



THE TOWNSHIP OF CALVIN



BRIDGE MANAGEMENT STUDY REPORT (FINAL)

6 BRIDGES

NOVEMBER 2023

Report Submitted By:



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1.0 INTRODUCTION

The Township of Calvin (the Township) has retained HP Engineering to perform inspections and develop a bridge management study for 6 structures owned and maintained by the Township.

Each structure in the Township's inventory was visually inspected using the Ministry of Transportation of Ontario's (MTO) Structure Inspection Manual. HP Engineering has entered the data from the inspections into individual inspection forms. The data for each structure present visual observations, suggested rehabilitation, further required investigation and budget cost information. Refer to the appendices for individual inspection sheets for bridges and culverts.

The following report summarizes the suggested rehabilitation / replacement costs, engineering investigation costs and replacement values for each structure based on benchmark budget costs.

Appendix A presents summary tables for all structures. The structures are listed in numerical order of structure number, and the rehabilitation / replacement costs (determined from benchmark budget costs) for each structure.

2.0 STRUCTURE INSPECTIONS

A total of 6 structures owned and maintained by the Township were visually inspected in accordance with the MTO Structure Inspection Manual. The inspections were performed during the summer of 2022.

For each structure, components were screened for visual signs of deterioration. The components were then given a rating (on the inspection forms) using the MTO extent and severity method, whereby the components are proportioned (in units of m², %, m, etc.) based on their observed conditions (excellent, good, fair, poor). This provides quantitative data as to the extent of the observed deterioration for each component. Explanatory statements accompany each of the components' ratings where deemed applicable by the inspector.

The inspection forms also provide information regarding suggested engineering investigation and repairs and associated budgetary estimates of expected costs. Suggested engineering investigations are subdivided based on time of need. Repairs and associated budgetary estimates are subdivided based on time of need. The basis of selection for budget costs is further discussed in Section 3.0 of this report.

Photographs of each inspected structure are included with the inspection sheets including a minimum of 2 photographs for each structure (approach and elevation). Additional photographs depicting the details of the structure, observed defects or deterioration have also been included.

Individual inspection forms for the structures are included as an attachment where the structures are separated into alphabetical order.

3.0 DETERMINATION OF COSTS

3.1 Repair, Rehabilitation and Replacement

Given the cursory information obtained during the visual inspections and without the benefit of detailed design information, it is impractical to develop detailed cost estimates for each structure. For these reasons, benchmark budget costs were developed for categories of repair, rehabilitation and replacement. Traditionally, benchmark costs do not necessarily provide accurate costs for individual repairs /

replacement, but have proven to provide sufficient 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 metres was used for both bridges and culverts. More accurate costs for each structure would be provided upon further engineering study and design based on exact repair, rehabilitation and replacement needs (including change in geometry). The following benchmark costs have been established for this study following the requirements of the inspection forms.

Bridge and Culvert Replacement Costs

Budget costs for the replacement of bridges are usually based on the deck surface area of individual structures (m²). Therefore, benchmark replacement costs for this study were determined using the following unit costs including approaches, administration and design costs, based on the spans of individual bridges and taking into account approach roadway costs (which do not vary with bridge span). In addition, the varying widths of bridges were taken into account 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	<10 m	\$8,000.00
	≥10 m	\$7,500.00
10-20	<10 m	\$7,500.00
	≥10 m	\$6,500.00
20-30	<10 m	\$6,500.00
	≥10 m	\$5,500.00
>30	<10 m	\$5,500.00
	≥10 m	\$4,500.00

In the case of culverts, the plan area (or deck surface area) used in the calculation was ('length of spans' + 1 m) x ('width of roadway' + 1 m). 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 life span is approximately 50% of 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 type or culvert type.

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 (including administration and design costs).

Bridge Rehabilitation Costs		
Category		% of Replacement Cost
1.	Major Bridge Rehabilitation	50-60
2.	Minor Bridge Rehabilitation	25-50
3.	Major Item Repair	5-25
4.	Minor Item Repair	5 or less

Culvert Repair / Rehabilitation Costs

It is generally not practical to undertake major rehabilitation work to culvert crossings where significant deterioration or deficiencies exist in the metal liner (barrel). 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 access.

Approach Roadway Repair / Rehabilitation Costs

For this study, approaches are considered to be 30m of roadway from the centre 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 (including administration and design costs).

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
1.	Capital Projects (Partial / Complete Paving, Guiderail)	\$40,000.00
2.	Minor Repairs / Maintenance (Crack Sealing, Surface Sealing, Guiderail Repairs)	\$14,000.00
3.	Crack Sealing Only	\$7,000.00

Construction Detour Costs

Several alternatives exist to maintain the flow of traffic when a bridge or culvert undergoes major rehabilitation or replacement. These include the 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 most costly 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
1.	Detour - Minor Rehabilitation / Major Rehabilitation of Bridges Less than 10m Long / Culvert Replacement	\$30,000.00
2.	Detour - Major Rehabilitation / Bridge Replacement	\$100,000.00

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
1.	Traffic Control- Minor Rehabilitation	\$30,000.00
2.	Traffic Control - Major Rehabilitation	\$50,000.00

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. Therefore, specific benchmark budget costs for these items were not developed.

Environmental Study Costs

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 Schedule A or A+ Environmental Assessment for Ontario Highways. This type of environmental assessment does not require 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)). 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
1.	Bridge / Culvert Replacement, Minor and Major Rehabilitation	\$9,500.00

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.

Contingency Costs

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

Recommended Replacement Costs

For the purposes of this report, when a structure (bridge or culvert) replacement has been recommended, all associated costs (approaches, detours, traffic control, utilities, right of way, environmental studies and contingency) have been included in the replacement cost provided in the 'Repair and Rehabilitation Required' table on the inspection forms.

3.2 Engineering Investigation

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

Engineering Investigation			
Category		Type of Structure	Cost
1.	Detailed Inspection / Rehabilitation Study - Full Bridge	Truss	\$27,500.00
		Others	\$22,000.00
		Traffic Barrier Only *	\$5,500.00
2.	Detailed Deck Condition Survey	Exposed Deck	\$5,500.00
		Asphalt Paved Deck	\$8,800.00
		Concrete Culvert with Height of Fill Less than 500 mm **	\$5,500.00
3.	Structure Evaluation	Truss	\$16,500.00
		Others	\$11,000.00
4.	Underwater Investigation	All Bridges	\$11,000.00

* Requirements for traffic barriers on bridges and culverts were determined using the Canadian Highway Bridge Design Code, MTO Standards and good engineering 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 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.

4.0 BRIDGE CONDITION INDICES (BCI)

Bridge Condition Index (BCI) values were derived using MTO's standard methods as outlined in their document entitled '*Bridge Condition Index, an Overall Measure of Bridge Condition*' (July 2009). Based on this document, we utilize an excel spreadsheet (developed based on the parameters outlined in the document) that, after inputting the inspection data for each element (condition ratings), automatically calculates the BCI value.

With the calculated BCI values for each structure, an *overall* picture of the general condition of the Municipality's structures inventory as a whole can then be presented by summarizing BCI ranges (good, fair, poor) and counting the overall percentage of structures in each category. This is the methodology that the MTO currently utilizes and it is generally an effective tool to determine where the Township stands in terms of the overall condition and maintenance needs for their structure inventory. This information can be used to compare the overall condition of various structures, to assist in prioritizing structures for future rehabilitation and assist in the funding application process.

The BCI ranges that are normally included in this summary table are as follows:

- Good (BCI Range 70-100); for this range, maintenance is not usually required with the next five years.
- Fair (BCI Range 60-70); for this range, maintenance work is usually required / scheduled within the next five years. Carrying out work within this timeframe (next five years) is typically considered the ideal time to get the most out of bridge spending.
- Poor (BCI Less than 60); for this range, maintenance work is usually required / schedule with the next year.

For the Township's inventory (6 structures total), the current summary of BCI ranges is presented as follows (individual structure BCI values are presented in the tables in *Appendix A*):

<i>BCI Range</i>	<i>Number of Structures in Range</i>	<i>Percent of Structures in Range</i>
70-100	5	83.3
60-70	1	16.7
Less than 60	0	0.0

5.0 ROUTINE MAINTENANCE

As part of the Township's overall bridge management program, a program of routine maintenance should be implemented and up-kept 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 Township'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 Township's inventory:

- 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.
- Concrete spot repairs; this would generally include localized patching of small concrete spalls and delaminations 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.
- 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.
- 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.
- 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.
- Re-grading 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.
- 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.

- 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.).
- 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 3-5 year intervals. Sealing concrete surfaces periodically assists in minimizing the migration of chlorides into the concrete.

6.0 ASSET MANAGEMENT INFORMATION

As previously mentioned, all structures were visited and inspected in conformance with the requirements of the Ontario Structure Inspection Manual (2008 Revision). Based on the results of the inspections, repair / rehabilitation needs and budgetary costs for these were identified. In addition, additional engineering inspections and studies were also recommended.

Although OSIM inspections (generally performed every 2 years) are a useful screening tool to identify upcoming bridge maintenance needs and costs, these inspections solely rely on visual evidence of deterioration and do not take into account the age (life cycles) of individual structures, nor do they take into account the potential for hidden deterioration (which could be revealed with further investigations such as detailed bridge condition surveys, rehabilitation studies, etc.).

In order to provide the Township with a more useful planning tool for structure maintenance, rehabilitation and replacement, all of the information gathered from the OSIM inspections was summarized in an Asset Information Summary table.

Asset Management Summary

This set of tables presents basic asset information for the structures such as structure name, type of structure and basic geometry. The replacement value for each structure (based on current and widened geometry, in the case where the width of the existing structures are deficient) is also provided. These values are presented in 2022 dollars. The BCI calculated for each structure is also provided.

The BCI values were calculated using the method established by the Ministry of Transportation of Ontario. This method takes into account the quantities for poor, fair, good and excellent for each of the elements and determines the cost of the rehabilitation needs. The BCI is determined by dividing the remaining value of the bridge (value of the bridge less cost of the rehabilitation needs) by its initial value (in new condition).

7.0 DISCUSSION

This Bridge Management Asset Study was developed to provide the Township of Calvin with the necessary information required to project budgets and set priorities for future bridge and culvert rehabilitation / replacement programs. The attached inspection sheets should be updated accordingly as repairs and rehabilitations are carried out.

Replacement, rehabilitation and engineering investigation budget costs were provided for 6 of the Township's structure based on visual biennial inspections performed by HP Engineering (during the summer of 2022).

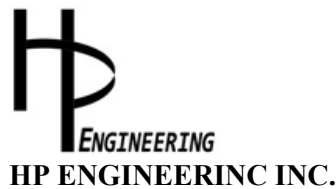
The costs for individual structures are presented on inspection forms and were based on benchmark costs developed for this study. These should be used for budgeting purposes only. More accurate cost estimates for each structure's needs would be provided based on more detailed scopes of work developed during the design engineering stages.

The estimated replacement value of the Township's bridge and culvert inventory (based on 6 structures in the inventory) is approximately **5.8** million dollars. The estimated value of all the bridges and culverts (based on 6 structures in the inventory) if reconstructed to current geometric standards would be approximately **7.5** million dollars.

Immediate repair / rehabilitation costs for the 6 structures inspected are estimated to be a total of approximately **130** thousand dollars. There were no longer term repair / rehabilitation costs (1-5 years or 6-10 years) identified for the 6 structures inspected.

The costs associated with recommended further Engineering Investigations for the 6 structures inspected was estimated to be a total of approximately **40** thousand dollars.

Respectfully Submitted,
November 27, 2023



Tashi Dwivedi, P.Eng.
Principal

APPENDIX A
ASSET MANAGEMENT SUMMARY
(6 STRUCTURES)

Appendix A : Asset Information Summary - Bridges

Site No	Bridge Name	Bridge Type	Year Built (Age)	Year of Last Rehab	Number of Spans	Total Length (Parallel to Roadway) (m)	Width (Perpendicular to roadway) (m)	Roadway Width (m)	Existing Surface Area (m ²)	Replacement Cost Existing Geometry (\$000)	Replacement Cost Current Geometric Standards (\$000)	BCI	Benchmark Budget Costs				Prioritization of Major / Minor Capital Work					
													Rehabilitation Costs (\$000)			Engineering Investigation Costs (\$000)	Prioritize Year of Need Major/Minor Capital Works	Estimated Major / Minor Capital Work Expenditure per Year (\$000)				
													< 1 year	1 5 Years	6 10 Years	Normal		2023	2024	2025	2026	Total (\$000)
B1	Hackenbroke Bridge	Concrete Rigid Frame	2018	-	1	4.60	6.30	5.50	29	232	373	75	0	0	0	0	N/A					0.00
B2	Walley Bridge	Steel Girder	-	-	3	51.80	5.60	4.50	290	1,595	2,587	73	0	0	0	10	N/A					0.00
B3	Crothers Bridge	Steel Girder	1988	-	1	42.50	10.10	8.60	429	1,932	2,199	75	0	0	0	10	N/A					0.00
B4	Stewarts Bridge	Timber Girder	-	-	1	4.90	5.30	4.75	26	208	388	68	82	0	0	5.0	2		86.5			86.50
B5	Pautois Bridge	Steel Girder	2012	-	1	18.48	8.70	7.90	161	1,206	1,297	75	0	0	0	0	N/A					0.00
B6	Crosses Bridge	Concrete Rigid Frame	1983	-	1	8.00	10.00	8.50	80	600	690	70	48	0	0	15	1	63.0				63.00
TOTALS										5,772	7,534		130	0	0	40		63	87	0	0	150

NOTES:
 1. BCI as calculated by HP Engineering.

ATTACHMENT 1

OSIM INSPECTION REPORTS & BCI FORMS

BRIDGES

Structure Condition Summary Form

Structure Name Hackenbroke Bridge
Structure Number B1
Date of Inspection June 04, 2022
Project No. 22035
Consultant HP Engineering Inc.

Element Group	Element Name	Unit (Qty.)	Unit Price (MTO)	Total Element Quantity	Element Qty. in Excellent Condition (1.00)	Element Quantity in Good Condition (0.75)	Element Quantity in Fair Condition (0.4)	Element Quantity in Poor Condition (0)	Total Replacement Value (TRV)	Current Element Value (CEV)	Element Condition Index	Performance Deficiency	Maintenance Need
Abutment	Abutment Walls	Sq.m	900.00	47.00	0.00	47.00	0.00	0.00	42300	31725	75	00	00
Approaches	Wearing Surface	Sq.m	6.00	102.00	0.00	102.00	0.00	0.00	612	459	75	00	00
Barriers	Railing Systems	m	200.00	25.00	0.00	25.00	0.00	0.00	5000	3750	75	00	00
	Deck Top - Thick Slab	Sq.m	350.00	40.50	0.00	40.50	0.00	0.00	14175	10631	75	00	00
Decks	Soffit - Thick Slab	Sq.m	350.00	37.40	0.00	37.40	0.00	0.00	13090	9818	75	00	00
	Wearing Surface	Sq.m	25.00	40.50	0.00	40.50	0.00	0.00	1013	759	75	00	00
Retaining Walls	Walls	Sq.m	350.00	59.50	0.00	59.50	0.00	0.00	20825	15619	75	00	00

97015 72761

Bridge Condition Index (BCI)

75

I_t

0

Importance Factor for Traffic

I_c

0

Importance Factor for Economic Impacts

I_w

0

Importance Factor for Bridge Width

I_p

0

Importance Factor for Bridge Profile or Alignment

Bridge Sufficiency Index (BSI)

75

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B1

INVENTORY DATA:			
Structure Name	<u>Hackenbroke Bridge</u>		
Main Hwy/Road #	<u>Peddlers Drive</u>	Under Structure:	Navigable Water <input type="checkbox"/> Non- Navigable Water <input checked="" type="checkbox"/> Rail <input type="checkbox"/> Road <input type="checkbox"/> Pedestrian <input type="checkbox"/> Other <input type="checkbox"/>
		On Structure:	Rail <input type="checkbox"/> Road <input checked="" type="checkbox"/> Pedestrian <input type="checkbox"/> Other <input type="checkbox"/>
Road Name:	<u>Peddlers Drive</u>		
Structure Location	<u>0.96 km West of Beckett Ln</u>		
Latitude	<u>46° 14' 10" N</u>	Longitude	<u>78° 56' 31" W</u>
Owner(s)	<u>Township of Calvin</u>	Heritage Designation	Not Cons. <input checked="" type="checkbox"/> Cons./Not App. <input type="checkbox"/> List/Not Desig. <input type="checkbox"/> Desig./not List <input type="checkbox"/> Desig. & List <input type="checkbox"/>
		MTO Region	<u>-</u>
MTO District	<u>-</u>	Road Class:	Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local <input checked="" type="checkbox"/> Posted Speed <u>-</u> No. of Lanes <u>1</u>
Old County	<u>-</u>	AADT	<u>-</u> % Trucks <u>-</u>
Geographic Twp.	<u>-</u>	Special Routes	Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle <input type="checkbox"/>
Structure Type	<u>Concrete Rigid Frame</u>		
Total Deck Length	<u>4.6</u> (m)	Detour Length Around Structure	<u>-</u> (km)
Overall Str. Width	<u>6.3</u> (m)	Fill on Structure	<u>-</u> (m)
Total Deck Area	<u>29</u> (m ²)	Skew Angle	<u>-</u> (Degrees)
Roadway Width	<u>5.5</u> (m)	Direction of Structure	<u>East/West</u>
Span Lengths	<u>3.6</u> (m)	No. of Spans	<u>1</u>

HISTORICAL DATA			
Year Built	<u>2018</u>	Last OSIM Inspection	<u>August 06, 2020</u>
Year of Last Major Rehab.	<u>-</u>	Last Enhanced OSIM Inspection	<u>-</u>
Current Load Limit	<u>-</u> (tonnes)	Last Bridge Master Inspection	<u>-</u>
Load Limit By-Law #	<u>-</u>	Last Evaluation	<u>-</u>
By-Law Expiry Date	<u>-</u>	Last Underwater Inspection	<u>-</u>
Min. Vertical Clearance	<u>-</u> (m)	Last Condition Survey	<u>-</u>
Rehabilitation History: (Date / Description)			

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B1

FIELD INSPECTION INFORMATION	
Date of Inspection:	<u>June 04, 2022</u> Type of Inspection: <input checked="" type="checkbox"/> OSIM <input type="checkbox"/> Enhanced OSIM
Inspector:	<u>Tashi Dwivedi, P.Eng., HP Engineering</u>
Others in Party:	<u>Nicholas Brown, HP Engineering</u>
Access Equipment Used:	<u>Measuring Tape, Digital Camera and Hammer</u>
Weather:	<u>Overcast</u>
Temperature:	<u>13 °C</u>

ADDITIONAL INVESTIGATION REQUIRED	Priority			Estimated Cost
	None	Normal	Urgent	
Rehabilitation/Replacement Study:	X			\$ -
Material Condition Survey	X			\$ -
Detailed Deck Condition Survey:	X			\$ -
Non-destructive Delamination Survey of Asphalt- Covered Deck:	X			\$ -
Concrete Substructure Condition Survey:	X			\$ -
Detailed Coating Condition Survey:	X			\$ -
Detailed Timber Investigation:	X			\$ -
Underwater Investigation:	X			\$ -
Fatigue Investigation:	X			\$ -
Seismic Investigation:	X			\$ -
Structure Evaluation:	X			\$ -
Monitoring	X			\$ -
Monitoring of Deformations, Settlement and Movements:	X			\$ -
Monitoring Crack Widths:	X			\$ -
Load Posting – Estimated Load Limit			Total Cost	\$ -
Investigation Notes:				

OVERALL STRUCTURAL NOTES:	
Recommended Work on Structure:	<input checked="" type="checkbox"/> None <input type="checkbox"/> Minor Rehab. <input type="checkbox"/> Major Rehab. <input type="checkbox"/> Replace
Timing of Recommended Work:	<input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years
Overall Comments: Structure is overall in good condition. The southeast, southwest and northeast retaining wall parallel to the stream is leaning towards the stream. A tree was observed obstructing the channel upstream. Light honeycombing noted at northeast corner of exterior deck soffit.	
Date of Next Inspection:	June 2024

Suspected Performance Deficiencies

- | | | |
|---|--|---|
| <ul style="list-style-type: none"> 00 None 01 Load carrying capacity 02 Excessive deformations (deflections & rotation) 03 Continuing settlement 04 Continuing movements 05 Seized bearings | <ul style="list-style-type: none"> 06 Bearing not uniformly loaded/unstable 07 Jammed expansion joint 08 Pedestrian/vehicular hazard 09 Rough riding surface 10 Surface ponding 11 Deck drainage | <ul style="list-style-type: none"> 12 Slippery surfaces 13 Flooding/channel blockage 14 Undermining of foundation 15 Unstable embankments 16 Other |
| Maintenance Needs | | |
| <ul style="list-style-type: none"> 01 Lift and swing bridge maintenance 02 Bridge cleaning 03 Bridge handrail maintenance 04 Painting steel bridge structures 05 Bridge deck joint repair 06 Bridge bearing maintenance | <ul style="list-style-type: none"> 07 Repair of structural steel 08 Repair of bridge concrete 09 Repair of bridge timber 10 Bailey bridges maintenance 11 Animal/pest control 12 Bridge surface repair | <ul style="list-style-type: none"> 13 Erosion control at bridges 14 Concrete sealing 15 Rout and seal 16 Bridge deck drainage 17 Sealing (loose Concrete or ACR Steel) 18 Other |

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B1

ELEMENT DATA					
Element Group:	Approaches		Length:	NE 75.7m, NW 9.5m, SE 13.3m, SW 75.7m	
Element Name:	Barrier		Width:	-	
Location:	NE, NW, SE, & SW of structure		Height:	-	
Material:	-		Count:	4	
Element Type:	-		Total Quantity:	174.2 m	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m	-	174.2	-	-
Comments: Approach barrier is generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Approaches		Length:	6 m	
Element Name:	Wearing Surface		Width:	8.5 m	
Location:	East & West of Structure		Height:	-	
Material:	Gravel / Asphalt		Count:	2	
Element Type:	Gravel / Asphalt Wearing Surface		Total Quantity:	102 m ²	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	102	-	-
Comments: Wearing surface appears to be generally in good condition with some loose gravel at edges.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B1

ELEMENT DATA					
Element Group:	Accessories		Length:	-	
Element Name:	Signs		Width:	-	
Location:	NE, NW, SE & SW of Structure		Height:	-	
Material:	Steel		Count:	6	
Element Type:	Hazard/Narrow Structure Signs		Total Quantity:	6	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	6	-	-
Comments: 4 - hazard signs are generally in good condition. 2 - narrow bridge ahead signs are not required for this structure.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Barriers		Length:	12.5 m	
Element Name:	Railing Systems		Width:	-	
Location:	North & South Sides of Structure		Height:	-	
Material:	Steel		Count:	2	
Element Type:	Steel Thrie Beam Railing		Total Quantity:	25 m	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	25	-	-
Comments: Deck barrier is generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B1

ELEMENT DATA					
Element Group:	Decks		Length:	8.5 m	
Element Name:	Wearing Surface		Width:	4.77 m	
Location:	Top of Deck		Height:	-	
Material:	Asphalt		Count:	1	
Element Type:	Asphalt Wearing Surface		Total Quantity:	40.5 m ²	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	40.5	-	-
Comments: Wearing surface is generally in good condition with some loose gravel noted on the edges of the deck.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Decks		Length:	8.5 m	
Element Name:	Deck Top (Covered)		Width:	4.77 m	
Location:	Top of Deck		Height:	-	
Material:	Concrete		Count:	1	
Element Type:	Thick Slab		Total Quantity:	40.5 m ²	
Environment:	Moderate		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	Gravel Wearing Surface				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	40.5	-	-
Comments: Based on condition of wearing surface and soffit, deck top was determined to be generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B1

ELEMENT DATA					
Element Group:	Decks		Length:	4.3 m	
Element Name:	Soffit – Thick Slab (Exterior)		Width:	1.0 m	
Location:	North & South Underside of Deck		Height:	-	
Material:	Concrete		Count:	2	
Element Type:	Thick Slab		Total Quantity:	8.6 m ²	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	8.6	-	-
Comments: Exterior soffit is generally in good condition with light honeycombing noted at northeast corner.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Decks		Length:	4.3 m	
Element Name:	Soffit – Thick Slab (Interior)		Width:	6.7 m	
Location:	Underside of the Deck		Height:	-	
Material:	Concrete		Count:	1	
Element Type:	Thick Slab		Total Quantity:	28.8 m ²	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	28.8	-	-
Comments: Interior deck soffit is generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B1

ELEMENT DATA					
Element Group:	Abutments		Length:	-	
Element Name:	Abutment Walls		Width:	8.7 m	
Location:	East & West Underside of Structure		Height:	2.7 m	
Material:	Cast-in-Place Concrete		Count:	2	
Element Type:	Reinforced Concrete Wall		Total Quantity:	47.0 m ²	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	47.0	-	-
Comments: Abutment walls are generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Foundations		Length:	-	
Element Name:	Foundation (Below Ground Level)		Width:	-	
Location:	Below Abutment Walls		Height:	-	
Material:	Concrete		Count:	-	
Element Type:	Strip Footing		Total Quantity:	-	
Environment:	Benign		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	N/A	-	-	-	-
Comments: No visible evidence of foundation instability observed at time of inspection.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B1

ELEMENT DATA					
Element Group:	Retaining Walls		Length:	4.8 m	
Element Name:	Walls		Width:	-	
Location:	NE, NW, SE & SW of Structure		Height:	3.1 m	
Material:	Pre-cast Concrete Blocks		Count:	4	
Element Type:	Pre-cast Concrete Block Walls		Total Quantity:	59.5 m ²	
Environment:	Benign		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	59.5	-	-
Comments: Limited inspection due to embankments and slope protection. Walls are generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Retaining Walls		Length:	3.6 m	
Element Name:	Walls		Width:	0.6 m	
Location:	NE, NW, SE & SW of Structure (Parallel to Stream)		Height:	1.8 m	
Material:	Pre-cast Concrete Blocks		Count:	4	
Element Type:	Pre-cast Concrete Block Walls		Total Quantity:	26 m ²	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	16	10	-
Comments: Southwest, southeast and northeast retaining wall is leaning towards stream, all walls are generally in good condition. Some undermining and flowing water noted at southeast wall.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B1

ELEMENT DATA					
Element Group:	Embankments and Streams		Length:	-	
Element Name:	Embankments		Width:	-	
Location:	NE, NW, SE & SW of Structure		Height:	-	
Material:	Native Soil		Count:	4	
Element Type:	Embankment		Total Quantity:	4	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	4	-	-
Comments: Embankments are steeply sloped and covered in rock slope protection.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Embankments and Streams		Length:	-	
Element Name:	Slope Protection		Width:	-	
Location:	NE, NW, SE & SW of Structure		Height:	-	
Material:	Rock		Count:	4	
Element Type:	Rock Slope Protection		Total Quantity:	4	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	each	-	4	-	-
Comments: Slope protection is generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B1

ELEMENT DATA					
Element Group:	Embankments and Streams		Length:	-	
Element Name:	Streams and Waterways		Width:	-	
Location:	Below Structure		Height:	-	
Material:	Native		Count:	-	
Element Type:	Streams		Total Quantity:	All	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	All	-	-	All	-
Comments: Low volume, low flow from south to north. Tree encroachment exists in channel on upstream.					
Performance Deficiencies: 00			Maintenance Needs: 18 - Remove Trees		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B1

REPAIR AND REHABILITATION REQUIRED		Priority			Estimated Cost
Element	Repair and Rehabilitation Required	6 - 10 Years	1 - 5 Years	< 1 year	
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
Total Cost					\$

ASSOCIATED WORK	Comments	Estimated Cost
Approaches		
Detours		
Traffic Control		
Utilities		
Right of Way		
Environmental Study		
Other		
Contingencies		
Total Cost		

JUSTIFICATION

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B1



Photo 1 Structure from east approach



Photo 2 Structure from west approach

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B1



Photo 3 East approach from centre of structure

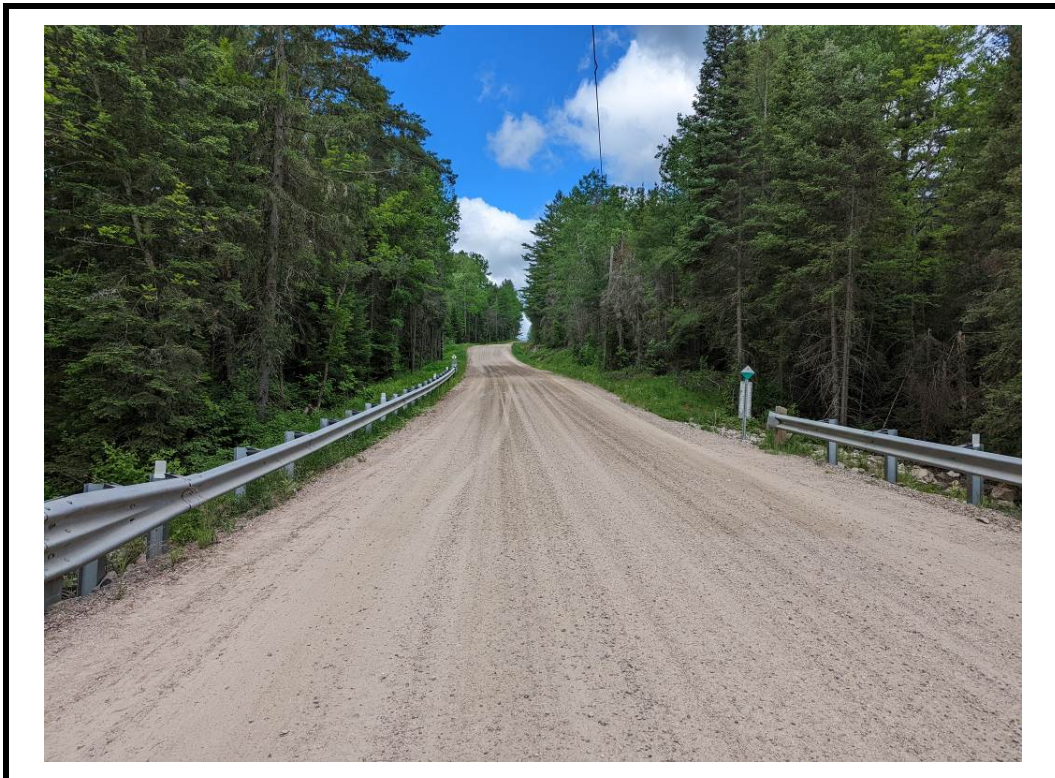


Photo 4 West approach from centre of structure

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B1



Photo 5 North elevation



Photo 6 South elevation

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B1



Photo 7 Northeast approach end treatment



Photo 8 Tire rutting noted on east approach wearing surface

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B1



Photo 9 Culvert barrel soffit



Photo 10 Light honeycombing noted on exterior deck soffit at northeast corner

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B1



Photo 11 Some undermining and water flowing at southeast wall



Photo 12 East abutment wall

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B1



Photo 13 West abutment wall



Photo 14 Some loose gravel noted at the edge of deck

Structure Condition Summary Form

Structure Name Walley Bridge
Structure Number B2
Date of Inspection June 04, 2022
Project No. 22035
Consultant HP Engineering Inc.

Element Group	Element Name	Unit (Qty.)	Unit Price (MTO)	Total Element Quantity	Element Qty. in Excellent Condition (1.00)	Element Quantity in Good Condition (0.75)	Element Quantity in Fair Condition (0.4)	Element Quantity in Poor Condition (0)	Total Replacement Value (TRV)	Current Element Value (CEV)	Element Condition Index	Performance Deficiency	Maintenance Need
Abutment	Abutment Walls	Sq.m	900.00	5.60	0.00	5.60	0.00	0.00	5040	3780	75	00	00
	Ballast Walls	Sq.m	350.00	8.40	0.00	8.30	0.10	0.00	2940	2193	75	00	00
	Bearings	Each	1000.00	8.00	0.00	0.00	8.00	0.00	8000	3200	40	00	00
	Wingwalls	Sq.m	350.00	7.10	0.00	7.10	0.00	0.00	2485	1864	75	00	00
Approaches	Wearing Surface	Sq.m	6.00	63.00	0.00	56.00	7.00	0.00	378	269	71	00	00
Barriers	Posts (Steel/Concrete)	Each	200.00	56.00	0.00	56.00	0.00	0.00	11200	8400	75	00	00
	Railing Systems	m	200.00	104.00	0.00	104.00	0.00	0.00	20800	15600	75	00	00
Beams / Main	Girders -Steel	Sq.m	420.00	579.20	0.00	578.20	1.00	0.00	243264	182301	75	00	00
Decks	Deck Top - Thin Slab	Sq.m	120.00	234.00	0.00	227.50	5.50	1.00	28080	20739	74	00	08
	Soffit - Thin Slab	Sq.m	120.00	325.90	0.00	319.90	4.00	2.00	39108	28983	74	00	08
Joints	Armouring / Retaining Devices	m	1.00	11.20	0.00	4.20	7.00	0.00	11	6	53	00	00
	Bearings	Each	1000.00	16.00	0.00	0.00	16.00	0.00	16000	6400	40	00	00
Piers	Caps	Sq.m	900.00	79.90	0.00	78.40	1.00	0.50	71910	53280	74	00	00
	Shafts/ Columns/ Pier Bents	Sq.m	900.00	2.00	0.00	2.00	0.00	0.00	1800	1350	75	00	00
Sidewalks/ Curbs	Curbs	Sq.m	40.00	84.40	0.00	71.50	11.90	1.00	3376	2335	69	00	08

454392 330700

Bridge Condition Index (BCI) 73

- I_t 0 Importance Factor for Traffic
- I_c 0 Importance Factor for Economic Impacts
- I_w 0 Importance Factor for Bridge Width
- I_p 0 Importance Factor for Bridge Profile or Alignment

Bridge Sufficiency Index (BSI) 73

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B2

INVENTORY DATA:			
Structure Name	<u>Walley Bridge</u>		
Main Hwy/Road #	<u>Peddlers Drive</u>	Under Structure:	Navigable Water <input type="checkbox"/> Non- Navigable Water <input checked="" type="checkbox"/> Rail <input type="checkbox"/> Road <input type="checkbox"/> Pedestrian <input type="checkbox"/> Other <input type="checkbox"/>
		On Structure:	Rail <input type="checkbox"/> Road <input checked="" type="checkbox"/> Pedestrian <input type="checkbox"/> Other <input type="checkbox"/>
Road Name:	<u>Peddlers Drive</u>		
Structure Location	<u>1.65 km West of Graham Road</u>		
Latitude	<u>46° 14' 33" N</u>	Longitude	<u>78° 55' 07" W</u>
Owner(s)	<u>Township of Calvin</u>	Heritage Designation	Not Cons. <input checked="" type="checkbox"/> Cons./Not App. <input type="checkbox"/> List/Not Desig. <input type="checkbox"/> Desig./not List <input type="checkbox"/> Desig. & List <input type="checkbox"/>
		Road Class:	Freeway <input type="checkbox"/> Arterial <input checked="" type="checkbox"/> Collector <input type="checkbox"/> Local <input type="checkbox"/>
MTO Region	<u>-</u>	Posted Speed	<u>-</u> No. of Lanes <u>1</u>
MTO District	<u>-</u>	AADT	<u>-</u> % Trucks <u>-</u>
Old County	<u>-</u>	Special Routes	Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle <input type="checkbox"/>
Geographic Twp.	<u>-</u>	Structure Type	<u>Concrete Slab on Steel I-Girders</u>
		Detour Length Around Structure	<u>-</u> (km)
Total Deck Length	<u>51.8</u> (m)	Fill on Structure	<u>-</u> (m)
Overall Str. Width	<u>5.6</u> (m)	Skew Angle	<u>-</u> (Degrees)
Total Deck Area	<u>290.1</u> (m ²)	Direction of Structure	<u>East/West</u>
Roadway Width	<u>4.5</u> (m)	No. of Spans	<u>3</u>
Span Lengths	<u>13.1, 26, 12.7</u> (m)		

HISTORICAL DATA			
Year Built	<u>-</u>	Last OSIM Inspection	<u>August 06, 2020</u>
Year of Last Major Rehab.	<u>-</u>	Last Enhanced OSIM Inspection	<u>-</u>
Current Load Limit	<u>-</u> (tonnes)	Last Bridge Master Inspection	<u>-</u>
Load Limit By-Law #	<u>-</u>	Last Evaluation	<u>-</u>
By-Law Expiry Date	<u>-</u>	Last Underwater Inspection	<u>-</u>
Min. Vertical Clearance	<u>-</u> (m)	Last Condition Survey	<u>-</u>
Rehabilitation History: (Date / Description)			

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B2

FIELD INSPECTION INFORMATION	
Date of Inspection: <u>June 04, 2022</u>	Type of Inspection: <input checked="" type="checkbox"/> OSIM <input type="checkbox"/> Enhanced OSIM
Inspector: <u>Tashi Dwivedi, P.Eng., HP Engineering</u>	
Others in Party: <u>Nicholas Brown, HP Engineering</u>	
Access Equipment Used: <u>Measuring Tape, Digital Camera and Hammer</u>	
Weather: <u>Sunny</u>	
Temperature: <u>26 °C</u>	

ADDITIONAL INVESTIGATION REQUIRED	Priority			Estimated Cost
	None	Normal	Urgent	
Rehabilitation/Replacement Study:	X			\$ -
Material Condition Survey	X			\$ -
Detailed Deck Condition Survey:		X		\$ 10,000.00
Non-destructive Delamination Survey of Asphalt- Covered Deck:	X			\$ -
Concrete Substructure Condition Survey:	X			\$ -
Detailed Coating Condition Survey:	X			\$ -
Detailed Timber Investigation:	X			\$ -
Underwater Investigation:	X			\$ -
Fatigue Investigation:	X			\$ -
Seismic Investigation:	X			\$ -
Structure Evaluation:	X			\$ -
Monitoring	X			\$ -
Monitoring of Deformations, Settlement and Movements:	X			\$ -
Monitoring Crack Widths:	X			\$ -
Load Posting – Estimated Load Limit			Total Cost	\$ 10,000.00

Investigation Notes:
 A deck condition survey is recommended due to the assumed age of the structure and the available rehabilitation history.

OVERALL STRUCTURAL NOTES:	
Recommended Work on Structure:	<input type="checkbox"/> None <input checked="" type="checkbox"/> Minor Rehab. <input type="checkbox"/> Major Rehab. <input type="checkbox"/> Replace
Timing of Recommended Work:	<input checked="" type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years
Overall Comments: Approach barrier and deck barrier have been replaced since previous inspection (design by others). Seals at piers exhibit hairline cracks, bulging and severe damage at curb edges due to snowplows with sections missing at northside. A few abutment and pier bearings appear to be bulging. Spall with exposed reinforcement noted at northeast end of curb. Spall with exposed corroded reinforcement and horizontal and vertical medium to wide cracks noted at south of west pier cap. Medium to wide horizontal crack at east pier and at south end.	
Date of Next Inspection:	June 2024

Suspected Performance Deficiencies

- | | | |
|--|--|-------------------------------|
| 00 None | 06 Bearing not uniformly loaded/unstable | 12 Slippery surfaces |
| 01 Load carrying capacity | 07 Jammed expansion joint | 13 Flooding/channel blockage |
| 02 Excessive deformations (deflections & rotation) | 08 Pedestrian/vehicular hazard | 14 Undermining of foundation |
| 03 Continuing settlement | 09 Rough riding surface | 15 Unstable embankments |
| 04 Continuing movements | 10 Surface ponding | 16 Other |
| 05 Seized bearings | 11 Deck drainage | |
| Maintenance Needs | | |
| 01 Lift and swing bridge maintenance | 07 Repair of structural steel | 13 Erosion control at bridges |
| 02 Bridge cleaning | 08 Repair of bridge concrete | 14 Concrete sealing |
| 03 Bridge handrail maintenance | 09 Repair of bridge timber | 15 Rout and seal |
| 04 Painting steel bridge structures | 10 Bailey bridges maintenance | 16 Bridge deck drainage |

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

- 05 Bridge deck joint repair
- 06 Bridge bearing maintenance

- 11 Animal/pest control
- 12 Bridge surface repair

- 17 Sealing (loose Concrete or ACR Steel)
- 18 Other

Site No.: B2

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B2

ELEMENT DATA					
Element Group:	Approaches		Length:	14m (NW), 29m (SW), 31m (NE), 29m (SE)	
Element Name:	Barrier		Width:	-	
Location:	East & West of Structure		Height:	-	
Material:	Steel		Count:	4	
Element Type:	Steel Flex Beam on Wood Posts		Total Quantity:	130 m	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m	-	103	-	-
Comments: Approach barrier and end treatment has been replaced since previous inspection and is generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Approaches		Length:	6 m	
Element Name:	Wearing Surface		Width:	5.25 m	
Location:	East & West Approaches		Height:	-	
Material:	Asphalt		Count:	2	
Element Type:	Asphalt Wearing Surface		Total Quantity:	63 m ²	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	56	7	-
Comments: Moderate ravelling observed throughout the approach. Asphalt polishing noted at the time of inspection.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B2

ELEMENT DATA					
Element Group:	Accessories		Length:	-	
Element Name:	Signs		Width:	-	
Location:	NE, NW, SE & SW of Structure		Height:	-	
Material:	Steel		Count:	6	
Element Type:	Hazard and One Lane Signs		Total Quantity:	6	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	Hot Dip Galvanizing				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	6	-	-
Comments: Signs are generally in good condition. Northeast hazard sign has a bent corner.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Barriers		Length:	52 m	
Element Name:	Railing Systems		Width:	-	
Location:	North & South Sides of Structure		Height:	-	
Material:	Steel		Count:	2	
Element Type:	Steel Flex Beam		Total Quantity:	104 m	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m	-	104	-	-
Comments: Deck barrier has been replaced since previous inspection and appears to be generally in good condition. Adequacy of deck barrier configuration (thrie beam railing face mounted on exterior of existing raised concrete curb) not reviewed by HP Engineering.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B2

ELEMENT DATA					
Element Group:	Barriers		Length:	-	
Element Name:	Posts		Width:	-	
Location:	North & South Sides of Structure		Height:	-	
Material:	Steel		Count:	56	
Element Type:	HSS Steel Posts		Total Quantity:	56	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	56	-	-
Comments: Barrier posts are generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Joints		Length:	5.6 m	
Element Name:	Armouring / Retaining Devices		Width:	-	
Location:	East & West Ends of Structure		Height:	-	
Material:	Steel		Count:	2	
Element Type:	Armouring / Retaining Devices		Total Quantity:	11.2 m	
Environment:	Severe		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m	-	4.2	7	-
Comments: Joints have been paved over at the ends of deck. Visible sections appear to be in generally good condition with some bulging noted.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B2

ELEMENT DATA					
Element Group:	Joints		Length:	5.6 m	
Element Name:	Seals / Sealants		Width:	-	
Location:	East & West Ends of Structure & At Piers		Height:	-	
Material:	Neoprene / Rubber		Count:	2	
Element Type:	Strip Seal		Total Quantity:	11.2	
Environment:	Severe		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	5.6	5.6	-
Comments: Mostly paved over at abutment with no evidence of leakage at north and south expansion seals. Seals at piers exhibit hairline cracks, bulging and severe damage at curb edges due to snow plow with sections missing at northside.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Sidewalks / Curbs		Length:	52.1 m	
Element Name:	Curbs		Width:	0.56 m	
Location:	North & South Sides of Structure		Height:	0.25 m	
Material:	Concrete		Count:	2	
Element Type:	Concrete Curb		Total Quantity:	84.4 m ²	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	71.5	11.9	1.0
Comments: Top surface of curb is generally in good condition with narrow cracks and small spalls at ends. Moderate scaling and abrasions from snow removal equipment noted at lower half of the curb face throughout. Spall with exposed reinforcement noted at northeast end of curb.					
Performance Deficiencies: 00			Maintenance Needs: 08 – Repair of Bridge Concrete		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B2

ELEMENT DATA					
Element Group:	Decks		Length:	-	
Element Name:	Drainage System		Width:	-	
Location:	North & South of Deck		Height:	-	
Material:	Steel		Count:	4	
Element Type:	Round Pipe Deck Drains		Total Quantity:	4	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	4	-	-
Comments: Generally in good condition with minor corrosion observed.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Decks		Length:	52 m	
Element Name:	Deck Top		Width:	4.5 m	
Location:	Top of Deck		Height:	-	
Material:	Concrete		Count:	1	
Element Type:	Thin Slab		Total Quantity:	234 m ²	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	227.5	5.5	1
Comments: Exposed deck top is generally in good condition with light scaling and minor abrasion throughout and is partially covered in asphalt at the ends of deck. Few small spalls at east end along north curb. Few patched spalls near west end along south curb and few small, exposed spalls noted.					
Performance Deficiencies: 00			Maintenance Needs: 08 – Repair of Bridge Concrete		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input checked="" type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B2

ELEMENT DATA					
Element Group:	Decks		Length:	2 m	
Element Name:	Soffit – Thin Slab (End)		Width:	5.6 m	
Location:	Underside of Deck		Height:	-	
Material:	Concrete		Count:	6	
Element Type:	Thin Slab		Total Quantity:	67.2 m ²	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	67.2	-	-
Comments: Generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Decks		Length:	39.8 m	
Element Name:	Soffit – Thin Slab (Exterior)		Width:	1 m	
Location:	Underside of Deck		Height:	-	
Material:	Concrete		Count:	2	
Element Type:	Thin Slab		Total Quantity:	79.6 m ²	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	73.6	4	2
Comments: Generally in good condition with light spalls along drip groove, narrow cracks and damp stains noted.					
Performance Deficiencies: 00			Maintenance Needs: 08 – Repair of Bridge Concrete		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input checked="" type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B2

ELEMENT DATA					
Element Group:	Decks		Length:	39.8 m	
Element Name:	Soffit – Thin Slab (Interior)		Width:	4.5 m	
Location:	Underside of Deck		Height:	-	
Material:	Concrete		Count:	1	
Element Type:	Thin Slab		Total Quantity:	179.1 m ²	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	179.1	-	-
Comments: Generally in good condition with narrow cracks.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Beams / MLEs		Length:	2 m	
Element Name:	Girders (End Spans – End)		Width:	0.23 m	
Location:	Underside of Structure		Height:	0.6 m	
Material:	Steel		Count:	16	
Element Type:	Steel I-Girders		Total Quantity:	60.5 m ²	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	59.5	1	-
Comments: Generally in good condition with localized light corrosion and some corrosion jacking at bearings.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B2

ELEMENT DATA					
Element Group:	Beams / MLEs		Length:	17.8 m	
Element Name:	Girders (End Spans – Middle)		Width:	0.23 m	
Location:	Underside of Structure		Height:	0.6 m	
Material:	Steel		Count:	8	
Element Type:	Steel I-Girders		Total Quantity:	269.1 m ²	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	269.1	-	-
Comments: Generally in good condition with light localized corrosion.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Beams / MLEs		Length:	2 m	
Element Name:	Girders (Middle Span – End)		Width:	0.3 m	
Location:	Underside of Deck		Height:	0.75 m	
Material:	Steel		Count:	8	
Element Type:	Steel I-Girders		Total Quantity:	38.4 m ²	
Environment:	Moderate		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	38.4	-	-
Comments: Visible portions are generally in good condition with light localized corrosion noted. Rating based on condition only.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B2

ELEMENT DATA					
Element Group:	Beams / MLEs		Length:	22 m	
Element Name:	Girders (Middle Span – Middle)		Width:	0.3 m	
Location:	Underside of Deck		Height:	0.75 m	
Material:	Steel		Count:	4	
Element Type:	Steel I-Girders		Total Quantity:	211.2 m ²	
Environment:	Benign		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	211.2	-	-
Comments: Generally in good condition with light localized corrosion observed.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Beams / MLEs		Length:	-	
Element Name:	Diaphragms (End Spans – End)		Width:	-	
Location:	East & West Underside of Structure		Height:	-	
Material:	Steel		Count:	12	
Element Type:	Steel I-Beam Diaphragms		Total Quantity:	12	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	12	-	-
Comments: Generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B2

ELEMENT DATA					
Element Group:	Beams / MLEs		Length:	-	
Element Name:	Diaphragms (End Spans – Middle)		Width:	-	
Location:	East & West Underside of Structure		Height:	-	
Material:	Steel		Count:	6	
Element Type:	Steel I-Beam Diaphragms		Total Quantity:	6	
Environment:	Benign		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	6	-	-
Comments: Generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Beams / MLEs		Length:	-	
Element Name:	Diaphragms (Middle Span – End)		Width:	-	
Location:	Underside of Structure		Height:	-	
Material:	Steel		Count:	6	
Element Type:	Steel I-Beam Diaphragms		Total Quantity:	6	
Environment:	Moderate		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	6	-	-
Comments: Generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B2

ELEMENT DATA					
Element Group:	Beams / MLEs		Length:	-	
Element Name:	Diaphragms (Middle Span – Middle)		Width:	-	
Location:	Underside of Structure		Height:	-	
Material:	Steel		Count:	9	
Element Type:	Steel I-Beam Diaphragms		Total Quantity:	9	
Environment:	Moderate		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	9	-	-
Comments: Generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Abutments		Length:	2.1 m	
Element Name:	Wingwalls		Width:	-	
Location:	NE, NW, SE & SW of Structure		Height:	0.85 m	
Material:	Concrete		Count:	4	
Element Type:	Reinforced Concrete Wingwall		Total Quantity:	7.1 m ²	
Environment:	Benign		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	7.1	-	-
Comments: Limited inspection, wingwalls at west side are mostly buried. Generally in good condition					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B2

ELEMENT DATA					
Element Group:	Abutments		Length:	-	
Element Name:	Ballast Walls		Width:	5.62 m	
Location:	East & West Underside of Structure		Height:	0.75 m	
Material:	Concrete		Count:	2	
Element Type:	Reinforced Concrete Wall		Total Quantity:	8.4 m ²	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	8.3	0.1	-
Comments: Generally in good condition with honeycombing noted at West ballast wall. Could not confirm the local evidence of leakage at east and west ballast walls.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Abutments		Length:	-	
Element Name:	Bearings		Width:	-	
Location:	On Abutment Walls		Height:	-	
Material:	Neoprene / Rubber / Steel		Count:	8	
Element Type:	Elastomeric Bearing / Steel Plate		Total Quantity:	8	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	-	8	-
Comments: Abutment bearings are compressed and bulging. Light to localized moderate corrosion / corrosion scale noted at bearings.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B2

ELEMENT DATA					
Element Group:	Abutments		Length:	-	
Element Name:	Abutment Walls		Width:	5.62 m	
Location:	East & West Underside of Structure		Height:	0.5 m	
Material:	Concrete		Count:	2	
Element Type:	Reinforced Concrete Abutment		Total Quantity:	5.6 m ²	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	5.6	-	-
Comments: Generally in good condition. Water stains noted at east and west abutment walls. Light map cracks noted at east abutment wall.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Piers		Length:	-	
Element Name:	Bearings		Width:	-	
Location:	On Piers Caps		Height:	-	
Material:	Neoprene / Rubber / Steel		Count:	16	
Element Type:	Elastomeric Bearing / Steel Plate		Total Quantity:	16	
Environment:	Moderate		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	-	16	-
Comments: Limited inspection due to height. Neoprene component of pier bearings appear to be compressed. Some corrosion scaling noted on base plates.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B2

ELEMENT DATA					
Element Group:	Piers	Length:	8.12 m		
Element Name:	Caps	Width:	1 m		
Location:	On Piers	Height:	1.3 m		
Material:	Concrete	Count:	2		
Element Type:	Rectangular Pier Caps	Total Quantity:	79.9 m ²		
Environment:	Moderate	Limited Inspection:	<input type="checkbox"/>		
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	78.4	1	0.5
Comments: Generally in good condition with narrow cracks, some light rust and water stains. Spall with exposed corroded reinforcement and horizontal and vertical medium to wide cracks noted at south of west pier cap. Medium to wide horizontal crack at east pier and at south end.					
Performance Deficiencies: 00			Maintenance Needs: 08 – Repair of Bridge Concrete		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input checked="" type="checkbox"/> 2 Years		

Element Group:	Piers	Length:	-		
Element Name:	Shafts/Columns/Pile Bents	Width:	-		
Location:	Underside of Structure	Height:	-		
Material:	Steel	Count:	2		
Element Type:	Pier Column	Total Quantity:	2		
Environment:	Benign	Limited Inspection:	<input checked="" type="checkbox"/>		
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	2	-	-
Comments: Steel piles covered in timber crib (piles are inaccessible). Timber sheathing and steel nosing are generally in good condition. Exact number of piles could not be verified due to presence of sheathing. Timber on west pier appears to be coming off. Some separation and weathering of timber crib noted throughout.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B2

ELEMENT DATA					
Element Group:	Foundations		Length:	-	
Element Name:	Foundation (Below Ground Level)		Width:	-	
Location:	Below Abutment Walls & Piers		Height:	-	
Material:	Concrete		Count:	-	
Element Type:	Strip Footing		Total Quantity:	-	
Environment:	Benign		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	N/A	-	-	-	-
Comments: No visible evidence of foundation instability noted at the time of inspection.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Embankments and Streams		Length:	-	
Element Name:	Embankments		Width:	-	
Location:	NE, NW N, S, SE, & SW of Structure		Height:	-	
Material:	Native Soil		Count:	6	
Element Type:	Embankment		Total Quantity:	6	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	6	-	-
Comments: Embankments are well vegetated with some large random rocks and rock protection in front of abutment walls. Old bridge abutments to north of current bridge.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B2

ELEMENT DATA					
Element Group:	Embankments and Streams		Length:	-	
Element Name:	Slope Protection		Width:	-	
Location:	East and West Underside of Structure		Height:	-	
Material:	Rock		Count:	2	
Element Type:	Slope Protection		Total Quantity:	2	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	2	-	-
Comments: Large rocks placed along the embankments directly in front of both the East and West abutments. Generally in fair condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Embankments and Streams		Length:	-	
Element Name:	Streams and Waterways		Width:	-	
Location:	Below Structure		Height:	-	
Material:	Native		Count:	-	
Element Type:	Streams		Total Quantity:	All	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	All	-	All	-	-
Comments: Water flows from south to north with moderate volume and flow; there are no visible flow obstructions.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B2

REPAIR AND REHABILITATION REQUIRED		Priority			Estimated Cost
Element	Repair and Rehabilitation Required	6 - 10 Years	1 - 5 Years	< 1 year	
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
Total Cost					\$ -

ASSOCIATED WORK	Comments	Estimated Cost
Approaches		\$ -
Detours		\$ -
Traffic Control		\$ -
Utilities		\$ -
Right of Way		\$ -
Environmental Study		\$ -
Other		\$ -
Contingencies		\$ -
Total Cost		\$ -

JUSTIFICATION

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B2



Photo 1 Structure from east approach



Photo 2 Structure from west approach

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B2



Photo 3 East approach from centre of structure



Photo 4 West approach from centre of structure

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B2



Photo 5 North elevation



Photo 6 South elevation

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B2



Photo 7 Typical approach barrier at northwest corner



Photo 8 Small Spall with exposed corroded reinforcement noted on curb at northwest corner

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B2



Photo 9 Scaling and abrasions noted on south curb



Photo 10 Spall with exposed corroded reinforcement noted on west pier cap

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B2



Photo 11 Middle span underside



Photo 12 Bulging abutment bearing and corrosion on bearing plate at southwest corner

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B2



Photo 13 East pier and pier cap



Photo 14 West pier and pier cap

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B2



Photo 15 East abutment wall



Photo 16 Light honeycombing noted on west ballast wall

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B2



Photo 17 Light scaling and minor abrasion noted throughout exposed deck top



Photo 18 Some separation and weathering of timber crib noted throughout pier shaft

Structure Condition Summary Form

Structure Name Crothers Bridge
Structure Number B3
Date of Inspection June 04, 2022
Project No. 22035
Consultant HP Engineering Inc.

Element Group	Element Name	Unit (Qty.)	Unit Price (MTO)	Total Element Quantity	Element Qty. in Excellent Condition (1.00)	Element Quantity in Good Condition (0.75)	Element Quantity in Fair Condition (0.4)	Element Quantity in Poor Condition (0)	Total Replacement Value (TRV)	Current Element Value (CEV)	Element Condition Index	Performance Deficiency	Maintenance Need
Abutment	Abutment Walls	Sq.m	900.00	49.90	0.00	45.90	4.00	0.00	44910	32423	72	00	00
	Ballast Walls	Sq.m	350.00	32.30	0.00	32.30	0.00	0.00	11305	8479	75	00	00
	Bearings	Each	1000.00	12.00	0.00	12.00	0.00	0.00	12000	9000	75	00	00
	Wingwalls	Sq.m	350.00	42.00	0.00	40.00	2.00	0.00	14700	10780	73	00	00
Approaches	Wearing Surface	Sq.m	6.00	103.20	0.00	103.20	0.00	0.00	619	464	75	00	00
Barriers	Posts - Timber	Each	50.00	44.00	0.00	44.00	0.00	0.00	2200	1650	75	00	00
	Railing Systems	m	200.00	85.00	0.00	85.00	0.00	0.00	17000	12750	75	00	00
Beams / Main	Girders	Sq.m	200.00	1,281.70	0.00	1,281.70	0.00	0.00	256340	192255	75	00	00
	Deck Top - Thin Slab	Sq.m	120.00	365.50	0.00	365.50	0.00	0.00	43860	32895	75	00	00
Decks	Soffit - Thin Slab	Sq.m	120.00	403.13	0.00	403.13	0.00	0.00	48376	36282	75	00	00
	Wearing Surface	Sq.m	25.00	365.50	0.00	365.50	0.00	0.00	9138	6853	75	00	02
Joints	Armouring / Retaining Devices	m	1.00	40.40	0.00	40.40	0.00	0.00	40	30	75	00	00

460488 343861

Bridge Condition Index (BCI)

75

I_t

0

Importance Factor for Traffic

I_c

0

Importance Factor for Economic Impacts

I_w

0

Importance Factor for Bridge Width

I_p

0

Importance Factor for Bridge Profile or Alignment

Bridge Sufficiency Index (BSI)

75

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B3

INVENTORY DATA:			
Structure Name	<u>Crothers Bridge</u>		
Main Hwy/Road #	<u>Adams Road</u>	Under Structure:	Navigable Water <input type="checkbox"/> Non- Navigable Water <input checked="" type="checkbox"/>
			Rail <input type="checkbox"/> Road <input type="checkbox"/> Pedestrian <input type="checkbox"/> Other <input type="checkbox"/>
Road Name:	<u>Adams Road</u>	On Structure:	Rail <input type="checkbox"/> Road <input checked="" type="checkbox"/> Pedestrian <input type="checkbox"/> Other <input type="checkbox"/>
Structure Location	<u>0.84 km east of Pratt Road</u>		
Latitude	<u>46° 13' 17.7" N</u>	Longitude	<u>78° 55' 18.6" W</u>
Owner(s)	<u>Township of Calvin</u>	Heritage Designation	Not Cons. <input checked="" type="checkbox"/> Cons. /Not App. <input type="checkbox"/> List/Not Desig. <input type="checkbox"/>
			Desig./not List <input type="checkbox"/> Desig. & List <input type="checkbox"/>
MTO Region	<u>-</u>	Road Class:	Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local <input type="checkbox"/>
MTO District	<u>-</u>	Posted Speed	<u>-</u> No. of Lanes <u>2</u>
Old County	<u>-</u>	AADT	<u>-</u> % Trucks <u>-</u>
Geographic Twp.	<u>-</u>	Special Routes	Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle <input type="checkbox"/>
Structure Type	<u>Steel Girder Bridge</u>	Detour Length Around Structure	<u>-</u> (km)
Total Deck Length	<u>42.5</u> (m)	Fill on Structure	<u>-</u> (m)
Overall Str. Width	<u>10.1</u> (m)	Skew Angle	<u>-</u> (Degrees)
Total Deck Area	<u>429.3</u> (m ²)	Direction of Structure	<u>East/West</u>
Roadway Width	<u>8.6</u> (m)	No. of Spans	<u>1</u>
Span Lengths	<u>42.5</u> (m)		

HISTORICAL DATA			
Year Built	<u>1988</u>	Last OSIM Inspection	<u>August 06, 2020</u>
Year of Last Major Rehab.	<u>-</u>	Last Enhanced OSIM Inspection	<u>-</u>
Current Load Limit	<u>-</u> (tonnes)	Last Bridge Master Inspection	<u>-</u>
Load Limit By-Law #	<u>-</u>	Last Evaluation	<u>-</u>
By-Law Expiry Date	<u>-</u>	Last Underwater Inspection	<u>-</u>
Min. Vertical Clearance	<u>-</u> (m)	Last Condition Survey	<u>-</u>
Rehabilitation History: (Date / Description)			

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B3

FIELD INSPECTION INFORMATION	
Date of Inspection:	<u>June 04, 2022</u> Type of Inspection: <input checked="" type="checkbox"/> OSIM <input type="checkbox"/> Enhanced OSIM
Inspector:	<u>Tashi Dwivedi, P.Eng., HP Engineering</u>
Others in Party:	<u>Nicholas Brown, HP Engineering</u>
Access Equipment Used:	<u>Measuring Tape, Digital Camera and Hammer</u>
Weather:	<u>Partly Cloudy</u>
Temperature:	<u>13 °C</u>

ADDITIONAL INVESTIGATION REQUIRED	Priority			Estimated Cost
	None	Normal	Urgent	
Rehabilitation/Replacement Study:	X			\$ -
Material Condition Survey	X			\$ -
Detailed Deck Condition Survey:		X		\$ 10,000.00
Non-destructive Delamination Survey of Asphalt- Covered Deck:	X			\$ -
Concrete Substructure Condition Survey:	X			\$ -
Detailed Coating Condition Survey:	X			\$ -
Detailed Timber Investigation:	X			\$ -
Underwater Investigation:	X			\$ -
Fatigue Investigation:	X			\$ -
Seismic Investigation:	X			\$ -
Structure Evaluation:	X			\$ -
Monitoring	X			\$ -
Monitoring of Deformations, Settlement and Movements:	X			\$ -
Monitoring Crack Widths:	X			\$ -
Load Posting – Estimated Load Limit		Total Cost		\$ 15,000.00
Investigation Notes: Deck condition survey is recommended due to the age of the structure.				

OVERALL STRUCTURAL NOTES:	
Recommended Work on Structure:	<input type="checkbox"/> None <input checked="" type="checkbox"/> Minor Rehab. <input type="checkbox"/> Major Rehab. <input type="checkbox"/> Replace
Timing of Recommended Work:	<input checked="" type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years
Overall Comments: Overall structure is generally in good condition. Approach barrier with end treatments and traffic barrier has been replaced since previous inspection. One missing sign observed on the southeast corner. narrow to medium map cracks observed at northeast and southeast wingwall.	
Date of Next Inspection:	June 2024

Suspected Performance Deficiencies

- | | | |
|--|--|--|
| 00 None | 06 Bearing not uniformly loaded/unstable | 12 Slippery surfaces |
| 01 Load carrying capacity | 07 Jammed expansion joint | 13 Flooding/channel blockage |
| 02 Excessive deformations (deflections & rotation) | 08 Pedestrian/vehicular hazard | 14 Undermining of foundation |
| 03 Continuing settlement | 09 Rough riding surface | 15 Unstable embankments |
| 04 Continuing movements | 10 Surface ponding | 16 Other |
| 05 Seized bearings | 11 Deck drainage | |
| Maintenance Needs | | |
| 01 Lift and swing bridge maintenance | 07 Repair of structural steel | 13 Erosion control at bridges |
| 02 Bridge cleaning | 08 Repair of bridge concrete | 14 Concrete sealing |
| 03 Bridge handrail maintenance | 09 Repair of bridge timber | 15 Rout and seal |
| 04 Painting steel bridge structures | 10 Bailey bridges maintenance | 16 Bridge deck drainage |
| 05 Bridge deck joint repair | 11 Animal/pest control | 17 Sealing (loose Concrete or ACR Steel) |
| 06 Bridge bearing maintenance | 12 Bridge surface repair | 18 Other |

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B3

ELEMENT DATA					
Element Group:	Approaches		Length:	NE 37.5m, NW 33.3m, SE 38.4, SW 33.9m	
Element Name:	Barrier		Width:	-	
Location:	NE, NW, SE & SW of Structure		Height:	-	
Material:	Steel		Count:	4	
Element Type:	Steel Flex Beam on steel Posts		Total Quantity:	144 m	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m	-	144	-	-
Comments: Rail has been replaced since previous inspection and generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Approaches		Length:	6 m	
Element Name:	Wearing Surface		Width:	8.6 m	
Location:	East & West of Structure		Height:	-	
Material:	Gravel / Surface Treatment		Count:	2	
Element Type:	Gravel / Surface Treatment Wearing Surface		Total Quantity:	103.2 m ²	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	103.2	-	-
Comments: Generally in good condition. Loose gravel throughout wearing surface noted.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B3

ELEMENT DATA					
Element Group:	Accessories		Length:	-	
Element Name:	Signs		Width:	-	
Location:	NE, NW, SE & SW of Structure		Height:	-	
Material:	Plastic		Count:	4	
Element Type:	Snow Plow Markers		Total Quantity:	4	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	3	-	1
Comments: One missing sign observed on the southeast corner. Others are generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 18- Install hazard sign		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input checked="" type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Barriers		Length:	42.5 m	
Element Name:	Railing Systems		Width:	-	
Location:	North & South Sides of Structure		Height:	-	
Material:	Steel		Count:	2	
Element Type:	Steel Flex Beam		Total Quantity:	85 m	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m	-	85	-	-
Comments: Railing system has been replaced since previous inspection and generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B3

ELEMENT DATA					
Element Group:	Barriers		Length:	-	
Element Name:	Posts		Width:	-	
Location:	North & South of Structure		Height:	-	
Material:	Steel		Count:	44	
Element Type:	Steel Post		Total Quantity:	44	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	44	-	-
Comments: Barrier has been replaced since previous inspection. Barrier posts are generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Joints		Length:	10.1 m	
Element Name:	Armouring / Retaining Devices		Width:	-	
Location:	East & West Ends of Structure		Height:	-	
Material:	Steel		Count:	4	
Element Type:	Steel Armouring		Total Quantity:	40.4 m	
Environment:	Severe		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m	-	40.4	-	-
Comments: Joint armouring covered by gravel wearing surface at time of inspection. Condition assumed based on previous inspection and condition of exposed ballast wall.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B3

ELEMENT DATA					
Element Group:	Joints		Length:	10.1 m	
Element Name:	Seals / Sealants		Width:	-	
Location:	East & West Ends of Structure		Height:	-	
Material:	Neoprene / Rubber		Count:	2	
Element Type:	Strip Seal		Total Quantity:	2	
Environment:	Severe		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	2	-	-
Comments: Joint seal covered at the time of inspection. Appear generally in good condition with no evidence of leakage.					
Performance Deficiencies: 00			Maintenance Needs: 02 – Bridge Cleaning		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Decks		Length:	42.5 m	
Element Name:	Wearing Surface		Width:	8.6 m	
Location:	Top of Deck		Height:	-	
Material:	Gravel		Count:	1	
Element Type:	Gravel Wearing Surface		Total Quantity:	365.5 m ²	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	365.5	-	-
Comments: Generally in good condition. Dirt buildup observed along edges of deck. Loose gravel noted at the edges of deck.					
Performance Deficiencies: 00			Maintenance Needs: 02 - Bridge Cleaning		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B3

ELEMENT DATA					
Element Group:	Decks		Length:	42.5 m	
Element Name:	Deck Top (Covered)		Width:	8.6 m	
Location:	Top of Deck		Height:	-	
Material:	Concrete		Count:	1	
Element Type:	Thin Slab		Total Quantity:	365.5 m ²	
Environment:	Severe		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	Gravel Wearing Surface				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	365.5	-	-
Comments: Deck top is covered by wearing surface and only exposed at edges of deck. Assumed to be in good condition based on condition of wearing surface and the underside of deck.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Decks		Length:	2 m	
Element Name:	Soffit – Thin Slab (End)		Width:	10.1 m	
Location:	East & West Underside of Deck		Height:	0.25 m	
Material:	Concrete		Count:	-	
Element Type:	Thin Slab		Total Quantity:	20.1 m ²	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	20.1	-	-
Comments: Generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B3

ELEMENT DATA					
Element Group:	Decks		Length:	38.5 m	
Element Name:	Soffit – Thin Slab (Exterior)		Width:	0.4 m	
Location:	North & South Sides of Deck		Height:	0.25 m	
Material:	Concrete		Count:	2	
Element Type:	Thin Slab		Total Quantity:	25.03 m ²	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	25.03	-	-
Comments: Generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Decks		Length:	38.5 m	
Element Name:	Soffit – Thin Slab (Interior)		Width:	9.3 m	
Location:	Underside of Deck		Height:	0.25 m	
Material:	Concrete		Count:	1	
Element Type:	Thin Slab		Total Quantity:	358 m ²	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	358	-	-
Comments: Generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B3

ELEMENT DATA					
Element Group:	Beams / MLEs		Length:	2 m	
Element Name:	Girders (End)		Width:	0.65 m	
Location:	East & West Underside of Structure		Height:	1.46 m	
Material:	Concrete		Count:	12	
Element Type:	Concrete I-Girders		Total Quantity:	116.9 m ²	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	116.9	-	-
Comments: Girder ends are generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Beams / MLEs		Length:	38.5 m	
Element Name:	Girders (Middle)		Width:	0.65 m	
Location:	Underside of Structure		Height:	1.46 m	
Material:	Concrete		Count:	6	
Element Type:	Concrete I-Girders		Total Quantity:	1125 m ²	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	1125	-	-
Comments: Girders are generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B3

ELEMENT DATA					
Element Group:	Beams / MLEs		Length:	1.5 m	
Element Name:	Diaphragms (End)		Width:	0.25 m	
Location:	East & West Underside of Structure		Height:	1.2 m	
Material:	Concrete		Count:	10	
Element Type:	Rectangular Concrete Diaphragms		Total Quantity:	39.8 m ²	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	39.8	-	-
Comments: End diaphragms are generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Beams / MLEs		Length:	1.5 m	
Element Name:	Diaphragms (Intermediate)		Width:	0.25 m	
Location:	Underside of Structure		Height:	1.2 m	
Material:	Concrete		Count:	5	
Element Type:	Rectangular Concrete Diaphragms		Total Quantity:	19.9 m ²	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	19.9	-	-
Comments: Diaphragms are generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B3

ELEMENT DATA					
Element Group:	Abutments		Length:	7 m	
Element Name:	Wingwalls		Width:	-	
Location:	NE, NW, SE & SW of Structure		Height:	1.5 m	
Material:	Concrete		Count:	4	
Element Type:	Reinforced Concrete Wingwall		Total Quantity:	42 m ²	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	40	2	-
Comments: Generally in good condition with narrow to medium map cracks observed at northeast and southeast wingwall.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Abutments		Length:	-	
Element Name:	Ballast Walls		Width:	10.1 m	
Location:	East & West Underside of Structure		Height:	1.6 m	
Material:	Concrete		Count:	2	
Element Type:	Reinforced Concrete Ballast		Total Quantity:	32.3 m ²	
Environment:	Benign		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	32.3	-	-
Comments: Limited inspection due to end diaphragms. Generally in good condition with narrow vertical crack on visible sections of East and West ballast walls.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B3

ELEMENT DATA					
Element Group:	Abutments		Length:	-	
Element Name:	Bearings		Width:	-	
Location:	East & West (On Abutment Walls)		Height:	-	
Material:	Neoprene / Rubber		Count:	12	
Element Type:	Elastomeric Bearing		Total Quantity:	12	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	12	-	-
Comments: Bearings are generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Abutments		Length:	-	
Element Name:	Abutment Walls		Width:	10.1 m	
Location:	East & West Underside of Structure		Height:	2.47 m	
Material:	Concrete		Count:	2	
Element Type:	Reinforced Concrete Abutment		Total Quantity:	49.9 m ²	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	45.9	4	-
Comments: Medium full height narrow vertical crack noted at middle of both abutment walls. Narrow map cracks noted at east abutment wall. Shear key between girders #3 and #4 at each abutment wall.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B3

ELEMENT DATA					
Element Group:	Foundations		Length:	-	
Element Name:	Foundation (Below Ground Level)		Width:	-	
Location:	Below Abutment Walls		Height:	-	
Material:	Concrete		Count:	-	
Element Type:	Strip Footing		Total Quantity:	-	
Environment:	Benign		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	N/A	-	-	-	-
Comments: No visible evidence of foundation instability noted at time of inspection.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Embankments and Streams		Length:	-	
Element Name:	Embankments		Width:	-	
Location:	NE, NW, E, SE, SW & W of Structure		Height:	-	
Material:	Native Soil		Count:	6	
Element Type:	Embankment		Total Quantity:	6	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	Stone used against abutment				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	6	-	-
Comments: NE, NW, SE & SW embankments are well vegetated and appear to be stable. Slope protection present on E and W embankments in front of abutment walls. All embankments are generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B3

ELEMENT DATA					
Element Group:	Embankments and Streams		Length:	-	
Element Name:	Slope Protection		Width:	-	
Location:	East & West Underside of Structure		Height:	-	
Material:	Rock		Count:	2	
Element Type:	Slope Protection		Total Quantity:	2	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	2	-	-
Comments: Rocks used to protect embankments in front of East and West abutments; generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Embankments and Streams		Length:	-	
Element Name:	Streams and Waterways		Width:	-	
Location:	Below Structure		Height:	-	
Material:	Native		Count:	-	
Element Type:	Streams		Total Quantity:	All	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	All	-	All	-	-
Comments: High volume and fast flow from south to north with no visible flow obstructions noted in the stream at the time of inspection.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B3

REPAIR AND REHABILITATION REQUIRED		Priority			Estimated Cost
Element	Repair and Rehabilitation Required	6 - 10 Years	1 - 5 Years	< 1 year	
Total Cost					\$ -

ASSOCIATED WORK	Comments	Estimated Cost
Approaches		
Detours		
Traffic Control		
Utilities		
Right of Way		
Environmental Study		
Other		
Contingencies		
Total Cost		\$ -

JUSTIFICATION

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B3



Photo 1 Structure from east approach



Photo 2 Structure from west approach

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B3



Photo 3 East approach from centre of structure



Photo 4 West approach from centre of structure

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B3



Photo 5 North elevation



Photo 6 South elevation

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B3



Photo 7 Typical approach barrier at southeast corner



Photo 8 Light tire rutting and loose gravel noted throughout approach wearing surface

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B3



Photo 9 Typical deck wearing surface with loose gravel noted throughout



Photo 10 Typical deck barrier at south side of structure

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B3



Photo 11 Underside of Structure



Photo 12 Cracks and stains noted on southeast wingwall

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B3



Photo 13 East abutment wall



Photo 14 West abutment wall

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B3



Photo 15 Typical bearing at east abutment wall



Photo 16 Typical view of diaphragm at west

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B3



Photo 17 Typical view of exterior girder at north side

Structure Condition Summary Form

Structure Name Stewarts Bridge
Structure Number B4
Date of Inspection May 30, 2022
Project No. 22035
Consultant HP Engineering Inc.

Element Group	Element Name	Unit (Qty.)	Unit Price (MTO)	Total Element Quantity	Element Qty. in Excellent Condition (1.00)	Element Quantity in Good Condition (0.75)	Element Quantity in Fair Condition (0.4)	Element Quantity in Poor Condition (0)	Total Replacement Value (TRV)	Current Element Value (CEV)	Element Condition Index	Performance Deficiency	Maintenance Need
Abutment	Abutment Walls	Sq.m	900.00	10.60	0.00	9.50	1.10	0.00	9540	6809	71	00	00
	Ballast Walls	Sq.m	350.00	3.18	0.00	2.83	0.25	0.10	1113	778	70	00	08
	Wingwalls	Sq.m	350.00	6.30	0.00	5.70	0.60	0.00	2205	1580	72	00	13
Approaches	Wearing Surface	Sq.m	6.00	57.00	0.00	0.00	55.00	2.00	342	132	39	09	12
Beams / Main	Girders - Timber	Sq.m	50.00	36.26	0.00	20.00	16.26	0.00	1813	1075	59	00	00
Decks	Deck - Timber	Sq.m	50.00	61.74	0.00	38.44	22.00	1.30	3087	1882	61	00	09 , 02
Sidewalks/ Curbs	Curbs	Sq.m	40.00	3.92	0.00	1.46	1.96	0.50	157	75	48	00	09

18257 12330

Bridge Condition Index (BCI) **68**

- I_t 0 Importance Factor for Traffic
- I_c 0 Importance Factor for Economic Impacts
- I_w 0 Importance Factor for Bridge Width
- I_p 0 Importance Factor for Bridge Profile or Alignment

Bridge Sufficiency Index (BSI) **68**

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B4

INVENTORY DATA:			
Structure Name	<u>Stewarts Bridge</u>		
Main Hwy/Road #	<u>Stewart Road</u>	Under Structure:	Navigable Water <input type="checkbox"/> Non- Navigable Water <input checked="" type="checkbox"/>
			Rail <input type="checkbox"/> Road <input type="checkbox"/> Pedestrian <input type="checkbox"/> Other <input type="checkbox"/>
Road Name:	<u>Stewart Road</u>	On Structure:	Rail <input type="checkbox"/> Road <input checked="" type="checkbox"/> Pedestrian <input type="checkbox"/> Other <input type="checkbox"/>
Structure Location	<u>0.98 km south of Homestead Road</u>		
Latitude	<u>46° 13' 45.5" N</u>	Longitude	<u>78° 51' 8.8" W</u>
Owner(s)	<u>Township of Calvin</u>	Heritage Designation	Not Cons. <input checked="" type="checkbox"/> Cons. /Not App. <input type="checkbox"/> List/Not Desig. <input type="checkbox"/>
			Desig./not List <input type="checkbox"/> Desig. & List <input type="checkbox"/>
MTO Region	<u>-</u>	Road Class:	Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local <input type="checkbox"/>
MTO District	<u>-</u>	Posted Speed	<u>-</u> No. of Lanes <u>1</u>
Old County	<u>-</u>	AADT	<u>-</u> % Trucks <u>-</u>
Geographic Twp.	<u>-</u>	Special Routes	Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle <input type="checkbox"/>
Structure Type	<u>Timber Girder Bridge</u>	Detour Length Around Structure	<u>-</u> (km)
Total Deck Length	<u>4.9</u> (m)	Fill on Structure	<u>-</u> (m)
Overall Str. Width	<u>5.3</u> (m)	Skew Angle	<u>-</u> (Degrees)
Total Deck Area	<u>25.97</u> (m ²)	Direction of Structure	<u>North/South</u>
Roadway Width	<u>4.75</u> (m)	No. of Spans	<u>1</u>
Span Lengths	<u>4.9</u> (m)		

HISTORICAL DATA			
Year Built	<u>-</u>	Last OSIM Inspection	<u>August 06, 2020</u>
Year of Last Major Rehab.	<u>-</u>	Last Enhanced OSIM Inspection	<u>-</u>
Current Load Limit	<u>-</u> (tonnes)	Last Bridge Master Inspection	<u>-</u>
Load Limit By-Law #	<u>-</u>	Last Evaluation	<u>-</u>
By-Law Expiry Date	<u>-</u>	Last Underwater Inspection	<u>-</u>
Min. Vertical Clearance	<u>-</u> (m)	Last Condition Survey	<u>-</u>
Rehabilitation History: (Date / Description)			
Structural evaluation carried out by HP Engineering in 2012.			

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B4

FIELD INSPECTION INFORMATION	
Date of Inspection:	<u>May 30, 2022</u> Type of Inspection: <input checked="" type="checkbox"/> OSIM <input type="checkbox"/> Enhanced OSIM
Inspector:	<u>Tashi Dwivedi, P.Eng., HP Engineering</u>
Others in Party:	<u>Nicholas Brown, HP Engineering</u>
Access Equipment Used:	<u>Measuring Tape, Digital Camera and Hammer</u>
Weather:	<u>Overcast</u>
Temperature:	<u>26 °C</u>

ADDITIONAL INVESTIGATION REQUIRED	Priority			Estimated Cost
	None	Normal	Urgent	
Rehabilitation/Replacement Study:		X		\$ 5,000.00
Material Condition Survey	X			\$ -
Detailed Deck Condition Survey:	X			\$ -
Non-destructive Delamination Survey of Asphalt- Covered Deck:	X			\$ -
Concrete Substructure Condition Survey:	X			\$ -
Detailed Coating Condition Survey:	X			\$ -
Detailed Timber Investigation:	X			\$ -
Underwater Investigation:	X			\$ -
Fatigue Investigation:	X			\$ -
Seismic Investigation:	X			\$ -
Structure Evaluation:	X			\$ -
Monitoring	X			\$ -
Monitoring of Deformations, Settlement and Movements:	X			\$ -
Monitoring Crack Widths:	X			\$ -
Load Posting – Estimated Load Limit		Total Cost		\$ 5,000.00
Investigation Notes: Rehabilitation/replacement study is for traffic barrier only.				

OVERALL STRUCTURAL NOTES:	
Recommended Work on Structure:	<input type="checkbox"/> None <input checked="" type="checkbox"/> Minor Rehab. <input type="checkbox"/> Major Rehab. <input type="checkbox"/> Replace
Timing of Recommended Work:	<input checked="" type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years
Overall Comments: Structure is generally in fair condition. No barriers were present at the time of the inspection; review an adequacy of the approach barrier and install code compliant deck barriers. Some minor scaling on the abutment and foundation footing. Splits, shakes, checks and rot noted on the timber curb. Honeycombing at north ballast wall and wide horizontal crack at south ballast wall.	
Date of Next Inspection:	May 2024

Suspected Performance Deficiencies

- | | | |
|--|--|--|
| 00 None | 06 Bearing not uniformly loaded/unstable | 12 Slippery surfaces |
| 01 Load carrying capacity | 07 Jammed expansion joint | 13 Flooding/channel blockage |
| 02 Excessive deformations (deflections & rotation) | 08 Pedestrian/vehicular hazard | 14 Undermining of foundation |
| 03 Continuing settlement | 09 Rough riding surface | 15 Unstable embankments |
| 04 Continuing movements | 10 Surface ponding | 16 Other |
| 05 Seized bearings | 11 Deck drainage | |
| Maintenance Needs | | |
| 01 Lift and swing bridge maintenance | 07 Repair of structural steel | 13 Erosion control at bridges |
| 02 Bridge cleaning | 08 Repair of bridge concrete | 14 Concrete sealing |
| 03 Bridge handrail maintenance | 09 Repair of bridge timber | 15 Rout and seal |
| 04 Painting steel bridge structures | 10 Bailey bridges maintenance | 16 Bridge deck drainage |
| 05 Bridge deck joint repair | 11 Animal/pest control | 17 Scaling (loose Concrete or ACR Steel) |
| 06 Bridge bearing maintenance | 12 Bridge surface repair | 18 Other |

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B4

ELEMENT DATA					
Element Group:	Approaches	Length:	-		
Element Name:	Barrier	Width:	-		
Location:	NE, NW, SE & SW of Structure	Height:	-		
Material:	-	Count:	-		
Element Type:	-	Total Quantity:	-		
Environment:	-	Limited Inspection:	<input type="checkbox"/>		
Protection System	-				
Condition Data:	Units	Excellent	Good	Fair	Poor
	N/A	-	-	-	-
Comments: No approach barrier presents at the time of inspection. Adequacy of the approach barrier should be reviewed.					
Performance Deficiencies: 08			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Approaches	Length:	6 m		
Element Name:	Wearing Surface	Width:	4.75 m		
Location:	North & South of Structure	Height:	-		
Material:	Gravel	Count:	2		
Element Type:	Gravel Wearing Surface	Total Quantity:	57 m ²		
Environment:	Severe	Limited Inspection:	<input type="checkbox"/>		
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	-	55	2
Comments: Gravel road (not winter maintained) is generally in fair condition with some light rutting on both approaches. Rough transition from the approach to the runners on the bridge deck. Loose gravel noted on approaches. Large pothole noted at south approach.					
Performance Deficiencies: 09			Maintenance Needs: 12		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B4

ELEMENT DATA					
Element Group:	Accessories		Length:	-	
Element Name:	Signs		Width:	-	
Location:	NE, NW, SE & SW of Structure		Height:	-	
Material:	Steel		Count:	6	
Element Type:	Hazard and One Lane Signs		Total Quantity:	6	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	Hot Dip Galvanizing				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	2	4	-
Comments: Four hazard signs at corners of structure and two one lane signs on approaches are generally in good condition. Hazard signs are in fair condition with peeling paint and cracking.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Sidewalks/Curbs		Length:	4.9 m	
Element Name:	Curbs		Width:	0.2 m	
Location:	East & West of Structure		Height:	0.2 m	
Material:	Timber		Count:	2	
Element Type:	Timber Curb		Total Quantity:	3.92 m ²	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	Creosote Treated				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	1.46	1.96	0.5
Comments: Splits, shakes, checks, splinters and minor to medium rot noted along exposed edge. Some damage to west timber curb at ends. Adequacy of existing barrier should be reviewed. The existing layout of the curb is 8"x8" timber curb resting on 4"x6" blocks to facilitate deck drainage on the low volume road.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B4

ELEMENT DATA					
Element Group:	Decks		Length:	4.9 m	
Element Name:	Deck Top (Exposed)		Width:	1 m	
Location:	Top of Deck		Height:	-	
Material:	Timber		Count:	2	
Element Type:	Timber Wearing Surface (Longitudinal)		Total Quantity:	9.8 m ²	
Environment:	Severe		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	Pressure Treated				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	4.5	5.3	-
Comments: Limited inspection due to debris/dirt accumulations. Appears to be in generally in good to fair condition with some abrasions and minor rot noted on the surface.					
Performance Deficiencies: 00			Maintenance Needs: 02 - Bridge Cleaning		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Decks		Length:	5.3 m	
Element Name:	Deck Top (Exposed)		Width:	4.9 m	
Location:	Top of Deck		Height:	-	
Material:	Timber		Count:	1	
Element Type:	Timber Wearing Surface (Transverse)		Total Quantity:	25.97 m ²	
Environment:	Severe		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	Creosote Treated				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	12.97	11.7	1.3
Comments: Limited inspection due to debris accumulation. Transverse timber planks are not exposed below running boards. Generally weathered with some local minor rot at ends of deck.					
Performance Deficiencies: 00			Maintenance Needs: 09 / 02		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input checked="" type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B4

ELEMENT DATA					
Element Group:	Decks		Length:	4.9 m	
Element Name:	Soffit		Width:	5.3 m	
Location:	Underside of Deck		Height:	-	
Material:	Timber		Count:	1	
Element Type:	Timber Soffit		Total Quantity:	25.97 m ²	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	Creosote Treated				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	20.97	5	-
Comments: Timber soffit is weathered but generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Beams / MLEs		Length:	4.9 m	
Element Name:	Girders		Width:	0.15 (4), 0.25 (2), 0.3 (3)	
Location:	Underside of Structure		Height:	0.3 m	
Material:	Timber		Count:	9	
Element Type:	Timber Beams		Total Quantity:	36.26 m ²	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	Creosote Treated				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	20	16.26	-
Comments: Timber girders are seated directly on top of abutment wall and are generally in good to fair condition; there is weathering throughout.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B4

ELEMENT DATA					
Element Group:	Abutments		Length:	1.77 m	
Element Name:	Wingwalls		Width:	-	
Location:	NE, NW, SE & SW of Structure		Height:	0.89 m	
Material:	Concrete		Count:	4	
Element Type:	Reinforced Concrete Wingwall		Total Quantity:	6.30 m ²	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	5.70	0.6	-
Comments: Generally in good condition with moderate scaling and some moss growth observed on surface.					
Performance Deficiencies: 00			Maintenance Needs: 13		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Abutments		Length:	-	
Element Name:	Ballast Walls		Width:	5.3 m	
Location:	North & South Underside of Structure		Height:	0.3 m	
Material:	Concrete		Count:	2	
Element Type:	Reinforced Concrete		Total Quantity:	3.18 m ²	
Environment:	Benign		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	2.83	0.25	0.1
Comments: Water leakage through ballast wall noted at northeast, northwest, and southwest corners of abutment walls. Honeycombing at north ballast wall and wide horizontal crack at south ballast wall.					
Performance Deficiencies: 00			Maintenance Needs: 08		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input checked="" type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B4

ELEMENT DATA					
Element Group:	Abutments		Length:	-	
Element Name:	Abutment Walls		Width:	5.3 m	
Location:	North & South Underside of Structure		Height:	1 m	
Material:	Concrete		Count:	2	
Element Type:	Reinforced Concrete Abutment		Total Quantity:	10.6 m ²	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	9.5	1.1	-
Comments: Generally in good condition with some popouts near the bearing seat. Moderate scaling noted below highwater line on abutments.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Foundations		Length:	-	
Element Name:	Foundation (Below Ground Level)		Width:	-	
Location:	Below Abutment Walls		Height:	-	
Material:	Concrete		Count:	-	
Element Type:	Strip Footing		Total Quantity:	-	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	N/A	-	-	-	-
Comments: Moderate scaling throughout existing concrete strip footing. No visible evidence of foundation instability noted at the time of inspection.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B4

ELEMENT DATA					
Element Group:	Embankments and Streams		Length:	-	
Element Name:	Embankments		Width:	-	
Location:	NE, NW, SE & SW of Structure		Height:	-	
Material:	Native Soil		Count:	4	
Element Type:	Embankment		Total Quantity:	4	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	4	-	-
Comments: Moderately sloped embankment, well vegetated with some loose rock. Embankments appear stable and in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Embankments and Streams		Length:	-	
Element Name:	Streams and Waterways		Width:	-	
Location:	Under Structure		Height:	-	
Material:	Native		Count:	-	
Element Type:	Streams		Total Quantity:	All	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	All	-	All	-	-
Comments: Moderate volume and flow from west to east with no visible flow obstructions at time of inspection.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B4

REPAIR AND REHABILITATION REQUIRED		Priority			Estimated Cost
Element	Repair and Rehabilitation Required	6 - 10 Years	1 - 5 Years	< 1 year	
Barrier	Install approved traffic barrier			X	\$ 21,500.00
Approach Barrier	Install code compliant approach barrier and end treatments			X	\$ 60,000.00
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
Total Cost					\$ 81,500.00

ASSOCIATED WORK	Comments	Estimated Cost
Approaches		
Detours		
Traffic Control		
Utilities		
Right of Way		
Environmental Study		
Other		
Contingencies		
Total Cost		\$ -

JUSTIFICATION

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B4



Photo 1 Structure from north approach



Photo 2 Structure from south approach

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B4



Photo 3 North approach from centre of structure



Photo 4 South approach from centre of structure

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B4



Photo 5 East elevation



Photo 6 West elevation

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B4



Photo 7 Damaged hazard sign on NW corner of barrier



Photo 8 Splits, checks and rot on northwest timber curb

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B4



Photo 9 Deck wearing surface



Photo 10 Weathering on timber girders

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B4



Photo 11 Moderate scaling noted on NW wingwall



Photo 12 Moderate scaling on base of north abutment wall

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B4



Photo 13 South abutment wall

Structure Condition Summary Form

Structure Name Pautois Bridge
Structure Number B5
Date of Inspection May 30, 2022
Project No. 22035
Consultant HP Engineering Inc.

Element Group	Element Name	Unit (Qty.)	Unit Price (MTO)	Total Element Quantity	Element Qty. in Excellent Condition (1.00)	Element Quantity in Good Condition (0.75)	Element Quantity in Fair Condition (0.4)	Element Quantity in Poor Condition (0)	Total Replacement Value (TRV)	Current Element Value (CEV)	Element Condition Index	Performance Deficiency	Maintenance Need
Abutment	Abutment Walls	Sq.m	900.00	60.90	0.00	60.90	0.00	0.00	54810	41108	75	00	00
	Ballast Walls	Sq.m	350.00	16.70	0.00	16.70	0.00	0.00	5845	4384	75	00	00
	Bearings	Each	1000.00	8.00	0.00	8.00	0.00	0.00	8000	6000	75	00	00
	Wingwalls	Sq.m	350.00	24.32	0.00	24.32	0.00	0.00	8512	6384	75	00	00
Approaches	Approach Slabs	Sq.m	140.00	94.80	0.00	94.80	0.00	0.00	13272	9954	75	00	00
	Wearing Surface	Sq.m	6.00	94.80	0.00	93.40	0.70	0.70	569	422	74	00	12
Barriers	Railing Systems	m	200.00	36.96	0.00	36.86	0.10	0.00	7392	5537	75	00	00
Beams / Main	Girders -Steel	Sq.m	420.00	151.62	0.00	151.62	0.00	0.00	63680	47760	75	00	00
Coatings	Structural steel	Sq.m	80.00	36.80	0.00	35.80	1.00	0.00	2944	2180	74	00	00
	Deck Top - Thin Slab	Sq.m	120.00	160.78	0.00	160.78	0.00	0.00	19294	14470	75	00	00
Decks	Soffit - Thin Slab	Sq.m	120.00	172.97	0.00	172.97	0.00	0.00	20756	15567	75	00	00
	Wearing Surface	Sq.m	25.00	133.06	0.00	131.06	2.00	0.00	3327	2477	74	00	00

208401 156243

Bridge Condition Index (BCI) 75

- I_t 0 Importance Factor for Traffic
- I_c 0 Importance Factor for Economic Impacts
- I_w 0 Importance Factor for Bridge Width
- I_p 0 Importance Factor for Bridge Profile or Alignment

Bridge Sufficiency Index (BSI) 75

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B5

INVENTORY DATA:			
Structure Name	<u>Pautois Bridge</u>		
Main Hwy/Road #	<u>Peddlers Drive</u>	Under Structure:	Navigable Water <input type="checkbox"/> Non- Navigable Water <input checked="" type="checkbox"/> Rail <input type="checkbox"/> Road <input type="checkbox"/> Pedestrian <input type="checkbox"/> Other <input type="checkbox"/>
		On Structure:	Rail <input type="checkbox"/> Road <input checked="" type="checkbox"/> Pedestrian <input type="checkbox"/> Other <input type="checkbox"/>
Road Name:	<u>Peddlers Drive</u>		
Structure Location	<u>0.34 km west of Pautois Rd.</u>		
Latitude	<u>46° 15 '37.3 " N</u>	Longitude	<u>78° 50' 53.60" W</u>
Owner(s)	<u>Township of Calvin</u>	Heritage Designation	Not Cons. <input checked="" type="checkbox"/> Cons. /Not App. <input type="checkbox"/> List/Not Desig. <input type="checkbox"/> Desig./not List <input type="checkbox"/> Desig. & List <input type="checkbox"/>
		Road Class:	Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local <input type="checkbox"/>
MTO Region	<u>-</u>	Posted Speed	<u>-</u> No. of Lanes <u>2</u>
MTO District	<u>-</u>	AADT	<u>-</u> % Trucks <u>-</u>
Old County	<u>-</u>	Special Routes	Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle <input type="checkbox"/>
Geographic Twp.	<u>-</u>	Structure Type	<u>Steel Girder Bridge</u>
		Detour Length Around Structure	<u>-</u> (km)
Total Deck Length	<u>18.48</u> (m)	Fill on Structure	<u>-</u> (m)
Overall Str. Width	<u>8.7</u> (m)	Skew Angle	<u>-</u> (Degrees)
Total Deck Area	<u>160.78</u> (m ²)	Direction of Structure	<u>East/West</u>
Roadway Width	<u>7.9</u> (m)	No. of Spans	<u>1</u>
Span Lengths	<u>18.48</u> (m)		

HISTORICAL DATA			
Year Built	<u>2012</u>	Last OSIM Inspection	<u>August 06, 2020</u>
Year of Last Major Rehab.	<u>-</u>	Last Enhanced OSIM Inspection	<u>-</u>
Current Load Limit	<u>-</u> (tonnes)	Last Bridge Master Inspection	<u>-</u>
Load Limit By-Law #	<u>-</u>	Last Evaluation	<u>-</u>
By-Law Expiry Date	<u>-</u>	Last Underwater Inspection	<u>-</u>
Min. Vertical Clearance	<u>-</u> (m)	Last Condition Survey	<u>-</u>
Rehabilitation History: (Date / Description)			

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B5

FIELD INSPECTION INFORMATION	
Date of Inspection:	<u>May 30, 2022</u> Type of Inspection: <input checked="" type="checkbox"/> OSIM <input type="checkbox"/> Enhanced OSIM
Inspector:	<u>Tashi Dwivedi, P.Eng., HP Engineering</u>
Others in Party:	<u>Nicholas Brown, HP Engineering</u>
Access Equipment Used:	<u>Measuring Tape, Digital Camera and Hammer</u>
Weather:	<u>Overcast</u>
Temperature:	<u>20 °C</u>

ADDITIONAL INVESTIGATION REQUIRED	Priority			Estimated Cost
	None	Normal	Urgent	
Rehabilitation/Replacement Study:	X			\$ -
Material Condition Survey	X			\$ -
Detailed Deck Condition Survey:	X			\$ -
Non-destructive Delamination Survey of Asphalt- Covered Deck:	X			\$ -
Concrete Substructure Condition Survey:	X			\$ -
Detailed Coating Condition Survey:	X			\$ -
Detailed Timber Investigation:	X			\$ -
Underwater Investigation:	X			\$ -
Fatigue Investigation:	X			\$ -
Seismic Investigation:	X			\$ -
Structure Evaluation:	X			\$ -
Monitoring	X			\$ -
Monitoring of Deformations, Settlement and Movements:	X			\$ -
Monitoring Crack Widths:	X			\$ -
Load Posting – Estimated Load Limit		Total Cost		\$ -
Investigation Notes:				

OVERALL STRUCTURAL NOTES:	
Recommended Work on Structure:	<input type="checkbox"/> None <input checked="" type="checkbox"/> Minor Rehab. <input type="checkbox"/> Major Rehab. <input type="checkbox"/> Replace
Timing of Recommended Work:	<input checked="" type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years
Overall Comments:	Overall, structure is generally in good condition. Wide transverse cracks at ends of approach slabs and medium to wide longitudinal cracks along both approach centrelines. Minor loss of stone noted at embankments on west with exposed geotextile.
Date of Next Inspection:	May 2024

Suspected Performance Deficiencies

- | | | |
|--|--|--|
| 00 None | 06 Bearing not uniformly loaded/unstable | 12 Slippery surfaces |
| 01 Load carrying capacity | 07 Jammed expansion joint | 13 Flooding/channel blockage |
| 02 Excessive deformations (deflections & rotation) | 08 Pedestrian/vehicular hazard | 14 Undermining of foundation |
| 03 Continuing settlement | 09 Rough riding surface | 15 Unstable embankments |
| 04 Continuing movements | 10 Surface ponding | 16 Other |
| 05 Seized bearings | 11 Deck drainage | |
| Maintenance Needs | | |
| 01 Lift and swing bridge maintenance | 07 Repair of structural steel | 13 Erosion control at bridges |
| 02 Bridge cleaning | 08 Repair of bridge concrete | 14 Concrete sealing |
| 03 Bridge handrail maintenance | 09 Repair of bridge timber | 15 Rout and seal |
| 04 Painting steel bridge structures | 10 Bailey bridges maintenance | 16 Bridge deck drainage |
| 05 Bridge deck joint repair | 11 Animal/pest control | 17 Sealing (loose Concrete or ACR Steel) |
| 06 Bridge bearing maintenance | 12 Bridge surface repair | 18 Other |

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B5

ELEMENT DATA					
Element Group:	Approaches	Length:	30 m		
Element Name:	Barrier	Width:	-		
Location:	East & West Approaches	Height:	-		
Material:	Steel	Count:	4		
Element Type:	Steel Flex Beam on Steel Posts	Total Quantity:	120 m		
Environment:	Severe	Limited Inspection:	<input type="checkbox"/>		
Protection System	Hot Dip Galvanizing				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m	-	120	-	-
Comments: Generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Approaches	Length:	6 m		
Element Name:	Wearing Surface	Width:	7.9 m		
Location:	East & West	Height:	-		
Material:	Asphalt	Count:	2		
Element Type:	Approach Wearing Surface	Total Quantity:	94.8 m ²		
Environment:	Severe	Limited Inspection:	<input type="checkbox"/>		
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	93.4	0.7	0.7
Comments: Generally in good condition with wide transverse cracks at ends of approach slabs and medium to wide longitudinal cracks along the both approach centrelines. Wide longitudinal crack noted on west approach. Light ravelling throughout the approach on both sides.					
Performance Deficiencies: 00			Maintenance Needs: 12		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input checked="" type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B5

ELEMENT DATA					
Element Group:	Approaches		Length:	6 m	
Element Name:	Approach Slabs		Width:	7.9 m	
Location:	East & West of Structure		Height:	0.25 m	
Material:	Concrete		Count:	2	
Element Type:	Concrete Approach Slab		Total Quantity:	94.8 m ²	
Environment:	Moderate		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	94.8	-	-
Comments: Based on the condition of wearing surface, the approach slabs are estimated assumed to be in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Accessories		Length:	-	
Element Name:	Signs		Width:	-	
Location:	NE, NW, SE & SW of Structure		Height:	-	
Material:	Steel		Count:	4	
Element Type:	Hazard Signs (Steel)		Total Quantity:	4	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	4	-	-
Comments: Hazards signs are generally in good condition with minor deformation and abrasion noted.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B5

ELEMENT DATA					
Element Group:	Barriers	Length:	18.48 m		
Element Name:	Railing Systems	Width:	-		
Location:	North & South of Sides of Structure	Height:	-		
Material:	Steel	Count:	2		
Element Type:	HSS Rails on Steel Posts	Total Quantity:	36.96 m		
Environment:	Severe	Limited Inspection:	<input type="checkbox"/>		
Protection System	Hot Dip Galvanizing				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m	-	36.86	0.1	-
Comments: Generally in good condition with minor abrasion noted at south barrier.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Decks	Length:	18.48 m		
Element Name:	Wearing Surface	Width:	7.2 m		
Location:	Top of Deck	Height:	-		
Material:	Asphalt	Count:	1		
Element Type:	Deck Wearing Surface	Total Quantity:	133.06 m ²		
Environment:	Severe	Limited Inspection:	<input type="checkbox"/>		
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	131.06	2	-
Comments: Generally in good condition with light asphalt polishing noted throughout. Medium longitudinal crack observed at centerline.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B5

ELEMENT DATA					
Element Group:	Decks		Length:	18.48 m	
Element Name:	Deck Top (Covered)		Width:	8.7 m	
Location:	Top of Deck		Height:	-	
Material:	Concrete		Count:	1	
Element Type:	Thin Slab		Total Quantity:	160.78 m ²	
Environment:	Moderate		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	Asphalt Wearing Surface				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	160.78	-	-
Comments: Based on the condition of wearing surface, the visible edges of the deck top and the soffit, the deck top is estimated to be in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Decks		Length:	18.48 m	
Element Name:	Soffit – Thin Slab (Exterior)		Width:	0.93 m	
Location:	North & South Underside of Structure		Height:	-	
Material:	Concrete		Count:	2	
Element Type:	Thin Slab		Total Quantity:	34.37 m ²	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²		34.37	-	-
Comments: Soffit exterior is generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B5

ELEMENT DATA					
Element Group:	Decks		Length:	18.48 m	
Element Name:	Soffit – Thin Slab (Interior)		Width:	7.5 m	
Location:	Underside of Structure		Height:	-	
Material:	Concrete		Count:	1	
Element Type:	Thin Slab		Total Quantity:	138.6 m ²	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	138.6	-	-
Comments: Soffit interior is generally in good condition with hairline longitudinal cracks noted.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Beams / MLEs		Length:	2 m	
Element Name:	Girders (End)		Width:	0.3 m	
Location:	East & West Underside of Deck		Height:	0.7 m	
Material:	Steel		Count:	8	
Element Type:	Steel I-Girders		Total Quantity:	36.8 m ²	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	36.8	-	-
Comments: Ends of steel girders are in good condition; coating is noted.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B5

ELEMENT DATA					
Element Group:	Beams / MLEs		Length:	12.48 m	
Element Name:	Girders (Intermediate)		Width:	0.3 m	
Location:	Underside of Deck		Height:	0.7 m	
Material:	Steel		Count:	4	
Element Type:	Steel I-Girders		Total Quantity:	114.82 m ²	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	114.82	-	-
Comments: Intermediate steel girders are in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Beams / MLEs		Length:	2.5 m	
Element Name:	Diaphragms (Ends)		Width:	0.09 m	
Location:	East & West Underside of Structure		Height:	0.38 m	
Material:	Steel		Count:	6	
Element Type:	Steel C-Channels		Total Quantity:	6	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	6	-	-
Comments: Steel diaphragms in end region are in good condition; coating is noted.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B5

ELEMENT DATA					
Element Group:	Beams / MLEs		Length:	2.5 m	
Element Name:	Diaphragms (Intermediate)		Width:	0.09 m	
Location:	Underside of Structure		Height:	0.38 m	
Material:	Steel		Count:	6	
Element Type:	Steel C-Channels		Total Quantity:	6	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	6	-	-
Comments: Intermediate steel diaphragms are in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Coatings		Length:	2 m	
Element Name:	Structural Steel (End)		Width:	0.3 m	
Location:	Coating on Girders (End)		Height:	0.7 m	
Material:	Concrete		Count:	8	
Element Type:	Paint		Total Quantity:	36.8 m ²	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	35.8	1	-
Comments: Coating on end portions of girders is in good condition with some light flaking and local failure.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B5

ELEMENT DATA					
Element Group:	Coatings		Length:	2.5 m	
Element Name:	Structural Steel (End)		Width:	0.09 m	
Location:	Coating on Diaphragms (End)		Height:	0.38 m	
Material:	Concrete		Count:	6	
Element Type:	Paint		Total Quantity:	6	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	6	-	-
Comments: Coating of diaphragms in end regions is in good condition					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Abutments		Length:	4 m	
Element Name:	Wingwalls		Width:	-	
Location:	NE, NW, SE & SW of Structure		Height:	1.52 m	
Material:	Concrete		Count:	4	
Element Type:	Reinforced Concrete Wingwall		Total Quantity:	24.32 m ²	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	24.32	-	-
Comments: Wingwalls are in good condition. Moss growth noted at deck interface on neoprene pad.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B5

ELEMENT DATA					
Element Group:	Abutments		Length:	-	
Element Name:	Ballast Walls		Width:	8.7 m	
Location:	East & West Underside of Structure		Height:	0.96 m	
Material:	Concrete		Count:	2	
Element Type:	Reinforced Concrete Ballast Wall		Total Quantity:	16.70 m ²	
Environment:	Benign		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	16.7	-	-
Comments: Ballast walls are generally in good condition based on partially visible portions. Damp stains observed on East ballast wall.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Abutments		Length:	-	
Element Name:	Bearings		Width:	-	
Location:	On Abutment Wall		Height:	-	
Material:	Neoprene / Rubber		Count:	8	
Element Type:	Elastomeric Bearing		Total Quantity:	8	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	8	-	-
Comments: Abutment bearings are in good condition. Steel shoe plates at each bearing location are in good condition as well.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B5

ELEMENT DATA					
Element Group:	Abutments		Length:	-	
Element Name:	Abutment Walls		Width:	8.7 m	
Location:	East & West Underside of Structure		Height:	3.5 m	
Material:	Concrete		Count:	2	
Element Type:	Reinforced Concrete Abutment		Total Quantity:	60.9 m ²	
Environment:	Benign		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	60.9	-	-
Comments: Abutment walls are partially covered by slope protection. Visible portions are in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Foundations		Length:	-	
Element Name:	Foundation (Below Ground Level)		Width:	-	
Location:	Below Abutment Walls		Height:	-	
Material:	Concrete		Count:	-	
Element Type:	Unknown		Total Quantity:	-	
Environment:	Benign		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	Unknown				
Condition Data:	Units	Excellent	Good	Fair	Poor
	N/A	-	-	-	-
Comments: No visible evidence of foundation instability observed at time of inspection.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B5

ELEMENT DATA					
Element Group:	Embankments and Streams		Length:	-	
Element Name:	Embankments		Width:	-	
Location:	NE, NW, SE & SW of Structure		Height:	-	
Material:	Native Soil		Count:	6	
Element Type:	Embankment		Total Quantity:	6	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	Rock Protection				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	5	1	-
Comments: Embankments appear stable, they are moderately sloped and covered by rock slope protection. Minor loss of stone noted at west with exposed geotextile.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Embankments and Streams		Length:	-	
Element Name:	Slope Protection		Width:	-	
Location:	NE, NW, SE & SW of Structure		Height:	-	
Material:	Rock		Count:	6	
Element Type:	Rock Slope Protection		Total Quantity:	6	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	5	1	-
Comments: Slope protection is generally in good condition with loss of fill at west.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B5

ELEMENT DATA					
Element Group:	Embankments and Streams		Length:	-	
Element Name:	Streams and Waterways		Width:	-	
Location:	Below Main Span		Height:	-	
Material:	Native		Count:	-	
Element Type:	Streams		Total Quantity:	All	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	All	-	All	-	-
Comments: Moderate volume with high flow from south to north with no visible flow obstructions at time of inspection.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B5

REPAIR AND REHABILITATION REQUIRED		Priority			Estimated Cost
Element	Repair and Rehabilitation Required	6 - 10 Years	1 - 5 Years	< 1 year	
Total Cost					\$

ASSOCIATED WORK	Comments	Estimated Cost
Approaches		
Detours		
Traffic Control		
Utilities		
Right of Way		
Environmental Study		
Other		
Contingencies		
Total Cost		\$ -

JUSTIFICATION

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B5



Photo 1 Structure from east approach



Photo 2 Structure from west approach

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B5



Photo 3 East approach from centre of structure



Photo 4 West approach from centre of structure

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B5



Photo 5 North elevation



Photo 6 South elevation

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B5



Photo 7 Wide transverse and longitudinal cracks on west approach wearing surface



Photo 8 Typical end of steel girder at south side of structure

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B5



Photo 9 East underside of structure



Photo 10 East abutment wall

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B5



Photo 11 Sand accumulation noted on both side of deck wearing surface



Photo 12 Typical bearing at southeast corner

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.:B5



Photo 13 Typical southeast wingwall

Structure Condition Summary Form

Structure Name Crosses Bridge
Structure Number B6
Date of Inspection May 30, 2022
Project No. 22035
Consultant HP Engineering Inc.

Element Group	Element Name	Unit (Qty.)	Unit Price (MTO)	Total Element Quantity	Element Qty. in Excellent Condition (1.00)	Element Quantity in Good Condition (0.75)	Element Quantity in Fair Condition (0.4)	Element Quantity in Poor Condition (0)	Total Replacement Value (TRV)	Current Element Value (CEV)	Element Condition Index	Performance Deficiency	Maintenance Need
Abutment	Abutment Walls	Sq.m	900.00	49.40	0.00	48.40	1.00	0.00	44460	33030	74	00	00
	Wingwalls	Sq.m	350.00	28.94	0.00	24.44	3.00	1.50	10129	6836	67	00	08
Approaches	Wearing Surface	Sq.m	6.00	102.00	0.00	92.00	10.00	0.00	612	438	72	00	18
Barriers	Railing Systems	m	200.00	37.20	0.00	0.00	18.60	18.60	7440	1488	20	08	18
Decks	Deck Top - Thick Slab	Sq.m	350.00	80.00	0.00	80.00	0.00	0.00	28000	21000	75	00	00
	Soffit - Thick Slab	Sq.m	350.00	88.00	0.00	81.50	5.00	1.50	30800	22094	72	00	08
	Wearing Surface	Sq.m	25.00	68.00	0.00	68.00	0.00	0.00	1700	1275	75	00	00

123141 86160

Bridge Condition Index (BCI)

70

I_t

0

Importance Factor for Traffic

I_c

0

Importance Factor for Economic Impacts

I_w

0

Importance Factor for Bridge Width

I_p

0

Importance Factor for Bridge Profile or Alignment

Bridge Sufficiency Index (BSI)

70

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B6

INVENTORY DATA:			
Structure Name	<u>Crosses Bridge</u>		
Main Hwy/Road #	<u>Homestead Road</u>	Under Structure:	Navigable Water <input type="checkbox"/> Non- Navigable Water <input checked="" type="checkbox"/> Rail <input type="checkbox"/> Road <input type="checkbox"/> Pedestrian <input type="checkbox"/> Other <input type="checkbox"/>
		On Structure:	Rail <input type="checkbox"/> Road <input checked="" type="checkbox"/> Pedestrian <input type="checkbox"/> Other <input type="checkbox"/>
Road Name:	<u>Homestead Road</u>		
Structure Location	<u>1.21 km west of Daventry Road</u>		
Latitude	<u>46° 14' 29.6" N</u>	Longitude	<u>78° 50' 51.1" W</u>
Owner(s)	<u>Township of Calvin</u>	Heritage Designation	Not Cons. <input checked="" type="checkbox"/> Cons. /Not App. <input type="checkbox"/> List/Not Desig. <input type="checkbox"/> Desig./not List <input type="checkbox"/> Desig. & List <input type="checkbox"/>
		Road Class:	Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input type="checkbox"/> Local <input type="checkbox"/>
MTO Region	<u>-</u>	Posted Speed	<u>-</u> No. of Lanes <u>2</u>
MTO District	<u>-</u>	AADT	<u>-</u> % Trucks <u>-</u>
Old County	<u>-</u>	Special Routes	Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle <input type="checkbox"/>
Geographic Twp.	<u>-</u>	Structure Type	<u>Concrete Rigid Frame</u>
		Detour Length Around Structure	<u>-</u> (km)
Total Deck Length	<u>8</u> (m)	Fill on Structure	<u>-</u> (m)
Overall Str. Width	<u>10</u> (m)	Skew Angle	<u>-</u> (Degrees)
Total Deck Area	<u>80</u> (m ²)	Direction of Structure	<u>East/West</u>
Roadway Width	<u>8.5</u> (m)	No. of Spans	<u>1</u>
Span Lengths	<u>8</u> (m)		

HISTORICAL DATA			
Year Built	<u>1983</u>	Last OSIM Inspection	<u>August 06, 2020</u>
Year of Last Major Rehab.	<u>-</u>	Last Enhanced OSIM Inspection	<u>-</u>
Current Load Limit	<u>-</u> (tonnes)	Last Bridge Master Inspection	<u>-</u>
Load Limit By-Law #	<u>-</u>	Last Evaluation	<u>-</u>
By-Law Expiry Date	<u>-</u>	Last Underwater Inspection	<u>-</u>
Min. Vertical Clearance	<u>-</u> (m)	Last Condition Survey	<u>-</u>
Rehabilitation History: (Date / Description)			

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B6

FIELD INSPECTION INFORMATION	
Date of Inspection:	<u>May 30, 2022</u> Type of Inspection: <input checked="" type="checkbox"/> OSIM <input type="checkbox"/> Enhanced OSIM
Inspector:	<u>Tashi Dwivedi, P.Eng., HP Engineering</u>
Others in Party:	<u>Nicholas Brown, HP Engineering</u>
Access Equipment Used:	<u>Measuring Tape, Digital Camera and Hammer</u>
Weather:	<u>Sunny</u>
Temperature:	<u>28 °C</u>

ADDITIONAL INVESTIGATION REQUIRED	Priority			Estimated Cost
	None	Normal	Urgent	
Rehabilitation/Replacement Study:		X		\$ 5,000.00
Material Condition Survey	X			\$ -
Detailed Deck Condition Survey:		X		\$ 10,000.00
Non-destructive Delamination Survey of Asphalt- Covered Deck:	X			\$ -
Concrete Substructure Condition Survey:	X			\$ -
Detailed Coating Condition Survey:	X			\$ -
Detailed Timber Investigation:	X			\$ -
Underwater Investigation:	X			\$ -
Fatigue Investigation:	X			\$ -
Seismic Investigation:	X			\$ -
Structure Evaluation:	X			\$ -
Monitoring	X			\$ -
Monitoring of Deformations, Settlement and Movements:	X			\$ -
Monitoring Crack Widths:	X			\$ -
Load Posting – Estimated Load Limit			Total Cost	\$ 15,000.00

Investigation Notes:
 Rehabilitation/replacement study is for traffic barrier only. A detailed deck condition survey is recommended due to the vintage of structure and condition of deck.

OVERALL STRUCTURAL NOTES:	
Recommended Work on Structure:	<input type="checkbox"/> None <input checked="" type="checkbox"/> Minor Rehab. <input type="checkbox"/> Major Rehab. <input type="checkbox"/> Replace
Timing of Recommended Work:	<input checked="" type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years
Overall Comments: Structure is generally in good condition. Adequacy of existing traffic barrier should be verified. End treatments are substandard and should be replaced with code compliant end treatments. Potholes on wearing surface should be filled. Wide horizontal crack observed on half the length on north fascia. Medium to wide horizontal crack full length with some localized delamination and efflorescence noted on south fascia.	
Date of Next Inspection:	May 2024

Suspected Performance Deficiencies

- | | | |
|--|--|--|
| 00 None | 06 Bearing not uniformly loaded/unstable | 12 Slippery surfaces |
| 01 Load carrying capacity | 07 Jammed expansion joint | 13 Flooding/channel blockage |
| 02 Excessive deformations (deflections & rotation) | 08 Pedestrian/vehicular hazard | 14 Undermining of foundation |
| 03 Continuing settlement | 09 Rough riding surface | 15 Unstable embankments |
| 04 Continuing movements | 10 Surface ponding | 16 Other |
| 05 Seized bearings | 11 Deck drainage | |
| Maintenance Needs | | |
| 01 Lift and swing bridge maintenance | 07 Repair of structural steel | 13 Erosion control at bridges |
| 02 Bridge cleaning | 08 Repair of bridge concrete | 14 Concrete sealing |
| 03 Bridge handrail maintenance | 09 Repair of bridge timber | 15 Rout and seal |
| 04 Painting steel bridge structures | 10 Bailey bridges maintenance | 16 Bridge deck drainage |
| 05 Bridge deck joint repair | 11 Animal/pest control | 17 Sealing (loose Concrete or ACR Steel) |
| 06 Bridge bearing maintenance | 12 Bridge surface repair | 18 Other |

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B6

ELEMENT DATA					
Element Group:	Approaches		Length:	NE 7.2m, NW 11.5m, SE 8.2m, SW 11.2m	
Element Name:	Barrier		Width:	-	
Location:	East & West Approaches		Height:	-	
Material:	Steel		Count:	4	
Element Type:	Steel Flex Beam on Wood Posts		Total Quantity:	38 m	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	Hot Dip Galvanizing				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m	-	-	19	19
Comments: Abrasions observed throughout north and south guide rail. Rot and weathering noted throughout wooden posts. End treatments are substandard and should be replaced with code compliant end treatments.					
Performance Deficiencies: 08 – Pedestrian/Vehicular Hazard			Maintenance Needs: 18 – Replace Damaged Rail Sections / Rotten Posts		
Recommended Work: <input type="checkbox"/> Rehab. <input checked="" type="checkbox"/> Replace <input checked="" type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Approaches		Length:	6 m	
Element Name:	Wearing Surface		Width:	8.5 m	
Location:	East & West		Height:	-	
Material:	Gravel		Count:	2	
Element Type:	Gravel Wearing Surface		Total Quantity:	102 m ²	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	92	10	-
Comments: Generally in good condition. Moderate vegetation growth in front of approach guiderail. Loose gravel noted on approaches.					
Performance Deficiencies: 00			Maintenance Needs: 18 – Clear Vegetation		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B6

ELEMENT DATA					
Element Group:	Accessories		Length:	-	
Element Name:	Signs		Width:	-	
Location:	Ends of Approach Guiderail		Height:	-	
Material:	Plastic		Count:	4	
Element Type:	White Plastic Markers		Total Quantity:	4	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	3	1	-
Comments: Generally in good condition. The markers appear to have been placed to mark the end of the approach guardrail as a hazard. Official hazard signs are recommended. Southeast markers leaning.					
Performance Deficiencies: 00			Maintenance Needs: 18- Install New hazard signs		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Barriers		Length:	18.6 m	
Element Name:	Railing Systems		Width:	-	
Location:	North & South of Sides of Structure		Height:	-	
Material:	Steel		Count:	2	
Element Type:	Steel Flex Beam on Wood Posts		Total Quantity:	37.2 m	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	Hot Dip Galvanizing				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m	-	-	18.6	18.6
Comments: Evidence of vehicle impact on the steel flex beam with some cracks and deterioration of grout pads. Wood posts exhibit rot and weathering. Adequacy of existing traffic barrier should be reviewed. Some grout pads covered in debris.					
Performance Deficiencies: 08			Maintenance Needs: 18- Clear debris		
Recommended Work: <input type="checkbox"/> Rehab. <input checked="" type="checkbox"/> Replace <input checked="" type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B6

ELEMENT DATA					
Element Group:	Decks		Length:	8 m	
Element Name:	Wearing Surface		Width:	8.5 m	
Location:	Top of Deck		Height:	-	
Material:	Gravel		Count:	1	
Element Type:	Gravel Wearing Surface		Total Quantity:	68 m ²	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	68	-	-
Comments: Wearing surface is generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Decks		Length:	8 m	
Element Name:	Deck Top (Covered)		Width:	10 m	
Location:	Top of Deck		Height:	-	
Material:	Concrete		Count:	1	
Element Type:	Thick Slab		Total Quantity:	80 m ²	
Environment:	Moderate		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	Gravel Wearing Surface				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	80	-	-
Comments: Based on the condition of the wearing surface and the underside of the deck, the deck top is assumed to be in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B6

ELEMENT DATA					
Element Group:	Decks		Length:	8 m	
Element Name:	Soffit – Thick Slab (Exterior)		Width:	1 m	
Location:	North & South Underside of Structure		Height:	0.5 m	
Material:	Concrete		Count:	2	
Element Type:	Thick Slab		Total Quantity:	24 m ²	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	17.5	5	1.5
Comments: Wide horizontal crack observed on half the length on north fascia. Medium to wide horizontal crack full length with some localized delamination and efflorescence noted on south fascia. Efflorescence, rust and damp stains noted.					
Performance Deficiencies: 00			Maintenance Needs: 08		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input checked="" type="checkbox"/> 2 Years		

Element Group:	Decks		Length:	8 m	
Element Name:	Soffit – Thick Slab (Interior)		Width:	8 m	
Location:	Underside of Structure		Height:	0.5 m	
Material:	Concrete		Count:	1	
Element Type:	Thick Slab		Total Quantity:	64 m ²	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	64	-	-
Comments: Generally in good condition.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B6

ELEMENT DATA					
Element Group:	Abutments		Length:	-	
Element Name:	Wingwalls		Width:	5.4 m	
Location:	NE, NW, SE & SW of Structure		Height:	1.34 m	
Material:	Concrete		Count:	4	
Element Type:	Reinforced Concrete Wingwall		Total Quantity:	28.94 m ²	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	24.44	3	1.5
Comments: Generally in good condition with narrow map cracks, localized delamination, damp stains and efflorescence. Heavy efflorescence observed at southwest wingwall.					
Performance Deficiencies: 00			Maintenance Needs: 08		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input checked="" type="checkbox"/> 2 Years		

Element Group:	Abutments		Length:	2.47 m	
Element Name:	Abutment Walls		Width:	10 m	
Location:	East & West Underside of Structure		Height:	-	
Material:	Concrete		Count:	2	
Element Type:	Reinforced Concrete Abutment		Total Quantity:	49.4 m ²	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m ²	-	48.4	1	-
Comments: Generally in good condition with a small medium crack, damp stains and efflorescence at the top of the south end of the west abutment wall. Narrow vertical cracks and efflorescence noted throughout.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B6

ELEMENT DATA					
Element Group:	Foundations		Length:	-	
Element Name:	Foundation (Below Ground Level)		Width:	-	
Location:	Below Abutment Walls		Height:	-	
Material:	Concrete		Count:	-	
Element Type:	Strip Footing		Total Quantity:	-	
Environment:	Benign		Limited Inspection:	<input checked="" type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	N/A	-	-	-	-
Comments: No visible evidence of foundation instability at the time of inspection.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Embankments and Streams		Length:	-	
Element Name:	Embankments		Width:	-	
Location:	NE, NW, SE & SW of Structure		Height:	-	
Material:	Native Soil		Count:	4	
Element Type:	Embankment		Total Quantity:	4	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	Slope Protection				
Condition Data:	Units	Excellent	Good	Fair	Poor
	Each	-	4	-	-
Comments: Generally in good condition with a few large stones at base of embankments. Embankments are moderately sloped, well vegetated, and appear stable.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B6

ELEMENT DATA					
Element Group:	Embankments and Streams		Length:	-	
Element Name:	Slope Protection		Width:	-	
Location:	NE, NW, SE & SW of Structure		Height:	-	
Material:	Rock		Count:	4	
Element Type:	Rock Protection		Total Quantity:	4	
Environment:	Moderate		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	All	-	-	4	-
Comments: Slope protection is in generally fair condition. Slope protection consists of a few large stones positioned at the base of embankments. Slope protection should be reinstated.					
Performance Deficiencies: 00			Maintenance Needs: 18 - Reinstale Slope Protection		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input checked="" type="checkbox"/> 2 Years		

Element Group:	Embankments and Streams		Length:	-	
Element Name:	Streams and Waterways		Width:	-	
Location:	Below Structure		Height:	-	
Material:	Native		Count:	-	
Element Type:	Streams		Total Quantity:	All	
Environment:	Benign		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	All	-	All	-	-
Comments: High volume, low flow from south to north with no visible flow obstructions noted at the time of inspection.					
Performance Deficiencies: 00			Maintenance Needs: 00		
Recommended Work: <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			Maintenance Needs: <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

Site No.: B6

REPAIR AND REHABILITATION REQUIRED		Priority			Estimated Cost
Element	Repair and Rehabilitation Required	6 - 10 Years	1 - 5 Years	< 1 year	
Approach Barrier	Install new approach guiderail and approved end treatments			X	\$ 48,000.00
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
Total Cost					\$ 48,000.00

ASSOCIATED WORK	Comments	Estimated Cost
Approaches		
Detours		
Traffic Control		
Utilities		
Right of Way		
Environmental Study		
Other		
Contingencies		
Total Cost		\$ -

JUSTIFICATION

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.: B6



Photo 1 Structure from east approach



Photo 2 Structure from west approach

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.: B6



Photo 3 East approach from centre of structure



Photo 4 West approach from centre of structure

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.: B6



Photo 5 North elevation



Photo 6 South elevation

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.: B6



Photo 7 Substandard end treatment with damage northwest approach barrier



Photo 8 Narrow crack with efflorescence and rust stains on southwest wingwall

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.: B6



Photo 9 Underside of structure



Photo 10 Wide horizontal cracks with concrete delamination noted on soffit exterior

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.: B6

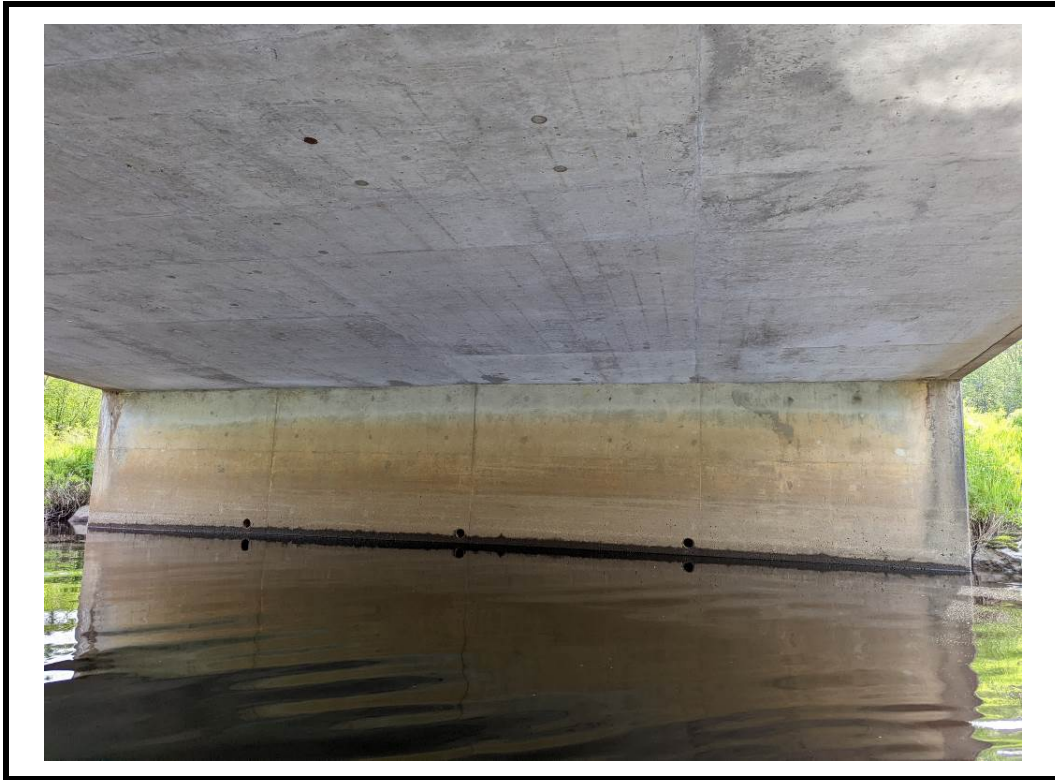


Photo 11 West abutment wall



Photo 12 Moderate vegetation grown in front of approach guiderail