

To: Economic and Development Services Committee

From: Anthony Ambra P.Eng., Commissioner  
Economic and Development Services Department

Report Number: ED-24-74

Date of Report: May 29, 2024

Date of Meeting: June 3, 2024

Subject: Baker Park Pedestrian Bridge Over Oshawa Creek  
Pedestrian Structure MS-6-2017

Ward: Ward 3

File: 03-05

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## **1.0 Purpose**

The purpose of this Report is to inform Council of the closure of Baker Park pedestrian bridge MS-6-2017 and seek Council direction to:

1. Allocate the appropriate funding source to expedite the structure's design and associated pre-engineering work to be conducted in 2024, and,
2. Refer the funding for replacement of the structure to the 2025 Mayor's budget.

Attachment 1 is the location map.

Attachment 2 is the Technical Memorandum from the Structural Engineer.

## **2.0 Recommendation**

That the Economic and Development Services Committee recommend to City Council:

1. That, pursuant to Report ED-24-74, dated May 29, 2024, staff be authorized to initiate the detailed design and associated pre-engineering work related to the Pedestrian Bridge MS-6-2017 located in Baker Park;
2. That, pursuant to Report ED-24-74, dated May 29, 2024, Council approve \$85,000 to be allocated from the Canadian Community Benefit Fund for the detailed design and the associated pre-engineering of Pedestrian Bridge MS-6-2017; and,
3. That, pursuant to Report ED-24-74 dated May 29, 2024, the replacement of Pedestrian Bridge MS-6-2017 located in Baker Park be referred to the 2025 Mayor's Budget.

### **3.0 Executive Summary**

The Baker Park Pedestrian Bridge Over Harmony Creek provides an active transportation link from Baker Court to Regent Drive.

During a routine visual inspection of the pedestrian bridge, Parks Maintenance staff observed that the structure exhibited movement when weight was applied. The team promptly documented the issue with photographs and identified it as a cause for concern.

On April 26 2024, Parks Maintenance staff contacted Engineering Services to discuss the observed conditions from routine visual inspections. From that staff consultation, it was decided to close the Pedestrian Bridge pending investigations from a Structural Engineer to ensure the structure was still safe for use.

Engineering Services arranged an unplanned inspection by a Structural Engineer to determine the structure's condition. Following the structural inspection, it was determined that the structure should remain closed until arrangements for its replacement can be made in order to minimize potential safety hazards and risks.

The closure has created a 750 metre (2,500 ft.) diversion for residents from the north side of Baker Park on the west side of Harmony Creek to arrive at the south portion of Baker Park.

Based on the 2023 Biennial Structure Inspection Program, the structure was not forecasted for replacement within the next 10 years, and has significantly deteriorated over the last year.

### **4.0 Input From Other Sources**

The following have been consulted in the preparation of this Report:

- Chief Administrative Officer
- Commissioner, Community and Operations Services Department
- Commissioner, Corporate and Finance Services Department

### **5.0 Analysis**

The City owns and maintains bridges and culverts to support the service of transportation and the movement of goods and people throughout the City.

The City manages a variety of assets including 71 road bridges and 41 pedestrian bridges (structures) as defined by the Bridges Act.

#### **5.1 Current Operations and Maintenance Program**

Parks Maintenance staff perform operations and maintenance activities listed below and inspections associated with Quality Standard No: Q4-309-010:

- Bridge and other park amenities are visually inspected every 10 to 15 working days;

- Winter Control Operations are performed on the bridge and pathway; and,
- Pedestrian bridges are visually inspected and maintained as part of the park system.

## **5.2 Regulatory Requirements**

Pursuant to the Public Transportation and Highway Improvement Act, specifically, Ontario Regulation 104/97 'Standards for Bridges' made under the Act requires that:

“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. O. Reg. 472/10, s. 2.”

Bridges or culverts with a span less than 3 metres are classified as “Municipal” structures and do not require inspection every two years as required by Ontario Regulations 104/97. Bridges or culverts with a span greater than 3 metres are classified as “Structures” and must be inspected once every two years, by Ontario law.

The City engages a professional structural engineer to complete legislated inspections on a biennial basis. This inspection provides the City with a 10-year renewal and replacement forecast which the City attempts to implement through the Capital Budget process.

## **5.3 Infrastructure Planning**

The City applies a systematic processes that facilitates decision-making in regards to the construction, acquisition, operation, maintenance, renewal, replacement, and disposition of assets in the most cost-effective manner. Considering whole life costs, climate change and adaptation, and risk.

The City currently uses the Bridge Condition Index (“B.C.I.”) rating systems to assess the condition and state of repair of structures. The B.C.I. as prescribed by the Ministry of Transportation (“M.T.O.”):

- $BCI = (\text{Current Residual Value}) / (\text{Replacement Value}) \times 100$

Every two years, the City conducts a Biennial Structure Inspection Program that assesses condition and aides in the development of both maintenance and capital reinvestment programs. The last biennial inspection for structure MS-6-2017 recommended maintenance work, replacement was beyond forecast.

The purpose of the Biennial Structural Inspection Program is to provide an updated assessment of the City’s municipal structures (Bridges and Culverts) and provide data and information for both infrastructure planning and asset management.

From the 2021 Biennial Structure Inspection Program:

- The total estimated replacement cost of these structures is \$206,627,162.00 based on the 2023 biennial inspection.

- The total estimated replacement cost of the City's pedestrian structures is \$25,150,000.00 based on the 2023 biennial inspection.
- The average age of the City's structures is 47.4 years (18 unknown age).
- The average age of the City's pedestrian structures is 51 years.
- The average B.C.I. of all the City's structures is 74.4.
- The average B.C.I. for the City's pedestrian structures is 68.8.

In the Biennial Structural Inspection Program, replacement cost estimates are determined using reproduction costs, which involve constructing an identical structure. During the design process of any structure's replacement, each structure undergoes hydraulic analysis to determine the existing and required flow conveyance capacity. If upsizing is deemed required to ensure adequate flow conveyance requirements, the replacement costs will be increased.

#### **5.4 Pedestrian Structure MS-6-2017**

Structure MS-6-2017 located 0.06 kilometres east of the east limit of Parklane Avenue at Baker Court and serves as a link between the east and west communities divided by Harmony Creek, facilitating convenient access to park amenities.

The bridge also provides the residents with easier and shorter access to both Vincent Massey Public School and Eastdale Collegiate and Vocational Institute located on Harmony Road south of Adelaide Avenue.

Infrastructure details:

- Baker Pedestrian Footbridge Over Harmony Creek
- Originally constructed in 1960
- Span 9 metres (29.5 ft.)
- Structure width 1.6 metres (5.3 ft.)
- Timber Slab on Timber Girders
- Replacement Value \$ \$150,000.00 (2023 dollars, Class D estimate)

Based on current 2023 Biennial Structural Inspection Program Report Structure MS-6-2017 is generally in fair condition.

- Structure MS-6-2017 is not ranked in the current forecast of structures in need of capital re-investment.
- The sum of the structures ahead in priority is estimated to be \$38,831,435 of needs combined based on the current forecast.
- From a simple condition perspective using the B.C.I. rating, the structure is ranked 18 out of 112 structures.

## **5.5 Structural Engineer Unplanned Inspection**

The pedestrian structure was evaluated by a structural engineer on May 14, 2024. The assessment revealed:

- Significant deterioration of the end timber girders and steel bearings. There is also a missing midspan timber diaphragm and a failed bracing rod on the bridge. Additionally, the end timber diaphragms exhibit signs of decay. The midspan section of the bridge, particularly on the north side, is undergoing noticeable deformation.
- The abutments are generally in fair to good condition, with minor localized spalling and cracking. The abutment protection (gabion mats) has shown signs of failure and erosion along the stream bed, necessitating repairs.
- It was also noted that a localized medium fire damage is evident on the timber diaphragms and end girders.
- A comprehensive hydraulic analysis and superstructure design that adheres to the new pedestrian bridge design standard (CSA-S7) will be required.
- The structure will need regular and thorough inspections every 2 to 3 months by a certified Structural Engineer to monitor the deterioration of the timber girders, if it was decided to keep the bridge open to pedestrians only.
- During this time, the bridge may be accessible to the public, with the limitation that it is not to be used by any vehicles (e.g. bicycles, motorcycles, maintenance vehicles).

Allowing bicycles on the trail bridge presents a safety concern due to its proximity to the roadway and the deteriorating north railing. The railing lacks structural integrity and poses a risk of collision for cyclists. Installing bollards and signage at the entrances may partially help to address the issue temporarily, however replacing the bridge would be the most effective solution for ensuring public safety and minimizing risk.

## **5.6 Next Steps**

Based on the attached Technical Memorandum received from the Structural Engineer, it is recommended to keep the bridge closed and advance the detailed design work and tender in preparation for a Q2 2025 tender date. Work that would need to complete prior to construction includes:

- Hydraulic analysis
- Detailed Design
- Geotechnical Investigations
- Central Lake Ontario Conservation Authority and Fisheries and Oceans Canada approvals
- Preparation of Tender Documents
- Tree removals

If staff received approval to proceed with the design in 2024, the estimated Project Schedule would be:

- Design substantially complete: Year end 2024
- Tender Preparation/Contract Award: Q1/Q2 2025
- Construction commencement Q2/Q3 2025
- Construction completion end of Q3/Q4 2025

Project and construction timing would be dependent on regulatory approvals, structure fabrication timeline and weather conditions.

### **5.7 Communication Strategy**

The closure of the pedestrian bridge and future construction updates/milestones will be communicated in accordance with the City's Public Notice Policy GOV-23-02, and through:

- City website newsfeed (and emailed to subscribers); and,
- Direct outreach to the Durham District School Board to share with the two area schools: Eastdale Collegiate and Vocational Institute and Vincent Massey Public School.

Additionally, a mail-out to the immediate community will be provided when the City is ready to be begin construction.

Updates will be provided as they become available.

### **6.0 Financial Implications**

\$85,000 in funding available from the Canadian Community Benefit Fund to undertake the Design, and the associated pre-engineering work in 2024 with the replacement costs referred to the 2025 Mayor's Budget.

### **7.0 Relationship to the Oshawa Strategic Plan**

The Recommendation in this Report advances the goals in Oshawa's Strategic Plan, including the goal of "Economic Prosperity and Financial Stewardship" through the themes of "Safe and Reliable Infrastructure".



Greg Hardy, P.Eng., PMP, Director,  
Engineering Services



Anthony Ambra, P.Eng., P.Eng., Commissioner,  
Economic and Development Services Department





# MEMORANDUM

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May 22, 2024

**Item: ED-24-74**  
**Attachment 2**

**City of Oshawa**  
**50 Centre St. South**  
**Oshawa, ON L1H 3Z7**

**Attn:** Melissa McCabe,  
Manager, Infrastructure Services

**Re:** Emergency Bridge Inspection – Baker Park Pedestrian Bridge (Site ID: MS-6-2017)  
TSI Inc. File: 24048-1

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## 1. INTRODUCTION

The City of Oshawa retained services of TSI Inc., in May 2024, to undertake an emergency detailed bridge inspection for Baker Park Pedestrian Bridge (Site ID: MS-6-20217) located on a local trail path approximately 60 m east of the east limit of Parklane Ave. at exact geographic coordinates of (43.90912158, -78.83117223). The bridge is a single span (Length: 9.0m; Width: 1.6m) pedestrian bridge with a timber superstructure (slab and girders) founded on reinforced concrete abutment walls.

The call for emergency bridge inspection was subsequent to an earlier inspection completed by the City's Parks Department and the subsequent temporary closure of the bridge due to the certain concerns noted by the City's patrol staff. Based on the City's patrol staff internal report, the subject pedestrian bridge, which is frequently used by the "bikers, e-scooters", in addition to the pedestrians, appear to have issues as it evidences movement under normal pedestrian walking.

The emergency detailed bridge inspection was completed by an inspection team from TSI Inc., under direct supervision of a senior Bridge Engineer, on May 11, 2024. This technical memorandum is prepared and submitted to the City outlining the major inspection findings and the conclusion and recommendations thereto.

## 2. MAIN INSPECTION FINDINGS

The following outlines the major inspection findings:

- The end timber girders evidence medium to severe decay and rot;



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- The end steel bearings were found to be severely corroded;
- The bridge is missing one midspan timber diaphragm (north side) and severely corroded and failed bracing rod. The end timber diaphragms appear to experience medium to severe rot as well;
- Evidence of localized medium fire damage to the timber diaphragms and end girders were noted;
- Excessive deformation along the midspan (particularly along north side (upstream side) of the bridge was notable. Nonetheless, the bridge did not seem to be unstable under normal walking, though the bridge showed evidence of excessive vibration under jumping (dynamic loads) particularly along the north side;
- The severity of rot on the NE and NW ends (upstream ends) are more than that of SE and SW (downstream ends) which suggest the potential prolonged exposure to moisture (Likely due to highwater level or frequent flooding events (?));
- The north side bridge railing was found to be less sturdy and more susceptible to local impact failure;
- Abutments were found to be in an overall good to fair condition evidencing some minor localized spall and cracks; and
- Abutment embankment protection system (i.e. gabion mats) shows evidence of failure and material loss along stream bed and require repair.

### 3. SUMMARY AND CONCLUSION

Based on the inspection findings noted above, it is recommended that:

- **The bridge must be planned to receive a new superstructure replacement within the next 1-2 years.** The design for bridge superstructure replacement shall be supported by a detailed drainage study and hydraulic analysis in accordance with the requirements of the new pedestrian bridge design standard (CSA-S7). Potential modification to the bridge elevation or alternatively implementing adequate protection system to the end bearings and girder ends may be required.
- Should the City opt to **keep the bridge open to the public**, there will be a need for undertaking a **more frequent (e.g. every 2-3 months) detailed bridge inspection completed by a Bridge Engineer, competed in this field.** The noted more frequent inspection is required to better asses the progressive rate of the noted decay in bridge timber end girders and to assist with undertaking immediate action, should there be any drastic change in the condition of the bridge.
- Furthermore, and in addition to the need for more frequent inspection, the bridge shall be **closed to any vehicular use, including bicycles, e-scooters, motorcycles, maintenance vehicles, etc.** (e.g. through installation of bollards, and proper signage). It is understood, through consultation with the City staff that the bridge is frequently used by bikers and e-scooters. The bridge is located on a sag with a curvature concaving towards south. The existing geometry will increase the likelihood of any potential collision impact by the riders along the bridge north railing which was found to be of less strength due to excessive decay of the end diaphragms and one missing mid-



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span diaphragm as previously noted in the previous section. **In discussions with the City, it has been determined that restricting the use of the bridge to pedestrians only is not feasible. As a result, it is recommended that the bridge remain closed to the public until it is replaced.**

Respectfully Submitted:

**TSI Inc.**

A handwritten signature in blue ink that reads 'Parisa Rameshni'. The signature is written in a cursive style with a large, sweeping flourish at the end.

**Prepared by:**

Parisa Rameshni, B.Sc.

Bridge Inspector



**Reviewed by:**

Ramin Rameshni, PhD, P.Eng.

Senior Bridge Engineer & Project Manager



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## ***Appendix A – Representative Photographs***



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*Figure 1: Bridge Closed to the Public*



*Figure 2: West Approach looking toward Bridge*



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*Figure 3: North Elevation-Evidence of Sag at Midspan*



*Figure 4: End Girder (Typ.)-Evidence of Severe Decay and Rot and Severe Corrosion to Steel Base Plates*



*Figure 5: Timber Girder (NE End); Evidence of Severe Rot and Decay*



*Figure 6: Soffit (Typ.)- Evidence of Missing Midspan Diaphragm*



*Figure 7: Timber Diaphragm-Evidence of Fire Damage*



*Figure 8: Bracing Rod-Evidence of Severe Corrosion and Failure*