REPORT OF

2018 Biennial
Bridge and Culvert Inspection

FOR:

Township of Johnson

PREPARED BY:

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Report Reviewed by:

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1.0 INTRODUCTION

STEM Engineering Group was retrained by Johnson Township to complete a visual inspection of several structures as part of the township's responsibility to ensure that their structures are kept in a safe condition and in good repair. This is required to be completed under the Highway Traffic Act and the Bridge Act that came into effect April 1st, 1997. The inspection is to be completed every 2 years in accordance to the Ontario Structural Inspection Manual.

The township is also responsible for passing any load limit bylaws required on their structures and requires engineering recommendations and the duration that the limit is valid for. The recommendations must be stamped by two engineers.

The following report prioritizes and recommends required maintenance work, repair work, and or replacement work for each structure.

2.0 SCOPE OF WORK

The visual inspection was conducted on five bridges and six culverts at the request of the township. The inspection included:

- Visual inspection of any deficiencies
- Photographic inventory of the structures, deficiencies and appearance.
- An individual assessment of each structure. This includes recommendations for improvements and estimated costs to maintain the structure's acceptable performance level.
- Ranking of the structure's needs.

3.0 STRUCTURES APPRAISALS FOR MAINTENANCE, REPAIR, AND REPLACEMENT REQUIRMENTS

For the 2018 biennial bridge and culvert inspection a total of five bridges and six culverts were inspected. Refer to Appendix B for the Municipal Bridge Appraisal Sheets for a summary of the inspections completed. They include required maintenance, repairs, and replacement recommendations for each structure.

In general we have found the following:

- Bridges and culverts can remain at current load postings.
- Any structures which do not have guiderails including approach guiderails should installed in the next 5 years.
- Any guiderails with wooden posts should be inspected yearly for decay or damage and replaced regularly.
- Bridge B4, Suddaby Creek Bridge, requires extensive rehabilitation to maintain an acceptable level of performance. The current load limit is 10 tonnes, and cannot be increased until a load evaluation and rehabilitation work is complete.

Of the structures inspected, one bridge and two culverts require further investigation. The purpose is to confirm the condition of elements which are not visible, or have limited accessibilities, but were deemed to show signs of degradation. Further investigations would provide the information required to determine the best course of action between rehabilitation and replacement of the structure.

The following is a list of the required further Engineering Investigations:

Bridge	Recommendations	Cost ($1000)
B4 Suddaby Creek Bridge:	**Deck Condition Survey**	**10**
	Rehabilitation/Replacement Analysis	**5**

Culvert	Recommendations	Cost ($1000)
C2 Sucker Creek Culvert Government Road	**Condition survey of Barrel**	**10**
C3 Sucker Creek Culvert Kensington Point Road	**Condition survey of Barrel**	**10**

4.0 Construction Needs Summary

The following Table 1is a summary of the total construction and rehabilitation requirements based on the 2018 biennial inspections. For the 10-year plan the total estimate is $1,295,000. Of this total, $185,000 is required for immediate needs, and an additional $710,000 for the 1-5 year needs. These estimates are based on the visual inspections completed and some could be moved to the 6-10 year forecast depending on the results of the more detailed studies regarding the Suddaby Creek Bridge deck condition survey and the barrel condition survey of the Sucker Creek Culverts on Government Road and Kensington Point Road. Table 1 does not include additional costs for contingencies and engineering. These additional costs can be found in Appendix C for each structure in this report.

Table 1: Construction and Rehabilitation Summary ($1000)					
Bridge/Culvert	Immediate Needs	1-5 Year Needs	Sub Total	6-10 Year Needs	Total
B1 - Shewfelt Creek Bridge Gordon Lake Rd.	-	10	10	-	10
B2 - Shewfelt Creek Fisher Side Road	-	65	65	-	65
B3 - Stobie Creek Bridge Government Road	-	60	60	-	60
B4 Suddaby Creek Bridge Old Mill Road	25	275	300	-	300
B5 - Suddaby Creek Bridge Gordon Lake Road by park	-	-	-	-	-
B6 Black Creek Bridge (New Bridge Summer of 2018)	-	-	-	-	-
Total Bridge	25	410	435	0	435
C1 - Desbarats River Culvert Government Road	-	-	-	-	-
C2 Sucker Creek Culvert Government Road (Dump)	40	300	340	-	340
C3 - Sucker Creek Culvert Kensington Point Road	40	-	40	-	40
C5 Government Road Culvert East of Fisher Road	40	-	40	400	440
C7 - Sucker Creek Culver Puddingston Road	-	-	-	-	-
C8 Sucker Creek Culvert Macdonald Drive	40	-	40	-	40
Total Culvert	160	300	460	400	860
Total Estimate	**185**	**710**	**895**	**400**	**1295**

5.0 Maintenance of Structures

Normal maintenance of the structures was not included in the cost summarized in Table 1. Items included in maintenance of the structures would be: trimming of vegetation from around hazard markers, tightening nuts and bolts, cleaning of bridge deck, removing obstructions from the stream, repairing and/or replacing any wooden guiderail posts and offset blocks, patching and/or repairing bridge deck. These items were deemed to be work the township can complete with their own forces. See Appendix B for a summary of maintenance work to be completed. Any costs associated with maintenance work the township cannot complete with their own work force should be moved to Table 1 for the respective bridge or culvert.

6.0 Conclusions

The 2018 Biennial Bridge Inspections were completed for all bridges and culverts within the township that required inspections. The results of this report gives reliable and current information which the township can use to implement a maintenance, rehabilitation, and/or replacement program.

The township's Bridge Management Plan will require updating yearly to reflect the previous year's project maintenance, rehabilitation, and replacement costs.

The bridge and culverts should be re-inspected by a qualified engineer every two years in accordance with the legislated Requirements.

Appendix A
2018 MUNICIPAL MAINTENANCE OF STRUCTURES SUMMARY

Appendix A Maintenance Requirements - 2018 (Johnson Township)		
Structure No.	**Location**	**Maintenance Requirements**
B1	Gordon Lake Road - 0.9km North of Hwy. 17	1. Vegatation obstructing the hazard markers should be trimmed or removed. 2. Loose nuts on the base of the guiderail plates on the east side and the loose bolt in the steel arch culvert must be tightened. 3. Repairs to the settlement of the shouldering behind the gabion baskets in the northwest quadrant should be completed.
B2	Fisher Road - 3.3km North of Hwy. 17	1. Excessive gravel build up on bridge deck and at railings should be removed and the deck drains unplugged. 2. Leaning or bent hazard signs should be straightened.
B3	Government Road 10m West of Gordon Lake Road	1. Broken or rotated offset blocks on the north railing should be replaced and/or straightened. 2. Cut guiderail in the southwest section should be replaced. 3. Minor erosion at the southeast quadrant should be restored and stabilized. 4. Transverse crack in the east approach should be routed and sealed, and pothole on bridge deck should be repaired. 5. Remove gravel and vegetation build up on the bridge deck wearing surface and under the guidrails 6. The gap under the south railing guiderail base plate hould have metal shims installed to provide full contact of the baseplate with concrete headwall/curb.
B4	Old Mill Road - 0.2km North of Gordon Lake Road	1. Remove excess gravel/debris built up on bridge deck and curb/railings. 2. Remove small trees that are growing under, immediately adjacent to bridge beams or on the abutment embankments.
B5	Gordon Lake Road - 0.5km North of Suddaby Park Road	1. Monitor transverse cracking in surface treated roadway and rout and seal or patch as required. 2. Replace the missing bolts in the guiderail at all four quadrants to connect flex beam to the posts.
B6	Gordon Lake Road - 80km South of Suddaby Park Road	New bridge 2018 not inspected at request of Township
C1	Government Road - 2.0km West of Gordon Lake Road	1. Straighten wooden offset blocks.

Structure No.	Location	Maintenance Requirements
C2	Governemnt Road - 1.9km West of Lake Huron Drive	1. Should seal or patch cracks in surface treatment to prevent further damage to wearing surface at the structure. 2. Depressions on either side of culvert should be patched to provide smooth roadway over structure 3. Remove beaver dam within the culvert. 4. Erosion on the north embankments and scour under the pipe inlet should be repaired and stabilized/protected
C3	Kensington Point Road - 0.4km South of Hwy. 17	1. Erosion of roadway embankment appears stable, however the lost material should be replaced and stabilized to prevent channelling of surface runoff
C5	Government Roac - 0.4km East of Fisher Road	1. Roadway should be graded to remove washboard in gravel wearing surface 2. The missing parging at the opened seams should be repaired 3. The embankment at and/or under the culvert inlet should be sealed to promote water flow through the culvert and not underneath it 4. Monitor bulging of culvert barrel at the centreline of the roadway and contact STEM Engineering if cracks develop.
C7	Puddingstone Road - 2.1km North of Governemtn Road	1. Replace broken or decayed guiderail posts 2. Lost armoring stone at the culvert inlet should be replaced.
C8	MacDonald Drive - 0.4km North of Hwy. 17	1. Remove any debris present upsteam of downstream of the culvert as part of regular maintenance.

Appendix B
2018 MUNICIPAL BRIDGE APPRAISAL SHEETS

Abbreviations Used

O-WAT	Over Waterway
O-RWY	Over Railway
DCS	Deck Condition Survey
LCE	Load Capacity Evaluation
C/S	Condition Study/Survey
RRA	Rehabilitation / Replacement Analysis
REB	Remove Existing Bridge
RBC	Replace Bridge with Culvert
RSL	Replace Bridge, Same Location
NCE	New Culvert
RSP	Rehabilitate Superstructure
RSB	Rehabilitate Substructure
WSS	Widen Superstructure and Substructure
RRW	Rehabilitation/Replace Retaining Walls
BIR	Bearing Improvement/Replacement
RIR	Railing Improvement/Replacement
RIO	Rehabilitate Inlet/Outlet Treatments
WSR	Wearing Surface Rehabilitation
PWP	Patch, Waterproof and Asphalt Paving
LMC	Latex Modified Concrete Overlay
OPW	Overlay, Waterproof and Asphalt Paving
CDS	Concrete Deck Soffit Repairs
CDR	Complete Deck Replacement
TJS	Transverse Expansion Joint Seal Replacement
TJR	Transverse Expansion Joint Replacement
RCS	Rehabilitation/Replacement of Safety Curbs/Sidewalks
CSS	Coating Structural Steel
CSR	Coating Steel Railings
EIR	Embankment Improvements/Rehabilitation
C/I	Channel Improvements
IAG	Installation of Approach Guiderail
OTH	Other Improvements
PC	Preliminary Cost Estimate

A. IDENTIFICATION							
Bridge Name	Shewfelt Creek Bridge at Oikari's			Bridge No.:	B1		
Road Name:	Gordon Lake Road			Road Section.:	250		
Location:	.90 km North of Highway 17			MTO Site No.:	38S-189		
Roadside Env.:	R	Posting Sign:	t t t	Crossing Type:		O-WAT	
Posting:	t t t	Low Clearnc Sign:		Federal Nav. Waterway:		Unknown	
Bylaw No.:		Easting:		Bridge Value:		$ 500,000.00	
Bylaw Exp. Date:	y m	Northling:		Old ID:			

B. RAILWAY OVERPASS/UNDERPASS			
Railway Level Crossing Number:		Original Board Order Number:	
Railway Company:		Date:	
Railway Subdivision:		Current Board Order Number:	
Subdivision Mileage:		Date:	
Transport Canada Crossing No.:		Seniority:	
Number of Tracks			

C. JURISDICTION					
Owner:	O A. MUN	Special Designation	NSD	MunicA:	
Owner Share:		Designation 2:		MunicB:	
Shared:		Adjacent Bridge No.:		Patrol:	
Shared With:					
Heritage Status:	R				

D. EXISTING CONDITIONS					
Substructure Year:	2006	Span Length.:	6.2m	Longitudian Joints:	0
Superstruct Year:		Deck Type	OT	Transverse Joints:	0
Bridge Type:	S-EA-F	Deck Length	6.2m	Number of Bearings:	0
Cossing Skew:	0	Deck Width	10.3m	Soil Condition:	U
No. of Spans:	1	Deck Area	64.0m2	Abutment/Fdn Type:	Open - UN
~~	ROAD OVER BRIDGE	~~~~~~~~~~			
Existing Road Class	300	Travel Deck Width:	7.1m	Safety Curb:	(A) N
Operational Status	2W-OAT	No. of Lanes:	2	Sidewalk and Curb:	(B) n
Wearing Surface	A	Median Type/Width:		Roadside Safety: Barriers Walls/Railings	FB
~~	ROAD UNDER BRIDGE	~~~~~~~~~~			
Existing Road Class:		No. of Lanes:		Traffic Barrier:	
Operation Status:		Median Type/Width:		Min Vertical Clearance:	
Opening Width:		Safety Curb:	A		
Surface Width:		Sidewalk and Curb:	B		

E. TRAFFIC DATA				
Legal Speed Limit:		Traffic Count		10 Year Traffic Forecast
Route Designations:		Year:		Year:
Bus	Truck Route	AADT:		AADT:
School	Bicycle	DHV Factor:		DHV Factor:
		DHV:		DHV:
		Trucks:		Trucks:
Source:		Peak Directional Split:		Capacity:
		10 Year Growth:		20 Year AADT:

F. INSPECTIONS					
Date:	19-Jun-18	Inspected By:	Reg McKinnon	Approved By:	
			P. Eng.		

G. BRIDGE NEEDS

Field	MCR	PCR	TON	Comments
Superstructure	6	6	ADEQ	
Wearing Surface	6	6	ADEQ	
Deck Condition	6	6	ADEQ	
Expansion Joints	0	0	ADEQ	
Railings	5	5	1-5 Yrs	
Substructure	6	6	ADEQ	
Coating	6	6	ADEQ	
Streams/Waterways	6	6	ADEQ	
Curbs/Sidewalks	0	0	ADEQ	

H. FUNCTIONAL NEEDS

Field	Existing	Min. Tolerable	Time of Need	Comments
Road over Culvert				
Travel Deck Width	7.1m	6.5m	ADEQ	
RO-Level of Service	A	E	ADEQ	
Min. Vert. Clear		4.5	ADEQ	
Sidewalks	N	N	ADEQ	

RECOMMENDED NEEDS

Impr. Class	Improvement	Description	Time of Nee	Year	Base/Const.

I. ENGINEERING RECOMMENDATIONS

Bridge Drawings:	
Engineering Investig.	
Total Cost of Eng. Investig.	
Single Posting	
Evaluated Posting	
Monitoring	
Closure Date	

J. DESIGN PARAMETERS

Design Class:	RSL
Operational Status	2W-OAT
Abutment Type	RSL-O
Design Deck Width	7.1m
Design Deck Length	6.2m

K. IMPROVEMENT COSTS

Total Construction/Rehab	$	10,000.00
Contingencies	$	1,000.00
Engineering	$	1,500.00
Total:	$	12,500.00

INSPECTION NOTES:

- No Posted Load Limit.
- Hazard markers are present in all four corners.
- No guardrail present at the northwest corner of the bridge.
- Guardrail posts have medium to wide checks and splits.
- Nuts for the guardrail posts baseplates were loose along the east railing.
- Surface treatment in good condition.
- Watercourse was unobstructed and no sign of scouring.
- Concrete headwalls in good condition with minor honeycombing.
- Gabion retaining walls in good condition. Gabion retaining wall along the northwest bank is budging outwards toward the creek causing minor settlement of the shoulder behind it.
- Plate steel arch culvert in good condition, tenth and eleventh rib from the northeast corner has localized indentations. Second Vertical seam had a loose bolt.

RECOMMENDATIONS:

- Guard should be installed along the northwest approach
- All hazard markers should be cleared of vegetation and implemented as part of the regular maintenance.
- Repair to the settled shoulder of the road along the northwest gabion should be complete

South Approach

East Elevation

Downstream of Bridge

East through the Culvert

Gabion along the northwest approach

Hazard marker obstructed by vegetation

Scraped Guiderail along east side

Splits and checks on posts

A. IDENTIFICATION							
Bridge Name	Shewfelt Creek Bridge at Grasley's			Bridge No.:	B2		
Road Name:	Fisher Road			Road Section.:	265		
Location:	3.3 km North of Hwy 17			MTO Site No.:	38S-190		
Roadside Env.:	R	Posting Sign:	t t t	Crossing Type:		O-WAT	
Posting:	t t t	Low Clearnc Sign:		Federal Nav. Waterway:		Unknown	
Bylaw No.:		Easting:		Bridge Value:		$ 350,000.00	
Bylaw Exp. Date:	y m	Northling:		Old ID:			

B. RAILWAY OVERPASS/UNDERPASS			
Railway Level Crossing Number:		Original Board Order Number:	
Railway Company:		Date:	
Railway Subdivision:		Current Board Order Number:	
Subdivision Mileage:		Date:	
Transport Canada Crossing No.:		Seniority:	
Number of Tracks			

C. JURISDICTION					
Owner:	O A MUN	Special Designation	NSD	MunicA:	
Owner Share:		Designation 2:		MunicB:	
Shared:		Adjacent Bridge No.:		Patrol:	
Shared With:					
Heritage Status:	R				

D. EXISTING CONDITIONS					
Substructure Year:	1950	Span Length.:	6.1m	Longitudian Joints:	0
Superstruct Year:		Deck Type	CC (Cast in Place)	Transverse Joints:	0
Bridge Type:	C-TB-F	Deck Length	7.0m	Number of Bearings:	0
Cossing Skew:	0	Deck Width	5.1m	Soil Condition:	U
No. of Spans:	1	Deck Area	35.7m2	Abutment/Fdn Type:	Closed SF
~~	ROAD OVER BRIDGE	~~~~~~~~~~			
Existing Road Class:	300	Travel Deck Width:	4.30m	Safety Curb:	(A) N
Operational Status:	2W-OAT	No. of Lanes:	1	Sidewalk and Curb:	(B) N
Wearing Surface	G	Median Type/Width:		Roadside Safety: Barriers Walls/Railings	CB
~~	ROAD UNDER BRIDGE	~~~~~~~~~~			
Existing Road Class:		No. of Lanes:		Traffic Barrier:	
Operation Status:		Median Type/Width:		Min Vertical Clearance:	
Opening Width:		Safety Curb:	A		
Surface Width:		Sidewalk and Curb:	B		

E. TRAFFIC DATA			
Legal Speed Limit:		Traffic Count	10 Year Traffic Forecast
Route Designations:		Year:	Year:
Bus	Truck Route	AADT:	AADT:
School	Bicycle	DHV Factor:	DHV Factor:
		DHV:	DHV:
		Trucks:	Trucks:
Source:		Peak Directional Split:	Capacity:
		10 Year Growth:	20 Year AADT:

F. INSPECTIONS					
Date:	19-Jun-18	Inspected By:	Reg McKinnon	Approved By:	
			P. Eng.		

G. BRIDGE NEEDS

Field	MCR	PCR	TON	Comments
Superstructure	4	5	1-5 yrs	
Wearing Surface	5	5	6-10 yrs	
Deck Condition	4	5	1-5 yrs	
Expansion Joints	0	0	ADEQ	
Railings	4	5	1-5 yrs	
Substructure	3	4	1-5 yrs	
Coating	0	0	ADEQ	
Streams/Waterways	5	5	6-10 yrs	
Curbs/Sidewalks	0	0	ADEQ	

H. FUNCTIONAL NEEDS

Field	Existing	Min. Tolerable	Time of Need	Comments
Road over Culvert				
Travel Deck Width	4.3m	6.5m	NOW	
RO-Level of Service	A	E	ADEQ	
Min. Vert. Clear		4.5	ADEQ	
Sidewalks	N	N	ADEQ	

RECOMMENDED NEEDS

Impr. Class	Improvement	Description	Time of Nee	Year	Base/Const.

I. ENGINEERING RECOMMENDATIONS

Bridge Drawings:	
Engineering Investig.	
Total Cost of Eng. Investig.	
Single Posting	
Evaluated Posting	
Monitoring	
Closure Date	

J. DESIGN PARAMETERS

Design Class:	RSL
Operational Status	2W-OAT
Abutment Type	RSL-O
Design Deck Width	6.5m
Design Deck Length	7.0m

K. IMPROVEMENT COSTS

Total Construction/Rehab	$	65,000.00
Contingencies	$	6,000.00
Engineering	$	10,000.00
Total:	$	81,000.00

INSPECTION NOTES:

- Cast in place concrete T-beam bridge with a concrete deck and gravel wearing surface with cast in place concrete railings.
- Concrete railings are in generally good condition with minor damage due to collisions.
- The railing height on the deck does not meet current standards.
- Four hazard signs are present at the structure; the southeast corner sign is bent.
- No approach guiderails have been provided at the structure.
- Gravel approaches and deck wearing surface are generally in good condition.
- Buildup of gravel under the concrete railings along the bridge deck.
- Four cored holes in concrete deck are present for drainage but are covered by the buildup of gravel on the bridge deck.
- Concrete deck soffit was in fair condition with moderate scaling; delamination and localized exposed corroded rebar and staining.
- Concrete girders were in good to fair condition with moderate scaling, narrow stained cracks, and delamination. Localized exposed corroded rebar on the second girder from the east near the south abutment wall and wide cracking at the haunches on south end of bridge with cracking in the ballast wall.
- Concrete abutment walls have moderate to wide horizontal cracks, scaling, and narrow to medium map cracking with efflorescent staining and delamination throughout. The north abutment wall has horizontal cracking at the cold joint and at the shear connection. It was noted that the north abutment wall was poured right at the edge of the abutment footing. The south abutment wall has horizontal cracks at the cold joints, the mid span and one at the beam elevation.
- Concrete wingwalls are in fair condition with narrow to medium map cracking and efflorescence staining throughout. The northeast wingwall has wide horizontal cracking and the southwest wingwalls have moderate to wide cracking, stained map cracks, delamination and spalls.

- The south abutment footing erosion protection is functioning satisfactorily.
- Vegetated roadway embankments are very steep but are generally in good condition.
- Both upstream and downstream channels were unobstructed and no signs of scouring or erosion.

RECOMMENDATIONS

- Structure does not require posting with a load limit.
- The excess gravel build up on the bridge deck should be removed and the deck drain holes should be unplugged as part of regular maintenance.
- Should rehabilitate deck soffit, T-beams, abutments and wingwalls.
- Should install traffic protection on the approaches.
- Any leaning or bent hazard signs should be straightened.

South across the bridge

West Elevation

North abutment wall with narrow to wide horizontal cracks, map cracking and delamination.

South abutment wall with narrow to wide horizontal cracks, map cracking and delamination.

Southeast wingwall with narrow to medium cracking, wide horizontal cracks and delamination

Southeast interior beam with exposed and corroded rebar.

Damage to guard due to impact and buildup of gravel below guard

Unobstructed flow upstream

A. IDENTIFICATION							
Bridge Name	Stobie Creek at Mennonite School			Bridge No.:	B3		
Road Name:	Government Road			Road Section.:	350		
Location:	10m West of Gordon Lake Road			MTO Site No.:	38S-307		
Roadside Env.:	R	Posting Sign:	t t t	Crossing Type:		O-WAT	
Posting:	t t t	Low Clearnc Sign:		Federal Nav. Waterway:		Unknown	
Bylaw No.:		Easting:		Bridge Value:		$	450,000.00
Bylaw Exp. Date:	y m	Northling:		Old ID:			

B. RAILWAY OVERPASS/UNDERPASS			
Railway Level Crossing Number:		Original Board Order Number:	
Railway Company:		Date:	
Railway Subdivision:		Current Board Order Number:	
Subdivision Mileage:		Date:	
Transport Canada Crossing No.:		Seniority:	
Number of Tracks			

C. JURISDICTION					
Owner:	O A MUN	Special Designation	CBL	MunicA:	
Owner Share:		Designation 2:		MunicB:	
Shared:		Adjacent Bridge No.:		Patrol:	
Shared With:					
Heritage Status:	R				

D. EXISTING CONDITIONS					
Substructure Year:	1937	Span Length.:	9.3m	Longitudian Joints:	0
Superstruct Year:		Deck Type	CC (Cast in Place)	Transverse Joints:	0
Bridge Type:	C-TB-F	Deck Length	10.1m	Number of Bearings:	0
Cossing Skew:	0	Deck Width	5.7m	Soil Condition:	U
No. of Spans:	1	Deck Area	57.6m2	Abutment/Fdn Type:	Closed SF
~~	ROAD OVER BRIDGE	~~~~~~~~~~			
Existing Road Class	300	Travel Deck Width:	4.80m	Safety Curb:	(A) N
Operational Status	2W- OAT	No. of Lanes:	1	Sidewalk and Curb:	(B) N
Wearing Surface	A	Median Type/Width:		Roadside Safety: Barriers Walls/Railings	FB
~~	ROAD UNDER BRIDGE	~~~~~~~~~~			
Existing Road Class:		No. of Lanes:		Traffic Barrier:	
Operation Status:		Median Type/Width:		Min Vertical Clearance:	
Opening Width:		Safety Curb:	A		
Surface Width:		Sidewalk and Curb:	B		

E. TRAFFIC DATA			
Legal Speed Limit:		Traffic Count	10 Year Traffic Forecast
Route Designations:		Year:	Year:
Bus	Truck Route	AADT:	AADT:
School	Bicycle	DHV Factor:	DHV Factor:
		DHV:	DHV:
		Trucks:	Trucks:
Source:		Peak Directional Split:	Capacity:
		10 Year Growth:	20 Year AADT:

F. INSPECTIONS					
Date:	19-Jun-18	Inspected By:	Reg McKinnon	Approved By:	
			P. Eng.		

G. BRIDGE NEEDS

Field	MCR	PCR	TON	Comments
Superstructure	5	5	6-10 Yrs	
Wearing Surface	3	4	1-5 Yrs	
Deck Condition	4	5	1-5 Yrs	
Expansion Joints	0	0	ADEQ	
Railings	3	4	1-5 Yrs	
Substructure	3	4	1-5 Yrs	
Coating	0	0	ADEQ	
Streams/Waterways	5	5	6-10 Yrs	
Curbs/Sidewalks	0	0	ADEQ	

H. FUNCTIONAL NEEDS

Field	Existing	Min. Tolerable	Time of Need	Comments
Road over Culvert				
Travel Deck Width	4.8m	6.5m	NOW	
RO-Level of Service	A	E	ADEQ	
Min. Vert. Clear		4.5	ADEQ	
Sidewalks	N	N	ADEQ	

RECOMMENDED NEEDS

Impr. Class	Improvement	Description	Time of Nee	Year	Base/Const.

I. ENGINEERING RECOMMENDATIONS

Bridge Drawings:	
Engineering Investig.	
Total Cost of Eng. Investig.	
Single Posting	
Evaluated Posting	
Monitoring	
Closure Date	

J. DESIGN PARAMETERS

Design Class:	RSL
Operational Status	2W-OAT
Abutment Type	RSL-O
Design Deck Width	6.5M
Design Deck Length	10.0M

K. IMPROVEMENT COSTS

Total Construction/Rehab	$	60,000.00
Contingencies	$	6,000.00
Engineering	$	10,000.00
Total:	$	76,000.00

INSPECTION NOTES:

- Single span cast in place concrete T-beam bridge with concrete deck and asphalt wear surface
- Asphalt wearing surface is in fair condition.
- Asphalt approaches are in fair condition with settlement, depressions and cracking noted at the bridge ends. The east approach has a medium transverse crack.
- Gravel and vegetation buildup along the bridge deck under the guiderails.
- Steel flex beam railings on deck are in generally good condition. No offset blocks were present on south guiderails. Offset blocks on the north guiderail, with some rotated and/or broken in half. The west end of the south guardrail has a large cut approximately 2.0 m long.
- Under a guiderail post along the south rail there was a gap and the anchor bolts appear stripped.
- Terminal end treatments were been provided in all four corners.
- Hazard markers were located at each corner of the bridge. Vegetation starting to obstruct view of hazard signs.
- Concrete deck soffit was in fair to good condition with wide localized cracking in soffit at the interior soffit at the east abutment (0.6m x 0.6m area)
- Concrete T-beams are in fair to good condition with moderate stained cracking on the exterior beam at the northeast corner and minor cracking on the bottom of the east and west ends of the south beam.
- A wide crack from the exterior face of the concrete beam/deck to the curb was noted at the northeast corner. The curb on south side has been repaired and light cracking was noted near the posts.
- Concrete abutment walls are in general good condition with delamination.
- Concrete footings were not visible due to the high water level.

- Watercourse is unobstructed.
- No traffic protection is provided on the approaches.
- Vegetated roadway embankments are in good condition with minor erosion with minor channelization in the southeast corner.

RECOMMENDATIONS:

- Previous report stated that undermining of abutments was present. Due to the high water level at time of inspection, abutments and footings were not inspected. If not already completed, repairs should be completed.
- Repair offset blocks along north guiderail.
- Replace section of cut guiderail along south side.
- Seal Transverse crack on the east approach.
- Repair minor erosion at the southeast corner of the bridge
- Remove gravel and vegetation from under the guiderails along the bridge deck and around hazard signs.
- Repair guiderail baseplate, including new anchor bolts and shims.

East across the bridge

South Elevation of bridge

Damaged Guiderail along south side

Broken and rotated offset block

Gap under guiderail baseplate

Typical T-beam arrangement

Medium to wide cracking of deck soffit at the east abutment

Downstream of bridge

A. IDENTIFICATION							
Bridge Name	Suddaby Creek Bridge			Bridge No.:	B4		
Road Name:	Old Mill Road			Road Section.:	240		
Location:	.20 km North of Gordon Lake Road			MTO Site No.:	38S-151		
Roadside Env.:	R	Posting Sign:	10t t t	Crossing Type:		O-Wat	
Posting:	10t t t	Low Clearnc Sign:		Federal Nav. Waterway:		Unknown	
Bylaw No.:		Easting:		Bridge Value:		$ 750,000.00	
Bylaw Exp. Date:	y m	Northling:		Old ID:			

B. RAILWAY OVERPASS/UNDERPASS			
Railway Level Crossing Number:		Original Board Order Number:	
Railway Company:		Date:	
Railway Subdivision:		Current Board Order Number:	
Subdivision Mileage:		Date:	
Transport Canada Crossing No.:		Seniority:	
Number of Tracks			

C. JURISDICTION					
Owner:	O A MUN	Special Designation	NSD	MunicA:	
Owner Share:		Designation 2:		MunicB:	
Shared:		Adjacent Bridge No.:		Patrol:	
Shared With:					
Heritage Status:	R				

D. EXISTING CONDITIONS					
Substructure Year:	1913	Span Length.:	6.3m	Longitudian Joints:	0
Superstruct Year:		Deck Type	CC (Cast in Place)	Transverse Joints:	0
Bridge Type:	C-TB-C	Deck Length	21.3m	Number of Bearings:	0
Cossing Skew:	0	Deck Width	5.3m	Soil Condition:	U
No. of Spans:	3	Deck Area	112.9m2	Abutment/Fdn Type:	Closed -UN
~~	ROAD OVER BRIDGE	~~~~~~~~~~			
Existing Road Class:	300	Travel Deck Width:	4.20m	Safety Curb:	(A) N / E 0.1 m
Operational Status:	2W-OAT	No. of Lanes:	1	Sidewalk and Curb:	(B) N / W 0.1m
Wearing Surface	C	Median Type/Width:	Roadside Safety:	Barriers Walls/Railings	
~~	ROAD UNDER BRIDGE	~~~~~~~~~~			
Existing Road Class:		No. of Lanes:		Traffic Barrier:	
Operation Status:		Median Type/Width:		Min Vertical Clearance:	
Opening Width:		Safety Curb:	A		
Surface Width:		Sidewalk and Curb:	B		

E. TRAFFIC DATA					
Legal Speed Limit:		Traffic Count		10 Year Traffic Forecast	
Route Designations:		Year:		Year:	
Bus	Truck Route	AADT:		AADT:	
School	Bicycle	DHV Factor:		DHV Factor:	
		DHV:		DHV:	
		Trucks:		Trucks:	
Source:		Peak Directional Split:		Capacity:	
		10 Year Growth:		20 Year AADT:	

F. INSPECTIONS					
Date:	19-Jun-18	Inspected By:	Reg McKinnon	Approved By:	
			P. Eng.		

G. BRIDGE NEEDS

Field	MCR	PCR	TON	Comments
Superstructure	3	3	1-5 Yrs	
Wearing Surface	4	4	1-5 Yrs	
Deck Condition	4	4	1-5 Yrs	
Expansion Joints	0	0	ADEQ	
Railings	2	3	NOW	
Substructure	3	4	1-5 Yrs	
Coating	0	0	ADEQ	
Streams/Waterways	3	3	1-5 Yrs	
Curbs/Sidewalks	4	5	1-5 Yrs	

H. FUNCTIONAL NEEDS

Field	Existing	Min. Tolerable	Time of Need	Comments
Road over Culvert				
Travel Deck Width	4.2m	6.5m	NOW	
RO-Level of Service	A	E	ADEQ	
Min. Vert. Clear		4.5	ADEQ	
Sidewalks	N	N	ADEQ	

RECOMMENDED NEEDS

Impr. Class	Improvement	Description	Time of Nee	Year	Base/Const.

I. ENGINEERING RECOMMENDATIONS

Bridge Drawings:	
Engineering Investig.	
Total Cost of Eng. Investig.	$ 15,000.00
Single Posting	
Evaluated Posting	
Monitoring	
Closure Date	

J. DESIGN PARAMETERS

Design Class:	RSL
Operational Status	2W-OAT
Abutment Type	RSL-O
Design Deck Width	6.5m
Design Deck Length	21.3m

K. IMPROVEMENT COSTS

Total Construction/Rehab	$ 300,000.00
Contingencies	$ 30,000.00
Engineering	$ 40,000.00
Total:	$ 370,000.00

INSPECTION NOTES:

- Three span (±6.3m, ±6.3m, ±6.3m) cast in place concrete T-Beam bridge with an exposed concrete deck wearing surface, piers and abutments.
- The bridge has concrete curbs and railing posts with light pipe handrails and gravel approaches.
- The light pipe handrails on the deck are in poor condition with broken concrete posts and missing sections.
- Hazard markers are located in all four quadrants - some bent/falling.
- Concrete deck curbs are in fair to poor condition with missing sections in the northeast quadrant.
- Concrete deck wearing surface is in fair condition with localized spalls, moderate abrasions and wear. Gravel and debris is built up on bridge deck at curbs.
- Deck drainage is through six 150mm diameter drains and are clear.
- Vegetated roadway embankments are in good condition. Trimming is required on the abutment embankments to eliminate any tree growth under the bridge.
- The north abutment embankment is in good condition.
- Concrete deck soffit is in generally in fair to poor condition with delamination, narrow to wide cracking and efflorescence throughout.
- Concrete T-beams are in fair to poor condition with the following:
    - Narrow to wide stained cracks, exposed corroded rebar, severe spalling of the northwest corner exterior beam and wet areas at the north side of the north beam.
    - Spalling at underside of east exterior beam with severely corroded and exposed rebar.
    - Efflorescence at sides and soffit of both interior and exterior beams;
    - Wide horizontal cracking at south end of both exterior beams;

  - Moderate scaling at haunches at south side of south pier;
  - Narrow cracking and delamination at haunch of second beam from east, on the south end, at the north pier;
  - Severe spalling, exposed rebar at north span, exterior beams (with moderate flaking and minor section loss of exposed rebar);
  - Moderate scaling and localized spalls at haunches of north abutment wall.
  - Severe spalling on the haunches in the northeast quadrant
- Concrete abutment walls are in fair condition with medium random cracking and light to medium scaling. Concrete ballast walls are in generally fair to poor condition with narrow to wide stained cracks, spalls, delamination(s) and efflorescence.
- Concrete piers are in fair condition with wide traverse cracking at south and north pier footing. Concrete patches at both pier footings. Medium transverse cracking at the top of all pier columns at north pier. The exterior portions of the piers have spalls, delamination(s) and the concrete is beginning to disintegrate.
- Watercourse is generally un-obstructed; however there is evidence of moderate scour/erosion to the south abutment and severe undermining of the pier footings.

Recommendations

- The 10 tonne load limit should remain in effect.
- Traffic protection on the approaches should be installed
- Bridge deck and curbs should be cleaned of excess gravel and remove any small trees growing at the underside of the bridge as part of regular maintenance.
- The erosion noted on the south abutment embankment should be repaired and stabilized to prevent the erosion from continuing under heavy rainfalls/ high stream flows. The undermining of the pier footings should also be repaired as soon as possible.
- The bridge railing requires repairs and should be upgraded to meet the current standards.
- Tree growth and vegetation at abutment embankments should be trimmed back to prevent encroachment on/under the bridge.
- A detailed deck condition survey and rehabilitation/replacement analysis is recommended to confirm the rehabilitation vs. replacement recommendation.
- Subject to findings of deck condition survey, repairs to concrete beams, soffit, piers, abutments and curbs/railings should be completed and the deck should be rehabilitated with a waterproofing membrane and wearing surface. The rehabilitation of all the concrete components will not increase the load capacity (see below).
- If this bridge is intended to be subject to higher loads, a load evaluation should be carried out to confirm the rehabilitation/replacement recommendation and any further repair recommendations.

South across bridge

West Elevation

Concrete wear surface with light to moderate scaling. Broken railing post.

Broken missing railing post. Damaged pipe rails

General arrangement of underside of bridge.

Exposed corroded rebar on east exterior beam.

Exposed Rebar on east beam at abutment

A. IDENTIFICATION							
Bridge Name	Suddaby Park			Bridge No.:	B5		
Road Name:	Gordon Lake Road			Road Section.:	195		
Location:	.5km North of Suddaby Park Rod			MTO Site No.:	38S-152		
Roadside Env.:	R	Posting Sign:	t t t	Crossing Type:		O- WAT	
Posting:	t t t	Low Clearnc Sign:		Federal Nav. Waterway:		Unknown	
Bylaw No.:		Easting:		Bridge Value:		$ 500,000.00	
Bylaw Exp. Date:	y m	Northling:		Old ID:			

B. RAILWAY OVERPASS/UNDERPASS			
Railway Level Crossing Number:		Original Board Order Number:	
Railway Company:		Date:	
Railway Subdivision:		Current Board Order Number:	
Subdivision Mileage:		Date:	
Transport Canada Crossing No.:		Seniority:	
Number of Tracks			

C. JURISDICTION					
Owner:	O A MUN	Special Designation	NSD	MunicA:	
Owner Share:		Designation 2:		MunicB:	
Shared:		Adjacent Bridge No.:		Patrol:	
Shared With:					
Heritage Status:	R				

D. EXISTING CONDITIONS					
Substructure Year:	2009	Span Length.:	5.3m	Longitudian Joints:	0
Superstruct Year:		Deck Type	CC (Cast In Place)	Transverse Joints:	0
Bridge Type:	P-BC-F	Deck Length	5.3m	Number of Bearings:	0
Cossing Skew:	0	Deck Width	13.0m	Soil Condition:	U
No. of Spans:	1	Deck Area	68.9m2	Abutment/Fdn Type:	Closed - PC
~~	ROAD OVER BRIDGE	~~~~~~~~~~			
Existing Road Class:	300	Travel Deck Width:	7.30m	Safety Curb:	(A) N / E 0.2m
Operational Status:	2w-OAT	No. of Lanes:	2	Sidewalk and Curb:	(B) N / W 0.2m
Wearing Surface	A	Median Type/Width:		Roadside Safety:	Barriers Walls/Railings
~~	ROAD UNDER BRIDGE	~~~~~~~~~~			
Existing Road Class:		No. of Lanes:		Traffic Barrier:	
Operation Status:		Median Type/Width:		Min Vertical Clearance:	
Opening Width:		Safety Curb:	A		
Surface Width:		Sidewalk and Curb:	B		

E. TRAFFIC DATA			
Legal Speed Limit:		Traffic Count	10 Year Traffic Forecast
Route Designations:		Year:	Year:
Bus	Truck Route	AADT:	AADT:
School	Bicycle	DHV Factor:	DHV Factor:
		DHV:	DHV:
		Trucks:	Trucks:
Source:		Peak Directional Split:	Capacity:
		10 Year Growth:	20 Year AADT:

F. INSPECTIONS					
Date:	19-Jun-18	Inspected By:	Reg McKinnon	Approved By:	
			P. Eng.		

G. BRIDGE NEEDS

Field	MCR	PCR	TON	Comments
Superstructure	6	6	ADEQ	
Wearing Surface	5	6	6-10 Yrs	
Deck Condition	6	6	ADEQ	
Expansion Joints	0	0	ADEQ	
Railings	6	6	ADEQ	
Substructure	6	6	ADEQ	
Coating	6	6	ADEQ	
Streams/Waterways	6	6	ADEQ	
Curbs/Sidewalks	6	6	ADEQ	

H. FUNCTIONAL NEEDS

Field	Existing	Min. Tolerable	Time of Need	Comments
Road over Culvert				
Travel Deck Width	7.3m	6.5m	ADEQ	
RO-Level of Service	A	E	ADEQ	
Min. Vert. Clear		4.5	ADEQ	
Sidewalks	N	N	ADEQ	

RECOMMENDED NEEDS

Impr. Class	Improvement	Description	Time of Nee	Year	Base/Const.

I. ENGINEERING RECOMMENDATIONS		**J. DESIGN PARAMETERS**		**K. IMPROVEMENT COSTS**	
Bridge Drawings:		Design Class:		Total Construction/Rehab	$ -
Engineering Investig.		Operational Status		Contingencies	$ -
Total Cost of Eng. Investig.		Abutment Type		Engineering	$ -
Single Posting		Design Deck Width		Total:	$ -
Evaluated Posting		Design Deck Length			
Monitoring					
Closure Date					

INSPECTION NOTES:

- Precast Concrete box culvert with surface road treatment.
- Medium transvers cracks in the south approach.
- Steel guiderails on wood posts over the structure as well as the approaches are in good condition. Guiderails at all four corners were missing bolts.
- Hazard markers were present at all four corners and visible.
- Extrurder end treatments were located at all four corners and in good condition.
- Embankments were in good condition.
- Concrete retaining walls were in good condition.
- Concrete deck soffit in good condition. Parging was missing at all of the construction joints between the precast sections along the length of the structure.

RECOMMENDATIONS:

- Transverse cracks in the roadway should be monitored. Cracks should be sealed or patched to prevent further damage to wearing surface.
- Install bolts where missing in the guiderail to connect the flex beam to the post.

North across length of bridge

East Elevation

Transverse crack in the wearing surface

Looking west through barrel

Missing parging at construction joints, typical at all joints.

Gabions along west side of road

Looking downstream of the structure

Guiderail support beam missing bolt to connect it to post

A. IDENTIFICATION					
Culvert Name	Desbarats River Culvert			Culvert No.:	C1
Road Name:	Government Road			Road Section.:	260
Location:	West of Desbarats			MTO Site No.:	
Roadside Env.:	R	Posting Sign:		Crossing Type:	O-WAT
Posting:	t t t	Low Clearnc Sign:		Federal Nav. Waterway:	UNKNOWN
Bylaw No.:		Easting:		Culvert Value:	$400,000.00
Bylaw Exp. Date:		Northling:		Old ID:	

B. RAILWAY OVERPASS/UNDERPASS			
Railway Level Crossing Number:		Original Board Order Number:	
Railway Company:		Date:	
Railway Subdivision:		Current Board Order Number:	
Subdivision Mileage:		Date:	
Transport Canada Crossing No.:		Seniority:	
Number of Tracks			

C. JURISDICTION					
Owner:	O A MUN	Special Designation:	CBL	MunicA:	
Owner Share:		Designation 2:		MunicB:	
Shared:		Adjacent Culvert No.:		Patrol:	
Shared With:					
Heritage Status:	R				

D. EXISTING CONDITIONS					
Substructure Year:	A. 2014	Cell/Span Width/Dia	3.1m	End Tratment:	A B C D
Superstruct Year:		Total Width/Dia.:	3.1m	End Upstream:	N
Material/Type:	CSP-PR	Max Height:	3.1m	End Downstream	N
Cossing Skew:	0	Length:	~15.5m	Soil Condition:	U
No. of Cells/Spans:	1	Type/Depth of Fill:	E .7	Foundation Type:	BD Bedding
		Culvert Floor	SC		
~~	ROAD OVER CULVERT	~~~~~~			
Existing Road Class	300	Platform Width:	8.5m	Safety Curb:	(A) N
Operational Status	2W-OAT	Surface Width:	7.5m	Sidewalk and Cur	(B) N
Surface Type:	G	No. of Lanes:	2.0	Roadside Safety:	(A) N NO
~~	ROAD THROUGH CULVERT	~~~~~~			(B) S NO
Existing Road Class:		No. of Lanes:		Traffic Barrier:	
Operation Status:		Median Type/Width:		Min Vertical Clearance:	
Opening Width:		Safety Curb:			
Surface Width:		Sidewalk and Curb:			

E. TRAFFIC DATA					
Legal Speed Limit:		Traffic Count		10 Year Traffic Forecast	
Route Designations:		Year:		Year:	
Bus	Truck Route	AADT:		AADT:	
School	Bicycle	DHV Factor:		DHV Factor:	
		DHV:		DHV:	
		Trucks:		Trucks:	
Source:		Peak Directional Split:		Capacity:	
		10 Year Growth:		20 Year AADT:	

F. INSPECTIONS					
Date:	19-Jun-18	Inspected By:	Reg McKinnon	Approved By:	
			P. Eng.		

G. CULVERT NEEDS

Field	MCR	PCR	TON	Comments
Barrel	9	9	ADEQ	
Foundations	9	9	ADEQ	
Guiderail/Barrier	6	6	1-5years	
Inlet Component	0	0	ADEQ	
Outlet Component	0	0	ADEQ	
Streams/Waterways	6	6	ADEQ	

H. FUNCTIONAL NEEDS

Field	Existing	Min. Tolerable	Time of Need	Comments
Road over Culvert				
RO-Platform Width	8.5m	6.5m	ADEQ	
RO-Level of Service	A	E	ADEQ	
RO-Roadside Safety		3	NOW	

RECOMMENDED NEEDS

Impr. Class	Improvement	Description	Time of Nee	Year	Base/Const.

I. ENGINEERING RECOMMENDATIONS

Culvert Drawings:	UNK
Engineering Investig.	
Total Cost of Eng. Investig.	
Evaluated Posting:	
Closure Date/Type	
Closure Type:	
Monitoring:	
Monitoring Component:	

J. DESIGN PARAMETERS

Design Class:	RSL
Design Platform Width	8.5m
Material/Type:	CPS-PR
Width/Diameter:	3.6m
Maximum Height:	3.6m
Culvert Length:	29.0m
No. of Culverts:	1
Depth of Fill:	1.0m

K. IMPROVEMENT COSTS

Total Construction/Rehab	$ -
Contingencies	$ -
Engineering	$ -
Total:	$ -

INSPECTION NOTES:

- Plastic coated corrugated steel round pipe culvert with approximately 0.7m of gravel fill and a surface treated roadway.
- Surface treated roadway and approaches are in good condition.
- Hazard markers located at all four corners.
- Approaches and culvert protected by guiderail with wooden posts and offset blocks on the approaches and metal posts over the culvert. Wooden posts and offset blocks have minor cracking and splitting, some offset blocks are rotated.
- Roadway embankments are in good condition and protected with armour rock.
- Steel culvert is generally in good condition
- Watercourse is un-obstructed with no evidence of scour.

RECOMMENDATIONS

- Structure does not require posting with a load limit.

East Across culvert

West across culvert

Municipality: Township of Johnson
Desbarats River Culvert Culvert No.: 01

Typical Guiderail

Rotated offset block

North side of Culvert, inlet. Banks protected by rock

South outlet

Looking north through the culvert.

A. IDENTIFICATION							
Culvert Name	Sucker Creek Road			Culvert No.:	C2		
Road Name:	Government Road			Road Section.:	375		
Location:	1.9 km West of Lake Huron Dr.			MTO Site No.:			
Roadside Env.:	R	Postin gSign:	t	Crossing Type:		O-WAT	
Posting:	t t t	Low Clearnc Sign:		Federal Nav. Waterway:		UNKNOWN	
Bylaw No.:		Easting:		Culvert Value:		$ 300,000.00	
Bylaw Exp. Date:	y m	Northling:		Old ID:			

B. RAILWAY OVERPASS/UNDERPASS			
Railway Level Crossing Number:		Original Board Order Number:	Date y m d
Railway Company:		Date:	
Railway Subdivision:		Current Board Order Number:	Date y m d
Subdivision Mileage:		Date:	
Transport Canada Crossing No.:		Seniority:	
Number of Tracks			

C. JURISDICTION					
Owner:	O A MUN	Special Designation	CBL	MunicA:	
Owner Share:		Designation 2:		MunicB:	
Shared:		Adjacent Culvert No.:		Patrol:	
Shared With:					
Heritage Status:	R				

D. EXISTING CONDITIONS					
Substructure Year:	1980	Cell/Span Width/Dia	3.0m	End Tratment:	A B C D
Superstruct Year:		Total Width/Dia.:	3.0m	End Upstream:	N
Material/Type:	CPS-PA	Max Height:	3.0m	End Downstream	N
Cossing Skew:	O	Length:	20.0m	Soil Condition:	U
No. of Cells/Spans:	1	Type/Depth of Fill:	.3m	Foundation Type:	UN - unknown
		Culvert Floor	SC		
~~	ROAD OVER CULVERT	~~~~~~~~~~			
Existing Road Class	300	Platform Width:	8.0m	Safety Curb:	(A) N
Operational Status	2W OAT	Surface Width:	7.0m	Sidewalk and Cur	(B) N
Surface Type:	0	No. of Lanes:	2.0	Roadside Safety:	(A) N NO
~~	ROAD THROUGH CULVERT	~~~~~~~~~~			(B) S NO
Existing Road Class:		No. of Lanes:		Traffic Barrier:	
Operation Status:		Median Type/Width:		Min Vertical Clearance:	
Opening Width:		Safety Curb:			
Surface Width:		Sidewalk and Curb:			

E. TRAFFIC DATA					
Legal Speed Limit:		Traffic Count		10 Year Traffic Forecast	
Route Designations:		Year:		Year:	
Bus	Truck Route	AADT:		AADT:	
School	Bicycle	DHV Factor:		DHV Factor:	
		DHV:		DHV:	
		Trucks:		Trucks:	
Source:		Peak Directional Split:		Capacity:	
		10 Year Growth:		20 Year AADT:	

F. INSPECTIONS					
Date:	19-Jun-18	Inspected By:	Reg McKinnon	Approved By:	

G. CULVERT NEEDS

Field	MCR	PCR	TON	Comments
Barrel	4	5	1-5 yrs.	
Foundations	6	6	ADEQ	
Guiderail/Barrier	0	0	NOW	
Inlet Component	0	0	ADEQ	
Outlet Component	0	0	ADEQ	
Streams/Waterways	6	5	ADEQ	

H. FUNCTIONAL NEEDS

Field	Existing	Min. Tolerable	Time of Need	Comments
Road over Culvert				
RO-Platform Width	8.0m	6.5m	ADEQ	
RO-Level of Service	A	E	ADEQ	
RO-Roadside Safety		3	NOW	

RECOMMENDED NEEDS

Impr. Class	Improvement	Description	Time of Nee	Year	Base/Const.

I. ENGINEERING RECOMMENDATIONS

Culvert Drawings:	UNK
Engineering Investig.	C/S
Total Cost of Eng. Investig.	$10,000.00
Evaluated Posting:	
Closure Date/Type	
Closure Type:	
Monitoring:	
Monitoring Component:	

J. DESIGN PARAMETERS

Design Class:	RSL
Design Platform Width:	8.0m
Material/Type:	cps-pr
Width/Diameter:	3.0m
Maximum Height:	3.0m
Culvert Length:	20m
No. of Culverts:	1
Depth of Fill:	.3m

K. IMPROVEMENT COSTS

Total Construction/Rehab:	$ 340,000.00
Contingencies	$ 34,000.00
Engineering	$ 60,000.00
Total:	$ 434,000.00

INSPECTION NOTES:

- Corrugated plate steel round pipe with approximately 0.3m of gravel fill and a surface treated roadway.
- Surface treated roadway is in generally fair to good condition with moderate settlement on either side of the structure and narrow to wide transverse cracks in the surface treatment. Bump signs were located in both directions.
- No traffic protection is provided on the approaches or over the structure.
- Vegetated roadway embankments are in fair condition with localized erosion observed in the northeast and northwest corners adjacent to the pipe inlet.
- Corrugated plate steel pipe is in fair condition with light to moderate corrosion and flaking at the waterline. Water was infiltrating the pipe through rust perforations and at plate joints.
- Significant sag in the culvert along its length and a moderate bulge in the culvert's east wall were noted.
- Beaver dam was present at inlet into the culvert.
- Inlet was no visible due to the beaver dam and high watertable

Recommendations

- Structure does not require posting with a load limit.
- Traffic protection should be installed on the approaches and over the structure.
- Beaver dam located at the culvert inlet should be removed
- Erosion on the north embankments and scour under the pipe inlet should be repaired and stabilized/protected to prevent re-occurrence.
- Cracks in surface treatment should be repaired to prevent damage to wearing surface at structure. Patching should also be placed on either side of the culvert to mitigate the depressions.

- Replacement of culvert should be budgeted in the next 5 years. Alternative option would be to install a liner in the culvert barrel. A culvert hydraulic study would be required to confirm suitability of installing a liner (this alternative was not costed).

East across culvert

North upstream of culvert

Municipality: Township of Johnson
Sucker Creek Culvert Culvert No.: 02

Beaver Dam at the inlet of the culvert

Culvert is rusting and flaking off. Water infiltrating through perforations in metal culvert.

Joint in culvert leaking.

North through the culvert, sag along its length.

North through the culvert, sag along its length.

A. IDENTIFICATION

Culvert Name	Sucker Creek Near CASS		Culvert No.:	C3	
Road Name:	Kensington Point Road		Road Section.:		
Location:	.4 km South of Highway 17		MTO Site No.:		
Roadside Env.:	R	Posting Sign: t	Crossing Type:		O-WAT
Posting:	t t t	Low Clearnc Sign:	Federal Nav. Waterway:		Unknown
Bylaw No.:		Easting:	Culvert Value:		$400,000.00
Bylaw Exp. Date:		Northling:	Old ID:		

B. RAILWAY OVERPASS/UNDERPASS

Railway Level Crossing Number:		Original Board Order Number:	
Railway Company:		Date:	
Railway Subdivision:		Current Board Order Number:	
Subdivision Mileage:		Date:	
Transport Canada Crossing No.:		Seniority:	
Number of Tracks			

C. JURISDICTION

Owner:	O A MUN	Special Designation:	CBL	MunicA:	
Owner Share:		Designation 2:		MunicB:	
Shared:		Adjacent Culvert No.:		Patrol:	
Shared With:					
Heritage Status:	R				

Substructure Year:	A 1980	Cell/Span Width/Dia	5.2m	End Tratment:	A B C D
Superstruct Year:		Total Width/Dia.:	5.2m	End Upstream:	N
Material/Type:	CPS-PA	Max Height:	2.5m	End Downstream	N
Cossing Skew:	0	Length:	23.5m	Soil Condition:	U
No. of Cells/Spans:	1	Type/Depth of Fill:	E 0.7m	Foundation Type:	BD - Bedding
		Culvert Floor	SC		
~~	ROAD OVER CULVERT	~~~~~~~~~~			
Existing Road Class:	300	Platform Width:	6.8m	Safety Curb:	(A) N /
Operational Status:	2W OAT	Surface Width:	5.8m	Sidewalk and Curb:	(B) N /
Surface Type:	0	No. of Lanes:	2.0	Roadside Safety:	(A) E NO
~~	ROAD THROUGH CULVERT	~~~~~~~~~~			(B) W NO
Existing Road Class:		No. of Lanes:		Traffic Barrier:	
Operation Status:		Median Type/Width:		Min Vertical Clearance:	
Opening Width:		Safety Curb:			
Surface Width:		Sidewalk and Curb:			

E. TRAFFIC DATA

Legal Speed Limit:		Traffic Count	10 Year Traffic Forecast
Route Designations:		Year:	Year:
Bus	Truck Route	AADT:	AADT:
School	Bicycle	DHV Factor:	DHV Factor:
		DHV:	DHV:
		Trucks:	Trucks:
Source:		Peak Directional Split:	Capacity:
		10 Year Growth:	20 Year AADT:

F. INSPECTIONS

Date:	19-Jun-18	Inspected By:	Reg McKinnon	Approved By:	
			P. Eng.		

G. CULVERT NEEDS

Field	MCR	PCR	TON	Comments
Barrel	4	5	1-5 years	
Foundations	9	9	ADEQ	
Guiderail/Barrier	0	0	NOW	
Inlet Component	0	0	ADEQ	
Outlet Component	0	0	ADEQ	
Streams/Waterways	6	6	ADEQ	

H. FUNCTIONAL NEEDS

Field	Existing	Min. Tolerable	Time of Need	Comments
Road over Culvert				
RO-Platform Width	6.8m	6.5m	ADEQ	
RO-Level of Service	A	E	ADEQ	
RO-Roadside Safety		3	NOW	

RECOMMENDED NEEDS

Impr. Class	Improvement	Description	Time of Nee	Year	Base/Const.

I. ENGINEERING RECOMMENDATIONS

Culvert Drawings:	UNK
Engineering Investig.	C/S
Total Cost of Eng. Investig.	$10,000.00
Evaluated Posting:	
Closure Date/Type	
Closure Type:	
Monitoring:	
Monitoring Component:	

J. DESIGN PARAMETERS

Design Class:	RSL
Design Platform Width:	6.8m
Material/Type:	CPS-PR
Width/Diameter:	5.2m
Maximum Height:	5.2m
Culvert Length:	23.5m
No. of Culverts:	1
Depth of Fill:	.7m

K. IMPROVEMENT COSTS

Total Construction/Rehab	$	40,000.00
Contingencies	$	4,000.00
Engineering	$	16,000.00
Total:	$	60,000.00

INSPECTION NOTES:

- Corrugated plate steel pipe arch with approximately 0.7m of gravel fill and a surface treated roadway.
- Roadway is generally in good condition.
- No traffic protection is provided on the approaches or over the structure.
- Embankments are in fair to good condition.
- Corrugated plate steel pipe is in fair condition with light to moderate corrosion with flaking at the waterline. Two minor bulges in the top of the culvert barrel were noted at the road center line.
- Watercourse is generally un-obstructed with no evidence of scour.

Recommendations

- Structure does not require posting with a load limit.
- Should install traffic protection on the approaches and over the structure.
- Northwest embankment slope appears stable however additional material could be placed to eliminate previous erosion in roadway embankment as part of regular maintenance.
- Should inspect the floor and bottom of walls for extensive corrosion and cracks to better determine the remaining life of the culvert and expected time frame for replacement or repairs. (Anticipate that underwater inspection will be carried out with aid of a diver).

South across the culvert

Looking west upstream of culvert

West elevation of culvert

Looking upstream though the culvert

Light to moderate corrosion at waterline

A. IDENTIFICATION							
Culvert Name	Government Road Culvert			Culvert No.:	C5		
Road Name:	Government Road			Road Section.:	260		
Location:	.4km East of Fisher Road			MTO Site No.:			
Roadside Env.:	R	Posting Sign:		Crossing Type:		O-WAT	
Posting:	t t t	Low Clearnc Sign:		Federal Nav. Waterway:		UNKNOWN	
Bylaw No.:		Easting:		Culvert Value:		$400,000.00	
Bylaw Exp. Date:		Northling:		Old ID:			

B. RAILWAY OVERPASS/UNDERPASS			
Railway Level Crossing Number:		Original Board Order Number:	
Railway Company:		Date:	
Railway Subdivision:		Current Board Order Number:	
Subdivision Mileage:		Date:	
Transport Canada Crossing No.:		Seniority:	
Number of Tracks			

C. JURISDICTION					
Owner:	O A MUN	Special Designation:	CBL	MunicA:	
Owner Share:		Designation 2:		MunicB:	
Shared:		Adjacent Culvert No.:		Patrol:	
Shared With:					
Heritage Status:	R				

D. EXISTING CONDITIONS					
Substructure Year:	A. 1980	Cell/Span Width/Dia	3.6m	End Tratment:	A B C D
Superstruct Year:		Total Width/Dia.:	3.6m	End Upstream:	N
Material/Type:	CSP-PR	Max Height:	3.6m	End Downstream	N
Cossing Skew:	0	Length:	29.0m	Soil Condition:	U
No. of Cells/Spans:	1	Type/Depth of Fill:	E 1.0m	Foundation Type:	BD Bedding
		Culvert Floor	SC		
~~	ROAD OVER CULVERT	~~~~~~~~~~			
Existing Road Class	300	Platform Width:	8.5m	Safety Curb:	(A) N
Operational Status	2W-OAT	Surface Width:	7.5m	Sidewalk and Cur	(B) N
Surface Type:	G	No. of Lanes:	2.0	Roadside Safety:	(A) N NO
~~	ROAD THROUGH CULVERT	~~~~~~~~~~			(B) S NO
Existing Road Class:		No. of Lanes:		Traffic Barrier:	
Operation Status:		Median Type/Width:		Min Vertical Clearance:	
Opening Width:		Safety Curb:			
Surface Width:		Sidewalk and Curb:			

E. TRAFFIC DATA					
Legal Speed Limit:		Traffic Count		10 Year Traffic Forecast	
Route Designations:		Year:		Year:	
Bus	Truck Route	AADT:		AADT:	
School	Bicycle	DHV Factor:		DHV Factor:	
		DHV:		DHV:	
		Trucks:		Trucks:	
Source:		Peak Directional Split:		Capacity:	
		10 Year Growth:		20 Year AADT:	

F. INSPECTIONS					
Date:	19-Jun-18	Inspected By:	Reg McKinnon	Approved By:	
			P. Eng.		

G. CULVERT NEEDS

Field	MCR	PCR	TON	Comments
Barrel	5	6	6-10 yrs	
Foundations	9	9	ADEQ	
Guiderail/Barrier	0	0	NOW	
Inlet Component	0	0	ADEQ	
Outlet Component	0	0	ADEQ	
Streams/Waterways	6	6	ADEQ	

H. FUNCTIONAL NEEDS

Field	Existing	Min. Tolerable	Time of Need	Comments
Road over Culvert				
RO-Platform Width	8.5m	6.5m	ADEQ	
RO-Level of Service	A	E	ADEQ	
RO-Roadside Safety		3	NOW	

RECOMMENDED NEEDS

Impr. Class	Improvement	Description	Time of Nee	Year	Base/Const.

I. ENGINEERING RECOMMENDATIONS

Culvert Drawings:	UNK
Engineering Investig.	
Total Cost of Eng. Investig.	
Evaluated Posting:	
Closure Date/Type	
Closure Type:	
Monitoring:	
Monitoring Component:	

J. DESIGN PARAMETERS

Design Class:	RSL
Design Platform Width	8.5m
Material/Type:	CPS-PR
Width/Diameter:	3.6m
Maximum Height:	3.6m
Culvert Length:	29.0m
No. of Culverts:	1
Depth of Fill:	1.0m

K. IMPROVEMENT COSTS

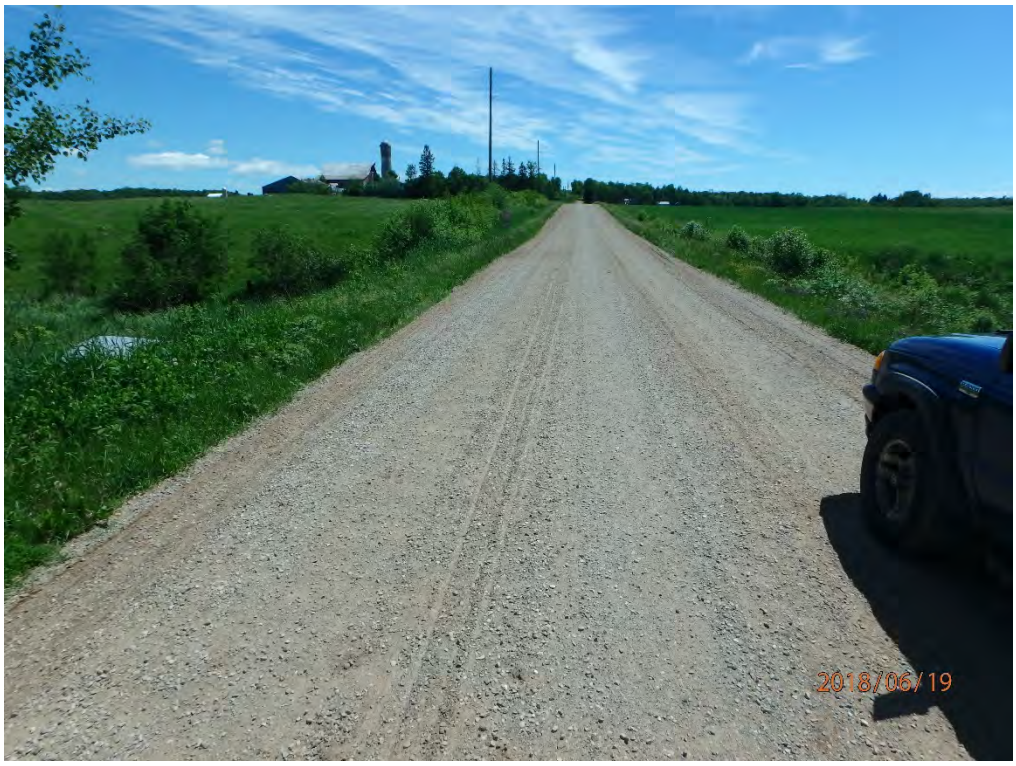
Total Construction/Rehab	$	440,000.00
Contingencies	$	44,000.00
Engineering	$	70,000.00
Total:	$	554,000.00

INSPECTION NOTES:

- Corrugated steel round pipe culvert with approximately 1.0 m of gravel fill and a gravel roadway.
- Gravel roadway and approaches are in good condition.
- No traffic protection is provided on the approaches or across the structure.
- Roadway embankments are in good condition and protected with vegetation and rock.
- Steel culvert is generally in fair to good condition with light to moderate corrosion of the barrel floor. The seams are slightly open and first segment from north at the seam has a damaged portion at the floor level. The barrel is slightly out of round. An indentation was noted on east wall of the culvert at approximately the center line of road. Parging of culvert joints has failed and sections missing throughout.
- Culvert inlet is undermined allowing water to pass around the outside base of the culvert through the roadway.
- Sag in culvert floor along culvert barrel at 1st joint from the outlet with pooling water.
- Watercourse is un-obstructed with no evidence of scour.

RECOMMENDATIONS

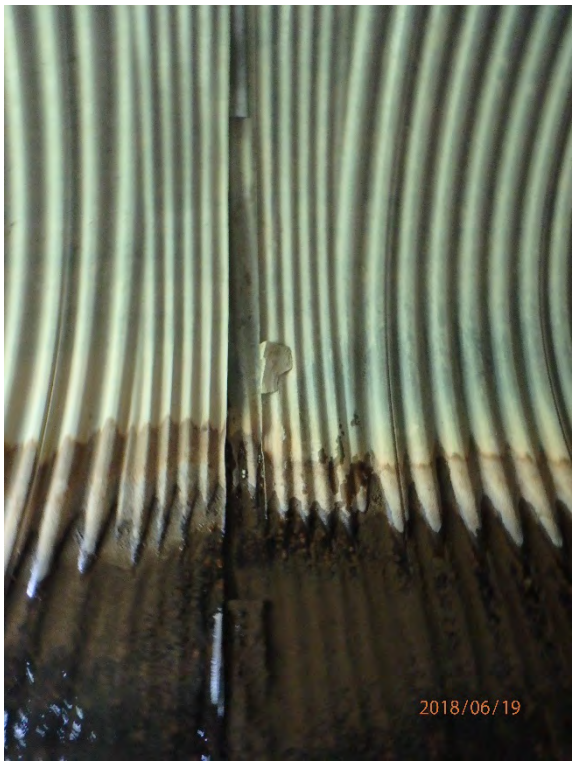
- Structure does not require posting with a load limit.
- Traffic protection should be installed at the approaches and across the structure
- The missing parging and opened seams should be repaired and maintaned to prevent water from travelling under the culvert, including repairs at each end of the culvert.
- Monitor indentation of culvert barrel at centerline of roadway/culvert barrel.
- Expected replacement of culvert should be budgeted for the next 6-10 years. Alternative option would be to install a liner in the culvert barrel. A culvert hydraulic study would be required to confirm suitability of installing a liner.



East Across culvert

South end of culvert looking at the outlet

Municipality: Township of Johnson
Government Road Culvert Culvert No.: 05



Parging missing at joint, typical.

Indentation on the east wall of culvert

Inlet of culvert, moderate undermining.

Outlet of culver, looking south downstream.

A. IDENTIFICATION							
Culvert Name	Sucker Creek Culvert			Culvert No.:	C7		
Road Name:	Puddingstone Road			Road Section.:	380		
Location:	2.1 km North of Government Rd.			MTO Site No.:			
Roadside Env.:	R	Posting Sign:	t	Crossing Type:		O-WAT	
Posting:	t t t	Low Clearnc Sign:		Federal Nav. Waterway:		U	
Bylaw No.:		Easting:		Culvert Value:		$400,000.00	
Bylaw Exp. Date:	y m	Northling:		Old ID:			

B. RAILWAY OVERPASS/UNDERPASS			
Railway Level Crossing Number:		Original Board Order Number:	
Railway Company:		Date:	
Railway Subdivision:		Current Board Order Number:	
Subdivision Mileage:		Date:	
Transport Canada Crossing No.:		Seniority:	
Number of Tracks			

C. JURISDICTION					
Owner:	O A MUN	Special Designation	CBL	MunicA:	
Owner Share:		Designation 2:		MunicB:	
Shared:		Adjacent Culvert No.:		Patrol:	
Shared With:					
Heritage Status:	R				

D. EXISTING CONDITIONS							
Substructure Year:	A. 2000	Cell/Span Width/Dia	5.0m	End Tratment:		A B C D	
Superstruct Year:		Total Width/Dia.:	5.0m	End Upstream:		N	
Material/Type:	CPS-PA	Max Height:	2.0m	End Downstream:		N	
Cossing Skew:	0	Length:	18.0m	Soil Condition:		U	
No. of Cells/Spans:	1	Type/Depth of Fill:	E .8m	Foundation Type:		UN- UNKNOWN	
		Culvert Floor	EA				
~~ ROAD OVER CULVERT		~~~~~~~~~~					
Existing Road Class:	300	Platform Width:	8.0m	Safety Curb:		(A) N	
Operational Status:	2W OAT	Surface Width:	7.0m	Sidewalk and Curb:		(B) N	
Surface Type:	G	No. of Lanes:	2.0	Roadside Safety:		(A) E SC	
~~ ROAD THROUGH CULVERT		~~~~~~~~~~				(B) W SC	
Existing Road Class:		No. of Lanes:		Traffic Barrier:			
Operation Status:		Median Type/Width:		Min Vertical Clearance:			
Opening Width:		Safety Curb:					
Surface Width:		Sidewalk and Curb:					

E. TRAFFIC DATA			
Legal Speed Limit:		Traffic Count	10 Year Traffic Forecast
Route Designations:		Year:	Year:
Bus	Truck Route	AADT:	AADT:
School	Bicycle	DHV Factor:	DHV Factor:
		DHV:	DHV:
		Trucks:	Trucks:
Source:		Peak Directional Split:	Capacity:
		10 Year Growth:	20 Year AADT:

F. INSPECTIONS					
Date:	19-Jun-18	Inspected By:	Reg McKinnon	Approved By:	
			P. Eng.		

G. CULVERT NEEDS

Field	MCR	PCR	TON	Comments
Barrel	6	6	ADEQ	
Foundations	9	9	ADEQ	
Guiderail/Barrier	3	4	1-5 YRS	
Inlet Component	0	0	ADEQ	
Outlet Component	0	0	ADEQ	
Streams/Waterways	6	6	ADEQ	

H. FUNCTIONAL NEEDS

Field	Existing	Min. Tolerable	Time of Need	Comments
Road over Culvert				
RO-Platform Width	8.0m	6.5m	ADEQ	
RO-Level of Service	A	E	ADEQ	
RO-Roadside Safety	3	3	1-5 YRS	

RECOMMENDED NEEDS

Impr. Class	Improvement	Description	Time of Nee	Year	Base/Const.

I. ENGINEERING RECOMMENDATIONS		**J. DESIGN PARAMETERS**		**K. IMPROVEMENT COSTS**	
Culvert Drawings:		Design Class:		Total Construction/Rehab	$ -
Engineering Investig.		Design Platform Width:	M	Contingencies	$ -
Total Cost of Eng. Investig.		Material/Type:		Engineering	$ -
Evaluated Posting:		Width/Diameter:	M	Total:	$ -
Closure Date/Type		Maximum Height:	M		
Closure Type:		Culvert Length:	M		
Monitoring:		No. of Culverts:			
Monitoring Component:		Depth of Fill:	M		

INSPECTION NOTES:

- Corrugated plate steel open footing arch with approximately 0.8 m of gravel fill and a gravel roadway.
- Gravel roadway is in good condition.
- Steel cable guiderail on timber posts is provided on the approaches and is in generally good condition. The cables were crossed at the southeast quadrant and a number of broken posts are causing slack in the cables. The posts generally have wide splits and checks with minor decay. The approach 3 cable guiderail have buried end treatments.
- Rock protection is provided on both roadway embankments and is in good condition with a loss of rock at the inlet of the culvert which has been pushed further into structure.
- Corrugated steel plate culvert is in good condition with light water staining of the culvert barrel at the water level.
- Water course is un-obstructed with no evidence of scour.

Recommendations

- Structure does not require posting with a load limit.
- Guiderail cables and posts must be repaired and maintained. The guiderail posts should be checked seasonally for broken or decayed posts.
- Lost armoring stone at the culvert inlet should be replaced to protect the walls of the structure.

North across the culvert

West end of the culvert, inlet

Broken post and slack in the steel guild cables

Protected embankment

East through the culvert

Loss of rock armor at inlet

Light staining at waterline

A. IDENTIFICATION							
Culvert Name	Sucker Creek Culvert			Culvert No.:	C8		
Road Name:	MacDonald Drive			Road Section.:	485		
Location:	.4 km North of Highway 17			MTO Site No.:			
Roadside Env.:	R	Posting Sign:	t	Crossing Type:		O-WAT	
Posting:	t t t	Low Clearnc Sign:		Federal Nav. Waterway:		unknown	
Bylaw No.:		Easting:		Culvert Value:		$ 350,000.00	
Bylaw Exp. Date:	y m	Northling:		Old ID:			

B. RAILWAY OVERPASS/UNDERPASS			
Railway Level Crossing Number:		Original Board Order Number:	
Railway Company:		Date:	
Railway Subdivision:		Current Board Order Number:	
Subdivision Mileage:		Date:	
Transport Canada Crossing No.:		Seniority:	
Number of Tracks			

C. JURISDICTION			
Owner: O A MUN	Special Designation CBL	MunicA:	
Owner Share:	Designation 2:	MunicB:	
Shared:	Adjacent Culvert No.:	Patrol:	
Shared With:			
Heritage Status: R			

D. EXISTING CONDITIONS						
Substructure Year:	A. 2000	Cell/Span Width/Dia	5.5m	End Tratment:		A B C D
Superstruct Year:		Total Width/Dia.:	5.5m	End Upstream:		N
Material/Type:	CPS-PA	Max Height:	2.1m	End Downstream:		N
Cossing Skew:	0	Length:	14.3m	Soil Condition:		U
No. of Cells/Spans:	1	Type/Depth of Fill:	E 0.7m	Foundation Type:		UNKNOWN
		Culvert Floor	EA			
~~ ROAD OVER CULVERT		~~~~~~~~~~				
Existing Road Class:	300	Platform Width:	6.0m	Safety Curb:		(A) N
Operational Status:	2W OAT	Surface Width:	5.0m	Sidewalk and Curb:		(B) N
Surface Type:	G	No. of Lanes:	2	Roadside Safety:		(A) N NO
~~ ROAD THROUGH CULVERT		~~~~~~~~~~				(B) S NO
Existing Road Class:		No. of Lanes:		Traffic Barrier:		
Operation Status:		Median Type/Width:		Min Vertical Clearance:		
Opening Width:		Safety Curb:				
Surface Width:		Sidewalk and Curb:				

E. TRAFFIC DATA				
Legal Speed Limit:		Traffic Count		10 Year Traffic Forecast
Route Designations:		Year:		Year:
Bus	Truck Route	AADT:		AADT:
School	Bicycle	DHV Factor:		DHV Factor:
		DHV:		DHV:
		Trucks:		Trucks:
Source:		Peak Directional Split:		Capacity:
		10 Year Growth:		20 Year AADT:

F. INSPECTIONS					
Date:	19-Jun-18	Inspected By:	Reg McKinnon	Approved By:	
			P. Eng.		

G. CULVERT NEEDS

Field	MCR	PCR	TON	Comments
Barrel	6	6	ADEQ	
Foundations	9	9	ADEQ	
Guiderail/Barrier	0	0	NOW	
Inlet Component	0	0	ADEQ	
Outlet Component	0	0	ADEQ	
Streams/Waterways	5	6	6-10 YRS	

H. FUNCTIONAL NEEDS

Field	Existing	Min. Tolerable	Time of Need	Comments
Road over Culvert				
RO-Platform Width	6.0m	6.5m	NOW	
RO-Level of Service	A	E	ADEQ	
RO-Roadside Safety		3	ADEQ	

RECOMMENDED NEEDS

Impr. Class	Improvement	Description	Time of Nee	Year	Base/Const.

I. ENGINEERING RECOMMENDATIONS

Culvert Drawings:	UNK
Engineering Investig.	
Total Cost of Eng. Investig.	
Evaluated Posting:	
Closure Date/Type	
Closure Type:	
Monitoring:	
Monitoring Component:	

J. DESIGN PARAMETERS

Design Class:	RSL
Design Platform Width:	9.0m
Material/Type:	CPS-PR
Width/Diameter:	2.5m
Maximum Height:	2.5m
Culvert Length:	22.0m
No. of Culverts:	1
Depth of Fill:	1.5m

K. IMPROVEMENT COSTS

Total Construction/Rehab	$	40,000.00
Contingencies	$	4,000.00
Engineering	$	8,000.00
Total:	$	52,000.00

INSPECTION NOTES:

- Corrugated plate steel plate arch culvert with approximately 0.7 m of gravel fill and a gravel roadway.
- Gravel roadway is in good condition.
- No traffic protection is provided on the approaches or across the structure.
- Roadway embankments are in good condition.
- Corrugated plate steel pipe is in good condition. Light surface corrosion, minor staining and light blistering was noted on the culvert barrel at the water level.
- Water course is generally un-obstructed with no evidence of scour.
- Minor debris was caught on page wire fencing that was immediately downstream.

Recommendations

- Structure does not require posting with a load limit.
- Regularly remove any debris caught on page wire fencing
- Provide traffic protection at approaches and across culvert

East across the culvert

Downstream of culvert. Page wire fence across the creak.

Upstream thought the culvert. Minor staining and surface corrosion at just above waterline.

Appendix C
2018 Municipal Bridge and Culvert Inventory

Appendix C - Township of Johnson 2018 Municipal Bridge & Culvert Inventory

Bridge No.	Priority Ranking	Bridge Name	Bridge Location	Crossing Type	Year of Const	Bridge Value ($1,000's)	Bridge Type	No. of Spans	Deck Length (m)	Deck Width (m)	Eng Invest Type/Year/ $1,000'S	Type of Improv	Co st Cat	Time of Improv	Constrn Cost in $1,000's	Total Proj.Cost $1,000's
B1	9	Shewfelt Creek Bridge (at Oikari's)	Gordon Lake Road - 0.9km North of Hwy. 17	O-WAT	2006	500	S-EA-F	1	6.2	10.3	-	IAG	PC	1-5 yrs	10	12.5
B2	4	Shewfelt Creek (at Grasley's)	Fisher Road – 3.3km North of Hwy. 17	O-WAT	1950	350	C-TB-F	1	7.0	5.1	-	RSB RSP IAG	PC PC PC	1-5 yrs 1-5 yrs 1-5 yrs	15 10 40	81
B3	5	Stobie Creek Bridge	Government Road – 10m West of Gordon Lake Road	O-WAT	1937	450	C-TB-F	1	10.1	5.7	-	RSB IAG	PC PC	1-5 yrs 1-5 yrs	30 30	76
B4	1	Suddaby Creek Bridge	Old Mill Road - 0.2km North of Gordon Lake Road	O-WAT	1913	750	C-TB-C	3	21.3	5.3	DCS/2017/ 10 RRA/2017/ 5	RIR IAG EIR RSB/RSP OWP Or RSL	PC PC PC PC PC PC	NOW 1-5 yrs 1-5 yrs 1-5 yrs 1-5 yrs 1-5 yrs	25 40 10 200 25 1,000	370
B5	10	Suddaby Park Bridge	Gordon Lake Road - 0.3km North of Suddaby Park Road	O-WAT	2009	500	P-BC-F	1	5.3	13.0	-	-	-	-	-	-
B6	3	Black Creek Bridge	Gordon Lake Road – 80m South of Suddaby Park Road	New Structure - 2018 - Not inspected at the Township Request												

Note: Total Municipal Bridge Value ($1,000's) = $2,550
Total Municipal Bridge Construction Needs ($1,000's) = $539.50
*** The engineering investigation(s) recommended will provide more information on the condition of non-visible primary elements and will determine the associated timeframe for repairs and/or replacement.**
**** This project cost is for the rehabilitation costs. Additional project costs would be required during total replacement of the structure.**

Culvert No.	Priority Ranking	Culvert Name	Culvert Location	Crossing Type	Year of Const	Culvert Value ($1,000's)	Culvert Type	No. of Spans	Culvert Length (m)	Culvert Width (m)	Eng Invest Type/Year/ $1,000'S	Type of Improv	Cost Cat	Time of Improv	Constrn Cost in $1,000's	Total Proj.Cost $1,000's
C1	-	Desbarats River Culvert	Government Road – 2.0 km West of Gordon Lake Road	O-WAT	2017	400	CPS	1	15.5	3.1	-	-	-	ADEQ	-	-
C2	2	Sucker Creek Culvert	Government Road – 1.9km West of Lake Huron Drive	O-WAT	1980	300	CPS- PR	1	20	3.0	C/S / 2016 / 10	IAG RSL	PC PC	NOW 1-5 yrs	40 300	434
C3	7	Sucker Creek (Near Cass)	Kensington Point Road - 0.4km South of Hwy. 17	O-WAT	1980	400	CPS- PR	1	23.5	5.2	C/S / 2016 / 10	IAG	PC	NOW	40	60
C4	-	Desbarats River Culvert	Boyer Drive – 30m South of Hwy. 17	O-WAT	2008	450	PCC- BOX	1	17.7	5.6	Not inspected as per township's request					
C5	6	Government Road Culvert	Government Road – 0.4km East of Fisher Road	O-WAT	1980	400	CPS- PR	1	29.0	3.6	-	IAG RSL	PC PC	NOW 6-10 yrs	40 400	554
C6		Does not exist as part of the asset management plan														
C7	11	Sucker Creek Culvert	Puddingstone Road – 2.1 km North of Government Road	O-WAT	2000	400	CPS- PA	1	18.0	5.0	-	-	-	-	-	-
C8	8	Sucker Creek Culvert	MacDonald Drive – 0.4km North of Hwy. 17	O-WAT	2000	350	CPS- PA	1	14.3	5.5	-	IAG	PC	NOW	40	52

Note: Total Municipal Culvert Value ($1,000's) = $2,250
Total Municipal Culvert Construction Needs ($1,000's) = *$1,100**
***** The engineering investigation(s) recommended will provide more information on the condition of non-visible primary elements and will determine the associated timeframe for repairs and/or replacement.**

Appendix D
STATEMENT OF QUALIFICATIONS AND LIMITATIONS

STATEMENT OF QUALIFICATIONS AND LIMITATIONS

This report has been prepared by STEM Engineering Group Inc. (STEM) and is intended solely for the Client named.

The material contained in the report:

- reflects our best judgment in light of the information reviewed by STEM at the time of preparation
- represent STEM's professional judgement in light of these Limitations and industry standards for the preparation of similar reports
- may be based on information provided to STEM which has not been independently verified
- shall not be used to express or imply warranties as to the fitness of the property for a particular purpose, unless otherwise agreed in writing by STEM
- is not a certification of compliance with past or present regulations
- must be read in its entirety and sections thereof should not be read out of such context
- has not been updated since the date of issuance of the report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued

Unless expressly stated to the contrary in the report:

- This assessment does not wholly eliminate uncertainty regarding the potential for existing or future costs, hazards or losses in connection with a property
- No physical or destructive testing, no intrusive exploration, and no design calculations have been performed unless specifically recorded
- Conditions existing but not recorded were not apparent given the level of study undertaken; further investigation can be performed on items of concern if so required
- Any time frame given for deterioration represents an educated guess based on apparent condition. Failure of the item, or the optimum repair/replacement process, may vary from our estimate
- Responsibility for detection of or advice about pollutants, contaminants or hazardous material is not included in our mandate
- Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties.

We accept no responsibility for any decisions made or actions taken as a result of this report unless we are specifically advised of and participate in such action, in which case our responsibility will be as agreed to at that time. Any user of this report specifically denies any right to claims against the Consultant, Sub-Consultants, their officers, agents and employees in excess of the fee paid for professional services

This Statement of Qualifications and Limitations is attached to and forms part of the report.