



Slope Stability Report

Proposed Residential Development

51-55 Hawkesville Road, St. Jacobs

Submitted to:

Polocorp Inc.
379 Queen Street South
Kitchener, ON
N2G 1W6

Submitted by:

GEI Consultants Canada Ltd.
650 Woodlawn Road West, Block C, Unit 2
Guelph, ON N1K 1B8
<https://canada.geiconsultants.com/>

January 23, 2025
Project No. 2403070

Table of Contents

1.	Introduction	1
2.	Visual Slope Inspection	2
3.	Subsurface Conditions	3
4.	Slope Stability Setbacks & Policies	4
5.	Slope Stability Analysis and Discussion	6
5.1	Soil Strength Design Parameters	6
5.2	Slope Geometry, Material Boundaries and Groundwater	6
5.3	Analysis of Existing Condition	6
5.4	Erosion Hazard Limit Determination	7
5.5	General Slope Considerations for Construction	8
6.	Limitations and Conclusions	10
6.1	Limitations	10
6.2	Conclusion	11

Figures

1. Site Location Plan
2. Borehole Location Plan
 - A. Aerial

Appendices

- A. Site Plan
- B. Site and Slope Photographs
- C. MNRF Slope Rating and Slope Inspection Forms
- D. Relevant Borehole Logs and Lab Testing
- E. Slope Stability Analysis
- F. Topographic Survey and Cross-Sections



1. Introduction

GEI Consultants Canada Ltd. (GEI) was retained by Polocorp Inc. (Client) to complete a slope stability study in support of the proposed residential development at 51-55 Hawkesville Road, St. Jacobs, Ontario (site). This report presents the findings of our visual slope inspection, slope stability analysis, and recommended setback for the proposed development.

The site is bounded by Hawkesville Road to the north, existing residential properties to the east, Conestogo River to the south, and a Waterloo-Spur Line rail corridor to the west. A site location plan is enclosed as Figure 1. The slope is located near the south side of the site approximately 200 m south of Hawkesville Road and extends from roughly 50 m east of the railway line to the east property line. The slope is approximately 8 to 13 m in height with an overall inclination of about 3.0H:1V to 2.4H:1V. The slope is heavily forested with trees.

Based on the site plan dated December 11, 2024, the proposed development will consist of 151 residential dwelling units comprising 17 single detached dwelling units and 134 townhouse type dwelling units. The nearest buildings to the slope will be single detached dwellings located on the tableland. The proposed development will also feature amenity areas, a stormwater management facility, and a sewage pumping station. Internal roadways, watermains and sewers will be private as the proposed development will be a condominium development. The site plan is included in Appendix A for reference.

The slope is located within an area regulated by the Grand River Conservation Authority (GRCA) under Ontario Regulation 150/06 - Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation. Accordingly, completion of a slope stability study is required to identify the erosion hazard and identify the development setback from the top of slope.

This slope stability study was completed in conjunction a geotechnical investigation completed for the proposed development. A geotechnical report is provided under separate cover.



2. Visual Slope Inspection

A visual inspection of the slope and site area was carried out by Mr. Geoff Lay, P.Eng., of GEI, on April 8, 2024. General information pertaining to the existing slope features, such as slope profile, drainage, vegetation cover, structures, erosion features and slope slide features were obtained. A summary of the results of the visual inspection is presented below. Photographs taken during the site visit are provided as Appendix B and the MNR Slope Inspection and Slope Rating Forms are included as Appendix C.

The slope was approximately 8 to 13 m in height with an overall inclination of about 3.0H:1V to 2.4H:1V. At the top of the slope, the ground surface was flat to slightly sloping, and grass covered, although some areas of exposed topsoil were observed. There were also some piles of leaves and sticks present along the top of slope and fill materials (e.g. pieces of concrete, wire mesh etc.) had also been dumped near the top of the slope.

The face of the slope was densely covered with small to medium sized trees. The trees were mostly vertical although some very slightly leaning. Due to the dense tree coverage, there was limited undergrowth, however there were areas of light vegetation and numerous leaves, sticks and rocks. The tree coverage was so dense in areas that it was not possible to access certain parts of the slope. No signs of concentrated runoff or seepage were observed, nor did we observe any signs of slope instability (e.g. tension cracks, toe bulging, etc.).

The Rating Value obtained from the MNR Slope Rating Form was 38. The rating value indicates a moderate potential for slope instability.



3. Subsurface Conditions

The subsurface conditions at the slope have been established based on the geotechnical investigation completed by GEI for the proposed development in conjunction with the results of a previous investigation by Chung & Vander Doelen Engineering (CVD).

One (1) borehole (i.e. 24-02) was advanced to a depth of 12.8m as part of the GEI investigation through the top of the slope near the east property boundary. Additionally, Polocorp provided GEI with a borehole log for a borehole previously completed at the site by CVD in 2021. Monitoring wells were installed in both the GEI and CVD boreholes to permit groundwater level measurement.

The relevant GEI and CVD borehole logs and results of laboratory testing completed by GEI are included in Appendix D. In general, the subsurface conditions encountered in the boreholes advanced near the slope consist of topsoil underlain by silty sand/sand and silt, and localized fill, which are underlain by a thick deposit of cohesionless glacial till. The glacial till was typically compact within the upper 1 m and then very dense below the upper 1 m. The glacial till extended from approximately Elev. 336.9 m to beyond the vertical depth of drilling. The groundwater level measured in wells installed in the boreholes ranged from 4.20 m to 7.55 m below ground surface (Elev. 335.0 to 331.56).



4. Slope Stability Setbacks & Policies

The Grand River Conservation Authority (GRCA) provides policy requirements and technical guidance for developments within slope and erosion hazard zones based on the following documents:

- “*Policies for the Administration of the Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation, Ontario Regular 150/06*”, by Grand River Conservation Authority, dated October 23, 2015

Included in these policy guidelines are setbacks in which all new development must be set behind. A summary of the following allowances are applicable:

- Toe Erosion Allowance: This setback is an estimate of the distance the toe of slope will move over the next 100 years. If the watercourse is greater than 15 metres away from the slope toe, no toe erosion allowance is required.
- Stable Slope Allowance: This setback is associated with the inclination of the slope that achieves a minimum factor of safety against instability. In some cases, the existing slope inclination may meet the minimum factor of safety.
- Erosion Hazard Allowance: An additional setback is applied to allow for emergency access, routine maintenance of the slope and potential erosion areas, and to create an additional buffer between the development and the potential erosion hazard. The GRCA may allow for a reduction of this setback to not less than 6 m within the Regulated Area where a geotechnical assessment demonstrates an appropriate factor of safety against slope failure and demonstrates that the proposed development poses negligible risk to creating new slope or erosion hazards.

The Toe Erosion Allowance and Stable Slope Allowance combine to form the Erosion Hazard Limit. The Erosion Hazard Limit is then combined with the Erosion Hazard Allowance to obtain the setback that all new development must be set behind. A schematic is provided in Figure A.



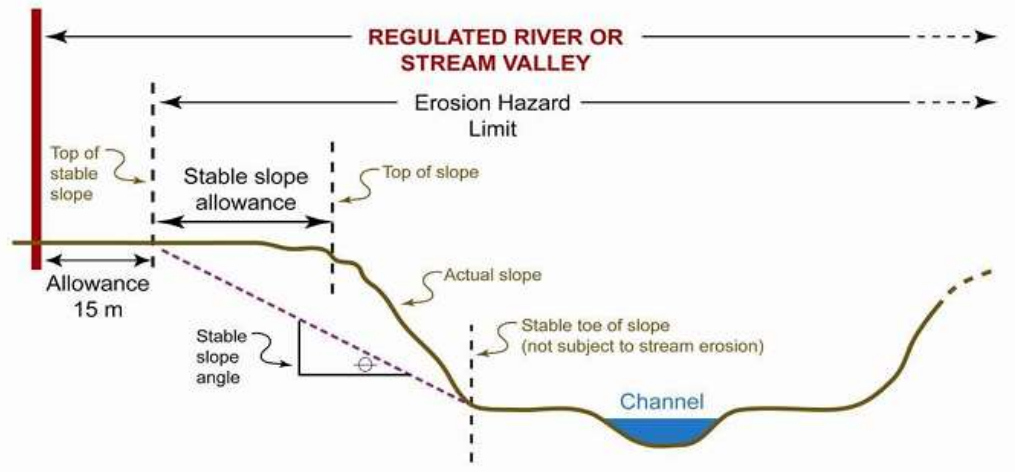


Figure A – Riverine Erosion Hazard Schematic. The 15 m Allowance is used to define the Regulated Area but GRCA Policy 8.2.8 permits a minimum 6 m allowance from the Erosion Hazard Limit for new multi-lot developments. (GRCA 2015)

The minimum factor of safety for stability analysis depends on the type of land use. For active e.g. residential), the GRCA policy allows a factor of safety (FOS) between 1.30 to 1.50.

Land Uses	Design Minimum Factor of Safety
Passive: no buildings near slope; farm field, bush, forest, timberland, woods, wasteland, badlands, tundra.	1.10
Light: no habitable structures near slope; recreational parks, golf courses, buried small utilities, tile beds, barns, garages, swimming pools, sheds, satellite dishes, dog houses.	1.20 to 1.30
Active: habitable or occupied structures near slope; residential, commercial, and industrial buildings, retaining walls, storage/warehousing of non-hazardous substances.	1.30 to 1.50
Infrastructure and Public Use: public use structures or buildings (i.e. hospitals, schools, stadiums), cemeteries, bridges, high voltage power transmission lines, towers, storage/warehousing of hazardous materials, waste management areas.	1.40 to 1.50

5. Slope Stability Analysis and Discussion

5.1 Soil Strength Design Parameters

Soil strength parameters values used in the slope stability analysis for this project are summarized below and indicated on the slope stability analysis figures within Appendix E.

Stratum	γ - Bulk Unit Weight (kN/m ³)	c' – Effective Cohesion (kPa)	ϕ - Friction Angle (degrees)
Loose to Compact Fill & Sand and Silt	20	0	30
Compact Glacial Till	22	0	33
Very Dense Glacial Till	23	0	37

The soil strength parameters were determined by GEI based on the in-situ and laboratory test results from the geotechnical investigations, in conjunction with our engineering judgement and experience with similar soils in the region. The soil strength parameters are based on effective stress analysis for long-term slope stability. It is considered that these soil properties are conservative, and the site soils are stronger. Furthermore, other effects which can increase the stability of the slope, such as negative pore water pressures within unsaturated soils (matric suction), and root mat reinforcement, have not been modelled.

5.2 Slope Geometry, Material Boundaries and Groundwater

The slope geometry used in the analysis was based on a topographic survey completed by GM BluePlan, included in Appendix F. Cross-section B-B was selected for stability analysis as it had the steepest inclination. The existing top of slope and bottom of slope locations were established by GEI based on the topographic plan and profiles, along with the visual slope inspection.

The material boundaries are based on the subsurface conditions encountered in the boreholes. Subsurface conditions and the detailed cross-sections with inferred stratigraphic boundaries are provided on the slope stability models in Appendix E.

5.3 Analysis of Existing Condition

Stability analyses were carried out using the commercially available computer program *Slide2* (Version 9.012) provided by RocScience Inc. The slope stability analyses were based on a force and moment limit equilibrium analysis using the Spencer method. This method of analysis calculates the minimum factor of safety (resisting versus driving forces) for numerous circular surfaces. The circular surfaces are centred on points on a grid with a set number of radius distances



to be calculated for each point. A factor of safety of 1.0 indicates the slope is at a point of pending failure since the resisting forces are equal to the driving forces.

The results of the *Slide2* slope stability analysis for existing conditions is provided within Appendix E and summarized in the table below.

Cross-Section Location	Approximate Slope Height	Existing Slope Inclination	Existing Slope Stability Factor of Safety	Figure No. (Appendix E)
Section B-B	13 m	2.4H:1V	1.72	E1

The computed factor of safety (FOS) for the existing slope was 1.71. The FOS is considered reasonable for a slope comprised primarily of very dense glacial till and indicates that the slope is stable.

5.4 Erosion Hazard Limit Determination

5.4.1 Toe Erosion Allowance

The toe erosion allowance is an estimate of the distance the toe of slope will move over the next 100 years. As no watercourse is within 15 metres of the slope toe, this does not apply at this site (i.e. a toe erosion allowance of 0 metres).

5.4.2 Stable Slope Allowance

The stable slope allowance is the setback from the existing top of slope associated with the inclination of the slope that achieves a minimum factor of safety (FOS) against instability. The GRCA Policy requires a FOS of 1.3 to 1.5 for active land use.

At this site, the stable slope allowance is equal to 0 m (i.e. the long-term stable top of slope is coincident with the existing top of slope) as a FOS greater than 1.7 was computed for the existing condition. This means the Erosion Hazard Limit coincides with the existing top of slope.

5.4.3 Erosion Hazard Allowance and Total Development Setbacks

The GRCA policy requires an additional setback be applied from the Erosion Hazard Limit to allow for emergency access, routine maintenance of the slope and potential erosion areas, and to create an additional buffer between the development and the potential erosion hazard. GRCA Policy 8.2.8 states that a minimum 6 m allowance from the Erosion Hazard Limit is required for all building lots associated with new multi-lot developments, where a geotechnical assessment demonstrates an appropriate factor of safety against slope failure and where the development will have negligible to no impact on slope and erosion hazards. The total setback for development is shown on the topographic plan in Appendix F.



Stability analysis was completed to assess the FOS against slope failure for new development located at these setbacks. In the analysis, a surcharge of 225 kPa (i.e. ULS loading based on the geotechnical report under a separate cover) was applied to the existing ground surface to account for new footing load.

The results of the analysis are included in Figure E2 for the 6 m setback condition (Appendix E). A FOS of 1.58 was computed for this condition which exceeded the minimum FOS of 1.30 to 1.50 required for active land use under the GRCA policy guideline.

Setback from Top of Slope	Groundwater Table condition	Factor of Safety (FOS)	Meets Minimum GRCA Factor of Safety?	Figure No. (Appendix E)
6 m	Normal	1.58	Yes	E2
6 m	High	1.31	Yes	E3

To account for a potential high groundwater scenario, the groundwater table in the 6 m setback model was then increased to 2 m below existing ground surface at the top of slope (Figure E3). The computed FOS for this scenario is 1.31 which is the lower end of the FOS range for active land use but still meets the GRCA policy guideline.

Based on the analysis results and to meet the GRCA policy guideline:

- All new building lots should be setback a minimum distance of 6 m from the existing top of slope.
- The analysis shows that the proposed building loads have a negligible impact on slope stability and the required FOS of 1.3 to 1.5 for active land use is still met under the loading condition for both normal and elevated groundwater conditions.
- The 6 m setback allows for access to the valley for maintenance or emergency purposes.
- It is expected that overland drainage will improve using engineering controls when the site is developed during civil engineering design (by others), which would reduce the risk of concentrated runoff over the slope and surficial erosion.
- Other considerations for construction works are provided in Section 5.5 to further reduce the risk of erosion or slope instability.

5.5 General Slope Considerations for Construction

For any work conducted in near proximity to the valley slope, the following recommendations should be followed during construction:

- Construction and restoration activities should be conducted in a manner which does not result in surface erosion of the slope.



- Site grading and drainage should be designed to prevent direct concentrated or channelized surface runoff from flowing directly over the slope.
- Water drainage from roof down-spouts, sumps, road drainage, etc. should not be permitted to flow over the slope crest, but be directed into stormwater management infrastructure or to the bottom of the slope to areas where the erosive energy can be dissipated (e.g. rip-rap splash pads).
- A healthy vegetative cover should be maintained on the slope, and disturbance to the slope and vegetation on the slope should not occur. Any slope areas disturbed by construction should be restored with suitable native vegetation as soon as possible.
- The slope should not be steepened and fill materials (including landscape debris) should not be placed on the slope or within 3 metres of the slope crest.
- A sedimentation control fence (silt fence) should be erected around work areas prior to the commencement of site works.



6. Limitations and Conclusions

6.1 Limitations

The recommendations and comments provided are necessarily on-going as new information of underground conditions becomes available. 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 test pit information must, therefore, be validated during excavation operations. Consequently, conditions not observed during this investigation may become apparent. Should this occur, GEI should be contacted to assess the situation and additional testing and reporting may be required.

GEI should be retained for a general review of the final design drawings and specifications to verify that this report has been properly interpreted and implemented. If not accorded the privilege of making this review, GEI 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 the design engineers. The number of test pits required to determine the localized underground conditions between test pits 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.

This report was prepared by GEI for the account of Polocorp Inc. 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. GEI accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this project.



6.2 Conclusion

It is recognized that municipal/regional governing bodies, in their capacity as the planning and building authority under Provincial statutes, will make use of and rely upon this report, cognizant of the limitations thereof, both as are expressed and implied.

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

Yours Truly,

GEI Consultants

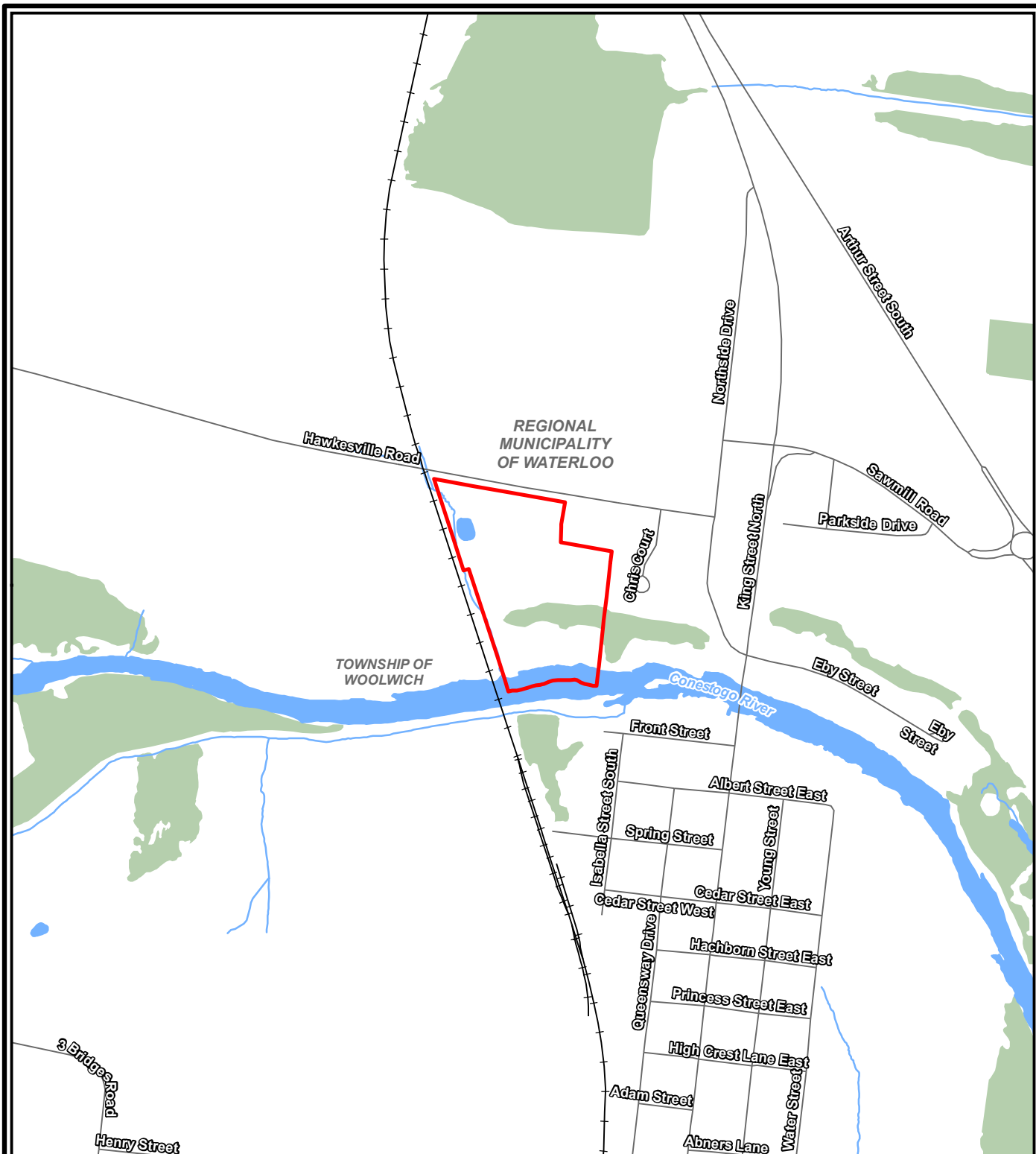
Reviewed By:



Russell Wiginton, P.Eng.
Senior Geotechnical Engineer

Figures



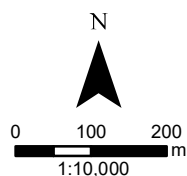


NOTES:

1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2024.

Legend

- Subject Lands
- Waterbody
- Road
- Wooded Area
- Railway
- Watercourse



51-55 Hawksville Road,
St. Jacobs, ON

Polocorp Inc.

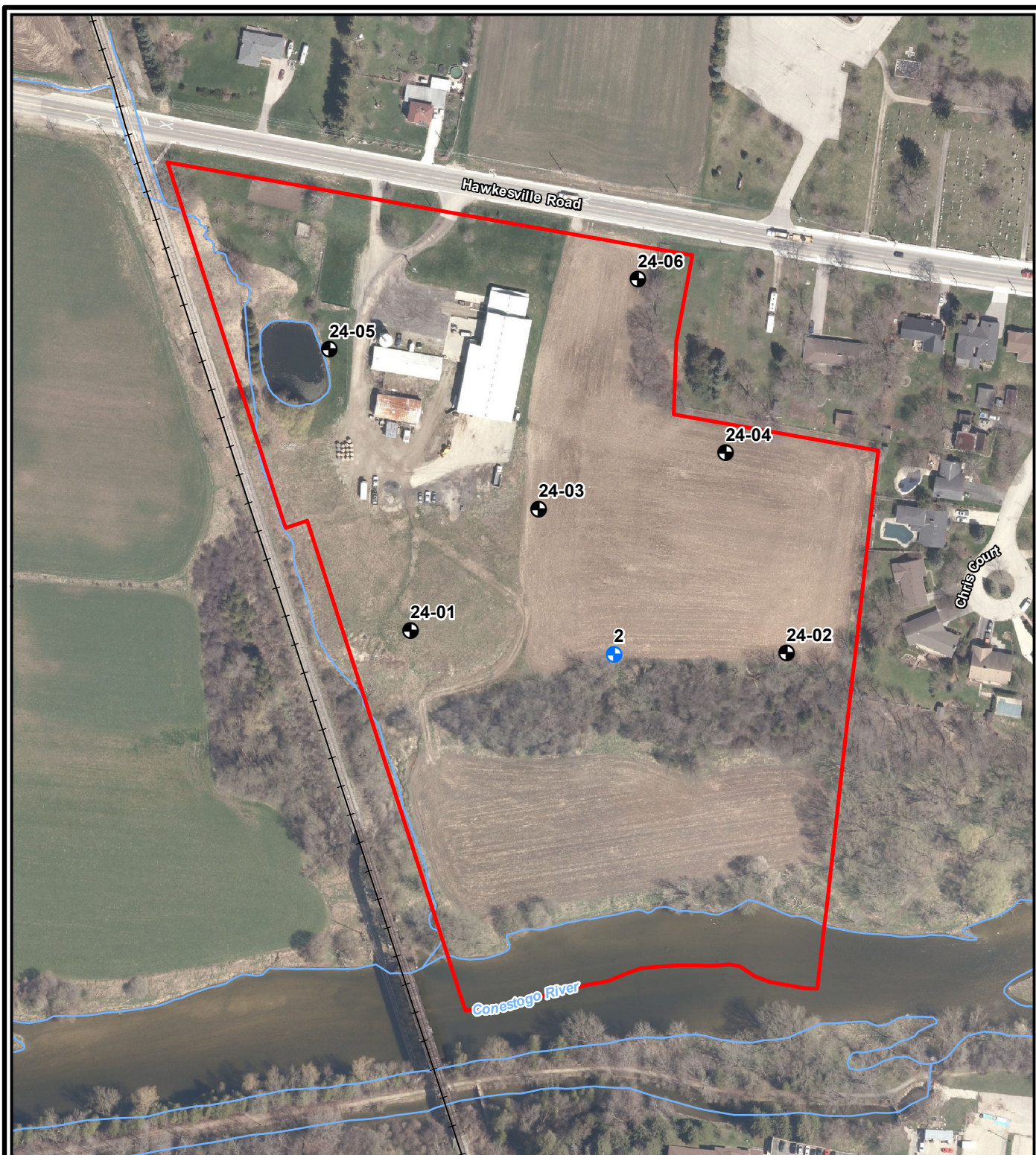


Project 2403070

SITE LOCATION PLAN

June 2024

Fig. 1

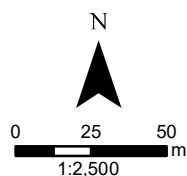


NOTES:

1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © King's Printer for Ontario, 2024.
3. Orthoimagery © First Base Solutions, 2024. Imagery taken in 2022.

Legend

- | | |
|--|-------------|
| Subject Lands | Railway |
| GEI Borehole (2024) | Watercourse |
| CVD Borehole (2024) | Waterbody |



51-55 Hawkesville Road,
St. Jacobs, ON

Polocorp Inc.



Project 2403070

BOREHOLE LOCATION PLAN
(AERIAL)

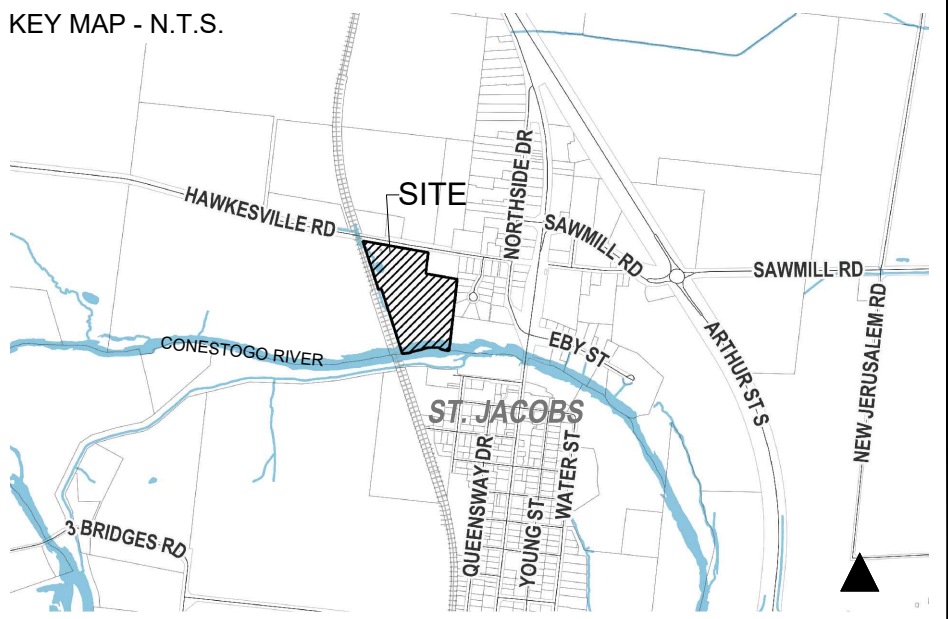
June 2024

Fig. 2A

Appendix A

Site Plan

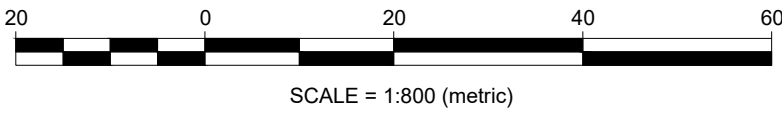




DRAFT PLAN OF SUBDIVISION

PART OF LOT 37, GERMAN COMPANT TRACT,
TOWNSHIP OF WOOLWICH
REGIONAL MUNICIPALITY OF WATERLOO

51 HAWKESVILLE ROAD, ST. JACOBS



LAND USE SCHEDULE			
DESCRIPTION	LOTS/BLKS.	UNITS	AREA (ha.)
Single Detached	1-16	16	0.738
Street Townhouses	17-20	44-58	1.097
Medium Density	21	50-65	1.162
Stormwater Facility	22	-	0.512
Parkette / Servicing Access	23	-	0.053
Open Space	24	-	2.371
Public Roads	-	-	0.914
TOTAL		110-139	6.847

DENSITY	GROSS	NET
Area (ha)	6.847	4.477
Density (uph)	16.1 - 20.3	24.6 - 31.0
People & Jobs per ha. (P&J/ha)	62.9 - 78.7	41.1 - 51.4

- LEGEND
- Dripline Limit
 - Dripline 10m Buffer
 - Railway 15m Setback
 - GRCA Floodline

INFORMATION REQUIRED
UNDER SECTION 51 (17) OF THE PLANNING ACT, R.S.O. 1990, c.P.13 AS AMENDED
INFORMATION REQUIRED BY CLAUSES a,b,c,d,e,f,i,g,j AND l ARE AS SHOWN ON THE DRAFT PLAN.

(n) Municipal Water Supply
(i) Silty Sands
(k) Municipal Sanitary and Storm Sewers

SURVEYOR'S CERTIFICATE
I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

JASON ELLIOTT, O.L.S.
J.D. Barnes Limited

DATE

OWNER'S CERTIFICATE
I HEREBY CONSENT TO THE FILING OF THIS PLAN BY POLOCORP INC., IN DRAFT FORM

MIKE PUOPOLO
Polocorp Inc.

DATE

APPROVALS

DRAFT FOR COORDINATION

REVISIONS		
DATE	BY	DESCRIPTION

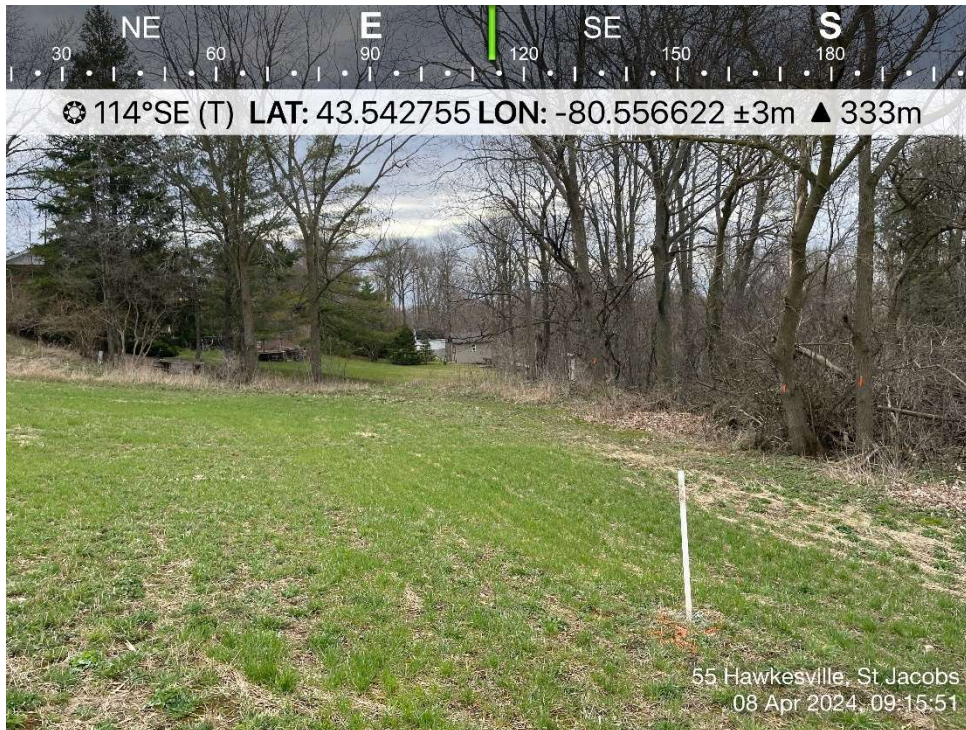
POLOCORP 379 Queen Street South
Kitchener, ON N2T 1W6
polocorpinc.com
519-745-3249

DATE: 2025.12.10 SCALE 1:800 (metric)
PROJECT: 1010 (Hawkesville) DRAWN BY: GFE/RT
FILE: dps1010-2025.12.10.dwg

Appendix B

Site and Slope Photographs





PHOTOGRAPH 1

GEI 2024

Description:

View of tableland near southeast corner of site. Staked borehole 24-02 is visible in the foreground.



PHOTOGRAPH 2

GEI 2024

Description:

View of tableland near CVD Borehole 2.



PHOTOGRAPH 3

GEI 2024

Description:

View of western end of slope.
 Photo taken looking north from
 beyond slope toe.



PHOTOGRAPH 4

GEI 2024

Description:

View of lands in front of
 (south) of slope. Although not
 visible in the photo, Conestogo
 river is present to the south
 (right).



PHOTOGRAPH 5

GEI 2024

Description:

View of the slope face taken near southeast corner of property. Slope was densely covered with small to medium sized trees with and slope face had limit undergrowth.



PHOTOGRAPH 6

GEI 2024

Description:

View of the slope face taken from near west end of slope. Slope was densely covered with small to medium sized trees with and slope face had limit undergrowth.

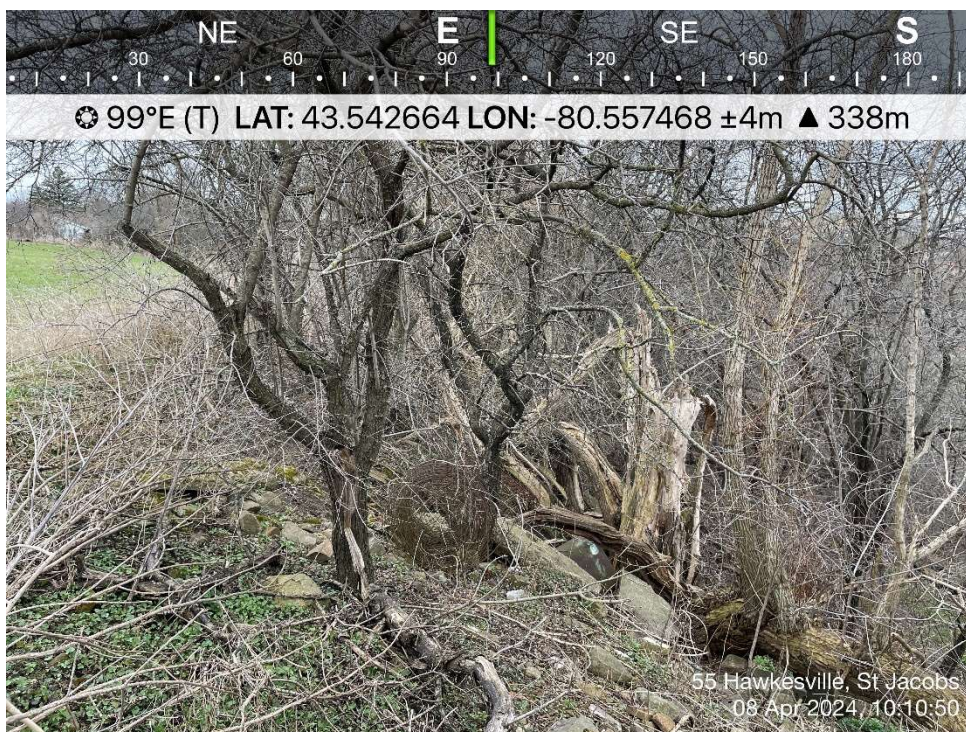


PHOTOGRAPH 7

GEI 2024

Description:

View of the slope face taken from near west end of slope. Slope was densely covered with small to medium sized trees with and slope face had limit undergrowth.



PHOTOGRAPH 8

GEI 2024

Description:

View of the slope at the top. Piles of sticks and fill materials (e.g. pieces of concrete, wire mesh etc.) were observed.

Appendix C

MNRF Slope Rating and Slope Inspection Forms



SLOPE RATING FORM

Site Location: 51-55 Hawkesville Rd, St. Jacobs
 Property Owner: Polocorp Inc.
 Inspected By: GL

File No: 2403070
 Inspection Date: April 8, 2024
 Weather: 15C, Overcast

1. SLOPE INSPECTION			Rating Value
	Degrees	Horiz. : Vert.	
a)	18 or less	3 : 1 or flatter	0 ☐
b)	18 to 26	2 : 1 to 3 : 1	6 ☒
c)	more than 26	steeper than 2 : 1	16 ☐
2. SOIL STRATIGRAPHY			
a)	Shale, Limestone, Granite (Bedrock)		0 ☐
b)	Sand, Gravel		6 ☐
c)	Glacial Till		9 ☒
d)	Clay, Silt		12 ☐
e)	Fill		16 ☐
f)	Leda Clay		24 ☐
3. SEEPAGE FROM SLOPE FACE			
a)	None or Near bottom only		0 ☒
b)	Near mid-slope only		6 ☐
c)	Near crest only or from several levels		12 ☐
4. SLOPE HEIGHT			
a)	2 metres or less		0 ☐
b)	2.1 to 5 metres		2 ☐
c)	5.1 to 10 metres		4 ☐
d)	Greater than 10 metres		8 ☒
5. VEGETATION COVER ON SLOPE FACE			
a)	Well vegetated; heavy shrubs or forested with mature trees		0 ☒
b)	Light vegetation; Mostly grass, weeds, occasional trees, shrubs		4 ☐
c)	No vegetation; bare		8 ☐
6. TABLELAND DRAINAGE			
a)	Tableland flat, no apparent drainage over slope		0 ☐
b)	Minor drainage over slope, no active erosion		2 ☒
c)	Drainage over slope, active erosion, gullies		4 ☐
7. PROXIMITY OF WATERCOURSE TO SLOPE TOE			
a)	15 metres or more from slope toe		0 ☐
b)	Less than 15 metres from slope toe		6 ☒
8. PREVIOUS LANDSLIDE ACTIVITY			
a)	No		0 ☒
b)	Yes		6 ☐

SLOPE INSTABILITY RATING	RATING VALUE TOTAL	INVESTIGATION REQUIREMENTS	TOTAL
1. Low potential	<24	Site inspection only, confirmation, report letter.	38
2. Slight potential	25-35	Site inspection and surveying, preliminary study, detailed report.	
3. Moderate potential	>35	Boreholes, piezometers, lab tests, surveying, detailed report.	

NOTES: a) Choose only one from each category; compare total rating value with above requirements.
 b) If there is a water body (stream, creek, river, pond, bay, lake) at the slope toe; the potential for toe erosion and undercutting should be evaluated in detail and, protection provided if required.

File No: 2403070
File Name: 51-55 Hawkesville Rd, St. Jacobs
Inspection Date: April 8, 2024
Inspected By (name): GL
Weather (circle): ☐ sunny ☐ partly cloudy ☒ overcast
☐ clear ☐ fog ☐ rain ☐ snow
Est. Air Temp. (°C): 15

☒ calm ☐ breezy ☐ windy
☐ cold ☒ cool ☐ warm ☐ hot

Site Location / Directions (describe main roads, features):

Slope located approximately 200 m south of Hawkesville Rd at above address

Site Location Sketch:

Property Ownership (name, address, phone):

Polocorp Inc.

Legal Description:

Lot _____
 Concession _____
 Township _____
 County _____

Watershed: _____

Governing Regional Body: _____

Governing Conservation Authority: _____

Current Land Use (circle and describe):

- ☒ Vacant – Field, bush, woods, forest, wilderness, tundra
☐ Passive – Recreational parks, golf courses, non-habitable structures, buried utilities, swimming pools
☐ Active – Habitable structures, residential, commercial, industrial, warehousing, storage
☐ Infrastructure/Public Use – Stadiums, hospitals, schools, bridges, high voltage power lines, waste management sites

SLOPE DATA**Height**

☐ 3 - 6 m ☐ 6 - 10 m ☒ 10 - 15 m ☐ 15 - 20 m
☐ 20 - 25 m ☐ 25 - 30 m ☐ >30 m

Estimated height (m): _____

Inclination / Shape

☐ 4:1 or flatter (25% / 14°) ☐ Up to 3:1 (33% / 18.5°) ☒ Up to 2:1 (50% / 26.5°)
☐ Up to 1:1 (100% / 45°) ☐ Up to 0.5:1 (200% / 63.5°) ☐ Steeper than 0.5:1 (>63.5°)

SLOPE DRAINAGE (describe):

TOP

Ground is flat to slightly sloped

No areas of concentrated runoff were observed.

FACE

No areas of concentrated runoff were observed. Normal sheet drainage.

No seepage observed.

BOTTOM

No concentrated runoff observed.

SLOPE SOIL STRATIGRAPHY (describe, positions, thicknesses, types):

TOP

Topsoil underlain by silty sand. Some fill material (e.g. pieces of concrete, wire mesh etc.) had been dumped at the top of the slope

FACE

Topsoil underlain by silty sand

BOTTOM

Topsoil underlain by silty sand

WATER COURSE FEATURES (circle and describe):

SWALES, GULLIES, DITCHES, CHANNELS

None observed

STREAMS, CREEKS, RIVERS

Conestogo river located approximately 70 m south of toe of slope

PONDS, BAYS, LAKES

None observed

SPRINGS, SEEPS, MARSHY GROUND

None observed

VEGETATION COVER (grasses, weeds, shrubs, saplings, trees):

TOP

Grass and some areas of exposed topsoil.

Piles of leaves along edge of top of slope.

FACE

Dense coverage of small to medium sized trees. Limited undergrowth due to thick tree canopy.
Many leaves and sticks.

BOTTOM

Dense coverage of small to medium sized trees. Limited undergrowth due to thick tree canopy.
Many leaves and sticks.

STRUCTURES (buildings, walls, fences, sewers, roads, stairs, decks, towers):

TOP

None

FACE

None

BOTTOM

None

EROSION FEATURES (scour, undercutting, bare areas, piping, rills, gully):

TOP

None observed

FACE

None observed. Normal sheet drainage.

BOTTOM

None observed

SLOPE SLIDE FEATURES (tension cracks, scarps, slumps, bulges, grabens, ridges, bent trees):

TOP

No signs of slope instability observed.

FACE

No signs of slope instability observed.

BOTTOM

No signs of slope instability observed.

Appendix D

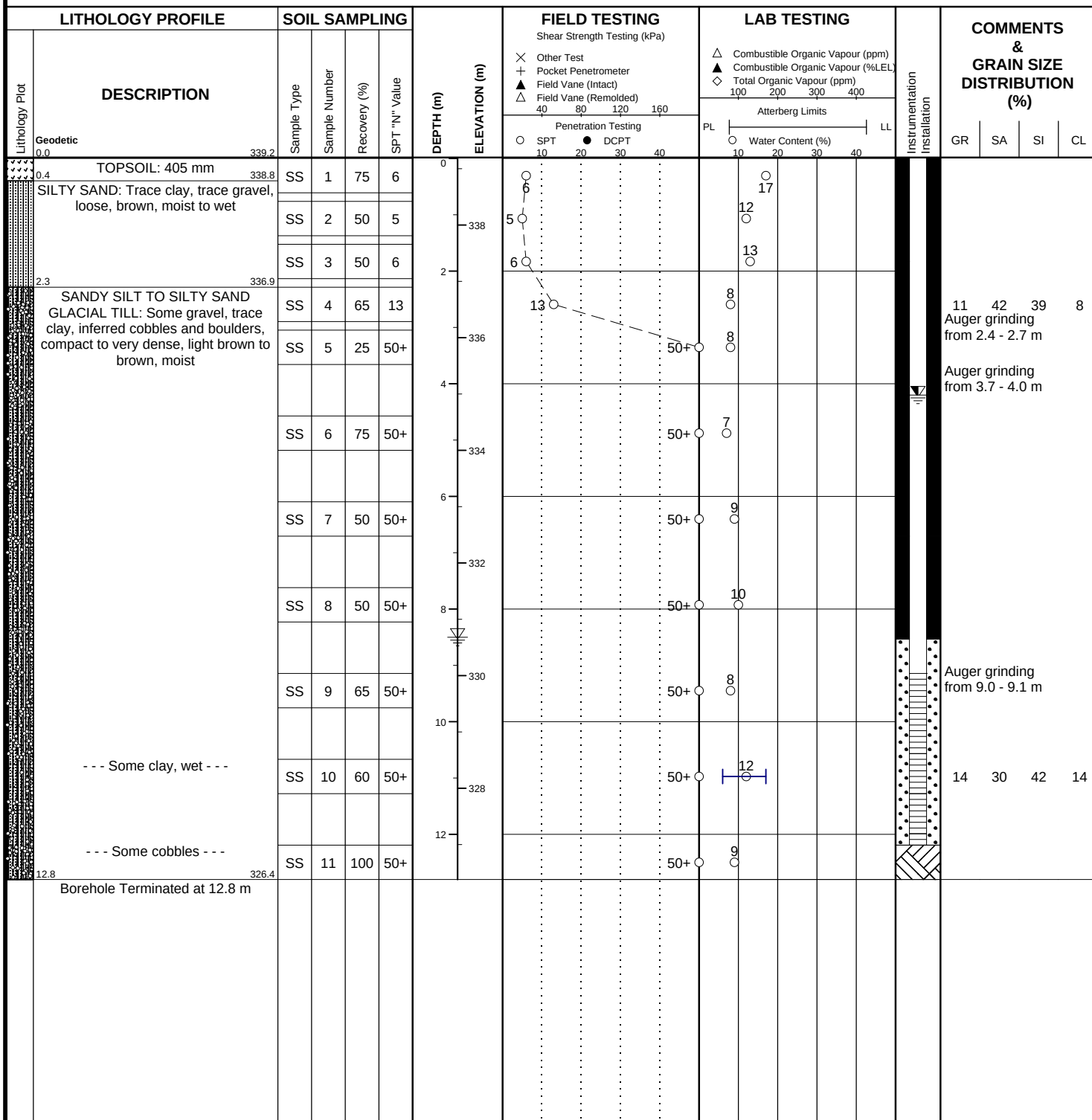
Relevant Borehole Logs and Lab Testing



RECORD OF BOREHOLE No. 24-02

Project Number: **2403070**
 Project Client: **Polocorp**
 Project Name: _____
 Project Location: **51-55 Hawkesville Road, St. Jacobs, ON**
 Drilling Location: **See Borehole Location Plan**
 Local Benchmark: _____

Drilling Method: **Hollow Stem Augers** Drilling Machine: **Track Mount**
 Logged By: **MM** Northing: **4821181** Date Started: **Apr 23/24**
 Reviewed By: **GL** Easting: **535822** Date Completed: **Apr 23/24**

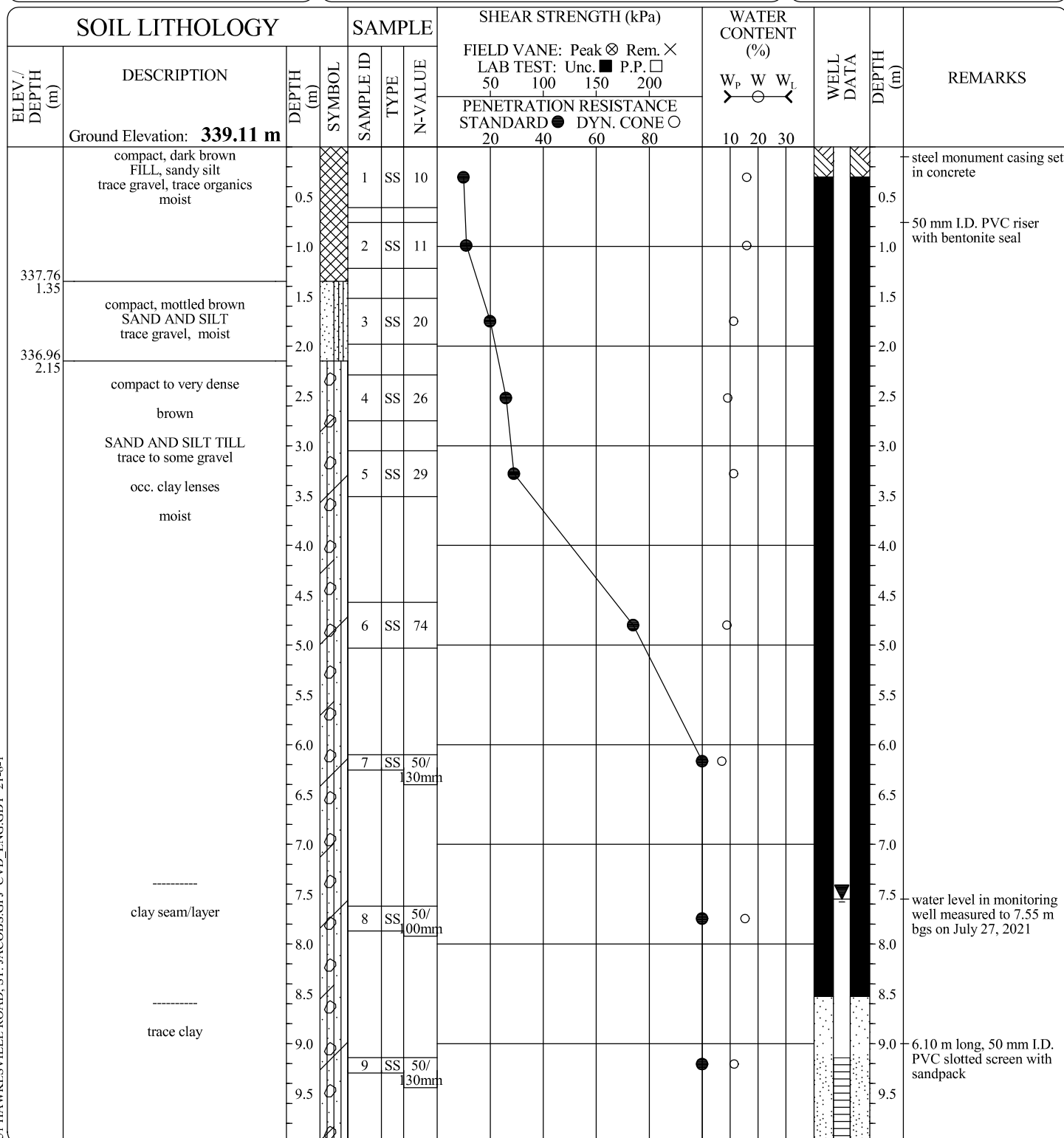


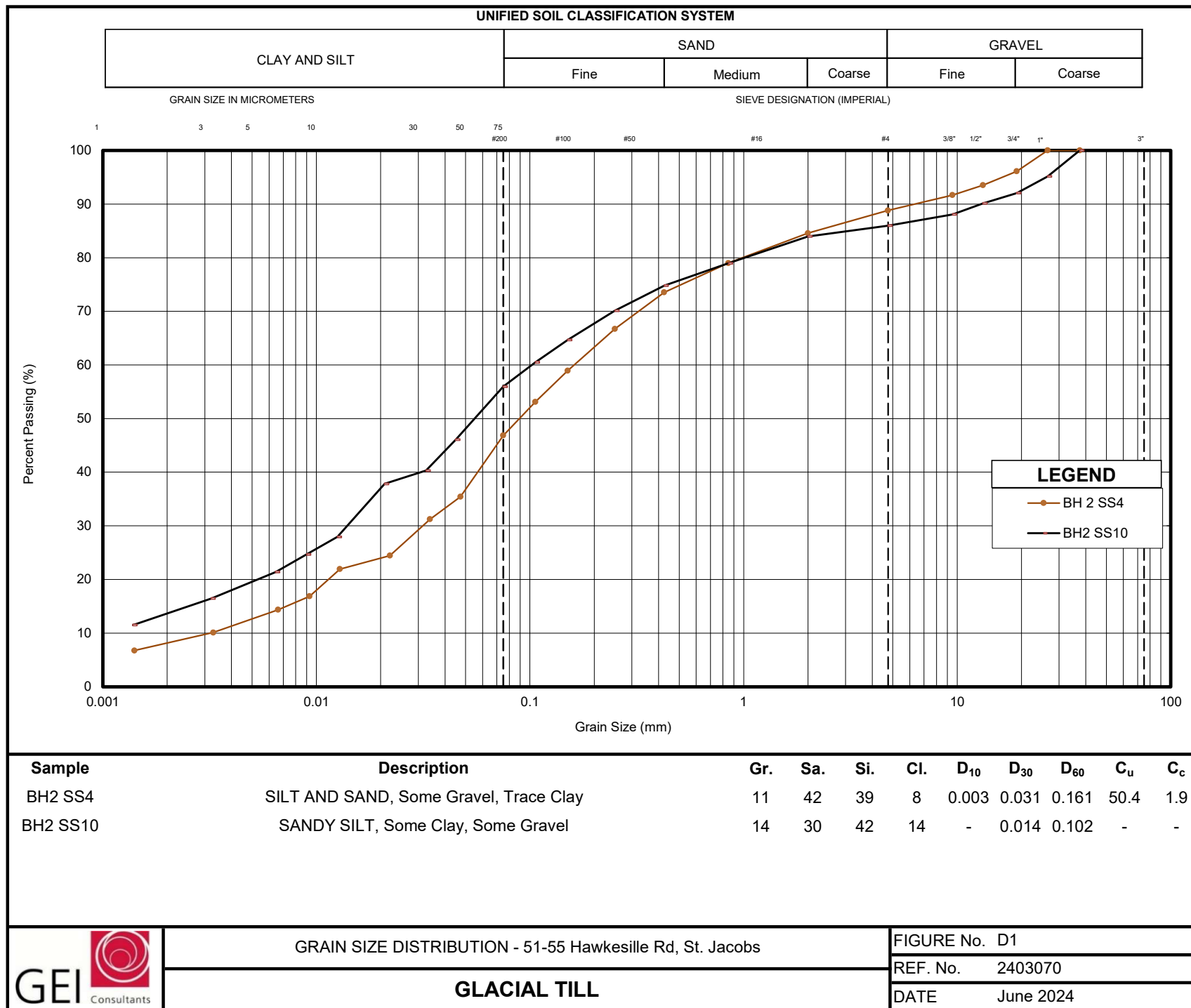
GEI CONSULTANTS
 647 Welham Road, Unit 14
 Barrie, Ontario L4N 0B7
 T : (705) 719-7994
 www.geiconsultants.com

Groundwater depth encountered on completion of drilling: 8.5 m. Cave depth after auger removal: Open
 Groundwater depth observed on: May 03/24 at depth of: 4.2 m. Groundwater Elevation: 335.0 m

Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretative assistance from a qualified geotechnical engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying "Explanation of Boring Log".

Scale 1:100
 Page: 1 of 1

FILE No: G21262**BOREHOLE No. 2**Client: **Polocorp Inc.**Project: **Slope Stability and Fill Investigation**Location: **51 Hawkesville Road, St. Jacobs, Ontario****EQUIPMENT DATA**Machine: **Diedrich D50T**Method: **Hollow Stem Auger**Size: **108 mm I.D.**Date: **Jul 27 - 21 TO Jul 27 - 21**PROJECT MANAGER: **EYC****CHUNG & VANDER DOELEN
ENGINEERING LTD.**311 Victoria Street North
Kitchener, Ontario N2H 5E1
ph. (519) 742-8979, fx. (519) 742-7739



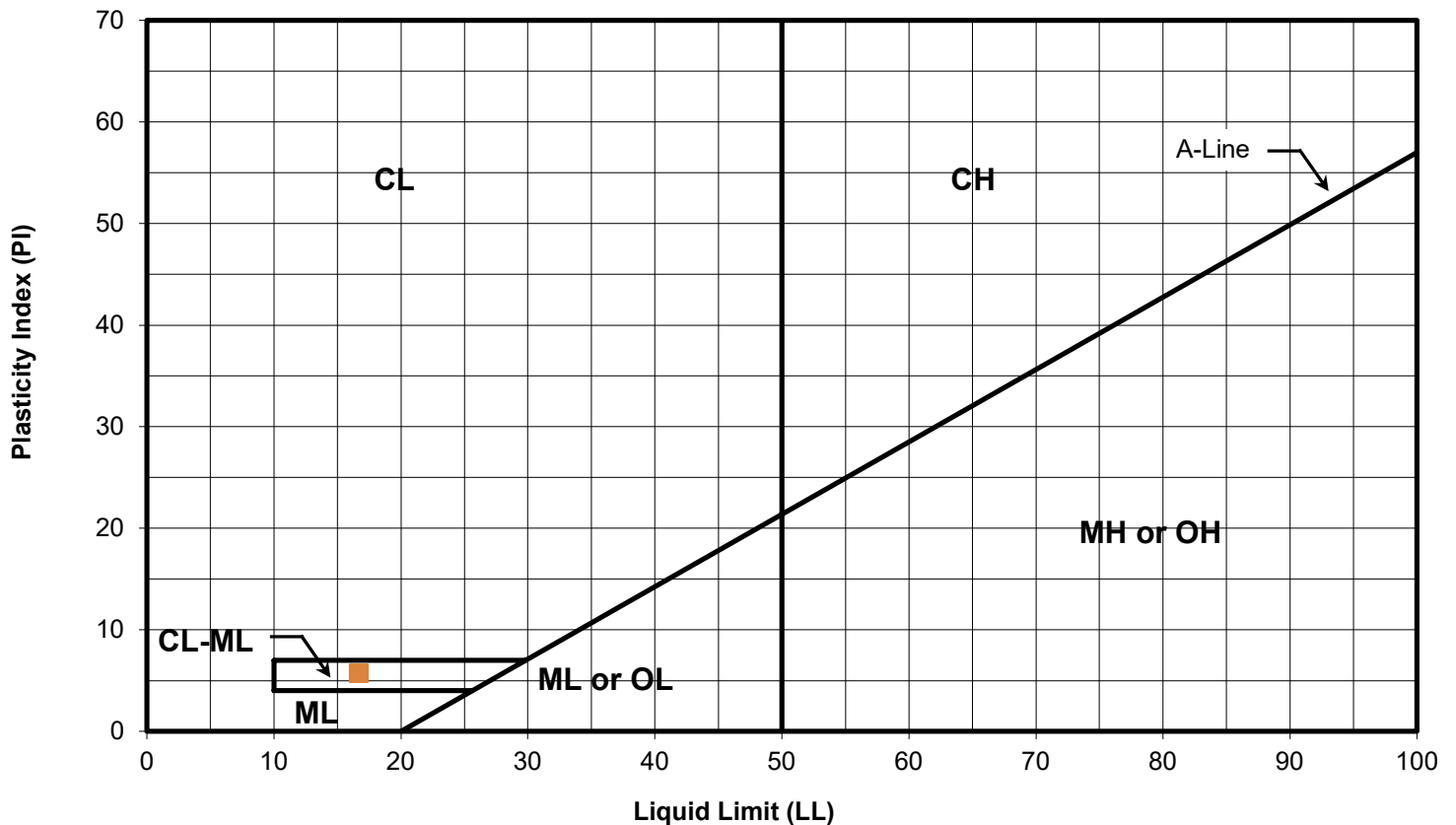
Atterberg Limits Report

Project Name: 51-55 Hawkesville Rd, St. Jacobs
Project No.: 2403070
Client: Polocorp

Figure No.: D2
Date Tested: May 2, 2024
Date Sampled: April 23, 2024

SAMPLE INFORMATION								
SAMPLE ID	BH2 SS10	LIQUID LIMIT (LL):	16.7	PLASTIC LIMIT (PL)	11.0	PLASTIC INDEX (PI)	5.7	

Plasticity Chart - Glacial Till



Appendix E

Slope Stability Analysis



Figure E1

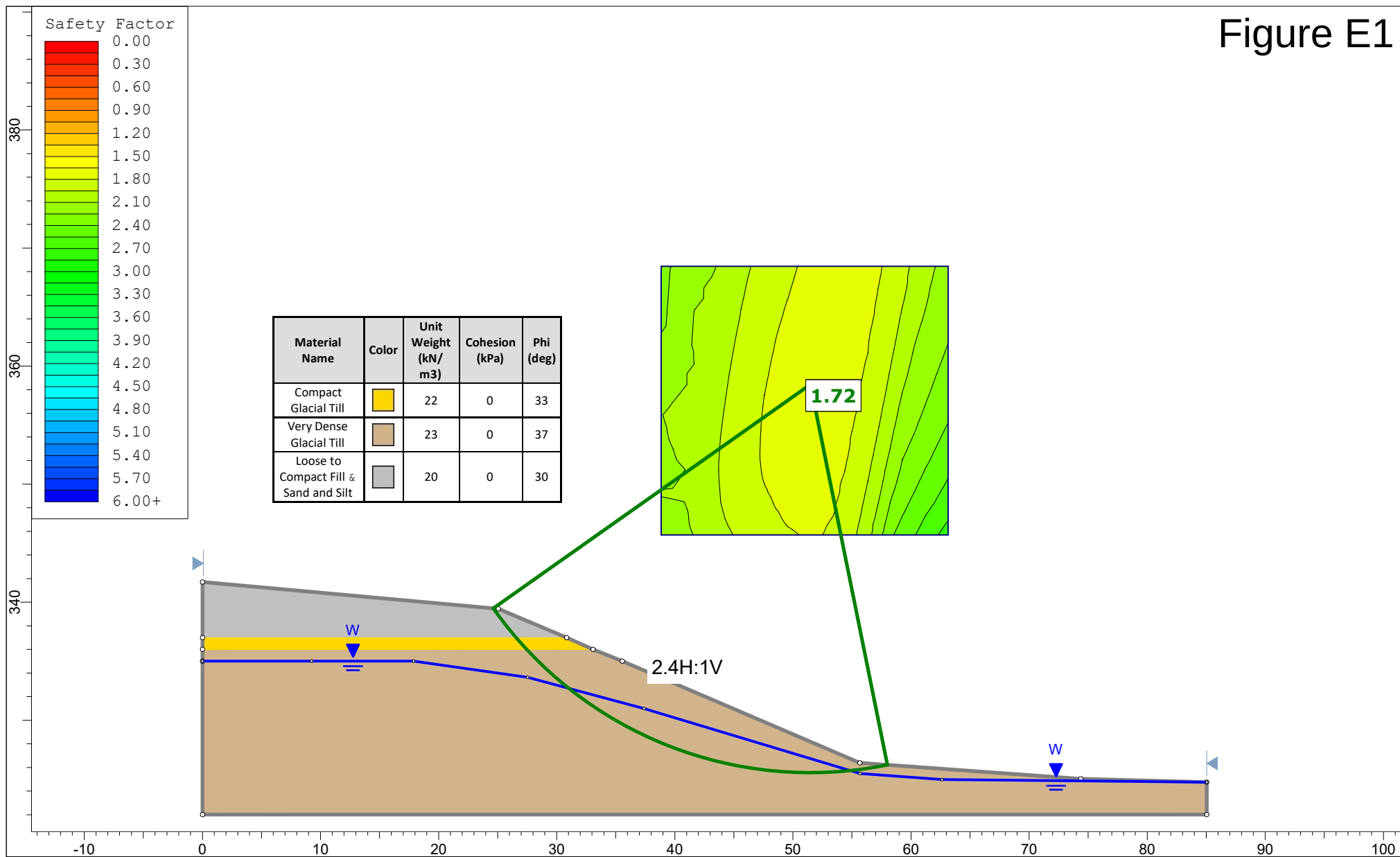


Figure E2

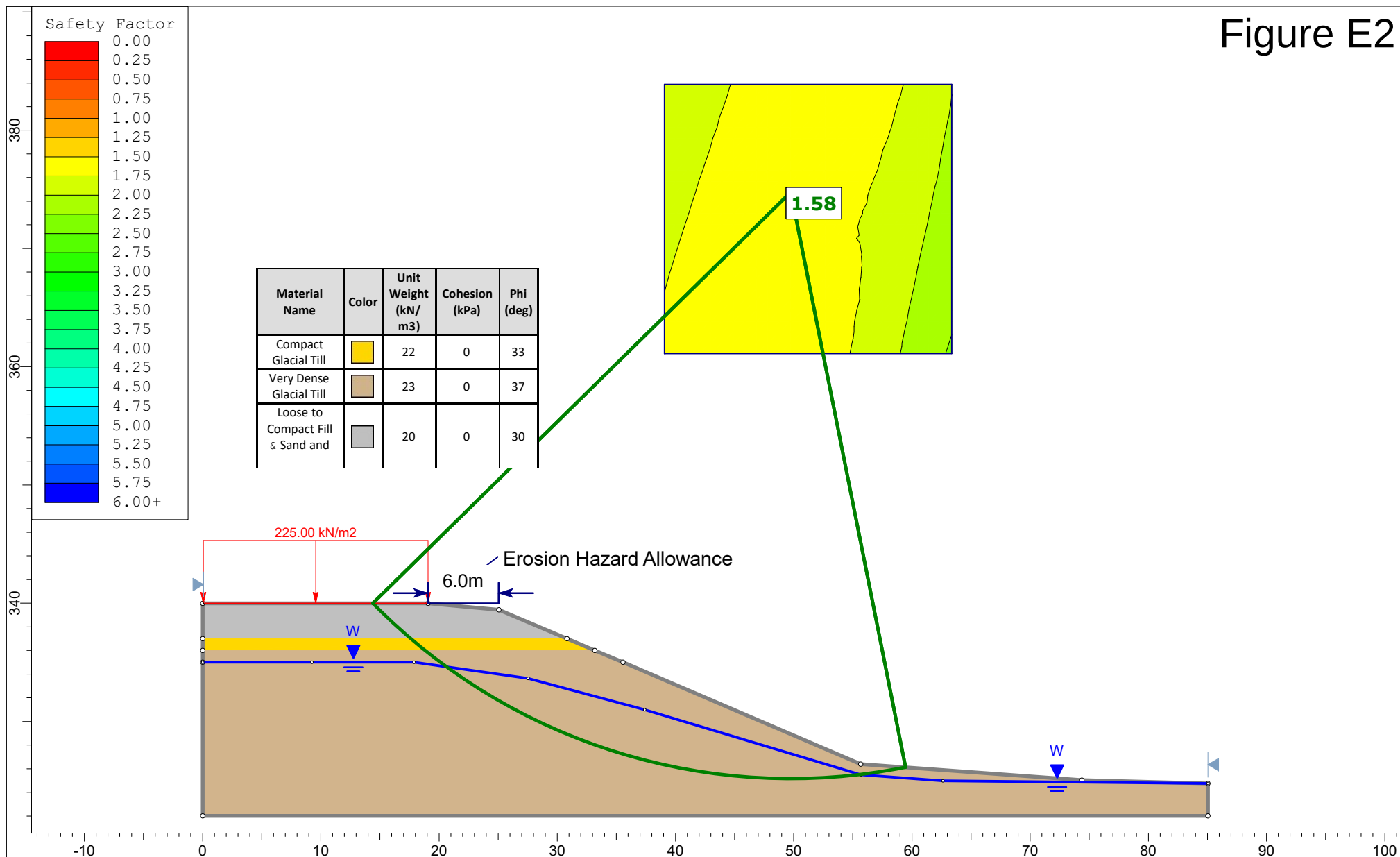
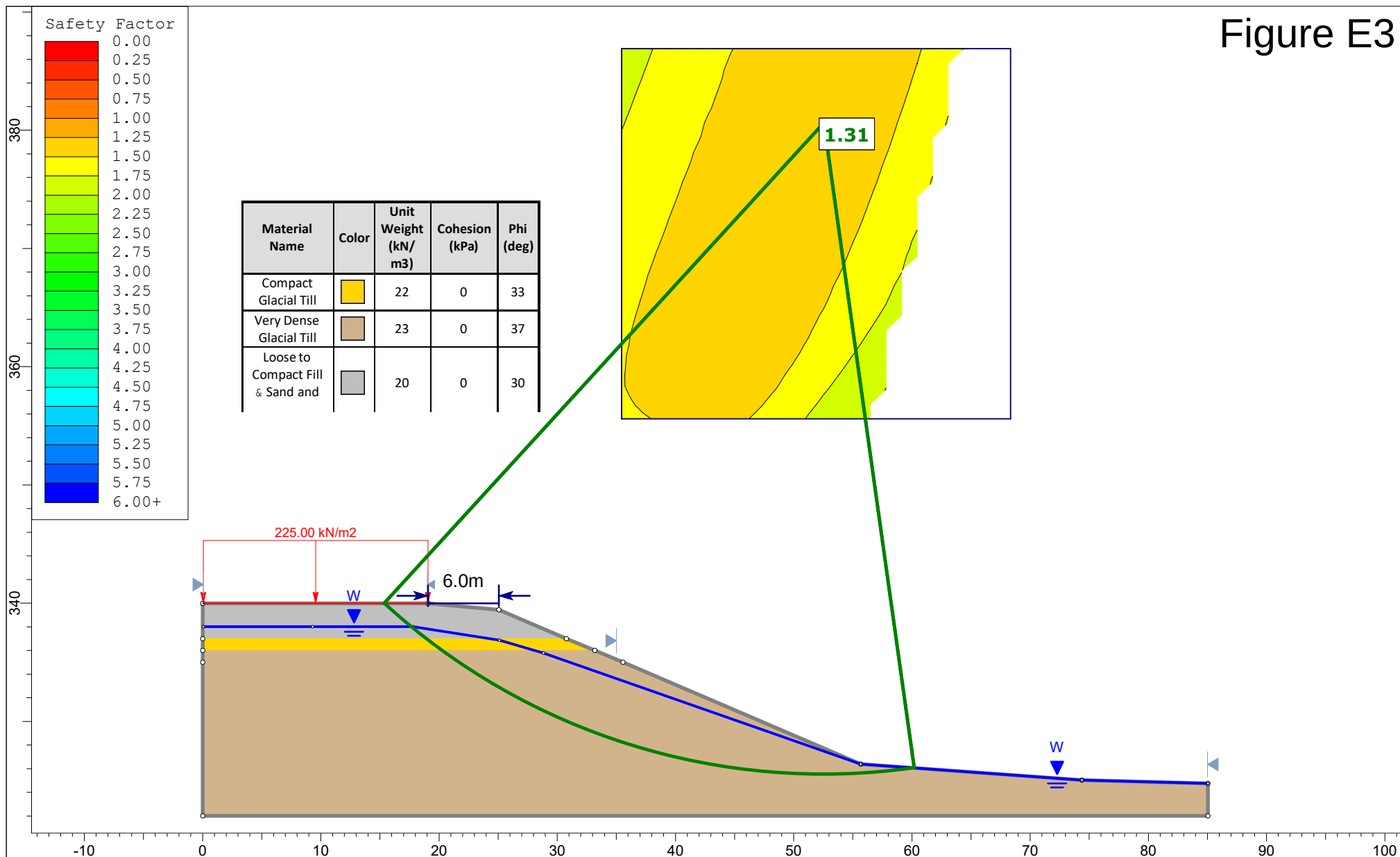


Figure E3

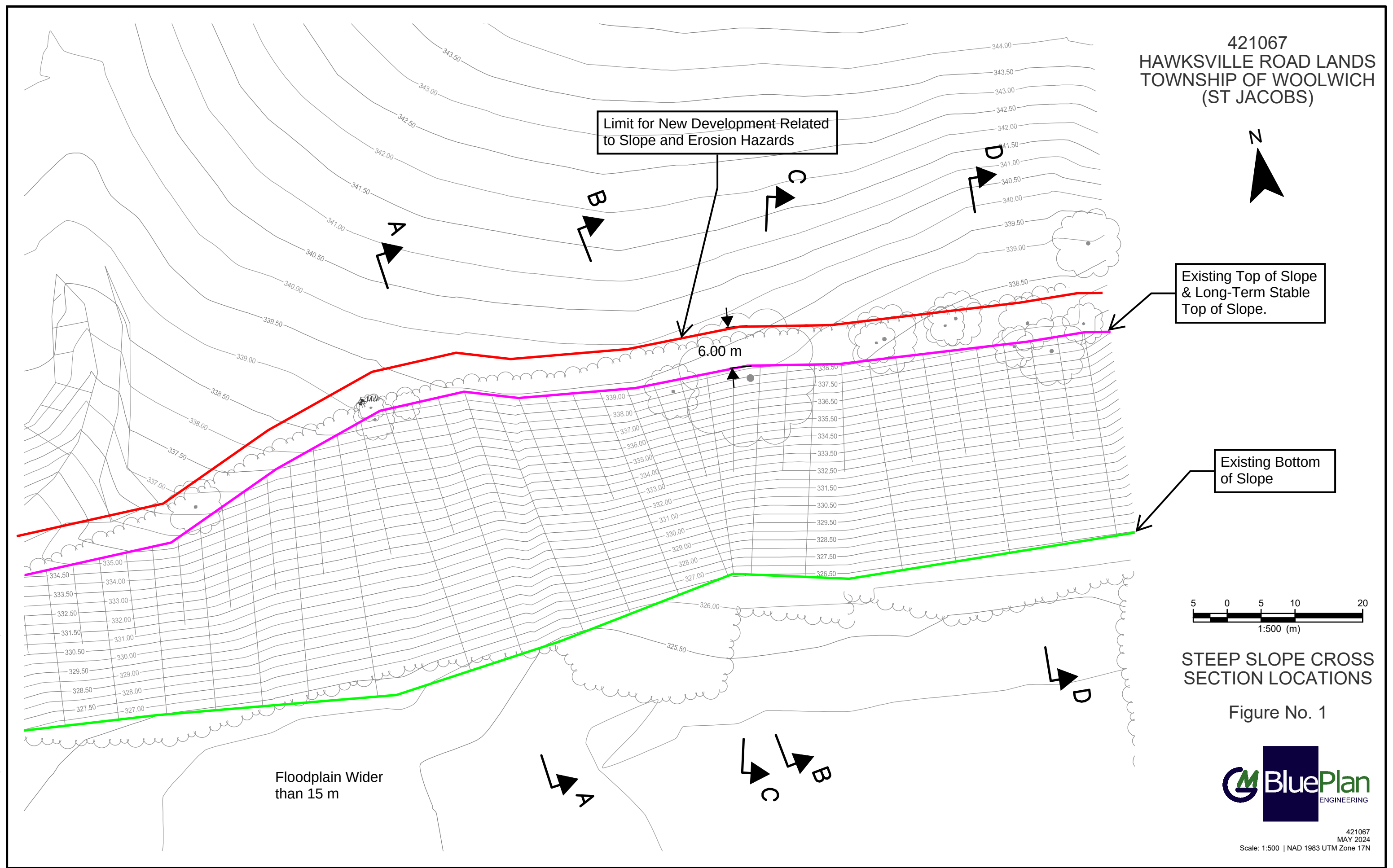


Appendix F

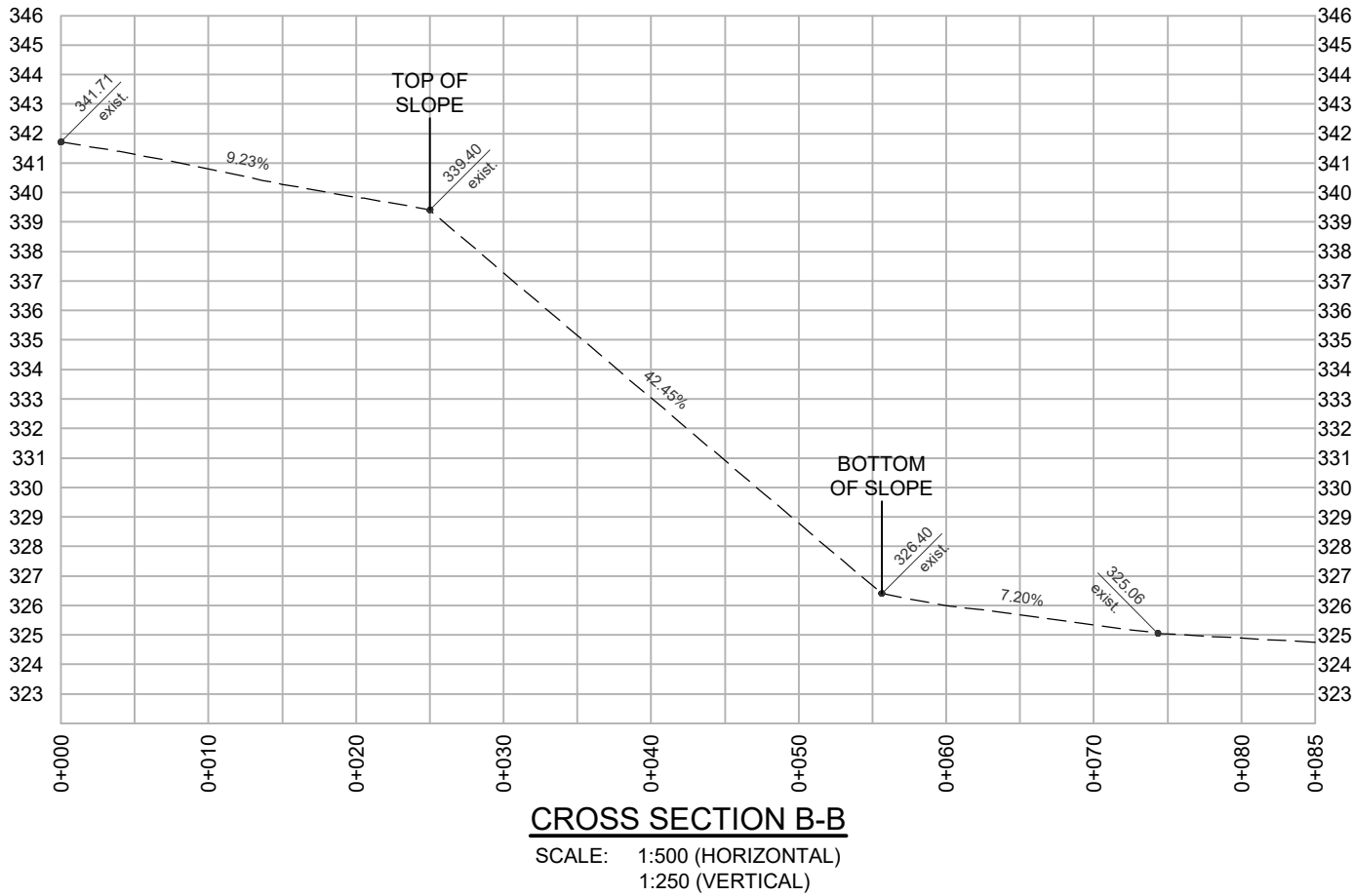
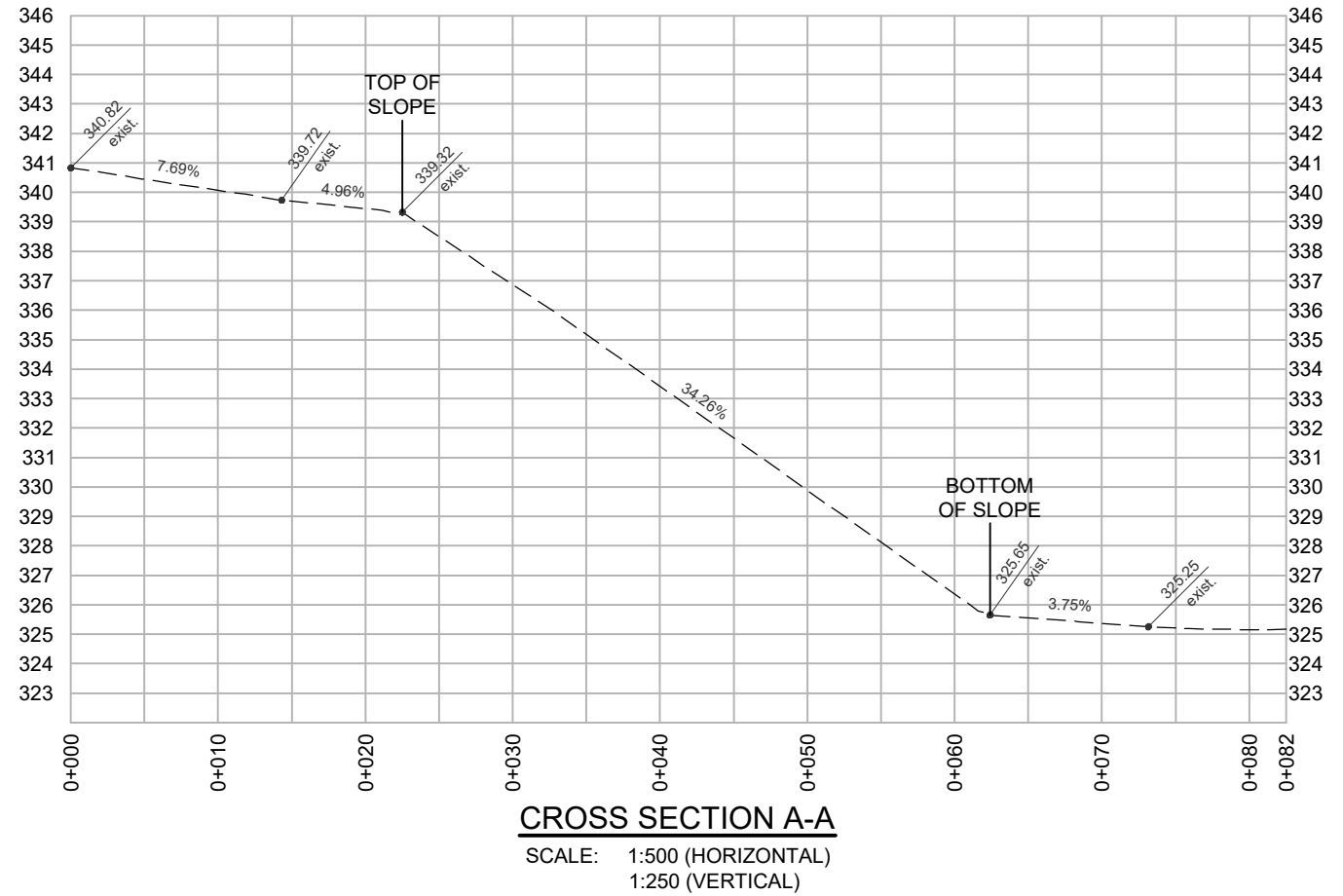
Topographic Survey and Cross-Sections



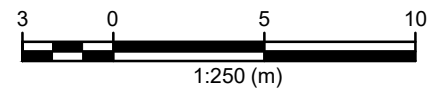
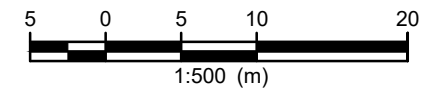
FILE W:\Kitchen\421-2021\421067 - St Jacobs Hawksville Northside Road\Drawings\421067 - Base.dwg LAYOUT: STEEP SLOPE FIG
LAST SAVED BY: Evan 5/1/2024 5:17:51 PM PLOTTED BY: Birch, Evan 5/1/2024 5:19:10 PM



FILE W:\kitchener\421-2021\421067 - St Jacobs Hawksville Northside Road\Drawings\421067 - Base.dwg LAYOUT: SLOPE CROSS SECTION 1
LAST SAVED BY: Evabir3950, 5/1/2024 5:17:51 PM PLOTTED BY: Birch, Evan 5/1/2024 5:19:20 PM



421067
HAWKSVILLE ROAD LANDS
TOWNSHIP OF WOOLWICH
(ST JACOBS)

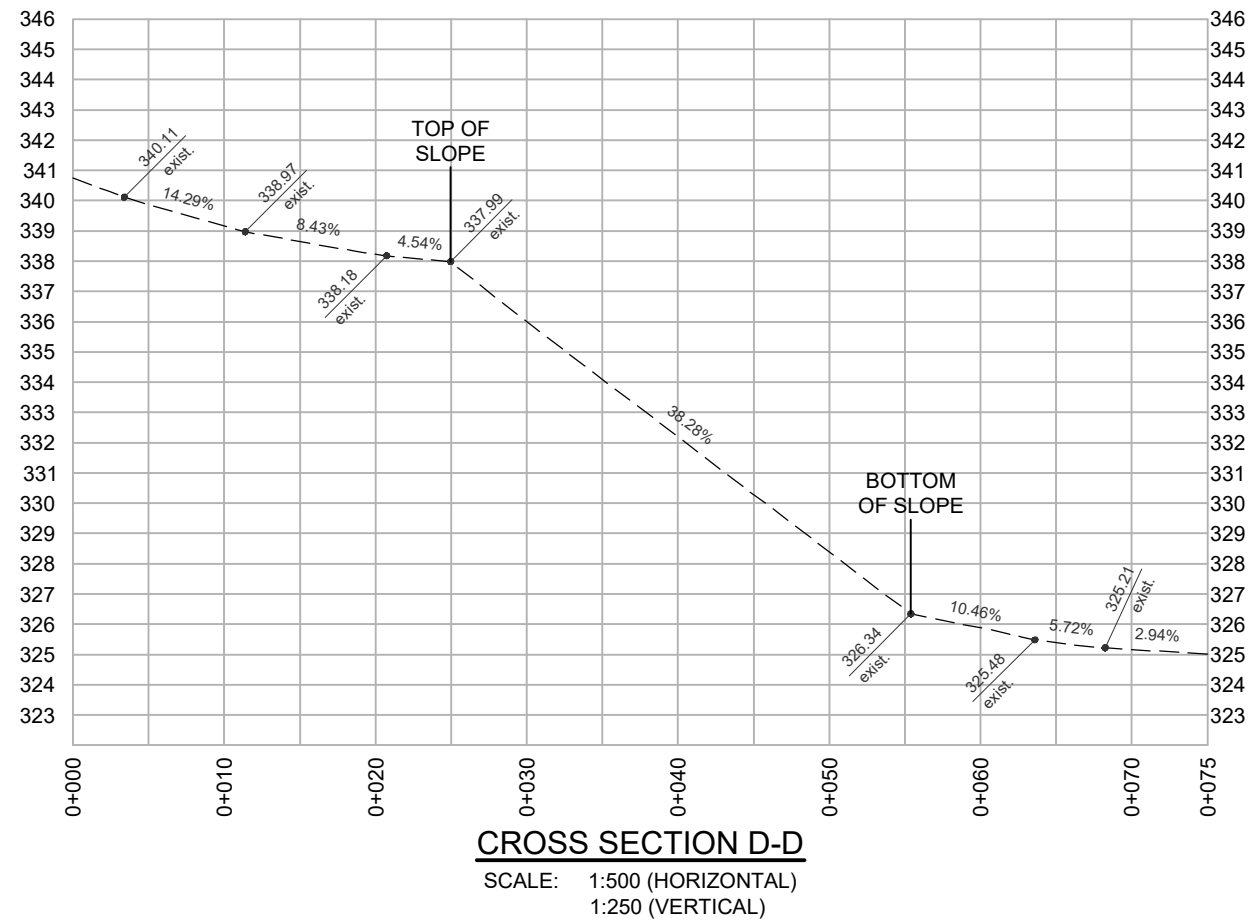
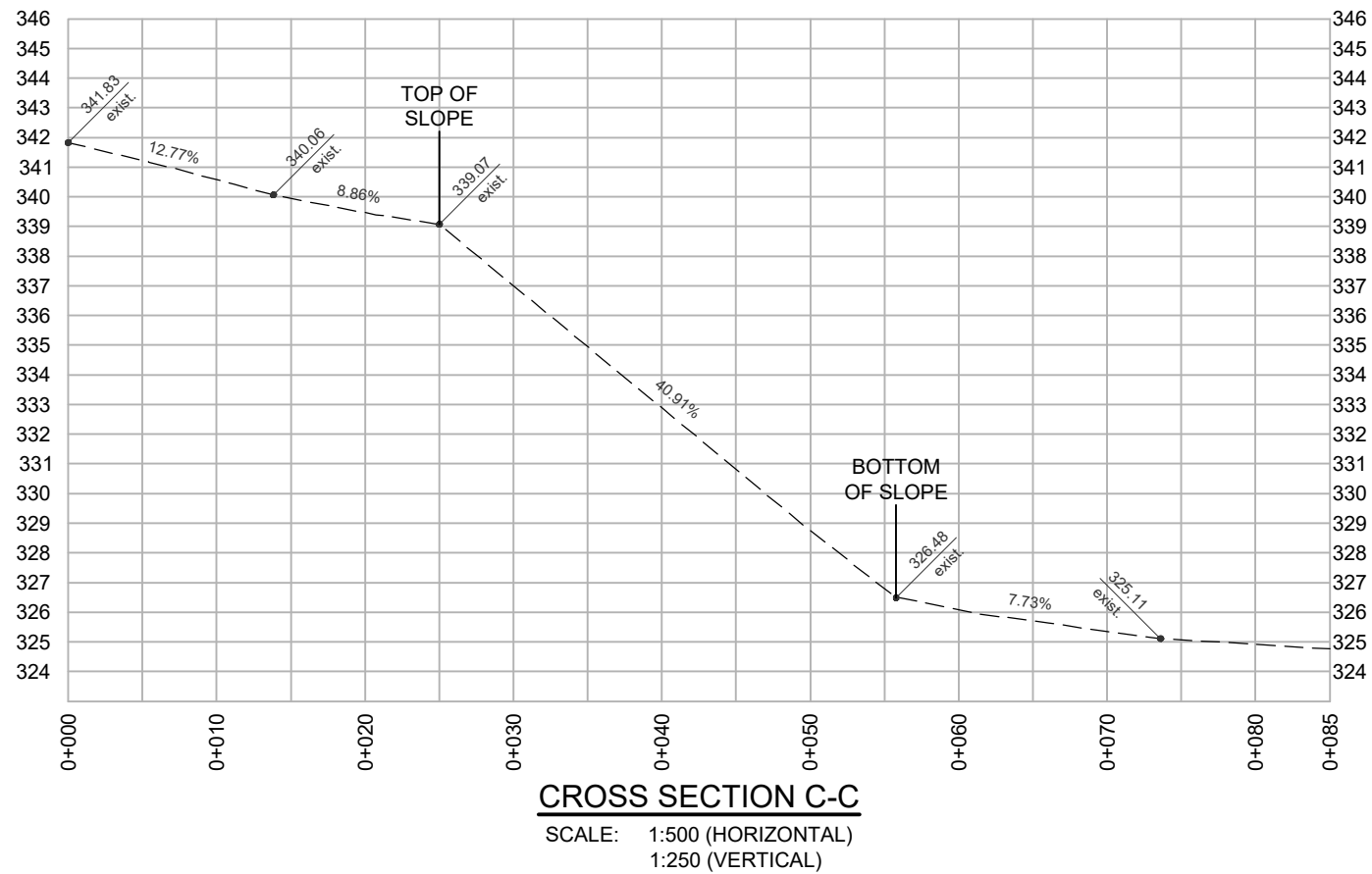


STEEP SLOPE CROSS
SECTION A-A AND B-B

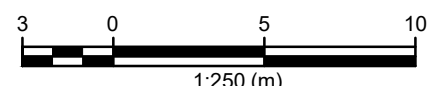
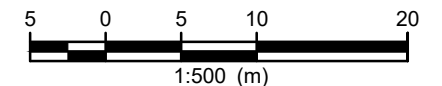
Figure No. 2



FILE W:\kitchener\421-2021\421067 - St Jacobs Hawksville Northside Road\Drawings\421067 - Base.dwg LAYOUT:SLOPE CROSS SECTION 2
LAST SAVED BY:Evan 5/1/2024 5:17:51 PM PLOTTED BY: Birch, Evan 5/1/2024 5:19:25 PM



421067
HAWKSVILLE ROAD LANDS
TOWNSHIP OF WOOLWICH
(ST JACOBS)



STEEP SLOPE CROSS
SECTIONS C-C AND D-D

Figure No. 3

