

**BOOKTON DRAIN CULVERT**

Site Number 971901

**COUNTY ROAD 19, WINDHAM**

0.1 km E of Bookton Cemetery

**Ontario Structure Inspection Manual - Inspection Form**

**Site Number:**

Inventory Data:			
Structure Name	<input type="text" value="Bookton Drain Culvert"/>		
Main Hwy/Road #	<input type="text" value="NORFOLK COUNTY RD 19 WEST"/>	<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, WINDHAM"/>		
Structure Location	<input type="text" value="0.1 km E of Bookton Cemetery"/>		
Latitude	<input n"="" type="text" value="42d 56' 46.4"/>	Longitude	<input type="text" value="80d 30' 16.6" 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. & List <input type="checkbox"/> Design./not 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="400"/> % Trucks <input type="text"/>
Geographic Twp.	<input type="text" value="124"/> Windham	Inspection Route Sequence	<input type="text"/>
Structure Type	<input type="text" value="13"/> Round Culvert	Interchange Number	<input type="text"/>
Total Deck Length	<input type="text" value="10"/> (m)	Interchange Structure Number	<input type="text"/>
Overall Str. Width	<input type="text" value="51.9"/> (m)	Min. Vertical Clearance	<input type="text" value="3"/> (m)
Total Deck Area	<input type="text" value="519"/> (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="11.2"/> (m)	Detour Length Around Bridge	<input type="text" value="6"/> (km)
Skew Angle	<input type="text"/> (Degrees)	Direction of Structure	<input type="text" value="North / South"/>
No. of Spans	<input type="text" value="1"/>	Fill on Structure	<input type="text" value="3"/> (m)
Span Length	<input type="text" value="3.7"/> (m)		

Historical Data:			
Year Built	<input type="text" value="1990"/>	Year of Last Major Rehab.	<input type="text"/>
Last OSIM Inspection	<input type="text" value="May 9, 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)		

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**Site Number:** 971901

Field Inspection Information:		
Date of Inspection:	July 22, 2016	Type of Inspection: <input checked="" type="checkbox"/> OSIM <input type="checkbox"/> Enhanced OSIM
Inspector:	Jason Timmermans, B.Eng., EIT, G. Douglas Vallee Ltd.	
Others in Party:	N/A	
Access Equipment Used:	Hammer, Binoculars, Measuring Tape, Camera, etc.	
Weather:	Partly Cloudy	
Temperature:	22 °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 hazard signs or barriers.		

Overall Structure Notes:	
Recommended Work on Structure:	<input checked="" type="checkbox"/> None <input type="checkbox"/> Minor Rehab. <input type="checkbox"/> Replace <input 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:	July 22, 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> |
|---|--|---|

Rehabilitation Required:		Element	Priority				Estimated Construction Cost
Rehab	Replace		Urgent	Within 1 yr	1-5 yrs	6-10 yrs	
		Wearing Surface (Approaches)					
		Barrels					
		Inlet Components					
		Outlet Components					
		Embankments					
		Foundation (below ground level)					
		Sign					
<b>Total Cost</b>						\$0	

Associated Work:	Comments	Estimated Construction Cost
Additional Investigations		
Traffic Management		
Utilities		
Road Allowance		
Environmental Assessment		
Engineering		
Other		
Contingencies		
<b>Total Cost</b>		\$0

Justification:		
Notes:	Construction Cost: \$0 Associated Work Cost: \$0 <hr style="width: 100px; margin-left: auto;"/> TOTAL Estimated Cost: \$0	

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**Element Data**

Element Group:		1600 Approaches				Length:		
Element Name:		1601 Wearing Surface (Approaches)				Width:		
Location:		Top of Fill				Height:		
Material:		2 Asphalt				Count:		1
Element Type:						Total Quantity:		1 Each
Environment:		Severe				Limited Inspection:		
Protection System:		Unknown				Perform. Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor			
Data:	Each	0	0.8	0.2	0			
Comments: Alligator cracking noted.								
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				

Element Group:		1200 Culverts				Length:		51.9
Element Name:		1203 Barrels				Width:		10
Location:		N & S				Height:		
Material:						Count:		1
Element Type:						Total Quantity:		519 sq.m
Environment:		Moderate				Limited Inspection:		
Protection System:		Unknown				Perform. Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor			
Data:	sq.m	0	509	10	0			
Comments: Corrosion in upper plate joints approximately 20m from north end. Chloride stains at plate joints.								
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				

Element Group:		1200 Culverts				Length:		
Element Name:		1201 Inlet Components				Width:		
Location:						Height:		
Material:						Count:		
Element Type:						Total Quantity:		sq.m
Environment:						Limited Inspection:		
Protection System:		Unknown				Perform. Deficiencies		
Condition	Units	Exc.	Good	Fair	Poor			
Data:	sq.m							
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:		1200 Culverts				Length:		
Element Name:		1202 Outlet Components				Width:		
Location:						Height:		
Material:						Count:		
Element Type:						Total Quantity:		sq.m
Environment:						Limited Inspection:		
Protection System:		Unknown				Perform. Deficiencies		
Condition Data:	Units	Exc.	Good	Fair	Poor			
	sq.m							
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		

Element Group:		1400 Embankments & Streams				Length:		
Element Name:		1402 Embankments				Width:		
Location:						Height:		
Material:						Count:		1
Element Type:						Total Quantity:		1 Each
Environment:						Limited Inspection:		
Protection System:		Unknown				Perform. Deficiencies		
Condition Data:	Units	Exc.	Good	Fair	Poor			
	Each	0	1	0	0			
Comments: Well graded. Slope protection at quadrants.								
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		

Element Group:		1300 Foundations				Length:		
Element Name:		1301 Foundation (below ground level)				Width:		
Location:						Height:		
Material:						Count:		2
Element Type:						Total Quantity:		2 Each
Environment:						Limited Inspection:		X
Protection System:		Unknown				Perform. Deficiencies		
Condition Data:	Units	Exc.	Good	Fair	Poor			
	Each							
Comments: Limited inspection. Not visible.								
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:	1500 Signs					Length:	
Element Name:	1501 Sign					Width:	
Location:	South					Height:	
Material:						Count:	1
Element Type:						Total Quantity:	1 Each
Environment:						Limited Inspection:	
Protection System:	Unknown					Perform. Deficiencies	
Condition Data:	Units	Exc.	Good	Fair	Poor		
	Each						
Comments: No hazard signs.							
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	



Figure 1 East Approach



Figure 2 West Approach





Figure 3 North Profile



Figure 4 South Profile



Figure 5 Upstream



Figure 6 Downstream



Figure 7 Barrel



Figure 8 Corrosion and Staining at Water Line



Figure 9 Corrosion at Plate Joints



Figure 10 Wearing Surface



Figure 11 Minor Damage and Rusting on Culvert at Inlet