Item 8.4

Section I – Items for Authority Action

TO: Chair and Members of the Authority
Meeting #7/18, Friday, September 28, 2018

FROM: Nick Saccone, Senior Director, Restoration and Infrastructure

RE: **HIGHLAND CREEK HYDROLOGY AND FLOODPLAIN MAPPING UPDATE**
Contract #10008608 - Comprehensive Hydrology and Floodplain Mapping Update of the Highland Creek Watershed within the City of Toronto

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KEY ISSUE

Award of Contract #10008608 for engineering consulting services to undertake a detailed hydrology and hydraulic model, and floodplain mapping update of the Highland Creek watershed within the City of Toronto.

RECOMMENDATION

THAT Contract #10008608 for the engineering services required to complete the hydrology model and floodplain mapping update for the Highland Creek watershed in the City of Toronto be awarded to Matrix Solutions at total cost not to exceed $199,514, plus HST, it being the highest ranked proposal resulting from the evaluation criteria set out in the Request for Proposals (RFP);

THAT Toronto and Region Conservation Authority (TRCA) staff be authorized to approve additional expenditures to a maximum of $39,900 (approximately 20% of the project cost) in excess of the contract cost as a contingency allowance if deemed necessary;

THAT should staff be unable to negotiate a mutually acceptable agreement with the above-mentioned proponent, staff be authorized to enter into contract negotiations with the next highest ranked proponent;

AND FURTHER THAT authorized TRCA officials be directed to take such action as necessary to implement the contract including the signing and execution of documents.

BACKGROUND

TRCA has identified the need to update the hydrology and hydraulic modelling and floodplain mapping for the Highland Creek watershed in the City of Toronto. The project will involve a comprehensive hydrology modelling update of the watershed to develop a new set of Regional and design storm flows for use in floodplain mapping updates and flood remediation studies. In addition, this project will include the development of a new hydraulic model of the watershed, resulting in approximately 27 updated floodplain map sheets within the study area.

It is TRCA's best practice to update floodplain mapping on a 10 to 15-year cycle to ensure the information is up to date and reflects current watershed conditions. In 2005 TRCA completed the last comprehensive floodplain mapping update for the Highland Creek. Since 2005 there have been a number of advancements in hydrology and hydraulic modelling leveraging GIS processes and LiDAR data which aid in streamlining model development, floodline generation and reporting. Further TRCA has collected over 13 years of meteorological monitoring information which will further aid in model calibration and validation, ensuring TRCA's models accurately characterize watershed response.

The previous hydrology model of the Highland Creek was based on the Visual Otthymo model and was developed using the best information of the time, consisting of catchment mapping from the work completed by the City of Toronto as part of the Wet Weather Flow Master Plan, and various sources for land use and soil mapping. The model was calibrated to one stream flow gauge and four precipitation gauges, using storm events from the late 1990's to the early 2000's. TRCA now proposes to develop a new hydrology model based on the PCSWMM hydrology modelling platform, using LiDAR to delineate catchments, as well as GIS processes, including air photo interpretation and soil classification to streamline model development. Further, staff intends to collect further rainfall data from City of Toronto gauges to help complement the model calibration and validations process.

The project will also involve the development of a comprehensive watershed scale hydraulic model utilizing the HEC-RAS (Hydrologic Engineering Center River Analysis System) hydraulic model to provide flood elevation estimates (2-350 year and Regional) throughout the Highland Creek watershed. HEC-RAS is well suited for this assignment as it is the industry standard for hydraulic modeling of river systems, and is used broadly across TRCA and the Province of Ontario. Once completed, the model will be used to update TRCA's floodline mapping (approximately 27 map sheets), flood forecasting and warning systems and flood emergency response plans.

The project will take approximately 13 months to complete, with an anticipated completion date of November 2019.

RATIONALE

Engineering Services staff completed a public prequalification process through Biddingo (www.biddingo.com) and identified four firms to invite to the formal bidding process based on the following:

- Corporate Profile;
- Project Manager qualifications and experience;
- Relevant project experience;
- Staff qualifications;
- GIS expertise; and
- Experience in hydraulic modelling and mapping.

Request for Proposal #10008608 was sent to the following four engineering firms on August 13, 2018:

- KGS Group,
- Matrix Solutions
- R.J. Burnside, and
- Wood

Consistent with TRCA's standard procurement process an opening committee consisting of representatives from Engineering and Corporate Services opened the submitted technical and cost proposal on August 31, 2018 with the following fee results:

Consulting Firms	Fees (Plus HST)
KGS Group	$128,988
Matrix Solutions	$199,514
R.J. Burnside	Did not Submit
Wood	$176,661

Members of the selection committee, consisting of Engineering Services staff (Nick Lorrain, Christina Bright and Ying Qiao), reviewed proposals based on a weighted scoring system consisting of the following:

Evaluation Criteria	Weighting (%)	Minimum Score
Proponent's Information and Profile	5%	5
Key Personal	15%	7.5
Experience and Methodology	20%	12.5
Scope of Work Capabilities	15%	7.5
Proposed work Plan and Timeframe	20%	12.5
Cost	25%	-

The averaged results from the staff evaluation of the proposals are as follows:

Consulting Firms	Ranking (out of 100%)
Matrix Solutions	87.2%
Wood	83.4%
KGS Group	80.3%
R.J. Burnside	Did not Submit

Based on the evaluation of the bids, it was concluded that the combined technical and fee proposal valued at $199,514 submitted by Matrix Solutions offered the best service for value among the engineering firms whose technical capacity matched the project needs.

Matrix Solutions has extensive knowledge of hydrology and hydraulic modelling, specifically modelling for floodplain mapping purposes and has completed a number of projects of similar size and scale. The fee schedule provided in Matrix Solutions proposal was deemed reasonable and consistent with past fee estimates provided for similar types of projects. Staff is confident that Matrix Solutions will provide TRCA with the desired product within the specified schedule and budget and therefore recommend that Contract #10008608 be awarded to Matrix Solutions for the base cost of $199,514, plus HST, as they are able to provide the valuable technical experience required and have a clear understanding of the scope of work as defined in the RFP.

FINANCIAL DETAILS

Funds required to complete this project are available from the National Disaster Mitigation Program – Floodplain Mapping Account 107-56.

Funding Source	Accounts	Budget (Plus HST)	Contingency (Plus HST)
NDMP/Region of York	107-56	$199,514	$39,900

A maximum upset limit of $199,514 plus 20% contingency, plus HST has been set for this project.

DETAILS OF WORK TO BE DONE

TRCA is looking to retain the services of a consulting engineering firm to complete a hydrology and floodplain mapping update for the Highland Creek watershed. The project will consist of two components which will be conducted concurrently; Hydrology and Hydraulic modeling. For the Hydrology modelling component, the study will include the development of a hydrology model of the Highland Creek watershed using the PCSWMM hydrology modelling platform, complete with a detailed calibration and validation process. The Hydraulic modeling component will consist of the development of a one dimensional hydraulic model using the HEC-RAS hydraulic modelling platform (Version 5.0.5). Floodlines will be derived from the Hydrology modeling component and will include digitally signed and stamped map sheets that covers approximately 27 standard floodplain map sheets and a final report.

As per the schedule identified in the request for proposals, and the proposal provided by Matrix Solutions, the general scope of work and associated timelines are as follows:

Work Plan	**Start Date**	**End Date**
Start Up Meeting	Week of October 5, 2018	
Background Review	October 5, 2018	November 23, 2018
Hydrology Model Development	November 1, 2018	April 30, 2019
Hydraulic Model Development	October 12, 2018	June 30, 2019
Floodline Generation	July 1, 2019	September 30, 2019
Project Completion		November 29, 2019

The timelines identified above include provisions for TRCA staff review of the models, floodlines, and associated reports, as well as consultation and meetings with City of Toronto staff.

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