REPORT ON

SLOPE STABILITY INVESTIGATION
PROPOSED RESIDENTIAL SUBDIVISION
336 KING STREET EAST, CALEDON, ONTARIO

PREPARED FOR:

336 KINGS RIDGE INC.

PREPARED BY:

DS CONSULTANTS LTD.

DS Project No : 18-566-30
Date : August 9, 2018

DS CONSULTANTS LTD.
6221 Highway 7, Unit 16
Vaughan, Ontario, L4H 0K8
Telephone: (905) 264-9393
www.dsconsultants.ca

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1. INTRODUCTION

DS Consultants Limited (DSCL) was retained by 336 Kings Ridge Inc. to undertake a slope stability assessment of the natural ravine slope existing at the south portion of the property located at 336 King Street East in Caledon, Ontario.

It is understood that the subject site will be redeveloped with a residential sub-division consisting of fifteen (15) town-houses. A slope stability study is required by the Toronto & Region Conservation Authority (TRCA) to determine the location of long-term stable top of slope (LTSTOS) line for the ravine slope associated with Humber River.

The purpose of this geotechnical investigation was to obtain information about the subsurface conditions at boreholes locations and from the findings in the boreholes to make recommendations pertaining to the stability of the existing ravine slope and determine the location of the longterm stable top of slope line.

This report is provided on the basis of the terms of reference presented above and, on the assumption, that the design will be in accordance with the applicable codes and standards. If there are any changes in the design features relevant to the geotechnical analyses, or if any questions arise concerning the geotechnical aspects of the codes and standards, this office should be contacted to review the design. It may then be necessary to carry out additional borings and reporting before the recommendations of this office can be relied upon.

The site investigation and recommendations follow generally accepted practice for geotechnical consultants in Ontario. The format and contents are guided by client specific needs and economics and do not conform to generalized standards for services. Laboratory testing for most part follows ASTM or CSA Standards or modifications of these standards that have become standard practice.

This report has been prepared for 336 Kings Ridge Inc. and TRCA. Third party use of this report without DSCL consent is prohibited.

2. FIELD AND LABORATORY WORK

Four boreholes (BH18-1 through BH18-4, see Drawing 1 for borehole locations) were drilled on May 10, 2018 to a depth of 8.2m for the proposed residential development. One borehole (BH18-5) was drilled on August 3, 2018 to a depth of 17.4m near the existing top of slope, for the slope stability assessment.

Boreholes were drilled with solid stem continuous flight augers equipment by a drilling sub-contractor under the direction and supervision of DSCL personnel. Samples were retrieved at regular intervals with a 50 mm O.D. split-barrel sampler driven with a hammer weighing 624 N and dropping 760 mm in accordance with the Standard Penetration Test (SPT) method. The samples were logged in the field and

returned to the DSCL laboratory for detailed examination by the project engineer and for laboratory testing.

As well as visual examination in the laboratory, all soil samples from geotechnical boreholes were tested for moisture contents. Grain size analyses of two (2) selected soil samples were conducted and the results are presented in Drawing 8.

Water level observations were made during and upon completion of drilling. Three (3) monitoring wells of 50mm diameter were installed in boreholes BH18-1, BH18-3 and BH18-4 for the long-term groundwater monitoring and environmental testing.

The surface elevations at the borehole locations were surveyed by DSCL, using differential GPS system, leased from Sokkia Canada Inc.

3. SUBSURFACE CONDITIONS

The subject site is currently occupied by a single storey structure and associated driveway and landscape areas. Topography of the site is generally flat, with mild slope towards south. A ravine slope is located at south portion of the subject property. It is understood that the existing structure will be demolished prior to the re-development of the site.

The borehole location plans are shown on **Drawing 1**. General notes on sample description are provided on **Drawing 1A**. The subsurface conditions in the boreholes are presented in the individual borehole logs presented on **Drawings 2 to 6**. A generalized sub-surface profile of the boreholes drilled near the ravine slope (BH18-3, BH18-4 and BH18-5) is presented on **Drawing 7**.

3.1 Soil Conditions

Pavement Structure/Topsoil:

Two boreholes (BH18-1 and BH18-2) were drilled on the driveway and encountered pavement structure consisting of 50mm, overlying 450 to 500mm of granular fill. Other two boreholes encountered **s**urficial topsoil layer of about 400mm in thickness. It should be noted that the thickness of the topsoil explored at the borehole locations may not be representative for the site and should not be relied on to calculate the amount of topsoil at the site.

Silty Clay:

Below the topsoil/pavement structure, native soil consisting of silty clay was found in BH18-1 to BH18-3, extending to depths of 4.6 to 6.1m and overlying silt deposit. Silty clay was present in a firm to hard consistency, with measured SPT 'N' values ranging from 8 to over 50 blows per 300mm penetration. Moisture contents in the tested samples of silty clay ranged between 18 to 22 percent.

Grain size analysis of one sample from silty clay deposit (BH18-1/SS3) was carried out and gradation curve for the results is provided on **Drawing 8**, with following fractions:

Clay: 43%

Silt: 54%

Sand: 3%

Atterberg Limits testing was carried out on same sample of silty clay deposit (BH18-1/SS3), results are provided on the respective borehole log and summarized below:

Liquid Limit: 35%

Plastic Limit: 19%

Plasticity Index: 16%

Silt/Silty Sand:

Below the surficial topsoil in BH18-4 and BH18-5 and below silty clay in all other boreholes, a silt deposit was encountered extending to the maximum explored depth of 17.6. Silt was interbedded with a silty sand layer below a depth of 7.6m. Silt was present in a compact to very dense state, with measured SPT 'N' values of 20 to over 50 blows per 300 mm of penetration.

Grain size analysis of one sample from silt deposit (BH18-4/SS4) was carried out and gradation curve for the results is provided on Drawing 8, with following fractions:

Clay: 12%

Silt: 73%

Sand: 12%

Gravel: 3%

3.2 Groundwater Conditions

Short term groundwater levels were found to be in the range of 2.3 to 7.6m below ground surface during drilling. Groundwater levels measured in the monitoring wells on May 21 and 28, 2018 were at depths ranging from 1.0 to 5.6m, corresponding to Elev. 219.5 to 224.7m. **Table 1** summarizes the depth and elevation of water level readings in monitoring wells.

Table 1: Groundwater Levels Observed in Monitoring Wells

BH No.	Ground Surface Elev. (m)	Date of Drilling	Date of Observation	Depth of Groundwater (m)	Elevation of Groundwater (m)
BH18-1	225.8	May 10, 2018	May 21, 2018	5.6	220.1
BH18-3	224.1	May 10, 2018	May 28, 2018	4.6	219.5
BH18-4	225.7	May 10, 2018	May 28, 2018	1.0	224.7

It should be noted that the groundwater levels can vary and are subject to seasonal fluctuations in response to major weather events.

4. DISCUSSION AND RECOMMENDATIONS

Based on the borehole information, our site observations and the measured slope profiles, a detailed slope stability study was carried out to determine the long-term stable top of slope line, as presented in the following.

4.1 SLOPE CONDITIONS AND PROFILES

A visual site assessment was undertaken by DSCL engineers on August 7, 2018. Slope profiles at Sections A-A to C-C were then derived from the topographic drawing provided by the client. The slope profile locations are shown on Drawing 1 and the slope profiles are presented on Drawings 9 to 11. Selected photographs taken during the site visits are presented in **Appendix A**. The site is currently vacant occupied by a single storey house and associated driveways and landscape areas.

Based on site observations, the slope conditions are further described as follows:

- The height of the ravine slope, from ravine to top of bank, typically ranges from about 13m to 17 m. The steepness of the slope varies from about 1.7H:1V to 2.2H:1V, as shown on Drawings 9 to 11.
- There is a water course (Humber River) located at or near the toe of slopes. The river within the property boundary is typically 9m to 15m in width. River banks are about 1.0 to 1.5m deep and water in the river was about 0.3 to 0.4m at the bottom of river.
- Active erosion of the river banks was observed at few locations.
- Water course is located within 15m from the toe of the slope.
- The slope surfaces and the flood plain areas were generally very well vegetated with grass, understorey vegetation and trees. However, few bare spots were observed during our site visit east of Section A-A. This area is probably used to walk down the slopes. Majority of the trees were found tilted on the slope surface.
- No water seepage was observed from the slope surfaces or in the floodplain.
- No evidences of previous or recent slope failures or movement were observed during site visits.

4.2 Erosion Considerations

Humber River was located within 15 m from the toe of the slope. Based on the borehole information and our site observations, the soils at the river level generally consist of silt to sandy silt soils. Minor active creek bank erosion was observed during the site visit. In accordance with the Provincial Guidelines entitled “Understanding Natural Hazards” and considering the soil and river conditions, it is our opinion that a river bank erosion allowance of e=8 m is required for the long-term stable slopes. This erosion allowance of e=8m will be used for the long-term stable slope analyses in the following sections.

4.3 Soil Parameters

Based on the record borehole information and our site observations, soil parameters used in the slope stability analyses are provided on Table 2.

Table 2: Soil Parameters for Long-term Slope Stability Analyses

Soil Type	Soil Density (kN/m^3)	Cohesion c' (kPa)	Friction Angle ϕ' (degree)
Topsoil	16.0	2	0
Silty Clay	20.0	5	30
Compact to very dense Silt	20.5	0	34

4.4 Stability Analyses of Existing Slopes

Seven existing slope profiles at Sections A-A to C-C (see Drawing 1 for locations) were derived from the topographic Drawing. The slope at Section A-A and B-B are relatively steeper than the slope at Section C-C.

Long-term stability analyses of the existing slope at Sections A-A to C-C have been carried out with the computer program SLIDE (Version 7) using the Simplified Bishop method. The analysis results are presented in Drawings 12 and 13 and are summarized in Table 3 below.

Table 3: Long-term Stability Analysis Results of Existing Slopes

Slope Location	Calculated Factor of Safety (FS)	Long-Term Stability
Section A-A (See Drawing 12)	1.41	Unstable (FS < 1.5)
Section C-C (See Drawing 13)	1.62	stable (FS > 1.5)

The calculated factor of safety of the existing slope at A-A is 1.41, which is less than the minimum acceptable value of 1.5. Therefore, the existing slope at Section A-A is considered unstable in terms of long term stability based on the TRCA requirements.

The calculated factor of safety of the existing slope at C-C is 1.62, which is greater than the minimum acceptable value of 1.5. The existing slope at Section C-C is considered stable in terms of long term stability based on TRCA requirements.

4.5 Analyses of Long-term Stable Slope

In order to determine the long-term stable slope at site, analysis of the imaginary 2H:1V slope together with erosion allowance of 8m at Section A-A (modified slope) has been carried out, and the results are

presented on Drawing 14. The calculated factor of safety of the 2H:1V slope at Section A-A is 1.52, which is greater than the minimum acceptable value of 1.5. The 2H:1V slope as shown on Drawing 14 is considered stable in terms of long-term stability.

Based on the analysis results, it can be concluded that a slope of 2H:1V or flatter inclination at subject site is considered stable in terms of long-term stability.

An erosion allowance of 8m together with 2H:1V slope will be applied to determine the long-term stable top of slope.

4.6 Proposed Long-term Stable Top of Slope

Based on the analysis results and applying stream bank erosion allowance of 8m, the points representing the long-term stable top of slope at the surveyed cross sections are as follows.

- Points "S1" on Drawings 9 and 13 represents the long-term stable top of slope at Section A-A
- Point "S2" on Drawing 10 represents the long-term stable top of slope at Section B-B
- Point "S3" on Drawings 11 and 14 represents the long-term stable top of slope at Section C-C

Based on the long-term stable top of slope at Sections A-A to C-C, and our field observations, the recommended long-term stable top of slope lines (Line S0-S1-S2-S3-S4) is shown on Drawing 1.

This long-term stable top of slope line must be reviewed by the Toronto & Region Conservation Authority (TRCA) for their approval, staked on site and then surveyed to verify the lines on design drawings.

4.7 Other Comments

Additional comments related to the slope stability at the site are as follows:

- Additional fill cannot be placed on the existing slope surfaces or near the top of the slopes.
- In order to prevent soil erosion at the slope surface, the vegetation and trees on the existing slopes must be preserved. Surface water must be directed away from the slope.
- It should be noted that for the proposed development, Toronto & Region Conservation Authority (TRCA) will require additional setback from the long-term stable top of slope line.

5. GENERAL COMMENTS AND LIMITATIONS OF REPORT

DS Consultants Limited (DSCL) should be retained for a general review of the final design and specifications to verify that this report has been properly interpreted and implemented. If not accorded

the privilege of making this review, DSCL will assume no responsibility for interpretation of the recommendations in the report.

This report is intended solely for the Client named. The material in it reflects our best judgment in light of the information available to DSCL at the time of preparation. Unless otherwise agreed in writing by DSCL, it shall not be used to express or imply warranty as to the fitness of the property for a particular purpose. No portion of this report may be used as a separate entity, it is written to be read in its entirety.

The conclusions and recommendations given in this report are based on information determined at the test hole locations. The information contained herein in no way reflects on the environment aspects of the project, unless otherwise stated. Subsurface and groundwater conditions between and beyond the test holes may differ from those encountered at the test hole locations, and conditions may become apparent during construction, which could not be detected or anticipated at the time of the site investigation. The benchmark and elevations used in this report are primarily to establish relative elevation differences between the test hole locations and should not be used for other purposes, such as grading, excavating, planning, development, etc.

The design recommendations given in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report.

The comments made in this report on potential construction problems and possible methods are intended only for the guidance of the designer. The number of test holes may not be sufficient to determine all the factors that may affect construction methods and costs. For example, the thickness of surficial topsoil or fill layers may vary markedly and unpredictably. The contractors bidding on this project or undertaking the construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusions as to how the subsurface conditions may affect their work. This work has been undertaken in accordance with normally accepted geotechnical engineering practices.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. DSCL accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. We accept no responsibility for any decisions made or actions taken as a result of this report unless we are specifically advised of and participate in such action, in which case our responsibility will be as agreed to at that time.

We trust that the information contained in this report is satisfactory. Should you have any questions, please do not hesitate to contact this office.

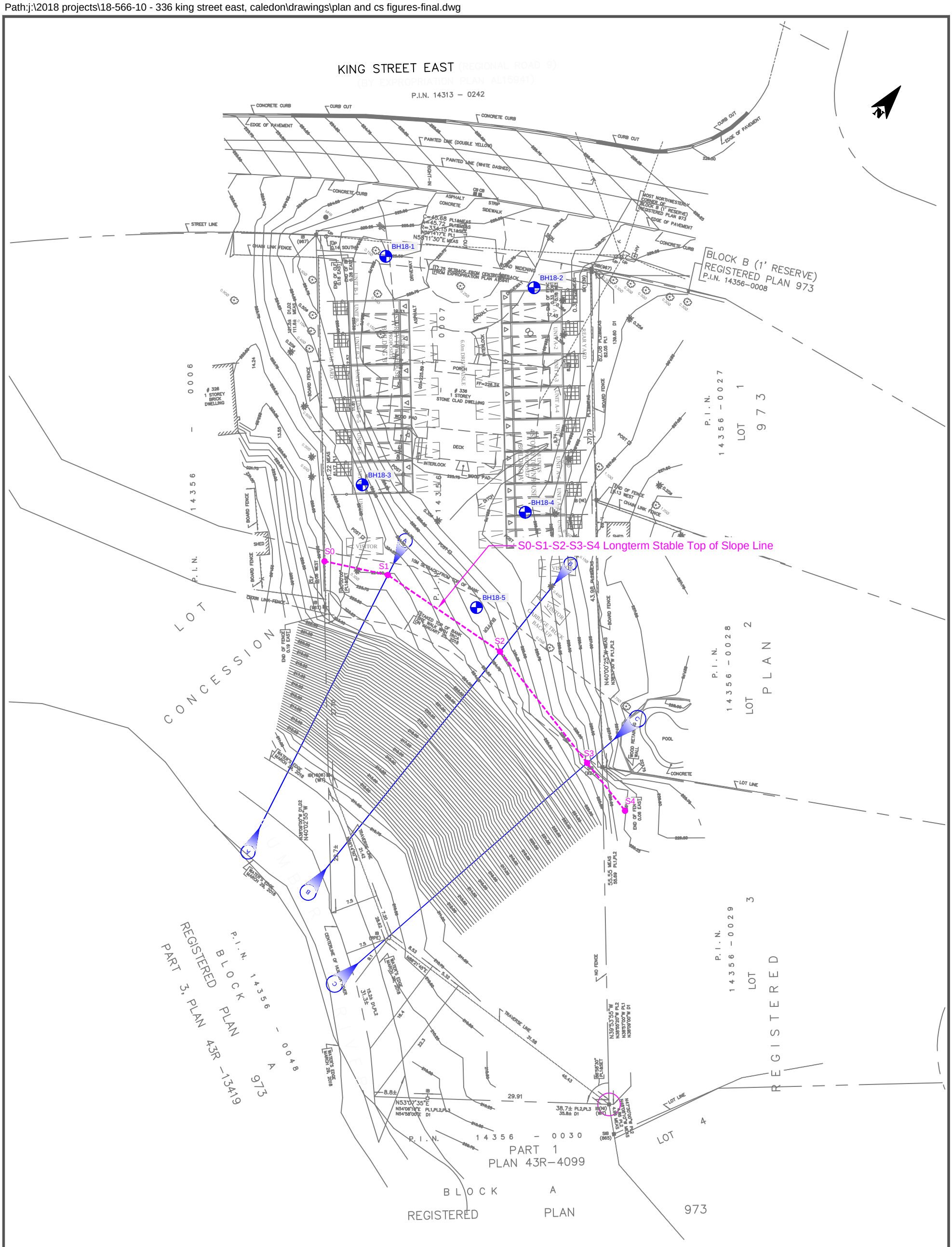
DS CONSULTANTS LIMITED

Alka Sangar, M.Eng., P.Eng

Shaheen Ahmad, M.A.Sc., P.Eng

Drawings

Path:j:\2018 projects\18-566-10 - 336 king street east, caledon\drawings\plan and cs figures-final.dwg



BH18-4 Borehole Location

S1 S4 Long Term Stable Top of Slope Line

DS CONSULTANTS LTD.
6221 Highway 7, UNIT 16
Vaughan, Ontario L4H 0K8
Telephone: (905) 264-9393
www.dsconsultants.ca

Project: 336 KING ST EAST, CALEDON, ON			
Title: BOREHOLE AND CROSS-SECTION LOCATIONS			
Client: 336 KINGS RIDGE INC	Approved By: A.S	Drawn By: S.Y	Date: August 2018
	Scale: As Shown	Project No: 18-566-10	Drawing No. 1

DS CONSULTANTS LTD.

LOG OF BOREHOLE BH18-1

PROJECT: Geotechnical Investigation - Proposed Townhouses
CLIENT: 336 Kings Ridge Inc.
PROJECT LOCATION: 336 King Street E, Caledon, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: May-10-2018

REF. NO.: 18-566-10
ENCL NO.: 2

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"	ELEVATION
225.8					
225.6 0.2	**ASPHALTIC CONCRETE:**50mm	1	AS		
225.3 0.5	**GRANULAR BASE:**450mm				
	SILTY CLAY: trace sand, occasional gravel & sand seams, brown to grey, moist, very stiff to hard	2	SS	8	225
		3	SS	28	224
		4	SS	42	223
		5	SS	36	222
		6	SS	69	221
219.7 6.1	**SILT:** some clay, trace sand, grey, moist, very dense	7	SS	68	219
218.2 7.6	**SILTY SAND:** trace clay, grey, wet, dense	8	SS	40	218
217.8 8.0	**SILT:** some clay, trace sand, grey, moist, dense				
8.2	**END OF BOREHOLE**				

Notes:
1) Water level at 7 mbgs upon completion.
2) Water Level Readings:

Date	Water Depth (mbgs)
May 21, 2018	5.6

W. L. 220.1 m
May 21, 2018

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE
20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

METHANE AND GRAIN SIZE DISTRIBUTION (%)

	GR	SA	SI	CL
3	54	43		

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

DS SOIL LOG 18-566-10 336 KING STREET E, CALEDON, ON.GPJ DS.GDT 18-8-10

LOG OF BOREHOLE BH18-2

PROJECT: Geotechnical Investigation - Proposed Townhouses
CLIENT: 336 Kings Ridge Inc.
PROJECT LOCATION: 336 King Street E, Caledon, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: May-10-2018

REF. NO.: 18-566-10
ENCL NO.: 3

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
225.9												
225.6 / 0.3	**ASPHALTIC CONCRETE:**50mm		1	AS								
225.4 / 0.6	**GRANULAR BASE:**500mm											
	SILTY CLAY: trace sand, occasional gravel & sand seams, brown to grey, moist, very stiff to hard		2	SS	14		225					
			3	SS	32		224					
			4	SS	45		223					
			5	SS	33		222					
219.8			6	SS	58		221					
6.1	**SILT:** some clay, trace sand, grey, moist, dense		7	SS	48		220					
218.3							219					
218.1 / 7.8	**SILTY SAND:** trace clay, grey, wet, dense		8	SS	42		218					
217.7 / 8.2	**SILT:** some clay, trace sand, grey, moist, dense											
	END OF BOREHOLE											

Notes:
1) Water level at 7.6m during drilling.

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

LOG OF BOREHOLE BH18-3

PROJECT: Geotechnical Investigation - Proposed Townhouses
CLIENT: 336 Kings Ridge Inc.
PROJECT LOCATION: 336 King Street E, Caledon, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: May-10-2018

REF. NO.: 18-566-10
ENCL NO.: 4

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"	ELEVATION
224.1 / 0.0	**TOPSOIL:** 400mm				
223.7 / 0.4	**SILTY CLAY:** trace sand, brown, moist, stiff to hard	1	SS	6	224
		2	SS	11	223
		3	SS	17	
		4	SS	33	222
		5	SS	49	221
219.5 / 4.6	**SILT:** some clay, trace sand, grey, wet, very dense	6	SS	54	220
					219
218.0 / 6.3	**SILTY SAND:** trace clay, grey, wet, very dense	7	SS	60	218
	SILT: trace to some clay, trace sand, grey, moist to very moist, very dense				217
215.9 / 8.2	**END OF BOREHOLE**	8	SS	56	216

Notes:
1) 50mm dia. monitoring well installed in the borehole upon completion.
2) Water Level Readings:

Date	Water Depth (mbgs)
May 28, 2018	4.6

W. L. 219.5 m
May 28, 2018

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
SHEAR STRENGTH (kPa) (20 40 60 80 100)
○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE
PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%) (10 20 30)
POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m³)
METHANE AND GRAIN SIZE DISTRIBUTION (%) — GR SA SI CL

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ 8=3% Strain at Failure

LOG OF BOREHOLE BH18-4

PROJECT: Geotechnical Investigation - Proposed Townhouses
CLIENT: 336 Kings Ridge Inc.
PROJECT LOCATION: 336 King Street E, Caledon, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: May-10-2018

REF. NO.: 18-566-10
ENCL NO.: 5

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
225.7									
0.0 / 225.3	**TOPSOIL:**400mm	1	SS	5		225			
0.4	**SILT:** some clay, trace to some sand, brown to grey, moist, compact to very dense	2	SS	20	W. L. 224.7 m May 28, 2018				
		3	SS	31		224			
	grey, wet below 2.3 m	4	SS	33		223			3 12 73 12
		5	SS	36		222			
	some clay to clayey below 4.6 m	6	SS	38		221			
		7	SS	88		220			
		8	SS	53		219			
217.5						218			
8.2	**END OF BOREHOLE**								

Notes:
1) 50mm dia. monitoring well installed in the borehole upon completion.
2) Water Level Readings:

Date	Water Depth (mbgs)
May 28, 2018	1.0

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH (kPa): ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE; 20 40 60 80 100

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L

WATER CONTENT (%): 10 20 30

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

DS SOIL LOG 18-566-10 336 KING STREET E, CALEDON, ON.GPJ DS.GDT 18-8-10

LOG OF BOREHOLE BH18-5

PROJECT: Geotechnical Investigation - Proposed Townhouses
CLIENT: 336 Kings Ridge Inc.
PROJECT LOCATION: 336 King Street E, Caledon, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150 mm
Date: Aug-03-2018

REF. NO.: 18-566-10
ENCL NO.: 6

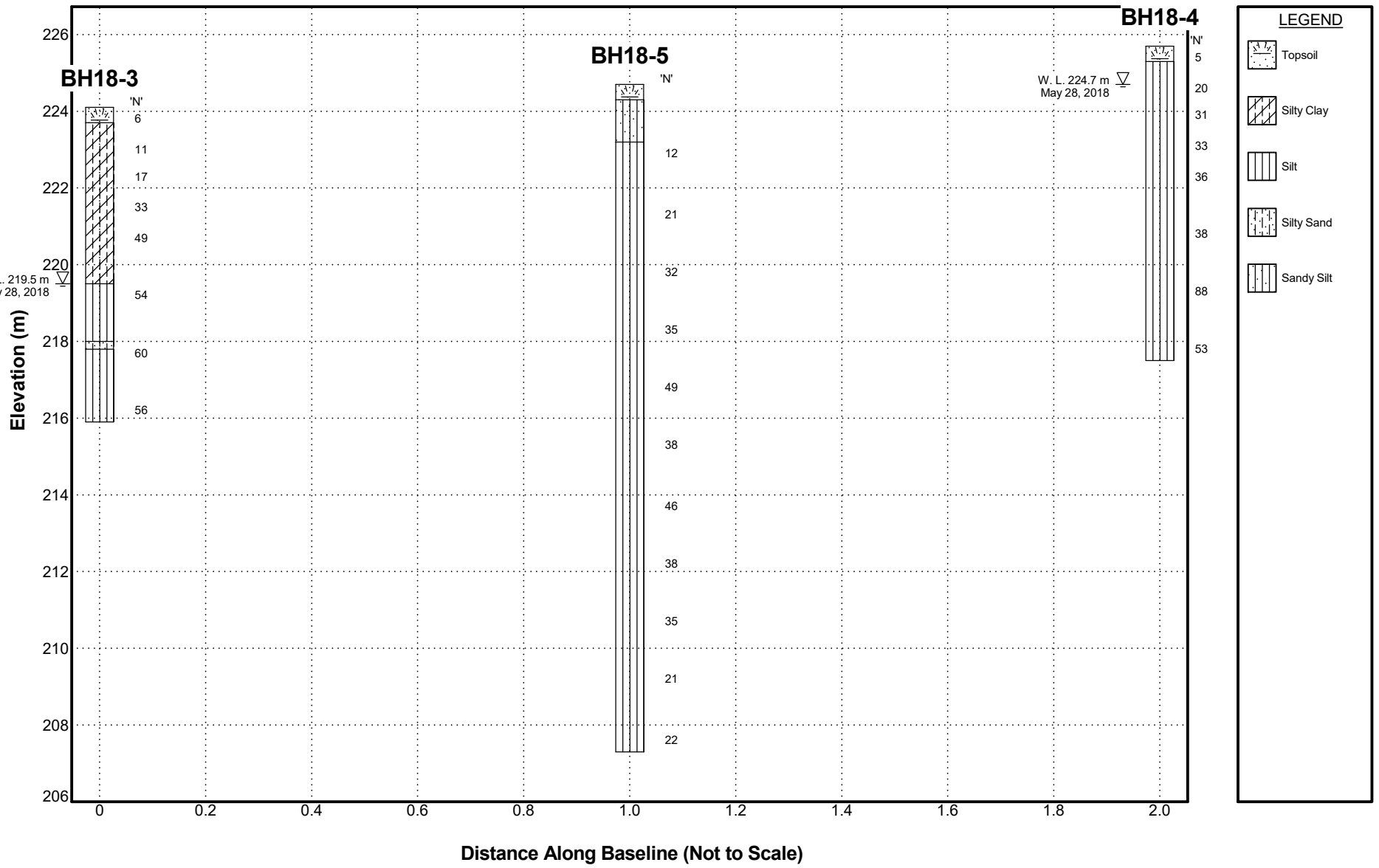
(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"	ELEVATION	Notes
224.7 / 0.0	**TOPSOIL:** 400 mm		AS			
224.3 / 0.4	**SANDY SILT:** trace clay, trace roots/organics, dark grey to brown, moist, compact (possible fill)					
223.2 / 1.5	**SILT :** trace clay, trace sand, brown to grey, moist to wet, compact to dense	1	SS	12	223	
		2	SS	21	221	
	grey and dense below 4.6 m	3	SS	32	220	
		4	SS	35	218	
	wet below 7.6 m	5	SS	49	217	
		6	SS	38	215	
		7	SS	46	214	
		8	SS	38	212	
		9	SS	35	211	
		10	SS	21	209	wet spoon
207.3 / 17.4	**END OF BOREHOLE**	11	SS	22	208	wet spoon

Notes:
1) Borehole wet at bottom upon completion.

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100
SHEAR STRENGTH (kPa): ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE; 20 40 60 80 100
PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%): 10 20 30
POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m³)
METHANE AND GRAIN SIZE DISTRIBUTION (%) — GR SA SI CL

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: +3, ×3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure



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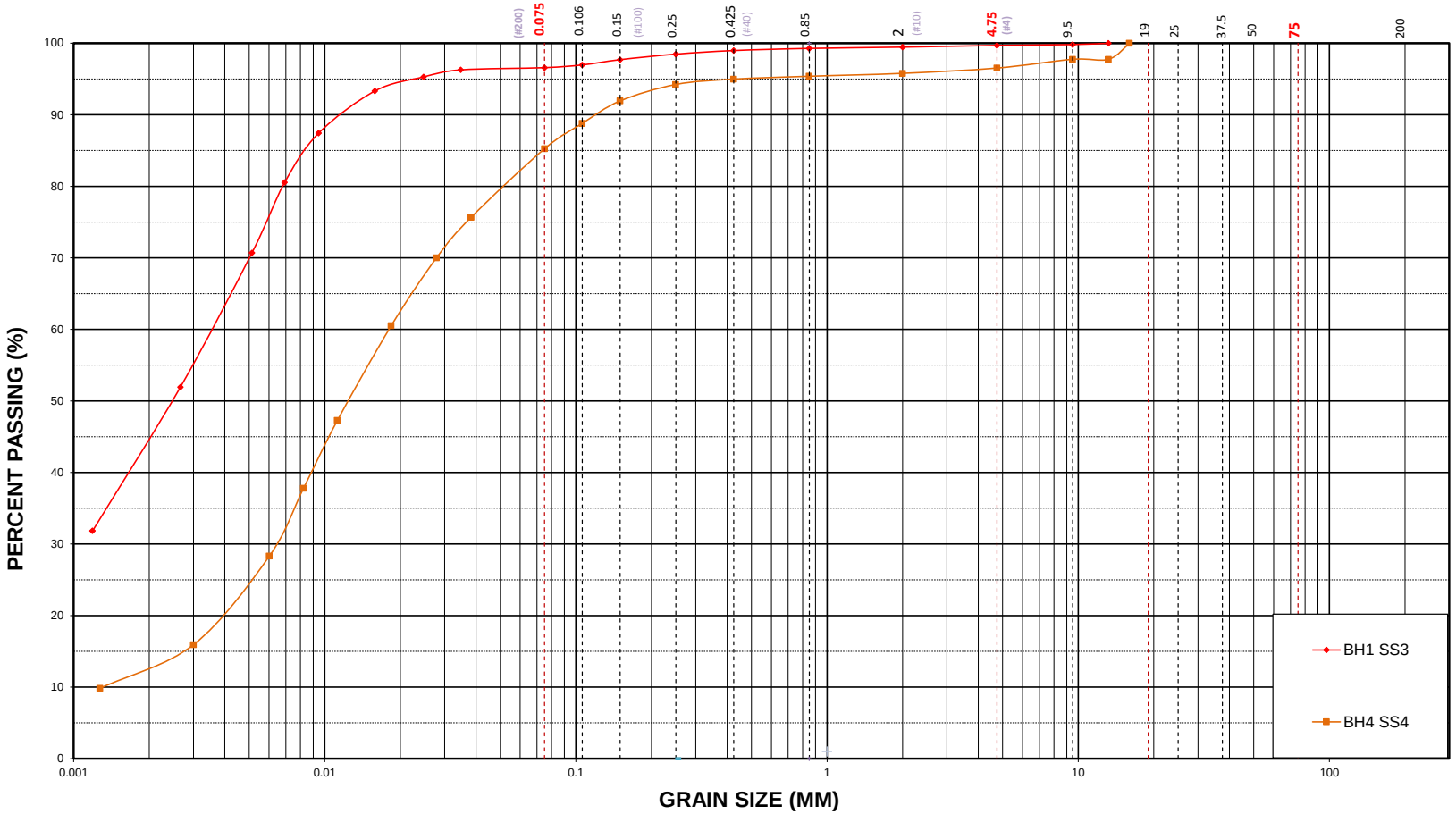
Generalized Sub-surface Profile

DRAWING NO.	7
JOB NO.	18-566-10
DATE	August, 2018

DS FENCE (M) 18-566-10 336 KING STREET E, CALEDON, ON.GPJ DS.GDT 18-8-10

Particle Size Distribution (ASTM-D421/D422)



Silt and Clay		Sand			Gravel		Cobble +
Clay	Silt	Fine	Medium	Coarse	Fine	Coarse	

Specification and Comments:

DS CONSULTANTS LTD.
6221 Highway 7, Unit 16
Vaughan, Ontario, L4H 0K8
Telephone: (905) 264-9393
www.dsconsultants.ca

Project:	**Proposed Residential Development**	Project No.:	**18-566-10**
Client:	**Georgian Group**	Date:	**May-25-2018**
Location:	**336 King Street E, Caledon,ON.**	Figure No.:	8

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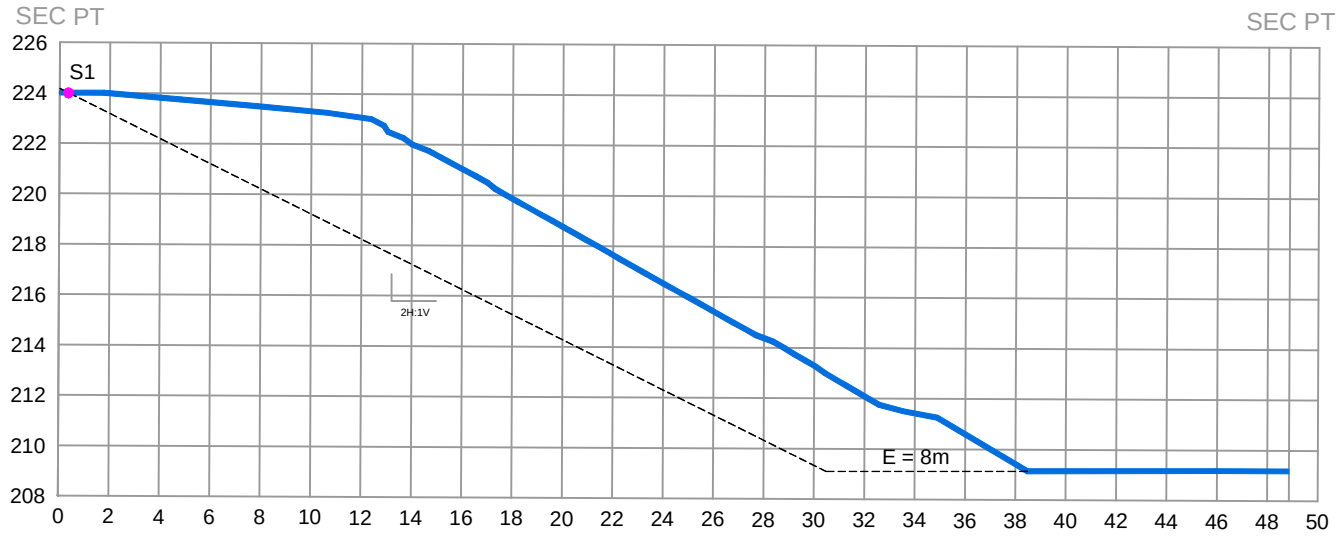

SECTION A-A

S1 ● Long Term Stable Top of Slope

0 5 10

DS CONSULTANTS LTD.
6221 Highway 7, UNIT 16
Vaughan, Ontario L4H 0K8
Telephone: (905) 264-9393
www.dsconsultants.ca

Project: 336 KING ST EAST, CALEDON, ON			
Title: EXISTING SLOPE AT CROSS-SECTION A-A			
Client: GEORGIAN GROUP	Approved By: A.S	Drawn By: S.Y	Date: August 2018
	Scale: As Shown	Project No: 18-566-10	Drawing No. 9

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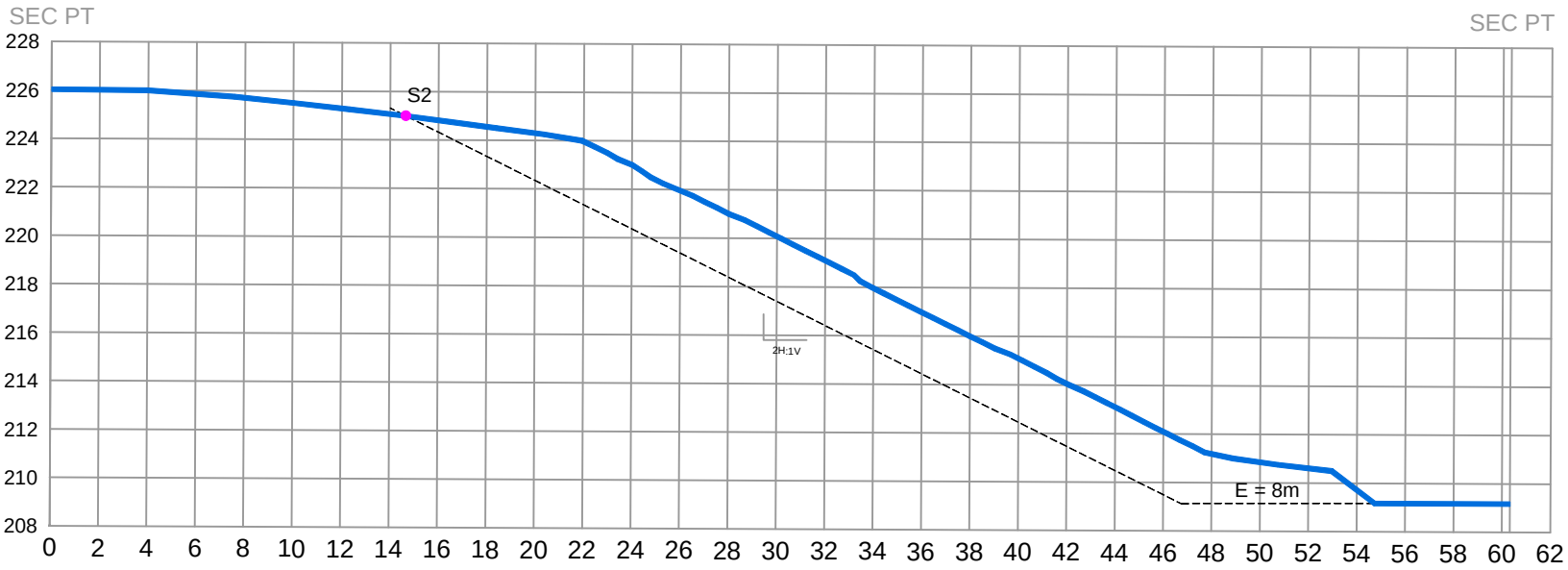

SECTION B-B

S2 ● Long Term Stable Top of Slope

0 5 10

DS CONSULTANTS LTD.
6221 Highway 7, UNIT 16
Vaughan, Ontario L4H 0K8
Telephone: (905) 264-9393
www.dsconsultants.ca

Project: 336 KING ST EAST, CALEDON, ON			
Title: EXISTING SLOPE AT CROSS-SECTION B-B			
Client: GEORGIAN GROUP	Approved By: A.S	Drawn By: S.Y	Date: August 2018
	Scale: As Shown	Project No: 18-566-10	Drawing No. 10

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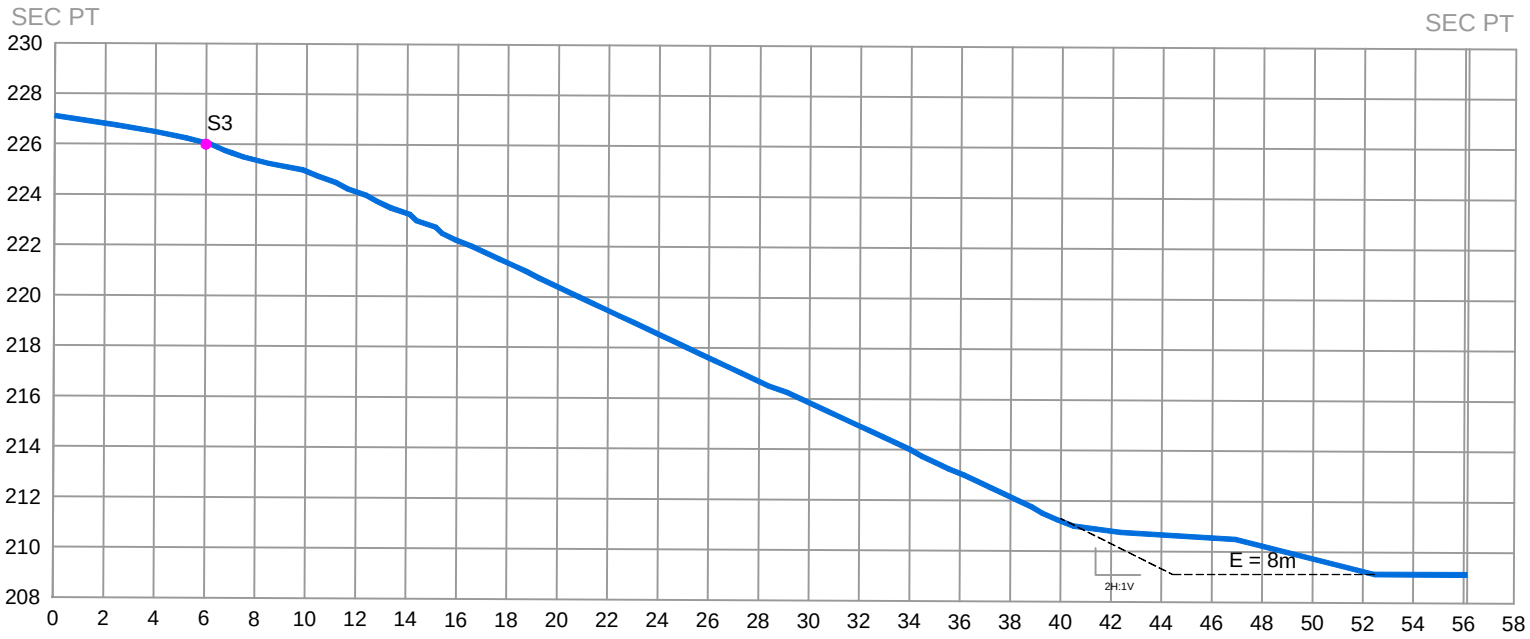


SECTION C-C

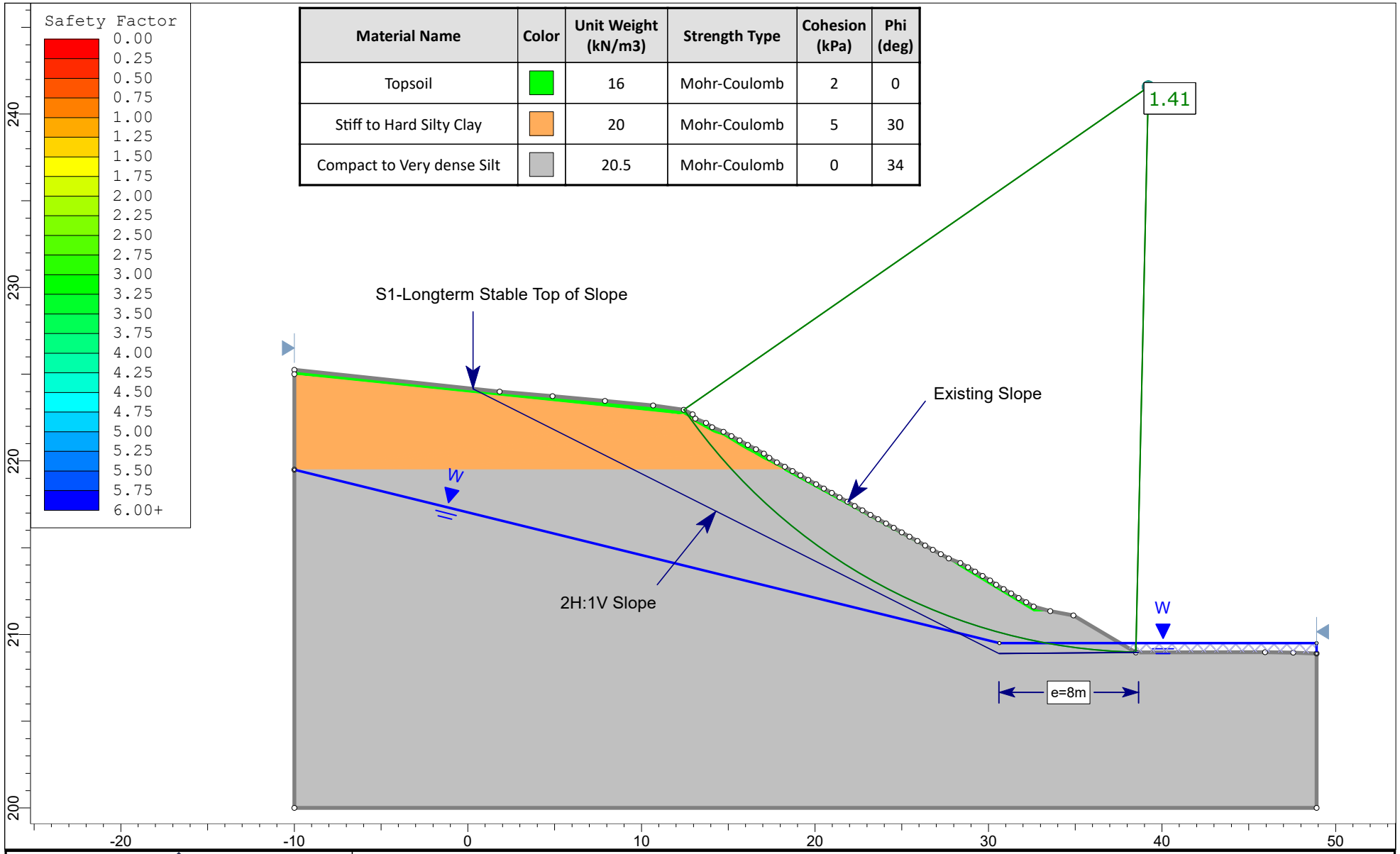
S3 ● Long Term Stable Top of Slope

0 5 10

DS CONSULTANTS LTD.
6221 Highway 7, UNIT 16
Vaughan, Ontario L4H 0K8
Telephone: (905) 264-9393
www.dsconsultants.ca

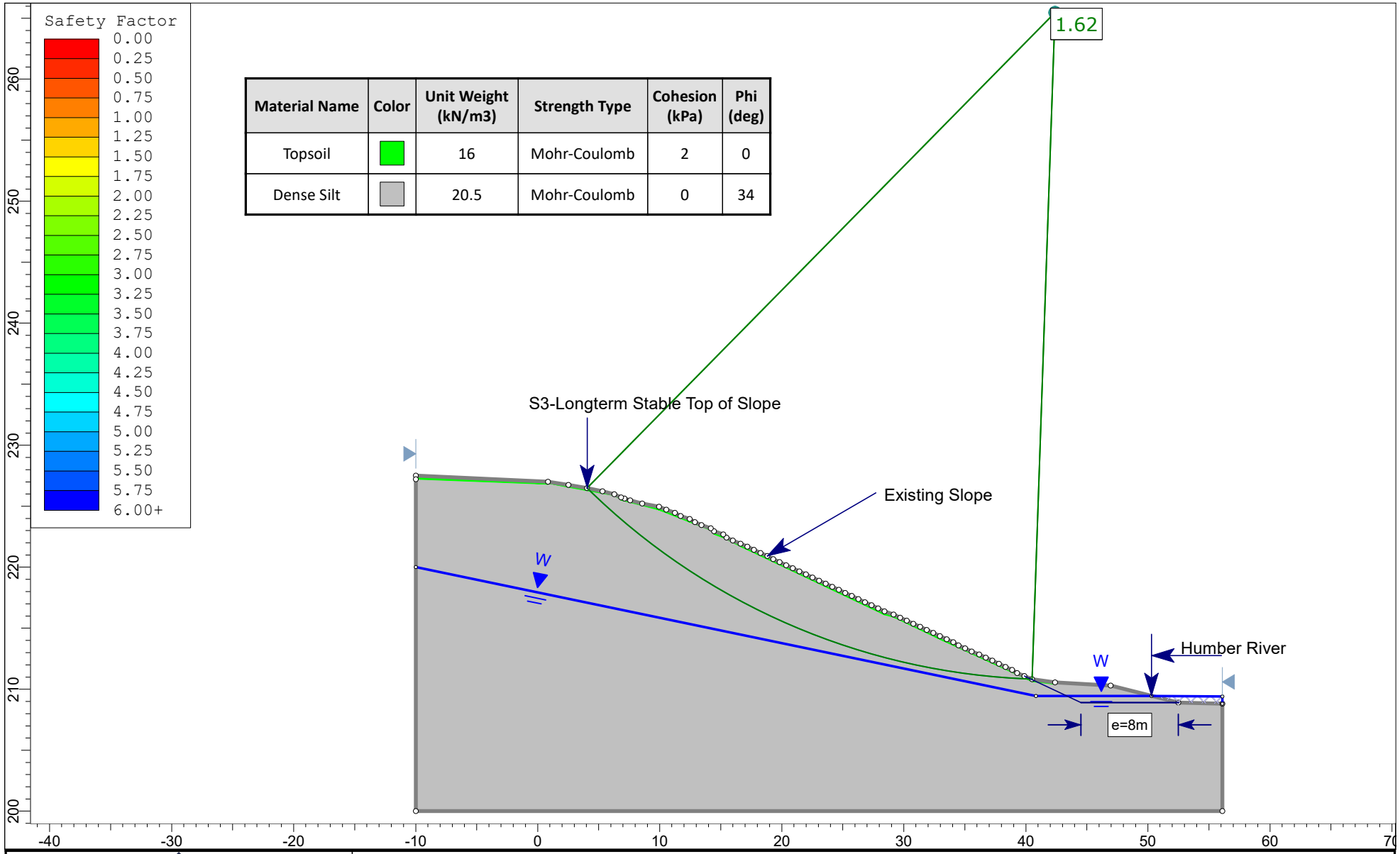
Project: 336 KING ST EAST, CALEDON, ON			
Title: EXISTING SLOPE AT CROSS-SECTION C-C			
Client: GEORGIAN GROUP	Approved By: A.S	Drawn By: S.Y	Date: August 2018
	Scale: As Shown	Project No: 18-566-10	Drawing No. 11

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)
Topsoil		16	Mohr-Coulomb	2	0
Stiff to Hard Silty Clay		20	Mohr-Coulomb	5	30
Compact to Very dense Silt		20.5	Mohr-Coulomb	0	34



SLIDEINTERPRET 7.029

Project	Project No.-18-566-30-Slope Stability Analyses-336 King Street E., Caledon, ON				
Analysis Description	Existing Slope at Section A-A				
Drawn By	AS	*Scale*	1:309	*Company*	DS Consultants Ltd
Date	2018-08-09, 1:38:57 PM			*File Name*	Drawing 12.slim

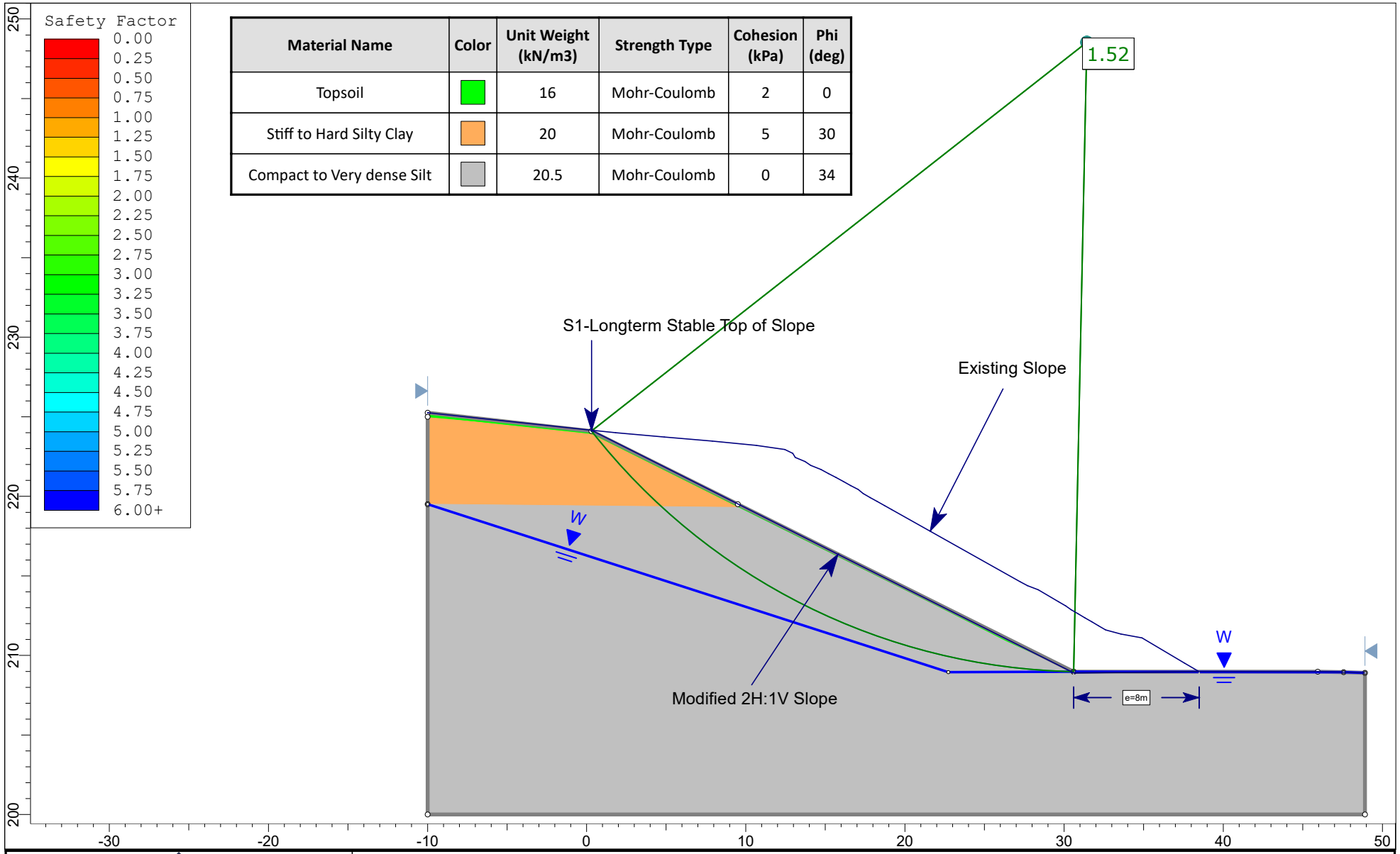


Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)
Topsoil		16	Mohr-Coulomb	2	0
Dense Silt		20.5	Mohr-Coulomb	0	34

SLIDEINTERPRET 7.029

Project	Project No. 18-566-30 - Slope Stability Assessment-336 King St. E, Caledon, ON			
Analysis Description	Existing Slope at Section C-C			
Drawn By	AS	*Scale*	1:439	*Company* DS Consultants Ltd
Date	2018-08-09, 1:14:40 PM			*File Name* Drawing 13.slim

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)
Topsoil		16	Mohr-Coulomb	2	0
Stiff to Hard Silty Clay		20	Mohr-Coulomb	5	30
Compact to Very dense Silt		20.5	Mohr-Coulomb	0	34



SLIDEINTERPRET 7.029

Project	Project No. 18-566-30 Slope Stability Assessment- 336 King Street E, Caledon, ON			
Analysis Description	Analyses of modified 2H:1V Slope at Section A-A			
Drawn By	AS	Scale	1:337	Company: DS Consultants Ltd.
Date	2018-08-09, 1:38:57 PM			File Name: Drawing 14.slim

Appendix A
Photographs of Slope

Photo 1: Tableland near Top of Slope Looking East (standing near BH18-5)

Photo 2: Tableland near Top of Slope Looking west, standing close to BH18-5

Photo 3: Tableland near Top of Slope Looking north, standing close to BH18-5

Photo 4: Vegetation on Slope Surface near the top of slope (looking East)

Photo 5: Vegetation on Slope Surface (looking southeast-downslope)

Photo 8: Vegetation on Slope Surface (looking southwest-downslope)

Photo 9: Watercourse Conditions Near Section B-B (looking west)

Photo 10: Watercourse Conditions Near Section B-B (looking east)

Photo 11: Vegetation Conditions near the toe of slope (looking north, upslope)

Photo 12: Photo 11: A Walking trail on Slope between Section A-A and B-B

Photo 13: TRCA Staked Top of Slope at East Property Boundary (near Section C-C, looking south)