Peto MacCallum Ltd.
CONSULTING ENGINEERS

GEOTECHNICAL INVESTIGATION
KEEPER'S COVE RESIDENTIAL DEVELOPMENT
SUNSET BLVD AND 39th SIDE ROAD
TOWN OF THE BLUE MOUNTAINS, ONTARIO

FOR

THE VILLAGE OF KEEPER'S COVE

PETO MacCALLUM LTD.
19 CHURCHILL DRIVE
BARRIE, ONTARIO
L4N 8Z5
PHONE: (705) 734-3900
FAX: (705) 734-9911
EMAIL: barrie@petomaccallum.com

Distribution:
1 cc: The Village of Keeper's Cove
1 cc: Henderson Paddon & Associates Limited (+ email)
1 cc: PML Barrie
1 cc: PML Toronto

PML Ref.: 05BF007
Report: 1
April, 2005

Peto MacCallum Ltd.
CONSULTING ENGINEERS

April 12, 2005

PML Ref.: 05BF007
Report: 1

Ms. Jill Kitchen
The Village of Keeper's Cove
256 Sunset Blvd.
Town of the Blue Mountains, Ontario
N0H 2E0

Dear Ms. Kitchen

Geotechnical Investigation
Keeper's Cove Residential Development
Sunset Blvd. and 39th Side Road
Town of The Blue Mountains, Ontario

We are pleased to present the results of the geotechnical investigation recently completed in connection with the noted project. The work described in the report was authorized by Ms. Jill Kitchen in the signed Engineering Services Agreement, PML Ref.: 05BF007, dated February 10, 2005, and confirmed by retainer.

The subject property is located on the south side of the intersection of Sunset Blvd. and 39th Sideroad in The Town of The Blue Mountains, Ontario. Development of the site for a 212 lot residential subdivision is proposed. The development will be fully serviced, and include some 2.3 km of roadway and a storm water management pond.

The purpose of this assignment was to assess the general soil and groundwater conditions at the site, and based on this information, to provide comments and geotechnical engineering recommendations pertinent to the planning and design of earthworks operations, underground services, road pavement, storm water management pond and house foundations.

Investigation Procedures

The field work for the investigation was carried out on March 16, 2005 and comprised fourteen test pits excavated to depths of 1.7 to 3.5 m below existing grade as illustrated on Drawing 1, appended.

19 Churchill Drive, Barrie, Ontario L4N 8Z5
Tel: (705) 734-3900 Fax: (705) 734-9911
E-mail: barrie@petomaccallum.com
BARRIE, BRAMPTON, HAMILTON, KITCHENER, TORONTO

The location and ground surface elevation at each test pit were established in the field by Henderson Paddon & Associates Limited.

The test pits were excavated by a local contractor working under the full time supervision of a member of our engineering staff who logged the exposed soil and groundwater conditions. Representative soil samples were returned to our laboratory for detailed examination to confirm field identification.

Grain size analyses (Figures 1 and 2) and Atterberg Limit Tests (Table 1) were carried out on two representative soil samples obtained from the vicinity of the proposed storm water management pond.

Site Description

The subject property is located on the south side of the intersection of Sunset Blvd and 39th Side Road in The Town of The Blue Mountains, about 100 m south of the Georgian Bay shoreline. A portion of the site is currently occupied by a mobile home community. The remainder of the property is covered by a mix of open fields and sparse to dense brush.

The ground surface within the proposed development area is relatively flat, ranging from about elevation 192 along the southwest side, and gradually dropping towards Georgian Bay, to elevation 182 at the north end of the property.

The southwest boundary of the site is coincident with the toe of a 7 to 9 m high abandoned shore bluff feature that formed along the edge of glacial Lake Nipissing. Wave action within this former lake eroded and washed away the relatively light finer material and left behind a lag deposit of heavier cobbles and boulders on the ground surface below the bluff.

Based on Quaternary Geology maps for the area, the surficial overburden materials comprise sandy silt till characterized by low relief, and undulating surface which has been subdued by lake water erosion.

Paleozioc Geology maps for the area indicate bedrock at the site comprises greyish brown and black shale of the Whitby Formation, or grey-green/grey-blue interbedded shale, siltstone and limestone of the Georgian Bay Formation, deposited during Ordovician Geolgic time. Local water well records indicate the bedrock occurs at depths of 20 to 35 m.

Summarized Subsurface Conditions

Reference is made to the appended Log of Test Pit sheets for details of the subsurface conditions, including soil classifications, inferred stratigraphy, and groundwater observations.

The stratigraphy revealed in the test pits typically comprised surficial topsoil and/or fill over discontinuous deposits of silt or clay underlain by a major glacial till stratum. Deposits of layered silt and clay were encountered locally beneath the till at the north end of the site. An isolated sand unit was contacted locally to the depth of exploration. The distribution and characteristics of the various units and groundwater observations are as follows:

Fill

Fill, or fill with a thin topsoil mantle, was encountered surficially to depths of 0.2 to 1.4 m (typically 0.3 to 0.8 m) at test pits 1 to 6, 9 and 13 located in/adjacent to the existing developed area at the east end of the site. The fill typically comprised brown to dark brown silt with trace to some clay, and trace sand ranging to sandy silt or silty sand with trace gravel and occasional boulders. The fill contained pieces of concrete or debris at test pits 2, 3 and 6. Sand and gravel associated with an existing driveway was encountered at test pit 5.

Topsoil

A 150 to 600 mm (typically 200 to 500 mm) thick layer of topsoil was encountered beneath the fill at test pits 1, 4, 5 and 9, surficially at test pits 7, 8, 10 to 12 and 14. Topsoil was also encountered as a thin mantle above the fill at test pits 1 to 3, 6 and 9. The material was variable, ranging from dark brown to black sandy silt to gravelly sand with numerous cobbles.

Sand

An isolated deposit of sand was contacted at test pit 11, extending from below the topsoil to the full depth of exploration at 3.0 m depth. The material comprised brown fine sand with trace gravel and trace silt and contained occasional cobbles and boulders. The sand was moist and considered compact.

Upper Silt and Clay

Discontinuous deposits of silt and/or clay were encountered beneath the fill or topsoil at test pits 2, 9, and 12 to depths of 1.0 to 1.9 m. The material was somewhat variable, ranging from sandy silt with trace gravel to silty clay with shale fragments. The clay was considered to be stiff with moisture contents about the plastic limit. Locally the clay was varved.

Silt Till

A silt till stratum was encountered beneath the surficial fill/topsoil and/or discontinuous upper clay deposits at each of the test pit locations with the exception of test pit 11. The unit was fully penetrated at depths of 1.6 to 3.0 m at test pits 1, 4 to 7, and 13, and was encountered to termination at depths of 1.9 to 2.9 m at test pits 2, 3, 8 to 12 and 14. The till typically comprised brown to grey silt with variable sand content, trace to some clay, trace gravel, and occasional cobbles and boulders. The particle size distribution of a sample of the till matrix is illustrated on Figure 1, appended. The Atterberg limits of the sample are summarized on Table 1 and indicate the liquid and plastic limits of the material are 21 and 13, respectively, with a corresponding plasticity index of 8. The material was generally dense (locally compact at test pit 7) and was moist.

Lower Silt and Clay

A lower deposit of layered silt and/or clay was contacted beneath the till at depths of 1.6 to 2.3 m to termination at depths of 2.8 to 3.5 m at test pits 1, 4, 5, and 13 located near the north end of the site. The material was generally grey, occasionally with brown layers and typically comprised silt

with trace sand inter layered with clayey silt to silty clay. The particle size distribution of a representative sample of the material is presented on Figure 2 appended. The liquid and plastic limits were 26 and 18 respectively with a corresponding plasticity index of 8. The material was generally described as dense and moist (locally stiff and drier than the plastic limit).

Groundwater

No free water or wet zones were observed within the 3.5 m maximum depth of exploration at any of the test pit locations.

Groundwater levels will be subject to seasonal fluctuations.

Engineering Considerations

General

The site terrain is relatively flat, with an overall slope down to the north or northeast from about elevation 192 along the toe of the abandoned shore bluff in the southwest to about elevation 182 at the north end of the site. The site design was not finalized at the time of this report, however, for preliminary planning purposes, only minor site grading is anticipated. Sewer inverts are expected to be maximum 3 m depth and the storm water management pond will be about 2 m deep. Pier foundations are being considered to support buildings at the south end of the site.

Within the 1.7 to 3.5 m depth of exploration, the test pits have revealed surficial topsoil and/or fill over discontinuous deposits of silt or clay underlain by a major glacial till stratum. Deposits of layered silt and clay were encountered locally beneath the till unit at the north end of the site. An isolated sand deposit was contacted locally to the depth of exploration at the south end of the site.

No seepage or free water was encountered in the test pits, indicating the regional groundwater table was below the depth of exploration at the time of the field work.

The soils are relatively competent and capable of supporting utilities and residential dwellings. Geotechnical recommendations pertaining to various servicing and development issues are discussed in the following sections of the report.

Site Grading

It is understood site grading will be minimal. Where necessary, excavated site soils may be used for filling purposes subject to moisture content at the time of placement. The degree of compactibility will be largely subject to weather conditions. In this regard, earthworks should be scheduled for relatively dry summer months when the materials can be expected to dry out somewhat.

In general, final cut and fill slopes should be graded at 2 horizontal to 1 vertical (H:V) or flatter.

Areas of deeper cuts should be examined for signs of seepage breakout which might warrant installation of protective measures such as granular blankets and or a subsurface drainage system.

Topsoil should be placed and sodding or suitable vegetation cover established as soon as possible after grading to minimize surface erosion.

Trench Excavation and Groundwater Control

Details of sewer inverts had not been finalized at the time of this report, however, it is understood will typically be less than 3 m below final grade and are within the depth of exploration at the test pits. Once the actual invert levels are established, the drawings should be reviewed. Additional deeper test pits will be required in any areas where the invert extends below the depth of exploration.

Excavations will be carried out primarily within the silt till stratum and locally will encounter fill, sand and the upper and lower silt and clay deposits.

Excavation may be carried out in open cut using conventional equipment. Harder digging should be expected in the till soils. It is noteworthy, test pits 2, 6, 10 and 14 were terminated at depths of 1.7 to 2.3 m due to "arduous digging" conditions. As previously discussed, numerous cobbles and boulders occur at ground surface and the presence of boulders within the till should not be disregarded.

Construction work must be carried out in accordance with the Occupational Health and Safety Act (OHSA) and local regulations. The site soils range include fill, firm to stiff silty clay, compact sand and compact to dense silt till. The soils should be classified as Type 3 in accordance with the OHSA requiring trench side slopes to be cut back at 1H:1V or flatter from the base of the excavation.

No seepage or wet zones were observed at the test pit locations and accordingly, groundwater is not expected to be a major concern during construction. Any nuisance seepage or surface water runoff that inadvertently enters the excavation may be removed by conventional sump pumping techniques.

Notwithstanding the foregoing comments, the possibility of encountering isolated/localized seepage zones associated with perched conditions in sandy layers within/above the less pervious soils should not be disregarded. In the event any persistent seepage zones are encountered, it may be necessary to provide granular drainage blankets and/or locally flatten the side slopes.

It is recommended that a test dig be carried out to permit prospective contractors an opportunity to observe the subsurface conditions likely to be encountered in order to assess excavation and groundwater control requirements cognizant of their own equipment.

Pipe Bedding

It is expected that the sewers will typically be founded on the native compact to dense silt till, dense/stiff lower silt and clay, or compact sand. Standard granular bedding in accordance with OPSS compacted to 95% Standard Proctor maximum dry density should be satisfactory. For flexible pipes, bedding and cover material should comprise OPSS Granular A. For rigid pipes,

bedding material should comprise OPSS Granular A, cover material should comprise select native trench backfill free of any oversized material.

In areas where wet subgrade conditions are encountered, it may be necessary to increase the bedding thickness, subject to field review.

Trench Backfill

Backfill in trenches should be placed in maximum 200 mm thick loose lifts compacted to 95% Standard Proctor maximum dry density to minimize post construction settlement in the backfill and pavement structure. Backfill for at least the upper 1 m of trench should be close to optimum moisture content to prevent subgrade stability issues.

Excavated soils are considered generally suitable for reuse as backfill, subject to moisture content control. Local zones of wet soils may be encountered where perched water exists. There may be opportunity for mixing with drier soil, or for "drying out" to render the material suitable for reuse, subject to field controls.

Organic, frozen or otherwise deleterious materials should not be incorporated as trench backfill.

Pavement Design and Construction

The Town of The Blue Mountains standard road pavement design comprises:

Asphaltic Concrete	80 mm (2 lifts of 40 mm)
Granular A Base Course	150 mm
Granular B Subbase Course	300 mm

Based on the frost susceptibility and drainage characteristics of the predominant silty subgrade soils at the site, the standard should be adequate for the anticipated local residential traffic loading.

The service life of the pavement may be extended by increasing the subbase course to 450 mm.

Subgrade preparation should involve stripping of existing fill, topsoil, organic, frozen or otherwise deleterious materials down to undisturbed native mineral soils. The exposed subgrade should be surface compacted to a minimum 95% Standard Proctor maximum dry density at insitu moisture contents within 2% of optimum to be verified by density testing by Peto MacCallum Ltd.

Following preparation, the exposed subgrade should be proofrolled with heavy equipment to identify any deleterious zones. The proofrolling should be witnessed by experienced personnel from Peto MacCallum Ltd. to identify any areas of unsatisfactory performances, and to provide recommendations for remedial measures, if necessary.

Upfilling may be achieved using excavated native mineral soils, subject to moisture content control, or alternatively, using imported material such as OPSS Granular B.

Imported material for the granular base and subbase should conform to OPS gradation specifications for Granular A and Granular B, and should be compacted to 100% Standard Proctor maximum dry density. Asphaltic concrete should be compacted to a minimum 97% Marshall Density.

The pavement design considers the construction will be carried out during the dry time of the year and the subgrade is stable and not heaving under construction traffic. If wet unstable conditions are encountered, additional granular subbase material may be required.

For the pavement to function properly, it is essential that provisions be made for water to drain out of and not collect in the base material. The incorporation of longitudinal subdrains is recommended in conjunction with crowning of the subgrade and final surface to promote drainage away from the structure. Bedding and cover material for subdrains should comprise OPSS Granular A or B. Manholes/catchbasins should be backfilled with free draining Granular B or equivalent. The catchbasins should be perforated just above the drain level and the holes screened with filter cloth. The above measures will help drain the pavement structure as well as alleviate the problems of differential frost movement between the catchbasins and pavement.

Stormwater Management Facilities

It is understood the storm water management facility will be about 2 m deep, however no further details were available at the time of this report.

Test pits 13 and 14 revealed surficial topsoil and localized fill to depths of 0.4 to 0.8 m, over dense brown silt till underlain by dense layered silt and silty clay. No free water was observed within the 3.5 m depth of exploration.

Particle size distribution curves for two representative samples are presented on Figures 1 and 2 and the results of Atterberg limit tests are summarized on Table 1. Based on the grading curves, the soils in the vicinity of the pond may be described as sandy silt with some clay to clayey silt with some sand. Based on the Atterberg test results, the material may be classified as CL with estimated hydraulic conductivity in the order of 1 X 10^{-6} cm/sec. These soils have low permeability characteristics which will tend to limit the quantity of water which will infiltrate into the ground below the pond.

For preliminary planning purposes, the sides of the pond should be sloped at 3H:1V or flatter. Topsoil and suitable vegetation cover should be established as soon as possible to minimize surface erosion.

Prior to finalization, plans for the pond should be reviewed by this office to determine whether any further protective measures are warranted.

House Foundations

The native soils at the site are generally competent and should be suitable for the use of piers or spread footings to support residential dwellings. The footings should fully penetrate any surficial topsoil and/or fill and be founded on undisturbed native mineral soils. In general, footings founded on compact to dense silt till, compact sand or stiff clay, may be proportioned based on an allowable bearing value of 150 kPa subject to inspection at the time of construction.

Locally, if firm clay (such as was contacted at test pit 2) is encountered at the proposed founding level, it is recommended the footings be stepped down as necessary and supported on the underlying silt till. Alternatively, the footings may be proportioned based on a reduced allowable bearing value of 50 kPa subject to inspection. The footings and foundation walls in these areas should be nominally reinforced to minimize the effects of differential settlement.

All exterior or unheated footings subject to frost action should be provided with minimum 1.2 m of earth cover or thermal equivalent as protection against frost penetration beneath the footings. A 25 mm thick layer of polystyrene insulation is thermally equivalent to 600 mm of soil cover.

It is noted that the till contains boulders and some difficulty in excavation and preparation of the founding surface should be anticipated. Where boulders protrude into the footings, the boulders must be removed and replaced with lean concrete. The installation of pier footings would particularly be impacted by the existence of cobbles/boulders.

Prior to placement of structural concrete, it is recommended that all founding surfaces be reviewed by Peto MacCallum Ltd. to verify the founding depth, subgrade conditions, and available bearing capacity and/or provide recommendations for modifications that may be necessitated by the actual conditions encountered.

Theoretic settlement of footings designed and constructed as outlined should not exceed 25 mm with differential settlement of about 75% of this value.

Basements would be feasible, subject to the incorporation of a perimeter drainage system comprising free draining granular backfill or prefabricated drainage board, in conjunction with a weeping tile surrounded with pea gravel, all fully wrapped with synthetic filter fabric.

In consideration of the potential for random zones of perched groundwater, it would be prudent to provide for underfloor drainage. The underfloor drainage system should comprise minimum 200 mm of clear stone (nominal 20 mm size) with weeping tile at 5 m centres. The subgrade should be fully blanketed with synthetic filter fabric prior to placement of clear stone. A

polyethylene sheet vapour barrier should be placed over the stone, particularly where a vapour sensitive floor finish is to be applied.

The weeping tiles should lead to a frost free sump or outlet.

Geotechnical review of the actual subsurface conditions during basement excavation must be carried out to finalize the underfloor drainage requirements.

Geotechnical Review, Construction Inspection and Testing

It is recommended that the design drawings be submitted for review by Peto MacCallum Ltd. prior to finalization, to ensure the design is compatible with the site subsurface conditions and that the recommendations contained in this report are properly interpreted and implemented.

Earthworks operations should be inspected by Peto MacCallum Ltd. to approve the subgrade preparation, backfill materials, placement and compaction procedures, and verify the specified degree of compaction is achieved uniformly throughout fill materials.

Prior to placement of structural concrete, founding surfaces should be inspected by Peto MacCallum Ltd. to verify the founding depth, subgrade conditions, and available bearing capacity and/or provide recommendations for modifications that may be necessitated by the actual conditions encountered.

The comments and recommendations provided in the report are based on the information revealed in the test pits. Conditions away from and between test pits may vary, particularly where foundation and/or service trenches exist. Geotechnical review during construction should be ongoing to confirm the subsurface conditions are substantially similar to those encountered in the test pits, which may otherwise require modifications to the original recommendations.

Closure

We trust this report is complete within our terms of reference, and the information presented is sufficient for your present purposes. If you have any questions, or when we may be of further assistance, please do not hesitate to contact our office.

Sincerely

Peto MacCallum Ltd.

John F. Wright, BSc.
Senior Project Supervisor

Turney Lee-Bun, P.Eng.
Branch Manager and Manager
Geotechnical and Geoenvironmental Services

JFW/TLB:jlb

Enclosures:
Table 1 – Atterberg Limits
Figures 1 & 2 – Particle Size Distribution Curves
Log of Test Pits Nos. 1 to 14
Drawing No. 1 – Test Pit Location Plan

TABLE 1

ATTERBERG LIMITS

TEST PIT	SAMPLE	DEPTH (m)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	SOIL CLASSIFICATION
13	1	0.8	21	13	8	CL
13	2	2.3	26	18	8	CL

NOTE: CL denotes inorganic clay of low to medium plasticity.

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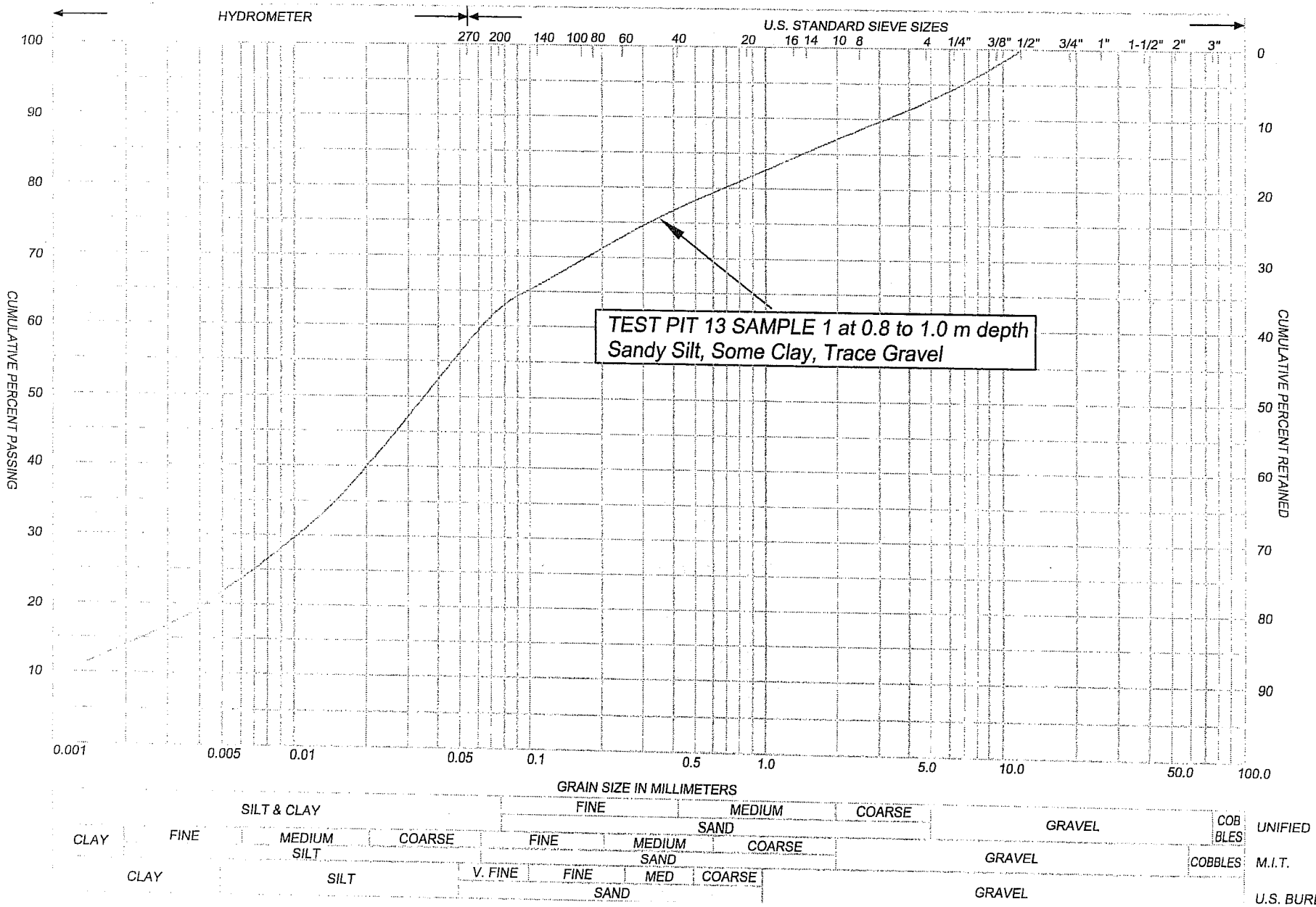
PARTICLE SIZE DISTRIBUTION CHART

PML Ref.: 05BF007
Figure No.: 1



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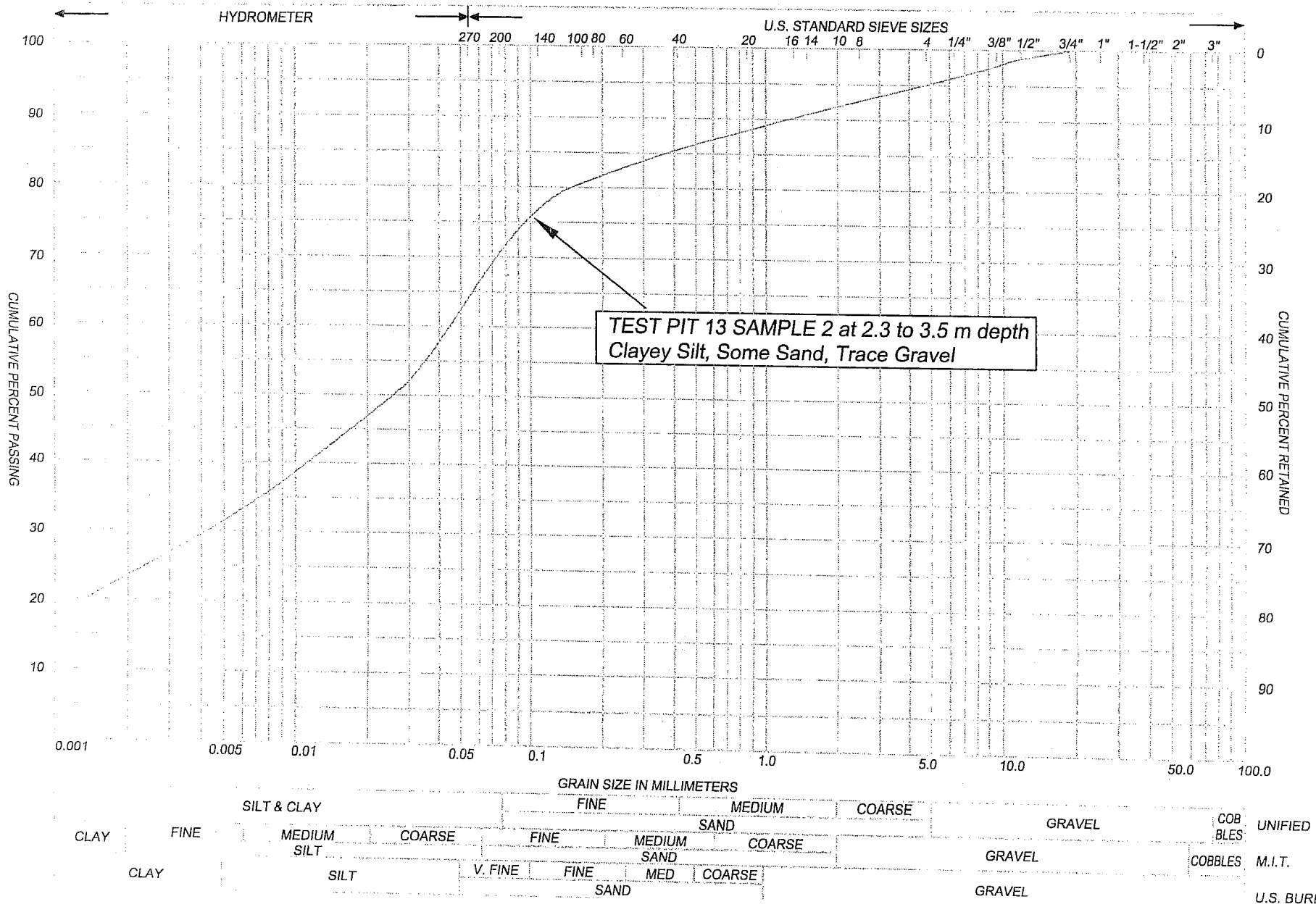
PARTICLE SIZE DISTRIBUTION CHART

PML Ref.: 05BF007
Figure No.: 2



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LOG OF TEST PIT NO. 1

PROJECT Keeper's Cove Residential Development
LOCATION Town of The Blue Mountains, Ontario
DATE March 16, 2005

PML REF. 05BF007
ENGINEER JFW
TECHNICIAN RM

DEPTH in METRES	DESCRIPTION	LEGEND	SAMPLE NUMBER	SHEAR STRENGTH kPa (50 100 150 200)	WATER CONTENT % (10 20 30)	GROUND WATER OBSERVATIONS AND REMARKS
	GROUND ELEVATION 182.85					
0.30	FILL: Brown, silt, some clay to clayey, trace sand, with boulders 700 mm diameter					
0.60	TOPSOIL: Black, sandy silt					
1.60	TILL: Dense, brown, silt, some clay, some gravel, trace sand, occ. cobbles/boulders, moist					
3.00	SILT: Dense, grey, silt, some clay to clayey, layered, moist					
	TEST PIT TERMINATED AT 3.00 m					Upon completion of excavation No free water

NOTES

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LOG OF TEST PIT NO. 2

PROJECT Keeper's Cove Residential Development
PML REF. 05BF007
LOCATION Town of The Blue Mountains, Ontario
ENGINEER JFW
DATE March 16, 2005
TECHNICIAN RM

DEPTH in METRES	DESCRIPTION GROUND ELEVATION 188.70	LEGEND	SAMPLE NUMBER	SHEAR STRENGTH kPa 50 100 150 200	WATER CONTENT % 10 20 30	GROUND WATER OBSERVATIONS AND REMARKS
0.10	TOPSOIL: Dark brown, silt, some clay, trace gravel					
0.60	FILL: Dark brown, silt, some clay, trace gravel, trace sand, occ. cobbles/boulders, with concrete pieces, moist					
1.00	CLAY: Firm, grey, silty clay, trace gravel, APL					
1.90	TILL: Dense, grey, silt, some sand to sandy, trace to some gravel, trace to some clay, moist		1			
	TEST PIT TERMINATED AT 1.90 m DUE TO ARDUOUS DIGGING					Upon completion of excavation No free water

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LOG OF TEST PIT NO. 3

PROJECT Keeper's Cove Residential Development
PML REF. 05BF007
LOCATION Town of The Blue Mountains, Ontario
ENGINEER JFW
DATE March 16, 2005
TECHNICIAN RM

DEPTH in METRES	DESCRIPTION GROUND ELEVATION 191.70	LEGEND	SAMPLE NUMBER	SHEAR STRENGTH kPa 50 100 150 200	WATER CONTENT % 10 20 30	GROUND WATER OBSERVATIONS AND REMARKS
0.15	TOPSOIL: Dark brown, sandy silt					
1.40	FILL: Brown, sandy silt, trace gravel, trace clay, occ. cobble, with concrete, moist					
2.40	TILL: Dense, brown to grey, silt, some sand, some clay, trace gravel, occ. cobble/boulder, moist					
	TEST PIT TERMINATED AT 2.40 m					Upon completion of excavation No free water

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LOG OF TEST PIT NO. 4

PROJECT Keeper's Cove Residential Development
LOCATION Town of The Blue Mountains, Ontario
DATE March 16, 2005

PML REF. 05BF007
ENGINEER JFW
TECHNICIAN RM

DEPTH in METRES	DESCRIPTION	LEGEND	SAMPLE NUMBER	SHEAR STRENGTH kPa (50 100 150 200)	WATER CONTENT % (10 20 30)	GROUND WATER OBSERVATIONS AND REMARKS
	GROUND ELEVATION 183.70					
0.25	FILL: Brown, silt, some sand, trace gravel, occ. cobbles/boulders, moist					
0.60	TOPSOIL: Black, silt and sand, some gravel					
1.95	TILL: Dense, light brown, silt, some gravel, some sand, occ. cobble/boulder, moist					
3.00	SILT: Dense, grey, silt, trace sand, with clayey layers, moist		1			
	TEST PIT TERMINATED AT 3.00 m					Upon completion of excavation No free water

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LOG OF TEST PIT NO. 5

PROJECT Keeper's Cove Residential Development
L/ CATION Town of The Blue Mountains, Ontario
ATE March 16, 2005

PML REF. 05BF007
ENGINEER JFW
TECHNICIAN RM

DEPTH in METRES	DESCRIPTION	LEGEND	SAMPLE NUMBER	SHEAR STRENGTH kPa (50 100 150 200)	WATER CONTENT % (10 20 30)	GROUND WATER OBSERVATIONS AND REMARKS
	GROUND ELEVATION 189.10					
0.30	FILL: Brown, sand and gravel, trace silt					
0.70	TOPSOIL: Dark brown, sandy silt, trace clay, occ. cobble, with roots					
2.30	TILL: Dense, light brown to grey, silt, some gravel, some clay, trace sand, occ. cobble/boulder, moist					
2.80	CLAY: Stiff, grey, layered, silty clay to clayey silt, DTPL					
	TEST PIT TERMINATED AT 2.80 m					Upon completion of excavation No free water

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LOG OF TEST PIT NO. 6

PROJECT Keeper's Cove Residential Development
PML REF. 05BF007
LOCATION Town of The Blue Mountains, Ontario
ENGINEER JFW
DATE March 16, 2005
TECHNICIAN RM

DEPTH in METRES	DESCRIPTION	LEGEND	SAMPLE NUMBER	SHEAR STRENGTH kPa (50 100 150 200)	WATER CONTENT % (10 20 30)	GROUND WATER OBSERVATIONS AND REMARKS
	GROUND ELEVATION 190.85					
0.10	TOPSOIL: Brown to dark brown, silt, some clay					
0.50	FILL: Brown, silty sand to sandy silt, some clay, with debris, moist					
1.00	TILL: Dense, brown, silt, some clay, trace gravel, trace sand, occ. cobble/boulder, moist					
1.70	grey					
	TEST PIT TERMINATED AT 1.70 m DUE TO ARDUOUS DIGGING					Upon completion of excavation No free water

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LOG OF TEST PIT NO. 7

PROJECT Keeper's Cove Residential Development
LOCATION Town of The Blue Mountains, Ontario
DATE March 16, 2005

PML REF. 05BF007
ENGINEER JFW
TECHNICIAN RM

DEPTH in METRES	DESCRIPTION	LEGEND	SAMPLE NUMBER	SHEAR STRENGTH kPa (50 100 150 200)	WATER CONTENT % (10 20 30)	GROUND WATER OBSERVATIONS AND REMARKS
	GROUND ELEVATION 182.95					
	TOPSOIL: Dark brown, gravelly sand, num. cobbles					
0.50						
	TILL: Compact, light brown, to grey, silt, some clay to clayey, trace gravel, trace sand, occ. cobble, very moist					
2.80						
	Dense, grey, silt, some clay, trace gravel, trace sand, moist					
3.00	TEST PIT TERMINATED AT 3.00 m					Upon completion of excavation No free water

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LOG OF TEST PIT NO. 8

PROJECT Keeper's Cove Residential Development
LOCATION Town of The Blue Mountains, Ontario
DATE March 16, 2005

PML REF. 05BF007
ENGINEER JFW
TECHNICIAN RM

DEPTH in METRES	DESCRIPTION	LEGEND	SAMPLE NUMBER	SHEAR STRENGTH kPa (50 100 150 200)	WATER CONTENT % (10 20 30)	GROUND WATER OBSERVATIONS AND REMARKS
	GROUND ELEVATION 188.70					
0.20	TOPSOIL: Dark brown, gravelly sand					
	TILL: Dense, brown, silt, some sand, trace gravel, trace clay, occ. cobble/boulder, moist		1			
1.70						
	TILL: Dense, grey, silt, some clay to clayey, trace gravel, trace sand, moist					
2.50						
	TEST PIT TERMINATED AT 2.50 m					Upon completion of excavation No free water

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Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF TEST PIT NO. 9

PROJECT Keeper's Cove Residential Development
LOCATION Town of The Blue Mountains, Ontario
DATE March 16, 2005

PML REF. 05BF007
ENGINEER JFW
TECHNICIAN RM

DEPTH in METRES	DESCRIPTION	LEGEND	SAMPLE NUMBER	SHEAR STRENGTH kPa (50 100 150 200)	WATER CONTENT % (10 20 30)	GROUND WATER OBSERVATIONS AND REMARKS
	GROUND ELEVATION 189.70					
0.11	TOPSOIL: Dark brown, sand, some gravel					
0.21	FILL: Brown, silty sand, to sandy silt, trace gravel					
0.40	TOPSOIL: Dark brown, sand, some gravel					
0.60	SILT: Brown, sandy silt, trace gravel, moist					
	CLAY: Stiff, brown and grey layers, varved, clayey silt to silty clay, APL		1			
1.90						
	TILL: Dense, grey, silt, some gravel, some clay, trace sand, occ. cobble, moist					
2.90						
	TEST PIT TERMINATED AT 2.90 m					Upon completion of excavation No free water

NOTES

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Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF TEST PIT NO. 10

PROJECT Keeper's Cove Residential Development
PML REF. 05BF007
LOCATION Town of The Blue Mountains, Ontario
ENGINEER JFW
DATE March 16, 2005
TECHNICIAN RM

DEPTH in METRES	DESCRIPTION	LEGEND	SAMPLE NUMBER	SHEAR STRENGTH kPa (50 100 150 200)	WATER CONTENT % (10 20 30)	GROUND WATER OBSERVATIONS AND REMARKS
	GROUND ELEVATION 189.00					
0.15	TOPSOIL: Dark brown, sand, some gravel					
	TILL: Dense, brown, silt, some gravel, some sand, some clay, num. cobbles/boulders, with shale pieces, moist					
1.40	grey, trace sand					
2.10	TEST PIT TERMINATED AT 2.10 m DUE TO ARDUOUS DIGGING					Upon completion of excavation No free water

NOTES

CHECKED BY

LOG OF TESTPITS - ARDUOUS DIGGING 05BF007 2005-03-16 PML LOGS.GPJ PETOMAC.GDT 2005.03.23

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF TEST PIT NO. 11

PROJECT Keeper's Cove Residential Development
LOCATION Town of The Blue Mountains, Ontario
DATE March 16, 2005

PML REF. 05BF007
ENGINEER JFW
TECHNICIAN RM

DEPTH in METRES	DESCRIPTION	LEGEND	SAMPLE NUMBER	SHEAR STRENGTH kPa (50 100 150 200)	WATER CONTENT % (10 20 30)	GROUND WATER OBSERVATIONS AND REMARKS
	GROUND ELEVATION 190.30					
0.50	TOPSOIL: Dark brown to black, sandy silt, some gravel, with roots					
3.00	SAND: Compact, brown, fine sand, trace gravel, trace silt, occ. cobble/boulder, moist					
	TEST PIT TERMINATED AT 3.00 m					Upon completion of excavation No free water Cave to 2.7 m

NOTES
Cobbles and boulders observed surficially

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Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF TEST PIT NO. 12

PROJECT Keeper's Cove Residential Development
PML REF. 05BF007
LOCATION Town of The Blue Mountains, Ontario
ENGINEER JFW
DATE March 16, 2005
TECHNICIAN RM

DEPTH in METRES	DESCRIPTION	LEGEND	SAMPLE NUMBER	SHEAR STRENGTH kPa (50 100 150 200)	WATER CONTENT % (10 20 30)	GROUND WATER OBSERVATIONS AND REMARKS
	GROUND ELEVATION 190.85					
0.60	TOPSOIL: Dark brown, sand, some gravel, some silt					
1.40	CLAY: Stiff, brown and grey, mottled, silty clay, with shale pieces, DTPL					
2.40	TILL: Dense, grey, silt; some gravel, some clay, trace sand, occ. cobble/boulder, moist					
	TEST PIT TERMINATED AT 2.40 m					Upon completion of excavation No free water

NOTES

Topsoil and Fill piles noted south and east of test pit location

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CONSULTING ENGINEERS

LOG OF TEST PIT NO. 13

PROJECT Keeper's Cove Residential Development
LOCATION Town of The Blue Mountains, Ontario
DATE March 16, 2005

PML REF. 05BF007
ENGINEER JFW
TECHNICIAN RM

DEPTH in METRES	DESCRIPTION	LEGEND	SAMPLE NUMBER	SHEAR STRENGTH kPa (50 100 150 200)	WATER CONTENT % (10 20 30)	GROUND WATER OBSERVATIONS AND REMARKS
	GROUND ELEVATION 185.15					
0.30	TOPSOIL: Dark brown, sandy silt					
0.80	FILL: Brown, silty sand, some gravel, occ. cobble, moist					
2.30	TILL: Dense, light brown, sandy silt, some clay, trace gravel, occ. cobble, moist		1			
3.50	SILT: Dense, light brown and grey, layered, silt and silty clay, some sand, trace gravel, moist, till-like		2			
	TEST PIT TERMINATED AT 3.50 m					Upon completion of excavation No free water

185.15
3.50
181.65

NOTES

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CONSULTING ENGINEERS

LOG OF TEST PIT NO. 14

PROJECT Keeper's Cove Residential Development
LOCATION Town of The Blue Mountains, Ontario
DATE March 16, 2005

PML REF. 05BF007
ENGINEER JFW
TECHNICIAN RM

DEPTH in METRES	DESCRIPTION	LEGEND	SAMPLE NUMBER	SHEAR STRENGTH kPa (50 100 150 200)	WATER CONTENT % (10 20 30)	GROUND WATER OBSERVATIONS AND REMARKS
	GROUND ELEVATION 188.40					
0.40	TOPSOIL: Dark brown, gravelly sand					
1.20	TILL: Dense, brown, silt, some sand to sandy, trace gravel, occ. cobble/boulder, moist					
2.30	TILL: Dense, grey, silt, some gravel, trace to some clay, trace sand, occ. cobble/boulder, moist					
	TEST PIT TERMINATED AT 2.30 m DUE TO ARDUOUS DIGGING					Upon completion of excavation No free water

NOTES

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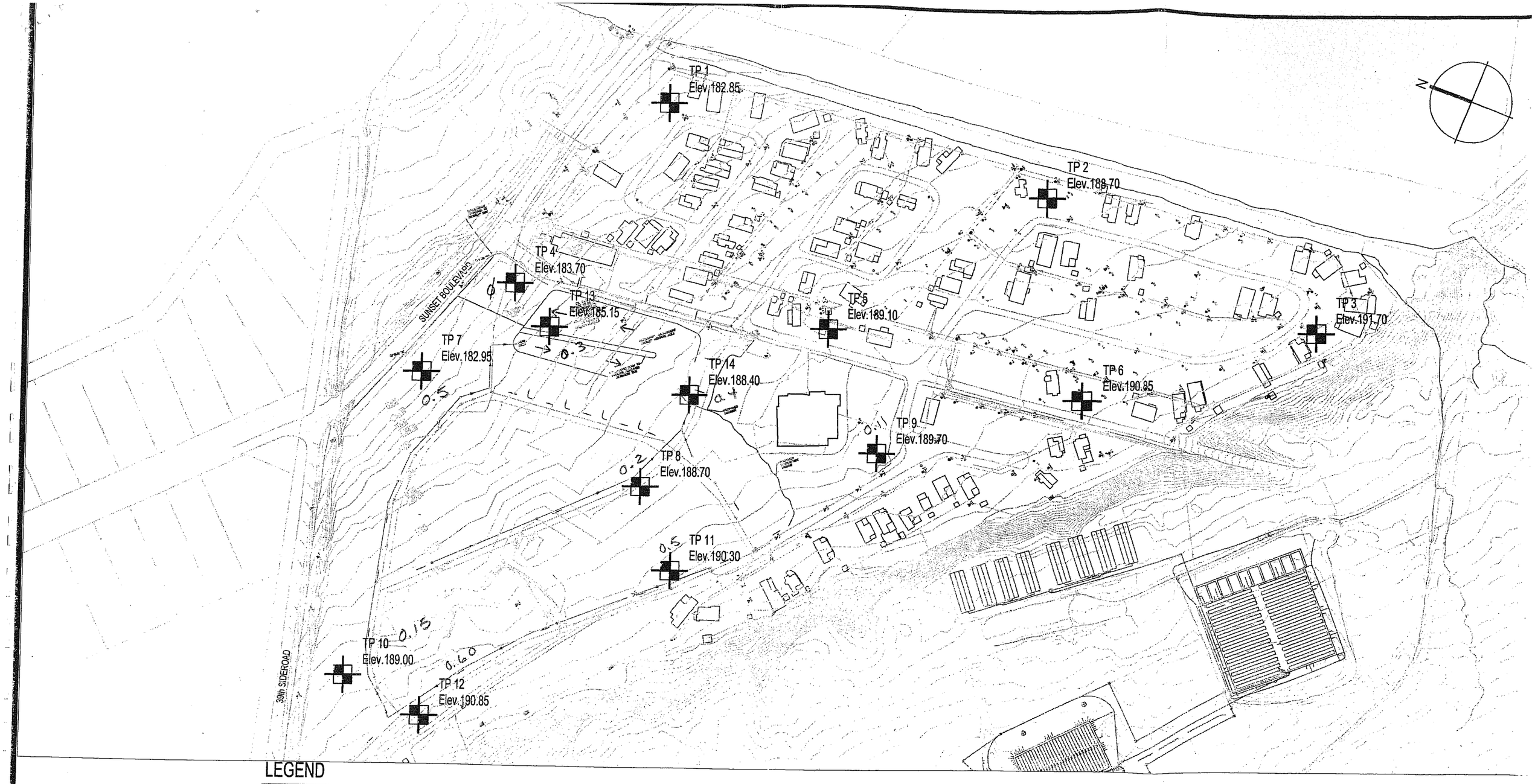

LEGEND

TP 1 Elev.182.85 — Test Pit 1, Ground Surface Elevation

NOTES:

1. Horizontal and vertical tie-ins provided by Henderson, Paddon & Associates Ltd. Drawing No. 304073-TP

TEST PIT LOCATION PLAN

KEEPER'S COVE RESIDENTIAL DEVELOPMENT TOWN OF THE BLUE MOUNTAINS, ONTARIO

Peto MacCallum Ltd.
CONSULTING ENGINEERS

DATE	SCALE	JOB NO.	DRAWING NO.
MARCH 2005	1:2000 (approx)	05BF007	1