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THURBER

August 1, 2002 File: 19-3853-0

Edmonton Community Services
c/o Gibbs & Brown Landscape Architects Ltd.
408 The Boardwalk, 10310 – 102 Avenue
Edmonton, Alberta T5J 2X6

Attention: Mr. Robert Gibbs

SELKIRK HOTEL RECONSTRUCTION, FORT EDMONTON PARK
SUPPLEMENTAL GEOTECHNICAL RECOMMENDATIONS

Dear Sir:

1. INTRODUCTION

This letter presents recommendations for trenching and excavation, pavement and sidewalk design for the Selkirk Hotel located in Fort Edmonton Park in Edmonton, Alberta. This letter should be read in conjunction with and form part of our geotechnical report for this site titled "Selkirk Hotel Reconstruction, Fort Edmonton Park, Geotechnical Investigation" dated January 30, 2002.

The scope of the investigation was outlined our proposal submitted to Edmonton Community Services c/o HIP Architects on May 28, 2002. Authorization to proceed with the study was provided verbally from Mr. Robert Gibbs of HIP Architects on June 17, 2002.

Use of this letter is subject to the Statement of General Conditions that is included at the end of the text of this letter. The reader's attention is specifically drawn to these conditions as it is considered essential that they be followed for the proper use and interpretation of this letter.

2. PROPOSED DEVELOPMENT

The location of the proposed building is shown on the attached site plan, Drawing No. 19-3853-0-1. The proposed sidewalk and gravel road (to be paved at a later date) are west of the building and the storm sewer extension is located south of the Hotel. We understand that construction will be floor slab-on-grade, without basement.

Continued...

3. METHOD OF INVESTIGATION

3.1 Field Program

Four test holes (TH02-4, TH02-4A, TH02-5, and TH02-6) were drilled on July 17, 2002, using a truck mounted auger drill rig at the approximate locations shown on Drawing No. 19-3583-0-1. Test hole TH02-4 was drilled a depth of 7.3 m below existing ground surface in the vicinity of the proposed storm sewer extension. Test hole TH02-4A was the first attempt at drilling this test hole, however it was terminated at a depth of 1.2 m due to the presence of a water main at the same location. (The utility locator did not identify this water main when he was marking the area for utilities prior to drilling). The remaining 2 test holes were drilled to depths of 2.3 m below existing ground surface at the proposed sidewalk and roadway locations.

Disturbed soil samples were obtained during drilling and Standard Penetration Tests were carried out at selected depths in the deep test hole. Water levels were noted during and after completion of the drilling.

3.2 Laboratory Testing

Laboratory testing included a visual classification and the determination of the natural water content of all soil samples. Atterberg Limit and a water-soluble sulphate tests were also carried out on selected soil samples.

The results of the drilling and laboratory testing are summarized on the test hole logs attached at the end of this letter. An explanation of the symbols and terms used to describe the test hole logs, and the Modified Unified Soils Classification are also provided.

4. SITE DESCRIPTION

4.1 Surface Conditions

The ground surface at the Selkirk Hotel site is relatively flat and is currently being used as a parking lot. The site drainage appears to be towards the ditch at the south end of the site.

4.2 Subsurface Conditions

Detailed descriptions of the subsurface conditions encountered in the test holes are provided on the individual logs included at the end of this letter.

A 50 mm to 200 mm thick layer of gravel fill was encountered at the surface of TH02-4A and TH02-5. The subsurface conditions generally consisted of clay fill (in test holes TH02-4 and TH02-4A) over clay to the completion of the test holes. Sand

was encountered at the end of test hole TH02-4.

Clay Fill

Clay fill was found directly at ground surface in test hole TH02-4 and TH02-4A. The clay fill was generally dark brown, medium to high plastic, silty, with traces of organics and gravel. Natural moisture contents in the clay fill ranged from 17% to 41%. The SPT blow counts in the clay fill were 5 and 10 blows for 300 mm penetration and the undrained shear strength determined from the pocket penetrometer (Cpen) was 15 to 215 kPa, indicating a firm to stiff consistency.

Clay

Clay was found directly beneath the clay fill in test hole TH02-4, below the gravel in test hole TH02-5, and at the surface in test hole TH02-6. The clay was generally brown, low to high plastic, silty and sandy. Natural moisture contents in the clay ranged from 9% to 31%. The SPT blow counts in the clay ranged from 2 to 7 blows for 300 mm penetration.

An Atterberg Limits test was carried out a sample at a depth of 0.3 m in test hole TH02-5. The liquid limit is 69% and the plastic limit is 24%, indicating that the clay is high plastic.

Sand

The underlying sand in test hole TH02-4 was brown, silty, with traces of gravel. Natural moisture contents in the sand was 21%. The SPT blow count in the sand was 35 blows for 300 mm penetration, indicating a compact state.

4.3 Groundwater

There was no water accumulated in the bottom of the test holes at the at the end of drilling. A standpipe piezometer was installed, during the initial investigation, in TH02-1 for future ground water level monitoring. This standpipe was read on July 17, 2002 and the standpipe was dry. The groundwater levels therefore appear to be relatively deep at the site.

It should be noted that groundwater levels can vary in response to seasonal factors and precipitation; hence, the actual groundwater conditions at the time of construction could vary from those recorded during this investigation.

Continued...

5. GEOTECHNICAL EVALUATION AND RECOMMENDATIONS

5.1 Trench Drainage

The depth of the storm sewer installation is understood to be in the order of 2 m to 2.5 m below existing ground surface.

Although not encountered during this investigation, groundwater seepage was noted during the January 2002 investigation in test holes TH02-1 and TH02-3 between 3.8 m and 6.1 m and may be encountered from the clay and gravel layers. In general, seepage rates into trenches from the underlying clay are expected to be relatively low and should be of a magnitude that can be handled by normal trench grading practices and sumps and pumps where necessary. Greater seepage flows may be expected were extensive sand layers are encountered during trenching.

5.2 Open Excavation

Based on the test holes drilled during this current investigation it is expected that the majority of the excavation will be through low to medium plastic clay with occasional sand layers.

Open sloped excavations are considered feasible for the storm sewer installation. Braced excavations may be considered where space restrictions dictate.

Where personnel are required to enter the trench, the trench excavation should be sloped at 1H: 1V or flatter above a height of 1.5 m above the base of the trench. Flatter slopes may be required in areas of sand or soft clay.

Excavated spoil material should be kept back from the top of the trench by at least 3 m or the depth of the excavation whichever is greater. Personnel should not be allowed in the open trench during installations without proper safety precautions being taken. In all cases, excavations should be consistent with Occupational Health and Safety regulations.

5.3 Pipe Bedding

All soft, loosened and disturbed material should be removed from the trench base before placement of bedding. The pipe should be bedded and installed according to the manufacturer's specifications. Care should be taken such that the pipe is not in contact with rigid objects such as cobbles or rocks as this will cause a stress concentration in the pipe and may result in breakage.

In the event that the trench base is situated in soft clays or saturated soils near the water table where the pipe support conditions may be poor, special bedding

procedures may be required to improve pipe support conditions and reduce future settlement of the pipes. Such special bedding requirements may consist of subexcavation and placement of a gravel pad of about 300 mm minimum thickness wrapped in a geotextile fabric in the base of the trench for support of the pipe bedding. This technique has been found to provide a better working surface in the trench base and also facilitates trench drainage during pipe installation.

5.4 Backfilling

The remainder of the trench above the bedding zone may be backfilled with the excavated on-site materials that are free of debris or organics.

The excavated materials that will be used for backfilling will generally consist of clay. Where settlement of the trench is to be minimized, such as under roadways and sidewalks, backfill should be placed in 150 mm lifts and compacted to at least 95% of Standard Proctor Maximum Dry Density (ASTM-D-698). Alternatively, compaction to the City of Edmonton specifications of 97% of a One Point Proctor.

The results of moisture content determination from the soil samples obtained from the field drilling program indicate that the high plastic clay near the surface is approximately 3% below it's estimated optimum moisture content becoming less plastic, softer, and wetter with depth. The clay should be suitable for compaction to the above requirements although it may require some moisture conditioning, including drying.

It should be recognized that even when compacted to specifications, settlement of the trench backfill might occur in the first one to two years.

The on site native material should not be placed frozen, or placed at temperatures below freezing. Heavy compaction equipment should not be allowed to operate above the placed pipe until 1 m of backfill has been placed and compacted above the pipe.

5.5 Cement Type

A water soluble sulphate test was carried out on a selected soil sample from the site. The result is consistent with the initial investigation and indicates a negligible concentration of water soluble sulphate. Therefore, Type 10 normal Portland cement can be used for all concrete in contact with the soil at this site. The results of the sulphate test is presented on the test hole log attached at the end of this letter.

6. PAVEMENT RECOMMENDATIONS

The proposed roadway and sidewalk is underlain mainly of clay and clay fill although gravel up to 200 mm thick was noted in two test holes. It is recommended that any

remaining organics or poor quality fill be subexcavated from the area of the proposed roadway and sidewalk. The subgrade should be inspected to ensure that it has been stripped down to competent clay or clay fill.

Provision should be made to ensure that positive surface drainage of the pavement structure be established to prevent the ponding of water. Ingressing of moisture to the subgrade soils can lead to pavement failure.

The finished subgrade under paved surfaces should be scarified to a depth of 150 mm and compacted to 100% of Standard Proctor maximum Dry Density. Any additional fill required to raise the grade to subgrade level may consist of native inorganic clay, placed in 150 mm thick lifts (compacted thickness) and compacted to at least 98% of Standard Proctor Maximum Dry Density of the material at a moisture content ± 2% of optimum.

It should be noted that the subgrade may become wet and softened as a result of construction traffic and weather conditions. If the clay subgrade for the roadway is too wet or soft to be compacted, either the upper 300 mm of subgrade should be cement stabilized with an application rate of 20 to 25 kg per square metre at subgrade or alternatively the soil may be subexcavated to a depth of 300 to 500 mm and replaced with compacted pitrun gravel. Placement of a woven geotextile at the base of the sub cut should be undertaken to improve the subgrade conditions.

It is recommended that the finished clay subgrade surface be sloped at a minimum of 1% toward catch basins, perimeter ditches, and gutters. The purpose of this is to drain any subsurface water from the subgrade and thereby prevent ponding of water.

It is understood that the roadway and sidewalk will initially be graveled for an undetermined period of time. It is recommended that a minimum thickness of 200 mm of crushed gravel be placed on the compacted clay subgrade. Prior to paving of the roadway and pouring of the concrete sidewalk the gravel layer should inspected to assess whether it is suitable. If required, the gravel may be scraped off to remove any potential surface contamination (i.e. mud, fines, or vegetation). Additional gravel should then be placed to obtain the required pavement thickness outlined in Table 6.1.

6.1 Roadway

The design roadway pavement thickness will depend on the magnitude, frequency and distribution of traffic loading anticipated in the area. In lieu of this information, the following guidelines presented in Table 6.1 below can be used for design of the pavement structures at this site.

TABLE 6.1
PAVEMENT STRUCTURES

Recommended Proposed Use	Recommended Pavement Structure
Parking Areas (for passenger cars and light trucks)	75 mm Asphaltic Concrete over 250 mm of 20 mm Crushed Granular Base Course over 150 mm prepared subgrade
Access Roads and Loading Areas (for delivery and garbage trucks)	100 mm Asphaltic Concrete over 300 mm of 20 mm Crushed Granular Base Course over 150 mm prepared subgrade

6.2 Sidewalk

The following guidelines presented in Table 6.2 below can be used for design of the sidewalks at this site.

TABLE 6.2
SIDEWALKS

Recommended Proposed Use	Recommended Pavement Structure
Walkway	120 mm Concrete over 150 mm of 20 mm Crushed Granular Base Course over 150 mm prepared subgrade

We trust that the above meets with your present requirements. If you have any questions, please contact the undersigned at your convenience.

Yours truly,
Thurber Engineering Ltd.
Robin Tweedie, P. Eng.
Review Principal

Geeta Belas, P. Eng.
Project Engineer

Enclosures

THURBER ENGINEERING LTD.

STATEMENT OF GENERAL CONDITIONS

1. STANDARD OF CARE

This study and Report have been prepared in accordance with generally accepted engineering or environmental consulting practices in this area. No other warranty, expressed or implied, is made.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report which is of a summary nature and is not intended to stand alone without reference to the instructions given to us by the Client, communications between us and the Client, and to any other reports, writings, proposals or documents prepared by us for the Client relative to the specific site described herein, all of which constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. WE CANNOT BE RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives and purposes that were described to us by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the document, subject to the limitations provided herein, are only valid to the extent that this Report expressly addresses proposed development, design objectives and purposes, and then only to the extent there has been no material alteration to or variation from any of the said descriptions provided to us unless we are specifically requested by the Client to review and revise the Report in light of such alteration or variation or to consider such representations, information and instructions.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT OUR WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS WE MAY EXPRESSLY APPROVE. The contents of the Report remain our copyright property. The Client may not give, lend or, sell the Report, or otherwise make the Report, or any portion thereof, available to any person without our prior written permission. Any use which a third party makes of the Report, are the sole responsibility of such third parties. Unless expressly permitted by us, no person other than the Client is entitled to rely on this Report. We accept no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without our express written permission.

5. INTERPRETATION OF THE REPORT

a) Nature and Exactness of Soil and Contaminant Description: Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel, may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other persons making use of such documents or records with our express written consent should be aware of this risk and this report is delivered on the express condition that such risk is accepted by the Client and such other persons. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. Where special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.

b) Reliance on Provided Information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to us. We have relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, we cannot accept responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other persons providing information relied on by us. We are entitled to rely on such representations, information and instructions and are not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.

(see over . . . .)

INTERPRETATION OF THE REPORT *(continued . . . .)*

c) Design Services: The Report may form part of the design and construction documents for information purposes even though it may have been issued prior to the final design being completed. We should be retained to review the final design, project plans and documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the report recommendations and the final design detailed in the contract documents should be reported to us immediately so that we can address potential conflicts.

d) Construction Services: During construction we must be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions to confirm and document that the site conditions do not materially differ from those interpreted conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

6. RISK LIMITATION

Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause an accidental release of those substances. In consideration of the provision of the services by us, which are for the Client's benefit, the Client agrees to hold harmless and to indemnify and defend us and our directors, officers, servants, agents, employees, workmen and contractors (hereinafter referred to as the "Company") from and against any and all claims, losses, damages, demands, disputes, liability and legal investigative costs of defence, whether for personal injury including death, or any other loss whatsoever, regardless of any action or omission on the part of the Company, that result from an accidental release of pollutants or hazardous substances occurring as a result of carrying out this Project. This indemnification shall extend to all Claims brought or threatened against the Company under any federal or provincial statute as a result of conducting work on this Project. In addition to the above indemnification, the Client further agrees not to bring any claims against the Company in connection with any of the aforementioned causes.

7. SERVICES OF SUBCONSULTANTS AND CONTRACTORS

The conduct of engineering and environmental studies frequently requires hiring the services of individuals and companies with special expertise and/or services which we do not provide. We may arrange the hiring of these services as a convenience to our Clients. As these services are for the Client's benefit, the Client agrees to hold the Company harmless and to indemnify and defend us from and against all claims arising through such hirings to the extent that the Client would incur had he hired those services directly. This includes responsibility for payment for services rendered and pursuit of damages for errors, omissions or negligence by those parties in carrying out their work. In particular, these conditions apply to the use of drilling, excavation and laboratory testing services.

8. CONTROL OF WORK AND JOBSITE SAFETY

We are responsible only for the activities of our employees on the jobsite. The presence of our personnel on the site shall not be construed in any way to relieve the Client or any contractors on site from their responsibilities for site safety. The Client acknowledges that he, his representatives, contractors or others retain control of the site and that we never occupy a position of control of the site. The Client undertakes to inform us of all hazardous conditions, or other relevant conditions of which the Client is aware. The Client also recognizes that our activities may uncover previously unknown hazardous conditions or materials and that such a discovery may result in the necessity to undertake emergency procedures to protect our employees as well as the public at large and the environment in general. These procedures may well involve additional costs outside of any budgets previously agreed to. The Client agrees to pay us for any expenses incurred as the result of such discoveries and to compensate us through payment of additional fees and expenses for time spent by us to deal with the consequences of such discoveries. The Client also acknowledges that in some cases the discovery of hazardous conditions and materials will require that certain regulatory bodies be informed and the Client agrees that notification to such bodies by us will not be a cause of action or dispute.

9. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on our interpretation of conditions revealed through limited investigation conducted within a defined scope of services. We cannot accept responsibility for independent conclusions, interpretations, interpolations and/or decisions of the Client, or others who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes but is not limited to decisions made to develop, purchase or sell land.

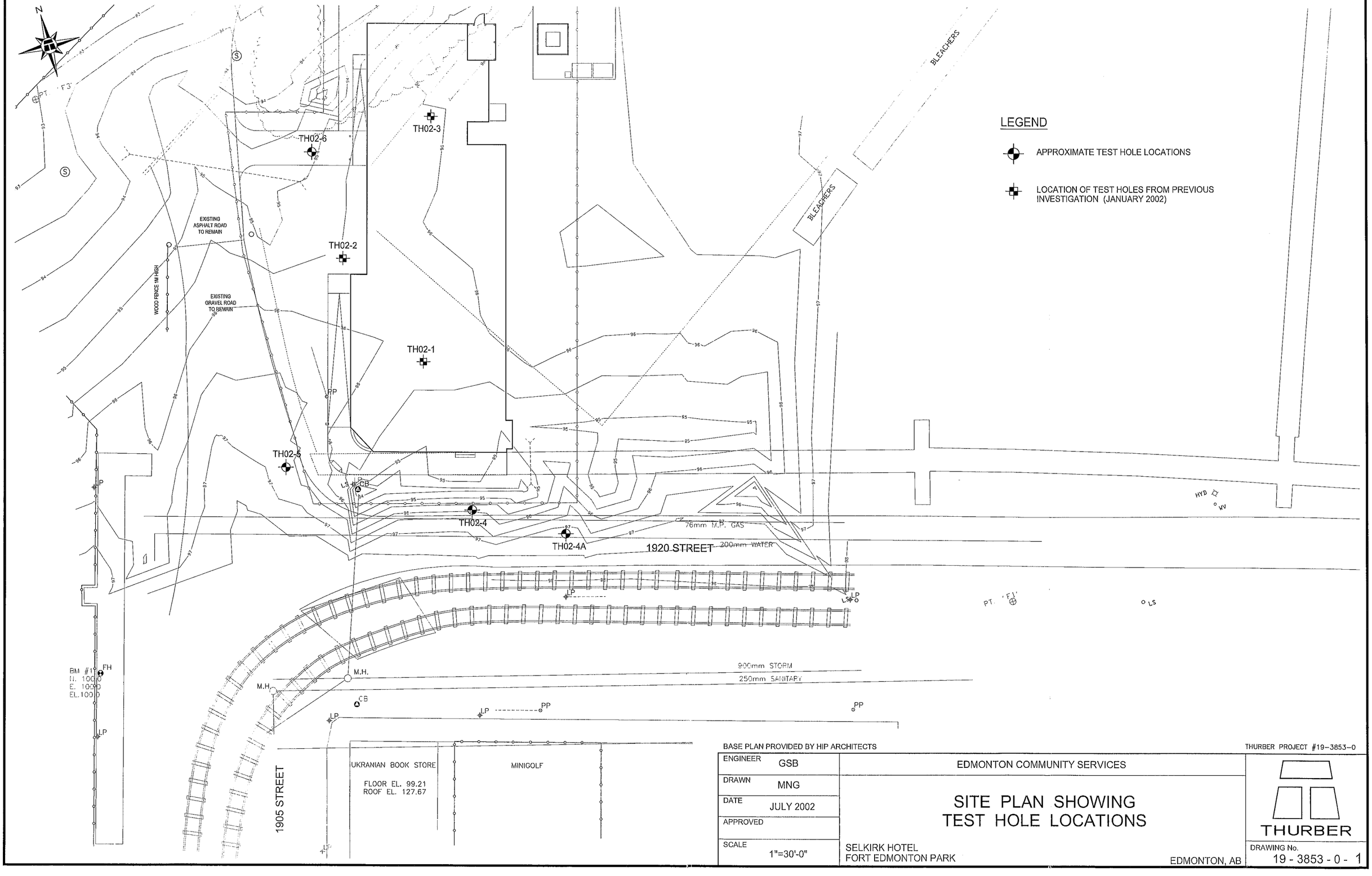
APPENDIX A

Site Plan Drawing No. 19-3853-0–1 Showing Test Hole Locations

Symbols and Terms Used on the Test Hole Logs

Modified Unified Soils Classification

Test Hole Logs - July 2002 (TH02-4 to TH02-6)



LEGEND

- APPROXIMATE TEST HOLE LOCATIONS
- LOCATION OF TEST HOLES FROM PREVIOUS INVESTIGATION (JANUARY 2002)

BASE PLAN PROVIDED BY HIP ARCHITECTS

THURBER PROJECT #19-3853-0

ENGINEER GSB	EDMONTON COMMUNITY SERVICES
DRAWN MNG	SITE PLAN SHOWING TEST HOLE LOCATIONS
DATE JULY 2002	
APPROVED	
SCALE 1"=30'-0"	SELKIRK HOTEL FORT EDMONTON PARK, EDMONTON, AB

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DRAWING No. 19 - 3853 - 0 - 1

SYMBOLS AND TERMS USED ON TEST HOLE LOGS

1. VISUAL TEXTURAL CLASSIFICATION OF MINERAL SOILS

CLASSIFICATION	APPARENT PARTICLE SIZE
Boulders	Greater than 200 mm
Cobbles	75 mm to 200 mm
Gravel	5 mm to 75 mm
Sand	Not visible to 5 mm
Silt	Non-Plastic particles, not visible to the naked eye
Clay	Plastic particles, not visible to the naked eye

2. TERMS DESCRIBING CONSISTENCY (COHESIVE SOILS ONLY)

DESCRIPTIVE TERM	APPROXIMATE UNDRAINED SHEAR STRENGTH	
Very Soft	Less than 10 kPa	
Soft	10 - 25 kPa	
Firm	25 - 50 kPa	
Stiff	50 - 100 kPa	
Very Stiff	100 - 200 kPa	Modified from National Building Code
Hard	200 - 300 kPa	
Very Hard	Greater than 300 kPa	

3. TERMS DESCRIBING DENSITY (COHESIONLESS SOILS ONLY)

DESCRIPTIVE TERM	STANDARD PENETRATION TEST (SPT) (Number of Blows per 300 mm)	
Very Loose	0 - 4	
Loose	4 - 10	
Compact	10 - 30	Modified from National Building Code
Dense	30 - 50	
Very Dense	Over 50	

4. LEGEND FOR TEST HOLE LOGS

SYMBOL FOR SAMPLE TYPE

Shelby Tube	A-Casing
SPT	Grab
No Recovery	Core

- ● MC - Moisture Content (% by weight) as determined by sample
- ▼ Water Level
- CPen - Shear Strength determined by pocket penetrometer
- CVane - Shear Strength determined by pocket vane
- Cu - Undrained Shear Strength determined by unconfined compression test

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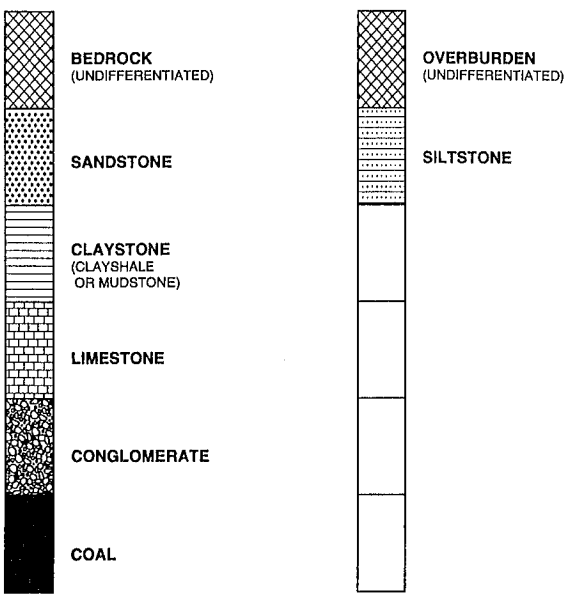
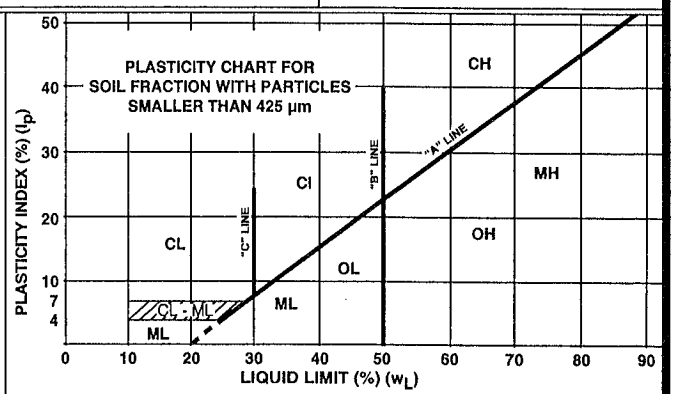
MODIFIED UNIFIED CLASSIFICATION SYSTEM FOR SOILS
(MODIFIED BY PFRA, 1985)

MAJOR DIVISION			GROUP SYMBOL	THURBER LOG SYMBOL	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA
COARSE-GRAINED SOILS (MORE THAN HALF BY WEIGHT LARGER THAN 75µm)	GRAVELS MORE THAN HALF COARSE GRAINS LARGER THAN 4.75 mm	CLEAN GRAVELS (LITTLE OR NO FINES)	GW		WELL GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES	$C_U = \frac{D_{60}}{D_{10}} > 4$; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1$ to 3
			GP		POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	NOT MEETING ALL GRADATION REQUIREMENTS FOR GW
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GM		SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	ATTERBERG LIMITS BELOW "A" LINE I_p LESS THAN 4
			GC		CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES	ATTERBERG LIMITS ABOVE "A" LINE I_p MORE THAN 7
	SANDS MORE THAN HALF COARSE GRAINS SMALLER THAN 4.75 mm	CLEAN SANDS (LITTLE OR NO FINES)	SW		WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	$C_U = \frac{D_{60}}{D_{10}} > 6$; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1$ to 3
			SP		POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	NOT MEETING ALL GRADATION REQUIREMENTS FOR SW
		SAND WITH FINES (APPRECIABLE AMOUNT OF FINES)	SM		SILTY SANDS, SAND-SILT MIXTURES	ATTERBERG LIMITS BELOW "A" LINE I_p LESS THAN 4
			SC		CLAYEY SANDS, SAND-CLAY MIXTURES	ATTERBERG LIMITS ABOVE "A" LINE I_p MORE THAN 7
FINE-GRAINED SOILS (MORE THAN HALF BY WEIGHT SMALLER THAN 75µm)	SILTS BELOW "A" LINE NEGLIGIBLE ORGANIC CONTENT	$w_L < 50\%$	ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	CLASSIFICATION IS BASED UPON PLASTICITY CHART (see below)
		$w_L > 50\%$	MH		INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS, FINE SANDY OR SILTY SOILS	
	CLAYS ABOVE "A" LINE NEGLIGIBLE ORGANIC CONTENT	$w_L < 30\%$	CL		INORGANIC CLAYS OF LOW PLASTICITY, GRAVELLY, SANDY, OR SILTY CLAYS, LEAN CLAYS	
		$30\% < w_L < 50\%$	CI		INORGANIC CLAYS OF MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS	
		$w_L > 50\%$	CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
	ORGANIC SILTS & CLAYS BELOW "A" LINE	$w_L < 50\%$	OL		ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW AND MEDIUM PLASTICITY	
		$w_L > 50\%$	OH		ORGANIC CLAYS OF HIGH PLASTICITY, ORGANIC SILTS	
HIGHLY ORGANIC SOILS			Pt		PEAT AND OTHER HIGHLY ORGANIC SOILS	STRONG COLOR OR ODOR, AND OFTEN FIBROUS TEXTURE

Determine percentages of gravel and sand from grain size curve. Depending on percentages of fines (fraction smaller than 75µm) coarse grained soils are classified as follows:
Less than 5% GW, GP, SW, SP
More than 12% GM, GC, SM, SC
5% to 12% Borderline cases requiring use of dual symbols

SPECIAL SYMBOLS





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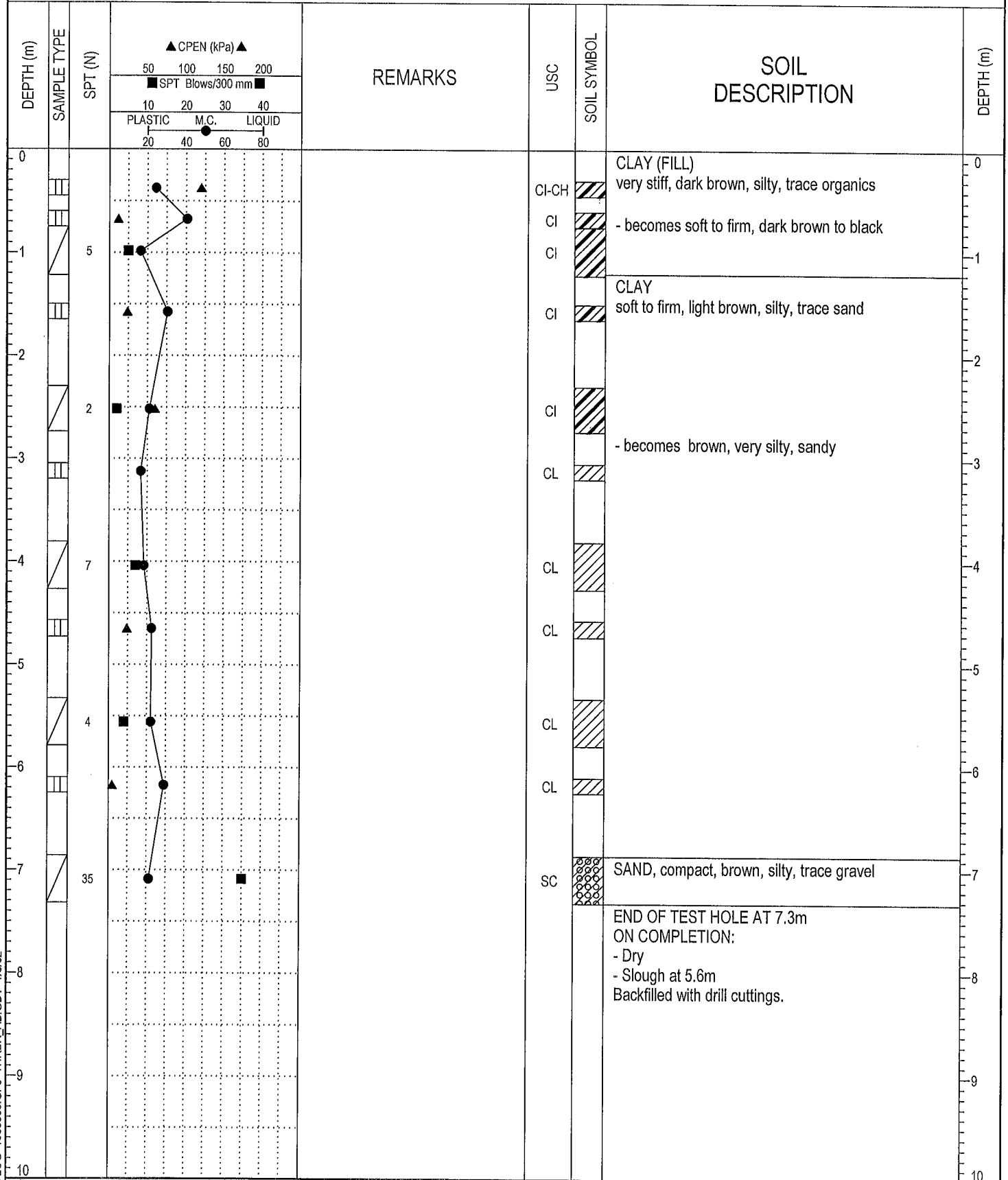
MODIFIED UNIFIED CLASSIFICATION SYSTEM FOR SOILS
(MODIFIED BY PFRA, 1985)

CLIENT: Edmonton Community Services	PROJECT: Selkirk Hotel, Ft. Edmonton Park	BOREHOLE NO: **TH02-4**
DRILLING COMPANY: SPT Drilling Ltd.	DATE DRILLED: July 17, 2002	PROJECT NO: 19-3853-0
DRILL/METHOD: B47/ Solid Stem Auger	LOCATION: See Drawing No. 19-3853-0-1	ELEVATION:

SAMPLE TYPE ▥ GRAB SAMPLE ▨ SPT



LOGGED BY: RK	COMPLETION DEPTH: 7.3 m
REVIEWED BY: GSB	COMPLETION DATE: 17/7/02

THURBER

Thurber Engineering Ltd.

EDMONTON, ALBERTA

BOREHOLE LOG 1938530.GPJ THRBR_AB.GDT 1/8/02

CLIENT: Edmonton Community Services	PROJECT: Selkirk Hotel, Ft. Edmonton Park	BOREHOLE NO: **TH02-4A**
DRILLING COMPANY: SPT Drilling Ltd.	DATE DRILLED: July 17, 2002	PROJECT NO: 19-3853-0
DRILL/METHOD: B47/ Solid Stem Auger	LOCATION: See Drawing No. 19-3853-0-1	ELEVATION:

SAMPLE TYPE ▥ GRAB SAMPLE ▨ SPT

DEPTH (m)	SAMPLE TYPE	SPT (N)	▲CPEN (kPa)▲ 50 100 150 200 ■SPT Blows/300 mm■ 10 20 30 40 PLASTIC M.C. LIQUID 10 20 30 40	REMARKS	USC	SOIL SYMBOL	SOIL DESCRIPTION	DEPTH (m)
0	▥		▲				GRAVEL (50mm thick)	0
					CH	▨	CLAY (FILL) stiff to very hard, dark brown, occassional gravel	
1	▨	10	■ ▲		CH	▨		1
2							END OF TEST HOLE AT 1.2m DUE TO LOCATION OF WATER MAIN IN SAME AREA AS TEST HOLE ON COMPLETION: - Dry - No slough Backfilled with drill cuttings.	2
3								3
4								4
5								5
6								6
7								7
8								8
9								9
10								10

BOREHOLE LOG 1938530.GPJ THRBR_AB.GDT 1/8/02

THURBER

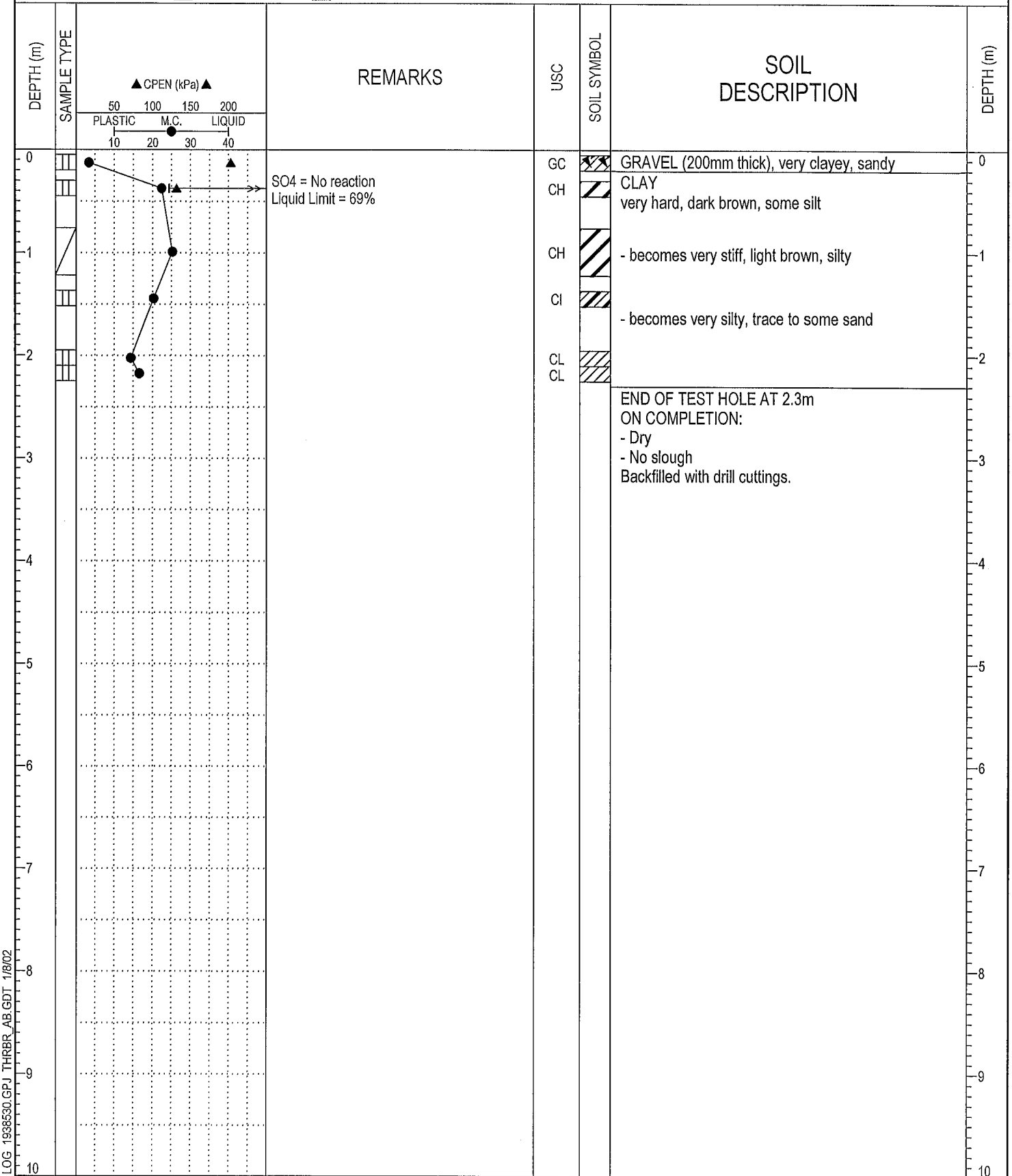
Thurber Engineering Ltd.

Edmonton, Alberta

LOGGED BY: RK	COMPLETION DEPTH: 1.2 m
REVIEWED BY: GSB	COMPLETION DATE: 17/7/02
	Page 1 of 1

CLIENT: Edmonton Community Services	PROJECT: Selkirk Hotel, Ft. Edmonton Park	BOREHOLE NO: **TH02-5**
DRILLING COMPANY: SPT Drilling Ltd.	DATE DRILLED: July 17, 2002	PROJECT NO: 19-3853-0
DRILL/METHOD: B47/ Solid Stem Auger	LOCATION: See Drawing No. 19-3853-0-1	ELEVATION:

SAMPLE TYPE ▥ GRAB SAMPLE ▨ SPT



BOREHOLE LOG 1938530.GPJ THRBR_AB.GDT 1/8/02

THURBER

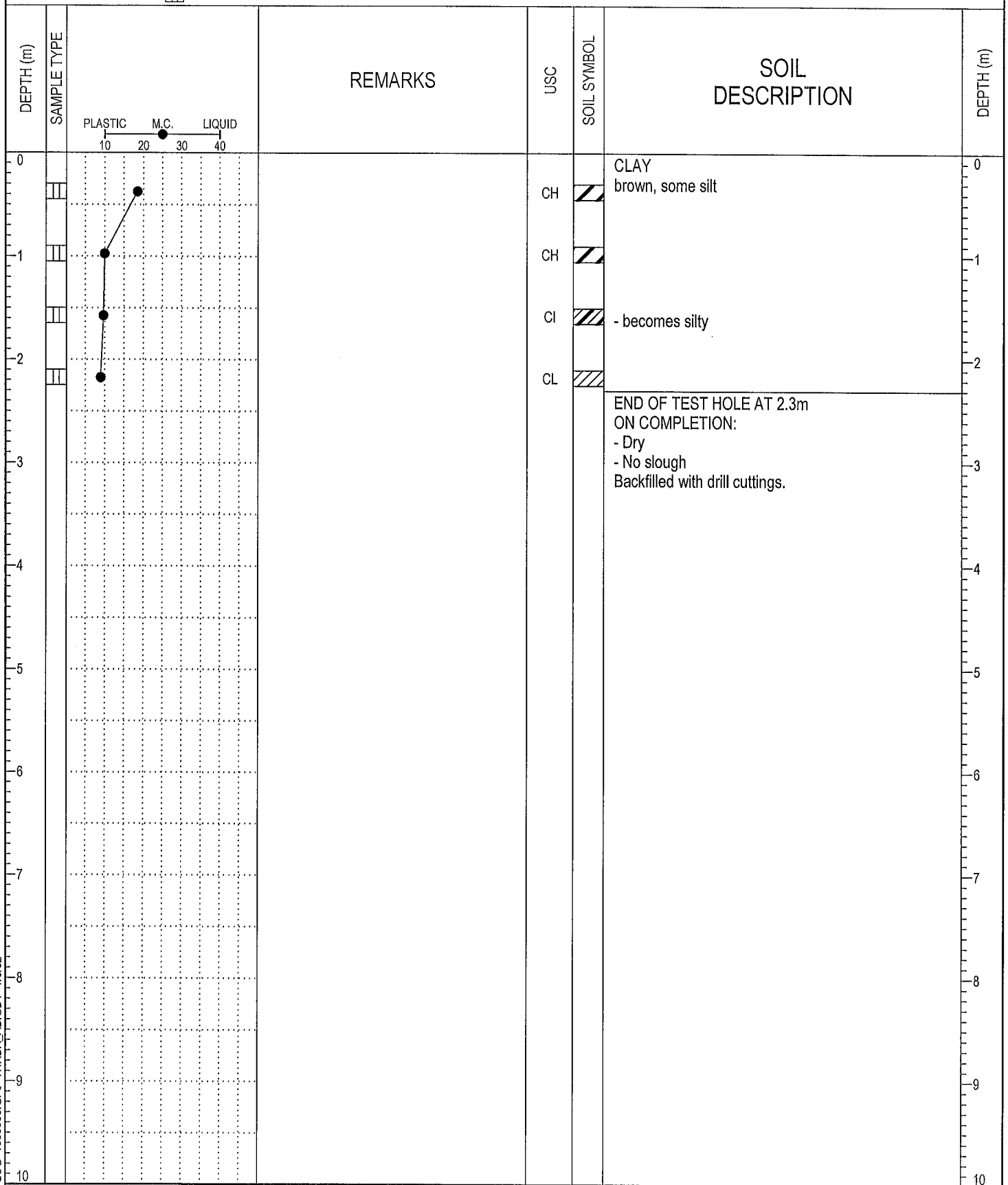
Thurber Engineering Ltd.

Edmonton, Alberta

LOGGED BY: RK	COMPLETION DEPTH: 2.3 m
REVIEWED BY: GSB	COMPLETION DATE: 17/7/02

CLIENT: Edmonton Community Services	PROJECT: Selkirk Hotel, Ft. Edmonton Park	BOREHOLE NO: **TH02-6**
DRILLING COMPANY: SPT Drilling Ltd.	DATE DRILLED: July 17, 2002	PROJECT NO: 19-3853-0
DRILL/METHOD: B47/ Solid Stem Auger	LOCATION: See Drawing No. 19-3853-0-1	ELEVATION:

SAMPLE TYPE: GRAB SAMPLE



BOREHOLE LOG 1938530.GPJ THRBR_AB.GDT 1/8/02

THURBER

Thurber Engineering Ltd.

Edmonton, Alberta

LOGGED BY: RK	COMPLETION DEPTH: 2.3 m
REVIEWED BY: GSB	COMPLETION DATE: 17/7/02

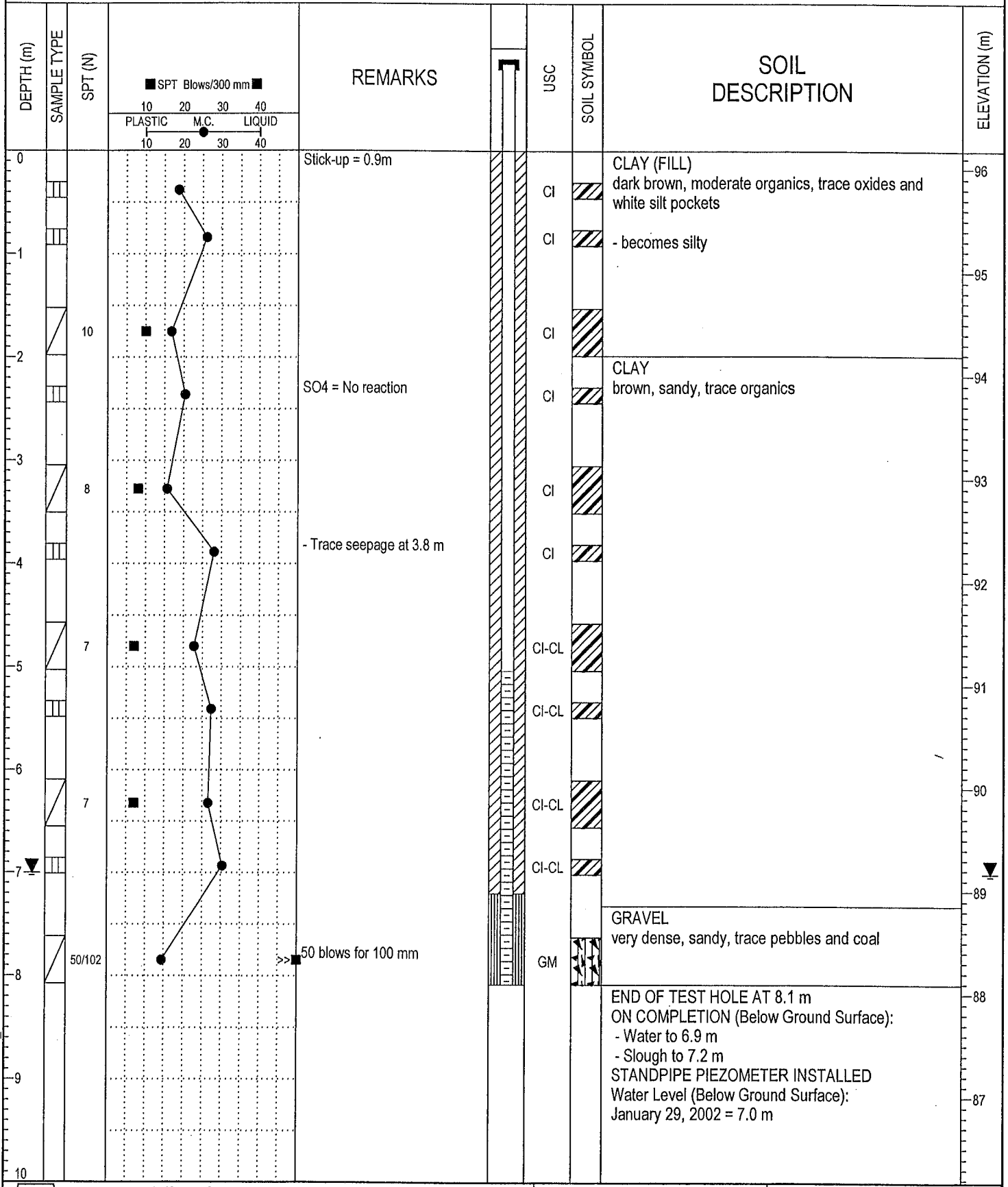
APPENDIX B

Test Hole Logs From Previous Investigation - January 2002 (TH02-1 to TH02-3)

CLIENT: Fort Edmonton Historical Society c/o HIP Architects	PROJECT: Selkirk Hotel Reconstruction	BOREHOLE NO: **TH02-1**
DRILLING COMPANY: SPT Drilling Ltd.	DATE DRILLED: January 10, 2002	PROJECT NO: 19-3694-0
DRILL/METHOD: B47/ Solid Stem Auger	LOCATION: See Drawing No. 19-3694-0-1	ELEVATION: 96.17 (m)

SAMPLE TYPE: GRAB SAMPLE; SPT

BACKFILL TYPE: DRILL CUTTINGS; SLOUGH



BOREHOLE LOG 1936940.GPJ THRBR_AB.GDT 30/1/02

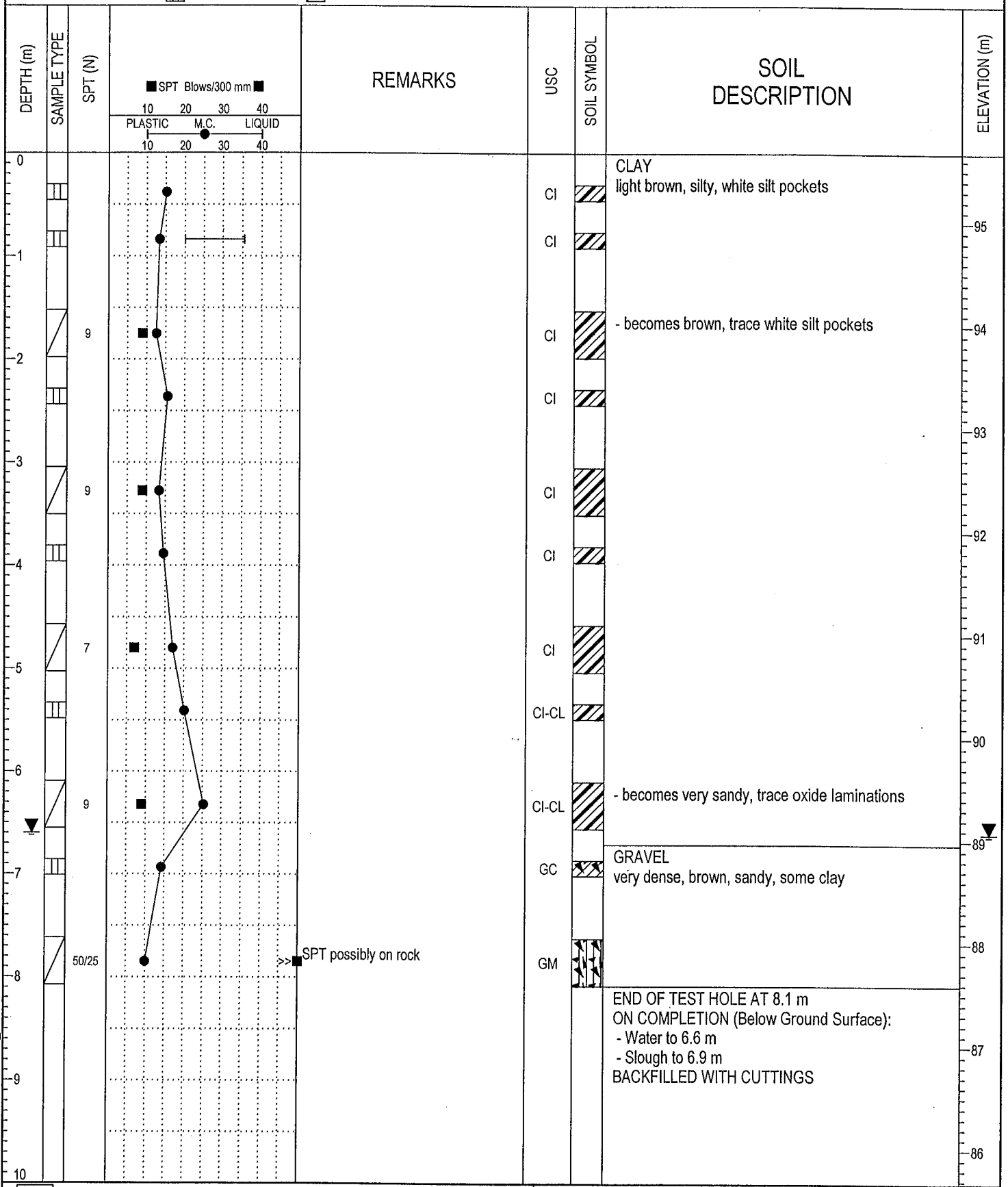
THURBER

Thurber Engineering Ltd.

LOGGED BY: GD	COMPLETION DEPTH: 8.1 m
REVIEWED BY: GSB	COMPLETION DATE: 10/1/02
	Page 1 of 1

CLIENT: Fort Edmonton Historical Society c/o HIP Architects	PROJECT: Selkirk Hotel Reconstruction	BOREHOLE NO: **TH02-2**
DRILLING COMPANY: SPT Drilling Ltd.	DATE DRILLED: January 10, 2002	PROJECT NO: 19-3694-0
DRILL/METHOD: B47/ Solid Stem Auger	LOCATION: See Drawing No. 19-3694-0-1	ELEVATION: 95.671 (m)

SAMPLE TYPE ▥ GRAB SAMPLE ▨ SPT



BOREHOLE LOG 1936940.GPJ THRBR_AB.GDT 30/1/02

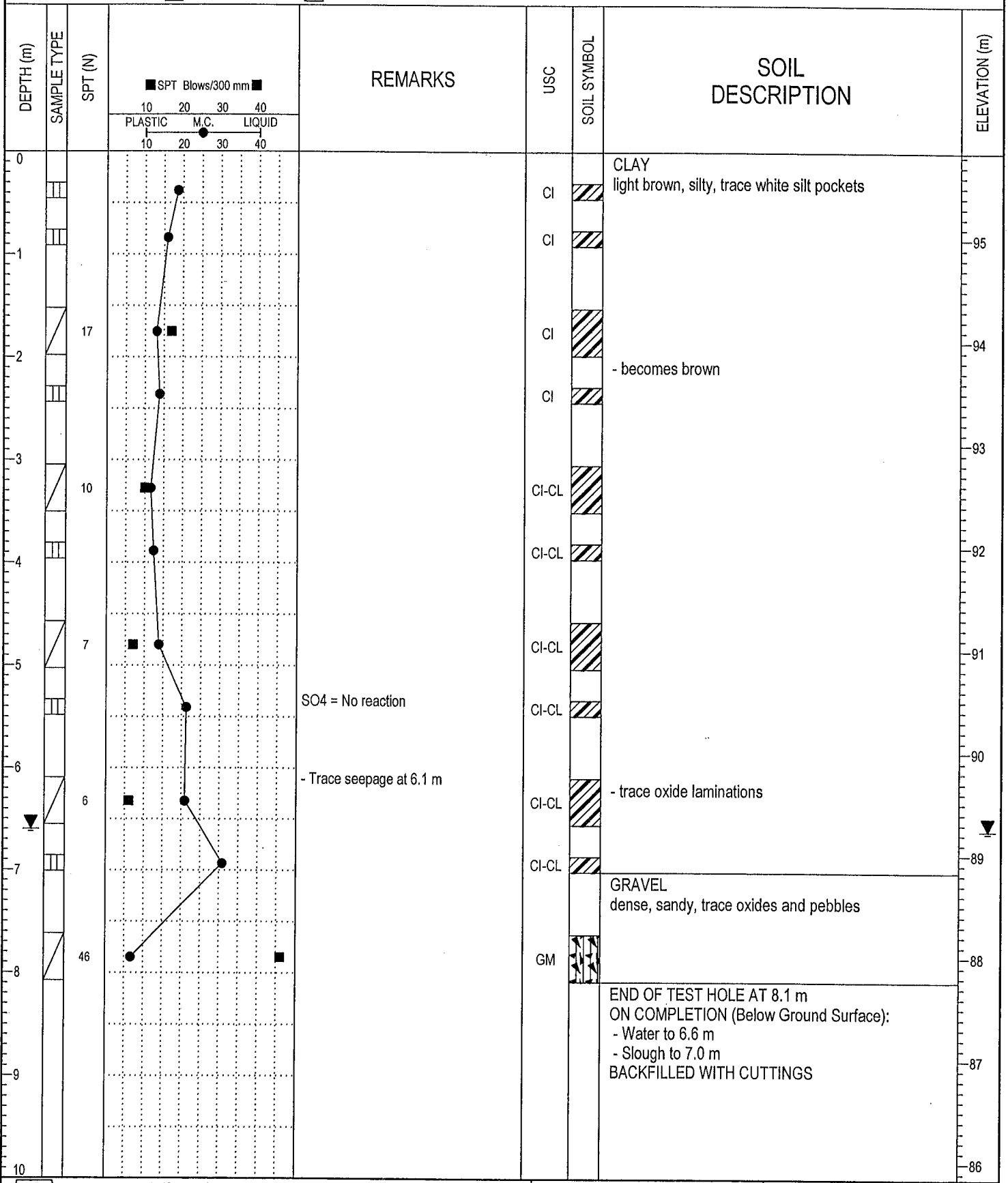
THURBER

Thurber Engineering Ltd.

LOGGED BY: GD	COMPLETION DEPTH: 8.1 m
REVIEWED BY: GSB	COMPLETION DATE: 10/1/02

CLIENT: Fort Edmonton Historical Society c/o HIP Architects	PROJECT: Selkirk Hotel Reconstruction	BOREHOLE NO: **TH02-3**
DRILLING COMPANY: SPT Drilling Ltd.	DATE DRILLED: January 10, 2002	PROJECT NO: 19-3694-0
DRILL/METHOD: B47/ Solid Stem Auger	LOCATION: See Drawing No. 19-3694-0-1	ELEVATION: 95.841 (m)

SAMPLE TYPE ▥ GRAB SAMPLE ▨ SPT



BOREHOLE LOG 1936940.GPJ THRBR_AB.GDT 30/1/02

THURBER

Thurber Engineering Ltd.

LOGGED BY: GD	COMPLETION DEPTH: 8.1 m
REVIEWED BY: GSB	COMPLETION DATE: 10/1/02