

Memorandum

Date: Friday, January 22, 2021
 Project: Ontario Line TA
 To: Liana Bresler, SvN
 From: Walter Burke and Anish Deshpande, Mott MacDonald
 Subject: Summary Hydrological Scope Discussion for King-Bathurst TOC – North Site & South Site

Purpose

The purpose of this memorandum is to present a recommended preliminary geotechnical and hydrological investigation scope (i.e., wells, borings and testing) to be performed at the King-Bathurst TOC to provide initial information to prospective TOC developers (DevCo). This memorandum supersedes our earlier memo dated December 31, 2020 based on ongoing discussions and recent information provided to Mott MacDonald by SvN on January 19, 2021. It is our intent that the data derived from this recommended preliminary investigation will be reviewed in conjunction with data presented in an earlier geotechnical data report prepared by another consultant and a design memorandum prepared by Thurber Engineering Ltd. (Thurber). This preliminary investigation is limited in extent and scope and is not intended to represent all the geotechnical and hydrological studies required for the project. At present Metrolinx is performing preliminary investigations to support the request for proposals (RFPs) for the stations and tunnel and the preliminary investigations will be followed by final investigations to be performed by the ProjectCo. However, it does not appear that any of the preliminary Metrolinx investigations are located within the footprint of the King-Bathurst Station TOC. We assume that the recommended preliminary investigation for the TOC development will be followed by a detailed final investigation to be performed by the DevCo.

The DevCo will be responsible to interpret the data presented and, perform the detailed geotechnical and hydrological investigations, testing, analysis and reporting necessary to develop final designs and comply with applicable codes and requirements, including but not limited to the City of Toronto Application Support Material: Terms of Reference (TOR). The DevCo is responsible for all applicable regulatory submissions, including but not limited to the City of Toronto Hydrological Review Form, August 2018 (Hydrological Form).

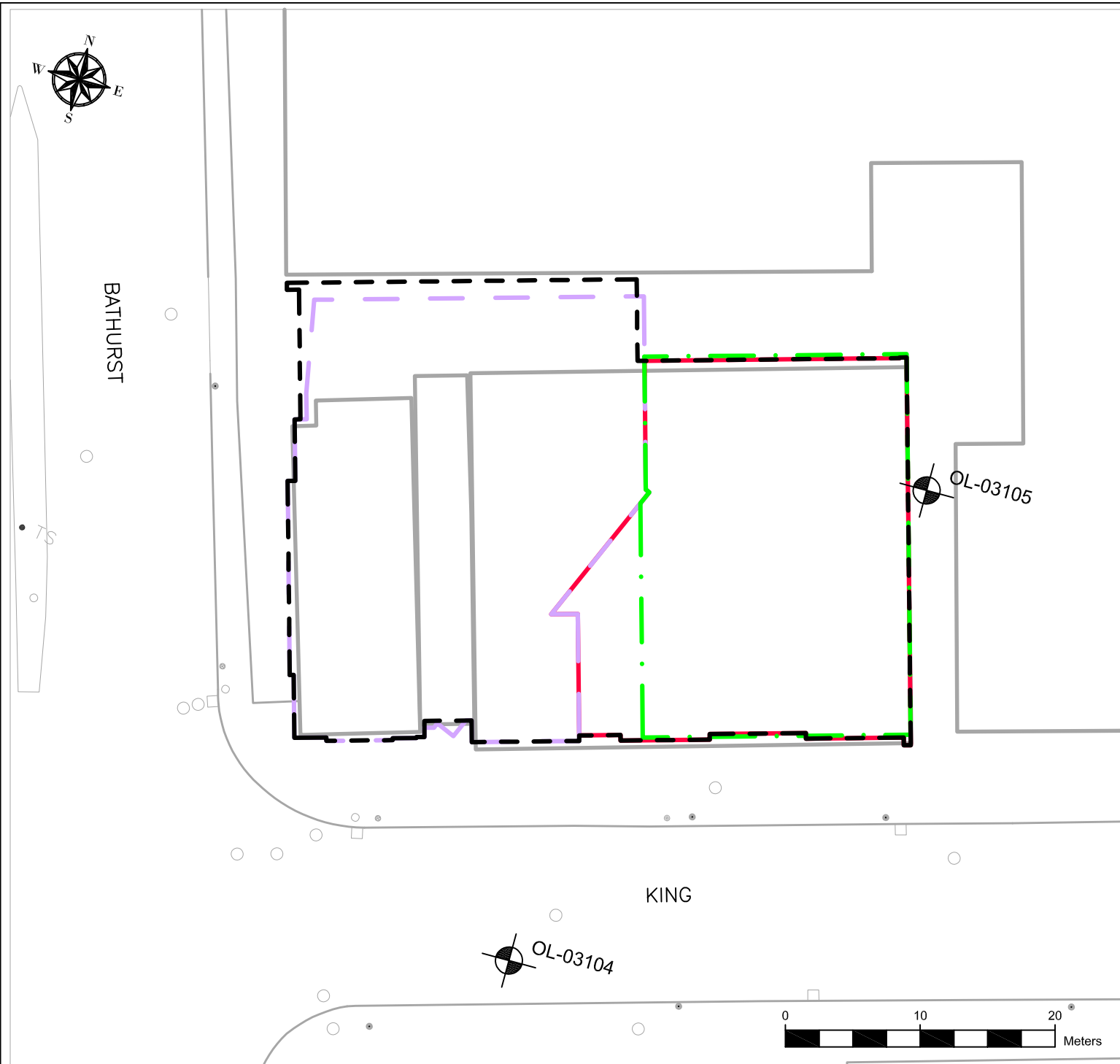
Scope

TOC Development ⁽¹⁾	
Name	King-Bathurst
<u>North Site</u>	
Approximate development footprint at ground level in square meters (sqm)	603
Maximum development roof-print (sqm)	1,382
Number of basements	1
Size of basement (sqm)	539
Development footprint without basement (sqm)	64
Maximum depth of basement, meters (m)	7.6
Maximum depth of preliminary drilled pier foundation ⁽²⁾ (m)	30

<p>South Site</p> <p>Approximate development at ground level (sqm) 953</p> <p>Number of basements 1</p> <p>Size of basement (sqm) 1,442</p> <p>Development footprint with basement outside of station (sqm) 953</p> <p>Size of basement outside of station (sqm) 816</p> <p>Maximum depth of basement, meters (m) 7.6</p> <p>Maximum depth of preliminary drilled pier foundation ⁽²⁾ (m) 30</p>	
Current Investigation Status	
<p>North Site</p> <p>Minimum number of wells in basement required per TOR ^{(3), (4), (5)} 3</p> <p>Estimated number of borings required in non-basement areas ⁽⁶⁾ 2</p> <p>Estimated total number of borings required for this development 5</p> <p>Current number of borings/wells in immediate vicinity of TOC development: 2</p> <p>Current number of borings/wells located within TOC footprint 1</p> <p>Approximate depth(s) of borings/wells within TOC footprint (m) 55</p> <p>South Site</p> <p>Minimum number of wells in basement required per TOR ^{(3), (4), (5)} 5</p> <p>Estimated number of borings required in non-basement areas ⁽⁶⁾ 1</p> <p>Estimated total number of borings required for this development 6</p> <p>Current number of borings/wells in immediate vicinity of TOC development: 2</p> <p>Current number of borings/wells located within TOC footprint 0</p> <p>Approximate depth(s) of borings/wells within TOC footprint (m) Not Applicable</p> <p>Thickness of soil overburden (m) 9.5 to 14.3</p> <p>Depth of groundwater in soil (m) 8.1 to 8.8</p> <p>Depth of groundwater in rock (m) 10.8 to 15.1</p>	
Recommended Preliminary Investigation ^{(7) (8)}	
<p>North Site</p> <p>Total no. of preliminary borings to be converted to wells in TOC basements 1</p> <p>Depth of borings/wells in TOC basement (m) 30</p> <p>Number of downhole hydrological tests 1</p> <p>Number of preliminary borings in non-basement TOC footprint 1</p> <p>Depth of borings in remaining TOC footprint (m) 30</p> <p>Total number of recommended borings/wells 2</p> <p>Recommended testing:</p> <ul style="list-style-type: none"> • rock unconfined compression tests ⁽⁹⁾ 6 (3 per boring) • groundwater analytical test suites in compliance with the testing protocols presented in the TOR. 1 • Analytical soil testing, as applicable ⁽¹⁰⁾ Assume by Stantec <p>South Site</p> <p>Total no. of preliminary borings to be converted to wells in TOC basements 1</p> <p>Depth of borings/wells in TOC basement (m) 30</p> <p>Number of downhole hydrological tests 1</p> <p>Number of preliminary borings in non-basement TOC footprint 1</p> <p>Depth of borings in remaining TOC footprint (m) 30</p> <p>Total number of recommended borings/wells 2</p> <p>Recommended testing:</p> <ul style="list-style-type: none"> • rock unconfined compression tests ⁽⁹⁾ 6 (3 per boring) • groundwater analytical test suites in compliance with the testing protocols presented in the TOR. 1 • Analytical soil testing, as applicable ⁽¹⁰⁾ Assume by Stantec 	

Notes:

- (1) Refer to attached drawings, KB1 and KB2, based on SvN drawings provided.
- (2) Depths are estimated as preliminary foundation design is not currently completed.
- (3) The TOR requires a minimum of 5 wells for a 30m x 30m basement. This results in a base exploration coverage of 180 square meters per well. The TOR states: "...additional groundwater wells shall be installed, and the qualified professional will use professional judgement to determine the number of additional wells required." This document assumes that the coverage cited above is applicable and that less stringent project-specific criteria will not be adopted.
- (4) Mott MacDonald has assumed a coverage of 500 square meters per additional well for basements that exceed 500 sqm in size.
- (5) Mott MacDonald assumes that borings to be performed for explorations to support the design of the station will be advanced to depths adequate for design of the TOC portion that overlays the station footprint, as applicable.
- (6) Based on an assumed boring distribution within the non-basement footprint to be confirmed by the geotechnical P. Eng. of record.
- (7) Advance and sample investigations through soil overburden in accordance with ASTM D1586. Advance investigations through rock in accordance with ASTM D2113.
- (8) Coordinate performance of recommended preliminary investigations with demolition, site remediation and access agreement constraints.
- (9) Perform tests in accordance with ASTM D7012.
- (10) Testing to be performed by Stantec as an extension of the OLTA Environmental Investigations.



LEGEND	
	STATION FOOTPRINT
	TOC FOOTPRINT AT GROUND LEVEL
	TOC MAXIMUM BUILT OVER FOOTPRINT
	TOC BASEMENT FOOTPRINT
	HISTORIC BORING LOCATION

AREA	m ²
TOC AERIAL FOOTPRINT	1,382
STATION FOOTPRINT OVERLAIN BY TOC BASEMENT	0
TOTAL AREA OF TOC BASEMENT	539
TOC ROOFPRINT NOT UNDERLAIN BY TOC BASEMENT, TOC FOOTPRINT, OR STATION FOOTPRINT	37
TOC ROOFPRINT NOT UNDERLAIN BY TOC BASEMENT OR STATION FOOTPRINT	105
TOC FOOTPRINT AT GROUND LEVEL	603

Reference Files:
 P:\Geotechnical References\Projects\Ontario Line Technical Advisory Services\King-Bathurst Station\PND-03-0810_02 King Bathurst TOC SITE B_2020.06.18.pdf, P:\Geotechnical References\Projects\Ontario Line Technical Advisory Services\King-Bathurst Station\02_Bathurst.zip\02_Bathurst\20201117-TD002-DT-BATHURST-SITE B_BELOW_GRADE.dwg, P:\Geotechnical References\Projects\Ontario Line Technical Advisory Services\King-Bathurst Station\02_Bathurst.zip\02_Bathurst\20201117-TD002-DT-BATHURST-SITE B_ROOF PLAN.dwg, P:\Geotechnical References\Projects\Ontario Line Technical Advisory Services\Ontario Line\Station Dwgs & Calcs from SvN\10206938-CI0000-00-BP001 Ontario Line Existing Conditions Plan.dwg

© Mott MacDonald

This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose. We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

M M
MOTT MACDONALD

111 Wood Avenue South
 Iselin NJ 08830-4112
 United States of America
 Certificate No. 24GA28016600

T +1 (800) 832 3272
 F +1 (973) 376 1072
 www.mottmacamericas.com

Client

ONETEAM
 ONTARIO LINE TECHNICAL ADVISOR

Rev	Date	Drawn	Description	Ch'k'd	App'd

Title ONTARIO LINE - KING BATHURST TOC NORTH SITE	Drawn	AJ	
	Checked	AD	
	Approved	WB	
Drawing Number KB1	Scale at ANSI B 1:10		
	Security STD	Status PRE	Rev 1



LEGEND	
	STATION FOOTPRINT
	TOC FOOTPRINT AT GROUND LEVEL
	TOC MAXIMUM BUILT OVER FOOTPRINT
	TOC BASEMENT FOOTPRINT
	HISTORIC BORING LOCATION

AREA	m ²
TOC AERIAL FOOTPRINT	1,963
STATION FOOTPRINT OVERLAIN BY TOC BASEMENT	626
TOTAL AREA OF TOC BASEMENT	1,442
TOC BASEMENT NOT UNDERLAIN BY STATION FOOTPRINT	816
TOC ROOFPRIENT NOT UNDERLAIN BY TOC BASEMENT OR STATION FOOTPRINT	137
TOC FOOTPRINT AT GROUND LEVEL	953

Reference Files:
 P:\Geotechnical References\Projects\Ontario Line Technical Advisory Services\King-Bathurst Station\PND-03-0810_02 King Bathurst TOC SITE D_2020.06.18.pdf, P:\Geotechnical References\Projects\Ontario Line Technical Advisory Services\King-Bathurst Station\02_Bathurst.zip\02_Bathurst\20201117-TD002-DT-BATHURST-SITE D_BELOW_GRADE.dwg, P:\Geotechnical References\Projects\Ontario Line Technical Advisory Services\King-Bathurst Station\02_Bathurst.zip\02_Bathurst\20201117-TD002-DT-BATHURST-SITE D_ROOF PLAN.dwg, P:\Geotechnical References\Projects\Ontario Line Technical Advisory Services\Ontario Line\Station Dwgs & Calcs from SvN\10206938-CI0000-00-BP001 Ontario Line Existing Conditions Plan.dwg

© Mott MacDonald
 This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose. We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.



111 Wood Avenue South
 Iselin NJ 08830-4112
 United States of America
 Certificate No. 24GA28016600
 T +1 (800) 832 3272
 F +1 (973) 376 1072
 www.mottmacamericas.com



Rev	Date	Drawn	Description	Ch'k'd	App'd

Title	ONTARIO LINE - KING BATHURST TOC SOUTH SITE		
	Drawing Number KB2		
	Security	Status	Rev
	STD	PRE	1

Drawn	AJ
Checked	AD
Approved	WB
Scale at ANSI B 1:10	