Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

Version 3.0
April 28, 2021 Matrix 24603-531
City of Mississauga PO 4500498356

Mr. Anthony Di Giandomenico, P. Eng.
Storm Drainage Engineer, Environmental Services
CITY OF MISSISSAUGA
Suite 800, 201 City Centre Dr.
Mississauga, ON L5B 2T4

Subject: Dixie-Dundas Flood Mitigation Detailed Work Plan for an Expanded Environmental Assessment Using a Combined Schedule C Approach

Dear Mr. Di Giandomenico:

1 INTRODUCTION

Matrix Solutions is pleased to provide this work plan and cost estimate to the City of Mississauga (the City) for an expanded Dixie-Dundas flood mitigation environmental assessment (EA) to address flooding issues associated with the Little Etobicoke Creek. This letter follows our February 19, 2021 letter, which outlined options for expanding the scope of the EA. Alternative approaches were presented in our original letter which ensured the requirements of a Schedule C EA are addressed for the original study area (the project was initially scoped as a Schedule B) and incorporated the recent hydraulic modelling, which indicated that expansion of the study area downstream to include the Dundas Street crossing is required to ensure adequate and full consideration of project impacts. Additionally, options were provided to address additional channel stability concerns and an exposed sanitary sewer into the EA.

After reviewing the alternatives, we understand the City has selected the combined Schedule C approach and confirmed that additional channel stability requirements and addressing the exposed sewer should be integrated into the EA scope. This current work plan builds off the previous letter, which was prepared to support City decision-making and to provide high-level costs. It also provides additional scope details and refined costs (Tables 1 and 2) specific to the City's chosen combined Schedule C approach.

1.1 Environmental Assessment Approach

The expanded Schedule C approach will ensure preliminary designs are completed for all additional areas of the study, concurrent with the preliminary design for the Dixie Road bridge replacement. A combined Schedule C approach was selected as the preferred EA approach by the City in part because it better recognizes the importance of the Dundas Street crossing as part of the overall flood mitigation solution. It ensures preliminary design of the Dundas Street bridge and associated channel works are included into an expansion of the current study.

1.2 Study Area

Following the review of work plan options and input from the City's stream monitoring program, the downstream boundary of the extended study area is confirmed as the Canadian Pacific (CP) rail crossing of Little Etobicoke Creek (located approximately 550 m downstream of Dundas Street). This study area allows for confirmation and adequate mapping of the Regional event floodplain north and south of Dundas Street. The floodplain in this area was shown to increase after Matrix Solutions updated the hydraulic (MIKE) modelling completed by others to better describe flows at the Dundas Street crossing during an overtopping condition (see Section 4). Within this expanded study area, channel stability will also be assessed between 550 m upstream to 300 m downstream of Dundas Street, where erosion concerns have been identified in the City's stream monitoring program.

2 TECHNICAL STUDIES

The technical background studies, including geomorphology, geotechnical, natural heritage, and archaeology, will be updated to include the expanded study area. These studies will match the previously completed scope to identify existing conditions, constraints, and potential project impacts. The technical studies are scoped assuming that channel work will extend to the erosion site located 300 m downstream of Dundas Street (i.e., no channel works will be completed between the erosion site and the CP rail crossing downstream). The fieldwork components of the natural heritage and geotechnical studies will provide a detailed inventory of existing site conditions to the downstream extent of this erosion site to inform the potential channel works.

3 DIXIE ROAD

The additional effort related to the Schedule C EA at Dixie Road (i.e., the original study area) focuses on developing and investigating alternative design approaches after confirming the preferred alternative solution. Developing these alternative design approaches is an added intermediate EA step between developing the conceptual alternative solutions and advancing a preliminary design. Though not a requirement of a Schedule B EA, preliminary design was included in the original scope and is already part of the project as one of the requirements of a Schedule C EA.

3.1 Alternative Design Approaches

While developing the alternative solutions, Matrix Solutions identified requirements upstream of Dixie Road for the City to obtain property to fit flood conveyance and to accommodate a trade-off that presented between raising the Dixie Road elevation for bridge replacement versus lowering the creek and the infrastructure crossing below it. Taken together, these are cost-sensitive components in the design warranting further analysis. This analysis will be undertaken by investigating alternative design approaches that vary the channel invert. The following design approaches are expected to be assessed after confirming a preferred alternative solution:

- Option 1: maintain channel elevation at Dixie Road
- Option 2: Lower channel elevation 0.5 m at Dixie Road
- Option 3: Lower channel elevation 1.0 m at Dixie Road

Option 1 reduces impacts to the infrastructure crossing below the creek, at the cost of raising the Dixie Road elevation and increasing property impacts. Option 3 reverses this trade-off with reduced property

and road elevation impacts and increased requirements for infrastructure lowering. As part of this analysis, modelling will further investigate the bridge configuration to understand better the relationship between the opening width, piers, deck thickness, and channel geometry to hone-in on an optimal Dixie Road elevation.

4 DUNDAS STREET

Matrix updated hydraulic (MIKE) modelling to better describe flows at the Dundas crossing during an overtopping condition. The resulting expanded flood plain was not identified in previous flood studies, nor realized by analysis within the EA until late 2020. Matrix prepared figures illustrating the preliminary flood plain differences predicted to allow for technical and EA discussion with Toronto and Region Conservation Authority (TRCA) and the City. TRCA generally agreed with the background modelling changes and recognized the need to expand the EA study area downstream and to investigate options for increasing the hydraulic capacity at Dundas Street. Preliminary modelling completed to date by Matrix Solutions indicates that improving hydraulic conveyance at Dundas Street (e.g., by replacing the crossing with a larger one) has good potential to mitigate flood plain impacts that were identified.

The Schedule C EA design phases at the Dundas Street crossing include identifying conceptual alternative solutions, developing alternative design approaches after identifying a preferred alternative solution, and advancing a preliminary (30%) design. Preliminary design requirements will be identified through hydraulic analysis and modelling that advance alternative solutions and alternative design approaches. It should also be noted that any works completed at Dundas Street do not have a hydraulic effect on Dixie Road works, and an improved Dundas crossing would need to be constructed before upstream works at Dixie to avoid a condition of increased flood plain in the vicinity of Dundas Street.

4.1 Hydraulic Investigation

The hydraulic investigation near Dundas Street is summarized at follows:

- Investigate options and define requirements for increasing the hydraulic capacity of the Dundas Street Crossing.
- Coordinate hydraulic requirements with the Dundas Connects TPAP study.
- Map flood lines immediately upstream of Dundas Street for discussion with the TRCA and to identify consultation requirements with property owners.
- Identify changes to the flood lines downstream of Dundas (upstream of the CP rail) for discussion with the TRCA. Preliminary modelling indicates that by increasing the conveyance capacity at Dundas Street, the downstream regional flood stays within the LEC valley corridor. The acceptability of allowing increases that do not otherwise cause significant land impacts and/or regulatory issues will be of prime focus.

4.2 Crossing Design

R.V. Anderson Associated Ltd. (RVA) will complete the preliminary crossing design, summarized as follows (Appendix A):

- **Background Review and Concept Design:** RVA will review all available background information related to the new crossing structure design. This background information will include as-built drawings of the existing crossing, utility drawings, borehole logs, OSIM reports, hydraulic reports, fluvial geomorphic reports, natural environment reports, and other relevant information. RVA will develop concepts for the crossing replacement to evaluate alternative solutions and alternative design approaches, with Matrix Solutions input, to define hydraulic conveyance requirements.

- **Structural Bridge Design:** The preliminary bridge general arrangement design drawings will indicate the overall horizontal and vertical alignments and profiles as well as various details such as the preliminary foundations design, abutment and wingwall design, working points, grading contours, preliminary girder and bearing layout, structural staging, and deck design.

- **Road Design:** RVA will coordinate with the topographic surveyor retained by Matrix Solutions to incorporate the topographic survey (i.e., LiDAR data) into a comprehensive base plan. After receiving initial input from the City, a preliminary plan and profile for the road design will be developed. A typical cross-section will show the roadway details, boulevards, bridge sections, and existing and proposed property lines.

- **Utility Relocation Design and Coordination:** RVA will circulate base plans to utility companies to obtain their existing and future requirements in the project area. RVA will then identify conflicts between existing utilities and the crossing replacement.

5 CHANNEL DESIGN

The Dundas Street replacement is expected to include channel modifications to Little Etobicoke Creek. These modifications will be considered in the EA process as part of developing alternative solutions and design approaches. Channel modifications are anticipated to employ natural channel design techniques to provide required flood conveyance benefits (i.e., expanded floodplain), thereby allowing better consideration of fish passage and geomorphic connectively (i.e., sediment transport).

The channel design as part of the Dundas Street crossing replacement will be developed to a preliminary (30%) design, meeting the requirements of a Schedule C EA. This channel design will extend 500 m upstream and 300 m downstream of Dundas Street to incorporate a preferred approach for addressing channel stability concerns within the study area (Section 5.1) and to tie-into the channel design component of the Dixie Road design. The resulting EA project deliverable will include one continuous preliminary channel design that extends from approximately 500 m upstream of Dixie Road to 300 m downstream of Dundas Street.

5.1 CHANNEL STABILITY

The City capital and stream monitoring programming identified channel stability concerns within the expanded Dixie-Dundas study area between approximately 500 m upstream to 300 m downstream of Dundas Street. Stability concerns upstream of Dundas Street include undermined gabion baskets,

displaced armourstone, and valley wall erosion. Downstream, stability concerns include an eroding valley wall (identified as “problem site 5” in the City monitoring program) and undermined gabion baskets (“problem site 6”).

Matrix Solutions will complete a geomorphic study to assess and develop alternative conceptual approaches to stabilize the channel. Developing these approaches to conceptual design is consistent with these works requiring a Schedule B level EA, if completed as a standalone study, while also realizing the planning efficiencies and advantages by avoiding a separate EA for these related works. These efficiencies include applying hydraulic modelling as a key input to understanding Little Etobicoke Creek’s flow regime and corresponding erosion processes and how they may change following upstream flood mitigation solutions. The conceptual approaches will also be coordinated and integrated with the flood mitigation designs at Dixie Road and Dundas Street.

The key elements of the channel stability study include:

- preparing and reviewing background mapping and reporting for the expanded study area
- completing a site assessment of the geomorphic and erosion conditions of Little Etobicoke Creek in the study area and downstream to the confluence of Etobicoke Creek
- analyzing geomorphic and erosion risk to property and infrastructure
- reporting and developing conceptual alternatives (up to three options)
- evaluating conceptual alternative solutions (including the do-nothing option) to identify a preferred approach

The preferred approach will be coordinated and integrated into the Dundas Street crossing replacement and associated preliminary channel design.

6 GEOTECHNICAL BOREHOLES

The conceptual flood mitigation solutions at Dixie Road include options for lowering the Little Etobicoke Creek. This channel lowering will reduce upstream water levels and the required Dixie Road top-of-roadway elevation associated with a bridge replacement. After confirming a preferred solution, alternative design approaches will be investigated as part of the next steps in the EA. These alternatives are expected to include assessing options for additional channel lowering (i.e., up to 1 m), recognizing that there are potentially significant cost benefits to be realized by lowering Little Etobicoke Creek as much as practical.

In our discussions with Thurber Engineering Ltd. on the expanded EA and preferred solution, we identified the option to drill two preliminary boreholes (Appendix B), one at each of the Dixie Road bridge and the Dundas Street crossing. The purpose of these boreholes would be to inform the maximum practical channel lowering by confirming the bedrock elevation and measuring groundwater conditions to quantify potential impacts. After discussion with the City, these boreholes are included within the detailed cost estimate. These boreholes have been scoped assuming they will be drilled off the road immediately upstream or downstream of Dixie Road and Dundas Street, to reduce costs associated with traffic management and restricted hours of drilling on the road (i.e., avoiding rush hours).

7 EXPOSED SANITARY LINE

The site studies identified an exposed 450 mm diameter sanitary main (gravity) crossing Little Etobicoke Creek, approximately 500 m downstream of Dixie Road. Matrix Solutions had originally determined that proposed flood mitigation works completed upstream of the sewer crossing would not worsen the exposed main. However, the sanitary line would still remain at its existing level of risk, prompting Matrix Solutions to also assess options to lower and tie-back into the sanitary system during the feasibility study. Matrix Solutions identified, with input from Peel Region, that the sanitary main could be lowered during flood mitigation construction as a concurrent project.

Efforts to address the exposed sanitary line have been included in the workplan following discussion with the City. The envisioned conceptual designs would consider the sanitary alignment elevation, gradients, and conflicts with other linear infrastructure (e.g., stormwater). Maximum design flexibility will be incorporated for the timing of eventual implementation such that construction is completed at a time that is optimum for both Region of Peel and the City.

8 PUBLIC ENGAGEMENT

Public engagement will include notification of the expanded study area and a project bulletin. The notification is anticipated to have a similar distribution to stakeholders and local residences as the initial notice of study commencement. The project bulletin is proposed as a streamlined alternative to an additional Public Information Centre (PIC). The envisioned project bulletin would be posted to the City's website, alongside PIC No. 1, to share key details and figures related to the expanded EA. The project bulletin will invite interested stakeholders the opportunity to identify project concerns and input. The second PIC, later this year, as initially scoped, will present preferred solutions and alternative design approaches for public feedback for all of the EA design components.

8.1 Indigenous Engagement

Cambium Indigenous Professional Services (CIPS) is currently preparing a record of engagement documenting the project activities related to:

- reviewing the Indigenous communities whose historical/modern Treaty and Indigenous rights may be subjectively affected by the proposed project
- sending project notification to identified communities
- following up with individual Indigenous communities to initiate the dialogue of engagement and confirm project notification
- confirming the level of interest of each Indigenous community
- informing the City on best engagement practices and options

As part of the expanded EA and advancing engagement with the Mississaugas of the Credit First Nation (MCFN), CIPS has prepared an expanded scope which includes:

- MCFN virtual or site meeting and documentation
- updated notification to Indigenous communities on the expanded EA study area
- final reporting for the EA project record

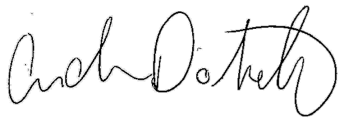
CIPS has estimated MCFN engagement fees of $2,750. These fees cover efforts to review the Stage 1 archaeology report and attend a project engagement meeting. The City's prefers to receive fees directly from the MCFN and accordingly they are not included in the cost estimate (Tables 1 and 2).

9 CLOSURE

We appreciate the opportunity to work with you on the Dixie-Dundas Flood Mitigation Project, and we look forward to continuing our progress on this important city-building initiative. We anticipate that the next steps will include any further refinement of our work plan and cost estimates, if required, and also confirming project schedule. If you have any questions or comments, please contact me at 226.314.1924 or adoherty@matrix-solutions.com.

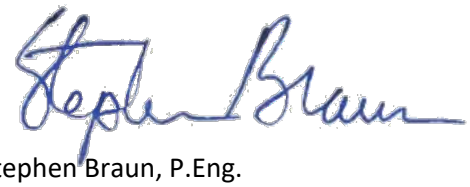
Yours truly,

MATRIX SOLUTIONS INC.



Andrew Doherty, P.Eng.
Water Resources Engineer

Reviewed by



Stephen Braun, P.Eng.
Senior Water Resources Engineer

AD/vc
Attachments

VERSION CONTROL

Version	Date	Issue Type	Filename	Description
V1.0	29-Mar-2021	Final	24603-531 Expanded EA WP 2021-03-29 final V1.0	Issued to client
V2.0	23-Apr-2021	Final Revised	24603-531 Expanded EA WP 2021-04-23 final V2.0	Updates throughout; Issued to client
V3.0	28-Apr-2021	Final	24603-531 Expanded EA WP 2021-04-28 final V3.0	Removed Appendix A; Updated Channel Design scope; Issued to Client

TABLE 1 Cost Estimate for Expanded Dixie-Dundas Environmental Assessment

EA Phase	Description of Work [1]	Cost
	Project Management and Bi-weekly Phone Calls Bi-weekly phone call, budget tracking, invoicing, internal/external project coordination, and communications. Confirmation of environmental assessment (EA) schedule and study area expansion.	$20,490
	Project Meetings Assume one online workshop plus two online meetings with Toronto and Region Conservation Authority (TRCA)/Regional Municipality of Peel (Region of Peel). Assume one formal meeting with Dundas Connects to solicit input and identify Bus Rapid Transit (BRT) requirements at Dundas crossing	$7,650
	Stakeholder Engagement	
	Project Bulletin Project bulletin to be posted to the City of Mississauga's website, alongside Public Information Centre (PIC) No. 1, to share key details and figures related to the expanded EA. Streamlined alternative to an additional PIC.	$3,310
	Address Regulatory Comments Assume one round of comments from the City of Mississauga and TRCA on Dundas Street bridge crossing.	$8,905
	Public and Indigenous Engagement	$13,200
Phase 1	**Prepare Notice** Notice of Commencement issued to public and stakeholders at the start of the master plan process.	$2,240
	Update Stakeholder List and Engagement Plan Stakeholders included in expanded EA expected to include Canadian Pacific Railway (CP), property owners impacted by Dundas crossing.	$1,240
	Update Problem and Opportunity Statement Update problem and opportunity statement considering the expanded study area and added project components.	$1,240
	Technical Studies	
	2019 Geotechnical Study Expansion (Appendix D)	$5,700
	2019 Natural Heritage Study Expansion (Appendix D)	$17,840
	Background Data Review and Gap Analysis	$3,170
	Geomorphology	$7,025
	Natural Heritage	$12,334
	Geotechnical	$3,700
	Geotechnical Boreholes (2) (Appendix C)	$21,900
	Archaeology	$3,290
Phase 2	**Dundas Street Crossing**	
	Dundas Street Hydraulic Investigation Investigate hydraulics at Dundas Street to address Region of Peel safety concerns. Identify required modelling updates at Dundas Street; consult TRCA on technical modelling updates and implications to flood lines and EA study area. Define flood conditions immediately upstream of Dundas Street (e.g., The Brick).	$9,920
	Hydraulic Modelling of Alternative Solutions Hydraulic modelling to screen the feasibility of options and define hydraulic conveyance requirements.	$19,280
	Shortlist of Alternative Solutions Develop up to three alternative solutions to define and identify hydraulic conveyance requirements, structural and road design concepts. Structural bridge concepts to be developed by R.V. Anderson Associates Ltd. Identify a preferred approach to incorporate any of the received input from City of Mississauga, Dundas Connects.	$16,700
	Flood Line Assessment to CP Railway Identify changes in the flood line to CP railway, comparing existing conditions and alternative solutions for discussion with TRCA.	$8,400
	Channel Stability	
	Conceptual Design Conceptual design for up to three options.	$13,940

EA Phase	Description of Work [1]	Cost
	Exposed Sanitary Line	
	Conceptual Design Conceptual design for up to three options.	$15,000
Phase 3	**Dixie Road Design & Dundas Street Crossing**	
	Developing Alternative Design Approaches Develop up to three alternative design approaches to conceptual design at each Dixie Road and Dundas Street.	$19,800
	Hydraulic Modelling of Alternatives Design Approaches Confirm hydraulics for alternative design approaches, including the bridge configuration, at each Dixie Road and Dundas Street.	$41,860
	Evaluate Alternative Design Approaches Apply evaluation criteria developed for EA to identify preferred design alternative to advance to preliminary design.	$21,400
Phase 4	**PIC No.2** Already scoped.	-
	Preliminary Design Dixie Road preliminary design already scoped. Dundas Street crossing and preliminary channel design (500 m upstream of Dundas Street to 300 m downstream)	$102,919
	Confirmation of Hydraulics Dixie Road preliminary design already scoped. Dundas crossing preliminary design (Appendix B).	$4,140
	Reporting Dixie Road reporting already scoped. Dundas Street crossing and channel stability.	$18,210
	5% Subcontractor Markup	$7,699
	TOTAL (NOT INCLUDING HST)	**$432,502**

TABLE 2 Time-Task Matrix for Expanded Dixie Dundas Environmental Assessment

EA Phase	Tasks	Steve Braun Project Manager $195	Roger Phillips Senior Geomorph. $195	Karen Hofbauer Hydraulics Lead $180	Robyn Leppington Senior Ecologist $165	Andrew Doherty Project Co-ordinator $140	Kim Weiler Civil CAD Design $130	Natalie Burrows Water Resources Engineer $130	Project Scientist/Engineer $130	Project Scientist/Engineer $120	Junior Project Scientist/Engineer (E.I.T.) $100	Lisa Prime Lead Planner $250	John Does Structural Director $250	David O'Sullivan Structural Lead $195	Kemar Campbell Roads Design $195	Henry Chui Structures Engineer $185	Structural Support $160	Structural Support $130	CAD Support $110	Total Professional Fees	Thurber	CIPS	ASI	Other Disbursements	Total Fees
	Project Management & Biweekly Phone Calls	50				60								12						$ 20,490	$ -	$ -	$ -	$ -	$ 20,490
	Meetings	10		10		18					6			4						$ 7,650	$ -	$ -	$ -	$ -	$ 7,650
	Stakeholder Engagement																								
	Project Bulletin	2				8					8	4								$ 3,310	$ -	$ -	$ -	$ -	$ 3,310
	Address Regulatory Comments	6		4	3	18						16								$ 8,905	$ -	$ -	$ -	$ -	$ 8,905
	Public Engagement	4				18						14								$ 6,800	$ -	$ 6,400	$ -		$ 13,200
Phase 1																									
	Prepare Notice					1					1	8								$ 2,240	$ -	$ -	$ -	$ -	$ 2,240
	Update Stakeholder List and Engagement Plan					1					1	4								$ 1,240	$ -	$ -	$ -	$ -	$ 1,240
	Update Problem and Opportunity Statement					1					1	4								$ 1,240	$ -	$ -	$ -	$ -	$ 1,240
	Technical Studies																								
	2019 Geotechnical Study Expansion [1]																				$ 5,700				$ 5,700
	2019 Natural Heritage Study Expansion [1]																			$ 17,038				$ 802	$ 17,840
	Background Data Review and Gap Analysis	2	2			4					8		1	4						$ 3,170	$ -	$ -	$ -	$ -	$ 3,170
	Geomorphology		16			4					32									$ 6,880	$ -	$ -	$ -	$ 145	$ 7,025
	Natural Heritage				18					58	16									$ 11,530	$ -	$ -	$ -	$ 804	$ 12,334
	Geotechnical																			$ -	$ 3,700	$ -	$ -	$ -	$ 3,700
	Geotechnical Boreholes (2)																				$ 21,900				$ 21,900
	Archaeology																			$ -	$ -	$ -	$ 3,290	$ -	$ 3,290
Phase 2	**Dundas Street Crossing**																								
	Dundas Street Hydraulic Investigation	8		12		22		24												$ 9,920	$ -	$ -	$ -	$ -	$ 9,920
	Hydraulic Modelling of Alternative Solutions	8		16			48	20			60									$ 19,280	$ -	$ -	$ -	$ -	$ 19,280
	Shortlist of Alternative Solutions	8		6		25					8	4	8	8	12	12	4			$ 16,700	$ -	$ -	$ -	$ -	$ 16,700
	Flood Line Assessment to CP Railway	8		16		8	8				18									$ 8,400	$ -	$ -	$ -	$ -	$ 8,400
	Channel Stability																								
	Conceptual Design Options		28			8	32				32									$ 13,940	$ -	$ -	$ -	$ -	$ 13,940
	Exposed Santitary Line																								
	Exposed Sanitary Alternative Solutions	16				20	36				44									$ 15,000		$ -	$ -	$ -	$ 15,000
Phase 3	**Dixie Road & Dundas Street Crossing**																								
	Developing Alternative Design Approaches	16		32		36	36				12									$ 19,800	$ -	$ -	$ -	$ -	$ 19,800
	Hydraulic Modelling of Alternative Design Approaches			40			16	96			140		4	4	8	8	8			$ 41,860	$ -	$ -	$ -	$ -	$ 41,860
	Evaluate Alternative Design Approaches	16		32		48					48	4								$ 21,400	$ -	$ -	$ -	$ -	$ 21,400
Phase 4																									
	Public Information Centre No. 2																			$ -	$ -	$ -	$ -	$ -	$ -
	Preliminary Design	4	16	16	4	40	40				80	4	22	18	42	102	50	110	151	$ 102,220	$ -	$ -	$ -	$ -	$ 102,919
	Confirmation of Hydraulics	2	2	4				8			16									$ 4,140	$ -	$ -	$ -	$ -	$ 4,140
	Reporting	18				40					56	10	4							$ 18,210	$ -	$ -	$ -	$ -	$ 18,210
	Total Hours	178	64	188	25	380	216	148	0	58	587	72	39	50	62	122	62	110	151	2512	**5% Subcontractor Markup**				$ 7,699
																					Expanded EA Total (not including HST)				$ 432,502

[1] Scope of the 2019 geotechnical and natural heritage study expansions are provided in Appendix C

Dixie-Dundas Flood Mitigation
EA Process for Expanded Study Area
Combined Schedule C EA Approach

Project Component

EA Phase 1 - Confirm problem & opportunity statement with expanded study

Dundas Street
Dixie Road
Channel Stability
Exposed Sanitary

Issue Notice
Notify stakeholders/contact list of expanded study area

Dundas Street
Channel Stability
Exposed Sanitary
Dixie Road

EA Phase 1b
- Update background technical studies (geomorphology, geotechnical, ecology, archaeology) to expanded study area

EA Phase 2b
- Develop alternative solutions for the Dundas Street crossing replacement, channel stability, and the exposed sanitary sewer

EA Phase 2: Confirm evaluation of preferred alternative solutions (all project components)

EA Phase 3: Develop alternative design approaches for preferred alternative solutions (Dixie Road and Dundas Street)

Dundas Street
Dixie Road
Channel Stability
Exposed Sanitary

Project Bulletin
- Introduce public to expanded project components with project bulletin posted online
- The project bulletin is proposed as a streamlined alternative to an additional Public Information Centre (PIC)
- Provide opportunity for interested stakeholders to identify project concerns and input

Note: From a hydraulic perspective, a Dundas Street crossing replacement would not impact solutions developed upstream to solve the spill at Queen Frederica Drive

PIC No. 2
- (PIC No. 1 held before project expansion)
- Present preferred alternative solutions and evaluation (all project components)
- Present alternative design approaches for preferred solutions (Dixie Road and Dundas Street)
- Provide opportunity for interested stakeholders to identify project concerns and input

EA Phase 3
- Preliminary design (Dundas Street and Dixie Road)
- Integrate and coordinate preferred channel stability alternative with Dundas Street preliminary design
- Integrate and coordinate preferred exposed sanitary alternative with Dixie Road preliminary design

EA Phase 4
- Environmental Study Report

Matrix Solutions Inc. ENVIRONMENT & ENGINEERING

PRIME STRATEGY & PLANNING innovative planning for sustainable communities

Figure 1

APPENDIX A
R.V. Anderson Associates Ltd.
Dundas Street Crossing Work Plan

R.V. Anderson Associates Limited
2001 Sheppard Avenue East Suite 300
Toronto Ontario M2J 4Z8 Canada
Tel 416 497 8600 Fax 855 833 4022
www.rvanderson.com

March 8, 2021 RVA 184319

Matrix Solutions
Suite 200, 2500 Meadowpine Blvd.
Mississauga, Ontario
L5N 6C4

Attention: Mr. Andrew Doherty, P.Eng.

Dear Mr. Doherty:

Re: Scope Change for Dixie-Dundas Flood Mitigation for Dundas Bridge Preliminary Design

R.V. Anderson Associates Limited submits herein the requested scope change proposal for engineering services to support the recommended bridge replacement on Dundas Street that will be required as part of the Dixie-Dundas Flood Mitigation project. Our proposal covers the provision of preliminary structural design services, preliminary road design, and utility layout and coordination.

SCOPE OF WORK

Background Review and Analysis

RVA will request and review all available information related to the design of the new bridge structure. This includes as-built drawings, utility drawings, borehole logs, OSIM reports, hydraulic reports, fluvial geomorphic reports, natural environment and any other relevant information. RVA would request that the City provide all useful background information. Using the information available, RVA would initiate concepts for the most effective method of bridge replacement.

Site Reconnaissance

At project startup, roads and structural engineering team members would carry out a site investigation of existing conditions at the bridge location. An inventory of significant field observations would be completed. Critical features that could impact the design of the bridge would be identified and documented for design purposes. We assume that Matrix will provide a full topographical survey with property information, for a least 500 metres on either side of the existing bridge, as well as the channel topography.

Agency and Stakeholder Consultation

Coordination meetings with the City, as well as other stakeholder meetings as required would be attended by RVA. It is expected that RVA's attendance will be required at most of

the meetings with conservation authorities and the MNRF. it is expected that a design review meeting will occur, for which RVA would attend.
Also, several meetings with the City of Mississauga are expected. These meetings would be to address all items related to the structural and road design for the replacement of the bridge.

Structural Bridge Design

The preliminary bridge general arrangement design drawings will indicate the overall horizontal and vertical alignments and profiles, as well as various details such as the preliminary foundations design, abutment and wingwall design, working points, grading contours, preliminary girder and bearing layout, structural staging, and deck design.

Road Design

RVA will coordinate with the topographic surveyor retained by Matrix to incorporate the topographic survey into a comprehensive base plan.
After receiving initial input from the City, a preliminary plan and profile for the road design would be developed. A typical cross-section will show the roadway details, boulevards, bridge section, and existing and proposed property lines.

Utility Relocation Design and Coordination

RVA will circulate base plans to utility companies to obtain their existing and future requirements in the project area. Utility conflicts between new construction and existing utilities would then be identified.
Further correspondence and meetings pertaining to utilities will also be attended by RVA.

Preliminary EA (30%) Design Submission

All preliminary civil and structural drawings would be provided to Matrix in PDF format, along with digital files. A cost estimate would be prepared for the road and structural design in accordance with the expected accuracy required of an EA (+/- 20%).
Please advise when you have received authorization to proceed with this scope chage, and please contact me if you have any questions.

Yours very truly,

R.V. ANDERSON ASSOCIATES LIMITED

David J. O'Sullivan
Senior Associate, Project Manager

Table

RVA Detailed Cost Estimate for Dixie Dundas Flood Mitigation - Scope Change #1 - Dundas Bridge Preliminary Design

Tasks	John Does	David O'Sullivan	Kemar Campell	Henry Chui	Structural Support	Structural Support	CAD Support	Total Professional Fees
	Structural Director	Structural Lead	Roads Design	Structures Engineer	Structural Support	Structural Support	Structural Support	
	$250	$195	$195	$185	$160	$130	$110	
Project Management and Meetings								
Project Management								$ -
Meetings (4 TRCA and City)		16						$ 3,120
Bi-Weekly Phone Calls								$ -
Stage 1 - Feasibility Assessment								
Problem and Opportunity Statement								$ -
Background Review and Gap Analysis								$ -
Identify and Prepare High Level Alternative Solutions	4		4	4				$ 2,520
Hydraulic Model Screening								$ -
Technical Studies								
Terrestrial and Aquatic Inventories								$ -
Geomorphic Assessment								$ -
Geotechnical, Hydrogeological and Archeological Studies	1	4						$ 1,030
Social and Economic Planning Environment								$ -
Confirm Short-list of Alternatives								$ -
Hydraulic Modelling of Refined Solutions (Dual Drainage)								$ -
Conceptual Design 10%	4	8	8	8	4			$ 6,240
Evaluate Refined Solutions and Select Preferred Alternative	4							$ 1,000
Feasibility Report	4							$ 1,000
Stage 2 - Class EA Process								
Public and Stakeholder Consultation								
Prepare Notice of Commencement								$ -
Public and Stakeholder Engagement								$ -
Open House (1) and Public Meeting (1)								$ -
Preliminary 30% Design	22	22	50	110	58	110	151	$ 80,080
Confirmation of Hydraulics								$ -
EA Schedule Confirmation and Reporting								$ -
Addressing Public and Agency Comments								$ -
Total Hours	39	50	62	122	62	110	151	596
Total Fees	$ 9,750	$ 9,750	$ 12,090	$ 22,570	$ 9,920	$ 14,300	$ 16,610	$ 94,990
Total Estimate								

NOTE: Costs shown above are an estimate for the proposed scope and do not include applicable taxes. Actual costs will be billed on a time and materials basis. All costs are based on Matrix Solutions' rates and third party pricing available to Matrix on the date this estimate was prepared. This estimate is valid for 90 days from the date it was issued.

This estimate replaces original proposal, with Stages 1 and 2 outlined here consistent with the work plan items outlined in original proposal of December 18, 2018.

APPENDIX B
Thurber Engineering Ltd.
Geotechnical Boreholes Work Plan

THURBER ENGINEERING LTD.

April 20, 2021 File No.: 25025

Matrix Solutions Inc.
7B-650 Woodlawn Rd W
Guelph, ON N1K 1B8

Attention: Andrew Doherty, P.Eng.

PROPOSAL FOR PRELIMINARY GEOTECHNICAL INVESTIGATION
DIXIE-DUNDAS FLOOD MITIGATION
MISSISSAUGA, ONTARIO

Dear Mr. Doherty:

At the request of Matrix Solutions Inc., Thurber Engineering Ltd. (Thurber) has prepared this proposal to conduct a preliminary geotechnical investigation for the proposed Dixie-Dundas Flood Mitigation project in Mississauga, Ontario. The following sections describe our scope and work plan as well as our schedule and the cost estimate to provide geotechnical consulting services concerning the above captioned project.

Use of this proposal is subject to the Statement of Limitations and Conditions, which is included at the end of this document.

1. BACKGROUND

The original project limits for the Dixie-Dundas Flood Mitigation project included 500 m upstream of the Dixie Road bridge and extended downstream to the north edge of the Dundas Street East bridge. We understand that the project limits have been expanded to include the Dundas Street East bridge and the stream channel up to 300 m downstream of the bridge.

It is understood that the preferred conceptual flood mitigation solution will include the following:

- Replacement of the Dixie Road bridge
- Replacement of the Dundas Street East bridge
- Possibly lowering the Little Etobicoke Creek bottom between 0 and 1 m at the Dixie Road Bridge area
- Channel stabilization works

2. PROPOSED SCOPE OF WORK

Two (2) boreholes will be advanced at the approximate locations shown on the proposed borehole plan at the end of this document.

THURBER

Element	Proposed Borehole ID	Target Depth (mbgs)	Monitoring Well
Dixie Road Bridge	DIX-01	10	Yes
Dundas Street East Bridge	DUN-01	10	Yes

Prior to commencement of the field investigation, utility clearances will be obtained in the vicinity of the borehole locations.

The boreholes will be drilled by a specialist drilling contractor. Soil samples will be obtained at select intervals using a split-spoon sampler in conjunction with Standard Penetration Testing (SPT) in accordance with ASTM D 1586. In-situ vane shear testing will be attempted within the cohesive deposits. Bedrock will be cored using HQ-size, triple-tube core barrels. Bedrock will be cored up to a maximum length of 3 m, if encountered.

The drilling and sampling operations will be supervised on a full-time basis by a member of Thurber's technical staff. The drilling supervisor will log the boreholes and process the recovered soil and rock samples for transport to the laboratory for further examination and testing.

A monitoring well will be installed in both boreholes to allow for measurements of the groundwater levels. The groundwater conditions will be noted in the open boreholes during drilling. Two additional monitoring visits will be carried out to identify fluctuations in the groundwater levels.

The as-drilled locations of the boreholes and ground surface elevations at the borehole locations will be surveyed using a Total Station or GPS unit.

The recovered soil samples will be subjected to visual identification and to natural moisture content determination. Select samples will be subjected to Atterberg Limit testing and gradation analyses (hydrometer and/or sieve). Rock cores will be photographed and their total core recovery (TCR), solid core recovery (SCR) and rock quality designation (RQD) measured. One soil sample from each borehole will be submitted for analytical testing of corrosivity parameters and sulphate content.

3. DELIVERABLES

The results of the field investigation will be submitted in a Geotechnical Investigation Report (both draft and final). A digital copy of the draft and final report will be submitted. A printed copy of the final report can be provided upon request.

4. SCHEDULE

The schedule provided in the table below is anticipated.

Activity	Duration
Authorization to Proceed	-

THURBER

Activity	Duration
Site Reconnaissance, Locates, Approvals, Field Work Notifications	4 weeks
Field Work(*)	1 week
Laboratory Testing	2 weeks
Preparation of Draft Memorandum	2 weeks
Preparation of Final Memorandum	2 weeks after receipt of comments on draft

Note: (*) Subject to change based on sub-contractor availability, weather conditions and other site conditions. Excludes long-term monitoring of the groundwater levels.

The field investigation will be carried out Monday through Friday (excluding weekends).

5. ESTIMATE OF COST

The cost estimate to carry out the proposed scope of work is provided in the table below.

Item	Cost
Traffic Control	$1,600
Driller	$9,900
Waste Disposal	$600
Field Equipment (including Spray Paint, Wooden Stakes, Flagging Tape, etc.)	$200
Field Supervision (including Work Plan, H&S Plan, Traffic Management Plan, Site Reconnaissance, Locates, Permits, Water Level Readings)	$4,600
Geotechnical Laboratory Testing	$900
Project Management (Meetings, Field Program Oversight)	$700
Engineering & Reporting	$3,400
TOTAL (excluding HST)	**$21,900**

6. SCOPE OF WORK ASSUMPTIONS

The following assumptions have been made in developing the proposed scope of work:

- Permission to Enter (PTE) will be provided by Matrix, if required
- Application fee and pavement degradation fee for Road Occupancy Permit (City of Mississauga) will be waived
- Daylighting of the borehole locations will not be required
- One drill rig will be used for the duration of the field investigation
- Field work will be undertaken between 8:00 a.m. and 5:00 p.m.
- Investigation-derived waste (drilling spoils and drilling water) will be contained in drums or totes pending receipt of waste characterization test results, where possible

THURBER

- The monitoring wells will be decommissioned in accordance with the requirements in O. Reg. 903, as amended
- Other projects will not interfere with the work limits

7. CLOSURE

We trust this information meets your present needs. If you have any questions, please contact the undersigned at your convenience.

Yours truly,
Thurber Engineering Ltd.

Renato Pasqualoni, P.Eng.
Review Principal

Michael Eastman, P.Eng.
Geotechnical Engineer

Attachments
- Statement of Limitations and Conditions
- Proposed Borehole Plan

THURBER

STATEMENT OF LIMITATIONS AND CONDITIONS

1. STANDARD OF CARE

This Report has been prepared in accordance with generally accepted engineering or environmental consulting practices in the applicable jurisdiction. No other warranty, expressed or implied, is intended or made.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report, which is of a summary nature and is not intended to stand alone without reference to the instructions given to Thurber by the Client, communications between Thurber and the Client, and any other reports, proposals or documents prepared by Thurber for the Client relative to the specific site described herein, all of which together constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. THURBER IS NOT RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives and purposes that were described to Thurber by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the Report, subject to the limitations provided herein, are only valid to the extent that the Report expressly addresses proposed development, design objectives and purposes, and then only to the extent that there has been no material alteration to or variation from any of the said descriptions provided to Thurber, unless Thurber is specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT THURBER'S WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS THURBER MAY EXPRESSLY APPROVE. Ownership in and copyright for the contents of the Report belong to Thurber. Any use which a third party makes of the Report, is the sole responsibility of such third party. Thurber accepts no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without Thurber's express written permission.

5. INTERPRETATION OF THE REPORT

a) Nature and Exactness of Soil and Contaminant Description: Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other persons making use of such documents or records with our express written consent should be aware of this risk and the Report is delivered subject to the express condition that such risk is accepted by the Client and such other persons. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. If special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.

b) Reliance on Provided Information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to Thurber. Thurber has relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, Thurber does not accept responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other persons providing information relied on by Thurber. Thurber is entitled to rely on such representations, information and instructions and is not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.

c) Design Services: The Report may form part of design and construction documents for information purposes even though it may have been issued prior to final design being completed. Thurber should be retained to review final design, project plans and related documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the Report's recommendations and the final design detailed in the contract documents should be reported to Thurber immediately so that Thurber can address potential conflicts.

d) Construction Services: During construction Thurber should be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions in order to confirm and document that the site conditions do not materially differ from those interpreted conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

6. RELEASE OF POLLUTANTS OR HAZARDOUS SUBSTANCES

Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause the escape, release or dispersal of those substances. Thurber shall have no liability to the Client under any circumstances, for the escape, release or dispersal of pollutants or hazardous substances, unless such pollutants or hazardous substances have been specifically and accurately identified to Thurber by the Client prior to the commencement of Thurber's professional services.

7. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on Thurber's interpretation of conditions revealed through limited investigation conducted within a defined scope of services. Thurber does not accept responsibility for independent conclusions, interpretations, interpolations and/or decisions of the Client, or others who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes but is not limited to decisions made to develop, purchase or sell land.


DIX-01
Dixie Rd
© 2021 Google
28 m
1985
Google Earth
lat 43.611578° lon -79.586995° elev 123 m eye alt 268 m


N
DUN-01
© 2021 Google
Google Earth
35 m
1985
lat 43.613304° lon -79.579159° elev 116 m eye alt 265 m

APPENDIX C
2019 Technical Study Expansions

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

Version 1.0
July 26, 2019 Matrix 24603-531

Muneef Ahmad, P.Eng.
Project Manager, Environmental Services Section
CITY OF MISSISSAUGA
Suite 800, 201 City Centre Dr.
Mississauga, ON L5B 2T4

Subject: Natural Heritage Evaluation Cost Estimate for the Dixie-Dundas Flood Mitigation Project, City of Mississauga

Dear Mr. Ahmad:

1 INTRODUCTION

Matrix Solutions Inc. is pleased to provide this cost estimate to complete a natural heritage evaluation (NHE) for the extended feasibility study area for the Dixie-Dundas Flood Mitigation Project. The original study area included Little Etobicoke Creek and its natural valley corridor from 500 m upstream of the Dixie Road bridge to 50 m downstream. The extended study area includes approximately 1.2 km of additional channel length and valley corridor downstream to Dundas Street. A NHE is required to establish the significance and sensitivity of the natural features present within the extended study area. This cost estimate is based on the tasks outlined below.

2 WORK PLAN

2.1 Natural Heritage Evaluation

Matrix will complete an NHE for the expanded study area identified with the City of Mississauga (the City) during the project milestone meeting on June 27, 2019. The NHE will consist of the following tasks to be completed throughout 2019:

- background review and consultation with regulatory agencies (Fisheries and Oceans Canada, Ministry of the Environment, Conservation and Parks [MECP], and Toronto and Region Conservation Authority [TRCA]) to collect existing ecosystem information and Species at Risk (SAR) potential

- identification of natural features to the extent possible through satellite imagery, air photo review and any secondary information available from the City's Natural Areas Survey, the City's Official Plan and the Region of Peel's Official Plan

- field investigations, which will include:

- Ecological Land Classification (ELC) within the expanded study area to delineate vegetation communities
- two-season botanical inventory (summer and fall) within the extended study area to record the presence or absence of significant vegetation
- aquatic habitat mapping of Little Etobicoke Creek for the extended study area
- evaluation of SAR and Significant Wildlife Habitat (SWH) within the extended study area

Based on *Ecological Land classification for Southern Ontario: First Approximation and Its Application* (Lee et al. 1998), ELC data will be collected to determine the provincial and local rarity status of the vegetation community. We propose a two-season botanical inventory, which will be collected in conjunction with the ELC mapping task. The botanical inventory will provide information on SAR plants within the study area. The original study included a spring and summer botanical inventory. Since the study area was extended after the spring botany timeline, the extended study area will not contain spring data. A three-season inventory would provide a full data set for analysis and therefore a provisional item has been added to section 3.1.1 to complete a spring botanical inventory in 2020.

Aquatic habitat mapping will include the collection of information such as channel morphology, riparian and instream vegetation, preferred habitat characteristics (i.e. woody debris and undercut banks) to determine fish habitat potential.

The SAR and SWH evaluation will be based on known flora and fauna occurrences, which will be determined through the MECP SAR screening, Natural Heritage Information Centre, and/or the Significant Wildlife Habitat Technical Guide and supporting mitigation tools. During the field investigation, evidence of bird nests and bat maternity roosts will be noted to document potential SAR or SWH use.

The additional data will be added to the existing NHE report for the original study area which will outline the finding of the NHE for the entire study area and will identify any constraints identified. Recommendations of setbacks will also be provided in the report as well as any other relevant technical information that should be taken into consideration during feasibility study and Environmental Assessment (EA) phase.

2.1.1 Reporting

The information collected throughout the extended study area will be summarized and will be discussed in a NHE Report prepared for the entire study area (original study area and extended study area). In addition, a constraints map will be created showing natural heritage features within the study area to assist in refining the list of alternative solutions during the feasibly study and EA phase of the project. The report will be provided to the City of Mississauga for review and will be finalized upon receipt of one round of comments (from the City of Mississauga and TRCA).

3 COST ESTIMATE

The estimated cost to undertake this study is **$17,840.00** (Table 1). The total cost includes expenses and disbursements but excludes HST. This is an upset limit that will not be exceeded without authorization.

3.1 Provisional Item

A spring botanical survey can not be completed for the study area extension because the spring timing window has expired for the 2019 season. We have provided a provisional item to complete the spring botanical survey during the Spring of 2020 in order to create a fuller data set which would include a three-season inventory. The cost of this assessment will be an additional **$3,046.00** (Table 2).

TABLE 1 Cost Estimate for Extended Study Area

Phase and Task Description	Quantity	Rate	Matrix Charges	Subtotal	Estimated Cost
Project Coordination & Meetings					
Project Coordination					
Senior 1	2 Hour(s)	$175.00	$350.00		
Project 4	2 Hour(s)	$130.00	$260.00		
Project 3	8 Hour(s)	$120.00	$960.00		
		Task Subtotal		*$1,570.00*	
Update Background Review					
Project 3	2 Hour(s)	$120.00	$240.00		
		Task Subtotal		*$240.00*	
Update Data Requests					
Project 3	2 Hour(s)	$120.00	$240.00		
		Task Subtotal		*$240.00*	
				Subtotal for Project Coordination & Meetings	***$2,050.00***
Field work					
Aquatic habitat assesment and fish community					
Project 4	12 Hour(s)	$130.00	$1,560.00		
Project 2	12 Hour(s)	$110.00	$1,320.00		
Kilometres/Mileage	180 Each	$0.95	$171.00		
Electrofisher - Backpack	1 day(s)	$335.00	$335.00		
Basic Field Kit Ontario	1 day(s)	$50.00	$50.00		
		Task Subtotal		*$3,436.00*	
ELC and Summer Botany					
Project 3	12 Hour(s)	$120.00	$1,440.00		
Project 2	12 Hour(s)	$110.00	$1,320.00		
Kilometres/Mileage	180 Each	$0.95	$171.00		
Basic Field Kit Ontario	1 day(s)	$50.00	$50.00		
		Task Subtotal		*$2,981.00*	
Fall Botany					
Project 3	12 Hour(s)	$120.00	$1,440.00		
Project 2	12 Hour(s)	$110.00	$1,320.00		
Kilometres/Mileage	180 Each	$0.95	$171.00		
Basic Field Kit Ontario	1 day(s)	$50.00	$50.00		
		Task Subtotal		*$2,981.00*	
				Subtotal for Field work	***$9,398.00***
Data Analysis					
Data Entry and Analysis					
Project 4	10 Hour(s)	$130.00	$1,300.00		
Project 3	10 Hour(s)	$120.00	$1,200.00		
		Task Subtotal		*$2,500.00*	
				Subtotal for Data Analysis	***$2,500.00***
Reporting					
Report Updates					
Senior 1	4 Hour(s)	$175.00	$700.00		
Project 3	12 Hour(s)	$120.00	$1,440.00		
		Task Subtotal		*$2,140.00*	
GIS Mapping					
Senior 1	2 Hour(s)	$175.00	$350.00		
Project 1	6 Hour(s)	$100.00	$600.00		
		Task Subtotal		*$950.00*	
				Subtotal for Reporting	***$3,090.00***
TOTALS				**Total For All Phases**	***$17,038.00***
				Misc. Expenses (5% of Professional Fees)	***$802.00***
				Total Project Estimate	***$17,840.00***

NOTE: Costs shown above are an estimate for the proposed scope and do not include applicable taxes. Actual costs will be billed on a time and materials basis. Matrix Solutions Inc. applies a fixed disbursement charge of 5% of professional fees billed to support our Health and Safety program, modelling and database software licensing fees, and various other miscellaneous expenses such as couriers, photocopying, parking, and taxis. All costs are based on Matrix Solutions' rates and third party pricing available to Matrix on the date this estimate was prepared. The total cost will not be exceeded by more than 10% without prior consultation. This estimate is valid for 90 days from the date it was issued.

TABLE 2 Cost Estimate for Provisional Item

Phase and Task Description	Quantity	Rate	Matrix Charges	Subtotal	Estimated Cost
Provisional Item					
Spring Botany for study area extention					
Senior 1	3 Hour(s)	$175.00	$525.00		
Project 3	10 Hour(s)	$120.00	$1,200.00		
Project 2	10 Hour(s)	$110.00	$1,100.00		
Kilometres/Mileage	180 Each	$0.95	$171.00		
Basic Field Kit Ontario	1 day(s)	$50.00	$50.00		
		Task Subtotal		*$3,046.00*	
				Subtotal for Provisional Item	***$3,046.00***
TOTALS				**Total For All Phases**	***$3,046.00***
				Misc. Expenses (0% of Professional Fees)	***$0.00***
				Total Project Estimate	***$3,046.00***

NOTE: Costs shown above are an estimate for the proposed scope and do not include applicable taxes. Actual costs will be billed on a time and materials basis. All costs are based on Matrix Solutions' rates and third party pricing available to Matrix on the date this estimate was prepared. The total cost will not be exceeded by more than 10% without prior consultation. This estimate is valid for 90 days from the date it was issued.

3.2 Work Plan Assumptions

The assumptions presented in the original work plan remain valid. Additional assumptions directly related to this scope change are as follows:

- Matrix assumes that three days of field effort for a two-person field crew will be sufficient to complete natural heritage data collection.

- This scope accounts for one major revision of the NHE report based on comments from regulatory agencies as well as the City of Mississauga. Should multiple rounds of revisions be required due to conflicting recommendations from the City and other agencies, a scope change will be required to undertake additional rounds of edits.

- This scope of work includes a two-season vegetation assessment (Summer and Fall 2019) inclusively as the time period for a spring botany survey has expired for 2019. If communications with MECP result in concerns regarding species at risk vegetation, or if SAR/SWH is found during the summer assessment, further assessments might be required. Such assessments would be discussed with the City of Mississauga prior to a scope change being requested.

4 CLOSURE

Any questions regarding the scope change should be directed to Andrew Doherty at 226.314.1924 (adoherty@matrix-solutions.com) or Karen Reis at 226.314.1914 (kreis@matrix-solutions.com).

Sincerely,

MATRIX SOLUTIONS INC.

Karen Reis, B.E.S (Hons)
Ecologist/Arborist

Reviewed by

Shaun Toner, B.Sc., P.Biol, PMP, CAN-CISEC
Senior Environmental Scientist/General Manager

Andrew Doherty, P. Eng.
Water Resources Engineer/Project Coordinator

KR/oa
Attachment

VERSION CONTROL

Version	Date	Issue Type	Filename	Description
V1.0	26-Jul-2019	Final	24603-531 Dixie-Dundas Scope Change 2019-07-26 F V1.0.docx	Issued to client

REFERENCE

Lee H. et al. 1998. *Ecological Land Classification for Southern Ontario: First Approximation and Its Application*. Ontario Ministry of Natural Resources, Southcentral Science Section, Science Development and Transfer Branch. SCSS Field Guide FG-02.

ACKNOWLEDGEMENT OF MATRIX SCOPE CHANGE

We accept the work plan and cost estimate dated July 26, 2019, with respect to Additional Natural Heritage Evaluation - Scope Change for the Dixie-Dundas Flood Mitigation Feasibility Study, City of Mississauga (Matrix 24603-531). We authorize Matrix Solutions Inc. to proceed with the described Scope Change.

City of Mississauga

Per: _____

Name: _____

Title: _____

Date: _____

[Please return by email, fax, or regular mail]

THURBER ENGINEERING LTD.

July 8, 2019 File: 25025

Matrix Solutions Inc.
Unit 7B, 650 Woodlawn Rd W
Guelph, ON N1K 1B8

Attention: Andrew Doherty, P.Eng.

PROPOSAL
GEOTECHNICAL DESKTOP STUDY – EXPANDED STUDY AREA
DIXIE-DUNDAS FLOOD MITIGATION
MISSISSAUGA, ONTARIO

Dear Mr. Doherty:

Thurber Engineering Ltd. (Thurber) is pleased to present you with this proposal to conduct a geotechnical desktop study in support of a feasibility assessment for the flood mitigation study of Little Etobicoke Creek by the intersection of Dixie Road and Dundas Street East in Mississauga, Ontario. This proposal outlines our proposed scope of work, schedule and cost to carry out the work.

It is a condition of this proposal that Thurber's performance of its professional services will be subject to the attached Statement of Limitations and Conditions.

BACKGROUND

The original extents of anticipated flood mitigation work included approximately 500 m upstream to 50 m downstream of Dixie Road Bridge in Mississauga, Ontario. The limits of the study area have since increased and now extend downstream to Dundas Street East, just before the bridge.

PROPOSED SCOPE OF WORK

Activities that will be carried out in association with this geotechnical desktop study consist of the following:

- A review of available information from the Ministry of Transportation (MTO) Foundation Library service (i.e. Geocres);
- A site visit in order to assess the site conditions within the study area, including existing slopes, creekbanks and pavements; and
- Preparation of a geotechnical desktop study report providing preliminary geotechnical recommendations for slope/creek stabilization along the expanded study area as well as recommendations for further work during the detailed design stage.

THURBER

ESTIMATE OF COST

The estimated cost to carry out the proposed scope of work is provided in the following table and is broken down as follows:

TASK	COST
Desktop study	$550
Site visit	$1,550
Engineering and reporting	$3,600
TOTAL ESTIMATED COST (excluding HST)	**$5,700**

SCHEDULE

Thurber is available and prepared to begin work on this project as soon as we receive written approval to proceed.

SCOPE OF WORK ASSUMPTIONS

For the purposes of developing the scope of work, we have made the following assumptions:

- Thurber will not be attending any meetings.

CLOSURE

We would like to thank you for the opportunity to submit our proposal and we look forward to working with you on this project. Should you have any questions, please contact our office.

Yours truly,

Thurber Engineering Ltd.

Michael Eastman, P.Eng.
Geotechnical Engineer

Renato Pasqualoni, P.Eng.
Principal

THURBER

STATEMENT OF LIMITATIONS AND CONDITIONS

1. STANDARD OF CARE

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2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report, which is of a summary nature and is not intended to stand alone without reference to the instructions given to Thurber by the Client, communications between Thurber and the Client, and any other reports, proposals or documents prepared by Thurber for the Client relative to the specific site described herein, all of which together constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. THURBER IS NOT RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives and purposes that were described to Thurber by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the Report, subject to the limitations provided herein, are only valid to the extent that the Report expressly addresses proposed development, design objectives and purposes, and then only to the extent that there has been no material alteration to or variation from any of the said descriptions provided to Thurber, unless Thurber is specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT THURBER'S WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS THURBER MAY EXPRESSLY APPROVE. Ownership in and copyright for the contents of the Report belong to Thurber. Any use which a third party makes of the Report, is the sole responsibility of such third party. Thurber accepts no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without Thurber's express written permission.

5. INTERPRETATION OF THE REPORT

a) Nature and Exactness of Soil and Contaminant Description: Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other persons making use of such documents or records with our express written consent should be aware of this risk and the Report is delivered subject to the express condition that such risk is accepted by the Client and such other persons. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. If special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.

b) Reliance on Provided Information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to Thurber. Thurber has relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, Thurber does not accept responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other persons providing information relied on by Thurber. Thurber is entitled to rely on such representations, information and instructions and is not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.

c) Design Services: The Report may form part of design and construction documents for information purposes even though it may have been issued prior to final design being completed. Thurber should be retained to review final design, project plans and related documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the Report's recommendations and the final design detailed in the contract documents should be reported to Thurber immediately so that Thurber can address potential conflicts.

d) Construction Services: During construction Thurber should be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions in order to confirm and document that the site conditions do not materially differ from those interpreted conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

6. RELEASE OF POLLUTANTS OR HAZARDOUS SUBSTANCES

Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause the escape, release or dispersal of those substances. Thurber shall have no liability to the Client under any circumstances, for the escape, release or dispersal of pollutants or hazardous substances, unless such pollutants or hazardous substances have been specifically and accurately identified to Thurber by the Client prior to the commencement of Thurber's professional services.

7. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on Thurber's interpretation of conditions revealed through limited investigation conducted within a defined scope of services. Thurber does not accept responsibility for independent conclusions, interpretations, interpolations and/or decisions of the Client, or others who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes but is not limited to decisions made to develop, purchase or sell land.