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PRELIMINARY GEOTECHNICAL INVESTIGATION REPORT

**Proposed Residential
Subdivision
Perth and Ottawa Streets
Richmond Area
Ottawa, Ontario**

Mattamy Homes Ltd.

PROJECT NO. 1026929

REPORT NO. 1026929

REPORT TO

**Mattamy Homes – Ottawa Division
123 Huntmar Drive
Ottawa, ON, K2S 1B9**

ON

**Preliminary Geotechnical Investigation
Proposed Residential Subdivision, Perth
and Ottawa Streets, Richmond Area
Ottawa, Ontario**

June 22, 2007

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1.0 INTRODUCTION

This report presents the results of the Geotechnical Investigation carried out for the proposed residential subdivision to be located to the west of the Village of Richmond in Ottawa, Ontario. The work was carried out in general accordance with our Proposal Number 1026824, dated June 7, 2007. Authorization to carry out the work was received on June 8, 2007, from Mr. Matthew Kingston of Mattamy Homes – Ottawa Division.

This report has been prepared specifically and solely for the project described herein. It presents the factual results of the Geotechnical Investigation and provides preliminary geotechnical recommendations for the design and construction of the residential subdivision.

2.0 PROJECT DESCRIPTION

The project site location is shown on the Key Plan, Drawing No. 1 in Appendix A. The property boundaries are indicated on Drawing No. 2 in Appendix A, and is based on Drawing Reference No. 07-10-724-00 prepared by J.D. Barnes Surveying Limited and dated April 21, 2007.

Although the layout and configuration of the proposed development has not yet been completed, it is anticipated that it will include numerous single family homes and townhouses on a new street network and that the development will be connected to municipal sewer services. Water supply, it is anticipated, will be through individual private wells.

3.0 SITE DESCRIPTION AND BACKGROUND

Geological maps, of the area indicate that the soil conditions vary significantly across the site. Southeast of Ottawa Street, maps indicate that a layer of glacial till is present overlying bedrock at shallow depth. Northwest of Ottawa Street the soil map profile includes sand (beach and reworked glaciofluvial origin) over silts and clays (marine origin) over glacial till. The thickness of the silt and clay layer increase along with depth to bedrock from southeast to northwest with total overburden thickness estimated to be as much as 10 m at the northwest limit of the site.

The subject site is approximately 300 acres in area and includes nine parcels of land. The site is roughly rectangular, 600 m wide and 2500 m long, with the long axis oriented northwest to southeast. The eight parcels include PINS 0062 and 0061 to the north of Perth Street, 0285, 0286, 0287 and 0714 between Perth and Ottawa Street and the Jock River and PIN 0075 on the southeast side of the Jock River.



The site is primarily used as an agricultural field. The Jock River crosses the southern end of the site. The layout of the site is shown on Drawing No. 2 in Appendix A.

The slopes adjacent to the Jock River are indicated in Ontario Geological Society Paper MP68 to have a Factor of Safety of 2.0 to 2.5 which indicates that only routine inspection will be necessary to determine the need and extent of a geotechnical investigation.

4.0 SCOPE OF WORK

Due to time constraints the scope of work for the project is divided into two phases; the Due Diligence Phase (Preliminary Phase) and Detailed Design Phase. The work completed for this report was conducted as part of the Due Diligence Phase. The scope of for each phase is summarized below:

Due Diligence Phase (Preliminary Phase)

- Field investigation
- Laboratory testing
- Prepare an initial due diligence report which will includes a test hole location plan, draft test hole logs and discussion of the geotechnical constraints to residential development of the site.

Detailed Design Phase

- Design discussions with the project team.
- Prepare a detailed geotechnical design report for the project. The report will include test hole location plan, test hole logs and recommendations for the detailed design of the development. The report will reflect the discussions from the other members of the design team including the proposed grading and layout of the subdivision.

The present report is the due diligence report. Further discussion and analysis will be carried out prior to presenting a final report for the proposed development.

Jacques Whitford is also conducting a Phase I Environmental Site Assessment (ESA) for the site. The results of the Phase I ESA are reported separately.



5.0 METHOD OF INVESTIGATION

5.1 Geotechnical Field Investigation

Prior to carrying out the investigation, Jacques Whitford staked out the proposed borehole locations and made arrangements to identify and clear the locations of underground utilities. The drain tile system that is present on the site could not be accurately located in the field. The drain tile system was encountered and may have been damaged at test pit locations TP07-10, TP07-22 and TP07-23.

Between June 14 and 20, 2007, test holes numbered BH 07-1 to TP 07-72 were advanced at the approximate locations shown on Drawing No. 2 in Appendix A. Several parcel's of the originally planned project site were eliminated from the scope of work, therefore test holes at locations BH 07-4, CPT 07-8, TP 07-12 and BH 07-16 were dropped after initiation of the project.

The test holes consisted of boreholes, Seismic Piezocone Penetration Tests, test pits and hand auger holes.

Boreholes

The boreholes were advanced using a track mounted CME power drill and hollow stem augers. Soil samples were collected at close intervals using a split spoon sampler while conducting standard penetration testing (SPT). Several relatively undisturbed samples of cohesive materials were acquired by pushing thin-walled samplers (Shelby tubes). The undrained shear strength of cohesive soils was measured in the boreholes by carrying out vane shear and pocket penetration tests. The boreholes were backfilled with auger cuttings.

Seismic Piezocone Penetration Test (SCPTu)

The Seismic Piezocone (SCPTu) tests consisted of pushing an instrumented rod with a cone-shaped tip into the ground at a controlled rate (20 mm/s) using the hydraulics of the CME power auger drill. The device contains electronic sensors that measure tip resistance, sleeve friction and pore water pressure at very short intervals in order to provide a near continuous profile. These measurements can be used to assess a wide variety of engineering properties of the subsurface soils. The equipment standards and test procedures are outlined in ASTM D5779-95. Seismic cone tests were also conducted at 1.0 m intervals to estimate the shear wave velocity of the soil.

When performing a seismic evaluation, the cone contains a built in geophone to measure compression and shear wave velocities in addition to the standard piezocone parameters. The seismic soundings were performed approximately at 1 m intervals.



During the seismic soundings, shear waves are generated by striking the seismic beam using a sledgehammer. The seismic beam is placed under the rear stabilizers of the drill rig and secured to the ground surface by using the weight of the drill. Seismic triggers are attached to this seismic beam, which initiate the recording of the seismic wave trace.

Geophones in the body of the piezocone recognize the arriving waves generated at the ground surface. Any waves received by the geophones on the cone penetrometer are sent back up to the control unit to be displayed on an oscilloscope. On site software then plots the wave amplitude versus time to calculate wave velocities.

For this assignment the piezocone testing also included several pore water pressure dissipation tests.

Test Pits

The test pits were excavated with rubber tired backhoes. Samples of all soil types were acquired from test pit walls. The test pits were backfilled with the excavated materials.

Hand Auger Holes

Access restrictions in the south east corner of the site prevented the use of mechanized equipment. Soil conditions were evaluated based on hand auger holes.

The subsurface stratigraphy encountered in each test hole was recorded in the field by our personnel. All samples recovered were stored in moisture-proof bags and were returned to our laboratory for detailed classification and testing.

Monitoring wells and standpipes were installed in several locations to allow for the measurement of groundwater levels. Groundwater levels were measured on June 20, 2007.

5.2 Survey

Prior to the fieldwork, the borehole locations were established in the field by Jacques Whitford personnel. The ground surface elevations at the test hole locations were surveyed relative to a temporary benchmark with an assigned elevation of 100.00 m Local. The temporary benchmark was established on the top of the concrete base of a light pole located on the north side of Perth Street. The location of the temporary benchmark is shown on Drawing 2 in Appendix A.



5.3 Laboratory Testing

All samples returned to the laboratory were subjected to detailed visual examination and additional classification by a geotechnical engineer. Selected samples were tested for moisture content, organic content, particle size gradation and Atterberg Limits. Results of this testing are shown on the Borehole Records and in Appendix D. Consolidation testing on two relatively undisturbed samples and some classification testing is currently underway. The results will be forwarded when they become available.

Samples will be stored for a period of one (1) month after issuance of this report unless we are otherwise directed by the client.

6.0 RESULTS OF INVESTIGATION

6.1 Site Description

The site is primarily used as an agricultural field. Some trees and brush were noted at localized areas throughout the site. Denser trees and brush are present in the vicinity of Jock River. A fill pile was observed near the south side of Ottawa Street. The approximate location of the fill pile, trees and brush are indicated on Drawing No. 2 in Appendix A.

A large drainage ditch is located near the northeast corner of the site. Steel corrugated pipe culvert provides access over the drainage ditch. A second drainage ditch which outlets to the Jock River runs through the southern parcel of land. The approximate locations of the ditches are indicated on Drawing No. 2 in Appendix A.

The slopes adjacent to the Jock River are heavily covered in trees and brush. The slopes heights were visually estimated to be less than 3 m in height and are sloped at angles shallower than 2H:1V.



6.2 Subsurface Information

In general, the subsurface profile changes significantly across the site.

Drawings 3 and 4 in Appendix A present plan summaries of the Estimated Thickness of the Clay Deposit and the Estimated Depth to Bedrock Respectively. Drawing No. 5 in Appendix A presents two stratigraphic plots across the site.

PIN 04437-0062, 0061, PIN 03933-0285, 0286

Within these parcels of land, the soils consist of a thick deposit of clay overlying a till deposit overlying inferred bedrock. Bedrock is anticipated at depths in excess of 6 m below ground surface to the north of Perth Street and becoming shallower to the south of Perth Street. The estimated thickness of the clay deposit and the depth to inferred bedrock are shown on Drawings No. 3 and 4, respectively.

PIN 03933-0287

Within this parcel of land the soils consist of a thin deposit of clay overlying a sandy silt deposit over a till deposit over inferred bedrock. Bedrock is anticipated at depths between 3 m to 4 m below ground surface. The estimated thickness of the clay deposit and the depth to inferred bedrock are shown on Drawings No. 3 and 4, respectively.

PIN 03933-0714 and PIN 03933-0746, 0047, 0075

Within these parcel's of land the soils consist of a deposit sandy silt over a till deposit over inferred bedrock. Bedrock is anticipated at depths greater than 4 m to less than 1 m below ground surface. The depth to inferred bedrock is shown on Drawing No. 4.

The subsurface conditions observed in the test holes are presented in detail on the Test Hole Records provided in Appendix B. An explanation of the symbols and terms used to describe the Borehole Records is also provided. The result of the Seismic Piezocone Tests is provided in Appendix C.

A summary of the observed subsurface conditions is presented below.

6.2.1 Surficial Materials

Topsoil was encountered in the majority of the test pits and boreholes and was observed to range from 0 mm to 300 mm in thickness. Two organic content tests were conducted on grab sample from test pits the results will be provided when testing is complete.



6.3 Clay (CL)

Borehole and Test Pit Results

Beneath the surficial materials a clay deposit was encountered across the majority of the northern half of the site. The upper 2 m to 3 m of clay was greyish brown and had a stiff to firm consistency. This upper clay layer is commonly referred to as a "crust". Several pocket penetration tests and in-situ shear tests were conducted on the clay crust; the result indicated shear strength between 48 kPa to greater than 160 kPa. The moisture content of the crust samples tested ranged from 23% to 53%.

Beneath the crust, the clay was grey and firm as indicated by the measured in-situ shear strength which varied from 20 kPa to 53 kPa. The moisture content of the clay samples tested ranged from 38% to 65%. Soil gradation test results are presented in Appendix D.

The clay can be classified as a lean clay (CL) in accordance with the Unified Soil Classification System (USCS).

The results of consolidation testing are not yet available and will be forwarded upon completion of the tests.

Seismic Piezocone Penetration Test (SCPTu)

The SPCTu tests classify the deposit as clays and organics. The results are presented in Appendix C.

Pore pressure dissipation tests were conducted within the SCPTu. The results of the pressure dissipation tests will be presented at the detailed design stage. The results of the SCPTu tests are presented in Appendix C.

6.4 Sandy Silt (ML)

Borehole and Test Pit Results

Beneath the surficial materials or clay a deposit of sandy silt with variable quantities of gravel was encountered. The deposit was generally encountered to the south of Perth Street. The color of the deposit was brown changing to grey with depth. The deposit was generally loose to compact as indicated by the SPT 'N' values which ranged from 1 to 37.

The moisture content of the samples tested ranged from 13 % to 37%. Soil gradation test results are presented in Appendix D. This material can be classified as sandy silt (ML) in accordance with the Unified Soil Classification System (USCS).

Seismic Piezocone Penetration Test

The SCPTu test classifies the deposit as sands and silt mix. The test results are presented in Appendix C.

6.5 Silty Sand (SM)

Borehole and Test Pit Results

A deposit of silty sand with variable quantities of sand and silt was encountered. The deposit was generally encountered near the Jock River. The color of the deposit was brown changing to grey with depth. The deposit was generally compact based on visual observation during the excavation of the test pits.

Soil gradation test results are presented in Appendix D. This material can be classified as sandy silt (SM) in accordance with the Unified Soil Classification System (USCS).

Seismic Piezocone Penetration Test

The SCPTu test was not conducted in this deposit.

6.6 Glacial Till

Borehole and Test Pit Results

Beneath the sandy silt and silty sand deposits a glacial till was observed. The till consists of a variable mixture of silt, sand and gravel with frequent cobbles and boulders. The deposit was generally compact to dense based on visual observation during the excavation of the test pits.

The moisture content of the samples tested ranged from 8 % to 20%. Wash sieve analysis are presented in Appendix D. This material can be classified as sandy silt (ML) in accordance with the Unified Soil Classification System (USCS).

Seismic Piezocone Penetration Test

The SCPTu was not conducted in this deposit.

6.6.1 Inferred Bedrock

Inferred bedrock was encountered at multiple test locations. The inferred bedrock was based on auger refusal, refusal of the back hoe bucket and refusal of the SCPTu. Table 6.1 summarizes the depth to inferred bedrock and Drawing No. 4 in Appendix A visually presents the bedrock depths inferred across the site.



Table 6.1: Summary of Depth to Bedrock

Test Hole Location	Depth to Inferred Bedrock Measured from Ground Surface (m)
MW 07-18	5.9
BH 07-21	5.3
TP 07-23	4.2
TP 07-24	4.3
MW 07-25	4.8
TP 07-26	4.4
BH 07-27	3.6
BH 07-28	3.9
TP 07-29	3.8
MW 07-30	3.9
TP 07-31	3.8
TP 07-32	3.5
TP 07-33	4.0
TP 07-34	3.6
MW 07-37	3.4
TP 07-36	2.9
TP 07-39	2.9
TP 07-40	1.9
TP 07-41	2.2
TP 07-42	3.3
TP 07-44	2.3
TP 07-45	2.9
TP 07-46	4.0
TP 07-48	3.6
TP 07-49	2.0
TP 07-50	3.8
TP 07-57	0.2
TP 07-58	0.9
TP 07-59	0.5
TP 07-60	1.9
TP 07-61	0.6
TP 07-62	0.7
TP 07-63	0.4
TP 07-64	3.5
TP 07-65	2.9
TP 07-67	1.6
TP 07-71	0.6
TP 07-75	3.5



6.7 Groundwater

Standpipes were installed five of the test pits. Monitoring wells were installed at eight of the boreholes. The groundwater levels were measured on June 20, 2007. Table 6.2 summarizes the groundwater levels measured on June 20, 2007. Fluctuations in the groundwater level due to seasonal variations or in response to a particular precipitation event should be anticipated.

Table 6.2: Summary of Measured Groundwater Levels

Test Hole Location	Groundwater Level Measured Below Ground Surface on June 20, 2007 (m)
MW 07-1	1.25
MW 07-7	1.44
MW 07-13	1.09
MW 07-18	0.72
MW 07-25	1.02
MW 07-30	1.21
MW 07-37	0.78
MW 07-40	1.68
TP 07-45	1.64
TP 07-47	0.60
TP 07-55	No reading
TP 07-66	1.05
TP 07-75	1.33

7.0 DISCUSSION AND RECOMMENDATIONS

7.1 Preliminary Geotechnical Assessment

Based on the soil conditions encountered in the test holes and our understanding of the project the following geotechnical constraints should be considered:

- A compressible deposit of clay was encountered within the northern section of the site. The approximate limits of the clay deposit are shown on Drawing No. 3 in Appendix A. Due to the compressible nature of the clay, grade raises over sections of the site should be restricted to minimize total settlements. Table 7.1 summarizes the preliminary grade raise restrictions for the site.



Table 7.1: Preliminary Grade Raise Restrictions

Site Area	Maximum Grade Raise above Existing Site Grades (m)
0062, 0061; north of Perth Street	1.0
PIN 0285, 0286; parcel to the south of Perth Street	1.5
PIN 0287; parcel north of Ottawa St.	2.0
PIN 0714, 0746, 0047, 0075; parcel north and south of Ottawa St.	4.0

- Shallow bedrock was encountered within the southern half of the site. It is anticipated that bedrock excavation for underground services and building foundations will be required in the area south of Ottawa Street. Estimated depths to inferred bedrock are presented on Drawing No. 4 in Appendix A.
- The soil conditions encountered are suitable for the use of conventional spread and strip footings for the support of structures. Table 7.2 provides Geotechnical Bearing Resistance Values for Preliminary Design purposes. The values have been calculated assuming no modifications to existing grades, a footing depth of 2.4 m below finished grade with an embedment of 0.5 m and a footing width of 0.8 m.

Table 7.2: Geotechnical Resistance for Shallow Foundations

Site Area	Founding Material	ULS (kPa)	SLS (kPa)
PIN 0062, 0061	Firm Clay	125	100
PIN 0285, 0286	Firm Clay	125	100
PIN 0287	Dense sandy silt	300	150
PIN 0714, 0746, 0047, 0075	Dense sandy silt, glacial till	300	150
PIN 0714, 0746, 0047, 0075	Bedrock	500	NA

The Ultimate Limit State (ULS) bearing resistance includes a resistance factor of 0.5. The Serviceability Limit State (SLS) bearing resistance corresponds to total settlement of 25 mm. Differential settlements between footings are expected to be less than 19 mm.

Note that settlement estimates are highly dependent on grade changes. The geotechnical resistance values will need to be reviewed in conjunction with the proposed grading plan.

- The groundwater table was observed to be relatively high. Grade reductions may lead to drainage concerns.

- Several test pits were terminated between 3 m to 4 m below ground surface within the sandy silt deposit due to side wall collapse and groundwater seepage. Excavations below the groundwater level may require shoring protection or special dewatering treatments.
- Several ditch's may require backfilling and the water courses may need diverting.
- In accordance with Table 4.1.8.4.A. of the 2006 Ontario Building Code, the project site is considered to be classified under several site classifications for seismic site response. Table 7.3 summarizes the appropriate site classification for the various parcels of land.

Table 7.3: Site Classification for Seismic Site Response

Parcel of Land	Ground Profile Name	Site Class
PIN 0062, 0061,0285, 0286	Soft Soil	E
PIN 0287, 0714	Stiff Soil	D
PIN 0746, 0047, 0075	Very Dense Soil and Soft Rock	C

- Table 7.4 summarizes the possible re-uses of site generated materials.

Table 7.4: Suitable Re-uses for Site Generated Materials

Soil Deposit	Exterior Foundation Wall Backfill	Subgrade Fill	Landscaping Fill
Clay Crust		X	X
Clay			X
Sandy Silt, Silt,			X
Glacial Till, Silty Sand	X	X	X
Crushed Bedrock	X	X	X

8.0 CLOSURE

This report has been prepared for the sole benefit of Mattamy Homes Ltd and its agents, and may not be used by any third party without the express written consent of Jacques Whitford Limited and Mattamy Homes Ltd. Any use which a third party makes of this report is the responsibility of such third party.

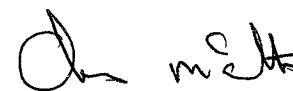
The recommendations made in this report are in accordance with our present understanding of your project. We request that we be permitted to review our recommendations when your drawings and specifications are complete.

This report is based on the site conditions encountered by Jacques Whitford at the time of the work, and at the specific testing and/or sampling locations, and can only be extrapolated to a limited extent around these locations. The extent depends on the variability of soil and groundwater conditions as influenced by geological processes, construction activities and site use. Should any conditions at the site be encountered which differ from those at the test locations, we require that we be notified immediately in order to permit reassessment of our findings.

We trust the above meets your present requirements. Should you require any further information please do not hesitate to contact us.

Yours very truly,

JACQUES WHITFORD LIMITED



Christopher McGrath, P.Eng.
Project Manager




Fred J. Griffiths, Ph.D., P.Eng.
Principal and Group Leader
Geotechnical and Materials Engineering

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APPENDIX A

Drawing No. 1 - Key Plan

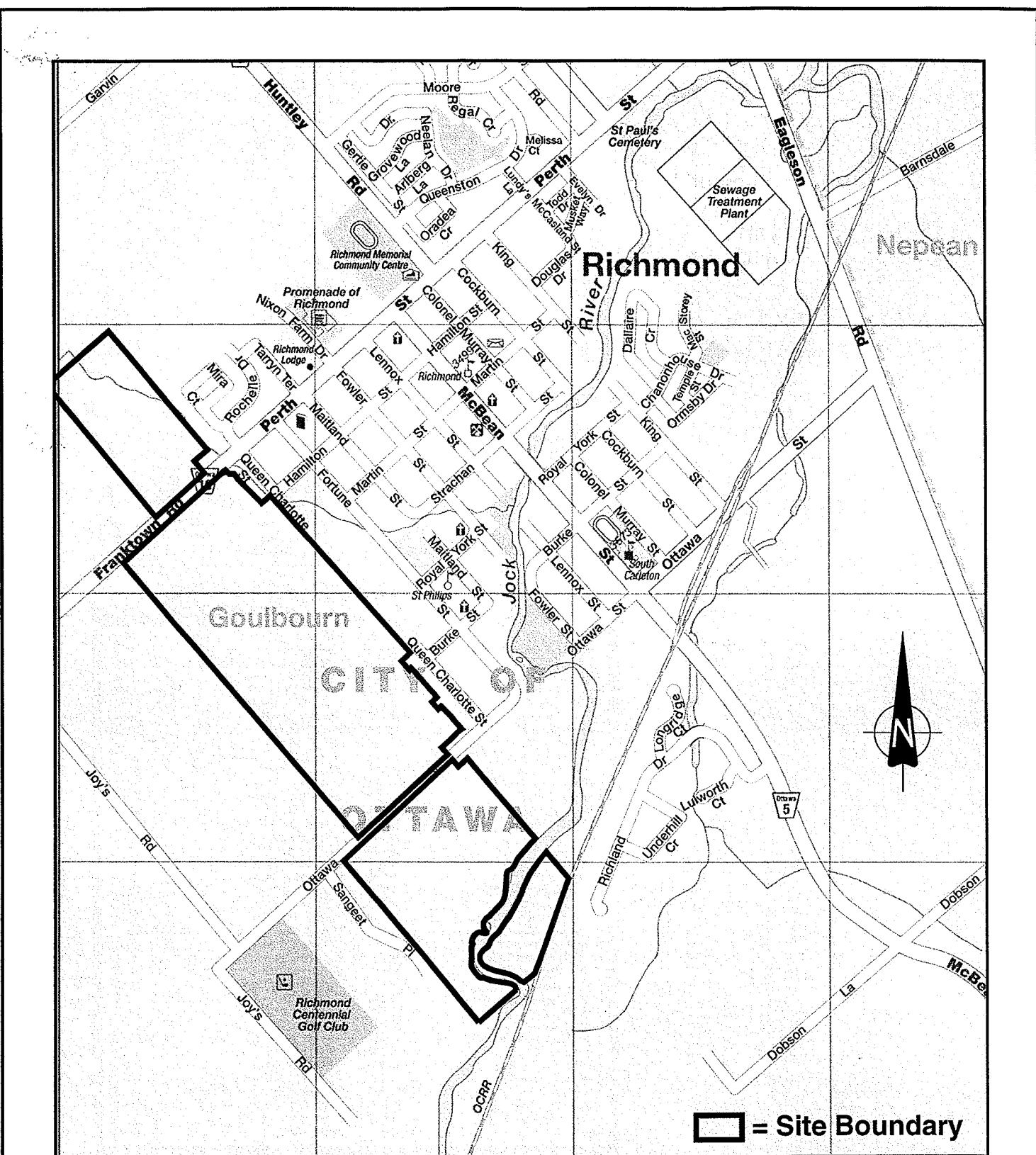
Drawing No. 2 - Test Hole Location Plan

Drawing No. 3 - Estimated Thickness of Clay Deposit

Drawing No. 4 - Inferred Depth to Bedrock

Drawing No. 5 – Stratigraphic Plot

Drawing No. 6 – Stratigraphic Plot

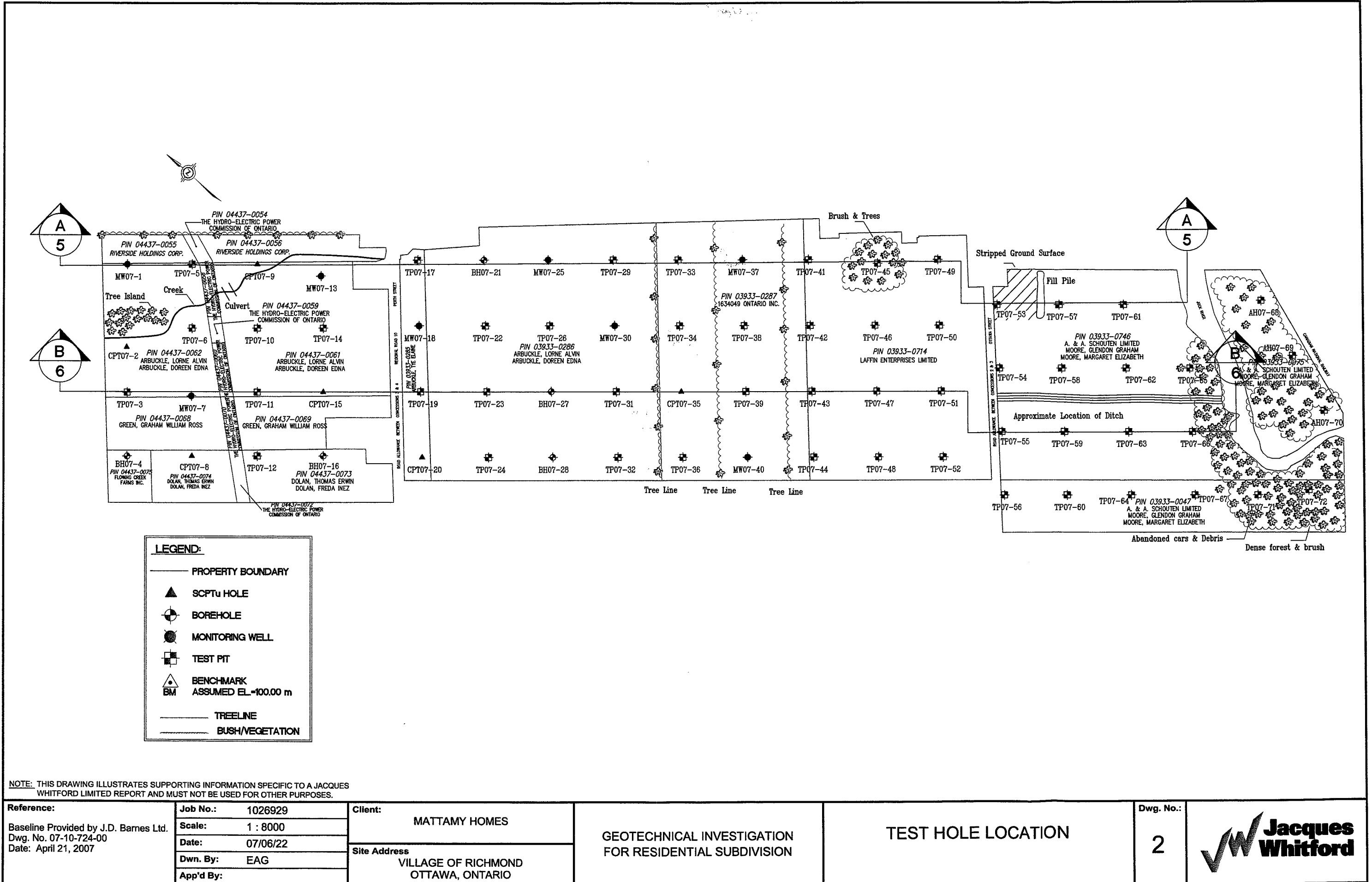


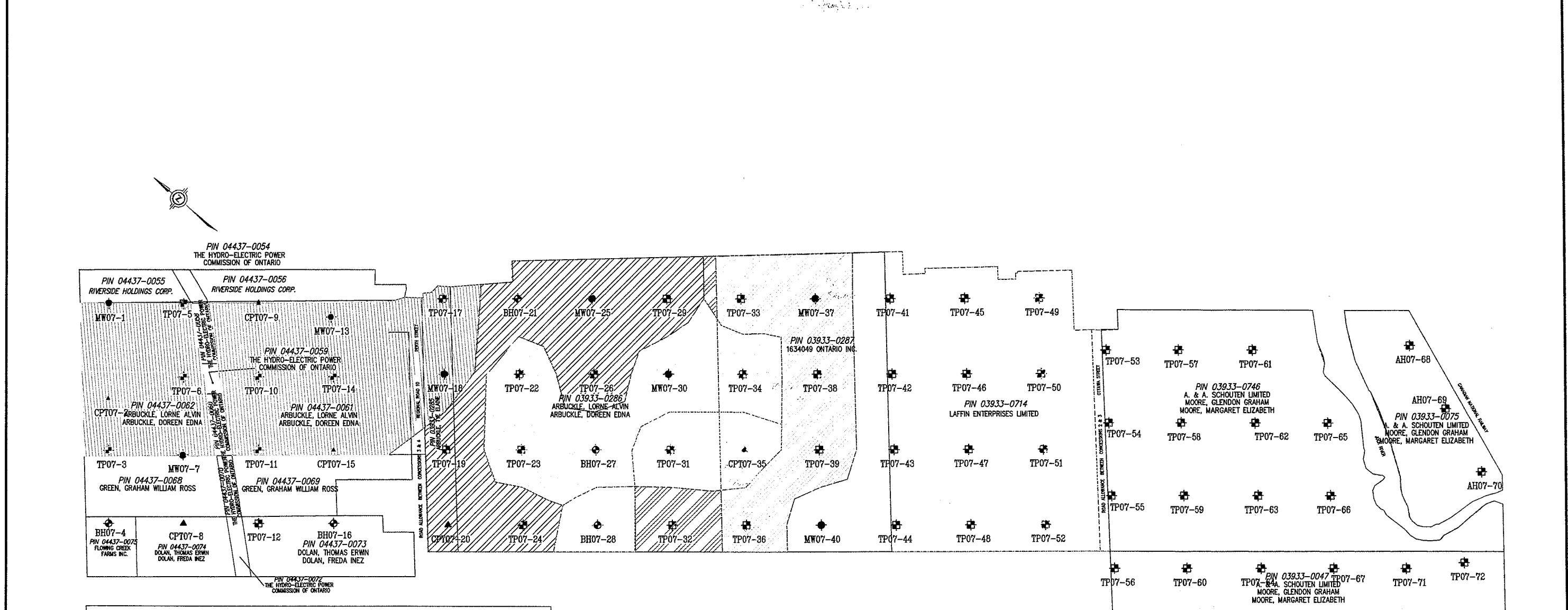
REFERENCE: MAPART

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A JACQUES WHITFORD LIMITED REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

KEY PLAN
GEOTECHNICAL INVESTIGATION FOR RESIDENTIAL SUBDIVISION
PERTH & OTTAWA STREETS, OTTAWA, ON.

Job No.:	1026929
Scale:	1 : 20 000
Date:	07/06/21
Dwn. By:	GBB
App'd By:	





LEGEND:

ESTIMATED THICKNESS OF CLAY DEPOSIT

> 4 m in thickness	
3 m to 4 m	
2 m to 3 m	
1 m to 2 m	
No clay	

PROPERTY BOUNDARY



SCPT/HOLE



BOREHOLE



MONITORING WELL



TEST PIT



**BENCHMARK
(TOP OF FIRE HYDRANT)
ASSUMED EL=100.00 m**



Notes :

- The thicknesses are inferred from the test hole results.
- Conditions between test holes could vary from those encountered at the test hole.

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Reference:
Baseline provided by J.D. Barnes Ltd.
Dwg No. 07-10-724-00
Date: April 21, 2007

Job No.: 1026929
Scale: 1 : 8000
Date: 07/06/22
Dwn. By: EAG
App'd By:

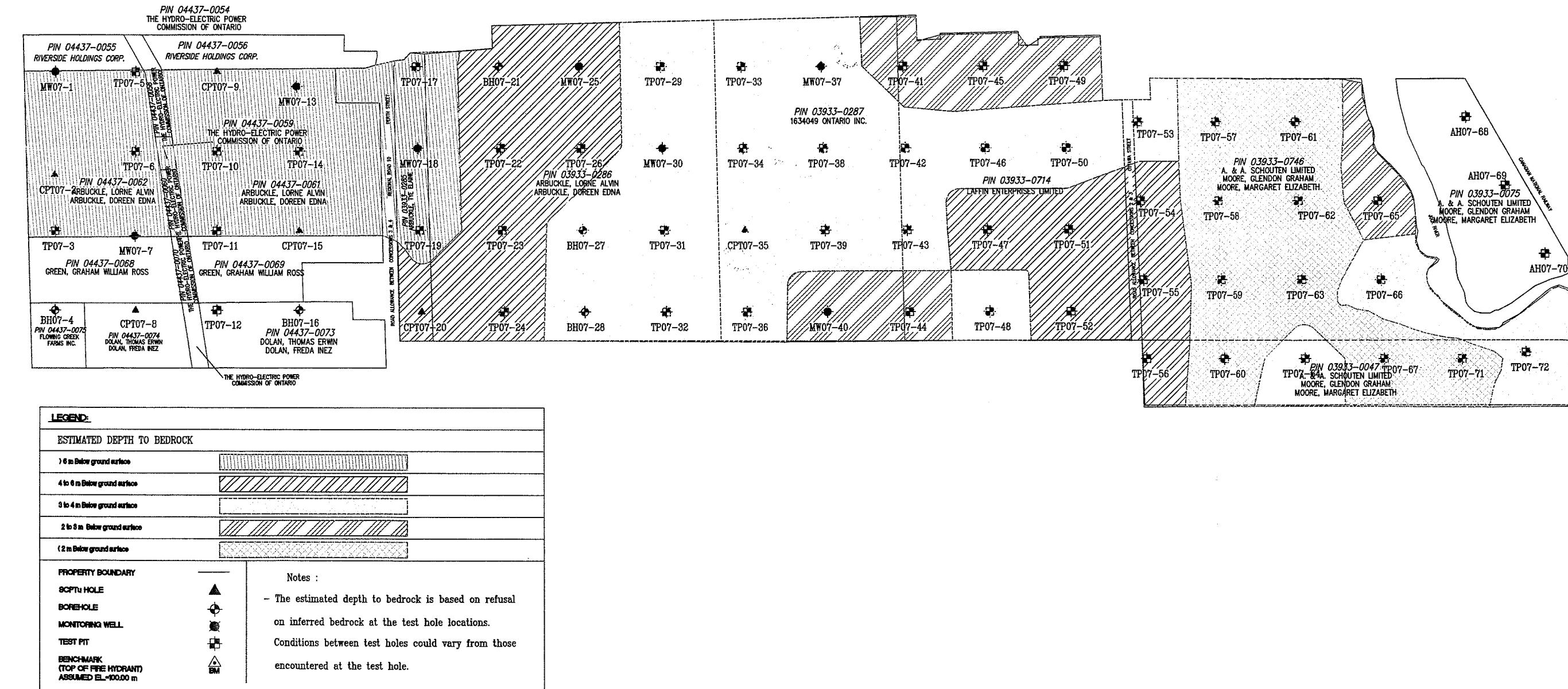
Client:
MATTAMY HOMES
Site Address:
VILLAGE OF RICHMOND
OTTAWA, ONTARIO

GEOTECHNICAL INVESTIGATION
FOR RESIDENTIAL SUBDIVISION

**ESTIMATED THICKNESS
OF CLAY DEPOSIT**

Dwg. No.:
3

Jacques Whitford



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A JACQUES WHITFORD LIMITED REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Reference: Job No.: 1026929
Baseline provided by J.D. Barnes Ltd.
Dwg. No. 07-10-724-00
April 21, 2007

Scale: 1 : 8000
Date: 07/06/22
Dwn. By: EAG
App'd By:

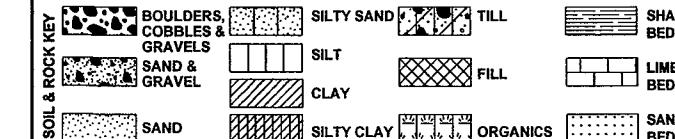
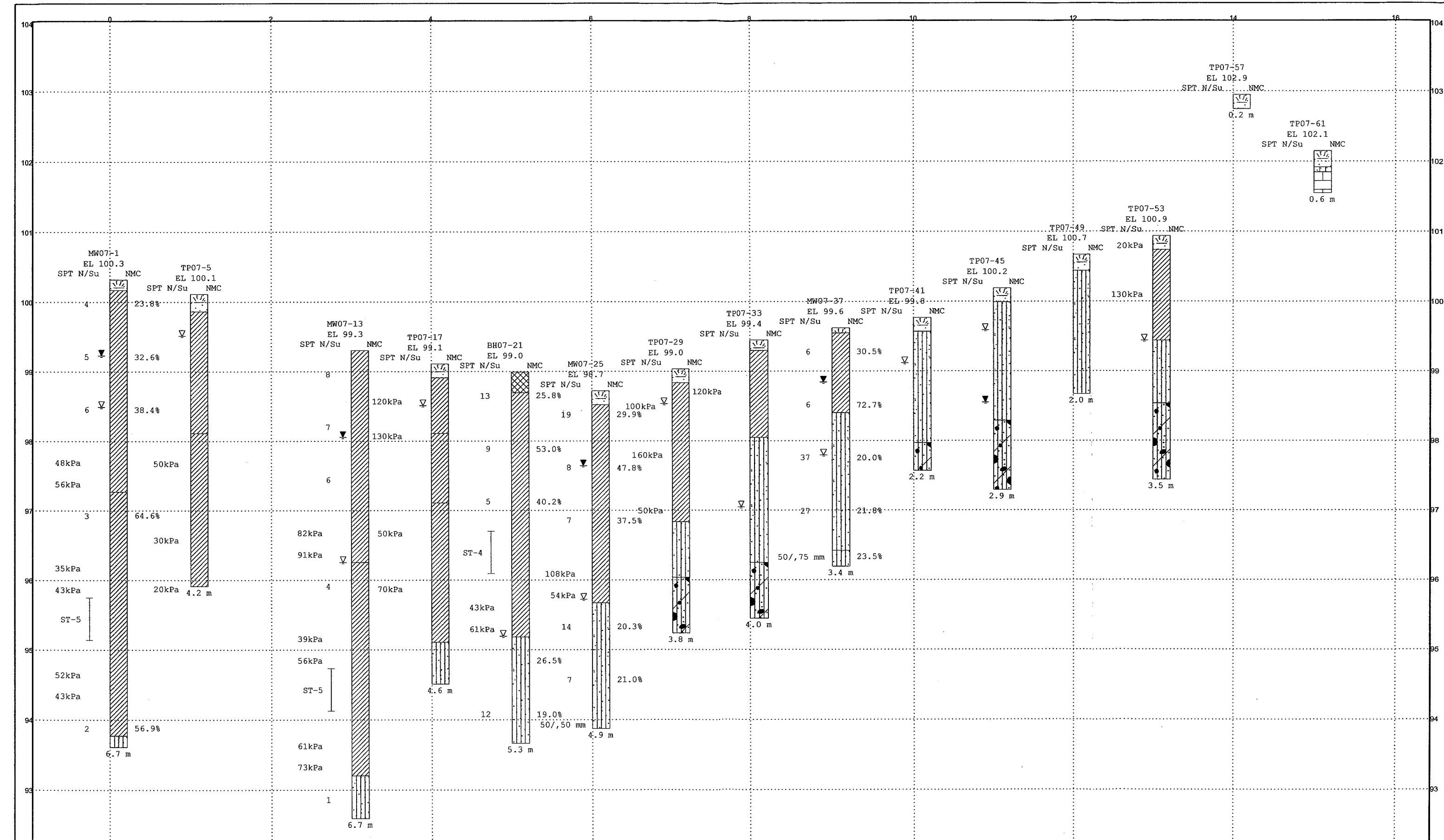
Client: MATTAMY HOMES
Site Address RICHMOND
OTTAWA, ONTARIO

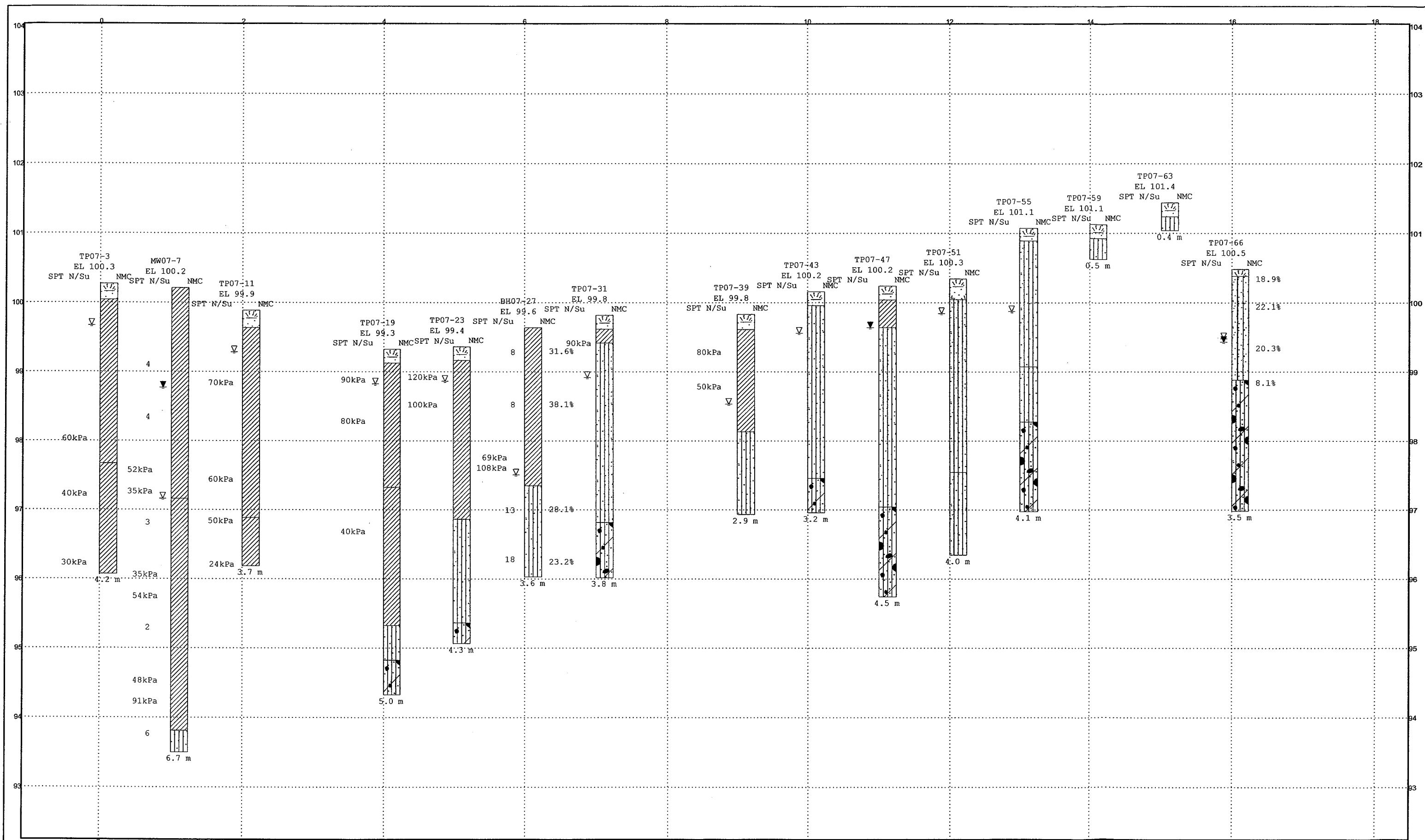
GEOTECHNICAL INVESTIGATION
FOR RESIDENTIAL SUBDIVISION

ESTIMATED DEPTH
TO BEDROCK

Dwg. No.: 4

Jacques Whitford





APPENDIX B

**Symbols and Terms Used on the Borehole Records
Borehole and Test Pit Records**



SYMBOLS AND TERMS USED ON BOREHOLE AND TEST PIT RECORDS

SOIL DESCRIPTION

Terminology describing common soil genesis:

<i>Topsoil</i>	- mixture of soil and humus capable of supporting vegetative growth
<i>Peat</i>	- mixture of visible and invisible fragments of decayed organic matter
<i>Till</i>	- unstratified glacial deposit which may range from clay to boulders
<i>Fill</i>	- material below the surface identified as placed by humans (excluding buried services)

Terminology describing soil structure:

<i>Desiccated</i>	- having visible signs of weathering by oxidization of clay minerals, shrinkage cracks, etc.
<i>Fissured</i>	- having cracks, and hence a blocky structure
<i>Varved</i>	- composed of regular alternating layers of silt and clay
<i>Stratified</i>	- composed of alternating successions of different soil types, e.g. silt and sand
<i>Layer</i>	- > 75 mm in thickness
<i>Seam</i>	- 2 mm to 75 mm in thickness
<i>Parting</i>	- < 2 mm in thickness

Terminology describing soil types:

The classification of soil types are made on the basis of grain size and plasticity in accordance with the Unified Soil Classification System (USCS) (ASTM D 2487 or D 2488). The classification excludes particles larger than 76 mm (3 inches). The USCS provides a group symbol (e.g. SM) and group name (e.g. silty sand) for identification.

Terminology describing cobbles, boulders, and non-matrix materials (organic matter or debris):

Terminology describing materials outside the USCS, (e.g. particles larger than 76 mm, visible organic matter, construction debris) is based upon the proportion of these materials present:

<i>Trace, or occasional</i>	Less than 10%
<i>Some</i>	10-20%
<i>Frequent</i>	> 20%

Terminology describing compactness of cohesionless soils:

The standard terminology to describe cohesionless soils includes compactness (formerly "relative density"), as determined by the Standard Penetration Test N-Value (also known as N-Index). A relationship between compactness condition and N-Value is shown in the following table.

Compactness Condition	SPT N-Value
<i>Very Loose</i>	<4
<i>Loose</i>	4-10
<i>Compact</i>	10-30
<i>Dense</i>	30-50
<i>Very Dense</i>	>50

Terminology describing consistency of cohesive soils:

The standard terminology to describe cohesive soils includes the consistency, which is based on undrained shear strength as measured by *in situ* vane tests, penetrometer tests, or unconfined compression tests.

Consistency	Undrained Shear Strength	
	kips/sq.ft.	kPa
<i>Very Soft</i>	<0.25	<12.5
<i>Soft</i>	0.25 - 0.5	12.5 - 25
<i>Firm</i>	0.5 - 1.0	25 - 50
<i>Stiff</i>	1.0 - 2.0	50 - 100
<i>Very Stiff</i>	2.0 - 4.0	100 - 200
<i>Hard</i>	>4.0	>200



ROCK DESCRIPTION

Terminology describing rock quality:

RQD	Rock Mass Quality
0-25	Very Poor
25-50	Poor
50-75	Fair
75-90	Good
90-100	Excellent

Rock quality classification is based on a modified core recovery percentage (RQD) in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be due to close shearing, jointing, faulting, or weathering in the rock mass and are not counted. RQD was originally intended to be done on NW core; however, it can be used on different core sizes if the bulk of the fractures caused by drilling stresses are easily distinguishable from *in situ* fractures. The terminology describing rock mass quality based on RQD is subjective and is underlain by the presumption that sound strong rock is of higher engineering value than fractured weak rock.

Terminology describing rock mass:

Spacing (mm)	Joint Classification	Bedding, Laminations, Bands
> 6000	Extremely Wide	-
2000-6000	Very Wide	Very Thick
600-2000	Wide	Thick
200-600	Moderate	Medium
60-200	Close	Thin
20-60	Very Close	Very Thin
<20	Extremely Close	Laminated
<6	-	Thinly Laminated

Terminology describing rock strength:

Strength Classification	Unconfined Compressive Strength (MPa)
Extremely Weak	< 1
Very Weak	1 - 5
Weak	5 - 25
Medium Strong	25 - 50
Strong	50 - 100
Very Strong	100 - 250
Extremely Strong	> 250

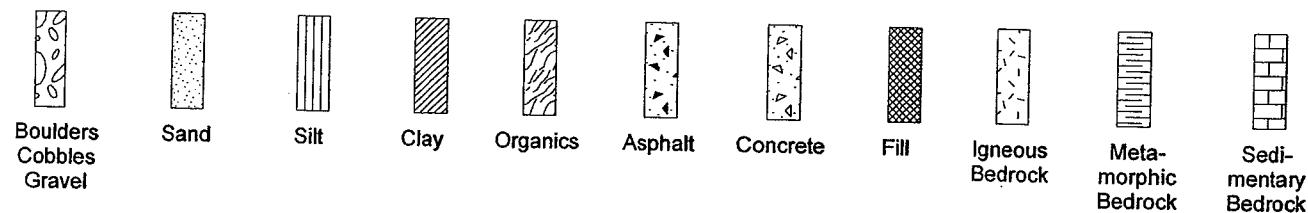
Terminology describing rock weathering:

Term	Description
Fresh	No visible signs of rock weathering. Slight discolouration along major discontinuities
Slightly Weathered	Discolouration indicates weathering of rock on discontinuity surfaces. All the rock material may be discoloured.
Moderately Weathered	Less than half the rock is decomposed and/or disintegrated into soil.
Highly Weathered	More than half the rock is decomposed and/or disintegrated into soil.
Completely Weathered	All the rock material is decomposed and/or disintegrated into soil. The original mass structure is still largely intact.



STRATA PLOT

Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols. The dimensions within the strata symbols are not indicative of the particle size, layer thickness, etc.



SAMPLE TYPE

SS	Split spoon sample (obtained by performing the Standard Penetration Test)
ST	Shelby tube or thin wall tube
PS	Piston sample
BS	Bulk sample
WS	Wash sample
HQ, NQ, BQ, etc.	Rock core samples obtained with the use of standard size diamond coring bits.

RECOVERY

For soil samples, the recovery is recorded as the length of the soil sample recovered. For rock core, recovery is defined as the total cumulative length of all core recovered in the core barrel divided by the length drilled and is recorded as a percentage on a per run basis.

N-VALUE / RQD

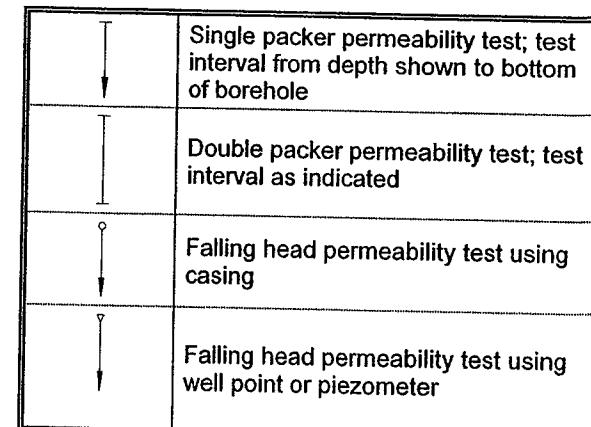
Numbers in this column are the field results of the Standard Penetration Test: the number of blows of a 140 pound (64 kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (50.8 mm) O.D. split spoon sampler one foot (305 mm) into the soil. For split spoon samples where insufficient penetration was achieved and N-values cannot be presented, the number of blows are reported over sampler penetration in millimetres (e.g. 50/75). Some design methods make use of N value corrected for various factors such as overburden pressure, energy ratio, borehole diameter, etc. No corrections have been applied to the N-values presented on the log. RQD is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery.

DYNAMIC CONE PENETRATION TEST (DCPT)

Dynamic cone penetration tests are performed using a standard 60 degree apex cone connected to A size drill rods with the same standard fall height and weight as the Standard Penetration Test. The DCPT value is the number of blows of the hammer required to drive the cone one foot (305 mm) into the soil. The DCPT is used as a probe to assess soil variability. Soil type may be inferred from adjacent boreholes and test pits.

OTHER TESTS

S	Sieve analysis
H	Hydrometer analysis
k	Laboratory permeability
y	Unit weight
G _s	Specific gravity of soil particles
CD	Consolidated drained triaxial
CU	Consolidated undrained triaxial with pore pressure measurements
UU	Unconsolidated undrained triaxial
DS	Direct Shear
C	Consolidation
Q _u	Unconfined compression
I _p	Point Load Index (I _p on Borehole Record equals I _p (50) in which the index is corrected to a reference diameter of 50 mm)



MONITORING WELL RECORD

1 of 1

MW07-1

CLIENT Mattamy Homes

LOCATION Proposed Subdivision, Richmond, ON

DATES: BORING June 18, 2007

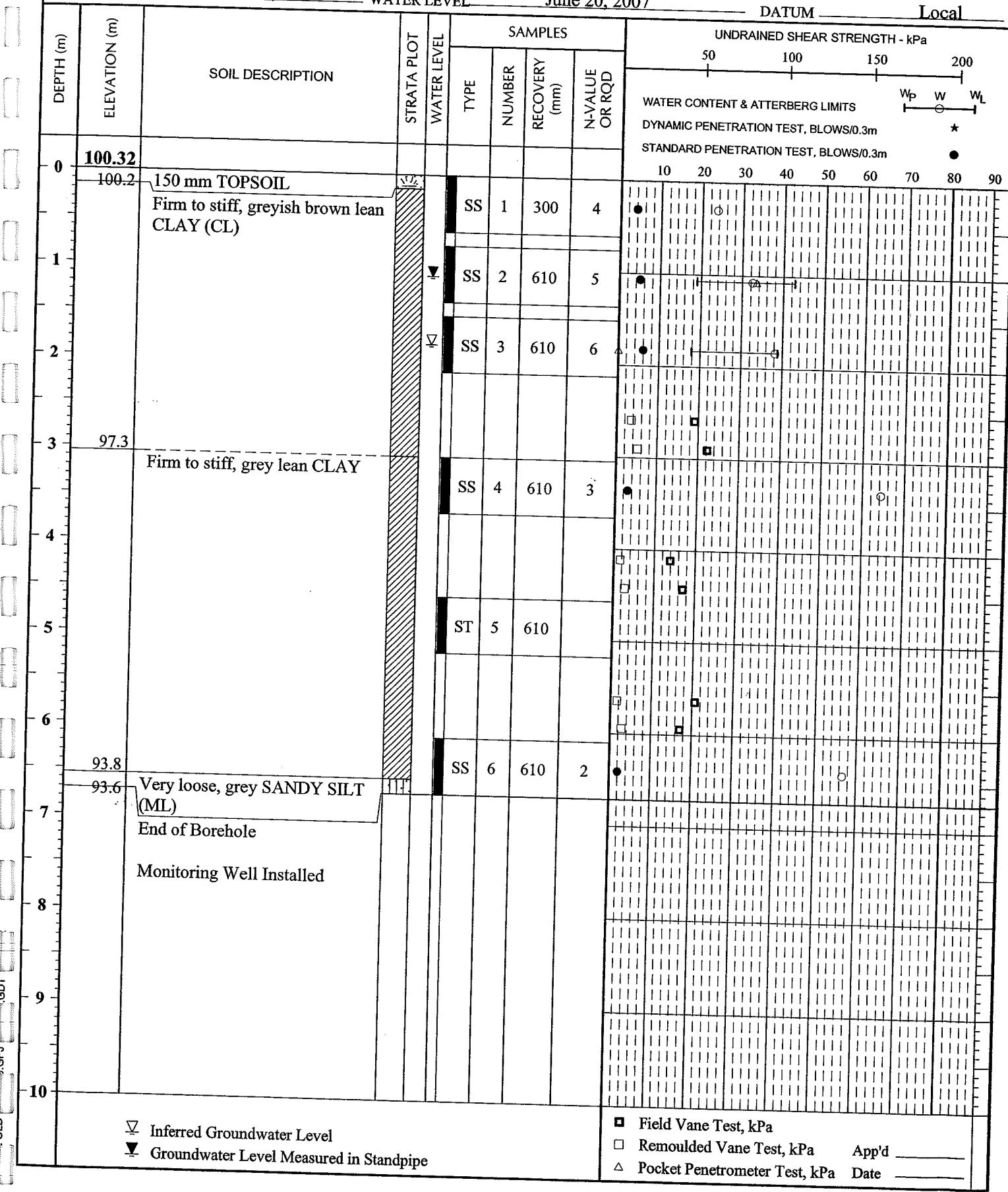
WATER LEVEL

June 20, 2007

BOREHOLE No. MW07-1

PROJECT No. 1026929

DATUM Local





TEST PIT RECORD

1 of

TP07-3

CLIENT Mattamy Homes

BOREHOLE No. TP07-3

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 16, 2007 WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa					
				WATER LEVEL	TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200
0	100.27											
0	100.0	230 mm TOPSOIL										
1		Stiff, greyish brown lean CLAY (CL)										
2												
3	97.7	Firm, grey lean CLAY (CL)										
4												
5	96.1	End of Borehole										
6												
▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe										<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa <input type="triangle"/> Pocket Penetrometer Test, kPa		App'd _____
										Date _____		

BOREHOLE RECORD

1 of 1

BH07-4CLIENT Mattamy HomesBOREHOLE No. **BH07-4**LOCATION Proposed Subdivision, Richmond, ONPROJECT No. 1026929

DATES: BORING

WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa							
				WATER LEVEL	TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200		
0		Borehole was not drilled												
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														

▽ Inferred Groundwater Level

 Field Vane Test, kPa

▼ Groundwater Level Measured in Standpipe

 Remoulded Vane Test, kPa App'd _____ Pocket Penetrometer Test, kPa Date _____

TEST PIT RECORD

TP07-5

CLIENT Mattamy Homes

BOREHOLE No. TP07-5

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 16, 2007 WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa							
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200	W _P	W	W _L
0	100.11	250 mm TOPSOIL			BS	1									
	99.9	Stiff, greyish brown lean CLAY (CL)			BS	2									
	98.1	Firm, grey lean CLAY (CL)			BS	3									
	95.9	End of Borehole			BS	4									
					BS	5									
					BS	6									
▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe															
<input checked="" type="checkbox"/> Field Vane Test, kPa															
<input type="checkbox"/> Remoulded Vane Test, kPa															App'd _____
<input type="checkbox"/> Pocket Penetrometer Test, kPa															Date _____

TEST PIT RECORD

1 of 1

TP07-6

CLIENT Mattamy Homes

BOREHOLE No. TP07-6

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 16, 2007

WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200
0	99.85											
99.6	250 mm TOPSOIL	Compact to dense, brown and grey SANDY SILT (ML)			BS	1						
97.9	Firm, grey lean CLAY (CL)				BS	2						
95.6	End of Borehole				BS	3						
95.6					BS	4						
95.6					BS	5						
6												
▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa App'd _____ <input type="triangle-down"/> Pocket Penetrometer Test, kPa Date _____				

MONITORING WELL RECORD

1 of 1

MW07-7

CLIENT Mattamy Homes

LOCATION Proposed Subdivision, Richmond, ON

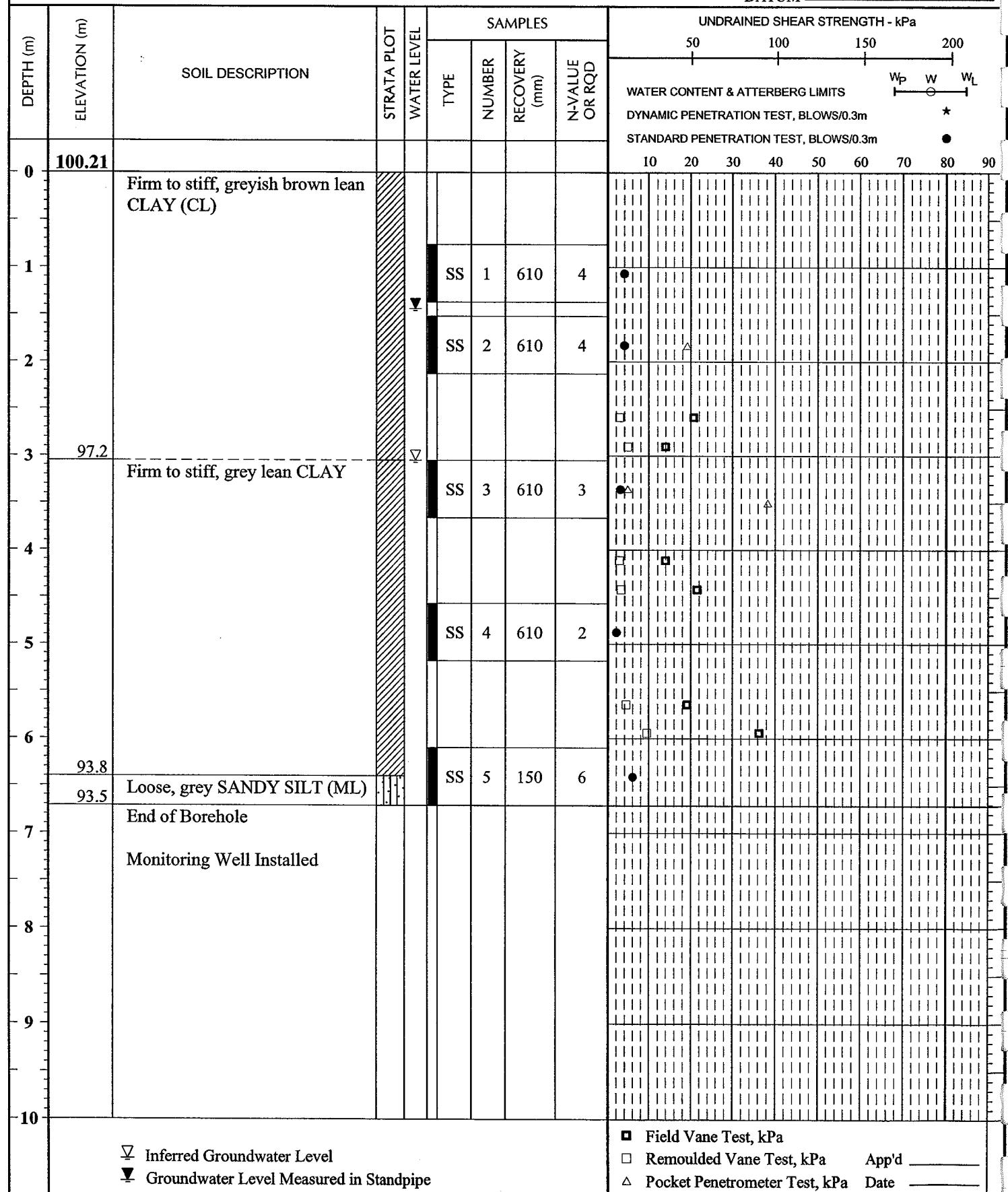
DATES: BORING June 18, 2007 WATER LEVEL

June 20, 2007

BOREHOLE No. MW07-7

PROJECT No. 1026929

DATUM Local



TEST PIT RECORD

1 of 1

TP07-10

CLIENT Mattamy Homes

LOCATION Proposed Subdivision, Richmond, ON

DATES: BORING June 16, 2007 WATER LEVEL

BOREHOLE No. TP07-10

PROJECT No. 1026929

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200
									W _P	W	W _L	
0	99.69											
0	99.4	250 mm TOPSOIL Stiff, greyish brown to grey lean CLAY (CL)	▽	BS	1							
1			▽	BS	2							
2	97.7	Firm, grey lean CLAY (CL)	▽	BS	3							
3			▽	BS	4							
4			▽	BS	5							
5	95.0	End of Borehole	▽	BS	6							
6			▽	BS	7							
▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa App'd _____ <input type="triangle-down"/> Pocket Penetrometer Test, kPa Date _____				

TEST PIT RECORD

TP07-11

CLIENT Mattamy Homes

BOREHOLE No. TP07-11

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 16, 2007 WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200
0	99.89											
0	99.6	250 mm TOPSOIL			BS	1						
1		Stiff, brown and grey lean CLAY (CL)	▽		BS	2						
2					BS	3						
3	96.9	Firm, grey lean CLAY (CL)	▽		BS	4						
3	96.2	End of Borehole	▽		BS	5						
4												
5												
6												
▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa <input type="checkbox"/> Pocket Penetrometer Test, kPa	App'd _____			
								<input type="checkbox"/> 	Date _____			



TEST PIT RECORD

1 of 1

TP07-12

CLIENT Mattamy Homes

BOREHOLE No. TP07-12

PROJECT No. 1026929

LOCATION Proposed Subdivision, Richmond, ON

DATES: BORING WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES		UNDRAINED SHEAR STRENGTH - kPa					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200
0		Test pit was not excavated										
1												
2												
3												
4												
5												
6												

Inferred Groundwater Level
 Groundwater Level Measured in Standpipe

Field Vane Test, kPa
 Remoulded Vane Test, kPa App'd _____
 Pocket Penetrometer Test, kPa Date _____

MW07-13

CLIENT Mattamy Homes

LOCATION Proposed Subdivision, Richmond, ON

DATES: BORING June 18, 2007

— WATER LEVEL

June 20, 2007

BOREHOLE No. MW07-13

PROJECT No. 1026929

DATES: BORING June 18, 2007 WATER LEVEL June 20, 2007 DATUM Local

SOIL PROFILE LOG

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				UNDRAINED SHEAR STRENGTH - kPa							
					Type	Number	Recovery (mm)	N-value or RQD	50	100	150	200				
0	99.30	Stiff, greyish brown lean CLAY (CL)			SS	1	120	8	●	●	●	●	●	●	●	●
1				▽	SS	2	75	7	●	●	●	●	●	●	●	●
2				▽	SS	3	610	6	●	●	●	△	●	●	●	●
3	96.3	Firm to stiff, grey lean CLAY		▽	SS	4	40	4	●	●	●	●	●	●	●	●
4					ST	5	610		□	□	□	□	□	□	□	□
5									□	□	□	□	□	□	□	□
6	93.2	Very loose, grey SANDY SILT (ML)			SS	6	300	1	●	●	●	●	●	●	●	●
7	92.6	End of Borehole														
8		Monitoring Well Installed														
9																
10																

Legend:

- ▽ Inferred Groundwater Level
- ▼ Groundwater Level Measured in Standpipe
- Field Vane Test, kPa
- Remoulded Vane Test, kPa
- △ Pocket Penetrometer Test, kPa
- App'd _____
- Date _____

TEST PIT RECORD

1 of 1

TP07-14

CLIENT Mattamy Homes

BOREHOLE No. TP07-14

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 16, 2007 WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200
0	99.65											
0	99.4	230 mm TOPSOIL										
0	99.3	Compact to dense, greyish brown clayey silty sand			BS	1						
0		Stiff, greyish brown lean CLAY (CL)			BS	2						
1					BS	3						
2	97.7	Firm, grey lean CLAY (CL)			BS	4						
3					BS	5						
4					BS	6						
4	95.5	End of Borehole										
5												
6												
▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa <input type="checkbox"/> Pocket Penetrometer Test, kPa	App'd _____ Date _____			

BOREHOLE RECORD

BH07-16

CLIENT Mattamy Homes

BOREHOLE No. BH07-16

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING

WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa									
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200	W _P	W	W _L		
0		Borehole was not drilled							10	20	30	40	50	60	70	80	90
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

▽ Inferred Groundwater Level

 Field Vane Test, kPa

▼ Groundwater Level Measured in Standpipe

 Remoulded Vane Test, kPa

App'd _____

 Pocket Penetrometer Test, kPa

Date _____

TEST PIT RECORD

1 of 1

TP07-17

CLIENT Mattamy Homes

BOREHOLE No. TP07-17

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 16, 2007 WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa			
					TYPE	NUMBER	RECOVERY (mm)	50	100	150	200
0	99.11										
0	98.9	200 mm TOPSOIL	▽		BS	1					
1	98.1	Very stiff, brown lean CLAY (CL)	▽		BS	2					
2	97.1	Stiff, greyish brown lean CLAY (CL)	▽		BS	3					
2	97.1	Firm, grey lean CLAY (CL)	▽		BS	4					
3			▽		BS	5					
3			▽		BS	6					
4	95.1	Dense, grey SANDY SILT (ML)	▽		BS	7					
4	94.5	End of Borehole	▽								
5											
6											
▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa			
								<input type="checkbox"/> Remoulded Vane Test, kPa	App'd		
								<input type="triangle"/> Pocket Penetrometer Test, kPa	Date		

MONITORING WELL RECORD

1 of

MW07-18

CLIENT Mattamy Homes

BOREHOLE No. MW07-18

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 14, 2007

WATER LEVEL

June 20, 2007

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa			
					TYPE	NUMBER	RECOVERY (mm)	UNDRAINED SHEAR STRENGTH - kPa			
								50	100	150	200
0	99.19	Firm to stiff, greyish brown lean CLAY (CL)			SS	1	190	7	■	○	△
1					SS	2	420	9	●	□	○
2	97.1	Firm to stiff, grey lean CLAY (CL)			SS	3	520	8	●	□	○
3					SS	4	610	7	●	□	○
4					SS	5	520	12	●	□	○
5	94.6	Loose to compact, grey SANDY SILT (ML)			SS	6	350	6	●	□	○
6	93.4	Loose, grey silty sand with gravel: TILL (SM)									
6	93.2	End of Borehole									
7		Auger Refusal on Inferred Bedrock									
8		Monitoring Well Installed									
9											
10											
▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe								■ Field Vane Test, kPa □ Remoulded Vane Test, kPa App'd _____ △ Pocket Penetrometer Test, kPa Date _____			

TEST PIT RECORD

1 of 1

TP07-19

CLIENT Mattamy Homes

BOREHOLE No. TP07-19

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 16, 2007

WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200
0	99.33											
0	99.1	200 mm TOPSOIL										
1		Stiff, greyish brown lean CLAY (CL)			BS	1						
2	97.3	Firm, grey lean CLAY (CL)			BS	2						
3					BS	3						
4	95.3	Dense, grey SANDY SILT (ML)			BS	4						
4	94.8	Dense, grey sandy silt, trace gravel, occasional cobbles: TILL (ML)			BS	5						
5	94.3	End of Borehole			BS	6						
6					BS	7						
6					BS	8						
▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa App'd _____ <input type="triangle-down"/> Pocket Penetrometer Test, kPa Date _____				

BOREHOLE RECORD

1 of 1

BH07-21

CLIENT Mattamy Homes

BOREHOLE No. BH07-21

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 15, 2007 WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200	
0	98.99				SS	1	100	13	1111	1111	1111	1111	
0	98.7	Loose brown sandy silt, some gravel, occasional cobbles: FILL	▨		SS	2	280	9	1111	1111	1111	1111	
1		Firm to stiff, greyish brown lean CLAY (CL)			SS	3	610	5	1111	1111	1111	1111	
2					ST	4	620		1111	1111	1111	1111	
3					SS	5	150		1111	1111	1111	1111	
4	95.2	Compact, grey SANDY SILT (ML)	▽		SS	6	360	12	1111	1111	1111	1111	
5	93.7	End of Borehole							1111	1111	1111	1111	
6		Auger Refusal on Inferred Bedrock							1111	1111	1111	1111	
7									1111	1111	1111	1111	
8									1111	1111	1111	1111	
9									1111	1111	1111	1111	
10									1111	1111	1111	1111	
▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa <input type="checkbox"/> Pocket Penetrometer Test, kPa	App'd _____				
								<input type="checkbox"/>	Date _____				

TEST PIT RECORD

1 of 1

TP07-22

CLIENT Mattamy Homes

LOCATION Proposed Subdivision, Richmond, ON

DATES: BORING June 15, 2007 WATER LEVEL

BOREHOLE No. TP07-22

PROJECT No. 1026929

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa			
					TYPE	NUMBER	RECOVERY (mm)	50 100 150 200			
								N-VALUE OR RQD	W _P	W	W _L
99.23											
0	99.0	200 mm TOPSOIL	▽	BS	1						
1		Stiff, greyish brown lean CLAY (CL)	▽	BS	2						
2	97.0	Dense, grey SANDY SILT (ML)	▽	BS	3						
3			▽	BS	4						
4	95.2	End of Borehole	▽	BS	5						
5			▽	BS	6						
6			▽								
▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa <input type="checkbox"/> Pocket Penetrometer Test, kPa	App'd _____		
								<input type="checkbox"/> Date _____			

TEST PIT RECORD

1 of 1

TP07-23

CLIENT Mattamy Homes

LOCATION Proposed Subdivision, Richmond, ON

DATES: BORING June 15, 2007 WATER LEVEL

BOREHOLE No. TP07-23

PROJECT No. 1026929

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200
0	99.36	200 mm TOPSOIL	▽	▽	BS	1						
	99.2	Very stiff, greyish brown lean CLAY (CL)	▽	▽	BS	2						
	1				BS	3						
	2				BS	4						
	3				BS	5						
	4				BS	6						
	5				BS	7						
	6											
	96.9	Compact to dense, grey and brown SANDY SILT (ML)	▽	▽								
	95.4	Dense, grey sandy silt, trace gravel, occasional cobbles: TILL (ML)	▽	▽								
	95.1	End of Borehole	▽	▽								
	5	Refusal on Inferred Bedrock	▽	▽								
	6		▽ Inferred Groundwater Level	▽	■ Field Vane Test, kPa							
			▼ Groundwater Level Measured in Standpipe	▼	□ Remoulded Vane Test, kPa							
					△ Pocket Penetrometer Test, kPa	App'd _____						
							Date _____					

TEST PIT RECORD

1 of 1

TP07-24

CLIENT Mattamy Homes

LOCATION Proposed Subdivision, Richmond, ON

DATES: BORING June 15, 2007 WATER LEVEL

BOREHOLE No. TP07-24

PROJECT No. 1026929

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200
									W _P	W	W _L	
0	99.94											
99.7	200 mm TOPSOIL	Very stiff to stiff, greyish brown lean CLAY (CL)	▽	BS 1								
1			▽	BS 2								
2			▽	BS 3								
97.4	Firm, grey lean CLAY (CL)		▽	BS 4								
3			▽	BS 5								
96.9	Compact to dense, grey SANDY SILT (ML)		▽	BS 6								
96.6	Dense, grey sandy silt, trace gravel, occasional cobbles: TILL (ML)		▽	BS 7								
4			▽	BS 8								
95.6	End of Borehole											
	Refusal on Inferred Bedrock											
5												
6												
▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa <input type="checkbox"/> Pocket Penetrometer Test, kPa	App'd _____			
								<input type="checkbox"/> Date _____				

TEST PIT RECORD

TP07-33

CLIENT Mattamy Homes

BOREHOLE No. TP07-33

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 15, 2007 WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa						
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200		
0	99.45	Stiff, brown lean CLAY (CL) Dense, brown SANDY SILT (ML) Dense, grey sandy silt, trace gravel, occasional cobbles: TILL (ML)		 	BS	1								
	99.3				BS	2								
	98.0				BS	3								
	96.2				BS	4								
	95.4				BS	5								
					BS	6								
					BS	7								
 														
 Field Vane Test, kPa  Remoulded Vane Test, kPa  Pocket Penetrometer Test, kPa								App'd						
								Date						

TEST PIT RECORD

1 of 1

TP07-34

CLIENT Mattamy Homes

BOREHOLE No. TP07-34

PROJECT No. 1026929

DATUM Local

LOCATION Proposed Subdivision, Richmond, ON

DATES: BORING June 15, 2007 WATER LEVEL

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES		UNDRAINED SHEAR STRENGTH - kPa					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200
0	99.56											
0	99.3	250 mm TOPSOIL			BS	1						
1	97.6	Stiff, brown lean CLAY (CL)	▽		BS	2						
2	96.3	Dense, brown to grey SANDY SILT (ML)			BS	3						
3	96.0	Dense, grey sandy silt, trace gravel, occasional cobbles: TILL (ML)			BS	4						
4		End of Borehole			BS	5						
4		Refusal on Inferred Bedrock			BS	6						
5					BS	7						
6												
▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe												
							<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa <input type="checkbox"/> Pocket Penetrometer Test, kPa					
								App'd				
								Date				

▽ Inferred Groundwater Level▼ Groundwater Level Measured in Standpipe Field Vane Test, kPa Remoulded Vane Test, kPa

App'd _____

 Pocket Penetrometer Test, kPa

Date _____

TEST PIT RECORD

TP07-36

CLIENT Mattamy Homes

BOREHOLE No. TP07-36

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 15, 2007 WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200
0	100.16				BS	1						
100.0	200 mm TOPSOIL				BS	2						
1	99.1	Stiff, brown lean CLAY (CL)	▽		BS	3						
2	97.3	Dense, brown SANDY SILT (ML)	▽		BS	4						
3		End of Borehole Refusal on Inferred Bedrock			BS	5						
4												
5												
6												
▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa <input type="checkbox"/> Pocket Penetrometer Test, kPa	App'd _____			
								<input type="checkbox"/> App'd _____ <input type="checkbox"/> Date _____				

MONITORING WELL RECORD

1 of 1

MW07-37CLIENT Mattamy HomesBOREHOLE No. MW07-37LOCATION Proposed Subdivision, Richmond, ONPROJECT No. 1026929DATES: BORING June 14, 2007

WATER LEVEL

June 20, 2007

DATUM

Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa										
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200						
0	99.62																	
0	99.5	75 mm TOPSOIL			SS	1	150	6	10	20	30	40	50	60	70	80	90	
1	98.4	Firm, greyish brown lean CLAY (CL)		▽	SS	2	300	6										
2	96.4	Compact to dense, greyish brown SANDY SILT (ML)		▽	SS	3	350	37										
3	96.2	Compact to dense, grey SANDY SILT (ML)		▽	SS	4	320	27										
3		End of Borehole			SS	5	280	50/										
4		Auger Refusal on Inferred Bedrock																
5		Monitoring Well Installed																
6																		
7																		
8																		
9																		
10																		
		▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe			<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa App'd _____ <input type="checkbox"/> Pocket Penetrometer Test, kPa Date _____													

TEST PIT RECORD

1 of 1

TP07-46

CLIENT Mattamy Homes

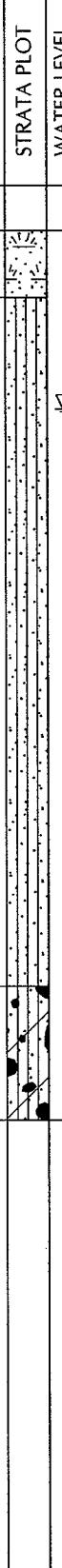
BOREHOLE No. TP07-46

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 14, 2007 WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				UNDRAINED SHEAR STRENGTH - kPa									
					TYPE	NUMBER	RECOVERY (mm)	N VALUE OR RQD	50	100	150	200						
0	100.16	300 mm TOPSOIL Compact to dense, brown to grey SANDY SILT (ML)			BS	1												
	99.9				BS	2												
	1				BS	3												
	2				BS	4												
	3				BS	5												
	96.8				BS	6												
	96.2				BS	7												
End of Borehole Refusal on Inferred Bedrock																		
 Inferred Groundwater Level  Groundwater Level Measured in Standpipe																		
<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa App'd _____ <input type="checkbox"/> Pocket Penetrometer Test, kPa Date _____																		

TEST PIT RECORD

1 of 1

TP07-47

CLIENT Mattamy Homes

BOREHOLE No. TP07-47

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 14, 2007

WATER LEVEL

June 20, 2007

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200
0	100.24											
0	100.0	200 mm TOPSOIL			BS	1						
		Stiff, brown lean CLAY (CL)			BS	2						
1	99.6	Compact to dense, brown and grey SANDY SILT (ML)			BS	3						
2					BS	4						
3					BS	5						
4					BS	6						
5	97.0	Dense, grey sandy silt, trace gravel, occasional cobbles: TILL (ML)			BS	7						
6	95.7	End of Borehole Standpipe Installed			BS	8						
6					BS	9						
Inferred Groundwater Level Groundwater Level Measured in Standpipe								<input type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa <input type="checkbox"/> Pocket Penetrometer Test, kPa	App'd _____			
								<input type="checkbox"/> App'd _____ <input type="checkbox"/> Date _____				

TEST PIT RECORD

TP07-48

CLIENT Mattamy Homes

LOCATION Proposed Subdivision, Richmond, ON

DATES: BORING June 15, 2007 WATER LEVEL

BOREHOLE No. TP07-48

PROJECT No. 1026929

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200
0	100.51											
100.4	150 mm TOPSOIL	Compact to dense, brown and grey SANDY SILT (ML)	▽	BS 1								
1			▽	BS 2								
2			▽	BS 3								
98.0		Dense, grey sandy silt, trace gravel, occasional cobbles: TILL (ML)	●	BS 4								
3			●	BS 5								
96.9		End of Borehole Refusal on Inferred Bedrock	●	BS 6								
4			●	BS 7								
5												
6												
▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa <input type="checkbox"/> Pocket Penetrometer Test, kPa	App'd _____			
								<input type="checkbox"/> App'd _____ <input type="checkbox"/> Date _____				



TEST PIT RECORD

1 of 1

TP07-49

CLIENT Mattamy Homes

BOREHOLE No. TP07-49

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 14, 2007 WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PILOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa			
					TYPE	NUMBER	RECOVERY (mm)	50	100	150	200
0	100.67										
1	100.4	230 mm TOPSOIL Compact to dense, brown and grey SANDY SILT (ML)			BS	1					
2	98.7	End of Borehole Refusal on Inferred Bedrock			BS	2					
3					BS	3					
4											
5											
6											

Inferred Groundwater Level
 Groundwater Level Measured in Standpipe

Field Vane Test, kPa
 Remoulded Vane Test, kPa App'd _____
 Pocket Penetrometer Test, kPa Date _____

TEST PIT RECORD

TP07-50

CLIENT Mattamy Homes

BOREHOLE No. TP07-50

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 14, 2007 WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa									
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200	W _P	W	W _L		
0	100.42				BS	1			10	20	30	40	50	60	70	80	90
	100.1	300 mm TOPSOIL		▽	BS	2											
		Compact to dense, brown and grey SANDY SILT (ML)		▽	BS	3											
				▽	BS	4											
				▽	BS	5											
				▽	BS	6											
				▽	BS	7											
				▽	BS	8											
96.9																	
96.6	Dense, grey sandy silt, trace gravel, occasional cobbles: TILL (ML)																
4	End of Borehole																
	Refusal on Inferred Bedrock																
5																	
6																	
▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa <input type="triangle-down"/> Pocket Penetrometer Test, kPa	App'd _____	Date _____							

TEST PIT RECORD

1 of 1

TP07-51

CLIENT Mattamy Homes

BOREHOLE No. TP07-51

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 14, 2007 WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa			
					TYPE	NUMBER	RECOVERY (mm)	50 100 150 200			
								N-VALUE OR RQD	W _P	W	W _L
0	100.34	300 mm TOPSOIL			BS	1					
1	100.0	Compact to dense, brown and grey SANDY SILT (ML)			BS	2					
2					BS	3					
3	97.5	Dense, grey SANDY SILT			BS	4					
4	96.3	End of Borehole			BS	5					
5					BS	6					
6					BS	7					

W▽ Inferred Groundwater Level
W▼ Groundwater Level Measured in Standpipe

■ Field Vane Test, kPa
 Remoulded Vane Test, kPa App'd _____
 Pocket Penetrometer Test, kPa Date _____



TEST PIT RECORD

TP07-52

CLIENT Mattamy Homes

LOCATION Proposed Subdivision, Richmond, ON

DATES: BORING June 14, 2007 WATER LEVEL

BOREHOLE No. TP07-52

PROJECT No. 1026929

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200
0	100.59	280 mm TOPSOIL			BS	1						
100.3		Compact to dense, brown and grey SANDY SILT (ML)			BS	2						
1					BS	3						
2					BS	4						
98.1		Dense, grey SANDY SILT			BS	5						
3					BS	6						
97.4		Dense, grey sandy silt, trace gravel, occasional cobbles: TILL (ML)			BS	7						
4					BS	8						
96.1		End of Borehole										
5												
6												
▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe								<input type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa <input type="checkbox"/> Pocket Penetrometer Test, kPa	App'd _____			
								<input type="checkbox"/>	Date _____			

TEST PIT RECORD

1 of 1

TP07-53

CLIENT Mattamy Homes

BOREHOLE No. TP07-53

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 15, 2007

WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa						
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200		
0	100.94	Firm, brown lean CLAY (CL) 200 mm TOPSOIL Compact to dense, brown and grey SANDY SILT (ML) Dense, grey sandy silt, trace gravel, occasional cobbles and boulders: TILL (ML)			BS	1								
	100.7				BS	2								
	99.4				BS	3								
	98.5				BS	4								
	97.4				BS	5								
					BS	6								
								<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa App'd _____ <input type="triangle"/> Pocket Penetrometer Test, kPa Date _____						
								Field Vane Test, kPa						
								Remoulded Vane Test, kPa App'd _____						
								<input type="triangle"/> Pocket Penetrometer Test, kPa Date _____						

TEST PIT RECORD

1 of 1

TP07-54

CLIENT Mattamy Homes

LOCATION Proposed Subdivision, Richmond, ON

DATES: BORING June 15, 2007 WATER LEVEL

BOREHOLE No. TP07-54

PROJECT No. 1026929

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200
0	101.37				BS	1						
101.2	200 mm TOPSOIL	Compact to dense, brown and grey SANDY SILT (ML)			BS	2						
1					BS	3						
2					BS	4						
3	98.4	Dense, grey SANDY SILT (ML)			BS	5						
4					BS	6						
5	96.9	End of Borehole			BS	7						
6												

■ Field Vane Test, kPa
□ Remoulded Vane Test, kPa App'd _____
△ Pocket Penetrometer Test, kPa Date _____

▽ Inferred Groundwater Level
▼ Groundwater Level Measured in Standpipe

TP07-55

CLIENT Mattamy Homes

LOCATION Proposed Subdivision, Richmond, ON

DATES: BORING June 14, 2007 WATER LEVEL

DATA FROM UNDRAINED SHEAR STRENGTH TESTS

TEST PIT RECORD

TP07-56

CLIENT Mattamy Homes

BOREHOLE No. TP07-56

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 14, 2007 WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa			
					TYPE	NUMBER	RECOVERY (mm)	50 100 150 200			
								N-VALUE OR RQD	W _P	W	W _L
0	101.21				BS	1					
101.0	200 mm TOPSOIL	Compact to dense, brown and grey SANDY SILT (ML)	▽	▽	BS	2					
1					BS	3					
2	99.2	Dense, grey SANDY SILT (ML)			BS	4					
3					BS	5					
98.0		Dense, grey sandy silt, trace gravel, occasional cobbles: TILL (ML)			BS	6					
97.6		End of Borehole									
4											
5											
6											
▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa <input type="checkbox"/> Pocket Penetrometer Test, kPa	App'd _____	Date _____	

TEST PIT RECORD

1 of 1

TP07-57

CLIENT Mattamy Homes

BOREHOLE No. TP07-57

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 15, 2007 WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES		UNDRAINED SHEAR STRENGTH - kPa					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200
0	102.95											
102.7	200 mm TOPSOIL	End of Borehole Refusal on Inferred Bedrock	V.L. L.S.	BS	1							
1												
2												
3												
4												
5												
6												
<input checked="" type="checkbox"/> Inferred Groundwater Level <input checked="" type="checkbox"/> Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa App'd _____ <input type="checkbox"/> Pocket Penetrometer Test, kPa Date _____				

TEST PIT RECORD

TP07-58

CLIENT Mattamy Homes
 LOCATION Proposed Subdivision, Richmond, ON
 DATES: BORING June 15, 2007 WATER LEVEL

BOREHOLE No. TP07-58
 PROJECT No. 1026929
 DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200
0	101.39											
	101.2	200 mm TOPSOIL			BS	1						
	100.9	Compact to dense, brown and grey SILTY SAND (SM)			BS	2						
	100.5	Dense, grey sandy silt, trace gravel: TILL (ML)			BS	3						
1		End of Borehole										
		Refusal on Inferred Bedrock										
2												
3												
4												
5												
6												
<input checked="" type="checkbox"/> Inferred Groundwater Level <input type="checkbox"/> Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa <input type="checkbox"/> Pocket Penetrometer Test, kPa	App'd _____			
								<input type="checkbox"/> App'd _____ <input type="checkbox"/> Date _____				



TEST PIT RECORD

1 of 1

TP07-59

CLIENT Mattamy Homes

BOREHOLE No. TP07-59

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 14, 2007 WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200	
									W _P	W	W _L		
0	101.13												
0	100.9	200 mm TOPSOIL			BS	1							
0	100.6	Compact to dense, brown SANDY SILT (ML)			BS	2							
1		End of Borehole											
1		Refusal on Inferred Bedrock											
2													
3													
4													
5													
6													
<input checked="" type="checkbox"/> Inferred Groundwater Level <input checked="" type="checkbox"/> Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa	<input type="checkbox"/> Remoulded Vane Test, kPa	App'd			
								<input checked="" type="checkbox"/> Pocket Penetrometer Test, kPa	Date				



TEST PIT RECORD

1 of 1

TP07-60

CLIENT Mattamy Homes

LOCATION Proposed Subdivision, Richmond, ON

DATES: BORING June 14, 2007 WATER LEVEL

BOREHOLE No. TP07-60

PROJECT No. 1026929

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200
0	101.36											
101.2	200 mm TOPSOIL	Compact to dense, brown and grey SANDY SILT (ML)			BS	1						
100.5		Dense, grey sandy silt, trace gravel, occasional cobbles: TILL (ML)			BS	2						
99.5					BS	3						
2	End of Borehole Refusal on Inferred Bedrock				BS	4						
3					BS	5						
4												
5												
6												
▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa <input type="checkbox"/> Pocket Penetrometer Test, kPa	App'd _____			
								<input type="checkbox"/>	Date _____			

TEST PIT RECORD

1 of 1

TP07-61

CLIENT Mattamy Homes

BOREHOLE No. TP07-61

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 15, 2007 WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200
0	102.15											
0	101.9	230 mm TOPSOIL			BS	1						
0	101.8	Compact to dense, brown SILTY SAND (SM)			BS	2						
0	101.5	Fractured Bedrock End of Borehole										
1		Refusal on Inferred Bedrock										
2												
3												
4												
5												
6												

 Field Vane Test, kPa Remoulded Vane Test, kPa App'd _____ Pocket Penetrometer Test, kPa Date _____

▽ Inferred Groundwater Level

▼ Groundwater Level Measured in Standpipe



TEST PIT RECORD

TP07-62

CLIENT Mattamy Homes

BOREHOLE No. TP07-62

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 15, 2007 WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa							
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200	W _P	W	W _L
0	101.68														
101.4	200 mm TOPSOIL				BS	1									
101.2	Compact to dense, brown and grey SANDY SILT (ML)				BS	2									
101.0	Dense, brown sandy silt, trace gravel, occasional cobbles: TILL (ML)				BS	3									
1	End of Borehole														
	Refusal on Inferred Bedrock														
2															
3															
4															
5															
6															
▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa <input type="checkbox"/> Pocket Penetrometer Test, kPa	App'd _____						
								<input type="checkbox"/>	Date _____						

TEST PIT RECORD

1 of 1

TP07-63

CLIENT Mattamy Homes

BOREHOLE No. TP07-63

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 14, 2007 WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200
0	101.44											
0	101.2	200 mm TOPSOIL	1/2	BS	1							
0	101.0	Compact to dense, brown SANDY SILT (ML) End of Borehole Refusal on Inferred Bedrock	1/2	BS	2							
1												
2												
3												
4												
5												
6												

 Inferred Groundwater Level
 Groundwater Level Measured in Standpipe

Field Vane Test, kPa
 Remoulded Vane Test, kPa App'd _____
 Pocket Penetrometer Test, kPa Date _____

TEST PIT RECORD

TP07-64

CLIENT Mattamy Homes

LOCATION Proposed Subdivision, Richmond, ON

DATES: BORING June 14, 2007 WATER LEVEL

BOREHOLE No. TP07-64

PROJECT No. 1026929

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200
0	101.32	230 mm TOPSOIL			BS	1						
101.1		Compact to dense, brown SILTY SAND (SM)			BS	2						
1	100.2	Dense, grey SILTY SAND (SM)	▽		BS	3						
2	98.9	Dense, grey sandy silt, trace gravel, occasional cobbles: TILL (SM)			BS	4						
3	97.8	End of Borehole Refusal on Inferred Bedrock			BS	5						
4					BS	6						
5												
6												
▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa App'd _____ <input type="triangle"/> Pocket Penetrometer Test, kPa Date _____				



TEST PIT RECORD

1 of 1

TP07-65

CLIENT Mattamy Homes

BOREHOLE No. TP07-65

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 15, 2007 WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa			
					TYPE	NUMBER	RECOVERY (mm)	50 100 150 200			
								N-VALUE OR RQD	W _P	W	W _L
0	100.15										
99.9	250 mm TOPSOIL	Compact to dense, brown SILTY SAND (SM)	▽	BS 1							
99.3	Dense, grey sandy silt, trace gravel, occasional cobbles: TILL (SM)		▽	BS 2							
1			▽	BS 3							
2			▽	BS 4							
3	End of Borehole Refusal on Inferred Bedrock or Boulders		▽	BS 5							
4											
5											
6											
▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe								<input type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa <input type="checkbox"/> Pocket Penetrometer Test, kPa	App'd _____ Date _____		

TEST PIT RECORD

1 of 1

TP07-66

CLIENT Mattamy Homes

LOCATION Proposed Subdivision, Richmond, ON

DATES: BORING June 14, 2007

WATER LEVEL

June 20, 2007

BOREHOLE No. TP07-66

PROJECT No. 1026929

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa			
					TYPE	NUMBER	RECOVERY (mm)	50 100 150 200			
								N-VALUE OR RQD	W _P	W	W _L
0	100.48				BS	1					
0	100.4	100 mm TOPSOIL Compact to dense, brown to grey SILTY SAND (SM)			BS	2					
1	98.9				BS	3					
2	97.0	Dense, grey sandy silt, trace gravel, occasional cobbles: TILL (SM)			BS	4					
3					BS	5					
4		End of Borehole Refusal on Inferred Boulders Standpipe Installed			BS	6					
5											
6											
Inferred Groundwater Level Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa <input type="checkbox"/> Pocket Penetrometer Test, kPa	App'd _____		
								<input type="checkbox"/> 	Date _____		

TEST PIT RECORD

1 of 1

TP07-67

CLIENT Mattamy Homes

BOREHOLE No. TP07-67

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 14, 2007 WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200
									W _P	W	W _L	
0	101.50											
0	101.3	200 mm TOPSOIL	▽	▽	BS	1						
1	100.2	Compact, brown SILTY SAND (SM)	▽	▽	BS	2						
1	99.9	Dense, grey sandy silt, trace gravel, occasional cobbles: TILL (SM)	▽	▽	BS	3						
1		End of Borehole			BS	4						
2		Refusal on Inferred Bedrock										
3												
4												
5												
6												
▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa App'd _____ <input type="triangle-down"/> Pocket Penetrometer Test, kPa Date _____				



TEST PIT RECORD

1 of 1

TP07-68

CLIENT Mattamy Homes

LOCATION Proposed Subdivision, Richmond, ON

DATES: BORING June 20, 2007 WATER LEVEL

BOREHOLE No. TP07-68

PROJECT No. 1026929

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200
0		130 mm TOPSOIL			BS	1						
		Compact, brown SILTY SAND (SM)			BS	2						
		Compact to dense, brown and grey SANDY SILT (ML)			BS	3						
1		End of Hand Auger Hole Hand Auger Refusal			BS	4						
2												
3												
4												
5												
6												
▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa <input type="checkbox"/> Pocket Penetrometer Test, kPa	App'd _____ Date _____			

TEST PIT RECORD

TP07-69

CLIENT Mattamy Homes

BOREHOLE No. TP07-69

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 20, 2007 WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa										
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200						
0		150 mm TOPSOIL Compact, brown silty sand, trace gravel, occasional cobbles: TILL			BS	1			10	20	30	40	50	60	70	80	90	
					BS	2												
1		End of Hand Auger Hole Hand Auger Refusal																
2																		
3																		
4																		
5																		
6																		
<input checked="" type="checkbox"/> Inferred Groundwater Level <input type="checkbox"/> Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa <input type="checkbox"/> Pocket Penetrometer Test, kPa	App'd _____			Date _____						

DYNAMIC PENETRATION TEST, BLOWS/0.3m

★

STANDARD PENETRATION TEST, BLOWS/0.3m

●



TEST PIT RECORD

TP07-70

CLIENT Mattamy Homes
 LOCATION Proposed Subdivision, Richmond, ON
 DATES: BORING June 20, 2007 WATER LEVEL
 BOREHOLE No. TP07-70
 PROJECT No. 1026929
 DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa										
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200						
0		30 mm TOPSOIL Compact, brown SILTY SAND (SM)							W _P	W	W _L							
1		End of Hand Auger Hole Hand Auger Refusal							10	20	30	40	50	60	70	80	90	
2																		
3																		
4																		
5																		
6																		
<input checked="" type="checkbox"/> Inferred Groundwater Level <input checked="" type="checkbox"/> Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa										
								<input type="checkbox"/> Remoulded Vane Test, kPa	App'd									
								<input type="checkbox"/> Pocket Penetrometer Test, kPa	Date									



TEST PIT RECORD

1 of 1

TP07-71

CLIENT Mattamy Homes

BOREHOLE No. TP07-71

LOCATION Proposed Subdivision, Richmond, ON

PROJECT No. 1026929

DATES: BORING June 14, 2007

WATER LEVEL

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE OR RQD	50	100	150	200
0	102.71											
102.5	230 mm TOPSOIL				BS	1						
102.1	Fractured Bedrock											
1	End of Borehole											
Refusal on Inferred Bedrock												
2												
3												
4												
5												
6												
<input checked="" type="checkbox"/> Inferred Groundwater Level <input checked="" type="checkbox"/> Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa App'd _____ <input type="checkbox"/> Pocket Penetrometer Test, kPa Date _____				



TEST PIT RECORD

1 of 1

TP07-72

CLIENT Mattamy Homes

LOCATION Proposed Subdivision, Richmond, ON

DATES: BORING June 14, 2007 WATER LEVEL June 20, 2007

BOREHOLE No. TP07-72

PROJECT No. 1026929

DATUM _____ Local

DATUM Local

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES			UNDRAINED SHEAR STRENGTH - kPa				
					Type	Number	Recovery (mm)	50	100	150	200	
0	102.44											
102.2	200 mm TOPSOIL	Dense, grey sandy silt, trace gravel, occasional cobbles: TILL (SM)	▽	▽	BS 1							
1			▽	▽	BS 2							
2			▽	▽	BS 3							
3			▽	▽	BS 4							
98.9	End of Borehole Refusal on Inferred Bedrock Standpipe Installed		▽	▽	BS 5							
4			▽	▽								
5			▽	▽								
6			▽	▽								
▽ Inferred Groundwater Level ▼ Groundwater Level Measured in Standpipe								<input checked="" type="checkbox"/> Field Vane Test, kPa <input type="checkbox"/> Remoulded Vane Test, kPa App'd _____ <input type="checkbox"/> Pocket Penetrometer Test, kPa Date _____				

∇ Inferred Groundwater Level

Δ inferred Groundwater Level
 ∇ Groundwater Level Measured in Standpipe

■ Field Vane Test kPa

Remoulded Vane Test kPa App'd

△ Pocket Penetrometer Test, kPa Date _____

APPENDIX C

Soil Grain Size Distribution Test Results



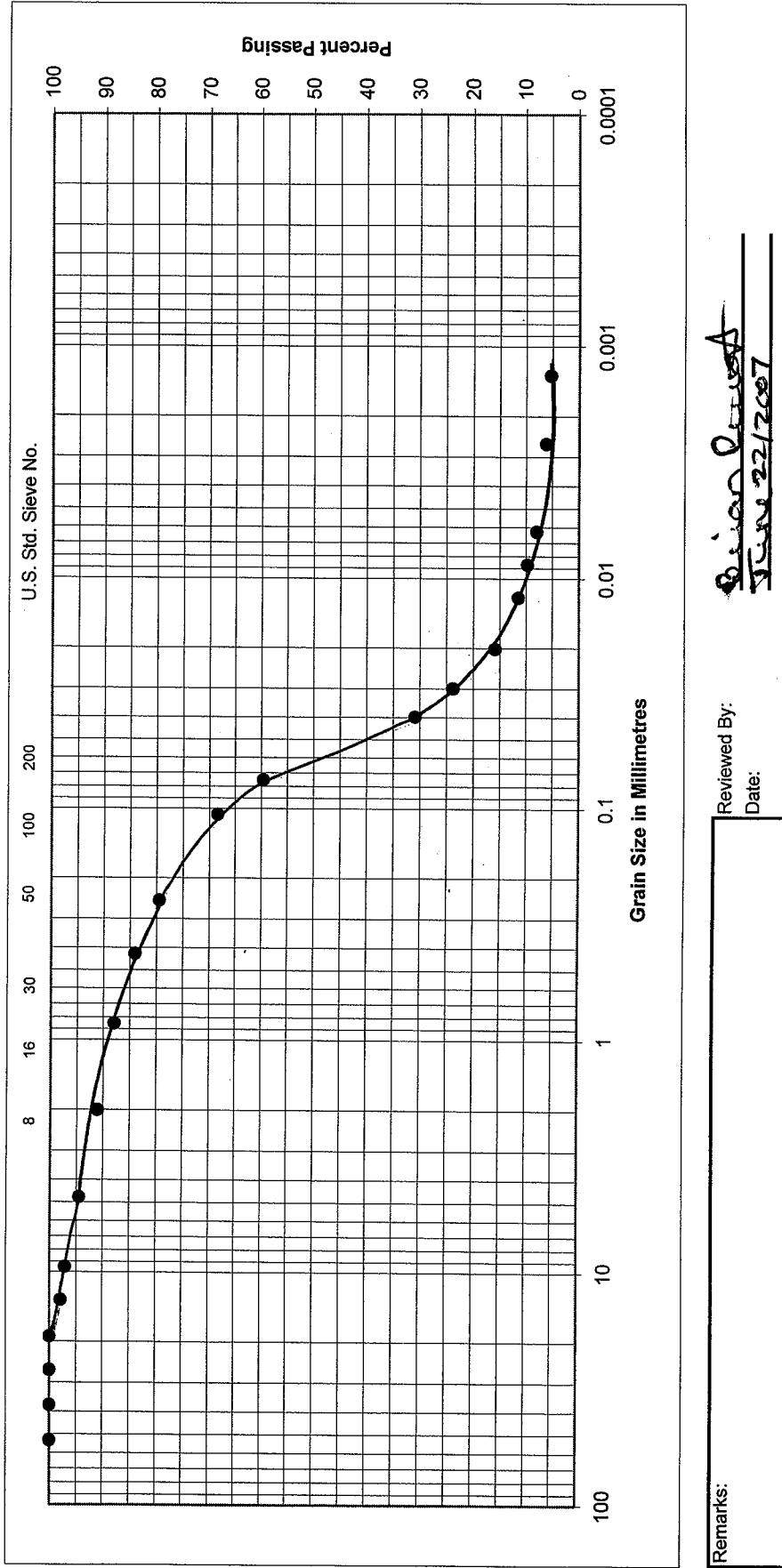


2781 Lancaster Rd.
Ottawa, Ontario K1B 1A7

Tel: 613 738-0708
Fax: 613 738-0721

Client: **Mattamy Homes** Project No.: 1026929
Project: **Mattamy Homes, Rickmond** Test Method: LS702
Material Type: N/A
Source: BH07-18, SS-6
Sampled From: 17.5' to 19.5'
Sampled By: Jeff Forrester

Hydrometer Analysis





2781 Lancaster Rd.
Ottawa ON, K1B 1A7

Wash Sieve Analysis

Client :	Mattamy Homes	Project No. :	1026929
Project :	Mattamy Homes, Richmond	Test Method :	LS 602 (ASTM C136)
Material Type :	Soils / Aggregate:		
Proposed Use :	Fill / Granulars:		
Supplier :	N/A	Sample No. :	N/A
Source :	BH07-25		
Sampled From :	SS-5, 12.5' to 14.5'		
Sampled By :	Jeff Forrester	Date Sampled :	14-Jun-07
Tested By :	Eric Naylor	Date Tested :	20-Jun-07

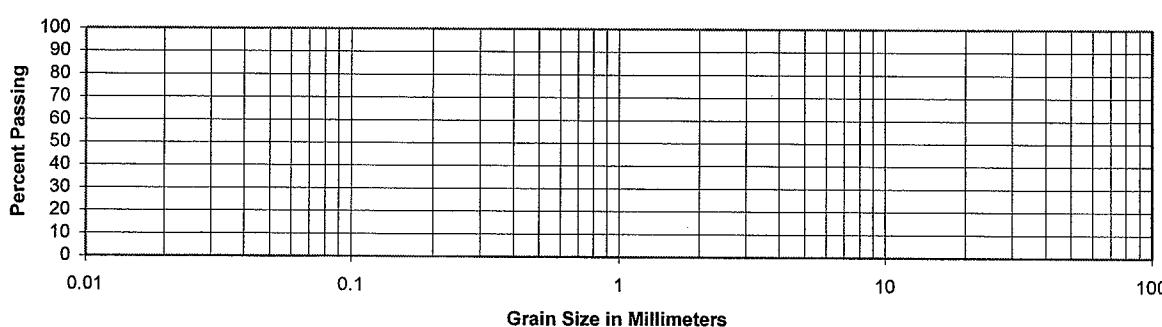
Wash Test Data

Sample Weight Before Sieve :		Sample Weight Before Wash :	266.5	
Sample Weight After Sieve :		Sample Weight After Wash :	37	Corrected
% Loss In Sieve :		% Passing No.200	86.1	N/A

Sieve Analysis

Sieve No.	Size of Opening		Wt. Retained grams	Cum Wt. Retained grams	% Passing	Specifications	
	Inches	mm				Min	Max
3	76.2						
2	53.0						
1	26.5						
3/4	19.0						
5/8	16.0						
1/2	13.2						
3/8	9.5						
+4	0.187	4.75		3.2	98.8		
		- 4.75		37.0			
8	0.0937	2.36					
16	0.0469	1.18					
30	0.234	0.600					
50	0.0117	0.300					
100	0.0059	0.150					
200	0.0029	0.075					
		Pan					

Classification of sample : % Gravel : **1.2** % Sand : **12.7** % Silt and Clay : **86.1**



Remarks :

Laboratory Supervisor : Brian Revert

Date: June 21/2007



2781 Lancaster Rd.
Ottawa ON, K1B 1A7

Wash Sieve Analysis

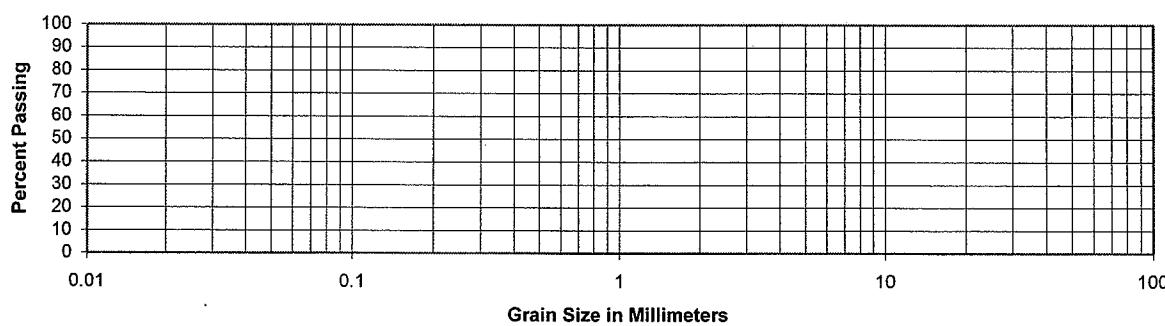
Client :	Mattamy Homes	Project No. :	1026929
Project :	Mattamy Homes, Richmond	Test Method :	LS 602 (ASTM C136)
Material Type :	Soils / Aggregate:		
Proposed Use :	Fill / Granulars:	Sample No. :	N/A
Supplier :	N/A		
Source :	BH07-28		
Sampled From :	SS-3, 5' to 7'	Date Sampled :	15-Jun-07
Sampled By :	Jeff Forrester	Date Tested :	20-Jun-07
Tested By :	Eric Naylor		

Wash Test Data

Sample Weight Before Sieve :		Sample Weight Before Wash :	325.3	
Sample Weight After Sieve :		Sample Weight After Wash :	180.6	Corrected
% Loss In Sieve :		% Passing No.200	44.5	N/A

Sieve Analysis

Sieve No.	Size of Opening		Wt. Retained grams	Cum Wt. Retained grams	% Passing	Specifications	
	Inches	mm				Min	Max
3	76.2						
2	53.0						
1	26.5						
3/4	19.0						
5/8	16.0						
1/2	13.2						
3/8	9.5						
+4	0.187	4.75		1.0	99.7		
		- 4.75		180.5			
8	0.0937	2.36					
16	0.0469	1.18					
30	0.234	0.600					
50	0.0117	0.300					
100	0.0059	0.150					
200	0.0029	0.075					
Pan							
Classification of sample :		% Gravel :	0.3	% Sand :	55.2	% Silt and Clay :	44.5



Remarks :

Laboratory Supervisor : Brian Rennert

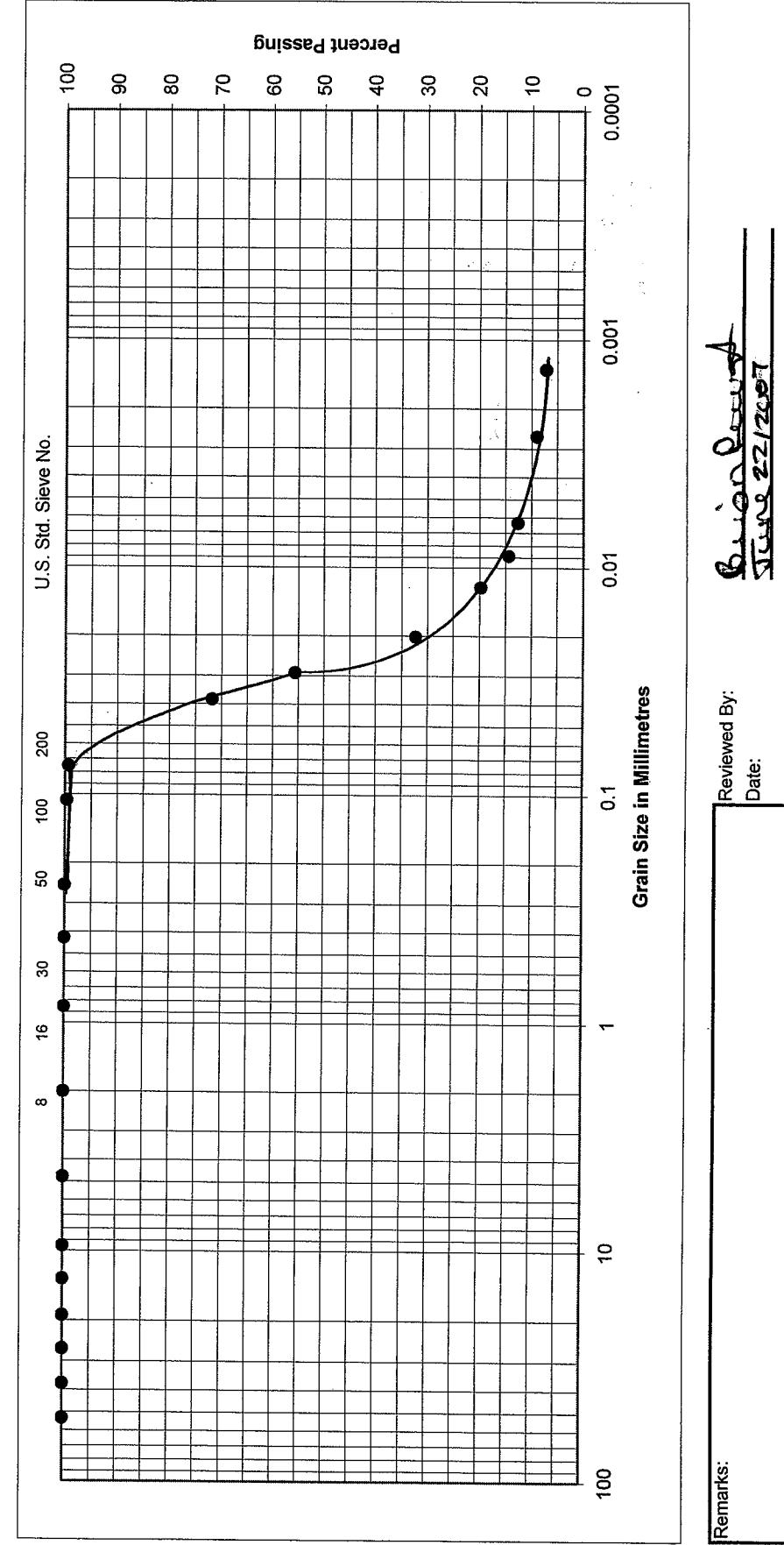
Date: June 21/2007



2781 Lancaster Rd.
Ottawa, Ontario K1B 1A7

Hydrometer Analysis

Client: **Mattamy Homes** Project No.: **1026929**
Project: **Mattamy Homes, Rickmond** Test Method: **LS702**
Material Type: **N/A**
Source: **BH07-37, SS-3** Sample No.: **N/A**
Sampled From: **5' to 7'** Date Sampled: **14-Jun-07**
Sampled By: **Jeff Forrester** Tested By: **Blaine Miller**
Date Tested: **21-Jun-07**



Remarks:

Reviewed By:
Date:

Blaine Miller
22/07/2007



2781 Lancaster Rd.
Ottawa ON, K1B 1A7

Wash Sieve Analysis

Client :	Mattamy Homes	Project No. :	1026929
Project :	Mattamy Homes, Richmond	Test Method :	LS 602 (ASTM C136)
Material Type :	Soils / Aggregate:		
Proposed Use :	Fill / Granulars:	Sample No. :	N/A
Supplier :	N/A		
Source :	TP-48		
Sampled From :	BS-3	Date Sampled :	14-Jun-07
Sampled By :	Jeff Forrester	Date Tested :	21-Jun-07
Tested By :	Eric Naylor		

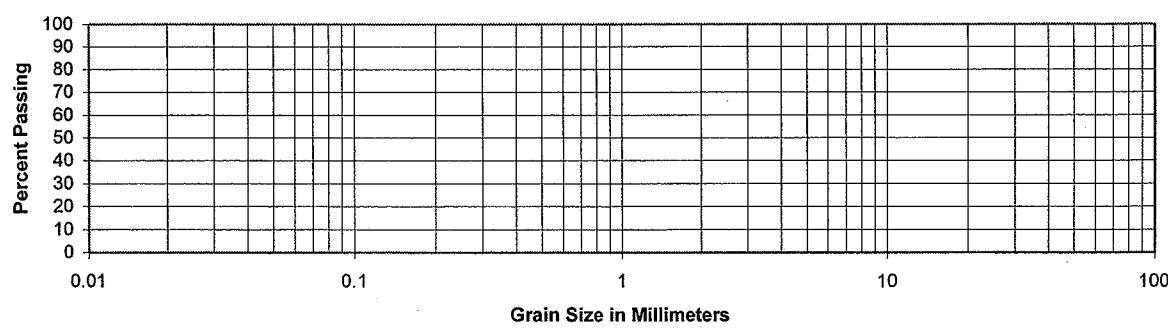
Wash Test Data

Sample Weight Before Sieve :		Sample Weight Before Wash :	254.2	
Sample Weight After Sieve :		Sample Weight After Wash :	8.3	Corrected
% Loss In Sieve :		% Passing No.200	96.7	N/A

Sieve Analysis

Sieve No.	Size of Opening		Wt. Retained grams	Cum Wt. Retained grams	% Passing	Specifications	
	Inches	mm				Min	Max
3	76.2						
2	53.0						
1	26.5						
3/4	19.0						
5/8	16.0						
1/2	13.2						
3/8	9.5						
+4	0.187		4.75	1.6	99.4		
			- 4.75	6.7			
8	0.0937		2.36				
16	0.0469		1.18				
30	0.234		0.600				
50	0.0117		0.300				
100	0.0059		0.150				
200	0.0029		0.075				
	Pan						

Classification of sample : % Gravel : **0.6** % Sand : **2.6** % Silt and Clay : **96.7**



Remarks :

Laboratory Supervisor : Brian Reuter

Date: June 22/2007



2781 Lancaster Rd.
Ottawa ON, K1B 1A7

Wash Sieve Analysis

Client :	Mattamy Homes	Project No. :	1026929
Project :	Mattamy Homes, Richmond	Test Method :	LS 602 (ASTM C136)
Material Type :	Soils / Aggregate:		
Proposed Use :	Fill / Granulars:	Sample No. :	N/A
Supplier :	N/A		
Source :	TP-48	Date Sampled :	14-Jun-07
Sampled From :	BS-7	Date Tested :	20-Jun-07
Sampled By :	Jeff Forrester		
Tested By :	Eric Naylor		

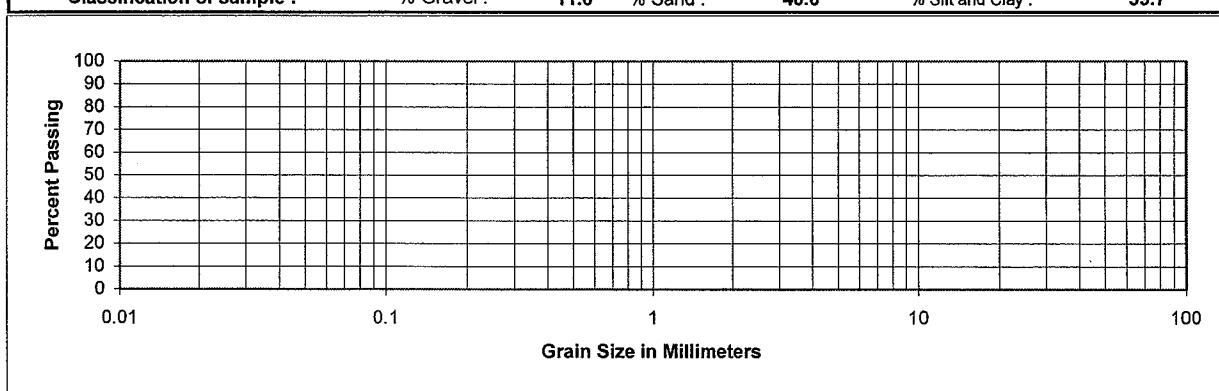
Wash Test Data

Sample Weight Before Sieve :		Sample Weight Before Wash :	385	
Sample Weight After Sieve :		Sample Weight After Wash :	232	Corrected
% Loss In Sieve :		% Passing No.200	39.7	N/A

Sieve Analysis

Sieve No.	Size of Opening		Wt. Retained grams	Cum Wt. Retained grams	% Passing	Specifications	
	Inches	mm				Min	Max
	3	76.2					
	2	53.0					
	1	26.5					
	3/4	19.0					
	5/8	16.0					
	1/2	13.2					
	3/8	9.5					
+4	0.187	4.75		44.7	88.4		
		- 4.75		231.9			
8	0.0937	2.36					
16	0.0469	1.18					
30	0.234	0.600					
50	0.0117	0.300					
100	0.0059	0.150					
200	0.0029	0.075					
		Pan					

Classification of sample : % Gravel : 11.6 % Sand : 48.6 % Silt and Clay : 39.7



Remarks :

Laboratory Supervisor : Brian Forrester

Date: June 21/2007



2781 Lancaster Rd.
Ottawa ON, K1B 1A7

Wash Sieve Analysis

Client :	Mattamy Homes	Project No. :	1026929
Project :	Mattamy Homes, Richmond	Test Method :	LS 602 (ASTM C136)
Material Type :	Soils / Aggregate:		
Proposed Use :	Fill / Granulars:	Sample No. :	N/A
Supplier :	N/A		
Source :	TP-54	Date Sampled :	14-Jun-07
Sampled From :	BS-3	Date Tested :	21-Jun-07
Sampled By :	Jeff Forrester		
Tested By :	Eric Naylor		

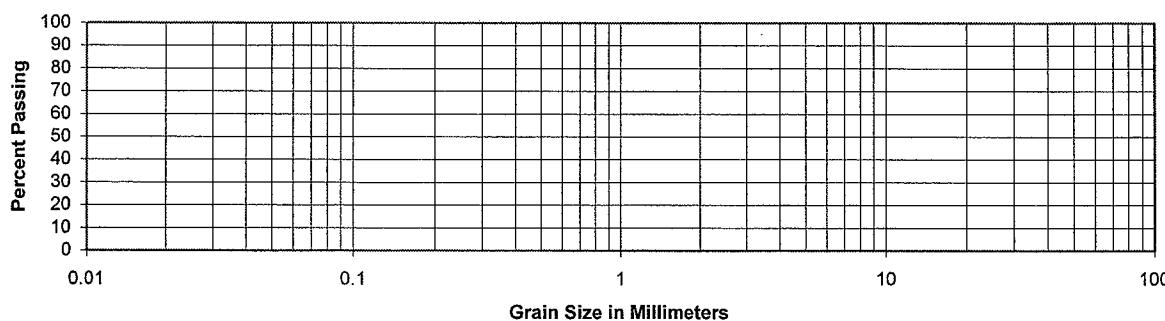
Wash Test Data

Sample Weight Before Sieve :		Sample Weight Before Wash :	259.3	
Sample Weight After Sieve :		Sample Weight After Wash :	9.5	Corrected
% Loss In Sieve :		% Passing No.200	96.3	N/A

Sieve Analysis

Sieve No.	Size of Opening		Wt. Retained grams	Cum Wt. Retained grams	% Passing	Specifications	
	Inches	mm				Min	Max
	3	76.2					
	2	53.0					
	1	26.5					
	3/4	19.0					
	5/8	16.0					
	1/2	13.2					
	3/8	9.5					
+4	0.187	4.75		0.0	100.0		
		- 4.75					
8	0.0937	2.36					
16	0.0469	1.18					
30	0.234	0.600					
50	0.0117	0.300					
100	0.0059	0.150					
200	0.0029	0.075					
	Pan						

Classification of sample : % Gravel : **0.0** % Sand : **3.7** % Silt and Clay : **96.3**



Remarks :

Laboratory Supervisor : Brian Reiter

Date: June 21/2007



2781 Lancaster Rd.
Ottawa ON, K1B 1A7

Wash Sieve Analysis

Client :	Mattamy Homes	Project No. :	1026929
Project :	Mattamy Homes, Richmond	Test Method :	LS 602 (ASTM C136)
Material Type :	Soils / Aggregate:		
Proposed Use :	Fill / Granulars:	Sample No. :	N/A
Supplier :	N/A		
Source :	TP-66		
Sampled From :	SS-4		
Sampled By :	Jeff Forrester	Date Sampled :	14-Jun-07
Tested By :	Eric Naylor	Date Tested :	20-Jun-07

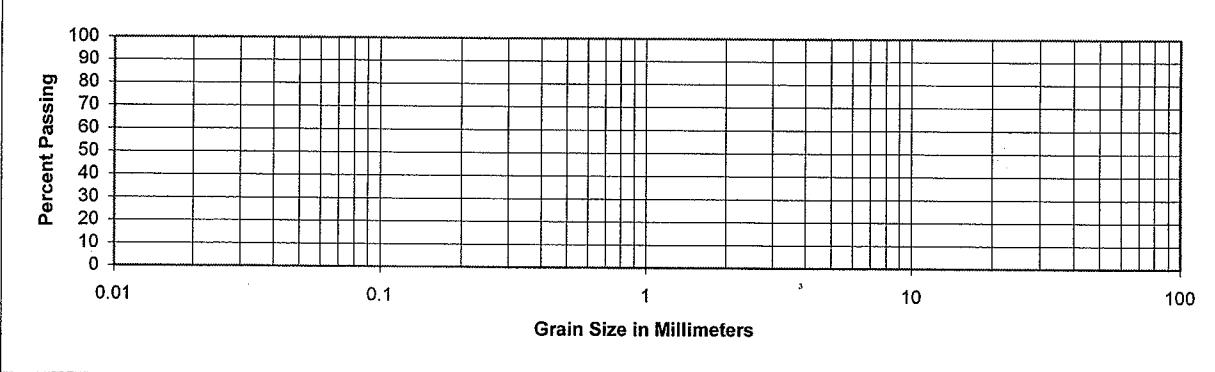
Wash Test Data

Sample Weight Before Sieve :		Sample Weight Before Wash :	2163.8	
Sample Weight After Sieve :		Sample Weight After Wash :	1424.5	Corrected
% Loss In Sieve :		% Passing No.200	34.2	N/A

Sieve Analysis

Sieve No.	Size of Opening		Wt. Retained grams	Cum Wt. Retained grams	% Passing	Specifications	
	Inches	mm				Min	Max
3	76.2						
2	53.0						
1	26.5						
3/4	19.0						
5/8	16.0						
1/2	13.2						
3/8	9.5						
+4	0.187	4.75		392.4	81.9		
		- 4.75		1424.3			
8	0.0937	2.36					
16	0.0469	1.18					
30	0.234	0.600					
50	0.0117	0.300					
100	0.0059	0.150					
200	0.0029	0.075					
		Pan					

Classification of sample : % Gravel : **18.1** % Sand : **47.7** % Silt and Clay : **34.2**



Remarks :

Laboratory Supervisor : R. Ian Reid

Date: June 21 2007



2781 Lancaster Rd.
Ottawa ON, K1B 1A7

Wash Sieve Analysis

Client :	Mattamy Homes	Project No. :	1026929
Project :	Mattamy Homes, Richmond	Test Method :	LS 602 (ASTM C136)
Material Type :	Soils / Aggregate:		
Proposed Use :	Fill / Granulars:	Sample No. :	N/A
Supplier :	N/A		
Source :	TP-75		
Sampled From :	SS-4		
Sampled By :	Jeff Forrester	Date Sampled :	14-Jun-07
Tested By :	Eric Naylor	Date Tested :	20-Jun-07

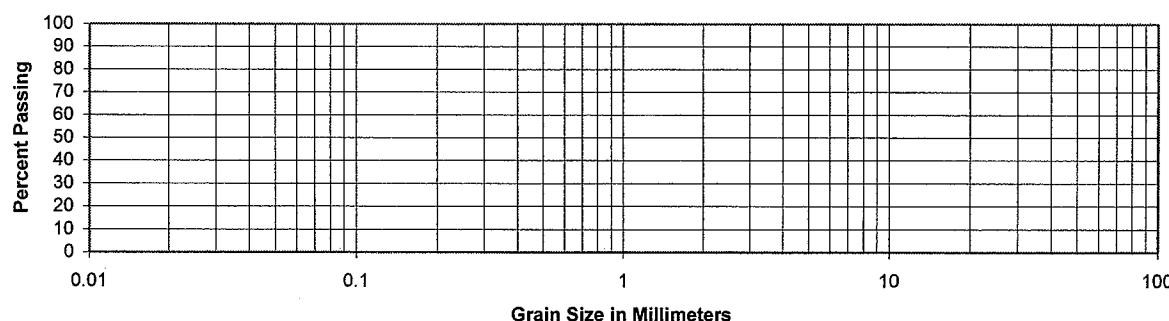
Wash Test Data

Sample Weight Before Sieve :		Sample Weight Before Wash :	2454.1	
Sample Weight After Sieve :		Sample Weight After Wash :	1688.2	Corrected
% Loss In Sieve :		% Passing No.200	31.2	N/A

Sieve Analysis

Sieve No.	Size of Opening		Wt. Retained grams	Cum Wt. Retained grams	% Passing	Specifications	
	Inches	mm				Min	Max
	3	76.2					
	2	53.0					
	1	26.5					
	3/4	19.0					
	5/8	16.0					
	1/2	13.2					
	3/8	9.5					
+4	0.187	4.75		669.2	72.7		
			- 4.75		1688.1		
8	0.0937	2.36					
16	0.0469	1.18					
30	0.234	0.600					
50	0.0117	0.300					
100	0.0059	0.150					
200	0.0029	0.075					
		Pan					

Classification of sample : % Gravel : **27.3** % Sand : **41.5** % Silt and Clay : **31.2**



Remarks :

Laboratory Supervisor : Brian R. Scott

Date: June 21/2007

APPENDIX D

Symbols and Terms Used on the SCPTu Records
SCPTu Probe Records



Terminology Used on SCPTu Records

Key Terminology and Principles

SCPTu:

- Seismic Piezocone (SCPTu);
- A piezocone (CPTu) is an enhanced cone penetration test (CPT) probe that is able to measure porewater pressure (u);
- A seismic piezocone (SCPTu) is further enhanced to measure surface generated compression and shear waves at depth; used to define the shear wave velocity of soils.

Equipment Type and Governing Standard:

- 10 cm^2 seismic piezocone;
- 150 cm^2 friction sleeve;
- manufactured by Applied Research Associates, Inc.;
- ASTM Specification D3441.

PCPT Investigation Objectives:

- evaluate soil type and soil stratigraphy;
- estimate the relative density of granular soils and in situ undrained shear strength of cohesive soils.

Soil Behaviour Type (SBT):

- The SBT is selected based on a soil's response to cone penetration, which is different from an explicit soil type defined by specified laboratory testing procedures, but is normally what the geotechnical engineer requires for design purposes.
- The SBT can be classified on the basis of the soil friction ratio, f_s ; ratio between the side shear on the friction sleeve and cone tip resistance.
- The SBT can also be classified on the basis of the normalized pore pressure, Bq ; a function of the pore water response and the cone tip resistance.
- The "CPT Soil Behaviour Type Legend" used for this project is attached.

Canadian Foundation Engineering Manual (3rd Edition) Statement on the CPT

- "The most significant advantage that the electric cone penetrometers offer is their repeatability and accuracy."
- "One of the most important applications of the cone penetration test is to accurately determine the soil profile."

Key References:

T. Lunne, P.K. Robertson, and J.J.M. Powell (1997). "Cone Penetration Testing in Geotechnical Practice"; Spon Press.

P.W. Mayne (1986). "CPT indexing of in situ OCR in Clays"; Proceedings of the ASCE Specialty Conference In Situ '86: Use of In Situ Tests in Geotechnical Engineering, Blacksburg, 780-93, ASCE.

P.K. Robertson and R.G. Campanella (1988). "Guidelines for geotechnical design using CPT and CPTU"; University of British Columbia, Vancouver, Department of Civil Engineering, Soil Mechanics Series 120.

Terminology and Key Engineering Relationships

Parameter	Description	Symbol/Equation	Reference
Depth	Depth of the centroid of the sensor		
Elevation	Elevation of centroid of the sensor	Ground Surface – Depth	
Sleeve Stress	Sleeve Stress – interpolated to the depth of the tip	f_s	
Tip Stress, Uncorrected	Measured Tip Stress	q_c	
Tip Stress COR	Tip Stress, corrected for probe geometry	$q_t = q_c + u_2 x(1-a)$	
Ratio COR	Friction Ratio	$R_f = \frac{f_s}{q_t} \times 100\%$	
Pore Pressure	Measured Pore Pressure	u_2	
Soil Behaviour Type	Soil Behaviour Type	<i>SBT</i>	Lunne, Roberson and Powell, 1997
Overburden Stress		$\sigma_{vo} = \sum_{i=1}^n \gamma_i x h_i$	
Effective Overburden Stress		$\sigma'_{vo} = \sigma_{vo} - u_o$	
Normalized Tip Stress		$Q_t = \frac{q_t - \sigma_{vo}}{\sigma'_{vo}}$	Lunne, Robertson and Powell, 1997
Normalized Friction Ratio		$F_r = \frac{f_s}{q_t - \sigma_{vo}}$	Lunne, Robertson and Powell, 1997
Normalized Pore Pressure		$B_q = \frac{\Delta u}{q_t - \sigma_{vo}}$ where $\Delta u = u_2 - u_0$	Lunne, Robertson and Powell, 1997

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Tools\Terminology

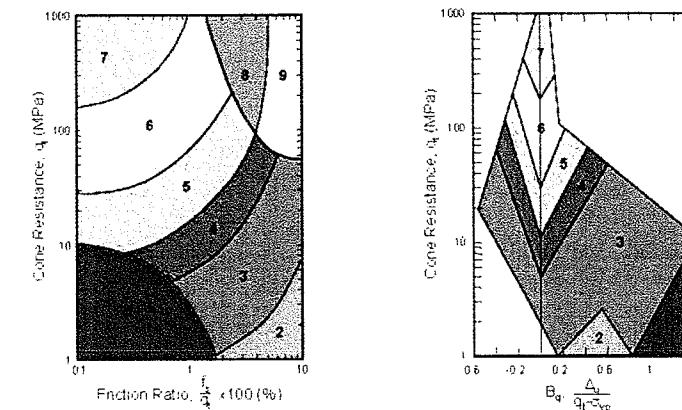
Used

on

SCPTu

Records.doc

CPT Soil Behavior Type Legend (Robertson et al. 1990)



Zone Soil Behavior Type

- 1 Sensitive, Fine Grained
- 2 Organic Soils-Peats
- 3 Clays; Clay to Silty Clay
- 4 Silt Mixtures; Clayey Silt to Silty Clay
- 5 Sand Mixtures; Silty Sand to Sandy Silt
- 6 Sands; Clean Sands to Silty Sands
- 7 Gravelly Sand to Sand
- 8 Very Stiff Sand to Clayey Sand*
- 9 Very Stiff Fine Grained*

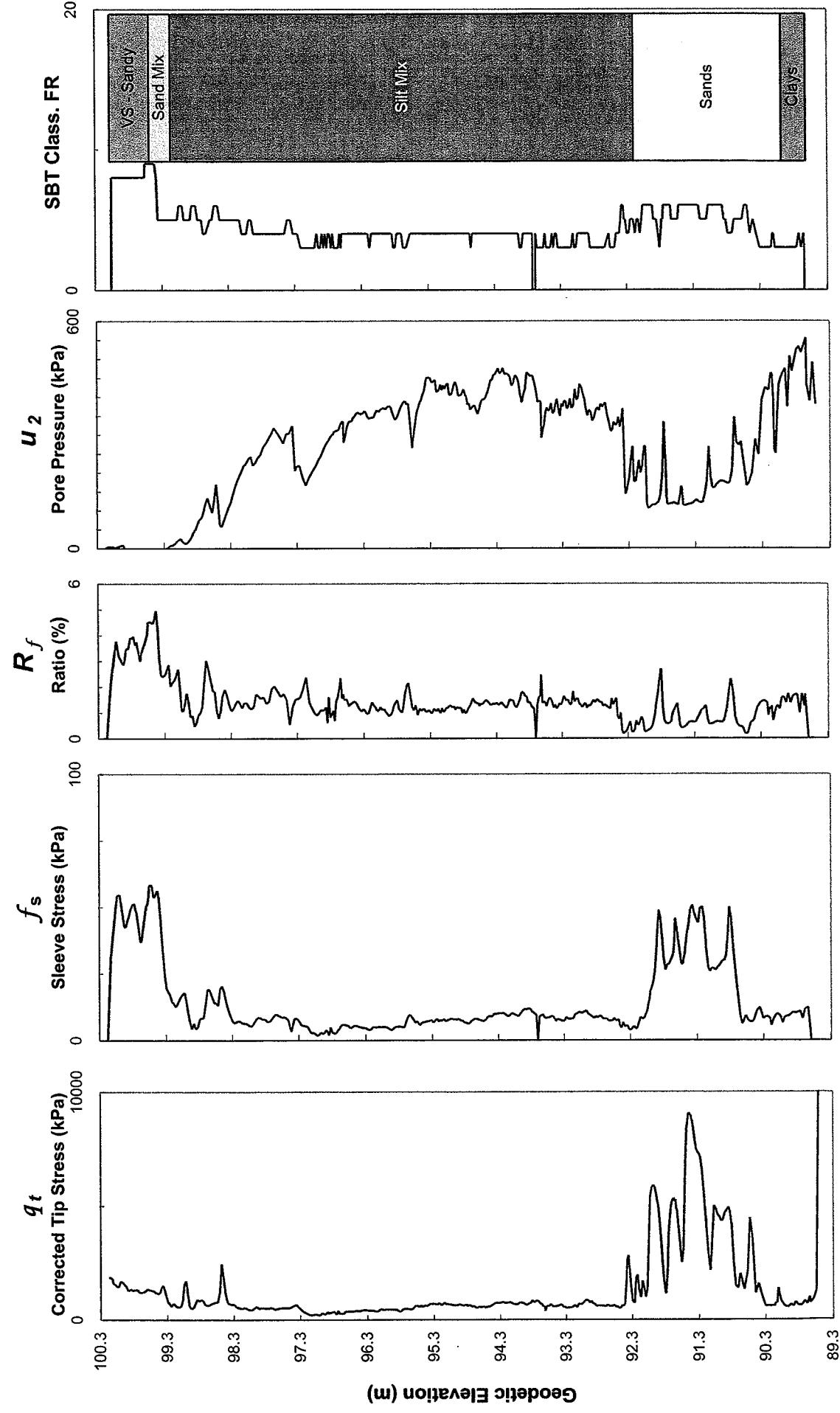
*Overconsolidated or Cemented



Jacques Whitford

Jacques
Whitford

SCPTu Start Elevation:	100.23 m	Test Date: June 15, 2007
Groundwater Elevation:	98.98 m	Project No. 1026929
Client: Mattamy Homes	Project: Proposed Residential Subdivision, Richmond, ON	

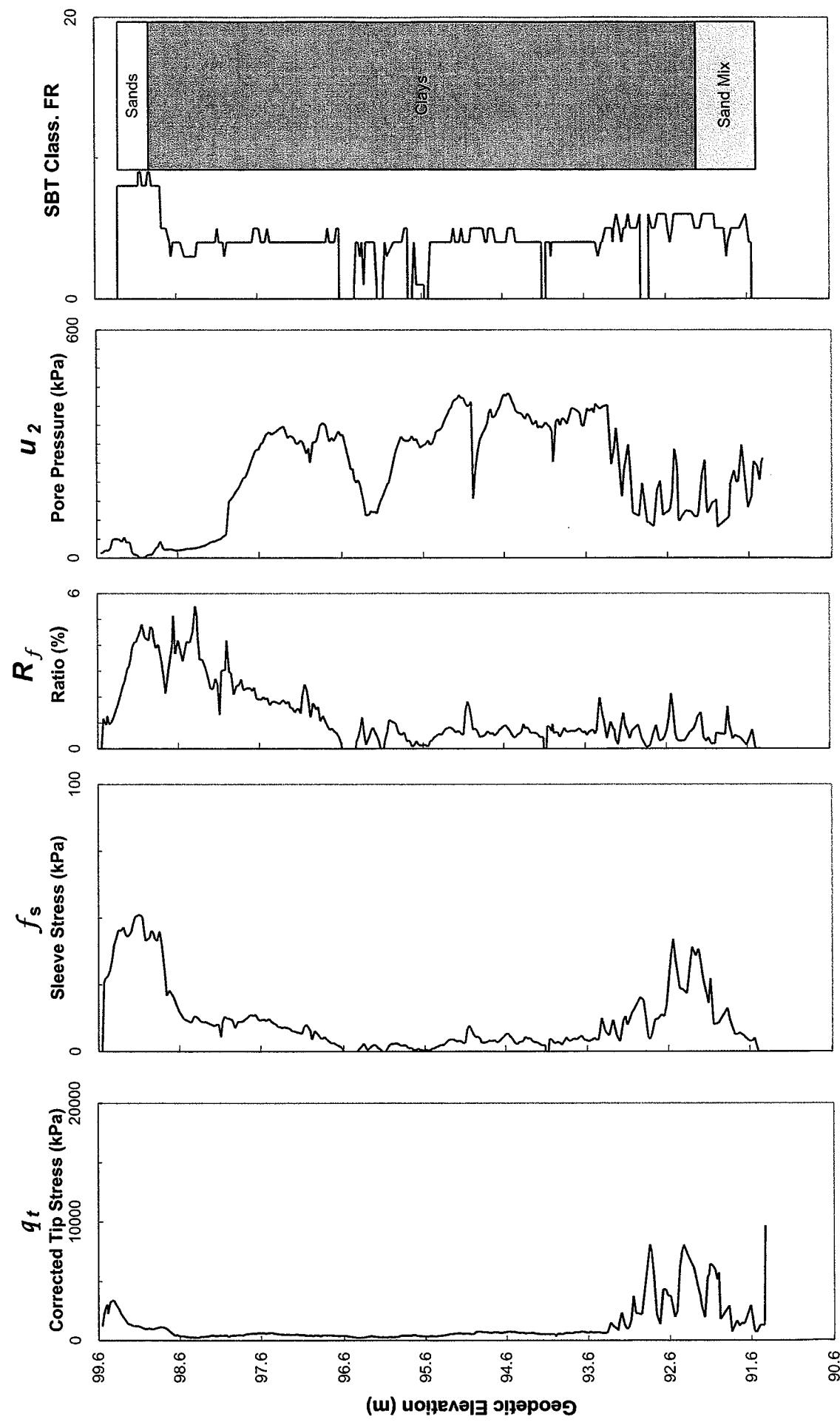


Class FR: Friction Ratio Classification (Robertson, 1990)

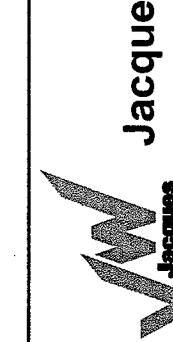
Jacques Whitford

**Jacques
Whitford**

SCPTu Start Elevation: Groundwater Elevation: Client: Mattamy Homes Project: Proposed Residential Subdivision, Richmond, ON	Elevation: 99.60 m 99.60 m 98.51 m	Test Date: June 18, 2007 Project No. 1026929	CPT 07-9
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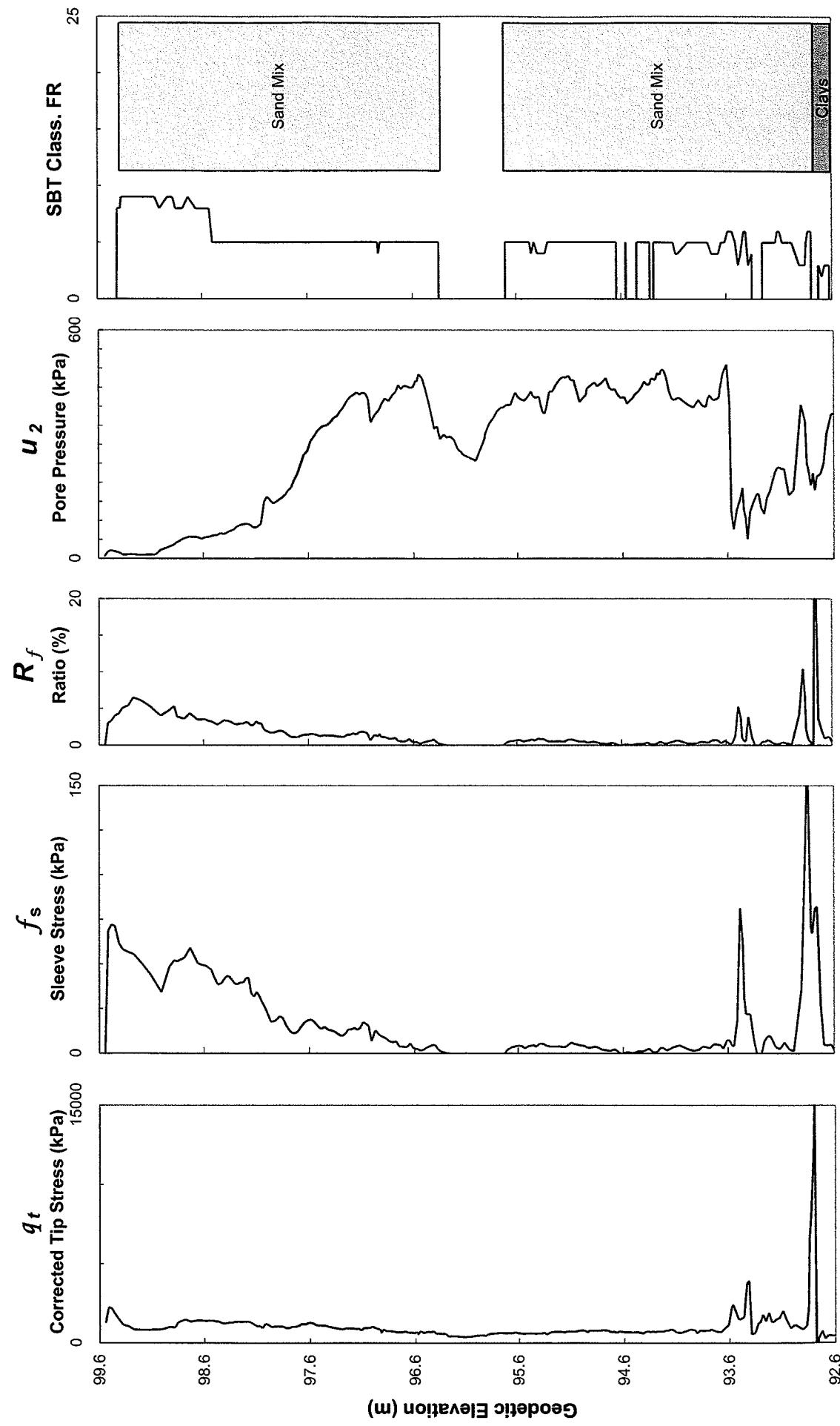
Class FR: Friction Ratio Classification (Robertson, 1990)



Jacques Whitford

Jacques
Whitford

Jacques Whitford	Elevation: SCPTu Start Elevation: Groundwater Elevation:	Test Date: June 18, 2007 Project No. 1026929	CPT 07-15
	Client: Mattamy Homes		
	Project: Proposed Residential Subdivision, Richmond, ON		

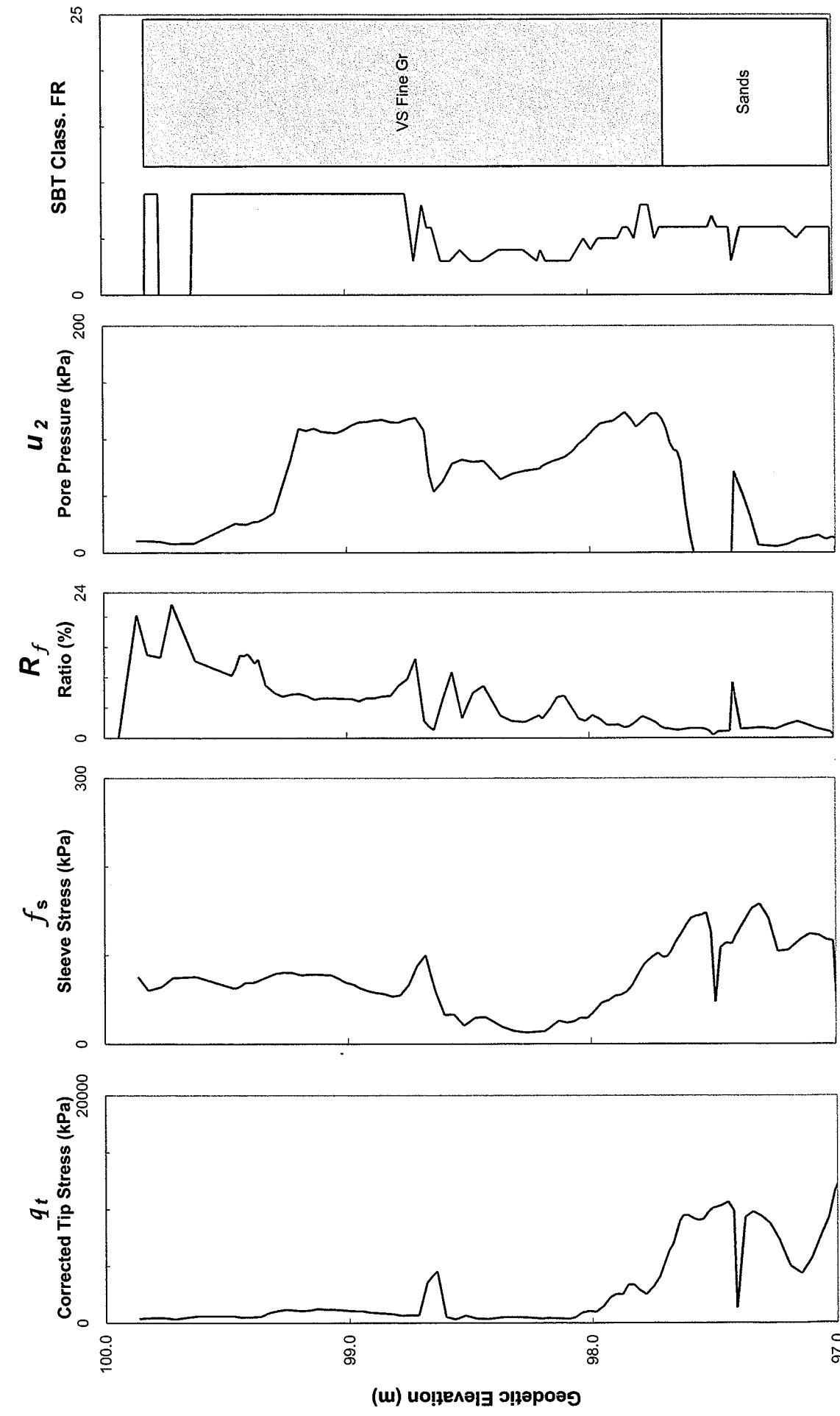


Class FR: Friction Ratio Classification (Robertson, 1990)



Jacques Whitford

SCPTu Start Elevation: Groundwater Elevation:	99.94 m 98.62 m	Test Date: June 15, 2007 Project No. 1026929	CPT 07-20
Client: Mattamy Homes			Project: Proposed Residential Subdivision, Richmond, ON



Class FR: Friction Ratio Classification (Robertson, 1990)



Jacques Whitford

Elevation: 99.64 m
SCPTu Start Elevation:
Groundwater Elevation:
Project: Proposed Residential Subdivision, Richmond, ON

Test Date: June 15, 2007
Project No. 1026929
CPT 07-35

