

**BOWEN STRUCTURE**

Site Number 981902

**COUNTY ROAD 19, TOWNSEND**

2.5 km W of County Road 70

**Ontario Structure Inspection Manual - Inspection Form**

**Site Number:**

Inventory Data:			
Structure Name	<input type="text" value="Bowen Structure"/>		
Main Hwy/Road #	<input type="text" value="NORFOLK COUNTY RD 19 EAST"/>	<input checked="" type="checkbox"/> On <input type="checkbox"/> Under	Crossing Type: <input type="checkbox"/> Rail <input type="checkbox"/> Road <input type="checkbox"/> Navig. Water <input type="checkbox"/> Ped. <input type="checkbox"/> Other <input checked="" type="checkbox"/> Non-Navig. Water
Hwy/Road Name	<input type="text" value="COUNTY ROAD 19, TOWNSEND"/>		
Structure Location	<input type="text" value="2.5 km W of County Road 70"/>		
Latitude	<input n"="" type="text" value="42d 58' 58.6"/>	Longitude	<input type="text" value="80d 12' 37.5" w"=""/>
Owner(s)	<input type="text" value="Norfolk County"/>	Heritage Designation:	<input checked="" type="checkbox"/> Not Cons. <input type="checkbox"/> Cons./not App. <input type="checkbox"/> List/not Design. <input type="checkbox"/> Design./not List <input type="checkbox"/> Desig. & List
MTO Region	<input type="text" value="30"/> Southwestern	Road Class:	<input type="checkbox"/> Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input checked="" type="checkbox"/> Local
MTO District	<input type="text" value="31"/> London / Stratford	Posted Speed	<input type="text" value="80"/> No. of Lanes <input type="text" value="2"/>
Old County	<input type="text" value="20"/> Norfolk	AADT	<input type="text" value="443"/> % Trucks <input type="text"/>
Geographic Twp.	<input type="text" value="125"/> Townsend	Inspection Route Sequence	<input type="text"/>
Structure Type	<input type="text" value="15"/> Rigid Frame, Vertical Legs	Interchange Number	<input type="text"/>
Total Deck Length	<input type="text" value="7.4"/> (m)	Interchange Structure Number	<input type="text"/>
Overall Str. Width	<input type="text" value="18.6"/> (m)	Min. Vertical Clearance	<input type="text" value="2.4"/> (m)
Total Deck Area	<input type="text" value="137.6"/> (m <sup>2</sup> )	Special Route	<input type="checkbox"/> Truck <input type="checkbox"/> Emergency <input checked="" type="checkbox"/> School <input type="checkbox"/> Bicycle
Roadway Width	<input type="text" value="7"/> (m)	Detour Length Around Bridge	<input type="text" value="10"/> (km)
Skew Angle	<input type="text"/> (Degrees)	Direction of Structure	<input type="text" value="North / South"/>
No. of Spans	<input type="text" value="2"/>	Fill on Structure	<input type="text" value="0.4"/> (m)
Span Length	<input type="text" value="2 @ 3.7"/> (m)		

Historical Data:			
Year Built	<input type="text" value="1985"/>	Year of Last Major Rehab.	<input type="text"/>
Last OSIM Inspection	<input type="text" value="May 26, 2014"/>	Last Evaluation	<input type="text"/>
Last Enhanced OSIM Inspection	<input type="text"/>	Current Load Limit	<input type="text" value="/ /"/> (tonnes)
Enhanced Access Equipment (ladder, boat, lift, etc.)	<input type="text"/>	Load Limit By-Law #	<input type="text"/>
Last Underwater Inspection	<input type="text"/>	By-Law Expiry Date	<input type="text"/>
Last Condition Survey	<input type="text"/>		
Rehab History:	(Date/description)		

**Ontario Structure Inspection Manual - Inspection Form**

**Site Number:** 981902

Field Inspection Information:		
Date of Inspection:	June 29, 2016	Type of Inspection: <input checked="" type="checkbox"/> OSIM <input type="checkbox"/> Enhanced OSIM
Inspector:	Ben Buchwald M.Eng., EIT, G. Douglas Vallee Ltd.	
Others in Party:	John McMorrow	
Access Equipment Used:	Hammer, Binoculars, Measuring Tape, Camera, etc.	
Weather:	Sunny	
Temperature:	27 °C	

Additional Investigation Required:	Priority		
	None	Normal	Urgent
Material Condition Survey			
<input checked="" type="checkbox"/> Detailed Deck Condition Survey:	X		
<input checked="" type="checkbox"/> Non-destructive Delamination Survey of Asphalt-Covered Deck:	X		
<input checked="" type="checkbox"/> Concrete Substructure Condition Survey:	X		
<input checked="" type="checkbox"/> Detailed Coating Condition Survey:	X		
<input checked="" type="checkbox"/> Detailed Timber Investigation	X		
<input checked="" type="checkbox"/> Post-Tensioned Strand Investigation	X		
Underwater Investigation:	X		
Fatigue Investigation:	X		
Seismic Investigation:	X		
Structure Evaluation:	X		
Monitoring			
<input checked="" type="checkbox"/> Monitoring of Deformations, Settlements and Movements:	X		
<input checked="" type="checkbox"/> Monitoring Crack Widths:	X		
Investigation Notes: No signs or barriers.			

Overall Structure Notes:	
Recommended Work on Structure:	<input type="checkbox"/> None <input type="checkbox"/> Minor Rehab. <input type="checkbox"/> Replace <input checked="" type="checkbox"/> Maintenance <input type="checkbox"/> Major Rehab.
Timing of Recommended Work:	<input type="checkbox"/> 1 to 5 years <input type="checkbox"/> 6 to 10 years
Overall Comments:	
Date of next Inspection:	June 1, 2018

**Suspected Performance Deficiencies**

- |   |  |   |
|---|--|---|
| <ul style="list-style-type: none"> <li>01 Load carrying capacity</li> <li>02 Excessive deformations (deflections &amp; rotations)</li> <li>03 Continuing settlement</li> <li>04 Continuing movements</li> <li>05 Seized bearings</li> </ul> | <ul style="list-style-type: none"> <li>07 Bearing not uniformly loaded/unstable</li> <li>08 Jammed expansion joint</li> <li>09 Pedestrian/vehicular hazard</li> <li>10 Rough riding surface</li> <li>11 Deck drainage</li> </ul> | <ul style="list-style-type: none"> <li>12 Slippery surfaces</li> <li>13 Flooding/channel blockage</li> <li>14 Undermining of foundation</li> <li>15 Unstable embankments</li> <li>16 Other</li> </ul> |
|---|--|---|

**Maintenance Needs**

- |   |  |   |
|---|--|---|
| <ul style="list-style-type: none"> <li>01 Lift and swing bridge maintenance</li> <li>02 Bridge cleaning</li> <li>03 Bridge handrail maintenance</li> <li>04 Painting steel bridge structures</li> <li>05 Bridge deck joint repair</li> <li>06 Bridge bearing maintenance</li> </ul> | <ul style="list-style-type: none"> <li>07 Repair to structural steel</li> <li>08 Repair of bridge concrete</li> <li>09 Repair of bridge timber</li> <li>10 Bailey bridges - maintenance</li> <li>11 Animal/pest control</li> <li>12 Bridge surface repair</li> </ul> | <ul style="list-style-type: none"> <li>13 Erosion control at bridges</li> <li>14 Concrete sealing</li> <li>15 Rout and seal</li> <li>16 Bridge deck drainage</li> <li>17 Scaling (Loose concrete or ACR steel)</li> <li>18 Other</li> </ul> |
|---|--|---|



**Ontario Structure Inspection Manual - Inspection Form**

**Site Number:** 981902

**Element Data**

Element Group:		1200 Culverts				Length:	18.6
Element Name:		1203 Barrels				Width:	3.7
Location:		Soffit				Height:	
Material:						Count:	2
Element Type:						Total Quantity:	137.6 m
Environment:		Severe				Limited Inspection:	
Protection System:		None				Perform. Deficiencies	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	m	0	0	130.6	7		
Comments:							
10, 2 meter long cracks. Joints are leaking in both boxes. Treated at cracks, deck splitting. West barrel is built up with soil. Efflorescence on midwall. Soffit changes elevation, minimal difference shown at deck therefore occurred at time of installation.							
Recommended Work:				Rehab <input type="checkbox"/> Replace <input type="checkbox"/>		Maintenance Needs: Concrete Sealing	
Timing:				Urgent <input type="checkbox"/> < 1yr <input type="checkbox"/> 1 - 5 yr <input type="checkbox"/> 6 - 10 yr <input type="checkbox"/>		<input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Group:		1200 Culverts				Length:	8
Element Name:		1201 Inlet Components				Width:	0.3
Location:						Height:	2.4
Material:						Count:	1
Element Type:						Total Quantity:	3.8 sq.m
Environment:		Moderate				Limited Inspection:	
Protection System:		None				Perform. Deficiencies	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	sq.m	0	3.5	0.34	0		
Comments:							
Light scaling and surface cracking. Parged joint between culverts is deteriorating.							
Recommended Work:				Rehab <input type="checkbox"/> Replace <input type="checkbox"/>		Maintenance Needs: Repair of Bridge Concrete	
Timing:				Urgent <input type="checkbox"/> < 1yr <input type="checkbox"/> 1 - 5 yr <input type="checkbox"/> 6 - 10 yr <input type="checkbox"/>		<input type="checkbox"/> Urgent <input checked="" type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

Element Group:		1200 Culverts				Length:	8
Element Name:		1202 Outlet Components				Width:	0.3
Location:						Height:	2.4
Material:						Count:	1
Element Type:						Total Quantity:	3.8 sq.m
Environment:		Moderate				Limited Inspection:	
Protection System:		None				Perform. Deficiencies	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	sq.m	0	3.8	0	0		
Comments:							
Recommended Work:				Rehab <input type="checkbox"/> Replace <input type="checkbox"/>		Maintenance Needs:	
Timing:				Urgent <input type="checkbox"/> < 1yr <input type="checkbox"/> 1 - 5 yr <input type="checkbox"/> 6 - 10 yr <input type="checkbox"/>		<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year	

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**Element Data**

Element Group:		100 Decks				Length:		
Element Name:		102 Deck Top				Width:		
Location:		North and South				Height:		
Material:						Count:		1
Element Type:						Total Quantity:		1 Each
Environment:		Severe				Limited Inspection:		
Protection System:		None				Perform. Deficiencies		
Condition Data:	Units	Exc.	Good	Fair	Poor			
	Each	0	0.9	0.1	0.05			
Comments:								
No visible problems from top. 4m visible from both ends. Joint between culverts is deteriorating.								
Recommended Work:				Rehab <input type="checkbox"/>		Replace <input type="checkbox"/>		
Timing:				Urgent <input type="checkbox"/>		< 1yr <input type="checkbox"/>		
				1 - 5 yr <input type="checkbox"/>		6 - 10 yr <input type="checkbox"/>		
Maintenance Needs:				<input type="checkbox"/>		Urgent <input type="checkbox"/>		
				<input type="checkbox"/>		1 year <input type="checkbox"/>		
				<input type="checkbox"/>		2 year <input type="checkbox"/>		

Element Group:		100 Decks				Length:		8
Element Name:		101 Wearing Surface				Width:		10
Location:		Top of Culvert				Height:		
Material:		2 Asphalt				Count:		1
Element Type:						Total Quantity:		80 m
Environment:		Severe				Limited Inspection:		
Protection System:		None				Perform. Deficiencies		
Condition Data:	Units	Exc.	Good	Fair	Poor			
	m	0	60	20	0			
Comments:								
Recommended Work:				Rehab <input type="checkbox"/>		Replace <input type="checkbox"/>		
Timing:				Urgent <input type="checkbox"/>		< 1yr <input type="checkbox"/>		
				1 - 5 yr <input type="checkbox"/>		6 - 10 yr <input type="checkbox"/>		
Maintenance Needs:				<input type="checkbox"/>		Urgent <input type="checkbox"/>		
				<input type="checkbox"/>		1 year <input type="checkbox"/>		
				<input type="checkbox"/>		2 year <input type="checkbox"/>		

Element Group:		1300 Foundations				Length:		
Element Name:		1301 Foundation (below ground level)				Width:		
Location:						Height:		
Material:						Count:		
Element Type:						Total Quantity:		
Environment:						Limited Inspection:		X
Protection System:		None				Perform. Deficiencies		
Condition Data:	Units	Exc.	Good	Fair	Poor			
Comments:								
Limited Inspections -Not visible.								
Recommended Work:				Rehab <input type="checkbox"/>		Replace <input type="checkbox"/>		
Timing:				Urgent <input type="checkbox"/>		< 1yr <input type="checkbox"/>		
				1 - 5 yr <input type="checkbox"/>		6 - 10 yr <input type="checkbox"/>		
Maintenance Needs:				<input type="checkbox"/>		Urgent <input type="checkbox"/>		
				<input type="checkbox"/>		1 year <input type="checkbox"/>		
				<input type="checkbox"/>		2 year <input type="checkbox"/>		



Figure 1 East Approach



Figure 2 West Approach



Figure 3 North Profile, Inlet



Figure 4 South Profile, Outlet





Figure 5 Upstream



Figure 6 Downstream



Figure 7 East Barrel



Figure 8 West Barrel



Figure 9 Light Delamination at Northwest Quadrant



Figure 10 Separation of Parging Between Culvert at South Side



Figure 11 Small Spall at South Culvert



Figure 12 Typical Leakage at Precast Joints