

## Section I – Items for the Board of Directors Action

**TO:** Chair and Members of the Board of Directors  
Meeting #8/20, Friday, November 20, 2020

**FROM:** Sameer Dhalla, Director, Development and Engineering Services

**RE:** **NATIONAL DISASTER MITIGATION PROGRAM – 2020 UPDATE**  
Summary of projects completed with National Disaster Mitigation Program funding support

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### KEY ISSUE

Update and summary of projects completed since 2016 utilizing National Disaster Mitigation Program funding support.

### RECOMMENDATION

**IT IS RECOMMENDED THAT this report be received;**

**THAT Toronto and Region Conservation Authority (TRCA) staff, in partnership with TRCA’s municipal partners, be directed to continue to pursue National Disaster Mitigation Program funding to accelerate risk mitigation projects through the recently announced 6<sup>th</sup> intake of the program;**

**AND FURTHER THAT TRCA staff request financial support for special projects from TRCA’s partner municipalities.**

### BACKGROUND

In 2016, TRCA’s Board of Directors approved a 5-year plan to enhance TRCA’s flood risk management program with funding from the National Disaster Mitigation Program (NDMP).

At Authority Meeting #6/16, held on July 22, 2016, Resolution #A109/16 was approved, in part, as follows:

*AND FURTHER THAT staff report back to the Authority in 2018 and 2020 to provide a summary of the work that has been completed with funding from the NDMP.*

The NDMP was established by the federal government in 2015 with the intent of allocating \$200 Million across Canada over five years towards initiatives aimed at reducing the impacts of natural disasters, specifically flooding. Eligible projects were those that fell under one of four NDMP funding streams, namely:

- (1) Risk Assessment
- (2) Flood Mapping
- (3) Flood Mitigation Planning
- (4) Investments in non-structural and small-scale structural mitigation projects

### RATIONALE

As the holders of delegated responsibility for flood management at a watershed scale, conservation authorities have been ideally-positioned project partners in this endeavor. TRCA has successfully received nearly \$3.8 Million in federal matching funds through the program. As a funding program that complemented TRCA’s flood risk management mandate, the NDMP has

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been an opportunity to fill funding gaps to address outstanding needs and has acted as a catalyst to accelerate investments in flood risk reduction activities. Highlights of the accomplishments under each stream of the NDMP are outlined below, and **Attachment 1** includes a full list of the NDMP projects from Intakes 1-5, which have all been completed. In many cases, outputs and processes developed specifically for one project have found myriad uses in other flood risk reduction activities, including further NDMP projects.

### (1) Risk Assessment

- The **Flood Risk Assessment and Ranking** study updated TRCA's database of flood vulnerable roads and structures, developed an updated methodology for quantifying riverine flood risk, and provided a renewed ranking of risk across TRCA's 41 Flood Vulnerable Clusters. The lessons learned and updated depth-damage functions were also shared with other Conservation Authorities to enhance the state of practice for flood risk assessment. The geospatial products developed through this project were also utilized to develop mapping to assist in emergency response for actual flood events, such as the Lake Ontario high water levels and 2019 Bolton Ice Jam flood event.
- Building on the concepts used in the riverine flood risk assessment process and modifying it to suite the unique characteristics of Toronto Islands, the **Toronto Islands Flood Characterization and Risk Assessment project** in partnership with the City of Toronto provided an improved understanding of flood scenarios and community and infrastructure vulnerabilities and risks following the 2017 high lake level event. It also provided direction on future flood mitigation investments which will be further fleshed out through an environmental assessment, as well as information utilized to install proactive resilience measures in 2018, 2019, and 2020.

### (2) Flood Mapping

- The **comprehensive updating of TRCA's flood plain mapping**, underpinned by state-of-the-art hydrology and hydraulic models, is a key accomplishment under the NDMP program. As outlined in the September 25, 2020 Summary of Recent Updates to TRCA Flood Mapping Program report (Resolution #A126/20), nearly all of TRCA's mapping is now less than 5 years old. Through the NDMP, over 400 flood plain map-sheets were developed in the Humber River, Mimico Creek, Don River, Highland Creek, Rouge River, Duffins Creek and Carruthers Creek watersheds. Updated hydrology modelling was also completed for the Petticoat Creek watershed.
- Furthermore, two-dimensional (2D) models were created in areas with complex flow regimes or where an enhanced understanding of risk was required. In many cases, the 2D modelling studies laid the foundation for further flood mitigation planning, as identified in the following section. 2D models were completed for the following areas:
  - Rockcliffe Special Policy Area in Toronto
  - Pickering and Ajax Special Policy Areas in Pickering and Ajax (Durham Region)
  - Spring Creek (Avondale) area in Brampton (Peel Region)
  - Unionville Special Policy Area in Markham (York Region)

### (3) Flood Mitigation Planning

- Recognizing that flood risk reduction efforts can involve existing flood protection infrastructure, the **Stouffville and Claireville Dam Feasibility Studies** assessed the viability of implementing risk reduction alternatives identified in recent dam safety reviews.
- Building on the analyses conducted as part of the earlier 2D modelling NDMP project in the area, the **Pickering and Ajax Dyke Restoration Conservation Ontario Class**

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**Environmental Assessment (EA)** was completed. The EA identified a preferred alternative for the rehabilitation of the Pickering and Ajax Dykes to enable them to meet current engineering standards and factors of safety while maintaining the existing level of flood protection.

- The **Black Creek at Rockcliffe Flood Remediation and Transportation Feasibility Study** re-examined the performance of flood remediation solutions originally recommended in 2014, using a new MIKE FLOOD 2D hydraulic model, which explicitly considers the influence of the Lavender Creek tributary, as well as the updated watershed flows from the 2018 “Humber River Hydrology Update Addendum”. The Feasibility Study also comprehensively assessed traffic impacts (using Synchro and SimTraffic Models) and included site investigations (Boreholes and Sub-Surface Engineering). The Feasibility study identified an improved flood remediation solution which significantly reduces the number of properties in the floodplain under all storm events.
- Through the **Downtown Brampton Flood Protection Environmental Assessment**, The City of Brampton and TRCA considered alternative ways to protect downtown Brampton from future flood events and unlock potential for revitalization. The EA has been completed and identified a preferred alternative for providing flood protection for the downtown area while considering urban design and land use opportunities for the City of Brampton.

### (4) Investments in non-structural and small-scale structural mitigation projects

- Considering the short-duration, high-intensity storms recently experienced in TRCA’s jurisdiction, the **G. Ross Lord Dam Safety Risk Assessment & Flood Operations** study analyzed the effects of modified dam operations rules in relation to the overall risks associated with the presence of this important piece of flood infrastructure.
- Five new real-time gauges were added to **TRCA’s network of real-time rain and stream gauges**. The real-time hydrometric network, together with the tools that collect and display this information, are a critical component of TRCA’s Flood Forecasting and Warning program.
- Recognizing that the characteristics of TRCA watersheds and the nature of the weather systems that impact them make it difficult to predict flooding, TRCA has been working to develop a **Next-generation Flood Forecasting and Warning Decision Support System (DSS)** using Delft-FEWSsting, the Delft Flood Early Warning System (FEWS) was selected as the platform on which to build TRCA’s next generation DSS. The completed pilot provides aggregation and spatial averaging of weather and radar forecasts for all of TRCA’s jurisdiction, as well as a customized adaptor that allows for FEWS to run hydrologic models in SWMM, which is one of the programs that is used by TRCA for floodplain mapping purposes.
- The **Flood Emergency Plan – Site Specific Flood Risk Packages** project utilized information from the Flood Risk Assessment and Ranking study, allowing TRCA to work together with municipal partners to jointly develop a set of impact tables and possible response actions, together with simplified mapping that could be utilized by first responders. Depending on the municipality, the SSFRPs do not necessarily represent formal response plans, but rather represent “site-specific risk information packages” meant to complement existing municipal emergency plans or risk-specific plans for flooding.
- Over the course of a 10-month period within the **Flood Risk Public Awareness and Education Program** span, Flood Risk Management staff hosted or attended events with an attendance of over 2,400 people combined, and created campaigns that reached

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50,000 people digitally, and 1,949 people by mail. From these, 3,100 people accessed the flood risk specific webpages to learn more about their risk, and there were over 200 meaningful in-person conversations with residents and business owners living in TRCA's flood vulnerable clusters. Furthermore, the number of new public signups to receive flood forecasting and warning messages between January and March 2020 (the most active period of the campaign) was more than four times the average of new self-subscriptions in a given quarter.

In summary, the dedicated funding provided through the National Disaster Mitigation Program has been the most significant impetus for flood risk reduction within TRCA's jurisdiction since the 1970s. This funding has supported a myriad of projects, from risk assessments to emergency planning documents, from state-of-the-art flood modelling and mapping to improvements to real-time gauges and flood forecasting tools, from large-scale community flood remediation studies with municipal partners to flood communication and outreach programs. As an early adopter of this program, TRCA has also provided guidance and leadership to other conservation authorities pursuing similar studies and to federal working groups that were developed in parallel to the program. The tireless efforts of staff to secure funding and deliver on project commitments over the past 5 years has meant that TRCA is already at the forefront of many of the objectives later identified in the Ontario Flooding Strategy. Matching funds are a critical component to achieving TRCA and municipal partners flood risk reduction objectives.

With the recently announced sixth intake of the NDMP, TRCA staff will pursue federal funding to leverage anticipated budget allocations for floodplain mapping extensions for the Humber and Rouge Rivers in York Region, an updated hydrology study for Etobicoke Creek in Peel, and updating coastal floodplain mapping along the Lake Ontario shoreline in Toronto. Staff will work with the Strategic Business Planning and Performance, and Community and Government Relations teams to identify opportunities for additional projects that are currently unfunded. Furthermore, TRCA will work towards securing other funding streams, such as the Disaster Mitigation and Adaptation Fund, to facilitate the construction of projects that have been planned through NDMP studies.

### **Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan**

This report supports the following strategies set forth in the TRCA 2013-2022 Strategic Plan:

**Strategy 2 – Manage our regional water resources for current and future generations**

**Strategy 4 – Create complete communities that integrate nature and the built environment**

**Strategy 10 – Accelerate innovation**

### **FINANCIAL DETAILS**

Funding and account codes for each completed NDMP project are listed in **Attachment 1**.

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**Date: October 8, 2020**

**Attachments: 1**

Attachment 1: National Disaster Mitigation Program (NDMP) Project Summary