REPORT

Council

August 13, 2024

FROM:	Transportation and Engineering Department
DATE:	July 30, 2024
SUBJECT:	**Lower Morrison and Lower Wedgewood Creeks Flood Mitigation Opportunities Study**
LOCATION:	Lower Morrison Creek/Lower Wedgewood Creek Between the Lower Morrison/Wedgwood Diversion Channel and Lake Ontario
WARD:	Ward 3 5, and 6

RECOMMENDATION:

That the Notice of Completion for the Lower Morrison and Lower Wedgewood Creeks Flood Mitigation Opportunities Study, Municipal Class Environmental Assessment Study be published, commencing a 30-day public review period from September 1, 2024, to September 30, 2024.

KEY FACTS:

The following are key points for consideration with respect to this report:

- In 2008 the *Town-Wide Flood Prioritization Study Review* identified, at a high-level, flood-prone areas throughout the town, including Lower Morrison and Lower Wedgewood Creeks watersheds.
- The Lower Morrison and Lower Wedgewood Creeks Study Flood Mitigation Opportunities Study (herein referred to as the Study) is a follow up to the 2008 study and includes a detailed assessment of riverine flood risk and recommended works to reduce these risks, in accordance with the Municipal Class Environmental Assessment (*MCEA*), Schedule B, process.
- The recommendations to mitigate creek flood risks include a combination of green infrastructure, culvert upgrades (various locations), and underground flood storage (Cornwall Road Sports Park).

- The recommendation for North Service Road/Invicta Drainage area includes constructing green infrastructure, a new stormwater management pond.
- The EA recommendations will be assessed through the lens of the Rainwater Management Financial Plan to prioritize against all other stormwater related infrastructure projects.
- An Environmental Study Report has been compiled, documenting the selection of a preferred alternatives. This report, subject to Council's endorsement, will be made available for public review, commencing September 1 to September 30, 2024.

BACKGROUND:

Town-wide Flood Prioritization Study identified flood-sensitive sites and subsequent creek studies has been completed and currently underway.

In 2008, the town compiled the findings from a long list of historical studies into one comprehensive document which was used to quantify the magnitude of riverine flood risk exposure in Oakville. Over 40 flood-sensitive sites were identified and documented in the 2008 *Town-Wide Flood Prioritization Study Review* report (Philips Engineering Ltd., 2008). The report contains details on each flood sensitive area, mapping, and high-level options for mitigation.

Subsequent detailed study of those creek channel reaches with flood sensitive sites were initiated to determine the most viable and responsible mitigation options. Follow-up flood mitigation studies to date include:

- Munn's Creek Flood Mitigation Opportunities Study (Completed in 2017)
- Sheldon Creek Flood Mitigation Opportunities Study (Completed in 2019)
- Joshua's Creek Flood Mitigation Opportunities Study (Pending Council Endorsement)
- 14 Mile Creek/McCraney Creeks Flood Mitigation Opportunities Study - (Anticipated Completion December 2024)

As part of the 2008 flood study, several creek flood prone sites were identified within Lower Morrison Creek and Lower Wedgewood Creek watersheds.

COMMENT/OPTIONS:

In 2016, the town retained WSP to complete the Lower Morrison and Lower Wedgewood Creeks Flood Mitigation Opportunities Study as a Schedule B Municipal Class Environmental Assessment (herein referred to as the "Study").

The Lower Morrison and Lower Wedgewood Creeks Flood Mitigation Opportunities Study assessed flood risks for properties along the creeks and evaluate North Service Road/Invicta drainage area.

The purpose of the Study is to establish recommended municipality-led capital work to reduce flood risks. This study is not an exercise in floodplain mapping for the purposes of establishing floodplain Regulatory boundaries, pursuant to the Conservation Authorities Act and under the authority of Conservation Halton (CH).

The study area has been historically cut off from its upper reaches by construction of the Morrison-Wedgewood Creek Diversion (MWD) channel in the 1960's. The MWD channel is not included within the study area scope. The Study Area is shown in Appendix A which includes both the properties along the creeks and the North Service Road/Invicta Drive drainage area.

Flood risks refer to the condition that occurs when any depth of riverine waters is present on a property, and/or a building is exposed to any depth of flood water on one or more of its sides, posing a potential danger to public safety and/or potentially causing damage to property and the environment. Flood risk is quantified into two categories for properties along the creeks:

1. "Property at risk" -
    a. Flooding risk on property, no flooding in the building
    b. Flooding risk on property, no buildings (vacant property)
2. "Building at risk" - Flooding risk on property, flooding risk in the building

Lower Morrison and Lower Wedgewood Creeks Results

Results indicate that flood risk is possible during the more frequent flooding events along the creek (i.e. less than a 10-year flood event); however, flooding impacts are greatest during the 100-year storm event. Specifically, flooding during the 100-year storm event results in 266 properties and 119 buildings at risk for potential flooding.

Flood mitigation alternatives were developed and screened based on functionality (technical merits) initially. Shortlisted alternatives were then comparatively assessed based on natural, social environment, and economic considerations. The alternatives, and the preferred alternatives (recommendations), are summarized in the table below:

ALTERNATIVE SOLUTIONS	DESCRIPTION / RESULT OF EVALUATION
Do Nothing	"Status quo." Do Nothing option is required to be included within the Municipal Class EA to provide a benchmark for the other alternatives. **Not recommended**

ALTERNATIVE SOLUTIONS	DESCRIPTION / RESULT OF EVALUATION
Low Impact Development Best Management Practices (LID BMPs)	Low impact development (LID) measures to promote infiltration, evaporation, harvesting, filtration, and detention of stormwater. **Recommended with other alternatives as part of the Town's green infrastructure preferred approached to rainwater management –** LIDs as a stand alone alternative are not designed to provide flood control for severe flood events, such as a 100-year storm and therefore cannot be considered a standalone solution. However, LIDs for the detention/treatment of runoff from more frequent storms will be incorporated during the detailed design phase. Green infrastructure / LID costs are incorporated into the recommended works below.
Culvert/ Bridge Upgrades	Culvert and or bridge upgrades can increase conveyance capacity and mitigate upstream flood conditions or the overtopping of roadways. **Recommended alternative –** estimated at $7.43 million, including green infrastructure / LID costs
Elimination/ Reduce Potential Culvert Blockages	Culvert blockages such as debris accumulation can cause a reduction in flow conveyance. **Not recommended** No records of frequent blockages of crossings in the study area. Routine maintenance activities will continue as needed.
Floodplain/ Channel Improvements	Floodplain or channel widening to increase the conveyance capacity of the channel. **Not recommended** Improving floodplain/channels on private property requires the property owner's consent. Due to practical considerations such as temporary work, permanent maintenance, and access easements as well as limited space availability, implementing floodplain or channel improvements on private property, make this option non-preferred.
Floodproofing Buildings	Sealing opening, implementing local berms or flood walls, establishing height of sill elevations for any new opening above a certain elevation. **Not recommended** For similar reasons as above, floodproofing in the form of berms on private property was considered non-viable. Several areas of

ALTERNATIVE SOLUTIONS	DESCRIPTION / RESULT OF EVALUATION
	possible berm placement on public lands were assessed; however, results indicated that there would be limited flood risk reductions with no buildings removed from the floodplain.
Flow Diversion	The use of a channel or pipe to convey flow/drainage away from high-risk flood areas to locations further downstream within the same creek, or within another creek system that has capacity. **Not recommended** A diversion from Lower Morrison Creek to Sixteen Mile Creek would provide the same flood mitigation benefit as an offline storage tank and would be more expensive to implement.
Online Storage	Detention of creek flows which exceed the dry weather base flows within the channel or the floodplain where there is sufficient area and depth available. **Not recommended** Limited space availability due to confined nature of creek system.
Offline Storage (green Infrastructure)	Creek flows during a flood event are directed to storage facilities beyond the channel corridor, detained and slowly released to the creek once peak flows have subsided. Storage can be in the form of a surface pond or underground storage tank (to be evaluated in future detail design). **Recommended alternative -** estimated at $7.19 million, including green infrastructure / LID costs
Roadway Profile Modifications	Modification of the roadway to reduce flooded or overtopping while maintaining safe access and egress. **Not recommended** Modifying the roadway profile to reduce flooding upstream of the crossing would result in a greater depth of floodwaters overtopping the roadway, thereby increasing the risk to public safety.
Combination	Combination of the foregoing alternatives used to strategically improve flood mitigation effectiveness. **Recommended alternative**

The preferred alternative is a combination green infrastructure (LID), culvert upgrades, and offline storage in the amount of approximately $15 million, including green infrastructure / LID costs.

Culvert upgrades, at the detailed design stage will need to consider property boundaries, construction access, road design, structural design, existing utilities, soil conditions, stream morphology, and natural heritage impacts.

The following culvert crossings are recommended for upgrade:

RECOMMENDED CULVERT UPGRADES		
LOCATION	**EXISTING CULVERT SIZE**	**PROPOSED CULVERT SIZE**
Lower Morrison Creek		
Lakeshore Road	7.9m x 3.2m	14.6m x 3.4m
Linbrook Road	7.3m x 1.5m	7.3m x 2.1m
Chartwell Road (North of Linbrook Road)	(Twin) 3m x 2.1m	6.4m x 2.4m
Chartwell Road (South of Linbrook Road)	3m x1.6m	6.1m x1.5m
Lower Wedgewood Creek		
Lakeshore Road	3.8m x 1.9m	1.4m x 3m
Warren Drive Park	4.2m x 1.5m	7.3m x 1.5m
Wedgewood Drive	5.5m x 2.1m	7.3m x 1.5m
Cornwall Road	(Twin) 1.8m x 1.2m	7.3m x 1.5m

Green infrastructure in the form of offline storage (underground storage tank), is recommended at Cornwall Road Sports Park. The facility will store the creek flows above a 5-year storm event, and slowly release the water into the creek. At detailed design stage, park features and usage as well as property boundaries, construction access, road design, structural design, existing utilities, soil conditions, stream morphology, and natural heritage impacts will need to be considered.

Future detail design phase of the recommended alternatives will incorporate green infrastructure design.

Town Council passed motion that green infrastructure be preferred, and grey infrastructure only where necessary and will be adopted under the town's Climate Action Plan.

The Study assessed Low Impact Developments (LIDs) as an option to reduce flood risk, however LIDs is not intended for flood control during severe storms. LIDs employ various strategies, such as infiltration, evaporation, harvesting, filtration, and stormwater detention at a smaller scale. During the detail design phase, LIDs such as tree conservation, soil improvements, and infiltration measures will be incorporated.

The implementation of the preferred alternatives will benefit 116 properties by reducing flood risk or removal from floodplain during the 100-year storm event.

	Property At Risk (100 Year Storm)	Reduced Flood Risk	Removed from Floodplain	Remaining Properties
Property at Risk	**266**	**60**	**13**	**193**
Building at Risk	**119**	**25**	**18**	**76**

After implementation of the preferred alternatives, there will be properties that will continue to experience flood risks, as there are limited engineering solutions on public own lands that can assists in the mitigation of the risks. However, there are several resources available to Oakville residents to help ensure their safety and minimize property damage due to flooding. This includes the Town of Oakville's Emergency Preparedness webpage and the Region of Halton's Community Hazards webpage. Additional flooding resources are available through Conservation Halton's webpages and the University of Waterloo Intact Centre on Climate Adaptation at www.intactcentreclimateadaptation.ca/.

North Service Road / Invicta Drainage Area Results

Alternatives to improve drainage and to reduce the potential for flooding were also reviewed for the North Service Road and Invicta Drive area. Recommendations include implementation of a green infrastructure via a new stormwater management pond at Eighth Line. Construction is currently scheduled to commence in 2026.

Rainwater Management Financial Plan

The Rainwater Management Financial Plan (RWMP) is a long-term plan to improve resiliency against climate change and protect our stormwater infrastructure and natural assets.

The RMFP takes comprehensive approach to integrate the state of good repair and increase resiliency of the town's stormwater network based on various studies and assessments completed to date. The multi-phase RWMP will deliver a financing plan that provides an all-inclusive approach to planning and implementing stormwater-related infrastructure renewal and improvement projects into the future.

Results from the Lower Morrison and Lower Wedgewood Creeks Flood Mitigation Opportunities Study will be assessed through the lens of the RWMP to prioritize recommendations along with all other stormwater initiatives, including all other riverine flood study recommendations. The RWMP has developed a matrix to prioritize the projects from the various study recommendations that considers, asset

management principles, cost/benefit, risk and likelihood of service impact and alignment/coordination with other projects so that projects in areas with the greatest risk and provide the most benefit are prioritized first.

Each watershed has its own unique characteristics that influence the nature of flooding within an area, this includes features such as drainage area, topography, proximity of urban land use to watercourse, etc. As a result of these differences, a consistent level of flood mitigation protection cannot always be achieved from one creek system to another or in one area to another within the same creek system. For example, not all mitigation options are able to protect a neighbourhood entirely from flooding at the more extreme events (i.e. 100-year storm). The RWMP will evaluate these protection measures in conjunction with their cost-effectiveness and level of flood protection as it prioritizes projects for future capital budgets.

Conclusion

The Lower Morrison and Lower Wedgewood Creek Flood Mitigation Opportunities Study has been compiled documenting the selection of a recommended preferred alternatives. Appendix B is the consultant's Executive Summary Report.

In accordance with a Schedule B undertaking, the project file must be made available for a 30-day public review period and staff are proposing to do so after this report is received, commencing September 1, 2024. The Report will be made available on the town's website and special accommodations to view hard copies will be determined on an as needed basis. A Notice of Study Completion will be sent out to the public, stakeholders and posted on the town's website and will have details on the public review period and how those interested can provide comments. Should no requests be made to Minister of Environment, Conservation and Parks requiring further study on the grounds of prevention, mitigation, or remedy of adverse impacts on constitutionally protected Aboriginal and treaty rights during the review period, the study will be deemed approved.

Moving forward, the Study recommendations will be integrated in the town's RWMP which will prioritize works against all other works related to stormwater assets.

CONSIDERATIONS:

(A) PUBLIC

Property owners located within the Study areas have received notifications about the study and have been invited to attend Public Information Centres (PICs). Community groups, including Oakville Green, Chartwell Maple Grove Residents Association, and Trafalgar Chartwell Residents Association, were also informed at various stages during the study.

At two (2) PICs held on June 18, 2019, and December 17, 2020, an overview of the issues, background and modelling results, evaluation, and preliminary preferred alternatives was presented. Feedback was gathered from residents, community groups, and agencies such as Conservation Halton, the Region of Halton, and the Ministry of Environment, Conservation, and Parks.

Additionally, Indigenous groups, including the Mississauga of the New Credit First Nation, Haudenosaunee Confederacy Council, Metis Nations of Ontario, and Six Nations of Grand River, were provided opportunity to engage with the project team, ask questions, and provide feedback.

(B) FINANCIAL

There is currently no financial impact from the Study recommendations. Recommendations from the Lower Morrison and Lower Wedgewood Creeks Flood Mitigation Opportunities Study will be evaluated alongside other stormwater initiatives, using the RWMP framework to prioritize projects for the capital forecast which is pending the development of a sustainable financing plan which is currently underway.

(C) IMPACT ON OTHER DEPARTMENTS & USERS

Recommendation from the Study have taken into consideration feedback from Parks and Open Space, Asset Management, Planning and Development and Legal, and external parties such as Conservation Halton, Region of Halton, area stakeholders and residents.

(D) COUNCIL STRATEGIC PRIORITIES

This report addresses Council's strategic priority:

- Environmental Sustainability

(E) CLIMATE CHANGE/ACTION

The recommendations of the report support the incorporation of climate change resiliency through flood protection measures. This initiative offers community benefits by safeguarding private and public lands, thereby mitigating the risks posed by more frequent and severe rainstorms resulting from climate change.

APPENDICES:

Appendix A -	Map of Study Area
Appendix B -	Lower Morrison and Lower Wedgewood Creeks Flood Mitigation Opportunities Study Executive Summary.

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