



The Corporation of the Town of Tecumseh

Public Works & Engineering Services

To: Mayor and Members of Council

From: Phil Bartnik, Director Public Works & Engineering Services

Date to Council: April 25, 2023

Report Number: PWES-2023-26

Subject: Turkey Creek Hydrologic and Hydraulic Modelling Study
Phases 1 and 2 Final Reports

Recommendations

It is recommended:

That PWES-2023-26 Turkey Creek Hydrologic and Hydraulic Modelling Study Phases 1 and 2 Final Reports, prepared by Dillon Consulting Limited and Landmark Engineers Inc., **be received**.

Background

The Turkey Creek Watershed is approximately 6,250 hectares in size and has contributing flows from predominantly urbanized areas that include the Town of Tecumseh, the Town of LaSalle and the City of Windsor. The primary sub-watersheds and tributaries within the Turkey Creek Watershed include Grand Marais Drain, Lennon Drain, Cahill Drain and the Wolfe Drain (see Attachments 1 & 2).

The watershed has had significant drainage alterations over the years due to significant urbanization, with the most recent being the construction of the Rt. Hon. Herb Gray Parkway (Parkway). The affected municipalities have initiated Engineer's Reports under the Drainage Act and various Master Plans to support development. Engineer's Reports under the Drainage Act have also been undertaken to identify any necessary improvements required within the watershed post-construction of the Parkway. Three key studies include the Town of Tecumseh's Oldcastle Stormwater Master Plan, the

Town of LaSalle's Howard-Bouffard Master Drainage Plan and the City of Windsor's Sewer Master Plan.

Through discussions between the Essex Region Conservation Authority (ERCA) and the affected municipalities, it was agreed that various ongoing studies would benefit from a more coordinated approach in updating the hydrology and hydraulics to support study inputs, assumptions, recommendations, and ongoing growth and development.

Town of Tecumseh Council, at its regular meeting held December 8, 2020, gave approval to report [PWES-2020-33](#) that authorized Administration to proceed with the Public Works & Engineering Services 2021 Capital Works Projects, including Tecumseh's participation in the Turkey Creek Hydrologic and Hydraulic Modelling Study (Motion: RCM-375/20).

ERCA, acting on behalf of Tecumseh, LaSalle and Windsor, retained Dillon Consulting Limited (Dillon) and Landmark Engineers Inc. (Landmark) to complete a Hydrologic and Hydraulic Modelling Study for the Turkey Creek Watershed.

The study was completed in two separate Phases. **Phase One** was completed in October 2021 and consisted of the review of available background information and existing models for the watershed to prepare an updated baseline hydrologic and hydraulic model for the watershed (Attachment 3). **Phase Two** was completed in January 2023 and builds upon the Phase One hydrologic and hydraulic models including the calibration/validation of flows and hydraulic gradelines under existing and future conditions, identifying areas of concern under both existing and future development conditions and determining/assessing the feasibility of holistic solutions and mitigation measures to address areas of concern (Attachment 4).

Comments

The Turkey Creek Watershed Hydrologic and Hydraulic Modelling Study was completed to support sustainable growth and development within the watershed. The Study provides updated hydrologic and hydraulic models for the main channels within the Turkey Creek watershed which better represent the current watershed and stream characteristics. The updated models can be used to identify residential, commercial and industrial areas that are at risk of flooding and can also estimate the impacts of climate change and/or future land-use changes on future water levels.

This study was undertaken with the key objective of estimating 1:100-year regulatory flood flows and corresponding water levels through the main watercourses: Turkey Creek, Cahill Drain and Lennon Drain. The main results of this study are as follows:

1. Updates to the 1:100-year peak flows compared to the Regulatory 1982 Study:

- Substantial increases in flows through Turkey Creek due to updated hydrologic modelling methodology.
- Notable decreases in flow through the Cahill and Lennon Drains due to flow attenuation from stormwater management ponds within the sub-watershed.

2. Updates to the 1:100-year water levels:

- Marginal increases in levels were determined throughout Turkey Creek, corresponding to a nominal expansion of flood extents and no increase in flood risk.
- Notable decrease in levels determined through the Cahill and Lennon Drains as a result of the decrease in flows due to a change in hydraulic modelling methodology as well as Cahill Drain channel improvements undertaken in the mid-1990's.

3. Identification of potential opportunities to reduce flood levels:

- There are several opportunities of varying cost and benefit that can be considered to improve upon the existing condition and retrieve some benefits:
 - Improvements to Lower Turkey Creek Channel (i.e. clean and remove phragmites and downed trees).
 - Restore or Improve Essex Terminal Railway Bridge Conveyance (i.e. modify to increase the flow area).
 - Construct Dikes along the Banks of Turkey Creek and the Cahill Drain behind identified Private Properties (i.e. to mitigate encroachment of flood extents onto dwellings).
 - Install culvert control at the Mouth of Titcombe Drain (i.e. to mitigate reverse flow into the Titcombe Drain area and reserve storage capacity for high-stage spillover).

The Final Reports provide the necessary 1:100-year flood levels required to support ERCA's regulatory processes under the Conservation Authorities Act.

As a result of these Final Reports, ERCA is able to expedite the development approval process within the Turkey Creek Watershed.

Essex Region Conservation Authority

As previously stated, the significant amount of development over the years in the Turkey Creek watershed triggered the need for a coordinated approach to updating the outdated 1980s – 1990s hydrology and hydraulics for the watershed. At the request of Tecumseh, LaSalle and Windsor, the Essex Region Conservation Authority (ERCA) coordinated the study, including the development of the Terms of Reference, managing the procurement process, and managing the successful consultants on behalf of the municipal partners to deliver the project. ERCA also prepared an application for funding to the National Disaster Mitigation Fund (NDMP) – Intake 6 to help offset the project costs.

At the January 19, 2023 ERCA Board of Directors Meeting, the Director of Watershed Management Services, James Bryant, provided an overview of the [Turkey Creek Hydrologic and Hydraulic Modelling Study – Final Report](#) prepared by Dillon Consulting Ltd. and Landmark Engineers.

The Final Report provides the Town of Tecumseh, the Town of LaSalle and the City of Windsor with the necessary information to continue the various Master Drainage Studies and provides a clear and concise representation of the drainage scheme, including assumptions for future development. Additionally, it provides the necessary 1:100-year flood levels required for ERCA to administer Section 28 of the Conservation Authorities Act. This information will and has already begun to expedite development approvals with a reasonable level of protection established for development in the Turkey Creek Watershed.

The Board of Directors approved the Turkey Creek Hydrologic and Hydraulic Modelling Study – Final Report for use by ERCA Administration as a technical document to support regulatory approvals and ERCA policy within the study area (Resolution 19/23).

April 25, 2023 SCM Presentation

Dillon and Landmark will be in attendance at the April 25, 2023 Special Council Meeting to make a presentation (Attachment 5) summarizing the Turkey Creek Hydrologic and Hydraulic Modelling Study.

Consultations

Development Services
Financial Services
City of Windsor
Dillon Consulting Limited
Essex Region Conservation Authority
Landmark Engineers Inc.

Town of LaSalle

Financial Implications

Report PWES-2020-33 had approved a budget of \$60,000 for Tecumseh's cost share for the Turkey Creek Hydrologic and Hydraulic Modelling Study from the Storm Sewer Lifecycle Reserve.

The total study cost, including ERCA's project management costs is \$420,000 (excluding HST) with a cost sharing based on the percentage of contributing watershed area in each municipality as known prior to the study commencing (Windsor 85%, LaSalle 11%, Tecumseh 4%).

During the early stages of this project, ERCA (on behalf of the municipal partners) submitted an application for funding to Intake 6 of the federal National Disaster Mitigation Program. Subsequently, ERCA was informed that the funding application was successful and that, through the Bilateral Contribution Agreement between Public Safety Canada (Government of Canada) and the Ministry of Municipal Affairs and Housing (Province of Ontario), this project was able to receive 50% funding up to \$182,000.

The following table summarizes the project financials:

Project Impact	Windsor	LaSalle	Tecumseh	Total
Cost Sharing Agreement	85%	11%	4%	100%
Phase 1 Costs	\$64,232.78	\$8,312.48	\$3,022.72	\$75,567.98
Phase 2 Costs	\$266,005.33	\$34,424.22	\$12,517.90	\$312,947.45
Project Management	\$25,500.00	\$3,300.00	\$1,200.00	\$30,000.00
Sub-Total	\$355,738.12	\$46,036.70	\$16,740.62	\$418,515.43
Less NDMP Grant	\$154,700.00	\$20,020.00	\$7,280.00	\$182,000.00
Total	\$201,038.12	\$26,016.70	\$9,460.62	\$236,515.43

Link to Strategic Priorities

Applicable	2019-22 Strategic Priorities
<input type="checkbox"/>	Make the Town of Tecumseh an even better place to live, work and invest through a shared vision for our residents and newcomers.
<input checked="" type="checkbox"/>	Ensure that Tecumseh's current and future growth is built upon the principles of sustainability and strategic decision-making.
<input type="checkbox"/>	Integrate the principles of health and wellness into all of Tecumseh's plans and priorities.
<input checked="" type="checkbox"/>	Steward the Town's "continuous improvement" approach to municipal service delivery to residents and businesses.
<input checked="" type="checkbox"/>	Demonstrate the Town's leadership role in the community by promoting good governance and community engagement, by bringing together organizations serving the Town and the region to pursue common goals.

Communications

Not applicable ☒

Website ☐ Social Media ☐ News Release ☐ Local Newspaper ☐

This report has been reviewed by Senior Administration as indicated below and recommended for submission by the Chief Administrative Officer.

Prepared by:

Cheryl Curran, BES
Project Technician

Reviewed by:

John Henderson, P.Eng.
Manager Engineering Services

Reviewed by:

Brian Hillman, MA, MCIP, RPP
Director Development Services

Reviewed by:

Tom Kitsos, CPA, CMA, BComm
Director Financial Services & Chief Financial Officer

Reviewed by:

Phil Bartnik, P.Eng.
Director Public Works & Engineering Services

Recommended by:

Margaret Misek-Evans, MCIP, RPP
Chief Administrative Officer

Attachment Number	Attachment Name
1	Turkey Creek Watershed – Project Study Area
2	Turkey Creek Sub-Watershed Area Summary Table

Attachment Number	Attachment Name
3	Turkey Creek Watershed Hydrologic and Hydraulic Modelling Study – Phase 1 Report
4	Turkey Creek Watershed Hydrologic and Hydraulic Modelling Study – Phase 2 Report
5	April 25, 2023 Special Council Meeting – Consultant’s Presentation