Duke Street Bridge over CP Railway

For The

City of Dryden

Ref. No. JML2024090

December 2024

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DUKE STREET BRIDGE OVER CP RAILWAY

1.0 Description

The Duke Street Bridge over CP Railway is located approximately 200 metres south of the Duke Street/Hwy 17 intersection. The structure is currently not load posted.

The structure is a double lane, three span bridge consisting of steel girders and a concrete deck supported on concrete piers and concrete abutments. The overall length of the bridge is approximately 35.5 meters, and the overall width of the bridge is 12.4 meters. The span lengths are 11.4 m, 11.5 m, and 11.4 m from south to north.

The deck consists of an asphalt wearing surface on a 178 mm thick reinforced concrete deck. A railing system exists at both sides of the bridge which consists of four horizontal HSS rails at the west side and two horizontal HSS rails at the east side with a steel flex beam guide rail at the approaches. A concrete sidewalk is located along the west side of the bridge, and a concrete curb is located along the east side of the bridge. Concrete parapet walls are located at the four corners of the bridge.

The deck is supported by five W610 ACR steel girders. The superstructure also includes ACR steel end and intermediate diaphragms. The ends of each steel girder sit upon elastomeric bearing pads at the piers and abutments. The abutments, wingwalls, and piers consist of reinforced, cast-in-place concrete.

2.0 Significant Findings

One full width medium crack and two full width narrow cracks were observed at the sidewalk.

Gravel has accumulated on top of the curb at the bridge and the approaches.

Delamination was observed at all four parapet walls. Light pattern cracking was observed at the inside faces of all parapet walls. The expansion joints have shrunk and are beginning to fail.

Gravel has accumulated on the base plates at the east and west side railing system posts.

A wide, full roadway width asphalt crack exists at both approach slab joints.

Light pattern cracking was observed throughout the northwest wingwall.

The steel beam guide rail is off clip angle shelves at end posts at northeast corner of site.

Erosion has occurred at top of embankment at southwest corner of bridge, and southeast end of

site.

Wire rope cables are loose at the approach railing system.

Rotated offset timbers were observed at southwest corner of site.

Gravel has built-up in front of steel beam guide rail at south approach to bridge.

Two full height medium cracks were observed at the north and south abutments.

Three areas of delamination were observed at the north abutment. Delamination and two spalls were observed at the south abutment.

Medium pattern cracks were observed at the sides of the abutments.

Delamination and one wide crack was observed at the south pier. A spall with exposed rebar, one area of delamination, and one wide crack was observed at the north pier.

There are wide vertical gaps between the wingwalls and the sides of the abutments.

Graffiti was observed on the piers and abutments.

3.0 Conclusions and Recommendations

The BCI is the ratio of the value of each bridge element in its current state to the total replacement value of the bridge. The overall Bridge Condition Index (BCI) of Duke Street Bridge over CP Railway is 77. The BCI value of the bridge indicates the bridge is in good condition.

We recommend the following remedial repairs be done within the next 1-5 years:

- Seal the cracks at the sidewalk with polyurethane.
- Remove the gravel from the curb and the base plates at the east and west side railing system posts.
- Reface the parapet walls. Provide new expansion joints.
- Rout and seal asphalt cracks at the approaches.
- Modify guide rail to sit upon shelf angles at termination posts.
- Restore eroded slopes at southwest corner of bridge and southeast end of site.
- Tighten all loose cables at the approach railing system.
- Remove/regrade gravel away from steel beam guide rail at south approach.
- Realign all rotated offset timbers behind steel beam guide rails.
- Remove graffiti off the piers and abutments.
- Inject the cracks at the abutments and piers with epoxy.
- Repair spalling and delaminated areas at the abutments and piers.

We recommend a monitoring system be established to measure and record the widths of the gaps between the wingwalls and abutments.

We recommend the next bridge inspection be done in 2026.

4.0 Estimated Construction Costs

The following are the estimated construction costs for the recommended remedial repairs:

Seal cracks at the sidewalk	$ 1,000.00
Remove the gravel from the curbs	$ 500.00
Reface parapet walls and provide new expansion joints.	$ 15,000.00
Rout and seal asphalt cracks	$ 1,000.00
Modify guide rail to sit on post shelves	$ 1,500.00
Restore eroded embankments	$ 500.00
Tighten loose cables	$ 500.00
Remove/regrade gravel in front of guide rail	$ 1,000.00
Realign plumb all offset timbers at posts	$ 1,000.00
Inject cracks at abutments and piers	$ 17,000.00
Repair spalling and delaminated areas at piers and abutments	$ 21,000.00
Subtotal	$ 60,000.00
Mob/Demob (20%)	$ 12,000.00
Engineering/Contingency (35%)	$ 21,000.00
Total Estimated Construction Cost	**$ 93,000.00 + HST**

Even though the structural inspection was carefully done, we do not claim that the observations made represent all of the faults or imperfections which may exist.

Inventory Data:

Structure Name	Duke Street Bridge over CP Railway		
Main Hwy/Road #	594 On ☒ Under ☐	Crossing Type:	☐ Navig. Water ☐ Non-Navig. Water ☒ Rail ☐ Road ☐ Ped. ☐ Other
Hwy/Road Name	Highway 594/Duke Street		
Structure Location	300 m South of Duke Street/Hwy 17 Intersection		
Latitude	49°47' 45"N	Longitude	92°49' 20"W
Owner(s)	City of Dryden	Heritage Designation:	☒ Not Cons. ☐ Cons./not App. ☐ List/not Desig. ☐ Desig./not List ☐ Desig. & List
MTO Region	Northwestern	Road Class:	Freeway ☐ Arterial ☐ Collector ☒ Local ☐
MTO District	Thunder Bay	Posted Speed	50 No. of Lanes 2
Old County	Rainy River	AADT	% Trucks
Geographic Twp.	544	Inspection Route Sequence	
Structure Type	3 Span Bridge	Interchange Number	
Total Deck Length	35.5 (m)	Interchange Structure Number	
Overall Str. Width	12.4 (m)	Min. Vertical Clearance	(m)
Total Deck Area	440 (sq.m)	Special Routes:	☐ Transit ☐ Truck ☒ School ☐ Bicycle
Roadway Width	9.1 (m)	Detour Length Around Bridge	3.5 (km)
Skew Angle	0 (Degrees)	Direction of Structure	North/South
No. of Spans	3	Fill on Structure	(m)
Span Lengths	11.4, 11.5, 11.4		(m)

Historical Data:

Year Built	1964	Year of Last Major Rehab.	2010
Last OSIM Inspection	2022	Last Evaluation	
Last Enhanced OSIM Inspection		Current Load Limit	/ / (tonnes)
Enhanced Access Equipment (ladder, boat, lift, etc.)		Load Limit By-Law #	
Last Underwater Inspection		By-Law Expiry Date	
Last Condition Survey	2007		

Rehab History: (Date/description)
2010 - Superstructure replaced and substructure repaired.

Field Inspection Information:			
Date of Inspection:	October 8, 2024	Type of Inspection:	☒OSIM ☐ Enhanced OSIM
Inspector:	Mohamed Chehabeddine, EIT, JML Engineering		
Others in Party:	Lucas Sandberg, JML Engineering		
Access Equipment Used:			
Weather:	Sunny		
Temperature:	18° C		

Additional Investigations Required:	Priority		
	None	Normal	Urgent
Material Condition Survey			
Detailed Deck Condition Survey:	☒	☐	☐
Non-destructive Delamination Survey of Asphalt-Covered Deck:	☒	☐	☐
Concrete Substructure Condition Survey:	☒	☐	☐
Detailed Coating Condition Survey:	☒	☐	☐
Detailed Timber Investigation	☒	☐	☐
Post-Tensioned Strand Investigation	☒	☐	☐
Underwater Investigation:	☒	☐	☐
Fatigue Investigation:	☒	☐	☐
Seismic Investigation:	☒	☐	☐
Structure Evaluation:	☒	☐	☐
Monitoring			
Monitoring of Deformations, Settlements and Movements:	☐	☒	☐
Monitoring Crack Widths:	☒	☐	☐
Investigation Notes: Establish a monitoring system to measure the gaps between the wingwalls and abutments.			

Overall Structure Notes:	
Recommended Work on Structure:	☐ None ☒ Minor Rehab. ☐ Major Rehab. ☐ Replace
Timing of Recommended Work:	☒ 1 to 5 years ☐ 6 to 10 years
Overall Comments:	Seal cracks at sidewalk with polyurethane. Remove gravel from top of curb and base plates. Reface concrete at parapet walls. Complete various repairs at approaches. Reface delaminated and spalling areas at piers and abutments and inject cracks with epoxy at piers and abutments.
Date of Next Inspection:	2026

Suspected Performance Deficiencies

01 Load carrying capacity
02 Excessive deformations (deflections & rotations)
03 Continuing settlement
04 Continuing movements
05 Seized bearings
06 Bearing not uniformly loaded/unstable
07 Jammed expansion joint
08 Pedestrian/vehicular hazard
09 Rough riding surface
10 Surface ponding
11 Deck drainage
12 Slippery surfaces
13 Flooding/channel blockage
14 Undermining of foundation
15 Unstable embankments
16 Other

Maintenance Needs

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
07 Repair to Structural Steel
08 Repair of Bridge Concrete
09 Repair of Bridge Timber
10 Bailey Bridges - Maintenance
11 Animal/Pest Control
12 Bridge Surface Repair
13 Erosion Control at Bridges
14 Concrete Sealing
15 Rout and Seal
16 Bridge Deck Drainage
17 Scaling (Loose Concrete or ACR Steel)
18 Other

Element Group:	**Decks**	**Length:**	35.6 m
Element Name:	**Wearing Surface**	**Width:**	9.1 m
Location:		**Height:**	0.178 m
Material:	Asphalt	**Count:**	1
Element Type:		**Total Quantity:**	324 sq m
Environment:	**Benign / Moderate / Severe**	**Limited Inspection**	☐
Protection System:	None		**Perform. Deficiencies**

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	
	m² / m / each / % / all		324			11

Comments:

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Decks**	**Length:**	35.6 m
Element Name:	**Deck Top**	**Width:**	12.4 m
Location:		**Height:**	0.178 m
Material:	Cast-in-place concrete	**Count:**	1
Element Type:		**Total Quantity:**	442 sq m
Environment:	**Benign / Moderate / Severe**	**Limited Inspection**	☒
Protection System:	Waterproofing and asphalt		**Perform. Deficiencies**

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	
	m² / m / each / % / all		442			

Comments:

Unable to inspect deck top due to wearing surface.

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Decks**	**Length:**	35.6 m
Element Name:	**Soffit – Thin Slab**	**Width:**	12.4 m
Location:		**Height:**	0.178 m
Material:	Cast-in-place concrete	**Count:**	1
Element Type:		**Total Quantity:**	442 sq m
Environment:	**Benign / Moderate / Severe**	**Limited Inspection**	☒
Protection System:			**Perform. Deficiencies**

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	
	m² / m / each / % / all	195	247			

Comments:

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Joints**	**Length:**	9.1 m
Element Name:	**Expansion Joints**	**Width:**	
Location:	North and South Approach	**Height:**	
Material:		**Count:**	2
Element Type:		**Total Quantity:**	18 m
Environment:	**Benign / Moderate / Severe**	**Limited Inspection**	☐
Protection System:			

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	m^2 / m / each / % / all		18			

Comments:

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Sidewalks/Curbs**	**Length:**	35.6 m
Element Name:	**Sidewalk**	**Width:**	2.03 m
Location:	West Side	**Height:**	0.2 m
Material:	Cast-in-place concrete	**Count:**	1
Element Type:		**Total Quantity:**	80 sq m
Environment:	**Benign / Moderate / Severe**	**Limited Inspection**	☐
Protection System:	None		

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	m^2 / m / each / % / all		79	1		

Comments:

One full width medium crack. Two narrow cracks.

Recommended Work:	☒Rehab ☐ Replace	**Maintenance Needs:**	
	☒1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	
Seal cracks with polyurethane.			

Element Group:	**Sidewalks/Curbs**	**Length:**	35.6 m
Element Name:	**Curbs**	**Width:**	0.61 m
Location:	East Side	**Height:**	0.2 m
Material:	Cast-in-place concrete	**Count:**	1
Element Type:		**Total Quantity:**	29 sq m
Environment:	**Benign / Moderate / Severe**	**Limited Inspection**	☐
Protection System:	None		

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	m^2 / m / each / % / all		28	1		

Comments:

Gravel accumulation on top of curb. Light abrasion and impact damage at approaches.

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	02
	☐1-5 years ☐ 6-10 years	☐ Urgent ☒ 1 year ☐ 2 year	
		Remove gravel.	

Element Group:	**Barriers**	**Length:**	3.9 m
Element Name:	**Parapet Walls**	**Width:**	0.254 m
Location:	North and South ends	**Height:**	1.12 m
Material:	Cast-in-place concrete	**Count:**	4
Element Type:		**Total Quantity:**	41 sq m
Environment:	**Benign / Moderate / (Severe)**	**Limited Inspection**	☐
Protection System:	Thoroseal		**Perform. Deficiencies**

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**
	(m²) / m / each / % / all		20	15	6

Comments:

Scaling at northwest wall at south. Delamination at all walls. Light to medium pattern cracking throughout front faces. Wide crack at southeast wall where a future corner spall will occur. The expansion joints have cracked and are failing.

Recommended Work:	☒Rehab ☐ Replace	**Maintenance Needs:**	
	☒1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	
Reface parapet walls. Replace expansion joints.			

Element Group:	**Barriers**	**Length:**	35.6 m
Element Name:	**Railing Systems**	**Width:**	
Location:	West and East sides	**Height:**	
Material:	Steel	**Count:**	2
Element Type:	HSS	**Total Quantity:**	71 m
Environment:	**Benign / (Moderate) / Severe**	**Limited Inspection**	☐
Protection System:	Hot dip galvanizing		**Perform. Deficiencies**

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**
	m² / (m) / each / % / all		71		

Comments:

Excessive joints at east side. Rails touching at splice joint but separated greatly at opposite end at west side. Gravel accumulation on base plates at west side.

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	02
	☐1-5 years ☐ 6-10 years	☐ Urgent ☒ 1 year ☐ 2 year	
		Remove gravel.	

Element Group:	**Coatings**	**Length:**	35.6 m
Element Name:	**Railing Systems**	**Width:**	
Location:	West and East sides	**Height:**	
Material:	Hot Dip Galvanizing	**Count:**	2
Element Type:		**Total Quantity:**	71 m
Environment:	**Benign / (Moderate) / Severe**	**Limited Inspection**	☐
Protection System:			**Perform. Deficiencies**

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**
	m² / (m) / each / % / all		71		

Comments:

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Beams/MLE's**	**Length:**	35.6 m
Element Name:	**Girders**	**Width:**	0.324 m
Location:	5 each span	**Height:**	0.611 m
Material:	Steel	**Count:**	5
Element Type:	I-Type	**Total Quantity:**	390 sq m
Environment:	**(Benign) / Moderate / Severe**	**Limited Inspection**	☒
Protection System:	ACR		

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	(m²) / m / each / % / all	172	218			

Comments:

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Beams/MLE's**	**Length:**	2.3 m
Element Name:	**Diaphragms**	**Width:**	0.086 m
Location:	Between Girders at Mid Span	**Height:**	0.381 m
Material:	Steel	**Count:**	26
Element Type:	Channel	**Total Quantity:**	26
Environment:	**(Benign) / Moderate / Severe**	**Limited Inspection**	☒
Protection System:	ACR		

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	m² / m / (each) / % / all		26			

Comments:

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Abutments**	**Length:**	
Element Name:	**Abutment Walls**	**Width:**	11.9 m
Location:	South Abutment	**Height:**	6.0 m
Material:	Cast-in-place concrete	**Count:**	1
Element Type:		**Total Quantity:**	72 sq m
Environment:	**(Benign) / Moderate / Severe**	**Limited Inspection**	☐
Protection System:			

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	(m²) / m / each / % / all		60	8	4	

Comments:

Light to medium scaling at base of abutment. One delaminated area near top of abutment. Two spalls. Two full height medium cracks. Graffiti paint on abutment.

Recommended Work:	☒Rehab ☐ Replace	**Maintenance Needs:**	02
	☒1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☒ 2 year	
Repair delaminated and spalling areas. Inject cracks with epoxy.		Remove graffiti paint.	

Element Group:	**Abutments**	**Length:**	
Element Name:	**Abutment Walls**	**Width:**	11.9 m
Location:	North Abutment	**Height:**	6.0 m
Material:	Cast-in-place concrete	**Count:**	1
Element Type:		**Total Quantity:**	72 sq m
Environment:	(**Benign**) / **Moderate** / **Severe**	**Limited Inspection**	☐
Protection System:			

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	(**m²**) / **m** / **each** / **%** / **all**		55	12	5	

Comments:

Two full height medium cracks, one full height wide crack. Three delaminated areas. Medium scaling at west and east corners, top, and edges. Graffiti paint on abutment.

Recommended Work:	☒Rehab ☐ Replace	**Maintenance Needs:**	02
	☒1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☒ 2 year	
Repair delaminated areas. Inject cracks with epoxy.		Remove graffiti paint.	

Element Group:	**Abutments**	**Length:**	
Element Name:	**Wingwalls**	**Width:**	7.5 m
Location:	South Wingwall	**Height:**	4.8 m
Material:	Cast-in-place concrete	**Count:**	2
Element Type:		**Total Quantity:**	72 sq m
Environment:	(**Benign**) / **Moderate** / **Severe**	**Limited Inspection**	☒
Protection System:			

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	(**m²**) / **m** / **each** / **%** / **all**		68	2	2	

Comments:

Large gap between wingwall and abutment wall. Light to medium pattern cracks at sides of abutments.

Recommended Work:	☒Rehab ☐ Replace	**Maintenance Needs:**	18
	☒1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☒ 2 year	
Reface areas with pattern cracks.		Establish a monitoring system to measure gap width.	

Element Group:	**Abutments**	**Length:**	
Element Name:	**Wingwalls**	**Width:**	7.5 m
Location:	North Wingwall	**Height:**	4.8 m
Material:	Cast-in-place concrete	**Count:**	2
Element Type:		**Total Quantity:**	72 sq m
Environment:	(**Benign**) / **Moderate** / **Severe**	**Limited Inspection**	☐
Protection System:			

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	(**m²**) / **m** / **each** / **%** / **all**		67	3	2	

Comments:

Large gap between wingwall and abutment wall. Light pattern cracking throughout. Scaling, medium cracks at sides at abutments.

Recommended Work:	☒Rehab ☐ Replace	**Maintenance Needs:**	18
	☒1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☒ 2 year	
Reface deteriorated areas		Establish a monitoring system to measure gap widths.	

Element Group:	**Abutments**	**Length:**	
Element Name:	**Bearings**	**Width:**	
Location:	North and South Ends	**Height:**	
Material:		**Count:**	5 per end
Element Type:	Elastomeric pad	**Total Quantity:**	10
Environment:	(**Benign**) / **Moderate** / **Severe**	**Limited Inspection**	☒
Protection System:			

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	m^2 / m / (**each**) / **% / all**		10			

Comments:

Unable to inspect.

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Piers**	**Length:**	6.1 m
Element Name:	**Piers**	**Width:**	0.69 m
Location:	South Pier	**Height:**	7.7 m
Material:	Cast-in-place concrete	**Count:**	1
Element Type:	Tee Type Pier	**Total Quantity:**	120 sq m
Environment:	(**Benign**) / **Moderate** / **Severe**	**Limited Inspection**	☐
Protection System:			

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	(**m^2**) / **m / each / % / all**		110	4	6	

Comments:

Several patched areas. One delaminated area at north face. Delamination and wide crack at east underside. Graffiti paint on pier.

Recommended Work:	☒Rehab ☐ Replace	**Maintenance Needs:**	02
	☒1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☒ 2 year	
Repair delaminated areas. Inject cracks with epoxy.		Remove graffitti paint.	

Element Group:	**Piers**	**Length:**	6.1 m
Element Name:	**Piers**	**Width:**	0.69 m
Location:	North Pier	**Height:**	7.7 m
Material:	Cast-in-place concrete	**Count:**	1
Element Type:	Tee type pier	**Total Quantity:**	120 sq m
Environment:	(**Benign**) / **Moderate** / **Severe**	**Limited Inspection**	☐
Protection System:			

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	(**m^2**) / **m / each / % / all**		109	4	7	

Comments:

Several patched areas. Spall with exposed rebar at south face. Wide cracks at corner spall and delamination at east face. Graffiti paint on pier.

Recommended Work:	☒Rehab ☐ Replace	**Maintenance Needs:**	02
	☒1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☒ 2 year	
Repair delaminated and spalled areas. Inject cracks with epoxy.		Remove graffiti paint.	

Element Group:	**Piers**	**Length:**	
Element Name:	**Bearings**	**Width:**	
Location:	North and South Pier	**Height:**	
Material:		**Count:**	10 per pier
Element Type:	Elastomeric pad	**Total Quantity:**	20
Environment:	**(Benign) / Moderate / Severe**	**Limited Inspection**	☒
Protection System:			

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	m^2 / m / (each) / % / all		20			

Comments:

Unable to inspect.

Recommended Work:	☐Rehab ☐ Replace ☐1-5 years ☐ 6-10 years	**Maintenance Needs:** ☐ Urgent ☐ 1 year ☐ 2 year

Element Group:	**Foundations**	**Length:**	
Element Name:	**Foundation (below ground level)**	**Width:**	
Location:	Piers and Abutments	**Height:**	
Material:		**Count:**	
Element Type:		**Total Quantity:**	
Environment:	**(Benign) / Moderate / Severe**	**Limited Inspection**	☐
Protection System:			

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	m^2 / m / each / % / (all)	☐	☒	☐	☐	

Comments:

Abutment and pier footings located below ground level. No signs of movement observed.

Recommended Work:	☐Rehab ☐ Replace ☐1-5 years ☐ 6-10 years	**Maintenance Needs:** ☐ Urgent ☐ 1 year ☐ 2 year

Element Group:	**Embankments & Streams**	**Length:**	
Element Name:	**Slope Protection**	**Width:**	
Location:	North and South ends	**Height:**	
Material:		**Count:**	
Element Type:		**Total Quantity:**	
Environment:	**(Benign) / Moderate / Severe**	**Limited Inspection**	☐
Protection System:			

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	m^2 / m / each / (%) / all		98			15

Comments:

Erosion occurring near southwest corner of bridge and southeast end of site.

Recommended Work:	☐Rehab ☐ Replace ☐1-5 years ☐ 6-10 years	**Maintenance Needs:** 13 ☐ Urgent ☐ 1 year ☒ 2 year Top up gravel and apply seed and mulch to stabilize slope.

Element Group:	**Approaches**	**Length:**	6.1 m
Element Name:	**Wearing Surfaces**	**Width:**	9.1 m
Location:	North and South ends	**Height:**	0.075 m
Material:	Asphalt	**Count:**	2
Element Type:		**Total Quantity:**	111 sq m
Environment:	**Benign / Moderate / (Severe)**	**Limited Inspection**	☐
Protection System:			

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	(m²) / m / each / % / all		107	2	2	

Comments:

Wide, full roadway width transverse crack exists at both approaches.

Recommended Work:	☒Rehab ☐ Replace	**Maintenance Needs:**	
	☒1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	
Rout and seal cracks.			

Element Group:	**Approaches**	**Length:**	6.1 m
Element Name:	**Approach Slabs**	**Width:**	11.2 m
Location:	North and South	**Height:**	0.254 m
Material:	Cast-in-place concrete	**Count:**	2
Element Type:		**Total Quantity:**	137 sq m
Environment:	**Benign / (Moderate) / Severe**	**Limited Inspection**	☒
Protection System:	Waterproofing and asphalt		

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	(m²) / m / each / % / all		137			

Comments:

Covered by asphalt.

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Approaches**	**Length:**	4 m
Element Name:	**Curb**	**Width:**	0.413 m
Location:	East curb	**Height:**	0.33 m
Material:	Cast-in-place concrete	**Count:**	2
Element Type:		**Total Quantity:**	4 sq m
Environment:	**Benign / Moderate / (Severe)**	**Limited Inspection**	☐
Protection System:			

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	(m²) / m / each / % / all		4			

Comments:

Gravel accumulation on both curbs. Abrasion at northeast curb.

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	02
	☐1-5 years ☐ 6-10 years	☐ Urgent ☒ 1 year ☐ 2 year	
		Remove gravel.	

Element Group:	**Approaches**	**Length:**	6.1 m
Element Name:	**Sidewalk**	**Width:**	1.5 m
Location:	North and South ends	**Height:**	
Material:	Cast-in-place concrete	**Count:**	2
Element Type:		**Total Quantity:**	18 sq m
Environment:	**Benign / Moderate / Severe**	**Limited Inspection**	☐
Protection System:	Waterproofing and asphalt		

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	m^2 / m / each / % / all		18			

Comments:

Recommended Work:	☐Rehab ☐ Replace	**Maintenance Needs:**	
	☐1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	

Element Group:	**Approaches**	**Length:**	
Element Name:	**Railing**	**Width:**	
Location:	North and South ends	**Height:**	
Material:	Steel Beam	**Count:**	
Element Type:		**Total Quantity:**	160 m
Environment:	**Benign / Moderate / Severe**	**Limited Inspection**	☐
Protection System:			

Condition Data:	**Units**	**Exc.**	**Good**	**Fair**	**Poor**	**Perform. Deficiencies**
	m^2 / m / each / % / all		159	1		

Comments:

Steel beam off clip angles at northeast corner of site. A few offset timbers have rotated. Impact damage at southeast corner.

Recommended Work:	☒Rehab ☐ Replace	**Maintenance Needs:**	
	☒1-5 years ☐ 6-10 years	☐ Urgent ☐ 1 year ☐ 2 year	
Modify steel beam to sit upon clip angles. Re-align offset timbers plumb.			

Photo 1: North approach to bridge.

Photo 2: South approach to bridge.

Photo 3: East elevation looking west.


Photo 4: West elevation looking east.

Photo 5: Deck cross-section.

Photo 6: Underside of deck at south span.

Photo 7: Underside of deck at middle span.

Photo 8: Underside of deck at north span.

Photo 9: North abutment.

Photo 10: Northeast wingwall.

Photo 11: Northwest wingwall.

Photo 12: South abutment.

Photo 13: Southeast wingwall.

Photo 14: Southwest wingwall.

Photo 15: North face of north pier.

Photo 16: South face of north pier.

Photo 17: North face of south pier.

Photo 18: South face of south pier.

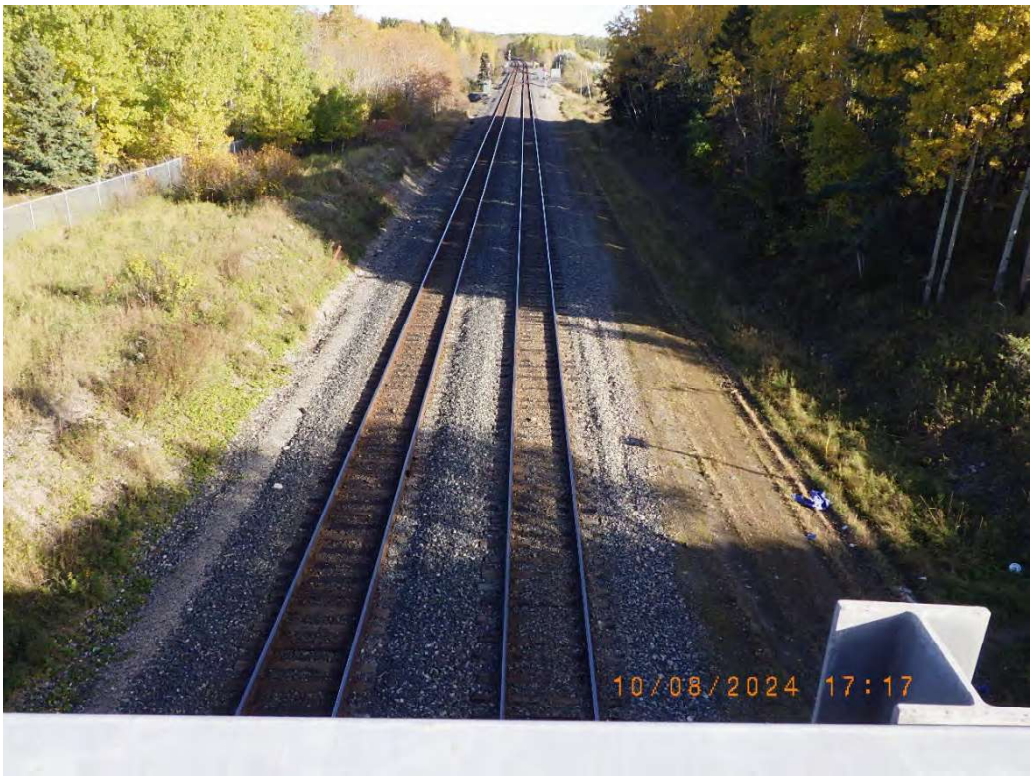

Photo 19: Looking east from bridge.

Photo 20: Looking west from bridge.

Photo 21: North approach slab joint.

Photo 22: South approach slab joint.

Photo 23: Northeast embankment.

Photo 24: Northwest embankment.

Photo 25: Southeast embankment.

Photo 26: Southwest embankment.

Photo 27: Barrier rail along east side of bridge.

Photo 28: Barrier rail along west side of bridge.

Photo 29: Abrasion damage along face and top edge of sidewalk.

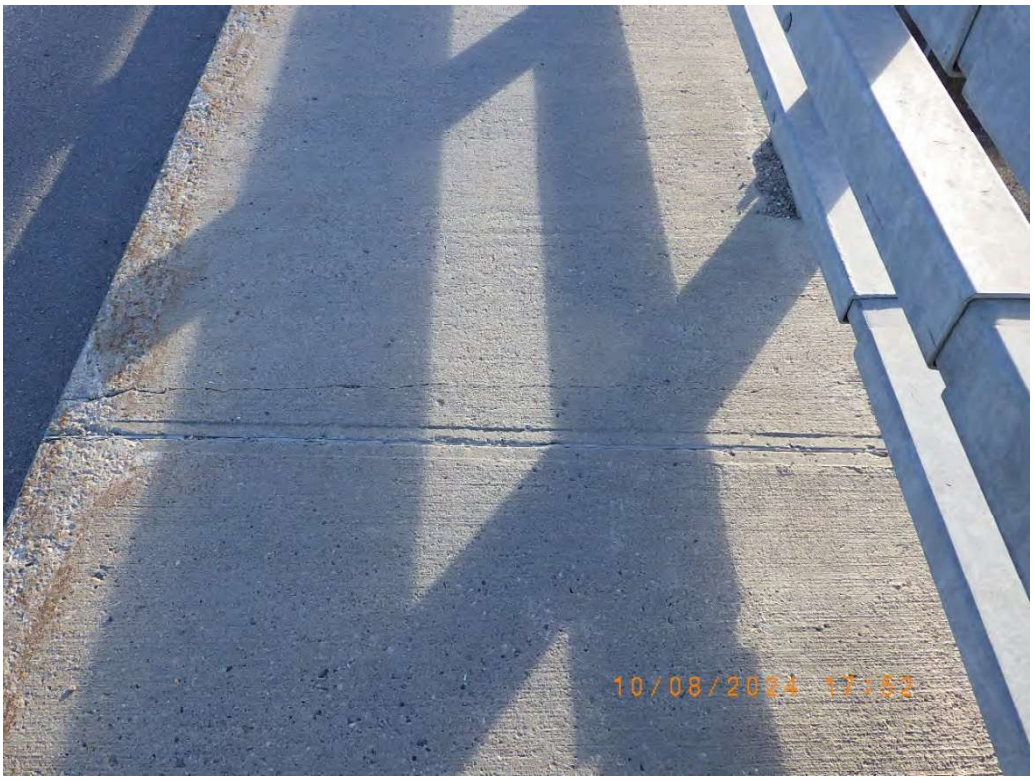

Photo 30: Medium transverse crack in sidewalk.

Photo 31: Gravel accumulation on curb and post base plates.

Photo 32: Scaling, delamination and cracks at northeast parapet wall (typ.).

Photo 33: Wide gap at steel beam splice.

Photo 34: Wide gap between southeast wingwall and south abutment (typ.).

Photo 35: Vertical crack at north abutment.

Photo 36: Corner spalls at south pier.

Photo 37: Erosion at embankment northwest corner of bridge.

Photo 38: Erosion at embankment southeast area of site.

Photo 39: Steel beam guide rail off steel shelves at northeast end treatment.

Photo 40: Loose cables at south approach.

Photo 41: Gravel accumulation in front of guide rail at east side of south approach.

Photo 42: Rotated offset timber at southeast corner of site (typ.).