



Summary Action Report

MTO Site Number: Unknown

Structure ID: K-0021

Structure Name: K-0021

Bridge Condition Index (BCI): 23.7

Road Name: Kemble Rock Road

Location: Lot 40/41, Conc. 20
Keppel

Inspection Date: 06/12/2024

Structure Type: Double CSP Culvert

Inspected By: David Debour, E.I.T.

No. of Spans: 2

Spans Lengths: 2 – 1.2mø

Road Width: 6.5m

Overall Structure Width: 2.8m

Year of Construction: Unknown

Current Load Limit: N/A



Overall Comments:

Due to the overall size and location of this structure, the culverts have been included in the Municipality's inventory in 2024. The culvert barrels appear to be in overall poor condition with major section loss at inverts, separation at barrel joints and deformations at the obvert noted throughout. Due to the severe deterioration of the culvert inverts, replacement is recommended within 1 year to ensure the performance of the roadway and the safety of the public.

Estimated Costs for Rehabilitation						
Construction Project Type	Urgent, Within 1 Year	1 to 5 Years	6 to 10 Years	Associated Costs	Contingencies and Engineering Costs	Total
Replacement	\$192,500			\$110,000	\$90,000	\$402,500



Inventory Data:					
Structure Name	K-0021				
Main Hwy/Road #		<input type="checkbox"/> On <input type="checkbox"/> Under	Crossing Type:	<input type="checkbox"/> Navig. Water <input checked="" type="checkbox"/> Non-Navig. Water <input type="checkbox"/> Rail <input type="checkbox"/> Road <input type="checkbox"/> Ped. <input type="checkbox"/> Other	
Hwy/Road Name	Kemble Rock Road				
Structure Location	Lot 40/41, Conc. 20 Keppel – 10m north of Concession Road 20 in Kemble, ON				
Latitude:	44.724636	Longitude:	-80.931694		
Owner(s):	The Township of Georgian Bluffs	Heritage Designation:	<input checked="" type="checkbox"/> Not Cons. <input type="checkbox"/> Cons./not App. <input type="checkbox"/> List/not Desig. <input type="checkbox"/> Desig./not List <input type="checkbox"/> Desig. & List		
MTO Region:	30	Road Class:	<input type="checkbox"/> Freeway <input type="checkbox"/> Arterial <input type="checkbox"/> Collector <input checked="" type="checkbox"/> Local		
MTO District:	33	Posted Speed:	50km/h	No. of Lanes:	2
Old County:	County of Grey	AADT:		% Trucks:	
Geographic Twp.:	Keppel	Inspection Route Sequence:			
Structure Type:	Double CSP Culvert	Interchange No.:			
Total Deck Length:	46.5m	Interchange Structure No.:			
Overall Str. Width:	2.8m	Min Vertical Clearance:			
Total Deck Area:	130.2m ²	Special Routes:	<input type="checkbox"/> Transit <input type="checkbox"/> Truck <input type="checkbox"/> School <input type="checkbox"/> Bicycle		
Roadway Width:	6.5m	Detour Length Around Bridge:	6.2km		
Skew Angle:	0°	Direction of Structure:	E-W		
No. of Spans:	2	Fill on Structure:	±0.45m		
Span Lengths:	2 - 1.2mø				

Historical Data:			
Year Built:	Unknown	Year of Last Major Rehab:	Unknown
Last OSIM Inspection:	Unknown	Last Load Evaluation:	N/A
Last Enhanced OSIM Inspection:	N/A	Current Load Limit:	N/A
Enhanced Access Equipment (ladder, boat, lift, etc.):	None	Load Limit By-Law #:	N/A
Last Underwater Inspection:	N/A	By-Law Expiry Date:	N/A
Last Condition Survey:	N/A		

Rehab History (Date and Description): No rehabilitation history provided by Township.



Field Inspection Information:			
Date of Inspection:	06/12/2024	Type of Inspection:	<input checked="" type="checkbox"/> OSIM <input type="checkbox"/> Enhanced OSIM
Inspector:	David Debour, E.I.T.		
Others in Party:	Tyson Weppler, C. Tech.		
Access Equipment Used:	N/A		
Weather:	18°C		

Additional Investigations Required:	Priority			Estimated Cost
	None	Normal	Urgent	
Material Condition Survey	X			
Detailed Deck Condition Survey:	X			
Non-destructive Delam. Survey of Asphalt-Covered Deck:	X			
Concrete Substructure Condition Survey:	X			
Detailed Coating Condition Survey:	X			
Detailed Timber Investigation	X			
Post-Tensioned Strand Investigation	X			
Underwater Investigation:	X			
Fatigue Investigation:	X			
Seismic Investigation:	X			
Structure Evaluation:	X			
Monitoring (deformations, settlements, movements, crack widths)			If Req.	TBD
Load Posting – Estimated Load			Total Cost	TBD
Investigation Notes: Monitoring of deformations recommended if structure is not replaced in 2024.				

Overall Structure Notes:	
Overall Comments:	Due to the overall size and location of this structure, the culverts have been included in the Municipality’s inventory in 2024. The culvert barrels appear to be in overall poor condition with major section loss at inverters, separation at barrel joints and deformations at the obvert noted throughout. Due to the severe deterioration of the culvert inverters, replacement is recommended within 1 year to ensure the performance of the roadway and the safety of the public.
Date of Next Inspection:	2026

Suspected Performance Deficiencies

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

Maintenance Needs

- | | | |
|---|--|---|
| 01 Lift and Swing Bridge Maintenance | 07 Repair to 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 |



Element Data

Element Group:		Approaches		Length:		3.5m	
Element Name:		Wearing Surface		Width:		6.5m	
Location:		Each Side		Height:			
Material:		Asphalt		Count:		2	
Element Type:				Total Quantity:		45.5m ²	
Environment:		Benign / Moderate / Severe		Limited Inspection <input type="checkbox"/>			
Protection System:							Perform. Deficiencies
Condition	Units		Exc.	Good	Fair	Poor	Perform. Deficiencies
Data:	m ² / m / each / % / all			45.5m ²			None
Comments: Wearing surface appears to be in overall good condition with no deficiencies noted.							
Recommended Work:				Maintenance Needs:		None	
<input type="checkbox"/> Rehab <input type="checkbox"/> Replace <input checked="" type="checkbox"/> Urgent <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years <input type="checkbox"/> None				<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year			
Wearing Surface will be replaced during the culvert replacement.							

Element Group:		Culverts		Length:		46.5m	
Element Name:		Barrels		Width:		1.2m	
Location:		South Culvert		Height:		1.2	
Material:		Corrugated Steel		Count:		1	
Element Type:				Total Quantity:		175.3m ²	
Environment:		Benign / Moderate / Severe		Limited Inspection <input checked="" type="checkbox"/>			
Protection System:		Hot Dip Galvanizing					Perform. Deficiencies
Condition	Units		Exc.	Good	Fair	Poor	Perform. Deficiencies
Data:	m ² / m / each / % / all				105.2	70.1	02
Comments: The south barrel appears to be in fair to poor condition with moderate to severe corrosion noted along the invert. Perforations below water staining mark noted throughout including around storm pipe outlet connected to south barrel wall. Localized deformations and perforations at obvert noted. Limited inspection of barrel invert due to accumulation of debris and sediment within culvert.							
Recommended Work:				Maintenance Needs:		None	
<input type="checkbox"/> Rehab <input checked="" type="checkbox"/> Replace <input checked="" type="checkbox"/> Urgent <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years <input type="checkbox"/> None				<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year			
Recommend the replacement of the structure within 1 year.							

Element Group:		Culverts		Length:		46.5m	
Element Name:		Barrels		Width:		1.2m	
Location:		North Culvert		Height:		1.2	
Material:		Corrugated Steel		Count:		1	
Element Type:				Total Quantity:		175.3m	
Environment:		Benign / Moderate / Severe		Limited Inspection <input checked="" type="checkbox"/>			
Protection System:		Hot Dip Galvanizing					Perform. Deficiencies
Condition	Units		Exc.	Good	Fair	Poor	Perform. Deficiencies
Data:	m ² / m / each / % / all				70.1	105.2	02
Comments: The north barrel appears to be in fair to poor condition with large deformations at the obvert noted throughout ranging from 0.1m to 0.3m in deflection. Separation noted at every barrel joint ranging from 0.1m – 0.2m. Large perforations along invert as caused complete separation of the barrel walls.							
Recommended Work:				Maintenance Needs:		None	
<input type="checkbox"/> Rehab <input checked="" type="checkbox"/> Replace <input checked="" type="checkbox"/> Urgent <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years <input type="checkbox"/> None				<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year			
Recommend the replacement of the structure within 1 year.							



Element Data

Element Group:		Decks		Length:		6.5m	
Element Name:		Wearing Surface		Width:		2.8m	
Location:		Deck Top		Height:			
Material:		Asphalt		Count:		1	
Element Type:				Total Quantity:		18.2m ²	
Environment:		Benign / Moderate / Severe		Limited Inspection <input type="checkbox"/>			
Protection System:							Perform. Deficiencies
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	
	m ² / m / each / % / all		15.2	1.5	1.5	None	
Comments: The asphalt wearing surface appears to be in overall good to fair condition. 3.5m ² of medium map cracking noted at southeast. 11m medium transverse cracking noted above culvert.							
Recommended Work: <input type="checkbox"/> Rehab <input checked="" type="checkbox"/> Replace				Maintenance Needs:		None	
<input checked="" type="checkbox"/> Urgent <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years <input type="checkbox"/> None				<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year			
Wearing surface will be replaced during the culvert replacement. Costed under Approach Element.							

Element Group:		Embankments and Streams		Length:			
Element Name:		Embankments		Width:			
Location:		Each Quadrant & at Culvert Obvert		Height:			
Material:		Soil		Count:		6	
Element Type:				Total Quantity:		6	
Environment:		Benign / Moderate / Severe		Limited Inspection <input type="checkbox"/>			
Protection System:							Perform. Deficiencies
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	
	m ² / m / each / % / all		2	3	1		
Comments: All embankments are noted to be heavily vegetated. Southwest embankment appears unstable. Moderate erosion noted at all eastern embankments.							
Recommended Work: <input type="checkbox"/> Rehab <input checked="" type="checkbox"/> Replace				Maintenance Needs:			
<input checked="" type="checkbox"/> Urgent <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years <input type="checkbox"/> None				<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year			
Re-grade embankments at time of culvert replacement.							

Element Group:		Embankments and Streams		Length:			
Element Name:		Streams and Waterways		Width:			
Location:				Height:			
Material:				Count:			
Element Type:				Total Quantity:		All	
Environment:		Benign / Moderate / Severe		Limited Inspection <input type="checkbox"/>			
Protection System:							Perform. Deficiencies
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	
	m ² / m / each / % / all		1			None	
Comments: Moderate sediment buildup noted within culverts. Minor erosion beginning within culverts due to perforations and section loss. Streams are heavily vegetated.							
Recommended Work: <input type="checkbox"/> Rehab <input type="checkbox"/> Replace				Maintenance Needs:		None	
<input type="checkbox"/> Urgent <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years <input type="checkbox"/> None				<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year			



Element Data

Element Group:		Sidewalks/Curbs		Length:		36m	
Element Name:		Curbs		Width:		0.7m	
Location:		Each Side		Height:		0.15m	
Material:		Concrete		Count:		1	
Element Type:		Reinforced Concrete		Total Quantity:		36.0m	
Environment:		Benign / Moderate / Severe		Limited Inspection <input type="checkbox"/>			
Protection System:							Perform. Deficiencies
Condition	Units		Exc.	Good	Fair	Poor	Perform. Deficiencies
Data:	m ² / m / each / % / all			28.8	3.6	3.6	None
Comments: Mountable curb on west side appears to be in overall good condition. Multiple transverse medium to wide cracks noted in curb throughout length.							
Recommended Work: <input type="checkbox"/> Rehab <input checked="" type="checkbox"/> Replace <input checked="" type="checkbox"/> Urgent <input type="checkbox"/> 1-5 years <input type="checkbox"/> 6-10 years <input type="checkbox"/> None				Maintenance Needs:		None	
				<input type="checkbox"/> Urgent <input type="checkbox"/> 1 year <input type="checkbox"/> 2 year			
Curbs will be replaced during the culvert replacement.							



Performance Deficiencies				
Element Group		Element Name		Performance Deficiency
Culverts		Barrels		02 – Excessive Deformations
Maintenance Needs				
Element Group		Element Name		Maintenance Needs
Repair/Rehabilitation				
Element Group	Element Name	Repair/Rehabilitation	Priority	Cost Estimate
Approach	Wearing Surface	Remove and Repave Roadway	Urgent	\$27,500
Culvert	Barrel	Remove and Replace South Barrel	Urgent	\$80,000
Culvert	Barrel	Remove and Replace North Barrel	Urgent	\$80,000
Sidewalks/Curbs	Curbs	Remove and Replace West Curb	Urgent	\$5,000
Total Repair/Rehabilitation Cost:				\$192,500
Associated Work				
			Comments	Cost Estimate
Site Mob./Demob.				\$25,000
Traffic Control			Assuming full roadway closure with detour.	\$10,000
Approaches			Restore embankments with rip-rap and topsoil.	\$10,000
Utilities			Utility protection during construction.	\$5,000
Right-of-way				
Background Studies			Geotechnical, Hydrology, Hydraulics, EIS, etc.	\$30,000
Environmental Assessment			Assume Schedule 'A' (exempt)	
Worksite Isolation and Dewatering			Assume cofferdams with bypass pumping.	\$30,000
Environmental Protection				\$10,000
Other				
			<u>Contingencies (15%):</u>	\$45,000
			<u>Engineering (15%):</u>	\$45,000
			Total Associated Work Cost:	\$120,000
			Total Cost:	\$402,500

Justification:

Replacement of the structure is recommended to ensure the safety of the public. Each barrel of the structure has experienced significant deterioration and section loss reducing the structural adequacy of the structure. We anticipate that deformations within the structures will worsen over time with continued traffic use and further deterioration of the culvert barrels.

If the structure is not replaced before the end of 2024, we recommend that the structure be monitored on a regular basis by a qualified individual until construction can be completed.



Photo 1 - View of Roadway Facing North.



Photo 2 - View of Structure Facing East.



Photo 3 - View of Large Deformation at South Barrel Obvert.



Photo 4 - View of Barrel Deterioration at Storm Pipe Connection for South Barrel.

Date of Photos: June 12, 2024

Inspector: David Debour, E.I.T.



Photo 5 - View of Excessive Perforations at South Barrel Invert (Typ.)



Photo 6 - View of Severe Section Loss at North Barrel Invert.



Photo 7 - View of Joint Separation at North Barrel (Typ.)



Photo 8 - View of Large Deformations at North Barrel Obvert (Typ.)

Date of Photos: June 12, 2024

Inspector: David Debour, E.I.T.



Photo 9 - View of Storm Pipe Connection at North Barrel.



Photo 10 - View of Transverse Cracking in Wearing Surface Over Structure.



Photo 11 - View of Map Cracking in Wearing Surface Over Structure.



Photo 12 - View of Transverse Crack in Curb (Typ.)

Date of Photos: June 12, 2024

Inspector: David Debour, E.I.T.