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BIENNIAL OSIM BRIDGE INSPECTION & CAPITAL NEED ANALYSIS

SUMMARY REPORT

TSI PROJECT NO: 24079

September 2025

(Final)

Submitted To:
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Appendices

1.0 Introduction

TSI Inc. was retained by the Corporation of the Town of Gananoque to perform detailed visual inspection of the Municipality's structural culverts and bridges in accordance with the MTO Ontario Structure Inspection Manual (OSIM-2018). The scope of work included carrying out biennial OSIM inspection for three (3) road bridges, ten (10) pedestrian bridges and eleven (11) pedestrian boardwalks in accordance with the requirements of the most recent edition (2018) of MTO OSIM manual. This summary report contains the individual OSIM inspection forms, as well as the Maintenance Needs Plan, and the 10-year (Rehabilitation/Replacement) Capital Plan for all structures inspected.

2.0 Scope of Work

The assignment involved the following:

- A detailed visual inspection of each structure under direct supervision of a Professional Engineer, licensed in the Province of Ontario, and trained by the Ministry of Transportation to do OSIM inspection;
- Generating OSIM inspection reports including representative pictures, observation notes, and comments from the field inspection for each structure;
- Completion of a prioritized list of maintenance needs for each structure and associated cost estimate (in current year dollars);
- Completion of a prioritized list of repairs and/or replacement needs for each structure, and its corresponding capital cost estimate, (in current year dollars);
- A detailed Summary Report presented herein.

3.0 Purpose

It is intended that the results of the assignment will be used by the Municipality to ensure that the following items are properly administrated:

- Ensure that the Municipality's structures remain at an acceptable level of safety;
- Ensure that the useful service life of the structures is prolonged;
- Ensure that maintenance and rehabilitation needs are identified and recorded for future planning;

- Ensure that the Municipality has adequate economic and technical information to effectively plan for additional studies and investigations, repair, and/ or replacement of the structure.

4.0 Structure Inspection

4.1 Methodology

The structures were visually inspected in accordance with the MTO Ontario Structure Inspection Manual (OSIM). To achieve the goals and objectives of this assignment, an element-by-element visual assessment of each structure was completed to identify material defects, performance deficiencies, and maintenance needs. The “severity and extent” approach, as outlined in the Preface of the OSIM, was used to simplify the process of using inspection information to estimate bridge rehabilitation needs and costs.

Prior to undertaking visual field inspections, previous OSIM reports were reviewed. A copy of the original drawings, where available, was requested from the Municipality and/or the Ministry of Transportation, Ontario and reviewed prior to the field inspections. The inspection work was completed by three (3) qualified inspectors including an experienced Professional Engineer, licensed in the Province of Ontario. Field inspections were conducted in November 2024 and April 2025. The work was carried out in accordance with the Occupational Health and Safety Act and the requirements of the Ontario Traffic Control Manual Book 7 – Temporary Conditions, where applicable.

Binoculars, camera, tape measures, steel chain, chest waders, flotation vest, hammers, paint markers and other items as listed in Clause 1.4 of Section 1 under Part 2 of OSIM were used to complete the inspections.

During an OSIM inspection, elements of a bridge or culvert are inspected for visual signs of deterioration. Additionally, tactile inspections of accessible concrete elements, such as concrete sounding, are undertaken during an inspection. The tactile inspection uncovers deterioration that is not visually noticeable. The inspection manual provides guidelines for the calculation of the overall quantity of an element. Element quantities are based on the element type and are in units for area (m^2), linear distance (m), units (each), etc.

Upon completion of the field inspections the structures were reviewed with regards to their individual maintenance and rehabilitation needs. A thorough review of each structure was completed for prioritizing and making recommendations appropriate for current and future use

requirements. A 10-year Capital Plan has been prepared to outline all replacement and/or rehabilitation recommendations, associated costs, and corresponding recommended timelines for each structure.

All reports and evaluation works have been internally reviewed to ensure accuracy and completeness. Report forms have been completed as per section 7 under Part 2 of OSIM. Budget estimates for recommended work have been based on recent project costs for similar work as well as industry benchmark costs.

4.2 Bridge Condition Index (BCI)

The BCI is calculated using asset management principals based on the remaining economic worth of the bridge. It is based on the premise that a bridge starts at a new condition and deteriorates to a lower condition with time. It uses actual inspection data from the various bridge elements and as the elements deteriorate, they have a lower economic value. Essentially, the BCI is a weighted average of all elements (since all elements are not of equal value to the bridge) and all Condition States (since each condition state represents a certain degree of loss of value of the element). The BCI begins at 100 when the bridge is in new condition and theoretically becomes 0 as all elements become fully in Poor condition. Practically, it is impossible for the BCI to fall to 0 since the entire bridge does not become poor before rehabilitation work is performed.

The BCI is based on the current value and replacement value of all elements in a bridge. The current value of the element is determined based on the depreciated value of the portions of the element that are in each of the four Condition States (Excellent, Good, Fair, and Poor). The following table provides weight factor used for condition states:

Condition State	Weight Factor
Excellent	1
Good	0.75
Fair	0.5
Poor	0.0

The BCI is used to plan repair and maintenance and does not imply for safety of a structure.

5.0 Determination of Costs

Given the cursory information obtained during the visual inspections and without having access to detailed design information, it is unrealistic to develop detailed cost estimates for each structure. For these reasons, benchmark budget costs were developed for categories of repair, rehabilitation and replacement. Usually, benchmark costs do not necessarily provide accurate costs for individual repairs/replacement but have proven to provide adequate accuracy for global budgeting purposes when dealing with a large number of structures.

For the purpose of this study, benchmark costs for the rehabilitation and replacement of structures are based on maintaining the existing width, length and alignment of each structure. However, the costs to replace the existing structures with structures meeting current geometric standards are included for comparison. For this purpose, an overall roadway width of 10 meters was used for both bridges and culverts. More accurate costs for each structure would be provided upon further engineering study and preliminary design based on exact repair, rehabilitation and replacement needs (including change in geometry). The following benchmark costs have been established for this report following the requirements of the inspection forms.

5.1 Bridge and Culvert replacement costs

Budget costs for the replacement of bridges are usually based on the deck surface area of individual structures (m^2). Therefore, benchmark replacement costs for this study were determined using the following unit costs based on the spans of individual bridges. The proposed unit costs are in general conformance with the recommendations of MTO Structural Financial Manual and our recent experience in the field. These unit costs include approach roadway costs (which do not vary with bridge span). In addition, the varying widths of bridges were considered to provide more realistic unit costs and to avoid large discrepancies in the replacement cost between bridges of different lengths, but similar surface areas.

Total Bridge Replacement Unit Costs		
Bridge Length (m)	**Width (m)**	**Unit Replacement Cost ($/m^2)**
3-10	<10m	$13,500.00
	≥10 m	$12,500.00
10-20	<10m	$12,500.00
	≥10 m	$11,500.00
20-30	<10m	$11,500.00
	≥10 m	$10,500.00
>30	<10m	$10,500.00
	≥10 m	$9,500.00

In the case of boardwalks, the Unite Replacement Cost ($/m^2) is between $3,000-10,000.

In the case of culverts, the plan area (or deck surface area) used in the calculation was ('total span' + 1 m) x ('length of culvert'). The purpose of using the Total Bridge Replacement Unit Costs table for culverts is to normalize the replacement cost figures. Although culverts are generally less expensive to construct than bridges, it is generally accepted that the expected service life span of a culvert is typically less than a bridge. It is valid, therefore, on a life cycle cost basis, to utilize the total Bridge Replacement Unit Costs table for all structures, whether they are bridge or culvert type.

5.2 Bridge Repair / Rehabilitation Costs

For budgeting purposes, costs for the rehabilitation of bridges are typically expressed as a percentage of the total replacement costs. Rehabilitation costs for this study are separated into four categories as presented in the table below.

Bridge Rehabilitation Costs	
Category	**% of Replacement Cost**
Major Bridge Rehabilitation	40-60
Minor Bridge Rehabilitation	20-40
Major Item Repair	10-20
Minor Item Repair	5 or less

5.3 Culvert Repair / Rehabilitation Costs

It is generally not practical to undertake major rehabilitation work to culvert crossings where significant material/performance deficiencies (e.g. metal liner (barrel) perforation or severe erosion of concrete) exist. Culvert replacement is normally planned in these circumstances. Repair work identified generally included repairs to the inlet and outlet structures such as headwalls, cut-off walls, retaining walls, restoration of backfill, slope protection at the culvert ends and installation / upgrading of guiderail. In the case of concrete barrels, some repair work to the barrels may be included if the opening is large enough to permit construction.

5.4 Approach Roadway Repair / Rehabilitation Costs

For this study, approaches are considered to be 30m of roadway from the center of each individual culvert (60 m total per culvert) and 6m of roadway from the end of the deck for each individual bridge (12m total per bridge). Repair / rehabilitation costs for approach roadways have been separated into three categories as presented in the table below.

Separate costs for Approach Roadway Repair / Rehabilitation have been included for Bridge Rehabilitation. For structure replacement costs and repairs, the approach roadway repair / rehabilitation costs have been included in the recommended work costs if applicable.

Approach Roadway Repair/Rehabilitation Costs	
Category	**Cost**
Capital Projects (Partial / Complete Paving, Guiderail)	$80,000.00
Minor Repairs / Maintenance (Crack Sealing, Surface Sealing, Guiderail Repairs)	$30,000.00
Crack Sealing Only	$15,000.00

5.5 Construction Detour Costs

Several alternatives exist to maintain the flow of traffic when a bridge or culvert undergoes major rehabilitation or replacement. These include construction of a detour structure adjacent to the existing structure, a detour route around (avoiding) the structure, and the staging of the construction to allow traffic on the structure during construction. The construction of a detour structure is the costliest option and is usually recommended only when the other options are not possible. The detour route is the least expensive option but is often not practical due to the length of the detour route and the inconvenience to residents near the structure. The most frequently recommended option is the staging of rehabilitation work to allow the passage of traffic.

Since most bridge projects would consist of rehabilitation and not replacement, the staging of work would be the most frequently used option to maintain traffic during construction. Therefore, the benchmark costs for detours are based on “staging” of the work as per the following. These costs are based on additional costs incurred from staging of the work during construction (extra effort, time). Traffic control costs would be separate from detour costs and are presented later in this section.

Detour During Construction Costs	
Category	**Cost**
Detour (Minor Rehabilitation / Major Rehabilitation of Bridges Less than 10m Long / Culvert Replacement)	$40,000.00
Detour (Major Rehabilitation / Bridge Replacement)	$70,000.00

5.6 Traffic Control Costs

In addition to performing the work in stages to accommodate traffic, the safety of traffic passing on the bridge or over the culvert during construction must also be ensured. The costs of traffic control during staged projects would be as follows:

Traffic Control Costs	
Category	**Cost**
Traffic Control – Minor Rehabilitation	$40,000.00
Traffic Control Major Rehabilitation	$80,000.00

5.7 Utilities / Right of Way Costs

Most bridge or culvert rehabilitation / replacement projects do not require substantial expenses for the installation or modification of existing utilities. Similarly, most of these projects do not require an increase in right of way (ROW). Therefore, specific benchmark budget costs for these items were not developed.

5.8 Environmental Study Cost

Since bridge or culvert replacements / rehabilitations typically do not involve a change in alignment or a reduction in clearances under the structure, these projects usually fall under the Municipal Class Environmental Assessment (MCEA)-Schedule A or A+ for Ontario Municipal Highways. The specific requirement of these two schedules of MCEA do not include detailed environmental and mitigation plans, but typically requires written application with, and permission from, the appropriate environmental agencies (Ontario Ministry of Natural Resources, Ontario

Ministry of the Environment, Local Conservation Authorities (Permit to Take Water), etc.). Therefore, the benchmark budget cost for environmental study would be as follows (based on the requirement of Schedule A or A+ Environmental Assessment):

Environmental study Costs	
Category	**Cost**
Bridge / Culvert Replacement, Minor and Major Rehabilitation	$15,000.00

5.9 Engineering Investigation

Further engineering investigation is recommended for several of the bridges and culverts as indicated on individual OSIM inspection forms. Benchmark budget costs for these additional engineering investigation works are presented in the table below:

Engineering Investigation		
Category	**Type of Structure**	**Cost**
Detailed Inspection / Rehabilitation Study – Full Bridge	Truss	$60,000.00
	Other Structures	$50,000.00
	Traffic Barrier Only*	$15,000.00
Detailed Deck Condition Survey	Exposed Deck	$35,000.00
	Asphalt Paved Deck	$50,000.00
	Concrete Culvert with Height of Fill Less than 500mm**	$25,000.00
Structure Evaluation	Truss	$25,000.00
	Other Structures	$20,000.00
Underwater Investigation	All Bridges	$20,000.00
Monitoring of Deformation	All Bridges	$10,000.00

* Requirements for traffic barriers on bridges and culverts were determined using the Canadian Highway Bridge Design Code, MTO Standards and best engineering standard practice. The evaluation of existing traffic barriers was based on assumed values of AADT and good engineering practice. For structures with existing approach guiderail, a review of the required approach / leaving end length of guiderail and end treatments (as per the MTO's Roadside Safety Manual) was not carried out.

** Deck condition survey on concrete culvert includes cores with no corrosion potential survey. Deck condition surveys on concrete culverts with a height of fill greater than 500 mm are not practical.

The benchmark budget costs for a Structure Evaluation and Detailed Deck Condition Survey would be reduced to 50% of that shown in the table above when any one of these are performed simultaneously with a Detailed Inspection / Rehabilitation Study.

Other investigations such as fatigue and seismic investigations would be included with the Detailed Inspection and Structure Evaluation (respectively), if deemed necessary by the engineer. Detailed coating condition surveys are typically only required where a failure of coating systems have occurred other than normal deterioration. A DART (Deck Assessment by Radar Technology) survey is not a commonly used investigation method. Detailed deck condition surveys are the most commonly used method of deck inspection. Therefore, individual costs for the various types of investigation described above are not provided.

5.10 Engineering Design Cost

For the purpose of this report, the "engineering design" associated with each bridge is estimated at 10% of the estimated rehabilitation/replacement cost.

5.11 Contract Administration, Construction Field Inspection and other design Services during Construction

For the purpose of this study, the total cost associated with "Contract Administration, Construction Field Inspection and other Design Services during Construction" is estimated at 15% of the estimated rehabilitation/replacement cost.

5.12 Other Costs

Any other costs not specified in the above (site specific requirements) are deemed to be covered in the total benchmark costs. Therefore, no specific amount for other work is specified in this report.

5.13 Contingency Costs

The benchmark costs used for budgeting purposes are based only on information obtained from visual OSIM inspections; hence, contingency allowances are already built into the benchmark costs. Therefore, specific amounts for contingencies will not be included in this report.

5.14 Total Capital Work Estimate

The total capital work estimate cost will be the sum of all above-noted costs identified under sub-sections 5.1 to 5.13 (where applicable).

6.0 Routine Maintenance

As part of the Municipality's overall bridge management program, a program of routine maintenance should be implemented and upkept for all structures. Maintaining this program will assist in minimizing the potential for premature deterioration of structural elements; and, when combined with a program of bridge rehabilitation, will assist in maximizing the useful service life of the Municipality's structure inventory.

Overall routine maintenance needs will vary depending on the type of structure, location, traffic volumes, winter maintenance procedures (sanding vs. salting, etc.), size of the structure, vintage and previous maintenance / rehabilitation carried out on the structure in the past. The following presents a general summary of routine maintenance operations that are considered applicable for the structures present within the Municipality's inventory:

6.1 Periodic bridge cleaning

This would include power-washing of all components exposed to roadway traffic and areas where debris accumulation is prevalent. This would include asphalt wearing surfaces, expansion joint gaps, edges of roadway, bearing seats, truss bottom chords, etc. Typically, this operation would be carried out on an annual basis, most likely each spring after winter sanding / salting operations have ceased; however, in some cases (i.e. gravel approach roadways, etc.), an increase in the number of cleanings per year may be required.

6.2 Concrete spot repairs

This would generally include localized patching of small concrete spalls and delamination located in areas within the roadway splash zones (top of deck, curbs, expansion joint block-outs, etc.). Completing these repairs will assist in preventing accelerated deterioration of concrete in these areas by reducing the ingress of chlorides, etc. There is no specific timing for these types of repairs, and they are generally performed on an as-needed basis.

6.3 Steel spot repairs / spot coating

This would generally include localized touch-ups to steel coatings located in areas within the roadway splash zones (truss bottom chords, exterior floor beams / stringers, etc.) as well as localized spot repairs in areas of appreciable section loss / corrosion. There is no specific timing for these types of repairs, and they are generally performed on an as-needed basis.

6.4 Clearing of debris in waterway

This would include clearing of trapped debris in the vicinity of the structure (upstream / downstream). This operation would typically be carried out on an annual basis, after the spring run-off period.

6.5 Asphalt surface repairs / rout and seal

This would include cold patch asphalt repairs, routing and sealing of wide cracks in asphalt. This operation would typically be carried out an annual basis, after winter clearing operations have ceased.

6.6 Regrading of Approach Roadways (Gravel Roadway Surfaces)

This would include placing and grading fresh granular material on roadway surfaces. The timing of this work would depend on the overall volume and type of traffic typically traversing the roadway (truck haul route, summer cottage traffic route, etc.). Typically, this work would be carried out on an annual or bi-annual basis.

6.7 Bridge deck drainage

This would include maintaining existing deck drains free of debris and maintaining them in an un-plugged condition. This operation would typically be carried out an annual basis, after winter clearing operations have ceased.

6.8 Clearing of debris / vegetation from approach guiderail

This would involve removing debris and vegetation from in front of approach guiderail. Although this is mainly a safety measure (to ensure proper performance of the guiderail), it also assists in prolonging the lifespan of the guiderail (accumulation of debris can accelerate rot on wooden posts, corrosion on steel guiderail, etc.).

6.9 Surface sealing of exposed concrete surfaces

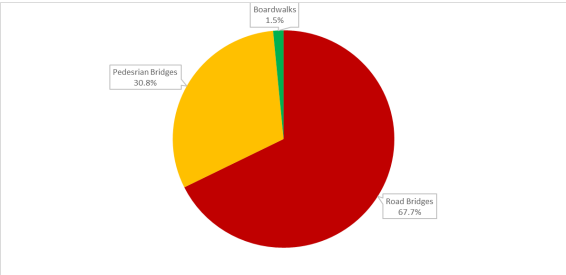
This would include cleaning and applying a concrete sealer on concrete surfaces exposed within the splash zone (exposed concrete decks, curbs, sidewalks and barrier walls); this operation is not typically required on an annual basis and would typically be completed in 3 to 5-year intervals. Sealing concrete surfaces periodically assists in minimizing the migration of chlorides into the concrete.

7.0 Structure Inventory Overview

TSI Inc. completed the OSIM inspection for twenty-four (24) Municipal Structures identified by the Town of Gananoque in 2024. The structures are split between three (3) road bridges, ten (10) pedestrian bridges and eleven (11) pedestrian boardwalks. In addition, based on MTO OSIM manual (Section 1.1.3.1, P. 1-2), the inspection interval of culverts with spans ranging from 3 to 6m can be increased to four years if the culvert is in good condition and the engineer/owner believes that the culvert or condition will not change significantly before the next inspection.

Structure replacement costs were calculated according to the guidelines in Section 5 of this report. The replacement cost of the bridges and boardwalks is included in **Appendix A**. The total replacement cost is approximately **$14,900,000.0** broken down as follows for the **24** structures inspected:

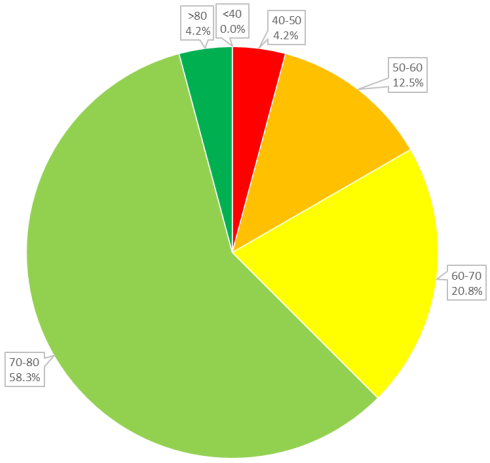
Replacement Costs		
Structure	**Cost**	**Percentage**
Road Bridges	$10,100,000.0	67.7%
Pedestrian Bridges	$4,600,000.0	30.8%
Boardwalks	$225,000.0	1.5%
Total	**$14,925,000.0**	**100.0**



To determine the overall condition of the structures in the transportation system, the number of structures in each Bridge Condition Index (BCI) Range was determined. This measure is more preferable than computing the average BCI value of all structures, which can be highly affected by the very new or very poor structure ratings. Based on the OSIM inspections, the following table provides a breakdown of the BCI values in each range for **Structures**:

BCI Range	Number	Percentage
<40	0	0.0%
40-50	1	4.2%
50-60	3	12.5%
60-70	5	20.8%
70-80	14	58.3%
>80	1	4.2%
Total	**24**	**100.0%**

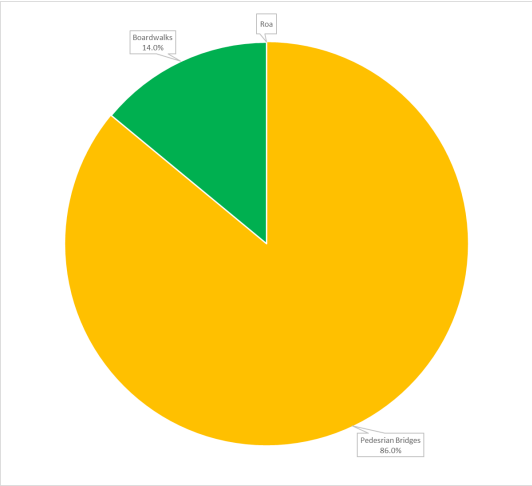
BCI range of structures.



The results clearly highlight the importance of proper planning and immediate action to be taken by the Counties in addressing the identified needs of the structures and to prolong the service life of its bridges and culverts.

The total anticipated capital costs of structures inspected is approximately **$1,100,000.0** broken down into a 10-year asset management plan (**Appendix C**)**.** Direct rehabilitation/replacement costs totaled approximately **$800,000.0**. The rehabilitation/replacement costs will then be supplemented by additional costs associated with implementing detour, traffic control, environmental study, engineering design, etc. to comprise the total capital work costs. These costs are tabulated separately in **Appendix B**, while maintenance needs are included in **Appendix E**. A detailed list of additional investigations is brought in **Appendix D**. OSIM reports for structures are included in **Appendix G**.

Anticipated Capital Costs		
Structure	**Cost**	**Percentage**
Road Bridges	$0.0	0.0%
Pedestrian Bridges	$920,000.0	86.0%
Boardwalks	$150,000.0	14.0%
Total	**$1,070,000.0**	**100.0**



8.0 General Recommendations

Based on the inspection information, we recommend the following courses of action:

1. Act on all recommendations noted in this report and in individual OSIM reports.
2. Implement all maintenance needs as outlined in **Appendix E.**
3. Conduct follow-up OSIM inspections in two (2) years' time, or on a more frequent intervals as recommended.
4. Establish an infrastructure plan identifying priorities and budgets to guide annual Municipality budgeting processes for the repair and maintenance of bridges and culverts.
5. Continue project development to have "construction ready" (ready for tender) projects to take advantage of funding opportunities.

9.0 Limitations

The structural reviews were carried out to address the intent of applicable provincial Regulations, Guidelines, Policies, Standards, Protocols and Objectives administered by the Province of Ontario. No visual review can eliminate the possibility of obtaining partially imprecise or incomplete information. It can only reduce the possibility to an acceptable level. Professional judgment was exercised in gathering and analyzing the limited information obtained and in the formulation of remedial measures. Like all professional persons/entities rendering advice, we do not act as absolute insurers of the condition of the structures, but we commit ourselves to care and competence in reviewing the information and reaching those conclusions based on the limited data and information available.

Our undertaking at TSI Inc., therefore, is to perform our work within limits prescribed by our clients, with the usual thoroughness and competence of the engineering profession. It is intended that the outcome of the structural reviews is to assist in reducing the client's risk associated with structural impairment. No other warranty or representation, either expressed or implied, is included or intended in this report.

This report was prepared for the exclusive use of the Town of Gananoque and may not be reproduced in whole or in part, without the prior written consent of TSI Inc., or used or relied upon in whole or in part by other parties for any purposes whatsoever. Any use which a third party makes of this report, or any part thereof, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. TSI Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this report.

10.0 Closure

We trust that this report with its comments and recommendations provides you with sufficient information to develop your municipal structure Capital Plan. However, should you have any questions, please do not hesitate to contact our office.

Respectfully submitted,

TSI Inc.

Parisa Rameshni **Ramin Rameshni, Ph.D., P.Eng.**

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Appendix A: *Structure Inventory*

Structure Inventory																
Structure ID	Structure Name	Structure Location	Latitude	Longitude	Year Built	Structure Type	Type	BCI	No. of Spans	Length (m)	Width (m)	Road Width (m)	Replacement Cost (Structure only)	Current Structure Value	Identified Capital Work Needs	Anticipated Capital Cost
947	Water Street Swing Bridge	Water St (1 lane), sidewalk - south side only	44.325479	-76.159398	1894	Plate Girder - Half Through	Road Bridge	71.7	2	36.80	4.00		$1,550,000.0	$1,111,350.0	None	$0.0
948	King Street Bridge	King St E (2 lanes), sidewalk - both sides	44.327033	-76.164556	1930	Slab on Steel Girder	Road Bridge	70.0	3	51.10	13.20	9.20	$6,400,000.0	$4,480,000.0	None	$0.0
2221	Hudson Bridge	Machar St (1 lane), sidewalk - south side only	44.330728	-76.167581	2019	Acrow Panel Truss	Road Bridge	96.3	1	39.10	5.20	3.80	$2,150,000.0	$2,070,450.0	None	$0.0
951	Gananoque River Pedestrian Bridge (Rail to Trail)	Lion's Trail (old Thousand Islands Railroad)	44.328486	-76.166889	1920	Timber Beam	Pedestrian Bridge	56.4	3	31.60	1.80		$600,000.0	$338,400.0	Major Rehabilitation	$360,000.0
953	Black (Snappers) Bridge	Lion's Trail (old Thousand Islands Railroad)	44.338872	-76.174972	1924	Pony Truss	Pedestrian Bridge	58.8	1	36.00	6.20	1.30	$1,880,000.0	$1,105,440.0	Major Rehabilitation	$530,000.0
950	Confederation Basin Pedestrian Bridge	unnamed pathway over Dam (55 m North of Tanner Street)	44.327860	-76.166260	1979	Slab on Steel Girder	Pedestrian Bridge	79.8	4	41.80	3.65		$1,600,000.0	$1,276,800.0	None	$0.0
13692	Power Canal Pedestrian Bridge	unnamed pathway over Dam (30 m South of Park Street)	44.328115	-76.165825	2015	Slab on Steel Girder	Pedestrian Bridge	62.2	1	9.00	2.10		$250,000.0	$155,500.0	None	$0.0
13693	Riverside Loop Pedestrian Bridge	Riverside Loop Trail	44.337680	-76.175190	2004	Boardwalk	Pedestrian Bridge	72.7	1	5.80	1.22	0.80	$35,000.0	$25,445.0	None	$0.0
14107	Narrows Loop South Pedestrian Bridge	Narrows Loop Trail	44.341475	-76.175270		Boardwalk	Pedestrian Bridge	71.6	1	3.55	1.20	0.90	$20,000.0	$14,320.0	None	$0.0
14108	Stocking Hill Creek Pedestrian Bridge	Roger's Trail	44.340655	-76.164418		Boardwalk	Pedestrian Bridge	70.7	1	18.40	1.25		$70,000.0	$49,490.0	Minor Rehabilitation	$17,500.0
14109	Grasshopper Park Pedestrian Bridge	River Trail	44.330666	-76.153366		Boardwalk	Pedestrian Bridge	71.1	1	6.20	1.20		$35,000.0	$24,885.0	None	$0.0
14110	Arthur Street Pedestrian Bridge	River Trail	44.333300	-76.147055		Boardwalk	Pedestrian Bridge	72.0	10	26.80	1.50		$60,000.0	$43,200.0	None	$0.0
14111	McLean Forest Pedestrian Bridge	River Trail	44.334070	-76.145620		Boardwalk	Pedestrian Bridge	68.0	2	6.60	1.55		$50,000.0	$34,000.0	Minor Rehabilitation	$12,500.0
14112	Herbert I	Roger's Trail	44.339450	-76.160460		Boardwalk	Pedestrian Boardwalk	43.8	1	3.60	0.90		$15,000.0	$6,570.0	Replacement	$18,750.0
14113	Herbert II	Roger's Trail	44.339530	-76.160280		Boardwalk	Pedestrian Boardwalk	75.0	1	2.45	0.80		$20,000.0	$15,000.0	None	$0.0
14114	Herbert III	Roger's Trail	44.339710	-76.160150		Boardwalk	Pedestrian Boardwalk	75.0	1	3.80	0.80		$15,000.0	$11,250.0	None	$0.0
14115	Herbert IV	Roger's Trail	44.341140	-76.158800		Boardwalk	Pedestrian Boardwalk	75.0	1	3.10	0.80		$10,000.0	$7,500.0	None	$0.0
14116	Narrows Loop I (North)	Narrows Loop Trail	44.342910	-76.175850		Boardwalk	Pedestrian Boardwalk	75.0	1	3.40	1.20		$20,000.0	$15,000.0	None	$0.0
14117	Riverside Loop I	Riverside Loop Trail	44.337690	-76.174760		Boardwalk	Pedestrian Boardwalk	75.0	1	5.20	1.20		$25,000.0	$18,750.0	None	$0.0
14118	Riverside Loop II	Riverside Loop Trail	44.337487	-76.174359		Boardwalk	Pedestrian Boardwalk	56.1	1	7.44	1.20		$30,000.0	$16,830.0	Replacement	$37,500.0
14119	Riverside Loop III	Riverside Loop Trail	44.336902	-76.173399		Boardwalk	Pedestrian Boardwalk	69.4	1	5.19	1.20		$25,000.0	$17,350.0	Replacement	$31,250.0
14120	Riverside Loop IV	Riverside Loop Trail	44.336117	-76.172498		Boardwalk	Pedestrian Boardwalk	66.2	1	8.47	1.20		$35,000.0	$23,170.0	Replacement	$43,750.0
14121	Snappers Loop I	Snappers Loop Trail	44.340320	-76.175130		Boardwalk	Pedestrian Boardwalk	64.1	1	1.85	0.70		$15,000.0	$9,615.0	Replacement	$18,750.0
14122	Wilson 1		44.339760	-76.151580		Boardwalk	Pedestrian Boardwalk	75.0	1	2.45	0.60		$15,000.0	$11,250.0	None	$0.0
								Total:					**$14,925,000.0**	**$10,881,565.0**		**$1,070,000.0**

Appendix B: *Anticipated Capital Costs*

Anticipated Capital Costs										
Structure ID	Structure Name	BCI	Rehabilitation/Replacement Cost	Approach Repair/Rehabilitation Costs	Detour Construction Cost	Traffic Control	Engineering Investigations	Design	Contract Administration	Total
14112	Herbert I	43.8	$15,000.0	$0.0	$0.0	$0.0	$0.0	$1,500.0	$2,250.0	$18,750.0
14118	Riverside Loop II	56.1	$30,000.0	$0.0	$0.0	$0.0	$0.0	$3,000.0	$4,500.0	$37,500.0
951	Gananoque River Pedestrian Bridge (Rail to Trail)	56.4	$240,000.0	$0.0	$0.0	$40,000.0	$20,000.0	$24,000.0	$36,000.0	$360,000.0
953	Black (Snappers) Bridge	58.8	$376,000.0	$0.0	$0.0	$40,000.0	$20,000.0	$37,600.0	$56,400.0	$530,000.0
14121	Snappers Loop I	64.1	$15,000.0	$0.0	$0.0	$0.0	$0.0	$1,500.0	$2,250.0	$18,750.0
14120	Riverside Loop IV	66.2	$35,000.0	$0.0	$0.0	$0.0	$0.0	$3,500.0	$5,250.0	$43,750.0
14119	Riverside Loop III	69.1	$25,000.0	$0.0	$0.0	$0.0	$0.0	$2,500.0	$3,750.0	$31,250.0
14111	McLean Forest Pedestrian Bridge	68.0	$10,000.0	$0.0	$0.0	$0.0	$0.0	$1,000.0	$1,500.0	$12,500.0
14108	Stocking Hill Creek Pedestrian Bridge	70.7	$14,000.0	$0.0	$0.0	$0.0	$0.0	$1,400.0	$2,100.0	$17,500.0
		Total:	$760,000.0						Total:	$1,070,000.0

Appendix C: *Capital Work 10-Year Plan*

Capital Work 10-Year Plan (in $1000's)																
Structure ID	Structure Name	BCI	Repair Needs	Recommended Timing		Description	2025 ($000)	2026 ($000)	2027 ($000)	2028 ($000)	2029 ($000)	2030 ($000)	2031 ($000)	2032 ($000)	2033 ($000)	2034 ($000)	10-Year Plan ($000)
				1 to 5 Years	6 to 10 Years												
14112	Herbert I	43.8	Replacement	✓		Design	$1.500										**$18.750**
						Construction & CA		$17.250									
14118	Riverside Loop II	56.1	Replacement	✓		Design			$3.000								**$37.500**
						Construction & CA				$34.500							
951	Gananoque River Pedestrian Bridge (Rail to Trail)	56.4	Major Rehabilitation	✓		Design	$44.000										**$360.000**
						Construction & CA		$316.000									
953	Black (Snappers) Bridge	58.8	Major Rehabilitation		✓	Design			$57.600								**$530.000**
						Construction & CA				$472.400							
14121	Snappers Loop I	64.1	Replacement		✓	Design					$1.500						**$18.750**
						Construction & CA						$17.250					
14120	Riverside Loop IV	66.2	Replacement		✓	Design					$3.500						**$43.750**
						Construction & CA						$40.250					
14119	Riverside Loop III	69.4	Replacement		✓	Design					$2.500						**$31.250**
						Construction & CA						$28.750					
14111	McLean Forest Pedestrian Bridge	68.0	Minor Rehabilitation		✓	Design					$1.000						**$12.500**
						Construction & CA						$11.500					
14108	Stocking Hill Creek Pedestrian Bridge	70.7	Minor Rehabilitation		✓	Design					$1.400						**$17.500**
						Construction & CA						$16.100					
						Total:	**$45.500**	**$333.250**	**$60.600**	**$506.900**	**$9.900**	**$113.850**	**$0.000**	**$0.000**	**$0.000**	**$0.000**	**$1,070.000**

Appendix D: *Additional Investigations*

Additional Investigations										
Structure ID	Structure Name	Type	BCI	Length (m)	Width (m)	Road Width (m)	Additional Investigations	Priority		
								Urgent	1 Year	2 Year
951	Gananoque River Pedestrian Bridge (Rail to Trail)	Timber Beam	56.4	31.6	1.8	0.0	Underwater Investigation		$20,000.0	
953	Black (Snappers) Bridge	Pony Truss	58.8	36.0	6.2	1.3	Underwater Investigation		$20,000.0	
13692	Power Canal Pedestrian Bridge	Slab on Steel Girder	62.2	9.0	2.1	0.0	Underwater Investigation		$20,000.0	
							Total Cost:	**$0.0**	**$60,000.0**	**$0.0**

Appendix E*: Maintenance Needs*

Maintenance Needs										
Structure ID	Structure Name	Structure Type	BCI	Length (m)	Width (m)	Road Width (m)	Maintenance Needs	Priority		
								Ongoing	1 Year	2 Year
14108	Stocking Hill Creek Pedestrian Bridge	Boardwalk	70.7	18.4	1.3	0.0	To remove beaver dam and Debris.		$3,000.0	
14109	Grasshopper Park Pedestrian Bridge	Boardwalk	71.1	6.2	1.2	0.0	To remove heavy vegetation.		$2,000.0	
14122	Wilson 1	Boardwalk	75.0	2.5	0.6	0.0	To remove fallen trees.		$1,500.0	
							Total Costs:	**$0.0**	**$6,500.0**	**$0.0**

Appendix F*: Approach Rehabilitation Structures*

Appendix G*: OSIM Reports*