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**ATTACHMENT 2**

***OSIM INSPECTION REPORTS & BCI FORMS***

***CULVERTS***

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## Structure Condition Summary Form

**Structure Name** Forest Lake Road Culvert  
**Structure Number** BR2  
**Date of Inspection** August 04, 2020  
**Project No.** 20032  
**Consultant** HP Engineering Inc.

Element Group	Element Name	Unit (Qty.)	Unit Price (MTO)	Total Element Quantity	Element Qty. in Excellent Condition (1.00)	Element Quantity in Good Condition (0.75)	Element Quantity in Fair Condition (0.4)	Element Quantity in Poor Condition (0)	Total Replacement Value (TRV)	Current Element Value (CEV)	Element Condition Index	Performance Deficiency	Maintenance Need
Approaches	Wearing Surface	Sq.m	6.00	81.60	0.00	69.60	12.00	0.00	490	342	70	00	18
Barriers	Barrier/ Parapet Walls	Sq.m	100.00	9.34	0.00	2.67	5.67	1.00	934	427	46	00	00
Decks	Wearing Surface	Sq.m	25.00	24.47	0.00	12.47	12.00	0.00	612	354	58	00	18
Culvert	Inlet Components	Sq.m	350.00	3.40	0.00	2.40	0.50	0.50	1190	700	59	00	00
	Outlet Components	Sq.m	350.00	3.40	0.00	2.40	0.50	0.50	1190	700	59	00	00
	Barrel	Sq.m	350.00	73.16	0.00	63.16	5.00	5.00	25606	17280	67	14	00
									<b>30021</b>	<b>19802</b>			

Bridge Condition Index (BCI)

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**MUNICIPAL STRUCTURE INSPECTION FORM**

**BRIDGE**

**STRUCTURE NUMBER.: BR2**

FIELD INSPECTION INFORMATION	
Date of Inspection:	August 4, 2020 <span style="float:right">Type of Inspection: <input checked="" type="checkbox"/> OSIM <input type="checkbox"/> Enhanced OSIM</span>
Inspector:	Sarah Vandergeest, P.Eng., HP Engineering
Others in Party:	Sagar Chhayani, HP Engineering
Access Equipment Used:	Measuring tape, Hip waders, Camera and Hammer
Weather:	Sunny
Temperature:	18°C

ADDITIONAL INVESTIGATION REQUIRED	Priority			Estimated Cost
	None	Normal	Urgent	
Rehabilitation/Replacement Study: Approach Barrier				\$ 5,000.00
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:				\$ -
Underwater Investigation:				\$ -
Fatigue Investigation:				\$ -
Seismic Investigation:				\$ -
Structure Evaluation:				\$ -
Monitoring				
Monitoring of Deformations, Settlement and Movements:				\$ -
Monitoring Crack Widths:				\$ -
<b>Load Posting – Estimated Load Limit</b>	<b>Total Cost</b>			<b>\$ 5,000.00</b>
<b>Investigation Notes:</b>				

OVERALL STRUCTURAL NOTES:	
Recommended Work on Structure:	<input type="checkbox"/> None <input checked="" type="checkbox"/> Minor Rehab. <input type="checkbox"/> Major Rehab. <input type="checkbox"/> Replace
Timing of Recommended Work:	<input checked="" type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years
Overall structure is generally in fair condition. Parapet walls are substandard and should be replaced with code compliant barrier. No approach guiderail present and should be installed. Severe scaling with localized spalls noted on inlet and outlet components. Severe erosion and undermining on west barrel wall. Concrete disintegration on east wall. Spall and exposed reinforcement on soffit. Wide vertical crack and large mass of concrete deteriorated at the centre of east wall.	
Date of Next Inspection:	August 2022

**Suspected Performance Deficiencies**

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

**MUNICIPAL STRUCTURE INSPECTION FORM**

**BRIDGE**

**STRUCTURE NUMBER.: BR2**

ELEMENT DATA					
<b>Element Group:</b>	Approaches		<b>Length:</b>		
<b>Element Name:</b>	Barrier		<b>Width:</b>		
<b>Location:</b>	NE, NW, SE & SW Corners of Structure		<b>Height:</b>		
<b>Material:</b>	Steel		<b>Count:</b>		
<b>Element Type:</b>	Steel Flex Beam on steel post		<b>Total Quantity:</b>		
<b>Environment:</b>	Severe		<b>Limited Inspection:</b>	<input type="checkbox"/>	
<b>Protection System</b>	None				
<b>Condition Data:</b>	<b>Units</b>	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
	m	-	-	-	-
<b>Comments:</b> Approach barriers were not present at the time of the inspection. A code compliant approach barrier system with end treatments should be installed.					
<b>Performance Deficiencies:</b> 08			<b>Maintenance Needs:</b> 00		
<b>Recommended Work:</b> <input checked="" type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input checked="" type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			<b>Maintenance Needs:</b> <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

<b>Element Group:</b>	Approaches		<b>Length:</b>	6.0	
<b>Element Name:</b>	Wearing Surface		<b>Width:</b>	6.8	
<b>Location:</b>	North and South of Structure		<b>Height:</b>	0.08	
<b>Material:</b>	Sand		<b>Count:</b>	2	
<b>Element Type:</b>			<b>Total Quantity:</b>	81.6	
<b>Environment:</b>	Severe		<b>Limited Inspection:</b>	<input type="checkbox"/>	
<b>Protection System</b>	None				
<b>Condition Data:</b>	<b>Units</b>	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
	m <sup>2</sup>		69.6	12	
<b>Comments:</b> Localized transverse and longitudinal cracks at the approaches, with several alligator cracks noted throughout the centerline. Light to moderate raveling was observed throughout.					
<b>Performance Deficiencies:</b> 00			<b>Maintenance Needs:</b> 18 – Asphalt Surface Repair		
<b>Recommended Work:</b> <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			<b>Maintenance Needs:</b> <input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

**MUNICIPAL STRUCTURE INSPECTION FORM**

**BRIDGE**

**STRUCTURE NUMBER.: BR2**

<b>Element Group:</b>	Barriers		<b>Length:</b>	3.6	
<b>Element Name:</b>	Barrier/Parapet Walls		<b>Width:</b>	-	
<b>Location:</b>	North and South of Structure		<b>Height:</b>	1.3	
<b>Material:</b>	Cast-in-place concrete		<b>Count:</b>	2	
<b>Element Type:</b>	Parapet Wall without railing		<b>Total Quantity:</b>	9.34	
<b>Environment:</b>	Moderate		<b>Limited Inspection:</b>	<input type="checkbox"/>	
<b>Protection System</b>	None				
<b>Condition Data:</b>	<b>Units</b>	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
	m	-	2.67	5.67	1
<b>Comments:</b> Medium to severe scaling noted on parapet walls. Barrier is substandard and should be replaced with a code compliant deck barrier.					
<b>Performance Deficiencies:</b> 08			<b>Maintenance Needs:</b> 00		
<b>Recommended Work:</b> <input checked="" type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input checked="" type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			<b>Maintenance Needs:</b> <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

ELEMENT DATA					
<b>Element Group:</b>	Decks		<b>Length:</b>	3.6	
<b>Element Name:</b>	Wearing Surface		<b>Width:</b>	6.8	
<b>Location:</b>	NA		<b>Height:</b>	0.09	
<b>Material:</b>	Asphalt		<b>Count:</b>	1	
<b>Element Type:</b>	NA		<b>Total Quantity:</b>	24.47	
<b>Environment:</b>	Severe		<b>Limited Inspection:</b>	<input type="checkbox"/>	
<b>Protection System</b>	None				
<b>Condition Data:</b>	<b>Units</b>	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
	m <sup>2</sup>	-	12.47	12	
<b>Comments:</b> Light to moderate raveling and medium cracks observed on the wearing surface.					
<b>Performance Deficiencies:</b> 00			<b>Maintenance Needs:</b> 18 – Asphalt Surface Repair		
<b>Recommended Work:</b> <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			<b>Maintenance Needs:</b> <input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

**MUNICIPAL STRUCTURE INSPECTION FORM**

**BRIDGE**

**STRUCTURE NUMBER.: BR2**

<b>Element Group:</b>	Culverts		<b>Length:</b>	12.4	
<b>Element Name:</b>	Barrel		<b>Width:</b>	3.1	
<b>Location:</b>	Below Roadway		<b>Height:</b>	1.4	
<b>Material:</b>	Cast-in-place concrete		<b>Count:</b>	1	
<b>Element Type:</b>	Frames - Articulated		<b>Total Quantity:</b>	73.16	
<b>Environment:</b>	Benign		<b>Limited Inspection:</b>	<input type="checkbox"/>	
<b>Protection System</b>	None				
<b>Condition Data:</b>	<b>Units</b>	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
	m <sup>2</sup>	-	63.16	5.00	5.00
<b>Comments:</b> Concrete disintegration on east wall. Spall and exposed reinforcement on soffit. Top of footing are exposed. Severe erosion and undermining of west wall. Wide vertical crack and large mass of concrete dissolved at the centre of east wall.					
<b>Performance Deficiencies: 14</b>			<b>Maintenance Needs: 00</b>		
<b>Recommended Work:</b> <input checked="" type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input checked="" type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			<b>Maintenance Needs:</b> <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

ELEMENT DATA					
<b>Element Group:</b>	Culverts		<b>Length:</b>	1.7	
<b>Element Name:</b>	Inlet Components		<b>Width:</b>	-	
<b>Location:</b>	East		<b>Height:</b>	1	
<b>Material:</b>	Cast-in-place concrete		<b>Count:</b>	2	
<b>Element Type:</b>	Retaining Wall		<b>Total Quantity:</b>	3.4	
<b>Environment:</b>	Benign		<b>Limited Inspection:</b>	<input type="checkbox"/>	
<b>Protection System</b>	None				
<b>Condition Data:</b>	<b>Units</b>	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
	m <sup>2</sup>	-	2.4	0.5	0.5
<b>Comments:</b> Severe scaling and localized spalls observed.					
<b>Performance Deficiencies: 00</b>			<b>Maintenance Needs: 00</b>		
<b>Recommended Work:</b> <input checked="" type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input checked="" type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			<b>Maintenance Needs:</b> <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

**MUNICIPAL STRUCTURE INSPECTION FORM**

**BRIDGE**

**STRUCTURE NUMBER.: BR2**

ELEMENT DATA					
<b>Element Group:</b>	Culverts	<b>Length:</b>	1.7		
<b>Element Name:</b>	Outlet Components	<b>Width:</b>	-		
<b>Location:</b>	West	<b>Height:</b>	1		
<b>Material:</b>	Cast-in-place concrete	<b>Count:</b>	2		
<b>Element Type:</b>	Retaining Wall	<b>Total Quantity:</b>	3.4		
<b>Environment:</b>	Benign	<b>Limited Inspection:</b>	<input type="checkbox"/>		
<b>Protection System</b>	None				
<b>Condition Data:</b>	<b>Units</b>	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
	m <sup>2</sup>	-	2.4	0.5	0.5
<b>Comments:</b> Severe to medium scaling noted throughout. Minor separation at construction joint. Severe erosion and severe undermining at southwest wingwall.					
<b>Performance Deficiencies:</b> 00			<b>Maintenance Needs:</b> 00		
<b>Recommended Work:</b> <input checked="" type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input checked="" type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			<b>Maintenance Needs:</b> <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

ELEMENT DATA					
<b>Element Group:</b>	Embankments and Streams	<b>Length:</b>			
<b>Element Name:</b>	Embankments	<b>Width:</b>			
<b>Location:</b>	NE, NW, SE & SW of Structure	<b>Height:</b>			
<b>Material:</b>	Native Soil	<b>Count:</b>	4		
<b>Element Type:</b>	Embankments	<b>Total Quantity:</b>	4		
<b>Environment:</b>	Benign	<b>Limited Inspection:</b>	<input type="checkbox"/>		
<b>Protection System</b>	Unknown				
<b>Condition Data:</b>	<b>Units</b>	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
	All	-	3	1	-
<b>Comments:</b> Embankments are generally in good condition with washout noted at NW corner.					
<b>Performance Deficiencies:</b> 00			<b>Maintenance Needs:</b> 00		
<b>Recommended Work:</b> <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			<b>Maintenance Needs:</b> <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		



**MUNICIPAL STRUCTURE INSPECTION FORM**

**BRIDGE**

**STRUCTURE NUMBER.: BR2**

<b>Element Group:</b>	Embankments & Streams		<b>Length:</b>		
<b>Element Name:</b>	Streams and Waterways		<b>Width:</b>		
<b>Location:</b>	Under Bridge		<b>Height:</b>		
<b>Material:</b>	NA		<b>Count:</b>	1	
<b>Element Type:</b>	NA		<b>Total Quantity:</b>	1	
<b>Environment:</b>	Benign		<b>Limited Inspection:</b>	<input type="checkbox"/>	
<b>Protection System</b>	None				
<b>Condition Data:</b>	<b>Units</b>	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
	Each	-	1	-	-
<b>Comments:</b> Low volume, fast flow and some debris observed in the stream.					
<b>Performance Deficiencies:</b> 00			<b>Maintenance Needs:</b> 18- Remove debris		
<b>Recommended Work:</b> <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			<b>Maintenance Needs:</b> <input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

**MUNICIPAL STRUCTURE INSPECTION FORM**

**BRIDGE**

**STRUCTURE NUMBER.: BR2**

<b>REPAIR AND REHABILITATION REQUIRED</b>		<b>Priority</b>			<b>Estimated Cost</b>
<b>Element</b>	<b>Repair and Rehabilitation Required</b>	<b>6 - 10 Years</b>	<b>1 - 5 Years</b>	<b>&lt; 1 year</b>	
Culvert – Barrel, Inlet and Outlet Components	Concrete repairs		X		\$ 60,000.00
Approach- Barrier	Install code complaint approach barrier		X		\$ 48,000.00
Barrier	Railing Systems – Deck Barrier		X		\$ 30,000.00
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
<b>Total Cost</b>					<b>\$ 138,000.00</b>

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

<b>JUSTIFICATION</b>

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.: BR2



Photo 1 Structure from east approach



Photo 2 Structure from west approach

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.: BR2



Photo 3 East approach from centre of structure



Photo 4 West approach from centre of structure



Photo 5 North elevation



Photo 6 South elevation



Photo 7 Horizontal and vertical cracks with tire rutting noted on wearing surface throughout



Photo 8 Moderate scaling noted on substandard traffic barrier



Photo 9 Spall noted on soffit at north end



Photo 10 South underside of structure



Photo 11 Full length crack and undermining noted on west abutment wall



Photo 12 Large spalls with exposed corroded reinforcement noted on soffit at mid span





Photo 13 Large spall with portion coming out at construction joint on east abutment wall



Photo 14 Delamination and spalls with exposed corroded reinforcement noted on soffit at south end



Photo 15 Moderate honeycombing, and undermining noted on southwest retaining wall



Photo 16 Large spalls with exposed corroded reinforcement noted on south fascia

## Structure Condition Summary Form

**Structure Name** Black Creek Road Culvert  
**Structure Number** BR8  
**Date of Inspection** August 04, 2020  
**Project No.** 20032  
**Consultant** HP Engineering Inc.

Element Group	Element Name	Unit (Qty.)	Unit Price (MTO)	Total Element Quantity	Element Qty. in Excellent Condition (1.00)	Element Quantity in Good Condition (0.75)	Element Quantity in Fair Condition (0.4)	Element Quantity in Poor Condition (0)	Total Replacement Value (TRV)	Current Element Value (CEV)	Element Condition Index	Performance Deficiency	Maintenance Need
Approaches	Wearing Surface	Sq.m	6.00	225.00		225.00	0.00	0.00	1350	1013	75	00	00
Culvert	Barrel	Sq.m	350.00	694.65	0.00	694.65	0.00	0.00	243128	182346	75	00	00
									<b>244478</b>	<b>183358</b>			

**Bridge Condition Index (BCI)**

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**MUNICIPAL STRUCTURE INSPECTION FORM**

**BRIDGE**

**STRUCTURE NUMBER.: BR8**

FIELD INSPECTION INFORMATION	
Date of Inspection:	August 4, 2020 <span style="float:right">Type of Inspection: <input checked="" type="checkbox"/> OSIM <input type="checkbox"/> Enhanced OSIM</span>
Inspector:	Sarah Vandergeest, P.Eng., HP Engineering
Others in Party:	Sagar Chhayani, HP Engineering
Access Equipment Used:	Measuring tape, Hip waders, Camera and Hammer
Weather:	Sunny
Temperature:	18°C

ADDITIONAL INVESTIGATION REQUIRED	Priority			Estimated Cost
	None	Normal	Urgent	
Rehabilitation/Replacement Study: Approach Barrier				\$ 5,000.00
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:				\$ -
Underwater Investigation:				\$ -
Fatigue Investigation:				\$ -
Seismic Investigation:				\$ -
Structure Evaluation:				\$ -
Monitoring				
Monitoring of Deformations, Settlement and Movements:				\$ -
Monitoring Crack Widths:				\$ -
<b>Load Posting – Estimated Load Limit</b>	<b>Total Cost</b>			<b>\$ 5,000.00</b>
<b>Investigation Notes:</b>				

OVERALL STRUCTURAL NOTES:	
Recommended Work on Structure:	<input type="checkbox"/> None <input checked="" type="checkbox"/> Minor Rehab. <input type="checkbox"/> Major Rehab. <input type="checkbox"/> Replace
Timing of Recommended Work:	<input checked="" type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years
Overall, structure is generally in good condition with erosion at northwest embankment. A code compliant barrier should be installed on south side of structure. Existing three-cable railing on north side should be replaced with code compliant barrier.	
Date of Next Inspection:	August 2022

**Suspected Performance Deficiencies**

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

**MUNICIPAL STRUCTURE INSPECTION FORM**

**BRIDGE**

**STRUCTURE NUMBER.: BR8**

ELEMENT DATA					
<b>Element Group:</b>	Approaches		<b>Length:</b>		
<b>Element Name:</b>	Barrier		<b>Width:</b>		
<b>Location:</b>	NE, NW, SE & SW Corners of Structure		<b>Height:</b>		
<b>Material:</b>	Steel		<b>Count:</b>		
<b>Element Type:</b>	Steel Flex Beam on wood post		<b>Total Quantity:</b>	100	
<b>Environment:</b>	Severe		<b>Limited Inspection:</b>	<input type="checkbox"/>	
<b>Protection System</b>	None				
<b>Condition Data:</b>	<b>Units</b>	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
	m	-	100	-	-
<b>Comments:</b> Approach barrier and end treatments should be installed on the south side of the structure. North approach barrier is substandard and should be replaced with a code compliant barrier and end treatments.					
<b>Performance Deficiencies: 08</b>			<b>Maintenance Needs: 00</b>		
<b>Recommended Work:</b>			<b>Maintenance Needs:</b>		
<input type="checkbox"/> Rehab. <input checked="" type="checkbox"/> Replace <input checked="" type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			<input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

<b>Element Group:</b>	Approaches		<b>Length:</b>	30	
<b>Element Name:</b>	Wearing Surface		<b>Width:</b>	7.5	
<b>Location:</b>	North and South of Structure		<b>Height:</b>	-	
<b>Material:</b>	Gravel		<b>Count:</b>	-	
<b>Element Type:</b>	NA		<b>Total Quantity:</b>	225	
<b>Environment:</b>	Severe		<b>Limited Inspection:</b>	<input type="checkbox"/>	
<b>Protection System</b>	None				
<b>Condition Data:</b>	<b>Units</b>	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
	m <sup>2</sup>	-	225	-	-
<b>Comments:</b> Generally in good condition.					
<b>Performance Deficiencies: 00</b>			<b>Maintenance Needs: 00</b>		
<b>Recommended Work:</b>			<b>Maintenance Needs:</b>		
<input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			<input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

**MUNICIPAL STRUCTURE INSPECTION FORM**

**BRIDGE**

**STRUCTURE NUMBER.: BR8**

ELEMENT DATA					
<b>Element Group:</b>	Accessories		<b>Length:</b>		
<b>Element Name:</b>	Signs		<b>Width:</b>		
<b>Location:</b>	North and South of Structure		<b>Height:</b>		
<b>Material:</b>	Steel		<b>Count:</b>		
<b>Element Type:</b>	Hazard Signs		<b>Total Quantity:</b>		
<b>Environment:</b>	Severe		<b>Limited Inspection:</b>	<input type="checkbox"/>	
<b>Protection System</b>	None				
<b>Condition Data:</b>	<b>Units</b>	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
	Each	-	-	-	-
<b>Comments:</b> No hazards signs noted at the time of the inspection.					
<b>Performance Deficiencies:</b> 00			<b>Maintenance Needs:</b> 18 - Install Hazard signs		
<b>Recommended Work:</b> <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			<b>Maintenance Needs:</b> <input checked="" type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

<b>Element Group:</b>	Culverts		<b>Length:</b>	5.5	
<b>Element Name:</b>	Barrel		<b>Width:</b>	42.1	
<b>Location:</b>	NA		<b>Height:</b>	3	
<b>Material:</b>	Precast concrete		<b>Count:</b>	1	
<b>Element Type:</b>	Box		<b>Total Quantity:</b>	694.65	
<b>Environment:</b>	Benign		<b>Limited Inspection:</b>	<input checked="" type="checkbox"/>	
<b>Protection System</b>	None				
<b>Condition Data:</b>	<b>Units</b>	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
	m <sup>2</sup>		694.65	-	-
<b>Comments:</b> Limited inspection due to high water level. Rating based on visible portion of barrel ends and previous inspection report.					
<b>Performance Deficiencies:</b> 00			<b>Maintenance Needs:</b> 00		
<b>Recommended Work:</b> <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			<b>Maintenance Needs:</b> <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

**MUNICIPAL STRUCTURE INSPECTION FORM**

**BRIDGE**

**STRUCTURE NUMBER.: BR8**

ELEMENT DATA					
<b>Element Group:</b>	Embankments & Streams		<b>Length:</b>	-	
<b>Element Name:</b>	Embankments		<b>Width:</b>	-	
<b>Location:</b>	All		<b>Height:</b>	-	
<b>Material:</b>	NA		<b>Count:</b>	4	
<b>Element Type:</b>	NA		<b>Total Quantity:</b>	4	
<b>Environment:</b>	Benign		<b>Limited Inspection:</b>	<input type="checkbox"/>	
<b>Protection System</b>	Hot dip galvanized				
<b>Condition Data:</b>	<b>Units</b>	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
	Each	-	4	-	-
<b>Comments:</b> Generally in good condition.					
<b>Performance Deficiencies:</b> 00			<b>Maintenance Needs:</b> 00		
<b>Recommended Work:</b> <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			<b>Maintenance Needs:</b> <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

<b>Element Group:</b>	Embankments & Streams		<b>Length:</b>	-	
<b>Element Name:</b>	Streams and Waterways		<b>Width:</b>	-	
<b>Location:</b>	Under Bridge		<b>Height:</b>	-	
<b>Material:</b>	NA		<b>Count:</b>	1	
<b>Element Type:</b>	NA		<b>Total Quantity:</b>	1	
<b>Environment:</b>	Benign		<b>Limited Inspection:</b>	<input type="checkbox"/>	
<b>Protection System</b>	Hot dip galvanized				
<b>Condition Data:</b>	<b>Units</b>	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
	All	-	1	-	-
<b>Comments:</b> High volume, low flow in the direction of north to south.					
<b>Performance Deficiencies:</b> 00			<b>Maintenance Needs:</b> 00		
<b>Recommended Work:</b> <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			<b>Maintenance Needs:</b> <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		



**MUNICIPAL STRUCTURE INSPECTION FORM**

**BRIDGE**

**STRUCTURE NUMBER.: BR8**

<b>REPAIR AND REHABILITATION REQUIRED</b>		<b>Priority</b>			<b>Estimated Cost</b>
<b>Element</b>	<b>Repair and Rehabilitation Required</b>	<b>6 - 10 Years</b>	<b>1 - 5 Years</b>	<b>&lt; 1 year</b>	
Approach Barrier	Install / Replace Barrier and End Treatments			X	\$ 48,000.00
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
<b>Total Cost</b>					<b>\$ 48,000.00</b>

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

<b>JUSTIFICATION</b>

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.: BR8



Photo 1 Structure from east approach



Photo 2 Structure from west approach

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.: BR8



Photo 3 East approach from centre of structure



Photo 4 West approach from centre of structure

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.: BR8



Photo 5 North elevation



Photo 6 No end treatment present at the time of inspection

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.: BR8



Photo 7 Barrier posts leaning at northeast approach



Photo 8 Potholes and previous repairs noted on west approach wearing surface



Photo 9 Spall noted on exterior interface of vertical leg and soffit



Photo 10 Visible portion of interior barrel

## Structure Condition Summary Form

**Structure Name** Rodeo Road Culvert  
**Structure Number** BR11  
**Date of Inspection** August 04, 2020  
**Project No.** 20032  
**Consultant** HP Engineering Inc.

Element Group	Element Name	Unit (Qty.)	Unit Price (MTO)	Total Element Quantity	Element Qty. in Excellent Condition (1.00)	Element Quantity in Good Condition (0.75)	Element Quantity in Fair Condition (0.4)	Element Quantity in Poor Condition (0)	Total Replacement Value (TRV)	Current Element Value (CEV)	Element Condition Index	Performance Deficiency	Maintenance Need
Approaches	Wearing Surface	Sq.m	6.00	306.00	0.00	300.00	6.00	0.00	1836	1364	74	00	18
Culvert	Barrel	Sq.m	350.00	189.42	0.00	189.42	0.00	0.00	66297	49723	75	00	00
									<b>68133</b>	<b>51087</b>			

**Bridge Condition Index (BCI)**

**75**





**MUNICIPAL STRUCTURE INSPECTION FORM**

**BRIDGE**

**STRUCTURE NUMBER.: BR11**

FIELD INSPECTION INFORMATION	
Date of Inspection:	August 4, 2020 <span style="float:right">Type of Inspection: <input checked="" type="checkbox"/> OSIM <input type="checkbox"/> Enhanced OSIM</span>
Inspector:	Sarah Vandergeest, P.Eng., HP Engineering
Others in Party:	Sagar Chhayani, HP Engineering
Access Equipment Used:	Measuring tape, Hip waders, Camera and Hammer
Weather:	Sunny
Temperature:	18°C

ADDITIONAL INVESTIGATION REQUIRED	Priority			Estimated Cost
	None	Normal	Urgent	
Rehabilitation/Replacement Study: Approach Barrier				\$ 5,000.00
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:				\$ -
Underwater Investigation:				\$ -
Fatigue Investigation:				\$ -
Seismic Investigation:				\$ -
Structure Evaluation:				\$ -
Monitoring				
Monitoring of Deformations, Settlement and Movements:				\$ -
Monitoring Crack Widths:				\$ -
<b>Load Posting – Estimated Load Limit</b>			<b>Total Cost</b>	<b>\$ 5,000.00</b>
<b>Investigation Notes:</b>				

OVERALL STRUCTURAL NOTES:	
Recommended Work on Structure:	<input type="checkbox"/> None <input checked="" type="checkbox"/> Minor Rehab. <input type="checkbox"/> Major Rehab. <input type="checkbox"/> Replace
Timing of Recommended Work:	<input checked="" type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years
Overall, structure is generally in good condition. A code complaint barrier should be installed over structure and on approaches.	
Date of Next Inspection:	August 2022

**Suspected Performance Deficiencies**

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

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

STRUCTURE NUMBER.: BR11

ELEMENT DATA					
Element Group:	Approaches		Length:		
Element Name:	Barrier		Width:		
Location:	NE, NW, SE & SW Corners of Structure		Height:		
Material:	Steel		Count:		
Element Type:	Steel Flex Beam on wood post		Total Quantity:		
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m	-	-	-	-
<p><b>Comments:</b> No approach barriers observed at the time of the inspection. It is recommended that code compliant barriers and end treatments be installed.</p>					
Performance Deficiencies: 08			Maintenance Needs: 00		
<b>Recommended Work:</b> <input type="checkbox"/> Rehab. <input checked="" type="checkbox"/> Replace <input checked="" type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			<b>Maintenance Needs:</b> <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

Element Group:	Approaches		Length:	15.3	
Element Name:	Wearing Surface		Width:	10	
Location:	North and South of Structure		Height:	-	
Material:	Gravel		Count:	2	
Element Type:	NA		Total Quantity:	306	
Environment:	Severe		Limited Inspection:	<input type="checkbox"/>	
Protection System	None				
Condition Data:	Units	Excellent	Good	Fair	Poor
	m <sup>2</sup>	-	300	6	-
<p><b>Comments:</b> Minor erosion at southeast. Small potholes forming and erosion observed at edges of roadway.</p>					
Performance Deficiencies: 00			Maintenance Needs: 18 – Regrade Approaches		
<b>Recommended Work:</b> <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			<b>Maintenance Needs:</b> <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input checked="" type="checkbox"/> 2 Years		

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

STRUCTURE NUMBER.: BR11

ELEMENT DATA					
<b>Element Group:</b>	Accessories		<b>Length:</b>		
<b>Element Name:</b>	Signs		<b>Width:</b>		
<b>Location:</b>	North and South of Structure		<b>Height:</b>		
<b>Material:</b>	Steel		<b>Count:</b>		
<b>Element Type:</b>	Hazard Signs		<b>Total Quantity:</b>		
<b>Environment:</b>	Severe		<b>Limited Inspection:</b>	<input type="checkbox"/>	
<b>Protection System</b>	None				
<b>Condition Data:</b>	<b>Units</b>	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
	Each	-	-	-	-
<b>Comments:</b> Hazard signs are missing and should be installed.					
<b>Performance Deficiencies:</b> 00			<b>Maintenance Needs:</b> 18 - Install Hazard signs		
<b>Recommended Work:</b> <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			<b>Maintenance Needs:</b> <input checked="" type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

<b>Element Group:</b>	Culverts		<b>Length:</b>	22	
<b>Element Name:</b>	Barrel		<b>Width:</b>	3.3	
<b>Location:</b>	NA		<b>Height:</b>	2.08	
<b>Material:</b>	Steel		<b>Count:</b>	1	
<b>Element Type:</b>	Pipe Arch		<b>Total Quantity:</b>	189.42	
<b>Environment:</b>	Benign		<b>Limited Inspection:</b>	<input type="checkbox"/>	
<b>Protection System</b>	None				
<b>Condition Data:</b>	<b>Units</b>	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
	m <sup>2</sup>	-	189.42	-	-
<b>Comments:</b> Generally in good condition. Small gaps found at some joints, which appeared to be installation related but no evidence of performance related issues.					
<b>Performance Deficiencies:</b> 00			<b>Maintenance Needs:</b> 00		
<b>Recommended Work:</b> <input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			<b>Maintenance Needs:</b> <input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

**MUNICIPAL STRUCTURE INSPECTION FORM**

**BRIDGE**

**STRUCTURE NUMBER.: BR11**

ELEMENT DATA					
<b>Element Group:</b>	Embankments & Streams		<b>Length:</b>	-	
<b>Element Name:</b>	Embankments		<b>Width:</b>	-	
<b>Location:</b>	All		<b>Height:</b>	-	
<b>Material:</b>	NA		<b>Count:</b>	4	
<b>Element Type:</b>	NA		<b>Total Quantity:</b>	4	
<b>Environment:</b>	Benign		<b>Limited Inspection:</b>	<input type="checkbox"/>	
<b>Protection System</b>	Hot dip galvanized				
<b>Condition Data:</b>	<b>Units</b>	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
	Each	-	2	2	-
<b>Comments:</b> Moderately sloped, well vegetated and stable embankments. Minor erosion observed at southeast and south west side of the structure					
<b>Performance Deficiencies: 00</b>			<b>Maintenance Needs: 13</b>		
<b>Recommended Work:</b>			<b>Maintenance Needs:</b>		
<input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			<input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input checked="" type="checkbox"/> 2 Years		

<b>Element Group:</b>	Embankments & Streams		<b>Length:</b>	-	
<b>Element Name:</b>	Streams and Waterways		<b>Width:</b>	-	
<b>Location:</b>	Under Bridge		<b>Height:</b>	-	
<b>Material:</b>	NA		<b>Count:</b>	1	
<b>Element Type:</b>	NA		<b>Total Quantity:</b>	1	
<b>Environment:</b>	Benign		<b>Limited Inspection:</b>	<input type="checkbox"/>	
<b>Protection System</b>	Hot dip galvanized				
<b>Condition Data:</b>	<b>Units</b>	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
	Each	-	1	-	-
<b>Comments:</b> Low volume and low flow from west to east direction.					
<b>Performance Deficiencies: 00</b>			<b>Maintenance Needs: 00</b>		
<b>Recommended Work:</b>			<b>Maintenance Needs:</b>		
<input type="checkbox"/> Rehab. <input type="checkbox"/> Replace <input type="checkbox"/> 1 – 5 Years <input type="checkbox"/> 6 – 10 Years			<input type="checkbox"/> Urgent <input type="checkbox"/> 1 Year <input type="checkbox"/> 2 Years		

**MUNICIPAL STRUCTURE INSPECTION FORM**

**BRIDGE**

**STRUCTURE NUMBER.: BR11**

<b>REPAIR AND REHABILITATION REQUIRED</b>		<b>Priority</b>			<b>Estimated Cost</b>
<b>Element</b>	<b>Repair and Rehabilitation Required</b>	<b>6 - 10 Years</b>	<b>1 - 5 Years</b>	<b>&lt; 1 year</b>	
Approach Barrier	Install Code Compliant Approach Barrier and End Treatments		X		\$ 48,000.00
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
<b>Total Cost</b>					<b>\$ 48,000.00</b>

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

<b>JUSTIFICATION</b>

MUNICIPAL STRUCTURE INSPECTION FORM

BRIDGE

SITE PHOTOGRAPHS

Site No.: BR11



Photo 1 Structure from north approach



Photo 2 Structure from south approach

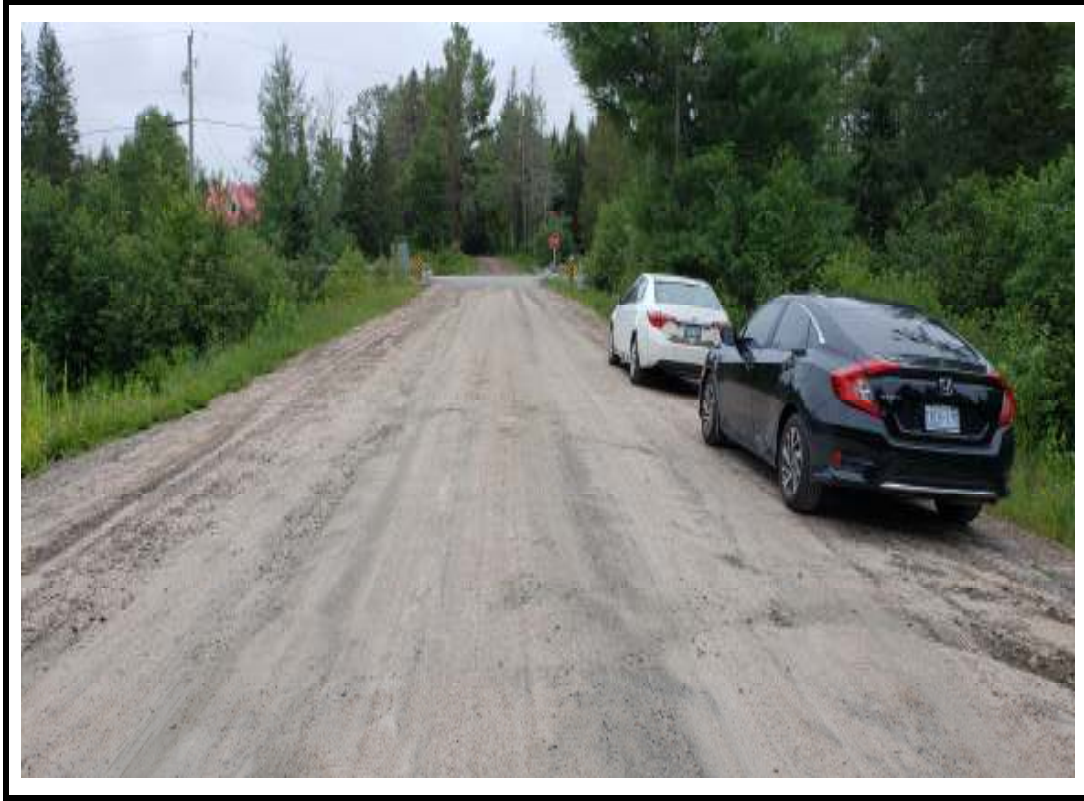


Photo 3 North approach from centre of structure



Photo 4 South approach from centre of structure



Photo 5 East elevation



Photo 6 West elevation





Photo 7 Potholes and loose gravel noted on wearing surface



Photo 8 Interior of barrel



Photo 9 Light corrosion noted inside barrel at joint