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|  | <b>Report Title</b> | 2019 OSIM Inspection Summary                                                                                                                              |
|                                                                                   | <b>Report No.</b>   | OPS 19-43                                                                                                                                                 |
|                                                                                   | <b>Author</b>       | Kevin De Leebeeck, P.Eng., Director of Operations                                                                                                         |
|                                                                                   | <b>Meeting Type</b> | Council Meeting                                                                                                                                           |
|                                                                                   | <b>Council Date</b> | October 15, 2019                                                                                                                                          |
|                                                                                   | <b>Attachments</b>  | <ul style="list-style-type: none"> <li>• Bridge, Culvert &amp; Retaining Wall 10-year Capital Plan</li> <li>• 2019 OSIM Inspection Needs Study</li> </ul> |

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## **RECOMMENDATION**

**THAT Council receive Report OPS 19-43 2019 OSIM Inspection Summary;**

**AND THAT the engineering design work for the retaining wall replacement along Quarter Town Line at Beech Boulevard in the amount of \$85,000 be brought forward as part of the 2020 budget deliberations;**

**AND FURTHER THAT the engineering design work for the rehabilitation of the culvert along Quarter Town Line at Stoney Creek in the amount of \$30,000 also be brought forward as part of the 2020 budget deliberations.**

## **BACKGROUND**

Further to Report OPS 19-14 G. Douglas Vallee Limited was retained by the Town to complete the inspection of bridges, culverts, and retaining walls within the Town in accordance with Ontario Regulation 104/97 and to provide a Summary Report in the form of a Bridge, Culvert and Retaining Wall Needs Study. In total, 35 structures were inspected in 2019. Each inspection consisted of an element-by-element evaluation with the information recorded on the Ontario Structure Inspection Manual (OSIM) inspection forms.

The inspection reports were analyzed to evaluate the current condition of each respective structure based on the Ministry of Transportation's "Bridge Condition Index (BCI) – An Overall Measure of Bridge Condition" (July 30, 2009) and to determine which structures are in need of rehabilitation or replacement works. The results were used to prepare a multi-year plan over the next 10 years to conduct the required work in order to maintain the structures in a safe and functional condition.

Overall the Town's inventory of bridges, culverts and retaining walls is in good condition with an average BCI of 75; however without any improvement work the networks average BCI can be expected to decrease to 62. The intent of the bridge, culvert and retaining wall 10-year capital plan is to maintain the current BCI average of 75.

## **SUMMARY**

Following the review of the recommended replacement and rehabilitation capital works from the 2015, 2017 and 2019 OSIM Inspection Reports staff have developed a 10-year capital plan for the Towns bridges, culverts and retaining wall structures. It is anticipated that as the Town's

Asset Management Plan is refined and as future OSIM inspections are completed that priorities will need to be adjusted, due external factors (i.e. regulatory, environmental, development, etc.) and as structure conditions change. However, the attached 10-year capital plan provides general planning guidance for staff and an overall indication of funding requirements for Council. A brief description of each identified replacement or rehabilitation is provided below in order of priority based on the review of the recommended capital works from the 2015, 2017 and 2019 OSIM Inspection Reports.

**1) Quarter Town Line Retaining Wall at Beech Blvd. – Urgent Replacement BCI: 44**

The Beech Blvd. and Quarter Town Line retaining wall is constructed of gabions baskets, with a total length of 42.0m and approximate height of 2.64m. Replacement is recommended due to ongoing movement and rotation of the retaining wall. Proximity of underground watermain adjacent to this retaining wall represents a real risk to the Town's water distribution system supporting the need for immediate replacement.

**2) Quarter Town Line Culvert at Stoney Creek – Urgent Rehabilitation BCI: 61**

This culvert is located on Quarter Town Line 85m north of Fairway Hills Blvd. at the Stoney Creek crossing. The structure is a box culvert, with two spans of 4m, and a total length of 21.3m. While the structure is in overall fair condition, severe rotation and sliding of the gabion basket retaining wall at the southwest quadrant has occurred requiring immediate rehabilitative work.

**3) Kinsmen Pedestrian Bridge – 1-5 Year Rehabilitation BCI: 45**

The Kinsmen Pedestrian Bridge is located on Veterans Memorial Walkway, 170m west of Rolph St. The structure is an old railway girder bridge constructed approximately in 1910 subsequently converted to a pedestrian bridge approximately 20 (+/-) years ago, with 9 spans and has total length of 107.5m. Major Rehabilitation to preserve the structure is recommended in 1-5 years. If no rehabilitation work is completed on the structure within this timeframe, then closure and/or replacement should be considered within 6-10 years.

**4) Devonshire Ave. Culvert – 1-5 Year Replacement BCI: 51**

Devonshire Ave. Culvert is located on Devonshire Ave. 125m east of Lamers Crt. The structure is a twin ellipse culvert, with spans of 1.9m and a total length of 20.1m. Severe local deformation of the east barrel as well as severe corrosion and section loss in the west barrel was noted during inspection. Overall the two barrels are in poor condition, the severe corrosion and section loss in the west barrel is particularly of concern and has triggered the recommendation of full replacement within 1 to 5 years. It would be economically feasible for the Town to replace both culvert barrels at the same time.

**5) Baldwin St. Culvert at Participark Trail – 1-5 Year Rehabilitation BCI: 69**

The Baldwin St. Culvert is located on Baldwin St. 120m west of Edgewood Dr. The structure is a round culvert, spanning 5.3m with a total length of 66m. During inspection it was noted that both the inlet and outlet headwalls have poor sections of concrete, specifically at the water level. The embankments were found to have severe erosion and the waterway was found to have severe scouring and ponding downstream. Minor rehabilitation work to address these defects is recommended within 1 to 5 years.

**6) Hawkins Pedestrian Bridge – 1-5 Year Rehabilitation    BCI: 71**

The Hawkins Pedestrian Bridge is located 60m west of Frank St. and Delevan Cres. The structure is a 3 span girder bridge with a total length of 61.8m. During inspection it was noted that the post and lag abutments, beam diaphragms, beam girders, bracing and piers all display light to severe corrosion. The inspection also noted that rotation/deformation of the diaphragm at the west abutment has occurred and severe undermining of the retaining wall footing. Cleaning and painting of all the above mentioned elements is recommended to protect them from the elements and extend their service life. Retaining wall repair and erosion control on the embankments is also recommended as part of the 1 to 5 year rehabilitation work.

**7) Simcoe St. Bridge – 1-5 Year Rehabilitation    BCI: 73**

The Simcoe St. Bridge is located on Simcoe St. 20m west of old Vienna Rd. The structure is a girder bridge, spanning 40m. During inspection it was noted that the wearing surface and approaches are in poor condition which is typical of Simcoe St. and Oxford St. beyond the structure as well. The Town should replace the structure's wearing surface and waterproof the deck in conjunction with related asphalt paving work on Oxford/Simcoe St. beyond the structure. Retaining wall maintenance, erosion control on the embankments and guide rail maintenance are also recommended as part of the 1 to 5 year rehabilitation work.

**8) Lisgar Ave. Culvert Outlet at Brock St. E. – 1-5 Year Rehabilitation    BCI: 61**

The Lisgar Ave. Culvert Outlet is located on Brock St. E. across from the Lisgar Ave. intersection. The structure is a box culvert with a span of 1.7m and a total length of 376m running up the length of Lisgar Ave. to Bridge St. E and through Municipal Parking Lot 6A to behind Canadian Tire. During the inspection a pressurized leak was noted in the soffit of the structure. Further investigation is recommended to determine the cause of the pressurized leakage and to determine the extent or rehabilitation work to be completed within 1 to 5 years.

**9) Lake Lisgar Outlet Culvert – 1-5 Year Rehabilitation    BCI: 68**

The Lake Lisgar Outlet Culvert is located on Concession St. E. 100m east of Park Ave. The structure is a box culvert spanning 1.6m with a total length of 45m. During the inspection severe undermining of the culvert outlet footing with exposed timber piles was noted. This structure is recommended to undergo an Enhanced OSIM Inspection due to limited access and to further scope the rehabilitation work within 1 to 5 years.

**10) Broadway Culvert at Christie St. – 6-10 Year Replacement    BCI: 53**

The Broadway Culvert is located at the intersection of Broadway and Christie St. The structure is an ellipse culvert, spanning 2.4m with a total length of 30.2m. During inspection it was noted that the barrel has global deformations, while the retaining wall at the east end displays signs of rotation. It is recommended that the deformation and rotation be monitored at each biennial inspection and that the culvert be replaced within 6 to 10 years.

**11) Concession St. W. Bridge – 6-10 Year Rehabilitation    BCI: 70**

The Concession St. W. Bridge is located on Concession St. 480m west of Broadway. The structure is a rigid frame bridge with vertical legs, spanning 10.7m, and has an overall width of 12.9m. While structure is in overall good condition, minor rehabilitation to the asphalt wearing surface, approaches and the concrete soffit is recommended within 6 to 10 years.

**12) Baldwin St. Culvert at Whispering Pine – 6-10 Year Replacement    BCI: 53**

The Baldwin St. Culvert is located 75m east of Whispering Pine Lane. The structure is a single round culvert spanning 1.1m with a total length of 40m. The structure is in fair to poor condition with deformation and abrupt changes in the curvature of the culvert wall. Continued deformation and deterioration of the culvert is anticipated to continue over the next 6 to 10 years requiring replacement.

**13) Lisgar Ave. North Culvert – 6-10 Year Rehabilitation    BCI: 70**

The Lisgar Ave. North Culvert is located on Lisgar Ave. 110m east of Van Norman Dr. The structure is a round culvert spanning 3.3m with a total length of 48.8m. During the inspection a horizontal crack (3") wide in the west wall at mid-length was noted. Due to high water levels it is recommended that a structure evaluation be completed at lower water levels or underwater inspection be conducted to determine feasibility of a liner rehabilitation option versus replacement.

**14) Newell Road East Retaining Wall – 6-10 Year Replacement    BCI: 48**

The Newell Rd. (East Side) retaining wall is constructed of re-used concrete slabs, blocks, pipes, etc. While the exact dimensions were difficult to obtain, the length is estimated to be approximately 80m and height to be 8m. The wall is generally in fair condition and no immediate signs of failure or movement were noted. However, this is not an engineered retaining wall and is recommended to be replaced within 6 to 10 years. Further Geotechnical investigation may determine if Newell Road would be affected by excavation or if alternative Retained Soil Systems (RSS) wall design would be feasible.

**15) Newell Road West Retaining Wall – 6-10 Year Replacement    BCI: 50**

The Newell Rd. (West Side) retaining wall is constructed of re-used concrete slabs, blocks, pipes, etc. While the exact dimensions were difficult to obtain, the length is estimated to be approximately 60m and height to be 8m. The wall is generally in fair condition and no immediate signs of failure or movement were noted. However, this is not an engineered retaining wall and is recommended that it be replaced within 6 to 10 years. Further Geotechnical investigation may determine if Newell Road would be affected by excavation or if alternative Retained Soil Systems (RSS) wall design would be feasible.

**16) Newell Road Culvert – 6-10 Year Replacement    BCI: 53**

Newell Road Culvert is located on Newell Road approximately 250m south of Baldwin St. The structure is a single round culvert spanning 2.1m with a total length of 75m. Continued deformation and deterioration of the culvert is anticipated to continue over the next decade. The structure should be replaced in conjunction with the retaining wall replacement works within the next 6 to 10 years.

## **CONSULTATION/COMMUNICATION**

Town staff consulted the following documents during the development of the bridge, culvert and retaining wall 10-year capital plan:

- Public Transportation and Highway Improvement Act.
- Ontario Regulation 104/97 Standards for Bridges, as amended.
- Infrastructure for Jobs and Prosperity Act.
- Ontario Regulation 588/17 Asset Management Planning for Municipal Infrastructure
- 2016 Town Asset Management Plan
- 2015 OSIM Inspection Summary Report
- 2017 OSIM Inspection Summary Report
- 2019 OSIM Inspection Summary Report

## **FINANCIAL IMPACT/FUNDING SOURCE**

To maintain the current bridge, culvert and retaining wall network average BCI of 75 over the next 10 years an average annual budget of approximately \$800,000 would be required. This represents approximately \$280,000 more than the annual funding identified in the Towns 2016 Asset Management Plan indicating a real short-term need to invest in the bridge, culvert and retaining wall network to ensure the expected useful life of these structures is realized.

To address the two identified Urgent needs staff are proposing that the engineering design work for the retaining wall along Quarter Town Line at Beech Blvd. in the amount of \$85,000 and the engineering design work for the Quarter Town Line Culvert at Stoney Creek in the amount of \$30,000 be brought forward as part of the 2020 budget deliberations.

## **COMMUNITY STRATEGIC PLAN**

The development and implementation of a 10-year capital plan for the Towns bridges, culverts and retaining wall structures supports Objective 1 – Excellence in Local Government of the Community Strategic Plan by demonstrating strong leadership and accountability and supports Objective 2 – Economic Sustainability of the Community Strategic Plan through timely planning and renewal of infrastructure assets to reach their full potential service life.

## Report Approval Details

|                      |                                                                                                                                                        |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Document Title:      | OPS 19-43 2019 OSIM Inspection Summary.docx                                                                                                            |
| Attachments:         | - OPS 19-43 Attachment 1 - Bridge, Culvert, Retaining Wall 10-year Capital Plan.pdf<br>- OPS 19-43 Attachment 2 - 2019 OSIM Inspection Needs Study.pdf |
| Final Approval Date: | Oct 8, 2019                                                                                                                                            |

This report and all of its attachments were approved and signed as outlined below:

**Dave Rushton - Oct 7, 2019 - 2:51 PM**

A handwritten signature in black ink, appearing to be 'DR', with a long horizontal line extending to the right.

**Ron Shaw - Oct 7, 2019 - 5:24 PM**

**Donna Wilson - Oct 8, 2019 - 8:04 AM**