	74.40 <b>1.52</b>	Compac	t reddish	silty sand, some gravel.	0 0	n 200															
2	73 73				4	0 0 0	SS-3	$\bigtriangleup$	67	24				_							
Ē	2.20	Dense to	very der	nse reddish silty sand,	<u>ه</u>	v. 75.2		$\boxtimes$													
Ē.		Some gre				at ele	SS-4		42	34	Ο										
					©.ª	level	88 E	$\ge$	22	96									$\neg$		
Ē						Water	55-5		33 71	00											
<b>4</b>							SS-7	$\geq$	45	50/13cm		-	-	_					-		
Ē					о С		DC-8		68												
Ē,					0		DC-9		100												
Ē					() 		SS-10		63	67/25cm											
Ē							DC-11		100												
<b>6</b>					0		SS-12	$ \models $	83	68				_					-		
Ē	69.39 6.53		BOREH		.  a.   . ()   .   .		SS-13	$\bowtie$	87	119/25cm											
Ę,			DONER																$\square$	$\square$	
Ē																					
E																					
8																					
1 1 1																					
9																			_		
ED: 20(																					
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050-C-1																					
Style - 11											$\vdash$	+	+						$\dashv$	$\dashv$	
otec74.																					
V:\Ge																					

$\square$					PR	OJECT	: Rabas	ska Pr	oject	(Phase 3)	), Lev	ris, Qı	uebec	;			BORE	HOL	E: ,	BH-	505	-05	
			Т	mataah	SIT	E :	Levis,	Queb	ec								PAGE	:: _	1	_ 0	F _	1	
<b>1</b>			j ie	rratecn	FIL	E NO :	<u>T-105</u>	0-C	(6042	38)							CASI	NG :	NW	1			
					вс	RING	DATE :		2005	-10-06		то		2005	-10-0	06	CORE	EBAF	REL	١	١Q		
		]	BORIN	G LOG	DA	TUM :		Geod	letic			c	OOR		TES	: 5	186485	.00 N	1	26 <sup>,</sup>	1656.	.02 E	
SAM	IPLE	со	NDITION	TYPE OF SAMPLER			LABOF	RATO	RY A	ND IN SIT	TU TE	ST				Field \	/ane	(	Su)	$\diamond$	inta	ct	
	] R	emo	oulded	SS Split spoon	_		GS G	rain si	ze an	alysis								(*	Sur)	•	rem	oulde	ed
	UI Lo	ndis ost	sturbed	PS Piston sampler	e			nit we	ight (F	:N/m³)						Swedi	sh cone	) ÷	Cur)	$\nabla$	inta rem	ct	he
	R	ock	core	DC Diamond core barrel			CP Co	ompre	essive	strength	(MPa	ı)				Dyn. C	Cone Pe	en. Te	st.	▼ × -		<u> – – ×</u>	;u (
	ī		STRA	TIGRAPHY		Ε	:	SAM	PLES	5								DYN	I. CC	ONE	PEN	<b>1.</b> ТЕ	ST
٤	u - N	ε		ION ANGLE: <u>90°</u>		EL.	0~~	z	%	•	W/	ATEF nd I	к со іміт	NTE	NT N	огу	STS		(ble	ows 0	10.3r/	n)	
Ξ	TIO	Ë	AZIMUTH	<u> </u>	BOL	ГĘ	ANI BER	E	ERY	RQD	a			5 ( 70	,	RAT		<u> </u>				<b>-</b>	
DEP	EV A	ШD	DE	SCRIPTION	λW	Ë	YPE IUM	N N	No So	l or	v	v <sub>P</sub>	w	w	L	BOI	SITI	UN			ED S		١R
					"	VAT	μZ	ы С	RE	Z	2		• •			LA	Z	3	5		іп ( 10	кга) 10	,
-	77.4 0.0	14 10	GROUND SURFA	ACE	$\sim$													$\vdash$	$\neg$			-	
	∖ <u>77.2</u> 0.1	<u>28</u> / 5	Compact brown s	and and gravel, some silt,	• 0		SS-1		50	20													
Ē,	76.6 <b>0.8</b>	64 0	Bedrock: Very set	verely fractured and		0-14	DC-2 SS-3		100 0	 20/0cm													
- 1 -			weathered rock.			005-1	DC-4		47														
	75.9 <b>1.5</b>	91 2	Layers of poor to	good quality grey siltstone,		on 2	DC-5		100	27													
- 2			25% beds of dark from borehole axi	shale. Bedding at 30-40° s.		6.94m	DC-3		100	21						CP=1(	00.1						_
						lev. 7																	
						el at e	DC-6		100	40													
- 3						er leve																	
-						Wate			100	84													
- 4							007		100	04													
									100	62													
	72.7 <b>4.7</b>	71 2					000		100	02													
- 5		_	END OF BOREH																	_			
- 6																							
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- 9																		$\vdash$	$\dashv$	_	-	$\dashv$	
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					PR	OJECT	: Rabas	ska Pr	oject	(Phase 3)	), Lev	is, Qı	lepec	;			BORE	HOL	E: /	BH-	506	-05
			То	matach	SIT	Е:	Levis,	Queb	ес								PAGE	:: _	1	_ 0	F_	1
				rratech	FIL	E NO :	<u>T-105</u>	0-C (	6042	38)							CASIN	NG :	NW	/		
					во	RING	DATE :		2005	-10-07		то		2005	-10-1	11	CORE	BAF	REL	.: 1	1Q	
		ł	<b>BORIN</b>	G LOG	DA	TUM :		Geod	etic			С	OOR		TES	: _5	186491.	.04 N	I	261	1437.	02 E
SAN	IPLE (	0	NDITION	TYPE OF SAMPLER			LABOF	RATO	RY A	ND IN SIT	Γυ τε	ST				Field	Vane	(:	Su)	$\diamond$	inta	ct
	Re	mo	oulded	SS Split spoon	0		GS G	rain si:	ze an	alysis								(\$	Sur)	٠	rem	oulded
	Lo:	st	luibeu	PS Piston sampler	C		D U	nit wei	ght (k	N/m³)						Swea	sn cone	) : ()	Cur)	$\nabla$	intao rem	ct oulded
	_ Ro	ck	core	DC Diamond core barrel			CP C	ompre	ssive	strength	(MPa	)				Dyn. (	Cone Pe	n. Te	st	<u>×</u>		X
	E I		STRA			Ε	:	SAM	PLES	6							(0	DYN	i. CC	)NE	PEN	I. TEST
ε	- z	=		ION ANGLE: <u>90°</u>		ĒĽ.	<u>م</u> م	Z	ر %	0	w,	nd L		NIE S (%		OR)	ESTS		(blo 5(	ows. N	/0.3r/ 10	n) 0
Ē		-	AZIMUTH.	· <u>· · · · · · · · · · · · · · · · · · </u>	BOL	LEV	AN	ITIO	ER)	RQI	ŭ			• (//	, 	RAT	and U TE					
DEP		ב	DE	SCRIPTION	SYM	ler B	YPE	DND	ŝ	l or	v	٧ <sub>P</sub>	w	w	L	ABO	SIT	UN			EDS	HEAR kPa)
						-MA		Ō	RE	-	2	0 4		0 80		ב	Z		50	ອ ນ	10	0
-	76.7	7	GROUND SURFA Topsoil.	ACE	~~:			$\bigtriangledown$			1								+	-	-	
Ē	0.30	<u> </u>	Compact grey and	d reddish sand, some silt		¥.,	SS-1		58	6												
Ē,			layer.		6 D	-10-1		$\bigtriangledown$														
Ę '	75.5 <b>1.22</b>	5	Generally dense (	(locally compact) reddish		2005	SS-2	$\langle \ \rangle$	62	24												
Ē			silty sand, trace o occasional cobble	f gravel to gravelly, es and boulders.	⊳ø	u o		$\bigtriangledown$	07							00						
- 2						76.37	SS-3		67	36	•					GS			$\dashv$	$\neg$		
Ē						t elev.	SS-4	$\geq$	61	44												
Ē,					<u>ه</u> و	evela	DC-5		38													
Ē						ater l	SS-6		0	20/0cm												
Ē					•	Σ	DC-7		27													
- 4							SS-8	$\ge$	46	32	$\overline{\odot}$					GS			$\dashv$	$\neg$	_	
					$\sim$		SS-9		0	22												
ǰ					8																	
					°€		SS-10	imes	42	29												
- 6					>	8													$\dashv$	$\neg$	_	
Ē	70.2	1			•	X	SS-11		39	75												
Ē.	6.55		END OF BOREH	OLE																		
E '																						
Ē																						
- 8																		$\vdash$	$\dashv$	$\dashv$	$\dashv$	
Ē																						
10																		$\vdash$	$\dashv$	$\neg$	$\dashv$	

ptec74\Style T-1050-C-BH.sty PLOTTED: 2005-12-1

					PR	DJECI	: Rabas	ska Pr	oject	(Phase 3)	, Levis	s, Qı	lepec			ВС	REHC	DLE :	Bŀ	<b>I-50</b> 7	7-05	5
			То	matach	SIT	E :	Levis,	Queb	ec							PA	GE :	1		OF _	4	
				rratech	FIL	E NO :	<u>T-105</u>	0-C	(6042	38)						CA	SING	: <u>N</u>	W			
	•				во	RING	DATE :		2005	-10-10		то		2005	-10-1	14 CC	RE B	ARRI	EL :	NQ3		
		ł	BORIN	G LOG	DA	гим :		Geod	etic			С	OOR	DINA	TES	: 51879	07.70	N	2	31438	3.50 E	
SAN	MPLE C	co	NDITION	TYPE OF SAMPLER			LABOF	RATO	RY A	ND IN SIT	UTE	ST				Field Vane		(Su	) 🔷	inta	act	
	C Rei	mo dis	oulded turbod	SS Split spoon	۵		GS G	rain si	ze an datior	alysis						Our disk a		(Su	r) 🔶	rem	nould	ed
		st	luibed	PS Piston sampler			D U	nit we	ight (k	' «N/m³)						Swealsh c	one	(Cu (Cu	) ⊽ r) ▼	inta ren	act nould	ed
	Ro	ck	core	DC Diamond core barrel			CP C	ompre	ssive	strength	(MPa)	)				Dyn. Cone	Pen.	Test	×-		>	x
	۶ı		STRA			ε		SAM	PLES	5	14/ 4	TEE		NTE	лт	~ "	וס	'N. (	CON	E PE	N. TI	EST
ε	ž,			• 0°		ĒĻ	<u>م</u> م	z	۲ %	0	ar	nd L		N I EI S (%	ы )	OR)		(1	olow 50	s/0.3 1(	- <b>m)</b> 00	
E	ATIO THO			· <u> </u>	IBOI	Ē	E AN	E	/ER	RQI				•	,	RAT and	:  -	-				L
HE I			DE	SCRIPTION	SYN	TER	ΓΥΡΕ	ONIC	ŝ	N or	w	P	W	w	L		l	INDI STF	RAIN REN(	iED S GTH i	3HE/ (kPa	AR I)
						MA		0	RE		 20	) 4	- <del></del> 0 6	0 80	)	2 4			50	1(	00	
F	0.00	2	Topsoil.		तित्त		00.4	$\bigtriangledown$	00	0		_						+		+		
Ē	0.15	;	Loose brown rede gravel. Presence	dish sand and silt, some of roots on top of the layer.			55-1	$\square$	83	8												
Ē	53.26 0.91	6	Bedrock: Verv se	everely fractured and			SS-2	$\ge$	82	50/13cm										<u> </u>		
Ē	52.90 <b>1.27</b>	2 7	weathered rock.	ality red mudstone and		0-14																
Ē			siltstone, 10% of	greenish grey mudstone		2005-1	DC-3		26	0												
	2		dark shale beds.			uo u												+		+		
Ē						19.87n	DC-4		55	34												
Ē 3						elev. 4														<u> </u>		
Ē	50.82	2		nt to foir quality rod		rel at e																
Ē	0.00		mudstone and sil	tstone, 10% of greenish		ter lev	DC-5		100	100												
<b>F</b> 4			of millimetric dark	shale beds. Bedding at hole axis.		Mat											_	+		+		
Ē						-			100	81												
Ē 5							00-0		100	01										<u> </u>		
Ē																						
Ē							DC-7		100	94												
F 6	i																	+		+		
Ē							DC-8		100	66												
Ę,	,																			<u> </u>		
E							DC-9		100	55												
Ē																						
<u>ه</u> ا	;																			+		
13:18h							DC-10		100	58												
9																		_		<u> </u>		
D: 200																						
																CP=12.2						
10 As	1						DC-11		100	55										+	$\square$	
50-C-B																						
₽								┝╋												<u> </u>	$\square$	
ec74/St							DC-12		100	90						CP=45.1						
/:/Geoft																CP=14.3						
- -																CF = 14.5						

Γ					PR	OJECT	: Rabas	ska Pi	oject (	Phase 3	), Levis, G	luebec	;		BORE	HOL	E: [	BH-	507-	05
			Т	matach	SIT	Έ:	Levis,	Quet	bec						PAGE	:: _	2	_ 01		4
		▼	j ie	rratecn	FIL	E NO :	<u>T-105</u>	D-C	(60423	38)					CASI	NG :	NW			
		•			во	RING I	DATE :		2005-	10-10	то		2005-10	-14	CORE	E BAF	₹REL	.: N	Q3	
		]	BORIN	G LOG	DA	TUM :		Geoc	letic			COOF		<b>3:</b> 5	187907	.70 N	1	261	438.5	0 E
S	AM	PLE CO	NDITION	TYPE OF SAMPLER			LABOR	RATO	RY AN	ID IN SI	TU TEST			Field \	/ane	(;	Su)	$\diamond$	intact	 t
	$\leq$	] Rem	oulded	SS Split spoon	_		GS Gr	ain s	ize ana	alysis				1		(	Sur)	•	remo	ulded
		Lost	sturbed	PS Piston sampler	e		D Ur	nit we	ight (k	N/m³)				Swedi	sh cone	) ÷	Cur)	$\bigtriangledown$	intact	: ulded
		Rock	core	DC Diamond core barrel			CP Co	ompre	essive	strength	(MPa)			Dyn. C	Cone Pe	en. Te	st :	• *		X
	-	<b>C</b>	STRA	ATIGRAPHY		Ε	5	SAM		5						DYN	I. CO	DNE	PEN.	. TEST
1	=	<u>г</u> Е	INCLINAT	ION ANGLE: <u>90°</u>		ЕĽ.	0	z	%	-	WATE			ORY	STS		(blo	)ws/	0.3m	)
		TIO	AZIMUTH	: <u>0°</u>	BOL	LEVI	ANI	110	ERΥ	RQD	anu		3 (%)	<b>AT</b>	D TE		50	<b>)</b>	100	
	5	EVA DEP	DE	SCRIPTION	MΥ	ĒR	YPE	DND	20	lor	w <sub>P</sub>	w	wL	BOF	SITU	UN				
	-					VAT	<u>⊢</u> ∠	ŭ	RE	2	20			LA	Z	3	50	1101	100	Fa)
F	+	41.98										+					$\neg$	-+	-	+
Ē		12.19	Layers of fair qua greenish grey mu	ality grey siltstone. 20% of udstone beds (1-30mm										CP=54	35					
F			thick), 10% of rec beds (1-20mm th	d mudstone and siltstone ick), trace of calcite										030	5.5					
F	13		veinlets. Bedding	at 30° from borehole axis.			DC-13		100	65										
Ē																				
F	14	40.17 <b>14.00</b>	Lavers of good g	uality red mudstone and				_						-				+		
Ē			siltstone, 10-40% beds, trace of da	of greenish grey mudstone rk shale. Presence of																
Ē			slikenside. Beddi axis.	ng at 30-40° from borehole			DC-14		100	87										
Ē	15																			
Ē																				
Ē	16						DC 15		100	77				-				_		
Ē							DC-13		100	//										
Ē								_												
Ē	17						DC-16		100	91				1				+		
Ē																				
Ē	18													_				$\rightarrow$		
Ē							DC-17		93	71				CP=3	5.0					
F							20 11													
Ē	19													-				+		
F																				
E	20						DC-18		90	77								$ \rightarrow$		
18hrs	╞	33.92 20.25	Layers of genera	lly poor to good quality																
12 13:			greenish grey mu siltstone beds (1-	idstone, 20% of grey 100mm thick), 5% of red																
005-12-	21		mudstone and sil trace of millimetri	tstone beds (1-30mm thick), c dark shale beds, and of			DC-19		76	44				-				+		
TED: 2			calcite veinlet.	° from horehole avis																
PL01	22		Southing at 10-00				DC-20		100	97						Щ				
-BH.stv																				
1050-C									100	~~~										
Style T-	23						DC-21		100	68				-		$\vdash$	+	+	+	+
otec74\							DC-22		100	100										
V:\Ge(																				

				PR	OJECT	: Rabas	ska P	roject	(Phase 3	), Levis, (	Quebe	с		BORE	HOL	E : /	BH-	507	-05	_
			Torratach	SIT	E :	Levis,	Quel	bec						PAGE	:: _	3	_ 0	F _	4	_
			Terratech	FIL	E NO :	<u>T-105</u>	0-C	(6042	38)					CASI	NG :	NW	1			_
				во	RING I	DATE :		2005	-10-10	то	<b>)</b>	2005-10	-14	CORE	E BAR	REL	.: <u>N</u>	IQ3		_
			BORING LOG	DA	TUM :		Geod	detic			cool	RDINATE	<b>S</b> : <u>51</u>	87907	.70 N	<u> </u>	261	438.	50 E	
SAN	IPLE (		NDITION         TYPE OF SAMPLER           builded         SS         Split spoon			GS G	RATO rain s	RY A	ND IN SI alvsis	TU TEST			Field Va	ane	(\$	Su)	$\diamond$	inta	ct	
	Un	dis	sturbed ST Thin walled Shelby tube	е		C Co	onsol	idatior	1				Swedis	h cone	;) €	Cu)	$\bigtriangledown$	inta	ct	;u
	Lo:	st ick	PS Piston sampler core DC Diamond core barrel			D Ur CP Co	nit we ompre	eight (ł essive	N/m <sup>3</sup> ) strength	(MPa)			Dvn. Co	one Pe	(C en. Te	Cur) st	▼ ★	rem	oulde	ed (
		0.1	STRATIGRAPHY		٤		SAM	PLE	3				Dyn. o.							ST
ε	E 8	=	INCLINATION ANGLE: 90°		י- ב		-	%		WATE	ER CO	ONTENT	JRΥ	STS		(blo	ows/	/0.3r	n)	.01
Ē		-	AZIMUTH: <u>0°</u>	Зõ	ĒVĒ	AND BER	TIO	ERY	ROD	and	LIMI	rs (%)	RATC nd	1 E		50	) 	10	0	
E			DESCRIPTION	XME	ËRL	YPE			orF	w <sub>P</sub>	w	wL	BOR	SITU	UN	DR/		D S	HEA	٩R
Γ		-		"	WAT	μz	U U U	REC	Z	⊢ 20	<del>0</del>		LA	Z	3	IK⊏ 5(	:NG 0	ן) דינ 10	кга) 10	,
			Layers of generally poor to good quality			DC-23		100	54		+					$\dashv$		$\neg$	-	-
Ē			greenish grey mudstone, 20% of grey siltstone beds (1-100mm thick), 5% of red																	
- 25			mudstone and siltstone beds (1-30mm thick), trace of millimetric dark shale beds, and of										_			$ \rightarrow $	_			
			calcite veinlet. Bedding at 10-60° from borehole axis.			DC-24		100	86											
			_																	
- 26								-												
- 27						DC-25		100	95		-		_			-	$\dashv$		_	
Ē																				
- 28			From 27.7m to 32.1m: Very poor quality rock,					1												
						DC-26		92	9											
-																				
- 29						DC-27		88	15				-				+			
Ē									-											
- 30								1			-		_			-	$\dashv$	_	_	
-						DC-28		86	13											
- 31																				
Ē																				
-						DC-29		98	0											
- 32						DC-30		100	0				_			$\neg$	+			
33						DC-31		100	87				_			$\rightarrow$	$\rightarrow$		_	
								1												
34						DC-32		100	91				1			1				
- 35							┝	-				$\left  \right $	-		$\vdash$	+	+	$\dashv$		
						DC-33		100	63											
-				Ŵ																

			_		PR	OJECI	: Rabas	ska Pi	roject	(Phase 3	), Levis,	Quebe	C			BORE	HOL	E: <b>/</b>	вн-:	507.	-05
			Т	mataal	SIT	E :	Levis,	Quet	bec							PAGE	: _	4	OF	: _	4
			j ie	rratecn	FIL	E NO :	<u>T-105</u>	0-C	(6042	38)						CASIN	1G :	NW			
		•			во	RING	DATE :		2005	10-10	т	o _	2005-	-10-1	4	CORE	BAR	REL	: N	Q3	
		]	BORIN	G LOG	DA	TUM :		Geod	letic			coo	RDINA	TES	: 51	87907.	.70 N		261	438.5	50 E
SAN	MPLE	E CO	NDITION	TYPE OF SAMPLER			LABOR	RATO	RY A	ND IN SI	TU TES	т			Field Va	ane	(٤	Su)	$\diamond$	intac	xt
	] F ⊠ I	Remo	oulded	SS Split spoon	ē		GS G	rain s onsoli	ize an datior	alysis					Curadia	h	(5	Sur)	•	remo	oulded
		Lost	suibeu	PS Piston sampler	•		D U	nit we	ight (k	N/m³)					Swedis	n cone	(C (C	Su) Cur)	$\mathbf{v}$	remo	rt oulded
	F	Rock	core	DC Diamond core barrel			CP C	ompre	essive	strength	(MPa)				Dyn. Co	one Pe	n. Tes	st	<u>×</u>		×
	٦					E	;		PLE	5	WAT			лт	≻	S	DYN	. CO	)NE	PEN	. TEST
ε	- N	ε	AZIMUTH	: 0°	_	ΈL	≘∝	z	γ %	۵	and		TS (%)	)	lor,	EST:		(DIC) 50	) )	0.3n 10(	ה) ס
E	ATIO	TH			<b>IBO</b>	Ľ	E AN	DITIC	VER	RQ					RAT	T U					
Ë		DE	DE	SCRIPTION	SYN	TER	IVN	NO:	S.	N or	w <sub>F</sub>	, w	w	L	ABC	N SIT	UN S	DRA TRE		D SI H (I	dEAR (Pa)
	Ξ	1				Ā			R		20	40	60 80		_	-		50	)	100	D
Ē			Layers of general	lly poor to good quality			DC-34		98	76									+		
Ē			siltstone beds (1-	100mm thick), 5% of red			00 04			70											
- 37	,		mudstone and sill trace of millimetri	tstone beds (1-30mm thick), c dark shale beds, and of								_					┢──┼		$\rightarrow$	$\rightarrow$	
Ē			calcite veinlet. Bedding at 10-60	° from borehole axis.			DC-35		98	88											
Ē																					
- 38	8						DC-36		100	100										1	
Ē	15	.57 60	Alternation of fair	to good quality red and			DC-37		100	68											
- 39			grey mudstone a	nd siltstone. Bedding at 30°													┢──┼	_	-+	$\downarrow$	
Ē			from borenole axi	15.			DC-38		100	72											
Ē																					
- 40	2						DC 00		100											+	
Ē							DC-39		100	88											
- 41	13	.15		015		X	-										┝──┼		_	$\rightarrow$	
Ē	41	.02	END OF BOREH	OLE																	
Ē																					
- 42	2																			+	
Ē																					
- 43	5																$\vdash$			+	
Ē																					
Ē																					
- 44	L.																		-	1	
45	5											_					$\vdash$	-+	+	+	+
46	5																	$\square$	+	$\uparrow$	
47	,												+				$\vdash$	-+	+	+	+

eotec74\StyleT-1050-C-BH.sty\_PLOTTED: 2005-12-12 13:18hrs

	Terratech	TE	ST	PIT	LC	)G	j Fil PA	ST PIT: <b>TP-503-05</b> E NO.: T-1050-C (604238) GE: 1 OF 1
JECT: Levis, ATION JM: FACE I FACE I RDINA TH: 5' PIT D CRIPTI	Rabaska Project (Phase 3), Levis, Quebec Quebec ELEVATION: 75.3 m TES: 186711.1 EAST: 261741.3 IMENSIONS: 2.5 m x 1.5 m MBER: ON OF PHOTOGRAPH:							
ELEV. (m) DEPTH (m)	DESCRIPTION	SYMBOL	WATER	BS SAMPL	CE E SAM	3R IPLE	LABORATORY TESTS	LEGEND
75.3 0.0 75.2 0.1 74.0 1.3 73.6 1.7	GROUND SURFACE Topsoil. Brown gravelly sand, trace of silt, 20% of cc and blouders (max. dia. 45cm), shells. Pres oxidation. Becoming grey at 0.7m depth. Grey gravelly and sandy silt, trace of clay, occasional cobbles. END OF TEST PIT	bbbles sence of				A	GS w = 12.9 P, Wopt =8.4, Dmax =20.6 CBR	LABORATORY TESTS w: Water comtent (%) GS: Grain size analysis D: Unit weight (kN/m <sup>3</sup> ) P: Modified Proctor test wOPT: Optimal water content (%) Dmax: Max. Dry unit weight (kN/m <sup>3</sup> ) wL: Liquid limit (%) wP: Plastic limit (%) CBR: C.B.R. test TYPE AND CONDITION OF SAMPLE Remoulded Intact BS Bulk sample CBR C.B.R. sample
ER LEV DITIONS E OF T DGRAP	EL: 1.30m (depth) DATE: 2009 S: Slight water inflow at 1.3m. ERRAIN: SURFACE SOII HY: DENSITY ( VEGETATION: White p	5-10-14 L: DF WOODS: 1	Scattere	d		ST/ EQI REI	ABILITY OF SIDES: Stable UIPMENT USED: Caterpille MARKS:	r 430 backhoe
	JECT:         Levis,         ATION         JM:         FACE I         RDINA         TO NU         JM:         TO NU         CRIPTI         (m)         TABO         TABO	JECT: Rabaska Project (Phase 3), Levis, Quebec         Levis, Quebec         ATION:         JM: Geodetic         FACE ELEVATION: 75.3 m         RDINATES:         TH: 5186711.1       EAST: 261741.3         PIT DIMENSIONS: 2.5 m x 1.5 m         TO NUMBER:         CRIPTION OF PHOTOGRAPH:         TO SCRIPTION         GROUND SURFACE         0.0         Topsoil.         0.1         Brown gravelly sand, trace of silt, 20% of cc and blouders (max. dia. 45cm), shells. Pres oxidation. Becoming grey at 0.7m depth.         74.0         1.3       Grey gravelly and sandy silt, trace of clay, occasional cobbles.         73.6         1.7       END OF TEST PIT         Silpht water inflow at 1.3m.         E OF TERRAIN:       SURFACE SO DORTORS: Slight water inflow at 1.3m.         E OF TERRAIN:       SURFACE SO DORTORS: Viete:         VEGETATION:       White	JECT: Rabaska Project (Phase 3), Levis, Quebec         Levis, Quebec         ATION:         JM: Geodetic         CACE ELEVATION: 75.3 m         RDINATES:         TH: 5186711.1 EAST: 261741.3         'PIT DIMENSIONS: 2.5 m x 1.5 m         TO NUMBER:         CRIPTION OF PHOTOGRAPH:         Uit of the photographic state of silt, 20% of cobbles and blouders (max, dia, 45cm), shells. Presence of oxidation. Becoming grey at 0.7m depth.         74.0         74.0         74.0         74.0         74.0         75.3         GROUND SURFACE         0.0         76.3         GROUND SURFACE         0.1         3         Grey gravelly sand, trace of silt, 20% of cobbles and blouders (max, dia, 45cm), shells. Presence of oxidation. Becoming grey at 0.7m depth.         74.0         73.3       Grey gravelly and sandy silt, trace of clay, occasional cobbles.         73.6         1.7       END OF TEST PIT         Image: Silght water inflow at 1.3m.         E OF TERRAIN:       SURFACE SOIL:         SIGRAPHY:       DENSITY OF WOODS:         YEIGED EY: H Chowinger St Texton.       DATE:	JECT: Rabaska Project (Phase 3), Levis, Quebec         JECT: Rabaska Project (Phase 3), Levis, Quebec         JECT: Rabaska Project (Phase 3), Levis, Quebec         ATION:         JM: Geodetic         GACE ELEVATION: 75.3 m         RDINATES: Th: 5186711.1 EAST: 261741.3 PIT DIMENSIONS: 2.5 m x 1.5 m         TO NUMBER: SRIPTION OF PHOTOGRAPH:         Quebec         Quebec         ATION:         JECT: Rabaska Project (Photograph):         Quebec         Quebec         GROUND SURFACE         0.0         Topsoil.         7.3         Group gravelly sand, trace of silt, 20% of cobbles and blouders (max. dia. 45cm), shells. Presence of oxidation. Becoming grey at 0.7m depth.         7.4         7.5         END OF TEST PIT         DIT         DIT         DOF TEST PIT         DIT         DIT	JECT Rabaska Project (Phase 3), Levis, Quebec         LEVET: Rabaska Project (Phase 3), Levis, Quebec         ATION:         JM: Geodetic         ACCE ELEVATION: 75.3 m         RDIMETS:         Th: 5180711.1 EAST: 261741.3         PIT DIMENSIONS: 2.5 m x 1.5 m         TO NUMBER:         SRIPTION OF PHOTOGRAPH:         III:         III:         OROUND SURFACE         0.0         75.3         CROUND SURFACE         0.1         10.2         0.1         11.3         Croupsoil.         7.3         Croupsoil.         7.4         0.1         1.3         Crey gravely and sandy silt, trace of clay, occasional cobbles.         0.1         1.3         Crey gravely and sandy silt, trace of clay, occasional cobbles.         7.4.0         1.7       END OF TEST PIT         1.8         2.7         2.8         2.9         3.6         7.7         END OF TEST PIT         DETE: 2005-10-14         ZHTM:         Crey Gravely and sandy silt, trace o	Image: Construction       Image: Construction         Image: Construction       Const	Image: State of the second state of	PIETRIECN     IEST PILLOG     PIL       PIC     IEST PILLOG     PIL       PIC     Resolution     PIL       Quebec     Iestic     PIL       Quebec     Iestic     PIL       PIC     Iestic     PIL       PIC     Resolution     PIL       PIC     Iestic     PIL       PIC     Iestic     PIL       PIC     Iestic     PIL       PIL     East     26       PIL     East     25 m x 1.5 m       PID NUMBER:     Iestic     Iestic       RIPTION OF PHOTOGRAPH:     Iestic     Iestic       PIL     DESCRIPTION     Iestic     Iestic       PIL     DESCRIPTI

	))	Terratech	TES	ΤI	PIT	Ľ	.0	G	TE j FIL PA	ST PIT: <b>TP-504-05</b> E NO.: T-1050-C (604238) GE: 1 OF 1
PRO	JECT:	Rabaska Project (Phase 3), Levis, Quebec								
SITE	Levis,	Quebec								
LOC	ATION									
DAT	UM:	Geodetic								
SUR	FACE	ELEVATION: 75.9 m								
	RDINA TH: 5	<b>TES:</b> 186591.0 <b>EAST:</b> 261551.9								
TES	T PIT D	IMENSIONS: 2.5 m x 1.5 m								
PHO										
DES C		UN OF PHOTOGRAPH:								
DEPTH (n	DEPTH (n		SYMBOL	WATER	BS SAMP	LE	CB SAMI	R PLE	LABORATORY TESTS	LEGEND
	75.9 <b>0.0</b>	GROUND SURFACE Topsoil.	~~Z							
-	75.6									w: Water comtent (%)
-	0.3	Reddish clayey silt, some sand, trace of grav	/el.		$\square$	1			w = 18.1 , wL = 31.6 , wP =	<b>GS:</b> Grain size analysis
-	75.3		. 2.		$\left( \right)$		_		17.3	D: Unit weight (kN/m <sup>3</sup> )
-	0.6	Reddish silty sand, some gravel, trace of clay of cobbles and boulders (max. dia. 60cm).	y, 30%		$\mathbb{N}$		$\setminus$ /			P: Modified Proctor test
-			N 9		Ň	2	$\backslash /$		GS w = 10.1 , wL = 17.7 , wP =	<b>wOPT:</b> Optimal water content (%)
- 1			D.				Y	А	12.5 P , Wopt =7.8 , Dmax =21.5	Dmax: Max. Drv unit weight (kN/m <sup>3</sup> )
-			0		ΝÆ		$\wedge$		CBR	wL: Liquid limit (%)
-			• •		XI	3	$  \rangle$			wP: Plastic limit (%)
-					$  \rangle  $					CBP: CBR test
-	74.3 <b>1.6</b>	END OF TEST PIT	<u></u>							ODA: O.D.A. test
- - 2 -										TYPE AND CONDITION OF SAMPLE
-										Remoulded
-										Intact
-										BS Bulk sample
- 3										CBR C.B.R. sample
-										
WAT	ER LEV	EL: m (depth) DATE:	1					ST/	BILITY OF SIDES: Stable	
CON	DITIONS	S:						EQI	JIPMENT USED: Caterpille	r 430 backhoe
STA	re of t	ERRAIN: SURFACE SOIL:	:					REI	MARKS:	
TOP		HY: DENSITY O	F WOODS: S							
		<b>RV:</b> H Chouinard Sr Tech	DATE: 200	05-10-	14					Bousquet M.A.Sc. Eng

Terratech	TES	<b>) T</b>	PI٦	r I	_0	G	j Fil PA	ST PIT: <b>TP-505-05</b> .E NO.: T-1050-C (604238) GE: 1 OF 1
PROJECT: Rabaska Project (Phase 3), Levis, Quebec         SITE: Levis, Quebec         LOCATION:         DATUM: Geodetic         SURFACE ELEVATION: 77.4 m         COORDINATES:         NORTH: 5186485.0         EAST: 261656.0         TEST PIT DIMENSIONS: 2.5 m x 1.3 m         PHOTO NUMBER: TP-505-05.BMP         DESCRIPTION OF PHOTOGRAPH:								
DEPTH (m) DEPTH (m) DEPTH (m)	SYMBOL	WATER	BS SAMI	S PLE	CB SAMI	R PLE	LABORATORY TESTS	LEGEND
77.4       GROUND SURFACE         0.0       Topsoil.         77.2       0.2         Brown sand and gravel, some silt. Fragment weathered rock.         76.8         0.6         Bedrock: Very severely fractured and weath rock.         76.0         76.0         76.0         76.0         76.0         76.0         76.0         76.0         76.1         76.0         76.0         76.0         76.1         76.2         76.3         76.4         76.5         76.6         76.7         76.8         76.0         76.1         76.2         76.3         76.4         76.5         76.6         76.7         76.8         76.9         76.1         76.2         76.3         76.4         76.5         76.6         76.7         76.8         77.8         77.9         77.9	ts of	Ţ		1 2		A	GS w = 11.8 P , Wopt =8.5 , Dmax =20.4 CBR	LABORATORY TESTS         w: Water comtent (%)         GS: Grain size analysis         D: Unit weight (kN/m³)         P: Modified Proctor test         wOPT: Optimal water content (%)         Dmax: Max. Dry unit weight (kN/m³)         wL: Liquid limit (%)         wP: Plastic limit (%)         CBR: C.B.R. test         TYPE AND CONDITION OF SAMPLE         Remoulded         WIL: BS         Bulk sample         CBR       C.B.R. sample
WATER LEVEL: 1.40m (depth)       DATE: 2005         CONDITIONS: Very slight water inflow at 1.4m.         STATE OF TERRAIN:       SURFACE SOIL         TOPOGRAPHY:       DENSITY O         SLOPE:       VERSECUTION:	5-10-14 _: DF WOODS:	<u> </u>	<u> </u>			STA EQI REI	ABILITY OF SIDES: JIPMENT USED: Caterpille MARKS:	er 430 backhoe
DESCRIBED BY: H. Chouinard, Sr. Tech.	<b>DATE:</b> 20	05-10-	-14				APPROVED BY : R	. Bousquet, M.A.Sc., Eng.





## **APPENDIX II**

## Laboratory Testing of Soil, Rock and Groundwater

List of Standards for Soil or Rock Testing

Laboratory Testing of Soil: Grain Size Distribution Atterberg Limits Modified Proctor Tests CBR Tests

Laboratory Testing of Rock: Petrographic Examination Swelling Potential / Petrographic Index

Laboratory Analyses of Groundwater

## List of Standards

Туре	Designation	ASTM Standards	NQ/BNQ Standards	LC Standards
	Core drilling	D 2113		
Subsurface	Groundwater monitoring	D 4750		
Investigation	Soil sampling	D 4220		
Investigation	SPT	D 1586	2501-140	
	Dynamic cone penetration		2501-145	
	Atterberg's Limits	D 4318	2501-090, 2501- 092	
	CBR / California Bearing Ratio	D 1883		
	Classification of soils	D 2487		
Soil Testing	Description of soils	D 2488		
-	Grain size analysis (sedimentation)	D 422	2501-025	
l	Grain size analysis (sieving)	D 1140	2501-025	21-040
1	Modified Proctor Density	D 1557	2501-250/251	
<u> </u>	Moisture content	D 2216		21-200, 21-201
	Compressive strength	D 2938		
Rock Testing	Pyrite detection	C 295, C 956	2560-500, 2560- 510, 2560-900	



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•))	) Т	ern	ate	ch	App Pro	pendix : ject : <u></u> Ra	II abaska P	roject (Pha	ase 2), Lev	Figure	:2			
	<b>GRA</b>	IN S	SIZE	: N	File	<u>We</u> • No : <u>T-</u>	est Optio	<u>n Site</u> (603333-K	ELL)					
						SOIL CLASSIFICATION SYSTEM								
Г		GRAVE	L		SAN	D			FINE PAR	TICLES				
	COAR	SE	FINE	COARSE	MEDIUM	FI	١E		SILT		CLAY			
100.0 -8	60	20		5		0.4	0.08	3			0.002			
100.0	I I I		•											
90.0	     				-	     					     			
80.0	I I		<b>√</b>			   					   			
00.0	   													
70.0	     										     			
<u>o</u> 60 0	   										   			
ASSIN	1   													
50.0 -	   					$\frac{1}{1}$	<u>م</u> ا	•			     			
<b>B</b> <b>B</b> 40,0	   	; ; ;									   			
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30.0	    								$\rightarrow$					
20.0	1 1 <del> </del>					   					   			
-	     									<b>`</b>	~			
10.0	   													
0.0			10		1		0.1		0.01					
					GRAI	N DIAMETER	(mm)							
	GF	RAVEL (%	, <b>)</b>		SAND (	%)			FINE PARTIC	CLES (%)				
<b>5</b> .7 <b>23.9</b>					42.1				34.0	)				
	20mm	5mm	2mn	n 0.4mm	0.08mm	0.002mm	 	D30	D60	Си	Cc			
-	100.0	94.3	88.9	) 76.4	53.1	11.8	N/A	0.0129	0.1314	N/A	N/A			
	00.0	/0.1	75.3	, 03.5		N/A	N/A	IN/A	0.3029	IN/A				
	BH-102-	NG SA 05	SS-4	DEPTH. (m) 2.3 - 2.9	Silt and sa	and, trace of g	DESCH	RIPTION			W (%) 11.4			
	BH-102-0	05	<u>SS-9</u>	6.1 - 6.4	Sand and	silt, some gra	vel				7.8			

♥	)) '	Ter	rate	ch	Proj	ect : <u>R</u>	abaska P	roject (Pha	ase 2), Le	vis, Quebe	:C
	GR	AIN	SIZE			W	/est Optio	n Site			
	DIST	RIB	UTIO	N	File	No : <u>T</u>	-1050-B (	<u>(603333-K</u>	ELL)		
	<b>_</b>			UNIFIED	SOIL CL	SOIL CLASSIFICATIO			1		
	CO.		FINE	COARSE		<b>)</b>	INF		FINE PAR	RTICLES	CLAY
				COARGE					- OILT		
	. 80	- 20		5 2		0.4	0.08	4			0.002
100	.0					1					1
90						i I					1
50	.0 1	Z	$\setminus$								1
80	.0					1	1				1
	- 1	1									
70	.0	1				1	I				1
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9 60	.0	1	$ \rightarrow $			1	1				1
IISS	- 1										
<b>⊿</b> ■ <sup>50</sup>	.0	 			<b>\</b>	 					 
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30	.0										 
	- !	1									
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10	.0							7			1
						1					<b>₽</b> ┤_₽
0	.0 100		10		1		0.1		0.01		0.0
					GRAIN		R (mm)				
GEND		GRAVEL	(%)		SAND (%	<b>b</b> )			FINE PARTI	CLES (%)	
		54.9			36.9				8.2	2	
	•	33.7			47.3				19.0	0	
	20mm	5mn	n 2mm	0.4mm	0.08mm	0.002mm	D10	D30	D60	Cu	Cc
GEND	2011111	0111					-				

LEGEND	SOUNDING	SAMPLE	DEPTH. (m)	DESCRIPTION	W (%)
••	BH-103-05	SS-3	1.5 - 2.1	Sandy gravel, trace of silt	11.0
<b>BB</b>	BH-103-05	SS-7	4.6 - 5.2	Sand and gravel, some silt	8.4

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LEGEND	20mm	5mm	2mm	0.4mm	0.08mm	0.002mm	D10	D30	D60	Cu	Cc
••	100.0	78.9	65.6	44.5	29.3	N/A	N/A	0.0920	1.3007	N/A	N/A

LEGEND	SOUNDING	SAMPLE	DEPTH. (m)	DESCRIPTION	W (%)
••	BH-104-05	SS-5	3.0 - 3.7	Gravelly and silty sand	11.6

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		Te	rra	tec	<b>h</b>								
•						Pro	West Ontion Site						
	GR	AIN	SI	ZE		File	Not	T 1050 I		012222 14			
	DIS	TRIE	BUT	ION				1-1050-1		00000-1			
					UNIFIED	SOIL C	OIL CLASSIFICATION SYSTEM						
		GR/	AVEL			SAN	ID				FINE PAR	RTICLES	
	C	OARSE	F	INE	COARSE	MEDIUM		FINE			SILT		CLAY
100.0	80		20	5	5 2		0.4		0.08				0.002
		$\langle \rangle$											
90.0		•											
80.0			<u> </u>										
00.0	- I						1						
70.0	 		$\frac{1}{1}$				   		 				
	- 1		1	$\mathbb{N}$	$\mathbf{N}$		i		1				
<b>SN</b> 60.0			   				   		   				   
ASS	- 1		   										   
50.0			   				   		<u> </u>				<u> </u>
RCE			1										
<b>4</b> 0.0			1						1				1
30.0	-		   										
20.0	    		 			•							 
	- :		1										
10.0			 						-				
0.0			;										
0.0	100	1 1 1		10		1 GRAI		0. <sup>2</sup>	1		0.01		0.
								,					
GEND		GRAVEL (%)					%)				FINE PART	ICLES (%)	
		42.0									18.	.1	
GEND	20mr	m 5n	nm	2mm	0.4mm	0.08mm	0.002mr	n D10	)	D30	D60	Cu	Сс
<u> </u>	91.9		2.2	47.6	17.1	8.0	N/A	0.136	63	0.9891	3.1358	23.013	2.290

LEGEND	SOUNDING	SAMPLE	DEPTH. (m)	DESCRIPTION	W (%)
••	BH-106-05	SS-3	1.5 - 2.1	Gravelly sand, trace of silt	10.3
	BH-106-05	SS-8	5.3 - 5.9	Sand and gravel, some silt	8.5

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2005-04-22 14:54h PLOTTED: cf. NAD -1050-B-74\StyleT.

	Ter	rate	ch	Appen	uix:	11	Figu	. <u> </u>		
				Projec	t: <u>Rabask</u>	a Project (Ph	ase 2), Levis, Qi	uebec		
G	BRAIN	SIZE			West O	ption Site	ition Site			
DI	STRIB	UTIO	N	File No	<b>o</b> : <u>T-1050-</u>	B (603333-K	(ELL)			
			UNIFIE	D SOIL CLA	SSIFICATIO	ON SYSTEM	Λ			
	GRA	/EL		SAND			FINE PARTICLES	<b>s</b>		
	COARSE	FINE	COARSE	MEDIUM	FINE		SILT	CLAY		
100.0			5 2       	0	.4	0.08		0.002		
					I I			   		
90.0					1					
80.0					 					
		<b>\</b>								
70.0	   	$-\lambda$	I I I I		1 			   		
<b>,</b>		$\mathbf{N}$			   			   		
	   	-+	     		   			   		
40.0					I I I					
-					1					
30.0					1			 		
					1					
20.0				<u> </u>	1			   		
10.0								   		
- 1			I I I I I I					   		
0.0		10		1	0.		0.01	0		
				GRAIN DI	AMETER (mm)					
END	GRAVEL	(%)		SAND (%)			FINE PARTICLES (	%)		
-	53.4			38.5			8.1			

LEGEND	20mm	5mm	2mm	0.4mm	0.08mm	0.002mm	D10	D30	D60	Cu	Сс
• •	83.9	46.6	30.5	14.0	8.1	N/A	0.1580	1.9533	7.8462	49.664	3.078

LEGEND	SOUNDING	SAMPLE	DEPTH. (m)	DESCRIPTION	W (%)
••	BH-108-05	SS-9	5.9 - 6.4	Gravel and sand, trace of silt	11.8

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LEGEND	SOUNDING	SAMPLE	DEPTH. (m)	DESCRIPTION	W (%)
••	BH-109-05	SS-3	1.5 - 2.1	Sand and silt, trace of gravel	14.5
<b>—</b>	BH-109-05	SS-6	3.8 - 4.4	Sand, some gravel and silt	9.4

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		err	ate	ch	Pro	ject : <u>R</u> a	abaska P	roject (Pha	ase 2), Le	vis, Quebe	c		
	CDA		2176			W	est Optio	n Site					
[	DIST	RIBU		N	File	File No : <u>T-1050-B (603333-KELL)</u>							
				UNIFIED	SOIL C	LASSIFIC	CATION	SYSTEN	I				
		GRAVEL	L		SAN	D			FINE PAR	TICLES			
	COAF	RSE	FINE	COARSE	MEDIUM	FI	NE		SILT		CLAY		
100.0	80	20		5 2		0.4	0.08				0.002		
			•										
90.0											1		
80.0						1							
00.0	- 1	V,											
70.0		<u> </u> }									1		
	- !												
<b>5</b> 60.0	1 1 1	i					I I				 		
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0.0 1			10		1		0.1		0.01		0.00		
					GRAI		R (mm)						
EGEND	G	RAVEL (%)	)		SAND (	%)			FINE PARTI	CLES (%)			
•	11.4								42.8	3			
		57.1			27.9				15.0	)			
EGEND	20mm	5mm	2mm	0.4mm	0.08mm	0.002mm	D10	D30	D60	Cu	Cc		
			/11 8	n// n		n /	11111611	11111000	11 7708	56 731			

DEPTH. (m) 2.7 - 3.4 DESCRIPTION W (%) 9.2 LEGEND SOUNDING SAMPLE SS-5 Sand and silt, some gravel • • BH-110-05 -BH-110-05 SS-7 4.3 - 4.9 Sandy gravel, some silt 8.3 

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 LEGEND
 SOUNDING
 SAMPLE
 DEPTH. (m)
 DESCRIPTION
 W (%)

 BH-116B-05
 SS-3
 I.5 - 2.1
 Sand, some silt and gravel
 I.2.7

 12.7

74\StyleT-1050-B-GRN.sty PLOTTED: 2005-04-22 14:52h

	Ter	rate	ch	Appendix	: <u>II</u>	Fig	jure :1
		1		Project :	Rabaska Project	(Phase 2), Levis, C	Quebec
		917E			West Option Site	9	
D	ISTRIB	UTIO	N	File No :	<u>T-1050-B (6033</u>	33-KELL)	
_				SOIL CLASS	FICATION SYS	TEM	
	GRAV	/EL		SAND		FINE PARTICLE	S
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
100.0	80 <u>20</u>		5 2	0.4	0.08		0.002
-							
90.0							
-							
80.0				1			
-	•						
70.0	÷ 🔶			i			
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<b>50</b> .0 -	<u> </u>	- ►		1			I
ASS							
<b>5</b> 0.0	<u> </u>			i			I
40.0 -	<u> </u>		+ >	•	1		 
-							
30.0							
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10.0							
-							
0.0 L 100		10		1	0.1	0.01	0.

LEGEND	GRAVEL (%)	SAND (%)	FINE PARTICLES (%)
••	51.4	22.9	25.6

LEGEND	20mm	5mm	2mm	0.4mm	0.08mm	0.002mm	D10	D30	D60	Cu	Cc
••	69.3	48.6	41.8	30.3	25.7	6.8	0.0066	0.3973	14.1895	2141.394	1.679

LEGEND	SOUNDING	SAMPLE	DEPTH. (m)	DESCRIPTION	W (%)
••	BH-117B-05	SS-5	3.0 - 3.7	Silty and sandy gravel	11.2

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2005-12-12 12:43h PLOTTED: stv :74\Style T-1050-



LEGEND	SOUNDING	SAMPLE	DEPTH. (m)	DESCRIPTION	W (%)
••	BH-502-05	SS-5	2.3 - 2.9	Silty sand, some gravel, some clay	9.6

<sup>2</sup>4\StyleT-1050-C-GRN.sty PLOTTED: 2005-12-12 12:43h



2202.10		0		0	0.00	0.002	2.0	200	200	00	00
•	95.7	75.1	69.6	63.0	54.1	N/A	N/A	N/A	0.2166	N/A	N/A

	SOUNDING	SAMPLE	DEPTH. (m)	DESCRIPTION	W (%)
••	BH-503-05	SS-5	3.0 - 3.7	Gravelly and sandy silt, trace of clay	N/A

\*4Style T-1050-C-GRN.sty PLOTTED: 2005-12-12 12:45h



PLOTTED: stv NAC 74\Style T-1050-C



ec74\StyleT-1050-C-GRN.sty\_PLOTTED: 2005-12-12 12:47



LEGEND	SOUNDING	SAMPLE	DEPTH. (m)	DESCRIPTION	W (%)
••	W-002-04	SS-3	1.5 - 2.1	Gravel and sand, some silt	9.5
	W-003-04	SS-6	3.8 - 4.4	Silt, some clay	19.1
<b>—</b>	W-004-04	SS-9	6.3 - 6.9	Silt and sand, trace of gravel	10.1
<b>•</b>	W-005-04	SS-3	1.5 - 2.1	Silty and gravelly sand	11.0

:74\StyleT-1050-B-GRN.sty PLOTTED: 2005-12-12 12:56h



74\Style T-1050-C-GRN.sty PLOTTED: 2005-12-12 12:49



LEGEND SOUNDING SAMPLE DEPTH. (m) DESCRIPTION W (%) • -• TP-504-05 BS-2 0.5 - 1.1 10.1 Silty sand, some gravel, trace of clay

2005-12-12 12:50h PLOTTED: stv NAU.

74\Style T-1050-C



74\StyleT-1050-C-GRN.sty PLOTTED: 2005-12-12 12:51h



74\Style T-1050-B-1 IM



005-12-12 12:00 74\Style T-1050-C-1 IM sty



# Terratech

# Essai de compactage Proctor

	- the -	Over the first of the				
Échantillon :	1	Description :				
Sondage :	TP-503-05	Densité relative :	2.75	Estimée	Vérifié par :	MB
Site :	T-1050-C	Classification :			Réalisé par :	СТ
Projet no :	604238	Profondeur :	0.15	m	Date :	21-5-2004 9:30:00
Projet desc.:	Rabaska Project (P	hase 3), L Levis, Quebec		a fair a share a share a	Normes :	BNQ 2501-250 & 255

Lim	Limites Granulométrie		Norme ASTM (D698/D1557) :	M	Norme BNQ 2501-250/251	
ten. en eau :	12.88	% < 80 µm :	13.08	Méthode (A/B/C/D) :	С	Essai Proctor Modifié
liquidité % :		% > 5 mm :	25.76			
plasticité % :		% > 20 mm :	10.37	No moule :	PR_G1	

Caractéristiques de l'essai Pr	octor	No	rmal :	Mo	odifié :	Spé	icial :		
Norme BNQ (ASTM) :		2501-2	50 (D698)	2501-25	55 (D1557)			1	
Méthode :	and the states	A	B/C/D	А	B/C/D	E	F		
Hauteur du moule :	cm				11.650				
Diamètre du moule :	cm				15.260				
Volume du moule :	cm <sup>3</sup>	- 3 S 5 5 5 5 5 5 5		SALAN PARA	2,132.40				
Masse du marteau :	kg			1	4.540		12389 201 1		
Hauteur de chute :	cm	1000			45.7		Strand La		
Nombre de coups par couche :					56		1		
Nombre de couches :					5				
Energie spécifique :	kg/cm <sup>2</sup>				27.400				
	N. Ge	Méthodes A e Méthodes C e	et B: Essai effect et D: Essai effect	ué sur le mate tué sur le mat	ériau passant le ta ériau passant le ta	mis de 5 mm mis de 20 m	m (#4) m (3/4 po.)		

en remplaçant le matériau retenu sur le tamis de 20 mm avec la méthode D

Essai no :		1	2	3	4	5	6	7	8
Teneur en eau									
Numéro de la tare :		A20	A8	A21	A1				
Masse de la tare :	g	956.000	962.000	957.000	1,013.000				
Masse sol humide + tare :	g	5,633.000	5,841.000	5,727.000	5,650.000				
Masse sol sec + tare :	g	5,094.000	5,420.000	5,406.000	5,415.000				
Teneur en eau :	%	13.026	9.444	7.215	5.338				

Poids volumique					State of the second				
Masse du moule :	kg	5.432	5.432	5.432	5.432	5.432	5.432	5.432	5.432
Masse du moule + sol :	kg	10.110	10.316	10.224	10.101	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	a second second		
Poids volumique sol sec :	kN/m <sup>3</sup>	19.035	20.524	20.556	20.385				
Masse volumique sol sec :	kg/m <sup>3</sup>	1940.95	2092.74	2096.00	2078.59				
Écart :									



Teneur en eau (%)

# Essai de compactage Proctor

Terratech

Site : Sondag Échantil	io : le : llon :	T-1050-C TP-504-05 2		Profondeur : Classification : Densité relative Description :	9:	 2.75	m Estimée		Date : Réalisé par : Vérifié par :	2004-05-21 09 CT MB	1:30:00
	Lim	ites	Granu	lométrie	Norme ASTM (D698/D1557) : M			м	Norme BNQ 2501-250/251		
ten. en	eau :		% < 80 µm :		Méthode (A	/B/C/D) :		С	Ess	sai Proctor Mo	difié
liquidite	é%:		% > 5 mm :								
plastici	te % :		% > 20 mm :		No moule :			PR_G1			
Caracté	éristiqu	les de l'essai	Proctor	Norr	nal :	Мо	difié :	Spe	écial :	1	
Norme I	BNQ (A	STM) :		2501-250	) (D698)	2501-25	5 (D1557)	- Opt			
Méthode	e:			A	B/C/D	A	B/C/D	E	F		
Hauteur	r du mo	ule :	cm				11.650				
Diamètr	re du m	oule :	cm				15.260				
Volume	du mo	ule :	cm <sup>3</sup>		A. A. B. A. B.		2,132.40				
Masse o	du mart	eau :	kg				4.540			1	
Hauteur	r de chu	ute :	cm				45.7				
Nombre	de col	ups par couch	θ.				56				
Energie	spécifi	que :	ka/cm <sup>2</sup>				27 400				
Linergie	specifi	440.	Ngrolli-	Méthodes A et	B: Essai effec	tué sur le maté	riau passant le	tamis de 5 mm	n (#4)		
				Méthodes C et en remplaçant	D: Essai effec le matériau rel	tué sur le mate tenu sur le tam	ériau passant le is de 20 mm av	e tamis de 20 m vec la méthode	nm (3/4 po.) D		
Essai n	10:			1	2	3	4	5	6	7	8
Teneur	en eau	1		D4	A 17	400	-				
Numero	de la te	are :		P4	A17	A30	2				
Masse		ido , taro :	g	5 902.000	5 949 000	5 800 000	5 960 000				
Masse s		tare :	g	5,893.000	5,949.000	5,890.000	5,860.000				
Teneur	en eau	+ laie .	%	10.018	8,210	7.333	4,722	1000			
Poids v	/olumic	que									
Masse o	du mou	le :	kg	5.432	5.432	5.432	5.432	5.432	5.432	5.432	5.432
Masse o	du mou	le + sol :	kg	10.381	10.486	10.444	10.314				
Daida	olumia	le sol sec :	kN/m <sup>3</sup>	20.688	21.480	21.476	21.440				
Polds vo						0100 00	2186 21	100000000000000000000000000000000000000			
Masse	volum	ique sol sec	: kg/m <sup>3</sup>	2109.53	2190.28	2189.83	2100.21				
Masse Écart :	volum	ique sol sec	: kg/m <sup>3</sup>	2109.53	2190.28	2189.83	2100.21				
Masse Écart :	volum	ique sol sec	<ul> <li>kg/m<sup>3</sup></li> <li>Points à i</li> <li>Point max</li> </ul>	2109.53 nsérer x. à insérer	2190.28	Points of Point m	déjà insérés ax. déjà inséré				95
Masse Écart :	volum 2200.	o	<ul> <li>kg/m³</li> <li>Points à i</li> <li>Point ma:</li> </ul>	2109.53 nsérer x. à insérer	2190.28	Points of Point m	déjà insérés ax. déjà inséré		V	aleurs calculé	es
Masse Écart :	volum 2200. 2190.	o	Points à i	2109.53 nsérer x. à insérer	2190.28	Points (     Point m	déjà insérés ax. déjà inséré		Va Tene	aleurs calculé ur en eau optim	i <b>es</b> ale, %
Masse Écart :	volum 2200. 2190. 2180.		Points à i	2109.53 nsérer x. à insérer	2190.28	Points of Point m	déjà insérés ax. déjà inséré		V: Tene	aleurs calculé ur en eau optim	i <b>es</b> ale, %
Masse Écart :	volum 2200. 2190. 2180.		Points à i	2109.53 nsérer x. à insérer	2190.28	Points of Point m	Jéjà insérés ax. déjà inséré		Vi Tene Poid	aleurs calculé ur en eau optim	ale, %
Masse Écart :	volum 2200. 2190. 2180. 2170.		Points à i	2109.53 nsérer x. à insérer	2190.28	Points c     Point m	léjà insérés ax. déjà inséré		Vi Tene Poid	aleurs calculé ur en eau optim s volumique sec	e <b>s</b> ale, % : max.
Masse Écart :	volum 2200. 2190. 2180. 2170. 2160.		Points à i	2109.53 nsérer x. à insérer	2190.28	Points of Point m	déjà insérés ax. déjà inséré		Vi Tene Poid	aleurs calculé ur en eau optim s volumique sec	es ale, % : max.
Masse Écart :	volum 2200. 2190. 2180. 2170. 2160. 2150.		Points à i	2109.53 nsérer x. à insérer	2190.28	Points      Point m	déjà insérés ax. déjà inséré		Vi Tene Poid	aleurs calculé ur en eau optim s volumique sec	es ale, % : max.
Masse Écart :	volum 2200. 2190. 2180. 2170. 2160. 2150.		Points à i	2109.53 nsérer x. à insérer	2190.28	Points (     Point m	léjà insérés ax. déjà inséré		Va Tene Poid	aleurs calculé ur en eau optim s volumique sec aleurs récupéré	es
As volumique sol sec	volum 2200. 2190. 2180. 2170. 2160. 2150. 2140.		Points à i	2109.53 nsérer x. à insérer	2190.28	Points of Point m	Jéjà insérés ax. déjà inséré		Vi Tene Poid	aleurs calculé ur en eau optim s volumique sec aleurs récupéré	es ale, % ; max. ;es
Masse Écart :	volum 2200. 2190. 2180. 2170. 2160. 2150. 2140. 2130.		Points à i	2109.53 nsérer x. à insérer	2190.28	Points (     Point m	Jéjà insérés ax. déjà inséré		Va Tene Poid	aleurs calculé ur en eau optim s volumique sec aleurs récupéré ur en eau optin 7.80	es ale, % : max. ies nale, %
Poids volumique sol sec	volum 2200. 2190. 2180. 2170. 2160. 2150. 2140. 2130. 2120.		Points à i	2109.53	2190.28	Points of Point m	Jéjà insérés ax. déjà inséré		Vi Tene Poid Vi Teneu Poid	aleurs calculé ur en eau optim s volumique sec aleurs récupéré ur en eau optin 7.80 s volumique sec	es ale, % max. ies nale, %
Poids volumidue sol sec	volum 2200. 2190. 2180. 2170. 2160. 2150. 2140. 2130. 2120. 2120. 2110.		Points à i	2109.53 nsérer x. à insérer	2190.28	Points of P	léjà insérés ax. déjà inséré		Vi Tene Poid	aleurs calculé ur en eau optim s volumique sec aleurs récupéré ur en eau optin 7.80 s volumique sec 2193 kg/m3	ies ale, % max. ies nale, %
Doids volumidue sol sec	volum 2200. 2190. 2180. 2170. 2160. 2150. 2140. 2130. 2120. 2120. 2110.		Points à i	2109.53	2190.28	Points (     Point m	Jéjà insérés ax. déjà inséré		Vi Tene Poid	aleurs calculé ur en eau optim s volumique sec aleurs récupéré ur en eau optin 7.80 s volumique sec 2193 kg/m3	es ale, % max. ies nale, %

Teneur en eau (%)

# Terratech

# Essai de compactage Proctor

					-				
Projet desc.:		1000 1 1000			4.121.353			Normes :	BNQ 2501-250 & 255
Projet no :			Profondeur :			m		Date :	2004-05-21 09:30:00
Site :	T-1050-C		Classification :					Réalisé par :	СТ
Sondage :	TP-505-05		Densité relative	:	2.75	Estimée		Vérifié par :	MB
Échantillon :	1		Description :			A second second			
1.1.	14	1 0	la m (tota						
Limites Grant		Iometrie	Norme ASI	M (D698/D	1557):	M	Norme	BNQ 2501-250/251	
ten. en eau :		% < 80 µm :		Méthode (A/B/C/D) : C		Es	sai Proctor Modifié		
liquidité % :		% > 5 mm :							
plasticité % :		% > 20 mm :		No moule :			PR_G1		
Caractéristiques de l'essai Proctor		Norm	nal :		Modifié :	S	Spécial :		
Norme BNQ (	ASTM) :		2501-250	(D698)	2501	-255 (D1557)		8 S. C. S.	
Méthode :		Charles States	A	B/C/D	A	B/C/D	E	F	
Hauteur du me	oule :	cm				11.650			
Diamètre du n	noule :	cm				15.260			
Volume du mo	oule :	cm <sup>3</sup>				2,132.40		1 3000 10	
Masse du mar	teau :	kg				4.540			
Hauteur de ch	ute :	cm				45.7			
Nombre de co	ups par couch	ne :				56			
Nombre de co	uches :					5			
Energie spécif	ique :	kg/cm <sup>2</sup>				27.400			
			Méthodes A et	B. Essai effect	tué sur le m	atóriau naceant le	tamic do 5 n	nm (#4)	
			inourou ou not	D. Loour onco	uo our io n	lateriau passarit le	a tannis de 5 n	(1111 (114)	

en remplaçant le matériau retenu sur le tamis de 20 mm avec la méthode D

Essai no :		1	2	3	4	5	6	7	8
Teneur en eau									
Numéro de la tare :		A2	2	A1	A21				
Masse de la tare :	g	919.000	985.000	1,014.000	1,013.000				
Masse sol humide + tare :	g	5,612.000	5,735.000	5,742.000	5,749.000				
Masse sol sec + tare :	g	5,089.000	5,274.000	5,355.000	5,413.000		19/18/10/2015		
Teneur en eau :	%	12.542	10.748	8.915	7.636				

Poids volumique									
Masse du moule :	kg	5.432	5.432	5.432	5.432	5.432	5.432	5.432	5.432
Masse du moule + sol :	kg	10.164	10.252	10.249	10.186				
Poids volumique sol sec :	kN/m <sup>3</sup>	19.337	20.016	20.340	20.313				
Masse volumique sol sec :	kg/m <sup>3</sup>	1971.79	2040.99	2074.06	2071.25	Sec. Carlos Sec.			
Écart :						1.1.1.1.1			



Teneur en eau (%)





PROJET : Rabaska DOSSIER No.: 604238-0000 Tranchée: TP-503-05 Profondeur: 0.15 à 1.20m

TENEURS EN EAU	INITIALE		FINALE		
	AUXILIAIRE	TOTALE	HAUT	TOTALE	
M.TOTALE HUMIDE	360.80	4838	166.44	5727.43	
M.TOTALE SECHE	325.50	4292	152.56	5243.9	
TARE No	61		149	A-2	
MASSE TARE	15.10		36.83	952.03	
W (%)	11.37	12.72	11.99	11.27	

	POINCONNEMENT									
LEC	TURE	D.H	FORCE	PRESSION	PRESSION	REMARQUES				
(0.01m	m)	(po)	(Newt)	(psi)	(MPa)					
	0	0.000	0	0.0	0.000					
	10.2	0.004	40	3.0	0.021					
	23.8	0.009	67	5.0	0.035					
	38.5	0.015	89	6.7	0.046					
	59.4	0.023	120	9.0	0.062					
	82.6	0.033	156	11.7	0.081					
1	01.0	0.040	175	13.1	0.091					
1	22.4	0.048	223	16.7	0.115					
1	30.1	0.051	242	18.1	0.125					
1	50.0	0.059	286	21.4	0.148					
1	73.3	0.068	335	25.1	0.173					
2	02.5	0.080	407	30.5	0.211					
2	51.3	0.099	534	40.0	0.276					
3	03.2	0.119	688	51.6	0.356					
3	53.4	0.139	843	63.2	0.436					
4	05.7	0.160	1011	75.8	0.523					
4	49.9	0.177	1156	86.7	0.598					
5	08.9	0.200	1356	101.7	0.702					
6	01.4	0.237	1684	126.3	0.872					
7	03.6	0.277	2063	154.7	1.068					
8	02.0	0.316	2417	181.2	1.251					
9	05.5	0.356	2796	209.7	1.447					
11	00.9	0.433	3481	261.0	1.802					
13	00.3	0.512	4230	317.2	2.189					
15	25.3	0.601	5067	379.9	2.623					
REMA	RQUES	:								

MASSES VOLUMIQUES	INITIALE	SATURATION
M.T.HUMIDE	12330	12300
MASSE MOULE	7492	7492
VOL. SOL	2113	2113
W %	12.72	12.03
M.VOL.SECHE	2031	2031
Sr (%)	102.2	96.6

CARACTERISTIQUES PHYSIQUES							
MASSE VOL.MAXIMUM	(kg/m3)	2105					
Wopt. PROCTOR MODIFIE	(%)	8.4					
LIMITE DE LIQUIDITE	(WL)						
LIMITE DE PLASTICITE	(WP)						
INDICE DE PLASTICITE	(IP)						
% PASSANT 0.08mm							
DENS.RELAT.PARTICULES	(Dr)	2.73					
DEGRE DE COMPACTAGE	(C%)	96.5					
ECART P/R Wopt.	(Dw)	4.3					

CONDITIONS D'ESSAI							
VITESSE	(mm/min)	1.27					
SECTION PISTON	(cm2)	19.32					
SURCHARGE	(kg)	4.54					
IMBIBITION	(hr)	96					
GONFLEMENT	(mm)	0.00					

RESULTATS D'ESSAI								
Correction initiale (mm)		1.26						
Poinconnement (mm)	MPa	Indice CBR						
2.54	0.48	7.0						
5.08	0.93	9.0						
Degre de compactage	(C%)							
Ecart p/r Wopt.	(Dw)							
Indice de consistance	(IC)							
Remarques:								
Compactage : 5 x 10coups	s x 4.54kg x 4	57mm						







PROJET : Rabaska DOSSIER No.: 604238-0000 Tranchée: TP-503-05 Profondeur: 0.15 à 1.20m

TENEURS EN EAU	INITIALE		FINALE		
	AUXILIAIRE	TOTALE	HAUT	TOTALE	
M.TOTALE HUMIDE	418.40	4882	187.20	5764.19	
M.TOTALE SECHE	377.50	4324	170.79	5270.74	
TARE No	52		64	A-17	
MASSE TARE	13.30		37.28	947.14	
W (%)	11.23	12.92	11.99	11.41	

POINCONNEMENT					
LECTURE	D.H	FORCE	PRESSION	PRESSION	REMARQUES
(0.01mm)	(po)	(Newt)	(psi)	(MPa)	
0	0.000	0	0.0	0.000	
6.2	0.002	20	1.5	0.010	
19.5	0.008	35	2.6	0.018	
42.7	0.017	54	4.0	0.028	
57.2	0.023	65	4.9	0.034	
86.7	0.034	87	6.5	0.045	
101.0	0.040	98	7.3	0.051	
122.6	0.048	114	8.5	0.059	
145.6	0.057	133	10.0	0.069	
159.7	0.063	147	11.0	0.076	
180.9	0.071	164	12.3	0.085	
200.5	0.079	169	12.7	0.087	
223.7	0.088	198	14.8	0.102	
251.7	0.099	228	17.1	0.118	
302.2	0.119	283	21.2	0.146	
346.2	0.136	331	24.8	0.171	
405.3	0.160	397	29.8	0.205	
457.1	0.180	456	34.2	0.236	
505.6	0.199	509	38.2	0.263	
602.8	0.237	616	46.2	0.319	
705.5	0.278	727	54.5	0.376	
800.9	0.315	830	62.2	0.430	
902.8	0.355	937	70.3	0.485	
1302.5	0.513	1362	102.1	0.705	
REMARQUES	:				

MASSES VOLUMIQUES	INITIALE	SATURATION
M.T.HUMIDE	12401	12361
MASSE MOULE	7519	7519
VOL. SOL	2135	2135
W %	12.92	11.99
M.VOL.SECHE	2025	2025
Sr (%)	102.5	95.1

CARACTERISTIQUES PHYSIQUES				
MASSE VOL.MAXIMUM	(kg/m3)	2105		
Wopt. PROCTOR MODIFIE	(%)	8.4		
LIMITE DE LIQUIDITE	(WL)			
LIMITE DE PLASTICITE	(WP)			
INDICE DE PLASTICITE	(IP)			
% PASSANT 0.08mm				
DENS.RELAT.PARTICULES	(Dr)	2.73		
DEGRE DE COMPACTAGE	(C%)	96.2		
ECART P/R Wopt.	(Dw)	4.5		

CONDITIONS D'ESSAI			
VITESSE	(mm/min)	1.27	
SECTION PISTON	(cm2)	19.32	
SURCHARGE	(kg)	4.54	
IMBIBITION	(hr)	96	
GONFLEMENT	(mm)	0.00	

RESULTATS D'ESSAI				
Correction initiale (mm)		0.50		
Poinconnement (mm)	MPa	Indice CBR		
2.54	0.15	2.1		
5.08	0.29	2.8		
Degre de compactage	(C%)			
Ecart p/r Wopt.	(Dw)			
Indice de consistance	(IC)			
Remarques:				
Compactage : 5 x 25coups x 4.54kg x 457mm				







PROJET : Rabaska DOSSIER No.: 604238-0000 Tranchée: TP-503-05 Profondeur: 0.15 à 1.20m

TENEURS EN EAU	INITIALE		FINALE	
	AUXILIAIRE	TOTALE	HAUT	TOTALE
M.TOTALE HUMIDE	370.50	4909	169.85	5836.68
M.TOTALE SECHE	332.50	4364	154.98	5354.43
TARE No	15		107	A-21
MASSE TARE	13.50		35.62	990.62
W (%)	11.91	12.49	11.99	11.05

POINCONNEMENT					
LECTURE	D.H	FORCE	PRESSION	PRESSION	REMARQUES
(0.01mm)	(po)	(Newt)	(psi)	(MPa)	
0	0.000	0	0.0	0.000	
10.5	0.004	57	4.3	0.030	
22.4	0.009	67	5.0	0.035	
44.0	0.017	82	6.1	0.042	
58.5	0.023	93	7.0	0.048	
80.9	0.032	108	8.1	0.056	
102.1	0.040	123	9.2	0.064	
125.8	0.050	140	10.5	0.072	
139.9	0.055	150	11.2	0.078	
160.3	0.063	166	12.4	0.086	
184.0	0.072	178	13.3	0.092	
204.7	0.081	201	15.1	0.104	
251.3	0.099	245	18.4	0.127	
305.8	0.120	294	22.0	0.152	
353.6	0.139	339	25.4	0.175	
405.8	0.160	391	29.3	0.202	
449.8	0.177	433	32.5	0.224	
509.0	0.200	491	36.8	0.254	
603.3	0.238	586	43.9	0.303	
702.4	0.277	680	51.0	0.352	
803.0	0.316	781	58.6	0.404	
905.5	0.356	870	65.2	0.450	
1101.9	0.434	1040	78.0	0.538	
1304.2	0.513	1211	90.8	0.627	
1501.1	0.591	1367	102.5	0.708	
REMARQUES	:				

MASSES VOLUMIQUES	INITIALE	SATURATION
M.T.HUMIDE	12371	12330
MASSE MOULE	7462	7462
VOL. SOL	2125	2125
W %	12.49	11.55
M.VOL.SECHE	2054	2054
Sr (%)	104.8	96.9

CARACTERISTIQUES PHYSIQUES				
MASSE VOL.MAXIMUM	(kg/m3)	2105		
Wopt. PROCTOR MODIFIE	(%)	8.4		
LIMITE DE LIQUIDITE	(WL)			
LIMITE DE PLASTICITE	(WP)			
INDICE DE PLASTICITE	(IP)			
% PASSANT 0.08mm				
DENS.RELAT.PARTICULES	(Dr)	2.73		
DEGRE DE COMPACTAGE	(C%)	97.6		
ECART P/R Wopt.	(Dw)	4.1		

CONDITIONS D'ESSAI			
VITESSE	(mm/min)	1.27	
SECTION PISTON	(cm2)	19.32	
SURCHARGE	(kg)	4.54	
IMBIBITION	(hr)	96	
GONFLEMENT	(mm)	0.00	

RESULTATS D'ESSAI				
Correction initiale (mm)	0.08			
Poinconnement (mm)	MPa	Indice CBR		
2.54	0.13	1.9		
5.08	0.28	2.7		
Degre de compactage	(C%)			
Ecart p/r Wopt.	(Dw)			
Indice de consistance	(IC)			
Remarques:				
Compactage : 5 x 56 coups x 4.54kg x 457mm				







PROJET : Rabaska DOSSIER No.: 604238-0000 Tranchée: TP-504-05 Profondeur: 0.5 à 1.6m

TENEURS EN EAU	INITIALE		FINALE	
	AUXILIAIRE	TOTALE	HAUT	TOTALE
M.TOTALE HUMIDE	419.80	4894	127.64	5860.42
M.TOTALE SECHE	388.00	4474	118.89	5455.08
TARE No	3001		31	A-25
MASSE TARE	13.10		32.18	981.26
W (%)	8.48	9.39	10.09	9.06

POINCONNEMENT					
LECTURE	D.H	FORCE	PRESSION	PRESSION	REMARQUES
(0.01mm)	(po)	(Newt)	(psi)	(MPa)	
0	0.000	0	0.0	0.000	
10.4	0.004	77	5.8	0.040	
24.1	0.009	116	8.7	0.060	
45.7	0.018	166	12.4	0.086	
59.7	0.024	209	15.7	0.108	
88.2	0.035	315	23.6	0.163	
102.4	0.040	379	28.4	0.196	
123.4	0.049	478	35.8	0.247	
144.3	0.057	591	44.3	0.306	
159.5	0.063	674	50.5	0.349	
180.6	0.071	803	60.2	0.416	
203.8	0.080	950	71.2	0.492	
254.1	0.100	1303	97.7	0.674	
307.1	0.121	1693	126.9	0.876	
350.6	0.138	2033	152.4	1.052	
406.1	0.160	2470	185.2	1.278	
456.0	0.180	2868	215.1	1.484	
508.4	0.200	3275	245.6	1.695	
599.6	0.236	4001	300.0	2.071	
707.3	0.278	4826	361.9	2.498	
807.0	0.318	5538	415.3	2.866	
906.9	0.357	6246	468.3	3.233	
1101.3	0.434	7554	566.4	3.910	
1303.8	0.513	8898	667.2	4.606	
1500.7	0.591	10166	762.3	5.262	
REMARQUES	:				

MASSES VOLUMIQUES	INITIALE	SATURATION
M.T.HUMIDE	12425	12411
MASSE MOULE	7531	7531
VOL. SOL	2105	2105
W %	9.39	9.08
M.VOL.SECHE	2125	2125
Sr (%)	91.3	88.2

CARACTERISTIQUES PHYSIQUES				
MASSE VOL.MAXIMUM	(kg/m3)	2193		
Wopt. PROCTOR MODIFIE	(%)	7.8		
LIMITE DE LIQUIDITE	(WL)			
LIMITE DE PLASTICITE	(WP)			
INDICE DE PLASTICITE	(IP)			
% PASSANT 0.08mm				
DENS.RELAT.PARTICULES	(Dr)	2.73		
DEGRE DE COMPACTAGE	(C%)	96.9		
ECART P/R Wopt.	(Dw)	1.6		

CONDITIONS D'ESSAI			
VITESSE	(mm/min)	1.27	
SECTION PISTON	(cm2)	19.32	
SURCHARGE	(kg)	4.54	
IMBIBITION	(hr)	96	
GONFLEMENT	(mm)	0.00	

RESULTATS D'ESSAI				
Correction initiale (mm)		0.92		
Poinconnement (mm)	MPa	Indice CBR		
2.54	1.03	14.9		
5.08	2.07	20.0		
Degre de compactage	(C%)			
Ecart p/r Wopt.	(Dw)			
Indice de consistance	(IC)			
Remarques:				
Compactage : 5 x 10coups x 4.54kg x 457mm				







PROJET : Rabaska DOSSIER No.: 604238-0000 Tranchée: TP-504-05 Profondeur: 0.5 à 1.6m

TENEURS EN EAU	INITIALE		FINALE	
	AUXILIAIRE	TOTALE	HAUT	TOTALE
M.TOTALE HUMIDE	479.30	5002	148.48	5970.73
M.TOTALE SECHE	442.40	4589	139.15	5584.75
TARE No	199		77	A-5
MASSE TARE	13.30		37.87	995.69
W (%)	8.60	9.00	9.21	8.41

POINCONNEMENT					
LECTURE	D.H	FORCE	PRESSION	PRESSION	REMARQUES
(0.01mm)	(po)	(Newt)	(psi)	(MPa)	
0	0.000	0	0.0	0.000	
7.7	0.003	77	5.8	0.040	
22.1	0.009	104	7.8	0.054	
45.7	0.018	145	10.9	0.075	
59.9	0.024	169	12.7	0.087	
80.4	0.032	214	16.0	0.111	
100.7	0.040	263	19.7	0.136	
120.6	0.047	315	23.6	0.163	
141.2	0.056	372	27.9	0.193	
163.3	0.064	443	33.2	0.229	
183.9	0.072	514	38.5	0.266	
207.0	0.081	597	44.8	0.309	
250.5	0.099	778	58.3	0.403	
308.0	0.121	1048	78.6	0.542	
352.0	0.139	1268	95.1	0.656	
399.9	0.157	1533	114.9	0.793	
449.8	0.177	1821	136.5	0.943	
507.8	0.200	2178	163.3	1.127	
601.1	0.237	2784	208.8	1.441	
703.3	0.277	3482	261.1	1.802	
803.9	0.316	4194	314.5	2.171	
905.4	0.356	4934	370.0	2.554	
1100.8	0.433	6393	479.4	3.309	
1304.6	0.514	8022	601.5	4.152	
REMARQUES	:				

MASSES VOLUMIQUES	INITIALE	SATURATION
M.T.HUMIDE	12427	12392
MASSE MOULE	7425	7425
VOL. SOL	2109	2109
W %	9.00	8.24
M.VOL.SECHE	2176	2176
Sr (%)	97.9	89.6

CARACTERISTIQUES PHYSIQUES					
MASSE VOL.MAXIMUM	(kg/m3)	2193			
Wopt. PROCTOR MODIFIE	(%)	7.8			
LIMITE DE LIQUIDITE	(WL)				
LIMITE DE PLASTICITE	(WP)				
INDICE DE PLASTICITE	(IP)				
% PASSANT 0.08mm					
DENS.RELAT.PARTICULES	(Dr)	2.73			
DEGRE DE COMPACTAGE	(C%)	99.2			
ECART P/R Wopt.	(Dw)	1.2			

CONDITIONS D'ESSAI			
VITESSE	(mm/min)	1.27	
SECTION PISTON	(cm2)	19.32	
SURCHARGE	(kg)	4.54	
IMBIBITION	(hr)	96	
GONFLEMENT	(mm)	0.00	

RESULTATS D'ESSAI				
Correction initiale (mm)		2.45		
Poinconnement (mm)	MPa	Indice CBR		
2.54	1.09	15.8		
5.08	1.98	19.1		
Degre de compactage	(C%)			
Ecart p/r Wopt.	(Dw)			
Indice de consistance	(IC)			
Remarques:				
Compactage : 5 x 25coups x 4.54kg x 457mm				







PROJET : Rabaska DOSSIER No.: 604238-0000 Tranchée: TP-504-05 Profondeur: 0.5 à 1.6m

TENEURS EN EAU	INITIALE		FINALE	
	AUXILIAIRE	TOTALE	HAUT	TOTALE
M.TOTALE HUMIDE	588.80	4988	144.93	5936.34
M.TOTALE SECHE	543.40	4569	135.11	5553.96
TARE No	153		121	A-26
MASSE TARE	13.80		36.50	984.86
W (%)	8.57	9.17	9.96	8.37

POINCONNEMENT						
LECTURE	D.H	FORCE	PRESSION	PRESSION	REMARQUES	
(0.01mm)	(po)	(Newt)	(psi)	(MPa)		
0	0.000	0	0.0	0.000		
10.7	0.004	66	4.9	0.034		
20.0	0.008	92	6.9	0.048		
41.0	0.016	151	11.3	0.078		
60.6	0.024	217	16.3	0.112		
79.5	0.031	326	24.4	0.169		
101.6	0.040	452	33.9	0.234		
121.8	0.048	571	42.8	0.296		
142.2	0.056	690	51.7	0.357		
163.2	0.064	806	60.4	0.417		
179.7	0.071	906	67.9	0.469		
204.6	0.081	1057	79.3	0.547		
253.3	0.100	1352	101.4	0.700		
300.4	0.118	1647	123.5	0.852		
348.5	0.137	1951	146.3	1.010		
399.9	0.157	2273	170.4	1.177		
451.1	0.178	2592	194.4	1.342		
508.2	0.200	2956	221.6	1.530		
599.5	0.236	3523	264.2	1.823		
702.6	0.277	4124	309.2	2.135		
801.5	0.316	4734	355.0	2.450		
900.6	0.355	5334	400.0	2.761		
REMARQUES	:					

MASSES VOLUMIQUES	INITIALE	SATURATION
M.T.HUMIDE	12554	12515
MASSE MOULE	7566	7566
VOL. SOL	2113	2113
W %	9.17	8.32
M.VOL.SECHE	2162	2162
Sr (%)	96.7	87.7

CARACTERISTIQUES PHYSIQUES					
MASSE VOL.MAXIMUM	(kg/m3)	2193			
Wopt. PROCTOR MODIFIE	(%)	7.8			
LIMITE DE LIQUIDITE	(WL)				
LIMITE DE PLASTICITE	(WP)				
INDICE DE PLASTICITE	(IP)				
% PASSANT 0.08mm					
DENS.RELAT.PARTICULES	(Dr)	2.73			
DEGRE DE COMPACTAGE	(C%)	98.6			
ECART P/R Wopt.	(Dw)	1.4			

CONDITIONS D'ESSAI				
VITESSE	(mm/min)	1.27		
SECTION PISTON	(cm2)	19.32		
SURCHARGE	(kg)	4.54		
IMBIBITION	(hr)	96		
GONFLEMENT	(mm)	0.00		

RESULTATS D'ESSAI					
Correction initiale (mm)		0.37			
Poinconnement (mm)	MPa	Indice CBR			
2.54	0.82	11.9			
5.08	1.65	16.0			
Degre de compactage	(C%)				
Ecart p/r Wopt.	(Dw)				
Indice de consistance	(IC)				
Remarques:					
Compactage : 5 x 56 coups x 4.54kg x 457mm					







PROJET : Rabaska DOSSIER No.: 604238-0000 Tranchée: TP-505-05 Profondeur: 0.2 à 0.6m

TENEURS EN EAU	INITIALE		FINALE	
	AUXILIAIRE	TOTALE	HAUT	TOTALE
M.TOTALE HUMIDE	415.20	4401	140.62	5537.29
M.TOTALE SECHE	378.70	4027	127.61	5020.87
TARE No	295		113	A-8
MASSE TARE	13.40		37.87	994.16
W (%)	9.99	9.30	14.50	12.82

L	POINCONNEMENT												
ſ	LECTURE	D.H	FORCE	PRESSION	PRESSION	REMARQUES							
	(0.01mm)	(po)	(Newt)	(psi)	(MPa)								
I	0	0.000	0	0.0	0.000								
I	10.5	0.004	261	19.6	0.135								
I	23.9	0.009	432	32.4	0.224								
I	45.5	0.018	686	51.4	0.355								
I	64.9	0.026	880	66.0	0.455								
I	87.1	0.034	1081	81.1	0.560								
I	101.3	0.040	1195	89.6	0.619								
I	121.3	0.048	1345	100.9	0.696								
I	143.9	0.057	1494	112.0	0.773								
I	163.8	0.064	1619	121.4	0.838								
I	200.7	0.079	1817	136.2	0.940								
I	256.3	0.101	2094	157.0	1.084								
I	305.6	0.120	2328	174.6	1.205								
I	357.5	0.141	2566	192.4	1.328								
I	401.5	0.158	2757	206.7	1.427								
I	450.8	0.177	2974	223.0	1.539								
I	509.4	0.201	3215	241.1	1.664								
I	605.0	0.238	3590	269.2	1.858								
I	700.2	0.276	3939	295.4	2.039								
I	804.0	0.317	4300	322.4	2.226								
I	902.0	0.355	4624	346.7	2.393								
I	1004.3	0.395	4963	372.1	2.569								
I	1107.9	0.436	5304	397.7	2.745								
I	1302.5	0.513	5961	447.0	3.085								
1	1501.9	0.591	6623	496.6	3.428								
ſ	REMARQUES	:				REMARQUES :							

MASSES VOLUMIQUES	INITIALE	SATURATION
M.T.HUMIDE	11827	11988
MASSE MOULE	7426	7426
VOL. SOL	2106	2106
W %	9.30	13.29
M.VOL.SECHE	1912	1912
Sr (%)	59.9	85.7

CARACTERISTIQUES PHYSIQUES					
MASSE VOL.MAXIMUM	(kg/m3)	2075			
Wopt. PROCTOR MODIFIE	(%)	8.5			
LIMITE DE LIQUIDITE	(WL)				
LIMITE DE PLASTICITE	(WP)				
INDICE DE PLASTICITE	(IP)				
% PASSANT 0.08mm					
DENS.RELAT.PARTICULES	(Dr)	2.73			
DEGRE DE COMPACTAGE	(C%)	92.1			
ECART P/R Wopt.	(Dw)	0.8			

CONDITIONS D'ESSAI				
VITESSE	(mm/min)	1.27		
SECTION PISTON	(cm2)	19.32		
SURCHARGE	(kg)	4.54		
IMBIBITION	(hr)	96		
GONFLEMENT	(mm)	0.00		

RESULTATS D'ESSAI					
Correction initiale (mm)	0.00				
Poinconnement (mm)	MPa	Indice CBR			
2.54	1.25	18.2			
5.08	1.73	16.7			
Degre de compactage	(C%)				
Ecart p/r Wopt.	(Dw)				
Indice de consistance	(IC)				
Remarques:					
Compactage : 5 x 10coups x 4.54kg x 457mm					







PROJET : Rabaska DOSSIER No.: 604238-0000 Tranchée: TP-505-05 Profondeur: 0.2 à 0.6m

TENEURS EN EAU	INITIALE		FINALE	
	AUXILIAIRE	TOTALE	HAUT	TOTALE
M.TOTALE HUMIDE	360.50	4728	112.93	5761.96
M.TOTALE SECHE	328.40	4305	104.65	5291.19
TARE No	PP		71	A-27
MASSE TARE	13.70		36.76	986.01
W (%)	10.20	9.82	12.20	10.93

POINCONNEMENT						
LECTUR	RE	D.H	FORCE	PRESSION	PRESSION	REMARQUES
(0.01mm)		(po)	(Newt)	(psi)	(MPa)	
	0	0.000	0	0.0	0.000	
9	.5	0.004	157	11.8	0.081	
18	.6	0.007	222	16.6	0.115	
41	.2	0.016	359	26.9	0.186	
61	.2	0.024	492	36.9	0.255	
84	.0	0.033	658	49.3	0.341	
103	.8	0.041	828	62.1	0.429	
126	.2	0.050	1026	76.9	0.531	
140	.5	0.055	1157	86.8	0.599	
158	.5	0.062	1335	100.1	0.691	
180	.2	0.071	1558	116.8	0.806	
200	.5	0.079	1772	132.9	0.917	
256	.2	0.101	2396	179.7	1.240	
306	.1	0.121	2977	223.2	1.541	
353	.7	0.139	3568	267.5	1.847	
401	.0	0.158	4149	311.1	2.148	
455	.9	0.179	4849	363.6	2.510	
511	.8	0.201	5535	415.0	2.865	
601	.8	0.237	6668	500.0	3.451	
699	.6	0.275	7888	591.5	4.083	
803	.9	0.316	9102	682.5	4.711	
903	.1	0.356	10190	764.1	5.274	
1100	.1	0.433	12205	915.2	6.317	
1300	.7	0.512	14081	1055.8	7.288	
1504	.1	0.592	15996	1199.4	8.280	
REMARQU	REMARQUES :					

MASSES VOLUMIQUES	INITIALE	SATURATION
M.T.HUMIDE	12343	12400
MASSE MOULE	7617	7617
VOL. SOL	2113	2113
W %	9.82	11.10
M.VOL.SECHE	2037	2038
Sr (%)	79.7	90.3

CARACTERISTIQUES PHYSIQUES						
MASSE VOL.MAXIMUM	(kg/m3)	2075				
Wopt. PROCTOR MODIFIE	(%)	8.5				
LIMITE DE LIQUIDITE	(WL)					
LIMITE DE PLASTICITE	(WP)					
INDICE DE PLASTICITE	(IP)					
% PASSANT 0.08mm						
DENS.RELAT.PARTICULES	(Dr)	2.73				
DEGRE DE COMPACTAGE	(C%)	98.2				
ECART P/R Wopt.	(Dw)	1.3				

CONDITIONS D'ESSAI					
VITESSE	(mm/min)	1.27			
SECTION PISTON	(cm2)	19.32			
SURCHARGE	(kg)	4.54			
IMBIBITION	(hr)	96			
GONFLEMENT	(mm)	0.00			

RESULTATS D'ESSAI					
Correction initiale (mm)		0.50			
Poinconnement (mm)	MPa	Indice CBR			
2.54	1.52	22.0			
5.08	3.16	30.5			
Degre de compactage	(C%)				
Ecart p/r Wopt.	(Dw)				
Indice de consistance	(IC)				
Remarques:					
Compactage : 5 x 25coups x 4.54kg x 457mm					







PROJET : Rabaska DOSSIER No.: 604238-0000 Tranchée: TP-505-05 Profondeur: 0.2 à 0.6m

TENEURS EN EAU	INITIALE		FINALE	
	AUXILIAIRE	TOTALE	HAUT	TOTALE
M.TOTALE HUMIDE	486.40	4748	102.91	5770.83
M.TOTALE SECHE	444.50	4324	94.28	5312.18
TARE No	234		46	A-20
MASSE TARE	13.50		32.57	988.31
W (%)	9.72	9.81	13.98	10.61

POINCONNEMENT						
LEC	TURE	D.H	FORCE	PRESSION	PRESSION	REMARQUES
(0.01m	m)	(po)	(Newt)	(psi)	(MPa)	
	0	0.000	0	0.0	0.000	
	14.3	0.006	160	12.0	0.083	
	19.6	0.008	167	12.5	0.086	
	37.8	0.015	251	18.8	0.130	
	59.7	0.024	326	24.4	0.169	
	80.3	0.032	401	30.1	0.208	
1	02.4	0.040	492	36.9	0.255	
1	22.2	0.048	583	43.7	0.302	
1	42.8	0.056	685	51.4	0.355	
1	63.3	0.064	792	59.4	0.410	
1	84.5	0.073	918	68.8	0.475	
2	04.8	0.081	1042	78.1	0.539	
2	53.0	0.100	1359	101.9	0.703	
3	01.4	0.119	1714	128.5	0.887	
3	51.9	0.139	2088	156.6	1.081	
4	07.9	0.161	2551	191.3	1.320	
4	49.5	0.177	2883	216.2	1.492	
5	11.7	0.201	3426	256.9	1.773	
6	02.7	0.237	4187	314.0	2.167	
7	01.0	0.276	5079	380.8	2.629	
8	01.6	0.316	5995	449.5	3.103	
9	04.5	0.356	7008	525.5	3.627	
11	03.5	0.434	8955	671.5	4.635	
13	00.3	0.512	10916	818.5	5.650	
14	99.7	0.590	12910	968.0	6.682	
REMA	REMARQUES :					

MASSES VOLUMIQUES	INITIALE	SATURATION
M.T.HUMIDE	12403	12436
MASSE MOULE	7655	7655
VOL. SOL	2101	2101
W %	9.81	10.57
M.VOL.SECHE	2058	2058
Sr (%)	83.1	89.6

CARACTERISTIQUES PHYSIQUES					
MASSE VOL.MAXIMUM	(kg/m3)	2075			
Wopt. PROCTOR MODIFIE	(%)	8.5			
LIMITE DE LIQUIDITE	(WL)				
LIMITE DE PLASTICITE	(WP)				
INDICE DE PLASTICITE	(IP)				
% PASSANT 0.08mm					
DENS.RELAT.PARTICULES	(Dr)	2.73			
DEGRE DE COMPACTAGE	(C%)	99.2			
ECART P/R Wopt.	(Dw)	1.3			

CONDITIONS D'ESSAI					
VITESSE	(mm/min)	1.27			
SECTION PISTON	(cm2)	19.32			
SURCHARGE	(kg)	4.54			
IMBIBITION	(hr)	96			
GONFLEMENT	(mm)	0.00			

RESULTATS D'ESSAI					
Correction initiale (mm)		2.09			
Poinconnement (mm)	MPa	Indice CBR			
2.54	1.55	22.4			
5.08	2.70	26.1			
Degre de compactage	(C%)				
Ecart p/r Wopt.	(Dw)				
Indice de consistance (IC)					
Remarques:					
Compactage : 5 x 56 coups x 4.54kg x 457mm					







Client	: Rabaska Limited Partnership	File no	: 603333-KELL / T-1050-B
		Sample no	: 001 to 018
Project	: Rabaska Project – Phase 2	Client ref.	:
	: Levis (Quebec)	Date	: 2005-04-19

#### 1.0 GENERAL INFORMATION

Sample	:	Rock core (DC)
Equipments	:	Microscope, coloration, acid etching
Others informations	:	18 samples identified in Section 2.0-Results

#### 2.0 RESULTS

#### 1.0 MANDATE

The petrographic examination was carried out on 18 rock samples of the Levis site for the determination of the swelling potential due to the presence of iron sulfur (pyrite, pyrrhotite, etc.).

This was carried out in the perspective that the material would eventually be used as granular backfill of would serve as rock foundation of structure.

#### 2.0 METHODOLOGY

Rock cores were selected from nine (9) boreholes. The 18 selected rock cores were crushed to the calibration of a 0-20 mm crushed stone.

The petrographic facies were then identified and the SPPI (Swelling Potential Petrographic Index) was determined in compliance with the Quebec Standard NQ 2560-500.

#### 3.0 RESULTS

The results are summarized in Table 1.





# PETROGRAPHIC EXAMINATION ASTM C295 – ASTM C856

Client	: Rabaska Limited Partnership	File no	: 603333-KELL / T-1050-B
1999	:	Sample no	: 001 to 018
Project	: Rabaska Project – Phase 2	Client ref.	:
	: Levis (Quebec)	Date	: 2005-04-19

#### 2.0 RESULTS (continuation)

Sample	Borehole	Depth	Main facies	SPPI	% eq. pyrite
1	BH-101-05	10 m	Light grey calcareous mudstone	12	0.11
2	BH-101-05	10-13 m	Greenish to grey mudstone	34	0.11
3	BH-102-05	10.5 m	Black shale	56	2.06
4	BH-102-05	12.5 m	Black shale / light grey mudstone	39	0.54
5	BH-104-05	9 m	Mudstone / black shale	35	0.05
6	BH-104-05	12 m	Grey calcareous mudstone	18	0.02
7	BH-106-05	7 m	Grey mudstone / black shale	43	0.11
8	BH-106-05	11.5 m	Black shale / calcareous sandstone	56	0.92
9	BH-107-05	8.7 m	Red and grey mudstone	44	0.03
10	BH-107-05	11-12.7 m	Grey mudstone	23	0.11
11	BH-108-05	9 m	Grey mudstone	17	0.03
12	BH-108-05	12.2 m	Red and grey mudstone	44	0.02
13	BH-109-05	8 m	Red mudstone	50	0.03
14	BH-109-05	10-13 m	Grey and red mudstone	21	0.05
15	BH-110-05	8 m	Grey mudstone	28	0.07
16	BH-110-05	12.5 m	Red mudstone	50	0.03
17	BH-103-05	11.5-11.8 m	Grey mudstone	25	0.06
18	BH-103-05	12.5-12.9 m	Grey mudstone	25	0.05





Client	: Rabaska Limited Partnership	File no	: 603333-KELL / T-1050-B
	:	Sample no	: 001 to 018
Project	: Rabaska Project – Phase 2	Client ref.	:
	: Levis (Quebec)	Date	: 2005-04-19

#### 2.0 RESULTS (continuation)

#### 4.0 CLASSIFICATION

To be classified as having a swelling potential, a sample needs to present a high SPPI and a high percentage of equivalent pyrite.

#### Non swelling

Samples 1 and 2, 5 to 7, and 9 to 18 are classified as stable and are not presenting any swelling potential due to the presence of pyrite. In all these samples, the equivalent pyrite is very low.

#### Potentially swelling

Samples 3 and 4 of Borehole BH-102-05, and sample 8 from Borehole BH-106-05 are classified as having a high swelling potential due to the presence of pyrite.

#### 5.0 CONCLUSION

The rock of Borehole BH-102-05 and BH-106-05 should not be use as granular backfill or as rock foundation.

The rock of the others boreholes analyzed can be use as granular backfill or as rock foundation as long that they meet the physical requirement.

Realized by :

Terratech

Approved by :

Alain Blanchette, geol., M.A.Sc Project manager Material Engineering

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## SWELLING POTENTIAL PETROGRAPHIC INDEX DETERMINATION NQ 2560-500

Client	:	Rabaska Limited Partnership	Date	:	2005/04/01
			File	:	603333-KELL
Project	:	Rabaska Project (Phase 2)	Labo no	:	001
		Levis (Quebec)	Client ref.	:	-

Sample	: Core drill	
Source	: Rabaska Project: West Option Site	
Sampling by	: Terratech	
Localisation	: Borehole BH-101-05 at 10 meters	

	Weight used									
Passing	mm	Retained	mm	Weight	g					
Passing	mm	Retained	mm	Weight	g					
Passing	mm	Retained	mm	Weight	g					
Passing	mm	Retained	mm ′	Weight	g					

	Results									
Petrographic farcies	PI	retained 100 %	SPPI	retained mm	SPPI	retained mm	SPPI	retained mm	SPPI	
Light grey calcareous mudstone	0.1	88	8.8							
Greenish to grey mudstone	0.25	12	3.0		-					
			C.S. S. S.							
SPPI per fraction			11.8							
Final SPPI : <u>12</u>	_									

# REMARQS

- Equivalent pyrite percentage : 0.11%

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ALAIN ANCHETTE # 254

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### SWELLING POTENTIAL PETROGRAPHIC INDEX DETERMINATION NQ 2560-500

Client	:	Rabaska Limited Partnership	Date	:	2005/04/01
			File	:	603333-KELL
Project	:	Rabaska Project (Phase 2)	Labo no	:	002
		Levis (Quebec)	Client ref.	:	-

Sample	: Core drill	
Source	: Rabaska Project: West Option Site	
Sampling by	: Terratech	
Localisation	: Borehole BH-101-05, between 10 and 13 meters	

Weight used										
Passing	mm	Retained	mm	Weight	g					
Passing	mm	Retained	mm	Weight	g					
Passing	mm	Retained	mm	Weight	g					
Passing	mm	Retained	mm	Weight	g					

	Results									
Petrographic farcies	PI	retained 100 %	SPPI	retained mm	SPPI	retained mm	SPPI	retained mm	SPPI	
Greenish to grey mudstone with imbedded black shale	0.5	35	17.5		13					
Greenish to grey mudstone	0.25	65	16.25							
	in a start		21 63							
SPPI per fraction			33.75							
Final SPPI : <u>34</u>	_		-							

#### REMARQS

- Equivalent pyrite percentage : 0.11%

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#### SWELLING POTENTIAL PETROGRAPHIC INDEX DETERMINATION NQ 2560-500

Client	:	Rabaska Limited Partnership	Date	:	2005/04/01
			File	:	603333-KELL
Project	:	Rabaska Project (Phase 2)	Labo no	:	003
		Levis (Quebec)	Client ref.	:	-

Sample	: Core drill
Source	: Rabaska Project: West Option Site
Sampling by	: Terratech
Localisation	: Borehole BH-102-05 at 10.5 meters

	Weight used												
Passing	mm	Retained	mm	Weight	g								
Passing	mm	Retained	mm	Weight	g								
Passing	mm	Retained	mm	Weight	g								
Passing	mm	Retained	mm	Weight	g								

Results													
Petrographic farcies	PI	retained 100 %	SPPI	retained mm	SPPI	retained mm	SPPI	retained mm	SPPI				
Black shale	0.75	70	52.5										
Light grey calcareous mudstone	0.1	30	3.0		1								
SPPI per fraction			55.5										
Final SPPI :56	-												
							1989 (A. 198						

# REMARQS

- Equivalent pyrite percentage : 2.06%

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### SWELLING POTENTIAL PETROGRAPHIC INDEX DETERMINATION NQ 2560-500

Client	:	Rabaska Limited Partnership	Date	:	2005/04/01
			File	:	603333-KELL
Project	:	Rabaska Project (Phase 2)	Labo no	:	004
	5.03	Levis (Quebec)	Client ref.	:	

Sample	: Core drill
Source	: Rabaska Project: West Option Site
Sampling by	: Terratech
Localisation	: Borehole BH-102-05 at 12.5 meters

Weight used											
Passing	mm	Retained	mm	Weight	g						
Passing	mm	Retained	mm	Weight	g						
Passing	mm	Retained	mm	Weight	g						
Passing	mm	Retained	mm	Weight	g						

Results													
Petrographic farcies	PI	retained 100 %	SPPI	retained mm	SPPI	retained mm	SPPI	retained mm	SPPI				
Light grey calcareous mudstone	0.1	55	5.5										
Black shale	0.75	45	33.75		4								
SPPI per fraction													
Final SPPI : <u>39</u>	Final SPPI : 39												

# REMARQS

- Equivalent pyrite percentage : 0.54%

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### SWELLING POTENTIAL PETROGRAPHIC INDEX DETERMINATION NQ 2560-500

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Client	:	Rabaska Limited Partnership	Date	:	2005/04/01
			File	:	603333-KELL
Project	:	Rabaska Project (Phase 2)	Labo no	:	005
		Levis (Quebec)	Client ref.	:	-

Sample	: Core drill	
Source	: Rabaska Project: West Option Site	
Sampling by	: Terratech	
Localisation	: Borehole BH-104-05 at 9 meters	

	Weight used											
Passing	mm	Retained	mm	Weight	g							
Passing	mm	Retained	mm	Weight	g							
Passing	mm	Retained	mm	Weight	g							
Passing	mm	Retained	mm	Weight	g							

Results													
Petrographic farcies	PI	retained 100 %	SPPI	retained mm	SPPI	retained mm	SPPI	retained mm	SPPI				
Greenish to grey mudstone with imbedded black shale	0.5	40	20.0		. 1								
Greenish to grey mudstone	0.25	60	15.0										
						1.1							
	39.												
SPPI per fraction		35.0											
Final SPPI : 35				1. 1. 1.									

#### REMARQS

- Equivalent pyrite percentage : 0.05%

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## SWELLING POTENTIAL PETROGRAPHIC INDEX DETERMINATION NQ 2560-500

Client	:	Rabaska Limited Partnership	Date	:	2005/04/01
			File	:	603333-KELL
Project	:	Rabaska Project (Phase 2)	Labo no	:	006
		Levis (Quebec)	Client ref.	:	•

Sample	: Core drill	
Source	: Rabaska Project: West Option Site	
Sampling by	: Terratech	
Localisation	: Borehole BH-104-05 at 12 meters	

	Weight used											
Passing	mm	Retained	mm	Weight	g							
Passing	mm	Retained	mm	Weight	g							
Passing	mm	Retained	mm	Weight	g							
Passing	mm	Retained	mm	Weight	g							

Results										
Petrographic farcies	PI	retained 100 %	SPPI	retained mm	SPPI	retained mm	SPPI	retained mm	SPPI	
Brownish to red mudstone	0.5	20	10.0							
Light grey calcareous mudstone	0.1	80	8.0		*	1				
							1.26-17			
SPPI per fraction		1211	18.0			1.4.18				
Final SPPI : <u>18</u>										

# REMARQS

- Equivalent pyrite percentage : 0.02%

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# SWELLING POTENTIAL PETROGRAPHIC INDEX DETERMINATION NQ 2560-500

Client	:	Rabaska Limited Partnership	Date	:	2005/04/01
			File	:	603333-KELL
Project	:	Rabaska Project (Phase 2)	Labo no	:	007
14. 352. 11.		Levis (Quebec)	Client ref.	:	-

Sample	: Core drill	
Source	: Rabaska Project: West Option Site	
Sampling by	: Terratech	
Localisation	: Borehole BH-106-05 at 7 meters	

	Weight used											
Passing	mm	Retained	mm	Weight	g							
Passing	mm	Retained	mm	Weight	g							
Passing	mm	Retained	mm	Weight	g							
Passing	mm	Retained	mm	Weight	g							

Results											
Petrographic farcies	PI	retained 100 %	SPPI	retained mm	SPPI	retained mm	SPPI	retained mm	SPPI		
Greenish to grey mudstone	0.25	65	16.25								
Black shale	0.75	35	26.25		-						
						1.00					
SPPI per fraction			42.5								
Final SPPI :43											

# REMARQS

- Equivalent pyrite percentage : 0.11%

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### SWELLING POTENTIAL PETROGRAPHIC INDEX DETERMINATION NQ 2560-500

Client	:	Rabaska Limited Partnership	Date	:	2005/04/01
1.177			File	:	603333-KELL
Project	:	Rabaska Project (Phase 2)	Labo no	:	008
		Levis (Quebec)	Client ref.	:	-

Sample	: Core drill	
Source	: Rabaska Project: West Option Site	
Sampling by	: Terratech	
Localisation	: Borehole BH-106-05 at 11.5 meters	

Weight used										
Passing	mm	Retained	mm	Weight	g					
Passing	mm	Retained	mm	Weight	g					
Passing	mm	Retained	mm	Weight	g					
Passing	mm	Retained	mm	Weight	g					

Results										
Petrographic farcies	PI	retained 100 %	SPPI	retained mm	SPPI	retained mm	SPPI	retained mm	SPPI	
Black shale	0.75	75	56.25							
Slight calcareous sandstone	0	25	0		-					
SPPI per fraction		56.25								
Final SPPI : <u>56</u>	-									
		State and								

# REMARQS

- Equivalent pyrite percentage : 0.92%

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# SWELLING POTENTIAL PETROGRAPHIC INDEX DETERMINATION NQ 2560-500

Client	:	Rabaska Limited Partnership	Date	:	2005/04/01
			File	:	603333-KELL
Project	:	Rabaska Project (Phase 2)	Labo no	:	009
		Levis (Quebec)	Client ref.	:	-

Sample	: Core drill
Source	: Rabaska Project: West Option Site
Sampling by	: Terratech
Localisation	: Borehole BH-107-05 at 8.75 meters

	Weight used											
Passing	mm	Retained	mm	Weight	g							
Passing	mm	Retained	mm	Weight	g	1						
Passing	mm	Retained	mm	Weight	g							
Passing	mm	Retained	mm	Weight	g							

Results												
Petrographic farcies	PI	retained 100 %	SPPI	retained mm	SPPI	retained mm	SPPI	retained mm	SPPI			
Brownish to red mudstone	0.5	75	37.5		-							
Greenish to grey mudstone	0.25	25	6.25		*							
SPPI per fraction			43.75									
Final SPPI :44	_											

# REMARQS

- Equivalent pyrite percentage : 0.03%

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# SWELLING POTENTIAL PETROGRAPHIC INDEX DETERMINATION NQ 2560-500

Client	:	Rabaska Limited Partnership	Date	: 2005/04/01
			File	: 603333-KELL
Project	:	Rabaska Project (Phase 2)	Labo no	: 010
		Levis (Quebec)	Client ref.	: -

Sample	: Core drill	
Source	: Rabaska Project: West Option Site	
Sampling by	: Terratech	
Localisation	: Borehole BH-107-05, between 11 and 12.75 meters	

	Weight used											
Passing	mm	Retained	mm	Weight	g	1						
Passing	mm	Retained	mm	Weight	g							
Passing	mm	Retained	mm	Weight	g							
Passing	mm	Retained	mm	Weight	g							

Results												
Petrographic farcies	PI	retained 100 %	SPPI	retained mm	SPPI	retained mm	SPPI	retained mm	SPPI			
Greenish to grey mudstone	0.25	85	21.25									
Light grey calcareous mudstone	0.1	15	1.5		-							
SPPI per fraction			22.75			Star Land						
Final SPPI :23												

# REMARQS

- Equivalent pyrite percentage : 0.13%

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# SWELLING POTENTIAL PETROGRAPHIC INDEX DETERMINATION NQ 2560-500

Client	:	Rabaska Limited Partnership	Date	: 2005/04/01
			File	: 603333-KELL
Project	:	Rabaska Project (Phase 2)	Labo no	: 011
		Levis (Quebec)	Client ref.	1-A

Sample	: Core drill
Source	: Rabaska Project: West Option Site
Sampling by	: Terratech
Localisation	: Borehole BH-108-05 at 9 meters

	Weight used											
Passing	mm	Retained	mm	Weight	g							
Passing	mm	Retained	mm	Weight	g							
Passing	mm	Retained	mm	Weight	g							
Passing	mm	Retained	mm	Weight	g							

Results												
Petrographic farcies	PI	retained 100 %	SPPI	retained mm	SPPI	retained mm	SPPI	retained mm	SPPI			
Greenish to grey mudstone	0.25	45	11.25									
Light grey calcareous mudstone	0.1	55	5.5		-							
SPPI per fraction			16.75									
Final SPPI :17	-											

# REMARQS

- Equivalent pyrite percentage : 0.03%

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# SWELLING POTENTIAL PETROGRAPHIC INDEX DETERMINATION NQ 2560-500

Client	:	Rabaska Limited Partnership	Date	: 2005/04/01
			File	: 603333-KELL
Project	:	Rabaska Project (Phase 2)	Labo no	: 012
100.00		Levis (Quebec)	Client ref.	

Sample	: Core drill	
Source	: Rabaska Project: West Option Site	
Sampling by	: Terratech	
Localisation	: Borehole BH-108-05 at 12.25 meters	

	Weight used										
Passing	mm	Retained	mm	Weight	g						
Passing	mm	Retained	mm	Weight	g						
Passing	mm	Retained	mm	Weight	g						
Passing	mm	Retained	mm	Weight	g						

	Results											
Petrographic farcies	PI	retained 100 %	SPPI	retained mm	SPPI	retained mm	SPPI	retained mm	SPPI			
Brownish to red mudstone	0.5	75	37.5									
Greenish to grey mudstone	0.25	25	6.25									
						1 carrie						
SPPI per fraction		43.75										
Final SPPI :44	Final SPPI : <u>44</u>					100						
		27 M. A.					1.1.2.74					

# REMARQS

- Equivalent pyrite percentage : 0.02%

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## SWELLING POTENTIAL PETROGRAPHIC INDEX DETERMINATION NQ 2560-500

Client	:	Rabaska Limited Partnership	Date	:	2005/04/01
			File	:	603333-KELL
Project	:	Rabaska Project (Phase 2)	Labo no	:	013
		Levis (Quebec)	Client ref.	:	•

Sample	: Core drill
Source	: Rabaska Project: West Option Site
Sampling by	: Terratech
Localisation	: Borehole BH-109-05 at 8 meters

	Weight used										
Passing	mm	Retained	mm	Weight	g						
Passing	mm	Retained	mm	Weight	g						
Passing	mm	Retained	mm	Weight	g						
Passing	mm	Retained	mm	Weight	g						

Results												
Petrographic farcies	PI	retained 100 %	SPPI	retained mm	SPPI	retained mm	SPPI	retained mm	SPPI			
Brownish to red mudstone	0.5	100	50.0									
SPPI per fraction												
Final SPPI : <u>50</u>	-											

# REMARQS

- Equivalent pyrite percentage : 0.03%

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# SWELLING POTENTIAL PETROGRAPHIC INDEX DETERMINATION NQ 2560-500

Client	:	Rabaska Limited Partnership	Date	:	2005/04/01
			File	:	603333-KELL
Project	:	Rabaska Project (Phase 2)	Labo no	:	014
		Levis (Quebec)	Client ref.	:	-

Sample	: Core drill	
Source	: Rabaska Project: West Option Site	
Sampling by	: Terratech	
Localisation	: Borehole BH-109-05, between 10 and 13 meters	

	Weight used										
Passing	mm	Retained	mm	Weight	g						
Passing	mm	Retained	mm	Weight	g						
Passing	mm	Retained	mm	Weight	g						
Passing	mm	Retained	mm	Weight	g						

	Results											
Petrographic farcies	PI	retained 100 %	SPPI	retained mm	SPPI	retained mm	SPPI	retained mm	SPPI			
Greenish to grey mudstone	0.25	25	6.25									
Brownish to red mudstone	0.5	30	15.0									
Slight calcareous sandstone	0	45	0									
SPPI per fraction			21.25									
Final SPPI :21	_		1 44						1111			

# REMARQS

- Equivalent pyrite percentage : 0.05%

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# SWELLING POTENTIAL PETROGRAPHIC INDEX DETERMINATION NQ 2560-500

Client	:	Rabaska Limited Partnership	Date	: 2005/04/01
			File	: 603333-KELL
Project	:	Rabaska Project (Phase 2)	Labo no	: 015
		Levis (Quebec)	Client ref.	:-

Sample	: Core drill
Source	: Rabaska Project: West Option Site
Sampling by	: Terratech
Localisation	: Borehole BH-110-05, at 8 meters

	Weight used											
Passing	mm	Retained	mm	Weight	g							
Passing	mm	Retained	mm	Weight	g							
Passing	mm	Retained	mm	Weight	g							
Passing	mm	Retained	mm	Weight	g							

Results											
Petrographic farcies	PI	retained 100 %	SPPI	retained mm	SPPI	retained mm	SPPI	retained mm	SPPI		
Brownish to red mudstone	0.5	20	10.0								
Greenish to grey mudstone	0.25	70	17.5		*						
Slight calcareous sandstone	0	10	0								
	1924										
					196						
SPPI per fraction			27.5			Cry Miles	1.22				
Final SPPI :28		S Gales	1.5.2.5								

# REMARQS

- Equivalent pyrite percentage : 0.07%

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# SWELLING POTENTIAL PETROGRAPHIC INDEX DETERMINATION NQ 2560-500

Client	:	Rabaska Limited Partnership	Date	:	2005/04/01
			File	:	603333-KELL
Project	:	Rabaska Project (Phase 2)	Labo no	:	016
Sec. Sec.		Levis (Quebec)	Client ref.	:	-

Sample	: Core drill	
Source	: Rabaska Project: West Option Site	
Sampling by	: Terratech	
Localisation	: Borehole BH-110-05 at 12.5 meters	

	Weight used											
Passing	mm	Retained	mm	Weight	g							
Passing	mm	Retained	mm	Weight	g							
Passing	mm	Retained	mm	Weight	g							
Passing	mm	Retained	mm	Weight	g							

Results											
Petrographic farcies	PI	retained 100 %	SPPI	retained mm	SPPI	retained mm	SPPI	retained mm	SPPI		
Brownish to red mudstone	0.5	100	50.0								
SPPI per fraction			50.0		4 - 19 M						
Final SPPI : <u>50</u>				1		,		,			
REMARQS - Equivalent pyrite percentage : 0.03%											

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9001

# SWELLING POTENTIAL **PETROGRAPHIC INDEX** DETERMINATION NQ 2560-500

Client	:	Rabaska Limited Partnership	Date	: 2005/04/01
			File	: 603333-KELL
Project	:	Rabaska Project (Phase 2)	Labo no	: 017
		Levis (Quebec)	Client ref.	:-

Sample	: Core drill	
Source	: Rabaska Project: West Option Site	
Sampling by	: Terratech	
Localisation	: Borehole BH-103-05, between 11.52 and 11.82 meters	

Weight used											
Passing	mm	Retained	mm	Weight	g						
Passing	mm	Retained	mm	Weight	g						
Passing	mm	Retained	mm	Weight	g						
Passing	mm	Retained	mm	Weight	g						

Results													
Petrographic farcies	PI	retained 100 %	SPPI	retained mm	SPPI	retained mm	SPPI	retained mm	SPPI				
Greenish to grey mudstone	0.25	100	25.0		-								
	-												
SPPI per fraction			25.0										
Final SPPI :25				•					( Secondary				
<u>REMARQS</u> - Equivalent pyrite percentage : 0.0	Final SPPI :												

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Client	: Rabaska Limited Partnership	File no	: T-1050-A (603333-RABA)
	:	Sample no	: W-002-04 (SS-4), W-005-04 (DC-5)
			W-006-04 (DC-3)
Project	: Rabaska Project (Phase 1)	Lab. no	: 013, 014, 015
	: Levis / Beaumont, Quebec	Date	: 3 March 2005

## 1.0 GENERAL INFORMATION

Samples	: Split spoon (SS), and core drilled (DC)
Equipments	: Microscope, coloration, acid etching
Others informations	: Lab. no 013: Split spoon : W-002-04 (SS-4) from 2.29 to 2.69 m Lab. no 014: Core drilled : W-005-04 (DC-5) from 3.02 to 3.81 m Lab. no 015: Core drilled : W-006-04 (DC-3) from 0.99 to 1.73 m

### 2.0 RESULTS

### 1.0 MANDATE

The petrographic examination was carried out on 3 rock samples of the West Option Site for the determination of the swelling potential due to the presence of pyrite, in the perspective that the materials would eventually be used as granular backfill or would serve as rock foundation of structures.

### 2.0 METHODOLOGY

Megascopic examination was performed on the 3 samples. The petrographic facies were identified and the SPPI values (Swelling Potential Petrographic Index) were determined in compliance to NQ 2560-500 standard.

### 3.0 RESULTS

### 3.1 Sample W-002-04 (SS-4) from 2.29 to 2.69 m

This is a split spoon sample. The material consists of a dark grey or **black shale** (slightly carbonated). The computed SPPI value is 50, and the equivalent pyrite percentage is 2.6%.

Consequently, the tested material is classified as having an average to high swelling potential due to the presence of pyrite.

### 3.2 Sample W-005-04 (DC-5) from 3.02 to 3.81 m

The tested sample is a rock core. The rock was identified as a *red shale* with thin laminations of grey or greenish shale. The computed SPPI value is 50, and the equivalent pyrite percentage is only 0.03%.

Due to its low percentage of pyrite, the tested material was classified as stable and not presenting any swelling potential due to the presence of pyrite.





Client	: Rabaska Limited Partnership	File no	: T-1050-A (603333-RABA)
194103		Sample no	: W-002-04 (SS-4), W-005-04 (DC-5)
and the second			W-006-04 (DC-3)
Project	: Rabaska Project (Phase 1)	Lab. no	: 013, 014, 015
11-11-11-1	: Levis / Beaumont, Quebec	Date	: 3 March 2005

### 2.0 RESULTS (cont'd)

### 3.3 Sample W-006-04 (DC-3) from 0.99 to 1.73 m

The tested sample is a rock core. The rock was identified as a *grey and red shale* with surficial traces of oxidation. The computed SPPI value is 25, and the equivalent pyrite percentage is only 0.08%.

Due to its low percentage of pyrite, this material was classified as stable and not presenting any swelling potential due to the presence of pyrite.

### 4.0 CONCLUSION

Relatively high SPPI values were obtained on all three tested samples, due to the high content in clay mineral.

However, only the *black shale* (W-002-04) has a high equivalent pyrite percentage, and consequently was found to have an average to high swelling potential.

The *red shale* (W-005-04) and *grey and red shale* (W-006-04) do not contain enough pyrite to cause any swelling, and are thus classified as stable.

Realized by :

Terratech

\_ Approved by :

Alain Blanchette, geol., M.A.Sc. Project manager Material Engineering





# SWELLING POTENTIAL PETROGRAPHIC INDEX DETERMINATION NQ 2560-500

Client	:	Rabaska Limited Partnership	Date	: .	2 November 2004
111111			File	: '	T-1050-A (603333-RABA)
Project	:	Rabaska Project (Phase 1)	Sample	:	W-002-04 (SS-4) 2.29 – 2.69 m
		Levis / Beaumont, Quebec	Lab. no	:	013

Sample	: Split spoon	
Source	: Rabaska Project : West Option Site	
Sampled by	: Terratech	Date: 22 and 23 September 2004
Location	: Borehole W-002-04	

Section 199	Weight used									
Passing	mm	Retained	mm	Weight	G					
Passing	mm	Retained	mm	Weight	G					
Passing	mm	Retained	mm	Weight	G					
Passing	mm	Retained	mm	Weight	G					

	Results								
Petrographic facies	PI	retained 10 mm	SPPI	retained 5 mm	SPPI	retained 2.5 mm	SPPI	retained mm	SPPI
Black clayey shale	0.5	100	50.0	100	50.0	100	50.0		
SPPI per fraction			50.0		50.0		50.0		
Final SPPI : 50		S. S. S.							

### REMARKS

- The sample breaks down following the thin laminations. This tendency increases after water immersion of the sample.
- Pyrite equivalent percentage: 2.6%

Realized by : Terratech

Approved by :

Alain Blanchette, geol., M.A.Sc. Project manager Material Engineering ALAIN NCHETTE





# SWELLING POTENTIAL PETROGRAPHIC INDEX DETERMINATION NQ 2560-500

Client	:	Rabaska Limited Partnership	Date	: 2 November 2004
and the second second			File	: T-1050-A (603333-RABA)
Project	:	Rabaska Project (Phase 1)	Sample	: W-005 (DC-5) 3.02 – 3.81 m
		Levis / Beaumont, Quebec	Lab. no	: 014

Sample	: Core drilled		
Source	: Rabaska Project : West Option Site		
Sampled by	: Terratech	Date : 29 September 2004	
Location	: Borehole W-005-04		

Weight used									
Passing	mm	Retained	mm	Weight	G				
Passing	mm	Retained	mm	Weight	G				
Passing	mm	Retained	mm	Weight	G				
Passing	mm	Retained	mm	Weight	G				

Results									
Petrographic facies	PI	retained 100%	SPPI	retained mm	SPPI	retained mm	SPPI	retained mm	SPPI
Red clayey shale with thin green shale laminations	0.5	100	50.0		s 1				
SPPI per fraction			50.0						
inal SPPI :50									

### REMARKS

- The sample breaks down following the thin laminations. This tendency increases after water immersion of the sample.
- Pyrite equivalent percentage: 0.03%

Terratech Realized by :

Approved by :

Alain Blanchette, geol., M.A.Sc. Project manager Material Engineering GE

ME

#254

QUÉBE





# SWELLING POTENTIAL PETROGRAPHIC INDEX DETERMINATION NQ 2560-500

Client	:	Rabaska Limited Partnership	Date	:	2 November 2004
and the state	1.40		File	:	T-1050-A (603333-RABA
Project	:	Rabaska Project (Phase 1)	Sample	:	W-006-04 (DC-3) 0.99 – 1.73 m
1.4.4.4		Levis / Beaumont, Quebec	Lan. No	:	015

Sample	: Core drilled		
Source	: Rabaska Project : West Option Site		
Sampling by	: Terratech	Date : 28 September 2004	
Localisation	: Borehole W-006-04		

	Weight used										
Passing	mm	Retained	mm	Weight	G						
Passing	mm	Retained	mm	Weight	G						
Passing	mm	Retained	mm	Weight	G						
Passing	mm	Retained	mm	Weight	G						

Results												
Petrographic facies	PI	retained 100%	SPPI	retained mm	SPPI	retained mm	SPPI	retained mm	SPPI			
Grey and reddish clayey shale	0.25	100	25.0		1							
SPPI per fraction	SPPI per fraction 25.0											
Final SPPI : 25					1.							

### REMARKS

- The sample breaks down following the thin laminations after water immersion.

- Pyrite equivalent percentage: 0.08%

Realized by : Ter

Terratech

Approved by :

Álain Blanchette, geól., M.A.Sc. Project manager Material Engineering IGEO

ALAUA

#254

QUEB

C



TERRATECH ST LAURENT DIV. DE SNC-LAVALIN 275, Benjamin-Hudon Saint-Laurent, PQ Canada H4N 1J1

### Attention: Alain Blanchette

### Report Date: 2005/04/22

Your Project #: LO 3333 T-1050-B Site: RABASKA Your C.O.C. #: 66622

### ANALYTICAL REPORT

### MAXXAM JOB #: A508009 Received: 2005/04/15, 10:30

Sample Matrix: GROUND WATER # Samples Received: 4

		Date	Date		
Analyses	Quantity	Extracted	Analyzed	Laboratory Method	Analytical Method
Total Alkalinity (pH end point 4.5) ()	4	2005/04/21	2005/04/21	SOP III-1003 rév.1	Titrimetric
				04/11/22 réf.primaire:	
				MA.315 Alc.1.0, 2001	
Anions ()	4	2005/04/22	2005/04/22	III-201 rév.9 03/03/29	Chromatography
Disposal Charges	4	N/A	2005/04/15		
pH	4	2005/04/15	2005/04/15	Que SOP-0054	pH meter
Sulfide Anions (S=)	4	2005/04/15	2005/04/15	Que SOP-0065	Spectro/Colorimetry

(1) This test was performed by Maxxam analytique - Anjou

### MAXXAM ANALYTIQUE INC.



### TERRATECH Client Project #: LO 3333 T-1050-B Project name: RABASKA Sampler Initials: HC

# **CONVENTIONAL PARAMETERS (GROUND WATER)**

Maxxam ID		796752	796752	796759	796760	796761		
Sampling Date		2005/04/14	2005/04/14	2005/04/14	2005/04/14	2005/04/14		
COC Number		66622	66622	66622	66622	66622		
	Units	BH-102-05	BH-102-05 Dup	BH-104-05	BH-106-05	BH-110-05	DL	QC Batch
CONVENTIONALS			1	1	Ι	*	1	
рН	pН	8.6	N/A	8.8	8.8	(11)	N/A	293309
Sulfur anion (S=)	mg/L	ND	N/A	ND	ND	ND	0.02	293310
Alkalinity (Total as CaCO3) pH 4.5	mg/L	320	320	260	350	200	2	293957
Bicarbonates (HCO3 as CaCO3)	mg/L	300	300	230	320	ND	2	293957
Carbonate (CO3 as CaCO3)	mg/L	16	19	29	29	130	2	293957
Chloride (Cl)	mg/L	50	45	180	5.5	5.6	3	294192
Sulfates (SO4)	mg/L	11	10	22	34	36	5	294192
ND = Not detected N/A = Not Applicable DL = Detection Limit	*	loub+fu	l					

QC Batch = Quality Control Batch

Please check for attached comments



TERRATECH Client Project #: LO 3333 T-1050-B Project name: RABASKA Sampler Initials: HC

### GENERAL COMMENTS

Condition of sample(s) upon receipt: GOOD

### CONVENTIONAL PARAMETERS (GROUND WATER)

Veuillez noter que les résultats n'ont pas été corrigés pour la récupération des échantillons de contrôle de qualité. Veuillez noter que les résultats ont été corrigés pour le blanc.

Results relate only to the items tested.

This report dated: 2005/04/22 replaces all previous reports.



TERRATECH Attention: Alain Blanchette Client Project #: LO 3333 T-1050-B P.O. #: Project name: RABASKA

# Quality Assurance Report

Maxxam Job Number: A508009

QA/QC			Date		
Batch			Analyzed		
Num Init	QC Type	Parameter	yyyy/mm/dd	Value Recovery	Units
293309 DD1	QC STANDARD	рН	2005/04/15	101	%
293310 JS2	QC STANDARD	Sulfur anion (S=)	2005/04/15	98	%
	BLANK	Sulfur anion (S=)	2005/04/15	ND, DL=0.02	mg/L
293957 FS	SPIKE	Alkalinity (Total as CaCO3) pH 4.5	2005/04/21	103	%
	BLANK	Alkalinity (Total as CaCO3) pH 4.5	2005/04/21	ND, DL=1	mg/L
		Bicarbonates (HCO3 as CaCO3)	2005/04/21	ND, DL=1	mg/L
		Carbonate (CO3 as CaCO3)	2005/04/21	ND, DL=1	mg/L
294192 FS	MATRIX SPIKE	Chloride (Cl)	2005/04/22	106	%
		Sulfates (SO4)	2005/04/22	111	%
	SPIKE	Chloride (Cl)	2005/04/22	93	%
		Sulfates (SO4)	2005/04/22	95	%
	BLANK	Chloride (Cl)	2005/04/22	ND, DL=0.06	mg/L
		Sulfates (SO4)	2005/04/22	ND, DL=0.1	mg/L
ND = Not detect	ted				
DL = Detection	Limit				

MATRIX SPIKE = Fortified sample QC Standard = Quality Control Standard SPIKE = Fortified sample





# APPENDIX III Drawings

Drawing T-1050-C-0000-4GDD-0001:	Location Plan
Drawing T-1050-C-0000-4GDD-0002:	Stratigraphic Sections A-A and B-B
Drawing T-1050-C-0000-4GDD-0003:	Stratigraphic Sections C-C, D-D and E-E
Drawing T-1050-C-0000-4GDD-0004:	Stratigraphic Sections F-F, G-G and H-H
Drawing T-1050-C-0000-4GDD-0005:	Trial Excavation TE-A-05
Drawing T-1050-C-0000-4GDD-0006:	Trial Excavation TE-B-05
Drawing T-1050-C-0000-4GDD-0007:	Stratigraphic Section I-I (1 of 2)
Drawing T-1050-C-0000-4GDD-0008:	Stratigraphic Section I-I (2 of 2)



		-
3000 E	LEGEND	
26:	BH-101-05 VERTICAL BOREHOLE - RECENT INVESTIGATION (NOTE 5)	
	BH-401-05 BOREHOLE AND DYNAMIC PENETRATION TEST- RECENT INVESTIGATION (NOTE 5)	
5188000 N	BH-117A INCLINED BOREHOLE - RECENT INVESTIGATION (NOTE 5)	
	BH-102-05 BOREHOLE WITH PIEZOMETER (OBSERVATION WELL) - RECENT INVESTIGATION (NOTE 5)	D
	BH/TP-501-05	
	<ul> <li>TEST PIT AND VERTICAL BOREHOLE - RECENT INVESTIGATION (NOTE 5)</li> <li>W-001-04</li> <li>VERTICAL BOREHOLE - PREVIOUS INVESTIGATION</li> </ul>	
?	(TERRATECH REPORT T-1050-A DATED MARCH 2005) W-004-04	
	<ul> <li>BOREHOLE WITH PIEZOMETER (OBSERVATION WELL) - PREVIOUS INVESTIGATION (TERRATECH REPORT T-1050-A DATED MARCH 2005)</li> <li>TE-B-05</li> </ul>	
22	TRIAL EXCAVATION (THIS REPORT)	
	RT-1-05	
	RESISTIVITY SOUNDING (THIS REPORT)	
5187500 <sup>°</sup> N	SEISMIC REFRACTION SURVEY LINE (WITH CHAINAGE)	
	POSSIBLE FAULT	
	(FROM MAP 4 OF GEOLOGICAL REPORT MB-94-40, SEE SAINT-JULIEN, P. 1995)	
	INC. SURVEY / EXTENSION INTERPRETED BY TERRATECH)	
	<sup>8</sup> PRIMARY GROUND SURFACE CONTOUR LINE - CONTOUR INTERVAL = 5m	
	SECONDARY GROUND SURFACE CONTOUR LINE - CONTOUR INTERVAL = 1m	
	BEDROCK SURFACE CONTOUR LINE - CONTOUR INTERVAL = 2m (NOTE 2)	
	RIVER BOTTOM CONTOUR LINE - CONTOUR INTERVAL = 1m (NOTE 3)	
65	. 76.6 GROUND SURFACE SPOT ELEVATION IN METERS	
60	STREAM	<b>-</b> -C
60 5187000 N	STREAM	<b>≺</b> C
60 5187000 N	STREAM POND	< C
60 5187000 N 59	STREAM POND MARSH / INUNDATED GROUND	< C
60 5187000 N 59	STREAM POND MARSH / INUNDATED GROUND PRIMARY ROAD / HIGHWAY SECONDARY ROAD	≺ C
60 5187000 N 59	STREAM POND MARSH / INUNDATED GROUND PRIMARY ROAD / HIGHWAY SECONDARY ROAD EXISTING BUILDING	< C
60 5187000 N 99	STREAM   Image: Stream   POND   Image: Stream   MARSH / INUNDATED GROUND   Image: PRIMARY ROAD / HIGHWAY   SECONDARY ROAD   Image: Stream   Image: Stream   Stream   Stream   Stream   Stream   Stream	< C B
60 5187000 N 69	STREAM   Image: Stream   Im	< C B
60 5187000 N 59	STREAM POND MARSH / INUNDATED GROUND PRIMARY ROAD / HIGHWAY SECONDARY ROAD EXISTING BUILDING STRATIGRAPHIC SECTION (NOTE 4) NOTES	<ul><li>C</li><li>B</li></ul>
60 5187000 N 69	STREAM   Image: Stream   POND   Image: Stream   Image: Marsh / INUNDATED GROUND   Image: PRIMARY ROAD / HIGHWAY   SECONDARY ROAD   Image: Stream Road	< C B
5187000 N	STREAM POND MARSH / INUNDATED GROUND PRIMARY ROAD / HIGHWAY SECONDARY ROAD EXISTING BUILDING EXISTING BUILDING STRATIGRAPHIC SECTION (NOTE 4) STRATIGRAPHIC SECTION (NOTE 4)	<ul><li>C</li><li>B</li></ul>
60 5187000 N \$9 \$9 5186500 N	STREAM         Image: POND	B
60 5187000 N 69 69 69 5186500 N	STREAM         Image: STREAM         Image: POND         Image: STREAM         Image: STRATIGRAPHIC SECTION (NOTE 4)         Image: Stream	B
60 5187000 N 59 5186500 N	STREAM         Image: POND	B
60 5187000 N 69 69 69 5186500 N	<ul> <li>STREAM</li> <li>POND</li> <li>MARSH / INUNDATED GROUND</li> <li>PRIMARY ROAD / HIGHWAY</li> <li>SECONDARY ROAD</li> <li>EXISTING BUILDING</li> <li>EXISTING BUILDING</li> <li>STRATIGRAPHIC SECTION (NOTE 4)</li> </ul> STRATIGRAPHIC SECTION (NOTE 4) Streating are in reference to SCOPQ - NAD83. All elevations are in meters and refer to geodetic datum. 1. The coordinates shown on this drawing are in reference to SCOPQ - NAD83. All elevations are in meters and refer to geodetic datum. 3. The bedrock surface contours were computer generated based on the bedrock surface elevation encountered at the sounding locations shown in plan. The actual bedrock surface between soundings may vary from that shown. 3. Bathymetric survey carried out by Entreprises Normand Juneau inc. on the dates of October 5 - 7 and November 16 - 17, 2004. 4. See drawings T-1050-C-0002 to 0008 for stratigraphic sections A-A to I-I. 5. "Recent investigation" refers to exploration works carried out during the period of 8 February to 15 April, 2005 (report T-1050-B of May 2005) and during the period of 8 February to 15 April, 2005 (report T-1050-B of May 2005) and during the period of 8 February to 15 April, 2005 (report T-1050-B of May 2005) and during the period of 8 February to 15 April, 2005 (report T-1050-B of May 2005) and during the period of 8 February to 15 April, 2005 (report T-1050-B of May 2005) and during the period of 8 February to 15 April, 2005 (report T-1050-B of May 2005) and during the period of 8 February to 15 April, 2005 (report T-1050-B of May 2005) and during the period of 8 February to 15 April, 2005 (report T-1050-B of May 2005) and during the period of 8 February to 15 April, 2005 (report T-1050-B of May 2005) and during the period of 8 February to 15 April, 2005 (report T-1050-B of May 2005) and during the period of 8 February to 15 April, 2005 (report T-1050-B of May 2005) and	B
60 5187000 N 69 69 5186500 N	<ul> <li>STREAM</li> <li>POND</li> <li>MARSH / INUNDATED GROUND</li> <li>PRIMARY ROAD / HIGHWAY</li> <li>SECONDARY ROAD</li> <li>EXISTING BUILDING</li> <li>EXISTING BUILDING</li> <li>STRATIGRAPHIC SECTION (NOTE 4)</li> </ul> NOTES 1. The coordinates shown on this drawing are in reference to SCOPQ - NAD83. All elevations are in meters and refer to geodetic datum. 2. The bedrock surface contours were computer generated based on the bedrock surface elevation encountered at the sounding locations shown in plan. The actual bedrock surface between soundings may vary from that shown. 3. Bathymetric survey carried out by Entreprises Normand Juneau inc. on the dates of October 5 - 7 and November 16 - 17, 2004. 4. See drawings T-1050-C-0002 to 0008 for stratigraphic sections A-A to I-I. 5. "Recent investigation" refers to exploration works carried out during the period of 30 September to 4 November, 2005 (this report). 6. This drawing is to be read in conjunction with the accompanying report.	B
5186500 N	STREAM POND MARSH / INUNDATED GROUND PRIMARY ROAD / HIGHWAY SECONDARY ROAD EXISTING BUILDING EXISTING BUILDING STRATIGRAPHIC SECTION (NOTE 4) STRATIGRAPHIC SECTION (NOTE 4) STRATIGRAPHIC SECTION (NOTE 4) NOTES 1. The coordinates shown on this drawing are in reference to SCOPQ - NAD83. All elevations are in meters and refer to geodetic datum. 2. The bedrock surface contours were computer generated based on the bedrock surface elevation encountered at the sounding locations shown in plan. The actual bedrock surface between soundings may vary from that shown. 3. Bathymetric survey carried out by Entreprises Normand Juneau inc. on the dates of October 5 - 7 and November 16 - 17, 2004. 4. See drawings T-1050-C-0002 to 0008 for stratigraphic sections A-A to II. 5. "Recent investigation" refers to exploration works carried out during the period of 8 February to 15 April, 2005 (report T-1050-B of May 2005) and during the period of 30 September to 4 November, 2005 (this report). 6. This drawing is to be read in conjunction with the accompanying report.	B
	STREAM POND MARSH / INUNDATED GROUND PRIMARY ROAD / HIGHWAY SECONDARY ROAD EXISTING BUILDING EXISTING BUILDING STRATIGRAPHIC SECTION (NOTE 4) STRATIGRAPHIC SECTION (NOTE 4) NOTES 1. The coordinates shown on this drawing are in reference to SCOPQ - NAD83. All elevations are in meters and refer to geodetic datum. 2. The bedrock surface contours were computer generated based on the bedrock surface elevation encountered at the sounding locations shown in plan. The actual bedrock surface between soundings may vary from that shown. 3. Bathymetric survey carried out by Entreprises Normand Juneau inc. on the dates of October 5 - 7 and November 16 - 17, 2004. 4. See drawings T-1050-C-0002 to 0008 for stratigraphic sections A-A to I-I. 5. "Recent investigation" refers to exploration works carried out during the period of 8 September to 4 November, 2005 (this report). 6. This drawing is to be read in conjunction with the accompanying report. CLENT C	B
SIGNED R. Bousquet, M.A.Sc	STREAM  STREA	B
SIGNED R. Bousquet, M.A.Sc AWN R. Anderson	STREAM POND POND MARSH / INUNDATED GROUND PRIMARY ROAD / HIGHWAY SECONDARY ROAD PRIMARY ROAD / HIGHWAY SECONDARY ROAD EXISTING BUILDING STRATIGRAPHIC SECTION (NOTE 4) STRATIGRAPHIC SECTION 4000000000000000000000000000000000000	B
60         5187000 N         60         5187000 N         60         60         59         5186500 N         5186500 N         5186500 N         5186500 N         5186500 N         SIGNED         R. Bousquet, M.A.Sc         AWN         R. Anderson         ECKED         R. Bousquet, M.A.Sc         TE         CRED         R. Bousquet, M.A.Sc	STREAM         Image:	A

A1-HOR-FRAME-EN (SI)



# 6 7 8 9 10 CENTIMETERS 0 1 2 3 4

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PTION	DATE (Y/M/D)	*	**	No REV	SION DESCRIPTION	DATE (Y/M/D)	*	**		
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SION REGISTER					REVISION REGISTER				REFERENCE DRAWINGS	

ED . Hébert, Sr. Geol.						A-A and B-B							
	CLIEN	IT											
5-11-24		10	20	70	10.00	PROJECT No	SUBDIVISION	SUBJECT	SERIAL	R			
1:1000 (HOR.)			20		40m	T 1050 C	0000		0002	Γ			
<b>1:500 (VERT.)</b> 5	Ó	5	10	15	2 <sup>0</sup> m	1-1000-0	0000	40 00	0002				
									A1-HOR-FRAME	E-EI			
						4							





FILL	Contraction of the second seco
CLAY	SILT
SAND	္လွ်္န္္တ္ရွိ GRAVEL
${}^{\circ}_{\circ} {}^{\circ}_{\circ}$ COBBLES OR BOULDERS	BEDROCK



										1 7 5 1
										PROFESSIONAL SEAL
PTION	DATE (Y/M/D)	*	**	No	REVISION DESCRIPTION	DATE (Y/M/D)	*	**		
DESIGNED ** APPROVE	ĪD				INITIALS: * DESIGNED ** APPI	ROVED				
SION REGISTER					REVISION REGISTER	?			REFERENCE DRAWINGS	
					<b>^</b>					

A1-HOR-FRAME-EN (SI)



- 1. The location of the sections in plan is shown on drawing T-1050-C-0001.
- 3. The stratigraphy shown on the sections has been simplified. For a more
- 4. Data concerning the various strata have been obtained at borehole locations only. The soil stratigraphy between boreholes may vary from that shown.
- 5. "Recent investigation" refers to exploration works carried out during the period of 8 February to 15 April, 2005 (report T-1050-B of May 2005) and during the period of 30 September to 4 November, 2005 (this report).

									PROFESSIONAL SEAL	
										DESI
										R.
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				-	ł					
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					с
BH-101-05	IVESTIGATION (NO	TE 5)			
BH-401-05 BOREHOLE AND DYNAMIC PENETR	RATION TEST- REC	ENT INVEST	GATION (NO	DTE 5)	<del>≺ C</del>
VERTICAL BOREHOLE - PREVIOUS (TERRATECH REPORT T-1050-A DA TE-A-05 TRIAL EXCAVATION - RECENT INVE	INVESTIGATION TED MARCH 2005) ESTIGATION (NOTE	5)			
$\begin{vmatrix} 1 \\ 27 \end{vmatrix}$ 27 DISTANCE IN FRONT OF () OR BE	HIND (   ) THE ALIG	GNMENT OF	THE SECTIO	N (IN METEF	RS)
ROCK QUALITY DESIGNATION (%)					
0 50 100 RQD - %					в
Vision of NC+LAVALIN Environment Inc.	CLIENT Rabaska	RABASKA	LNG IMPO JEBEC, CA	RT TERMI NADA	NAL
Vision of SNC+LAVALINE ENVIRONMENT       Division of SNC+LAVALINE ENVIRONMENT         PREPARATION       PREPARATION         PREPARATION       APPROVAL         DESIGNED       PROJECT DISCIPLINE ENGINEER         R. Bousquet, M.A.Sc., Eng.       PROJECT DISCIPLINE ENGINEER         H. Madjar, M.A.Sc., Eng.       PROJECT ENGINEERING MANAGER         PROJECT ENGINEERING MANAGER       PROJECT ENGINEERING MANAGER	CLIENT Rabaska PROJECT RABASKA – LEVIS/BEAUN TITLE	RABASKA QI LNG RI MONT	LNG IMPO JEBEC, CA ECEIVING	RT TERMI NADA TERMIN QUEB	NAL A JAL EC
PREPARATION       PROJECT DISCIPLINE ENGINEER         R. Bousquet, M.A.Sc., Eng.       PROJECT DISCIPLINE ENGINEER         H. Madjar, M.A.Sc., Eng.       PROJECT DISCIPLINE ENGINEER         DRAWN       PROJECT DISCIPLINE ENGINEER         R. Anderson       PROJECT ENGINEERING MANAGER         CHECKED       R. Bousquet, M.A.Sc., Eng.         DATE       CLIENT	CLIENT Rabaska PROJECT RABASKA – LEVIS/BEAUM TITLE STRAT F	RABASKA QI LNG RI MONT FIGRAPH F-F, G-G	LNG IMPO JEBEC, CA ECEIVING HIC SEC and H-H	RT TERMI NADA TERMIN QUEB TIONS	NAL A VAL EC

D

1

A1-HOR-FRAME-EN (SI)



4



FAMILY JOINT	NUMBER OBSERVED	ORIENTATION (°)			
	5	295 / 39	Open, regular and smooth sur		
	5	252 / 41	Open, irregular and rugged su		
3	4	310 / 61	Open, irregular and rugged sur		





1

D

С

В

urface, filled with exsudation black mineral, spaced from 10cm to 15cm

Terrateck	Division of SNC+LAVALIN Environment Inc.	CLIENT	RABASKA   QI	LNG IMPO JEBEC, CA	RT TERM NADA	INAL	,
PREPARATION	APPROVAL	PROJECT					
DESIGNED Y. Boulianne, Eng.	PROJECT DISCIPLINE ENGINEER H. Madjar, M.A.Sc., Eng.	RABASKA – Levis/beau	LNG RI Mont	ECEIVING	TERMI	NAL	
DRAWN R. Anderson	PROJECT ENGINEERING MANAGER	TITLE			4022		
CHECKED J-J. Hébert, Sr. Geol.		TRIAL		ATION TE	-A-05		
DATE 2005-11-22	CLIENT						
		PROJECT No	SUBDIVISION	SUBJECT	SERIAL	REV.	
1:50	0.5 1.0 1.5 2.0m	T-1050-C	0000	4G <sub> </sub> DD	0005	0	
					A1-HOR-FRAME	E-EN (SI)	







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Å Å ξġ 1:38 50-C ΙČ /05/01 \46\T-1 2006/ 4238/ N. LAST PATH: ISSUE REGISTER ISSUE REGISTER

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В

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PHOTO MOSAIC SHOWING WEST FACE OF TRIAL EXCAVATION TE-B-05



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1. The location of the trial excavation in plan is shown on drawing T-1050-C-0001.

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В

2. This drawing is to be read in conjunction with the accompanying report.

Terratecl	Division of SNC+LAVALIN Environment Inc.	CLIENT RABASKA LNG IMPORT TERMINAL QUEBEC, CANADA
PREPARATION	APPROVAL	PROJECT
DESIGNED J-J. Hébert, Sr. Geol.	PROJECT DISCIPLINE ENGINEER H. Madjar, M.A.Sc., Eng.	RABASKA – LNG RECEIVING TERMINAL
DRAWN R. Anderson	PROJECT ENGINEERING MANAGER	
CHECKED Y. Boulianne, Eng.		TRIAL EXCAVATION TE-B-05
DATE 2005-1031	CLIENT	
		PROJECT No SUBDIVISION SUBJECT SERIAL REV.
1:75	0 1 2 3m	T-1050-C 0000 4G DD 0006 0
		A1-HOR-FRAME-EN (SI)



### 6 7 8 9 10 CENTIMETERS 0 1 2 3 4



			PROFESSIONAL SEAL	Terratecl	Division of SNC+LAVALIN Environment Inc.	CLIENT RABASKA LNG IMPORT TERMINAL QUEBEC, CANADA		
				PREPARATION	APPROVAL	PROJECT		
				DESIGNED R. Bousquet, M.A.Sc., Eng.	PROJECT DISCIPLINE ENGINEER H. Madjar, M.A.Sc., Eng.	RABASKA – LNG RECEIVING TERMINAL		
				DRAWN R. Anderson	PROJECT ENGINEERING MANAGER			
		SNC-LAVALIN RABASKA – LNG RECEIVING TERMINAL		CHECKED R. Bousquet, M.A.Sc., Eng.		SECTION I-I		
IPTION DATE (Y/M/D) * **	No         REVISION DESCRIPTION         DATE (Y/M/D)         *         **	OVERALL SHE PLAN DRAWING: 016267-0000-41-D2-0001, REV. A		DATE	CLIENT	(2 OF 2)		
DESIGNED ** APPROVED	INITIALS: * DESIGNED ** APPROVED	DATED: 2005-05-31		SCALE 1 · 1 000 (HOP) 10	0 10 20 30 40m	PROJECT No SUBDIVISION SUBJECT SERIAL REV.		
SION REGISTER	REVISION REGISTER	REFERENCE DRAWINGS		AS SHOWN500 (VERT.) 5	0 5 10 15 20m	T-1050-C 0000 4G DD 0008 0		
						A1-HOR-FRAME-EN (S		

# SPECIAL NOTE

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The geology shown on the sections does not represent the exact reality. It is based on a geological interpretation and therefore any extrapolation and interpolation should be considered with great caution.

The information provided here is not intended for construction purposes.

- 1. The location of the sections in plan is shown on drawing T-1050-C-0001.
- 2. All elevations are in meters and refer to geodetic datum.
- 3. The stratigraphy shown on the sections has been simplified. For a more precise stratigraphy description, refer to the boring logs.
- 4. Data concerning the various strata have been obtained at borehole locations only. The soil stratigraphy between boreholes may vary from that shown.
- 5. "Recent investigation" refers to exploration works carried out during the period of 8 February to 15 April, 2005 (report T-1050-B of May 2005) and during the period of 30 September to 4 November, 2005 (this report).
- 6. This drawing is to be read in conjunction with the accompanying report.

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