

TOWN OF CALEDON  
PLANNING  
RECEIVED  
January 23, 2026

***FORWARD ENGINEERING  
& ASSOCIATES INC.***

**Geotechnical, Environmental, Inspection & Material Testing Services  
244 Brockport Drive, Unit 15, Toronto, Ontario, M9W 6X9, Tel: (416)798-3500, Fax:(416)798-8481**

**REPORT, REV. 1  
GEOTECHNICAL INVESTIGATION  
PROPOSED RESIDENTIAL SUBDIVISION  
13286 NUNNVILLE ROAD  
CALEDON, ONTARIO**

**PREPARED FOR:  
ADEL GEORGE (OWNER)  
13286 Nunnville Road  
Caledon, Ontario  
L7E 2Z9**

**January 02, 2026  
Ref. No. G7442**

**Distribution: 1 PDF Copy– ADEL GEORGE  
1 PDF Copy–FORWARD ENGINEERING & ASSOCIATES INC.**

List of Contents

INTRODUCTION ..... 1

PURPOSE AND SCOPE ..... 1

PROPOSED DEVELOPMENT ..... 1

FIELD AND LABORATORY TESTING ..... 2

    Field Works ..... 2

    Laboratory Testing ..... 2

SITE CONDITIONS ..... 3

    Surface Conditions ..... 3

    Subsurface Conditions ..... 4

GEOTECHNICAL DISCUSSION AND RECOMMENDATIONS ..... 7

    Residential Units Foundations ..... 7

        1. Conventional Spread/Strip Footings on Native Undisturbed Soils ..... 7

        2. Conventional Spread/Strip Footings on Engineered Fill ..... 8

**General Foundation Notes** ..... **9**

    Earthquake Considerations ..... 10

    Underground Walls/Retaining Walls ..... 10

    Excavation and Backfill ..... 11

    Slab Construction and Permanent Drainage ..... 11

    Underground Utilities ..... 11

    Pavement Design ..... 13

    General Comments ..... 14

**LIST OF ENCLOSURES:**

*BOREHOLE LOCATION PLAN - DRAWING NO. 1*

*ENGINEERED FILL PROFILE - DRAWING NO. 2*

*PERIMETER DRAINAGE - DRAWING NO. 3*

*LOG OF BOREHOLE SHEETS (Nos. 1 to 6) - APPENDIX A*

## **INTRODUCTION**

This report presents the results of the geotechnical investigation carried out by Forward Engineering & Associates Inc. for the proposed residential subdivision development at 13286 Nunnville Road, in Caledon, Ontario.

The locations of the proposed residential dwellings in relation to the surrounding existing and proposed roads are shown on Drawing No. 1. The approximate locations of the boreholes drilled during this investigation are also presented on Drawing No. 1.

This investigation was authorized by Mr. Adel George, the client and owner.

## **PURPOSE AND SCOPE**

The objectives (purpose) of this investigation were to determine the following:

- The extent, depth and properties of the predominant fill/soil strata as they affect the design and construction of the proposed development.
- The short-term groundwater levels, if encountered.
- The appropriate geotechnical design criteria for the dwelling unit's foundations, excavations, backfill, slab construction, utilities, roadway and driveways pavement.

To achieve the above noted objectives, the field program of this investigation consisted of six [6] boreholes drilled to a maximum depth of 6.55 m below the Existing Ground Surface Level (EGSL).

On completion of the field and laboratory work, an engineering analysis was carried out, and this summary report was prepared.

## **PROPOSED DEVELOPMENT**

The proposed construction will consist of re-developing the existing residential lot by dividing into multiple residential units, as shown on the Architects Site Plan, Drawing No. 1.

The project will be provided with municipal water and sewer services meeting urban standards.

## **FIELD AND LABORATORY TESTING**

### **Field Works**

The field work for the borehole investigation consisted of six [6] boreholes (Nos. 1 to 6), drilled on February 24 and 25, 2025, under the supervision of a member of our staff.

The drilled boreholes were located at the approximate locations shown on Drawing No. 1 and extended to a depth of about 6.55 m below the EGSL. Boreholes No. 1 and 2 were relocated in the field from the originally planned/intended location due to proximity to septic field and existing landscape retaining wall.

Five [5] of the boreholes (BH/MW-1 and BH/MW-3 to BH/MW-6) were equipped with Water Monitoring Wells (WMWs) to facilitate future measurements of the water levels.

Soils were sampled in the boreholes following the Standard Penetration Test (SPT) method using a CME-55 Track Mounted Auger Drill Rig using Rotary Drilling with Split Spoon Samplers.

The samples were logged in the field and appropriately stored in plastic bags and re-examined in more detail in the laboratory. The samples will be stored for a period of three months and then discarded, unless we are instructed differently.

Groundwater observations were made in the open boreholes, during and upon completion of the drilling operation. The results are recorded on the Log of Borehole sheets attached in Appendix A.

Elevations referred to in this report are metric and geodetic. The ground level elevations at the borehole locations were interpolated from the *Surveyors Real Property Report* dated May 16, 2022, by Wahba Surveying., and provided to us by the client.

### **Laboratory Testing**

Laboratory testing consisted of determination of the in-situ moisture content of the retrieved and representative soil samples.

## SITE CONDITIONS

### Surface Conditions

The Site is located at 13286 Nunnville Road, Caledon, Ontario.

At the time of our visit, the dwelling located on the property was occupied and the site was blanketed with snow. For this description it will be assumed that the north bearing is parallel to Nunnville Road.

The site condition, as observed during our site visit February 24, 2025, is presented in the following *Table No. 1*.

*Table 1 - Site Surface Observations*

<b>East Boundaries:</b>	Nunnville Road.
<b>North Boundaries:</b>	Vacant property under development.
<b>West Boundaries:</b>	Treed slope grading down steeply in the west direction. The bottom of the slope was not accessible or visible at the time of our visit.
<b>South Boundaries:</b>	Residential dwellings.
<b>Surface Coverage:</b>	The site predominantly consists of landscaping with mature trees. The remainder of the site is covered by the dwelling and asphalt driveway.
<b>Ground Level:</b>	The topography of the site, has an overall minor grade, sloping down from south to north. A steep slope is present on the west side of the property and grades down in the west direction.
<b>Ditches:</b>	None observed.
<b>Berms/Stockpiles:</b>	None observed.
<b>Existing Structures:</b>	<ul style="list-style-type: none"><li>• Residential dwelling (1 storey structure with walkout basement).</li><li>• Retaining wall running parallel to driveway, and another retaining wall located at rear (north-west) of the dwelling.</li><li>• Small shed at rear of dwelling.</li></ul>
<b>Proposed/Intended Land Use:</b>	Residential.

## Subsurface Conditions

The subsurface conditions encountered at the borehole locations are shown on the Log of Borehole sheets, presented in Appendix A, and can be summarized as follows:

<p><b>Pavement</b></p>	<p>Pavement layer, consisting of asphalt ranging in thickness from about 65 to 70 mm, followed by granular (crushed stones) fill base ranging in thickness from about 335 to 750 mm, was encountered at the surface of boreholes BH/MW-1 and BH-2.</p> <p><i>At the time of our investigation this layer was frozen. Consequently, the measurements of this layer are not considered accurate.</i></p>
<p><b>Topsoil/Organic Soil</b></p>	<p>A layer of Topsoil/Organic soil was encountered at the surface of all the boreholes, except BH/MW-1 and BH-2, with a thickness ranging from about 150 to 300 mm.</p> <p><i>At the time of our investigation this layer was frozen. Consequently, the measurements of this layer are not considered accurate.</i></p>
<p><b>Fill/Disturbed Soil</b></p>	<p>A layer of Fill/Disturbed soil was found below the pavement or topsoil in all the boreholes, except BH/MW-1 and BH/MW-4, and extended to a depth ranging from about 0.76 to 1.52 m below the EGSL.</p> <p>This stratum consisted mainly of brown clayey silt with minor traces of rootlets. In all the boreholes, this stratum was found in moist state and in loose to compact state of packing.</p> <p>In BH-2, olfactory evidence of hydrocarbons was observed in the lower zone of this layer.</p> <p><i>For detailed description of this layer, further investigation through test pits is recommended.</i></p>
<p><b>Clayey Silt Till</b></p>	<p>Clayey Silt Till was encountered below the topsoil and/or fill/disturbed soil layers in boreholes BH/MW-3</p>

	<p>to BH/MW-6, extending to a depth ranging from about 1.52 to 3.05 m below EGSL.</p> <p>This brown and grey till was observed to be fissured and was found in moist state and in very stiff to hard consistency.</p>
<b>Silty Clay Till</b>	<p>Silty Clay Till was encountered below the pavement, fill/disturbed soil, and/or clayey silt till layers in all the boreholes, extending to the maximum explored depth of this investigation.</p> <p>This brown and grey till occasionally encountered very moist to wet pockets of silt and clay but was found generally in moist to very moist state. This till was found mainly in very stiff to hard consistency.</p> <p>In BH-2, olfactory evidence of hydrocarbons was observed in the upper zone of this stratum.</p>
<b>Groundwater</b>	<p>Groundwater level observations were made during and immediately upon the completion of the drilling investigation. The results are summarized in the following <i>Table 2a</i>, as shown:</p>

***Table 2a: Groundwater & Cave-in Observations Upon Completion of Drilling***

<b>Borehole No.</b>	<b>Borehole Depth (m)</b>	<b>Cave-in Depth Below EGSL (m)</b>	<b>Groundwater Depth Below EGSL (m)</b>
BH/MW-1	6.55	open	dry
BH-2	6.55	open	dry
BH/MW-3	6.55	open	dry
BH/MW-4	6.55	open	dry
BH/MW-5	6.55	open	wet at bottom
BH/MW-6	6.55	open	dry

The water level in BH/MW-1 and BH/MW-3 to BH/MW-6, which were equipped with a stick up and/or flush mounted monitoring well, was measured after the completion of the drilling operation and our observations are recorded and presented in the following *Table 2b*, as shown.

***Table 2b: Groundwater Observation about a Week after Completion of Drilling***

<b>ID &amp; Date of GWL Measurement</b>	<b>Groundwater Depth Below EGSL &amp; (elevation)</b>
BH/MW-1 <i>March 5, 2025</i>	5.57 m (239.74 m)
BH/MW-3 <i>March 5, 2025</i>	2.34 m (244.46 m)
BH/MW-4 <i>March 5, 2025</i>	5.18 m (241.22 m)
BH/MW-5 <i>March 5, 2025</i>	5.45 m (541.43 m)
BH/MW-6 <i>March 5, 2025</i>	0.47 m (245.50 m)

It should be noted, however, that the groundwater levels are subject to seasonal fluctuations. Consequently, definitive information on the long-term groundwater levels could not be obtained at the present time.

# GEOTECHNICAL DISCUSSION AND RECOMMENDATIONS

## Residential Units Foundations

The proposed residential subdivision development will consist of typical residential units with basements. The finished floor elevation (FFE) and structural loads are not known at this stage.

The proposed dwelling structures may be supported on the following two [2] options:

1. Conventional strip/spread footings supported on the native undisturbed soil.
2. Conventional strip/spread footings supported on Engineered Fill.

### 1. Conventional Spread/Strip Footings on Native Undisturbed Soils

Based on the encountered subsoil conditions, the proposed dwellings can be supported on conventional spread/strip footings established on the undisturbed, native stiff to very stiff clayey silt till/silty clay till, at least 300 mm below the bottom of the fill/disturbed soil, at or below a depth ranging from 0.75 to 1.8 m below Existing Ground Surface Level (EGSL), as presented in Table 3, shown below.

The size of the strip/spread footings can be proportioned to the following bearing resistances:

Factored Bearing Resistance at Ultimate Limit State (ULS) = 225kPa

Bearing Resistance at Serviceability Limit State (SLS) = 150 kPa

*Table 3 –Founding Depth and Elevation of Strip/Spread Footings*

Borehole No.	Borehole Elevation (m)	Founding Depth (m)	Founding Elevation (m)
BH/MW-1	245.31	1.10	244.21
BH-2	246.50	1.80	244.70
BH/MW-3	246.80	1.05	245.75

Borehole No.	Borehole Elevation (m)	Founding Depth (m)	Founding Elevation (m)
BH/MW-4	246.40	0.75	245.65
BH/MW-5	246.88	1.05	245.83
BH/MW-6	245.97	1.05	244.92

## **2. Conventional Spread/Strip Footings on Engineered Fill**

In the areas where the footings are to be established above the original competent soils, engineered fill should be provided. The size of the strip/spread footings can be proportioned to the following bearing resistances:

Factored Bearing Resistance at Ultimate Limit State (ULS) = 225 kPa

Bearing Resistance at Serviceability Limit State (SLS) = 150 kPa

The construction of the engineered fill shall be carried out as follows:

1. Remove and salvage the upper fill/disturbed soil material that is considered suitable for re-use, i.e. free of organic or any other deleterious materials, to re-use for the construction of the engineered fill layer.
2. The building area shall be stripped of topsoil, disturbed soils and any organic materials.
3. The exposed native subgrade shall be proof-rolled. All soft and heaving areas should be sub-excavated and replaced with competent fill. The exposed native subgrade shall be examined and approved by this office prior to placement of fill.
4. Engineered fill, shall consist of inorganic soil with moisture content close to its optimum value (within  $\pm 2\%$ ), as determined by Standard Proctor Maximum Dry Density (SPMDD) testing method. The salvaged excavated suitable fill may be used, provided it is maintained to meet the above moisture content.

5. The backfill shall be placed in 200 mm lifts and compacted to 100 percent SPMDD. Fill placement and compaction monitoring on a full-time bases are required to verify that the compaction requirements are met.
6. The fill shall be placed in such a manner so that the specified fill geometry, as shown in Drawing No. 2, is achieved. The fill shall extend at least to 0.5 m below the underside of the footings, and outward laterally 0.5 to 1.5 m from the edge of the footings, at the floor slab level. The fill slopes can be constructed at 1H to 1V.
7. If the engineered fill is inorganic material (not granular material), which will be exposed to the effects of frost, it shall be placed to at least 0.6 m above the proposed founding level. Furthermore, it shall be protected by a layer of loose fill at least 0.60 m thick for additional frost protection. The on-site generated fill shall not be placed during the wet and freezing conditions. Crushed recycled concrete or Granular B/C material is suggested for construction of engineered fill during the winter period.
8. Generally, when constructed on engineered fill, the strip foundations and the top section of the foundation wall must be continuously reinforced longitudinally with two overlapped No. 6 (20 mm) steel bars, or as directed by the Structural Engineer.
9. Any imported fill must be chemically clean, i.e. to meet the regulations requirements at the time of the construction.

### General Foundation Notes

Adjacent footings, founded at different elevations, should be stepped at 10 horizontal to 7 vertical.

For frost protection requirements, all exterior footings, and footings in unheated areas, must have a minimum soil cover of 1.2 m.

Under no circumstances should the footings be constructed over loose, soft or frozen subgrade soil or within ponded water. During winter construction, the footings must be adequately protected against the effects of frost. Concrete should be placed without delay after excavation to avoid softening of the subgrade surface. Hand cleaning of footing bases should be carried out as directed by the field inspector.

Total settlements of the spread/strip footings designed and constructed in accordance with the above recommended resistance at SLS should be less than the tolerable limits of 25 mm. The differential settlements are expected to be less than 19 mm.

Furthermore, the recommended bearing capacity and foundation elevations have been calculated from the limited borehole information and are intended for design purposes only.

More specific information, with respect to founding conditions between the boreholes will become available when the proposed construction is underway. Therefore, the encountered founding conditions must be verified in the field and all footings must be inspected by this office, before placement of concrete.

### **Earthquake Considerations**

For structural design seismic consideration, the seismic provisions of the Ontario Building Code (OBC 2024) outline the Classification of sites for Seismic Site Response in Table 4.1.8.4.-B of the National Building Code of Canada (NBC) 2020.

According to Table 4.1.8.4.-B of the code, and this investigation findings, the subject Seismic Site Class is selected as Class “D”.

### **Underground Walls/Retaining Walls**

Basement walls shall be designed to resist a pressure "p", at any depth, "h" below the surface, as given by the expression:

$$p = 0.45[\gamma h + q]$$

Where:

0.45 is the earth pressure coefficient considered applicable

$\gamma = 21.0 \text{ kN/m}^3$  is the unit weight of backfill

q = an allowance for surcharge

The above equation assumes that perimeter drains will be provided and that the backfill against the subsurface walls would be a free draining granular material.

## **Excavation and Backfill**

The excavation should be backslope at 45 degrees or flatter in accordance with the current Ontario Occupational Health and Safety Act (OHSA).

The anticipated water seepage, if any, into the excavations from the more permeable seams/lenses or surface run-off can be handled by conventional pumping methods.

The material to be used for backfilling under floor slab should be suitable for compaction, i.e. free of organics and with natural moisture content which is within 2 percent of the optimum moisture content. The backfill material should be compacted to at least 98 percent of the Standard Proctor Maximum Dry Density (SPMDD).

Selected on site excavated soils can be used as backfill under the floor slab or in-service trenches, provided the excavated materials are not allowed to become wet. However, the excavated materials will be very sensitive to moisture content, and the use of Granular B/C is preferred.

The backfill against the subsurface walls, and confined spaces, should be free draining granular fill, preferably conforming to the Ontario Provincial Standard Specification (OPSS) for granular base course, Granular B.

## **Slab Construction and Permanent Drainage**

The floor slabs can be constructed following the standard slab-on-grade technique, provided that the topsoil and fill/disturbed soils are removed, and the base is thoroughly proof-rolled. Any soft spots revealed during proof-rolling should be sub-excavated, backfilled and adequately compacted.

The floor slabs should rest on a well compacted layer of “19 mm clear stone” at least 200 mm thick when compacted. The stone bed would act as a barrier and prevent capillary rise of moisture from the subgrade to the floor slab.

Perimeter drainage system, as shown on Drawing No. 3, should be provided.

## **Underground Utilities**

The problem areas of pavement settlement largely occur adjacent to manholes, catch basins and service crossings. The on-site materials would generally be difficult to compact in these areas, and it is therefore recommended that a sand backfill be used

in confined areas. The upper 1.0 m of the trench backfill should be compacted to 98 % SPMDD. Below this zone, a 95 % SPMDD compaction is acceptable.

### *Sewer Bedding*

The subgrade soil is generally of very stiff to hard consistency; therefore, it should provide good support for sewer pipes unless it is unduly disturbed. Standard Class "B" or High Performance/ Washed Chip stone bedding should provide adequate support. Sewer bedding and sand cover materials should conform to the Town of Caledon/Bolton specifications. Where the sewer trench base is wet, 19 mm clear limestone layer should be used for bedding.

### *Trench Backfill*

Above the pipe sand cover layer which should extend at least 300 mm above the pipe crown, the trench can be backfilled with the on-site clean mineral fill free of topsoil. The backfill within the top 1.20 m (below road subgrade) should be free of rocks larger than 300 mm in diameter. During winter construction special attention should be given to separate frozen soil from the backfill.

Within the road allowance, the backfill should be placed in shallow lifts and compacted thoroughly. The thickness of each individual fill layer should be compatible with the compaction equipment's capability to compact that layer to a minimum of 95% of its maximum dry density as determined by the Standard Proctor test method. The top 1.0 m fill layers should be compacted to a minimum of 98% standard Proctor dry density. The best compaction can be achieved using sheep's-foot type heavy vibratory compactor.

In areas where the founding material, below the proposed invert levels, consists of silt till or relatively dry silty sand, Granular Class B bedding is recommended. It should be noted, however, that the recommended type of bedding is to be placed on undisturbed subgrade. If the construction methods will disturb the subgrade, i.e. excess hydrostatic pressure, piping, boulder removal etc., higher class bedding may have to be used.

Due to the difficulties in compacting chunks of clayey soil around manholes and catch basins, granular fill conforming to the Ontario Provincial Standard Specification for granular base course, Granular B. should be used for backfilling around manholes and catch-basin.

The backfill around manholes and catch-basins if not adequately compacted, then to be jetted, as per Town of Caledon specification requirements.

## Pavement Design

In the proposed pavement areas any vegetation, organic soil and/or fill with noticeable amounts of organics should be removed and the base should be thoroughly proof-rolled. Any soft spots revealed during proof-rolling should be sub-excavated and backfilled with suitable materials compacted to at least 98% SPMDD.

The subgrade soil is frost susceptible. The design of pavement is therefore mainly influenced by the need to minimize the effects of freezing and thawing. Consequently, the ground must not be unnecessarily disturbed.

The subgrade should be sloped to facilitate drainage towards catch basins and the final subgrade should be compacted before pavement is constructed.

It should be noted that the subgrade should be dry and firm, not spongy, during compaction and during the construction of the [sub] base. Soft or spongy subgrade areas should also be sub-excavated and properly replaced with suitable approved backfill compacted to 98 % SPMDD.

The subgrade will suffer strength regression if water is allowed to infiltrate into the mantle. Therefore, sub-drains should be installed along the edge of all pavement areas to prevent surface water from infiltrating into the subgrade.

Within the parking lots, sub-drains radiating from the catch basins should also be installed. These sub-drains should be at least 3 m long in each direction and have inverts at least 0.75 m below the pavement surface.

Based on the engineering properties of the subgrade soil, climatic conditions and the anticipated use of the pavement, typical flexible asphaltic pavement designs for this development local roads and dwelling's driveways are as follows:

*Table 4a -Typical Flexible Asphaltic Pavement Design for Local Roadways*

<b>Pavement OPS Components</b>	<b>Thickness</b>
<b>Asphaltic Concrete Surface Course and Binder</b>	40 mm HL3
	80 mm HL8
<b>Granular 'A' Base or Equivalent</b>	150 mm
<b>Granular 'B' Type II Sub-base or Equivalent</b>	375 mm

*Table 4b - Typical Flexible Asphaltic Pavement Design for Dwelling Driveways*

<b>Pavement Components</b>	<b>Heavy Duty</b>	<b>Medium Duty</b>
<b>Asphaltic Concrete</b>	40 mm HL3	40 mm HL3
	60 mm HL8	40 mm HL8
<b>19 mm Crushed Limestone</b>	150 mm	150 mm
<b>Granular B Sub-base or 50 mm Crushed Limestone</b>	300 mm	200 mm

All granular materials used in the construction of pavement should be compacted to 98 % of Standard Proctor maximum dry density.

It should be noted that all pavement materials should meet their relevant OPSS, Region of Peel, and Town of Caledon/Bolton Standard Specification requirements for placement and quality.

If the proposed pavements are to be constructed during wet seasons, the moisture content in the subgrade will probably be above the optimum, and this will render its shear strength inadequate to support paving equipment traffic. In this case, the granular sub/base should be replaced by an equal thickness of compacted size 50 mm Crusher-Run Limestone, or recycled concrete.

### General Comments

This geotechnical report is provided on the basis of the terms of reference provided above and, on the assumption, that the design will be in accordance with the applicable codes and standards.

If there is any change in the design features relevant to the geotechnical analyses, or if any questions arise regarding the geotechnical aspects of the codes and standards, this office should be contacted to review the design.

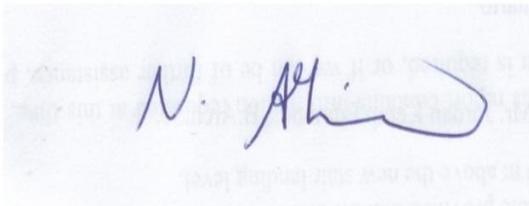
The comments given in this report are intended only for the guidance of design engineers. Contractors bidding on or undertaking the works should, in this light, decide on their own investigations, as well as their own interpretations of the factual borehole results.

This concern specifically applies to the classification of the fill/organic/topsoil cover and the potential reuse of these soils on/off site.

The prospective contractors must draw their own conclusions as to how the near surface and subsurface conditions may affect them.

We trust this report contains information requested at this time. However, if any clarification is required, or if we can be of further assistance, please contact this office.

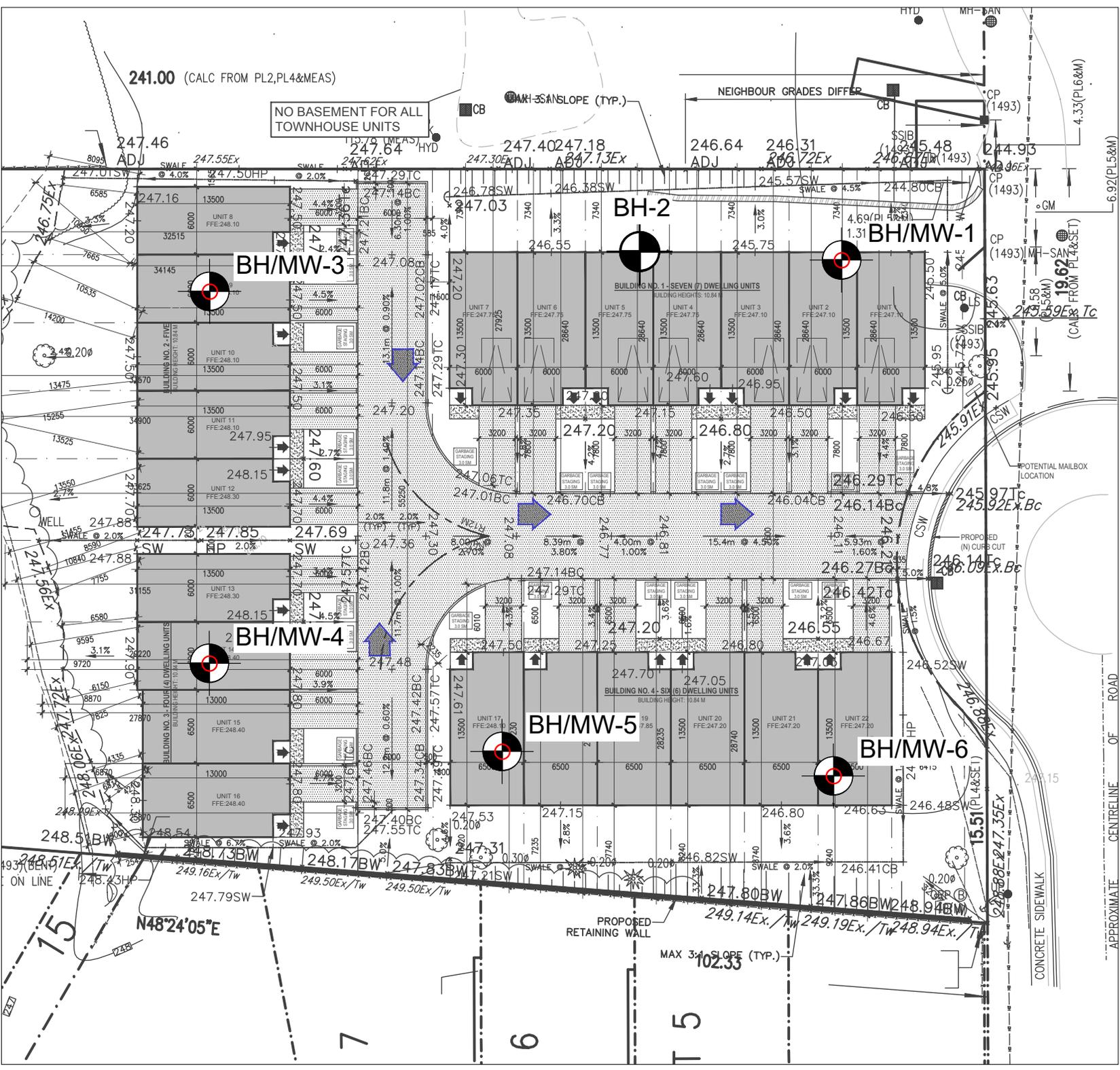
Yours truly,  
**Forward Engineering & Associates Inc.**



Nasser Abdelghani, M.Sc., P.Eng.  
Project Geotechnical Engineer



G. S. Semaan, M.Eng., P.Eng.  
Principal



- NOTES:**
- BH**  = BOREHOLE LOCATION
  - BH/MW**  = BOREHOLE/ MONITORING WELL LOCATION

## DRAWING No. 1

### BOREHOLE & MONITORING WELL LOCATION PLAN

04	
03	
02	
01	
Rev.	DATE REVISION / ISSUE

**Project Name:** PROPOSED RESIDENTIAL DEVELOPMENT

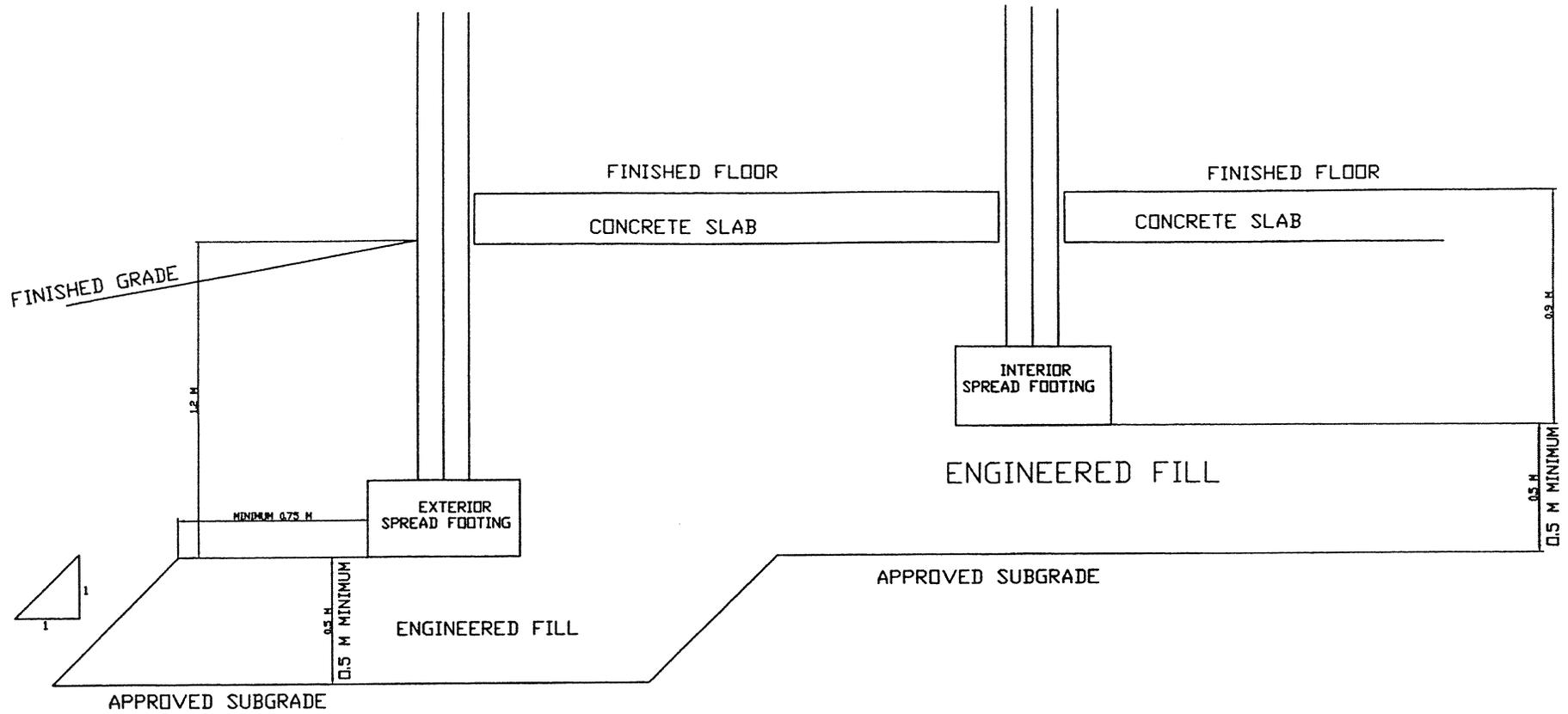
**Address:** 13286 NUNNVILLE ROAD, CALEDON, ON.

PROJECT No.	:7442
DRAWING DATE	:JAN. 2, 2026
DRAWN BY:	P.R. PAGE 1 of 1
CHECKED BY:	G.S.



**FORWARD ENGINEERING**  
& Associates Inc.

Forward Engineering & Associates Inc.  
244 Brockport Drive, Unit 15  
Toronto, Ontario M9W 6X9  
Tel: 416-798-3500 Fax: 416-798-8481



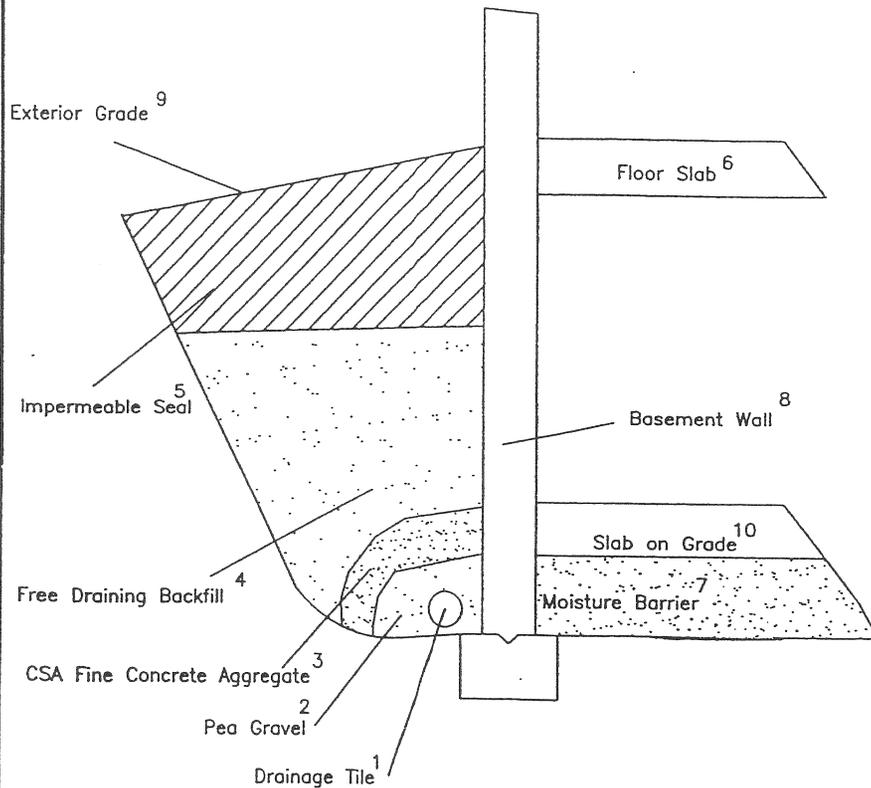
**NOTES:**

1. The exposed subgrade to be proofrolled by heavy sheep foot equipment - minimum 10 passes.
2. The engineered fill should be placed in 200 mm layers compacted to 100 % SPMDD.
3. The proposed strip and spread footings should be designed for 150 kPa. All dimensions to be provided by the Structural Engineer.
4. Acceptance of the engineered fill is subject to full time compaction control.

FORWARD ENGINEERING & ASSOCIATES INC.		
ENGINEERED FILL PROFILE		
N.T.S.	DATE: MAY 2002	DRAWING NO. 2

# DRAINAGE AND BACKFILL RECOMMENDATIONS

(Not to Scale)



TYPICAL SECTION

## NOTES:

1. Drainage tile to consist of 100 (4") diam. Weeping tile or equivalent perforated pipe leading to a positive sump or outlet. Invert to be minimum 150mm (6") below underside of floor slab.
2. Pea gravel 150mm (6") top and sides of drain. If drain is not on footing, 100 mm (4") of pea gravel below drain. Clear 20mm (3/4") crushed stone may be used provided it is covered by an approved porous membrane (Terrafix 270R or equivalent).
3. C.S.A. Fine aggregate to act as filter material. Minimum 300 mm (12") top and sides of tile drain. This may be replaced by an approved porous plastic membrane as indicated in 2.
4. Free draining backfill - Class B pit-run gravel or equivalent compacted to 93 - 95 % Standard Proctor Maximum Dry Density (SPMDD).
5. Impermeable backfill seal compacted clay, clay 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 slab or adequate bracing.
7. Moisture barrier to consist of 20mm (3/4") compacted crushed stone. Layer to be 200mm (8") thick.
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 at least 300 (1') below underside of floor slab. Tiles to be placed in parallel rows 6-8m (20' - 25') centres one way.
12. do not connect the underfloor drains to perimeter drains.
13. If the 20mm (3/4") stone requires surface blinding, use 6mm (1/4") stone chips.

**DRAWING NO. 3**

# **APPENDIX A**

**BOREHOLE LOG SHEETS**

**(1 – 6)**

Project No: 7442

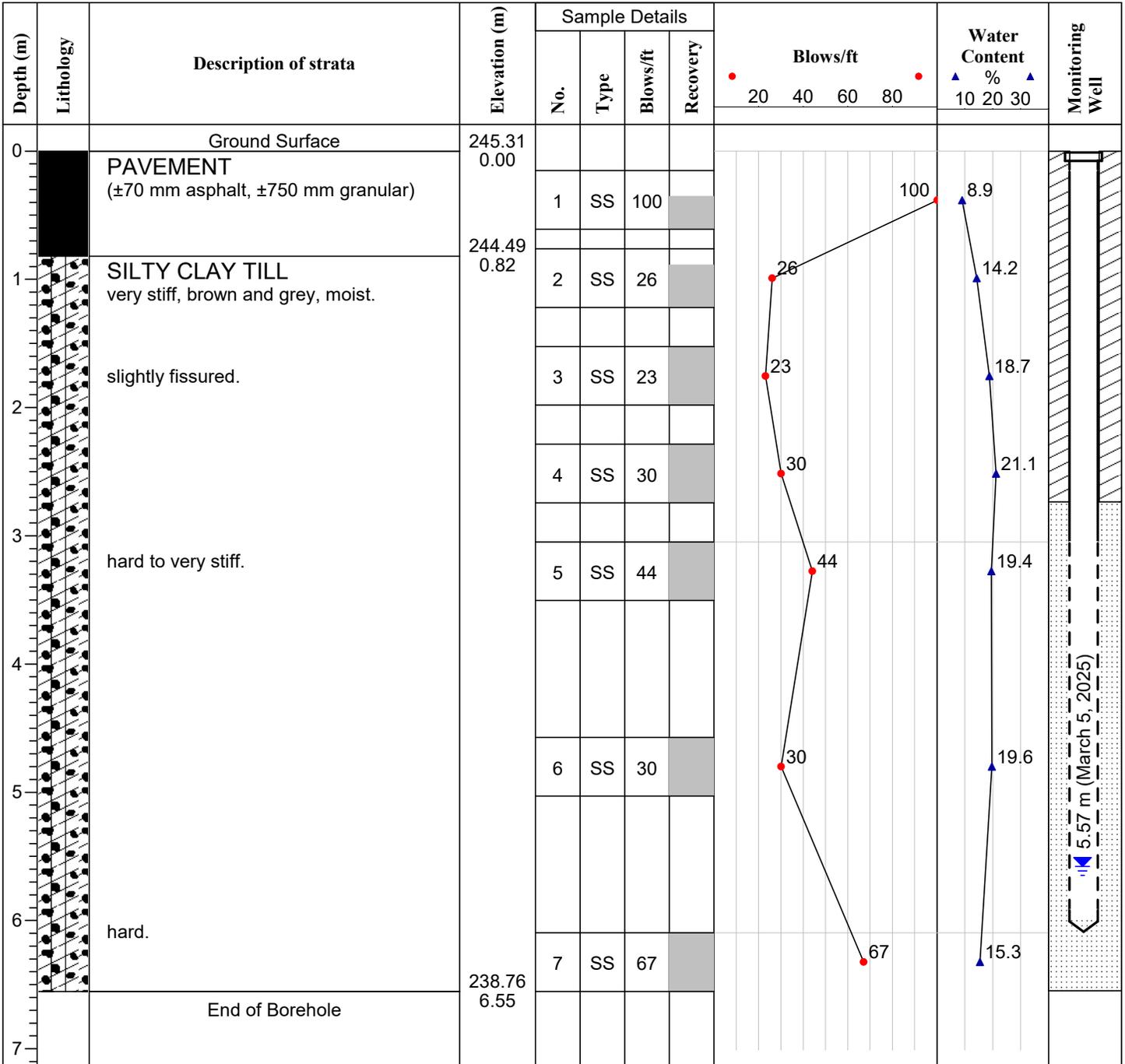
## Log of Borehole BH/MW-1

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Client: Mr. ADEL GEORGE

Enclosure: 2

Location: 13286 NUNNVILLE ROAD, CALEDON, ON



**Remarks:** -Upon completion of drilling, the borehole was open and dry.  
 -On March 5, 2025, the water level in the installed well was measured at 5.57 m below EGSL.

Drill Method: CME 55 - SOLID  
 Drill Date: 25 FEB. 2025  
 Datum: GEODETIC



Engineer: P.R.  
 Checked by: G.S.  
 Sheet No. 1 of 1

Project No: 7442

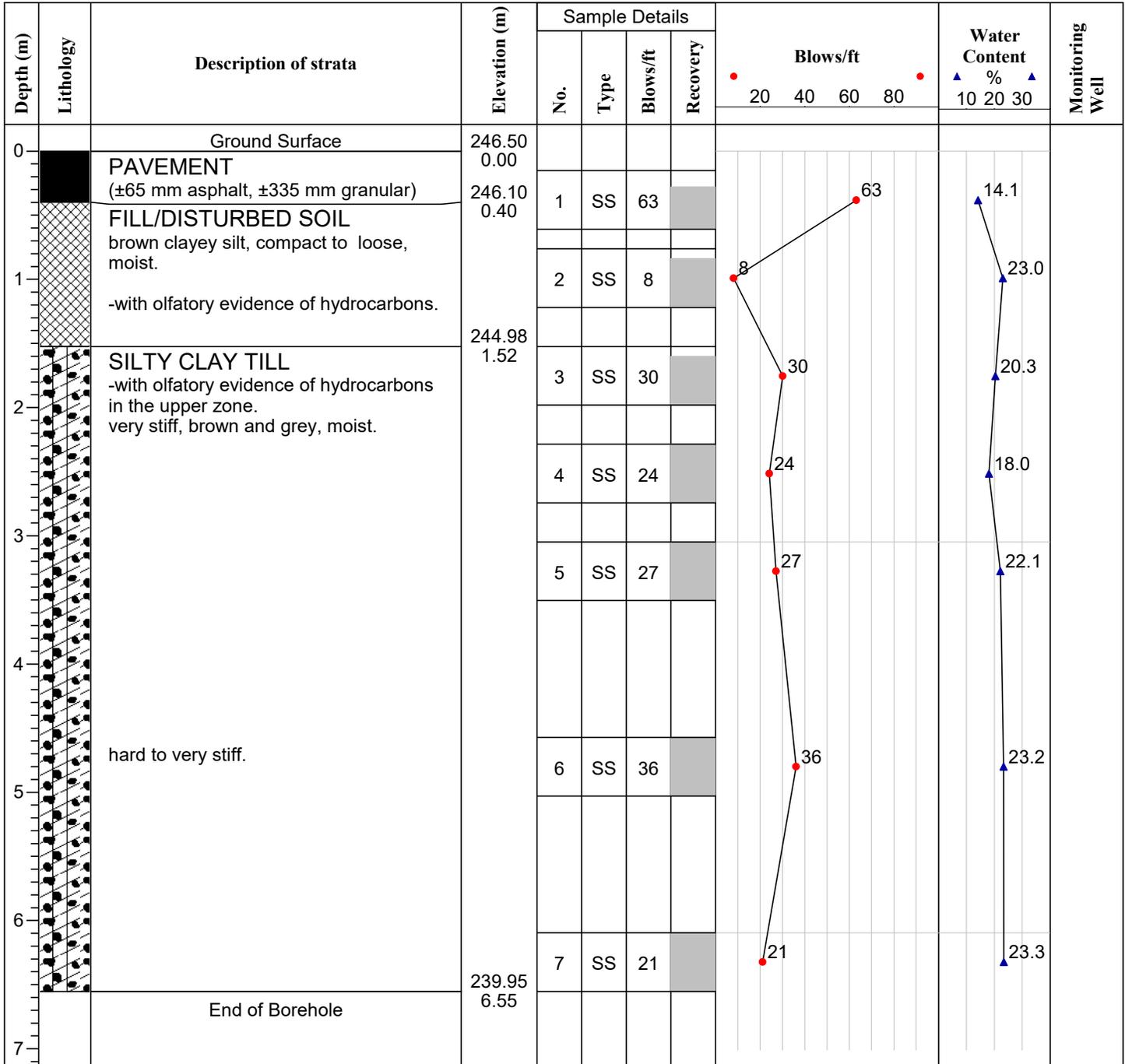
## Log of Borehole BH-2

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Client: Mr. ADEL GEORGE

Enclosure: 3

Location: 13286 NUNNVILLE ROAD, CALEDON, ON



**Remarks:** -Upon completion of drilling, the borehole was open and dry.

Drill Method: CME 55 - SOLID

Drill Date: 25 FEB. 2025

Datum: GEODETIC



Engineer: P.R.

Checked by: G.S.

Sheet No. 1 of 1

Project No: 7442

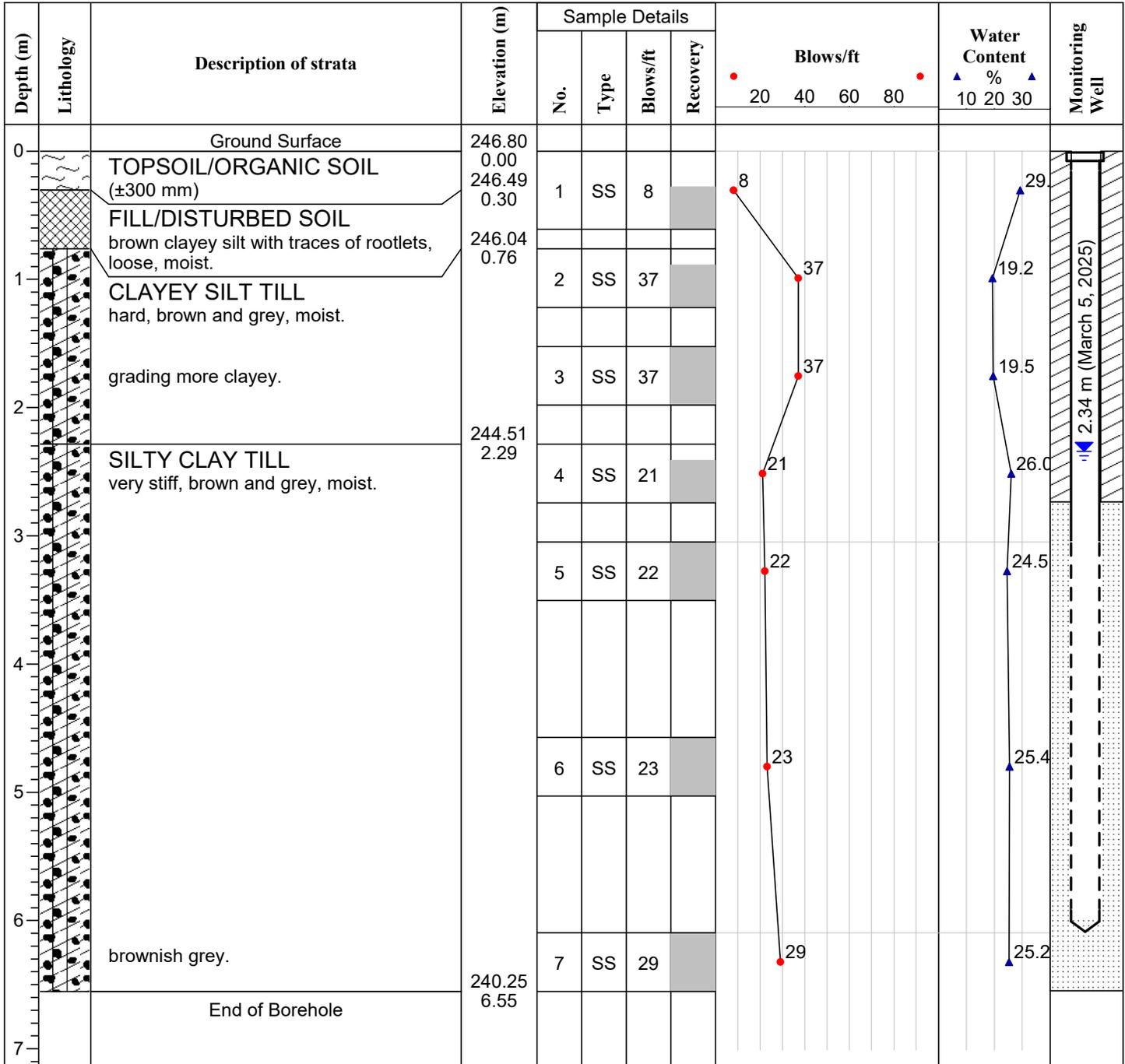
## Log of Borehole BH/MW-3

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Client: Mr. ADEL GEORGE

Enclosure: 4

Location: 13286 NUNNVILLE ROAD, CALEDON, ON



**Remarks:** -Upon completion of drilling, the borehole was open and dry.  
 -On March 5, 2025, the water level in the installed well was measured at 2.34 m below EGSL.

Drill Method: CME 55 - SOLID  
 Drill Date: 24 FEB. 2025  
 Datum: GEODETIC



Engineer: P.R.  
 Checked by: G.S.  
 Sheet No. 1 of 1

Project No: 7442

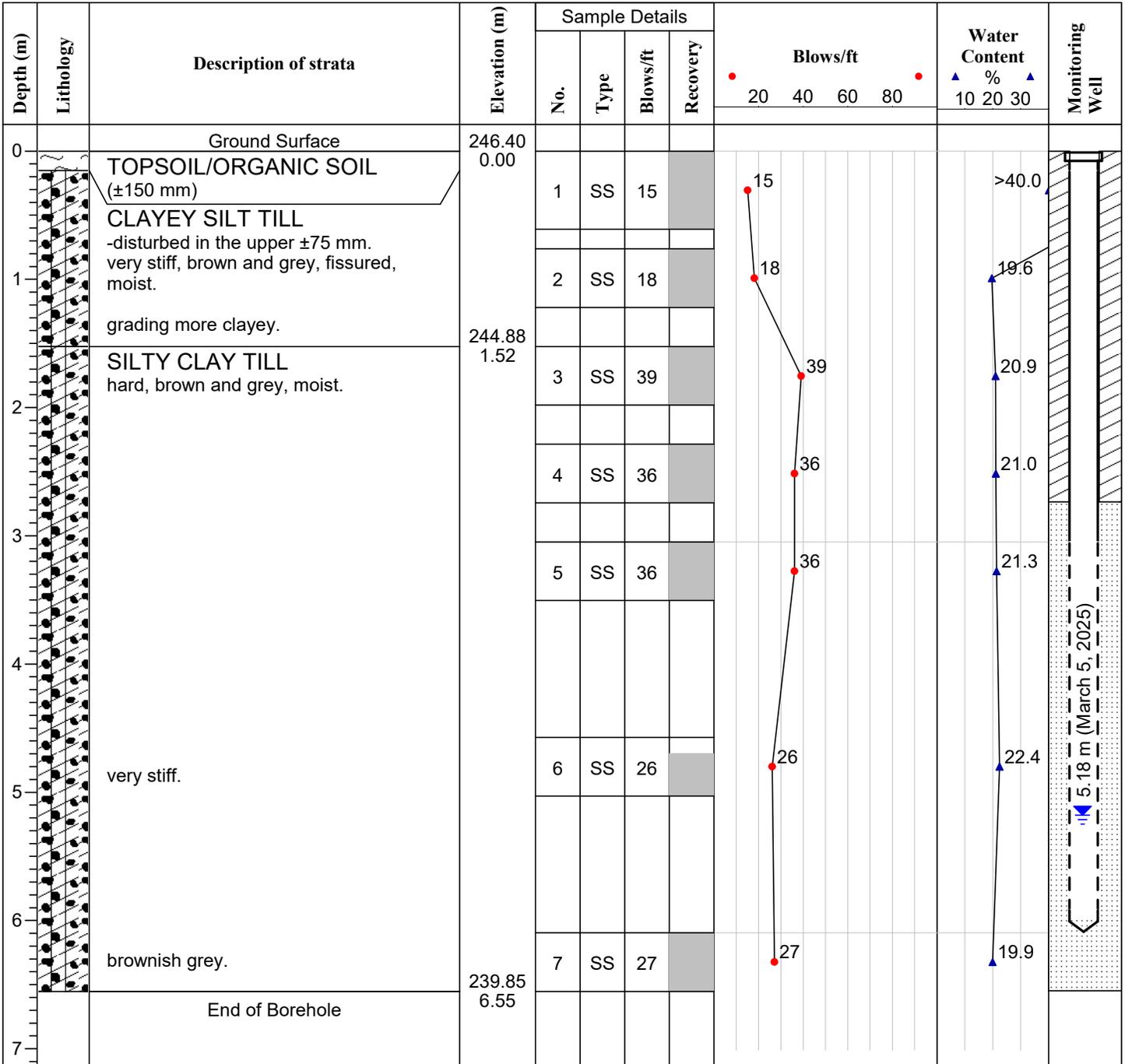
## Log of Borehole BH/MW-4

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Client: Mr. ADEL GEORGE

Enclosure: 5

Location: 13286 NUNNVILLE ROAD, CALEDON, ON



**Remarks:** -Upon completion of drilling, the borehole was open and dry.  
 -On March 5, 2025, the water level in the installed well was measured at 5.18 m below EGSL.

Drill Method: CME 55 - SOLID  
 Drill Date: 24 FEB. 2025  
 Datum: GEODETIC



Engineer: P.R.  
 Checked by: G.S.  
 Sheet No. 1 of 1

Project No: 7442

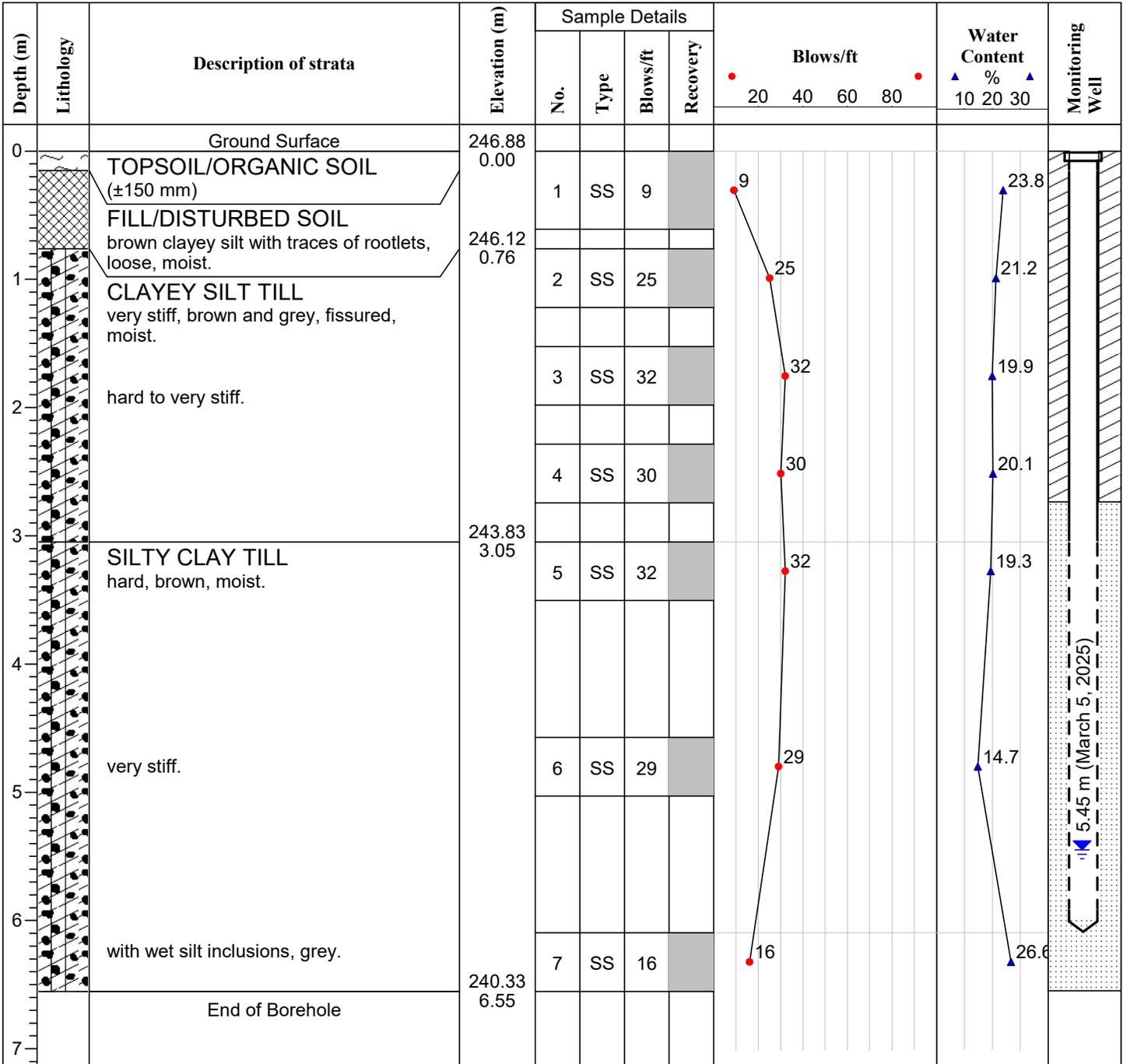
## Log of Borehole BH/MW-5

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Client: Mr. ADEL GEORGE

Enclosure: 6

Location: 13286 NUNNVILLE ROAD, CALEDON, ON



**Remarks:** -Upon completion of drilling, the borehole was open and wet at the bottom.  
 -On March 5, 2025, the water level in the installed well was measured at 5.45 m below EGSL.

Drill Method: CME 55 - SOLID  
 Drill Date: 24 FEB. 2025  
 Datum: GEODETIC



Engineer: P.R.  
 Checked by: G.S.  
 Sheet No. 1 of 1

Project No: 7442

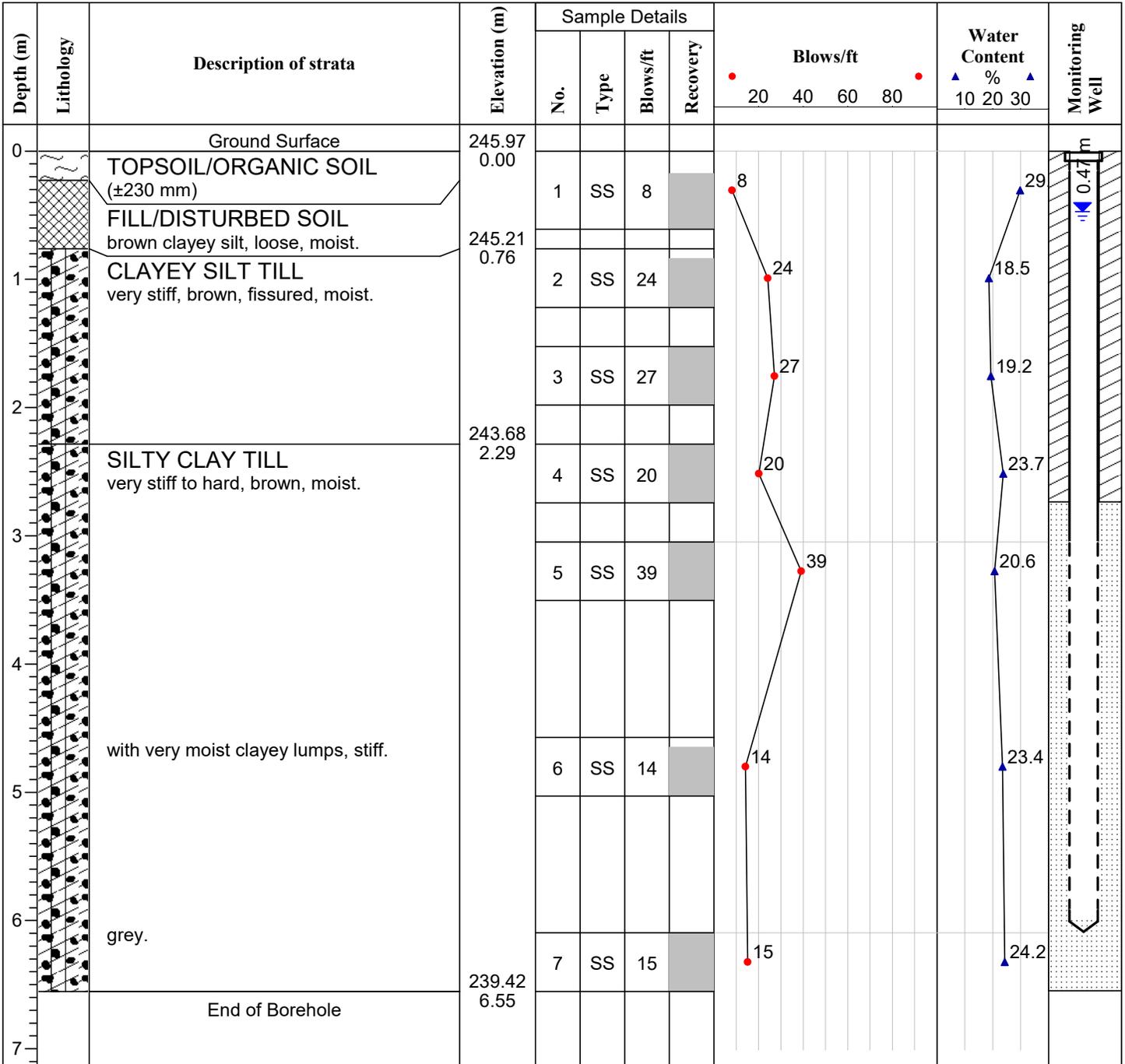
## Log of Borehole BH/MW-6

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Client: Mr. ADEL GEORGE

Enclosure: 7

Location: 13286 NUNNVILLE ROAD, CALEDON, ON



**Remarks:** -Upon completion of drilling, the borehole was open and dry.  
 -On March 5, 2025, the water level in the installed well was measured at 0.47 m below EGSL.

Drill Method: CME 55 - SOLID

Drill Date: 24 FEB. 2025

Datum: GEODETIC



Engineer: P.R.

Checked by: G.S.

Sheet No. 1 of 1