Appendix H

Structural Conceptual Design Reports

CONCEPTUAL DESIGN REPORT
Jane Street Bridge
Structure No. 091

Agreement RFP #10009033

Prepared for:
Toronto and Region Conservation Authority
101 Exchange Avenue, Vaughan, Ontario, L4K 5R6

Prepared by:
Wood Environment & Infrastructure Solutions
3450 Harvester Road
Burlington ON L7N 3W5

July 2020

Jane Street Bridge, Structure No. 091

Conceptual Design Report
Wood Project No. TPB198079, TRCA

Prepared for:

Toronto and Region Conservation Authority

101 Exchange Avenue, Vaughan, Ontario, L4K 5R6

Prepared by:

Wood Environment & Infrastructure Solutions
a Division of Wood Canada Limited
3450 Harvester Road, Suite 100
Burlington, ON L7N 3W5   Canada
T: 905-335-2353

July 2020

Copyright and non-disclosure notice

Third-party disclaimer

Table of Contents

List of Figures

1.0 Project Overview

1.1 Introduction

The Toronto and Region Conservation Authority (TRCA) retained Wood Environment & Infrastructure Solutions (Wood) to provide "Consulting Engineering Services to Undertake a Flood Remediation and Transportation Feasibility Study of the Rockcliffe Special Policy Area (SPA) in the City of Toronto". This assignment includes the replacement of the existing Jane Street Crossing over Black Creek (Structure No. 091) for which the conceptual design of the replacement is to be completed.

The purpose of this Conceptual Design Report is to describe the current condition of the structure and provide recommendations for the replacement of the structure.

1.2 Key Plan

Figure 1: Key Plan of Jane Street Crossing Over Black Creek, Structure No. 091

1.3 Background Information

The following background information has been provided by the Ministry:

- Original Construction Drawings, prepared by Municipality of Metropolitan Toronto Roads Department, dated June 1964
- OSIM Structure Inspection Report, dated August 30, 2017

2.0 Existing Conditions

2.1 Existing Structure

The Jane Street Culvert over Black Creek is a 57.25m long cast-in-place concrete arch structure with a 10.7m span and is located on Jane Street approximately 70m south of the Alliance Avenue intersection. The culvert carries four lanes of traffic (two in each direction) with a posted speed of 50 km/hr. Traffic volumes as of 2017 were found to be approximately 11,823 AADT. There are sidewalks and guiderails on each side of the roadway. Based on the existing drawings, the existing roadway width is 15.24m (50'), including the gutter, plus another 3.048m (10') on each side for the curb, sidewalk, steel beam guide rail (SBGR), and another 0.6096m (2') offset behind the SBGR before the ground starts sloping down. The total is 21.336m 'flat' before ground slopes on either side. There is approximately 6.0m of earth fill on top of the culvert and the watercourse flows from east to west through the culvert. It is suspected that there may be embedded utility ducts within each sidewalk.

The existing structure is the product of two major construction projects from the past. The original central segment of the culvert was constructed in 1948 and is approximately 36.58m long. In 1964, extensions on both ends of the culvert were constructed. The extension project also saw the construction of wingwalls at all four quadrants. The foundations for the extended portion of the culvert and the wingwalls were supported using steel piles embedded into the ground to varying depths. Although no other information is available on previous rehabilitation work, it is suspected that general repairs and maintenance like concrete patching and concrete surface cleaning has taken place due to the existing condition of the structure.

As part of provincial requirements, any structures carrying public traffic and meeting the criteria of the Ontario Structure Inspection Manual (OSIM) require bi-ennial inspections. The latest OSIM inspection for this structure (2017) found that the structure is generally in good condition with a Bridge Condition Index (BCI) of 70.09. The BCI is a value developed by the Ministry of Transportation of Ontario (MTO) to provide an indication of the overall condition of the structure. In general, a BCI of 70-100 equates to a good condition rating, 60-70 equates to a fair condition rating, and 60 or less equates to a poor condition rating.

Photographs of the existing structure taken on July 24, 2019 during a site visit are attached.

2.2 Traffic Conditions

The Jane Street Crossing carries northbound and southbound traffic along a major arterial road (Jane Street) and over the Black Creek. It has a posted speed limit of 50 km/h. The Annual Average Daily Traffic (AADT) was measured as 11,823.

3.0 Proposed Replacement

The new Jane Street Bridge will be a 102m long, four span (10m, 36m, 36m, and 20m) structure with a proposed width of 29.7m including 1.5m sidewalks on both sides of the bridge.. The proposed bridge will carry two 3.5m wide lanes of Northbound traffic, two 3.5m wide lanes of Southbound traffic, and two 2.5m bike lanes along Jane Street over Black Creek. In addition to the above, the City of Toronto has asked for the inclusion of a 7.0m wide lane for future LRT construction. For the superstructure type, steel I-girders or precast and prestressed concrete girders can be considered. The provided conceptual drawing shows the steel option.

The governing conditions that ultimately established the length of bridge shown are based on hydraulic and geotechnical recommendations. Through hydraulic modelling prior to collection of sub-surface geotechnical information, a two-span 72m long bridge with 1.5H:1V embankment slope was determined to be sufficient.

However, the geotechnical investigations found that the existing fill along the proposed slope embankments consisted of poor fill material (refer to Geotechnical Report for further details) that would cause instability if the original 1.5H:1V slopes were to be constructed.

As such, to accommodate geotechnical concerns, the embankment slopes would either need to be flattened and the span of the bridge lengthened with support piles, or some form of soil stabilization installed. It was determined that the lengthening of the bridge would be preferred for multiple reasons:

1. The extent of excavations and backfilling to replace the existing poor soil along the embankments would be substantial due to the slip circle failure zone.
2. The extra excavations would most likely interfere with additional underground infrastructure.
3. The staging of the construction and more specifically, the roadway protection effort to maintain some active lanes of traffic along Jane Street would be increased from a design and construction point-of-view. A third stage of construction would likely have to be added.
4. Soil stabilization measures while maintaining active traffic lanes may introduce additional cost and construction time whereas top-down construction is an option for pile supported slope.
5. The construction period would be lengthened.
6. At face value, a soil stabilization option would be cheaper. However, with consideration for the above points and in lieu of a more detailed analysis, the increase in cost for both options could potentially be similar.

The length of the proposed 102m long bridge was determined using 2H:1V slopes for the embankments with benches at intervals to provide slope stability.

It is important to note that the effort at this level for the structural design is only at a conceptual level. Further analysis should be carried out to examine both alternatives in greater detail in the subsequent assignments.

4.0 Construction Staging & Traffic Control

Due to the high volumes of traffic along Jane Street, the construction of the bridge would be conducted in stages with roadway protection in the form of soldier piles and lagging. It is anticipated that two stages would be required with traffic being shifted to the newly built section of the bridge to allow for the construction of the remaining half.

It is anticipated that the work could be completed as follows:

- Mobilize and install traffic control measures to allow for one lane of traffic in each direction along Jane Street;

- Install soldier piles;
- Excavate to required depth while simultaneously installing soldier pile lagging to protect roadway above;
- Construct substructure elements for half of bridge;
- Install superstructure elements for half of bridge;
- Construct deck, approach slabs, sleeper slabs, and sidewalks for half of bridge;
- Construct parapet walls for half of bridge;
- Install waterproofing and wearing surface for half of bridge;
- Shift traffic to newly built portion of bridge;
- Excavate and remove existing arch culvert;
- Construct substructure elements for second half of bridge;
- Install superstructure elements for second half of bridge;
- Construct deck, approach slabs, sleeper slabs, and sidewalks for second half of bridge;
- Construct parapet walls for second half of bridge;
- Install waterproofing and wearing surface for second half of bridge; and
- Remove traffic control measures and demobilize.

5.0 Estimated Construction Cost & Duration

5.1 Estimated Construction Cost

The estimated construction cost for the proposed works is approximately **$23,892,000.00**. This includes a 20% contingency. A cost breakdown is attached.

5.2 Estimated Construction Duration

The total estimated construction duration is approximately two construction seasons over the course of two years.

6.0 Miscellaneous

6.1 Design Codes

The design of the rehabilitation works will be undertaken in accordance with the latest edition of CSA S6, the Canadian Highway Bridge Design Code (CHBDC) as well as all other current directives and standards.

6.2 Access to Site

The site is readily accessible from the lanes of Jane Street.

7.0 Closure

We trust that this report is adequate for your purposes. If you have any questions or concerns, please feel free to contact the undersigned at your convenience.

Respectfully submitted by:

Wood Environment & Infrastructure Solutions
A Division of Wood Canada Limited

Dante Shawil

Dante Shawil, EIT
Structural Designer

NTheodor.

Nicolas Theodor, P.Eng.
Senior Associate Bridge Engineer

Figure 1: West Elevation

Figure 2: East Elevation

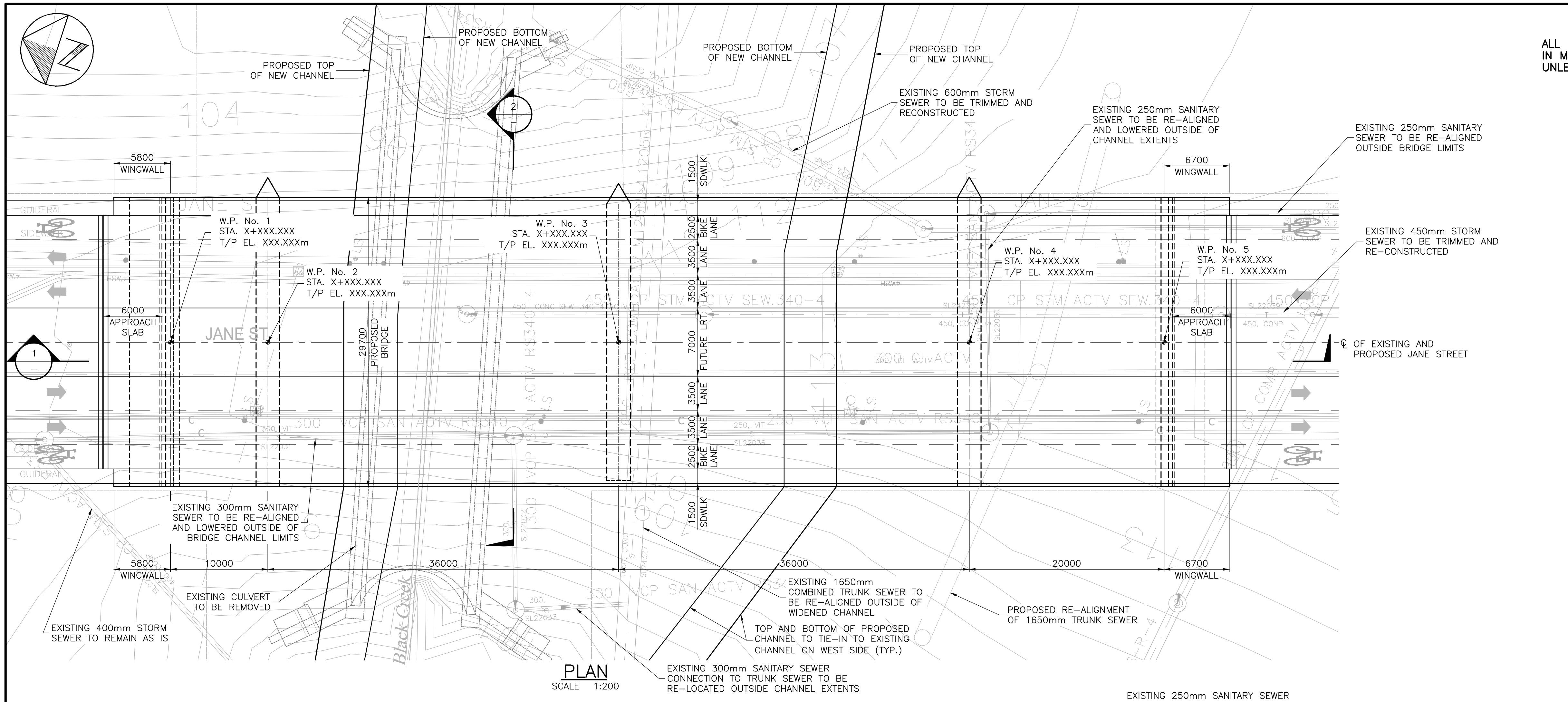
Figure 3: Downstream Channel

Figure 4: Upstream Channel

Figure 5: Culvert Barrel

Path: P:\2019\Projects\TPB198079 - Black Creek At Rockcliffe SPA Flood Remediation\06_DES-ENG\01_CAD\02_DWGS\03_STRUC\02_CONT\Jane - 091\TPB198079 - Jane Street Bridge (#091) - Conceptual Drawing

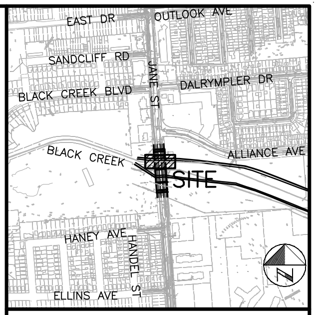
Plotted: 2020-07-21
Last Saved: 2020-05-08
Plotted By: dante.shawil
Last Saved By: peter.kiriakos



PLAN
SCALE 1:200

METRIC

ALL DIMENSIONS SHOWN ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE NOTED.



KEY PLAN

GENERAL NOTES:

1. CLASS OF CONCRETE:

ALL	35 MPa.

UNLESS OTHERWISE SPECIFIED.

2. CLEAR COVER TO REINFORCING STEEL:

DECK : TOP	70±20
BOTTOM	40±10
FOOTING :	100±25
REMAINDER :	70±20

UNLESS OTHERWISE SPECIFIED.

3. STRUCTURAL STEEL:
   - ALL STRUCTURAL STEEL SHALL BE CAN/CSA G40.20-13/ G40.21-13 GRADE 350W ROLLED SECTIONS AND 300W PLATES.
   - BOLTS SHALL BE GALVANIZED A325M.
   - BOLTS SHALL BE INSTALLED BY THE TURN-OF-THE-NUT METHOD.
   - GALVANIZING SHALL CONFORM TO ASTM A123 AND A153.

4. REINFORCING STEEL:
   - REINFORCING STEEL SHALL BE GRADE 400W UNLESS OTHERWISE SPECIFIED.
   - STAINLESS REINFORCING STEEL SHALL BE TYPE 316LN, OR DUPLEX 2205 AND HAVE A MINIMUM YIELD STRENGTH OF 500 MPa. UNLESS OTHERWISE SPECIFIED.
     BAR MARKS WITH PREFIX 'S' DENOTE STAINLESS STEEL BARS.
   - TENSION LAP LENGTHS NOT INDICATED ON THE CONTRACT DRAWINGS SHALL BE CLASS B.
   - GLASS FIBER REINFORCED POLYMER REINFORCING BARS SHALL BE GRADE III AS SPECIFIED IN THE CONTRACT DRAWINGS. THE NOMINAL DIAMETER, TENSILE MODULUS OF ELASTICITY AND AND GUARANTEED MINIMUM TENSILE STRENGTH SHALL BE AS SPECIFIED IN THE CONTRACT DOCUMENTS.
     - BAR MARKS WITH A PREFIX GIII DENOTES GRADE III GLASS FIBRE REINFORCED POLYMER BARS.
   - BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS USING MINIMUM BEND DIAMETERS, WHILE STIRRUPS AND TIES SHALL HAVE MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL STANDARD DRAWING SS12-1 UNLESS INDICATED OTHERWISE.

5. ROADWAY PROTECTION SYSTEMS SHALL BE DESIGNED FOR PERFORMANCE LEVEL 2.

6. THE PILE FOUNDATION SHALL BE DESIGNED/CONSTRUCTED TO WITHSTAND ADDITIONAL LATERAL LOADS IMPOSED BY THE DEFORMATION OF THE POSTULATED SOIL MASS BEHIND THE PILES. MAGNITUDE AND LOCATION OF SUCH LATERAL LOAD SHOULD BE ESTABLISHED BASED ON SOIL-STRUCTURE INTERACTION MODELING.

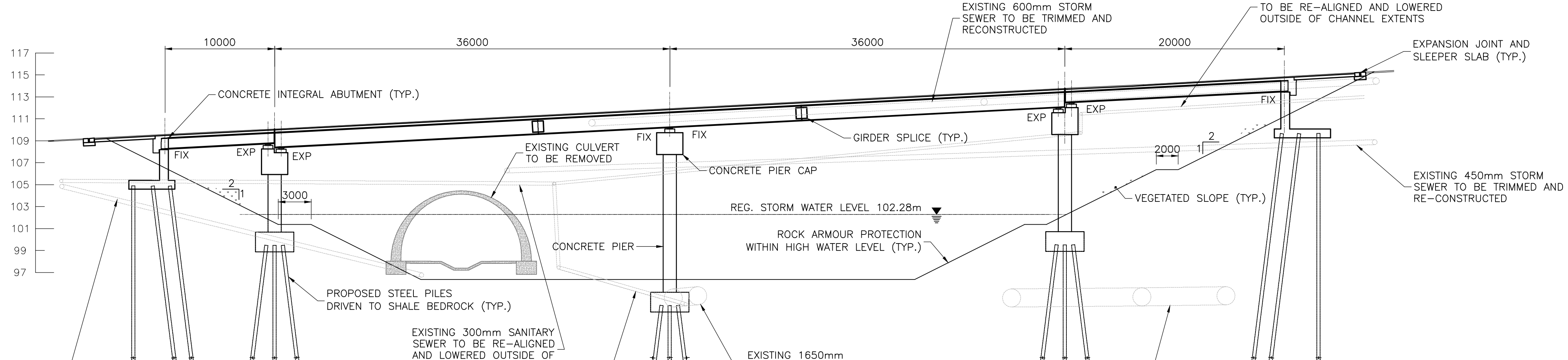
CONSTRUCTION NOTES

1. BACKFILL SHALL BE PLACED SIMULTANEOUSLY BEHIND BOTH ABUTMENTS, KEEPING THE HEIGHT OF THE BACKFILL APPROXIMATELY THE SAME. AT NO TIME SHALL THE DIFFERENCE IN ELEVATION BE GREATER THAN 500mm.

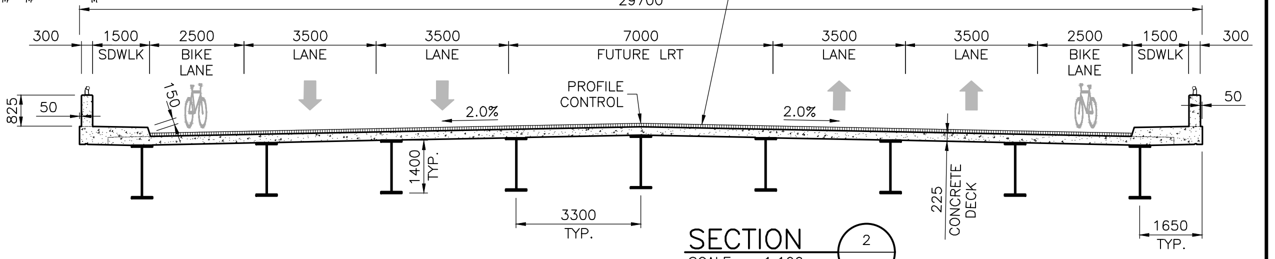
LIST OF DRAWINGS:

S1. GENERAL ARRANGEMENT

APPLICABLE STANDARD DRAWINGS



SECTION 1 –
SCALE 1:250



SECTION 2 –
SCALE 1:100

No	Date	Drawn	Appr'd	Revisions
1	2020-03	MEM	DS	CONCEPTUAL DESIGN

APPROVALS

Design	DS	Checked	NT
Drawn	MEM	Checked	DS

Scale
AS SHOWN

Date
MARCH 2020

PRELIMINARY
NOT TO BE USED
FOR CONSTRUCTION

FLOOD REMEDIATION AND
TRANSPORTATION FEASIBILITY
STUDY OF ROCKCLIFFE
SPECIAL POLICY AREA
TRCA

JANE STREET & BLACK CREEK - STRUCTURE 091 GENERAL ARRANGEMENT

wood.

Contract No.

Consultant File No.
TPB198079

Drawing No.
SHEET S01 OF

JANE STREET BRIDGE

COST ESTIMATES

ITEM NO.	DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	AMOUNT
1	Concrete Removal - Full Depth (existing culvert)	m^3	1200	$ 1,500.00	$ 1,800,000.00
2	Roadway protection	m^2	1000	$ 1,000.00	$ 1,000,000.00
3	New 102m x 30m Structure (cost includes excavations and backfill)	m^2	3060	$ 5,000.00	$ 15,300,000.00
4	Miscellaneous (i.e. traffic control, dewatering, access & protection, etc.) - 10% of above	LS	1	$ 1,810,000.00	$ 1,810,000.00
				SUBTOTAL	$ 19,910,000.00
				CONTINGENCY (20%)	$ 3,982,000.00
				TOTAL	$ 23,892,000.00
				HST (13%)	$ 3,105,960.00
				TOTAL AMOUNT OF TENDER	$ 26,997,960.00

CONCEPTUAL DESIGN REPORT
Rockcliffe Boulevard Bridge
Structure No. 702

Agreement RFP #10009033

Prepared for:
Toronto and Region Conservation Authority
101 Exchange Avenue, Vaughan, Ontario, L4K 5R6

Prepared by:
Wood Environment & Infrastructure Solutions
3450 Harvester Road
Burlington ON L7N 3W5

July 2020

Rockcliffe Boulevard Bridge, Structure No. 702

Conceptual Design Report

Wood Project No. TPB198079, TRCA

Prepared for:

Toronto and Region Conservation Authority

101 Exchange Avenue, Vaughan, Ontario, L4K 5R6

Prepared by:

Wood Environment & Infrastructure Solutions
a Division of Wood Canada Limited
3450 Harvester Road, Suite 100
Burlington, ON L7N 3W5 Canada
T: 905-335-2353

July 2020

Copyright and non-disclosure notice

The contents and layout of this report are subject to copyright owned by Wood (© Wood Environment & Infrastructure Solutions a Division of Wood Canada Limited). save to the extent that copyright has been legally assigned by us to another party or is used by Wood under license. To the extent that we own the copyright in this report, it may not be copied or used without our prior written agreement for any purpose other than the purpose indicated in this report. The methodology (if any) contained in this report is provided to you in confidence and must not be disclosed or copied to third parties without the prior written agreement of Wood. Disclosure of that information may constitute an actionable breach of confidence or may otherwise prejudice our commercial interests. Any third party who obtains access to this report by any means will, in any event, be subject to the Third Party Disclaimer set out below.

Third-party disclaimer

Any disclosure of this report to a third party is subject to this disclaimer. The report was prepared by Wood at the instruction of, and for use by, our client named on the front of the report. It does not in any way constitute advice to any third party who is able to access it by any means. Wood excludes to the fullest extent lawfully permitted all liability whatsoever for any loss or damage howsoever arising from reliance on the contents of this report. We do not however exclude our liability (if any) for personal injury or death resulting from our negligence, for fraud or any other matter in relation to which we cannot legally exclude liability.

Table of Contents

List of Figures

July 2020

1.0 Project Overview

1.1 Introduction

The Toronto and Region Conservation Authority (TRCA) retained Wood Environment & Infrastructure Solutions (Wood) to provide “Consulting Engineering Services to Undertake a Flood Remediation and Transportation Feasibility Study of the Rockcliffe Special Policy Area (SPA) in the City of Toronto”. This assignment includes the replacement of the existing Rockcliffe Boulevard Bridge over Black Creek (Structure No. 702) for which the conceptual design of the replacement is to be completed.

The purpose of this Conceptual Design Report is to describe the current condition of the structure and provide recommendations for the replacement of the structure.

1.2 Key Plan

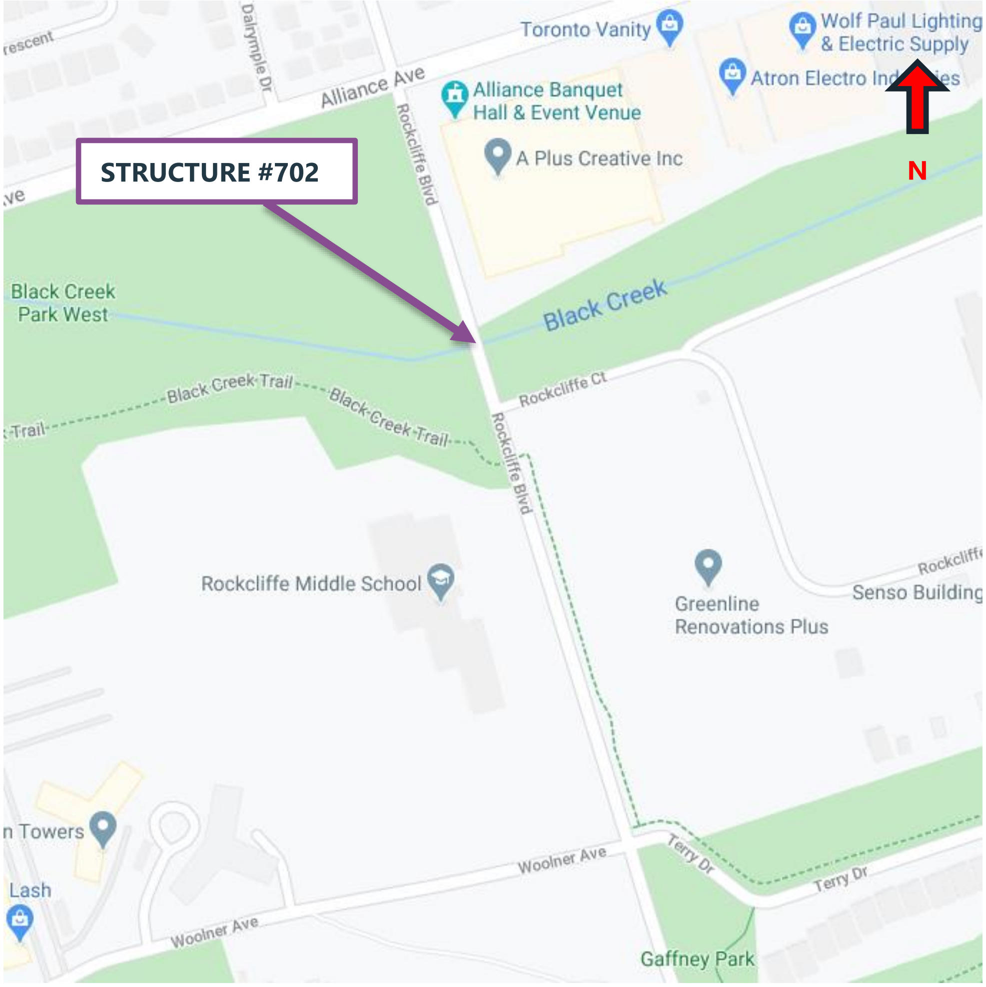


Figure 1: Key Plan of Rockcliffe Boulevard Crossing Over Black Creek, Structure No. 702

1.3 Background Information

The following background information has been provided by the Ministry:

- Original Construction Drawings (not very legible), prepared by Municipality of Metropolitan Toronto Roads Department, dated February 1963
- Rehabilitation Drawings, prepared by SNC-Lavalin, dated February 2007
- OSIM Structure Inspection Report, dated August 23, 2017

2.0 Existing Conditions

2.1 Existing Structure

The Rockcliffe Boulevard Bridge over Black Creek, constructed in 1963, is a 14.85m wide cast-in-place concrete rigid frame structure with a 15.2m span and is located on Rockcliffe Boulevard approximately 35m north of the Rockcliffe Court intersection. The bridge carries two lanes of traffic (one in each direction) with a posted speed of 50 km/hr. there are sidewalks and parapet walls on each side of the bridge. The bridge spans north-south with flows along the Black Creek travelling east-west. Along the west exterior soffit, ten utility ducts are secured to a hangar.

In 2007, the structure was widened as part of a major rehabilitation project. This project also included the replacement of the sidewalks and parapet walls along with general patch repairs to the concrete on the bridge.

As part of provincial requirements, any structures carrying public traffic and meeting the criteria of the Ontario Structure Inspection Manual (OSIM) require bi-ennial inspections. The latest OSIM inspection for this structure (2017) found that the structure is generally in good condition with a Bridge Condition Index (BCI) of 77.14. The BCI is a value developed by the Ministry of Transportation of Ontario (MTO) to provide an indication of the overall condition of the structure. In general, a BCI of 70-100 equates to a good condition rating, 60-70 equates to a fair condition rating, and 60 or less equates to a poor condition rating.

Photographs of the existing structure taken on July 24, 2019 during the site visit are attached.

2.2 Traffic Conditions

The Rockcliffe Boulevard Crossing carries northbound and southbound traffic along a collector road (Rockcliffe Boulevard) and over the Black Creek. It has a posted speed limit of 30 km/h. The Annual Average Daily Traffic (AADT) was measured as 9,690.

3.0 Proposed Replacement

The new Rockcliffe Boulevard Bridge will be a 52m long, two span (26m and 26m) structure with a proposed width of 15.85m including 1.5m sidewalks on both sides of the bridge. The proposed bridge will carry one 4.875m wide lane of Northbound traffic and one 4.875m wide lane of Southbound traffic along Rockcliffe Boulevard over Black Creek. For the superstructure type, the use of precast and prestressed boxes is recommended due to clearance issues.

A General Arrangement has been attached for your reference.

4.0 Construction Staging & Traffic Control

For the replacement of the Rockcliffe Boulevard Bridge, it is anticipated that full closure of the roadway will be utilized. The work would be completed in one year.

It is anticipated that the work could be completed as follows:

- Mobilize and install traffic control measures to close down traffic along Rockcliffe Boulevard;
- Excavate both approaches of existing bridge simultaneously keeping the height of excavation approximately the same. At no time shall the difference in elevation be greater than 500mm;
- Remove existing bridge;
- Construct substructure elements;
- Install superstructure elements;
- Construct deck, approach slabs, sleeper slabs, and sidewalks;
- Construct parapet walls;
- Install waterproofing and wearing surface; and
- Remove traffic control measures and demobilize.

5.0 Estimated Construction Cost & Duration

5.1 Estimated Construction Cost

The estimated construction cost for the proposed works is approximately **$4,805,712.00**. This includes a 20% contingency. A cost breakdown is attached.

5.2 Estimated Construction Duration

The total estimated construction duration is approximately one construction season over the course of one year.

6.0 Miscellaneous

6.1 Design Codes

The design of the rehabilitation works will be undertaken in accordance with CSA S6-19, the Canadian Highway Bridge Design Code (CHBDC) as well as all other current directives and standards.

6.2 Access to Site

The site is readily accessible from the lanes of Rockcliffe Boulevard.

7.0 Closure

We trust that this report is adequate for your purposes. If you have any questions or concerns, please feel free to contact the undersigned at your convenience.

Respectfully submitted by:

Wood Environment & Infrastructure Solutions
A Division of Wood Canada Limited

Report prepared by:

Dante Shawil

Dante Shawil, EIT
Structural Designer

Report reviewed by:

NTheodor.

Nicolas Theodor, P.Eng.
Senior Associate Bridge Engineer

Figure 1: West Elevation

Figure 2: East Elevation

Figure 3: Downstream Channel

Figure 4: Upstream Channel

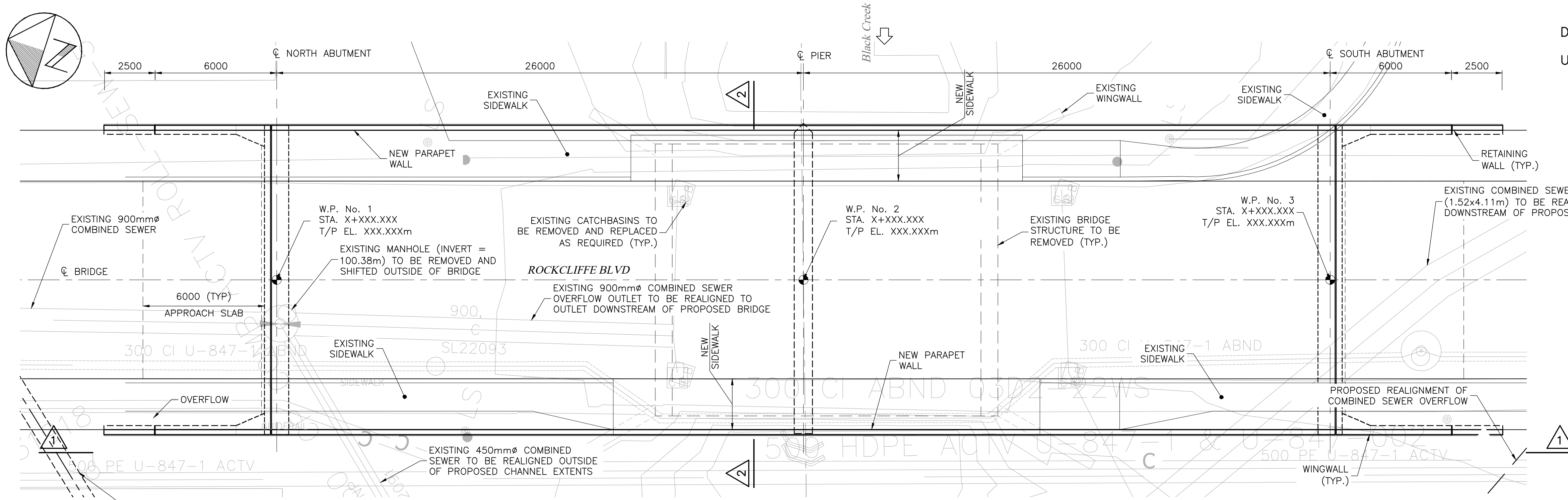
Figure 5: Bridge Soffit

Figure 6: Wearing Surface

Path: P:\2019\Projects\TPB198079 – Black Creek At Rockcliffe SPA Flood Remediation\06_DES-ENG\01_CAD\02_DWGS\03_STRUC\02_CONT\Rockcliffe – 702\TPB198079 – Rockcliffe Boulevard Bridge (#702) – Conc

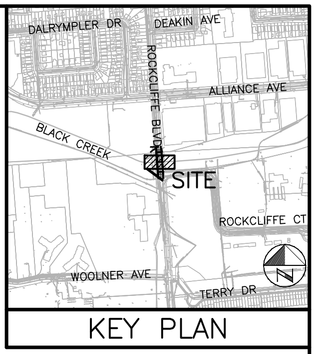
Plotted By: dante.shawil
Last Saved By: peter.kiriakos

Plotted: 2020-07-21
Last Saved: 2020-05-08

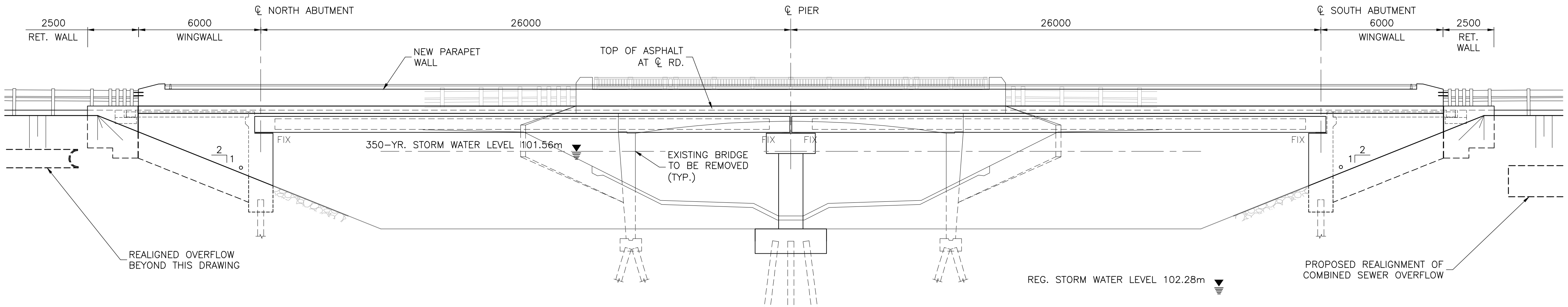


PLAN
SCALE 1:125

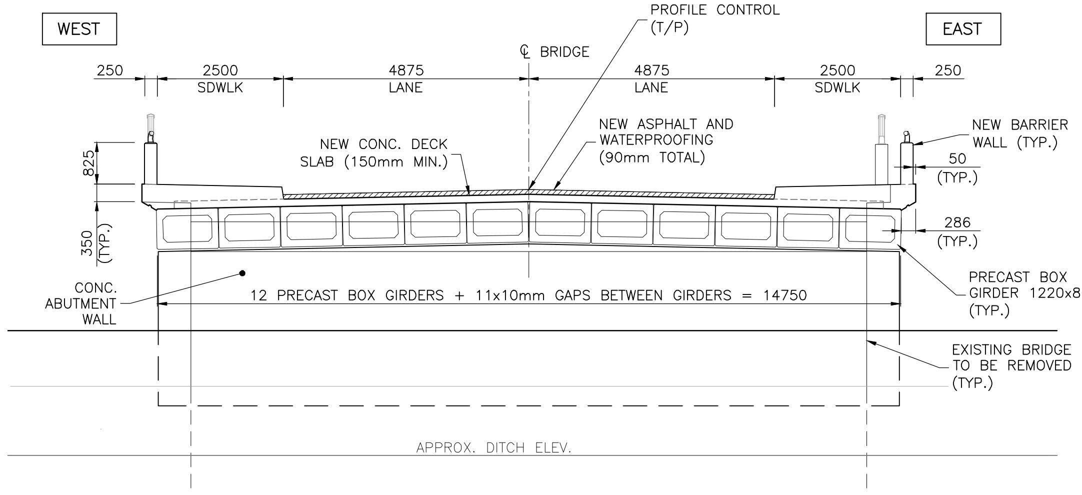
METRIC
DIMENSIONS ARE IN METRES
AND/OR MILLIMETRES
UNLESS OTHERWISE SHOWN



KEY PLAN



WEST ELEVATION
SCALE 1:125



SECTION 2
SCALE 1:75

GENERAL NOTES:

1. CLASS OF CONCRETE:

ALL	30 MPa.
PRECAST CONCRETE GIRDERS	50 MPa.

UNLESS OTHERWISE SPECIFIED.

2. CLEAR COVER TO REINFORCING STEEL:

DECK : TOP	70±20
BOTTOM	40±10
FOOTING :	100±25
REMAINDER :	70±20

UNLESS OTHERWISE SPECIFIED.

3. REINFORCING STEEL:
- REINFORCING STEEL SHALL BE GRADE 400W UNLESS OTHERWISE SPECIFIED.
- STAINLESS REINFORCING STEEL SHALL BE TYPE 316LN, OR DUPLEX 2205 AND HAVE A MINIMUM YIELD STRENGTH OF 500 MPa. UNLESS OTHERWISE SPECIFIED. BAR MARKS WITH PREFIX 'S' DENOTE STAINLESS STEEL BARS.
- TENSION LAP LENGTHS NOT INDICATED ON THE CONTRACT DRAWINGS SHALL BE CLASS B.
- GLASS FIBER REINFORCED POLYMER REINFORCING BARS SHALL BE GRADE III AS SPECIFIED IN THE CONTRACT DRAWINGS. THE NOMINAL DIAMETER, TENSILE MODULUS OF ELASTICITY AND AND GUARANTEED MINIMUM TENSILE STRENGTH SHALL BE AS SPECIFIED IN THE CONTRACT DOCUMENTS.
  - BAR MARKS WITH A PREFIX GIII DENOTES GRADE III GLASS FIBRE REINFORCED POLYMER BARS.
- BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS USING MINIMUM BEND DIAMETERS, WHILE STIRRUPS AND TIES SHALL HAVE MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL STANDARD DRAWING SS12-1 UNLESS INDICATED OTHERWISE.

4. ROADWAY PROTECTION SYSTEMS SHALL BE DESIGNED FOR PERFORMANCE LEVEL 2.
5. IF REQUIRED, THE PILE FOUNDATION SHALL BE DESIGNED/CONSTRUCTED TO WITHSTAND ADDITIONAL LATERAL LOADS IMPOSED BY THE DEFORMATION OF THE POSTULATED SOIL MASS BEHIND THE PILES. MAGNITUDE AND LOCATION OF SUCH LATERAL LOAD SHOULD BE ESTABLISHED BASED ON SOIL-STRUCTURE INTERACTION MODELING.

CONSTRUCTION NOTES

1. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, DETAILS, AND ELEVATIONS OF THE EXISTING STRUCTURE ON SITE, THAT ARE RELEVANT TO THE WORK SHOWN ON THE DRAWINGS PRIOR TO COMMENCEMENT OF WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE CONTRACT ADMINISTRATOR PRIOR TO PROCEEDING WITH THE WORK. PROPOSED ADJUSTMENT OF THE WORK REQUIRED TO MATCH THE EXISTING STRUCTURE SHALL BE SUBMITTED FOR APPROVAL.
2. NO BACKFILL SHALL BE PLACED UNTIL CONCRETE IN THE DECK HAS REACHED A STRENGTH OF 25 MPa.
3. BACKFILL SHALL BE PLACED SIMULTANEOUSLY BEHIND BOTH ABUTMENTS, KEEPING THE HEIGHT OF THE BACKFILL APPROXIMATELY THE SAME. AT NO TIME SHALL THE DIFFERENCE IN ELEVATION BE GREATER THAN 500mm.

LIST OF DRAWINGS:

S1. GENERAL ARRANGEMENT

APPLICABLE STANDARD DRAWINGS

No	Date	Drawn	Appr'd	Revisions
1	2020-03	PK	DS	CONCEPTUAL DESIGN

APPROVALS

Design	DS	Checked	NT
Drawn	MEM	Checked	DS

Scale
AS SHOWN

Date
MARCH 2020

PRELIMINARY
NOT TO BE USED
FOR CONSTRUCTION

FLOOD REMEDIATION AND
TRANSPORTATION FEASIBILITY
STUDY OF ROCKCLIFFE
SPECIAL POLICY AREA
TRCA

ROCKCLIFFE BLVD & BLACK
CREEK - STRUCTURE 702
GENERAL ARRANGEMENT

wood.

Contract No.

Consultant File No.
TPB198079

Drawing No.
SHEET S01 OF

ROCKCLIFFE BRIDGE REPLACEMENT

COST ESTIMATES

ITEM NO.	DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	AMOUNT
1	Concrete Removal - Full Depth (existing bridge)	LS	1	$ 300,000.00	$ 300,000.00
2	New 52m x 15.3m Structure (cost includes excavations and backfill)	m^2	795.6	$ 4,000.00	$ 3,182,400.00
3	Miscellaneous (i.e. traffic control, dewatering, access & protection, etc.) - 15% of above	LS	1	$ 522,360.00	$ 522,360.00
				SUBTOTAL	$ 4,004,760.00
				CONTINGENCY (20%)	$ 800,952.00
				TOTAL	$ 4,805,712.00
				HST (13%)	$ 624,742.56
				TOTAL AMOUNT OF TENDER	$ 5,430,454.56

CONCEPTUAL DESIGN REPORT
Symes Road Culvert
Structure No. 898

Agreement RFP #10009033

Prepared for:
Toronto and Region Conservation Authority
101 Exchange Avenue, Vaughan, Ontario, L4K 5R6

Prepared by:
Wood Environment & Infrastructure Solutions
3450 Harvester Road
Burlington ON L7N 3W5

Toronto and Region Conservation Authority

wood.

July 2020

Symes Road Culvert, Structure No. 898

Conceptual Design Report
Wood Project No. TPB198079, TRCA

Prepared for:

Toronto and Region Conservation Authority

101 Exchange Avenue, Vaughan, Ontario, L4K 5R6

Prepared by:

Wood Environment & Infrastructure Solutions
a Division of Wood Canada Limited
3450 Harvester Road, Suite 100
Burlington, ON L7N 3W5 Canada
T: 905-335-2353

July 2020

Copyright and non-disclosure notice

Third-party disclaimer

Table of Contents

List of Figures

1.0 Project Overview

1.1 Introduction

The Toronto and Region Conservation Authority (TRCA) retained Wood Environment & Infrastructure Solutions (Wood) to provide "Consulting Engineering Services to Undertake a Flood Remediation and Transportation Feasibility Study of the Rockcliffe Special Policy Area (SPA) in the City of Toronto". This assignment includes the replacement of the existing Symes Road Culvert over Lavender Creek (Structure No. 898) for which the conceptual design of the replacement is to be completed.

The purpose of this Conceptual Design Report is to describe the current condition of the structure and provide recommendations for the replacement of the structure.

1.2 Key Plan

Figure 1: Key Plan of Symes Road Crossing Over Lavender Creek, Structure No. 898

1.3 Background Information

The following background information has been provided by the Ministry:

- Original Construction Drawings, prepared by Township of York, Department of Works, dated January 1954
- OSIM Structure Inspection Report, dated October 23, 2017

2.0 Existing Conditions

2.1 Existing Structure

The Symes Road Culvert is a 40m long rectangular cast-in-place concrete culvert with a 3.5m span and is located on Symes Road, approximately 50m south of the Hillborn Avenue intersection. The culvert allows for the flow of the Lavender Creek under Symes Road. The culvert carries two lanes of traffic (one in each direction) with a posted speed of 40 km/hr. No sidewalks are present along the roads. However, curbs with steel beam guide rail (SBGR) are present along the road on both sides. A large trunk sewer is located towards the outlet end of the existing structure and is seated directly above the culvert.

As part of provincial requirements, any structures carrying public traffic and meeting the criteria of the Ontario Structure Inspection Manual (OSIM) require bi-ennial inspections. The latest OSIM inspection for this structure (2017) found that the structure is generally in good condition with a Bridge Condition Index (BCI) of 72.12. The BCI is a value developed by the Ministry of Transportation of Ontario (MTO) to provide an indication of the overall condition of the structure. In general, a BCI of 70-100 equates to a good condition rating, 60-70 equates to a fair condition rating, and 60 or less equates to a poor condition rating.

Photographs of the existing structure taken on July 24, 2019 during the site visit are attached.

2.2 Traffic Conditions

The Symes Road crossing carries northbound and southbound traffic along a local road (Symes Road) and over the Black Creek. It has a posted speed limit of 40 km/h. The Annual Average Daily Traffic (AADT) was measured as 2770.

3.0 Proposed Replacement

The new Symes Road Culvert will be a twin 5.4mx1.8m precast box culvert structure. An existing trunk sewer on top of the existing culvert will require temporary support or temporary relocation to accommodate the construction work and installation of the new culvert panels.

The roadway cross-section will be reconstructed to match existing conditions with one lane for Northbound traffic and one lane for Southbound traffic.

The construction will be carried out with full road closure.

A conceptual general arrangement drawing has been attached.

4.0 Construction Staging & Traffic Control

For the replacement of the Symes Road Culvert, it is anticipated that full closure of the roadway will be utilized. The work would be completed in six-eight weeks.

It is anticipated that the work could be completed as follows:

- Mobilize and install traffic control measures to close down traffic along Symes Road;
- Temporarily protect/relocate utilities;

- Excavate and remove existing structure;
- Prepare subbase and install new culvert panels;
- Backfill;
- Construct new steel beam guide rail and curbs;
- Install waterproofing and wearing surface; and
- Remove traffic control measures and demobilize.

5.0 Estimated Construction Cost & Duration

5.1 Estimated Construction Cost

The estimated construction cost for the proposed works is approximately **$3,332,700.00**. This includes a 20% contingency. A cost breakdown is attached.

5.2 Estimated Construction Duration

The total estimated construction duration is approximately one construction season over the course of six-eight weeks.

6.0 Miscellaneous

6.1 Design Codes

The design of the rehabilitation works will be undertaken in accordance with CSA S6-19, the Canadian Highway Bridge Design Code (CHBDC) as well as all other current directives and standards.

6.2 Access to Site

The site is readily accessible from the lanes of Symes Road.

7.0 Closure

We trust that this report is adequate for your purposes. If you have any questions or concerns, please feel free to contact the undersigned at your convenience.

Respectfully submitted by:

Wood Environment & Infrastructure Solutions
A Division of Wood Canada Limited

Report prepared by:

Dante Shawil

Dante Shawil, EIT
Structural Designer

Report reviewed by:

NTheodor.

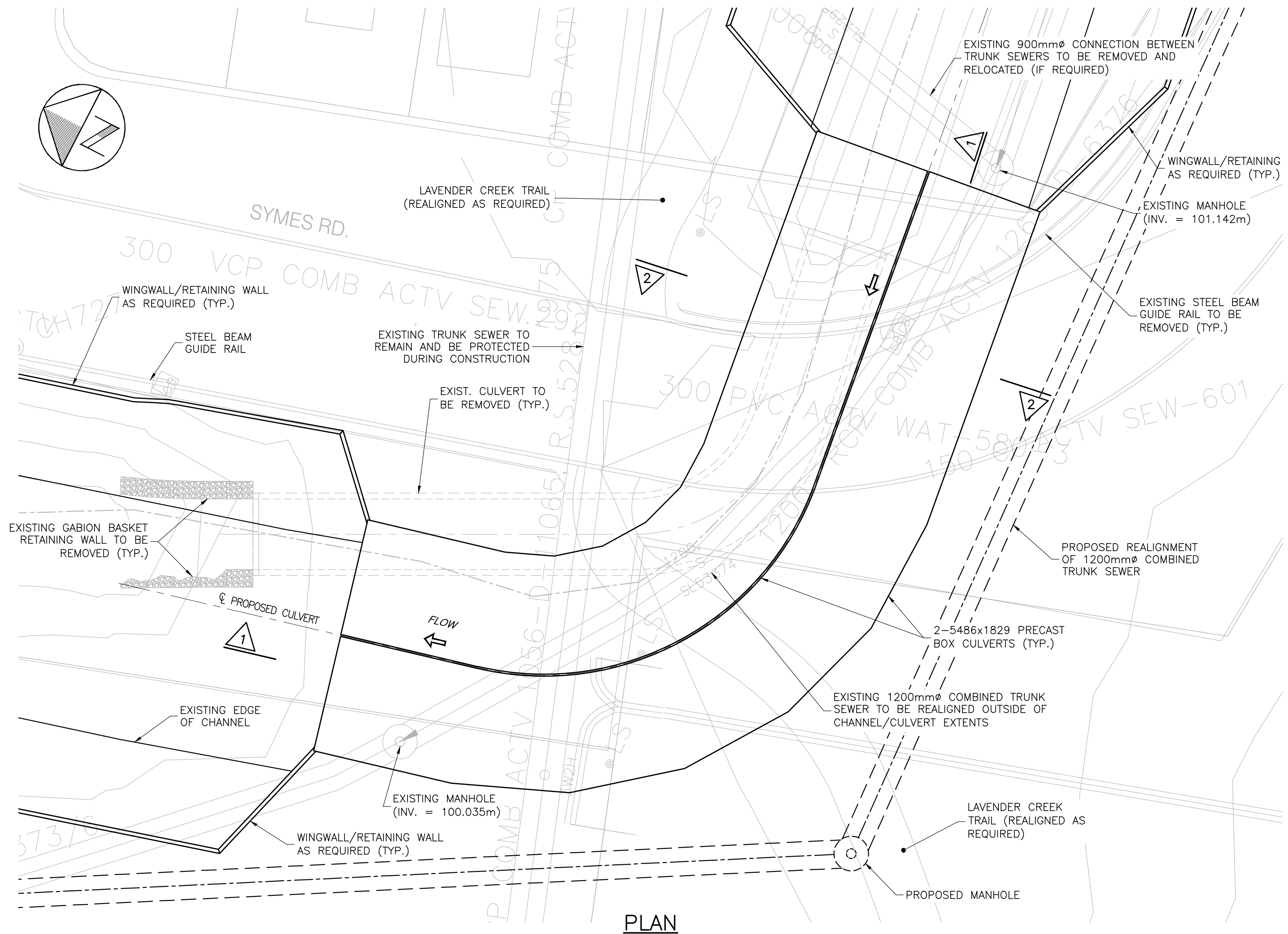
Nicolas Theodor, P.Eng.
Senior Associate Bridge Engineer

Figure 1: West Elevation

Figure 2: East Elevation

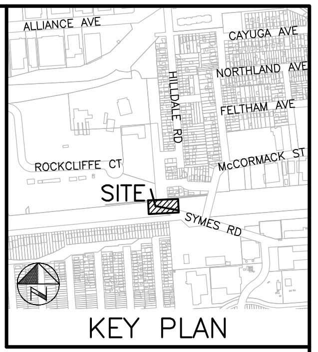
Figure 3: Downstream Channel

Figure 4: Upstream Channel

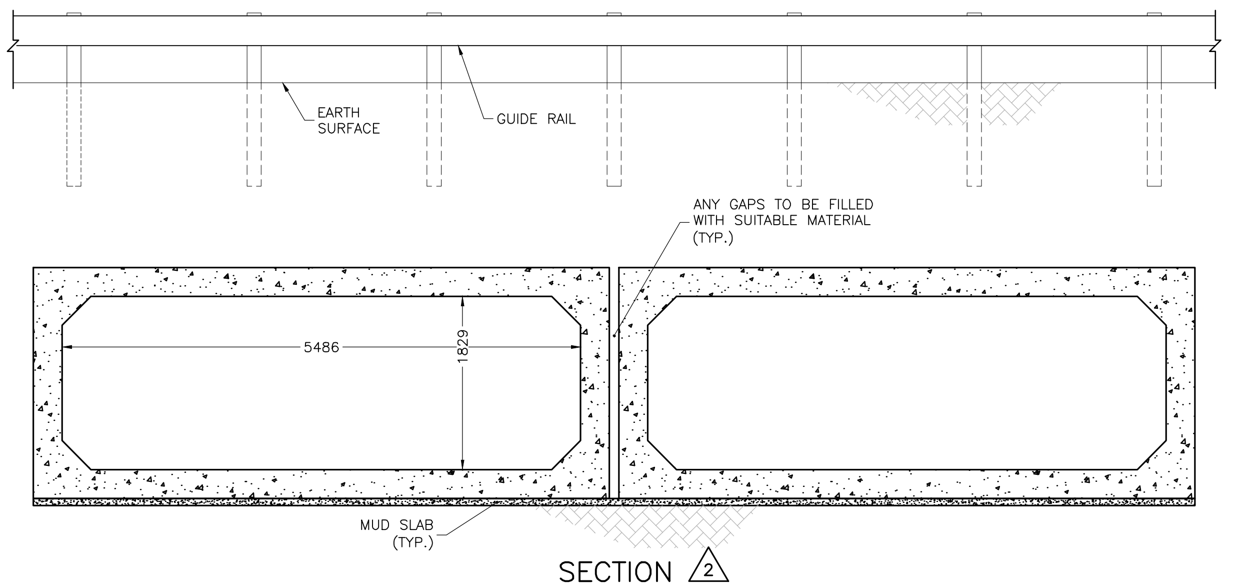


PLAN

SCALE 1:150

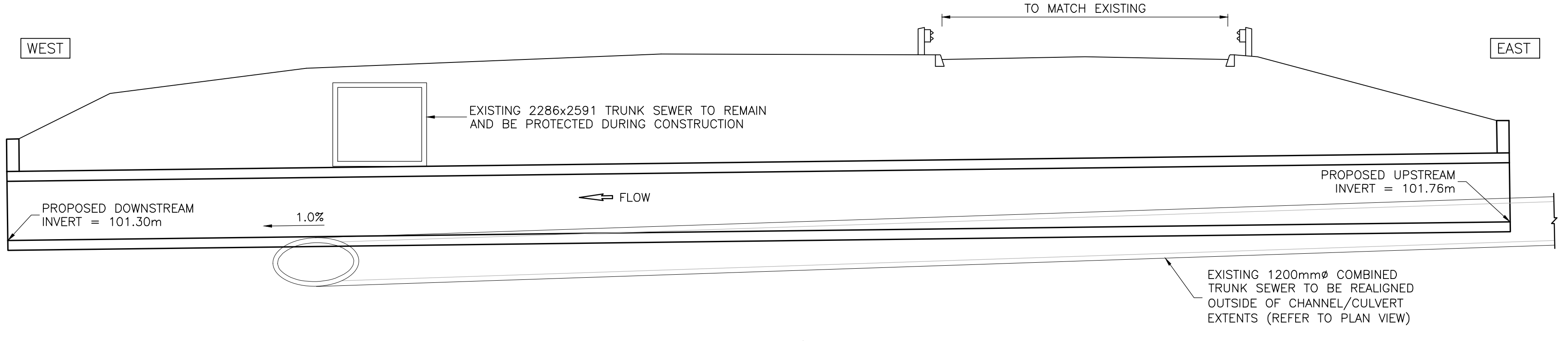


KEY PLAN



SECTION 2

SCALE 1:40



CULVERT SECTION 1

SCALE 1:125

NOTES:

1. DESIGN SHALL CONFORM TO THE CANADIAN HIGHWAY BRIDGE DESIGN CODE, CAN/CSA-S6-14, DESIGN LIVE LOADING IS CL-625-ONT.
2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS OF THE EXISTING AND PROPOSED WORK AND ALL DETAILS ON SITE AND REPORT DISCREPANCIES TO THE CONTRACT ADMINISTRATOR BEFORE PROCEEDING WITH THE WORK.
3. ALL SERVICES ARE TO BE ACCURATELY LOCATED PRIOR TO CONSTRUCTION AND ADEQUATE PROTECTION PROVIDED AT ALL TIMES. ANY INTERFERENCE OF EXISTING SERVICES OR UTILITIES WITH PROPOSED STRUCTURE OR CONSTRUCTION OPERATIONS IS TO BE REPORTED TO THE ENGINEER PRIOR TO THE COMMENCING OF CONSTRUCTION.
4. THE SPECIFIED COMPRESSIVE CONCRETE STRENGTH (AT 28 DAYS) SHALL BE:
   FOR PRECAST UNITS: --MPa CLASS XX
   FOR CAST-IN-PLACE: --MPa CLASS XX
5. CLEAR COVER TO REINFORCING STEEL IN CONCRETE SHALL BE:

   PRECAST CONCRETE

- BOTTOM OF CULVERT TOP SLAB	40mm ±10mm
- REMAINDER	50mm ±10mm

   CAST-IN-PLACE CONCRETE
   - 100mm ±25mm - CONCRETE AGAINST OR PERMANENTLY EXPOSED TO EARTH
   - 70mm ±20mm - REMAINDER, UNLESS OTHERWISE NOTED.
6. DETAIL, BEND, PLACE AND SUPPORT REINFORCING STEEL TO CONFORM TO THE REINFORCING STEEL MANUAL OF STANDARD PRACTICE AND CSA A23.1-09, UNLESS NOTED OTHERWISE.
7. EXPOSED EDGES TO BE CHAMFERED 20x20 EXCEPT AS NOTED.
8. REINFORCING SHALL BE DEFORMED WELDED WIRE FABRIC TO ASTM A497M (Fy=500 MPa.) AND DEFORMED BARS CONFORMING TO CSA STANDARD G30.18-09m, GRADE 400W.
9. CONTRACTOR TO DESIGN, SUPPLY AND INSTALL PRECAST REINFORCED CONCRETE UNITS FOR THE SIZE, DEPTH AND LOADS INDICATED ON THE DRAWINGS, DETAILS FOR HEADER WALLS TO BE AS SHOWN.
10. PROVIDE WATER TIGHT JOINTS BETWEEN ALL PRECAST CONCRETE SEGMENTS AS PER MANUFACTURER SPECIFICATIONS.
11. DIMENSIONS AND ELEVATION SHOWN TO EXISTING CONDITIONS ARE TO BE FIELD VERIFIED.
12. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER STRUCTURAL DETAIL DRAWINGS.
13. SOIL BEARING CAPACITY:

SERVICEABILITY LIMIT STATE:	- KPa (UNFACTORED)
ULTIMATE LIMIT STATE	- KPa (FACTORED)

    THE GEOTECHNICAL ENGINEER TO VERIFY THIS REQUIREMENT PRIOR TO PLACING BOX CULVERT AND CONCRETE.
14. DO NOT SCALE THESE DRAWINGS.

CONSTRUCTION NOTES:

1. BACKFILL SHALL BE PLACED SIMULTANEOUSLY BEHIND BOTH SIDES OF CULVERT KEEPING THE HEIGHT OF THE BACKFILL APPROXIMATELY THE SAME. AT NO TIME SHALL THE DIFFERENCE IN ELEVATION BE GREATER THAN 500mm.
2. THE SUB-BASE SHALL BE FREE FROM FROZEN MATERIAL AND SHALL BE COMPACTED TO SPECIFICATIONS. FROZEN AND SOFTENED MATERIALS SHALL BE REMOVED AND REPLACED WITH SUITABLE COMPACTED MATERIALS. OBTAIN ACCEPTANCE REGARDING SUB-BASE MATERIAL AND COMPACTION FROM THE OWNER'S REPRESENTATIVE PRIOR TO PLACING CONCRETE.

No	Date	Drawn	Appr'd	Revisions
1	XX-XX-XX	XX	XX	CONCEPTUAL

APPROVALS

Design	DS	Checked	NT
Drawn	PK	Checked	DS

Scale
AS SHOWN

Date
MARCH 2020

PRELIMINARY
NOT TO BE USED
FOR CONSTRUCTION

FLOOD REMEDIATION AND
TRANSPORTATION FEASIBILITY
STUDY OF ROCKCLIFFE
SPECIAL POLICY AREA
TRCA

SYMES ROAD & LAVENDER
CREEK - STRUCTURE 898
GENERAL ARRANGEMENT

wood.

Contract No.

Consultant File No.
TPB198079

Drawing No.
SHEET S01 OF

SYMES ROAD CULVERT CROSSING

COST ESTIMATES

ITEM NO.	DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	AMOUNT
1	Concrete Removal - Full Depth (existing culvert)	LS	1	$ 75,000.00	$ 75,000.00
2	New Twin-5.5m x 1.8m Culvert Structure (cost includes excavations and backfill)	m^2	780	$ 3,000.00	$ 2,340,000.00
3	Miscellaneous (i.e. traffic control, dewatering, access & protection, etc.) - 15% of above	LS	1	$ 362,250.00	$ 362,250.00
				SUBTOTAL	$ 2,777,250.00
				CONTINGENCY (20%)	$ 555,450.00
				TOTAL	$ 3,332,700.00
				HST (13%)	$ 433,251.00
				TOTAL AMOUNT OF TENDER	$ 3,765,951.00

CONCEPTUAL DESIGN REPORT
Symes Road Private Crossing Bridge
Structure No. 709

Agreement RFP #10009033

Prepared for:
Toronto and Region Conservation Authority
101 Exchange Avenue, Vaughan, Ontario, L4K 5R6

Prepared by:
Wood Environment & Infrastructure Solutions
3450 Harvester Road
Burlington ON L7N 3W5

July 2020

Symes Road Private Crossing Bridge, Structure No. 709

Conceptual Design Report

Wood Project No. TPB198079, TRCA

Prepared for:

Toronto and Region Conservation Authority

101 Exchange Avenue, Vaughan, Ontario, L4K 5R6

Prepared by:

Wood Environment & Infrastructure Solutions
a Division of Wood Canada Limited
3450 Harvester Road, Suite 100
Burlington, ON L7N 3W5 Canada
T: 905-335-2353

July 2020

Copyright and non-disclosure notice

The contents and layout of this report are subject to copyright owned by Wood (© Wood Environment & Infrastructure Solutions a Division of Wood Canada Limited). save to the extent that copyright has been legally assigned by us to another party or is used by Wood under license. To the extent that we own the copyright in this report, it may not be copied or used without our prior written agreement for any purpose other than the purpose indicated in this report. The methodology (if any) contained in this report is provided to you in confidence and must not be disclosed or copied to third parties without the prior written agreement of Wood. Disclosure of that information may constitute an actionable breach of confidence or may otherwise prejudice our commercial interests. Any third party who obtains access to this report by any means will, in any event, be subject to the Third Party Disclaimer set out below.

Third-party disclaimer

Any disclosure of this report to a third party is subject to this disclaimer. The report was prepared by Wood at the instruction of, and for use by, our client named on the front of the report. It does not in any way constitute advice to any third party who is able to access it by any means. Wood excludes to the fullest extent lawfully permitted all liability whatsoever for any loss or damage howsoever arising from reliance on the contents of this report. We do not however exclude our liability (if any) for personal injury or death resulting from our negligence, for fraud or any other matter in relation to which we cannot legally exclude liability.

Table of Contents

List of Figures

1.0 Project Overview

1.1 Introduction

The Toronto and Region Conservation Authority (TRCA) retained Wood Environment & Infrastructure Solutions (Wood) to provide "Consulting Engineering Services to Undertake a Flood Remediation and Transportation Feasibility Study of the Rockcliffe Special Policy Area (SPA) in the City of Toronto". This assignment includes the replacement of the existing Symes Road Private Crossing Bridge over Lavender Creek (Structure No. 709) for which the conceptual design of the replacement is to be completed.

The purpose of this Conceptual Design Report is to describe the current condition of the structure and provide recommendations for the replacement of the structure.

1.2 Key Plan

Figure 1: Key Plan of Symes Road Private Crossing Bridge Over Lavender Creek, Structure No. 709

1.3 Background Information

The following background information has been provided by the Ministry:

- Original Construction Drawings, prepared by Township of York Department of Works, dated February 1954
- OSIM Structure Inspection Report, dated August 23, 2017

2.0 Existing Conditions

2.1 Existing Structure

The existing bridge along the Lavender Creek is a 13.4m wide reinforced concrete T-beam bridge with a 4.8m span and is located off Symes Road, approximately 25m north of the Orman Avenue intersection. The bridge provides access to the nearby private business ('Bothwell Accurate') on the West side. The bridge spans east-west with flows along the Lavender Creek travelling south-north.

As part of provincial requirements, any structures carrying public traffic and meeting the criteria of the Ontario Structure Inspection Manual (OSIM) require bi-ennial inspections. The latest OSIM inspection for this structure (2017) found that the structure is generally in good condition with a Bridge Condition Index (BCI) of 68.15. The BCI is a value developed by the Ministry of Transportation of Ontario (MTO) to provide an indication of the overall condition of the structure. In general, a BCI of 70-100 equates to a good condition rating, 60-70 equates to a fair condition rating, and 60 or less equates to a poor condition rating.

Photographs of the structure taken on July 24, 2019 during the site visit are attached.

3.0 Proposed Replacement

The new Symes Road Bridge providing access to the private commercial business at the North end of Symes Road will be a 20m single-span structure with side-by-side prestressed concrete box girders. The side-by-side girders will be used here to minimize the vertical depth of the structure and therefore improve hydraulic properties at the crossing. The lengthening of the structure will primarily occur on the private property side once enough land has been purchased.

The roadway cross-section will be reconstructed to match existing conditions with one lane for Eastbound traffic and one lane for Westbound traffic. The overall width of the proposed bridge will be similar to the existing bridge.

The construction will be carried with full road closure. Access for the commercial business will only be possible from the West side through Rockcliffe Boulevard.

A General Arrangement drawing is attached for your reference.

4.0 Construction Staging & Traffic Control

For the replacement of the Symes Road Bridge, it is anticipated that full closure of the roadway will be utilized. The work would be completed in eight (8) weeks .

It is anticipated that the work would be completed as follows:

- Mobilize and install traffic control measures to close down access to the bridge;
- Excavate and remove existing bridge;

- Construct substructure elements including piles and abutments and backfill;
- Construct wingwalls/retaining walls along the channel as required;
- Install superstructure elements;
- Construct deck, approach slabs, and curbs;
- Construct barrier system;
- Install waterproofing and wearing surface; and
- Remove traffic control measures and demobilize.

5.0 Estimated Construction Cost & Duration

5.1 Estimated Construction Cost

The estimated construction cost for the proposed works is approximately **$2,069,280.00**. This includes a 20% contingency. A cost breakdown is attached.

5.2 Estimated Construction Duration

The total estimated construction duration is approximately one construction season over the course of eight weeks.

6.0 Miscellaneous

6.1 Design Codes

The design of the rehabilitation works will be undertaken in accordance with CSA S6-19, the Canadian Highway Bridge Design Code (CHBDC) as well as all other current directives and standards.

6.2 Access to Site

The site is readily accessible from the lanes of Symes Road. Work along the West side will require access through the private property.

7.0 Closure

We trust that this report is adequate for your purposes. If you have any questions or concerns, please feel free to contact the undersigned at your convenience.

Respectfully submitted by:

Wood Environment & Infrastructure Solutions
A Division of Wood Canada Limited

Report prepared by:

Dante Shawil

Dante Shawil, EIT
Structural Designer

Report reviewed by:

NTheodor.

Nicolas Theodor, P.Eng.
Senior Associate Bridge Engineer

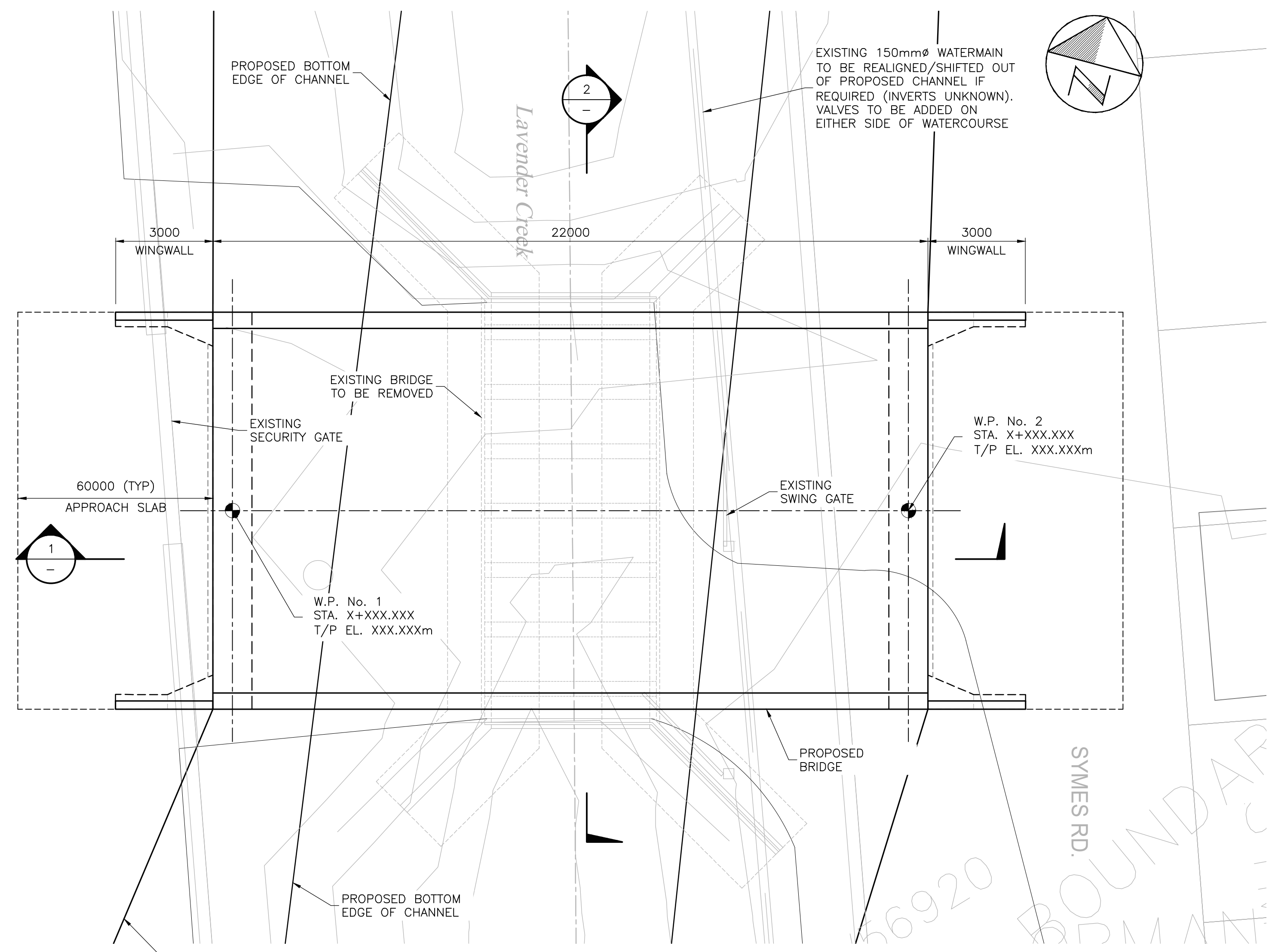
Figure 1: North Elevation

Figure 2: South Elevation

Figure 3: Downstream Channel

Figure 4: Upstream Channel

Figure 5: Wearing Surface



PLAN
SCALE 1:100

GENERAL NOTES:

1. CLASS OF CONCRETE:
   ALL .... 30 MPa.
   PRECAST CONCRETE GIRDERS .... 50 MPa.
   UNLESS OTHERWISE SPECIFIED.
2. CLEAR COVER TO REINFORCING STEEL:
   DECK : TOP .... 70±20
   BOTTOM .... 40±10
   FOOTING : .... 100±25
   REMAINDER : .... 70±20
   UNLESS OTHERWISE SPECIFIED.
3. REINFORCING STEEL:
   - REINFORCING STEEL SHALL BE GRADE 400W UNLESS OTHERWISE SPECIFIED.
   - STAINLESS REINFORCING STEEL SHALL BE TYPE 316LN, OR DUPLEX 2205 AND HAVE A MINIMUM YIELD STRENGTH OF 500 MPa. UNLESS OTHERWISE SPECIFIED.
     BAR MARKS WITH PREFIX 'S' DENOTE STAINLESS STEEL BARS.
   - TENSION LAP LENGTHS NOT INDICATED ON THE CONTRACT DRAWINGS SHALL BE CLASS B.
   - GLASS FIBER REINFORCED POLYMER REINFORCING BARS SHALL BE GRADE III AS SPECIFIED IN THE CONTRACT DRAWINGS. THE NOMINAL DIAMETER, TENSILE MODULUS OF ELASTICITY AND AND GUARANTEED MINIMUM TENSILE STRENGTH SHALL BE AS SPECIFIED IN THE CONTRACT DOCUMENTS.
     - BAR MARKS WITH A PREFIX GIII DENOTES GRADE III GLASS FIBRE REINFORCED POLYMER BARS.
   - BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS USING MINIMUM BEND DIAMETERS, WHILE STIRRUPS AND TIES SHALL HAVE MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL STANDARD DRAWING SS12–1 UNLESS INDICATED OTHERWISE.
4. ROADWAY PROTECTION SYSTEMS SHALL BE DESIGNED FOR PERFORMANCE LEVEL 2.

CONSTRUCTION NOTES

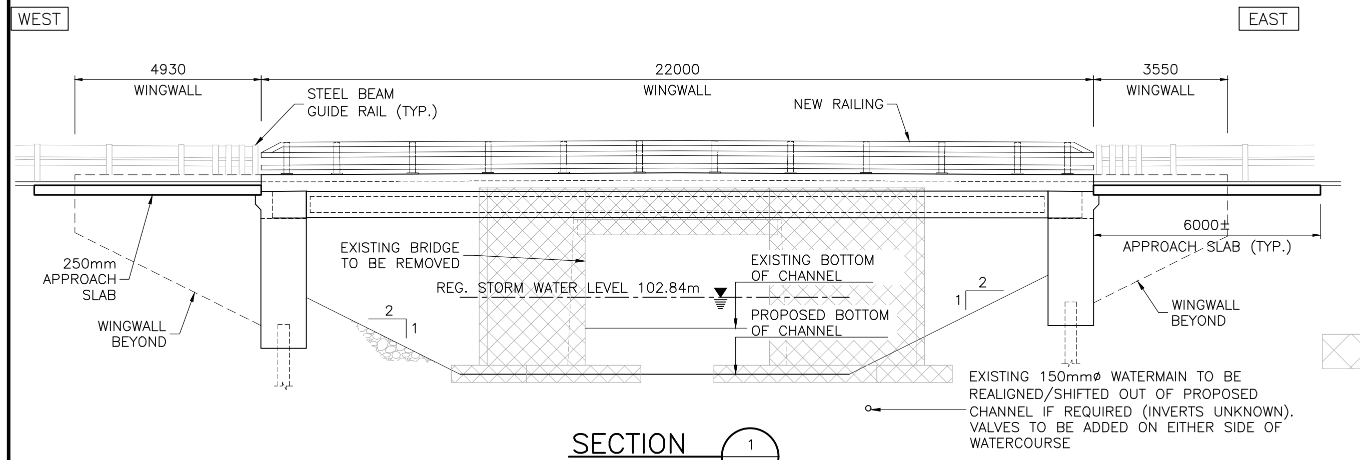
1. NO BACKFILL SHALL BE PLACED UNTIL CONCRETE IN THE DECK HAS REACHED A STRENGTH OF 25 MPa.
2. BACKFILL SHALL BE PLACED SIMULTANEOUSLY BEHIND BOTH ABUTMENTS, KEEPING THE HEIGHT OF THE BACKFILL APPROXIMATELY THE SAME. AT NO TIME SHALL THE DIFFERENCE IN ELEVATION BE GREATER THAN 500mm.
3. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, DETAILS, AND ELEVATIONS OF THE EXISTING STRUCTURE ON SITE, THAT ARE RELEVANT TO THE WORK SHOWN ON THE DRAWINGS PRIOR TO COMMENCEMENT OF WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE CONTRACT ADMINISTRATOR PRIOR TO PROCEEDING WITH THE WORK. PROPOSED ADJUSTMENT OF THE WORK REQUIRED TO MATCH THE EXISTING STRUCTURE SHALL BE SUBMITTED FOR APPROVAL.

LIST OF DRAWINGS:

S1. GENERAL ARRANGEMENT

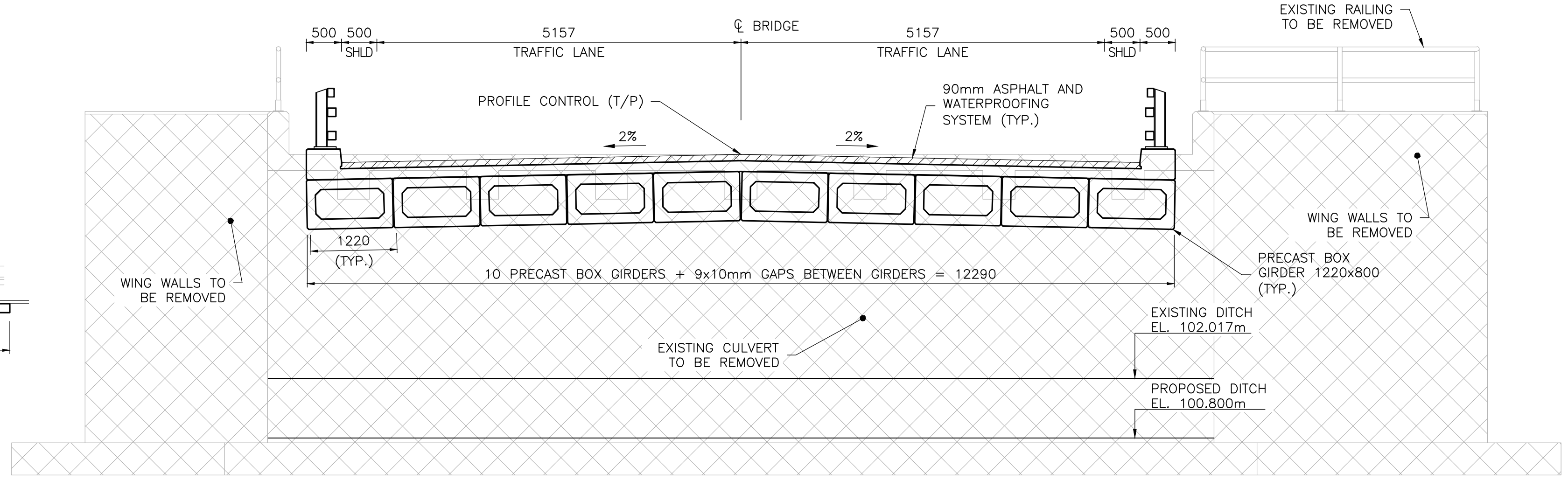
APPLICABLE STANDARD DRAWINGS

KEY PLAN



SECTION 1 –
SCALE 1:100

REG. STORM WATER LEVEL 102.28m



SECTION 2 –
SCALE 1:50

No	Date	Drawn	Appr'd	Revisions
1	2020-03	PK	DS	CONCEPTUAL DESIGN

APPROVALS

Design	DS	Checked	DS
Drawn	PK	Checked	DS

Scale
AS SHOWN

Date
MARCH 2020

PRELIMINARY
NOT TO BE USED
FOR CONSTRUCTION

FLOOD REMEDIATION AND
TRANSPORTATION FEASIBILITY
STUDY OF ROCKCLIFFE
SPECIAL POLICY AREA
TRCA

SYMES ROAD & LAVENDER CREEK - STRUCTURE 709 GENERAL ARRANGEMENT

wood.

Contract No.

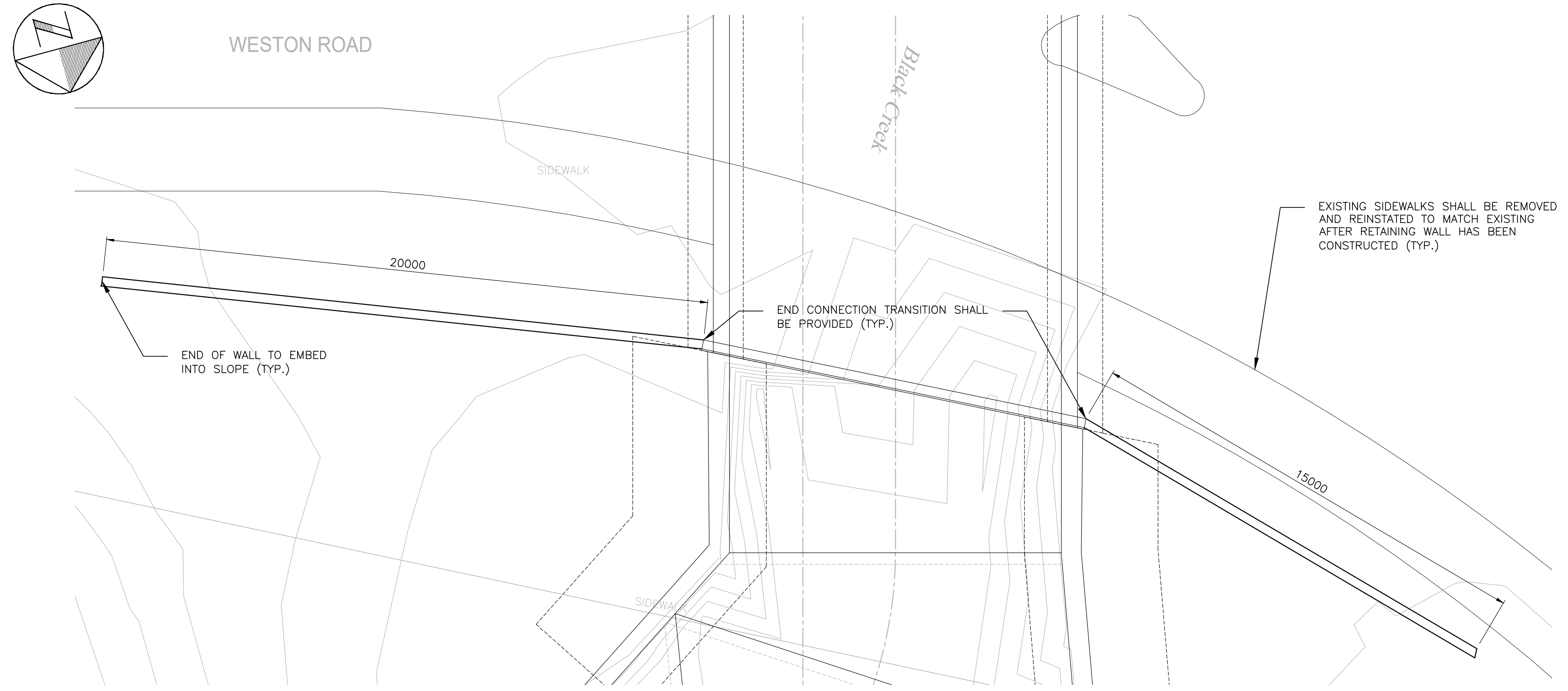
Consultant File No.
TPB198079

Drawing No.
SHEET S01 OF

SYMES PRIVATE CROSSING

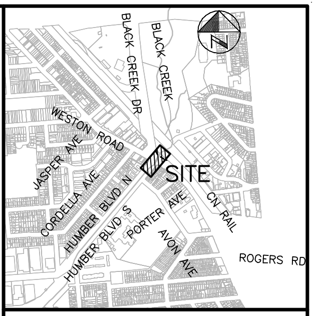
COST ESTIMATES

ITEM NO.	DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	AMOUNT
1	Concrete Removal - Full Depth (existing culvert)	LS	1	$ 150,000.00	$ 150,000.00
2	New 22m x 13m Structure (cost includes excavations and backfill)	m^2	286	$ 4,500.00	$ 1,287,000.00
3	Miscellaneous (i.e. traffic control, dewatering, access & protection, etc.) - 20% of above	LS	1	$ 287,400.00	$ 287,400.00
				SUBTOTAL	$ 1,724,400.00
				CONTINGENCY (20%)	$ 344,880.00
				TOTAL	$ 2,069,280.00
				HST (13%)	$ 269,006.40
				TOTAL AMOUNT OF TENDER	$ 2,338,286.40

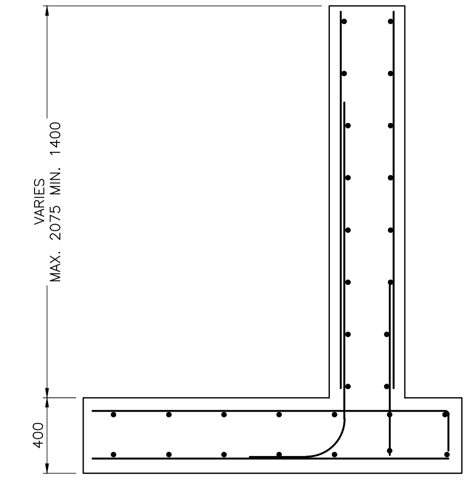


PLAN

SCALE 1:200

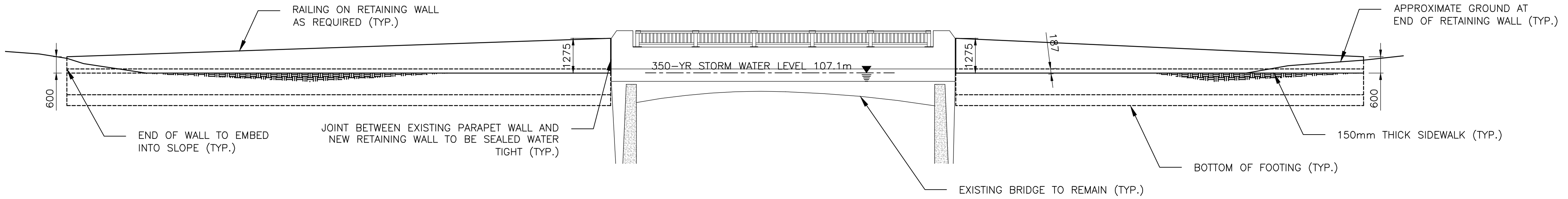


KEY PLAN



TYPICAL SECTION OF RETAINING WALL

SCALE 1:50



NORTH ELEVATION VIEW

SCALE 1:200

NOTES:

1. DESIGN SHALL CONFORM TO THE CANADIAN HIGHWAY BRIDGE DESIGN CODE, CAN/CSA-S6-19.
2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS OF THE EXISTING AND PROPOSED WORK AND ALL DETAILS ON SITE AND REPORT DISCREPANCIES TO THE CONTRACT ADMINISTRATOR BEFORE PROCEEDING WITH THE WORK.
3. ALL SERVICES ARE TO BE ACCURATELY LOCATED PRIOR TO CONSTRUCTION AND ADEQUATE PROTECTION PROVIDED AT ALL TIMES. ANY INTERFERENCE OF EXISTING SERVICES OR UTILITIES WITH PROPOSED STRUCTURE OR CONSTRUCTION OPERATIONS IS TO BE REPORTED TO THE ENGINEER PRIOR TO THE COMMENCING OF CONSTRUCTION.
4. THE SPECIFIED COMPRESSIVE CONCRETE STRENGTH (AT 28 DAYS) SHALL BE:
   FOR CAST-IN-PLACE: --MPa CLASS XX
5. REINFORCING SHALL BE EITHER STAINLESS STEEL (TYPE 316 LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500 MPa OR GLASS FIBRE REINFORCED POLYMER (GFRP) GRADE III WITH A NOMINAL CROSS SECTIONAL AREA ACCORDING TO CAN/CSA S-807.
6. CLEAR COVER TO REINFORCING STEEL IN CONCRETE SHALL BE:
   CAST-IN-PLACE CONCRETE
   - 100mm ±25mm - CONCRETE AGAINST OR PERMANENTLY EXPOSED TO EARTH
   - 70mm ±20mm - REMAINDER, UNLESS OTHERWISE NOTED.
7. DETAIL, BEND, PLACE AND SUPPORT REINFORCING STEEL TO CONFORM TO THE REINFORCING STEEL MANUAL OF STANDARD PRACTICE AND CSA A23.1-09, UNLESS NOTED OTHERWISE.
8. EXPOSED EDGES TO BE CHAMFERED 20x20 EXCEPT AS NOTED.
9. DIMENSIONS AND ELEVATION SHOWN TO EXISTING CONDITIONS ARE TO BE FIELD VERIFIED.
10. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER STRUCTURAL DETAIL DRAWINGS.
11. SOIL BEARING CAPACITY:
    SERVICEABILITY LIMIT STATE: - KPa (UNFACTORED)
    ULTIMATE LIMIT STATE - KPa (FACTORED)

    THE GEOTECHNICAL ENGINEER TO VERIFY THIS REQUIREMENT PRIOR TO PLACING BOX CULVERT AND CONCRETE.
12. DO NOT SCALE THESE DRAWINGS.

CONSTRUCTION NOTES:

1. THE SUB-BASE SHALL BE FREE FROM FROZEN MATERIAL AND SHALL BE COMPACTED TO SPECIFICATIONS. FROZEN AND SOFTENED MATERIALS SHALL BE REMOVED AND REPLACED WITH SUITABLE COMPACTED MATERIALS. OBTAIN ACCEPTANCE REGARDING SUB-BASE MATERIAL AND COMPACTION FROM THE OWNER'S REPRESENTATIVE PRIOR TO PLACING CONCRETE.

No	Date	Drawn	Appr'd	Revisions
1	2020-03	MEM	DS	CONCEPTUAL DESIGN

APPROVALS

Design	DS	Checked	NT
Drawn	MEM	Checked	DS

Scale
AS SHOWN

Date
MARCH 2020

PRELIMINARY
NOT TO BE USED
FOR CONSTRUCTION

FLOOD REMEDIATION AND
TRANSPORTATION FEASIBILITY
STUDY OF ROCKCLIFFE
SPECIAL POLICY AREA
TRCA

WESTON ROAD & BLACK
CREEK - STRUCTURE 092
GENERAL ARRANGEMENT

wood.

Contract No.

Consultant File No.
TPB198079

Drawing No.
SHEET S01 OF

Plotted: 2020-07-21 Plotted By: dante.shawil
Last Saved: 2020-05-08 Last Saved By: peter.kiriakos

Path: P:\2019\Projects\TPB198079 - Black Creek At Rockcliffe SPA Flood Remediation\06_DES-ENG\01_CAD\02_DWGS\03_STRUC\02_CONT\Weston - 092\TPB198079 - Weston Road Bridge (#092) - Conceptual Drc

Appendix I

Geotechnical Investigation Report

Preliminary Geotechnical Investigation Report: Flood Remediation & Transportation Study

Black Creek at Rockcliffe Special Policy Area

Toronto, Ontario
TPB197079.3.5

Prepared for:

Toronto and Region Conservation Authority

Attn: Mr. Nick Lorrain Senior Manager Capital Projects

101 Exchange Avenue
Vaughan, Ontario, L4K 5R6

Preliminary Geotechnical Investigation Report

Flood Remediation & Transportation Study
Black Creek at Rockcliffe Special Policy Area
TPB197079.3.5

Prepared for:

Toronto and Region Conservation Authority, Development & Engineering Services
ATTN: Mr. Nick Lorrain, Senior Manager Capital Projects
101 Exchange Avenue, Vaughan, ON, L4K 5R6

Prepared by:

Wood Environment & Infrastructure Solutions,
a Division of Wood Canada Limited
3450 Harvester Road, Suite 100
Burlington, ON
L7N 3W5
T: 905-335-2353

April 14, 2020

Copyright and non-disclosure notice

Third-party disclaimer

PART A

GEOTECHNICAL INVESTIGATION

SECTIONS 1 to 5

PART B

DESIGN RECOMMENDATIONS

SECTIONS 6 TO 9

TABLE OF CONTENTS

SECTION **PAGE**

FIGURES

APPENDICES

1 AUTHORITY

Wood Environment & Infrastructure Solutions, a division of Wood Limited ("Wood") has carried out a Preliminary Geotechnical Investigation for the Rockcliffe Special Policy area along the Black Creek valley corridor between Scarlett Road and Weston Road in Toronto, Ontario as shown in Figure 1. Authorization to proceed with the geotechnical was received from the Toronto and Region Conservation Authority by way of a Consultant Agreement Contract Number 10009033 dated May 24, 2019 along with subsequent change orders 1 and 3 dated September 10 and October 2, 2019, respectively.

2 INTRODUCTION

The purpose of the geotechnical investigation is to determine the soil and groundwater conditions and to provide design and construction recommendations for the possible replacement of 7 bridges spanning over Black Creek, 2 Symes Road box culverts over Lavender Creek and the construction of a series of 3 flood protection berms within Rockcliffe Special Policy area. Subsequently, as the overall flood protection analysis progressed the geotechnical scope of work was revised to consist of replacing the bridges at Jane Street, Rockcliffe Boulevard and the two Symes Road box culverts. A flood protection retaining wall will be constructed at Weston Road allowing the existing bridge to remain. The Rockcliffe Boulevard, Symes Road and Hilldale Road flood protection berm systems within the Rockcliffe Special Policy area have also been subsequently removed as viable flood protection options.

The following sections give a brief description of the existing site conditions, proposed development, geological setting and terms of reference.

2.1 BACKGROUND

A desk top study was performed to identify soil conditions along the study area and develop the subsurface investigation and is summarized in the following paragraphs.

Flood protection berm area located east of Scarlett Road within Symthe Park

Ontario Geological Survey Borehole ID 642757 located at the toe of the slope within Symthe Park had encountered loose sand, silt, clay, gravel, organics extending to 4.3m below existing grade (geodetic elevation of 91.4m) underlain by soft silt, clay extending to 7.0m below existing grade (geodetic elevation of 88.7m) followed by hard clay, silt, sand and gravel extending to the borehole termination depth of 9.1m below existing grade (geodetic elevation of 86.6m).

Jane Street bridge area

Ontario Geological Survey Borehole ID 644508 located within Symthe Park, south of Black Creek had encountered loose sand, silt, clay, gravel, organics extending to 3.4m below existing grade (geodetic elevation of 96.2m) underlain by compact gravel, sand, silt, shells, clay extending to 10.7m below existing grade (geodetic elevation of 88.9m), followed by a thin layer of an unknown stiff material to a soft clay, silt, gravel extending to a depth of 14.3m below existing grade (geodetic elevation of 85.3m), followed by dense silt, clay extending to a depth of 17.4m below existing grade (geodetic elevation of 82.2m), followed by hard till sand extending to the borehole termination depth of 18.3m below existing grade (geodetic elevation of 81.3m).

It is understood that the existing structure is supported by steel piles likely extended several metres into the dense / hard soils encountered at 17.4m below existing grade.

Rockcliffe Boulevard bridge area

Ontario Geological Survey Borehole ID 643861 located within Symthe Park and west of Rockcliffe Boulevard encountered loose to dense fill extending to 2.4m below existing grade (geodetic elevation of 96.8m) underlain by dense sand, silt, clay extending to 7.0m below existing grade (geodetic elevation of 92.2m), followed by silt, sand of unknown consistency extending to 13.1m below grade (geodetic elevation of 86.1m), followed by a 1.5m thick seam of firm clay, silt, gravel followed by dense sand gravel clay till extending from 14.6m below existing grade to the borehole termination depth of 18.6m below existing grade (geodetic elevation of 80.6m).

It is understood that the existing Rockcliffe Blvd. bridge structure is supported by piles likely extended several metres into the dense soils encountered at 14.6m below existing grade.

Rockcliffe Court, Symes & Hilldale Road areas

Ontario Geological Survey Borehole ID 646649 located Hilldale Court east of Symes Road encountered 0.9m of material described as soil underlain by sand, silt extending to 2.4m below existing grade (geodetic elevation of 101.6m) underlain by silt, organic material extending to 4.0m below existing grade (geodetic elevation of 100.0m), followed by silt extending to the borehole termination depth of 7.6m below existing grade (geodetic elevation of 96.4m). Soil consistencies were not available.

Alliance Avenue, Hilldale Road and Louvain Street areas

Ontario Geological Survey Borehole ID 646664 located along Humber Boulevard South and east of Hilldale Road encountered sand, silt organics of unknown consistency extending to 3.4m below existing grade (geodetic elevation of 111.5m) underlain by sand, gravel, silt, clay of unknown consistency extending to 7.3m below existing grade (geodetic elevation of 107.6m), followed by dense sand, clay, silt extending to 13.4m below grade (geodetic elevation of 101.5m), followed by dense sand extending to the borehole termination depth of 15.5m below existing grade (geodetic elevation of 99.4m).

Weston Road bridge area

MTO -Northwest Metro Arterial Borehole 1 located near the southeast corner of Weston Road and Black Creek Drive had encountered fill extending to 2.1m below existing grade (geodetic elevation of 102.9m) generally underlain by very stiff to hard clayey silt extending to 19.5m below existing grade (geodetic elevation of 85.5m), followed by compact sand extending to 20.1m below grade (geodetic elevation of 84.9m), followed by dense glacial till extending to the borehole termination depth of 21.8m below existing grade (geodetic elevation of 83.2m).

2.2 TERMS OF REFERENCE

The findings of the preliminary investigation, together with Wood's comments and recommendations, are presented in this report. The anticipated construction conditions are also discussed but only to the extent that they may influence the design decisions. Any construction methods discussed express Wood's opinions only and are not intended to direct contractors on how to carry out the construction. Contractors should also be aware that the data and the interpretation presented in this report may not be sufficient to assess all the factors that may have an effect on construction.

This report was prepared with the assumption that the design will be in accordance with applicable standards and codes, regulations of authorities having jurisdiction, and good engineering practices.

Further, the recommendations and opinions expressed in this report are only applicable to the proposed project as described above.

There should also be an ongoing liaison with Wood during both the design and construction phases of the project to ensure that the recommendations in this report have been interpreted and implemented correctly. Also, if any further clarification and/or elaboration are needed concerning the geotechnical aspects of this project, Wood should be contacted immediately.

2.3 SITE GEOLOGY

According to the Surficial Geology of Southern Ontario, provided by the Ontario Geological Survey (MRD128 published 2010), surficial soils in the project area consist of coarse-textured glaciolacustrine deposits (sand, gravel, minor silt and clay) with modern alluvial deposits (clay, silt, gravel, and may contain organics) along Black Creek from Scarlett Road to Hilldale Road.

A review of the Paleozoic Geology of Southern Ontario provided by the Ontario Geological Survey (MRD219, published 2007) indicates the presence of shale and limestone bedrock of the Georgian Bay Formation within the project limits.

3 METHODOLOGY

3.1 GEOTECHNICAL INVESTIGATION

The preliminary geotechnical investigation comprised a drilling investigation, laboratory testing of samples recovered and the engineering interpretation of these results according to current practice, standards, and background knowledge.

3.1.1 Field Work

Wood retained Geo-Environmental Drilling Inc. and Davis Drilling Inc. to complete the drilling activities at the Site.

Twenty (20) boreholes were drilled at the sites from September 9 to October 8, 2019 under supervision of qualified Wood field staff. The boreholes were drilled using CME 75 truck mounted drill rigs designed for soil sampling purposes and outfitted with hollow stem augers. Samples were obtained through the overburden soil, by driving a standard split spoon-sampling device in accordance with the requirements of the Standard Penetration Resistance Test (ASTM D1586) including thin wall sampling (ASTM D1587) of soil, as required. At the Client's request all excess soil cuttings and drilling mud was placed in containers and subsequently removed from the sites by Provincial Environmental Services.

Upon recovery, all samples were examined and placed in appropriate containers. The fieldwork was supervised by experienced Wood personnel, who also performed preliminary sample identification, and prepared field borehole logs.

The borehole locations were determined in consultation with the Client. Wood personnel laid out the borehole locations in the field, as closely as possible to the specified locations, however, locations were repositioned if underground municipal services and over-head hydro lines were not in a safe working distance from the proposed locations.

The ground surface elevations and the location of each borehole were extrapolated from Lidar data.

The borehole locations, surface elevations and depths are summarized in Table 3.1 below.

Table 3.1: Borehole Locations, Surface Elevations, Depths

Borehole	**Borehole Location**		**Surface Geodetic Elevation (m)**	**Drill Depth (m) Proposed/Actual**	**Comments**
	Northing	**Easting**			
FLOOD PROTECTION BERM NORTH SIDE OF BLACK CREEK AND EAST OF SCARLETT ROAD					
1	4836768	620622	99.4	15.0/15.8	Possible Flood Protection Berm
2	4836794	620768	98.2	8.0/8.2	Possible Flood Protection Berm
3	4836867	620800	104.0	15.0/14.3	Possible Flood Protection Berm
3A	4836867	620800	104.0	5.2/5.2	Possible Flood Protection Berm
Jane Street Bridge Replacement					
4	4836853	621339	115.3	30.0/31.1	
5	4836962	621255	106.8	30.0/30.6	
Rockcliffe Boulevard Bridge Replacement					
6	4836945	621803	102.3	30.0/29.0	
7	4836910	621819	102.2	30.0/30.5	
Flood Protection Berm along Rockcliffe Blvd and Rockcliffe Court					
8	4836868	621791	104.0	5.0/5.2	No longer a viable flood protection option
9	4836835	622263	105.7	5.0/5.2	No longer a viable flood protection option
10	4836725	621889	100.0	5.0/8.2	No longer a viable flood protection option
LAVENDER CREEK BRIDGE REPLACEMENT					
11	4836800	622413	105.9	5.0/8.2	Extent of investigation insufficient for design change from culvert to bridge deep foundation design
12	4836932	622358	104.4	5.0/8.2	
Possible Flood Protection Berm along Lavender Creek					
13	4837127	622271	102.9	5.0/5.2	No longer a viable flood protection option
ALLIANCE AVENUE AND HILLDALE ROAD BRIDGE REPLACEMENTS					
14	4837315	622258	104.8	30.0/31.1	No longer a viable flood protection option
15	4837274	622290	104.7	30.0/43.3	No longer a viable flood protection option
16	4837265	622255	104.7	30.0/31.1	No longer a viable flood protection option

Borehole	Borehole Location		Surface Geodetic Elevation (m)	Drill Depth (m) Proposed/Actual	Comments
	Northing	Easting			
Louvain Street Pedestrian Bridge Replacement					
17	4837533	622356	103.9	15.0/15.8	No longer a viable flood protection option
18	4837510	622367	104.0	15.0/15.8	No longer a viable flood protection option
Weston Road Bridge Replacement					
19	4837776	622497	104.7	30.0/31.1	No longer a viable flood protection option. Flood protection retaining wall only.
20	4837851	622503	106.9	30.0/31.1	

The inferred stratigraphy, results of Standard Penetration Resistance testing ("N" values), groundwater conditions, and the results of laboratory moisture content testing performed on all overburden samples, are presented on the Records of Borehole Logs included in Appendix A.

Groundwater conditions were monitored during drilling of each borehole.

Upon completion of drilling, groundwater monitoring wells were installed in Boreholes 3 and 20, and all other boreholes were backfilled with bentonite in accordance with Ontario Ministry of Environment ("MOE") Regulation 903, as amended.

3.2.1 Laboratory Tests

Following the field investigation, soil samples were returned to the Wood Burlington laboratory for further classification and grain size/hydrometer analysis of 32 selected samples, Atterberg limit testing of 12 selected samples, corrosivity testing of 6 selected samples and consolidation analysis of 1 sample. The results of this testing are included in Appendix B.

4 GENERAL SUBSURFACE CONDITONS

For a description of the preliminary soils and groundwater conditions encountered each of the site specific borehole locations during this investigation, reference should be made to the Record of Borehole Logs in Appendix A.

In general, the study area consists of following stratigraphic units (in order from surface): (1) Topsoil/asphalt, (2) Peat, (3) Common Fill, (4) Sandy silt to silt (possible alluvial or Shallow water deposit), and (5) Stiff to hard silty clay to clayey silt. Underlying this overburden stratigraphy is bedrock shale.

The following soil descriptions are given in order to enhance the understanding of the recorded data.

4.1 POSSIBLE FLOOD PROTECTION BERM NORTH SIDE OF BLACK CREEK AND EAST OF SCARLETT ROAD

Boreholes 1, 2, 3 and 3A

Topsoil

Boreholes 1, 2 and 3 encountered a surficial deposit of topsoil ranging from 150 mm to 200 mm in thickness.

Fill

Underlying the topsoil in Boreholes 1, 2 and 3, a fill deposit was encountered, which extended from 2.3 m below existing grade in Borehole 2 to 7.2 m and below existing grade in Borehole 1. The fill materials encountered in Borehole 1 were extended to a depth of 3.0 m below existing grade. The fills In Boreholes 2 and 3 generally consisted of silty sand with trace to some gravel as well as trace organics and rootlets in Boreholes 1 and 3. Standard Penetration Test (SPT) carried out within the silty sand fill deposit gave 'N' values ranging from 2 to 13 blows for 300 mm of penetration indicating loose to compact states. The moisture contents ranged from 3% to 20%.

The fill encountered underlying the silty sand fill in Borehole 1 generally consisted of silty clay with some sand, gravel and trace plastic fragments which extended to 7.2 m below grade. SPT tests carried out within the silty clay fill gave 'N' values ranging from 37 blows for 300 mm to 50 blows for 130 mm of penetration indicating a hard consistency. The moisture contents ranged from 2% to 4%.

Peat

The fill in Borehole 2 was underlain by a peat deposit approximately 100 mm in thickness, which extended from 2.3 m to a depth of 2.4 m below existing grade.

Silt and Sand, trace Clay

Underlying the fills in Borehole 1, a deposit of silt and sand, trace clay was encountered, which extended to the borehole termination depth of 15.8 m below existing grade. SPT tests carried out within the silt and sand gave 'N' values ranging from 6 to 51 blows for 300 mm of penetration indicating loose to very dense states. The moisture contents ranged from 13% to 21%.

The results of a grain size/hydrometer analysis on a sample of the silt and sand, trace clay are included in Appendix B and are summarized in Borehole 1 log and in Table 4.1.1 as noted below.

Table 4.1.1 – Laboratory Test Results BH1 SS10

Sample	Depth (m)	Gradation (%)			
		Gravel	Sand	Silt	Clay
BH1 SS 10	10.7 to 11.3	0	46	51.8	2.2

Silty Sand

Underlying the peat in Borehole 2, a silty sand with some gravel was encountered, which extended to a depth of 4.1 m below existing grade. SPT tests carried out within the silty sand gave 'N' values of 6 and 12 blows for 300 mm of penetration indicating the deposit was loose to compact states. The moisture contents of 2 samples was determined to be 7% and 15%.

Silt and Sand, some Clay trace Gravel and Cobbles

Underlying the silty sand in Borehole 2 a silt and sand, some clay trace sand, gravel and cobbles was encountered, which extended to a depth of 6.9 m below existing grade. SPT tests carried out within the silt and sand, some clay deposit gave 'N' values of 14 blows for 300 mm of penetration and 50 blows for 0 mm of penetration indicating the deposit was compact to very dense states. The moisture content of 1 sample was determined to be 12%.

The results of a grain size/hydrometer analyses and Atterberg Limits determination on a sample of the silt and sand, some clay are included in Appendix B and are summarized in Borehole 2 log and in Table 4.1.2 as noted below.

Table 4.1.2 – Laboratory Test Results BH2 SS6

Sample	**Depth (m)**	**Gradation (%)**				**Atterberg Limits***			**USCS Modified Group Symbol**
		Gravel	**Sand**	**Silt**	**Clay**	**LL**	**PL**	**PI**	
BH2 SS 6	7.6 to 8.2	6.8	37.6	40.8	14.8	20	14	6	CL-ML

*LL = Liquid Limit, PL = Plastic Limit, PI = Plastic Index

Silt, trace Sand

Underlying the fill in Borehole 3, a deposit of silt, trace sand was encountered, which extended to 4.1 m below existing grade. A single SPT tests carried out within the silt trace sand gave an 'N' value of 3 blows for 300 mm of penetration indicating loose states. The moisture content of 1 sample was determined to be 35%.

Clayey Silt, trace Sand and Gravel

Underlying the silt, trace sand in Borehole 3, a clayey silt was encountered, which extended to 10.2 m below existing grade. The clayey silt contained trace sand and gravel. SPT tests carried out within the clayey silt trace sand and gravel gave 'N' values ranging from 2 to 67 blows for 300 mm of penetration indicating very soft to hard consistencies. The moisture contents ranged from 9% to 16%.

The results of a grain size/hydrometer analyses and Atterberg Limit determination on a sample of the clayey silt, trace sand and gravel are included in Appendix B and are summarized in Borehole 3 log and in Table 4.1.3 as noted below.

Table 4.1.3 - Laboratory Test Results BH3 SS6

Sample	Depth (m)	Gradation (%)				Atterberg Limits*			USCS Modified Group Symbol
		Gravel	Sand	Silt	Clay	LL	PL	PI	
BH3 SS 6	4.6 to 5.2	2	5.5	62.5	30	25	16	9	CL

*LL = Liquid Limit, PL = Plastic Limit, PI = Plastic Index

The presence of the soft clayey silt encountered in Borehole 3 at approximately 4.1 m below existing grade required obtaining an undisturbed sample for the purpose of consolidation testing. The sample was obtained by drilling a secondary borehole (Borehole 3A) immediately adjacent to Borehole 3. The thin wall tube sample was obtained from 4.6 m to 5.2 m below existing grade. The laboratory consolidation report is included in Appendix B.

The results of a grain size/hydrometer analyses and Atterberg Limit determination on the sample are included in Appendix B and are summarized in Borehole 3A log and in Table 4.1.4 as noted below.

Table 4.1.4 - Laboratory Test Results BH3A SH 1

Sample	Depth (m)	Gradation (%)				Atterberg Limits*			USCS Modified Group Symbol
		Gravel	Sand	Silt	Clay	LL	PL	PI	
BH3A SH 1	4.6 to 5.2	1	2	57	40	30	17	13	CL

*LL = Liquid Limit, PL = Plastic Limit, PI = Plastic Index

Sandy Silt

Underlying the clayey silt in Borehole 3, a sandy silt with trace to some gravel and trace clay was encountered, which extended to the borehole termination depth of 14.3 m below existing grade. SPT tests carried out within the sandy silt trace to some gravel and trace clay gave 'N' values ranging from 37 blows for 300 mm to 50 blows for 50mm of penetration indicating the deposit was in dense to very dense state. The moisture contents ranged from 3% to 16%.

4.2 JANE STREET BRIDGE REPLACEMENT

Boreholes 4 and 5

Topsoil

Boreholes 4 and 5 encountered a surficial deposit of topsoil with 175 mm and 150 mm in thickness, respectively.

Fill

Underlying the topsoil in Boreholes 4 and 5, a common fill was encountered which extended from 8.7 m below existing grade in Borehole 5 to 17.8 m below existing grade in Borehole 4. The fill in Borehole 4 generally consisted of silty sandy to sandy silt with traces of gravel, wood, glass, brick, ceramic, plastic and nails indicating poor quality nature of the fill. SPT tests carried out within the Borehole 4 silty sand to sandy silt fill gave ‘N’ values ranging from 3 to 36 blows for 300 mm of penetration indicating loose to dense states. The moisture contents ranged from 4% to 67%.

Fill materials of varying composition were encountered within Borehole 5. The fill underlying the topsoil generally consisted of silty sand to sand silt with traces of gravel. From 1.4 m to 7.2 m below grade, the silty sand to sandy silt fill deposit contained traces of glass, slag, metal and wood. From 7.2 m to 8.7 m below grade, a silt fill with traces of glass and organics was encountered. SPT tests carried out within the Borehole 5 fill materials gave ‘N’ values ranging from 2 to 16 blows for 300 mm of penetration indicating very loose to compact states. The moisture contents ranged from 5% to 31%.

Silt, some Sand trace Clay and gravel / Silt trace clay and sand

Underlying the fill in Borehole 4, a deposit of silt, some sand with trace clay and gravel was encountered, which extended to a depth of 24 m below existing grade. At which point the deposit transitioned to a deposit of silt with traces of clay and sand which extended to 25.5 m below existing grade. SPT tests carried out within the silt deposits gave ‘N’ values ranging from 29 to 38 blows for 300 mm of penetration indicating compact to dense states. The moisture contents ranged from 21% to 27%.

The results of 2 grain size/hydrometer analysis on samples of the silt deposits are included in Appendix B and are summarized in Borehole 4 log and in Table 4.2.1 as noted below.

Table 4.2.1 Laboratory Test Results BH4 SS15 and SS19

Sample	Depth (m)	Gradation (%)			
		Gravel	Sand	Silt	Clay
BH4 SS 15	18.3 to 18.9	0.1	11	84.4	4.5
BH4 SS 19	24.4 to 25.0	0	3.1	91.8	5.1

Silt and Clay, trace Sand

Underlying the above noted silt deposits in Borehole 4, a deposit of silt and clay with trace sand was encountered, which extended to the borehole determination depth of 31.1 m below existing grade. SPT tests carried out within the silt and clay deposit gave ‘N’ values ranging from 8 to 48 blows for 300 mm of penetration indicating firm to hard consistency. The moisture contents ranged from 20% to 27%.

The results of a grain size/hydrometer analyses and Atterberg Limits determination on a sample of the silt and clay with trace sand are included in Appendix B and are summarized in Borehole 4 log and in Table 4.2.2 as noted below.

Table 4.2.2 Laboratory Test Results BH4 SS20

Sample	Depth (m)	Gradation (%)				Atterberg Limits*			USCS Modified Group Symbol
		Gravel	Sand	Silt	Clay	LL	PL	PI	
BH4 SS 20	25.9 to 26.5	0	0.7	59.8	39.5	28	17	11	CL

*LL = Liquid Limit, PL = Plastic Limit, PI = Plastic Index

Sandy Silt some Clay trace Gravel

Underlying the fill in Borehole 5, a deposit of sandy silt, some clay and trace gravel was encountered, which extended to a depth of 11.7 m below existing grade. SPT tests carried out within the silt deposit gave 'N' values of 5 and 11 blows for 300 mm of penetration indicating loose to compact states. The moisture contents were determined to be 11% and 32%.

The results of a grain size/hydrometer analysis on a sample of the sandy silt, some clay and trace gravel are included in Appendix B and are summarized in Borehole 5 log and in Table 4.2.3 as noted below.

Table 4.2.3 Laboratory Test Results BH5 SS9

Sample	Depth (m)	Gradation (%)			
		Gravel	Sand	Silt	Clay
BH5 SS 9	9.1 to 9.7	2.6	33.5	43.9	20.0

Silt, some Clay trace Sand and Gravel

Underlying the sandy silt, some clay trace gravel in Borehole 5, a deposit of silt with some clay and trace sand and gravel was encountered, which extended to a depth of 17.8 m below existing grade. SPT tests carried out within the silt deposit gave 'N' values ranging from 7 to 12 blows for 300 mm of penetration indicating loose to compact states. The moisture contents ranged from 18% to 24%.

The results of a grain size/hydrometer analysis on a sample of the silt, some clay and trace sand and gravel are included in Appendix B and are summarized in Borehole 5 log and in Table 4.2.3 as noted below.

Table 4.2.3

Sample	Depth (m)	Gradation (%)			
		Gravel	Sand	Silt	Clay
BH5 SS 11	9.1 to 9.7	1.0	1.7	87.1	10.2

Clay and Silt trace Sand and Gravel

Underlying the silt in Borehole 5 a deposit of clay and silt with trace sand and gravel was encountered, which extended to a depth of 30.0 m below existing grade. SPT tests carried out within the silt and clay deposit gave ‘N’ values ranging from 5 to 64 blows for 300 mm of penetration indicating firm to hard consistency. The moisture contents ranged from 10% to 38%.

The results of a grain size/hydrometer analyses and Atterberg Limit determination on a sample of the of clay and silt with trace sand and gravel are included in Appendix B and are summarized in Borehole 5 log and in Table 4.2.4 as noted below.

Table 4.2.4 Laboratory Test Results BH4 SS15

Sample	Depth (m)	Gradation (%)				Atterberg Limits*			USCS Modified Group Symbol
		Gravel	Sand	Silt	Clay	LL	PL	PI	
BH4 SS 15	18.3 to 18.9	0.6	9.2	43.2	47.0	31	17	14	CI

*LL = Liquid Limit, PL = Plastic Limit, PI = Plastic Index

Weathered Shale

Underlying the clay and silt with trace sand and gravel in Borehole 5, a grey weathered shale was encountered. Borehole 5 was terminated due to auger refusal in the weathered shale at 30.6 m below existing grade.

4.3 ROCKCLIFFE BOULEVARD BRIDGE REPLACEMENT

Boreholes 6 and 7

Topsoil

Boreholes 6 and 7 encountered a surficial deposit of topsoil with 125 mm and 150 mm in thickness, respectively.

Fill

Underlying the topsoil in Boreholes 6 and 7, a deposit of fill was encountered which extended from 2.3 m to 3.0 m below existing grade. The fill generally consisted of silty sand with trace to some gravel and organics. The fill deposit in Borehole 6 was underlain by a layer of organics and decaying wood which extended to 2.4 m below existing grade. SPT tests carried out within the silty sand fill gave ‘N’ values ranging from 3 to 19 blows for 300 mm of penetration indicating loose to compact states. The moisture contents ranged from 4% to 18%.

Silty Sand

Underlying the fill / organics in Borehole 6 and the fill in Borehole 7, a deposit of silty sand was encountered which extended to depths of 4.1 m and 6.4 m below existing grade. SPT tests carried out within the silty sand deposit gave ‘N’ values ranging from 0 to 5 blows for 300 mm of penetration indicating very loose to loose states. The moisture contents ranged from 12% to 27%.

Silt

Underlying the silty sand in Boreholes 6 and 7, a deposit of silt was encountered, which extended to 13.3 m and 14.8 m below existing grade. The silt deposit in Borehole 6 contained traces of clay and sand. The silt deposit in Borehole 7 contained traces of clay and gravel from 8.7 m to 11.7 m below existing grade. SPT tests carried out within the silt deposits gave 'N' values ranging from 3 to 11 blows for 300 mm of penetration indicating loose to compact states. The moisture contents ranged from 16% to 28%.

The results of a grain size/hydrometer analysis on a sample of the Borehole 6 (silt, trace clay and sand) are included in Appendix B and are summarized in Borehole 6 log and in Table 4.3.1 as noted below.

Table 4.3.1 Laboratory Test Results BH6 SS8

Sample	Depth (m)	Gradation (%)			
		Gravel	Sand	Silt	Clay
BH6 SS 8	7.6 to 8.2	0	1.0	92.0	7.0

Silt and Clay, trace Sand and Gravel

Underlying the silt in Borehole 7, a deposit of silt and clay with trace sand and gravel was encountered, which extended to a depth of 22.4 m below existing grade. SPT tests carried out within the silt and clay deposit gave 'N' values ranging from 8 to 22 blows for 300 mm of penetration indicating stiff to very stiff consistencies. The moisture contents were determined to range from 15% to 31%.

The results of a grain size/hydrometer analyses and Atterberg Limits determination on a sample of the silt and clay with trace sand and gravel are included in Appendix B and are summarized in Borehole 7 log and in Table 4.3.2 as noted below.

Table 4.3.2 Laboratory Test Results BH7 SS12

Sample	Depth (m)	Gradation (%)				Atterberg Limits*			USCS Modified Group Symbol
		Gravel	Sand	Silt	Clay	LL	PL	PI	
BH7 SS 12	13.7 to 14.3	1.0	2.0	43.0	54.0	36	18	18	CI

*LL = Liquid Limit, PL = Plastic Limit, PI = Plastic Index

Silty Clay trace Sand and Gravel

Underlying the silt in Borehole 6, a deposit of silty clay, trace sand and gravel was encountered which extended to a depth of 17.1 m below existing grade. The silty clay, trace sand and gravel deposit was also encountered with increasing depth from 18.6 m to 19.4 m below existing grade, from 20.1 m to 22.4 m below existing grade and 23.2 m to 25.5 m below existing grade. SPT tests carried out within the uppermost silty clay deposit gave an 'N' value of 9 blows for 300 mm of penetration indicating a stiff consistency. The SPT tests carried out within the deeper silty clay deposits gave ‘N’ values ranging from 15 to 21 blows for 300 mm of penetration indicating very stiff consistency. The moisture contents ranged from 14% to 28%.

Sand

The discontinuous silty clay, trace sand and gravel deposits encountered in Borehole 6 were separated by deposits of sand containing trace silt and gravel. The sand deposits were encountered from 17.1 m to 18.6 m below existing grade, from 19.4 m to 20.1 m below existing grade and from 22.4 m to 23.2 m below existing grade. The moisture content of 1 sample was determined to be 16%.

Silty Sand

Underlying the silt and clay with trace sand and gravel in Borehole 7, a deposit of silty sand was encountered, which extended to a depth of 24.7 m below existing grade. A single SPT test carried out within the silty sand deposit gave an ‘N’ value of 29 blows for 300 mm of penetration indicating compact states. The moisture content of 1 sample was determined to be 14%.

Silty Clay, trace Sand and Gravel

Underlying the silty sand in Borehole 7 a deposit of silty clay trace, sand and gravel was encountered, which extended to a depth of 25.5 m below existing grade. The moisture content of 1 sample was determined to be 18%.

Sandy Gravelly Silt, some Clay

Underlying the silty clay, trace sand and gravel in Borehole 6, a deposit of sandy gravelly silt with some clay was encountered, which extended to the borehole termination depth of 29.0 m below existing grade. SPT tests carried out within the sandy gravelly silt deposit gave ‘N’ values ranging from 42 blows for 300 mm of penetration to 50 blows for 50 mm of penetration indicating dense to very dense states. The moisture contents were determined to be 5% and 18%.

The results of a grain size/hydrometer analysis on a sample of the sandy gravelly silt with some clay are included in Appendix B and are summarized in Borehole 6 log and in the following Table No 4.3.3.

Table 4.3.3 Laboratory Test Results BH6 SS21

Sample	Depth (m)	Gradation (%)			
		Gravel	Sand	Silt	Clay
BH6 SS 21	27.4 to 28	20.1	28.2	41.2	10.5

Silty Gravelly Sand, trace Clay

Underlying the silty clay, trace sand and gravel in Borehole 7, a deposit of silty gravelly sand with trace clay was encountered, which extended to a depth of 28.5 m below existing grade. SPT tests carried out within the sandy gravelly silt deposit gave ‘N’ values ranging from 40 to 82 blows for

300 mm of penetration indicating dense to very dense states. The moisture contents were determined to be 7% and 11%.

The results of a grain size/hydrometer analysis on a sample of the silty gravelly sand, trace clay are included in Appendix B and are summarized in Borehole 7 log and in the following Table No. 4.3.4

Table 4.3.4 Laboratory Test Results BH7 SS20

Sample	**Depth (m)**	**Gradation (%)**			
		Gravel	**Sand**	**Silt**	**Clay**
BH7 SS 20	25.9 to 26.5	22.9	45.9	25.1	6.1

Weathered Shale

Underlying the silty gravelly sand in Borehole 7, a grey weathered shale was encountered. It was possible to auger 2.0 m into the weathered shale to a depth of 30.5 m below existing grade where auger refusal occurred. SPT tests carried out within the weathered shale gave 'N' values of 50 blows for 30 mm and 50 blows for 0 mm of penetration indicating very dense states. The moisture content was determined to be 15%.

4.4 POSSIBLE FLOOD PROTECTION BERM ALONG ROCKCLIFFE BOULEVARD AND ROCKCLIFFE COURT

Boreholes 8, 9 and 10

Topsoil

Borehole 8 encountered a surficial deposit of topsoil 175 mm in thick.

Pavement Structure

Borehole 9 revealed the Rockcliffe Court pavement consisted of 100 mm of asphalt underlain by granular 330 mm in thickness.

Borehole 10 revealed the Rockcliffe Boulevard pavement consisted of solely of asphalt 290 mm in thickness.

Fill

The topsoil in Borehole 8 and the pavement structure in Boreholes 9 and 10 were underlain by a deposit of fill, which extended from 1.4 m below existing grade in Borehole 8 to 6.2 m below existing grade in Borehole 10. The borehole 9 fill consisted of silty sand. The Borehole 8 and 10 fill generally consisted of a silty sand with trace gravel, brick, glass, ceramic and slag. SPT tests carried out within the silt sand fill deposits gave 'N' values ranging from 4 to 36 blows for 300 mm penetration indicating loose to dense states. The moisture contents ranged from 8% to 30%.

Silt

Underlying the fill in Boreholes 8 and 9 deposits of silt were encountered, which extended to the borehole termination depths of 5.2 m below existing grade. The silt deposit encountered in Borehole 8 contained some sand and traces of clay and gravel. The silt deposit encountered in Borehole 9 contained traces of clay and sand. The SPT tests carried out within the silt deposits gave 'N' values ranging from 2 to 13 blows for 300 mm of penetration indicating loose to compact states. The moisture content ranged from 15% to 25%.

The results of 2 grain size/hydrometer analysis on samples of the silt deposits are included in Appendix B and are summarized in Boreholes 8 and 9 and in the following Table No. 4.4.1.

Table 4.4.1 Laboratory Test Results

Sample	Depth (m)	Gradation (%)			
		Gravel	Sand	Silt	Clay
BH8 SS 6	4.6 to 5.2	3.3	18.5	72.1	6.1
BH9 SS 5	3.1 to 3.7	0	7.3	87.4	5.3

Gravelly Sand, some Silt

Underlying the fill in Borehole 10 a deposit of gravelly sand, some silt was encountered, which extended to the borehole termination depth of 8.2 m below existing grade. SPT tests carried out within the gravelly sand, some silt deposit gave 'N' values of 8 and 20 blows for 300 mm of penetration indicating loose to compact states. The moisture contents were determined to be 10% and 19%.

The results of a grain size/hydrometer analysis on a sample of the gravelly sand some silt are included in Appendix B and are summarized in Borehole 10 log and in the following Table No. 4.4.2.

Table 4.4.2 Laboratory Test Results BH10 SS8

Sample	Depth (m)	Gradation (%)			
		Gravel	Sand	Silt	Clay
BH10 SS 8	7.6 to 8.2	31.8	57.5	10.7	0

4.5 POSSIBLE FLOOD PROTECTION BERM ALONG LAVENDER CREEK AND LAVENDER CREEK CULVERT REPLACEMENT

Boreholes 11, 12 and 13

Topsoil

Borehole 13 encountered a surficial deposit of topsoil 100 mm in thickness.

Pavement Structure

Borehole 11 revealed the Lavender Creek Trail pavement structure consisted of 50 mm of asphalt underlain by granular 175 mm in thickness.

Fill

Surficially in Borehole 12, underlying the pavement structure in Borehole 11 and underlying the topsoil in Borehole 13 a deposit of fill was encountered which extended from 2.7 m to 5.6 m below existing grade. The Borehole 11 and 13 fill materials which extended from 2.7 m and 4.1 m below existing grade, respectively generally consisted of silty sand with trace to some gravel with trace debris such as concrete, mortar, wood, slag and plastic. SPT tests carried out within the Borehole 11 and 13 fill deposits gave 'N' values ranging from 2 to 16 blows for 300 mm penetration indicating very loose to compact states. The moisture contents ranged from 6% to 22%.

Fill materials of varying composition were encountered within Borehole 12. The upper 2 m of fill generally consisted of varying quantities of silt sand and gravel underlain by organic silt fill with trace sand, gravel and brick fragments 0.9 in thickness followed by silt fill with trace sand and leather fragments 2.5 m in thickness. SPT tests carried out within the various Borehole 12 fill deposits gave 'N' values ranging from 2 to 10 blows for 300 mm indicating very loose to compact states. The moisture contents ranged from 6% to 42%.

Organic Clayey Silt

Underlying the fill in Borehole 11 a deposit of organic clayey silt was encountered which extended to a depth of 4.1 m below existing grade. A single SPT test carried out within the organic clayey silt deposit gave an 'N' value of 2 blows for 300 mm of penetration indicating very soft consistency. The moisture contents of 2 samples were determined to be 41% and 54%.

Sandy Silt, trace Gravel / Sandy Silt, trace Gravel and Clay

Underlying the organic clayey silt in Borehole 11 and the fill deposit in Borehole 12 a deposit of sandy silt with trace gravel was encountered, which extended to a depth of 6.4 m below existing grade in Borehole 11 and to the Borehole 12 termination depth of 8.2 m. The Borehole 12 sandy silt deposit contained traces of gravel and clay. A single SPT test carried out within the Borehole 11 sandy silt trace gravel deposit gave an 'N' value of 3 blows for 300 mm of penetration indicating a loose state. The moisture content was determined to be 44%.

SPT tests carried out within the Borehole 12 sandy silt, trace gravel and clay deposit gave 'N' values of 5 and 15 blows for 300 mm of penetration indicating loose to compact states. The moisture content of 2 samples was determined to be 18% and 24%.

The results of a grain size/hydrometer analysis on a sample of the sandy silt trace gravel and clay are included in Appendix B and are summarized in Borehole 12 log and in the following Table No. 4.5.1.

Table 4.5.1 Laboratory Test Results BH12 SS7

Sample	Depth (m)	Gradation (%)			
		Gravel	Sand	Silt	Clay
BH 12 SS 7	6.1 to 6.7	9.8	32.4	52.9	4.9

Silt

Underlying the sandy silt in Borehole 11 a deposit of silt was encountered, which extended to the borehole termination depth of 8.2 m below existing grade. A single SPT test carried out within the silt deposit gave an ‘N’ value of 13 blows for 300 mm of penetration indicating a compact state. The moisture content of 2 samples were determined to be 17% and 18%.

Silt and Sand, some Gravel trace Silt

Underlying the fill in Borehole 13 a deposit of silt and sand, some gravel trace clay was encountered, which extended to the borehole termination depth of 5.2 m below existing grade. A single SPT test carried out within the silt and sand some gravel trace silt deposit gave an ‘N’ value of 20 blows for 300 mm of penetration indicating a compact state. The moisture content was determined to be 12%.

The results of a grain size/hydrometer analysis on a sample of the silt and sand, some gravel trace silt are included in Appendix B and summarized in Borehole log 13 and in the following Table No. 4.5.2.

Table 4.5.2 Laboratory Test Results BH13 SS6

Sample	Depth (m)	Gradation (%)			
		Gravel	Sand	Silt	Clay
BH13 SS 6	4.6 to 5.2	18.2	37.2	42.3	2.3

4.6 ALLIANCE AVENUE AND HILLDALE ROAD BRIDGE REPLACEMENTS

Boreholes 14, 15 and 16

Topsoil

Boreholes 14, 15 and 16 encountered a surficial deposit of topsoil ranging in thickness from 50 mm to 125 mm.

Fill

Underlying the topsoil in Boreholes 14, 15 and 16 a deposit of fill was encountered, which extended from 4.1 m 4.9 m below existing grade. The fill generally consisted of silty sand with traces of gravel, organics, roots and wood. SPT tests carried out within the silty sand fill deposits gave 'N' values ranging from 2 to 23 blows for 300 mm penetration indicating very loose to compact states. The moisture contents ranged from 2% to 23%.

Sandy Silt, trace Clay and Gravel

Underlying the fill in Borehole 14, a deposit of sandy silt, trace clay and gravel was encountered, which extended to a depth of 10.2 m below existing grade. SPT tests carried out within the sandy silt, trace clay and gravel deposit gave 'N' values ranging from 6 to 12 blows for 300 mm of penetration indicating loose to compact states. The moisture contents ranged from 24% to 27%.

The results of a grain size/hydrometer analysis on a sample of the sandy silt and sand, trace clay and gravel are included in Appendix B and summarized in Borehole log 14 and in the following Table No. 4.6.1.

Table 4.6.1 Laboratory Test Results BH14 SS8

Sample	Depth (m)	Gradation (%)			
		Gravel	Sand	Silt	Clay
BH14 SS 8	7.6 to 8.2	0.6	30.6	65.6	3.2

Silty Sand and Organics

Underlying the fill in Borehole 15, a deposit of silty sand and organics 0.8 m in thickness was encountered which extended to a depth of 4.9 m below existing grade.

Sand, trace Gravel to Silty Sand

Underlying the fill in Borehole 16 a deposit of sand, trace gravel was encountered, which extended to 4.9 m below existing grade followed by a deposit of silty sand which extended to 5.6 m below existing grade. SPT tests carried out within the sand trace gravel and silty sand deposits gave an 'N' value of 7 blows for 300 mm of penetration indicating a loose state. The moisture content was determined to be 25%.

Silt

Underlying the silty sand and organics in Borehole 15 and the silty sand in Borehole 16 a deposit of silt was encountered, which extended to a depth of 10.2 m below existing grade. SPT tests carried out within the silt deposit gave 'N' values ranging from 9 to 34 blows for 300 mm of penetration indicating loose to dense states. The moisture contents ranged from 10% to 26%.

Sandy Silt, trace clay

Underlying the silty sand in Borehole 16 a deposit of sandy silt, trace clay was encountered, which extended to a depth of 10.2 m below existing grade. SPT tests carried out within the sandy silt deposit gave 'N' values ranging from 7 to 21 blows for 300 mm of penetration indicating loose to compact states. The moisture contents ranged from 23% to 26%.

The results of a grain size/hydrometer analysis on a sample of the sandy silt, trace clay and gravel are included in Appendix B and are summarized in Borehole log 16 and in the following Table No. 4.6.2.

Table 4.6.2 Laboratory Test Results BH16 SS8

Sample	Depth (m)	Gradation (%)			
		Gravel	Sand	Silt	Clay
BH16 SS 8	7.6 to 8.2	0	30.9	67.1	2.0

Silty Clay

Underlying the sandy silt, trace clay in Borehole 16, a deposit of silty clay was encountered, which extended to a depth of 22.1 m below existing grade. The silty clay deposit contained sand seams as well as traces of trace sand and gravel beyond 13.3 m below existing grade. SPT tests carried out within the silty clay deposit gave 'N' values ranging from 2 to 28 blows for 300 mm of penetration indicating very soft to very stiff consistency. The moisture contents ranged from 14% to 30%.

Sandy Silt, some Clay trace Gravel

Underlying the silty clay, trace sand and gravel in Borehole 16 a deposit of sandy silt, some clay trace gravel was encountered, which extended to the borehole termination depth of 31.1 m below existing grade. SPT tests carried out within the sandy silt some clay trace gravel deposit gave 'N' values ranging from 12 to 27 blows for 300 mm of penetration indicating stiff to very stiff consistency. The moisture contents ranged from 10% to 22%.

The results of a grain size/hydrometer analyses and Atterberg Limits determination on a sample of the sandy silt, some clay trace gravel which are included in Appendix B and are summarized in Borehole 16 log and in the following Table No. 4.6.3

Table 4.6.3 Laboratory Test Results BH 16 SS 20

Sample	Depth (m)	Gradation (%)				Atterberg Limits*			USCS Modified Group Symbol
		Gravel	Sand	Silt	Clay	LL	PL	PI	
BH16 SS 20	7.6 to 8.2	4.4	33.1	437	18.8	23	14	9	CL

*LL = Liquid Limit, PL = Plastic Limit, PI = Plastic Index

Sandy Clayey Silt, trace Gravel

Underlying the sandy silt trace clay and gravel in Borehole 14 a deposit of sandy clayey silt, trace gravel was encountered, which extended to a depth of 27.7 m below existing grade. SPT tests carried out within sandy clayey silt, trace gravel deposit gave ‘N’ values ranging from 2 to 33 blows for 300 mm of penetration indicating very soft to hard consistencies. The moisture contents were determined to range from 12% to 24%.

The results of a grain size/hydrometer analyses and Atterberg Limits determination on a sample of the sandy clayey silt, trace gravel are included in Appendix B and are summarized in Borehole 14 and in the following Table No. 4.6.4.

Table 4.6.4 Laboratory Test Results BH14 SS12

Sample	**Depth (m)**	**Gradation (%)**				**Atterberg Limits***			**USCS Modified Group Symbol**
		Gravel	**Sand**	**Silt**	**Clay**	**LL**	**PL**	**PI**	
BH14 SS 12	12.2 to 12.8	2.1	24.1	46.1	27.7	26	17	9	CL

*LL = Liquid Limit, PL = Plastic Limit, PI = Plastic Index

Silt

Underlying the sandy clayey silt, trace gravel in Borehole 14, a layer of silt was encountered, which extended to a depth of 28.5 m below existing grade.

Silty Clay, trace Sand and Gravel

Underlying the silt in Borehole 14 a deposit of silty clay, trace sand and gravel was encountered, which extended to the borehole termination depth of 31.1 m below existing grade. SPT tests carried out within the silty clay, trace sand and gravel deposit gave ‘N’ values of 12 and 20 blows for 300 mm of penetration indicating stiff to very stiff consistency. The moisture contents were determined to be 15% and 16%.

Clayey Silt, trace Sand

Underlying the silt in Borehole 15 a deposit of clayey silt, trace sand was encountered, which extended to a depth of 14.8 m below existing grade. SPT tests carried out within clayey silt, trace sand deposit gave ‘N’ values ranging from 5 to 14 blows for 300 mm of penetration indicating firm to stiff consistencies. The moisture contents were determined to be 16% and 25%.

The results of a grain size/hydrometer analyses and Atterberg Limits determination on a sample of the clayey silt, trace sand are included in Appendix B and are summarized in Borehole 15 and in the following Table 4.6.5.

Table 4.6.5 Laboratory Test Results BH15 SS10

Sample	Depth (m)	Gradation (%)				Atterberg Limits*			USCS Modified Group Symbol
		Gravel	Sand	Silt	Clay	LL	PL	PI	
BH15 SS 10	10.7 to 11.3	0	0.5	67.1	32.4	24	16	8	CL

*LL = Liquid Limit, PL = Plastic Limit, PI = Plastic Index

Silt and Clay, trace Sand and Gravel

Underlying the clayey silt, trace sand in Borehole 15 a deposit of silt and clay, trace sand and gravel was encountered, which extended to a depth of 23.9 m below existing grade. SPT tests carried out within silt and clay, trace sand and gravel deposit gave ‘N’ values ranging from 13 to 25 blows for 300 mm of penetration indicating stiff to very stiff consistencies. The moisture contents ranged from 14% to 20%.

The results of a grain size/hydrometer analyses and Atterberg Limits determination on a sample of the clay and silt trace sand and gravel are included in Appendix B and are summarized in Borehole 15 and in the following Table No. 4.6.6.

Table 4.6.6 Laboratory Test Results BH15 SS17

Sample	Depth (m)	Gradation (%)				Atterberg Limits*			USCS Modified Group Symbol
		Gravel	Sand	Silt	Clay	LL	PL	PI	
BH15 SS 17	22.9 to 23.5	0.1	5.0	55.8	39.1	28	18	10	CL

*LL = Liquid Limit, PL = Plastic Limit, PI = Plastic Index

Silt

Underlying the clay and silt, trace sand and gravel in Borehole 15 a deposit of silt was encountered which extended to a depth of 25.5 m below existing grade. The silt deposit was also encountered with increasing depth from 39.2 m to 40.7 m below existing grade. The silt deposits generally contained traces of sand and gravel. SPT tests carried out within the silt deposits gave ‘N’ values of 21 and 28 blows for 300 mm of penetration indicating a compact state. The moisture contents were determined to be 11% and 19%.

Silty Sand

Two deposits of silty sand trace gravel were encountered in Borehole 15 from 28.5 m to 30.0 m below existing grade and from 40.7 m to 41.5 m below existing grade. SPT tests carried out within the uppermost silty sand deposit gave an ‘N’ value of 35 blows for 300 mm of penetration indicating a dense state. The moisture content was determined to be 14%.

Silty Clay, trace Sand and Gravel

Underlying the 23.9 m to 25.5 m deep silt deposit in Borehole 15 a deposit of silty clay, trace sand and gravel was encountered, which extended to a depth of 28.5 m below existing grade. The silty clay, trace sand and gravel deposit was also encountered from 30.0 m to 39.2 m below existing grade and from 41.5 m to the borehole termination depth of 43.3 m below existing grade. SPT tests carried out within the two uppermost silty clay deposits gave ‘N’ values ranging from 9 to 24 blows for 300 mm of penetration indicating a stiff to very stiff consistency. The SPT tests carried out within the 41.5 m to 43.3 m deep silty clay deposit provided an ‘N’ value of 50 blows for 130 mm of penetration indicating a hard consistency. The moisture contents of the deposits ranged from 11% to 30%.

4.7 LOUVAIN STREET PEDESTRIAN BRIDGE REPLACEMENT

Boreholes 17 and 18

Pavement Structure

Borehole 17 revealed the Humber Boulevard North pavement consisted of an asphalt surface 110 mm in thickness underlain by concrete 220 mm in thickness and 200 mm in thickness.

Borehole 18 revealed the Humber Boulevard South pavement consisted of asphalt 170 mm in thickness underlain by granular 390 mm in thickness.

Fill

Underlying the pavement structure in Boreholes 17 and 18 a deposit of silty sand fill, trace gravel was encountered. The fill depths varied from 2.6 m below existing in Borehole 18 to 3.0 m below existing grade in Borehole 17. SPT tests carried out within the silty sand fill, trace gravel gave ‘N’ values ranging from 3 to 11 blows for 300 mm of penetration indicating loose to compact states. The moisture contents ranged from 7% to 16%.

Silt

Underlying the fill in Borehole 18 a deposit of silt was encountered, which extended to a depth of 7.2 m below existing grade. SPT tests carried out within the silt deposit gave ‘N’ values ranging from 4 to 26 blows for 300 mm of penetration indicating loose to compact states. The moisture contents ranged from 19% to 22%.

Silt and Sand

Underlying the fill in Borehole 17 a deposit of silt and sand was encountered, which extended to a depth of 5.6 m below existing grade. SPT tests carried out within the silt and sand deposit gave ‘N’ values of 3 and 11 blows for 300 mm of penetration indicating loose to compact states. The moisture contents within were determined to be 20% and 27%.

The results of a grain size/hydrometer analysis on a sample of the silt and sand is included in Appendix B and are summarized in Borehole 17 log and in the following Table No. 4.7.1.

Table 4.7.1 Laboratory Test Results BH17 SS5

Sample	Depth (m)	Gradation (%)			
		Gravel	Sand	Silt	Clay
BH17 SS 5	4.6 to 5.2	0	38.7	61.3	0

Sand and Silt, trace Clay and Gravel

Underlying the silt in Borehole 18 a deposit of sand and silt, trace clay and gravel was encountered, which extended to the borehole termination depth of 15.8 m below existing grade. SPT tests carried out within the sand and silt, trace clay and gravel deposit gave 'N' values ranging from 7 to 20 blows for 300 mm of penetration indicating loose to compact states. The moisture contents ranged from 13% to 19%.

The results of a grain size/hydrometer analysis on a sample of the sand and silt, trace clay and gravel is included in Appendix B and are summarized in Borehole 18 log and in the following Table No. 4.7.2.

Table 4.7.2 Laboratory Test Results BH18 SS11

Sample	Depth (m)	Gradation (%)			
		Gravel	Sand	Silt	Clay
BH18 SS 11	12.2 to 12.8	3.5	41.1	46.5	8.9

Silty Clay trace Sand and Gravel

Underlying the silt and sand in Borehole 17 a deposit of silty clay, trace sand and gravel was encountered, which extended to the borehole termination depth of 15.8 m below existing grade. A layer of silt approximately 0.7 m thick was encountered within the silty clay deposit at a depth of 12.6 m below existing grade. SPT tests carried out within the silty clay, trace sand and gravel deposit gave 'N' values ranging from 0 to 24 blows for 300 mm of penetration indicating very soft to very stiff consistency. The moisture contents ranged from 12% to 25%.

4.8 WESTON ROAD BRIDGE REPLACEMENT

Boreholes 19 and 20

Topsoil

Borehole 20 encountered a surficial deposit of topsoil 75 mm in thickness.

Pavement Structure

Borehole 19 revealed the Humber Boulevard South pavement consisted of asphalt 120mm in thickness underlain by granular 330 mm in thickness.

Fill

Underlying the topsoil in Borehole 20 and the pavement structure in Borehole 19 a deposit of fill was encountered, which extended to 4.1 m below existing grade. The fill in Borehole 19 generally consisted of silty sand with trace to some gravel. The fill in Borehole 20 generally consisted of silty sand with some gravel trace brick, asphalt and clay. SPT tests carried out within the silty sand fill deposits gave ‘N’ values ranging from 3 to 53 blows for 300 mm penetration indicating loose to very dense states. The moisture contents ranged from 3% to 22%.

Silty Clay, trace Sand and Gravel

Underlying the fill deposit in Boreholes 19 and 20 a deposit of silty clay, trace sand and gravel was encountered, which extended to depths of 11.7 m and 7.2 m below existing grade, respectively. SPT tests carried out within the silty clay, trace sand and gravel deposits gave ‘N’ values ranging from 14 to 30 blows for 300 mm of penetration indicating a stiff to very stiff consistency. The moisture contents of the silty clay deposits ranged from 12% to 21%

Silt, trace Sand

Underlying the silty clay, trace sand and gravel in Borehole 20 a deposit of silt, trace sand was encountered, which extended to a depth of 8.7 m below existing grade. A single SPT test carried out within the silt, trace sand deposit gave an ‘N’ value of 24 blows for 300 mm of penetration indicating a compact state. The moisture content of the silt deposit was determined to be 19%.

Clayey Silt, trace Sand and Gravel

Underlying the silt, trace sand in Borehole 20 a deposit of clayey silt, trace sand and gravel was encountered, which extended to a depth of 13.3 m below existing grade. SPT tests carried out within the clayey silt, trace sand and gravel deposit gave 3 ‘N’ values ranging 24 blows for 300 mm of penetration indicating very stiff consistency. The moisture contents ranged from 11% to 19%.

The results of a grain size/hydrometer analyses and Atterberg Limits determination on a sample of the clayey silt trace sand and gravel are included in Appendix B and are summarized in Borehole 20 log and in the following Table 4.8.1.

Table 4.8.1 Laboratory Test Results BH20 SS9

Sample	Depth (m)	Gradation (%)				Atterberg Limits*			USCS Modified Group Symbol
		Gravel	Sand	Silt	Clay	LL	PL	PI	
BH20 SS 9	9.1 to 9.7	0.5	9.3	66.5	23.7	30	19	11	CL

*LL = Liquid Limit, PL = Plastic Limit, PI = Plastic Index

Silty Clay

Underlying the clayey silt, trace sand and gravel in Borehole 20 a deposit of silty clay was encountered, which extended to a depth of 14.8 m below existing grade. SPT tests carried out within the silty clay deposit gave a single 'N' value of 12 blows for 300 mm of penetration indicating stiff consistency. The moisture content was determined to be 24%.

Silt and Clay some Sand trace Gravel

Underlying the silty clay deposit in Borehole 19 a deposit of silt and clay, some sand trace gravel was encountered, which extended to a depth of 17.8 m below existing grade. SPT tests carried out within the silt and clay deposit gave 'N' values ranging from 8 to 13 blows for 300 mm of penetration indicating a stiff consistency. The moisture contents of the deposits ranged from 21% to 23%.

The results of a grain size/hydrometer analyses and Atterberg Limits determination on a sample of the silt and clay, some sand trace gravel are included in Appendix B and are summarized in Borehole 19 log and in the following Table No. 4.8.2.

Table 4.8.2 Laboratory Test Results BH19 SS11

Sample	Depth (m)	Gradation (%)				Atterberg Limits*			USCS Modified Group Symbol
		Gravel	Sand	Silt	Clay	LL	PL	PI	
BH19 SS 11	12.2 to 12.8	4.6	18.4	40.9	36.1	30	16	14	CL

*LL = Liquid Limit, PL = Plastic Limit, PI = Plastic Index

Silt trace Clay, Sand and Gravel

Underlying the silty clay deposit in Borehole 20 a deposit of silt, trace clay, sand and gravel was encountered, which extended to a depths of 17.8 m below existing grade. SPT tests carried out within the silt, trace clay, sand and gravel deposits gave 'N' values of 19 and 21 blows for 300 mm of penetration indicating a compact state. The moisture contents were determined to be 18% and 20%.

The results of a grain size/hydrometer analysis on a sample of the silt, trace clay, sand and gravel are included in Appendix B and are summarized in Borehole 20 log and in the following Table No. 4.8.3.

Table 4.8.3 Laboratory Test Results BH20 SS13

Sample	Depth (m)	Gradation (%)			
		Gravel	Sand	Silt	Clay
BH20 SS 13	15.2 to 15.8	0.2	2.8	89.0	8.0

Silt / Silty Sand

Underlying the silt and clay some sand trace gravel in Borehole 19 alternating deposits of non cohesive silt and silty sand were encountered, which extended to 22.4 m below existing grade. SPT tests carried out within the silt / silty sand deposits provided 'N' values ranging from 13 to 36 blows for 300 mm of penetration indicating compact to dense states. The moisture contents ranged from 15% to 22%

Silty Clay

Underlying the silt, trace clay, sand and gravel in Borehole 20 a deposit of silty clay, trace sand was encountered, which extended to 20.9 m below existing grade. Three other deposits of silty clay generally containing traces of sand and / or gravel were encountered extending from 22.4 m to 23.2 m, from 23.9 to 27.0 m below existing grade and from 28.5 m to the borehole termination depth of 31.1 m below existing grade. SPT tests carried out within the silty clay deposits gave 'N' values ranging from 9 to 22 blows for 300 mm of penetration indicating a stiff to very stiff consistency. The moisture contents of the deposits ranged from 10% to 26%.

Silty Sand

The silty clay, trace sand deposit in Borehole 20 extending from 17.8 to 20.9 m below existing grade was underlain by a deposit of silty sand, which extended to 22.4 m below existing grade. A single SPT test carried out within the silty sand deposit gave an 'N' value of 21 blows for 300 mm of penetration indicating a compact state. The moisture content of the silty sand deposit was determined to be 17%.

Sand and Gravel

The silty clay, trace sand and gravel deposit in Borehole 20 extending from 22.4 to 23.2 m below existing grade was underlain by a deposit of sand and gravel, which extended to 23.9 m below existing grade. Another deposit of sand and gravel was also encountered extending from 27.0 m to 28.5 m below existing grade. A single SPT test carried out within the sand and gravel deposit gave an 'N' value of 31 blows for 300 mm of penetration indicating a dense state. The moisture content of the sand and gravel deposit was determined to be 11%.

Silty Clay, trace Sand and Gravel

Underlying the silt deposit in Borehole 19 a deposit of silty clay, trace sand and gravel was encountered, which extended to a depth of 23.9 m below existing grade. SPT tests carried out within the silty clay, trace sand and gravel deposits gave an 'N' value of 32 blows for 300 mm of penetration indicating a hard consistency. The moisture content was determined to be 13%.

Sandy Silt, trace Clay

Underlying the silty clay, trace sand and gravel in Borehole 19 a deposit of sandy silt, trace clay was encountered, which extended to 28.5 m below existing grade. The SPT tests carried out within the sandy silt, trace clay deposit provided 'N' values ranging from 44 to 59 blows for 300 mm of penetration indicating dense to very dense states. The moisture contents ranged from 16% to 20%

The results of a grain size/hydrometer analysis on a sample of the sandy silt trace clay are included in Appendix B and are summarized in Borehole 19 log and in the following Table No. 4.8.4.

Table 4.8.4 Laboratory Test Results BH19 SS19

Sample	**Depth (m)**	**Gradation (%)**			
		Gravel	**Sand**	**Silt**	**Clay**
BH19 SS 19	24.4 to 25.0	4.6	18.4	40.9	36.1

Silty Clay, trace Sand and Gravel

Underlying the sandy silt, trace clay deposit in Borehole 19 a deposit of silty clay, trace sand and gravel was encountered, which extended to the Borehole termination depth of 31.1 m below existing grade. SPT tests carried out within the silty clay, trace sand and gravel deposits gave an 'N' values of 27 and 55 blows for 300 mm of penetration indicating very stiff to hard consistency. The moisture content was determined to be 14% and 18%.

4.9 GROUNDWATER CONDITIONS

Water levels recorded in each borehole upon completion of the drilling operations as well as within the installed monitoring wells are shown in Table 4.9.1 below:

Table 4.9.1: Groundwater Conditions

Borehole	Recorded Groundwater Levels	
	(Date) / Depth*	Depth on January 15, 2020
Possible Flood Protection Berm Area-North Side of Black Creek & East of Scarlett Road		
BH1	(10Sept2019) / 5.9m	-
BH2	(09Sept2019) / 2.4m	-
BH3	(09Sept2019) / 3.0m	4.0m
Jane Street Bridge Area		
BH4	(16Sept2019) / dry to 31.1m	-
BH5	(13Sept2019) / dry to 30.6m	-
Rockcliffe Boulevard Bridge Area		

BH6	(18Sept2019) /dry to 29.0m	-
BH7	(17Sept2019) / dry to 30.5m	-
Possible Flood Protection Berm Area along Rockcliffe Blvd. & Rockcliffe Court		
BH8	(11Sept2019) / 3.4m	-
BH9	(11Sept2019) / 4.3m	-
BH10	(23Sept2019) / 6.4m	-
Possible Flood Protection Berm along Lavender Creek and Culvert Areas		
BH11	(16Sept2019) / dry to 8.2m	-
BH12	(16Sept2019) / dry to 8.2m	-
BH13	(16 Sept2019) / dry to 5.2m	-
Alliance Avenue & Hilldale Road Bridge Areas		
BH14	(24Sept2019) / dry to 31.1m	-
BH15	(26Sept2019) / dry to 43.3m	-
BH16	(24Sept2019) / dry to 31.1m	-
Louvain Street Pedestrian Bridge Area		
BH17	(23Sept2019) / 4.3m	-
BH18	(23Sept2019) / 3.7m	-
Weston Road Bridge Area		
BH19	(19Sept2019) / dry to 31.1m	-
BH20	(08Oct2019) / 4.9m	4.9m

Note: *Initial Groundwater levels obtained upon completion of drilling.

It should be noted that the groundwater at the site would fluctuate seasonally and can be expected to be somewhat higher during the spring months and in response to major weather events. The groundwater levels in the vicinity of the Black Creek valley lands will likely match the Black Creek water levels. The groundwater levels in the vicinity of Lavender Creek will likely match the Lavender Creek water levels.

4.10 ELECTRO-CHEMICAL CHARACTERIZATION

Based on laboratory test results, electrical resistivity and corrosive characteristics of the sub-soil at the location of several existing bridge structures (Jane Street bridge, Rockcliffe bridge, Alliance Avenue bridge, and Louvian Street Pedestrian bridge) are given in Table 4.10.1 (see Appendix B for detailed test report).

Table 4.10.1: Summary of Electro-Chemical Properties.

Sample		BH4-SS14	BH5-SS13	BH6-SS13	BH7-SS11	BH14-SS19	BH15-SS25	BH16-SS7	BH17-SS4	BH18-SS12
Parameter	Unit	Values								
Chloride (2:1)	µg/g	216	11	69	46	51	52	420	553	24
Sulphate (2:1)	µg/g	1230	380	586	150	268	173	388	296	347
pH (2:1)	pH Units	9.37	8.26	8.17	8.60	8.29	8.34	8.45	8.41	8.21
Electrical Conductivity (2:1)	mS/cm	1.31	1.33	0.772	0.313	0.485	0.406	1.12	1.28	0.514
Resistivity (2:1) (Calculated)	ohm.cm	763	752	1300	3190	2060	2460	893	781	1950
Redox Potential 1	mV	51	283	146	240	228	175	226	266	159
Redox Potential 2	mV	59	285	149	242	231	176	229	267	162
Redox Potential 3	mV	60	286	151	240	228	179	233	269	164

5 CLOSURE

Part A of this report is written by Willie Kokotec, P.Eng. Mr. Nazmur Rahman, M.A.Sc., P.E., P.Eng., Senior Associate Geotechnical Engineer conducted an independent review of the report.

Yours very truly,

Wood Environment & Infrastructure Solutions,

a division of Wood Canada Limited

Prepared by:

Willie

Willie Kokotec, P. Eng.
Senior Project Engineer

Reviewed by:

Nazmur Rahman, M.A.Sc., P.E., P.Eng.
Senior Associate Geotechnical Engineer

PART B

FOUNDATION DESIGN RECOMMENDATIONS

6 GENERAL FOUNDATION RECOMMENDATIONS

This Section of the report provides foundation design recommendations for the feasibility design of flood management structures for the Rockcliffe study area. The recommendations are based on interpretation of the factual data obtained from the investigation completed by Wood as indicated in Part A of this report.

6.1 SITE CHARACTERIZATION

The study area is located within the Black Creek watershed that feeds into the Humber River drainage system.

The topography in the area prior to land development is gently sloping with ground elevation varying from 102.8 m near Weston Road to elevation 89 m near Janes Street. Recent residential and industrial developments have introduced common fill into the area, limiting the flow capacity of the Black Creek and its tributary, Lavender Creek.

The Black Creek watershed area has been almost entirely developed prior to the adoption of stormwater quantity and quality control measures. As a result, flooding has been an issue of concern in some areas. Some reaches have been transformed into concrete channels to increase the conveyance capacity of the system. Stream flow tends to increase rapidly during storm events due to high rates of run-off from impervious surfaces and lack of stormwater controls (TRCA, 2008).

6.1.1 Frost Depth

According to OPSD3090.101 (Rev 1) from the Ministry of Transportation of Ontario (MTO), the frost penetration depth is 1.2 m for native soils within the subject site. The underside elevation of shallow foundations and pile caps should be located no shallower than this depth with respect to finished grades. Backfill materials to be used above the foundation level should be free-draining with adequate drainage to maintain the 1.2 m frost depth.

Should this minimum required soil cover not be feasible, equivalent synthetic insulation can be used according to Section 13.5.2 of the Canadian Foundation Engineering Manual (CFEM, 2006).

6.1.2 Seismicity

Spectral acceleration (Sa(T[1])) and design PGA values for site are taken from the National Building Code of Canada's (NBCC) seismic hazard calculator (2015) and are summarized in Table 6.2 for 1 in 2475 return period seismic hazard. Based on the reported subsurface conditions, this site is preliminarily classified as Site Class D. As part of the detailed investigation, geophysical shear-wave velocity testing should be done to minimum 30 m depth to establish the site classification for design of seismically sensitive structures.

Table 6.2: Seismic Parameters (NBCC, 2015)

Latitude	Longitude	Sa (0.05)	Sa (0.1)	Sa (0.2)	Sa (0.3)	Sa (0.5)	Sa (1.0)	Sa (2.0)	Sa (5.0)	Sa (10.0)	PGA (g)
43.677 N	79.496 W	0.213	0.259	0.217	0.163	0.114	0.059	0.028	0.007	0.003	0.139

Notes:

1. Values are given in the units of gravitational acceleration (g) (9.81 m/s2).
2. Values given are for firm ground (Site Class 'C'). Refer to NBCC (2015) for an amplification factor to be applied for Class D founding soils.

6.2 DESIGN SOIL PARAMETERS

The soil parameters recommended for the foundation design are summarized in Table 6.3 below.

The design lateral earth pressure distribution on foundation walls and retaining walls will depend on the amount of wall and movement/rotation as follows:

- "Active" condition (K_a) should be used if the retaining wall is allowed to move (or rotate) away from the retained soil.
- "Passive" condition (K_p) should be used if the retaining wall is allowed to move (or rotate) towards the soil.
- "At rest" condition (K_0) should be used if the retaining wall is not allowed to move/rotate.

---

[1] T is the vibration period in seconds.

Table 6.3: Design Parameters of Soil Stratums

Soil Type	Fill	Silt with Sand / Silty Sand / Sandy Silt	Silty clay to clayey silt (stiff to very stiff)	Silty clay to clayey silt (very stiff to hard)
Bulk unit weight (kN/m^3)	15 to 17	18 to 19	19 to 20	20 to 21
Undrained shear strength (kPa)	0	0	50 to 100*	100 to 200*
Effective friction angle (degrees)	23 to 25	25 to 28	28 to 30	30 to 32
<u>Coefficient of lateral earth pressure</u> - At rest - Active - Passive (reduced to limit lateral movement)	 0.57 - 0.61 0.4 - 0.44 1.0	 0.53 - 0.57 0.36 - 0.4 1.0	 0.5 - 0.53 0.33 - 0.36 1.0	 0.47 - 0.53 0.3 - 0.36 1.0

*For undrained condition only

6.3 SITE PREPARATION

Foundation excavation into competent native sand or clayey silt to silty clay may require stripping/removal of surficial incompetent soils and any exposed soils which contain organic matters and other compressible and weak and deleterious materials. The base of the excavation should be proof-rolled with heavy roller. Over excavation and backfill with competent soil may also be employed depending on subsurface condition. During proof-rolling, spongy, wet or soft/loose spots should be sub-excavated to stable subgrade and replaced with approved soil, compatible with subgrade conditions.

6.4 EXCAVATION AND DEWATERING

All excavations must be carried out in accordance with the latest version of O. Reg. 213/91 (Occupational Health and Safety Act (OHSA) and Regulations for Construction Projects). The soils found at the site are classified as follows:

- Fill, silty, sandy, clayey above the groundwater table - Type 3
- Compact Sandy Silt, above the groundwater table - Type 3
- Firm to Stiff Clayey Silt - Type 3

- Very loose Fill (SPT ‘N’ < 4), Peat - Type 4

It should be noted that where an excavation is made through more than one soil type, the soil type with lowest classification governs. Where entry is required into an excavation that is greater than 1.2 m, the trench walls must be suitably sloped and/or braced in accordance with O. Reg. 213/91 of the OHSA. Should a temporary excavation support system be designed and constructed, it should be in accordance with OPSS 539 (Temporary Protection Systems) as applicable for lateral movement Performance Level 2.

Excavation in the native sand/silt below groundwater will require dewatering to ensure dry working condition as well as to ensure integrity of the founding stratum is maintained during construction.

A qualified geotechnical engineer should review all proposed excavation procedures. If shored excavations are considered, a licensed professional engineer should approve the proposed shoring method.

Settlement of the native soils should be estimated in consideration to the location and construction sequencing of an embankment as a surcharge load. In most cases regrading/re-sloping may be necessary during construction to maintain grades and lines of earth structures such as embankments.

Any excavation and removal of fill originally placed may require shoring system if construction is planned while half of the existing lanes will be opened for traffic. Shoring system should be designed per soil design parameters provided in Section 6.1. Abutment slope of the existing fill at the locations of Jane street bridge, Rockcliffe bridge and Lavender Creek – Symes Road should not be steeper than 3H:1V to satisfy the long-term static condition, and Pseudo-Static stability. Steeper slope could be considered if rigid elements such as pile wall or soil anchor supported wall is provided to withstand lateral load imposed by potentially straining soil mass. A detailed soil – structure interaction modelling should be carried out to support the design of rigid system.

For earth-retaining structures, stability checks should be done for overturning, uplift, sliding and bearing capacity. Minimum factors of safety for each stability check are presented in Table 6.4.

Table 6.4: Design Factors of Safety for Retaining Structures, Slopes, and Flood Berms

Failure Mode	Corresponding Minimum Factor of Safety	Reference
Uplift	1.5 – 2.0	Table 8.3, CFEM
Overturning	2.0	NAVFAC DM 7.02
Bearing Capacity	2.0 – 3.0	Table 8.3, CFEM
Sliding	1.5	Fig. 24.12, CFEM
Global Slope Stability	1.3 (end of construction) 1.5 (long term steady state) 1.2 to 1.3 (Rapid Drawdown, see Note 1) 1.1 (Pseudo Static)	CFEM, LRIA (Note 2)

Notes:

1. Rapid drawdown case is applicable for upstream slopes of flood protection berms
2. Lakes and River Improvement Act, Ontario Ministry of Natural Resources (2011)

6.5 FOUNDATION DESIGN

Silty sand/sandy silt fill or loose to compact alluvial / shallow water deposit commonly encountered in the area is not capable of supporting heavy foundation loads. Conventional spread footings for lightly loaded structures can be founded on silty sand layer (Shallow water deposit) or stiff to very stiff silty clay depending on the founding grade. The bearing surface must be clean and free of any loose or deleterious material.

Deep foundations may be considered in cases where conventional spread footing is not feasible. Bedrock shale is relatively deep (about 30 m below grade) and driven piles or cast-in-place caisson piles socketed into the Shale are suitable deep foundation options. Likely the most practical deep foundation type is provided by driven steel piles, particularly where the overburden is thicker and sand layers/lenses presence within silty clay stratum overlying bedrock shale. Augured, cast-in-place caissons may also be used, if they are more cost competitive than driven steel piles or as dictated by design and construction sequencing. Pile casing may be required in areas where thick fill / shallow water sandy silt deposit presence, as well as in locations where potentially water bearing sand lenses/laminae are present (see Table 7.1).

6.5.1 Shallow Spread/Strip Foundation

Shallow foundations (spread/strip foundations) may be used if the foundations are founded on engineered fill, native competent clay deposit, and/or sound bedrock.

The Serviceability Limit State (SLS)/Ultimate Limit State (ULS) values shown in Table 6.5 should be used for foundation design. The values shown assume that the soils within the zone of influence of the footing (a depth of about 2 times the footing width below the foundation grade) are not weaker than the indicated subgrade soils.

Table 6.5: Recommended Bearing Capacity for Spread Shallow Foundation

Design Capacity (kPa)	Sandy Fill	Silt with sand (elevation ranges from 83.5 m to 104.2 m)	Silty clay (elevation ranges from 73.6 m to 102.8 m)
Factored Ultimate Limit State (ULS), Note 2	Note 1	150	225
Serviceability Limit State (SLS), Note 3		100	150

Notes:

1. Structures cannot be founded on common fill. Common fill to be sub-excavated and replaced with engineered fill if required. Recommendation for engineered fill can be provided once civil/structural layout is finalized and the layout necessitates such requirement for sub-excavation of common fill and placement of engineered fill.
2. A geotechnical resistance factor of 0.5 applied.
3. SLS capacity provided assume 2 m x 2 m foundation, and the value given is conservative estimate for 25 mm settlement and differential settlement of 15 mm. Detailed soil – structure modelling is required to calculate the SLS capacity for different foundation conditions.
4. Frost penetration depth is approximately 1.2 m for Toronto and region. Therefore, the founding level should be below 1.2 m from grade.

The SLS/ULS values shown in Table 6.5 should be used for preliminary design in order to assess the feasibility of using shallow foundations and/or assessing the sizes of shallow foundations. For detail design, detailed foundation analyses will be required to confirm that the bearing pressures and corresponding settlements/foundation movements are within tolerable limits.

These values are based on concentric vertical loading. Inclined loads can be evaluated on a case-by-case basis once further foundation requirements are known in the detailed design.

6.6 DEEP FOUNDATION

Deep foundation recommendations in this section are presented for driven H-piles and bored caissons that may be used for the potential bridge piers and abutment walls of the proposed bridge replacement/channel expansion structures. A fill depth of minimum 1.2 m is assumed above the underside of the pile cap/pile head elevation, and for design, it is assumed that the groundwater table is at the finished ground surface.

Following construction issues should be considered during the design stage in selection of pile type:

- Piles may have to be driven through hard silty clay stratum for the pile tip to be founded on Shale bedrock. Selection of pile type and hammer type should be based on analyses of dynamic waves through selective pile and soil and the capacity of pile should be confirmed by field load testing.
- Pile driving will generate vibration that may be above tolerance of adjacent structures. A vibration monitoring program should be in place.
- Bored pile may be an option for bridge replacements depending on the design and construction sequencing / construction method, for example, top-down construction method. If bored caissons are to be used, consideration should be given to loose to compact sandy silt fill and native sandy silt (of alluvial or shallow water glacial deposit). Borehole may become unstable and pile casing may be required to advance through these layers. Also, some locations (e.g, BH-15 and BH-20) encountered wet sandy lense/laminae in the lower silty clay stratum overlying the Shale bedrock.
- If slurry construction technique to be chosen for the bored piles, detrimental effect of poor construction (such as formation of thick layer of slurry between the pile and the surrounding soil) should be considered during the design (CFEM, 2006).

6.6.1 Driven H-Piles

For piled foundations, HP 310 x 110 steel piles (typically used in Ontario) driven with adequate hammers to hard silty clay till or Shale in accordance with the procedures described in OPSS 903 are anticipated to mobilize following skin friction values. The skin friction values provided in Table 6.6 can be used to estimate the unfactored ULS capacity of driven pile. However, the actual mobilized ULS resistance may be significantly lower if the pile tips are not adequately set on hard till or shale.

Table 6.6: Unit Skin Friction Values for Cohesive Sub-surface Stratums

Stratum	Undrained Strength (kPa)	Unit skin friction (kPa) (CFEM, Clause 18.2.1)
Fill	To be ignored	
Shallow water/Alluvial sandy silt		
Upper Silty Clay (N > 15)	100	45
Lower Silty Clay (N > 30)	200	65
Shale	Capacity from toe resistance	

Alternatively, capacity of driven H-pile for specific bridge location is provided below.

Table 6.7: Capacity of Driven H-Piles

Bridge Location	Janes St (BH-05)	Rockcliffe (BH-06)
Assumed Pile Type	HP 310 x 110	HP 310 x 110
Pile Tip El. in Shale (m), Note 3	75	72 (assumed)
Pile length below fill (m), Note 2	23	28
Factored ULS Capacity (kN), See Note 1	800	700
SLS Capacity (kN)	600	500

Notes:
1. A geotechnical resistance factor of 0.4 applied as per CFEM Table 8-1. Per CFEM, resistance factor can be increased to 0.6 if site specific pile load testing is carried out. Also, for cohesive soil with undrained shear strength > 100 kPa, capacity given are based on CFEM clause 18.2.1. The CFEM suggests pile capacity should be determined by test loading for this type of soil for the final design.
2. Existing fill will be completely or partially removed as part of channel widening.
3. Lower pile capacity should be considered if the pile tip to be terminated on hard silty clay.

Need for detailed assessment of corrosion potential of driven H-piles should be based on (a) preliminary electro-chemical properties provided in Section 6.1.2, (b) location of pile/pile cap above or below water table, and heterogeneity of the soil layer above water table. Detailed investigation and laboratory test program should be executed for the next level of design.

6.6.2 Bored Caissons

Bored caissons in hard clay or socketed into Shale are also the preferred option to support the bridge structure. Temporary casings will likely be required given the risk of sloughing within the drilled shafts and to manage groundwater. Specially, basal gravelly sand was encountered at the Rockcliffe bridge area. It is assumed base of the rock socket will be cleaned and inspected. For the preliminary design purposes, the geotechnical resistances in compression are given in Table 6.8 for bored caissons with diameters of 1.2 m. Resistances were computed according to Section 18.2.1 of the CFEM. It should be mentioned that factored ULS values were obtained by using a geotechnical resistance factor of 0.4 (Table 8.1, CFEM). The SLS values provided correspond to allowable capacities to limit settlement to 25 mm.

Table 6.8: Capacity of Caisson Foundation

Description	Janes St (BH-05)			Rockcliffe (BH-07)			Symes Road Bridge
	Pile tip in hard silty clay	Pile tip in shale		Pile tip in hard silty clay	Pile tip in shale		
Assumed Pile Dia./ Socket length (m)	1.2/0	1.2/1.2		1.2/0	1.2/1.2		Subsurface condition to be investigated. Consider values provided for Janes street for preliminary design.
Pile Tip El. (m) - assumed	76	75		73	72		
Factored ULS Capacity (kN)	2000	2500		2100	2600		
SLS Capacity (kN)	1500	1900		1600	2000		

Notes:
1. A geotechnical resistance factor of 0.4 applied as per CFEM Table 8-1. Per CFEM, resistance factor can be increased to 0.6 if site specific pile load testing is carried out.
2. Existing fill will be completely or partially removed as part of channel widening.

6.6.3 Lateral Resistance

The pile resistance and deformation to lateral loads is strongly dependent on the structural configuration at the loadings and should be determined based on field tests and adequate soil-structure analyses. Significant lateral loads may be resisted by adequately battered piles.

For silty clay

For the conceptual design of piles in cohesive soil, the resistance to lateral loading versus deflection in front of a single pile may be calculated from the coefficient of horizontal subgrade reaction (k_h in kPa/m). k_h is determined based on the equations given below (CFEM 1996, CHBDC, 2014):

$k_h=(67S_u)/B$

Where:

k_h = the coefficient of horizontal subgrade reaction (kPa/m);

S_u = the undrained shear strength of the soil (kPa); and

B = the pile diameter or width (m).

Undrained shear strength of the upper clay shall be considered as 70 kPa, and undrained shear strength of the lower clay can be considered as 100 kPa for this purpose.

For compact Silt

$k_h=(n_h\ z)/B$

Where:

n_h = the constant of subgrade reaction (kPa/m);

z = the depth (m); and

B = the pile diameter or width (m).

Value n_h for the silt layer can be considered as 5,000 kPa/m.

The conventional SLS value for lateral resistance of a single pile represents the allowable lateral shear force that is applied to a free-head pile (i.e. free to rotate), and is the force required to displace the pile head horizontally by 10 mm, as measured at the ground surface. The ULS lateral resistance is defined as the lateral force applied to the caisson shaft causing unstable caisson displacements due to soil failure or pile structural failure.

6.7 LATERAL EARTH PRESSURE

It is understood permanent flood protection retaining wall is required for the Weston Road bridge area. Also, abutment walls, culverts, and temporary shoring system will have to be designed for lateral earth pressure.

The lateral earth pressures acting on the permanent or temporary walls will depend on the type and method of placement of the backfill materials, on the nature of the soils behind the backfill, on the magnitude of surcharge including construction and traffic loadings, on the freedom of lateral movement of the structure, and on the drainage conditions behind the walls.

Lateral earth pressure coefficients for at-rest, active and passive conditions are provided in Table 6.3. Horizontal pressure on cantilever type wall can be computed according to:

$$\sigma_z = [d\gamma + \gamma' (z-d) + q] \times K$$

Where:

σ_z = effective lateral earth pressure acting at depth z

K = earth pressure coefficient

γ' = effective unit weight of retained soil

γ = total unit weight of retained soil

d = depth to water table below ground surface

q = uniform surcharge at ground surface behind the wall (including the loads incurred by existing structure and traffic loading)

Bulk unit weights (Y) of soils should be used above the water table, and submerged unit weights should be used below the water table. The effects of surcharge load should be applied where required.

It is recommended that non-frost susceptible soil be used as backfill behind retaining walls, which should extend horizontally behind the wall for a distance equal to the depth of frost penetration, which as previously stated is 1.2 m.

6.8 PROTECTION OF EXISTING UTILITIES

Utilities within the construction area should be located and marked at the surface. Excavation by hand is recommended to daylight and confirm utility locations. It should be noted that utility locates are valid for 30 days.

In general, suitable bridging, concrete slabs or other appropriate measures should be used to protect existing uncased utilities. Protection/retaining structures shall be designed in accordance with OPSS and MTO Guidelines, as well as per CFEM (2006), as needed.

6.9 PROTECTION OF EXISTING STRUCTURES

The extent of the zone of influence around the perimeter of any excavation shall be taken as twice the deepest part of the excavation. Existing structures that are within this zone shall be monitored for disturbances related to construction. Global settlements should not exceed 25 mm and differential settlements[2] should be no greater than 15 mm. Refer to CFEM, Table 11.1 for limiting/tolerable values for any anticipated deformation mode.

7 SPECIFIC RECOMMENDATIONS

Following site specific design and construction considerations are given based on the understanding of anticipated structure and understanding of the sub-surface stratigraphy based on geotechnical investigation completed by Wood in 2019. For the purpose of foundation design recommendations, the sub-surface stratigraphy is simplified and presented in Table 7.1. Refer to Part A of this report for detailed description of subsurface characterization for each location.

These recommendations are specific to the proposed structures/type of structures only and revisited during next levels of the design.

7.1 SCARLETT ROAD FLOOD PROTECTION BERM

It is understood a flood protection berm may be likely required north of the existing concrete lined channel as the project advances to next level of design. Boreholes BH-1 to BH-3 completed in the area encountered 2.4 m to 7.2 m fill overlying 4.2 m to 8.7 m thick silty sand/sandy silt/clayey silt stratum.

Layout (especially the offset of the flood protection berm from the north crest of the existing concrete lined channel) and size of the required flood protection berm is not available, as such following high-level design and construction recommendations are provided.

- The flood protection berm with an impervious fill shall be built on compact silty sand or firm clayey silt. Any loose and/or deleterious materials should be removed, and foundation subgrade should be proof rolled.
- The flood protection berm in general shall not be steeper than 3H:1V in inclination; shallower slope may be considered depending on the height of the berm and imposed loads on the berm for which stability analysis should be carried out in the detailed design phase. The assessment should consider the presence of existing concrete lined channel and potential deformation induced by surcharge load.
- Any erodible and coarse soil foundation should be cut-off with minimum 1.5 m cut-off trench.
- Side slopes should be provided with erosion protection in consideration to design flood velocity upstream.

The design and construction of the flood protection berm should comply with applicable standards such as LRIA (2011) and conform to TRCA's design guidelines.

---

[2] More stringent deformation criteria could be applicable to active traffic lanes and approach slabs.

7.2 JANE STREET BRIDGE (STRUCTURE # 091)

The proposed 102 m span Jane Street bridge will provide the required flow capacity through the valley section to handle regional flood. Ancillary structures include (a) 6 m approach slabs on either side of the bridge, (b) abutment wingwalls, and (c) sub-drainage system. An arch culvert installed within the Black Creek valley during early residential/industrial development will be removed, including 10 m to 17 m fill beneath the existing Jane street.

It is understood the proposed replacement bridge structure will follow the alignment of the existing Culvert/Jane Street. It is also understood a restricted traffic flow will be maintained during construction by strategically sequencing the construction (say, half of the bridge under construction while other half in operation or top-down construction method).

The Creek valley is comprised of up to 9 m thick sandy silt/silty sand at surface which could be potentially liquefiable for the design earthquake loading condition. Seismic liquefaction potential of this layer should be further investigated, preferably with seismic Cone Penetration Testing with Pore Pressure Measurements (sCPTu), during the detailed design phase.

Due to deep cut within the existing common fill, permanent cut slope in the fill in front of the abutments should be no steeper than 3H:1V to satisfy long term static condition and Pseudo-Static seismic stability. A detailed description of foundation stratigraphy, material parameters, design criteria, and analyses methodology is provided in Appendix C. Steeper slope could be considered if rigid elements such as pile wall or soil anchor supported wall is provided to withstand lateral load imposed by potentially straining soil mass. Such options may include, but not limited to:

> (a) removal and replacement of common fill behind the wall (to an extent for a significant width behind the wall, for global stability) with engineered fill, or
>
> (b) soil anchor wall, or
>
> (c) secant pile wall designed to take additional lateral load that may be exerted by deformed soil.

A detailed soil – structure interaction modelling should be carried out to support the design of rigid system if option (c) is chosen for the detailed design.

Following additional recommendations are made:

- Structures cannot be founded on man-made fill that is found to contain deleterious materials.
- Any Reinforced Soil Slope (RSS) or Mechanically Stabilized Earth (MSE) system is not recommended within the flood plain where potential for scouring and negatively impacting the foundation is a high possibility.
- The slope surface below regional flood level should be provided with erosion protection all along the slope. Within the high flood level, the slope should be protected with armor stone layer designed for the anticipated flow velocity to avoid high erosive forces and scouring action.

Driven H-piles or drilled caissons are the preferred foundation option. Design recommendations for deep foundation at Jane street bridge extension area is provided in Section 6.6 above.

7.3 ROCKCLIFFE BOULEVARD BRIDGE (STRUCTURE #702)

It is understood the existing bridge and concrete lined Black Creek channel will be removed and replaced with a 52 m span single pier bridge with integral abutments and 6 m (in longitudinal direction) long wing wall and retaining wall either sides (Structure #702). The proposed bridge will have 4.875 m traffic lanes and 2.5 m sidewalk each direction.

Following specific geotechnical recommendations are provided, in addition to general recommendations discussed under Section 6.0.

- Deep foundations (driven H-piles or drilled caissons) are the preferred foundation option for bridge piers and abutment structures that are sensitive to settlement. Foundation design parameters for Rockcliffe Blvd bridge location is provided in Section 6.6.
- Existing fill is 2.4 m thick at the north abutment area, and the fill thickness is 3 m at the south. For the preliminary design purposes, the slope should be 3H:1V or shallower with erosion protection (such as vegetation cover) above High Flood Level (HWL). Appropriately designed rock armor protection should be provided below HWL as per OPSS 1004.
- Due to uncertainty about the quality of existing fill, any structures (such as retaining walls) above elevation 99 m should be founded on engineered fill. Existing common fill should be sub-excavated and replaced with Granular B Type II (or equivalent) fill. The thickness of such sub-excavation shall not be less than the width of the foundation.

7.4 LAVENDER CREEK BOX CULVERT (STRUCTURE # 898)

At present, Lavender Creek (a tributary to Black Creek) flows through a single culvert crossing at Symes Road. It is understood the creek flow capacity will be increased with provision of twin 5.4 m x 1.8 m precast box culverts. The invert of the culvert is 101.75 m at the upstream and 101.3 m downstream with a slope of 1%. Wingwalls or retaining walls are proposed at the inlet/outlet of the culvert structure.

Based on BH-11 advanced at this location, the founding stratum of the box culverts will be alluvial or shallow water deposited loose to compact sandy silt/silt. With limited geotechnical information, it is assumed the stratum below elevation 100 m will be compact sandy silt/silt. As such, it is recommended any soil between elevation 100 m and underside of the culvert be removed and replaced with Granular A material compacted to 98% SPMDD. Lean concrete working mat could also be considered. Consideration should be given to the existing 1200 mm diameter combined sewer line runs underneath the proposed box culverts. This would also provide the working platform for culvert installation and ensure the subgrade integrity.

- Bearing capacity of the native competent sandy silt founding layer at approximate elevation 100 m is provided in Table 6.5 .Given that a grade raise of the existing roadway embankment is not required and that the existing native overburden will not experience additional loading in excess of its loading history, settlements of the culverts should be less than 25 mm.
- Excavation for the foundation, dewatering to keep the working platform safe, and protection of existing utilities (such as 1200 mm dia. RCP combined sewer, manhole etc.) are critical components of construction of Lavender creek box culvert. Refer to Section 6 for detailed discussion on these aspects. Alternatively, an engineered trench box or shoring system (temporary excavation support) could be utilized for excavation support in these materials.
- Due to erosive nature of the founding stratum, and to prevent under-seepage, a cut-off wall shall be provided at either ends of culverts.
- Requirement for erosion protection measures at the inlets and outlets of the culverts should be assessed by a hydraulic engineer in consideration to design peak flow of the creek and high flood level. As a minimum, rip-rap treatment of the culvert outlets should be in accordance with OPSD 810.01 (Rip-Rap Treatment for Sewer and Culvert Outlets).

7.5 SYMES ROAD – LAVENDER CREEK BRIDGE (STRUCTURE #709)

The proposed 22 m span bridge across Lavender Creek replaces the existing bridge and provides design flow capacity access an access road to a private property off Symes Road. The channel bottom will also be lowered as part of flood flow enhancement. Design high flood elevation is understood to be 102.84 m. The access road will have 5157 mm traffic lane with 500 mm shoulder width each way. An existing 150 mm diameter watermain is proposed to be realigned out of the channel widening area.

Based on one borehole, BH12, the stratigraphy at this location consists of silty sand embankment fill overlying loose to compact sandy silt. The borehole was terminated within the upper sandy silt stratum and therefore complete stratigraphy could not be described for the purpose of this report. As such, additional investigation should be carried out to fully understand the subsurface condition at this location during the detailed design phase. As such, the recommendations given below is fully preliminary in nature.

- Deep foundations (either driven H-piles or drilled caissons) are the preferred foundation option. Design recommendation discussed in Section 6.6 can be followed for deep foundation design for a preliminary design.
- For shallow footings and retaining walls (such as for wing walls) founded on compact to dense sandy silt layer, bearing capacity values provided in Table 6.5, and lateral earth pressure coefficients provided in Table 6.2 can be considered.
- Due to the anticipated 5.6 m fill overlying loose to compact sandy silt, Symes Road bridge abutment slope should also be graded to not steeper than 3H:1V. Alternatively, structural element such as piles can be designed to withstand slope induced lateral load, similar to the

abutment slope recommendations provided in Section 7.2 for the Jane Street bridge replacement.

7.6 FLOOD PROTECTION WALL – WESTON ROAD

It is understood a flood protection retaining wall be required along the Black creek bank in the vicinity of Weston Road – Black Creek Drive intersection. Civil design layout is not available currently. General design recommendations for site preparation, shallow foundation, and lateral earth pressure are provided in Section 6.0.

8 REFERENCES

Canadian Foundation Engineering Manual (2006), Canadian Geotechnical Society, 4th Edition.

Coleman (1895), Glacial and Inter-Glacial Deposits near Toronto, University of Chicago Press.

Ontario Geological Survey, Preliminary Map P. 2204, Quaternary Geology of Toronto and Surrounding Area, Southern Ontario.

Ontario Provincial Standards and Specifications (OPSS).

Toronto Region Conservation Authority (2008), Humber River – State of the watershed Report – Surface Water Quantity.

9 CLOSURE

The Report Limitations included as Appendix D are an integral part of this report.

Geotechnical recommendations provided are based on information gathered at specific locations that were investigated based on project understanding at that time. Further geotechnical investigation is recommended for the detailed design phase.

Part B of this report is written by Mathi Shan, M.Sc., P.Eng, and Eddie Sokolowski, E.I.T (Appendix C). Mr. Nazmur Rahman, M.A.Sc., P.E., P.Eng., Senior Associate Geotechnical Engineer conducted an independent review of the report.

Sincerely,

Wood Environment & Infrastructure Solutions,
a Division of Wood Canada Limited

Prepared By:	Reviewed By:
Mathi Shan, M.Sc., P.Eng.	Nazmur Rahman, M.A.Sc., P.E., P.Eng.
Senior Geotechnical Engineer	Senior Associate Geotechnical Engineer

PART B

FOUNDATION DESIGN RECOMMENDATIONS

6 GENERAL FOUNDATION RECOMMENDATIONS

This Section of the report provides foundation design recommendations for the feasibility design of flood management structures for the Rockcliffe study area. The recommendations are based on interpretation of the factual data obtained from the investigation completed by Wood as indicated in Part A of this report.

6.1 SITE CHARACTERIZATION

The study area is located within the Black Creek watershed that feeds into the Humber River drainage system.

The topography in the area prior to land development is gently sloping with ground elevation varying from 102.8 m near Weston Road to elevation 89 m near Janes Street. Recent residential and industrial developments have introduced common fill into the area, limiting the flow capacity of the Black Creek and its tributary, Lavender Creek.

The Black Creek watershed area has been almost entirely developed prior to the adoption of stormwater quantity and quality control measures. As a result, flooding has been an issue of concern in some areas. Some reaches have been transformed into concrete channels to increase the conveyance capacity of the system. Stream flow tends to increase rapidly during storm events due to high rates of run-off from impervious surfaces and lack of stormwater controls (TRCA, 2008).

6.1.1 Frost Depth

According to OPSD3090.101 (Rev 1) from the Ministry of Transportation of Ontario (MTO), the frost penetration depth is 1.2 m for native soils within the subject site. The underside elevation of shallow foundations and pile caps should be located no shallower than this depth with respect to finished grades. Backfill materials to be used above the foundation level should be free-draining with adequate drainage to maintain the 1.2 m frost depth.

Should this minimum required soil cover not be feasible, equivalent synthetic insulation can be used according to Section 13.5.2 of the Canadian Foundation Engineering Manual (CFEM, 2006).

6.1.2 Seismicity

Spectral acceleration (Sa(T[1])) and design PGA values for site are taken from the National Building Code of Canada's (NBCC) seismic hazard calculator (2015) and are summarized in Table 6.2 for 1 in 2475 return period seismic hazard. Based on the reported subsurface conditions, this site is preliminarily classified as Site Class D. As part of the detailed investigation, geophysical shear-wave velocity testing should be done to minimum 30 m depth to establish the site classification for design of seismically sensitive structures.

Table 6.2: Seismic Parameters (NBCC, 2015)

Latitude	Longitude	Sa (0.05)	Sa (0.1)	Sa (0.2)	Sa (0.3)	Sa (0.5)	Sa (1.0)	Sa (2.0)	Sa (5.0)	Sa (10.0)	PGA (g)
43.677 N	79.496 W	0.213	0.259	0.217	0.163	0.114	0.059	0.028	0.007	0.003	0.139

<u>Notes:</u>

1. Values are given in the units of gravitational acceleration (g) (9.81 m/s2).
2. Values given are for firm ground (Site Class 'C'). Refer to NBCC (2015) for an amplification factor to be applied for Class D founding soils.

6.2 DESIGN SOIL PARAMETERS

The soil parameters recommended for the foundation design are summarized in Table 6.3 below.

The design lateral earth pressure distribution on foundation walls and retaining walls will depend on the amount of wall and movement/rotation as follows:

- "Active" condition (K_a) should be used if the retaining wall is allowed to move (or rotate) away from the retained soil.
- "Passive" condition (K_p) should be used if the retaining wall is allowed to move (or rotate) towards the soil.
- "At rest" condition (K_0) should be used if the retaining wall is not allowed to move/rotate.

---

[1] T is the vibration period in seconds.

Table 6.3: Design Parameters of Soil Stratums

Soil Type	Fill	Silt with Sand / Silty Sand / Sandy Silt	Silty clay to clayey silt (stiff to very stiff)	Silty clay to clayey silt (very stiff to hard)
Bulk unit weight (kN/m^3)	15 to 17	18 to 19	19 to 20	20 to 21
Undrained shear strength (kPa)	0	0	50 to 100*	100 to 200*
Effective friction angle (degrees)	23 to 25	25 to 28	28 to 30	30 to 32
Coefficient of lateral earth pressure				
- At rest	0.57 - 0.61	0.53 - 0.57	0.5 - 0.53	0.47 - 0.53
- Active	0.4 - 0.44	0.36 - 0.4	0.33 - 0.36	0.3 - 0.36
- Passive (reduced to limit lateral movement)	1.0	1.0	1.0	1.0

*For undrained condition only

6.3 SITE PREPARATION

Foundation excavation into competent native sand or clayey silt to silty clay may require stripping/removal of surficial incompetent soils and any exposed soils which contain organic matters and other compressible and weak and deleterious materials. The base of the excavation should be proof-rolled with heavy roller. Over excavation and backfill with competent soil may also be employed depending on subsurface condition. During proof-rolling, spongy, wet or soft/loose spots should be sub-excavated to stable subgrade and replaced with approved soil, compatible with subgrade conditions.

6.4 EXCAVATION AND DEWATERING

All excavations must be carried out in accordance with the latest version of O. Reg. 213/91 (Occupational Health and Safety Act (OHSA) and Regulations for Construction Projects). The soils found at the site are classified as follows:

○ Fill, silty, sandy, clayey above the groundwater table	- Type 3
○ Compact Sandy Silt, above the groundwater table	- Type 3
○ Firm to Stiff Clayey Silt	- Type 3

- Very loose Fill (SPT ‘N’ < 4), Peat - Type 4

It should be noted that where an excavation is made through more than one soil type, the soil type with lowest classification governs. Where entry is required into an excavation that is greater than 1.2 m, the trench walls must be suitably sloped and/or braced in accordance with O. Reg. 213/91 of the OHSA. Should a temporary excavation support system be designed and constructed, it should be in accordance with OPSS 539 (Temporary Protection Systems) as applicable for lateral movement Performance Level 2.

Excavation in the native sand/silt below groundwater will require dewatering to ensure dry working condition as well as to ensure integrity of the founding stratum is maintained during construction.

A qualified geotechnical engineer should review all proposed excavation procedures. If shored excavations are considered, a licensed professional engineer should approve the proposed shoring method.

Settlement of the native soils should be estimated in consideration to the location and construction sequencing of an embankment as a surcharge load. In most cases regrading/re-sloping may be necessary during construction to maintain grades and lines of earth structures such as embankments.

Any excavation and removal of fill originally placed may require shoring system if construction is planned while half of the existing lanes will be opened for traffic. Shoring system should be designed per soil design parameters provided in Section 6.1. Abutment slope of the existing fill at the locations of Jane street bridge, Rockcliffe bridge and Lavender Creek – Symes Road should not be steeper than 3H:1V to satisfy the long-term static condition, and Pseudo-Static stability. Steeper slope could be considered if rigid elements such as pile wall or soil anchor supported wall is provided to withstand lateral load imposed by potentially straining soil mass. A detailed soil – structure interaction modelling should be carried out to support the design of rigid system.

For earth-retaining structures, stability checks should be done for overturning, uplift, sliding and bearing capacity. Minimum factors of safety for each stability check are presented in Table 6.4.

Table 6.4: Design Factors of Safety for Retaining Structures, Slopes, and Flood Berms

Failure Mode	Corresponding Minimum Factor of Safety	Reference
Uplift	1.5 – 2.0	Table 8.3, CFEM
Overturning	2.0	NAVFAC DM 7.02
Bearing Capacity	2.0 – 3.0	Table 8.3, CFEM
Sliding	1.5	Fig. 24.12, CFEM
Global Slope Stability	1.3 (end of construction) 1.5 (long term steady state) 1.2 to 1.3 (Rapid Drawdown, see Note 1) 1.1 (Pseudo Static)	CFEM, LRIA (Note 2)

Notes:

1. Rapid drawdown case is applicable for upstream slopes of flood protection berms
2. Lakes and River Improvement Act, Ontario Ministry of Natural Resources (2011)

6.5 FOUNDATION DESIGN

Silty sand/sandy silt fill or loose to compact alluvial / shallow water deposit commonly encountered in the area is not capable of supporting heavy foundation loads. Conventional spread footings for lightly loaded structures can be founded on silty sand layer (Shallow water deposit) or stiff to very stiff silty clay depending on the founding grade. The bearing surface must be clean and free of any loose or deleterious material.

Deep foundations may be considered in cases where conventional spread footing is not feasible. Bedrock shale is relatively deep (about 30 m below grade) and driven piles or cast-in-place caisson piles socketed into the Shale are suitable deep foundation options. Likely the most practical deep foundation type is provided by driven steel piles, particularly where the overburden is thicker and sand layers/lenses presence within silty clay stratum overlying bedrock shale. Augured, cast-in-place caissons may also be used, if they are more cost competitive than driven steel piles or as dictated by design and construction sequencing. Pile casing may be required in areas where thick fill / shallow water sandy silt deposit presence, as well as in locations where potentially water bearing sand lenses/laminae are present (see Table 7.1).

6.5.1 Shallow Spread/Strip Foundation

Shallow foundations (spread/strip foundations) may be used if the foundations are founded on engineered fill, native competent clay deposit, and/or sound bedrock.

The Serviceability Limit State (SLS)/Ultimate Limit State (ULS) values shown in Table 6.5 should be used for foundation design. The values shown assume that the soils within the zone of influence of the footing (a depth of about 2 times the footing width below the foundation grade) are not weaker than the indicated subgrade soils.

Table 6.5: Recommended Bearing Capacity for Spread Shallow Foundation

Design Capacity (kPa)	Sandy Fill	Silt with sand (elevation ranges from 83.5 m to 104.2 m)	Silty clay (elevation ranges from 73.6 m to 102.8 m)
Factored Ultimate Limit State (ULS), Note 2	Note 1	150	225
Serviceability Limit State (SLS), Note 3		100	150

Notes:

1. Structures cannot be founded on common fill. Common fill to be sub-excavated and replaced with engineered fill if required. Recommendation for engineered fill can be provided once civil/structural layout is finalized and the layout necessitates such requirement for sub-excavation of common fill and placement of engineered fill.
2. A geotechnical resistance factor of 0.5 applied.
3. SLS capacity provided assume 2 m x 2 m foundation, and the value given is conservative estimate for 25 mm settlement and differential settlement of 15 mm. Detailed soil – structure modelling is required to calculate the SLS capacity for different foundation conditions.
4. Frost penetration depth is approximately 1.2 m for Toronto and region. Therefore, the founding level should be below 1.2 m from grade.

The SLS/ULS values shown in Table 6.5 should be used for preliminary design in order to assess the feasibility of using shallow foundations and/or assessing the sizes of shallow foundations. For detail design, detailed foundation analyses will be required to confirm that the bearing pressures and corresponding settlements/foundation movements are within tolerable limits.

These values are based on concentric vertical loading. Inclined loads can be evaluated on a case-by-case basis once further foundation requirements are known in the detailed design.

6.6 DEEP FOUNDATION

Deep foundation recommendations in this section are presented for driven H-piles and bored caissons that may be used for the potential bridge piers and abutment walls of the proposed bridge replacement/channel expansion structures. A fill depth of minimum 1.2 m is assumed above the underside of the pile cap/pile head elevation, and for design, it is assumed that the groundwater table is at the finished ground surface.

Following construction issues should be considered during the design stage in selection of pile type:

- Piles may have to be driven through hard silty clay stratum for the pile tip to be founded on Shale bedrock. Selection of pile type and hammer type should be based on analyses of dynamic waves through selective pile and soil and the capacity of pile should be confirmed by field load testing.
- Pile driving will generate vibration that may be above tolerance of adjacent structures. A vibration monitoring program should be in place.
- Bored pile may be an option for bridge replacements depending on the design and construction sequencing / construction method, for example, top-down construction method. If bored caissons are to be used, consideration should be given to loose to compact sandy silt fill and native sandy silt (of alluvial or shallow water glacial deposit). Borehole may become unstable and pile casing may be required to advance through these layers. Also, some locations (e.g, BH-15 and BH-20) encountered wet sandy lense/laminae in the lower silty clay stratum overlying the Shale bedrock.
- If slurry construction technique to be chosen for the bored piles, detrimental effect of poor construction (such as formation of thick layer of slurry between the pile and the surrounding soil) should be considered during the design (CFEM, 2006).

6.6.1 Driven H-Piles

For piled foundations, HP 310 x 110 steel piles (typically used in Ontario) driven with adequate hammers to hard silty clay till or Shale in accordance with the procedures described in OPSS 903 are anticipated to mobilize following skin friction values. The skin friction values provided in Table 6.6 can be used to estimate the unfactored ULS capacity of driven pile. However, the actual mobilized ULS resistance may be significantly lower if the pile tips are not adequately set on hard till or shale.

Table 6.6: Unit Skin Friction Values for Cohesive Sub-surface Stratums

Stratum	Undrained Strength (kPa)	Unit skin friction (kPa) (CFEM, Clause 18.2.1)
Fill	To be ignored	
Shallow water/Alluvial sandy silt		
Upper Silty Clay (N > 15)	100	45
Lower Silty Clay (N > 30)	200	65
Shale	Capacity from toe resistance	

Alternatively, capacity of driven H-pile for specific bridge location is provided below.

Table 6.7: Capacity of Driven H-Piles

Bridge Location	Janes St (BH-05)	Rockcliffe (BH-06)
Assumed Pile Type	HP 310 x 110	HP 310 x 110
Pile Tip El. in Shale (m), Note 3	75	72 (assumed)
Pile length below fill (m), Note 2	23	28
Factored ULS Capacity (kN), See Note 1	800	700
SLS Capacity (kN)	600	500

Notes:
1. A geotechnical resistance factor of 0.4 applied as per CFEM Table 8-1. Per CFEM, resistance factor can be increased to 0.6 if site specific pile load testing is carried out. Also, for cohesive soil with undrained shear strength > 100 kPa, capacity given are based on CFEM clause 18.2.1. The CFEM suggests pile capacity should be determined by test loading for this type of soil for the final design.
2. Existing fill will be completely or partially removed as part of channel widening.
3. Lower pile capacity should be considered if the pile tip to be terminated on hard silty clay.

Need for detailed assessment of corrosion potential of driven H-piles should be based on (a) preliminary electro-chemical properties provided in Section 6.1.2, (b) location of pile/pile cap above or below water table, and heterogeneity of the soil layer above water table. Detailed investigation and laboratory test program should be executed for the next level of design.

6.6.2 Bored Caissons

Bored caissons in hard clay or socketed into Shale are also the preferred option to support the bridge structure. Temporary casings will likely be required given the risk of sloughing within the drilled shafts and to manage groundwater. Specially, basal gravelly sand was encountered at the Rockcliffe bridge area. It is assumed base of the rock socket will be cleaned and inspected. For the preliminary design purposes, the geotechnical resistances in compression are given in Table 6.8 for bored caissons with diameters of 1.2 m. Resistances were computed according to Section 18.2.1 of the CFEM. It should be mentioned that factored ULS values were obtained by using a geotechnical resistance factor of 0.4 (Table 8.1, CFEM). The SLS values provided correspond to allowable capacities to limit settlement to 25 mm.

Table 6.8: Capacity of Caisson Foundation

Description	Janes St (BH-05)			Rockcliffe (BH-07)			Symes Road Bridge
	Pile tip in hard silty clay	Pile tip in shale		Pile tip in hard silty clay	Pile tip in shale		
Assumed Pile Dia./ Socket length (m)	1.2/0	1.2/1.2		1.2/0	1.2/1.2		Subsurface condition to be investigated. Consider values provided for Janes street for preliminary design.
Pile Tip El. (m) - assumed	76	75		73	72		
Factored ULS Capacity (kN)	2000	2500		2100	2600		
SLS Capacity (kN)	1500	1900		1600	2000		

Notes:
1. A geotechnical resistance factor of 0.4 applied as per CFEM Table 8-1. Per CFEM, resistance factor can be increased to 0.6 if site specific pile load testing is carried out.
2. Existing fill will be completely or partially removed as part of channel widening.

6.6.3 Lateral Resistance

The pile resistance and deformation to lateral loads is strongly dependent on the structural configuration at the loadings and should be determined based on field tests and adequate soil-structure analyses. Significant lateral loads may be resisted by adequately battered piles.

For silty clay

For the conceptual design of piles in cohesive soil, the resistance to lateral loading versus deflection in front of a single pile may be calculated from the coefficient of horizontal subgrade reaction (k_h in kPa/m). k_h is determined based on the equations given below (CFEM 1996, CHBDC, 2014):

$k_h=(67S_u)/B$

Where:

k_h = the coefficient of horizontal subgrade reaction (kPa/m);

S_u = the undrained shear strength of the soil (kPa); and

B = the pile diameter or width (m).

Undrained shear strength of the upper clay shall be considered as 70 kPa, and undrained shear strength of the lower clay can be considered as 100 kPa for this purpose.

For compact Silt

$k_h=(n_h\ z)/B$

Where:

n_h = the constant of subgrade reaction (kPa/m);

z = the depth (m); and

B = the pile diameter or width (m).

Value n_h for the silt layer can be considered as 5,000 kPa/m.

The conventional SLS value for lateral resistance of a single pile represents the allowable lateral shear force that is applied to a free-head pile (i.e. free to rotate), and is the force required to displace the pile head horizontally by 10 mm, as measured at the ground surface. The ULS lateral resistance is defined as the lateral force applied to the caisson shaft causing unstable caisson displacements due to soil failure or pile structural failure.

6.7 LATERAL EARTH PRESSURE

It is understood permanent flood protection retaining wall is required for the Weston Road bridge area. Also, abutment walls, culverts, and temporary shoring system will have to be designed for lateral earth pressure.

The lateral earth pressures acting on the permanent or temporary walls will depend on the type and method of placement of the backfill materials, on the nature of the soils behind the backfill, on the magnitude of surcharge including construction and traffic loadings, on the freedom of lateral movement of the structure, and on the drainage conditions behind the walls.

Lateral earth pressure coefficients for at-rest, active and passive conditions are provided in Table 6.3. Horizontal pressure on cantilever type wall can be computed according to:

$$\sigma_z = [d\gamma + \gamma' (z-d) + q] \times K$$

Where:

σ_z = effective lateral earth pressure acting at depth z

K = earth pressure coefficient

γ' = effective unit weight of retained soil

γ = total unit weight of retained soil

d = depth to water table below ground surface

q = uniform surcharge at ground surface behind the wall (including the loads incurred by existing structure and traffic loading)

Bulk unit weights (Y) of soils should be used above the water table, and submerged unit weights should be used below the water table. The effects of surcharge load should be applied where required.

It is recommended that non-frost susceptible soil be used as backfill behind retaining walls, which should extend horizontally behind the wall for a distance equal to the depth of frost penetration, which as previously stated is 1.2 m.

6.8 PROTECTION OF EXISTING UTILITIES

Utilities within the construction area should be located and marked at the surface. Excavation by hand is recommended to daylight and confirm utility locations. It should be noted that utility locates are valid for 30 days.

In general, suitable bridging, concrete slabs or other appropriate measures should be used to protect existing uncased utilities. Protection/retaining structures shall be designed in accordance with OPSS and MTO Guidelines, as well as per CFEM (2006), as needed.

6.9 PROTECTION OF EXISTING STRUCTURES

The extent of the zone of influence around the perimeter of any excavation shall be taken as twice the deepest part of the excavation. Existing structures that are within this zone shall be monitored for disturbances related to construction. Global settlements should not exceed 25 mm and differential settlements[2] should be no greater than 15 mm. Refer to CFEM, Table 11.1 for limiting/tolerable values for any anticipated deformation mode.

7 SPECIFIC RECOMMENDATIONS

Following site specific design and construction considerations are given based on the understanding of anticipated structure and understanding of the sub-surface stratigraphy based on geotechnical investigation completed by Wood in 2019. For the purpose of foundation design recommendations, the sub-surface stratigraphy is simplified and presented in Table 7.1. Refer to Part A of this report for detailed description of subsurface characterization for each location.

These recommendations are specific to the proposed structures/type of structures only and revisited during next levels of the design.

7.1 SCARLETT ROAD FLOOD PROTECTION BERM

It is understood a flood protection berm may be likely required north of the existing concrete lined channel as the project advances to next level of design. Boreholes BH-1 to BH-3 completed in the area encountered 2.4 m to 7.2 m fill overlying 4.2 m to 8.7 m thick silty sand/sandy silt/clayey silt stratum.

Layout (especially the offset of the flood protection berm from the north crest of the existing concrete lined channel) and size of the required flood protection berm is not available, as such following high-level design and construction recommendations are provided.

- The flood protection berm with an impervious fill shall be built on compact silty sand or firm clayey silt. Any loose and/or deleterious materials should be removed, and foundation subgrade should be proof rolled.
- The flood protection berm in general shall not be steeper than 3H:1V in inclination; shallower slope may be considered depending on the height of the berm and imposed loads on the berm for which stability analysis should be carried out in the detailed design phase. The assessment should consider the presence of existing concrete lined channel and potential deformation induced by surcharge load.
- Any erodible and coarse soil foundation should be cut-off with minimum 1.5 m cut-off trench.
- Side slopes should be provided with erosion protection in consideration to design flood velocity upstream.

The design and construction of the flood protection berm should comply with applicable standards such as LRIA (2011) and conform to TRCA's design guidelines.

---

[2] More stringent deformation criteria could be applicable to active traffic lanes and approach slabs.

7.2 JANE STREET BRIDGE (STRUCTURE # 091)

The proposed 102 m span Jane Street bridge will provide the required flow capacity through the valley section to handle regional flood. Ancillary structures include (a) 6 m approach slabs on either side of the bridge, (b) abutment wingwalls, and (c) sub-drainage system. An arch culvert installed within the Black Creek valley during early residential/industrial development will be removed, including 10 m to 17 m fill beneath the existing Jane street.

It is understood the proposed replacement bridge structure will follow the alignment of the existing Culvert/Jane Street. It is also understood a restricted traffic flow will be maintained during construction by strategically sequencing the construction (say, half of the bridge under construction while other half in operation or top-down construction method).

The Creek valley is comprised of up to 9 m thick sandy silt/silty sand at surface which could be potentially liquefiable for the design earthquake loading condition. Seismic liquefaction potential of this layer should be further investigated, preferably with seismic Cone Penetration Testing with Pore Pressure Measurements (sCPTu), during the detailed design phase.

Due to deep cut within the existing common fill, permanent cut slope in the fill in front of the abutments should be no steeper than 3H:1V to satisfy long term static condition and Pseudo-Static seismic stability. A detailed description of foundation stratigraphy, material parameters, design criteria, and analyses methodology is provided in Appendix C. Steeper slope could be considered if rigid elements such as pile wall or soil anchor supported wall is provided to withstand lateral load imposed by potentially straining soil mass. Such options may include, but not limited to:

(a) removal and replacement of common fill behind the wall (to an extent for a significant width behind the wall, for global stability) with engineered fill, or

(b) soil anchor wall, or

(c) secant pile wall designed to take additional lateral load that may be exerted by deformed soil.

A detailed soil – structure interaction modelling should be carried out to support the design of rigid system if option (c) is chosen for the detailed design.

Following additional recommendations are made:

- Structures cannot be founded on man-made fill that is found to contain deleterious materials.
- Any Reinforced Soil Slope (RSS) or Mechanically Stabilized Earth (MSE) system is not recommended within the flood plain where potential for scouring and negatively impacting the foundation is a high possibility.
- The slope surface below regional flood level should be provided with erosion protection all along the slope. Within the high flood level, the slope should be protected with armor stone layer designed for the anticipated flow velocity to avoid high erosive forces and scouring action.

Driven H-piles or drilled caissons are the preferred foundation option. Design recommendations for deep foundation at Jane street bridge extension area is provided in Section 6.6 above.

7.3 ROCKCLIFFE BOULEVARD BRIDGE (STRUCTURE #702)

It is understood the existing bridge and concrete lined Black Creek channel will be removed and replaced with a 52 m span single pier bridge with integral abutments and 6 m (in longitudinal direction) long wing wall and retaining wall either sides (Structure #702). The proposed bridge will have 4.875 m traffic lanes and 2.5 m sidewalk each direction.

Following specific geotechnical recommendations are provided, in addition to general recommendations discussed under Section 6.0.

- Deep foundations (driven H-piles or drilled caissons) are the preferred foundation option for bridge piers and abutment structures that are sensitive to settlement. Foundation design parameters for Rockcliffe Blvd bridge location is provided in Section 6.6.
- Existing fill is 2.4 m thick at the north abutment area, and the fill thickness is 3 m at the south. For the preliminary design purposes, the slope should be 3H:1V or shallower with erosion protection (such as vegetation cover) above High Flood Level (HWL). Appropriately designed rock armor protection should be provided below HWL as per OPSS 1004.
- Due to uncertainty about the quality of existing fill, any structures (such as retaining walls) above elevation 99 m should be founded on engineered fill. Existing common fill should be sub-excavated and replaced with Granular B Type II (or equivalent) fill. The thickness of such sub-excavation shall not be less than the width of the foundation.

7.4 LAVENDER CREEK BOX CULVERT (STRUCTURE # 898)

At present, Lavender Creek (a tributary to Black Creek) flows through a single culvert crossing at Symes Road. It is understood the creek flow capacity will be increased with provision of twin 5.4 m x 1.8 m precast box culverts. The invert of the culvert is 101.75 m at the upstream and 101.3 m downstream with a slope of 1%. Wingwalls or retaining walls are proposed at the inlet/outlet of the culvert structure.

Based on BH-11 advanced at this location, the founding stratum of the box culverts will be alluvial or shallow water deposited loose to compact sandy silt/silt. With limited geotechnical information, it is assumed the stratum below elevation 100 m will be compact sandy silt/silt. As such, it is recommended any soil between elevation 100 m and underside of the culvert be removed and replaced with Granular A material compacted to 98% SPMDD. Lean concrete working mat could also be considered. Consideration should be given to the existing 1200 mm diameter combined sewer line runs underneath the proposed box culverts. This would also provide the working platform for culvert installation and ensure the subgrade integrity.

- Bearing capacity of the native competent sandy silt founding layer at approximate elevation 100 m is provided in Table 6.5 .Given that a grade raise of the existing roadway embankment is not required and that the existing native overburden will not experience additional loading in excess of its loading history, settlements of the culverts should be less than 25 mm.
- Excavation for the foundation, dewatering to keep the working platform safe, and protection of existing utilities (such as 1200 mm dia. RCP combined sewer, manhole etc.) are critical components of construction of Lavender creek box culvert. Refer to Section 6 for detailed discussion on these aspects. Alternatively, an engineered trench box or shoring system (temporary excavation support) could be utilized for excavation support in these materials.
- Due to erosive nature of the founding stratum, and to prevent under-seepage, a cut-off wall shall be provided at either ends of culverts.
- Requirement for erosion protection measures at the inlets and outlets of the culverts should be assessed by a hydraulic engineer in consideration to design peak flow of the creek and high flood level. As a minimum, rip-rap treatment of the culvert outlets should be in accordance with OPSD 810.01 (Rip-Rap Treatment for Sewer and Culvert Outlets).

7.5 SYMES ROAD – LAVENDER CREEK BRIDGE (STRUCTURE #709)

The proposed 22 m span bridge across Lavender Creek replaces the existing bridge and provides design flow capacity access an access road to a private property off Symes Road. The channel bottom will also be lowered as part of flood flow enhancement. Design high flood elevation is understood to be 102.84 m. The access road will have 5157 mm traffic lane with 500 mm shoulder width each way. An existing 150 mm diameter watermain is proposed to be realigned out of the channel widening area.

Based on one borehole, BH12, the stratigraphy at this location consists of silty sand embankment fill overlying loose to compact sandy silt. The borehole was terminated within the upper sandy silt stratum and therefore complete stratigraphy could not be described for the purpose of this report. As such, additional investigation should be carried out to fully understand the subsurface condition at this location during the detailed design phase. As such, the recommendations given below is fully preliminary in nature.

- Deep foundations (either driven H-piles or drilled caissons) are the preferred foundation option. Design recommendation discussed in Section 6.6 can be followed for deep foundation design for a preliminary design.
- For shallow footings and retaining walls (such as for wing walls) founded on compact to dense sandy silt layer, bearing capacity values provided in Table 6.5, and lateral earth pressure coefficients provided in Table 6.2 can be considered.
- Due to the anticipated 5.6 m fill overlying loose to compact sandy silt, Symes Road bridge abutment slope should also be graded to not steeper than 3H:1V. Alternatively, structural element such as piles can be designed to withstand slope induced lateral load, similar to the

abutment slope recommendations provided in Section 7.2 for the Jane Street bridge replacement.

7.6 FLOOD PROTECTION WALL – WESTON ROAD

It is understood a flood protection retaining wall be required along the Black creek bank in the vicinity of Weston Road – Black Creek Drive intersection. Civil design layout is not available currently. General design recommendations for site preparation, shallow foundation, and lateral earth pressure are provided in Section 6.0.

8 REFERENCES

Canadian Foundation Engineering Manual (2006), Canadian Geotechnical Society, 4th Edition.

Coleman (1895), Glacial and Inter-Glacial Deposits near Toronto, University of Chicago Press.

Ontario Geological Survey, Preliminary Map P. 2204, Quaternary Geology of Toronto and Surrounding Area, Southern Ontario.

Ontario Provincial Standards and Specifications (OPSS).

Toronto Region Conservation Authority (2008), Humber River – State of the watershed Report – Surface Water Quantity.

9 CLOSURE

The Report Limitations included as Appendix D are an integral part of this report.

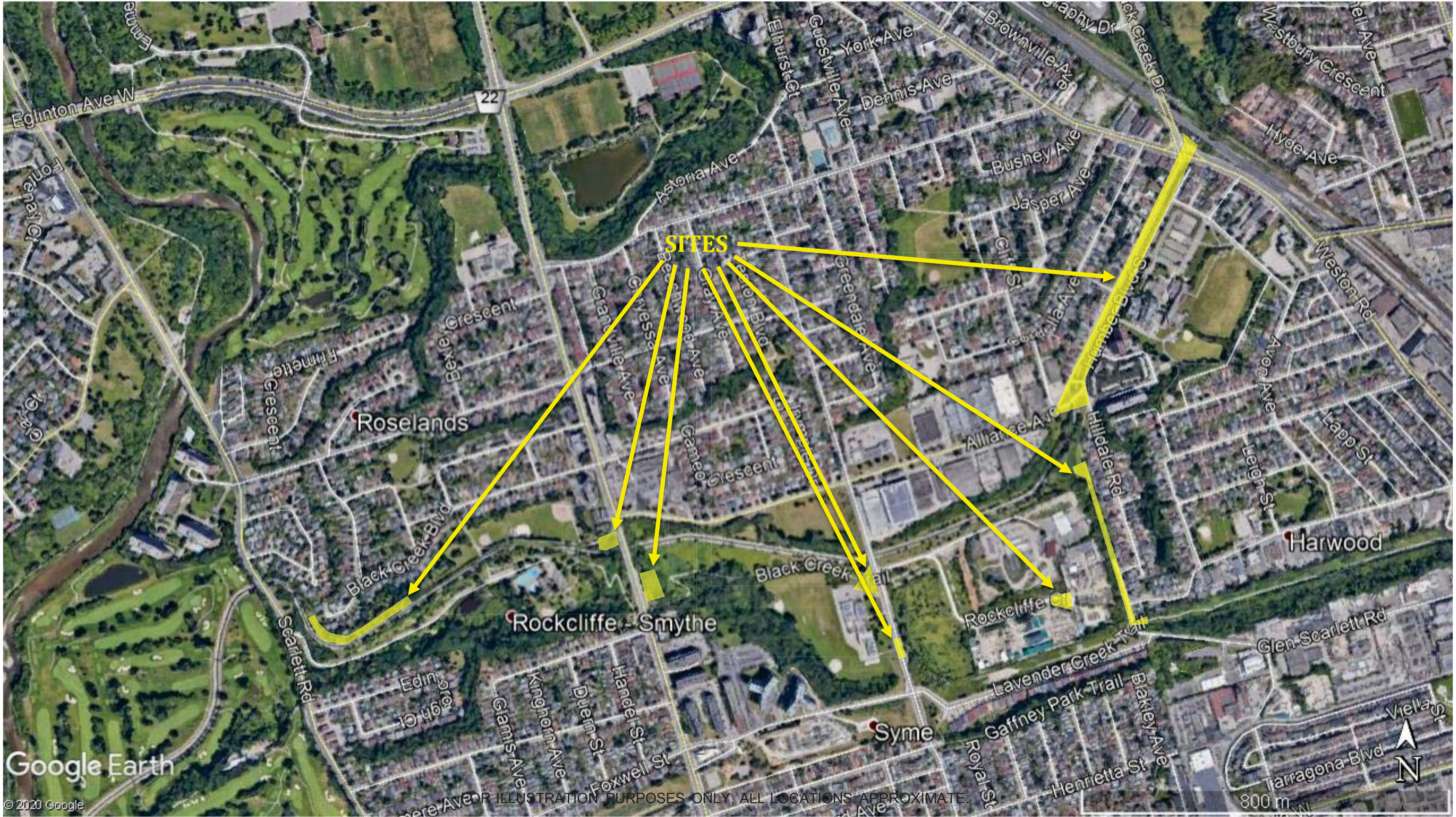
Geotechnical recommendations provided are based on information gathered at specific locations that were investigated based on project understanding at that time. Further geotechnical investigation is recommended for the detailed design phase.

Part B of this report is written by Mathi Shan, M.Sc., P.Eng, and Eddie Sokolowski, E.I.T (Appendix C). Mr. Nazmur Rahman, M.A.Sc., P.E., P.Eng., Senior Associate Geotechnical Engineer conducted an independent review of the report.

Sincerely,

Wood Environment & Infrastructure Solutions,
a Division of Wood Canada Limited

Prepared By:	Reviewed By:
Mathi Shan, M.Sc., P.Eng.	Nazmur Rahman, M.A.Sc., P.E., P.Eng.
Senior Geotechnical Engineer	Senior Associate Geotechnical Engineer



CLIENT:

TORONTO & REGION
CONSERVATION AUTHORITY

CLIENT LOGO:

Toronto and Region Conservation Authority

wood.

Wood Environment &
Infrastructure Solutions
3450 Harvester Road, Suite 100
Burlington, Ontario

LEGEND:

🟨 Site Location

DWN BY: TH

CHK'D BY: WK

DATUM: NAD83

PROJECTION: UTM Zone 17

SCALE: As Shown

PROJECT:

FLOOD REMEDIATION AND TRANSPORTATION
FEASIBILITY STUDY- GEOTECHINCAL
INVESTIGATION
ROCKCLIFFE S.P.A., TORONTO, ONTARIO

TITLE:

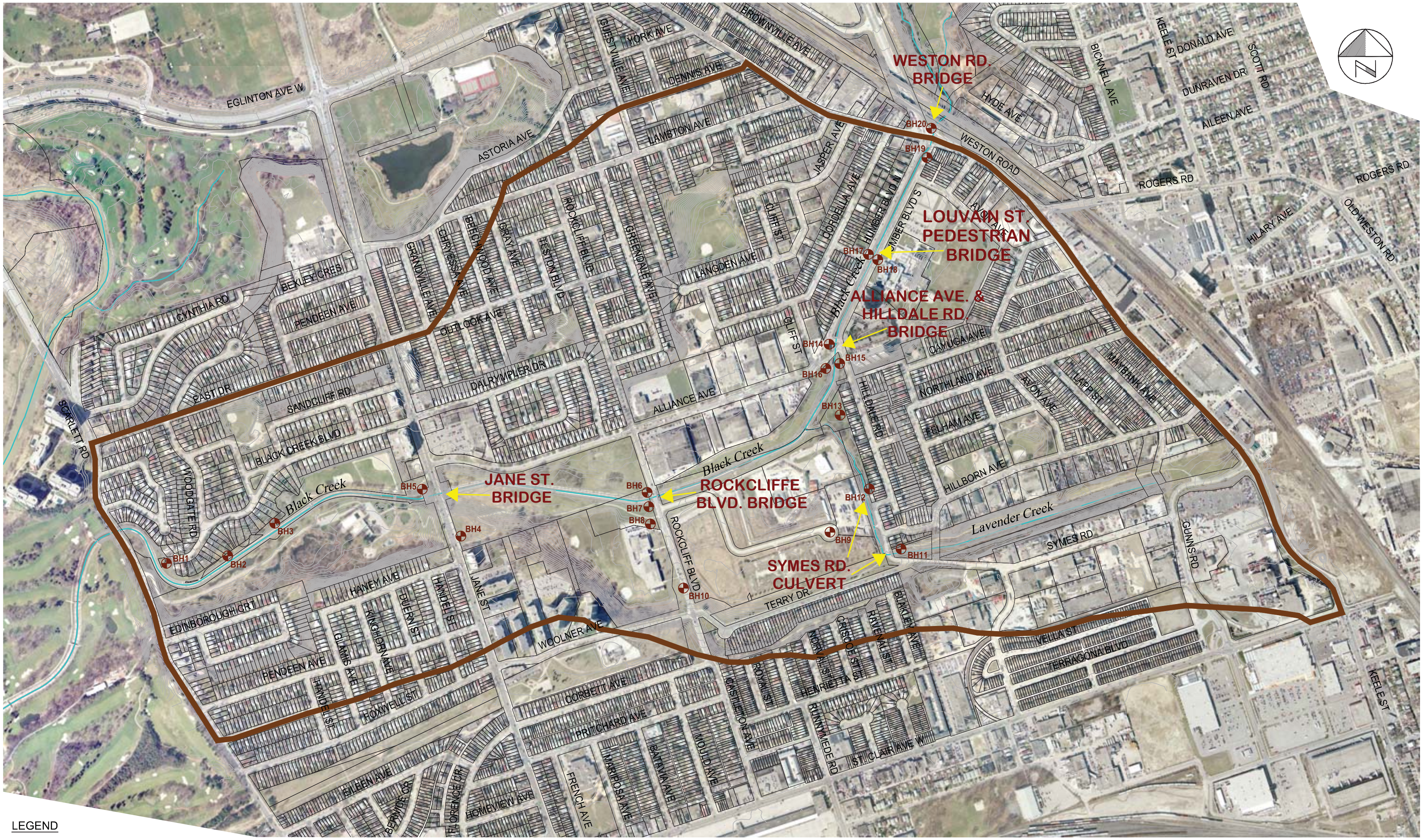
SITE LOCATION PLAN

REV. NO.: A

DATE: APRIL 2020

PROJECT NO.: TPB198079.3.5

NO.: FIGURE 1



LEGEND

- — STUDY AREA
- — PARCEL FABRIC
- — WATERCOURSE
- — CONTOUR (1m)
- BH9 ● BOREHOLE LOCATION

SCALE VALID ONLY FOR
24"x36" VERSION

FLOOD REMEDIATION AND
TRANSPORTATION FEASIBILITY
STUDY OF ROCKVILLE
SPECIAL POLICY AREA
TRCA

BOREHOLE
LOCATION
PLAN

wood.

Scale 1:4500
0 50 100 200

Consultant File No.
TPB198079

Figure No.

Path: P:\2019\Projects\TPB198079 -- Black Creek At Rockcliffe SPA Flood Remediation\06_DES-ENG\01_CAD\02_DWGS\05_WR\01_PROJ\2020-04\Fig Borehole.dwg

Plotted By: richard.bortolo
Last Saved By: richard.bortolo

Plotted: 2020-04-06
Last Saved: 2020-04-06

APPENDIX A

Wood Environment & Infrastructure Solutions

EXPLANATION OF BOREHOLE LOG

This form describes some of the information provided on the borehole logs, which is based primarily on examination of the recovered samples, and the results of the field and laboratory tests. Additional description of the soil/rock encountered is given in the accompanying geotechnical report.

GENERAL INFORMATION

Project details, borehole number, location coordinates and type of drilling equipment used are given at the top of the borehole log.

SOIL LITHOLOGY

Elevation and Depth

This column gives the elevation and depth of inferred geologic layers. The elevation is referred to the datum shown in the Description column.

Lithology Plot

This column presents a graphic depiction of the soil and rock stratigraphy encountered within the borehole.

Description

This column gives a description of the soil stratums, based on visual and tactile examination of the samples augmented with field and laboratory test results. Each stratum is described according to the *Modified Unified Soil Classification System*.

The compactness condition of cohesionless soils (SPT) and the consistency of cohesive soils (undrained shear strength) are defined as follows *(Ref. Canadian Foundation Engineering Manual)*:

Compactness of Cohesionless Soils	SPT N-Value
Very loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	> 50

Consistency of Cohesive Soils	Undrained Shear Strength	
	kPa	psf
Very soft	0 to 12	0 to 250
Soft	12 to 25	250 to 500
Firm	25 to 50	500 to 1000
Stiff	50 to 100	1000 to 2000
Very stiff	100 to 200	2000 to 4000
Hard	Over 200	Over 4000

Soil Sampling

Sample types are abbreviated as follows:

SS	Split Spoon	TW	Thin Wall Open (Pushed)	RC	Rock Core
AS	Auger Sample	TP	Thin Wall Piston (Pushed)	WS	Washed Sample

Additional information provided in this section includes sample numbering, sample recovery and numerical testing results.

Field and Laboratory Testing

Results of field testing (e.g., SPT, pocket penetrometer, and vane testing) and laboratory testing (e.g., natural moisture content, and limits) executed on the recovered samples are plotted in this section.

Instrumentation Installation

Instrumentation installations (monitoring wells, piezometers, inclinometers, etc.) are plotted in this section. Water levels, if measured during fieldwork, are also plotted. These water levels may or may not be representative of the static groundwater level depending on the nature of soil stratum where the piezometer tips are located, the time elapsed from installation to reading and other applicable factors.

Comments

This column is used to describe non-standard situations or notes of interest.

Wood
Environment & Infrastructure Solutions
3450 Harvester Road, Suite 100
Burlington, Ontario, L7N 3W5
Tel: (905) 335-2353
Fax: (905) 335-1414
www.woodplc.com

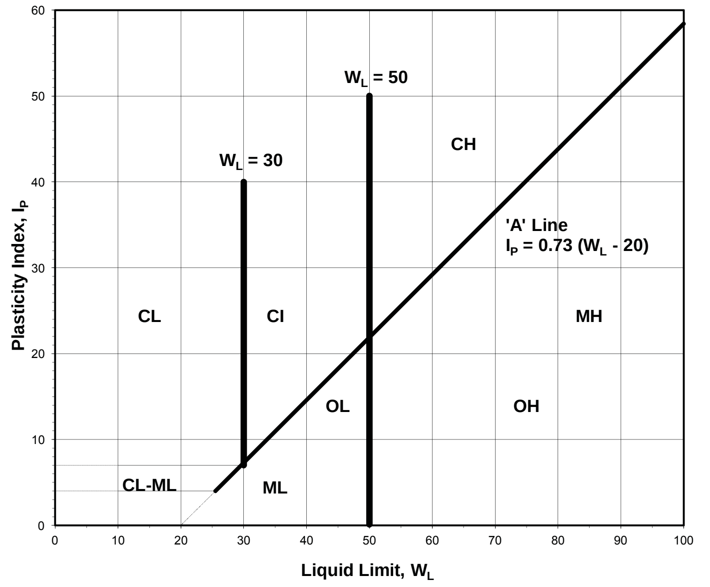
MODIFIED * UNIFIED CLASSIFICATION SYSTEM FOR SOILS

*The soil of each stratum is described using the Unified Soil Classification System (Technical Memorandum 36-357 prepared by Waterways Experiment Station, Vicksburg, Mississippi, Corps of Engineers, U.S Army. Vol. 1 March 1953.) modified slightly so that an inorganic clay of "medium plasticity" is recognized.

MAJOR DIVISION			GROUP SYMBOL	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA
COARSE GRAINED SOILS (MORE THAN HALF BY WEIGHT LARGER THAN 75µm)	GRAVELS MORE THAN HALF THE COARSE FRACTION LARGER THAN 4.75mm	CLEAN GRAVELS (TRACE OR NO FINES)	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	$C_u= \frac{D_{60}}{D_{10}}>4; C_C= \frac{(D_{30})^2}{D_{10} X D_{60}} = 1 \text{ to } 3$
			GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	NOT MEETING ABOVE REQUIREMENTS
		DIRTY GRAVELS (WITH SOME OR MORE FINES)	GM	SILTY GRAVELS, GRAVEL-SAND- SILT MIXTURES	ATTERBERG LIMITS BELOW "A" LINE OR P.I MORE THAN 4
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES	ATTERBERG LIMITS BELOW "A" LINE OR P.I MORE THAN 7
	SANDS MORE THAN HALF THE COARSE FRACTION SMALLER THAN 4.75mm	CLEAN SANDS (TRACE OR NO FINES)	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	$C_u= \frac{D_{60}}{D_{10}}>6; C_C= \frac{(D_{30})^2}{D_{10} X D_{60}} = 1 \text{ to } 3$
			SP	POORLY GRADED GRAVELS, GRAVEL- SAND MIXTURES, LITTLE OR NO FINES	NOT MEETING ABOVE REQUIREMENTS
		DIRTY SANDS (WITH SOME OR MORE FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES	ATTERBERG LIMITS BELOW "A" LINE OR P.I MORE THAN 4
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES	ATTERBERG LIMITS BELOW "A" LINE OR P.I MORE THAN 7
FINE-GRAINED SOILS (MORE THAN HALF BY WEIGHT SMALLER THAN 75µm)	SILTS BELOW "A" LINE NEGLIGIBLE ORGANIC CONTENT	$W_L < 50\%$	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY SANDS OF SLIGHT PLASTICITY	CLASSIFICATION IS BASED UPON PLASTICITY CHART (SEE BELOW)
		$W_L > 50\%$	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS, FINE SANDY OR SILTY SOILS	
	CLAYS ABOVE "A" LINE NEGLIGIBLE ORGANIC CONTENT	$W_L < 30\%$	CL	INORGANIC CLAYS OF LOW PLASTICITY, GRAVELLY, SANDY OR SILTY CLAYS, LEAN CLAYS	
		$30\% < W_L < 50\%$	CI	INORGANIC CLAYS OF MEDIUM PLASTICITY, SILTY CLAYS	
		$W_L > 50\%$	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
	ORGANIC SLITS & CLAYS BELOW "A" LINE	$W_L < 50\%$	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	WHENEVER THE NATURE OF THE FINES CONTENT HAS NOT BEEN DETERMINED, IT IS DESIGNATED BY THE LETTER "F", E.G SF IS A MIXTURE OF SAND WITH SILT OR CLAY
		$W_L > 50\%$	OH	ORGANIC CLAYS OF HIGH PLASTICITY	
HIGH ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS	STRONG COLOUR OR ODOUR, AND OFTEN FIBROUS TEXTURE

SOIL COMPONENTS					
FRACTION	U.S STANDARD SIEVE SIZE		DEFINING RANGES OF PERCENTAGE BY WEIGHT OF MINOR COMPONENTS		
GRAVEL	COARSE	PASSING	RETAINED	PERCENT	DESCRIPTOR
		76 mm	19 mm	35-50 20-35 10-20 1-10	AND Y/EY SOME TRACE
	FINE	19 mm	4.75 mm		
SAND	COARSE	4.75 mm	2.00 mm		
	MEDIUM	2.00 mm	425 µm		
	FINE	425 µm	75 µm		
FINES (SILT OR CLAY BASED ON PLASTICITY)		75 µm			
OVERSIZED MATERIAL					
ROUNDED OR SUBROUNDED: COBBLES 76 mm TO 200 mm BOULDERS > 200 mm				NOT ROUNDED: ROCK FRAGMENTS > 76 mm ROCKS > 0.76 CUBIC METRE IN VOLUME	

Plasticity Chart for Soil Passing 425 Micron Sieve



Wood
Environment & Infrastructure Solutions
3450 Harvester Road, Suite 100
Burlington, Ontario, L7N 3W5
Tel: (905) 335-2353
Fax: (905) 335-1414
www.woodplc.com

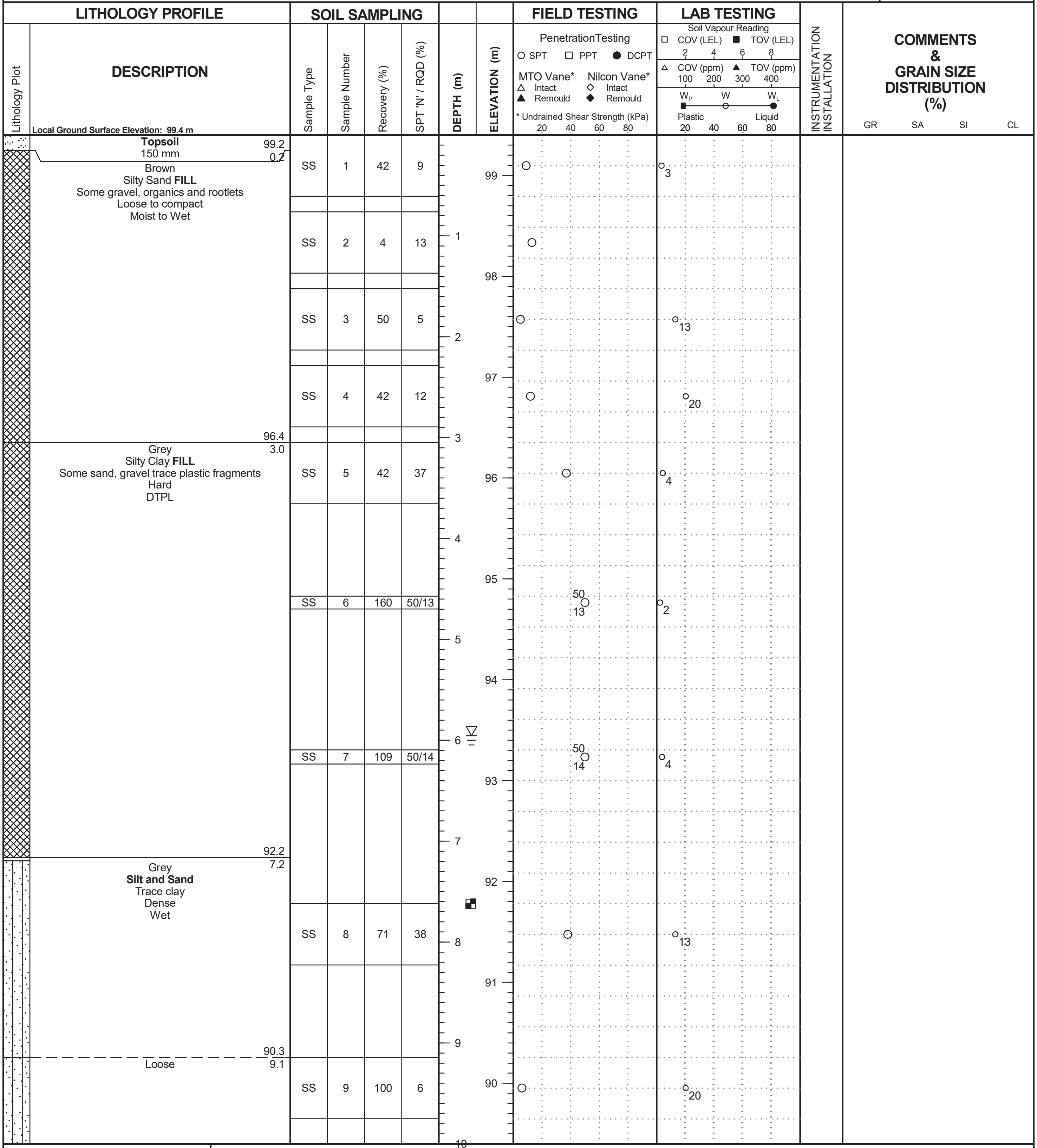
Note 1: Soils are classified and described according to their engineering properties and behaviour.

Note 2: The modifying adjectives used to define the actual or estimated percentage range by weight of minor components are consistent with the Canadian Foundation Engineering Manual.

RECORD OF BOREHOLE No. BH1

Project Number: TPB198079
Project Client: Toronto Regional Conservation Authority
Project Name: Black Creek Flood Remediation and Transportation Feasibility Study
Project Location: Rockliffe, Toronto
Drilling Location: N: 4836768 E: 620622
Drilling Method: 200 mm Hollow Stem Augering
Drilling Machine: Track Mounted Drill
Date Started: Sep 10, 19
Date Completed: Sep 10, 19
Logged by: PG
Compiled by: TH
Reviewed by: WK
Revision No.: 0, 4/2/20

wood.



Local Ground Surface Elevation: 99.4 m

Elevation / Depth (m)	Description
99.2 0.2	**Topsoil** 150 mm
96.4 3.0	Brown Silty Sand **FILL** Some gravel, organics and rootlets Loose to compact Moist to Wet
92.2 7.2	Grey Silty Clay **FILL** Some sand, gravel trace plastic fragments Hard DTPL
90.3 9.1	Grey **Silt and Sand** Trace clay Dense Wet
	Loose

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)
SS	1	42	9
SS	2	4	13
SS	3	50	5
SS	4	42	12
SS	5	42	37
SS	6	160	50/13
SS	7	109	50/14
SS	8	71	38
SS	9	100	6

Wood
Environment & Infrastructure Solutions

3450 Harvester Road
Burlington, Ontario, L7N 3W5
Canada
Tel. No.: 1 (905) 335-2353
www.woodplc.com

Groundwater depth during drilling on 9/10/2019 at a depth of: 5.9 m.

Cave in depth after removal of augers: 7.6 m.

Scale: 1 : 53

Continued on Next Page

RECORD OF BOREHOLE No. BH1

Project Number: **TPB198079**
Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**
Project Location: **Rockliffe, Toronto**

LITHOLOGY PROFILE | SOIL SAMPLING | FIELD TESTING | LAB TESTING | INSTRUMENTATION INSTALLATION | COMMENTS & GRAIN SIZE DISTRIBUTION (%)

FIELD TESTING: Penetration Testing ○ SPT ☐ PPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ Remould; * Undrained Shear Strength (kPa) 20 40 60 80

LAB TESTING: Soil Vapour Reading ☐ COV (LEL) ■ TOV (LEL) 2 4 6 8; △ COV (ppm) ▲ TOV (ppm) 100 200 300 400; WP W WL Plastic Liquid 20 40 60 80

Lithology Plot	DESCRIPTION	Elev. / Depth (m)	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	W (%)	GR	SA	SI	CL
	Loose										
	Compact to very dense	88.7 10.7									
			SS	10	100	23	20	0	46	52	2
			SS	11	100	51	18				
			SS	12	100	21	21				
			SS	13	79	52	21				
		83.6									
	Borehole Terminated	15.8									

DEPTH (m): 11, 12, 13, 14, 15
ELEVATION (m): 89, 88, 87, 86, 85, 84

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

RECORD OF BOREHOLE No. BH2

Project Number: **TPB198079**
Project Client: **Toronto Regional Conservation Authority**
Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**
Project Location: **Rockliffe, Toronto**

Drilling Location: **N: 4836794 E: 620768**
Drilling Method: **200 mm Hollow Stem Augering**
Drilling Machine: **Track Mounted Drill**
Date Started: **Sep 9, 19** Date Completed: **Sep 9, 19**

wood.

Logged by: **PG** Compiled by: **TH** Reviewed by: **WK** Revision No.: **0, 4/2/20**

LITHOLOGY PROFILE | SOIL SAMPLING | FIELD TESTING | LAB TESTING | INSTRUMENTATION INSTALLATION | COMMENTS & GRAIN SIZE DISTRIBUTION (%)

Penetration Testing: ○ SPT ☐ PPT ● DCPT; MTO Vane*: △ Intact ▲ Remould; Nilcon Vane*: ◇ Intact ◆ Remould; * Undrained Shear Strength (kPa) 20 40 60 80

Soil Vapour Reading: ☐ COV (LEL) ■ TOV (LEL) 2 4 6 8; △ COV (ppm) ▲ TOV (ppm) 100 200 300 400; WP W WL Plastic Liquid 20 40 60 80

Local Ground Surface Elevation: 98.2 m

Elevation (m) / Depth (m)	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	W	GR	SA	SI	CL
98.0 0.2	**Topsoil** 175mm									
	Brown Silty Sand **FILL** Loose Moist	SS	1	67	5	5				
		SS	2	54	9	8				
		SS	3	54	4	8				
95.9 95.8 2.3 2.4	**PEAT**									
	Brown **Silt and Sand** Some clay, trace gravel Loose to compact Wet	SS	4	54	6	15				
		SS	5	54	12	7				
94.1 4.1	Grey **Sand and Silt** Some clay, trace gravel Stiff to hard Wet									
		SS	6	63	14	12	7	38	40	15
92.1 6.1	Cobbles	~~SS~~	~~7~~	~~0~~	~~50/0~~					
91.3 6.9	Grey **Silt** Compact Wet									
		SS	8	63	22	19				
90.0 8.2	**Borehole Terminated**									

Wood
Environment & Infrastructure Solutions
3450 Harvester Road
Burlington, Ontario, L7N 3W5
Canada
Tel. No.: 1 (905) 335-2353
www.woodplc.com

Groundwater depth during drilling on 9/9/2019 at a depth of: 2.4 m.

Cave in depth after removal of augers: 4.3 m.

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

RECORD OF BOREHOLE No. BH3

Project Number:	TPB198079	Drilling Location:	N: 4836867 E: 620800
Project Client:	Toronto Regional Conservation Authority	Drilling Method:	200 mm Hollow Stem Augering
Project Name:	Black Creek Flood Remediation and Transportation Feasibility Study	Drilling Machine:	Track Mounted Drill
Project Location:	Rockliffe, Toronto	Date Started:	Sep 9, 19
		Date Completed:	Sep 9, 19

wood.

Logged by: PG   Compiled by: TH   Reviewed by: WK   Revision No.: 0, 4/2/20

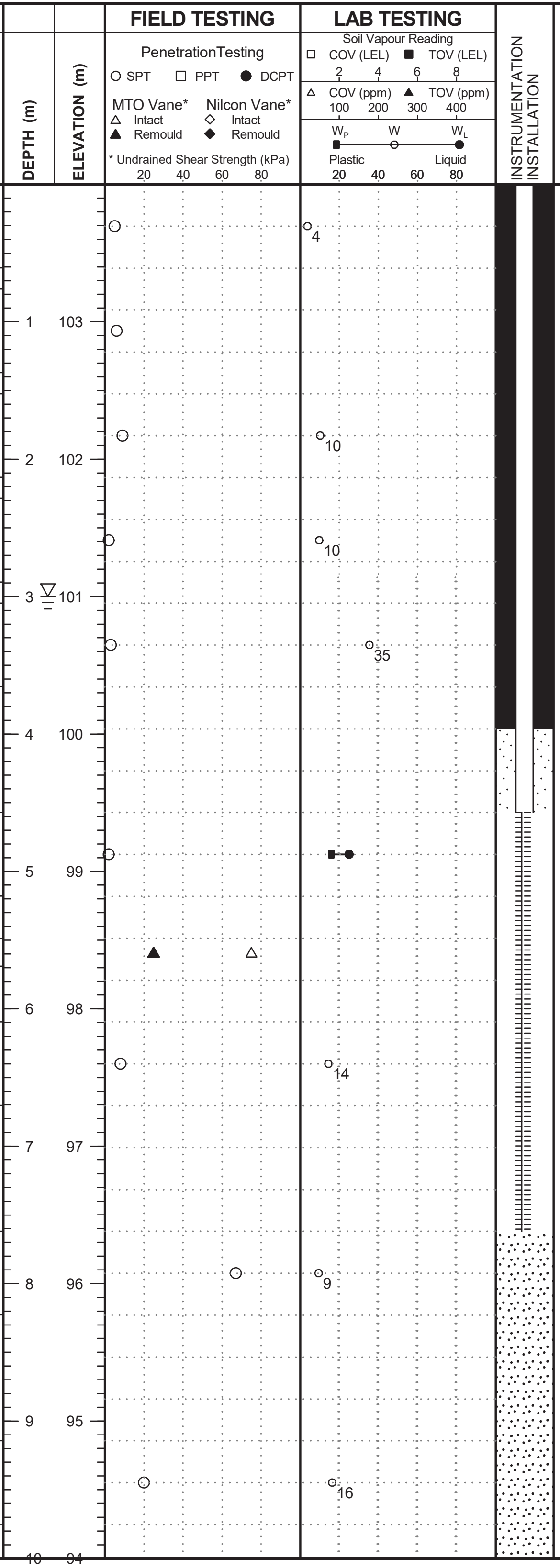
LITHOLOGY PROFILE

Local Ground Surface Elevation: 104.0 m

DESCRIPTION	Elevation (m) / Depth (m)
Topsoil 200mm	103.8 0.2
Brown Silty Sand **FILL** Trace fine gravel Loose to very loose Moist	101.0 3.0
Grey **Silt** Trace sand Very loose Saturated	99.9 4.1
Grey **Clayey Silt** Trace sand and gravel Very soft to firm WTPL	96.8 7.2
Very stiff to hard DTPL	

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR	SA	SI	CL
SS	1	17	5				
SS	2	75	6				
SS	3	71	9				
SS	4	17	2				
SS	5	33	3				
SS	6	83	2	2	6	62	30
VANE	7						
SS	8	83	8				
SS	9	71	67				
SS	10	75	20				



Wood
Environment & Infrastructure Solutions

3450 Harvester Road
Burlington, Ontario, L7N 3W5
Canada
Tel. No.: 1 (905) 335-2353
www.woodplc.com

▽ Groundwater depth during drilling on 9/9/2019 at a depth of: 3.0 m.

▨ Cave in depth after removal of augers: 10.1 m.

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

Continued on Next Page

RECORD OF BOREHOLE No. BH3

Project Number: **TPB198079**
Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**
Project Location: **Rockliffe, Toronto**

wood.

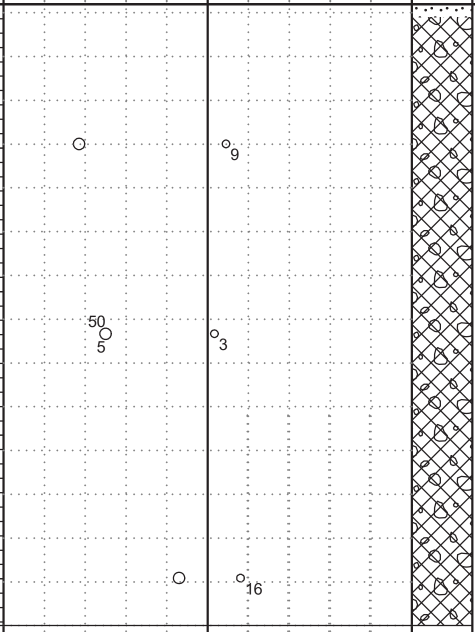
LITHOLOGY PROFILE | **SOIL SAMPLING** | **FIELD TESTING** | **LAB TESTING**

Penetration Testing: ○ SPT ☐ PPT ● DCPT
MTO Vane*: △ Intact ▲ Remould
Nilcon Vane*: ◇ Intact ◆ Remould
* Undrained Shear Strength (kPa) 20 40 60 80

Soil Vapour Reading: ☐ COV (LEL) ■ TOV (LEL) 2 4 6 8
△ COV (ppm) ▲ TOV (ppm) 100 200 300 400
W_P W W_L Plastic Liquid 20 40 60 80

COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

Lithology Plot	DESCRIPTION	Elevation / Depth	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)
		93.8 10.2						
	Grey **Sandy Silt** Trace to some gravel, trace clay Dense to very dense Moist to damp							
			SS	11	67	37	11	93
							12	92
			SS	12	38	50/5		
							13	91
			SS	13	77	86	14	90
		89.7 14.3						
	Borehole Terminated							



Borehole details as 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 Borehole Log'.

Scale: 1 : 53

RECORD OF BOREHOLE No. BH3A

Project Number: **TPB198079**
Project Client: **Toronto Regional Conservation Authority**
Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**
Project Location: **Rockliffe, Toronto**

Drilling Location: **N: 4836867 E: 620800**
Drilling Method: **200 mm Hollow Stem Augering**
Drilling Machine: **Track Mounted Drill**
Date Started: **Sep 9, 19** Date Completed: **Sep 9, 19**

wood.

Logged by: **PG** Compiled by: **TH** Reviewed by: **WK** Revision No.: **0, 4/2/20**

LITHOLOGY PROFILE			SOIL SAMPLING						FIELD TESTING	LAB TESTING		COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
Lithology Plot	DESCRIPTION Local Ground Surface Elevation: 104.0 m	Elev. / Depth (m)	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	PenetrationTesting ○ SPT ☐ PPT ● DCPT MTO Vane* △ Intact ▲ Remould Nilcon Vane* ◇ Intact ◆ Remould * Undrained Shear Strength (kPa) 20 40 60 80	Soil Vapour Reading ☐ COV (LEL) ■ TOV (LEL) 2 4 6 8 △ COV (ppm) ▲ TOV (ppm) 100 200 300 400 W_P W W_L Plastic Liquid 20 40 60 80	INSTRUMENTATION INSTALLATION	GR	SA	SI	CL
▩	**Probe to 15ft**						0	104							
							1	103							
							2	102							
							3	101							
							4	100							
▨	Grey **Silty Clay** Trace sand and gravel Very soft	99.4 4.6	SH	1	100					W_P ≈ 20, W ≈ 27		1	2	57	40
		98.8 5.2					5	99							

Wood
Environment & Infrastructure Solutions

3450 Harvester Road
Burlington, Ontario, L7N 3W5
Canada
Tel. No.: 1 (905) 335-2353
www.woodplc.com

≚ No freestanding groundwater observed in open borehole upon completion of drilling.

Scale: 1 : 53

RECORD OF BOREHOLE No. BH4

Project Number:	TPB198079	Drilling Location:	N: 4836853 E: 621339
Project Client:	Toronto Regional Conservation Authority	Drilling Method:	200 mm Hollow Stem Augering
Project Name:	Black Creek Flood Remediation and Transportation Feasibility Study	Drilling Machine:	Track Mounted Drill
Project Location:	Rockliffe, Toronto	Date Started:	Sep 16, 19
		Date Completed:	Sep 16, 19

Logged by: **TH** Compiled by: **TH** Reviewed by: **WK** Revision No.: **0, 4/2/20**

LITHOLOGY PROFILE

Local Ground Surface Elevation: 115.3 m

Elevation / Depth (m)	Description
115.1 0.2	**Topsoil** 175mm
	Brown/Grey/Black Silty Sand to Sandy Silt **FILL** Trace gravel, wood, glass, brick, ceramic, nails, organics, and plastics Loose to very dense Moist to wet

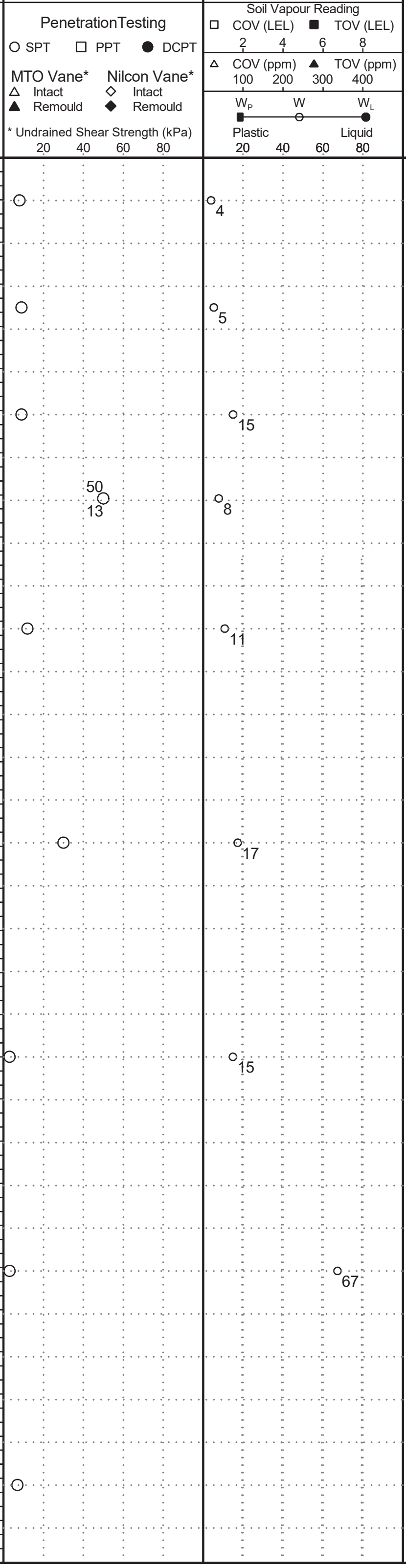
SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)
SS	1	63	8
SS	2	50	9
SS	3	54	9
SS	4	36	50/13
SS	5	54	12
SS	6	42	30
SS	7	42	3
SS	8	54	3
SS	9	13	7

DEPTH (m): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

ELEVATION (m): 115, 114, 113, 112, 111, 110, 109, 108, 107, 106

FIELD TESTING / LAB TESTING



INSTRUMENTATION INSTALLATION

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL

Wood
Environment & Infrastructure Solutions

3450 Harvester Road
Burlington, Ontario, L7N 3W5
Canada
Tel. No.: 1 (905) 335-2353
www.woodplc.com

$\overline{\nabla}$ No freestanding groundwater observed in open borehole upon completion of drilling.

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

Page: 1 of 3

Continued on Next Page

RECORD OF BOREHOLE No. BH4

Project Number: **TPB198079**
Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**
Project Location: **Rockliffe, Toronto**

wood.

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING	LAB TESTING	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	Penetration Testing ○ SPT ☐ PPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ Remould; * Undrained Shear Strength (kPa) 20 40 60 80	Soil Vapour Reading ☐ COV (LEL) ■ TOV (LEL) 2 4 6 8; △ COV (ppm) ▲ TOV (ppm) 100 200 300 400; W_P W W_L Plastic Liquid 20 40 60 80		GR	SA	SI	CL
▨	Brown/Grey/Black Silty Sand to Sandy Silt **FILL** Trace gravel, wood, glass, brick, ceramic, nails, organics, and plastics Loose to very dense Moist to wet						105							
		SS	10	0	11	11	104	○						
		SS	11	0	6	12	103	○						
		SS	12	0	8	13 14	102 101	○						
		SS	13	0	17	15	100	○						
		SS	14	75	36	16 17	99 98	○	24					
	97.5 17.8 Brown **Silt** Some sand, trace gravel and clay Compact to dense Wet					18	97							
		SS	15	63	38	19	96	○	22		1	11	84	4
		SS	16	58	29	20	95	○	27					
	94.4 20.9 Grey					21	94							

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

Continued on Next Page

RECORD OF BOREHOLE No. BH4

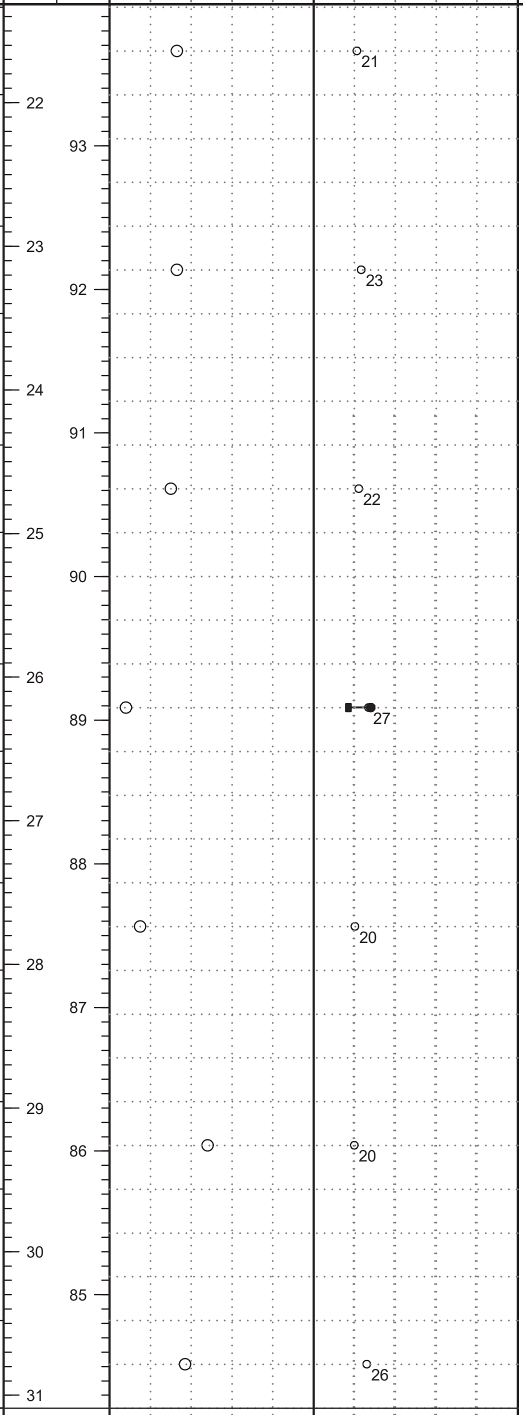
Project Number: TPB198079

Project Name: Black Creek Flood Remediation and Transportation Feasibility Study

Project Location: Rockliffe, Toronto

wood.

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING	LAB TESTING		COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
Elevation / Depth	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	Penetration Testing ○ SPT ☐ PPT ● DCPT	W (%)	INSTRUMENTATION INSTALLATION	GR	SA	SI	CL
	Grey													
		SS	17	67	33				21					
		SS	18	58	33				23					
91.5 23.8	Silt Trace clay and sand													
		SS	19	63	30				22		0	3	92	5
89.8 25.5	Grey **Silt and Clay** Trace sand Firm to stiff WTPL													
		SS	20	100	8				27		0	9	60	40
		SS	21	100	15				20					
86.8 28.5	Hard APL													
		SS	22	100	48				20					
		SS	23	88	37				26					
84.2 31.1	**Borehole Terminated**													



Borehole details as 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 Borehole Log'.

Scale: 1 : 53

RECORD OF BOREHOLE No. BH5

Project Number: **TPB198079**
Project Client: **Toronto Regional Conservation Authority**
Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**
Project Location: **Rockliffe, Toronto**
Drilling Location: **N: 4836962 E: 621255**
Drilling Method: **200 mm Hollow Stem Augering**
Drilling Machine: **Track Mounted Drill**
Date Started: **Sep 10, 19** Date Completed: **Sep 13, 19**

wood.

Logged by: **PG** Compiled by: **TH** Reviewed by: **WK** Revision No.: **0, 4/2/20**

LITHOLOGY PROFILE

Local Ground Surface Elevation: 106.8 m

Elevation (m) / Depth (m)	DESCRIPTION
106.6 0.2	**Topsoil** 150mm
105.4 1.4	Brown Silty Sand **FILL** Trace gravel Loose to compact Damp
99.6 7.2	Brown/Grey/Black SIlty sand to sandy silt **FILL** Trace gravel, glass, slag, metal, and wood Very loose Moist to damp
98.1 8.7	Brown and black Silt **FILL** Trace organics and glass Very loose Wet
	Grey **Sandy Silt** Some clay, trace gravel Loose to compact Wet

SOIL SAMPLING / FIELD TESTING / LAB TESTING

FIELD TESTING: PenetrationTesting ○ SPT ☐ PPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ Remould; * Undrained Shear Strength (kPa) 20 40 60 80

LAB TESTING: Soil Vapour Reading ☐ COV (LEL) ■ TOV (LEL) 2 4 6 8; △ COV (ppm) ▲ TOV (ppm) 100 200 300 400; WP W WL Plastic Liquid 20 40 60 80

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	W	INSTRUMENTATION INSTALLATION	GR	SA	SI	CL
SS	1	50	5	8					
SS	2	67	16	5					
SS	3	13	2						
SS	4	17	2						
SS	5	17	3						
SS	6	13	3						
SS	7	42	2						
SS	8	33	3	31					
SS	9	100	5	32		3	34	44	20

DEPTH (m): 1 2 3 4 5 6 7 8 9 10
ELEVATION (m): 106 105 104 103 102 101 100 99 98 97

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

No freestanding groundwater observed in open borehole upon completion of drilling.

Wood
Environment & Infrastructure Solutions
3450 Harvester Road
Burlington, Ontario, L7N 3W5
Canada
Tel. No.: 1 (905) 335-2353
www.woodplc.com

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

Continued on Next Page

RECORD OF BOREHOLE No. BH5

Project Number: **TPB198079**

Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**

Project Location: **Rockliffe, Toronto**

wood.

LITHOLOGY PROFILE

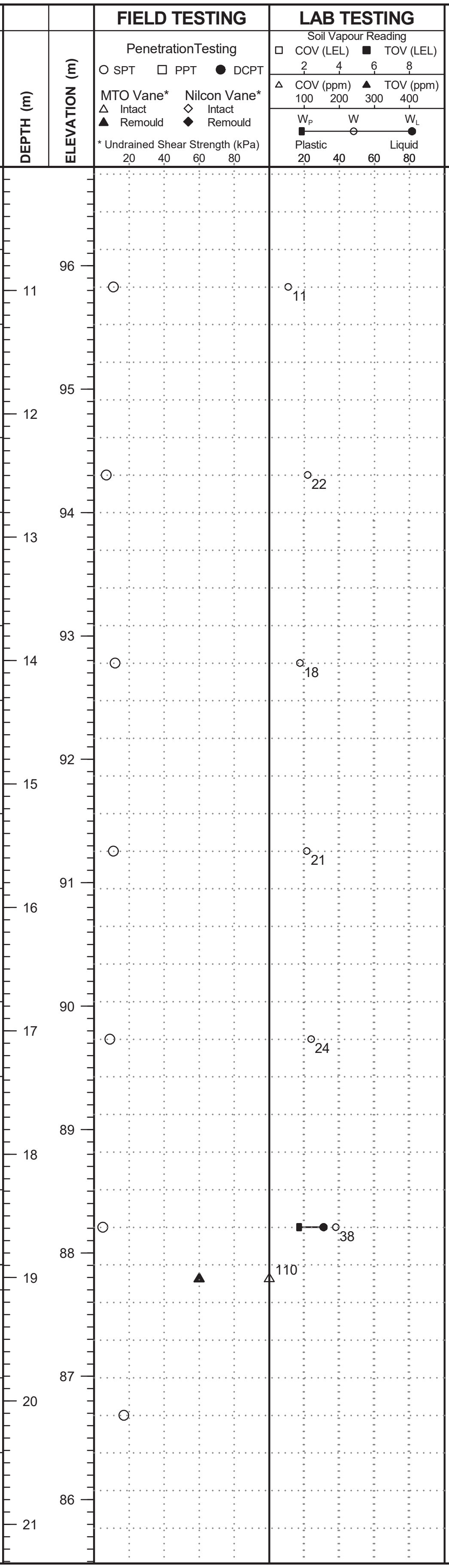
Elevation / Depth (m)	DESCRIPTION
	Grey **Sandy Silt** Some clay, trace gravel Loose to compact Wet
95.1 11.7	Grey **Silt** Some clay, trace sand and gravel Loose to compact Wet
89.0 17.8	Grey **Clay and Silt** Trace sand and gravel Firm to very stiff WTPL
85.9 20.9	Very stiff DTPL

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	GR	SA	SI	CL
SS	10	83	11				
SS	11	100	7	1	2	87	10
SS	12	71	12				
SS	13	75	11				
SS	14	83	9				
SS	15	54	5	1	9	43	47
VANE	16						
SS	17	0	17				

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

INSTRUMENTATION INSTALLATION



Borehole details as 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 Borehole Log'.

Scale: 1 : 53

Continued on Next Page

RECORD OF BOREHOLE No. BH5

Project Number: TPB198079

Project Name: Black Creek Flood Remediation and Transportation Feasibility Study

Project Location: Rockliffe, Toronto

wood.

LITHOLOGY PROFILE | SOIL SAMPLING | FIELD TESTING | LAB TESTING | INSTRUMENTATION INSTALLATION | COMMENTS & GRAIN SIZE DISTRIBUTION (%)

FIELD TESTING: PenetrationTesting ○ SPT ☐ PPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ Remould; * Undrained Shear Strength (kPa) 20 40 60 80

LAB TESTING: Soil Vapour Reading ☐ COV (LEL) ■ TOV (LEL) 2 4 6 8; △ COV (ppm) ▲ TOV (ppm) 100 200 300 400; W_P W W_L Plastic Liquid 20 40 60 80

COMMENTS & GRAIN SIZE DISTRIBUTION (%): GR SA SI CL

DESCRIPTION	Elevation (m) / Depth (m)
Very stiff DTPL	
Trace sand and gravel Stiff WTPL	84.4 22.4
Very stiff DTPL	82.9 23.9
Hard	81.3 25.5
Grey **Shale**	76.8 30.0
Borehole Terminated	76.3 30.5

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	W (%)
SS	18	67	16	22
SS	19	100	13	24
SS	20	79	20	12
SS	21	79	42	12
SS	22	75	50	10
SS	23	67	64	14
SS	24	0	50/10	

DEPTH (m): 22 23 24 25 26 27 28 29 30

ELEVATION (m): 85 84 83 82 81 80 79 78 77

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

RECORD OF BOREHOLE No. BH6

Project Number:	TPB198079	Drilling Location:	N: 4836945 E: 621803
Project Client:	Toronto Regional Conservation Authority	Drilling Method:	200 mm Hollow Stem Augering
Project Name:	Black Creek Flood Remediation and Transportation Feasibility Study	Drilling Machine:	Track Mounted Drill
Project Location:	Rockliffe, Toronto	Date Started:	Sep 18, 19
		Date Completed:	Sep 18, 19

Logged by: PG Compiled by: TH Reviewed by: WK Revision No.: 0, 4/2/20

wood.

LITHOLOGY PROFILE

Local Ground Surface Elevation: 102.3 m

DESCRIPTION	Elevation (m)	Depth (m)
Topsoil 125mm	102.2	0.1
Brown Silty Sand **FILL** Trace gravel Loose to compact Moist	100.2	2.1
Dark Brown **Organics** Decaying wood Moist	99.9	2.4
Brown **Silty Sand** Saturated	99.3	3.0
Dark Brown **Silty Sand** Trace fine gravel Loose Saturated	98.2	4.1
Grey **Silt** Trace clay and sand Very loose to loose Saturated		

SOIL SAMPLING / FIELD TESTING / LAB TESTING / COMMENTS & GRAIN SIZE DISTRIBUTION (%)

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	W	GR	SA	SI	CL
SS	1	75	15	6				
SS	2	92	12	18				
SS	3	79	4	11				
SS	4	100	2	24				
SS	5	79	5	27				
SS	6	63	8	24				
SS	7	75	5	25				
SS	8	83	3	25	0	1	92	7
SS	9	25	8	28				

DEPTH (m): 1 2 3 4 5 6 7 8 9 10

ELEVATION (m): 102 101 100 99 98 97 96 95 94 93

FIELD TESTING: PenetrationTesting ○ SPT ☐ PPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ Remould; * Undrained Shear Strength (kPa) 20 40 60 80

LAB TESTING: Soil Vapour Reading ☐ COV (LEL) ■ TOV (LEL) 2 4 6 8; △ COV (ppm) ▲ TOV (ppm) 100 200 300 400; W_P W W_L Plastic Liquid 20 40 60 80

INSTRUMENTATION INSTALLATION

Wood
Environment & Infrastructure Solutions

3450 Harvester Road
Burlington, Ontario, L7N 3W5
Canada
Tel. No.: 1 (905) 335-2353
www.woodplc.com

∇ No freestanding groundwater observed in open borehole upon completion of drilling.

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

Continued on Next Page

RECORD OF BOREHOLE No. BH6

Project Number: **TPB198079**

Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**

Project Location: **Rockliffe, Toronto**

wood.

LITHOLOGY PROFILE DESCRIPTION	Elevation (m) / Depth (m)
Grey **Silt** Trace clay and sand Very loose to loose Saturated	87.5 14.8
Grey **Silty Clay** Trace sand and fine gravel Stiff WTPL	85.2 17.1
Grey **Sand** Trace gravel and silt Wet	83.7 18.6
Grey **Silty Clay** Trace sand and fine gravel WTPL	82.9 19.4
Grey **Sand** Trace silt and gravel Wet	82.2 20.1
Grey **Sandy Gravelly Silt** Some clay DTPL	

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	LAB TESTING (W)
SS	10	0	5	
SS	11	67	5	25
SS	12	75	6	24
SS	13	100	9	15
SS	14	83	18	17
SS	15	96	8	28
SS	16	100	16	22

DEPTH (m): 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21

ELEVATION (m): 92, 91, 90, 89, 88, 87, 86, 85, 84, 83, 82, 81

FIELD TESTING

Penetration Testing
○ SPT ☐ PPT ● DCPT

MTO Vane* Nilcon Vane*
△ Intact ◇ Intact
▲ Remould ◆ Remould

* Undrained Shear Strength (kPa)
20 40 60 80

LAB TESTING

Soil Vapour Reading
☐ COV (LEL) ■ TOV (LEL)
2 4 6 8
△ COV (ppm) ▲ TOV (ppm)
100 200 300 400
W_P W W_L
Plastic Liquid
20 40 60 80

INSTRUMENTATION INSTALLATION

COMMENTS & GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

Continued on Next Page

RECORD OF BOREHOLE No. BH6

Project Number: **TPB198079**

Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**

Project Location: **Rockliffe, Toronto**

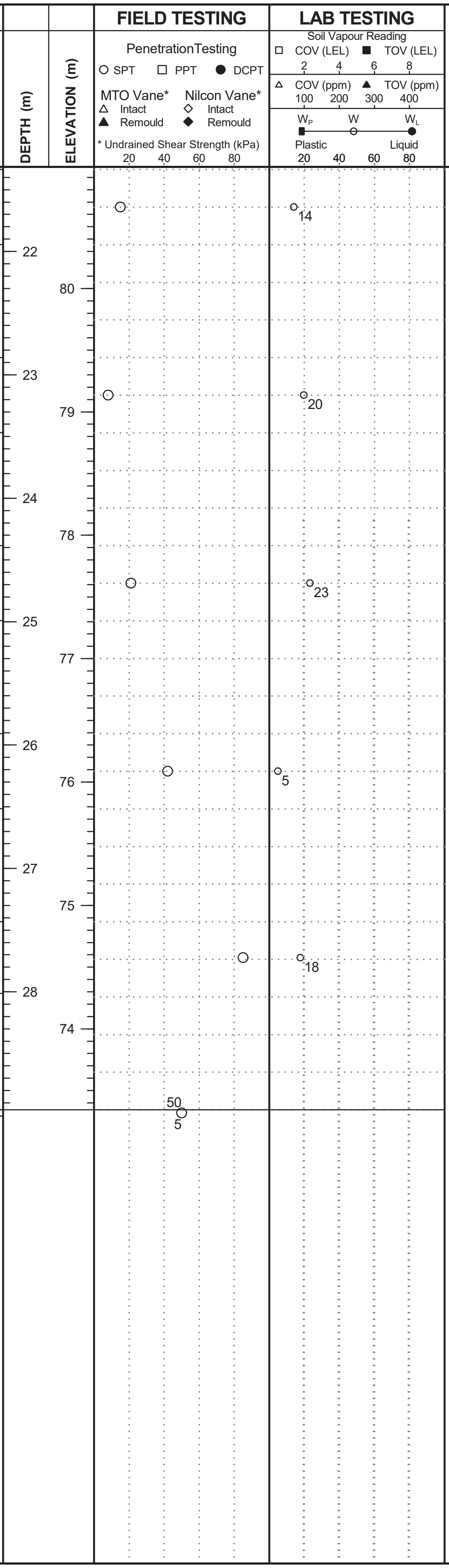
wood.

LITHOLOGY PROFILE

Elevation (m)	Depth (m)	DESCRIPTION
		Grey **Sandy Gravelly Silt** Some clay DTPL
79.9	22.4	Grey **Silty Sand** Wet
79.1	23.2	Grey **Silty Clay** Trace sand and fine gravel Very stiff DTPL
76.8	25.5	Grey **Sandy gravelly silt** Some clay Dense to very dense Moist
73.3	29.0	**Borehole Terminated at Refusal**

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	W (%)	GR	SA	SI	CL
SS	17	88	15	14				
SS	18	88	8	20				
SS	19	79	21	23				
SS	20	8	42	5				
SS	21	61	85	18	20	28	41	11
~~SS~~	~~22~~	~~0~~	~~50/5~~					



INSTRUMENTATION INSTALLATION

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

RECORD OF BOREHOLE No. BH7

Project Number: TPB198079
Project Client: Toronto Regional Conservation Authority
Project Name: Black Creek Flood Remediation and Transportation Feasibility Study
Project Location: Rockliffe, Toronto
Drilling Location: N: 4836910 E: 621819
Drilling Method: 200 mm Hollow Stem Augering
Drilling Machine: Track Mounted Drill
Date Started: Sep 17, 19
Date Completed: Sep 17, 19

Logged by: PG
Compiled by: TH
Reviewed by: WK
Revision No.: 0, 4/2/20

LITHOLOGY PROFILE

Local Ground Surface Elevation: 102.2 m

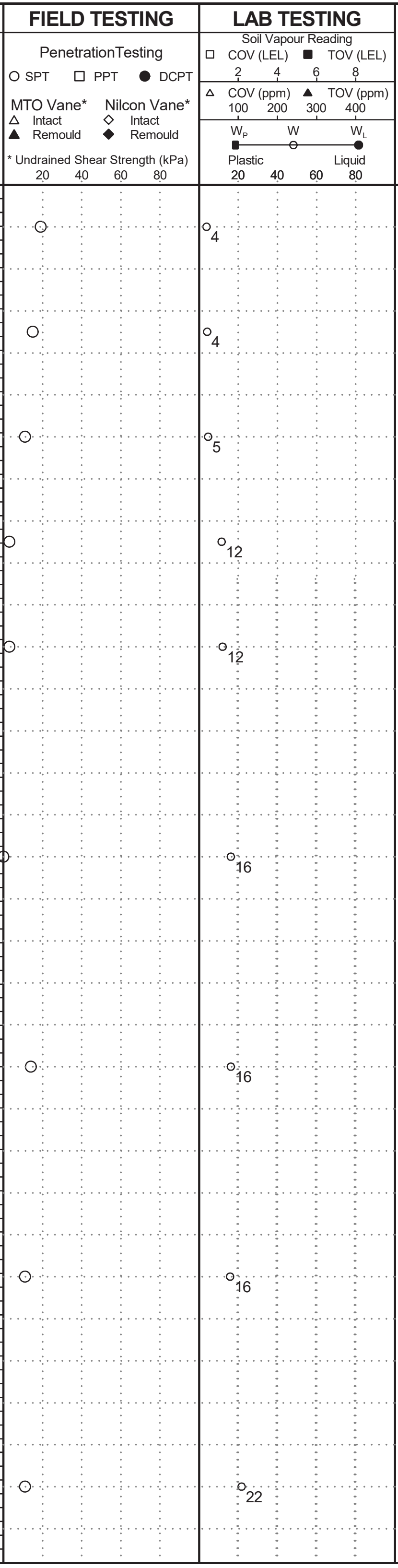
DESCRIPTION	Elevation / Depth
Topsoil 150mm	102.0 0.2
Brown Silty Sand **FILL** Some gravel and roots Compact Damp	100.0 2.2
Dark Grey Silty Sand **FILL** Trace gravel and organics Very loose Moist	99.2 3.0
Dark Grey **Silty Sand** Trace to some gravel, trace organics Very loose Wet	95.8 6.4
Grey **Silt** Compact Wet	93.5 8.7
Trace clay and fine gravel Compact to loose Saturated	

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)
SS	1	58	19
SS	2	100	15
SS	3	83	11
SS	4	50	3
SS	5	58	3
SS	6	100	0
SS	7	83	14
SS	8	63	11
SS	9	63	11

DEPTH (m): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

ELEVATION (m): 102, 101, 100, 99, 98, 97, 96, 95, 94, 93



INSTRUMENTATION INSTALLATION

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL

Wood
Environment & Infrastructure Solutions
3450 Harvester Road
Burlington, Ontario, L7N 3W5
Canada
Tel. No.: 1 (905) 335-2353
www.woodplc.com

No freestanding groundwater observed in open borehole upon completion of drilling.

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

Continued on Next Page

RECORD OF BOREHOLE No. BH7

Project Number: **TPB198079**

Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**

Project Location: **Rockliffe, Toronto**

wood.

LITHOLOGY PROFILE | SOIL SAMPLING | FIELD TESTING | LAB TESTING | INSTRUMENTATION INSTALLATION | COMMENTS & GRAIN SIZE DISTRIBUTION (%)

Penetration Testing: ○ SPT ☐ PPT ● DCPT

MTO Vane*: △ Intact ▲ Remould; Nilcon Vane*: ◇ Intact ◆ Remould

* Undrained Shear Strength (kPa) 20 40 60 80

Soil Vapour Reading: ☐ COV (LEL) ■ TOV (LEL) 2 4 6 8; △ COV (ppm) ▲ TOV (ppm) 100 200 300 400

W_P W W_L — Plastic 20 40 60 80 Liquid

Elevation / Depth (m)	Description
	Trace clay and fine gravel Compact to loose Saturated
90.5 11.7	Compact Wet
88.9 13.3	Grey **Clay and Silt** Trace sand and fine gravel Stiff WTPL
84.4 17.8	Very stiff APL

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	W	GR	SA	SI	CL
SS	10	71	7	24				
SS	11	71	11	23				
SS	12	100	8	31	1	2	43	54
SS	13	100	13	15				
SS	14	100	12	15				
SS	15	100	22	19				
SS	16	100	19	19				

Scale: 1 : 53

Continued on Next Page

RECORD OF BOREHOLE No. BH7

Project Number: TPB198079 Project Name: Black Creek Flood Remediation and Transportation Feasibility Study

Project Location: Rockliffe, Toronto

wood.

LITHOLOGY PROFILE | SOIL SAMPLING | FIELD TESTING | LAB TESTING | INSTRUMENTATION INSTALLATION | COMMENTS & GRAIN SIZE DISTRIBUTION (%)

FIELD TESTING: PenetrationTesting ○ SPT ☐ PPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ Remould; * Undrained Shear Strength (kPa) 20 40 60 80

LAB TESTING: Soil Vapour Reading ☐ COV (LEL) ■ TOV (LEL) 2 4 6 8; △ COV (ppm) ▲ TOV (ppm) 100 200 300 400; W_P W W_L Plastic Liquid 20 40 60 80

Lithology Plot	DESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	FIELD TESTING	LAB TESTING	GR	SA	SI	CL
	Very stiff APL		SS	17	100	15			○	19				
	Grey **Silty Sand** Compact Wet	79.8 22.4	SS	18	100	29			○	14				
	Grey **Silty Clay** Trace sand and gravel DTPL	77.5 24.7	SS	19	92	48			○	23				
	Grey **Silty Gravelly Sand<B>> Trace clay Dense to very dense Moist**	76.7 25.5	SS	20	83	40			○	7	23	46	25	6
			SS	21	61	85			○	11				
	Grey **Shale**	73.7 28.5	~~SS~~	~~22~~	~~100~~	~~50/3~~			50 ○ 3	15				
	Borehole Terminated	71.7 30.5	~~SS~~	~~23~~		~~50/0~~			50 ○ 0					

DEPTH (m): 22 23 24 25 26 27 28 29 30

ELEVATION (m): 80 79 78 77 76 75 74 73 72

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

RECORD OF BOREHOLE No. BH8

Project Number: **TPB198079**
Project Client: **Toronto Regional Conservation Authority**
Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**
Project Location: **Rockliffe, Toronto**

Drilling Location: **N: 4836868 E: 621791**
Drilling Method: **200 mm Hollow Stem Augering**
Drilling Machine: **Track Mounted Drill**
Date Started: **Sep 16, 19** Date Completed: **Sep 16, 19**

Logged by: **PG** Compiled by: **TH** Reviewed by: **WK** Revision No.: **0, 4/2/20**

LITHOLOGY PROFILE — Local Ground Surface Elevation: 104.0 m

Elevation (m) / Depth (m)	DESCRIPTION
103.8 0.2	**Topsoil** 175mm
101.0 3.0	Brown Silty Sand **FILL** Trace gravel, brick, concrete Compact to dense Moist damp
98.8 5.2	Brown **Silt** Some sand, trace gravel and clay Compact to very loose Wet to saturated
	Borehole Terminated

SOIL SAMPLING / FIELD TESTING / LAB TESTING

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	W (%)	GR	SA	SI	CL
SS	1	50	18	8				
SS	2	67	32	9				
SS	3	83	34	12				
SS	4	33	15	30				
SS	5	63	13	22				
SS	6	88	2	22	3	19	72	6

FIELD TESTING: PenetrationTesting ○ SPT ☐ PPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ Remould; * Undrained Shear Strength (kPa) 20 40 60 80

LAB TESTING: Soil Vapour Reading ☐ COV (LEL) ■ TOV (LEL) 2 4 6 8; △ COV (ppm) ▲ TOV (ppm) 100 200 300 400; WP W WL; Plastic Liquid 20 40 60 80

INSTRUMENTATION INSTALLATION

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

Groundwater depth during drilling on 9/16/2019 at a depth of: 3.4 m.

Cave in depth after removal of augers: 3.7 m.

Wood
Environment & Infrastructure Solutions
3450 Harvester Road
Burlington, Ontario, L7N 3W5
Canada
Tel. No.: 1 (905) 335-2353
www.woodplc.com

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

RECORD OF BOREHOLE No. BH9

wood.

Project Number:	TPB198079	Drilling Location:	N: 4836835 E: 622263
Project Client:	Toronto Regional Conservation Authority	Drilling Method:	150 mm Solid Stem Augers
Project Name:	Black Creek Flood Remediation and Transportation Feasibility Study	Drilling Machine:	Truck Mounted Drill
Project Location:	Rockliffe, Toronto	Date Started:	Sep 11, 19
		Date Completed:	Sep 11, 19
Logged by:	TH	Compiled by:	TH
Reviewed by:	WK	Revision No.:	0, 4/2/20

Local Ground Surface Elevation: 105.7 m

LITHOLOGY PROFILE

DESCRIPTION	Elevation (m)	Depth (m)
Pavement Structure 100mm **Asphalt** 330mm **Granular**	105.6	0.1
Brown Silty Sand **FILL** Damp	105.2	0.5
Brown **Silt** Trace sand and clay Loose to compact Wet	104.3	1.4
Grey Very loose to loose	102.7	3.0
Compact	101.3	4.4
Borehole Terminated	100.5	5.2

SOIL SAMPLING, FIELD TESTING & LAB TESTING

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	Water content W (%)	GR	SA	SI	CL
SS	1	100	50/13	5				
SS	2	83	14	16				
SS	3	83	7	22				
SS	4	100	12	23				
SS	5	83	2	25	0	8	87	5
SS	6	67	7	20				
SS	7	88	11	15				

FIELD TESTING: PenetrationTesting ○ SPT ☐ PPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ Remould; * Undrained Shear Strength (kPa) 20 40 60 80

LAB TESTING: Soil Vapour Reading ☐ COV (LEL) ■ TOV (LEL) 2 4 6 8; △ COV (ppm) ▲ TOV (ppm) 100 200 300 400; W_P W W_L Plastic Liquid 20 40 60 80

INSTRUMENTATION INSTALLATION

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

Wood
Environment & Infrastructure Solutions
3450 Harvester Road
Burlington, Ontario, L7N 3W5
Canada
Tel. No.: 1 (905) 335-2353
www.woodplc.com

∇ Groundwater depth during drilling on 9/11/2019 at a depth of: 4.3 m.

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

RECORD OF BOREHOLE No. BH10

Project Number: TPB198079
Project Client: Toronto Regional Conservation Authority
Project Name: Black Creek Flood Remediation and Transportation Feasibility Study
Project Location: Rockliffe, Toronto
Drilling Location: N: 4836725 E: 621889
Drilling Method: 150 mm Solid Stem Augering
Drilling Machine: Truck Mounted Drill
Date Started: Sep 23, 19
Date Completed: Sep 23, 19

wood.

Logged by: TH
Compiled by: TH
Reviewed by: WK
Revision No.: 0, 4/2/20

LITHOLOGY PROFILE | **SOIL SAMPLING** | **FIELD TESTING** | **LAB TESTING** | INSTRUMENTATION INSTALLATION | **COMMENTS & GRAIN SIZE DISTRIBUTION (%)**

Penetration Testing: ○ SPT ☐ PPT ● DCPT
MTO Vane*: △ Intact ▲ Remould
Nilcon Vane*: ◇ Intact ◆ Remould
* Undrained Shear Strength (kPa): 20 40 60 80

Soil Vapour Reading: ☐ COV (LEL) ■ TOV (LEL): 2 4 6 8
△ COV (ppm) ▲ TOV (ppm): 100 200 300 400
W_P W W_L — Plastic / Liquid: 20 40 60 80

Local Ground Surface Elevation: 110.0 m

Lithology Plot / DESCRIPTION	Elev. / Depth (m)	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	W	GR	SA	SI	CL
Pavement Structure 290mm **Asphalt**	109.7 0.3									
Brown Silty Sand **FILL** Trace gravel and glass Dense to compact Moist		SS	1	67	36	11				
		SS	2	75	36	8				
		SS	3	96	29	8				
		SS	4	83	17	11				
Dark Brown Silty Sand **FILL** Trace gravel, glass, ceramic, and slag Loose Moist	107.0 3.0	SS	5	54	4	12				
		SS	6	58	8	7				
Brown **Gravelly Sand** Some silt Compact Wet	103.8 6.2	SS	7	75	8	19				
		SS	8	75	20	10	31	58	11	0
Borehole Terminated	101.8 8.2									

DEPTH (m)	ELEVATION (m)
1	109
2	108
3	107
4	106
5	105
6	104
7	103
8	102

Wood
Environment & Infrastructure Solutions
3450 Harvester Road
Burlington, Ontario, L7N 3W5
Canada
Tel. No.: 1 (905) 335-2353
www.woodplc.com

▽ Groundwater depth during drilling on 9/23/2019 at a depth of: 6.2 m.

▚ Cave in depth after removal of augers: 6.4 m.

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

Page: 1 of 1

RECORD OF BOREHOLE No. BH11

Project Number: TPB198079
Project Client: Toronto Regional Conservation Authority
Project Name: Black Creek Flood Remediation and Transportation Feasibility Study
Project Location: Rockliffe, Toronto
Drilling Location: N: 4836800 E: 622413
Drilling Method: 200 mm Hollow Stem Augering
Drilling Machine: Track Mounted Drill
Date Started: Sep 16, 19 Date Completed: Sep 16, 19

Logged by: PG Compiled by: TH Reviewed by: WK Revision No.: 0, 4/2/20

LITHOLOGY PROFILE

Local Ground Surface Elevation: 105.9 m

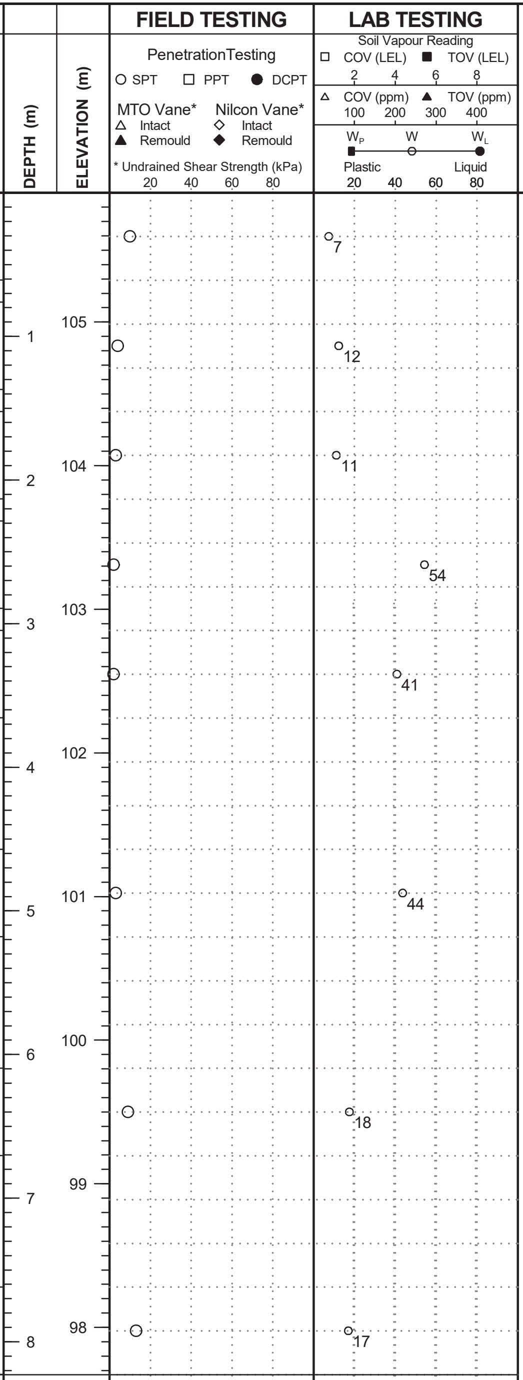
DESCRIPTION	Elevation / Depth (m)
Pavement Structure 50mm **Asphalt**	105.8 0.1
175mm **Granular Base**	105.7 0.2
Brown Silty Sand **FILL** Some gravel, trace concrete, plastic, and slag Very loose Damp to moist	103.2 2.7
Black **Organic Clayey Silt** Very loose Wet	101.8 4.1
Dark Grey **Sandy Silt** Trace gravel Very loose Wet	99.5 6.4
Grey **Silt** Compact Saturated	97.7 8.2
Borehole Terminated	

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)
SS	1	21	10
SS	2	75	4
SS	3	79	3
SS	4	96	2
SS	5	46	2
SS	6	92	3
SS	7	96	9
SS	8	67	13

FIELD TESTING

LAB TESTING



INSTRUMENTATION INSTALLATION

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL

Wood
Environment & Infrastructure Solutions
3450 Harvester Road
Burlington, Ontario, L7N 3W5
Canada
Tel. No.: 1 (905) 335-2353
www.woodplc.com

No freestanding groundwater observed in open borehole upon completion of drilling.

Scale: 1 : 53

RECORD OF BOREHOLE No. BH12

Project Number: **TPB198079**
Project Client: **Toronto Regional Conservation Authority**
Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**
Project Location: **Rockliffe, Toronto**

Drilling Location: **N: 4836932 E: 622358**
Drilling Method: **200 mm Hollow Stem Augering**
Drilling Machine: **Track Mounted Drill**
Date Started: **Sep 16, 19** Date Completed: **Sep 16, 19**

Logged by: **PG** Compiled by: **TH** Reviewed by: **WK** Revision No.: **0, 4/2/20**

wood.

LITHOLOGY PROFILE | SOIL SAMPLING | FIELD TESTING | LAB TESTING | INSTRUMENTATION INSTALLATION | COMMENTS & GRAIN SIZE DISTRIBUTION (%)

Penetration Testing: ○ SPT ☐ PPT ● DCPT
MTO Vane*: △ Intact ▲ Remould
Nilcon Vane*: ◇ Intact ◆ Remould
* Undrained Shear Strength (kPa): 20 40 60 80

Soil Vapour Reading: ☐ COV (LEL) ■ TOV (LEL): 2 4 6 8
△ COV (ppm) ▲ TOV (ppm): 100 200 300 400
W_P W W_L: Plastic 20 40 60 80 Liquid

Local Ground Surface Elevation: 104.4 m

DESCRIPTION	Elevation / Depth (m)	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	W (%)	GR	SA	SI	CL
Brown Sand and Gravel **FILL**		SS	1	33	10	6				
	103.7 0.7									
Brown Silty Fine Sand **FILL** Trace fine gravel Loose to very loose Moist		SS	2	100	7	14				
		SS	3	75	3	18				
	102.2 2.2									
Black Organic Silt **FILL** Trace sand, gravel, and brick fragments		SS	4	42	2	34				
	101.4 3.0									
Grey Silt **FILL** Trace sand, leather fragments Very loose Wet		SS	5	96	2	42				
		SS	6	33	3	25				
	98.8 5.6									
Grey **Sandy Silt** Trace gravel and clay Compact to loose Wet		SS	7	75	15	18	10	32	53	5
		SS	8	88	5	24				
	96.2 8.2									
Borehole Terminated	8.2									

Wood
Environment & Infrastructure Solutions
3450 Harvester Road
Burlington, Ontario, L7N 3W5
Canada
Tel. No.: 1 (905) 335-2353
www.woodplc.com

No freestanding groundwater observed in open borehole upon completion of drilling.

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

RECORD OF BOREHOLE No. BH13

Project Number:	TPB198079	Drilling Location:	N: 4837127 E: 622271
Project Client:	Toronto Regional Conservation Authority	Drilling Method:	200 mm Hollow Stem Augering
Project Name:	Black Creek Flood Remediation and Transportation Feasibility Study	Drilling Machine:	Track Mounted Drill
Project Location:	Rockliffe, Toronto	Date Started:	Sep 16, 19
		Date Completed:	Sep 16, 19

Logged by:	PG	Compiled by:	TH	Reviewed by:	WK	Revision No.:	0, 4/2/20

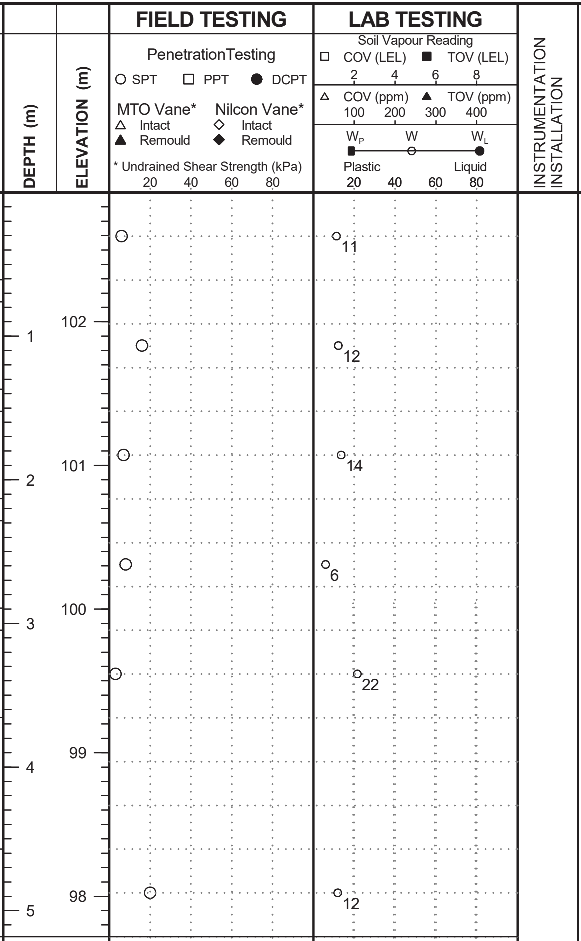
LITHOLOGY PROFILE

Local Ground Surface Elevation: 102.9 m

DESCRIPTION	Elevation (m) / Depth (m)
Topsoil 100mm	102.8 0.1
Brown Silty Sand **FILL** Trace mortar, gravel, wood, and slag Compact to very loose Moist	98.8 4.1
Grey **Silt and Sand** Some gravel, trace clay Wet	97.7 5.2
Borehole Terminated	

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	GR	SA	SI	CL
SS	1	71	6				
SS	2	0	16				
SS	3	96	7				
SS	4	63	8				
SS	5	67	3				
SS	6	63	20	18	37	42	3



COMMENTS & GRAIN SIZE DISTRIBUTION (%)

Wood
Environment & Infrastructure Solutions

3450 Harvester Road
Burlington, Ontario, L7N 3W5
Canada
Tel. No.: 1 (905) 335-2353
www.woodplc.com

No freestanding groundwater observed in open borehole upon completion of drilling.

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

RECORD OF BOREHOLE No. BH14

wood.

Project Number:	TPB198079	Drilling Location:	N: 4837315 E: 622258
Project Client:	Toronto Regional Conservation Authority	Drilling Method:	200 mm Hollow Stem Augering
Project Name:	Black Creek Flood Remediation and Transportation Feasibility Study	Drilling Machine:	Track Mounted Drill
Project Location:	Rockliffe, Toronto	Date Started:	Sep 24, 19
		Date Completed:	Sep 25, 19
Logged by:	PG	Compiled by:	TH
Reviewed by:	WK	Revision No.:	0, 4/2/20

LITHOLOGY PROFILE

Local Ground Surface Elevation: 104.8 m

Elevation / Depth (m)	DESCRIPTION
104.7 0.1	**Topsoil** 50 mm
104.1 0.7	Dark brown Sand **FILL** Trace silt, gravel and organics Damp
	Brown Silty Sand **FILL** Trace gravel Compact Moist
99.9 4.9	Grey **Sandy Silt** Trace clay and gravel Loose to compact Damp

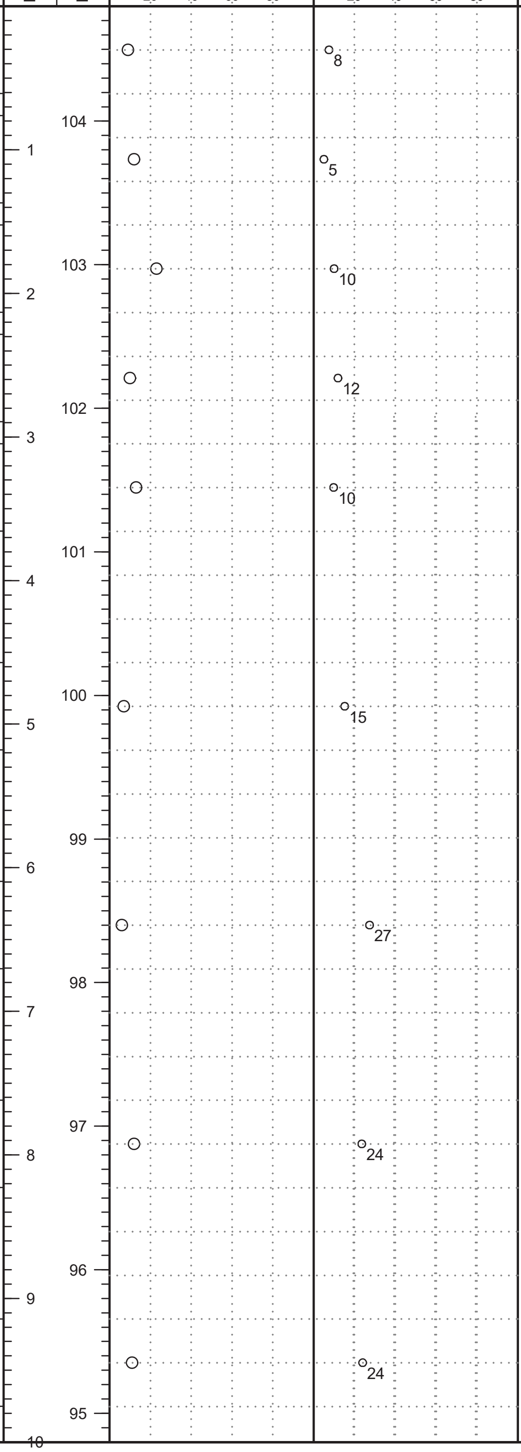
SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	Moisture (%)	GR	SA	SI	CL
SS	1	54	9	8				
SS	2	75	12	5				
SS	3	79	23	10				
SS	4	71	10	12				
SS	5	17	13	10				
SS	6	79	7	15				
SS	7	79	6	27				
SS	8	83	12	24	1	31	65	3
SS	9	83	11	24				

FIELD TESTING

LAB TESTING

COMMENTS & GRAIN SIZE DISTRIBUTION (%)



INSTRUMENTATION INSTALLATION

Wood
Environment & Infrastructure Solutions

3450 Harvester Road
Burlington, Ontario, L7N 3W5
Canada
Tel. No.: 1 (905) 335-2353
www.woodplc.com

$\underline{\nabla}$ No freestanding groundwater observed in open borehole upon completion of drilling.

Scale: 1 : 53

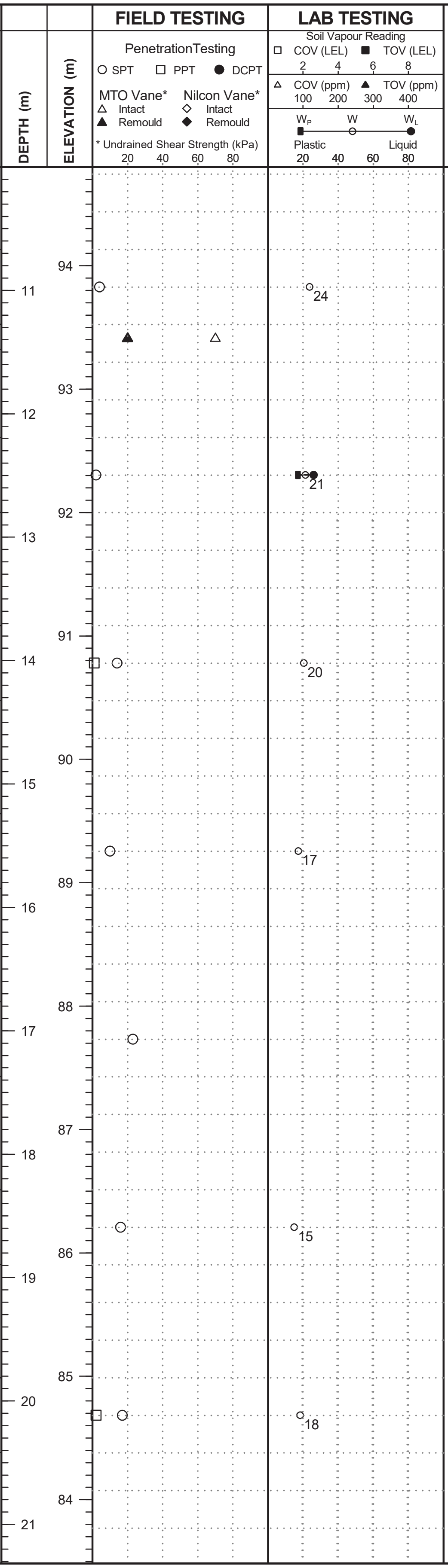
Continued on Next Page

RECORD OF BOREHOLE No. BH14

Project Number: **TPB198079** Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**

Project Location: **Rockliffe, Toronto**

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING	LAB TESTING	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)				GR	SA	SI	CL
	94.6													
	10.2 Grey **Sandy Clayey Silt** Trace gravel Soft WTPL													
		SS	10	100	4									
		VANE	11											
		SS	12	100	2						2	24	46	28
	91.5 13.3 Stiff WTPL													
		SS	13	100	14									
	90.0 14.8 APL													
		SS	14	100	10									
	88.5 16.3 Very Stiff to hard APL													
		SS	15	0	23									
		SS	16	63	16									
		SS	17	100	17									



Borehole details as 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 Borehole Log'.

Scale: 1 : 53

Continued on Next Page

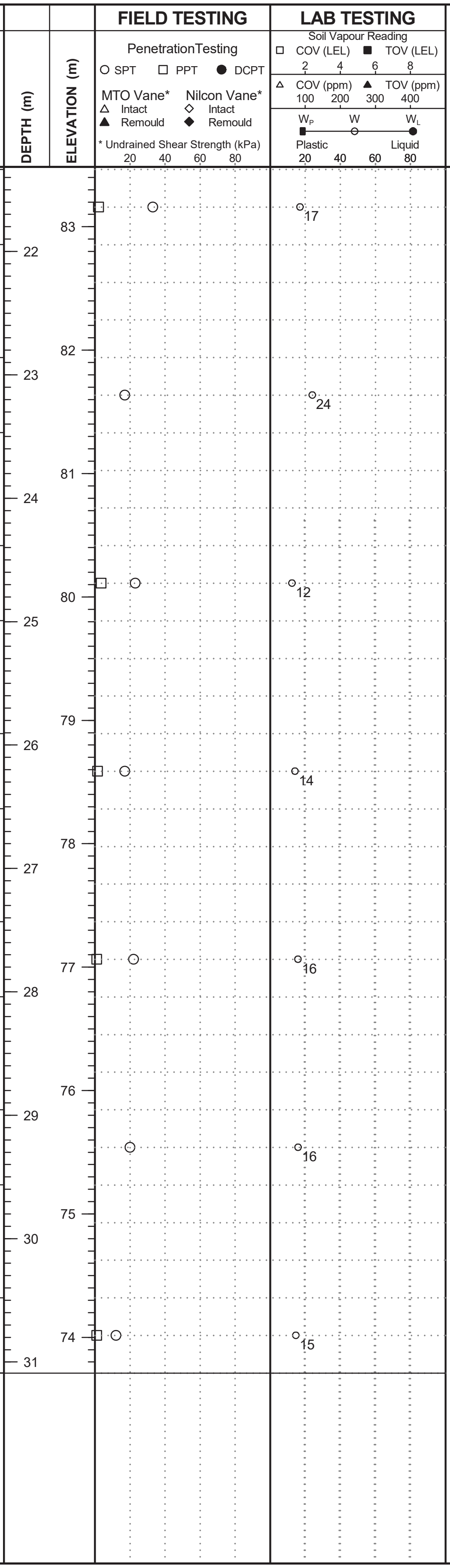
RECORD OF BOREHOLE No. BH14

Project Number: **TPB198079**

Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**

Project Location: **Rockliffe, Toronto**

LITHOLOGY PROFILE		SOIL SAMPLING				LAB TESTING
DESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	W
Very Stiff to hard APL		SS	18	63	33	17
		SS	19	63	17	24
DTPL	80.9 23.9					
		SS	20	100	23	12
Stiff APL	79.3 25.5					
		SS	21	100	17	14
WTPL	77.8 27.0					
Grey **Silt** Moist	77.1 27.7	SS	22	100	22	16
Grey **Silty Clay** Trace sand and gravel Stiff to very stiff DTPL	76.3 28.5					
		SS	23	100	20	16
		SS	24	100	12	15
Borehole Terminated	73.7 31.1					



INSTRUMENTATION INSTALLATION

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

RECORD OF BOREHOLE No. BH15

wood.

Project Number:	TPB198079	Drilling Location:	N: 583475 E: 4791524
Project Client:	Toronto Regional Conservation Authority	Drilling Method:	200 mm Hollow Stem Augering
Project Name:	Black Creek Flood Remediation and Transportation Feasibility Study	Drilling Machine:	Track Mounted Drill
Project Location:	Rockliffe, Toronto	Date Started:	Sep 25, 19
		Date Completed:	Sep 26, 19
Logged by:	PG	Compiled by:	TH
Reviewed by:	WK	Revision No.:	0, 4/2/20

LITHOLOGY PROFILE

Local Ground Surface Elevation: 104.7 m

ELEVATION (m) / DEPTH (m)	DESCRIPTION
104.6 0.1	**Topsoil** 125mm
	Brown Silty Fine Sand **FILL** Trace gravel, roots, and organics Loose to very loose Moist
100.6 4.1	Black **Silty Sand and Organics** Saturated
99.8 4.9	Brown **Silt** Dense to compact Saturated
96.0 8.7	Loose

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	LAB TESTING W
SS	1	67	8	6
SS	2	100	8	11
SS	3	63	7	13
SS	4	63	5	14
SS	5	100	2	23
SS	6	79	8	10
SS	7	67	34	22
SS	8	0	10	
SS	9	79	9	26

FIELD TESTING: PenetrationTesting ○ SPT ☐ PPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ Remould; * Undrained Shear Strength (kPa) 20 40 60 80

LAB TESTING: Soil Vapour Reading ☐ COV (LEL) ■ TOV (LEL) 2 4 6 8; △ COV (ppm) ▲ TOV (ppm) 100 200 300 400; W_P W W_L Plastic Liquid 20 40 60 80

INSTRUMENTATION INSTALLATION

COMMENTS & GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

Wood
Environment & Infrastructure Solutions
3450 Harvester Road
Burlington, Ontario, L7N 3W5
Canada
Tel. No.: 1 (905) 335-2353
www.woodplc.com

No freestanding groundwater observed in open borehole upon completion of drilling.

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

Continued on Next Page

RECORD OF BOREHOLE No. BH15

Project Number: **TPB198079** Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**

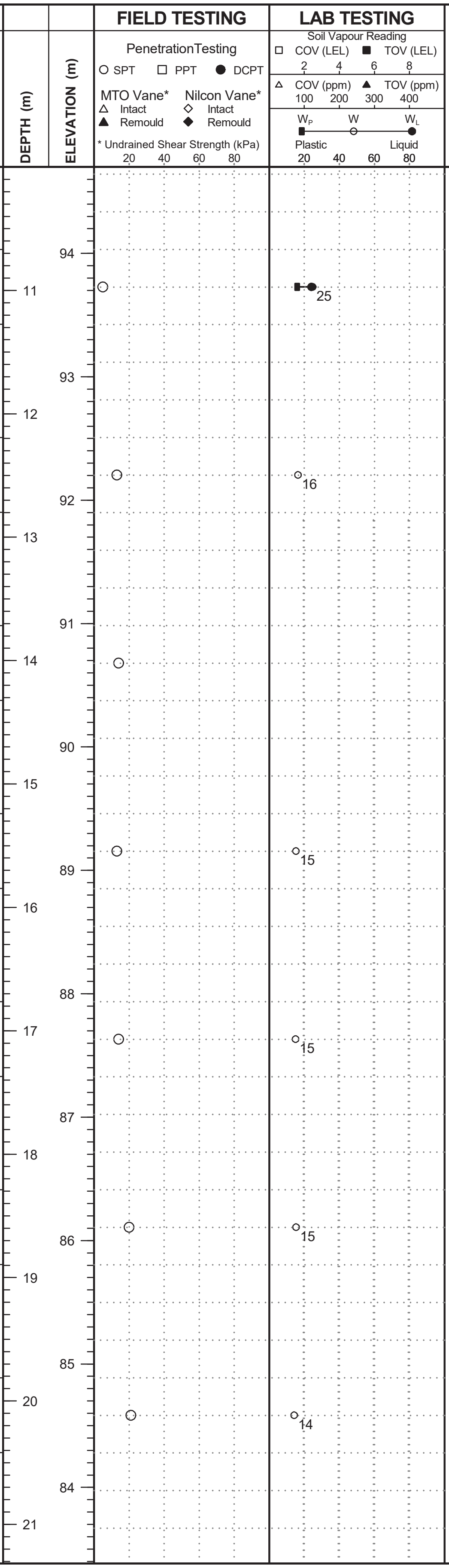
Project Location: **Rockliffe, Toronto**

LITHOLOGY PROFILE

Description	Elevation / Depth (m)
Loose	
Grey **Clayey Silt** Trace sand Firm WTPL	94.5 10.2
Stiff APL	93.0 11.7
Grey **Silt and Clay** Trace sand and fine gravel Stiff APL to WTPL	89.9 14.8
Very stiff DTPL	86.9 17.8
APL	83.8 20.9

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	GR	SA	SI	CL
SS	10	100	5	0	1	67	32
SS	11	96	13				
SS	12	0	14				
SS	13	71	13				
SS	14	100	14				
SS	15	100	20				
SS	16	88	21				



INSTRUMENTATION INSTALLATION

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

Scale: 1 : 53

Continued on Next Page

RECORD OF BOREHOLE No. BH15

Project Number: **TPB198079**

Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**

Project Location: **Rockliffe, Toronto**

LITHOLOGY PROFILE

Elevation / Depth (m)	DESCRIPTION
	APL
82.3 22.4	WTPL
80.8 23.9	Grey **Silt** Trace sand and fine gravel Compact Damp
79.2 25.5	Grey **Silty Clay** Trace sand and gravel Stiff to very stiff APL
76.2 28.5	Grey **Silty Sand** Trace gravel Dense Wet
74.7 30.0	Grey **Silty Clay** Trace sand and gravel Very stiff to stiff WTPL
73.2 31.5	APL

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	GR	SA	SI	CL
SS	17	63	25				
SS	18	100	17	0	5	56	39
SS	19	38	21				
SS	20	100	14				
SS	21	100	24				
SS	22	100	35				
SS	23	100	16				
SS	24	100	16				

FIELD TESTING

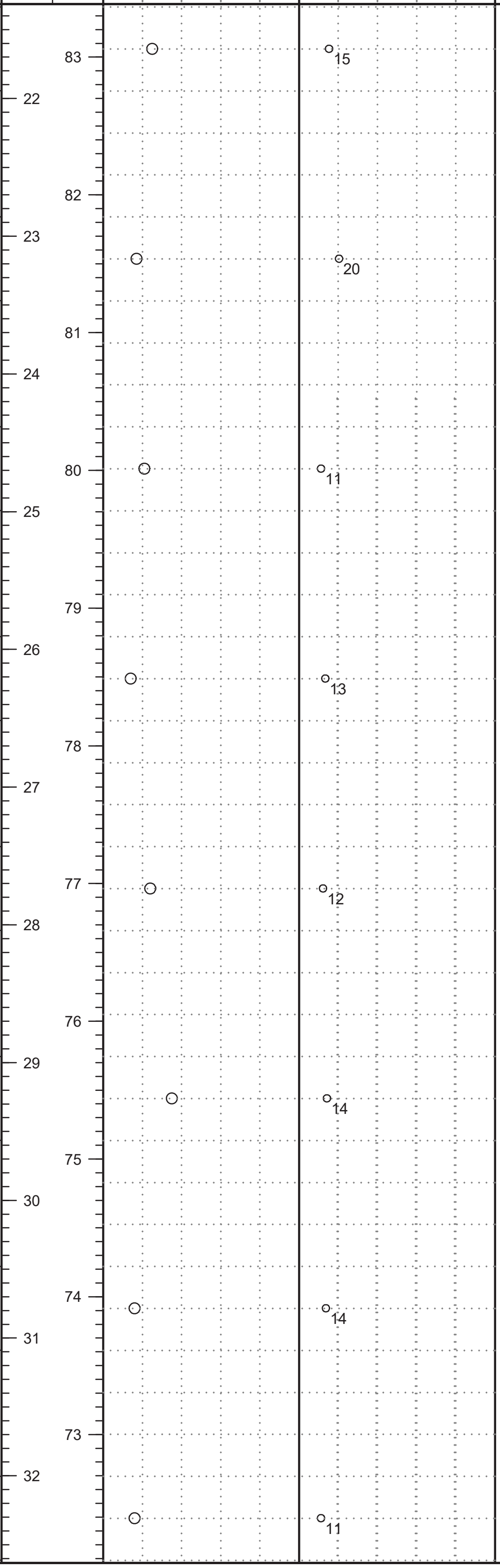
PenetrationTesting
○ SPT ☐ PPT ● DCPT
MTO Vane* Nilcon Vane*
△ Intact ◇ Intact
▲ Remould ◆ Remould
* Undrained Shear Strength (kPa)

LAB TESTING

Soil Vapour Reading
☐ COV (LEL) ■ TOV (LEL)
△ COV (ppm) ▲ TOV (ppm)
W_P W W_L
Plastic Liquid

INSTRUMENTATION INSTALLATION

COMMENTS & GRAIN SIZE DISTRIBUTION (%)



Borehole details as 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 Borehole Log'.

Scale: 1 : 53

Continued on Next Page

RECORD OF BOREHOLE No. **BH15**

Project Number: **TPB198079** Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**

Project Location: **Rockliffe, Toronto**

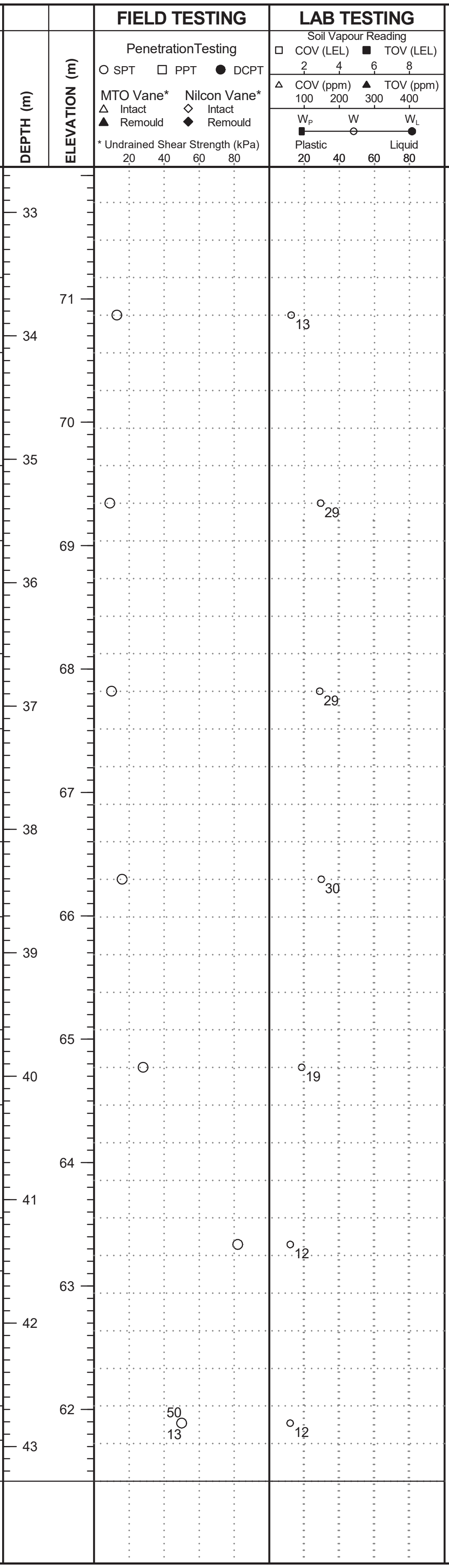
wood.

LITHOLOGY PROFILE

Elevation (m) / Depth (m)	DESCRIPTION
	APL
70.1 34.6	Trace sand WTPL
65.5 39.2	Grey **Silt** Trace sand Very stiff Wet
64.0 40.7	Grey **Silty Sand** Wet
63.6 41.1	Grey **Silty Clay** Trace sand and gravel Hard DTPL
61.4 43.3	**Borehole Terminated**

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)
SS	25	100	13
SS	26	75	9
SS	27	92	10
SS	28	100	16
SS	29	100	28
SS	30	118	82
SS	31	73	50/13



INSTRUMENTATION INSTALLATION

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

RECORD OF BOREHOLE No. **BH16**

Project Number: **TPB198079**
Project Client: **Toronto Regional Conservation Authority**
Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**
Project Location: **Rockliffe, Toronto**
Drilling Location: **N: 4837265 E: 622255**
Drilling Method: **200 mm Hollow Stem Augering**
Drilling Machine: **Track Mounted Drill**
Date Started: **Sep 20, 19** Date Completed: **Sep 24, 19**

Logged by: **TH** Compiled by: **TH** Reviewed by: **WK** Revision No.: **0, 4/2/20**

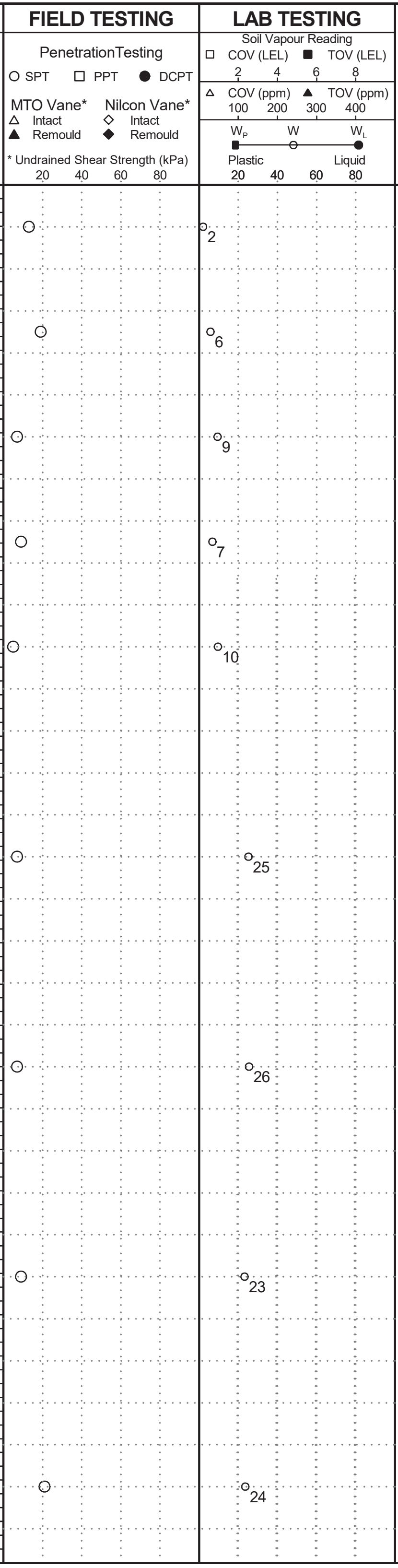
LITHOLOGY PROFILE

Local Ground Surface Elevation: 104.7 m

DESCRIPTION	ELEVATION (m) / DEPTH (m)
Topsoil 75mm	104.6 0.1
Brown Silty Sand **FILL** Compact to loose Damp	
Trace grave and wood Loose Moist	102.6 2.1
Brown **Sand** Trace gravel Saturated	100.6 4.1
Grey **Silty Sand** Saturated	99.8 4.9
Grey **Sandy Silt** Trace clay Loose to compact Wet	99.1 5.6

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	W	GR	SA	SI	CL
SS	1	83	13	2				
SS	2	79	19	6				
SS	3	88	7	9				
SS	4	21	9	7				
SS	5	67	5	10				
SS	6	71	7	25				
SS	7	67	7	26				
SS	8	67	9	23	0	31	67	2
SS	9	63	21	24				



INSTRUMENTATION INSTALLATION

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

DEPTH (m): 1 2 3 4 5 6 7 8 9 10

ELEVATION (m): 104 103 102 101 100 99 98 97 96 95

Wood
Environment & Infrastructure Solutions
3450 Harvester Road
Burlington, Ontario, L7N 3W5
Canada
Tel. No.: 1 (905) 335-2353
www.woodplc.com

≚ No freestanding groundwater observed in open borehole upon completion of drilling.

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

Continued on Next Page

RECORD OF BOREHOLE No. BH16

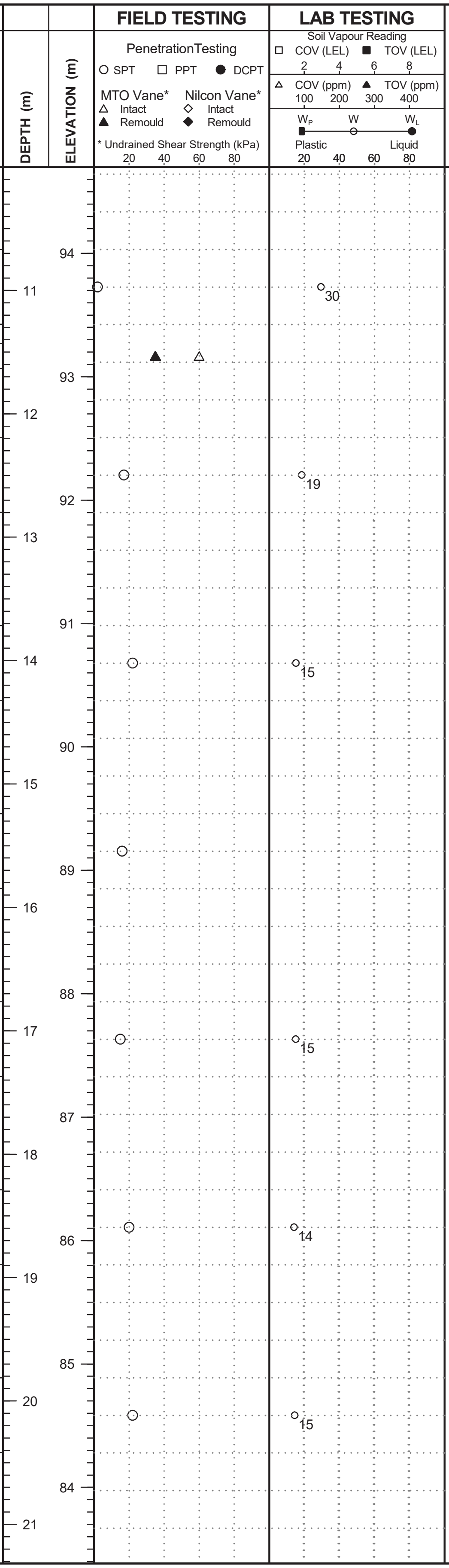
Project Number: TPB198079
Project Name: Black Creek Flood Remediation and Transportation Feasibility Study
Project Location: Rockliffe, Toronto

LITHOLOGY PROFILE

Elevation / Depth	DESCRIPTION
94.5 10.2	Grey **Silty Clay** Soft WTPL
93.0 11.7	Grey **Silty Clay with Sand Seams** Very stiff DTPL
91.4 13.3	Grey **Silty Clay** Trace sand and gravel Very stiff APL

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)
SS	10	100	2
VANE	11		
SS	12	100	17
SS	13	100	22
SS	14	0	16
SS	15	100	15
SS	16	92	20
SS	17	83	22



INSTRUMENTATION INSTALLATION

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL

Scale: 1 : 53

Continued on Next Page

RECORD OF BOREHOLE No. BH16

Project Number: **TPB198079** Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**

Project Location: **Rockliffe, Toronto**

wood.

LITHOLOGY PROFILE

Lithology Plot	DESCRIPTION	Elevation / Depth (m)
▨	Grey **Silty Clay** Trace sand and gravel Very stiff APL	82.6 22.1
⁚	Grey **Sandy Silt** Some clay, trace gravel Stiff to very stiff WTPL	73.6 31.1
	Borehole Terminated	

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)
SS	18	100	28
SS	19	100	26
SS	20	0	27
SS	21	100	14
SS	22	100	12
SS	23	17	19
SS	24	100	17

DEPTH (m): 22, 23, 24, 25, 26, 27, 28, 29, 30, 31

ELEVATION (m): 83, 82, 81, 80, 79, 78, 77, 76, 75, 74

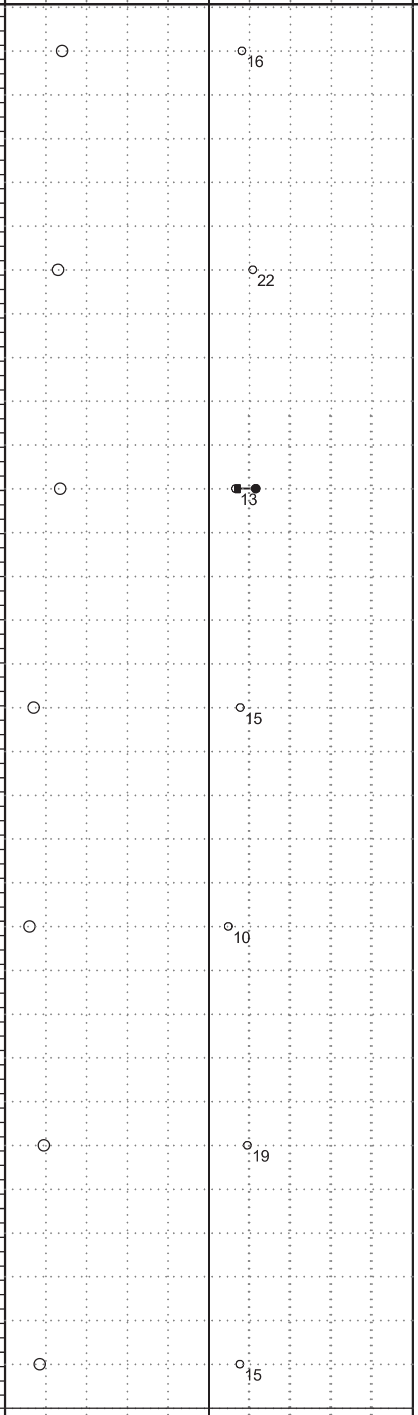
FIELD TESTING

PenetrationTesting
○ SPT ☐ PPT ● DCPT
MTO Vane* Nilcon Vane*
△ Intact ◇ Intact
▲ Remould ◆ Remould
* Undrained Shear Strength (kPa)
20 40 60 80

LAB TESTING

Soil Vapour Reading
☐ COV (LEL) ■ TOV (LEL)
2 4 6 8
△ COV (ppm) ▲ TOV (ppm)
100 200 300 400
Wₚ W W_L
Plastic Liquid
20 40 60 80

INSTRUMENTATION INSTALLATION



COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL
4	33	44	19

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

RECORD OF BOREHOLE No. BH17

Project Number:	TPB198079	Drilling Location:	N: 4837533 E: 622356
Project Client:	Toronto Regional Conservation Authority	Drilling Method:	200 mm Hollow Stem Augering
Project Name:	Black Creek Flood Remediation and Transportation Feasibility Study	Drilling Machine:	Truck Mounted Drill
Project Location:	Rockliffe, Toronto	Date Started:	Sep 23, 19
		Date Completed:	Sep 23, 19

Logged by: TH
Compiled by: TH
Reviewed by: WK
Revision No.: 0, 4/2/20

wood.

Local Ground Surface Elevation: 103.9 m

LITHOLOGY PROFILE

DESCRIPTION	Elevation (m) / Depth (m)
Pavement Structure 110mm **Asphalt** 220mm **Concrete** **200mm** Granular Fill	103.8 / 0.1 103.6 / 0.3 103.4 / 0.5
Brown Silty Sand **FILL** Trace gravel Very loose Moist	103.4 / 0.5
Grey **Silt and Sand** Compact to very loose Wet	100.9 / 3.0
Grey **Silty Clay** Trace sand and fine gravel Very soft WTPL	98.3 / 5.6
Stiff DTPL	97.0 / 6.9
APL	95.2 / 8.7

SOIL SAMPLING, FIELD TESTING, LAB TESTING

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	Water content (%)	GR	SA	SI	CL
SS	1	83	3	16				
SS	2	71	4	7				
SS	3	83	3	12				
SS	4	71	11	20				
SS	5	42	3	27	0	39	61	0
SS	6	100	0	25				
SS	7	83	12	13				
SS	8	88	12	14				

FIELD TESTING: PenetrationTesting ○ SPT ☐ PPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ Remould; * Undrained Shear Strength (kPa) 20 40 60 80

LAB TESTING: Soil Vapour Reading ☐ COV (LEL) ■ TOV (LEL) 2 4 6 8; △ COV (ppm) ▲ TOV (ppm) 100 200 300 400; W_P W W_L Plastic Liquid 20 40 60 80

INSTRUMENTATION INSTALLATION

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

DEPTH (m): 1 2 3 4 5 6 7 8 9 10
ELEVATION (m): 103 102 101 100 99 98 97 96 95 94

Wood
Environment & Infrastructure Solutions
3450 Harvester Road
Burlington, Ontario, L7N 3W5
Canada
Tel. No.: 1 (905) 335-2353
www.woodplc.com

∇ Groundwater depth during drilling on 9/23/2019 at a depth of: 4.3 m.

▚ Cave in depth after removal of augers: 4.6 m.

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

Continued on Next Page

RECORD OF BOREHOLE No. BH17

Project Number: **TPB198079**
Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**
Project Location: **Rockliffe, Toronto**

LITHOLOGY PROFILE | SOIL SAMPLING | FIELD TESTING | LAB TESTING | INSTRUMENTATION INSTALLATION | COMMENTS & GRAIN SIZE DISTRIBUTION (%)

FIELD TESTING: Penetration Testing ○ SPT ☐ PPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ Remould; * Undrained Shear Strength (kPa) 20 40 60 80

LAB TESTING: Soil Vapour Reading ☐ COV (LEL) ■ TOV (LEL) 2 4 6 8; △ COV (ppm) ▲ TOV (ppm) 100 200 300 400; W

Wp W WL, Plastic Liquid 20 40 60 80

COMMENTS & GRAIN SIZE DISTRIBUTION (%): GR SA SI CL

Lithology Plot	DESCRIPTION	Elev. / Depth	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	Lab Testing (W)
▨	APL								
			SS	9	100	13	11	93	14
▨	Very stiff DTPL	92.2 11.7					12	92	
			SS	10	100	24			22
	Grey **Silt** Wet	91.3 12.6					13	91	
▨	Grey **Silty Clay** Trace sand and gravel Very stiff APL to DTPL	90.6 13.3							
			SS	11	100	16	14	90	15
							15	89	
			SS	12	100	19			12
		88.1 15.8							

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

RECORD OF BOREHOLE No. BH18

Project Number: **TPB198079**
Project Client: **Toronto Regional Conservation Authority**
Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**
Project Location: **Rockliffe, Toronto**
Drilling Location: **N: 4837510 E: 622367**
Drilling Method: **200 mm Hollow Stem Augering**
Drilling Machine: **Truck Mounted Drill**
Date Started: **Sep 23, 19** Date Completed: **Sep 23, 19**

Logged by: **TH** Compiled by: **TH** Reviewed by: **WK** Revision No.: **0, 4/2/20**

wood.

Local Ground Surface Elevation: 103.9 m

Field Testing – PenetrationTesting: ○ SPT ☐ PPT ● DCPT; MTO Vane*: △ Intact ▲ Remould; Nilcon Vane*: ◇ Intact ◆ Remould; * Undrained Shear Strength (kPa) 20 40 60 80

Lab Testing – Soil Vapour Reading: ☐ COV (LEL) ■ TOV (LEL) 2 4 6 8; △ COV (ppm) ▲ TOV (ppm) 100 200 300 400; W_P W W_L Plastic Liquid 20 40 60 80

LITHOLOGY PROFILE – DESCRIPTION	Elevation / Depth	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	FIELD TESTING (SPT)	LAB TESTING (W)	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
Pavement Structure 170mm **Asphalt** 390mm **Granular Fill**	103.7 0.2	SS	1	79	15	○	7		
Brown Silty Sand **FILL** Trace gravel Loose to compact Moist to wet	103.3 0.6	SS	2	71	11	○	12		
		SS	3	88	7	○	15		
Grey **Silt** Loose Wet	101.3 2.6	SS	4	71	11	○	22		
		SS	5	63	4	○	20		
Compact	99.8 4.1								
		SS	6	83	26	○	22		
		SS	7	83	11	○	19		
Grey **Sand and Silt** Trace clay and gravel Firm APL	96.7 7.2	SS	8	83	7	○	14		
Stiff	95.2 8.7								
		SS	9	100	13	○	19		

DEPTH (m): 1 2 3 4 5 6 7 8 9 10

ELEVATION (m): 103 102 101 100 99 98 97 96 95 94

Wood
Environment & Infrastructure Solutions
3450 Harvester Road
Burlington, Ontario, L7N 3W5
Canada
Tel. No.: 1 (905) 335-2353
www.woodplc.com

▽ Groundwater depth during drilling on 9/23/2019 at a depth of: 3.7 m.

▨ Cave in depth after removal of augers: 4.0 m.

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

Continued on Next Page

RECORD OF BOREHOLE No. BH18

Project Number: **TPB198079** Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**

Project Location: **Rockliffe, Toronto**

FIELD TESTING: PenetrationTesting ○ SPT ☐ PPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ Remould; * Undrained Shear Strength (kPa) 20 40 60 80

LAB TESTING: Soil Vapour Reading ☐ COV (LEL) ■ TOV (LEL) 2 4 6 8; △ COV (ppm) ▲ TOV (ppm) 100 200 300 400; W_P W W_L; Plastic Liquid 20 40 60 80

LITHOLOGY PROFILE DESCRIPTION	SOIL SAMPLING Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	FIELD TESTING	LAB TESTING	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR	SA	SI	CL
Stiff													
	SS	10	100	13	11	93	○	13					
Very stiff 92.2 11.7													
					12	92							
	SS	11	100	19			○	13		4	41	46	9
					13	91							
	SS	12	100	17	14	90	○	15					
					15	89							
	SS	13	100	20			○	13					
88.1 **Borehole Terminated** 15.8													

Scale: 1 : 53

RECORD OF BOREHOLE No. BH19

Project Number: **TPB198079**
Project Client: **Toronto Regional Conservation Authority**
Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**
Project Location: **Rockliffe, Toronto**
Drilling Location: **N: 4837776 E: 622497**
Drilling Method: **200 mm Hollow Stem Augering**
Drilling Machine: **Truck Mounted Drill**
Date Started: **Sep 19, 19** Date Completed: **Sep 19, 19**

Logged by: **PG** Compiled by: **TH** Reviewed by: **WK** Revision No.: **0, 4/2/20**

LITHOLOGY PROFILE

Local Ground Surface Elevation: 104.7 m

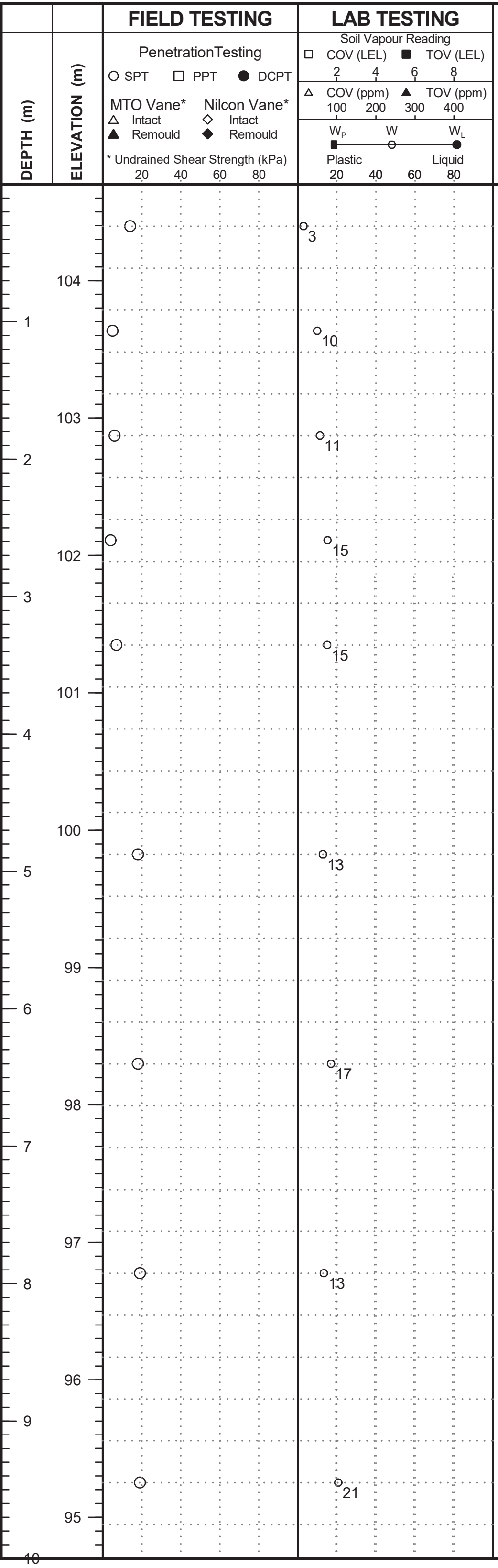
DESCRIPTION	Elevation / Depth (m)
Pavement Structure 120mm **Asphalt** 330mm **Granular**	104.6 0.1 104.2
Brown Silty Sand **FILL** Trace to some gravel Loose Damp	0.5
Grey **Silty Clay** Trace sand and gravel Very stiff DTPL	100.6 4.1

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)
SS	1	100	14
SS	2	63	5
SS	3	33	6
SS	4	58	4
SS	5	54	7
SS	6	88	18
SS	7	29	18
SS	8	92	19
SS	9	67	19

FIELD TESTING

LAB TESTING



INSTRUMENTATION INSTALLATION

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL

Wood
Environment & Infrastructure Solutions
3450 Harvester Road
Burlington, Ontario, L7N 3W5
Canada
Tel. No.: 1 (905) 335-2353
www.woodplc.com

No freestanding groundwater observed in open borehole upon completion of drilling.

Scale: 1 : 53

Continued on Next Page

RECORD OF BOREHOLE No. BH19

Project Number: **TPB198079**

Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**

Project Location: **Rockliffe, Toronto**

wood.

LITHOLOGY PROFILE | SOIL SAMPLING | FIELD TESTING | LAB TESTING | INSTRUMENTATION INSTALLATION | COMMENTS & GRAIN SIZE DISTRIBUTION (%)

FIELD TESTING: PenetrationTesting ○ SPT ☐ PPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ Remould; * Undrained Shear Strength (kPa) 20 40 60 80

LAB TESTING: Soil Vapour Reading ☐ COV (LEL) ■ TOV (LEL) 2 4 6 8; △ COV (ppm) ▲ TOV (ppm) 100 200 300 400; W_P W W_L Plastic Liquid 20 40 60 80

DESCRIPTION	Elevation / Depth	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	W (%)	GR	SA	SI	CL
Grey **Silty Clay** Trace sand and gravel Very stiff DTPL							94					
		SS	10	83	22	11		12				
	93.0 11.7						93					
Grey **Silt and Clay** Some sand, trace gravel Stiff WTPL						12						
		SS	11	100	13		92	21	5	18	41	36
						13	91					
		SS	12	100	10	14		21				
						15	90					
		SS	13	83	8		89	21				
						16	88					
		SS	14	100	8	17		23				
	86.9 17.8						87					
Grey **Silt** Trace sand and fine gravel Compact Wet						18						
		SS	15	100	13		86	22				
	85.3 19.4					19						
Grey **Silty Sand** Some gravel Compact Wet							85					
		SS	16	92	15	20		15				
	83.8 20.9						84					
						21						

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

Continued on Next Page

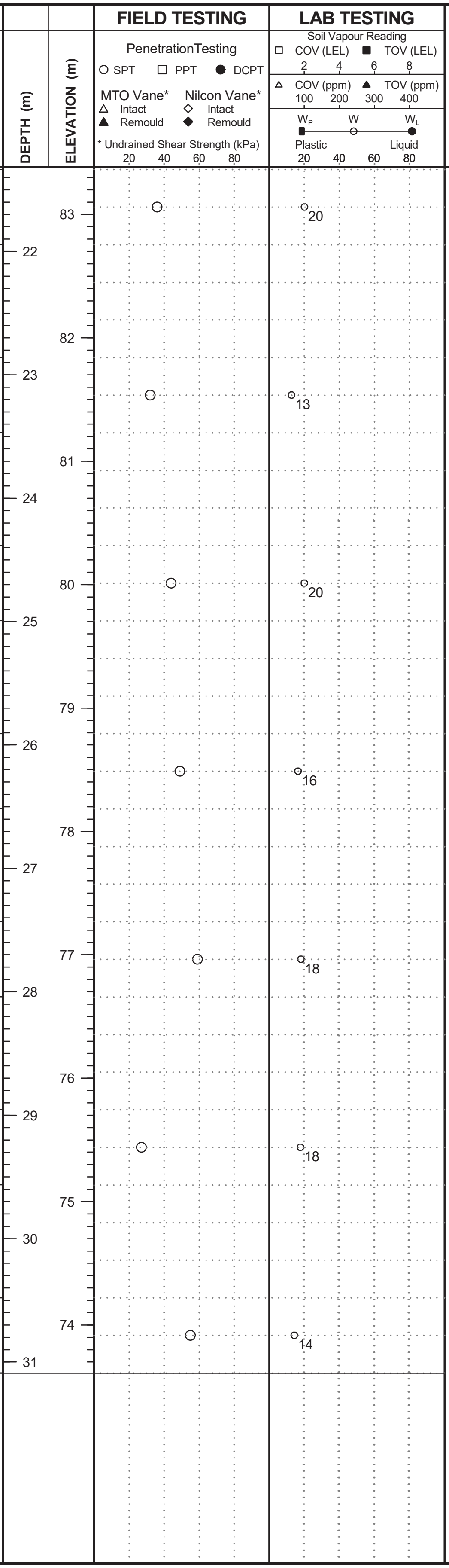
RECORD OF BOREHOLE No. BH19

Project Number: TPB198079

Project Name: Black Creek Flood Remediation and Transportation Feasibility Study

Project Location: Rockliffe, Toronto

LITHOLOGY PROFILE		SOIL SAMPLING				COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
DESCRIPTION	Elevation / Depth	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	GR	SA	SI	CL
Grey **Silt** Trace fine sand Dense Wet		SS	17	54	36				
Grey **Silty Clay** Trace sand and gravel Hard DTPL	82.3 22.4	SS	18	92	32				
Grey **Sandy Silt** Trace clay Dense to very dense Wet	80.8 23.9	SS	19	100	44	0	29	67	4
		SS	20	83	49				
		SS	21	100	59				
Grey **Silty Clay** Trace sand and gravel Very stiff to hard	76.2 28.5	SS	22	100	27				
		SS	23	100	55				
Borehole Terminated	73.6 31.1								



Scale: 1 : 53

RECORD OF BOREHOLE No. BH20

wood.

Project Number: TPB198079
Project Client: Toronto Regional Conservation Authority
Project Name: Black Creek Flood Remediation and Transportation Feasibility Study
Project Location: Rockliffe, Toronto
Drilling Location: N: 4837851 E: 622503
Drilling Method: 200 mm Hollow Stem Augering
Drilling Machine: Track Mounted Drill
Date Started: Aug 10, 19
Date Completed: Aug 10, 19

Logged by: PG
Compiled by: TH
Reviewed by: WK
Revision No.: 0, 4/2/20

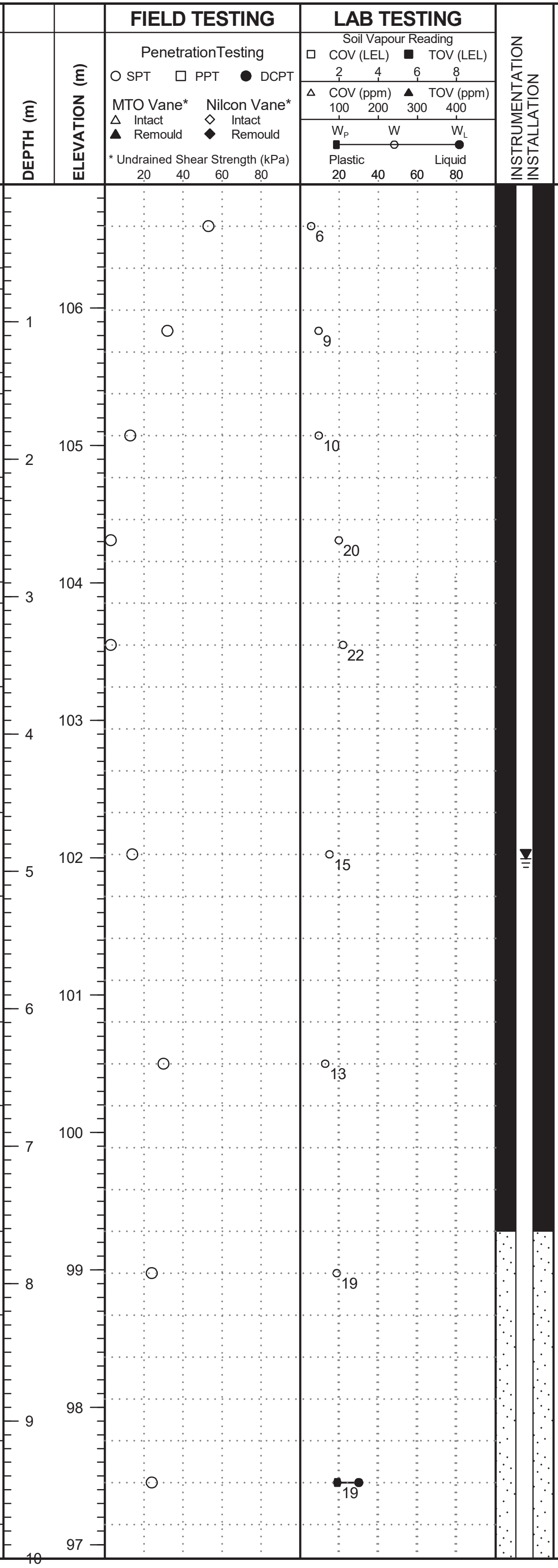
LITHOLOGY PROFILE

Local Ground Surface Elevation: 106.9 m

Elevation (m) / Depth (m)	DESCRIPTION
106.8 0.1	**Topsoil** 75mm
	Brown to grey Silty Sand **FILL** Some gravel, trace brick, asphalt, and clay Dense to very loose Damp to moist
102.8 4.1	Grey **Silty Clay** Trace sand and fine gravel Stiff to very stiff DTPL
99.7 7.2	Grey **Silt** Trace sand Compact Wet
98.2 8.7	Grey **Clayey Silt** Trace sand and fine gravel Very stiff DTPL

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	W	GR	SA	SI	CL
SS	1	92	53	6				
SS	2	100	32	9				
SS	3	83	13	10				
SS	4	67	3	20				
SS	5	88	3	22				
SS	6	83	14	15				
SS	7	83	30	13				
SS	8	83	24	19				
SS	9	88	24	19	1	9	66	24



COMMENTS & GRAIN SIZE DISTRIBUTION (%)

Wood
Environment & Infrastructure Solutions

3450 Harvester Road
Burlington, Ontario, L7N 3W5
Canada
Tel. No.: 1 (905) 335-2353
www.woodplc.com

▽ No freestanding groundwater observed in open borehole upon completion of drilling.

▼ Groundwater depth observed on 1/17/2020 at a depth of: 4.9 m.

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

Continued on Next Page

RECORD OF BOREHOLE No. BH20

Project Number: **TPB198079**
Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**
Project Location: **Rockliffe, Toronto**

LITHOLOGY PROFILE | **SOIL SAMPLING** | **FIELD TESTING** | **LAB TESTING**

Penetration Testing: ○ SPT ☐ PPT ● DCPT
MTO Vane*: △ Intact ▲ Remould
Nilcon Vane*: ◇ Intact ◆ Remould
* Undrained Shear Strength (kPa) 20 40 60 80

Soil Vapour Reading: ☐ COV (LEL) ■ TOV (LEL) 2 4 6 8
△ COV (ppm) ▲ TOV (ppm) 100 200 300 400
W_P W W_L Plastic Liquid 20 40 60 80

INSTRUMENTATION INSTALLATION

COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL

Lithology Plot	DESCRIPTION	Elevation (m) / Depth (m) at base
	Grey **Clayey Silt** Trace sand and fine gravel Very stiff DTPL	93.6 13.3
	Grey **Silty Clay** Stiff APL	92.1 14.8
	Grey **Silt** Trace clay, sand, and gravel Compact Wet	89.1 17.8
	Grey **Silty Clay** Trace sand Stiff WTPL	86.0 20.9

Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	W (%)	GR	SA	SI	CL
SS	10	92	24	11				
SS	11	83	24	14				
SS	12	100	12	24				
SS	13	92	19	18	0	3	89	8
SS	14	92	21	20				
SS	15	100	9	26				
SS	16	100	11	24				

DEPTH (m)	ELEVATION (m)
11	96
12	95
13	94
14	93
15	92
16	91
17	90
18	89
19	88
20	87
21	86

Borehole details as 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 Borehole Log'.

Scale: 1 : 53

Continued on Next Page

RECORD OF BOREHOLE No. BH20

Project Number: **TPB198079** Project Name: **Black Creek Flood Remediation and Transportation Feasibility Study**

Project Location: **Rockliffe, Toronto**

wood.

LITHOLOGY PROFILE

DESCRIPTION	Elevation (m)	Depth (m)
Grey **Silty Sand** Compact Wet	84.5	22.4
Grey **Silty Clay** Trace sand and gravel APL	83.7	23.2
Grey **Sand and Gravel** Dense Wet	83.0	23.9
Grey **Silty Clay** Trace sand and gravel Very stiff to stiff DTPL	79.9	27.0
Grey **Sand and Gravel** Dense Wet	78.4	28.5
Grey **Silty Clay** Trace sand and gravel Very stiff WTPL	75.8	31.1
Borehole Terminated		

SOIL SAMPLING

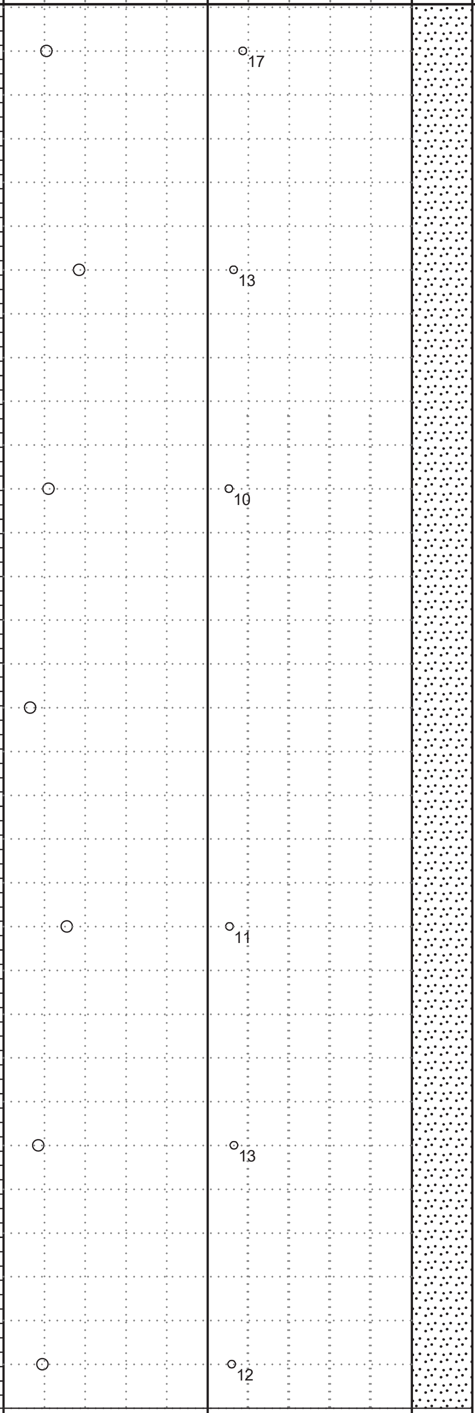
Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)
SS	17	88	21
SS	18	79	37
SS	19	100	22
SS	20	0	13
SS	21	50	31
SS	22	67	17
SS	23	67	19

DEPTH (m): 22, 23, 24, 25, 26, 27, 28, 29, 30, 31

ELEVATION (m): 85, 84, 83, 82, 81, 80, 79, 78, 77, 76

FIELD TESTING

LAB TESTING



COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL

Borehole details as 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 Borehole Log'.

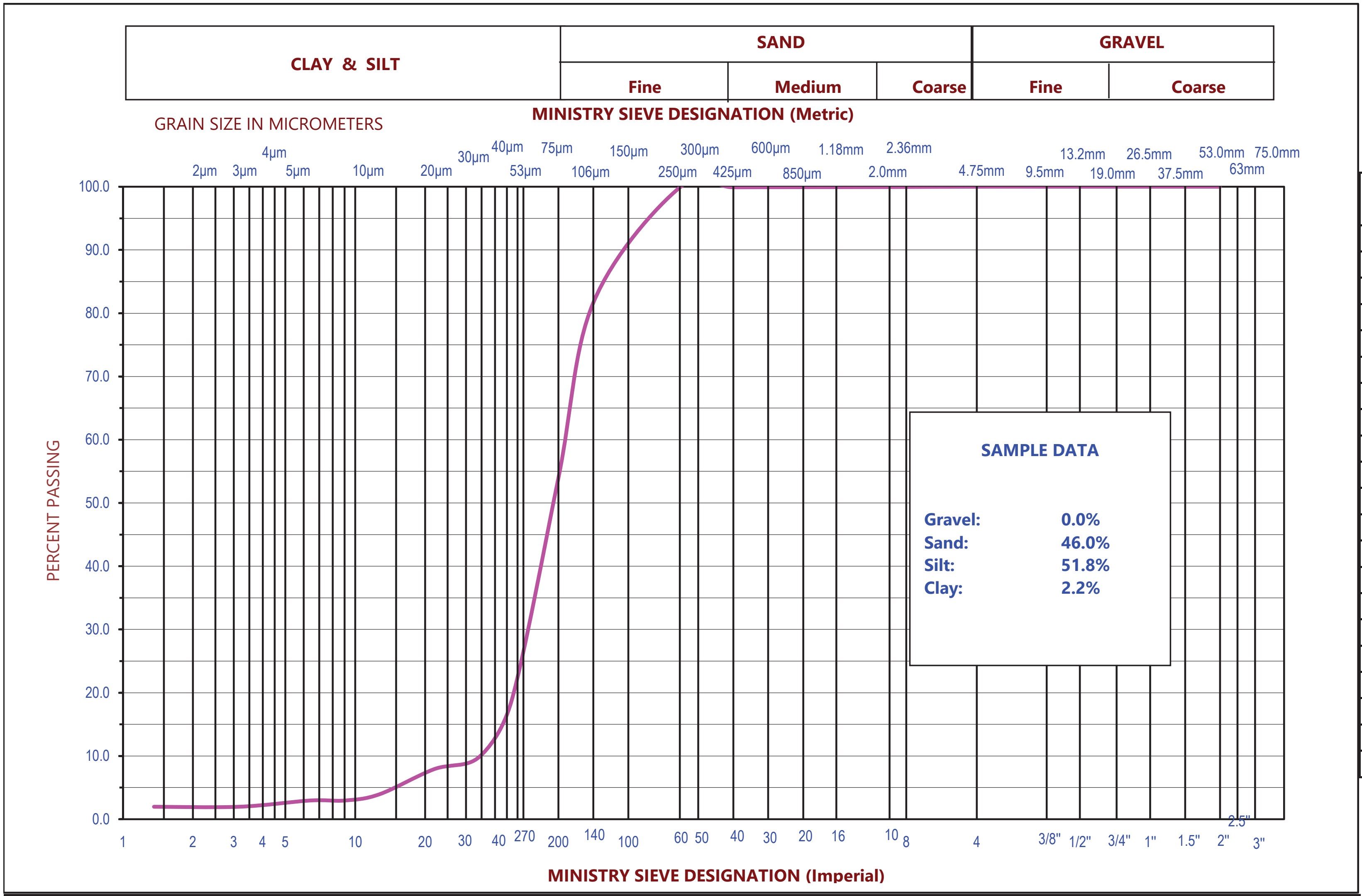
Scale: 1 : 53

APPENDIX B

wood.

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702



SAMPLE DATA

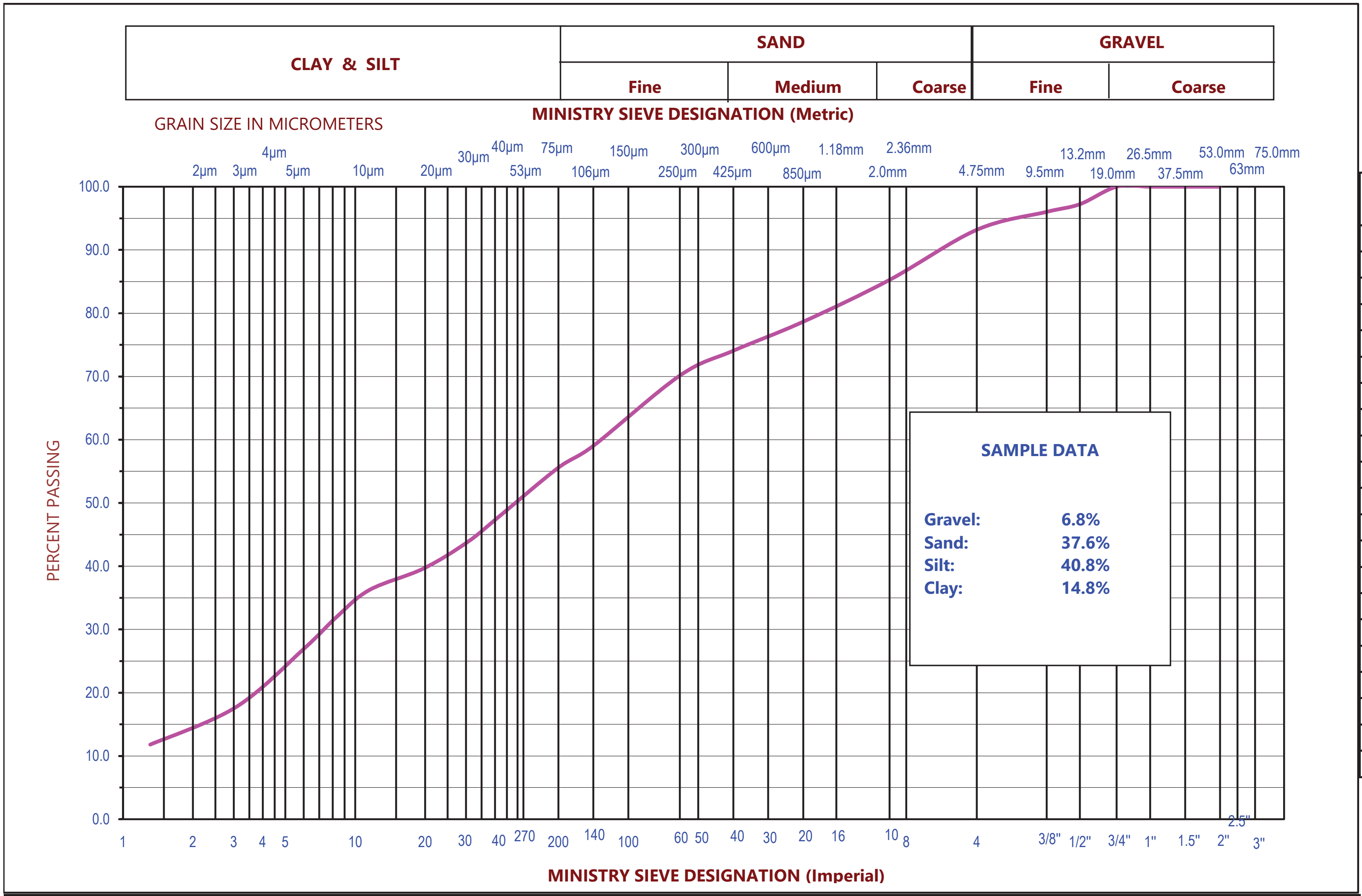
Gravel: 0.0%
Sand: 46.0%
Silt: 51.8%
Clay: 2.2%

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	100.0
9.5	100.0
4.75	100.0
2.00	99.9
0.85	99.9
0.425	99.9
0.250	99.9
0.106	81.7
0.075	54.0
0.0471	18.7
0.0343	9.9
0.0218	7.9
0.0127	3.9
0.0090	3.0
0.0064	3.0
0.0032	2.0
0.0014	2.0

Client:	Toronto Region Conservation Authori	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S428-19
Job No.:	TPB198079.3.5	BH1 - SS10	**Tested By:**	JW
Date Received:	November 2019	**Sand and Silt, trace Clay**	**Report Date:**	29 January 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702 or ASTM D7928



SAMPLE DATA

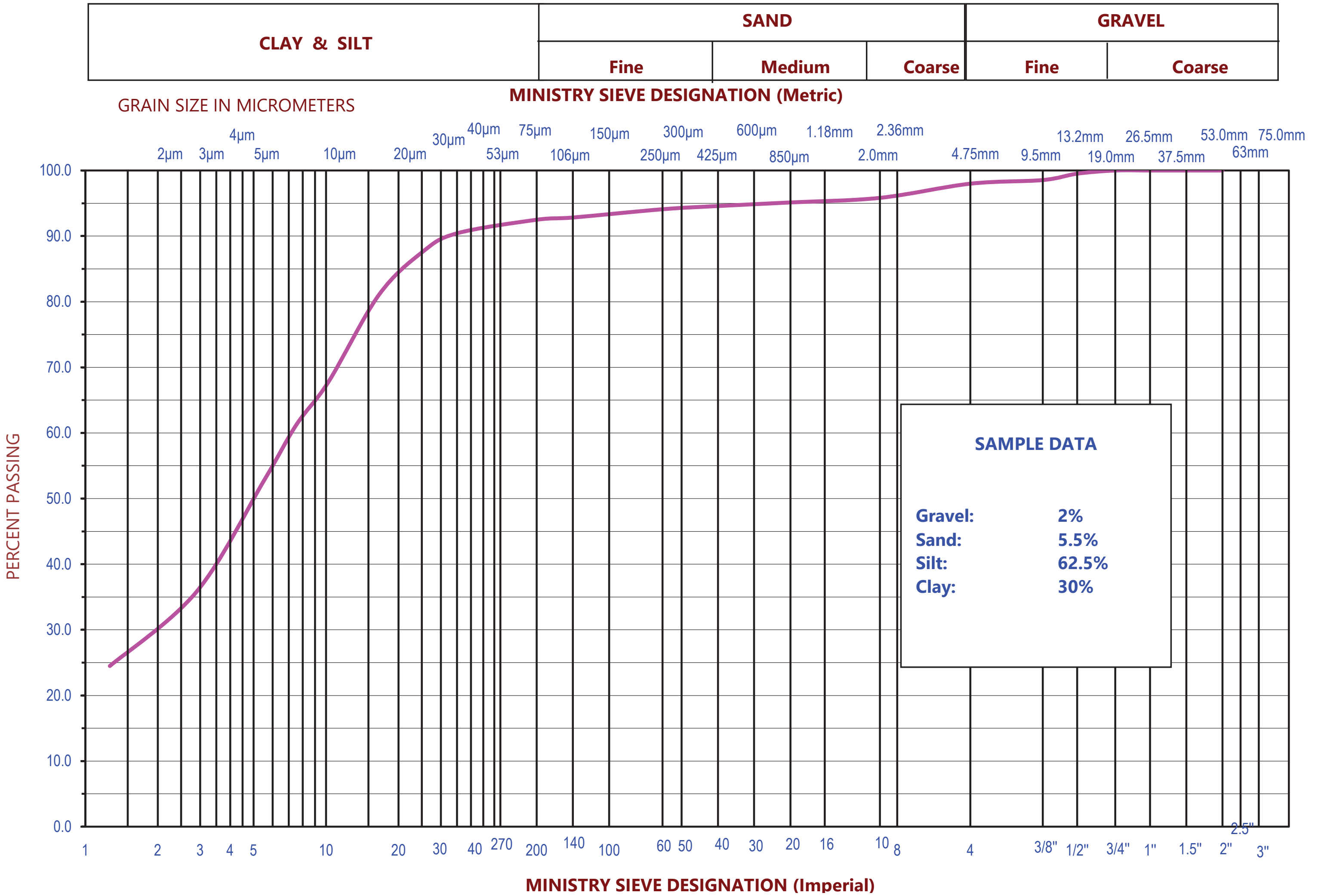
Gravel:	6.8%
Sand:	37.6%
Silt:	40.8%
Clay:	14.8%

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	97.2
9.5	96.0
4.75	93.2
2.00	85.3
0.85	78.7
0.425	74.1
0.250	70.1
0.106	59.0
0.075	55.6
0.0423	48.1
0.0305	43.8
0.0197	39.6
0.0115	36.3
0.0083	32.0
0.0060	27.0
0.0031	17.7
0.0013	11.8

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S429-19
Job No.:	TPB198079.3.5	BH2 - SS6	**Tested By:**	J.W
Date Received:	9 September 2020	**Sand & Silt, some Clay, trace Gravel**	**Report Date:**	7 February 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702 or ASTM D7928



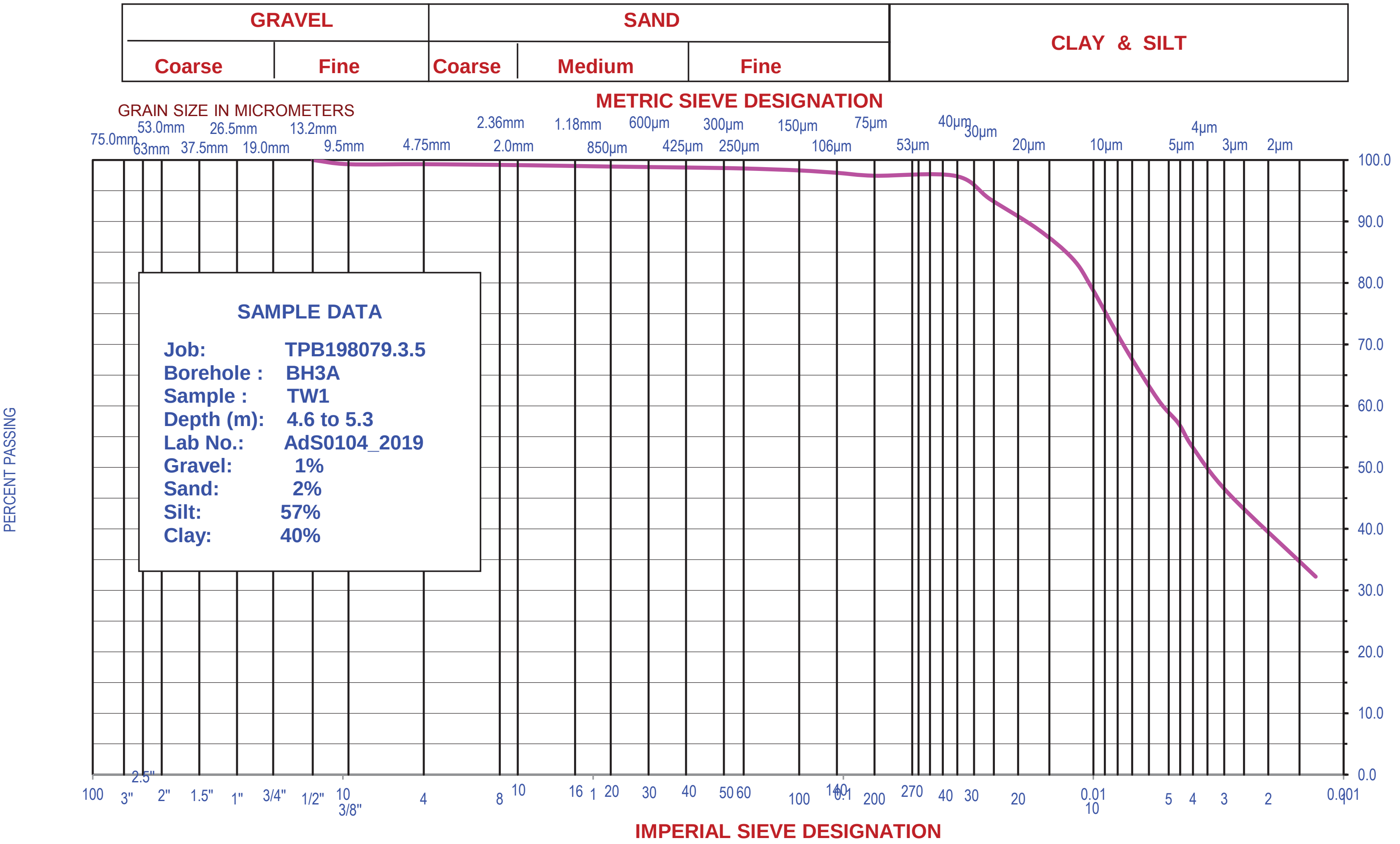
SAMPLE DATA

Gravel: 2%
Sand: 5.5%
Silt: 62.5%
Clay: 30%

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	99.5
9.5	98.5
4.75	98.0
2.00	95.8
0.85	95.1
0.425	94.6
0.250	94.1
0.106	92.8
0.075	92.5
0.0350	90.4
0.0252	87.6
0.0166	81.0
0.0102	67.8
0.0075	61.2
0.0055	52.7
0.0029	35.8
0.0013	24.5

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S427-19
Job No.:	TPB198079.3.5	BH3 - SS6	**Tested By:**	J.W
Date Received:	9 September 2020	**Clayey Silt, trace Sand, trace Gravel**	**Report Date:**	7 February 2020

UNIFIED SOIL CLASSIFICATION SYSTEM



SAMPLE DATA

Job: TPB198079.3.5
Borehole : BH3A
Sample : TW1
Depth (m): 4.6 to 5.3
Lab No.: AdS0104_2019
Gravel: 1%
Sand: 2%
Silt: 57%
Clay: 40%

Wood Environment & Infrastructure Solutions,
a Division of Wood Canada Limited
50 Vogell Road, Units 3 & 4, Richmond Hill, Ontario
Canada L4B 3K6
Tel. (905) 415-2632, Fax (647) 689-4876
www.woodplc.com

GRAIN SIZE DISTRIBUTION

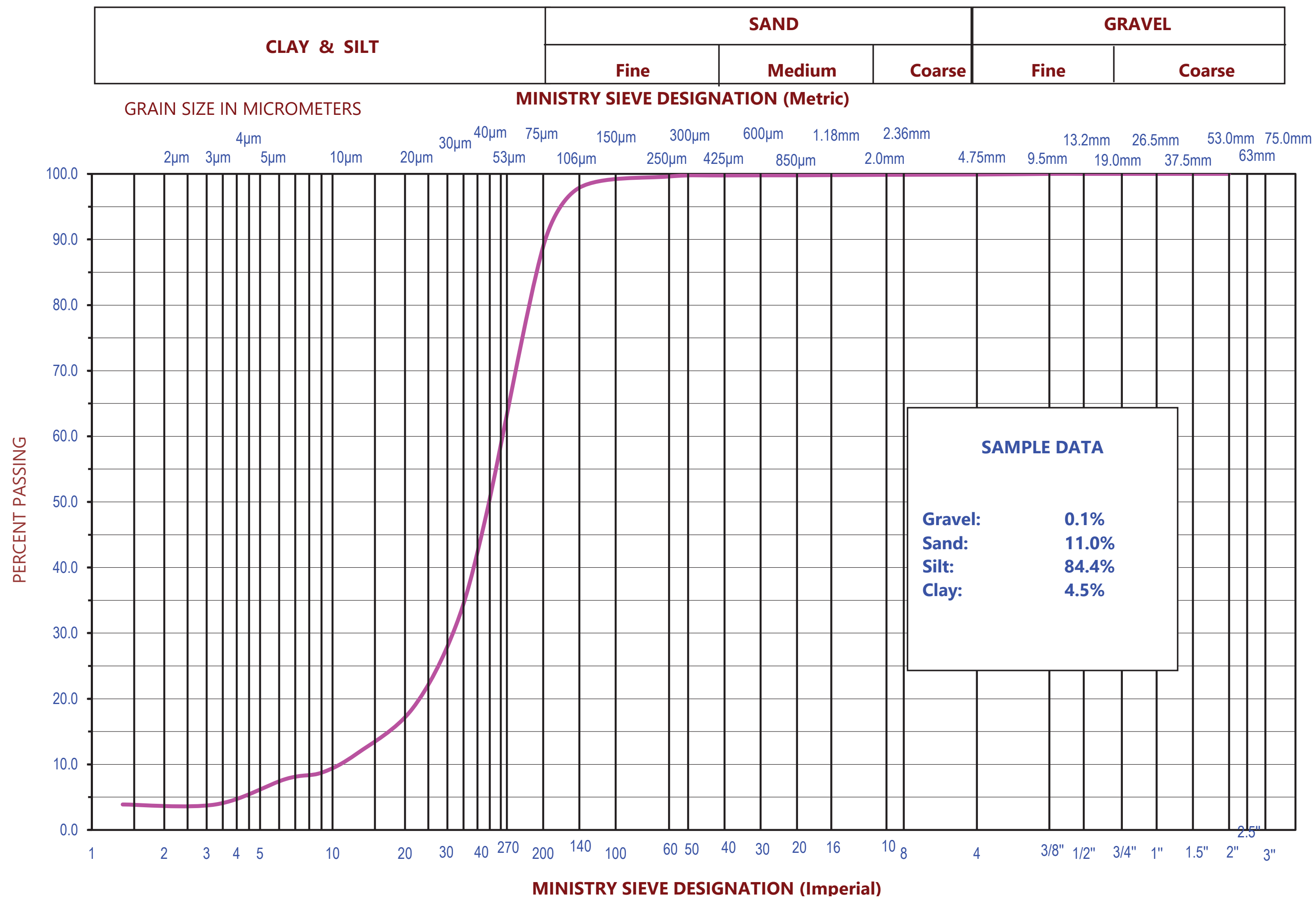
LEAN CLAY

trace gravel and sand

Client :- Toronto & Region Conservation
Project:- Black Creek At Rockcliffe SPA Study
Location:- Black Creek At Rockcliffe, Toronto, ON.
Lab No. :- AdS0104_2019
Date :- 27 Nov 2019

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702 or ASTM D7928



SAMPLE DATA

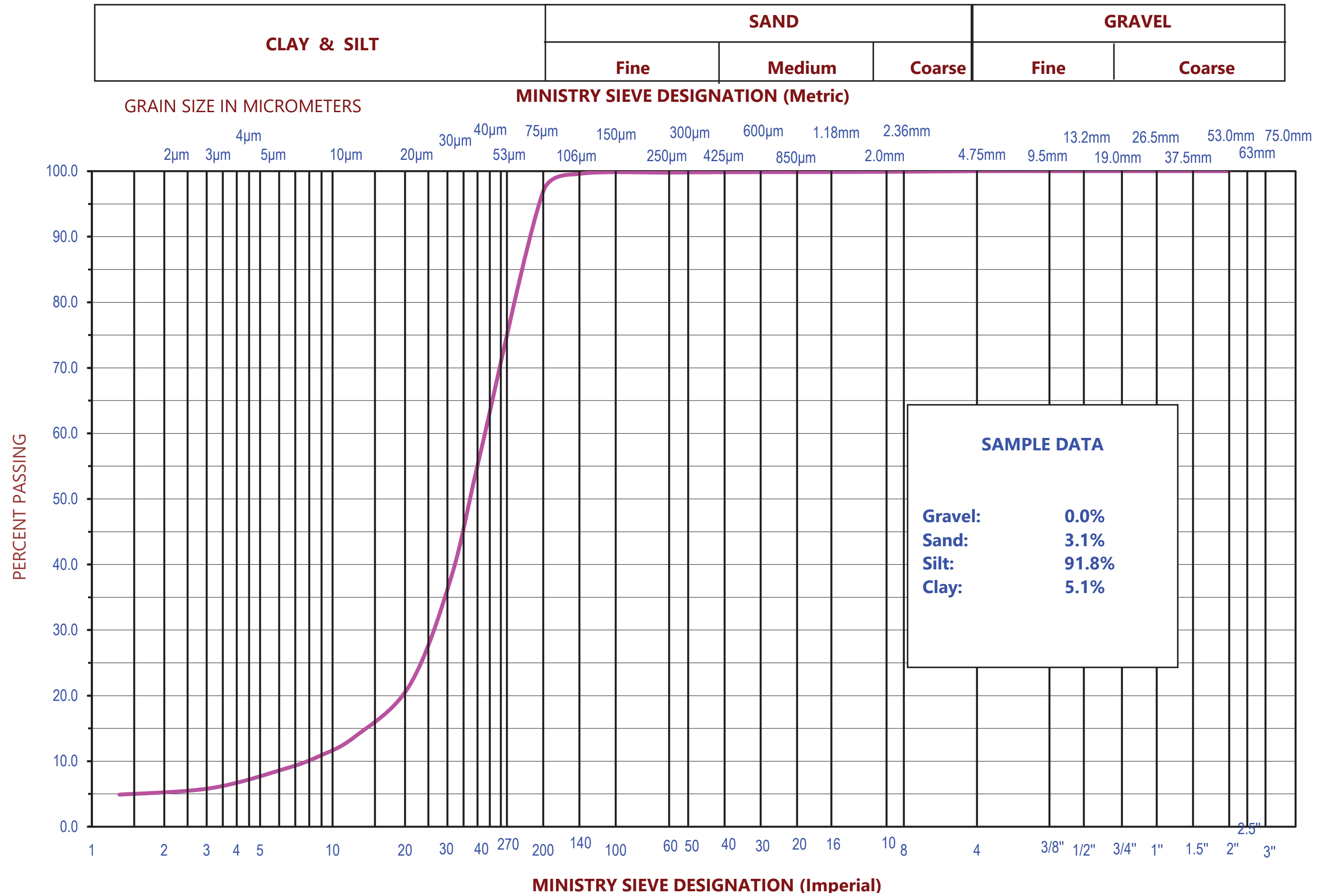
Gravel:	**0.1%**
Sand:	**11.0%**
Silt:	**84.4%**
Clay:	**4.5%**

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	100.0
9.5	100.0
4.75	99.9
2.00	99.9
0.85	99.8
0.425	99.8
0.250	99.6
0.106	97.9
0.075	88.9
0.0432	47.6
0.0325	31.1
0.0214	18.5
0.0126	11.7
0.0090	8.7
0.0064	7.8
0.0033	3.9
0.0013	3.9

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S120-20
Job No.:	TPB198079.3.5	BH4 - SS15	**Tested By:**	JW
Date Received:	26 February 2020	**Silt, some Sand, trace Gravel & Clay**	**Report Date:**	16 March 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702



SAMPLE DATA

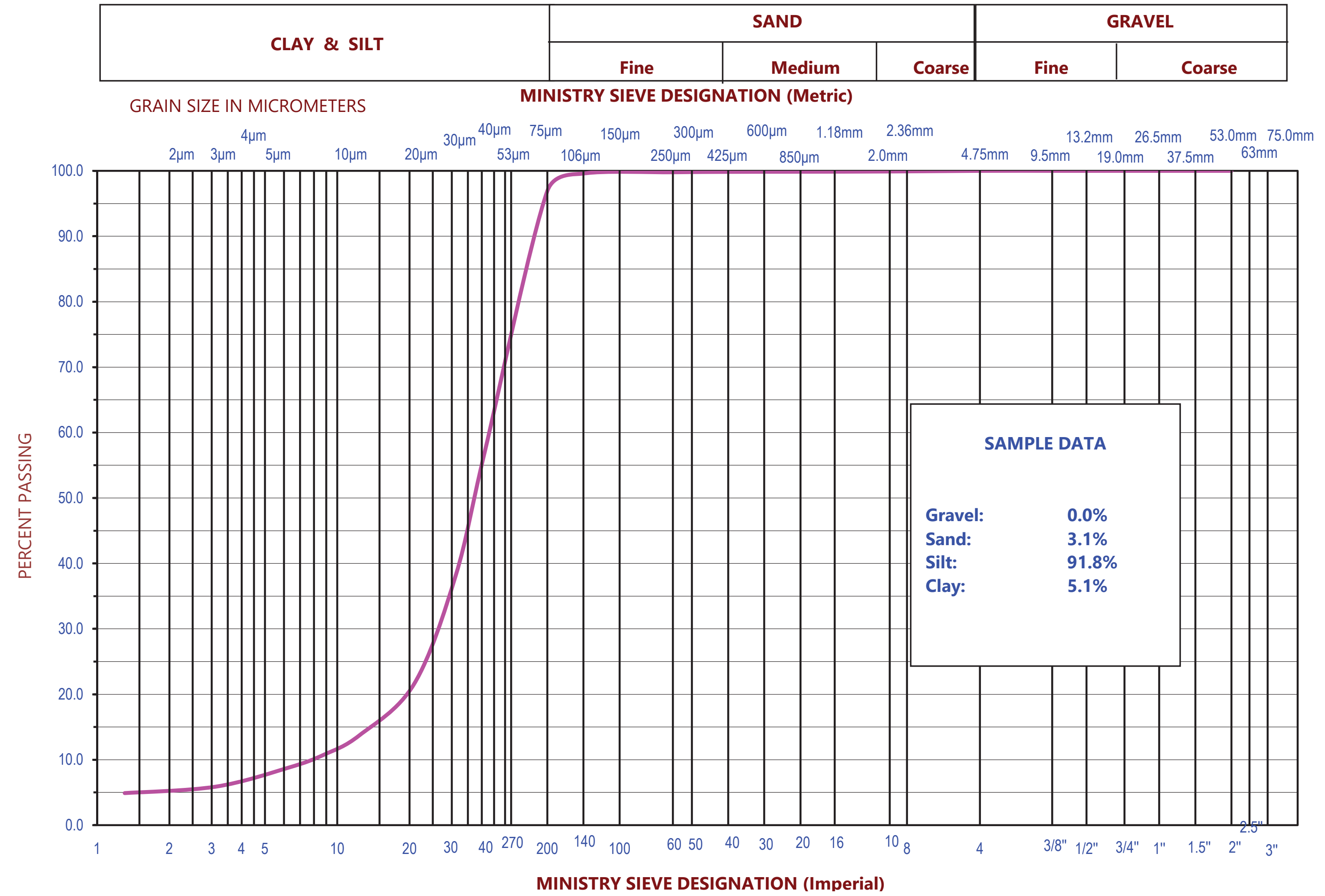
Gravel:	**0.0%**
Sand:	**3.1%**
Silt:	**91.8%**
Clay:	**5.1%**

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	100.0
9.5	100.0
4.75	100.0
2.00	99.9
0.85	99.9
0.425	99.8
0.250	99.8
0.106	99.6
0.075	96.9
0.0410	56.8
0.0312	38.2
0.0209	21.6
0.0124	13.7
0.0088	10.8
0.0063	8.8
0.0031	5.9
0.0013	4.9

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S392-19
Job No.:	TPB198079.3.5	BH4 - SS19	**Tested By:**	JW
Date Received:	November 2019	**Silt, trace Clay & Sand**	**Report Date:**	6 February 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702



SAMPLE DATA

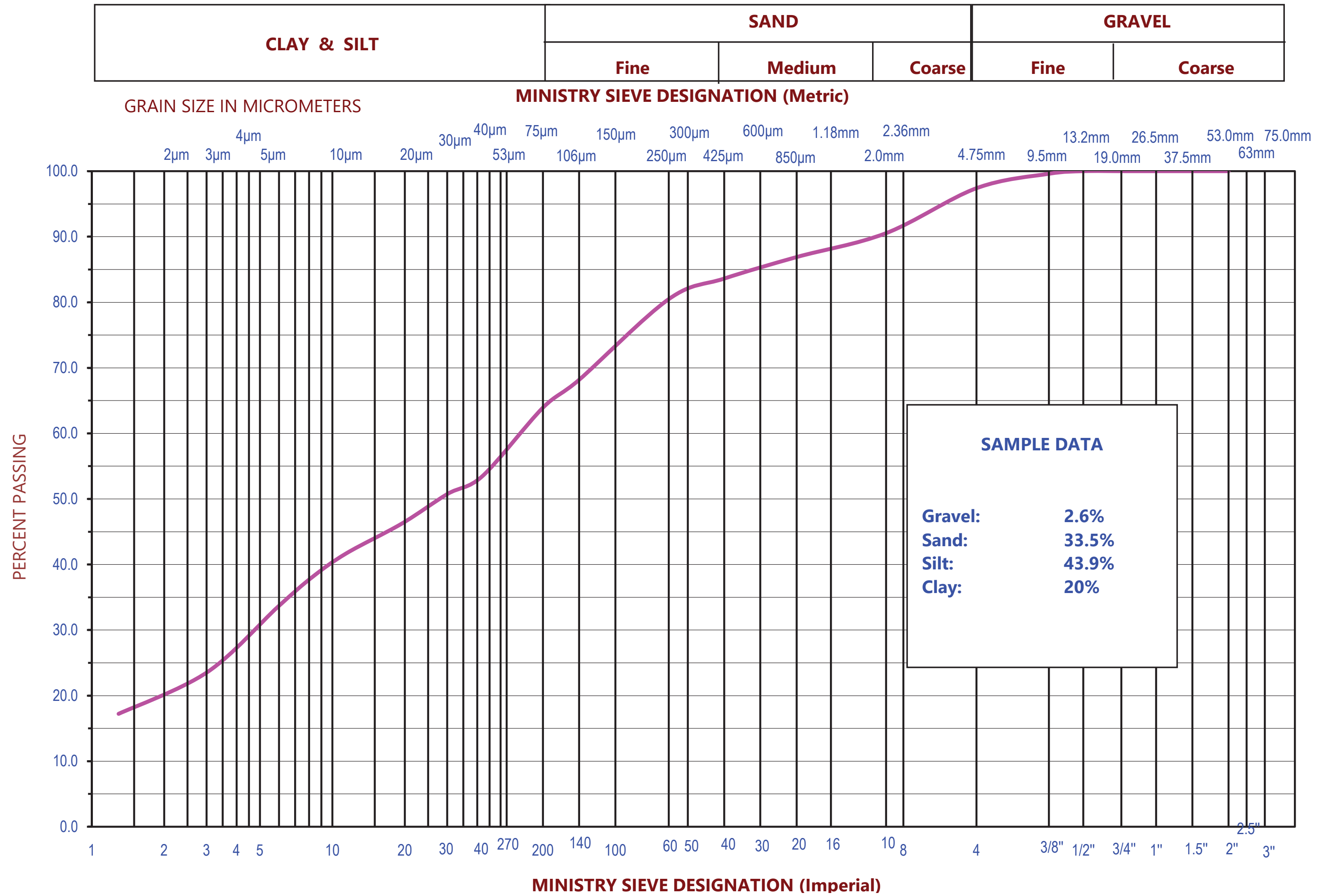
Gravel:	0.0%
Sand:	3.1%
Silt:	91.8%
Clay:	5.1%

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	100.0
9.5	100.0
4.75	100.0
2.00	99.9
0.85	99.9
0.425	99.8
0.250	99.8
0.106	99.6
0.075	96.9
0.0410	56.8
0.0312	38.2
0.0209	21.6
0.0124	13.7
0.0088	10.8
0.0063	8.8
0.0031	5.9
0.0013	4.9

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S392-19
Job No.:	TPB198079.3.5	BH4 - SS19	**Tested By:**	JW
Date Received:	November 2019	**Silt, trace Clay & Sand**	**Report Date:**	6 February 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702 or ASTM D7928



SAMPLE DATA

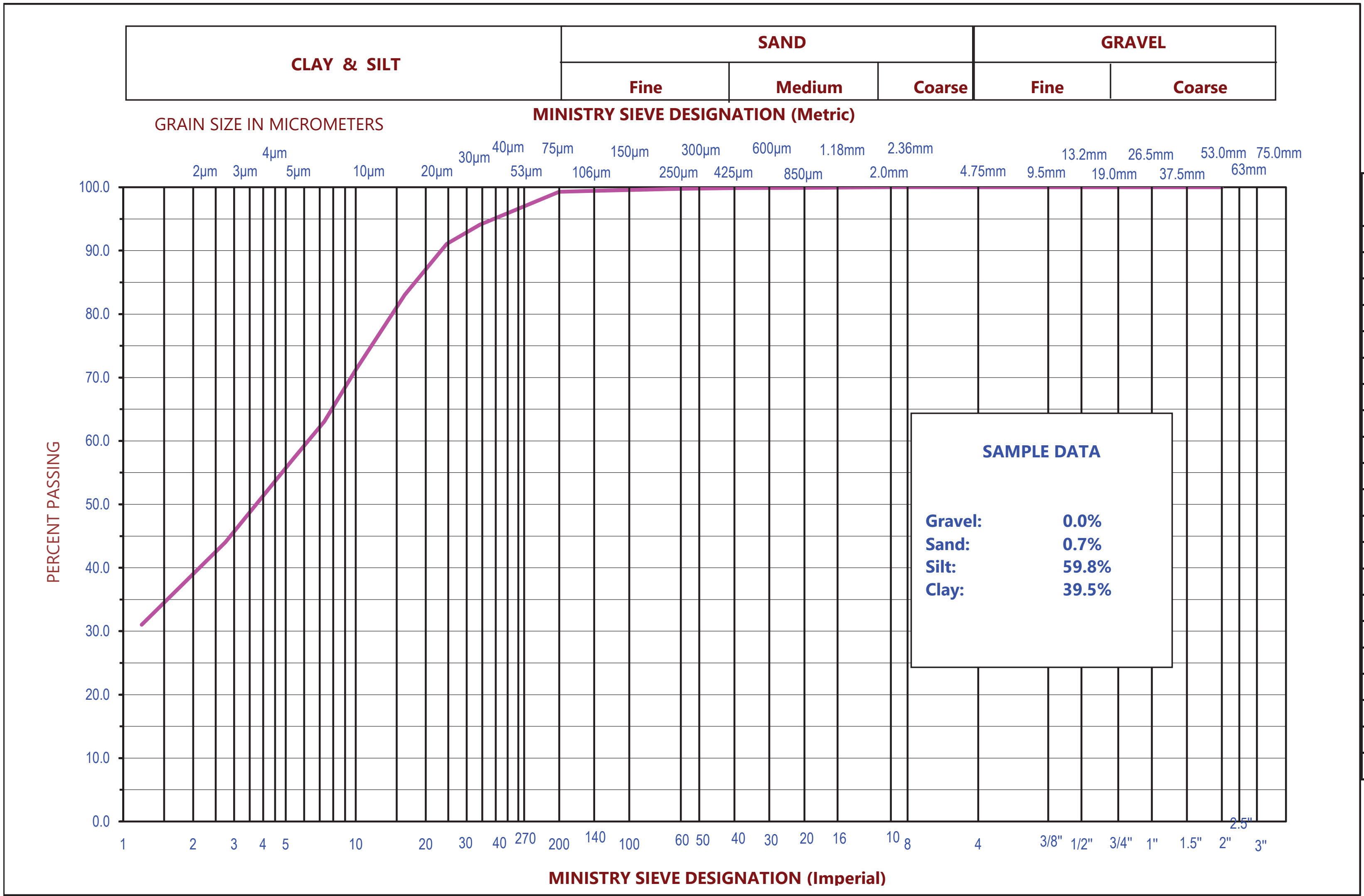
Gravel:	**2.6%**
Sand:	**33.5%**
Silt:	**43.9%**
Clay:	**20%**

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	100.0
9.5	99.6
4.75	97.4
2.00	90.5
0.85	86.9
0.425	83.6
0.250	80.5
0.106	68.2
0.075	63.9
0.0420	53.5
0.0301	50.8
0.0194	46.2
0.0114	41.7
0.0082	38.1
0.0059	33.5
0.0030	23.6
0.0013	17.2

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S412-19
Job No.:	TPB198079.3.5	BH5 - SS9	**Tested By:**	J.W
Date Received:	10 September 2019	**Sandy Silt, some Clay, trace Gravel**	**Report Date:**	7 February 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702



SAMPLE DATA

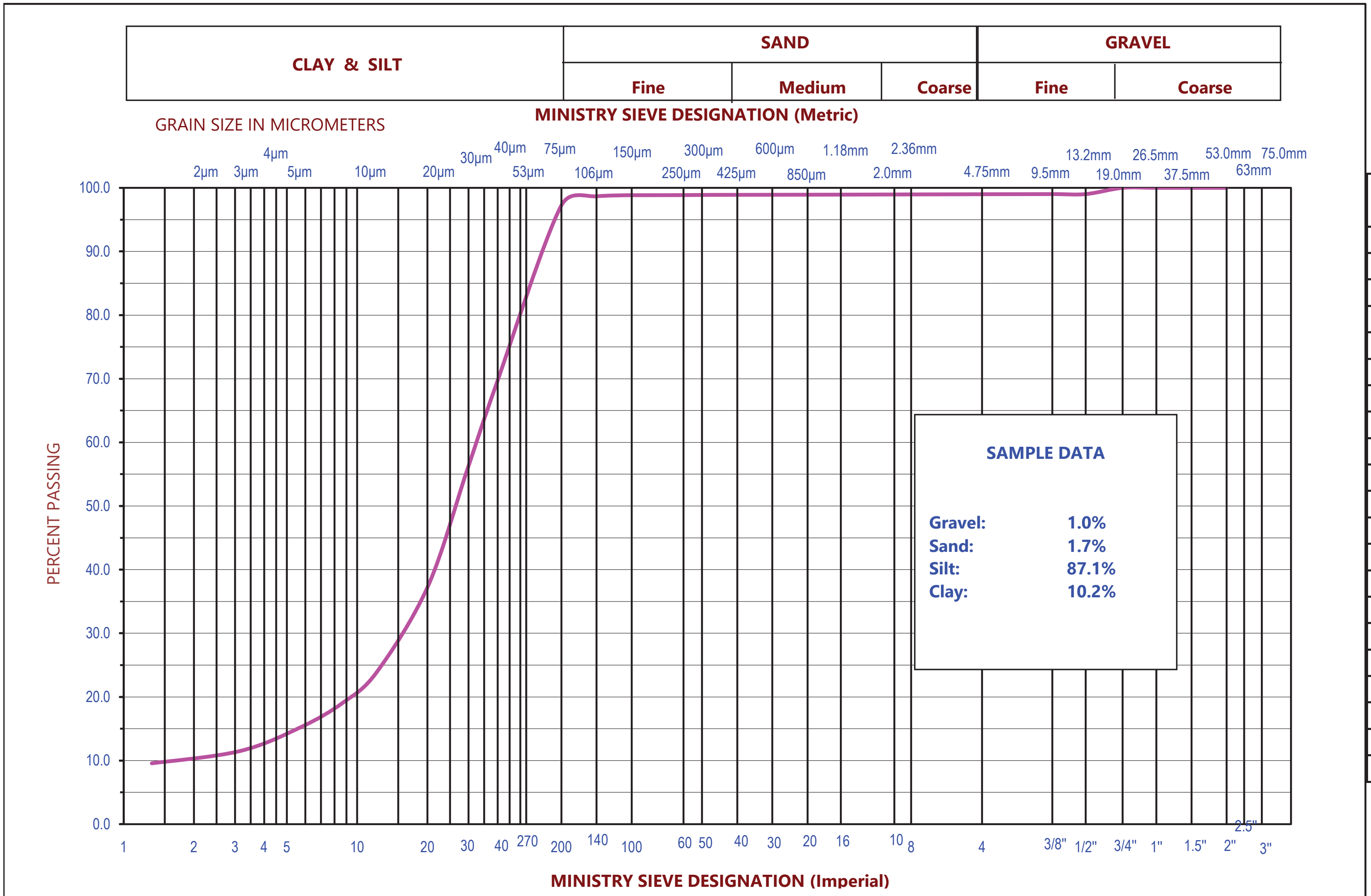
Gravel:	**0.0%**
Sand:	**0.7%**
Silt:	**59.8%**
Clay:	**39.5%**

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	100.0
9.5	100.0
4.75	100.0
2.00	100.0
0.85	99.9
0.425	99.9
0.250	99.8
0.106	99.4
0.075	99.3
0.0342	94.1
0.0246	91.1
0.0163	83.1
0.0099	71.1
0.0073	63.1
0.0053	57.0
0.0028	44.0
0.0012	31.0

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S393-19
Job No.:	TPB198079.3.5	BH4 - SS20	**Tested By:**	JW
Date Received:	November 2019	**Silt & Clay, trace Sand**	**Report Date:**	6 February 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702 or ASTM D7928



SAMPLE DATA

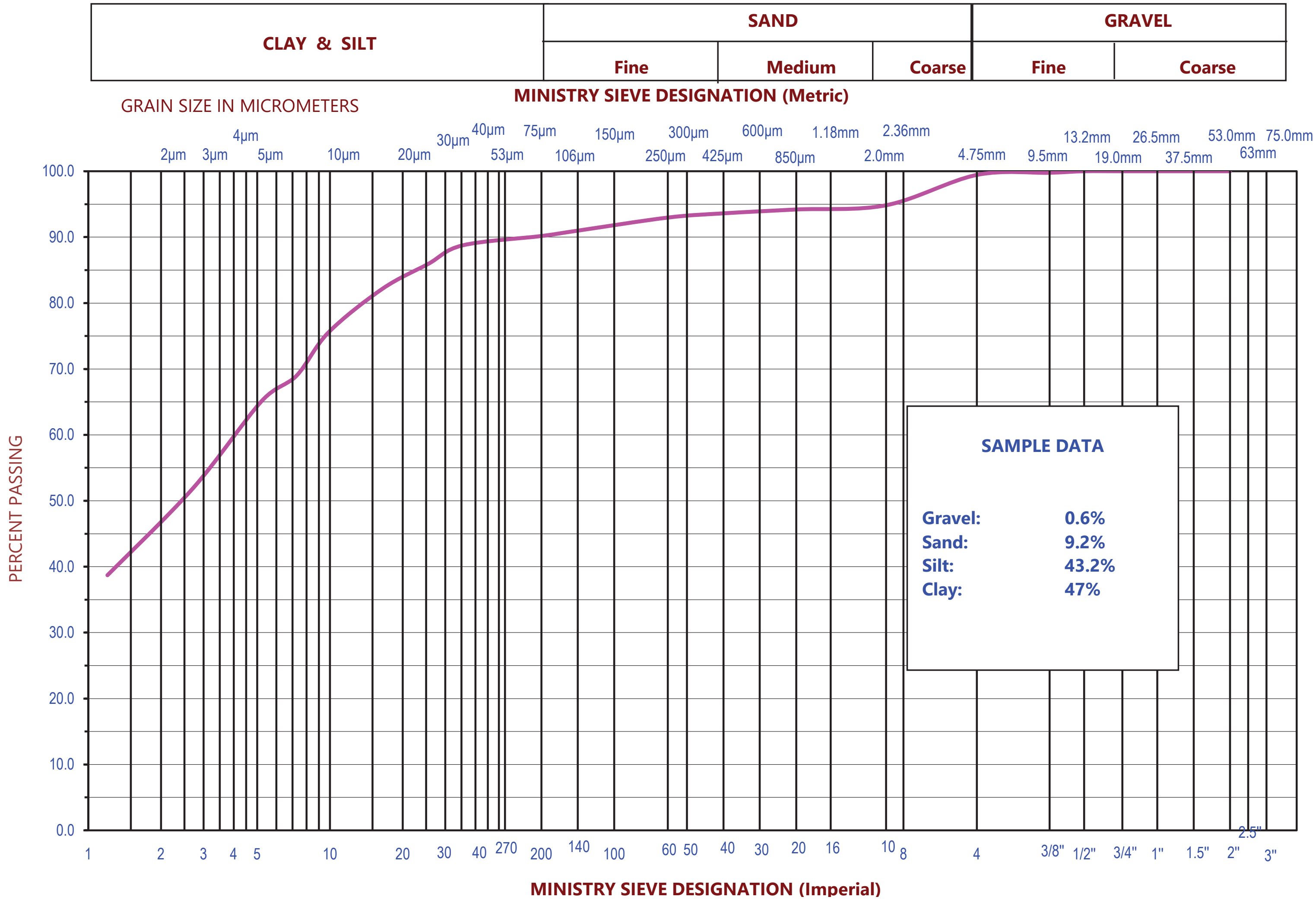
Gravel:	**1.0%**
Sand:	**1.7%**
Silt:	**87.1%**
Clay:	**10.2%**

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	99.0
9.5	99.0
4.75	99.0
2.00	99.0
0.85	98.9
0.425	98.9
0.250	98.9
0.106	98.7
0.075	97.3
0.0393	68.9
0.0295	55.5
0.0201	37.3
0.0121	23.9
0.0087	19.1
0.0058	15.3
0.0031	11.5
0.0013	9.6

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S119-20
Job No.:	TPB198079.3.5	BH5 - SS11	**Tested By:**	JW
Date Received:	26 February 2020	**Silt, some Clay, trace Gravel & Sand**	**Report Date:**	16 March 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702 or ASTM D7928



SAMPLE DATA

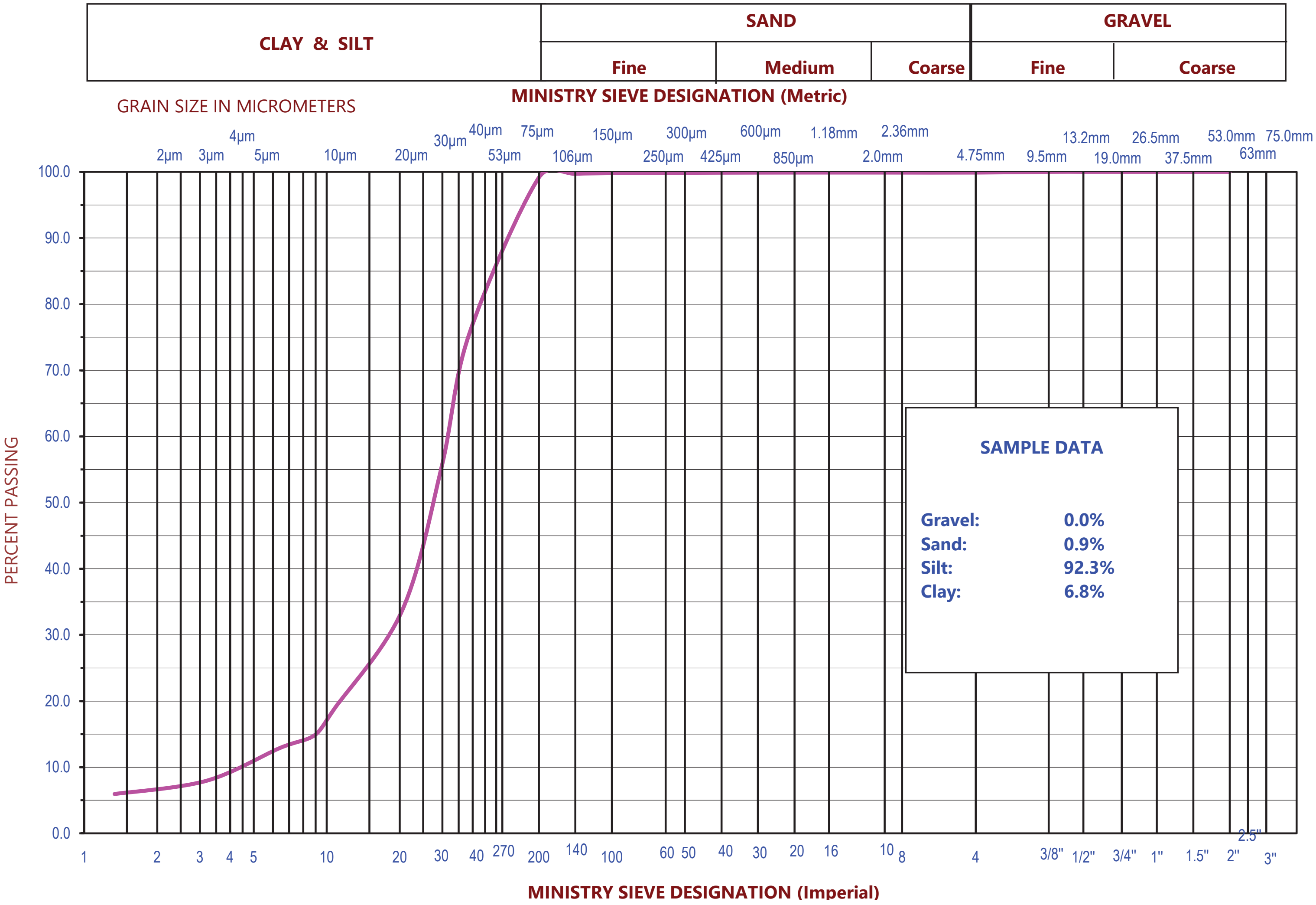
Gravel:	**0.6%**
Sand:	**9.2%**
Silt:	**43.2%**
Clay:	**47%**

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	100.0
9.5	99.8
4.75	99.4
2.00	94.8
0.85	94.2
0.425	93.6
0.250	93.0
0.106	91.0
0.075	90.2
0.0354	88.8
0.0255	85.9
0.0165	82.1
0.0099	75.5
0.0073	68.9
0.0052	65.1
0.0027	51.9
0.0012	38.7

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S413-19
Job No.:	TPB198079.3.5	BH5 - SS15	**Tested By:**	J.W
Date Received:	10 September 2019	**Silt & Clay, trace Sand & Gravel**	**Report Date:**	7 February 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702



SAMPLE DATA

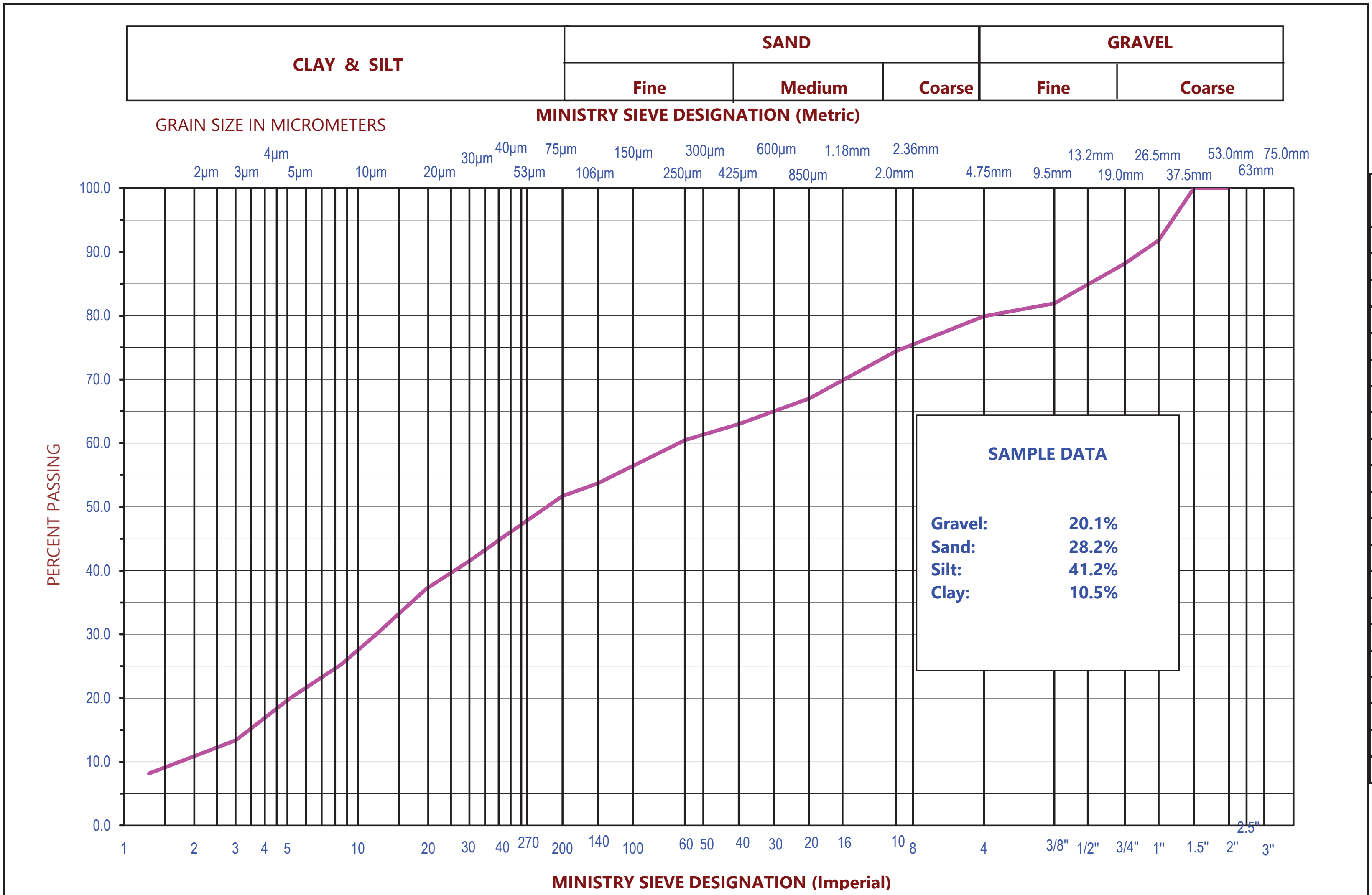
Gravel:	**0.0%**
Sand:	**0.9%**
Silt:	**92.3%**
Clay:	**6.8%**

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	100.0
9.5	100.0
4.75	99.9
2.00	99.9
0.85	99.9
0.425	99.9
0.250	99.8
0.106	99.7
0.075	99.1
0.0386	75.4
0.0298	55.6
0.0205	33.7
0.0108	18.8
0.0089	14.9
0.0064	12.9
0.0032	7.9
0.0013	6.0

Client:	Toronto Region Conservation Authori	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S396-19
Job No.:	TPB198079.3.5	BH6 - SS8	**Tested By:**	JW
Date Received:	November 2019	**Silt, trace Clay & Sand**	**Report Date:**	29 January 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702



SAMPLE DATA

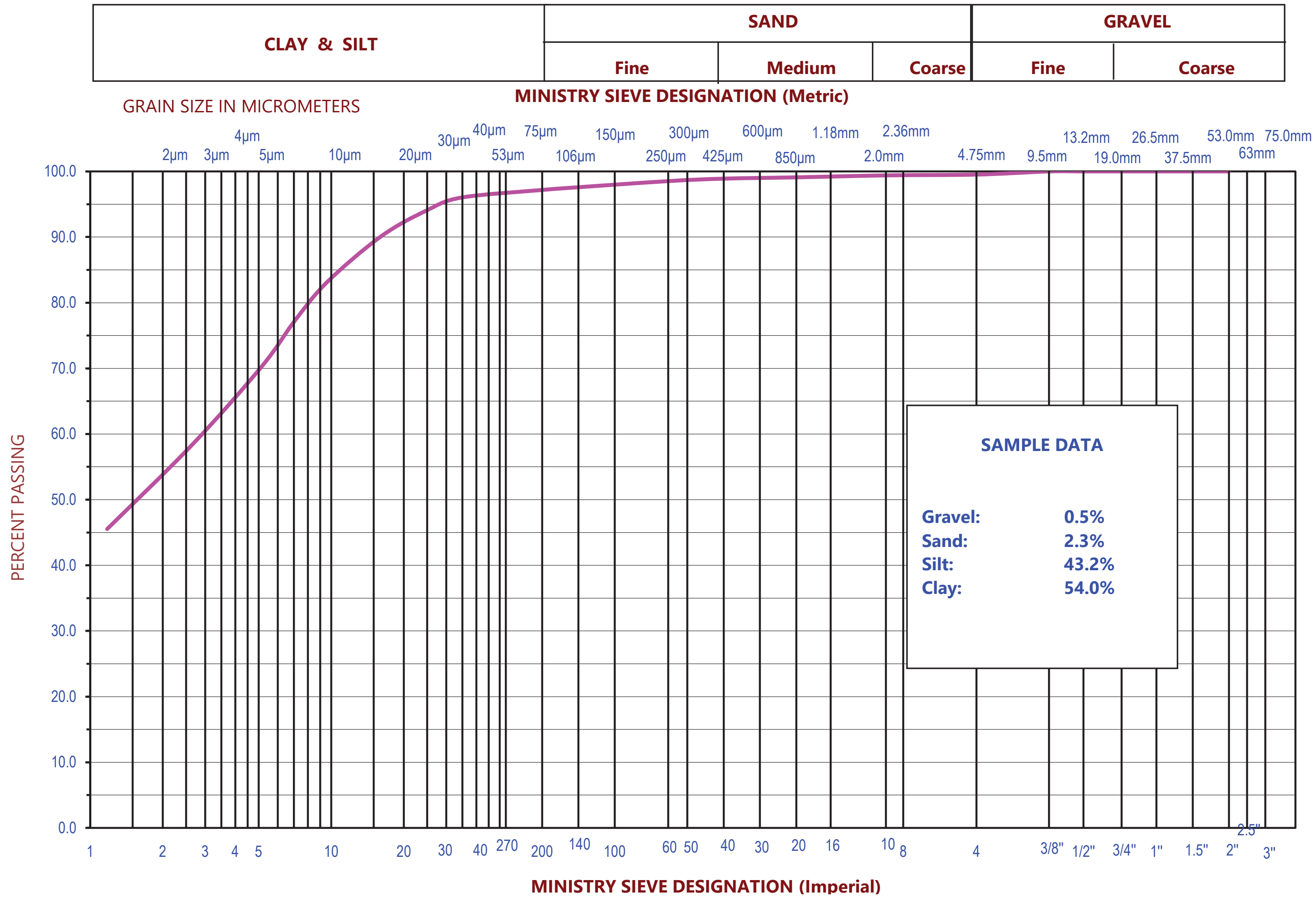
Gravel:	**20.1%**
Sand:	**28.2%**
Silt:	**41.2%**
Clay:	**10.5%**

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	91.8
19	88.2
13.2	84.9
9.5	81.9
4.75	79.9
2.00	74.4
0.85	67.0
0.425	63.0
0.250	60.5
0.106	53.7
0.075	51.7
0.0419	45.3
0.0303	41.6
0.0196	37.1
0.0117	29.7
0.0085	25.2
0.0052	20.0
0.0030	13.4
0.0013	8.2

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S397-19
Job No.:	TPB198079.3.5	BH6-SS21	**Tested By:**	JW
Date Received:	November 2019	**Sandy Gravelly Silt some Clay**	**Report Date:**	19 February 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702 or ASTM D7928



SAMPLE DATA

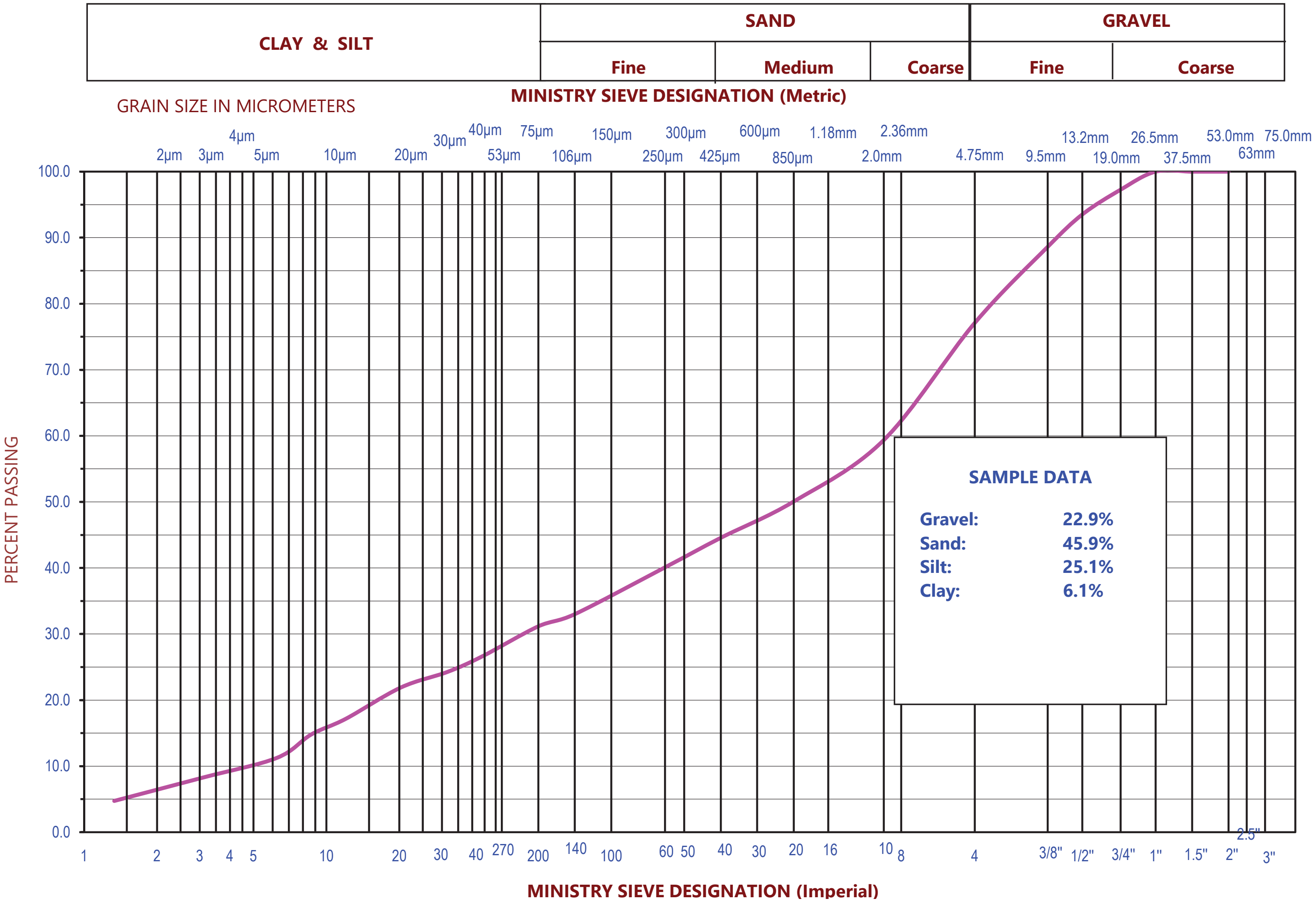
Gravel:	**0.5%**
Sand:	**2.3%**
Silt:	**43.2%**
Clay:	**54.0%**

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	100.0
9.5	100.0
4.75	99.5
2.00	99.4
0.85	99.1
0.425	98.9
0.250	98.5
0.106	97.6
0.075	97.2
0.0347	96.0
0.0248	94.0
0.0161	90.1
0.0096	83.1
0.0070	77.2
0.0051	70.3
0.0027	58.4
0.0012	45.5

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S398-19
Job No.:	TPB198079.3.5	BH7 - SS12	**Tested By:**	JW
Date Received:	November 2019	**Silt & Clay, trace Sand & Gravel**	**Report Date:**	14 January 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702 or ASTM D7928



SAMPLE DATA

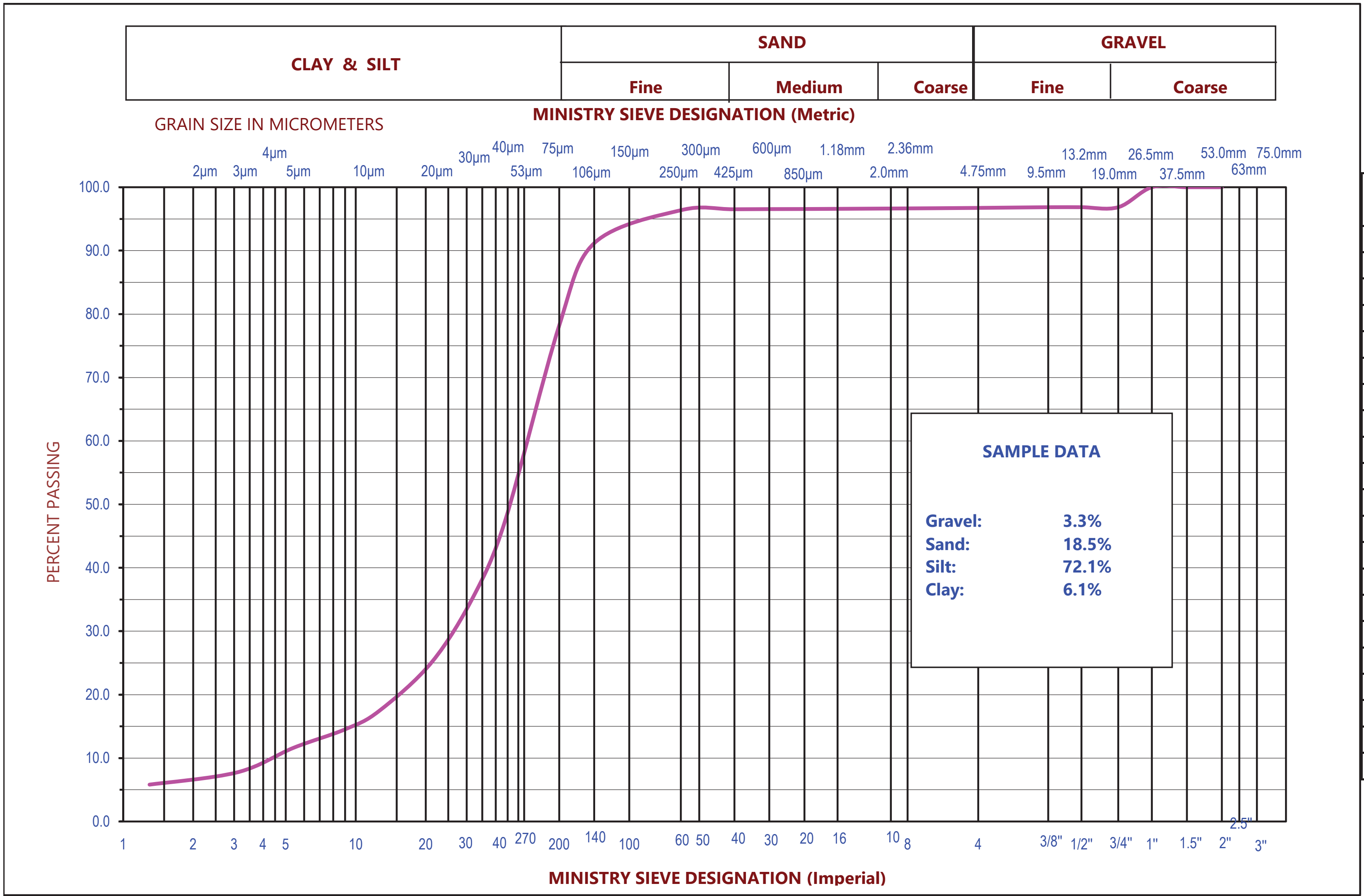
Gravel:	22.9%
Sand:	45.9%
Silt:	25.1%
Clay:	6.1%

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	97.3
13.2	93.5
9.5	88.6
4.75	77.1
2.00	59.4
0.85	50.1
0.425	44.6
0.250	40.1
0.106	33.0
0.075	31.2
0.0441	26.6
0.0316	24.3
0.0203	21.9
0.0120	17.2
0.0087	14.8
0.0062	11.2
0.0031	8.3
0.0013	4.7

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S399-19
Job No.:	TPB198079.3.5	BH7 - SS20	**Tested By:**	JW
Date Received:	November 2019	**Gravelly, Silty Sand, trace Clay**	**Report Date:**	14 January 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702



SAMPLE DATA

Gravel: **3.3%**
Sand: **18.5%**
Silt: **72.1%**
Clay: **6.1%**

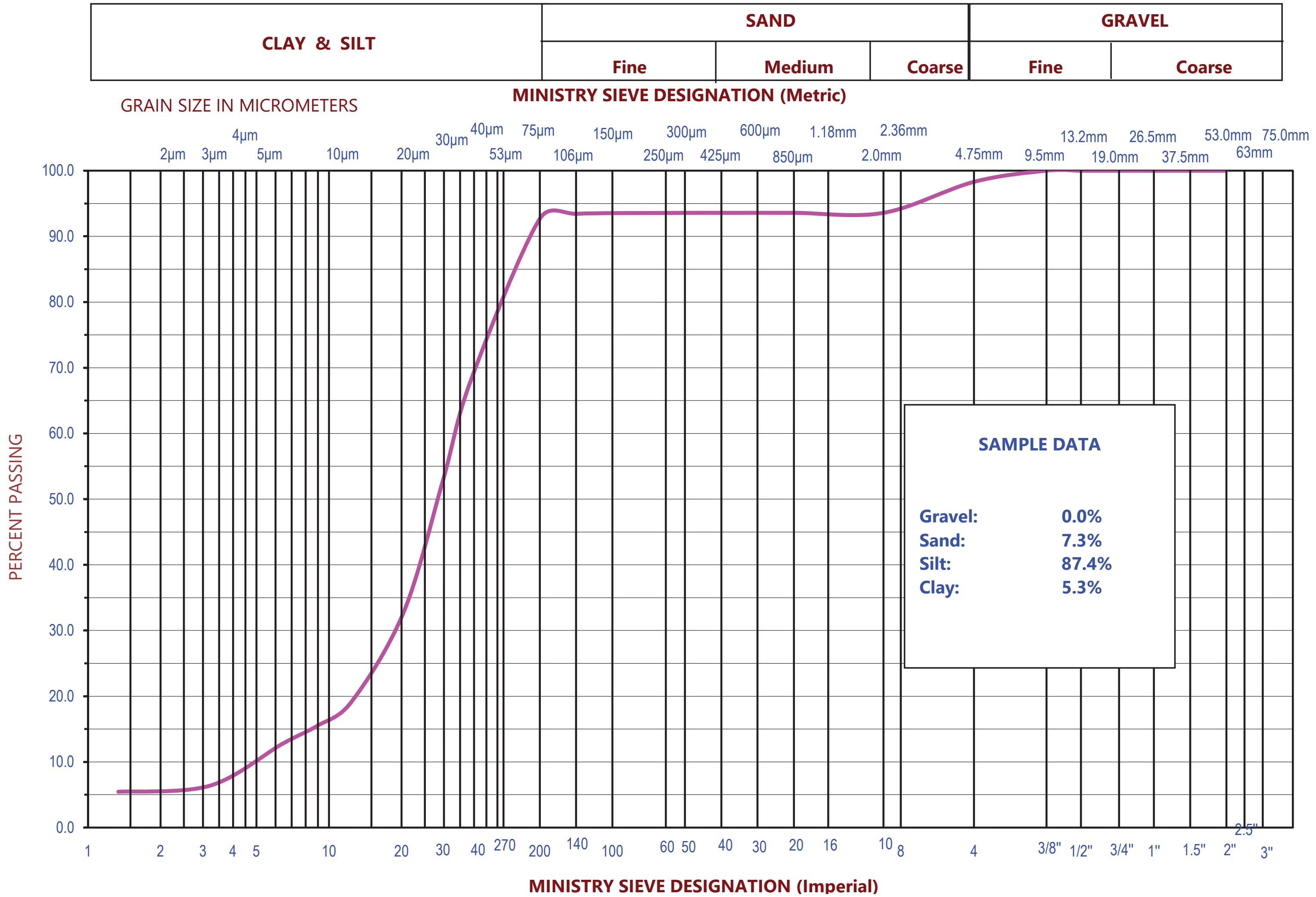
Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	96.8
13.2	96.8
9.5	96.8
4.75	96.7
2.00	96.6
0.85	96.6
0.425	96.5
0.250	96.4
0.106	91.2
0.075	78.2
0.0440	47.5
0.0325	35.9
0.0213	25.2
0.0126	17.4
0.0090	14.5
0.0054	11.6
0.0031	7.8
0.0013	5.8

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S416-19
Job No.:	TPB198079.3.5	BH8-SS6	**Tested By:**	JW
Date Received:	November 2019	**Silt, some Sand, trace Gravel & Clay**	**Report Date:**	19 February 2020

wood.

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702



SAMPLE DATA

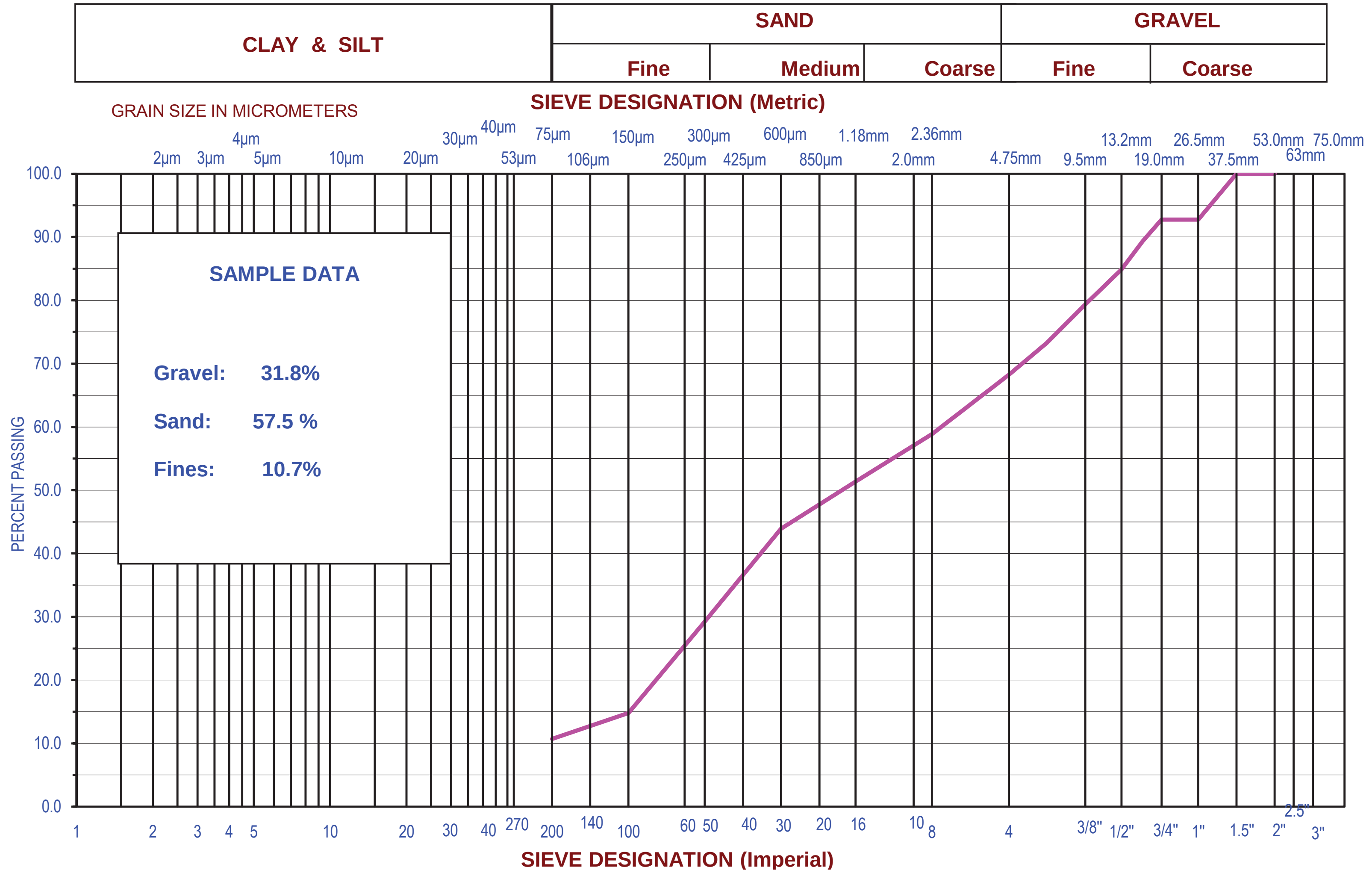
Gravel:	0.0%
Sand:	7.3%
Silt:	87.4%
Clay:	5.3%

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	100.0
9.5	100.0
4.75	98.3
2.00	93.6
0.85	93.6
0.425	93.6
0.250	93.6
0.106	93.4
0.075	92.7
0.0389	68.2
0.0297	52.8
0.0204	32.7
0.0124	19.1
0.0089	15.5
0.0064	12.7
0.0032	6.4
0.0013	5.5

Client:	Toronto Region Conservation Authori	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S430-19
Job No.:	TPB198079.3.5	BH9 - SS5	**Tested By:**	JW
Date Received:	November 2019	**Silt, trace Sand & Clay**	**Report Date:**	29 January 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS - 602



SAMPLE DATA

Gravel: 31.8%

Sand: 57.5 %

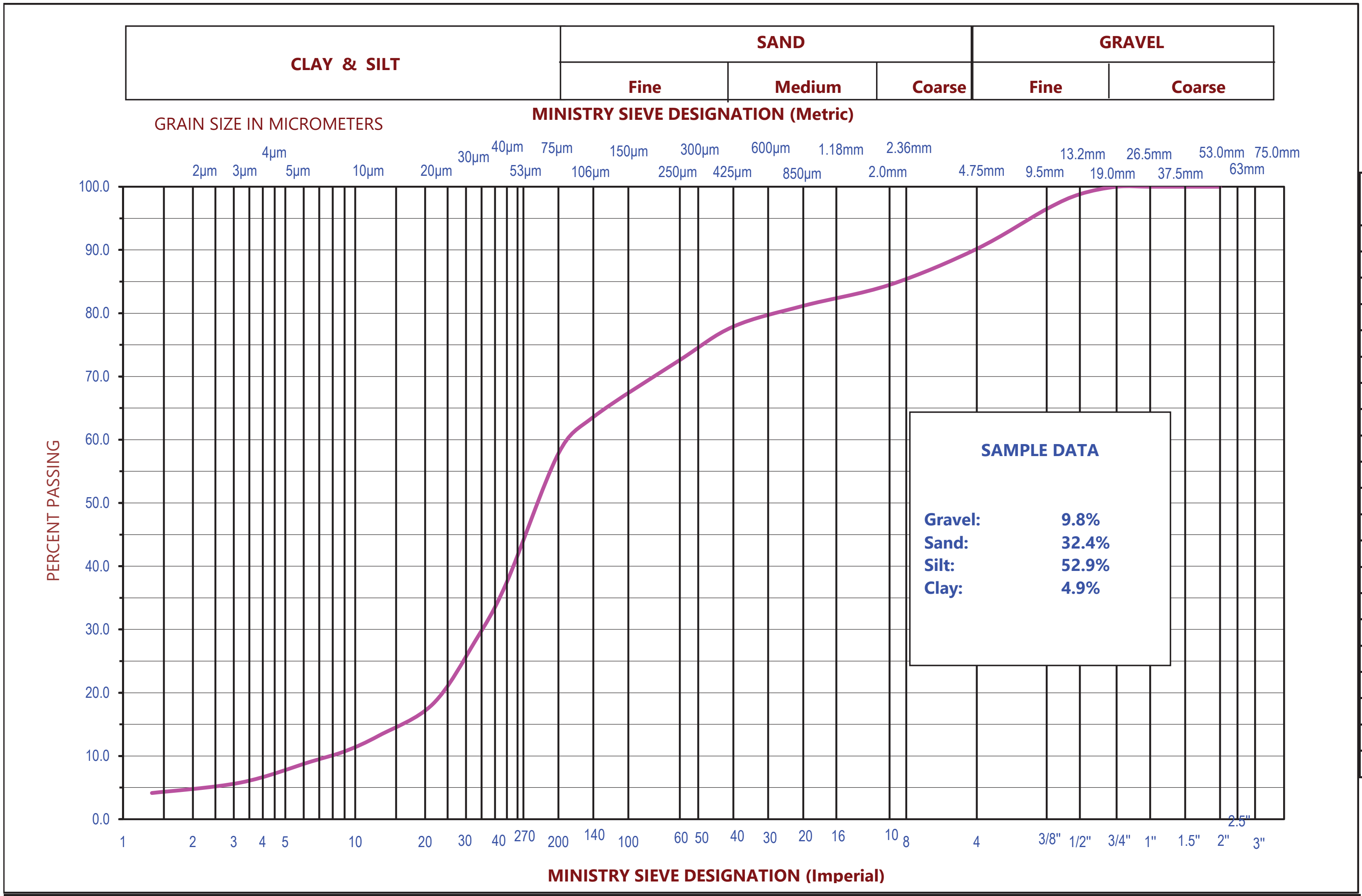
Fines: 10.7%

Sieve size (mm)	%passing
53.0	100.0
37.5	100.0
26.5	92.8
19.0	92.8
16.0	89.3
13.2	84.9
9.5	79.4
6.7	73.3
4.75	68.2
2.36	58.9
1.180	51.3
0.600	43.9
0.300	29.2
0.150	14.8
0.075	10.7

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S417-19
Job No.:	TPB198079.3.5	BH10 - SS8	**Tested By:**	JW
Date Received:	November 2019	**Gravely Sand, some Silt**	**Report Date:**	14 January 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702 or ASTM D7928



SAMPLE DATA

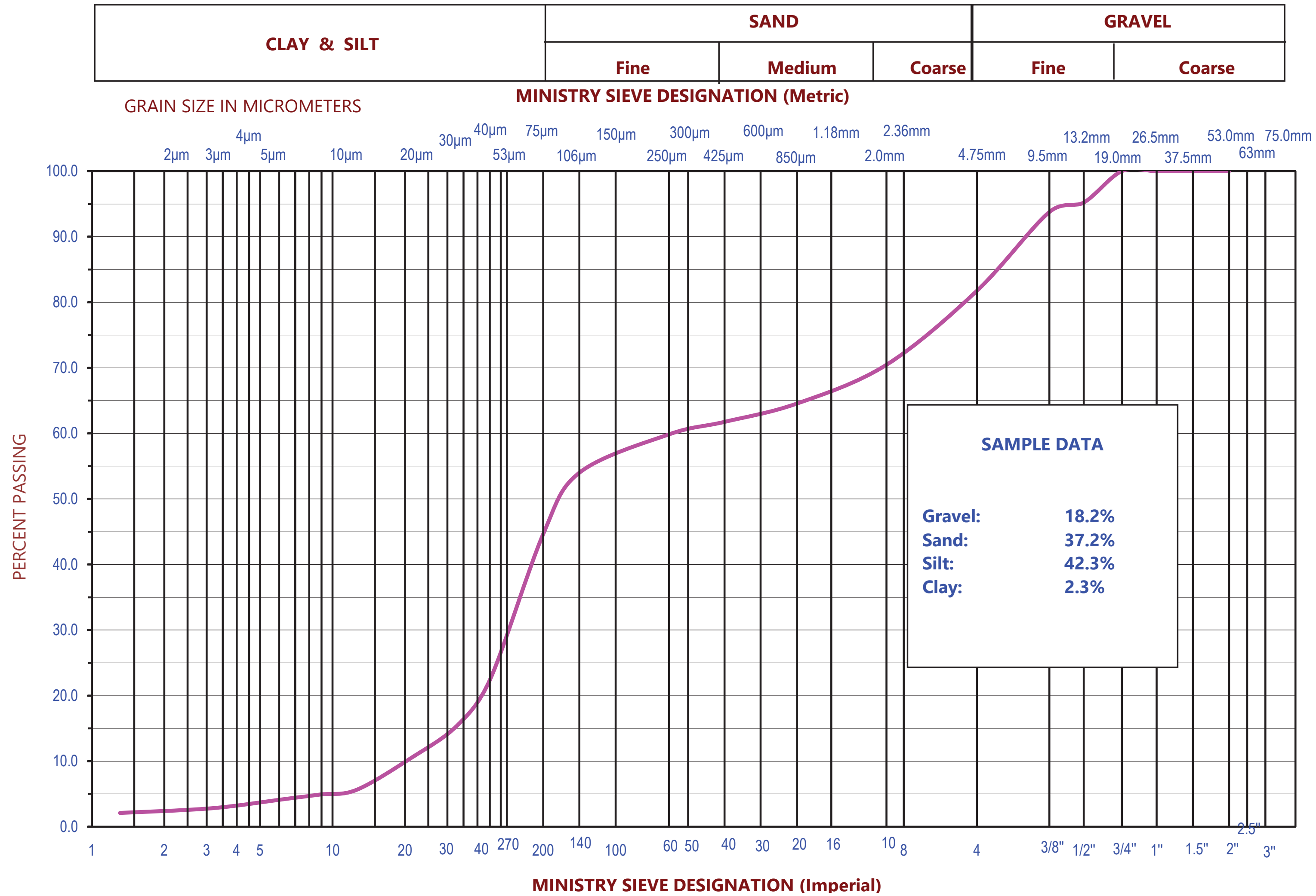
Gravel:	**9.8%**
Sand:	**32.4%**
Silt:	**52.9%**
Clay:	**4.9%**

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	98.8
9.5	96.5
4.75	90.2
2.00	84.5
0.85	81.2
0.425	77.9
0.250	72.6
0.106	63.6
0.075	57.8
0.0447	37.3
0.0329	28.2
0.0216	18.2
0.0127	13.3
0.0091	10.8
0.0065	9.1
0.0032	5.8
0.0013	4.1

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S418-19
Job No.:	TPB198079.3.5	BH12 - SS7	**Tested By:**	JW
Date Received:	November 2019	**Sandy Silt, trace Gravel & Clay**	**Report Date:**	19 December 2019

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702



SAMPLE DATA

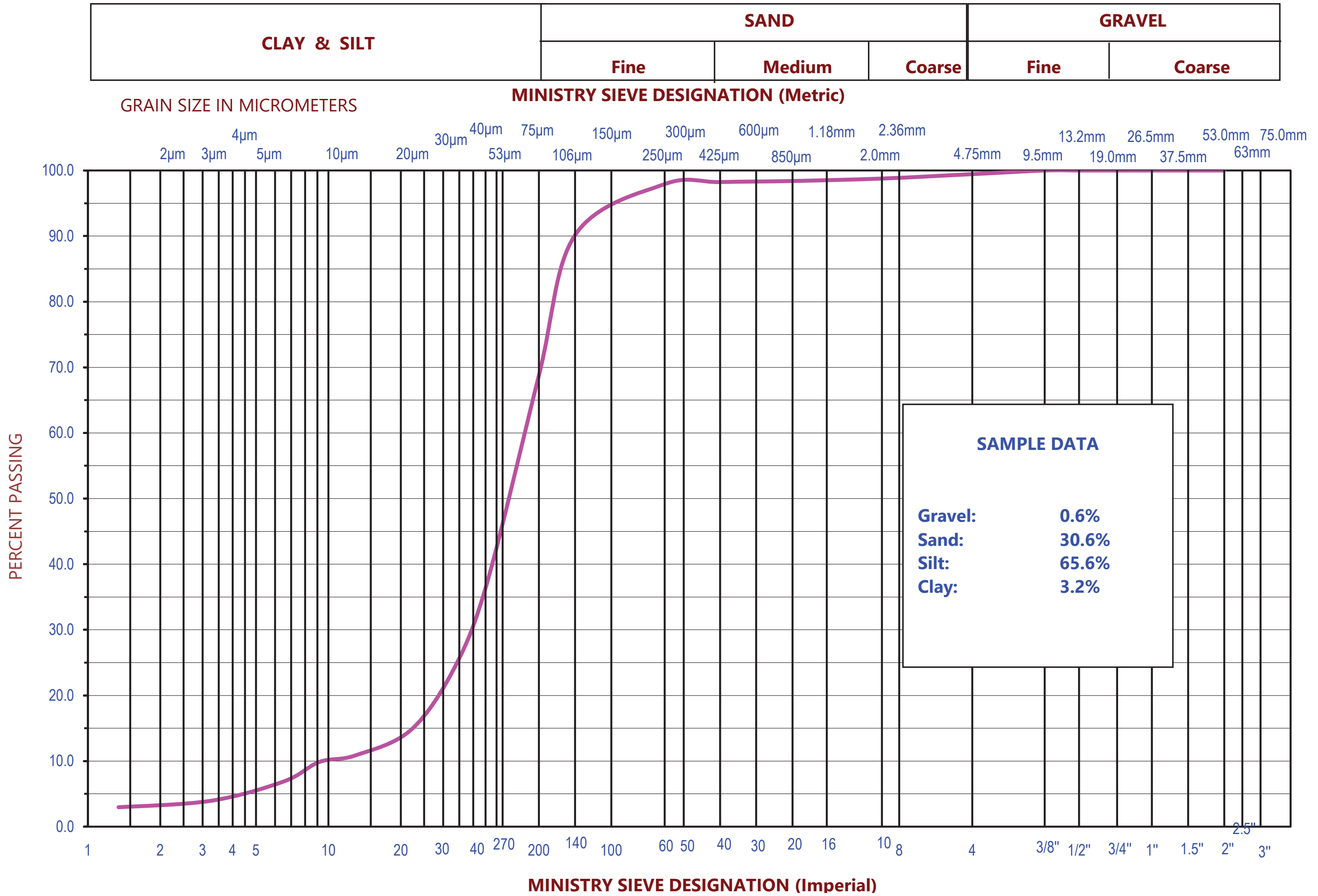
Gravel:	18.2%
Sand:	37.2%
Silt:	42.3%
Clay:	2.3%

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	95.2
9.5	93.8
4.75	81.8
2.00	70.5
0.85	64.6
0.425	61.8
0.250	59.9
0.106	54.0
0.075	44.6
0.0452	22.5
0.0330	15.5
0.0213	10.6
0.0126	5.6
0.0089	4.9
0.0063	4.2
0.0031	2.8
0.0013	2.1

Client:	Toronto Region Conservation Authori	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S419-19
Job No.:	TPB198079.3.5	BH13 - SS6	**Tested By:**	JW
Date Received:	November 2019	**Silt & Sand, some Gravel, trace Clay**	**Report Date:**	30 January 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702 or ASTM D7928



SAMPLE DATA

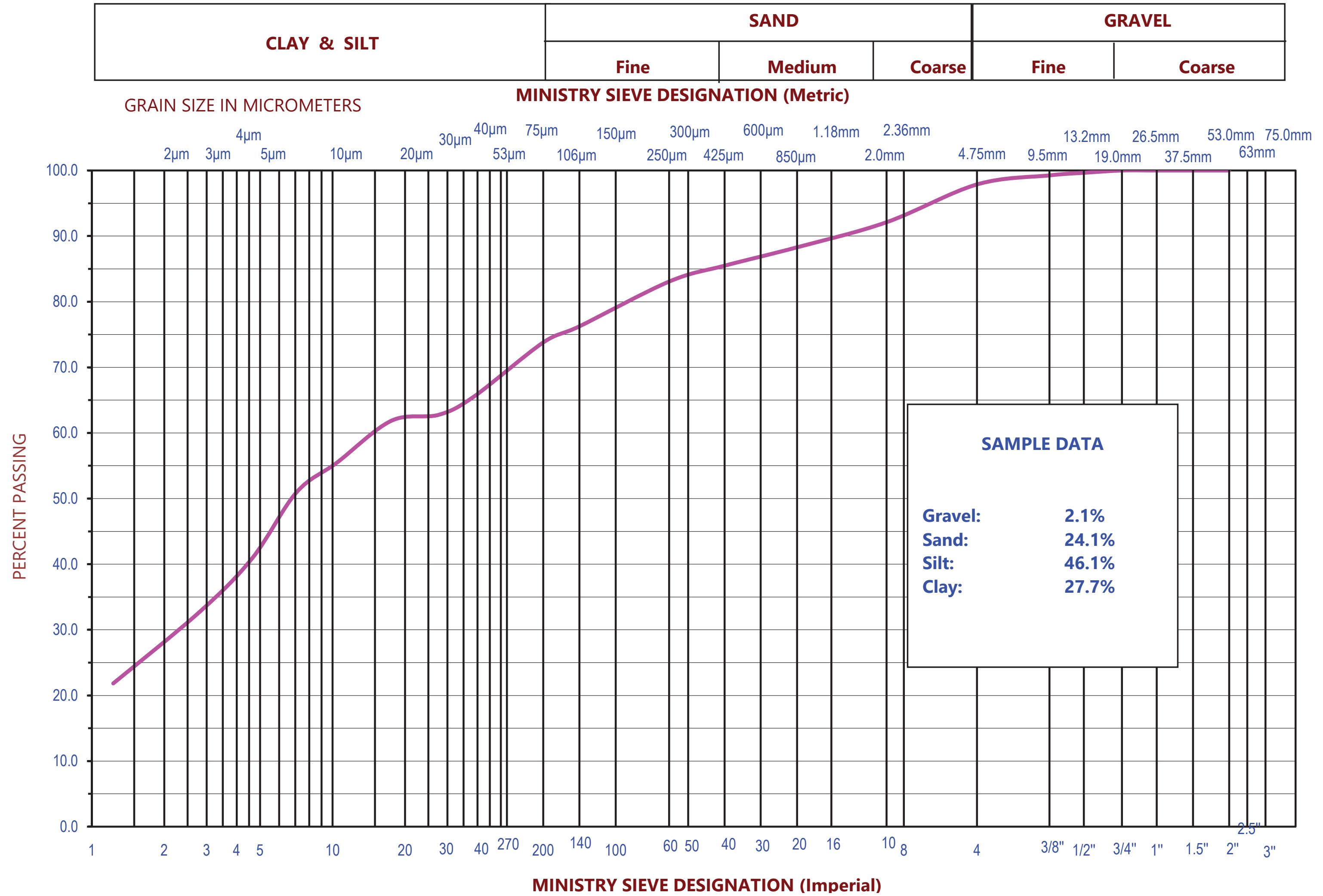
Gravel:	0.6%
Sand:	30.6%
Silt:	65.6%
Clay:	3.2%

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	100.0
9.5	100.0
4.75	99.4
2.00	98.8
0.85	98.4
0.425	98.2
0.250	97.9
0.106	90.1
0.075	68.8
0.0459	37.5
0.0339	24.7
0.0221	14.8
0.0129	10.8
0.0092	9.9
0.0065	6.9
0.0032	3.9
0.0013	3.0

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S386-19
Job No.:	TPB198079.3.5	BH14 - SS8	**Tested By:**	JW
Date Received:	November 2019	**Sandy Silt, trace Clay & Gravel**	**Report Date:**	19 December 2019

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702



SAMPLE DATA

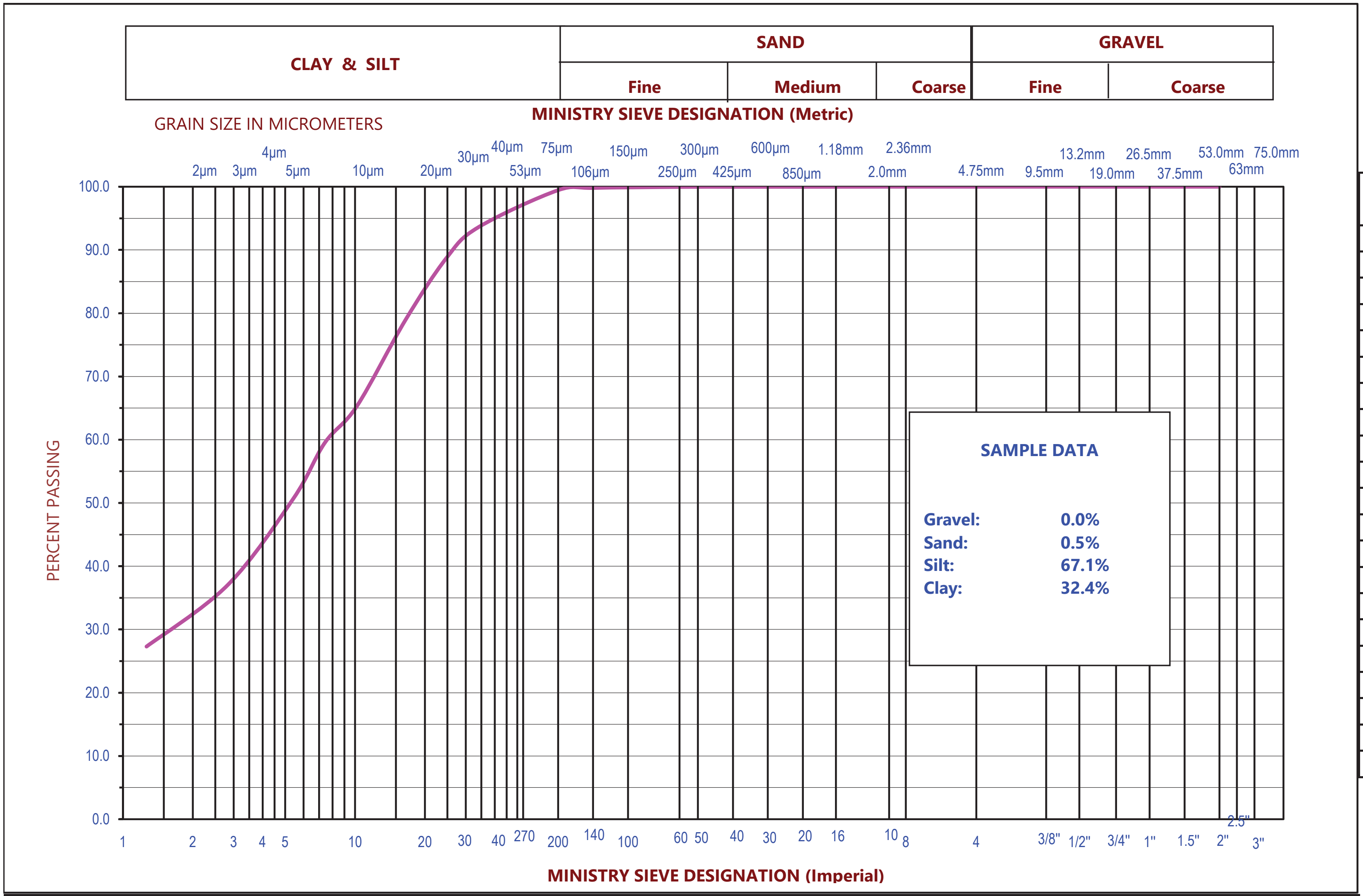
Gravel:	**2.1%**
Sand:	**24.1%**
Silt:	**46.1%**
Clay:	**27.7%**

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	99.6
9.5	99.3
4.75	97.9
2.00	92.1
0.85	88.3
0.425	85.5
0.250	83.1
0.106	76.2
0.075	73.8
0.0385	65.5
0.0276	62.8
0.0175	61.9
0.0104	55.5
0.0071	50.9
0.0046	40.9
0.0028	32.7
0.0012	21.8

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S387-19
Job No.:	TPB198079.3.5	BH14 - SS12	**Tested By:**	JW
Date Received:	November 2019	**Sandy Clayey Silt, trace Gravel**	**Report Date:**	6 February 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702



SAMPLE DATA

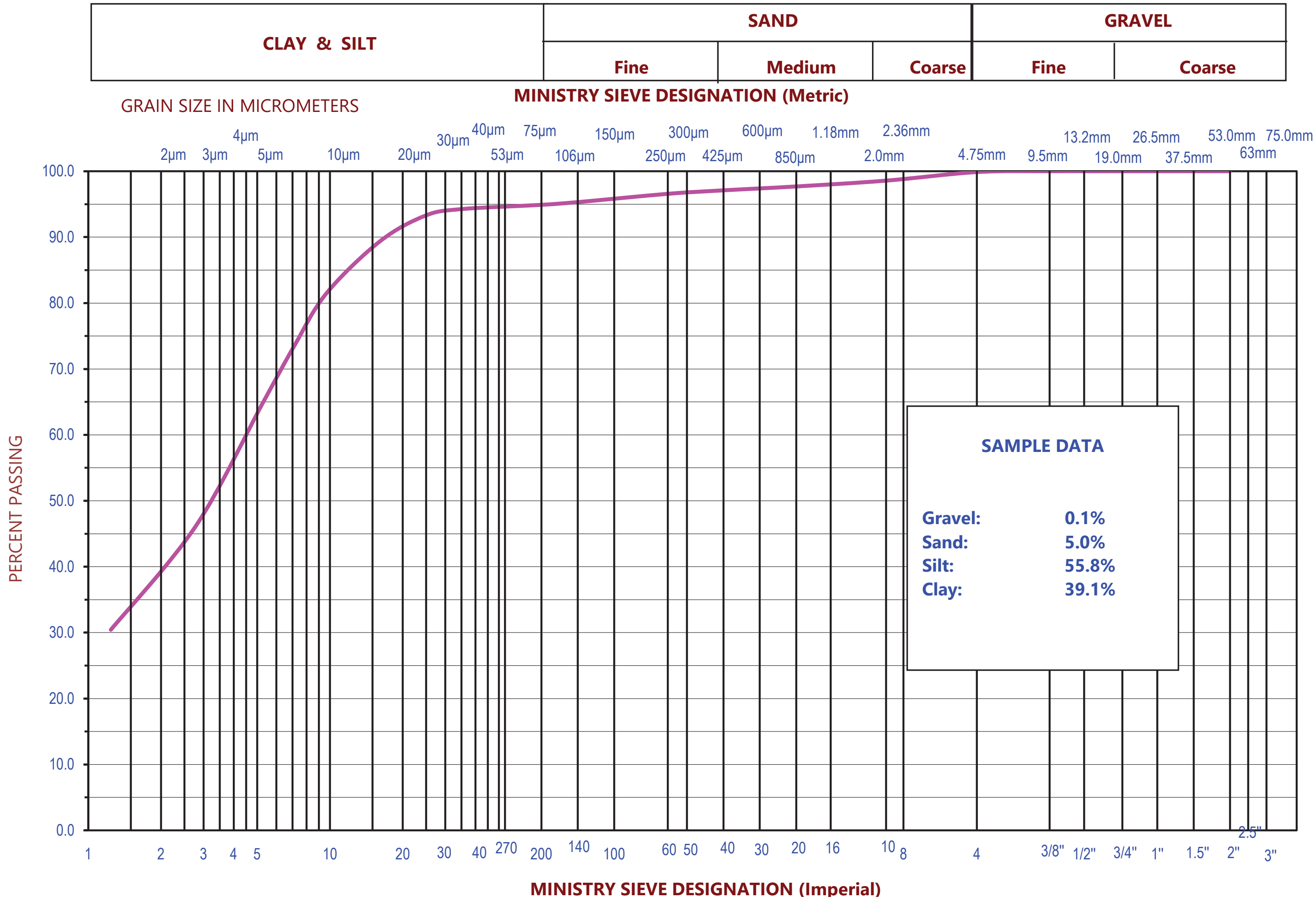
Gravel:	**0.0%**
Sand:	**0.5%**
Silt:	**67.1%**
Clay:	**32.4%**

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	100.0
9.5	100.0
4.75	100.0
2.00	100.0
0.85	100.0
0.425	100.0
0.250	100.0
0.106	99.8
0.075	99.5
0.0340	93.6
0.0248	88.7
0.0165	79.0
0.0102	65.3
0.0074	59.5
0.0054	50.7
0.0028	37.0
0.0013	27.3

Client:	Toronto Region Conservation Authori	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S388-19
Job No.:	TPB198079.3.5	BH15 - SS10	**Tested By:**	JW
Date Received:	November 2019	**Clayey Silt, trace Sand**	**Report Date:**	30 January 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702 or ASTM D7928



SAMPLE DATA

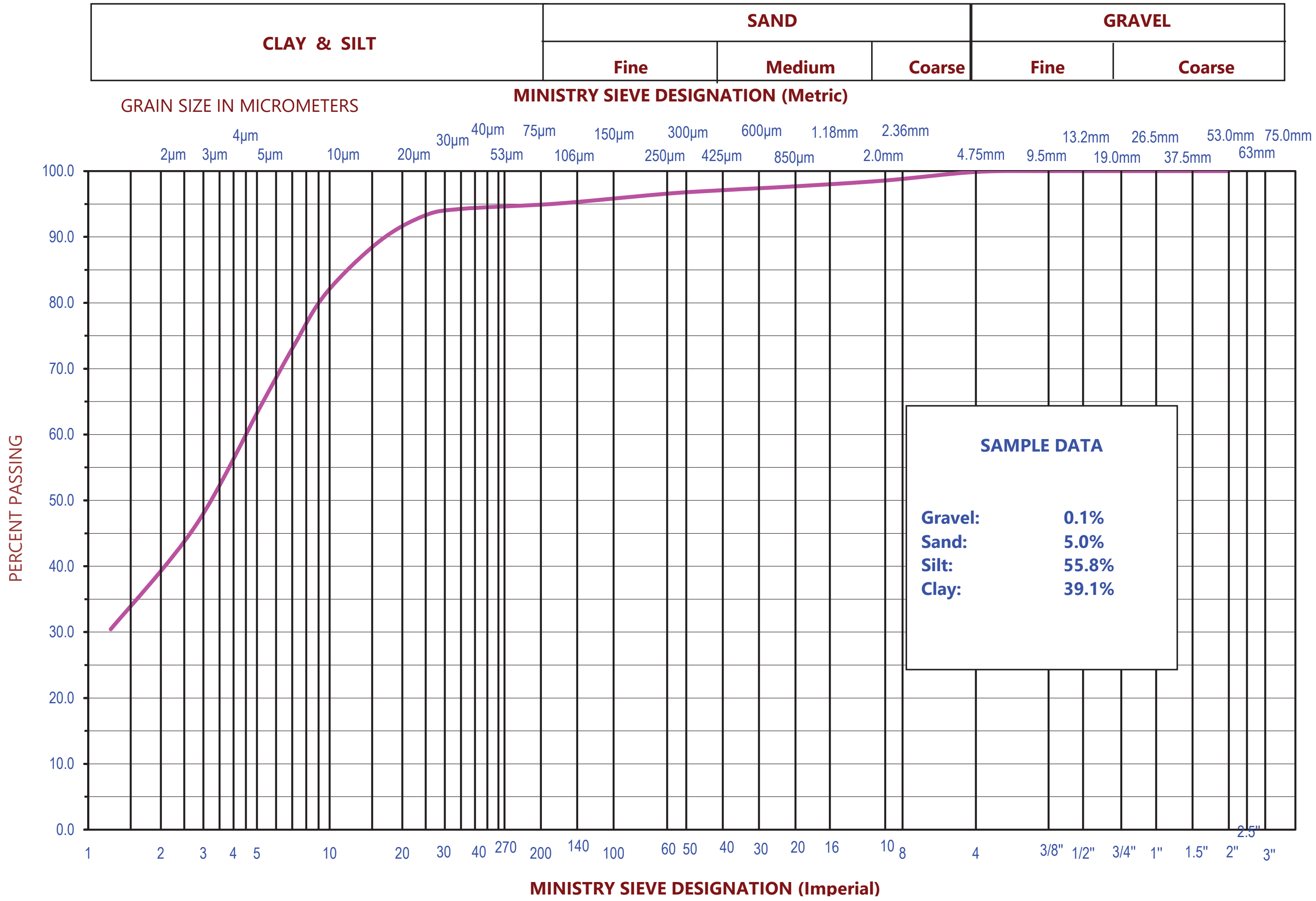
Gravel:	0.1%
Sand:	5.0%
Silt:	55.8%
Clay:	39.1%

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	100.0
9.5	100.0
4.75	99.9
2.00	98.6
0.85	97.7
0.425	97.1
0.250	96.6
0.106	95.3
0.075	94.9
0.0349	94.3
0.0248	93.3
0.0161	89.3
0.0097	81.5
0.0072	73.6
0.0053	64.8
0.0028	46.1
0.0012	30.4

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S389-19
Job No.:	TPB198079.3.5	BH15 - SS18	**Tested By:**	JW
Date Received:	November 2019	**Clay & Silt, trace Sand & Gravel**	**Report Date:**	19 December 2019

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702 or ASTM D7928



SAMPLE DATA

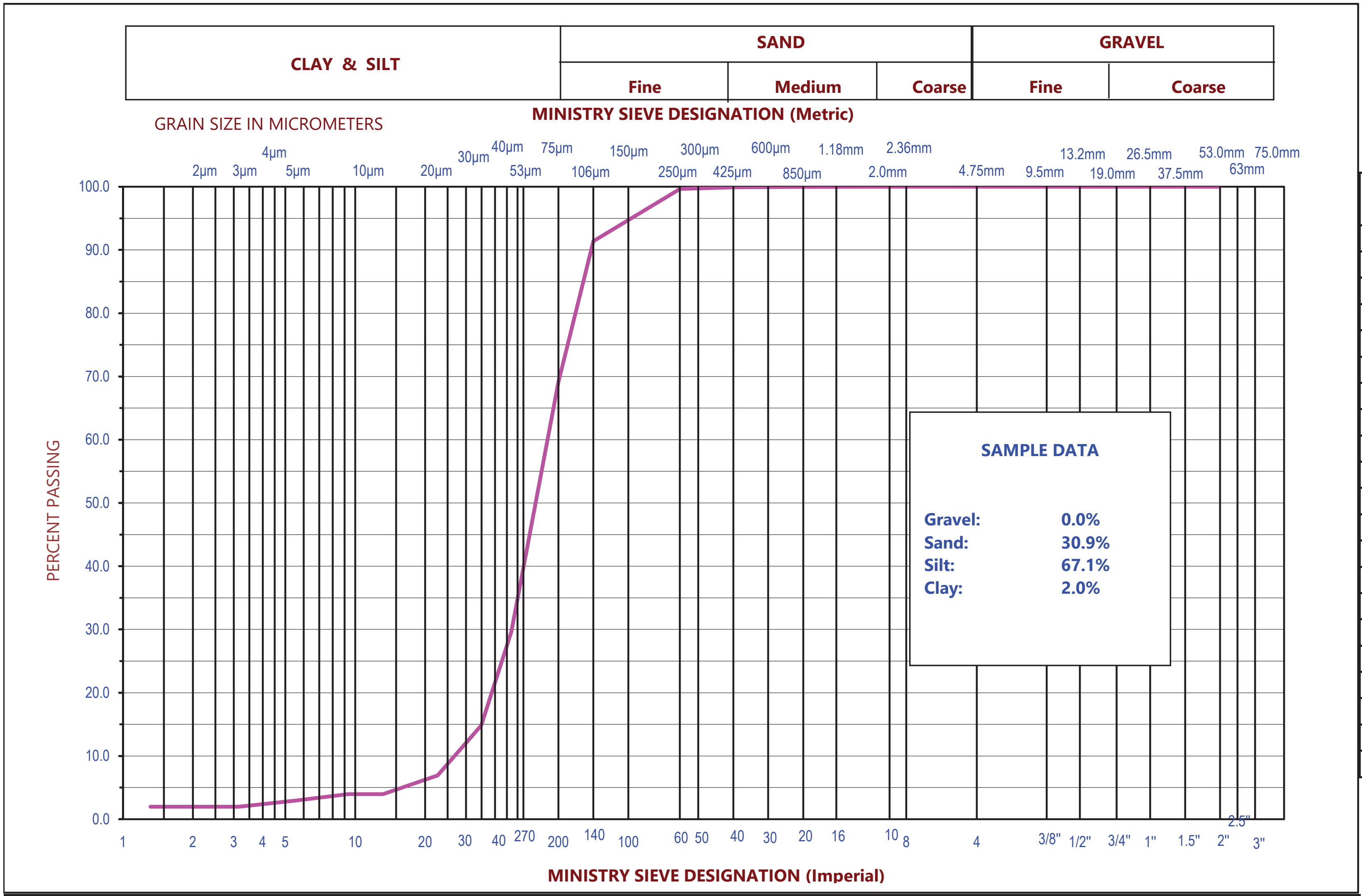
Gravel:	0.1%
Sand:	5.0%
Silt:	55.8%
Clay:	39.1%

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	100.0
9.5	100.0
4.75	99.9
2.00	98.6
0.85	97.7
0.425	97.1
0.250	96.6
0.106	95.3
0.075	94.9
0.0349	94.3
0.0248	93.3
0.0161	89.3
0.0097	81.5
0.0072	73.6
0.0053	64.8
0.0028	46.1
0.0012	30.4

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S389-19
Job No.:	TPB198079.3.5	BH15 - SS18	**Tested By:**	JW
Date Received:	November 2019	**Clay & Silt, trace Sand & Gravel**	**Report Date:**	19 December 2019

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702



SAMPLE DATA

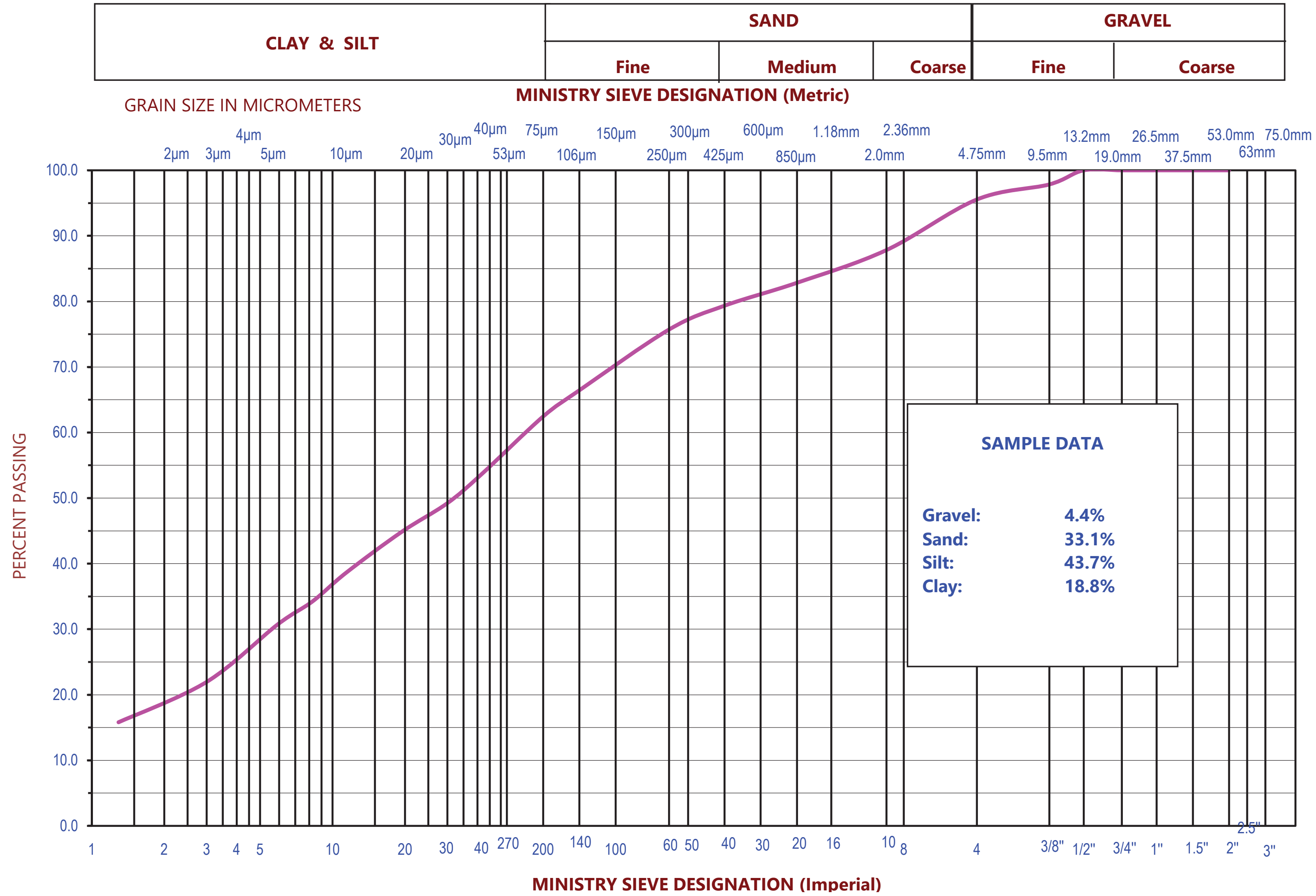
Gravel:	0.0%
Sand:	30.9%
Silt:	67.1%
Clay:	2.0%

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	100.0
9.5	100.0
4.75	100.0
2.00	100.0
0.85	100.0
0.425	99.9
0.250	99.6
0.106	91.4
0.075	69.1
0.0471	29.7
0.0349	14.8
0.0226	6.9
0.0132	4.0
0.0093	4.0
0.0056	3.0
0.0032	2.0
0.0013	2.0

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S408-19
Job No.:	TPB198079.3.5	BH16-SS8	**Tested By:**	JW
Date Received:	November 2019	**Sandy Silt, trace Clay**	**Report Date:**	19 February 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702 or ASTM D7928



SAMPLE DATA

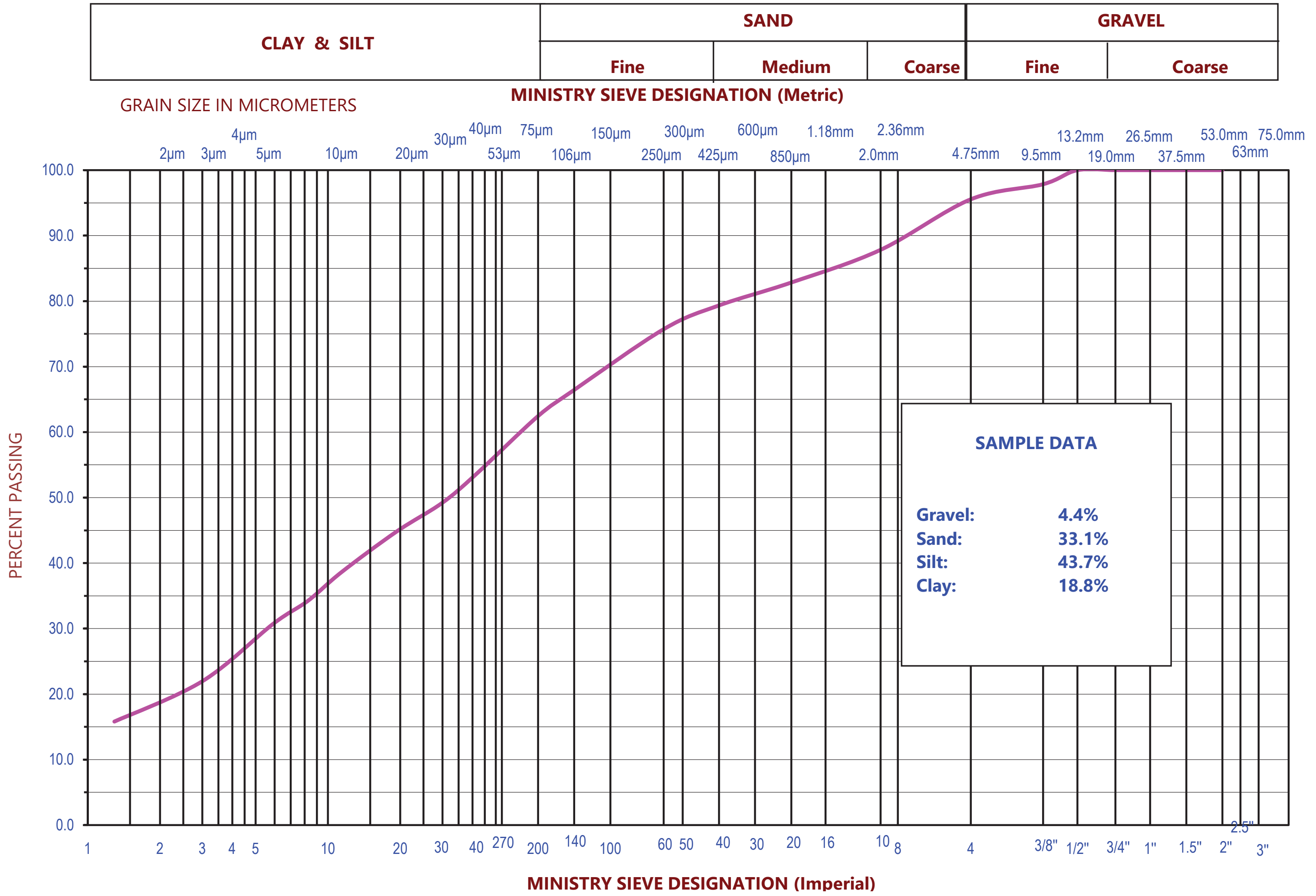
Gravel:	**4.4%**
Sand:	**33.1%**
Silt:	**43.7%**
Clay:	**18.8%**

Sieve size (mm)	**% Passing**
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	100.0
9.5	97.8
4.75	95.6
2.00	87.8
0.85	82.8
0.425	79.3
0.250	75.7
0.106	66.4
0.075	62.5
0.0414	53.6
0.0299	49.2
0.0193	44.8
0.0114	38.6
0.0083	34.2
0.0059	30.7
0.0030	22.0
0.0013	15.8

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S409-19
Job No.:	TPB198079.3.5	BH16 - SS20	**Tested By:**	JW
Date Received:	November 2019	**Sandy Silt, some Clay, trace Gravel**	**Report Date:**	14 January 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702 or ASTM D7928



SAMPLE DATA

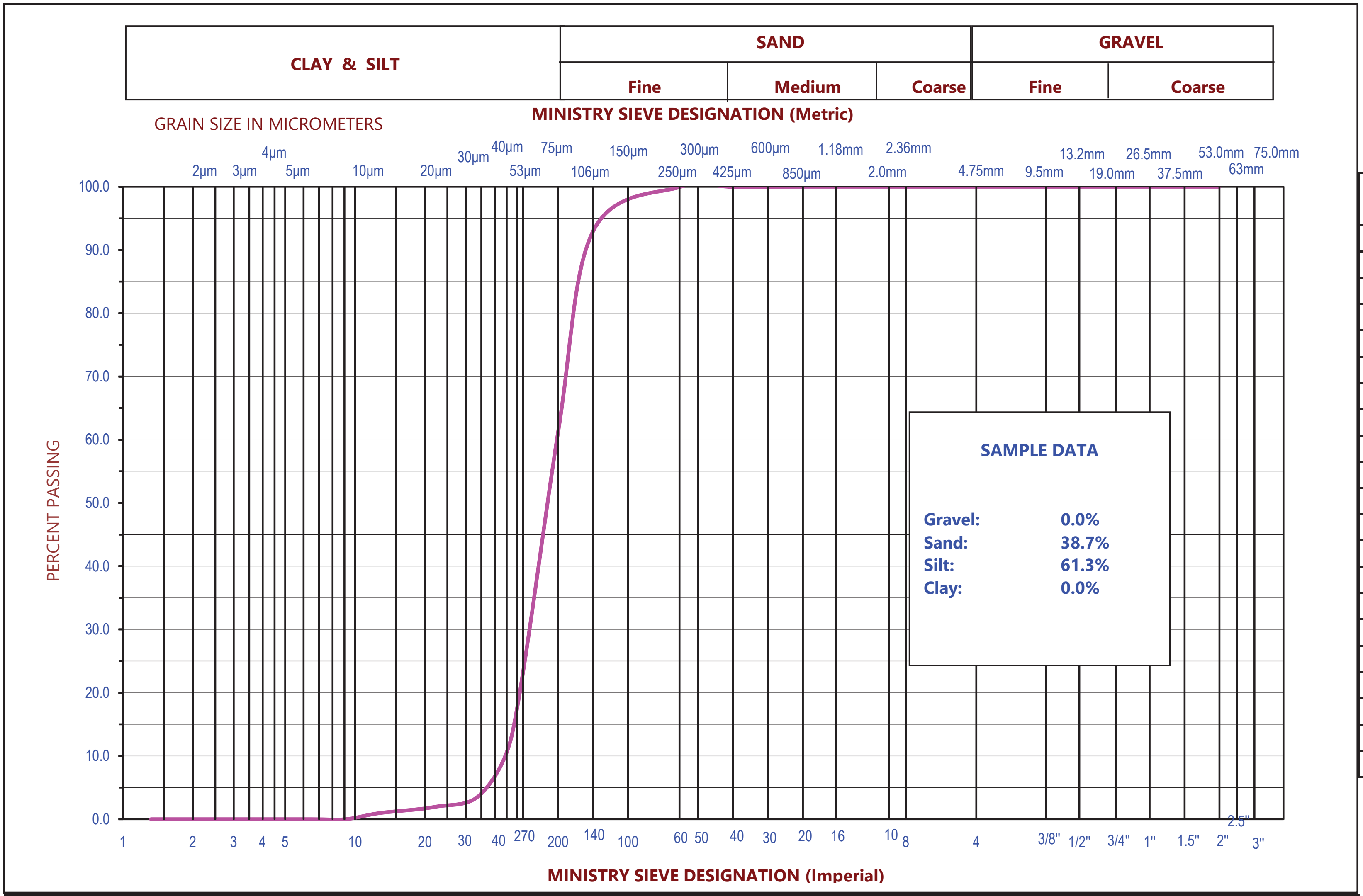
Gravel:	**4.4%**
Sand:	**33.1%**
Silt:	**43.7%**
Clay:	**18.8%**

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	100.0
9.5	97.8
4.75	95.6
2.00	87.8
0.85	82.8
0.425	79.3
0.250	75.7
0.106	66.4
0.075	62.5
0.0414	53.6
0.0299	49.2
0.0193	44.8
0.0114	38.6
0.0083	34.2
0.0059	30.7
0.0030	22.0
0.0013	15.8

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S409-19
Job No.:	TPB198079.3.5	BH16 - SS20	**Tested By:**	JW
Date Received:	November 2019	**Sandy Silt, some Clay, trace Gravel**	**Report Date:**	14 January 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702



SAMPLE DATA

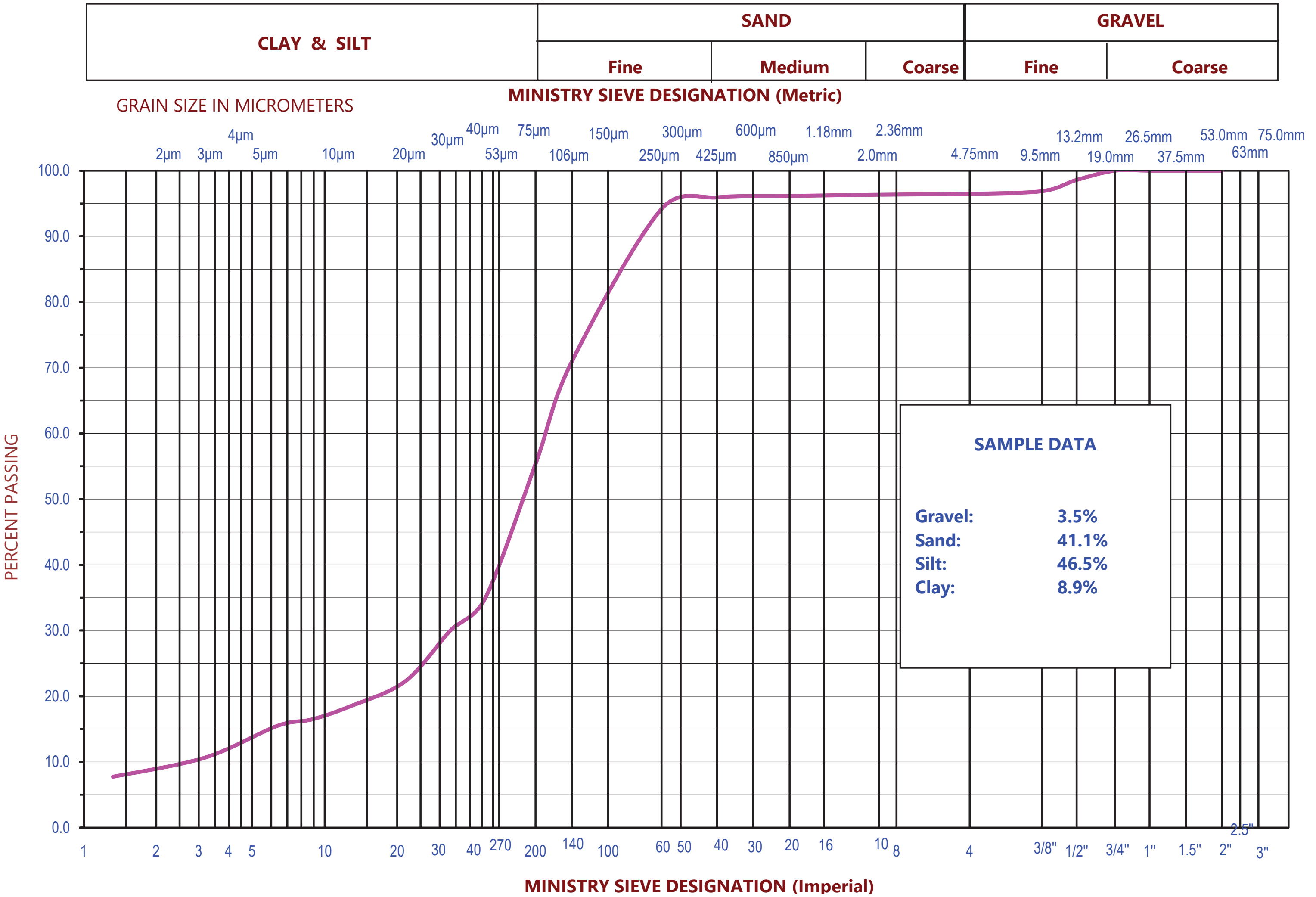
Gravel:	**0.0%**
Sand:	**38.7%**
Silt:	**61.3%**
Clay:	**0.0%**

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	100.0
9.5	100.0
4.75	100.0
2.00	100.0
0.85	100.0
0.425	100.0
0.250	99.9
0.106	92.9
0.075	61.3
0.0476	13.6
0.0347	3.9
0.0220	1.9
0.0128	1.0
0.0091	0.0
0.0065	0.0
0.0032	0.0
0.0013	0.0

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S411-19
Job No.:	TPB198079.3.5	BH17 - SS5	**Tested By:**	JW
Date Received:	November 2019	**Silt & Sand**	**Report Date:**	6 February 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702 or ASTM D7928



SAMPLE DATA

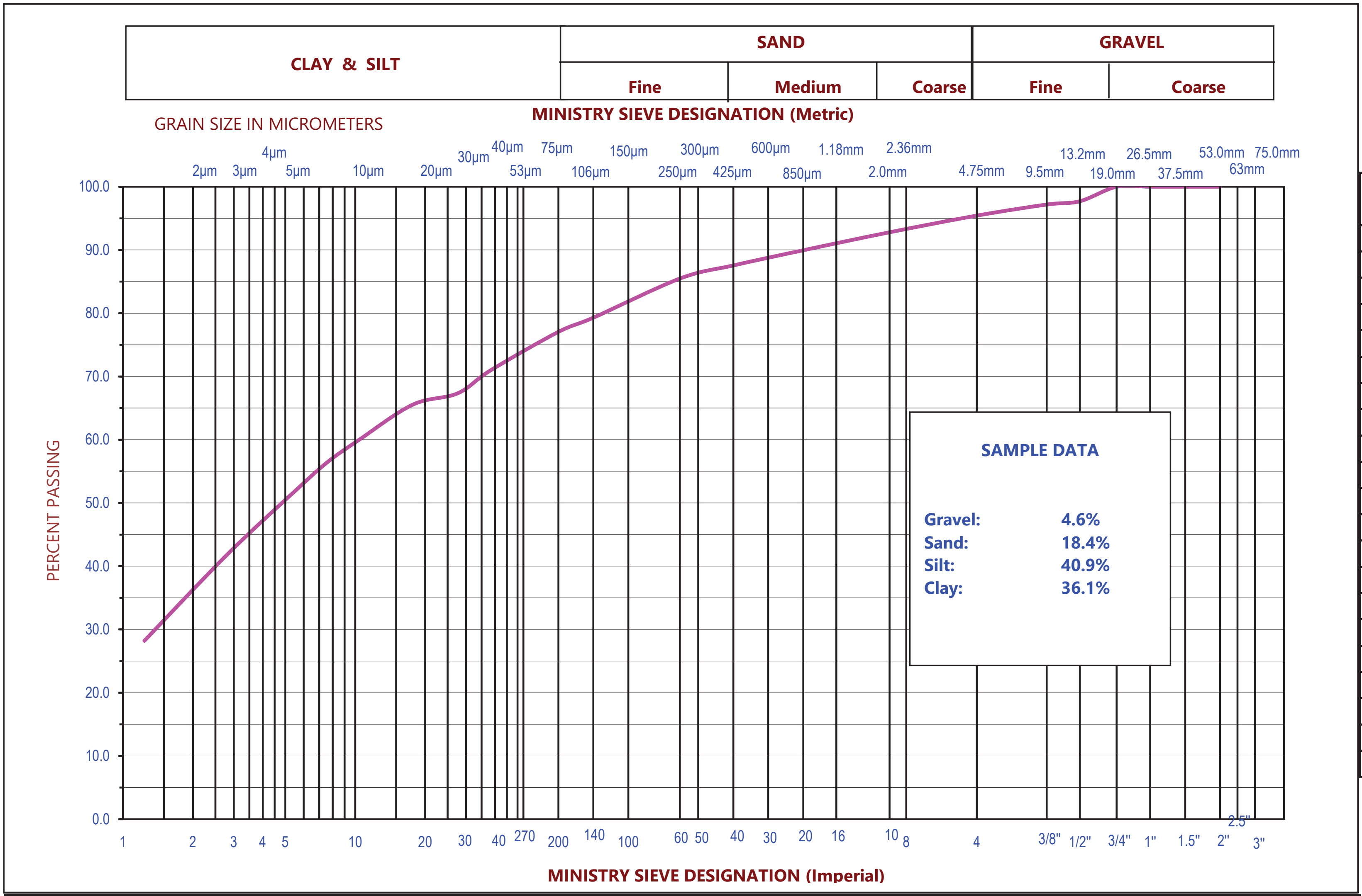
Gravel:	**3.5%**
Sand:	**41.1%**
Silt:	**46.5%**
Clay:	**8.9%**

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	98.6
9.5	96.9
4.75	96.5
2.00	96.3
0.85	96.1
0.425	95.9
0.250	94.2
0.106	70.9
0.075	55.4
0.0463	34.9
0.0333	30.0
0.0216	22.3
0.0126	18.4
0.0088	16.5
0.0064	15.5
0.0032	10.7
0.0013	7.7

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S407-19
Job No.:	TPB198079.3.5	BH18 - SS11	**Tested By:**	JW
Date Received:	November 2019	**Sand & Silt, trace Clay & Gravel**	**Report Date:**	14 January 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702



SAMPLE DATA

Gravel:	4.6%
Sand:	18.4%
Silt:	40.9%
Clay:	36.1%

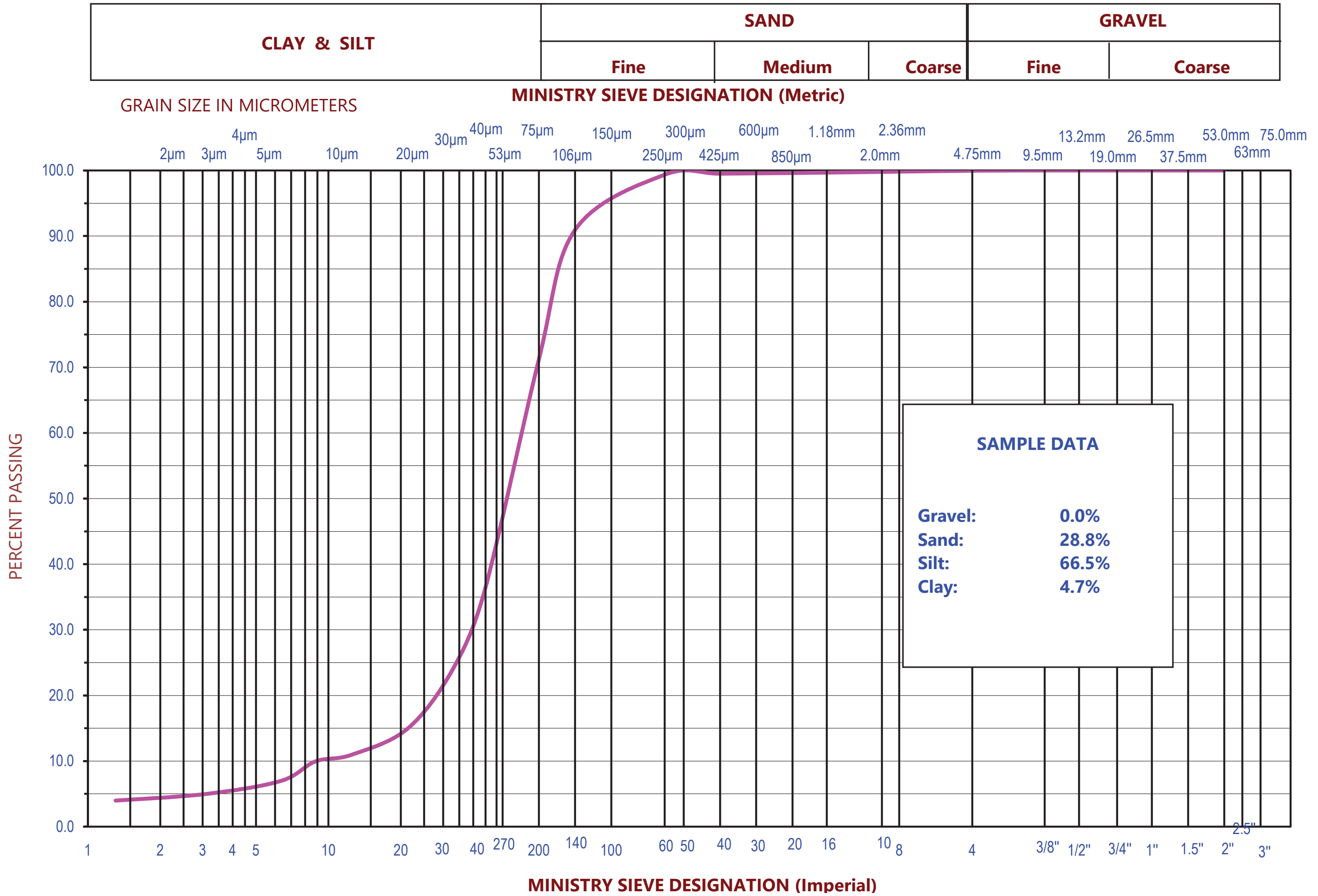
Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	97.7
9.5	97.2
4.75	95.4
2.00	92.8
0.85	90.0
0.425	87.6
0.250	85.5
0.106	79.3
0.075	77.0
0.0383	71.0
0.0276	67.3
0.0176	65.5
0.0105	60.1
0.0076	56.4
0.0055	51.9
0.0028	41.9
0.0012	28.2

Client:	Toronto Region Conservation Authori	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S394-19
Job No.:	TPB198079.3.5	BH19 - SS11	**Tested By:**	JW
Date Received:	November 2019	**Silt & Clay, some Sand, trace Gravel**	**Report Date:**	29 January 2020

wood.

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702



SAMPLE DATA

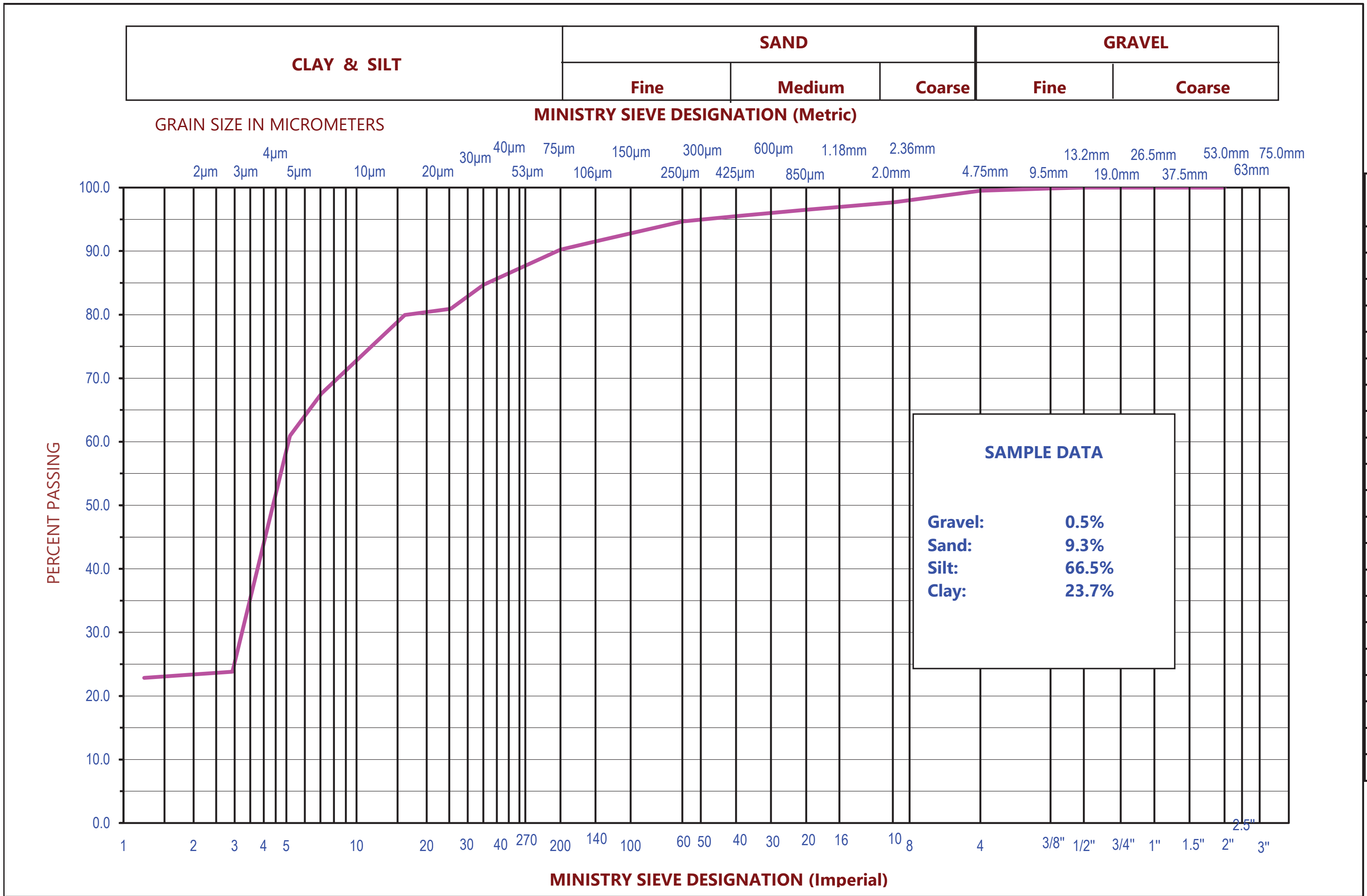
Gravel:	0.0%
Sand:	28.8%
Silt:	66.5%
Clay:	4.7%

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	100.0
9.5	100.0
4.75	100.0
2.00	99.8
0.85	99.6
0.425	99.5
0.250	99.4
0.106	90.9
0.075	71.2
0.0445	35.8
0.0328	23.9
0.0213	14.9
0.0125	10.9
0.0088	9.9
0.0063	7.0
0.0031	5.0
0.0013	4.0

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S395-19
Job No.:	TPB198079.3.5	BH19 - SS19	**Tested By:**	JW
Date Received:	November 2019	**Sandy Silt, trace Clay**	**Report Date:**	6 February 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702



SAMPLE DATA

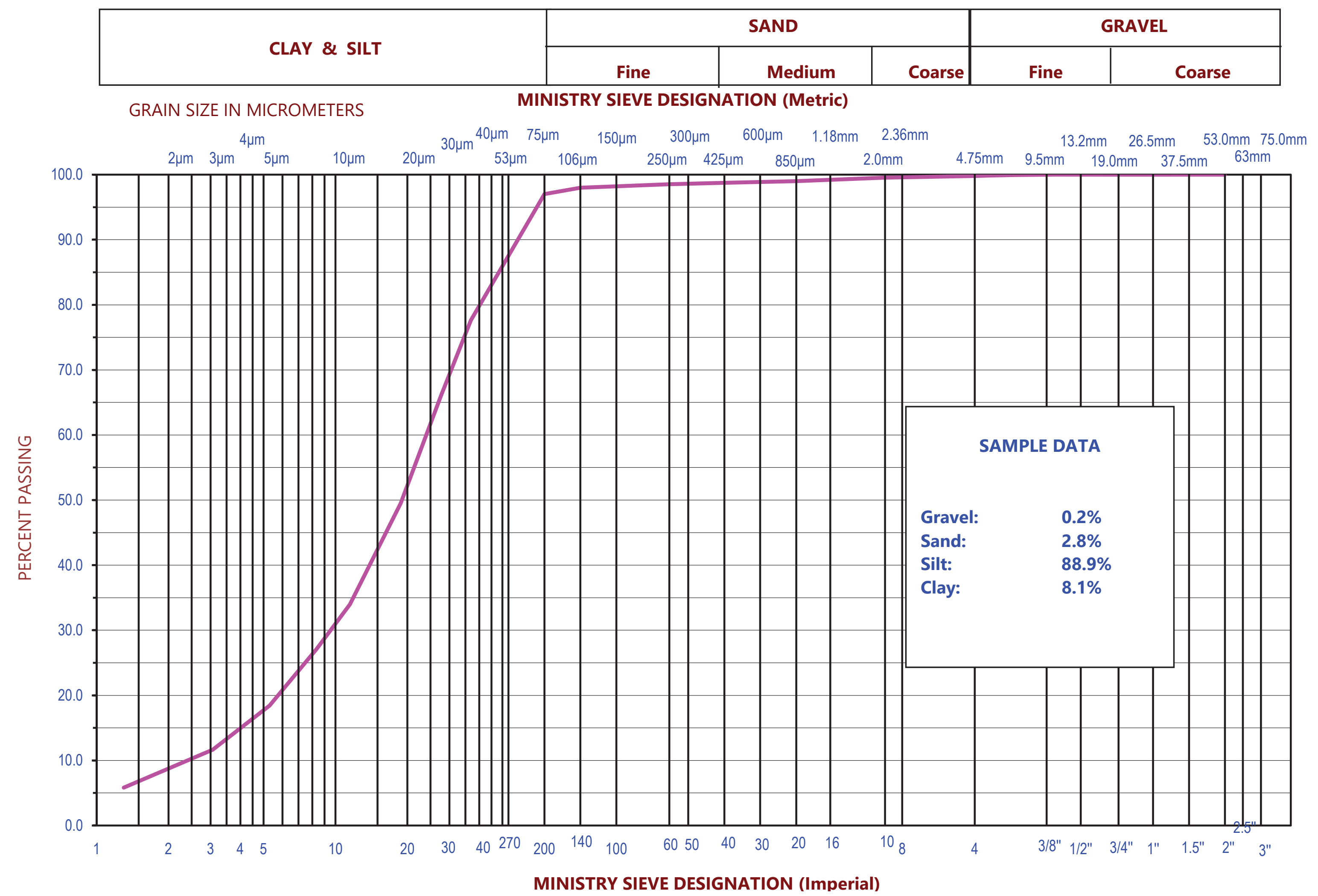
Gravel:	**0.5%**
Sand:	**9.3%**
Silt:	**66.5%**
Clay:	**23.7%**

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	100.0
9.5	99.9
4.75	99.5
2.00	97.6
0.85	96.5
0.425	95.5
0.250	94.7
0.106	91.5
0.075	90.2
0.0351	84.7
0.0254	80.9
0.0161	80.0
0.0097	72.3
0.0071	67.6
0.0052	60.9
0.0029	23.8
0.0012	22.8

Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S390-19
Job No.:	TPB198079.3.5	BH20 - SS9	**Tested By:**	JW
Date Received:	November 2019	**Clayey Silt, trace Gravel & Sand**	**Report Date:**	12 February 2020

UNIFIED SOIL CLASSIFICATION SYSTEM

Determination of Particle Size Analysis of Soils LS 702



SAMPLE DATA

Gravel:	**0.2%**
Sand:	**2.8%**
Silt:	**88.9%**
Clay:	**8.1%**

Sieve size (mm)	% Passing
53	100
37.5	100.0
26.5	100.0
19	100.0
13.2	100.0
9.5	100.0
4.75	99.8
2.00	99.5
0.85	99.0
0.425	98.7
0.250	98.5
0.106	98.0
0.075	97.0
0.0369	77.6
0.0276	66.0
0.0188	49.5
0.0115	34.0
0.0084	27.2
0.0053	18.4
0.0031	11.6
0.0013	5.8

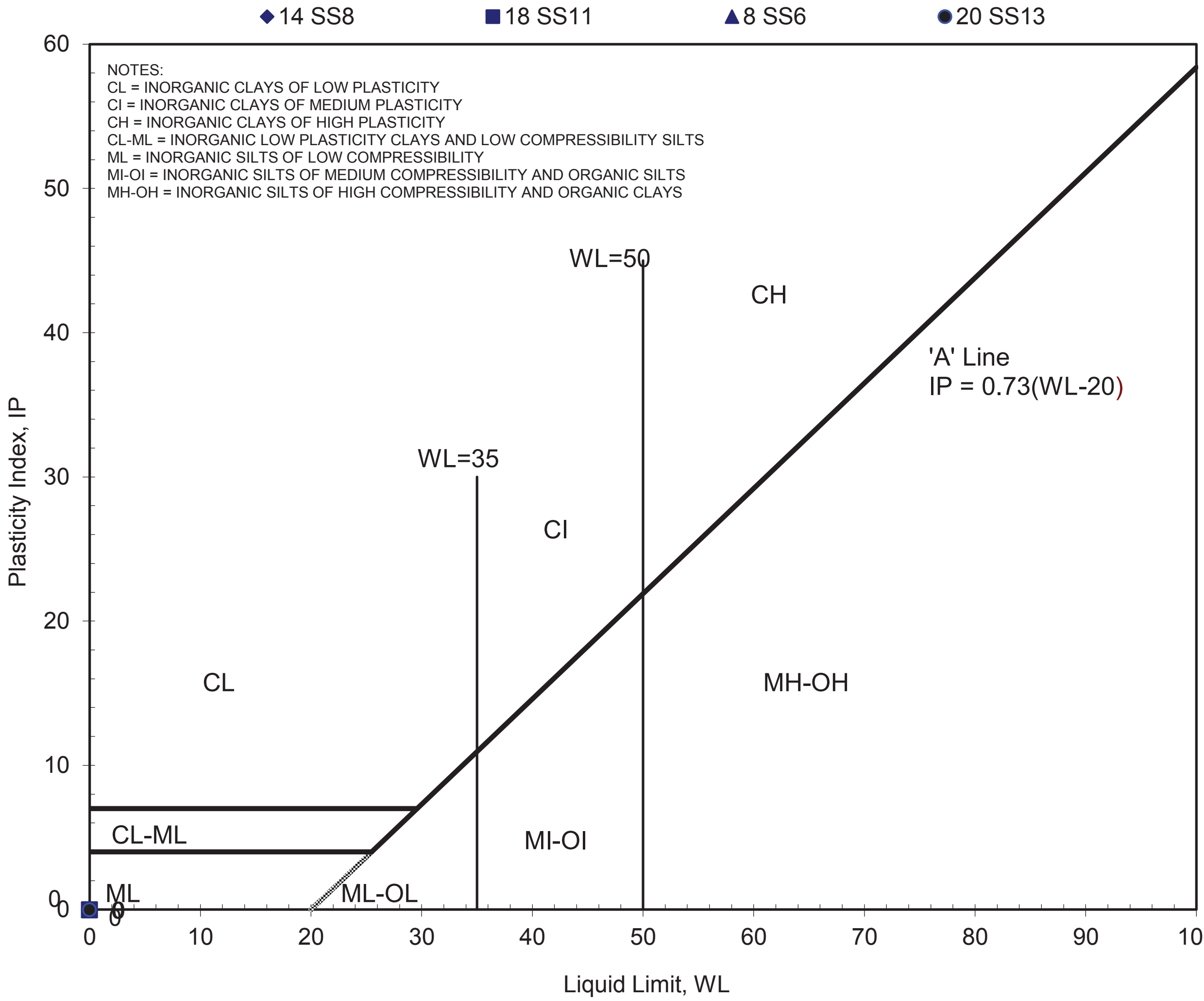
Client:	Toronto Region Conservation Authority	**GRAIN SIZE DISTRIBUTION**	**Sample No.:**	S391-19
Job No.:	TPB198079.3.5	BH20 - SS13	**Tested By:**	JW
Date Received:	November 2019	**Silt, trace Gravel, Sand & Clay**	**Report Date:**	12 February 2020

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOIL
LS 703/704 (ASTM D 4318)

Client:	Black Creek at Rockcliffe SPA Study	**Project No.:**	TPB198079.3.5
Sample Location:	Toronto & Region Conservation Authority	**Date Tested:**	18-Feb-20
Sample Type:	Black Creek at Rockcliffe, Toronto	**Tested By:**	KH

TEST RESULTS

Borehole No.	14	18	8	20
Sample No.	SS8	SS11	SS6	SS13
Depth	S386-19	S407-19	S416-19	S391-19
Liquid Limit				
Plastic Limit				
Plasticity Index	Non-plastic	Non-plastic	Non-plastic	Non-plastic
Soil Classification				
Natural Moiture Content %				



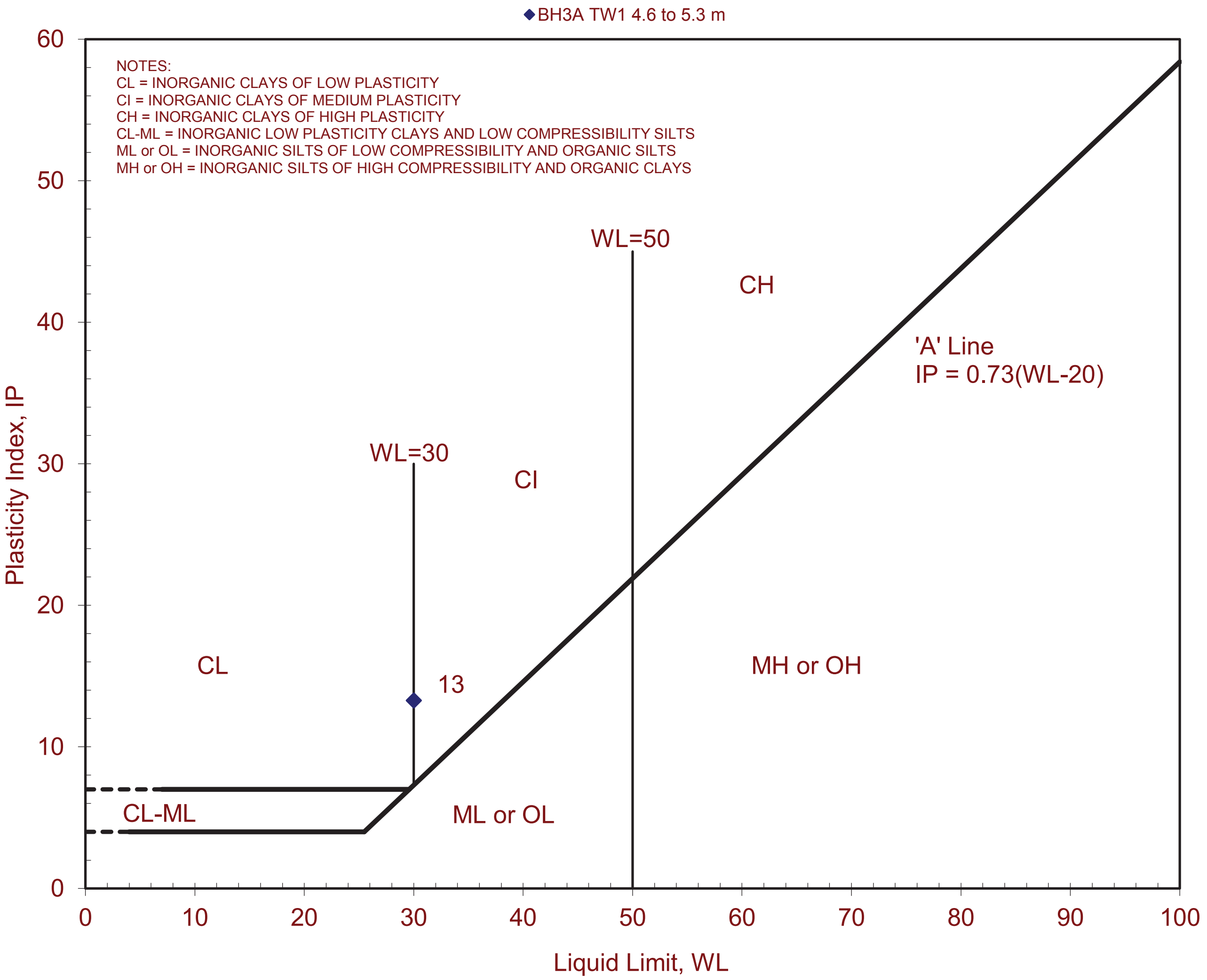
Signed By:

ATTERBERG LIMITS
D 4318

Project Title: Black Creek At Rockcliffe SPA Study
Project Client: Toronto & Region Conservation
Project Location: Black Creek At Rockcliffe, Toronto, ON.
Date Tested: 28-Nov-2019
Project No.: TPB198079.3.5
Sampled By: -
Tested By: CZ

TEST RESULTS

Borehole No.	BH3A			
Sample No.	TW1			
Depth	4.6 to 5.3 m			
Liquid Limit	30			
Plastic Limit	17			
Plasticity Index	13			
Soil Classification	CI			
Natural Moiture Content %	31			



Laboratory Sheet No.: Att-01

Signed By: SB

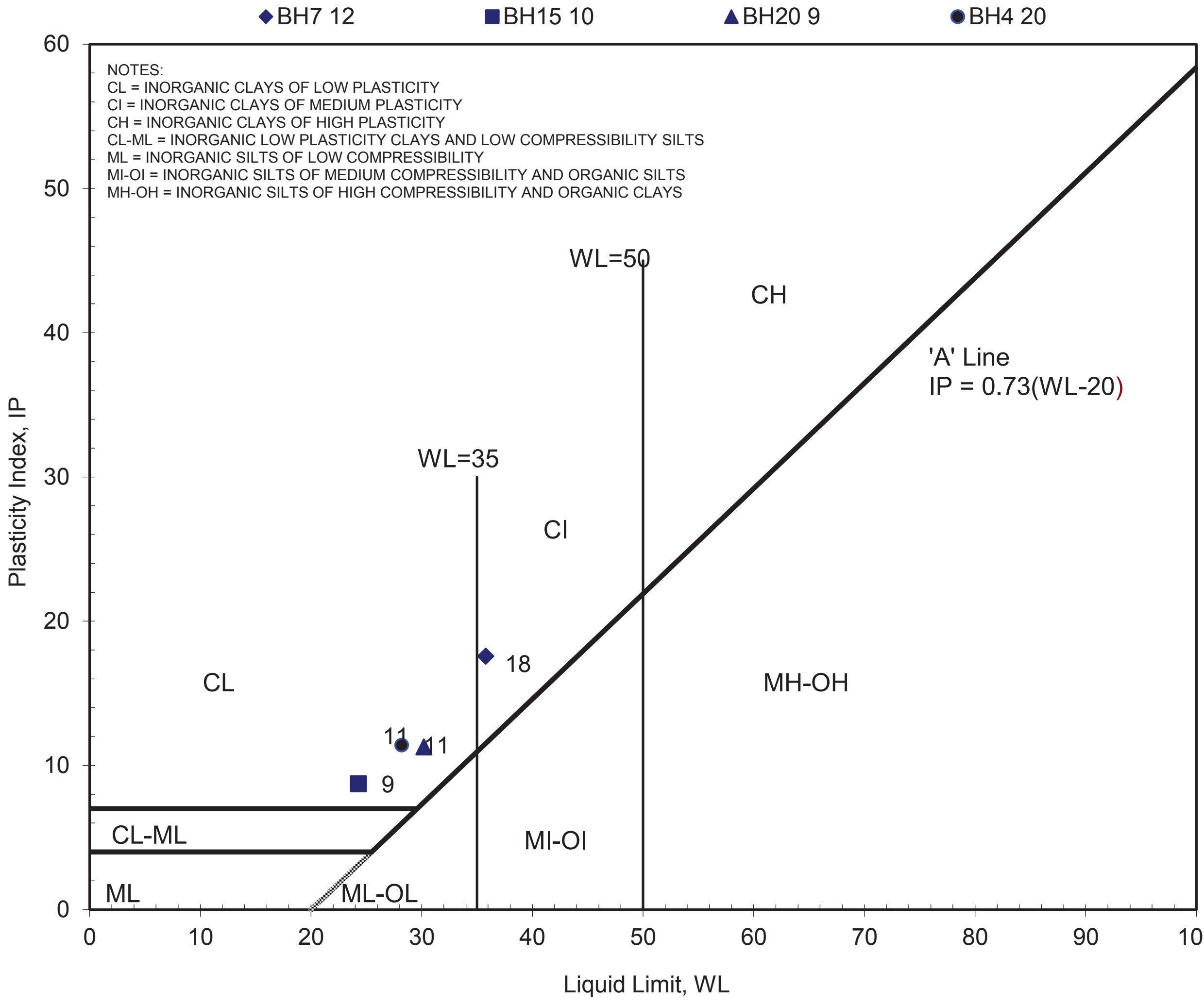
LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOIL
LS 703/704 (ASTM D 4318)

Client: Toronto Region Conservation Authority
Sample Location: Black Creek at Rockcliffe SPA Study
Sample Type: Black Creek at Rockcliffe, Toronto

Project No.: TPB198079.3.5
Date Tested: 04/10 Feb 2020
Tested By: KH

TEST RESULTS

Borehole No.	BH7	BH15	BH20	BH4
Sample No.	12	10	9	20
Lab Sample No.	S398-19	S388-19	S390-19	S393-19
Liquid Limit	36	24	30	28
Plastic Limit	18	16	19	17
Plasticity Index	18	9	11	11
Soil Classification	CI	CL	CL	CL
Natural Moiture Content %				



Signed By:

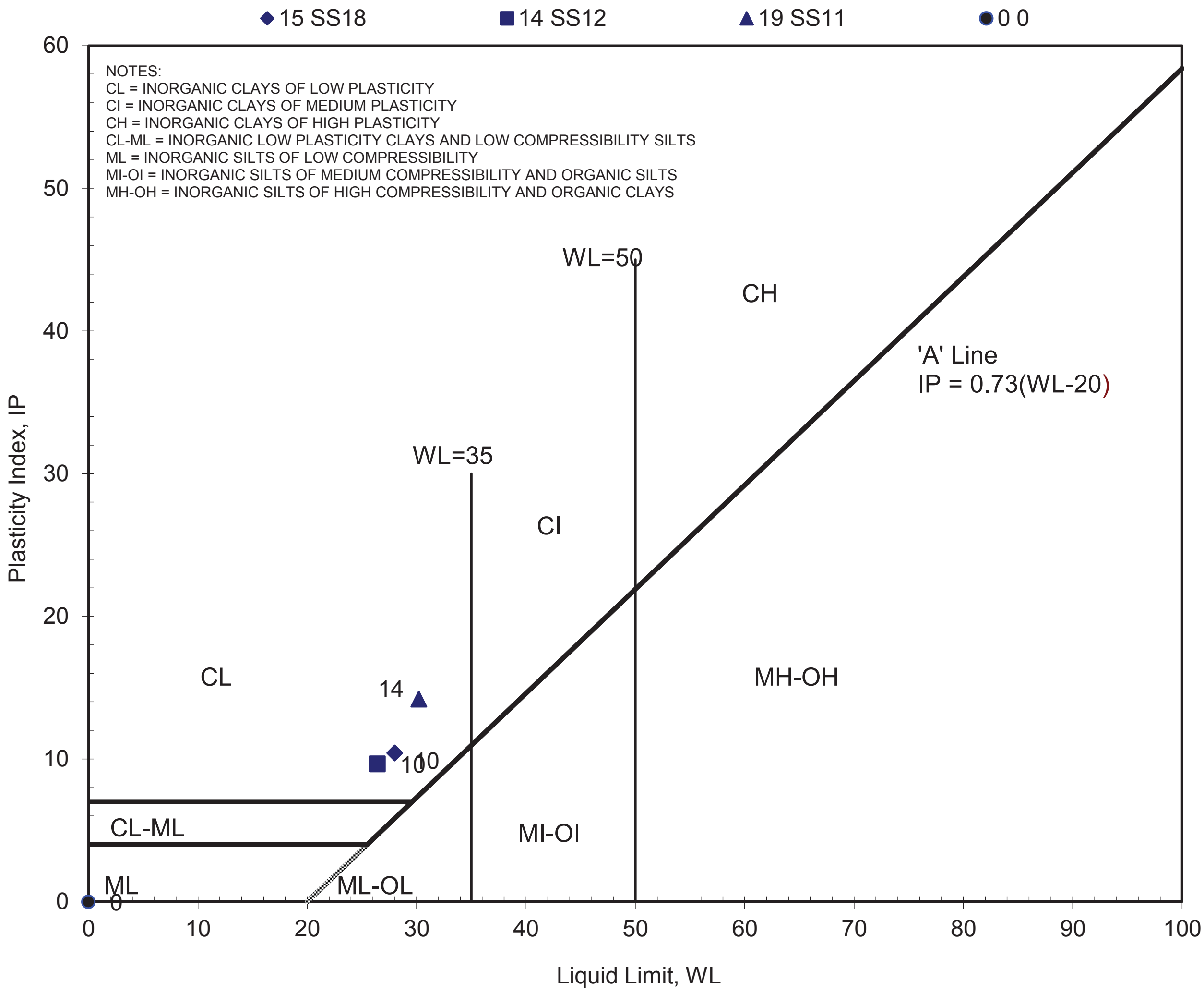
LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOIL
LS 703/704 (ASTM D 4318)

Client: Toronto Region Conservation Authority
Sample Location: Black Creek at Rockcliffe SPA Study
Sample Type: Black Creek at Rockcliffe, Toronto

Project No.: TPB198079.3.5
Date Tested: 18-Feb-20
Tested By: KH

TEST RESULTS

Borehole No.	15	14	19	
Sample No.	SS18	SS12	SS11	
Lab No.	S389-19	S387-19	S394-19	
Liquid Limit	28	26	30	
Plastic Limit	18	17	16	#DIV/0!
Plasticity Index	10	10	14	#DIV/0!
Soil Classification	CL	CL	CL	
Natural Moiture Content %				



Signed By:

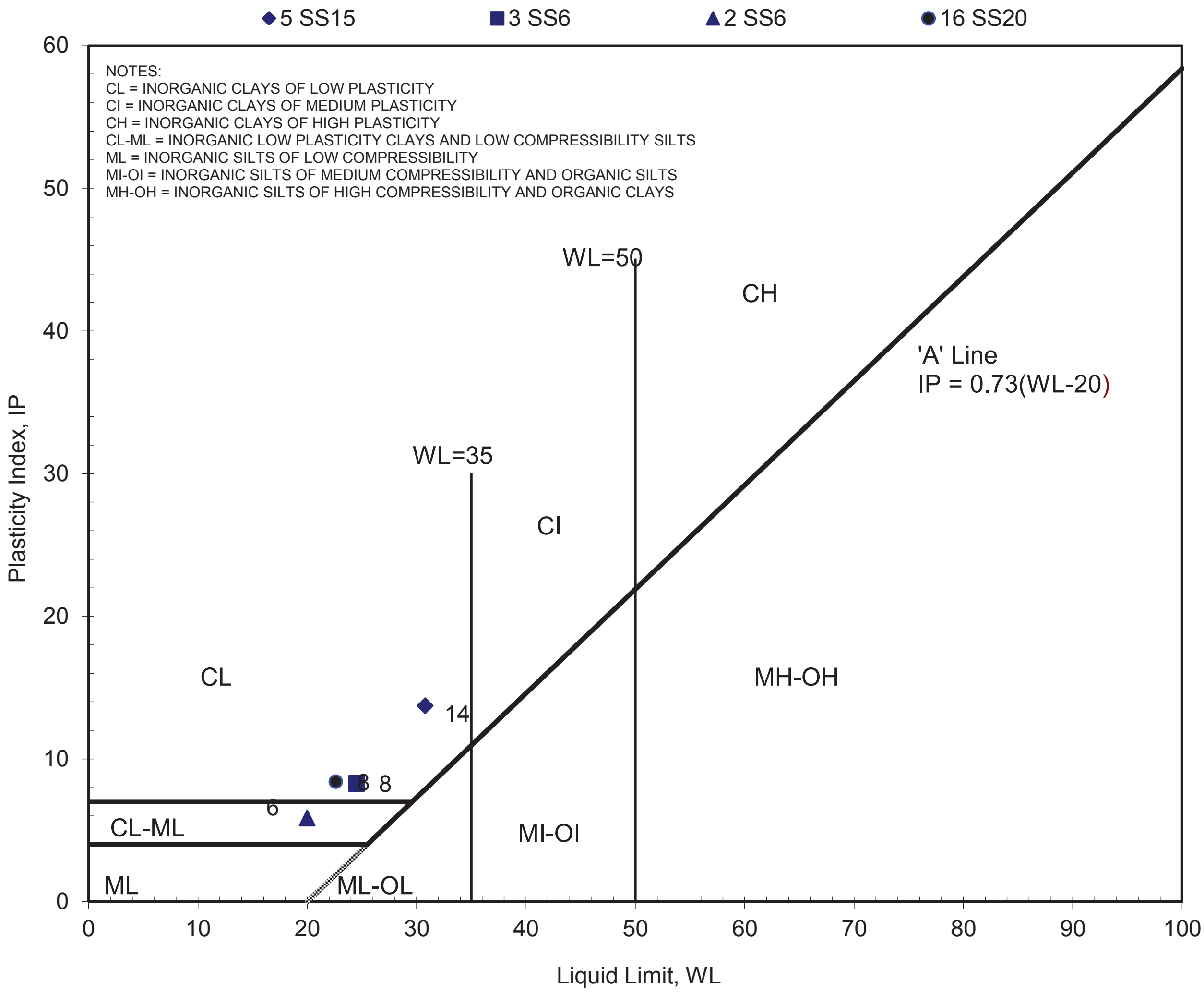
LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOIL
LS 703/704 (ASTM D 4318)

Client: Toronto Region Conservation Authority
Sample Location: Black Creek at Rockcliffe SPA Study
Sample Type: Black Creek at Rockcliffe, Toronto

Project No.: TPB198079.3.5
Date Tested: 12-Feb-20
Tested By: KH

TEST RESULTS

Borehole No.	5	3	2	16
Sample No.	SS15	SS6	SS6	SS20
Lab No.	S413-19	S427-19	S429-19	S409-19
Liquid Limit	31	25	20	23
Plastic Limit	17	16	14	14
Plasticity Index	14	8	6	8
Soil Classification	CL	CL	CL-ML	CL
Natural Moiture Content %				

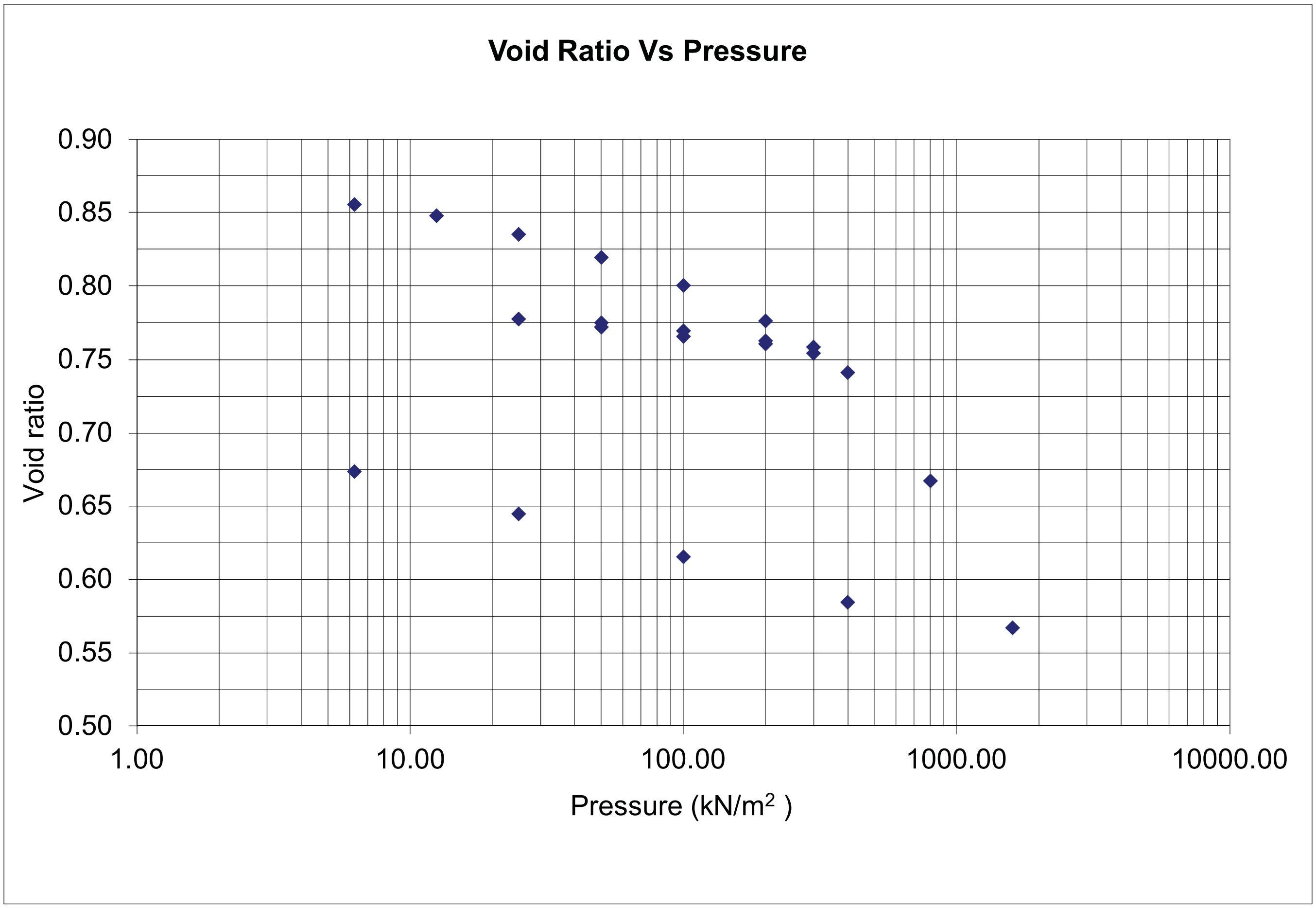


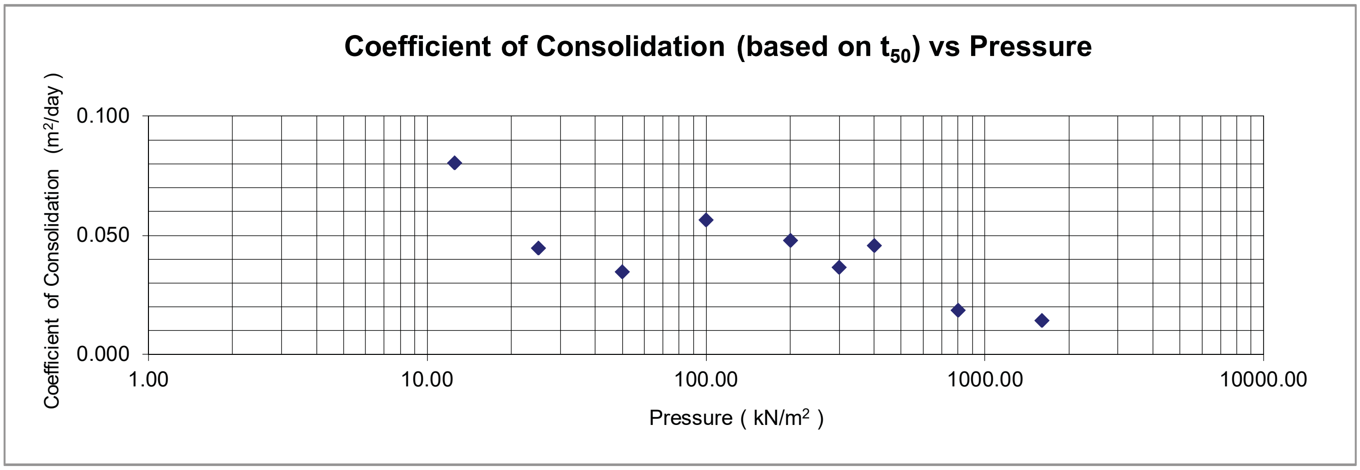
Signed By:

ONE DIMENSIONAL CONSOLIDATION TEST (ASTM D 2435-11)

Project: Black Creek At Rockcliffe SPA Study **Job No.:** TPB198079.3.5
Client: Toronto & Region Conservation
Date: 26-Nov-19 **Sample ID:** BH3A - TW1 **Depth(m):** 4.6 to 5.3

σ'_v versus e and c_v





CLIENT NAME: WOOD ENVIRONMENT & INFRASTRUCTURE SOLUTIONS **ATTENTION TO: Willie Kokotec**

SAMPLING SITE:Blackcreek, York **SAMPLED BY:Wood**

Corrosivity Package

DATE RECEIVED: 2019-11-27 **DATE REPORTED: 2019-12-04**

			SAMPLE DESCRIPTION:	BH4-SS14	BH5-SS13		BH6-SS13	BH7-SS11	BH14-SS19	BH15-SS25
			SAMPLE TYPE:	Soil	Soil		Soil	Soil	Soil	Soil
			DATE SAMPLED:	2019-10-31	2019-10-31		2019-10-31	2019-10-31	2019-10-31	2019-10-31
Parameter	**Unit**	**G / S**	**RDL**	**752042**	**752043**	**RDL**	**752044**	**752045**	**752046**	**752047**
Chloride (2:1)	µg/g		4	216	11	2	69	46	51	52
Sulphate (2:1)	µg/g		4	1230	380	2	586	150	268	173
pH (2:1)	pH Units		NA	9.37	8.26	NA	8.17	8.60	8.29	8.34
Electrical Conductivity (2:1)	mS/cm		0.005	1.31	1.33	0.005	0.772	0.313	0.485	0.406
Resistivity (2:1) (Calculated)	ohm.cm		1	763	752	1	1300	3190	2060	2460
Redox Potential 1	mV		NA	51	283	NA	146	240	228	175
Redox Potential 2	mV		NA	59	285	NA	149	242	231	176
Redox Potential 3	mV		NA	60	286	NA	151	240	228	179

			SAMPLE DESCRIPTION:	BH16-SS7	BH17-SS4		BH18-SS12	BH19-SS18	BH20-SS19
			SAMPLE TYPE:	Soil	Soil		Soil	Soil	Soil
			DATE SAMPLED:	2019-10-31	2019-10-31		2019-10-31	2019-10-31	2019-10-31
Parameter	**Unit**	**G / S**	**RDL**	**752048**	**752049**	**RDL**	**752050**	**752051**	**752052**
Chloride (2:1)	µg/g		4	420	553	2	24	8	40
Sulphate (2:1)	µg/g		4	388	296	2	347	382	525
pH (2:1)	pH Units		NA	8.45	8.41	NA	8.21	8.20	8.33
Electrical Conductivity (2:1)	mS/cm		0.005	1.12	1.28	0.005	0.514	0.525	0.672
Resistivity (2:1) (Calculated)	ohm.cm		1	893	781	1	1950	1900	1490
Redox Potential 1	mV		NA	226	266	NA	159	219	220
Redox Potential 2	mV		NA	229	267	NA	162	222	221
Redox Potential 3	mV		NA	233	269	NA	164	218	223

Certified By: Iris Verástegui

ONE DIMENSIONAL CONSOLIDATION TEST (ASTM D 2435-11)

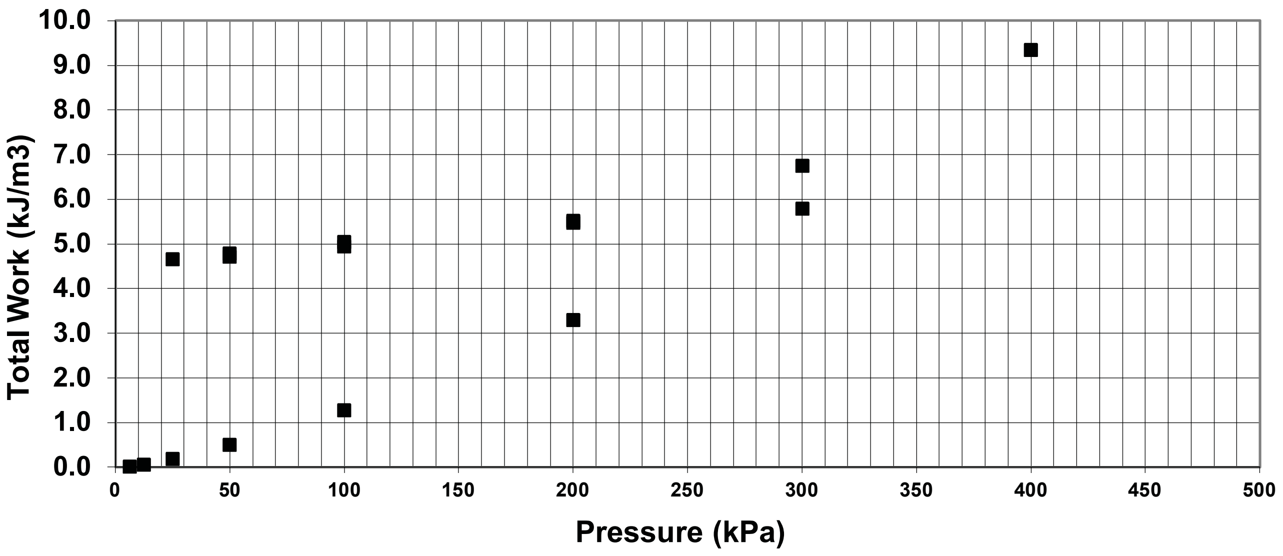
Project: Black Creek At Rockcliffe SPA Study **Job No.:** TPB198079.3.5
Client: Toronto & Region Conservation
Date: 26-Nov-19 **Sample ID:** BH3A - TW1 **Depth(m):** 4.6 to 5.3

Strain Energy Data

Pressure (kN/m^2)	c_v (based on t_{90}) (m^2/day)	Void ratio
6.25		0.856
12.50	0.0802	0.848
25.00	0.0446	0.835
50.00	0.0347	0.819
100.0	0.0563	0.801
200.0	0.0479	0.776
300.0	0.0364	0.758
200.00		0.761
100.00		0.766
50.00		0.772
25.00		0.778
50.00		0.775
100.0		0.770
200.0		0.763
300.0		0.754
400.0	0.0457	0.741
800.0	0.0185	0.667
1600.0	0.0141	0.567
400.0		0.584
100.00		0.615
25.00		0.645
6.25		0.673

Pressure (kN/m^2)	Height mm	Total Work (KJ/m^3)
6.25	19.587	0.000
12.50	19.510	0.037
25.00	19.373	0.169
50.00	19.208	0.488
100.0	19.010	1.261
200.0	18.754	3.281
300.0	18.567	5.774
200.00	18.590	5.464
100.00	18.644	5.028
50.00	18.709	4.767
25.00	18.769	4.647
50.00	18.742	4.701
100.0	18.685	4.929
200.0	18.613	5.507
300.0	18.522	6.729
400.0	18.384	9.337
800.0	17.608	34.664
1600.0	16.556	106.360
400.0	16.739	95.306
100.00	17.065	90.437
25.00	17.371	89.316
6.25	17.674	89.044

Strain Energy Method for Preconsolidation Pressure



APPENDIX C

Wood Environment & Infrastructure Solutions
a Division of Wood Canada Limited
160 Traders Boulevard East, Suite 110
Mississauga, Ontario L4Z 3K7
Canada
T: 905.568.2929
www.woodplc.com

Memo

To: File **Date:** 14th April, 2020

From: Eddie Sokolowski, E.I.T (Wood)

CC: Mathi Shan, P.Eng. (Wood)

Ref:

Re: **Appendix C**
Rockcliffe Special Policy Area, Flood Protection and Transportation Feasibility Study
Slope Stability Assessment, Toronto Regional Conservation Authority

---

1.0 Introduction

Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited (Wood) has been retained by the Toronto and Region Conservation Authority (TRCA) to provide engineering services pertaining to the flood protection and transportation within the Rockcliffe area. The flood protection measures within the study area includes an upgrade to the Jane Street bridge crossing and Rockcliffe Boulevard (Blvd) bridge crossing through the Black Creek flood plain, as well as Symes Road bridge crossing through the Lavender Creek bridge crossing. Location of these bridge crossings are shown in Figure 1 of the main geotechnical investigation report (main report).

This memorandum reviews and discusses the geotechnical aspects of the proposed bridge embankments as well as provides the results of the stability analyses concluding with any recommendations.

2.0 Background

2.1 Site Description

The project site is considered completely urbanized with a mixture of residential, commercial, institutional and industrial land uses. The water course of both Black Creek and Lavender Creek has been straightened and heavily modified over time through concrete lining, culverts, and bridge crossings (Amec, 2014). Jane Street and Rockcliffe Blvd run in north-south direction, crossing through the Black Creek flood plain at Smyth Park. The current arch culvert crossing at the Jane Street and bridge at Rockcliffe Blvd provides the grade separation between the creek and Jane Street. It is understood that the proposed replacement bridge structures will follow the alignment of the existing alignment but will be wider at the creek crossing.

2.2 Geotechnical Information Review

A geotechnical investigation was carried out between September 9, 2019 and October 8, 2019. Detail of the sub-surface investigation including subsurface condition interpreted from the investigation is provided in Section 3 and Section 4 of the main report.

The subsurface at the project site consists of common / random fill at the surface likely placed as part of the development within the Black Creek flood plain. Underlying the fill was the natural soil deposit consisting of compact to dense silt transitioning into a silty clay. The silty clay deposit is firm to stiff in consistency and gradually transitions to hard consistency with depth, underlain by shale bedrock.

A summary of the soil stratigraphy encountered at the project site provided in Table 7.1 of the main report and described below:

- Fill – loose to dense sand to sandy silt fill with inclusions of glass, nails, ceramics, wood and brick pieces identified in SPT samples.
- Loose to dense silt with trace sand and clay – The stratum appears to be densified in samples retrieved from borehole BH-04 due to thick fill. In borehole BH-05, as well as in Rockcliffe Blvd area, the stratum appears loose to compact in compactness condition. Laboratory index testing has indicated that the stratum is non-cohesive.
- Silty clay - Transitioning from stiff to very stiff to hard in consistency at depth.
- Shale

It should be noted that subsurface investigation for Symes Road bridge location was prematurely terminated within the surface sandy silt layer. As such, detailed subsurface condition for Symes Road bridge expansion is not available.

Though groundwater table was not encountered within the specific bridge expansion areas under consideration during Wood’s 2019 geotechnical investigation, monitoring well observation from near-by locations indicate groundwater table may be at near surface (fill – upper sandy silt interface). The regional groundwater table is expected to follow the Creek bed elevation in the study area.

3.0 Geotechnical Slope Modelling

Jane Street Bridge Embankment

The typical section considered for the geotechnical analyses considers stratigraphy encountered at the north embankment (BH-05) and south embankment (BH-04). The north embankment is approximately 10 m in height while the south embankment is approximately 15 to 17 m in height. It is understood that the embankment will be constructed from free-draining material or a sub-drainage system will be installed within the existing fill and graded to design slope to prevent the embankment slopes from becoming saturated. An abutment wall was considered as indicated in conceptual drawing and modelled with concrete element in each of the analyses for the Jane Street Bridge embankment.

Rockcliffe Blvd Bridge Embankment

Based on boreholes BH-6 and BH-7, 2.3 m to 3 m high reclamation fill was encountered in the area, overlying 8.5 m to 9.1 m thick sandy silt stratum.

Symes Road Bridge Embankment

Based on boreholes BH-12, 5.6 m high reclamation fill was encountered in the area, overlying sandy silt stratum. The borehole was terminated within the sandy silt stratum at elevation 96.2 m. For the modelling purpose, the general subsurface condition is assumed to be that of Jane Street bridge embankment, but this should be evaluated during next phase of the design.

3.1 Slope Stability Analysis

Limit equilibrium-based slope stability analyses were carried out using the Slope/W software (Version 8.16) developed by GEO SLOPE International Ltd using the Morgenstern-Price method of slices with half-sine function for circular slip surfaces to represent inter-slice forces.

The various design parameters chosen for the stability analyses were selected based on engineering experience and correlation with limited in-situ field testing (SPT N-Values). Depending on the soil type, design parameters for both undrained and drained condition of the foundation materials were considered in the analyses and is provided in the table below:

Table 1: Soil Properties for Slope Stability Analysis

Parameter	Material			
	Fill	Concrete Abutment	Silt (trace sand)	Stiff to Very Stiff Silty Clay
Unit Weight (kN/m^3), Note 1	17	3	18	19
Effective Friction Angle (˚)	23	-	25	28
Effective Cohesion (kPa)	2	1,000	-	-
Minimum Undrained Shear Strength (kPa)	-	-	Note 2	80
Tau/Sigma Ratio	-	-	Note 2	0.21

Note:

1. See Table 6.3 of the main report for additional material parameters.
2. Based on non-cohesive nature of the material, upper sandy silt/silt layer is considered to behave in drained manner for loading. The geotechnical behaviour of this silt layer should be further assessed during next stage of the design with Cone Penetration Testing (CPT) and advanced laboratory testing.
3. It is understood the abutment will be resting on deep foundations.

A surcharge load of 12 kN/m^3 was also applied at the crest of the slope to simulate the various operational loads on the embankment.

4.0 Analyses Results

The slope stability analyses results for the embankments are summarized in Table 2 and discussed in the individual sections below. The selected stability models discussed in the below sections are shown in Figures 2 to 17.

Table 2: Bridge Embankment Slope Stability Analyses Results

Analysis Case	Description	Target Factor of Safety against Slope Instability (FoS)	Jane St. North Embankment Slope FoS	Jane St. South Embankment Slope FoS	Rockcliffe Embankment Slope FoS	Symes Embankment Slope FoS
A1	End of Construction (Undrained)	1.3	1.5	1.5	1.5	1.5
A2	Long-Term (Drained)	1.5	1.5	1.5	1.5	1.5
B1	Pseudo-static (Drained)	1.1	1.2	1.1	1.2	1.2
B2	Pseudo-static (Undrained)	1.1	1.2	1.1	1.2	1.2
Recommended Overall Slope			3H:1V	3H:1V	3H:1V	3H:1V

4.1 End of Construction Static Condition

The stability analyses of the bridge embankment for the end of construction condition (EoC) are shown on Figures 2 to 5 (Case A1). The embankment fill is already existing thus it is assumed that no excess pore pressures will develop within the foundation silty clay material during construction. The resulting pore-pressures are represented by a phreatic surface at the elevation of the original ground surface. Undrained parameters for the silty clay stratum have been accounted for by modelling the foundation using a minimum shear strength and a strength ratio (Tau/sigma).

4.2 Long-Term Static Condition

The stability analyses of the bridge embankment for the long-term condition are shown in Figures 6 to 9 (Case A2). The resulting pore-pressures are represented by a phreatic surface at the original ground surface. Excess pore-pressures generated from construction loading (if any) within the foundation are assumed to have dissipated resulting in a drained scenario. For all locations, this scenario was found to govern the design slope.

4.3 Pseudo-static Loading Condition

Stability of the bridge embankment for earthquake loading was assessed assuming occurrence of the 1 in 2,475-year design earthquake event (2% probability in 50 years) during the operating period. The pseudo-static loading analyses were carried out using a horizontal seismic coefficient of 0.086 g (half of PGA = 0.139 g x 1.24 (acceleration amplification factor for Site Class D), provided by Natural Building Code of Canada, 2015). The stability analyses of the bridge embankment for the pseudo-static conditions are shown in Figures 10 to 17 (Cases B1 and B2).

5.0 Discussion and Conclusion

5.1 Jane Street - North Embankment

The slope stability models indicate that the embankment is stable under the short-term and long-term operating conditions, for both static and pseudo-static conditions. The critical stability case is the drained long-term scenario. The analyses indicate that an overall slope of 3H:1V is enough to achieve the required minimum global factor of safety with foundation pore pressures considered at the original ground level. The embankment should be constructed in the form of benches, 5 m high by 3 m wide with an estimated internal slope of 2.7H:1V to provide internal slope stability. The benched configuration would also provide access for any future maintenance. The embankment should also be free draining to prevent any groundwater mounding within the embankment which will result in a reduced factor of safety.

5.2 Jane Street - South Embankment

The slope stability models indicate that the embankment is stable under the short-term and long-term operating conditions, for both static and pseudo-static conditions. The critical stability case is the drained long-term static scenario. The analyses indicate that an overall slope of 3H:1V is enough to achieve the required minimum global factor of safety with foundation pore pressures considered at the original ground level. The embankment should be constructed in the form of benches, 5 m high by 3 m wide with an estimated internal slope of 2.6H:1V to provide internal slope stability. The benched configuration would also provide access for any future maintenance. The embankment should also be free draining to prevent any groundwater mounding within the embankment which will result in a reduced factor of safety.

5.3 Rockcliffe Blvd Embankment Slope

The Rockcliffe Bridge abutment embankment is approximately 3 m in height and will be constructed from free-draining material to prevent the embankment slopes from becoming saturated. This formed the basis for the geotechnical analyses. The slope stability models indicate that the embankment is stable under the short-term and long-term operating conditions, for both static and pseudo-static conditions. The critical stability case is the drained long-term static scenario. The analyses indicate that an overall slope of 3H:1V is enough to achieve the required minimum global factor of safety with foundation pore pressures considered at the original ground level.

5.4 Symes Road Embankment Slope

The Symes Bridge abutment embankment is approximately 5.6 m in height and will be constructed from free-draining material to prevent the embankment slopes from becoming saturated. This formed the basis for the geotechnical analyses. The slope stability models indicate that the embankment is stable under the short-term and long-term operating conditions, for both static and pseudo-static conditions. The critical stability case is the drained long-term static scenario. The analyses indicate that an overall slope of 3H:1V is enough to achieve the required minimum global factor of safety with foundation pore pressures considered at the original ground level.

Additional investigations and laboratory tests are recommended in order to confirm these design parameters presented in this memorandum and better define the conditions on site.

Following recommendations are made for the detailed design of these embankment slopes:

- Subsurface condition of Symes Road Bridge expansion should be investigated with deep boreholes that intercept underlying bedrock shale.

- Geotechnical properties of existing fill, upper sandy silt/silt layer, and underlying silty clay layer should be further investigated with Cone Penetration Testing with pore pressure measurements (CPTu) to establish drainage characteristics of these layers, as well as to assign appropriate stress-strain and deformation properties.

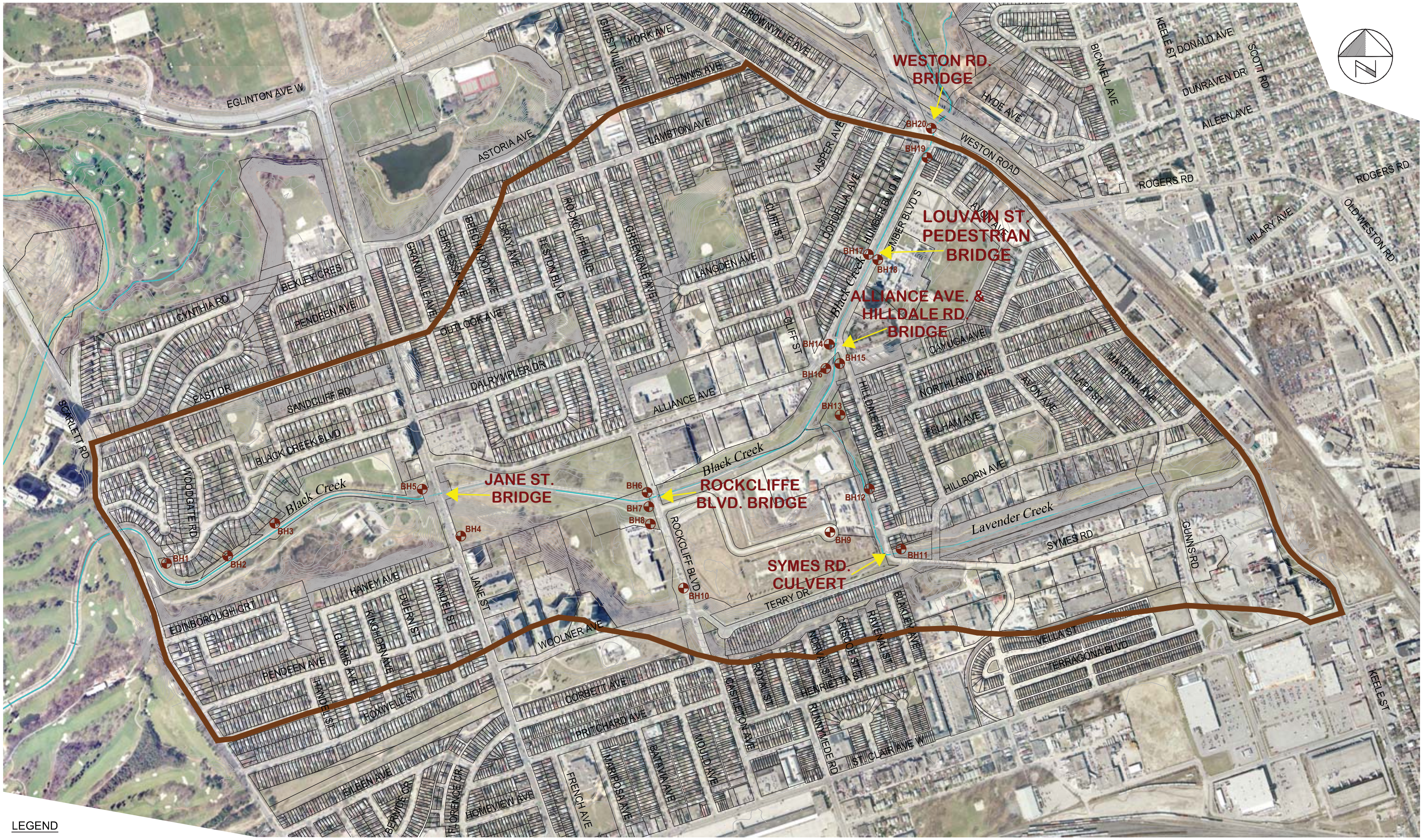
- Embankment slope should be designed with sub-drainage system to ensure hydrostatic head does not develop immediately behind the slope surface.

6.0 References

Amec. (2014). Black Creek (Rockcliffe Area) Riverine Flood management Class Environmental Assessment, Report Submitted to Toronto and Region Conservation Authority. Amec Foster Wheeler.

Canadian Geotechnical Society. (2006). Canadian Foundation Engineering Manual. Canadian Geotechnical Society.

Figures



LEGEND

▬	STUDY AREA
—	PARCEL FABRIC
∼	WATERCOURSE
∼	CONTOUR (1m)
BH9 ●	BOREHOLE LOCATION

SCALE VALID ONLY FOR 24"x36" VERSION

FLOOD REMEDIATION AND
TRANSPORTATION FEASIBILITY
STUDY OF ROCKVILLE
SPECIAL POLICY AREA
TRCA

BOREHOLE
LOCATION
PLAN

wood.

Scale 1:4500
0 50 100 200

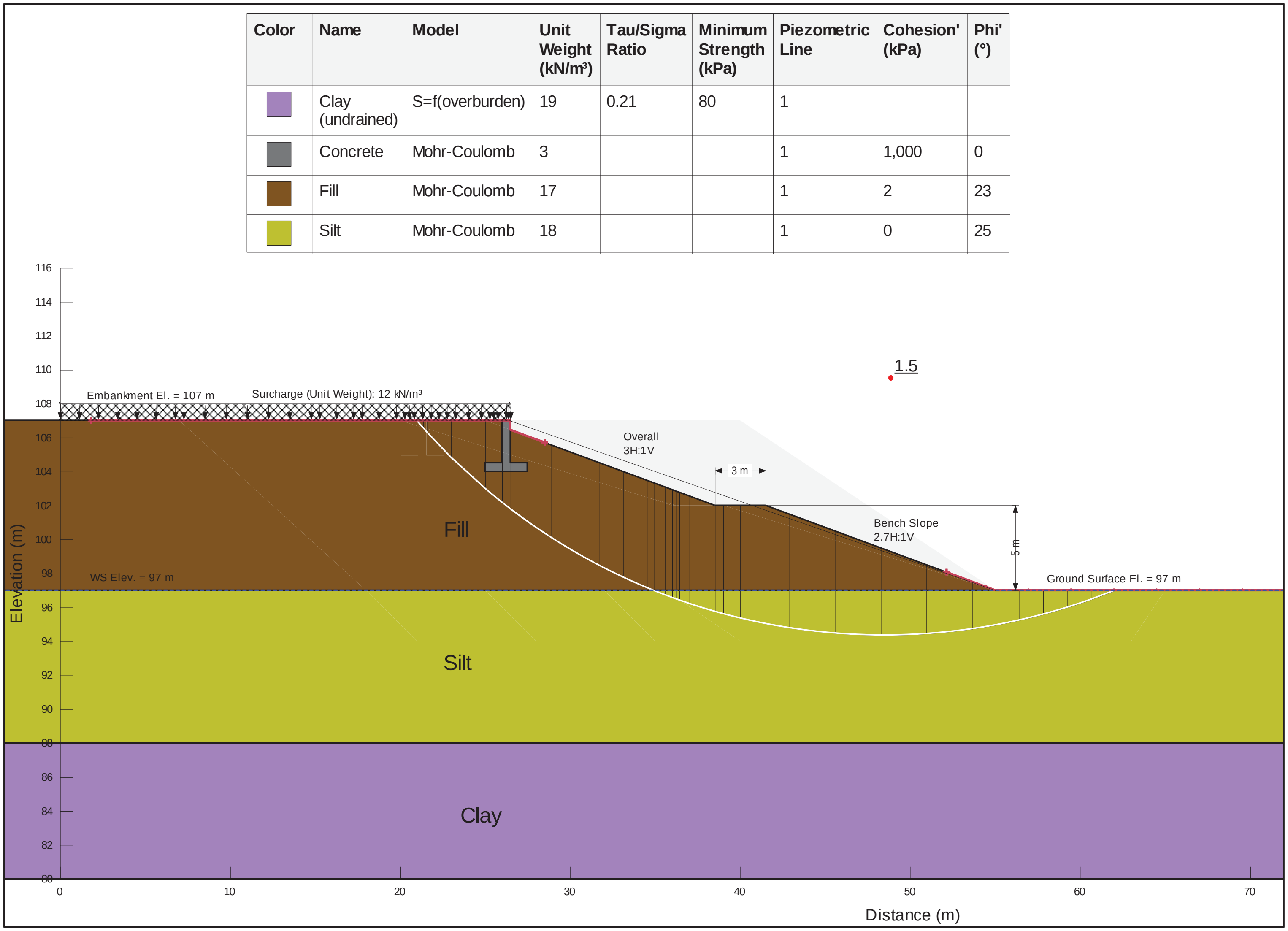
Consultant File No.
TPB198079

Figure No.

Path: P:\2019\Projects\TPB198079 -- Black Creek At Rockcliffe SPA Flood Remediation\06_DES-ENG\01_CAD\02_DWGS\05_WR\01_PRO\2020-04\Fig Borehole.dwg

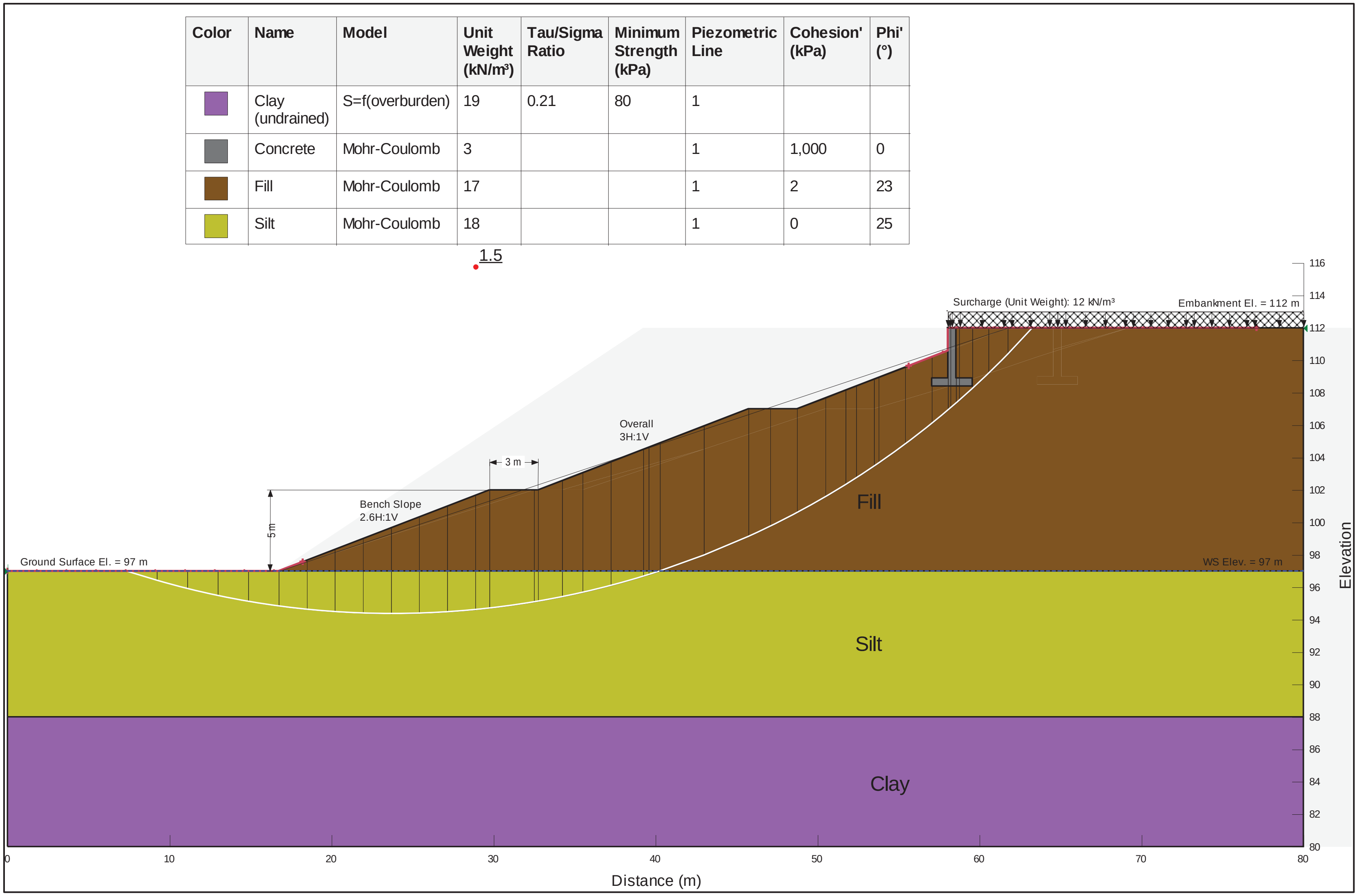
Plotted By: richard.bortolo
Last Saved By: richard.bortolo

Plotted: 2020-04-06
Last Saved: 2020-04-06



Color	Name	Model	Unit Weight (kN/m³)	Tau/Sigma Ratio	Minimum Strength (kPa)	Piezometric Line	Cohesion' (kPa)	Phi' (°)
🟪	Clay (undrained)	S=f(overburden)	19	0.21	80	1		
⬛	Concrete	Mohr-Coulomb	3			1	1,000	0
🟫	Fill	Mohr-Coulomb	17			1	2	23
🟨	Silt	Mohr-Coulomb	18			1	0	25

Figure 2: Jane St. North Embankment End of Construction (Undrained) Case A1



Color	Name	Model	Unit Weight (kN/m³)	Tau/Sigma Ratio	Minimum Strength (kPa)	Piezometric Line	Cohesion' (kPa)	Phi' (°)
🟪	Clay (undrained)	S=f(overburden)	19	0.21	80	1		
⬛	Concrete	Mohr-Coulomb	3			1	1,000	0
🟫	Fill	Mohr-Coulomb	17			1	2	23
🟨	Silt	Mohr-Coulomb	18			1	0	25

Figure 3: Jane St. South Embankment End of Construction (Undrained) Case A1

Color	Name	Model	Unit Weight (kN/m³)	Tau/Sigma Ratio	Minimum Strength (kPa)	Piezometric Line	Cohesion' (kPa)	Phi' (°)
🟪	Clay (undrained)	S=f(overburden)	19	0.21	80	1		
🟫	Fill	Mohr-Coulomb	17			1	2	23
🟨	Silt	Mohr-Coulomb	18			1	0	25

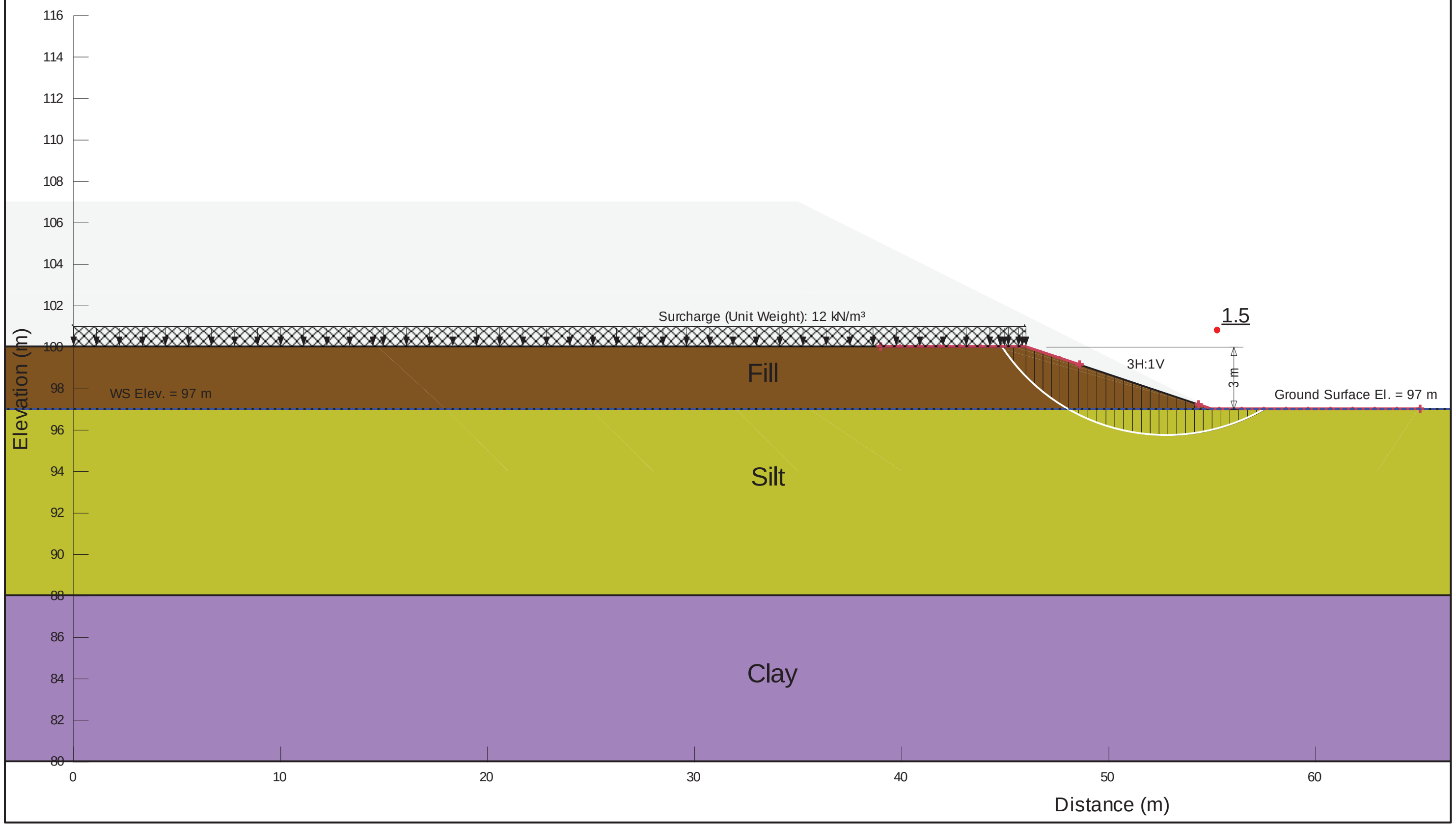
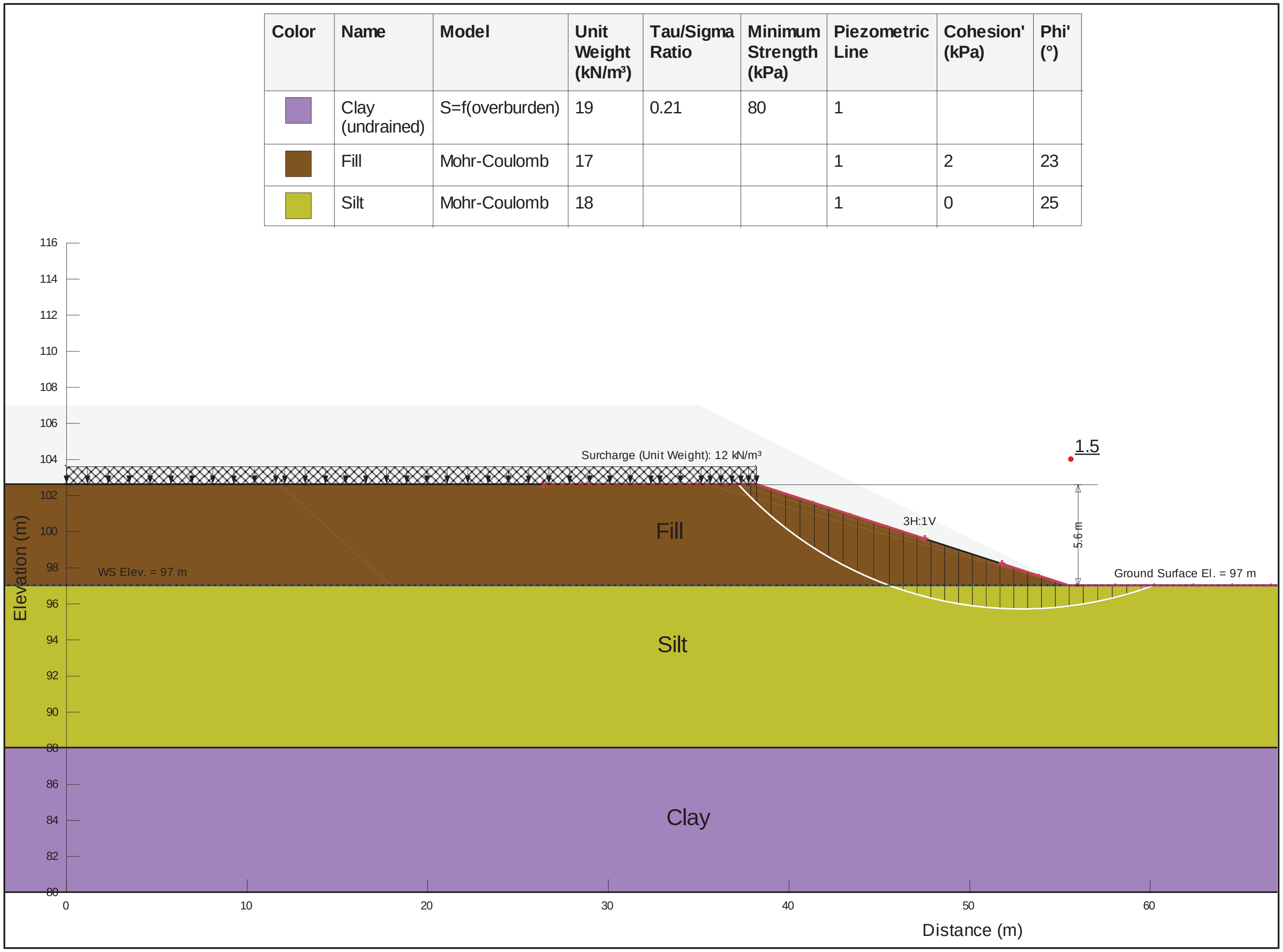
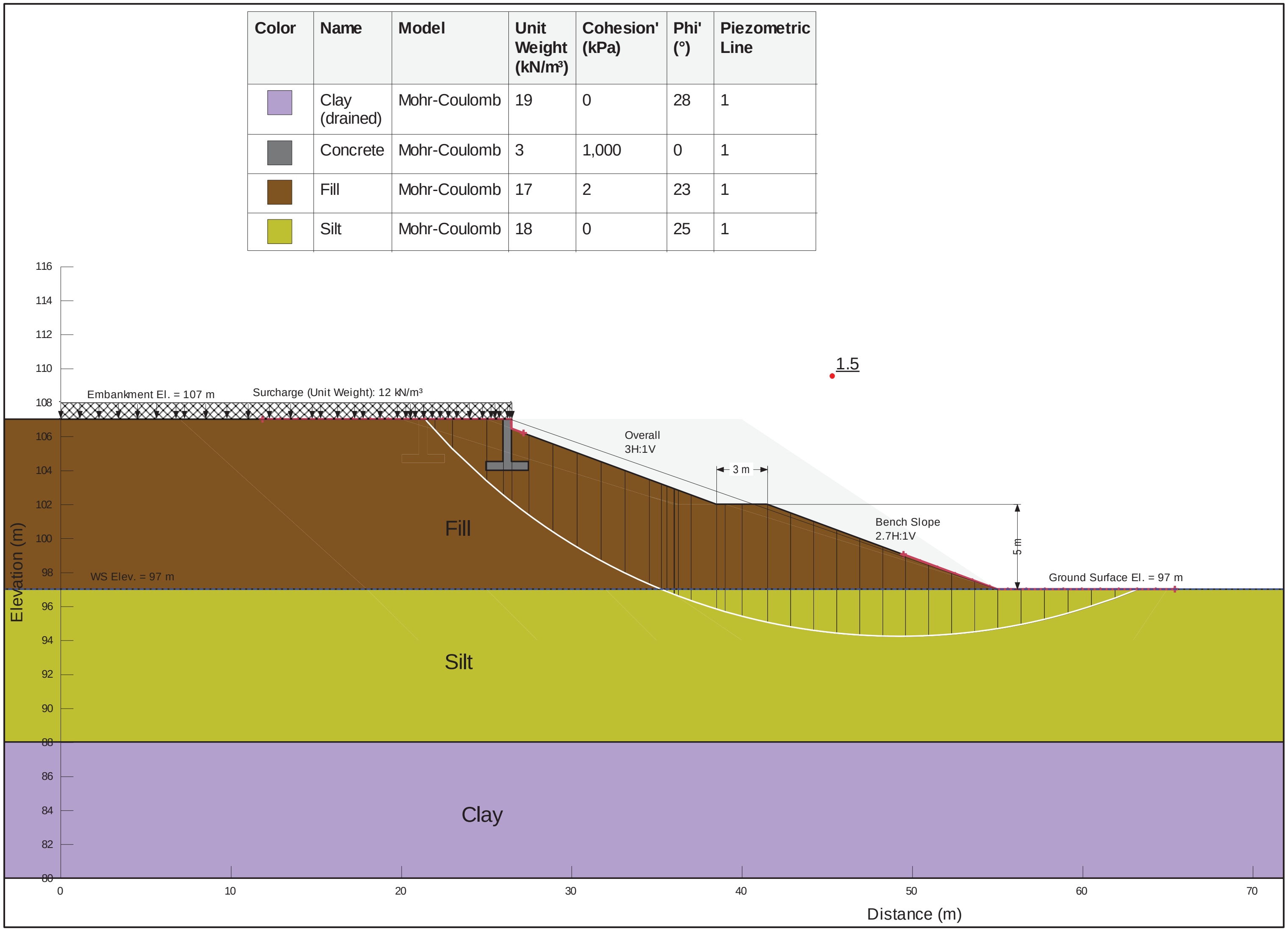


Figure 4: Rockcliffe Embankment End of Construction (Undrained) Case A1



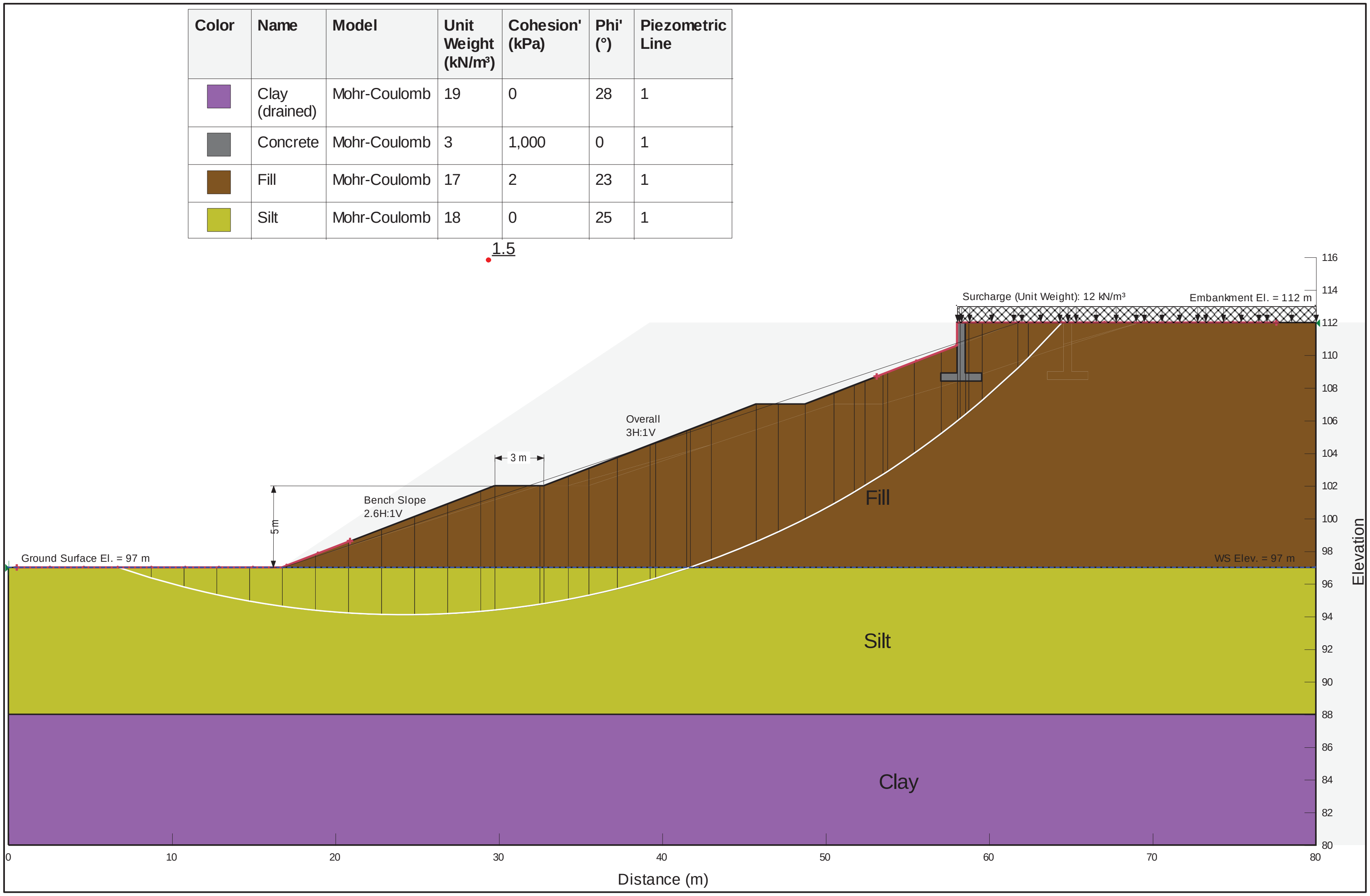
Color	Name	Model	Unit Weight (kN/m³)	Tau/Sigma Ratio	Minimum Strength (kPa)	Piezometric Line	Cohesion' (kPa)	Phi' (°)
🟪	Clay (undrained)	S=f(overburden)	19	0.21	80	1		
🟫	Fill	Mohr-Coulomb	17			1	2	23
🟨	Silt	Mohr-Coulomb	18			1	0	25

Figure 5: Symes Embankment End of Construction (Undrained) Case A1



Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Piezometric Line
🟪	Clay (drained)	Mohr-Coulomb	19	0	28	1
⬛	Concrete	Mohr-Coulomb	3	1,000	0	1
🟫	Fill	Mohr-Coulomb	17	2	23	1
🟨	Silt	Mohr-Coulomb	18	0	25	1

Figure 6: Jane St. North Embankment Long-Term (Drained) Case A2



Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Piezometric Line
🟪	Clay (drained)	Mohr-Coulomb	19	0	28	1
⬛	Concrete	Mohr-Coulomb	3	1,000	0	1
🟫	Fill	Mohr-Coulomb	17	2	23	1
🟨	Silt	Mohr-Coulomb	18	0	25	1

Figure 7: Jane St. South Embankment Long-Term (Drained) Case A2

Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Piezometric Line
🟪	Clay (drained)	Mohr-Coulomb	19	0	28	1
🟫	Fill	Mohr-Coulomb	17	2	23	1
🟨	Silt	Mohr-Coulomb	18	0	25	1

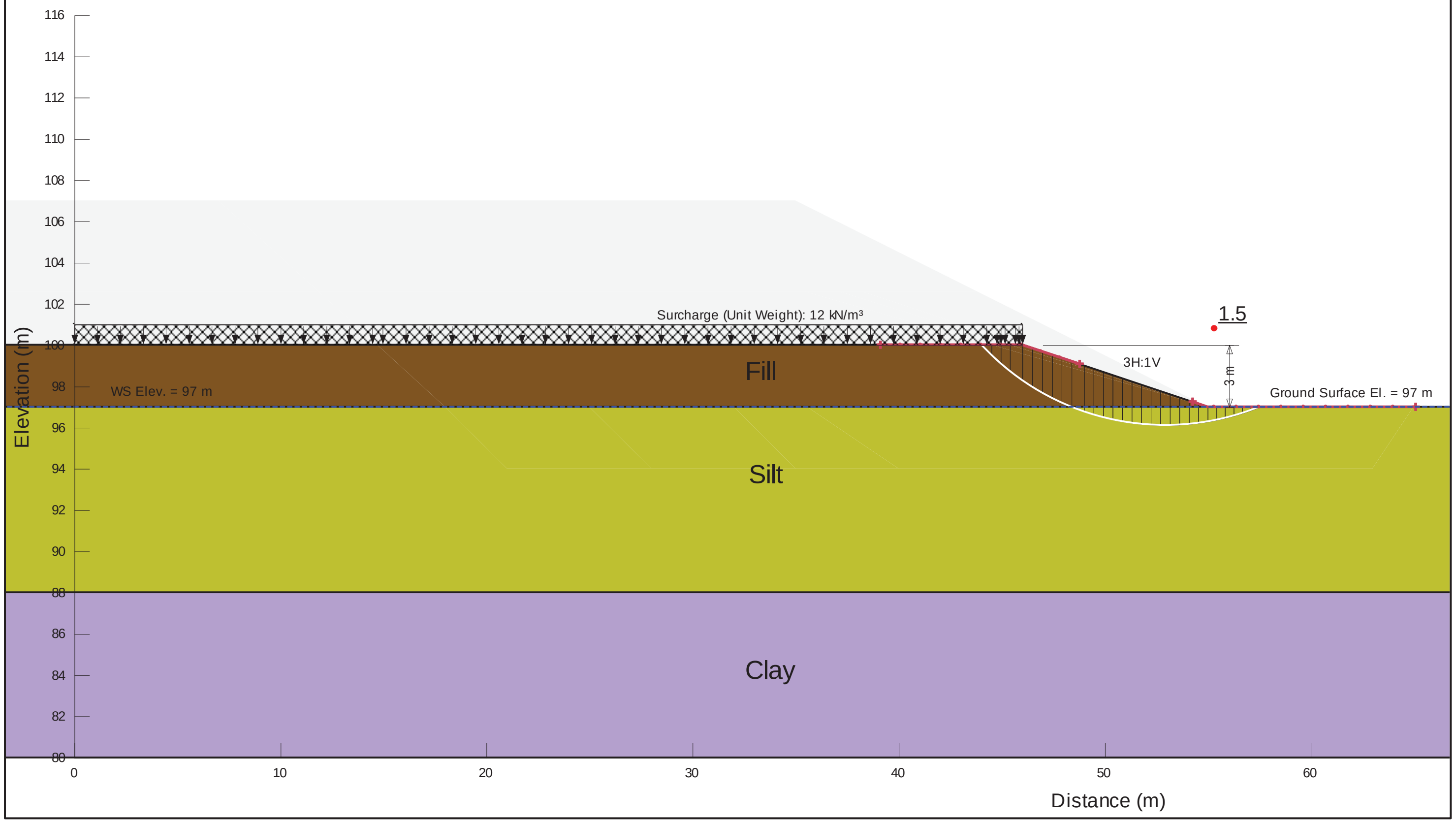


Figure 8: Rockcliffe Embankment Long-Term (Drained) Case A2

Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Piezometric Line
🟪	Clay (drained)	Mohr-Coulomb	19	0	28	1
🟫	Fill	Mohr-Coulomb	17	2	23	1
🟨	Silt	Mohr-Coulomb	18	0	25	1

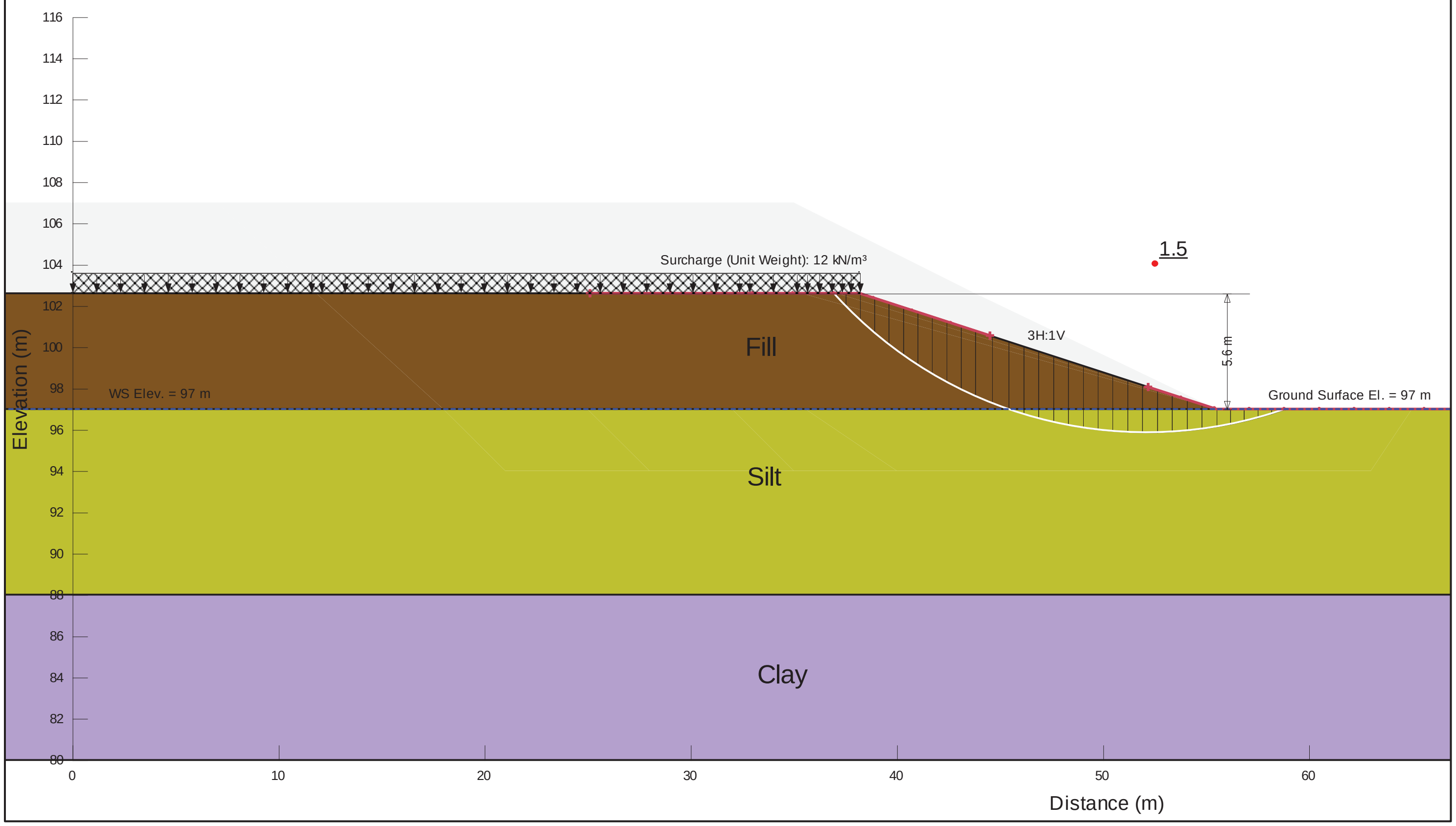


Figure 9: Symes Embankment Long-Term (Drained) Case A2

Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Piezometric Line
🟪	Clay (drained)	Mohr-Coulomb	19	0	28	1
⬛	Concrete	Mohr-Coulomb	3	1,000	0	1
🟫	Fill	Mohr-Coulomb	17	2	23	1
🟨	Silt	Mohr-Coulomb	18	0	25	1

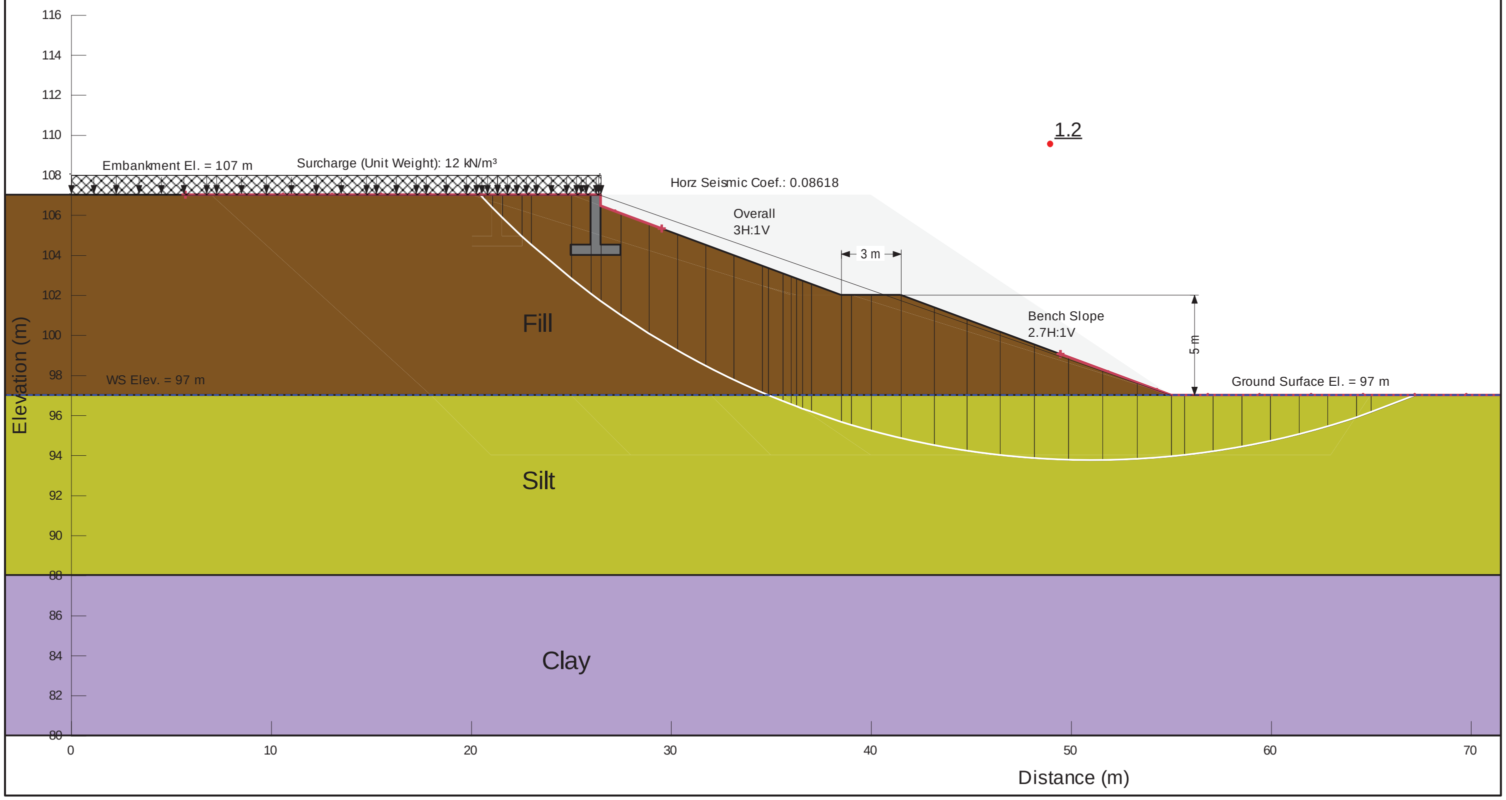
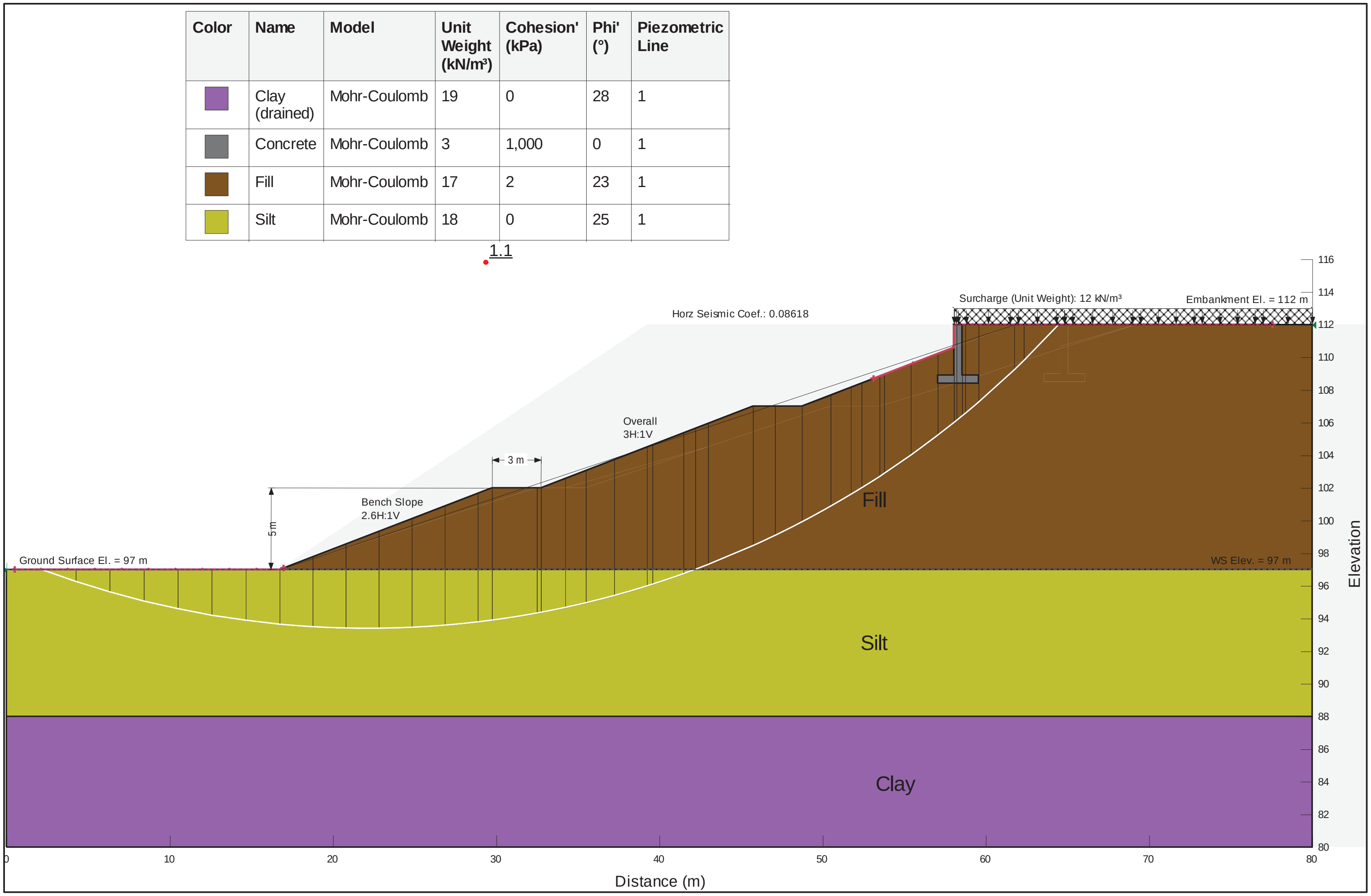
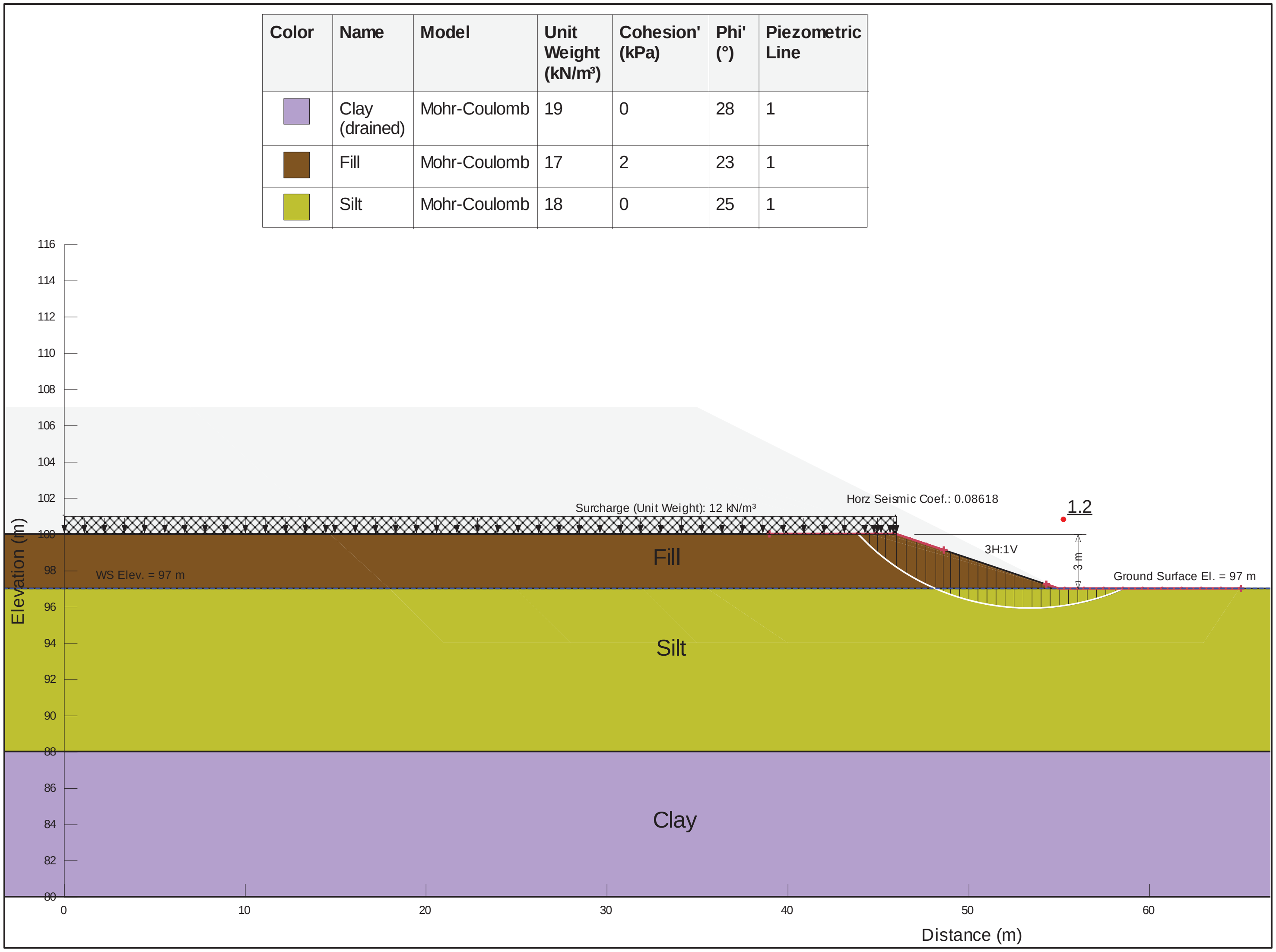


Figure 10: Jane St. North Embankment Pseudo-Static (Drained) Case B1



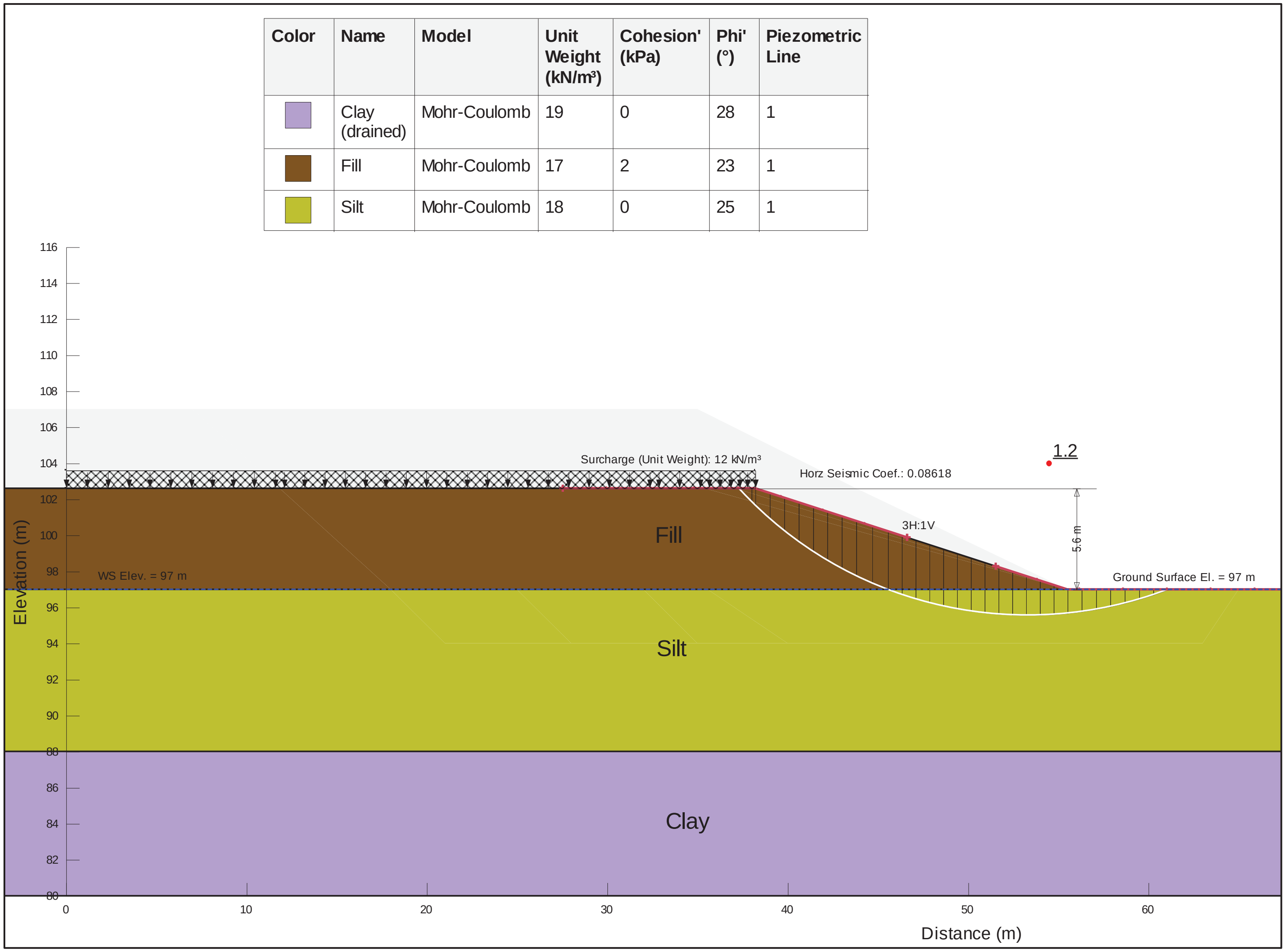
Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Piezometric Line
🟪	Clay (drained)	Mohr-Coulomb	19	0	28	1
⬛	Concrete	Mohr-Coulomb	3	1,000	0	1
🟫	Fill	Mohr-Coulomb	17	2	23	1
🟨	Silt	Mohr-Coulomb	18	0	25	1

Figure 11: Jane St. South Embankment Pseudo-Static (Drained) Case B1



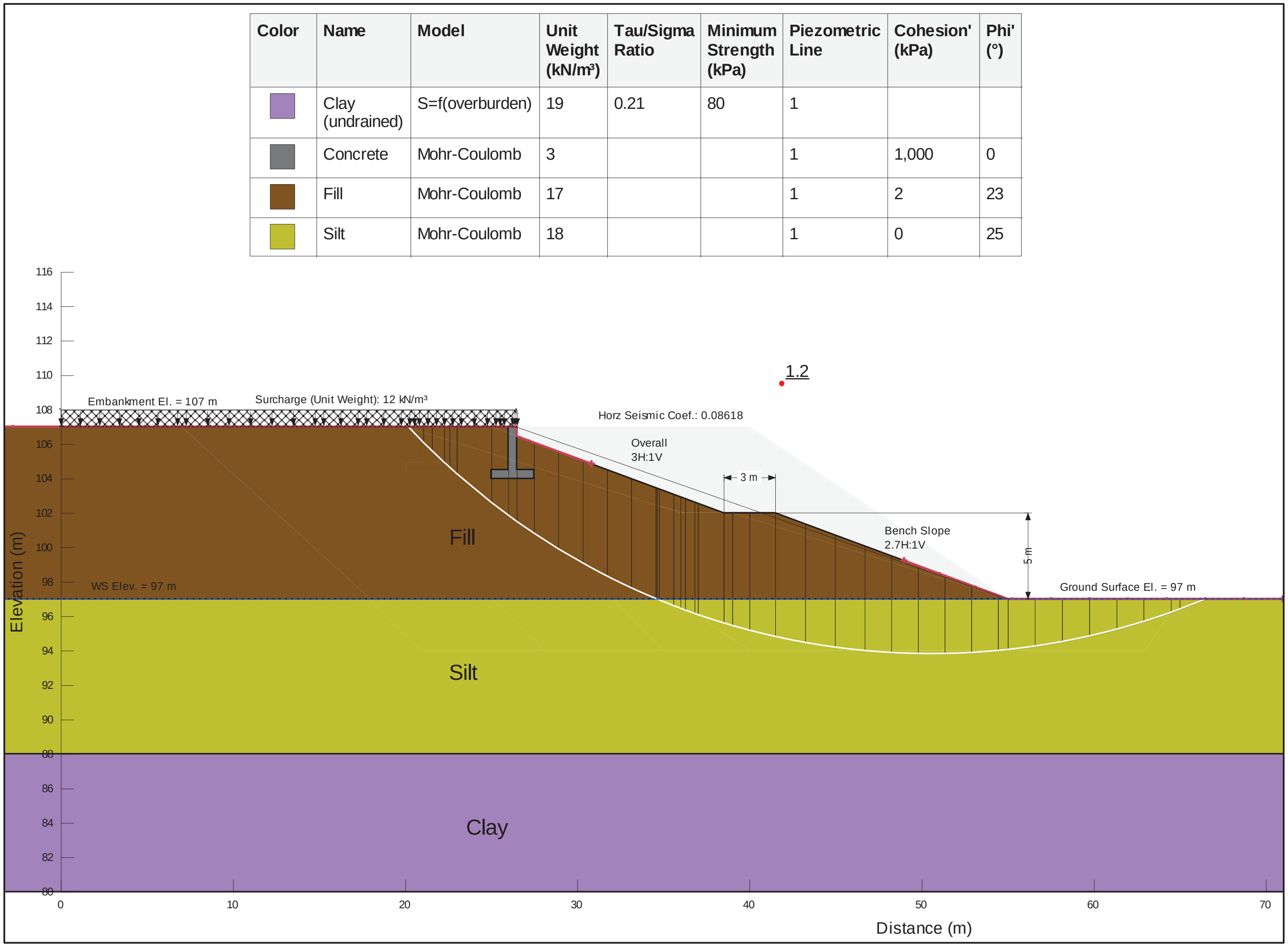
Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Piezometric Line
🟪	Clay (drained)	Mohr-Coulomb	19	0	28	1
🟫	Fill	Mohr-Coulomb	17	2	23	1
🟨	Silt	Mohr-Coulomb	18	0	25	1

Figure 12: Rockcliffe Embankment Pseudo-Static (Drained) Case B1



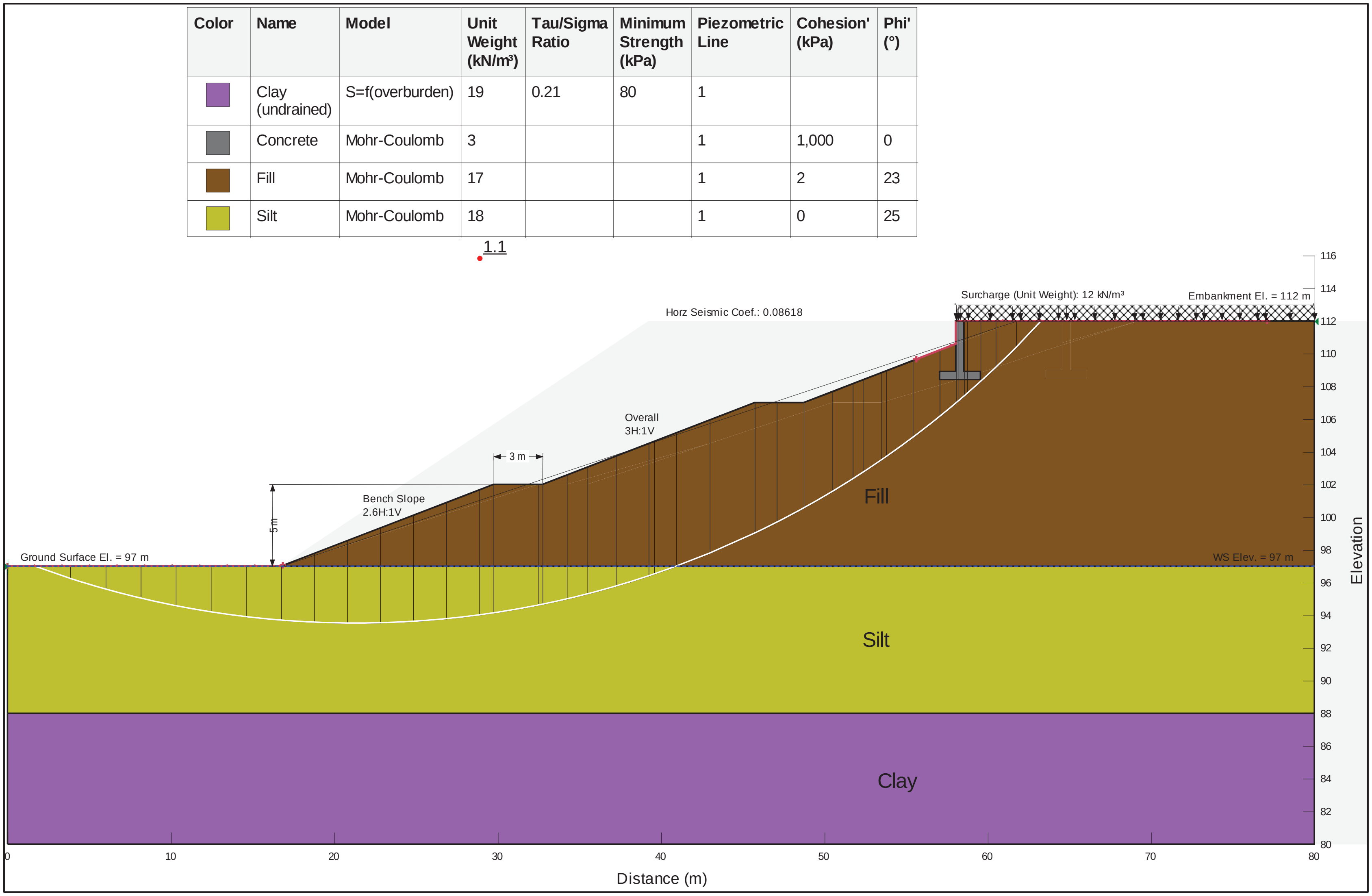
Color	Name	Model	Unit Weight (kN/m³)	Cohesion' (kPa)	Phi' (°)	Piezometric Line
🟪	Clay (drained)	Mohr-Coulomb	19	0	28	1
🟫	Fill	Mohr-Coulomb	17	2	23	1
🟨	Silt	Mohr-Coulomb	18	0	25	1

Figure 13: Symes Embankment Pseudo-Static (Drained) Case B1



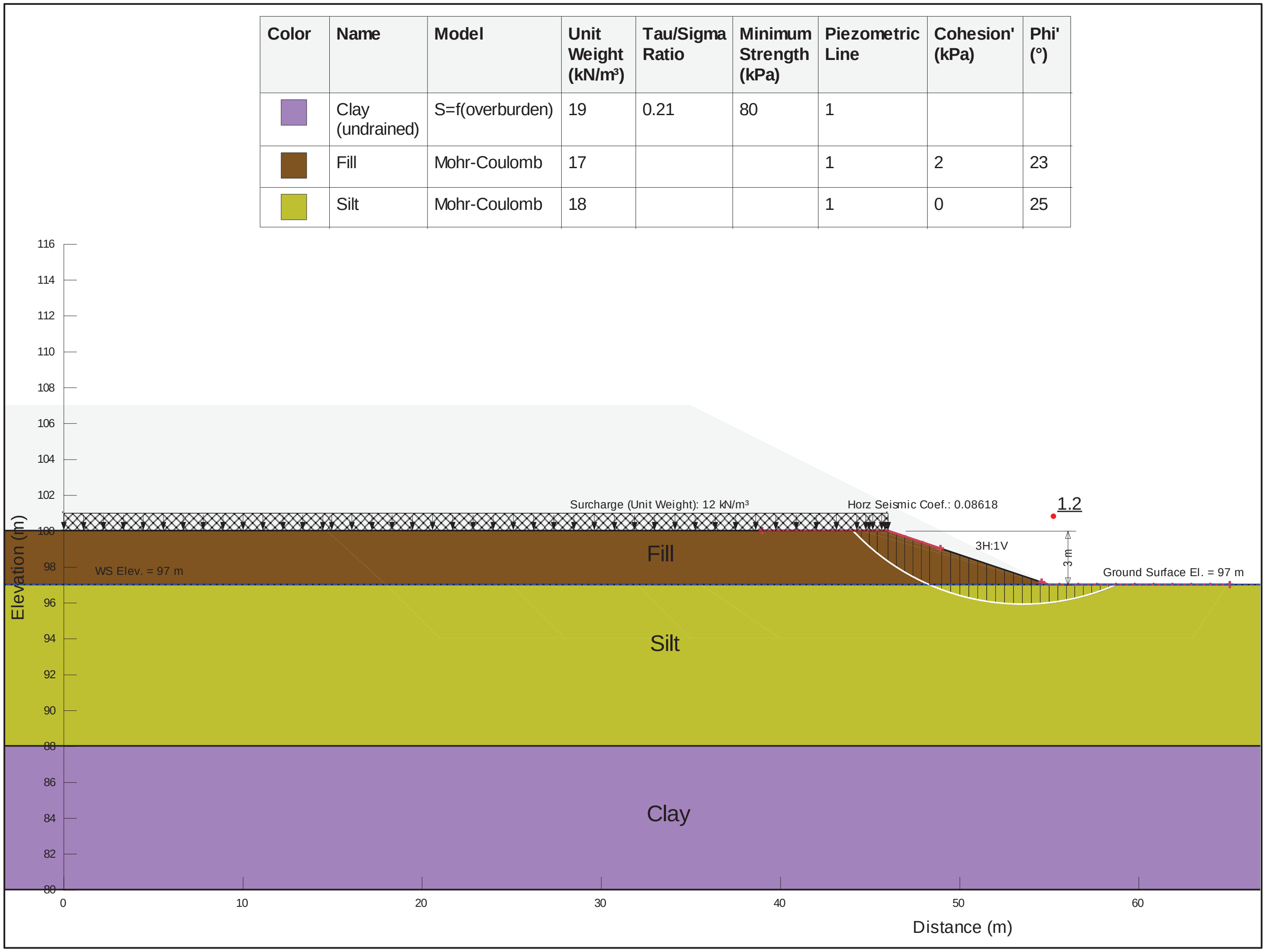
Color	Name	Model	Unit Weight (kN/m³)	Tau/Sigma Ratio	Minimum Strength (kPa)	Piezometric Line	Cohesion' (kPa)	Phi' (°)
🟪	Clay (undrained)	S=f(overburden)	19	0.21	80	1		
⬛	Concrete	Mohr-Coulomb	3			1	1,000	0
🟫	Fill	Mohr-Coulomb	17			1	2	23
🟨	Silt	Mohr-Coulomb	18			1	0	25

Figure 14: Jane St. North Embankment Pseudo-Static (Undrained) Case B2



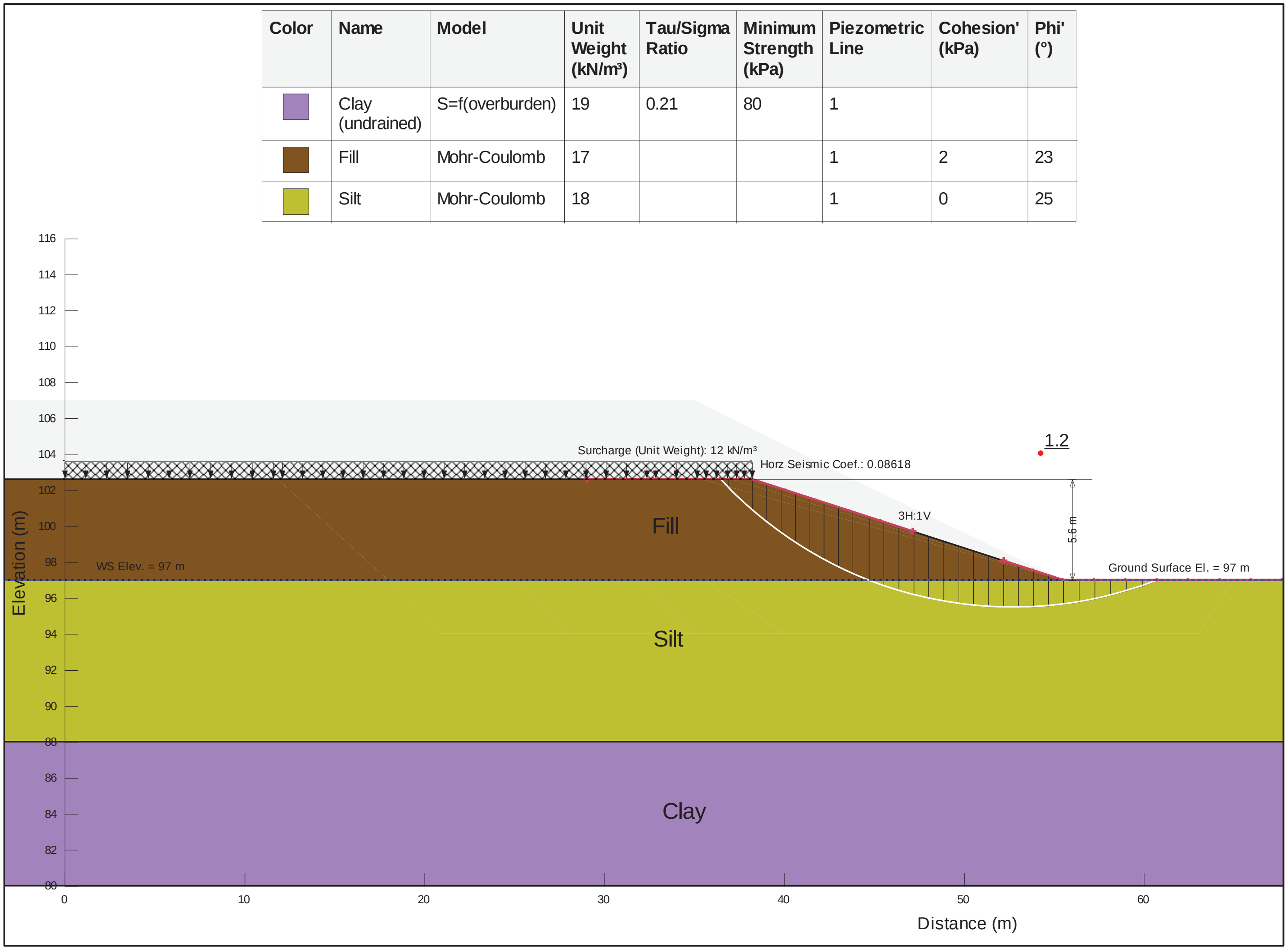
Color	Name	Model	Unit Weight (kN/m³)	Tau/Sigma Ratio	Minimum Strength (kPa)	Piezometric Line	Cohesion' (kPa)	Phi' (°)
🟪	Clay (undrained)	S=f(overburden)	19	0.21	80	1		
⬛	Concrete	Mohr-Coulomb	3			1	1,000	0
🟫	Fill	Mohr-Coulomb	17			1	2	23
🟨	Silt	Mohr-Coulomb	18			1	0	25

Figure 15: Jane St. South Embankment Pseudo-Static (Undrained) Case B2



Color	Name	Model	Unit Weight (kN/m³)	Tau/Sigma Ratio	Minimum Strength (kPa)	Piezometric Line	Cohesion' (kPa)	Phi' (°)
🟪	Clay (undrained)	S=f(overburden)	19	0.21	80	1		
🟫	Fill	Mohr-Coulomb	17			1	2	23
🟨	Silt	Mohr-Coulomb	18			1	0	25

Figure 16: Rockcliffe Embankment Pseudo-Static (Undrained) Case B2



Color	Name	Model	Unit Weight (kN/m³)	Tau/Sigma Ratio	Minimum Strength (kPa)	Piezometric Line	Cohesion' (kPa)	Phi' (°)
🟪	Clay (undrained)	S=f(overburden)	19	0.21	80	1		
🟫	Fill	Mohr-Coulomb	17			1	2	23
🟨	Silt	Mohr-Coulomb	18			1	0	25

Figure 17: Symes Embankment Pseudo-Static (Undrained) Case B2

APPENDIX D

Standard Limitations to Geotechnical Reports

The work performed in the preparation of this report and the conclusions presented herein are subject to the following:

a) The contract between Wood and the Client, including any subsequent written amendment or Change Order dully signed by the parties (hereinafter together referred as the "Contract");

b) Any and all time, budgetary, access and/or site disturbance, risk management preferences, constraints or restrictions as described in the contract, in this report, or in any subsequent communication sent by Wood to the Client in connection to the Contract; and

c) The limitations stated herein.

2. **Standard of care:** Wood has prepared this report in a manner consistent with the level of skill and are ordinarily exercised by reputable members of Wood's profession, practicing in the same or similar locality at the time of performance, and subject to the time limits and physical constraints applicable to the scope of work, and terms and conditions for this assignment. No other warranty, guaranty, or representation, expressed or implied, is made or intended in this report, or in any other communication (oral or written) related to this project. The same are specifically disclaimed, including the implied warranties of merchantability and fitness for a particular purpose.

3. **Limited locations:** The information contained in this report is restricted to the site and structures evaluated by Wood and to the topics specifically discussed in it, and is not applicable to any other aspects, areas, or locations.

4. **Information utilized:** The information, conclusions and estimates contained in this report are based exclusively on: i) information available at the time of preparation, ii) the accuracy and completeness of data supplied by the Client or by third parties as instructed by the Client, and iii) the assumptions, conditions, and qualifications/limitations set forth in this report.

5. **Accuracy of information:** No attempt has been made to verify the accuracy of any information provided by the Client or third parties, except as specifically stated in this report (hereinafter "Supplied Data"). Wood cannot be held responsible for any loss or damage, of either contractual or extra-contractual nature, resulting from conclusions that are based upon reliance on the Supplied Data.

6. **Report interpretation:** This report must be read and interpreted in its entirety, as some sections could be inaccurately interpreted when taken individually or out-of-context. The contents of this report are based upon the conditions known and information provided as of the date of preparation. The text of the final version of this report supersedes any other previous versions produced by Wood.

7. **No legal representations:** Wood makes no representations whatsoever concerning the legal significance of its findings, or as to other legal matters touched on in this report, including but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel.

8. **Decrease in property value:** Wood shall not be responsible for any decrease, real or perceived, of the property or site's value or failure to complete a transaction, as a consequence of the information contained in this report.

9. **No third-party reliance:** This report is for the sole use of the party to whom it is addressed unless expressly stated otherwise in the report or Contract. Any use or reproduction which any third party makes of the report, in whole or in part, or any reliance thereon or decisions made based on any information or conclusions in the report is the sole responsibility of such third party. Wood does not represent or warrant the accuracy, completeness, merchantability, fitness for purpose or usefulness of this document, or any information contained in this document, for use or consideration by any third party. Wood accepts no responsibility whatsoever for damages or loss of any nature or kind suffered by any such third party as a result of actions taken or not taken or decisions made in reliance on this report or anything set out therein. including without limitation, any indirect, special, incidental, punitive, or consequential loss, liability or damage of any kind.

10. **Assumptions**: Where design recommendations are given in this report, they apply only if the project contemplated by the Client is constructed substantially in accordance with the details stated in this report. It is the sole responsibility of the Client to provide to Wood changes made in the project, including but not limited to, details in the design, conditions, engineering, or construction that could in any manner whatsoever impact the validity of the recommendations made in the report. Wood shall be entitled to additional compensation from Client to review and assess the effect of such changes to the project.

11. **Time dependence**: If the project contemplated by the Client is not undertaken within a period of 18 months following the submission of this report, or within the time frame understood by Wood to be contemplated by the Client at the commencement of Wood's assignment, and/or, if any changes are made, for example, to the elevation, design or nature of any development on the site, its size and configuration, the location of any development on the site and its orientation, the use of the site, performance criteria and the location of any physical infrastructure, the conclusions and recommendations presented herein should not be considered valid unless the impact of the said changes is evaluated by Wood, and the conclusions of the report are amended or are validated in writing accordingly.

    Advancements in the practice of geotechnical engineering, engineering geology and hydrogeology and changes in applicable regulations, standards, codes or criteria could impact the contents of the report, in which case, a supplementary report may be required. The requirements for such a review remain the sole responsibility of the Client or their agents.

    Wood will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

12. **Limitations of visual inspections:** Where conclusions and recommendations are given based on a visual inspection conducted by Wood, they relate only to the natural or man-made structures, slopes, etc. inspected at the time the site visit was performed. These conclusions cannot and are not extended to include those portions of the site or structures, which were not reasonably available, in Wood's opinion, for direct observation.

13. **Limitations of site investigations**: Site exploration identifies specific subsurface conditions only at those points from which samples have been taken and only at the time of the site investigation. Site investigation programs are a professional estimate of the scope of investigation required to provide a general profile of subsurface conditions.

    The data derived from the site investigation program and subsequent laboratory testing are interpreted by trained personnel and extrapolated across the site to form an inferred geological representation and an engineering opinion is rendered about overall subsurface conditions and their likely behaviour with regard to the proposed development. Despite this investigation, conditions between and beyond the borehole/test hole locations may differ from those encountered at the borehole/test hole locations and the actual conditions at the site might differ from those inferred to exist, since no subsurface exploration program, no matter how comprehensive, can reveal all subsurface details and anomalies.

    Final sub-surface/bore/profile logs are developed by geotechnical engineers based upon their interpretation of field logs and laboratory evaluation of field samples. Customarily, only the final bore/profile logs are included in geotechnical engineering reports.

    Bedrock, soil properties and groundwater conditions can be significantly altered by environmental remediation and/or construction activities such as the use of heavy equipment or machinery, excavation, blasting, pile-driving or draining or other activities conducted either directly on site or on adjacent terrain. These properties can also be indirectly affected by exposure to unfavorable natural events or weather conditions, including freezing, drought, precipitation and snowmelt.

    During construction, excavation is frequently undertaken which exposes the actual subsurface and groundwater conditions between and beyond the test locations, which may differ from those encountered at the test locations. It is recommended that Wood be retained during construction to confirm that the subsurface conditions throughout the site do not deviate materially from those encountered at the test locations, that construction work has no negative impact on the geotechnical aspects of the design, to adjust recommendations in accordance with conditions as additional site information is gained, and to deal quickly with geotechnical considerations if they arise.

Interpretations and recommendations presented herein may not be valid if an adequate level of review or inspection by Wood is not provided during construction.

14. **Factors that may affect construction methods, costs and scheduling**: The performance of rock and soil materials during construction is greatly influenced by the means and methods of construction. Where comments are made relating to possible methods of construction, construction costs, construction techniques, sequencing, equipment or scheduling, they are intended only for the guidance of the project design professionals, and those responsible for construction monitoring. The number of test holes may not be sufficient to determine the local underground conditions between test locations that may affect construction costs, construction techniques, sequencing, equipment, scheduling, operational planning, etc.

    Any contractors bidding on or undertaking the works should draw their own conclusions as to how the subsurface and groundwater conditions may affect their work, based on their own investigations and interpretations of the factual soil data, groundwater observations, and other factual information.

15. **Groundwater and Dewatering**: Wood will accept no responsibility for the effects of drainage and/or dewatering measures if Wood has not been specifically consulted and involved in the design and monitoring of the drainage and/or dewatering system.

16. **Environmental and Hazardous Materials Aspects**: Unless otherwise stated, the information contained in this report in no way reflects on the environmental aspects of this project, since this aspect is beyond the Scope of Work and the Contract. Unless expressly included in the Scope of Work, this report specifically excludes the identification or interpretation of environmental conditions such as contamination, hazardous materials, wild life conditions, rare plants or archeology conditions that may affect use or design at the site. This report specifically excludes the investigation, detection, prevention or assessment of conditions that can contribute to moisture, mould or other microbial contaminant growth and/or other moisture related deterioration, such as corrosion, decay, rot in buildings or their surroundings. Any statements in this report or on the boring logs regarding odours, colours, and unusual or suspicious items or conditions are strictly for informational purposes

17. **Sample Disposal**: Wood will dispose of all uncontaminated soil and rock samples after 30 days following the release of the final geotechnical report. Should the Client request that the samples be retained for a longer time, the Client will be billed for such storage at an agreed upon rate. Contaminated samples of soil, rock or groundwater are the property of the Client, and the Client will be responsible for the proper disposal of these samples, unless previously arranged for with Wood or a third party.

18. **Effect of iron minerals:** This report does not address issues related to the discovery or presence of iron minerals, such as pyrite, or the effects of iron minerals, if any, in the soil or to be used in concrete. Should specific information be required, additional testing may be requested by the Client for which Wood shall be entitled to additional compensation. **(Optional clause, inserted for use in Quebec, can be deleted if not applicable to project)**

Wood Environment & Infrastructure Solutions,
a Division of Wood Canada Limited

Appendix J

Traffic & Transportation Assessment

Memo

To: Nick Lorrain (TRCA)

From: Mustafa Ismatyar (Wood), Joel Elgersma (Wood), Rudy Sooklall (Wood)

Date: July 17, 2020

File: TPB198079

cc: Steve Chipps (Wood)

Re: **Black Creek at Rockcliffe Special Policy Area Flood Remediation and Transportation Feasibility Study – Traffic Memorandum**

1.0 INTRODUCTION

Wood Environment & Infrastructure Solutions ("Wood") was retained by the Toronto and Region Conservation Authority ("TRCA") to undertake a flood remediation and transporation feasibility study of the Rockcliffe special policy area in the City of Toronto ("City"). As part of the assigment, a transportation and traffic needs assessment was required to evaluate the impacts which the proposed flood remediation infrastructure may have on the adjacent road network. The transportation assessment was carried out using traffic counts conducted on October 8, 2019 specifically for this study. This memorandum documents findings and recommedations of a traffic assessement for the existing and future conditions.

1.1 STUDY AREA

The study area, confimed with the City, is bound by Jane Street to the west, Weston Road to the east, Humber Boulevard to the north, and Terry Drive to the south as shown in **Figure 1**.

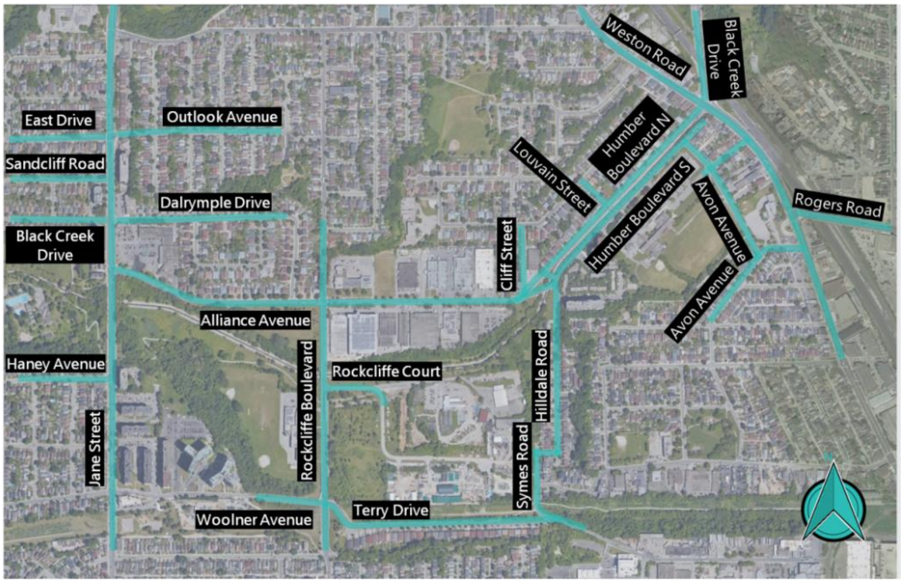


Figure 1: Study Area

3450 Harvester Road
Burlington, ON L7N 3W5
+1 905 335 2353
www.woodplc.com

Wood Environment & Infrastructure Solutions
a Division of Wood Canada Limited
Registered office: 2020 Winston Park Drive, Suite 700, Oakville, Ontario L6H 6X7
Registered in Canada No. 773289-9; GST: 899879050 RT0008; DUNS: 25-362-6642

1.2 STUDY METHODOLOGY

Intersection operations were assessed using the Synchro 9 software which utilizes the Highway Capacity Manual (HCM) 2000 methodology published by the Transportation Research Board National Research Council. The Synchro 9 can analyze both signalized and unsignalized intersections in a road corridor or network considering the spacing, interaction, queues and operations between intersections.

Intersection operations performance metrics are reported in terms of Level of Service (LOS), volume to capacity (v/c) ratios, and 95th percentile queues. Level of Service is based on the average control delay per vehicle for a given movement. Delay is an indicator of how long a vehicle must wait to complete a movement and is represented by a letter between 'A' and 'F', with 'F' being the longest delay. **Table 1** summarizes the LOS criteria for signalized and unsignalized intersections.

Table 1: Intersection Level of Service Criteria

Level of Service	Average Control Delay per Vehicle (second / vehicle)	
	Signalized Intersection[1]	Unsignalized Intersection[1]
A	≤ 10	≤ 10
B	>10 and ≤ 20	>10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

1.3 DATA COLLECTION

Existing traffic volumes were obtained from traffic count surveys conducted on October 8, 2019 by Traffic Survey Analysis Inc. (TSA) during the AM peak period (7:00 a.m.to 9:00 a.m.) and PM peak period (4:00p.m. to 6:00 p.m.).The traffic count surveys were conducted for the study intersections listed in **Table 2** and detailed turning movement counts are provided in **Appendix A**. The existing signal timing plans were obtained from the City of Toronto which are provided in **Appendix B**.

Table 2: Summary of Turning Movement Counts

No.	Intersection	Control Type	Count Date
1	Jane Street / East Drive-Outlook Avenue	Signalized	October 8, 2019
2	Jane Street / Sandcliff Road	Unsignalized	October 8, 2019
3	Jane Street / Black Creek Boulevard	Unsignalized	October 8, 2019
4	Jane Street / Alliance Avenue	Signalized	October 8, 2019
5	Jane Street / Haney Avenue	Signalized	October 8, 2019
6	Rockcliffe Boulevard / Alliance Avenue	Signalized	October 8, 2019
7	Rockcliffe Boulevard / Rockcliffe Court	Unsignalized	October 8, 2019
8	Rockcliffe Blvd / Terry Drive-Woolner Avenue	Unsignalized	October 8, 2019
9	Symes Road / Terry Drive	Unsignalized	October 8, 2019
10	Symes Road / Hillborn Avenue	Unsignalized	October 8, 2019
11	Symes Road / Orman Avenue	Unsignalized	October 8, 2019
12	Cliff Street/Alliance Avenue / Humber Boulevard N	Unsignalized	October 8, 2019

---

[1] HCM 2000 Methodology

Table 2: Summary of Turning Movement Counts (Cont'd)

No.	Intersection	Control Type	Count Date
13	Humber Boulevard N / Hilldale Road	Unsignalized	October 8, 2019
14	Alliance Avenue / Humber Boulevard S/Hilldale Road	Unsignalized	October 8, 2019
15	Humber Boulevard N / Louvain Street	Unsignalized	October 8, 2019
16	Humber Boulevard S / Avon Avenue	Unsignalized	October 8, 2019
17	Humber Boulevard N / Black Creek Drive and Weston	Signalized	October 8, 2019
18	Weston Road / Porter Avenue	Unsignalized	October 8, 2019
19	Weston Road / Rogers Road	Signalized	October 8, 2019
20	Weston Road / Avon Crescent	Unsignalized	October 8, 2019
21	Avon Avenue / Avon Crescent	Unsignalized	October 8, 2019
22	Avon Avenue / Porter Avenue	Unsignalized	October 8, 2019

2.0 EXISTING TRAFFIC CONDITIONS

Traffic operations under existing conditions were analyzed for the peak hours during the weekday AM (7:00 a.m. to 9:00 a.m.) and weekday PM (4:00 p.m. to 6:00 p.m.) periods using the Synchro 9 software. The Synchro models were developed as per the City's Guidelines for Using Synchro 9 dated March 18, 2016. Peak hour factors were calculated based on the existing traffic counts.

2.1 EXISTING INTERSECTION OPERATIONS

The existing intersection operations were analyzed using the study area road network illustrated in **Figure 2** and existing balanced peak hour volumes shown in **Figure 3**. For comparison purposes, the existing unbalanced peak hour traffic volumes are also provided in **Figure 4**.

The overall signalized intersection operation results are summarized in **Table 3** and graphically represented in **Figure 5** and **Figure 6** including critical movements. The critical movements were identified based on the following criteria:

- The v/c ratio for overall intersection or shared through/turning movements is 0.85 or greater;
- The v/c ratio for an exclusive movement is 1.00 or greater; or,
- The LOS for overall intersection or any movement is 'E' or 'F'.

Table 3: Intersection Capacity Analysis - Existing Conditions

Intersection	AM Peak Hour		PM Peak Hour	
	v/c	LOS	v/c	LOS
Jane Street / East Drive and Outlook Avenue	0.57	B	0.53	B
Jane Street / Alliance Avenue	0.53	B	0.59	B
Jane Street / Haney Avenue	0.43	A	0.39	A
Rockcliffe Boulevard / Alliance Avenue	0.78	C	0.79	C
Humber Blvd N and Black Creek Dr / Weston Rd	**0.85**	D	0.79	D
Weston Road / Rogers Road	**0.87**	D	**0.94**	D

Detailed analysis results are provided in **Appendix C** and the Synchro reports can be found in **Appendix D**.

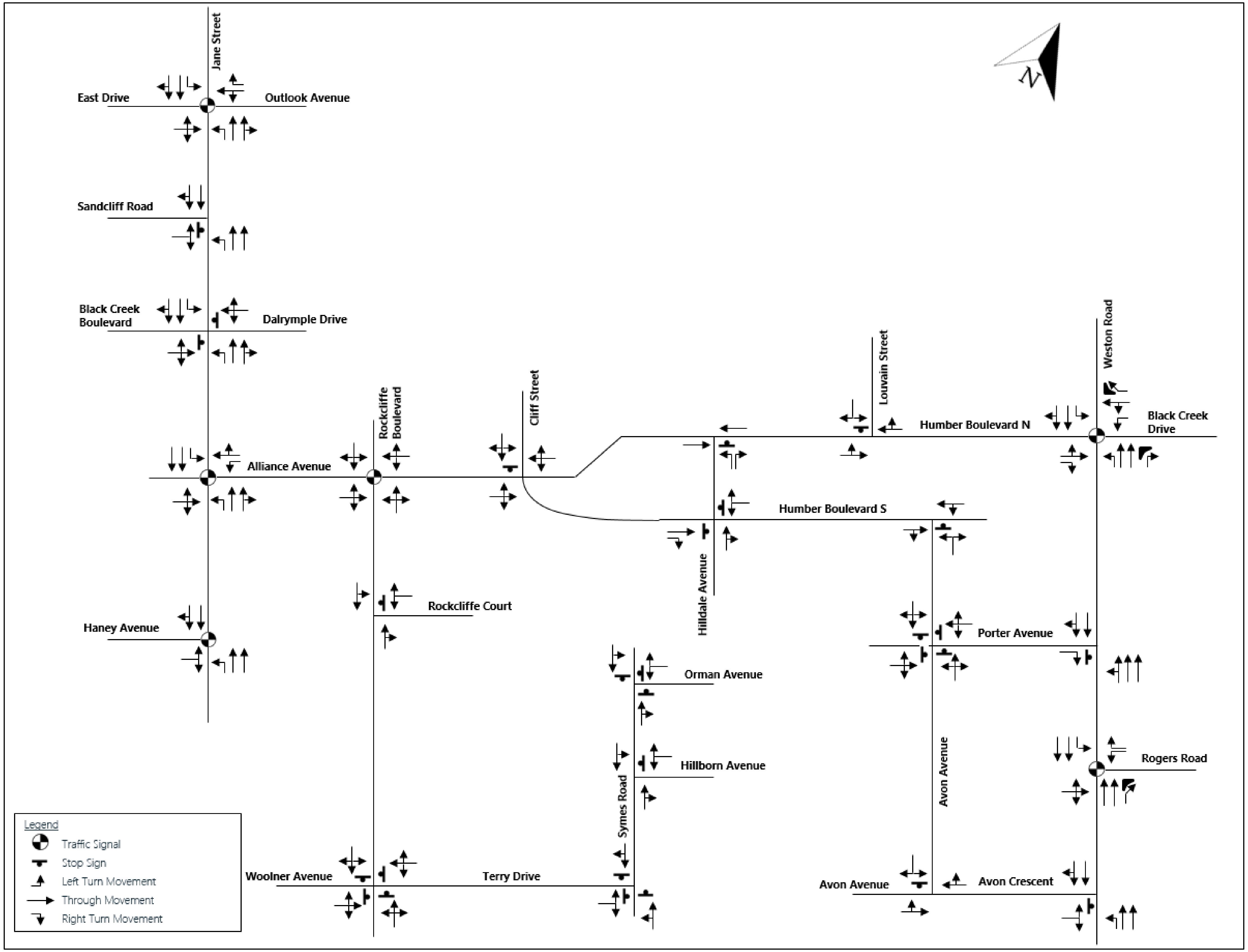


Figure 2: Existing Lane Configurations

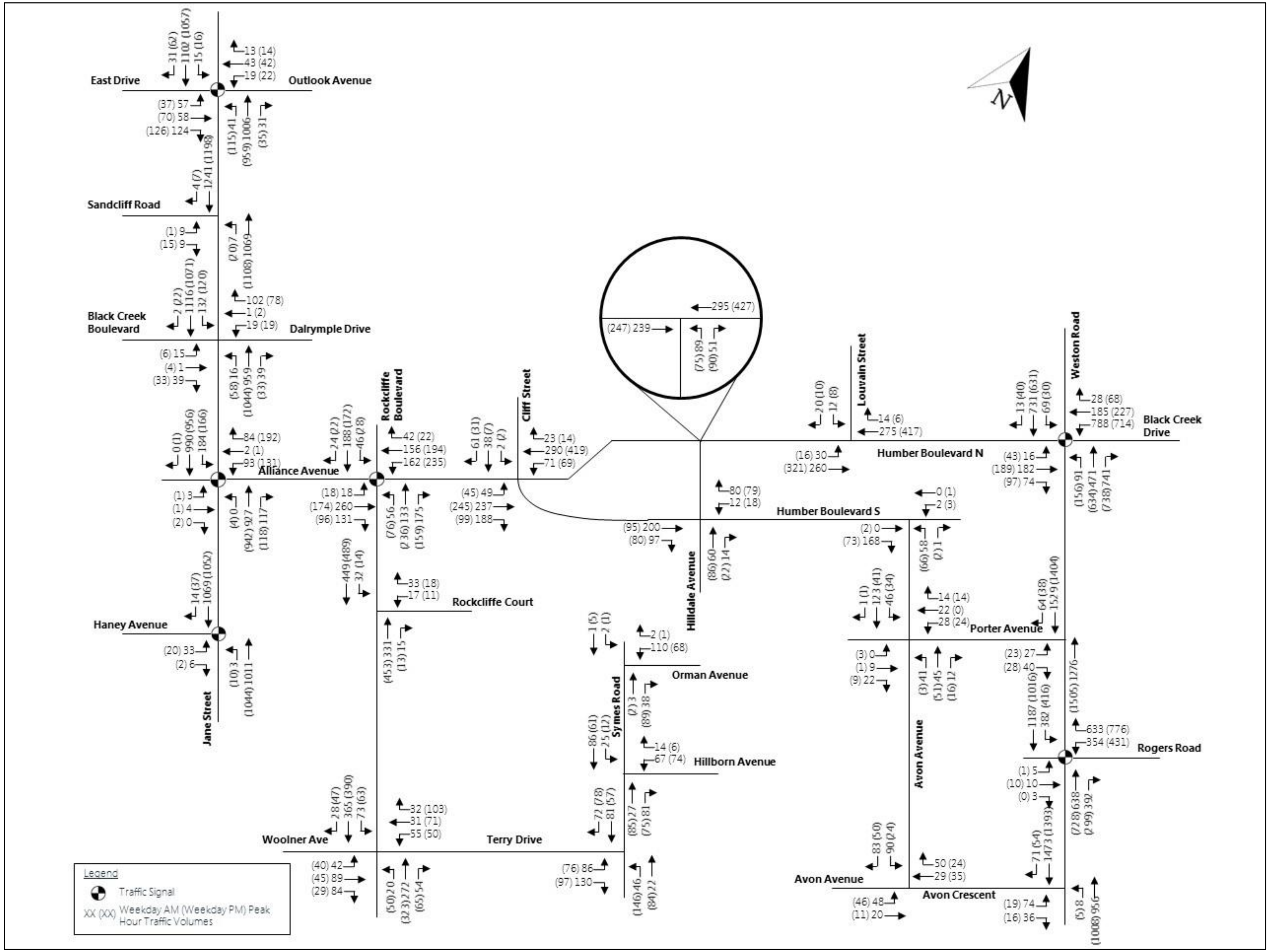


Figure 3: 2019 Existing Balanced Volumes

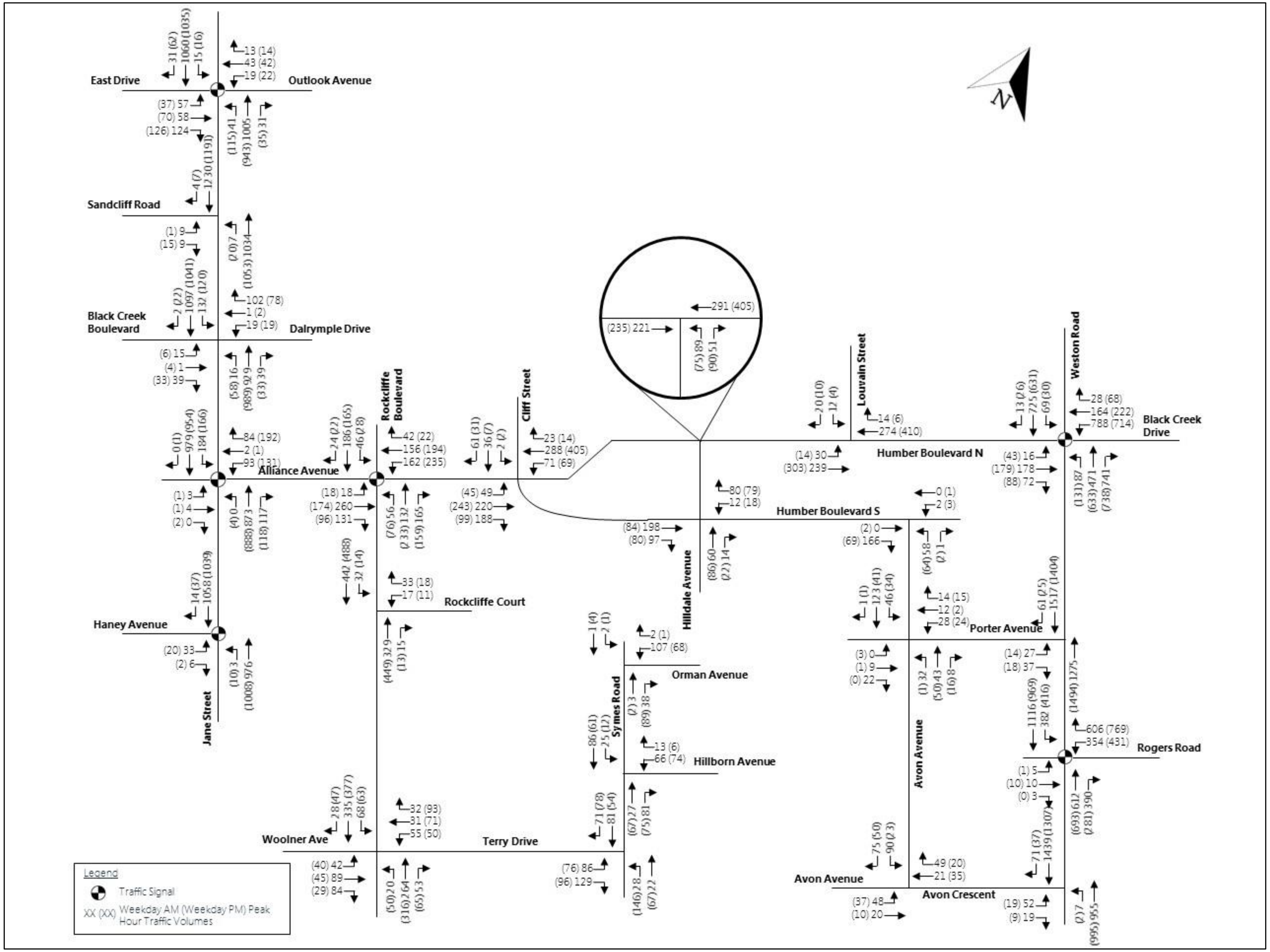


Figure 4: 2019 Existing Unbalanced Volumes

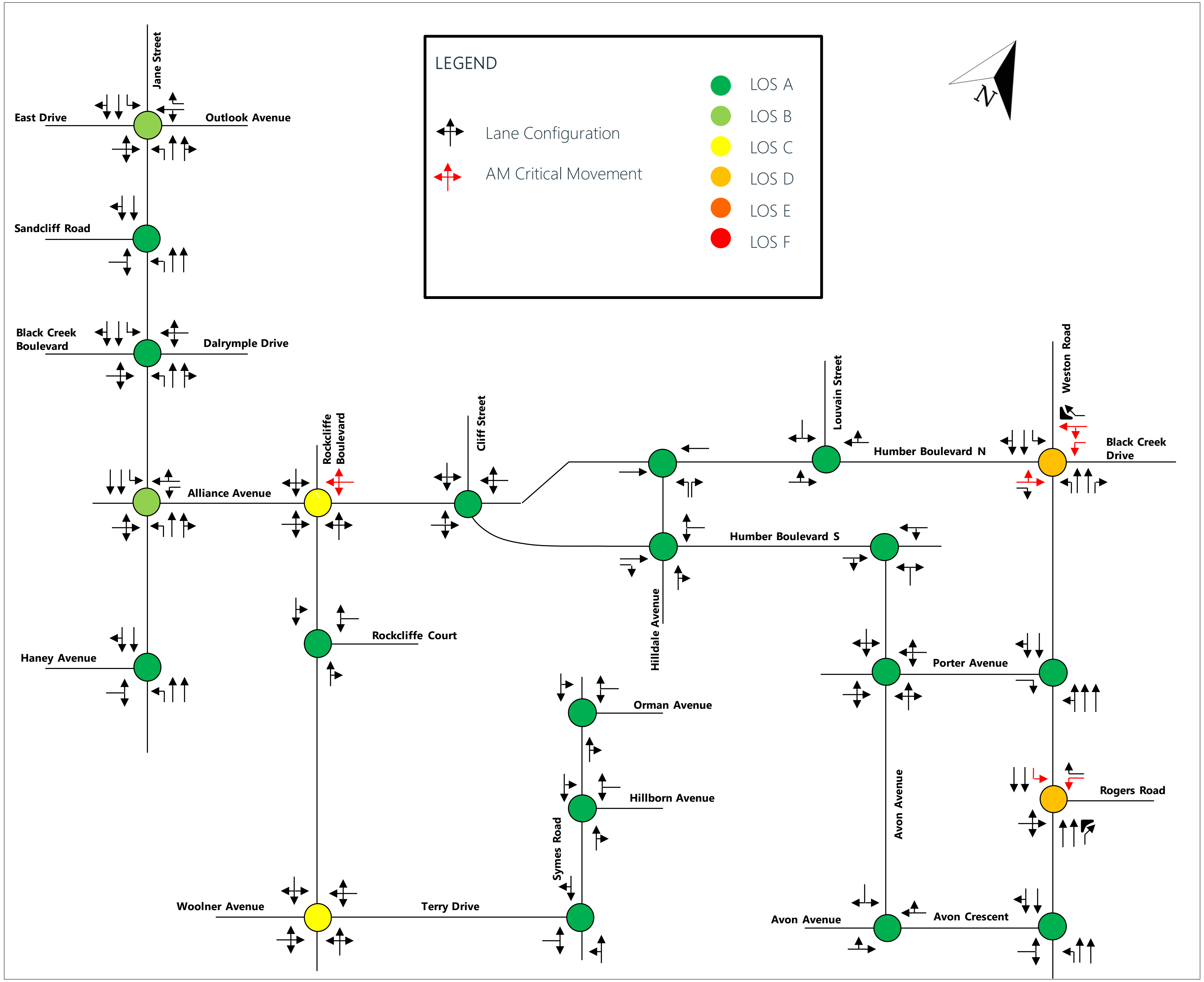


Figure 5: 2019 Existing Intersection LOS – AM Peak Hour

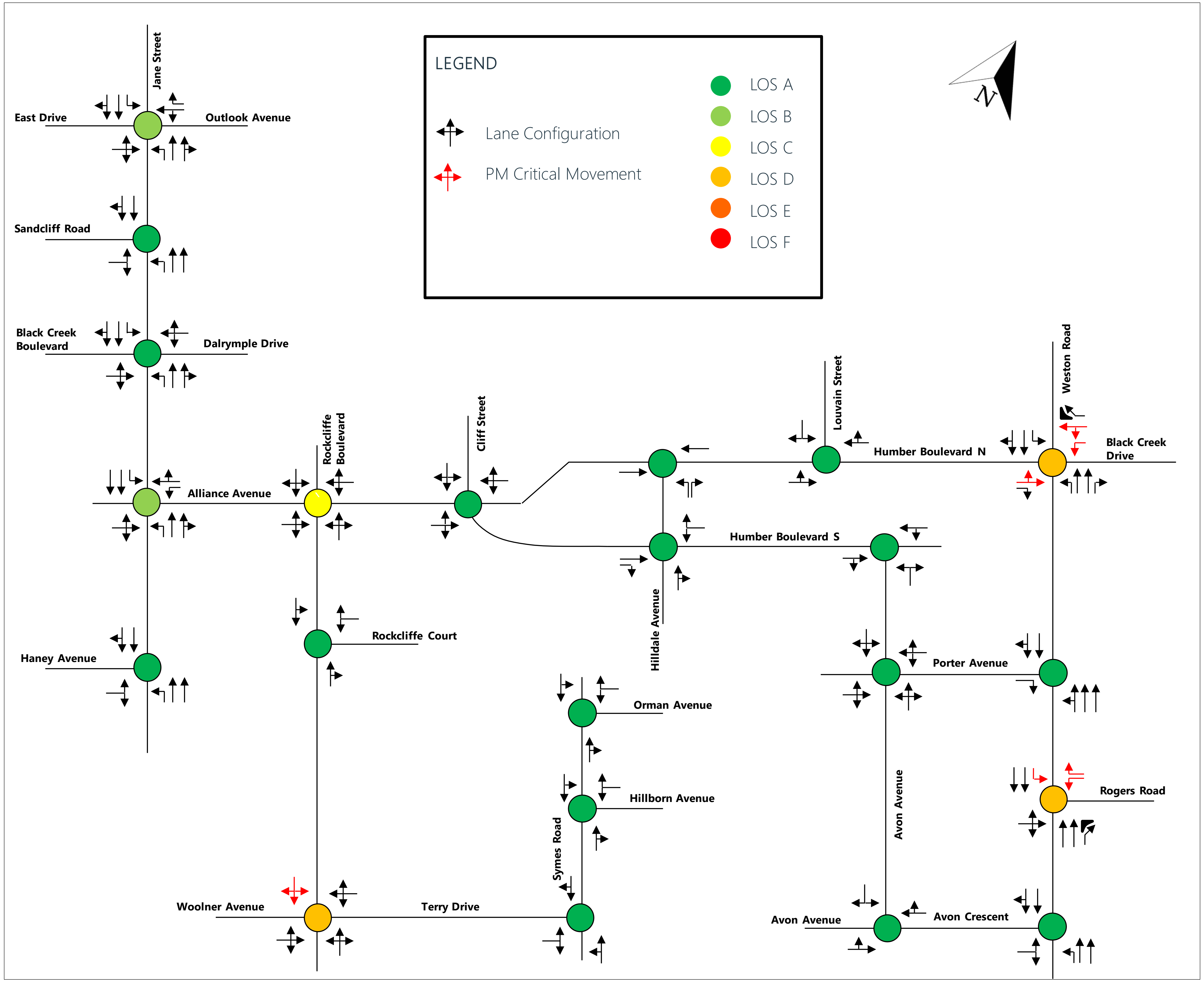


Figure 6: 2019 Existing Intersection LOS – PM Peak Hour

The results of the overall signalized intersection capacity analysis in **Table 3** indicate that all study intersections are operating with residual capacity and an acceptable level of service except for the intersection of Humber Boulevard North and Black Creek Drive / Weston Road which is operating with a v/c ratio of 0.85 during the AM peak hour and the intersection of Weston Road and Rogers Road which is operating with v/c ratios of 0.87 and 0.94 during the AM and PM peak hours, respectively.

The detailed analysis results provided in **Appendix D** indicate the following movements at the intersection of Weston Road / Rogers Road are operating at level of service 'F' and a v/c ratio over 1.00.

- Westbound left turn movement during the PM peak hour (v/c ratio = 1.03)
- Southbound left turn movement during the AM peak hour (v/c ratio = 1.03)
- Southbound left turn movement during the PM peak hour (v/c ratio = 1.08)

The results of the analysis above suggest that the westbound and southbound operations exceed capacity. However, it is not theoretically possible for an existing movement to be over capacity, since the existing counted traffic was accommodated by the intersection. This indicates that the Synchro analysis parameters are likely conservative and therefore underestimated the actual available capacity of the intersection.

The 95th percentile queue lengths for all movements at signalized intersections within the study area were extracted from the Synchro9 analysis for the weekday AM and PM peak hours and were compared to the available storage lengths. The analysis results in **Appendix C** indicate that all existing queues can be accommodated within the available storage lengths except for the following movements:

- Humber Boulevard N / Black Creek Drive-Weston Road
    - Southbound through movement during the AM peak hour (exceeds available storage length by 61 m)
    - Southbound through movement during the PM peak hour (exceeds available storage length by 32 m)
- Weston Road / Rogers Road
    - Southbound left turn movement during the AM peak hour (exceeds available storage length by 78 m)
    - Southbound left turn movement during the PM peak hour (exceeds available storage length by 89 m)

The queue lengths at two key study intersections are shown in **Figure 7** and **Figure 8**. Detailed queuing results are provided in **Appendix C** and the Synchro reports can be found in **Appendix D**.

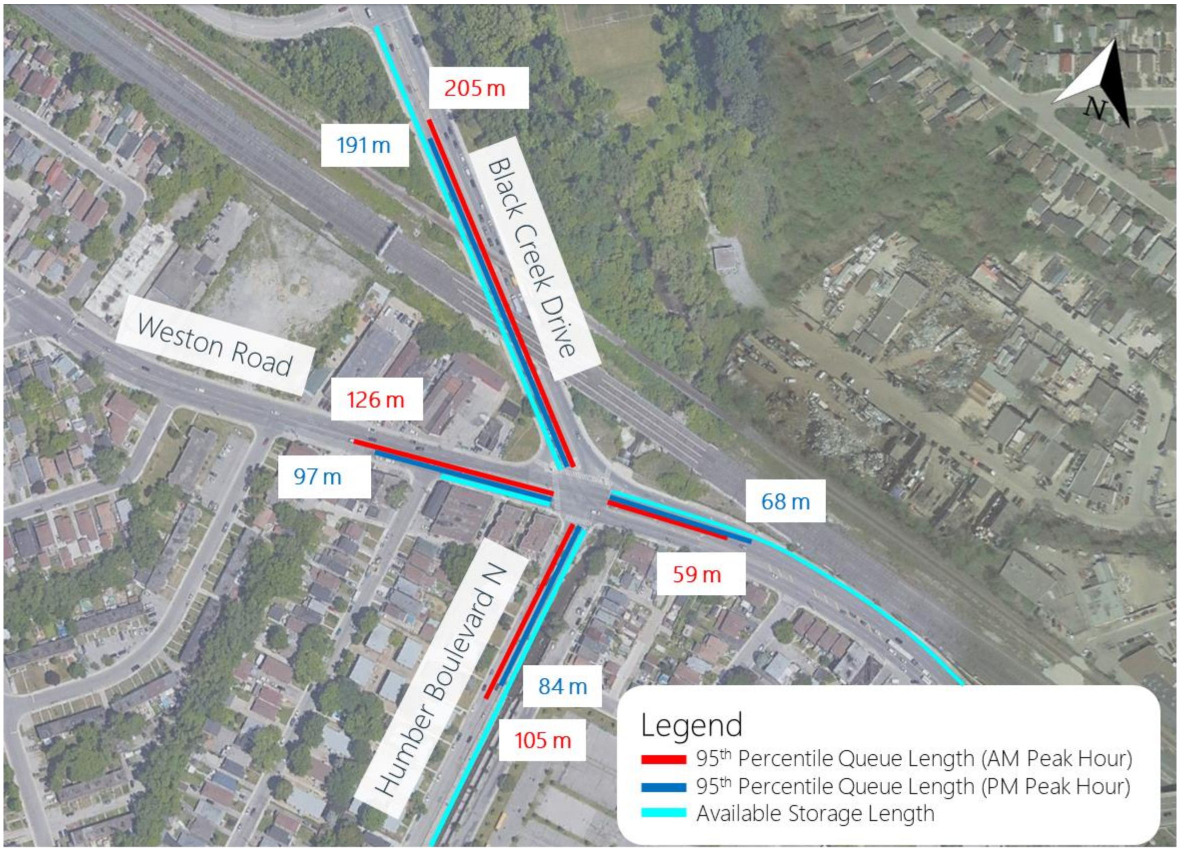


Figure 7: Black Creek Drive and Weston Road – Existing 95th Percentile Queue Lengths

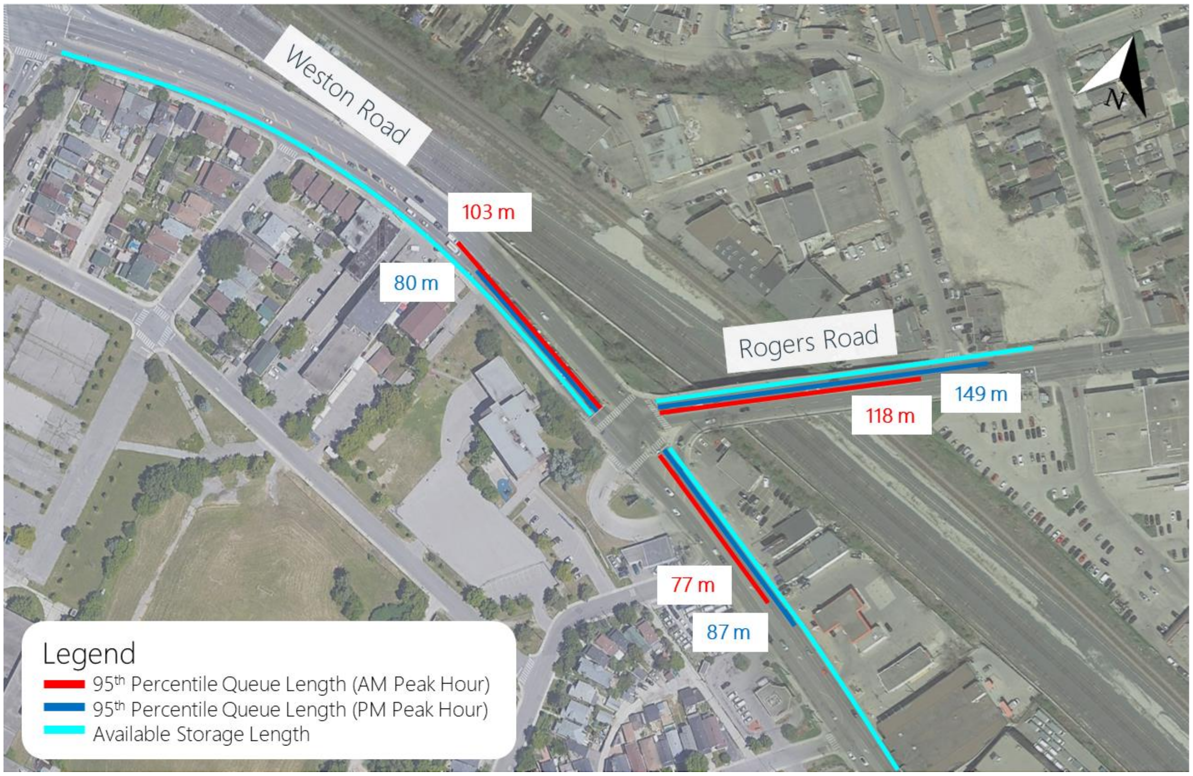


Figure 8: Weston Road and Rogers Road – Existing 95th Percentile Queue Lengths

3.0 BACKGROUND GROWTH

Future background traffic volumes consist of the following components: traffic growth from outside the study area and traffic generated within the study area from adjacent proposed developments. A review of historical traffic data and traffic reports for other developments in the vicinity of the study area was carried out to determine the background growth rate. Detailed calculations for the growth rate are provided in **Appendix E**. It was noted that there was a negative growth along Weston Road which ranges from -1.6% to -2.2% while the growth rate along Jane Street ranges from 1.3% to 1.8%.

In addition, available traffic reports for other background developments (i.e. Proposed Expansion of George Syme Community School TIS, 611 & 623 Keele Street Proposed Self-Storage study) were also reviewed to help determine a reasonable growth rate for the analysis. It was noted that no growth was used in these traffic reports. Therefore, a growth rate of 0.5% compounded per annum was applied to the existing balanced volumes to determine the future (2031) traffic volumes.

4.0 FUTURE (2031) TRAFFIC CONDITIONS

A review of the preferred flood remediation alternatives was conducted to identify the alternatives that would have an impact on traffic within the study area road network. The preferred alternatives and evaluation of their impact on the adjacent road network are discussed in this section.

4.1 PREFERRED ALTERNATIVES

The preferred flood remediation alternatives are as follows:

- Replace 10.7 m span structure at Jane Street with a 102 m span bridge
- Naturalize and widen Black Creek from Jane Street to Rockcliffe Boulevard to 55 m top width
- Upgrade 15.2 m by 4.6 m Rockcliffe Boulevard bridge to a 52 m span by 4.9 m rise bridge
- Naturalize and widen Black Creek from Rockcliffe Boulevard to downstream of Alliance Avenue to 55 m top width
- Construct a 0.5 m high flood protection wall at Weston Road
- Naturalize and widen Lavender Creek to 22.5 m top width from Black Creek to Symes Road
- Remove south crossing of Lavender Creek 4.8 m by 2.1 m
- Replace Lavender Creek northern 4.8 m by 2.3 m crossing with a 20 m span by 3.87 m rise crossing
- Replace Symes Road crossing 3.66 m by 0.90 m rise, 40.2 m long, with twin 5.4 m span by 1.8 m rise culverts

Based on a review of the above noted alternatives, it was concluded that only the proposed Jane Street alternative (i.e. replace 10.7 m span structure at Jane Street with a 102 m span bridge) may have an impact on the adjacent road network. Therefore, this alternative was considered for further evaluation under future (2031) traffic conditions.

4.2 JANE STREET ALTERNATIVE CONSTRUCTION STAGING

The proposed Jane Street bridge will be constructed in two stages where one lane will be closed in each direction in Stage 1 and Stage 2 to facilitate construction works. Therefore, the capacity along Jane Street will be reduced from two lanes to one lane per direction for the duration of the construction.

The assessment of temporary conditions (i.e. construction staging) is not part of the scope of work for this study. However, based on a high-level review of the existing traffic data, it is noted that one lane in each direction cannot accommodate existing traffic volumes along Jane Street during the AM and PM peak hours. **Figure 9** shows a comparison of existing versus construction conditions where one lane will be closed in each direction, based on an assumed capacity of 800 vehicles per hour per lane (vphpl) along Jane Street.

Figure 9: Existing versus Construction Staging Jane Street Through Capacity

Figure 9 shows that there will be an excess of approximately 200 to 300 vehicles in the AM and PM peak hours due to the reduced through capacity on Jane Street during the construction. These volumes will need to be diverted to the adjacent road network to minimize excessive delays drivers may experience due to the lane closures on Jane Street to facilitate construction.

Figure 10 shows potential detour routes for traffic diversion during the construction of the Jane Street bridge. Detour 1 is west of Jane Street via Eglinton Avenue, Scarlett Road and St. Clair Avenue while

Detour 2 is east of Jane Street via Eglinton Avenue, Weston Road, and St. Clair Avenue. It was noted by the City that Detour 1 may not be feasible due to existing constraints at the intersection of St. Clair Avenue and Scarlett Road.

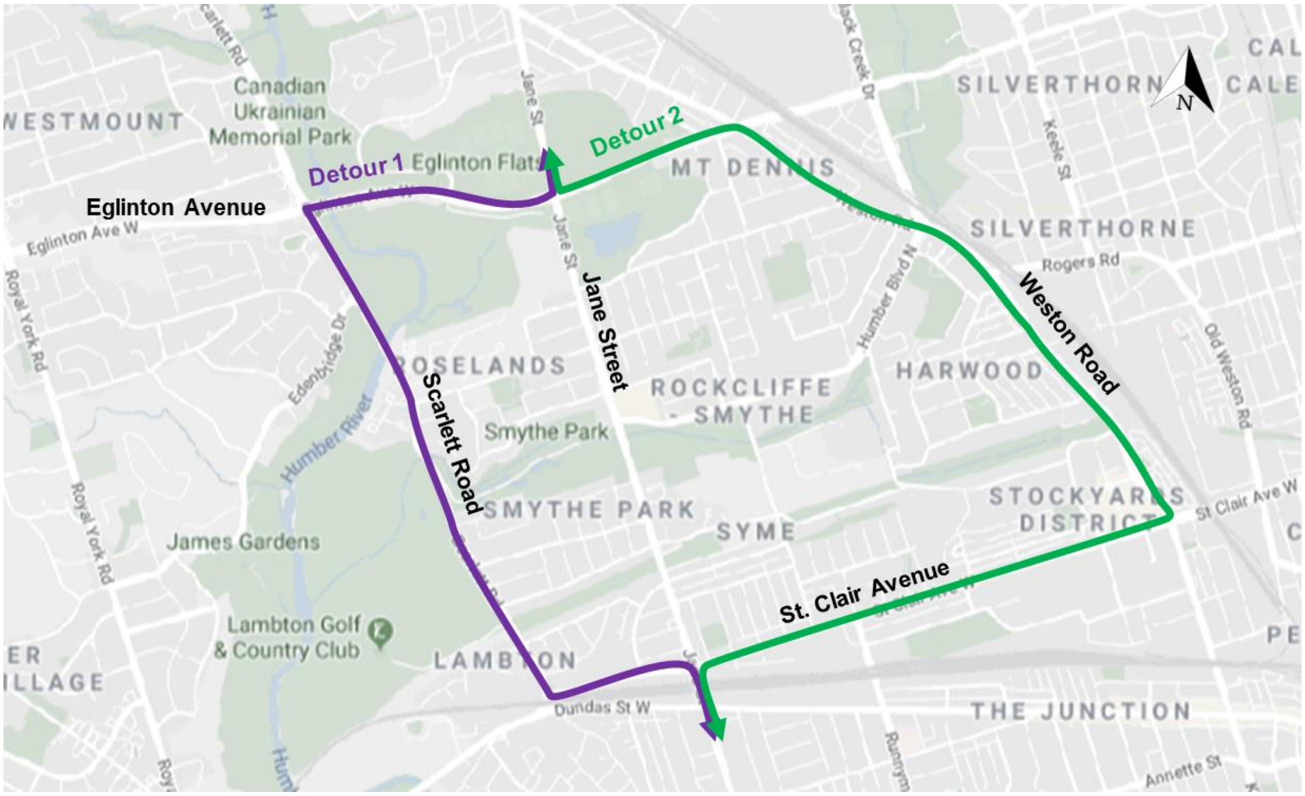


Figure 10: Potential Detour Routes

It is important to note that the assessment of the roadway capacity during construction and potential detour routes discussed above are based on a high-level review. Since the assessment of temporary conditions (i.e., construction conditions) was not within the scope of the traffic assessment for this study, it is recommended that a more detailed analysis be conducted during the next stages of this study (i.e. Class EA) to assess temporary conditions and to confirm the feasibility of the two potential detour routes.

4.3 FUTURE (2031) INTERSECTION OPERATIONS

Traffic operations under future (2031) conditions for the proposed Jane Street alternative were analyzed for the peak hours during the weekday AM (7:00 a.m. to 9:00 a.m.) and weekday PM (4:00 p.m. to 6:00 p.m.) periods using the Synchro 9 software. The following two scenarios were assessed under Future (2031) conditions:

- **Scenario 1:** Without Proposed Improvements ("Do Nothing")
- **Scenario 2:** With Proposed Improvements and LRT along Jane Street

4.1.1 Scenario 1 – Without Improvements (Do-Nothing)

The future (2031) intersection operations for Scenario 1 were analyzed using the existing study area road network illustrated in **Figure 2**. The future (2031) total traffic volumes were determined by applying a growth rate of 0.5% compounded per annum to the existing balanced volumes and are shown in **Figure 11**.

The overall signalized intersection operation results are summarized in **Table 3** and graphically represented in **Figure 12** and **Figure 13** including critical movements.

Table 4: Intersection Capacity Analysis – Future (2031) Conditions (Scenario 1)

Intersection	**AM Peak Hour**		**PM Peak Hour**	
	v/c	**LOS**	**v/c**	**LOS**
Jane Street / East Drive and Outlook Avenue	0.60	B	0.60	B
Jane Street / Alliance Avenue	0.57	B	0.63	C
Jane Street / Haney Avenue	0.45	A	0.41	A
Rockcliffe Boulevard / Alliance Avenue	**0.85**	**C**	0.84	C
Humber Blvd N and Black Creek Dr / Weston Rd	**0.90**	**D**	**0.85**	**D**
Weston Road / Rogers Road	**0.92**	**D**	**1.00**	**E**

Detailed analysis results are provided in **Appendix F** and the Synchro reports can be found in **Appendix G**.

The analysis results for Scenario 1 (Do Nothing) indicate that all movements at the study area intersections are expected to operate with residual capacity and acceptable level of service under future (2031) conditions except for several movements that are expected to operate with a volume to capacity ratio of 0.85 or greater as shown in **Figure 12**.

The following movements at the study area intersections of are expected to operate at or over capacity.

- Weston Road / Rogers Road
    - Westbound left turn movement during the PM peak hour (v/c ratio = 1.09)
    - Westbound right movement during the PM peak hour (v/c ratio = 1.12)
    - Southbound left turn movement during the AM peak hour (v/c ratio = 1.10)
    - Southbound left turn movement during the PM peak hour (v/c ratio = 1.14)
- Rockcliffe Boulevard / Terry Drive - Woolner Avenue
    - Southbound left-through-right movement during the PM peak hour (v/c ratio = 1.02)
- Humber Boulevard N / Black Creek Drive and Weston Road
    - Eastbound left-through movement during the AM peak hour (v/c ratio = 1.05)
    - Westbound left movement during the PM peak hour (v/c ratio = 1.06)
    - Westbound through movements during the PM peak hour (v/c ratio = 1.07)

In general, 95th percentile queues lengths can be accommodated within available storage lengths under the future (2031) conditions except for the following movements:

- Humber Boulevard N / Black Creek Drive and Weston Road
    - Southbound through movement during the AM peak hour (exceeds available storage length by 80 m)
    - Southbound through movement during the PM peak hour (exceeds available storage length by 39 m)
- Weston Road / Rogers Road
    - Southbound left turn movement during the AM peak hour (exceeds available storage length by 89 m)
    - Southbound left turn movement during the PM peak hour (exceeds available storage length by 99 m)

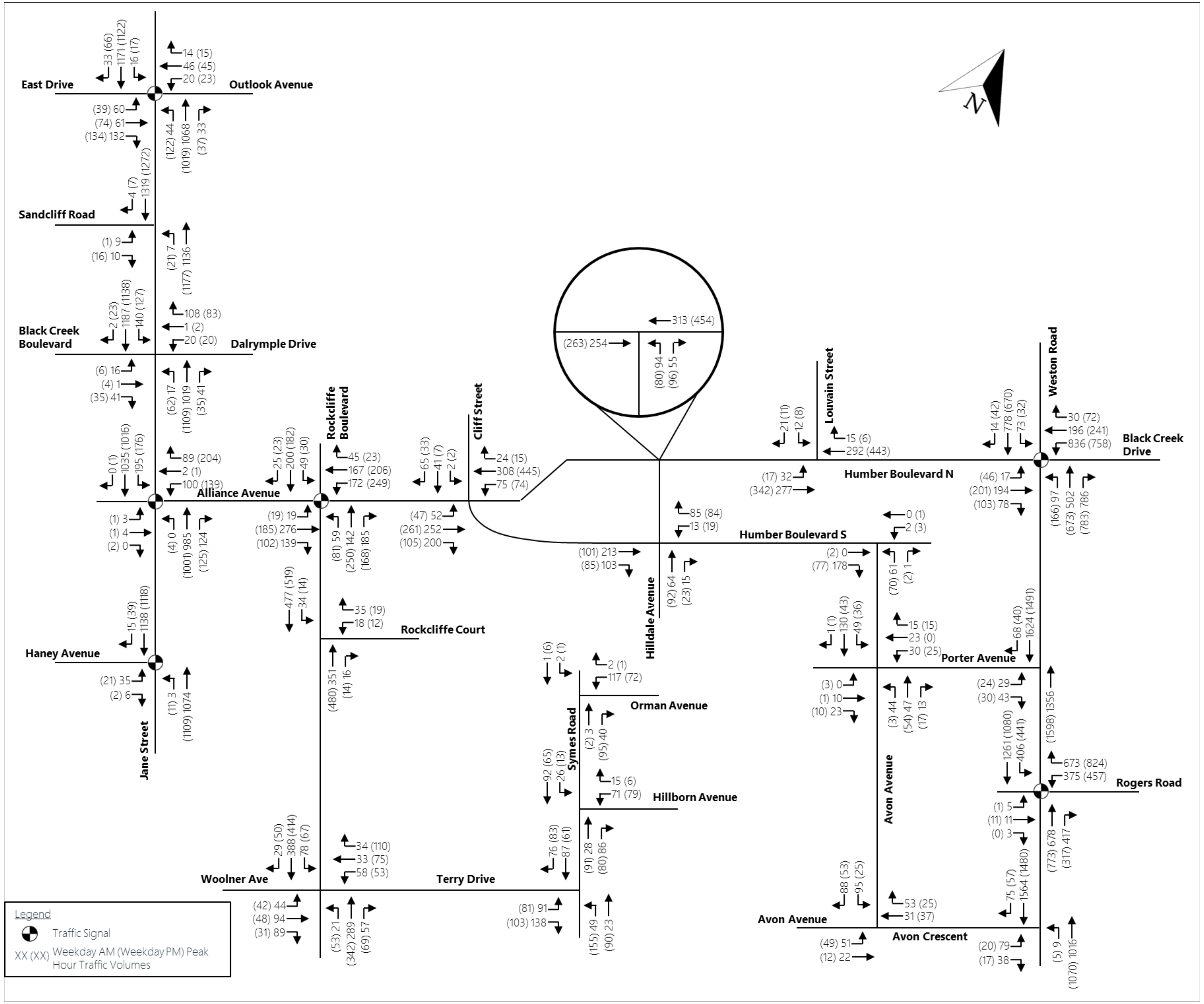


Figure 11: Future (2031) Traffic Volumes – Scenario 1 (Do Nothing)
]]>

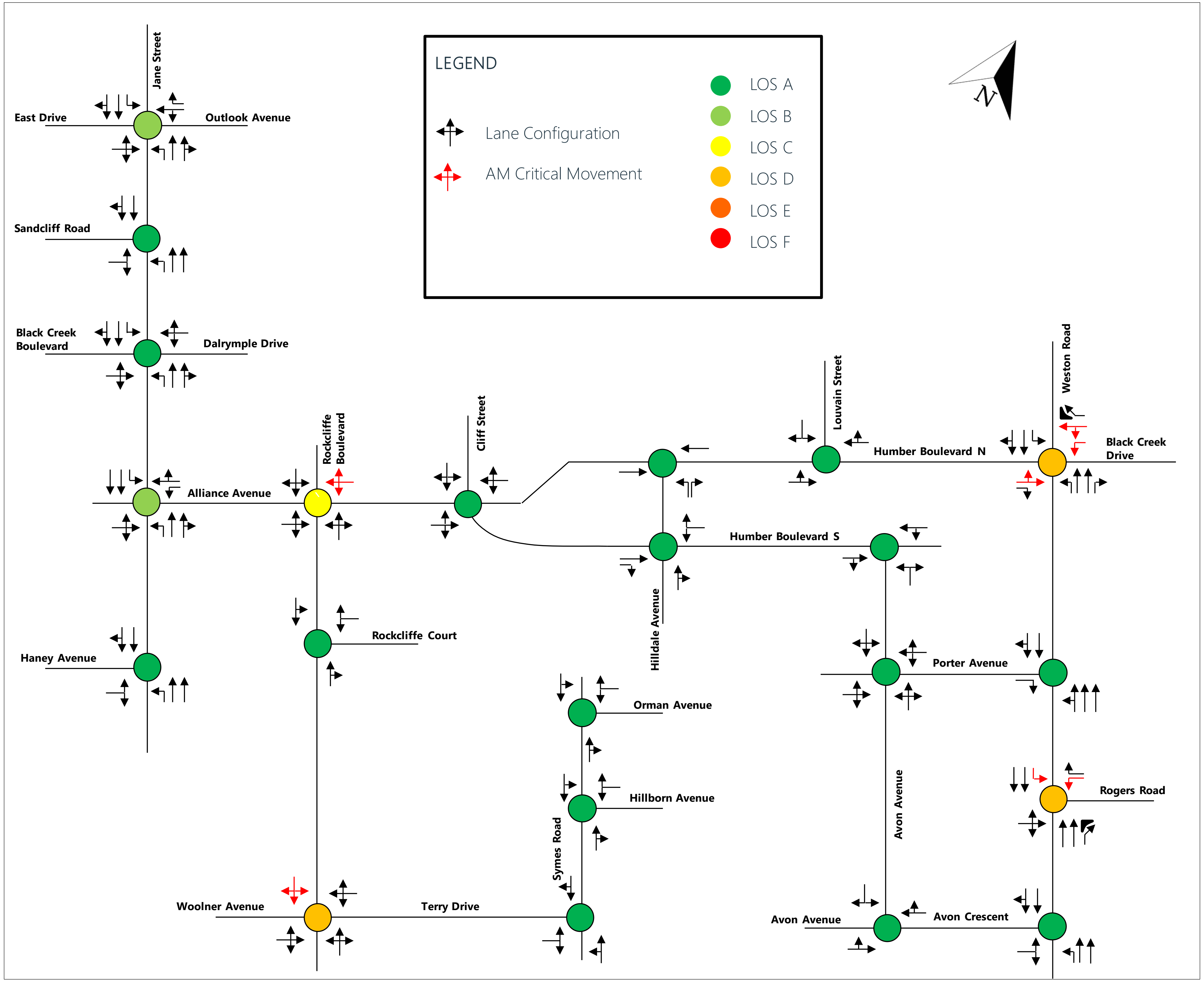


Figure 12: Future (2031) Intersection LOS – Scenario 1 (Do Nothing) – AM Peak Hour

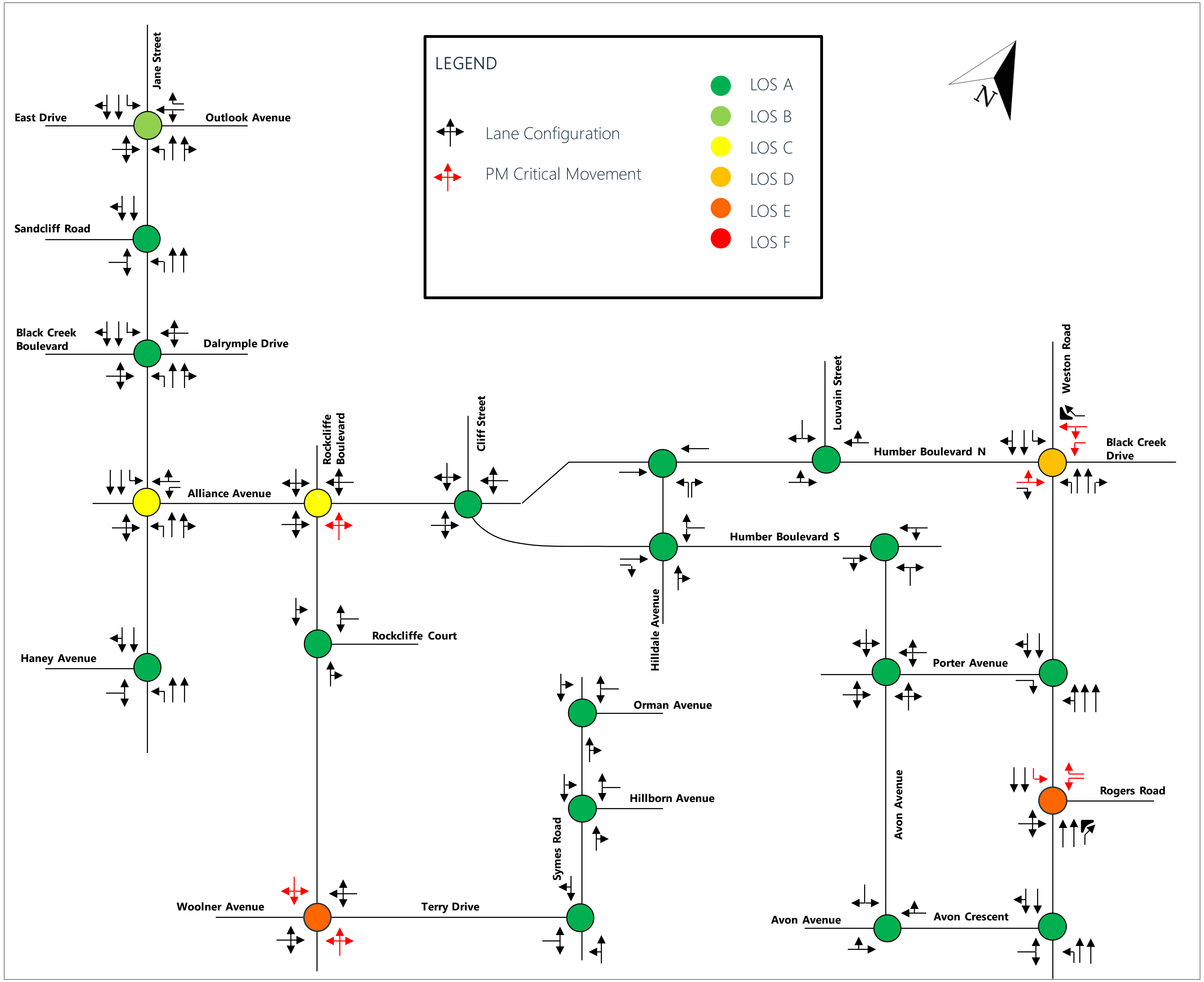


Figure 13: Future (2031) Intersection LOS – Scenario 1 (Do Nothing) – PM Peak Hour

4.1.1 Scenario 2 – With Improvements and LRT

The future (2031) intersection operations for Scenario 2 were analyzed for the proposed Jane Street alternative with the LRT in operation using the road network illustrated in **Figure 14**.

Due to the LRT along Jane Street median, several changes are required to intersection operations for safety reasons. The analysis incorporated these changes to the Synchro model to assess future (2031) intersection operations for Scenario 2:

- North / south left turn movements along Jane Street at signalized intersections within the study area were modelled as fully protected movements;
- Existing unsignalized intersections were assumed to become right-in-right-out and impacted traffic volumes for the restricted movements were diverted to adjacent signalized intersections; and
- The cycle lengths at existing signalized intersections within the study area were increased from 100 seconds to 120 seconds during the AM and PM peak hours to accommodate longer crossing times for east/west pedestrians.

It is important to note that the traffic operations analysis for Scenario 2 with the LRT in operation for this planning stage of the project is considered a high-level analysis to assess the worst-case scenario using the Synchro software. It is noted that the Synchro software has limitations in modelling LRT operations. Therefore, a detailed traffic analysis for Jane Street with the LRT in operation will be required using other software packages (i.e. microsimulation software such as Vissim, Aimsun etc.) to accurately model the LRT operations in the next stages of that project.

The diverted traffic volumes and future (2031) total traffic volumes are shown in **Figure 15** and **Figure 16**, respectively. The overall signalized intersection operation results are summarized in **Table 5** and graphically represented in **Figure 17** and **Figure 18** including critical movements.

Table 5: Intersection Capacity Analysis – Future (2031) Conditions (Scenario 2)

Intersection	AM Peak Hour		PM Peak Hour	
	v/c	LOS	v/c	LOS
Jane Street / East Drive and Outlook Avenue	0.68	C	0.73	C
Jane Street / Alliance Avenue	0.77	D	0.80	D
Jane Street / Haney Avenue	0.48	A	0.44	A
Rockcliffe Boulevard / Alliance Avenue	**0.85**	**C**	0.84	C
Humber Blvd N and Black Creek Dr / Weston	**0.90**	**D**	**0.85**	**D**
Weston Road / Rogers Road	**0.92**	**D**	**1.00**	**E**

Detailed analysis results are provided in **Appendix H** and the Synchro reports can be found in **Appendix I**.

The analysis results for Scenario 2 indicate that all movements at the study intersections are expected to operate with residual capacity and acceptable level of service under future (2031) conditions (Scenario 2) except for some movements that are expected to operate with a volume to capacity ratio of 0.85 or greater as shown in **Figure 17**.

The following movements at the study area intersections are expected to operate at or over capacity.

- Weston Road / Rogers Road
    - Westbound left turn movement during the PM peak hour (v/c ratio = 1.09)
    - Westbound right movement during the PM peak hour (v/c ratio = 1.12)

    - Southbound left turn movement during the AM peak hour (v/c ratio = 1.10)
    - Southbound left turn movement during the PM peak hour (v/c ratio = 1.14)
- Rockcliffe Boulevard / Terry Drive - Woolner Avenue
    - Southbound left-through-right movement during the PM peak hour (v/c ratio = 1.02)
- Humber Boulevard N / Black Creek Drive and Weston Road
    - Eastbound left-through movement during the AM peak hour (v/c ratio = 1.05)
    - Westbound left movement during the PM peak hour (v/c ratio = 1.06)
    - Westbound through movements during the PM peak hour (v/c ratio = 1.07)

In general, 95th percentile queues lengths can be accommodated within available storage lengths under the future (2031) conditions except for the following movements:

- Humber Boulevard N / Black Creek Drive and Weston Road
    - Southbound through movement during the AM peak hour (exceeds available storage length by 80 m)
    - Southbound through movement during the PM peak hour (exceeds available storage length by 39 m)
- Weston Road / Rogers Road
    - Southbound left turn movement during the AM peak hour (exceeds available storage length by 89 m)
    - Southbound left turn movement during the PM peak hour (exceeds available storage length by 99 m)
- Jane Street / East Drive-Outlook Avenue
    - Northbound left turn movement during the PM peak hour (exceeds available storage length by 7 m)
- Jane Street / Alliance Avenue
    - Southbound left turn movement during the AM peak hour (exceeds available storage length by 108 m)
    - Southbound left turn movement during the PM peak hour (exceeds available storage length by 89 m)

It is important to note that the capacity constraints at above intersections are not caused as a result of the Jane Street bridge crossing alternative but are due to the anticipated background growth in traffic over time and reassigned unsignalized intersections left turning traffic demand on Jane Street due to the LRT in the median.

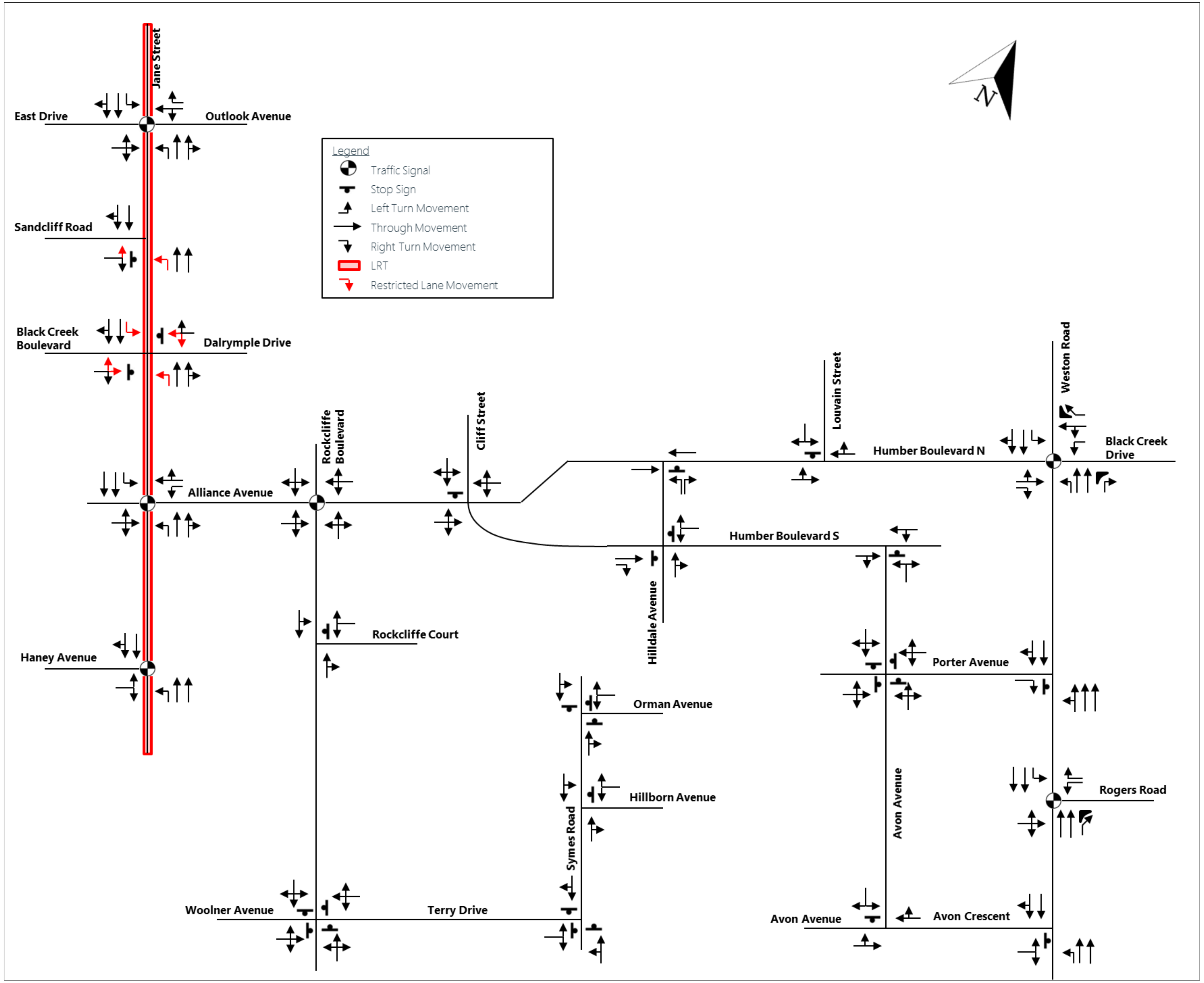


Figure 14: Future (2031) Lane Configurations – Scenario 2 (with Improvement and LRT)

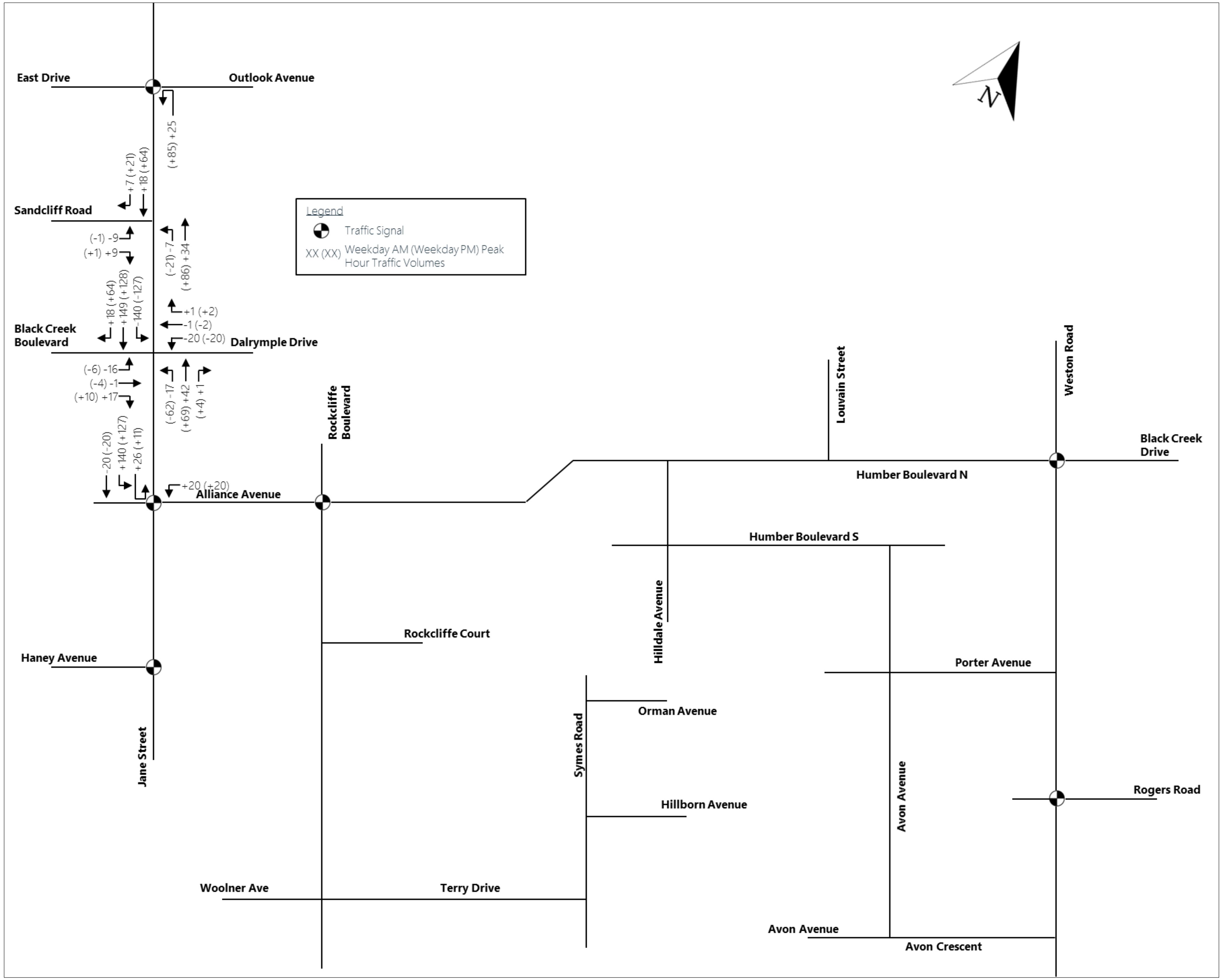


Figure 15: Future (2031) Net Diverted Traffic Volumes- Scenario 2 (with Improvement and LRT)

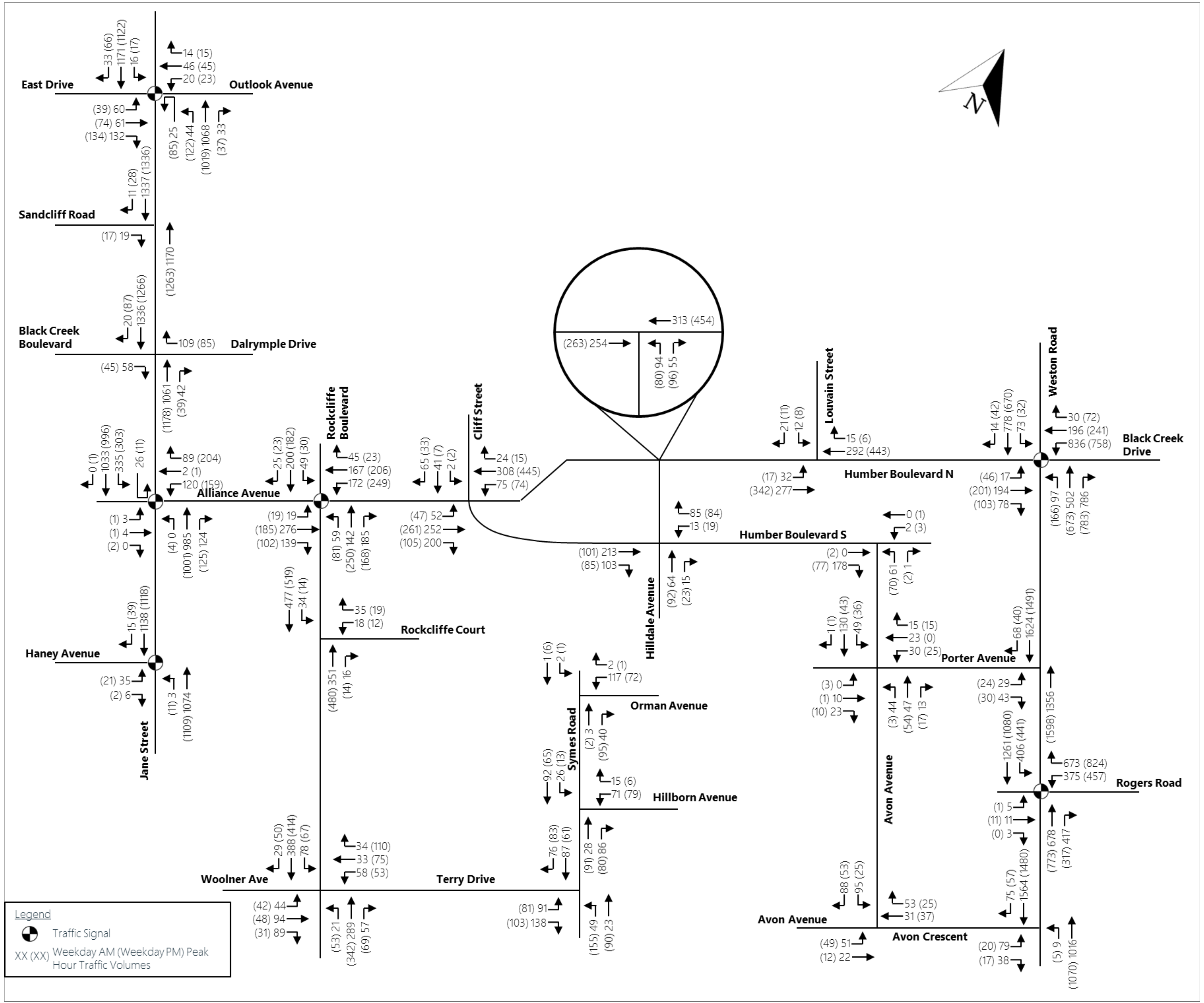


Figure 16: Future (2031) Total Traffic Volumes - Scenario 2 (with Improvement and LRT)

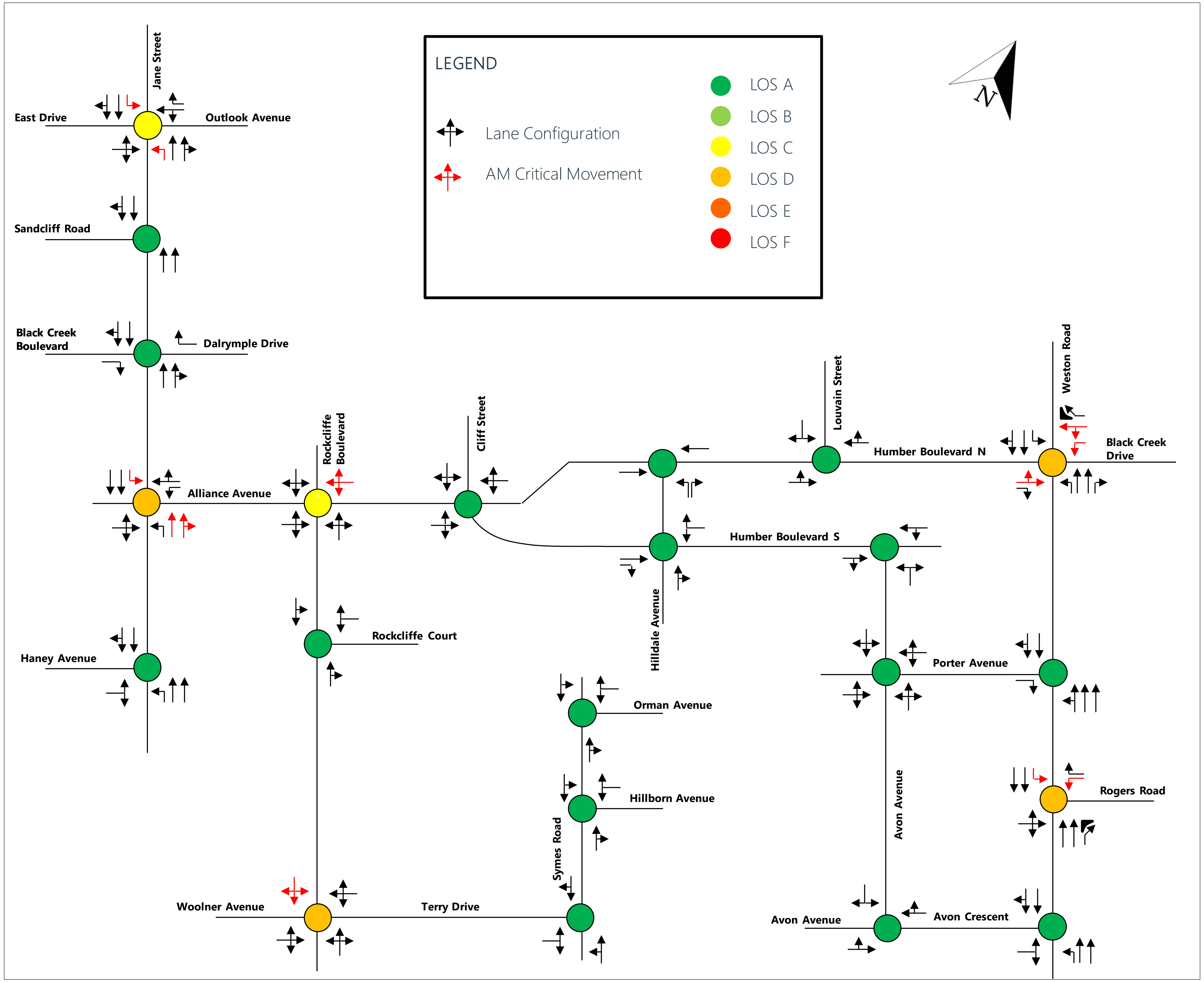


Figure 17: Future (2031) Total Traffic Volumes - Scenario 2 (with Improvement and LRT) – AM Peak Hour

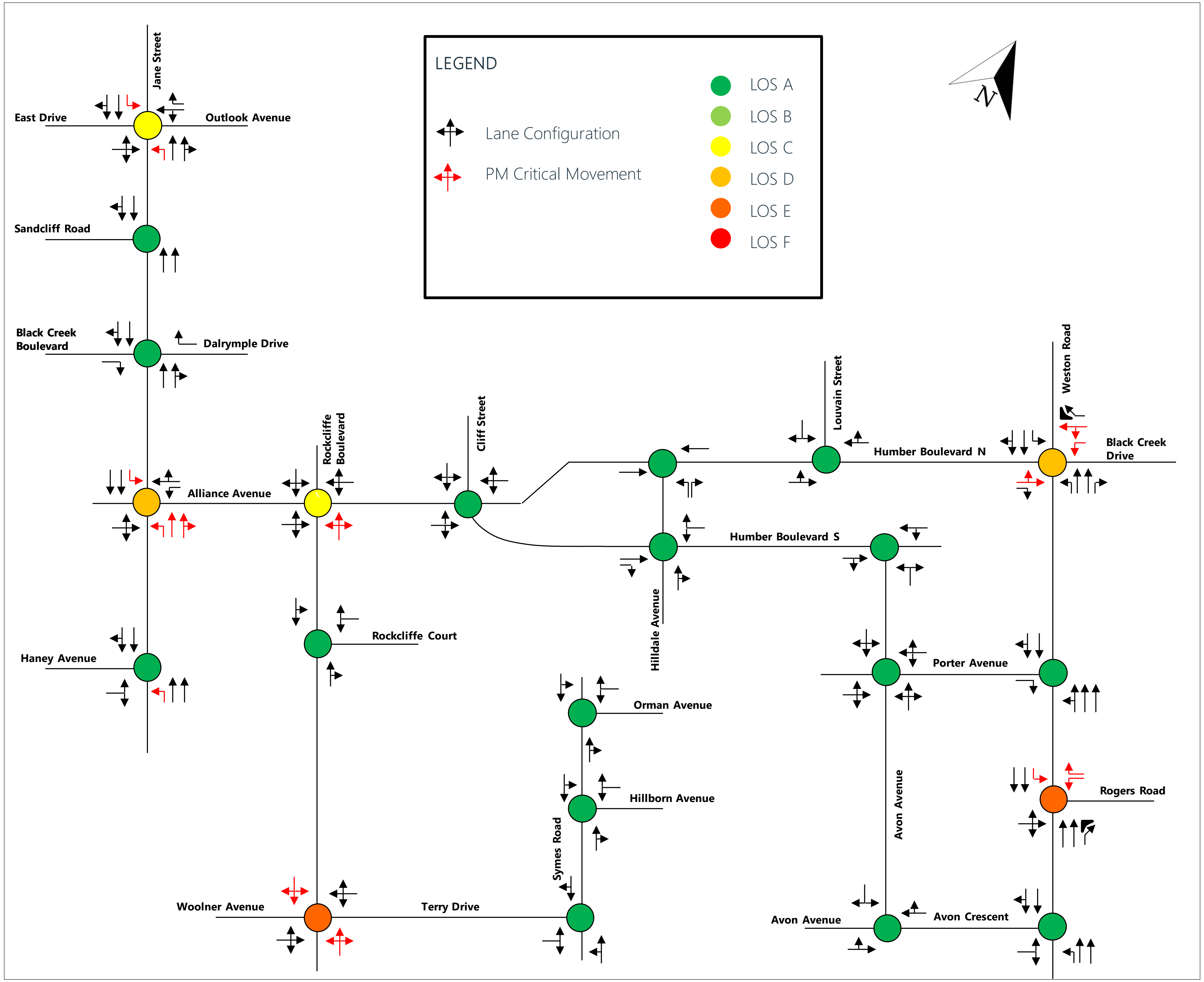


Figure 18: Future (2031) Total Traffic Volumes - Scenario 2 (with Improvement and LRT) – PM Peak Hour

5.0 CONCLUSION

A comparison of the results from the traffic analysis is provided in **Table 6** and **Table 7** below for the existing and future permanent conditions (Scenario 1 – 2031 with Improvements and Scenario 2 – 2031 with Improvements and Jane Street LRT).

Table 6: Intersection Operations Comparison

Intersection / Movement	LOS (v/c)					
	AM Peak Hour			PM Peak Hour		
	Existing	Sc 1	Sc 2	Existing	Sc 1	Sc 2
Weston Road / Rogers Road						
WBL	D (0.90)	E (0.95)	E (0.95)	**F (1.03)**	**F (1.09)**	**F (1.09)**
WBR	D (0.58)	D (0.71)	D (0.71)	E (0.97)	**F (1.12)**	**F (1.12)**
SBL	**F (1.03)**	**F (1.10)**	**F (1.10)**	**F (1.08)**	**F (1.14)**	**F (1.14)**
Rockcliffe Boulevard / Terry Drive						
SBLTR	D (0.82)	E (0.91)	E (0.91)	E (0.91)	**F (1.02)**	**F (1.02)**
Humber Blvd North / Black Creek Drive						
EBLT	F (0.99)	**F (1.05)**	**F (1.05)**	E (0.79)	E (0.82)	E (0.82)
WBL	E (0.91)	E (0.95)	E (0.95)	E (0.99)	**F (1.06)**	**F (1.06)**
WBT	E (0.92)	E (0.97)	E (0.97)	E (0.99)	**F (1.07)**	**F (1.07)**
Jane Street / East Drive-Outlook Avenue						
NBL	A (0.17)	A (0.21)	E (0.59)	A (0.53)	B (0.63)	E (0.84)
SBL	A (0.06)	A (0.07)	E (0.40)	A (0.06)	A (0.07)	E (0.40)
Jane Street / Alliance Avenue						
NBL	-	-	-	B (0.01)	B (0.02)	E (0.13)
NBTR	C (0.63)	C (0.67)	E (0.98)	C (0.66)	C (0.70)	D (0.98)
SBL	C (0.55)	C (0.63)	F (0.96)	C (0.59)	C (0.66)	F (0.95)
Jane Street / Haney Avenue						
NBL	A (0.01)	A (0.01)	E (0.14)	A (0.03)	A (0.04)	E (0.27)

Notes: LOS – Level of Service, v/c – volume to capacity ratio, Sc 1 - Scenario 1, Sc 2 - Scenario 2

Table 7: Queuing Comparison

Intersection / Movement	Available Storage Length (m)	95th Percentile Queue Length (m)					
		AM Peak Hour			PM Peak Hour		
		Existing	Sc 1	Sc 2	Existing	Sc 1	Sc 2
Weston Road / Rogers Road							
SBL	60	**138**	**149**	**149**	**149**	**159**	**159**
Humber Blvd North / Black Creek Drive							
SBT	65	**126**	**145**	**145**	**97**	**104**	**104**
Jane Street / East Drive-Outlook Avenue							
NBL	55	<7	<7	21	<7	<7	**62**
Jane Street / Alliance Avenue							
SBL	45	35	40	**153**	35	43	**134**

Notes: Sc 1 - Scenario 1, Sc 2 - Scenario 2

It is important to note that the capacity constraints at above intersections under the future (2031) total conditions are not caused as a result of the Jane Street alternative but due to the background growth in traffic over time (i.e. in Scenario 1 and Scenario 2) and reassigned unsignalized intersections traffic demand on Jane Street due to the LRT (i.e. in Scenario 2).

In addition, it is important to note that the traffic operations analysis for Scenario 2 with the LRT in operation for, this planning stage of the project is considered a high-level analysis to assess the worst-case scenario using the Synchro software. It is noted that the Synchro software has limitations in modelling LRT operations. Therefore, a detailed traffic analysis with the LRT in operation will be required using other software packages (i.e. microsimulation software such as Vissim, Aimsun etc.) to accurately model the LRT operations in the next stages of that project.

In general, the following changes to the existing signal operations are recommended with the LRT in operation:

- North / south left turn movements along Jane Street at signalized intersections within the study area need to be fully protected movements; and
- The cycle lengths at existing signalized intersections within the study area will need to be increased to accommodate longer crossing times for east/west pedestrians.

The proposed Jane Street bridge is currently proposed to be constructed in two stages where one lane will be closed in each direction for each of the two stages. A high-level traffic impact review was conducted to understand the likely impacts, and two potential detour routes were identified to accommodate any excess traffic demand which cannot be accommodated by the lane reduction on Jane Street (from two lanes to a single lane per direction) during construction. Since the assessment of temporary conditions (i.e. construction conditions) was not within the scope of the traffic assessment for this study, it is recommended that a more detailed analysis be conducted during the next stages of this study (i.e. Class EA) to assess temporary conditions and to confirm the feasibility of the two potential detour routes.

Appendix A: Turning Movement Counts

Jane Street & East Drive-Outlook Avenue

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:45:00
To: 8:45:00

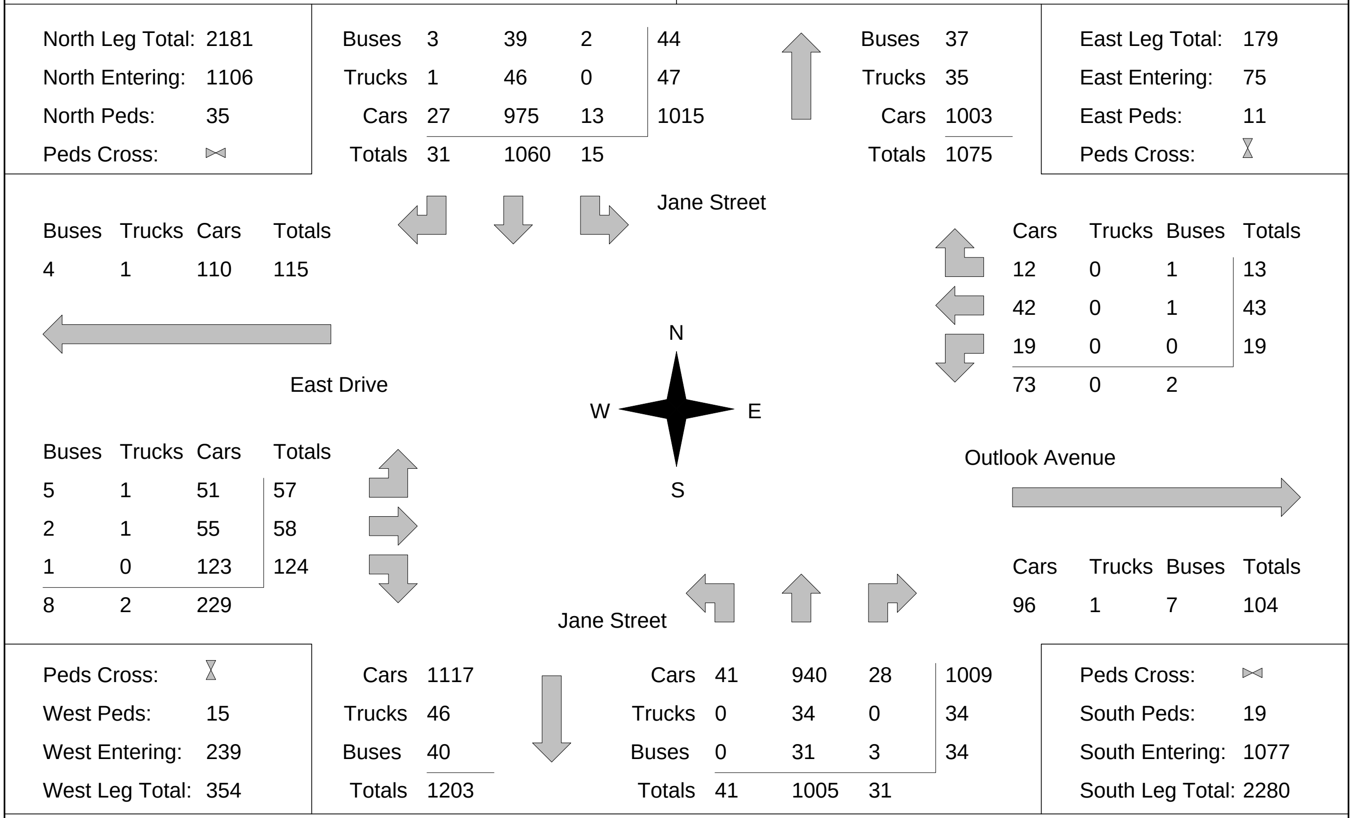
Municipality: York
Site #: 0000005801
Intersection: Jane Street & East Drive/Outlook Av
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Jane Street runs N/S



North Leg Total:	2181
North Entering:	1106
North Peds:	35
Peds Cross:	⋈

Buses	3	39	2	44
Trucks	1	46	0	47
Cars	27	975	13	1015
Totals	31	1060	15	

Buses	37
Trucks	35
Cars	1003
Totals	1075

East Leg Total:	179
East Entering:	75
East Peds:	11
Peds Cross:	⧖

Jane Street

Buses	Trucks	Cars	Totals
4	1	110	115

East Drive

Buses	Trucks	Cars	Totals
5	1	51	57
2	1	55	58
1	0	123	124
8	2	229	

Cars	Trucks	Buses	Totals
12	0	1	13
42	0	1	43
19	0	0	19
73	0	2	

Outlook Avenue

Cars	Trucks	Buses	Totals
96	1	7	104

Jane Street

Peds Cross:	⧖
West Peds:	15
West Entering:	239
West Leg Total:	354

Cars	1117
Trucks	46
Buses	40
Totals	1203

Cars	41	940	28	1009
Trucks	0	34	0	34
Buses	0	31	3	34
Totals	41	1005	31	

Peds Cross:	⋈
South Peds:	19
South Entering:	1077
South Leg Total:	2280

Comments

Jane Street & East Drive-Outlook Avenue

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 17:00:00
To: 18:00:00

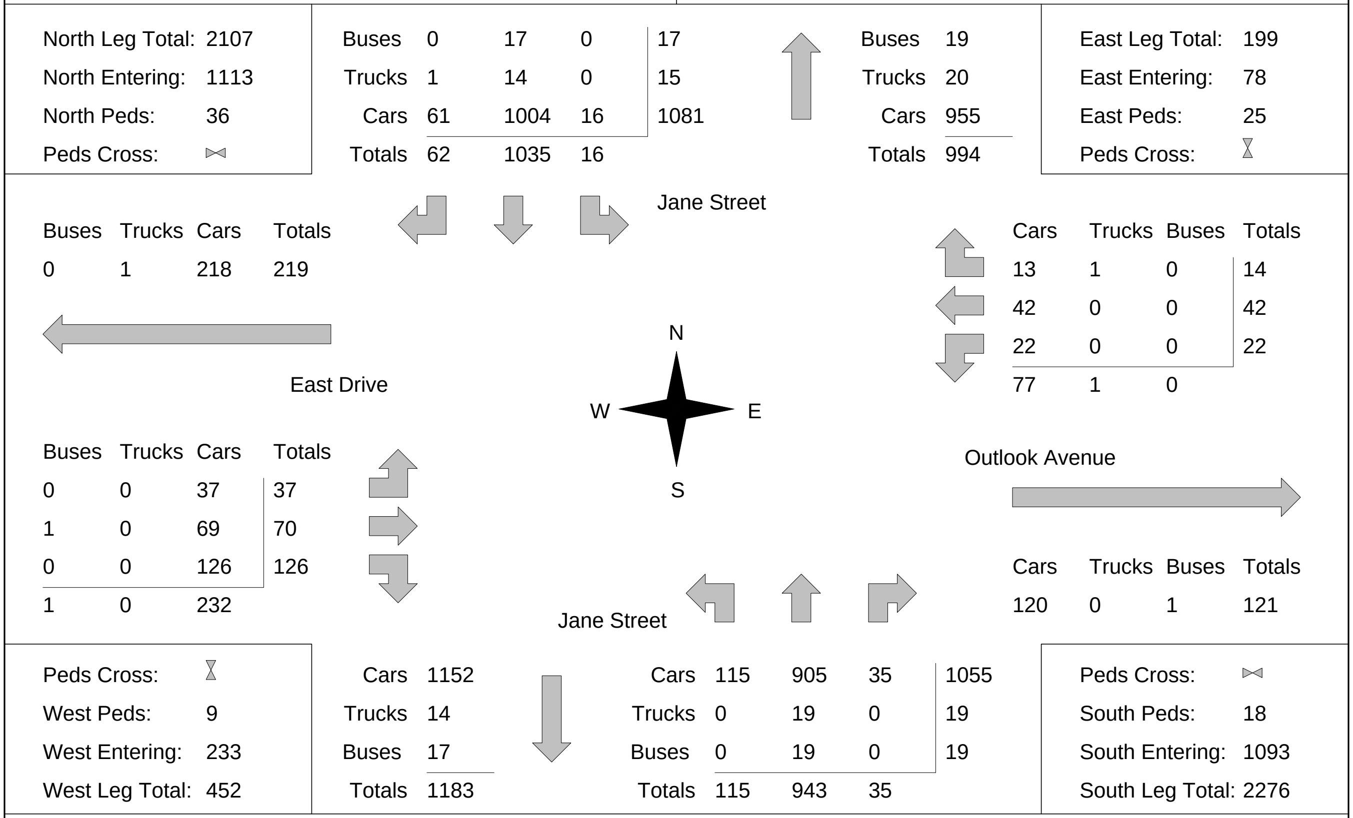
Municipality: York
Site #: 0000005801
Intersection: Jane Street & East Drive/Outlook Av
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Jane Street runs N/S



North Leg Total: 2107
North Entering: 1113
North Peds: 36
Peds Cross: ⋈

Buses	0	17	0	17
Trucks	1	14	0	15
Cars	61	1004	16	1081
Totals	62	1035	16	

Buses	19
Trucks	20
Cars	955
Totals	994

East Leg Total: 199
East Entering: 78
East Peds: 25
Peds Cross: ⧗

Buses	Trucks	Cars	Totals
0	1	218	219

Cars	Trucks	Buses	Totals
13	1	0	14
42	0	0	42
22	0	0	22
77	1	0	

Buses	Trucks	Cars	Totals
0	0	37	37
1	0	69	70
0	0	126	126
1	0	232	

Cars	Trucks	Buses	Totals
120	0	1	121

Peds Cross: ⧗
West Peds: 9
West Entering: 233
West Leg Total: 452

Cars	1152
Trucks	14
Buses	17
Totals	1183

Cars	115	905	35	1055
Trucks	0	19	0	19
Buses	0	19	0	19
Totals	115	943	35	

Peds Cross: ⋈
South Peds: 18
South Entering: 1093
South Leg Total: 2276

Comments

Jane Street & East Drive-Outlook Avenue

Total Count Diagram

Municipality: York
Site #: 0000005801
Intersection: Jane Street & East Drive/Outlook Av
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy
Person(s) who counted:

**** Signalized Intersection ****

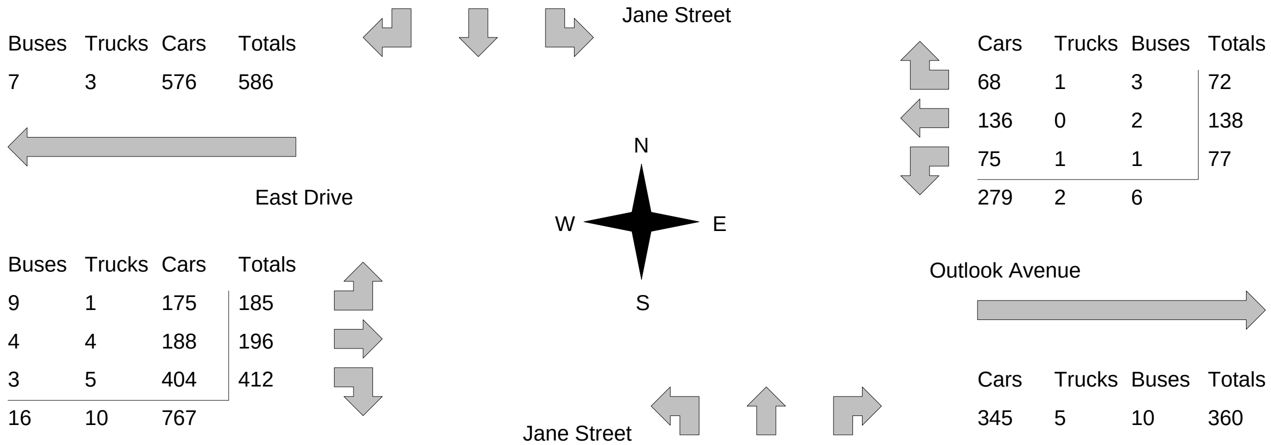
Major Road: Jane Street runs N/S

North Leg Total: 8257
North Entering: 4151
North Peds: 117
Peds Cross: ⋈

Buses	4	108	2	114
Trucks	2	105	0	107
Cars	147	3733	50	3930
Totals	153	3946	52	

Buses	118
Trucks	116
Cars	3872
Totals	4106

East Leg Total: 647
East Entering: 287
East Peds: 58
Peds Cross: ⧗



Buses	Trucks	Cars	Totals
7	3	576	586

Cars	Trucks	Buses	Totals
68	1	3	72
136	0	2	138
75	1	1	77
279	2	6	

Buses	Trucks	Cars	Totals
9	1	175	185
4	4	188	196
3	5	404	412
16	10	767	

Cars	Trucks	Buses	Totals
345	5	10	360

Peds Cross: ⧗
West Peds: 63
West Entering: 793
West Leg Total: 1379

Cars	4212
Trucks	111
Buses	112
Totals	4435

Cars	293	3629	107	4029
Trucks	1	114	1	116
Buses	1	106	4	111
Totals	295	3849	112	

Peds Cross: ⋈
South Peds: 70
South Entering: 4256
South Leg Total: 8691

Comments

Jane Street & East Drive-Outlook Avenue
Traffic Count Summary

Intersection: Jane Street & East Drive/Outlook A **Count Date:** 8-Oct-2019 **Municipality:** York

North Approach Totals / South Approach Totals

	North Approach Totals					North/South Total Approaches	South Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	10	970	22	1002	21	1959	8:00:00	20	920	17	957	12
9:00:00	16	1039	32	1087	42	2153	9:00:00	49	982	35	1066	20
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	10	902	37	949	18	2089	17:00:00	111	1004	25	1140	20
18:00:00	16	1035	62	1113	36	2206	18:00:00	115	943	35	1093	18
Totals:	52	3946	153	4151	117	8407		295	3849	112	4256	70

East Approach Totals / West Approach Totals

	East Approach Totals					East/West Total Approaches	West Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	18	31	19	68	9	229	8:00:00	43	29	89	161	7
9:00:00	23	37	16	76	18	317	9:00:00	67	56	118	241	43
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	14	28	23	65	6	223	17:00:00	38	41	79	158	4
18:00:00	22	42	14	78	25	311	18:00:00	37	70	126	233	9
Totals:	77	138	72	287	58	1080		185	196	412	793	63

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	16:00	17:00	18:00	18:00	18:00
Crossing Values:	0	125	208	0	131	183	183	183

Jane Street & Sandcliff Road

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:45:00
To: 8:45:00

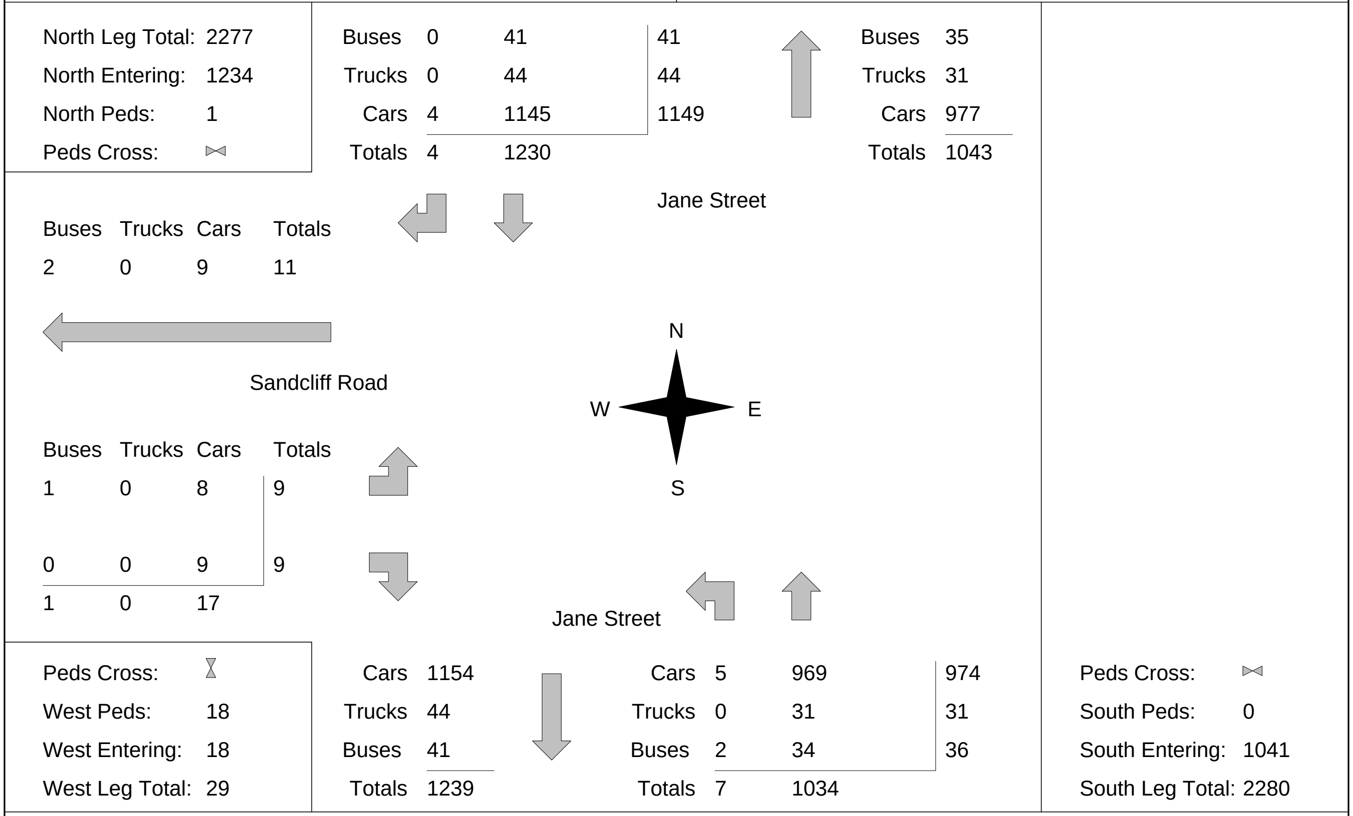
Municipality: York
Site #: 0000005802
Intersection: Jane Street & Sandcliff Road
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Jane Street runs N/S



North Leg Total: 2277
North Entering: 1234
North Peds: 1
Peds Cross: ⋈

Buses	0	41	41
Trucks	0	44	44
Cars	4	1145	1149
Totals	4	1230	

Buses	35
Trucks	31
Cars	977
Totals	1043

Buses	Trucks	Cars	Totals
2	0	9	11

Buses	Trucks	Cars	Totals
1	0	8	9
0	0	9	9
1	0	17	

Peds Cross: ⧗
West Peds: 18
West Entering: 18
West Leg Total: 29

Cars	1154
Trucks	44
Buses	41
Totals	1239

Cars	5	969	974
Trucks	0	31	31
Buses	2	34	36
Totals	7	1034	

Peds Cross: ⋈
South Peds: 0
South Entering: 1041
South Leg Total: 2280

Comments

Jane Street & Sandcliff Road

Afternoon Peak Diagram

Specified Period		**One Hour Peak**	
From:	16:00:00	**From:**	17:00:00
To:	18:00:00	**To:**	18:00:00

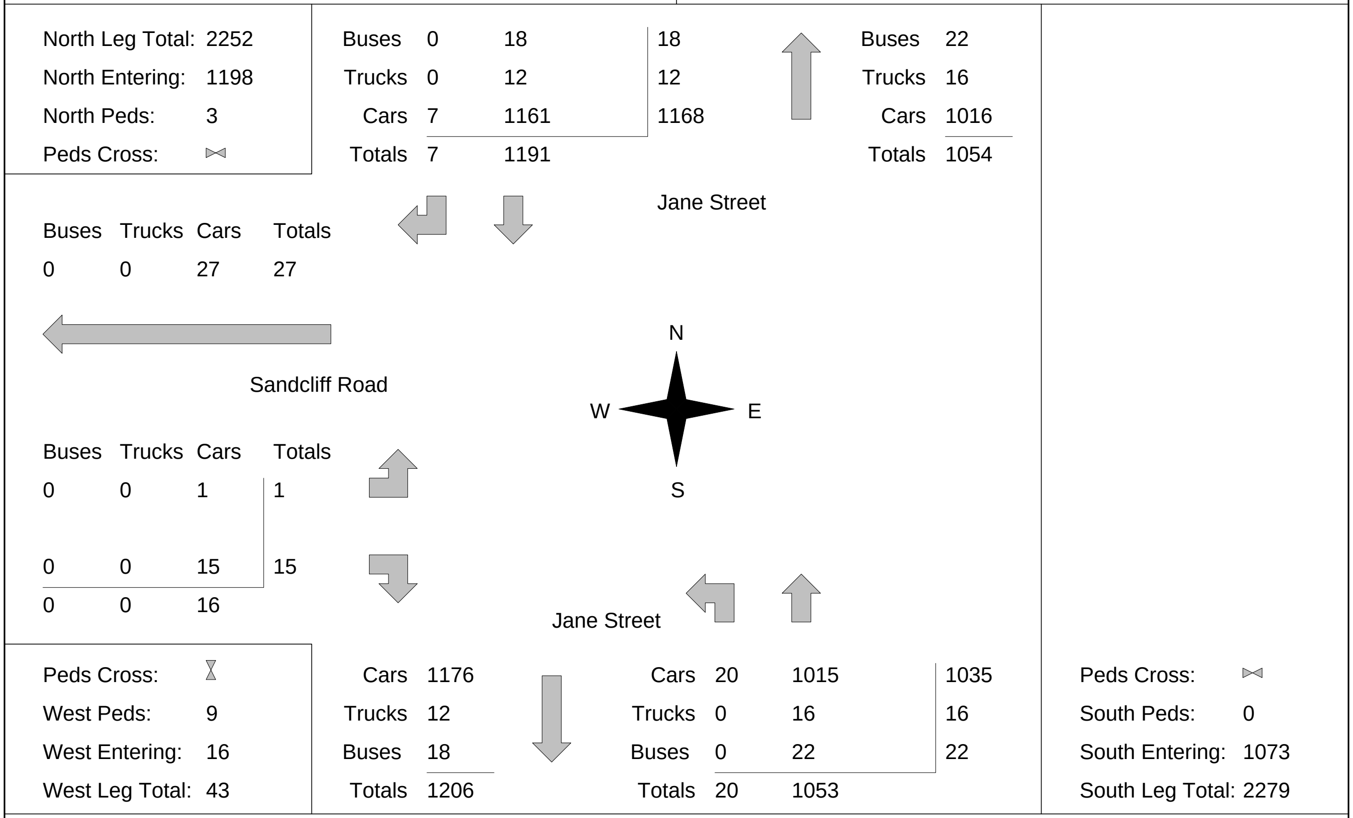
Municipality: York
Site #: 0000005802
Intersection: Jane Street & Sandcliff Road
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Jane Street runs N/S



North Leg Total: 2252
North Entering: 1198
North Peds: 3
Peds Cross: ⋈

Buses	0	18	18
Trucks	0	12	12
Cars	7	1161	1168
Totals	7	1191	

Buses	22
Trucks	16
Cars	1016
Totals	1054

Jane Street

Buses	Trucks	Cars	Totals
0	0	27	27

Sandcliff Road

Buses	Trucks	Cars	Totals
0	0	1	1
0	0	15	15
0	0	16	

Jane Street

Peds Cross: ⧖
West Peds: 9
West Entering: 16
West Leg Total: 43

Cars	1176
Trucks	12
Buses	18
Totals	1206

Cars	20	1015	1035
Trucks	0	16	16
Buses	0	22	22
Totals	20	1053	

Peds Cross: ⋈
South Peds: 0
South Entering: 1073
South Leg Total: 2279

Comments

Jane Street & Sandcliff Road

Total Count Diagram

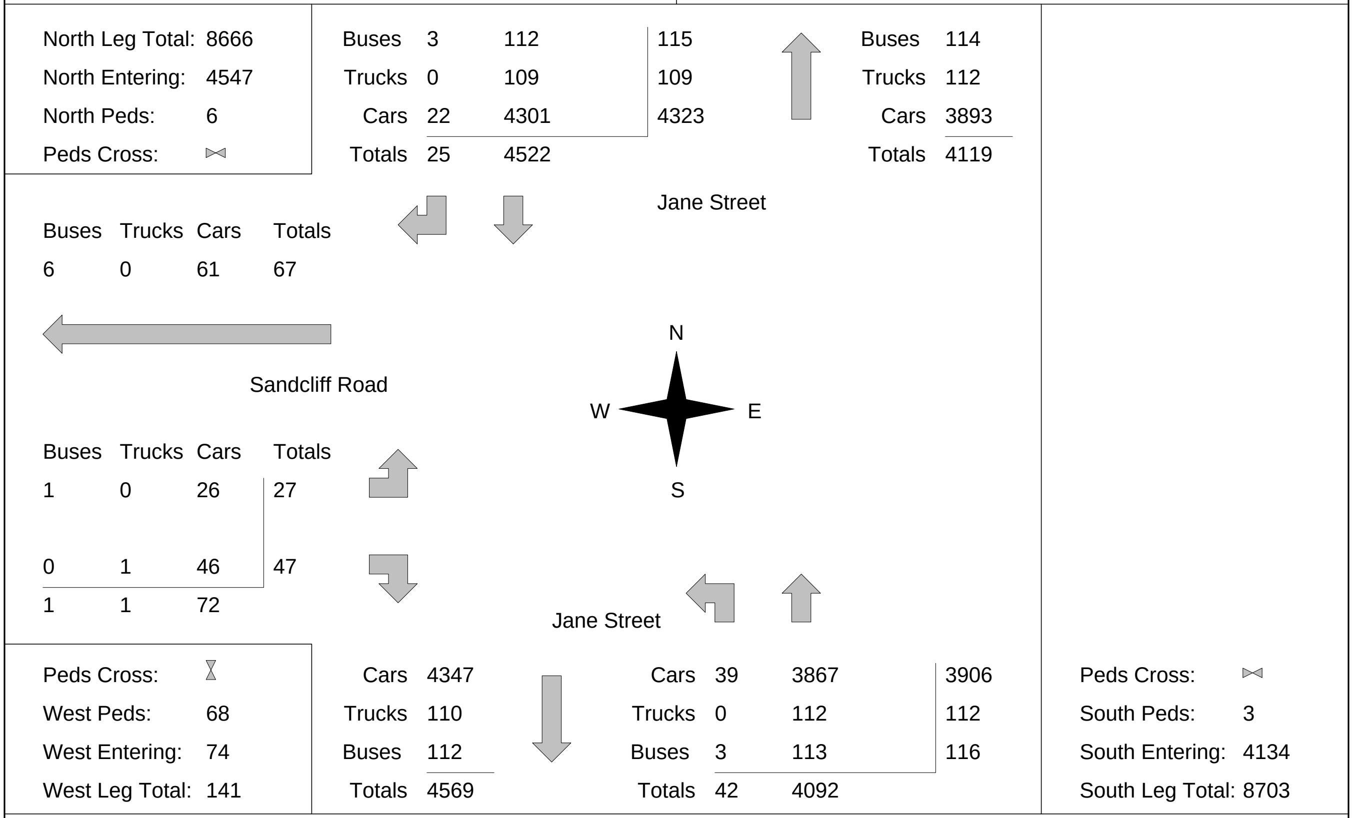
Municipality: York
Site #: 0000005802
Intersection: Jane Street & Sandcliff Road
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Jane Street runs N/S



North Leg Total: 8666
North Entering: 4547
North Peds: 6
Peds Cross: ⋈

Buses	3	112	115
Trucks	0	109	109
Cars	22	4301	4323
Totals	25	4522	

Buses	114
Trucks	112
Cars	3893
Totals	4119

Buses	Trucks	Cars	Totals
6	0	61	67

Buses	Trucks	Cars	Totals
1	0	26	27
0	1	46	47
1	1	72	

Peds Cross: ⧗
West Peds: 68
West Entering: 74
West Leg Total: 141

Cars	4347
Trucks	110
Buses	112
Totals	4569

Cars	39	3867	3906
Trucks	0	112	112
Buses	3	113	116
Totals	42	4092	

Peds Cross: ⋈
South Peds: 3
South Entering: 4134
South Leg Total: 8703

Comments

Jane Street & Sandcliff Road
Traffic Count Summary

Intersection: Jane Street & Sandcliff Road **Count Date:** 8-Oct-2019 **Municipality:** York

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Buses				Total Peds		Hour Ending	Includes Cars, Trucks, & Buses				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	1125	5	1130	2	2058	8:00:00	6	922	0	928	2
9:00:00	0	1195	5	1200	1	2224	9:00:00	8	1016	0	1024	0
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	0	1011	8	1019	0	2128	17:00:00	8	1101	0	1109	1
18:00:00	0	1191	7	1198	3	2271	18:00:00	20	1053	0	1073	0
Totals:	0	4522	25	4547	6	8681		42	4092	0	4134	3

East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Buses				Total Peds		Hour Ending	Includes Cars, Trucks, & Buses				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	0	0	0	0	27	8:00:00	15	0	12	27	4
9:00:00	0	0	0	0	0	16	9:00:00	5	0	11	16	38
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	0	0	0	0	0	15	17:00:00	6	0	9	15	17
18:00:00	0	0	0	0	0	16	18:00:00	1	0	15	16	9
Totals:	0	0	0	0	0	74		27	0	47	74	68

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	16:00		17:00	18:00	18:00	18:00
Crossing Values:	0	19	6	0		7	4	4	4

Jane Street & Black Creek Boulevard/Dalrymple Dr

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:45:00
To: 8:45:00

Municipality: York
Site #: 0000005803
Intersection: Jane Street & Black Creek Boulevar
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Jane Street runs N/S

North Leg Total: 2277
North Entering: 1231
North Peds: 1
Peds Cross: ⋈

Buses	0	38	1	39
Trucks	0	44	0	44
Cars	2	1015	131	1148
Totals	2	1097	132	

Buses	36
Trucks	32
Cars	978
Totals	1046

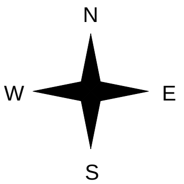
East Leg Total: 294
East Entering: 122
East Peds: 9
Peds Cross: ⧗

Jane Street

Buses	Trucks	Cars	Totals
0	0	19	19

Black Creek Boulevard

Cars	Trucks	Buses	Totals
100	2	0	102
1	0	0	1
17	2	0	19
118	4	0	



Buses	Trucks	Cars	Totals
2	0	13	15
1	0	0	1
1	1	37	39
4	1	50	

Dalrymple Drive

Cars	Trucks	Buses	Totals
170	0	2	172

Jane Street

Peds Cross: ⧗
West Peds: 20
West Entering: 55
West Leg Total: 74

Cars	1069
Trucks	47
Buses	39
Totals	1155

Cars	16	865	39	920
Trucks	0	30	0	30
Buses	0	34	0	34
Totals	16	929	39	

Peds Cross: ⋈
South Peds: 1
South Entering: 984
South Leg Total: 2139

Comments

Jane Street & Black Creek Boulevard/Dalrymple Dr

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 17:00:00
To: 18:00:00

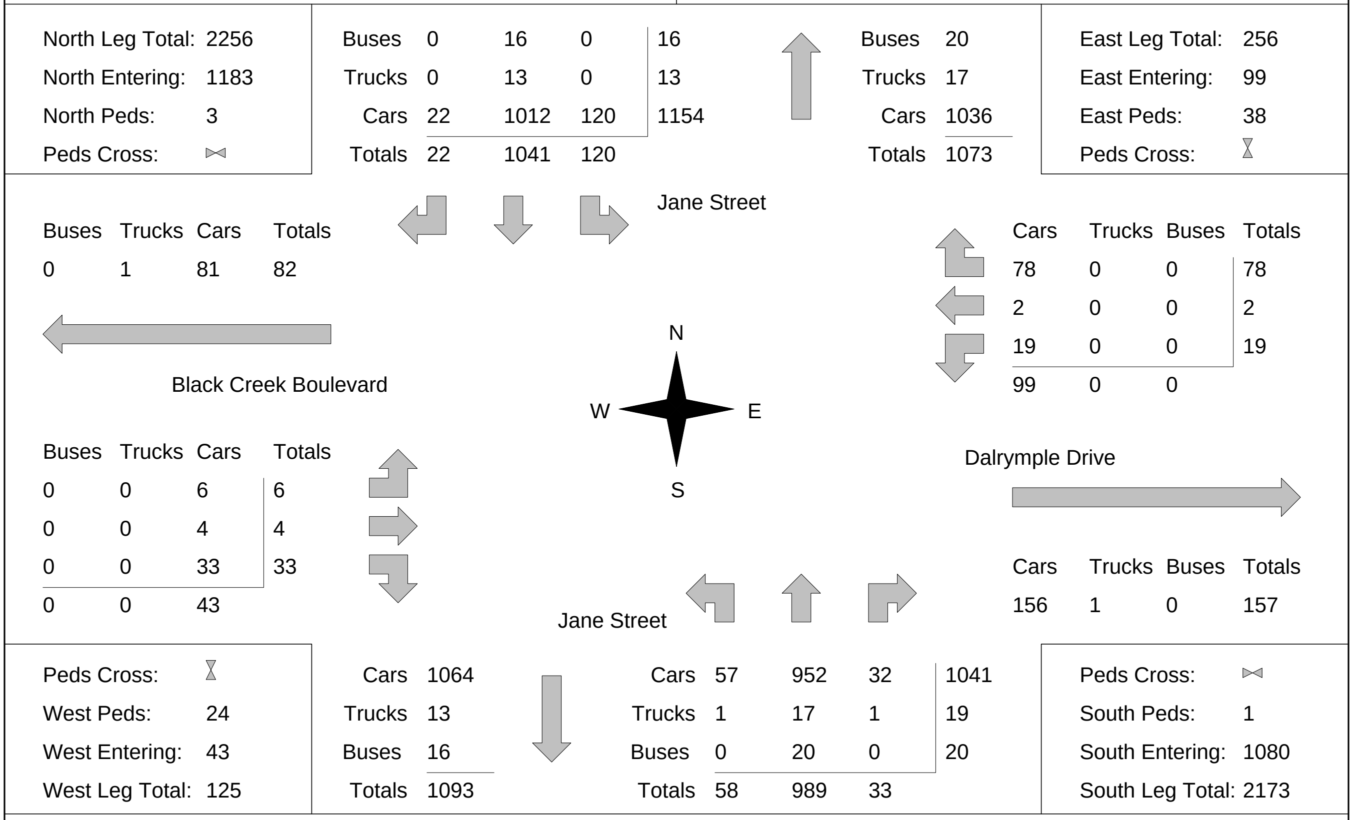
Municipality: York
Site #: 0000005803
Intersection: Jane Street & Black Creek Bouleva
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Jane Street runs N/S



North Leg Total: 2256
North Entering: 1183
North Peds: 3
Peds Cross: ⋈

Buses	0	16	0	16
Trucks	0	13	0	13
Cars	22	1012	120	1154
Totals	22	1041	120	

Buses	20
Trucks	17
Cars	1036
Totals	1073

East Leg Total: 256
East Entering: 99
East Peds: 38
Peds Cross: ⧗

Jane Street

Buses	Trucks	Cars	Totals
0	1	81	82

Cars	Trucks	Buses	Totals
78	0	0	78
2	0	0	2
19	0	0	19
99	0	0	

Black Creek Boulevard

Buses	Trucks	Cars	Totals
0	0	6	6
0	0	4	4
0	0	33	33
0	0	43	

Dalrymple Drive

Cars	Trucks	Buses	Totals
156	1	0	157

Jane Street

Peds Cross: ⧗
West Peds: 24
West Entering: 43
West Leg Total: 125

Cars	1064
Trucks	13
Buses	16
Totals	1093

Cars	57	952	32	1041
Trucks	1	17	1	19
Buses	0	20	0	20
Totals	58	989	33	

Peds Cross: ⋈
South Peds: 1
South Entering: 1080
South Leg Total: 2173

Comments

Jane Street & Black Creek Boulevard/Dalrymple Dr

Total Count Diagram

Municipality: York
Site #: 0000005803
Intersection: Jane Street & Black Creek Boulevar
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy
Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Jane Street runs N/S

North Leg Total:	8725
North Entering:	4525
North Peds:	9
Peds Cross:	⋈

Buses	0	107	2	109
Trucks	0	110	3	113
Cars	51	3810	442	4303
Totals	51	4027	447	

Buses	114
Trucks	115
Cars	3971
Totals	4200

East Leg Total:	1037
East Entering:	431
East Peds:	101
Peds Cross:	⧗

Buses	Trucks	Cars	Totals
0	1	184	185

Cars	Trucks	Buses	Totals
347	3	0	350
8	0	0	8
71	2	0	73
426	5	0	

Buses	Trucks	Cars	Totals
2	1	37	40
1	0	14	15
4	1	118	123
7	2	169	

Cars	Trucks	Buses	Totals
599	4	3	606

Peds Cross:	⧗
West Peds:	85
West Entering:	178
West Leg Total:	363

Cars	3999
Trucks	113
Buses	111
Totals	4223

Cars	125	3587	143	3855
Trucks	1	111	1	113
Buses	0	112	0	112
Totals	126	3810	144	

Peds Cross:	⋈
South Peds:	7
South Entering:	4080
South Leg Total:	8303

Comments

Jane Street & Black Creek Boulevard/Dalrymple Dr
Traffic Count Summary

Intersection: Jane Street & Black Creek Bouleva **Count Date:** 8-Oct-2019 **Municipality:** York

North Approach Totals							South Approach Totals					
	Includes Cars, Trucks, & Buses					North/South Total Approaches		Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	105	1008	5	1118	2	2004	8:00:00	17	827	42	886	3
9:00:00	126	1058	9	1193	3	2183	9:00:00	18	934	38	990	2
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	96	920	15	1031	1	2155	17:00:00	33	1060	31	1124	1
18:00:00	120	1041	22	1183	3	2263	18:00:00	58	989	33	1080	1
Totals:	447	4027	51	4525	9	8605		126	3810	144	4080	7

East Approach Totals							West Approach Totals					
	Includes Cars, Trucks, & Buses					East/West Total Approaches		Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	20	4	102	126	5	173	8:00:00	15	7	25	47	3
9:00:00	21	1	103	125	16	180	9:00:00	13	1	41	55	29
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	13	1	67	81	42	114	17:00:00	6	3	24	33	29
18:00:00	19	2	78	99	38	142	18:00:00	6	4	33	43	24
Totals:	73	8	350	431	101	609		40	15	123	178	85

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	16:00	17:00	17:00	18:00	18:00
Crossing Values:	0	47	40	0	24	24	33	33

Jane Street & Alliance Avenue/Private Driveway

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:45:00
To: 8:45:00

Municipality: York
Site #: 0000005804
Intersection: Jane Street & Alliance Avenue/Priva
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Signalized Intersection ****

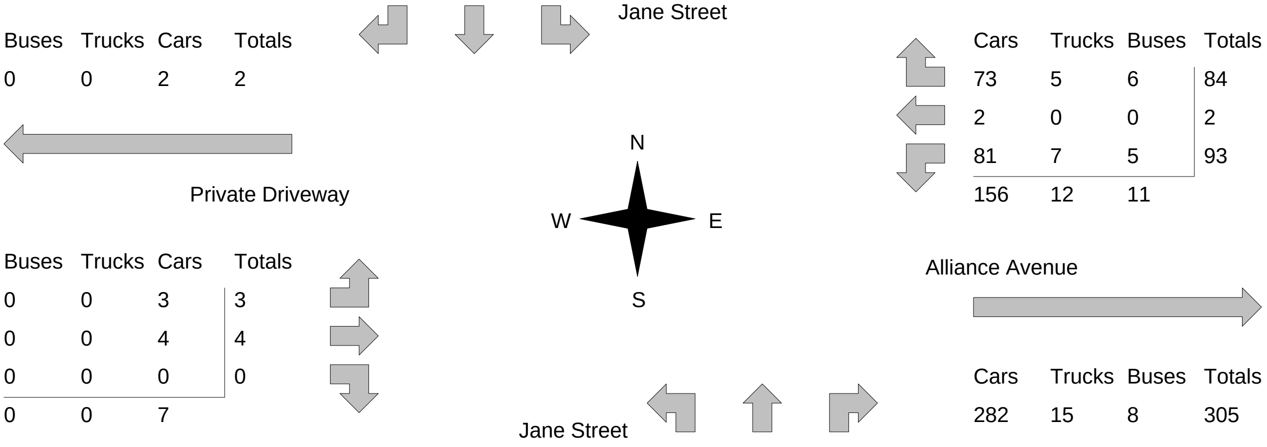
Major Road: Jane Street runs N/S

North Leg Total: 2123
North Entering: 1163
North Peds: 72
Peds Cross: ⋈

Buses	0	34	4	38
Trucks	0	42	6	48
Cars	0	903	174	1077
Totals	0	979	184	

Buses	32
Trucks	32
Cars	896
Totals	960

East Leg Total: 484
East Entering: 179
East Peds: 1
Peds Cross: ⧗



Buses	Trucks	Cars	Totals
0	0	2	2

Cars	Trucks	Buses	Totals
73	5	6	84
2	0	0	2
81	7	5	93
156	12	11	

Buses	Trucks	Cars	Totals
0	0	3	3
0	0	4	4
0	0	0	0
0	0	7	

Cars	Trucks	Buses	Totals
282	15	8	305

Peds Cross: ⧗
West Peds: 2
West Entering: 7
West Leg Total: 9

Cars	984
Trucks	49
Buses	39
Totals	1072

Cars	0	820	104	924
Trucks	0	27	9	36
Buses	0	26	4	30
Totals	0	873	117	

Peds Cross: ⋈
South Peds: 0
South Entering: 990
South Leg Total: 2062

Comments

Jane Street & Alliance Avenue/Private Driveway

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 17:00:00
To: 18:00:00

Municipality: York
Site #: 0000005804
Intersection: Jane Street & Alliance Avenue/Priva
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Jane Street runs N/S

North Leg Total: 2202
North Entering: 1121
North Peds: 78
Peds Cross: ⋈

Buses	0	15	1	16
Trucks	0	9	5	14
Cars	1	930	160	1091
Totals	1	954	166	

Buses	22
Trucks	21
Cars	1038
Totals	1081

East Leg Total: 609
East Entering: 324
East Peds: 11
Peds Cross: ⧗

Jane Street

Buses	Trucks	Cars	Totals
0	0	6	6

Private Driveway

Cars	Trucks	Buses	Totals
185	2	5	192
1	0	0	1
129	2	0	131
315	4	5	

N
W
E
S

Buses	Trucks	Cars	Totals
0	0	1	1
0	0	1	1
0	0	2	2
0	0	4	

Alliance Avenue

Cars	Trucks	Buses	Totals
277	6	2	285

Jane Street

Peds Cross: ⧗
West Peds: 2
West Entering: 4
West Leg Total: 10

Cars	1061
Trucks	11
Buses	15
Totals	1087

Cars	4	852	116	972
Trucks	0	19	1	20
Buses	0	17	1	18
Totals	4	888	118	

Peds Cross: ⋈
South Peds: 0
South Entering: 1010
South Leg Total: 2097

Comments

Jane Street & Alliance Avenue/Private Driveway

Total Count Diagram

Municipality: York
Site #: 0000005804
Intersection: Jane Street & Alliance Avenue/Priva
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy
Person(s) who counted:

**** Signalized Intersection ****

Major Road: Jane Street runs N/S

North Leg Total:	8269
North Entering:	4268
North Peds:	234
Peds Cross:	⋈

Buses	0	101	10	111
Trucks	0	91	25	116
Cars	4	3472	565	4041
Totals	4	3664	600	

Buses	112
Trucks	116
Cars	3773
Totals	4001

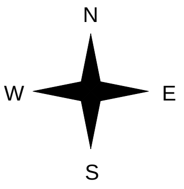
East Leg Total:	2040
East Entering:	974
East Peds:	26
Peds Cross:	⧗

Jane Street

Buses	Trucks	Cars	Totals
0	0	14	14

Private Driveway

Cars	Trucks	Buses	Totals
482	15	23	520
4	0	0	4
420	19	11	450
906	34	34	



Buses	Trucks	Cars	Totals
0	0	6	6
0	0	6	6
0	0	3	3
0	0	15	

Alliance Avenue

Cars	Trucks	Buses	Totals
1000	47	19	1066

Jane Street

Peds Cross:	⧗
West Peds:	6
West Entering:	15
West Leg Total:	29

Cars	3895
Trucks	110
Buses	112
Totals	4117

Cars	6	3285	429	3720
Trucks	0	101	22	123
Buses	0	89	9	98
Totals	6	3475	460	

Peds Cross:	⋈
South Peds:	0
South Entering:	3941
South Leg Total:	8058

Comments

Jane Street & Alliance Avenue/Private Driveway
Traffic Count Summary

Intersection: Jane Street & Alliance Avenue/Priv **Count Date:** 8-Oct-2019 **Municipality:** York

North Approach Totals						North/South Total Approaches	South Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	120	936	1	1057	32	1954	8:00:00	0	810	87	897	0
9:00:00	203	917	0	1120	69	2105	9:00:00	0	860	125	985	0
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	111	857	2	970	55	2019	17:00:00	2	917	130	1049	0
18:00:00	166	954	1	1121	78	2131	18:00:00	4	888	118	1010	0
Totals:	600	3664	4	4268	234	8209		6	3475	460	3941	0

East Approach Totals						East/West Total Approaches	West Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	73	1	67	141	2	145	8:00:00	1	2	1	4	1
9:00:00	103	1	87	191	1	197	9:00:00	3	3	0	6	2
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	143	1	174	318	12	319	17:00:00	1	0	0	1	1
18:00:00	131	1	192	324	11	328	18:00:00	1	1	2	4	2
Totals:	450	4	520	974	26	989		6	6	3	15	6

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	16:00	17:00	17:00	18:00	18:00
Crossing Values:	0	108	178	0	200	200	211	211

Jane Street & Haney Avenue

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:30:00
To: 8:30:00

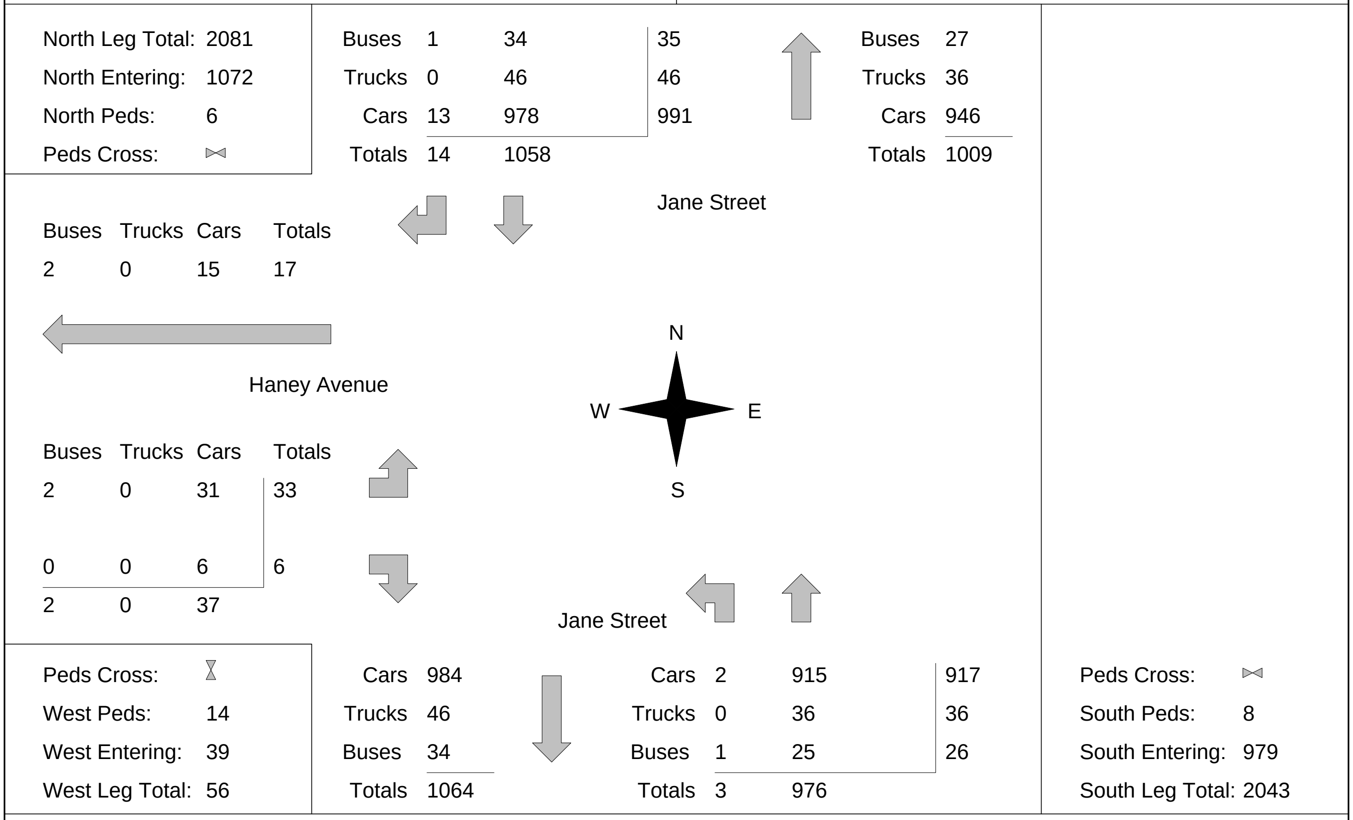
Municipality: York
Site #: 0000005805
Intersection: Jane Street & Haney Avenue
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Jane Street runs N/S



North Leg Total: 2081
North Entering: 1072
North Peds: 6
Peds Cross: ⋈

Buses	1	34	35
Trucks	0	46	46
Cars	13	978	991
Totals	14	1058	

Buses	27
Trucks	36
Cars	946
Totals	1009

Buses	Trucks	Cars	Totals
2	0	15	17

Buses	Trucks	Cars	Totals
2	0	31	33
0	0	6	6
2	0	37	

Peds Cross: ⧗
West Peds: 14
West Entering: 39
West Leg Total: 56

Cars	984
Trucks	46
Buses	34
Totals	1064

Cars	2	915	917
Trucks	0	36	36
Buses	1	25	26
Totals	3	976	

Peds Cross: ⋈
South Peds: 8
South Entering: 979
South Leg Total: 2043

Comments

Jane Street & Haney Avenue

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 16:45:00
To: 17:45:00

Municipality: York
Site #: 0000005805
Intersection: Jane Street & Haney Avenue
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Jane Street runs N/S

North Leg Total: 2104
North Entering: 1076
North Peds: 9
Peds Cross: ⋈

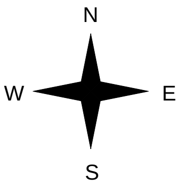
Buses	0	16	16
Trucks	1	10	11
Cars	36	1013	1049
Totals	37	1039	

Buses	16
Trucks	33
Cars	979
Totals	1028

Jane Street

Buses	Trucks	Cars	Totals
0	1	46	47

Haney Avenue



Buses	Trucks	Cars	Totals
0	0	20	20
0	0	2	2
0	0	22	

Jane Street

Peds Cross: ⧗
West Peds: 23
West Entering: 22
West Leg Total: 69

Cars	1015
Trucks	10
Buses	16
Totals	1041

Cars	10	959	969
Trucks	0	33	33
Buses	0	16	16
Totals	10	1008	

Peds Cross: ⋈
South Peds: 22
South Entering: 1018
South Leg Total: 2059

Comments

Jane Street & Haney Avenue

Total Count Diagram

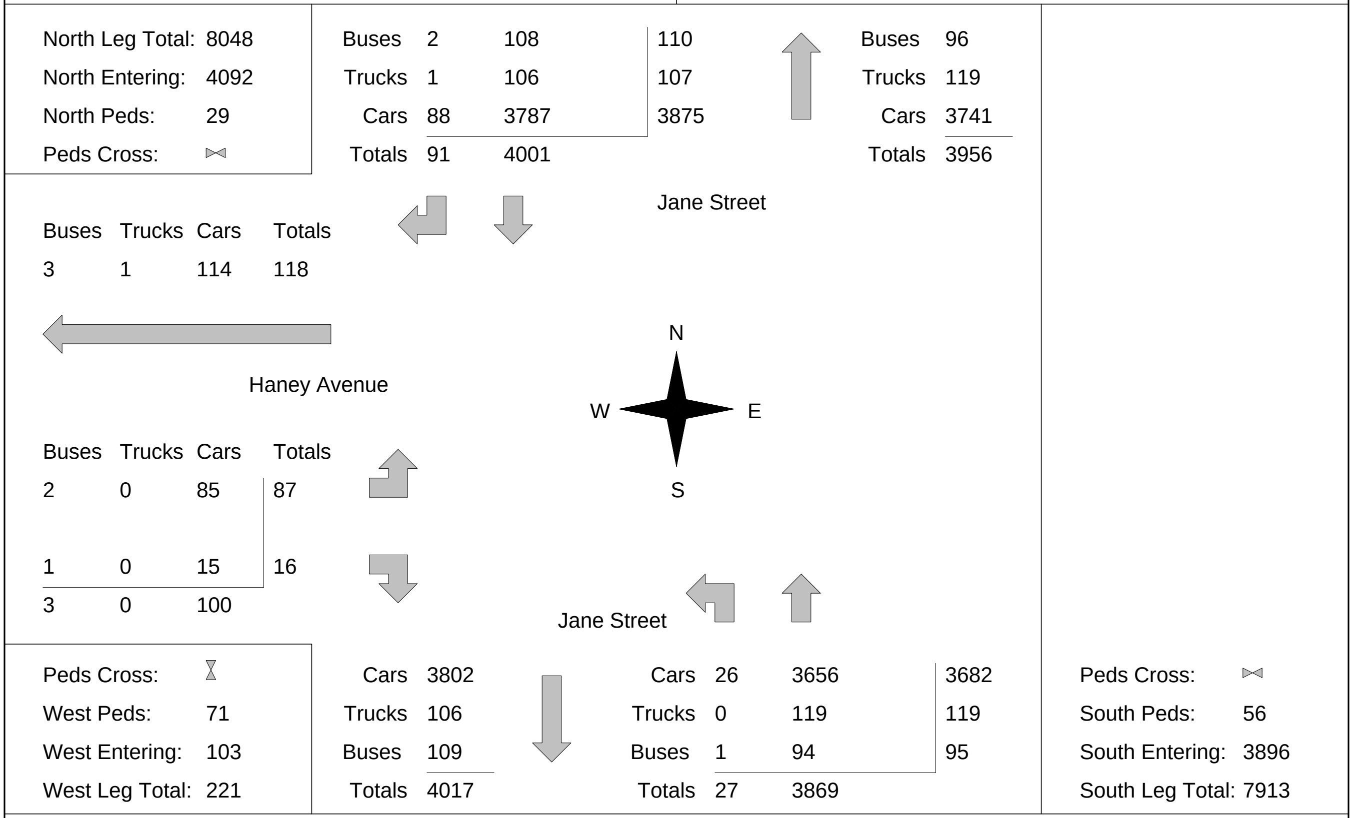
Municipality: York
Site #: 0000005805
Intersection: Jane Street & Haney Avenue
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Jane Street runs N/S



North Leg Total: 8048
North Entering: 4092
North Peds: 29
Peds Cross: ⋈

Buses	2	108	110
Trucks	1	106	107
Cars	88	3787	3875
Totals	91	4001	

Buses	96
Trucks	119
Cars	3741
Totals	3956

Buses	Trucks	Cars	Totals
3	1	114	118

Buses	Trucks	Cars	Totals
2	0	85	87
1	0	15	16
3	0	100	

Peds Cross: ⧗
West Peds: 71
West Entering: 103
West Leg Total: 221

Cars	3802
Trucks	106
Buses	109
Totals	4017

Cars	26	3656	3682
Trucks	0	119	119
Buses	1	94	95
Totals	27	3869	

Peds Cross: ⋈
South Peds: 56
South Entering: 3896
South Leg Total: 7913

Comments

Jane Street & Haney Avenue
Traffic Count Summary

Intersection: Jane Street & Haney Avenue | **Count Date:** 8-Oct-2019 | **Municipality:** York

North Approach Totals						North/South Total Approaches	South Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	1010	7	1017	4	1902	8:00:00	2	883	0	885	1
9:00:00	0	998	18	1016	7	1984	9:00:00	5	963	0	968	12
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	0	961	27	988	10	2014	17:00:00	11	1015	0	1026	27
18:00:00	0	1032	39	1071	8	2088	18:00:00	9	1008	0	1017	16
Totals:	0	4001	91	4092	29	7988		27	3869	0	3896	56

East Approach Totals						East/West Total Approaches	West Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	0	0	0	0	25	8:00:00	23	0	2	25	8
9:00:00	0	0	0	0	0	36	9:00:00	29	0	7	36	18
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	0	0	0	0	0	20	17:00:00	15	0	5	20	26
18:00:00	0	0	0	0	0	22	18:00:00	20	0	2	22	19
Totals:	0	0	0	0	0	103		87	0	16	103	71

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	16:00		17:00	17:00	18:00	18:00
Crossing Values:	0	28	48	0		52	52	44	44

Rockcliffe Boulevard & Alliance Avenue

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 8:00:00
To: 9:00:00

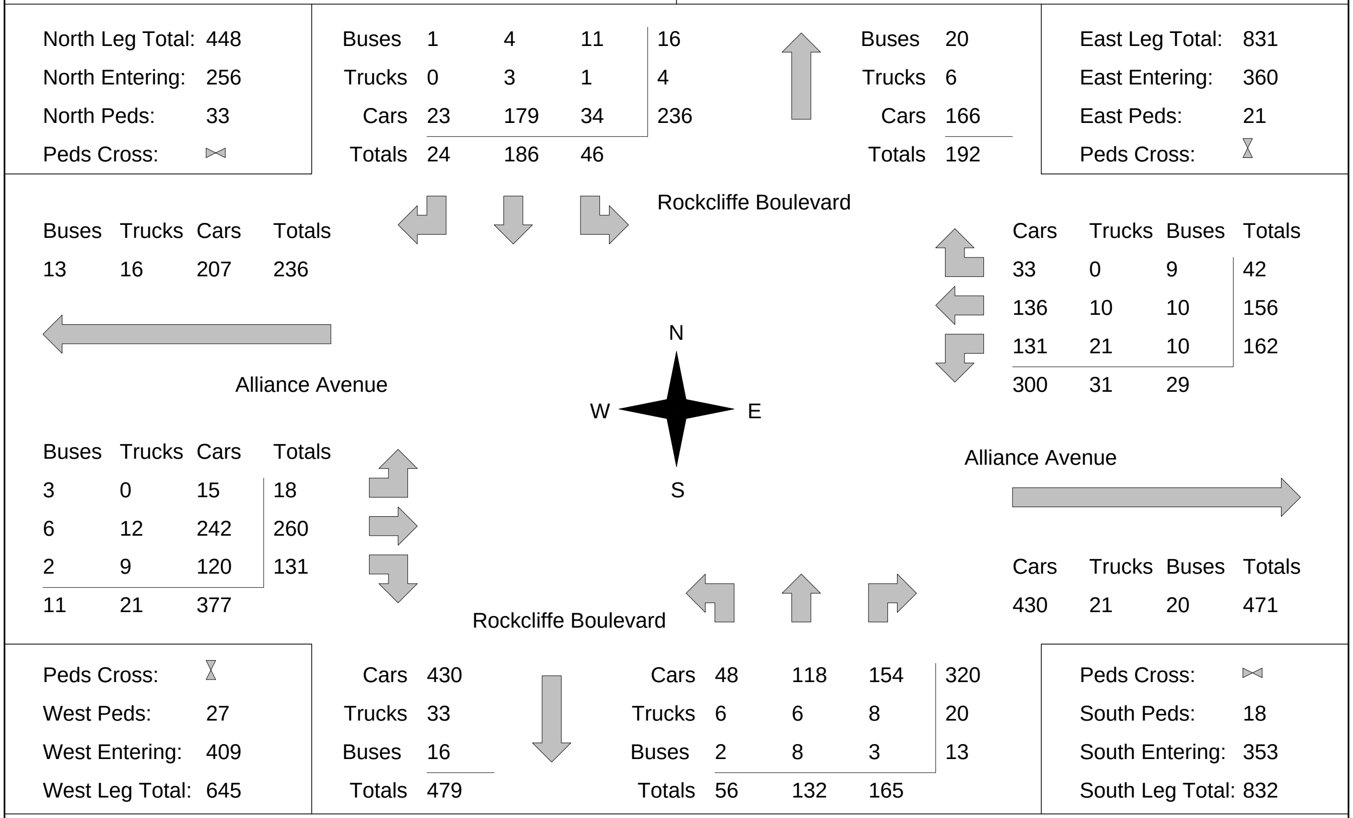
Municipality: York
Site #: 0000005806
Intersection: Alliance Avenue & Rockcliffe Boulev
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Alliance Avenue runs W/E



North Leg Total: 448
North Entering: 256
North Peds: 33
Peds Cross: ⋈

Buses	1	4	11	16
Trucks	0	3	1	4
Cars	23	179	34	236
Totals	24	186	46	

Buses	20
Trucks	6
Cars	166
Totals	192

East Leg Total: 831
East Entering: 360
East Peds: 21
Peds Cross: ⧗

Buses	Trucks	Cars	Totals
13	16	207	236

Cars	Trucks	Buses	Totals
33	0	9	42
136	10	10	156
131	21	10	162
300	31	29	

Buses	Trucks	Cars	Totals
3	0	15	18
6	12	242	260
2	9	120	131
11	21	377	

Cars	Trucks	Buses	Totals
430	21	20	471

Peds Cross: ⧗
West Peds: 27
West Entering: 409
West Leg Total: 645

Cars	430
Trucks	33
Buses	16
Totals	479

Cars	48	118	154	320
Trucks	6	6	8	20
Buses	2	8	3	13
Totals	56	132	165	

Peds Cross: ⋈
South Peds: 18
South Entering: 353
South Leg Total: 832

Comments

Rockcliffe Boulevard & Alliance Avenue

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 17:00:00
To: 18:00:00

Municipality: York
Site #: 0000005806
Intersection: Alliance Avenue & Rockcliffe Boulev
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Alliance Avenue runs W/E

North Leg Total:	488
North Entering:	215
North Peds:	35
Peds Cross:	⋈

Buses	0	3	4	7
Trucks	0	2	0	2
Cars	22	160	24	206
Totals	22	165	28	

Buses	4
Trucks	3
Cars	266
Totals	273

East Leg Total:	812
East Entering:	451
East Peds:	13
Peds Cross:	⧗

Rockcliffe Boulevard

Buses	Trucks	Cars	Totals
5	3	284	292

Cars	Trucks	Buses	Totals
20	1	1	22
187	2	5	194
230	4	1	235
437	7	7	

Alliance Avenue

N

W E

S

Alliance Avenue

Buses	Trucks	Cars	Totals
0	0	18	18
0	6	168	174
1	2	93	96
1	8	279	

Cars	Trucks	Buses	Totals
346	10	5	361

Rockcliffe Boulevard

Peds Cross:	⧗
West Peds:	25
West Entering:	288
West Leg Total:	580

Cars	483
Trucks	8
Buses	5
Totals	496

Cars	75	228	154	457
Trucks	1	2	4	7
Buses	0	3	1	4
Totals	76	233	159	

Peds Cross:	⋈
South Peds:	20
South Entering:	468
South Leg Total:	964

Comments

Rockcliffe Boulevard & Alliance Avenue

Total Count Diagram

Municipality: York
Site #: 0000005806
Intersection: Alliance Avenue & Rockcliffe Boule
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Alliance Avenue runs W/E

North Leg Total:	1642
North Entering:	805
North Peds:	106
Peds Cross:	⋈

Buses	1	17	23	41
Trucks	0	9	2	11
Cars	89	588	76	753
Totals	90	614	101	

Buses	40
Trucks	24
Cars	773
Totals	837

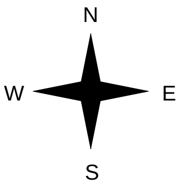
East Leg Total:	3010
East Entering:	1552
East Peds:	57
Peds Cross:	⧗

Rockcliffe Boulevard

Buses	Trucks	Cars	Totals
35	40	936	1011

Alliance Avenue

Cars	Trucks	Buses	Totals
97	5	12	114
613	24	31	668
709	44	17	770
1419	73	60	



Buses	Trucks	Cars	Totals
4	1	61	66
10	36	701	747
3	21	371	395
17	58	1133	

Alliance Avenue

Cars	Trucks	Buses	Totals
1356	61	41	1458

Rockcliffe Boulevard

Peds Cross:	⧗
West Peds:	81
West Entering:	1208
West Leg Total:	2219

Cars	1668
Trucks	74
Buses	37
Totals	1779

Cars	234	615	579	1428
Trucks	16	18	23	57
Buses	3	24	8	35
Totals	253	657	610	

Peds Cross:	⋈
South Peds:	58
South Entering:	1520
South Leg Total:	3299

Comments

Rockcliffe Boulevard & Alliance Avenue
Traffic Count Summary

Intersection:	Count Date:	Municipality:
Alliance Avenue & Rockcliffe Boule	8-Oct-2019	York

North Approach Totals						North/South Total Approaches	South Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	18	128	22	168	13	443	8:00:00	37	78	160	275	4
9:00:00	46	186	24	256	33	609	9:00:00	56	132	165	353	18
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	9	135	22	166	25	590	17:00:00	84	214	126	424	16
18:00:00	28	165	22	215	35	683	18:00:00	76	233	159	468	20
Totals:	101	614	90	805	106	2325		253	657	610	1520	58

East Approach Totals						East/West Total Approaches	West Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	132	101	22	255	7	513	8:00:00	13	149	96	258	5
9:00:00	162	156	42	360	21	769	9:00:00	18	260	131	409	27
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	241	217	28	486	16	739	17:00:00	17	164	72	253	24
18:00:00	235	194	22	451	13	739	18:00:00	18	174	96	288	25
Totals:	770	668	114	1552	57	2760		66	747	395	1208	81

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	16:00	17:00	17:00	18:00	18:00
Crossing Values:	0	195	336	0	347	516	375	502

Rockcliffe Boulevard & Rockcliffe Court

Morning Peak Diagram

Specified Period		**One Hour Peak**	
From:	7:00:00	**From:**	8:00:00
To:	9:00:00	**To:**	9:00:00

Municipality: York
Site #: 0000005807
Intersection: Rockcliffe Boulevard & Rockcliffe Co
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

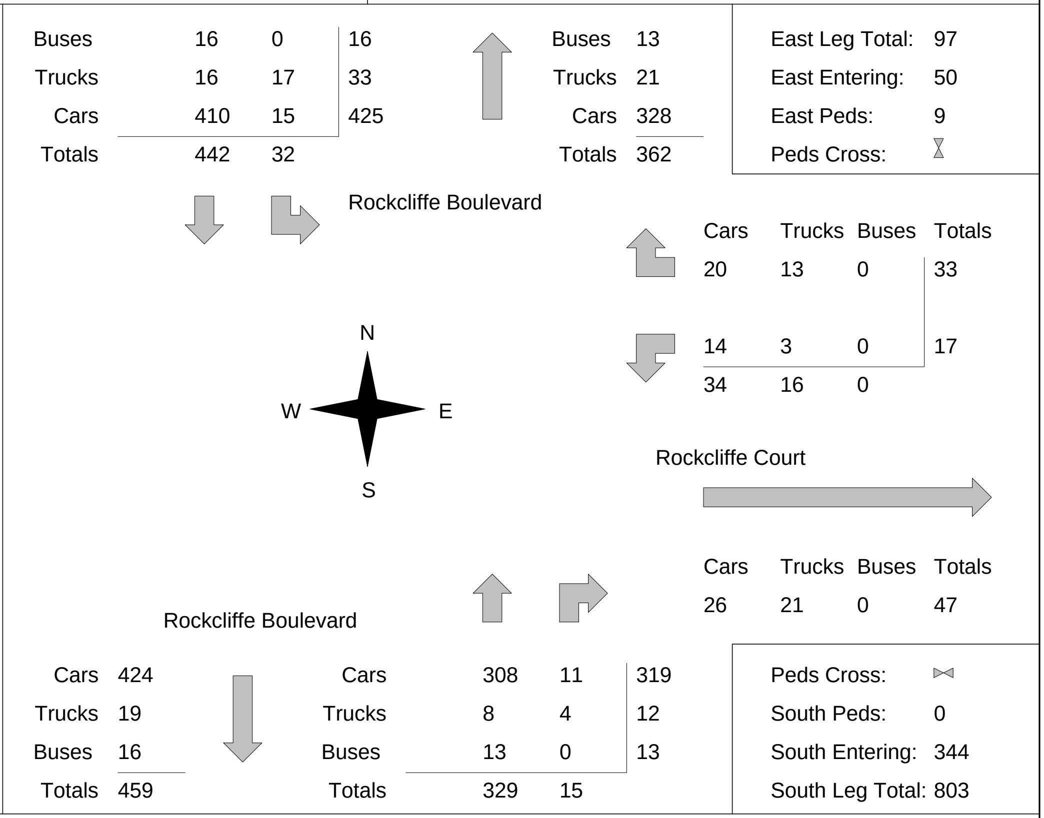
Major Road: Rockcliffe Boulevard runs N/S

North Leg Total: 836
North Entering: 474
North Peds: 0
Peds Cross: ⋈

Buses	16	0	16
Trucks	16	17	33
Cars	410	15	425
Totals	442	32	

Buses	13
Trucks	21
Cars	328
Totals	362

East Leg Total: 97
East Entering: 50
East Peds: 9
Peds Cross: ⧗



Cars	Trucks	Buses	Totals
20	13	0	33
14	3	0	17
34	16	0	

Cars	Trucks	Buses	Totals
26	21	0	47

Cars	424
Trucks	19
Buses	16
Totals	459

Cars	308	11	319
Trucks	8	4	12
Buses	13	0	13
Totals	329	15	

Peds Cross: ⋈
South Peds: 0
South Entering: 344
South Leg Total: 803

Comments

Rockcliffe Boulevard & Rockcliffe Court

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 17:00:00
To: 18:00:00

Municipality: York
Site #: 0000005807
Intersection: Rockcliffe Boulevard & Rockcliffe C
TFR File #: 1
Count date: 8-Oct-2019

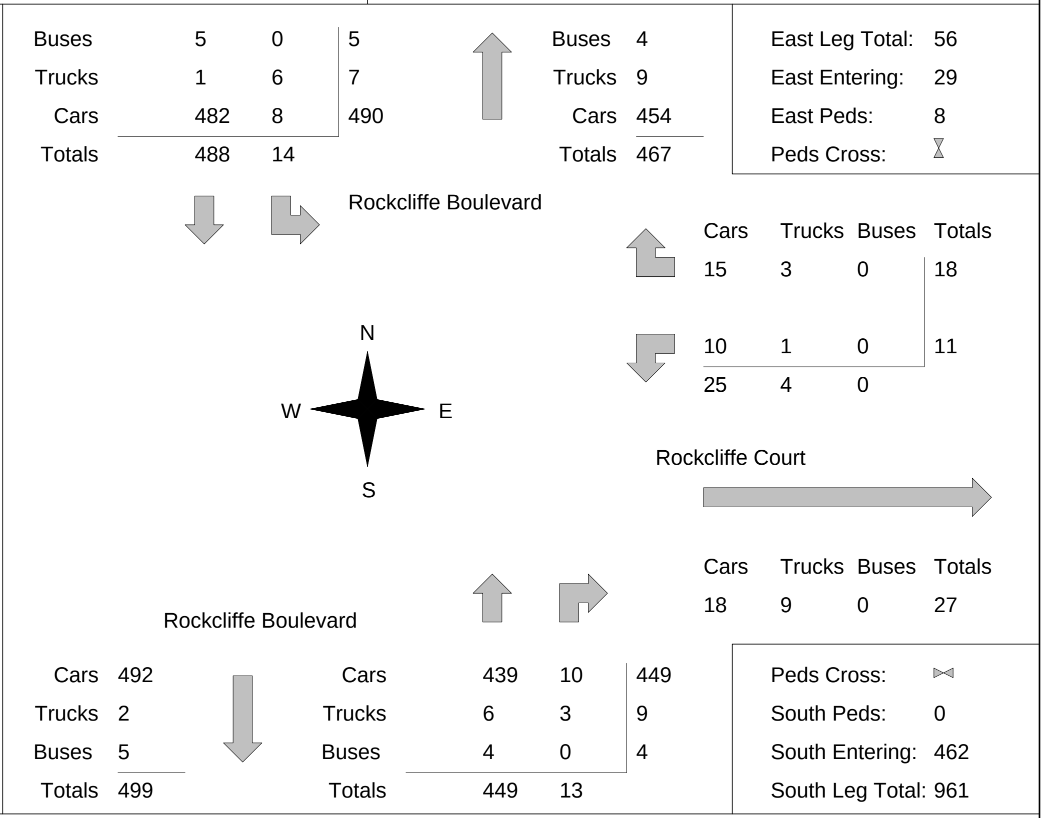
Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Rockcliffe Boulevard runs N/S

North Leg Total:	969
North Entering:	502
North Peds:	1
Peds Cross:	⋈



Buses	5	0	5
Trucks	1	6	7
Cars	482	8	490
Totals	488	14	

Buses	4
Trucks	9
Cars	454
Totals	467

East Leg Total:	56
East Entering:	29
East Peds:	8
Peds Cross:	⧗

Cars	Trucks	Buses	Totals
15	3	0	18
10	1	0	11
25	4	0	

Cars	Trucks	Buses	Totals
18	9	0	27

Cars	492
Trucks	2
Buses	5
Totals	499

Cars	439	10	449
Trucks	6	3	9
Buses	4	0	4
Totals	449	13	

Peds Cross:	⋈
South Peds:	0
South Entering:	462
South Leg Total:	961

Comments

Rockcliffe Boulevard & Rockcliffe Court

Total Count Diagram

Municipality: York
Site #: 0000005807
Intersection: Rockcliffe Boulevard & Rockcliffe C
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Rockcliffe Boulevard runs N/S

North Leg Total: 3306
North Entering: 1779
North Peds: 6
Peds Cross: ⋈

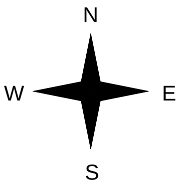
Buses	36	0	36
Trucks	33	39	72
Cars	1607	64	1671
Totals	1676	103	

Buses	34
Trucks	59
Cars	1434
Totals	1527

East Leg Total: 344
East Entering: 189
East Peds: 31
Peds Cross: ⧗

Rockcliffe Boulevard

Cars	Trucks	Buses	Totals
83	34	0	117
53	19	0	72
136	53	0	



Rockcliffe Court

Cars	Trucks	Buses	Totals
106	49	0	155

Rockcliffe Boulevard

Cars	1660
Trucks	52
Buses	36
Totals	1748

Cars	1351	42	1393
Trucks	25	10	35
Buses	34	0	34
Totals	1410	52	

Peds Cross: ⋈
South Peds: 0
South Entering: 1462
South Leg Total: 3210

Comments

Rockcliffe Boulevard & Rockcliffe Court
Traffic Count Summary

Intersection: Rockcliffe Boulevard & Rockcliffe C **Count Date:** 8-Oct-2019 **Municipality:** York

North Approach Totals							South Approach Totals					
	Includes Cars, Trucks, & Buses					North/South Total Approaches		Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	36	315	0	351	0	607	8:00:00	0	238	18	256	0
9:00:00	32	442	0	474	0	818	9:00:00	0	329	15	344	0
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	21	431	0	452	5	852	17:00:00	0	394	6	400	0
18:00:00	14	488	0	502	1	964	18:00:00	0	449	13	462	0
Totals:	103	1676	0	1779	6	3241		0	1410	52	1462	0

East Approach Totals							West Approach Totals					
	Includes Cars, Trucks, & Buses					East/West Total Approaches		Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	38	0	37	75	1	75	8:00:00	0	0	0	0	0
9:00:00	17	0	33	50	9	50	9:00:00	0	0	0	0	0
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	6	0	29	35	13	35	17:00:00	0	0	0	0	0
18:00:00	11	0	18	29	8	29	18:00:00	0	0	0	0	0
Totals:	72	0	117	189	31	189		0	0	0	0	0

Calculated Values for Traffic Crossing Major Street

Hours Ending:	0:00	0:00	7:00	8:00	9:00	16:00	17:00	18:00
Crossing Values:	0	0	0	38	17	0	11	12

Rockcliffe Boulevard & Terry Drive-Woolner Avenu

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 8:00:00
To: 9:00:00

Municipality: York
Site #: 0000005808
Intersection: Rockcliffe Boulevard & Terry Drive
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Rockcliffe Boulevard runs N/S

North Leg Total: 769
North Entering: 431
North Peds: 16
Peds Cross: ⋈

Buses	6	9	1	16
Trucks	3	18	0	21
Cars	19	308	67	394
Totals	28	335	68	

Buses	15
Trucks	12
Cars	311
Totals	338

East Leg Total: 328
East Entering: 118
East Peds: 9
Peds Cross: ⧗

Rockcliffe Boulevard

Buses	Trucks	Cars	Totals
14	4	61	79

Cars	Trucks	Buses	Totals
29	2	1	32
28	0	3	31
53	0	2	55
110	2	6	

Woolner Avenue

N

W E

S

Terry Drive

Buses	Trucks	Cars	Totals
4	2	36	42
3	0	86	89
1	1	82	84
8	3	204	

Cars	Trucks	Buses	Totals
205	1	4	210

Rockcliffe Boulevard

Peds Cross: ⧗
West Peds: 31
West Entering: 215
West Leg Total: 294

Cars	443
Trucks	19
Buses	12
Totals	474

Cars	14	246	52	312
Trucks	1	8	1	10
Buses	5	10	0	15
Totals	20	264	53	

Peds Cross: ⋈
South Peds: 6
South Entering: 337
South Leg Total: 811

Comments

Rockcliffe Boulevard & Terry Drive-Woolner Avenu

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 17:00:00
To: 18:00:00

Municipality: York
Site #: 0000005808
Intersection: Rockcliffe Boulevard & Terry Drive
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

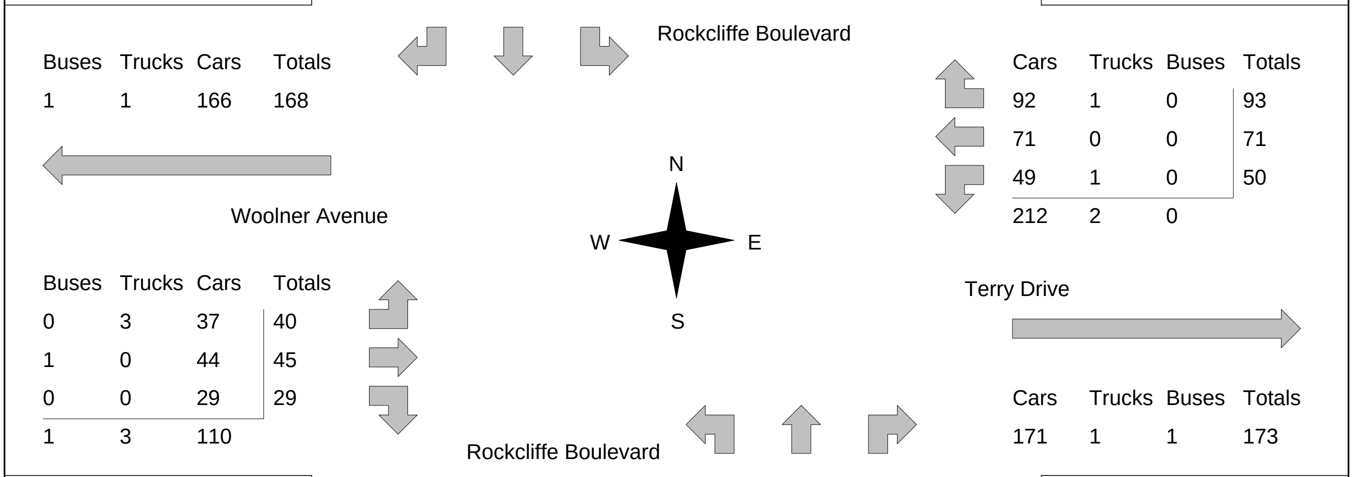
Major Road: Rockcliffe Boulevard runs N/S

North Leg Total:	936
North Entering:	487
North Peds:	2
Peds Cross:	⋈

Buses	1	3	0	4
Trucks	1	1	0	2
Cars	45	373	63	481
Totals	47	377	63	

Buses	5
Trucks	9
Cars	435
Totals	449

East Leg Total:	387
East Entering:	214
East Peds:	8
Peds Cross:	⧗



Buses	Trucks	Cars	Totals
1	1	166	168

Cars	Trucks	Buses	Totals
92	1	0	93
71	0	0	71
49	1	0	50
212	2	0	

Buses	Trucks	Cars	Totals
0	3	37	40
1	0	44	45
0	0	29	29
1	3	110	

Cars	Trucks	Buses	Totals
171	1	1	173

Peds Cross:	⧗
West Peds:	13
West Entering:	114
West Leg Total:	282

Cars	451
Trucks	2
Buses	3
Totals	456

Cars	50	306	64	420
Trucks	0	5	1	6
Buses	0	5	0	5
Totals	50	316	65	

Peds Cross:	⋈
South Peds:	6
South Entering:	431
South Leg Total:	887

Comments

Rockcliffe Boulevard & Terry Drive-Woolner Avenu

Total Count Diagram

Municipality: York
Site #: 0000005808
Intersection: Rockcliffe Boulevard & Terry Drive
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

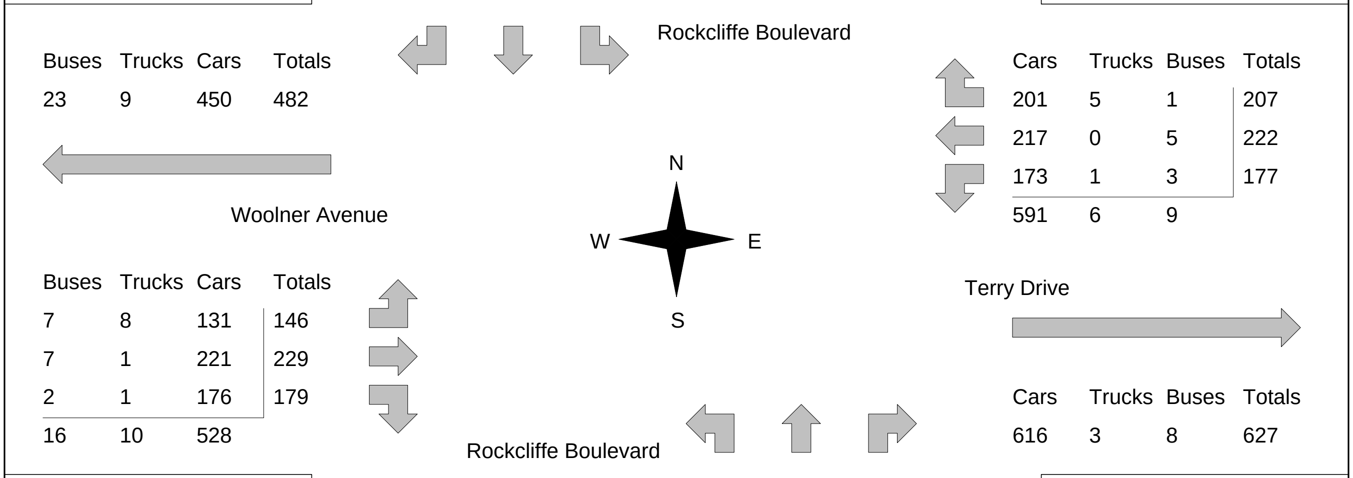
Major Road: Rockcliffe Boulevard runs N/S

North Leg Total: 3140
North Entering: 1705
North Peds: 20
Peds Cross: ⋈

Buses	12	21	1	34
Trucks	8	45	0	53
Cars	122	1277	219	1618
Totals	142	1343	220	

Buses	32
Trucks	34
Cars	1369
Totals	1435

East Leg Total: 1233
East Entering: 606
East Peds: 29
Peds Cross: ⧗



Buses	Trucks	Cars	Totals
23	9	450	482

Cars	Trucks	Buses	Totals
201	5	1	207
217	0	5	222
173	1	3	177
591	6	9	

Buses	Trucks	Cars	Totals
7	8	131	146
7	1	221	229
2	1	176	179
16	10	528	

Cars	Trucks	Buses	Totals
616	3	8	627

Peds Cross: ⧗
West Peds: 60
West Entering: 554
West Leg Total: 1036

Cars	1626
Trucks	47
Buses	26
Totals	1699

Cars	111	1037	176	1324
Trucks	1	21	2	24
Buses	6	24	0	30
Totals	118	1082	178	

Peds Cross: ⋈
South Peds: 16
South Entering: 1378
South Leg Total: 3077

Comments

Rockcliffe Boulevard & Terry Drive-Woolner Avenu
Traffic Count Summary

Intersection: Rockcliffe Boulevard & Terry Drive **Count Date:** 8-Oct-2019 **Municipality:** York

North Approach Totals							South Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds	North/South Total Approaches	Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	37	291	24	352	2	590	8:00:00	16	204	18	238	0
9:00:00	68	335	28	431	16	768	9:00:00	20	264	53	337	6
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	52	340	43	435	0	807	17:00:00	32	298	42	372	4
18:00:00	63	377	47	487	2	918	18:00:00	50	316	65	431	6
Totals:	220	1343	142	1705	20	3083		118	1082	178	1378	16

East Approach Totals							West Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds	East/West Total Approaches	Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	24	23	18	65	2	170	8:00:00	34	42	29	105	2
9:00:00	55	31	32	118	9	333	9:00:00	42	89	84	215	31
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	48	97	64	209	10	329	17:00:00	30	53	37	120	14
18:00:00	50	71	93	214	8	328	18:00:00	40	45	29	114	13
Totals:	177	222	207	606	29	1160		146	229	179	554	60

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	16:00	17:00	18:00	18:00	18:00
Crossing Values:	0	102	208	0	179	169	169	169

Symes Road & Terry Drive

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 8:00:00
To: 9:00:00

Municipality: York
Site #: 0000005809
Intersection: Symes Road & Terry Drive
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

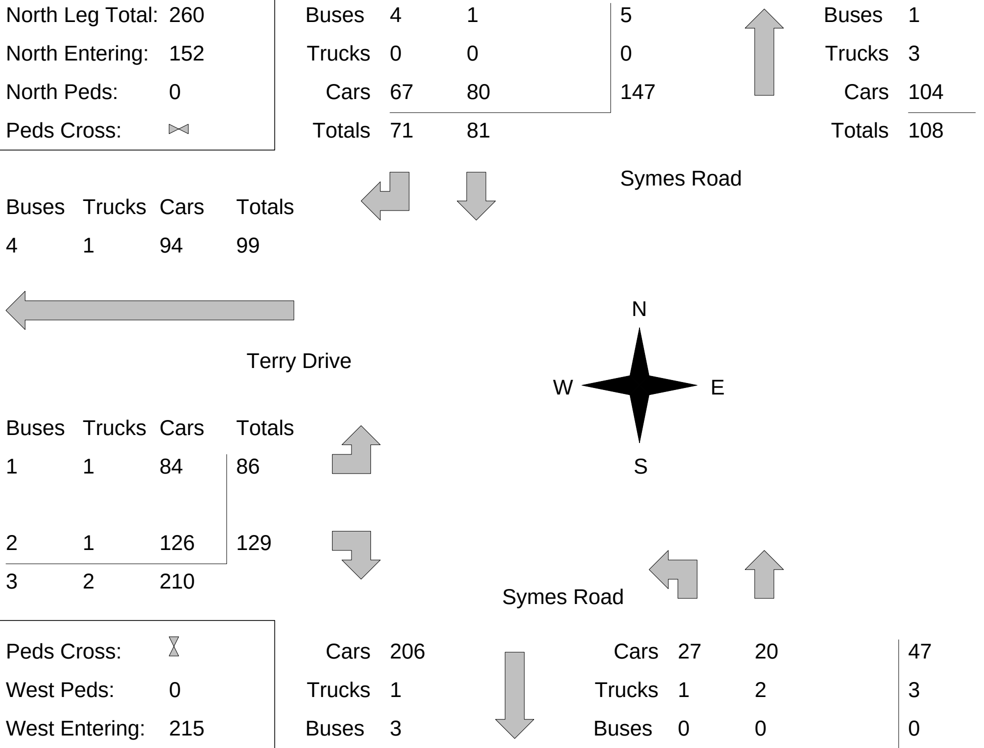
**** Non-Signalized Intersection ****

Major Road: Symes Road runs N/S

North Leg Total: 260
North Entering: 152
North Peds: 0
Peds Cross: ⋈

Buses	4	1	5
Trucks	0	0	0
Cars	67	80	147
Totals	71	81	

Buses	1
Trucks	3
Cars	104
Totals	108



Buses	Trucks	Cars	Totals
4	1	94	99

Buses	Trucks	Cars	Totals
1	1	84	86
2	1	126	129
3	2	210	

Peds Cross: ⧗
West Peds: 0
West Entering: 215
West Leg Total: 314

Cars	206
Trucks	1
Buses	3
Totals	210

Cars	27	20	47
Trucks	1	2	3
Buses	0	0	0
Totals	28	22	

Peds Cross: ⋈
South Peds: 1
South Entering: 50
South Leg Total: 260

Comments

Symes Road & Terry Drive

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 17:00:00
To: 18:00:00

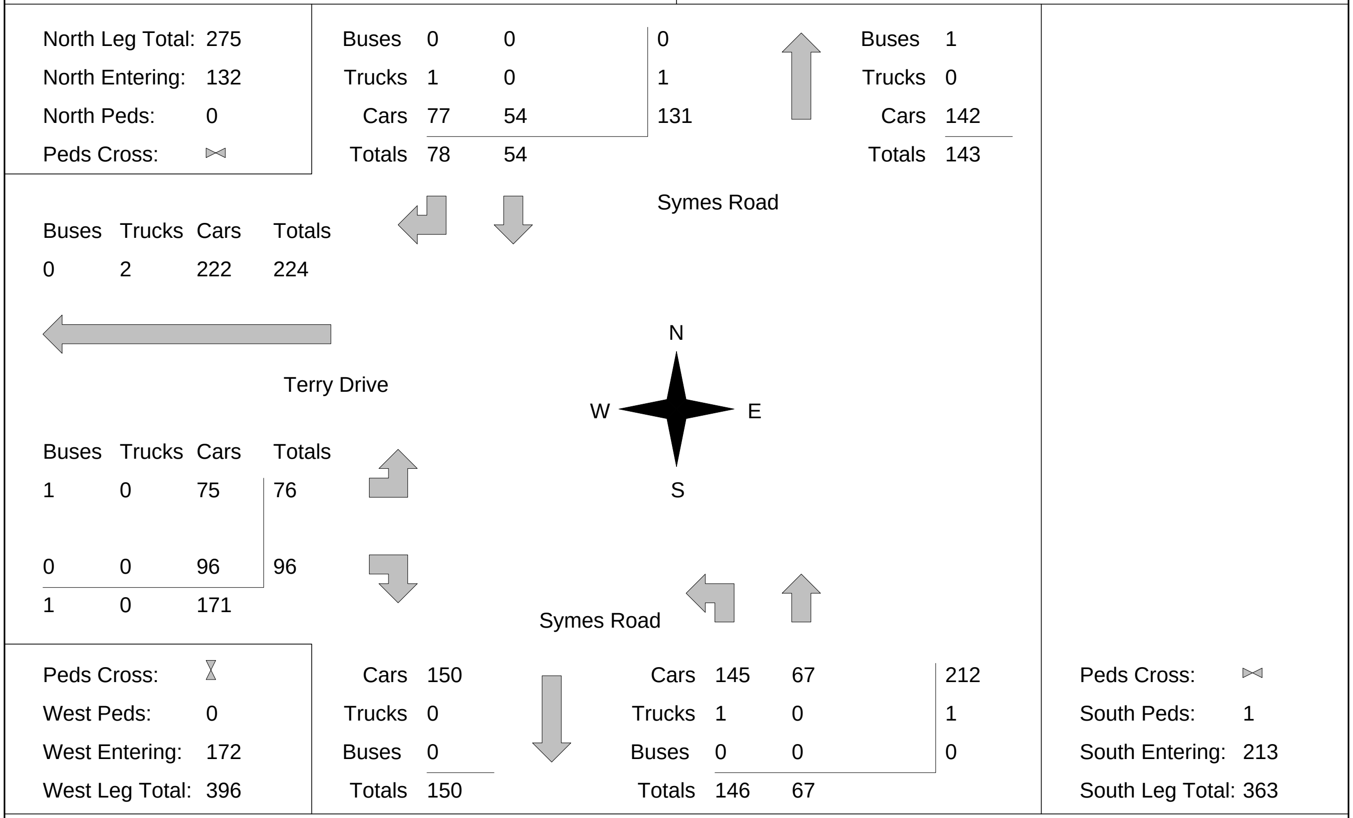
Municipality: York
Site #: 0000005809
Intersection: Symes Road & Terry Drive
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Symes Road runs N/S



North Leg Total: 275
North Entering: 132
North Peds: 0
Peds Cross: ⋈

Buses	0	0	0
Trucks	1	0	1
Cars	77	54	131
Totals	78	54	

Buses	1
Trucks	0
Cars	142
Totals	143

Buses	Trucks	Cars	Totals
0	2	222	224

Buses	Trucks	Cars	Totals
1	0	75	76
0	0	96	96
1	0	171	

Peds Cross: ⧗
West Peds: 0
West Entering: 172
West Leg Total: 396

Cars	150
Trucks	0
Buses	0
Totals	150

Cars	145	67	212
Trucks	1	0	1
Buses	0	0	0
Totals	146	67	

Peds Cross: ⋈
South Peds: 1
South Entering: 213
South Leg Total: 363

Comments

Symes Road & Terry Drive

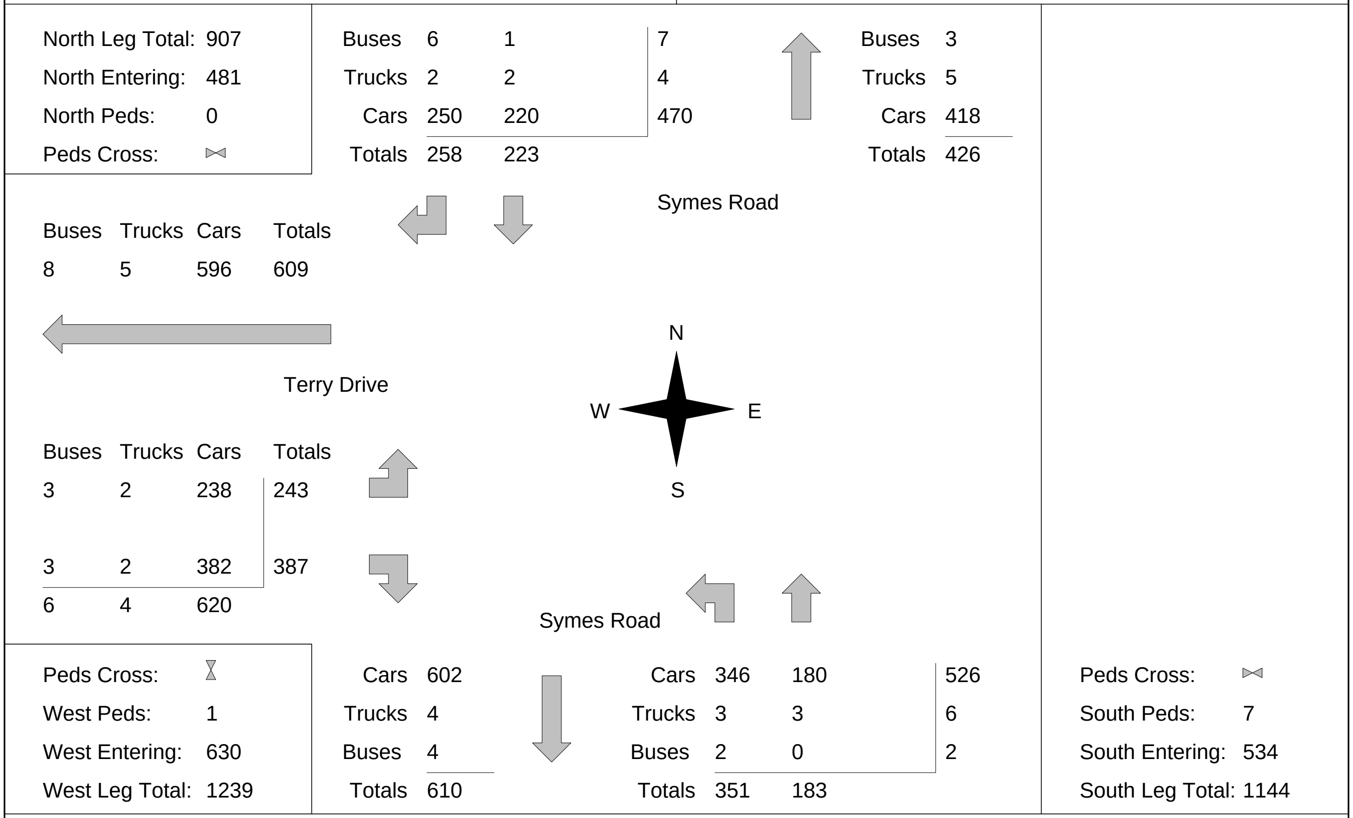
Total Count Diagram

Municipality: York
Site #: 0000005809
Intersection: Symes Road & Terry Drive
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy
Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Symes Road runs N/S



North Leg Total: 907
North Entering: 481
North Peds: 0
Peds Cross: ⋈

Buses	6	1	7
Trucks	2	2	4
Cars	250	220	470
Totals	258	223	

Buses	3
Trucks	5
Cars	418
Totals	426

Buses	Trucks	Cars	Totals
8	5	596	609

Buses	Trucks	Cars	Totals
3	2	238	243
3	2	382	387
6	4	620	

Peds Cross: ⧗
West Peds: 1
West Entering: 630
West Leg Total: 1239

Cars	602
Trucks	4
Buses	4
Totals	610

Cars	346	180	526
Trucks	3	3	6
Buses	2	0	2
Totals	351	183	

Peds Cross: ⋈
South Peds: 7
South Entering: 534
South Leg Total: 1144

Comments

Symes Road & Terry Drive
Traffic Count Summary

Intersection: Symes Road & Terry Drive | **Count Date:** 8-Oct-2019 | **Municipality:** York

North Approach Totals						North/South Total Approaches	South Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	52	40	92	0	128	8:00:00	26	10	0	36	2
9:00:00	0	81	71	152	0	202	9:00:00	28	22	0	50	1
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	0	36	69	105	0	340	17:00:00	151	84	0	235	3
18:00:00	0	54	78	132	0	345	18:00:00	146	67	0	213	1
Totals:	0	223	258	481	0	1015		351	183	0	534	7

East Approach Totals						East/West Total Approaches	West Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	0	0	0	0	109	8:00:00	32	0	77	109	1
9:00:00	0	0	0	0	0	215	9:00:00	86	0	129	215	0
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	0	0	0	0	0	134	17:00:00	49	0	85	134	0
18:00:00	0	0	0	0	0	172	18:00:00	76	0	96	172	0
Totals:	0	0	0	0	0	630		243	0	387	630	1

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	16:00	17:00	17:00	18:00	18:00
Crossing Values:	0	34	87	0	52	52	77	77

Symes Road & Hillborn Avenue

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 8:00:00
To: 9:00:00

Municipality: York
Site #: 0000005810
Intersection: Symes Road & Hillborn Avenue
TFR File #: 1
Count date: 8-Oct-2019

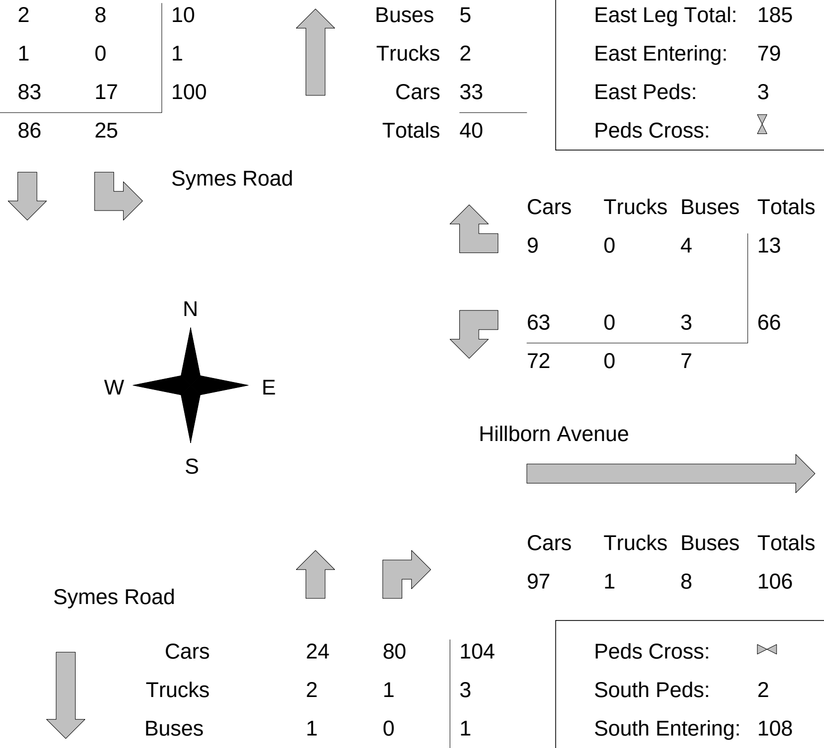
Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Symes Road runs N/S

North Leg Total: 151
North Entering: 111
North Peds: 1
Peds Cross: ⋈



Buses	2	8	10
Trucks	1	0	1
Cars	83	17	100
Totals	86	25	

Buses	5
Trucks	2
Cars	33
Totals	40

East Leg Total: 185
East Entering: 79
East Peds: 3
Peds Cross: ⧗

Cars	Trucks	Buses	Totals
9	0	4	13
63	0	3	66
72	0	7	

Cars	Trucks	Buses	Totals
97	1	8	106

Cars	146
Trucks	1
Buses	5
Totals	152

Cars	24	80	104
Trucks	2	1	3
Buses	1	0	1
Totals	27	81	

Peds Cross: ⋈
South Peds: 2
South Entering: 108
South Leg Total: 260

Comments

Symes Road & Hillborn Avenue

Afternoon Peak Diagram

Specified Period		**One Hour Peak**	
From:	16:00:00	**From:**	17:00:00
To:	18:00:00	**To:**	18:00:00

Municipality: York
Site #: 0000005810
Intersection: Symes Road & Hillborn Avenue
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Symes Road runs N/S

North Leg Total:	146
North Entering:	73
North Peds:	0
Peds Cross:	⋈

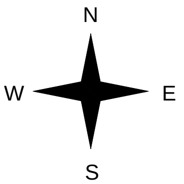
Buses	0	0	0
Trucks	0	1	1
Cars	61	11	72
Totals	61	12	

Buses	0
Trucks	0
Cars	73
Totals	73

East Leg Total:	167
East Entering:	80
East Peds:	2
Peds Cross:	⧗

Symes Road

Cars	Trucks	Buses	Totals
6	0	0	6
73	1	0	74
79	1	0	



Hillborn Avenue

Cars	Trucks	Buses	Totals
85	1	1	87

Symes Road

Cars	134
Trucks	1
Buses	0
Totals	135

Cars	67	74	141
Trucks	0	0	0
Buses	0	1	1
Totals	67	75	

Peds Cross:	⋈
South Peds:	1
South Entering:	142
South Leg Total:	277

Comments

Symes Road & Hillborn Avenue

Total Count Diagram

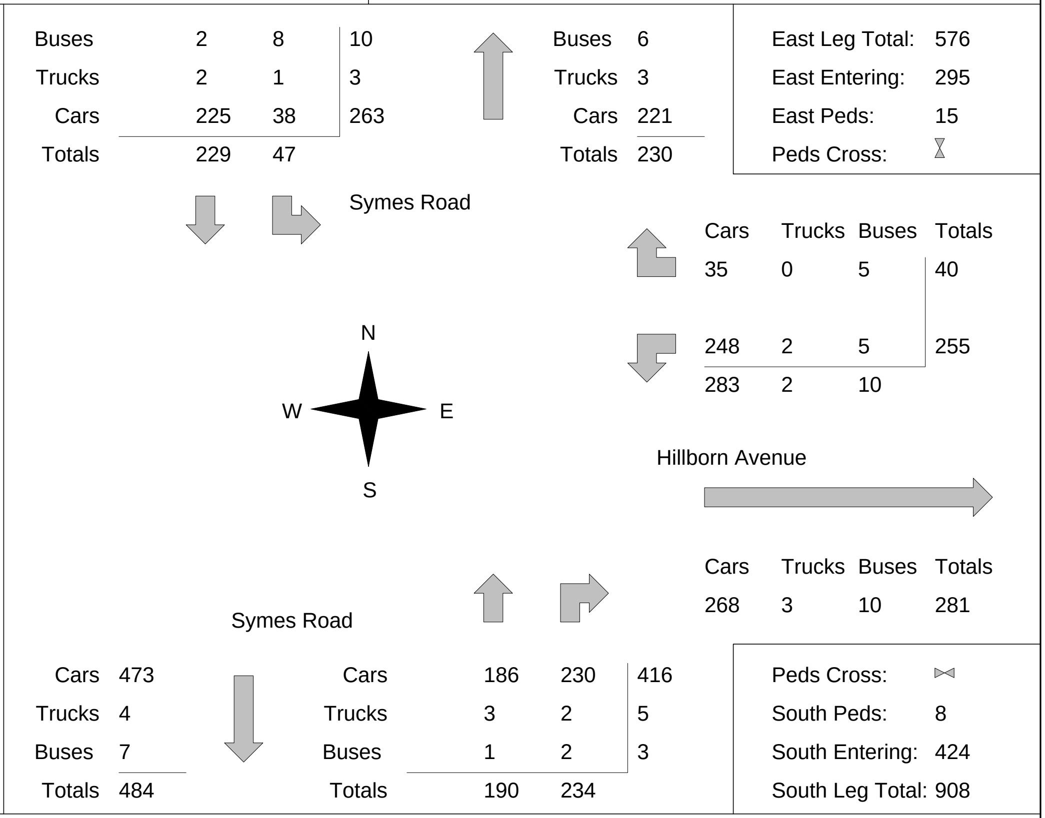
Municipality: York
Site #: 0000005810
Intersection: Symes Road & Hillborn Avenue
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy
Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Symes Road runs N/S

North Leg Total:	506
North Entering:	276
North Peds:	1
Peds Cross:	⋈



Buses	2	8	10
Trucks	2	1	3
Cars	225	38	263
Totals	229	47	

Buses	6
Trucks	3
Cars	221
Totals	230

East Leg Total:	576
East Entering:	295
East Peds:	15
Peds Cross:	⧗

Cars	Trucks	Buses	Totals
35	0	5	40
248	2	5	255
283	2	10	

Cars	Trucks	Buses	Totals
268	3	10	281

Cars	473
Trucks	4
Buses	7
Totals	484

Cars	186	230	416
Trucks	3	2	5
Buses	1	2	3
Totals	190	234	

Peds Cross:	⋈
South Peds:	8
South Entering:	424
South Leg Total:	908

Comments

Symes Road & Hillborn Avenue
Traffic Count Summary

Intersection: Symes Road & Hillborn Avenue | **Count Date:** 8-Oct-2019 | **Municipality:** York

North Approach Totals							South Approach Totals					
	Includes Cars, Trucks, & Buses					North/South Total Approaches		Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	4	46	0	50	0	91	8:00:00	0	11	30	41	3
9:00:00	25	86	0	111	1	219	9:00:00	0	27	81	108	2
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	6	36	0	42	0	175	17:00:00	0	85	48	133	2
18:00:00	12	61	0	73	0	215	18:00:00	0	67	75	142	1
Totals:	47	229	0	276	1	700		0	190	234	424	8

East Approach Totals							West Approach Totals					
	Includes Cars, Trucks, & Buses					East/West Total Approaches		Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	47	0	10	57	1	57	8:00:00	0	0	0	0	0
9:00:00	66	0	13	79	3	79	9:00:00	0	0	0	0	0
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	68	0	11	79	9	79	17:00:00	0	0	0	0	0
18:00:00	74	0	6	80	2	80	18:00:00	0	0	0	0	0
Totals:	255	0	40	295	15	295		0	0	0	0	0

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	16:00		17:00	17:00	18:00	18:00
Crossing Values:	0	50	69	0		70	70	75	75

Symes Road & Orman Avenue

Morning Peak Diagram

Specified Period		**One Hour Peak**	
From:	7:00:00	**From:**	8:00:00
To:	9:00:00	**To:**	9:00:00

Municipality: York
Site #: 0000005811
Intersection: Symes Road & Orman Avenue
TFR File #: 1
Count date: 8-Oct-2019

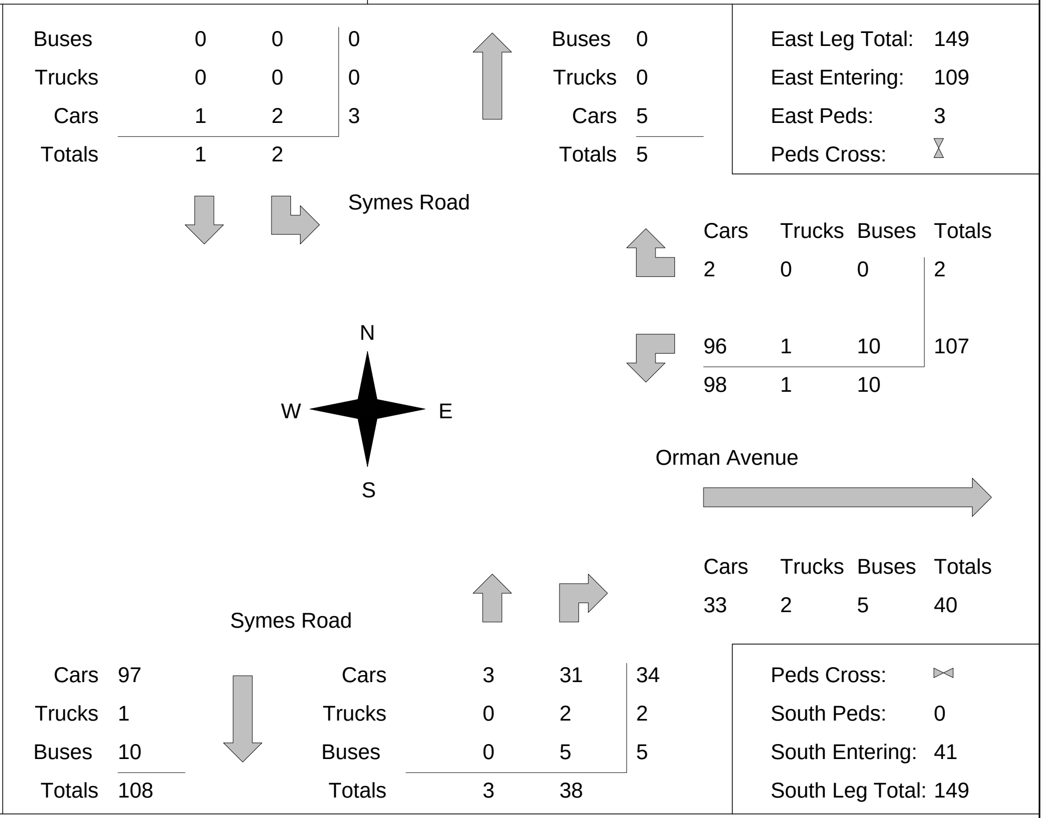
Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Symes Road runs N/S

North Leg Total: 8
North Entering: 3
North Peds: 2
Peds Cross: ⋈



Buses	0	0	0
Trucks	0	0	0
Cars	1	2	3
Totals	1	2	

Buses	0
Trucks	0
Cars	5
Totals	5

East Leg Total: 149
East Entering: 109
East Peds: 3
Peds Cross: ⧗

Cars	Trucks	Buses	Totals
2	0	0	2
96	1	10	107
98	1	10	

Cars	Trucks	Buses	Totals
33	2	5	40

Cars	97
Trucks	1
Buses	10
Totals	108

Cars	3	31	34
Trucks	0	2	2
Buses	0	5	5
Totals	3	38	

Peds Cross: ⋈
South Peds: 0
South Entering: 41
South Leg Total: 149

Comments

Symes Road & Orman Avenue

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 16:30:00
To: 17:30:00

Municipality: York
Site #: 0000005811
Intersection: Symes Road & Orman Avenue
TFR File #: 1
Count date: 8-Oct-2019

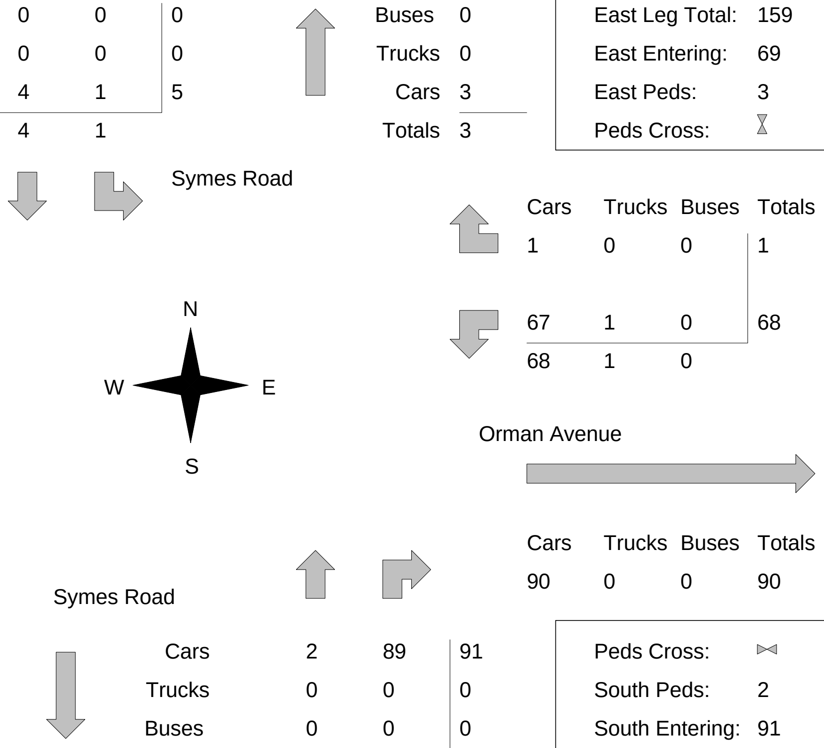
Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Symes Road runs N/S

North Leg Total: 8
North Entering: 5
North Peds: 0
Peds Cross: ⋈



Symes Road

Buses	0	0	0
Trucks	0	0	0
Cars	4	1	5
Totals	4	1	

Buses	0
Trucks	0
Cars	3
Totals	3

East Leg Total: 159
East Entering: 69
East Peds: 3
Peds Cross: ⧗

Orman Avenue

Cars	Trucks	Buses	Totals
1	0	0	1
67	1	0	68
68	1	0	

Cars	Trucks	Buses	Totals
90	0	0	90

Symes Road

Cars	71
Trucks	1
Buses	0
Totals	72

Cars	2	89	91
Trucks	0	0	0
Buses	0	0	0
Totals	2	89	

Peds Cross: ⋈
South Peds: 2
South Entering: 91
South Leg Total: 163

Comments

Symes Road & Orman Avenue

Total Count Diagram

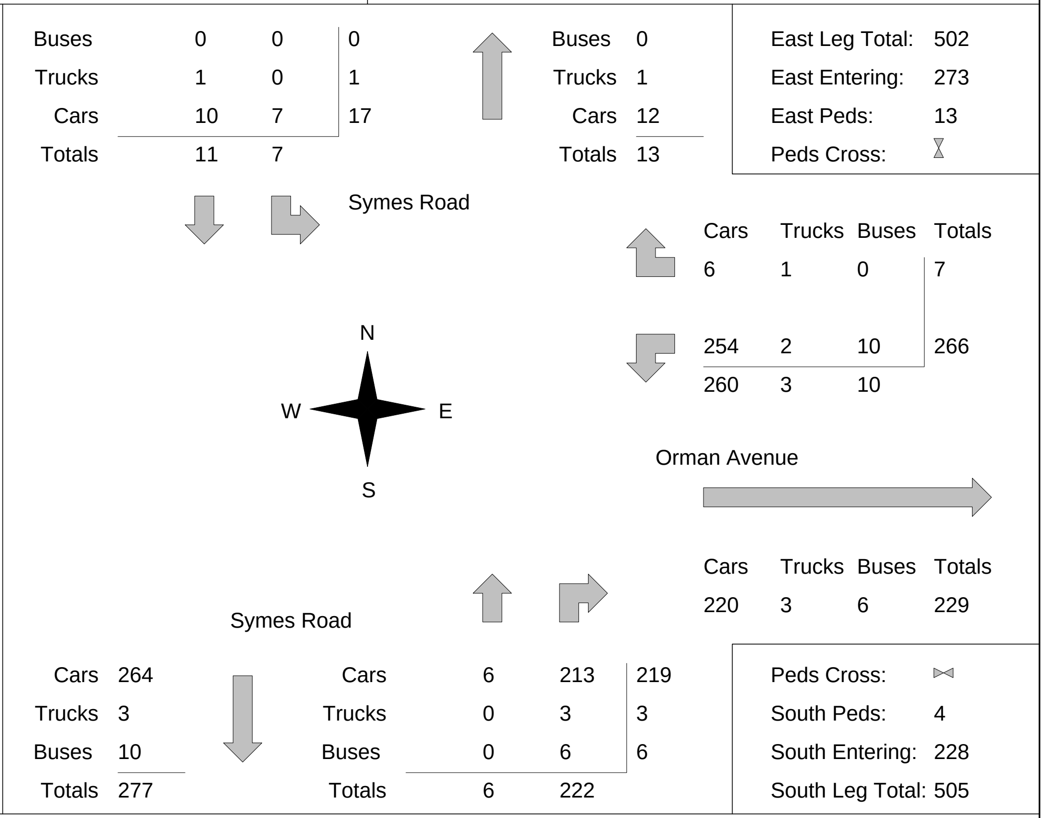
Municipality: York
Site #: 0000005811
Intersection: Symes Road & Orman Avenue
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy
Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Symes Road runs N/S

North Leg Total: 31
North Entering: 18
North Peds: 7
Peds Cross: ⋈



Buses	0	0	0
Trucks	1	0	1
Cars	10	7	17
Totals	11	7	

Buses	0
Trucks	1
Cars	12
Totals	13

East Leg Total: 502
East Entering: 273
East Peds: 13
Peds Cross: ⧗

Cars	Trucks	Buses	Totals
6	1	0	7
254	2	10	266
260	3	10	

Cars	Trucks	Buses	Totals
220	3	6	229

Cars	264
Trucks	3
Buses	10
Totals	277

Cars	6	213	219
Trucks	0	3	3
Buses	0	6	6
Totals	6	222	

Peds Cross: ⋈
South Peds: 4
South Entering: 228
South Leg Total: 505

Comments

Symes Road & Orman Avenue
Traffic Count Summary

Intersection: Symes Road & Orman Avenue	Count Date: 8-Oct-2019	Municipality: York

North Approach Totals						North/South Total Approaches	South Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	3	6	0	9	4	29	8:00:00	0	1	19	20	1
9:00:00	2	1	0	3	2	44	9:00:00	0	3	38	41	0
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	0	0	0	0	0	94	17:00:00	0	0	94	94	3
18:00:00	2	4	0	6	1	79	18:00:00	0	2	71	73	0
Totals:	7	11	0	18	7	246		0	6	222	228	4

East Approach Totals						East/West Total Approaches	West Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	46	0	4	50	3	50	8:00:00	0	0	0	0	0
9:00:00	107	0	2	109	3	109	9:00:00	0	0	0	0	0
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	44	0	0	44	7	44	17:00:00	0	0	0	0	0
18:00:00	69	0	1	70	0	70	18:00:00	0	0	0	0	0
Totals:	266	0	7	273	13	273		0	0	0	0	0

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	16:00	17:00	18:00	18:00	18:00
Crossing Values:	0	51	109	0	47	70	70	70

Cliff Street & Alliance Avenue/Humber Boulevard

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 8:00:00
To: 9:00:00

Municipality: York
Site #: 0000005812
Intersection: Alliance Avenue/Humber Boulevard
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

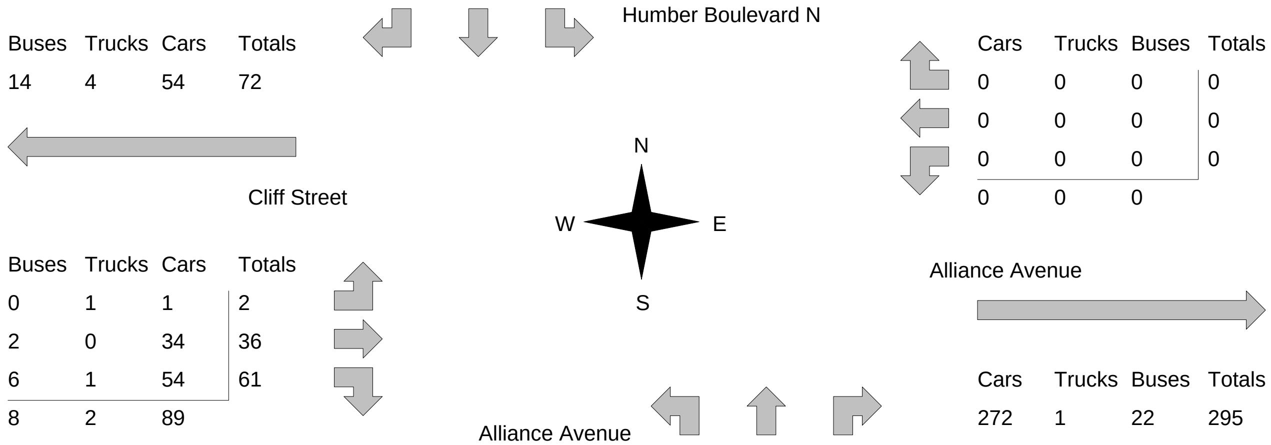
Major Road: Alliance Avenue/Humber Boulevard

North Leg Total:	604
North Entering:	382
North Peds:	0
Peds Cross:	⋈

Buses	3	20	4	27
Trucks	1	19	0	20
Cars	19	249	67	335
Totals	23	288	71	

Buses	5
Trucks	16
Cars	201
Totals	222

East Leg Total:	295
East Entering:	0
East Peds:	0
Peds Cross:	⧗



Buses	Trucks	Cars	Totals
14	4	54	72

Cars	Trucks	Buses	Totals
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	

Buses	Trucks	Cars	Totals
0	1	1	2
2	0	34	36
6	1	54	61
8	2	89	

Cars	Trucks	Buses	Totals
272	1	22	295

Peds Cross:	⧗
West Peds:	15
West Entering:	99
West Leg Total:	171

Cars	303
Trucks	20
Buses	26
Totals	349

Cars	35	200	171	406
Trucks	3	15	1	19
Buses	11	5	16	32
Totals	49	220	188	

Peds Cross:	⋈
South Peds:	2
South Entering:	457
South Leg Total:	806

Comments

Cliff Street & Alliance Avenue/Humber Boulevard

Afternoon Peak Diagram

Specified Period	**From:** 16:00:00	**To:** 18:00:00
One Hour Peak	**From:** 17:00:00	**To:** 18:00:00

Municipality: York
Site #: 0000005812
Intersection: Alliance Avenue/Humber Boulevard
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Alliance Avenue/Humber Boulevard

North Leg Total:	733
North Entering:	488
North Peds:	2
Peds Cross:	⋈

Buses	0	6	0	6
Trucks	0	6	0	6
Cars	14	393	69	476
Totals	14	405	69	

Buses	0
Trucks	3
Cars	242
Totals	245

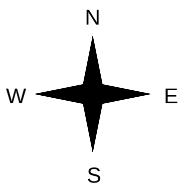
East Leg Total:	175
East Entering:	0
East Peds:	1
Peds Cross:	⧗

Humber Boulevard N

Buses	Trucks	Cars	Totals
6	0	53	59

Cars	Trucks	Buses	Totals
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	

Cliff Street



Buses	Trucks	Cars	Totals
0	0	2	2
0	0	7	7
0	1	30	31
0	1	39	

Alliance Avenue

Cars	Trucks	Buses	Totals
171	4	0	175

Alliance Avenue

Peds Cross:	⧗
West Peds:	13
West Entering:	40
West Leg Total:	99

Cars	423
Trucks	7
Buses	6
Totals	436

Cars	39	240	95	374
Trucks	0	3	4	7
Buses	6	0	0	6
Totals	45	243	99	

Peds Cross:	⋈
South Peds:	1
South Entering:	387
South Leg Total:	823

Comments

Cliff Street & Alliance Avenue/Humber Boulevard

Total Count Diagram

Municipality: York
Site #: 0000005812
Intersection: Alliance Avenue/Humber Boulevard
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy
Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Alliance Avenue/Humber Boulevard

North Leg Total:	2490
North Entering:	1586
North Peds:	2
Peds Cross:	⋈

Buses	4	45	4	53
Trucks	6	50	1	57
Cars	60	1220	196	1476
Totals	70	1315	201	

Buses	12
Trucks	41
Cars	851
Totals	904

East Leg Total:	711
East Entering:	0
East Peds:	3
Peds Cross:	⧗

Humber Boulevard N

Buses	Trucks	Cars	Totals
31	18	182	231

Cars	Trucks	Buses	Totals
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	

Cliff Street

N

W E

S

Buses	Trucks	Cars	Totals
0	3	3	6
2	0	68	70
7	5	148	160
9	8	219	

Alliance Avenue

Cars	Trucks	Buses	Totals
675	9	27	711

Alliance Avenue

Peds Cross:	⧗
West Peds:	45
West Entering:	236
West Leg Total:	467

Cars	1368
Trucks	55
Buses	52
Totals	1475

Cars	122	848	411	1381
Trucks	12	38	8	58
Buses	27	12	21	60
Totals	161	898	440	

Peds Cross:	⋈
South Peds:	6
South Entering:	1499
South Leg Total:	2974

Comments

Cliff Street & Alliance Avenue/Humber Boulevard
Traffic Count Summary

Intersection: Alliance Avenue/Humber Boulevar **Count Date:** 8-Oct-2019 **Municipality:** York

North Approach Totals						North/South Total Approaches	South Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	25	230	13	268	0	598	8:00:00	20	226	84	330	1
9:00:00	71	288	23	382	0	839	9:00:00	49	220	188	457	2
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	36	392	20	448	0	773	17:00:00	47	209	69	325	2
18:00:00	69	405	14	488	2	875	18:00:00	45	243	99	387	1
Totals:	201	1315	70	1586	2	3085		161	898	440	1499	6

East Approach Totals						East/West Total Approaches	West Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	0	0	0	2	46	8:00:00	2	16	28	46	5
9:00:00	0	0	0	0	0	99	9:00:00	2	36	61	99	15
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	0	0	0	0	0	51	17:00:00	0	11	40	51	12
18:00:00	0	0	0	0	1	40	18:00:00	2	7	31	40	13
Totals:	0	0	0	0	3	236		6	70	160	236	45

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	16:00	17:00	17:00	18:00	18:00
Crossing Values:	0	19	40	0	13	13	12	12

Humber Boulevard & Hilldale Road

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 8:00:00
To: 9:00:00

Municipality: York
Site #: 0000005813
Intersection: Humber Boulevard N & Hilldale Roa
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Humber Boulevard N runs N/S

North Leg Total: 563
North Entering: 291
North Peds: 2
Peds Cross: ⋈

Buses	18	0	18
Trucks	20	0	20
Cars	253	0	253
Totals	291	0	

Buses	12
Trucks	15
Cars	245
Totals	272

East Leg Total: 140
East Entering: 140
East Peds: 1
Peds Cross: ⧗

Humber Boulevard N

Cars	Trucks	Buses	Totals
44	0	7	51
81	0	8	89
125	0	15	

N
W E
S

Hilldale Road

Cars	Trucks	Buses	Totals
0	0	0	0

Humber Boulevard N

Cars	334
Trucks	20
Buses	26
Totals	380

Cars	201	0	201
Trucks	15	0	15
Buses	5	0	5
Totals	221	0	

Peds Cross: ⋈
South Peds: 56
South Entering: 221
South Leg Total: 601

Comments

Humber Boulevard & Hilldale Road

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 16:30:00
To: 17:30:00

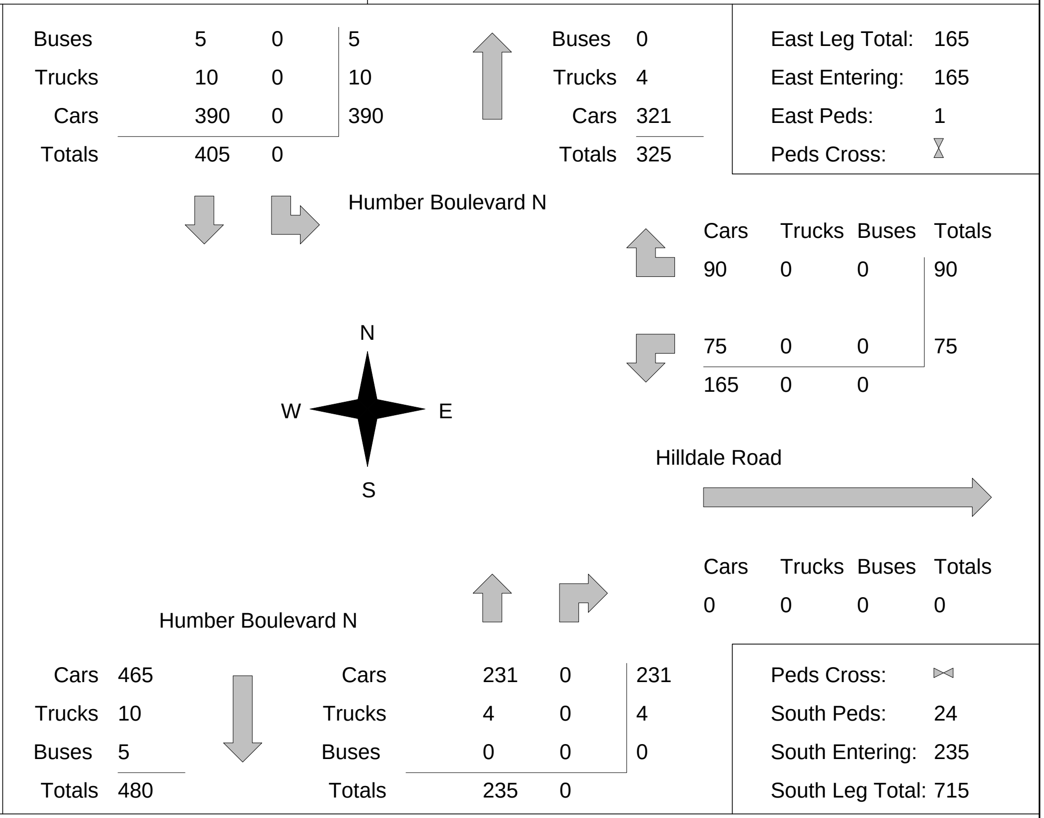
Municipality: York
Site #: 0000005813
Intersection: Humber Boulevard N & Hilldale Roa
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy
Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Humber Boulevard N runs N/S

North Leg Total: 730
North Entering: 405
North Peds: 2
Peds Cross: ⋈



Buses	5	0	5
Trucks	10	0	10
Cars	390	0	390
Totals	405	0	

Buses	0
Trucks	4
Cars	321
Totals	325

East Leg Total: 165
East Entering: 165
East Peds: 1
Peds Cross: ⧗

Humber Boulevard N

Cars	Trucks	Buses	Totals
90	0	0	90
75	0	0	75
165	0	0	

Hilldale Road

Cars	Trucks	Buses	Totals
0	0	0	0

Humber Boulevard N

Cars	465
Trucks	10
Buses	5
Totals	480

Cars	231	0	231
Trucks	4	0	4
Buses	0	0	0
Totals	235	0	

Peds Cross: ⋈
South Peds: 24
South Entering: 235
South Leg Total: 715

Comments

Humber Boulevard & Hilldale Road

Total Count Diagram

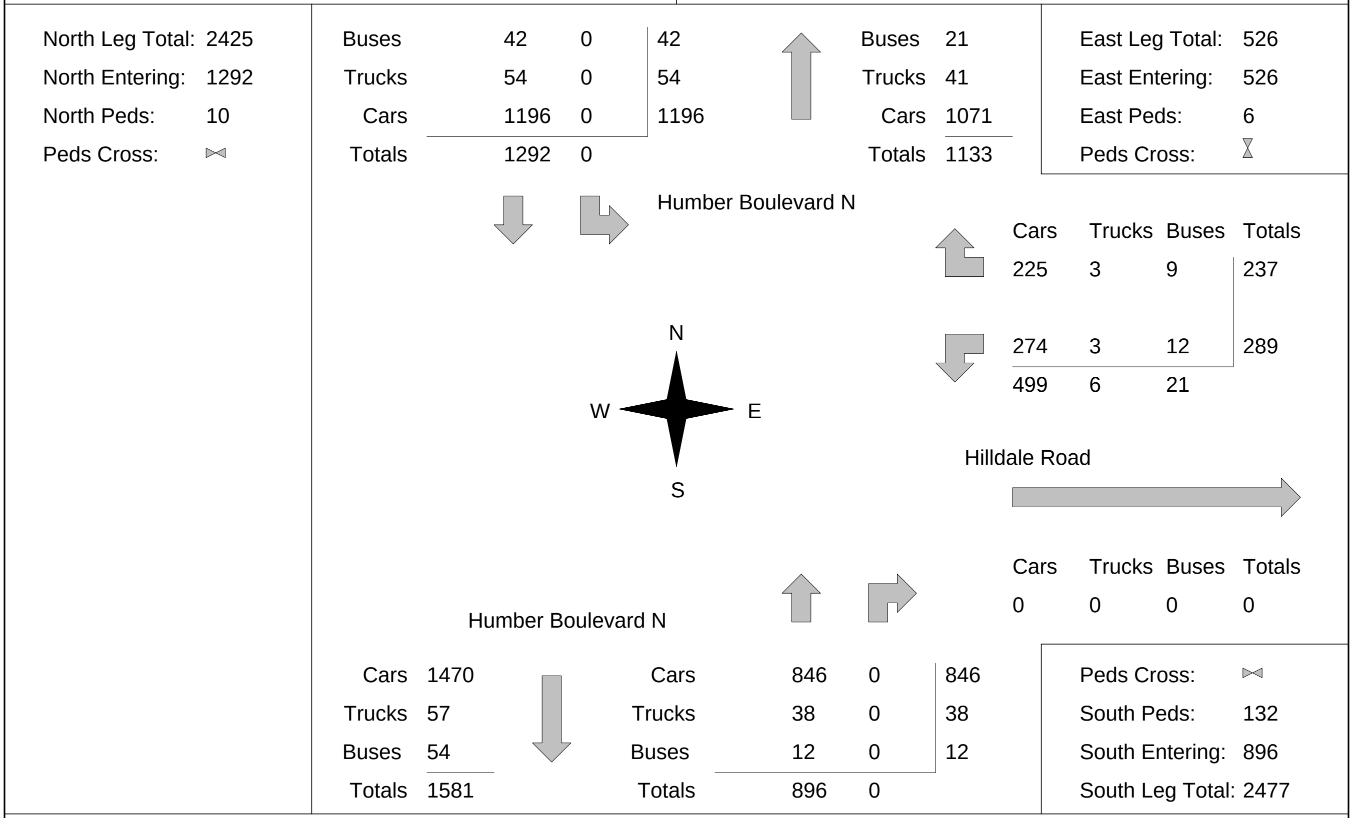
Municipality: York
Site #: 0000005813
Intersection: Humber Boulevard N & Hilldale Roa
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Humber Boulevard N runs N/S



North Leg Total: 2425
North Entering: 1292
North Peds: 10
Peds Cross: ⋈

Buses	42	0	42
Trucks	54	0	54
Cars	1196	0	1196
Totals	1292	0	

Buses	21
Trucks	41
Cars	1071
Totals	1133

East Leg Total: 526
East Entering: 526
East Peds: 6
Peds Cross: ⧗

Humber Boulevard N

Cars	Trucks	Buses	Totals
225	3	9	237
274	3	12	289
499	6	21	

Hilldale Road

Cars	Trucks	Buses	Totals
0	0	0	0

Humber Boulevard N

Cars	1470
Trucks	57
Buses	54
Totals	1581

Cars	846	0	846
Trucks	38	0	38
Buses	12	0	12
Totals	896	0	

Peds Cross: ⋈
South Peds: 132
South Entering: 896
South Leg Total: 2477

Comments

Humber Boulevard & Hilldale Road
Traffic Count Summary

Intersection: Humber Boulevard N & Hilldale Ro **Count Date:** 8-Oct-2019 **Municipality:** York

North Approach Totals							South Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds	North/South Total Approaches	Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	215	0	215	1	438	8:00:00	0	223	0	223	17
9:00:00	0	291	0	291	2	512	9:00:00	0	221	0	221	56
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	0	389	0	389	4	610	17:00:00	0	221	0	221	42
18:00:00	0	397	0	397	3	628	18:00:00	0	231	0	231	17
Totals:	0	1292	0	1292	10	2188		0	896	0	896	132

East Approach Totals							West Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds	East/West Total Approaches	Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	51	0	33	84	1	84	8:00:00	0	0	0	0	0
9:00:00	89	0	51	140	1	140	9:00:00	0	0	0	0	0
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	85	0	84	169	3	169	17:00:00	0	0	0	0	0
18:00:00	64	0	69	133	1	133	18:00:00	0	0	0	0	0
Totals:	289	0	237	526	6	526		0	0	0	0	0

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	16:00	17:00	17:00	18:00	18:00
Crossing Values:	0	69	147	0	131	131	84	84

Alliance Avenue & Humber Boulevard S-Hilldale Ro

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 8:00:00
To: 9:00:00

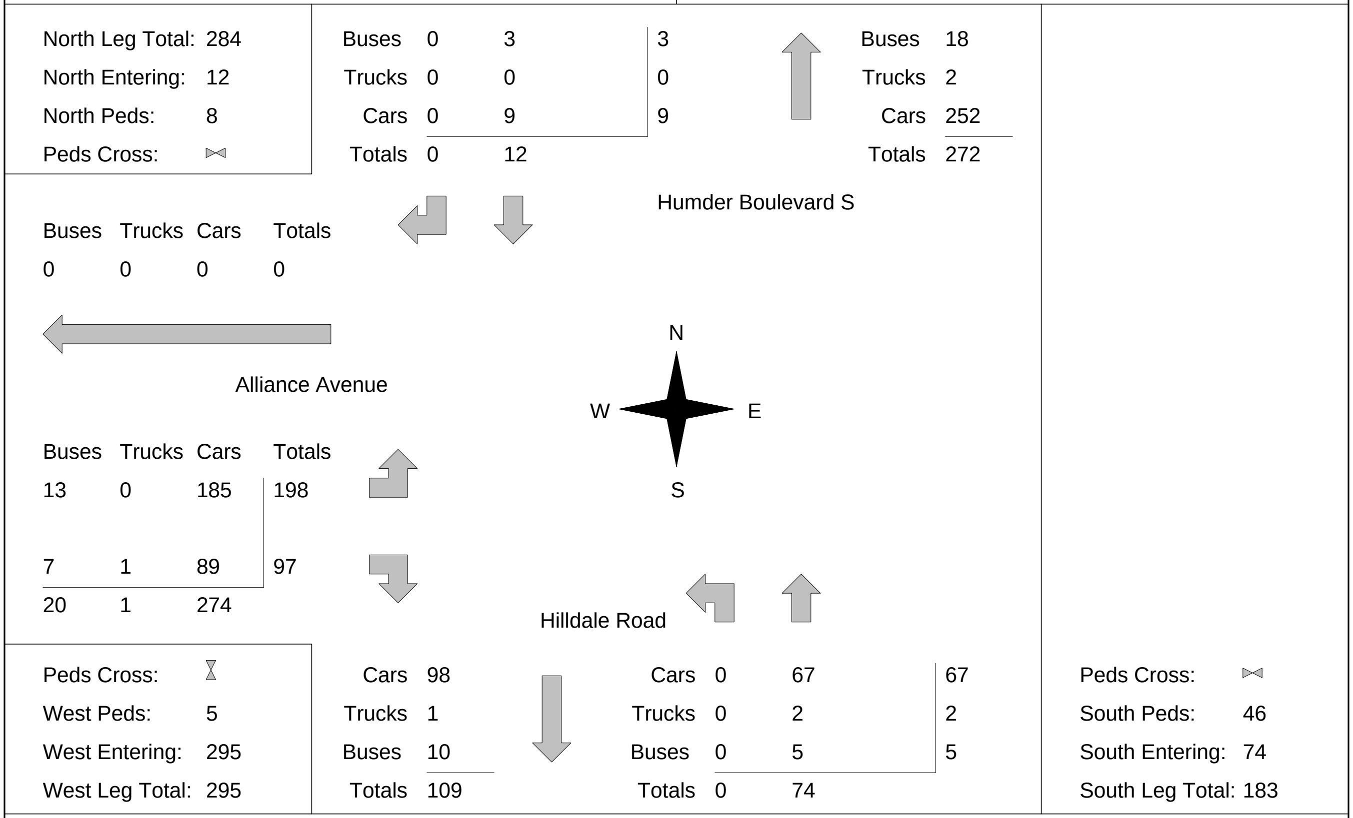
Municipality: York
Site #: 0000005814
Intersection: Humder Boulevard S & Hilldale Roa
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Humder Boulevard S & Hilldale Roa



North Leg Total: 284
North Entering: 12
North Peds: 8
Peds Cross: ⋈

Buses	0	3	3
Trucks	0	0	0
Cars	0	9	9
Totals	0	12	

Buses	18
Trucks	2
Cars	252
Totals	272

Humder Boulevard S

Buses	Trucks	Cars	Totals
0	0	0	0

Alliance Avenue

Buses	Trucks	Cars	Totals
13	0	185	198
7	1	89	97
20	1	274	

Hilldale Road

Peds Cross: ⧖
West Peds: 5
West Entering: 295
West Leg Total: 295

Cars	98
Trucks	1
Buses	10
Totals	109

Cars	0	67	67
Trucks	0	2	2
Buses	0	5	5
Totals	0	74	

Peds Cross: ⋈
South Peds: 46
South Entering: 74
South Leg Total: 183

Comments

Alliance Avenue & Humber Boulevard S-Hilldale Ro

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 16:30:00
To: 17:30:00

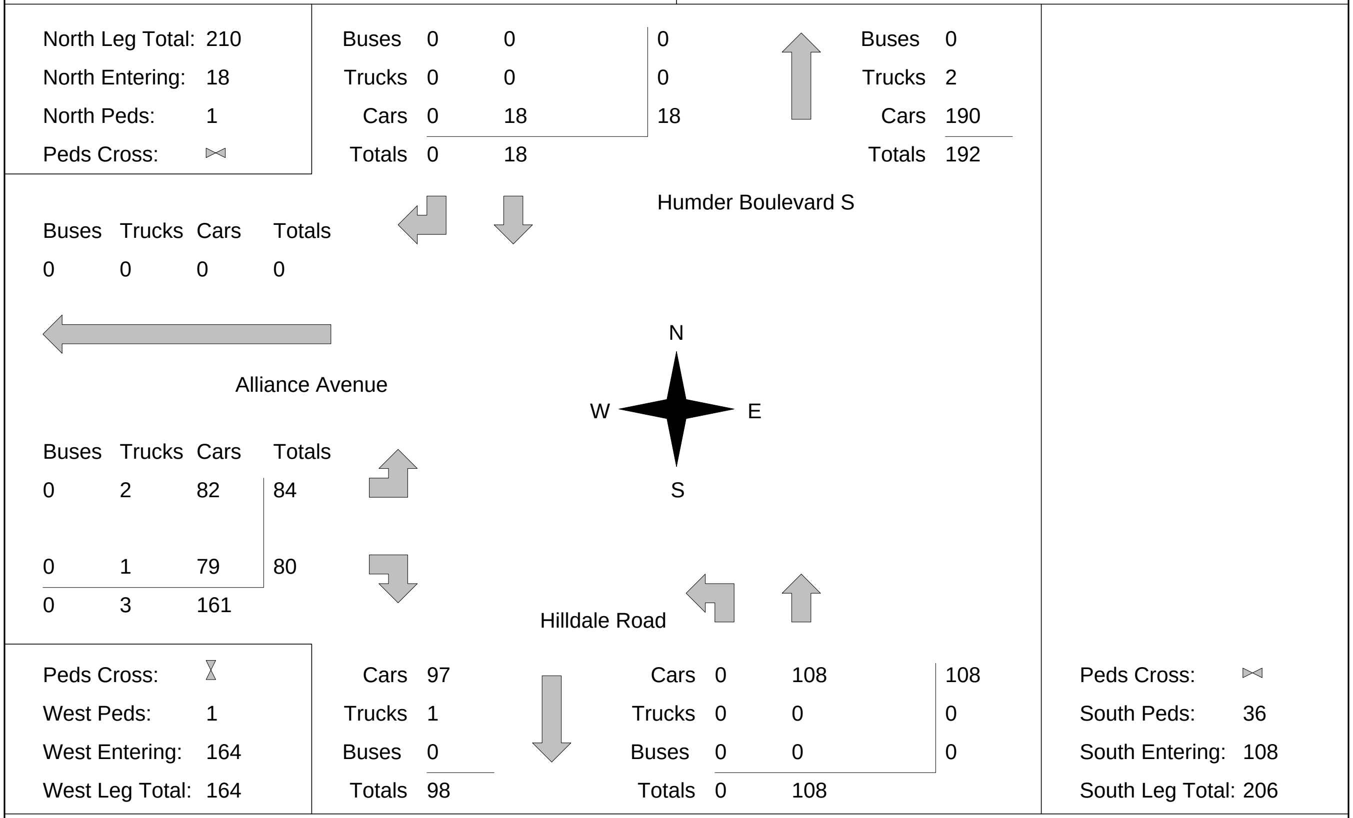
Municipality: York
Site #: 0000005814
Intersection: Humder Boulevard S & Hilldale Roa
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Humder Boulevard S & Hilldale Roa



North Leg Total: 210
North Entering: 18
North Peds: 1
Peds Cross: ⋈

Buses	0	0	0
Trucks	0	0	0
Cars	0	18	18
Totals	0	18	

Buses	0
Trucks	2
Cars	190
Totals	192

Humder Boulevard S

Buses	Trucks	Cars	Totals
0	0	0	0

Alliance Avenue

Buses	Trucks	Cars	Totals
0	2	82	84
0	1	79	80
0	3	161	

Hilldale Road

Peds Cross: ⧖
West Peds: 1
West Entering: 164
West Leg Total: 164

Cars	97
Trucks	1
Buses	0
Totals	98

Cars	0	108	108
Trucks	0	0	0
Buses	0	0	0
Totals	0	108	

Peds Cross: ⋈
South Peds: 36
South Entering: 108
South Leg Total: 206

Comments

Alliance Avenue & Humber Boulevard S-Hilldale Ro

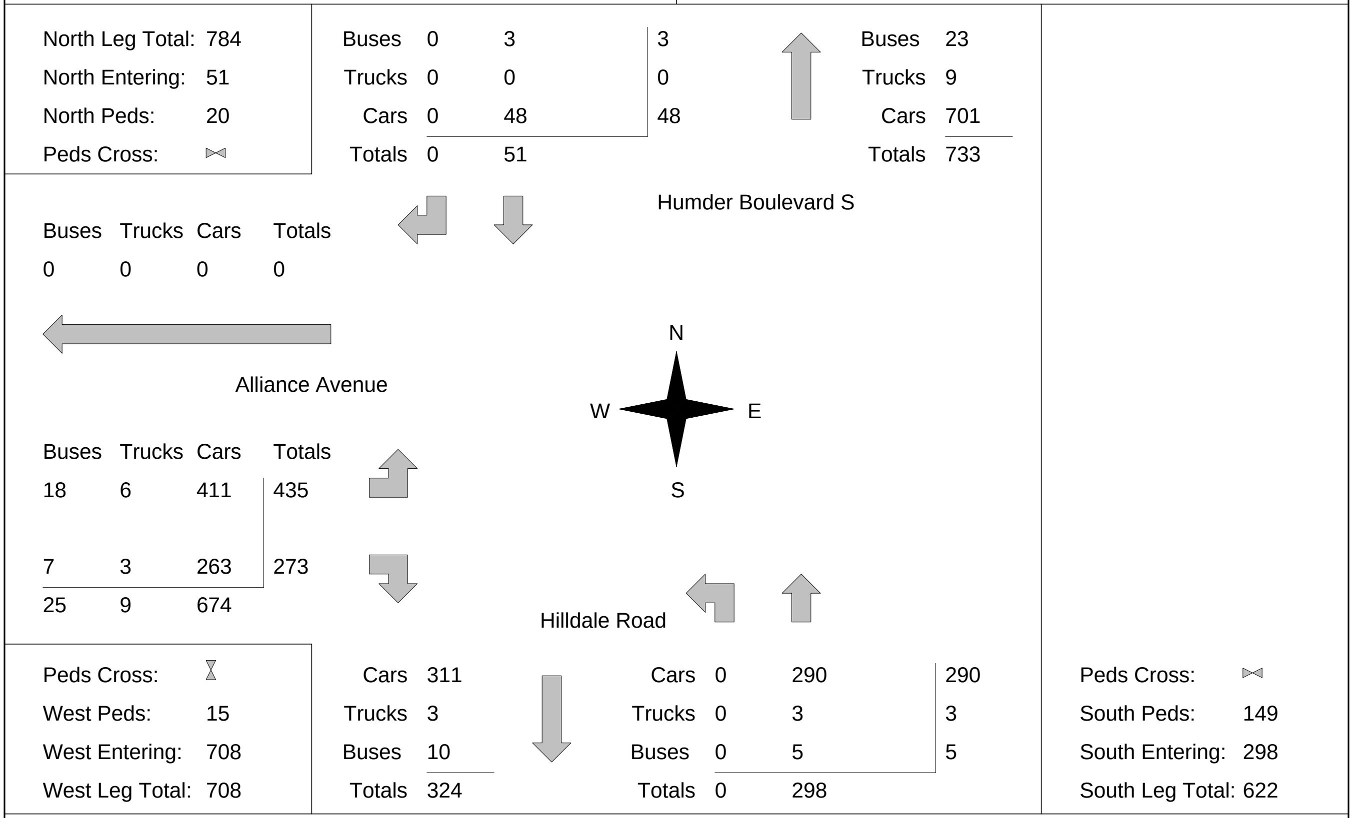
Total Count Diagram

Municipality: York
Site #: 0000005814
Intersection: Humder Boulevard S & Hilldale Roa
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy
Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Humder Boulevard S & Hilldale Roa



North Leg Total: 784
North Entering: 51
North Peds: 20
Peds Cross: ⋈

Buses	0	3	3
Trucks	0	0	0
Cars	0	48	48
Totals	0	51	

Buses	23
Trucks	9
Cars	701
Totals	733

Humder Boulevard S

Buses	Trucks	Cars	Totals
0	0	0	0

Alliance Avenue

Buses	Trucks	Cars	Totals
18	6	411	435
7	3	263	273
25	9	674	

Hilldale Road

Peds Cross: ⧗
West Peds: 15
West Entering: 708
West Leg Total: 708

Cars	311
Trucks	3
Buses	10
Totals	324

Cars	0	290	290
Trucks	0	3	3
Buses	0	5	5
Totals	0	298	

Peds Cross: ⋈
South Peds: 149
South Entering: 298
South Leg Total: 622

Comments

Alliance Avenue & Humber Boulevard S-Hilldale Ro

Traffic Count Summary

Intersection: Humder Boulevard S & Hilldale Ro **Count Date:** 8-Oct-2019 **Municipality:** York

North Approach Totals							South Approach Totals					
	Includes Cars, Trucks, & Buses					North/South Total Approaches		Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	8	0	8	3	49	8:00:00	0	41	0	41	22
9:00:00	0	12	0	12	8	86	9:00:00	0	74	0	74	46
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	0	14	0	14	2	109	17:00:00	0	95	0	95	54
18:00:00	0	17	0	17	7	105	18:00:00	0	88	0	88	27
Totals:	0	51	0	51	20	349		0	298	0	298	149

East Approach Totals							West Approach Totals					
	Includes Cars, Trucks, & Buses					East/West Total Approaches		Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	0	0	0	0	125	8:00:00	92	0	33	125	6
9:00:00	0	0	0	0	0	295	9:00:00	198	0	97	295	5
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	0	0	0	0	0	111	17:00:00	60	0	51	111	4
18:00:00	0	0	0	0	0	177	18:00:00	85	0	92	177	0
Totals:	0	0	0	0	0	708		435	0	273	708	15

Calculated Values for Traffic Crossing Major Street

Hours Ending:	0:00	0:00	7:00	8:00	9:00	16:00	17:00	18:00
Crossing Values:	0	0	0	117	252	0	116	119

Midblock Pedestrian Crossing

Total Count Diagram

Municipality: York
Site #: 0000005815
Intersection: Humber Boulevard N &
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Humber Boulevard N runs N/S

North Leg Total: 0
North Entering: 0
North Peds: 0
Peds Cross: ⋈

Buses	0	0	0	0
Trucks	0	0	0	0
Cars	0	0	0	0
Totals	0	0	0	

↑

Buses	0
Trucks	0
Cars	0
Totals	0

East Leg Total: 0
East Entering: 0
East Peds: 0
Peds Cross: ⧗

↲ ↓ ↳

Humber Boulevard N

Buses	Trucks	Cars	Totals
0	0	0	0

←

Cars	Trucks	Buses	Totals
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	

N
W E
S

Buses	Trucks	Cars	Totals
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	

→

Cars	Trucks	Buses	Totals
0	0	0	0

↰ ↑ ↱

Humber Boulevard N

Peds Cross: ⧗
West Peds: 0
West Entering: 0
West Leg Total: 0

Cars	0
Trucks	0
Buses	0
Totals	0

↓

Cars	0	0	0	0
Trucks	0	0	0	0
Buses	0	0	0	0
Totals	0	0	0	

Peds Cross: ⋈
South Peds: 132
South Entering: 0
South Leg Total: 0

Comments

Midblock Pedestrian Crossing
Traffic Count Summary

Intersection: Humber Boulevard N & | **Count Date:** 8-Oct-2019 | **Municipality:** York

North Approach Totals / South Approach Totals

	North Approach Totals Includes Cars, Trucks, & Buses							South Approach Totals Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds	North/South Total Approaches	Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	0	0	0	0	0	8:00:00	0	0	0	0	17
9:00:00	0	0	0	0	0	0	9:00:00	0	0	0	0	56
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	0	0	0	0	0	0	17:00:00	0	0	0	0	42
18:00:00	0	0	0	0	0	0	18:00:00	0	0	0	0	17
Totals:	0	0	0	0	0	0		0	0	0	0	132

East Approach Totals / West Approach Totals

	East Approach Totals Includes Cars, Trucks, & Buses							West Approach Totals Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds	East/West Total Approaches	Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	0	0	0	0	0	8:00:00	0	0	0	0	0
9:00:00	0	0	0	0	0	0	9:00:00	0	0	0	0	0
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	0	0	0	0	0	0	17:00:00	0	0	0	0	0
18:00:00	0	0	0	0	0	0	18:00:00	0	0	0	0	0
Totals:	0	0	0	0	0	0		0	0	0	0	0

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	16:00	17:00	17:00	18:00	18:00
Crossing Values:	0	17	56	0	42	42	17	17

Humber Boulevard N & Louvain Street

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 8:00:00
To: 9:00:00

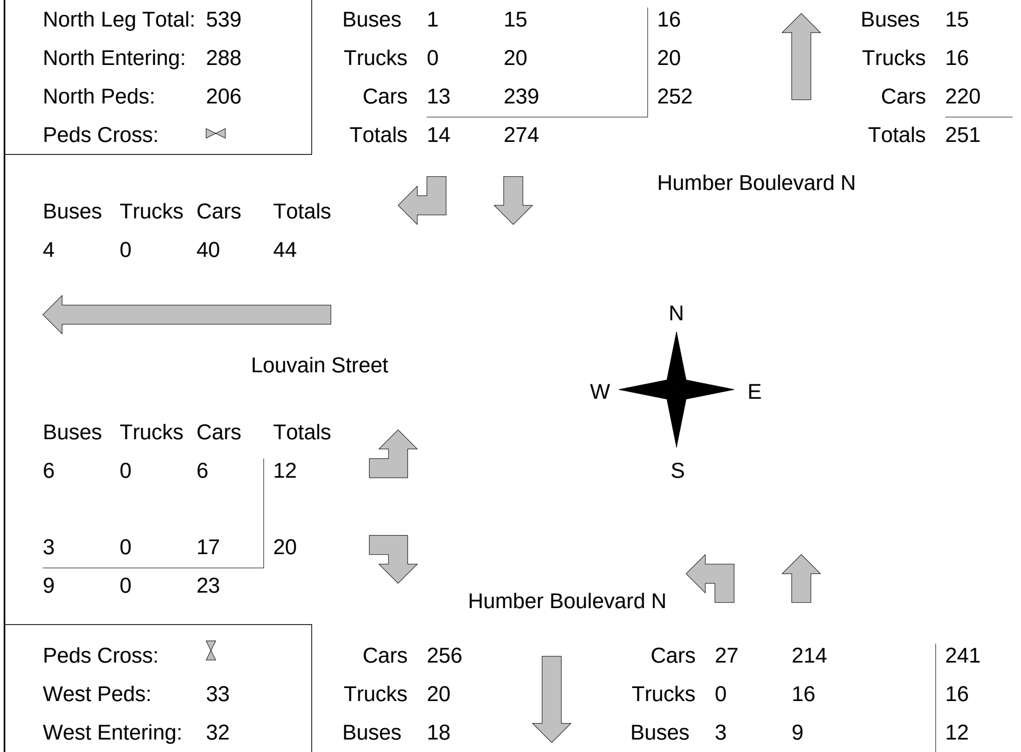
Municipality: York
Site #: 0000005816
Intersection: Humber Boulevard N & Louvain Stre
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Humber Boulevard N runs N/S



North Leg Total: 539
North Entering: 288
North Peds: 206
Peds Cross: ⋈

Buses	1	15	16
Trucks	0	20	20
Cars	13	239	252
Totals	14	274	

Buses	15
Trucks	16
Cars	220
Totals	251

Humber Boulevard N

Buses	Trucks	Cars	Totals
4	0	40	44

Louvain Street

Buses	Trucks	Cars	Totals
6	0	6	12
3	0	17	20
9	0	23	

Humber Boulevard N

Peds Cross: ⧗
West Peds: 33
West Entering: 32
West Leg Total: 76

Cars	256
Trucks	20
Buses	18
Totals	294

Cars	27	214	241
Trucks	0	16	16
Buses	3	9	12
Totals	30	239	

Peds Cross: ⋈
South Peds: 0
South Entering: 269
South Leg Total: 563

Comments

Humber Boulevard N & Louvain Street

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 17:00:00
To: 18:00:00

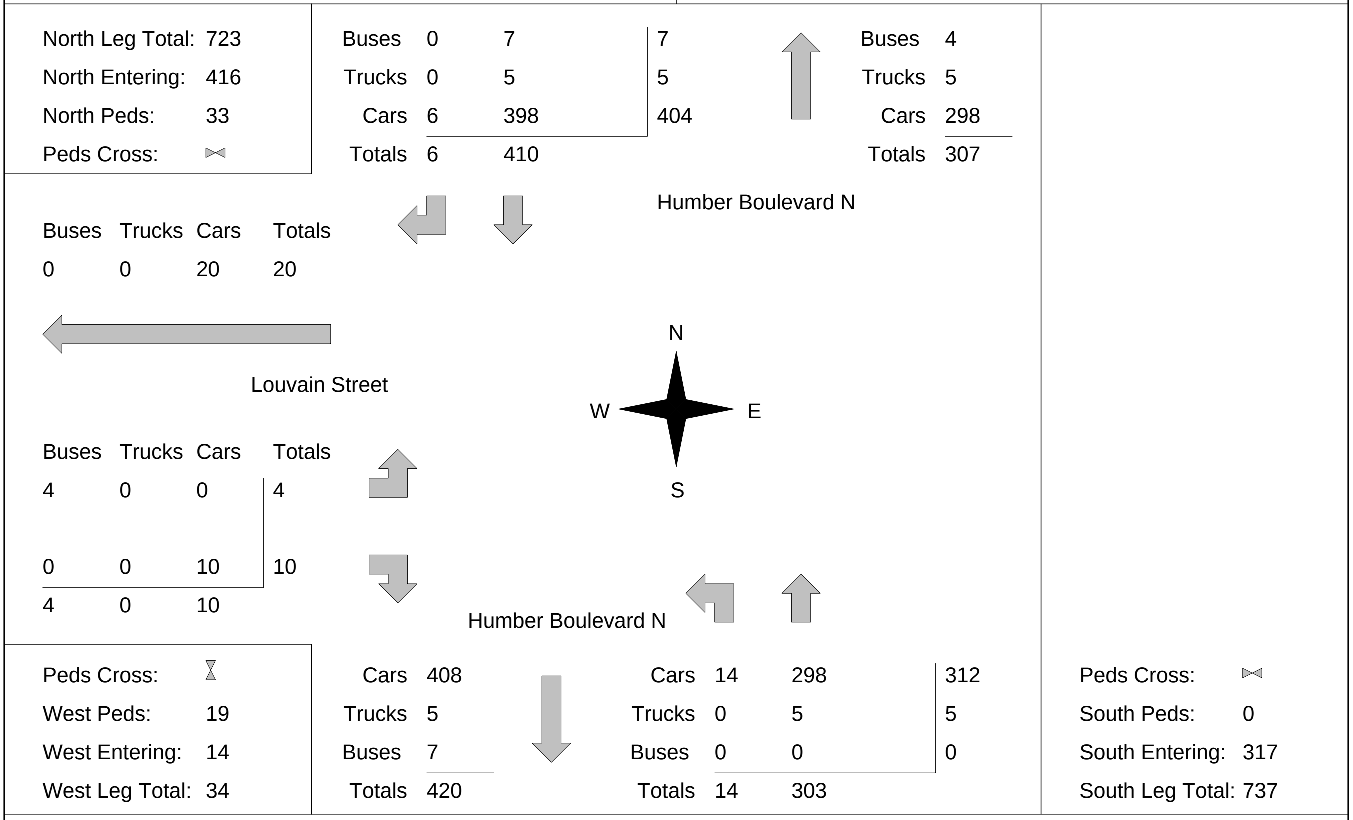
Municipality: York
Site #: 0000005816
Intersection: Humber Boulevard N & Louvain Stre
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Humber Boulevard N runs N/S



North Leg Total: 723
North Entering: 416
North Peds: 33
Peds Cross: ⋈

Buses	0	7	7
Trucks	0	5	5
Cars	6	398	404
Totals	6	410	

Buses	4
Trucks	5
Cars	298
Totals	307

Humber Boulevard N

Buses	Trucks	Cars	Totals
0	0	20	20

Louvain Street

Buses	Trucks	Cars	Totals
4	0	0	4
0	0	10	10
4	0	10	

Humber Boulevard N

Peds Cross: ⧗
West Peds: 19
West Entering: 14
West Leg Total: 34

Cars	408
Trucks	5
Buses	7
Totals	420

Cars	14	298	312
Trucks	0	5	5
Buses	0	0	0
Totals	14	303	

Peds Cross: ⋈
South Peds: 0
South Entering: 317
South Leg Total: 737

Comments

Humber Boulevard N & Louvain Street

Total Count Diagram

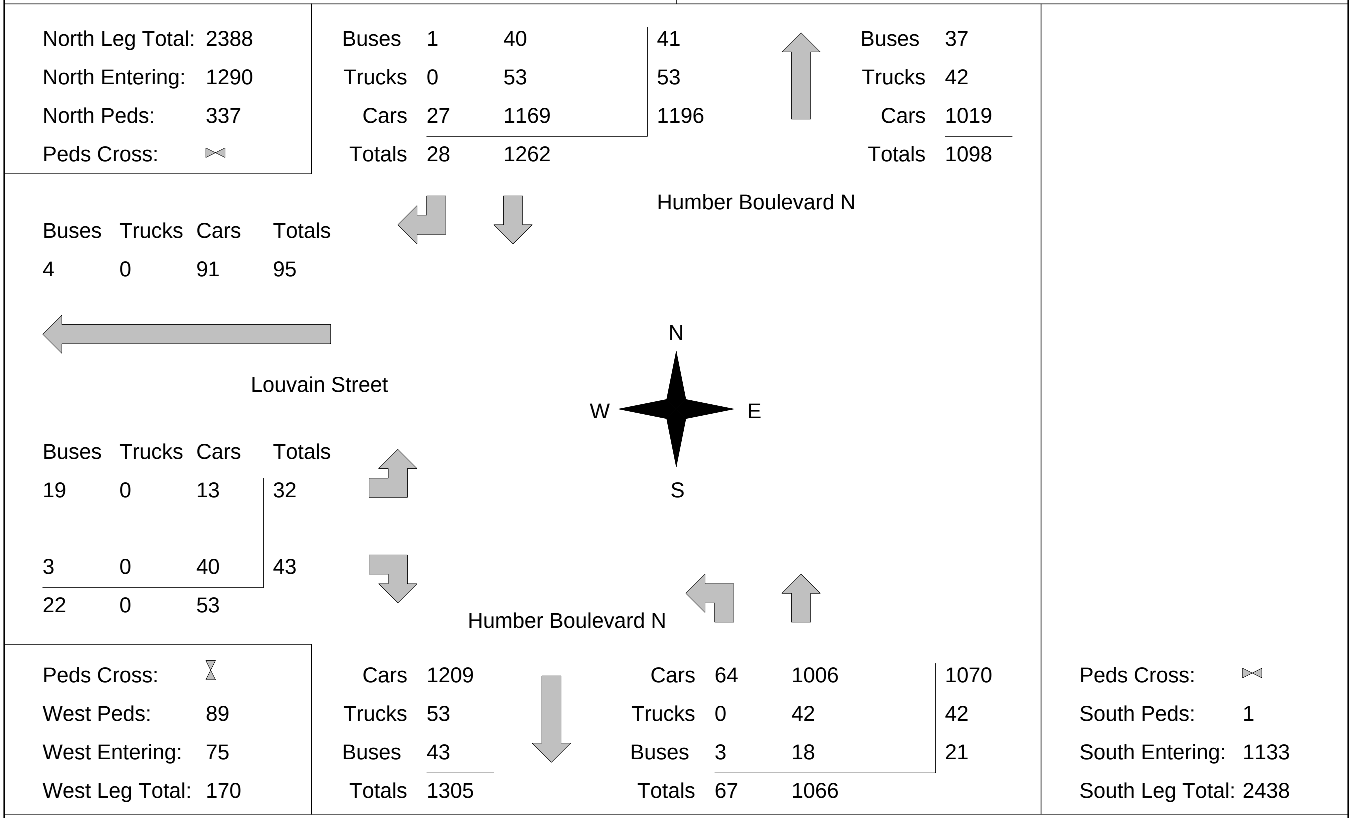
Municipality: York
Site #: 0000005816
Intersection: Humber Boulevard N & Louvain Stre
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Humber Boulevard N runs N/S



North Leg Total: 2388
North Entering: 1290
North Peds: 337
Peds Cross: ⋈

Buses	1	40	41
Trucks	0	53	53
Cars	27	1169	1196
Totals	28	1262	

Buses	37
Trucks	42
Cars	1019
Totals	1098

Humber Boulevard N

Buses	Trucks	Cars	Totals
4	0	91	95

Louvain Street

Buses	Trucks	Cars	Totals
19	0	13	32
3	0	40	43
22	0	53	

Humber Boulevard N

Peds Cross: ⧗
West Peds: 89
West Entering: 75
West Leg Total: 170

Cars	1209
Trucks	53
Buses	43
Totals	1305

Cars	64	1006	1070
Trucks	0	42	42
Buses	3	18	21
Totals	67	1066	

Peds Cross: ⋈
South Peds: 1
South Entering: 1133
South Leg Total: 2438

Comments

Humber Boulevard N & Louvain Street
Traffic Count Summary

Intersection: Humber Boulevard N & Louvain St **Count Date:** 8-Oct-2019 **Municipality:** York

North Approach Totals							South Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds	North/South Total Approaches	Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	211	5	216	44	479	8:00:00	6	257	0	263	0
9:00:00	0	274	14	288	206	557	9:00:00	30	239	0	269	0
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	0	367	3	370	54	654	17:00:00	17	267	0	284	1
18:00:00	0	410	6	416	33	733	18:00:00	14	303	0	317	0
Totals:	0	1262	28	1290	337	2423		67	1066	0	1133	1

East Approach Totals							West Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds	East/West Total Approaches	Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	0	0	0	0	18	8:00:00	11	0	7	18	11
9:00:00	0	0	0	0	0	32	9:00:00	12	0	20	32	33
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	0	0	0	0	0	11	17:00:00	5	0	6	11	26
18:00:00	0	0	0	0	0	14	18:00:00	4	0	10	14	19
Totals:	0	0	0	0	0	75		32	0	43	75	89

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	16:00	17:00	17:00	18:00	18:00
Crossing Values:	0	55	218	0	60	60	37	37

Humber Boulevard S & Avon Avenue

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 8:00:00
To: 9:00:00

Municipality: York
Site #: 0000005817
Intersection: Humber Boulevard S & Avon Avenu
TFR File #: 1
Count date: 8-Oct-2019

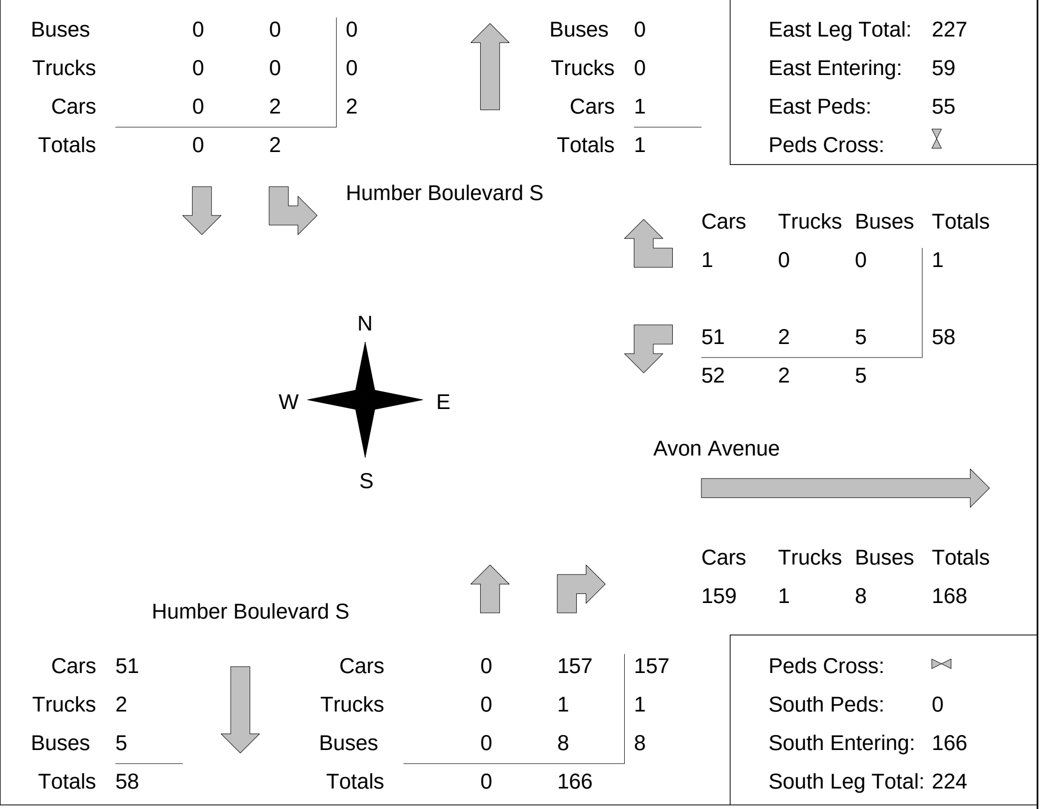
Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Humber Boulevard S runs N/S

North Leg Total: 3
North Entering: 2
North Peds: 0
Peds Cross: ⋈



Buses	0	0	0
Trucks	0	0	0
Cars	0	2	2
Totals	0	2	

Buses	0
Trucks	0
Cars	1
Totals	1

East Leg Total: 227
East Entering: 59
East Peds: 55
Peds Cross: ⧗

Cars	Trucks	Buses	Totals
1	0	0	1
51	2	5	58
52	2	5	

Cars	Trucks	Buses	Totals
159	1	8	168

Cars	51
Trucks	2
Buses	5
Totals	58

Cars	0	157	157
Trucks	0	1	1
Buses	0	8	8
Totals	0	166	

Peds Cross: ⋈
South Peds: 0
South Entering: 166
South Leg Total: 224

Comments

Humber Boulevard S & Avon Avenue

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 16:45:00
To: 17:45:00

Municipality: York
Site #: 0000005817
Intersection: Humber Boulevard S & Avon Avenu
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Humber Boulevard S runs N/S

North Leg Total: 8
North Entering: 4
North Peds: 0
Peds Cross: ⋈

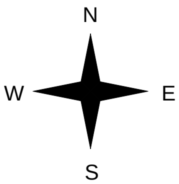
Buses	0	0	0
Trucks	0	0	0
Cars	1	3	4
Totals	1	3	

Buses	0
Trucks	0
Cars	4
Totals	4

East Leg Total: 138
East Entering: 66
East Peds: 7
Peds Cross: ⧗

Humber Boulevard S

Cars	Trucks	Buses	Totals
2	0	0	2
62	1	1	64
64	1	1	



Avon Avenue

Cars	Trucks	Buses	Totals
70	2	0	72

Humber Boulevard S

Cars	63
Trucks	1
Buses	1
Totals	65

Cars	2	67	69
Trucks	0	2	2
Buses	0	0	0
Totals	2	69	

Peds Cross: ⋈
South Peds: 0
South Entering: 71
South Leg Total: 136

Comments

Humber Boulevard S & Avon Avenue

Total Count Diagram

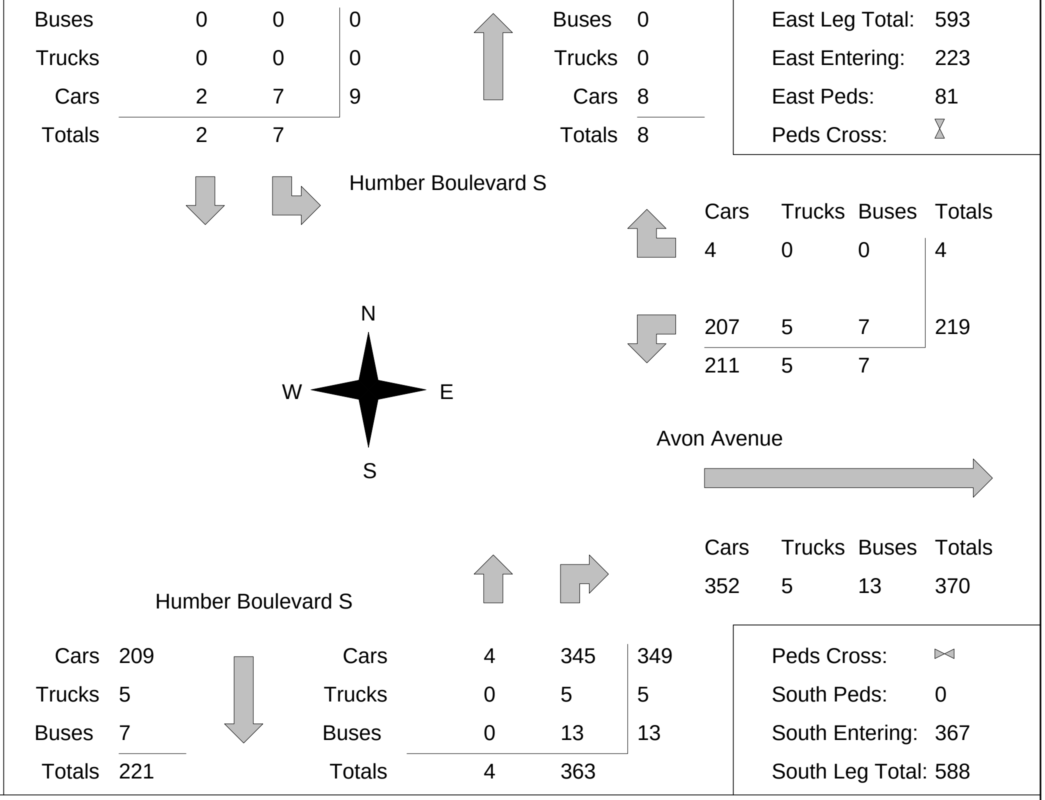
Municipality: York
Site #: 0000005817
Intersection: Humber Boulevard S & Avon Avenu
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Humber Boulevard S runs N/S



North Leg Total:	17
North Entering:	9
North Peds:	0
Peds Cross:	⋈

Buses	0	0	0
Trucks	0	0	0
Cars	2	7	9
Totals	2	7	

Buses	0
Trucks	0
Cars	8
Totals	8

East Leg Total:	593
East Entering:	223
East Peds:	81
Peds Cross:	⧗

Cars	Trucks	Buses	Totals
4	0	0	4
207	5	7	219
211	5	7	

Cars	Trucks	Buses	Totals
352	5	13	370

Cars	209
Trucks	5
Buses	7
Totals	221

Cars	4	345	349
Trucks	0	5	5
Buses	0	13	13
Totals	4	363	

Peds Cross:	⋈
South Peds:	0
South Entering:	367
South Leg Total:	588

Comments

Humber Boulevard S & Avon Avenue
Traffic Count Summary

Intersection: Humber Boulevard S & Avon Aver	Count Date: 8-Oct-2019	Municipality: York

North Approach Totals						North/South Total Approaches	South Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	1	1	0	2	0	72	8:00:00	0	1	69	70	0
9:00:00	2	0	0	2	0	168	9:00:00	0	0	166	166	0
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	1	0	0	1	0	60	17:00:00	0	0	59	59	0
18:00:00	3	1	0	4	0	76	18:00:00	0	3	69	72	0
Totals:	7	2	0	9	0	376		0	4	363	367	0

East Approach Totals						East/West Total Approaches	West Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	42	0	0	42	7	42	8:00:00	0	0	0	0	0
9:00:00	58	0	1	59	55	59	9:00:00	0	0	0	0	0
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	64	0	2	66	15	66	17:00:00	0	0	0	0	0
18:00:00	55	0	1	56	4	56	18:00:00	0	0	0	0	0
Totals:	219	0	4	223	81	223		0	0	0	0	0

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	16:00	17:00	17:00	18:00	18:00
Crossing Values:	0	42	58	0	64	64	55	55

Humber Boulevard N & Black Creek Drive/Weston Ro

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 8:00:00
To: 9:00:00

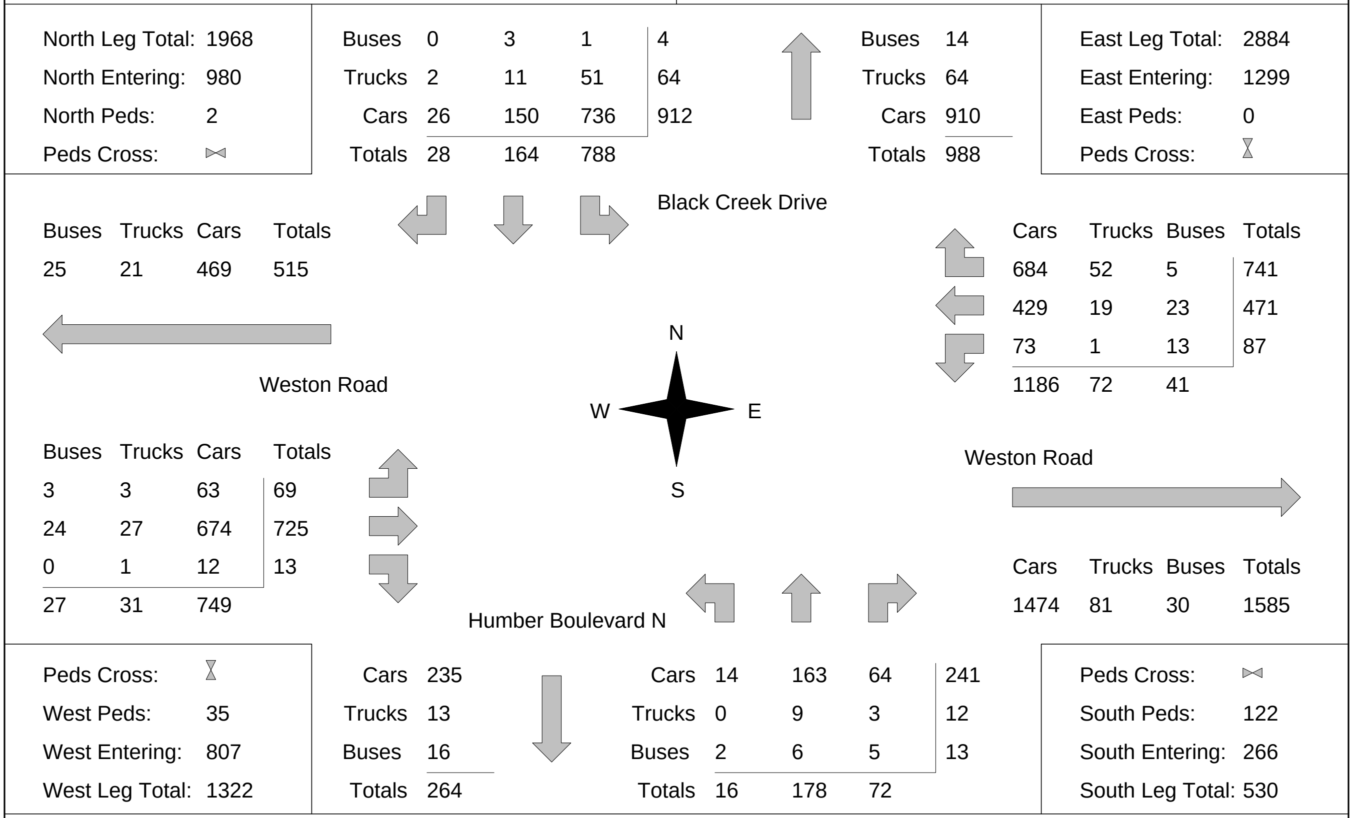
Municipality: York
Site #: 0000005818
Intersection: Weston Road & Black Creek Drive/\
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Weston Road runs W/E



North Leg Total: 1968
North Entering: 980
North Peds: 2
Peds Cross: ⋈

Buses	0	3	1	4
Trucks	2	11	51	64
Cars	26	150	736	912
Totals	28	164	788	

Buses	14
Trucks	64
Cars	910
Totals	988

East Leg Total: 2884
East Entering: 1299
East Peds: 0
Peds Cross: ⧗

Black Creek Drive

Buses	Trucks	Cars	Totals
25	21	469	515

Weston Road

Cars	Trucks	Buses	Totals
684	52	5	741
429	19	23	471
73	1	13	87
1186	72	41	

N
W
E
S

Buses	Trucks	Cars	Totals
3	3	63	69
24	27	674	725
0	1	12	13
27	31	749	

Weston Road

Cars	Trucks	Buses	Totals
1474	81	30	1585

Humber Boulevard N

Peds Cross: ⧗
West Peds: 35
West Entering: 807
West Leg Total: 1322

Cars	235
Trucks	13
Buses	16
Totals	264

Cars	14	163	64	241
Trucks	0	9	3	12
Buses	2	6	5	13
Totals	16	178	72	

Peds Cross: ⋈
South Peds: 122
South Entering: 266
South Leg Total: 530

Comments

Humber Boulevard N & Black Creek Drive/Weston Ro

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 16:30:00
To: 17:30:00

Municipality: York
Site #: 0000005818
Intersection: Weston Road & Black Creek Drive/
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Weston Road runs W/E

North Leg Total:	1951
North Entering:	1004
North Peds:	12
Peds Cross:	⋈

Buses	1	0	0	1
Trucks	4	8	14	26
Cars	63	214	700	977
Totals	68	222	714	

Buses	1
Trucks	43
Cars	903
Totals	947

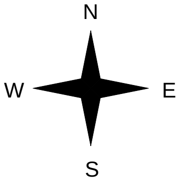
East Leg Total:	2935
East Entering:	1502
East Peds:	1
Peds Cross:	⧗

Black Creek Drive

Buses	Trucks	Cars	Totals
17	18	709	744

Weston Road

Cars	Trucks	Buses	Totals
698	39	1	738
604	14	15	633
123	4	4	131
1425	57	20	



Buses	Trucks	Cars	Totals
0	0	30	30
12	12	607	631
0	0	26	26
12	12	663	

Weston Road

Cars	Trucks	Buses	Totals
1387	27	19	1433

Humber Boulevard N

Peds Cross:	⧗
West Peds:	41
West Entering:	687
West Leg Total:	1431

Cars	363
Trucks	12
Buses	4
Totals	379

Cars	42	175	80	297
Trucks	0	4	1	5
Buses	1	0	7	8
Totals	43	179	88	

Peds Cross:	⋈
South Peds:	50
South Entering:	310
South Leg Total:	689

Comments

Humber Boulevard N & Black Creek Drive/Weston Ro

Total Count Diagram

Municipality: York
Site #: 0000005818
Intersection: Weston Road & Black Creek Drive/\
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Signalized Intersection ****

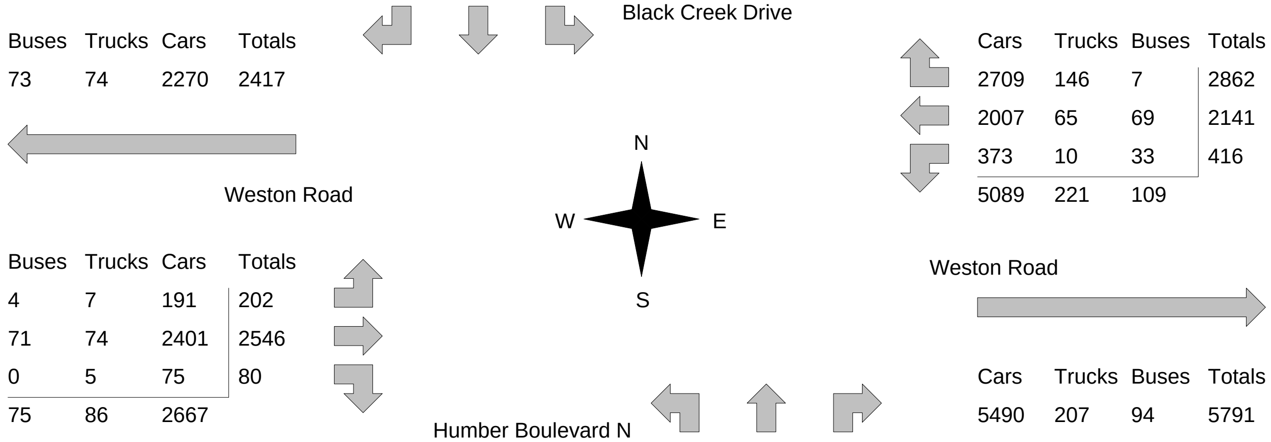
Major Road: Weston Road runs W/E

North Leg Total: 7674
North Entering: 3875
North Peds: 33
Peds Cross: ⋈

Buses	1	6	2	9
Trucks	9	36	124	169
Cars	171	708	2818	3697
Totals	181	750	2944	

Buses	23
Trucks	185
Cars	3591
Totals	3799

East Leg Total: 11210
East Entering: 5419
East Peds: 2
Peds Cross: ⧗



Black Creek Drive

Buses	Trucks	Cars	Totals
73	74	2270	2417

Cars	Trucks	Buses	Totals
2709	146	7	2862
2007	65	69	2141
373	10	33	416
5089	221	109	

Weston Road

Buses	Trucks	Cars	Totals
4	7	191	202
71	74	2401	2546
0	5	75	80
75	86	2667	

Weston Road

Cars	Trucks	Buses	Totals
5490	207	94	5791

Humber Boulevard N

Peds Cross: ⧗
West Peds: 156
West Entering: 2828
West Leg Total: 5245

Cars	1156
Trucks	51
Buses	39
Totals	1246

Cars	92	691	271	1054
Trucks	0	32	9	41
Buses	3	12	21	36
Totals	95	735	301	

Peds Cross: ⋈
South Peds: 271
South Entering: 1131
South Leg Total: 2377

Comments

Humber Boulevard N & Black Creek Drive/Weston Ro
Traffic Count Summary

Intersection: Weston Road & Black Creek Drive/ **Count Date:** 8-Oct-2019 **Municipality:** York

North Approach Totals							South Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds	North/South Total Approaches	Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	826	122	18	966	8	1207	8:00:00	11	181	49	241	46
9:00:00	788	164	28	980	2	1246	9:00:00	16	178	72	266	122
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	649	233	67	949	13	1239	17:00:00	37	168	85	290	53
18:00:00	681	231	68	980	10	1314	18:00:00	31	208	95	334	50
Totals:	2944	750	181	3875	33	5006		95	735	301	1131	271

East Approach Totals							West Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds	East/West Total Approaches	Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	70	399	632	1101	1	1771	8:00:00	65	589	16	670	20
9:00:00	87	471	741	1299	0	2106	9:00:00	69	725	13	807	35
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	119	643	764	1526	1	2185	17:00:00	31	601	27	659	55
18:00:00	140	628	725	1493	0	2185	18:00:00	37	631	24	692	46
Totals:	416	2141	2862	5419	2	8247		202	2546	80	2828	156

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	16:00	17:00	18:00	18:00	18:00
Crossing Values:	0	1039	1017	0	975	989	989	868

Weston Road & Porter Avenue

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 8:00:00
To: 9:00:00

Municipality: York
Site #: 0000005819
Intersection: Weston Road & Porter Avenue
TFR File #: 1
Count date: 8-Oct-2019

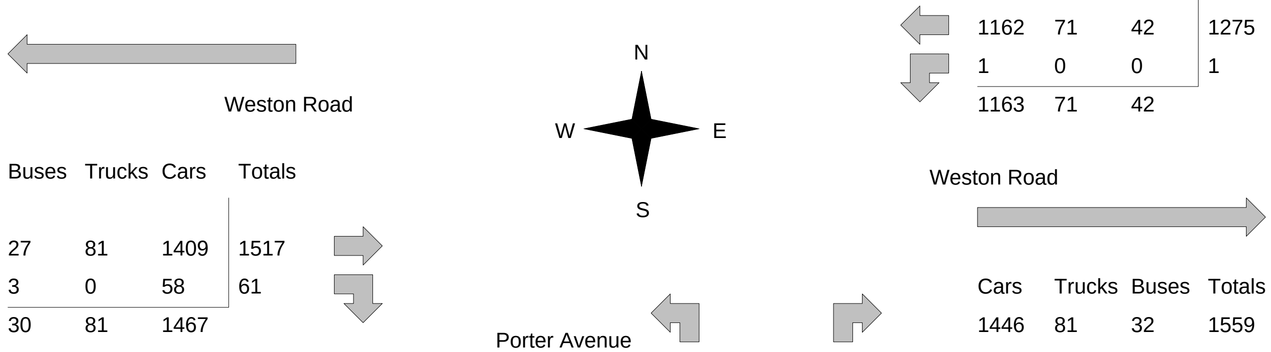
Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Weston Road runs W/E

East Leg Total:	2835
East Entering:	1276
East Peds:	0
Peds Cross:	⧗



Buses	Trucks	Cars	Totals
42	71	1189	1302

Buses	Trucks	Cars	Totals
27	81	1409	1517
3	0	58	61
30	81	1467	

Cars	Trucks	Buses	Totals
1162	71	42	1275
1	0	0	1
1163	71	42	

Cars	Trucks	Buses	Totals
1446	81	32	1559

Peds Cross:	⧗
West Peds:	0
West Entering:	1578
West Leg Total:	2880

Cars	59
Trucks	0
Buses	3
Totals	62

Cars	27	37	64
Trucks	0	0	0
Buses	0	5	5
Totals	27	42	

Peds Cross:	⋈
South Peds:	13
South Entering:	69
South Leg Total:	131

Comments

Weston Road & Porter Avenue

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 16:30:00
To: 17:30:00

Municipality: York
Site #: 0000005819
Intersection: Weston Road & Porter Avenue
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

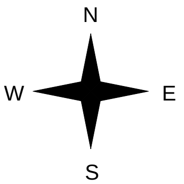
Major Road: Weston Road runs W/E

East Leg Total: 2919
East Entering: 1497
East Peds: 0
Peds Cross: ⧗

Buses	Trucks	Cars	Totals
20	58	1430	1508

Weston Road

Cars	Trucks	Buses	Totals
1416	58	20	1494
2	1	0	3
1418	59	20	



Buses	Trucks	Cars	Totals
19	27	1358	1404
0	0	25	25
19	27	1383	

Weston Road

Cars	Trucks	Buses	Totals
1376	27	19	1422

Porter Avenue

Peds Cross: ⧗
West Peds: 0
West Entering: 1429
West Leg Total: 2937

Cars	27
Trucks	1
Buses	0
Totals	28

Cars	14	18	32
Trucks	0	0	0
Buses	0	0	0
Totals	14	18	

Peds Cross: ⋈
South Peds: 32
South Entering: 32
South Leg Total: 60

Comments

Weston Road & Porter Avenue

Total Count Diagram

Municipality: York
Site #: 0000005819
Intersection: Weston Road & Porter Avenue
TFR File #: 1
Count date: 8-Oct-2019

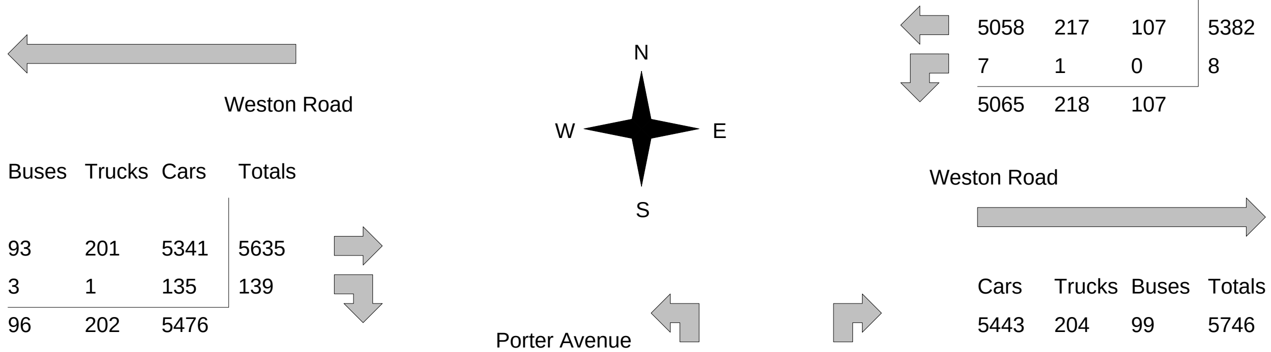
Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Weston Road runs W/E

East Leg Total:	11136
East Entering:	5390
East Peds:	1
Peds Cross:	⧗



Weston Road (westbound exiting, west leg)

Buses	Trucks	Cars	Totals
109	218	5149	5476

Weston Road (eastbound entering, west leg)

Buses	Trucks	Cars	Totals
93	201	5341	5635
3	1	135	139
96	202	5476	

Weston Road (westbound entering, east leg)

Cars	Trucks	Buses	Totals
5058	217	107	5382
7	1	0	8
5065	218	107	

Weston Road (eastbound exiting, east leg)

Cars	Trucks	Buses	Totals
5443	204	99	5746

Peds Cross:	⧗
West Peds:	0
West Entering:	5774
West Leg Total:	11250

Cars	142
Trucks	2
Buses	3
Totals	147

Cars	91	102	193
Trucks	1	3	4
Buses	2	6	8
Totals	94	111	

Peds Cross:	⋈
South Peds:	92
South Entering:	205
South Leg Total:	352

Comments

Weston Road & Porter Avenue
Traffic Count Summary

Intersection: Weston Road & Porter Avenue | **Count Date:** 8-Oct-2019 | **Municipality:** York

North Approach Totals							South Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds	North/South Total Approaches	Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	0	0	0	0	43	8:00:00	19	0	24	43	15
9:00:00	0	0	0	0	0	69	9:00:00	27	0	42	69	13
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	0	0	0	0	0	43	17:00:00	25	0	18	43	32
18:00:00	0	0	0	0	0	50	18:00:00	23	0	27	50	32
Totals:	0	0	0	0	0	205		94	0	111	205	92

East Approach Totals							West Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds	East/West Total Approaches	Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	1	1114	0	1115	0	2560	8:00:00	0	1419	26	1445	0
9:00:00	1	1275	0	1276	0	2854	9:00:00	0	1517	61	1578	0
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	2	1514	0	1516	1	2848	17:00:00	0	1307	25	1332	0
18:00:00	4	1479	0	1483	0	2902	18:00:00	0	1392	27	1419	0
Totals:	8	5382	0	5390	1	11164		0	5635	139	5774	0

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	16:00	17:00	17:00	18:00	18:00
Crossing Values:	0	19	27	0	26	26	23	23

Weston Road & Rogers Road / Bus Loop Stops

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 8:00:00
To: 9:00:00

Municipality: York
Site #: 0000005820
Intersection: Weston Road & Rogers Road
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Weston Road runs W/E

North Leg Total:	1742
North Entering:	960
North Peds:	4
Peds Cross:	⋈

Buses	19	0	24	43
Trucks	30	0	6	36
Cars	557	0	324	881
Totals	606	0	354	

Buses	27
Trucks	29
Cars	726
Totals	782

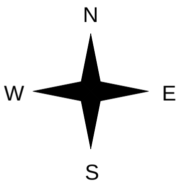
East Leg Total:	2475
East Entering:	1002
East Peds:	45
Peds Cross:	⧗

Rogers Road

Buses	Trucks	Cars	Totals
42	72	1109	1223

Cars	Trucks	Buses	Totals
372	10	8	390
552	42	18	612
0	0	0	0
924	52	26	

Weston Road



Buses	Trucks	Cars	Totals
9	19	354	382
26	61	1029	1116
0	0	0	0
35	80	1383	

Weston Road

Cars	Trucks	Buses	Totals
1353	67	53	1473

Bus Loop Stops

Peds Cross:	⧗
West Peds:	40
West Entering:	1498
West Leg Total:	2721

Cars	0
Trucks	0
Buses	0
Totals	0

Cars	0	0	0	0
Trucks	0	0	0	0
Buses	5	10	3	18
Totals	5	10	3	

Peds Cross:	⋈
South Peds:	3
South Entering:	18
South Leg Total:	18

Comments

Weston Road & Rogers Road / Bus Loop Stops

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 17:00:00
To: 18:00:00

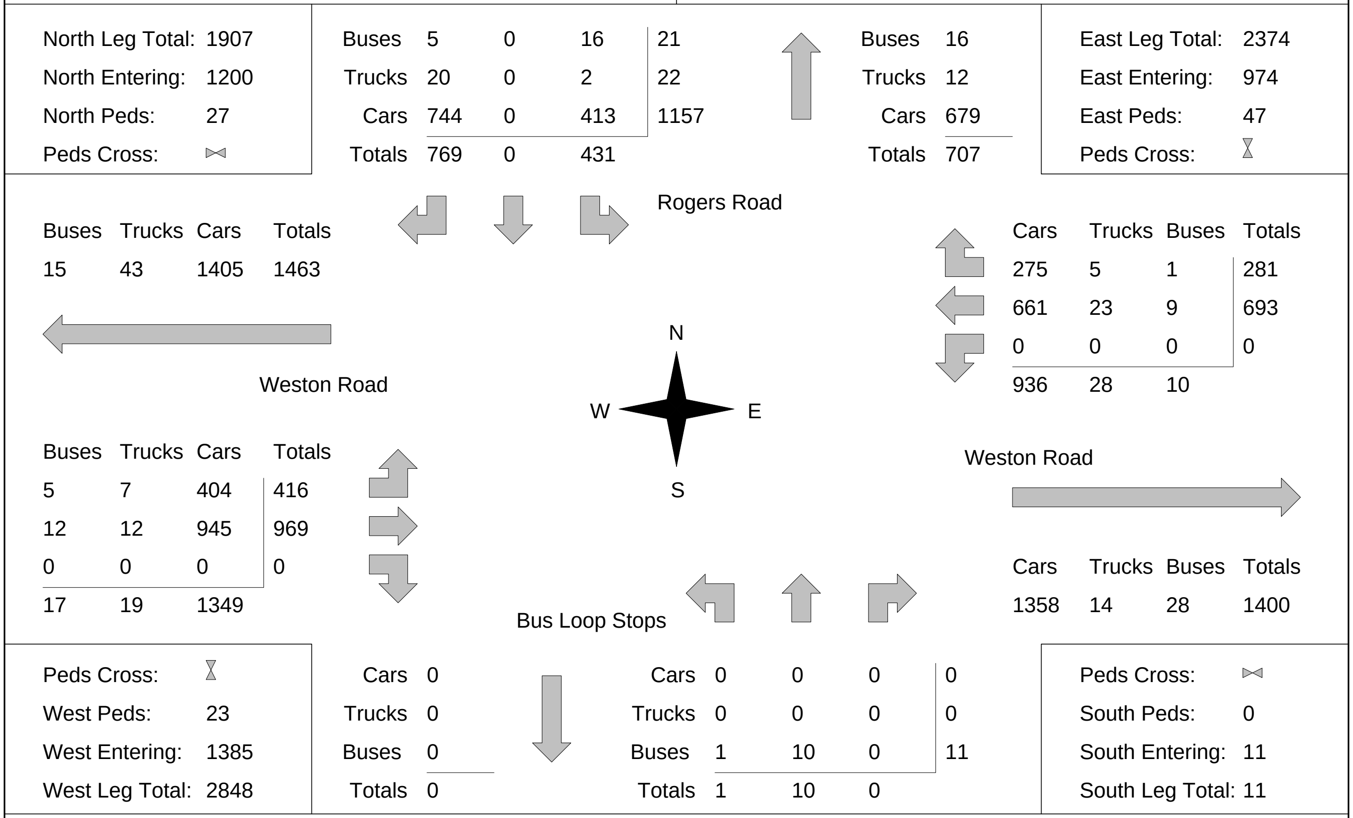
Municipality: York
Site #: 0000005820
Intersection: Weston Road & Rogers Road
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Weston Road runs W/E



North Leg Total:	1907
North Entering:	1200
North Peds:	27
Peds Cross:	⋈

Buses	5	0	16	21
Trucks	20	0	2	22
Cars	744	0	413	1157
Totals	769	0	431	

Buses	16
Trucks	12
Cars	679
Totals	707

East Leg Total:	2374
East Entering:	974
East Peds:	47
Peds Cross:	⧗

Buses	Trucks	Cars	Totals
15	43	1405	1463

Cars	Trucks	Buses	Totals
275	5	1	281
661	23	9	693
0	0	0	0
936	28	10	

Buses	Trucks	Cars	Totals
5	7	404	416
12	12	945	969
0	0	0	0
17	19	1349	

Cars	Trucks	Buses	Totals
1358	14	28	1400

Peds Cross:	⧗
West Peds:	23
West Entering:	1385
West Leg Total:	2848

Cars	0
Trucks	0
Buses	0
Totals	0

Cars	0	0	0	0
Trucks	0	0	0	0
Buses	1	10	0	11
Totals	1	10	0	

Peds Cross:	⋈
South Peds:	0
South Entering:	11
South Leg Total:	11

Comments

Weston Road & Rogers Road / Bus Loop Stops

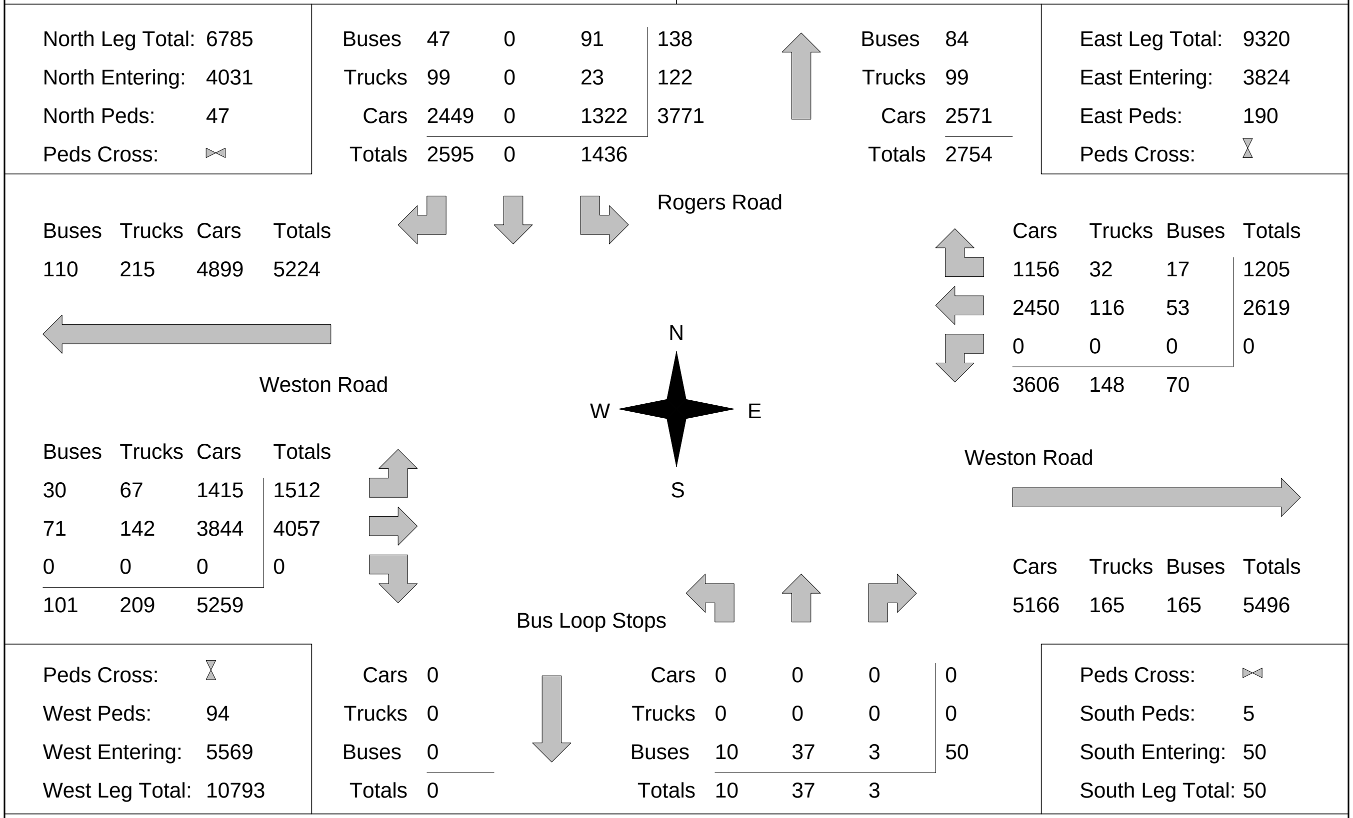
Total Count Diagram

Municipality: York
Site #: 0000005820
Intersection: Weston Road & Rogers Road
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy
Person(s) who counted:

**** Signalized Intersection ****

Major Road: Weston Road runs W/E



North Leg Total: 6785
North Entering: 4031
North Peds: 47
Peds Cross: ⋈

Buses	47	0	91	138
Trucks	99	0	23	122
Cars	2449	0	1322	3771
Totals	2595	0	1436	

Buses	84
Trucks	99
Cars	2571
Totals	2754

East Leg Total: 9320
East Entering: 3824
East Peds: 190
Peds Cross: ⧗

Buses	Trucks	Cars	Totals
110	215	4899	5224

Cars	Trucks	Buses	Totals
1156	32	17	1205
2450	116	53	2619
0	0	0	0
3606	148	70	

Buses	Trucks	Cars	Totals
30	67	1415	1512
71	142	3844	4057
0	0	0	0
101	209	5259	

Cars	Trucks	Buses	Totals
5166	165	165	5496

Peds Cross: ⧗
West Peds: 94
West Entering: 5569
West Leg Total: 10793

Cars	0
Trucks	0
Buses	0
Totals	0

Cars	0	0	0	0
Trucks	0	0	0	0
Buses	10	37	3	50
Totals	10	37	3	

Peds Cross: ⋈
South Peds: 5
South Entering: 50
South Leg Total: 50

Comments

Weston Road & Rogers Road / Bus Loop Stops
Traffic Count Summary

Intersection: Weston Road & Rogers Road	Count Date: 8-Oct-2019	Municipality: York

North Approach Totals						North/South Total Approaches	South Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	301	0	469	770	7	780	8:00:00	0	10	0	10	2
9:00:00	354	0	606	960	4	978	9:00:00	5	10	3	18	3
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	350	0	751	1101	9	1112	17:00:00	4	7	0	11	0
18:00:00	431	0	769	1200	27	1211	18:00:00	1	10	0	11	0
Totals:	1436	0	2595	4031	47	4081		10	37	3	50	5

East Approach Totals						East/West Total Approaches	West Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	598	277	875	45	2301	8:00:00	358	1068	0	1426	12
9:00:00	0	612	390	1002	45	2500	9:00:00	382	1116	0	1498	40
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	0	716	257	973	53	2233	17:00:00	356	904	0	1260	19
18:00:00	0	693	281	974	47	2359	18:00:00	416	969	0	1385	23
Totals:	0	2619	1205	3824	190	9393		1512	4057	0	5569	94

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	16:00	17:00	17:00	18:00	18:00
Crossing Values:	0	368	454	0	433	1269	512	1412

Weston Road & Avon Crescent

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 8:00:00
To: 9:00:00

Municipality: York
Site #: 0000005821
Intersection: Weston Road & Avon Crescent
TFR File #: 1
Count date: 8-Oct-2019

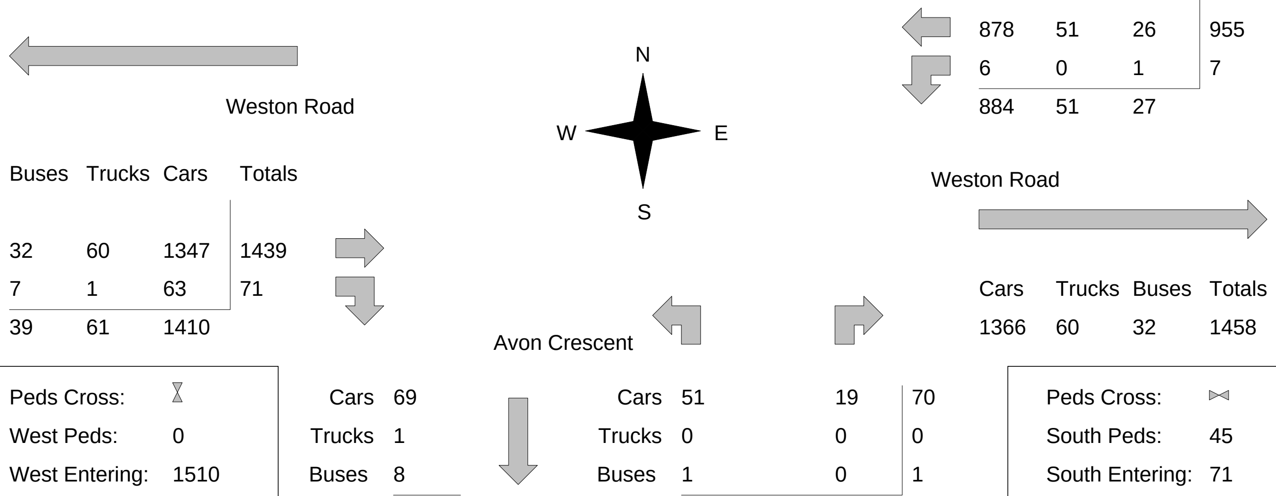
Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Weston Road runs W/E

East Leg Total: 2420
East Entering: 962
East Peds: 1
Peds Cross: ⧗



Buses	Trucks	Cars	Totals
27	51	929	1007

Buses	Trucks	Cars	Totals
32	60	1347	1439
7	1	63	71
39	61	1410	

Cars	Trucks	Buses	Totals
878	51	26	955
6	0	1	7
884	51	27	

Cars	Trucks	Buses	Totals
1366	60	32	1458

Peds Cross: ⧗
West Peds: 0
West Entering: 1510
West Leg Total: 2517

Cars	69
Trucks	1
Buses	8
Totals	78

Cars	51	19	70
Trucks	0	0	0
Buses	1	0	1
Totals	52	19	

Peds Cross: ⋈
South Peds: 45
South Entering: 71
South Leg Total: 149

Comments

Weston Road & Avon Crescent

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 16:45:00
To: 17:45:00

Municipality: York
Site #: 0000005821
Intersection: Weston Road & Avon Crescent
TFR File #: 1
Count date: 8-Oct-2019

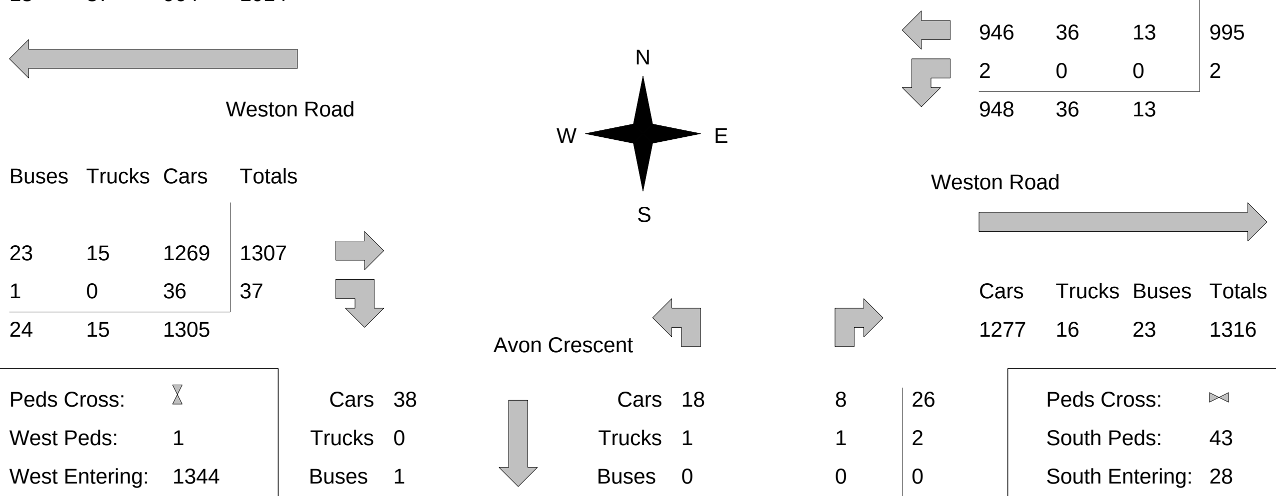
Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Weston Road runs W/E

East Leg Total: 2313
East Entering: 997
East Peds: 0
Peds Cross: ⧗



Buses	Trucks	Cars	Totals
13	37	964	1014

Cars	Trucks	Buses	Totals
946	36	13	995
2	0	0	2
948	36	13	

Buses	Trucks	Cars	Totals
23	15	1269	1307
1	0	36	37
24	15	1305	

Cars	Trucks	Buses	Totals
1277	16	23	1316

Peds Cross: ⧗
West Peds: 1
West Entering: 1344
West Leg Total: 2358

Cars	38
Trucks	0
Buses	1
Totals	39

Cars	18	8	26
Trucks	1	1	2
Buses	0	0	0
Totals	19	9	

Peds Cross: ⋈
South Peds: 43
South Entering: 28
South Leg Total: 67

Comments

Weston Road & Avon Crescent

Total Count Diagram

Municipality: York
Site #: 0000005821
Intersection: Weston Road & Avon Crescent
TFR File #: 1
Count date: 8-Oct-2019

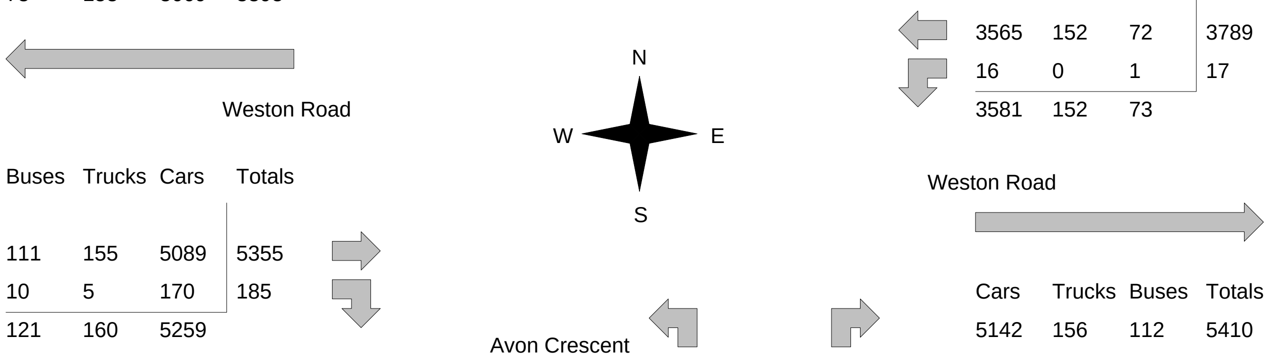
Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Weston Road runs W/E

East Leg Total: 9216
East Entering: 3806
East Peds: 5
Peds Cross: ⧗



Buses	Trucks	Cars	Totals
73	153	3669	3895

Weston Road

Buses	Trucks	Cars	Totals
111	155	5089	5355
10	5	170	185
121	160	5259	

Cars	Trucks	Buses	Totals
3565	152	72	3789
16	0	1	17
3581	152	73	

Weston Road

Cars	Trucks	Buses	Totals
5142	156	112	5410

Avon Crescent

Peds Cross: ⧗
West Peds: 3
West Entering: 5540
West Leg Total: 9435

Cars	186
Trucks	5
Buses	11
Totals	202

Cars	104	53	157
Trucks	1	1	2
Buses	1	1	2
Totals	106	55	

Peds Cross: ⋈
South Peds: 189
South Entering: 161
South Leg Total: 363

Comments

Weston Road & Avon Crescent
Traffic Count Summary

Intersection: Weston Road & Avon Crescent | **Count Date:** 8-Oct-2019 | **Municipality:** York

North Approach Totals						North/South Total Approaches	South Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	0	0	0	0	25	8:00:00	13	0	12	25	42
9:00:00	0	0	0	0	0	71	9:00:00	52	0	19	71	45
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	0	0	0	0	0	29	17:00:00	17	0	12	29	58
18:00:00	0	0	0	0	0	36	18:00:00	24	0	12	36	44
Totals:	0	0	0	0	0	161		106	0	55	161	189

East Approach Totals						East/West Total Approaches	West Approach Totals					
	Includes Cars, Trucks, & Buses							Includes Cars, Trucks, & Buses				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	3	910	0	913	3	2344	8:00:00	0	1404	27	1431	0
9:00:00	7	955	0	962	1	2472	9:00:00	0	1439	71	1510	0
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	5	939	0	944	1	2206	17:00:00	0	1217	45	1262	3
18:00:00	2	985	0	987	0	2324	18:00:00	0	1295	42	1337	0
Totals:	17	3789	0	3806	5	9346		0	5355	185	5540	3

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	16:00		17:00	17:00	18:00	18:00
Crossing Values:	0	16	53	0		21	1280	24	1341

Avon Avenue & Avon Crescent

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 8:00:00
To: 9:00:00

Municipality: York
Site #: 0000005822
Intersection: Avon Crescent & Avon Avenue & A
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

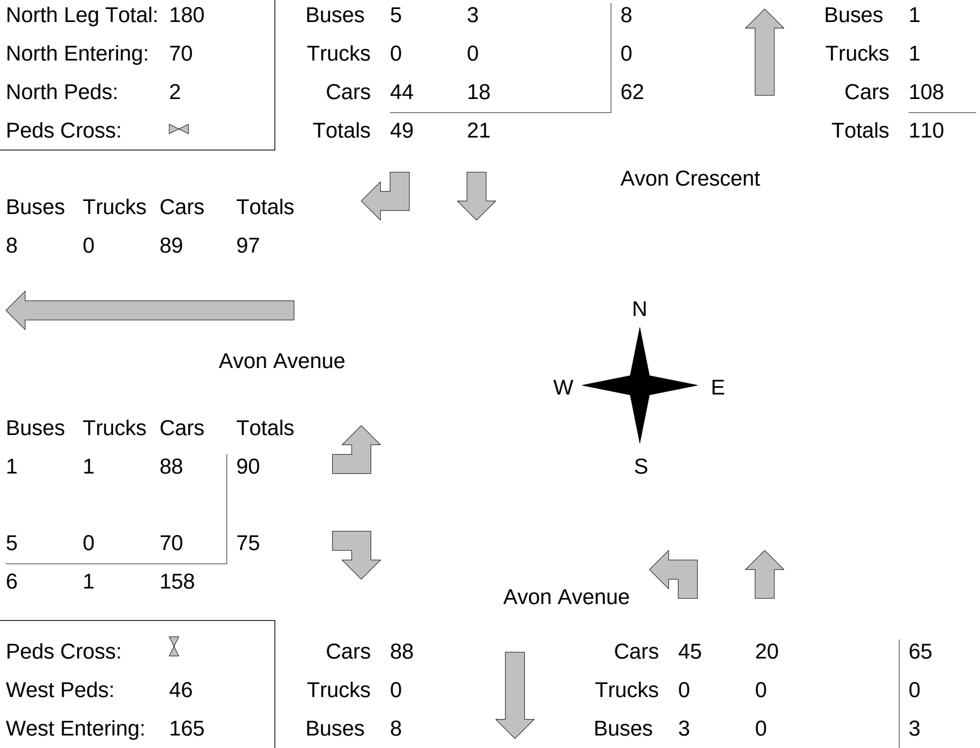
**** Non-Signalized Intersection ****

Major Road: Avon Crescent & Avon Avenue runs

North Leg Total: 180
North Entering: 70
North Peds: 2
Peds Cross: ⋈

Buses	5	3	8
Trucks	0	0	0
Cars	44	18	62
Totals	49	21	

Buses	1
Trucks	1
Cars	108
Totals	110



Buses	Trucks	Cars	Totals
8	0	89	97

Buses	Trucks	Cars	Totals
1	1	88	90
5	0	70	75
6	1	158	

Peds Cross: ⧗
West Peds: 46
West Entering: 165
West Leg Total: 262

Cars	88
Trucks	0
Buses	8
Totals	96

Cars	45	20	65
Trucks	0	0	0
Buses	3	0	3
Totals	48	20	

Peds Cross: ⋈
South Peds: 4
South Entering: 68
South Leg Total: 164

Comments

Avon Avenue & Avon Crescent

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 17:00:00
To: 18:00:00

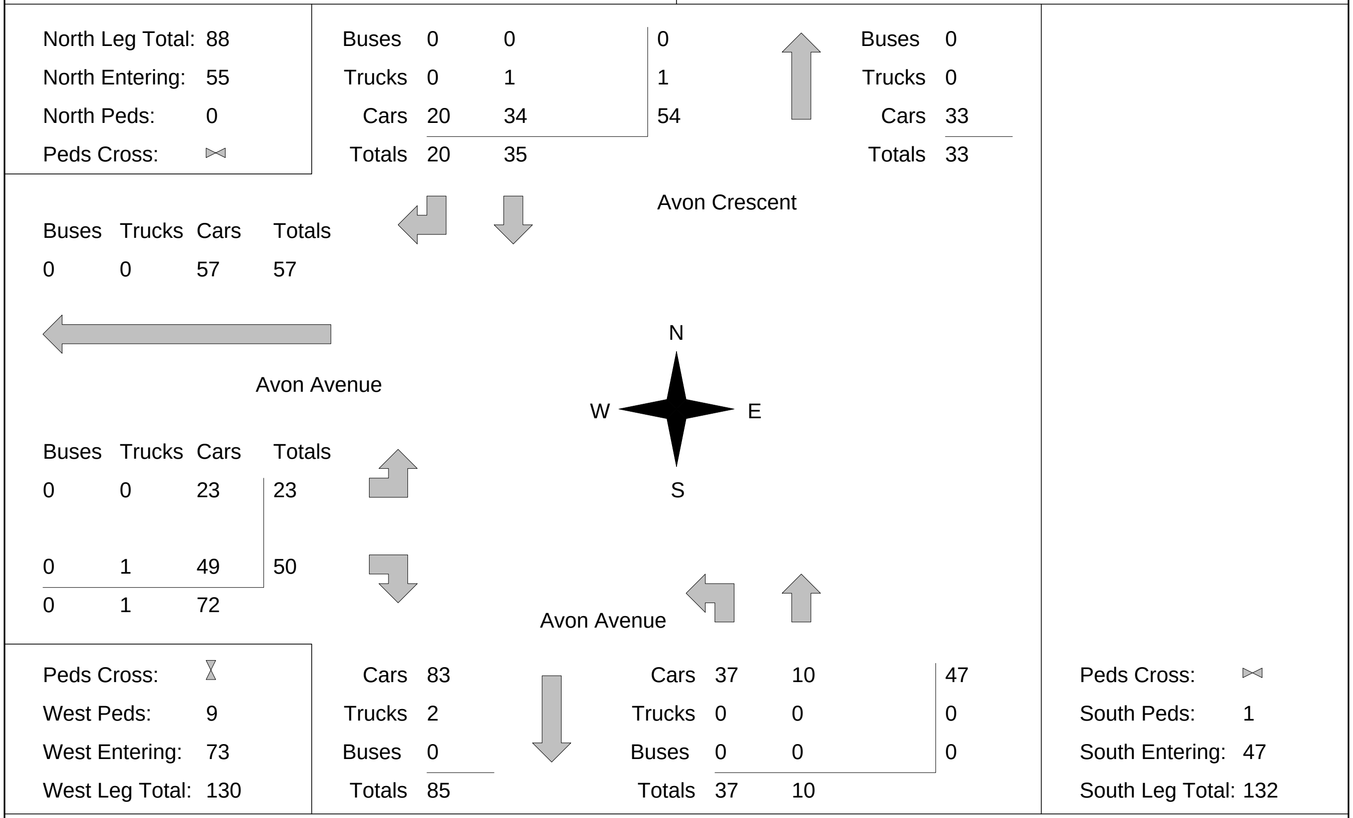
Municipality: York
Site #: 0000005822
Intersection: Avon Crescent & Avon Avenue & Av
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Avon Crescent & Avon Avenue runs



North Leg Total: 88
North Entering: 55
North Peds: 0
Peds Cross: ⋈

Buses	0	0	0
Trucks	0	1	1
Cars	20	34	54
Totals	20	35	

Buses	0
Trucks	0
Cars	33
Totals	33

Buses	Trucks	Cars	Totals
0	0	57	57

Buses	Trucks	Cars	Totals
0	0	23	23
0	1	49	50
0	1	72	

Peds Cross: ⧗
West Peds: 9
West Entering: 73
West Leg Total: 130

Cars	83
Trucks	2
Buses	0
Totals	85

Cars	37	10	47
Trucks	0	0	0
Buses	0	0	0
Totals	37	10	

Peds Cross: ⋈
South Peds: 1
South Entering: 47
South Leg Total: 132

Comments

Avon Avenue & Avon Crescent

Total Count Diagram

Municipality: York
Site #: 0000005822
Intersection: Avon Crescent & Avon Avenue & Av
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy
Person(s) who counted:

** Non-Signalized Intersection **

Major Road: Avon Crescent & Avon Avenue runs

North Leg Total:	429
North Entering:	212
North Peds:	4
Peds Cross:	⋈

Buses	7	4	11
Trucks	0	1	1
Cars	115	85	200
Totals	122	90	

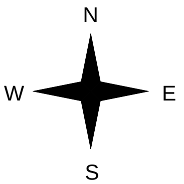
Buses	3
Trucks	2
Cars	212
Totals	217

Avon Crescent

Buses	Trucks	Cars	Totals
10	3	273	286

Avon Avenue

Buses	Trucks	Cars	Totals
3	2	160	165
7	1	184	192
10	3	344	



Avon Avenue

Peds Cross:	⧗
West Peds:	79
West Entering:	357
West Leg Total:	643

Cars	269
Trucks	2
Buses	11
Totals	282

Cars	158	52	210
Trucks	3	0	3
Buses	3	0	3
Totals	164	52	

Peds Cross:	⋈
South Peds:	7
South Entering:	216
South Leg Total:	498

Comments

Avon Avenue & Avon Crescent

Traffic Count Summary

Intersection: Avon Crescent & Avon Avenue & A **Count Date:** 8-Oct-2019 **Municipality:** York

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Buses				Total Peds		Hour Ending	Includes Cars, Trucks, & Buses				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	10	24	34	0	71	8:00:00	31	6	0	37	0
9:00:00	0	21	49	70	2	138	9:00:00	48	20	0	68	4
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	0	24	29	53	2	117	17:00:00	48	16	0	64	2
18:00:00	0	35	20	55	0	102	18:00:00	37	10	0	47	1
Totals:	0	90	122	212	4	428		164	52	0	216	7

East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Buses				Total Peds		Hour Ending	Includes Cars, Trucks, & Buses				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	0	0	0	0	66	8:00:00	30	0	36	66	9
9:00:00	0	0	0	0	0	165	9:00:00	90	0	75	165	46
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	0	0	0	0	0	53	17:00:00	22	0	31	53	15
18:00:00	0	0	0	0	0	73	18:00:00	23	0	50	73	9
Totals:	0	0	0	0	0	357		165	0	192	357	79

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	16:00	17:00	18:00	18:00	18:00
Crossing Values:	0	30	96	0	26	24	24	24

Avon Avenue & Porter Avenue/ Parking lot Access

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 8:00:00
To: 9:00:00

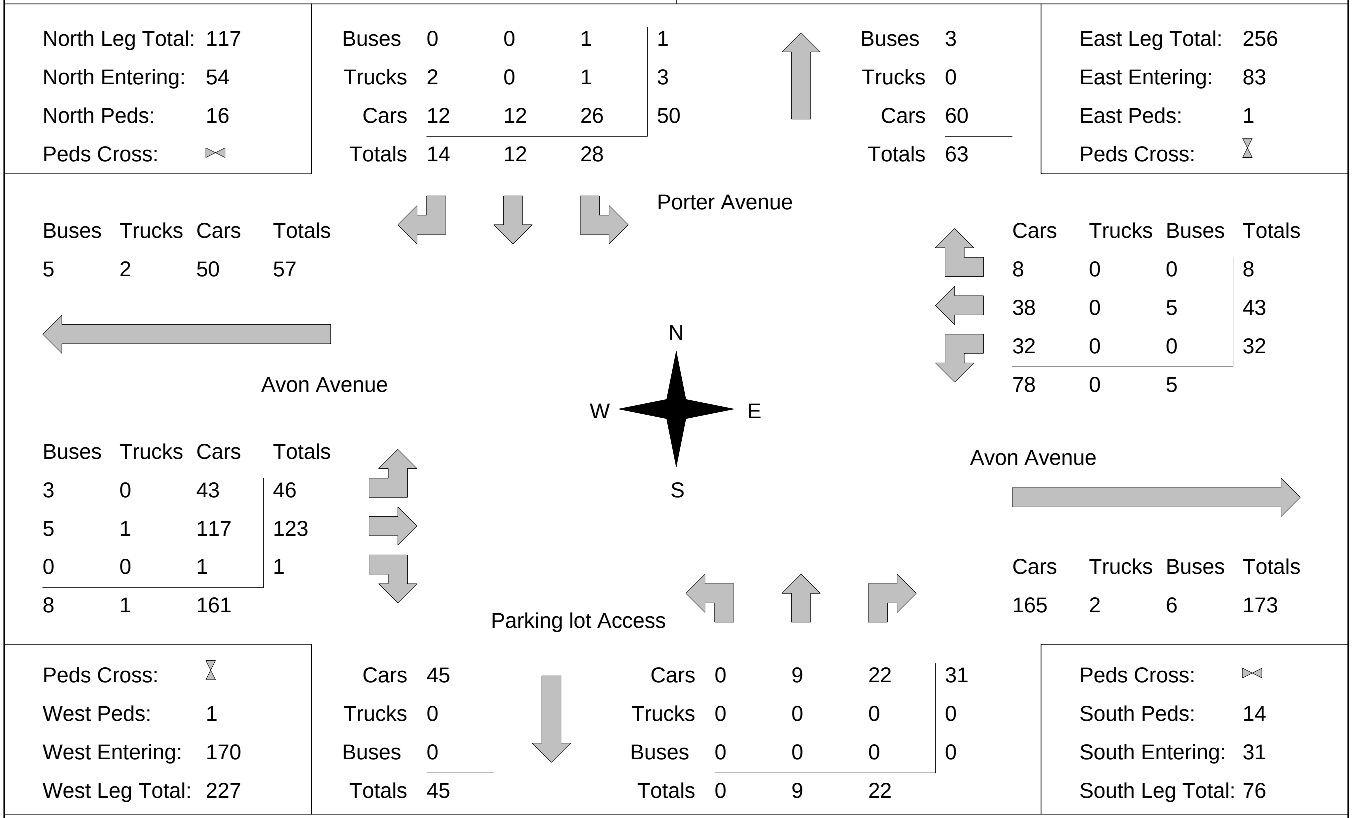
Municipality: York
Site #: 0000005823
Intersection: Avon Avenue & Porter Avenue / Pa
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Avon Avenue runs W/E



North Leg Total: 117
North Entering: 54
North Peds: 16
Peds Cross: ⋈

Buses	0	0	1	1
Trucks	2	0	1	3
Cars	12	12	26	50
Totals	14	12	28	

Buses	3
Trucks	0
Cars	60
Totals	63

East Leg Total: 256
East Entering: 83
East Peds: 1
Peds Cross: ⧗

Buses	Trucks	Cars	Totals
5	2	50	57

Cars	Trucks	Buses	Totals
8	0	0	8
38	0	5	43
32	0	0	32
78	0	5	

Buses	Trucks	Cars	Totals
3	0	43	46
5	1	117	123
0	0	1	1
8	1	161	

Cars	Trucks	Buses	Totals
165	2	6	173

Peds Cross: ⧗
West Peds: 1
West Entering: 170
West Leg Total: 227

Cars	45
Trucks	0
Buses	0
Totals	45

Cars	0	9	22	31
Trucks	0	0	0	0
Buses	0	0	0	0
Totals	0	9	22	

Peds Cross: ⋈
South Peds: 14
South Entering: 31
South Leg Total: 76

Comments

Avon Avenue & Porter Avenue/ Parking lot Access

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 16:45:00
To: 17:45:00

Municipality: York
Site #: 0000005823
Intersection: Avon Avenue & Porter Avenue / Pa
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy

Person(s) who counted:

**** Non-Signalized Intersection ****

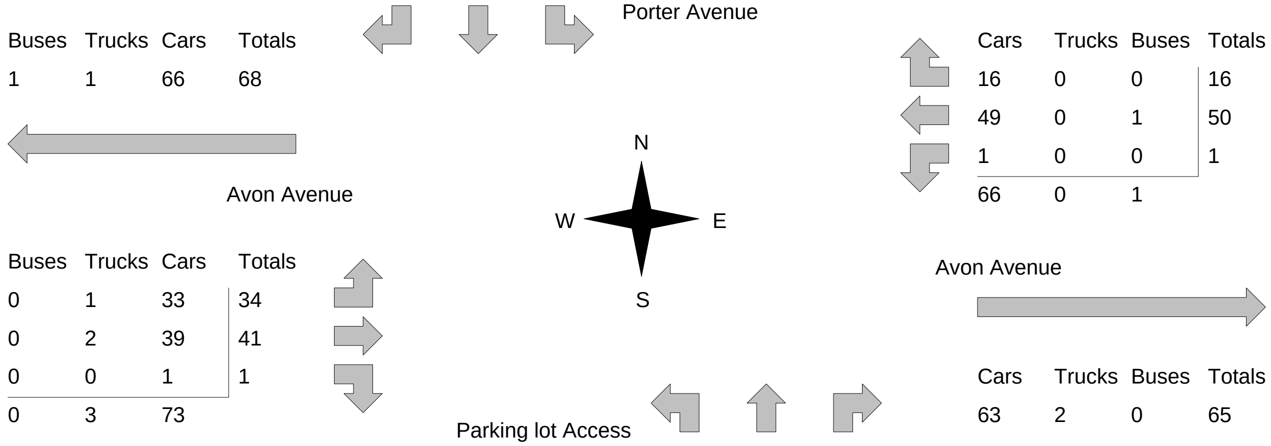
Major Road: Avon Avenue runs W/E

North Leg Total:	92
North Entering:	41
North Peds:	2
Peds Cross:	⋈

Buses	0	0	0	0
Trucks	1	0	0	1
Cars	14	2	24	40
Totals	15	2	24	

Buses	0
Trucks	1
Cars	50
Totals	51

East Leg Total:	132
East Entering:	67
East Peds:	2
Peds Cross:	⧗



Buses	Trucks	Cars	Totals
1	1	66	68

Cars	Trucks	Buses	Totals
16	0	0	16
49	0	1	50
1	0	0	1
66	0	1	

Buses	Trucks	Cars	Totals
0	1	33	34
0	2	39	41
0	0	1	1
0	3	73	

Cars	Trucks	Buses	Totals
63	2	0	65

Peds Cross:	⧗
West Peds:	0
West Entering:	76
West Leg Total:	144

Cars	4
Trucks	0
Buses	0
Totals	4

Cars	3	1	0	4
Trucks	0	0	0	0
Buses	0	0	0	0
Totals	3	1	0	

Peds Cross:	⋈
South Peds:	22
South Entering:	4
South Leg Total:	8

Comments

Avon Avenue & Porter Avenue/ Parking lot Access

Total Count Diagram

Municipality: York
Site #: 0000005823
Intersection: Avon Avenue & Porter Avenue / Pa
TFR File #: 1
Count date: 8-Oct-2019

Weather conditions:
Cloudy
Person(s) who counted:

**** Non-Signalized Intersection ****

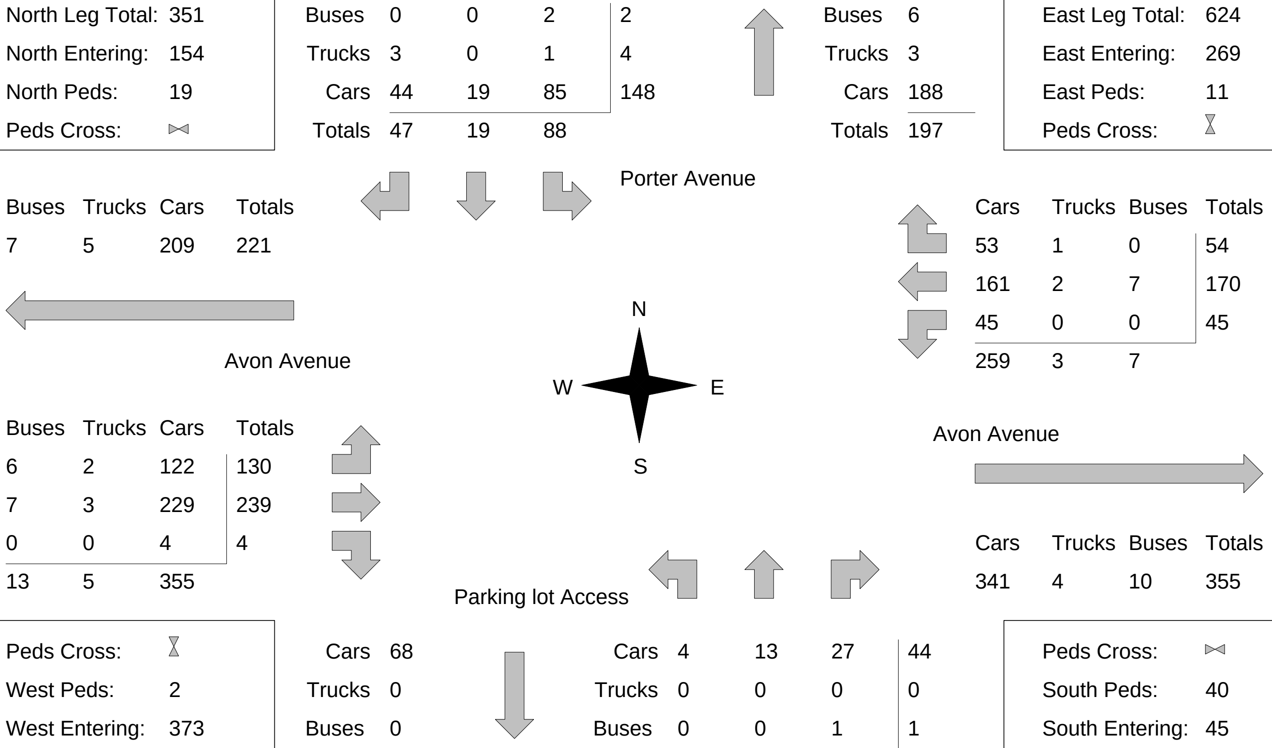
Major Road: Avon Avenue runs W/E

North Leg Total: 351
North Entering: 154
North Peds: 19
Peds Cross: ⋈

Buses	0	0	2	2
Trucks	3	0	1	4
Cars	44	19	85	148
Totals	47	19	88	

Buses	6
Trucks	3
Cars	188
Totals	197

East Leg Total: 624
East Entering: 269
East Peds: 11
Peds Cross: ⧗



Buses	Trucks	Cars	Totals
7	5	209	221

Cars	Trucks	Buses	Totals
53	1	0	54
161	2	7	170
45	0	0	45
259	3	7	

Buses	Trucks	Cars	Totals
6	2	122	130
7	3	229	239
0	0	4	4
13	5	355	

Cars	Trucks	Buses	Totals
341	4	10	355

Peds Cross: ⧗
West Peds: 2
West Entering: 373
West Leg Total: 594

Cars	68
Trucks	0
Buses	0
Totals	68

Cars	4	13	27	44
Trucks	0	0	0	0
Buses	0	0	1	1
Totals	4	13	28	

Peds Cross: ⋈
South Peds: 40
South Entering: 45
South Leg Total: 113

Comments

Avon Avenue & Porter Avenue/ Parking lot Access
Traffic Count Summary

Intersection: Avon Avenue & Porter Avenue / P **Count Date:** 8-Oct-2019 **Municipality:** York

North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Buses				Total Peds		Hour Ending	Includes Cars, Trucks, & Buses				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	13	3	10	26	1	32	8:00:00	1	2	3	6	3
9:00:00	28	12	14	54	16	85	9:00:00	0	9	22	31	14
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	17	3	9	29	0	36	17:00:00	3	1	3	7	19
18:00:00	30	1	14	45	2	46	18:00:00	0	1	0	1	4
Totals:	88	19	47	154	19	199		4	13	28	45	40

East Approach Totals						East/West Total Approaches	West Approach Totals					
Hour Ending	Includes Cars, Trucks, & Buses				Total Peds		Hour Ending	Includes Cars, Trucks, & Buses				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	9	27	14	50	5	119	8:00:00	24	43	2	69	1
9:00:00	32	43	8	83	1	253	9:00:00	46	123	1	170	1
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	4	56	16	76	3	135	17:00:00	29	29	1	59	0
18:00:00	0	44	16	60	2	135	18:00:00	31	44	0	75	0
Totals:	45	170	54	269	11	642		130	239	4	373	2

Calculated Values for Traffic Crossing Major Street

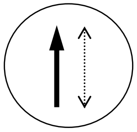
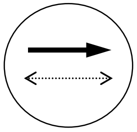
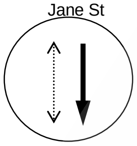
Hours Ending:	0:00	0:00	7:00	8:00	9:00	16:00	17:00	18:00
Crossing Values:	0	0	0	23	42	0	26	33

Appendix B: Existing Signal Timing Plans

LOCATION: **Jane St & East Dr / Outlook Ave**
MODE/COMMENT: **SAP with PR & TSP***
TCS: **526**
PREPARED BY / DATE: ***Parsons*** **/ October 22, 2018**
CHECKED BY / DATE: **Masoud Ramezani / Pierre Vandall / October 26, 2018**
IMPLEMENTATION DATE: **December 4, 2018**

DISTRICT: **Toronto & East York**
COMPUTER SYSTEM: **TransSuite**
CONTROLLER/CABINET TYPE: **Peek ATC-1000 / TS2T1**
CONFLICT FLASH: **Red & Red**
DESIGN WALK SPEED: **1.0m/s (FDW based on full crossing @ 1.2m/s)**
CHANNEL/DROP: **4023 / 18**
CONTROLLER FIRMWARE: **3.018.1.2976**

N

NEMA Phase			**OFF**	**AM**	**PM**	**NGHT**	**WKND**	**Phase Mode**	**Remarks**
			All Other Times	**06:30-09:30 M-F**	**15:00-18:45 M-F**	**22:00-06:30 Daily**	**10:00-19:00 Sat & Sun**	**(Fixed/Demanded/Callable)**	
	Local Plan		Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5		
	Split Table		Split 1	Split 2	Split 3	Split 4	Split 5		
1 NOT USED	WLK								Pedestrian Minimums: NSWK = 7 sec, NSFD = 12 sec EWWK = 7 sec, EWFD = 17 sec
	FDW								
	MIN								
	MAX1								EW phase is callable by vehicle or pedestrian actuation. If a vehicle and/or pedestrian call is received, the maximum EWG is served. The EWWK & EWFD are displayed on the pedestrian signal heads if a pedestrian or vehicle call is received.
	AMB								
	ALR								
	SPLIT								
Jane St 2 	WLK	7						Fixed POZ activated by Request Loop (max extension of 30 secs in Green/Walk)	*See back for TSP Instructions.
	FDW	12							**TSP enabled for NB & SB directions on November 28, 2014.**
	MIN	19							
	MAX1	44							Additional 1 second above the pedestrian minimum provided to the Phase 4/8 SPLIT is to be served in Phase 4/8.
	AMB	4							
	ALR	2							
	SPLIT		49	66	69	43	49		
3 NOT USED	WLK								
	FDW								
	MIN								
	MAX1								
	AMB								
	ALR								
	SPLIT								
East Dr 4 	WLK	7						Callable by Stopbar Loop and/or Pushbutton (truncations allowable to pedestrian minimum)	
	FDW	17							
	MIN	24							
	MAX1	24							
	AMB	3							
	ALR	3							
	SPLIT		31	34	31	31	31		
5 NOT USED	WLK								
	FDW								
	MIN								
	MAX1								
	AMB								
	ALR								
	SPLIT								
Jane St 6 	WLK	7						Fixed POZ activated by Request Loop (max extension of 30 secs in Green/Walk)	
	FDW	12							
	MIN	19							
	MAX1	44							
	AMB	4							
	ALR	2							
	SPLIT		49	66	69	43	49		
7 NOT USED	WLK								
	FDW								
	MIN								
	MAX1								
	AMB								
	ALR								
	SPLIT								
Outlook Ave 8 	WLK	7						Callable by Stopbar Loop and/or Pushbutton (truncations allowable to pedestrian minimum)	
	FDW	17							
	MIN	24							
	MAX1	24							
	AMB	3							
	ALR	3							
	SPLIT		31	34	31	31	31		
	CL		80	100	100	74	80		
	OF		47	19	3	19	10		

NOTES:

LOC: Jane St & East Dr / Outlook Ave
MODE: SAP with PR & TSP*
TCS: 526 ***PREPARATION DATE (TIMING CARD):*** October 26, 2018

OFFSET CORRECTION PARAMETERS

2.3.4 O.C. Extend / Reduce

(Max. time added & subtracted in sec.)

			Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8	From page 1 [Cycle]	[Slop]	2.3.5 Pct. of Cycle
OFF													Pattern 1
	Split 1	Ext.	--	30	--	--	--	30	--	--	80	25	20 s
		Rdc.	--	24	--	1	--	24	--	1			[25 %]
AM													Pattern 2
	Split 2	Ext.	--	38	--	--	--	38	--	--	100	45	25 s
		Rdc.	--	41	--	4	--	41	--	4			[25 %]
PM													Pattern 3
	Split 3	Ext.	--	38	--	--	--	38	--	--	100	45	25 s
		Rdc.	--	44	--	1	--	44	--	1			[25 %]
NGHT													Pattern 4
	Split 4	Ext.	--	28	--	--	--	28	--	--	74	19	19 s
		Rdc.	--	18	--	1	--	18	--	1			[25 %]
WKND													Pattern 5
	Split 5	Ext.	--	30	--	--	--	30	--	--	80	25	20 s
		Rdc.	--	24	--	1	--	24	--	1			[25 %]

T.S.P. PARAMETERS

PREPARED: Parsons

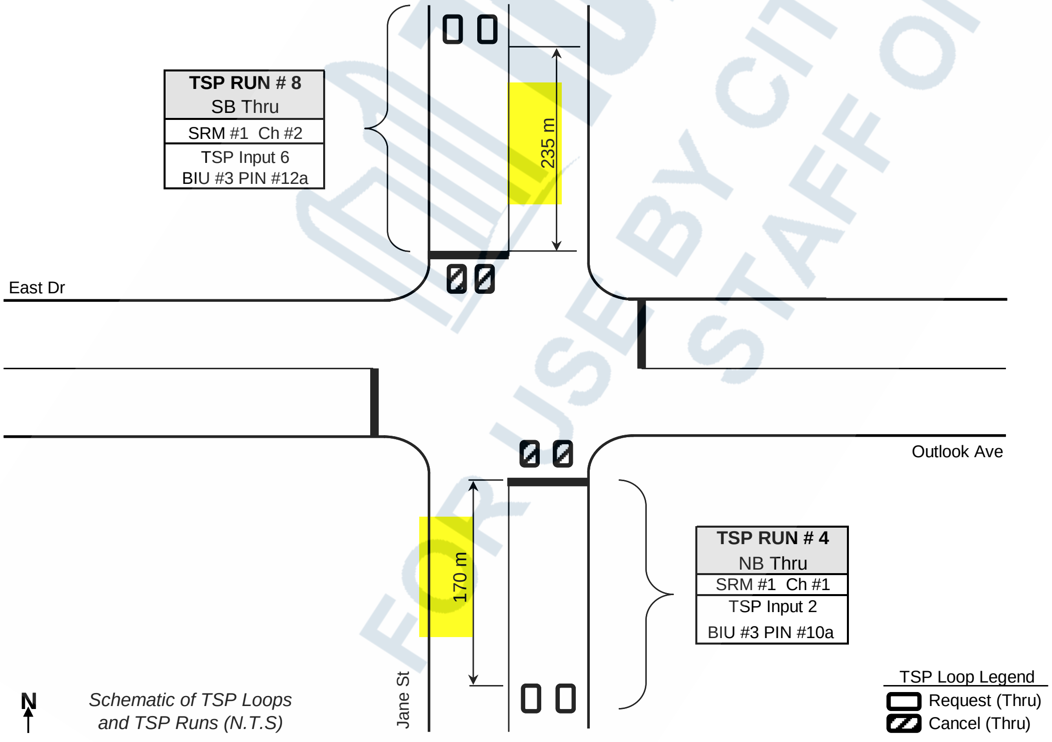
	TSP RUN # 4 NB Thru	TSP RUN # 8 SB Thru
2.8.2 Transit Run Parameters		
ATC Green Extend Mode (Equivalent TTC Algorithm)	Mode 2 **A**	Mode 2 **A**
2.8.3 Transit Action Plan 1 (Used for all Patterns)		
Run Enable (X = Yes)	X	X
Run Config = 1	Recovery = 2 (O.C. with delay)	
2.8.4 Transit Run Configuration 1		
Delay / Extend / Fail	-- / -- / 235	-- / -- / 235
CALLS (and Extends)	**Ø 2/6**	**Ø 2/6**
Skips	--	--
Reduces (Truncates)	**Ø 4/8**	**Ø 4/8**

2.8.6 TSP Split Tables: 1, 3, 4 and 5

	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
GRN EXT (SDW Extension)	--	--	--	--	--	--	--	--
GRN RDC (Reduction)	--	--	--	-1	--	--	--	-1
WLK EXT (Walk Extension)	--	30	--	--	--	30	--	--

2.8.6 TSP Split Table: 2

	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
GRN EXT (SDW Extension)	--	--	--	--	--	--	--	--
GRN RDC (Reduction)	--	--	--	-4	--	--	--	-4
WLK EXT (Walk Extension)	--	30	--	--	--	30	--	--



Schematic of TSP Loops and TSP Runs (N.T.S)

Notes:

TSP uses Run #4 and Run #8 instead of TSP Run #2 and Run # 6 because of wiring issues. If the wiring can be corrected, the TSP Runs should be reprogrammed to 2 and 6 for consistency.

ATC Mode	0	2	3	4
TTC Algor'm	**B-2**	**A**	**C**	**D**
Extensions	SDW	Walk	W/SDW	W/SDW

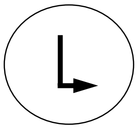
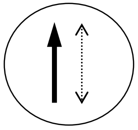
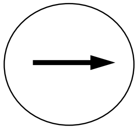
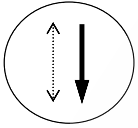
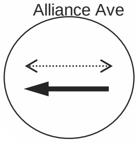
TSP SUMMARY

Maximum Green Extensions:
NSG: 30 s Green/Walk
Truncation of phases 4 and 8

LOCATION:	**Jane St & Alliance Ave / Private Access**
MODE/COMMENT:	**SAP with PR & TSP***
TCS:	**525**
PREPARED BY / DATE:	***Parsons* / October 22, 2018**
CHECKED BY / DATE:	**Masoud Ramezani / Pierre Vandall / October 26, 2018**
IMPLEMENTATION DATE:	**December 4, 2018**

DISTRICT:	**Toronto & East York**
COMPUTER SYSTEM:	**TransSuite**
CONTROLLER/CABINET TYPE:	**Peek ATC-1000 / TS2T1**
CONFLICT FLASH:	**Red & Red**
DESIGN WALK SPEED:	**1.0m/s (FDW based on full crossing @ 1.2m/s)**
CHANNEL/DROP:	**4069/2**
CONTROLLER FIRMWARE:	**3.018.1.2976**

N ↑

			OFF	**AM**	**PM**	**NGHT**	**WKND**	**Phase Mode**	
NEMA Phase			**All Other Times**	**06:30-09:30 M-F**	**15:00-18:45 M-F**	**22:00-06:30 Daily**	**10:00-19:00 Sat & Sun**	**(Fixed/Demanded/Callable)**	**Remarks**
	Local Plan		Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5		
	Split Table		Split 1	Split 2	Split 3	Split 4	Split 5		
1 	WLK							Callable by 9m Setback Loop	Pedestrian Minimums: NSWK = 7 sec, NSFD = 13 sec EWWK = 7 sec, EWFD = 16 sec
	FDW								EW phase is callable by vehicle or pedestrian actuation. If a vehicle and/or pedestrian call is received, the maximum EWG is served. The EWWK & EWFD are displayed on the pedestrian signal heads if a pedestrian or vehicle call is received.
	MIN	6							
	MAX1	7							
	AMB	3							
	ALR	1							
	SPLIT		11	11	11		11		
Jane St 2 	WLK	7						Fixed POZ activated by Request Loop (max extension of 30 secs in Green/Walk)	Left-Turn Passage Time = 2 sec *See back for TSP Instructions. **TSP enabled for NB & SB directions on November 28, 2014.** Additional 1 second above the pedestrian minimum provided to the Phase 4/8 SPLIT is to be served in Phase 4/8.
	FDW	13							
	MIN	20							
	MAX1	33							
	AMB	4							
	ALR	3							
	SPLIT		39	59	59	44	39		
3 NOT USED	WLK								
	FDW								
	MIN								
	MAX1								
	AMB								
	ALR								
	SPLIT								
Private Access 4 	WLK	7						Callable by Stopbar Loop (truncations allowable to pedestrian minimum)	
	FDW	16							
	MIN	23							
	MAX1	23							
	AMB	3							
	ALR	3							
	SPLIT		30	30	30	30	30		
5 NOT USED	WLK								
	FDW								
	MIN								
	MAX1								
	AMB								
	ALR								
	SPLIT								
Jane St 6 	WLK	7						Fixed POZ activated by Request Loop (max extension of 30 secs in Green/Walk)	
	FDW	13							
	MIN	20							
	MAX1	44							
	AMB	4							
	ALR	3							
	SPLIT		50	70	70	44	50		
7 NOT USED	WLK								
	FDW								
	MIN								
	MAX1								
	AMB								
	ALR								
	SPLIT								
Alliance Ave 8 	WLK	7						Callable by Stopbar Loop and/or Pushbutton (truncations allowable to pedestrian minimum)	
	FDW	16							
	MIN	23							
	MAX1	23							
	AMB	3							
	ALR	3							
	SPLIT		30	30	30	30	30		
	CL		80	100	100	74	80		
	OF		75	10	95	66	51		

NOTES:

Pedestrian crossing on South side prohibited.

LOC: Jane St & Alliance Ave / Private Access
MODE: SAP with PR & TSP*
TCS: 525 ***PREPARATION DATE (TIMING CARD):*** October 26, 2018

OFFSET CORRECTION PARAMETERS

2.3.4 O.C. Extend / Reduce

(Max. time added & subtracted in sec.)

		Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8	From page 1 [Cycle]	[Slop]	2.3.5 Pct. of Cvcle
OFF												Pattern 1
Split 1	Ext.	--	30	--	--	--	30	--	--	80	14	20 s
	Rdc.	1	12	--	1	--	13	--	1			[25 %]
AM												Pattern 2
Split 2	Ext.	--	38	--	--	--	38	--	--	100	34	25 s
	Rdc.	1	32	--	1	--	33	--	1			[25 %]
PM												Pattern 3
Split 3	Ext.	--	38	--	--	--	38	--	--	100	34	25 s
	Rdc.	1	32	--	1	--	33	--	1			[25 %]
NGHT												Pattern 4
Split 4	Ext.	--	28	--	--	--	28	--	--	74	18	19 s
	Rdc.	--	17	--	1	--	17	--	1			[25 %]
WKND												Pattern 5
Split 5	Ext.	--	30	--	--	--	30	--	--	80	14	20 s
	Rdc.	1	12	--	1	--	13	--	1			[25 %]

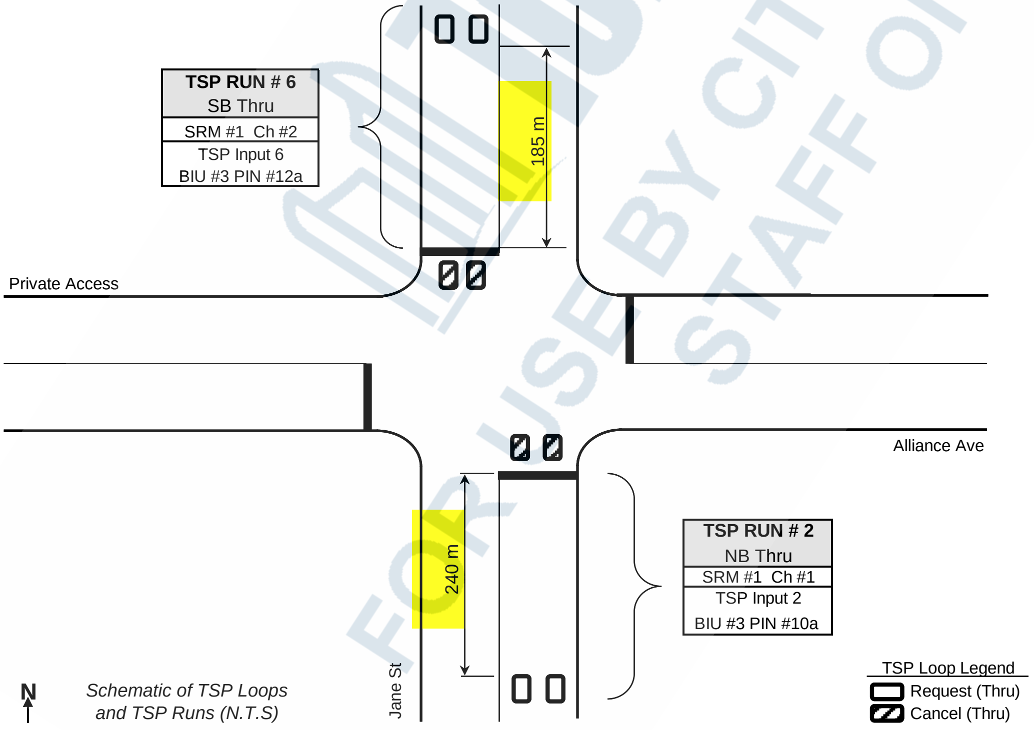
T.S.P. PARAMETERS

PREPARED: Parsons

	TSP RUN # 2 NB Thru	**TSP RUN # 6** SB Thru
2.8.2 Transit Run Parameters		
ATC Green Extend Mode (Equivalent TTC Algorithm)	Mode 2 A	Mode 2 A
2.8.3 Transit Action Plan 1 (Used for all Patterns)		
Run Enable (X = Yes)	X	X
Run Config = 1	Recovery = 2 (O.C. with delay)	
2.8.4 Transit Run Configuration 1		
Delay / Extend / Fail	-- / -- / 235	-- / -- / 235
CALLS (and Extends)	**Ø 2/6**	**Ø 2/6**
Skips	--	--
Reduces (Truncates)	**Ø 4/8**	**Ø 4/8**

2.8.6 TSP Split Tables: 1, 2, 3, 4 & 5

	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
GRN EXT (SDW Extension)	--	--	--	--	--	--	--	--
GRN RDC (Reduction)	--	--	--	-1	--	--	--	-1
WLK EXT (Walk Extension)	--	30	--	--	--	30	--	--



Schematic of TSP Loops and TSP Runs (N.T.S)

Notes:

ATC Mode	0	2	3	4
TTC Algor'm	**B-2**	**A**	**C**	**D**
Extensions	SDW	Walk	W/SDW	W/SDW

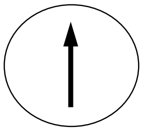
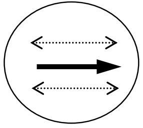
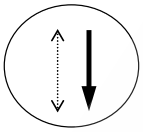
TSP SUMMARY

Maximum Green Extensions:
NSG: 30 s Green/Walk
Truncation of phases 4 and 8

LOCATION: **Jane St & Haney Ave**
MODE/COMMENT: **SA2-VMG with PR, 2-Wire Polara APS & TSP***
TCS: **1076**
PREPARED BY / DATE: ***Parsons*** **/ October 22, 2018**
CHECKED BY / DATE: **Masoud Ramezani / Pierre Vandall / October 26, 2018**
IMPLEMENTATION DATE: **December 4, 2018**

DISTRICT: **Etobicoke York**
COMPUTER SYSTEM: **TransSuite**
CONTROLLER/CABINET TYPE: **Peek ATC-1000 / TS2T1**
CONFLICT FLASH: **Red & Red**
DESIGN WALK SPEED: **1.0 m/s (FDW based on full crossing @ 1.2m/s)**
CHANNEL/DROP: **4023/4**
CONTROLLER FIRMWARE: **3.18.1.2976**

N

NEMA Phase			**OFF**	**AM**	**PM**	**NGHT**	**WKND**	**Phase Mode**	**Remarks**
			All Other Times	**06:30-09:30 M-F**	**15:00-18:45 M-F**	**22:00-06:30 Daily**	**10:00-19:00 Sat & Sun**	**(Fixed/Demanded/Callable)**	
	Local Plan		Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5		
	Split Table		Split 1	Split 2	Split 3	Split 4	Split 5		
1 NOT USED	WLK FDW MIN MAX1 AMB ALR SPLIT								Pedestrian Minimums: NSWK = 7 sec, NSFD = 13 sec EWWK = 7 sec, EWFD = 14 sec EBG phase is callable by vehicle or pedestrian actuation. If a vehicle call is received, the minimum EBG is 7 seconds. If ongoing vehicle demand exists on the Stopbar Loop, the EBG is capable of providing vehicle extensions up to the maximum
Jane St 2 	WLK FDW MIN MAX1 AMB ALR SPLIT	7 13 20 47 4 2	52	72	72	46	52	Fixed POZ activated by Request Loop (max extension of 30 secs in Green/Walk)	green split. If a pedestrian call is received, the maximum would be served. The EWWK & EWFD are only displayed on the pedestrian signal heads if a pedestrian call is received. Extension time is based on vehicle demand and is taken from the NSG. Unused extension time is given to the NSG. APS on during NSWK & EWWK when activated by push buttons
3 NOT USED	WLK FDW MIN MAX1 AMB ALR SPLIT								Extended Push Activation = 3 sec *See back for TSP instructions. **SB TSP enabled on July 11, 2017. NB TSP enabled on January 10, 2018.** Script #2 is used to mitigate issues with TSP operation in ATC-1000 firmware version 3.018.1.2976
Haney Ave 4 	WLK FDW MIN MAX1 AMB ALR SPLIT	7 14 7 21 3 3	28	28	28	28	28	Callable by Stopbar Loop and/or Pushbutton; Extendable by Stopbar Loop (truncations allowable to pedestrian minimum)	
5 NOT USED	WLK FDW MIN MAX1 AMB ALR SPLIT								
Jane St 6 	WLK FDW MIN MAX1 AMB ALR SPLIT	7 13 20 47 4 2	52	72	72	46	52	Fixed POZ activated by Request Loop (max extension of 30 secs in Green/Walk)	
7 NOT USED	WLK FDW MIN MAX1 AMB ALR SPLIT								
8 ACTIVATED	WLK FDW MIN MAX1 AMB ALR SPLIT	7 14 7 21 3 3	28	28	28	28	28		
	CL OF		80 5	100 62	100 44	74 58	80 48		

NOTES:
T-Intersection (no East leg)

LOC: Jane St & Haney Ave
MODE: SA2-VMG with PR, 2-Wire Polara APS & TSP*
TCS: 1076 ***PREPARATION DATE (TIMING CARD):*** October 26, 2018

OFFSET CORRECTION PARAMETERS

2.3.4 O.C. Extend / Reduce

(Max. time added & subtracted in sec.)

From page 1

		Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8	[Cycle]	[Slop]	2.3.5 O.C. Thres.
OFF												Pattern 1
Split 1	Ext.	--	30	--	--	--	30	--	--	80	27	20 s
	Rdc.	--	26	--	1	--	26	--	1			[25 %]
AM												Pattern 2
Split 2	Ext.	--	38	--	--	--	38	--	--	100	47	25 s
	Rdc.	--	46	--	1	--	46	--	1			[25 %]
PM												Pattern 3
Split 3	Ext.	--	38	--	--	--	38	--	--	100	47	25 s
	Rdc.	--	46	--	1	--	46	--	1			[25 %]
NGHT												Pattern 4
Split 4	Ext.	--	28	--	--	--	28	--	--	74	21	19 s
	Rdc.	--	20	--	1	--	20	--	1			[25 %]
WKND												Pattern 5
Split 5	Ext.	--	30	--	--	--	30	--	--	80	27	20 s
	Rdc.	--	26	--	1	--	26	--	1			[25 %]

T.S.P. PARAMETERS

PREPARED: Parsons

	TSP RUN # 2 NB Thru	TSP RUN # 6 SB Thru
2.8.2 Transit Run Parameters		
ATC Green Extend Mode (Equivalent TTC Algorithm)	Mode 2 A	Mode 2 A
2.8.3 Transit Action Plan 1 (Used for all Patterns)		
Run Enable (X = Yes)	X	X
Run Config = **1** Recovery = 2 (O.C. with delay)		
2.8.4 Transit Run Configuration 1		
Delay / Extend / Fail	-- / -- / 235	-- / -- / 235
CALLS (and Extends)	**Ø 2/6**	**Ø 2/6**
Skips	--	--
Reduces (Truncates)	**Ø 4/8**	**Ø 4/8**

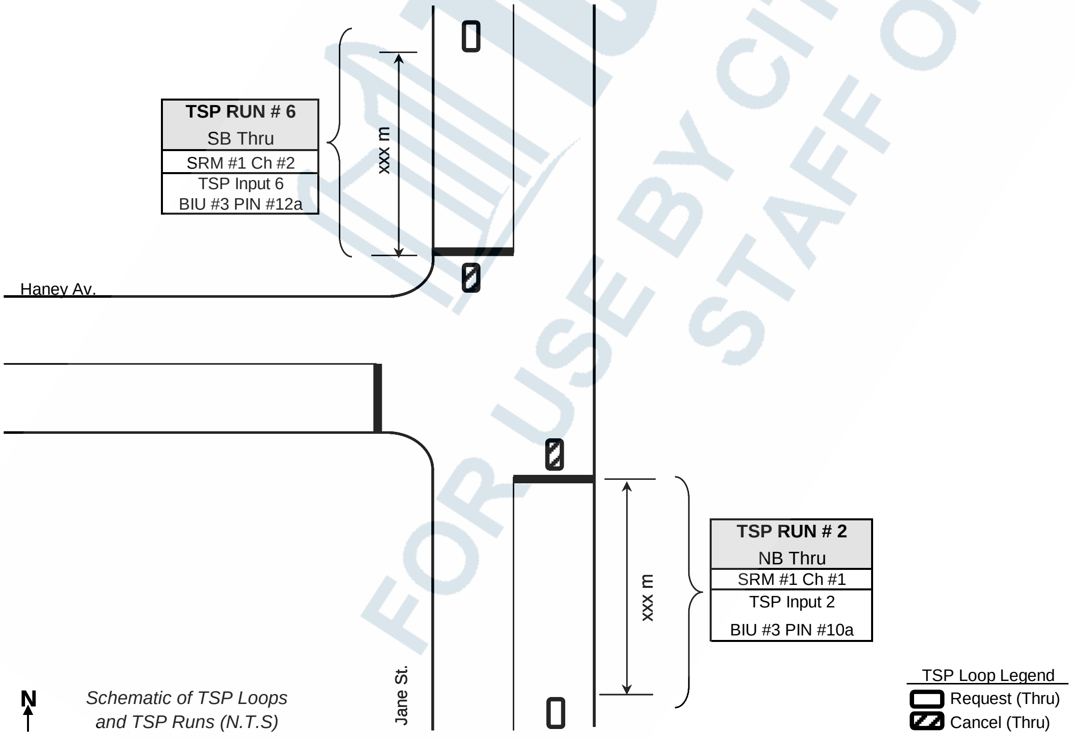
2.8.6 TSP Split Tables: 1, 2, 3, 4, & 5	Ø 1	Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
GRN EXT (SDW Extension)	--	--	--	--	--	--	--	--
GRN RDC (Reduction)	--	--	--	-1	--	--	--	-1
WLK EXT (Walk Extension)	--	+30	--	--	--	+30	--	--

2.1.9.2 Advanced I/O Scripts

Input Script 2 "TSPFilterA"

Blocks TSP inputs 2 & 6 during phase 4/8 Amb & AllR, and during unused time served in phase 2/6 late in the cycle, to mitigate firmware issues with ATC-1000 Build 3.018.1.2976

TSP Inputs can be checked on screen 1.2.4 at all times.



Schematic of TSP Loops and TSP Runs (N.T.S)

Notes:

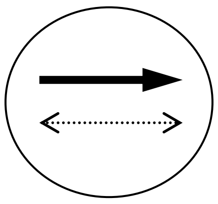
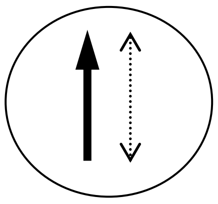
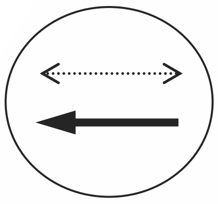
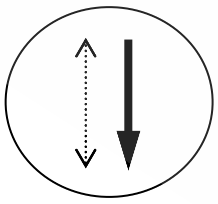
ATC Mode	0	2	3	4
TTC Algor'm	**B-2**	**A**	**C**	**D**
Extensions	SDW	Walk	W/SDW	W/SDW

TSP SUMMARY

Maximum Green Extensions:
EWG: 30 s Green/Walk
Truncation of Phase 4/8 to min.

LOCATION:	**Alliance Ave & Rockcliffe Blvd**	*DISTRICT:*	**Etobicoke - York**
TCS:	**3009**	*COMPUTER SYSTEM:*	**TransSuite**
MODE/COMMENT:	**FXT**	*CONTROLLER/CABINET TYPE:*	**Econolite ASC/3-2100 / TS2T1**
PREPARED/CHECKED BY:	**ML/LL**	*CONFLICT FLASH:*	**Red & Red**
PREPARATION DATE:	**May 25, 2010**	*DESIGN WALK SPEED:*	**1.0 m/s** (FDW based on full crossing at 1.2 m/s)
IMPLEMENTATION DATE:	**December 2, 2010**	*CHANNEL/DROP:*	**4069/1**

N

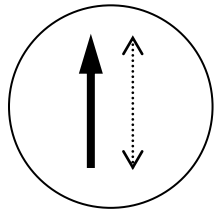
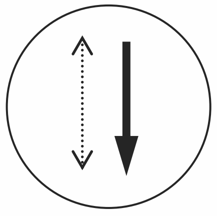
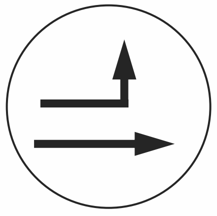
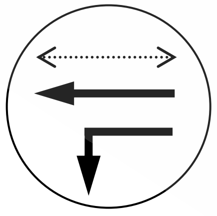
NEMA Phase		**OFF All Other Times**	**AM 06:45-9:30 M-F**	**PM 15:45-18:15 M-F**	**Phase Mode (Fixed/Demanded/Callable)**	**Remarks**
	Local Plan	Pattern 1	Pattern 2	Pattern 3		
	System Plan	Plan 1	Plan 2	Plan 3		
1 NOT USED	WLK FDW MIN MAX1 AMB ALR SPLIT					Pedestrian Minimums: EWWK = 7 secs; EWFD = 15 secs NSWK = 7 secs; NSFD = 12 secs
2 Alliance Ave 	WLK 7 FDW 15 MIN 22 MAX1 22 AMB 4 ALR 2 SPLIT	34	34	34	Fixed	
3 NOT USED						
4 Rockcliffe Blvd 	WLK 7 FDW 12 MIN 19 MAX1 19 AMB 4 ALR 2 SPLIT	26	26	26	Fixed	
5 NOT USED	WLK FDW MIN MAX1 AMB ALR SPLIT					
6 Alliance Ave 	WLK 7 FDW 15 MIN 22 MAX1 22 AMB 4 ALR 2 SPLIT	34	34	34	Fixed	
7 NOT USED	WLK FDW MIN MAX1 AMB ALR SPLIT					
8 Rockcliffe Blvd 	WLK 7 FDW 12 MIN 19 MAX1 19 AMB 4 ALR 2 SPLIT	26	26	26	Fixed	
	CL OF VP	60 1 15	60 1 15	60 1 15		

NOTES: Picked up under TransSuite system control on June 27, 2013 at approximately 14:26.

LOCATION: **Weston Rd & Black Creek Dr/Humber Blvd North**
MODE/COMMENT: **FXT with UPS**
TCS#/SCN# **577 / 51221**
CODER BY / DATE: **Ameneh Dialameh / January 25, 2019**
CHECKED BY /DATE: **Carmen Lam / January 25, 2019**
DISTRICT: **Etobicoke York**
COMPUTER SYSTEM: **UTC/SCOOT**
CONTROLLER/CABINET: **PEEK ATC-1000 / TS2 T1**
CONFLICT: **Red & Red & Red**
DESIGN WALK SPEED: **1.0 m/s (FDW based on full crossing using 1.2 m/s)**
IMPLEMENTATION DATE: **July 15, 2019**

N
↑

UTC Stages	Green Returns
A	2 & 5
B	2 & 6
C	3 & 7
F	4 & 8

NEMA Phase (Green Return)			OFF All Other Times	AM 06:30-10:00 M-F	PM 15:00-19:00 M-F	Phase Mode (Fixed/Demanded or Callable)
	Local Plan		Pattern 1	Pattern 2	Pattern 3	
	Split Table		Split 1	Split 2	Split 3	
1 NOT USED	WLK					
	FDW					
	MIN					
	MAX1					
	MAX2					
	AMB					
	ALR					
	SPLIT					
2 Weston Rd 	WLK	7				Fixed
	FDW	21				
	MIN	28				
	MAX1	45				
	MAX2	45				
	AMB	4				
	ALR	2				
	SPLIT		55	61	55	
3 NOT USED	WLK					
	FDW					
	MIN					
	MAX1					
	MAX2					
	AMB					
	ALR					
	SPLIT					
4 NOT USED	WLK					
	FDW					
	MIN					
	MAX1					
	MAX2					
	AMB					
	ALR					
	SPLIT					
5 	WLK					Callable by Wavetronix during AM and PM Callable & Extendable by Transit Loop 24/7
	FDW					
	MIN	6				
	MAX1	7				
	MAX2	16				
	AMB	3				
	ALR	1				
	SPLIT		20	20	20	
6 Weston Rd 	WLK	7				Fixed
	FDW	21				
	MIN	28				
	MAX1	28				
	MAX2	29				
	AMB	4				
	ALR	2				
	SPLIT		35	41	35	
7 Humber Blvd N 	WLK					EBG/EBLA Callable & Extendable by Stopbar Loops.
	FDW					
	MIN	7				
	MAX1	14				
	MAX2	24				
	AMB	4				
	ALR	2				
	SPLIT		25	21	25	
8 Black Creek Dr 	WLK	7				WBG/WBLA Fixed
	FDW	18				
	MIN	25				
	MAX1	25				
	MAX2	30				
	AMB	4				
	ALR	2				
	SPLIT		36	50	36	
	CL		116	132	116	
	OF		1	1	1	

Remarks

Pedestrian Minimums:
NSWK = 7 sec, NSFD = 21 sec
EWWK = 7 sec,EWFD = 18 sec

EB Phase 7 callable, extendable & skippable. If called Phase 7 served before Phase 8.

Side Street Passage Time = 3 sec

SF#1 Disable NBLA Transit Extension (time to be determined)

SF#2 Didable NBLA(time to be determined)

SF#4 Enables Max2 values (times to be determined)

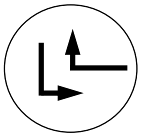
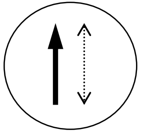
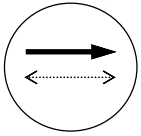
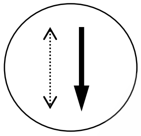
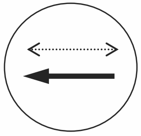
Left Turn Passage Time = 2s

NBLA is callable by mixed traffic via the Wavetronix during AM and PM. If a call is received by the Wavetronix, NBLA will be served 6 seconds with no additional extensions. NBLA can also be callable and extendable by transit vehicles via the request and cancel loops in the northbound left-turn lane. If a transit vehicle call is received, the minimum NBLA is 6 seconds and can extend up to the maximum of 16 seconds during all time periods.

Notes:

LOCATION:	**Weston Rd & Rogers Rd / TTC Loop**	*DISTRICT:*	**Etobicoke York**
TCS:	**395**	*COMPUTER SYSTEM:*	**TransSuite**
MODE / COMMENT:	**FXT**	*CONTROLLER / CABINET TYPE:*	**Econolite ASC/3-2100 / TS2 T1**
PREPARED / CHECKED BY:	***CIMA+* / BF**	*CONFLICT FLASH:*	**Red & Red**
PREPARATION DATE:	**July 31, 2018**	*DESIGN WALK SPEED:*	1.0 m/s **(FDW based on full crossing @ 1.2 m/s)**
IMPLEMENTATION DATE:	**August 16, 2018**	*CHANNEL / DROP:*	**5011 / 23**
		CONTROLLER FIRMWARE:	**2.47.10**

N ↑

NEMA Phase			**OFF**	**AM**	**PM**	**NGHT**	**WKND**	**Phase Mode**	**Remarks**
			All Other Times	**06:45-09:30 M-F**	**15:15-19:00 M-F**	**22:00-06:00 Daily**	**14:15-19:00 Sat & Sun**	**(Fixed / Demanded / Callable)**	
	Local Plan		Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5		
	System Plan		Plan 1	Plan 2	Plan 3	Plan 4	Plan 5		
1 	WLK							SBLT Fully Protected Callable/Extendable by Stop-bar Loop	Pedestrian Minimums: NSWK = 7 seconds, NSFD = 16 seconds EWWK = 7 seconds, EWFD = 23 seconds SB Left-Turn Passage Time = 2.5 seconds WBRA is concurrently on with SBLT.
	FDW								
	MIN	6							
	MAX1	19							
	AMB	3							
	ALR	1							
	SPLIT		23	25	25	11	25		
Weston Rd 2 	WLK	7						Fixed	
	FDW	16							
	MIN	23							
	MAX1	26							
	AMB	4							
	ALR	3							
	SPLIT		33	36	36	35	36		
3 NOT USED	WLK								
	FDW								
	MIN								
	MAX1								
	AMB								
	ALR								
	SPLIT								
TTC Loop 4 	WLK	7						Fixed	
	FDW	23							
	MIN	30							
	MAX1	31							
	AMB	3							
	ALR	5							
	SPLIT		39	39	39	39	39		
5 NOT USED	WLK								
	FDW								
	MIN								
	MAX1								
	AMB								
	ALR								
	SPLIT								
Weston Rd 6 	WLK	7						Fixed SBSA display	
	FDW	16							
	MIN	23							
	MAX1	49							
	AMB	4							
	ALR	3							
	SPLIT		56	61	61	46	61		
7 NOT USED	WLK								
	FDW								
	MIN								
	MAX1								
	AMB								
	ALR								
	SPLIT								
Rogers Rd 8 	WLK	7						Fixed	
	FDW	23							
	MIN	30							
	MAX1	31							
	AMB	3							
	ALR	5							
	SPLIT		39	39	39	39	39		
	CL		95	100	100	85	100		
	OF		1	67	70	1	70		

Notes: Vehicles prohibited except TTC buses on TTC Loop (Phase 4). One-way on TTC Loop. .

Appendix C: Existing MOE Summary Tables

Table C-1: Existing Intersection Operations Summary

Intersection / Movement	Weekday AM Peak Hour			Weekday PM Peak Hour			Available Storage Length (m)
	v/c	LOS (Delay in seconds)	95th Percentile Queue Length (m)	v/c	LOS (Delay in seconds)	95th Percentile Queue Length (m)	
Jane Street / East Drive & Outlook Avenue							
Overall	0.57	B (10)	-	0.53	B (10)	-	-
EBLTR	0.53	C (34)	56	0.50	C (33)	56	225
WBLT	0.15	C (30)	20	0.16	C (29)	22	80
WBR	0.01	C (28)	< 7	0.01	C (28)	< 7	30
NBL	0.17	A (3)	< 7	0.53	A (10)	< 7	55
NBTR	0.52	A (3)	14	0.50	A (3)	17	90
SBL	0.06	A (7)	< 7	0.06	A (7)	< 7	50
SBTR	0.59	B (11)	83	0.54	B (10)	76	215
Jane Street / Sandcliff Road							
Overall	-	A (-)	-	-	A (-)	-	-
EBLR	0.04	B (14)	< 7	0.03	B (11)	< 7	125
NBL	0.01	B (12)	< 7	0.04	B (11)	< 7	25
NBT	0.32	A (-)	< 7	0.35	A (-)	< 7	80
SBTR	0.50	A (-)	< 7	0.51	A (-)	< 7	85
Jane Street / Black Creek Boulevard & Dalrymple Drive							
Overall	-	A (2)	-	-	A (2)	-	-
EBLTR	0.22	C (23)	7	0.24	D (29)	7	120
WBLTR	0.26	C (15)	9	0.41	D (28)	15	180
NBL	0.02	B (10)	< 7	0.10	B (11)	< 7	25
NBTR	0.39	A (-)	< 7	0.45	A (-)	< 7	100
SBL	0.16	B (10)	< 7	0.19	B (11)	< 7	35
SBTR	0.45	A (-)	< 7	0.46	A (-)	< 7	80
Jane Street / Alliance Avenue							
Overall	0.53	B (18)	-	0.59	B (20)	-	-
EBLTR	0.02	C (29)	< 7	0.01	C (29)	< 7	20
WBL	0.31	C (32)	30	0.42	C (33)	42	45
WBTR	0.08	C (30)	13	0.19	C (31)	21	430
NBL	-	-	-	0.01	B (14)	< 7	35
NBTR	0.63	C (23)	122	0.66	C (25)	144	225
SBL	0.55	C (21)	35	0.59	C (26)	35	45
SBTR	0.50	A (9)	61	0.47	A (9)	57	100
Jane Street / Haney Avenue							
Overall	0.43	A (4)	-	0.39	A (4)	-	-
EBLR	0.24	D (44)	14	0.11	D (41)	10	70
NBL	0.01	A (2)	< 7	0.03	A (2)	< 7	45

Intersection / Movement	Weekday AM Peak Hour			Weekday PM Peak Hour			Available Storage Length (m)
	v/c	LOS (Delay in seconds)	95th Percentile Queue Length (m)	v/c	LOS (Delay in seconds)	95th Percentile Queue Length (m)	
NBT	0.40	A (3)	58	0.42	A (4)	61	80
SBTR	0.45	A (3)	92	0.43	A (4)	72	225
Rockcliffe Boulevard / Alliance Avenue							
Overall	0.78	C (22)	-	0.79	C (22)	-	-
EBLTR	0.51	B (13)	48	0.32	B (11)	29	500
WBLTR	**0.85**	**C (31)**	81	0.77	C (22)	86	450
NBLTR	0.69	C (25)	65	0.82	C (31)	91	190
SBLTR	0.53	B (20)	43	0.39	B (17)	34	155
Rockcliffe Boulevard / Rockcliffe Court							
Overall	-	A (-)	-	-	A (-)	-	-
WBLR	0.13	B (15)	< 7	0.09	C (16)	< 7	110
NBTR	0.22	A (-)	< 7	0.30	A (-)	< 7	260
SBLT	0.04	A (1)	< 7	0.02	A (-)	< 7	190
Rockcliffe Boulevard / Terry Drive and Woolner Avenue							
Overall	-	C (22)	-	-	D (32)	-	-
EBLTR	0.42	B (15)	-	0.26	B (14)	-	200
WBLTR	0.25	B (13)	-	0.47	C (16)	-	555
NBLTR	0.62	C (19)	-	0.81	D (31)	-	105
SBLTR	0.82	D (30)	-	**0.91**	**E (44)**	-	260
Symes Road / Terry Drive							
Overall	-	A (9)	-		A (9)	-	
EBLR	0.28	A (9)	-	0.23	A (9)	-	555
NBLT	0.10	A (9)	-	0.31	A (10)	-	225
SBTR	0.20	A (8)	-	0.17	A (8)	-	75
Symes Road / Hillborn Avenue							
Overall	-	A (8)	-		A (8)	-	
WBLR	0.12	A (8)	-	0.12	A (8)	-	180
NBTR	0.13	A (8)	-	0.20	A (8)	-	75
SBLT	0.16	A (8)	-	0.10	A (8)	-	55
Symes Road / Orman Avenue							
Overall	-	A (8)	-		A (7)	-	
WBLR	0.15	A (8)	-	0.09	A (8)	-	25
NBTR	0.05	A (7)	-	0.10	A (7)	-	55
SBLT	0.00	A (7)	-	0.01	A (7)	-	20
Cliff Street / Alliance Avenue / Humber Boulevard N							
Overall	-	A (4)	-	-	A (2)	-	
EBLTR	0.05	A (1)	< 7	0.05	A (1)	< 7	450
WBTR	0.07	A (2)	< 7	0.06	A (2)	< 7	55

Intersection / Movement	Weekday AM Peak Hour			Weekday PM Peak Hour			Available Storage Length (m)
	v/c	LOS (Delay in seconds)	95th Percentile Queue Length (m)	v/c	LOS (Delay in seconds)	95th Percentile Queue Length (m)	
SBLTR	0.31	C (10)	10	0.10	B (15)	< 7	150
Humber Boulevard N / Hilldale Road							
Overall	-	A (3)	-	-	A (3)	-	-
EBT	0.17	A (-)	< 7	0.17	A (-)	< 7	55
WBT	0.20	A (-)	< 7	0.29	A (-)	< 7	200
NBL	0.28	C (8)	9	0.25	C (19)	8	15
NBR	0.08	B (10)	< 7	0.14	B (11)	< 7	15
Alliance Avenue / Humber Boulevard S / Hilldale Road							
Overall	-	A (8)	-	-	A (8)	-	-
EBT	0.30	A (9)	-	0.14	A (8)	-	70
EBR	0.12	A (7)	-	0.10	A (7)	-	70
WBLR	0.12	A (8)	-	0.12	A (8)	-	430
NBTR	0.11	A (8)	-	0.15	A (8)	-	380
Humber Boulevard N / Louvain Street							
Overall	-	A (1)	-	-	A (1)	-	-
EBLT	0.03	A (1)	< 7	0.02	A (1)	< 7	200
WBTR	0.19	A (-)	< 7	0.27	A (-)	< 7	310
SBLR	0.11	C (17)	< 7	0.06	C (18)	< 7	70
Humber Boulevard S / Avon Avenue							
Overall	-	A (3)	-	-	A (4)	-	-
EBTR	0.11	A (-)	< 7	0.05	A (-)	< 7	430
WBLT	0.00	A (8)	< 7	0.00	A (6)	< 7	75
NBLR	0.08	B (10)	< 7	0.09	A (9)	< 7	70
Humber Boulevard N / Black Creek Drive and Weston Road							
Overall	**0.85**	**D (49)**	-	0.79	D (45)	-	-
EBLT	**0.99**	**F (115)**	105	0.79	**E (60)**	84	310
EBR	0.06	D (52)	8	0.07	D (42)	10	25
WBL	**0.91**	**E (63)**	198	**0.99**	**E (79)**	186	270
WBT	**0.92**	**E (65)**	**205**	**0.99**	**E (80)**	**191**	270
WBR	0.02	C (29)	< 7	0.05	C (31)	< 7	270
NBL	0.42	C (27)	26	0.51	C (24)	36	85
NBT	0.35	C (26)	59	0.43	C (24)	68	310
NBR	0.53	C (31)	28	0.51	C (27)	25	310
SBL	0.27	D (36)	29	0.13	C (31)	14	45
SBTR	0.78	D (47)	126	0.69	D (40)	97	65
Weston Road / Porter Avenue							
Overall	-	A (-)	-	-	A (-)	-	-
EBLR	0.32	D (29)	11	0.19	C (21)	< 7	90

Intersection / Movement	Weekday AM Peak Hour			Weekday PM Peak Hour			Available Storage Length (m)
	v/c	LOS (Delay in seconds)	95th Percentile Queue Length (m)	v/c	LOS (Delay in seconds)	95th Percentile Queue Length (m)	
NBT	0.26	A (-)	< 7	0.30	A (-)	< 7	185
SBTR	0.63	A (-)	< 7	0.56	A (-)	< 7	115
Weston Road / Rogers Road							
Overall	**0.87**	**D (37)**	-	**0.94**	**D (53)**	-	-
EBLTR	0.06	C (24)	8	0.04	C (23)	< 7	10
WBL	**0.90**	**D (54)**	118	**1.03**	**F (85)**	149	175
WBR	0.58	D (37)	73	**0.97**	**E (79)**	133	175
NBT	0.65	C (34)	77	0.71	D (35)	87	340
NBR	0.48	C (33)	48	0.39	C (31)	41	340
SBL	**1.03**	**F (94)**	**138**	**1.08**	**F (108)**	**149**	60
SBT	0.64	B (17)	103	0.53	B (15)	80	310
Weston Road / Avon Crescent							
Overall	-	A (-)	-	-	A (-)	-	-
EBLR	0.46	D (32)	18	0.13	C (20)	< 7	85
NBL	0.02	B (14)	< 7	0.01	B (14)	< 7	65
NBT	0.29	A (-)	0	0.30	A (-)	0	270
SBTR	0.59	A (-)	0	0.56	A (-)	0	50
Avon Avenue / Avon Crescent							
Overall	-	A (8)	-	-	A (6)	-	-
EBLT	0.05	A (6)	< 7	0.04	A (6)	< 7	65
WBTR	0.06	A (-)	< 7	0.04	A (-)	< 7	85
SBLR	0.31	B (12)	10	0.10	A (10)	< 7	225
Avon Avenue / Porter Avenue							
Overall	-	A (9)	-	-	A (8)	-	-
EBLTR	0.05	A (8)	-	0.02	A (7)	-	20
WBLTR	0.12	A (9)	-	0.05	A (7)	-	90
NBLTR	0.17	A (9)	-	0.09	A (8)	-	225
SBLTR	0.28	A (9)	-	0.11	A (8)	-	70

Appendix D: Existing Intersection Operation Calculations (Synchro)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			↰	↱	↰	↑↱		↰	↑↱	
Traffic Volume (vph)	57	58	124	19	43	13	41	1006	31	15	1102	31
Future Volume (vph)	57	58	124	19	43	13	41	1006	31	15	1102	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.98			1.00	0.95	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00	1.00	0.99	1.00		1.00	1.00	
Frt		0.93			1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1644			1859	1429	1816	3151		1607	3054	
Flt Permitted		0.91			0.89	1.00	0.20	1.00		0.22	1.00	
Satd. Flow (perm)		1513			1681	1429	374	3151		380	3054	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	58	59	127	19	44	13	42	1027	32	15	1124	32
RTOR Reduction (vph)	0	41	0	0	0	10	0	2	0	0	2	0
Lane Group Flow (vph)	0	203	0	0	63	3	42	1057	0	15	1154	0
Confl. Peds. (#/hr)	35		19	19		35	15		11	11		15
Confl. Bikes (#/hr)			1						2			
Heavy Vehicles (%)	11%	5%	1%	0%	2%	8%	0%	7%	10%	13%	8%	13%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	35	0	0	45	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		24.4			24.4	24.4	63.6	63.6		63.6	63.6	
Effective Green, g (s)		25.4			25.4	25.4	64.6	64.6		64.6	64.6	
Actuated g/C Ratio		0.25			0.25	0.25	0.65	0.65		0.65	0.65	
Clearance Time (s)		6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		384			426	362	241	2035		245	1972	
v/s Ratio Prot								0.34			c0.38	
v/s Ratio Perm		c0.13			0.04	0.00	0.11			0.04		
v/c Ratio		0.53			0.15	0.01	0.17	0.52		0.06	0.59	
Uniform Delay, d1		32.1			28.9	27.9	7.1	9.4		6.5	10.1	
Progression Factor		1.00			1.00	1.00	0.24	0.22		1.00	1.00	
Incremental Delay, d2		1.3			0.2	0.0	1.4	0.8		0.5	1.3	
Delay (s)		33.5			29.1	27.9	3.1	2.9		7.0	11.4	
Level of Service		C			C	C	A	A		A	B	
Approach Delay (s)		33.5			28.9			2.9			11.3	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	10.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	81.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Jane St & Sandcliff Rd

Existing Conditions
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑↑	↑↱	
Traffic Volume (veh/h)	9	9	7	1069	1241	4
Future Volume (Veh/h)	9	9	7	1069	1241	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	9	9	7	1091	1266	4
Pedestrians	18				1	
Lane Width (m)	3.7				3.7	
Walking Speed (m/s)	1.1				1.1	
Percent Blockage	2				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				204	105	
pX, platoon unblocked	0.89	0.79	0.79			
vC, conflicting volume	1846	653	1288			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	720	42	843			
tC, single (s)	7.0	6.9	4.7			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.5			
p0 queue free %	97	99	99			
cM capacity (veh/h)	297	800	498			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	18	7	546	546	844	426
Volume Left	9	7	0	0	0	0
Volume Right	9	0	0	0	0	4
cSH	433	498	1700	1700	1700	1700
Volume to Capacity	0.04	0.01	0.32	0.32	0.50	0.25
Queue Length 95th (m)	1.0	0.3	0.0	0.0	0.0	0.0
Control Delay (s)	13.7	12.3	0.0	0.0	0.0	0.0
Lane LOS	B	B				
Approach Delay (s)	13.7	0.1			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	44.4%	ICU Level of Service	A
Analysis Period (min)	15		

3: Jane St & Black Creek Blvd/Dalrymple Dr

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣		↰	↑↱		↰	↑↱	
Traffic Volume (veh/h)	15	1	39	19	1	102	16	959	39	132	1116	2
Future Volume (Veh/h)	15	1	39	19	1	102	16	959	39	132	1116	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	15	1	40	20	1	105	16	989	40	136	1151	2
Pedestrians		20			9			1			1	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		2			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								114			195	
pX, platoon unblocked	0.87	0.87	0.82	0.87	0.87	0.78	0.82			0.78		
vC, conflicting volume	2077	2514	598	1939	2495	524	1173			1038		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1018	1520	78	859	1499	0	778			485		
tC, single (s)	7.8	8.5	7.0	7.7	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	5.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	86	97	95	87	99	87	98			84		
cM capacity (veh/h)	110	33	771	159	85	838	684			836		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	56	126	16	659	370	136	767	386
Volume Left	15	20	16	0	0	136	0	0
Volume Right	40	105	0	0	40	0	0	2
cSH	256	479	684	1700	1700	836	1700	1700
Volume to Capacity	0.22	0.26	0.02	0.39	0.22	0.16	0.45	0.23
Queue Length 95th (m)	6.2	8.0	0.5	0.0	0.0	4.4	0.0	0.0
Control Delay (s)	22.9	15.2	10.4	0.0	0.0	10.1	0.0	0.0
Lane LOS	C	C	B			B		
Approach Delay (s)	22.9	15.2	0.2			1.1		
Approach LOS	C	C						

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥		↰	↱		↰	↑↱		↰	↑↱	
Traffic Volume (vph)	3	4	0	93	2	84	0	927	117	184	990	0
Future Volume (vph)	3	4	0	93	2	84	0	927	117	184	990	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0			6.0		3.0	6.0	
Lane Util. Factor		1.00		1.00	1.00			0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.90			1.00		1.00	1.00	
Flpb, ped/bikes		0.96		1.00	1.00			1.00		1.00	1.00	
Frt		1.00		1.00	0.85			0.98		1.00	1.00	
Flt Protected		0.98		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1814		1615	1249			3143		1738	3130	
Flt Permitted		0.93		0.75	1.00			1.00		0.18	1.00	
Satd. Flow (perm)		1717		1280	1249			3143		333	3130	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	3	4	0	95	2	86	0	946	119	188	1010	0
RTOR Reduction (vph)	0	0	0	0	65	0	0	10	0	0	0	0
Lane Group Flow (vph)	0	7	0	95	23	0	0	1055	0	188	1010	0
Confl. Peds. (#/hr)	72					72	2		1	1		2
Confl. Bikes (#/hr)									5			1
Heavy Vehicles (%)	0%	0%	0%	13%	0%	13%	0%	6%	11%	5%	8%	0%
Bus Blockages (#/hr)	0	0	0	0	11	0	0	32	0	0	37	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		23.0		23.0	23.0			52.2		64.0	64.0	
Effective Green, g (s)		24.0		24.0	24.0			53.2		65.0	65.0	
Actuated g/C Ratio		0.24		0.24	0.24			0.53		0.65	0.65	
Clearance Time (s)		6.0		6.0	6.0			7.0		4.0	7.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		412		307	299			1672		340	2034	
v/s Ratio Prot					0.02			c0.34		c0.05	0.32	
v/s Ratio Perm		0.00		c0.07						0.31		
v/c Ratio		0.02		0.31	0.08			0.63		0.55	0.50	
Uniform Delay, d1		29.0		31.2	29.4			16.5		9.5	9.0	
Progression Factor		1.00		1.00	1.00			1.28		2.00	0.95	
Incremental Delay, d2		0.0		0.6	0.1			1.7		1.7	0.7	
Delay (s)		29.0		31.8	29.5			22.9		20.7	9.3	
Level of Service		C		C	C			C		C	A	
Approach Delay (s)		29.0			30.7			22.9			11.1	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Jane St & Haney Ave

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑↑	↑↱	
Traffic Volume (vph)	33	6	3	1011	1069	14
Future Volume (vph)	33	6	3	1011	1069	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		0.99	1.00	1.00	
Frt	0.98		1.00	1.00	1.00	
Flt Protected	0.96		0.95	1.00	1.00	
Satd. Flow (prot)	1711		1363	3207	3060	
Flt Permitted	0.96		0.24	1.00	1.00	
Satd. Flow (perm)	1711		349	3207	3060	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	34	6	3	1042	1102	14
RTOR Reduction (vph)	5	0	0	0	1	0
Lane Group Flow (vph)	35	0	3	1042	1115	0
Confl. Peds. (#/hr)	6	8	14			14
Confl. Bikes (#/hr)		1				
Heavy Vehicles (%)	6%	0%	33%	7%	9%	7%
Bus Blockages (#/hr)	0	0	0	30	42	0
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	7.4		80.6	80.6	80.6	
Effective Green, g (s)	8.4		81.6	81.6	81.6	
Actuated g/C Ratio	0.08		0.82	0.82	0.82	
Clearance Time (s)	6.0		6.0	6.0	6.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	143		284	2616	2496	
v/s Ratio Prot	c0.02			0.32	c0.36	
v/s Ratio Perm			0.01			
v/c Ratio	0.24		0.01	0.40	0.45	
Uniform Delay, d1	42.8		1.7	2.5	2.7	
Progression Factor	1.00		1.00	1.00	1.06	
Incremental Delay, d2	0.9		0.1	0.5	0.5	
Delay (s)	43.7		1.8	3.0	3.3	
Level of Service	D		A	A	A	
Approach Delay (s)	43.7			3.0	3.3	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	3.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Rockcliffe Blvd & Alliance Ave

Existing Conditions
AM Peak Hour

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Volume (vph)	18	260	131	162	156	42	56	133	175	46	188	24
Future Volume (vph)	18	260	131	162	156	42	56	133	175	46	188	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			0.99			0.97			0.99	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.96			0.98			0.94			0.99	
Flt Protected		1.00			0.98			0.99			0.99	
Satd. Flow (prot)		1674			1384			1481			1605	
Flt Permitted		0.98			0.64			0.92			0.89	
Satd. Flow (perm)		1638			910			1368			1436	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	19	274	138	171	164	44	59	140	184	48	198	25
RTOR Reduction (vph)	0	28	0	0	8	0	0	55	0	0	6	0
Lane Group Flow (vph)	0	403	0	0	371	0	0	328	0	0	265	0
Confl. Peds. (#/hr)	33		18	18		33	27		21	21		27
Confl. Bikes (#/hr)			6			3			6			10
Heavy Vehicles (%)	17%	7%	8%	19%	13%	21%	14%	11%	7%	26%	5%	4%
Bus Blockages (#/hr)	0	0	0	0	29	0	0	15	0	0	16	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		28.0			28.0			20.0			20.0	
Effective Green, g (s)		29.0			29.0			21.0			21.0	
Actuated g/C Ratio		0.48			0.48			0.35			0.35	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		791			439			478			502	
v/s Ratio Prot												
v/s Ratio Perm		0.25			c0.41			c0.24			0.18	
v/c Ratio		0.51			0.85			0.69			0.53	
Uniform Delay, d1		10.6			13.5			16.7			15.5	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.3			17.9			7.8			3.9	
Delay (s)		13.0			31.4			24.5			19.5	
Level of Service		B			C			C			B	
Approach Delay (s)		13.0			31.4			24.5			19.5	
Approach LOS		B			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	22.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

7: Rockcliffe Blvd & Rockcliffe Ct

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Traffic Volume (veh/h)	17	33	331	15	32	449
Future Volume (Veh/h)	17	33	331	15	32	449
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	36	360	16	35	488
Pedestrians	9					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	1					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						205
pX, platoon unblocked						
vC, conflicting volume	935	377			385	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	935	377			385	
tC, single (s)	6.6	6.6			4.6	
tC, 2 stage (s)						
tF (s)	3.7	3.7			2.7	
p0 queue free %	93	94			96	
cM capacity (veh/h)	263	590			935	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	54	376	523
Volume Left	18	0	35
Volume Right	36	16	0
cSH	417	1700	935
Volume to Capacity	0.13	0.22	0.04
Queue Length 95th (m)	3.4	0.0	0.9
Control Delay (s)	14.9	0.0	1.0
Lane LOS	B		A
Approach Delay (s)	14.9	0.0	1.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
8: Rockcliffe Blvd & Woolner Ave/Terry Dr

Existing Conditions
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	42	89	84	55	31	32	20	272	54	73	365	28
Future Volume (vph)	42	89	84	55	31	32	20	272	54	73	365	28
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	44	94	88	58	33	34	21	286	57	77	384	29

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	226	125	364	490
Volume Left (vph)	44	58	21	77
Volume Right (vph)	88	34	57	29
Hadj (s)	-0.11	0.05	0.05	0.12
Departure Headway (s)	6.7	7.2	6.2	6.0
Degree Utilization, x	0.42	0.25	0.62	0.82
Capacity (veh/h)	480	435	550	578
Control Delay (s)	14.5	12.6	18.8	30.4
Approach Delay (s)	14.5	12.6	18.8	30.4
Approach LOS	B	B	C	D

Intersection Summary			
Delay	22.1		
Level of Service	C		
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
9: Symes Rd & Terry Dr

Existing Conditions
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↰	↱	
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	86	130	46	22	81	72
Future Volume (vph)	86	130	46	22	81	72
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	95	143	51	24	89	79

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	238	75	168
Volume Left (vph)	95	51	0
Volume Right (vph)	143	0	79
Hadj (s)	-0.24	0.27	-0.22
Departure Headway (s)	4.2	4.9	4.3
Degree Utilization, x	0.28	0.10	0.20
Capacity (veh/h)	804	690	782
Control Delay (s)	8.9	8.5	8.4
Approach Delay (s)	8.9	8.5	8.4
Approach LOS	A	A	A

Intersection Summary			
Delay	8.6		
Level of Service	A		
Intersection Capacity Utilization	35.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
10: Symes Rd & Hillborn Ave

Existing Conditions
AM Peak Hour

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	67	14	27	81	25	86
Future Volume (vph)	67	14	27	81	25	86
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	78	16	31	94	29	100

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	94	125	129
Volume Left (vph)	78	0	29
Volume Right (vph)	16	94	0
Hadj (s)	0.20	-0.39	0.21
Departure Headway (s)	4.7	3.9	4.5
Degree Utilization, x	0.12	0.13	0.16
Capacity (veh/h)	724	893	785
Control Delay (s)	8.3	7.5	8.3
Approach Delay (s)	8.3	7.5	8.3
Approach LOS	A	A	A

Intersection Summary			
Delay	8.0		
Level of Service	A		
Intersection Capacity Utilization	24.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
11: Symes Rd & Orman Ave

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	110	2	3	38	2	1
Future Volume (vph)	110	2	3	38	2	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	121	2	3	42	2	1

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	123	45	3
Volume Left (vph)	121	0	2
Volume Right (vph)	2	42	0
Hadj (s)	0.35	-0.27	0.13
Departure Headway (s)	4.4	3.9	4.4
Degree Utilization, x	0.15	0.05	0.00
Capacity (veh/h)	814	882	796
Control Delay (s)	8.1	7.1	7.4
Approach Delay (s)	8.1	7.1	7.4
Approach LOS	A	A	A

Intersection Summary			
Delay	7.8		
Level of Service	A		
Intersection Capacity Utilization	17.6%	ICU Level of Service	A
Analysis Period (min)	15		

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			↱						✥	
Traffic Volume (veh/h)	49	237	188	71	290	23	0	0	0	2	38	61
Future Volume (Veh/h)	49	237	188	71	290	23	0	0	0	2	38	61
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	52	252	200	76	309	24	0	0	0	2	40	65
Pedestrians		2									15	
Lane Width (m)		3.7									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	348			452			1016	956	352	944	1044	338
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	348			452			1016	956	352	944	1044	338
tC, single (s)	4.4			4.2			7.1	6.5	6.2	7.6	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.5			2.3			3.5	4.0	3.3	4.0	4.0	3.4
p0 queue free %	95			93			100	100	100	99	80	90
cM capacity (veh/h)	1060			1088			150	227	696	177	197	673

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	504	409	107
Volume Left	52	76	2
Volume Right	200	24	65
cSH	1060	1088	345
Volume to Capacity	0.05	0.07	0.31
Queue Length 95th (m)	1.2	1.7	9.8
Control Delay (s)	1.4	2.2	20.1
Lane LOS	A	A	C
Approach Delay (s)	1.4	2.2	20.1
Approach LOS			C

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
13: Hilldale Rd & Humber Blvd N

Existing Conditions
AM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↰	↱
Traffic Volume (veh/h)	239	0	0	295	89	51
Future Volume (Veh/h)	239	0	0	295	89	51
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	281	0	0	347	105	60
Pedestrians	56			2	1	
Lane Width (m)	3.7			3.7	3.7	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	5			0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			282		685	284
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			282		685	284
tC, single (s)			4.1		6.5	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.4
p0 queue free %			100		72	92
cM capacity (veh/h)			1291		382	725

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	281	347	105	60
Volume Left	0	0	105	0
Volume Right	0	0	0	60
cSH	1700	1700	382	725
Volume to Capacity	0.17	0.20	0.28	0.08
Queue Length 95th (m)	0.0	0.0	8.4	2.0
Control Delay (s)	0.0	0.0	18.0	10.4
Lane LOS			C	B
Approach Delay (s)	0.0	0.0	15.2	
Approach LOS			C	

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	27.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱		✣			↱				
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	200	97	12	0	80	0	60	14	0	0	0
Future Volume (vph)	0	200	97	12	0	80	0	60	14	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	217	105	13	0	87	0	65	15	0	0	0

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total (vph)	217	105	100	80
Volume Left (vph)	0	0	13	0
Volume Right (vph)	0	105	87	15
Hadj (s)	0.14	-0.56	-0.26	0.04
Departure Headway (s)	4.9	4.2	4.3	4.9
Degree Utilization, x	0.30	0.12	0.12	0.11
Capacity (veh/h)	719	831	809	691
Control Delay (s)	8.8	6.6	7.8	8.4
Approach Delay (s)	8.1		7.8	8.4
Approach LOS	A		A	A

Intersection Summary			
Delay	8.1		
Level of Service	A		
Intersection Capacity Utilization	29.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		Y	
Traffic Volume (veh/h)	30	260	275	14	12	20
Future Volume (Veh/h)	30	260	275	14	12	20
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	34	295	313	16	14	23
Pedestrians			206		33	
Lane Width (m)			3.7		3.7	
Walking Speed (m/s)			1.1		1.1	
Percent Blockage			19		3	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			333			
pX, platoon unblocked						
vC, conflicting volume	362				923	354
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	362				923	354
tC, single (s)	4.2				6.9	6.4
tC, 2 stage (s)						
tF (s)	2.3				4.0	3.4
p0 queue free %	97				93	96
cM capacity (veh/h)	1118				188	641

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	329	329	37
Volume Left	34	0	14
Volume Right	0	16	23
cSH	1118	1700	335
Volume to Capacity	0.03	0.19	0.11
Queue Length 95th (m)	0.7	0.0	2.8
Control Delay (s)	1.1	0.0	17.1
Lane LOS	A		C
Approach Delay (s)	1.1	0.0	17.1
Approach LOS			C

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	44.1%	ICU Level of Service	A
Analysis Period (min)	15		

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Volume (veh/h)	0	168	2	0	58	1
Future Volume (Veh/h)	0	168	2	0	58	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	181	2	0	62	1
Pedestrians					55	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					5	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			236		150	146
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			236		150	146
tC, single (s)			4.1		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			100		92	100
cM capacity (veh/h)			1274		776	860

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	181	2	63
Volume Left	0	2	62
Volume Right	181	0	1
cSH	1700	1274	777
Volume to Capacity	0.11	0.00	0.08
Queue Length 95th (m)	0.0	0.0	2.0
Control Delay (s)	0.0	7.8	10.0
Lane LOS		A	B
Approach Delay (s)	0.0	7.8	10.0
Approach LOS			B

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	24.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱	↖	↰	↱	↖	↑↑	↱	↖	↑↱	
Traffic Volume (vph)	16	182	74	788	185	28	91	471	741	69	731	13
Future Volume (vph)	16	182	74	788	185	28	91	471	741	69	731	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	5.0	5.0	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1737	1392	1620	1631	1526	1563	3349	1468	1670	3151	
Flt Permitted		1.00	1.00	0.95	0.97	1.00	0.16	1.00	1.00	0.47	1.00	
Satd. Flow (perm)		1737	1392	1620	1631	1526	267	3349	1468	831	3151	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	17	190	77	821	193	29	95	491	772	72	761	14
RTOR Reduction (vph)	0	0	68	0	0	19	0	0	444	0	1	0
Lane Group Flow (vph)	0	207	9	501	513	10	95	491	328	72	774	0
Confl. Peds. (#/hr)	35					35	122		2	2		122
Confl. Bikes (#/hr)						2			5			8
Heavy Vehicles (%)	12%	10%	14%	7%	11%	7%	16%	9%	8%	9%	8%	8%
Bus Blockages (#/hr)	0	0	7	0	0	0	0	0	0	0	30	0
Turn Type	Split	NA	Perm	Split	NA	Prot	pm+pt	NA	Perm	Perm	NA	
Protected Phases	7	7		8	8	8	5	2			6	
Permitted Phases			7				2		2	6		
Actuated Green, G (s)		15.0	15.0	44.0	44.0	44.0	55.0	55.0	55.0	40.7	40.7	
Effective Green, g (s)		16.0	16.0	45.0	45.0	45.0	56.0	56.0	56.0	41.7	41.7	
Actuated g/C Ratio		0.12	0.12	0.34	0.34	0.34	0.42	0.42	0.42	0.32	0.32	
Clearance Time (s)		6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		210	168	552	556	520	224	1420	622	262	995	
v/s Ratio Prot		c0.12		0.31	c0.31	0.01	0.04	0.15			c0.25	
v/s Ratio Perm			0.01				0.14		c0.22	0.09		
v/c Ratio		0.99	0.06	0.91	0.92	0.02	0.42	0.35	0.53	0.27	0.78	
Uniform Delay, d1		57.9	51.3	41.5	41.8	28.9	26.0	25.6	28.2	33.8	41.0	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		57.5	0.1	21.2	23.2	0.1	1.3	0.7	3.2	2.6	6.0	
Delay (s)		115.4	51.5	62.7	65.0	28.9	27.3	26.3	31.3	36.4	46.9	
Level of Service		F	D	E	E	C	C	C	C	D	D	
Approach Delay (s)		98.1			62.9			29.2			46.0	
Approach LOS		F			E			C			D	

Intersection Summary			
HCM 2000 Control Delay	48.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	132.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	100.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↱			↑↑↑	↑↱	
Traffic Volume (veh/h)	27	40	0	1276	1529	64
Future Volume (Veh/h)	27	40	0	1276	1529	64
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	28	42	0	1343	1609	67
Pedestrians	13					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				213	119	
pX, platoon unblocked	0.82	0.79	0.79			
vC, conflicting volume	2103	851	1689			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1374	263	1330			
tC, single (s)	6.8	7.1	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	75	92	100			
cM capacity (veh/h)	113	557	408			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	70	448	448	448	1073	603
Volume Left	28	0	0	0	0	0
Volume Right	42	0	0	0	0	67
cSH	216	1700	1700	1700	1700	1700
Volume to Capacity	0.32	0.26	0.26	0.26	0.63	0.35
Queue Length 95th (m)	10.2	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	29.4	0.0	0.0	0.0	0.0	0.0
Lane LOS	D					
Approach Delay (s)	29.4	0.0			0.0	
Approach LOS	D					

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
20: Weston Rd & Rogers Rd

Existing Conditions
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣		↰		↱		↑↑	↱	↰	↑↑	
Traffic Volume (vph)	5	10	3	354	0	633	0	638	392	382	1187	0
Future Volume (vph)	5	10	3	354	0	633	0	638	392	382	1187	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0		7.0		3.0		6.0	6.0	3.0	6.0	
Lane Util. Factor		1.00		1.00		1.00		0.95	1.00	1.00	0.95	
Frpb, ped/bikes		0.99		1.00		1.00		1.00	0.97	1.00	1.00	
Flpb, ped/bikes		0.99		0.96		1.00		1.00	1.00	1.00	1.00	
Frt		0.98		1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected		0.99		0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		907		1616		1512		3349	1344	1706	3411	
Flt Permitted		0.99		0.75		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)		907		1268		1512		3349	1344	1706	3411	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	5	10	3	361	0	646	0	651	400	390	1211	0
RTOR Reduction (vph)	0	2	0	0	0	451	0	0	208	0	0	0
Lane Group Flow (vph)	0	16	0	361	0	195	0	651	192	390	1211	0
Confl. Peds. (#/hr)	40		45	45		40	3		4	4		3
Confl. Bikes (#/hr)			2			4			2			5
Heavy Vehicles (%)	100%	100%	100%	8%	0%	8%	0%	9%	5%	7%	7%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	27	0	0	0
Turn Type	Perm	NA		Perm		Over		NA	Perm	Prot	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8					2			
Actuated Green, G (s)		30.8		30.8		21.2		29.0	29.0	21.2	54.2	
Effective Green, g (s)		31.8		31.8		22.2		30.0	30.0	22.2	55.2	
Actuated g/C Ratio		0.32		0.32		0.22		0.30	0.30	0.22	0.55	
Clearance Time (s)		8.0		8.0		4.0		7.0	7.0	4.0	7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		288		403		335		1004	403	378	1882	
v/s Ratio Prot						0.13		0.19		c0.23	c0.35	
v/s Ratio Perm		0.02		c0.28					0.14			
v/c Ratio		0.06		0.90		0.58		0.65	0.48	1.03	0.64	
Uniform Delay, d1		23.7		32.5		34.7		30.4	28.6	38.9	15.6	
Progression Factor		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.1		21.6		2.6		3.2	4.0	54.7	1.7	
Delay (s)		23.8		54.2		37.3		33.7	32.6	93.6	17.3	
Level of Service		C		D		D		C	C	F	B	
Approach Delay (s)		23.8			43.4			33.3			35.9	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	37.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	100.9%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
21: Weston Rd & Avon Cres

Existing Conditions
AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑↑	↑↱	
Traffic Volume (veh/h)	74	36	8	956	1473	71
Future Volume (Veh/h)	74	36	8	956	1473	71
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	76	37	8	976	1503	72
Pedestrians	45			1		
Lane Width (m)	3.7			3.7		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	4			0		
Right turn flare (veh)						
Median type				None	TWLTL	
Median storage veh)					2	
Upstream signal (m)					88	
pX, platoon unblocked	0.75	0.75	0.75			
vC, conflicting volume	2088	834	1620			
vC1, stage 1 conf vol	1584					
vC2, stage 2 conf vol	504					
vCu, unblocked vol	1785	113	1161			
tC, single (s)	6.8	7.0	4.3			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.3			
p0 queue free %	59	94	98			
cM capacity (veh/h)	186	657	391			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	113	8	488	488	1002	573
Volume Left	76	8	0	0	0	0
Volume Right	37	0	0	0	0	72
cSH	243	391	1700	1700	1700	1700
Volume to Capacity	0.46	0.02	0.29	0.29	0.59	0.34
Queue Length 95th (m)	17.3	0.5	0.0	0.0	0.0	0.0
Control Delay (s)	32.0	14.4	0.0	0.0	0.0	0.0
Lane LOS	D	B				
Approach Delay (s)	32.0	0.1			0.0	
Approach LOS	D					

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		Y	
Traffic Volume (veh/h)	48	20	29	50	90	83
Future Volume (Veh/h)	48	20	29	50	90	83
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	63	26	38	66	118	109
Pedestrians		4	2		46	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		4	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	150				271	121
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	150				271	121
tC, single (s)	4.2				6.4	6.3
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.4
p0 queue free %	95				82	88
cM capacity (veh/h)	1347				654	874

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	89	104	227
Volume Left	63	0	118
Volume Right	0	66	109
cSH	1347	1700	744
Volume to Capacity	0.05	0.06	0.31
Queue Length 95th (m)	1.1	0.0	9.8
Control Delay (s)	5.6	0.0	11.9
Lane LOS	A		B
Approach Delay (s)	5.6	0.0	11.9
Approach LOS			B

Intersection Summary			
Average Delay	7.7		
Intersection Capacity Utilization	29.3%	ICU Level of Service	A
Analysis Period (min)	15		

23: Avon Ave & Portor Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	9	22	28	22	14	41	45	12	46	123	1
Future Volume (vph)	0	9	22	28	22	14	41	45	12	46	123	1
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	0	12	29	37	29	19	55	60	16	61	164	1

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	41	85	131	226
Volume Left (vph)	0	37	55	61
Volume Right (vph)	29	19	16	1
Hadj (s)	-0.42	0.11	0.15	0.15
Departure Headway (s)	4.4	4.9	4.6	4.5
Degree Utilization, x	0.05	0.12	0.17	0.28
Capacity (veh/h)	735	676	746	766
Control Delay (s)	7.7	8.5	8.5	9.3
Approach Delay (s)	7.7	8.5	8.5	9.3
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.8		
Level of Service	A		
Intersection Capacity Utilization	28.5%	ICU Level of Service	A
Analysis Period (min)	15		

Queues
1: Jane St & East Dr/Outlook Ave

	→	←	↖	↰	↑	↘	↓
Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	244	63	13	42	1059	15	1156
v/c Ratio	0.57	0.15	0.03	0.17	0.52	0.06	0.59
Control Delay	30.9	29.8	2.8	3.3	3.0	7.6	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.9	29.8	2.8	3.3	3.0	7.6	11.7
Queue Length 50th (m)	32.0	9.6	0.0	0.6	7.8	1.0	59.7
Queue Length 95th (m)	55.2	19.4	1.6	m1.4	13.1	3.6	82.6
Internal Link Dist (m)	151.9	119.5			80.9		170.1
Turn Bay Length (m)			30.0	55.0		50.0	
Base Capacity (vph)	478	487	437	241	2035	245	1973
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.13	0.03	0.17	0.52	0.06	0.59

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Queues
4: Jane St & Alliance Ave

	→	↙	←	↑	↘	↓
Lane Group	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	7	95	88	1065	188	1010
v/c Ratio	0.02	0.31	0.24	0.63	0.54	0.50
Control Delay	29.3	34.6	9.0	22.9	16.7	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.3	34.6	9.0	22.9	16.7	9.5
Queue Length 50th (m)	1.0	15.2	0.3	94.7	11.9	40.4
Queue Length 95th (m)	4.5	29.4	12.1	121.8	34.4	60.1
Internal Link Dist (m)	144.7		50.9	238.8		90.1
Turn Bay Length (m)		45.0			45.0	
Base Capacity (vph)	429	320	376	1681	350	2034
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.30	0.23	0.63	0.54	0.50

Intersection Summary

Queues
5: Jane St & Haney Ave

	↗	↖	↑	↓
Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	40	3	1042	1116
v/c Ratio	0.20	0.01	0.38	0.42
Control Delay	35.7	4.0	3.7	4.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	35.7	4.0	3.7	4.1
Queue Length 50th (m)	6.3	0.1	21.2	10.8
Queue Length 95th (m)	13.8	1.0	57.2	92.0
Internal Link Dist (m)	123.4		130.8	238.8
Turn Bay Length (m)		45.0		
Base Capacity (vph)	398	300	2758	2632
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.10	0.01	0.38	0.42

Intersection Summary

Queues
6: Rockcliffe Blvd & Alliance Ave

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	431	379	383	271
v/c Ratio	0.53	0.85	0.72	0.53
Control Delay	12.1	34.4	22.6	19.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.1	34.4	22.6	19.7
Queue Length 50th (m)	26.0	32.7	27.4	22.3
Queue Length 95th (m)	47.6	#80.6	#64.8	42.1
Internal Link Dist (m)	48.8	220.5	180.4	136.1
Turn Bay Length (m)				
Base Capacity (vph)	820	447	533	508
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.53	0.85	0.72	0.53

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

18: Weston Rd & Humber Blvd N/Black Creek Dr

	→	↘	↙	←	↖	↖	↑	↗	↘	↓
Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	207	77	501	513	29	95	491	772	72	775
v/c Ratio	0.99	0.29	0.91	0.92	0.05	0.42	0.35	0.72	0.27	0.78
Control Delay	116.1	6.8	63.3	65.5	0.1	28.2	26.5	6.2	38.5	47.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	116.1	6.8	63.3	65.5	0.1	28.2	26.5	6.2	38.5	47.7
Queue Length 50th (m)	54.6	0.0	130.5	134.7	0.0	14.5	44.7	0.0	14.0	96.0
Queue Length 95th (m)	#104.2	7.1	#198.0	#204.2	0.0	25.7	58.4	28.0	28.8	#125.4
Internal Link Dist (m)	309.3			193.0			94.9			190.2
Turn Bay Length (m)		25.0			40.0	85.0			45.0	
Base Capacity (vph)	210	262	552	556	590	281	1420	1067	263	996
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.99	0.29	0.91	0.92	0.05	0.34	0.35	0.72	0.27	0.78

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

20: Weston Rd & Rogers Rd

	→	↙	↖	↑	↗	↘	↓
Lane Group	EBT	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	18	361	646	651	400	390	1211
v/c Ratio	0.06	0.90	0.82	0.65	0.65	1.03	0.64
Control Delay	21.7	58.9	15.2	34.0	13.9	94.1	17.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.7	58.9	15.2	34.0	13.9	94.1	17.6
Queue Length 50th (m)	2.0	66.0	10.5	57.4	15.1	~82.1	81.3
Queue Length 95th (m)	7.1	#118.0	#72.8	76.3	47.9	#137.6	102.8
Internal Link Dist (m)	25.5			64.0			188.7
Turn Bay Length (m)					30.0	60.0	
Base Capacity (vph)	291	406	787	1004	611	378	1883
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.89	0.82	0.65	0.65	1.03	0.64

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1: Jane St & East Dr/Outlook Ave

Existing Conditions
PM Peak Hour

	⤴	→	⤵	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			↰	↱	↰	↑↑↱		↰	↑↑↱	
Traffic Volume (vph)	37	70	126	22	42	14	115	959	35	16	1057	62
Future Volume (vph)	37	70	126	22	42	14	115	959	35	16	1057	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.98			1.00	0.94	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00	1.00	1.00	1.00		0.99	1.00	
Frt		0.93			1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.99			0.98	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1717			1881	1439	1820	3271		1805	3381	
Flt Permitted		0.94			0.86	1.00	0.19	1.00		0.23	1.00	
Satd. Flow (perm)		1632			1649	1439	358	3271		430	3381	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	39	74	134	23	45	15	122	1020	37	17	1124	66
RTOR Reduction (vph)	0	43	0	0	0	11	0	2	0	0	4	0
Lane Group Flow (vph)	0	204	0	0	68	4	122	1055	0	17	1186	0
Confl. Peds. (#/hr)	36		18	18		36	9		25	25		9
Confl. Bikes (#/hr)			1			1			1			3
Heavy Vehicles (%)	0%	1%	0%	0%	0%	7%	0%	6%	0%	0%	3%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	22	0	0	18	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		24.1			24.1	24.1	63.9	63.9		63.9	63.9	
Effective Green, g (s)		25.1			25.1	25.1	64.9	64.9		64.9	64.9	
Actuated g/C Ratio		0.25			0.25	0.25	0.65	0.65		0.65	0.65	
Clearance Time (s)		6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		409			413	361	232	2122		279	2194	
v/s Ratio Prot								0.32			c0.35	
v/s Ratio Perm		c0.12			0.04	0.00	0.34			0.04		
v/c Ratio		0.50			0.16	0.01	0.53	0.50		0.06	0.54	
Uniform Delay, d1		32.1			29.3	28.1	9.4	9.1		6.4	9.5	
Progression Factor		1.00			1.00	1.00	0.29	0.26		1.00	1.00	
Incremental Delay, d2		1.0			0.2	0.0	6.9	0.7		0.4	1.0	
Delay (s)		33.0			29.4	28.1	9.6	3.0		6.8	10.4	
Level of Service		C			C	C	A	A		A	B	
Approach Delay (s)		33.0			29.2			3.7			10.4	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	80.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑↑	↑↱	
Traffic Volume (veh/h)	1	15	20	1108	1198	7
Future Volume (Veh/h)	1	15	20	1108	1198	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	16	22	1204	1302	8
Pedestrians	9				3	
Lane Width (m)	3.7				3.7	
Walking Speed (m/s)	1.1				1.1	
Percent Blockage	1				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				204	105	
pX, platoon unblocked	0.88	0.81	0.81			
vC, conflicting volume	1964	664	1319			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	864	125	931			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	96			
cM capacity (veh/h)	249	732	599			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	17	22	602	602	868	442
Volume Left	1	22	0	0	0	0
Volume Right	16	0	0	0	0	8
cSH	657	599	1700	1700	1700	1700
Volume to Capacity	0.03	0.04	0.35	0.35	0.51	0.26
Queue Length 95th (m)	0.6	0.9	0.0	0.0	0.0	0.0
Control Delay (s)	10.6	11.2	0.0	0.0	0.0	0.0
Lane LOS	B	B				
Approach Delay (s)	10.6	0.2			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	43.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
3: Jane St & Black Creek Blvd/Dalrymple Dr

Existing Conditions
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Traffic Volume (veh/h)	6	4	33	19	2	78	58	1044	33	120	1071	22
Future Volume (Veh/h)	6	4	33	19	2	78	58	1044	33	120	1071	22
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	4	36	21	2	85	63	1135	36	130	1164	24
Pedestrians		24			38			1			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		2			4			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								114			195	
pX, platoon unblocked	0.85	0.85	0.83	0.85	0.85	0.76	0.83			0.76		
vC, conflicting volume	2242	2795	619	2198	2789	626	1212			1209		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1221	1874	145	1168	1867	0	856			652		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	91	95	75	95	89	90			81		
cM capacity (veh/h)	75	42	719	83	43	800	636			695		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	47	108	63	757	414	130	776	412
Volume Left	7	21	63	0	0	130	0	0
Volume Right	36	85	0	0	36	0	0	24
cSH	197	266	636	1700	1700	695	1700	1700
Volume to Capacity	0.24	0.41	0.10	0.45	0.24	0.19	0.46	0.24
Queue Length 95th (m)	6.8	14.3	2.5	0.0	0.0	5.2	0.0	0.0
Control Delay (s)	28.8	27.5	11.3	0.0	0.0	11.4	0.0	0.0
Lane LOS	D	D	B			B		
Approach Delay (s)	28.8	27.5	0.6			1.1		
Approach LOS	D	D						

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
4: Jane St & Alliance Ave

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥		↰	↱		↰	↑↱		↰	↑↱	
Traffic Volume (vph)	1	1	2	131	1	192	4	942	118	166	956	1
Future Volume (vph)	1	1	2	131	1	192	4	942	118	166	956	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0		6.0	6.0		3.0	6.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.89		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		0.98		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.93		1.00	0.85		1.00	0.98		1.00	1.00	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1740		1789	1366		1823	3288		1755	3423	
Flt Permitted		0.95		0.76	1.00		0.27	1.00		0.15	1.00	
Satd. Flow (perm)		1672		1422	1366		522	3288		280	3423	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1	1	2	144	1	211	4	1035	130	182	1051	1
RTOR Reduction (vph)	0	2	0	0	150	0	0	10	0	0	0	0
Lane Group Flow (vph)	0	2	0	144	62	0	4	1155	0	182	1052	0
Confl. Peds. (#/hr)	78					78	2		11	11		2
Confl. Bikes (#/hr)						3			2			2
Heavy Vehicles (%)	0%	0%	0%	2%	0%	4%	0%	5%	2%	4%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	5	0	0	18	0	0	17	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		23.0		23.0	23.0		52.2	52.2		64.0	64.0	
Effective Green, g (s)		24.0		24.0	24.0		53.2	53.2		65.0	65.0	
Actuated g/C Ratio		0.24		0.24	0.24		0.53	0.53		0.65	0.65	
Clearance Time (s)		6.0		6.0	6.0		7.0	7.0		4.0	7.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		401		341	327		277	1749		311	2224	
v/s Ratio Prot					0.05			c0.35		c0.05	0.31	
v/s Ratio Perm		0.00		c0.10			0.01			0.33		
v/c Ratio		0.01		0.42	0.19		0.01	0.66		0.59	0.47	
Uniform Delay, d1		28.9		32.1	30.3		11.0	16.9		10.6	8.8	
Progression Factor		1.00		1.00	1.00		1.28	1.34		2.24	0.91	
Incremental Delay, d2		0.0		0.8	0.3		0.1	1.9		2.5	0.6	
Delay (s)		28.9		33.0	30.5		14.2	24.5		26.3	8.7	
Level of Service		C		C	C		B	C		C	A	
Approach Delay (s)		28.9			31.5			24.5			11.3	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	19.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

5: Jane St & Haney Ave

Existing Conditions

PM Peak Hour

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑↑	↑↱	
Traffic Volume (vph)	20	2	10	1044	1052	37
Future Volume (vph)	20	2	10	1044	1052	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		0.99	1.00	1.00	
Frt	0.99		1.00	1.00	0.99	
Flt Protected	0.96		0.95	1.00	1.00	
Satd. Flow (prot)	1809		1807	3351	3397	
Flt Permitted	0.96		0.23	1.00	1.00	
Satd. Flow (perm)	1809		432	3351	3397	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	21	2	11	1111	1119	39
RTOR Reduction (vph)	2	0	0	0	1	0
Lane Group Flow (vph)	21	0	11	1111	1157	0
Confl. Peds. (#/hr)	9	22	23			23
Confl. Bikes (#/hr)						3
Heavy Vehicles (%)	0%	0%	0%	5%	3%	3%
Bus Blockages (#/hr)	0	0	0	18	17	0
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	9.8		78.2	78.2	78.2	
Effective Green, g (s)	10.8		79.2	79.2	79.2	
Actuated g/C Ratio	0.11		0.79	0.79	0.79	
Clearance Time (s)	6.0		6.0	6.0	6.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	195		342	2653	2690	
v/s Ratio Prot	c0.01			0.33	c0.34	
v/s Ratio Perm			0.03			
v/c Ratio	0.11		0.03	0.42	0.43	
Uniform Delay, d1	40.3		2.2	3.2	3.3	
Progression Factor	1.00		1.00	1.00	1.11	
Incremental Delay, d2	0.2		0.2	0.5	0.5	
Delay (s)	40.5		2.4	3.7	4.1	
Level of Service	D		A	A	A	
Approach Delay (s)	40.5			3.7	4.1	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	50.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Rockcliffe Blvd & Alliance Ave

Existing Conditions
PM Peak Hour

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (vph)	18	174	96	235	194	22	76	236	159	28	172	22
Future Volume (vph)	18	174	96	235	194	22	76	236	159	28	172	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			1.00			0.98			0.99	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.95			0.99			0.95			0.99	
Flt Protected		1.00			0.97			0.99			0.99	
Satd. Flow (prot)		1748			1731			1701			1746	
Flt Permitted		0.96			0.70			0.91			0.91	
Satd. Flow (perm)		1689			1237			1567			1607	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	18	178	98	240	198	22	78	241	162	29	176	22
RTOR Reduction (vph)	0	30	0	0	3	0	0	31	0	0	7	0
Lane Group Flow (vph)	0	264	0	0	457	0	0	450	0	0	221	0
Confl. Peds. (#/hr)	35		20	20		35	25		13	13		25
Confl. Bikes (#/hr)			3			6			8			6
Heavy Vehicles (%)	0%	3%	3%	2%	4%	9%	1%	3%	3%	14%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	7	0	0	5	0	0	7	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		28.0			28.0			20.0			20.0	
Effective Green, g (s)		29.0			29.0			21.0			21.0	
Actuated g/C Ratio		0.48			0.48			0.35			0.35	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		816			597			548			562	
v/s Ratio Prot												
v/s Ratio Perm		0.16			c0.37			c0.29			0.14	
v/c Ratio		0.32			0.77			0.82			0.39	
Uniform Delay, d1		9.5			12.7			17.8			14.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.1			9.1			13.0			2.1	
Delay (s)		10.5			21.8			30.8			16.7	
Level of Service		B			C			C			B	
Approach Delay (s)		10.5			21.8			30.8			16.7	
Approach LOS		B			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	94.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Traffic Volume (veh/h)	11	18	453	13	14	489
Future Volume (Veh/h)	11	18	453	13	14	489
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	12	20	498	14	15	537
Pedestrians	8					1
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						205
pX, platoon unblocked						
vC, conflicting volume	1080	514			520	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1080	514			520	
tC, single (s)	6.5	6.4			4.5	
tC, 2 stage (s)						
tF (s)	3.6	3.5			2.6	
p0 queue free %	95	96			98	
cM capacity (veh/h)	228	527			860	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	32	512	552
Volume Left	12	0	15
Volume Right	20	14	0
cSH	354	1700	860
Volume to Capacity	0.09	0.30	0.02
Queue Length 95th (m)	2.3	0.0	0.4
Control Delay (s)	16.2	0.0	0.5
Lane LOS	C		A
Approach Delay (s)	16.2	0.0	0.5
Approach LOS	C		

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

8: Rockcliffe Blvd & Woolner Ave/Terry Dr

PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	40	45	29	50	71	103	50	323	65	63	390	47
Future Volume (vph)	40	45	29	50	71	103	50	323	65	63	390	47
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	42	47	31	53	75	108	53	340	68	66	411	49

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	120	236	461	526
Volume Left (vph)	42	53	53	66
Volume Right (vph)	31	108	68	49
Hadj (s)	-0.02	-0.21	-0.02	0.00
Departure Headway (s)	7.8	7.1	6.3	6.2
Degree Utilization, x	0.26	0.47	0.81	0.91
Capacity (veh/h)	410	472	551	566
Control Delay (s)	13.5	16.2	31.2	43.9
Approach Delay (s)	13.5	16.2	31.2	43.9
Approach LOS	B	C	D	E

Intersection Summary			
Delay	32.0		
Level of Service	D		
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
9: Symes Rd & Terry Dr

Existing Conditions
PM Peak Hour

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↰	↳	
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	76	97	146	84	57	78
Future Volume (vph)	76	97	146	84	57	78
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	79	101	152	88	59	81

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	180	240	140
Volume Left (vph)	79	152	0
Volume Right (vph)	101	0	81
Hadj (s)	-0.23	0.14	-0.34
Departure Headway (s)	4.5	4.6	4.3
Degree Utilization, x	0.23	0.31	0.17
Capacity (veh/h)	734	746	789
Control Delay (s)	8.9	9.7	8.1
Approach Delay (s)	8.9	9.7	8.1
Approach LOS	A	A	A

Intersection Summary			
Delay	9.0		
Level of Service	A		
Intersection Capacity Utilization	40.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
10: Symes Rd & Hillborn Ave

Existing Conditions
PM Peak Hour

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	74	6	85	75	12	61
Future Volume (vph)	74	6	85	75	12	61
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	86	7	99	87	14	71

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	93	186	85
Volume Left (vph)	86	0	14
Volume Right (vph)	7	87	0
Hadj (s)	0.16	-0.27	0.06
Departure Headway (s)	4.6	4.0	4.4
Degree Utilization, x	0.12	0.20	0.10
Capacity (veh/h)	726	883	799
Control Delay (s)	8.3	8.0	7.9
Approach Delay (s)	8.3	8.0	7.9
Approach LOS	A	A	A

Intersection Summary			
Delay	8.0		
Level of Service	A		
Intersection Capacity Utilization	24.6%	ICU Level of Service	A
Analysis Period (min)	15		

11: Symes Rd & Orman Ave

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	68	1	2	89	1	5
Future Volume (vph)	68	1	2	89	1	5
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	77	1	2	101	1	6

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	78	103	7
Volume Left (vph)	77	0	1
Volume Right (vph)	1	101	0
Hadj (s)	0.21	-0.59	0.03
Departure Headway (s)	4.3	3.5	4.2
Degree Utilization, x	0.09	0.10	0.01
Capacity (veh/h)	811	996	833
Control Delay (s)	7.8	6.9	7.2
Approach Delay (s)	7.8	6.9	7.2
Approach LOS	A	A	A

Intersection Summary			
Delay	7.3		
Level of Service	A		
Intersection Capacity Utilization	17.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
12: Alliance Ave & Humber Blvd N & Cliff St

Existing Conditions
PM Peak Hour

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			↱						✥	
Traffic Volume (veh/h)	45	245	99	69	419	14	0	0	0	2	7	31
Future Volume (Veh/h)	45	245	99	69	419	14	0	0	0	2	7	31
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	47	258	104	73	441	15	0	0	0	2	7	33
Pedestrians		1			2			1			13	
Lane Width (m)		3.7			3.7			0.0			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	469			363			1037	1020	313	1014	1064	462
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	469			363			1037	1020	313	1014	1064	462
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			94			100	100	100	99	96	94
cM capacity (veh/h)	1025			1207			177	211	731	197	199	589

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	409	529	42
Volume Left	47	73	2
Volume Right	104	15	33
cSH	1025	1207	414
Volume to Capacity	0.05	0.06	0.10
Queue Length 95th (m)	1.1	1.5	2.6
Control Delay (s)	1.4	1.7	14.7
Lane LOS	A	A	B
Approach Delay (s)	1.4	1.7	14.7
Approach LOS			B

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	48.7%	ICU Level of Service	A
Analysis Period (min)	15		

13: Hilldale Rd & Humber Blvd N

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↰	↱
Traffic Volume (veh/h)	247	0	0	427	75	90
Future Volume (Veh/h)	247	0	0	427	75	90
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	287	0	0	497	87	105
Pedestrians	24			2	1	
Lane Width (m)	3.7			3.7	3.7	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	2			0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			288		809	290
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			288		809	290
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		75	86
cM capacity (veh/h)			1284		344	752

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	287	497	87	105
Volume Left	0	0	87	0
Volume Right	0	0	0	105
cSH	1700	1700	344	752
Volume to Capacity	0.17	0.29	0.25	0.14
Queue Length 95th (m)	0.0	0.0	7.5	3.7
Control Delay (s)	0.0	0.0	19.0	10.6
Lane LOS			C	B
Approach Delay (s)	0.0	0.0	14.4	
Approach LOS			B	

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	33.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱		✣			↱				
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	95	80	18	0	79	0	86	22	0	0	0
Future Volume (vph)	0	95	80	18	0	79	0	86	22	0	0	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	106	89	20	0	88	0	96	24	0	0	0

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total (vph)	106	89	108	120
Volume Left (vph)	0	0	20	0
Volume Right (vph)	0	89	88	24
Hadj (s)	0.05	-0.68	-0.45	-0.12
Departure Headway (s)	4.9	4.2	4.0	4.4
Degree Utilization, x	0.14	0.10	0.12	0.15
Capacity (veh/h)	713	830	859	766
Control Delay (s)	7.5	6.5	7.6	8.2
Approach Delay (s)	7.1		7.6	8.2
Approach LOS	A		A	A

Intersection Summary			
Delay	7.5		
Level of Service	A		
Intersection Capacity Utilization	25.2%	ICU Level of Service	A
Analysis Period (min)	15		

16: Humber Blvd N & Louvain St

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		Y	
Traffic Volume (veh/h)	16	321	417	6	8	10
Future Volume (Veh/h)	16	321	417	6	8	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	18	353	458	7	9	11
Pedestrians			33		19	
Lane Width (m)			3.7		3.7	
Walking Speed (m/s)			1.1		1.1	
Percent Blockage			3		2	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			333			
pX, platoon unblocked						
vC, conflicting volume	484				902	480
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	484				902	480
tC, single (s)	4.1				7.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				4.4	3.3
p0 queue free %	98				95	98
cM capacity (veh/h)	1070				198	579

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	371	465	20
Volume Left	18	0	9
Volume Right	0	7	11
cSH	1070	1700	310
Volume to Capacity	0.02	0.27	0.06
Queue Length 95th (m)	0.4	0.0	1.6
Control Delay (s)	0.6	0.0	17.4
Lane LOS	A		C
Approach Delay (s)	0.6	0.0	17.4
Approach LOS			C

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
17: Avon Ave & Humber Blvd S

Existing Conditions
PM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Volume (veh/h)	2	73	3	1	66	2
Future Volume (Veh/h)	2	73	3	1	66	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	2	87	4	1	79	2
Pedestrians					7	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			96		62	52
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			96		62	52
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		92	100
cM capacity (veh/h)			1500		934	1014

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	89	5	81
Volume Left	0	4	79
Volume Right	87	0	2
cSH	1700	1500	936
Volume to Capacity	0.05	0.00	0.09
Queue Length 95th (m)	0.0	0.1	2.2
Control Delay (s)	0.0	5.9	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	5.9	9.2
Approach LOS			A

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	17.4%	ICU Level of Service	A
Analysis Period (min)	15		

18: Weston Rd & Humber Blvd N/Black Creek Dr

PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱	↰	↰	↱	↰	↑↑	↱	↰	↑↱	
Traffic Volume (vph)	43	189	97	714	227	68	156	634	738	30	631	40
Future Volume (vph)	43	189	97	714	227	68	156	634	738	30	631	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	5.0	5.0	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.99	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1866	1470	1700	1735	1526	1714	3476	1474	1806	3338	
Flt Permitted		0.99	1.00	0.95	0.97	1.00	0.20	1.00	1.00	0.41	1.00	
Satd. Flow (perm)		1866	1470	1700	1735	1526	361	3476	1474	777	3338	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	43	191	98	721	229	69	158	640	745	30	637	40
RTOR Reduction (vph)	0	0	82	0	0	50	0	0	424	0	4	0
Lane Group Flow (vph)	0	234	16	469	481	19	158	640	321	30	673	0
Confl. Peds. (#/hr)	41		1	1		41	50		12	12		50
Confl. Bikes (#/hr)			2			1			9			4
Heavy Vehicles (%)	2%	2%	8%	2%	3%	7%	6%	5%	5%	0%	4%	10%
Bus Blockages (#/hr)	0	0	7	0	0	0	0	0	0	0	15	0
Turn Type	Split	NA	Prot	Split	NA	Prot	pm+pt	NA	Perm	Perm	NA	
Protected Phases	7	7	7	8	8	8	5	2			6	
Permitted Phases							2		2	6		
Actuated Green, G (s)		17.5	17.5	31.5	31.5	31.5	49.0	49.0	49.0	33.0	33.0	
Effective Green, g (s)		18.5	18.5	32.5	32.5	32.5	50.0	50.0	50.0	34.0	34.0	
Actuated g/C Ratio		0.16	0.16	0.28	0.28	0.28	0.43	0.43	0.43	0.29	0.29	
Clearance Time (s)		6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		297	234	476	486	427	307	1498	635	227	978	
v/s Ratio Prot		c0.13	0.01	0.28	c0.28	0.01	0.06	0.18			c0.20	
v/s Ratio Perm							0.16		c0.22	0.04		
v/c Ratio		0.79	0.07	0.99	0.99	0.05	0.51	0.43	0.51	0.13	0.69	
Uniform Delay, d1		46.9	41.4	41.5	41.6	30.4	22.5	23.0	24.0	30.2	36.3	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		12.9	0.1	37.8	38.4	0.2	1.5	0.9	2.9	1.2	4.0	
Delay (s)		59.8	41.5	79.3	79.9	30.6	24.0	23.9	26.9	31.4	40.3	
Level of Service		E	D	E	E	C	C	C	C	C	D	
Approach Delay (s)		54.4			76.3			25.3			39.9	
Approach LOS		D			E			C			D	

Intersection Summary

HCM 2000 Control Delay	45.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	116.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	101.4%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

19: Weston Rd & Portor Ave

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑↑↑	↑↱	
Traffic Volume (veh/h)	23	28	0	1505	1404	38
Future Volume (Veh/h)	23	28	0	1505	1404	38
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	23	29	0	1536	1433	39
Pedestrians	32					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	3					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				213	119	
pX, platoon unblocked	0.88	0.83	0.83			
vC, conflicting volume	1996	768	1504			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1143	309	1197			
tC, single (s)	6.8	7.0	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	86	95	100			
cM capacity (veh/h)	169	548	475			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	52	512	512	512	955	517
Volume Left	23	0	0	0	0	0
Volume Right	29	0	0	0	0	39
cSH	274	1700	1700	1700	1700	1700
Volume to Capacity	0.19	0.30	0.30	0.30	0.56	0.30
Queue Length 95th (m)	5.2	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	21.2	0.0	0.0	0.0	0.0	0.0
Lane LOS	C					
Approach Delay (s)	21.2	0.0			0.0	
Approach LOS	C					

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
20: Weston Rd & Rogers Rd

Existing Conditions
PM Peak Hour

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥		↰		↱		↑↑	↱	↰	↑↑	
Traffic Volume (vph)	1	10	0	431	0	776	0	728	299	416	1016	0
Future Volume (vph)	1	10	0	431	0	776	0	728	299	416	1016	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0		7.0		3.0		6.0	6.0	3.0	6.0	
Lane Util. Factor		1.00		1.00		1.00		0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00		1.00		1.00		1.00	0.92	1.00	1.00	
Flpb, ped/bikes		1.00		0.95		1.00		1.00	1.00	1.00	1.00	
Frt		1.00		1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected		1.00		0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		954		1674		1570		3444	1379	1772	3544	
Flt Permitted		1.00		0.75		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)		954		1322		1570		3444	1379	1772	3544	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	1	10	0	435	0	784	0	735	302	420	1026	0
RTOR Reduction (vph)	0	0	0	0	0	449	0	0	139	0	0	0
Lane Group Flow (vph)	0	11	0	435	0	335	0	735	163	420	1026	0
Confl. Peds. (#/hr)	23		47	47		23			27	27		
Confl. Bikes (#/hr)						5			5			3
Heavy Vehicles (%)	100%	100%	0%	4%	0%	4%	0%	6%	2%	3%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	15	0	0	0
Turn Type	Perm	NA		Perm		Over		NA	Perm	Prot	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8					2			
Actuated Green, G (s)		31.0		31.0		21.0		29.0	29.0	21.0	54.0	
Effective Green, g (s)		32.0		32.0		22.0		30.0	30.0	22.0	55.0	
Actuated g/C Ratio		0.32		0.32		0.22		0.30	0.30	0.22	0.55	
Clearance Time (s)		8.0		8.0		4.0		7.0	7.0	4.0	7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		305		423		345		1033	413	389	1949	
v/s Ratio Prot						0.21		c0.21		c0.24	0.29	
v/s Ratio Perm		0.01		c0.33					0.12			
v/c Ratio		0.04		1.03		0.97		0.71	0.39	1.08	0.53	
Uniform Delay, d1		23.4		34.0		38.7		31.1	27.8	39.0	14.3	
Progression Factor		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.0		51.2		40.3		4.2	2.8	68.6	1.0	
Delay (s)		23.4		85.2		79.0		35.3	30.6	107.6	15.3	
Level of Service		C		F		E		D	C	F	B	
Approach Delay (s)		23.4			81.2			33.9			42.1	
Approach LOS		C			F			C			D	

Intersection Summary

HCM 2000 Control Delay	52.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	109.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
21: Weston Rd & Avon Cres

Existing Conditions
PM Peak Hour

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑↑	↑↱	
Traffic Volume (veh/h)	19	16	5	1008	1393	54
Future Volume (Veh/h)	19	16	5	1008	1393	54
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	19	16	5	1029	1421	55
Pedestrians	43				1	
Lane Width (m)	3.7				3.7	
Walking Speed (m/s)	1.1				1.1	
Percent Blockage	4				0	
Right turn flare (veh)						
Median type				None	TWLTL	
Median storage veh)					2	
Upstream signal (m)					88	
pX, platoon unblocked	0.81	0.81	0.81			
vC, conflicting volume	2017	781	1519			
vC1, stage 1 conf vol	1492					
vC2, stage 2 conf vol	526					
vCu, unblocked vol	1793	274	1181			
tC, single (s)	6.9	7.0	4.5			
tC, 2 stage (s)	5.9					
tF (s)	3.5	3.4	2.4			
p0 queue free %	90	97	99			
cM capacity (veh/h)	188	556	387			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	35	5	514	514	947	529
Volume Left	19	5	0	0	0	0
Volume Right	16	0	0	0	0	55
cSH	269	387	1700	1700	1700	1700
Volume to Capacity	0.13	0.01	0.30	0.30	0.56	0.31
Queue Length 95th (m)	3.4	0.3	0.0	0.0	0.0	0.0
Control Delay (s)	20.4	14.4	0.0	0.0	0.0	0.0
Lane LOS	C	B				
Approach Delay (s)	20.4	0.1			0.0	
Approach LOS	C					

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
22: Avon Ave & Avon Cres

Existing Conditions
PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		Y	
Traffic Volume (veh/h)	46	11	35	24	24	50
Future Volume (Veh/h)	46	11	35	24	24	50
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	58	14	44	30	30	63
Pedestrians		1			9	
Lane Width (m)		3.7			3.7	
Walking Speed (m/s)		1.1			1.1	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	83				198	69
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	83				198	69
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				96	94
cM capacity (veh/h)	1514				750	985

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	72	74	93
Volume Left	58	0	30
Volume Right	0	30	63
cSH	1514	1700	894
Volume to Capacity	0.04	0.04	0.10
Queue Length 95th (m)	0.9	0.0	2.6
Control Delay (s)	6.1	0.0	9.5
Lane LOS	A		A
Approach Delay (s)	6.1	0.0	9.5
Approach LOS			A

Intersection Summary			
Average Delay	5.5		
Intersection Capacity Utilization	21.2%	ICU Level of Service	A
Analysis Period (min)	15		

23: Avon Ave & Portor Ave

PM Peak Hour

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	3	1	9	24	0	14	3	51	16	34	41	1
Future Volume (vph)	3	1	9	24	0	14	3	51	16	34	41	1
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	4	1	11	28	0	16	4	60	19	40	48	1

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	16	44	83	89
Volume Left (vph)	4	28	4	40
Volume Right (vph)	11	16	19	1
Hadj (s)	-0.36	-0.09	-0.08	0.15
Departure Headway (s)	4.0	4.2	4.0	4.3
Degree Utilization, x	0.02	0.05	0.09	0.11
Capacity (veh/h)	863	819	864	827
Control Delay (s)	7.0	7.4	7.5	7.8
Approach Delay (s)	7.0	7.4	7.5	7.8
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.5		
Level of Service	A		
Intersection Capacity Utilization	23.9%	ICU Level of Service	A
Analysis Period (min)	15		

Queues
1: Jane St & East Dr/Outlook Ave

	→	←	↖	↖	↑	↘	↓
Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	247	68	15	122	1057	17	1190
v/c Ratio	0.55	0.16	0.04	0.53	0.50	0.06	0.54
Control Delay	29.7	30.5	3.9	10.2	3.1	7.2	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.7	30.5	3.9	10.2	3.1	7.2	10.6
Queue Length 50th (m)	31.6	10.3	0.0	2.3	10.1	1.1	58.4
Queue Length 95th (m)	55.5	21.1	2.2	m5.2	16.9	3.7	75.6
Internal Link Dist (m)	151.9	119.5			80.9		170.1
Turn Bay Length (m)			30.0	55.0		50.0	
Base Capacity (vph)	467	428	398	232	2125	278	2198
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.16	0.04	0.53	0.50	0.06	0.54

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Queues
4: Jane St & Alliance Ave

	→	↙	←	↖	↑	↘	↓
Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	4	144	212	4	1165	182	1052
v/c Ratio	0.01	0.42	0.44	0.01	0.66	0.57	0.47
Control Delay	23.8	36.7	9.0	14.5	24.6	20.2	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.8	36.7	9.0	14.5	24.6	20.2	8.8
Queue Length 50th (m)	0.3	23.7	2.3	0.5	112.2	13.9	42.8
Queue Length 95th (m)	3.0	41.8	20.5	m1.3	143.6	34.8	56.7
Internal Link Dist (m)	147.5		56.2		238.8		90.1
Turn Bay Length (m)		45.0		35.0		45.0	
Base Capacity (vph)	419	355	489	277	1758	319	2224
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.41	0.43	0.01	0.66	0.57	0.47

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Queues
5: Jane St & Haney Ave

Lane Group	EBL	NBL	NBT	SBT
	↗	↖	↑	↓
Lane Group Flow (vph)	23	11	1111	1158
v/c Ratio	0.09	0.03	0.40	0.41
Control Delay	32.5	5.0	4.8	5.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	32.5	5.0	4.8	5.3
Queue Length 50th (m)	3.9	0.3	22.2	20.6
Queue Length 95th (m)	9.6	2.4	61.0	71.4
Internal Link Dist (m)	123.4		130.8	238.8
Turn Bay Length (m)		45.0		
Base Capacity (vph)	417	362	2801	2841
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.06	0.03	0.40	0.41

Intersection Summary

Queues
6: Rockcliffe Blvd & Alliance Ave

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	294	460	481	227
v/c Ratio	0.35	0.77	0.83	0.40
Control Delay	9.0	23.7	31.4	16.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.0	23.7	31.4	16.7
Queue Length 50th (m)	14.5	38.1	42.8	17.5
Queue Length 95th (m)	28.3	#85.2	#90.3	33.3
Internal Link Dist (m)	41.3	216.8	180.4	136.1
Turn Bay Length (m)				
Base Capacity (vph)	846	600	579	569
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.35	0.77	0.83	0.40

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues

18: Weston Rd & Humber Blvd N/Black Creek Dr

	→	↘	↙	←	↖	↖	↑	↗	↘	↓
Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	234	98	469	481	69	158	640	745	30	677
v/c Ratio	0.79	0.29	0.99	0.99	0.13	0.51	0.43	0.70	0.13	0.69
Control Delay	65.6	6.5	80.7	81.6	1.1	25.6	24.1	5.7	33.8	41.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.6	6.5	80.7	81.6	1.1	25.6	24.1	5.7	33.8	41.0
Queue Length 50th (m)	50.8	0.0	~120.4	~124.1	0.0	21.3	52.3	0.0	5.0	71.0
Queue Length 95th (m)	#83.3	9.4	#185.6	#190.3	1.5	35.2	67.6	24.9	13.4	96.7
Internal Link Dist (m)	309.3			193.0			94.9			190.2
Turn Bay Length (m)		25.0			40.0	85.0			45.0	
Base Capacity (vph)	321	354	475	485	514	358	1498	1059	228	982
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.28	0.99	0.99	0.13	0.44	0.43	0.70	0.13	0.69

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues

20: Weston Rd & Rogers Rd

	→	↙	↖	↑	↗	↘	↓
Lane Group	EBT	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	11	435	784	735	302	420	1026
v/c Ratio	0.04	1.03	0.99	0.71	0.55	1.08	0.53
Control Delay	24.0	87.1	40.8	35.7	14.3	107.1	15.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	87.1	40.8	35.7	14.3	107.1	15.5
Queue Length 50th (m)	1.5	~90.7	48.7	66.4	15.0	~91.3	62.6
Queue Length 95th (m)	5.5	#148.3	#132.2	87.0	41.0	#148.1	79.3
Internal Link Dist (m)	25.5			64.0			188.7
Turn Bay Length (m)					30.0	60.0	
Base Capacity (vph)	305	422	794	1033	553	389	1949
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	1.03	0.99	0.71	0.55	1.08	0.53

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Appendix E: Growth Rate Calculations

AM Peak Hour

Rogers-Weston

Weston north of Rogers

Year	Volume	Growth
2012	3042	
2019	2721	-1.6%

Weston south of Rogers

Year	Volume	Growth
2012	2896	
2019	2475	-2.2%

Rogers east of Weston

Year	Volume	Growth
2012	1630	
2019	1742	1.0%

PM Peak Hour

Rogers-Weston

Weston north of Rogers

Year	Volume	Growth
2012	2824	
2019	2848	0.1%

Weston south of Rogers

Year	Volume	Growth
2012	2785	
2019	2374	-2.3%

Rogers east of Weston

Year	Volume	Growth
2012	1933	
2019	1907	-0.2%

AM Peak Hour

Haney-Jane

Jane north of Haney

Year	Volume	Growth
2013	1895	
2019	2081	1.6%

Jane south of Haney

Year	Volume	Growth
2013	1896	
2019	2043	1.3%

Haney west of Jane

Year	Volume	Growth
2013	75	
2019	56	-4.8%

PM Peak Hour

Haney-Jane

Jane north of Haney

Year	Volume	Growth
2013	1888	
2019	2104	1.8%

Jane south of Haney

Year	Volume	Growth
2013	1894	
2019	2059	1.4%

Haney west of Jane

Year	Volume	Growth
2013	134	
2019	69	-10.5%

Appendix F: Future (2031) Total MOE Summary Tables - Scenario 1

Table F-1: Future (2031) Intersection Operations Summary (Scenario 1 - Do Nothing)

Intersection / Movement	Weekday AM Peak Hour			Weekday PM Peak Hour			Available Storage Length (m)
	v/c	LOS (Delay in seconds)	95th Percentile Queue Length (m)	v/c	LOS (Delay in seconds)	95th Percentile Queue Length (m)	
Jane Street / East Drive & Outlook Avenue							
Overall	0.60	B (11)	-	0.60	B (11)	-	-
EBLTR	0.56	C (34)	58	0.54	C (34)	60	225
WBLT	0.16	C (29)	20	0.18	C (30)	22	80
WBR	0.01	C (28)	<7	0.01	C (28)	<7	30
NBL	0.21	A (7)	<7	0.63	B (15)	<7	55
NBTR	0.55	A (9)	14	0.52	A (3)	12	90
SBL	0.07	A (7)	<7	0.07	A (7)	<7	50
SBTR	0.62	B (12)	94	0.58	B (11)	84	215
Jane Street / Sandcliff Road							
Overall	-	A (-)	-	-	A (-)	-	-
EBLR	0.04	B (13)	<7	0.03	B (11)	<7	125
NBL	0.02	B (13)	<7	0.04	B (12)	<7	25
NBT	0.34	A (-)	<7	0.38	A (-)	<7	80
SBTR	0.53	A (-)	<7	0.54	A (-)	<7	85
Jane Street / Black Creek Boulevard & Dalrymple Drive							
Overall	-	A (2)	-	-	A (3)	-	-
EBLTR	0.24	C (24)	<7	0.26	D (31)	8	120
WBLTR	0.28	C (16)	9	0.46	D (31)	17	180
NBL	0.03	B (11)	<7	0.11	B (12)	<7	25
NBTR	0.41	A (-)	<7	0.47	A (-)	<7	100
SBL	0.18	B (10)	<7	0.21	B (12)	<7	35
SBTR	0.48	A (-)	<7	0.49	A (-)	<7	80
Jane Street / Alliance Avenue							
Overall	0.57	B (19)	-	0.63	C (21)	-	-
EBLTR	0.02	C (29)	<7	0.01	C (29)	<7	20
WBL	0.33	C (32)	31	0.44	C (33)	44	45
WBTR	0.08	C (30)	12	0.25	C (31)	26	430
NBL	-	-	-	0.02	B (14)	<7	35
NBTR	0.67	C (24)	134	0.70	C (26)	154	225
SBL	0.63	C (27)	40	0.66	C (31)	43	45
SBTR	0.53	B (10)	71	0.50	A (9)	65	100
Jane Street / Haney Avenue							
Overall	0.45	A (4)	-	0.41	A (5)	-	-
EBLR	0.26	D (44)	14	0.11	D (41)	10	70
NBL	0.01	A (2)	<7	0.04	A (3)	<7	45

Intersection / Movement	Weekday AM Peak Hour			Weekday PM Peak Hour			Available Storage Length (m)
	v/c	LOS (Delay in seconds)	95th Percentile Queue Length (m)	v/c	LOS (Delay in seconds)	95th Percentile Queue Length (m)	
NBT	0.42	A (3)	62	0.44	A (4)	67	80
SBTR	0.47	A (4)	99	0.45	A (5)	102	225
Rockcliffe Boulevard / Alliance Avenue							
Overall	0.85	C (26)	-	0.84	C (25)	-	-
EBLTR	0.54	B (14)	52	0.35	B (11)	30	500
WBLTR	**0.93**	D (43)	90	0.82	C (26)	94	450
NBLTR	0.74	C (27)	72	**0.88**	D (36)	99	190
SBLTR	0.57	C (21)	46	0.42	B (17)	35	155
Rockcliffe Boulevard / Rockcliffe Court							
Overall	-	A (-)	-	-	A (-)	-	-
WBLR	0.15	C (16)	<7	0.10	C (17)	<7	110
NBTR	0.23	A (-)	<7	0.32	A (-)	<7	260
SBLT	0.04	A (1)	<7	0.02	A (1)	<7	190
Rockcliffe Boulevard / Terry Drive and Woolner Avenue							
Overall	-	C (29)	-	-	**E (46)**	-	-
EBLTR	0.47	C (16)	-	0.29	B (14)	-	200
WBLTR	0.28	B (14)	-	0.51	C (18)	-	555
NBLTR	0.69	C (23)	-	**0.89**	**E (42)**	-	105
SBLTR	**0.91**	**E (43)**	-	**1.02**	**F (68)**	-	260
Symes Road / Terry Drive							
Overall	-	A (9)	-	-	A (9)	-	
EBLR	0.30	A (9)	-	0.24	A (9)	-	555
NBLT	0.11	A (9)	-	0.33	A (10)	-	225
SBTR	0.22	A (9)	-	0.18	A (8)	-	75
Symes Road / Hillborn Avenue							
Overall	-	A (8)	-	-	A (8)	-	
WBLR	0.13	A (8)	-	0.13	A (8)	-	180
NBTR	0.14	A (8)	-	0.22	A (8)	-	75
SBLT	0.17	A (8)	-	0.11	A (8)	-	55
Symes Road / Orman Avenue							
Overall	-	A (8)	-	-	A (7)	-	
WBLR	0.16	A (8)	-	0.10	A (8)	-	25
NBTR	0.05	A (7)	-	0.11	A (7)	-	55
SBLT	0.00	A (7)	-	0.01	A (7)	-	20
Cliff Street / Alliance Avenue / Humber Boulevard N							
Overall	-	A (4)	-	-	A (2)	-	
EBLTR	0.05	A (1)	<7	0.05	A (1)	<7	450
WBTR	0.08	A (2)	<7	0.07	A (2)	<7	55

Intersection / Movement	Weekday AM Peak Hour			Weekday PM Peak Hour			Available Storage Length (m)
	v/c	LOS (Delay in seconds)	95th Percentile Queue Length (m)	v/c	LOS (Delay in seconds)	95th Percentile Queue Length (m)	
SBLTR	0.36	C (23)	12	0.11	C (15)	<7	150
Humber Boulevard N / Hilldale Road							
Overall	-	A (3)	-	-	A (3)	-	-
EBT	0.18	A (-)	<7	0.18	A (-)	<7	55
WBT	0.22	A (-)	<7	0.31	A (-)	<7	200
NBL	0.31	C (19)	10	0.29	C (21)	9	15
NBR	0.09	B (11)	<7	0.15	B (11)	<7	15
Alliance Avenue / Humber Boulevard S / Hilldale Road							
Overall	-	A (8)	-	-	A (8)	-	-
EBT	0.32	A (9)	-	0.15	A (8)	-	70
EBR	0.13	A (7)	-	0.11	A (7)	-	70
WBLR	0.13	A (8)	-	0.13	A (8)	-	430
NBTR	0.13	A (9)	-	0.16	A (8)	-	380
Humber Boulevard N / Louvain Street							
Overall	-	A (1)	-	-	A (1)	-	-
EBLT	0.03	A (1)	<7	0.02	A (1)	<7	200
WBTR	0.21	A (-)	<7	0.29	A (-)	<7	310
SBLR	0.12	C (18)	<7	0.07	C (18)	<7	70
Humber Boulevard S / Avon Avenue							
Overall	-	A (3)	-	-	A (4)	-	-
EBTR	0.11	A (-)	<7	0.06	A (-)	<7	430
WBLT	0.00	A (8)	<7	0.00	A (6)	<7	75
NBLR	0.09	B (10)	<7	0.09	A (9)	<7	70
Humber Boulevard N / Black Creek Drive and Weston Road							
Overall	**0.90**	D (53)	-	**0.85**	D (52)	-	-
EBLT	**1.05**	**F (133)**	112	0.82	**E (62)**	92	310
EBR	0.06	D (52)	8	0.07	D (41)	11	25
WBL	**0.95**	**E (71)**	215	**1.06**	**F (102)**	202	270
WBT	**0.97**	**E (75)**	222	**1.07**	**F (103)**	206	270
WBR	0.02	C (29)	<7	0.05	C (31)	<7	270
NBL	0.47	C (28)	27	0.56	C (26)	37	85
NBT	0.36	C (27)	62	0.45	C (24)	72	310
NBR	0.55	C (32)	30	0.57	C (29)	39	310
SBL	0.30	D (37)	30	0.15	C (32)	14	45
SBTR	0.83	D (50)	**145**	0.74	D (42)	**104**	65
Weston Road / Porter Avenue							
Overall	-	A (-)	-	-	A (-)	-	-
EBLR	0.38	D (33)	13	0.20	C (22)	22	90

Intersection / Movement	Weekday AM Peak Hour			Weekday PM Peak Hour			Available Storage Length (m)
	v/c	LOS (Delay in seconds)	95th Percentile Queue Length (m)	v/c	LOS (Delay in seconds)	95th Percentile Queue Length (m)	
NBT	0.28	A (-)	<7	0.32	A (-)	<7	185
SBTR	0.67	A (-)	<7	0.60	A (-)	<7	115
Weston Road / Rogers Road							
Overall	**0.92**	D (42)	-	**1.00**	**E (67)**	-	-
EBLTR	0.06	C (24)	7	0.04	C (24)	<7	10
WBL	**0.95**	**E (66)**	128	**1.09**	**F (106)**	161	175
WBR	0.71	D (43)	92	**1.12**	**F (123)**	154	175
NBT	0.69	C (35)	82	0.76	D (37)	93	340
NBR	0.54	C (34)	57	0.44	C (32)	46	340
SBL	**1.10**	**F (113)**	**149**	**1.14**	**F (130)**	**159**	60
SBT	0.68	B (18)	113	0.56	B (16)	86	310
Weston Road / Avon Crescent							
Overall	-	A (-)	-	-	A (-)	-	-
EBLR	0.54	E (39)	22	0.15	C (22)	22	85
NBL	0.03	C (15)	<7	0.01	C (15)	15	65
NBT	0.30	A (-)	<7	0.32	A (-)	<7	270
SBTR	0.63	A (-)	<7	0.59	A (-)	<7	50
Avon Avenue / Avon Crescent							
Overall	-	A (8)	-	-	A (6)	-	-
EBLT	0.05	A (6)	<7	0.04	A (6)	<7	65
WBTR	0.07	A (-)	<7	0.05	A (-)	<7	85
SBLR	0.33	B (12)	12	0.11	A (10)	<7	225
Avon Avenue / Porter Avenue							
Overall	-	A (9)	-	-	A (8)	-	-
EBLTR	0.06	A (8)	-	0.02	A (7)	-	20
WBLTR	0.13	A (9)	-	0.05	A (8)	-	90
NBLTR	0.18	A (9)	-	0.10	A (8)	-	225
SBLTR	0.30	A (9)	-	0.11	A (8)	-	70

Appendix G: Future (2031) Intersection Operation Calculations (Synchro) – Scenario 1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱			↰↑	↱	↰	↑↑↱		↰	↑↑↱	
Traffic Volume (vph)	60	61	132	20	46	14	44	1068	33	16	1171	33
Future Volume (vph)	60	61	132	20	46	14	44	1068	33	16	1171	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.98			1.00	0.95	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.93			1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1648			1860	1442	1817	3180		1623	3082	
Flt Permitted		0.91			0.88	1.00	0.17	1.00		0.20	1.00	
Satd. Flow (perm)		1514			1668	1442	335	3180		349	3082	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	61	62	135	20	47	14	45	1090	34	16	1195	34
RTOR Reduction (vph)	0	42	0	0	0	10	0	2	0	0	2	0
Lane Group Flow (vph)	0	216	0	0	67	4	45	1122	0	16	1227	0
Confl. Peds. (#/hr)	35		19	19		35	15		11	11		15
Confl. Bikes (#/hr)			1						2			
Heavy Vehicles (%)	10%	5%	1%	0%	2%	7%	0%	6%	9%	12%	7%	12%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	35	0	0	45	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		24.6			24.6	24.6	63.4	63.4		63.4	63.4	
Effective Green, g (s)		25.6			25.6	25.6	64.4	64.4		64.4	64.4	
Actuated g/C Ratio		0.26			0.26	0.26	0.64	0.64		0.64	0.64	
Clearance Time (s)		6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		387			427	369	215	2047		224	1984	
v/s Ratio Prot								0.35			c0.40	
v/s Ratio Perm		c0.14			0.04	0.00	0.13			0.05		
v/c Ratio		0.56			0.16	0.01	0.21	0.55		0.07	0.62	
Uniform Delay, d1		32.3			28.8	27.7	7.3	9.8		6.6	10.5	
Progression Factor		1.00			1.00	1.00	0.23	0.21		1.00	1.00	
Incremental Delay, d2		1.8			0.2	0.0	1.8	0.9		0.6	1.5	
Delay (s)		34.1			29.0	27.8	3.5	3.0		7.3	12.0	
Level of Service		C			C	C	A	A		A	B	
Approach Delay (s)		34.1			28.8			3.0			11.9	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣		↰	↱		↰	↑↱		↰	↑↱	
Traffic Volume (vph)	3	4	0	100	2	89	0	985	124	195	1053	0
Future Volume (vph)	3	4	0	100	2	89	0	985	124	195	1053	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0			6.0		3.0	6.0	
Lane Util. Factor		1.00		1.00	1.00			0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.90			1.00		1.00	1.00	
Flpb, ped/bikes		0.96		1.00	1.00			1.00		1.00	1.00	
Frt		1.00		1.00	0.85			0.98		1.00	1.00	
Flt Protected		0.98		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1814		1630	1260			3146		1738	3130	
Flt Permitted		0.93		0.75	1.00			1.00		0.16	1.00	
Satd. Flow (perm)		1716		1292	1260			3146		295	3130	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	3	4	0	102	2	91	0	1005	127	199	1074	0
RTOR Reduction (vph)	0	0	0	0	69	0	0	10	0	0	0	0
Lane Group Flow (vph)	0	7	0	102	24	0	0	1122	0	199	1074	0
Confl. Peds. (#/hr)	72					72	2		1	1		2
Confl. Bikes (#/hr)									5			1
Heavy Vehicles (%)	0%	0%	0%	12%	0%	12%	0%	6%	10%	5%	8%	0%
Bus Blockages (#/hr)	0	0	0	0	11	0	0	32	0	0	37	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		23.0		23.0	23.0			52.2		64.0	64.0	
Effective Green, g (s)		24.0		24.0	24.0			53.2		65.0	65.0	
Actuated g/C Ratio		0.24		0.24	0.24			0.53		0.65	0.65	
Clearance Time (s)		6.0		6.0	6.0			7.0		4.0	7.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		411		310	302			1673		318	2034	
v/s Ratio Prot					0.02			c0.36		c0.05	0.34	
v/s Ratio Perm		0.00		c0.08						0.35		
v/c Ratio		0.02		0.33	0.08			0.67		0.63	0.53	
Uniform Delay, d1		29.0		31.4	29.4			17.0		10.5	9.3	
Progression Factor		1.00		1.00	1.00			1.28		2.27	0.99	
Incremental Delay, d2		0.0		0.6	0.1			2.0		3.2	0.8	
Delay (s)		29.0		32.0	29.6			23.8		27.1	10.1	
Level of Service		C		C	C			C		C	B	
Approach Delay (s)		29.0			30.8			23.8			12.7	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

5: Jane St & Haney Ave

AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	⅄		↰	↑↑	↑↱	
Traffic Volume (vph)	35	6	3	1074	1138	15
Future Volume (vph)	35	6	3	1074	1138	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		0.99	1.00	1.00	
Frt	0.98		1.00	1.00	1.00	
Flt Protected	0.96		0.95	1.00	1.00	
Satd. Flow (prot)	1712		1364	3237	3088	
Flt Permitted	0.96		0.22	1.00	1.00	
Satd. Flow (perm)	1712		321	3237	3088	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	36	6	3	1107	1173	15
RTOR Reduction (vph)	5	0	0	0	1	0
Lane Group Flow (vph)	37	0	3	1107	1187	0
Confl. Peds. (#/hr)	6	8	14			14
Confl. Bikes (#/hr)		1				
Heavy Vehicles (%)	6%	0%	33%	6%	8%	7%
Bus Blockages (#/hr)	0	0	0	30	42	0
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	7.4		80.6	80.6	80.6	
Effective Green, g (s)	8.4		81.6	81.6	81.6	
Actuated g/C Ratio	0.08		0.82	0.82	0.82	
Clearance Time (s)	6.0		6.0	6.0	6.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	143		261	2641	2519	
v/s Ratio Prot	c0.02			0.34	c0.38	
v/s Ratio Perm			0.01			
v/c Ratio	0.26		0.01	0.42	0.47	
Uniform Delay, d1	42.9		1.7	2.6	2.8	
Progression Factor	1.00		1.00	1.00	1.19	
Incremental Delay, d2	0.9		0.1	0.5	0.6	
Delay (s)	43.8		1.8	3.1	3.8	
Level of Service	D		A	A	A	
Approach Delay (s)	43.8			3.1	3.8	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Volume (vph)	19	276	139	172	167	45	59	142	185	49	200	25
Future Volume (vph)	19	276	139	172	167	45	59	142	185	49	200	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			0.99			0.97			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.96			0.98			0.94			0.99	
Flt Protected		1.00			0.98			0.99			0.99	
Satd. Flow (prot)		1675			1396			1481			1621	
Flt Permitted		0.98			0.62			0.91			0.87	
Satd. Flow (perm)		1637			884			1363			1425	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	20	291	146	181	176	47	62	149	195	52	211	26
RTOR Reduction (vph)	0	28	0	0	8	0	0	55	0	0	6	0
Lane Group Flow (vph)	0	429	0	0	396	0	0	351	0	0	283	0
Confl. Peds. (#/hr)	33		18	18		33	27		21	21		27
Confl. Bikes (#/hr)			6			3			6			10
Heavy Vehicles (%)	16%	7%	8%	18%	12%	20%	14%	11%	7%	24%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	29	0	0	15	0	0	16	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		28.0			28.0			20.0			20.0	
Effective Green, g (s)		29.0			29.0			21.0			21.0	
Actuated g/C Ratio		0.48			0.48			0.35			0.35	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		791			427			477			498	
v/s Ratio Prot												
v/s Ratio Perm		0.26			c0.45			c0.26			0.20	
v/c Ratio		0.54			0.93			0.74			0.57	
Uniform Delay, d1		10.8			14.5			17.1			15.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.7			28.8			9.7			4.7	
Delay (s)		13.5			43.3			26.8			20.5	
Level of Service		B			D			C			C	
Approach Delay (s)		13.5			43.3			26.8			20.5	
Approach LOS		B			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱	↰	↰↑	↱	↰	↑↑	↱	↰	↑↱	
Traffic Volume (vph)	17	194	78	836	196	30	97	502	786	73	778	14
Future Volume (vph)	17	194	78	836	196	30	97	502	786	73	778	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	5.0	5.0	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1737	1405	1636	1641	1526	1580	3380	1482	1686	3180	
Flt Permitted		1.00	1.00	0.95	0.97	1.00	0.14	1.00	1.00	0.46	1.00	
Satd. Flow (perm)		1737	1405	1636	1641	1526	225	3380	1482	813	3180	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	18	202	81	871	204	31	101	523	819	76	810	15
RTOR Reduction (vph)	0	0	71	0	0	20	0	0	472	0	1	0
Lane Group Flow (vph)	0	220	10	531	544	11	101	523	347	76	824	0
Confl. Peds. (#/hr)	35					35	122		2	2		122
Confl. Bikes (#/hr)						2			5			8
Heavy Vehicles (%)	12%	10%	13%	6%	11%	7%	15%	8%	7%	8%	7%	7%
Bus Blockages (#/hr)	0	0	7	0	0	0	0	0	0	0	30	0
Turn Type	Split	NA	Perm	Split	NA	Prot	pm+pt	NA	Perm	Perm	NA	
Protected Phases	7	7		8	8	8	5	2			6	
Permitted Phases			7				2		2	6		
Actuated Green, G (s)		15.0	15.0	44.0	44.0	44.0	55.0	55.0	55.0	40.4	40.4	
Effective Green, g (s)		16.0	16.0	45.0	45.0	45.0	56.0	56.0	56.0	41.4	41.4	
Actuated g/C Ratio		0.12	0.12	0.34	0.34	0.34	0.42	0.42	0.42	0.31	0.31	
Clearance Time (s)		6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		210	170	557	559	520	214	1433	628	254	997	
v/s Ratio Prot		c0.13		0.32	c0.33	0.01	0.04	0.15			c0.26	
v/s Ratio Perm			0.01				0.16		c0.23	0.09		
v/c Ratio		1.05	0.06	0.95	0.97	0.02	0.47	0.36	0.55	0.30	0.83	
Uniform Delay, d1		58.0	51.3	42.5	42.9	28.9	26.7	25.9	28.6	34.3	42.0	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		75.2	0.1	28.2	32.0	0.1	1.6	0.7	3.5	3.0	7.8	
Delay (s)		133.2	51.5	70.7	74.9	28.9	28.3	26.6	32.1	37.3	49.8	
Level of Service		F	D	E	E	C	C	C	C	D	D	
Approach Delay (s)		111.2			71.6			29.8			48.8	
Approach LOS		F			E			C			D	

Intersection Summary			
HCM 2000 Control Delay	53.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	132.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	102.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥		↰		↱		↑↑	↱	↰	↑↑	
Traffic Volume (vph)	5	11	3	375	0	673	0	678	417	406	1261	0
Future Volume (vph)	5	11	3	375	0	673	0	678	417	406	1261	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0		7.0		3.0		6.0	6.0	3.0	6.0	
Lane Util. Factor		1.00		1.00		1.00		0.95	1.00	1.00	0.95	
Frpb, ped/bikes		0.99		1.00		1.00		1.00	0.97	1.00	1.00	
Flpb, ped/bikes		0.99		0.96		1.00		1.00	1.00	1.00	1.00	
Frt		0.98		1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected		0.99		0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		934		1616		1526		3349	1344	1706	3411	
Flt Permitted		0.99		0.75		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)		934		1267		1526		3349	1344	1706	3411	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	5	11	3	383	0	687	0	692	426	414	1287	0
RTOR Reduction (vph)	0	2	0	0	0	447	0	0	209	0	0	0
Lane Group Flow (vph)	0	17	0	383	0	240	0	692	217	414	1287	0
Confl. Peds. (#/hr)	40		45	45		40	3		4	4		3
Confl. Bikes (#/hr)			2			4			2			5
Heavy Vehicles (%)	100%	91%	100%	8%	0%	7%	0%	9%	5%	7%	7%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	27	0	0	0
Turn Type	Perm	NA		Perm		Over		NA	Perm	Prot	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8					2			
Actuated Green, G (s)		30.8		30.8		21.2		29.0	29.0	21.2	54.2	
Effective Green, g (s)		31.8		31.8		22.2		30.0	30.0	22.2	55.2	
Actuated g/C Ratio		0.32		0.32		0.22		0.30	0.30	0.22	0.55	
Clearance Time (s)		8.0		8.0		4.0		7.0	7.0	4.0	7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		297		402		338		1004	403	378	1882	
v/s Ratio Prot						0.16		0.21		c0.24	c0.38	
v/s Ratio Perm		0.02		c0.30					0.16			
v/c Ratio		0.06		0.95		0.71		0.69	0.54	1.10	0.68	
Uniform Delay, d1		23.7		33.4		35.9		30.9	29.2	38.9	16.1	
Progression Factor		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.1		32.7		6.7		3.9	5.1	74.4	2.0	
Delay (s)		23.8		66.1		42.6		34.8	34.3	113.3	18.2	
Level of Service		C		E		D		C	C	F	B	
Approach Delay (s)		23.8			51.0			34.6			41.3	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	42.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	103.4%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 2031 Future Total Conditions (Do Nothing)
2: Jane St & Sandcliff Rd AM Peak Hour

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑↑	↑↱	
Traffic Volume (veh/h)	9	10	7	1136	1319	4
Future Volume (Veh/h)	9	10	7	1136	1319	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	9	10	7	1159	1346	4
Pedestrians	18				1	
Lane Width (m)	3.7				3.7	
Walking Speed (m/s)	1.1				1.1	
Percent Blockage	2				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				204	105	
pX, platoon unblocked	0.88	0.77	0.77			
vC, conflicting volume	1960	693	1368			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	700	8	884			
tC, single (s)	7.0	6.9	4.7			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.5			
p0 queue free %	97	99	98			
cM capacity (veh/h)	302	817	464			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	19	7	580	580	897	453
Volume Left	9	7	0	0	0	0
Volume Right	10	0	0	0	0	4
cSH	452	464	1700	1700	1700	1700
Volume to Capacity	0.04	0.02	0.34	0.34	0.53	0.27
Queue Length 95th (m)	1.0	0.3	0.0	0.0	0.0	0.0
Control Delay (s)	13.3	12.9	0.0	0.0	0.0	0.0
Lane LOS	B	B				
Approach Delay (s)	13.3	0.1			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Traffic Volume (veh/h)	16	1	41	20	1	108	17	1019	41	140	1187	2
Future Volume (Veh/h)	16	1	41	20	1	108	17	1019	41	140	1187	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	16	1	42	21	1	111	18	1051	42	144	1224	2
Pedestrians		20			9			1			1	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		2			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								114			195	
pX, platoon unblocked	0.86	0.86	0.80	0.86	0.86	0.76	0.80			0.76		
vC, conflicting volume	2207	2671	634	2060	2651	556	1246			1102		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1018	1559	38	847	1536	0	804			491		
tC, single (s)	7.7	8.5	7.0	7.7	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	5.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	85	97	95	87	99	86	97			82		
cM capacity (veh/h)	106	30	796	157	78	812	650			807		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	59	133	18	701	392	144	816	410
Volume Left	16	21	18	0	0	144	0	0
Volume Right	42	111	0	0	42	0	0	2
cSH	248	470	650	1700	1700	807	1700	1700
Volume to Capacity	0.24	0.28	0.03	0.41	0.23	0.18	0.48	0.24
Queue Length 95th (m)	6.8	8.8	0.6	0.0	0.0	4.9	0.0	0.0
Control Delay (s)	23.9	15.6	10.7	0.0	0.0	10.4	0.0	0.0
Lane LOS	C	C	B			B		
Approach Delay (s)	23.9	15.6	0.2			1.1		
Approach LOS	C	C						

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Traffic Volume (veh/h)	18	35	351	16	34	477
Future Volume (Veh/h)	18	35	351	16	34	477
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	38	382	17	37	518
Pedestrians	9					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	1					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						205
pX, platoon unblocked						
vC, conflicting volume	992	400			408	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	992	400			408	
tC, single (s)	6.6	6.6			4.6	
tC, 2 stage (s)						
tF (s)	3.7	3.6			2.7	
p0 queue free %	92	93			96	
cM capacity (veh/h)	244	576			926	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	58	399	555
Volume Left	20	0	37
Volume Right	38	17	0
cSH	392	1700	926
Volume to Capacity	0.15	0.23	0.04
Queue Length 95th (m)	3.9	0.0	0.9
Control Delay (s)	15.8	0.0	1.1
Lane LOS	C		A
Approach Delay (s)	15.8	0.0	1.1
Approach LOS	C		

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		

8: Rockcliffe Blvd & Woolner Ave/Terry Dr

AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	44	94	89	58	33	34	21	289	57	78	388	29
Future Volume (vph)	44	94	89	58	33	34	21	289	57	78	388	29
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	46	99	94	61	35	36	22	304	60	82	408	31

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	239	132	386	521
Volume Left (vph)	46	61	22	82
Volume Right (vph)	94	36	60	31
Hadj (s)	-0.12	0.03	0.04	0.12
Departure Headway (s)	7.0	7.6	6.5	6.3
Degree Utilization, x	0.47	0.28	0.69	0.91
Capacity (veh/h)	479	425	531	521
Control Delay (s)	16.1	13.5	22.7	43.0
Approach Delay (s)	16.1	13.5	22.7	43.0
Approach LOS	C	B	C	E

Intersection Summary			
Delay	28.8		
Level of Service	D		
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↰	↱	
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	91	138	49	23	87	76
Future Volume (vph)	91	138	49	23	87	76
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	100	152	54	25	96	84

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	252	79	180
Volume Left (vph)	100	54	0
Volume Right (vph)	152	0	84
Hadj (s)	-0.24	0.25	-0.22
Departure Headway (s)	4.3	4.9	4.4
Degree Utilization, x	0.30	0.11	0.22
Capacity (veh/h)	796	682	774
Control Delay (s)	9.1	8.6	8.6
Approach Delay (s)	9.1	8.6	8.6
Approach LOS	A	A	A

Intersection Summary			
Delay	8.8		
Level of Service	A		
Intersection Capacity Utilization	36.7%	ICU Level of Service	A
Analysis Period (min)	15		

10: Symes Rd & Hillborn Ave

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	71	15	28	86	26	92
Future Volume (vph)	71	15	28	86	26	92
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	83	17	33	100	30	107

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	100	133	137
Volume Left (vph)	83	0	30
Volume Right (vph)	17	100	0
Hadj (s)	0.20	-0.39	0.20
Departure Headway (s)	4.7	3.9	4.5
Degree Utilization, x	0.13	0.14	0.17
Capacity (veh/h)	719	885	772
Control Delay (s)	8.4	7.6	8.4
Approach Delay (s)	8.4	7.6	8.4
Approach LOS	A	A	A

Intersection Summary			
Delay	8.1		
Level of Service	A		
Intersection Capacity Utilization	24.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	117	2	3	40	2	1
Future Volume (vph)	117	2	3	40	2	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	129	2	3	44	2	1

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	131	47	3
Volume Left (vph)	129	0	2
Volume Right (vph)	2	44	0
Hadj (s)	0.34	-0.28	0.13
Departure Headway (s)	4.3	3.9	4.4
Degree Utilization, x	0.16	0.05	0.00
Capacity (veh/h)	816	877	791
Control Delay (s)	8.2	7.1	7.4
Approach Delay (s)	8.2	7.1	7.4
Approach LOS	A	A	A

Intersection Summary			
Delay	7.9		
Level of Service	A		
Intersection Capacity Utilization	18.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis 2031 Future Total Conditions (Do Nothing)

12: Alliance Ave & Humber Blvd N & Cliff St

AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			↱						✥	
Traffic Volume (veh/h)	52	252	200	75	308	24	0	0	0	2	41	65
Future Volume (Veh/h)	52	252	200	75	308	24	0	0	0	2	41	65
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	55	268	213	80	328	26	0	0	0	2	44	69
Pedestrians		2									15	
Lane Width (m)		3.7									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	369			481			1078	1014	374	1000	1107	358
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	369			481			1078	1014	374	1000	1107	358
tC, single (s)	4.4			4.1			7.1	6.5	6.2	7.6	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.5	4.0	3.3	4.0	4.0	3.4
p0 queue free %	95			92			100	100	100	99	75	89
cM capacity (veh/h)	1049			1066			129	208	676	160	179	656

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	536	434	115
Volume Left	55	80	2
Volume Right	213	26	69
cSH	1049	1066	317
Volume to Capacity	0.05	0.08	0.36
Queue Length 95th (m)	1.3	1.8	12.2
Control Delay (s)	1.4	2.3	22.7
Lane LOS	A	A	C
Approach Delay (s)	1.4	2.3	22.7
Approach LOS			C

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↰	↱
Traffic Volume (veh/h)	254	0	0	313	94	55
Future Volume (Veh/h)	254	0	0	313	94	55
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	299	0	0	368	111	65
Pedestrians	56			2	1	
Lane Width (m)	3.7			3.7	3.7	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	5			0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			300		724	302
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			300		724	302
tC, single (s)			4.1		6.5	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.4
p0 queue free %			100		69	91
cM capacity (veh/h)			1271		362	711

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	299	368	111	65
Volume Left	0	0	111	0
Volume Right	0	0	0	65
cSH	1700	1700	362	711
Volume to Capacity	0.18	0.22	0.31	0.09
Queue Length 95th (m)	0.0	0.0	9.7	2.3
Control Delay (s)	0.0	0.0	19.3	10.6
Lane LOS			C	B
Approach Delay (s)	0.0	0.0	16.1	
Approach LOS			C	

Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	28.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis 2031 Future Total Conditions (Do Nothing)
14: Hilldale Rd & Alliance Ave/Humber Blvd S
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱		✥			↱				
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	213	103	13	0	85	0	64	15	0	0	0
Future Volume (vph)	0	213	103	13	0	85	0	64	15	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	232	112	14	0	92	0	70	16	0	0	0

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total (vph)	232	112	106	86
Volume Left (vph)	0	0	14	0
Volume Right (vph)	0	112	92	16
Hadj (s)	0.12	-0.56	-0.27	0.04
Departure Headway (s)	4.9	4.2	4.3	4.9
Degree Utilization, x	0.32	0.13	0.13	0.12
Capacity (veh/h)	718	826	801	682
Control Delay (s)	9.0	6.7	7.9	8.6
Approach Delay (s)	8.2		7.9	8.6
Approach LOS	A		A	A

Intersection Summary			
Delay	8.2		
Level of Service	A		
Intersection Capacity Utilization	31.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis 2031 Future Total Conditions (Do Nothing)
16: Humber Blvd N & Louvain St AM Peak Hour

	↗	→	←	↖	↘	↙
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		Y	
Traffic Volume (veh/h)	32	277	292	15	12	21
Future Volume (Veh/h)	32	277	292	15	12	21
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	36	315	332	17	14	24
Pedestrians			206		33	
Lane Width (m)			3.7		3.7	
Walking Speed (m/s)			1.1		1.1	
Percent Blockage			19		3	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			333			
pX, platoon unblocked						
vC, conflicting volume	382				966	374
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	382				966	374
tC, single (s)	4.2				6.9	6.3
tC, 2 stage (s)						
tF (s)	2.3				4.0	3.4
p0 queue free %	97				92	96
cM capacity (veh/h)	1104				176	627

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	351	349	38
Volume Left	36	0	14
Volume Right	0	17	24
cSH	1104	1700	322
Volume to Capacity	0.03	0.21	0.12
Queue Length 95th (m)	0.8	0.0	3.0
Control Delay (s)	1.2	0.0	17.7
Lane LOS	A		C
Approach Delay (s)	1.2	0.0	17.7
Approach LOS			C

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	46.1%	ICU Level of Service	A
Analysis Period (min)	15		

17: Avon Ave & Humber Blvd S

AM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Volume (veh/h)	0	178	2	0	61	1
Future Volume (Veh/h)	0	178	2	0	61	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	191	2	0	66	1
Pedestrians					55	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					5	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			246		154	150
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			246		154	150
tC, single (s)			4.1		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			100		91	100
cM capacity (veh/h)			1263		773	855

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	191	2	67
Volume Left	0	2	66
Volume Right	191	0	1
cSH	1700	1263	774
Volume to Capacity	0.11	0.00	0.09
Queue Length 95th (m)	0.0	0.0	2.2
Control Delay (s)	0.0	7.9	10.1
Lane LOS		A	B
Approach Delay (s)	0.0	7.9	10.1
Approach LOS			B

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	25.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis 2031 Future Total Conditions (Do Nothing)
19: Weston Rd & Portor Ave

AM Peak Hour

	↗	↘	↖	↑	↓	↙
Movement	**EBL**	**EBR**	**NBL**	**NBT**	**SBT**	**SBR**
Lane Configurations	Y			↑↑↑	↑↱	
Traffic Volume (veh/h)	29	43	0	1356	1624	68
Future Volume (Veh/h)	29	43	0	1356	1624	68
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	31	45	0	1427	1709	72
Pedestrians	13					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				213	119	
pX, platoon unblocked	0.81	0.77	0.77			
vC, conflicting volume	2234	904	1794			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1410	266	1427			
tC, single (s)	6.8	7.0	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	71	92	100			
cM capacity (veh/h)	106	543	366			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	76	476	476	476	1139	642
Volume Left	31	0	0	0	0	0
Volume Right	45	0	0	0	0	72
cSH	202	1700	1700	1700	1700	1700
Volume to Capacity	0.38	0.28	0.28	0.28	0.67	0.38
Queue Length 95th (m)	12.5	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	33.2	0.0	0.0	0.0	0.0	0.0
Lane LOS	D					
Approach Delay (s)	33.2	0.0			0.0	
Approach LOS	D					

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

2031 Future Total Conditions (Do Nothing)

AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑↑	↑↱	
Traffic Volume (veh/h)	79	38	9	1016	1564	75
Future Volume (Veh/h)	79	38	9	1016	1564	75
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	81	39	9	1037	1596	77
Pedestrians	45			1		
Lane Width (m)	3.7			3.7		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	4			0		
Right turn flare (veh)						
Median type				None	TWLTL	
Median storage veh)					2	
Upstream signal (m)					88	
pX, platoon unblocked	0.72	0.72	0.72			
vC, conflicting volume	2216	882	1718			
vC1, stage 1 conf vol	1680					
vC2, stage 2 conf vol	536					
vCu, unblocked vol	1917	76	1230			
tC, single (s)	6.8	7.0	4.3			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.3			
p0 queue free %	51	94	97			
cM capacity (veh/h)	167	670	357			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	120	9	518	518	1064	609
Volume Left	81	9	0	0	0	0
Volume Right	39	0	0	0	0	77
cSH	220	357	1700	1700	1700	1700
Volume to Capacity	0.54	0.03	0.30	0.30	0.63	0.36
Queue Length 95th (m)	22.1	0.6	0.0	0.0	0.0	0.0
Control Delay (s)	39.3	15.3	0.0	0.0	0.0	0.0
Lane LOS	E	C				
Approach Delay (s)	39.3	0.1			0.0	
Approach LOS	E					

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis 2031 Future Total Conditions (Do Nothing)
22: Avon Ave & Avon Cres
AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		Y	
Traffic Volume (veh/h)	51	22	31	53	95	88
Future Volume (Veh/h)	51	22	31	53	95	88
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	67	29	41	70	125	116
Pedestrians		4	2		46	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		4	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	157				287	126
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	157				287	126
tC, single (s)	4.2				6.4	6.3
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.4
p0 queue free %	95				80	87
cM capacity (veh/h)	1339				638	869

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	96	111	241
Volume Left	67	0	125
Volume Right	0	70	116
cSH	1339	1700	732
Volume to Capacity	0.05	0.07	0.33
Queue Length 95th (m)	1.2	0.0	10.9
Control Delay (s)	5.6	0.0	12.3
Lane LOS	A		B
Approach Delay (s)	5.6	0.0	12.3
Approach LOS			B

Intersection Summary			
Average Delay	7.8		
Intersection Capacity Utilization	29.9%	ICU Level of Service	A
Analysis Period (min)	15		

23: Avon Ave & Portor Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	10	23	30	23	15	44	47	13	49	130	1
Future Volume (vph)	0	10	23	30	23	15	44	47	13	49	130	1
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	0	13	31	40	31	20	59	63	17	65	173	1

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	44	91	139	239
Volume Left (vph)	0	40	59	65
Volume Right (vph)	31	20	17	1
Hadj (s)	-0.42	0.11	0.15	0.14
Departure Headway (s)	4.5	5.0	4.7	4.5
Degree Utilization, x	0.06	0.13	0.18	0.30
Capacity (veh/h)	720	667	738	760
Control Delay (s)	7.8	8.7	8.7	9.5
Approach Delay (s)	7.8	8.7	8.7	9.5
Approach LOS	A	A	A	A

Intersection Summary			
Delay	9.0		
Level of Service	A		
Intersection Capacity Utilization	29.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis 2031 Future Total Conditions (Do Nothing)

1: Jane St & East Dr/Outlook Ave

PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			↰↑	↱	↰	↑↱		↰	↑↱	
Traffic Volume (vph)	39	74	134	23	45	15	122	1019	37	17	1122	66
Future Volume (vph)	39	74	134	23	45	15	122	1019	37	17	1122	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.98			1.00	0.94	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00	1.00	1.00	1.00		0.99	1.00	
Frt		0.93			1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.99			0.98	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1717			1882	1439	1821	3302		1808	3381	
Flt Permitted		0.94			0.85	1.00	0.17	1.00		0.21	1.00	
Satd. Flow (perm)		1630			1622	1439	320	3302		392	3381	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	41	79	143	24	48	16	130	1084	39	18	1194	70
RTOR Reduction (vph)	0	43	0	0	0	12	0	2	0	0	4	0
Lane Group Flow (vph)	0	220	0	0	72	4	130	1121	0	18	1260	0
Confl. Peds. (#/hr)	36		18	18		36	9		25	25		9
Confl. Bikes (#/hr)			1			1			1			3
Heavy Vehicles (%)	0%	1%	0%	0%	0%	7%	0%	5%	0%	0%	3%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	22	0	0	18	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		24.2			24.2	24.2	63.8	63.8		63.8	63.8	
Effective Green, g (s)		25.2			25.2	25.2	64.8	64.8		64.8	64.8	
Actuated g/C Ratio		0.25			0.25	0.25	0.65	0.65		0.65	0.65	
Clearance Time (s)		6.0			6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		410			408	362	207	2139		254	2190	
v/s Ratio Prot								0.34			0.37	
v/s Ratio Perm		c0.13			0.04	0.00	c0.41			0.05		
v/c Ratio		0.54			0.18	0.01	0.63	0.52		0.07	0.58	
Uniform Delay, d1		32.3			29.3	28.1	10.4	9.4		6.5	9.9	
Progression Factor		1.00			1.00	1.00	0.39	0.26		1.00	1.00	
Incremental Delay, d2		1.3			0.2	0.0	10.9	0.7		0.5	1.1	
Delay (s)		33.7			29.5	28.1	15.0	3.2		7.0	11.0	
Level of Service		C			C	C	B	A		A	B	
Approach Delay (s)		33.7			29.2			4.4			10.9	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥		↰	↱		↰	↑↱		↰	↑↱	
Traffic Volume (vph)	1	1	2	139	1	204	4	1001	125	176	1016	1
Future Volume (vph)	1	1	2	139	1	204	4	1001	125	176	1016	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0		6.0	6.0		3.0	6.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.89		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		0.98		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.93		1.00	0.85		1.00	0.98		1.00	1.00	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1741		1807	1379		1823	3288		1772	3423	
Flt Permitted		0.95		0.76	1.00		0.26	1.00		0.13	1.00	
Satd. Flow (perm)		1671		1436	1379		489	3288		245	3423	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	1	1	2	153	1	224	4	1100	137	193	1116	1
RTOR Reduction (vph)	0	2	0	0	141	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	2	0	153	84	0	4	1228	0	193	1117	0
Confl. Peds. (#/hr)	78					78	2		11	11		2
Confl. Bikes (#/hr)						3			2			2
Heavy Vehicles (%)	0%	0%	0%	1%	0%	3%	0%	5%	2%	3%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	5	0	0	18	0	0	17	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		23.2		23.2	23.2		52.1	52.1		63.8	63.8	
Effective Green, g (s)		24.2		24.2	24.2		53.1	53.1		64.8	64.8	
Actuated g/C Ratio		0.24		0.24	0.24		0.53	0.53		0.65	0.65	
Clearance Time (s)		6.0		6.0	6.0		7.0	7.0		4.0	7.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		404		347	333		259	1745		291	2218	
v/s Ratio Prot					0.06			c0.37		c0.06	0.33	
v/s Ratio Perm		0.00		c0.11			0.01			0.37		
v/c Ratio		0.01		0.44	0.25		0.02	0.70		0.66	0.50	
Uniform Delay, d1		28.8		32.2	30.6		11.1	17.6		12.1	9.2	
Progression Factor		1.00		1.00	1.00		1.23	1.33		2.18	0.93	
Incremental Delay, d2		0.0		0.9	0.4		0.1	2.2		4.9	0.7	
Delay (s)		28.8		33.1	31.0		13.8	25.6		31.2	9.3	
Level of Service		C		C	C		B	C		C	A	
Approach Delay (s)		28.8			31.8			25.6			12.5	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

5: Jane St & Haney Ave

PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↱		↰	↑↑	↑↱	
Traffic Volume (vph)	21	2	11	1109	1118	39
Future Volume (vph)	21	2	11	1109	1118	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		0.99	1.00	1.00	
Frt	0.99		1.00	1.00	0.99	
Flt Protected	0.96		0.95	1.00	1.00	
Satd. Flow (prot)	1810		1809	3351	3430	
Flt Permitted	0.96		0.21	1.00	1.00	
Satd. Flow (perm)	1810		397	3351	3430	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	22	2	12	1180	1189	41
RTOR Reduction (vph)	2	0	0	0	1	0
Lane Group Flow (vph)	22	0	12	1180	1229	0
Confl. Peds. (#/hr)	9	22	23			23
Confl. Bikes (#/hr)						3
Heavy Vehicles (%)	0%	0%	0%	5%	2%	3%
Bus Blockages (#/hr)	0	0	0	18	17	0
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	9.8		78.2	78.2	78.2	
Effective Green, g (s)	10.8		79.2	79.2	79.2	
Actuated g/C Ratio	0.11		0.79	0.79	0.79	
Clearance Time (s)	6.0		6.0	6.0	6.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	195		314	2653	2716	
v/s Ratio Prot	c0.01			0.35	c0.36	
v/s Ratio Perm			0.03			
v/c Ratio	0.11		0.04	0.44	0.45	
Uniform Delay, d1	40.3		2.2	3.3	3.4	
Progression Factor	1.00		1.00	1.00	1.28	
Incremental Delay, d2	0.3		0.2	0.5	0.5	
Delay (s)	40.5		2.5	3.9	4.8	
Level of Service	D		A	A	A	
Approach Delay (s)	40.5			3.9	4.8	
Approach LOS	D			A	A	

Intersection Summary

HCM 2000 Control Delay	4.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

6: Rockcliffe Blvd & Alliance Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (vph)	19	185	102	249	206	23	81	250	168	30	182	23
Future Volume (vph)	19	185	102	249	206	23	81	250	168	30	182	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			1.00			0.98			0.99	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.95			0.99			0.95			0.99	
Flt Protected		1.00			0.97			0.99			0.99	
Satd. Flow (prot)		1748			1739			1701			1748	
Flt Permitted		0.96			0.68			0.91			0.90	
Satd. Flow (perm)		1686			1220			1560			1590	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	19	189	104	254	210	23	83	255	171	31	186	23
RTOR Reduction (vph)	0	30	0	0	3	0	0	31	0	0	7	0
Lane Group Flow (vph)	0	282	0	0	484	0	0	478	0	0	234	0
Confl. Peds. (#/hr)	35		20	20		35	25		13	13		25
Confl. Bikes (#/hr)			3			6			8			6
Heavy Vehicles (%)	0%	3%	3%	2%	3%	9%	1%	3%	3%	13%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	7	0	0	5	0	0	7	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		28.0			28.0			20.0			20.0	
Effective Green, g (s)		29.0			29.0			21.0			21.0	
Actuated g/C Ratio		0.48			0.48			0.35			0.35	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		814			589			546			556	
v/s Ratio Prot												
v/s Ratio Perm		0.17			c0.40			c0.31			0.15	
v/c Ratio		0.35			0.82			0.88			0.42	
Uniform Delay, d1		9.6			13.3			18.3			14.9	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.2			12.2			17.7			2.3	
Delay (s)		10.8			25.5			36.0			17.2	
Level of Service		B			C			D			B	
Approach Delay (s)		10.8			25.5			36.0			17.2	
Approach LOS		B			C			D			B	

Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	97.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Weston Rd & Humber Blvd N/Black Creek Dr

2031 Future Total Conditions (Do Nothing)

PM Peak Hour

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱	↰	↰	↱	↰	↑↑	↱	↰	↑↱	
Traffic Volume (vph)	46	201	103	758	241	72	166	673	783	32	670	42
Future Volume (vph)	46	201	103	758	241	72	166	673	783	32	670	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	5.0	5.0	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.99	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1866	1470	1700	1735	1526	1733	3510	1474	1807	3344	
Flt Permitted		0.99	1.00	0.95	0.97	1.00	0.17	1.00	1.00	0.39	1.00	
Satd. Flow (perm)		1866	1470	1700	1735	1526	316	3510	1474	748	3344	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	46	203	104	766	243	73	168	680	791	32	677	42
RTOR Reduction (vph)	0	0	87	0	0	53	0	0	431	0	4	0
Lane Group Flow (vph)	0	249	17	498	511	20	168	680	360	32	715	0
Confl. Peds. (#/hr)	41		1	1		41	50		12	12		50
Confl. Bikes (#/hr)			2			1			9			4
Heavy Vehicles (%)	2%	2%	8%	2%	3%	7%	5%	4%	5%	0%	4%	7%
Bus Blockages (#/hr)	0	0	7	0	0	0	0	0	0	0	15	0
Turn Type	Split	NA	Prot	Split	NA	Prot	pm+pt	NA	Perm	Perm	NA	
Protected Phases	7	7	7	8	8	8	5	2			6	
Permitted Phases							2		2	6		
Actuated Green, G (s)		18.0	18.0	31.0	31.0	31.0	49.0	49.0	49.0	32.7	32.7	
Effective Green, g (s)		19.0	19.0	32.0	32.0	32.0	50.0	50.0	50.0	33.7	33.7	
Actuated g/C Ratio		0.16	0.16	0.28	0.28	0.28	0.43	0.43	0.43	0.29	0.29	
Clearance Time (s)		6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		305	240	468	478	420	298	1512	635	217	971	
v/s Ratio Prot		c0.13	0.01	0.29	c0.29	0.01	0.06	0.19			c0.21	
v/s Ratio Perm							0.18		c0.24	0.04		
v/c Ratio		0.82	0.07	1.06	1.07	0.05	0.56	0.45	0.57	0.15	0.74	
Uniform Delay, d1		46.8	41.0	42.0	42.0	30.8	23.1	23.3	24.9	30.5	37.1	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		15.4	0.1	59.7	60.8	0.2	2.4	1.0	3.6	1.4	5.0	
Delay (s)		62.2	41.2	101.7	102.8	31.0	25.5	24.3	28.5	31.9	42.1	
Level of Service		E	D	F	F	C	C	C	C	C	D	
Approach Delay (s)		56.0			97.5			26.4			41.7	
Approach LOS		E			F			C			D	

Intersection Summary			
HCM 2000 Control Delay	52.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	116.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	103.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣		↰		↱		↑↑	↱	↰	↑↑	
Traffic Volume (vph)	1	11	0	457	0	824	0	773	317	441	1080	0
Future Volume (vph)	1	11	0	457	0	824	0	773	317	441	1080	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0		7.0		3.0		6.0	6.0	3.0	6.0	
Lane Util. Factor		1.00		1.00		1.00		0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00		1.00		1.00		1.00	0.92	1.00	1.00	
Flpb, ped/bikes		1.00		0.95		1.00		1.00	1.00	1.00	1.00	
Frt		1.00		1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected		1.00		0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		996		1674		1570		3444	1379	1772	3544	
Flt Permitted		1.00		0.75		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)		996		1321		1570		3444	1379	1772	3544	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	1	11	0	462	0	832	0	781	320	445	1091	0
RTOR Reduction (vph)	0	0	0	0	0	447	0	0	139	0	0	0
Lane Group Flow (vph)	0	12	0	462	0	385	0	781	181	445	1091	0
Confl. Peds. (#/hr)	23		47	47		23			27	27		
Confl. Bikes (#/hr)						5			5			3
Heavy Vehicles (%)	100%	91%	0%	4%	0%	4%	0%	6%	2%	3%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	15	0	0	0
Turn Type	Perm	NA		Perm		Over		NA	Perm	Prot	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8					2			
Actuated Green, G (s)		31.0		31.0		21.0		29.0	29.0	21.0	54.0	
Effective Green, g (s)		32.0		32.0		22.0		30.0	30.0	22.0	55.0	
Actuated g/C Ratio		0.32		0.32		0.22		0.30	0.30	0.22	0.55	
Clearance Time (s)		8.0		8.0		4.0		7.0	7.0	4.0	7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		318		422		345		1033	413	389	1949	
v/s Ratio Prot						0.25		c0.23		c0.25	0.31	
v/s Ratio Perm		0.01		c0.35					0.13			
v/c Ratio		0.04		1.09		1.12		0.76	0.44	1.14	0.56	
Uniform Delay, d1		23.4		34.0		39.0		31.7	28.2	39.0	14.6	
Progression Factor		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.0		71.9		83.6		5.2	3.4	91.0	1.2	
Delay (s)		23.5		105.9		122.6		36.8	31.6	130.0	15.8	
Level of Service		C		F		F		D	C	F	B	
Approach Delay (s)		23.5			116.6			35.3			48.9	
Approach LOS		C			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	67.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	113.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

2: Jane St & Sandcliff Rd

PM Peak Hour

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑↑	↑↱	
Traffic Volume (veh/h)	1	16	21	1177	1272	7
Future Volume (Veh/h)	1	16	21	1177	1272	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	17	23	1279	1383	8
Pedestrians	9				3	
Lane Width (m)	3.7				3.7	
Walking Speed (m/s)	1.1				1.1	
Percent Blockage	1				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				204	105	
pX, platoon unblocked	0.86	0.79	0.79			
vC, conflicting volume	2084	704	1400			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	854	101	979			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	96			
cM capacity (veh/h)	247	739	560			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	18	23	640	640	922	469
Volume Left	1	23	0	0	0	0
Volume Right	17	0	0	0	0	8
cSH	665	560	1700	1700	1700	1700
Volume to Capacity	0.03	0.04	0.38	0.38	0.54	0.28
Queue Length 95th (m)	0.6	1.0	0.0	0.0	0.0	0.0
Control Delay (s)	10.6	11.7	0.0	0.0	0.0	0.0
Lane LOS	B	B				
Approach Delay (s)	10.6	0.2			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↑↱		↰	↑↱	
Traffic Volume (veh/h)	6	4	35	20	2	83	62	1109	35	127	1138	23
Future Volume (Veh/h)	6	4	35	20	2	83	62	1109	35	127	1138	23
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	4	38	22	2	90	67	1205	38	138	1237	25
Pedestrians		24			38			1			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		2			4			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								114			195	
pX, platoon unblocked	0.83	0.83	0.81	0.83	0.83	0.74	0.81			0.74		
vC, conflicting volume	2380	2964	656	2332	2958	662	1286			1281		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1237	1942	116	1179	1934	0	891			665		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	90	89	95	71	95	88	89			79		
cM capacity (veh/h)	68	36	731	76	37	772	601			663		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	49	114	67	803	440	138	825	437
Volume Left	7	22	67	0	0	138	0	0
Volume Right	38	90	0	0	38	0	0	25
cSH	185	248	601	1700	1700	663	1700	1700
Volume to Capacity	0.26	0.46	0.11	0.47	0.26	0.21	0.49	0.26
Queue Length 95th (m)	7.8	17.1	2.8	0.0	0.0	5.9	0.0	0.0
Control Delay (s)	31.3	31.2	11.7	0.0	0.0	11.9	0.0	0.0
Lane LOS	D	D	B			B		
Approach Delay (s)	31.3	31.2	0.6			1.2		
Approach LOS	D	D						

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	59.1%	ICU Level of Service	B
Analysis Period (min)	15		

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Traffic Volume (veh/h)	12	19	480	14	14	519
Future Volume (Veh/h)	12	19	480	14	14	519
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	13	21	527	15	15	570
Pedestrians	8					1
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						205
pX, platoon unblocked						
vC, conflicting volume	1142	544			550	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1142	544			550	
tC, single (s)	6.5	6.4			4.5	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.6	
p0 queue free %	94	96			98	
cM capacity (veh/h)	210	509			837	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	34	542	585
Volume Left	13	0	15
Volume Right	21	15	0
cSH	330	1700	837
Volume to Capacity	0.10	0.32	0.02
Queue Length 95th (m)	2.6	0.0	0.4
Control Delay (s)	17.2	0.0	0.5
Lane LOS	C		A
Approach Delay (s)	17.2	0.0	0.5
Approach LOS	C		

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis 2031 Future Total Conditions (Do Nothing)

8: Rockcliffe Blvd & Woolner Ave/Terry Dr

PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	42	48	31	53	75	110	53	342	69	67	414	50
Future Volume (vph)	42	48	31	53	75	110	53	342	69	67	414	50
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	44	51	33	56	79	116	56	360	73	71	436	53

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	128	251	489	560
Volume Left (vph)	44	56	56	71
Volume Right (vph)	33	116	73	53
Hadj (s)	-0.03	-0.22	-0.03	-0.01
Departure Headway (s)	8.1	7.3	6.6	6.5
Degree Utilization, x	0.29	0.51	0.89	1.02
Capacity (veh/h)	405	466	534	544
Control Delay (s)	14.3	17.8	41.9	68.2
Approach Delay (s)	14.3	17.8	41.9	68.2
Approach LOS	B	C	E	F

Intersection Summary			
Delay	45.5		
Level of Service	E		
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		

9: Symes Rd & Terry Dr

PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↰	↱	
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	81	103	155	90	61	83
Future Volume (vph)	81	103	155	90	61	83
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	84	107	161	94	64	86

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	191	255	150
Volume Left (vph)	84	161	0
Volume Right (vph)	107	0	86
Hadj (s)	-0.23	0.14	-0.33
Departure Headway (s)	4.6	4.7	4.3
Degree Utilization, x	0.24	0.33	0.18
Capacity (veh/h)	723	738	778
Control Delay (s)	9.1	10.0	8.3
Approach Delay (s)	9.1	10.0	8.3
Approach LOS	A	A	A

Intersection Summary			
Delay	9.3		
Level of Service	A		
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱			↰↑
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	79	6	91	80	13	65
Future Volume (vph)	79	6	91	80	13	65
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	92	7	106	93	15	76

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	99	199	91
Volume Left (vph)	92	0	15
Volume Right (vph)	7	93	0
Hadj (s)	0.16	-0.27	0.06
Departure Headway (s)	4.7	4.0	4.4
Degree Utilization, x	0.13	0.22	0.11
Capacity (veh/h)	717	877	782
Control Delay (s)	8.4	8.1	8.0
Approach Delay (s)	8.4	8.1	8.0
Approach LOS	A	A	A

Intersection Summary			
Delay	8.1		
Level of Service	A		
Intersection Capacity Utilization	25.9%	ICU Level of Service	A
Analysis Period (min)	15		

11: Symes Rd & Orman Ave

PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	72	1	2	95	1	6
Future Volume (vph)	72	1	2	95	1	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	82	1	2	108	1	7

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	83	110	8
Volume Left (vph)	82	0	1
Volume Right (vph)	1	108	0
Hadj (s)	0.21	-0.59	0.03
Departure Headway (s)	4.3	3.5	4.2
Degree Utilization, x	0.10	0.11	0.01
Capacity (veh/h)	807	992	829
Control Delay (s)	7.8	6.9	7.3
Approach Delay (s)	7.8	6.9	7.3
Approach LOS	A	A	A

Intersection Summary			
Delay	7.3		
Level of Service	A		
Intersection Capacity Utilization	17.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis 2031 Future Total Conditions (Do Nothing)
12: Alliance Ave & Humber Blvd N & Cliff St

PM Peak Hour

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			↱						✥	
Traffic Volume (veh/h)	47	261	105	74	445	15	0	0	0	2	7	33
Future Volume (Veh/h)	47	261	105	74	445	15	0	0	0	2	7	33
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	49	275	111	78	468	16	0	0	0	2	7	35
Pedestrians		1			2			1			13	
Lane Width (m)		3.7			3.7			0.0			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	497			387			1101	1082	334	1076	1130	490
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	497			387			1101	1082	334	1076	1130	490
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			93			100	100	100	99	96	94
cM capacity (veh/h)	1000			1183			158	192	712	178	180	569

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	435	562	44
Volume Left	49	78	2
Volume Right	111	16	35
cSH	1000	1183	394
Volume to Capacity	0.05	0.07	0.11
Queue Length 95th (m)	1.2	1.6	2.8
Control Delay (s)	1.5	1.8	15.3
Lane LOS	A	A	C
Approach Delay (s)	1.5	1.8	15.3
Approach LOS			C

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↰	↱
Traffic Volume (veh/h)	263	0	0	454	80	96
Future Volume (Veh/h)	263	0	0	454	80	96
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	306	0	0	528	93	112
Pedestrians	24			2	1	
Lane Width (m)	3.7			3.7	3.7	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	2			0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			307		859	309
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			307		859	309
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		71	85
cM capacity (veh/h)			1264		322	734

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	306	528	93	112
Volume Left	0	0	93	0
Volume Right	0	0	0	112
cSH	1700	1700	322	734
Volume to Capacity	0.18	0.31	0.29	0.15
Queue Length 95th (m)	0.0	0.0	8.9	4.1
Control Delay (s)	0.0	0.0	20.7	10.8
Lane LOS			C	B
Approach Delay (s)	0.0	0.0	15.3	
Approach LOS			C	

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	35.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis 2031 Future Total Conditions (Do Nothing)
14: Hilldale Rd & Alliance Ave/Humber Blvd S

PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱		✥			↱				
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	101	85	19	0	84	0	92	23	0	0	0
Future Volume (vph)	0	101	85	19	0	84	0	92	23	0	0	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	112	94	21	0	93	0	102	26	0	0	0

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total (vph)	112	94	114	128
Volume Left (vph)	0	0	21	0
Volume Right (vph)	0	94	93	26
Hadj (s)	0.05	-0.68	-0.45	-0.12
Departure Headway (s)	4.9	4.2	4.1	4.5
Degree Utilization, x	0.15	0.11	0.13	0.16
Capacity (veh/h)	708	824	840	759
Control Delay (s)	7.6	6.5	7.7	8.3
Approach Delay (s)	7.1		7.7	8.3
Approach LOS	A		A	A

Intersection Summary			
Delay	7.6		
Level of Service	A		
Intersection Capacity Utilization	25.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		Y	
Traffic Volume (veh/h)	17	342	443	6	8	11
Future Volume (Veh/h)	17	342	443	6	8	11
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	19	376	487	7	9	12
Pedestrians			33		19	
Lane Width (m)			3.7		3.7	
Walking Speed (m/s)			1.1		1.1	
Percent Blockage			3		2	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			333			
pX, platoon unblocked						
vC, conflicting volume	513				956	510
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	513				956	510
tC, single (s)	4.1				7.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				4.4	3.3
p0 queue free %	98				95	98
cM capacity (veh/h)	1044				182	558

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	395	494	21
Volume Left	19	0	9
Volume Right	0	7	12
cSH	1044	1700	295
Volume to Capacity	0.02	0.29	0.07
Queue Length 95th (m)	0.4	0.0	1.7
Control Delay (s)	0.6	0.0	18.1
Lane LOS	A		C
Approach Delay (s)	0.6	0.0	18.1
Approach LOS			C

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	41.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis — 2031 Future Total Conditions (Do Nothing)

17: Avon Ave & Humber Blvd S — PM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↖↗	
Traffic Volume (veh/h)	2	77	3	1	70	2
Future Volume (Veh/h)	2	77	3	1	70	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	2	92	4	1	83	2
Pedestrians					7	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			101		64	55
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			101		64	55
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		91	100
cM capacity (veh/h)			1494		931	1011

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	94	5	85
Volume Left	0	4	83
Volume Right	92	0	2
cSH	1700	1494	932
Volume to Capacity	0.06	0.00	0.09
Queue Length 95th (m)	0.0	0.1	2.3
Control Delay (s)	0.0	5.9	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	5.9	9.2
Approach LOS			A

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	17.9%	ICU Level of Service	A
Analysis Period (min)	15		

19: Weston Rd & Portor Ave

PM Peak Hour

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑↑↑	↑↱	
Traffic Volume (veh/h)	24	30	0	1598	1491	40
Future Volume (Veh/h)	24	30	0	1598	1491	40
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	24	31	0	1631	1521	41
Pedestrians	32					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	3					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				213	119	
pX, platoon unblocked	0.88	0.81	0.81			
vC, conflicting volume	2117	813	1594			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1157	315	1274			
tC, single (s)	6.8	7.0	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	94	100			
cM capacity (veh/h)	164	536	436			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	55	544	544	544	1014	548
Volume Left	24	0	0	0	0	0
Volume Right	31	0	0	0	0	41
cSH	269	1700	1700	1700	1700	1700
Volume to Capacity	0.20	0.32	0.32	0.32	0.60	0.32
Queue Length 95th (m)	5.7	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	21.8	0.0	0.0	0.0	0.0	0.0
Lane LOS	C					
Approach Delay (s)	21.8	0.0			0.0	
Approach LOS	C					

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑↑	↑↱	
Traffic Volume (veh/h)	20	17	5	1070	1480	57
Future Volume (Veh/h)	20	17	5	1070	1480	57
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	20	17	5	1092	1510	58
Pedestrians	43				1	
Lane Width (m)	3.7				3.7	
Walking Speed (m/s)	1.1				1.1	
Percent Blockage	4				0	
Right turn flare (veh)						
Median type				None	TWLTL	
Median storage veh)					2	
Upstream signal (m)					88	
pX, platoon unblocked	0.80	0.80	0.80			
vC, conflicting volume	2139	827	1611			
vC1, stage 1 conf vol	1582					
vC2, stage 2 conf vol	557					
vCu, unblocked vol	1919	272	1256			
tC, single (s)	6.9	7.0	4.5			
tC, 2 stage (s)	5.9					
tF (s)	3.5	3.4	2.4			
p0 queue free %	88	97	99			
cM capacity (veh/h)	168	546	352			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	37	5	546	546	1007	561
Volume Left	20	5	0	0	0	0
Volume Right	17	0	0	0	0	58
cSH	247	352	1700	1700	1700	1700
Volume to Capacity	0.15	0.01	0.32	0.32	0.59	0.33
Queue Length 95th (m)	3.9	0.3	0.0	0.0	0.0	0.0
Control Delay (s)	22.2	15.4	0.0	0.0	0.0	0.0
Lane LOS	C	C				
Approach Delay (s)	22.2	0.1			0.0	
Approach LOS	C					

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		

22: Avon Ave & Avon Cres

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		⤶⤷	
Traffic Volume (veh/h)	49	12	37	25	25	53
Future Volume (Veh/h)	49	12	37	25	25	53
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	61	15	46	31	31	66
Pedestrians		1			9	
Lane Width (m)		3.7			3.7	
Walking Speed (m/s)		1.1			1.1	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	86				208	72
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	86				208	72
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				96	93
cM capacity (veh/h)	1510				739	982

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	76	77	97
Volume Left	61	0	31
Volume Right	0	31	66
cSH	1510	1700	888
Volume to Capacity	0.04	0.05	0.11
Queue Length 95th (m)	1.0	0.0	2.8
Control Delay (s)	6.1	0.0	9.5
Lane LOS	A		A
Approach Delay (s)	6.1	0.0	9.5
Approach LOS			A

Intersection Summary			
Average Delay	5.5		
Intersection Capacity Utilization	21.7%	ICU Level of Service	A
Analysis Period (min)	15		

23: Avon Ave & Portor Ave

PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	3	1	10	25	0	15	3	54	17	36	43	1
Future Volume (vph)	3	1	10	25	0	15	3	54	17	36	43	1
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	4	1	12	29	0	18	4	64	20	42	51	1

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	17	47	88	94
Volume Left (vph)	4	29	4	42
Volume Right (vph)	12	18	20	1
Hadj (s)	-0.38	-0.11	-0.08	0.15
Departure Headway (s)	4.0	4.2	4.1	4.3
Degree Utilization, x	0.02	0.05	0.10	0.11
Capacity (veh/h)	858	816	860	823
Control Delay (s)	7.0	7.5	7.5	7.8
Approach Delay (s)	7.0	7.5	7.5	7.8
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.6		
Level of Service	A		
Intersection Capacity Utilization	24.5%	ICU Level of Service	A
Analysis Period (min)	15		

Queues

2031 Future Total Conditions (Do Nothing)

1: Jane St & East Dr/Outlook Ave

AM Peak Hour

	→	←	↖	↖	↑	↘	↓
Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	258	67	14	45	1124	16	1229
v/c Ratio	0.60	0.16	0.04	0.21	0.55	0.07	0.62
Control Delay	31.7	29.6	3.2	3.8	3.1	8.1	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.7	29.6	3.2	3.8	3.1	8.1	12.4
Queue Length 50th (m)	34.6	10.2	0.0	0.6	8.2	1.0	65.5
Queue Length 95th (m)	58.1	20.1	1.8	m1.4	14.0	4.0	93.6
Internal Link Dist (m)	151.9	119.5			80.9		170.1
Turn Bay Length (m)			30.0	55.0		50.0	
Base Capacity (vph)	478	483	441	215	2048	224	1985
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.14	0.03	0.21	0.55	0.07	0.62

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

4: Jane St & Alliance Ave

	→	↙	←	↑	↘	↓
Lane Group	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	7	102	93	1132	199	1074
v/c Ratio	0.02	0.33	0.25	0.67	0.61	0.53
Control Delay	29.3	35.0	8.8	23.9	21.4	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.3	35.0	8.8	23.9	21.4	10.2
Queue Length 50th (m)	1.0	16.4	0.3	104.0	16.1	43.0
Queue Length 95th (m)	4.5	31.3	12.3	133.5	40.2	71.2
Internal Link Dist (m)	144.7		50.9	238.8		90.1
Turn Bay Length (m)		45.0			45.0	
Base Capacity (vph)	429	323	383	1682	328	2034
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.32	0.24	0.67	0.61	0.53

Intersection Summary

5: Jane St & Haney Ave

	↗	↖	↑	↓
Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	42	3	1107	1188
v/c Ratio	0.21	0.01	0.40	0.45
Control Delay	36.1	4.0	3.8	4.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	36.1	4.0	3.8	4.8
Queue Length 50th (m)	6.7	0.1	23.4	14.0
Queue Length 95th (m)	14.3	1.1	62.2	99.4
Internal Link Dist (m)	123.4		130.8	238.8
Turn Bay Length (m)		45.0		
Base Capacity (vph)	398	276	2783	2655
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.11	0.01	0.40	0.45

Intersection Summary

Queues

6: Rockcliffe Blvd & Alliance Ave

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	457	404	406	289
v/c Ratio	0.56	0.93	0.76	0.57
Control Delay	12.7	47.6	25.5	20.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.7	47.6	25.5	20.8
Queue Length 50th (m)	28.5	37.5	30.3	24.4
Queue Length 95th (m)	51.7	#89.5	#71.9	45.5
Internal Link Dist (m)	48.8	220.5	180.4	136.1
Turn Bay Length (m)				
Base Capacity (vph)	819	434	532	504
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.56	0.93	0.76	0.57

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues

2031 Future Total Conditions (Do Nothing)

18: Weston Rd & Humber Blvd N/Black Creek Dr

AM Peak Hour

	→	↘	↙	←	↖	↖	↑	↗	↘	↓
Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	220	81	531	544	31	101	523	819	76	825
v/c Ratio	1.05	0.31	0.95	0.97	0.05	0.46	0.36	0.74	0.30	0.83
Control Delay	130.3	7.4	71.0	75.1	0.2	29.4	26.8	6.5	39.4	50.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	130.3	7.4	71.0	75.1	0.2	29.4	26.8	6.5	39.4	50.4
Queue Length 50th (m)	~62.0	0.0	141.6	146.5	0.0	15.5	48.1	0.0	15.0	104.4
Queue Length 95th (m)	#111.8	8.3	#214.6	#222.1	0.0	27.0	62.2	29.5	30.4	#145.1
Internal Link Dist (m)	309.3			193.0			94.9			190.2
Turn Bay Length (m)		25.0			40.0	85.0			45.0	
Base Capacity (vph)	210	264	557	559	590	274	1433	1100	255	999
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.05	0.31	0.95	0.97	0.05	0.37	0.36	0.74	0.30	0.83

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues

20: Weston Rd & Rogers Rd

	→	↙	↖	↑	↗	↘	↓
Lane Group	EBT	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	19	383	687	692	426	414	1287
v/c Ratio	0.06	0.95	0.87	0.69	0.70	1.10	0.68
Control Delay	21.8	69.2	20.7	35.1	16.2	112.2	18.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.8	69.2	20.7	35.1	16.2	112.2	18.5
Queue Length 50th (m)	2.1	71.8	18.4	62.0	19.9	~91.8	89.5
Queue Length 95th (m)	7.4	#127.9	#92.0	81.9	56.5	#148.6	113.0
Internal Link Dist (m)	25.5			64.0			188.7
Turn Bay Length (m)					30.0	60.0	
Base Capacity (vph)	300	405	786	1004	611	378	1883
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.95	0.87	0.69	0.70	1.10	0.68

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
1: Jane St & East Dr/Outlook Ave

2031 Future Total Conditions (Do Nothing)
PM Peak Hour

Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	263	72	16	130	1123	18	1264
v/c Ratio	0.58	0.18	0.04	0.63	0.52	0.07	0.58
Control Delay	31.0	30.6	4.3	17.1	3.2	7.5	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.0	30.6	4.3	17.1	3.2	7.5	11.1
Queue Length 50th (m)	34.8	11.0	0.0	2.8	12.1	1.2	64.3
Queue Length 95th (m)	59.6	22.0	2.5	m6.6	18.9	4.0	84.4
Internal Link Dist (m)	151.9	119.5			80.9		170.1
Turn Bay Length (m)			30.0	55.0		50.0	
Base Capacity (vph)	466	421	398	207	2141	253	2195
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.17	0.04	0.63	0.52	0.07	0.58

Intersection Summary
m Volume for 95th percentile queue is metered by upstream signal.

Queues
4: Jane St & Alliance Ave

	→	↙	←	↖	↑	↘	↓
Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	4	153	225	4	1237	193	1117
v/c Ratio	0.01	0.44	0.47	0.02	0.70	0.65	0.50
Control Delay	23.5	36.9	11.2	14.2	25.7	26.7	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.5	36.9	11.2	14.2	25.7	26.7	9.5
Queue Length 50th (m)	0.3	25.3	5.9	0.5	123.4	17.4	46.6
Queue Length 95th (m)	3.0	43.7	25.9	m1.2	154.1	#43.0	65.4
Internal Link Dist (m)	147.5		56.2		238.8		90.1
Turn Bay Length (m)		45.0		35.0		45.0	
Base Capacity (vph)	419	359	484	260	1756	298	2218
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.43	0.46	0.02	0.70	0.65	0.50

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

5: Jane St & Haney Ave

	↗	↖	↑	↓
Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	24	12	1180	1230
v/c Ratio	0.10	0.04	0.42	0.43
Control Delay	32.7	5.1	5.0	6.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	32.7	5.1	5.0	6.2
Queue Length 50th (m)	4.1	0.3	24.3	24.3
Queue Length 95th (m)	9.9	2.5	66.7	101.5
Internal Link Dist (m)	123.4		130.8	238.8
Turn Bay Length (m)		45.0		
Base Capacity (vph)	417	333	2801	2868
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.06	0.04	0.42	0.43

Intersection Summary

6: Rockcliffe Blvd & Alliance Ave

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	312	487	509	240
v/c Ratio	0.37	0.82	0.88	0.43
Control Delay	9.3	27.8	37.3	17.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.3	27.8	37.3	17.2
Queue Length 50th (m)	15.8	42.2	46.9	18.8
Queue Length 95th (m)	30.4	#93.8	#98.6	35.3
Internal Link Dist (m)	41.3	216.8	180.4	136.1
Turn Bay Length (m)				
Base Capacity (vph)	844	593	576	563
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.37	0.82	0.88	0.43

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
2031 Future Total Conditions (Do Nothing)

18: Weston Rd & Humber Blvd N/Black Creek Dr
PM Peak Hour

	→	↘	↙	←	↖	↖	↑	↗	↘	↓
Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	249	104	498	511	73	168	680	791	32	719
v/c Ratio	0.82	0.30	1.06	1.07	0.14	0.56	0.45	0.74	0.15	0.74
Control Delay	68.3	7.6	100.0	101.4	1.6	27.1	24.5	7.2	34.4	42.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.3	7.6	100.0	101.4	1.6	27.1	24.5	7.2	34.4	42.8
Queue Length 50th (m)	54.6	0.0	~134.9	~139.0	0.0	22.8	56.2	4.4	5.4	77.1
Queue Length 95th (m)	#91.9	10.9	#202.1	#206.2	2.4	37.1	72.2	39.3	14.3	#103.9
Internal Link Dist (m)	309.3			193.0			94.9			190.2
Turn Bay Length (m)		25.0			40.0	85.0			45.0	
Base Capacity (vph)	321	354	469	479	509	347	1512	1066	217	975
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.29	1.06	1.07	0.14	0.48	0.45	0.74	0.15	0.74

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

	→	↙	↖	↑	↗	↘	↓
Lane Group	EBT	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	12	462	832	781	320	445	1091
v/c Ratio	0.04	1.09	1.05	0.76	0.58	1.14	0.56
Control Delay	24.0	105.9	59.5	37.3	15.9	128.0	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	105.9	59.5	37.3	15.9	128.0	16.0
Queue Length 50th (m)	1.6	~101.6	~82.7	71.8	18.2	~101.4	68.3
Queue Length 95th (m)	5.6	#160.5	#154.3	93.4	46.1	#159.4	86.3
Internal Link Dist (m)	25.5			64.0			188.7
Turn Bay Length (m)					30.0	60.0	
Base Capacity (vph)	318	422	792	1033	552	389	1949
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	1.09	1.05	0.76	0.58	1.14	0.56

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Appendix H: Future (2031) Total MOE Summary Tables - Scenario 2

Table H-1: Future (2031) Intersection Operations Summary (Scenario 2 – with improvement + LRT)

Intersection / Movement	Weekday AM Peak Hour			Weekday PM Peak Hour			Available Storage Length (m)
	v/c	LOS (Delay in seconds)	95th Percentile Queue Length (m)	v/c	LOS (Delay in seconds)	95th Percentile Queue Length (m)	
Jane Street / East Drive & Outlook Avenue							
Overall	0.68	C (21)	-	0.73	C (30)	-	-
EBLTR	0.56	D (40)	68	0.53	D (39)	67	225
WBLT	0.15	C (34)	23	0.17	C (34)	24	80
WBR	0.01	C (33)	<7	0.01	C (33)	<7	30
NBL	0.59	**E (68)**	21	0.84	**E (68)**	62	55
NBTR	0.60	A (8)	33	0.58	B (16)	68	90
SBL	0.40	**E (64)**	11	0.40	**E (63)**	12	50
SBTR	0.73	C (24)	155	0.80	C (32)	172	215
Jane Street / Sandcliff Road							
Overall	-	A (-)	-	-	A (-)	-	-
EBR	0.03	A (9)	<7	0.02	B (10)	<7	125
NBT	0.35	A (-)	<7	0.40	A (-)	<7	80
SBTR	0.53	A (-)	<7	0.57	A (-)	<7	85
Jane Street / Black Creek Boulevard & Dalrymple Drive							
Overall	-	A (-)	-	-	A (-)	-	-
EBR	0.08	B (10)	<7	0.07	B (10)	<7	120
WBR	0.16	B (11)	<7	0.14	B (11)	<7	180
NBTR	0.43	A (-)	<7	0.50	A (-)	<7	100
SBTR	0.54	A (-)	<7	0.54	A (-)	<7	80
Jane Street / Alliance Avenue							
Overall	0.77	D (43)	-	0.80	D (41)	-	-
EBLTR	0.01	C (31)	<7	0.01	C (31)	<7	20
WBL	0.34	C (34)	27	0.44	D (35)	43	45
WBTR	0.08	C (34)	<7	0.16	D (39)	9	430
NBL	-	-	-	0.13	**E (64)**	<7	35
NBTR	**0.98**	**E (55)**	187	**0.98**	D (49)	201	225
SBL	**0.96**	**F (81)**	153	**0.95**	**F (84)**	134	45
SBTR	0.54	B (19)	108	0.56	C (20)	97	100
Jane Street / Haney Avenue							
Overall	0.48	A (5)	-	0.44	A (7)	-	-
EBLR	0.21	D (50)	15	0.07	D (42)	10	70
NBL	0.14	**E (61)**	<7	0.27	**E (61)**	9	45
NBT	0.42	A (4)	88	0.48	A (7)	95	80
SBTR	0.51	A (5)	131	0.53	A (6)	25	225
Rockcliffe Boulevard / Alliance Avenue							

Intersection / Movement	**Weekday AM Peak Hour**			**Weekday PM Peak Hour**			**Available Storage Length (m)**
	v/c	**LOS (Delay in seconds)**	**95th Percentile Queue Length (m)**	**v/c**	**LOS (Delay in seconds)**	**95th Percentile Queue Length (m)**	
Overall	0.85	C (26)	-	0.84	C (25)	-	-
EBLTR	0.54	B (14)	52	0.35	B (11)	30	500
WBLTR	**0.93**	D (43)	90	0.82	C (26)	94	450
NBLTR	0.74	C (27)	72	**0.88**	D (36)	99	190
SBLTR	0.57	C (21)	46	0.42	B (17)	35	155
Rockcliffe Boulevard / Rockcliffe Court							
Overall	-	A (-)	-	-	A (-)	-	-
WBLR	0.15	C (16)	<7	0.10	C (17)	<7	110
NBTR	0.23	A (-)	<7	0.32	A (-)	<7	260
SBLT	0.04	A (1)	<7	0.02	A (1)	<7	190
Rockcliffe Boulevard / Terry Drive and Woolner Avenue							
Overall	-	C (29)	-	-	**E (46)**	-	-
EBLTR	0.47	C (16)	-	0.29	B (14)	-	200
WBLTR	0.28	B (14)	-	0.51	C (18)	-	555
NBLTR	0.69	C (23)	-	**0.89**	**E (42)**	-	105
SBLTR	**0.91**	**E (43)**	-	**1.02**	**F (68)**	-	260
Symes Road / Terry Drive							
Overall	-	A (9)	-	-	A (9)	-	
EBLR	0.30	A (9)	-	0.24	A (9)	-	555
NBLT	0.11	A (9)	-	0.33	A (10)	-	225
SBTR	0.22	A (9)	-	0.18	A (8)	-	75
Symes Road / Hillborn Avenue							
Overall	-	A (8)	-	-	A (8)	-	
WBLR	0.13	A (8)	-	0.13	A (8)	-	180
NBTR	0.14	A (8)	-	0.22	A (8)	-	75
SBLT	0.17	A (8)	-	0.11	A (8)	-	55
Symes Road / Orman Avenue							
Overall	-	A (8)	-	-	A (7)	-	
WBLR	0.16	A (8)	-	0.10	A (8)	-	25
NBTR	0.05	A (7)	-	0.11	A (7)	-	55
SBLT	0.00	A (7)	-	0.01	A (7)	-	20
Cliff Street / Alliance Avenue / Humber Boulevard N							
Overall	-	A (4)	-	-	A (2)	-	
EBLTR	0.05	A (1)	<7	0.05	A (1)	<7	450
WBTR	0.08	A (2)	<7	0.07	A (2)	<7	55
SBLTR	0.36	C (23)	12	0.11	C (15)	<7	150
Humber Boulevard N / Hilldale Road							
Overall	-	A (3)	-	-	A (3)	-	-

Intersection / Movement	Weekday AM Peak Hour			Weekday PM Peak Hour			Available Storage Length (m)
	v/c	LOS (Delay in seconds)	95th Percentile Queue Length (m)	v/c	LOS (Delay in seconds)	95th Percentile Queue Length (m)	
EBT	0.18	A (-)	<7	0.18	A (-)	<7	55
WBT	0.22	A (-)	<7	0.31	A (-)	<7	200
NBL	0.31	C (19)	10	0.29	C (21)	9	15
NBR	0.09	B (11)	<7	0.15	B (11)	<7	15
Alliance Avenue / Humber Boulevard S / Hilldale Road							
Overall	-	A (8)	-	-	A (8)	-	-
EBT	0.32	A (9)	-	0.15	A (8)	-	70
EBR	0.13	A (7)	-	0.11	A (7)	-	70
WBLR	0.13	A (8)	-	0.13	A (8)	-	430
NBTR	0.13	A (9)	-	0.16	A (8)	-	380
Humber Boulevard N / Louvain Street							
Overall	-	A (1)	-	-	A (1)	-	-
EBLT	0.03	A (1)	<7	0.02	A (1)	<7	200
WBTR	0.21	A (-)	<7	0.29	A (-)	<7	310
SBLR	0.12	C (18)	<7	0.07	C (18)	<7	70
Humber Boulevard S / Avon Avenue							
Overall	-	A (3)	-	-	A (4)	-	-
EBTR	0.11	A (-)	<7	0.06	A (-)	<7	430
WBLT	0.00	A (8)	<7	0.00	A (6)	<7	75
NBLR	0.09	B (10)	<7	0.09	A (9)	<7	70
Humber Boulevard N / Black Creek Drive and Weston Road							
Overall	**0.90**	D (53)	-	**0.85**	D (52)	-	-
EBLT	**1.05**	**F (133)**	112	0.82	**E (62)**	92	310
EBR	0.06	D (52)	8	0.07	D (41)	11	25
WBL	**0.95**	**E (71)**	215	**1.06**	**F (102)**	202	270
WBT	**0.97**	**E (75)**	222	**1.07**	**F (103)**	206	270
WBR	0.02	C (29)	<7	0.05	C (31)	<7	270
NBL	0.47	C (28)	27	0.56	C (26)	37	85
NBT	0.36	C (27)	62	0.45	C (24)	72	310
NBR	0.55	C (32)	30	0.57	C (29)	39	310
SBL	0.30	D (37)	30	0.15	C (32)	14	45
SBTR	0.83	D (50)	**145**	0.74	D (42)	**104**	65
Weston Road / Porter Avenue							
Overall	-	A (-)	-	-	A (-)	-	-
EBLR	0.38	D (33)	13	0.20	C (22)	22	90
NBT	0.28	A (-)	<7	0.32	A (-)	<7	185
SBTR	0.67	A (-)	<7	0.60	A (-)	<7	115
Weston Road / Rogers Road							

Intersection / Movement	Weekday AM Peak Hour			Weekday PM Peak Hour			Available Storage Length (m)
	v/c	LOS (Delay in seconds)	95th Percentile Queue Length (m)	v/c	LOS (Delay in seconds)	95th Percentile Queue Length (m)	
Overall	**0.92**	D (42)	-	**1.00**	**E (67)**	-	-
EBLTR	0.06	C (24)	7	0.04	C (24)	<7	10
WBL	**0.95**	**E (66)**	128	**1.09**	**F (106)**	161	175
WBR	0.71	D (43)	92	**1.12**	**F (123)**	154	175
NBT	0.69	C (35)	82	0.76	D (37)	93	340
NBR	0.54	C (34)	57	0.44	C (32)	46	340
SBL	**1.10**	**F (113)**	**149**	**1.14**	**F (130)**	**159**	60
SBT	0.68	B (18)	113	0.56	B (16)	86	310
Weston Road / Avon Crescent							
Overall	-	A (-)	-	-	A (-)	-	-
EBLR	0.54	E (39)	22	0.15	C (22)	22	85
NBL	0.03	C (15)	<7	0.01	C (15)	15	65
NBT	0.30	A (-)	<7	0.32	A (-)	<7	270
SBTR	0.63	A (-)	<7	0.59	A (-)	<7	50
Avon Avenue / Avon Crescent							
Overall	-	A (8)	-	-	A (6)	-	-
EBLT	0.05	A (6)	<7	0.04	A (6)	<7	65
WBTR	0.07	A (-)	<7	0.05	A (-)	<7	85
SBLR	0.33	B (12)	12	0.11	A (10)	<7	225
Avon Avenue / Porter Avenue							
Overall	-	A (9)	-	-	A (8)	-	-
EBLTR	0.06	A (8)	-	0.02	A (7)	-	20
WBLTR	0.13	A (9)	-	0.05	A (8)	-	90
NBLTR	0.18	A (9)	-	0.10	A (8)	-	225
SBLTR	0.30	A (9)	-	0.11	A (8)	-	70

Appendix I: Future (2031) Intersection Operation Calculations (Synchro) – Scenario 2

1: Jane St & East Dr/Outlook Ave

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↰↑↱			↰↑	↱		↰	↑↑↱		↰	↑↑↱
Traffic Volume (vph)	60	61	132	20	46	14	25	44	1068	33	16	1171
Future Volume (vph)	60	61	132	20	46	14	25	44	1068	33	16	1171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0	6.0		4.0	5.0		4.0	5.0
Lane Util. Factor		1.00			1.00	1.00		1.00	0.95		1.00	0.95
Frpb, ped/bikes		0.98			1.00	0.95		1.00	1.00		1.00	1.00
Flpb, ped/bikes		0.99			1.00	1.00		1.00	1.00		1.00	1.00
Frt		0.93			1.00	0.85		1.00	1.00		1.00	1.00
Flt Protected		0.99			0.99	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1654			1860	1454		1811	3180		1630	3082
Flt Permitted		0.90			0.88	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1514			1654	1454		1811	3180		1630	3082
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.92	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	61	62	135	20	47	14	27	45	1090	34	16	1195
RTOR Reduction (vph)	0	35	0	0	0	10	0	0	2	0	0	1
Lane Group Flow (vph)	0	223	0	0	67	4	0	72	1122	0	16	1228
Confl. Peds. (#/hr)	35		19	19		35		15		11	11	
Confl. Bikes (#/hr)			1							2		
Heavy Vehicles (%)	10%	5%	1%	0%	2%	7%	2%	0%	6%	9%	12%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	35	0	0	45
Turn Type	Perm	NA		Perm	NA	Perm	Prot	Prot	NA		Prot	NA
Protected Phases		4			8		5	5	2		1	6
Permitted Phases	4			8		8						
Actuated Green, G (s)		30.6			30.6	30.6		7.1	69.4		2.0	64.3
Effective Green, g (s)		31.6			31.6	31.6		8.1	70.4		3.0	65.3
Actuated g/C Ratio		0.26			0.26	0.26		0.07	0.59		0.02	0.54
Clearance Time (s)		7.0			7.0	7.0		5.0	6.0		5.0	6.0
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		398			435	382		122	1865		40	1677
v/s Ratio Prot								c0.04	0.35		0.01	c0.40
v/s Ratio Perm		c0.15			0.04	0.00						
v/c Ratio		0.56			0.15	0.01		0.59	0.60		0.40	0.73
Uniform Delay, d1		38.2			33.9	32.6		54.3	15.8		57.6	20.7
Progression Factor		1.00			1.00	1.00		1.18	0.46		1.00	1.00
Incremental Delay, d2		1.8			0.2	0.0		4.1	0.8		6.4	2.9
Delay (s)		40.0			34.1	32.7		68.4	8.0		64.1	23.6
Level of Service		D			C	C		E	A		E	C
Approach Delay (s)		40.0			33.9				11.6			24.1
Approach LOS		D			C				B			C

Intersection Summary			
HCM 2000 Control Delay	20.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	95.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	33
Future Volume (vph)	33
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.98
Adj. Flow (vph)	34
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	15
Confl. Bikes (#/hr)	
Heavy Vehicles (%)	12%
Bus Blockages (#/hr)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

	↗	→	↘	↙	←	↖	↖	↑	↗	↶	↘	↓
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations		✥		↰	↱		↰	↑↱			↰	↑↱
Traffic Volume (vph)	3	4	0	120	2	89	0	985	124	26	335	1033
Future Volume (vph)	3	4	0	120	2	89	0	985	124	26	335	1033
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			6.0			4.0	6.0
Lane Util. Factor		1.00		1.00	1.00			0.95			1.00	0.95
Frpb, ped/bikes		1.00		1.00	0.92			1.00			1.00	1.00
Flpb, ped/bikes		0.97		1.00	1.00			1.00			1.00	1.00
Frt		1.00		1.00	0.85			0.98			1.00	1.00
Flt Protected		0.98		0.95	1.00			1.00			0.95	1.00
Satd. Flow (prot)		1828		1630	1286			3146			1742	3130
Flt Permitted		0.93		0.75	1.00			1.00			0.95	1.00
Satd. Flow (perm)		1737		1292	1286			3146			1742	3130
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.92	0.98	0.98
Adj. Flow (vph)	3	4	0	122	2	91	0	1005	127	28	342	1054
RTOR Reduction (vph)	0	0	0	0	66	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	7	0	122	27	0	0	1124	0	0	370	1054
Confl. Peds. (#/hr)	72					72	2		1		1	
Confl. Bikes (#/hr)									5			
Heavy Vehicles (%)	0%	0%	0%	12%	0%	12%	0%	6%	10%	2%	5%	8%
Bus Blockages (#/hr)	0	0	0	0	11	0	0	32	0	0	0	37
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	Prot	NA
Protected Phases		4			8		5	2		1	1	6
Permitted Phases	4			8								
Actuated Green, G (s)		32.6		32.6	32.6			42.7			25.7	73.4
Effective Green, g (s)		33.6		33.6	33.6			43.7			26.7	74.4
Actuated g/C Ratio		0.28		0.28	0.28			0.36			0.22	0.62
Clearance Time (s)		7.0		7.0	7.0			7.0			5.0	7.0
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	3.0
Lane Grp Cap (vph)		486		361	360			1145			387	1940
v/s Ratio Prot					0.02			c0.36			c0.21	0.34
v/s Ratio Perm		0.00		c0.09								
v/c Ratio		0.01		0.34	0.08			0.98			0.96	0.54
Uniform Delay, d1		31.2		34.4	31.8			37.8			46.1	13.1
Progression Factor		1.00		0.97	1.06			0.89			1.14	1.40
Incremental Delay, d2		0.0		0.4	0.1			21.7			28.8	0.8
Delay (s)		31.2		33.7	33.7			55.2			81.4	19.2
Level of Service		C		C	C			E			F	B
Approach Delay (s)		31.2			33.7			55.2				35.3
Approach LOS		C			C			E				D

Intersection Summary			
HCM 2000 Control Delay	43.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	0
Future Volume (vph)	0
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.98
Adj. Flow (vph)	0
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	2
Confl. Bikes (#/hr)	1
Heavy Vehicles (%)	0%
Bus Blockages (#/hr)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↱		↰	↑↑	↑↱	
Traffic Volume (vph)	35	6	3	1074	1138	15
Future Volume (vph)	35	6	3	1074	1138	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.98		1.00	1.00	1.00	
Flt Protected	0.96		0.95	1.00	1.00	
Satd. Flow (prot)	1713		1372	3237	3088	
Flt Permitted	0.96		0.95	1.00	1.00	
Satd. Flow (perm)	1713		1372	3237	3088	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	36	6	3	1107	1173	15
RTOR Reduction (vph)	5	0	0	0	0	0
Lane Group Flow (vph)	37	0	3	1107	1188	0
Confl. Peds. (#/hr)	6	8	14			14
Confl. Bikes (#/hr)		1				
Heavy Vehicles (%)	6%	0%	33%	6%	8%	7%
Bus Blockages (#/hr)	0	0	0	30	42	0
Turn Type	Prot		Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases						
Actuated Green, G (s)	11.2		1.0	95.8	89.8	
Effective Green, g (s)	12.2		2.0	96.8	90.8	
Actuated g/C Ratio	0.10		0.02	0.81	0.76	
Clearance Time (s)	7.0		5.0	6.0	6.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	174		22	2611	2336	
v/s Ratio Prot	c0.02		0.00	c0.34	c0.38	
v/s Ratio Perm						
v/c Ratio	0.21		0.14	0.42	0.51	
Uniform Delay, d1	49.5		58.1	3.4	5.8	
Progression Factor	1.00		1.00	1.00	0.65	
Incremental Delay, d2	0.6		2.8	0.5	0.7	
Delay (s)	50.1		61.0	3.9	4.5	
Level of Service	D		E	A	A	
Approach Delay (s)	50.1			4.1	4.5	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	5.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

6: Rockcliffe Blvd & Alliance Ave

AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Volume (vph)	19	276	139	172	167	45	59	142	185	49	200	25
Future Volume (vph)	19	276	139	172	167	45	59	142	185	49	200	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			0.99			0.97			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.96			0.98			0.94			0.99	
Flt Protected		1.00			0.98			0.99			0.99	
Satd. Flow (prot)		1675			1396			1481			1621	
Flt Permitted		0.98			0.62			0.91			0.87	
Satd. Flow (perm)		1637			884			1363			1425	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	20	291	146	181	176	47	62	149	195	52	211	26
RTOR Reduction (vph)	0	28	0	0	8	0	0	55	0	0	6	0
Lane Group Flow (vph)	0	429	0	0	396	0	0	351	0	0	283	0
Confl. Peds. (#/hr)	33		18	18		33	27		21	21		27
Confl. Bikes (#/hr)			6			3			6			10
Heavy Vehicles (%)	16%	7%	8%	18%	12%	20%	14%	11%	7%	24%	4%	4%
Bus Blockages (#/hr)	0	0	0	0	29	0	0	15	0	0	16	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		28.0			28.0			20.0			20.0	
Effective Green, g (s)		29.0			29.0			21.0			21.0	
Actuated g/C Ratio		0.48			0.48			0.35			0.35	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		791			427			477			498	
v/s Ratio Prot												
v/s Ratio Perm		0.26			c0.45			c0.26			0.20	
v/c Ratio		0.54			0.93			0.74			0.57	
Uniform Delay, d1		10.8			14.5			17.1			15.8	
Progression Factor		1.06			1.00			1.00			1.00	
Incremental Delay, d2		1.9			28.8			9.7			4.7	
Delay (s)		13.5			43.3			26.8			20.5	
Level of Service		B			D			C			C	
Approach Delay (s)		13.5			43.3			26.8			20.5	
Approach LOS		B			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱	↰	↰	↱	↰	↑↑	↱	↰	↑↱	
Traffic Volume (vph)	17	194	78	836	196	30	97	502	786	73	778	14
Future Volume (vph)	17	194	78	836	196	30	97	502	786	73	778	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	5.0	5.0	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1737	1405	1636	1641	1526	1580	3380	1482	1686	3180	
Flt Permitted		1.00	1.00	0.95	0.97	1.00	0.14	1.00	1.00	0.46	1.00	
Satd. Flow (perm)		1737	1405	1636	1641	1526	225	3380	1482	813	3180	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	18	202	81	871	204	31	101	523	819	76	810	15
RTOR Reduction (vph)	0	0	71	0	0	20	0	0	472	0	1	0
Lane Group Flow (vph)	0	220	10	531	544	11	101	523	347	76	824	0
Confl. Peds. (#/hr)	35					35	122		2	2		122
Confl. Bikes (#/hr)						2			5			8
Heavy Vehicles (%)	12%	10%	13%	6%	11%	7%	15%	8%	7%	8%	7%	7%
Bus Blockages (#/hr)	0	0	7	0	0	0	0	0	0	0	30	0
Turn Type	Split	NA	Perm	Split	NA	Prot	pm+pt	NA	Perm	Perm	NA	
Protected Phases	7	7		8	8	8	5	2			6	
Permitted Phases			7				2		2	6		
Actuated Green, G (s)		15.0	15.0	44.0	44.0	44.0	55.0	55.0	55.0	40.4	40.4	
Effective Green, g (s)		16.0	16.0	45.0	45.0	45.0	56.0	56.0	56.0	41.4	41.4	
Actuated g/C Ratio		0.12	0.12	0.34	0.34	0.34	0.42	0.42	0.42	0.31	0.31	
Clearance Time (s)		6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		210	170	557	559	520	214	1433	628	254	997	
v/s Ratio Prot		c0.13		0.32	c0.33	0.01	0.04	0.15			c0.26	
v/s Ratio Perm			0.01				0.16		c0.23	0.09		
v/c Ratio		1.05	0.06	0.95	0.97	0.02	0.47	0.36	0.55	0.30	0.83	
Uniform Delay, d1		58.0	51.3	42.5	42.9	28.9	26.7	25.9	28.6	34.3	42.0	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		75.2	0.1	28.2	32.0	0.1	1.6	0.7	3.5	3.0	7.8	
Delay (s)		133.2	51.5	70.7	74.9	28.9	28.3	26.6	32.1	37.3	49.8	
Level of Service		F	D	E	E	C	C	C	C	D	D	
Approach Delay (s)		111.2			71.6			29.8			48.8	
Approach LOS		F			E			C			D	

Intersection Summary

HCM 2000 Control Delay	53.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	132.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	102.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis 2031 Future Total Conditions (Jane Alternative)
20: Weston Rd & Rogers Rd

AM Peak Hour

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥		↰		↱		↑↑	↱	↰	↑↑	
Traffic Volume (vph)	5	11	3	375	0	673	0	678	417	406	1261	0
Future Volume (vph)	5	11	3	375	0	673	0	678	417	406	1261	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0		7.0		3.0		6.0	6.0	3.0	6.0	
Lane Util. Factor		1.00		1.00		1.00		0.95	1.00	1.00	0.95	
Frpb, ped/bikes		0.99		1.00		1.00		1.00	0.97	1.00	1.00	
Flpb, ped/bikes		0.99		0.96		1.00		1.00	1.00	1.00	1.00	
Frt		0.98		1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected		0.99		0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		934		1616		1526		3349	1344	1706	3411	
Flt Permitted		0.99		0.75		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)		934		1267		1526		3349	1344	1706	3411	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	5	11	3	383	0	687	0	692	426	414	1287	0
RTOR Reduction (vph)	0	2	0	0	0	447	0	0	209	0	0	0
Lane Group Flow (vph)	0	17	0	383	0	240	0	692	217	414	1287	0
Confl. Peds. (#/hr)	40		45	45		40	3		4	4		3
Confl. Bikes (#/hr)			2			4			2			5
Heavy Vehicles (%)	100%	91%	100%	8%	0%	7%	0%	9%	5%	7%	7%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	27	0	0	0
Turn Type	Perm	NA		Perm		Over		NA	Perm	Prot	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8					2			
Actuated Green, G (s)		30.8		30.8		21.2		29.0	29.0	21.2	54.2	
Effective Green, g (s)		31.8		31.8		22.2		30.0	30.0	22.2	55.2	
Actuated g/C Ratio		0.32		0.32		0.22		0.30	0.30	0.22	0.55	
Clearance Time (s)		8.0		8.0		4.0		7.0	7.0	4.0	7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		297		402		338		1004	403	378	1882	
v/s Ratio Prot						0.16		0.21		c0.24	c0.38	
v/s Ratio Perm		0.02		c0.30					0.16			
v/c Ratio		0.06		0.95		0.71		0.69	0.54	1.10	0.68	
Uniform Delay, d1		23.7		33.4		35.9		30.9	29.2	38.9	16.1	
Progression Factor		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.1		32.7		6.7		3.9	5.1	74.4	2.0	
Delay (s)		23.8		66.1		42.6		34.8	34.3	113.3	18.2	
Level of Service		C		E		D		C	C	F	B	
Approach Delay (s)		23.8			51.0			34.6			41.3	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	42.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	103.4%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑↱	
Traffic Volume (veh/h)	0	19	0	1170	1337	11
Future Volume (Veh/h)	0	19	0	1170	1337	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	0	19	0	1194	1364	11
Pedestrians	18				1	
Lane Width (m)	3.7				3.7	
Walking Speed (m/s)	1.1				1.1	
Percent Blockage	2				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				204	105	
pX, platoon unblocked	0.83	0.70	0.70			
vC, conflicting volume	1986	706	1393			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	164	0	717			
tC, single (s)	7.0	6.9	4.7			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.5			
p0 queue free %	100	97	100			
cM capacity (veh/h)	639	755	500			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	19	597	597	909	466
Volume Left	0	0	0	0	0
Volume Right	19	0	0	0	11
cSH	755	1700	1700	1700	1700
Volume to Capacity	0.03	0.35	0.35	0.53	0.27
Queue Length 95th (m)	0.6	0.0	0.0	0.0	0.0
Control Delay (s)	9.9	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	9.9	0.0		0.0	
Approach LOS	A				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

3: Jane St & Black Creek Blvd/Dalrymple Dr

AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↱			↑↱	
Traffic Volume (veh/h)	0	0	58	0	0	109	0	1061	42	0	1336	20
Future Volume (Veh/h)	0	0	58	0	0	109	0	1061	42	0	1336	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	0	60	0	0	112	0	1094	43	0	1377	21
Pedestrians		20			9			1			1	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		2			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								114			195	
pX, platoon unblocked	0.81	0.81	0.71	0.81	0.81	0.66	0.71			0.66		
vC, conflicting volume	2068	2554	720	1874	2542	578	1418			1146		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	217	821	0	0	807	0	770			190		
tC, single (s)	7.7	8.5	7.0	7.7	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	5.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	92	100	100	84	100			100		
cM capacity (veh/h)	452	136	747	719	249	709	594			908		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	60	112	729	408	918	480
Volume Left	0	0	0	0	0	0
Volume Right	60	112	0	43	0	21
cSH	747	709	1700	1700	1700	1700
Volume to Capacity	0.08	0.16	0.43	0.24	0.54	0.28
Queue Length 95th (m)	2.0	4.2	0.0	0.0	0.0	0.0
Control Delay (s)	10.2	11.0	0.0	0.0	0.0	0.0
Lane LOS	B	B				
Approach Delay (s)	10.2	11.0	0.0		0.0	
Approach LOS	B	B				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

7: Rockcliffe Blvd & Rockcliffe Ct

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Traffic Volume (veh/h)	18	35	351	16	34	477
Future Volume (Veh/h)	18	35	351	16	34	477
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	38	382	17	37	518
Pedestrians	9					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	1					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						205
pX, platoon unblocked						
vC, conflicting volume	992	400			408	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	992	400			408	
tC, single (s)	6.6	6.6			4.6	
tC, 2 stage (s)						
tF (s)	3.7	3.6			2.7	
p0 queue free %	92	93			96	
cM capacity (veh/h)	244	576			926	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	58	399	555
Volume Left	20	0	37
Volume Right	38	17	0
cSH	392	1700	926
Volume to Capacity	0.15	0.23	0.04
Queue Length 95th (m)	3.9	0.0	0.9
Control Delay (s)	15.8	0.0	1.1
Lane LOS	C		A
Approach Delay (s)	15.8	0.0	1.1
Approach LOS	C		

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	44	94	89	58	33	34	21	289	57	78	388	29
Future Volume (vph)	44	94	89	58	33	34	21	289	57	78	388	29
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	46	99	94	61	35	36	22	304	60	82	408	31

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	239	132	386	521
Volume Left (vph)	46	61	22	82
Volume Right (vph)	94	36	60	31
Hadj (s)	-0.12	0.03	0.04	0.12
Departure Headway (s)	7.0	7.6	6.5	6.3
Degree Utilization, x	0.47	0.28	0.69	0.91
Capacity (veh/h)	479	425	531	521
Control Delay (s)	16.1	13.5	22.7	43.0
Approach Delay (s)	16.1	13.5	22.7	43.0
Approach LOS	C	B	C	E

Intersection Summary			
Delay	28.8		
Level of Service	D		
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		

9: Symes Rd & Terry Dr

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↰	↱	
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	91	138	49	23	87	76
Future Volume (vph)	91	138	49	23	87	76
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	100	152	54	25	96	84

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	252	79	180
Volume Left (vph)	100	54	0
Volume Right (vph)	152	0	84
Hadj (s)	-0.24	0.25	-0.22
Departure Headway (s)	4.3	4.9	4.4
Degree Utilization, x	0.30	0.11	0.22
Capacity (veh/h)	796	682	774
Control Delay (s)	9.1	8.6	8.6
Approach Delay (s)	9.1	8.6	8.6
Approach LOS	A	A	A

Intersection Summary			
Delay	8.8		
Level of Service	A		
Intersection Capacity Utilization	36.7%	ICU Level of Service	A
Analysis Period (min)	15		

10: Symes Rd & Hillborn Ave

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱			↰↑
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	71	15	28	86	26	92
Future Volume (vph)	71	15	28	86	26	92
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	83	17	33	100	30	107

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	100	133	137
Volume Left (vph)	83	0	30
Volume Right (vph)	17	100	0
Hadj (s)	0.20	-0.39	0.20
Departure Headway (s)	4.7	3.9	4.5
Degree Utilization, x	0.13	0.14	0.17
Capacity (veh/h)	719	885	772
Control Delay (s)	8.4	7.6	8.4
Approach Delay (s)	8.4	7.6	8.4
Approach LOS	A	A	A

Intersection Summary			
Delay	8.1		
Level of Service	A		
Intersection Capacity Utilization	24.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	117	2	3	40	2	1
Future Volume (vph)	117	2	3	40	2	1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	129	2	3	44	2	1

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	131	47	3
Volume Left (vph)	129	0	2
Volume Right (vph)	2	44	0
Hadj (s)	0.34	-0.28	0.13
Departure Headway (s)	4.3	3.9	4.4
Degree Utilization, x	0.16	0.05	0.00
Capacity (veh/h)	816	877	791
Control Delay (s)	8.2	7.1	7.4
Approach Delay (s)	8.2	7.1	7.4
Approach LOS	A	A	A

Intersection Summary			
Delay	7.9		
Level of Service	A		
Intersection Capacity Utilization	18.0%	ICU Level of Service	A
Analysis Period (min)	15		

12: Alliance Ave & Humber Blvd N & Cliff St

AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			↱						✥	
Traffic Volume (veh/h)	52	252	200	75	308	24	0	0	0	2	41	65
Future Volume (Veh/h)	52	252	200	75	308	24	0	0	0	2	41	65
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	55	268	213	80	328	26	0	0	0	2	44	69
Pedestrians		2									15	
Lane Width (m)		3.7									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	369			481			1078	1014	374	1000	1107	358
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	369			481			1078	1014	374	1000	1107	358
tC, single (s)	4.4			4.1			7.1	6.5	6.2	7.6	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.4			2.2			3.5	4.0	3.3	4.0	4.0	3.4
p0 queue free %	95			92			100	100	100	99	75	89
cM capacity (veh/h)	1049			1066			129	208	676	160	179	656

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	536	434	115
Volume Left	55	80	2
Volume Right	213	26	69
cSH	1049	1066	317
Volume to Capacity	0.05	0.08	0.36
Queue Length 95th (m)	1.3	1.8	12.2
Control Delay (s)	1.4	2.3	22.7
Lane LOS	A	A	C
Approach Delay (s)	1.4	2.3	22.7
Approach LOS			C

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		

13: Hilldale Rd & Humber Blvd N

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↰	↱
Traffic Volume (veh/h)	254	0	0	313	94	55
Future Volume (Veh/h)	254	0	0	313	94	55
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	299	0	0	368	111	65
Pedestrians	56			2	1	
Lane Width (m)	3.7			3.7	3.7	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	5			0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			300		724	302
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			300		724	302
tC, single (s)			4.1		6.5	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.4
p0 queue free %			100		69	91
cM capacity (veh/h)			1271		362	711

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	299	368	111	65
Volume Left	0	0	111	0
Volume Right	0	0	0	65
cSH	1700	1700	362	711
Volume to Capacity	0.18	0.22	0.31	0.09
Queue Length 95th (m)	0.0	0.0	9.7	2.3
Control Delay (s)	0.0	0.0	19.3	10.6
Lane LOS			C	B
Approach Delay (s)	0.0	0.0	16.1	
Approach LOS			C	

Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	28.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱		✥			↱				
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	213	103	13	0	85	0	64	15	0	0	0
Future Volume (vph)	0	213	103	13	0	85	0	64	15	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	232	112	14	0	92	0	70	16	0	0	0

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total (vph)	232	112	106	86
Volume Left (vph)	0	0	14	0
Volume Right (vph)	0	112	92	16
Hadj (s)	0.12	-0.56	-0.27	0.04
Departure Headway (s)	4.9	4.2	4.3	4.9
Degree Utilization, x	0.32	0.13	0.13	0.12
Capacity (veh/h)	718	826	801	682
Control Delay (s)	9.0	6.7	7.9	8.6
Approach Delay (s)	8.2		7.9	8.6
Approach LOS	A		A	A

Intersection Summary			
Delay	8.2		
Level of Service	A		
Intersection Capacity Utilization	31.0%	ICU Level of Service	A
Analysis Period (min)	15		

16: Humber Blvd N & Louvain St

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		Y	
Traffic Volume (veh/h)	32	277	292	15	12	21
Future Volume (Veh/h)	32	277	292	15	12	21
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	36	315	332	17	14	24
Pedestrians			206		33	
Lane Width (m)			3.7		3.7	
Walking Speed (m/s)			1.1		1.1	
Percent Blockage			19		3	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			333			
pX, platoon unblocked						
vC, conflicting volume	382				966	374
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	382				966	374
tC, single (s)	4.2				6.9	6.3
tC, 2 stage (s)						
tF (s)	2.3				4.0	3.4
p0 queue free %	97				92	96
cM capacity (veh/h)	1104				176	627

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	351	349	38
Volume Left	36	0	14
Volume Right	0	17	24
cSH	1104	1700	322
Volume to Capacity	0.03	0.21	0.12
Queue Length 95th (m)	0.8	0.0	3.0
Control Delay (s)	1.2	0.0	17.7
Lane LOS	A		C
Approach Delay (s)	1.2	0.0	17.7
Approach LOS			C

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	46.1%	ICU Level of Service	A
Analysis Period (min)	15		

17: Avon Ave & Humber Blvd S

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↔	
Traffic Volume (veh/h)	0	178	2	0	61	1
Future Volume (Veh/h)	0	178	2	0	61	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	191	2	0	66	1
Pedestrians					55	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					5	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			246		154	150
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			246		154	150
tC, single (s)			4.1		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			100		91	100
cM capacity (veh/h)			1263		773	855

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	191	2	67
Volume Left	0	2	66
Volume Right	191	0	1
cSH	1700	1263	774
Volume to Capacity	0.11	0.00	0.09
Queue Length 95th (m)	0.0	0.0	2.2
Control Delay (s)	0.0	7.9	10.1
Lane LOS		A	B
Approach Delay (s)	0.0	7.9	10.1
Approach LOS			B

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	25.4%	ICU Level of Service	A
Analysis Period (min)	15		

19: Weston Rd & Portor Ave

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑↑↑	↑↱	
Traffic Volume (veh/h)	29	43	0	1356	1624	68
Future Volume (Veh/h)	29	43	0	1356	1624	68
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	31	45	0	1427	1709	72
Pedestrians	13					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				213	119	
pX, platoon unblocked	0.81	0.77	0.77			
vC, conflicting volume	2234	904	1794			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1410	266	1427			
tC, single (s)	6.8	7.0	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	71	92	100			
cM capacity (veh/h)	106	543	366			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	76	476	476	476	1139	642
Volume Left	31	0	0	0	0	0
Volume Right	45	0	0	0	0	72
cSH	202	1700	1700	1700	1700	1700
Volume to Capacity	0.38	0.28	0.28	0.28	0.67	0.38
Queue Length 95th (m)	12.5	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	33.2	0.0	0.0	0.0	0.0	0.0
Lane LOS	D					
Approach Delay (s)	33.2	0.0			0.0	
Approach LOS	D					

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑↑	↑↱	
Traffic Volume (veh/h)	79	38	9	1016	1564	75
Future Volume (Veh/h)	79	38	9	1016	1564	75
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	81	39	9	1037	1596	77
Pedestrians	45			1		
Lane Width (m)	3.7			3.7		
Walking Speed (m/s)	1.1			1.1		
Percent Blockage	4			0		
Right turn flare (veh)						
Median type				None	TWLTL	
Median storage veh)					2	
Upstream signal (m)					88	
pX, platoon unblocked	0.72	0.72	0.72			
vC, conflicting volume	2216	882	1718			
vC1, stage 1 conf vol	1680					
vC2, stage 2 conf vol	536					
vCu, unblocked vol	1917	76	1230			
tC, single (s)	6.8	7.0	4.3			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.3			
p0 queue free %	51	94	97			
cM capacity (veh/h)	167	670	357			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	120	9	518	518	1064	609
Volume Left	81	9	0	0	0	0
Volume Right	39	0	0	0	0	77
cSH	220	357	1700	1700	1700	1700
Volume to Capacity	0.54	0.03	0.30	0.30	0.63	0.36
Queue Length 95th (m)	22.1	0.6	0.0	0.0	0.0	0.0
Control Delay (s)	39.3	15.3	0.0	0.0	0.0	0.0
Lane LOS	E	C				
Approach Delay (s)	39.3	0.1			0.0	
Approach LOS	E					

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

22: Avon Ave & Avon Cres

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		Y	
Traffic Volume (veh/h)	51	22	31	53	95	88
Future Volume (Veh/h)	51	22	31	53	95	88
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	67	29	41	70	125	116
Pedestrians		4	2		46	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		4	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	157				287	126
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	157				287	126
tC, single (s)	4.2				6.4	6.3
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.4
p0 queue free %	95				80	87
cM capacity (veh/h)	1339				638	869

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	96	111	241
Volume Left	67	0	125
Volume Right	0	70	116
cSH	1339	1700	732
Volume to Capacity	0.05	0.07	0.33
Queue Length 95th (m)	1.2	0.0	10.9
Control Delay (s)	5.6	0.0	12.3
Lane LOS	A		B
Approach Delay (s)	5.6	0.0	12.3
Approach LOS			B

Intersection Summary			
Average Delay	7.8		
Intersection Capacity Utilization	29.9%	ICU Level of Service	A
Analysis Period (min)	15		

23: Avon Ave & Portor Ave

AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	10	23	30	23	15	44	47	13	49	130	1
Future Volume (vph)	0	10	23	30	23	15	44	47	13	49	130	1
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	0	13	31	40	31	20	59	63	17	65	173	1

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	44	91	139	239
Volume Left (vph)	0	40	59	65
Volume Right (vph)	31	20	17	1
Hadj (s)	-0.42	0.11	0.15	0.14
Departure Headway (s)	4.5	5.0	4.7	4.5
Degree Utilization, x	0.06	0.13	0.18	0.30
Capacity (veh/h)	720	667	738	760
Control Delay (s)	7.8	8.7	8.7	9.5
Approach Delay (s)	7.8	8.7	8.7	9.5
Approach LOS	A	A	A	A

Intersection Summary			
Delay	9.0		
Level of Service	A		
Intersection Capacity Utilization	29.1%	ICU Level of Service	A
Analysis Period (min)	15		

	↗	→	↘	↙	←	↖	↶	↖	↑	↗	↘	↓
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations		✥			↰↑	↱		↰	↑↱		↰	↑↱
Traffic Volume (vph)	39	74	134	23	45	15	85	122	1019	37	17	1122
Future Volume (vph)	39	74	134	23	45	15	85	122	1019	37	17	1122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0	6.0		4.0	5.0		4.0	5.0
Lane Util. Factor		1.00			1.00	1.00		1.00	0.95		1.00	0.95
Frpb, ped/bikes		0.98			1.00	0.95		1.00	1.00		1.00	1.00
Flpb, ped/bikes		0.99			1.00	1.00		1.00	1.00		1.00	1.00
Frt		0.93			1.00	0.85		1.00	0.99		1.00	0.99
Flt Protected		0.99			0.98	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1722			1883	1451		1810	3300		1825	3380
Flt Permitted		0.94			0.84	1.00		0.95	1.00		0.95	1.00
Satd. Flow (perm)		1632			1611	1451		1810	3300		1825	3380
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.92	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	41	79	143	24	48	16	92	130	1084	39	18	1194
RTOR Reduction (vph)	0	38	0	0	0	12	0	0	2	0	0	3
Lane Group Flow (vph)	0	225	0	0	72	4	0	222	1121	0	18	1261
Confl. Peds. (#/hr)	36		18	18		36		9		25	25	
Confl. Bikes (#/hr)			1			1				1		
Heavy Vehicles (%)	0%	1%	0%	0%	0%	7%	2%	0%	5%	0%	0%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	22	0	0	18
Turn Type	Perm	NA		Perm	NA	Perm	Prot	Prot	NA		Prot	NA
Protected Phases		4			8		5	5	2		1	6
Permitted Phases	4			8		8						
Actuated Green, G (s)		30.6			30.6	30.6		16.6	69.4		2.0	54.8
Effective Green, g (s)		31.6			31.6	31.6		17.6	70.4		3.0	55.8
Actuated g/C Ratio		0.26			0.26	0.26		0.15	0.59		0.02	0.46
Clearance Time (s)		7.0			7.0	7.0		5.0	6.0		5.0	6.0
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		429			424	382		265	1936		45	1571
v/s Ratio Prot								c0.12	0.34		0.01	c0.37
v/s Ratio Perm		c0.14			0.04	0.00						
v/c Ratio		0.53			0.17	0.01		0.84	0.58		0.40	0.80
Uniform Delay, d1		37.8			34.1	32.7		49.8	15.5		57.6	27.4
Progression Factor		1.00			1.00	1.00		1.13	1.01		1.00	1.00
Incremental Delay, d2		1.2			0.2	0.0		12.1	0.7		5.7	4.4
Delay (s)		39.0			34.3	32.7		68.4	16.4		63.4	31.8
Level of Service		D			C	C		E	B		E	C
Approach Delay (s)		39.0			34.0				24.9			32.3
Approach LOS		D			C				C			C

Intersection Summary			
HCM 2000 Control Delay	29.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	94.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	66
Future Volume (vph)	66
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.94
Adj. Flow (vph)	70
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	9
Confl. Bikes (#/hr)	3
Heavy Vehicles (%)	2%
Bus Blockages (#/hr)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM Signalized Intersection Capacity Analysis 2031 Future Total Conditions (Jane Alternative)
4: Jane St & Alliance Ave
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations		✥		↰	↱		↰	↑↱			↰	↑↱
Traffic Volume (vph)	1	1	2	159	1	204	4	1001	125	11	303	996
Future Volume (vph)	1	1	2	159	1	204	4	1001	125	11	303	996
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0		4.0	6.0			4.0	6.0
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95			1.00	0.95
Frpb, ped/bikes		1.00		1.00	0.91		1.00	0.99			1.00	1.00
Flpb, ped/bikes		0.99		1.00	1.00		1.00	1.00			1.00	1.00
Frt		0.93		1.00	0.85		1.00	0.98			1.00	1.00
Flt Protected		0.99		0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)		1746		1807	1412		1825	3286			1772	3423
Flt Permitted		0.95		0.76	1.00		0.95	1.00			0.95	1.00
Satd. Flow (perm)		1684		1436	1412		1825	3286			1772	3423
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.92	0.91	0.91
Adj. Flow (vph)	1	1	2	175	1	224	4	1100	137	12	333	1095
RTOR Reduction (vph)	0	1	0	0	161	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	3	0	175	64	0	4	1229	0	0	345	1096
Confl. Peds. (#/hr)	78					78	2		11		11	
Confl. Bikes (#/hr)						3			2			
Heavy Vehicles (%)	0%	0%	0%	1%	0%	3%	0%	5%	2%	2%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	5	0	0	18	0	0	0	17
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	Prot	NA
Protected Phases		4			8		5	2		1	1	6
Permitted Phases	4			8								
Actuated Green, G (s)		32.6		32.6	32.6		1.0	44.8			23.6	67.4
Effective Green, g (s)		33.6		33.6	33.6		2.0	45.8			24.6	68.4
Actuated g/C Ratio		0.28		0.28	0.28		0.02	0.38			0.21	0.57
Clearance Time (s)		7.0		7.0	7.0		5.0	7.0			5.0	7.0
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		471		402	395		30	1254			363	1951
v/s Ratio Prot					0.05		0.00	c0.37			c0.19	0.32
v/s Ratio Perm		0.00		c0.12								
v/c Ratio		0.01		0.44	0.16		0.13	0.98			0.95	0.56
Uniform Delay, d1		31.2		35.4	32.6		58.1	36.6			47.1	16.3
Progression Factor		1.00		0.98	1.19		1.06	0.78			1.20	1.20
Incremental Delay, d2		0.0		0.6	0.1		1.9	20.0			27.3	0.8
Delay (s)		31.2		35.2	39.0		63.5	48.7			83.7	20.3
Level of Service		C		D	D		E	D			F	C
Approach Delay (s)		31.2			37.3			48.7				35.5
Approach LOS		C			D			D				D

Intersection Summary			
HCM 2000 Control Delay	41.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	90.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	1
Future Volume (vph)	1
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.91
Adj. Flow (vph)	1
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	2
Confl. Bikes (#/hr)	2
Heavy Vehicles (%)	0%
Bus Blockages (#/hr)	0
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↱		↰	↑↑	↑↱	
Traffic Volume (vph)	21	2	11	1109	1118	39
Future Volume (vph)	21	2	11	1109	1118	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		4.0	5.0	5.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frpb, ped/bikes	1.00		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.99		1.00	1.00	0.99	
Flt Protected	0.96		0.95	1.00	1.00	
Satd. Flow (prot)	1811		1825	3351	3428	
Flt Permitted	0.96		0.95	1.00	1.00	
Satd. Flow (perm)	1811		1825	3351	3428	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	22	2	12	1180	1189	41
RTOR Reduction (vph)	2	0	0	0	2	0
Lane Group Flow (vph)	22	0	12	1180	1228	0
Confl. Peds. (#/hr)	9	22	23			23
Confl. Bikes (#/hr)						3
Heavy Vehicles (%)	0%	0%	0%	5%	2%	3%
Bus Blockages (#/hr)	0	0	0	18	17	0
Turn Type	Prot		Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases						
Actuated Green, G (s)	19.2		2.0	87.8	80.8	
Effective Green, g (s)	20.2		3.0	88.8	81.8	
Actuated g/C Ratio	0.17		0.02	0.74	0.68	
Clearance Time (s)	7.0		5.0	6.0	6.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	304		45	2479	2336	
v/s Ratio Prot	c0.01		0.01	c0.35	c0.36	
v/s Ratio Perm						
v/c Ratio	0.07		0.27	0.48	0.53	
Uniform Delay, d1	42.0		57.4	6.3	9.5	
Progression Factor	1.00		1.00	1.00	0.50	
Incremental Delay, d2	0.1		3.2	0.7	0.7	
Delay (s)	42.1		60.6	6.9	5.5	
Level of Service	D		E	A	A	
Approach Delay (s)	42.1			7.5	5.5	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis 2031 Future Total Conditions (Jane Alternative)
6: Rockcliffe Blvd & Alliance Ave PM Peak Hour

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Volume (vph)	19	185	102	249	206	23	81	250	168	30	182	23
Future Volume (vph)	19	185	102	249	206	23	81	250	168	30	182	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			1.00			0.98			0.99	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.95			0.99			0.95			0.99	
Flt Protected		1.00			0.97			0.99			0.99	
Satd. Flow (prot)		1748			1739			1701			1748	
Flt Permitted		0.96			0.68			0.91			0.90	
Satd. Flow (perm)		1686			1220			1560			1590	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	19	189	104	254	210	23	83	255	171	31	186	23
RTOR Reduction (vph)	0	30	0	0	3	0	0	31	0	0	7	0
Lane Group Flow (vph)	0	282	0	0	484	0	0	478	0	0	234	0
Confl. Peds. (#/hr)	35		20	20		35	25		13	13		25
Confl. Bikes (#/hr)			3			6			8			6
Heavy Vehicles (%)	0%	3%	3%	2%	3%	9%	1%	3%	3%	13%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	7	0	0	5	0	0	7	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		28.0			28.0			20.0			20.0	
Effective Green, g (s)		29.0			29.0			21.0			21.0	
Actuated g/C Ratio		0.48			0.48			0.35			0.35	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		814			589			546			556	
v/s Ratio Prot												
v/s Ratio Perm		0.17			c0.40			c0.31			0.15	
v/c Ratio		0.35			0.82			0.88			0.42	
Uniform Delay, d1		9.6			13.3			18.3			14.9	
Progression Factor		1.42			1.00			1.00			1.00	
Incremental Delay, d2		0.4			12.2			17.7			2.3	
Delay (s)		14.1			25.5			36.0			17.2	
Level of Service		B			C			D			B	
Approach Delay (s)		14.1			25.5			36.0			17.2	
Approach LOS		B			C			D			B	

Intersection Summary			
HCM 2000 Control Delay	25.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	97.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱	↰	↰	↱	↰	↑↑	↱	↰	↑↱	
Traffic Volume (vph)	46	201	103	758	241	72	166	673	783	32	670	42
Future Volume (vph)	46	201	103	758	241	72	166	673	783	32	670	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0	5.0	5.0	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.99	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1866	1470	1700	1735	1526	1733	3510	1474	1807	3344	
Flt Permitted		0.99	1.00	0.95	0.97	1.00	0.17	1.00	1.00	0.39	1.00	
Satd. Flow (perm)		1866	1470	1700	1735	1526	316	3510	1474	748	3344	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	46	203	104	766	243	73	168	680	791	32	677	42
RTOR Reduction (vph)	0	0	87	0	0	53	0	0	431	0	4	0
Lane Group Flow (vph)	0	249	17	498	511	20	168	680	360	32	715	0
Confl. Peds. (#/hr)	41		1	1		41	50		12	12		50
Confl. Bikes (#/hr)			2			1			9			4
Heavy Vehicles (%)	2%	2%	8%	2%	3%	7%	5%	4%	5%	0%	4%	7%
Bus Blockages (#/hr)	0	0	7	0	0	0	0	0	0	0	15	0
Turn Type	Split	NA	Prot	Split	NA	Prot	pm+pt	NA	Perm	Perm	NA	
Protected Phases	7	7	7	8	8	8	5	2			6	
Permitted Phases							2		2	6		
Actuated Green, G (s)		18.0	18.0	31.0	31.0	31.0	49.0	49.0	49.0	32.7	32.7	
Effective Green, g (s)		19.0	19.0	32.0	32.0	32.0	50.0	50.0	50.0	33.7	33.7	
Actuated g/C Ratio		0.16	0.16	0.28	0.28	0.28	0.43	0.43	0.43	0.29	0.29	
Clearance Time (s)		6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		305	240	468	478	420	298	1512	635	217	971	
v/s Ratio Prot		c0.13	0.01	0.29	c0.29	0.01	0.06	0.19			c0.21	
v/s Ratio Perm							0.18		c0.24	0.04		
v/c Ratio		0.82	0.07	1.06	1.07	0.05	0.56	0.45	0.57	0.15	0.74	
Uniform Delay, d1		46.8	41.0	42.0	42.0	30.8	23.1	23.3	24.9	30.5	37.1	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		15.4	0.1	59.7	60.8	0.2	2.4	1.0	3.6	1.4	5.0	
Delay (s)		62.2	41.2	101.7	102.8	31.0	25.5	24.3	28.5	31.9	42.1	
Level of Service		E	D	F	F	C	C	C	C	C	D	
Approach Delay (s)		56.0			97.5			26.4			41.7	
Approach LOS		E			F			C			D	

Intersection Summary			
HCM 2000 Control Delay	52.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	116.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	103.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥		↰		↱		↑↑	↱	↰	↑↑	
Traffic Volume (vph)	1	11	0	457	0	824	0	773	317	441	1080	0
Future Volume (vph)	1	11	0	457	0	824	0	773	317	441	1080	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0		7.0		3.0		6.0	6.0	3.0	6.0	
Lane Util. Factor		1.00		1.00		1.00		0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00		1.00		1.00		1.00	0.92	1.00	1.00	
Flpb, ped/bikes		1.00		0.95		1.00		1.00	1.00	1.00	1.00	
Frt		1.00		1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected		1.00		0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		996		1674		1570		3444	1379	1772	3544	
Flt Permitted		1.00		0.75		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)		996		1321		1570		3444	1379	1772	3544	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	1	11	0	462	0	832	0	781	320	445	1091	0
RTOR Reduction (vph)	0	0	0	0	0	447	0	0	139	0	0	0
Lane Group Flow (vph)	0	12	0	462	0	385	0	781	181	445	1091	0
Confl. Peds. (#/hr)	23		47	47		23			27	27		
Confl. Bikes (#/hr)						5			5			3
Heavy Vehicles (%)	100%	91%	0%	4%	0%	4%	0%	6%	2%	3%	3%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	15	0	0	0
Turn Type	Perm	NA		Perm		Over		NA	Perm	Prot	NA	
Protected Phases		4				1		2		1	6	
Permitted Phases	4			8					2			
Actuated Green, G (s)		31.0		31.0		21.0		29.0	29.0	21.0	54.0	
Effective Green, g (s)		32.0		32.0		22.0		30.0	30.0	22.0	55.0	
Actuated g/C Ratio		0.32		0.32		0.22		0.30	0.30	0.22	0.55	
Clearance Time (s)		8.0		8.0		4.0		7.0	7.0	4.0	7.0	
Vehicle Extension (s)		3.0		3.0		3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		318		422		345		1033	413	389	1949	
v/s Ratio Prot						0.25		c0.23		c0.25	0.31	
v/s Ratio Perm		0.01		c0.35					0.13			
v/c Ratio		0.04		1.09		1.12		0.76	0.44	1.14	0.56	
Uniform Delay, d1		23.4		34.0		39.0		31.7	28.2	39.0	14.6	
Progression Factor		1.00		1.00		1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.0		71.9		83.6		5.2	3.4	91.0	1.2	
Delay (s)		23.5		105.9		122.6		36.8	31.6	130.0	15.8	
Level of Service		C		F		F		D	C	F	B	
Approach Delay (s)		23.5			116.6			35.3			48.9	
Approach LOS		C			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	67.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	113.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

2: Jane St & Sandcliff Rd

PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑	↑↱	
Traffic Volume (veh/h)	0	17	0	1263	1336	28
Future Volume (Veh/h)	0	17	0	1263	1336	28
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	18	0	1373	1452	30
Pedestrians	9				3	
Lane Width (m)	3.7				3.7	
Walking Speed (m/s)	1.1				1.1	
Percent Blockage	1				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				204	105	
pX, platoon unblocked	0.82	0.68	0.68			
vC, conflicting volume	2166	750	1491			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	221	0	788			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	100			
cM capacity (veh/h)	607	738	569			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	18	686	686	968	514
Volume Left	0	0	0	0	0
Volume Right	18	0	0	0	30
cSH	738	1700	1700	1700	1700
Volume to Capacity	0.02	0.40	0.40	0.57	0.30
Queue Length 95th (m)	0.6	0.0	0.0	0.0	0.0
Control Delay (s)	10.0	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.0	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↱			↑↱	
Traffic Volume (veh/h)	0	0	45	0	0	85	0	1178	39	0	1266	87
Future Volume (Veh/h)	0	0	45	0	0	85	0	1178	39	0	1266	87
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	49	0	0	92	0	1280	42	0	1376	95
Pedestrians		24			38			1			3	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		2			4			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								114			195	
pX, platoon unblocked	0.80	0.80	0.69	0.80	0.80	0.64	0.69			0.64		
vC, conflicting volume	2182	2808	760	2077	2834	702	1495			1360		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	204	988	0	72	1021	0	806			440		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	93	100	100	86	100			100		
cM capacity (veh/h)	476	187	731	629	179	672	546			699		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	49	92	853	469	917	554
Volume Left	0	0	0	0	0	0
Volume Right	49	92	0	42	0	95
cSH	731	672	1700	1700	1700	1700
Volume to Capacity	0.07	0.14	0.50	0.28	0.54	0.33
Queue Length 95th (m)	1.6	3.6	0.0	0.0	0.0	0.0
Control Delay (s)	10.3	11.2	0.0	0.0	0.0	0.0
Lane LOS	B	B				
Approach Delay (s)	10.3	11.2	0.0		0.0	
Approach LOS	B	B				

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		

7: Rockcliffe Blvd & Rockcliffe Ct

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑↱			↰↑
Traffic Volume (veh/h)	12	19	480	14	14	519
Future Volume (Veh/h)	12	19	480	14	14	519
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	13	21	527	15	15	570
Pedestrians	8					1
Lane Width (m)	3.7					3.7
Walking Speed (m/s)	1.1					1.1
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						205
pX, platoon unblocked						
vC, conflicting volume	1142	544			550	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1142	544			550	
tC, single (s)	6.5	6.4			4.5	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.6	
p0 queue free %	94	96			98	
cM capacity (veh/h)	210	509			837	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	34	542	585
Volume Left	13	0	15
Volume Right	21	15	0
cSH	330	1700	837
Volume to Capacity	0.10	0.32	0.02
Queue Length 95th (m)	2.6	0.0	0.4
Control Delay (s)	17.2	0.0	0.5
Lane LOS	C		A
Approach Delay (s)	17.2	0.0	0.5
Approach LOS	C		

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	42	48	31	53	75	110	53	342	69	67	414	50
Future Volume (vph)	42	48	31	53	75	110	53	342	69	67	414	50
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	44	51	33	56	79	116	56	360	73	71	436	53

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	128	251	489	560
Volume Left (vph)	44	56	56	71
Volume Right (vph)	33	116	73	53
Hadj (s)	-0.03	-0.22	-0.03	-0.01
Departure Headway (s)	8.1	7.3	6.6	6.5
Degree Utilization, x	0.29	0.51	0.89	1.02
Capacity (veh/h)	405	466	534	544
Control Delay (s)	14.3	17.8	41.9	68.2
Approach Delay (s)	14.3	17.8	41.9	68.2
Approach LOS	B	C	E	F

Intersection Summary			
Delay	45.5		
Level of Service	E		
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		

9: Symes Rd & Terry Dr

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	81	103	155	90	61	83
Future Volume (vph)	81	103	155	90	61	83
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	84	107	161	94	64	86

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	191	255	150
Volume Left (vph)	84	161	0
Volume Right (vph)	107	0	86
Hadj (s)	-0.23	0.14	-0.33
Departure Headway (s)	4.6	4.7	4.3
Degree Utilization, x	0.24	0.33	0.18
Capacity (veh/h)	723	738	778
Control Delay (s)	9.1	10.0	8.3
Approach Delay (s)	9.1	10.0	8.3
Approach LOS	A	A	A

Intersection Summary			
Delay	9.3		
Level of Service	A		
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↱			↰
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	79	6	91	80	13	65
Future Volume (vph)	79	6	91	80	13	65
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	92	7	106	93	15	76

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	99	199	91
Volume Left (vph)	92	0	15
Volume Right (vph)	7	93	0
Hadj (s)	0.16	-0.27	0.06
Departure Headway (s)	4.7	4.0	4.4
Degree Utilization, x	0.13	0.22	0.11
Capacity (veh/h)	717	877	782
Control Delay (s)	8.4	8.1	8.0
Approach Delay (s)	8.4	8.1	8.0
Approach LOS	A	A	A

Intersection Summary			
Delay	8.1		
Level of Service	A		
Intersection Capacity Utilization	25.9%	ICU Level of Service	A
Analysis Period (min)	15		

11: Symes Rd & Orman Ave

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	72	1	2	95	1	6
Future Volume (vph)	72	1	2	95	1	6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	82	1	2	108	1	7

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	83	110	8
Volume Left (vph)	82	0	1
Volume Right (vph)	1	108	0
Hadj (s)	0.21	-0.59	0.03
Departure Headway (s)	4.3	3.5	4.2
Degree Utilization, x	0.10	0.11	0.01
Capacity (veh/h)	807	992	829
Control Delay (s)	7.8	6.9	7.3
Approach Delay (s)	7.8	6.9	7.3
Approach LOS	A	A	A

Intersection Summary			
Delay	7.3		
Level of Service	A		
Intersection Capacity Utilization	17.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			↱						✣	
Traffic Volume (veh/h)	47	261	105	74	445	15	0	0	0	2	7	33
Future Volume (Veh/h)	47	261	105	74	445	15	0	0	0	2	7	33
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	49	275	111	78	468	16	0	0	0	2	7	35
Pedestrians		1			2			1			13	
Lane Width (m)		3.7			3.7			0.0			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	497			387			1101	1082	334	1076	1130	490
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	497			387			1101	1082	334	1076	1130	490
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			93			100	100	100	99	96	94
cM capacity (veh/h)	1000			1183			158	192	712	178	180	569

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	435	562	44
Volume Left	49	78	2
Volume Right	111	16	35
cSH	1000	1183	394
Volume to Capacity	0.05	0.07	0.11
Queue Length 95th (m)	1.2	1.6	2.8
Control Delay (s)	1.5	1.8	15.3
Lane LOS	A	A	C
Approach Delay (s)	1.5	1.8	15.3
Approach LOS			C

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↰	↱
Traffic Volume (veh/h)	263	0	0	454	80	96
Future Volume (Veh/h)	263	0	0	454	80	96
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	306	0	0	528	93	112
Pedestrians	24			2	1	
Lane Width (m)	3.7			3.7	3.7	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	2			0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			307		859	309
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			307		859	309
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		71	85
cM capacity (veh/h)			1264		322	734

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	306	528	93	112
Volume Left	0	0	93	0
Volume Right	0	0	0	112
cSH	1700	1700	322	734
Volume to Capacity	0.18	0.31	0.29	0.15
Queue Length 95th (m)	0.0	0.0	8.9	4.1
Control Delay (s)	0.0	0.0	20.7	10.8
Lane LOS			C	B
Approach Delay (s)	0.0	0.0	15.3	
Approach LOS			C	

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	35.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↱		✥			↱				
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	0	101	85	19	0	84	0	92	23	0	0	0
Future Volume (vph)	0	101	85	19	0	84	0	92	23	0	0	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	112	94	21	0	93	0	102	26	0	0	0

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total (vph)	112	94	114	128
Volume Left (vph)	0	0	21	0
Volume Right (vph)	0	94	93	26
Hadj (s)	0.05	-0.68	-0.45	-0.12
Departure Headway (s)	4.9	4.2	4.1	4.5
Degree Utilization, x	0.15	0.11	0.13	0.16
Capacity (veh/h)	708	824	840	759
Control Delay (s)	7.6	6.5	7.7	8.3
Approach Delay (s)	7.1		7.7	8.3
Approach LOS	A		A	A

Intersection Summary			
Delay	7.6		
Level of Service	A		
Intersection Capacity Utilization	25.9%	ICU Level of Service	A
Analysis Period (min)	15		

	↰	→	←	↱	↳	↲
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		↲↳	
Traffic Volume (veh/h)	17	342	443	6	8	11
Future Volume (Veh/h)	17	342	443	6	8	11
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	19	376	487	7	9	12
Pedestrians			33		19	
Lane Width (m)			3.7		3.7	
Walking Speed (m/s)			1.1		1.1	
Percent Blockage			3		2	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			333			
pX, platoon unblocked						
vC, conflicting volume	513				956	510
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	513				956	510
tC, single (s)	4.1				7.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				4.4	3.3
p0 queue free %	98				95	98
cM capacity (veh/h)	1044				182	558

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	395	494	21
Volume Left	19	0	9
Volume Right	0	7	12
cSH	1044	1700	295
Volume to Capacity	0.02	0.29	0.07
Queue Length 95th (m)	0.4	0.0	1.7
Control Delay (s)	0.6	0.0	18.1
Lane LOS	A		C
Approach Delay (s)	0.6	0.0	18.1
Approach LOS			C

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	41.8%	ICU Level of Service	A
Analysis Period (min)	15		

17: Avon Ave & Humber Blvd S

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Volume (veh/h)	2	77	3	1	70	2
Future Volume (Veh/h)	2	77	3	1	70	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	2	92	4	1	83	2
Pedestrians					7	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			101		64	55
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			101		64	55
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		91	100
cM capacity (veh/h)			1494		931	1011

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	94	5	85
Volume Left	0	4	83
Volume Right	92	0	2
cSH	1700	1494	932
Volume to Capacity	0.06	0.00	0.09
Queue Length 95th (m)	0.0	0.1	2.3
Control Delay (s)	0.0	5.9	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	5.9	9.2
Approach LOS			A

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	17.9%	ICU Level of Service	A
Analysis Period (min)	15		

19: Weston Rd & Portor Ave

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			↑↑↑	↑↱	
Traffic Volume (veh/h)	24	30	0	1598	1491	40
Future Volume (Veh/h)	24	30	0	1598	1491	40
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	24	31	0	1631	1521	41
Pedestrians	32					
Lane Width (m)	3.7					
Walking Speed (m/s)	1.1					
Percent Blockage	3					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				213	119	
pX, platoon unblocked	0.88	0.81	0.81			
vC, conflicting volume	2117	813	1594			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1157	315	1274			
tC, single (s)	6.8	7.0	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	94	100			
cM capacity (veh/h)	164	536	436			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	55	544	544	544	1014	548
Volume Left	24	0	0	0	0	0
Volume Right	31	0	0	0	0	41
cSH	269	1700	1700	1700	1700	1700
Volume to Capacity	0.20	0.32	0.32	0.32	0.60	0.32
Queue Length 95th (m)	5.7	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	21.8	0.0	0.0	0.0	0.0	0.0
Lane LOS	C					
Approach Delay (s)	21.8	0.0			0.0	
Approach LOS	C					

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		

21: Weston Rd & Avon Cres

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		↰	↑↑	↑↱	
Traffic Volume (veh/h)	20	17	5	1070	1480	57
Future Volume (Veh/h)	20	17	5	1070	1480	57
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	20	17	5	1092	1510	58
Pedestrians	43				1	
Lane Width (m)	3.7				3.7	
Walking Speed (m/s)	1.1				1.1	
Percent Blockage	4				0	
Right turn flare (veh)						
Median type				None	TWLTL	
Median storage veh)					2	
Upstream signal (m)					88	
pX, platoon unblocked	0.80	0.80	0.80			
vC, conflicting volume	2139	827	1611			
vC1, stage 1 conf vol	1582					
vC2, stage 2 conf vol	557					
vCu, unblocked vol	1919	272	1256			
tC, single (s)	6.9	7.0	4.5			
tC, 2 stage (s)	5.9					
tF (s)	3.5	3.4	2.4			
p0 queue free %	88	97	99			
cM capacity (veh/h)	168	546	352			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	37	5	546	546	1007	561
Volume Left	20	5	0	0	0	0
Volume Right	17	0	0	0	0	58
cSH	247	352	1700	1700	1700	1700
Volume to Capacity	0.15	0.01	0.32	0.32	0.59	0.33
Queue Length 95th (m)	3.9	0.3	0.0	0.0	0.0	0.0
Control Delay (s)	22.2	15.4	0.0	0.0	0.0	0.0
Lane LOS	C	C				
Approach Delay (s)	22.2	0.1			0.0	
Approach LOS	C					

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		

22: Avon Ave & Avon Cres

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↱		⇆	
Traffic Volume (veh/h)	49	12	37	25	25	53
Future Volume (Veh/h)	49	12	37	25	25	53
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	61	15	46	31	31	66
Pedestrians		1			9	
Lane Width (m)		3.7			3.7	
Walking Speed (m/s)		1.1			1.1	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	86				208	72
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	86				208	72
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				96	93
cM capacity (veh/h)	1510				739	982

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	76	77	97
Volume Left	61	0	31
Volume Right	0	31	66
cSH	1510	1700	888
Volume to Capacity	0.04	0.05	0.11
Queue Length 95th (m)	1.0	0.0	2.8
Control Delay (s)	6.1	0.0	9.5
Lane LOS	A		A
Approach Delay (s)	6.1	0.0	9.5
Approach LOS			A

Intersection Summary			
Average Delay	5.5		
Intersection Capacity Utilization	21.7%	ICU Level of Service	A
Analysis Period (min)	15		

23: Avon Ave & Portor Ave

PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	3	1	10	25	0	15	3	54	17	36	43	1
Future Volume (vph)	3	1	10	25	0	15	3	54	17	36	43	1
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	4	1	12	29	0	18	4	64	20	42	51	1

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	17	47	88	94
Volume Left (vph)	4	29	4	42
Volume Right (vph)	12	18	20	1
Hadj (s)	-0.38	-0.11	-0.08	0.15
Departure Headway (s)	4.0	4.2	4.1	4.3
Degree Utilization, x	0.02	0.05	0.10	0.11
Capacity (veh/h)	858	816	860	823
Control Delay (s)	7.0	7.5	7.5	7.8
Approach Delay (s)	7.0	7.5	7.5	7.8
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.6		
Level of Service	A		
Intersection Capacity Utilization	24.5%	ICU Level of Service	A
Analysis Period (min)	15		

1: Jane St & East Dr/Outlook Ave

	→	←	↖	↰	↑	↘	↓
Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	258	67	14	72	1124	16	1229
v/c Ratio	0.60	0.15	0.03	0.51	0.58	0.19	0.72
Control Delay	36.6	33.2	0.1	70.2	7.9	60.1	25.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.6	33.2	0.1	70.2	7.9	60.1	25.0
Queue Length 50th (m)	41.2	11.5	0.0	18.0	26.3	3.7	124.5
Queue Length 95th (m)	67.7	22.7	0.0	m21.3	m33.3	11.0	154.5
Internal Link Dist (m)	151.9	119.5			80.9		170.1
Turn Bay Length (m)			30.0	55.0		50.0	
Base Capacity (vph)	487	496	487	150	1945	84	1703
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.14	0.03	0.48	0.58	0.19	0.72

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

4: Jane St & Alliance Ave

	→	↙	←	↑	↘	↓
Lane Group	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	7	122	93	1132	370	1054
v/c Ratio	0.01	0.34	0.22	0.98	0.96	0.54
Control Delay	29.7	34.5	7.9	56.0	83.0	20.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.7	34.5	7.9	56.0	83.0	20.2
Queue Length 50th (m)	1.2	20.5	1.9	~148.2	92.8	84.3
Queue Length 95th (m)	4.7	m26.5	m3.4	#186.6	#152.5	107.8
Internal Link Dist (m)	144.7		50.9	238.8		90.1
Turn Bay Length (m)		45.0			45.0	
Base Capacity (vph)	521	387	449	1152	387	1941
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.32	0.21	0.98	0.96	0.54

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Queues
5: Jane St & Haney Ave

Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	42	3	1107	1188
v/c Ratio	0.21	0.04	0.41	0.48
Control Delay	41.4	55.3	5.4	5.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	41.4	55.3	5.4	5.2
Queue Length 50th (m)	8.2	0.7	26.0	14.4
Queue Length 95th (m)	15.1	3.9	87.8	130.7
Internal Link Dist (m)	123.4		130.8	238.8
Turn Bay Length (m)		45.0		
Base Capacity (vph)	475	75	2675	2501
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.09	0.04	0.41	0.48

Intersection Summary

6: Rockcliffe Blvd & Alliance Ave

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	457	404	406	289
v/c Ratio	0.56	0.93	0.76	0.57
Control Delay	12.3	47.6	25.5	20.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.3	47.6	25.5	20.8
Queue Length 50th (m)	48.5	37.5	30.3	24.4
Queue Length 95th (m)	m57.1	#89.5	#71.9	45.5
Internal Link Dist (m)	48.8	220.5	180.4	136.1
Turn Bay Length (m)				
Base Capacity (vph)	819	434	532	504
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.56	0.93	0.76	0.57

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	220	81	531	544	31	101	523	819	76	825
v/c Ratio	1.05	0.31	0.95	0.97	0.05	0.46	0.36	0.74	0.30	0.83
Control Delay	130.3	7.4	71.0	75.1	0.2	29.4	26.8	6.5	39.4	50.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	130.3	7.4	71.0	75.1	0.2	29.4	26.8	6.5	39.4	50.4
Queue Length 50th (m)	~62.0	0.0	141.6	146.5	0.0	15.5	48.1	0.0	15.0	104.4
Queue Length 95th (m)	#111.8	8.3	#214.6	#222.1	0.0	27.0	62.2	29.5	30.4	#145.1
Internal Link Dist (m)	309.3			193.0			94.9			190.2
Turn Bay Length (m)		25.0			40.0	85.0			45.0	
Base Capacity (vph)	210	264	557	559	590	274	1433	1100	255	999
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.05	0.31	0.95	0.97	0.05	0.37	0.36	0.74	0.30	0.83

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

20: Weston Rd & Rogers Rd

	→	↙	↖	↑	↗	↘	↓
Lane Group	EBT	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	19	383	687	692	426	414	1287
v/c Ratio	0.06	0.95	0.87	0.69	0.70	1.10	0.68
Control Delay	21.8	69.2	20.7	35.1	16.2	112.2	18.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.8	69.2	20.7	35.1	16.2	112.2	18.5
Queue Length 50th (m)	2.1	71.8	18.4	62.0	19.9	~91.8	89.5
Queue Length 95th (m)	7.4	#127.9	#92.0	81.9	56.5	#148.6	113.0
Internal Link Dist (m)	25.5			64.0			188.7
Turn Bay Length (m)					30.0	60.0	
Base Capacity (vph)	300	405	786	1004	611	378	1883
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.95	0.87	0.69	0.70	1.10	0.68

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

	→	←	↖	↰	↑	↘	↓
Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	263	72	16	222	1123	18	1264
v/c Ratio	0.56	0.17	0.03	0.83	0.56	0.19	0.80
Control Delay	34.7	33.5	0.1	72.1	16.3	59.5	33.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.7	33.5	0.1	72.1	16.3	59.5	33.3
Queue Length 50th (m)	40.9	12.4	0.0	55.3	59.1	4.2	140.7
Queue Length 95th (m)	66.6	23.9	0.0	m62.2	m68.1	11.7	172.0
Internal Link Dist (m)	151.9	119.5			80.9		170.1
Turn Bay Length (m)			30.0	55.0		50.0	
Base Capacity (vph)	525	483	517	274	2020	95	1574
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.15	0.03	0.81	0.56	0.19	0.80

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

4: Jane St & Alliance Ave

	→	↙	←	↖	↑	↘	↓
Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	4	175	225	4	1237	345	1096
v/c Ratio	0.01	0.44	0.40	0.04	0.98	0.95	0.53
Control Delay	24.0	36.9	6.8	58.5	49.4	85.4	18.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	36.9	6.8	58.5	49.4	85.4	18.9
Queue Length 50th (m)	0.3	32.2	4.2	1.0	151.1	~88.3	73.7
Queue Length 95th (m)	3.0	m43.1	m9.3	m2.2	#200.5	m#134.0	96.8
Internal Link Dist (m)	147.5		56.2		238.8		90.1
Turn Bay Length (m)		45.0		35.0		45.0	
Base Capacity (vph)	506	430	580	92	1262	362	2065
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.41	0.39	0.04	0.98	0.95	0.53

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

5: Jane St & Haney Ave

	↗	↖	↑	↓
Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	24	12	1180	1230
v/c Ratio	0.07	0.13	0.45	0.48
Control Delay	31.9	57.6	9.2	6.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	31.9	57.6	9.2	6.6
Queue Length 50th (m)	3.8	2.8	77.0	22.5
Queue Length 95th (m)	10.4	9.1	94.5	25.4
Internal Link Dist (m)	123.4		130.8	238.8
Turn Bay Length (m)		45.0		
Base Capacity (vph)	499	94	2614	2560
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.05	0.13	0.45	0.48

Intersection Summary

6: Rockcliffe Blvd & Alliance Ave

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	312	487	509	240
v/c Ratio	0.37	0.82	0.88	0.43
Control Delay	11.7	27.8	37.3	17.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	11.7	27.8	37.3	17.2
Queue Length 50th (m)	37.2	42.2	46.9	18.8
Queue Length 95th (m)	m39.5	#93.8	#98.6	35.3
Internal Link Dist (m)	41.3	216.8	180.4	136.1
Turn Bay Length (m)				
Base Capacity (vph)	844	593	576	563
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.37	0.82	0.88	0.43

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

18: Weston Rd & Humber Blvd N/Black Creek Dr

	→	↘	↙	←	↖	↖	↑	↗	↘	↓
Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	249	104	498	511	73	168	680	791	32	719
v/c Ratio	0.82	0.30	1.06	1.07	0.14	0.56	0.45	0.74	0.15	0.74
Control Delay	68.3	7.6	100.0	101.4	1.6	27.1	24.5	7.2	34.4	42.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.3	7.6	100.0	101.4	1.6	27.1	24.5	7.2	34.4	42.8
Queue Length 50th (m)	54.6	0.0	~134.9	~139.0	0.0	22.8	56.2	4.4	5.4	77.1
Queue Length 95th (m)	#91.9	10.9	#202.1	#206.2	2.4	37.1	72.2	39.3	14.3	#103.9
Internal Link Dist (m)	309.3			193.0			94.9			190.2
Turn Bay Length (m)		25.0			40.0	85.0			45.0	
Base Capacity (vph)	321	354	469	479	509	347	1512	1066	217	975
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.29	1.06	1.07	0.14	0.48	0.45	0.74	0.15	0.74

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

20: Weston Rd & Rogers Rd

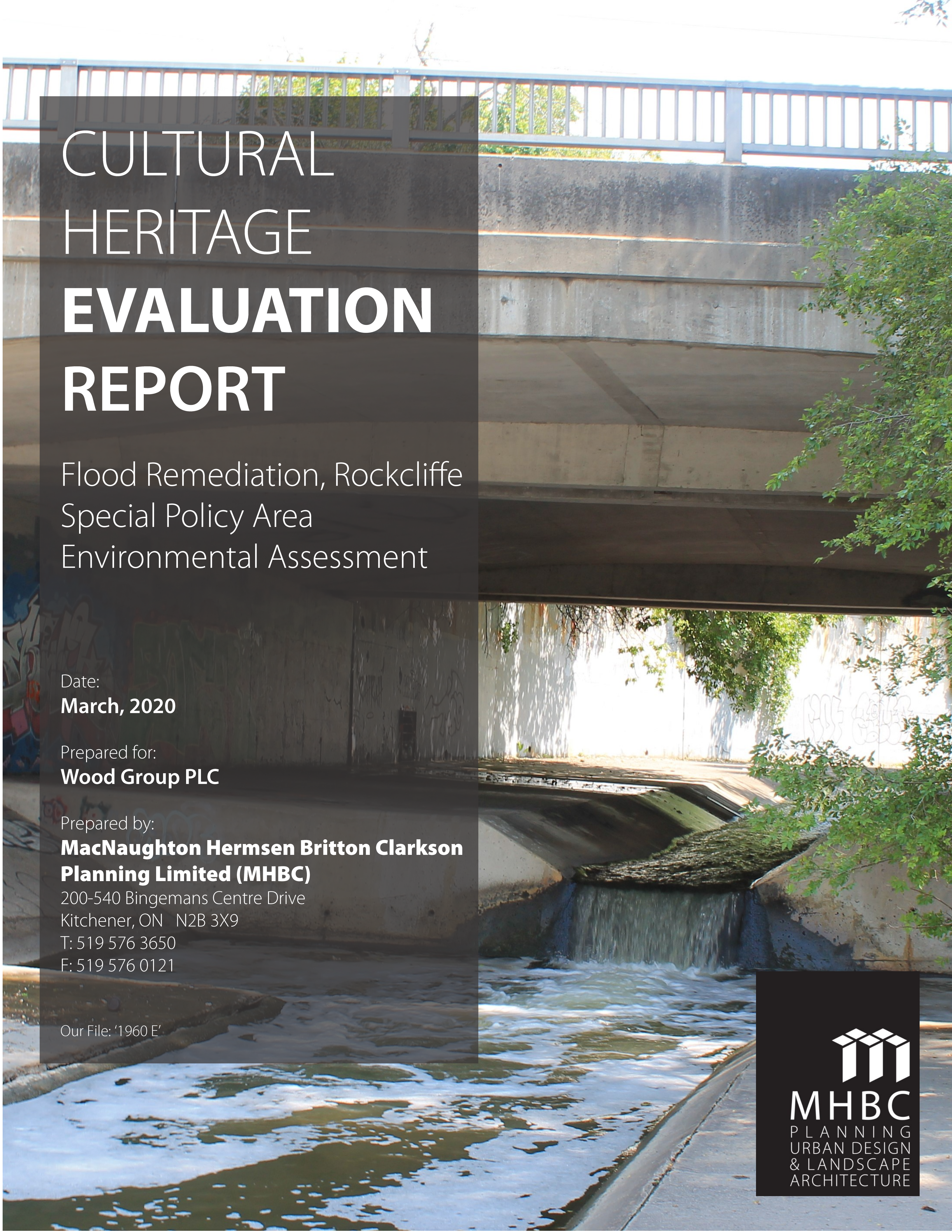
	→	↙	↖	↑	↗	↘	↓
Lane Group	EBT	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	12	462	832	781	320	445	1091
v/c Ratio	0.04	1.09	1.05	0.76	0.58	1.14	0.56
Control Delay	24.0	105.9	59.5	37.3	15.9	128.0	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	105.9	59.5	37.3	15.9	128.0	16.0
Queue Length 50th (m)	1.6	~101.6	~82.7	71.8	18.2	~101.4	68.3
Queue Length 95th (m)	5.6	#160.5	#154.3	93.4	46.1	#159.4	86.3
Internal Link Dist (m)	25.5			64.0			188.7
Turn Bay Length (m)					30.0	60.0	
Base Capacity (vph)	318	422	792	1033	552	389	1949
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	1.09	1.05	0.76	0.58	1.14	0.56

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Appendix K

Cultural Heritage Assessment



CULTURAL HERITAGE **EVALUATION REPORT**

Flood Remediation, Rockcliffe Special Policy Area Environmental Assessment

Date:
March, 2020

Prepared for:
Wood Group PLC

Prepared by:
MacNaughton Hermsen Britton Clarkson Planning Limited (MHBC)
200-540 Bingemans Centre Drive
Kitchener, ON   N2B 3X9
T: 519 576 3650
F: 519 576 0121

Our File: '1960 E'

MHBC
PLANNING
URBAN DESIGN
& LANDSCAPE
ARCHITECTURE

Table of Contents

Project Personnel

Dan Currie, MA, MCIP, RPP, CAHP	*Managing Director of Cultural Heritage*	Project Manager
Vanessa Hicks, MA, CAHP	*Heritage Planner*	Editor, Author

Acknowledgement of Related Studies

This Cultural Heritage Evaluation Report (CHER) acknowledges the work of the following organizations. These studies and reports are related to this CHER and have been referenced in this CHER where necessary, and are acknowledged accordingly.

Toronto Region Conservation Authority, prepared by Amec	*Black Creek (Rockcliffe Area) Riverine Flood Management Class Environmental Assessment*	March 2014
Toronto Region Conservation Authority, prepared by XCG	*Basement Flooding Study Area 4 and Combined Sewer Overflow Control Environmental Assessment*	August 2014

Acknowledgement of First Nations Territory, Traditions, and Cultural Heritage

This document takes into consideration the cultural heritage of First Nations, including their oral traditions and history. This Heritage Impact Assessment acknowledges that the study area is situated on the land of the Anishinabewaki, Huron-Wendant, and Haudenosaunee.

Glossary of Abbreviations

EA	*Environmental Assessment*
EAA	*Environmental Assessment Act*
CHL	*Cultural Heritage Landscape*
CHER	*Cultural Heritage Evaluation Report*
FRTFS	*Flood Remediation and Transportation Feasibility Study*
HCD	*Heritage Conservation District*
MHBC	*MacNaughton Hermsen Britton Clarkson Planning Limited*
MHSTCI	*Ministry of Heritage, Sport, Tourism and Culture Industries*
MTO	*Ministry of Transportation*
OHA	*Ontario Heritage Act*
OHTK	*Ontario Heritage Toolkit*
O-REG 9/06	*Ontario Regulation 9/06 for determining cultural heritage significance*
PPS 2014	*Provincial Policy Statement (2014)*
TRCA	*Toronto Region Conservation Authority*

Definitions

Slab	*Often concrete with bituminous overlays (such as on a bridge deck or approach slab) resting on abutments, having no beams under the deck.*	MTO, 2008
Deck	*A deck is the surface of a bridge and is a structural element of the superstructure and can be comprised of materials including concrete, steel, or wood. The deck can be covered in asphalt or another type of material.*	MTO, 2008
Abutment	*A substructure unit which supports the end of the structure and retains the approach fill.*	MTO, 2008
Wingwall	*A wingwall is located at the end of the bridge, part of an abutment and provides support for the road/approach.*	MTO, 2008
Parapet	*A parapet is a safety barrier or extension of the wall at the edge of the structure, often including a railing system.*	MTO, 2008
Culvert (structural)	*A structure that forms an opening through soil and a) has a span of 3 metres or more or b) has the sum of the individual spans of 3 metres or more, for adjacent multiple cell culverts, or c) has the sum of individual spans of 3 metres, or more… d) has been designed by the Owner as qualifying as a culvert.*	MTO, 2008
Retaining Wall	*Any structure that holds back fill and is not connected to a bridge.*	MTO, 2008
Span	*The horizontal distance between adjacent supports of the superstructure of a bridge, or the longest horizontal dimension of the cross-section of a culvert or tunnel taken perpendicular to the walls.*	MTO, 2008
Stringer	*Stringers span between floor beams and provide the support for the deck above.*	MTO, 2008
Open footing Culvert	*A culvert in the shape of an open rectangle, consistent of two wall elements supported on footings and a top slab. Note that there is no bottom slab.*	MTO, 2000
Closed footing culvert	*A closed footing culvert has a base slab which is a smooth (often concrete) surface instead of the natural streambed.*	MTO, 2008

Culvert Extension	*A portion of a culvert built beyond the limits of a previously existing culvert.*	MTO, 2000
Haunch	*The increase in thickness of a culvert's walls or slabs at the corners*	MTO, 2008
Channel	*A natural stream that conveys water; a ditch or channel excavated for the flow of water*	TRCA, 1980

Note: Definitions provided below in italics are provided as written in the OSIM Manual (MTO, 2008).

1.0 Executive Summary

MHBC was retained by Wood Group PLC to undertake a Cultural Heritage Evaluation Report (CHER) for the Municipal Class Environmental Assessment for the Flood Remediation and Transportation Feasibility Study (FRTFS) of the Rockcliffe Special Policy Area Environmental Assessment in the City of Toronto. The Municipal Class Environmental Assessment must consider a variety of issues which includes natural, social, cultural, as well as economic environments.

At the onset of the EA study, cultural heritage was recognized as an important aspect of the existing environment. The Toronto and Region Conservation Authority Class Environmental Assessment Request for Proposal (RFP) identified that the project requires due diligence as it relates to the identification and evaluation of cultural heritage resources, including built heritage resources and Cultural Heritage Landscapes. This CHER provides input into the Flood Remediation and Transportation Feasibility Study of the Rockcliffe Special Policy Area as it relates to the identification and evaluation of cultural heritage resources.

The purpose of this Cultural Heritage Evaluation Report is to identify potential cultural heritage resources (including built heritage resources and Cultural Heritage Landscapes) within, and directly adjacent to the study area which may be impacted by the proposed FRTFS. Should significant cultural heritage resources be identified, an impact analysis would be provided by way of a Heritage Impact Assessment (HIA). The scope of this CHER does not include buried archaeological resources.

The study area is located in the City of Toronto and follows the watershed of Black Creek, which is a tributary of the Humber River and has been channeled via the construction of the 'Scarlett Road Channel' in 1967. The study area includes ten built structures which are the primary focus of this CHER, those being nine bridges and one culvert. Four of the identified bridges are pedestrian bridges; the remaining six are road/vehicular bridges. A field investigation was undertaken on August 16, 2019 in order to document the study area through photographs and identify potential cultural heritage resources.

Summary of Conclusions and Recommendations

This CHER has provided an analysis of all the bridges and culverts within the identified study area and has determined that none of them are considered significant cultural heritage resources.

Further review by way of a Heritage Impact Assessment is not necessary for any of these structures as it relates to the (FRTFS) of the Rockcliffe Special Policy Area Environmental Assessment.

This Cultural Heritage Evaluation Report identified that the study area includes one property designated under Part IV of the *Ontario Heritage Act* at 150 Symes Road. This property is sited away from Black Creek Channel at a distance of more than 600 metres. Therefore, it is unlikely that any activities related to flood remediation as part of this Environmental Assessment will have an impact on the property at 150 Symes Road. A Heritage Impact Assessment is not necessary for this property provided that the EA will not result in alterations to this property or lands which are directly adjacent.

The study area also includes a portions of the post WWII-era Conn Smythe Subdivisions which are located near what is now Smythe Park, at the west end of the broader study area. The Conn Smythe subdivision areas as noted in this report meet the PPS 2014 definition of a potential Cultural Heritage Landscape. Provided that the EA will not result in alterations to these areas which are related to a) the removal/demolition of buildings and structures, and/or b) changes to lot fabric and circulation patterns, review by way of a Heritage Impact Assessment is not necessary.

2.0 Introduction

MHBC was retained by Wood Group to undertake a Cultural Heritage Evaluation Report (CHER) for the Municipal Class Environmental Assessment for the Flood Remediation and Transportation Feasibility Study (FRTFS) of the Rockcliffe Special Policy Area in the City of Toronto. The Municipal Class Environmental Assessment must consider a variety of issues which includes natural, social, cultural, as well as economic environments.

The purpose of the Flood Remediation and Transportation Feasibility Study (FRTFS) of the Rockcliffe Special Policy Area is to assess the technical and transportation feasibility of implementing Flood Remediation solutions for the study area. The Rockcliffe Special Policy Area was first identified by the MTRCA Watershed Plan (1980) as being prone to flooding. According to the TRCA Black Creek (Rockcliffe Area) Riverine Flood Management EA Report (2014),

> *The Black Creek has flooded on several occasions including the August 2005 storm event where the concrete lined channel upstream of Alliance Avenue was at capacity and the overbank areas downstream of Jane Street were flooded, and July 2013 which similarly caused extensive surface flooding and also local basement flooding.*

Therefore, the EA study is related to the re-assessment of flood remediation measures and to assess the performance of existing flood remediation measures as per the TRCA Black Creek (Rockcliffe Area) Riverine Flood Management Class EA (2014). As such, the FRTFS may result in alterations to built features related to flood remediation and water management surrounding the Black Creek channel such as the nine bridges and one culvert included in this report.

2.1 Location and Description of Study Area

The Study Area is located in the City of Toronto and follows the watershed of the Black Creek channel, east of the Humber River. The study area is situated south of Eglington Avenue West, north of Dundas Street West. The study area is part of the recognized Rockcliffe-Smythe neighbourhood. The study area boundaries of the Environmental Assessment are provided below (see Figure 3).

The Rockcliffe-Smythe neighbourhood is primarily residential, with industrial and commercial/retail uses along arterial roads such as Weston Road, St. Clair Avenue, and Alliance Avenue. Pockets of industrial lands are also located along Alliance Avenue and Glen Scarlett Road. The south-east portion of the study area includes the new 'Stockyards' Commercial/Retail development along Weston Road and St. Clair Avenue West.

The study area also consists of institutional uses, including three schools within the floodplain. The study area includes several parks including (but not limited to) Smythe Park, Westlake Memorial Park, and Dalrymple Park. The study area includes high-rise residential buildings such as those located near the intersection of Jane Street and Woolner Avenue, and east of Humber Boulevard South.

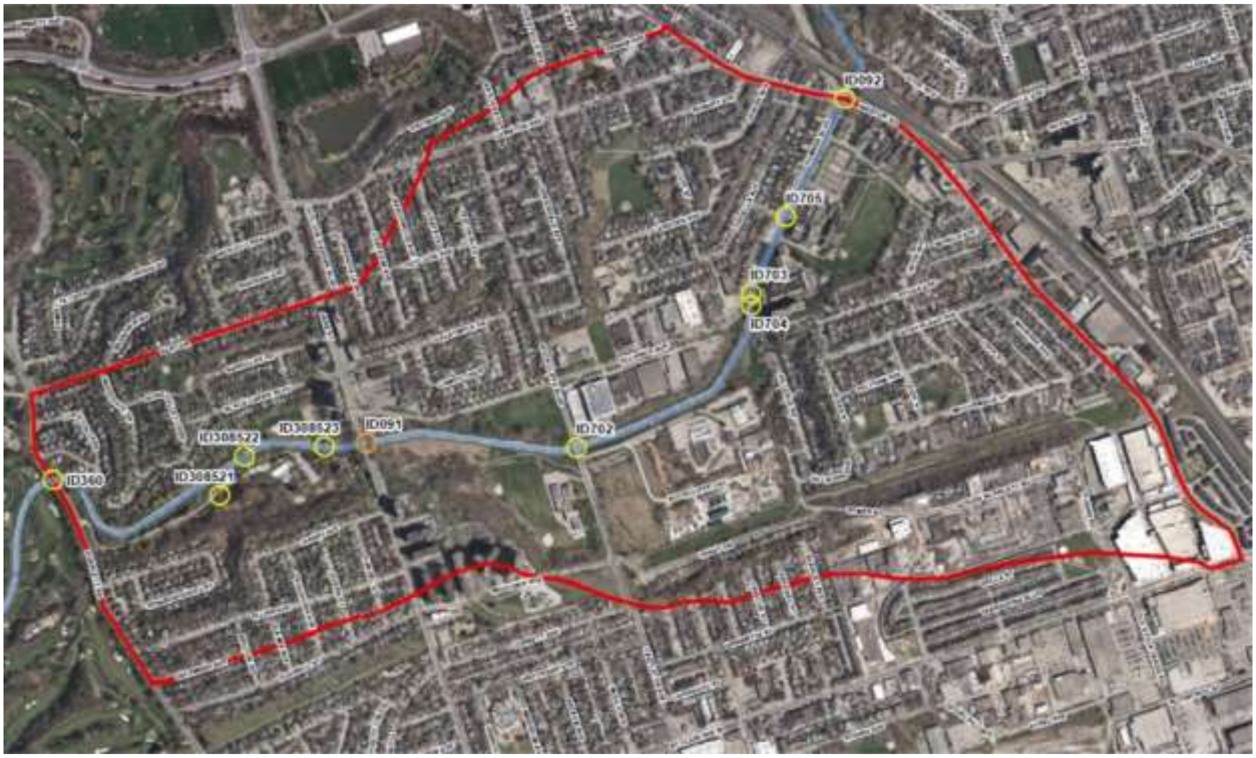


Figure 1: Aerial photo noting location of study area boundaries in red with approximate location of bridges (yellow) and culvert (orange). (Source: MHBC, 2019)

Ten structures located within the study area which may be impacted by the Flood Remediation and EA are noted in the table provided below. Detailed data sheets of each bridge are provided in Appendix D of this report.

BRIDGES:

ID No.	Common Name	Type	Construction Date
360	Scarlett Road Bridge	Road/Vehicle	1983
308521	Smythe Park Bridge (1)	Pedestrian	2000
308523	Smythe Park Bridge (2)	Road/Vehicle	1980
308522	Smythe Park Bridge (3)	Road/Vehicle	2005
702	Rockcliffe Blvd. over Black Creek	Road/Vehicle	1963 *(repairs and replacements in 2007)*
704	Alliance Ave. over Black Creek	Road/Vehicle	1975
703	Humber Blvd. over Black Creek	Road/Vehicle	1975
705	Humber Blvd. over Black Creek	Pedestrian	2015 *(original constructed 1943, replaced in 1975 and again in 2015)*
092	Weston Road over Black Creek	Road/Vehicle	1980 *(Repaired 2006)*

CULVERTS:

ID No.	Common Name	Type	Construction Date
091	Janet Street Over Black Creek	Culvert	*1948 (Alterations in 1964)*

The Rockcliffe-Smythe Special Policy Area was identified by the TRCA as it relates to flood remediation. According to the TRCA Environmental Assessment Report (2014), the Black Creek (Rockcliffe) Special Policy Area was first identified in the TRCA 1980 Flood Control Program Watershed Plan, which specified that the area was at risk of flood damage from Weston Road to Rockcliffe Boulevard. According to the TRCA Black Creek (Rockcliffe Area) Riverine Flood Management EA Report (2014),

> *…the Rockcliffe Area of the Black Creek subwatershed is located near the downstream limit of the Black Creek subwatershed and is urbanized with a mixture of residential, commercial, institutional and industrial land uses. The watercourse has been straightened and heavily modified over time through*

concrete lining and many culvert and bridge crossings. Historical development has encroached upon the watercourse's floodplain resulting in a significant flood risk to property and people.

The black creek has flooded on several occasions including the August 2005 storm event where the concrete lined channel upstream of Alliance Avenue was at capacity and the overbank areas downstream of Jane Street were flooded, and July 2013 which similarly caused extensive surface flooding and also local basement flooding.

2.2 Terms of Reference

This Cultural Heritage Evaluation Report has been guided by the Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes by the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI), which is provided in Appendix F of this report.

The Ontario Heritage Toolkit is an explanatory guide to the *Ontario Heritage Act*. The Ontario Heritage Toolkit is comprised of several volumes including *Heritage Resources in the Land Use Planning Process*. This document includes InfoSheet #5 regarding Cultural Heritage Evaluation Reports and Conservation Plans. According to this InfoSheet, a Cultural Heritage Evaluation Report (CHER) generally contains, but is not limited to the following information:

- Historical Research, Site Analysis and Evaluation;
- Identification of the Significance and Heritage Attributes of the Cultural Heritage Resource;
- Description of the proposed Development or Site Alteration;
- Measurement of Development or Site Alteration Impact;
- Consideration of Alternatives, Mitigation and Conservation Methods;
- Implementation and Monitoring; and
- Summary Statement and Conservation Recommendations.

The contents of this Cultural Heritage Evaluation Report have also been guided by the Ministry of Tourism, Culture and Sport *Standards and Guidelines for the Conservation of Provincial Heritage Properties – Heritage Identification and Evaluation Process* (2014). While no provincial heritage properties have been identified within, or adjacent to, the study area, this document provides guidelines regarding the recommended contents of a CHER as follows:

- Executive Summary;
- Introduction;
- Description of the Property;

- Research;
- Maps, Drawings, Plans and Images;
- Community Engagement;
- Evaluation;
- Conclusions;
- Draft Statement of Cultural Heritage Value and Heritage Attributes;
- Summary of Resources/Sources Cited; and
- Appendices.

2.3 Heritage Status

The City of Toronto maintains an online Heritage Register, which includes properties designated as well as 'listed' under the *Ontario Heritage Act*. These properties are indicated on the City of Toronto Heritage Property map.

The Black Creek channel and ten built features (bridges and culverts) are not located adjacent (contiguous) to any significant cultural heritage resources or Cultural Heritage Landscapes which have been previously identified by the City of Toronto.

Only one property located within the study area has been identified as a cultural heritage resource. This property is located at 150 Symes Road and was designated under Part IV of the *Ontario Heritage Act* by the City of Toronto in 2014 as per By-law no. 73-2014.

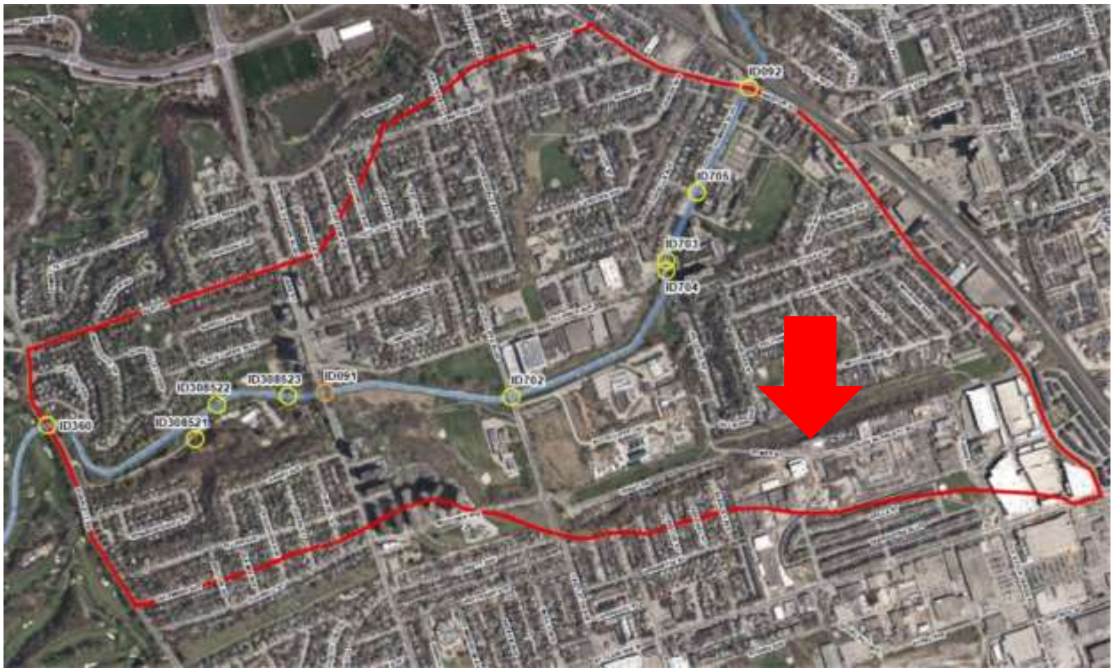


Figure 2: Map noting the location of 150 Symes Road within the Study Area Boundary in relation to the Black Creek Channel (noted in blue) and ten bridges and culverts (noted in circles) (Source: City of Toronto, 2019)

2.4 Adjacent Lands

Lands located directly adjacent to the study area can be described as a mix of residential, commercial, and industrial uses with pockets of parklands. The lands located west of the study area includes the Lambton Golf and Country Club. Lands located north of the study (north of East Drive and Astoria Avenue) include single-detached residential and low-rise apartments as well as parklands (Gladhurst Park) and the northern portion of the Lambton Golf and Country Club. Lands east of Weston Road includes both residential and commercial uses. Adjacent lands south of the study area also include a mix of residential, commercial, and industrial uses, north of the railway. Lands located directly adjacent to the study area are not identified by the City of Toronto as part of a designated Cultural Heritage Landscape or Heritage Conservation District.

Lands directly adjacent to the study area do not include any designated or 'listed' heritage properties. Section 6.0 of this report provides a screening of these adjacent lands in order to determine whether or not they include cultural heritage resources which have not been previously identified and may be impacted by the Environmental Assessment.

3.0 Methodology and Screening for Potential Cultural Heritage Resources

3.1 Methodology

The methodology employed in this CHER for screening for potential cultural heritage resources includes both a preliminary and secondary screening process. The following sub-sections of this report provides an overview of the criteria used for both the preliminary and secondary screening process.

3.1.1 Preliminary Screening

The purpose of preliminary screening is to identify a) cultural heritage resources and Cultural Heritage Landscapes which have already been recognized by agencies (i.e. the Province of Ontario, the Ontario Heritage Trust, Parks Canada, Toronto Region Conservation Authority, the Ministry of Tourism, Culture & Sport, and the City of Toronto). This includes lands located within the study area and adjacent (contiguous).

3.1.2 Secondary Screening

The study area and adjacent lands were also screened for potential cultural heritage resources and Cultural Heritage Landscapes which have not been previously identified.

The secondary screening was informed through local historical documentation and research. This includes (but is not limited to) local history resources, historical maps and aerial photography. The majority of research was undertaken using resources available at the Toronto Land Registry Office, City of Toronto archives, the Toronto Public Library and the University of Toronto (both online and in-library). This background research resulted in a thorough understanding of the development of the area and the identification of any significant themes, associations, and features (for example).

The secondary screening process flagged potential cultural heritage resources over 40 years old (constructed prior to the year 1979). The 40-year threshold has been employed as a guideline in the screening for cultural heritage resources. This rolling age of 40 years for the preliminary identification of cultural heritage resource of potential cultural heritage value or interest has been accepted at the provincial and federal level as per the *Environmental Guide for Built Heritage and*

Cultural Heritage Landscapes (Ministry of Transportation, 2007). While this is true, resources which are slightly older or younger than 40 years old does not determine their cultural heritage value. Resources must be evaluated as per *Ontario Regulation 9/06* or *Ontario Regulation 10/06* in order to determine whether or not they are of significant cultural heritage value.

Available historic topographic maps, aerial photographs and Fire Insurance Plans aids in the identification of structures, neighbourhoods, landforms, and other features which were constructed prior to 1979 as per the established 40 year rolling baseline.

The entire study area and adjacent lands were subject to windshield surveys to screen for potential cultural heritage resources, including built features, buildings, and potential Cultural Heritage Landscapes.

4.0 Historical Overview

4.1 Pre-European Contact Era/First Nations

The first inhabitants of Southern Ontario arrived approximately 12,500 years before present after the retreat of the glaciers which shaped the landscape and created large glacial lakes. Evidence of Ontario's first inhabitants can be found along the former shoreline of Lake Iroquois, located north of what is now Davenport Road (City of Toronto, 2004).

The area which now encompasses the City of Toronto includes features of the natural landscape which provided a convergence of transportation routes by both land and water. These transportation routes (trails, rivers, and streams) linked the Lower and Upper Great Lakes. The river valleys and lake shores provided the preferred landscapes for camps as well as semi-permanent villages towards the end of the Archaic period when Hunter-Gatherers became semi-settled into various hunting territories. The Woodland period is marked by the introduction of complex burial sites, agricultural practises, and ceramic production. Those living along the central north shore of Lake Ontario include the ancestral groups of the Neutral, Huron, and Petun. Evidence of Iroquoian villages have also been found throughout Ontario within the drainage systems of the Humber, Don, and Dufferin Rivers.

By 1600 A.D. most of the people inhabiting the north shore of Lake Ontario travelled north or west, joining other Native groups in Simcoe County and the Niagara Peninsula, respectively. By the early 17th century, the Five Nations native groups (consisting of the Seneca, Cayuga, Onondaga, Oneida and Mohawk) conflicted with these travelling groups and resulted in the collapse of the Huron, Petun and Neutrals. By the Contact Period (late 17th century) the central north shore of Lake Ontario was hunting territory of primarily the Seneca. Their main settlements were found near the mouths of the Humber River and the Rouge River, where branches of the 'Toronto Carrying Place' linked Lake Ontario to the Upper Great Lakes (City of Toronto, 2004) (See Figure 3).

By the end of the 18th century, lands in what is now the Greater Toronto Area and York Region were part of the surrender of lands to the British Crown from the Mississaugas of the New Credit (See Figure 4).

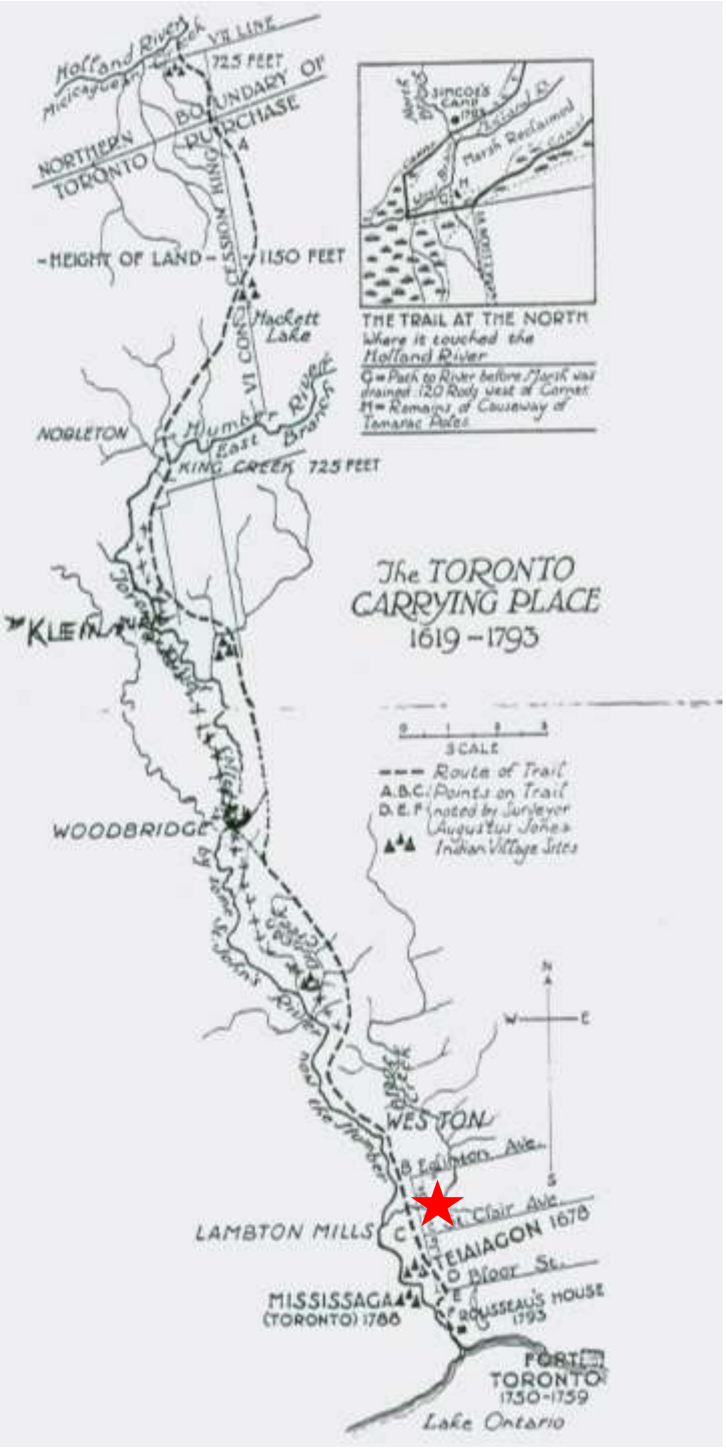


Figure 3: Map of the Toronto Carrying Place and route linking Lake Ontario with the Upper Great Lakes. Approximate location of study area noted with red star, east of the historic transportation route. (Source: Turner, 2015)

Figure 4: Map of the Original Plan of Toronto Purchase, 1787-1805. Approximate location of study area noted with red star. (Source: Toronto Public Library)

4.2 York County, Township of York in the late 18th and 19th centuries

In 1792, Governor Lieutenant-Colonel John Graves Simcoe of England divided the Province of Upper Canada into nineteen counties. The study area is located in the City of Toronto, formerly part of the County of York, York Township. York Township was surveyed c. 1793. The township was surveyed using the single front special survey system, which generally consisted of a grid pattern of concession roads (oriented north-south) and side-roads (oriented east-west), between which were typically 5 200-acre lots, with lot frontage on both concession roads (Dean and Matthews, 1969; Robinson, 1885). Land owners frequently sold portions of their land to family members or other settlers, resulting in irregular lot patterns as seen on 19th century mapping.

According to a review of historic maps, the study area is located on part of Lots 6, 7, 8, 9, 10 of the Third Concession, and Lots 36, 37, 38, 39, 40 (also of the Third Concession) of the former Township of York South West (See Figure 5).

Original land owners included Isaac Devans (Lot 6), Abraham Devans (Lot 7 & 8), Levy Devans (Lot 9 & 10), Benjamin Conlin (north half, Lot 40), Robert Catherwood (south half, Lot 40), Kings College (Lot 39), Jason Dennis (Lot 38), George Crookshanks (Lot 37), John H. Scarlett (west half, Lot 36), and Louise Scarlett (east half, Lot 36).

According to J.D. Brown's Map of the Township of York (1851), the study area is situated between Scarlett's Road to the west (which remains Scarlett's Road) and 'Plan Road' to the east, which follows the present-day path of Weston Road. No property owners are indicated on the map and no buildings or features are indicated. The area surrounding Black Creek appears includes wood lots, valleys, and possible marsh areas. The closest feature to the study area at the time is noted as 'S. Scarlett's Mill', near the meeting of Scarlett's Road and the Humber River in the Third Concession (See Figure 6).

The study area was located central to three communities established in the mid. 19th century, namely Weston, Carlton and Lambton. At this time, the City of Toronto did not include the subject lands. According to the R.W.S. MacKay Canada Directory of 1851, Weston is described as a Village in the Township of York, County of York, Canada West, 12 miles north of Toronto. Lambton is noted as being situated in the County of York, and is grouped together with Milton and Mimico having a combined population of 650. The settlement of Carlton is not noted in the 1851 Directory.

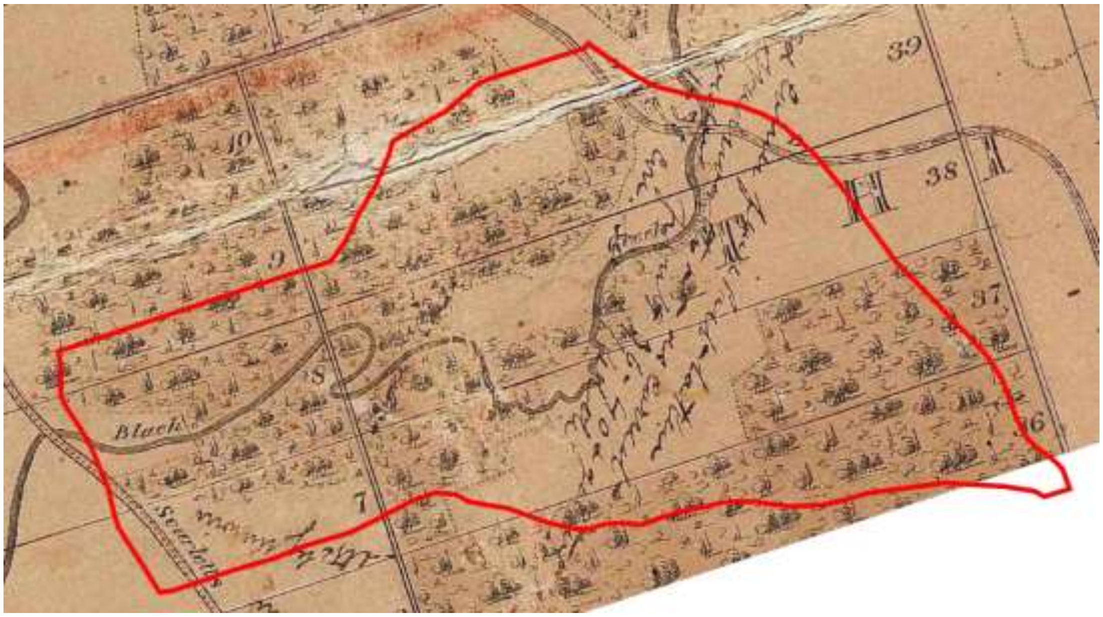


Figure 5: Excerpt of J.D. Browne's Map of the Township of York, County of York, Upper Canada, 1851. Approximate location of study area noted in red. (Source: Toronto Public Library)

According to the Blackett Robinson History of York Township (1885), the first settlement in the context of the study area was located along Scarlett Road at the meeting of the Humber River as follows:

> *The Humber River lies about half a mile further west, forming the boundary between York and Etobicoke townships. It is also a favourite resort for excursionists and pleasure-seekers. It banks present a variety of scenery, large areas of low lands and swamps overgrown with reeds alternating with steep wooded bluffs. (Blackett Robinson, 1885: p 88)*
>
> *In 1846, a new saw-mill was built by Mr. Samuel Scarlet in York Township, about a mile above Lambton, but he abandoned it in a few years for a new site across the river, where greater water-power was obtainable. Further up the stream, Mr. Joseph Dennis put up a saw-mill in 1844, which afterwards became the property of his son, Henry Dennis, who converted a portion of it into a flax-mill. James Williams had a carding and fulling mill a little distance above, which was destroyed by fire in 1865. (Blackett Robinson, 1885: p 88)*

According to the Tremaine Map of 1860, the study area was divided among various owners in the Third Concession, namely S. Scarlett, John A. Scarlett, Rev. Rob. Harding, Devlin, John Lukin Robinson, John Dennis, Henry Dennis, Robert Marshall, Joseph Dennis J.P. Col. Ready, and J. Stoughton Dennis J.P (See Figure 6). By this time, the study area is flanked on either side by main transportation routes, those being Scarlett Road to the west and what is now Weston Road and the Grand Trunk Railway to the east. No buildings or features are noted within the limits of the study area. The closest feature noted on the map is Scarlett's Mill at the intersection of Scarlett's Road and a tributary of the Humber River (See Figure 7). Two other buildings are also noted on Lot 7 (owned by John A. Scarlett) on both the east and west sides of what is now Scarlett Road.

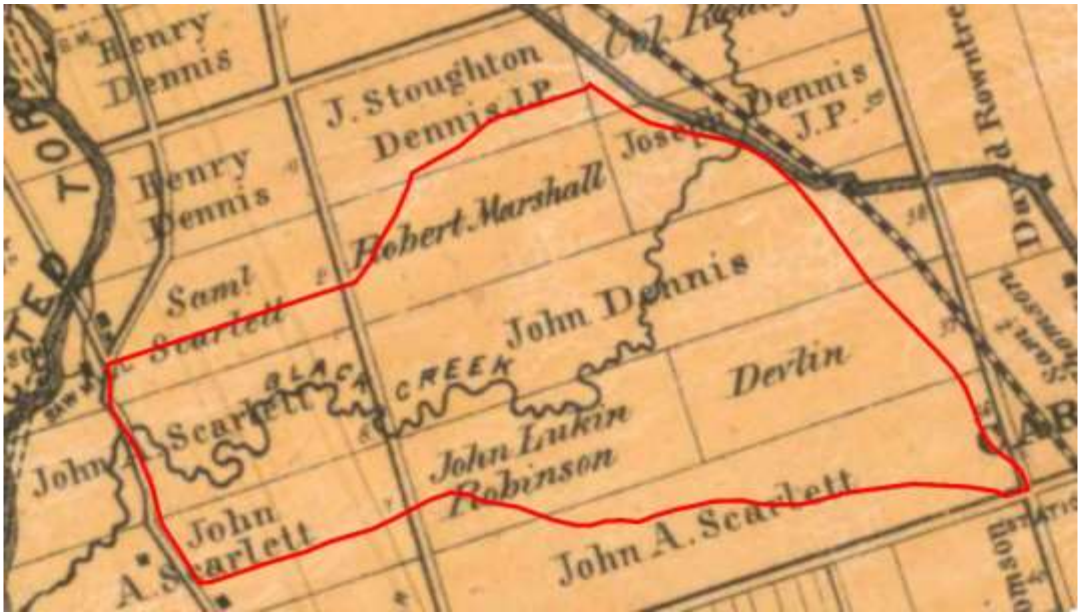


Figure 6: Excerpt of George Tremaine's Map of the County of York, Canada West, 1860. Approximate location of study area noted in red. (Source: City of Toronto Archives Online)

John A. Scarlett and his descendants were the first prominent settlers in the area and made a significant contribution to the growth of York Township. J. A. Scarlett arrived in York Township in 1808 and began purchasing land along the Humber River. He was the proprietor of a lumber yard, grist mill, saw mill, planning mill, distillery and brickyard in Etobicoke and York Townships by 1830. J.A. Scarlett and his sons owned more than 1,000 acres on both sides of the Humber between Dundas Street and the former Village of Weston by 1860. Scarlett Road, located west of the study area boundary is named after J.A. Scarlett. While a few buildings associated with the Scarlett family remain, none of them are located within or adjacent to the study area (Etobicoke Historical Society, 2015).

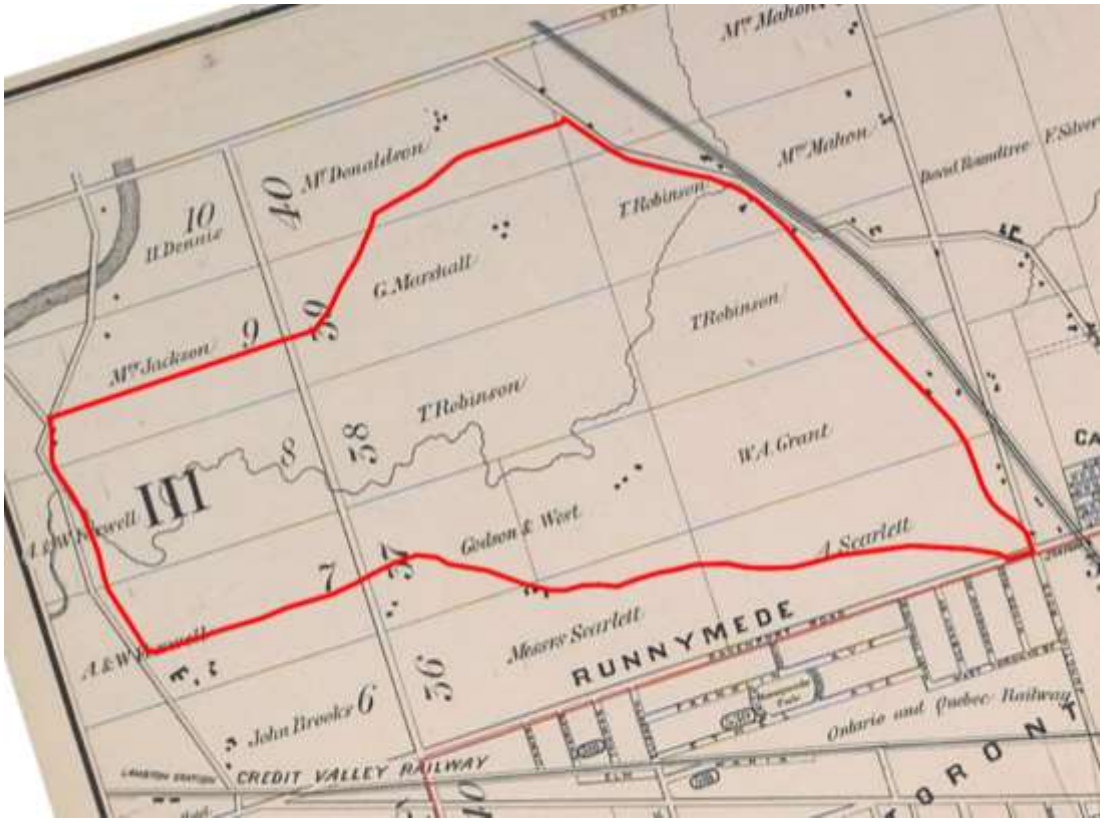


Figure 7: Excerpt of Goad's Fire Insurance Plan, West of Dufferin Street,1884 (Source: City of Toronto Archives Online)

According to Goad's 1884 Fire Insurance Plan, the context of the study area remained rural in nature and several buildings are clustered together, which appear to be farm complexes. Most are located close to major roads (such as Weston and Scarlett), and a few are located on the north and south sides of Black Creek.

Figure 8: Excerpt of the Miles & Co. Illustrated Historical Atlas of the County of York, South West York, 1887. Approximate location of study area noted in red. (Source: City of Toronto Archives Online)

As shown by the 1887 map of the Township of South West York, development in and around the study area continued (See Figure 8). Jane Street now transects the study area north-south. The Credit Valley Railway runs south of the study area, south of St. Clair Avenue. Several buildings are indicated on the map on lands owned by Clark (Lot 37), Jno. & Edward Scarlett (Lot 36, west half), Alb. And Wal. Faxwell (or Foxwell) (Lot 7), S. Scarlett (Lot 38, west half), and Geo. Marshall (Lot 39, west half). A Brick Works is noted on the east half of Lot 38, Concession III (along what is now Weston Road) on land owned by Thomas Robertson. Other landowners within the study area at this time included Brooks, West & Taylor, Warwood, Donaldson, and Douglas.

Settlement within the study area was slow until the end of the 19th century. The majority of the buildings indicated on the 1887 Historical Atlas Map were likely farms. Two of such farms owned by Clark and Scarlett were accessed by what is now Jane Street. The closest urbanized areas to the study area continued to be Carlton, Weston, and Lambton.

Buildings within the study area at this time remain concentrated along transportation routes as opposed to the watershed of Black Creek. By 1894, available Fire Insurance Plans for the study area show the creation of a more urbanized pattern of settlement. This includes the creation of the Mount Dennis community on Lot 40 as well as the subdivision of Lot 9 and Lot 39 (See Figure 9).

Lands within the study area immediately adjacent to Black Creek appear to remain rural in character. This was likely the result of marshy areas and drainage patterns.

Figure 9: Excerpt of Goad's Fire Insurance Plan, West of Dufferin Street, 1894 (Source: City of Toronto Archives Online)

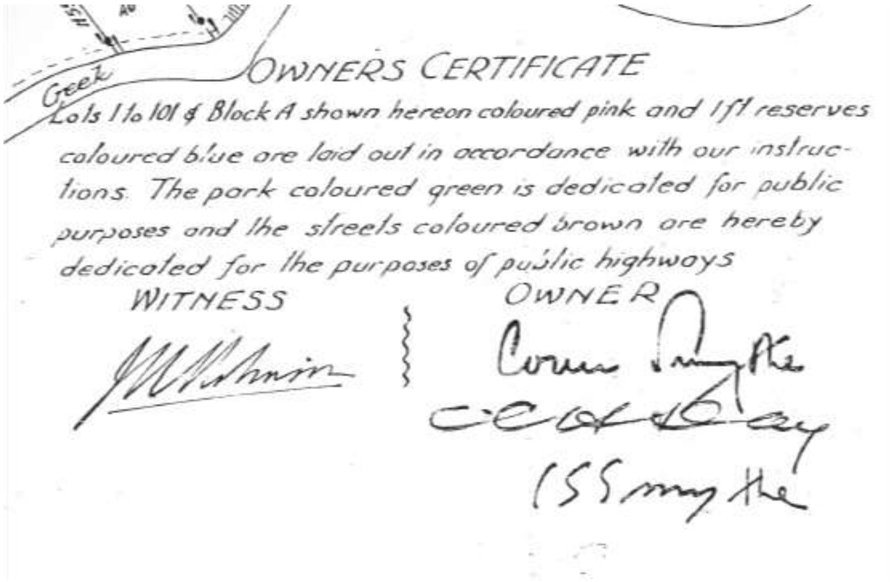
By the turn-of-the-century, urbanised settlement increased, leading to the creation of additional communities through the subdivision of Lots 36 and 37 and the creation of local roads and streets. However, the lands immediately adjacent to Black Creek remained unsettled and no features are noted along the creek (such as bridges, culverts, etc.).

Figure 10: Excerpt of Goad's Fire Insurance Plan, West of Dufferin Street, 1903 (Source: City of Toronto Archives Online)

The first major industrial development of the Rockcliffe-Smythe area was the Conn Smythe gravel pit, which opened in the 1920s (See Figure 11). Conn Smythe was a former owner of the Toronto Maple Leafs from 1927 to 1961. He was also awarded the Military Cross in WWI and was injured during his service in WWII (Canadian Encyclopedia). After World War II, the Smythe gravel pit was depleted and the lands were subdivided and urbanized. Smythe constructed homes for those returning from World War II. Available maps indicate that Smythe Park currently sits on the site of the former gravel pit and is home to the Smythe Park Recreation and Community Centre. According to records available in the land registry office, Registered Subdivision Plans 3366, 4033, 4755, 5076, 4386 and 5224 are all part of the lands which were sold and developed by Conn Smythe.

Figure 11: Historical photo of the Conn Smythe Sand and Gravel Yards (East side of Jane Street, north of Alliance Ave.), 1958. (Source: Toronto Public Library)

Figure 12: Excerpt of Goad's Fire Insurance Plan,1924 (stitched together from available plans) (Source: City of Toronto Archives Online)



OWNERS CERTIFICATE

Lots 1 to 101 & Block A shown hereon coloured pink and 1ft reserves coloured blue are laid out in accordance with our instructions. The park coloured green is dedicated for public purposes and the streets coloured brown are hereby dedicated for the purposes of public highways

WITNESS

OWNER

Conn Smythe

I S Smythe

Figure 13: Excerpt of Registered Plan 3366 noting Conn Smythe as an owner. (Source: Toronto Land Registry Office, Registered Plan 3366)

According to the aerial photo of the study area in the mid. 20th century, residential areas were prominent north and south of Black Creek. Pockets of parkland, wooded areas, and industrial areas are now present west of Weston Road, north of the Canadian Pacific Railway (See Figure 14). The study area formerly included the Rockcliffe Sewage Plant. As farms were replaced with 20th century housing along Lavender Creek (a small tributary of Black Creek), a sewage plant was needed to reduce the need for backyard septic systems. By 1930 the City constructed the Rockcliffe Sewage Plant Rockcliffe Boulevard south of Alliance Avenue (See Figure 15).

According to the TRCA (2014), the Rockcliffe-Smythe neighbourhood developed with urban uses by the 1950s and included a separate storm and sanitary sewers which feed into a combined sewer system. A combined sewer overflow is located along Black Creek at the north-west side of the Creek and Rockcliffe Boulevard.

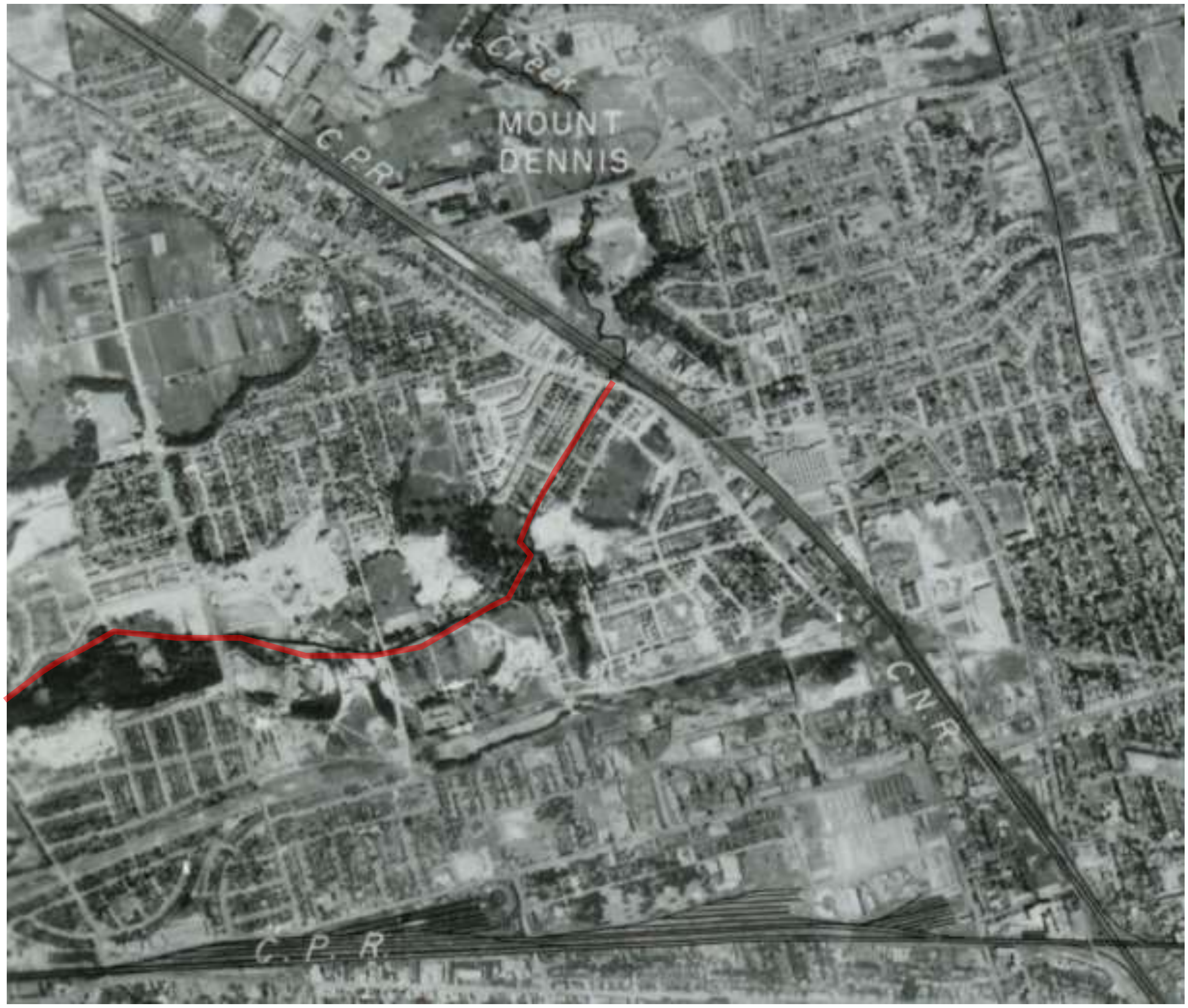


Figure 14: Aerial photo of the Rockcliffe-Smythe community (west of Weston Road), 1954. Approximate location of the Black Creek channel (within the context of the study area) noted in red. (Source: Toronto Public Library)

Figure 15: Historical photo of the Rockcliffe Sewage Plant, 1954. (Source: Toronto Public Library)

One of the most notable features of the study area is the Black Creek Channel, which was engineered for the purpose of mitigating flood damage. As such, Black Creek does not follow its original path. The creek has been engineered and channeled by the 'Scarlett Road Channel' which provides protection for public utilities against erosion and mitigates flooding. The channel is located at Weston Road, to west of Scarlett Road and was constructed in 1967 and can be described as a concrete channel with vegetated overbanks.

This established pattern of settlement continued into the second half of the 19th century as per a review of the 1974 topographic map (See Figure 16). The map notes the location of several developments including apartments located east of Jane Street, industrial areas located north of St. Clair Avenue, schools, established residential neighbourhoods, and community parks.

Figure 16: Historical Topographic Map of the Rockcliffe-Smythe neighbourhood, 1974. (Source: Toronto Public Library)

4.3 20th and 21st Century Development of the Study Area

The late 20th century and early 21st century is marked by not only the continued use of established neighbourhoods within the study area, but also by intensification and re-development. For example, the study area includes remnants of early 20th century architecture and Victory Housing as part of the Conn Smythe subdivisions after WWII (See Figures 17 & 18) and mid-century apartments (See Figures 19 & 20)

Figures 17 & 18: (left) View of 'Victory Housing' located north of the Black Creek Channel part of the Conn Smythe subdivisions, (right) View of Foursquare/Edwardian type housing in the north-east portion of the study area (Source: MHBC, 2019)

Figures 19 & 20: (left) View of mid. 20th century low-rise row housing units in north-eastern portion of the Study Area along Jasper Avenue, (right) View of 1960s/1970s apartment complexes located north-east of Woolner Avenue and Jane Street, (Source: MHBC, 2019)

Figures 21 & 22: (left) View of altered 20th century residential building in a contemporary style located at the north-west corner of Foxwell Street and Bruton Road, (left) View of contemporary apartment unit (recently constructed) on Beechwood Avenue, south of Lambton Avenue, (Source: MHBC, 2019)

More recent developments include the revitalization of the present 'Stockyards' shopping centre located at the south-east corner of the study area, the addition of the Brewery developments at Symes Road, and the growth of industrial uses along Alliance Avenue and Glen Scarlett Road (See Figures 23 – 26)

Figures 23 & 24: (left) Views of industrial buildings looking west along Glen Scarlett Road from Gunns Road, (right) View of industrial buildings looking north-west along Alliance Avenue near intersection of Alliance Avenue and Cliff Street, (Source: MHBC, 2019)

Figures 25 & 26: (left) View of "Stock Yards" retail complex located in the south-east of the study area along Weston Road and St. Clair Avenue West, (right) View of Rainhard Brewing Co. looking south from Symes Road, (Source: MHBC, 2019)

4.4 Summary of Historical Development of the Study Area

What is now the Rockcliffe-Smythe neighbourhood began in the late 18th century with the division of York County and associated Townships. As lots, concessions, and roads were created, settlement became possible. The first settlements were situated in the various villages and towns (Weston, Lambton, and Carlton) and along Scarlett Road when the first sawmill in the vicinity of the study area was constructed. Throughout the 19th century, settlements were situated along main roads (such as Weston Road and St. Clair Avenue) as opposed to the watershed of Black Creek, which was considered inferior to the waterpower available with the nearby Humber River. The lands surrounding Black Creek were also likely marshy and not suitable for settlement and agriculture.

Industries and subdivisions appeared by the first few decades of the 20th century and continued to grow into the late 20th century. This includes the former Smythe Gravel Pit and later the Conn Smythe subdivisions which provided housing for WWII veterans. Industrial uses increased as did residential areas, parks, schools, and churches.

The study area can be described as a mix of residential, commercial and industrial uses spanning from the late 19th century to present. The City of Toronto Building and Construction Dates Map (See Figure 27) provides an overview of the building construction dates within the study area and clearly depicts that the majority of buildings along the Black Creek Channel were constructed between 1946 and 1960.

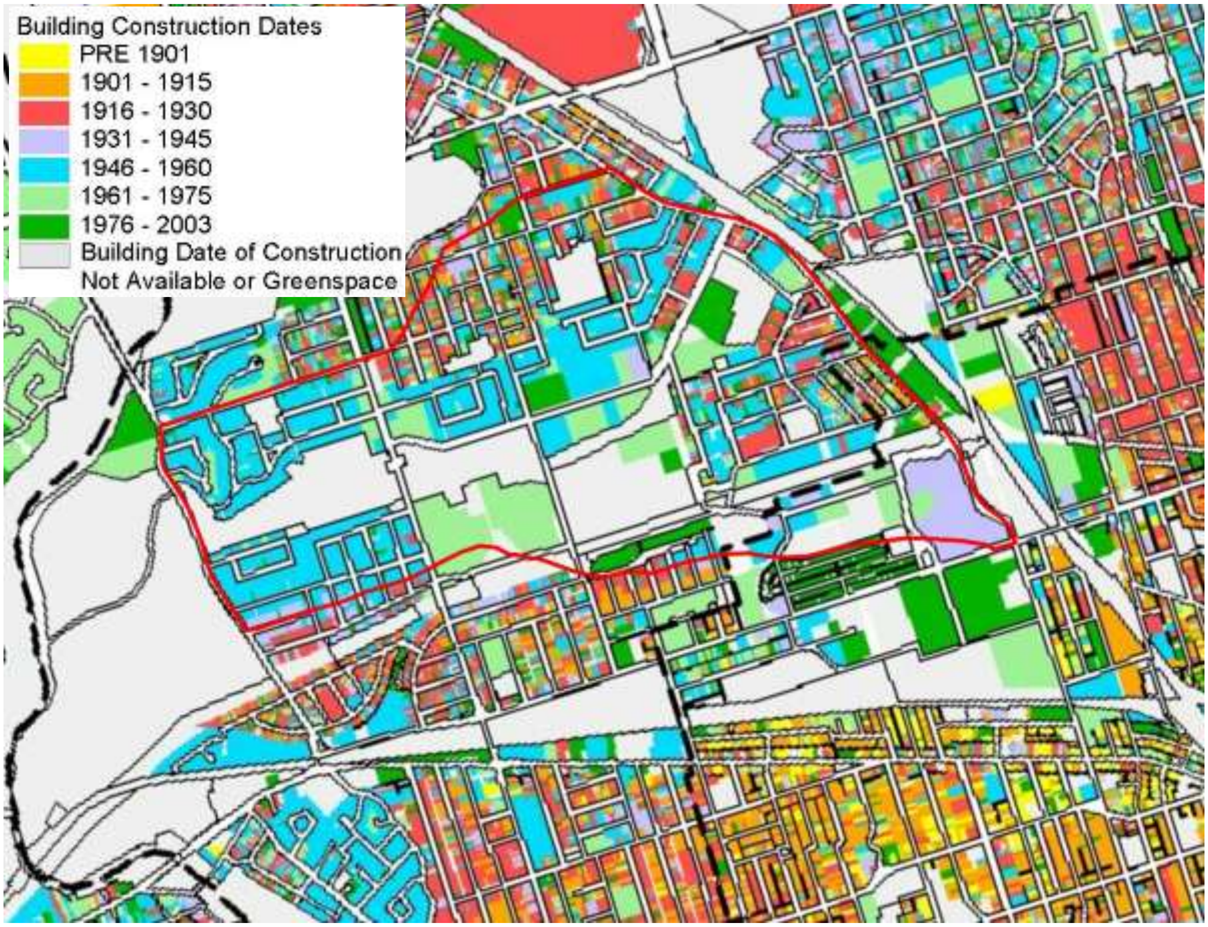


Figure 27: Excerpt of City of Toronto Building Construction Dates Map, (Source: City of Toronto, 2003)

5.0 Description of Bridges and Culverts and Preliminary Screening

5.1 Introduction

The following sub-sections of this report provide a) a description of the nine bridges and one culvert located within the study area which is the focus of this CHER and b) a description of any previously identified cultural heritage resources within or directly adjacent to the study area. The following is supplemented with a detailed Photo Map provided in Appendix B and C of this report.

Section 5.0 of this report will provide a review of the secondary screening process and a description of any potential cultural heritage resources located within, or adjacent to the study area.

5.2 Bridges/Culverts

The following provides a detailed description of the bridges and culverts which are the focus of this CHER, including their location, construction type, date of construction, repair and alteration history (where applicable), and construction materials. A summary of the following descriptions are provided with the Bridge Data Sheets in Appendix D of this report.

All bridges and culverts located within the study area are managed and maintained by the City of Toronto and TRCA. The three pedestrian bridges within Smythe Park (ID nos. 308521, 308522, and 308521) are structures of the Parks, Forestry & Recreation Services Department of the City of Toronto. The remaining seven bridges located within the study area are structures of the Transportation Services Department of the City of Toronto.

Figure 28: Aerial photo noting location of study area boundaries in red with approximate location of bridges (yellow) and culvert (orange). (Source: MHBC, 2019)

BRIDGES:

ID No.	Common Name	Bridge Type	Construction Date
360	Scarlett Road Bridge	Road/Vehicle	1983
308521	Smythe Park Bridge (1)	Pedestrian	2000
308523	Smythe Park Bridge (2)	Road/Vehicle	1980
308522	Smythe Park Bridge (3)	Road/Vehicle	2005
702	Rockcliffe Blvd. over Black Creek	Road/Vehicle	1963
704	Alliance Ave. over Black Creek	Road/Vehicle	1975
703	Humber Blvd. over Black Creek	Road/Vehicle	1975
705	Humber Blvd. over Black Creek	Pedestrian	1975

092	Weston Road over Black Creek	Road/Vehicle	1980
CULVERTS:			
ID No.	Common Name	Type	Construction Date
091	Jane Street Over Black Creek	Culvert	1948

5.2.1 ID No. 092

Bridge ID. No. 092, also referred to as the 'Weston Road over Black Creek Bridge' can be described as a cast-in-place concrete Rigid Frame bridge with vertical legs. The bridge includes a concrete parapet wall with single aluminium post and panel railing, cast-in-place concrete barriers and abutments and reinforced concrete retaining walls. The deck top is asphalt and the eastern parapet wall includes a City of Toronto Plaque reading '1980, 2006'. The plaque refers to its original construction date in 1980. However, considerable repairs were undertaken in 2006. This included patching portions of the bridge, waterproofing and paving, new median, new sidewalk, new parapet walls, as well as a new railing system. Therefore, while the existing abutments, wing walls and main structural components of the bridge are original, they have been repaired and other elements have been replaced, including the parapet wall and railing at Weston Road which is the most visible portion of all the bridge components other than the asphalt deck top.

The bridge provides access over the Black Creek Channel along Weston Road and is located adjacent to the Black Creek Drive rail bridge (ID. No. 377), which is beyond the study area boundary.

Figures 29 & 30: (left) View of parapet and railing looking north-east from intersection of Weston Road and Black Creek Drive (right) View of northeast retaining wall, soffit and barrier exterior (Source: MHBC, 2019)

5.2.2 ID No. 705

Bridge ID No. 705, also known as the 'Humber Boulevard Pedestrian Bridge over Black Creek' can be described as a steel Half-Through Truss bridge. The bridge includes a steel deck top, galvanized steel railing on the truss, box/trapezoidal stringers (beams) as well as cast-in-place concrete abutments and retaining walls. The bridge does not have a plaque, but a construction marker identifies it as 'Eagle Bridge' (possibly the mark of a construction or engineering company).

The bridge is primarily visible from Humber Boulevard South or Humber Boulevard North. The bridge may also be seen along the Black Creek Chanel from Bridge ID No. 092 at Weston Road as well as Bridge ID No. 703 at Hilldale Road and Humber Boulevard North. The existing chain link fence partially obstructs views of the bridge along these roads. The details of the truss and railing and deck are only readily visible when crossing the bridge. The bridge provides access over the Black Creek Channel between the St. Oscar Romero Catholic School and the community north-west of Humber Boulevard North.

Figures 31 & 32: (left) View of north elevation of truss and approach (right) View of west abutment and retaining wall, north elevation of truss and railing. (Source: MHBC, 2019)

5.2.3 ID No. 703

Bridge ID No. 703 is also referred to as the Humber Boulevard over Black Creek Bridge. The bridge is designed as an I-Beam and Girder road bridge, constructed in 1975. The bridge is similar in its design with the adjacent bridge (ID No. 704). Bridge ID No. 703 includes a cast-in-place concrete deck and asphalt deck top, cast-in-place concrete sidewalk, curb, and median as well as a galvanized steel post and panel railing. Precast concrete girders are located below the bridge deck. The bridge also features cast-in-place concrete abutments and reinforced concrete retaining walls.

The bridge is primarily visible when crossing the structure as overgrown vegetation and the existing chain-link safety fence is partially obstructing views along Humber Boulevard.

Figures 33 & 34: (left) View of west approach asphalt surface, sidewalk, railing, and chain-link fence, (right) View of south elevation railing, abutment, and soffit (Source: MHBC, 2019)

5.2.4 ID No. 704

Bridge ID No. 704 is similar in design to the adjacent bridge (No. 703) to the north. Bridge ID No. 704 provides access along Alliance Avenue over Black Creek and can be described as an I-Beam and Girder road bridge, constructed in 1975. The bridge includes a cast-in-place concrete deck and asphalt deck top, cast-in-place concrete sidewalk, curb, and median as well as a galvanized steel post and panel railing. Precast concrete girders are located below the bridge deck. The bridge also features cast-in-place concrete abutments and reinforced concrete retaining walls.

The bridge is primarily visible from Humber Boulevard, Alliance Avenue. The bridge can also be seen when standing on Bridge ID No. 703, looking south. Views of the bridge are partially obstructed at Alliance Avenue due to the presence of overgrown vegetation as well as a Chain-link safety fence.

Figures 35 & 36: (left) View of north elevation of bridge railing and soffit, from Humber Boulevard, (right) Detail view of Galvanized steel post and panel railing (painted green, evidence of corrosion) (Source: MHBC, 2019)

5.2.5 ID No. 702

Bridge ID. No 702 is a Rigid Frame cast-in-place concrete road bridge with vertical legs. The structure provides access along Rockcliffe Boulevard over Black Creek channel. The bridge includes cast-in-place concrete and aluminium post and panel railing as well as a cast-in-place concrete deck with asphalt deck top, concrete sidewalk, and cast-in-place concrete abutments.

The bridge was originally constructed in 1963 and underwent substantial alterations in 2007. In 2007 the repairs and alterations to the bridge included widening the bridge, repairs to abutments and wingwalls, and replacement of the existing parapet walls and railing. These alterations are commemorated by the existing City of Toronto Plaque on the bridge noting the years '1963, 2007'.

The bridge is primarily visible along Rockcliffe Boulevard, Rockcliffe Crescent, and the Black Creek Trail. The most visible portion of the bridge from Rockcliffe Boulevard is the existing parapet wall and aluminium railing, which replaced the original railing in 2007.

Figures 37 & 38: (left) View of west parapet wall and railing, (right) View of east elevation abutment, wingwall, and soffit from channel embankment (Source: MHBC, 2019)

5.2.6 ID No. 091

Culvert ID No. 091 is also known as the 'Jane Street over Black Creek' Culvert. The culvert was constructed in 1948. The barrel of the culvert was extended at both ends in 1963. The culvert can be described as a barrel arch culvert made of cast-in-place concrete. The structure includes a cast-in-place concrete deck with asphalt deck top. The structure includes steel flex beams in a wood post railing system, which was not readily visible and covered with vegetation. An inspection of this element of this part of the structure was not undertaken due to limited access and safety concerns.

The culvert is not visible from Jane Street. There is no indication of a large culvert underneath the road as there are no parapet walls, railings, or other features to note its presence other than the existing aluminum guardrails.

Figures 39 & 40: (left) View of barrel inlet, looking east (right) View of Jane Street looking south over culvert, (Source: MHBC, 2019)

5.2.7 ID No. 308523

Bridge ID No. 308523 is referred to as the Smythe Park Bridge (no. 2 of 3) and can be described as a T-Beam and Girder bridge constructed in 1980. The bridge is intended for pedestrians only and includes pre-cast concrete elements including the deck top, girders (T-type), abutments, and ballast walls. The existing retaining walls are made of cast-in-place reinforced concrete. The bridge includes a steep post and panel railing system.

The bridge provides access over Black Creek Channel within Smythe Park. The Black Creek Trail is located north of the bridge, with the Smythe Park Recreation Centre and outdoor pool located to the south-west. The bridge is only visible from the trails and parklands within Smythe Park.

Figures 41 & 42: (left) View of west elevation, looking east along Black Creek Channel (right) Detail vew of steel railing system (Source: MHBC, 2019)

5.2.8 ID No. 308522

Bridge ID No. 30852 is also referred to as the Smythe Park Bridge (no. 3 of 3) and can be described as a steel half-through truss pedestrian bridge constructed in 2005. The bridge includes a 2-rail steel and wood railing system, steel box/trapezoidal floor beams with cast-in place concrete abutment walls and cast-in-place reinforced concrete wingwalls.

The bridge provides access over Black Creek Channel as part of the Black Creek Trail. The Smythe Park parking lot is located south of the bridge, and a path providing access to Black Creek Boulevard is located to the north. The bridge is only visible from the immediate context along the Black Creek Trail due to the presence of mature vegetation.

Figures 43 & 44: (left) View of west elevation, looking east from Black Creek Channel (right) View of north abutment, looking north from Black Creek Channel noting steel floor beams/stringer (Source: MHBC, 2019)

5.2.9 ID No. 308521

Bridge No. 308521 is also referred to as the Smythe Park Bridge (no. 1 of 3) and can be described as an I-Beam and Girder pedestrian bridge constructed in 2000. The bridge includes a wood plank deck top, steel post and panel railing system, Steel I-Type girders and steel floor beams below the deck. The bridge provides access over a pond south of Black Creek Trail, towards Edinborough Park to the south. The bridge is only visible to those travelling over it. The bridge is located within a densely treed area and its view is obstructed by vegetation surrounding the pond.

Figures 45 & 46: (left) View of bridge looking south from Black Creek Trail, (right) Detail view of wood plank bridge deck and steel railing system, (Source: MHBC, 2019)

5.2.10 ID No. 360

Bridge ID No. 360 is also referred to as the 'Scarlett Road Bridge' and provides access along Scarlett Road over the Black Creek Channel. The bridge is situated east of the Lambton Golf & Country Club and west of Smythe Park. The bridge can be described as a cast-in-place concrete Rigid Frame bridge with vertical legs constructed in 1983. The bridge includes cast-in-place concrete deck with asphalt deck top, cast-in-place concrete sidewalks and curbs and cast-in-place parapet walls with aluminium post and panel single railing system. Cast-in-place concrete abutments and reinforced concrete wingwalls are visible looking east and west along the Black Creek Channel.

Only the asphalt deck, parapet walls and railing systems of the bridge are visible when travelling north or south along Scarlett Road. Views of the bridge soffit, abutment and wing walls are also visible from the adjacent Golf Course along the Black Creek Channel.

Figures 47 & 48: (left) View of bridge looking east along Black Creek Channel noting west soffit and barrier exterior wall, (right) Detail view of east railing system and parapet wall, looking north towards Scarlett Road (Source: MHBC, 2019)

5.3 Previously Identified Cultural Heritage Resources

Only one protected heritage property which has been previously identified is located within the study area. This property is located at 150 Symes Road and was designated under Part IV of the *Ontario Heritage Act* by the City of Toronto in 2014 as per By-law no. 73-2014. This property is known as the former Symes Incinerator, constructed c. 1933 by architect Kenneth Stevenson Giles (Chief Architect for the City of Toronto). This property is now part of the Junction Craft Brewing establishment (See Figure 49).

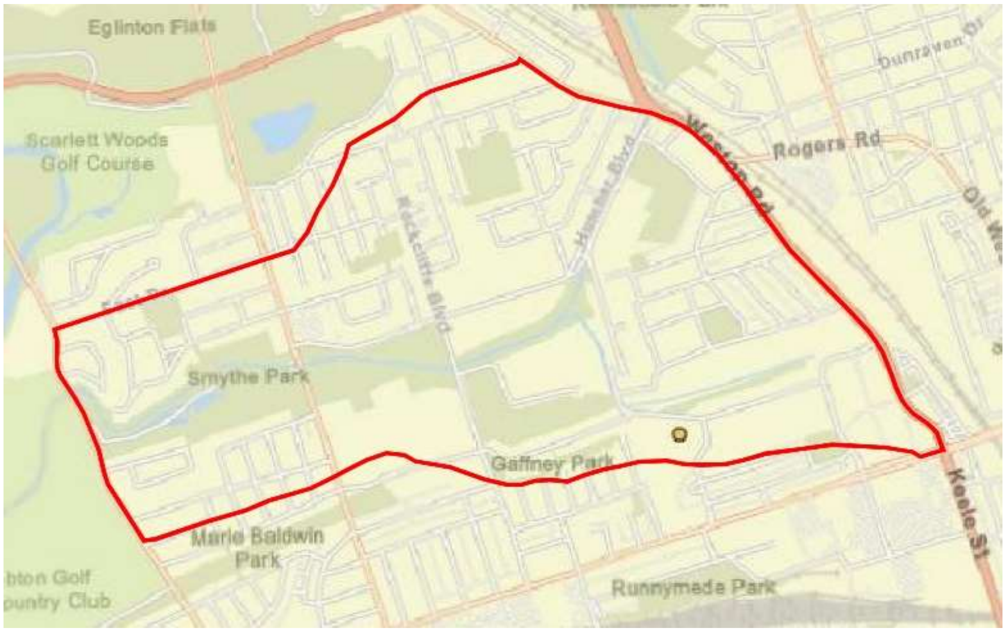


Figure 49: City of Toronto Heritage Resources Map noting the study are boundaries and cultural heritage resources. Designated property located at 150 Symes Road noted with yellow dot. (Source: City of Toronto Heritage Resources Interactive Map, accessed 2019; MHBC, 2019)

The historical plaque for the property indicates that it includes an Art-Deco style building which was one of several waste incinerators built by the City of Toronto. The plaque notes that the context of the study area included the Union Stockyards (later the Ontario Stockyards) which covered approximately 81 hectares of land west of Keele Street on the north and south side of Clair Avenue.

Figures 50 & 51: (left) View of east façade of former incinerator building, looking west from Symes Road, (right) View of west façade of former incinerator building looking east from parking lot. (Source: MHBC, 2019)

No protected heritage properties which have been previously identified (i.e. by the City of Toronto) is located directly adjacent to the study area.

6.0 Secondary Screening and Identification of Potential Cultural Heritage Resources and Cultural Heritage Landscapes

6.1 Introduction

The following secondary screening applies to lands located within and directly adjacent to the study area. This secondary screening has been undertaken as per the methodology outlined in Section 3.0 of this report. The purpose of the secondary screening is to identify potential cultural heritage resources and cultural heritage landscapes which have not been previously recognized.

6.2 Screening for Potential Built Heritage Resources & Cultural Heritage Landscapes

Criteria for identifying potential Cultural Heritage Landscapes are provided below as per Provincial Policy Statement 2014 and the Ontario Heritage Toolkit.

A cultural heritage landscape is defined by Provincial Policy Statement 2014 as follows:

> *Cultural Heritage Landscape: means a defined geographical area that may have been modified by human activity and is identified as having cultural heritage value or interest by a community, including an Aboriginal community. The area may involve features such as structures, spaces, archaeological sites or natural elements that are valued together for their interrelationship, meaning or association. Examples may include, but are not limited to, heritage conservation districts designated under the Ontario Heritage Act; villages, parks, gardens, battlefields, mainstreets and neighbourhoods, cemeteries, trailways, viewsheds, natural areas and industrial complexes of heritage significance; and areas recognized by federal or international designation authorities (e.g. a National Historic Site or District designation, or a UNESCO World Heritage Site).*

The Ontario Heritage Toolkit identifies that a Cultural Heritage Landscape may be classified as either designed (purposely planned), evolved (grown over a period of time), static/relict (evolutionary process has ended), or dynamic (continuing to evolve).

Cultural Heritage Landscapes are also identified and evaluated based on their associative/historical value, such as with themes or events, the identification of a grouping of heritage resources within a defined area, and its value as determined by a community based on local histories and public consultations, for example.

While the entirety of the study area has been modified by human activity, potential Cultural Heritage Landscapes should make an important contribution to the understanding of the community as per the PPS 2014 definition of 'significance' as follows:

> *e. in regard to cultural heritage and archaeology, resources that have been determined to have cultural heritage value or interest for the important contribution they make to our understanding of the history of a place, an event, or a people.*

Therefore, a defined geographical area may meet the criteria of a Cultural Heritage Landscape but may not culminate in a grouping of landforms and features which make an important contribution to the understanding of a place, event, or people.

The identification of potential built heritage resources as well as Cultural Heritage Landscapes was facilitated through a review of historic documents, maps, plans, heritage register, histories of the study area, and historic photographs. This culminated in an understanding of the study area in order to identify whether or not the broader study area (or parts thereof) constituted as a potential CHL. Further, the following features of the broader study area (both built and natural) were considered for any contributions they may make to a potential Cultural Heritage Landscapes. This included (but was not limited to) the following:

- 19th Century Transportation Routes:
  - Scarlett Road, Weston Road, Railway corridors;
- Landforms and Natural Features:
  - Black Creek and associated watershed, valleys, etc.;
- Neighbourhoods:
  - 19th century subdivisions:
    - 'Mount Dennis' Subdivision (Lot 40, Concession 3);
    - Subdivision (Lot 36, Concession 3);
    - Subdivision (Lot 37, Concession 3);
  - 20th Century subdivisions:
    - Smythe-related subdivision (including 'Roselands') and park (Lots 37 and 38, Concession 3);

  - Industrial Areas
    - Alliance Avenue;
    - Rockcliffe Crescent
    - Symes Road, Glen Scarlett Road, McCormack Street, Gunns Road
- Built Features:
  - Bridges/Culverts (as per those identified in the previous section of this report)
  - Scarlett Road Channel (also referred to as the Black Creek Channel);
  - Individual properties/buildings identified by the City of Toronto (i.e. 150 Symes Road);

Through the identification of the above noted aspects of the broader study area and a review of historic aerial photos, maps and plans, certain areas of the study area were identified which are worthy of noting in the screening process. This includes the following:

6.2.1 Subdivision of Lots 39 and 40, Concession 3

The subdivisions located at the northern-most portion of the broader study area includes Lots 39 and 40, Concession3. As per a review of historic maps and plans, the subdivision of lot 40 can be dated between 1880 and 1893. The vast majority of Lot 39, however, includes buildings dating to the mid. 20th century. Only a small portion of this neighbourhood is located within the study area and includes a variety of buildings (primarily residential) dating to various time periods according to the City of Toronto Building Construction Dates map. No significant cultural heritage resources were identified within this area during the screening process. Further, this area is sited a significant distance away from the Black Creek Channel and is not anticipated to be impacted by Flood Remediation activities.

Figures 52 & 53: (left) Detail of Goad's1893 Fire Insurance Plan for the 'Mount Dennis' subdivision, (right) Detail of the City of Toronto Building Construction Dates Map for the 'Mount Dennis' subdivision and north-east corner of the broader study area.

Figure 54: Detail of the City of Toronto Building Construction Dates Map Legend

6.2.2 Subdivision of Lot 36, Concession 3

This subdivision is primarily located outside of the broader study area boundary. Only a small portion of Lot 36, Concession 3 is located within the study area boundary. This small area within the broader study area boundary is no longer residential, but industrial in use. No significant cultural heritage resources were identified within this area during the screening process. This area is sited away from the Black Creek Channel and is not anticipated to be impacted by Flood Remediation activities.

Figures 55 & 56: (left) Detail of Goad's1893 Fire Insurance Plan noting the Subdivision on Lot 36, Concession 3, (right) Detail of the City of Toronto Building Construction Dates Map for the south-east corner of the broader study area.

6.2.3 Subdivision of Lot 37, Concession 3

The subdivision of land part of Lot 37, Concession 3 occurred at some point between 1880 and 1893 as per a review of available Fire Insurance Plans. This area includes a range of residential buildings constructed between the 19th and 20th centuries and is known as the present day Hardwood neighbourhood. No significant cultural heritage resources were identified within this area during the screening process.This area is also sited away from the Black Creek Channel and is not anticipated to be impacted by Flood Remediation activities.

Figures 57 & 58: (left) Detail of Goad's1893 Fire Insurance Plan for the Subdivision of land on Lot 37, Concession 3, (right) Detail of the City of Toronto Building Construction Dates Map for the subdivision and south-east corner of the study area (present day Hardwood neighbourhood).

6.2.4 Conn Smythe Subdivisions

The Conn Smythe subdivision refers to the western portion of the broader study area (and adjacent lands) which were subdivided by C. Smythe after his sand and gravel pit was depleted. After WWII, Smythe subdivided the lands for the purpose of creating Veterans housing. This includes the 'Roseland' neighbourhood located north of Black Creek, east of Scarlett Road. These areas were developed in the mid. 20th century. The City of Toronto Building Construction Dates Map confirms that the vast majority of buildings in this location were constructed during this time period. Smythe Park was also constructed at this time and is located on the area which formerly included the Smythe Sand and Gravel Pit.

Figures 59 & 60: (left) Detail of the 1957 aerial photo of the west portion of the broader study area, part of the Conn Smyth subdivision and park (right) Detail of the City of Toronto Building Construction Dates Map for the Conn Smyth subdivision.

According to records available in the land registry office, Registered Subdivision Plans 3366, 4033, 4755, 5076, 4386 and 5224 are all part of the lands which were sold and developed by Conn Smythe.

Figure 61: Aerial photo noting the study area boundaries in red and the location of Registered Plans 3366, 4033, 4755, 5076, and 4386 (Conn Smythe subdivisions). *Note: Registered Plan 5224 was noted as missing from the Toronto Land Registry Office.

The location of the registered plans identify portions of the lands which were previously owned by Conn Smythe. While Registered Plan 5224 was noted as missing from the Toronto Land Registry Office, this subdivision was located north of Alliance Avenue, surrounding Dalrymple Drive and Cameo Crescent. These lands were previously the Smythe Sand and Gravel Pit and were turned into subdivisions. The intent was to develop the lands as veterans housing after WWII. This area has potential to be identified as a Cultural Heritage Landscape and is evaluated in Section 7.3 of this report. Portions of the Conn Smythe subdivision are located within close proximity of the Black Creek Channel.

6.2.5 Alliance Avenue

Alliance Avenue is part of Lot 39, Concession 3 and appears to have been developed as an industrial area at some point between 1900 and 1962. The City of Toronto Building Construction Dates map confirms that the majority of buildings in this area were constructed during or after the mid. 20th century. This area is sited away from the Black Creek Channel and is not anticipated to be impacted by Flood Remediation activities.

Figures 62 & 63: (left) Detail of 1962 aerial photograph of Alliance Avenue, noting presence of industrial buildings, (right) Detail of the City of Toronto Building Construction Dates Map for the Alliance Avenue area (Source: MHBC, 2019)

6.2.6 Rockcliffe Crescent

This area is located south of Black Creek, east of Jane Street. According to the 1957 aerial photo of the broader study area boundaries, this area was already used for Industrial activities. The 1974 topographic map of the area notes that this area formerly included Greenhouses. The existing 'Senso' business at 301 Rockcliffe Court includes two greenhouses which are not original to the industrial developments of the 1950s. This area has been considerably altered since the mid. 20th century and is sited away from the Black Creek Channel. This area is not anticipated to be impacted by Flood Remediation activities.

Figures 64 & 65: (left) Detail of 1957 aerial photo of the broader study area and the 'Rockcliffe Crescent' area, east of Jane Street (right) Detail of the City of Toronto Building Construction Dates Map for the Rockcliffe Crescent Area (Source: MHBC, 2019)

6.2.7 Symes Road, Glen Scarlett Road, McCormack Street, Gunns Road

The south-east corner of the broader study area was historically used for industrial purposes as per a review of the 1924 Fire Insurance Plans. This area includes what is now the 'Stockyards' retail shopping area at the north-west corner of Weston Road and St. Clair Avenue as well as the new brewery outlet at 150 Symes Road. The remainder of this area along Glen Scarlett Road includes 20th century industrial buildings. The majority of mid. 20th century industrial buildings has since been removed from this portion of the site in order to accommodate new developments, such as the 'Stockyards' shopping area.

6.3 Summary of Secondary Screening

Of these identified areas of the broader study area, the Conn Smythe Subdivision is the only area which has potential for meeting the criteria of a Cultural Heritage Landscape under PPS 2014. This area includes readily distinguishable geographical boundaries as per maps and plans dating to the mid. 20th century. The City of Toronto Building Construction Dates Map notes that the vast majority of residential buildings in this area were constructed between 1946 and 1960 and many are likely 'Victory Housing' as a result of the subdivision of Conn Smythe after WWII. The majority of the Conn Smythe subdivisions are located within the study area.

7.0 Evaluation of Cultural Heritage Resources

The following sub-sections of this report provide an evaluation of the properties, landscapes and features which have been identified in the preliminary and secondary screening process as being of potential cultural heritage value or interest and warrant evaluation as per *Ontario Regulation 9/06*. These criteria have been adopted as standard practice in determining significant cultural heritage value or interest. This evaluation is the result of available historical documentation and field investigation conducted from the public realm only as permission to enter private property has not been granted.

7.1 Evaluation Criteria

7.1.1 Evaluation Criteria under Ontario Regulation 9/06

The *Ontario Heritage Act*, R.S.O, 1990, c.0.18 remains the guiding legislation for the conservation of significant cultural heritage resources in Ontario. This Cultural Heritage Evaluation Report has been guided by the criteria provided with *Regulation 9/06* of the *Ontario Heritage Act* which outlines the mechanism for determining cultural heritage value or interest. The regulation sets forth categories of criteria and several sub-criteria.

Ontario Regulation 9/06 prescribes that: A property may be designated under section 29 of the Act if it meets one or more or the following criteria for determining whether it is of cultural heritage value or interest:

1. *The property has design value or physical value because it,*
    - *i. is a rare, unique, representative or early example of a style, type, expression, material or construction method,*
    - *ii. displays a high degree of craftsmanship or artistic merit, or*
    - *iii. demonstrates a high degree of technical or scientific achievement.*
2. *The property has historical value or associative value because it,*
    - *i. has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community,*

  - *ii. yields, or has the potential to yield, information that contributes to an understanding of a community or culture, or*
  - *iii. demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.*

3. *The property has contextual value because it*
    - *i. is important in defining, maintaining or supporting the character of an area,*
    - *ii. is physically, functionally, visually or historically linked to its surroundings, or*
    - *iii. is a landmark.*

7.1.2 Evaluation Criteria for Bridges and Engineering Structures

Bridges and similar structures can demonstrate cultural heritage significance as they communicate scientific innovation and engineering. This is related to the development and use of materials, construction methods, design, and aesthetics. While bridges are constructed for their functional purposes (such as crossing waterways and other obstructions), they can also be aesthetic in nature and complement their surrounding context, becoming notable landmarks (MTO, 1991).

A bridge must be evaluated as per Ontario Regulation 9/06 to determine whether or not it meets the criteria as being of cultural heritage value or interest. This can include an analysis of structural materials, date of construction, design value, historical associations, architect, etc.

Bridges can be organized into three basic types, namely beam, arch, and suspension bridges. Bridge materials can range from wood, stone, steel, concrete, and others. Wood and stone represent the earliest materials used in bridge construction in Ontario. Concrete bridges appear in Ontario in the early 20th century (Cuming, 1983).

Bridges are designed based on their environment and required load capacity. The context and surrounding landforms for an intended bridge can dictate its construction techniques, design, and even materials. This can include (but is not limited to) the presence of water, valleys, soil conditions, ground conditions, slope and topography (Cuming, 1983).

The relative significance of bridge can be determined by several factors, including whether or not it is the first of its kind (prototype bridge), exemplary of its kind (i.e. the longest), is rare (i.e. few survive) (Ontario Heritage Bridge Guidelines).

Bridges do not need to be of a certain age to determine cultural heritage significance. Generally, bridges which are more than 40 years of age or more are flagged for further evaluation. Bridges listed in the MTO Ontario Heritage Bridge Guidelines (Provincially Owned Bridges) (2008) range in date of construction from 1873 to 1940.

Evaluation criteria (O-Reg 9/06) as it is specifically applied to bridges is provided in the Ontario Heritage Bridge Guidelines for Provincially Owned Bridges (MTO, 2008) and has assisted the evaluations of bridges/culverts in Section 7.3 of this report.

7.2 Historical Summary of Bridges/Culverts in North America and Ontario

In order to determine whether or not the bridges/culverts or other engineered-type structures are of potential cultural heritage significance, a brief history or context of these structures must be given. The following provides a brief history of these structures in North American (and Ontario) as it relates to the availability and first introduction of materials, bridge types, advancements in bridge design, and types of structures which are defined as 'common' in the 20th and 21st centuries.

According to the Humber Heritage Bridge Inventory (TRCA, 2011), steel bridges first appeared in the United States in the 1870s and was recognized by the Canadian Society of Civil Engineers in 1886. Steel was considered a more affordable and stronger material than iron and became the primarily material for bridge construction after 1870 (TRCA, 2011).

Concrete was introduced as a bridge material after the turn-of-the-century. The first concrete bridges featured arch designs in the early 1900s. Simple solid slab bridges were ideal for crossing short spans. Longer span bridges at this time period was troublesome as it resulted in cracks under tension. By the 1930s concrete was considered the primary bridge material (over steel) and was popular in Ontario where aggregate sources were readily available (TRCA, 2011; HRC, 2013).

By 1915, editorials in The Canadian Engineer outlined the lack of aesthetic design in concrete bridges, stating a need to respect the natural environment. Engineers and designers were including aesthetics into their designs by 1939 (Cuming, 1983).

Due to the shortage of labour and availability of materials, bridges were not often constructed during WWII (Arch, Truss and Beam). Following WWII, there was a greater demand for bridge capacity and safety – which may also be related to the increasing reliance on automobiles.

By the 1950s and 1960s, bridges were again constructed in plain styles without decoration. Older bridges were replaced with ones using a standardized design. Most of Ontario's earliest and unique structures have been removed from the landscape (HRC, 2013).

The rigid frame concrete bridge was first introduced in 1931 and quickly became the standard for highway overpasses. Concrete bridges grew in popularity due to flexibility in design. Reinforced concrete was developed shortly thereafter. The first rigid frame concrete bridges were first used on the Queen Elizabeth Highway in 1938 (TRCA, 2011).

All bridges located within the study area are either of either the Rigid Frame, Half-Through Truss, or Beam and Girder type. The culvert is considered an arched culvert with closed footing. The following provides context as to these types of structures.

In the early 20th century advances were made in the design of steel and concrete bridges/structures. Concrete bridges grew in popular from the 1890s into the 20th century. Concrete standardized bridges did not need to rely on arched designs. Truss bridges were replaced.

Concrete bridge designs were developed and the concrete slab and girders were used by 1898, with continuous slabs by 1909, and rigid frames by 1922. T-Beam and pressed concrete by 1937 (Context for Historic Bridge Types).

Rigid Frame Concrete Bridges

Rigid Frame bridges were first developed in Germany and used in North America by the1920s. This bridge type was preferred as it was inexpensive and relatively easy to build, and could be made aesthetically pleasing. By the 1940s there were more than 400 rigid frame bridges in the United States. Standard plans based on designs by Arthur C. Hayden design were considered a 'homogenous unit of beams, slab, and walls' and form one solid cast-in-place structure. All of the larger road/vehicular bridges located within the study area are rigid frame types made of cast-in-place concrete. These bridges can have one or multiple spans and usually include a parapet railing. According to Parsons Brickerhoff (2005), culturally significant rigid frame bridges are those which date to their early period of development (1920s) or are representative of this early type of standard bridge design.

Culverts

Little information is found on the history of culverts in Ontario compared to bridges and other engineered structures. However, culverts were used historically to fulfill the same function as they do today which is to improve the flow of water. According to Rossow (n.d.), culverts are designed to increase water carrying capacity and are covered with an embankment. Culverts have been known to be overlooked in history (compared to bridges, for example), as their form and function make them less visible from the landscape.

According to the Humber River Heritage Bridge Inventory (TRCA, 2011), only two culverts which are of significant cultural heritage value have been identified. This includes the following:

- Caledon Trailway – East and West Culvert (single span stone arch culvert, constructed c. 1889 – designated in 1996 under the Ontario Heritage Act, Town of Caledon);

The heritage bridge inventory for the Grand River Watershed (HRC, 2013) notes one culvert which was identified as being of cultural significance due to its unique design and outstanding construction. This is noted as the stone arched bridge and culvert constructed c. 1854 in the County of Brant.

The Canadian Register of Historic Places does not list any significant culverts or similar structures at this time.

According to Rossow (n.d.), culverts made of cast-in-place concrete are typically either arch-shaped or rectangular-shaped (also known as 'box'), but can also come in circular, pipe-arch, horizontal elliptical, and vertical elliptical shapes. Culverts can include one or multiple barrels and have a span of 24 to 41 feet. Arched culverts are typically used for environments with low and wide waterway. In recent years, corrugated metal culverts are used (since the 1960s) where possible as they are safe, functional and inexpensive.

7.3 Evaluation of Bridges and Culvert within the Study Area

An evaluation of each of the bridges and one culvert located within the study area is provided in Appendix E of this report. Only four (4) of these structures are more than 40 years old, being constructed prior to 1979. This includes Structure ID. Nos 704, 703, 702, and 091. Based on the cultural heritage evaluations based on the criteria as per Ontario Regulation 9/06, none of these structures are considered cultural heritage resources.

7.4 Evaluation of the Conn Smythe Subdivision

As previously noted in this report, the broader study area includes the mid. 20th century subdivision by Conn Smythe for the purposes of providing housing to WWII Veterans. Mid. 20th century Veterans ('Victory') housing neighbourhoods dated to the WWII period are becoming more frequently studied and identified as being potentially cultural heritage resources. For example, the City of Toronto is currently considering undertaking a study of the Sunshine Valley area. If this area is studied, the City of Toronto has noted that it would represent the first post-war suburban neighbourhood considered for designation under the *Ontario Heritage Act* (City of Toronto, 2017).

This area is located within proximity of Black Creek and meets the criteria of the definition of a CHL. The following will evaluate this criteria to determine whether or not the area is significant.

Further guidelines and criteria for identifying and evaluating potential Cultural Heritage Landscapes are provided below as per Provincial Policy Statement and the Ontario Heritage Toolkit.

A cultural heritage landscape is defined by Provincial Policy Statement 2014 as follows:

> *Cultural Heritage Landscape: means a defined geographical area that may have been modified by human activity and is identified as having cultural heritage value or interest by a community, including an Aboriginal community. The area may involve features such as structures, spaces, archaeological sites or natural elements that are valued together for their interrelationship, meaning or association. Examples may include, but are not limited to, heritage conservation districts designated under the Ontario Heritage Act; villages, parks, gardens, battlefields, mainstreets and neighbourhoods, cemeteries, trailways, viewsheds, natural areas and industrial complexes of heritage significance; and areas recognized by federal or international designation authorities (e.g. a National Historic Site or District designation, or a UNESCO World Heritage Site).*

The Ontario Heritage Toolkit identifies that a Cultural Heritage Landscape may be classified as either designed (purposely planned), evolved (grown over a period of time), static/relict (evolutionary process has ended), or dynamic (continuing to evolve).

Cultural Heritage Landscapes are also identified and evaluated based on their associative/historical value, such as with themes or events, the identification of a grouping of heritage resources within a defined area, and its value as determined by a community based on local histories and public consultations, for example.

Design/Physical Value

The existing neighbourhoods within the broader context of the study area which are a result of the Conn Smythe subdivisions in the mid. 20th century include 'Victory Housing' typical of this time period. According to Blumenson, these residential buildings are easily distinguished by their simplicity of form, lack of decoration, small size, and placement of doors and windows (usually 3 bays) with a simple front or side gabled roof. These houses were often prefabricated and assembled on-site. These buildings are sited on planned subdivisions with crescent and cul-de-sac streets. Their presence often dominates the landscape and culminates in a distinct setting. Many of these houses are present at the western portion of the study area both north and south of Smythe Park. While this is true, the vast majority of these mid. 20th century houses have been altered to include additions, new porches, new windows, and new cladding resulting in the loss of some of the areas heritage integrity.

Historical or Associative Value

This portion of the broader study area boundary is associated with Constantine (Conn) Falkland Cary Smythe, former owner of the C. Smythe Sand and Gravel Pit Ltd. and former owner of the Toronto Maple Leafs and was significant in the construction of Maple Leaf Gardens. Smythe was also a Veteran of WWI and WWII and was involved with other philanthropic activities and charities in Toronto (Canadian Encyclopedia).

Contextual Value

The Conn Smythe subdivisions are not functionally related to the study area or Black Creek. The area was chosen by Smythe as it was underdeveloped in the mid. 20th century and was located on and adjacent to land which was formerly part of the Smythe Sand and Gravel pit. A map noting the location of these lands is provided in Appendix G of this report.

8.0 Conclusions and Recommendations

Bridges and Culverts

This CHER has provided an analysis of all the bridges and culverts within the identified study area and has determined that none of them are considered significant cultural heritage resources. If any of these bridges and culverts are to be impacted by the Flood Remediation and Transportation Feasibility of the Rockcliffe Special Policy Area Environmental Assessment, review by way of a Heritage Impact Assessment is not necessary.

150 Symes Road

The study area includes one cultural heritage resource located at 150 Symes Road, which is designated under Part IV of the *Ontario Heritage Act* and is subject to a Heritage Easement Agreement. This property is sited away from Black Creek Channel at a distance of more than 600 metres. Therefore, it is unlikely that any activities related to flood remediation as part of this Environmental Assessment will have an impact on the property at 150 Symes Road. A Heritage Impact Assessment is not necessary for this property provided that the EA will not result in alterations to this property or lands which are directly adjacent.

Conn Smythe Subdivision

The study area also includes a portions of the post WWII-era Conn Smythe Subdivisions which are located near what is now Smythe Park, at the west end of the broader study area. The Conn Smythe subdivision areas as noted in this report meet the PPS 2014 definition of a potential Cultural Heritage Landscape. Provided that the EA will not result in alterations to these areas which are related to a) the removal/demolition of buildings and structures, and/or b) changes to lot fabric and circulation patterns, review by way of a Heritage Impact Assessment is not necessary.

9.0 References

Blackett Robinson, 1885. History of Toronto and County of York

Blumenson, John. *Ontario Architecture: A Guide to Styles and Building Terms 1874 to the Present*. Fitzhenry and Whiteside, 1990.

Chamberlin, William P. Transportation Research Board. National Cooperative Highway Research Program, Synthesis of Highway Practice 101. Historic Bridges – Criteria for Decision Making. 1983.

Corporation of the City of Toronto, Chief Planner and Executive Director of the City of Toronto Planning Division. *Authorization to Study Sunshine Valley as a Potential Heritage Conservation District*. May 4, 2017. Accessed online at https://www.toronto.ca/legdocs/mmis/2017/te/bgrd/backgroundfile-103849.pdf

D.J. Cuming. Ontario's Heritage Bridge Program. Canadian Journal of Civil Engineering. Volume 11, No. 2, 1984.

Dean, W.G. and Matthews, G.J., *Economic Atlas of Ontario*, 1st Ed., Toronto: University of Toronto Press, 1969.

http://www.etobicokehistorical.com/edward-scarlett-house.html

Ministry of Environment, Ontario. *Environmental Assessment Act*, 2006.

Ministry of Tourism, Culture and Sport. Check Sheet for Environmental Assessments: Screening for Impacts to Built Heritage Resources and Cultural Heritage Landscapes, 2010.

Ministry of Tourism, Culture and Sport. Ontario Heritage Act, 2005.

Ministry of Tourism, Culture and Sport. Ontario Heritage Toolkit, 2006.

Ministry of Tourism, Culture and Sport. Standards and Guidelines for the Conservation of Provincial Heritage Properties, 2010

Ministry of Transportation, Ontario. *Environmental Guide for Built Heritage and Cultural Heritage Landscapes*, 2007.

Ministry of Transportation and Ministry of Culture and Communications. Ontario Heritage Bridge Program, 1991.

Ministry of Transportation. Ontario Heritage Bridge Guidelines for Provincially Owned Bridges, 2008.

Heritage Resources Centre. Heritage Bridges Identification and Assessment Guide, Ontario 1945 – 1965, n.d.

Lucas, John. Heritage Aspects of Bridge Engineering, Paper prepared for presentation at the…2012 Conference of the Transportation Association of Canada, Fredericton, New Brunswick., 2012.

Parsons Brickerhoff and Engineering and Industrial Heritage. A Context for Common Historic Bridge Types, NCHRP Project 25-25, Task 15. Prepared for the National Cooperative Highway Research Program, Transportation Research Council, National Research Council, 2005.

Toronto Archaeological Master Plan. 2004

Appendix A – Map of Study Area and Bridges/Culverts

Figure
Bridges & Culverts

Rockcliffe Special Policy Area
City of Toronto

Legend

🟥	Study Area
▬	Black Creek Channel
○	Bridge
○	Culvert

Sources

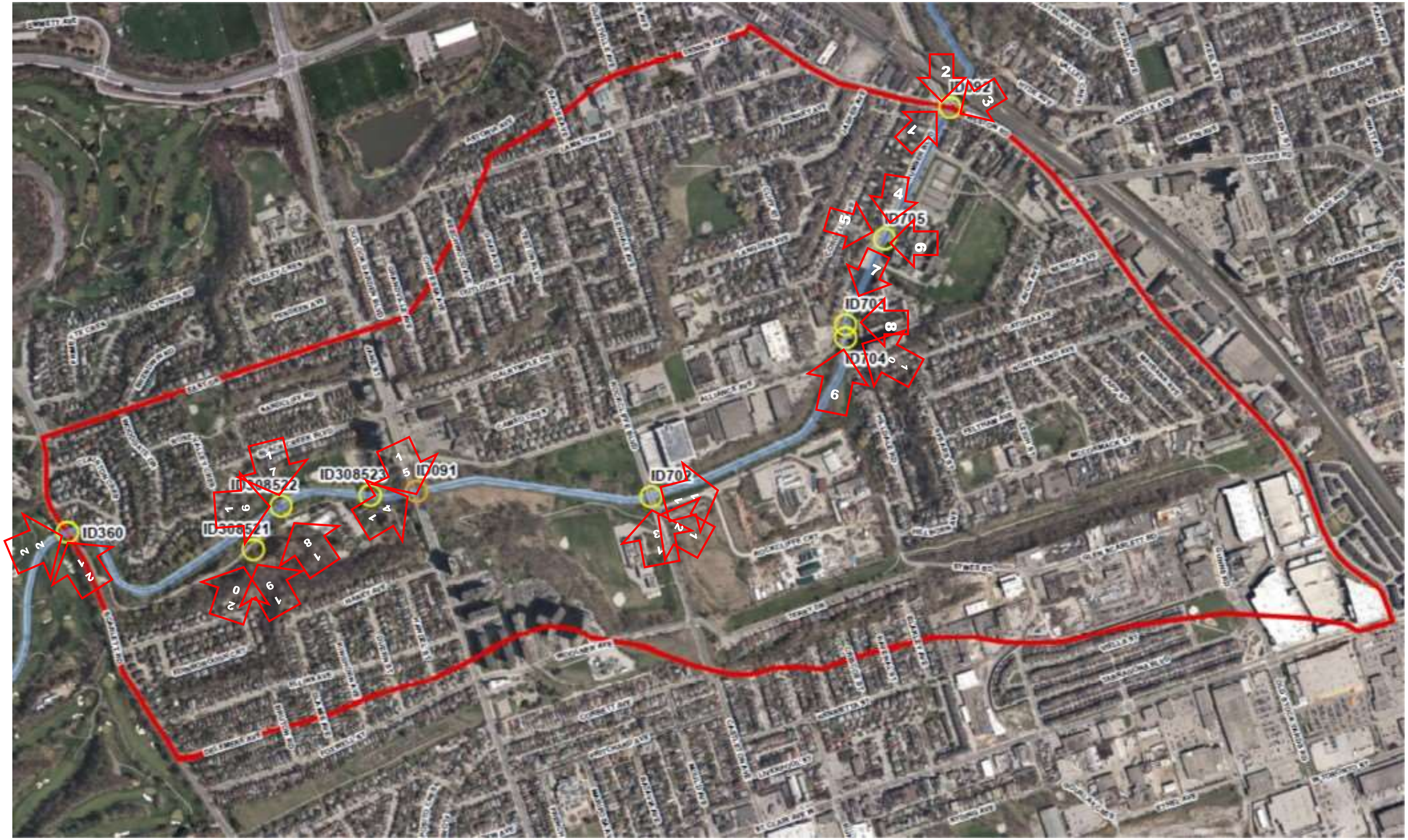
- Contains information licensed under the Open Government License - Ontario
- Aerial - Esri Imagery Basemap

Date:	August 27, 2019
File:	1960E
Scale:	1:10,000
Drawn:	JB

Document Path: K:\1960E - Rockcliffe SPA Toronto\Rpt\Bridges & Culverts.mxd

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
200-540 BINGEMANS CENTRE DR. KITCHENER, ON. N2B 3X9
P: 519.576.3650 F: 519.576.0121 | WWW.MHBCPLAN.COM

Appendix B – Photo Map (Bridges and Culverts)



Map 1: Location of study area outlined in red. Approximate location of photographs taken noted with red arrows. (Source: MHBC, 2019)

Figures 1 & 2: (left) View of Bridge ID no. 092 looking north-east from south-east corner of Humber Avenue and Weston Road , (right) View of Bridge ID no. 092 looking north from south-west corner of Humber Avenue and Weston Road (Source: MHBC, 2019)

Figures 3 & 4: (left) View of Block Creek Channel looking south-west from south side of Bridge ID no. 092, (right) View of Bridge ID no. 705 looking west from south-east corner of Humber Boulevard and Louvain Street (Source: MHBC, 2019)

Figures 5 & 6: (left) View of Bridge ID no. 705 looking south-east from the north-west corner of Louvain Street and Humber Boulevard North, (right) View of Bridge ID no. 705 looking south-west from Humber Boulevard South (Source: MHBC, 2019)

Figures 7 & 8: (left) View of Black Creek Channel looking south-west from Bridge ID no. 705, (right) View of Bridge ID no. 703 looking west from the intersection of Hilldale Road and Humber Boulevard South (Source: MHBC, 2019)

Figures 9 & 10: (left) View of Bridge ID no. 703 looking north from Alliance Avenue, (right) View of Bridge ID no. 704 looking north-west from the corner of Hilldale Road and Symes Road Park Trail/Pathway (Source: MHBC, 2019)

Figures 11 & 12: (left) View of Black Creek Channel looking east from Bridge ID no. 702, (right) View of Bridge ID no. 702 looking west from Rockcliffe Court (Source: MHBC, 2019)

Figures 13 & 14: (left) View of Bridge ID no. 702 looking North from the corner of Rockcliffe Boulevard and Black Creek Trail, (right) View of Culvert ID no. 091 looking north-east from the Black Creek Channel (Source: MHBC, 2019)

Figures 15 & 16: (left) View of Bridge ID no. 091 looking North down Jane Street, (right) View of Bridge ID no. 308523 looking east from the Black Creek Channel (Source: MHBC, 2019)

Figures 17 & 18: (left) View of Bridge ID no. 308522 looking south-west from Black Creek Channel, (right) View of Bridge ID no. 208522 looking south from Smythe Park (Source: MHBC, 2019)

Figures 19 & 20: (left) View of Bridge ID no. 308521 looking north towards Black Creek Trail, (right) View of Bridge ID no. 308521 looking south-west from Black Creek Trail (Source: MHBC, 2019)

Figures 21 & 22: (left) View of Bridge ID no. 360 looking north-west from Scarlett Road, (right) View of Bridge ID no. 360 and Black Creek Channel looking north-east from Lambton Golf and Country Club (Source: MHBC, 2019)

Appendix C – Photo Map (Context/Study Area)

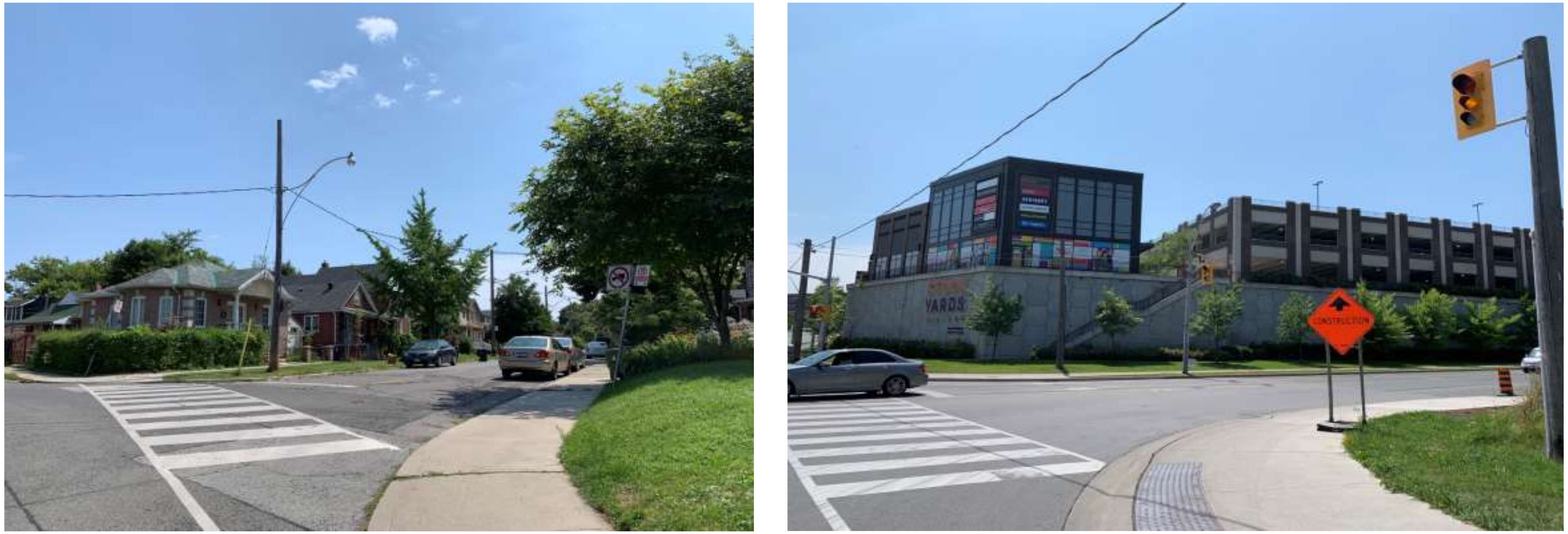
Map 1: Location Map of Study Bridge Sites (MHBC, 2019)

Figures 1 & 2: (left) View of Weston Road looking north-west from intersection of Weston Road and Humber Boulevard, (right) View of Weston Road looking south-east from intersection of Weston Road and Humber Boulevard (Source: MHBC, 2019)

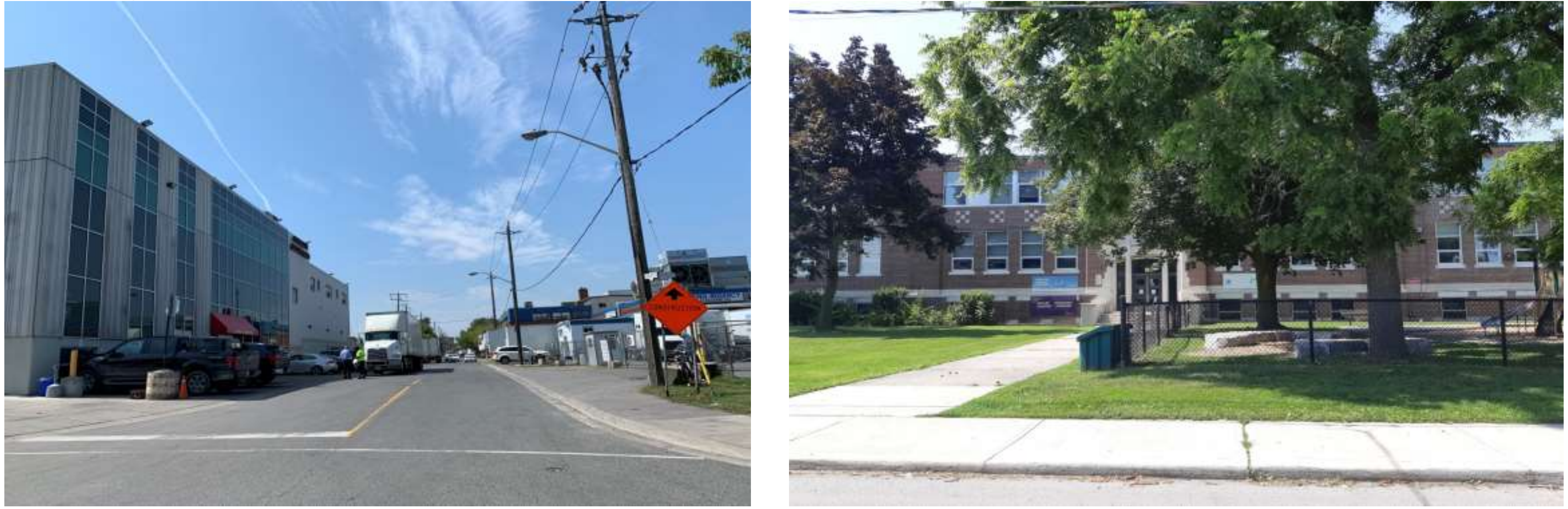
Figures 3 & 4: (left) View of Humber Boulevard South and adjacent Black Creek Channel looking south-west from Weston Road , (right) View of Louvain Street looking west from north corner of Louvain Street and Humber Boulevard North (Source: MHBC, 2019)

Figures 5 & 6: (left) View of Humber Boulevard North looking north from corner of Louvain Street and Humber Boulevard North, (right) View of Humber Boulevard elevation looking south from the (Source: MHBC, 2019)

Figures 7 & 8: (left) View of Alliance Avenue elevation looking north-east from west from north corner of Hilldale Road and Humber Boulevard North, (right) View of Humber Boulevard elevation looking north-east from the south corner of Hilldale Road and Alliance Avenue (Source: MHBC, 2019)



Figures 9 & 10: (left) View of Maybank Avenue from south-west corner of Northland Avenue and Maybank Avenue, (right) View of "Stock Yards" looking south from north-west corner of Weston Road and Gunns Road (Source: MHBC, 2019)



Figures 11 & 12: (left) View of Glen Scarlett Road looking south from corner of Gunns Road and Glen Scarlett Road , (right) View of Hairwood Public School looking west from Leigh Street (Source: MHBC, 2019)

Figures 13 & 14: (left) View of commercial/industrial buildings looking north-east from Hillborn Avenue, (right) View of low-rise residential dwelling looking south from Hillborn Avenue (Source: MHBC, 2019)

Figures 15 & 16: (left) View of Rockcliffe Court and Black Creek looking east from intersection of Rockcliffe Boulevard and Rockcliffe Court, (right) View of Rockcliffe Boulevard looking south from the intersection of Black Creek Trail and Rockcliffe Boulevard (Source: MHBC, 2019)

Figures 17 & 18: (left) View of Rockcliffe Road looking north from intersection of Black Creek Trail and Rockcliffe Road, (right) View of Black Creek Trail looking west with adjacent Black Creek on right (Source: MHBC, 2019)

Figures 19 & 20: (left) View of Black Creek Trail (front) and Black Creek channel (far) looking north from Black Creek Trail, (right) View of Jane Street looking north from south of Bridge ID no. 091 (Source: MHBC, 2019)

Figures 21 & 22: (left) View of Jane Street looking south from north of Bridge ID no, 091, (right) View of Black Creek Trail looking east from Smythe Park with Bridge ID no. 308552 on right (Source: MHBC, 2019)

Figures 23 & 24: (left) View of Black Creek Trail looking east towards Smythe Park , (right) View of Scarlett Road looking south from the north of Bridge ID no. 360 (Source: MHBC, 2019)

Figures 25 & 26: (left) View of Scarlett Road looking north from south of Bridge ID no. 360, (right) View of low-rise residential dwellings looking south-east from East Drive (Source: MHBC, 2019)

Figures 27 & 28: (left) View of Noble Park looking south from East Drive, (right) View of low-rise residential dwellings looking south from East Drive (Source: MHBC, 2019)

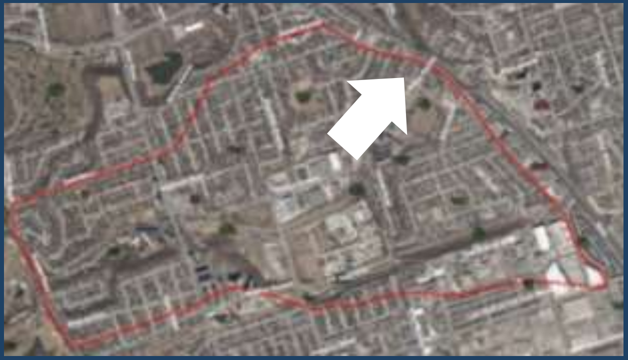
Figures 29 & 30: (left) View of low-rise residential dwellings looking south-east from north-west intersection of Outlook Avenue and Grandville Avenue, (right) View of Lambton Avenue looking east from the south-east intersection of Gray Avenue and Lambton Avenue (Source: MHBC, 2019)

Figures 31 & 32: (left) View of single-detached residential dwellings looking north from Lambton Avenue , (right) View of low-rise residential dwellings looking north from south-west intersection of Lambton Avenue and Guestville Avenue (Source: MHBC, 2019)

Figures 33 & 34: (left) View of low-rise residential housing looking north-east from Jasper Avenue, (right) View of light commercial area looking north-east from north corner of Weston Road and Jasper Avenue (Source: MHBC, 2019)

Appendix D – Bridge/Culvert Data Sheets

ID 092

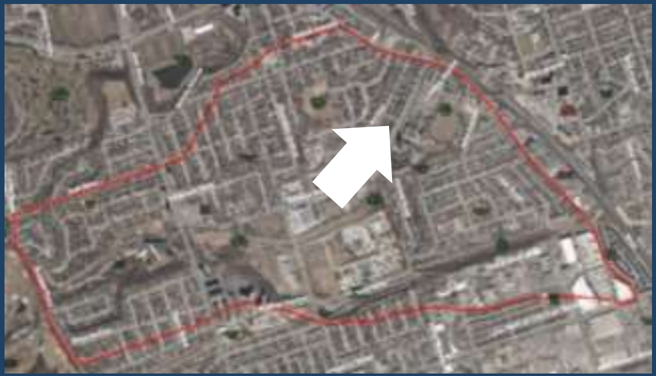


Type.	BRIDGE: Road/Vehicular (Rigid Frame, Vertical Legs)
Construction Date.	1980 (Repairs in 2006: new Parapet walls, railing system, sidewalk, median)
Location.	Intersection of Weston Road, Black Creek Drive, Humber Blvd N.
Cultural Heritage Evaluation *O-Reg 9/06* Summary.	✗ Not significant

Notes:

- Parapet wall with single railing (aluminum post and panels)
- Cast-in-place concrete barriers and abutments, reinforced concrete retaining walls
- Cast-in-place concrete deck, Asphalt deck top
- City of Toronto Plaque '1980, 2006' (original construction date and repairs)

ID 705



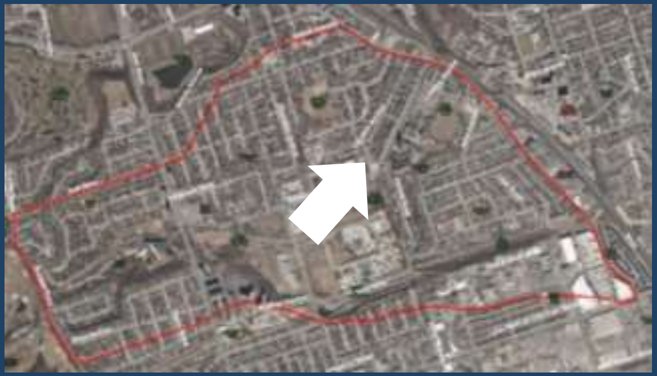
Type.	BRIDGE: Pedestrian (Half-Through Truss)
Construction Date.	2015 (original structure dated 1943, replaced in 1975 and again in 2015)
Location.	Near intersection of Humber Blvd N and Louvaine St.
Cultural Heritage Evaluation *O-Reg 9/06* Summary.	✗ Not significant

Notes:

- Steel deck top
- Galvanized steel Railing on Truss;
- Box/trapezoidal beams
- Cast-in-place concrete abutments and retaining walls
- Construction Marker (see photo above):

EAGLE BRIDGE, MAX LOAD 80 P.S.R., DO NOT APPLY SALT OR CALCIUM ON THIS STRUCTURE, E13-111186, 1 519 743 4353

ID 703

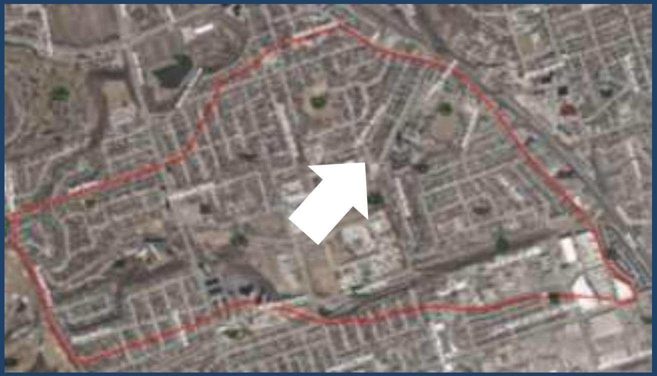


Type.	BRIDGE: Road/Vehicular (I-Beam/Girder)
Construction Date.	1975
Location.	Near intersection of Humber Blvd N., Humber Blvd S. and Hilldale Road.
Cultural Heritage Evaluation *O-Reg 9/06* Summary.	✗ Not significant

Notes:

- Cast-in-place concrete and asphalt deck
- Cast-in-place concrete sidewalk and median
- Galvanized steel post and panel railing
- Precast concrete girders (below deck)
- Cast-in-place concrete abutments and reinforced concrete retaining walls

ID 704

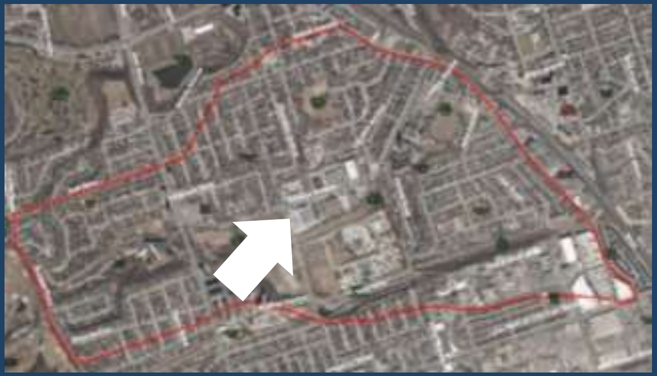


Type.	BRIDGE: Road/Vehicular (I-Beam, Girder)
Construction Date.	1975
Location.	Near intersection of Humber Blvd N., Alliance Ave, Hilldale Road
Cultural Heritage Evaluation *O-Reg 9/06* Summary.	✗ Not significant

Notes:

- Cast-in-place concrete and asphalt deck;
- Cast-in-place concrete sidewalk and median;
- Galvanized steel post and panel railing;
- Precast concrete girders (below deck);
- Cast-in-place concrete abutments and reinforced concrete retaining walls;

ID 702

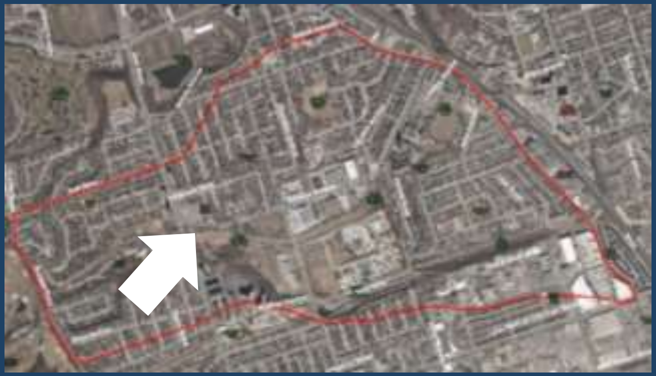


Type.	BRIDGE: Road/Vehicular (Rigid Frame, Vertical Legs)
Construction Date.	1963 (Widened, Repairs to Abutments and Wingwalls, Parapet walls replaced in 2007)
Location.	Rockcliffe Blvd. over Black Creek
Cultural Heritage Evaluation *O-Reg 9/06* Summary.	✗ Not significant

Notes:

- Cast-in-place concrete and asphalt deck;
- Cast-in-place concrete sidewalk/median/curb
- Cast-in-place concrete barrier and parapet walls with single railing system (aluminum post and panel);
- Cast-in-place abutments
- Toronto Plaque (1963, 2007)

ID 091

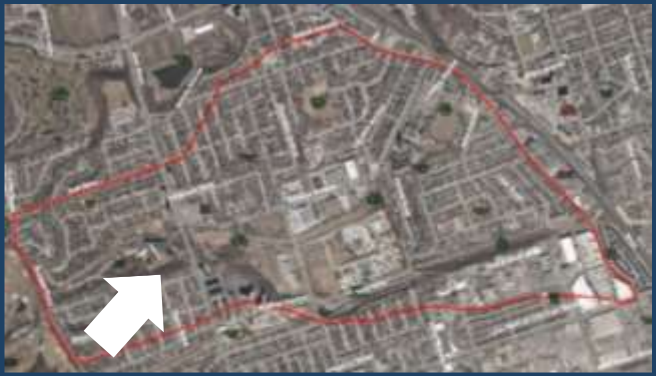


Type.	Culvert (Barrel Arch Culvert)
Construction Date.	1948 (1964 Barrel extended at both ends)
Location.	Jane Street over Black Creek
Cultural Heritage Evaluation *O-Reg 9/06* Summary.	✗ Not Significant

Notes:

- Cast-in-place concrete and asphalt deck
- Cast-in-place concrete sidewalk/curb/median
- Steel flex beam on wood post railing system
- Wood barriers (posts)
- Galvanized steel hand railing
- Cast-in-place concrete culvert (inlet and outlet components at headwall and wingwalls)
- Cast-in-place concrete barrel (arch);

ID 308523

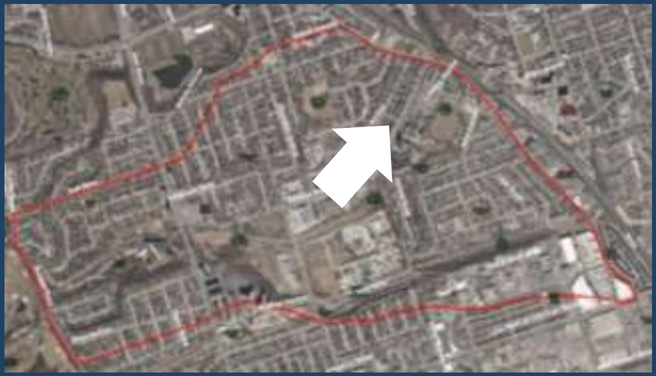


Type.	BRIDGE: Pedestrian (T-Beams/Girder)
Construction Date.	1980
Location.	Smythe Park over Black Creek
Cultural Heritage Evaluation *O-Reg 9/06* Summary.	✗ Not Significant

Notes:

- Precast concrete deck top;
- Steel post and panel railing system;
- Precast concrete girders (T-type);
- Cast-in-place concrete abutments and ballast walls;
- Cast-in-place reinforced concrete retaining walls;

ID 308522



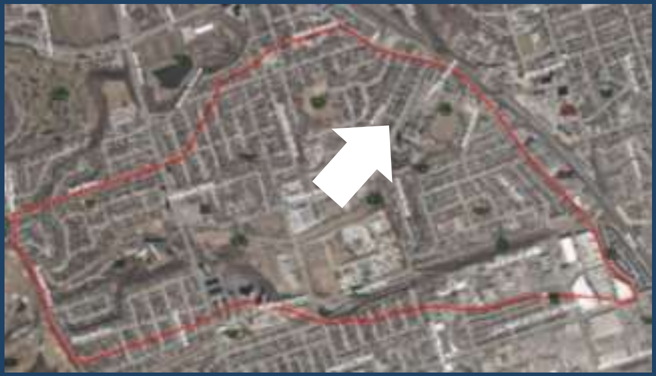
Type.	BRIDGE: Pedestrian (Half-Through Truss)
Construction Date.	2005
Location.	Smythe Park over Black Creek
Cultural Heritage Evaluation *O-Reg 9/06* Summary.	✗ Not Significant

Notes:

- Steel joints (armoring/retaining devices)
- 2-Rail steel and wood railing system
- Steel box/trapezoidal floor beams
- Cast-in-place concrete abutment walls
- Cast-in-place reinforced concrete wingwalls

ID 308521

Type.	BRIDGE: Pedestrian (I-Beams/Girder)
Construction Date.	2000
Location.	Smythe Park
Cultural Heritage Evaluation *O-Reg 9/06* Summary.	✗ Not significant



Notes:

- Wood plank deck top
- Steel post and panel railing system
- Steel I-Type girders
- Steel Floor Beams

ID 360

Type.	BRIDGE: Road/Vehicular (Rigid Frame, Vertical Legs)
Construction Date.	1983
Location.	Scarlett Road over Black Creek
Cultural Heritage Evaluation *O-Reg 9/06* Summary.	✗ Not Significant

Notes:

- Cast-in-place concrete and asphalt decks
- Cast-in-place concrete sidewalk/curb/median
- Cast-in-place parapet walls
- Aluminum post and panel single railing system
- Cast-in-place concrete abutments
- Cast-in-place reinforced concrete wingwalls

Appendix E – Bridge/Culvert Heritage Evaluation Tables

Ontario Regulation 9/06

ID 091

Design/Physical Value

i. Rare, unique, representative or early example of a style, type, expression, material or construction method	No. While Culvert ID. 091 was originally constructed in 1948, it is not considered an early concrete structure as the material was widely used by the 1920s in North America. The culvert was altered in 1964 resulting in extending the barrel arch considerably at either ends in 1964, requiring numerous alterations to the structure. Cast-in-place concrete culverts of this type are not rare or unique in Ontario as per a review of the Government of Ontario List of Provincial Bridges (2017).
ii. Displays high degree of craftsmanship or artistic merit	No. The bridge does not display a high degree of craftsmanship or artistic merit. Drawings of the existing bridge confirm that it was constructed of cast-in-place concrete and was designed based on function rather than aesthetics as the structure is not visible from the public realm along Jane Street.
iii. Demonstrates high degree of technical or scientific achievement	No. Culvert ID. 091 does not demonstrate a high degree of technical or scientific achievement. It does not signify a progressive leap in bridge engineering standards as culverts constructed of cast-in-place concrete were considered commonplace by the 1920s.

Historical/Associative Value

i. Direct associations with a theme, event, belief, person, activity, organization, institution that is significant	No. Culvert ID. 091 is not associated with a theme, event, person, activity, organization or institution that is significant. The culvert was constructed in 1948, altered in 1964 has not been part of the landscape long enough to accumulate any significant associations. In addition to this, its design and function is not intended to be visible from the pedestrian realm along Jane Street and therefore is less likely to develop any significant associations.
ii. Yields, or has potential to yield information that contributes to an understanding of a community or culture	No. This criteria is commonly (but not necessarily) associated with buried archaeological resources which may or may not be present. This structure is not considered significant in its design/physical or associative values and is not anticipated to yield further information which is significant to understanding the Smythe-Rockcliffe community.
iiii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer, or theorist who is significant to the community.	No. The original culvert was significantly smaller than the existing design was drawn by R. Foster, 1931 of the Township of York Department of Works. There is no evidence to suggest that the designer of the culvert Is considered significant to the local community.

Contextual Value

i. Important in defining, maintaining or supporting the character of an area	No. The bridge is only visible from its immediate context while travelling over the bridge along Rockcliffe Boulevard. The bridge and its parapet walls are also visible from the adjacent Black Creek Trail and Rockcliffe Crescent. As the bridge is standard in its design, it is not important in defining, maintaining, or supporting the character of the Smythe-Rockcliffe community.
ii. Physically, functionally, visually, or historically linked to its surroundings	No. While Culvert ID 091 is functionally related to its surroundings as it improves the flow of water of the Black Creek Channel and provides a crossing along Jane Street, it is not significant in its functional relationship to the environment. The bridge could be replaced with another of its kind and would not result in impacts to any physical, functional, visual or historical relationships.
iii. Is a landmark	No. The only portions of concrete which are visible from Jane Street includes its asphalt deck and aluminum barriers, which are typical of any road. The arch of the culvert is only visible to those walking along the base of the Channel, which is not part of the public realm.

Ontario Regulation 9/06

ID 092

Design/Physical Value

i. Rare, unique, representative or early example of a style, type, expression, material or construction method	No. Cast-in-place concrete bridges are not considered rare, or unique in Ontario. ID 705 is not a prototype, or exemplary of its type. Does not display a high degree of technical merit or scientific achievement. Does not signify a progressive leap in bridge engineering standards. Many bridges of this type are located within the City of Toronto and Province of Ontario as per a review of the Government of Ontario List of Provincial Bridges (2017). The bridge underwent significant repairs in 2006 which removed most of the original (1980) components including both parapet walls/railings which were the most visible features. This bridge represents a modern standard of bridge design in Ontario.
ii. Displays high degree of craftsmanship or artistic merit	No. Cast-in-place bridges are of a standard design and does not display a high degree of craftsmanship or artistic merit.
iii. Demonstrates high degree of technical or scientific achievement	No. While the earliest examples of cast-in-place concrete rigid frame bridges dating between 1900 and 1920 may be considered of high scientific achievement as they advanced bridge designs, Bridge ID 092 is not an early example.

Historical/Associative Value

i. Direct associations with a theme, event, belief, person, activity, organization, institution that is significant	No. Bridge ID 092 is not associated with a theme, event, person, activity, organization or institution that is significant. The bridge has not been part of the landscape long enough to accumulate any significant associations. The bridge was designed by FENCO Consultants in 1980
ii. Yields, or has potential to yield information that contributes to an understanding of a community or culture	No. This criteria is commonly (but not necessarily) associated with buried archaeological resources which may or may not be present. This structure is not considered significant in its design/physical or associative values and is not anticipated to yield further information which is significant to understanding the Smythe-Rockcliffe community.
iiii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer, or theorist who is significant to the community.	No. The bridge was designed by FENCO Consultants in 1980. There is no evidence in the historic record to suggest that FENCO Consultants were considered significant to the community.

Contextual Value

i. Important in defining, maintaining or supporting the character of an area	No. The only portions of the bridge which is visible from the immediate context are its cast-in-place concrete parapet walls with aluminum railing. This aspect of the bridge is standard in design and is not important in defining, maintaining, or supporting the character of the Smythe-Rockcliffe community.
ii. Physically, functionally, visually, or historically linked to its surroundings	No. While Bridge ID 092 is functionally related to its surroundings as it serves as a crossing along Weston Road over the Black Creek Channel, it is not significant in its functional relationship to the environment. The bridge could be replaced with another of its kind and would not result in impacts to any physical, functional, visual or historical relationships.
iii. Is a landmark	No. The only portions of the bridge which is visible from the immediate context are its cast-in-place concrete parapet walls with aluminum railing. These portions of the bridge are the only ones located at grade (along Weston Road) are of standard design and are not distinguishable from other bridges within its context. The bridge does not include any unique or rare features which would distinguish it as a landmark. Further, Bridge ID 092 is dwarfed by the larger rail bridge (ID. 377) located east of Weston Road.

Ontario Regulation 9/06

ID 360

Design/Physical Value

i. Rare, unique, representative or early example of a style, type, expression, material or construction method	No. Bridge ID. 360 was constructed in 1983 and is therefore not considered early as cast-in-place concrete rigid frame bridges were common in North America by the 1920s. .
ii. Displays high degree of craftsmanship or artistic merit	No. The bridge does not display a high degree of craftsmanship or artistic merit.
iii. Demonstrates high degree of technical or scientific achievement	No. Bridge ID. 360 does not demonstrate a high degree of technical or scientific achievement. It does not signify a progressive leap in bridge engineering standards as cast-in-place concrete bridges with aluminum railing systems are standard in design.

Historical/Associative Value

i. Direct associations with a theme, event, belief, person, activity, organization, institution that is significant	No. Bridge ID No. 360 is not associated with a theme, event, person, activity, organization or institution that is significant. The bridge was constructed in 1983 and has not been part of the landscape long enough to accumulate any significant associations.
ii. Yields, or has potential to yield information that contributes to an understanding of a community or culture	No. This criteria is commonly (but not necessarily) associated with buried archaeological resources which may or may not be present. This structure is not considered significant in its design/physical or associative values and is not anticipated to yield further information which is significant to understanding the Smythe-Rockcliffe community.
iiii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer, or theorist who is significant to the community.	No. The bridge was designed by FENCO Engineers Inc. as per drawing S-672-0 for the Scarlett Road Reconstruction project in 1983. There is no evidence to suggest that this company is considered significant to the local community in terms of its design.

Contextual Value

i. Important in defining, maintaining or supporting the character of an area	No. The only features of the bridge which are visible from the public realm include its asphalt deck (which are indistinguishable from other roads), and its cast-in-place parapet walls with aluminum post and panel railing system. As the bridge is standard in its design, it is not important in defining, maintaining, or supporting the character of the Smythe-Rockcliffe community.
ii. Physically, functionally, visually, or historically linked to its surroundings	No. While the bridge is functionally related to its surroundings as it provides a crossing over the Black Creek Chanel along Scarlett Road, it is not significant in its functional relationship to the environment. The bridge could be replaced with another of its kind and would not result in impacts to any physical, functional, visual or historical relationships.
iii. Is a landmark	No. Only the aluminum railing and concrete parapet of the bridge is visible while travelling along Jane Street over Black Creek Chanel. The existing railing and deck are of a standard design and is similar to Bridge IDs. 092, and 702.

Ontario Regulation 9/06

ID 702

Design/Physical Value

i. Rare, unique, representative or early example of a style, type, expression, material or construction method	No. While Bridge ID No. 702 was originally constructed in 1963, the bridge has been widened, with repairs/alterations to abutments and wingwalls, and parapet walls replaced in 2007 which has essentially resulted in the existing early 21st century bridge design. The 2007 replacement of the parapet walls with a cast-in-place concrete parapet wall with aluminum post and panel railing system which is of a standard design and is indistinguishable from Bridge ID No. 092. Cast-in-place concrete bridges of this type are not rare or unique in Ontario. ID 702 is not a prototype, or exemplary of its type.
ii. Displays high degree of craftsmanship or artistic merit	No. The bridge does not display a high degree of craftsmanship or artistic merit. Drawings of the existing bridge confirm that it was partially constructed of pre-cast girders of typical bridge design employing elements which are pre-designed and categorized into different 'types'.
iii. Demonstrates high degree of technical or scientific achievement	No. Bridge ID 702 does not demonstrate a high degree of technical or scientific achievement. It does not signify a progressive leap in bridge engineering standards.

Historical/Associative Value

i. Direct associations with a theme, event, belief, person, activity, organization, institution that is significant	No. Bridge ID 702 is not associated with a theme, event, person, activity, organization or institution that is significant. The bridge was constructed in 1963 and almost all of its components replaced or altered in 2007 and has not been part of the landscape long enough to accumulate any significant associations.
ii. Yields, or has potential to yield information that contributes to an understanding of a community or culture	No. This criteria is commonly (but not necessarily) associated with buried archaeological resources which may or may not be present. This structure is not considered significant in its design/physical or associative values and is not anticipated to yield further information which is significant to understanding the Smythe-Rockcliffe community.
iiii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer, or theorist who is significant to the community.	No. The bridge was designed by James F. MacLaren Limited Consulting Engineers of Toronto. Drawings of the original bridge are dated 1963 as per Project No. B-3 of the Metropolitain Toronto and Region Conservation Authority. There is no evidence to suggest that James F. MacLaren Ltd. Is considered significant to the local community.

Contextual Value

i. Important in defining, maintaining or supporting the character of an area	No. The bridge is only visible from its immediate context while travelling over the bridge along Rockcliffe Boulevard. The bridge and its parapet walls are also visible from the adjacent Black Creek Trail and Rockcliffe Crescent. As the bridge is standard in its design, it is not important in defining, maintaining, or supporting the character of the Smythe-Rockcliffe community.
ii. Physically, functionally, visually, or historically linked to its surroundings	No. While Bridge ID 702 is functionally related to its surroundings as it serves as a crossing along Rockcliffe Blvd. over Black Creek Channel, it is not significant in its functional relationship to the environment. The bridge could be replaced with another of its kind and would not result in impacts to any physical, functional, visual or historical relationships.
iii. Is a landmark	No. The only portions of the bridge which is visible from the immediate context are its cast-in-place concrete parapet with aluminum railing system, which is a standard and frequently used type of railing (i.e. Bridge ID No. 092). These are of standard design and are not readily distinguishable from other bridges within its context. The bridge does not include any unique or rare features which would distinguish it as a landmark.

Ontario Regulation 9/06

ID 703

Design/Physical Value

i. Rare, unique, representative or early example of a style, type, expression, material or construction method	No. Later 20th century cast-in-place and galvanized steel bridges with precast concrete girders of this type are not rare or unique in Ontario. ID 703 is not a prototype, or exemplary of its type.
ii. Displays high degree of craftsmanship or artistic merit	No. The bridge does not display a high degree of craftsmanship or artistic merit. Drawings of the existing bridge confirm that it was partially constructed of pre-cast girders of typical bridge design employing elements which are pre-designed and categorized into different 'types'.
iii. Demonstrates high degree of technical or scientific achievement	No. Bridge ID 703 does not demonstrate a high degree of technical or scientific achievement. It does not signify a progressive leap in bridge engineering standards.

Historical/Associative Value

i. Direct associations with a theme, event, belief, person, activity, organization, institution that is significant	No. Bridge ID 703 is not associated with a theme, event, person, activity, organization or institution that is significant. The bridge was constructed in 1975 and has not been part of the landscape long enough to accumulate any significant associations.
ii. Yields, or has potential to yield information that contributes to an understanding of a community or culture	No. This criteria is commonly (but not necessarily) associated with buried archaeological resources which may or may not be present. This structure is not considered significant in its design/physical or associative values and is not anticipated to yield further information which is significant to understanding the Smythe-Rockcliffe community.
iiii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer, or theorist who is significant to the community.	No. The bridge was designed by James F. MacLaren Limited Consulting Engineers of Toronto in. Drawings for the bridge are dated 1965 as per Project No. B-5 of the Metropolitain Toronto and Region Conservation Authority. There is no evidence to suggest that James F. MacLaren Ltd. Is considered significant to the local community.

Contextual Value

i. Important in defining, maintaining or supporting the character of an area	No. The bridge is only visible from its immediate context along Humber Blvd. South and Humber Blvd North or while travelling over the bridge along Hilldale Road. As the bridge is standard in its design, it is not important in defining, maintaining, or supporting the character of the Smythe-Rockcliffe community.
ii. Physically, functionally, visually, or historically linked to its surroundings	No. While Bridge ID 703 is functionally related to its surroundings as it serves as a crossing along Hildale Road over Black Creek Channel between Humber Blvd. North and Humber Blvd. South, it is not significant in its functional relationship to the environment. The bridge could be replaced with another of its kind and would not result in impacts to any physical, functional, visual or historical relationships.
iii. Is a landmark	No. The only portions of the bridge which is visible from the immediate context are its pre-fabricated steel post and panel railing, which is a standard and frequently used type of railing system. These are of standard design and are not readily distinguishable from other bridges within its context. The bridge does not include any unique or rare features which would distinguish it as a landmark.

Ontario Regulation 9/06

ID 704

Design/Physical Value

i. Rare, unique, representative or early example of a style, type, expression, material or construction method	No. Later 20th century cast-in-place and galvanized steel bridges with precast concrete girders of this type are not rare or unique in Ontario. ID 704 is not a prototype, or exemplary of its type.
ii. Displays high degree of craftsmanship or artistic merit	No. The bridge does not display a high degree of craftsmanship or artistic merit. Drawings of the existing bridge confirm that it was partially constructed of pre-cast girders of typical bridge design employing elements which are pre-designed and categorized into different 'types'.
iii. Demonstrates high degree of technical or scientific achievement	No. Bridge ID 704 does not demonstrate a high degree of technical or scientific achievement. It does not signify a progressive leap in bridge engineering standards.

Historical/Associative Value

i. Direct associations with a theme, event, belief, person, activity, organization, institution that is significant	No. Bridge ID 704 is not associated with a theme, event, person, activity, organization or institution that is significant. The bridge was constructed in 1975 and has not been part of the landscape long enough to accumulate any significant associations.
ii. Yields, or has potential to yield information that contributes to an understanding of a community or culture	No. This criteria is commonly (but not necessarily) associated with buried archaeological resources which may or may not be present. This structure is not considered significant in its design/physical or associative values and is not anticipated to yield further information which is significant to understanding the Smythe-Rockcliffe community.
iiii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer, or theorist who is significant to the community.	No. The bridge was designed by James F. MacLaren Limited Consulting Engineers of Toronto in. Drawings for the bridge are dated 1965 as per Project No. B-5 of the Metropolitain Toronto and Region Conservation Authority. There is no evidence in the historic record which indicates that James F. MacLaren Ltd. Is considered significant to the local community.

Contextual Value

i. Important in defining, maintaining or supporting the character of an area	No. The bridge is only visible from its immediate context along Humber Blvd. South and Humber Blvd North or while travelling over the bridge along Alliance Avenue. As the bridge is standard in its design, it is not important in defining, maintaining, or supporting the character of the Smythe-Rockcliffe community.
ii. Physically, functionally, visually, or historically linked to its surroundings	No. While Bridge ID 704 is functionally related to its surroundings as it serves as a crossing along Alliance Avenue over Black Creek Channel between Humber Blvd. North and Humber Blvd. South, it is not significant in its functional relationship to the environment. The bridge could be replaced with another of its kind and would not result in impacts to any physical, functional, visual or historical relationships.
iii. Is a landmark	No. The only portions of the bridge which is visible from the immediate context are its pre-fabricated steel post and panel railing, which is a standard and frequently used type of railing system. These are of standard design and are not readily distinguishable from other bridges within its context. The bridge does not include any unique or rare features which would distinguish it as a landmark.

Ontario Regulation 9/06

ID 705

Design/Physical Value

i. Rare, unique, representative or early example of a style, type, expression, material or construction method	No. 21st century half-through truss pedestrian bridges made of steel are not rare or unique in Ontario. ID 705 is not a prototype, or exemplary of its type. While half through truss bridges dating to the early 20th century may have cultural heritage value, later examples do not. The previous bridge in this location was constructed in 1943, fully replaced in 1975 and again in 2015.
ii. Displays high degree of craftsmanship or artistic merit	No. The bridge design includes pre-fabricated steel trusses does not display a high degree of craftsmanship or artistic merit.
iii. Demonstrates high degree of technical or scientific achievement	No. While the earliest examples of authentic half-through truss (pony truss) bridges may be considered of high scientific achievement as they advanced bridge designs, Bridge ID 705 is not an early example. The bridge does not signify a progressive leap in bridge engineering standards.

Historical/Associative Value

i. Direct associations with a theme, event, belief, person, activity, organization, institution that is significant	No. Bridge ID 705 is not associated with a theme, event, person, activity, organization or institution that is significant. The bridge has not been part of the landscape long enough to accumulate any significant associations.
ii. Yields, or has potential to yield information that contributes to an understanding of a community or culture	No. This criteria is commonly (but not necessarily) associated with buried archaeological resources which may or may not be present. This structure is not considered significant in its design/physical or associative values and is not anticipated to yield further information which is significant to understanding the Smythe-Rockcliffe community.
iiii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer, or theorist who is significant to the community.	No. The bridge was designed by Toronto Engineering and Construction Services in 2014 as per specifications for the Humber Boulevard Pedestrian Bridge Replacement (Contract No.13SE-25S.

Contextual Value

i. Important in defining, maintaining or supporting the character of an area	No. The bridge is only visible from its immediate context along Humber Boulevard (north and south) and Louvain Street. As the bridge is standard in its design, it is not important in defining, maintaining, or supporting the character of the Smythe-Rockcliffe community.
ii. Physically, functionally, visually, or historically linked to its surroundings	No. While Bridge ID 705 is functionally related to its surroundings as it serves as a crossing along Louvaine Street over Black Creek Channel between Humber Blvd. North and Humber Blvd. South, it is not significant in its functional relationship to the environment. The bridge could be replaced with another of its kind and would not result in impacts to any physical, functional, visual or historical relationships.
iii. Is a landmark	No. The only portions of the bridge which is visible from the immediate context are its pre-fabricated steel half-through truss railing. These are of standard design and are not readily distinguishable from other bridges within its context. The bridge does not include any unique or rare features which would distinguish it as a landmark.

Ontario Regulation 9/06

ID 308521

Design/Physical Value

i. Rare, unique, representative or early example of a style, type, expression, material or construction method	No. Bridge ID. 308521 was constructed in 2000. Early 21st century wood and steel bridges with simple I-type girders and steel floor beams are not unique. The bridge is of a recent design and is therefore not early.
ii. Displays high degree of craftsmanship or artistic merit	No. The bridge does not display a high degree of craftsmanship or artistic merit.
iii. Demonstrates high degree of technical or scientific achievement	No. Bridge ID. 308521 does not demonstrate a high degree of technical or scientific achievement. It does not signify a progressive leap in bridge engineering standards as bridges constructed of steel girders with wood plank deck tops are not rare in Ontario.

Historical/Associative Value

i. Direct associations with a theme, event, belief, person, activity, organization, institution that is significant	No. Bridge ID No. 308521 is not associated with a theme, event, person, activity, organization or institution that is significant. The bridge was constructed in 2000 and has not been part of the landscape long enough to accumulate any significant associations.
ii. Yields, or has potential to yield information that contributes to an understanding of a community or culture	No. This criteria is commonly (but not necessarily) associated with buried archaeological resources which may or may not be present. This structure is not considered significant in its design/physical or associative values and is not anticipated to yield further information which is significant to understanding the Smythe-Rockcliffe community.
iiii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer, or theorist who is significant to the community.	No. The designer and contractor and currently unknown, but was likely constructed by a local contractor.

Contextual Value

i. Important in defining, maintaining or supporting the character of an area	No. The bridge is only visible from its immediate context within Smythe Park along its pedestrian trails. As the bridge is standard in its design, it is not important in defining, maintaining, or supporting the character of the Smythe-Rockcliffe community.
ii. Physically, functionally, visually, or historically linked to its surroundings	No. While the bridge is functionally related to its surroundings as it provides a crossing over a swamp area within Smythe Park, it is not significant in its functional relationship to the environment. The bridge could be replaced with another of its kind and would not result in impacts to any physical, functional, visual or historical relationships.
iii. Is a landmark	No. The bridge is only visible within Smythe Park and does not include unique design features which have been demonstrated to be of a significant landmark quality. The existing railing and deck are intended to serve its functional purpose and the design does not include aesthetics.

Ontario Regulation 9/06

ID 308522

Design/Physical Value

i. Rare, unique, representative or early example of a style, type, expression, material or construction method	No. Bridge ID. 308522 was constructed in 2005. Early 21st century wood and steel bridges with steel floor beams and half-through truss type railings are not unique. The bridge is of a recent design and is therefore not early.
ii. Displays high degree of craftsmanship or artistic merit	No. The bridge does not display a high degree of craftsmanship or artistic merit.
iii. Demonstrates high degree of technical or scientific achievement	No. Bridge ID. 308522 does not demonstrate a high degree of technical or scientific achievement. It does not signify a progressive leap in bridge engineering standards as bridges constructed of cast-in-place concrete as well as steel were considered commonplace by the 1920s.

Historical/Associative Value

i. Direct associations with a theme, event, belief, person, activity, organization, institution that is significant	No. Bridge ID No. 308522 is not associated with a theme, event, person, activity, organization or institution that is significant. The bridge was constructed in 2005 and has not been part of the landscape long enough to accumulate any significant associations.
ii. Yields, or has potential to yield information that contributes to an understanding of a community or culture	No. This criteria is commonly (but not necessarily) associated with buried archaeological resources which may or may not be present. This structure is not considered significant in its design/physical or associative values and is not anticipated to yield further information which is significant to understanding the Smythe-Rockcliffe community.
iiii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer, or theorist who is significant to the community.	No. The designer and contractor and currently unknown, but was likely constructed by a local contractor.

Contextual Value

i. Important in defining, maintaining or supporting the character of an area	No. The bridge is only visible from its immediate context within Smythe Park along its pedestrian trails. As the bridge is standard in its design, it is not important in defining, maintaining, or supporting the character of the Smythe-Rockcliffe community.
ii. Physically, functionally, visually, or historically linked to its surroundings	No. While the bridge is functionally related to its surroundings as it provides a crossing over Black Creek Channel within Smythe Park, it is not significant in its functional relationship to the environment. The bridge could be replaced with another of its kind and would not result in impacts to any physical, functional, visual or historical relationships.
iii. Is a landmark	No. The bridge is only visible within Smythe Park and does not include unique design features which have been demonstrated to be of a significant landmark quality. While the existing railing is more aesthetic than a plain post and panel railing system, it is not considered significant.

Ontario Regulation 9/06

ID 308523

Design/Physical Value

i. Rare, unique, representative or early example of a style, type, expression, material or construction method	No. Bridge ID. 308523 was constructed in 1980. By this time, Beam and Girder bridges constructed of steel and cast-in-place concrete were widely used. The materials and design of this bridge are not rare or unique in Ontario.
ii. Displays high degree of craftsmanship or artistic merit	No. The bridge does not display a high degree of craftsmanship or artistic merit.
iii. Demonstrates high degree of technical or scientific achievement	No. Bridge ID. 308523 does not demonstrate a high degree of technical or scientific achievement. It does not signify a progressive leap in bridge engineering standards as bridges constructed of cast-in-place concrete as well as steel were considered commonplace by the 1920s.

Historical/Associative Value

i. Direct associations with a theme, event, belief, person, activity, organization, institution that is significant	No. Bridge ID No. 308523 is not associated with a theme, event, person, activity, organization or institution that is significant. The bridge was constructed in 1980 and has not been part of the landscape long enough to accumulate any significant associations.
ii. Yields, or has potential to yield information that contributes to an understanding of a community or culture	No. This criteria is commonly (but not necessarily) associated with buried archaeological resources which may or may not be present. This structure is not considered significant in its design/physical or associative values and is not anticipated to yield further information which is significant to understanding the Smythe-Rockcliffe community.
iiii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer, or theorist who is significant to the community.	No. The designer and contractor and currently unknown, but was likely constructed by a local contractor.

Contextual Value

i. Important in defining, maintaining or supporting the character of an area	No. The bridge is only visible from its immediate context within Smythe Park along its pedestrian trails. As the bridge is standard in its design, it is not important in defining, maintaining, or supporting the character of the Smythe-Rockcliffe community.
ii. Physically, functionally, visually, or historically linked to its surroundings	No. While the bridge is functionally related to its surroundings as it provides a crossing over Black Creek Channel within Smythe Park, it is not significant in its functional relationship to the environment. The bridge could be replaced with another of its kind and would not result in impacts to any physical, functional, visual or historical relationships.
iii. Is a landmark	No. The bridge is only visible within Smythe Park and does not include unique design features which have been demonstrated to be of a significant landmark quality.

Appendix F - Ministry of Tourism, Culture and Sport Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes Checklist

Ontario

**Ministry of Tourism,
Culture and Sport**

Programs & Services Branch
401 Bay Street, Suite 1700
Toronto ON M7A 0A7

Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes

A Checklist for the Non-Specialist

The **purpose of the checklist** is to determine:

- if a property(ies) or project area:
  - is a recognized heritage property
  - may be of cultural heritage value
- it includes all areas that may be impacted by project activities, including – but not limited to:
  - the main project area
  - temporary storage
  - staging and working areas
  - temporary roads and detours

Processes covered under this checklist, such as:

- *Planning Act*
- *Environmental Assessment Act*
- *Aggregates Resources Act*
- *Ontario Heritage Act* – Standards and Guidelines for Conservation of Provincial Heritage Properties

Cultural Heritage Evaluation Report (CHER)

If you are not sure how to answer one or more of the questions on the checklist, you may want to hire a qualified person(s) (see page 5 for definitions) to undertake a cultural heritage evaluation report (CHER).

The CHER will help you:

- identify, evaluate and protect cultural heritage resources on your property or project area
- reduce potential delays and risks to a project

Other checklists

Please use a separate checklist for your project, if:

- you are seeking a Renewable Energy Approval under Ontario Regulation 359/09 – separate checklist
- your Parent Class EA document has an approved screening criteria (as referenced in Question 1)

Please refer to the Instructions pages for more detailed information and when completing this form.

Project or Property Name
Flood Remediation and Transportation Feasibility Study of the Rockcliffe Special Policy Area Municipal Class EA

Project or Property Location (upper and lower or single tier municipality)
City of Toronto, Rockcliffe Special Policy Area (Black Creek)

Proponent Name
MacNaughton Hermsen Britton Clarkson Planning Ltd (sub-consultant of Wood Group)

Proponent Contact Information
540 Bingemans Centre Drive, Kitchener ON N2B 3X9

Screening Questions

	Yes	No
1. Is there a pre-approved screening checklist, methodology or process in place?	☐	☑

If Yes, please follow the pre-approved screening checklist, methodology or process.

If No, continue to Question 2.

Part A: Screening for known (or recognized) Cultural Heritage Value

	Yes	No
2. Has the property (or project area) been evaluated before and found **not** to be of cultural heritage value?	☐	☑

If Yes, do **not** complete the rest of the checklist.

The proponent, property owner and/or approval authority will:

- summarize the previous evaluation and
- add this checklist to the project file, with the appropriate documents that demonstrate a cultural heritage evaluation was undertaken

The summary and appropriate documentation may be:

- submitted as part of a report requirement
- maintained by the property owner, proponent or approval authority

If No, continue to Question 3.

	Yes	No
3. Is the property (or project area):		
a. identified, designated or otherwise protected under the *Ontario Heritage Act* as being of cultural heritage value?	☐	☑
b. a National Historic Site (or part of)?	☐	☑
c. designated under the *Heritage Railway Stations Protection Act*?	☐	☑
d. designated under the *Heritage Lighthouse Protection Act*?	☐	☑
e. identified as a Federal Heritage Building by the Federal Heritage Buildings Review Office (FHBRO)?	☐	☑
f. located within a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site?	☐	☑

If Yes to any of the above questions, you need to hire a qualified person(s) to undertake:

- a Cultural Heritage Evaluation Report, if a Statement of Cultural Heritage Value has not previously been prepared or the statement needs to be updated

If a Statement of Cultural Heritage Value has been prepared previously and if alterations or development are proposed, you need to hire a qualified person(s) to undertake:

- a Heritage Impact Assessment (HIA) – the report will assess and avoid, eliminate or mitigate impacts

If No, continue to Question 4.

Part B: Screening for Potential Cultural Heritage Value

	Yes	No
4. Does the property (or project area) contain a parcel of land that:		
a. is the subject of a municipal, provincial or federal commemorative or interpretive plaque?	☐	☑
b. has or is adjacent to a known burial site and/or cemetery?	☐	☐
c. is in a Canadian Heritage River watershed?	☑	☐
d. contains buildings or structures that are 40 or more years old?	☑	☐

Part C: Other Considerations

	Yes	No
5. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area):		
a. is considered a landmark in the local community or contains any structures or sites that are important in defining the character of the area?	☐	☐
b. has a special association with a community, person or historical event?	☐	☐
c. contains or is part of a cultural heritage landscape?	☐	☐

If Yes to one or more of the above questions (Part B and C), there is potential for cultural heritage resources on the property or within the project area.

You need to hire a qualified person(s) to undertake:

- a Cultural Heritage Evaluation Report (CHER)

If the property is determined to be of cultural heritage value and alterations or development is proposed, you need to hire a qualified person(s) to undertake:

- a Heritage Impact Assessment (HIA) – the report will assess and avoid, eliminate or mitigate impacts

If No to all of the above questions, there is low potential for built heritage or cultural heritage landscape on the property.

The proponent, property owner and/or approval authority will:

- summarize the conclusion
- add this checklist with the appropriate documentation to the project file

The summary and appropriate documentation may be:

- submitted as part of a report requirement e.g. under the *Environmental Assessment Act*, *Planning Act* processes
- maintained by the property owner, proponent or approval authority

Instructions

Please have the following available, when requesting information related to the screening questions below:

- a clear map showing the location and boundary of the property or project area
  - large scale and small scale showing nearby township names for context purposes
- the municipal addresses of all properties within the project area
- the lot(s), concession(s), and parcel number(s) of all properties within a project area

For more information, see the Ministry of Tourism, Culture and Sport's Ontario Heritage Toolkit or Standards and Guidelines for Conservation of Provincial Heritage Properties.

In this context, the following definitions apply:

- **qualified person(s)** means individuals – professional engineers, architects, archaeologists, etc. – having relevant, recent experience in the conservation of cultural heritage resources.
- **proponent** means a person, agency, group or organization that carries out or proposes to carry out an undertaking or is the owner or person having charge, management or control of an undertaking.

1. Is there a pre-approved screening checklist, methodology or process in place?

An existing checklist, methodology or process may already be in place for identifying potential cultural heritage resources, including:

- one endorsed by a municipality
- an environmental assessment process e.g. screening checklist for municipal bridges
- one that is approved by the Ministry of Tourism, Culture and Sport (MTCS) under the Ontario government's Standards & Guidelines for Conservation of Provincial Heritage Properties [s.B.2.]

Part A: Screening for known (or recognized) Cultural Heritage Value

2. Has the property (or project area) been evaluated before and found not to be of cultural heritage value?

Respond 'yes' to this question, if all of the following are true:

A property can be considered not to be of cultural heritage value if:

- a Cultural Heritage Evaluation Report (CHER) - or equivalent - has been prepared for the property with the advice of a qualified person and it has been determined not to be of cultural heritage value and/or
- the municipal heritage committee has evaluated the property for its cultural heritage value or interest and determined that the property is not of cultural heritage value or interest

A property may need to be re-evaluated, if:

- there is evidence that its heritage attributes may have changed
- new information is available
- the existing Statement of Cultural Heritage Value does not provide the information necessary to manage the property
- the evaluation took place after 2005 and did not use the criteria in Regulations 9/06 and 10/06

Note: Ontario government ministries and public bodies [prescribed under Regulation 157/10] may continue to use their existing evaluation processes, until the evaluation process required under section B.2 of the Standards & Guidelines for Conservation of Provincial Heritage Properties has been developed and approved by MTCS.

To determine if your property or project area has been evaluated, contact:

- the approval authority
- the proponent
- the Ministry of Tourism, Culture and Sport

3a. Is the property (or project area) identified, designated or otherwise protected under the *Ontario Heritage Act* as being of cultural heritage value e.g.:

i. designated under the *Ontario Heritage Act*

- individual designation (Part IV)
- part of a heritage conservation district (Part V)

Individual Designation – Part IV

A property that is designated:

- by a municipal by-law as being of cultural heritage value or interest [s.29 of the *Ontario Heritage Act*]
- by order of the Minister of Tourism, Culture and Sport as being of cultural heritage value or interest of provincial significance [s.34.5]. **Note**: To date, no properties have been designated by the Minister.

Heritage Conservation District – Part V

A property or project area that is located within an area designated by a municipal by-law as a heritage conservation district [s. 41 of the *Ontario Heritage Act*].

For more information on Parts IV and V, contact:

- municipal clerk
- Ontario Heritage Trust
- local land registry office (for a title search)

---

ii. subject of an agreement, covenant or easement entered into under Parts II or IV of the *Ontario Heritage Act*

An agreement, covenant or easement is usually between the owner of a property and a conservation body or level of government. It is usually registered on title.

The primary purpose of the agreement is to:

- preserve, conserve, and maintain a cultural heritage resource
- prevent its destruction, demolition or loss

For more information, contact:

- Ontario Heritage Trust - for an agreement, covenant or easement [clause 10 (1) (c) of the *Ontario Heritage Act*]
- municipal clerk – for a property that is the subject of an easement or a covenant [s.37 of the *Ontario Heritage Act*]
- local land registry office (for a title search)

---

iii. listed on a register of heritage properties maintained by the municipality

Municipal registers are the official lists - or record - of cultural heritage properties identified as being important to the community.

Registers include:

- all properties that are designated under the *Ontario Heritage Act* (Part IV or V)
- properties that have not been formally designated, but have been identified as having cultural heritage value or interest to the community

For more information, contact:

- municipal clerk
- municipal heritage planning staff
- municipal heritage committee

---

iv. subject to a notice of:

- intention to designate (under Part IV of the *Ontario Heritage Act*)
- a Heritage Conservation District study area bylaw (under Part V of the *Ontario Heritage Act*)

A property that is subject to a **notice of intention to designate** as a property of cultural heritage value or interest and the notice is in accordance with:

- section 29 of the *Ontario Heritage Act*
- section 34.6 of the *Ontario Heritage Act.* **Note**: To date, the only applicable property is Meldrum Bay Inn, Manitoulin Island. [s.34.6]

An area designated by a municipal by-law made under section 40.1 of the *Ontario Heritage Act* as a **heritage conservation district study area**.

For more information, contact:

- municipal clerk – for a property that is the subject of notice of intention [s. 29 and s. 40.1]
- Ontario Heritage Trust

v. included in the Ministry of Tourism, Culture and Sport's list of provincial heritage properties

Provincial heritage properties are properties the Government of Ontario owns or controls that have cultural heritage value or interest.

The Ministry of Tourism, Culture and Sport (MTCS) maintains a list of all provincial heritage properties based on information provided by ministries and prescribed public bodies. As they are identified, MTCS adds properties to the list of provincial heritage properties.

For more information, contact the MTCS Registrar at registrar@ontario.ca.

3b. Is the property (or project area) a National Historic Site (or part of)?

National Historic Sites are properties or districts of national historic significance that are designated by the Federal Minister of the Environment, under the *Canada National Parks Act*, based on the advice of the Historic Sites and Monuments Board of Canada.

For more information, see the National Historic Sites website.

3c. Is the property (or project area) designated under the *Heritage Railway Stations Protection Act*?

The *Heritage Railway Stations Protection Act* protects heritage railway stations that are owned by a railway company under federal jurisdiction. Designated railway stations that pass from federal ownership may continue to have cultural heritage value.

For more information, see the Directory of Designated Heritage Railway Stations.

3d. Is the property (or project area) designated under the *Heritage Lighthouse Protection Act*?

The *Heritage Lighthouse Protection Act* helps preserve historically significant Canadian lighthouses. The Act sets up a public nomination process and includes heritage building conservation standards for lighthouses which are officially designated.

For more information, see the Heritage Lighthouses of Canada website.

3e. Is the property (or project area) identified as a Federal Heritage Building by the Federal Heritage Buildings Review Office?

The role of the Federal Heritage Buildings Review Office (FHBRO) is to help the federal government protect the heritage buildings it owns. The policy applies to all federal government departments that administer real property, but not to federal Crown Corporations.

For more information, contact the Federal Heritage Buildings Review Office.

See a directory of all federal heritage designations.

3f. Is the property (or project area) located within a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site?

A UNESCO World Heritage Site is a place listed by UNESCO as having outstanding universal value to humanity under the Convention Concerning the Protection of the World Cultural and Natural Heritage. In order to retain the status of a World Heritage Site, each site must maintain its character defining features.

Currently, the Rideau Canal is the only World Heritage Site in Ontario.

For more information, see Parks Canada – World Heritage Site website.

Part B: Screening for potential Cultural Heritage Value

4a. Does the property (or project area) contain a parcel of land that has a municipal, provincial or federal commemorative or interpretive plaque?

Heritage resources are often recognized with formal plaques or markers.

Plaques are prepared by:

- municipalities
- provincial ministries or agencies
- federal ministries or agencies
- local non-government or non-profit organizations

For more information, contact:

- municipal heritage committees or local heritage organizations – for information on the location of plaques in their community
- Ontario Historical Society's Heritage directory – for a list of historical societies and heritage organizations
- Ontario Heritage Trust – for a list of plaques commemorating Ontario's history
- Historic Sites and Monuments Board of Canada – for a list of plaques commemorating Canada's history

4b. Does the property (or project area) contain a parcel of land that has or is adjacent to a known burial site and/or cemetery?

For more information on known cemeteries and/or burial sites, see:

- Cemeteries Regulations, Ontario Ministry of Consumer Services – for a database of registered cemeteries
- Ontario Genealogical Society (OGS) – to locate records of Ontario cemeteries, both currently and no longer in existence; cairns, family plots and burial registers
- Canadian County Atlas Digital Project – to locate early cemeteries

In this context, adjacent means contiguous or as otherwise defined in a municipal official plan.

4c. Does the property (or project area) contain a parcel of land that is in a Canadian Heritage River watershed?

The Canadian Heritage River System is a national river conservation program that promotes, protects and enhances the best examples of Canada's river heritage.

Canadian Heritage Rivers must have, and maintain, outstanding natural, cultural and/or recreational values, and a high level of public support.

For more information, contact the Canadian Heritage River System.

If you have questions regarding the boundaries of a watershed, please contact:

- your conservation authority
- municipal staff

4d. Does the property (or project area) contain a parcel of land that contains buildings or structures that are 40 or more years old?

A 40 year 'rule of thumb' is typically used to indicate the potential of a site to be of cultural heritage value. The approximate age of buildings and/or structures may be estimated based on:

- history of the development of the area
- fire insurance maps
- architectural style
- building methods

Property owners may have information on the age of any buildings or structures on their property. The municipality, local land registry office or library may also have background information on the property.

Note: 40+ year old buildings or structure do not necessarily hold cultural heritage value or interest; their age simply indicates a higher potential.

A building or structure can include:

- residential structure
- farm building or outbuilding
- industrial, commercial, or institutional building
- remnant or ruin
- engineering work such as a bridge, canal, dams, etc.

For more information on researching the age of buildings or properties, see the Ontario Heritage Tool Kit Guide Heritage Property Evaluation.

Part C: Other Considerations

5a. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) is considered a landmark in the local community or contains any structures or sites that are important to defining the character of the area?

Local or Aboriginal knowledge may reveal that the project location is situated on a parcel of land that has potential landmarks or defining structures and sites, for instance:

- buildings or landscape features accessible to the public or readily noticeable and widely known
- complexes of buildings
- monuments
- ruins

5b. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) has a special association with a community, person or historical event?

Local or Aboriginal knowledge may reveal that the project location is situated on a parcel of land that has a special association with a community, person or event of historic interest, for instance:

- Aboriginal sacred site
- traditional-use area
- battlefield
- birthplace of an individual of importance to the community

5c. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) contains or is part of a cultural heritage landscape?

Landscapes (which may include a combination of archaeological resources, built heritage resources and landscape elements) may be of cultural heritage value or interest to a community.

For example, an Aboriginal trail, historic road or rail corridor may have been established as a key transportation or trade route and may have been important to the early settlement of an area. Parks, designed gardens or unique landforms such as waterfalls, rock faces, caverns, or mounds are areas that may have connections to a particular event, group or belief.

For more information on Questions 5.a., 5.b. and 5.c., contact:

- Elders in Aboriginal Communities or community researchers who may have information on potential cultural heritage resources. Please note that Aboriginal traditional knowledge may be considered sensitive.
- municipal heritage committees or local heritage organizations
- Ontario Historical Society's "Heritage Directory" - for a list of historical societies and heritage organizations in the province

An internet search may find helpful resources, including:

- historical maps
- historical walking tours
- municipal heritage management plans
- cultural heritage landscape studies
- municipal cultural plans

Information specific to trails may be obtained through Ontario Trails.

Appendix G – Conn Smythe Subdivison Areas Map

Study Area/ Historical Subdivision Map

Rockcliffe Special Policy Area
City of Toronto

▭ Study Area

Notes:
- Google Satellite Imagery

DATE: February 10, 2020
FILE: 1960E
SCALE 1:10,000
DRAWN: GC

north

K:\1960E - ROCKCLIFFE SPA TORONTO\RPT\RPLAN_OVERLAY.DWG

MHBC
PLANNING
URBAN DESIGN
& LANDSCAPE
ARCHITECTURE
200-540 BINGEMANS CENTRE DR. KITCHENER, ON, N2B 3X9
P: 519.576.3650 F: 519.576.0121 | WWW.MHBCPLAN.COM

Appendix H – Curriculum Vitae

MHBC
PLANNING
URBAN DESIGN
& LANDSCAPE
ARCHITECTURE

CURRICULUM**VITAE**

Dan Currie, MA, MCIP, RPP, CAHP

Dan Currie, a Partner and Managing Director of MHBC's Cultural Heritage Division, joined MHBC Planning in 2009, after having worked in various positions in the public sector since 1997 including the Director of Policy Planning for the City of Cambridge and Senior Policy Planner for the City of Waterloo.

Dan provides a variety of planning services for public and private sector clients including a wide range of cultural heritage policy and planning work including strategic planning, heritage policy, heritage conservation district studies and plans, heritage master plans, heritage impact assessments and cultural heritage landscape studies.

EDUCATION

2006
Masters of Arts (Planning)
University of Waterloo

1998
Bachelor of Environmental Studies
University of Waterloo

1998
Bachelor of Arts (Art History)
University of Saskatchewan

PROFESSIONAL ASSOCIATIONS

Full Member, Canadian Institute of Planners
Full Member, Ontario Professional Planners Institute
Professional Member, Canadian Association of Heritage Professionals

SELECTED PROJECT EXPERIENCE

HERITAGE PLANNING

City of Hamilton Heritage Impact Assessment for Pier 8
Town of Erin Designation of Main Street Presbyterian Church
City of Kitchener Homer Watson House Heritage Impact Assessment and Parking Plan
Region of Waterloo Schneider Haus Heritage Impact Assessment
Niagara Parks Commission Queen Victoria Park Cultural Heritage Evaluation Report
City of Guelph Cultural Heritage Action Plan
Town of Cobourg, Heritage Master Plan
Municipality of Chatham Kent, Rondeau Heritage Conservation District Plan
City of Kingston, Barriefield Heritage Conservation District Plan Update
Burlington Heights Heritage Lands Management Plan
City of Markham, Victoria Square Heritage Conservation District Study
City of Kitchener, Heritage Inventory Property Update
Township of Muskoka Lakes, Bala Heritage Conservation District Plan
Municipality of Meaford, Downtown Meaford Heritage Conservation District Plan
City of Guelph, Brooklyn and College Hill Heritage Conservation District Plan

CONTACT

540 Bingemans Centre Drive,
Suite 200
Kitchener, ON N2B 3X9
T 519 576 3650 x 744
F 519 576 0121
dcurrie@mhbcplan.com
www.mhbcplan.com

CURRICULUM**VITAE**

Dan Currie, MA, MCIP, RPP, CAHP

City of Toronto, Garden District Heritage Conservation District Plan
City of London, Western Counties Cultural Heritage Plan

Other heritage consulting services including:

- Preparation of Heritage Impact Assessments for both private and public sector clients
- Requests for Designations
- Alterations or new developments within Heritage Conservation Districts
- Cultural Heritage Evaluations for Environmental Assessments

MASTER PLANS, GROWTH MANAGEMENT STRATEGIES AND POLICY STUDIES

City of Vaughan Municipal Land Acquisition Strategy
Town of Frontenac Islands Marysville Secondary Plan
Niagara-on-the-Lake Corridor Design Guidelines
Cambridge West Master Environmental Servicing Plan
Township of West Lincoln Settlement Area Expansion Analysis
Ministry of Infrastructure Review of Performance Indicators for the Growth Plan
Township of Tiny Residential Land Use Study
Port Severn Settlement Area Boundary Review
City of Cambridge Green Building Policy
Township of West Lincoln Intensification Study & Employment Land Strategy
Ministry of the Environment Review of the D-Series Land Use Guidelines
Meadowlands Conservation Area Management Plan
City of Cambridge Trails Master Plan
City of Kawartha Lakes Growth Management Strategy
City of Cambridge Growth Management Strategy
City of Waterloo Height and Density Policy
City of Waterloo Student Accommodation Study
City of Waterloo Land Supply Study
City of Kitchener Inner City Housing Study

CURRICULUM**VITAE**

Dan Currie, MA, MCIP, RPP, CAHP

DEVELOPMENT PLANNING

Provide consulting services and prepare planning applications for private sector clients for:

- Draft plans of subdivision
- Consent
- Official Plan Amendment
- Zoning By-law Amendment
- Minor Variance
- Site Plan

CONTACT

540 Bingemans Centre Drive,
Suite 200
Kitchener, ON N2B 3X9
T 519 576 3650 x 744
F 519 576 0121
dcurrie@mhbcplan.com
www.mhbcplan.com

MHBC
PLANNING
URBAN DESIGN
& LANDSCAPE
ARCHITECTURE

CURRICULUM**VITAE**

Vanessa Hicks, M.A., C.A.H.P.

Vanessa Hicks is a Heritage Planner with MHBC and joined the firm after having gained experience as a Manager of Heritage Planning in the public realm where she was responsible for working with Heritage Advisory Committees in managing heritage resources, Heritage Conservation Districts, designations, special events and heritage projects (such as the Architectural Salvage Program).

Vanessa is a member of the Canadian Association of Heritage Professionals and graduated from the University of Waterloo with a Masters Degree in Planning, specializing in heritage planning and conservation. Vanessa provides a variety of research and report writing services for public and private sector clients. She has experience in historical research, inventory work, evaluation and analysis on a variety of projects, including Heritage Conservation Districts (HCDs), Heritage Impact Assessments (HIAs), Cultural Heritage Evaluation Reports (CHERs), Conservation Plans (CPs), Documentation and Salvage Reports, and Commemoration Projects (i.e. plaques). Vanessa is also able to comment provide comments regarding Stages 1-4 Archaeological Assessments due to her experience as a practicing field archaeologist and experience writing archaeological reports submitted to the Ministry of Tourism, Culture and sport.

EDUCATION

2016
Master of Arts in Planning, specializing in Heritage Planning
University of Waterloo, School of Planning

2010
Bachelor of Arts (Honours) in Historical/Industrial Archaeology
Wilfrid Laurier University

PROFESSIONAL ASSOCIATIONS

Professional Member, Canadian Association of Heritage Professionals

PROFESSIONAL EXPERIENCE

June 2016 - Present	Cultural Heritage Specialist/ Heritage Planner MacNaughton Hermsen Britton Clarkson Planning Ltd.
2012 - 2016	Program Manager, Heritage Planning Town of Aurora
May 2012 - October 2012	Heritage Planning Assistant Town of Grimsby
2007 - 2010	Archaeologist Archaeological Research Associates Ltd.

CONTACT
540 Bingemans Centre Drive,
Suite 200
Kitchener, ON N2B 3X9
T 519 576 3650 x 728
F 519 576 0121
vhicks@mhbcplan.com
www.mhbcplan.com

CURRICULUM**VITAE**

Vanessa Hicks, M.A., C.A.H.P.

SELECT PROJECT EXPERIENCE

HERITAGE IMPACT ASSESSMENTS (HIAs) 2016-2019

Heritage Impact Assessment - 'Southworks', 64 Grand Avenue South, City of Cambridge
Heritage Impact Assessment – Badley Bridge, part of a Municipal EA Class Assessment, Township of Centre Wellington
Heritage Impact Assessment – 474 and 484 Queen Street South (and Schneider Haus National Historic Site), City of Kitchener
Heritage Impact Assessment – 883 Doon Village Road, City of Kitchener
Heritage Impact Assessment – 57 Lakeport Road, City of St. Catharines
Heritage Impact Assessment – Langmaids Island, Lake of Bays
Heritage Impact Assessment – 1679 Blair Road, City of Cambridge
Heritage Impact Assessment - 64 Margaret Avenue, City of Kitchener

CULTURAL HERITAGE EVALUATION REPORTS (CHERs) 2016-2019

Cultural Heritage Evaluation Report - Dunlop Street West and Bradford Street, Barrie - Prince of Wales School and Barrie Central Collegiate Institute
Cultural Heritage Evaluation Report - Lakeshore Drive, Town of Oakville
Cultural Heritage Evaluation Report – Queen Victoria Park Cultural Heritage

HERITAGE CONSERVATION DISTRICTS (HCDs)

Heritage Conservation District Study – Southeast Old Aurora (Town of Aurora)

CONSERVATION PLANS

Strategic Conservation Plan – Queen Victoria Park Cultural Heritage Landscape

DOCUMENTATION AND SALVAGE REPORTS

Documentation and Salvage Report & Commemoration Plan – 474 and 484 Queen Street South, City of Kitchener

SPECIAL PROJECTS

Artifact Display Case - Three Brewers Restaurant(275 Yonge St., Toronto)

CONTACT
540 Bingemans Centre Drive,
Suite 200
Kitchener, ON N2B 3X9
T 519 576 3650 x 728
F 519 576 0121
vhicks@mhbcplan.com
www.mhbcplan.com

MHBC
PLANNING
URBAN DESIGN
& LANDSCAPE
ARCHITECTURE