

Item for the Information of the Regional Watershed Alliance

TO: Chair and Members of the Regional Watershed Alliance
Meeting #3/20, Wednesday, September 16, 2020

FROM: Sameer Dhalla, Director, Development and Engineering Services

RE: **UPDATE ON FLOOD RISK OUTREACH PROGRAM AND REMEDIATION PROJECTS**

KEY ISSUE

Summary of the outreach activities undertaken in flood vulnerable neighbourhoods as part of the National Disaster Mitigation Program (NDMP) funded Flood Risk Public Awareness and Education Program, and overview of flood remediation activities in select flood vulnerable clusters.

RECOMMENDATION

IT IS RECOMMENDED THAT the Regional Watershed Alliance members receive this report, which includes content from the *FLOOD RISK PUBLIC AWARENESS AND EDUCATION PROGRAM* report originally presented to the Toronto and Region Conservation Authority (TRCA) Board of Directors on June 26, 2020;

AND FURTHER THAT Regional Watershed Alliance members continue to participate in the various studies outlined in this report and work with their networks to advocate for funding to support implementation of flood remediation and restoration projects for flood vulnerable communities.

BACKGROUND

Areas in the jurisdiction which contain a high concentration of buildings within the regulatory floodplain are termed Flood Vulnerable Clusters (FVCs). Many of these areas correspond to communities that were developed prior to land-use planning practices for natural hazard management. Through the Flood Risk Assessment and Ranking (FRAR) study, TRCA quantified and ranked the risk in the 41 FVCs within the jurisdiction. In keeping with the strategic plan objectives to reduce flood risks and protect communities, TRCA continues to pursue both structural and non-structural risk reduction opportunities in Flood Vulnerable Clusters. This report provides an update on the implementation of the Flood Risk Public Awareness and Education program, one of the non-structural measures applied in high-risk areas, as well as provides an overview of structural flood remediation projects that are in various stages of planning in FVCs across TRCA's jurisdiction.

At Regional Watershed Alliance Meeting #3/19, held on September 11, 2019, TRCA staff prepared a report on Flood Risk Management initiatives, together with a presentation specific to the upcoming outreach project, which were received as part of resolution #R15/19. The Regional Watershed Alliance provided feedback on frequently asked questions, which was incorporated into subsequently developed communications materials utilized in the Flood Risk Public Awareness and Education Program.

RATIONALE

Outreach Program Update

Pro-actively communicating risks to flood-vulnerable communities can lessen the impact of flooding to these areas, as residents can take preparatory steps to protect themselves and their homes. The comprehensive and sensitive delivery of risk communication, in advance of a flood emergency, can support effective crisis communications during a flood emergency. In this context, risk communication is meant to enable audiences to analyze, evaluate, and synthesize information that will be valuable in the face of a potential emergency. Crisis communication, by contrast, is meant to trigger audiences to remember known information, understand simple directions, and apply key actions to lessen the impact of the crisis. The flood messages issued by conservation authorities are an example of crisis communications. Pro-actively providing information to increase awareness in flood prone neighbourhoods is an example of risk communications, which can prime these audiences to follow the protective actions outlined in the flood messages.

While the Toronto and Region Conservation Authority (TRCA) has historically made flood risk information available to the public via general website content and partnerships with municipal emergency management activities, the inclusion of flood outreach activities as a method of non-structural flood risk reduction under the National Disaster Mitigation Program (NDMP) presented a unique opportunity for more targeted communication with residents and businesses in FVCs. TRCA successfully secured funding in 2018 through Intake 4 of the NDMP to actively reach out to flood vulnerable communities in TRCA's jurisdiction. Thus, the Flood Risk Public Awareness and Education Program was launched, which included two broad program objectives. First, to disseminate information on flood risk and current initiatives in risk reduction to municipal partners, and second, to jointly deliver (together with municipal partners) risk information to flood vulnerable neighbourhoods via a combination of digital, print, and in-person campaigns.

Prior to undertaking public outreach, the Flood Risk Public Awareness and Education Program involved a municipal outreach component, in order to share the results of the FRAR study with municipal partner staff, and set the stage for collaboration on public outreach initiatives in the target neighbourhoods. Internal groups, such as the Government and Community Relations and Sustainable Neighbourhood Action Program teams, were also consulted to help identify target neighbourhood characteristics, and the Regional Watershed Alliance was consulted to identify possible FAQs and information topic areas. TRCA's Communications, Marketing and Events business unit was also a key partner in executing the program.

Municipal Partner Engagement

In June of 2019, Flood Risk Management staff undertook four full-day workshops with over 100 municipal partner staff, from diverse departments amongst TRCA's municipal partners, including Durham Region, the City of Pickering, Town of Ajax, York Region, City of Markham, City of Richmond Hill, Town of Whitchurch-Stouffville, City of Vaughan, City of Toronto, Peel Region, City of Brampton, Town of Caledon, and City of Mississauga. These workshops provided an opportunity for TRCA to share location specific information on Flood Vulnerable Clusters, review roles and responsibilities, and establish the working groups, and workplans, for the delivery of the public outreach component. Where the planned public outreach events were organized by TRCA, staff liaised with the local and regional councillors in the target areas either through direct meetings or through presentations to council or committee meetings. Local elected officials were often in attendance and highly supportive of the events held.

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Internal and Industry Partner Engagement

In addition to municipal partners, other agencies with active program areas in flood risk outreach were invited to participate in applicable open houses. Attendees included the Electrical Safety Authority to provide information on post-flood recovery practices, the Intact Centre on Climate Adaptation to provide information on lot-level flood protection measures, and the Insurance Bureau of Canada to field questions on insurance coverage options. Each municipal partner's respective Emergency Management staff also attended, thus providing a 'one-stop-shop' for residents to inform themselves about various elements of flood risk. Including information about lot-level impacts and homeowner actions was among the suggestions received by the Regional Watershed Alliance

Public Outreach Events and Materials

Where existing public engagement events were already planned in the area by municipal partners or other TRCA departments, Flood Risk Management staff leveraged the existing event opportunity and attended the related event, providing panels, takeaway materials, and the opportunity to answer questions. Where no public engagement opportunity already existed in the highest priority clusters, TRCA pursued active outreach, with methods that were jointly developed with municipal partners over the course of six months. These tactics included direct mail campaigns, geo-targeted social media advertising, tailored websites for each cluster with more detailed flood risk information, and finally hosting dedicated open houses for the public to provide information and answer questions. Key messages were established to outline risk information, clarify roles and responsibilities, and provide targeted tips for enhancing flood preparedness. Cluster-specific flood risk webpages were developed with this content, with a goal to drive residents and business towards this information. Given the diversity of municipal partner approaches, as well as the unique demographics of each cluster, the engagement methods were tailored for each cluster, and are summarized in the table below.

Table 1 – Target cluster and strategy summary

Cluster Name (rank)	Municipality	Outreach strategy-in-person	Date of in-person event	Digital Content developed	Advertising strategy
Rockcliffe (1)	Toronto	Attendance at existing event organized by local councillor	June 11, 2019	Directed to existing project page	N/A
Oak Ridges/Lake Wilcox (8)	Richmond Hill	Attendance at existing event organized by Fire and Emergency Services	October 5, 2019	Dedicated flood risk webpage	
Woodbridge (21)	Vaughan	Attendance at existing community event – Woodbridge Fall Fair	October 12, 2019	Dedicated flood risk webpage	Community centre posters; geo-targeted social media campaign
Pickering Village (4)	Pickering/Ajax	Attendance at existing Public Information Centre (PIC) related to flood infrastructure improvements	October 30, 2019	Directed to existing project page	N/A – note that the PIC itself was advertised per Environmental Assessment (EA) requirements

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Cluster Name (rank)	Municipality	Outreach strategy-in-person	Date of in-person event	Digital Content developed	Advertising strategy
Jane-Wilson (2)	Toronto	Attendance at existing PIC for Basement Flooding Area 45 Master Plan and Black Creek Trunk Sewer Improvement Study	December 11, 2019	Dedicated flood risk webpage	Geotargeted social-media campaign (PIC itself was advertised by the City of Toronto)
Bolton Core (5)	Caledon	Dedicated flood risk public open house	January 7, 2020	Dedicated flood risk webpage	Hand-delivered invitation letters
Stouffville Centre (27)	Whitchurch-Stouffville	Dedicated flood risk public open house	January 20, 2020	Dedicated flood risk webpage	Town recreation guide; geo-targeted social media campaign
Avondale /Spring Creek (6)	Brampton	Dedicated flood risk public open house	January 30, 2020	Dedicated flood risk webpage	Hand-delivered lenticular postcards; geotargeted social media campaign
Vellore Woods (29)	Vaughan	Attendance at existing community event – Vaughan Winterfest	February 9, 2020		Community centre posters
Dixie-Dundas (3)	Mississauga	Dedicated flood risk public open house	March 2, 2020	Dedicated flood risk webpage	Mailed letter invites; geotargeted social media campaign
Markham Industrial / Don Mills Channel (10)	Markham	Dedicated door-to-door information campaign	March 5 & 6, 2020	Dedicated flood risk webpage	Door-to-door delivery of employee safety poster

Where Flood Risk Management staff hosted dedicated public open houses, the format included informational panel displays with staff on-hand to answer questions, followed by a short presentation, and question and answer session. A professional facilitator was engaged as a neutral point of contact, to guide the question and answer sessions, and to collect qualitative feedback. Event summaries, panels, and presentation slides were posted online to ensure continued access to the information for members who were not able to attend in-person. A variety of methods were used to advertise the open houses, including geo-targeted social media campaigns, community centre posters, and print invitations whose format varied from formal letters to visually arresting postcards. Each of the print materials were equipped with links and QR codes to direct readers towards the online information; this also allowed for the collection on the effectiveness of the campaigns, as it was possible to determine how many website visits originated from these print campaigns. Overall traffic to the Flood Risk Management sections of TRCA's website was also tracked.

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Summary of Program Reach

Over the course of a 10-month period; Flood Risk Management staff hosted or attended events with an attendance of over 2,400 people combined, and created campaigns that reached 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. Attendance at open houses can be influenced by a variety of factors, ranging from the weather on the day to the demographics of the audience, to whether or not the community was already 'over-engaged'. Of the public open houses that were organized specifically for this campaign, the two that were the most well-attended were where:

- There had recently been a major flood event (Bolton Core)
- The direct mail campaign was the most visually arresting (Avondale/Spring Creek)

While the attendance at open houses on average corresponded to only 10% of the target audiences, the continued presence of the key information on the cluster specific webpages will allow for growth, over time, in the proportion of residents and businesses that are aware of their flood risk.

Key Themes

Attendees at the dedicated open houses hosted by Flood Risk Management staff were given a simple survey to determine their prior risk knowledge as well as the degree to which the information presented was useful. Although approximately only 25% of attendees completed surveys, the facilitator hired by TRCA for these events also captured qualitative information on key themes.

From the survey, it was possible to glean that:

- Most respondents heard about the open house through TRCA's direct mail efforts
- Most respondents (75%) now know what to do during a flood
- Almost all attendees found the information presented to be useful

From the qualitative observations provided by the facilitator, several themes emerged with respect to public perception around flood risk, as well as roles and responsibilities. Key themes included that:

- Residents wanted to share their anecdotal experience of flood risks and have a desire to supplement the data gathered during real flood events with their 'eyes on the ground' information.
- Residents sought clarity on whom to call (TRCA, the municipality, or first responders) for flooding situations; residents did not see a distinction between urban or riverine flooding
- Many residents expressed concerns around debris removal and channel cleanups
- Residents and business owners sought information on specific measures they could take on their own properties
- Attendees were appreciative of the information being shared

As this program represented the first opportunity of its kind, the lessons learned from each outreach event were applied to subsequent events where possible and will continue to be applied towards future flood risk communications initiatives. Content to directly address the key themes above is already being generated.

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Next Steps - Outreach

The Flood Risk Public Awareness and Education Program was in its final stages when the new Ontario Flooding Strategy was released, which underscored the importance of increasing awareness as a method to reduce flood risk. Ensuring Ontarians are aware of flood risks is one of five overarching objectives within the strategy, and TRCA has exhibited leadership in this realm through the delivery of the Flood Risk Awareness and Education Program. While the ability to undertake dedicated public open houses and door-to-door in-person campaigns will be limited in the absence of follow-up funding to the National Disaster Mitigation Program, education and outreach remains a key program area within the Flood Risk Management group. Broad-range activities in this realm that are expected to continue in collaboration with municipal partners. Key activities for this year include the continued development of tailored web content for high-risk flood vulnerable clusters, with expanded information on remediation and infrastructure projects, as well as an overhaul of the main Flood Risk Management website to incorporate the key areas in which residents and business owners seek information. Objectives also include the development of informational videos explaining concepts like the '100-year storm', flashy watersheds, and the process of creating floodplain maps, as well as factsheets on seasonal flood risks, such as ice-jams and thunderstorms. Social media campaigns will continue to be developed to address the key theme areas identified from the public open houses, such as clarity on roles and responsibilities during flood events. Additional engagement with flood vulnerable cluster residents will continue to occur as opportunities arise. A key target audience for the coming years includes the real estate and insurance industry, whose touchpoints with homeowners can be leveraged in order to increase awareness of flood risks, a tactic that is explicitly identified within Ontario's Flooding Strategy. Although this year's Emergency Preparedness Week events were cancelled due to COVID-19, Flood Risk Management staff will continue to work with municipal partners to identify unique opportunities to increase awareness amongst residents and business owners living in flood vulnerable neighbourhoods.

Ongoing Flood Remediation Projects

While education and outreach efforts represent a non-structural approach to flood risk reduction, TRCA undertakes flood risk management efforts throughout the full spectrum of the emergency management cycle. In the realm of flood mitigation, TRCA and partner municipalities are pursuing flood remediation capital projects in several flood vulnerable clusters. The following section provides an overview of select projects that are at various stages of planning across TRCA's jurisdiction.

Rockcliffe (City of Toronto)

The Rockcliffe neighbourhood is located in Ward 5 (York South-Weston) of the City of Toronto and within the regulatory floodplain of Black Creek. Historical development in the floodplain and alterations to the river channel prior to modern floodplain management practices has resulted in significant risk. It is an area with a high concentration of structures in the floodplain, and is the highest ranked Flood Vulnerable Cluster in TRCA's jurisdiction in terms of flood risk and consequence, according to the 2018 FRAR study.

TRCA and the City of Toronto have been coordinating efforts to reduce flooding risks in the Rockcliffe area. In 2014, the TRCA and the City completed two separate Environmental Assessment (EA) studies that examined options to reduce riverine and sewer system related flooding, respectively.

Leveraging NDMP funding, the Black Creek at Rockcliffe Special Policy Area Flood Remediation and Transportation Feasibility study in partnership with the City of Toronto was

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recently completed. The objective of the Feasibility Study was a thorough re-assessment of the flood remediation alternatives developed in TRCA's 2014 riverine flooding EA, in light of model refinements, infrastructure considerations and flood observations. The study examined the performance of the recommended flood remediation solutions 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). Through the Feasibility Study, an improved flood remediation solution was identified, which significantly reduces the number of properties in the floodplain under all storm events.

The feasibility study identified the following flood protection works, which will be further fleshed out through the EA process, which is slated to begin in the fall:

- Conveyance improvements through increased water crossing sizes at Jane Street, Rockcliffe Boulevard, and Symes Road,
- Channel conveyance improvements through channel lowering and widening of Black Creek from Jane Street to Alliance Boulevard, and Lavender Creek from Symes Road to the confluence with Black Creek, and,
- A flood wall at Weston Road.

Details from the feasibility study were outlined in the report adopted as Resolution #A77/20 at TRCA Board of Directors Meeting #5/20 held on June 26, 2020.

Pickering-Ajax Dyke (Pickering/Ajax – Region of Durham)

The Pickering Village Flood Vulnerable Cluster spans the Pickering/Ajax border in the Region of Durham, and is ranked #4 in terms of riverine flood risk in TRCA's jurisdiction. Studies completed in 2018 revealed that the Pickering and Ajax Dykes, which were constructed in the 1980s to provide functional flood protection to these areas, do not meet current engineering design standards for stability, and that infrastructure upgrades would be required to bring them to a level of service that would provide 100-year flood protection. The ensuing Pickering and Ajax Dyke Restoration Conservation Ontario Class Environmental Assessment was undertaken to identify the preferred alternative for the rehabilitation of the existing Pickering and Ajax Dykes to meet current engineering standards and factors of safety while maintaining the existing level of flood protection.

The preferred solution consists of a 'hard engineering solution', which includes a structural component such as sheet piles (corrugated metal plates) driven through the dyke and rock embankments to ensure the required stability factors are met. This type of solution was selected for areas of the Pickering Dyke where space limitations provide little room for rehabilitation works between the creek and private properties. For areas along Pickering Dyke where space was available, and for the Ajax Dyke, a 'soft engineering solution' was preferred, utilizing earthen embankment slopes that are stable and more gradual than those of the existing dyke.

The EA also included the preparation of 30% design level drawings, supporting calculations/modelling and a capital construction cost estimate reflecting a feasible design of the preferred alternative. The ESR has been posted for public review and commenting. Details from the EA process were outlined in the report adopted as Resolution #A89/20 at TRCA Board of Directors Meeting #5/20 held on June 26, 2020.

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Downtown Brampton Flood Protection Environmental Assessment

The City of Brampton's downtown is subject to flooding during extreme storm events (the Regulatory Flood event). It is, therefore, subject to land use development restrictions under a Special Policy Area designation. The City of Brampton and TRCA have considered alternative ways to protect downtown Brampton from future flood events and unlock potential for revitalization through the Downtown Brampton Flood Protection Environmental Assessment (DBFP EA). The purpose of the DBFP EA was to identify a preferred alternative for providing flood protection for the City of Brampton's downtown while considering urban design and land use opportunities for the City of Brampton.

The flood risk is caused by two distinct spills, an upstream spill into the historic creek valley north of Church Street, and a downstream spill south of the CN rail bridge. While alternative solutions to the downstream spill did not provide a level of benefit to warrant implementation, several elements of a preferred alternative for the upstream spill were identified to improve conveyance, which has a positive impact on both the upstream and downstream spill areas. The preferred alternative consists of the following components:

- Widening and deepening the by-pass channel
- Re-aligning Ken Whillans Drive and re-grading Church Street and the valley north of Church Street
- Bridge replacements at Church Street, Scott Street, and Queen Street along with modifications to the CN rail bridge
- Relocation or replacement of the pedestrian bridge in Centennial Park

With the implementation of the DBFP EA project, partial or full removal of the downtown SPA north of Wellington Street can be achieved. The removal of the downtown SPA is paramount to attaining the goals of Vision 2040 and Riverwalk plans and will allow for the revitalization of the downtown core by lifting the restrictions to development.

Details from the EA process were outlined in the report adopted as Resolution #A78/20 at TRCA Board of Directors Meeting #5/20 held on June 26, 2020.

Bolton Berm Major Maintenance Project

As a low-lying area developed in the floodplain prior to land-use planning practices to limit the risk from natural hazards, the Bolton Core area in the Town of Caledon has historically been susceptible to flooding – with open water flooding events impacting the area prior to the construction of flood infrastructure in the area in the 1980s. Bolton Core is currently ranked #5 in terms of riverine flood risk in TRCA's jurisdiction. In 2016, TRCA undertook an engineering study to investigate the berm's current condition and level of service. The recommendations from this study identified several upgrades required to bring the berm to current safety standards and provide the design flood protection against the 500-year storm.

The major maintenance project involves increasing the height of the berm by removing the topsoil and adding compacted, engineered fill. Stone will be added to the river side of the berm to protect it from erosion. The berm will be raised 20 to 70 centimetres, depending on the location along the crest. Restoration will include seeding the berm with grasses and planting riparian shrubs along the riverbank.

Due to the length of the berm, TRCA will be conducting this work in phases:

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- Phase I, between 181 King Street East and 211 King Street East, beginning September 2020
- Phase II, between Queen Street and Humber Lea Road, expected to begin in 2021

Dixie-Dundas Special Policy Area Flood Remediation Environmental Assessment

The lands south of Little Etobicoke Creek surrounding Dixie Road, also known as the Dixie-Dundas Flood Vulnerable Cluster, are subject to flooding as a result of spilling from the creek during high flow conditions. This area is ranked #3 in terms of riverine flood risk within TRCA's jurisdiction, and the area consists of a variety of commercial, industrial, residential, and park land uses. The City of Mississauga has commenced the Dixie-Dundas Flood Mitigation Feasibility Study and subsequent Schedule 'C' Municipal Class Environmental Assessment (EA) process to seek solutions to mitigate flooding risks from Little Etobicoke Creek at the project area. TRCA staff continue to support this endeavour, providing funding as well as technical input in the following areas:

- Technical Advisory Committee (TAC) and Steering Committee members,
- Hydraulic modelling support and review
- Technical review and provision of comments on technical submissions
- Public consultation support

Highland Creek (Markham Branch) Corporate Drive Flood Remediation Assessment

In co-ordination with various divisions of the City of Toronto, including City Planning, Toronto Water, Transportation Services, and Engineering and Construction Services, TRCA is undertaking the Highland Creek (Markham Branch) Corporate Drive Flood Remediation Assessment, following a two-stage process whereby the technical study mirroring Phases I and II of the Municipal Class EA process is completed, with a second stage to complete the formal Municipal Class EA if directed to proceed. The feasibility study, which is nearing completion, aims to more accurately characterize existing riverine flood risk and develop appropriate flood remediation alternatives that eliminate the risk of flooding within the study area, allowing for potential redevelopment opportunities. The study will also identify design considerations, implementation constraints, and approximate costs to minimize uncertainty for future design phases, as well as identify opportunities to undertake stream restoration within the study limits, while supporting the primary goal of flood risk reduction.

With many of the capacity constraints stemming from crossings, the following remediation options are being investigated:

- Relief Culverts at all crossings
- Relief Culverts at Progress and Bellamy
- Arch Culverts at Progress and Bellamy
- New Bridges at all crossings
- New Bridges at Progress and Bellamy

The technical report is expected to be completed in the fall of 2020, which will inform the City of Toronto decision on whether to proceed with the EA.

Summary

In summary, TRCA continues to work towards reducing flood risk, utilizing both structural approaches such as remedial capital works, and non-structural approaches such as enhanced

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public awareness and outreach. The members of the RWA are encouraged to participate in the ongoing flood remediation projects discussed in this report and to support TRCA and partner efforts to advocate for funding from senior levels of government to advance these projects which will benefit flood vulnerable communities.

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

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

Strategy 8 – Gather and share the best sustainability knowledge

FINANCIAL DETAILS

General flood risk awareness and communications activities are funded through the Flood Risk and Communications operating account 115-62. The specific Flood Risk Public Awareness and Education Program was completed using funds provided by the National Disaster Mitigation Program, City of Toronto, and the regional municipalities of Peel, York and Durham. Funding was allocated in account 107-54.

The various flood remediation projects are funded through TRCA's Flood Protection and Remedial Studies programs, as well as the National Disaster Mitigation Program.

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