



## The Corporation of the Town of Tecumseh

Public Works & Environmental Services

**To:** Mayor and Members of Council

**From:** Phil Bartnik, Director Public Works & Environmental Services

**Date to Council:** May 11, 2021

**Report Number:** PWES- 2021-19

**Subject:** 2020 Bridge & Culvert Needs Study (Structures with Spans >3.0m)

---

### Recommendations

It is recommended:

**That** Report No. PWES-2021-19 2020 Bridge & Culvert Needs Study (Structures with Spans > 3.0m) **be received**;

**And that** the recommendations contained within the 2020 Bridge & Culvert Needs Study (Structures with Spans > 3.0m) **form the basis for prioritizing** projects when completing the annual Public Works & Environmental Services Capital Works Plan.

### Background

At the December 10, 2019 Regular Meeting of Council, Council approved the recommendations (Motion: RCM-401/19) of Report No. PWES-2019-49 titled "2020-2024 Public Works & Environmental Services Capital Works Plan" that authorized Administration to proceed with the 2020 capital works projects including the completion of the 2020 Bridge & Culvert Needs Study for structures with spans greater than three metres.

Dillon Consulting Limited was retained to conduct the study based on their past experience on the Town's bridge and culvert structures and completion of the 2003, 2008, 2014, 2016 and 2018 Bridge and Culvert Needs Studies.

### Comments

The purpose of the Bridge and Culvert Needs Study (BCNS) was to assess the existing bridges and culverts with a span greater than three metres in the Town of Tecumseh and to prepare a comprehensive plan for improving and maintaining these structures for the next ten-year period. A full copy of the 2020 BCNS will be posted on the Town's website.

The eighteen (18) structures located in the Town, and included in this study, were classified as a Bridge or Culvert according to CAN/CSA S6-14 Canadian Highway Bridge Design Code (see Table 1 below and Attachment 2). The structures were inventoried and appraised according to the Ontario Structure Inspection Manual (OSIM) published by the Ministry of Transportation of Ontario, recent field inspections, and discussions with the Town.

Inspections of Bridges and Culverts are to take place every two years as legislated by O.Reg. 472/10 under the Public Transportation and Highway Improvement Act, which states:

- s.2(3): The structural integrity, safety and condition of every bridge shall be determined through the performance of at least one inspection in every second calendar year under the direction of a professional engineer and in accordance with the Ontario Structure Inspection Manual

**Table 1: Bridge and Culvert (Structures with Spans >3.0m) Inventory**

Structure ID	Structure Location	Structure Type	Year Constructed	Year of Last Major Rehab
1002	Pike Creek at 12 <sup>th</sup> Concession Road	Concrete Rigid Frame (Bridge)	1961	2016
1003	Pike Creek at 12 <sup>th</sup> Concession Road	Concrete Slab on Steel Girder (Bridge)	1965	2013
1004	Sullivan Creek at 12 <sup>th</sup> Concession Road	Concrete Non-Rigid Frame (Bridge)	1965	2019
1005	Pike Creek at Baseline Road	Concrete Slab on Steel Girder (Bridge)	1955	2013
1006	Sullivan Creek at Baseline Road	Concrete Rigid Frame (Culvert)	2015	---
1009	Pike Creek at Malden Road	Concrete Rigid Frame (Culvert)	2007	---
1010	West Townline Drain at Malden Road	Corrugated Steel Pipe Arch (Culvert)	1995	---
1011	Malden Road Drain at South Talbot Road	Concrete Rigid Frame (Culvert)	2007	---
1013	Merrick Creek at 8 <sup>th</sup> Concession Road	Concrete Non-Rigid Frame (Bridge)	1965	2020
1014	Colchester Townline Drain at 6 <sup>th</sup> Concession Road	Concrete Non-Rigid Frame (Culvert)	1955	2019
1015	Merrick Creek Drain at 6 <sup>th</sup> Concession Road	Concrete Rigid Frame (Culvert)	2007	---
1016	Collins Drain at Outer Drive	Concrete Rigid/Non-Rigid Frame (Culvert)	1975	2005

Structure ID	Structure Location	Structure Type	Year Constructed	Year of Last Major Rehab
1021	Pike Creek at 12 <sup>th</sup> Concession Road	Corrugated Steel Pipe Arch (Culvert)	1965	---
1028	East Townline Drain at St. Thomas Street	Concrete Rigid Frame (Culvert)	1975	---
1029	East Townline Drain at Little River	Concrete Rigid Frame (Culvert)	1975	---
2001	Colchester Townline Drain at 8 <sup>th</sup> Concession Road	Corrugated Steel Pipe Arch (Culvert)	2012	---
1	Lakewood Park over Lakewood Park Channel	Bowstring Pratt Truss (Bridge)	2016	---
2	Malden Road over Pike Creek	Pratt Truss (Bridge)	2015	---

## Bridge Condition Index

The Bridge Condition Index (BCI) was developed by the Ministry of Transportation as a means of combining the inspection information obtained through the OSIM data into a single value. The BCI is calculated using asset management principals based upon the remaining economic worth of the structure. The value takes into consideration that the structure is composed of a number of distinct elements that begin at a certain condition from the point of construction or rehabilitation, and that deteriorate over time.

The index is a planning tool to assist the Town in scheduling improvements. The BCI is the ratio of current approximate value of a structure to its estimated replacement cost and should not be used to rate or indicate the safety of a structure or an individual element. The BCI is organized into ranges of **0** to **100**, where **100** would represent a newly constructed structure, free of any immediate repair needs. Generally, the BCI ratings are considered as (i) **70 to 100** - 'good' condition; (ii) **60 to 70** - 'fair' condition; (iii) less than **60** - 'poor' condition.

The BCI was calculated for each structure and compared to the BCI of previous studies (2003 to 2018) and is depicted in Attachment 3 and 4. The average BCI value calculated for 2020 is 78.4, which is slightly higher than the BCI value of 77.0 that was calculated for the 2018 study. It should be noted that the planned removal of structure No.'s 1028 and 1029 (as part of the Manning Road Improvements Phase 2 to commence in 2021) will further theoretically increase the average BCI value to 80.9.

The average BCI value calculated for 2020 of 78.4 indicates that the Town is maintaining its infrastructure in overall good condition.

## **Recommended Structure Improvements**

### **1-5 Year Capital Needs**

Two (2) structures were identified with deficiencies that should be addressed within the next one to five years:

- Structure No. 1028 – East Townline Drain at St. Thomas Street Bridge
- Structure No. 1029 – East Townline Drain at Little River Road Bridge

Temporary repairs on structures 1028 and 1029, consisting of large steel plates placed on the culvert to slab above the soffit deterioration were carried out in July 2016. Since that time the Town has undertaken a monitoring program that consisted of a biannual inspection by a professional engineer to ensure that the temporary repairs remained satisfactory. These structures are slated to be removed as part of the Manning Road Improvements Phase 2 project, where construction is scheduled to commence in July 2021.

### **6-10 Year Capital Needs**

One (1) structure was identified with deficiencies that should be addressed within the next six to ten years:

- Structure No. 1016 Collins Drain at Outer Drive

Structure 1016 was the only structure identified needing rehabilitation within the six to ten-year timeframe. The proposed works include installation of waterproofing, concrete patch repairs and crack injection to the original culvert structure, full replacement of the asphalt surface, steel beam guiderail posts and replacement of signage. The estimated cost for this work is \$300,000.

## **Consultations**

Financial Services  
Dillon Consulting Limited

## **Financial Implications**

The 2020 Bridge & Culvert Needs Study (Structures with Spans > 3.0m) identified \$300,000 in recommended rehabilitations within the six to ten-year timeframe. These recommended works will be incorporated within the Public Works & Environmental Services Capital Works Plan.

The Town's Bridges and Culverts Lifecycle Reserve is the funding source for these capital projects. This reserve also funds lifecycle works for culverts with spans of less than 3.0m.

The annual budget allocation to this reserve was increased by \$20,000 for 2021, bringing the 2021 allocation to \$410,000. The reserve has a 2020 year-end balance of \$548,000, however projects a near-term temporary deficit of close to \$1 million by 2022 that should correct by 2025.

The target annual allocation for this reserve is \$500,000 as established during the 2021 budget process incorporating the Town's Asset Management Plan, PWES 2020-2024 five-year capital plan, recent study updates and current replacement costs. Upcoming annual budget exercises will consider gradual increases to the annual allocation to reach our updated target as well as access to grants, other reserves and project deferrals to address the temporary near-term funding deficit.

## Link to Strategic Priorities

Applicable	2019-22 Strategic Priorities
<input checked="" 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 type="checkbox"/>	Steward the Town's "continuous improvement" approach to municipal service delivery to residents and businesses.
<input 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:

Dana Reid  
Clerk I Administrative Clerk

Reviewed by:

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

Reviewed by:

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

Recommended by:

Margaret Misek-Evans, MCIP, RPP  
Chief Administrative Officer

<b>Attachment Number</b>	<b>Attachment Name</b>
1	2020 Bridge & Culverts Needs Study, Dillon consulting Limited, dated March 30, 2021 – Executive Summary
2	Bridge & Culverts Location Plan
3	Summary of Bridge Condition Index between 2003 and 2020
4	Bridge Condition Index Trends