March 28, 2023

Alexa-Rae Valente
Oak Ridges Seaton Inc.
c/o DG Group Inc.
30 Floral Parkway, Suite 300
Concord, Ontario, L4K 4R1

Re: Supplemental Geotechnical Review
3160 Sideline 26 – Seaton Lands A5
Pickering, Ontario
EXP Reference: BRM-00360451-H0

EXP Services Inc. (EXP) was requested to provide a geotechnical review of the holdout property located at 3160 Sideline 26, Pickering, Ontario. It is EXP's understanding that the subject property was recently consolidated into the overall development project for Seaton Lands A5. The property is located at the north-east corner of Seaton A5 and on the west side of Sideline 26. A site plan is attached with this letter for reference.

As part of our analysis, EXP reviewed the Geotechnical Report[1] for the site. Three (3) pertinent boreholes are located in close proximity to the subject property (Boreholes 4, 6 and 9). Based on the borehole information, the soil in all three boreholes consists of a brown sandy silt till. Borehole location plan and borehole logs are attached with this letter.

In general, the soil and groundwater conditions are relatively consistent in this area of the site. Based on our review, the comments and recommendations outlined in the Geotechnical Report[1], are applicable for the property at 3160 Sideline 26, Pickering, Ontario.

It should be noted that all existing underground infrastructure on the subject property (i.e. foundations, storage tanks, wells, unsuitable fill material, etc.) should be adequately removed. EXP should be present to monitor removal operations to confirm suitable subgrade soils are present prior to earthwork operations.

[1]*Geotechnical Investigation, Proposed Residential Development, Part 1 on Plan 40R-25574, Part of Lots 27 and 28, Concession 4, Pickering, Ontario, Project Reference: BRM-00360451-A0, dated March 21, 2012, prepared by EXP Services Inc.*

We trust that the information is satisfactory for your purposes. If you have any questions or wish to discuss this further, please do not hesitate to contact this office.

Yours truly,
EXP Services Inc.

Christopher Rebong, P. Eng.
Project Manager
Earth & Environment

Peter Chan, P. Eng.
Division Manager
Earth & Environment

Enclosure(s):
(a) General Site Plan
(b) Borehole Location Plan (From EXP's Geotechnical Report[1])
(c) Borehole Logs (From EXP's Geotechnical Report[1])
(d) Geotechnical Investigation Report[1] For Seaton A5 Lands

Drawings

Site Location Plan – 3160 Sideline 26, Pickering, Ontario

Borehole Location Plan *(from Geotechnical Report[1])*

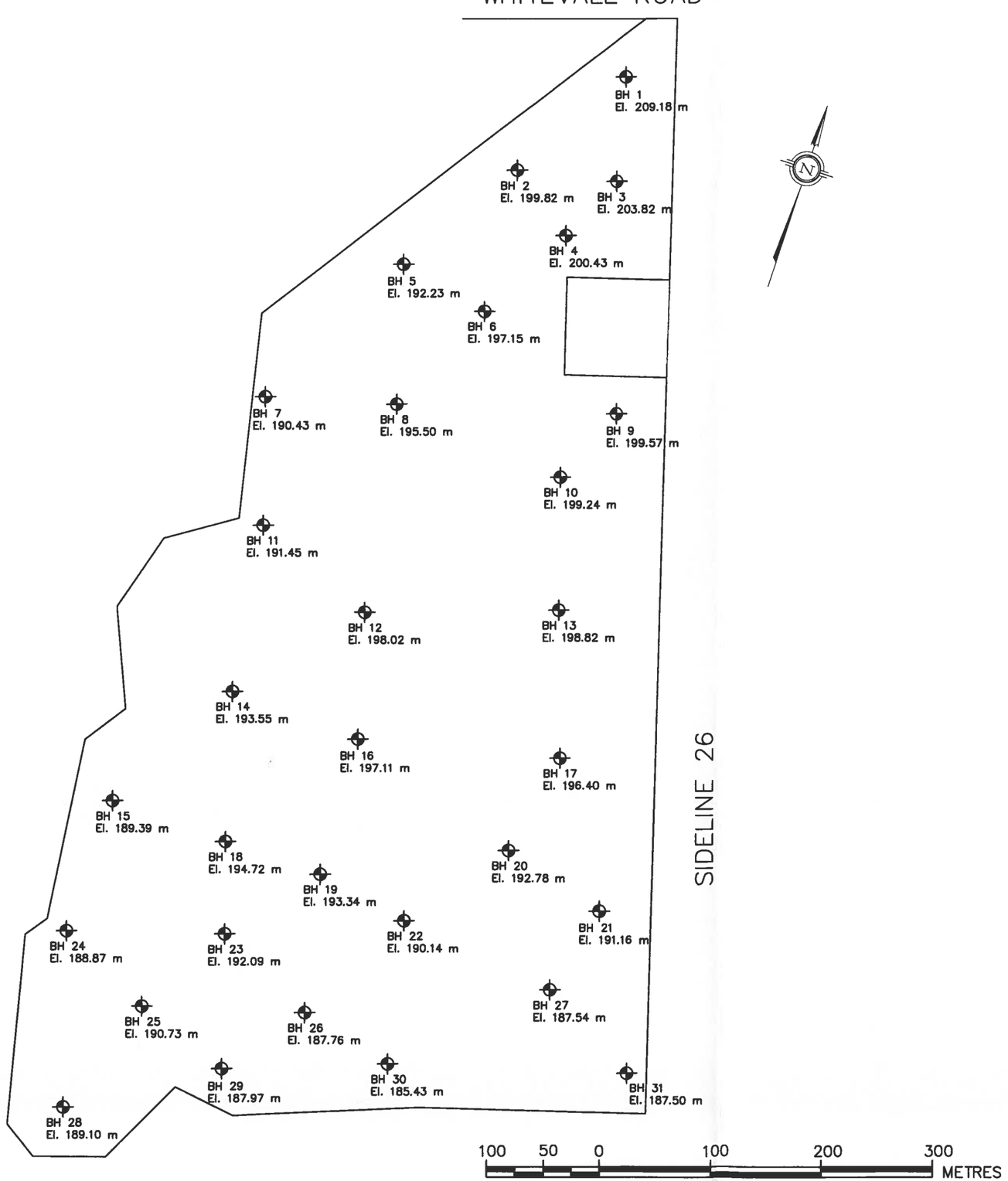
Drawing No. 1: Site Location Plan
3160 Sideline 26
Seaton Lands A5
Pickering, Ontario

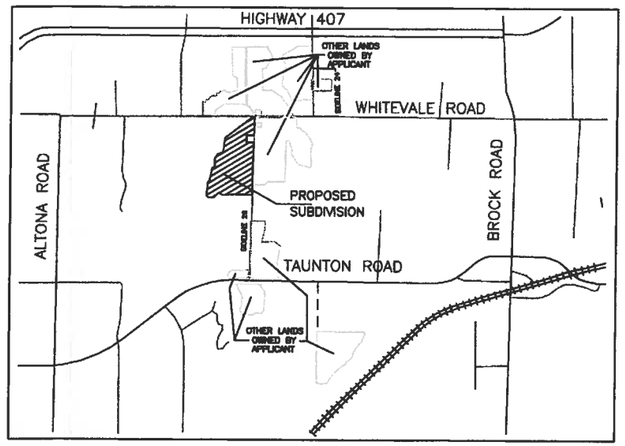
Project Number: BRM-00360451-H0
Date: March 2023

Drawn By: C. Rebong
Checked By: P. Chan

N

220 Commerce Valley Drive West
Suite 500
Markham, Ontario L3T 0A8
(905) 695-3217 www.exp.com





KEY PLAN

LEGEND

Approximate Borehole Location

NOTES:

1. The boundaries and soil types have been established only at borehole locations. Between boreholes they are assumed and may be subject to considerable error.
2. Soil samples will be retained in storage for 3 months and then destroyed unless Client advises that an extended time period is required.
3. Borehole elevations should not be used to design building or road grades.
4. Topsoil quantities should not be established from the information provided at the borehole locations.
5. This drawing was reproduced from a site plan provided by the Client.

Trow Associates Inc.
70 Gibson Drive, Unit 12, Markham, Ontario L3R 4C2

GEOTECHNICAL INVESTIGATION

PROPOSED RESIDENTIAL DEVELOPMENT
PART OF LOTS 27 AND 28, CONCESSION 4
(PART 1, PLAN 40R-25574)
PICKERING, ONTARIO

BOREHOLE LOCATION PLAN

BRGE00360451A	DATE : APR. 2009	DRAWING NO.: 1

Borehole Logs

Borehole Logs 4, 6 and 9 *(from Geotechnical Report[1])*

Log of Borehole 4

Project No. BRGE00360451A

Drawing No. 5

Project: Geotechnical Investigation - Proposed Residential Development

Sheet No. 1 of 1

Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

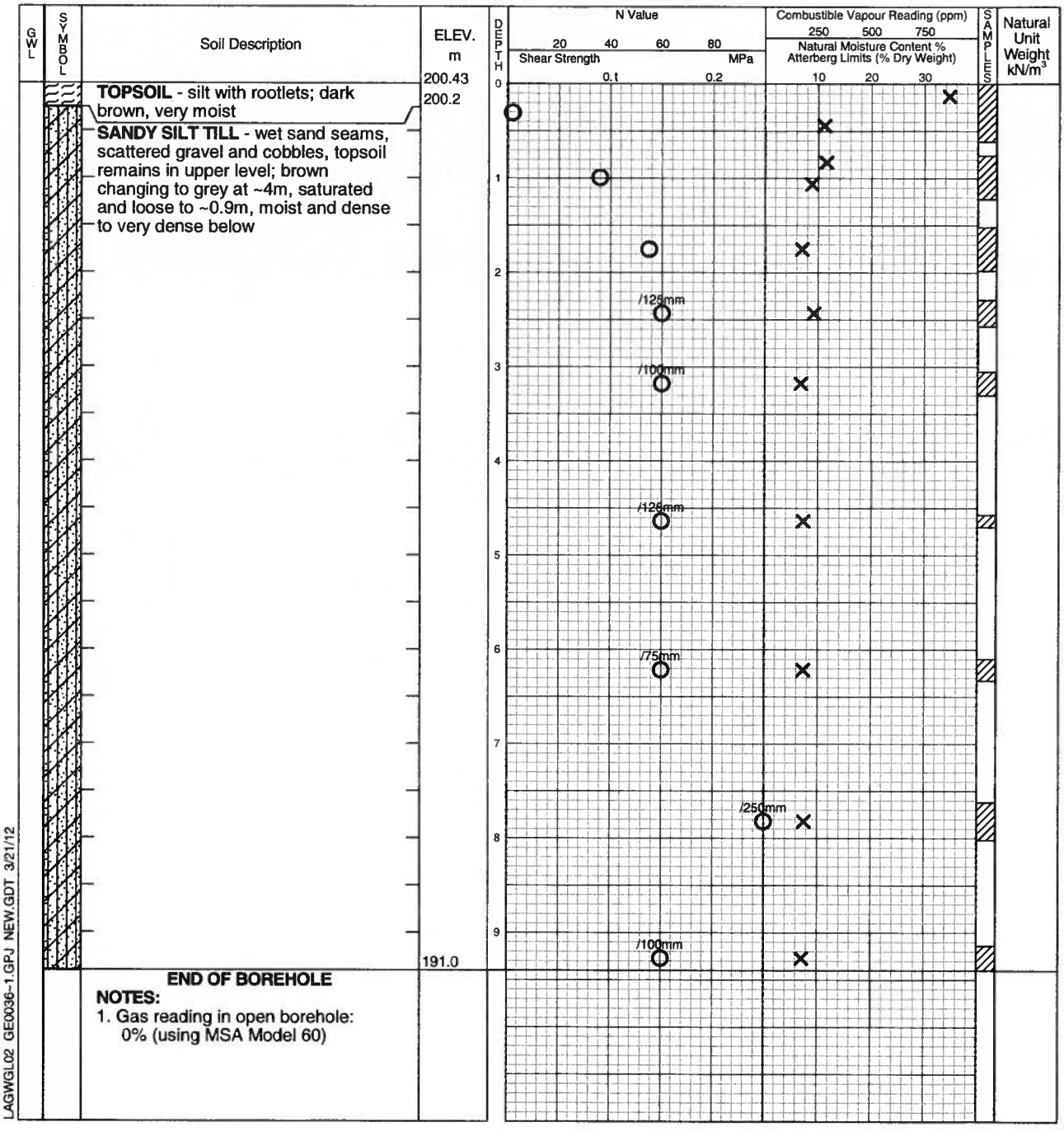
Date Drilled: April 16, 2009

Drill Type: CME 75 Drill

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



LAGWGL02 GE0036-1.GPJ NEW.GDT 3/21/12

Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	8.84

Log of Borehole 6

Project No. BRGE00360451A

Drawing No. 7

Project: Geotechnical Investigation - Proposed Residential Development

Sheet No. 1 of 1

Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 15, 2009

Drill Type: CME 75 Drill

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL - sandy silt with rootlets; dark brown, very moist	197.15	0
		SANDY SILT TILL - scattered gravel and cobbles, topsoil remains in upper level; brown changing to grey at ~4m, saturated and loose to ~0.75, moist and compact to very dense below	196.9	
				1
				2
				3
				4
				5
				6
				7
				8
			187.9	9
		END OF BOREHOLE		

N Value: 20 40 60 80
Shear Strength: 0.1 0.2 MPa

/125mm
/125mm
/125mm
/150mm
/125mm
/100mm

Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

SAMPLES

Natural Unit Weight kN/m³

NOTES:
1. Gas reading in open borehole: 0% (using MSA Model 60)

LAGWGL02 GE0036-1.GPJ NEW.GDT 3/21/12

exp.

Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	8.64

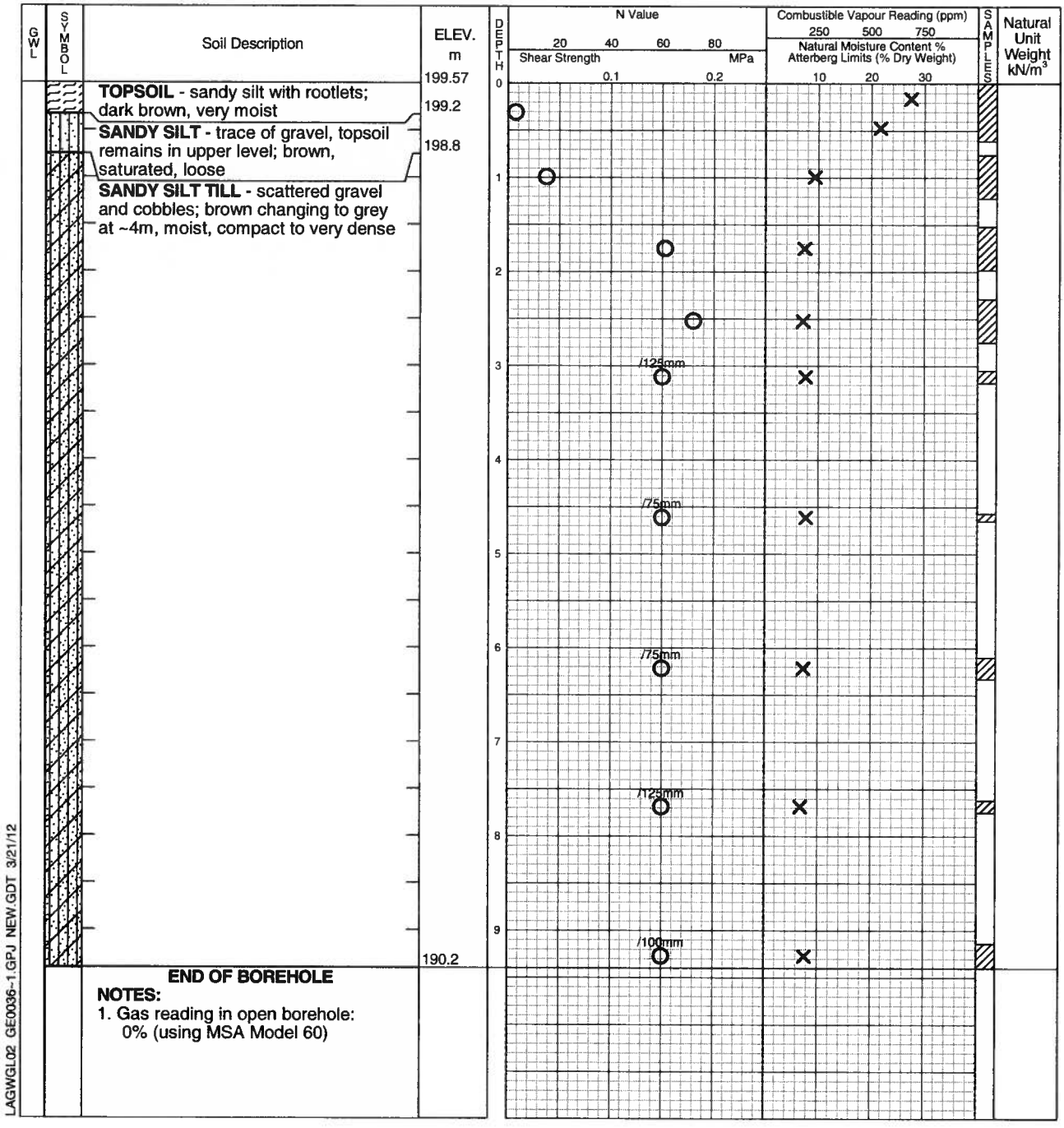
Log of Borehole 9

Project No. BRGE00360451A
Drawing No. 10
Project: Geotechnical Investigation - Proposed Residential Development
Sheet No. 1 of 1
Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 14, 2009
Drill Type: CME 75 Drill
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	8.79

Geotechnical Investigation Report

(Proposed Residential Development, Part 1 on Plan 40R-25574, Part of Lots 27 and 28, Concession 4, Pickering, Ontario, Project Reference: BRM-00360451-A0, dated March 21, 2012, prepared by EXP Services Inc.)

Oak Ridges Farm Co-Tenancy
c/o Metrus Development Inc.

Geotechnical Investigation
Proposed Residential Development
Part 1 on Plan 40R-25574
Part of Lots 27 and 28, Concession 4
Pickering, Ontario

Project Number
BRM-00360451-A0

Prepared By:

exp Services Inc.
220 Commerce Valley Drive West
Suite 500
Markham, Ontario L3T 0A8
Canada

Date Submitted
Revised March 21, 2012

TABLE OF CONTENTS

Appendices

Drawings

1. Introduction

This report presents the results of a geotechnical investigation carried out for the proposed residential development referred to as Part 1 on Plan 40R-25574, Part of Lots 27 and 28, Concession 4 (South of Whitevale Road) in Pickering, Ontario. The work was authorized by Mr. Tom Albani of Metrus Development Inc. on behalf of Oak Ridges Farm Co-tenancy.

The project involves the design and construction of numerous single family and townhouse lots, three (3) medium density blocks, two (2) school blocks and one (1) mixed-use block together with the necessary support infrastructure such as roads, sewers and other services.

The purpose of this investigation was to determine the subsurface soil and groundwater conditions at the site by putting down sampled boreholes and, based on an assessment of the factual borehole data, to provide geotechnical engineering guidelines for the design and construction of the proposed residential development. Recommendations and/or comments regarding site grading, excavation and groundwater control, building construction, sewer and watermain installation and pavement design and construction were to be provided.

Our Terms of Reference also included a Phase I Environmental Site Assessment and limited environmental soil testing to determine the quality of the on-site soils. The findings of the environmental site assessment are reported under separate cover.

The comments and recommendations given in this report are based on the assumption the above-described design concept will proceed into construction. If changes are made either in the design phase or during construction, this office must be retained to review these modifications. The result of this review may be a modification of our recommendations or the requirement of additional field or laboratory work to check whether the changes are acceptable from a geotechnical viewpoint.

2. Site Description

The site is located on the west side of Sideline 26 extending from Whitevale Road to about 1 kilometer south of Whitevale Road. The legal description of the site is Part 1 on Plan 40R-25574, Part of Lots 27 and 28, Concession 4, City of Pickering, Regional Municipality of Durham. The site is irregular in shape and covers an area of about 39 hectares.

The majority of the site consists of three (3) tree-lined corn fields. A grass field with a partially demolished concrete silo is located at the north end of the site. Residential dwellings are present on the west and south sides of the grass field. The site slopes from north to south. Ground surface elevations at the borehole locations ranged from about 185.5 to 209 m.

The site is bounded by undeveloped land, residential land use and Whitevale Road to the north, agricultural land use to the south, Sideline 26 to the east, and agricultural land use and forest to the west.

3. Fieldwork

The fieldwork was carried out during the period of April 6 to 16, 2009. Thirty-one (31) sampled boreholes were drilled to depths ranging from 9.25 to 9.60 m below existing grade at the approximate locations shown on the attached Borehole Location Plan (Drawing No. 1). On June 8, 2009, **exp** returned to the site to install groundwater monitoring wells at the location of Boreholes 5 and 15.

The boreholes were advanced using continuous flight solid and hollow stem augering equipment owned and operated by a specialist drilling contractor. In each borehole, samples were recovered using conventional split spoon equipment and standard penetration test methods.

Water levels were observed in the open boreholes during the course of the fieldwork. Five (5) of the boreholes were instrumented with 19 mm diameter piezometers and Boreholes 5 and 15 were instrumented with 50 mm diameter wells for groundwater level monitoring. At each borehole location, tests for the concentration of flammable gases were carried out using a portable combustible gas tester (MSA Model 60 calibrated with methane).

The fieldwork was supervised by a geotechnical engineer from **Exp Services Inc.** who monitored the drilling operations and logged the borings. All split spoon samples were transported to our laboratory for detailed examination.

The location and ground surface elevation of the boreholes were established in the field by Holding Jones Vanderveen Inc. (Ontario Land Surveyors).

4. Laboratory Testing

The laboratory testing program comprised the following:

- Moisture content determination on all recovered soil samples, with results presented on the Log of Borehole sheets (Drawing Nos. 2 to 32).
- Grain size analysis of two (2) soil samples, with results presented in Appendix A.
- One (1) soil sample analyzed for pH and sulphate, with results presented in Appendix B.
- Five (5) soil samples analyzed for selected general and inorganic parameters in accordance with land use criteria listed in Table 2 and Table 3 of the Ministry of the Environment standards (Ontario Regulation 153), dated July 27, 2009.

5. Subsurface Conditions

5.1 Soil

The detailed soil profile encountered in each borehole and the results of laboratory moisture content determinations and gas tests are indicated on the attached borehole logs (Drawing Nos. 2 to 32). It should be noted the soil boundaries indicated on the borehole logs are inferred from non-continuous sampling and observations during drilling. These boundaries are intended to reflect approximate transition zones for the purpose of geotechnical design and should not be interpreted as exact planes of geological change. The "Notes on Sample Descriptions" preceding the borehole logs form an integral part of and should be read in conjunction with this report.

The soil stratigraphy at the site, as revealed in the boreholes, generally comprised topsoil overlying a major deposit of glacial sandy silt till.

A brief description of the soil profiles, in order of depth, follows.

Topsoil

Topsoil, comprising 180 to 410 mm dark brown silt or sandy silt with rootlets, was encountered surficially in all of the boreholes.

Topsoil measurements were carried out at the borehole locations only and were found to be highly variable. Consequently, topsoil quantities should not be established from the information provided at the borehole locations only. If required, a more detailed evaluation (involving shallow test pits) is recommended to accurately quantify the amount of topsoil to be removed for construction purposes.

Sandy Silt

A shallow sandy silt stratum was encountered below the topsoil layer in ten (10) of the thirty-one (31) boreholes drilled at the site. The sandy silt was brown in colour and generally existed in a loose state. Moisture contents of this material ranged from 13 to 22% but were typically in the 18 to 20% range, generally indicating a saturated condition. The sandy silt extended to depths of approximately 0.75 to 0.9 m below existing grade.

Sand

A fine to medium grained sand deposit was encountered below the sandy silt stratum in Borehole 1. The sand was brown in colour and existed in a compact to dense state. Moisture contents of the sand ranged from 4 to 10%, indicating a moist to very moist condition. The sand deposit extended to a depth of about 2.1 m below existing grade.

Sandy Silt Till

The predominant soil deposit at this site is glacial sandy silt till. Sandy silt till was encountered at depths ranging from 0.18 to approximately 0.9 m below existing grade in all of the boreholes. The sandy silt till deposit was brown and grey in colour and contained scattered gravel and cobbles. Wet sand/sand and gravel seams and layers were also common within this glacial till deposit. The relative density of the sandy silt till varied from loose to very dense. The sandy silt till was found to be loose to depths of about 0.75 to 1.0 m below existing grade in the majority of the boreholes. Moisture contents of the sandy silt till ranged from 7 to 14%, indicating a moist to saturated condition.

5.2 Groundwater

Groundwater conditions were observed in the open boreholes during the course of the fieldwork. Seven (7) of the boreholes (Boreholes 1, 5, 11, 13, 15, 27 and 28) were instrumented with groundwater piezometers or wells for subsequent readings. Groundwater measurements are included in the attached borehole logs.

Upon completion of drilling, groundwater levels ranging from 0.76 to 8.99 m below existing grade were recorded in sixteen (16) of the thirty-one (31) boreholes drilled at the site. The groundwater primarily originated from wet sand seams and layers and saturated zones within the sandy silt till deposit. The remainder of the boreholes were dry upon completion of drilling.

After a period of 24 to 86 days, groundwater levels in the piezometers and wells ranged from 0.15 to 6.46 m below existing grade. The high groundwater levels in the piezometers and wells at Boreholes 5, 13, 15, 27 and 28 are attributed to seasonally perched water in the upper soils.

Seasonal fluctuation of the groundwater levels at the site should be anticipated.

5.3 Gas Vapour Monitoring

Tests for the generation of flammable gases were carried out in all of the open boreholes using a portable combustible gas tester (MSA Model 60 calibrated with methane). The results of these tests are included in the attached borehole logs.

The MSA combustible gas indicator did not detect methane gas in any of the boreholes.

6. Grain Size Anlyses

Two (2) grain size analyses were conducted on soil samples recovered from Boreholes 1 and 13. The grain size distribution curves are included in Appendix A. The following Table 1 presents the estimated soil permeabilities based on the Unified Soil Classification of the grain size distribution curves.

Table 1: Soil Permeabilities

Location	Soil Types	Estimated Coefficient of Permeability (cm/sec)
Borehole 1 (1.5 – 2.0 m)	Fine to Medium Sand	10^{-3} to 10^{-4}
Borehole 13 (6.1 – 6.5 m)	Sandy Silt Till	10^{-5} to 10^{-6}

7. Engineering Discussion and Recommendations

7.1 General

The project involves the design and construction of numerous single-family and townhouse lots, three (3) medium density blocks, two (2) school blocks and one (1) mixed-use block together with the necessary support infrastructure such as roads, sewers and other services.

The following subsections provide geotechnical engineering guidelines for the design and construction of the proposed residential development.

7.2 Site Grading

Final site grades have not been established at the time of this investigation. However, in view of the rolling topography, it is anticipated some regrading (cut and fill operations) will be carried out at the site. The following procedures are recommended for the construction of structural fill for building lots and pavement areas, where required.

- All vegetation, topsoil, topsoil-stained and loose native soil should be removed from proposed building and pavement areas.

- The exposed subgrade surface should be proofrolled with a heavy roller and examined by a geotechnical engineer. Any soft areas detected during the proofrolling process should be subexcavated and replaced with approved material.

- Low areas can then be brought up to final subgrade level with approved on-site or imported material placed in lifts not exceeding 300 mm and compacted to 100% standard Proctor maximum dry density (SPMDD) within building areas ("engineered fill") and 95% SPMDD to within 600 mm of final subgrade level and 98% SPMDD for the upper 600 mm in pavement areas. The moisture content of the fill to be placed should be at or near its optimum moisture content in order to assure the specified densities can be achieved with reasonable compactive effort. Some of the on-site soils will require partial drying before they can be properly compacted. Any organic or excessively wet or otherwise deleterious material should not be used for backfilling purposes.

- Fill and cut slopes should not be steeper than 2 horizontal to 1 vertical and should be protected from surface erosion.

- All imported borrow fill material from local sources should be free from organic material and foreign objects (i.e. trees, roots, debris, etc.) and should be tested geotechnically by **Exp Services Inc.** prior to transport to the site. In addition, the chemical quality of the borrow fill material should be assessed by **Exp Services Inc.** in accordance with land use criteria listed in the Ministry of the Environment standards (Ontario Regulation 153), dated July 27, 2009.

- All excavation, backfilling and compaction operations should be monitored on a full-time basis by geotechnical staff to approve materials and to ensure the specified degrees of compaction have been obtained.

7.3 Site Servicing

7.3.1 Sewer and Watermain Installation

7.3.1.1 Open Cut Excavation

The sewer and watermain invert levels have not yet been determined. Based on the results of the investigation, excavations for sewer and watermain installation will be carried out within loose sandy silt, compact to dense sand, and loose to very dense sandy silt till. Saturated conditions will be encountered above invert level throughout the site where saturated sandy silt and sandy silt till are present at shallow depths and where wet sand/sand and gravel seams and layers in the sandy silt till are present at varying depths.

Subject to groundwater control measures discussed in the following section, excavation may be carried out in open cuts using conventional equipment. Side slopes of temporary excavation must conform to the latest edition of the Occupational Health and Safety Act (OHSA) and local regulations. Within the meaning of OHSA, moist, compact to very dense sandy silt till is classified as a Type 2 soil. Compact to very dense sandy silt till containing wet sand seams and layers or saturated zones is classified as a Type 3 soil. Loose, saturated sandy silt is classified as a Type 4 soil. Locally, due to spatial restrictions, vertical trenching may be required. It is our opinion steeper temporary slopes may be permitted if a trench box is utilized, subject to on-site inspection.

It should also be noted occasional cobbles and boulders were noted within the sandy silt till deposit and their presence may influence the progress of excavation. Consequently, provisions should be made in the contract documents to cover any delays caused by boulder obstructions.

7.3.1.2 Groundwater Control

Groundwater seepage into the trenches should be anticipated from the upper saturated sandy silt stratum and form wet sand/sand and gravel seams and layers and saturated zones in the sandy silt till deposit. The quantity of water from these sources will vary depending upon the extent and thickness of individual wet seams and layers and saturated zones. It should be recognized groundwater levels are also influenced by the effects of precipitation as well as seasonal fluctuations. It is our opinion the seepage produced by these sources can be handled using conventional sump pumping in conjunction with oversized excavations.

7.3.1.3 Pipe Bedding

It is anticipated the sewer and watermain pipes will be founded on competent native soils or on engineered fill. Provided adequate groundwater control measures are implemented, no bearing capacity problems are envisaged.

The pipe bedding should consist of a minimum thickness of 100 mm compacted 19 mm crusher-run limestone for P.V.C. pipe and a minimum thickness of 150 mm HL-6 stone for concrete pipe. If the founding subgrade is susceptible to disturbance due to water seepage, the pipe bedding for P.V.C. pipe should consist of 100 mm compacted 19 mm crusher-run limestone above at least 150 mm of 19 mm clear stone. However, the clear stone layer must be completely wrapped in a geotextile filter fabric to prevent the migration of fines into the void spaces of the clear stone which could lead to loss of subgrade support, subsequent settlement and possible failure of the pipe. The chosen geotextile should be compatible with the existing soils on site. For preliminary guidance, it is anticipated Terrafix 270R or similar should suffice. HL-6 stone bedding should also be wrapped in filter fabric for a wet trench condition.

The base of the excavations in the competent compact to very dense soils should remain stable provided excavations are not left open for extended periods of time and the work is done in accordance with good construction practice.

The bedding material should be placed in 150 mm lifts and compacted to at least 98% SPMDD. Particular attention should be given to ensure material placed beneath the bottom quadrants of the pipe is adequately compacted. Compaction is not required for clear stone or HL-6 stone bedding.

Pipe cover material should consist of fine sand which can be more readily compacted with light equipment to avoid damaging the pipes. The cover material should be placed in 150 mm lifts, compacted to 98% SPMDD and extend to 300 mm above the top of the pipe.

7.3.1.4 Backfilling Operations

The sandy silt and portions of the sandy silt till are saturated and may be difficult to compact depending on the time of year. For construction carried out in dry summer months and allowing for some moisture loss, compaction of most of these materials to 95% SPMDD should be attainable. Any organic or excessively wet material should not be used as trench backfill.

All backfilling and compaction operations should be closely examined by representatives of this office to ensure uniform compaction to specification requirements, especially in the vicinity of manholes and in all areas that are not readily accessible to compaction equipment, etc. All backfill should be placed in maximum 300 mm horizontal lifts and uniformly compacted to 95% SPMDD. For trenches below pavement areas, the upper 600 mm of backfill should be compacted to 98% SPMDD.

To minimize potential problems, backfilling operations should follow closely after excavation and pipe installation so only a minimal length of trench is exposed. This will minimize wetting of the subgrade and

backfill materials. Should construction extend to the winter season, particular attention should be given to ensure frozen material is not used as backfill.

7.3.2 Pavement Design and Construction

The pavement subgrade is expected to comprise native sandy silt and sandy silt till and compacted engineered fill. Based on estimated CBR values, the frost susceptibility of the anticipated subgrade materials, expected traffic loading, and assuming adequate drainage, the following minimum pavement structure component thicknesses specified by the City of Pickering (Table 2) are considered satisfactory. Other thickness combinations can be used provided the Granular Base Equivalency (GBE) is maintained and any minimum component thickness specified by the City of Pickering is met.

Table 2: Recommended Pavement Structure Thicknesses

Pavement Layer	Compaction Requirements	Local Roadway	Collector Roadway	Arterial/Roadway (Future Realigned Whitevale Road)	Driveway
Asphaltic Concrete (OPSS 310)	92 to 96.5% MRD	35 mm HL3 50 mm HL8	35 mm HL3 70 mm HL8	35 mm HL3 100 mm HL8	50 mm HL3A
OPSS Granular A Base (OPSS 1010)	100% SPMDD*	150 mm	150 mm	150 mm	150 mm
OPSS Granular B Subbase (OPSS 1010)	100% SPMDD*	300 mm	450 mm	450 mm	-

* Denotes standard Proctor maximum dry density, ASTM-D698

The subgrade should be compacted to 98% SPMDD for the upper 600 mm.

The foregoing design assumes construction is carried out during dry periods and the subgrade is stable under the load of construction equipment. If construction is carried out during wet weather and heaving or rolling of the subgrade is experienced, additional thickness of subbasecourse material may be required.

The long-term performance of the pavement structure is highly dependent upon the subgrade support conditions. Stringent construction control procedures should be maintained to ensure uniform subgrade moisture and density conditions are achieved. In addition, the need for adequate drainage cannot be over-emphasized. The finished pavement surface and underlying subgrade should be free of depressions and sloped to provide effective surface drainage toward catchbasins. Surface water should not be allowed to pond adjacent to the outside edges of pavement areas.

Additional comments on the construction of proposed roadways are as follows:

1. As part of the subgrade preparation, proposed roadways should be stripped of topsoil and other obviously unsuitable material. Soft or spongy subgrade areas identified during proofrolling should be subexcavated and replaced with suitable approved backfill. Fill required to raise the grades to design elevations should be organic-free and at a moisture content which will permit compaction to 98% SPMDD. The final subgrade surface should be properly shaped and crowned.

2. In view of the silty nature of the subgrade soils, we recommend subdrains be installed on both sides of the roadways at least 300 m below the granular subbase. This will ensure no water collects in the granular courses which could result in pre-mature pavement failure during the spring thaw.

3. To minimize problems of differential movement between the pavement and catchbasins/manholes due to frost action, backfill around these structures should consist of free-draining granular material. The granular material should be compacted to 98% SPMDD with a small tamper to avoid damaging the structures. In addition, catchbasins should be perforated just above the drain and the holes screened with filter cloth.

4. The most severe loading conditions on light-duty pavement areas and the subgrade may occur during construction. Consequently, special provisions such as restricted lanes, half-loads during paving, etc. may be required, especially if construction is carried out during unfavorable weather.

7.4 Building Construction

7.4.1 Foundation Considerations

The site is considered suitable for construction of the single family dwellings, townhouses, schools, medium-density blocks, and mixed-use block. Since final site grades have not yet been established, two (2) foundation schemes are being presented for consideration; namely footings on native soils and footings on engineered fill. A composite system incorporating the two (2) schemes would also be geotechnically feasible for low-rise structures only.

7.4.1.1 Conventional Footings

The proposed single family dwellings, townhouses, schools and other low-rise residential and commercial buildings may be supported on conventional spread and strip footings founded on the competent native sand and sandy silt till below all existing topsoil and loose soils. Footings founded on the compact to very dense sand and sandy silt till may be designed for a bearing capacity of 150 kPa at S.L.S. (Serviceability Limit States), subject to inspection during construction. The factored bearing capacity at U.L.S. (Ultimate Limit States) is 225 kPa.

Any mid-rise condominiums with high column loading within the medium-density and mixed-use blocks at the central and north parts of the site may be supported on conventional spread and strip footings founded on the dense to very dense sandy silt till. For preliminary design purposes, footings founded on

the dense to very dense sandy silt till may be designed for a bearing capacity of 500 kPa at S.L.S. The factored bearing capacity at U.L.S. is 750 kPa. When the location of any mid-rise structures has been finalized, a more detailed soil investigation should be carried out to provide geotechnical parameters for final design and construction.

7.4.1.2 Engineered Fill

The proposed single family dwellings, townhouses, schools and other low-rise residential and commercial buildings may also be supported on footings founded on engineered fill developed over the competent native sandy silt till and designed for a bearing capacity of 150 kPa at S.L.S. The engineered fill should be constructed to above the level of the garage footings for the single family dwellings.

The engineered fill should be constructed by removing all topsoil, topsoil-stained soil and the upper loose sandy silt and sandy silt till soils down to the competent sandy silt till subgrade. The engineered fill should extend at least 3 m beyond the outside edge of exterior footings. The required extent of engineered fill should be determined based on a known fixed location for the structures and adherement of the conditions outlined above. The boundaries of the engineered fill should be laid out by a surveyor in consultation with engineering staff from **Exp Services Inc.**

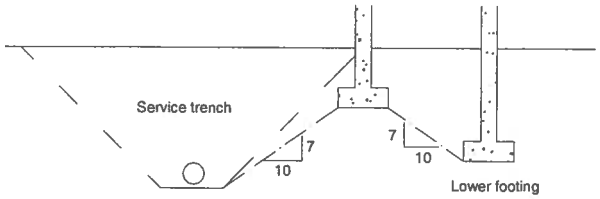
Prior to placement of engineered fill, the exposed subgrade surface should be examined by geotechnical personnel. Any loose or soft areas detected during proofrolling should be removed and replaced with approved material compacted to 100% standard Proctor maximum dry density (SPMDD). The areas can then be brought up to design subgrade level with approved on-site or imported material placed in lifts not exceeding 300 mm and compacted to 100% SPMDD. Some of the on-site soils will require partial drying before they can be compacted to 100% SMPDD.

The engineered fill construction should be monitored on a full-time basis by geotechnical personnel from **Exp Services Inc.** to examine and approve backfill materials, to evaluate placement operations, and to verify the specified degree of compaction is being achieved uniformly throughout the fill.

It is recommended nominal reinforcing steel be installed in the footings and foundation walls of structures supported on engineered fill to minimize cracking from differential settlement. The basement walls should be reinforced continuously with 2-15M bars above the footings and below the window sill.

7.4.1.3 Foundations General

Footings which are to be placed at different elevations should be located such that the higher footings are set below a line drawn up at 10 horizontal to 7 vertical from the near edge of the lower footing or existing service trench, as indicated on the following sketch:



FOOTINGS NEAR SERVICE TRENCHES OR AT DIFFERENT ELEVATIONS

All footings exposed to seasonal freezing conditions should be protected from frost action by at least 1.2 m of soil cover or equivalent insulation, depending on the final design requirements.

The total and differential settlements of well designed and constructed footings on native soils and on engineered fill placed in accordance with the above recommendations are expected to be less than 25 mm and 20 mm, respectively.

It should be noted the recommended bearing capacities have been calculated by **exp** from the borehole information for the design stage only. The investigation and comments are necessarily ongoing as new information on underground conditions becomes available. For example, it should be appreciated modification to bearing levels may be required if unforeseen subsoil conditions are revealed after the excavation is exposed to full view or if final design decisions differ from those assumed in this report. For this reason, this office should be retained to review final foundation drawings and to provide field inspections during the construction stage.

7.4.2 Excavation and Groundwater Control

Excavation for single family dwellings or townhouses with a basement will extend to about 2 to 2.5 m below finished grade. Excavation for mid-rise condominiums with one (1) level of underground parking will extend to about 3.5 to 4 m below finished grade. Excavation should be relatively straightforward and must be carried out in accordance with the latest edition of the Occupational Health and Safety Act and local regulations. For preliminary guidance, side slopes of 1 vertical to 1 horizontal may be used subject to geotechnical inspection. Where loose soil is encountered, it may be necessary to locally flatten the side slopes.

Groundwater seepage into the excavation(s) should be anticipated during construction. It should be possible to control and remove seepage water from the upper saturated sandy silt stratum and from wet sand/sand and gravel seams and layers and saturated zones in the sandy silt till deposit entering the excavation(s) using conventional construction dewatering techniques, i.e. pumping from sumps.

It should be noted boulders frequently occur in till deposits and their presence may influence the progress of excavation. Consequently, provisions should be made in the contract documents to cover any delays caused by the presence of boulders.

7.4.3 Floor Slab Construction and Permanent Drainage

Floor slabs for proposed structures can be constructed as a slab-on-grade on native competent soil or on engineered fill constructed in the manner described in the "Site Grading" subsection of the report. A moisture barrier consisting of 250 mm of 19 mm clear stone should be placed between the prepared subgrade and the floor slab. If the subgrade is wet, the clear stone should be placed directly on top of synthetic filter fabric covering the subgrade. Within any unheated areas and entrances to structures with underground parking, 50 mm of Styrofoam insulation should be provided below the floor slab to protect against frost heave.

Perimeter drainage is required to remove any water adjacent to basement walls. Details are provided on attached Drawing No. 33. For structures with underground parking, it may be more practical to incorporate an exterior drainage system attached to the backside of the basement wall connected to a frost free outlet inside the building. The exterior drainage should consist of Terradrain 200 or equivalent covering the entire basement wall in order to reduce the risk of water penetration. The Terradrain panels should be outletted through the basement wall into the basement as per attached Drawing No. 34.

In addition, underfloor drains should be installed in areas where persistent groundwater seepage is encountered during excavation. The underfloor drains should be spaced at 3 to 4 m centres and consist of 100 mm diameter perforated pipe surrounded by 150 mm of 19 mm clear stone, protected by geotextile filter cloth, and connected to a frost free outlet.

7.4.4 Earth Pressure on Subsurface Walls

The lateral earth pressure acting on subsurface walls (i.e. basement walls) may be calculated from the following equation:

$$p = k(\gamma h + q)$$

where: p = the pressure in kPa acting against any subsurface wall at depth, h, below the ground surface;

k = the earth pressure coefficient considered to be appropriate for the subsurface walls, for this case, 0.35;

γ = the bulk unit weight of the backfill, use 22.5 kN/m^3;

h = the depth in m below the ground surface at which the pressure, p, is to be computed; and

q = the value of any adjacent surcharge in kPa which may be acting close to the wall.

The above expression assumes an effective perimeter tile drain system will be incorporated to prevent the build-up of hydrostatic pressure behind the subsurface wall. All subsurface walls should be

waterproofed. To minimize infiltration of surface water, the upper 600 mm of backfill should comprise compacted relatively impervious material sloped away from the structure.

7.4.5 Earthquake Considerations

The recommendations for the geotechnical aspects to determine the earthquake loading are presented below.

7.4.5.1 Subsoil Conditions

The subsoil and groundwater information at this site have been examined in relation to Section 4.1.8.4 of OBC 2006. The subsoil consisted of topsoil, sandy silt, sand, and sandy silt till. The foundations will be founded on the competent native sand and sandy silt till or on engineered fill. The reported N-values for the soil below the founding level ranged from 10 to 60 for 75 mm.

There have been no shear wave velocity measurements carried out at this site and therefore, N-values will be used to determine the site classification.

7.4.5.2 Depth of Boreholes

Table 4.1.8.4.A. Site Classification for Seismic Site Response in OBC 2006 indicated that to determine the site classification, the average properties in the top 30 m are to be used. The boreholes at this site were advanced to depths of 9.25 to 9.60 m as per the terms of reference. No bedrock was encountered at this site.

7.4.5.3 Site Classification

Based on the soil conditions, the Site Class for this site is "C" as per Table 4.1.8.4.A, Site Classification for Seismic Site Response, OBC 2006.

7.4.6 Subsurface Concrete

One (1) soil sample from Borehole 12 was submitted for analysis of pH and sulphate content. The test results, included in Appendix B, indicated a pH value of 7.95 and a sulphate content of 33 ppm as SO_4, indicating a "negligible" degree of sulphate attack on subsurface concrete structures. For information regarding selection of cement type for subsurface concrete structures, reference is made to C.S.A. Standard CAN3-A23.

8. Limited Environmental Soil Testing

Five (5) soil samples from Boreholes 2, 8, 13, 19 and 28 were analyzed for selected general and inorganic parameters. The results of these analyses were compared with soil land use criteria listed in Table 2 (Full Depth Generic Site Condition Standards in a Potable Ground Water Condition) and Table 3 (Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition) of the Ministry of the Environment standards (Ontario Regulation 153), dated July 27, 2009. The analytical results (Certificate of Analysis) are compiled in Appendix C.

The five (5) soil samples met all property use standards for fine to medium and coarse textured soils in Table 2 and Table 3 of the Ministry of the Environment standards, dated July 27, 2009. Based on the chemical test results, excess soils requiring off-site disposal can be taken to any land based site accepting fill, subject to approval from the owner of the receiving site.

9. General Comments

Exp Services Inc. should be retained for a general review of the final design and specifications to verify this report has been properly interpreted and implemented. If not accorded the privilege of making this review, **Exp Services Inc.** will assume no responsibility for interpretation of the recommendations in the report.

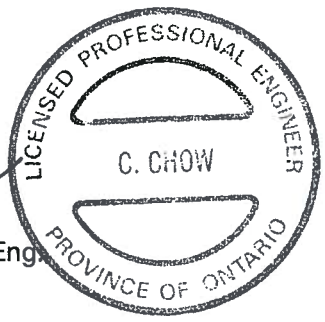
The comments given in this report are intended only for the guidance of design engineers. The number of boreholes required to determine the localized underground conditions between boreholes affecting construction costs, techniques, sequencing, equipment, scheduling, etc. could be greater than has been carried out for design purposes. Contractors bidding on or undertaking the works should, in this light, decide on their own investigations as well as their own interpretations of the factual borehole results so that they may draw their own conclusions as to how the subsurface conditions may affect them.

More specific information with respect to the conditions between samples or the lateral and vertical extent of materials may become apparent during excavation operations. The interpretation of the borehole information must, therefore, be validated during excavation operations. Consequently, during the future development of the property, conditions not observed during this investigation may become apparent; should this occur, **Exp Services Inc.** should be contacted to assess the situation and additional testing and reporting may be required. **Exp Services Inc.** has qualified personnel to provide assistance in regard to future geotechnical issues related to this property.

We trust this report is satisfactory for your purposes. Should you have any questions or comments, please do not hesitate to contact this office.

Yours truly,

Exp Services Inc.



Clement Chow, P. Eng.
Project Engineer

Peter Chan, P.Eng.
Manager, Geotechnical Division

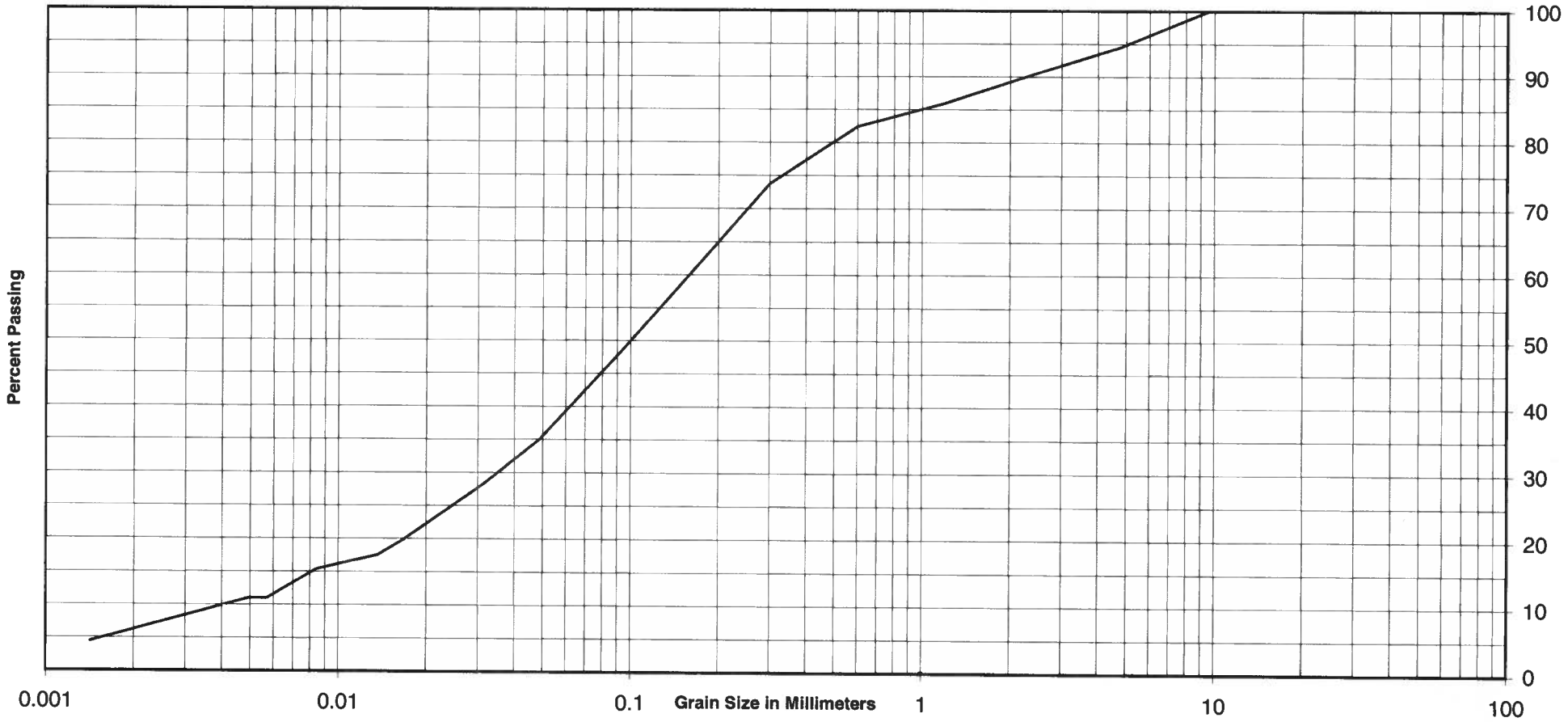
Appendix A
Grain Size Distribution Curves

UNIFIED SOIL CLASSIFICATION SYSTEM

GRAIN SIZE DISTRIBUTION

PROJECT NO: BRGE 00360451A

SILT & CLAY	SAND			GRAVEL	
	FINE	MEDIUM	COARSE	FINE	COARSE



PROJECT: Proposed Residential Development
LOCATION: Part of Lots 27 and 28, Concession 4, Pickering
BOREHOLE #: 13
SAMPLE #: 165
DEPTH: 6.10 to 6.50 m
ELEVATION: N/A

Classification of Sample:

Grey Sandy Silt Till

ENCLOSURE No.:

Appendix B
pH and Sulphate Analysis

Maxxam Job #: A945885
Report Date: 2009/04/30

Trow Associates Inc
Client Project #: BRGE00360451A

RESULTS OF ANALYSES OF SOIL

Maxxam ID		CG8603		
Sampling Date		2009/04/13		
	Units	BH12 1.5-2.0M	RDL	QC Batch
Inorganics				
Available (CaCl2) pH	pH	7.95		1800644
Soluble (20:1) Sulphate (SO4)	ug/g	33	20	1802495

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Table 9
Requirements For Concrete Subjected to Sulphate Attack

Exposure classification	Degree of exposure	Water-soluble sulphate (SO_4) in soil sample, %	Sulphate (SO_4) in ground water samples, mg/L	Minimum specified 28-day compressive strength, MPa*	Maximum water/cementing materials ratio*	Portland cement to be used†
S-1	Very severe	over 2.0	over 10,000	35	0.40	50
S-2	Severe	0.20 to 2.0	1,500 to 10,000	32	0.45	50
S-3	Moderate	0.10 to 0.20	150 to 1,500	30	0.50	20‡, 40, or 50

*See Clause 15.1.4 and 15.1.5.
†See Clause 15.1.6.
‡Type 20 cement with moderate sulphate resistance (see Clause 3.1.2).

Appendix C
Certificate of Analysis for Environmental Soil Testing

Your Project #: BRGE00360451A
Your C.O.C. #: 414021

Attention: Simon Lan
Trow Associates Inc
70 Gibson Dr
Unit 12
Markham, ON
L3R 4C3

Report Date: 2009/04/30

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: A945885
Received: 2009/04/22, 16:11

Sample Matrix: Soil
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Hot Water Extractable Boron	2	2009/04/28	2009/04/28	CAM SOP-00408	EPA 3050B
Hot Water Extractable Boron	3	2009/04/29	2009/04/29	CAM SOP-00408	EPA 3050B
Free Cyanide	2	N/A	2009/04/28	CAM SOP-00457	SM 4500CN-I
Free Cyanide	3	N/A	2009/04/29	CAM SOP-00457	SM 4500CN-I
Conductivity	5	N/A	2009/04/28	CAM SOP-00414	APHA 2510
Chromium (VI) in Soil	5	2009/04/29	2009/04/29	CAM SOP-00420	EPA 3060A
Acid Extr. Metals (aqua regia) by ICPMS	5	2009/04/29	2009/04/29	CAM SOP-00447	EPA 6020
MOISTURE	5	N/A	2009/04/27	CAM SOP-00445	McKeague 2nd ed 1978
pH CaCl2 EXTRACT	5	2009/04/28	2009/04/21	CAM SOP-00413	SM 4500 H
pH CaCl2 EXTRACT	1	2009/04/28	2009/04/28	CAM SOP-00413	SM 4500 H
Sodium Adsorption Ratio (SAR)	5	2009/04/23	2009/04/29	Ont SOP 0072	EPA 6010
Sulphate (20:1 Extract)	1	N/A	2009/04/30	CAM SOP-00464	EPA 375.4

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
* Results relate only to the items tested.

Encryption Key

Sam Lyons
30 Apr 2009 16:41:50 -04:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

SAMANTHA LYONS, Project Manager
Email: samantha.lyons@maxxamanalytics.com
Phone# (905) 817-5700 Ext:5797

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CALA have approved this reporting process and electronic report format.

For Service Group specific validation please refer to the Validation Signature Page

Total cover pages: 1

Maxxam Job #: A945885
Report Date: 2009/04/30

Trow Associates Inc
Client Project #: BRGE00360451A

O'REG 153 METALS & INORGANICS COMPLETE (SOIL)

Maxxam ID		CG8598	CG8598		CG8599		CG8600		
Sampling Date		2009/04/16	2009/04/16		2009/04/14		2009/04/15		
	Units	BH2 0.75-1.2M	BH2 0.75-1.2M Lab-Dup	QC Batch	BH8 0-0.6M	QC Batch	BH13 0.75-1.2M	RDL	QC Batch
Calculated Parameters									
Sodium Adsorption Ratio	N/A	1.0		1796632	1.1	1796632	0.98	N/A	1796632
Inorganics									
Conductivity	mS/cm	0.11		1800630	0.16	1800630	0.13	0.002	1800630
Free Cyanide	ug/g	<0.01	<0.01	1800743	<0.01	1800722	<0.01	0.01	1801790
Moisture	%	10		1799643	19	1799643	12	0.2	1799643
Available (CaCl2) pH	pH	7.90		1800675	7.56	1800675	7.76		1800675
Metals									
Hot Water Ext. Boron (B)	ug/g	<0.01		1802081	0.19	1802081	0.04	0.01	1800826
Chromium (VI)	ug/g	<0.2	<0.2	1801755	<0.2	1801755	<0.2	0.2	1801755
Acid Extractable Antimony (Sb)	ug/g	<0.2		1801825	<0.2	1801825	<0.2	0.2	1801825
Acid Extractable Arsenic (As)	ug/g	2		1801825	2	1801825	<1	1	1801825
Acid Extractable Barium (Ba)	ug/g	38		1801825	62	1801825	37	0.5	1801825
Acid Extractable Beryllium (Be)	ug/g	0.2		1801825	0.4	1801825	0.2	0.2	1801825
Acid Extractable Cadmium (Cd)	ug/g	<0.1		1801825	0.2	1801825	<0.1	0.1	1801825
Acid Extractable Chromium (Cr)	ug/g	9		1801825	16	1801825	6	1	1801825
Acid Extractable Cobalt (Co)	ug/g	4.1		1801825	6.0	1801825	5.4	0.1	1801825
Acid Extractable Copper (Cu)	ug/g	5.2		1801825	7.1	1801825	2.8	0.5	1801825
Acid Extractable Lead (Pb)	ug/g	4		1801825	9	1801825	2	1	1801825
Acid Extractable Molybdenum (Mo)	ug/g	<0.5		1801825	<0.5	1801825	<0.5	0.5	1801825
Acid Extractable Nickel (Ni)	ug/g	7.2		1801825	12	1801825	4.9	0.5	1801825
Acid Extractable Selenium (Se)	ug/g	<0.5		1801825	<0.5	1801825	<0.5	0.5	1801825
Acid Extractable Silver (Ag)	ug/g	<0.2		1801825	<0.2	1801825	<0.2	0.2	1801825
Acid Extractable Thallium (Tl)	ug/g	<0.05		1801825	0.07	1801825	0.09	0.05	1801825
Acid Extractable Vanadium (V)	ug/g	17		1801825	27	1801825	35	5	1801825
Acid Extractable Zinc (Zn)	ug/g	21		1801825	38	1801825	56	5	1801825
Acid Extractable Mercury (Hg)	ug/g	<0.05		1801825	<0.05	1801825	<0.05	0.05	1801825

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: A945885
Report Date: 2009/04/30

Trow Associates Inc
Client Project #: BRGE00360451A

O'REG 153 METALS & INORGANICS COMPLETE (SOIL)

Maxxam ID		CG8600			CG8601			CG8602		
Sampling Date		2009/04/15			2009/04/13			2009/04/08		
	Units	BH13 0.75-1.2M Lab-Dup	RDL	QC Batch	BH19 1.5-2.0M	RDL	QC Batch	BH28 0-0.6M	RDL	QC Batch
Calculated Parameters										
Sodium Adsorption Ratio	N/A		N/A	1796632	1.0	N/A	1796632	0.92	N/A	1796632
Inorganics										
Conductivity	mS/cm		0.002	1800630	0.13	0.002	1800630	0.16	0.002	1800630
Free Cyanide	ug/g		0.01	1801790	<0.01	0.01	1801790	0.01	0.01	1801790
Moisture	%		0.2	1799643	8.8	0.2	1799643	11	0.2	1799643
Available (CaCl2) pH	pH	7.79		1800675	7.93		1800675	7.73		1800675
Metals										
Hot Water Ext. Boron (B)	ug/g		0.01	1800826	0.03	0.01	1802081	0.26	0.01	1800826
Chromium (VI)	ug/g		0.2	1801755	<0.2	0.2	1801755	<0.2	0.2	1801755
Acid Extractable Antimony (Sb)	ug/g		0.2	1801825	<0.2	0.2	1801825	<0.2	0.2	1801814
Acid Extractable Arsenic (As)	ug/g		1	1801825	1	1	1801825	2	1	1801814
Acid Extractable Barium (Ba)	ug/g		0.5	1801825	42	0.5	1801825	52	0.5	1801814
Acid Extractable Beryllium (Be)	ug/g		0.2	1801825	0.2	0.2	1801825	0.3	0.2	1801814
Acid Extractable Cadmium (Cd)	ug/g		0.1	1801825	<0.1	0.1	1801825	0.2	0.1	1801814
Acid Extractable Chromium (Cr)	ug/g		1	1801825	9	1	1801825	12	1	1801814
Acid Extractable Cobalt (Co)	ug/g		0.1	1801825	4.0	0.1	1801825	4.7	0.1	1801814
Acid Extractable Copper (Cu)	ug/g		0.5	1801825	3.5	0.5	1801825	4.9	0.5	1801814
Acid Extractable Lead (Pb)	ug/g		1	1801825	4	1	1801825	7	1	1801814
Acid Extractable Molybdenum (Mo)	ug/g		0.5	1801825	<0.5	0.5	1801825	<0.5	0.5	1801814
Acid Extractable Nickel (Ni)	ug/g		0.5	1801825	7.1(1)	2.5	1801825	8.2	0.5	1801814
Acid Extractable Selenium (Se)	ug/g		0.5	1801825	<0.5	0.5	1801825	<0.5	0.5	1801814
Acid Extractable Silver (Ag)	ug/g		0.2	1801825	<0.2	0.2	1801825	<0.2	0.2	1801814
Acid Extractable Thallium (Tl)	ug/g		0.05	1801825	<0.05	0.05	1801825	0.17	0.05	1801814
Acid Extractable Vanadium (V)	ug/g		5	1801825	17	5	1801825	21	5	1801814
Acid Extractable Zinc (Zn)	ug/g		5	1801825	22	5	1801825	26	5	1801814
Acid Extractable Mercury (Hg)	ug/g		0.05	1801825	<0.05	0.05	1801825	<0.05	0.05	1801814

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) - Detection Limit was raised due to matrix interferences.

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Maxxam Job #: A945885
Report Date: 2009/04/30

Trow Associates Inc
Client Project #: BRGE00360451A

RESULTS OF ANALYSES OF SOIL

Maxxam ID		CG8603		
Sampling Date		2009/04/13		
	Units	BH12 1.5-2.0M	RDL	QC Batch
Inorganics				
Available (CaCl2) pH	pH	7.95		1800644
Soluble (20:1) Sulphate (SO4)	ug/g	33	20	1802495

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: A945885
Report Date: 2009/04/30

Trow Associates Inc
Client Project #: BRGE00360451A

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
1799643	Moisture	2009/04/27							4.4	50		
1800630	Conductivity	2009/04/28					<0.002	mS/cm	9.4	35	109	75 - 125
1800722	Free Cyanide	2009/04/28	113	75 - 125	107	75 - 125	<0.01	ug/g	NC	35		
1800743	Free Cyanide	2009/04/28	97	75 - 125	109	75 - 125	<0.01	ug/g	NC	35		
1800826	Hot Water Ext. Boron (B)	2009/04/28					<0.01	ug/g			98	77 - 121
1801755	Chromium (VI)	2009/04/29	76	75 - 125	108	75 - 125	<0.2	ug/g	NC	35	102	85 - 115
1801790	Free Cyanide	2009/04/29	100	75 - 125	103	75 - 125	<0.01	ug/g	NC	35		
1801814	Acid Extractable Antimony (Sb)	2009/04/29	100	75 - 125			<0.2	ug/g	NC	35	89	75 - 125
1801814	Acid Extractable Arsenic (As)	2009/04/29	106	75 - 125			<1	ug/g	NC	35	100	75 - 125
1801814	Acid Extractable Barium (Ba)	2009/04/29	99	75 - 125			0.5, RDL=0.5	ug/g	6.1	35	97	75 - 125
1801814	Acid Extractable Beryllium (Be)	2009/04/29	100	75 - 125			<0.2	ug/g	NC	35	99	75 - 125
1801814	Acid Extractable Cadmium (Cd)	2009/04/29	101	75 - 125			<0.1	ug/g	NC	35	93	75 - 125
1801814	Acid Extractable Chromium (Cr)	2009/04/29	97	75 - 125			<1	ug/g	5.9	35	91	75 - 125
1801814	Acid Extractable Cobalt (Co)	2009/04/29	105	75 - 125			<0.1	ug/g	6.9	35	93	75 - 125
1801814	Acid Extractable Copper (Cu)	2009/04/29	104	75 - 125			<0.5	ug/g	0.2	35	100	75 - 125
1801814	Acid Extractable Lead (Pb)	2009/04/29	102	75 - 125			<1	ug/g	NC	35	104	75 - 125
1801814	Acid Extractable Molybdenum (Mo)	2009/04/29	104	75 - 125			<0.5	ug/g	NC	35	95	75 - 125
1801814	Acid Extractable Nickel (Ni)	2009/04/29	98	75 - 125			<0.5	ug/g	4.8	35	90	75 - 125
1801814	Acid Extractable Selenium (Se)	2009/04/29	102	75 - 125			<0.5	ug/g	NC	35	119	50 - 150
1801814	Acid Extractable Silver (Ag)	2009/04/29	102	75 - 125			<0.2	ug/g	NC	35	91	75 - 125
1801814	Acid Extractable Thallium (Tl)	2009/04/29	95	75 - 125			<0.05	ug/g	NC	35	74(1)	75 - 125
1801814	Acid Extractable Vanadium (V)	2009/04/29	107	75 - 125			<5	ug/g	NC	35	99	75 - 125
1801814	Acid Extractable Zinc (Zn)	2009/04/29	98	75 - 125			<5	ug/g	NC	35	96	75 - 125
1801814	Acid Extractable Mercury (Hg)	2009/04/29	105	75 - 125			<0.05	ug/g			112	75 - 125
1801825	Acid Extractable Antimony (Sb)	2009/04/29	103	75 - 125			<0.2	ug/g	NC	35	89	75 - 125
1801825	Acid Extractable Arsenic (As)	2009/04/29	106	75 - 125			<1	ug/g	NC	35	98	75 - 125
1801825	Acid Extractable Barium (Ba)	2009/04/29	NC(2)	75 - 125			<0.5	ug/g	1.7	35	101	75 - 125
1801825	Acid Extractable Beryllium (Be)	2009/04/29	111	75 - 125			<0.2	ug/g	NC	35	107	75 - 125
1801825	Acid Extractable Cadmium (Cd)	2009/04/29	105	75 - 125			<0.1	ug/g	NC	35	90	75 - 125
1801825	Acid Extractable Chromium (Cr)	2009/04/29	109	75 - 125			<1	ug/g	3.2	35	93	75 - 125
1801825	Acid Extractable Cobalt (Co)	2009/04/29	108	75 - 125			<0.1	ug/g	3.8	35	101	75 - 125
1801825	Acid Extractable Copper (Cu)	2009/04/29	103	75 - 125			<0.5	ug/g	NC	35	104	75 - 125
1801825	Acid Extractable Lead (Pb)	2009/04/29	107	75 - 125			<1	ug/g	NC	35	104	75 - 125
1801825	Acid Extractable Molybdenum (Mo)	2009/04/29	111	75 - 125			<0.5	ug/g	NC	35	93	75 - 125
1801825	Acid Extractable Nickel (Ni)	2009/04/29	107	75 - 125			<0.5	ug/g	0.9	35	95	75 - 125
1801825	Acid Extractable Selenium (Se)	2009/04/29	105	75 - 125			<0.5	ug/g	NC	35	80	50 - 150
1801825	Acid Extractable Silver (Ag)	2009/04/29	104	75 - 125			<0.2	ug/g	NC	35	88	75 - 125
1801825	Acid Extractable Thallium (Tl)	2009/04/29	101	75 - 125			<0.05	ug/g	0.9	35	80	75 - 125
1801825	Acid Extractable Vanadium (V)	2009/04/29	NC(2)	75 - 125			<5	ug/g	5.3	35	107	75 - 125
1801825	Acid Extractable Zinc (Zn)	2009/04/29	NC(2)	75 - 125			<5	ug/g	4.7	35	92	75 - 125

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: A945885
Report Date: 2009/04/30

Trow Associates Inc
Client Project #: BRGE00360451A

QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits	% Recovery	QC Limits
1801825	Acid Extractable Mercury (Hg)	2009/04/29	99	75 - 125			<0.05	ug/g	NC	35	106	75 - 125
1802081	Hot Water Ext. Boron (B)	2009/04/29					<0.01	ug/g			97	77 - 121
1802495	Soluble (20:1) Sulphate (SO4)	2009/04/30	91	75 - 125	109	80 - 120	<20	ug/g	NC(3)	35		

N/A = Not Applicable
NC = Non-calculable
RDL = Reportable Detection Limit
RPD = Relative Percent Difference
(1) - The recovery was below the lower control limit. This may represent a low bias in some results for flagged analytes.
(2) - The recovery in the matrix spike was not calculated (NC). Because of the high concentration of this analyte in the parent sample, the relative difference between the spiked and unspiked concentrations is not sufficiently significant to permit a reliable recovery calculation.
(3) - Due to colour interferences, sample required dilution. Detection limit was adjusted accordingly.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel. (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Validation Signature Page

Maxxam Job #: A945885

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Eva Pranjic

EWA PRANJIC, M.Sc., C.Chem, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CALA have approved this reporting process and electronic report format.

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Maxxam Analytics Inc. 6740 Campobello Road, Mississauga, ON M6R [illegible]
Phone: 905-817-5700 Fax: 905-817-5777

22-Apr-09 16:11
SAMANTHA LYONS
A945885
NMI ENV-704

CHAIN OF CUSTODY RECORD

Page _____ of _____

INVOICE INFORMATION	REPORT INFORMATION	PROJECT INFORMATION	MAXXAM JOB NUMBER
Company Name: Trow Associates Inc.	Company Name:	Quotation #:	
Contact Name: Clement Chow	Contact Name:	P.O. #:	CHAIN OF CUSTODY #
Address: 7D Gibson Drive, Unit 12, Markham, Ontario	Address:	Project #: hrgeo0360 451a	00 414021
Phone: 905 470-0073 Fax: 905 470-9848	Phone: Fax:	Project Name:	
Email: clement.chow@trow.com	Email:	Location:	
		Sampled By: Clement Chow	

REGULATORY CRITERIA

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form.

☐ MISA ☐ Reg. 153 ☐ Table 1 ☐ Table 2 ☐ Table 3 Sewer Use ☐ Sanitary ☐ Storm Region: _____ ☐ Other _____ specify

☐ PWQO

☐ Reg. 558

Report Criteria on C of A? ☐

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM.

ANALYSIS REQUESTED (Please be specific)

TURNAROUND TIME (TAT) REQUIRED

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS.

Regular (Standard) TAT:
☑ 5 to 7 Working Days

Rush TAT: Rush Confirmation #: _____ (call lab for #)
☐ 1 day ☐ 2 days ☐ 3 days

DATE Required: _____

TIME Required: _____

Please note that TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

	Sample Identification	Date Sampled	Time Sampled	Matrix (gw, sw, Soil, etc.)	Regulated Drinking Water? (Y / N)	Metals Field Filtered? (Y / N)	Reg 153 Inorganics - Complete pH + SO4	# of Cont.	COMMENTS / TAT COMMENTS
1	BH 2 0.75-1.2m	April 6/09		Soil			✓	1	
2	BH 8 0-0.6m	April 14/09		Soil			✓	1	
3	BH 13 0.75-1.2m	April 15/09		Soil			✓	1	
4	BH 19 1.5-2.0m	April 13/09		Soil			✓	1	
5	BH 28 0-0.6m	April 8/09		Soil			✓	1	
6									
7	BH 12 1.5-2.0m	April 13/09		Soil			✓	1	
8									
9									
10									
11									
12									

'09 APR 22 16:1j

RELINQUISHED BY (Signature/Print)	RECEIVED BY (Signature/Print)	Date	Time	Laboratory Use Only
C. Chow Clement Chow	Jim	09/04/22	16:11	Temperature (°C) on Receipt: 7/7/8°C; Condition of Sample on Receipt: ☐ OK ☐ SIF

*MANDATORY SECTIONS IN GREY MUST BE FILLED OUT. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

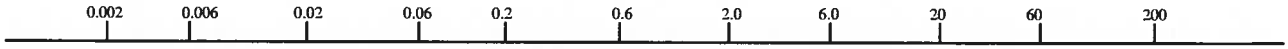
DRAWINGS
Borehole Location Plan
Borehole Logs
Exterior Drainage Systems

Notes On Sample Descriptions

1. All sample descriptions included in this report follow the Canadian Foundations Engineering Manual soil classification system. This system follows the standard proposed by the International Society for Soil Mechanics and Foundation Engineering. Laboratory grain size analyses provided by Trow also follow the same system. Different classification systems may be used by others; one such system is the Unified Soil Classification. Please note that, with the exception of those samples where a grain size analysis has been made, all samples are classified visually. Visual classification is not sufficiently accurate to provide exact grain sizing or precise differentiation between size classification systems.

ISSMFE SOIL CLASSIFICATION

CLAY	SILT			SAND			GRAVEL			COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE		



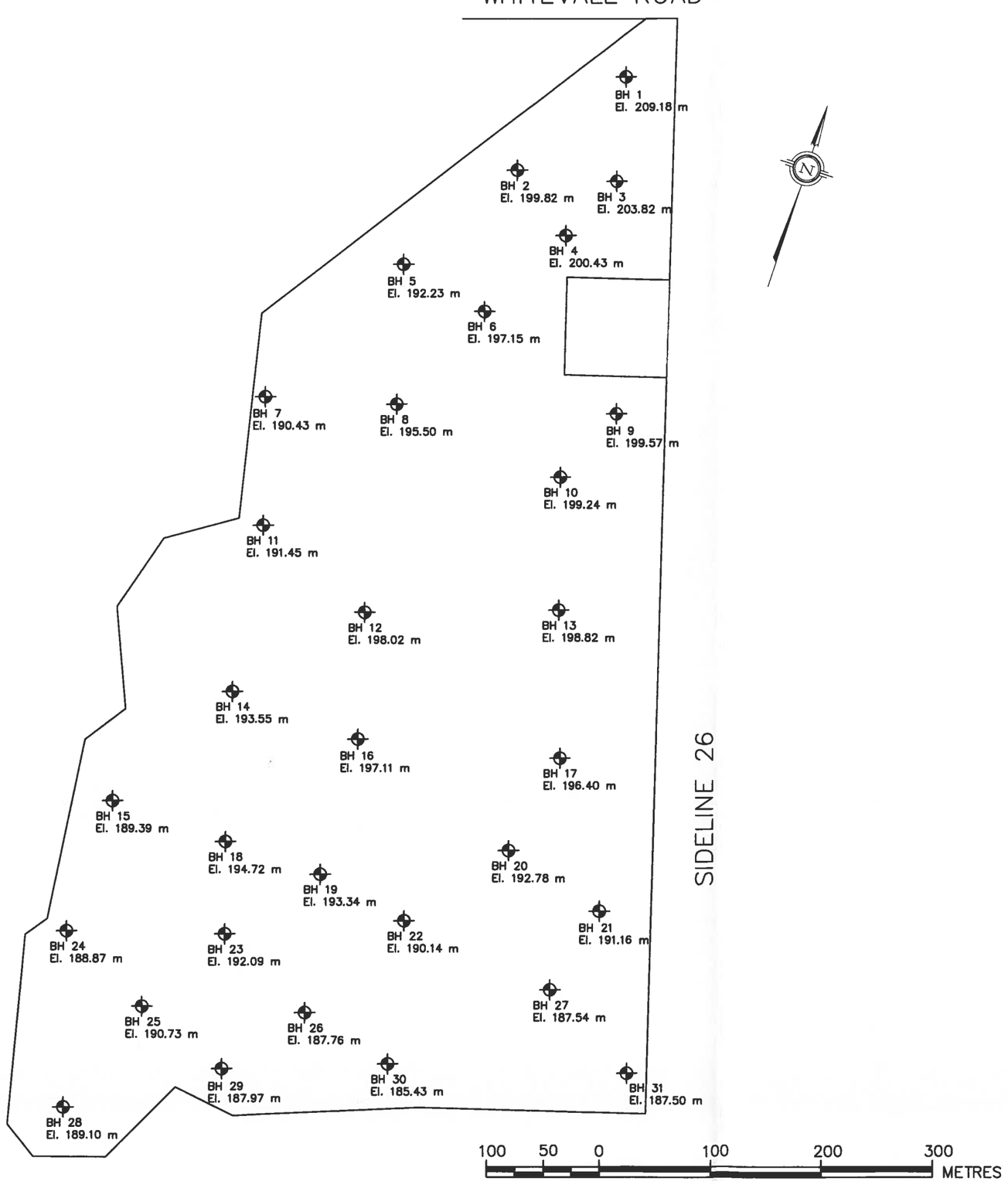
EQUIVALENT GRAIN DIAMETER IN MILLIMETERS

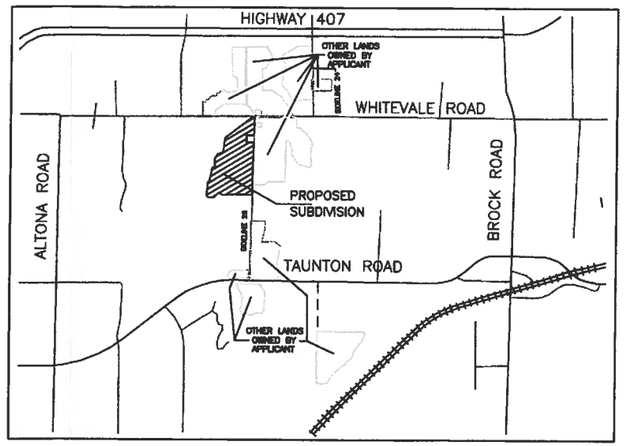
CLAY (PLASTIC) TO	FINE	MEDIUM	CRS.	FINE	COARSE
SILT (NONPLASTIC	SAND			GRAVEL	

UNIFIED SOIL CLASSIFICATION

2. Fill: Where fill is designated on the borehole log it is defined as indicated by the sample recovered during the boring process. The reader is cautioned that fills are heterogeneous in nature and variable in density or degree of compaction. The borehole description may therefore not be applicable as a general description of site fill materials. All fills should be expected to contain obstruction such as wood, large concrete pieces or subsurface basements, floors, tanks, etc., none of these may have been encountered in the boreholes. Since boreholes cannot accurately define the contents of the fill, test pits are recommended to provide supplementary information. Despite the use of test pits, the heterogeneous nature of fill will leave some ambiguity as to the exact composition of the fill. Most fills contain pockets, seams, or layers of organically contaminated soil. This organic material can result in the generation of methane gas and/or significant ongoing and future settlements. Fill at this site may have been monitored for the presence of methane gas and, if so, the results are given on the borehole logs. The monitoring process does not indicate the volume of gas that can be potentially generated nor does it pinpoint the source of the gas. These readings are to advise of the presence of gas only, and a detailed study is recommended for sites where any explosive gas/methane is detected. Some fill material may be contaminated by toxic/hazardous waste that renders it unacceptable for deposition in any but designated land fill sites; unless specifically stated the fill on this site has not been tested for contaminants that may be considered toxic or hazardous. This testing and a potential hazard study can be undertaken if requested. In most residential/commercial areas undergoing reconstruction, buried oil tanks are common and are generally not detected in a conventional geotechnical site investigation.

3. Till: The term till on the borehole logs indicates that the material originates from a geological process associated with glaciation. Because of this geological process the till must be considered heterogeneous in composition and as such may contain pockets and/or seams of material such as sand, gravel, silt or clay. Till often contains cobbles (60 to 200 mm) or boulders (over 200 mm). Contractors may therefore encounter cobbles and boulders during excavation, even if they are not indicated by the borings. It should be appreciated that normal sampling equipment cannot differentiate the size or type of any obstruction. Because of the horizontal and vertical variability of till, the sample description may be applicable to a very limited zone; caution is therefore essential when dealing with sensitive excavations or dewatering programs in till materials.





KEY PLAN

LEGEND

Approximate Borehole Location

NOTES:

1. The boundaries and soil types have been established only at borehole locations. Between boreholes they are assumed and may be subject to considerable error.
2. Soil samples will be retained in storage for 3 months and then destroyed unless Client advises that an extended time period is required.
3. Borehole elevations should not be used to design building or road grades.
4. Topsoil quantities should not be established from the information provided at the borehole locations.
5. This drawing was reproduced from a site plan provided by the Client.

Trow Associates Inc.
70 Gibson Drive, Unit 12, Markham, Ontario L3R 4C2

GEOTECHNICAL INVESTIGATION

PROPOSED RESIDENTIAL DEVELOPMENT
PART OF LOTS 27 AND 28, CONCESSION 4
(PART 1, PLAN 40R-25574)
PICKERING, ONTARIO

BOREHOLE LOCATION PLAN

BRGE00360451A	DATE : APR. 2009	DRAWING NO.: 1

Log of Borehole 1

Project No. BRGE00360451A

Drawing No. 2

Project: Geotechnical Investigation - Proposed Residential Development

Sheet No. 1 of 1

Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

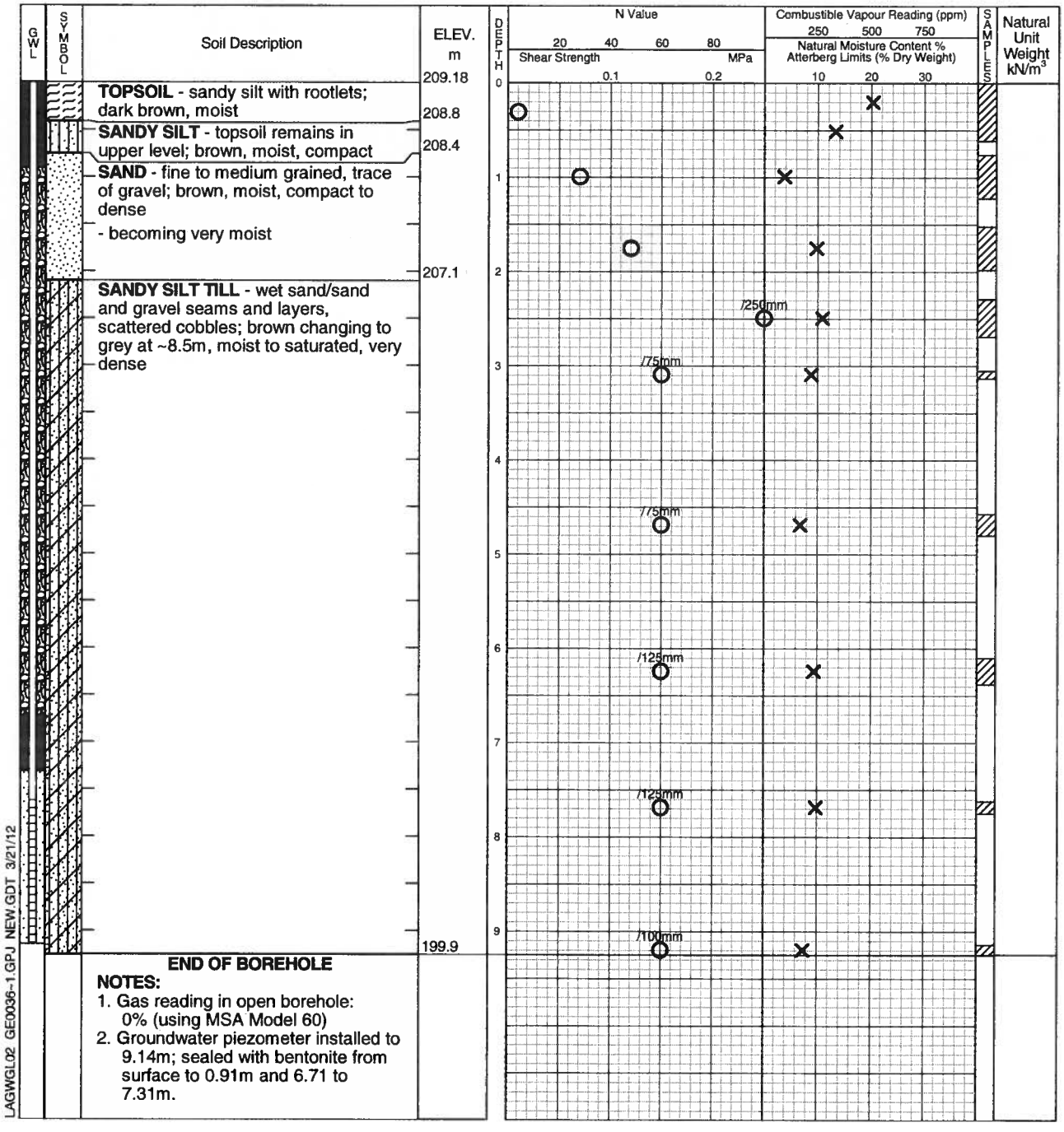
Date Drilled: April 16, 2009

Drill Type: CME 75 Drill

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



Time	Water Level (m)	Depth to Cave (m)
On completion	1.88	
After 8 days	2.43	
After 29 days	2.17	
After 77 days	2.47	

Log of Borehole 2

Project No. BRGE00360451A

Drawing No. 3

Project: Geotechnical Investigation - Proposed Residential Development

Sheet No. 1 of 1

Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 16, 2009

Drill Type: CME 75 Drill

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL - sandy silt with rootlets; dark brown, very moist	199.82	0
		SANDY SILT TILL - wet sand seams, scattered gravel and cobbles, topsoil remains in upper level; brown changing to grey at ~7m, saturated and loose to ~0.75m, moist and compact to very dense below	199.4	
			190.2	9
		END OF BOREHOLE		

NOTES:
1. Gas reading in open borehole: 0% (using MSA Model 60)

N Value: 20, 40, 60, 80
Shear Strength: 0.1, 0.2 MPa
Combustible Vapour Reading (ppm): 250, 500, 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10, 20, 30
SAMPLES
Natural Unit Weight kN/m³

Time	Water Level (m)	Depth to Cave (m)
On completion	5.79	8.53

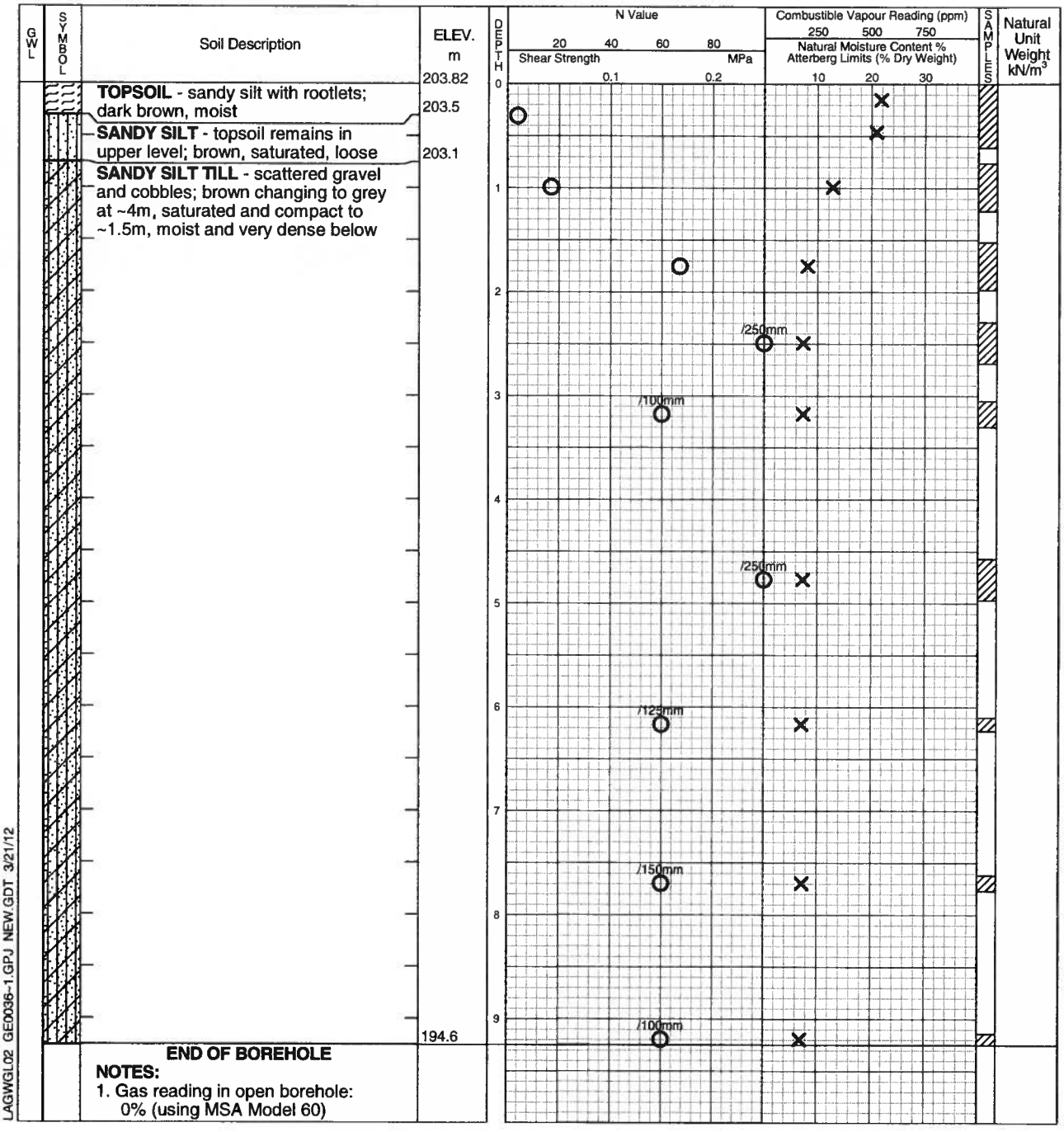
LAGWGL02 GE0036-1.GPJ NEW.GDT 3/21/12

Log of Borehole 3

Project No. BRGE00360451A
Drawing No. 4
Project: Geotechnical Investigation - Proposed Residential Development
Sheet No. 1 of 1
Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 15, 2009
Drill Type: CME 75 Drill
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test
Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	8.91

Log of Borehole 4

Project No. BRGE00360451A

Drawing No. 5

Project: Geotechnical Investigation - Proposed Residential Development

Sheet No. 1 of 1

Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

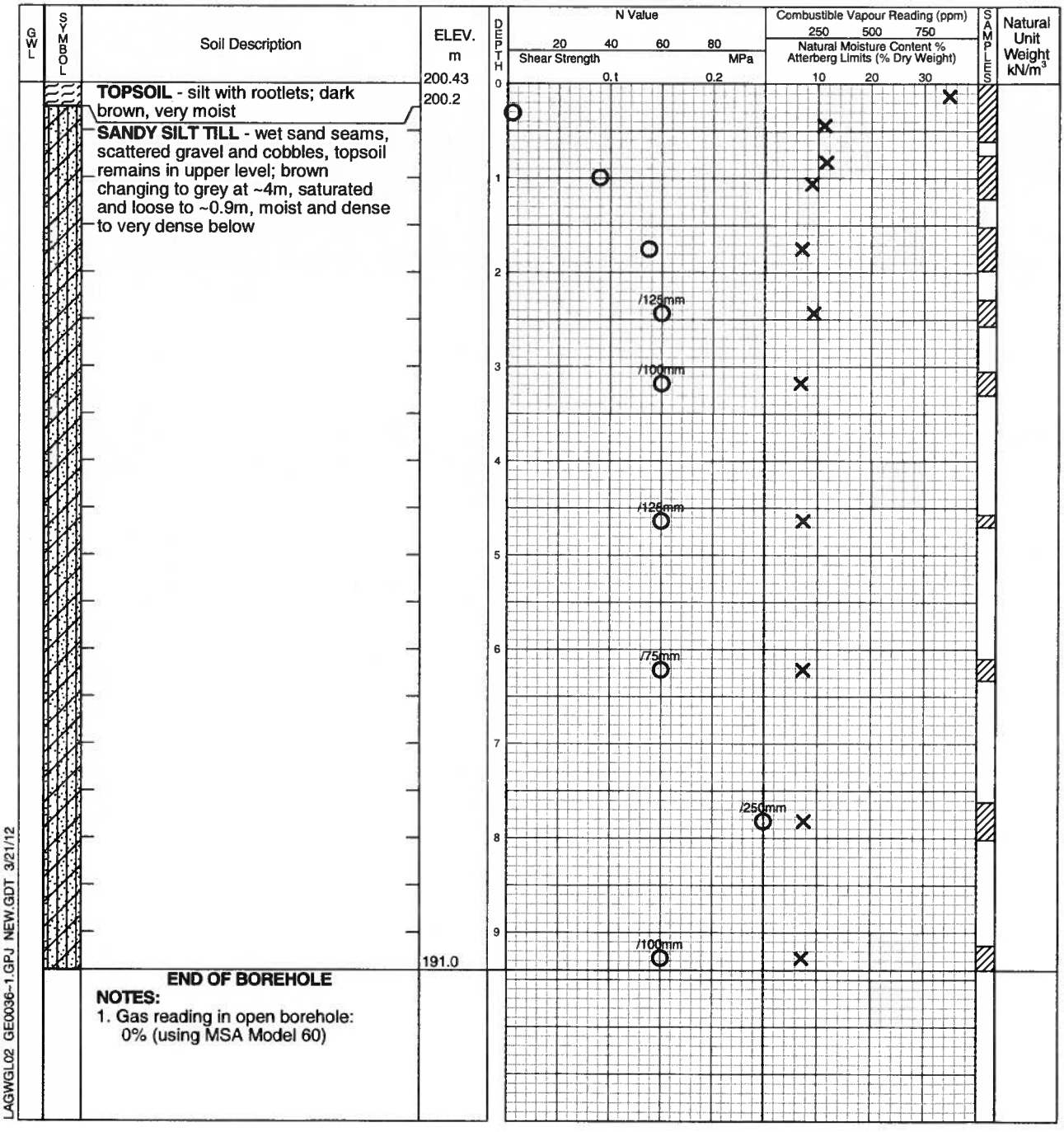
Date Drilled: April 16, 2009

Drill Type: CME 75 Drill

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



LAGWGL02 GE0036-1.GPJ NEW.GDT 3/21/12

Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	8.84

Log of Borehole 5

Project No. BRGE00360451A
Drawing No. 6
Project: Geotechnical Investigation - Proposed Residential Development
Sheet No. 1 of 1
Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 15 and June 8, 2009
Drill Type: CME 75 Drill
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test
Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL - sandy silt with rootlets; dark brown, very moist	192.23	0
			191.9	
		SANDY SILT TILL - wet sand seams; scattered gravel and cobbles, topsoil remains in upper level; brown changing to grey at ~4m, moist to saturated, loose to ~1m, compact to very dense below		1
				2
				3
				4
				5
				6
				7
				8
				9
			182.6	
		END OF BOREHOLE		

N Value: 20 40 60 80
Shear Strength MPa: 0.1 0.2
Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30
SAMPLES
Natural Unit Weight kN/m³

NOTES:
1. Gas reading in open borehole: 0% (using MSA Model 60)
2. Groundwater monitoring well installed to 6.91m on June 8, 2009; sealed with bentonite from surface to 5.08m.

LAGWGL02 GE0036-1.GPJ NEW.GDT 3/21/12

exp.

Time	Water Level (m)	Depth to Cave (m)
On completion (open hole)	Dry	8.79
On completion (well)	Dry	
After 24 days (well)	0.41	

Log of Borehole 6

Project No. BRGE00360451A

Drawing No. 7

Project: Geotechnical Investigation - Proposed Residential Development

Sheet No. 1 of 1

Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 15, 2009

Drill Type: CME 75 Drill

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL - sandy silt with rootlets; dark brown, very moist	197.15	0
		SANDY SILT TILL - scattered gravel and cobbles, topsoil remains in upper level; brown changing to grey at ~4m, saturated and loose to ~0.75, moist and compact to very dense below	196.9	
				1
				2
				3
				4
				5
				6
				7
				8
			187.9	9
		END OF BOREHOLE		

N Value: 20 40 60 80
Shear Strength: 0.1 0.2 MPa

/125mm
/125mm
/125mm
/150mm
/125mm
/100mm

Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

SAMPLES

Natural Unit Weight kN/m³

NOTES:
1. Gas reading in open borehole: 0% (using MSA Model 60)

LAGWGL02 GE0036-1.GPJ NEW.GDT 3/21/12

exp.

Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	8.64

Log of Borehole 7

Project No. BRGE00360451A
Drawing No. 8
Project: Geotechnical Investigation - Proposed Residential Development
Sheet No. 1 of 1
Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 14, 2009
Drill Type: CME 75 Drill
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test
Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL - sandy silt with rootlets; dark brown, moist	190.43	0
		SANDY SILT TILL - wet sand seams, scattered gravel and cobbles, topsoil remains in upper level; brown changing to grey at ~4m, saturated to ~1.5m, moist below, loose to ~0.75, compact to very dense below	190.2	1
				2
				3
				4
				5
				6
				7
				8
			181.0	9
		END OF BOREHOLE		

N Value: 20 40 60 80
Shear Strength: 0.1 0.2 MPa
Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

/250mm
/125mm
/100mm

SAMPLES

Natural Unit Weight kN/m³

NOTES:
1. Gas reading in open borehole: 0% (using MSA Model 60)

LAGWGL02 GE0036-1.GPJ NEW.GDT 3/21/12

Time	Water Level (m)	Depth to Cave (m)
On completion	8.08	8.79

Log of Borehole 8

Project No. BRGE00360451A

Drawing No. 9

Project: Geotechnical Investigation - Proposed Residential Development

Sheet No. 1 of 1

Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 14, 2009

Drill Type: CME 75 Drill

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		TOPSOIL - sandy silt with rootlets; dark brown, very moist	195.50
		SANDY SILT - trace of gravel, topsoil remains in upper level; brown, saturated, loose	195.2
		SANDY SILT TILL - wet sand seams, scattered gravel and cobbles; brown changing to grey at ~4m, saturated to ~1.5m, moist below, compact to very dense	194.8
		END OF BOREHOLE	186.2

NOTES:
1. Gas reading in open borehole: 0% (using MSA Model 60)

DEPTH | N Value (20, 40, 60, 80) | Shear Strength (0.1, 0.2 MPa) | Combustible Vapour Reading (ppm) (250, 500, 750) | Natural Moisture Content % Atterberg Limits (% Dry Weight) (10, 20, 30) | SAMPLES | Natural Unit Weight kN/m³

0 1 2 3 4 5 6 7 8 9

/125mm

/150mm

LAGWGL02 GE0036-1.GPJ NEW.GDT 3/21/12

exp.

Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	8.86

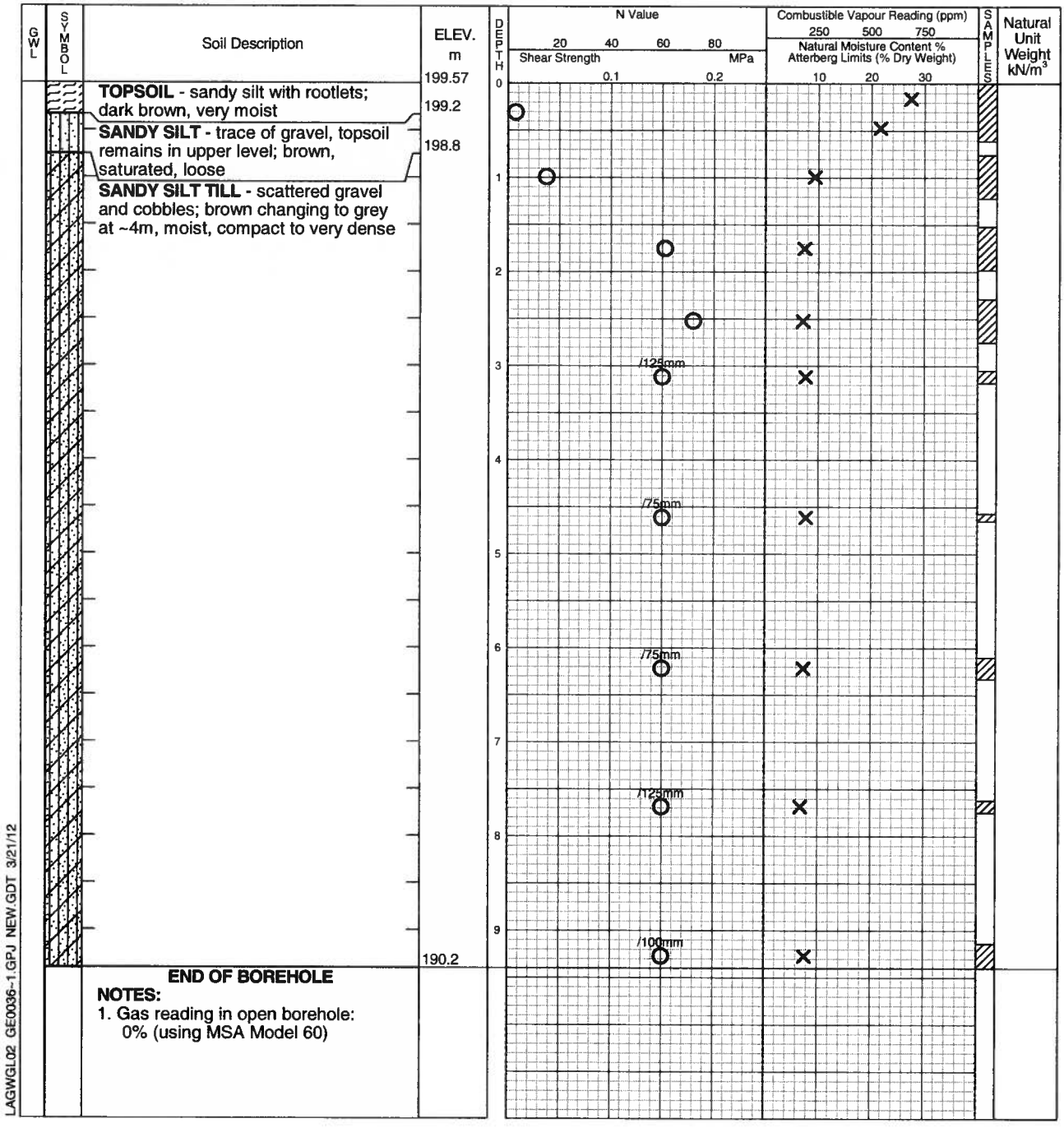
Log of Borehole 9

Project No. BRGE00360451A
Drawing No. 10
Project: Geotechnical Investigation - Proposed Residential Development
Sheet No. 1 of 1
Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 14, 2009
Drill Type: CME 75 Drill
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	8.79

Log of Borehole 10

Project No. BRGE00360451A | Drawing No. 11

Project: Geotechnical Investigation - Proposed Residential Development | Sheet No. 1 of 1

Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 14, 2009

Drill Type: CME 75 Drill

Datum: Geodetic

Auger Sample ⊠ | SPT (N) Value ○ ▨ | Dynamic Cone Test —— | Shelby Tube ■ | Field Vane Test S

Combustible Vapour Reading □ | Natural Moisture ✕ | Plastic and Liquid Limit ⊢—○ | Undrained Triaxial at % Strain at Failure ⊕ | Penetrometer ▲

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL - silt with rootlets; dark brown, very moist	199.24	0
		SANDY SILT TILL - wet sand seams, scattered gravel and cobbles, topsoil remains in upper level; brown changing to grey at ~4m, saturated and loose to ~0.9m, moist and compact to very dense below	199.0	
		END OF BOREHOLE	190.0	9

NOTES:
1. Gas reading in open borehole: 0% (using MSA Model 60)

N Value: 20 40 60 80 | Shear Strength MPa: 0.1 0.2

Combustible Vapour Reading (ppm): 250 500 750

Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

SAMPLES | Natural Unit Weight kN/m³

/125mm /150mm /125mm /75mm /125mm /100mm

LAGWGL02 GE0036-1.GPJ NEW.GDT 3/21/12

exp.

Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	8.94

Log of Borehole 11

Project No. BRGE00360451A | Drawing No. 12

Project: Geotechnical Investigation - Proposed Residential Development | Sheet No. 1 of 1

Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 13, 2009

Drill Type: CME 75 Drill

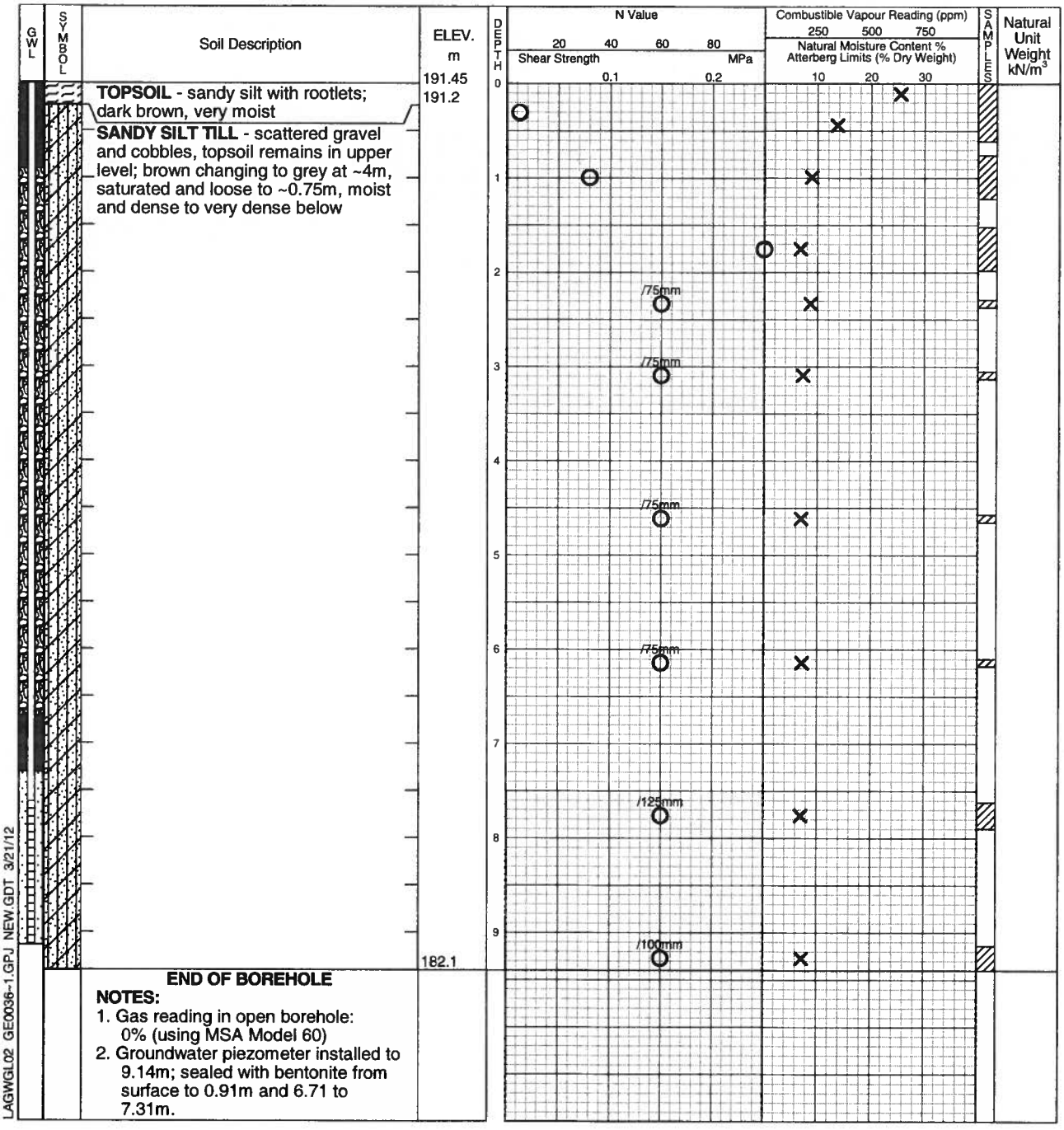
Datum: Geodetic

Auger Sample ⊠
SPT (N) Value ○ ▨
Dynamic Cone Test ——
Shelby Tube ■
Field Vane Test S

Combustible Vapour Reading □
Natural Moisture ×
Plastic and Liquid Limit ⊢—○
Undrained Triaxial at % Strain at Failure ⊕
Penetrometer ▲

GWL	SYMBOL	Soil Description	ELEV. m
		TOPSOIL - sandy silt with rootlets; dark brown, very moist	191.45
		SANDY SILT TILL - scattered gravel and cobbles, topsoil remains in upper level; brown changing to grey at ~4m, saturated and loose to ~0.75m, moist and dense to very dense below	191.2
		END OF BOREHOLE	182.1

NOTES:
1. Gas reading in open borehole: 0% (using MSA Model 60)
2. Groundwater piezometer installed to 9.14m; sealed with bentonite from surface to 0.91m and 6.71 to 7.31m.



Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	
After 11 days	Dry	
After 32 days	9.01	
After 80 days	6.46	

LAGWGL02 GE0036-1.GPJ NEW.GDT 3/21/12

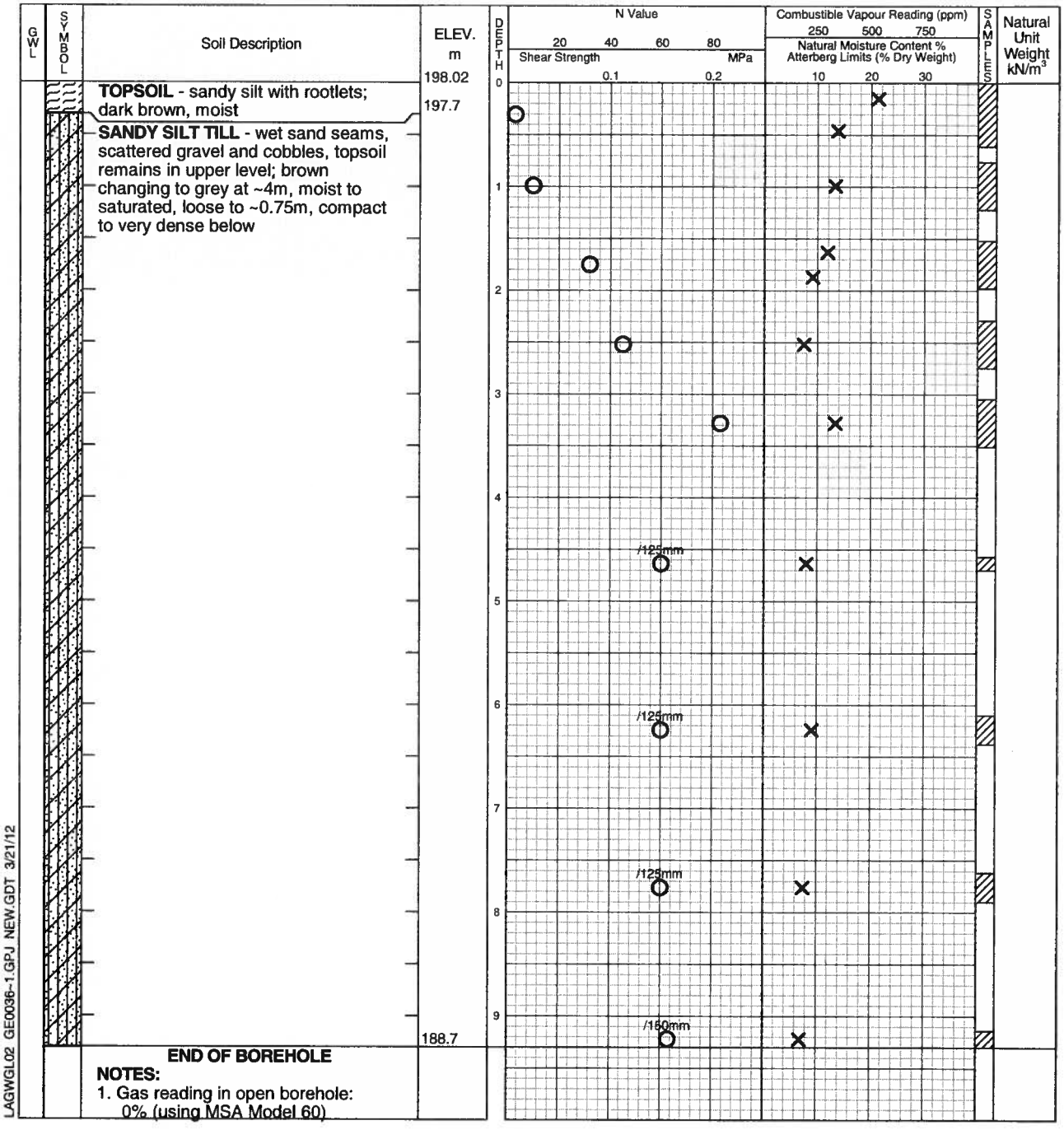
Log of Borehole 12

Project No. BRGE00360451A
Drawing No. 13
Project: Geotechnical Investigation - Proposed Residential Development
Sheet No. 1 of 1
Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 13 and 14, 2009
Drill Type: CME 75 Drill
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	8.48

Log of Borehole 13

Project No. BRGE00360451A
Drawing No. 14
Project: Geotechnical Investigation - Proposed Residential Development
Sheet No. 1 of 1
Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 15, 2009
Drill Type: CME 75 Drill
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		TOPSOIL - sandy silt with rootlets; dark brown, moist	198.82
		SANDY SILT TILL - wet sand seams and layers, occasional sand and gravel pockets, scattered cobbles, topsoil remains in upper level; brown changing to grey at ~5.5m, moist to saturated, loose to ~0.75m, compact to very dense below	198.6
		END OF BOREHOLE	189.3

NOTES:
1. Gas reading in open borehole: 0% (using MSA Model 60)
2. Groundwater piezometer installed to 9.14m; sealed with bentonite from surface to 0.91m and 6.71 to 7.31m.

DEPTH (m): 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

N Value: 20, 40, 60, 80
Shear Strength: 0.1, 0.2 MPa

Combustible Vapour Reading (ppm): 250, 500, 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10, 20, 30

/250mm

SAMPLES

Natural Unit Weight kN/m³

LAGWGL02 GE0036-1.GPJ NEW.GDT 3/21/12

Time	Water Level (m)	Depth to Cave (m)
On completion	8.56	
After 9 days	0.46	
After 30 days	0.79	
After 78 days	0.83	

Log of Borehole 14

Project No. BRGE00360451A | Drawing No. 15

Project: Geotechnical Investigation - Proposed Residential Development | Sheet No. 1 of 1

Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 13, 2009

Drill Type: CME 75 Drill

Datum: Geodetic

Auger Sample ⊠ | SPT (N) Value ○ ▨ | Dynamic Cone Test — | Shelby Tube ■ | Field Vane Test S

Combustible Vapour Reading □ | Natural Moisture × | Plastic and Liquid Limit ⊢○ | Undrained Triaxial at % Strain at Failure ⊕ | Penetrometer ▲

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL - silt with rootlets; dark brown, moist	193.55	0
		SANDY SILT TILL - scattered gravel and cobbles, topsoil remains in upper level; brown changing to grey at ~3m, moist with wet sand seams, compact to very dense	193.4	
				1
				2
				3
				4
				5
				6
				7
				8
			184.3	9
		END OF BOREHOLE		

N Value: 20 40 60 80 | Shear Strength 0.1 0.2 MPa

Combustible Vapour Reading (ppm): 250 500 750

Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

SAMPLES | Natural Unit Weight kN/m³

/150mm /100mm /225mm /150mm /125mm /100mm

NOTES:
1. Gas reading in open borehole: 0% (using MSA Model 60)

LAGWGL02 GE0036-1.GPJ NEW.GDT 3/21/12

exp.

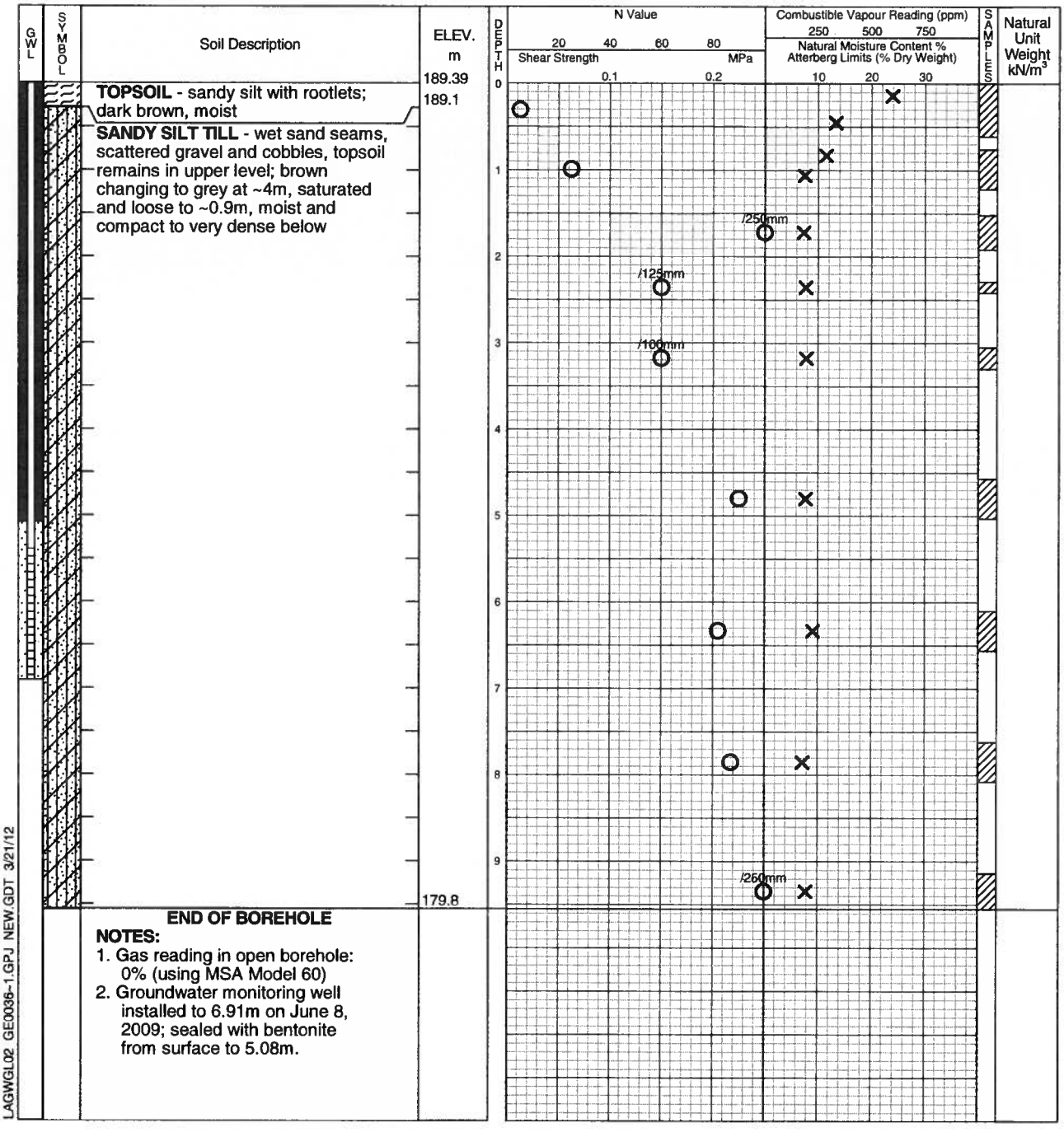
Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	8.79

Log of Borehole 15

Project No. BRGE00360451A
Drawing No. 16
Project: Geotechnical Investigation - Proposed Residential Development
Sheet No. 1 of 1
Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 8 and June 8, 2009
Drill Type: CME 75 Drill
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test
Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



Time	Water Level (m)	Depth to Cave (m)
On completion (open hole)	8.15	8.99
On completion (well)	Dry	
After 24 days (well)	0.15	

Log of Borehole 16

Project No. BRGE00360451A | Drawing No. 17

Project: Geotechnical Investigation - Proposed Residential Development | Sheet No. 1 of 1

Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 10, 2009

Drill Type: CME 75 Drill

Datum: Geodetic

Auger Sample ⊠ | SPT (N) Value ○ ▨ | Dynamic Cone Test — | Shelby Tube ■ | Field Vane Test S

Combustible Vapour Reading □ | Natural Moisture × | Plastic and Liquid Limit ⊢—○ | Undrained Triaxial at % Strain at Failure ⊕ | Penetrometer ▲

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL - sandy silt with rootlets; dark brown, moist	197.11	0
		SANDY SILT TILL - scattered gravel and cobbles, topsoil remains in upper level; brown changing to grey at ~5.5m, saturated to ~2m, moist below, loose to ~0.75m, compact to very dense below	196.9	1
				2
				3
				4
				5
				6
				7
				8
				9
		END OF BOREHOLE	187.7	

N Value: 20 40 60 80 — Shear Strength MPa: 0.1 0.2

Combustible Vapour Reading (ppm): 250 500 750 — Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

/125mm /75mm /150mm /250mm /100mm

SAMPLES | Natural Unit Weight kN/m³

NOTES:
1. Gas reading in open borehole: 0% (using MSA Model 60)

LAGWGL02 GE0036-1.GPJ NEW.GDT 3/21/12

exp.

Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	8.56

Log of Borehole 17

Project No. BRGE00360451A
Drawing No. 18
Project: Geotechnical Investigation - Proposed Residential Development
Sheet No. 1 of 1
Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 7, 2009
Drill Type: CME 75 Drill
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		TOPSOIL - silt with rootlets; dark brown, very moist	196.40
		SANDY SILT - trace of gravel, topsoil remains in upper level; brown, saturated, loose	196.1
		SANDY SILT TILL - wet sand seams and layers, scattered gravel and cobbles; brown changing to grey at ~4m, moist to saturated, compact to very dense	195.7
		END OF BOREHOLE	186.9

NOTES:
1. Gas reading in open borehole: 0% (using MSA Model 60)

DEPTH 0 1 2 3 4 5 6 7 8 9

N Value: 20 40 60 80
Shear Strength: 0.1 0.2 MPa

Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

/100mm
/125mm
/250mm
/100mm
/250mm

SAMPLES

Natural Unit Weight kN/m³

LAGWGL02 GE0036-1.GPJ NEW.GDT 3/21/12

exp.

Time	Water Level (m)	Depth to Cave (m)
On completion	3.30	3.91

Log of Borehole 18

Project No. BRGE00360451A
Drawing No. 19
Project: Geotechnical Investigation - Proposed Residential Development
Sheet No. 1 of 1
Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 10, 2009
Drill Type: CME 75 Drill
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL - sandy silt with rootlets; dark brown, moist	194.72	0
		SANDY SILT TILL - scattered gravel and cobbles, topsoil remains in upper level; brown changing to grey at ~4m, saturated to ~2m, moist below, loose to ~0.75m, compact to very dense below	194.5	
		END OF BOREHOLE	185.4	9

N Value: 20 40 60 80
Shear Strength MPa: 0.1 0.2
Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30
SAMPLES
Natural Unit Weight kN/m³

/100mm
/250mm
/150mm

NOTES:
1. Gas reading in open borehole: 0% (using MSA Model 60)

LAGWGL02 GE0036-1.GPJ NEW.GDT 3/21/12

exp.

Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	8.36

Log of Borehole 19

Project No. BRGE00360451A
Drawing No. 20
Project: Geotechnical Investigation - Proposed Residential Development
Sheet No. 1 of 1
Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 13, 2009
Drill Type: CME 75 Drill
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL - silt with rootlets; dark brown, very moist	193.34	0
		SANDY SILT TILL - wet sand seams, scattered gravel and cobbles, topsoil remains in upper level; brown changing to grey at ~4m, saturated to ~1.5m, moist below, loose to ~0.75m, compact to very dense below	193.0	
				1
				2
				3
				4
				5
				6
				7
				8
				9
			183.7	
		END OF BOREHOLE		

NOTES:
1. Gas reading in open borehole: 0% (using MSA Model 60)

N Value: 20 40 60 80
Shear Strength: 0.1 0.2 MPa
/125mm
/75mm
/150mm
Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30
SAMPLES
Natural Unit Weight kN/m³

LAGWGL02 GE00036-1.GPJ NEW.GDT 3/21/12

Time	Water Level (m)	Depth to Cave (m)
On completion	7.54	8.69

Log of Borehole 20

Project No. BRGE00360451A
Drawing No. 21
Project: Geotechnical Investigation - Proposed Residential Development
Sheet No. 1 of 1
Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 7, 2009
Drill Type: CME 75 Drill
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL - sandy silt with rootlets; dark brown, very moist	192.78	0
		SANDY SILT - trace of gravel, topsoil remains in upper level; brown, saturated, loose	192.4	
		SANDY SILT TILL - scattered gravel and cobbles; brown changing to grey at ~4m, moist with wet sand seams, dense to very dense	192.0	1
				2
				3
				4
				5
				6
				7
				8
				9
		END OF BOREHOLE	183.4	

NOTES:
1. Gas reading in open borehole: 0% (using MSA Model 60)

N Value: 20 40 60 80
Shear Strength: 0.1 0.2 MPa

/150mm
/100mm
/150mm
/100mm
/125mm
/125mm
/100mm

Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

SAMPLES

Natural Unit Weight kN/m³

Time	Water Level (m)	Depth to Cave (m)
On completion	8.61	9.14

LAGWGL02 GE0036-1.GPJ NEW.GDT 3/21/12

Log of Borehole 21

Project No. BRGE00360451A | Drawing No. 22

Project: Geotechnical Investigation - Proposed Residential Development | Sheet No. 1 of 1

Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 6, 2009

Drill Type: CME 75 Drill

Datum: Geodetic

Auger Sample ⊠ | SPT (N) Value ○ ▨ | Dynamic Cone Test — | Shelby Tube ■ | Field Vane Test S

Combustible Vapour Reading □ | Natural Moisture × | Plastic and Liquid Limit ⊢○ | Undrained Triaxial at % Strain at Failure ⊕ | Penetrometer ▲

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL - sandy silt with rootlets; dark brown, very moist	191.16	0
		SANDY SILT - trace of gravel, topsoil remains in upper level; brown, saturated, loose	190.9	
		SANDY SILT TILL - wet sand seams, scattered gravel and cobbles; brown changing to grey at ~4m, saturated to ~1.5m, moist below, compact to very dense	190.4	1
				2
				3
				4
				5
				6
				7
				8
				9
		END OF BOREHOLE	181.8	

N Value: 20 40 60 80 | Shear Strength MPa: 0.1 0.2

Combustible Vapour Reading (ppm): 250 500 750

Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

SAMPLES | Natural Unit Weight kN/m³

/150mm

/125mm

/100mm

NOTES:

1. Gas reading in open borehole: 0% (using MSA Model 60)

LAGWGL02 GE0036-1.GPJ NEW.GDT 3/21/12

exp.

Time	Water Level (m)	Depth to Cave (m)
On completion	0.76	8.53

Log of Borehole 22

Project No. BRGE00360451A — Drawing No. 23

Project: Geotechnical Investigation - Proposed Residential Development — Sheet No. 1 of 1

Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

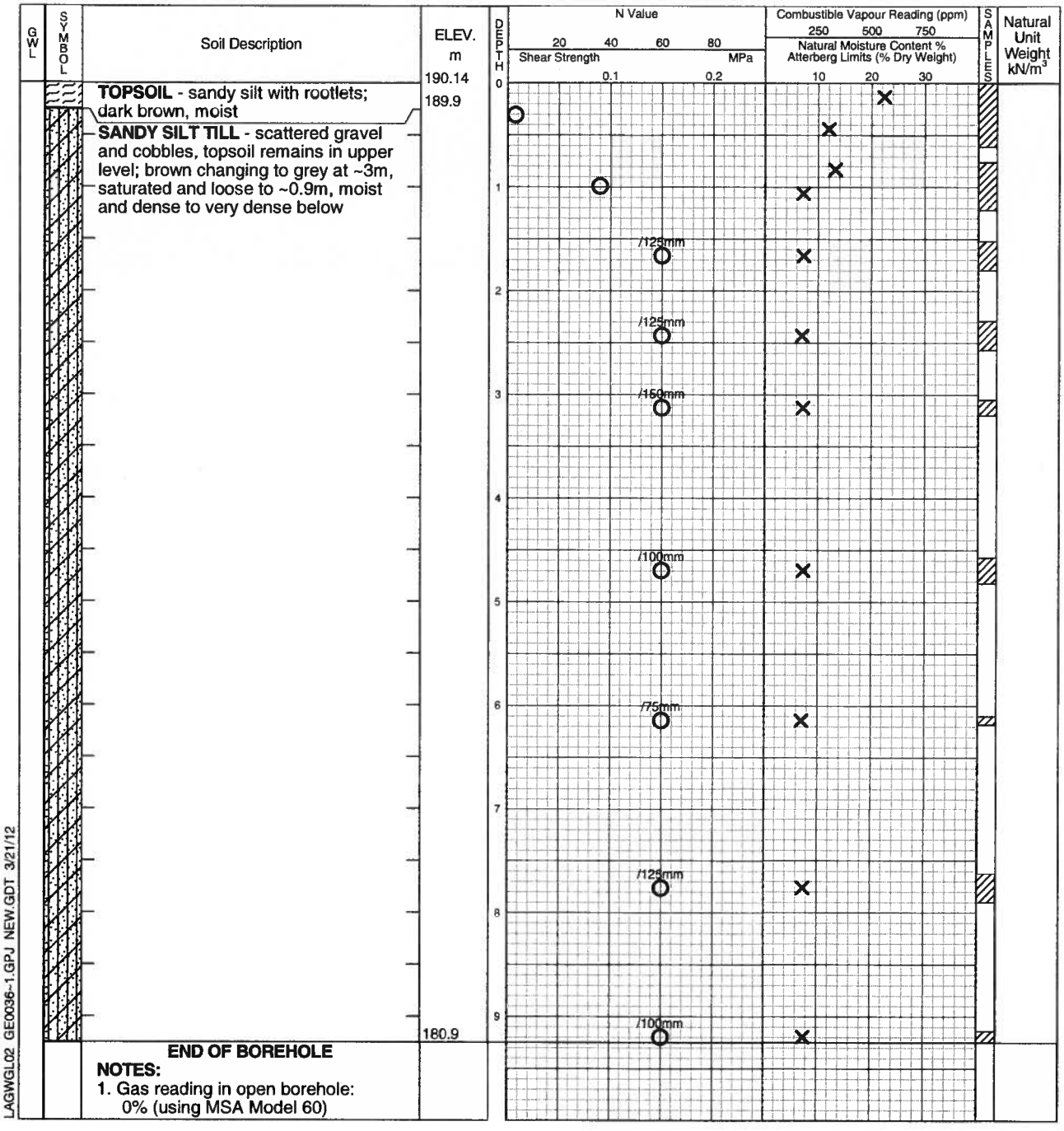
Date Drilled: April 10, 2009

Drill Type: CME 75 Drill

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	8.46

Log of Borehole 23

Project No. BRGE00360451A | Drawing No. 24

Project: Geotechnical Investigation - Proposed Residential Development | Sheet No. 1 of 1

Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 10, 2009

Drill Type: CME 75 Drill

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
			192.09
		TOPSOIL - sandy silt with rootlets; dark brown, moist	191.9
		SANDY SILT - trace of gravel, topsoil remains in upper level; brown, saturated, loose	191.3
		SANDY SILT TILL - scattered gravel and cobbles; brown changing to grey at ~4m, moist, dense to very dense	
			182.8
		END OF BOREHOLE	

NOTES:
1. Gas reading in open borehole: 0% (using MSA Model 60)

DEPTH (0 to 9)

N Value: 20 40 60 80
Shear Strength: 0.1 0.2 MPa
Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

/125mm
/275mm
/125mm
/100mm

SAMPLES

Natural Unit Weight kN/m³

Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	8.41

exp.

Log of Borehole 24

Project No. BRGE00360451A
Drawing No. 25
Project: Geotechnical Investigation - Proposed Residential Development
Sheet No. 1 of 1
Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 8, 2009
Drill Type: CME 75 Drill
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test
Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL - silt with rootlets; dark brown, very moist	188.87	0
		SANDY SILT - trace of gravel, topsoil remains in upper level; brown, saturated, loose	188.6	
		SANDY SILT TILL - wet sand seams, scattered gravel and cobbles; brown changing to grey at ~4m, saturated to ~1.5m, moist below, compact to very dense	188.1	1
				2
				3
				4
				5
				6
				7
				8
				9
		END OF BOREHOLE	179.3	

NOTES:
1. Gas reading in open borehole: 0% (using MSA Model 60)

N Value: 20 40 60 80
Shear Strength MPa: 0.1 0.2
/275mm
/150mm
/125mm
Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30
SAMPLES
Natural Unit Weight kN/m³

LAGWGL02 GE0036-1.GPJ NEW.GDT 3/21/12

exp.

Time	Water Level (m)	Depth to Cave (m)
On completion	1.37	8.69

Log of Borehole 25

Project No. BRGE00360451A
Drawing No. 26
Project: Geotechnical Investigation - Proposed Residential Development
Sheet No. 1 of 1
Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 8, 2009
Drill Type: CME 75 Drill
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL - sandy silt with rootlets; dark brown, very moist	190.73	0
		SANDY SILT TILL - wet sand seams, scattered gravel and cobbles, topsoil remains in upper level; brown changing to grey at ~4m, saturated to ~0.75m, moist below, compact to very dense	190.5	
				1
				2
				3
				4
				5
				6
				7
				8
				9
		END OF BOREHOLE	181.3	

N Value: 20 40 60 80
Shear Strength: 0.1 0.2 MPa

Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

/125mm
/125mm
/125mm
/125mm
/100mm
/100mm

SAMPLES

Natural Unit Weight kN/m³

NOTES:
1. Gas reading in open borehole: 0% (using MSA Model 60)

LAGWGL02 GE0036-1.GPJ NEW.GDT 3/21/12

exp.

Time	Water Level (m)	Depth to Cave (m)
On completion	8.99	9.09

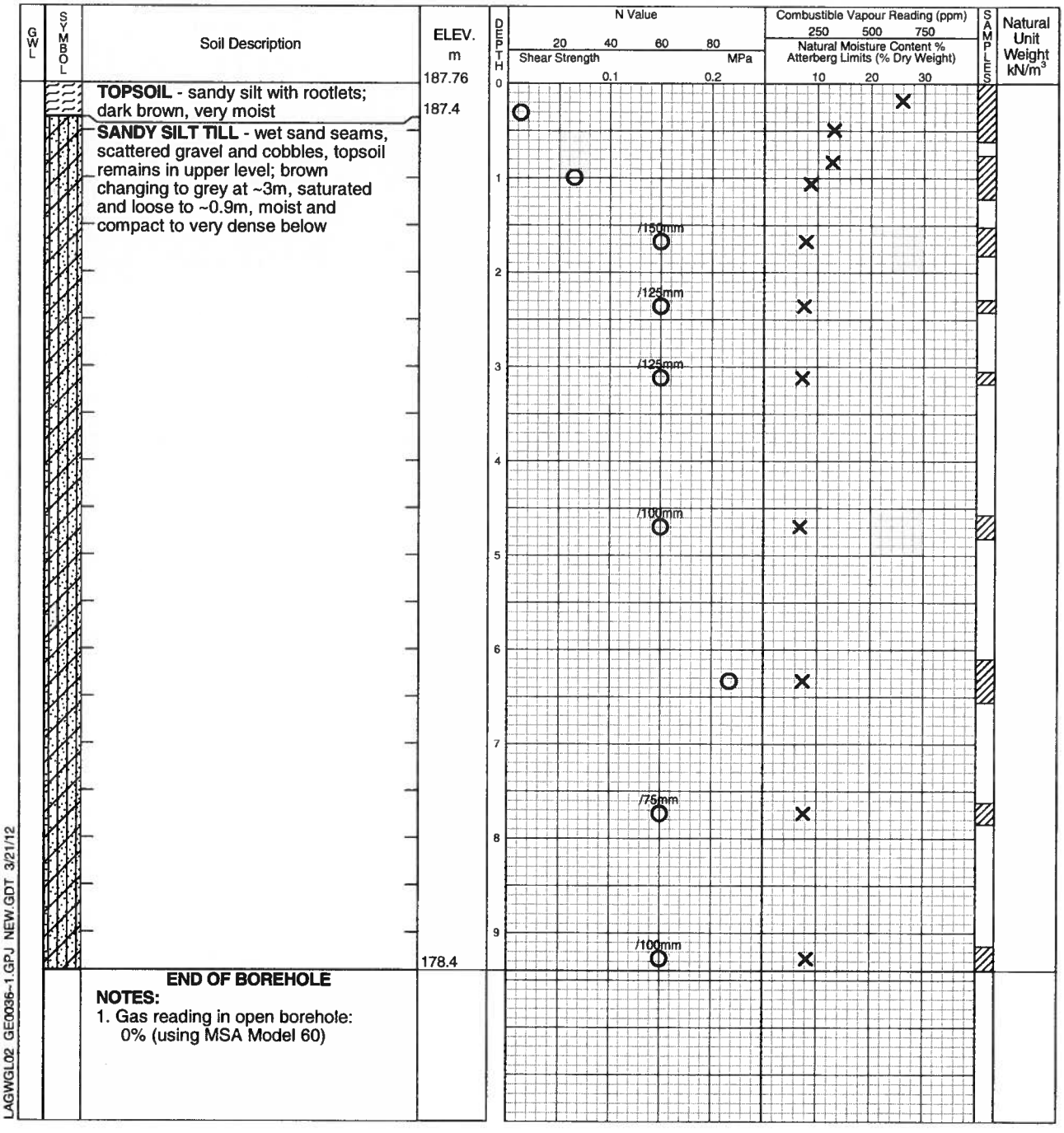
Log of Borehole 26

Project No. BRGE00360451A
Drawing No. 27
Project: Geotechnical Investigation - Proposed Residential Development
Sheet No. 1 of 1
Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 9, 2009
Drill Type: CME 75 Drill
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



LAGWGL02 GE0036-1.GPJ NEW.GDT 3/21/12

exp.

Time	Water Level (m)	Depth to Cave (m)
On completion	4.27	8.38

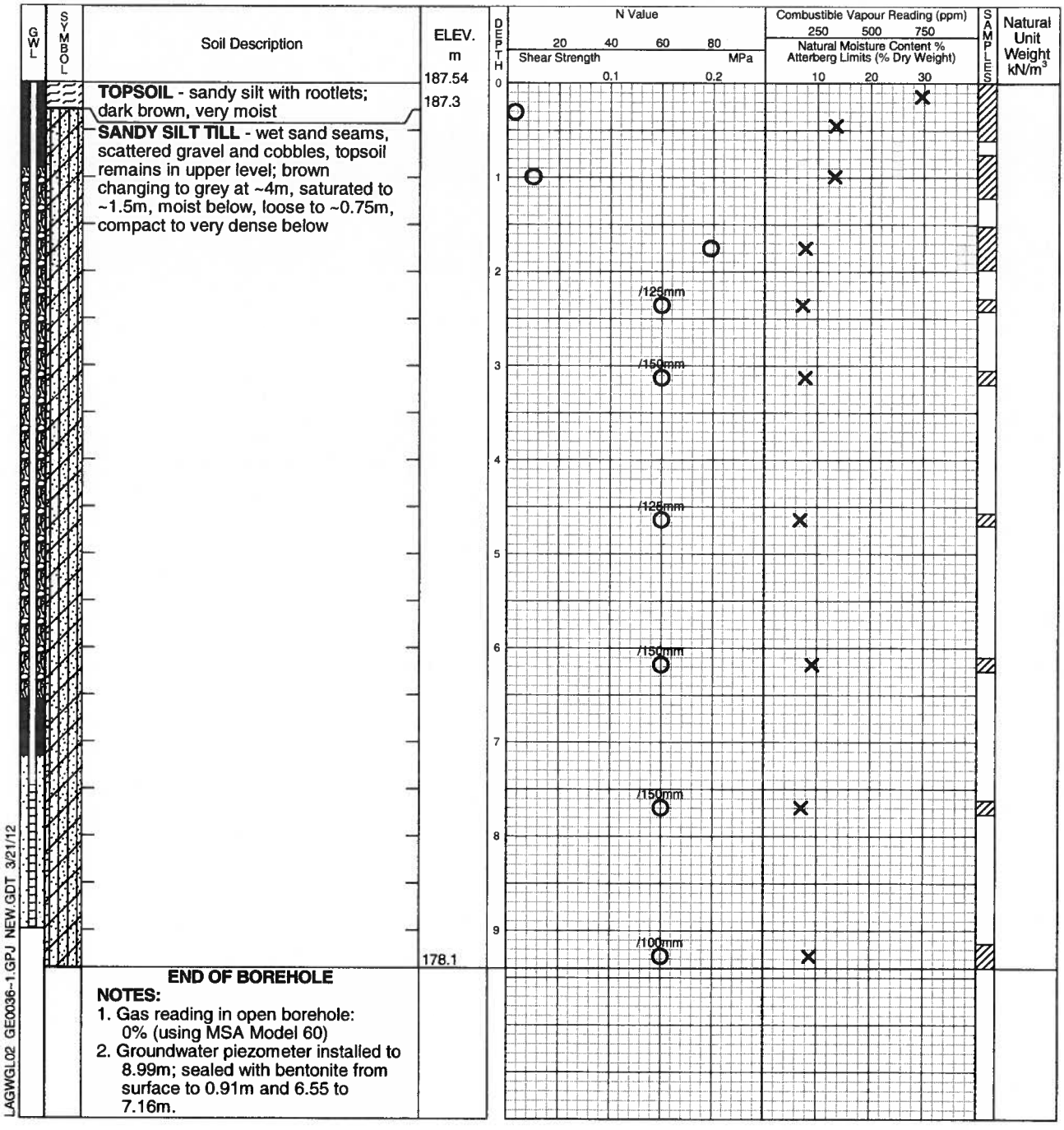
Log of Borehole 27

Project No. BRGE00360451A
Drawing No. 28
Project: Geotechnical Investigation - Proposed Residential Development
Sheet No. 1 of 1
Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 7, 2009
Drill Type: CME 75 Drill
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



Time	Water Level (m)	Depth to Cave (m)
On completion	6.25	
After 17 days	0.11	
After 38 days	0.23	
After 86 days	0.32	

Log of Borehole 28

Project No. BRGE00360451A | Drawing No. 29

Project: Geotechnical Investigation - Proposed Residential Development | Sheet No. 1 of 1

Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 8, 2009

Drill Type: CME 75 Drill

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		TOPSOIL - sandy silt with rootlets; dark brown, moist	189.10
		SANDY SILT TILL - wet sand seams, scattered gravel and cobbles, topsoil remains in upper level; brown changing to grey at ~4m, saturated and loose to ~0.75m, moist and very dense below	188.8
		END OF BOREHOLE	179.7

NOTES:
1. Gas reading in open borehole: 0% (using MSA Model 60)
2. Groundwater piezometer installed to 9.14m; sealed with bentonite from surface to 0.91m and 6.71 to 7.31m.

DEPTH

N Value: 20 40 60 80
Shear Strength: 0.1 0.2 MPa

Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

/250mm
/150mm
/125mm
/125mm
/100mm
/75mm
/100mm

SAMPLES

Natural Unit Weight kN/m³

Time	Water Level (m)	Depth to Cave (m)
On completion	8.94	
After 16 days	0.68	
After 37 days	1.06	
After 85 days	0.86	

LAGWGL02 GE0036-1.GPJ NEW.GDT 3/21/12

Log of Borehole 29

Project No. BRGE00360451A
Drawing No. 30
Project: Geotechnical Investigation - Proposed Residential Development
Sheet No. 1 of 1
Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 8, 2009
Drill Type: CME 75 Drill
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test
Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL - sandy silt with rootlets; dark brown, moist	187.97	0
		SANDY SILT TILL - wet sand seams, scattered gravel and cobbles, topsoil remains in upper level; brown changing to grey at ~4m, saturated to ~0.75m, moist below, compact to very dense	187.7	
				1
				2
				3
				4
				5
				6
				7
				8
				9
		END OF BOREHOLE	178.6	

N Value: 20 40 60 80
Shear Strength: 0.1 0.2 MPa
Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30
SAMPLES
Natural Unit Weight kN/m³

/150mm
/125mm
/100mm

NOTES:
1. Gas reading in open borehole: 0% (using MSA Model 60)

LAGWGL02 GE0036-1.GPJ NEW.GDT 3/21/12

exp.

Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	8.79

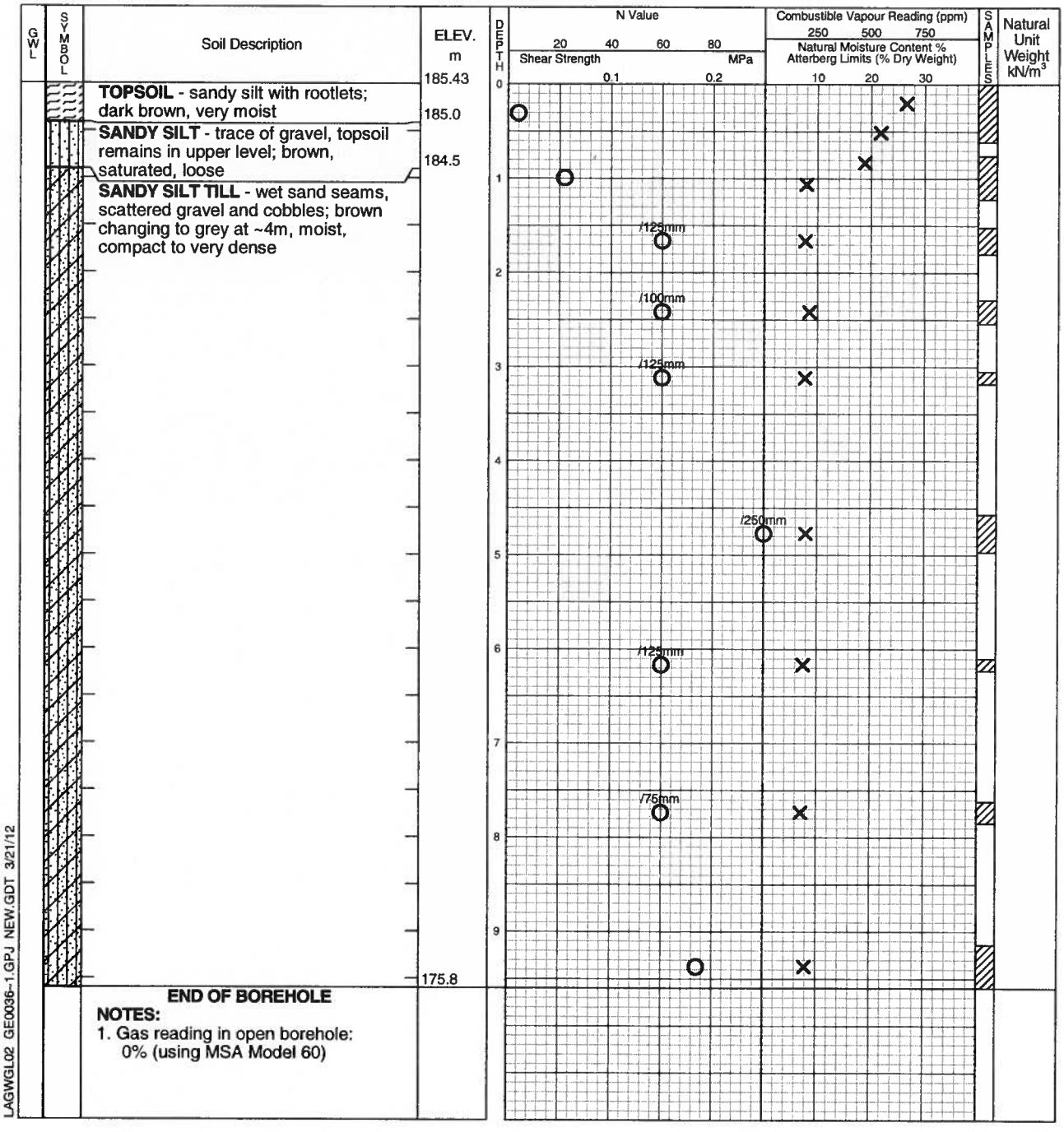
Log of Borehole 30

Project No. BRGE00360451A
Drawing No. 31
Project: Geotechnical Investigation - Proposed Residential Development
Sheet No. 1 of 1
Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 7, 2009
Drill Type: CME 75 Drill
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



LAGWGL02 GE0036-1.GPJ NEW.GDT 3/21/12

Time	Water Level (m)	Depth to Cave (m)
On completion	3.71	8.69

Log of Borehole 31

Project No. BRGE00360451A | Drawing No. 32

Project: Geotechnical Investigation - Proposed Residential Development | Sheet No. 1 of 1

Location: Part of Lots 27 and 28, Concession 4, (Part 1, Plan 40R-25574), Pickering, Ontario

Date Drilled: April 6, 2009

Drill Type: CME 75 Drill

Datum: Geodetic

Auger Sample ⊠ | SPT (N) Value ○ ▨ | Dynamic Cone Test —— | Shelby Tube ■ | Field Vane Test S

Combustible Vapour Reading □ | Natural Moisture × | Plastic and Liquid Limit ⊢—○ | Undrained Triaxial at % Strain at Failure ⊕ | Penetrometer ▲

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL - sandy silt with rootlets; dark brown, moist	187.50	0
		SANDY SILT TILL - wet sand seams and layers, scattered gravel and cobbles, topsoil remains in upper level; brown changing to grey at ~5.5m, moist to saturated, loose to ~0.75m, compact to very dense below	187.3	
				177.9
		END OF BOREHOLE		

N Value: 20 40 60 80 | Shear Strength 0.1 0.2 MPa

Combustible Vapour Reading (ppm): 250 500 750 | Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

/275mm

/275mm

/125mm

SAMPLES | Natural Unit Weight kN/m³

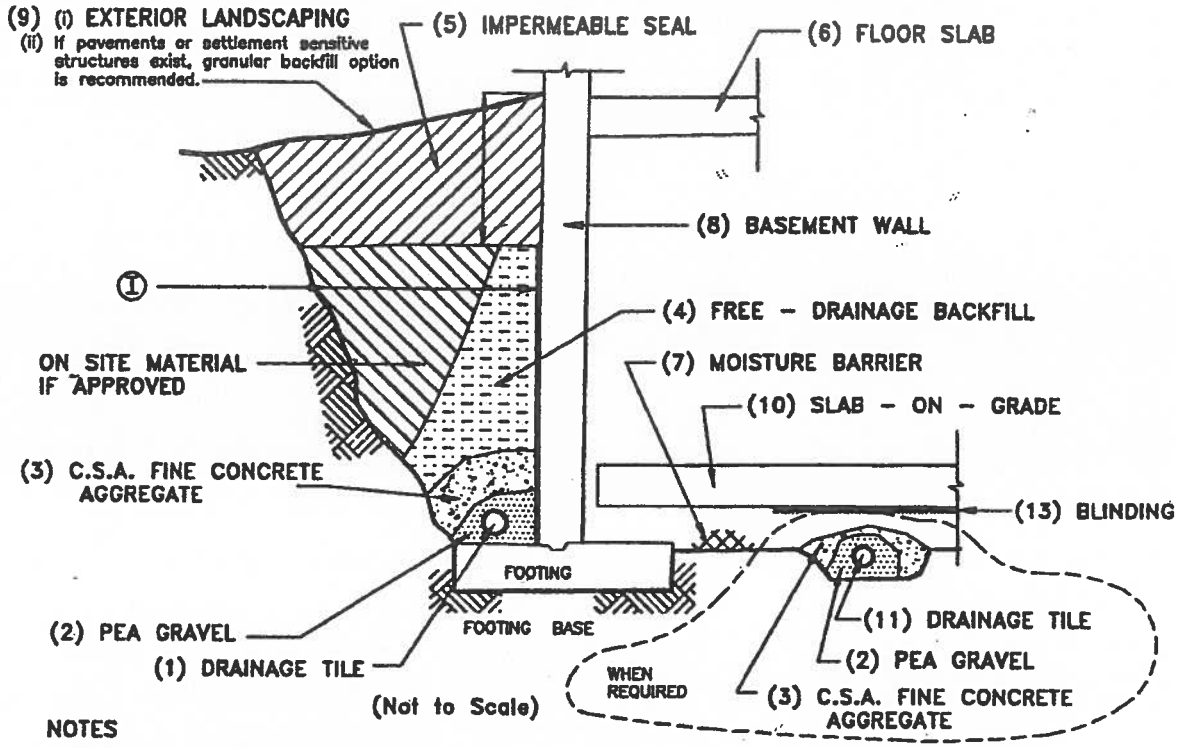
NOTES:
1. Gas reading in open borehole: 0% (using MSA Model 60)

LAGWGL02 GE0036-1.GPJ NEW.GDT 3/21/12

exp.

Time	Water Level (m)	Depth to Cave (m)
On completion	1.02	1.98

BASEMENT DRAINAGE DRAWING



NOTES

OPTION A - GRANULAR BACKFILL

1. Drainage tile to consist of 100mm (4 in.) diameter weeping tile or equivalent perforated pipe leading to a positive sump or outlet. Invert to be minimum of 150mm (6 in.) below underside of floor slab.
2. Pea gravel 150mm (6 in.) top and sides of drain. If drain is not on footing, place 100mm (4 in.) of pea gravel below drain. 20mm (3/4 in.) clear stone may be used provided it is covered by an approved porous geotextile membrane (Terrafix 270R or equivalent).
3. C.S.A. fine concrete aggregate to act as filter material. Minimum 300mm (12 in.) top and sides of drain. This may be replaced by an approved porous geotextile membrane (Terrafix 270R or equivalent).
4. Free-draining backfill - OPSS Granular B or equivalent compacted to 93 to 95 (maximum) percent Standard Proctor density. Do not compact closer than 1.8m (6 ft.) from wall with heavy equipment. Use hand controlled light compaction equipment within 1.8m (6 ft.) of wall.
5. Impermeable backfill seal of compacted clay, clayey silt or equivalent. If original soil is free-draining seal may be omitted.
6. Do not backfill until wall is supported by basement and floor slabs or adequate bracing.
7. Moisture barrier to consist of compacted 20mm (3/4 in.) clear stone or equivalent free-draining material. Layer to be 200mm (8 in.) minimum thickness.
8. Basement walls to be damp-proofed.
9. Exterior grade to slope away from wall.
10. Slab-on-grade should not be structurally connected to wall or footing.
11. Underfloor drain invert to be a least 300mm (12 in.) below underside of floor slab. Drainage tile placed in parallel rows 6 to 8m (20 to 25ft.) centres one way. Place drain on 100mm (4 in.) of pea gravel with 150mm (6 in.) of pea gravel top and sides. CSA fine concrete aggregate to be provided as filter material or an approved geotextile membrane (as in 2 above) may be used.
12. Do not connect the underfloor drains to perimeter drains.
13. If the 20mm (3/4 in.) clear stone requires surface blinding, use 6mm (1/4 in.) clear stone chips.

NOTE: A) Underfloor drainage can be deleted where not required (see report).

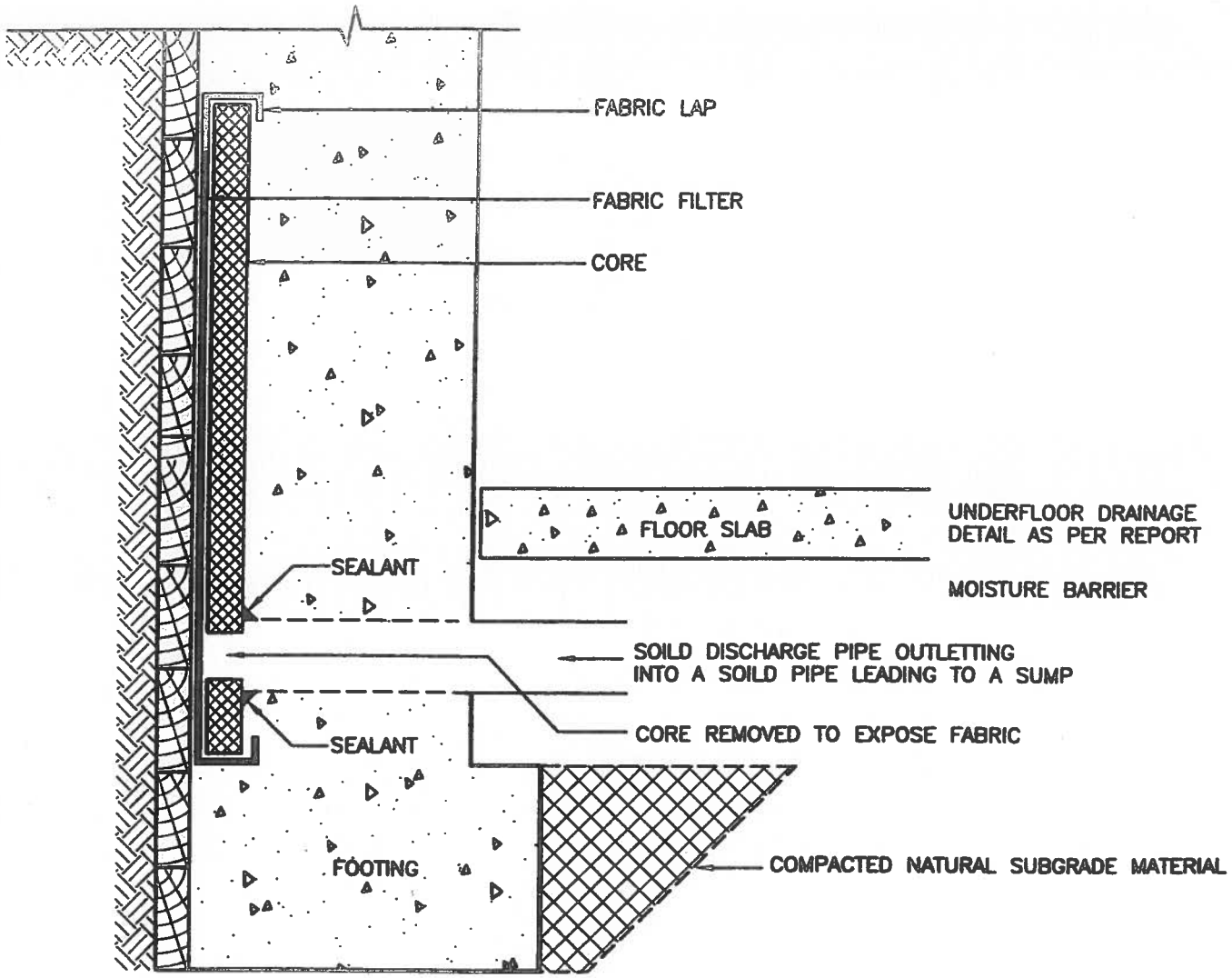
OPTION B - CORE DRAIN

Prefabricated continuous wall drains (I) may be installed and Zone 4 backfilled with on site material compacted to 93 - 95% proctor. Further cost savings may result by placing the wall drains at equal distance strips no greater then 2.5m spacing but the risks of water leakage must by assessed and then assumed by the client.

1. Wall drain option (I) may increase the lateral pressures above those of the conventional detail.
2. The use of waterproofing details at construction and expansion joints may also be required.
3. For Block walls or unreinforced cast in place concrete, the granular backfill option is recommended

Note: If water table exists above the floor slab, then options of granular in combinations with the wall drain should be reviewed

Drawing No. 33



SECTION AT DISCHARGE PIPE

NOTES:

1. DRAINAGE CORE AND CLOTH TO BE TERRADRAIN 200 OR EQUIVALENT.
2. INSTALLATION INSTRUCTIONS AS PER MANUFACTURES SPECIFICATION.
3. TO BE FULL WIDTH UNLESS OTHERWISE RECOMMENDED BY THE ENGINEER.
4. FINAL DETAIL MUST BE APPROVED BEFORE SYSTEM IS CONSIDERED ACCEPTABLE.
5. TERRADRAIN 200 SHOULD BE KEPT A MINIMUM OF 1.2 m BELOW EXTERIOR FINISHED GRADE.

SUGGESTED EXTERIOR DRAINAGE

Drawing No. 34