patersongroup **memorandum**

consulting engineers

re: **Response to Community Comments**
Proposed Multi-Storey Building
St. Joseph Boulevard and Duford Drive - Ottawa

to: Fotenn - **Ms. Julie Carrara** - Carrara@fotenn.com

date: January 19, 2018

file: PG4083-MEMO.01R

Further to your request, Paterson Group (Paterson) prepared the current memorandum to provide a review of existing slope stability in the area of the subject site and discuss a former slope failure which occurred in the 1960s along Duford Drive. This memorandum should be read in conjunction with Paterson Report PG4083-1 Revision 2 dated January 18, 2018.

1.0 Historical Information

It is understood that a slope failure occurred along the east side of Duford Drive in the 1960s. Photographs of the slope failure were provided to Paterson for this response. Photographs 1 and 2 attached to the present report show a shallow slope failure across a limited section of overall slope face. Based on slope features noted in the photographs, such as lack of vegetation across the slope face and the soil surface in the area of Duford Drive, it appears that the slope failure occurred across a section of the slope, which had been recently re-shaped as part of the construction of Duford Drive.

The natural grade of the slope face was drastically changed during the construction of Duford Drive. It is expected that the slope failure can be directly contributed to the steepness of excavated slope face along with exposure to precipitation events before a vegetative layer could establish. It should be further noted that a vegetative layer across a slope face promotes surficial run-off during precipitation events and limits infiltration of rainwater into the slope soil. Infiltration of water from precipitation events into a slope reduces overall slope stability.

The current slope face was noted to include a terraced area along the base of the slope face in the area of the former slope failure (see Photos 3, 4 and 5). It is suspected that the terraced area was introduced after the initial slope failure to stabilize the reinstated slope. Currently, the slope face was noted to be grass covered with mature trees. No signs of slope instability were noted.

2.0 Slope Stability Analysis and Discussion

A slope stability analysis (Section C) considering a fully saturated slope was completed at the former slope failure location. A global slope stability factor of safety of greater than 1.0 was determined based on our analysis. This result indicates a stable slope.

A slope stability analysis (Section B) was also completed for the slope across the subject site, including the slope across Duford Drive from the subject site. The results of our slope stability analysis for Section B indicate a global slope stability factor of safety of greater than 1.0, which is indicative of a stable slope.

Based on our review of the slopes in the area of the subject site, no issues from a slope stability perspective will occur by developing the subject site with the proposed development. The former slope failure observed in the 1960s during construction of Duford Drive was reinstated to provide a stable slope and no signs of slope instability are present within the existing slope. Based on our slope stability review and knowledge of area soils, the construction of the proposed development will not negatively impact the former slope failure area or the other area slopes.

Based on the stability of the slope across the site and the stiffness of the underlying silty clay deposit, the vibrations associated with the temporary shoring installation will not have negative impacts on the overall slope stability or on any adjacent structures or buildings. The temporary shoring system will be designed to support the slope during construction of the building, which will ultimately be constructed to resist the lateral earth pressure from the slope.

We trust that this information satisfies your immediate requirements.

Best Regards,

Paterson Group Inc.

Jan. 21-2018

LICENSED PROFESSIONAL ENGINEER
D. J. GILBERT
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PROVINCE OF ONTARIO

David J. Gilbert, P.Eng.

Historical Photographs, Aerial and Street View Images

Photo 1: Localized slope failure occurring in the mid 1960s adjacent to Duford Drive. Subject site is located within the foreground of the photograph. St. Joseph Boulevard is in the background. Ground surface adjacent to Duford Drive is noted to be free of vegetation, which is indicative that construction of the subject roadway section and cutting of the subject slope was recently completed. It is suspected that the exposed slope was re-shaped to an unstable slope angle as part of the construction work at that time.

Photo 2: Same localized slope failure, which occurred in mid 1960s.

Photo 3: Street view image from Google Earth of former slope failure area (presented in Photos 1 and 2) adjacent to Duford Drive. Ground noted to be re-shaped with a terraced slope in front of reinstated slope.

Photo 4: Street view image from Google Earth of the same former slope failure area presented in Photos 1 and 2. The ground surface is noted to be stable with no signs of slope instability.

Photo 5: Area of former slope failure noted in Photos 1 and 2. Subject site is property along the right side of the photograph.

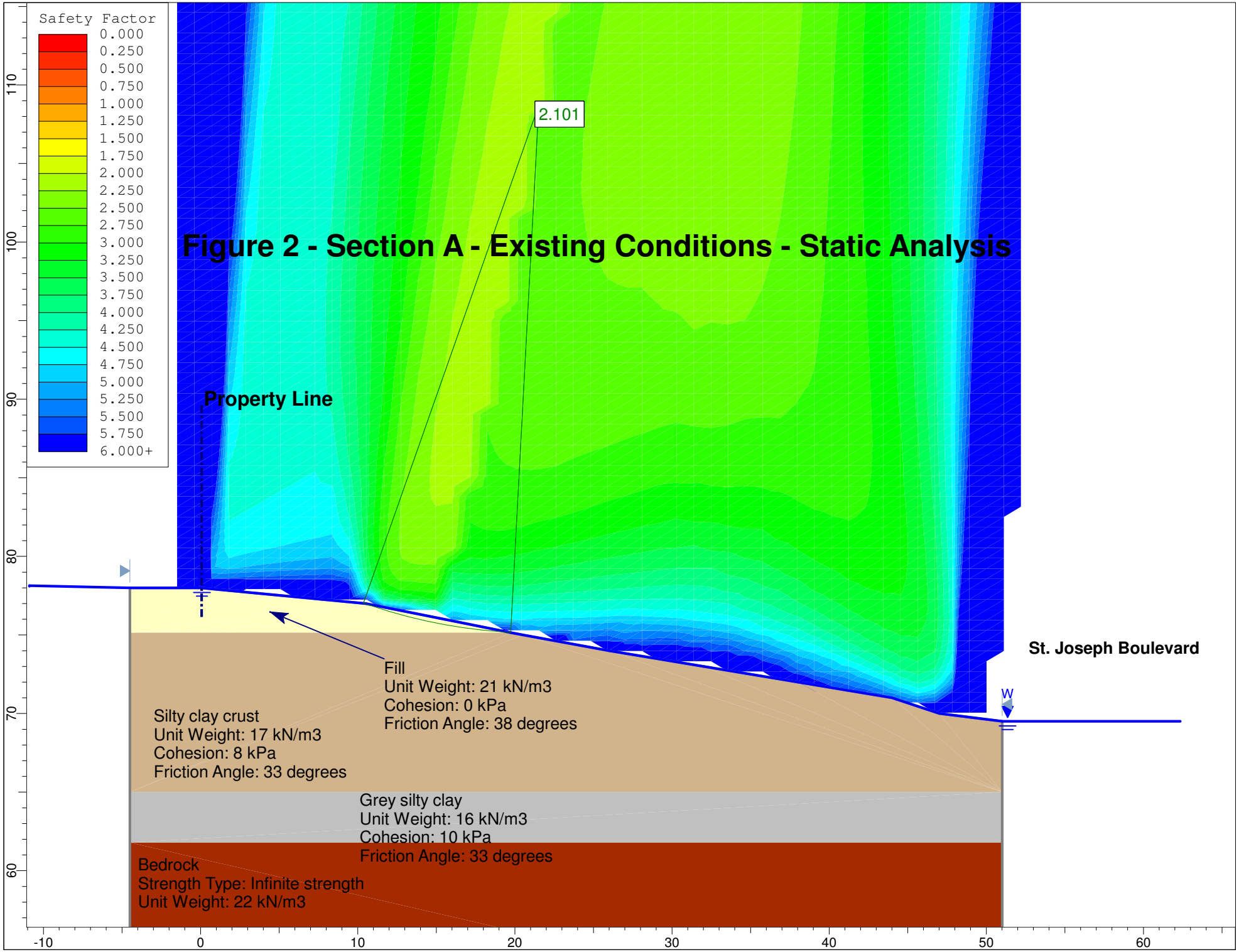


Figure 2 - Section A - Existing Conditions - Static Analysis

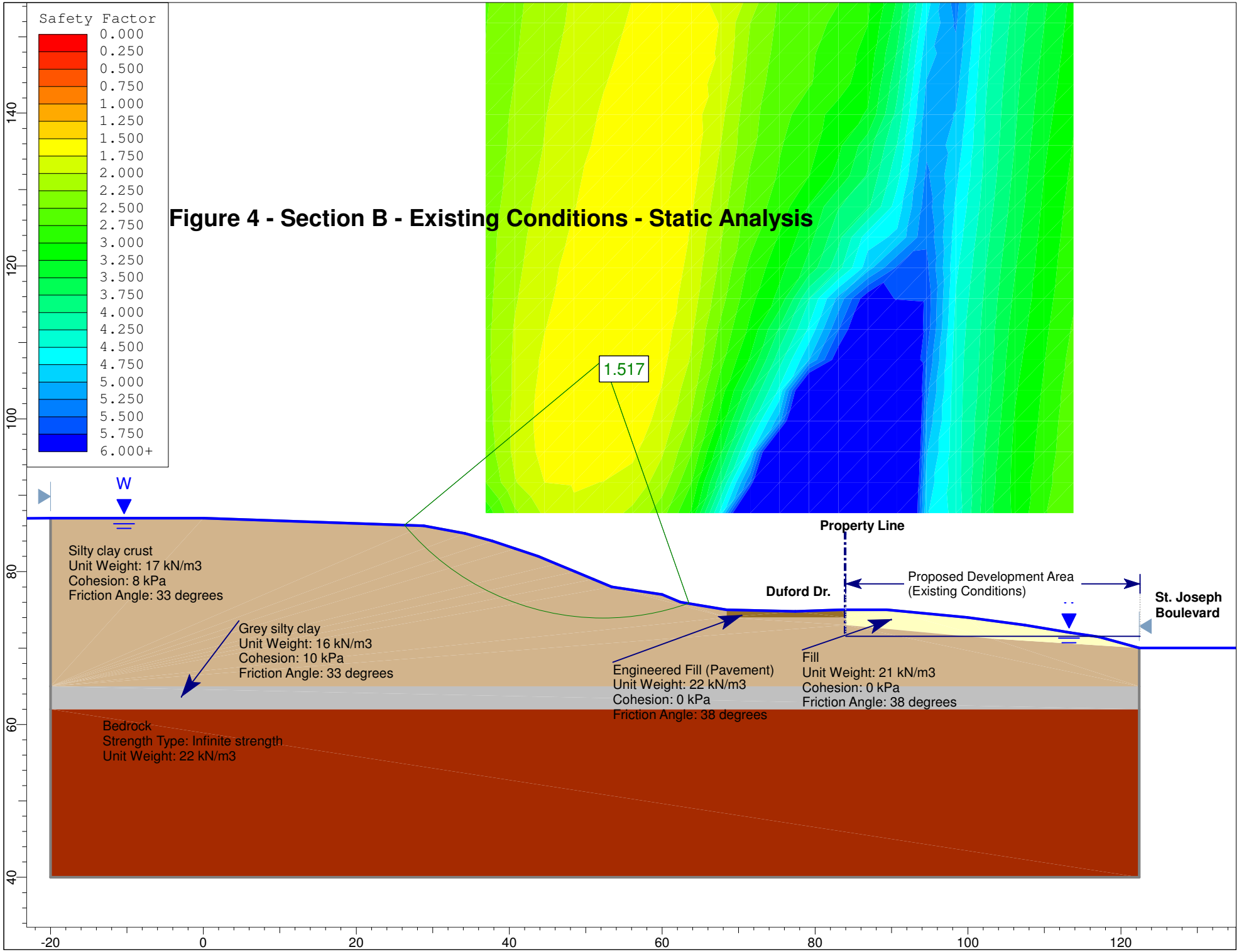


Figure 4 - Section B - Existing Conditions - Static Analysis

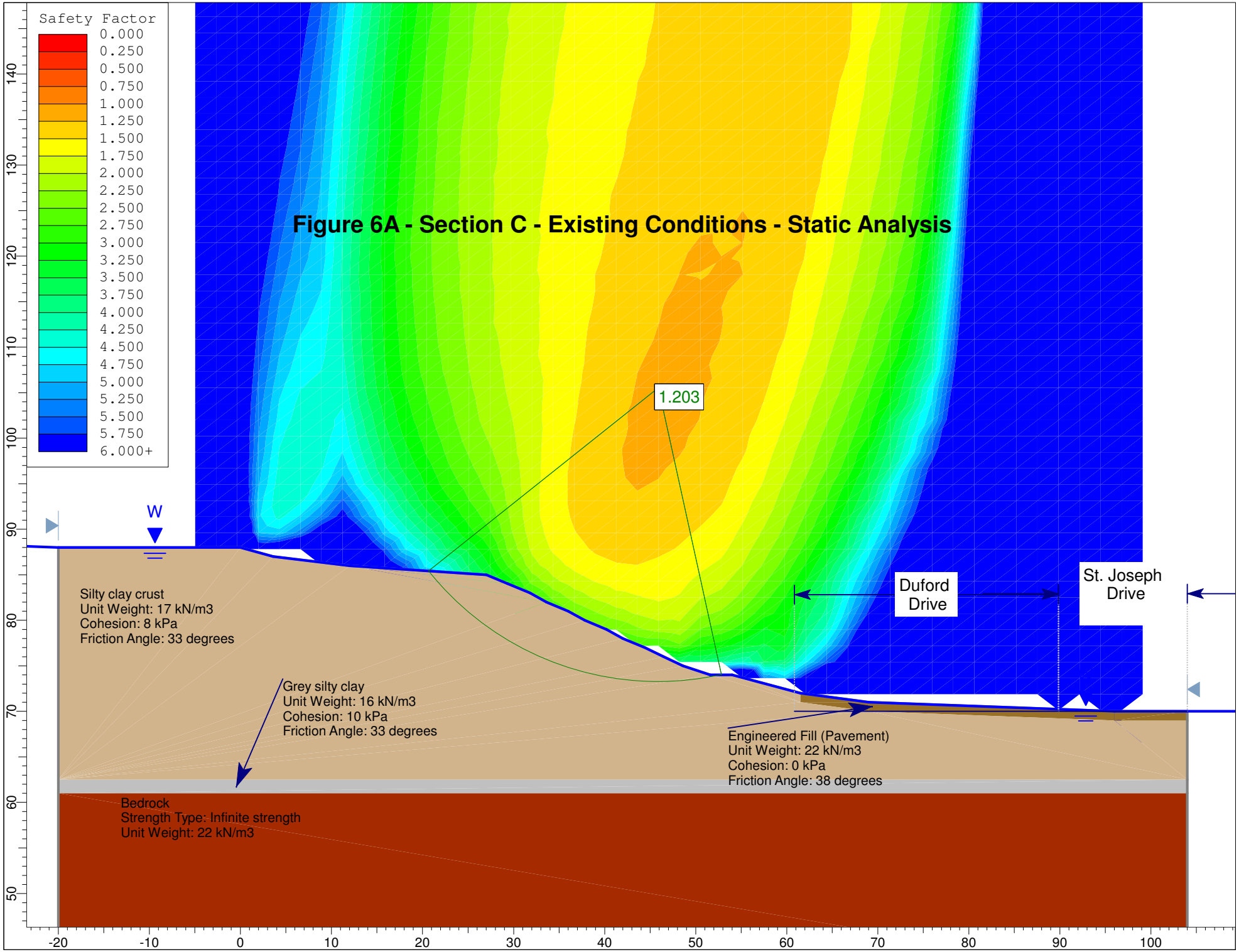
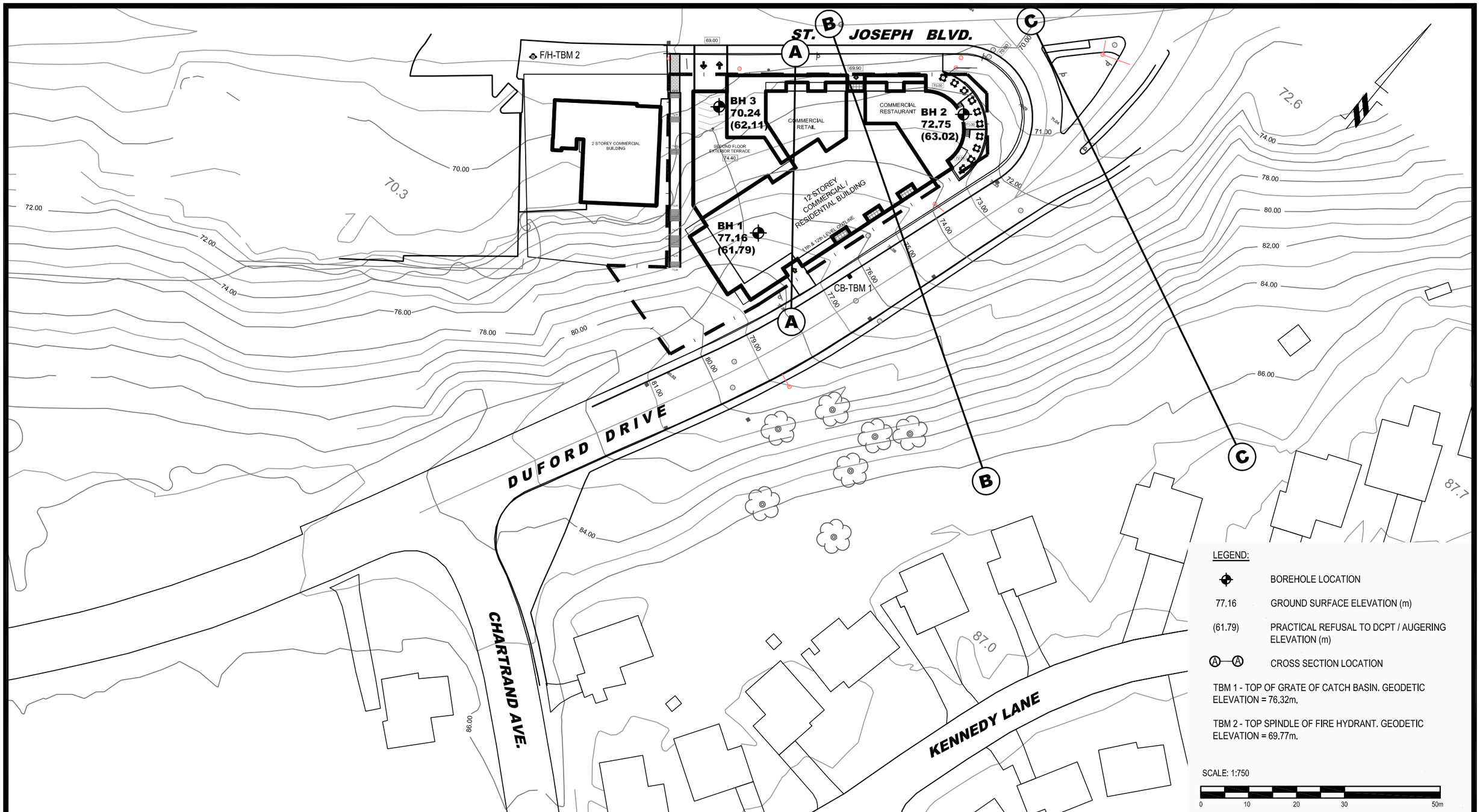


Figure 6A - Section C - Existing Conditions - Static Analysis
Safety Factor
0.000
0.250
0.500
0.750
1.000
1.250
1.500
1.750
2.000
2.250
2.500
2.750
3.000
3.250
3.500
3.750
4.000
4.250
4.500
4.750
5.000
5.250
5.500
5.750
6.000+
1.203
W
Duford Drive
St. Joseph Drive
Silty clay crust
Unit Weight: 17 kN/m3
Cohesion: 8 kPa
Friction Angle: 33 degrees
Grey silty clay
Unit Weight: 16 kN/m3
Cohesion: 10 kPa
Friction Angle: 33 degrees
Engineered Fill (Pavement)
Unit Weight: 22 kN/m3
Cohesion: 0 kPa
Friction Angle: 38 degrees
Bedrock
Strength Type: Infinite strength
Unit Weight: 22 kN/m3
140
130
120
110
100
90
80
70
60
50
-20
-10
0
10
20
30
40
50
60
70
80
90
100



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NO.	REVISIONS	DATE	INITIAL
1	SLOPE STABILITY CROSS SECTION ADDED	13/12/2017	FA

THE TORGAN GROUP

GEOTECHNICAL INVESTIGATION
PROP. MULTI-STOREY BUILDING - ST. JOSEPH BOULEVARD

OTTAWA, ONTARIO

Title:

SLOPE STABILITY SECTIONS

Scale: 1:750	Date: 01/2018
Drawn by: MPG	Report No.: PG4083-1
Checked by: FA	Dwg. No.: PG4083-2
Approved by: DJG	Revision No.: 1

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