

Ontario Structure Inspection Manual (OSIM)  
Bridge Inspection Report  
Township of Stone Mills

Prepared by:  
Jewell Engineering

For:  
Cataraqi Conservation

Dated October 22, 2020

October 22, 2020

Cataraqui Region Conservation Authority  
1641 Perth Road  
P.O. Box 160  
Glenburnie, ON K0H 1S0

Attn: **Steve Knapton**  
Supervisor, Operations & Maintenance

RE: Cataraqui Region Conservation Authority  
2020 OSIM Bridge Inspection Submission  
Our File No. 200-9678

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Dear Sir:

Jewell Engineering Inc. is pleased to provide you with our completed OSIM Bridge Inspection Reports of the Conservation Authority's eleven (11) structures within the Township of Stone Mills.

Ten (10) structures were inspected on September 24<sup>th</sup> 2020 and one (1) structure had been previously inspected under the County of Lennox and Addington's inspection cycle.

The Cataraqui Trail is owned and maintained by the Cataraqui Region Conservation Authority. The trail was originally owned by the Canadian National Railway and operated as a railbed until being donated to the Conservation Authority in 1997. The majority of structures are holdovers from the railway and are therefore over engineered for pedestrian use.

The CNR Viaduct (CRCA-SM8), located in Yarker, consists of the original railway bridge and a wearing surface and railing system modified for pedestrian use. The creosoted timber railway ties that make up the deck have started to rot. As the railway ties likely predate the transfer of ownership, they would be at least 23 years old. The wearing surface also exhibits sections of rot and decay. It has been recommended that a timber condition assessment be completed on the railway ties. The steel superstructure should be reviewed during bridge deck replacement for enhanced access. The concrete substructure has been recommended for refacing but could be forgone as repairs would be primarily superficial.

(Cont...)



**Professional Engineers**  
Ontario

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The Newburgh Bridge (CRCA-SM4) and the Camden East Bridge (CRCA-SM5) both exhibit rot in the railway ties for similar reasons to the CNR viaduct mentioned above. The steel elements in each bridge appear to remain in good condition and should not require any foreseeable maintenance. Both structures require railings as they have at least a 2.5 meter vertical drop. In the case of the Newburgh Bridge, there is a 4m drop and a gap between the edge of the deck and the exterior girders.

The Harrowsmith East Culvert (CRCA-SM11) exhibits disintegration at both ends from run off. Repair of the culvert is recommended within the next 10 years as the pattern of disintegration is likely to continue.

Each attached report includes colour photographs as per Provincial requirements for bridge inspections. All bridges have been reported on using traditional OSIM reports.

We have provided an electronic copy of all inspection reports and photos for your use on the attached USB key.

Please note that the estimated costing for recommended capital work is for construction only and other costs related to the following may be required for the completion of a project: additional investigations, approvals, engineering, administration and taxes. Prior to the completion of budgeting for a proposed project, or the completion of funding applications, the Municipality is advised to seek advice from an engineering firm in regards to estimated project costs.

The remaining structures are generally in good condition with minor maintenance needs.

If you have any questions or concerns, please contact the writer.



Engineer's Stamp

Sincerely,

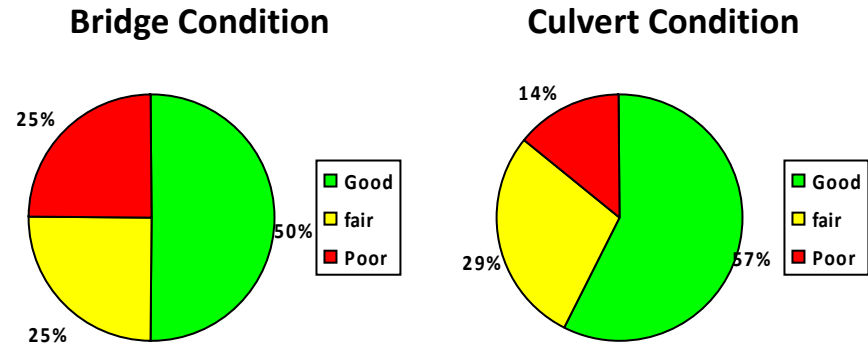
A handwritten signature in black ink, appearing to read "Chris Bent".

Chris Bent, P.Eng.  
Jewell Engineering Inc.  
Belleville Office

CB/jl

## List 1 - Summary Listing of All Structures

Asset Health Summary			
Bridges			
Poor		Fair	Good
BCI<50	50<BCI<60	60<BCI<70	BCI<70
0	1	1	2
Culverts			
Poor		Fair	Good
BCI<50	50<BCI<60	60<BCI<70	BCI<70
1	0	2	4



Structure Number	Structure Name	Road Name	Struct. Type	Deck Area (sq.m)	Estimated Replacement Cost (\$2020)	BCI
CRCA-SM1	Strathcona Culvert West	Cataraqui Trail	Round Culvert	30.1	\$390,000.00	65.73
CRCA-SM2	Strathcona Culvert East	Cataraqui Trail	Arch Culvert	42.9	\$560,000.00	70.25
CRCA-SM3	Academy Street Entrance Culvert	Cataraqui Trail	Round Culvert	14	\$80,000.00	75
CRCA-SM4	Newburgh Bridge	Cataraqui Trail	Half-through Beams of Gi	56	\$600,000.00	68.07
CRCA-SM5	Camden East Bridge	Cataraqui Trail	I-Beams or Girders	30.8	\$400,000.00	70.52
CRCA-SM6	Camden East - Yarker West Culve	Cataraqui Trail	Rectangular Culvert	5.6	\$80,000.00	67.72
CRCA-SM7	Camden East - Yarker East Culvert	Cataraqui Trail	Rectangular Culvert	11.4	\$100,000.00	74.17
CRCA-SM8	CNR Viaduct	Cataraqui Trail	I-Beams or Girders	460	\$3,450,000.00	51.06
CRCA-SM9	Yarker East Bridge	Cataraqui Trail	I-Beams or Girders	17.2	\$100,000.00	73.32
CRCA-SM10	Harrowsmith West Culvert	Cataraqui Trail	Rectangular Culvert	24.6	\$320,000.00	71.16



## List 1 - Summary Listing of All Structures

Structure Number	Structure Name	Road Name	Struct. Type	Deck Area (sq.m)	Estimated Replacement Cost (\$2020)	BCI
CRCA-SM11	Harrowsmith East Culvert	Cataraqui Trail	Rectangular Culvert	41.6	\$540,000.00	38.12

## List 2 - Structures Recommended for Rehabilitation

<b>CRCA-SM4</b>	<b>Newburgh Bridge</b>			
<b>Major Rehab</b>	Install Railing System		\$15,000.00	Within 1 Year
Decks	Deck Top - Thin Slab	Replace deck	\$40,000.00	1-5 Years
Decks	Wearing Surface	Replace with deck (Costed under deck)		1-5 Years
		<b>Associated Work:</b>	\$0.00	
		<b>Total Cost:</b>	\$55,000.00	
<b>CRCA-SM5</b>	<b>Camden East Bridge</b>			
<b>Minor Rehab</b>	Install railing system		\$15,000.00	Within 1 Year
Decks	Deck Top - Thin Slab	Replace deck	\$15,000.00	6-10 Years
Decks	Wearing Surface	Replace wearing surface (costed under deck)		6-10 Years
		<b>Associated Work:</b>	\$0.00	
		<b>Total Cost:</b>	\$30,000.00	
<b>CRCA-SM8</b>	<b>CNR Viaduct</b>			
<b>Major Rehab</b>				1-5 Years
Decks	Deck Top - Thin Slab	Replace Deck	\$140,000.00	1-5 Years
Barriers	Railing Systems	Replace Railing System	\$40,000.00	1-5 Years
Piers	Shafts/ Columns/ Pile Bents	Re-face Substructure	\$300,000.00	6-10 Years
		<b>Associated Work:</b>	\$8,000.00	
		<b>Total Cost:</b>	\$488,000.00	
<b>CRCA-SM11</b>	<b>Harrowsmith East Culvert</b>			
<b>Major Rehab</b>				6-10 Years
Culverts	Barrels	Concrete repairs to culvert ends.	\$80,000.00	6-10 Years
		<b>Associated Work:</b>	\$16,000.00	
		<b>Total Cost:</b>	\$96,000.00	

**Inventory Data**

Structure Name:	Strathcona Culvert West		
Road Name:	Catarqui Trail		
Structure Location:	380m East of Findlay Street		
Owner(s)	CRCA		
Latitude: 44.309309867	Longitude: -76.898244129	Crossing Type:	Non-Navig. Water
MTO Region:	Eastern	Heritage Designation:	Not Cons.
MTO District:	Kingston	Road Class:	Local
Structure Type:	Round Culvert	Posted Speed: 50km/h	AADT:
Total Deck Length:	1.22m	No. of Lanes: 1	% Trucks:
Overall Str. Width:	24.7m	Min. Vertical Clearance:	0
Total Deck Area:	30.1sq.m	Special Routes:	
Roadway Width:	2.7m	Transit <input type="checkbox"/>	Truck <input type="checkbox"/>
Skew Angle:	0	School <input type="checkbox"/>	Bicycle <input type="checkbox"/>
No. Spans:	1	Detour Length Around Bridge:	
Span Lengths:	1.22	Direction of Structure:	East-West
		Fill on Structure:	3m

**Historical Data**

Year Built:	Year of Last Major Rehab:
Last OSIM Inspection:	Last Evaluation:
Last Enhanced OSIM Inspection:	Current Load Limit
Enhanced Access Equipment:	Load Limit By-Law #
Last Underwater Inspection:	By-Law Expiry Date:
Last Condition Survey:	
Rehab History (Date/Description):	

**Field Inspection Information**

Date of Inspection:	2020-09-24	Weather:	Cloudy
Inspector:	John Landry, EIT	Temperature:	20
Others in Party:	Shane Wall, RCJI		
Equipment Used:	Camera, Handtools		

**Additional Investigations Required**

	Priority	Estimated Cost
Material Condition Survey		\$0.00
Detailed Deck condition Survey		\$0.00
Non-Destructive Delamination Survey of Asphalt-Covered Deck		\$0.00
Concrete Substructure Condition Survey		\$0.00
Detailed Coating Condition Survey		\$0.00
Detailed Timber Investigation		\$0.00
Post-Tensioned Strand Investigation		\$0.00
Underwater Investigation		\$0.00
Fatigue Investigation		\$0.00
Seismic Investigation		\$0.00
Structure Evaluation		\$0.00
Monitoring		\$0.00
Monitoring of Deformations, Settlements and Movements		\$0.00
Monitoring Crack Widths		\$0.00

Investigation Notes:

Total Cost: \$0.00

**Overall Structure Notes**

Recommended Work on Structure: None

Timing

BCI: 65.73

Overall Comments:

Date of next inspection: 2022-09-24

Culvert has minor deformation around mid-section and has light to moderate scaling along floor.

Element Data				
Element Group: Culverts		Material: Corrugated Steel		Length: 24.7m
Element Name: Barrels		Element Type: Pipe Round		Width: 1.22m
Location: Below trail		Environment: Benign		Height: 1.22m
Units	Excellent	Good	Fair	Poor
Sq.m	0	76.3	12.4	6
Protect. System:				Count: 1
				Total Quant. 94.7
Comments: Light to moderate corrosion with section loss in floor of barrel. Deformation in barrel around mid length.				
Rehab Recommendations:				
Limited Inspection <input type="checkbox"/> Performance Def: Maintenance: Timing:				

Element Data				
Element Group: Embankments and Streams		Material:		Length:
Element Name: Streams and Waterways		Element Type -		Width:
Location: Through culvert		Environment:		Height:
Units	Excellent	Good	Fair	Poor
All	0	1	0	0
Protect. System:				Count: 1
				Total Quant. 1
Comments: Culvert dry at time of inspection.				
Rehab Recommendations:				
Limited Inspection <input type="checkbox"/> Performance Def: Maintenance: Timing:				

Element Data				
Element Group: Embankments and Streams		Material:		Length:
Element Name: Embankments		Element Type -		Width:
Location: All four quadrants		Environment:		Height:
Units	Excellent	Good	Fair	Poor
All	0	4	0	0
Protect. System:				Count: 4
				Total Quant. 4
Comments: No concerns. Embankments are heavily vegetated.				
Rehab Recommendations:				
Limited Inspection <input type="checkbox"/> Performance Def: Maintenance: Timing:				



**Element Data**

Element Group: Approaches	Material: Gravel	Length: <input type="text" value="15m"/>										
Element Name: Wearing Surface	Element Type -	Width: <input type="text" value="2.7m"/>										
Location: Over culvert	Environment: Severe	Height: <input type="text"/>										
Protect. System:		Count: <input type="text" value="1"/>										
<table border="1"> <thead> <tr> <th>Units</th> <th>Excellent</th> <th>Good</th> <th>Fair</th> <th>Poor</th> </tr> </thead> <tbody> <tr> <td>Sq.m</td> <td>0</td> <td>40.5</td> <td>0</td> <td>0</td> </tr> </tbody> </table>		Units	Excellent	Good	Fair	Poor	Sq.m	0	40.5	0	0	Total Quant. <input type="text" value="40.5"/>
Units	Excellent	Good	Fair	Poor								
Sq.m	0	40.5	0	0								

**Comments:**

Well graded.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:**

Associated Work		
Associated Work	Comments	Estimated Cost
Approaches:		\$0.00
Detours:		\$0.00
Traffic Control:		\$0.00
Utilities:		\$0.00
Right of Way:		\$0.00
Environmental Study:		\$0.00
Other:		\$0.00
Contingencies:		\$0.00
<b>Associated Work Total:</b>		<u>\$0.00</u>

Total Estimated Cost	
Total cost of Recommended Works	\$0.00



South elevation



North elevation





Looking West over culvert



Looking east over culvert



Typical corrosion in culvert floor



Looking through barrel from south





Deformation of barrel at mid length

**Inventory Data**

Structure Name:	Strathcona Culvert East	Crossing Type:	Non-Navig. Water
Road Name:	Cataraqui Trail	Heritage Designation:	Not Cons.
Structure Location:	950m East of Finlay Street	Road Class:	Local
Owner(s)	CRCA	Posted Speed:	50km/h      AADT:
Latitude: 44.313175072	Longitude: -76.893433788	No. of Lanes:	1      % Trucks:
MTO Region:	Eastern	Min. Vertical Clearance:	
MTO District:	Kingston	Special Routes:	
Structure Type:	Arch Culvert	Transit <input type="checkbox"/>	Truck <input type="checkbox"/>
Total Deck Length:	3m	School <input type="checkbox"/>	Bicycle <input type="checkbox"/>
Overall Str. Width:	14.3m	Detour Length Around Bridge:	
Total Deck Area:	42.9sq.m	Direction of Structure:	East-West
Roadway Width:	2.7m	Fill on Structure:	1.2m
Skew Angle:	0		
No. Spans:	1		
Span Lengths:	2.46m		

**Historical Data**

Year Built:	Year of Last Major Rehab:
Last OSIM Inspection:	Last Evaluation:
Last Enhanced OSIM Inspection:	Current Load Limit
Enhanced Access Equipment:	Load Limit By-Law #
Last Underwater Inspection:	By-Law Expiry Date:
Last Condition Survey:	
Rehab History (Date/Description):	

**Field Inspection Information**

Date of Inspection:	2020-09-24	Weather:	Cloudy
Inspector:	John Landry, EIT	Temperature:	20
Others in Party:	Shane Wall, RCJI		
Equipment Used:	Camera, Handtools		

**Additional Investigations Required**

	Priority	Estimated Cost
Material Condition Survey		\$0.00
Detailed Deck condition Survey		\$0.00
Non-Destructive Delamination Survey of Asphalt-Covered Deck		\$0.00
Concrete Substructure Condition Survey		\$0.00
Detailed Coating Condition Survey		\$0.00
Detailed Timber Investigation		\$0.00
Post-Tensioned Strand Investigation		\$0.00
Underwater Investigation		\$0.00
Fatigue Investigation		\$0.00
Seismic Investigation		\$0.00
Structure Evaluation		\$0.00
Monitoring		\$0.00
Monitoring of Deformations, Settlements and Movements		\$0.00
Monitoring Crack Widths		\$0.00

Investigation Notes:

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 Total Cost: \$0.00
**Overall Structure Notes**

Recommended Work on Structure: None

Timing

BCI: 70.25

Overall Comments:

Date of next inspection: 2022-09-24

Structure has some cracking with efflorescence and delamination in walls. Overall structure remains in servicable condition.

Element Data				
Element Group: Culverts		Material: Cast-in-place Concrete		Length: 3.2m
Element Name: Inlet Components		Element Type -		Width: 0.5m
Location: North end		Environment: Moderate		Height: 2.23m
Units	Excellent	Good	Fair	Poor
Sq.m	0	7.14	0	0
Protect. System:		Count: 2		Total Quant. 7.14
Comments: Hariline cracks with efflorescence, Light scaling.				
Rehab Recommendations:				
Limited Inspection <input type="checkbox"/>				
Performance Def:				
Maintenance:				
Timing:				

Element Data				
Element Group: Culverts		Material: Cast-in-place Concrete		Length: 3.2m
Element Name: Outlet Components		Element Type -		Width: 0.5m
Location: South end		Environment: Moderate		Height: 2.23m
Units	Excellent	Good	Fair	Poor
Sq.m	0	7.14	0	0
Protect. System:		Count: 2		Total Quant. 7.14
Comments: Hariline cracks with efflorescence, Light scaling.				
Rehab Recommendations:				
Limited Inspection <input type="checkbox"/>				
Performance Def:				
Maintenance:				
Timing:				

Element Data				
Element Group: Culverts		Material: Cast-in-place Concrete		Length: 14.3m
Element Name: Barrels		Element Type Arch		Width: 2.46m
Location: Below trail		Environment: Benign		Height: 2.2m
Units	Excellent	Good	Fair	Poor
Sq.m	0	85.5	10	2.5
Protect. System:		Count: 1		Total Quant. 98
Comments: Culvert walls exhibit delamination and spalling. Narrow to medium cracks with efflorescence in barrel walls. Localized honeycombing and slight erosion at base of wall.				
Rehab Recommendations:				
Limited Inspection <input type="checkbox"/>				
Performance Def:				
Maintenance:				
Timing:				

**Element Data**

Element Group: Embankments and Streams  
 Element Name: Streams and Waterways

Material:  
 Element Type -

Length:   
 Width:   
 Height:   
 Count:   
 Total Quant.

Location: Through culvert

Units	Excellent	Good	Fair	Poor
All	0	1	0	0

Environment:  
 Protect. System:

**Comments:**

Dry at time of inspection. No concerns.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:**

**Element Data**

Element Group: Embankments and Streams  
 Element Name: Embankments

Material:  
 Element Type -

Length:   
 Width:   
 Height:   
 Count:   
 Total Quant.

Location: All four quadrants

Units	Excellent	Good	Fair	Poor
All	0	3	1	0

Environment:  
 Protect. System:

**Comments:**

Erosion noted in southwest quadrant. Timber retaining wall been erected but erosion continues below.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:**

**Element Data**

Element Group: Approaches  
 Element Name: Wearing Surface

Material: Gravel  
 Element Type -

Length:   
 Width:   
 Height:   
 Count:   
 Total Quant.

Location: Over culvert

Units	Excellent	Good	Fair	Poor
Sq.m	0	54	0	0

Environment: Severe  
 Protect. System:

**Comments:**

Well graded. Good condition.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:**



Associated Work		
Associated Work	Comments	Estimated Cost
Approaches:		\$0.00
Detours:		\$0.00
Traffic Control:		\$0.00
Utilities:		\$0.00
Right of Way:		\$0.00
Environmental Study:		\$0.00
Other:		\$0.00
Contingencies:		\$0.00
<b>Associated Work Total:</b>		<u>\$0.00</u>

Total Estimated Cost	
Total cost of Recommended Works	\$0.00



South elevation



North elevation





Looking east over culvert



Looking west over culvert



East wall (typical)



West wall (typical)





Cracking with efflorescence in west wall



Spalling and delamination in east wall





Cracking with efflorescence in west wall



Typical soffit detail



Southwest outlet wall (typical)

**Inventory Data**

Structure Name:	Academy Street Entrance Culverts		
Road Name:	Cataraqui Trail		
Structure Location:	15m South of Academy Street		
Owner(s)	CRCA		
Latitude: 44.322940279	Longitude: -76.882739416	Crossing Type:	Non-Navig. Water
MTO Region:	Eastern	Heritage Designation:	Not Cons.
MTO District:	Kingston	Road Class:	Local
Structure Type:	Round Culvert	Posted Speed: 50km/h	AADT:
Total Deck Length:	2m	No. of Lanes: 1	% Trucks:
Overall Str. Width:	7m	Min. Vertical Clearance:	
Total Deck Area:	14sq.m	Special Routes:	
Roadway Width:	2.7m	Transit <input type="checkbox"/>	Truck <input type="checkbox"/>
Skew Angle:	0	School <input type="checkbox"/>	Bicycle <input type="checkbox"/>
No. Spans:	2	Detour Length Around Bridge:	
Span Lengths:	1m; 1m	Direction of Structure:	North-South
		Fill on Structure:	0.3m

**Historical Data**

Year Built:	Year of Last Major Rehab:
Last OSIM Inspection:	Last Evaluation:
Last Enhanced OSIM Inspection:	Current Load Limit
Enhanced Access Equipment:	Load Limit By-Law #
Last Underwater Inspection:	By-Law Expiry Date:
Last Condition Survey:	
Rehab History (Date/Description):	

**Field Inspection Information**

Date of Inspection:	2020-09-24	Weather:	Cloudy
Inspector:	John Landry, EIT	Temperature:	20
Others in Party:	Shane Wall, RCJI		
Equipment Used:	Camera, Handtools		

**Additional Investigations Required**

	Priority	Estimated Cost
Material Condition Survey		\$0.00
Detailed Deck condition Survey		\$0.00
Non-Destructive Delamination Survey of Asphalt-Covered Deck		\$0.00
Concrete Substructure Condition Survey		\$0.00
Detailed Coating Condition Survey		\$0.00
Detailed Timber Investigation		\$0.00
Post-Tensioned Strand Investigation		\$0.00
Underwater Investigation		\$0.00
Fatigue Investigation		\$0.00
Seismic Investigation		\$0.00
Structure Evaluation		\$0.00
Monitoring		\$0.00
Monitoring of Deformations, Settlements and Movements		\$0.00
Monitoring Crack Widths		\$0.00

Investigation Notes:

Total Cost: \$0.00

**Overall Structure Notes**

Recommended Work on Structure: None

Timing

BCI: 75

Overall Comments:

Date of next inspection: 2022-09-24

Culverts are in good condition.

**Element Data**

Element Group: Culverts	Material: Corrugated Steel	Length: 7m										
Element Name: Barrels	Element Type Pipe Round	Width: 1m										
Location: Below trail	Environment: Benign	Height: 1m										
<table border="1"> <thead> <tr> <th>Units</th> <th>Excellent</th> <th>Good</th> <th>Fair</th> <th>Poor</th> </tr> </thead> <tbody> <tr> <td>Sq.m</td> <td>0</td> <td>44</td> <td>0</td> <td>0</td> </tr> </tbody> </table>	Units	Excellent	Good	Fair	Poor	Sq.m	0	44	0	0	Protect. System:	Count: 2
Units	Excellent	Good	Fair	Poor								
Sq.m	0	44	0	0								
		Total Quant. 44										

Comments:  
 Culverts remain in good condition.

Limited Inspection

Performance Def:

Maintenance:

Timing:

Rehab Recommendations:

**Element Data**

Element Group: Embankments and Streams	Material: -	Length: <input type="text"/>										
Element Name: Streams and Waterways	Element Type -	Width: <input type="text"/>										
Location: Through culverts	Environment:	Height: <input type="text"/>										
<table border="1"> <thead> <tr> <th>Units</th> <th>Excellent</th> <th>Good</th> <th>Fair</th> <th>Poor</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> </tr> </tbody> </table>	Units	Excellent	Good	Fair	Poor	All	0	1	0	0	Protect. System:	Count: 1
Units	Excellent	Good	Fair	Poor								
All	0	1	0	0								
		Total Quant. 1										

Comments:  
 No concerns. Ditch flows north to south.

Limited Inspection

Performance Def:

Maintenance:

Timing:

Rehab Recommendations:

**Element Data**

Element Group: Embankments and Streams	Material: Gravel	Length: <input type="text"/>										
Element Name: Embankments	Element Type -	Width: <input type="text"/>										
Location: All four quadrants	Environment: Moderate	Height: <input type="text"/>										
<table border="1"> <thead> <tr> <th>Units</th> <th>Excellent</th> <th>Good</th> <th>Fair</th> <th>Poor</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>0</td> <td>4</td> <td>0</td> <td>0</td> </tr> </tbody> </table>	Units	Excellent	Good	Fair	Poor	All	0	4	0	0	Protect. System:	Count: 4
Units	Excellent	Good	Fair	Poor								
All	0	4	0	0								
		Total Quant. 4										

Comments:  
 Heavily vegetated. No concerns.

Limited Inspection

Performance Def:

Maintenance:

Timing:

Rehab Recommendations:

**Element Data**

Element Group: Approaches	Material: Gravel	Length: <input type="text" value="10m"/>
Element Name: Wearing Surface	Element Type -	Width: <input type="text" value="2.7m"/>
Location: Over culverts	Environment: Severe	Height: <input type="text"/>
Protect. System:		Count: <input type="text" value="1"/>
		Total Quant. <input type="text" value="27"/>

Units	Excellent	Good	Fair	Poor
Sq.m	0	27	0	0

**Comments:**

Well graded. Good condition.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:**

Associated Work		
Associated Work	Comments	Estimated Cost
Approaches:		\$0.00
Detours:		\$0.00
Traffic Control:		\$0.00
Utilities:		\$0.00
Right of Way:		\$0.00
Environmental Study:		\$0.00
Other:		\$0.00
Contingencies:		\$0.00
<b>Associated Work Total:</b>		<b>\$0.00</b>

Total Estimated Cost	
Total cost of Recommended Works	\$0.00





West elevation



East elevation





Looking north over culverts



Looking through south barrel



Looking south over culverts



Looking through north barrel

**Inventory Data**

Structure Name:	Newburgh Bridge		
Road Name:	Cataraqui Trail		
Structure Location:	210m West of East County Road 17 Entrance		
Owner(s)	CRCA		
Latitude: 44.338106463	Longitude: -76.866823637	Crossing Type:	Non-Navig. Water
MTO Region:	Eastern	Heritage Designation:	Not Cons.
MTO District:	Kingston	Road Class:	Local
Structure Type:	Half-through Beams of Girders	Posted Speed: 50km/h	AADT:
Total Deck Length:	10.8m	No. of Lanes: 1	% Trucks:
Overall Str. Width:	5.2m	Min. Vertical Clearance:	0
Total Deck Area:	56sq.m	Special Routes:	
Roadway Width:	3m	Transit <input type="checkbox"/>	Truck <input type="checkbox"/>
Skew Angle:	0	School <input type="checkbox"/>	Bicycle <input type="checkbox"/>
No. Spans:	1	Detour Length Around Bridge:	
Span Lengths:	9.8m	Direction of Structure:	East-West
		Fill on Structure:	

**Historical Data**

Year Built:	Year of Last Major Rehab:
Last OSIM Inspection:	Last Evaluation:
Last Enhanced OSIM Inspection:	Current Load Limit
Enhanced Access Equipment:	Load Limit By-Law #
Last Underwater Inspection:	By-Law Expiry Date:
Last Condition Survey:	
Rehab History (Date/Description):	

**Field Inspection Information**

Date of Inspection:	2020-09-24	Weather:	Cloudy
Inspector:	John Landry, EIT	Temperature:	20
Others in Party:	Shane Wall, RCJI		
Equipment Used:	Camera, Handtools		



**Additional Investigations Required**

	Priority	Estimated Cost
Material Condition Survey		\$0.00
Detailed Deck condition Survey		\$0.00
Non-Destructive Delamination Survey of Asphalt-Covered Deck		\$0.00
Concrete Substructure Condition Survey		\$0.00
Detailed Coating Condition Survey		\$0.00
Detailed Timber Investigation		\$0.00
Post-Tensioned Strand Investigation		\$0.00
Underwater Investigation		\$0.00
Fatigue Investigation		\$0.00
Seismic Investigation		\$0.00
Structure Evaluation		\$0.00
Monitoring		\$0.00
Monitoring of Deformations, Settlements and Movements		\$0.00
Monitoring Crack Widths		\$0.00

Investigation Notes:

Total Cost: \$0.00

**Overall Structure Notes**

Recommended Work on Structure: Major Rehab

Timing Within 1 Year

BCI: 68.07

Overall Comments:

Date of next inspection: 2022-09-24

Superstructure remains in good condition. Deck will require replacement within the next 5 years.

**Element Data**

Element Group: Decks	Material: Wood	Length: 10.8m										
Element Name: Wearing Surface	Element Type -	Width: 3.02m										
Location: Over railway ties	Environment: Severe	Height:										
<table border="1"> <thead> <tr> <th>Units</th> <th>Excellent</th> <th>Good</th> <th>Fair</th> <th>Poor</th> </tr> </thead> <tbody> <tr> <td>Sq.m</td> <td>0</td> <td>27.1</td> <td>5</td> <td>0.5</td> </tr> </tbody> </table>	Units	Excellent	Good	Fair	Poor	Sq.m	0	27.1	5	0.5	Protect. System:	Count: 1
Units	Excellent	Good	Fair	Poor								
Sq.m	0	27.1	5	0.5								
		Total Quant. 32.6										

**Comments:**

Loose nails, weathering and splitting throughout. Abrasion at deck ends.

Limited Inspection

Performance Def:

Maintenance:

Timing: 1-5 Years

**Rehab Recommendations:**

Replace with deck (Costed under deck)

**Element Data**

Element Group: Decks	Material: Wood	Length: 10.8m										
Element Name: Deck Top - Thin Slab	Element Type Wood Planks	Width: 4m										
Location: Deck surface	Environment: Severe	Height:										
<table border="1"> <thead> <tr> <th>Units</th> <th>Excellent</th> <th>Good</th> <th>Fair</th> <th>Poor</th> </tr> </thead> <tbody> <tr> <td>Sq.m</td> <td>0</td> <td>23.2</td> <td>15</td> <td>5</td> </tr> </tbody> </table>	Units	Excellent	Good	Fair	Poor	Sq.m	0	23.2	15	5	Protect. System:	Count: 1
Units	Excellent	Good	Fair	Poor								
Sq.m	0	23.2	15	5								
		Total Quant. 43.2										

**Comments:**

Indications of rot noted in numerous railway ties. Vegetation growing through checks and splits. One split railway tie at the east end of deck.

Limited Inspection

Performance Def:

Maintenance:

Timing: 1-5 Years

**Rehab Recommendations:**

Replace deck

**Element Data**

Element Group: Beams	Material: Steel	Length: 10.8m										
Element Name: Girders	Element Type I-Type	Width: 0.36m										
Location: North and south exterior	Environment: Severe	Height: 1.25m										
<table border="1"> <thead> <tr> <th>Units</th> <th>Excellent</th> <th>Good</th> <th>Fair</th> <th>Poor</th> </tr> </thead> <tbody> <tr> <td>Sq.m</td> <td>0</td> <td>85.1</td> <td>0</td> <td>0</td> </tr> </tbody> </table>	Units	Excellent	Good	Fair	Poor	Sq.m	0	85.1	0	0	Protect. System:	Count: 2
Units	Excellent	Good	Fair	Poor								
Sq.m	0	85.1	0	0								
		Total Quant. 85.1										

**Comments:**

Light corrosion. Generally in good condition.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:**



Element Data				
Element Group: Beams		Material: Steel		Length: <input type="text" value="3.4m"/>
Element Name: Floor Beams		Element Type I-Type		Width: <input type="text" value="0.15m"/>
Location: Underside of bridge		Environment: Benign		Height: <input type="text" value="0.45m"/>
Units	Excellent	Good	Fair	Poor
Sq.m	0	20.4	0	0
Protect. System:				Count: <input type="text" value="4"/>
				Total Quant. <input type="text" value="20.4"/>
Comments:				
Light corrosion. Generally in good condition.				
Rehab Recommendations:				
Limited Inspection <input type="checkbox"/> Performance Def: Maintenance: Timing:				

Element Data				
Element Group: Beams		Material: Steel		Length: <input type="text" value="3.4m"/>
Element Name: Stringers		Element Type I-Type		Width: <input type="text" value="0.15m"/>
Location: Underside of deck		Environment: Benign		Height: <input type="text" value="0.45m"/>
Units	Excellent	Good	Fair	Poor
Sq.m	0	12	0	0
Protect. System:				Count: <input type="text" value="12"/>
				Total Quant. <input type="text" value="12"/>
Comments:				
Stringers remain in good condition.				
Rehab Recommendations:				
Limited Inspection <input type="checkbox"/> Performance Def: Maintenance: Timing:				

Element Data				
Element Group: Bracing		Material: Steel		Length: <input type="text"/>
Element Name: Bracing		Element Type Channel		Width: <input type="text"/>
Location: Underside of bridge		Environment: Benign		Height: <input type="text"/>
Units	Excellent	Good	Fair	Poor
Sq.m	0	3	0	0
Protect. System:				Count: <input type="text" value="3"/>
				Total Quant. <input type="text" value="3"/>
Comments:				
Cross bracing remains in good condition.				
Rehab Recommendations:				
Limited Inspection <input type="checkbox"/> Performance Def: Maintenance: Timing:				

**Element Data**

Element Group: Abutments  
 Element Name: Abutment Walls

Material: Cast-in-place Concrete  
 Element Type Conventional Closed

Length:

Width: 7.45m

Location: East and west

Environment: Moderate

Height: 4.2m

Units	Excellent	Good	Fair	Poor
Sq.m	0	54.1	6	2.5

Protect. System:

Count: 2

Total Quant. 62.6

**Comments:**

Light to moderate scaling throughout. Cracking with efflorescence in south end of east abutment. Light to moderate disintegration in west wall at south end. Spalling with exposed rebar in north end of east footing.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:****Element Data**

Element Group: Abutments  
 Element Name: Ballast Walls

Material: Cast-in-place Concrete  
 Element Type -

Length:

Width: 7.45m

Location: East and west

Environment: Moderate

Height: 0.8m

Units	Excellent	Good	Fair	Poor
Sq.m	0	9.4	2	0.5

Protect. System:

Count: 2

Total Quant. 11.9

**Comments:**

Unable to view due to floor beam configuration. Assumed to be in similar condition to abutment walls.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:****Element Data**

Element Group: Abutments  
 Element Name: Wingwalls

Material: Cast-in-place Concrete  
 Element Type Reinforced Concrete

Length: 7.2m

Width:

Location: All four quadrants

Environment: Moderate

Height: 4.2m

Units	Excellent	Good	Fair	Poor
Sq.m	0	35.5	15	10

Protect. System:

Count: 4

Total Quant. 60.5

**Comments:**

Severe spalling and cracking with efflorescence, disintegration. Northeast wingwall has a wide crack and has started to separate.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:**

**Element Data**

Element Group: Abutments

Material: Steel

Length:

Element Name: Bearings

Element Type Plate

Width:

Location: On abutment walls

Environment: Moderate

Height:

Units	Excellent	Good	Fair	Poor
Each	0	4	0	0

Protect. System:

Count: 4

Total Quant. 4

**Comments:**

Appear to be in good condition.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:**

**Element Data**

Element Group: Foundations

Material:

Length:

Element Name: Foundations (Below Ground Level)

Element Type

Width:

Location: Below abutment walls

Environment:

Height:

Units	Excellent	Good	Fair	Poor

Protect. System:

Count:

Total Quant.

**Comments:**

No visible evidence of foundation instability.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:**

**Element Data**

Element Group: Embankments and Streams

Material:

Length:

Element Name: Embankments

Element Type -

Width:

Location: All four quadrants

Environment:

Height:

Units	Excellent	Good	Fair	Poor
All	0	4	0	0

Protect. System:

Count: 4

Total Quant. 4

**Comments:**

Well vegetated. No concerns.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:**

**Element Data**

Element Group: Approaches  
 Element Name: Wearing Surface

Material: Gravel  
 Element Type -

Length:

Width:

Location: East and west

Environment: Severe

Height:

Units	Excellent	Good	Fair	Poor
Sq.m	0	32.4	0	0

Protect. System:

Count:

Total Quant.

**Comments:**

Well graded. Good condition.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:**



**Recommended Work by Element**

Element Name	Recommended work	Timing	Estimated Cost
Deck Top - Thin Slab	Replace deck	1-5 Years	\$40,000.00

**Recommended General Work**

Recommended Work	Description	Timing	Estimated Cost
Major Rehab	Install Railing System	Within 1 Year	\$15,000.00

**Associated Work**

Associated Work	Comments	Estimated Cost
<b>Approaches:</b>		\$0.00
<b>Detours:</b>		\$0.00
<b>Traffic Control:</b>		\$0.00
<b>Utilities:</b>		\$0.00
<b>Right of Way:</b>		\$0.00
<b>Environmental Study:</b>		\$0.00
<b>Other:</b>	Mobilization, Bonding, Insurance	\$15,000.00
<b>Contingencies:</b>		\$10,000.00
<b>Associated Work Total:</b>		\$25,000.00

**Total Estimated Cost**

Total cost of Recommended Works \$80,000.00



North elevation



South elevation





Looking east over bridge



Looking west over bridge





Deck wearing surface



North girder detail





South girder detail



Gap between girder and deck edge





Rot and vegetation growth in railway ties



Split Railway tie in northeast



Typical soffit detail



West abutment wall





East abutment wall



Spall in northeast footing





Southeast wingwall



Disintegration in northwest abutment wall



Cracking with efflorescence in southeast abutment



**Inventory Data**

Structure Name:	Camden East Bridge	Crossing Type:	Non-Navig. Water
Road Name:	Cataraqui Trail	Heritage Designation:	Not Cons.
Structure Location:	550m East of County Road 17	Road Class:	Local
Owner(s)	CRCA	Posted Speed:	50km/h      AADT:
Latitude: 44.340090506	Longitude: -76.857865804	No. of Lanes:	1      % Trucks:
MTO Region:	Eastern	Min. Vertical Clearance:	0
MTO District:	Kingston	Special Routes:	
Structure Type:	I-Beams or Girders	Transit <input type="checkbox"/>	Truck <input type="checkbox"/>
Total Deck Length:	7.7m	School <input type="checkbox"/>	Bicycle <input type="checkbox"/>
Overall Str. Width:	4m	Detour Length Around Bridge:	
Total Deck Area:	30.8sq.m	Direction of Structure:	East-West
Roadway Width:	3m	Fill on Structure:	0m
Skew Angle:	0		
No. Spans:	1		
Span Lengths:	7		

**Historical Data**

Year Built:	Year of Last Major Rehab:
Last OSIM Inspection:	Last Evaluation:
Last Enhanced OSIM Inspection:	Current Load Limit
Enhanced Access Equipment:	Load Limit By-Law #
Last Underwater Inspection:	By-Law Expiry Date:
Last Condition Survey:	
Rehab History (Date/Description):	

**Field Inspection Information**

Date of Inspection:	2020-09-24	Weather:	Cloudy
Inspector:	John Landry, EIT	Temperature:	20
Others in Party:	Shane Wall, RCJI		
Equipment Used:	Camera, Handtools		

**Additional Investigations Required**

	Priority	Estimated Cost
Material Condition Survey		\$0.00
Detailed Deck condition Survey		\$0.00
Non-Destructive Delamination Survey of Asphalt-Covered Deck		\$0.00
Concrete Substructure Condition Survey		\$0.00
Detailed Coating Conditon Survey		\$0.00
Detailed Timber Investigation		\$0.00
Post-Tensioned Strand Investigation		\$0.00
Underwater Investigation		\$0.00
Fatigue Investigation		\$0.00
Seismic Investigation		\$0.00
Structure Evaluation		\$0.00
Monitoring		\$0.00
Monitoring of Deformations, Settlements and Movements		\$0.00
Monitoring Crack Widths		\$0.00

Investigation Notes:

---

**Total Cost: \$0.00**
**Overall Structure Notes**

Recommended Work on Structure: Minor Rehab

Timing Within 1 Year

**BCI: 70.52**

Overall Comments:

Date of next inspection: 2022-09-24

Recommend installing railing system over structure. Railway ties that make up deck have started to rot and have vegetation growing from cracks and checks. Deck may require replacement within 6-10 years.

**Element Data**

Element Group:	Decks	Material:	Wood	Length:	7.7m
Element Name:	Wearing Surface	Element Type:	-	Width:	2.6m
Location:	Covering deck	Environment:	Severe	Height:	
Units	Excellent	Good	Fair	Poor	Count:
Sq.m	0	17	3	0	1
Protect. System:					Total Quant.
					20

**Comments:**

Wearing surface has light to moderate checks and splits. Some loose boards.

Limited Inspection

Performance Def:

Maintenance:

Timing: 6-10 Years

**Rehab Recommendations:**

Replace wearing surface (costed under deck)

**Element Data**

Element Group:	Decks	Material:	Wood	Length:	7.7m
Element Name:	Deck Top - Thin Slab	Element Type:	Wood Planks	Width:	4m
Location:	Railway Tie Deck	Environment:	Severe	Height:	
Units	Excellent	Good	Fair	Poor	Count:
Sq.m	0	17.8	8	5	1
Protect. System:					Total Quant.
					30.8

**Comments:**

Light to moderate checks and splits and railway ties. Vegetation growing from cracks indicate rot within the ties.

Limited Inspection

Performance Def:

Maintenance:

Timing: 6-10 Years

**Rehab Recommendations:**

Replace deck

**Element Data**

Element Group:	Beams	Material:	Steel	Length:	7.7m
Element Name:	Girders	Element Type:	I-Type	Width:	0.19m
Location:	Underside of bridge	Environment:	Benign	Height:	0.61m
Units	Excellent	Good	Fair	Poor	Count:
Sq.m	0	91.5	0	0	6
Protect. System:					Total Quant.
					91.5

**Comments:**

Light corrosion. Generally in good condition.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:**

Element Data				
Element Group: Abutments		Material: Cast-in-place Concrete		Length: <input type="text"/>
Element Name: Abutment Walls		Element Type: Conventional Closed		Width: 3.5m
Location: East and west		Environment: Severe		Height: 2.3m
Units	Excellent	Good	Fair	Poor
Sq.m	0	13.6	2	0.5
Protect. System:		Count: 2		Total Quant. 16.1
Comments: Moderate erosion at base of wall. Light AAR throughout. Light to moderate delamination and disintegration.				
Rehab Recommendations: <input type="text"/>				
Limited Inspection <input type="checkbox"/> Performance Def: Maintenance: Timing:				

Element Data				
Element Group: Abutments		Material: Cast-in-place Concrete		Length: <input type="text"/>
Element Name: Ballast Walls		Element Type: -		Width: 3.5m
Location: East and west		Environment: Moderate		Height: 0.8m
Units	Excellent	Good	Fair	Poor
Sq.m	0	4.35	1	0.25
Protect. System:		Count: 2		Total Quant. 5.6
Comments: Condition assumed based on abutment wall condition.				
Rehab Recommendations: <input type="text"/>				
Limited Inspection <input checked="" type="checkbox"/> Performance Def: Maintenance: Timing:				

Element Data				
Element Group: Abutments		Material: Cast-in-place Concrete		Length: 3.2m
Element Name: Wingwalls		Element Type: Reinforced Concrete		Width: <input type="text"/>
Location: All four quadrants		Environment: Moderate		Height: 2.1m
Units	Excellent	Good	Fair	Poor
Sq.m	0	8.5	3	1.5
Protect. System:		Count: 4		Total Quant. 13.4
Comments: Wide cracks in southwest wingwall. Light spalling in northwest. Light scaling throughout.				
Rehab Recommendations: <input type="text"/>				
Limited Inspection <input type="checkbox"/> Performance Def: Maintenance: Timing:				

**Element Data**

Element Group: Retaining walls	Material: Cast-in-place Concrete	Length: 3.5m										
Element Name: Walls	Element Type Reinforced Concrete	Width: <input type="text"/>										
Location: Northwest	Environment: Benign	Height: 1.2m										
<table border="1"> <thead> <tr> <th>Units</th> <th>Excellent</th> <th>Good</th> <th>Fair</th> <th>Poor</th> </tr> </thead> <tbody> <tr> <td>Sq.m</td> <td>0</td> <td>2.95</td> <td>1</td> <td>0.25</td> </tr> </tbody> </table>	Units	Excellent	Good	Fair	Poor	Sq.m	0	2.95	1	0.25	Protect. System:	Count: 1
Units	Excellent	Good	Fair	Poor								
Sq.m	0	2.95	1	0.25								
		Total Quant. 4.2										

Comments:  
 Light spalling. Light to moderate scaling throughout.

Limited Inspection   
 Performance Def:  
 Maintenance:  
 Timing:

Rehab Recommendations:

**Element Data**

Element Group: Foundations	Material:	Length: <input type="text"/>										
Element Name: Foundations (Below Ground Level)	Element Type	Width: <input type="text"/>										
Location: Below abutment walls	Environment:	Height: <input type="text"/>										
<table border="1"> <thead> <tr> <th>Units</th> <th>Excellent</th> <th>Good</th> <th>Fair</th> <th>Poor</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Units	Excellent	Good	Fair	Poor						Protect. System:	Count: <input type="text"/>
Units	Excellent	Good	Fair	Poor								
		Total Quant. <input type="text"/>										

Comments:  
 No visible evidence of foundation instability at time of inspection.

Limited Inspection   
 Performance Def:  
 Maintenance:  
 Timing:

Rehab Recommendations:

**Element Data**

Element Group: Embankments and Streams	Material:	Length: <input type="text"/>										
Element Name: Streams and Waterways	Element Type -	Width: <input type="text"/>										
Location: Below bridge	Environment:	Height: <input type="text"/>										
<table border="1"> <thead> <tr> <th>Units</th> <th>Excellent</th> <th>Good</th> <th>Fair</th> <th>Poor</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> </tr> </tbody> </table>	Units	Excellent	Good	Fair	Poor	All	0	1	0	0	Protect. System:	Count: 1
Units	Excellent	Good	Fair	Poor								
All	0	1	0	0								
		Total Quant. 1										

Comments:  
 Low flow at time of inspection.

Limited Inspection   
 Performance Def:  
 Maintenance:  
 Timing:

Rehab Recommendations:



**Element Data**

Element Group: Embankments and Streams  
 Element Name: Embankments

Material:  
 Element Type -

Length:

Width:

Location: All four quadrants

Environment:

Height:

Units	Excellent	Good	Fair	Poor
All	0	4	0	0

Protect. System:

Count: 4

Total Quant. 4

**Comments:**

No concerns.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:**

**Element Data**

Element Group: Approaches  
 Element Name: Wearing Surface

Material: Gravel  
 Element Type -

Length: 6m

Width: 2.7m

Location: East and west

Environment: Severe

Height:

Units	Excellent	Good	Fair	Poor
Sq.m	0	32.4	0	0

Protect. System:

Count: 2

Total Quant. 32.4

**Comments:**

Approach wearing surface is generally in good condition.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:**

**Recommended Work by Element**

Element Name	Recommended work	Timing	Estimated Cost
Deck Top - Thin Slab	Replace deck	6-10 Years	\$15,000.00

**Recommended General Work**

Recommended Work	Description	Timing	Estimated Cost
Minor Rehab	Install railing system	Within 1 Year	\$15,000.00

**Associated Work**

Associated Work	Comments	Estimated Cost
<b>Approaches:</b>		\$0.00
<b>Detours:</b>		\$0.00
<b>Traffic Control:</b>		\$0.00
<b>Utilities:</b>		\$0.00
<b>Right of Way:</b>		\$0.00
<b>Environmental Study:</b>		\$0.00
<b>Other:</b>		\$0.00
<b>Contingencies:</b>		\$0.00
<b>Associated Work Total:</b>		\$0.00

**Total Estimated Cost**

Total cost of Recommended Works \$30,000.00



South elevation

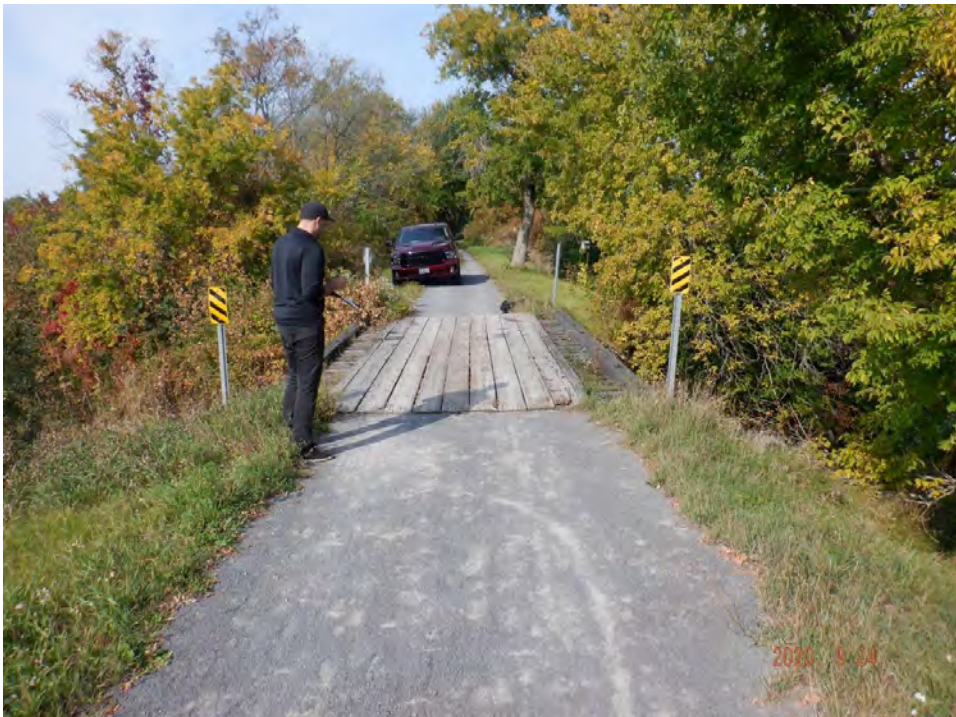


North elevation





Looking east over bridge



Looking west over bridge





Deck wearing surface



Split board in northeast





Vegetation growing in railway tie



West abutment wall





East abutment wall



Erosion at base of east abutment wall





northwest wingwall



Southeast wingwall





Disintegration in south end of east abutment



Typical soffit detail





Northwest retaining wall



Southwest wingwall

**Inventory Data**

Structure Name:	Camden East - Yarker West Culvert	Crossing Type:	Non-Navig. Water
Road Name:	Cataraqui Trail	Heritage Designation:	Not Cons.
Structure Location:	890m East of Curl Road	Road Class:	Local
Owner(s)	CRCA	Posted Speed:	50km/h      AADT:
Latitude: 44.356455347	Longitude: -76.792701949	No. of Lanes:	1      % Trucks:
MTO Region:	Eastern	Min. Vertical Clearance:	0
MTO District:	Kingston	Special Routes:	
Structure Type:	Rectangular Culvert	Transit <input type="checkbox"/>	Truck <input type="checkbox"/>
Total Deck Length:	1m	School <input type="checkbox"/>	Bicycle <input type="checkbox"/>
Overall Str. Width:	5.6m	Detour Length Around Bridge:	
Total Deck Area:	5.6sq.m	Direction of Structure:	East-West
Roadway Width:	2.7m	Fill on Structure:	0.3m
Skew Angle:	0		
No. Spans:	1		
Span Lengths:	1		

**Historical Data**

Year Built:	Year of Last Major Rehab:
Last OSIM Inspection:	Last Evaluation:
Last Enhanced OSIM Inspection:	Current Load Limit
Enhanced Access Equipment:	Load Limit By-Law #
Last Underwater Inspection:	By-Law Expiry Date:
Last Condition Survey:	
Rehab History (Date/Description):	

**Field Inspection Information**

Date of Inspection:	2020-09-24	Weather:	Cloudy
Inspector:	John Landry, EIT	Temperature:	20
Others in Party:	Shane Wall, RCJI		
Equipment Used:	Camera, Handtools		

**Additional Investigations Required**

	Priority	Estimated Cost
Material Condition Survey		\$0.00
Detailed Deck condition Survey		\$0.00
Non-Destructive Delamination Survey of Asphalt-Covered Deck		\$0.00
Concrete Substructure Condition Survey		\$0.00
Detailed Coating Condition Survey		\$0.00
Detailed Timber Investigation		\$0.00
Post-Tensioned Strand Investigation		\$0.00
Underwater Investigation		\$0.00
Fatigue Investigation		\$0.00
Seismic Investigation		\$0.00
Structure Evaluation		\$0.00
Monitoring		\$0.00
Monitoring of Deformations, Settlements and Movements		\$0.00
Monitoring Crack Widths		\$0.00

Investigation Notes:

Total Cost: \$0.00

**Overall Structure Notes**

Recommended Work on Structure: None

Timing

BCI: 67.72

Overall Comments:

Date of next inspection: 2022-09-24

Concrete slab on masonry walls. Generally in good condition. Medium to wide cracks in slab.

Element Data				
Element Group: Culverts		Material: Masonry		Length: 5.6m
Element Name: Barrels		Element Type Frames - Rigid		Width: 1m
Location: Below roadway		Environment: Benign		Height: 1.4m
Units	Excellent	Good	Fair	Poor
Sq.m	0	16	2	1
Protect. System:			Count: 1	Total Quant. 19
Comments: Medium to wide cracks in concrete soffit. Masonry appears to be in good condition.				
Rehab Recommendations:				
			Limited Inspection <input type="checkbox"/>	
			Performance Def:	
			Maintenance:	
			Timing:	

Element Data				
Element Group: Embankments and Streams		Material:		Length: <input type="text"/>
Element Name: Streams and Waterways		Element Type -		Width: <input type="text"/>
Location: Through culvert		Environment:		Height: <input type="text"/>
Units	Excellent	Good	Fair	Poor
All	0	1	0	0
Protect. System:			Count: 1	Total Quant. 1
Comments: Dry at time of inspection.				
Rehab Recommendations:				
			Limited Inspection <input type="checkbox"/>	
			Performance Def:	
			Maintenance:	
			Timing:	

Element Data				
Element Group: Embankments and Streams		Material:		Length: <input type="text"/>
Element Name: Embankments		Element Type -		Width: <input type="text"/>
Location: All four quadrants		Environment:		Height: <input type="text"/>
Units	Excellent	Good	Fair	Poor
All	0	4	0	0
Protect. System:			Count: 4	Total Quant. 4
Comments: No concerns.				
Rehab Recommendations:				
			Limited Inspection <input type="checkbox"/>	
			Performance Def:	
			Maintenance:	
			Timing:	



**Element Data**

Element Group: Approaches	Material: Gravel	Length: <input type="text" value="10m"/>
Element Name: Wearing Surface	Element Type -	Width: <input type="text" value="2.7m"/>
Location: Over culvert	Environment: Severe	Height: <input type="text"/>
Protect. System:		Count: <input type="text" value="1"/>
		Total Quant. <input type="text" value="54"/>

Units	Excellent	Good	Fair	Poor
Sq.m	0	54	0	0

**Comments:**

Generally in good condition.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:**

Associated Work		
Associated Work	Comments	Estimated Cost
Approaches:		\$0.00
Detours:		\$0.00
Traffic Control:		\$0.00
Utilities:		\$0.00
Right of Way:		\$0.00
Environmental Study:		\$0.00
Other:		\$0.00
Contingencies:		\$0.00
<b>Associated Work Total:</b>		\$0.00

Total Estimated Cost	
Total cost of Recommended Works	\$0.00



North elevation



South elevation





Looking west over culvert



Looking east over culvert



East wall



West wall





Typical soffit detail



Cracking in soffit





Wide crack in soffit

**Inventory Data**

Structure Name:	Camden East - Yarker East Culvert	Crossing Type:	Non-Navig. Water
Road Name:	Cataraqui Trail	Heritage Designation:	Not Cons.
Structure Location:	1.55 km West of Sidings Street	Road Class:	Local
Owner(s)	CRCA	Posted Speed:	50km/h      AADT:
Latitude: 44.362176024	Longitude: -76.786632627	No. of Lanes:	1      % Trucks:
MTO Region:	Eastern	Min. Vertical Clearance:	0
MTO District:	Kingston	Special Routes:	
Structure Type:	Rectangular Culvert	Transit <input type="checkbox"/>	Truck <input type="checkbox"/>
Total Deck Length:	2m	School <input type="checkbox"/>	Bicycle <input type="checkbox"/>
Overall Str. Width:	5.7m	Detour Length Around Bridge:	
Total Deck Area:	11.4sq.m	Direction of Structure:	East-West
Roadway Width:	2.7m	Fill on Structure:	0m
Skew Angle:	0		
No. Spans:	1		
Span Lengths:	1.4		

**Historical Data**

Year Built:	Year of Last Major Rehab:
Last OSIM Inspection:	Last Evaluation:
Last Enhanced OSIM Inspection:	Current Load Limit
Enhanced Access Equipment:	Load Limit By-Law #
Last Underwater Inspection:	By-Law Expiry Date:
Last Condition Survey:	
Rehab History (Date/Description):	

**Field Inspection Information**

Date of Inspection:	2020-09-24	Weather:	Cloudy
Inspector:	John Landry, EIT	Temperature:	20
Others in Party:	Shane Wall, RCJI		
Equipment Used:	Camera, Handtools		

**Additional Investigations Required**

	Priority	Estimated Cost
Material Condition Survey		\$0.00
Detailed Deck condition Survey		\$0.00
Non-Destructive Delamination Survey of Asphalt-Covered Deck		\$0.00
Concrete Substructure Condition Survey		\$0.00
Detailed Coating Conditon Survey		\$0.00
Detailed Timber Investigation		\$0.00
Post-Tensioned Strand Investigation		\$0.00
Underwater Investigation		\$0.00
Fatigue Investigation		\$0.00
Seismic Investigation		\$0.00
Structure Evaluation		\$0.00
Monitoring		\$0.00
Monitoring of Deformations, Settlements and Movements		\$0.00
Monitoring Crack Widths		\$0.00

Investigation Notes:

Total Cost: \$0.00

**Overall Structure Notes**

Recommended Work on Structure: None

Timing

BCI: 74.17

Overall Comments:

Date of next inspection: 2022-09-24

Culvert is generally in good condition.



Element Data				
Element Group: Culverts		Material: Cast-in-place Concrete		Length: 5.7m
Element Name: Barrels		Element Type Frames - Rigid		Width: 1.4m
Location: Below trail		Environment: Benign		Height: 1.1m
Units	Excellent	Good	Fair	Poor
Sq.m	0	20	0.5	0
Protect. System:		Count: 1		Total Quant. 20.5
Comments: Light to to moderate honeycombing and light AAR.				
Rehab Recommendations:				
Limited Inspection <input type="checkbox"/>				
Performance Def:				
Maintenance:				
Timing:				

Element Data				
Element Group: Embankments and Streams		Material:		Length:
Element Name: Streams and Waterways		Element Type -		Width:
Location: Through culvert		Environment:		Height:
Units	Excellent	Good	Fair	Poor
All	0	1	0	0
Protect. System:		Count: 1		Total Quant. 1
Comments: Dry at time of inspection.				
Rehab Recommendations:				
Limited Inspection <input type="checkbox"/>				
Performance Def:				
Maintenance:				
Timing:				

Element Data				
Element Group: Embankments and Streams		Material:		Length:
Element Name: Embankments		Element Type -		Width:
Location: All four quadrants		Environment:		Height:
Units	Excellent	Good	Fair	Poor
All	0	4	0	0
Protect. System:		Count: 4		Total Quant. 4
Comments: No concerns.				
Rehab Recommendations:				
Limited Inspection <input type="checkbox"/>				
Performance Def:				
Maintenance:				
Timing:				

**Element Data**

Element Group: Approaches	Material: Gravel	Length: <input type="text" value="10m"/>										
Element Name: Wearing Surface	Element Type -	Width: <input type="text" value="2.7m"/>										
Location: Over culvert	Environment: Severe	Height: <input type="text"/>										
<table border="1"> <thead> <tr> <th>Units</th> <th>Excellent</th> <th>Good</th> <th>Fair</th> <th>Poor</th> </tr> </thead> <tbody> <tr> <td>Sq.m</td> <td>0</td> <td>27</td> <td>0</td> <td>0</td> </tr> </tbody> </table>	Units	Excellent	Good	Fair	Poor	Sq.m	0	27	0	0	Protect. System:	Count: <input type="text" value="1"/>
Units	Excellent	Good	Fair	Poor								
Sq.m	0	27	0	0								
		Total Quant. <input type="text" value="27"/>										

**Comments:**

Well graded. Good condition.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:**

Associated Work		
Associated Work	Comments	Estimated Cost
Approaches:		\$0.00
Detours:		\$0.00
Traffic Control:		\$0.00
Utilities:		\$0.00
Right of Way:		\$0.00
Environmental Study:		\$0.00
Other:		\$0.00
Contingencies:		\$0.00
<b>Associated Work Total:</b>		\$0.00

Total Estimated Cost	
Total cost of Recommended Works	\$0.00





South elevation



North elevation





Looking west over culvert



Looking east over culvert



West wall



East wall





Typical soffit detail



**Inventory Data**

Structure Name:	CNR Viaduct	Crossing Type:	Navig. Water
Road Name:	Cataraqui Trail	Heritage Designation:	Not Cons.
Structure Location:	50m East of Cutler Road	Road Class:	Local
Owner(s)	CRCA, County of Lennox and Addington	Posted Speed:	50km/h AADT:1356
Latitude: 44.373338639	Longitude: -76.771862043	No. of Lanes:	1 % Trucks: 6
MTO Region:	Eastern	Min. Vertical Clearance:	
MTO District:	Kingston	Special Routes:	
Structure Type:	I-Beams or Girders	Transit <input type="checkbox"/>	Truck <input type="checkbox"/>
Total Deck Length:	127.7m	School <input checked="" type="checkbox"/>	Bicycle <input type="checkbox"/>
Overall Str. Width:	3.6m	Detour Length Around Bridge:	
Total Deck Area:	460sq.m	Direction of Structure:	East-West
Roadway Width:	7m	Fill on Structure:	0m
Skew Angle:	0		
No. Spans:	7		
Span Lengths:	7 @ 17.9m		

**Historical Data**

Year Built:	1900	Year of Last Major Rehab:	
Last OSIM Inspection:	2018-08-16	Last Evaluation:	
Last Enhanced OSIM Inspection:		Current Load Limit	
Enhanced Access Equipment:		Load Limit By-Law #	
Last Underwater Inspection:		By-Law Expiry Date:	
Last Condition Survey:			
Rehab History (Date/Description):			

**Field Inspection Information**

Date of Inspection:	2020-07-27	Weather:	Sunny
Inspector:	John Landry, EIT	Temperature:	30
Others in Party:	Shane Wall, RCJI		
Equipment Used:	Camera, Handtools		

**Additional Investigations Required**

	Priority	Estimated Cost
Material Condition Survey		\$0.00
Detailed Deck condition Survey		\$0.00
Non-Destructive Delamination Survey of Asphalt-Covered Deck		\$0.00
Concrete Substructure Condition Survey		\$0.00
Detailed Coating Conditon Survey		\$0.00
Detailed Timber Investigation	Normal	\$8,000.00
Post-Tensioned Strand Investigation		\$0.00
Underwater Investigation		\$0.00
Fatigue Investigation		\$0.00
Seismic Investigation		\$0.00
Structure Evaluation		\$0.00
Monitoring		\$0.00
Monitoring of Deformations, Settlements and Movements		\$0.00
Monitoring Crack Widths		\$0.00

Investigation Notes:

Total Cost: \$8,000.00

Recommend Timber Investigation on railway ties to determine extent of decay.

**Overall Structure Notes**

Recommended Work on Structure: Major Rehab

Timing 1-5 Years

**BCI: 51.06**

Overall Comments:

Date of next inspection: 2022-07-27

Shared structure with Lennox and Addington. L&A Structure Number 000605. Structure is maintained for recreational use by the Cataraqui River Conservation Authority. Piers and superstructure designed for railway loads. It is strongly recommended that the steel elements have an enhanced inspection completed during deck rehab.

**Element Data**

Element Group:	Decks	Material:	Wood	Length:	127.7m
Element Name:	Wearing Surface	Element Type:	-	Width:	3.3m
Location:	On deck surface	Environment:	Severe	Height:	
Units	Excellent	Good	Fair	Poor	Count:
Sq.m	0	360	80	20	1
Protect. System:					Total Quant.
					460

**Comments:**

Moderate to severe rot noted in deck boards. Loose boards and vegetation growing in deck boards.

Limited Inspection

Performance Def:

Maintenance:

Timing: 1-5 Years

**Rehab Recommendations:**

--

**Element Data**

Element Group:	Decks	Material:	Wood	Length:	127.1m
Element Name:	Deck Top - Thin Slab	Element Type:	Wood Planks	Width:	3.3m
Location:	Below deck boards	Environment:	Severe	Height:	
Units	Excellent	Good	Fair	Poor	Count:
Sq.m	0	360	80	20	1
Protect. System: Creosote					Total Quant.
					460

**Comments:**

Railway deck ties. Vegetation growing in deck ties on outside edge of wearing surface. Limited inspection due to wearing surface. Assumed to be in similar condition as wearing surface.

Limited Inspection

Performance Def:

Maintenance:

Timing: 1-5 Years

**Rehab Recommendations:**

Replace Deck
--------------

**Element Data**

Element Group:	Barriers	Material:	Steel	Length:	127.7m
Element Name:	Railing Systems	Element Type:	Pedestrian Fencing	Width:	
Location:	North and south	Environment:	Severe	Height:	1.3m
Units	Excellent	Good	Fair	Poor	Count:
m	0	255.4	0	0	2
Protect. System:					Total Quant.
					255.4

**Comments:**

Pedestrian fencing is generally in good condition. Fencing likely does not meet current CHBDC railing requirements and should be reviewed with next deck replacement.

Limited Inspection

Performance Def:

Maintenance:

Timing: 1-5 Years

**Rehab Recommendations:**

Replace Railing System
------------------------



Element Data

Element Group: Beams  
Element Name: Girders

Material: Steel  
Element Type I-Type

Length: 127.7m

Width: 0.4m

Location: Underside of bridge

Environment: Moderate

Height: 1.9m

Units	Excellent	Good	Fair	Poor
Sq.m	0	1169.2	140	70

Protect. System:

Count: 2

Total Quant. 1379.2

Comments:

Moderate to severe corrosion and section loss in web at bottom flange. Debris sitting on horizontal surfaces. Perforations noted in stiffeners and bracing elements. Middle 5 spans viewed from the ground.

Limited Inspection

Performance Def:

Maintenance:

Timing:

Rehab Recommendations:

Element Data

Element Group: Beams  
Element Name: Diaphragms

Material: Steel  
Element Type Cross Type

Length:

Width:

Location: Between girders

Environment: Moderate

Height:

Units	Excellent	Good	Fair	Poor
Each	0	42	5	2

Protect. System:

Count: 49

Total Quant. 49

Comments:

Isolated areas of light to moderate section loss. Light to moderate corrosion throughout.

Limited Inspection

Performance Def:

Maintenance:

Timing:

Rehab Recommendations:

Element Data

Element Group: Bracing  
Element Name: Bracing

Material: Steel  
Element Type Channel

Length:

Width:

Location:

Environment: Moderate

Height:

Units	Excellent	Good	Fair	Poor
Sq.m	0	43	8	5

Protect. System:

Count:

Total Quant. 56

Comments:

Perforation and moderate to severe section loss noted in bracing.

Limited Inspection

Performance Def:

Maintenance:

Timing:

Rehab Recommendations:

**Element Data**

Element Group:	Abutments	Material:	Cast-in-place Concrete	Length:	4.9m	
Element Name:	Abutment Walls	Element Type	Conventional Closed	Width:	0.9m	
Location:	East and west	Environment:	Moderate	Height:	2.1m	
Units	Excellent	Good	Fair	Poor	Count:	2
Sq.m	0	0	16.6	4	Total Quant.	20.6

**Comments:**

Abutments have moderate to severe scaling and light to moderate disintegration.

Limited Inspection

Performance Def:

Maintenance:

Timing: 6-10 Years

**Rehab Recommendations:****Element Data**

Element Group:	Abutments	Material:	Cast-in-place Concrete	Length:	7.7m	
Element Name:	Ballast Walls	Element Type	-	Width:		
Location:	On abutment walls	Environment:	Moderate	Height:	2.4m	
Units	Excellent	Good	Fair	Poor	Count:	2
Sq.m	0	0	18.5	18.5	Total Quant.	37

**Comments:**

Moderate to severe scaling and light to moderate disintegration. Narrow to medium cracks throughout.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:****Element Data**

Element Group:	Piers	Material:	Cast-in-place Concrete	Length:	5m	
Element Name:	Shafts/ Columns/ Pile Bents	Element Type	Concrete Rectangular Columns with Cap	Width:	2m	
Location:		Environment:	Moderate	Height:	5m	
Units	Excellent	Good	Fair	Poor	Count:	6
Sq.m	0	0	210	210	Total Quant.	420

**Comments:**

Piers have moderate to severe disintegration throughout. Cracking and spalling likely associated with cold joints.

Limited Inspection

Performance Def:

Maintenance:

Timing: 6-10 Years

**Rehab Recommendations:**

Re-face Substructure

**Element Data**

Element Group: Embankments and Streams      Material:      Length:

Element Name: Streams and Waterways      Element Type -      Width:

Location: Below bridge      Environment:      Height:

Units	Excellent	Good	Fair	Poor
All	0	1	0	0

Protect. System:      Count:

Total Quant.

Comments:  
Napanee River. Flows north to south

Rehab Recommendations:

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Element Data**

Element Group: Embankments and Streams      Material:      Length:

Element Name: Embankments      Element Type -      Width:

Location: All four quadrants      Environment:      Height:

Units	Excellent	Good	Fair	Poor
All	0	4	0	0

Protect. System:      Count:

Total Quant.

Comments:  
No concerns.

Rehab Recommendations:

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Element Data**

Element Group: Signs      Material: Steel      Length:

Element Name: Signs      Element Type -      Width:

Location: all four quadrants over structure      Environment: Severe      Height:

Units	Excellent	Good	Fair	Poor
Each	0	4	0	0

Protect. System:      Count:

Total Quant.

Comments:  
Generally in good condition.

Rehab Recommendations:

Limited Inspection

Performance Def:

Maintenance:

Timing:



**Element Data**

Element Group: Approaches	Material: Asphalt	Length: <input type="text" value="10m"/>										
Element Name: Wearing Surface	Element Type -	Width: <input type="text" value="7m"/>										
Location: Below bridge	Environment: Severe	Height: <input type="text"/>										
<table border="1"> <thead> <tr> <th>Units</th> <th>Excellent</th> <th>Good</th> <th>Fair</th> <th>Poor</th> </tr> </thead> <tbody> <tr> <td>Sq.m</td> <td>0</td> <td>70</td> <td>0</td> <td>0</td> </tr> </tbody> </table>	Units	Excellent	Good	Fair	Poor	Sq.m	0	70	0	0	Protect. System:	Count: <input type="text" value="1"/>
Units	Excellent	Good	Fair	Poor								
Sq.m	0	70	0	0								
		Total Quant. <input type="text" value="70"/>										

Comments:

No concerns.

Limited Inspection

Performance Def:

Maintenance:

Timing:

Rehab Recommendations:

**Recommended Work by Element**

Element Name	Recommended work	Timing	Estimated Cost
Shafts/ Columns/ Pile	Re-face Substructure	6-10 Years	\$300,000.00
Deck Top - Thin Slab	Replace Deck	1-5 Years	\$140,000.00
Railing Systems	Replace Railing System	1-5 Years	\$40,000.00

**Associated Work**

Associated Work	Comments	Estimated Cost
<b>Approaches:</b>		\$0.00
<b>Detours:</b>		\$0.00
<b>Traffic Control:</b>		\$0.00
<b>Utilities:</b>		\$0.00
<b>Right of Way:</b>		\$0.00
<b>Environmental Study:</b>		\$0.00
<b>Other:</b>	Mobilization, Bonding, Insurance	\$40,000.00
<b>Contingencies:</b>		\$40,000.00
<b>Associated Work Total:</b>		\$80,000.00

**Total Estimated Cost**

Total cost of Recommended Works \$560,000.00



West section of south elevation



East section of south elevation





West abutment wall



Typical abutment bearing detail





Perforated girder stiffeners in northwest



Light cracking and disintegration in west abutment wall





West face of pier 1 (west to east)



East face of pier 1





West face of pier 2



East face of pier 2





West face of pier 3



East face of pier 3





West face of pier 4



East face of pier 4





West face of pier 5



East face of pier 5



East abutment wall



Typical soffit detail





Perforated diaphragm section in northeast



Looking east over bridge



Looking west over bridge



Bridge deck surface





Rot in deck boards



Rot in deck boards





Chain-link fence railing



Sidewalk below bridge



Wearing surface below bridge

**Inventory Data**

Structure Name:	Yarker East Bridge	Crossing Type:	Non-Navig. Water
Road Name:	Cataraqui Trail	Heritage Designation:	Not Cons.
Structure Location:	430m East of Colebrook Road	Road Class:	Local
Owner(s)	CRCA	Posted Speed:	50km/h      AADT:
Latitude: 44.375803004	Longitude: -76.758932238	No. of Lanes:	1      % Trucks:
MTO Region:	Eastern	Min. Vertical Clearance:	0
MTO District:	Kingston	Special Routes:	
Structure Type:	I-Beams or Girders	Transit <input type="checkbox"/>	Truck <input type="checkbox"/>
Total Deck Length:	4.7m	School <input type="checkbox"/>	Bicycle <input type="checkbox"/>
Overall Str. Width:	3.65m	Detour Length Around Bridge:	
Total Deck Area:	17.2sq.m	Direction of Structure:	East-West
Roadway Width:	3.65m	Fill on Structure:	
Skew Angle:	0		
No. Spans:	1		
Span Lengths:	4.7		

**Historical Data**

Year Built:	Year of Last Major Rehab:
Last OSIM Inspection:	Last Evaluation:
Last Enhanced OSIM Inspection:	Current Load Limit
Enhanced Access Equipment:	Load Limit By-Law #
Last Underwater Inspection:	By-Law Expiry Date:
Last Condition Survey:	
Rehab History (Date/Description):	

**Field Inspection Information**

Date of Inspection:	2020-09-24	Weather:	Cloudy
Inspector:	John Landry, EIT	Temperature:	20
Others in Party:	Shane Wall, RCJI		
Equipment Used:	Camera, Handtools		



Additional Investigations Required		
	Priority	Estimated Cost
Material Condition Survey		\$0.00
Detailed Deck condition Survey		\$0.00
Non-Destructive Delamination Survey of Asphalt-Covered Deck		\$0.00
Concrete Substructure Condition Survey		\$0.00
Detailed Coating Conditon Survey		\$0.00
Detailed Timber Investigation		\$0.00
Post-Tensioned Strand Investigation		\$0.00
Underwater Investigation		\$0.00
Fatigue Investigation		\$0.00
Seismic Investigation		\$0.00
Structure Evaluation		\$0.00
Monitoring		\$0.00
Monitoring of Deformations, Settlements and Movements		\$0.00
Monitoring Crack Widths		\$0.00
Investigation Notes:	Total Cost: \$0.00	

Overall Structure Notes	
Recommended Work on Structure: None	Timing
<b>BCI: 73.32</b>	
Overall Comments:	Date of next inspection: 2022-09-24
Bridge is generally in good condition. Recommend spot replacing deck boards as needed. Unable to inspect underside of structure due to water level. Was able to determine there are a significant number of girders but was not able to determine exactly how many.	

Element Data				
Element Group: Decks		Material: Wood		Length: 4.7m
Element Name: Wearing Surface		Element Type -		Width: 3.65m
Location: Deck surface		Environment: Severe		Height:
Units	Excellent	Good	Fair	Poor
Sq.m	0	13.2	3	1
Protect. System:				Count: 1
				Total Quant. 17.2
<b>Comments:</b> Wearing surface exhibits rot in deck ends. Loose nails and screws noted. Recommend spot replacing wearing surface boards as needed.				
<b>Rehab Recommendations:</b> Replace wearing surface				
Limited Inspection <input type="checkbox"/> Performance Def: Maintenance: Repair of Bridge Timber Timing: 6-10 Years				

Element Data				
Element Group: Decks		Material: Wood		Length: 4.7m
Element Name: Deck Top - Thin Slab		Element Type Wood Planks		Width: 3.65m
Location: Deck surface		Environment: Moderate		Height:
Units	Excellent	Good	Fair	Poor
Sq.m	0	17.2	0	0
Protect. System:				Count: 1
				Total Quant. 17.2
<b>Comments:</b> Timber railway ties. Assumed to be in good to fair condition based on wearing surface.				
<b>Rehab Recommendations:</b>				
Limited Inspection <input type="checkbox"/> Performance Def: Maintenance: Timing:				

Element Data				
Element Group: Barriers		Material: Wood		Length: 4.7m
Element Name: Railing Systems		Element Type Wood Rail >83mm thick on Wood Post		Width:
Location: North and south		Environment: Severe		Height: 1.1m
Units	Excellent	Good	Fair	Poor
m	0	8.9	0.5	0
Protect. System:				Count: 2
				Total Quant. 9.4
<b>Comments:</b> One missing section of top railing. Checking in northwest post.				
<b>Rehab Recommendations:</b>				
Limited Inspection <input type="checkbox"/> Performance Def: Maintenance: Timing:				

**Element Data**

Element Group: Beams	Material: Wood	Length: <input type="text" value="4.7m"/>										
Element Name: Girders	Element Type Rectangular-Solid	Width: <input type="text" value="0.25m"/>										
Location: Below bridge	Environment: Benign	Height: <input type="text" value="0.4m"/>										
<table border="1"> <thead> <tr> <th>Units</th> <th>Excellent</th> <th>Good</th> <th>Fair</th> <th>Poor</th> </tr> </thead> <tbody> <tr> <td>Sq.m</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Units	Excellent	Good	Fair	Poor	Sq.m					Protect. System:	Count: <input type="text"/>
Units	Excellent	Good	Fair	Poor								
Sq.m												
		Total Quant. <input type="text"/>										

**Comments:**

Unable to determine number of girders due to lack of clearance. Exterior girders appeared to be in good condition.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:**

**Element Data**

Element Group: Abutments	Material: Wood	Length: <input type="text"/>										
Element Name: Abutment Walls	Element Type Post and Lagging	Width: <input type="text" value="3.65m"/>										
Location: East and west	Environment: Severe	Height: <input type="text" value="0.7m"/>										
<table border="1"> <thead> <tr> <th>Units</th> <th>Excellent</th> <th>Good</th> <th>Fair</th> <th>Poor</th> </tr> </thead> <tbody> <tr> <td>Sq.m</td> <td>0</td> <td>5.1</td> <td>0</td> <td>0</td> </tr> </tbody> </table>	Units	Excellent	Good	Fair	Poor	Sq.m	0	5.1	0	0	Protect. System:	Count: <input type="text" value="2"/>
Units	Excellent	Good	Fair	Poor								
Sq.m	0	5.1	0	0								
		Total Quant. <input type="text" value="5.1"/>										

**Comments:**

Unable to view due to water level. Assumed to be in good condition.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:**

**Element Data**

Element Group: Embankments and Streams	Material:	Length: <input type="text"/>										
Element Name: Streams and Waterways	Element Type -	Width: <input type="text"/>										
Location: Below bridge	Environment:	Height: <input type="text"/>										
<table border="1"> <thead> <tr> <th>Units</th> <th>Excellent</th> <th>Good</th> <th>Fair</th> <th>Poor</th> </tr> </thead> <tbody> <tr> <td>All</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> </tr> </tbody> </table>	Units	Excellent	Good	Fair	Poor	All	0	1	0	0	Protect. System:	Count: <input type="text" value="1"/>
Units	Excellent	Good	Fair	Poor								
All	0	1	0	0								
		Total Quant. <input type="text" value="1"/>										

**Comments:**

Water level provides little clearance for the inspection of the substructure.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:**



**Element Data**

Element Group: Embankments and Streams

Material:  
Element Type -

Length:

Element Name: Embankments

Width:

Location: All four quadrants

Environment:  
Protect. System:

Height:

Units	Excellent	Good	Fair	Poor
All	0	4	0	0

Count:

Total Quant.

Comments:

No concerns.

Limited Inspection

Performance Def:

Maintenance:

Timing:

Rehab Recommendations:

**Element Data**

Element Group: Approaches

Material: Gravel  
Element Type -

Length:

Element Name: Wearing Surface

Width:

Location: East and west

Environment: Severe  
Protect. System:

Height:

Units	Excellent	Good	Fair	Poor
Sq.m	0	32.4	0	0

Count:

Total Quant.

Comments:

Well graded. Generally in good condition.

Limited Inspection

Performance Def:

Maintenance:

Timing:

Rehab Recommendations:

Associated Work		
Associated Work	Comments	Estimated Cost
Approaches:		\$0.00
Detours:		\$0.00
Traffic Control:		\$0.00
Utilities:		\$0.00
Right of Way:		\$0.00
Environmental Study:		\$0.00
Other:		\$0.00
Contingencies:		\$0.00
<b>Associated Work Total:</b>		<u>\$0.00</u>

Total Estimated Cost	
Total cost of Recommended Works	\$0.00



South elevation



North elevation





Looking wst over bridge



Looking east over bridge





Deck wearing surface



Rot in deck surface





Rot in west deck end



North railing system





South railing system

**Inventory Data**

Structure Name:	Harrowsmith West Culvert		
Road Name:	Cataraqui Trail		
Structure Location:	200m East of MacLean Road		
Owner(s)	CRCA		
Latitude: 44.397455187	Longitude: -76.692845723	Crossing Type:	Non-Navig. Water
MTO Region:	Eastern	Heritage Designation:	Not Cons.
MTO District:	Kingston	Road Class:	Local
Structure Type:	Rectangular Culvert	Posted Speed: 50km/h	AADT:
Total Deck Length:	3m	No. of Lanes: 1	% Trucks:
Overall Str. Width:	8.2m	Min. Vertical Clearance:	0
Total Deck Area:	24.6sq.m	Special Routes:	
Roadway Width:	2.7m	Transit <input type="checkbox"/>	Truck <input type="checkbox"/>
Skew Angle:	0	School <input type="checkbox"/>	Bicycle <input type="checkbox"/>
No. Spans:	1	Detour Length Around Bridge:	
Span Lengths:	2.2m	Direction of Structure:	East-West
		Fill on Structure:	0.6m

**Historical Data**

Year Built:	Year of Last Major Rehab:
Last OSIM Inspection:	Last Evaluation:
Last Enhanced OSIM Inspection:	Current Load Limit
Enhanced Access Equipment:	Load Limit By-Law #
Last Underwater Inspection:	By-Law Expiry Date:
Last Condition Survey:	
Rehab History (Date/Description):	

**Field Inspection Information**

Date of Inspection:	2020-09-24	Weather:	Cloudy
Inspector:	John Landry, EIT	Temperature:	20
Others in Party:	Shane Wall, RCJI		
Equipment Used:	Camera, Handtools		

**Additional Investigations Required**

	Priority	Estimated Cost
Material Condition Survey		\$0.00
Detailed Deck condition Survey		\$0.00
Non-Destructive Delamination Survey of Asphalt-Covered Deck		\$0.00
Concrete Substructure Condition Survey		\$0.00
Detailed Coating Conditon Survey		\$0.00
Detailed Timber Investigation		\$0.00
Post-Tensioned Strand Investigation		\$0.00
Underwater Investigation		\$0.00
Fatigue Investigation		\$0.00
Seismic Investigation		\$0.00
Structure Evaluation		\$0.00
Monitoring		\$0.00
Monitoring of Deformations, Settlements and Movements		\$0.00
Monitoring Crack Widths		\$0.00

Investigation Notes:

Total Cost: \$0.00

**Overall Structure Notes**

Recommended Work on Structure: None

Timing

BCI: 71.16

Overall Comments:

Date of next inspection: 2022-09-24

Culvert is in good condition. No anticipated work needed.



Element Data				
Element Group: Culverts		Material: Cast-in-place Concrete		Length: 3m
Element Name: Inlet Components		Element Type -		Width:
Location: North end		Environment: Moderate		Height: 1.9m
Units	Excellent	Good	Fair	Poor
Sq.m	0	3.45	2	0.25
Protect. System:		Count: 2		Total Quant. 5.7
Comments: Narrow to medium cracks noted.				
Rehab Recommendations:				
Limited Inspection <input type="checkbox"/>				
Performance Def:				
Maintenance:				
Timing:				

Element Data				
Element Group: Culverts		Material: Cast-in-place Concrete		Length: 3m
Element Name: Outlet Components		Element Type -		Width:
Location: South end		Environment: Benign		Height: 1.9m
Units	Excellent	Good	Fair	Poor
Sq.m	0	4.7	1	0
Protect. System:		Count: 2		Total Quant. 5.7
Comments: Generally in good condition. Light scaling and narrow cracks.				
Rehab Recommendations:				
Limited Inspection <input type="checkbox"/>				
Performance Def:				
Maintenance:				
Timing:				

Element Data				
Element Group: Culverts		Material: Cast-in-place Concrete		Length: 8.2m
Element Name: Barrels		Element Type Frames - Rigid		Width: 2.2m
Location: Below trail		Environment: Benign		Height: 1.9m
Units	Excellent	Good	Fair	Poor
Sq.m	0	46.7	2	0.5
Protect. System:		Count: 1		Total Quant. 49.2
Comments: Culvert is generally in good condition. Medium cracks noted in southeast.				
Rehab Recommendations:				
Limited Inspection <input type="checkbox"/>				
Performance Def:				
Maintenance:				
Timing:				

**Element Data**

Element Group: Embankments and Streams  
 Element Name: Streams and Waterways

Material:  
 Element Type -

Length:   
 Width:   
 Height:   
 Count:   
 Total Quant.

Location: Through culvert

Environment:  
 Protect. System:

Units	Excellent	Good	Fair	Poor
All	0	1	0	0

**Comments:**

Dry at time of inspection.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:**

**Element Data**

Element Group: Embankments and Streams  
 Element Name: Embankments

Material:  
 Element Type -

Length:   
 Width:   
 Height:   
 Count:   
 Total Quant.

Location: All four quadrants

Environment:  
 Protect. System:

Units	Excellent	Good	Fair	Poor
All	0	4	0	0

**Comments:**

No concerns.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:**

**Element Data**

Element Group: Approaches  
 Element Name: Wearing Surface

Material: Gravel  
 Element Type -

Length:   
 Width:   
 Height:   
 Count:   
 Total Quant.

Location: Over culvert

Environment: Severe  
 Protect. System:

Units	Excellent	Good	Fair	Poor
Sq.m	0	22	5	0

**Comments:**

Vegetation growth through surface.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:**

Associated Work		
Associated Work	Comments	Estimated Cost
Approaches:		\$0.00
Detours:		\$0.00
Traffic Control:		\$0.00
Utilities:		\$0.00
Right of Way:		\$0.00
Environmental Study:		\$0.00
Other:		\$0.00
Contingencies:		\$0.00
<b>Associated Work Total:</b>		<b>\$0.00</b>

Total Estimated Cost	
Total cost of Recommended Works	\$0.00





North elevation



South elevation





Looking east over culvert



Looking west over culvert



West wall



East wall





Typical soffit detail



Cracking in southeast



Honeycombing in east wall

**Inventory Data**

Structure Name:	Harrowsmith East Culvert		
Road Name:	Cataraqui Trail		
Structure Location:	670m East of Colebrook Road		
Owner(s)	CRCA		
Latitude: 44.40545805	Longitude: -76.680227713	Crossing Type:	Road
MTO Region:	Eastern	Heritage Designation:	Not Cons.
MTO District:	Kingston	Road Class:	Local
Structure Type:	Rectangular Culvert	Posted Speed: 50km/h	AADT:
Total Deck Length:	4m	No. of Lanes: 1	% Trucks:
Overall Str. Width:	10.4m	Min. Vertical Clearance:	0
Total Deck Area:	41.6sq.m	Special Routes:	
Roadway Width:	2.7m	Transit <input type="checkbox"/>	Truck <input type="checkbox"/>
Skew Angle:	0	School <input type="checkbox"/>	Bicycle <input type="checkbox"/>
No. Spans:	1	Detour Length Around Bridge:	
Span Lengths:	3.65m	Direction of Structure:	East-West
		Fill on Structure:	1m

**Historical Data**

Year Built:	Year of Last Major Rehab:
Last OSIM Inspection:	Last Evaluation:
Last Enhanced OSIM Inspection:	Current Load Limit
Enhanced Access Equipment:	Load Limit By-Law #
Last Underwater Inspection:	By-Law Expiry Date:
Last Condition Survey:	
Rehab History (Date/Description):	

**Field Inspection Information**

Date of Inspection:	2020-09-24	Weather:	Cloudy
Inspector:	John Landry, EIT	Temperature:	20
Others in Party:	Shane Wall, RCJI		
Equipment Used:	Camera, Handtools		



**Additional Investigations Required**

	Priority	Estimated Cost
Material Condition Survey		\$0.00
Detailed Deck condition Survey		\$0.00
Non-Destructive Delamination Survey of Asphalt-Covered Deck		\$0.00
Concrete Substructure Condition Survey		\$0.00
Detailed Coating Condition Survey		\$0.00
Detailed Timber Investigation		\$0.00
Post-Tensioned Strand Investigation		\$0.00
Underwater Investigation		\$0.00
Fatigue Investigation		\$0.00
Seismic Investigation		\$0.00
Structure Evaluation		\$0.00
Monitoring		\$0.00
Monitoring of Deformations, Settlements and Movements		\$0.00
Monitoring Crack Widths		\$0.00

Investigation Notes:

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**Total Cost: \$0.00**
**Overall Structure Notes**

Recommended Work on Structure: Major Rehab

Timing 6-10 Years

**BCI: 38.12**

Overall Comments:

Date of next inspection: 2022-09-24

culvert is in fair to poor condition. The culvert ends as well as the inlet/outlet walls have started to disintegrate. Ends will likely require repair within the next 10 years.

**Element Data**

Element Group: Culverts	Material: Cast-in-place Concrete	Length: 5.8m			
Element Name: Inlet Components	Element Type -	Width:			
Location: North end	Environment: Moderate	Height: 3.8m			
Units	Excellent	Good	Fair	Poor	Count: 2
Sq.m	0	0	6	16	Total Quant. 22

Comments:  
Severe disintegration throughout inlet walls.

Limited Inspection   
Performance Def:  
Maintenance:  
Timing:

Rehab Recommendations:

**Element Data**

Element Group: Culverts	Material: Cast-in-place Concrete	Length: 5.8m			
Element Name: Outlet Components	Element Type -	Width:			
Location: South end	Environment: Moderate	Height: 3.8m			
Units	Excellent	Good	Fair	Poor	Count: 2
Sq.m	0	0	11	11	Total Quant. 22

Comments:  
Severe disintegration throughout outlet walls. Most notably the southeast wall.

Limited Inspection   
Performance Def:  
Maintenance:  
Timing:

Rehab Recommendations:

**Element Data**

Element Group: Culverts	Material: Cast-in-place Concrete	Length: 10.4m			
Element Name: Barrels	Element Type Frames - Rigid	Width: 3.65m			
Location: Below trail	Environment: Benign	Height: 3.7m			
Units	Excellent	Good	Fair	Poor	Count: 1
Sq.m	0	49.9	40	25	Total Quant. 114.9

Comments:  
Severe disintegration at culvert ends. Light to moderate localized scaling.

Limited Inspection   
Performance Def:  
Maintenance:  
Timing: 6-10 Years

Rehab Recommendations:  
Concrete repairs to culvert ends.

**Element Data**

Element Group: Embankments and Streams  
 Element Name: Embankments

Material:  
 Element Type -

Length:

Width:

Location: All four quadrants

Environment:

Height:

Units	Excellent	Good	Fair	Poor
All	0	4	0	0

Protect. System:

Count:

Total Quant.

**Comments:**

No concerns.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:**

**Element Data**

Element Group: Approaches  
 Element Name: Wearing Surface

Material:  
 Element Type -

Length:

Width:

Location: Over culvert

Environment:

Height:

Units	Excellent	Good	Fair	Poor
Sq.m	0	54	0	0

Protect. System:

Count:

Total Quant.

**Comments:**

Light wheel rutting. Generally in good condition.

Limited Inspection

Performance Def:

Maintenance:

Timing:

**Rehab Recommendations:**



**Recommended Work by Element**

Element Name	Recommended work	Timing	Estimated Cost
Barrels	Concrete repairs to culvert ends.	6-10 Years	\$80,000.00

**Associated Work**

Associated Work	Comments	Estimated Cost
<b>Approaches:</b>		\$0.00
<b>Detours:</b>		\$0.00
<b>Traffic Control:</b>		\$0.00
<b>Utilities:</b>		\$0.00
<b>Right of Way:</b>		\$0.00
<b>Environmental Study:</b>		\$0.00
<b>Other:</b>	Mobilization, Bonding, Insurance	\$8,000.00
<b>Contingencies:</b>		\$8,000.00
<b>Associated Work Total:</b>		\$16,000.00

**Total Estimated Cost**

Total cost of Recommended Works \$96,000.00



South elevation



Looking west over culvert





Looking east over culvert



West wall (typical)





East wall (typical)



Moderate scaling in wall



Typical soffit detail



Scaling and disintegration in soffit end





Severe disintegration in northeast wingwall



Northeast wingwall





Southwest wingwall



Southeast wingwall



Northwest wingwall