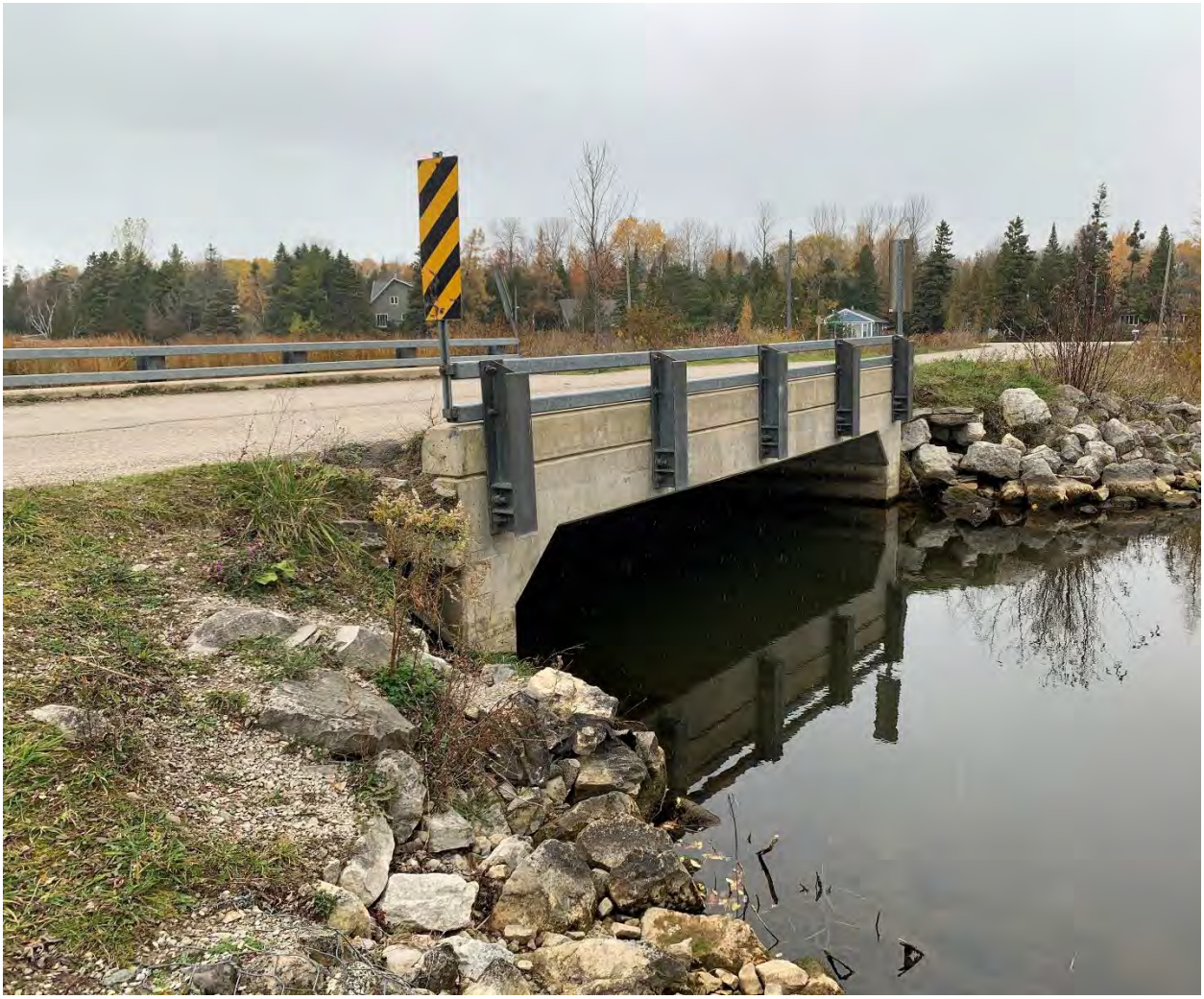
MUNICIPALITY OF NORTHERN BRUCE PENINSULA

2020 STRUCTURE INSPECTION REPORT



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2020 STRUCTURE INSPECTION REPORT

MUNICIPALITY OF NORTHERN BRUCE PENINSULA

FINAL
PROJECT NO.: 201-01605-00
DATE: MARCH 10, 2021

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TABLE 1
Bridge/Culvert Inventory/Recommendation Summary
Repair/Replacement Recommendations and Financial Plan
Municipality of Northern Bruce Peninsula

March 2021 201-01605-00

No.	Name/Location	Bridge or Culvert?	Type	Span	Year Built/ Repaired	Conditions	Load Limit		Recommendations		Repairs/Upgrades		Replacement Estimated Cost (2020 Dollars)	Life Expectancy	
							Existing	Load Limit Analysis Required	Repair/Rehabilitation	Replacement	Time (Years)	Cost		As-Is	With Repairs
1	4th Conc. Bridge S. of Barrow Bay Rd. (Judges Creek)	Bridge	Concrete Beam	7.6 m	1937/1977	Fair/Poor	12 t	Yes	**AB & BP, CR & EP, CS, Hazard Signs, foundation repair, grade gravel	Consider	1-5	$250,000	$500,000	2025	2037
2	10th Sideroad Bridge, Lot 10, Conc 2 E (Judges Creek)	Bridge	Concrete, Open Footing	6.2 m	1940	Poor	8 t	*Yes	**AB & BP, CR, EP (beam, soffit & foundation)	Yes	0-1	$250,000	$450,000	2021	2040
3	Cherry Hill Road Bridge, Lot 6 (N. Monument Corners) (Stokes - Chin Creek)	Bridge	Concrete Beam	6.1 m	1940	Fair	15 t	-	**AB, BP (upgrade), CR, beam soffit & Fd'n Repair, EP	Consider	1-5	$140,000	$475,000	2025	2040
4	Spring Creek Bridge, Ira Lake Road (Old Hwy 6)	Bridge	Concrete Rigid Frame	4.5 m	1925	Poor	5 t	*Yes	**AB & BP, CRF & EP	Yes	0-1	$200,000	$500,000	2019	2025
5	Stokes Bay Road Bridge (Copper Kettle) (Stokes Sideroad)	Bridge	Concrete Rigid Frame	7.9 m	1950/1988	Fair/Good	-	-	AB, BP (sidewalk) EP, CR, (foundation) protection	-	1-5	$130,000	$500,000	2035	2050
6	Heron Point Road Bridge, Stokes River	Bridge	Concrete Rigid Frame	7.1 m	1952	Poor	12 t	*Yes	**AB (Repl.) & EP & CR, foundation repair	Yes	0-1	$225,000	$550,000	2020	2052
7	Lindsay Road 5 Culvert, Stokes River	Bridge	Concrete Rigid Frame	7.3 m	1972	Good	-	-	***AB & BP, CR (Abut)	-	1-5	$55,000	$450,000	2045	2072
8	Isthmus Bay Road Bridge, Swan Lake Drain	Bridge	Concrete Rigid Frame	6.1 m	1950/2000	Good	-	-	BP, AB & CR	-	1-5	$70,000	$500,000	2057	2075
9	Cape Chin Culvert (S. Cape Chin Sideroad), Chin Creek	Culvert	Concrete Rigid Frame (Arch)	4.3 m	2008	Good	-	-	BP (tighten cable, replace posts), EP	-	0-1	$6,000	$350,000	2054	2083
10	Lindsay Road 5 Culvert (Chin Creek)	Culvert	Steel MPPA	4.4 m	1970	Fair	-	-	***AB & BP (new)	-	0-1	$40,000	$275,000	2029	2045
11	Myles Bay Shore Road Bridge	Bridge	Concrete Rigid Frame	7.3 m	2001	Good	-	-	**AB & BP (new) EP (Slope & footing), repair N/W footing	-	0-1	$65,000	$550,000	2060	2101
12	Stokes Bay Road Culvert (Old Woman's River)	Culvert	Steel MPPA	4.7 m	1967	Fair	-	-	***AB & BP (new), EP (corners)	Consider	0-1	$45,000	$250,000	2027	2042
13	Bury Road Culvert, Old Woman's River (Fern Creek Drain)	Culvert	Concrete Open Footing	6.1 m	1960's	Fair	15 t	Yes	**AB & BP (New), EP & CR	-	1-5	$115,000	$425,000	2026	2055
14	East Road Culvert (N. Cape Chin Rd. 4) (Chin Creek - Stokes Road)	Culvert	Steel MPPA	3.7 m	1975/2007	Good/Fair	-	-	AB & BP (tighten cable and replace posts)	-	0-1	$2,500	$250,000	2035	2050
15	Conc. 4 Culvert (S. of Sideroad 10)	Culvert	Steel SCP	3.1 m	2014	Good	-	-	**BP & AP	-	1-5	$55,000	$200,000	2054	2074
16	Barrow Bay Road Culvert, E. of Conc. 4, Judges Creek	Culvert	Steel MPPA	7.0 m	1980	Fair	-	-	EP	-	1-5	$7,500	$325,000	2030	2050
17	Conc. 4 Culvert (N. Barrow Bay Road)	Culvert	Steel MPPA	3.6 m	1980	Good	-	-	**AB & BP	-	0-1	$55,000	$225,000	2030	2045
18	10th Sideroad, Judges Creek, Br. Drain	Culvert	Steel CSP	2 & 1.5 m	1990	Good	-	-	**AB & BP (new) & EP	-	0-1	$60,000	$215,000	2040	2060
19	Pike Bay Road, Judges Creek	Culvert	Steel MPPA	4.5 m	1990	Good	-	-	AB & BP, EP	-	0-1	$15,000	$270,000	2040	2060
	Totals											**$1,786,000**	**$7,260,000**		

Note:

Life Expectancy for Concrete Structures	Life Expectancy for CSP - MPPA
Pre 1960 = 60 - 80 years Between 1960-1980 = 70 - 90 years Post 1980 = 80 - 100 years	All years = 40 to 50 years

*Inspection recommended annually due to current condition.
**Post or maintain warning speed reduction 35 km/hr. until AB & BP installed or upgraded.
***Post or maintain warning speed reduction 45 km/hr. until AB & BP installed or upgraded.

Legend (Upgrade/Repair Symbols):

CR = Concrete Repair	ST = Structure
LL = Load Limit	AP = Approach
BP = Barrier Protection	BA = Barrier
AB = Approach Barriers	STAP = Structure & Approach
CS = Corner Slope	APBP = Approach Barrier Protection
EP = Erosion Protection	STBP = Structure Barrier Protection
EMP = Embankment Protection	BAP = Barrier Posts

Table 2
Bridge Condition Index (BCI) Values
Municipality of Northern Bruce Peninsula

March 2021 201-01605-00

Structure ID	Name	Age	BCI
1	Concession 4 Bridge	84	24
2	Sideroad 10 Bridge	81	22
3	Cherry Hill Road Bridge	81	37
4	Spring Creek (Ira Lake Road) Bridge	96	25
5	Copper Kettle (Stokes Bay Road) Bridge	71	60
6	Heron Point Road Bridge	69	31
8	Isthmus Bay Road Bridge	71	55
9	Cape Chin Culvert	13	47

Legend

Range	Colour	Recommendation
80-100	Excellent	Continue Monitoring and Maintenance
60-80	Good	Continue Monitoring and Maintenance
40-60	Fair	Initiate planning for future repairs
0-40	Poor	Schedule repairs in immediate future

TABLE 3
2020 Bridge/Culvert Maintenance Requirements Summary
Municipality of Northern Bruce Peninsula

March 2021 201-01605-00

No.	Name/Location	Bridge / Culvert	Type	Condition	Maintenance Requirement	Time (Years)
1	4th Conc. Bridge S. of Barrow Bay Rd. (Judges Creek)	Bridge	Concrete Beam	Fair/Poor	• Grade the wearing surface for drainage • Grade the shoulders and clear vegetation for drainage • Clear debris along curbs for drainage • Place four (4) End Hazard signs • Align existing signs vertically and with traffic	1-5
2	10th Sideroad Bridge, Lot 10, Conc 2 E (Judges Creek)	Bridge	Concrete, Open Footing	Poor	• Grade the wearing surface for drainage • Grade the shoulders and clear vegetation for drainage • Clear debris along curbs for drainage • Place four (4) End Hazard signs • Place two (2) 35km/hr warning signs at each approach	0-1
3	Cherry Hill Road Bridge, Lot 6 (N. Monument Corners) (Stokes - Chin Creek)	Bridge	Concrete Beam	Fair	• Grade the wearing surface for drainage • Grade the shoulders and clear vegetation for drainage • Clear debris along curbs for drainage • Place four (4) End Hazard signs • Place two (2) 35km/hr warning signs at each approach • Place narrow structure sign at south approach	1-5
4	Spring Creek Bridge, Ira Lake Road (Old Hwy 6)	Bridge	Concrete Rigid Frame	Poor	• Grade the wearing surface for drainage • Grade the shoulders and clear vegetation for drainage • Clear debris along curbs for drainage • Align existing signs vertically and with traffic • Place two (2) 35km/hr warning signs at each approach • Place two (2) advanced load limit restriction warning signs at each approach • Replace the damaged southwest End Hazard sign	0-1
5	Stokes Bay Road Bridge (Copper Kettle) (Stokes Sideroad)	Bridge	Concrete Rigid Frame	Fair/Good	• Place four (4) End Hazard signs	1-5
6	Heron Point Road Bridge, Stokes River	Bridge	Concrete Rigid Frame	Poor	• Grade the south approach wearing surface for drainage	0-1
7	Lindsay Road 5 Culvert, Stokes River	Bridge	Concrete Rigid Frame	Good	• Place four (4) End Hazard signs • Place reduced speed limit 45 km/hr signage at each approach (or install barrier protection)	1-5
8	Isthmus Bay Road Bridge, Swan Lake Drain	Bridge	Concrete Rigid Frame	Good	• Grade the approach shoulders and clear vegetation for drainage • Clear debris along curbs for drainage • Replace the southeast End Hazard sign • Align existing signs vertically and with traffic	1-5
9	Cape Chin Culvert (S. Cape Chin Sideroad), Chin Creek	Culvert	Concrete Rigid Frame (Arch)	Good	• Place four (4) End Hazard signs	0-1
10	Lindsay Road 5 Culvert (Chin Creek)	Culvert	Steel MPPA	Fair	• Place four (4) End Hazard signs • Align existing signs vertically and with traffic	0-1
11	Myles Bay Shore Road Bridge	Bridge	Concrete Rigid Frame	Good	• Replace the northeast End Hazard sign • Place two (2) 35km/hr warning signs at each approach (or install barrier protection)	0-1
12	Stokes Bay Road Culvert (Old Woman's River)	Culvert	Steel MPPA	Fair	• Place four (4) End Hazard signs • Place reduced speed limit 45 km/hr signage at each approach (or install barrier protection)	0-1
13	Bury Road Culvert, Old Woman's River (Fern Creek Drain)	Culvert	Concrete Open Footing	Fair	• Grade the wearing surface for drainage • Grade the shoulders and clear vegetation for drainage • Clear debris along curbs for drainage • Align existing signs vertically and with traffic • Place two (2) 35km/hr warning signs at each approach (or install barrier protection) • Place four (4) End Hazard signs	1-5
14	East Road Culvert (N. Cape Chin Rd. 4) (Chin Creek - Stokes Road)	Culvert	Steel MPPA	Good/Fair	• Align existing signs vertically and with traffic	0-1
15	Conc. 4 Culvert (S. of Sideroad 10)	Culvert	Steel CSP	Good	• Grade the wearing surface for drainage • Grade the shoulders and clear vegetation for drainage • Repair shoulder/embankment washout • Place four (4) End Hazard signs • Place two (2) 35km/hr warning signs at each approach (or install barrier protection)	1-5
16	Barrow Bay Road Culvert, E. of Conc. 4, Judges Creek	Culvert	Steel MPPA	Fair	• Place four (4) End Hazard signs	1-5
17	Conc. 4 Culvert (N. Barrow Bay Road)	Culvert	Steel MPPA	Good	• Grade the wearing surface for drainage • Grade the shoulders and clear vegetation for drainage • Place four (4) End Hazard signs • Replace the damaged south Narrow Structure sign • Place two (2) 35km/hr warning signs at each approach (or install barrier protection)	0-1
18	10th Sideroad, Judges Creek, Br. Drain	Culvert	Steel CSP	Good	• Grade the wearing surface for drainage • Grade the shoulders and clear vegetation for drainage • Place four (4) End Hazard signs	0-1
19	Pike Bay Road, Judges Creek	Culvert	Steel MPPA	Good	• Align existing signs vertically and with traffic	0-1

BRIDGE/CULVERT NO.	NAME AND LOCATION
1	4TH CONC. BRIDGE S. OF BARROW BAY RD. (JUDGES CREEK)
2	10TH SIDEROAD CULVERT, LOT 10, CONC 2 E. (JUDGES CREEK)
3	CHERRY HILL ROAD BRIDGE, LOT 6 , N. OF MONUMENT CORNERS, (CHIN CREEK)
4	SPRING CREEK BRIDGE, IRA LAKE ROAD (OLD HWY 6)
5	STOKES BAY ROAD/COPPER KETTLE BRIDGE, (STOKES RIVER)
6	HERON POINT ROAD BRIDGE, (STOKES RIVER)
7	LINDSAY ROAD 5 CULVERT, (STOKES RIVER)
8	ISTHMUS BAY ROAD BRIDGE, (SWAN LAKE DRAIN)
9	CAPE CHIN CULVERT, S. CAPE CHIN SIDEROAD, (CHIN CREEK)
10	LINDSAY ROAD 5 CULVERT (CHIN CREEK)
11	MYLES BAY SHORE ROAD BRIDGE (OLD WOMAN'S RIVER)
12	STOKES BAY ROAD CULVERT (OLD WOMAN'S RIVER)
13	BURY ROAD CULVERT, OLD WOMAN'S RIVER (FERN CREEK DRAIN)
14	EAST ROAD CULVERT, N. CAPE CHIN RD. 4, (STOKES RIVER)
15	CONC. 4 CULVERT , S. OF SIDEROAD 10, (JUDGES CREEK BR. DRAIN)
16	BARROW BAY ROAD CULVERT, CONC. 4, (JUDGES CREEK)
17	CONC. 4 CULVERT, N. OF BARROW BAY ROAD, (JUDGES CREEK BR. DRAIN)
18	10TH SIDEROAD CULVERT, (JUDGES CREEK BR. DRAIN)
19	PIKE BAY ROAD CULVERT, (JUDGES CREEK)

MUNICIPALITY OF
NORTHERN BRUCE PENINSULA

TOWN OF
SOUTH BRUCE PENINSULA

LAKE
HURON

GEORGIAN
BAY

LEGEND

- BRIDGE/CULVERT LOCATION AND NUMBER
- PRIVATE ROAD
- MUNICIPAL ROAD
- COUNTY ROAD
- PROVINCIAL - HWY 6
- WATERCOURSE
- WATERBODY
- WETLAND AREA
- PROPERTY PARCEL

0 1 2 4 6 8
Kilometres

Municipality of Northern Bruce Peninsula
56 LINDSAY RD 5, RR #2
LION'S HEAD, ON N0H 1W0
519-793-3522

BRIDGE AND CULVERT LOCATIONS
MUNICIPALITY OF
NORTHERN BRUCE PENINSULA

DRAWN:	JET
APPROVED:	KH/CW
DATE:	DEC 2018
SCALE:	1:150,000
FILE NO.:	181-03007-00
FIGURE:	1

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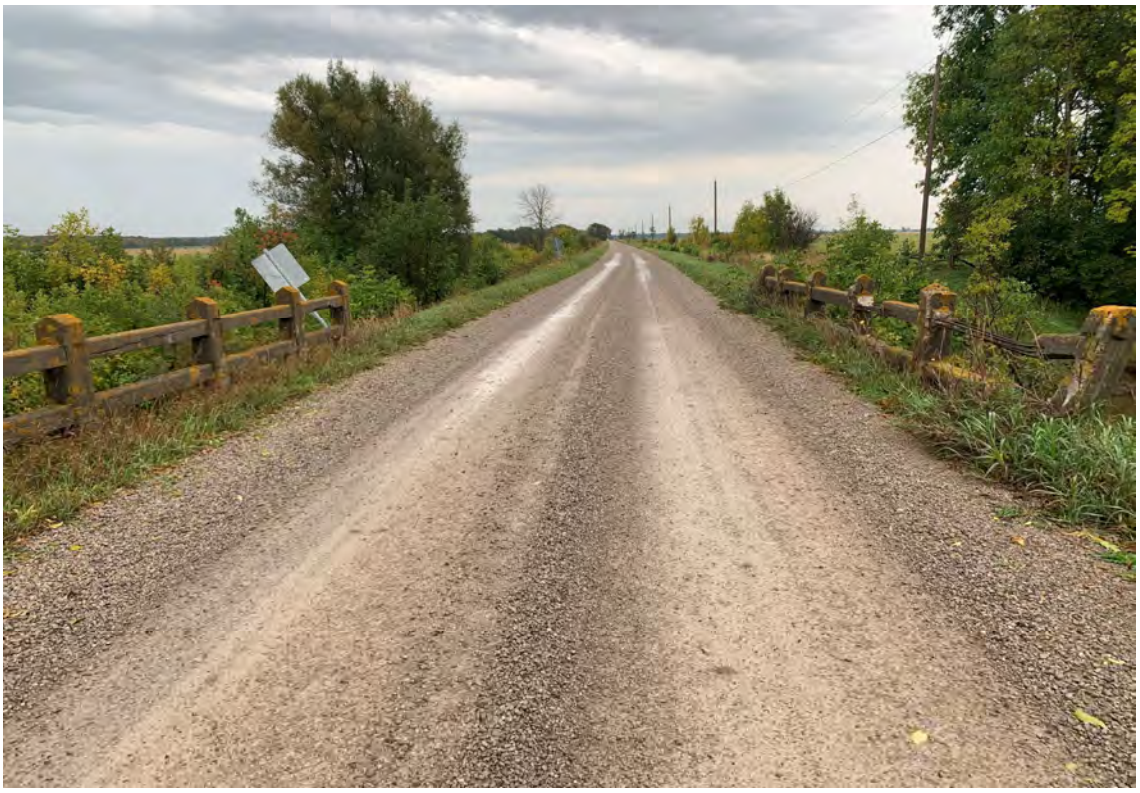
Bridge/Culvert Inspection Report

Site Number	1	**Project Number**	201-01605-00
Structure Name	4th Concession Bridge	**Municipality**	Northern Bruce Peninsula
MTO Region Code	30	**County**	Bruce **Code** 02
MTO District Code	33	**Geographic Twp Code**	377



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Bridge/Culvert Inspection Report

Inventory Data

Structure Name	4th Concession Bridge	Site Number	1
County	Bruce	Road Name	4th Concession
Municipality	Northern Bruce Peninsula	Road Type	Rural Local - Gravel
Bridge or Culvert	Bridge	Owner	Northern Bruce Peninsula
Structure Type	Concrete Beam	AADT	100
Span (m)	7.6 No. 1	% Trucks	15%
Height (m)	2.6	Overall Structure Width (m)	6.4
Direction of Structure	East/West - 22° skew	Roadway Width (m)	5
Year Built/Rehabilitated	1937/1977	Total Deck Length (m)	8.3
Current Load Limit	12 t	Total Deck Area (s.m.)	48.64
Detour Length (km)	6	Heritage Des.	None
Waterway	Judges Creek		

Inspection Data

Date of Inspection	September 24, 2020
Name of Inspector	Katherine Hemstock, EIT
Equipment Used	Tape, pick, hammer
Weather Conditions	Overcast
Temperature	16°C
Last Inspection	November 8, 2018

Photos:

1-1 - Title Page

1-2 - Abutment and footing with spalling

1-3 - Abutment, girders and soffit with spalling and delamination

1-4 - North abutment, soffit and foundation

1-5 - Wingwall deterioration (typical)

1-6 - Structure barrier and excessive granular fill on deck

1-7 - Embankment erosion behind south footing and abutment

1-8 - Vegetation & debris accumulation along shoulders, potholes in wearing surface, load limit reduction sign not

1-9 - Structure elevation, exterior soffit, curb and barrier

1-10 - View of watercourse upstream

1-11 - View of watercourse downstream

1-12 - Active abutment wall drain

Additional Investigation Required	Foundation inspection, load limit analysis and deck condition survey
Total Rehabilitation	Place new approach and barrier protection. Complete concrete beam, soffit, and curb and wingwall repair. Place foundation erosion protection and repair. Place hazard signs and remove excess gravel off deck.
Total Rehabilitation Budget Costing	$250,000
Next Inspection	September 2022
Justification	Repair & rehabilitation is recommended (due to the current fair condition of the structure) to extend service life until replacement is necessary. Maintain the speed limit at 35 km/hr. as interim measure until barrier approach protection is in place. Maintain the load limit at 12 tonnes until load limit analysis and condition survey completed.

Element Data

Structure:	1

Element Group:	Decks		Length:	9.1 m			
Element Name:	Wearing Surface		Width:	5 m			
Location:			Height:				
Material:	Gravel		Count:				
Element Type:			Total Quantity:	45.5 m^2			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			27.3	18.2	Yes	Yes

Comments: The deck is flat (no grade) with poor drainage, debris accumulation on each side, and an excess of granular fill. Large potholes have developed in the wheel path.

Recommended Work: None | 6-10 Years | 1-5 Years | **< 1 Year** | Urgent

Grade and clear debris along curbs

Element Data

Element Group:	Decks		Length:	9.1 m			
Element Name:	Deck Top		Width:	5.8 m			
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:	52.78 m^2			
Environment:	Moderate		Limited Insp'n:	Yes			
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			52.78		Yes	

Comments: Limited inspection of the top deck condition due to cover with granular wearing surface. The thickness of the granular surface is excessive and creates a high dead load on the structure.

Recommended Work: None | 6-10 Years | 1-5 Years | **< 1 Year** | Urgent

Grade out excess gravel and inspect the condition of the concrete deck top.

Element Data

Element Group:	Decks		Length:	7.6 m			
Element Name:	Soffit - Thick Slab		Width:	6.9 m			
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:	48.64 m^2			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			38.91	9.73		

Comments: Exterior soffit concrete loss with exposed rebar was observed.

Recommended Work: None | 6-10 Years | **1-5 Years** | < 1 Year | Urgent

Remove delaminated concrete, clean steel and replace concrete.

Element Data

Structure:	1

Element Group:	Decks	Length:	
Element Name:	Drainage	Width:	
Location:		Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	2 (each side)
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each				2	Yes	Yes

Comments: Flat through the length of the structure deck impeding the curb to shoulder drainage (each side). Debris and vegetation have accumulate along the curbs preventing drainage.

Recommended Work: None 6-10 Years 1-5 Years **[< 1 Year]** Urgent

Annual maintenance, clear debris and grade to achieve positive drainage.

Element Data

Element Group:	Sidewalks/curbs	Length:	11.5 m
Element Name:	Curbs	Width:	0.3 m
Location:		Height:	0.16 m
Material:	Concrete	Count:	2
Element Type:		Total Quantity:	10.58 m^2
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			4.23	6.35		

Comments: Severe surface spalling was observed.

Recommended Work: None 6-10 Years **[1-5 Years]** < 1 Year Urgent

Remove poor concrete areas, clean reinforcing steel, and replace concrete.

Element Data

Element Group:	Barriers	Length:	11.5 m
Element Name:	Barrier/Parapet Walls	Width:	0.17 m
Location:		Height:	1.07 m
Material:	Concrete	Count:	2
Element Type:		Total Quantity:	24.61 m^2
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2				24.61	Yes	

Comments: Section loss of vertical and horizontal elements. The concrete is severely delaminated with steel rebar exposed and with observed section loss. The current configuration does not meet code, and there is no approach protection, presenting a pedestrian and vehicle hazard.

Recommended Work: None 6-10 Years 1-5 Years **[< 1 Year]** Urgent

Remove and replace the barrier and add approach protection. Maintain the speed limit of 35 km/hr in the interim.

Element Data

Structure:	1

Element Group:	Barriers	Length:	0.17 m
Element Name:	Posts	Width:	0.17 m
Location:		Height:	1.07 m
Material:	Concrete	Count:	12
Element Type:		Total Quantity:	12
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each				12	Yes	

Comments: Surface spalling and exposed rebar at the post bases were observed.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Remove and replace the posts with the barrier and add approach protection.

Element Data

Element Group:	Beam/MLE's	Length:	7.6 m
Element Name:	Floor Beams	Width:	0.41 m
Location:		Height:	0.61 m
Material:	Concrete	Count:	4
Element Type:		Total Quantity:	49.55 m^2
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			14.87	34.68		

Comments: Four concrete girders were poured with the deck on top of each abutment wall. The exterior beam concrete has spalled exposing the rebar. The interior beams have exposed rebar and cracking at the abutments.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Repair all poor concrete, clean reinforcing steel, and replace concrete.

Element Data

Element Group:	Abutments	Length:	
Element Name:	Abutment Walls	Width:	7.62 m
Location:		Height:	1.78 m
Material:	Concrete	Count:	2
Element Type:		Total Quantity:	27.13 m^2
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			18.99	8.14		

Comments: Surface cracking, spalling, and calcite deposits were observed. The north abutment has significant water staining and vertical cracking.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Repair all poor concrete, clean reinforcing steel, and replace concrete.

Element Data

Structure:	1

Element Group:	Abutments		Length:	3.05			
Element Name:	Wingwalls		Width:				
Location:			Height:	1.83			
Material:	Concrete		Count:	4			
Element Type:			Total Quantity:	22.32 m^2			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencie	Maint. Needs
	%			11.16	11.16		

Comments: Surface spalling & cracking was observed at each wingwall.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Repair all poor concrete, clean reinforcing steel, and replace concrete.

Element Data

Element Group:	Foundations		Length:				
Element Name:	Foundation (below ground level)		Width:				
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:	√			
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencie	Maint. Needs

Comments: A previous repair to the south side (under water) was observed. The exposed south footing sounds hollow when walking across it. Investigate the extent of the voids and fill with concrete grout.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Repair all poor concrete and place erosion protection south side.
Further investigation required.

Element Data

Element Group:	Embankments & Streams		Length:				
Element Name:	Streams and Waterways		Width:				
Location:			Height:				
Material:	Earth / Stone		Count:				
Element Type:			Total Quantity:	All			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencie	Maint. Needs
	All			All			

Comments: Low velocity stream/ municipal drain has been dredged in the past. The bed appears stable with no obstructions observed.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Structure:	1

Element Group:	Embankments & Streams	Length:	
Element Name:	Embankments	Width:	
Location:		Height:	
Material:	Earth / Stone	Count:	
Element Type:		Total Quantity:	6
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			4	2	Yes	

Comments: Stone and well vegetated Earth embankments with some erosion observed along the back of the wingwall.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Stabilize the eroded slopes by adding rip rap rap and/or rock protection.

Element Data

Element Group:	Embankments & Streams	Length:	
Element Name:	Slope Protection	Width:	
Location:		Height:	
Material:	Earth / Stone	Count:	
Element Type:		Total Quantity:	6
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			4	2	Yes	

Comments: Stone and well vegetated Earth embankments with some erosion observed along the back of the wingwall.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Stabilize the eroded slopes by adding rip rap rap and/or rock protection.

Element Data

Element Group:	Signs	Length:	
Element Name:	Signs	Width:	
Location:		Height:	
Material:	Steel	Count:	
Element Type:		Total Quantity:	4
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			4		Yes	Yes

Comments: Load limit, speed limit and narrow structure signs in place, but are not plumb and require straightening vertically.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Place four end hazard signs and straighten existing signs.

Element Data

Structure:	1

Element Group:	Approaches		Length:	5 m			
Element Name:	Wearing Surface		Width:	5 m			
Location:			Height:				
Material:	Gravel		Count:	2			
Element Type:			Total Quantity:	50 m^2			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			50			Yes

Comments: Shoulder vegetation has started to encroach on the roadway. Large potholes and wheel path rutting have developed at each approach.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Grade the shoulders and clear the encroaching vegetation.

Element Data

Element Group:	Approaches		Length:				
Element Name:	Drainage		Width:				
Location:			Height:				
Material:	Gravel		Count:				
Element Type:			Total Quantity:	4			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each				4	Yes	Yes

Comments: Shoulder vegetation has started to encroach on the roadway.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Grade the shoulders and clear the encroaching vegetation.

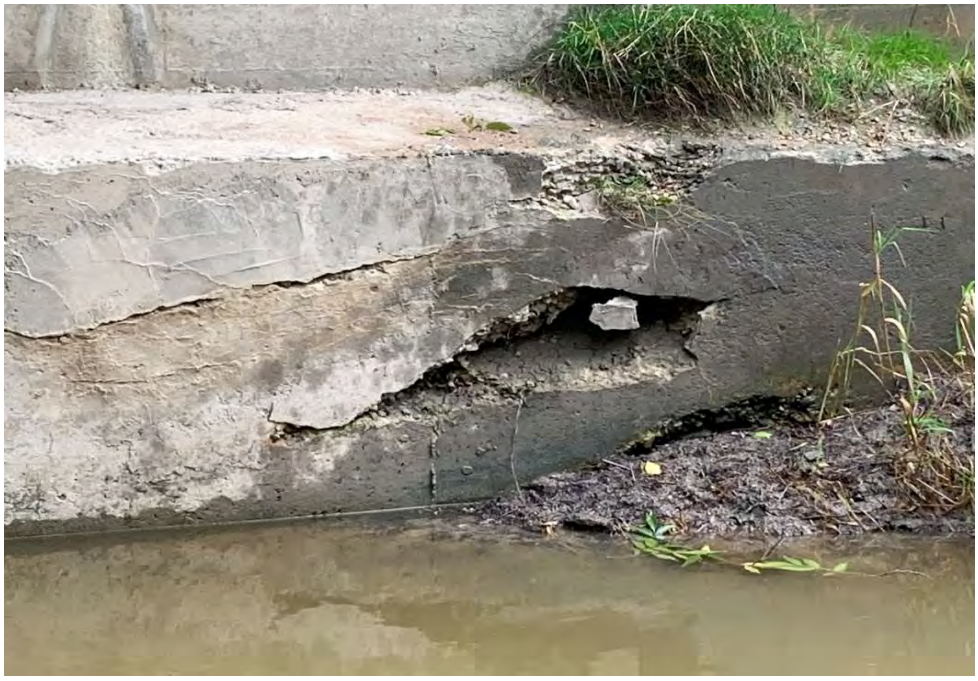


Photo 1-2: S. Abutment and footing with spalling

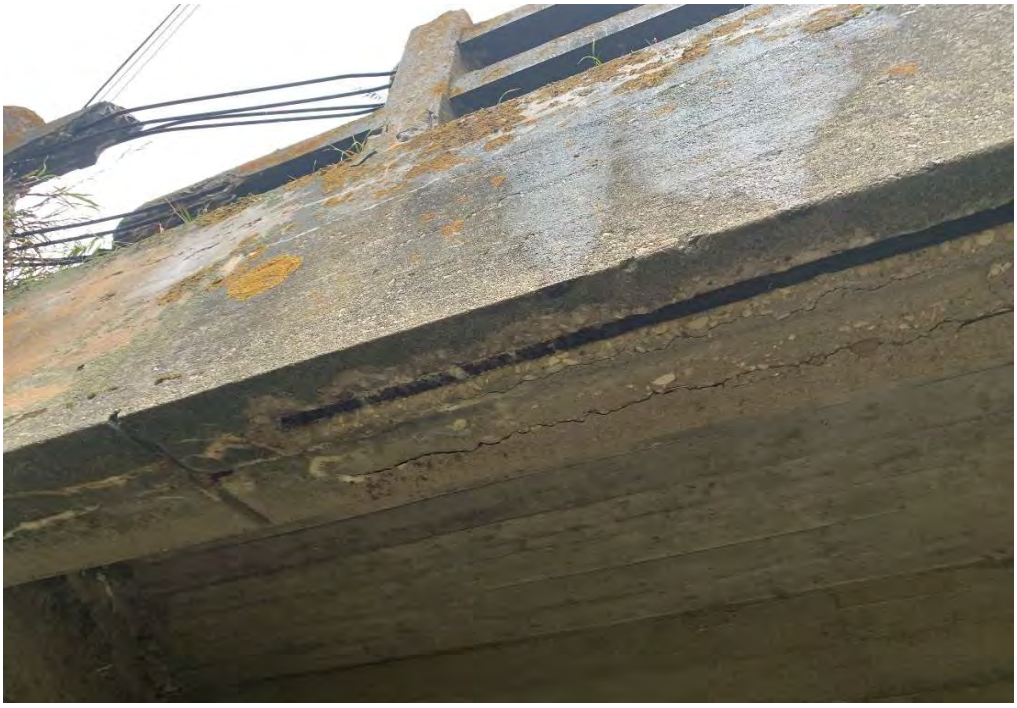


Photo 1-3: North Abutment girders and soffit with spalling and delamination

Date of Photos: Sept. 24, 2020

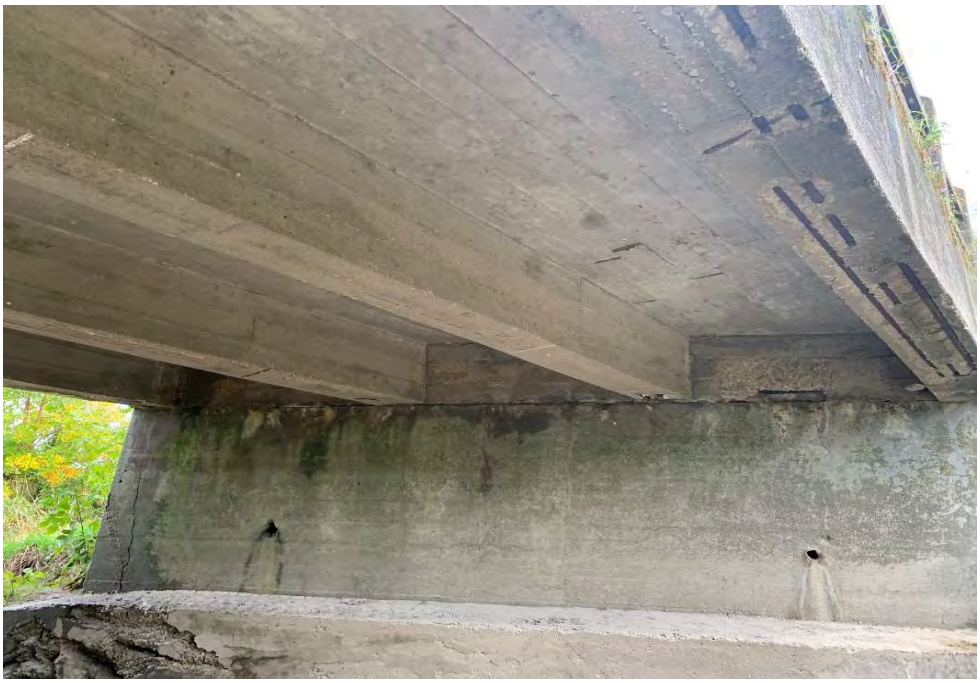


Photo 1-4: South abutment, soffit and foundation

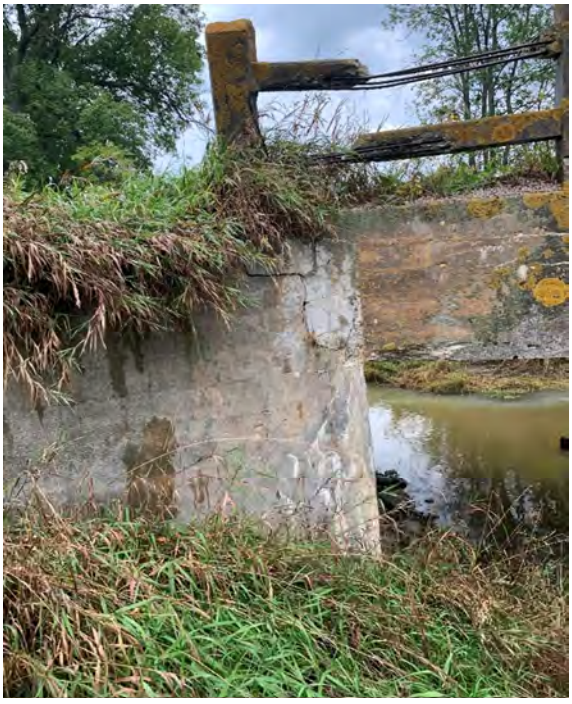


Photo 1-5: Wingwall deterioration (typ)

Date of Photos: Sept. 24, 2020

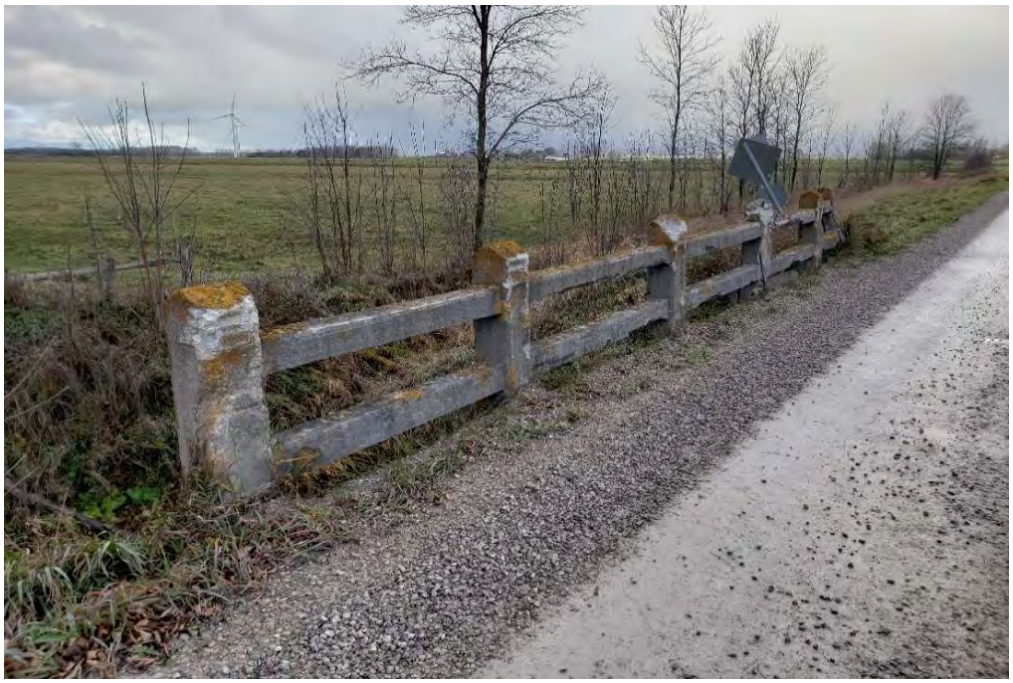


Photo 1-6 - Structure barrier and excessive granular fill on deck

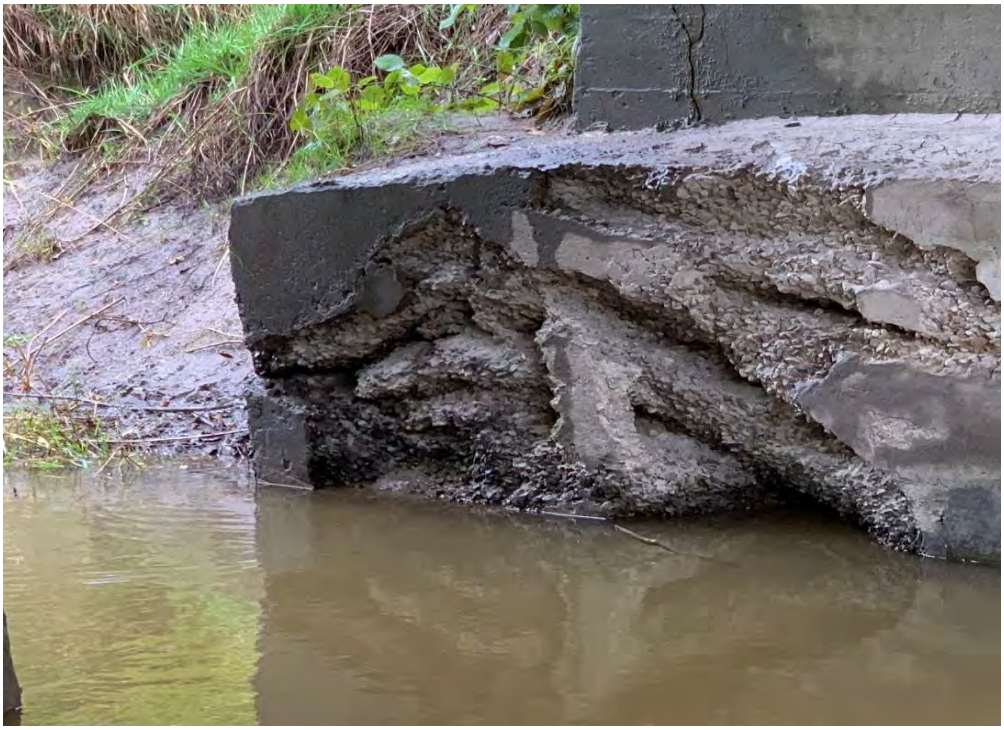


Photo 1-7 - Embankment erosion behind south footing and abutment

Date of Photos: Sept. 24, 2020

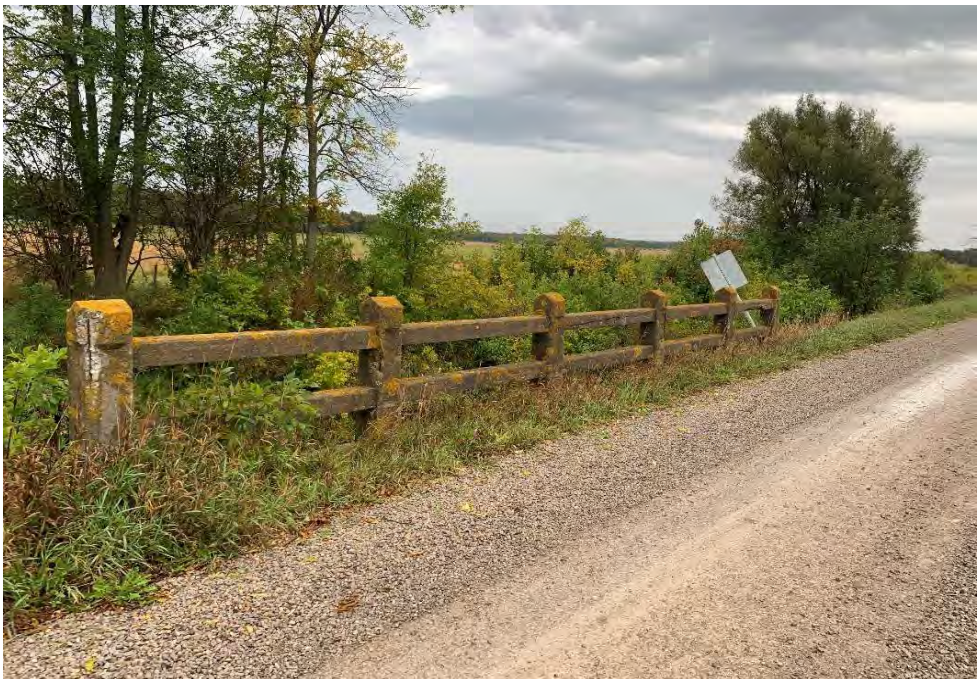


Photo 1-8 - Vegetation and debris accumulation along shoulders, potholes in wearing surface, load limit reduction sign not plumb

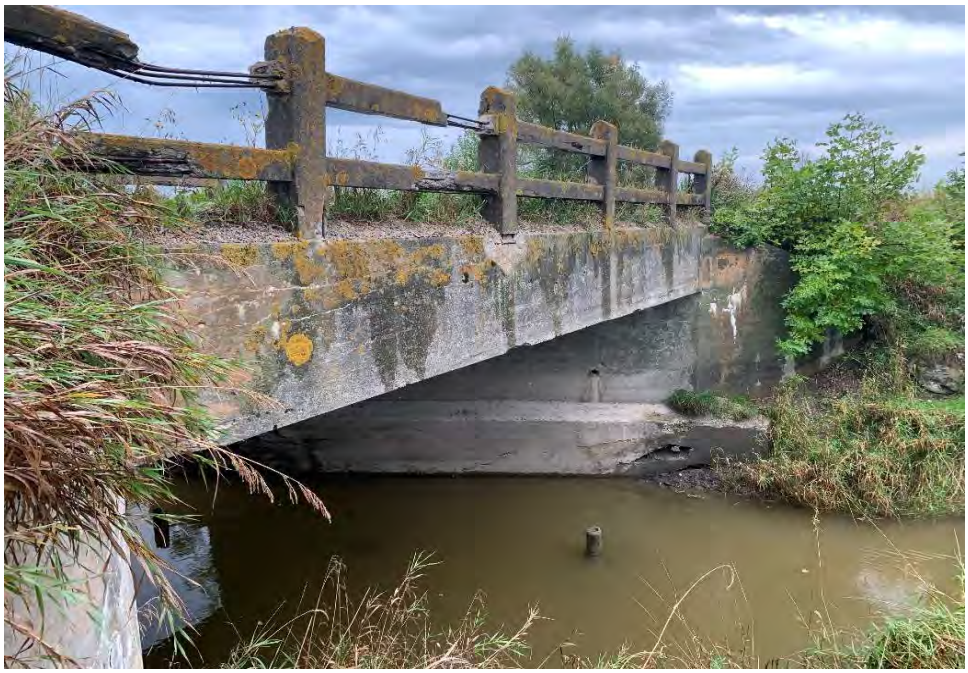


Photo 1-9 - Structure elevation, exterior soffit, curb and barrier

Date of Photos: Sept. 24, 2020

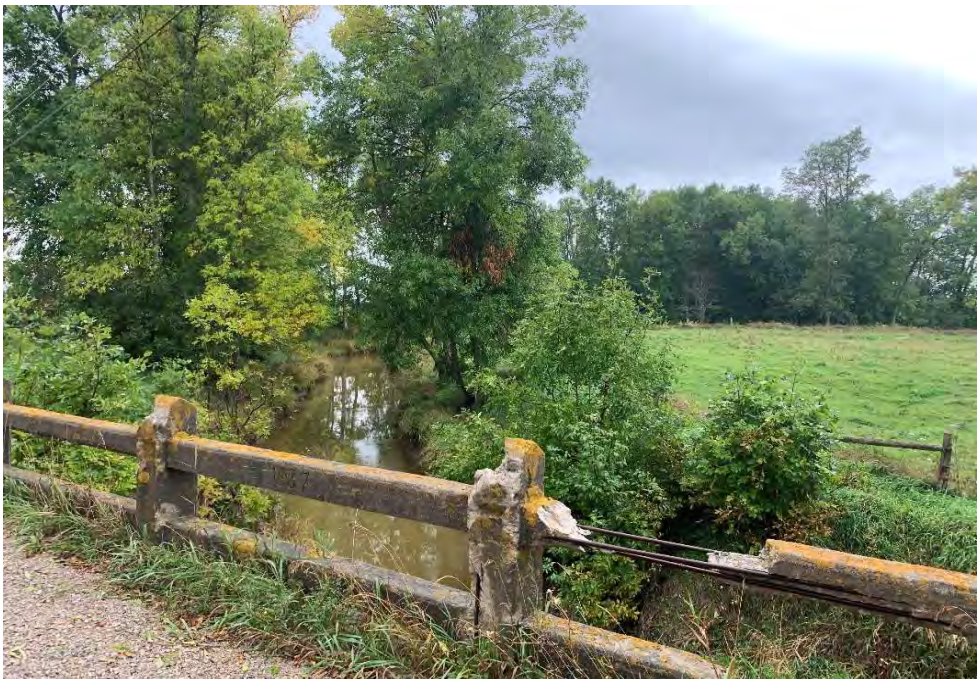


Photo 1-10 - View of watercourse upstream

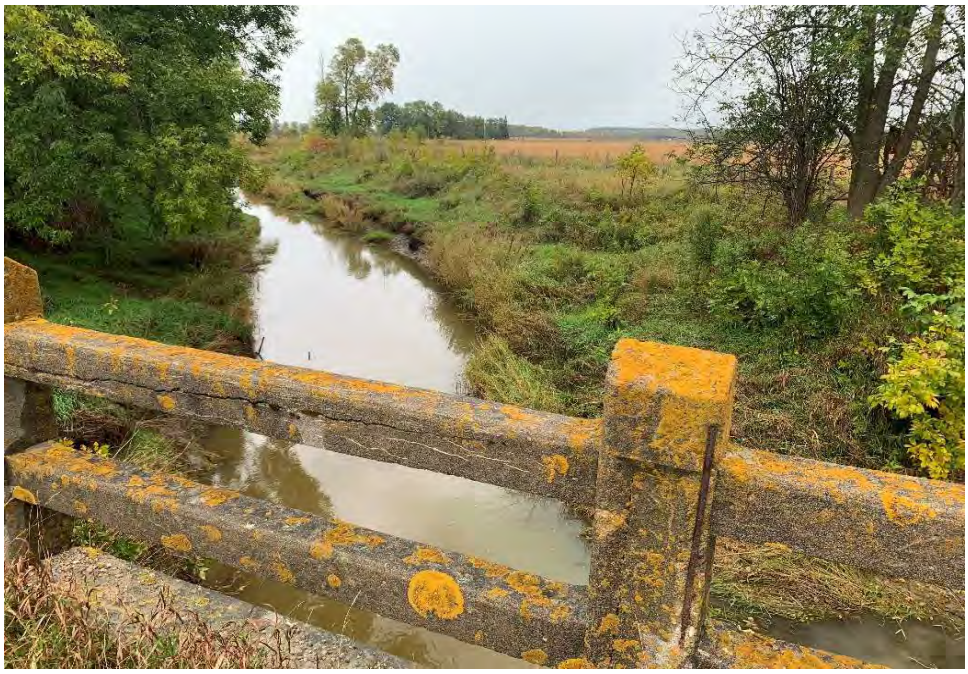


Photo 1-11- view of watercourse downstream

Date of Photos: Sept. 24, 2020

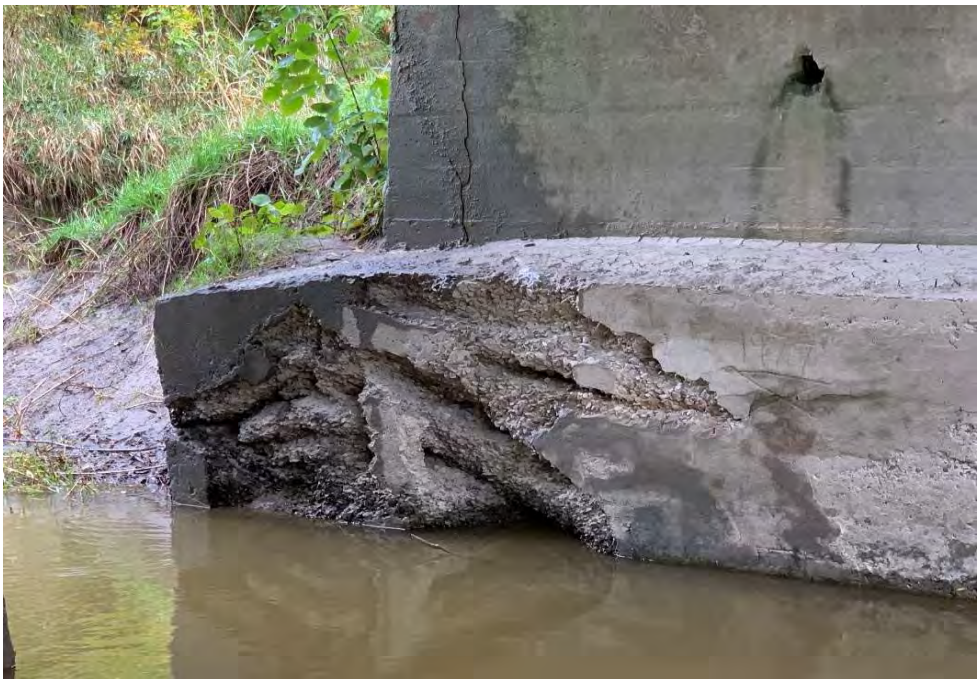
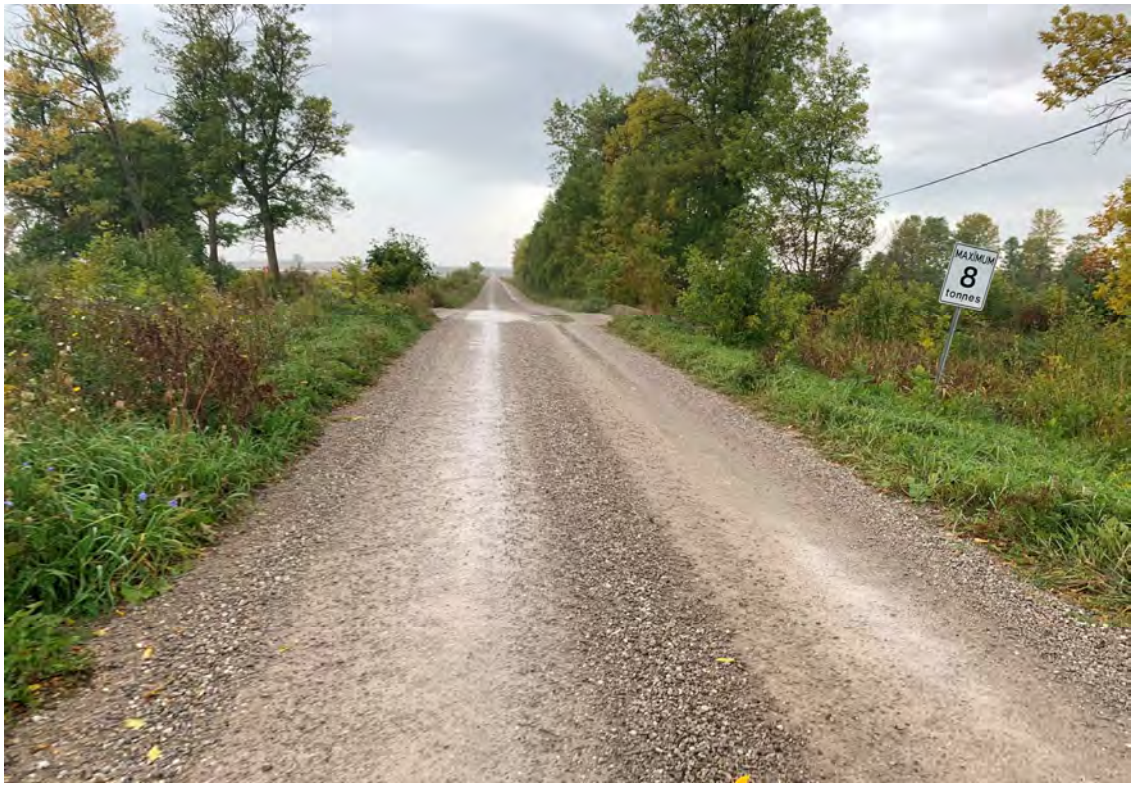


Photo 1-12 - Active abutment wall drain

Date of Photos: Sept. 24, 2020

Bridge/Culvert Inspection Report

Site Number	2	**Project Number**	201-01605-00		
Structure Name	10th Sideroad Bridge	**Municipality**	Northern Bruce Peninsula		
MTO Region Code	30	**County**	Bruce	**Code**	02
MTO District Code	33	**Geographic Twp Code**	377		



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	10th Sideroad Bridge	Site Number	2
County	Bruce	Road Name	10th Sideroad
Municipality	Northern Bruce Peninsula	Road Type	Rural Local
Bridge or Culvert	Bridge	Owner	Northern Bruce Peninsula
Structure Type	Concrete Slab - Open Footing	AADT	150
Span (m)	6.2 No. 1	% Trucks	15%
Height (m)	2.7	Overall Structure Width (m)	6.75
Direction of Structure	North/South - 20° skew	Roadway Width (m)	6.1
Year Built/Rehabilitated	1940	Total Deck Length (m)	6.1
Current Load Limit	8 t	Total Deck Area (s.m.)	52
Detour Length (km)	6	Heritage Des.	None
Waterway	Judges Creek		

Inspection Data

Date of Inspection	October 30, 2020
Name of Inspector	Katherine Hemstock, EIT
Equipment Used	Tape, pick, hammer
Weather Conditions	Overcast
Temperature	16°C

Photos:

2-1 - Title Page

2-2 - Spalling of exterior curb

2-3 - Structure deck

2-4 - West abutment and south exterior soffit

2-5 - Structure elevation, wingwalls, exterior curb and soffit

2-6 - Extreme efflorescence at joint

2-7 - Erosion at structure footing, efflorescence of wingwall (typical)

2-8 - Delamination of soffit

2-9 - Load limit posting

2-10 - View of watercourse upstream

2-11 - View of watercourse downstream

2-12 - Vegetation and debris accumulation at curb and along approach shoulder

Last Inspection	November 8, 2018
Additional Investigation Required	Undertake annual inspections - deck soffit and foundation, load limit analysis
Total Rehabilitation	Install approach and barrier protection, complete concrete beam, soffit and curb repair. Complete footing/foundation underpinning. Place foundation erosion protection.
Total Rehabilitation Budget Costing	$250,000
Next Inspection	September 2022
Justification	Due to the age, poor condition, and load carrying capacity, complete replacement is recommended as being most cost effective for long term service life. Reduce the posted speed limit to 35 km/hr. until barrier protection installed. Maintain the 8 tonne load limit.

Element Data

Structure:	2

Element Group:	Decks	Length:	6.7 m
Element Name:	Wearing Surface	Width:	6.1 m
Location:		Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	40.87 m^2
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			36.79	4.08		Yes

Comments: Granulars and debris have accumulated along the curb.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Clear granulars and debris along curb and clean structure deck annually.

Element Data

Element Group:	Decks	Length:	6.7 m
Element Name:	Deck Top	Width:	6.1 m
Location:		Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	40.87 m^2
Environment:	Severe	Limited Insp'n:	Yes
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			36.79	4.08		Yes

Comments: Pitting of the concrete surface was observed throughout the deck length due to snow removal and grading of deck. Small delamination observed.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Clear granular debris along the curb annually and complete concrete repairs.

Element Data

Element Group:	Decks	Length:	6.2 m
Element Name:	Soffit - Thick Slab	Width:	6.75 m
Location:		Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	41.85 m^2
Environment:	Benign	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			16.74	25.11		

Comments: Cracking was observed between slab and abutment at the construction joint with rebar exposed and evidence of active corrosion. Heavy spalling and leachate were observed throughout the soffit.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Remove the poor concrete, clean the reinforcing steel, and replace the concrete.

Element Data

Structure:	2

Element Group:	Curbs/Sidewalk	Length:	14 m
Element Name:	Curbs	Width:	0.31 m
Location:	Each Side	Height:	0.31 m
Material:	Concrete	Count:	2
Element Type:		Total Quantity:	2.69 m^2
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			1.08	1.61	Yes	Yes

Comments: No barrier currently in place and the structure is debris covered. The exterior curb (south side) has heavy delaminations, the north side has some delamination. Reduce the speed limit to 35 km/hr until barrier protection is installed to Code.

Recommended Work: None | 6-10 Years | [1-5 Years (Replace)] | < 1 Year | [Urgent (Barrier Protection)]

Install barrier to provide required vehicle safety, repair concrete and clear debris.

Element Data

Element Group:	Abutments	Length:	6.75 m
Element Name:	Abutment Walls	Width:	
Location:	Each Side	Height:	1.95 m
Material:	Concrete	Count:	2
Element Type:		Total Quantity:	26.32 m^2
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			13.16	13.16		

Comments: Hairline cracks were observed at the cold joints. Vertical hairline cracks at approximately 6'-0" are showing water staining.

Recommended Work: None | 6-10 Years | [1-5 Years] | < 1 Year | Urgent

Replace the abutments and structure.

Element Data

Element Group:	Foundations	Length:	
Element Name:	Foundation (below ground level)	Width:	
Location:	Each End	Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	Yes
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
						Yes	

Comments: Concrete spalling was observed underwater and the southeast and southwest corners are undermined.

Recommended Work: None | 6-10 Years | [1-5 Years] | < 1 Year | Urgent

Provide erosion protection and underpin the foundation/footings with concrete. Place a new foundation when the structure is replaced.

Element Data

Structure:	2

Element Group:	Embankments & Streams	Length:	
Element Name:	Streams and Waterways	Width:	
Location:		Height:	
Material:		Count:	
Element Type:		Total Quantity:	All
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	All			All			

Comments: Visible scour around concrete at southeast and southwest corner.
Flow is against west corner of inlet. Debris at southeast quadrant should be removed to prevent further obstruction.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent
Remove debris and place rip rap to prevent further scour.

Element Data

Element Group:	Embankments & Streams	Length:	
Element Name:	Embankments	Width:	
Location:	Each Corner	Height:	
Material:		Count:	6
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			6			

Comments: The embankments are heavily vegetated with some erosion evident at each quadrant.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent
Place rip-rap erosion protection to repair and revent further erosion of embankments.

Element Data

Element Group:	Signs	Length:	
Element Name:	Signs	Width:	
Location:	Each Corner	Height:	
Material:	Steel	Count:	2
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			100		Yes	

Comments: Two 8 tonne load limit signs at approaches. No end hazard signs are present.

Recommended Work: None 6-10 Years 1-5 Years < 1 Year [Urgent]
Install end hazard and 35 km/hr speed limit signs to provide required vehicle safety.

Element Data

Structure:	2

Element Group:	Approaches	Length:	5 m
Element Name:	Wearing Surface	Width:	3.9 m
Location:	Each End	Height:	
Material:	Gravel	Count:	2
Element Type:		Total Quantity	39 m^2
Environment:	Severe	Limited Insp'n	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencie	Maint. Needs
	m^2			35.1	4.9		Yes

Comments: Heavy vegetation was observed along the shoulder. Wheel path rutting was observed with small potholes starting to form. Grade approaches and cear vegetation annually.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Annual grading or the wearing surface and shoulders is recommended for drainage.

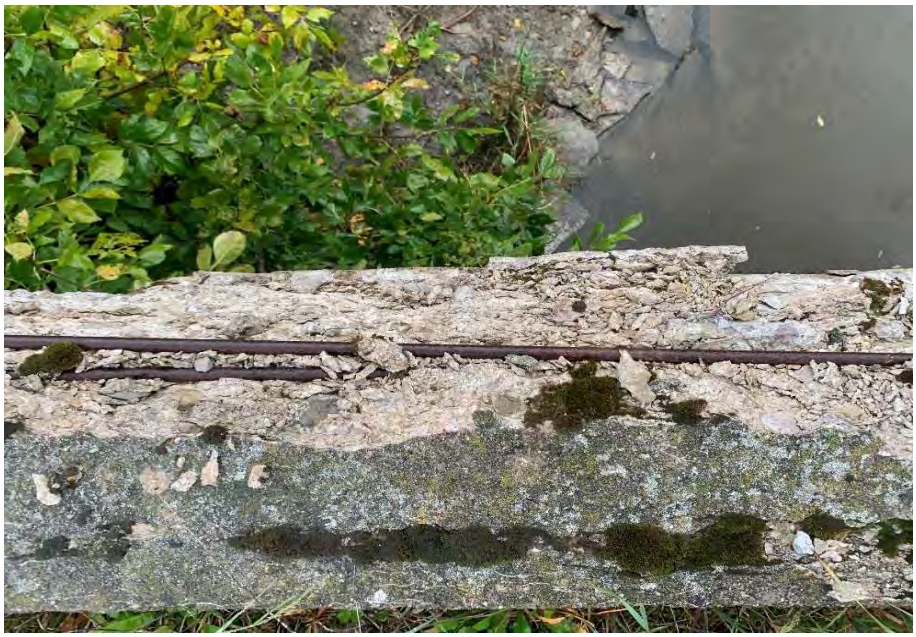


Photo 2-2: Spalling of exterior curb

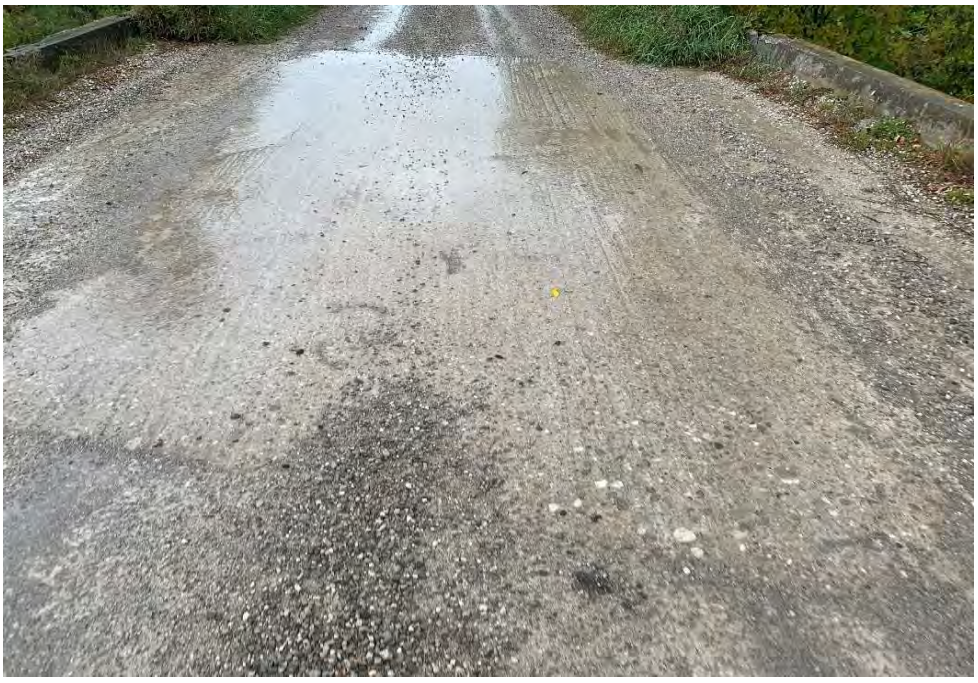


Photo 2-3: Structure deck

Date of Photos: Sept. 24, 2020

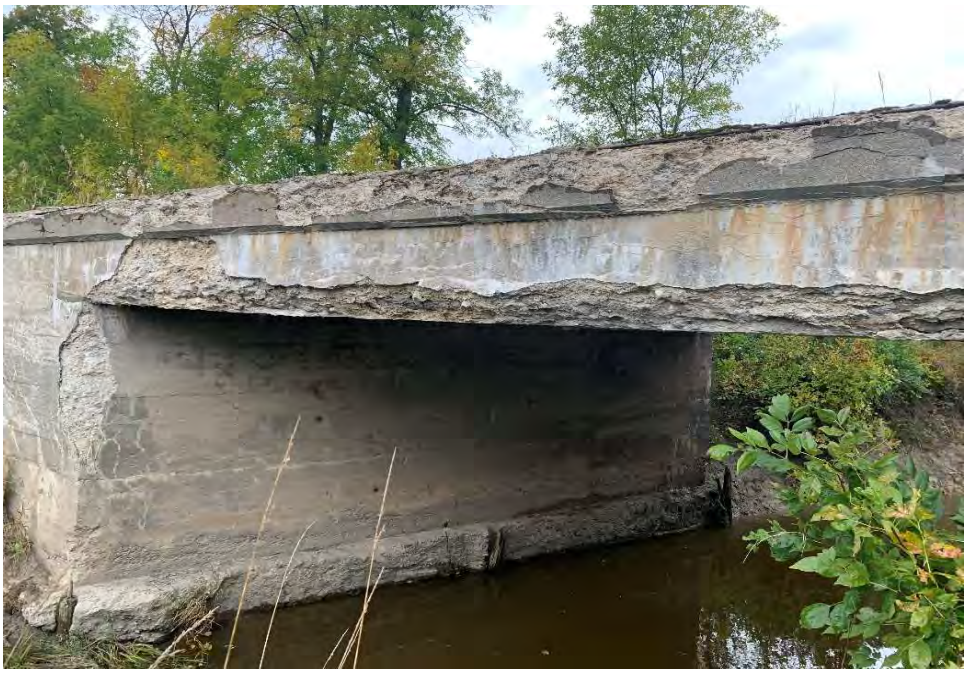


Photo 2-4: West abutment and south exterior soffit

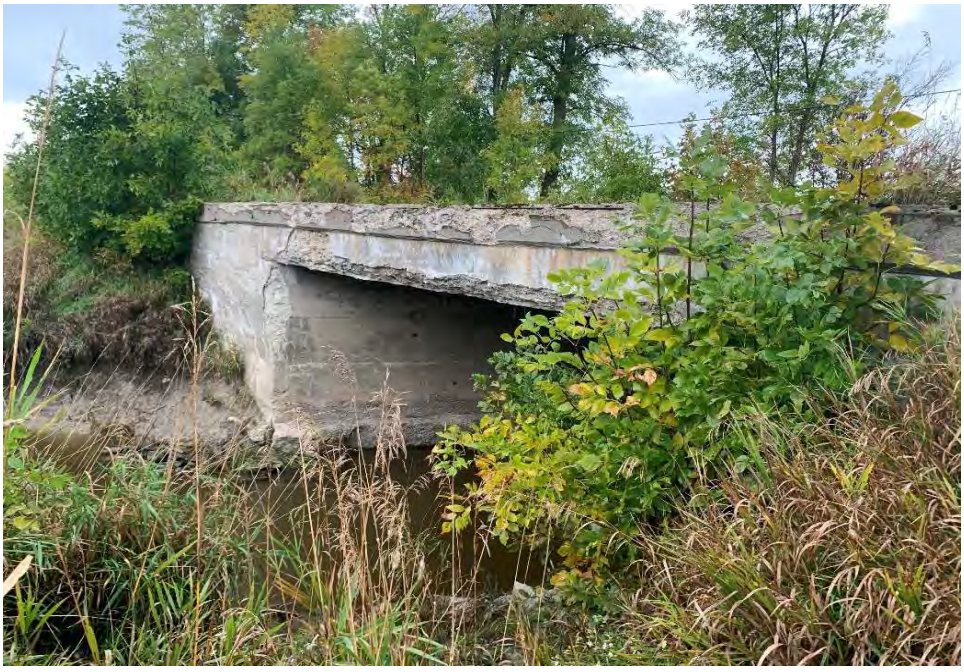


Photo 2-5: Structure elevation, wingwalls, exterior curb and soffit

Date of Photos: Sept. 24, 2020

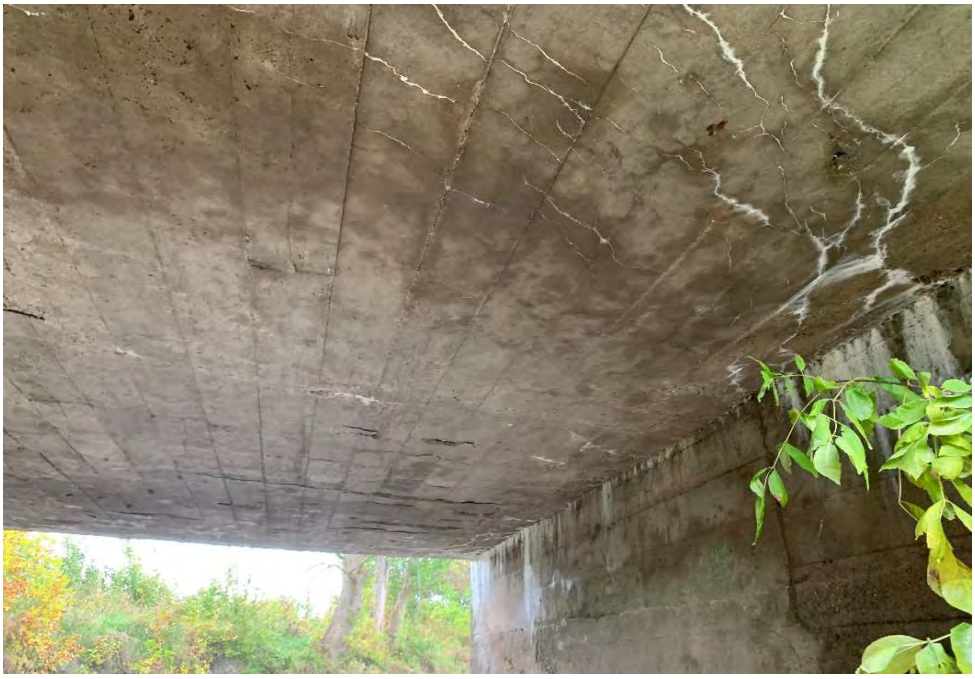


Photo 2-6: Extreme efflorescence at joint

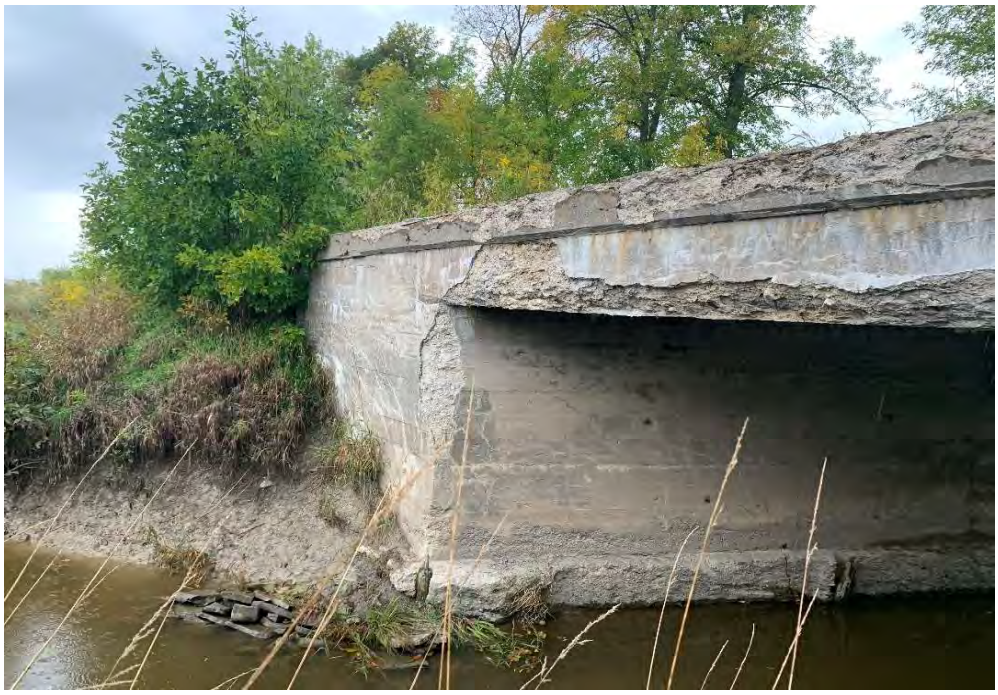


Photo 2-7: Erosion at structure footing, efflorescence of wingwall (typ)

Date of Photos: Sept. 24, 2020

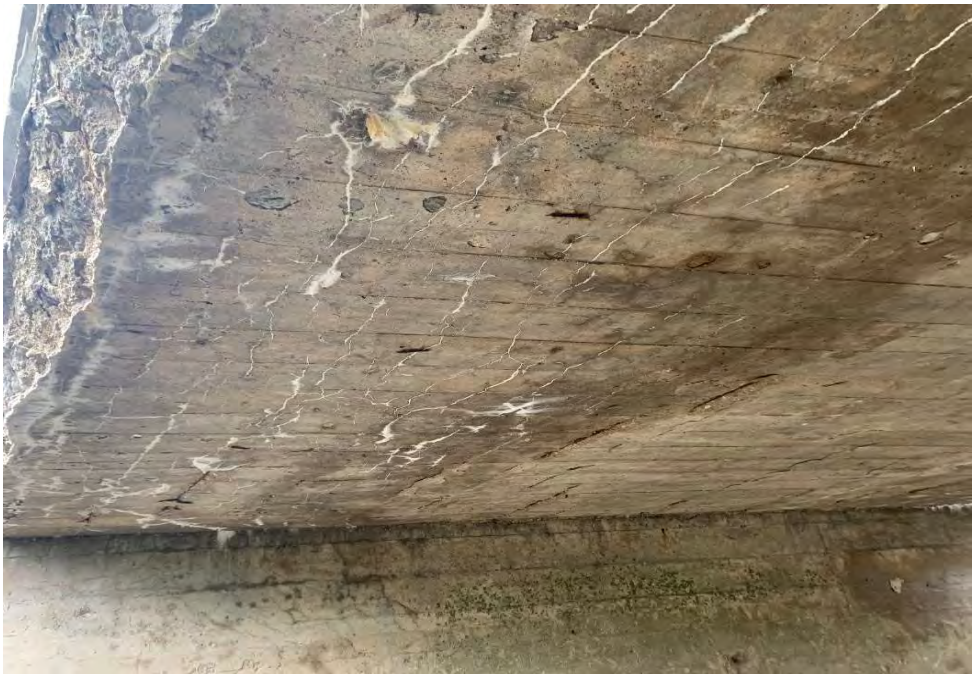


Photo 2-8: Delamination of soffit

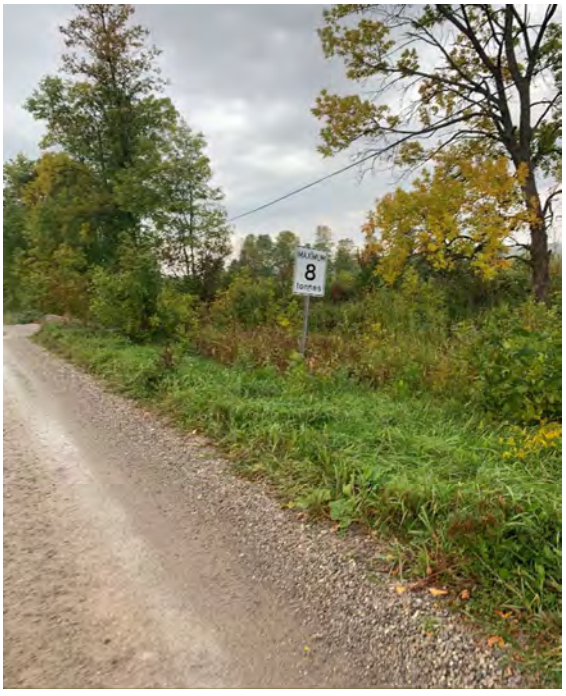


Photo 2-9: Load limit posting

Date of Photos: Sept. 24, 2020

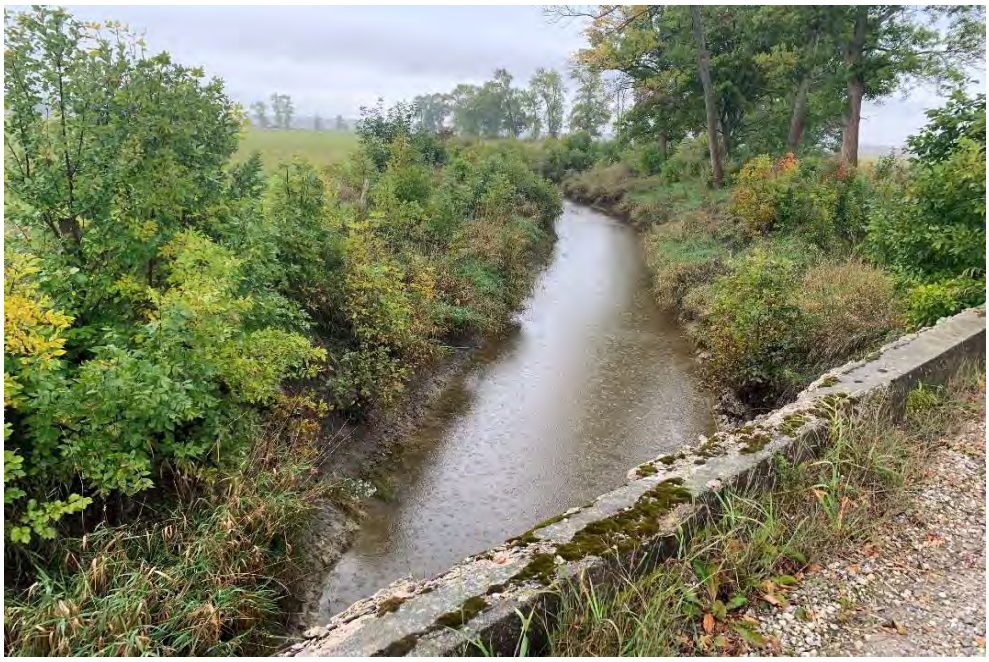


Photo 2-10: View of watercourse upstream

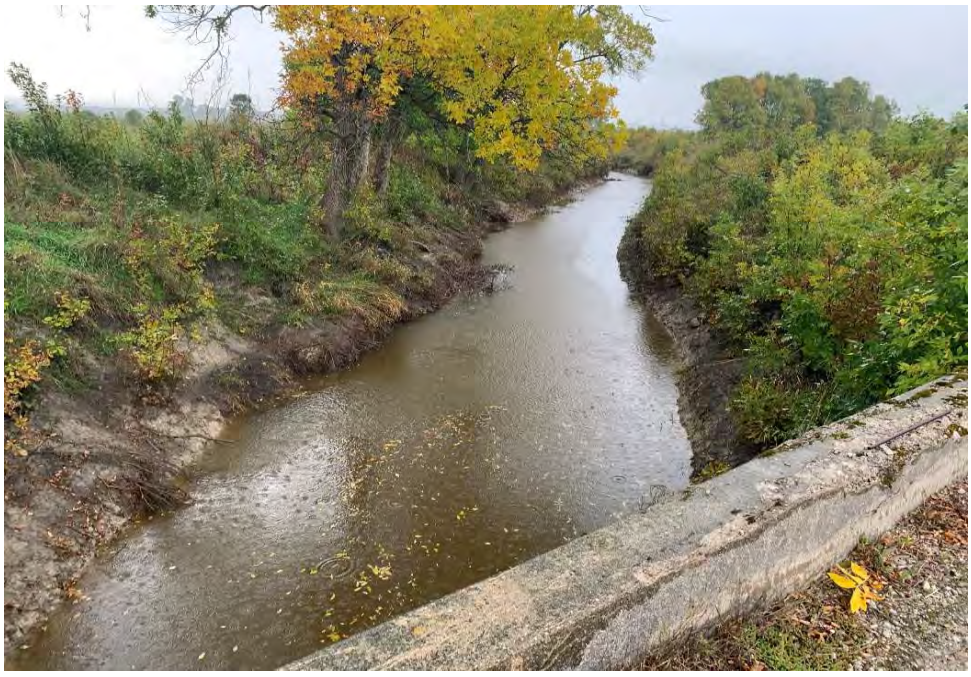


Photo 2-11: View of watercourse downstream

Date of Photos: Sept. 24, 2020

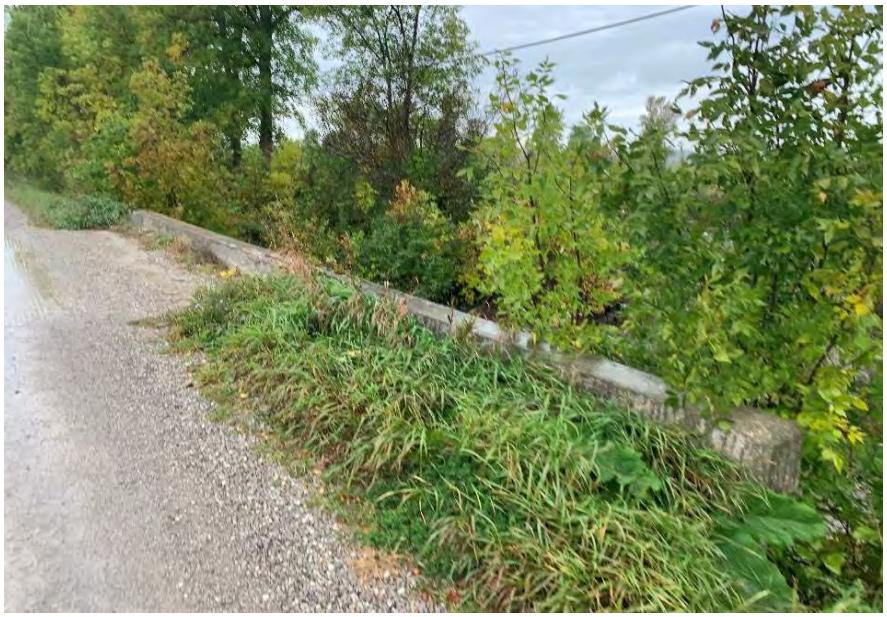
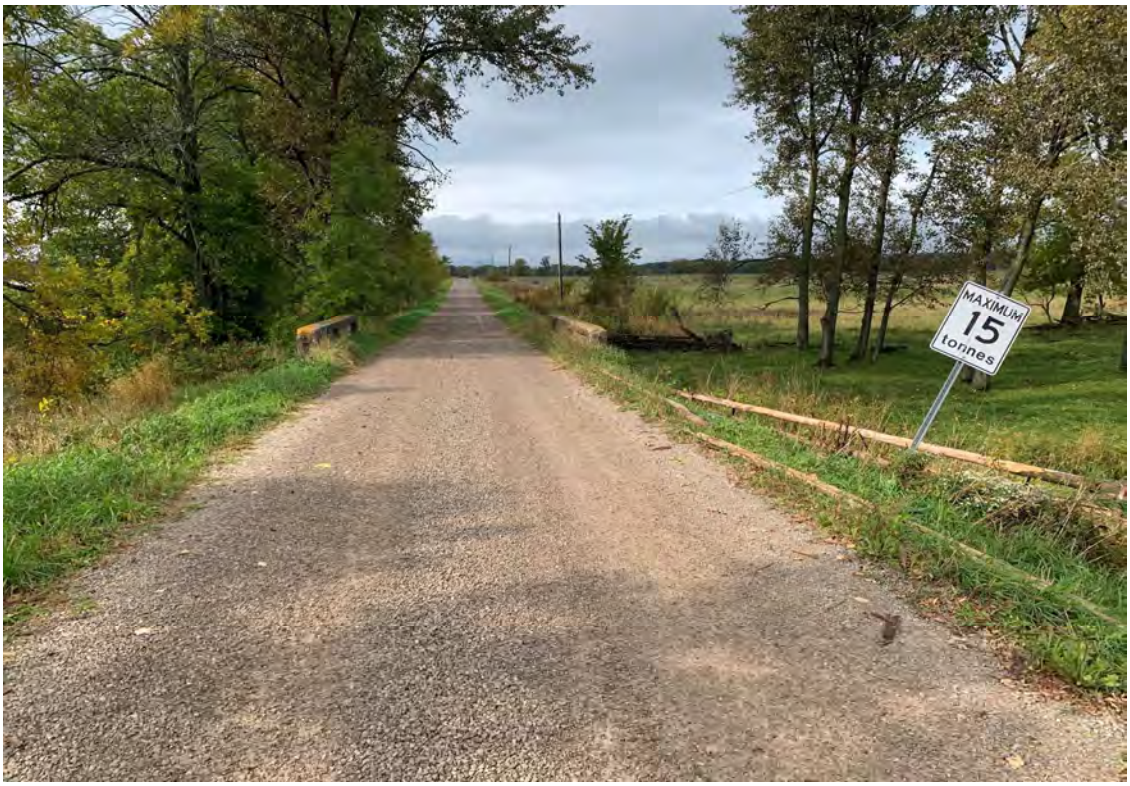


Photo 2-12: Vegetation and debris accumulation at curb and along approach shoulder

Date of Photos: Sept. 24, 2020

Bridge/Culvert Inspection Report

Site Number	3	**Project Number**	201-01605-00		
Structure Name	Cherry Hill Road Bridge	**Municipality**	Northern Bruce Peninsula		
MTO Region Code	30	**County**	Bruce	**Code**	02
MTO District Code	33	**Geographic Twp Code**	377		



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Cherry Hill Road Bridge	Site Number	3
County	Bruce	Road Name	Cherry Hill
Municipality	Northern Bruce Peninsula	Road Type	Rural Local
Bridge or Culvert	Bridge	Owner	Northern Bruce Peninsula
Structure Type	Concrete Beam	AADT	50
Span (m)	6.1 No. 1	% Trucks	15%
Height (m)	1.4	Overall Structure Width (m)	5.5
Direction of Structure	East/West	Roadway Width (m)	5
Year Built/Rehabilitated	1940	Total Deck Length (m)	7.3
Current Load Limit	15 t	Total Deck Area (s.m.)	40
Detour Length (km)	N/A - Dead End	Heritage Des.	None
Waterway	Stokes/Chin Creek		

Inspection Data

Date of Inspection	September 24, 2020
Name of Inspector	Katherine Hemstock, EIT
Equipment Used	Tape, pick, hammer
Weather Conditions	Overcast, partly sunny
Temperature	16°C
Last Inspection	November 8, 2018

Photos:

3-1 - Title Page - General

3-2 - View of structure from north approach

3-3 - View of upstream watercourse

3-4 - View of downstream watercourse

3-5 - Structure and approach wearing surface with wheel path rutting and encroaching vegetation

3-6 - East structure elevation, exterior girder and barrier wall

3-7 - Wingwall and exterior curb (typical)

3-8 - Exterior girder delamination and spalling

3-9 - View of concrete girders and soffits

3-10 - View of west structure elevation, exterior girder and barrier wall

Additional Investigation Required	Deck condition survey
Total Rehabilitation	Install approach protection and upgrade barrier protection to meet current code. Repair concrete girders, soffit and footings. Place foundation erosion protection. Place narrow structure, speed limit 35 km/hr sign and speed limit end hazard signs. Remove the excess granulars from the deck.
Total Rehabilitation Budget Costing	$140,000
Next Inspection	September 2022
Justification	Due to low traffic and fair condition, maintain the 15 tonne load limit and undertake rehabilitation to extend service life versus replacement. Reduce the speed limit to 35 km/hr. until barrier protection is upgraded and approach protection installed. Remove the excess granular fill and complete a deck condition inspection.

Element Data

Structure:	3

Element Group:	Decks	Length:	7.3
Element Name:	Wearing Surface	Width:	5
Location:		Height:	
Material:	Gravel	Count:	
Element Type:		Total Quantity:	36.5
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			18.25	18.25	Yes	Yes

Comments: Excess granular fill with wheel path rutting and heavily vegetated grass shoulders were observed.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Annual grading, clear vegetation to achieve positive drainage. Reduce excess of granular fill on bridge.

Element Data

Element Group:	Decks	Length:	7.3
Element Name:	Deck Top	Width:	5
Location:		Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	36.5
Environment:	Moderate	Limited Insp'n:	√
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			36.5		Yes	Yes

Comments: The concrete deck is not visible for inspection due to cover with excessive granular fill, but is assumed to be in fair condition based on wearing surface observations.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Remove excess granular fill and sound the structure deck to investigate condition.

Element Data

Element Group:	Decks	Length:	7
Element Name:	Soffit - Thick Slab	Width:	5.5
Location:		Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	28.47
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			25.62	2.85		

Comments: Some cracking and spalled surfaces were observed with more severe spalling of the exterior soffit.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Remove all poor concrete areas, clean the reinforcing steel, and replace concrete.

Structure:	3

Element Data

Element Group:	Sidewalks/curbs	Length:	11.3
Element Name:	Curbs	Width:	0.15
Location:		Height:	0.4
Material:	Concrete	Count:	2
Element Type:		Total Quantity:	12.43
Environment:	Severe	Limited Insp'n:	√
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			9.94	2.49		Yes

Comments: Surface spalling of the exterior curb was observed. Limited inspection of the interior curb due to granular fill and heavily vegetated curb line.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Clear the vegetation along the curb face and repair all poor concrete areas.

Element Data

Element Group:	Barriers	Length:	7.3
Element Name:	Barrier/Parapet Walls	Width:	0.3
Location:		Height:	0.8
Material:	Concrete	Count:	2
Element Type:		Total Quantity:	11.68
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			9.34	1.17	Yes	

Comments: Parapet wall has observed surface cracks, spalling, and damaged ends. The current height does not meet Code and there is no approach protection in place.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Remove all areas of poor concrete, clean reinforcing steel, and replace concrete. Add a top rail and place approach barrier protection to meet current Code.

Element Data

Element Group:	Beams/MLE's	Length:	7
Element Name:	Girders	Width:	0.33
Location:		Height:	0.48
Material:	Concrete	Count:	4
Element Type:		Total Quantity:	36.12
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			27.09	9.03		

Comments: Poor concrete was observed at the abutment walls. The concrete at the bottom of the exterior girders has spalled exposing the rebar.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Repair exterior girders remove delaminated concrete, clean the rebar, and pour new concrete.

Structure:	3

Element Data

Element Group:	Abutments		Length:				
Element Name:	Abutment Walls		Width:	5.5			
Location:			Height:	1.5			
Material:	Concrete		Count:	2			
Element Type:			Total Quanti	16.5			
Environment:	Moderate		Limited Insp				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			16.5			

Comments: Some minor surface cracking & spalling were observed. There are 4 100 mm by 100 mm rectangular drain holes.

Recommended Work: None [6-10 Years] 1-5 Years < 1 Year Urgent

Remove all poor concrete, clean reinforcing steel, and replace concrete.

Element Data

Element Group:	Abutments		Length:	2.5			
Element Name:	Wingwalls		Width:				
Location:			Height:	1.2			
Material:	Concrete		Count:	4			
Element Type:			Total Quanti	12			
Environment:	Moderate		Limited Insp				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			12			

Comments: Minor surface spalling & cracking were observed.

Recommended Work: None [6-10 Years] 1-5 Years < 1 Year Urgent

Remove all poor concrete, clean reinforcing steel, and replace concrete.

Element Data

Element Group:	Foundations		Length:				
Element Name:	Foundation (below ground level)		Width:				
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quanti				
Environment:	Moderate		Limited Insp	√			
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs

Comments: Limited inspection due to cover. The foundations are below water level. There is some minor erosion, but overall the structure appears stable.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Place rock erosion protection.

Structure:	3

Element Data

Element Group:	Embankments & Streams	Length:	
Element Name:	Streams and Waterways	Width:	
Location:		Height:	
Material:	Earth / Stone	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	All			All			

Comments: The watercourse appears stable with no obstruction at the time of inspection.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Element Data

Element Group:	Embankments & Streams	Length:	
Element Name:	Embankments	Width:	
Location:		Height:	
Material:	Earth / Stone	Count:	6
Element Type:		Total Quantity:	6
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			6			

Comments: The embankments are stone / earth (well vegetated) and appear stable.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Element Data

Element Group:	Embankments & Streams	Length:	
Element Name:	Slope Protection	Width:	
Location:		Height:	
Material:	Earth / Stone	Count:	6
Element Type:		Total Quantity:	6
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			6			

Comments: The stone slope protection appears stable.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Structure:	3

Element Data

Element Group:	Signs	Length:	
Element Name:	Signs	Width:	
Location:		Height:	
Material:	Steel	Count:	3
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		2	1		Yes	Yes

Comments: The load limit sign at the south approach is not plumb and requires straightening. No end hazard signs currently in place. Place reduced speed limit of 35km/hr signs for increased road user safety until barrier protection is upgraded to meet current code.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Place four end hazard signs at each quadrant and a northbound narrow structure sign. Place reduced speed limit of 35km/hr signs for increased road user safety until barrier protection is upgraded to meet current code. Straighten the south approach load limit sign.

Element Data

Element Group:	Approaches	Length:	5
Element Name:	Wearing Surface	Width:	5
Location:		Height:	
Material:	Gravel	Count:	2
Element Type:		Total Quantity:	50
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			50			Yes

Comments: Narrow granular surface approach is in fair condition with minor wheel path rutting observed. Heavily vegetated edge of shoulders are impeding drainage.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Grade the approaches and shoulders annual to achieve positive drainage.

Element Data

Element Group:	Approaches	Length:	
Element Name:	Drainage	Width:	
Location:		Height:	
Material:	Gravel	Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			50	50	Yes	Yes

Comments: Heavy (grass) vegetation on shoulders should be cleared to improve drainage.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Grade the shoulders annually to promote positive drainage.

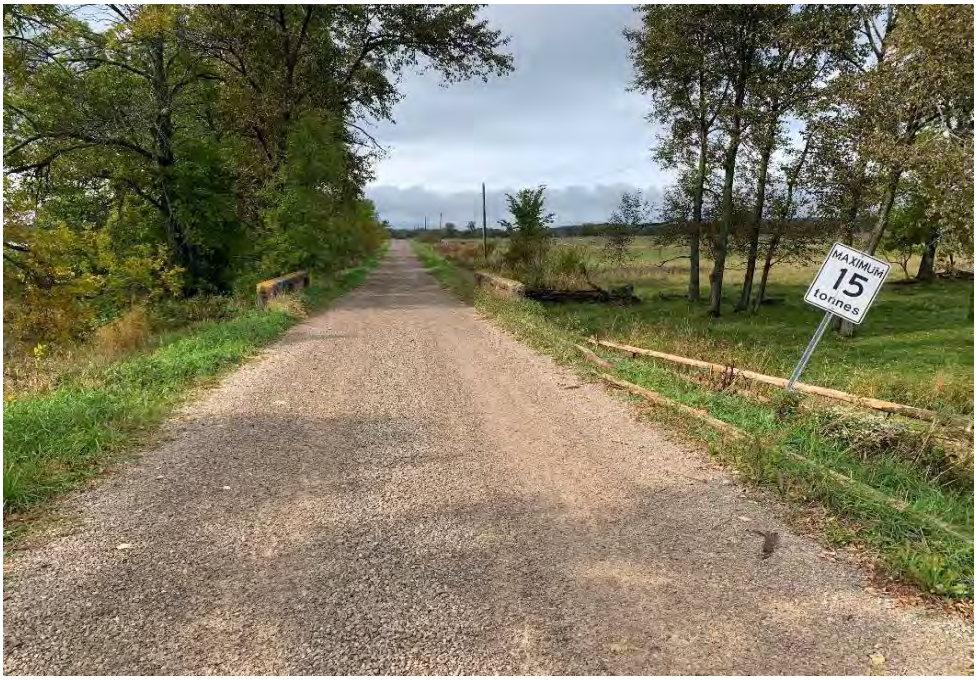


Photo 3-2: View of structure from the south approach

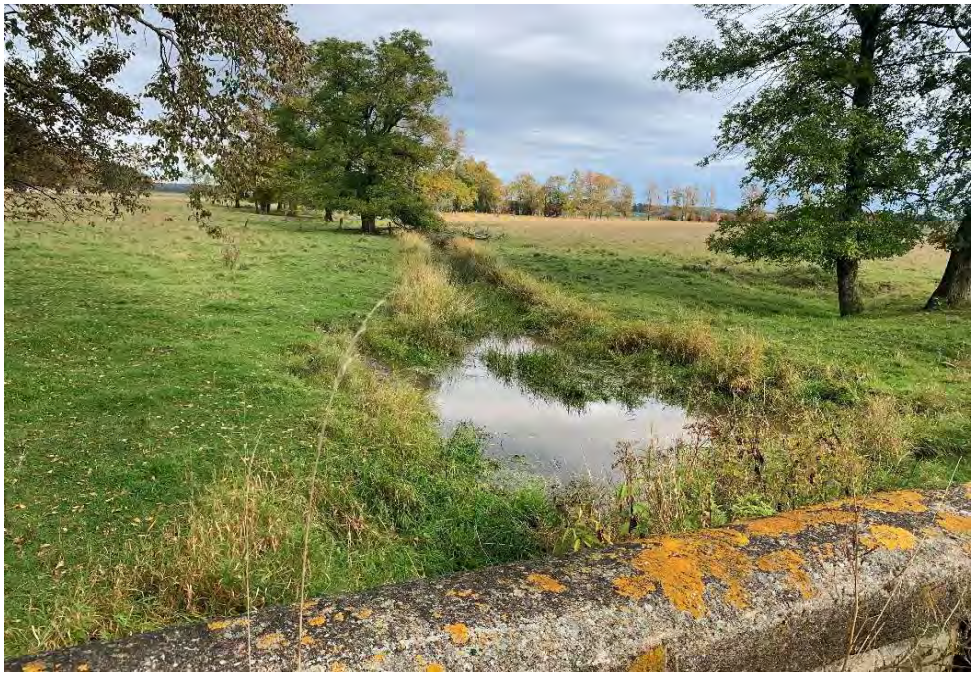


Photo 3-3: View of upstream watercourse

Date of Photos: Sept. 24, 2020

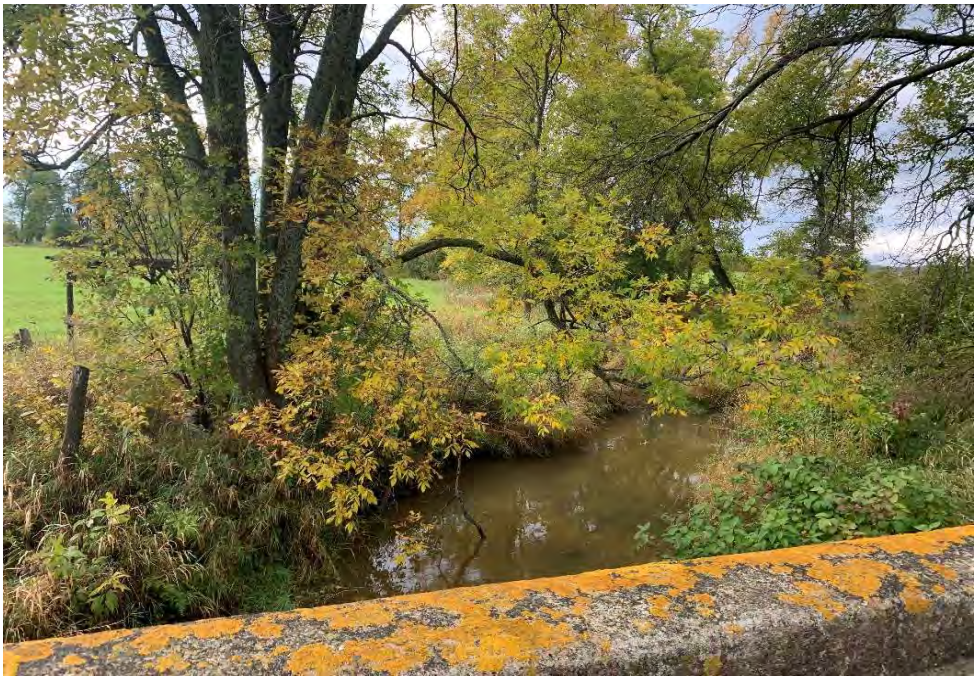


Photo 3-4: View of watercourse downstream

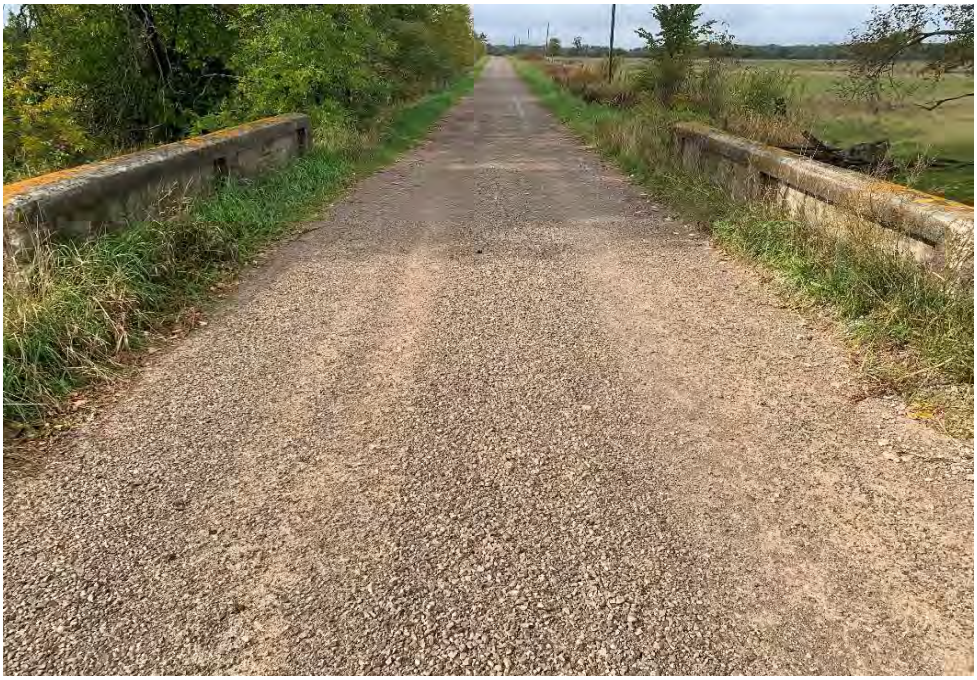


Photo 3-5: Structure and approach wearing surface with wheel path rutting and encroaching vegetation

Date of Photos: Sept. 24, 2020

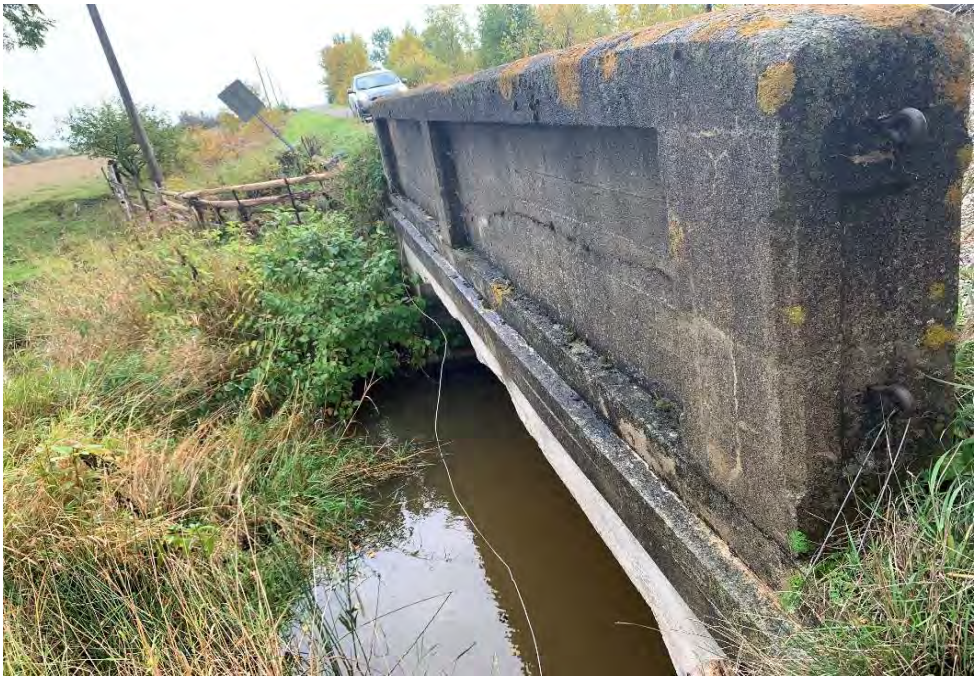


Photo 3-6: East structure elevation, exterior girder and barrier wall

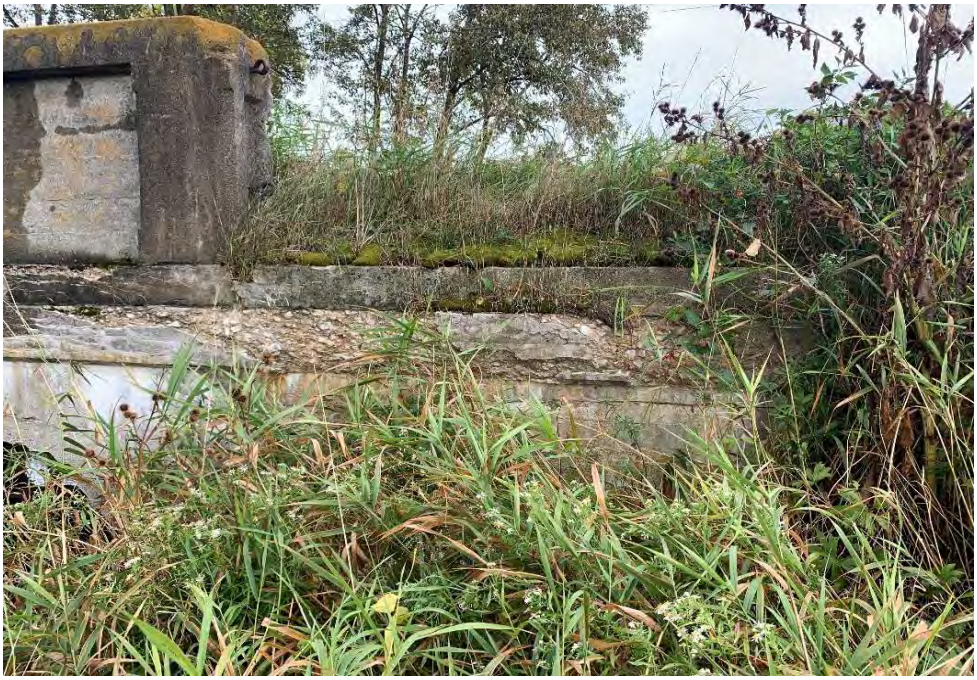


Photo 3-7: Wingwall and exterior curb (typical)

Date of Photos: Sept. 24, 2020

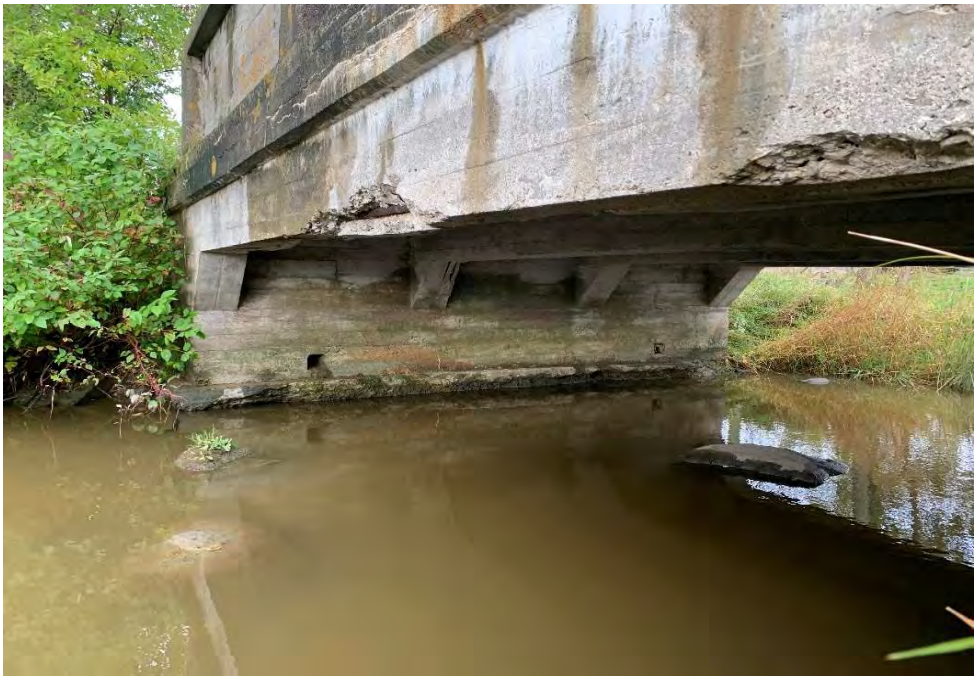


Photo 3-8: Exterior girder delamination and spalling

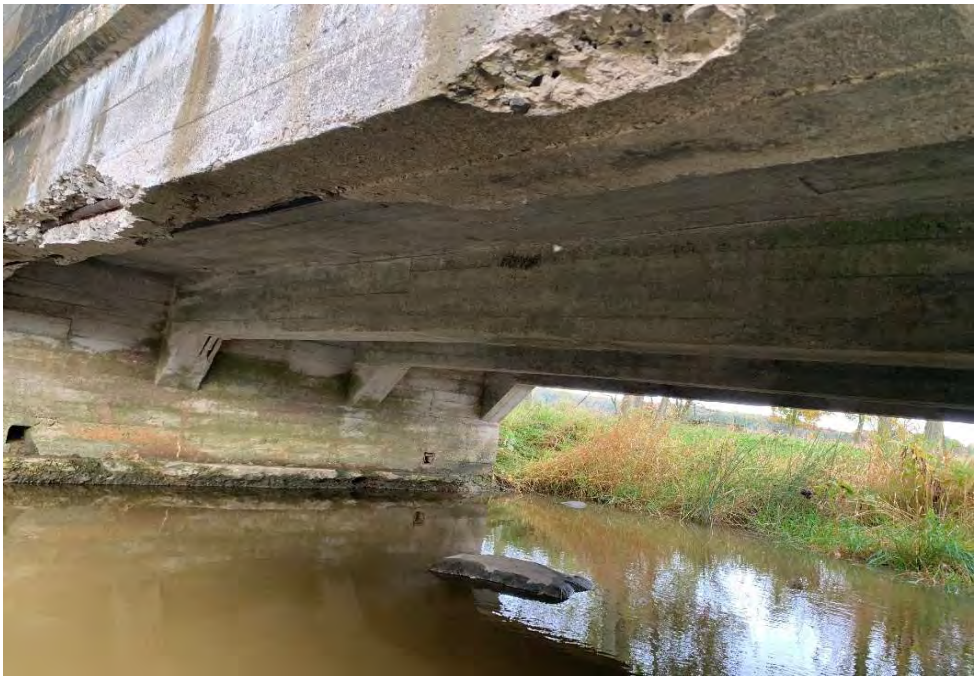


Photo 3-9: View of concrete girders and soffit

Date of Photos: Sept. 24, 2020

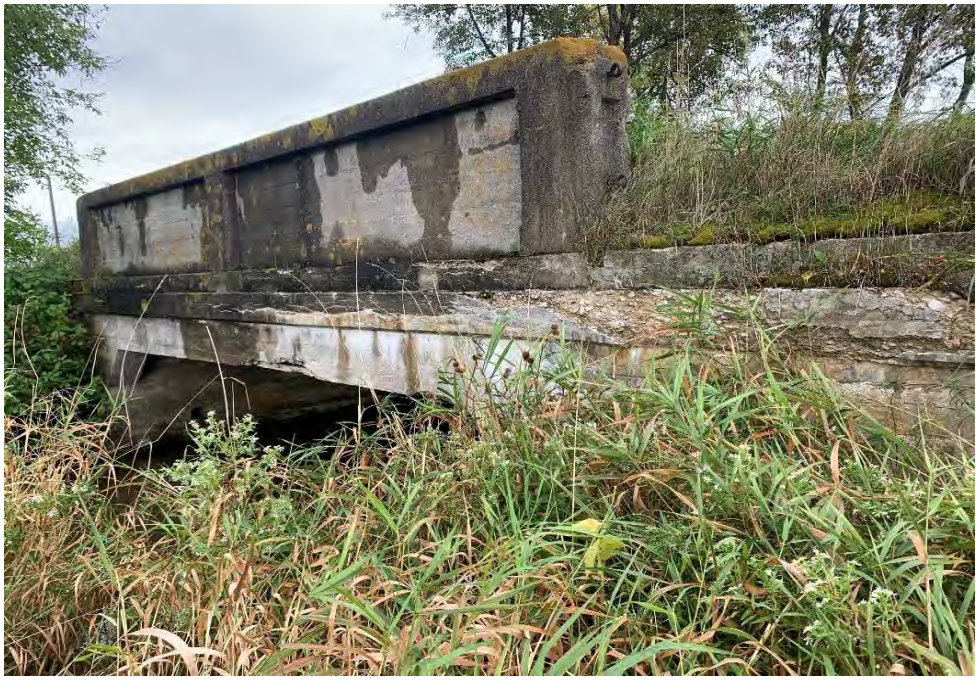
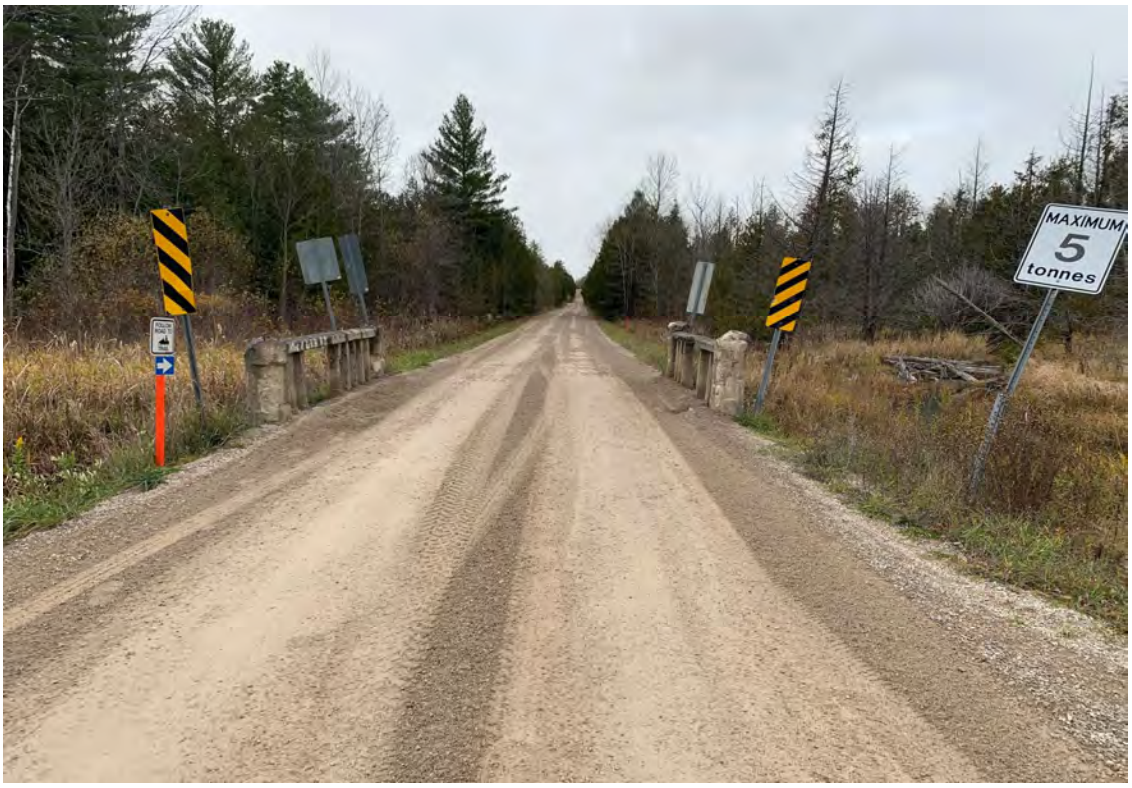


Photo 3-10: View of west structure elevation, exterior girder and barrier wall

Date of Photos: Sept. 24, 2020

Bridge/Culvert Inspection Report

Site Number	4	**Project Number**	201-01605-00		
Structure Name	Ira Lake Road Bridge	**Municipality**	Northern Bruce Peninsula		
MTO Region Code	30	**County**	Bruce	**Code**	02
MTO District Code	33	**Geographic Twp Code**	377		



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Ira Lake Road Bridge	Site Number	4
County	Bruce	Road Name	Ira Lake (Old Hwy #6)
Municipality	Northern Bruce Peninsula	Road Type	Rural Local
Bridge or Culvert	Bridge	Owner	Northern Bruce Peninsula
Structure Type	Rigid Frame - Open Footing	AADT	150
Span (m)	4.5 No. 1	% Trucks	15%
Height (m)	1.2	Overall Structure Width (m)	5.7
Direction of Structure	East/West - 15° skew	Roadway Width (m)	3.3
Year Built/Rehabilitated	1925	Total Deck Length (m)	4.7
Current Load Limit	5 t	Total Deck Area (s.m.)	24
Detour Length (km)	16	Heritage Des.	None
Waterway	Spring Creek		

Inspection Data

Date of Inspection	October 30, 2020
Name of Inspector	Katherine Hemstock, EIT
Equipment Used	Tape, pick, hammer
Weather Conditions	Overcast
Temperature	4°C
Last Inspection	November 8, 2018

Photos:
4-1 - Title Page - General
4-2 - View of east structure elevation, wingwalls, exterior curb and barrier
4-3 - View of soffit and abutment wall
4-4 - View of soffit, exterior curb and barrier
4-5 - Wearing surface deterioration
4-6 - View of south abutment wall
4-7 - View of west structure elevation, exterior soffit, curb and barrier
4-8 - View of watercourse upstream
4-9 - View of watercourse downstream

Additional Investigation Required	Condition survey and load limit analysis and inspect annually if left in service
Total Rehabilitation	Replacement recommended versus rehabilitation
Total Rehabilitation Budget Costing	$200,000 (repair) $500,000 (replacement)
Next Inspection	October 2021
Justification	Due to the age, poor condition and load limit capacity/narrow (one lane) with no barrier and approach protection complete replacement is recommended as being most cost effective for long-term service life. Maintain load limit of 5 t, inspect annually and maintain speed limit of 35 km/hr. until bridge is replaced/rehab with approach and barrier protection installed to Code.

Element Data

Structure:	4

Element Group:	Decks	Length:	4.1 m
Element Name:	Deck Top	Width:	5.1 m
Location:		Height:	0.3 m
Material:	Concrete	Count:	
Element Type:		Total Quantity:	20.91 m^2
Environment:	Moderate	Limited Insp'n:	√
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			15.68	5.23		

Comments: Limited inspection due to granular wearing surface cover, but where the deck is visible there is observed spalling and delamination.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Clear the granular fill from the structure and remove all poor concrete, clean reinforcing steel, and replace concrete.

Element Data

Element Group:	Decks	Length:	4.5 m
Element Name:	Soffit - Thick Slab	Width:	5.7 m
Location:		Height:	0.3 m
Material:	Concrete	Count:	
Element Type:		Total Quantity:	25.65 m^2
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			20.78	4.87		

Comments: Spalling and delamination around drain holes and exterior soffit was observed.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Remove all poor concrete, clean reinforcing steel, and replace concrete.

Element Data

Element Group:	Decks	Length:	
Element Name:	Drainage	Width:	
Location:		Height:	
Material:	Concrete	Count:	4
Element Type:		Total Quantity:	4
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each				4		Yes

Comments: Four 75 mm dia. holes through curb are plugged and ineffective.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Patch the drain holes with concrete and grade structure to achieve positive drainage.

Element Data

Structure:	4

Element Group:	Sidewalks/curbs	Length:	5.1 m
Element Name:	Curbs	Width:	0.46 m
Location:		Height:	0.125 m
Material:	Concrete	Count:	2
Element Type:		Total Quantity:	5.97m^2
Environment:	Severe	Limited Insp'n:	Yes
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			2.99	2.99		Yes

Comments: Limited inspection due to cover with granular fill. Where visible for inspection (exterior curb) there is surface spalling and delamination.

Recommended Work: None 6-10 Years **[1-5 Years]** < 1 Year Urgent

Clear granular fill, remove all poor concrete, clean reinforcing steel, and replace concrete.

Element Data

Element Group:	Barriers	Length:	4.88 m
Element Name:	Barrier/Parapet Walls	Width:	
Location:		Height:	0.81 m
Material:	Concrete	Count:	2
Element Type:		Total Quantity:	7.91 m^2
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2				7.91	Yes	

Comments: The top concrete rail has observed delamination, surface spalling, and exposed reinforcing steel with section loss. Several concrete posts are missing.

Recommended Work: None 6-10 Years 1-5 Years **[< 1 Year]** Urgent

Remove and replace the barrier and add approach barrier protection to meet current code requirements.

Element Data

Element Group:	Barriers	Length:	0.16 m
Element Name:	Posts	Width:	0.16 m
Location:		Height:	0.81 m
Material:	Concrete	Count:	22
Element Type:		Total Quantity:	22
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	each				22	Yes	

Comments: Surface spalling & exposed rebar was observed at the post bases. Six interior posts are broken off and missing.

Recommended Work: None 6-10 Years 1-5 Years **[< 1 Year]** Urgent

Remove and replace with new barrier and add approach barrier protection to meet current code requirements.

Element Data

Structure:	4

Element Group:	Abutments	Length:	
Element Name:	Abutment Walls	Width:	5.69 m
Location:		Height:	1.22 m
Material:	Concrete	Count:	2
Element Type:		Total Quantity:	6.94 m^2
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			5.55	1.39		

Comments: Surface cracking & spalling were observed on each abutment wall.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Remove all poor concrete, clean the reinforcing steel, and replace concrete.

Element Data

Element Group:	Abutments	Length:	1.83 m
Element Name:	Wingwalls	Width:	1.22 m
Location:		Height:	
Material:	Concrete	Count:	4
Element Type:		Total Quantity:	8.93 m^2
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			4.47	4.47		

Comments: Severe surface spalling, cracking, and section loss at top of footing were observed.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Repair concrete

Element Data

Element Group:	Foundations	Length:	
Element Name:	Foundation (below ground level)	Width:	
Location:		Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	√
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
						Yes	

Comments: Limited inspection due to cover, however the top of footings are visibly exposed and under water with observed scaling and delamination of concrete.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Repair concrete or replace the structure.

Element Data

Structure:	4

Element Group:	Embankments & Streams		Length:				
Element Name:	Streams and Waterways		Width:				
Location:			Height:				
Material:	Earth / Stone / Bedrock		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficienci	Maint. Needs
				All			Yes

Comments: Trees at the edge of waterway upstream and downstream. Beaver activity evident.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Clear fallen debris.

Element Data

Element Group:	Embankments & Streams		Length:				
Element Name:	Embankments		Width:				
Location:			Height:				
Material:	Earth / Stone		Count:	6			
Element Type:			Total Quantity:	6			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficienci	Maint. Needs
	Each			6			

Comments: Stone / Earth vegetated embankments, with some minor bank erosion observed.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Place rip rap erosion protection.

Element Data

Element Group:	Embankments & Streams		Length:				
Element Name:	Slope Protection		Width:				
Location:			Height:				
Material:	Earth / Stone		Count:	6			
Element Type:			Total Quantity:	6			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficienci	Maint. Needs
	Each			6			

Comments: Vegetated slopes with some bank erosion starting upstream.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Place rip rap erosion protection.

Element Data

Structure:	4

Element Group:	Signs	Length:	
Element Name:	Signs	Width:	
Location:		Height:	
Material:	Steel	Count:	6
Element Type:		Total Quantity:	6
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			5	1	Yes	Yes

Comments: Load limit, narrow structure, and end hazard signs are in place but not plumb or facing traffic. The southeast end hazard sign is damaged and requires replacement.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Maintain, straighten and align all signage with traffic. Replace the southwest end hazard sign. Place advanced load limit warning and reduced speed limit 35 km/hr signs.

Element Data

Element Group:	Approaches	Length:	5 m
Element Name:	Wearing Surface	Width:	3.96 m
Location:		Height:	
Material:	Gravel	Count:	2
Element Type:		Total Quantity:	39.6 m^2
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			29.7	9.9	Yes	Yes

Comments: Wearing surface recently graded. Continue annual grading.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Grade approach and structure wearing surfaces annually.

Element Data

Element Group:	Approaches	Length:	
Element Name:	Drainage	Width:	
Location:		Height:	
Material:	Earth/Gravel	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			100			Yes

Comments: Shoulders heavy vegetated with grass which is impeding drainage.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Clear vegetation off shoulders to achieve proper drainage.

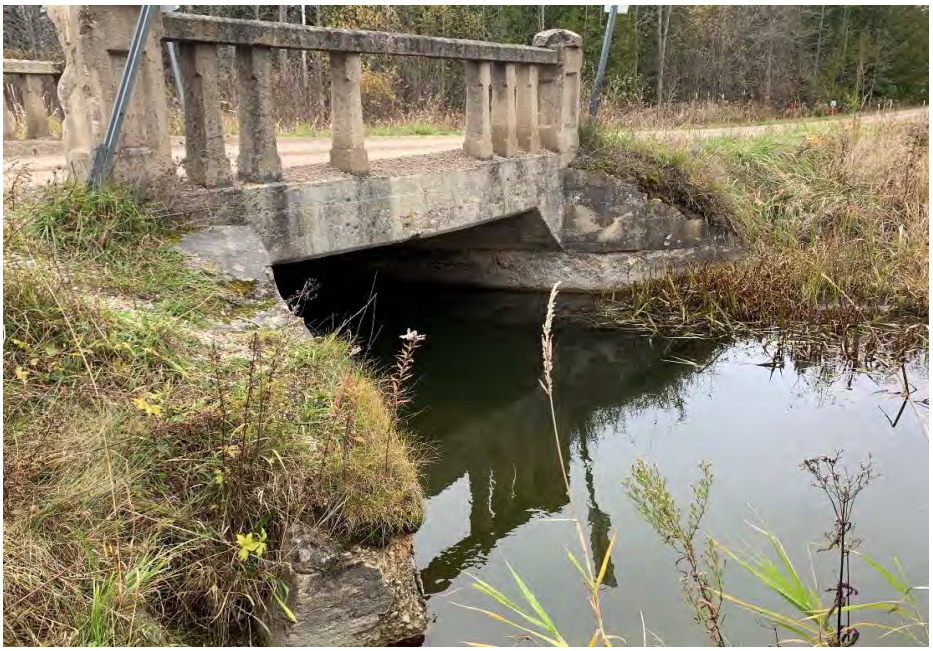


Photo 4-2: View of east structure elevation, wingwalls, exterior curb and barrier

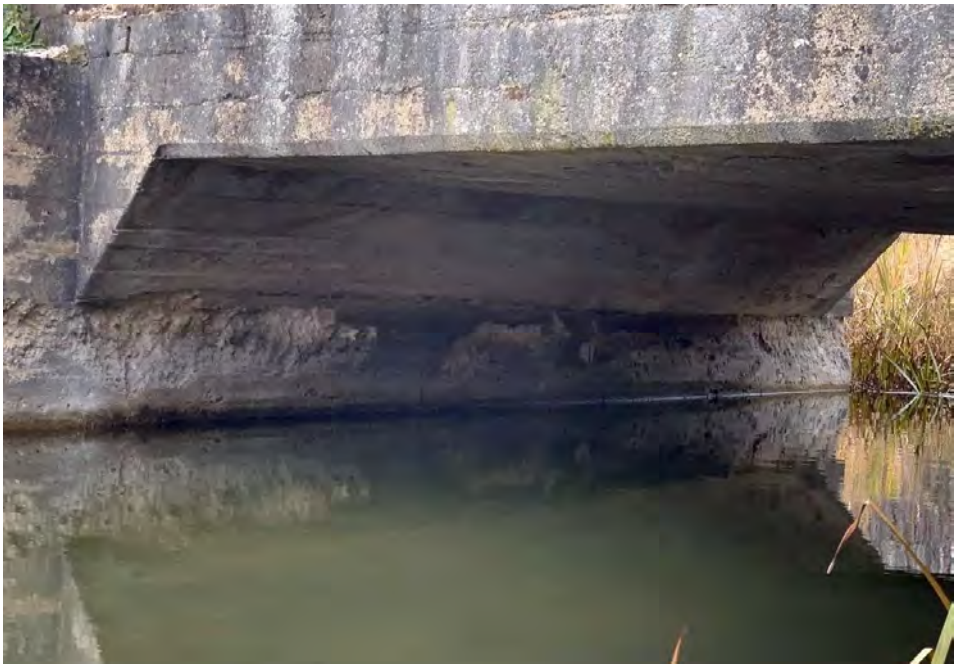


Photo 4-3: View of soffit and abutment wall

Date of Photos: Oct. 30, 2020

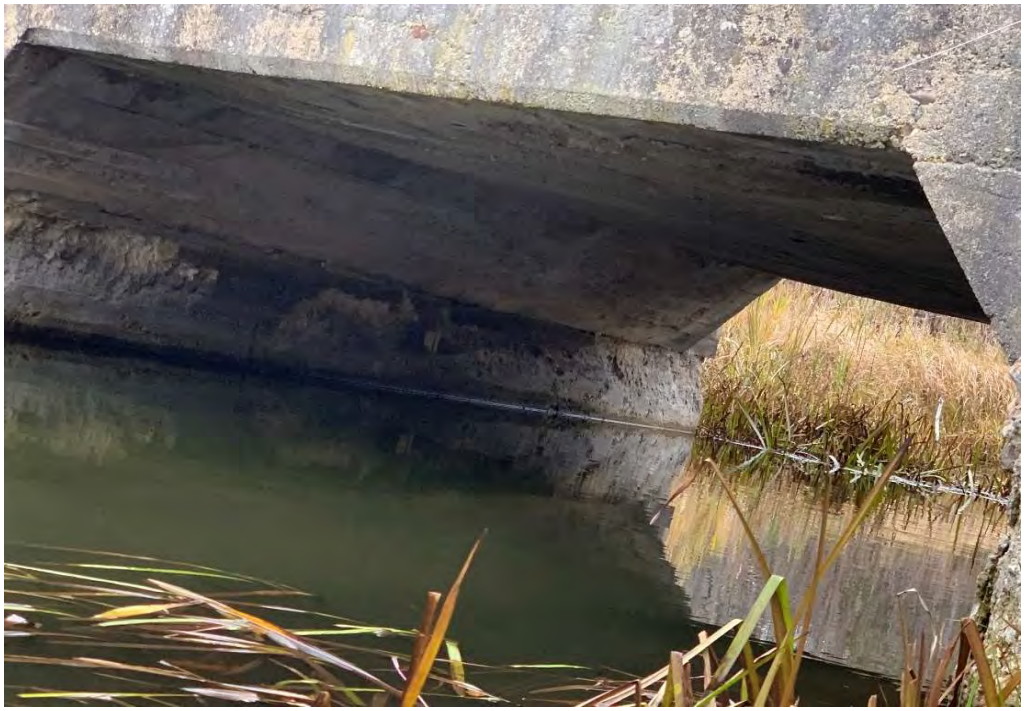


Photo 4-4: View of soffit, exterior curb and barrier

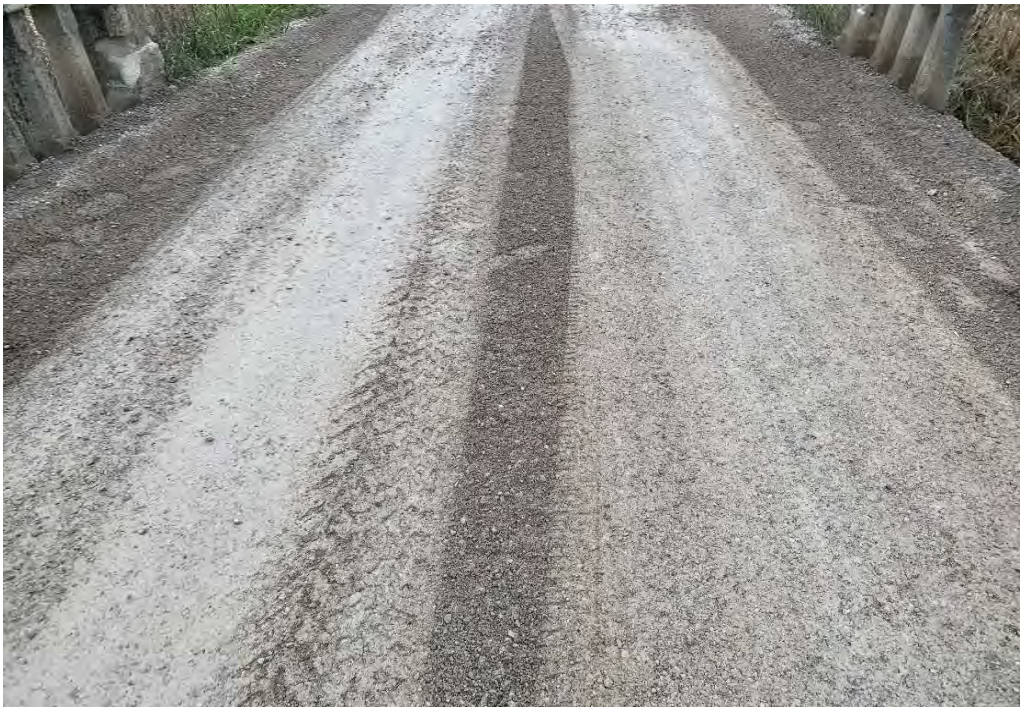


Photo 4-5: Wearing surface deterioration

Date of Photos: Oct. 30, 2020

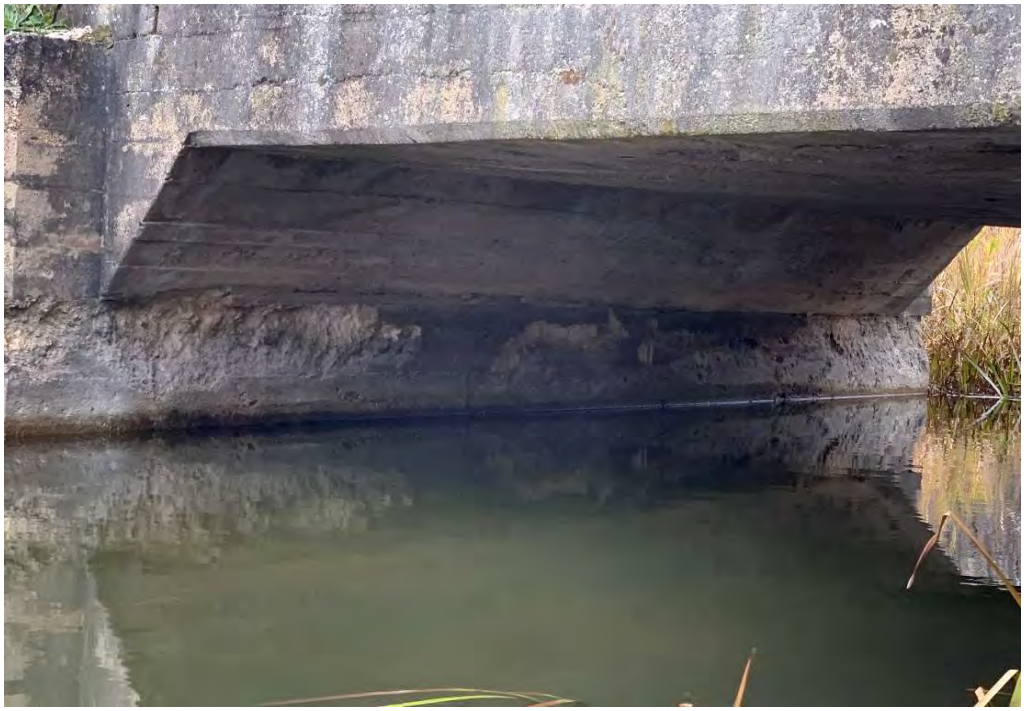


Photo 4-6: View of south abutment wall

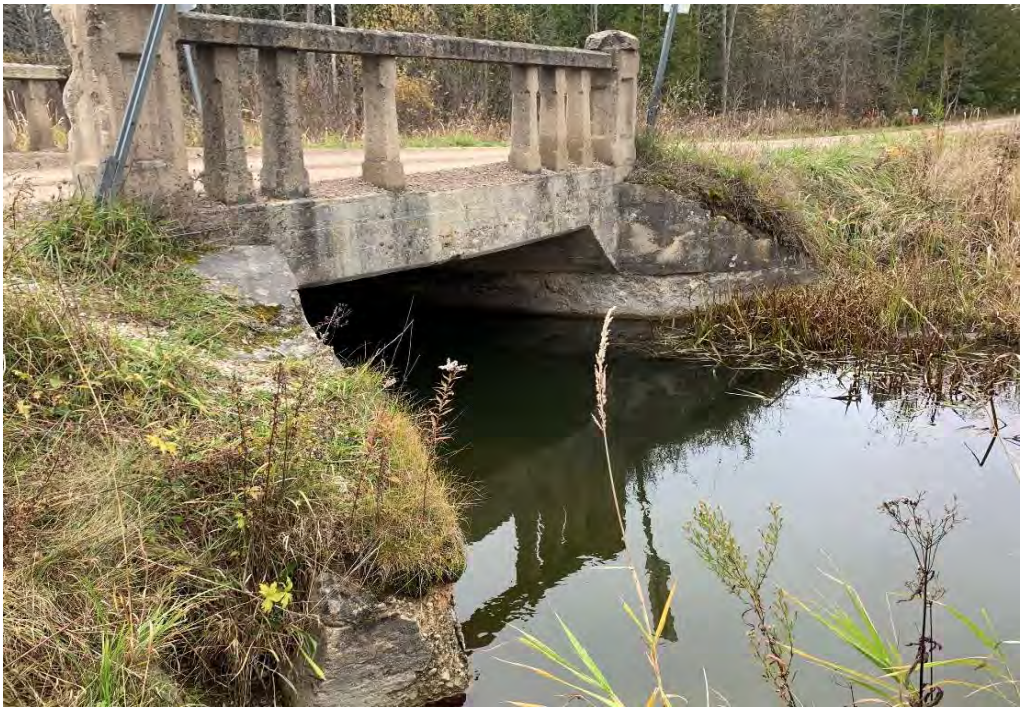


Photo 4-7: View of west structure elevation, exterior soffit, curb and barrier

Date of Photos: Oct. 30, 2020

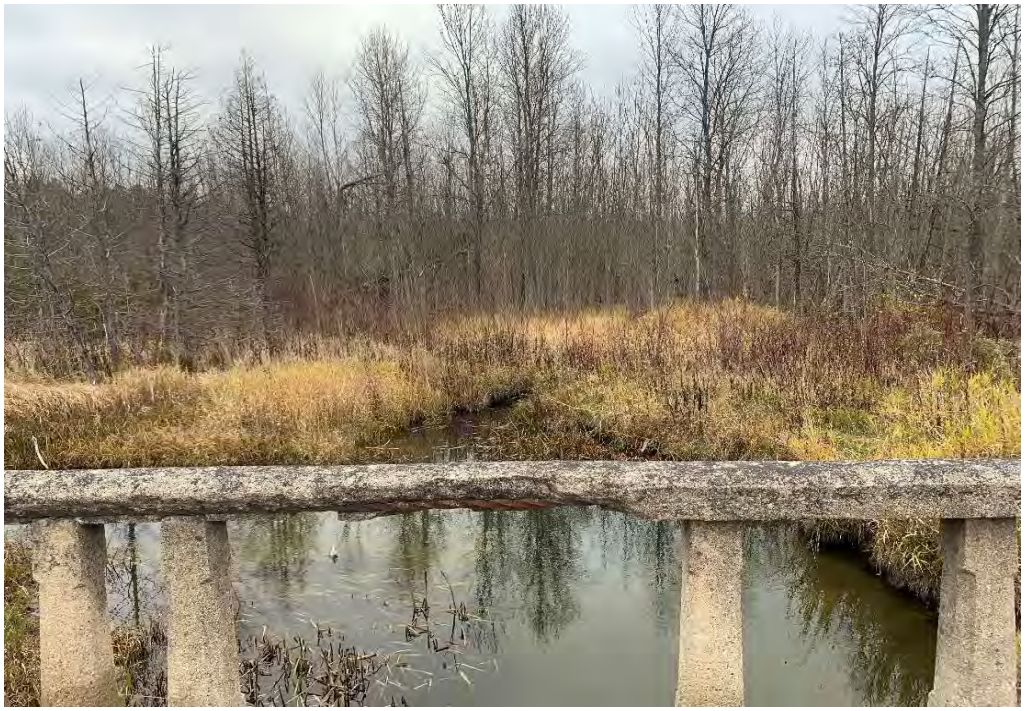


Photo 4-8: View of watercourse upstream

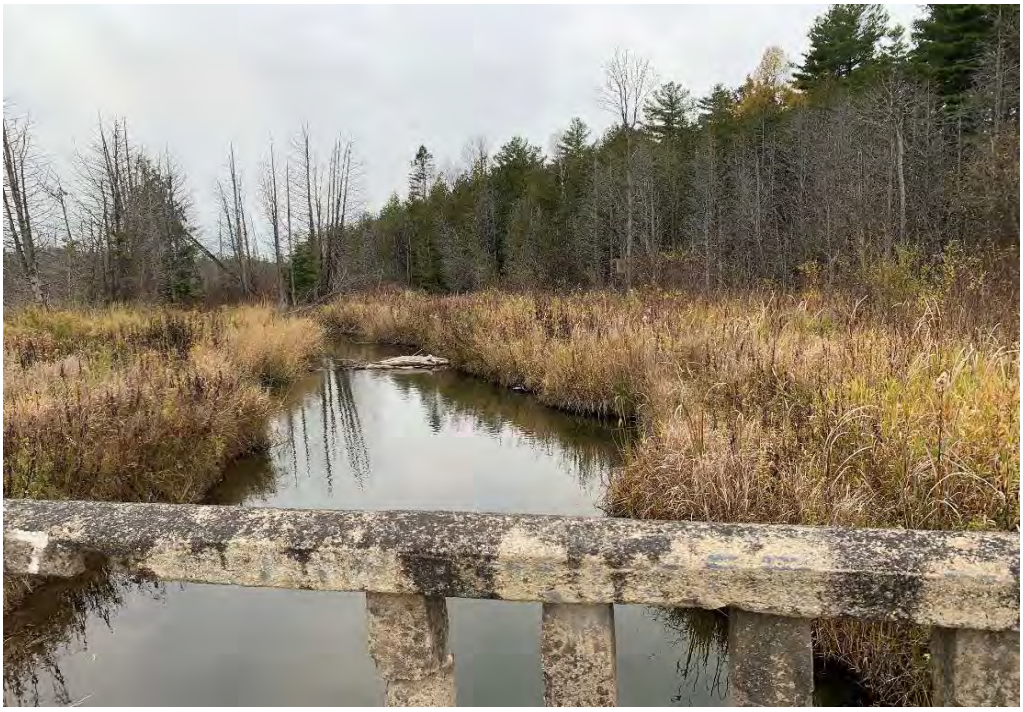
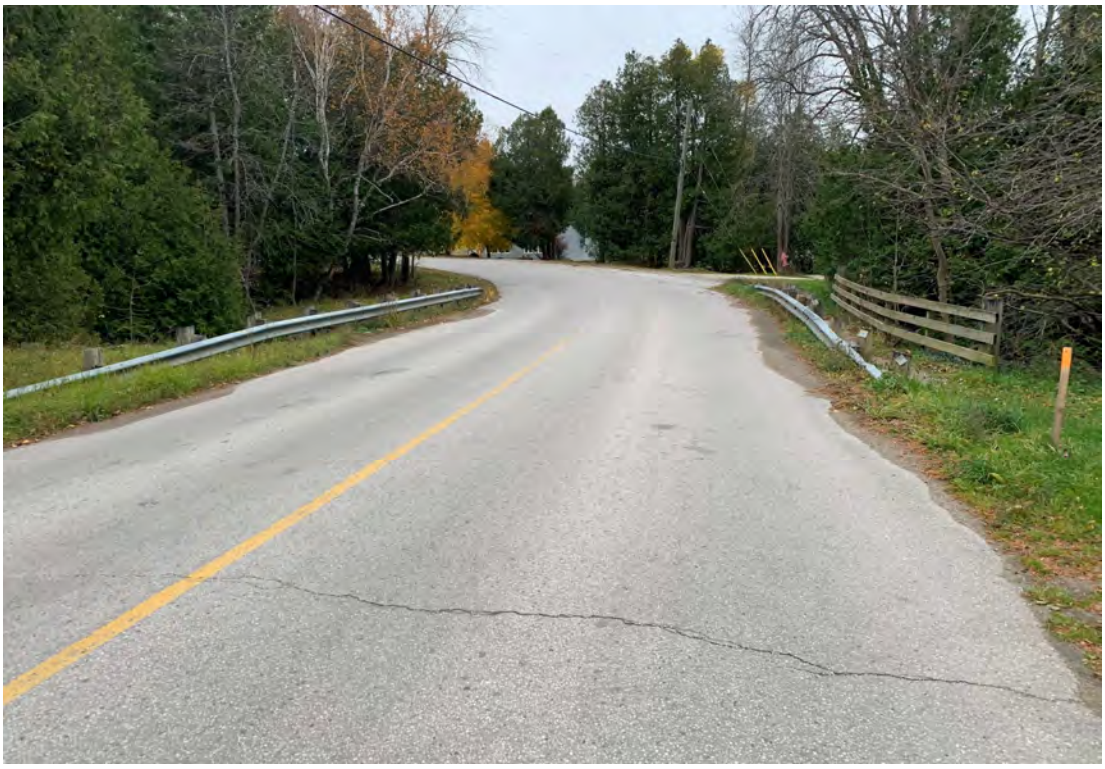


Photo 4-9: View of watercourse downstream

Date of Photos: Oct. 30, 2020

Bridge/Culvert Inspection Report

Site Number	5	**Project Number**	201-01605-00		
Structure Name	Stokes Bay Road/Copper Kettle Bridge	**Municipality**	Northern Bruce Peninsula		
MTO Region Code	30	**County**	Bruce	**Code**	02
MTO District Code	33	**Geographic Twp Code**	377		



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Stokes Bay Road Bridge	Site Number	5
County	Bruce	Road Name	Stokes Bay Road
Municipality	Northern Bruce Peninsula	Road Type	Rural Coll.
Bridge or Culvert	Bridge	Owner	Northern Bruce Peninsula
Structure Type	Concrete - Rigid Frame	AADT	400
Span (m)	7.9 No. 1	% Trucks	10%
Height (m)	2		
Direction of Structure	East/West - 22° skew	Overall Structure Width (m)	10.7
Year Built/Rehabilitated	1950/1988	Roadway Width (m)	7.9
Current Load Limit	None	Total Deck Length (m)	7.9
Detour Length (km)	27	Total Deck Area (s.m.)	84.5
Waterway	Stokes River	Heritage Des.	None

Inspection Data

Date of Inspection	October 30, 2020
Name of Inspector	Katherine Hemstock, EIT
Equipment Used	Tape, pick, hammer
Weather Conditions	Overcast
Temperature	4°C
Last Inspection	November 8, 2018

Photos:
5-1 - Title Page
5-2 - View of south structure elevation, exterior curb and soffit, wingwalls and slope protection
5-3 - Impact damage to southeast barrier protection
5-4 - Wooden barrier post rot (typical)
5-5 - Pedestrian (south side only) and structure barrier (typical)
5-6 - Southeast structure embankment erosion
5-7 - View of structure exterior soffit and curb
5-8 - View of structure soffit
5-9 - View of upstream watercourse
5-10 - View of downstream watercourse
5-11 - View of north structure elevation, exterior curb and soffit and northwest wingwall

Additional Investigation Required	None
Total Rehabilitation	Upgrade approach and barrier protection, sidewalk, and hand railing. Complete foundation repair and erosion protection placement. Repair soffit concrete at construction joint.
Total Rehabilitation Budget Costing	$130,000
Next Inspection	October 2022
Justification	Repair & rehabilitation recommended due to current good condition of structure to extend service life. Replace approach and barrier protection not to Code for road user safety.

Element Data

Structure:	5

Element Group:	Decks	Length:	7.4 m
Element Name:	Wearing Surface	Width:	8.5 m
Location:		Height:	
Material:	Asphalt	Count:	
Element Type:		Total Quantity:	62.9 m^2
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2		62.9				

Comments: The structure deck was resurfaced in 2011. The asphalt is in good condition.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Element Group:	Decks	Length:	7.4 m
Element Name:	Deck Top	Width:	11.5 m
Location:		Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	85.1 m^2
Environment:	Benign	Limited Insp'n:	Yes
Protection System:	Wearing Surface		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2		85.1				

Comments: Limited inspection due to wearing surface cover, however the visible ends are in good condition.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Element Group:	Decks	Length:	7.9 m
Element Name:	Soffit - Thick Slab	Width:	10.7 m
Location:		Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	84.53 m^2
Environment:	Benign	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2		59.17	17.02	8.45		

Comments: Cracking was observed at the base of the haunch at the construction joint and the construction cold joint extension section. There is leakage at the mid-span cold joint. An 8 m^2 section of poor/delaminated concrete with significant corrosion of rebar was observed.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Complete concrete repair at the mid-span cold joint.

Element Data

Structure:	5

Element Group:	Barrier	Length:	3.85 m
Element Name:	Railing System	Width:	
Location:	Each Side	Height:	
Material:	Steel/Wood	Count:	16
Element Type:	Flex Beam/Post	Total Quantity:	61.6 m
Environment:	Severe	Limited Insp'n:	
Protection System:	Galvanized		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m			37.2	24.4	Yes	

Comments: The steel flex beam has observed impact damage to the southwest and northwest end sections. The wooden posts are showing signs of rot, with 20% of the posts having significant rot. The current configuration (the end termination) does not meet current code. There is a pedestrian barricade that doest not meet code height for cyclists.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Replace/install barrier to code to provide required vehicle safety.

Element Data

Element Group:	Abutments	Length:	1.52 m
Element Name:	Abutment Walls	Width:	10.7 m
Location:	Each Side	Height:	
Material:	Concrete	Count:	2
Element Type:		Total Quantity:	32.53 m^2
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2		26.02	6.51			

Comments: Hairline cracks were observed at the haunches in the cold joint. Vertical hairline cracks have observed water staining.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Element Group:	Abutments	Length:	1.55 m
Element Name:	Wingwalls	Width:	1.57 m
Location:		Height:	
Material:	Concrete	Count:	4
Element Type:		Total Quantity:	9.74 m^2
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2		3.2	4.6	1.94		

Comments: Hairline cracks with efflorescence were observed at the south wingwalls. Minor spalling and delamination's were observed at the southwest wingwall. The north wingwalls have moderate honeycombing.

Recommended Work: None [6-10 Years] 1-5 Years < 1 Year Urgent

Remove all poor concrete, clean reinforcing steel, and replace concrete.

Element Data

Structure:	5

Element Group:	Foundations	Length:	
Element Name:	Foundation (below ground level)	Width:	
Location:	Each End	Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	Yes
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs

Comments: Not visible for inspection, however the structure appears stable and is founded on bedrock.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Element Group:	Embankments & Streams	Length:	
Element Name:	Streams and Waterways	Width:	
Location:		Height:	
Material:	Bedrock	Count:	
Element Type:		Total Quantity:	All
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	All			All			

Comments: No signs of impedance to flow. Scour was observed around the concrete at the inlet.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Place rip rap slope protection to prevent further scour and repair the existing rip rap at the northwest quadrant.

Element Data

Element Group:	Embankments & Streams	Length:	
Element Name:	Embankments	Width:	
Location:	Each Corner	Height:	
Material:	Stone/Earth	Count:	
Element Type:		Total Quantity:	6
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			2	4	Yes	

Comments: Heavily vegetated with rip rap and stone slope protection at the inlet and bedrock at the outlet. The northwest and southwest slopes have eroded and require repair and protection.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Repair slopes and add additional rip rap/rock slope protection.

Element Data

Structure:	5

Element Group:	Signs		Length:				
Element Name:	Signs		Width:				
Location:	Each Corner		Height:				
Material:	Steel		Count:				
Element Type:			Total Quantity:	1			
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		1			Yes	Yes

Comments: The checkboard curve sign is in good condition. There are no end hazard marker signs currently in place.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Place new end marker hazard signs at each quadrant.

Element Data

Element Group:	Approaches		Length:	5 m			
Element Name:	Wearing Surface		Width:	8.5 m			
Location:	Each End		Height:				
Material:	Asphalt		Count:	2			
Element Type:			Total Quantity:	85 m^2			
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2		75	10			

Comments:

The structure and approaches were resurfaced in 2011. The wearing surface is in good condition.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

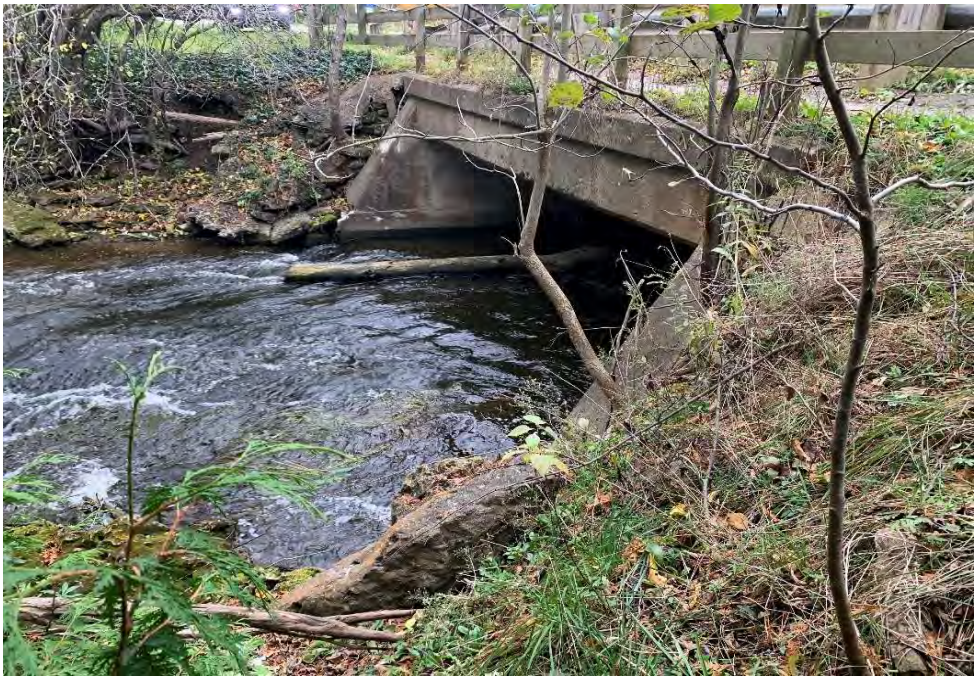


Photo 5-2: View of south structure elevation, exterior curb and soffit, wingwalls and slope protection

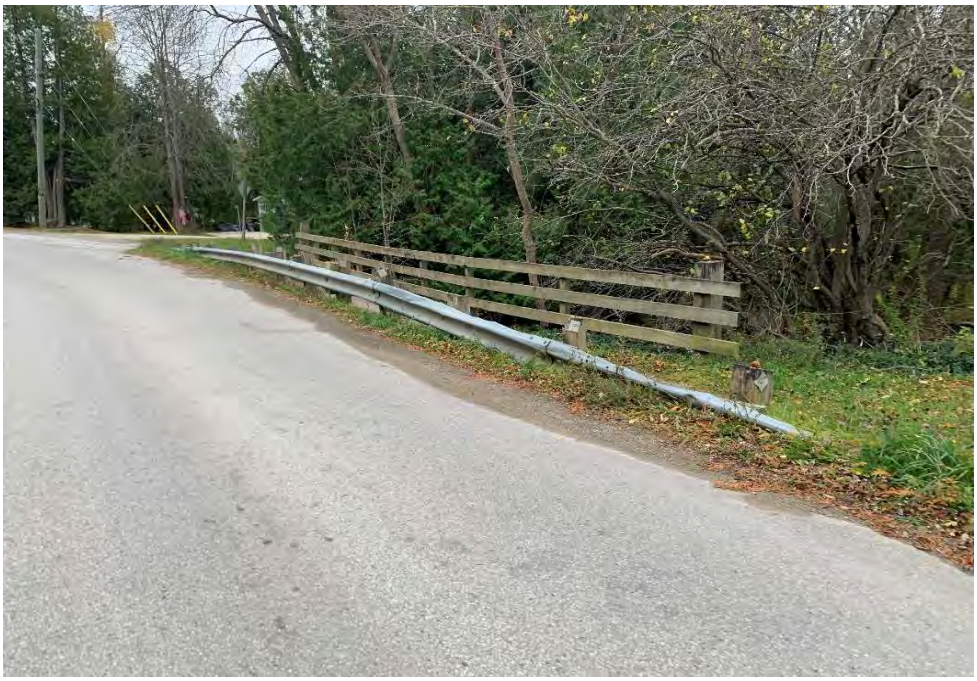


Photo 5-3: Impact damage to southeast barrier protection

Date of Photos: Oct. 30, 2020

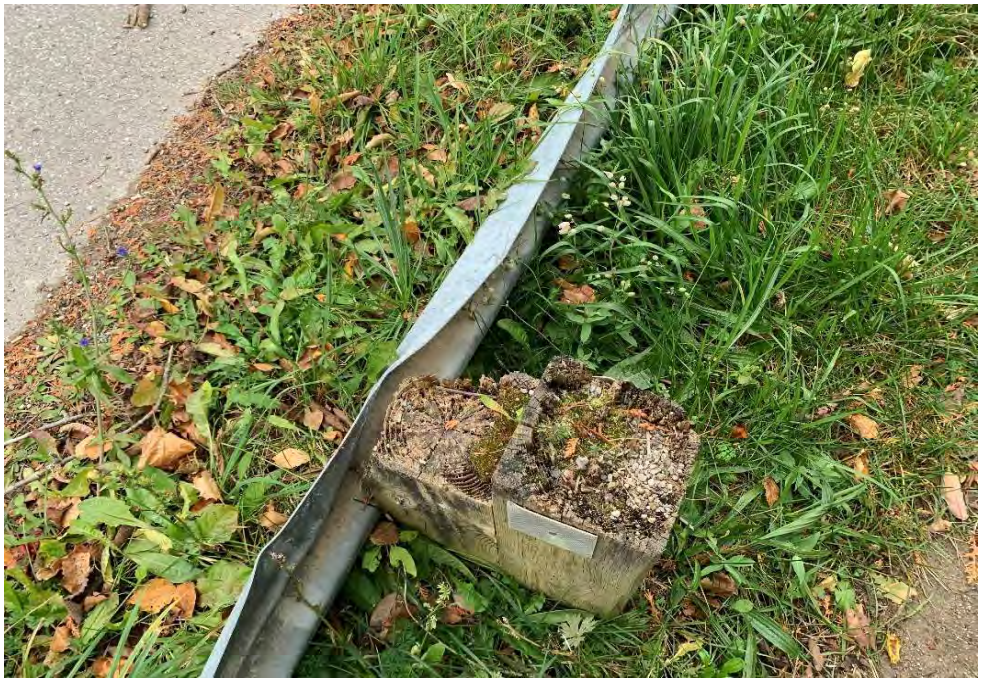


Photo 5-4: Wooden barrier post rot (typical)

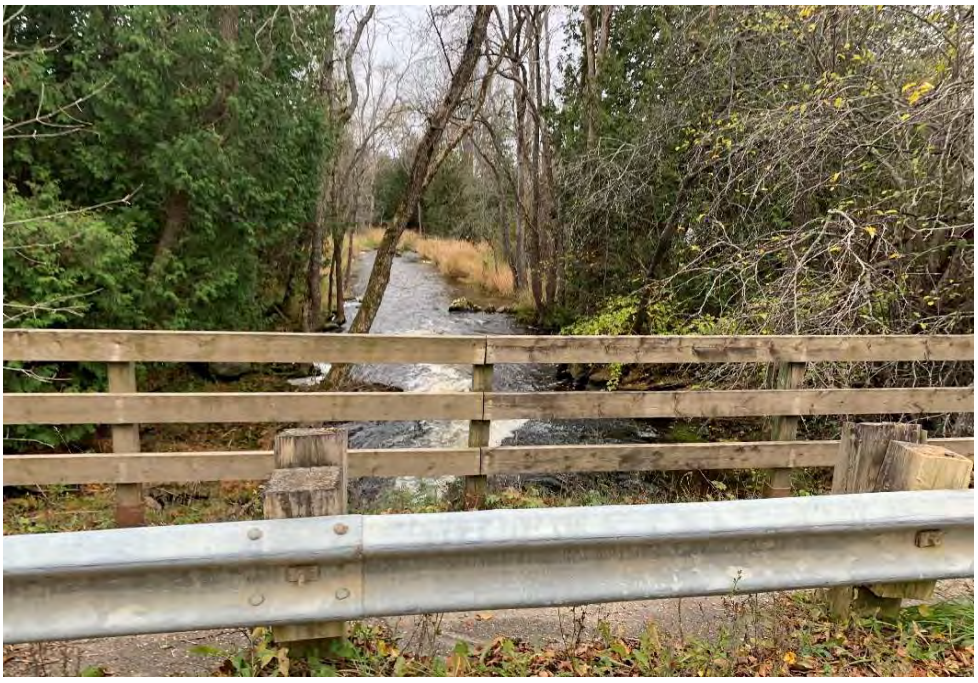


Photo 5-5: Pedestrian (south side only) and structure barrier (typ)

Date of Photos: Oct. 30, 2020

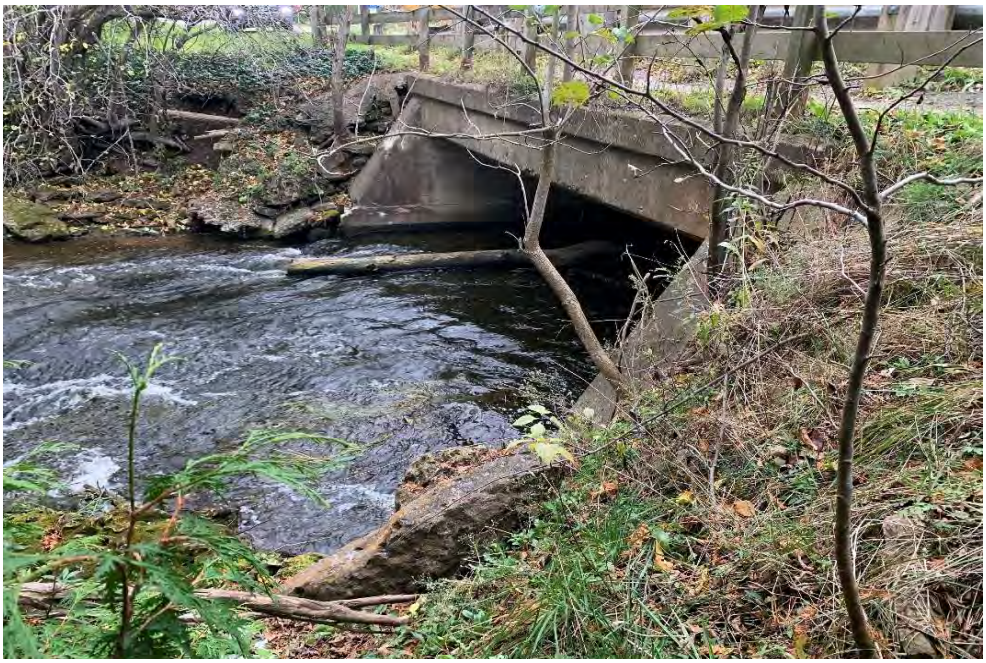


Photo 5-6: Southeast structure embankment erosion

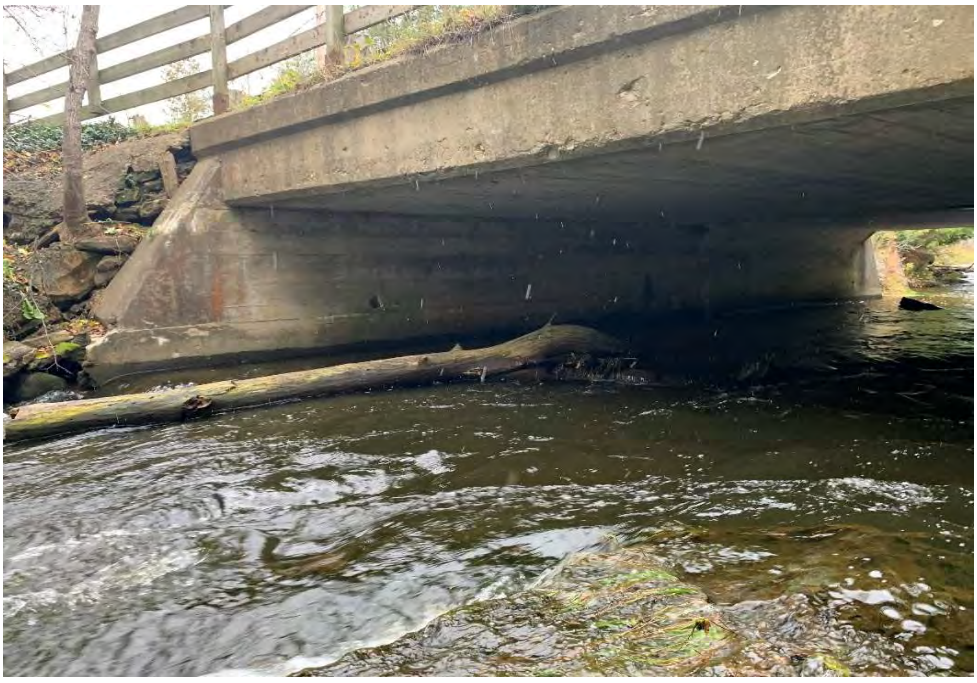


Photo 5-7: View of structure exterior soffit and curb

Date of Photos: Oct. 30, 2020

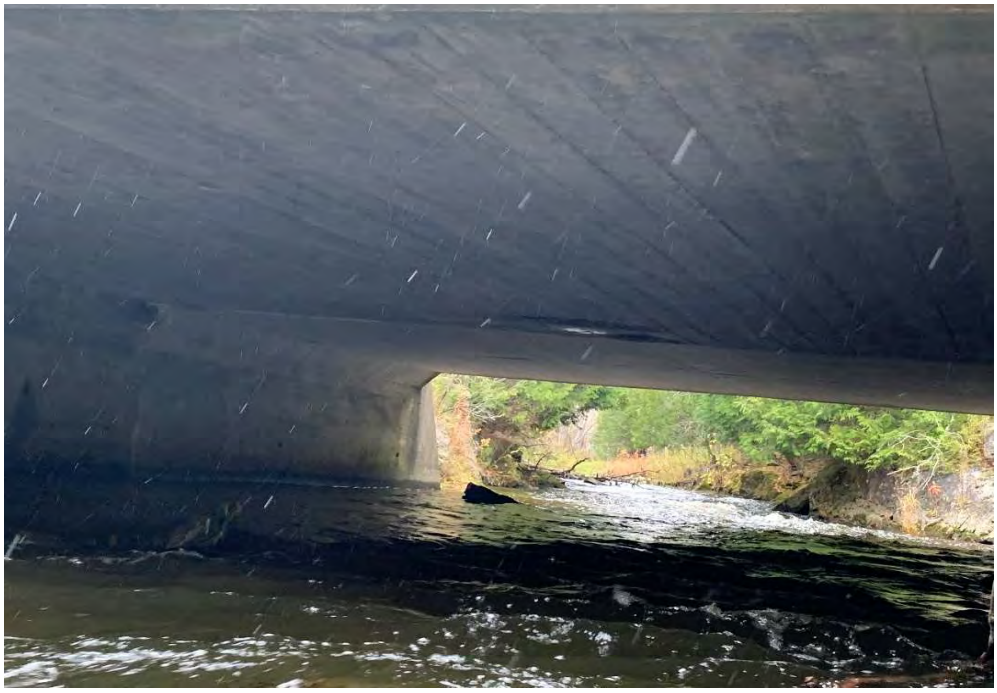


Photo 5-8: View of structure soffit

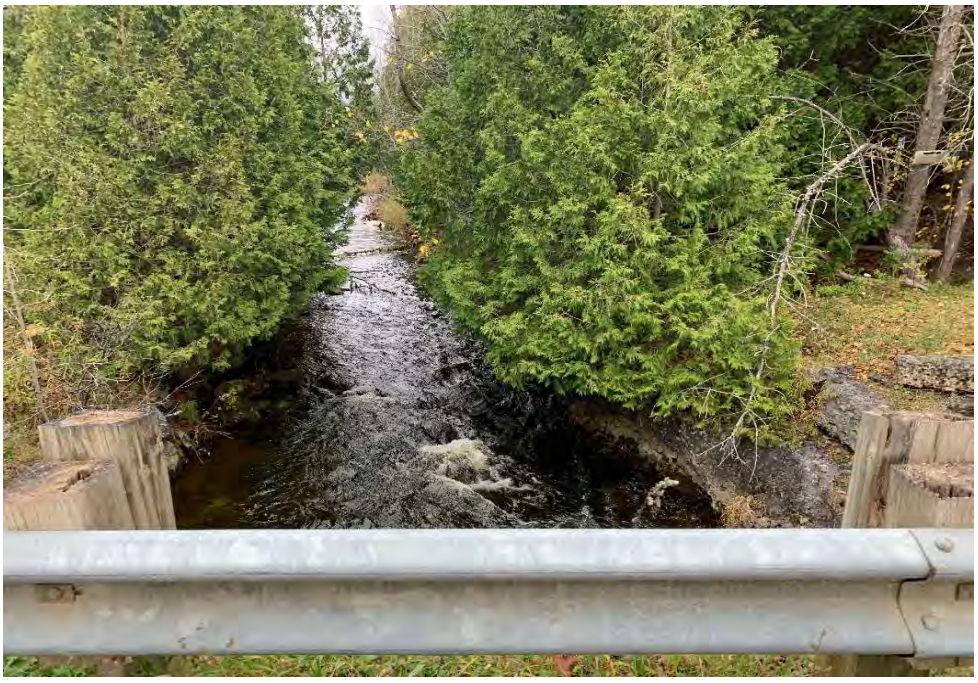


Photo 5-9: View of upstream watercourse

Date of Photos: Oct. 30, 2020

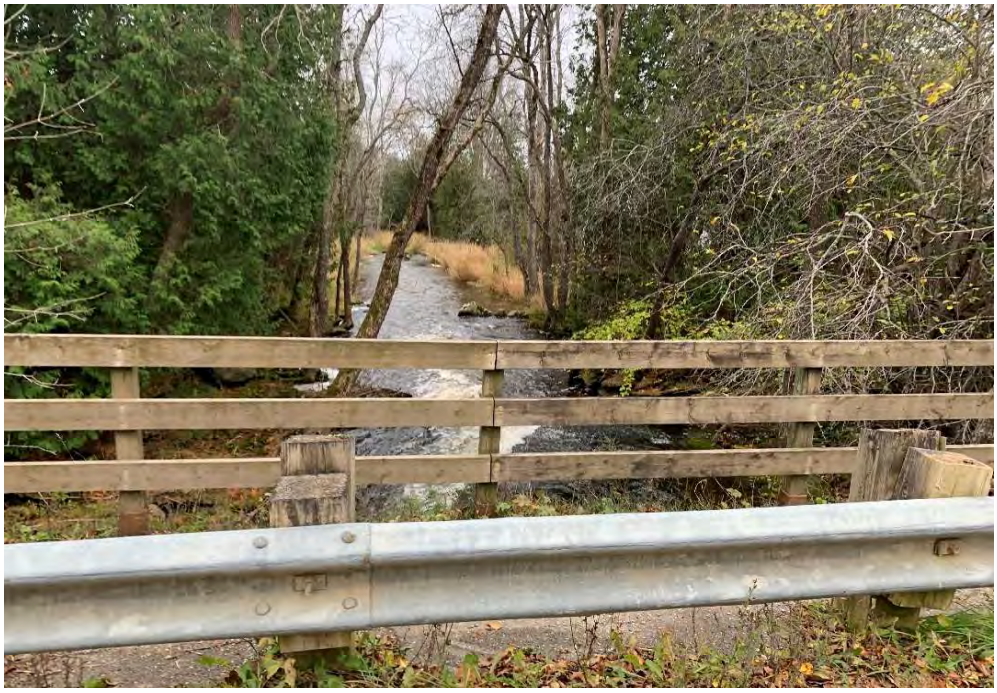


Photo 5-10: View of downstream watercourse

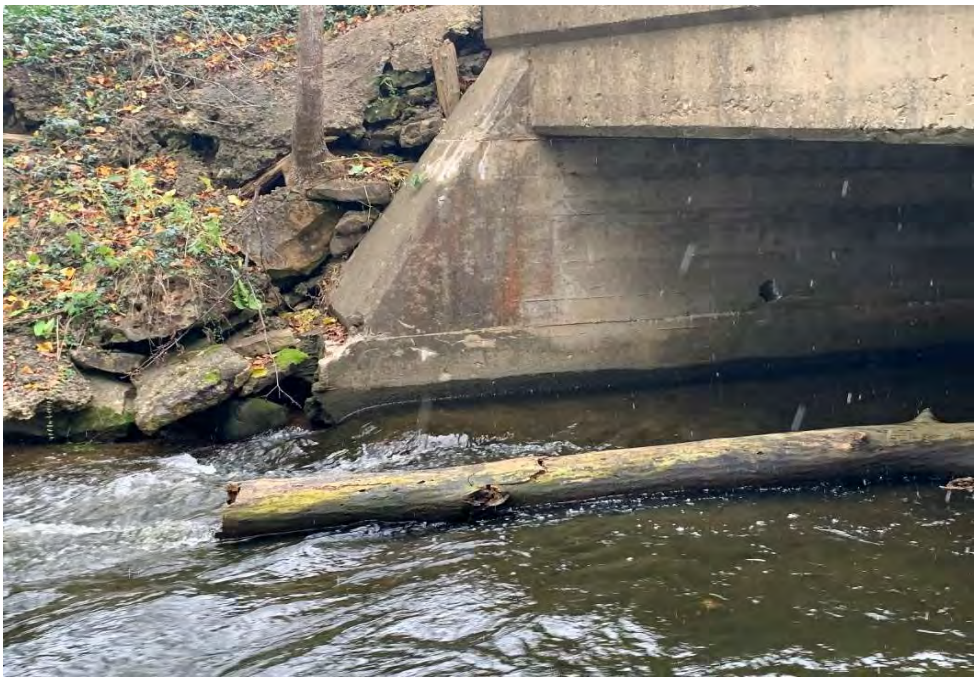
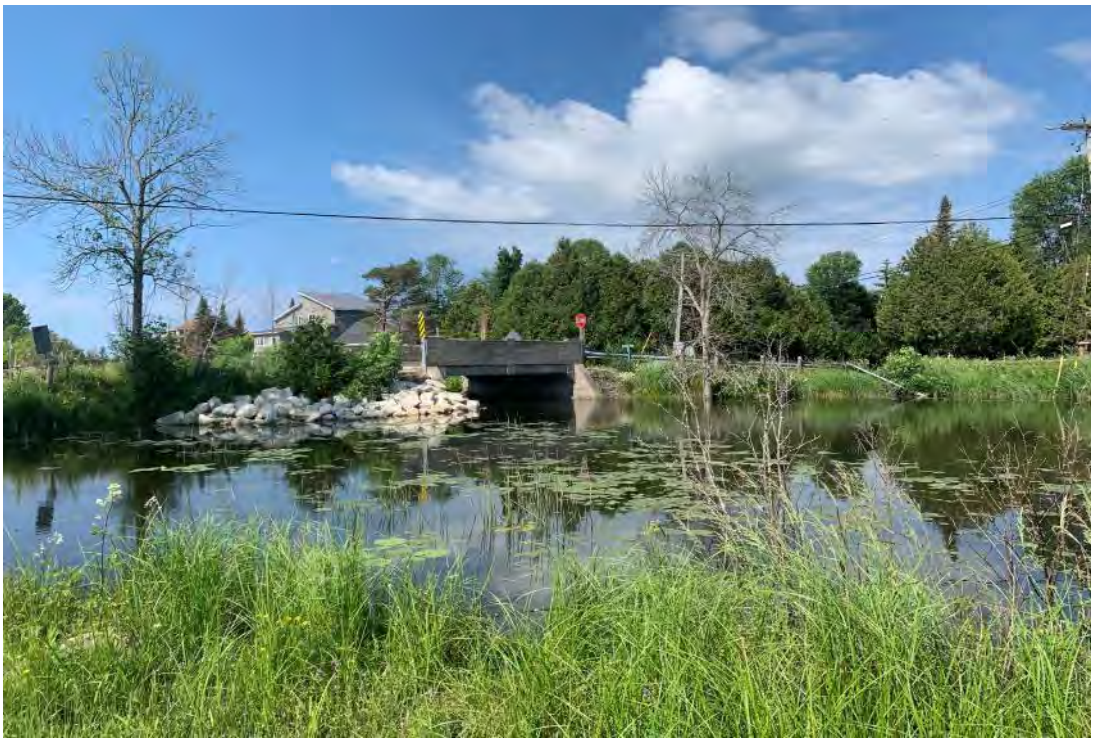


Photo 5-11: View of south structure elevation, exterior curb and soffit and northwest wingwall

Date of Photos: Oct. 30, 2020

Bridge/Culvert Inspection Report

Site Number	6	**Project Number**	201-01605-00		
Structure Name	Heron Point Road Bridge	**Municipality**	Northern Bruce Peninsula		
MTO Region Code	30	**County**	Bruce	**Code**	02
MTO District Code	33	**Geographic Twp Code**	377		



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Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Heron Point Road Bridge	Site Number	6
County	Bruce	Road Name	Heron Point Road
Municipality	Northern Bruce Peninsula	Road Type	Rural Local
Bridge or Culvert	Bridge	Owner	Northern Bruce Peninsula
Structure Type	Rigid Frame	AADT	200
Span (m)	7.1 No. 1	% Trucks	10%
Height (m)	2.5		
Direction of Structure	East/West - 15° skew	Overall Structure Width (m)	8.1
Year Built/Rehabilitated	1952	Roadway Width (m)	5.9
Current Load Limit	12 t	Total Deck Length (m)	8.3
Detour Length (km)	N/A - Dead Ends	Total Deck Area (s.m.)	67.2
Waterway	Stokes River	Heritage Des.	None

Inspection Data

Date of Inspection	July 3, 2020
Name of Inspector	Katie Hemstock, EIT
Equipment Used	Tape, pick, hammer
Weather Conditions	Overcast
Temperature	23℃
Last Inspection	November 8, 2018

Photos:

6-1 - Title Page

6-2 - View of structure deck with delaminations and ponding

6-3 - View of structure from north approach

6-4 - View of east structure elevation, slope protection and exterior of parapet wall

6-5 - Damaged approach barrier flex beam and wood posts

6-6 - View of west structure elevation, wingwalls, exterior curb and parapet wall

6-7 - View of structure soffit

6-8 - View of foundation crack and abutment wall

6-9 - Differential foundation settlement

6-10 - View of watercourse downstream

6-11 - View of watercourse upstream

6-12 - Southeast rock embankment protection

Additional Investigation Required	If the structure is to remain in service, complete a load Limit Analysis to determine the safe load limit. In the interim, complete annual inspections.
Total Rehabilitation	Replacement recommended as rehabilitation is no longer economical.
Total Rehabilitation Budget Costing	$225,000
Next Inspection	July 2021
Justification	Due to the poor overall condition of the substructure and the recent failure, it is recommended that replacement of the structure be completed as opposed to rehabilitation. In the interim, maintain the 12 tonne load limit restriction. If the structure is to remain open and rehabilitation completed, a detailed structural evaluation and load carrying capacity analysis should be completed in order to confirm the safe load limit. Maintain the speed limit of 35 km/hr until approach barrier upgraded.

Element Data

Structure:	6

Element Group:	Decks	Length:	8.05 m
Element Name:	Deck Top	Width:	5.9 m
Location:		Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	47.5 m^2
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			35.6	11.9	Yes	

Comments: The structure deck has observed localized spalling and popouts, and is relatively flat allowing water to pond. Granulars have accumulated along west edge of the deck.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Repair all poor and delaminated concrete, waterproof the structure deck, and place an asphalt wearing surface graded to achieve proper drainage.

Element Data

Element Group:	Decks	Length:	7.41 m
Element Name:	Soffit - Thick Slab	Width:	6.8 m
Location:		Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	50.39 m^2
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			45.35	5.04		

Comments: Observed spalling, cracking, and staining with effervescence of the soffit. The spalling is severe at all corners. The southeast haunch is in very poor condition.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Remove all poor concrete, clean reinforcing steel and replace concrete.

Element Data

Element Group:	Decks	Length:	
Element Name:	Drainage	Width:	
Location:		Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
						Yes	

Comments: There are currently no deck drains in place and the grade is relatively flat allowing for water ponding.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Following future deck rehabilitation, place a waterproofing membrane and asphalt wearing surface graded to achieve positive drainage.

Element Data

Structure:	**6**

Element Group:	Sidewalks/curbs	Length:	8.05
Element Name:	Curbs	Width:	0.21
Location:		Height:	0.21
Material:	Concrete	Count:	2
Element Type:		Total Quantity:	6.76 m^2
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			5.41	1.35		

Comments: The existing curbs have observed surface spalling and end chips. The northeast corner is severely spalled.

Recommended Work: None 6-10 Years **[1-5 Years]** < 1 Year Urgent

Remove all poor concrete, clean reinforcing steel, and replace concrete.

Element Data

Element Group:	Barriers	Length:	8.05
Element Name:	Barrier/Parapet Walls	Width:	0.15
Location:		Height:	1.15
Material:	Concrete	Count:	2
Element Type:		Total Quantity:	18.52 m^2
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			16.67	1.85		

Comments: Parapet wall with some spalling and end damage chips.

Recommended Work: None **[6-10 Years]** 1-5 Years < 1 Year Urgent

Remove all poor concrete, clean reinforcing steel, and replace concrete.

Element Data

Element Group:	Abutments	Length:	
Element Name:	Abutment Walls	Width:	7.8
Location:		Height:	0.64
Material:	Concrete	Count:	2
Element Type:		Total Quantity:	9.98 m^2
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			8.98	1		

Comments: Surface cracking & spalling observed throughout the abutment walls.

Recommended Work: None 6-10 Years **[1-5 Years]** < 1 Year Urgent

Remove all poor concrete, clean reinforcing steel, and replace concrete.

Element Data

Structure:	**6**

Element Group:	Abutments	Length:	
Element Name:	Wingwalls	Width:	3.05
Location:		Height:	0.6
Material:	Concrete	Count:	2
Element Type:		Total Quantity:	1.83 m^2
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			1.19	0.64	Yes	

Comments: The 2017 failure of the southeast wingwall has left the embankment vulnerable to erosion. Temporary rock protection has been installed until the structure or structure can be replaced. Surface spalling & cracking of the remaining wingwall was observed.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Repair remaining wingwall concrete.

Element Data

Element Group:	Foundations	Length:	
Element Name:	Foundation (below ground level)	Width:	9.5
Location:		Height:	0.85
Material:	Concrete	Count:	2
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
						Yes	

Comments: Founded on bedrock. Split through the centre severely spalled and delaminated. A detailed structural assessment should be completed and the load carrying capacity determined if the structure is to remain open.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Remove and replace all poor concrete, clean reinforcing steel, and replace concrete.

Element Data

Element Group:	Embankments & Streams	Length:	
Element Name:	Streams and Waterways	Width:	
Location:		Height:	
Material:	Earth / Stone / Rock	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	All			All			

Comments: Bedrock streambed is stable and free of obstruction at the time of inspection.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Structure:	**6**

Element Group:	Embankments & Streams	Length:	
Element Name:	Embankments	Width:	
Location:		Height:	
Material:	Earth / Stone	Count:	6
Element Type:		Total Quantity:	6
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			5	1		

Comments: The embankments appear stable with both stone and vegetated earth. Slight corner erosion was observed at each quadrant.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Replace rip-rap corner erosion protection

Element Data

Element Group:	Embankments & Streams	Length:	
Element Name:	Slope Protection	Width:	
Location:		Height:	
Material:	Earth / Stone / Rock	Count:	6
Element Type:		Total Quantity:	6
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			6			

Comments: Both vegetated earth and rock protected slopes. Some corner erosion and settlement of the existing rock protection was observed. New rip rap placed in 2017 to protect the embankment exposed following the failure of the structure wingwall.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Place erosion protection at the corners.

Element Data

Element Group:	Signs	Length:	
Element Name:	Signs	Width:	
Location:		Height:	
Material:	Steel / Wood	Count:	
Element Type:		Total Quantity:	9
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			9			

Comments: Load limit, hazard, dead end, stop (north side), narrow structure, and 35km/hr speed posting signs are all in fair condition.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Structure:	**6**

Element Group:	Approaches		Length:	5 m			
Element Name:	Wearing Surface		Width:	5.9 m			
Location:			Height:				
Material:	Asphalt / Gravel		Count:	2			
Element Type:			Total Quantity:	59 m^2			
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			29.5	29.5		Yes

Comments: The north approach is asphalt with observed stress cracking, and the south approach is a granular surface.

Recommended Work: None 6-10 Years **1-5 Years** < 1 Year Urgent

Pave the south approach to reduce maintenance and improve drainage. In the interim, continue annual grading of the approach wearing surface and shoulders.

Element Data

Element Group:	Approaches		Length:				
Element Name:	Drainage		Width:				
Location:			Height:				
Material:	Asphalt / Gravel		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	All			50	50	Yes	

Comments: Settlement (stress) and cracking of the north asphalt approach was observed.

Recommended Work: None 6-10 Years **1-5 Years** < 1 Year Urgent

Resurface the north side and pave south side. Provide a crown along the center line to achieve positive drainage.

Element Data

Element Group:	Approaches		Length:				
Element Name:	Guiderail		Width:				
Location:			Height:				
Material:	Steel/Timber		Count:				
Element Type:	3 - Cable and Flex Beam		Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	Galvanized						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m			50	50	Yes	

Comments: The flex beam on the north side is not to Code. There are no intermediate posts, a deficient connection to the structure parapet wall, and no end protection. The 3-cable guiderail on the south approach is set too high, the cable is loose, several posts are broken, and the structure connection is not to code.

Recommended Work: None 6-10 Years **1-5 Years** < 1 Year Urgent

Upgrade the north approach barrier protection and structure connection to meet current code. Replace the 3-cable south side barrier with flex beam.

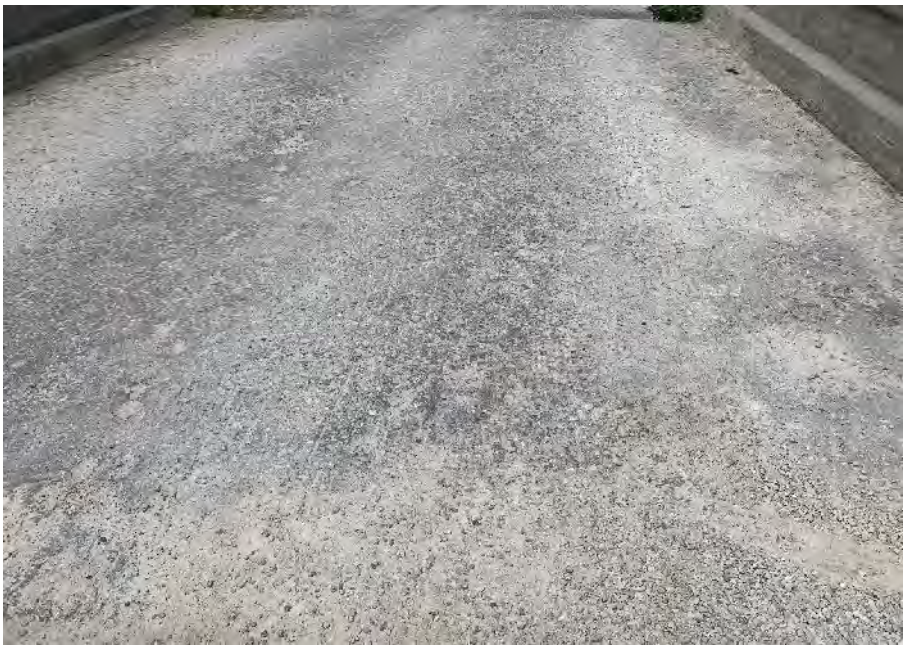


Photo 6-2: View of structure deck with delaminations

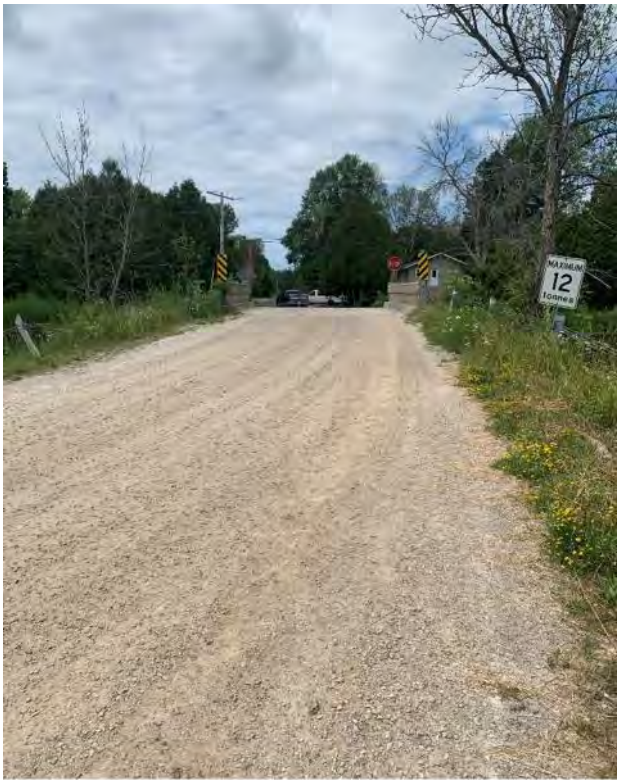


Photo 6-3: View of structure from south approach

Date of Photos: July 3, 2020

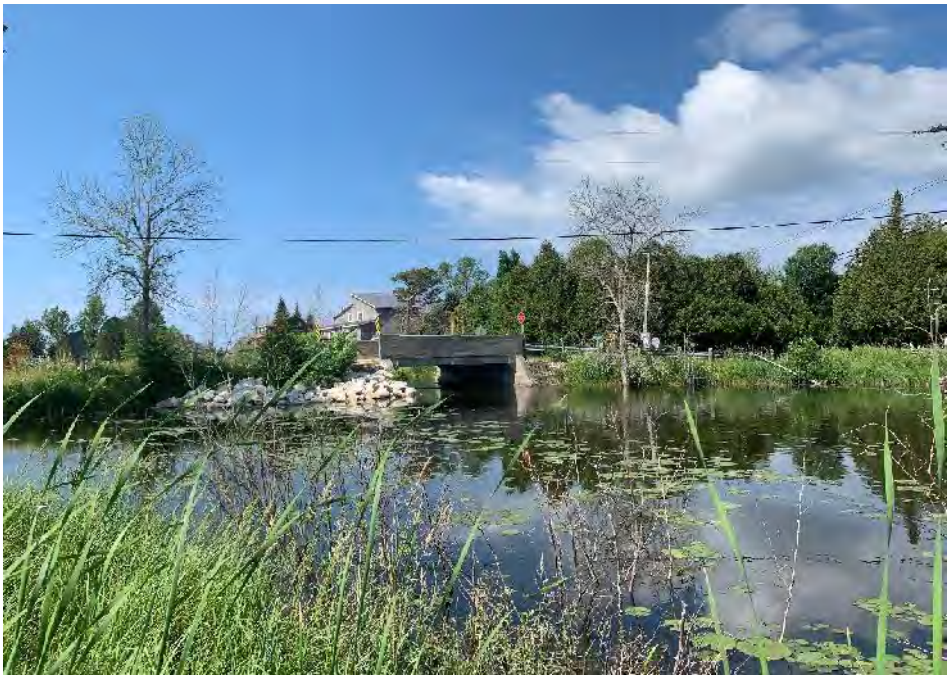


Photo 6-4: View of east structure elevation, slope protection and exterior of parapet wall

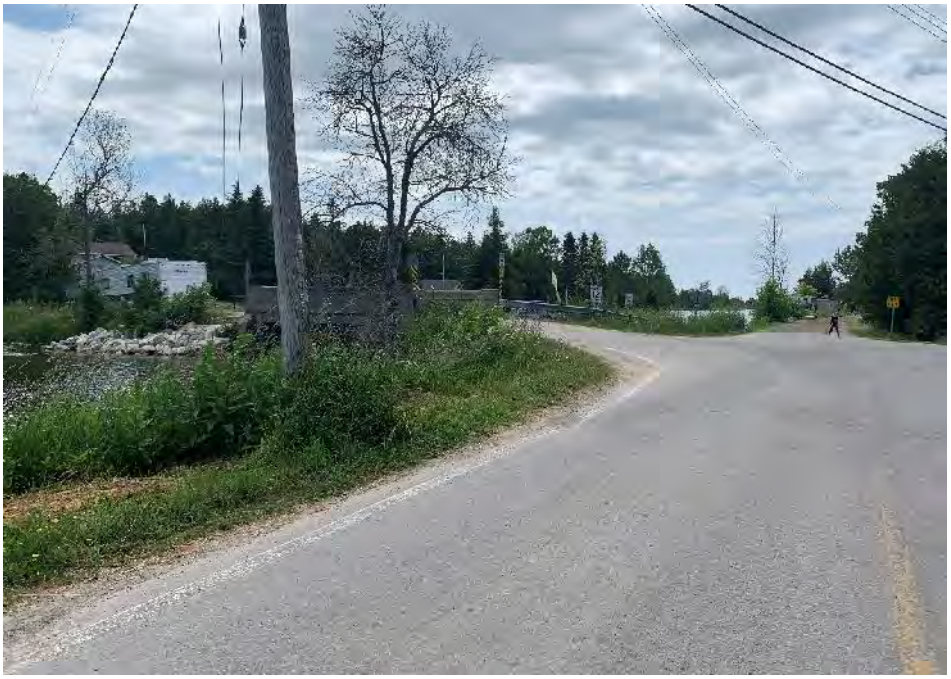


Photo 6-5: View of approach barrier flex beam and wood posts

Date of Photos: July 3, 2020

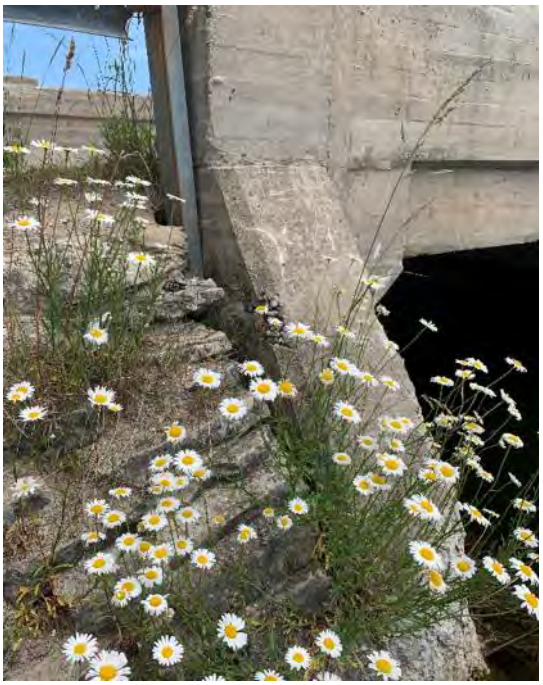


Photo 6-6: View of west structure elevation, wingwalls, exterior curb and parapet wall

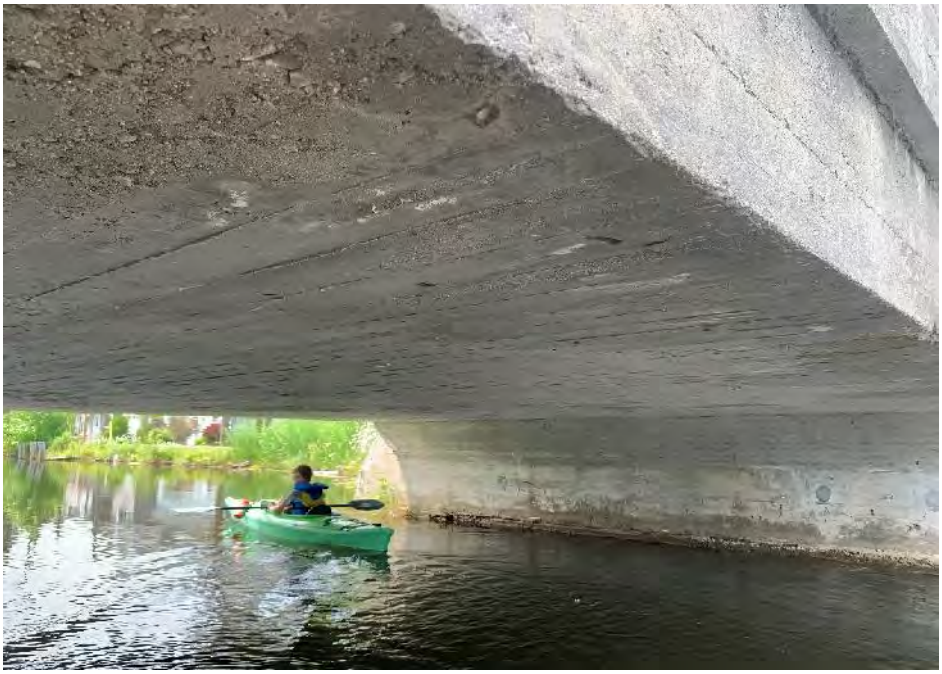


Photo 6-7: View of structure soffit

Date of Photos: July 3, 2020

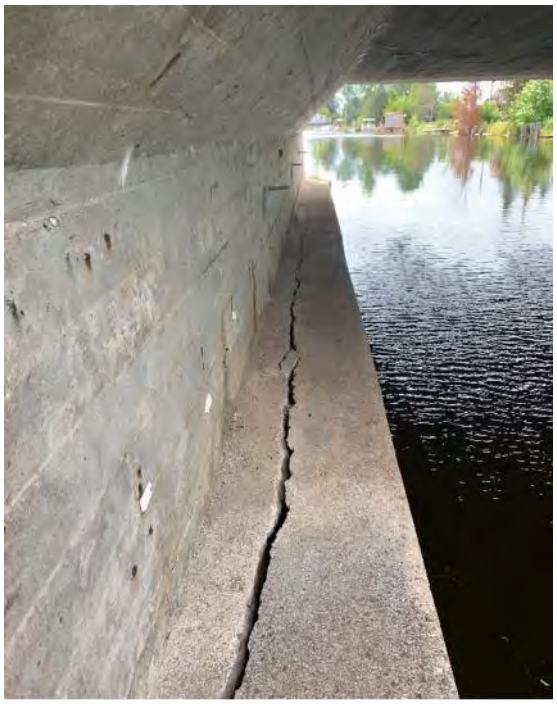


Photo 6-8: View of foundation crack and abutment wall

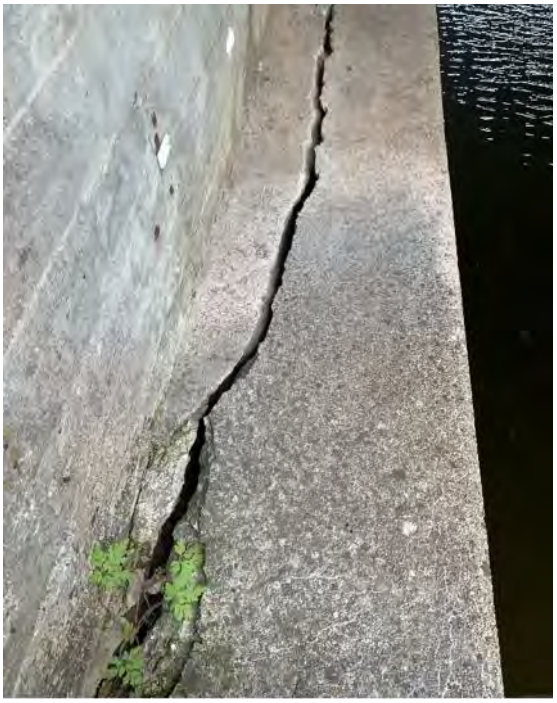


Photo 6-9: Differential foundation settlement

Date of Photos: July 3, 2020

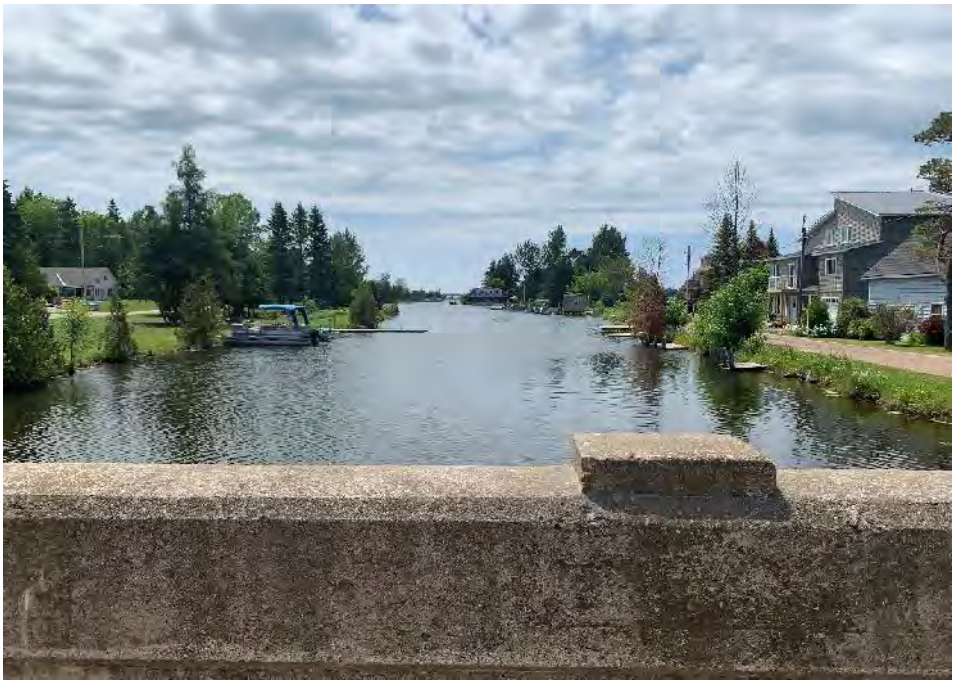


Photo 6-10: View of watercourse downstream

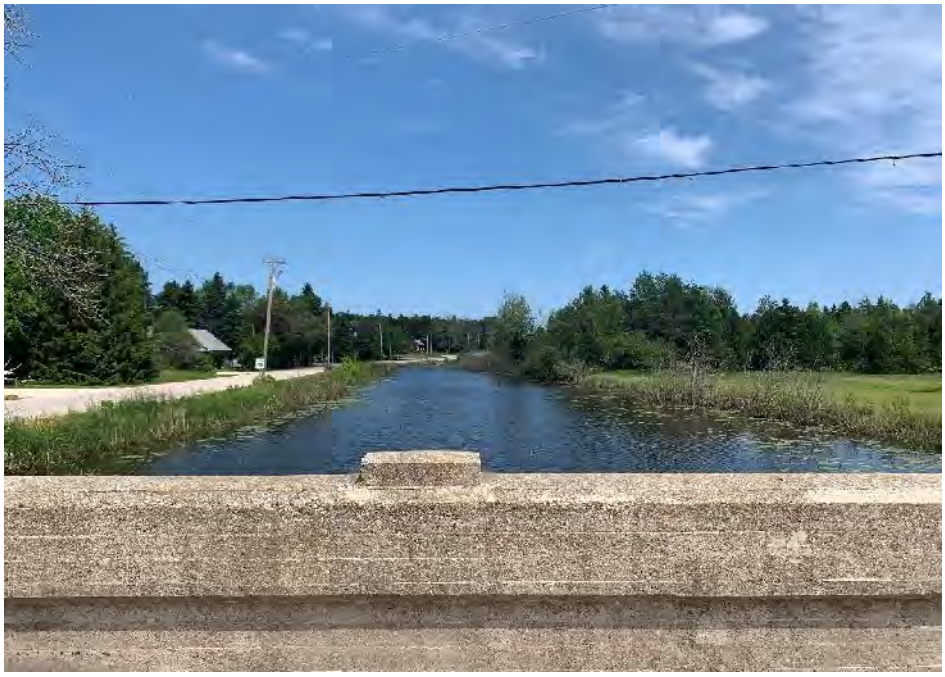


Photo 6-11: View of watercourse upstream

Date of Photos: July. 3, 2020

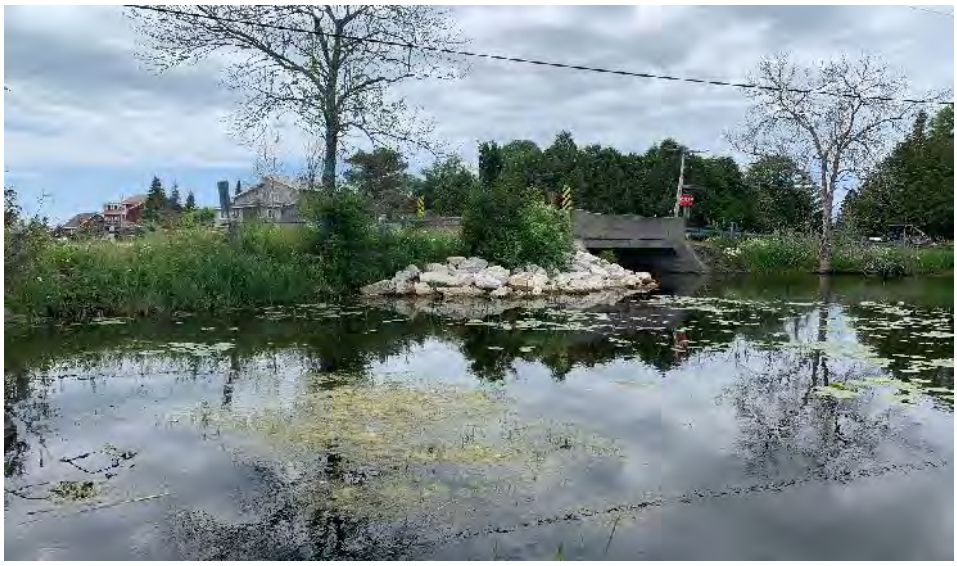
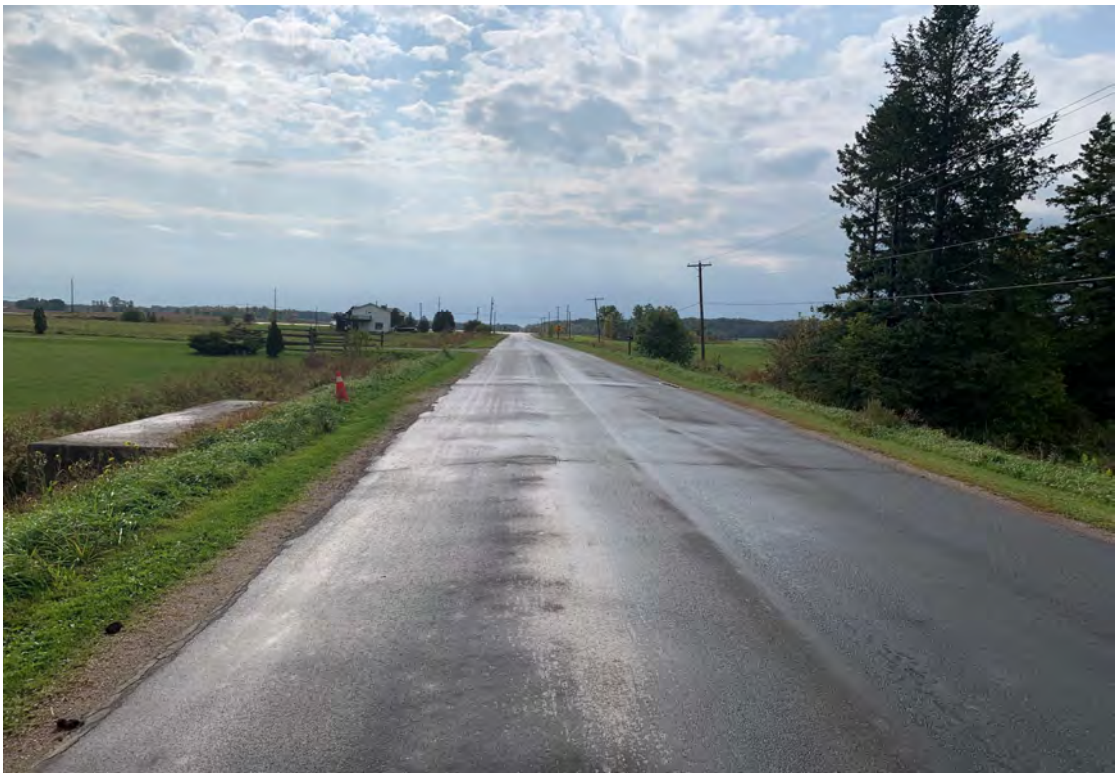


Photo 6-12: Southeast rock embankment protection

Date of Photos: July. 3, 2020

Bridge/Culvert Inspection Report

Site Number	7	**Project Number**	201-01605-00		
Structure Name	Lindsay Road 5 Culvert	**Municipality**	Northern Bruce Peninsula		
MTO Region Code	30	**County**	Bruce	**Code**	02
MTO District Code	33	**Geographic Twp Code**	377		



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Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Lindsay Road 5 Culvert	Site Number	7
County	Bruce	Road Name	Lindsay Road 5
Municipality	Northern Bruce Peninsula	Road Type	Rural Coll.
Bridge or Culvert	Culvert	Owner	Northern Bruce Peninsula
Structure Type	Rigid Frame	AADT	350
Span (m)	7.3 No. 1	% Trucks	15%
Height (m)	3.1	Overall Structure Width (m)	17.4
Direction of Structure	North/South	Roadway Width (m)	6.1
Year Built/Rehabilitated	1972	Total Deck Length (m)	8.4
Current Load Limit	None	Total Deck Area (s.m.)	146
Detour Length (km)	5.5	Heritage Des.	None
Waterway	Stokes River		

Inspection Data

Date of Inspection	September 24, 2020
Name of Inspector	Katie Hemstock, EIT
Equipment Used	Tape, pick, hammer
Weather Conditions	Overcast
Temperature	16°C
Last Inspection	November 8, 2018

Photos:

7-1 - Title Page

7-2 - View of watercourse upstream and upstream culvert end

7-3 - View of watercourse downstream and downstream culvert end

7-4 - Structure elevation

7-5 - Structure elevation

7-6 - View of soffit and abutment walls

Additional Investigation Required	None
Total Rehabilitation	Install approach & barrier protection to Code. Seal the abutment cold joints. Repair the erosion of the northwest corner.
Total Rehabilitation Budget Costing	$55,000
Next Inspection	September 2020
Justification	The structure is in overall good condition. Construction of approach & barrier protection is justified for public safety and to meet code. Reduce the speed to 45 km/hr. until barrier protection is installed.

Element Data

Structure:	7

Element Group:	Decks		Length:				
Element Name:	Wearing Surface		Width:				
Location:			Height:				
Material:	Surface Treatment		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%	75	15	10			

Comments: Asphalt wearing surface recently placed. Slight settlement was observed.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Element Data

Element Group:	Decks		Length:				
Element Name:	Deck Top		Width:				
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Benign		Limited Insp'n:	Yes			
Protection System:	Wearing Surface						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		95	5			

Comments: The visible ends are in overall good condition with some localized minor spalling

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Element Data

Element Group:	Decks		Length:				
Element Name:	Soffit - Thick Slab		Width:				
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Benign		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				

Comments: Minor cracking at base of haunch at construction joint.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Element Data

Structure:	7

Element Group:	Abutments	Length:	
Element Name:	Abutment Walls	Width:	
Location:	Each Side	Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		80	20			

Comments: Hairline cracks at cold joint in haunches and some spalling (honeycomb) on walls.
Transverse cracking at cold joint, 1/3 way up from footing on each side.

Recommended Work: None | **6-10 Years** | 1-5 Years | < 1 Year | Urgent

Concrete repair, seal cold joint.

Element Data

Element Group:	Foundations	Length:	
Element Name:	Foundation (below ground level)	Width:	
Location:	Each End	Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	Yes
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs

Comments: The foundations are not visible, but the structure appears stable.

Recommended Work: **None** | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Element Data

Element Group:	Embankments & Streams	Length:	
Element Name:	Streams and Waterways	Width:	
Location:		Height:	
Material:	Earth / Rock	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				

Comments: No signs of impedance to flow at the time of inspection. Medium velocity watercourse.

Recommended Work: **None** | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Element Data

Structure:	7

Element Group:	Embankments & Streams	Length:	
Element Name:	Embankments	Width:	
Location:	Each Corner	Height:	
Material:	Earth / Rock	Count:	6
Element Type:		Total Quantity:	6
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		5	1			

Comments: The embankments are heavily vegetated with rip rap protection on the slopes. The slopes are very steep and there is observed erosion at the northwest quadrant.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Repair northwest slope erosion.

Element Data

Element Group:	Signs	Length:	
Element Name:	Signs	Width:	
Location:	Each Corner	Height:	
Material:		Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%					Yes	

Comments: No end hazard signs at structure.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Install four end hazard signs to provide required vehicle safety.

Element Data

Element Group:	Approaches	Length:	
Element Name:	Wearing Surface	Width:	
Location:	Each End	Height:	
Material:	Asphalt	Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		75	25			

Comments: Asphalt wearing surface recently placed. Slight settlement was observed at the deck ends.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

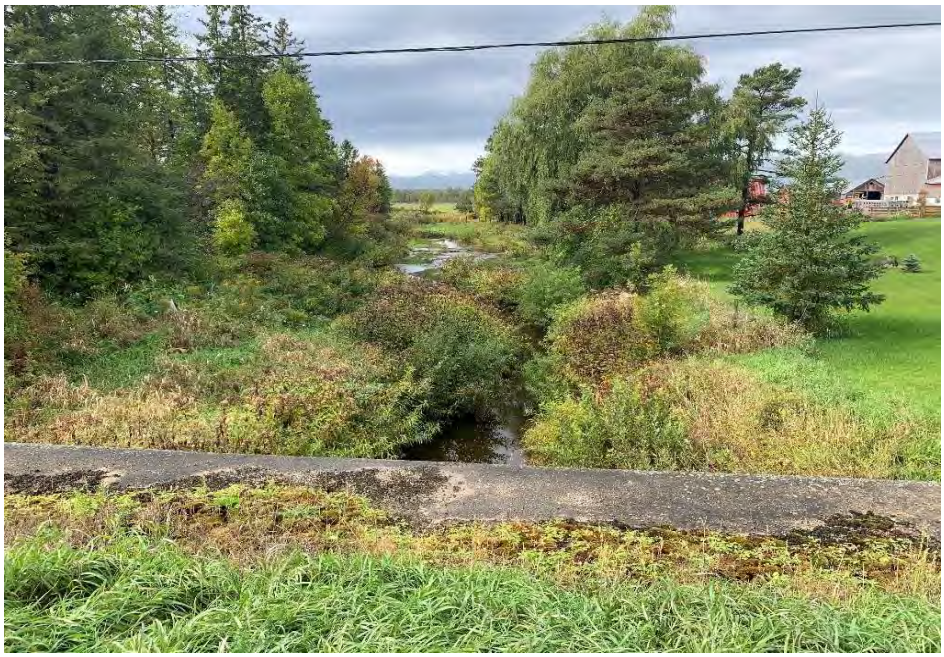


Photo 7-2: View of watercourse upstream and upstream culvert end

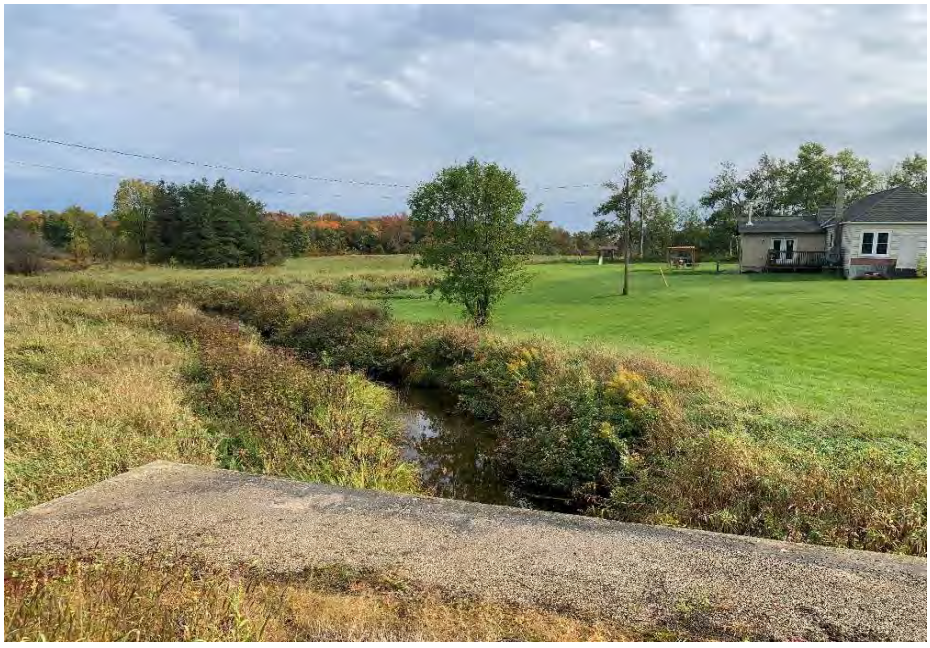


Photo 7-3: View of watercourse downstream and downstream culvert end

Date of Photos: September 24, 2020

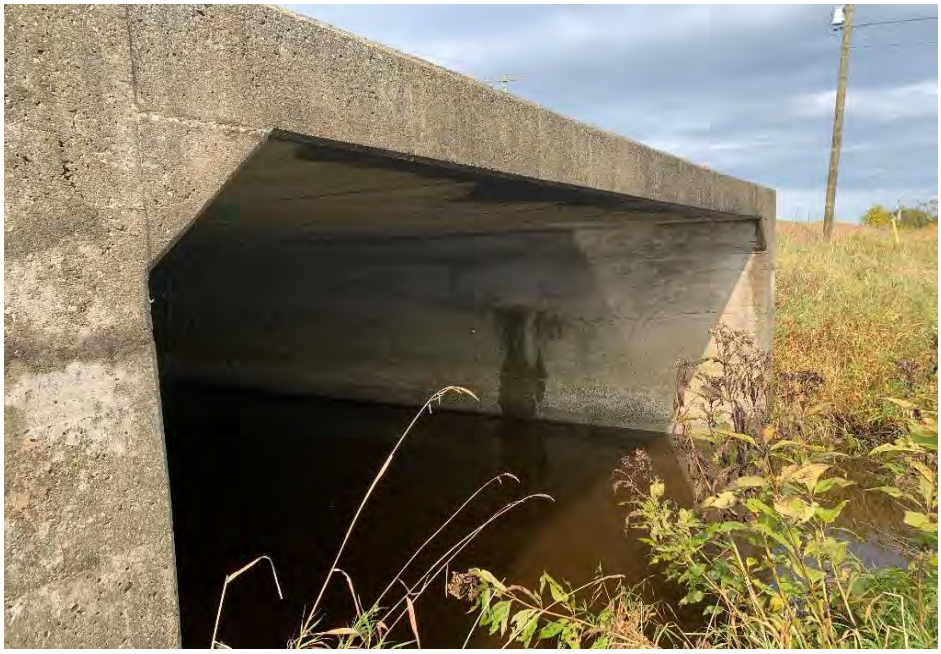


Photo 7-4: Structure Elevation

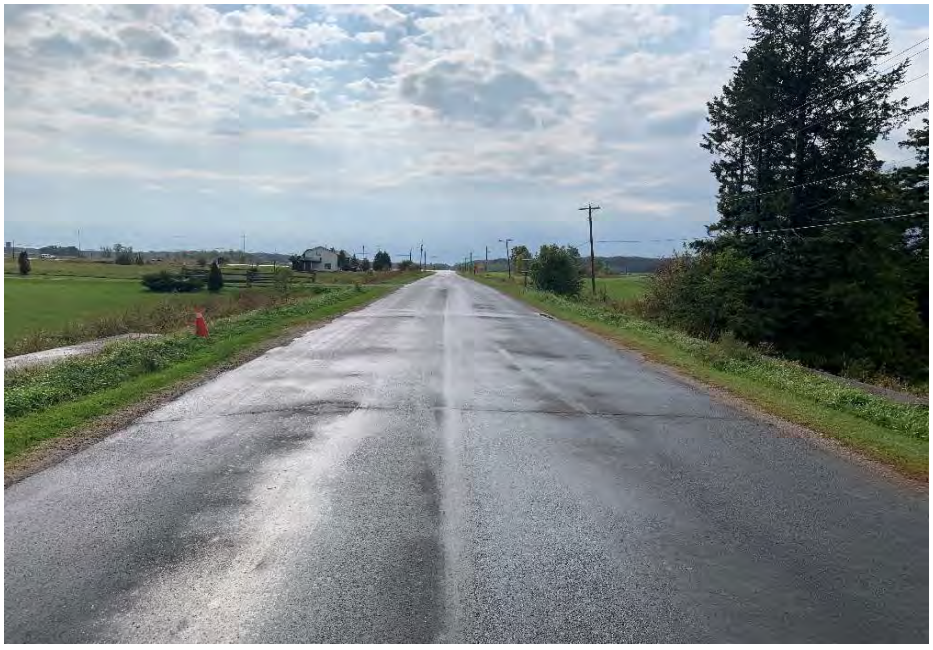


Photo 7-5: Wearing Surface

Date of Photos: September 24, 2020

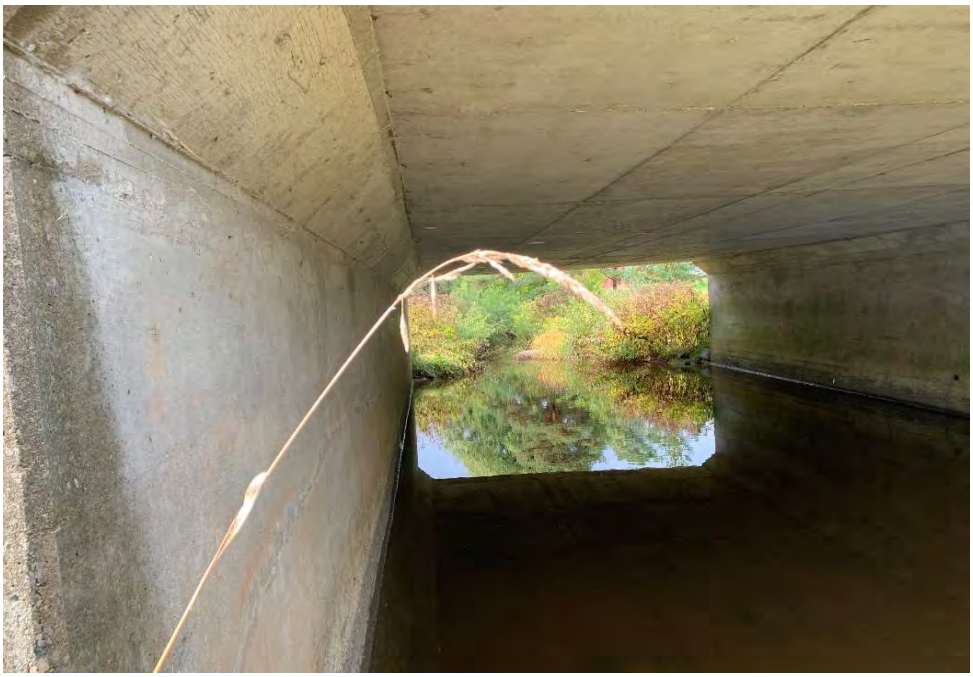
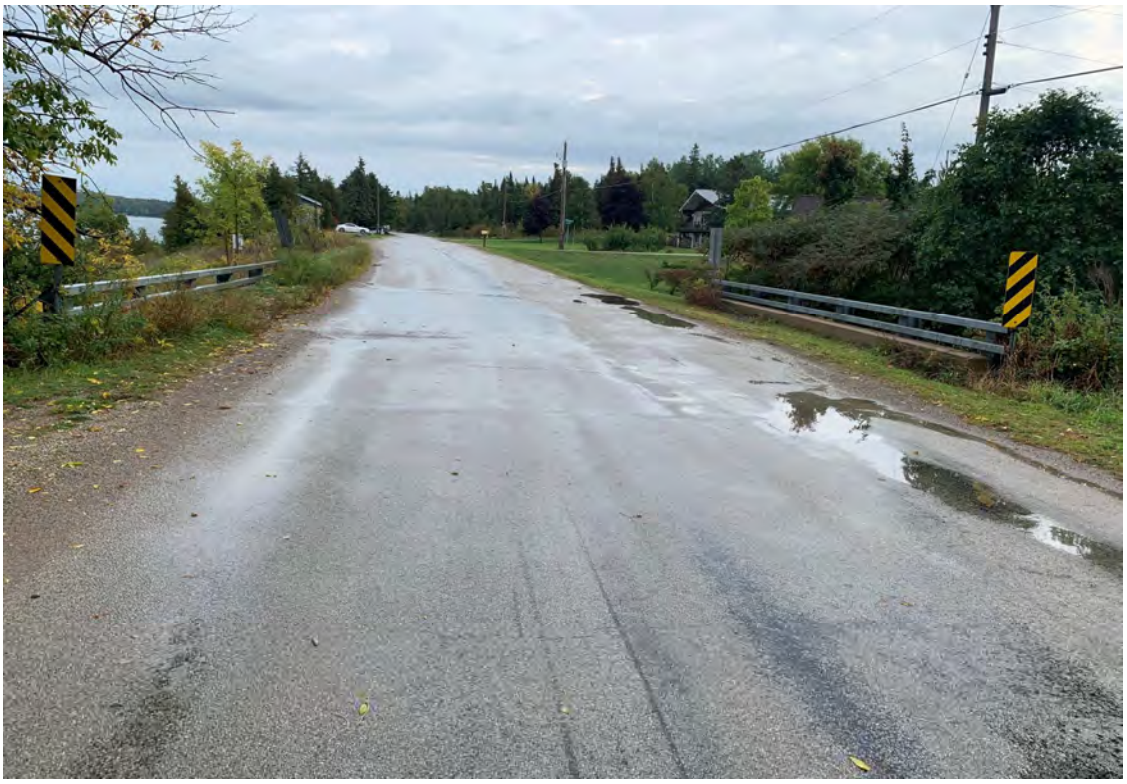


Photo 7-6: View of soffit and abutment walls

Date of Photos: September 24, 2020

Bridge/Culvert Inspection Report

Site Number	8	**Project Number**	201-01605-00		
Structure Name	Isthmus Bay Road Bridge	**Municipality**	Northern Bruce Peninsula		
MTO Region Code	30	**County**	Bruce	**Code**	02
MTO District Code	33	**Geographic Twp Code**	377		



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Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Isthmus Bay Road Bridge	Site Number	8
County	Bruce	Road Name	Isthmus Bay Road
Municipality	Northern Bruce Peninsula	Road Type	Rural Coll.
Bridge or Culvert	Bridge	Owner	Northern Bruce Peninsula
Structure Type	Concrete Slab	AADT	350
Span (m)	6.1 No. 1	% Trucks	10%
Height (m)	1.5	Overall Structure Width (m)	9.9
Direction of Structure	East/West	Roadway Width (m)	7.3
Year Built/Rehabilitated	1950/2000	Total Deck Length (m)	7.3
Current Load Limit	None	Total Deck Area (s.m.)	72
Detour Length (km)	14	Heritage Des.	None
Waterway	Swan Lake Drain		

Inspection Data

Date of Inspection	September 24, 2020
Name of Inspector	Katherine Hemstock, EIT
Equipment Used	Tape, pick, hammer
Weather Conditions	Overcast
Temperature	16°C
Last Inspection	November 8, 2018

Photos:
8-1 - Title Page
8-2 - View of structure barrier, signage (typical) and encroaching vegetation
8-3 - View of watercourse upstream and deficient barrier protection
8-4 - Deficient barrier termination and hazard signage
8-5 - View of watercourse downstream and deficient barrier protection
8-6 - View of structure approach and deck wearing surface
8-7 - View of east structure elevation, wingwalls, exterior soffit and curb
8-8 - View of north abutment wall and bedrock streambed
8-9 - View of south abutment wall and soffit
8-10 - View of structure soffit
8-11 - View of east structure elevation, exterior barrier protection, curb and soffit

Additional Investigation Required	Deck condition survey
Total Rehabilitation	Repair the concrete soffit at the southeast wingwall and the footing. Upgrade the barrier protection to meet Code.
Total Rehabilitation Budget Costing	$70,000
Next Inspection	September 2022
Justification	Due to the good overall condition of the structure, undertake the rehabilitation and upgrade the barrier protection to extend the safe service life.

Element Data

Structure:	8

Element Group:	Decks	Length:	7.3
Element Name:	Wearing Surface	Width:	6.4
Location:		Height:	
Material:	Asphalt	Count:	
Element Type:		Total Quantity:	46.72
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			42.05	4.67		

Comments: Flat grade creating poor drainage, gravel and vegetation build up at the edges retaining moisture.

Recommended Work: None [6-10 Years] 1-5 Years < 1 Year Urgent

Remove gravel and debris at bridge edges.

Element Data

Element Group:	Decks	Length:	7.3
Element Name:	Deck Top	Width:	9.4
Location:		Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	68.62
Environment:	Moderate	Limited Insp'n:	Yes
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2		68.62				

Comments:
Limited inspection due to surface treatment wearing surface cover. The edges have granular and vegetation build up.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Clear the granulars and vegetation along the sides. When the wearing surface is to be replaced, remove and inspect the condition of the top deck.

Element Data

Element Group:	Decks	Length:	10.3
Element Name:	Soffit - Thick Slab	Width:	6.1
Location:		Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	62.83
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2		31.42	31.42			

Comments: Some spalling was observed at the east end, but is in relatively good condition. The west portion is newer and in good condition.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Structure:	8

Element Group:	Decks	Length:	
Element Name:	Drainage	Width:	
Location:		Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100		Yes	Yes

Comments: Graded to curbs that are debris covered.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Clear the debris and gravel along the curb to achieve drainage.

Element Data

Element Group:	Sidewalks/curbs	Length:	10.5
Element Name:	Curbs	Width:	0.3
Location:		Height:	0.25
Material:	Concrete	Count:	2
Element Type:		Total Quantity:	11.55
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2		8.66	2.89			

Comments: The curbs have some surface spalling.

Recommended Work: None [6-10 Years] 1-5 Years < 1 Year Urgent

Remove all poor concrete, clean reinforcing steel, and replace concrete.

Element Data

Element Group:	Barriers	Length:	10.5
Element Name:	Railing Systems	Width:	
Location:		Height:	
Material:	Steel	Count:	2
Element Type:	Box Beam	Total Quantity:	21
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m			21		Yes	

Comments: There is currently no approach barrier protection. The structure barrier protection does not meet Code (height).

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Install barrier protection to meet current Code.

Element Data

Structure:	8

Element Group:	Barriers	Length:	
Element Name:	Posts	Width:	
Location:		Height:	
Material:	Steel	Count:	12
Element Type:	I-Beam	Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		12			Yes	

Comments: The structure barrier protection does not meet Code.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Upgrade the barrier protection to Code.

Element Data

Element Group:	Abutments	Length:	10.3
Element Name:	Abutment Walls	Width:	
Location:		Height:	1.8
Material:	Concrete	Count:	2
Element Type:		Total Quantity:	37.08
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2		18.54	18.54			

Comments: Some surface cracking & spalling at east end.
West end is newer and is in good condition.

Recommended Work: None [6-10 Years] 1-5 Years < 1 Year Urgent

Remove and replace all poor concrete, clean reinforcing steel, and replace concrete.

Element Data

Element Group:	Abutments	Length:	2.1
Element Name:	Wingwalls	Width:	
Location:		Height:	1.5
Material:	Concrete	Count:	4
Element Type:		Total Quantity:	12.6
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2		6.3	6.3			

Comments: Some surface spalling & cracking was observed, specifically at the southest corner. The west abutment is in good condition.

Recommended Work: None [6-10 Years] 1-5 Years < 1 Year Urgent

Remove and replace all poor concrete, clean reinforcing steel, and replace concrete.

Element Data

Structure:	8

Element Group:	Foundations	Length:	
Element Name:	Foundation	Width:	
Location:		Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	Yes
Protection System:		Rip-Rap at West Corner	

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs

Comments: Limited inspection due to cover, however the structure appears stable.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Element Group:	Embankments & Streams	Length:	
Element Name:	Slope Protection	Width:	
Location:		Height:	
Material:	Earth / Stone	Count:	6
Element Type:		Total Quantity:	6
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		6				

Comments: The slopes are well vegetated and appear stable.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Element Group:	Signs	Length:	
Element Name:	Signs	Width:	
Location:		Height:	
Material:	Steel	Count:	4
Element Type:		Total Quantity:	4
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			3	1	Yes	Yes

Comments: Four end hazard signs are currently in place. The southeast sign is damaged and requires replacement.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent
Replace the southeast hazard sign.

Element Data

Structure:	8

Element Group:	Approaches	Length:	5
Element Name:	Wearing Surface	Width:	7.3
Location:		Height:	
Material:	Surface Treatment	Count:	2
Element Type:		Total Quantity:	73
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2			65.7	7.3	Yes	

Comments: Stress cracking, previous patches, settlement at bridge deck, and wheel path rutting were observed throughout the wearing surface.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Replace the approach surface treatment.

Element Data

Element Group:	Approaches	Length:	
Element Name:	Drainage	Width:	
Location:		Height:	
Material:	Asphalt	Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			90	10	Yes	Yes

Comments: Settlement (stress) and cracking

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Rehab - Base (drainage) and surface with road resurfacing

Maintenance - clear shoulder debris and vegetation and grade for drainage

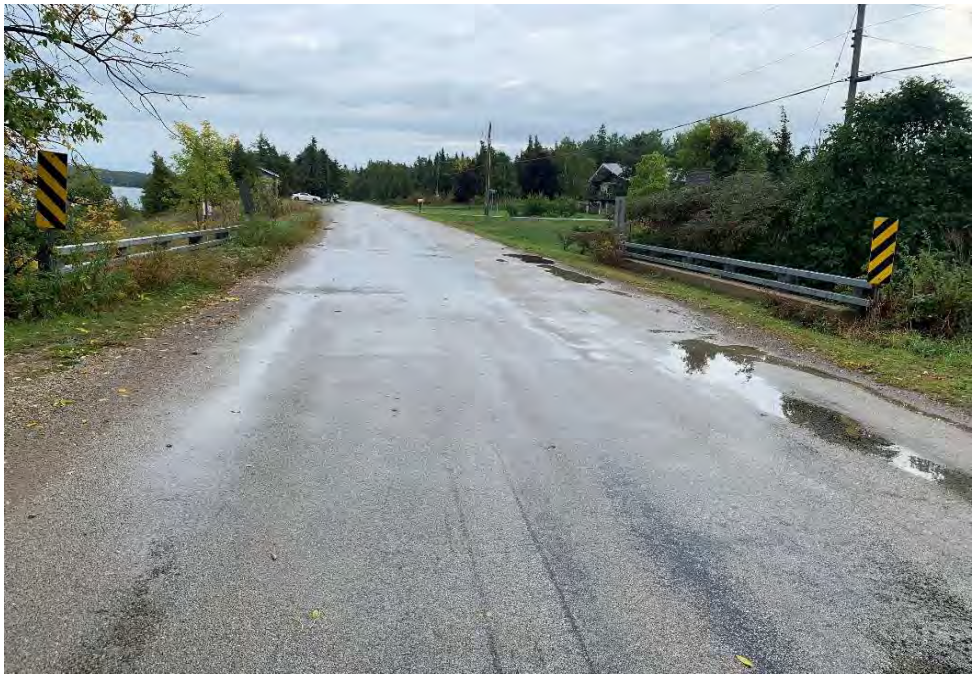


Photo 8-2: View of structure barrier, signage (typ) and encroaching vegetation

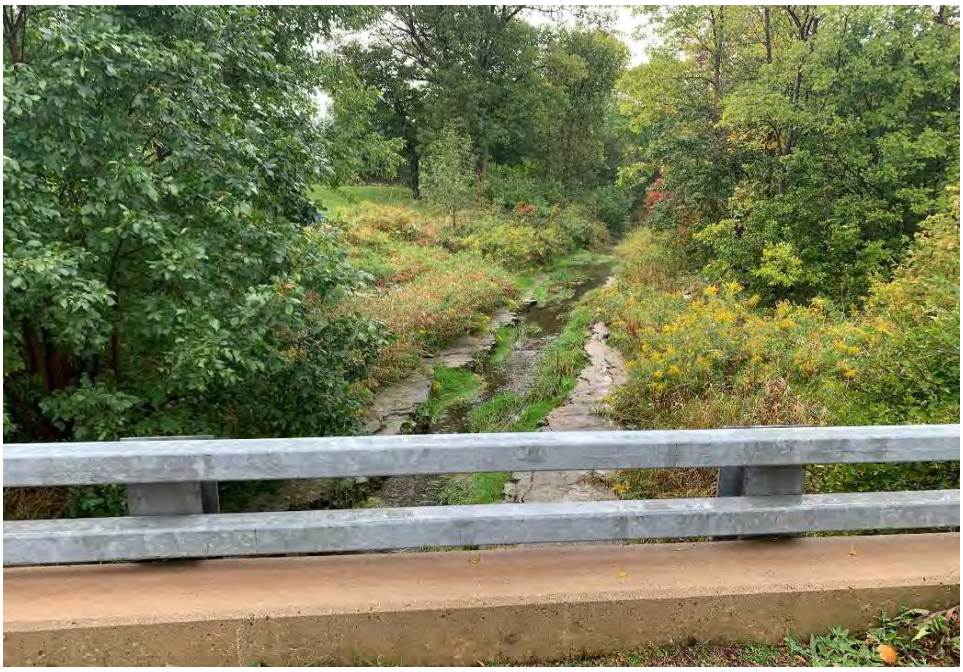


Photo 8-3: View of watercourse upstream and deficient barrier protection

Date of Photos: Sept 24, 2020

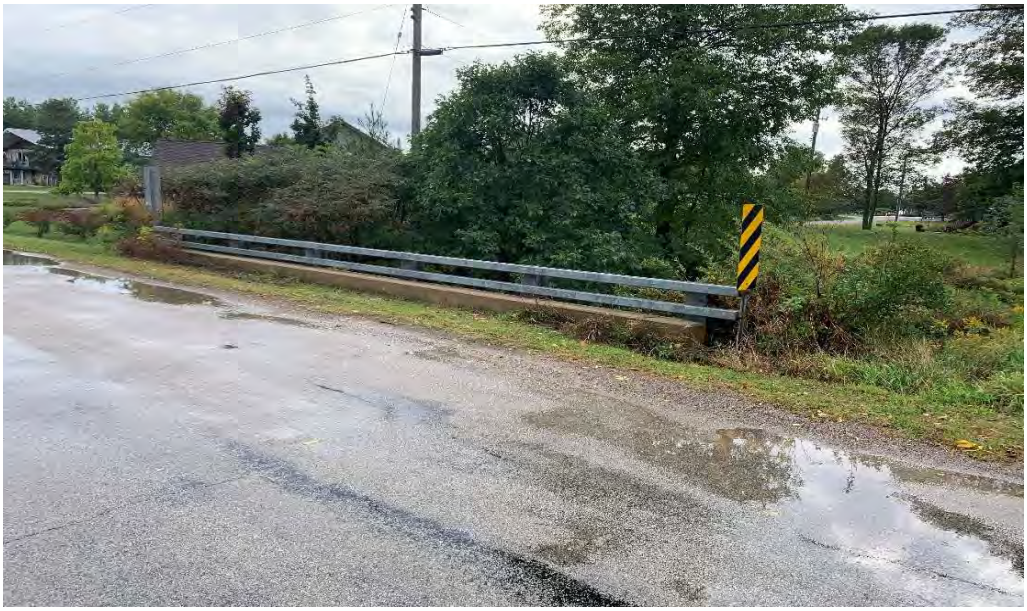


Photo 8-4: Deficient barrier termination and hazard signage

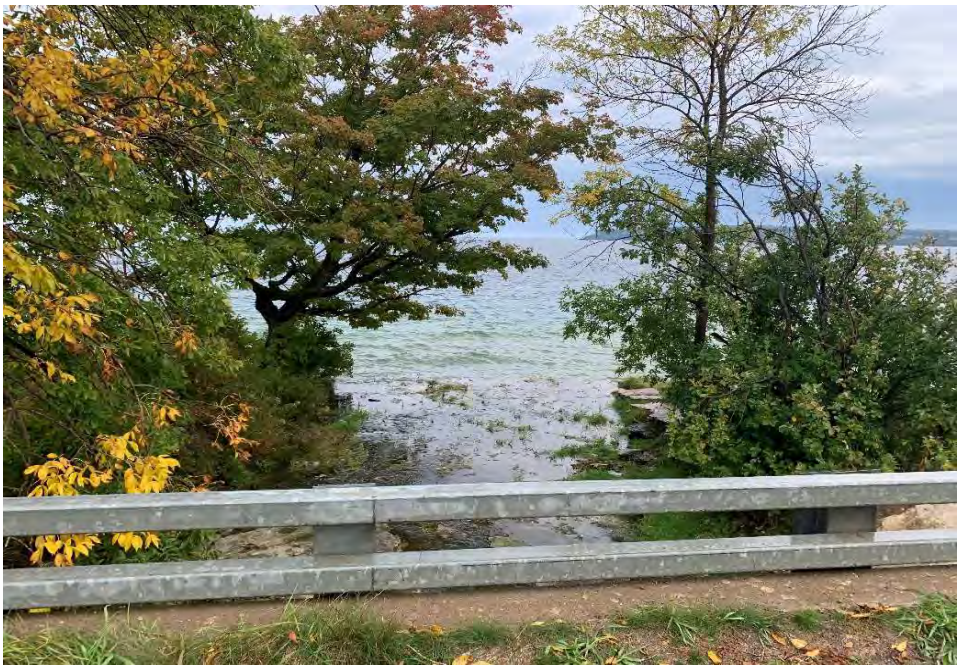


Photo 8-5: View of watercourse downstream and deficient barrier protection

Date of Photos: Sept 24, 2020

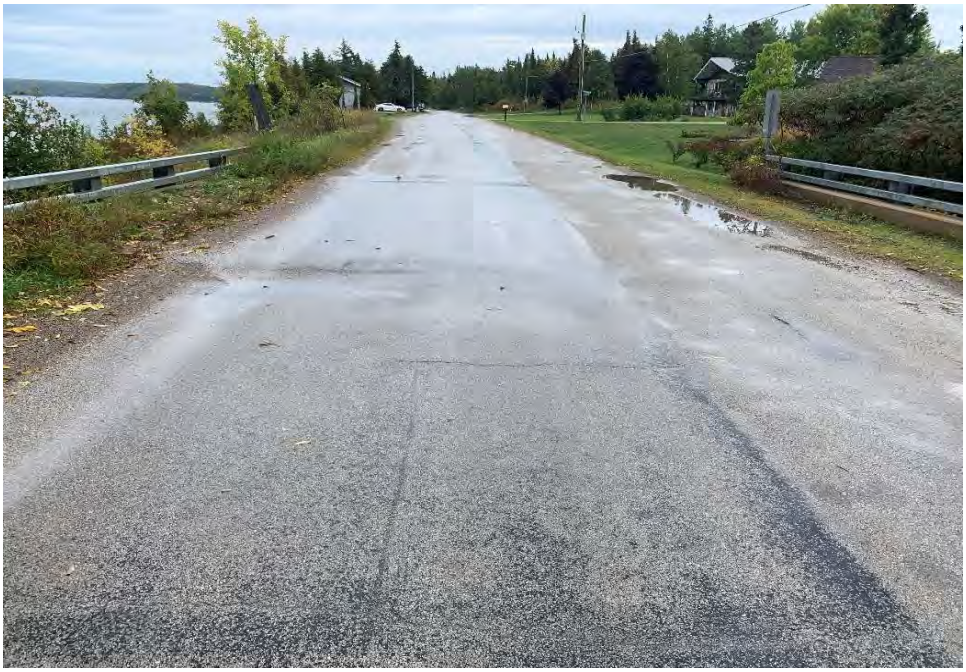


Photo 8-6: View of structure approach and deck wearing surface

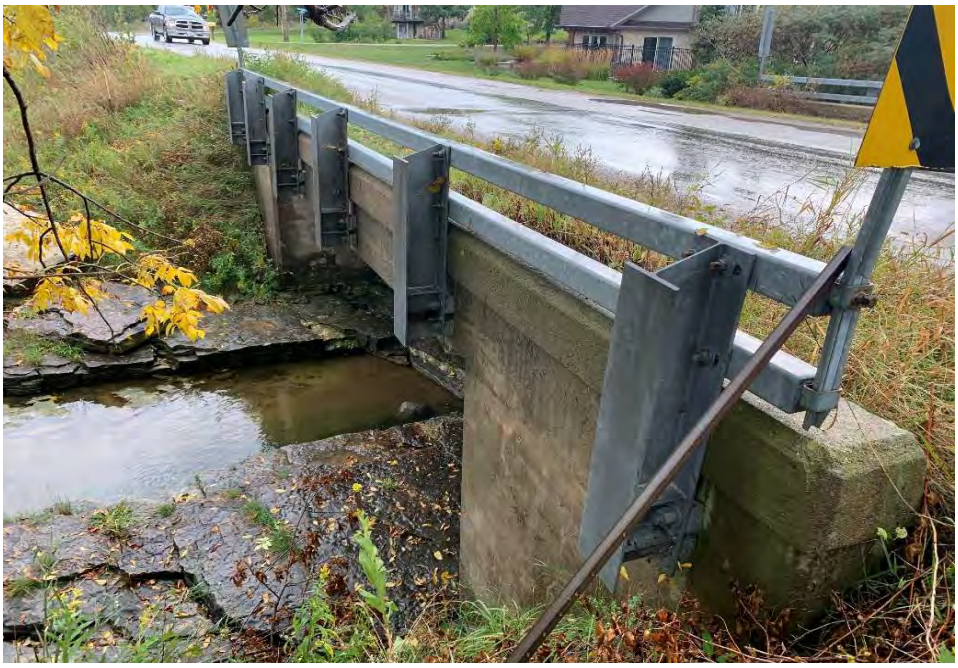


Photo 8-7: View of east structure elevation, wingwalls, exterior soffit and curb

Date of Photos: Sept 24, 2020

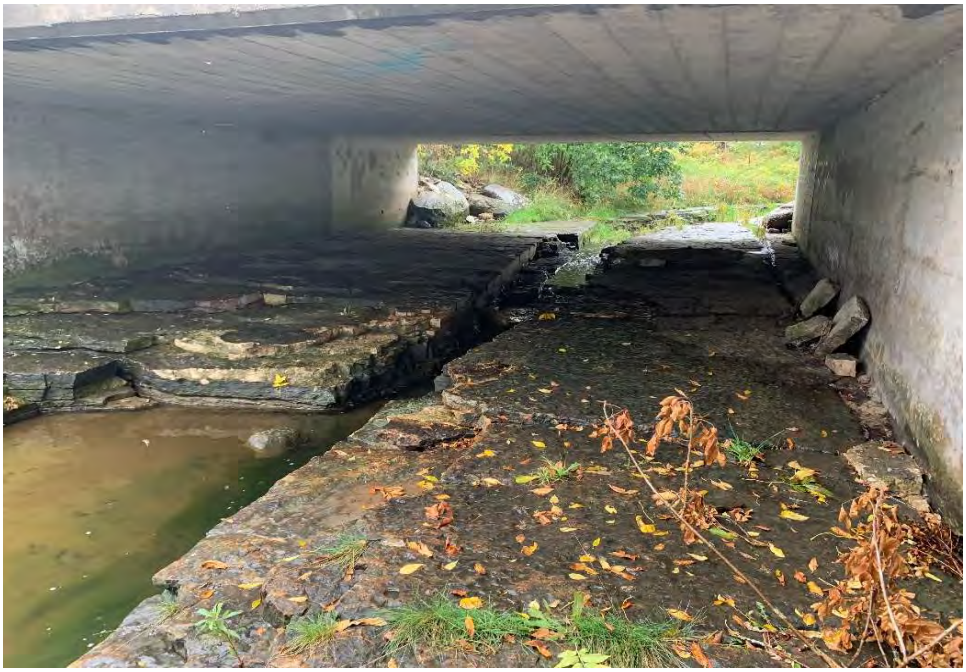


Photo 8-8: View of north abutment wall and bedrock streambed

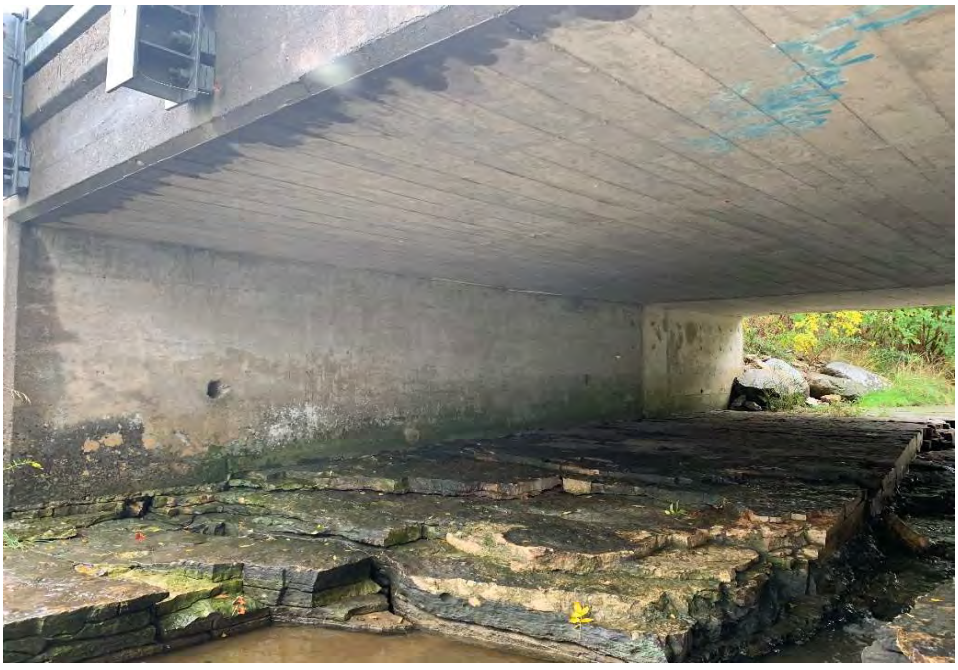


Photo 8-9: View of south abutment wall and soffit

Date of Photos: Sept 24, 2020

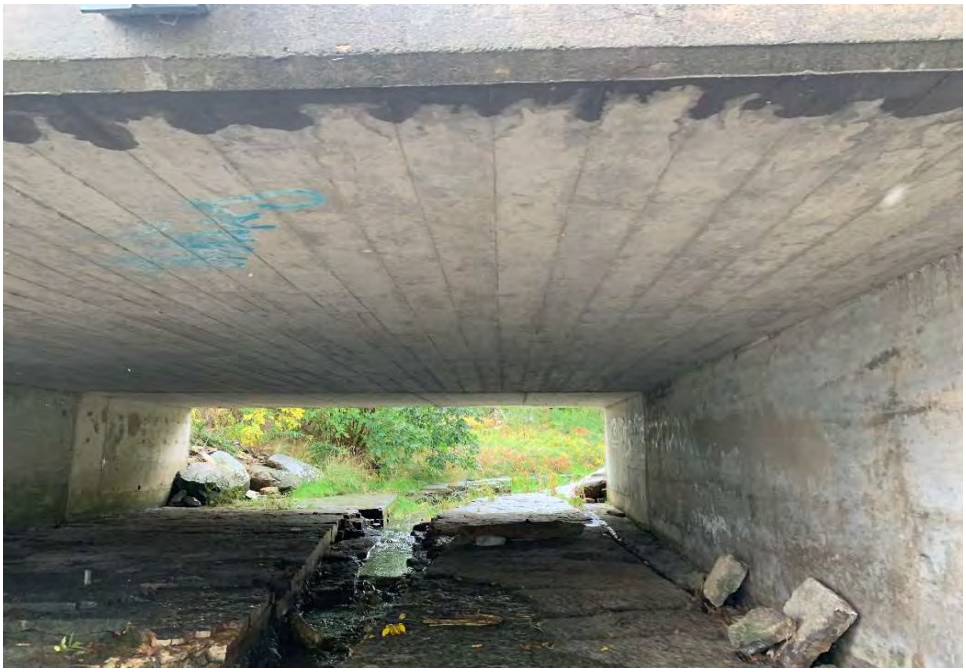


Photo 8-10: View of structure soffit

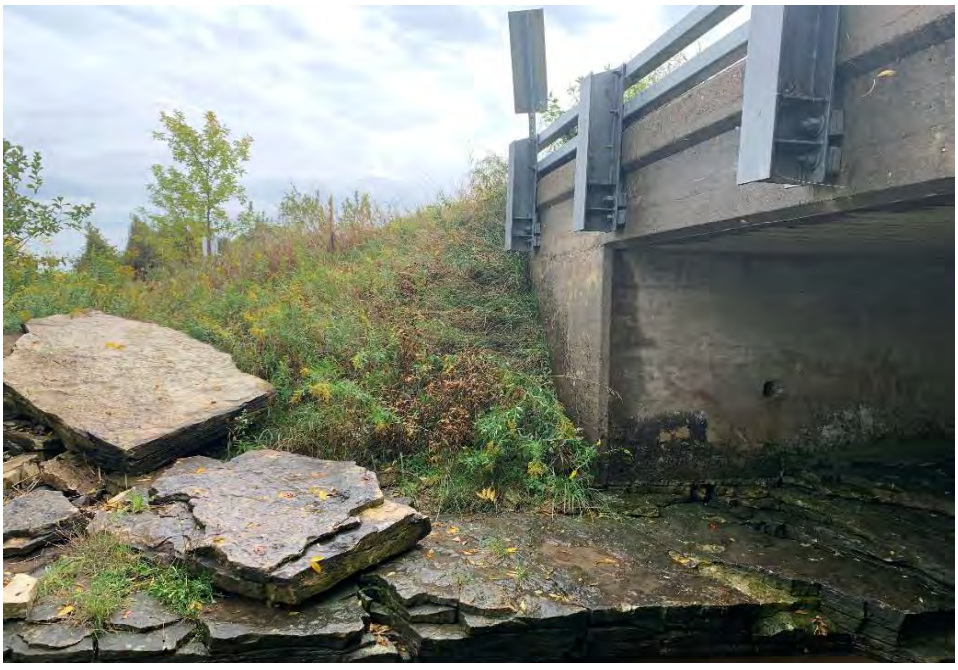
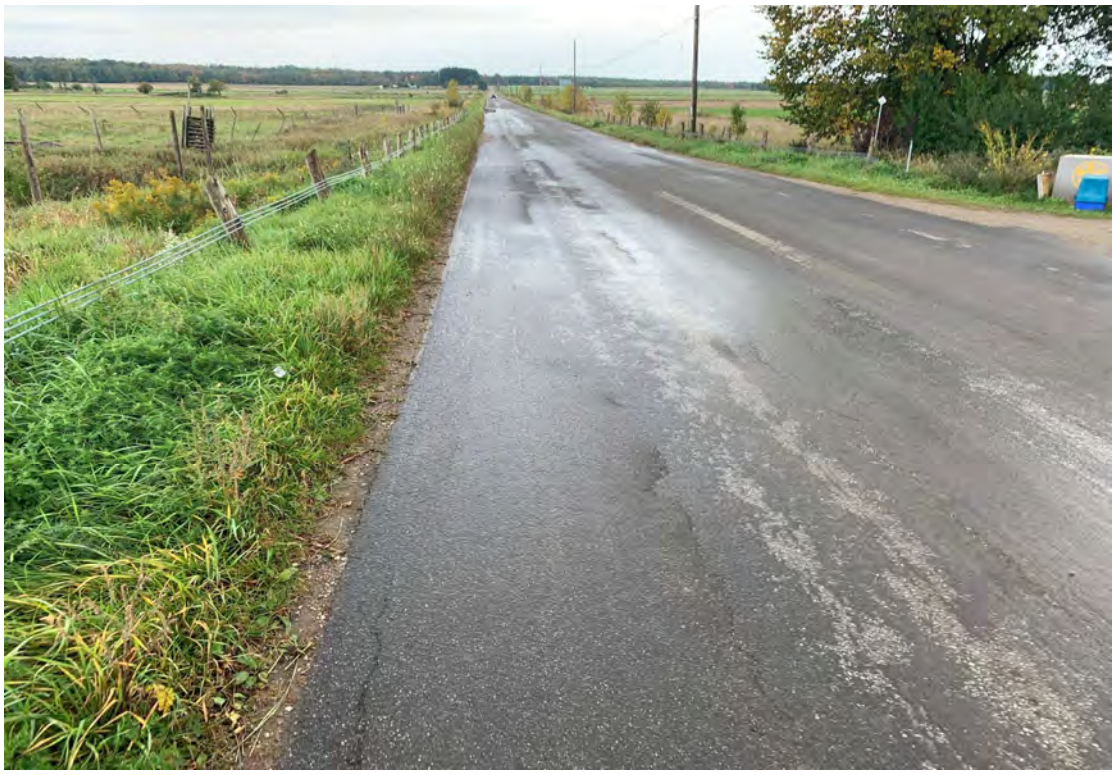


Photo 8-11: View of structure elevation, exterior barrier protection, curb and soffit

Date of Photos: Sept 24, 2020

Bridge/Culvert Inspection Report

Site Number	9	**Project Number**	201-01605-00		
Structure Name	Cape Chin Culvert	**Municipality**	Northern Bruce Peninsula		
MTO Region Code	30	**County**	Bruce	**Code**	02
MTO District Code	33	**Geographic Twp Code**	377		



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Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Cape Chin Culvert	Site Number	09
County	Bruce	Road Name	East Road
Municipality	Northern Bruce Peninsula	Road Type	Rural Coll.
Bridge or Culvert	Culvert	Owner	Northern Bruce Peninsula
Structure Type	Rigid Frame - Arch - Precast	AADT	350
Span (m)	4.3 No. 1	% Trucks	15%
Height (m)	1.8	Overall Structure Width (m)	15
Direction of Structure	East/West - 20° skew	Roadway Width (m)	7.5
Year Built/Rehabilitated	2008	Total Deck Length (m)	4.9
Current Load Limit	None	Total Deck Area (s.m.)	68.6
Detour Length (km)	32	Heritage Des.	None
Waterway	Chin Creek		

Inspection Data

Date of Inspection	September 24, 2020
Name of Inspector	Katie Hemstock, EIT
Equipment Used	Tape, pick, hammer
Weather Conditions	Overcast
Temperature	16°C
Last Inspection	November 8, 2018

Photos:

9-1 - Title Page
9-2 - View of structure inlet elevation and embankments
9-3 - View of structure outlet elevation and embankments
9-4 - View of pipe arch soffit and walls
9-5 - View of west 3 cable guiderail barrier protection with loose cable
9-6 - View of watercourse upstream
9-7 - View of watercourse downstream
9-8 - View of northeast deficient section of 3 cable guiderail (impact damage)
9-9 - View of structure wearing surface from approaching perspective
9-10 - HDPE pipe culvert downstream of main culvert

Additional Investigation Required	None
Total Rehabilitation	The cable guiderail needs tightening. The northeast corner cable connection is missing. Replace the rotten posts. Complete the embankment erosion repairs.
Total Rehabilitation Budget Costing	$6,000
Next Inspection	September, 2022
Justification	Repair the barrier protection to ensure vehicle safety.

Element Data

Structure:	9

Element Group:	Culvert	Length:	15
Element Name:	Barrels	Width:	4
Location:		Height:	1.1
Material:	Concrete	Count:	93
Element Type:	Arch	Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencie	Maint. Needs
	m^2		93				

Comments: The concrete arch is in good condition with no visible defects.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Element Data

Element Group:	Culvert	Length:	
Element Name:	Inlet Components	Width:	4.3
Location:		Height:	0.2
Material:	Concrete	Count:	1
Element Type:		Total Quantity:	1.34
Environment:	Benign	Limited Insp'n:	Yes
Protection System:	Wearing Surface		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencie	Maint. Needs
	m^2		1.34				

Comments: The inlet embankments and slope protection appear stable and are unobstructed.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Element Data

Element Group:	Culvert	Length:	
Element Name:	Outlet Components	Width:	4.3
Location:		Height:	0.2
Material:	Concrete	Count:	1
Element Type:		Total Quantity:	1.34
Environment:	Moderate	Limited Insp'n:	
Protection System:	Wearing Surface		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencie	Maint. Needs
	m^2		1.34				

Comments: The outlet embankments and slope protection are stable. There is a HDPE pipe culvert which outlets just downstream of the main culvert.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Element Data

Structure:	9

Element Group:	Barriers	Length:	3.85
Element Name:	Railing System	Width:	
Location:	Each Side	Height:	
Material:	Steel	Count:	35
Element Type:	3-Cable on Wood Post	Total Quantity:	134.75
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m				134.75	Yes	

Comments: The 3-cable guiderail cables need tightening on both the east and west sides. The northeast quadrant has observed impact damage.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Tighten the west and east cables and repair the damaged northeast section.

Element Data

Element Group:	Barriers	Length:	
Element Name:	Posts	Width:	
Location:		Height:	
Material:	Wood	Count:	37
Element Type:		Total Quantity:	37
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		17	15	5	Yes	

Comments: The cables need tightening on both sides. Five (5) posts require replacement at the northeast quadrant. Overall, the posts are showing signs of rot.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Tighten each cable and replace damaged posts.

Element Data

Element Group:	Deck	Length:	4.3
Element Name:	Wearing Surface	Width:	6.9
Location:		Height:	
Material:	Asphalt	Count:	1
Element Type:		Total Quantity:	29.67
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2	29.67					

Comments: The new asphalt wearing surface is in excellent condition.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Structure:	9

Element Group:	Foundations	Length:	
Element Name:	Foundation (below ground level)	Width:	
Location:	Each End	Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	Yes
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%						

Comments: The foundations are not visible for inspection, however the structure appears stable.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Element Group:	Embankments & Streams	Length:	
Element Name:	Streams and Waterways	Width:	
Location:		Height:	
Material:	Bedrock	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				

Comments: The watercourse is unobstructed and in good condition.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Element Group:	Embankments & Streams	Length:	
Element Name:	Embankments	Width:	
Location:	Each Corner	Height:	
Material:	Stone	Count:	6
Element Type:		Total Quantity:	6
Environment:	Moderate	Limited Insp'n:	
Protection System:	Rip Rap		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		5	1			

Comments: The embankments are in good condition with large rip rap slope protection. Some minor erosion was observed between the rip-rap.

Recommended Work: None [6-10 Years] 1-5 Years < 1 Year Urgent
Repair the erosion.

Element Data

Structure:	9

Element Group:	Signs	Length:	
Element Name:	Signs	Width:	
Location:	Each Corner	Height:	
Material:	Steel	Count:	4
Element Type:		Total Quantity:	4
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each	4				Yes	Yes

Comments: Signs in excellent condition, end of guiderail marker posts/sign.
No end hazard signs.

Recommended Work: None | 6-10 Years | 1-5 Years | [< 1 Year] | Urgent

Install four end hazard signs to increase vehicle safety.

Element Data

Element Group:	Approaches	Length:	5
Element Name:	Wearing Surface	Width:	6.9
Location:	Each End	Height:	
Material:	Asphalt	Count:	2
Element Type:		Total Quantity:	69
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	m^2	69					

Comments: The new asphalt wearing surface is in excellent condition.

Recommended Work: [None] | 6-10 Years | 1-5 Years | < 1 Year | Urgent

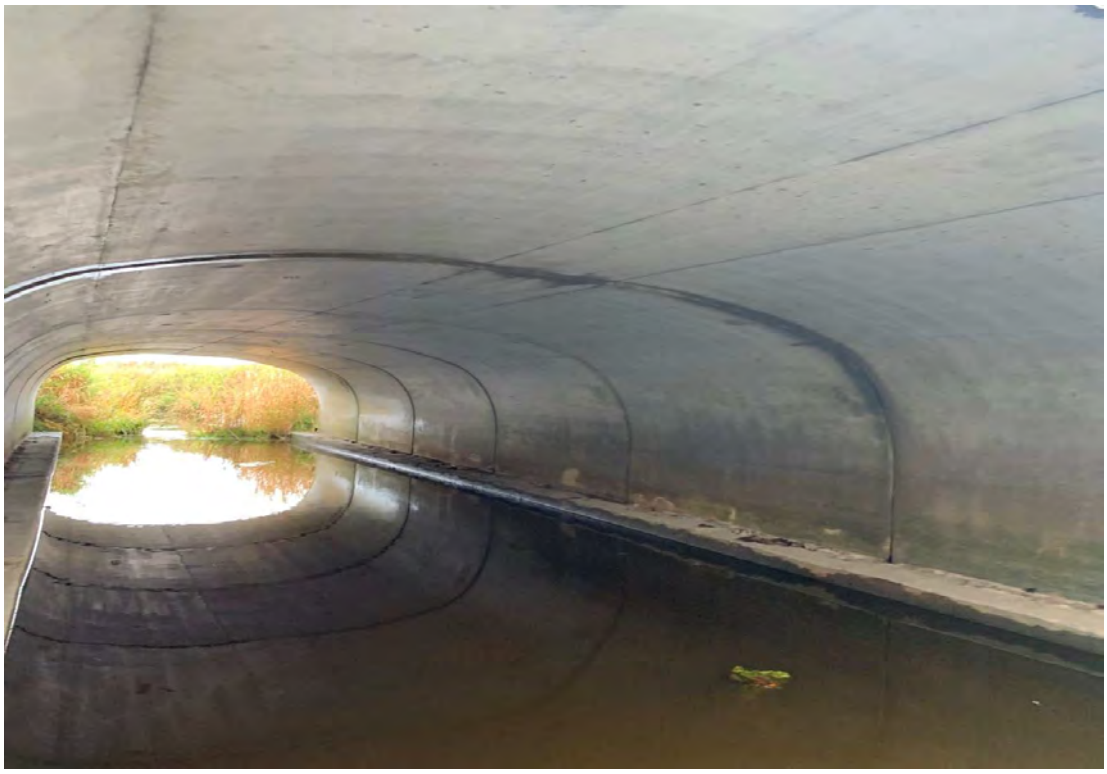


Photo 9-2 - View of structure inlet elevation and embankment

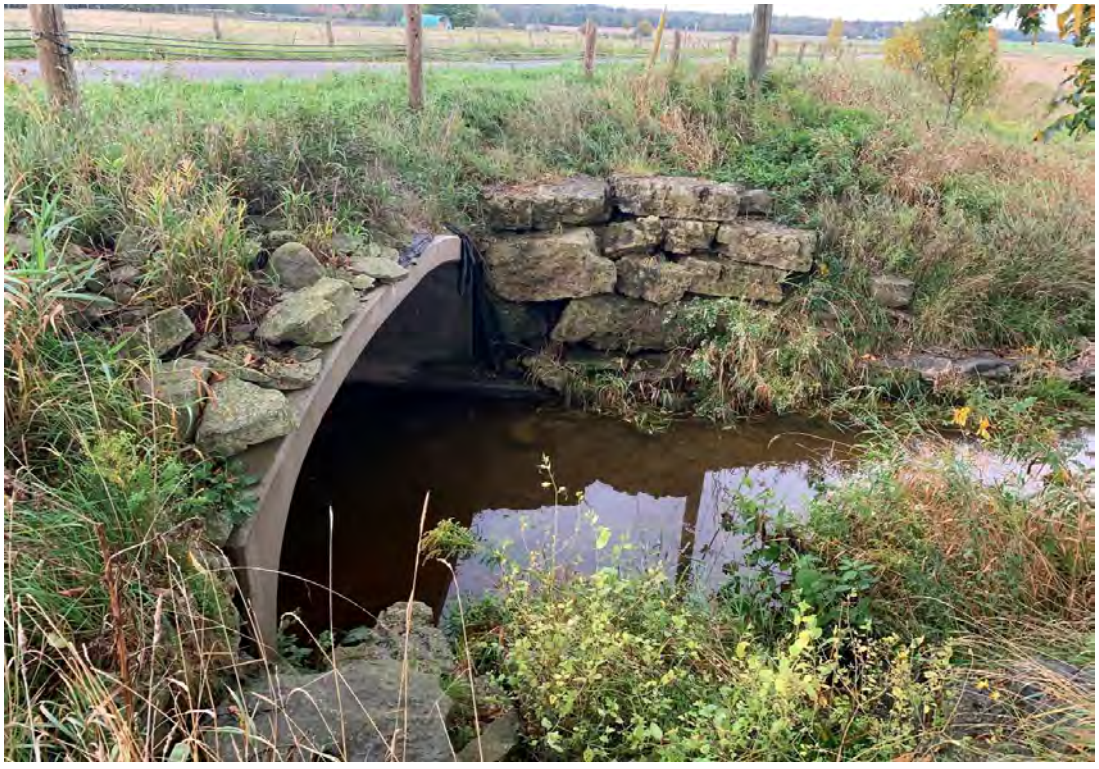


Photo 9-3 - View of structure outlet elevation and embankments

Date: September 24 2020

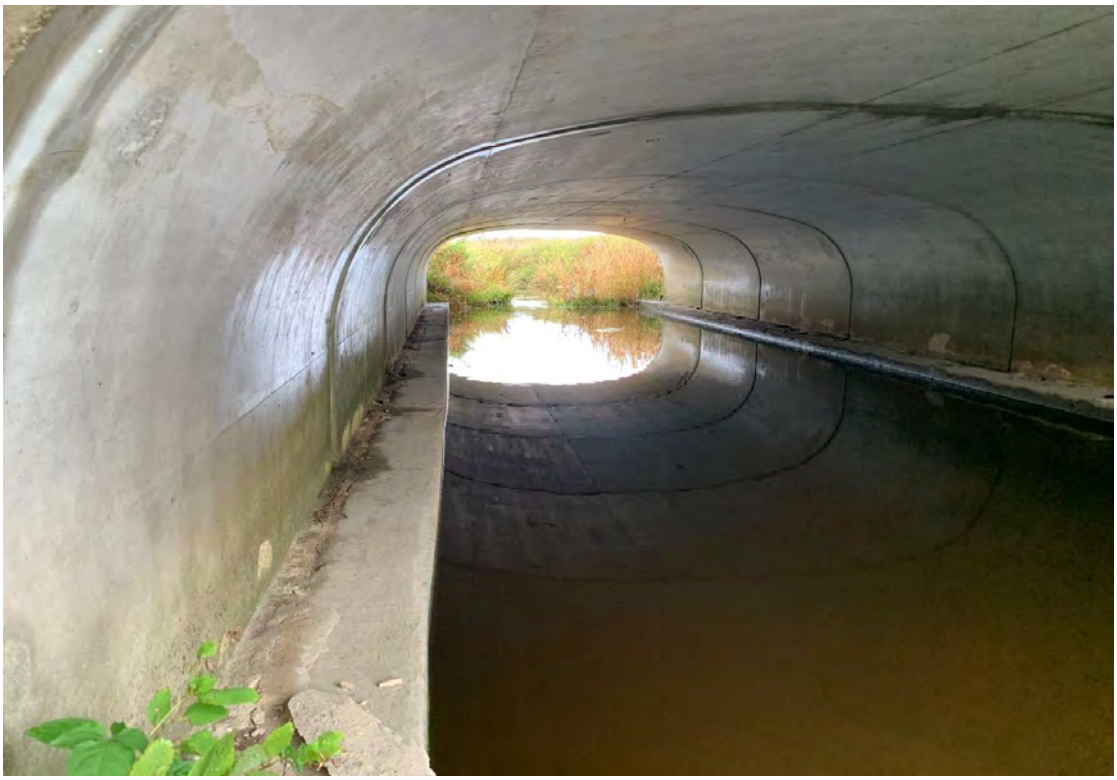


Photo 9-4 - View of pipe arch soffit and walls

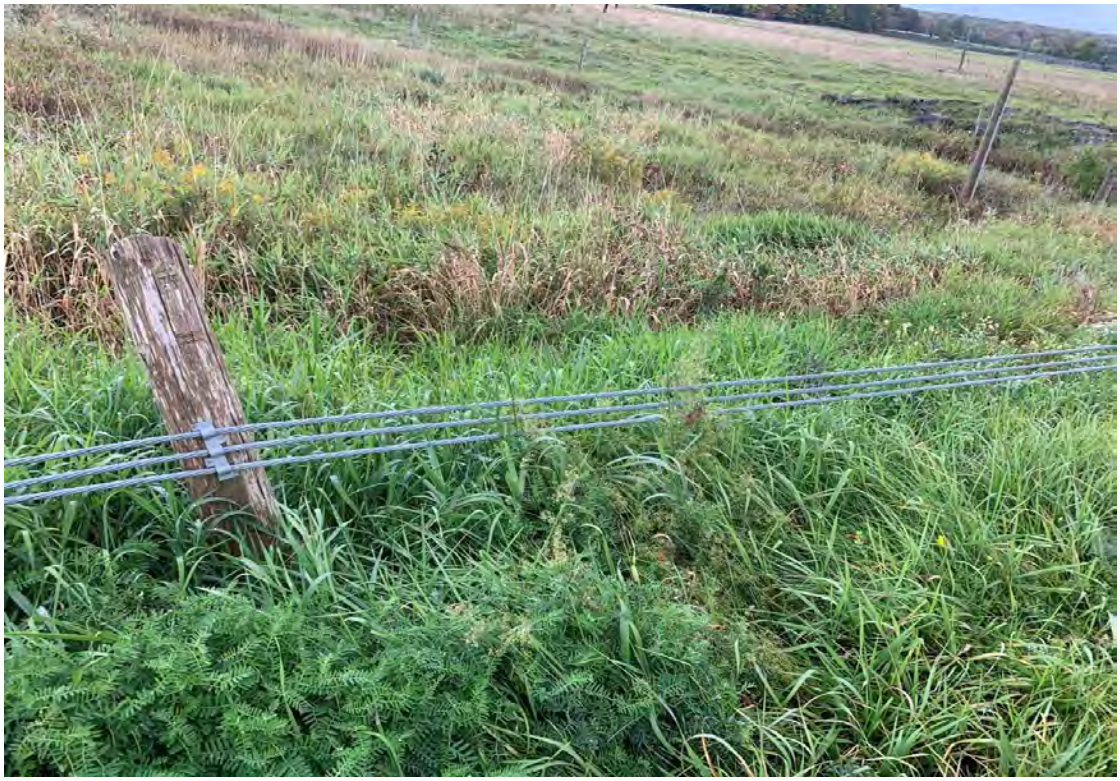


Photo 9-5 - View of west 3 cable guiderail barrier protection with loose cable

Date: September 24 2020

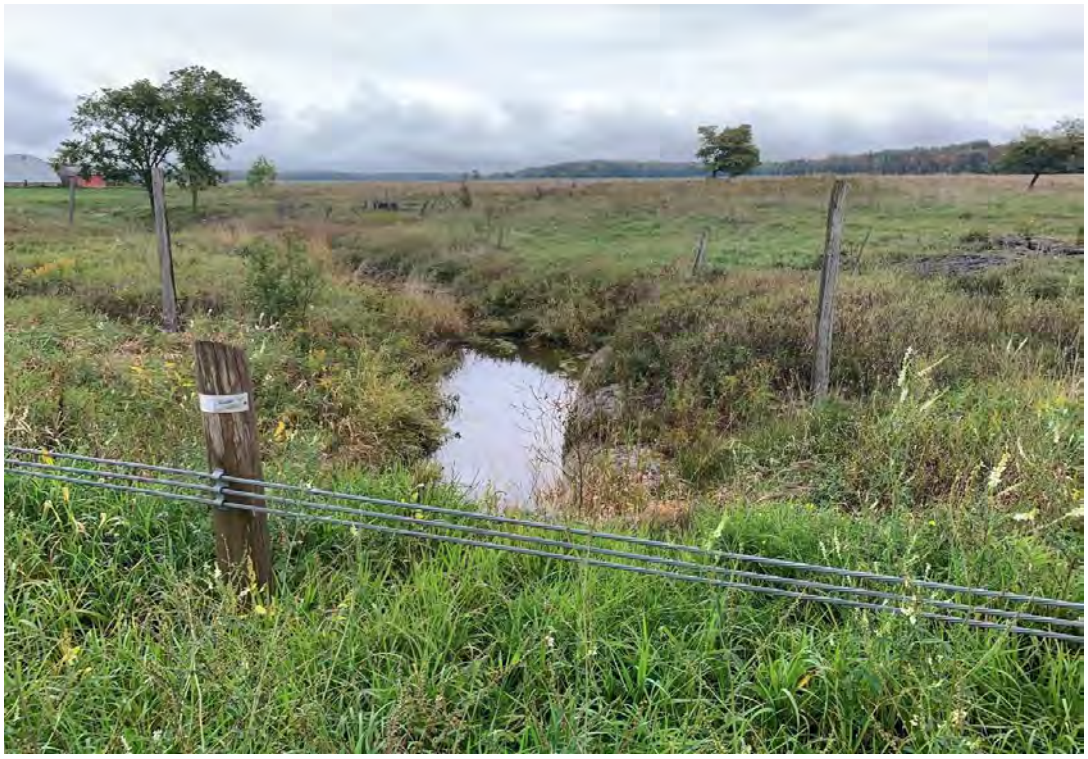


Photo 9-6 - View of watercourse upstream

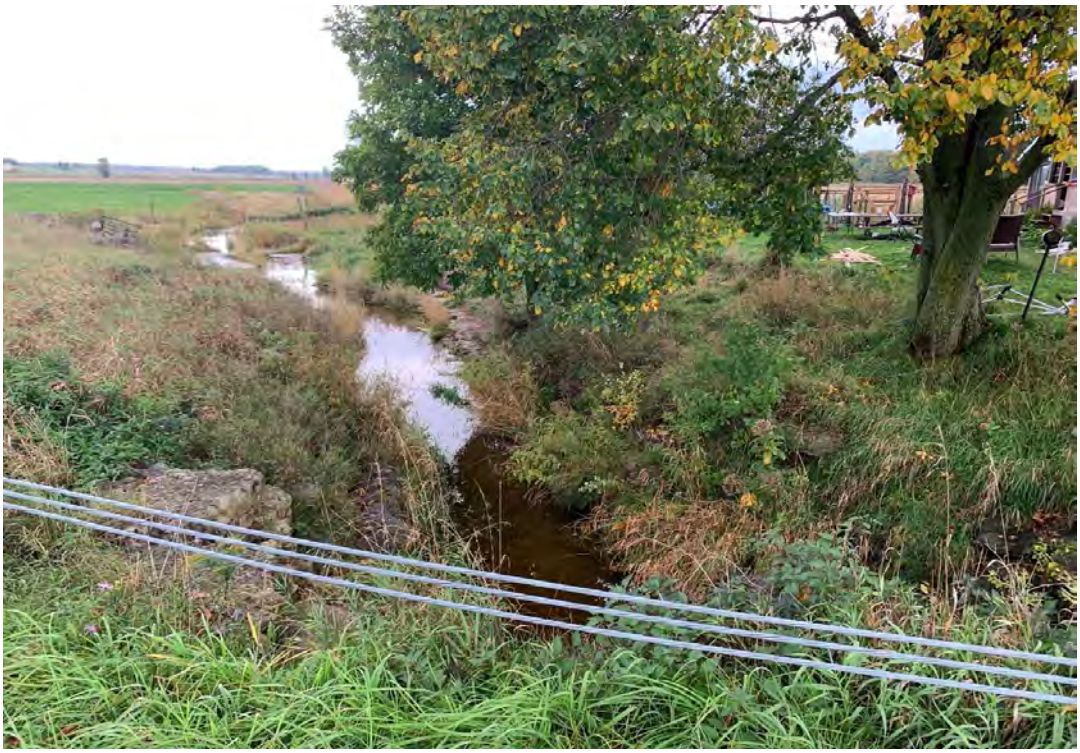


Photo 9-7 - View of watercourse downstream

Date: September 24 2020

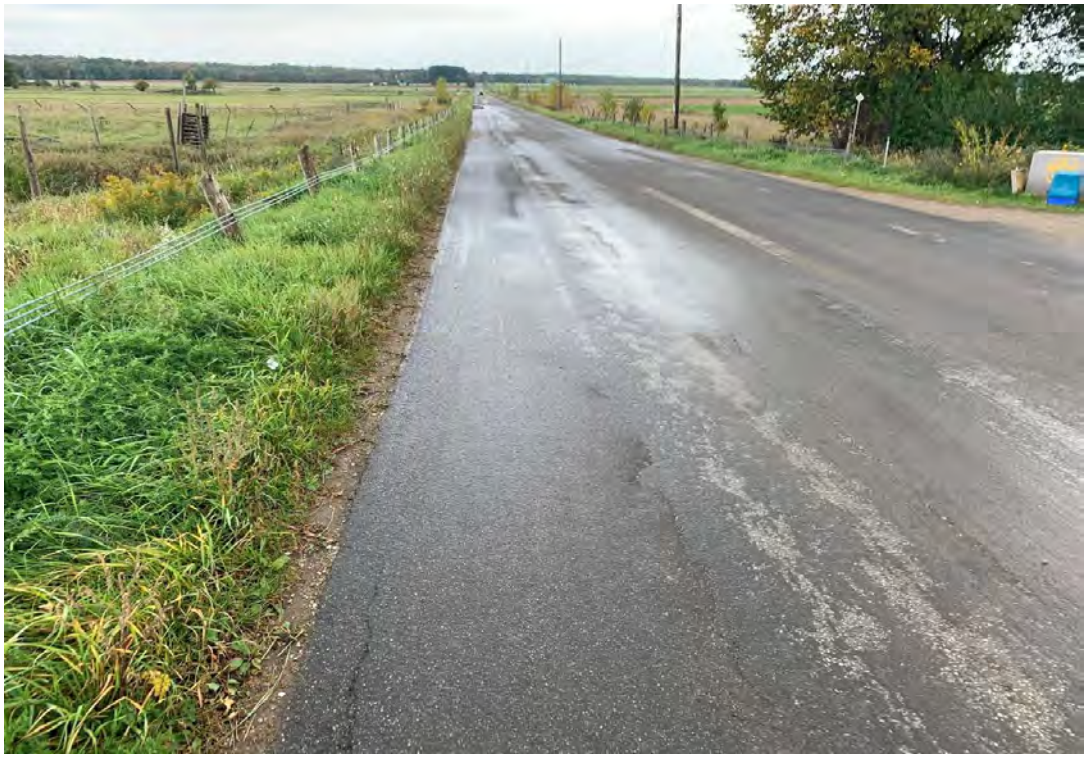


Photo 9-8 - View of northeast deficient section of 3 cable guiderail (impact damage)

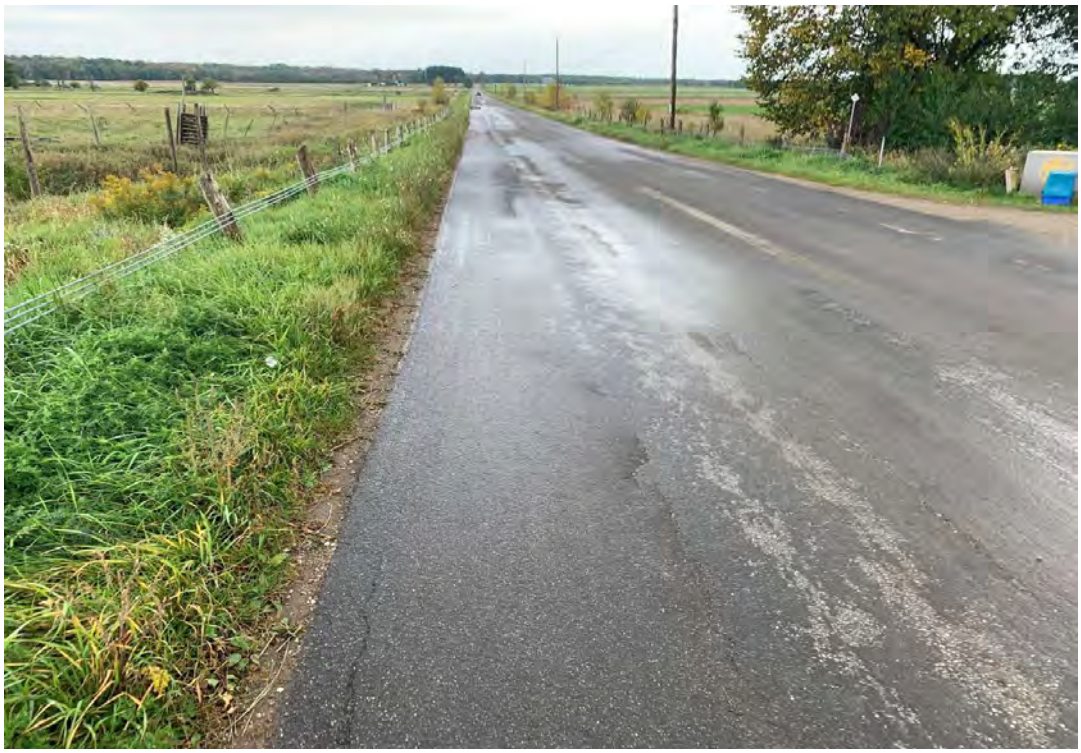
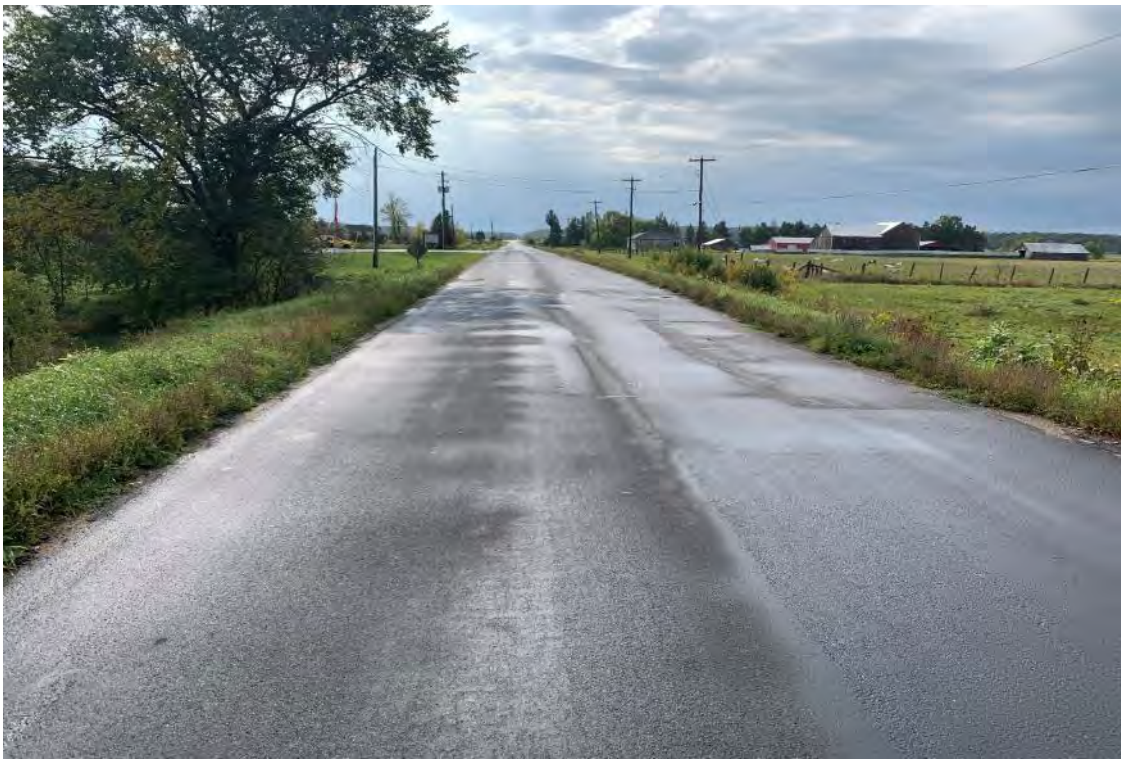


Photo 9-9 - View of structure wearing surface from approaching perspective

Date: September 24 2020

Bridge/Culvert Inspection Report

Site Number	10	**Project Number**	201-01605-00		
Structure Name	Lindsay Road 5 Culvert	**Municipality**	Northern Bruce Peninsula		
MTO Region Code	30	**County**	Bruce	**Code**	02
MTO District Code	33	**Geographic Twp Code**	377		



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Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Lindsay Road 5 Culvert	Site Number	10
County	Bruce	Road Name	Lindsay Road 5
Municipality	Northern Bruce Peninsula	Road Type	Rural Coll.
Bridge or Culvert	Culvert	Owner	Northern Bruce Peninsula
Structure Type	Steel - SP - CSP - PA	AADT	350
Span (m)	4.4 No. 1	% Trucks	15%
Height (m)	2.8	Overall Structure Width (m)	18.3
Direction of Structure	North/South	Roadway Width (m)	6.1
Year Built/Rehabilitated	1970	Total Deck Length (m)	4.4
Current Load Limit	None	Total Deck Area (s.m.)	81
Detour Length (km)	5.5	Heritage Des.	None
Waterway	Chin Creek		

Inspection Data

Date of Inspection	September 30, 2020
Name of Inspector	Katie Hemstock, EIT
Equipment Used	Tape, pick, hammer
Weather Conditions	Overcast
Temperature	16℃
Last Inspection	November 8, 2018

Photos:
10-1 - Title Page
10-2 - View of watercourse upstream and inlet component
10-3 - View of watercourse downstream and outlet component
10-4 - View of culvert barrel in elevation
10-5 - View of interior culvert barrel
10-6 - Localized corrosion with section loss
10-7 - View of structure approach wearing surface and speed limit warning sign (not plumb)

Additional Investigation Required	None
Total Rehabilitation	Install approach and barrier protection.
Total Rehabilitation Budget Costing	$40,000
Next Inspection	September 2020
Justification	Due to the overall good condition of the culvert, undertake rehabilitation to extend the service life. Maintain the speed limit of 45 km/hr. as an interim measure until approach and barrier protection is installed.

Element Data

Structure:	**10**

Element Group:	Decks		Length:				
Element Name:	Wearing Surface		Width:				
Location:			Height:				
Material:	Surface Treatment		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			50	50	Yes	

Comments: The structure wearing surface has heaved at the location of the culvert creating an impact load on the structure when vehicles pass over it.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

When the surface is replaced, complete sub excavation and restore and properly compact the granular base.

Element Data

Element Group:	Culverts		Length:				
Element Name:	Inlet Component		Width:				
Location:	North End		Height:				
Material:	Stone and Earth		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			80	20	Yes	

Comments: Erosion and scour were observed at the base with deposits and debris restricting the flow at the inlet.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Repair the erosion and place rip-rap erosion protection.

Element Data

Element Group:	Culverts		Length:				
Element Name:	Outlet Components		Width:				
Location:	South End		Height:				
Material:	Stone and Earth		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			60	40	Yes	

Comments: Scour was observed at the base of each side of the culvert. The culvert end is bent.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Replace the missing stones and place rip-rap erosion protection.

Element Data

Structure:	**10**

Element Group:	Culvert	Length:	
Element Name:	Barrel	Width:	
Location:		Height:	
Material:	Steel	Count:	
Element Type:	Multi Plate Pipe Arch	Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	Galvanized		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		40	50	10		

Comments: The culvert barrel has observed corrosion at water level with minor section loss.

Recommended Work: None | [6-10 Years] | 1-5 Years | < 1 Year | Urgent

Monitor the section loss as it advances, consider repair vs replacement when section loss exceeds acceptable limits.

Element Data

Element Group:	Streams/Embankments	Length:	
Element Name:	Streams and Waterways	Width:	
Location:		Height:	
Material:	Bedrock and Earth	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			80	20		

Comments: There is an observed deposit of silt downstream.

Recommended Work: None | 6-10 Years | [1-5 Years] | < 1 Year | Urgent

Remove all obstructions to flow.

Element Data

Element Group:	Streams/Embankments	Length:	
Element Name:	Embankment	Width:	
Location:	Each Corner	Height:	
Material:		Count:	6
Element Type:		Total Quantity:	6
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each Corner		6				

Comments: The embankments are in overall good condition.

Recommended Work: [None] | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Element Data

Structure:	**10**

Element Group:	Approaches		Length:				
Element Name:	Wearing Surface		Width:				
Location:	Each End		Height:				
Material:	Surface Treatment		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		95	5			

Comments: Minor settlement was observed at the north side of the east approach

Recommended Work: None 6-10 Years 1-5 Years < 1 Year Urgent

Monitor settlement and patch as required.

Element Group:	Accessories		Length:				
Element Name:	Signs		Width:				
Location:	Approaches		Height:				
Material:	Steel		Count:	2			
Element Type:			Total Quantity:	2			
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		2			Yes	Yes

Comments: The 45 km/hr and bump warning signs are in good conditions, but require striaghtening verticaly and to face traffic.

Recommended Work: None 6-10 Years 1-5 Years < 1 Year Urgent

Install end hazard signs.

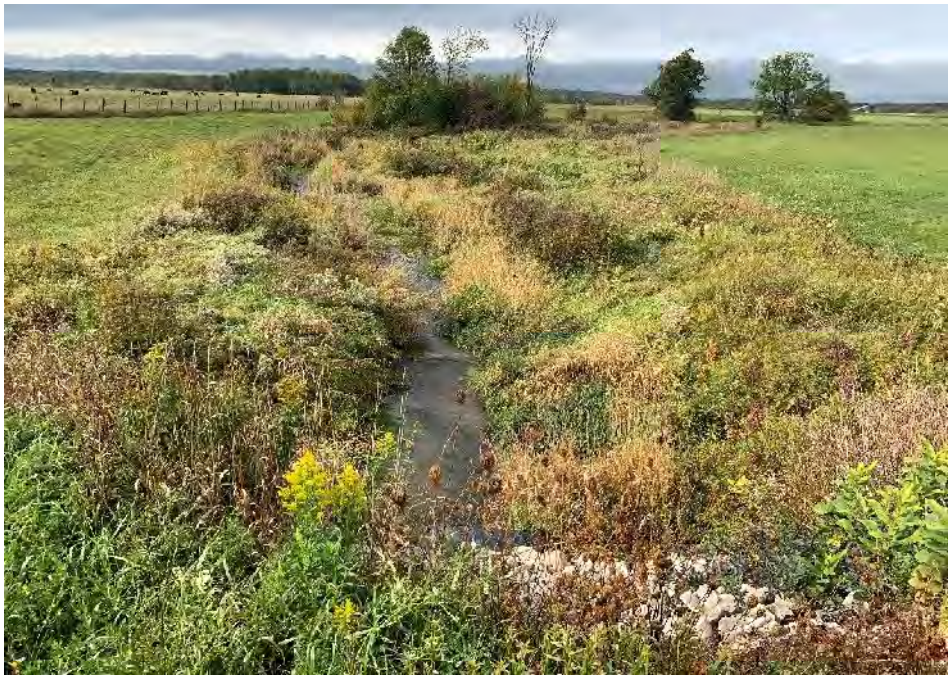


Photo 10-2: View of watercourse upstream and inlet component

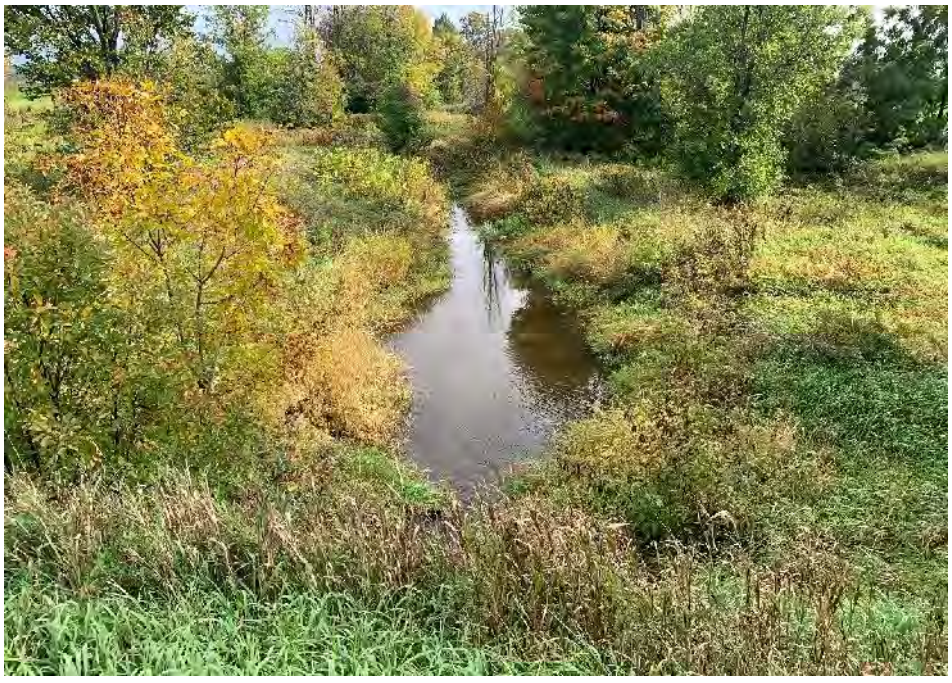


Photo 10-3: View of watercourse downstream and outlet component

Date of Photos: Sept. 24, 2020

Photo 10-4: View of culvert barrel in elevation

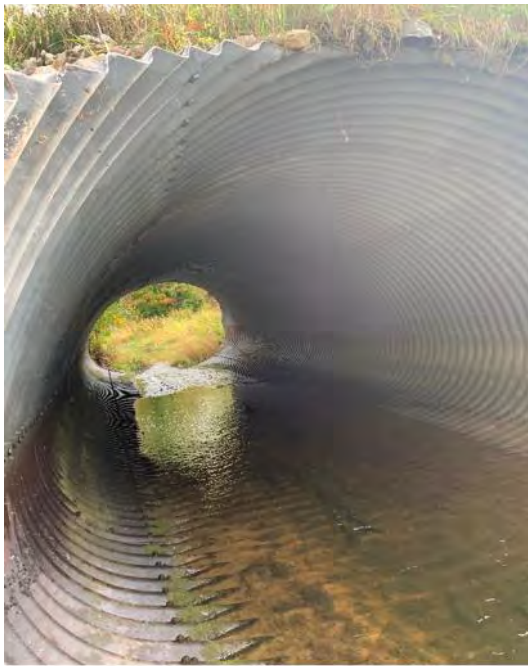


Photo 10-5: View of interior culvert barrel

Date of Photos: Sept. 24, 2020

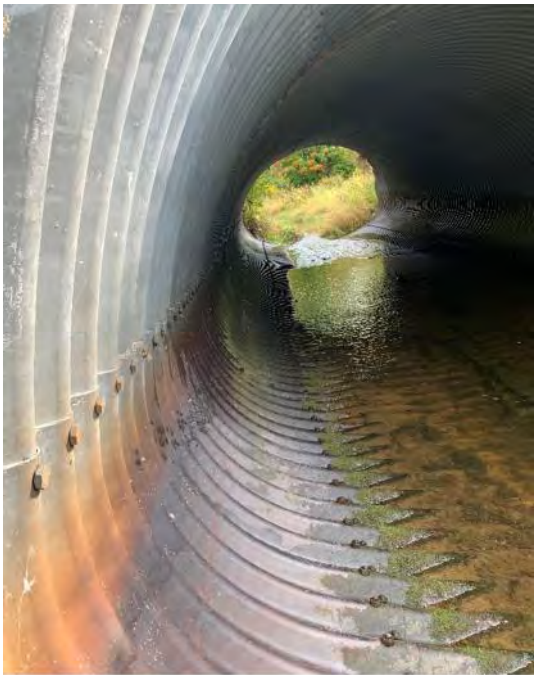
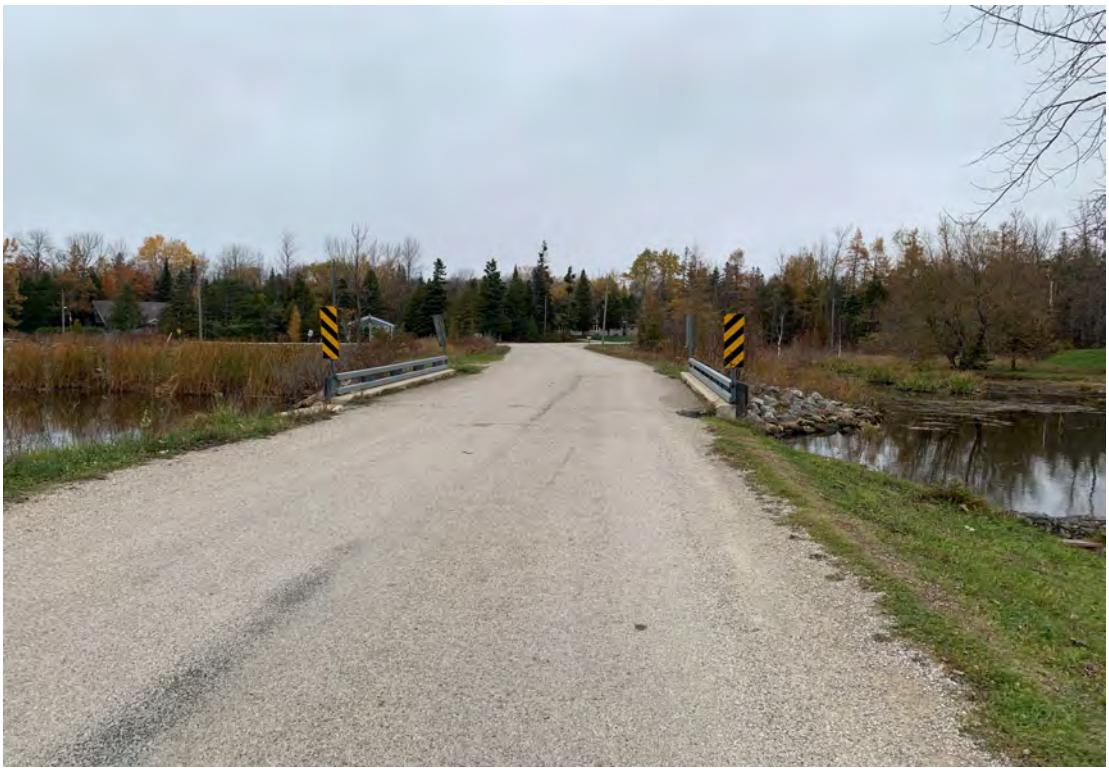


Photo 10-6: Localized corrosion with section loss

Date of Photos: Sept. 24, 2020

Bridge/Culvert Inspection Report

Site Number	11	**Project Number**	201-01605-00
Structure Name	Myles Bay Shore Road Bridge	**Municipality**	Northern Bruce Peninsula
MTO Region Code	30	**County**	Bruce **Code** 02
MTO District Code	33	**Geographic Twp Code**	377



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Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Myles Bay Shore Road Bridge	Site Number	11
County	Bruce	Road Name	Myles Bay Shore Road
Municipality	Northern Bruce Peninsula	Road Type	Rural Local
Bridge or Culvert	Bridge	Owner	Northern Bruce Peninsula
Structure Type	Concrete - Rigid Frame	AADT	300
Span (m)	7.3 No. 1	% Trucks	5%
Height (m)	2.2	Overall Structure Width (m)	6.6
Direction of Structure	East/West	Roadway Width (m)	6
Year Built/Rehabilitated	2001	Total Deck Length (m)	8.4
Current Load Limit	None	Total Deck Area (s.m.)	50
Detour Length (km)	3	Heritage Des.	None
Waterway	Old Woman's River		

Inspection Data

Date of Inspection	October 30, 2020
Name of Inspector	Katherine Hemstock, EIT
Equipment Used	Tape, pick, hammer
Weather Conditions	Overcast
Temperature	4°C
Last Inspection	November 8, 2018

Photos:
11-1 - Title Page
11-2 - View of east structure elevation, exterior soffit, barrier and embankments
11-3 - View of east exterior barrier protection, soffit and wingwalls
11-4 - View of structure soffit
11-5 - Rock slope protection and geotextile failure at the southeast quadrant
11-6 - View of north abutment wall and soffit
11-7 - View of structure wearing surface, barrier protection and end hazard signage
11-8 - View of watercourse downstream
11-9 - View of watercourse upstream
11-10 - Minor erosion at the northwest structure quadrant
11-11 - Structure wearing surface

Additional Investigation Required	Deck condition survey
Total Rehabilitation	Upgrade the bridge barrier protection and install approach barrier protection to meet current Code. Complete the southwest quandrant embankment repair and place foundation erosion protection. Place tremmie concrete at the northwest foundation corner and provide protection. Grade off the excess gravel (deck cover) and inspect the structure deck. Consider waterproofing and paving the deck to extend the service life of the structure.
Total Rehabilitation Budget Costing	$65,000 or $95,000 with waterproof and pave
Next Inspection	Oct-22
Justification	Replace barrier and install approach barrier protection. Reduce the posted speed to 35 km/hr. until proper barrier is installed. Repair the embankment and foundation/footing erosion protection. Consider waterproofing and paving when granular fill is removed in order to prolong the service life of this new high service level structure.

Element Data

Structure:	11

Element Group:	Decks	Length:	
Element Name:	Wearing Surface	Width:	
Location:		Height:	
Material:	Surface Treatment	Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				Yes

Comments: The surface treatment is relatively new and in good condition. There is an excess of granular fill on the structure deck, at the time of other upgrades or when the surface treatment reaches the end of its lifecycle, remove the granular fill and inspect the structure deck for deficiencies.

Recommended Work: None [6-10 Years] 1-5 Years < 1 Year Urgent

Remove excess granulars and inspect condition of the structure deck.

Element Data

Element Group:	Decks	Length:	
Element Name:	Deck Top	Width:	
Location:		Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	√
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				

Comments: Limited inspection due to cover by granulars (excessive depth) and surface treatment wearing surface. When the surface treatment reaches the end of its lifecycle, remove and inspect the condition of the top deck. Consider placing a waterproofing membrane and paving the structure deck to maximize the service life of this high asset value structure.

Recommended Work: None [6-10 Years] 1-5 Years < 1 Year Urgent

Remove excess granulars and inspect condition of the structure deck.

Element Data

Element Group:	Decks	Length:	
Element Name:	Thick Slab	Width:	
Location:		Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				

Comments: The soffit is in good condition with no visible defects.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Structure:	11

Element Group:	Decks	Length:	
Element Name:	Drainage	Width:	
Location:		Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			

Comments: Surface to slope drainage is adequate. There is very little crossfall grade to the wearing surface.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Element Group:	Sidewalks/curbs	Length:	
Element Name:	Curbs	Width:	
Location:		Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		93	5	2		

Comments: The concrete is in good condition with some observed minor damage to ends from maintenance equipment.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Element Group:	Barriers	Length:	
Element Name:	Railing Systems	Width:	
Location:		Height:	
Material:	Steel	Count:	
Element Type:	Box Beam	Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		95	5		Yes	

Comments: There is currently no approach protection in place and the ends of the structure barrier pose a vehicular hazard. The structure barrier is code deficient (does not meet height requirements) and has no pedestrian/cyclist handrail. Minor corrosion of the galvanized railing has started.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Install bridge and approach barrier protection to Code.

Element Data

Structure:	**11**

Element Group:	Barriers	Length:	
Element Name:	Posts	Width:	
Location:		Height:	
Material:	Steel	Count:	
Element Type:	I-Beam	Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100			Yes	

Comments: The end posts are unprotected and hazardous to road users. The current configuration does not meet code.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Replace the structure barrier protection to meet current code and install approach barrier protection with proper end termination.

Element Data

Element Group:	Abutments	Length:	
Element Name:	Abutment Walls	Width:	
Location:		Height:	
Material:	Concrete	Count:	2
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				

Comments: Minor surface cracking was observed.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Element Group:	Abutments	Length:	
Element Name:	Wingwalls	Width:	
Location:		Height:	
Material:	Concrete	Count:	4
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		50	50			

Comments: Two wingwalls are fieldstone in fair condition and two wingwalls are armour stone in good condition.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Structure:	11

Element Group:	Foundations		Length:				
Element Name:	Foundation (below ground level)		Width:				
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:	Yes			
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
						Yes	

Comments: The south footings appear stable and are well protected. The northeast footing appears stable, but is poorly protected. The northwest footing is heavily undermined and poorly protected.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Underpin and stabilize northwest footing and provide more rip-rap and rock protection to the northeast and northwest footings.

Element Data

Element Group:	Embankments & Streams		Length:				
Element Name:	Streams and Waterways		Width:				
Location:			Height:				
Material:	Earth / Stone		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			

Comments: The watercourse is stable with large stone (boulders) throughout.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Monitor the large boulders if the flow is restricted.

Element Data

Element Group:	Embankments & Streams		Length:				
Element Name:	Embankments		Width:				
Location:			Height:				
Material:	Earth / Stone		Count:	6			
Element Type:			Total Quantity:	6			
Environment:	Moderate		Limited Insp'n:				
Protection System:							
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		3	3			

Comments: The slopes are stone and vegetated earth. The southeast quadrant has erosion and failure of the geotextile and rock protection. The southwest quadrant has minor erosion of the embankment.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Repair all erosion and place new geotextile and rip rap/rock slope protection.

Element Data

Structure:	11

Element Group:	Embankments & Streams	Length:	
Element Name:	Slope Protection	Width:	
Location:		Height:	
Material:	Earth / Stone	Count:	6
Element Type:		Total Quantity:	6
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		3	3			

Comments: The slopes are stone and vegetated earth. The southeast quadrant has erosion and failure of the geotextile and rock protection. The southwest quadrant has minor erosion of the embankment.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Repair all erosion and place new geotextile and rip rap/rock slope protection.

Element Data

Element Group:	Signs	Length:	
Element Name:	Signs	Width:	
Location:		Height:	
Material:	Steel	Count:	
Element Type:		Total Quantity:	4
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		2	2		Yes	

Comments: Four end hazard signs are in place. The signs have lost their reflective coating and the northeast sign is damaged and requires replacement.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Replace the northeast end hazard sign. Replace the remaining signs in 6 to 10 years.

Element Data

Element Group:	Approaches	Length:	
Element Name:	Wearing Surface	Width:	
Location:		Height:	
Material:	Gravel	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				Yes

Comments: The approach wearing surface is a recently placed surface treatment and is in good condition.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

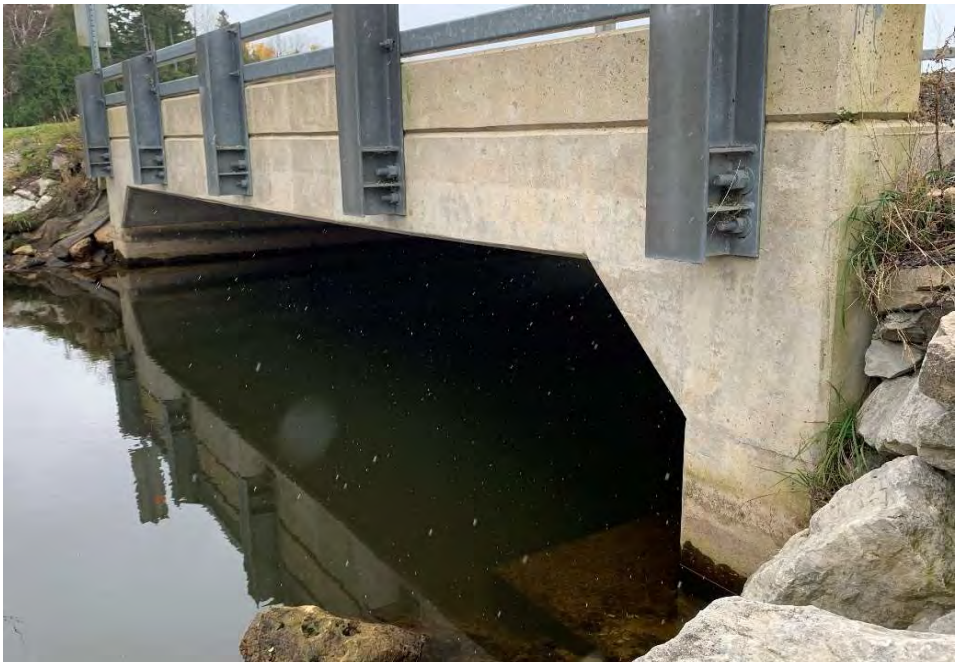


Photo 11-2: View of east structure elevation, exterior soffit, barrier and embankments

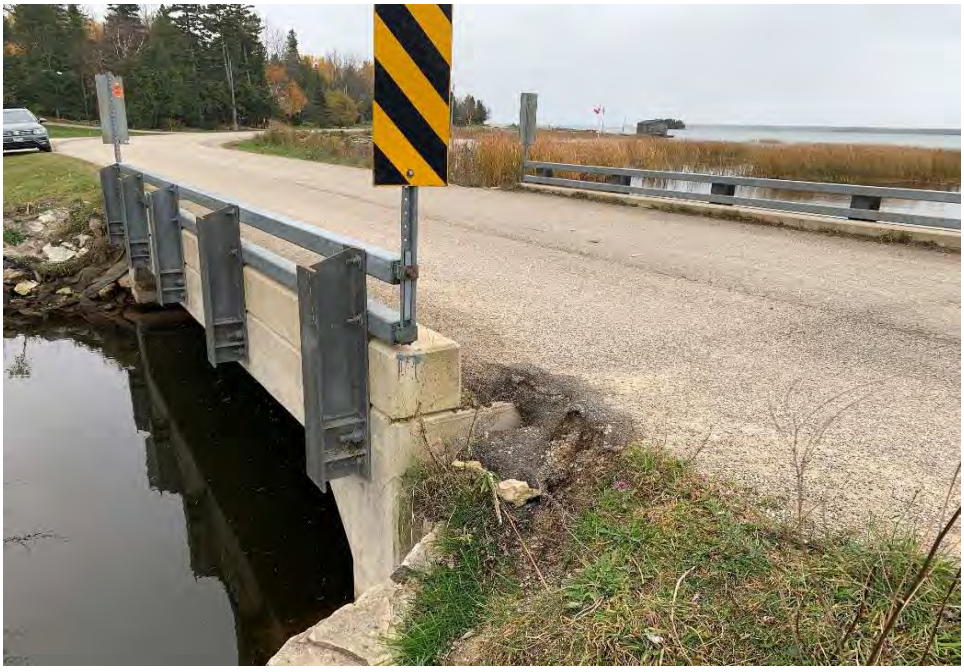
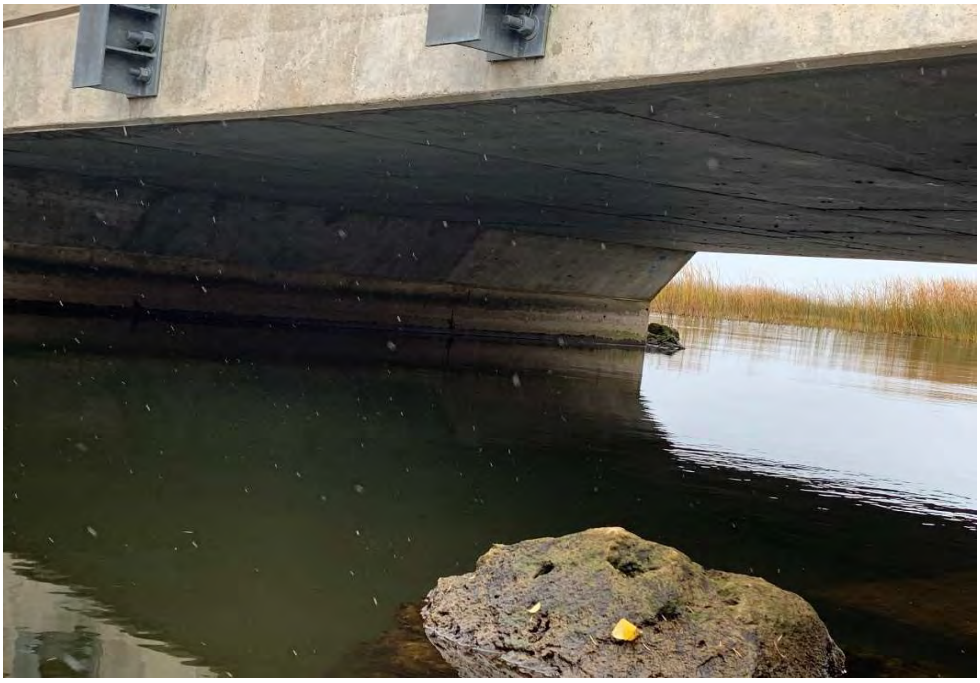
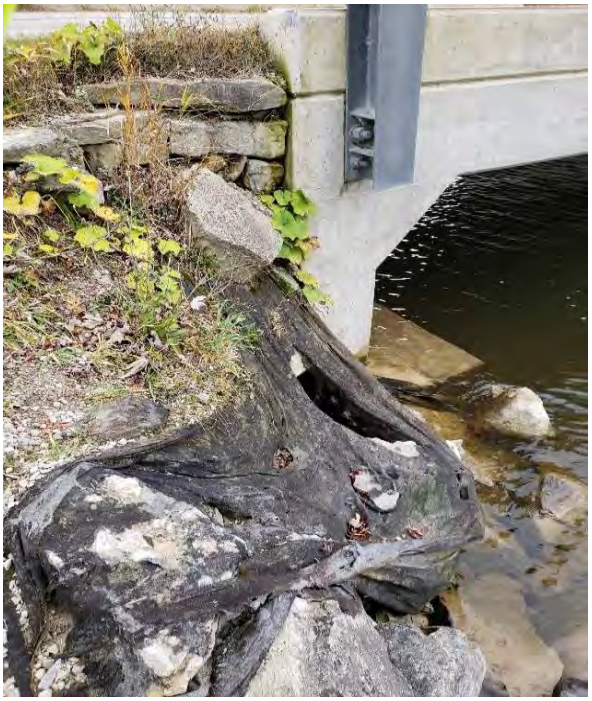


Photo 11-3: View of east exterior barrier protection, soffit and wingwalls

Date of Photos: Oct. 30, 2020

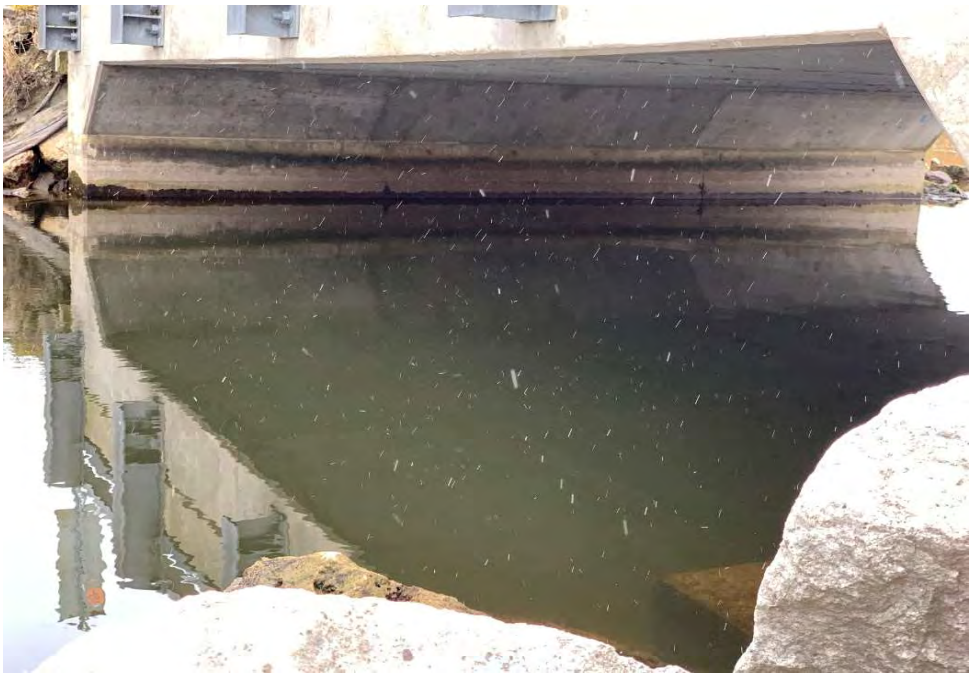


11-4: View of structure soffit

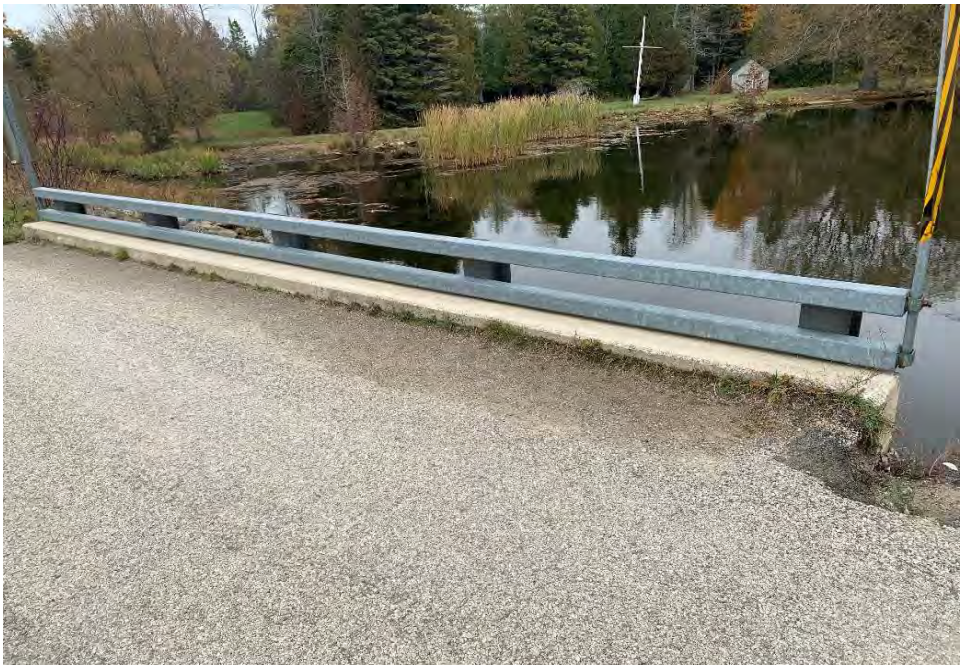


11-5: Rock slope protection and geotextile failure at the souteast quadrant

Date of Photos: Oct. 30, 2020

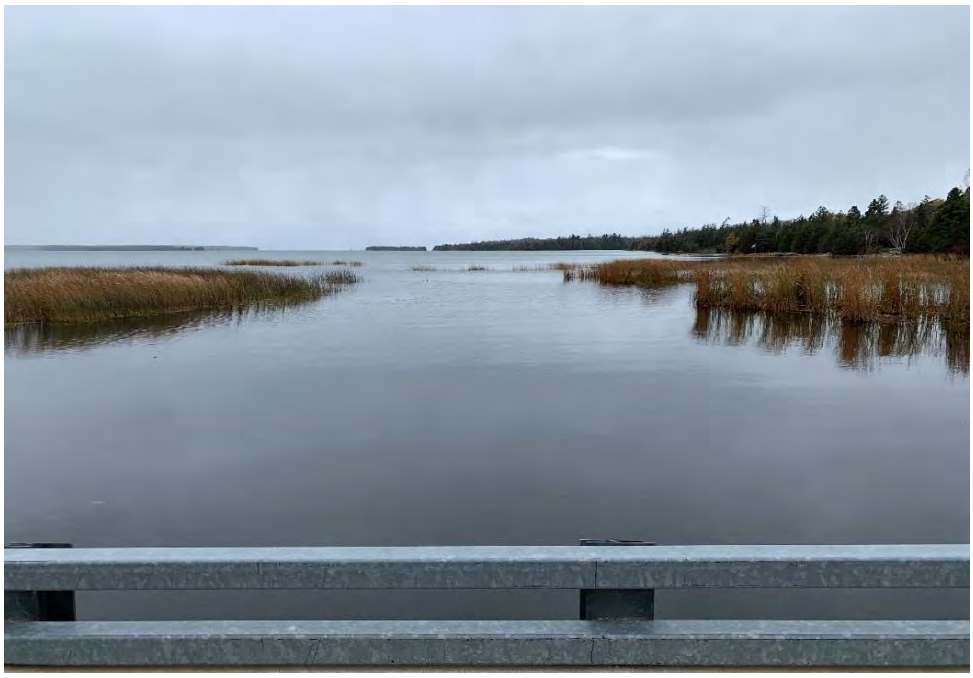


11-6: View of north abutment wall and soffit

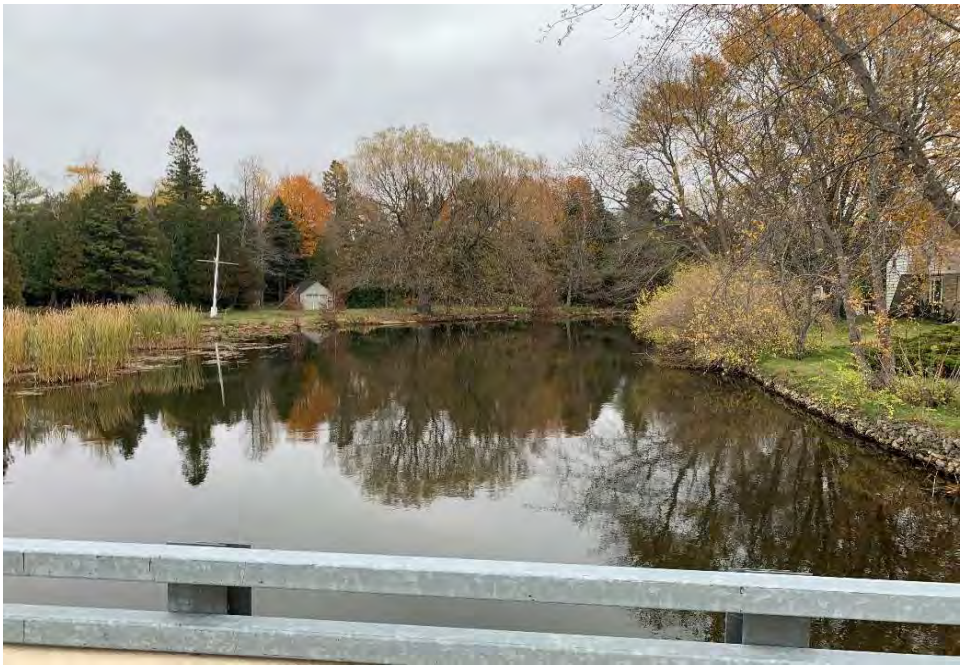


11-7: View of structure wearing surface, barrier protection and end hazard signage

Date of Photos: Oct. 30, 2020

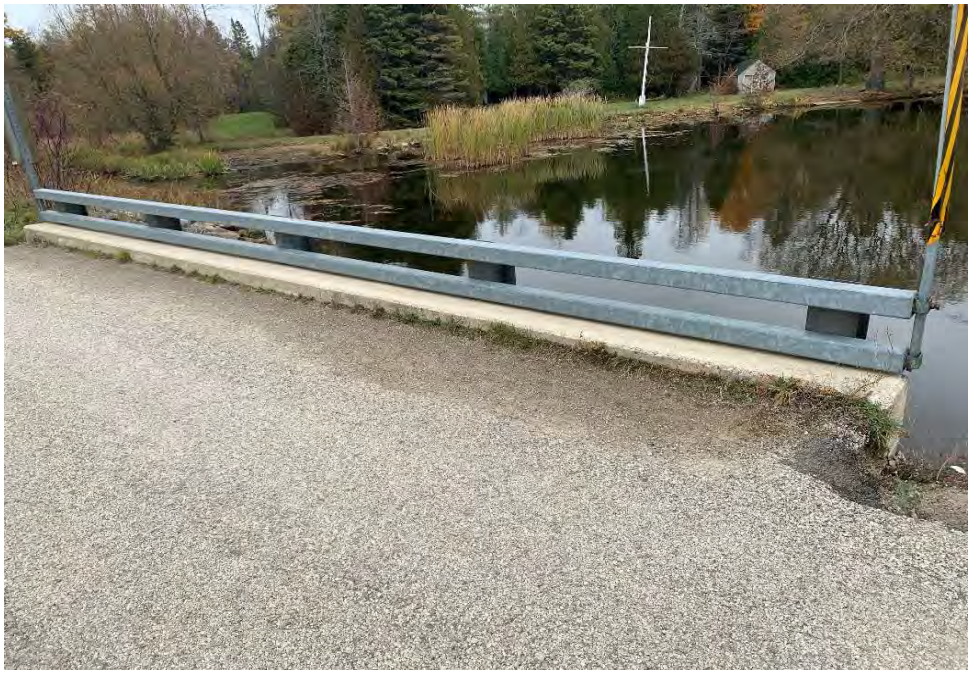


11-8: View of watercourse downstream

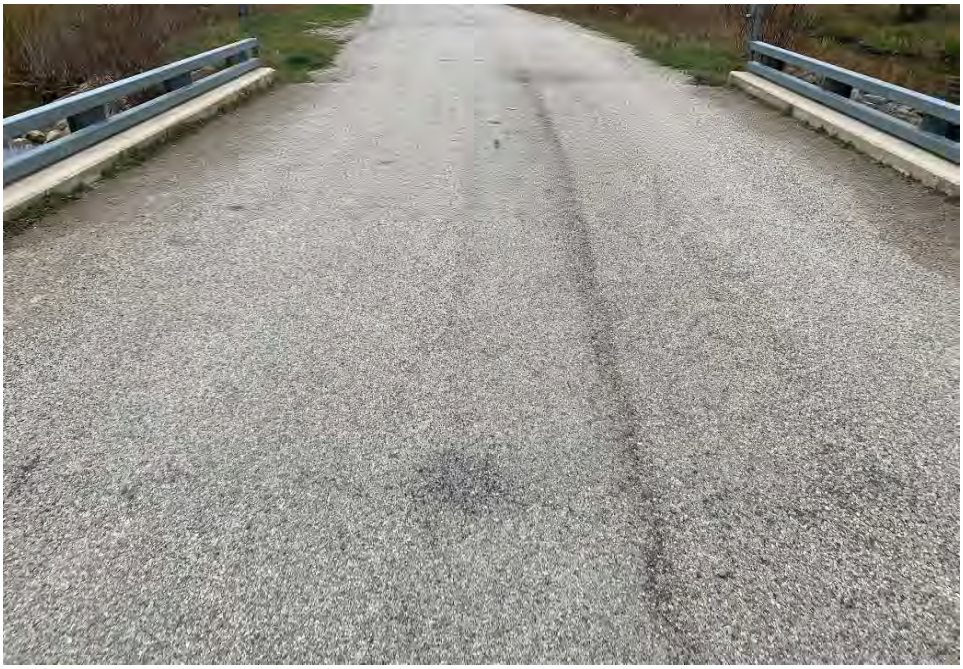


11-7: View of watercourse upstream

Date of Photos: Oct. 30, 2020



11-10: Minor erosion at the northwest structure quadrant

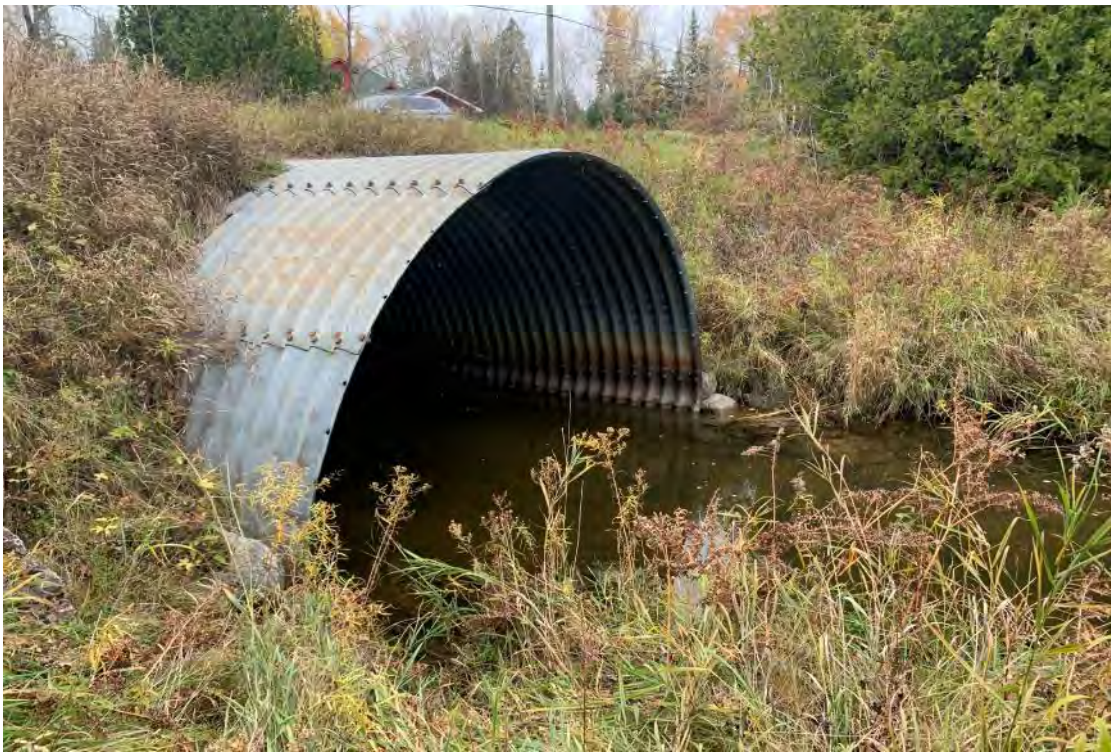


11-11: Structure wearing surface

Date of Photos: Oct. 30, 2020

Bridge/Culvert Inspection Report

Site Number	12	**Project Number**	201-01605-00		
Structure Name	Stokes Bay Road Culvert	**Municipality**	Northern Bruce Peninsula		
MTO Region Code	30	**County**	Bruce	**Code**	02
MTO District Code	33	**Geographic Twp Code**	377		



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Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Stokes Bay Road Culvert	Site Number	12
County	Bruce	Road Name	Stokes Bay Road
Municipality	Northern Bruce Peninsula	Road Type	Rural Coll.
Bridge or Culvert	Culvert	Owner	Northern Bruce Peninsula
Structure Type	Steel - SP - SCP - PA	AADT	350
Span (m)	4.7 No. 1	% Trucks	15%
Height (m)	3	Overall Structure Width (m)	22
Direction of Structure	East/West	Roadway Width (m)	6.1
Year Built/Rehabilitated	1970	Total Deck Length (m)	4.7
Current Load Limit	None	Total Deck Area (s.m.)	103
Detour Length (km)	4	Heritage Des.	None
Waterway	Old Woman's River (Fern Creek Drain)		

Inspection Data

Date of Inspection	October 30, 2020
Name of Inspector	Katherine Hemstock, EIT
Equipment Used	Tape, pick, hammer
Weather Conditions	Overcast
Temperature	4℃
Last Inpsection	November 8, 2018

Photos:

12-1 - Title Page

12-2 - View of culvert inlet in elevation (north perspective)

12-3 - View of culvert inlet in elevation (south perspective)

12-4 - View of surface treatment wearing surface

12-5 - View of culvert outlet in elevation

12-6 - View of watercourse downstream

12-7 - View of watercourse upstream

12-8 - View of culvert barrel interior

12-9 - View of culvert barrel corrosion at the waterline (typ)

Additional Investigation Required	Complete annual inspections of the culvert barrel to monitor the deformation.
Total Rehabilitation	Install approach and barrier protection to Code. Repair erosion and place rip-rap erosion protection. Install end hazard signs.
Total Rehabilitation Budget Costing	$45,000
Next Inspection	October, 2022
Justification	Due to the age and fair condition of this structure, undertake the rehabilitation and place the barrier approach protection (for safety). Reduce the speed to 45 km/hr. until the barrier protection is installed.

Element Data

Structure:	12

Element Group:	Decks	Length:	
Element Name:	Wearing Surface	Width:	
Location:		Height:	
Material:	Surface Treatment	Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		75	25			

Comments: The surface treatment wearing surface is in good to fair condition with minor settlement and wheel path rutting observed.

Recommended Work: None | **6-10 Years** | 1-5 Years | < 1 Year | Urgent

Replace the surface treatment.

Element Data

Element Group:	Barriers	Length:	
Element Name:	Barrier	Width:	
Location:	Each Side	Height:	
Material:		Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%					Yes	

Comments: There is currently no barrier protection in place. The clear zone is approximately 3 m.

Recommended Work: None | 6-10 Years | **1-5 Years** | < 1 Year | Urgent

Install barrier protection to meet current code requirements. Reduce the posted speed limit to 45km/hr until barrier protection is installed.

Element Data

Element Group:	Culverts	Length:	
Element Name:	Inlet Component	Width:	
Location:	East End	Height:	
Material:	Stone and Earth	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			60	40	Yes	

Comments: A scour was observed at the base of the inlet and is restricting flow (southeast corner).

Recommended Work: None | 6-10 Years | **1-5 Years** | < 1 Year | Urgent

Replace the missing stones and rip-rap.

Element Data

Structure:	**12**

Element Group:	Culverts	Length:	
Element Name:	Outlet Components	Width:	
Location:	West End	Height:	
Material:	Stone and Earth	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		30	60	10	Yes	

Comments: Some of the rip rap and rock slope protection has failed.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Replace the missing stones and rip-rap.

Element Data

Element Group:	Culvert	Length:	
Element Name:	Barrel	Width:	
Location:		Height:	
Material:	Steel	Count:	
Element Type:	Pipe Arch	Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	Galvanized		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		40	50	10		

Comments: Deformations are visible at the obvert, with corrosion and swelling near the water level. Section loss is 10% at most.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Monitor the deformation for movement.

Element Data

Element Group:	Foundation	Length:	
Element Name:	Foundation (below grade)	Width:	
Location:		Height:	
Material:	Granular	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	Yes
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
						Yes	

Comments: Limited inspection of the foundation due to cover. Erosion was observed under the pipe inlet.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Place rip-rap on geotextile erosion protection.

Element Data

Structure:	**12**

Element Group:	Streams/Embankments	Length:	
Element Name:	Streams and Waterways	Width:	
Location:		Height:	
Material:	Stone/Sand	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			

Comments: Low velocity watercourse with no visible obstruction at the time of inspection.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Element Group:	Streams/Embankments	Length:	
Element Name:	Embankment	Width:	
Location:	Each Corner	Height:	
Material:	Stone / Earth	Count:	6
Element Type:		Total Quantity:	6
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			5	1		

Comments: Heavily vegetated with some minor erosion at the northeast quadrant.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent
Place rip-rap erosion protection.

Element Data

Element Group:	Signs	Length:	
Element Name:	Signs	Width:	
Location:	Each Corner	Height:	
Material:		Count:	
Element Type:		Total Quantity:	0
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each					Yes	

Comments: No signs present.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent
Install required end hazard signage and speed limit signage.

Element Data

Structure:	**12**

Element Group:	Approaches	Length:	
Element Name:	Wearing Surface	Width:	
Location:	Each End	Height:	
Material:	Surface Treatment	Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		75	25			Yes

Comments: The surface treatment is in good to fair conditon with minor wheel path rutting observed.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

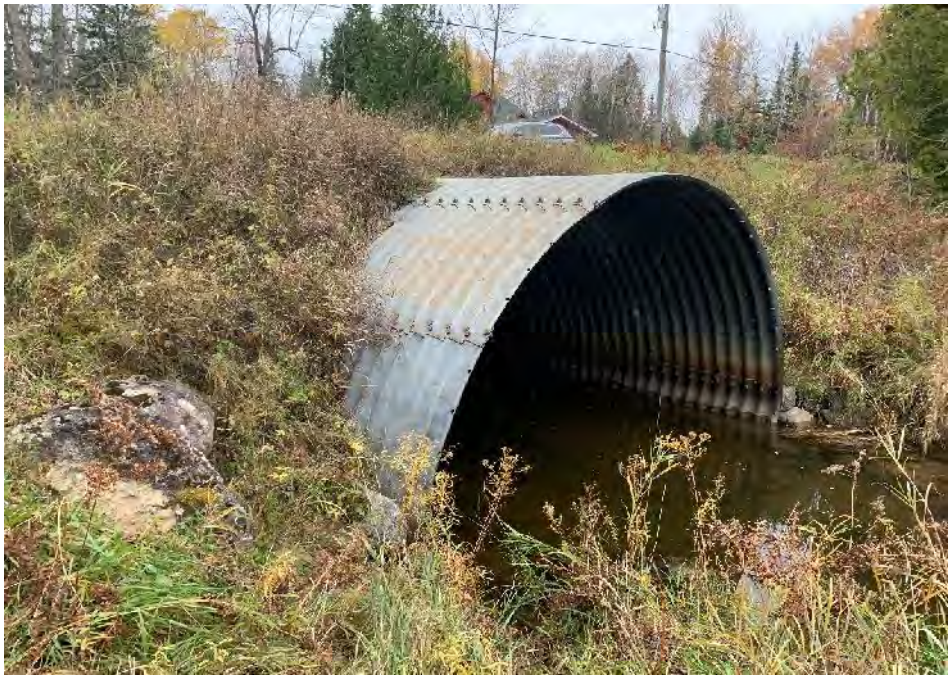


Photo 12-2: View of culvert inlet in elevation (north perspective)

Photo 12-3: View of culvert barrel interior

Date of Photos: Oct. 30, 2020

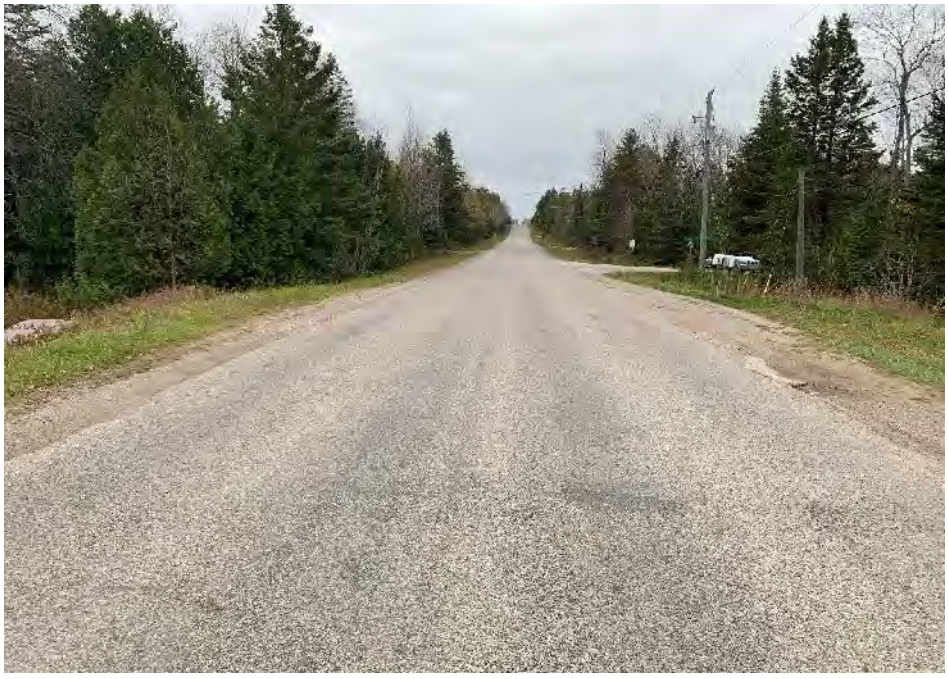


Photo 12-4: View of surface treatment wearing surface

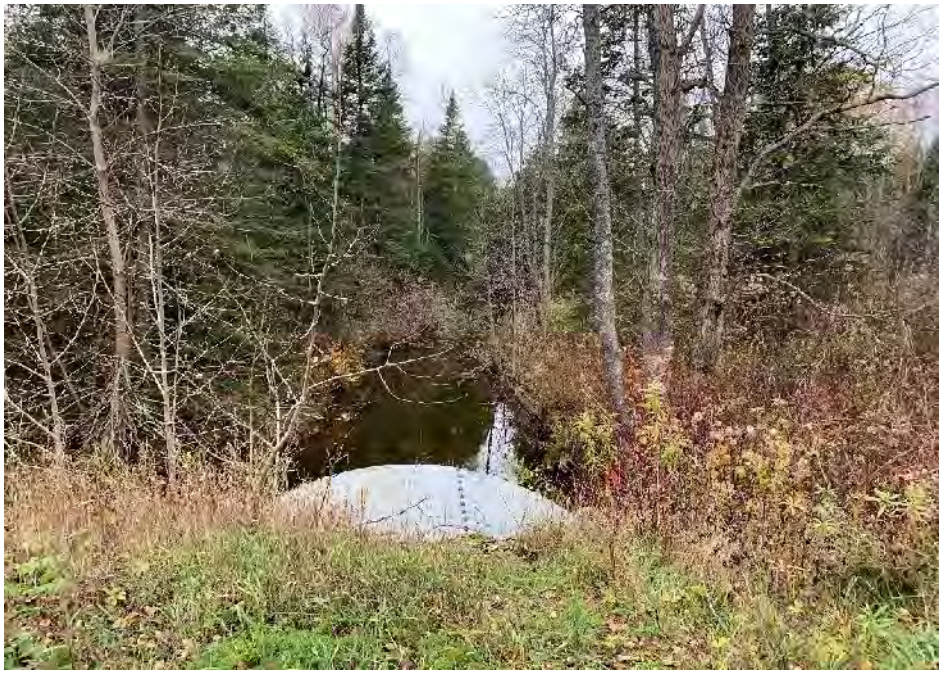


Photo 12-5: View of culvert outlet

Date of Photos: Oct. 30, 2020

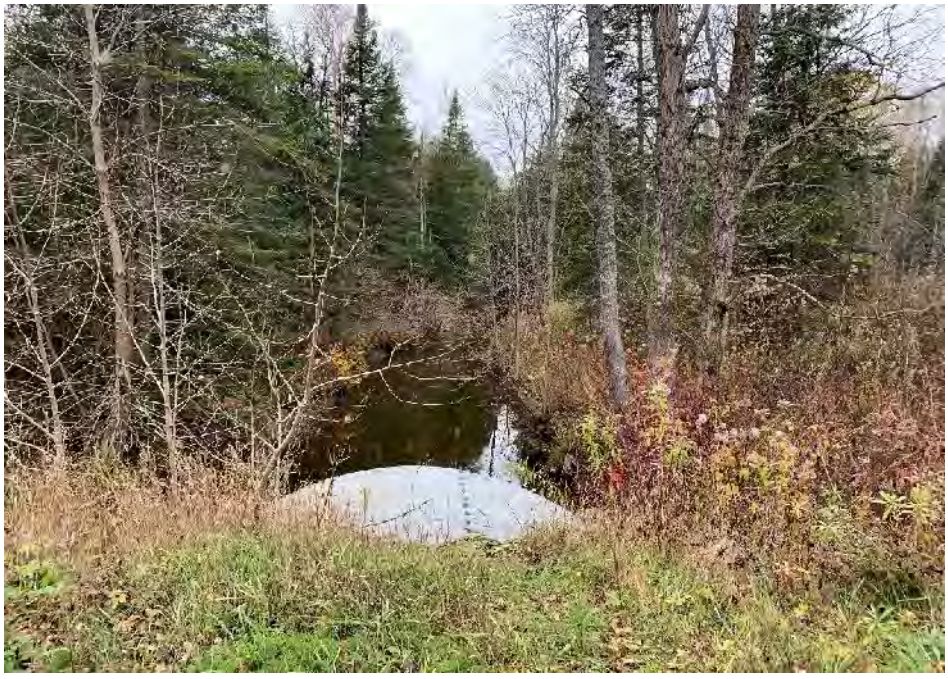


Photo 12-6: View of watercourse downstream

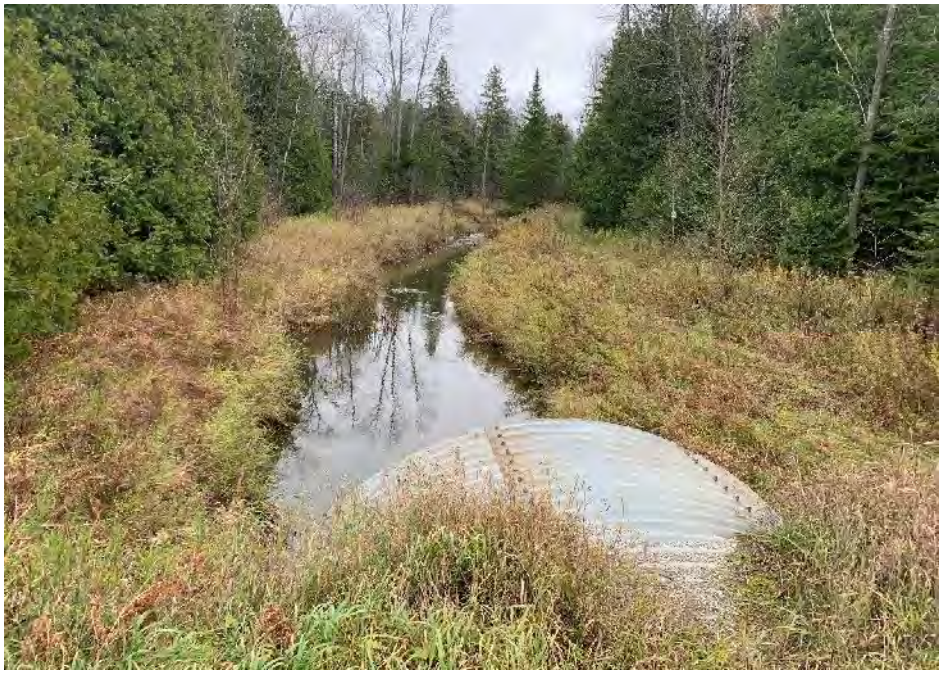


Photo 12-7: View of watercourse upstream

Date of Photos: Oct. 30, 2020

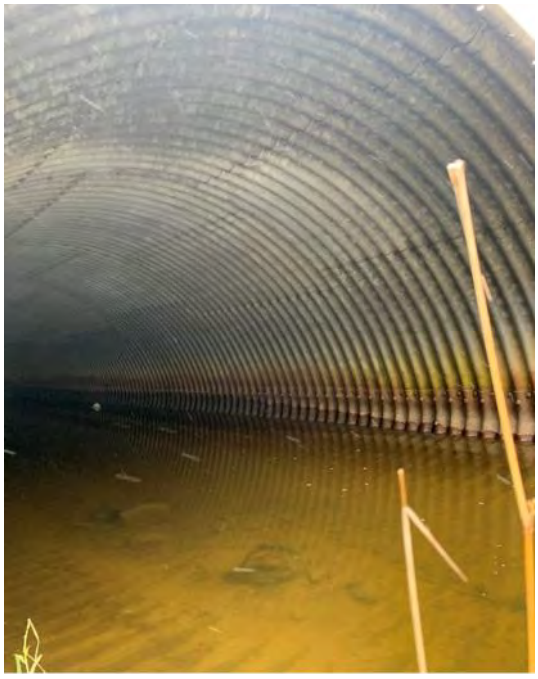


Photo 12-8: View of culvert barrel interior

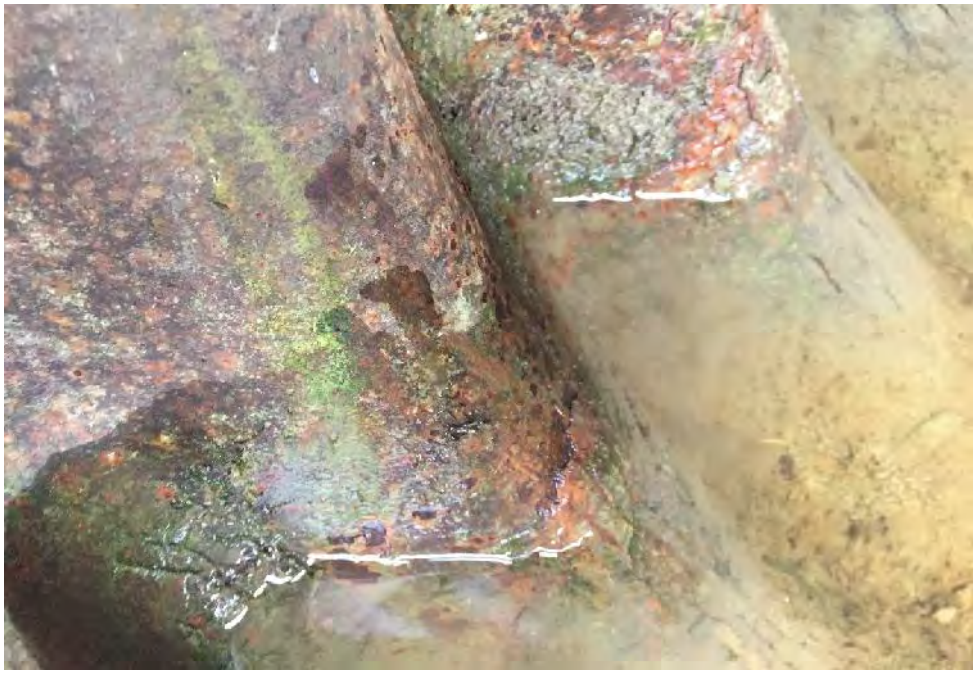
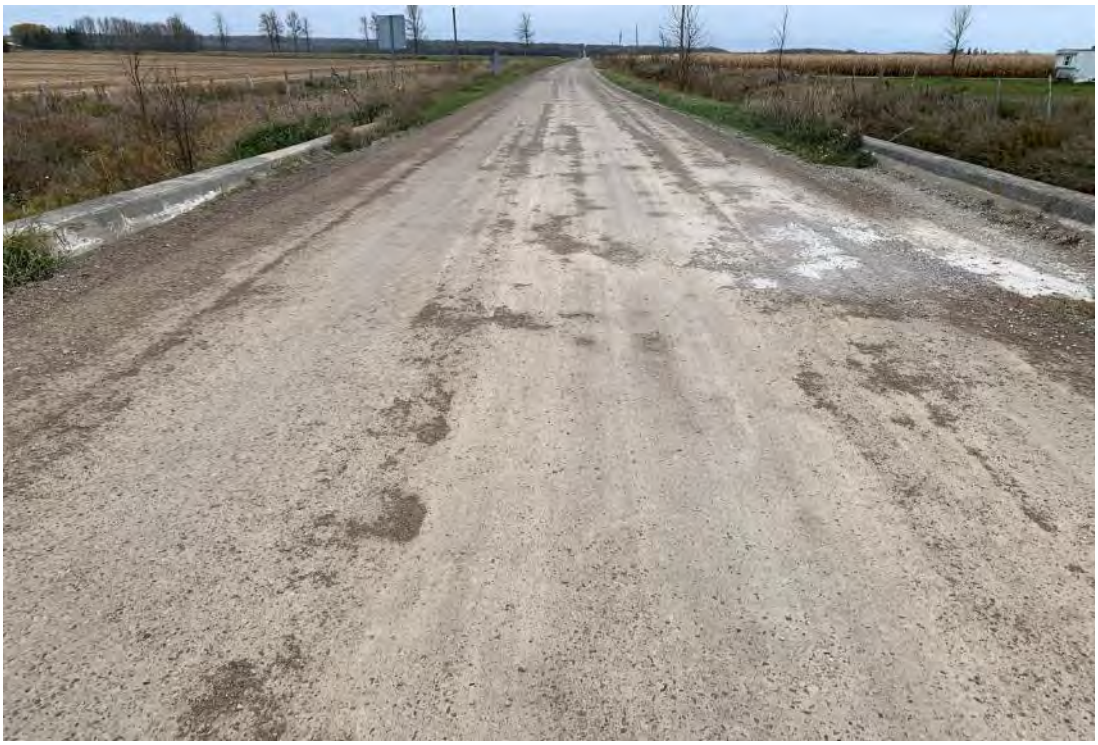


Photo 12-9: View of culvert barrel corrosion at the waterline (typical)

Date of Photos: Oct. 30, 2020

Bridge/Culvert Inspection Report

Site Number	13	**Project Number**	201-01605-00		
Structure Name	Bury Road Culvert	**Municipality**	Northern Bruce Peninsula		
MTO Region Code	30	**County**	Bruce	**Code**	02
MTO District Code	33	**Geographic Twp Code**	377		



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Tel: 519-376-7612
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Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Bury Road Culvert	Site Number	13
County	Bruce	Road Name	Bury Road
Municipality	Northern Bruce Peninsula	Road Type	Rural Local
Bridge or Culvert	Bridge	Owner	Northern Bruce Peninsula
Structure Type	Concrete Slab	AADT	100
Span (m)	6.1 No. 1	% Trucks	15%
Height (m)	2	Overall Structure Width (m)	7.5
Direction of Structure	East/West	Roadway Width (m)	5.5
Year Built/Rehabilitated	1960	Total Deck Length (m)	6.4
Current Load Limit	15 t	Total Deck Area (s.m.)	48
Detour Length (km)	8	Heritage Des.	None
Waterway	Old Woman's River (Fern Creek Drain)		

Inspection Data

Date of Inspection	October 30, 2020
Name of Inspector	Katherine Hemstock, EIT
Equipment Used	Tape, pick, hammer
Weather Conditions	Overcast
Temperature	4℃
Last Inspection	November 8, 2018

Photos:

13-1 - Title Page

13-2 - View of structure from the north approach

13-3 - Posted weight limit signage require realignment

13-4 - Approach and structure wearing surface

13-5 - Southwest structure wingwall (typical)

13-6 - View of west structure elevation, exterior soffit and north abutment wall

13-7 - View of structure soffit and north abutment wall

13-8 - View of south abutment wall and exposed footing

13-9 - View of watercourse upstream

13-10 - View of watercourse downstream

Additional Investigation Required	Inspect Annually - Deck Soffit and Foundations, deck condition survey
Total Rehabilitation	Place approach and structure barrier protection to meet current Code. Complete the concrete soffit, footing and foundation erosion repairs.
Total Rehabilitation Budget Costing	$115,000
Next Inspection	October 2022
Justification	Due to the low traffic volumes and fair condition of the structure, maintain load limit of 15 tonnes. Undertake rehabilitation to extend the service life (short term) versus replacement. Reduce speed limit to 35 km/hr. as interim measure until barrier protection is installed to Code. Inspect the structure annually to monitor condition until rehabilitation.

Element Data

Structure:	**13**

Element Group:	Decks		Length:				
Element Name:	Deck Top		Width:				
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:	Yes			
Protection System:	Wearing Surface						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			80	20		

Comments: The visible ends are in fair condition, the majority of the deck top is debris/gravel covered and not visible for inspection. Remove the granular cover and inspect the condition of the top deck.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Clear the debris and gravel along curb, perform a deck condition survey, and seal and waterproof deck top.

Element Data

Element Group:	Decks		Length:				
Element Name:	Soffit - Thick Slab		Width:				
Location:			Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			30	70		

Comments: Spalling and delaminated concrete with rebar exposed on both sides at abutment walls. An exterior soffit crack is developing (possibly a shear failure) at the northwest corner soffit exterior. Monitor annualy for movement.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Remove the delaminated concrete, sand blast rebar and complete concrete repair. Waterproof the deck top to prevent further deterioration. Monitor the crack annually.

Element Data

Element Group:	Barrier		Length:				
Element Name:	Railing System		Width:				
Location:	Each Side		Height:				
Material:	Concrete		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%					Yes	

Comments: No structure or approach barrier protection current in place.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Install structure and approach barrier protection to provide required vehicle safety. Reduce the speed limit to 35km/hr in the interim.

Element Data

Structure:	13

Element Group:	Abutments	Length:	
Element Name:	Abutment Walls	Width:	
Location:	Each Side	Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:			

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			80	20		

Comments: Hairline cracks at cold joint where abutment/wingwall meets the soffit at the northwest corner. Surface spalling and calcite deposits were observed on each wingwall.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Remove all poor concrere, clean the reinforcing steel, and replace concrete.

Element Data

Element Group:	Foundations	Length:	
	Foundation (below ground level)	Width:	
Location:	Each End	Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	Yes
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%						

Comments: Some erosion surrounding the footing was observed at the downstream end and along north side and southwest corner.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Place erosion protection along the base of the abutment walls/top of footings.

Element Data

Element Group:	Embankments & Streams	Length:	
Element Name:	Streams and Waterways	Width:	
Location:		Height:	
Material:		Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			80	20	Yes	

Comments: Erosion and settlement were observed at the structure outlet. The flow has shifted against the south abutment/footing with a silt deposit along the north abutment.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent

Place rip rap to prevent further erosion and clear the sediment deposit.

Element Data

Structure:	**13**

Element Group:	Embankments & Streams	Length:	
Element Name:	Embankments	Width:	
Location:	Each Corner	Height:	
Material:		Count:	6
Element Type:		Total Quantity:	6
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		6				

Comments: Heavily vegetated embankments with rip rap on the northeast face.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Element Group:	Approaches	Length:	
Element Name:	Wearing Surface	Width:	
Location:		Height:	
Material:	Gravel	Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			80	20	Yes	Yes

Comments: Clear the debris and vegetation build along the edge of each shoulder to achieve drainage. The surface has potholes and wheel path rutting.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent
Grade and clear the vegetation from the shoulder annually.

Element Data

Element Group:	Accessories	Length:	
Element Name:	Signs	Width:	
Location:		Height:	
Material:	Steel	Count:	2
Element Type:		Total Quantity:	2
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			2		Yes	Yes

Comments: There are currently two 15 tonne load limit signs. The signs are in good condition but are not plumb and require straightening. There are no end hazard signs currently in place.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent
Straighten the load limit signs and install end hazard signs.

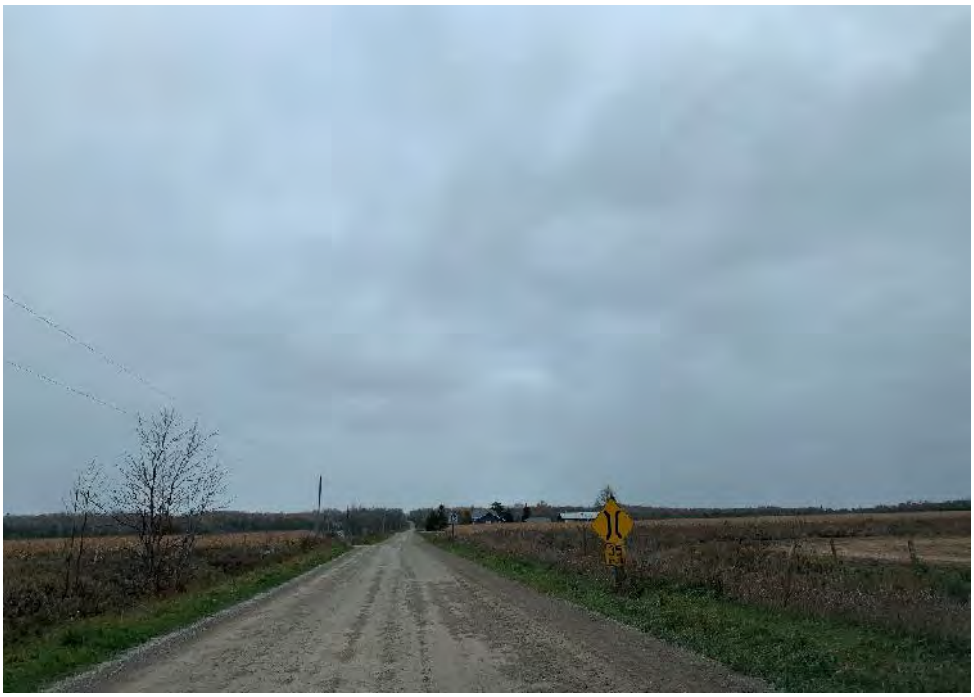


Photo 13-2: View of structure from the south approach

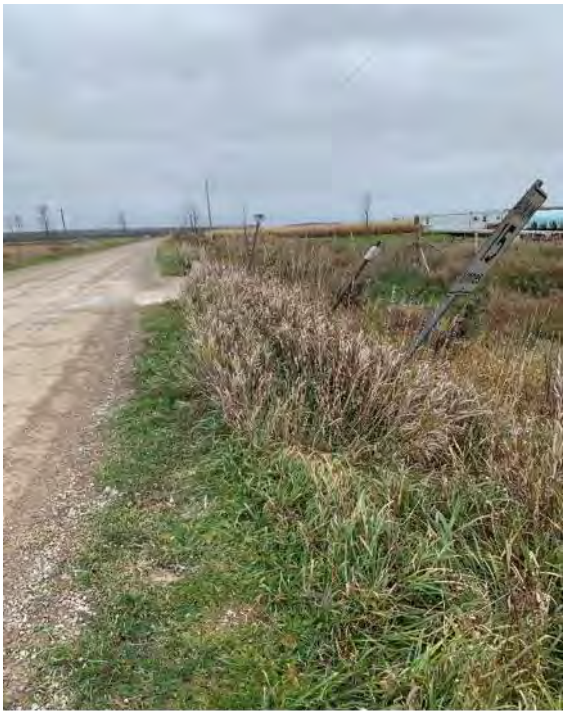


Photo 13-3: Posted weight limit signage requires realignment

Date of Photos: Oct. 30, 2020

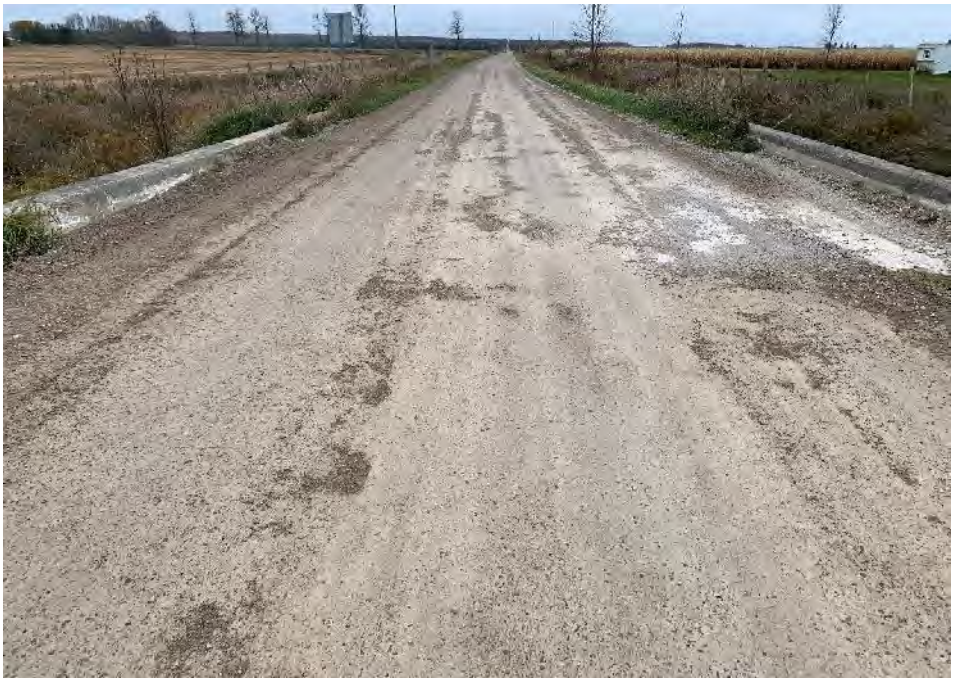


Photo 13-4: Approach and structure wearing surface

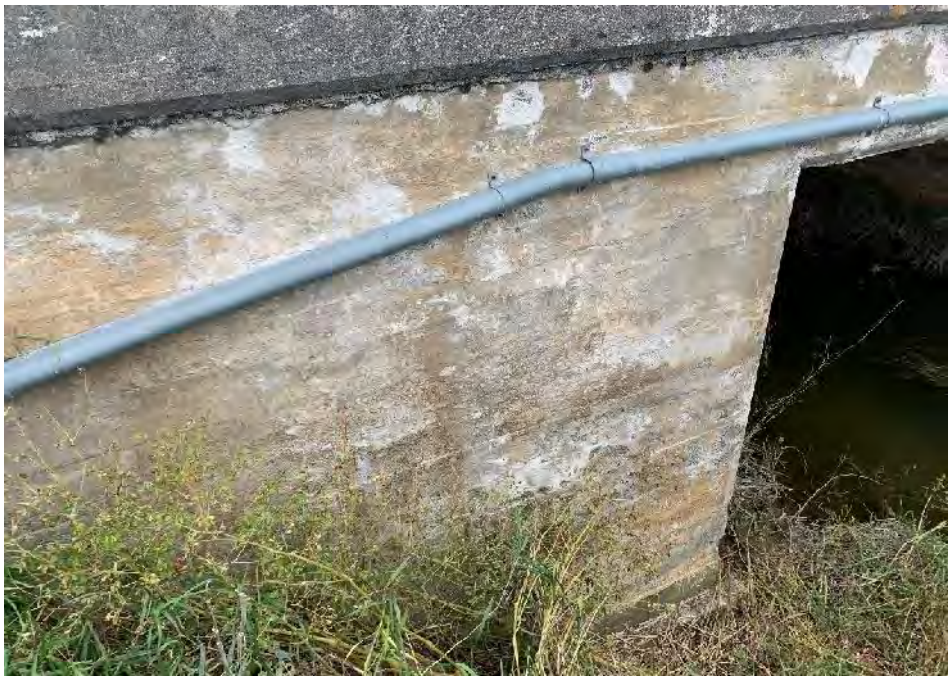


Photo 13-5: Southwest structure wingwall (typical)

Date of Photos: Oct. 30, 2020

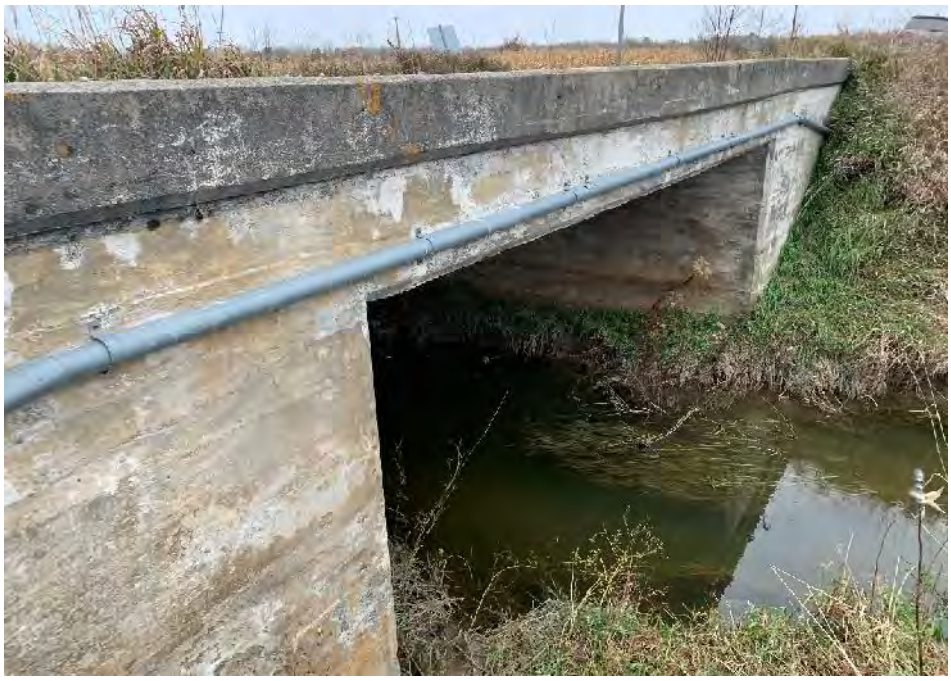


Photo 13-6: View of east structure elevation, exterior soffit and north abutment wall

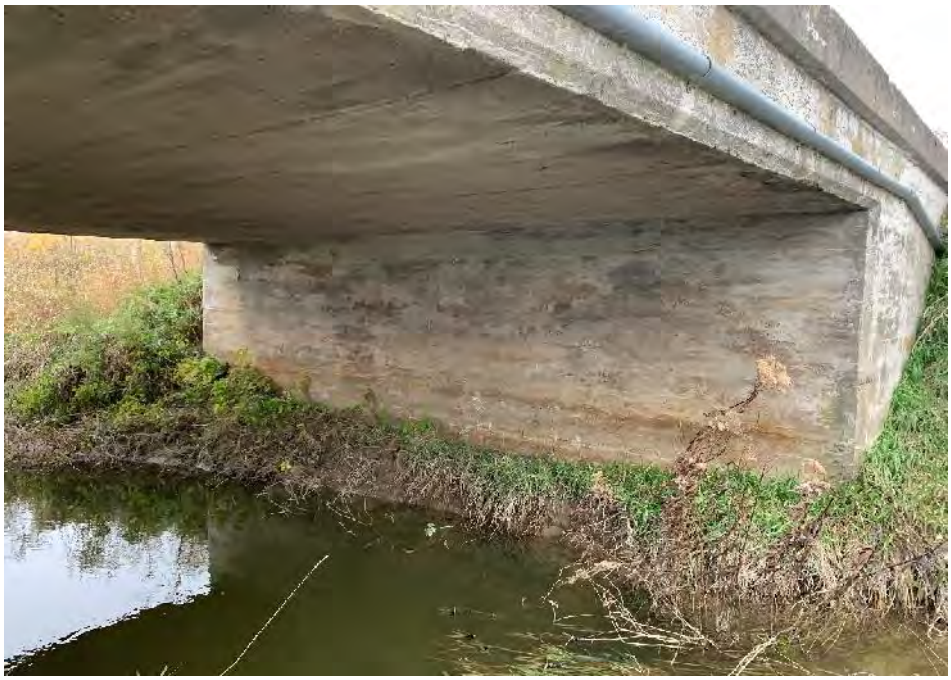


Photo 13-7: View of structure soffit and north abutment wall

Date of Photos: Oct. 30, 2020

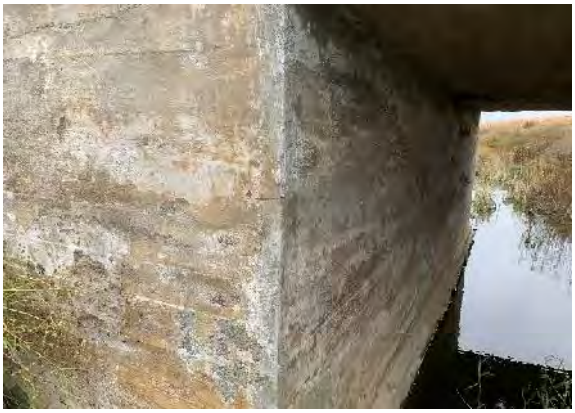


Photo 13-8: View of south abutment wall and exposed footing

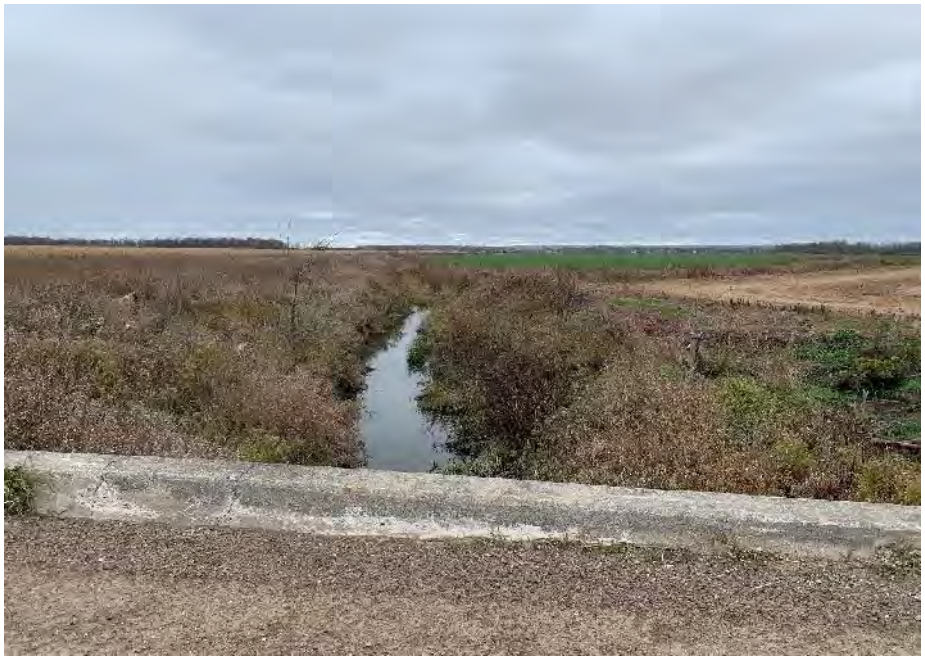


Photo 13-9: View of watercourse upstream

Date of Photos: Oct. 30, 2020

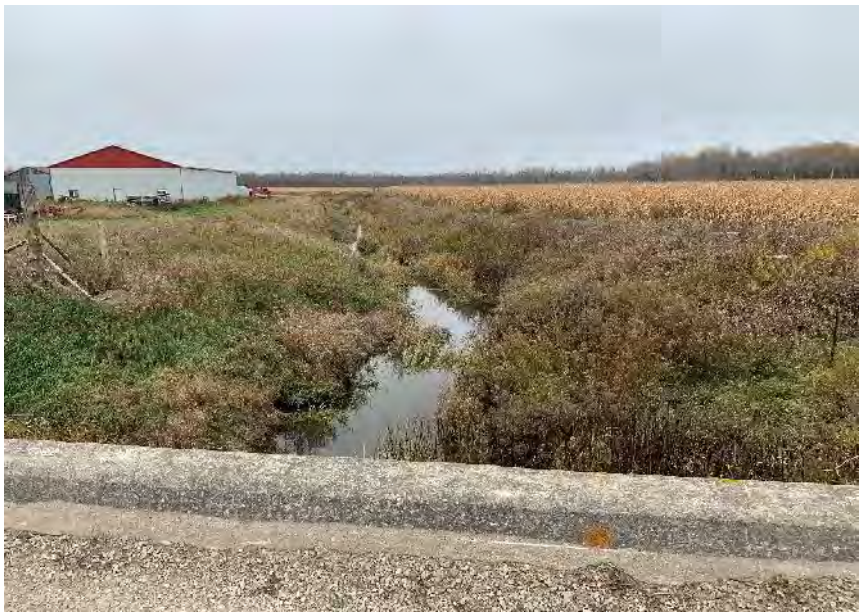
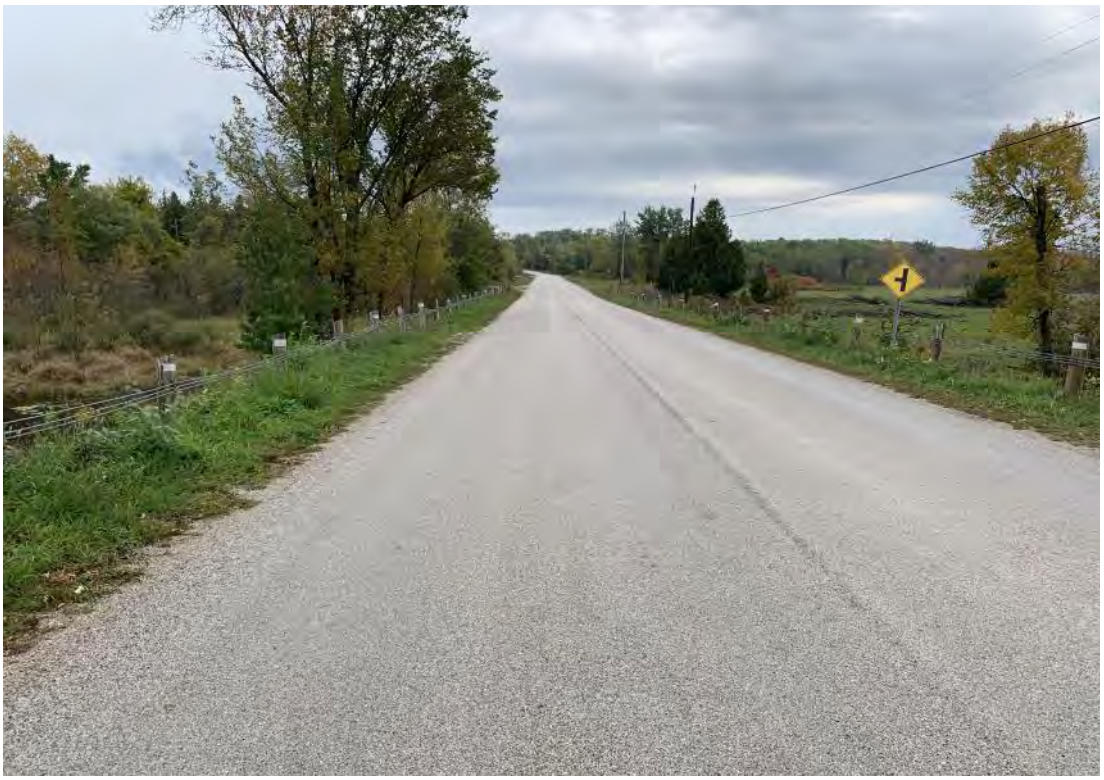


Photo 13-10: View of watercourse downstream

Date of Photos: Oct. 30, 2020

Bridge/Culvert Inspection Report

Site Number	14	**Project Number**	201-01605-00		
Structure Name	East Road Culvert	**Municipality**	Northern Bruce Peninsula		
MTO Region Code	30	**County**	Bruce	**Code**	02
MTO District Code	33	**Geographic Twp Code**	377		



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Bridge/Culvert Inspection Report

Inventory Data

Structure Name	East Road Culvert	Site Number	14
County	Bruce	Road Name	East Road
Municipality	Northern Bruce Peninsula	Road Type	Rural Coll.
Bridge or Culvert	Culvert	Owner	Northern Bruce Peninsula
Structure Type		AADT	350
Span (m)	3.7 No. 1	% Trucks	15%
Height (m)	2.8	Overall Structure Width (m)	20
Direction of Structure	East/West	Roadway Width (m)	5.5
Year Built/Rehabilitated	1975	Total Deck Length (m)	3.7
Current Load Limit	None	Total Deck Area (s.m.)	74
Detour Length (km)	32	Heritage Des.	None
Waterway	Stokes River		

Inspection Data

Date of Inspection	September 24, 2020
Name of Inspector	Katherine Hemstock, EIT
Equipment Used	Tape, pick, hammer
Weather Conditions	Overcast
Temperature	16℃
Last Inspection	November 8, 2018

Photos:

14-1 - Title Page - View of structure from the south approach

14-2 - View of structure wearing surface

14-3 - View of watercourse downstream

14-4 - View of watercourse upstream

14-5 - View of culvert barrel interior, obvert

14-6 - View of culvert barrel interior

14-7 - View of slope protection

Additional Investigation Required	None
Total Rehabilitation	Tighten the barrier protection cables and repair the connection to the posts. Continue to monitor the corrosion of the barrel (especially at the inlet).
Total Rehabilitation Budget Costing	$2,500
Next Inspection	September 2022
Justification	Maintain for safe service life.

Element Data

Structure:	**14**

Element Group:	Decks		Length:				
Element Name:	Wearing Surface		Width:				
Location:			Height:				
Material:	Surface Treatment		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				

Comments: The surface treatment is in good condition with minor wheel path rutting observed.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Element Group:	Barriers		Length:				
Element Name:	Barrier		Width:				
Location:			Height:				
Material:	Steel Cable/Wood Posts		Count:				
Element Type:	3-Cable Guiderail		Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100			Yes	

Comments: The east cables are loose and detached at two posts. Some wooden posts arebeinging to show signs of rot.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent
Tighten the cable guiderail and repair the post connections. Monitor the wooden post condition.

Element Data

Element Group:	Culverts		Length:				
Element Name:	Inlet Component		Width:				
Location:	East End		Height:				
Material:	Stone		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				

Comments: The embankments and haunches are stable and rock protected.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Structure:	**14**

Element Group:	Culverts	Length:	
Element Name:	Outlet Components	Width:	
Location:	West End	Height:	
Material:		Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				

Comments: The embankments and haunches are stable and rock protected.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Element Data

Element Group:	Culvert	Length:	
Element Name:	Barrel	Width:	
Location:		Height:	
Material:	Steel	Count:	
Element Type:	Multiple Plate	Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	Galvanized		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		50	50			

Comments: Rust and some corrosion were observed below the high water line. At the inlet end, minor section loss was observed not exceeding 5%. Monitor the section loss as it advances.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Element Data

Element Group:	Streams/Embankments	Length:	
Element Name:	Streams and Waterways	Width:	
Location:		Height:	
Material:	Earth / Rock	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			

Comments: A small silt deposit was observed upstream, but is not obstructing the flow. The streambed is bedrock downstream.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Element Data

Structure:	**14**

Element Group:	Streams/Embankments	Length:	
Element Name:	Embankment	Width:	
Location:	Each Corner	Height:	
Material:	Stone	Count:	6
Element Type:		Total Quantity:	6
Environment:		Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each Corner		6				

Comments: The embankments appear stable with no sign of erosion or movement of the rock protection.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Element Group:	Signs	Length:	
Element Name:	Signs	Width:	
Location:	Corner	Height:	
Material:	Steel	Count:	2
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100			Yes	Yes

Comments: End of guiderail post marker signs are not plum or aligned with traffic. There are reverse curve signs at each approach.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent
Straighten and align guiderail port marker signs.

Element Data

Element Group:	Approaches	Length:	
Element Name:	Wearing Surface	Width:	
Location:	Each End	Height:	
Material:	Surface Treatment	Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				

Comments: The surface treatment is in good condition with minor wheel path rutting observed.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

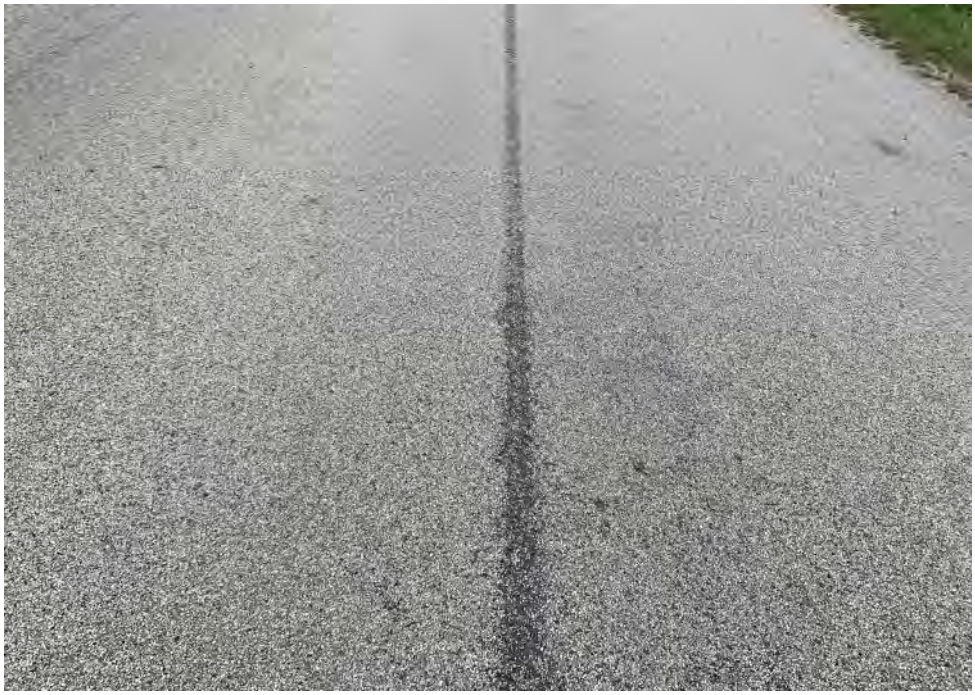


Photo 14-2: View of structure wearing surface

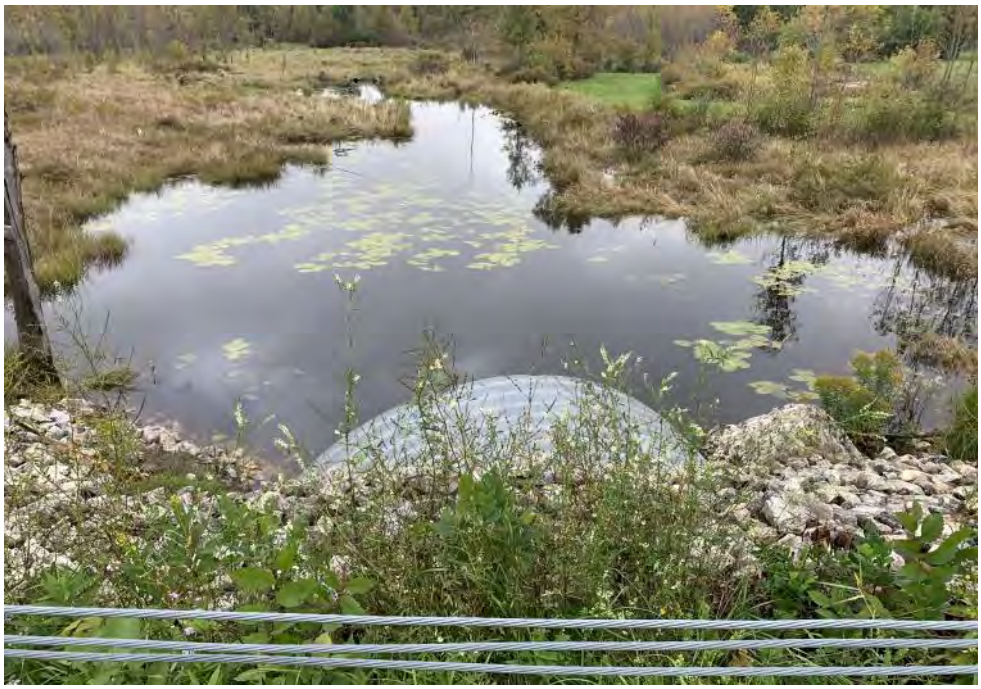


Photo 14-3: View of watercourse downstream

Date of Photos: Sept. 24, 2020

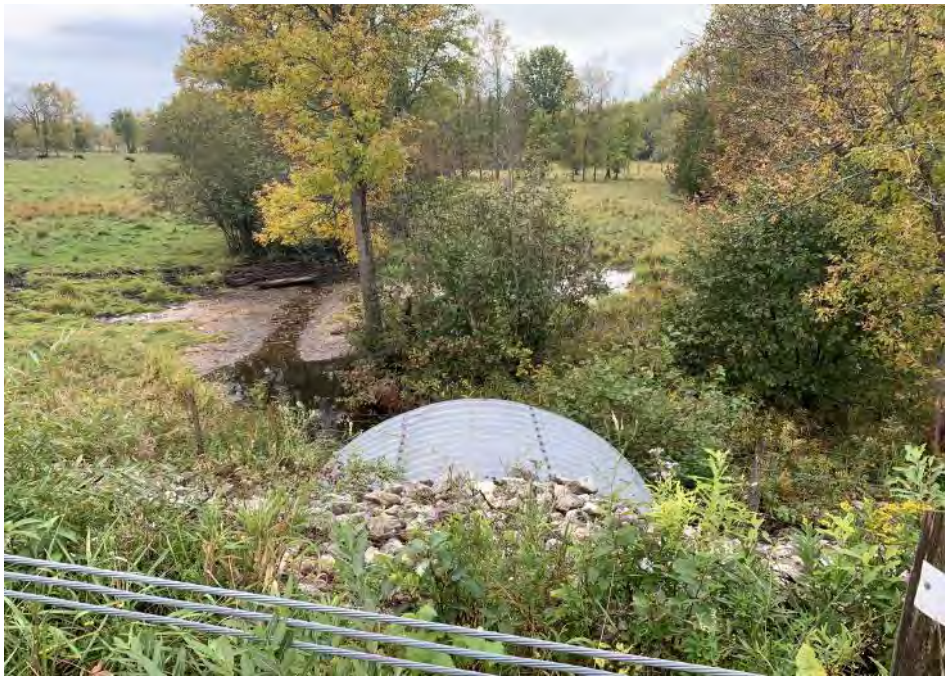


Photo 14-4: View of watercourse upstream

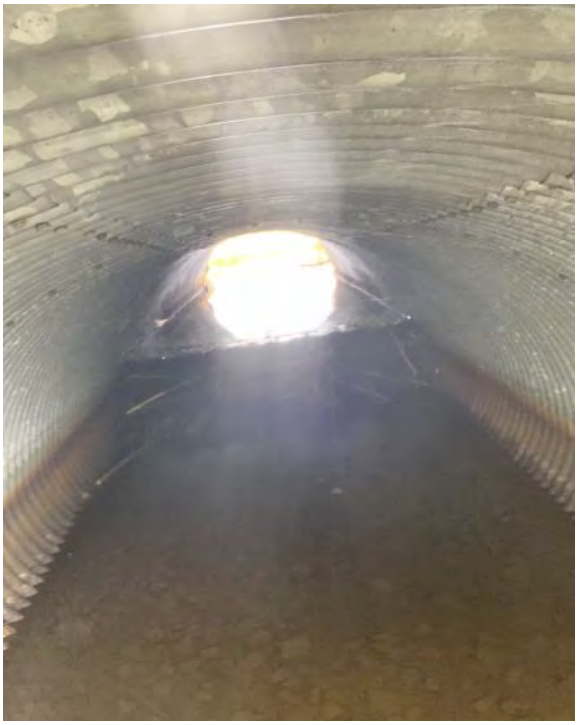


Photo 14-5: View of culvert barrel interior, obvert

Date of Photos: Sept. 24, 2020

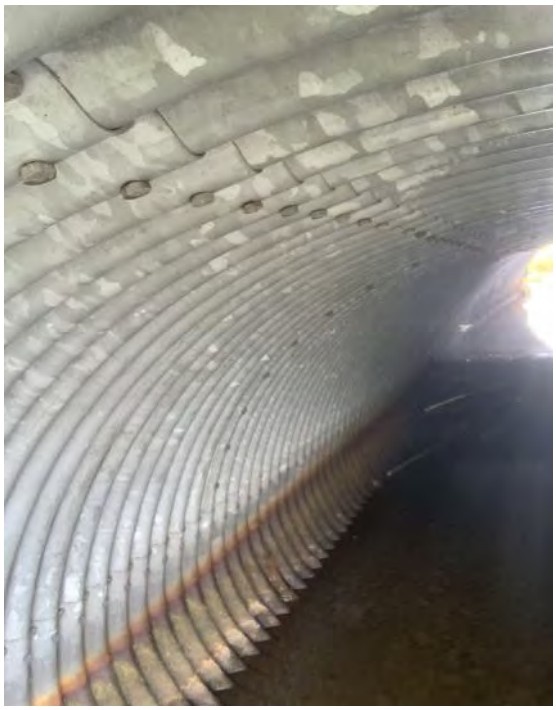


Photo 14-6: View of culvert barrel interior

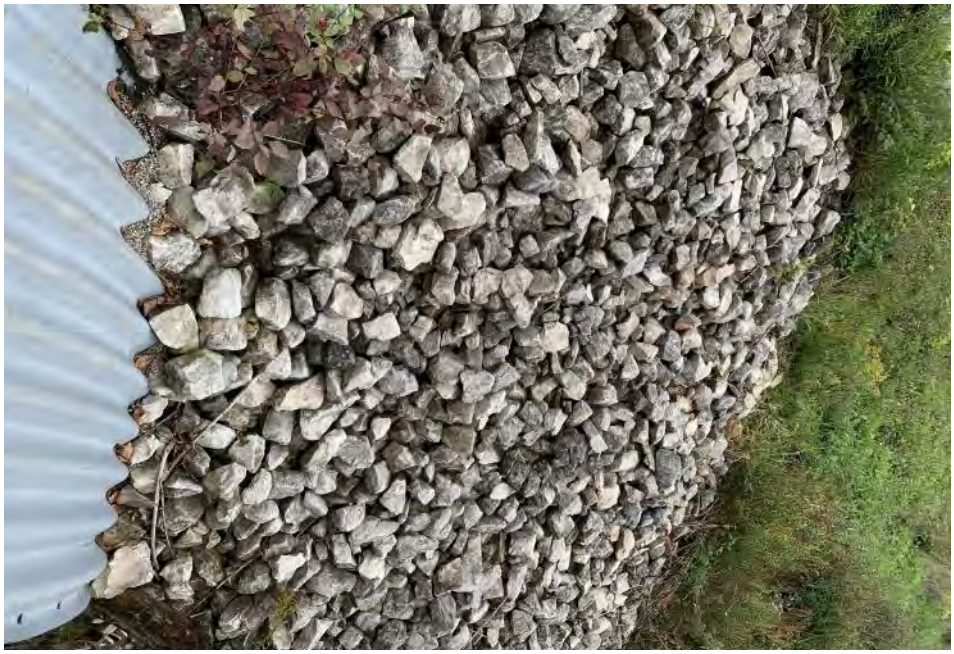
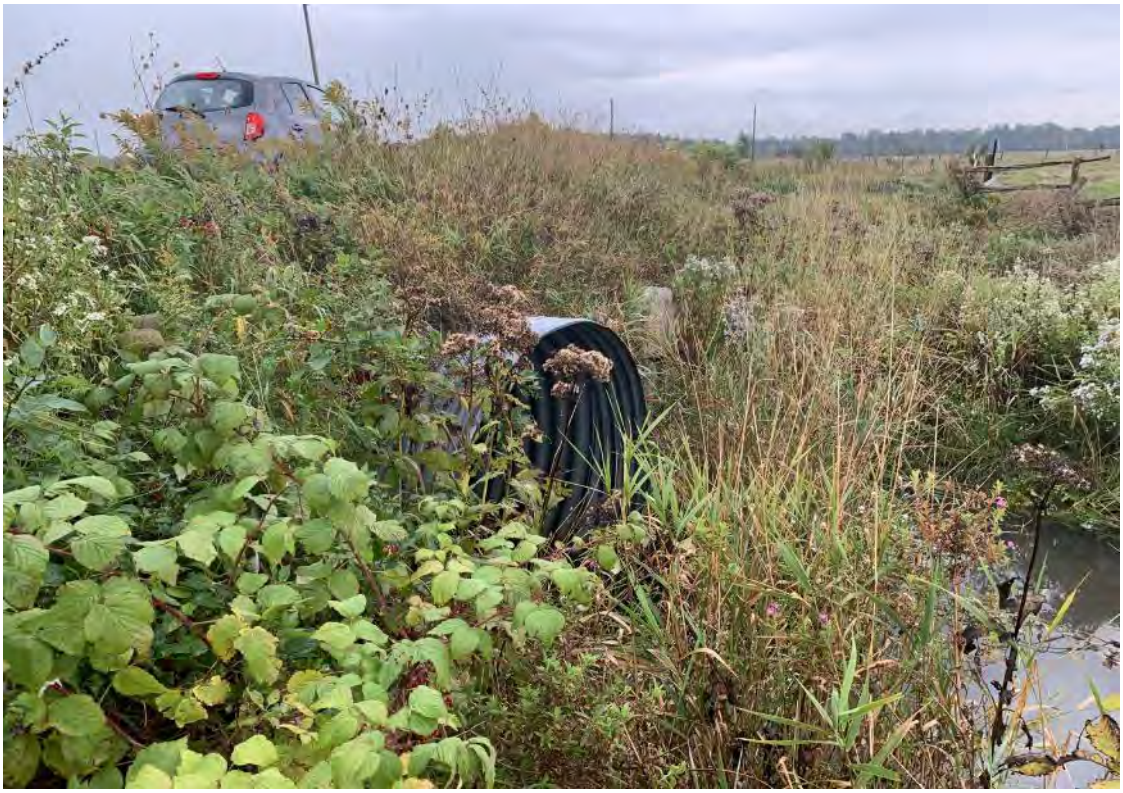


Photo 14-7: View of slope protection

Date of Photos: Sept. 24, 2020

Bridge/Culvert Inspection Report

Site Number	15	**Project Number**	201-01605-00		
Structure Name	Concession 4 Culvert	**Municipality**	Northern Bruce Peninsula		
MTO Region Code	30	**County**	Bruce	**Code**	02
MTO District Code	33	**Geographic Twp Code**	377		



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Concession 4 Culvert	Site Number	15
County	Bruce	Road Name	Concession 4
Municipality	Northern Bruce Peninsula	Road Type	Rural Local
Bridge or Culvert	Culvert	Owner	Northern Bruce Peninsula
Structure Type	Steel CSP (double)	AADT	50
Span (m)	2.8, 0.9 No. 2	% Trucks	10%
Height (m)	2.8 m, 0.6 m	Overall Structure Width (m)	6 m
Direction of Structure	East/West 45° skew	Roadway Width (m)	4 + wide shoulder
Year Built/Rehabilitated	2014	Total Deck Length (m)	
Current Load Limit	None	Total Deck Area (s.m.)	
Detour Length (km)	N/A (Dead End)	Heritage Des.	None
Waterway	Branch - Judges Creek		

Inspection Data

Date of Inspection	September 24, 2020
Name of Inspector	Katherine Hemstock, EIT
Equipment Used	Tape, pick, hammer
Weather Conditions	Overcast
Temperature	16℃
Last Inspection	November 8, 2018

Photos:

15-1 - Title Page

15-2 - View of approach and structure wearing surface

15-3 - Rock protection at inlet end

15-4 - View of east culvert end in elevation

15-5 - View of structure wearing surface

15-6 - View of watercourse downstream

15-7 - View of culvert barrel interior

Additional Investigation Required	None
Total Rehabilitation	Install barrier protection and signage to code.
Total Rehabilitation Budget Costing	$55,000
Next Inspection	September 2022
Justification	Install barrier and approach protection for increased road user safetly. In the interim, reduce the posted speed to 35 km/hr to improve vehicular safety and reduce liability.

Element Data

Structure:	**15**

Element Group:	Decks	Length:	
Element Name:	Wearing Surface	Width:	
Location:		Height:	
Material:	Gravel	Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:	Wearing Surface		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100		Yes	Yes

Comments: The granular wearing surface is uneven and requires grading to achieve drainage.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Grade annually and clear vegetation from shoulders.

Element Data

Element Group:	Barrier	Length:	
Element Name:	Railing System	Width:	
Location:	Each Side	Height:	
Material:	Concrete	Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%					Yes	

Comments:

Recommended Work: None 6-10 Years 1-5 Years < 1 Year [Urgent]

Install barrier protection to Code to provide required vehicle safety.

Element Data

Element Group:	Culverts	Length:	
Element Name:	Inlet Component	Width:	
Location:	East End	Height:	
Material:	Stone and Earth	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				

Comments: The low level CSP pipe culvert is partilly submerged underwater. There is some observed erosion of the embankments at the culvert inlet.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Repair erosion and add rip-rap slope protection.

Element Data

Structure:	**15**

Element Group:	Culverts	Length:	
Element Name:	Outlet Components	Width:	
Location:	West End	Height:	
Material:	Stone and Earth	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	Yes
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				

Comments: The low level CSP pipe culvert is partilly submerged underwater.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Element Data

Element Group:	Culvert	Length:	
Element Name:	Barrel	Width:	
Location:		Height:	
Material:	Steel	Count:	
Element Type:	Pipe Arch	Total Quantity:	
Environment:	Moderate	Limited Insp'n:	Yes
Protection System:	Galvanized		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				

Comments: Low level culvert under water.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Element Data

Element Group:	Embankments & Streams	Length:	
Element Name:	Streams and Waterways	Width:	
Location:		Height:	
Material:	Earth	Count:	6
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		6				

Comments: The embankments are stable and well vegetated.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Element Data

Structure:	**15**

Element Group:	Embankments & Streams	Length:	
Element Name:	Embankments	Width:	
Location:	Each Corner	Height:	
Material:	Earth/Stone	Count:	6
Element Type:		Total Quantity:	6
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		4	2			

Comments: The slopes are partially vegetated with some rock protection. Rock protection has been placed at the inlet end.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Element Group:	Signs	Length:	
Element Name:	Signs	Width:	
Location:		Height:	
Material:	Steel	Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:	Paint		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%					Yes	Yes

Comments: There are no End Hazard signs currently in place.

Recommended Work: None 6-10 Years 1-5 Years < 1 Year [Urgent]
Install end hazard signs.

Element Data

Element Group:	Approaches	Length:	
Element Name:	Wearing Surface	Width:	
Location:	Each End	Height:	
Material:	Gravel	Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100			Yes	Yes

Comments: The granular wearing surface is uneven and requires grading to achieve drainage.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent
Grade annually and clear vegetation from shoulders.

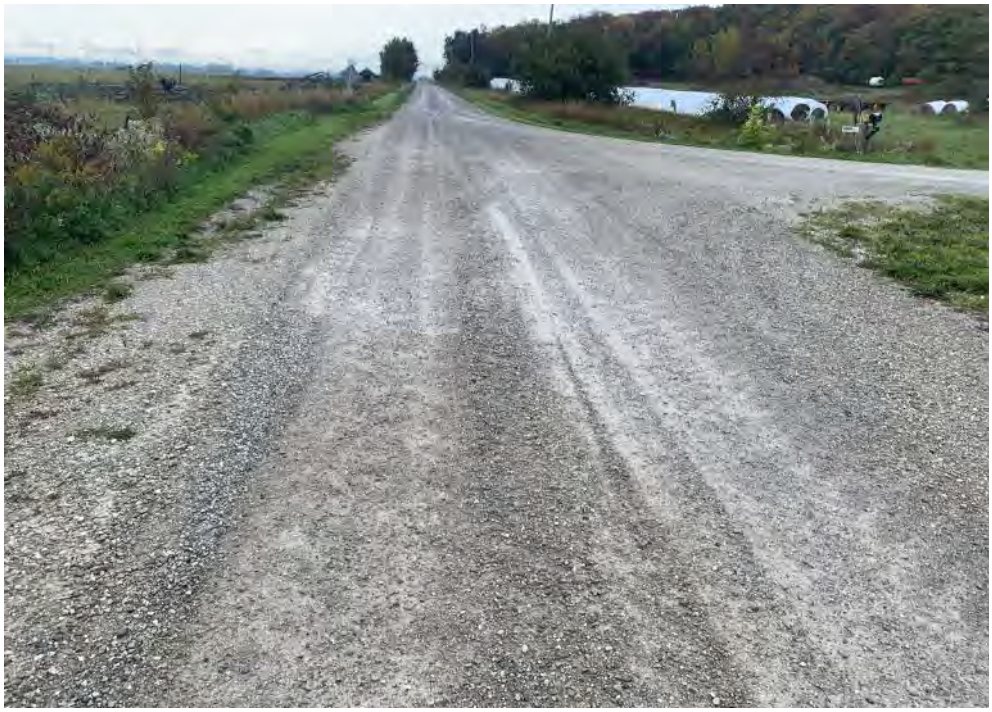


Photo 15-2: View of approach and structure wearing surface

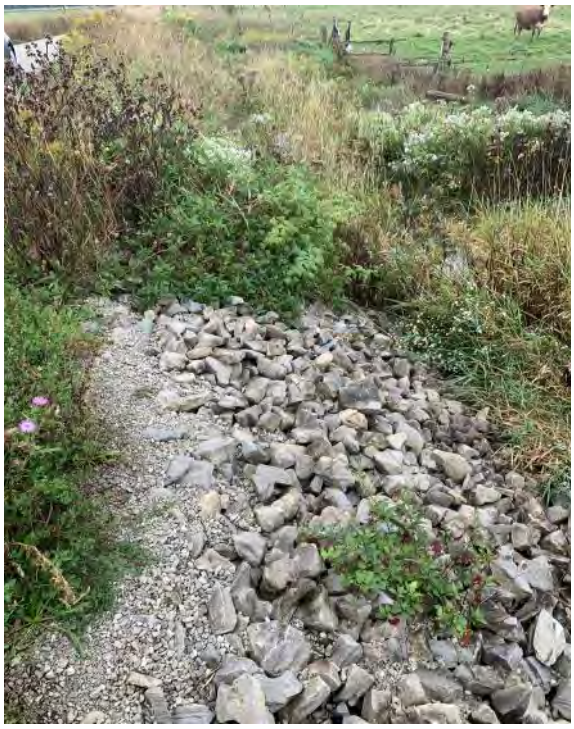


Photo 15-3: Rock protection at inlet end

Date of Photos: Sept. 24, 2020

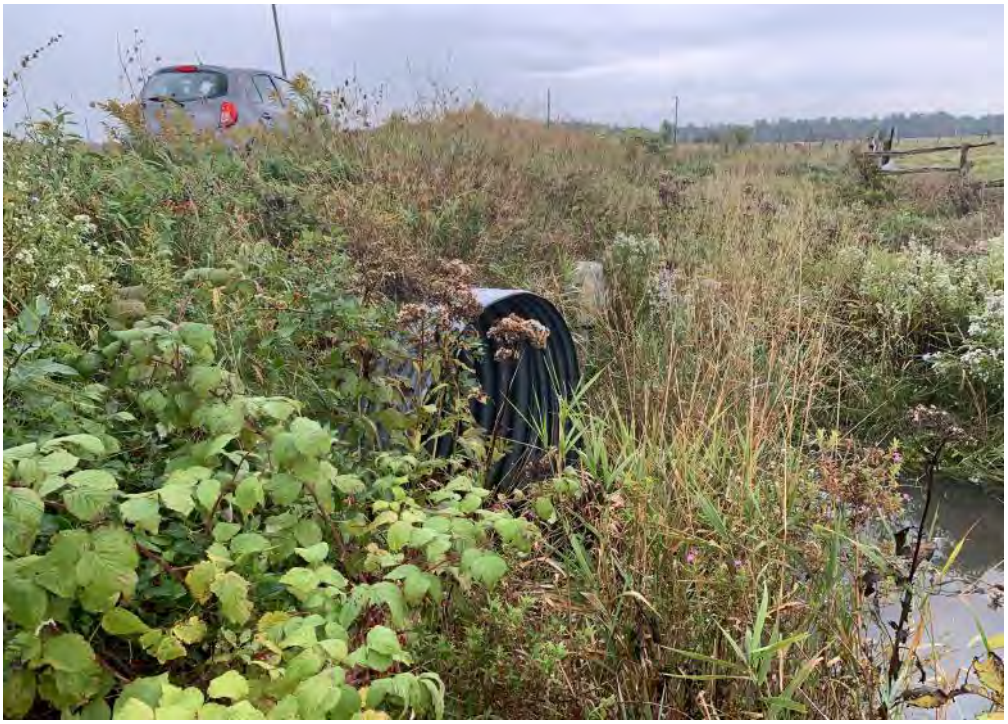


Photo 15-4: View of east culvert end in elevation

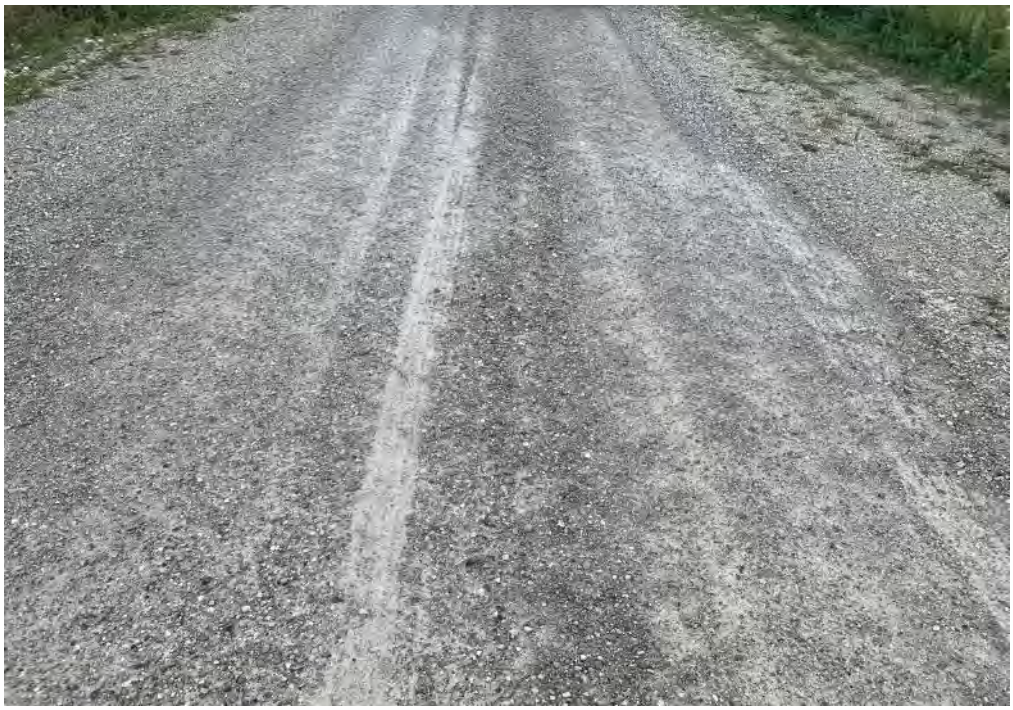


Photo 15-5: View of structure wearing surface

Date of Photos: Sept. 24, 2020

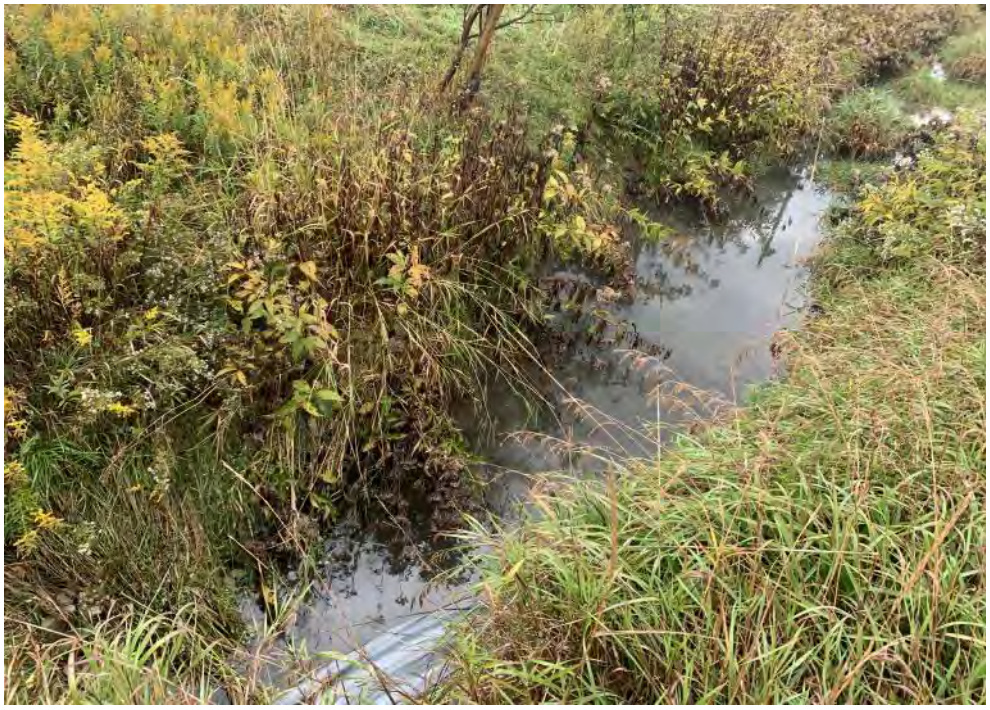


Photo 15-6: View of watercourse downstream

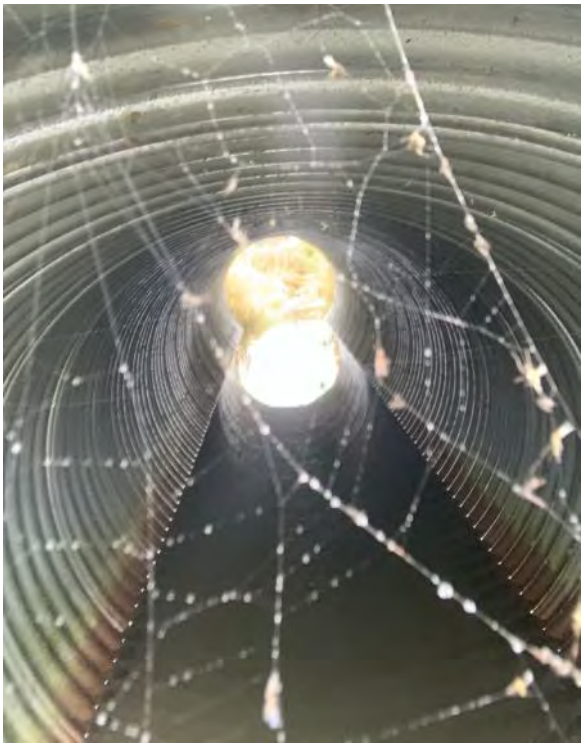
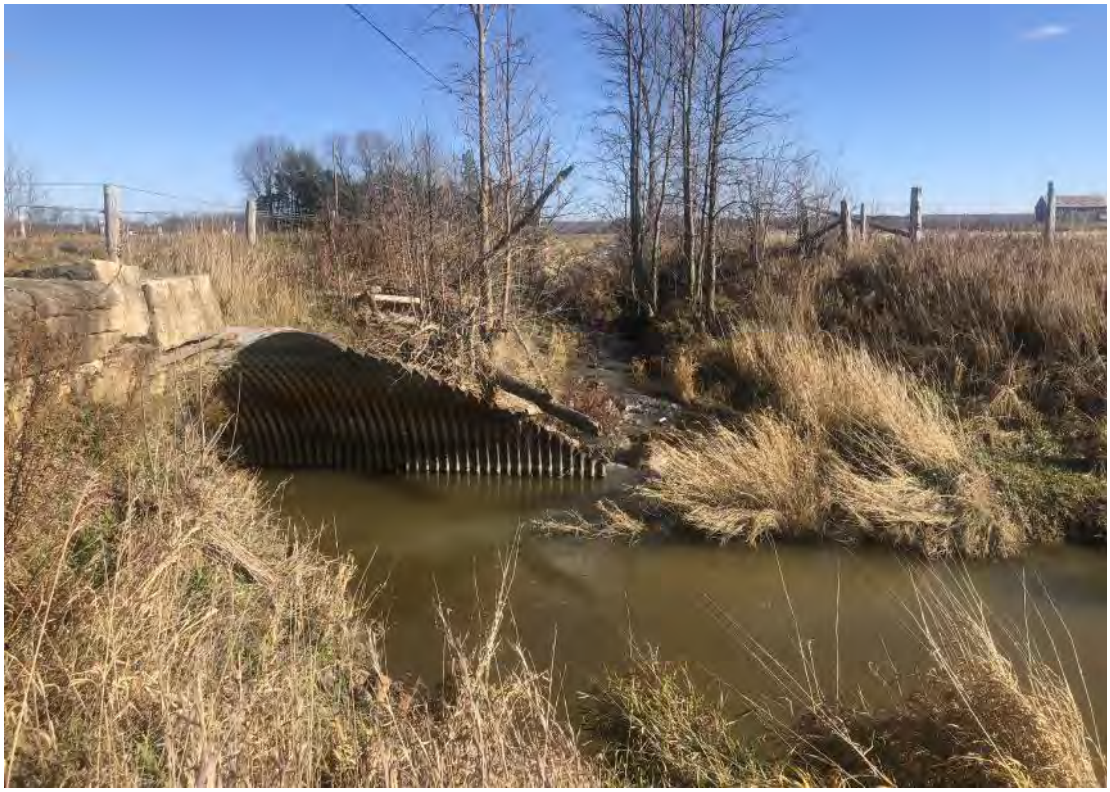


Photo 15-7: View of culvert barrel interior

Date of Photos: Sept. 24, 2020

Bridge/Culvert Inspection Report

Site Number	16	**Project Number**	201-01605-00		
Structure Name	Barrow Bay Road Culvert	**Municipality**	Northern Bruce Peninsula		
MTO Region Code	30	**County**	Bruce	**Code**	02
MTO District Code	33	**Geographic Twp Code**	377		



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Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Barrow Bay Road Culvert	Site Number	16
County	Bruce	Road Name	Barrow Bay Road
Municipality	Northern Bruce Peninsula	Road Type	Rural Coll.
Bridge or Culvert	Culvert	Owner	Northern Bruce Peninsula
Structure Type	Steel - SP - CSP - PA multi-plate	AADT	350
Span (m)	7 No. 1	% Trucks	15%
Height (m)	3.8	Overall Structure Width (m)	21.8
Direction of Structure	North/South	Roadway Width (m)	6.1
Year Built/Rehabilitated	1980	Total Deck Length (m)	7
Current Load Limit	None	Total Deck Area (s.m.)	N/A
Detour Length (km)	6	Heritage Des.	None
Waterway	Judges Creek		

Inspection Data

Date of Inspection	November 12, 2020
Name of Inspector	Shauna Armstrong, EIT
Equipment Used	Tape, pick, hammer
Weather Conditions	Sunny
Temperature	10°C
Special Notes	November 8, 2018

Photos:

16-1 - Title Page - Upstream elevation

16-2 - View of culvert barrel in elevation (outlet end)

16-3 - View of culvert barrel in elevation (intlet end)

16-4 - View of watercourse upstream

16-5 - View of watercourse downstream

16-6 - Culvert barrel interior

16-7 - View of structure from approach

16-8 - Loose cable on barrier protection

16-9 - Wooden post (typical)

Additional Investigation Required	None
Total Rehabilitation	Place erosion protection at south slope and replace barrier posts.
Total Rehabilitation Budget Costing	$7,500
Next Inspection	November 2022
Justification	Due to the good condition of this structure, improvements are recommended to maximise the safe service life. Replace all deteriorating barrier protection posts .

Element Data

Structure:	**16**

Element Group:	Decks	Length:	
Element Name:	Wearing Surface	Width:	
Location:		Height:	
Material:	Surface Treatment	Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		90	10			

Comments: Some minor cracking was observed at the shoulders.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Element Group:	Barriers	Length:	
Element Name:	Barrier	Width:	
Location:	Each Side	Height:	
Material:	Steel/Wood	Count:	20 posts - 3 cable
Element Type:	3-Cable Guiderail	Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Ea.		20				

Comments: The three cable guide barrier is in fair overall condition. Some of the wooden posts are experiencing moderate rot and should be replaced for vehicle safety.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent
Replace the rotten barrier posts.

Element Data

Element Group:	Culverts	Length:	
Element Name:	Inlet Component	Width:	
Location:	South End	Height:	
Material:	Stone	Count:	
Element Type:	Stone Head Wall	Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		50	40	10		

Comments: Some erosion was observed under the large block stones protect the south slope.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent
Place additional stone blocks and rip-rap. Remove the debris at the inlet.

Element Data

Structure:	**16**

Element Group:	Culverts	Length:	
Element Name:	Outlet Components	Width:	
Location:	North End	Height:	
Material:	Stone/Rip-Rap/Earth	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			

Comments: The outlet slopes are very steep, but appear stable.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Element Data

Element Group:	Culvert	Length:	
Element Name:	Barrel	Width:	
Location:		Height:	
Material:	Steel	Count:	
Element Type:	Pipe Arch	Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	Galvanized		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			

Comments: Corrosion and swelling were observed at water level. No section loss. Monitor the corrosion.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Element Data

Element Group:	Foundation	Length:	
Element Name:	Foundation (below grade)	Width:	
Location:		Height:	
Material:	Stone/Gravel	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	Yes
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs

Comments: The foundation is not visible for inspection, however the structure appears stable.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Element Data

Structure:	**16**

Element Group:	Streams/Embankments	Length:	
Element Name:	Streams and Waterways	Width:	
Location:		Height:	
Material:	Earth	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			

Comments:

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Element Data

Element Group:	Streams/Embankments	Length:	
Element Name:	Embankment	Width:	
Location:	Each Corner	Height:	
Material:	Stone/Earth	Count:	6
Element Type:		Total Quantity:	6
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		3	3			

Comments: The embankments are heavily vegetated with minor signs of erosion.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Repair the embankment erosion and place rip rap slope protection.

Element Data

Element Group:	Approaches	Length:	
Element Name:	Wearing Surface	Width:	
Location:	Each End	Height:	
Material:	Surface Treatment	Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			

Comments: Some cracking at shoulders.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

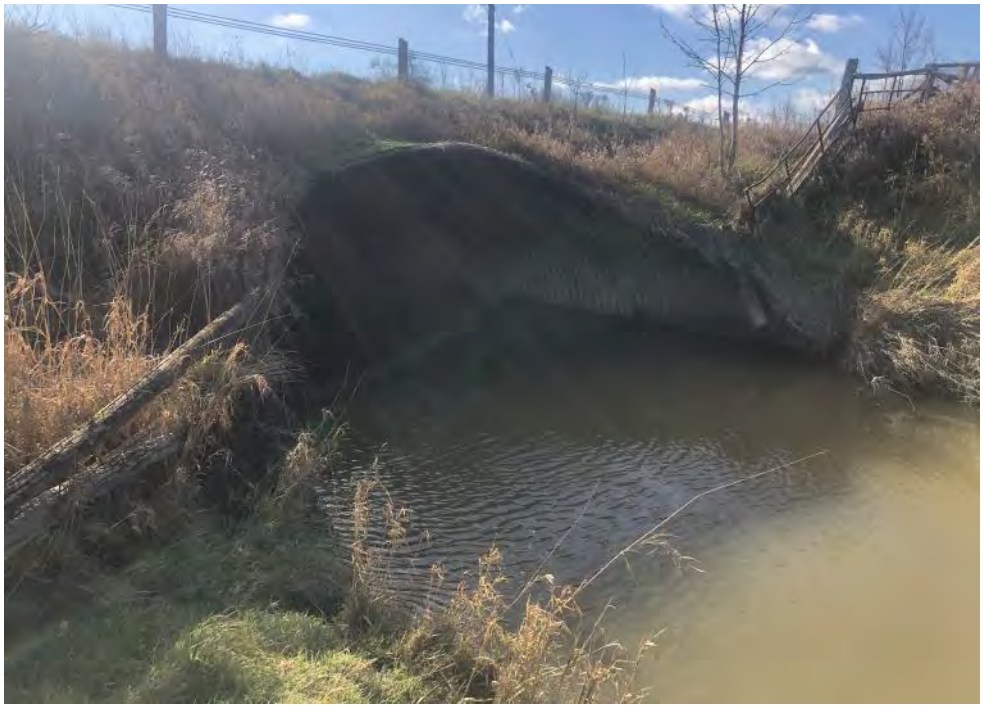


Photo 16-2: View of culvert barrel in elevation (outlet end)

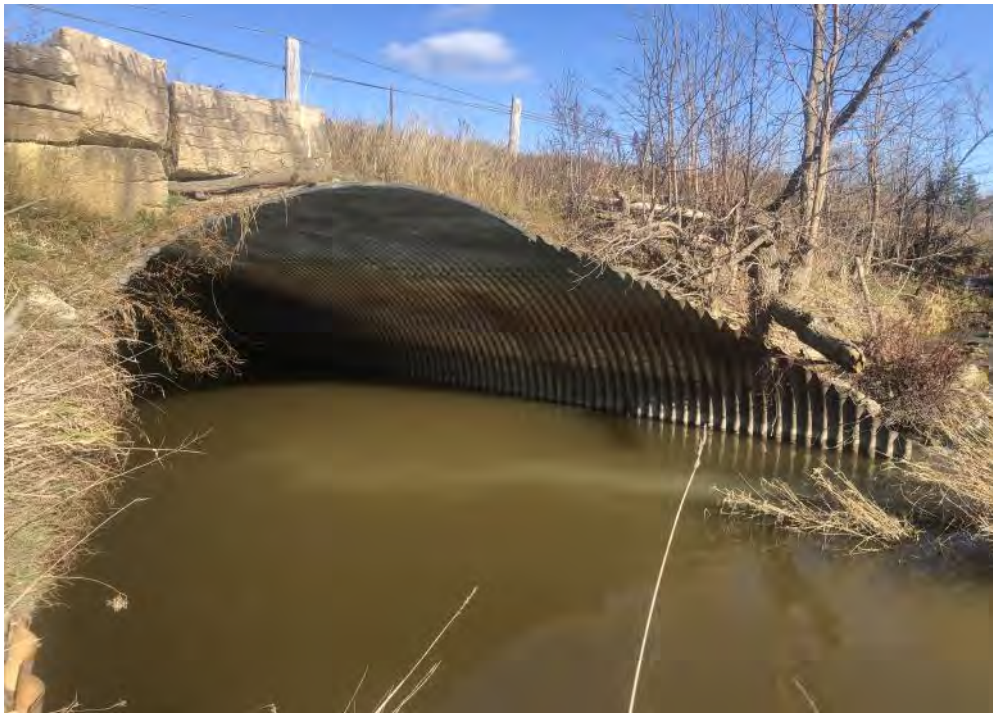


Photo 16-3: View of culvert barrel in elevation (inlet end)

Date of Photos: Nov. 12, 2020

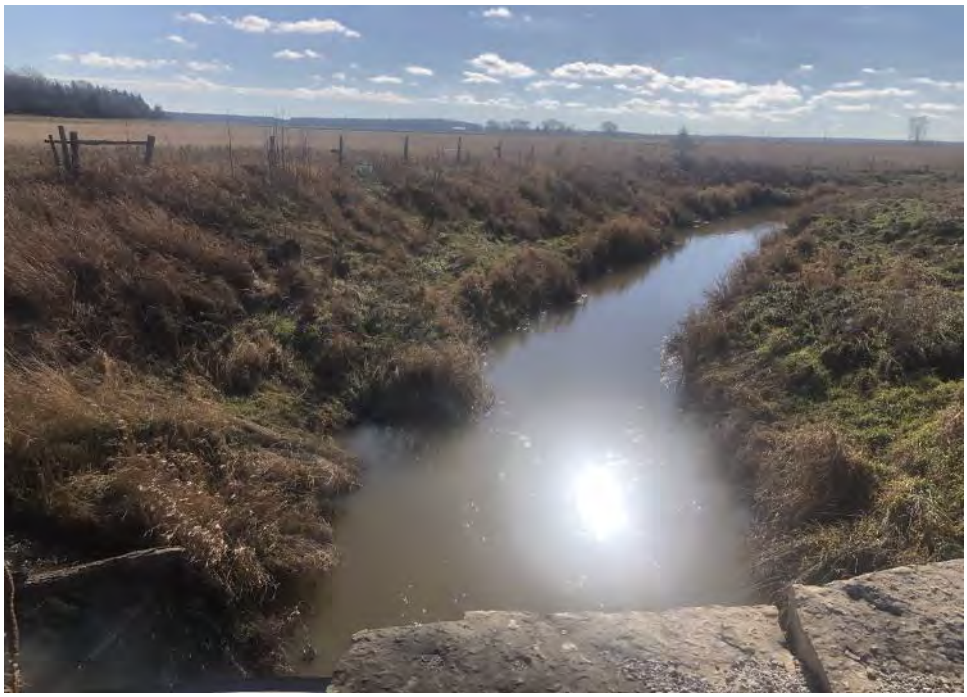


Photo 16-4: View of wtercourse upstream

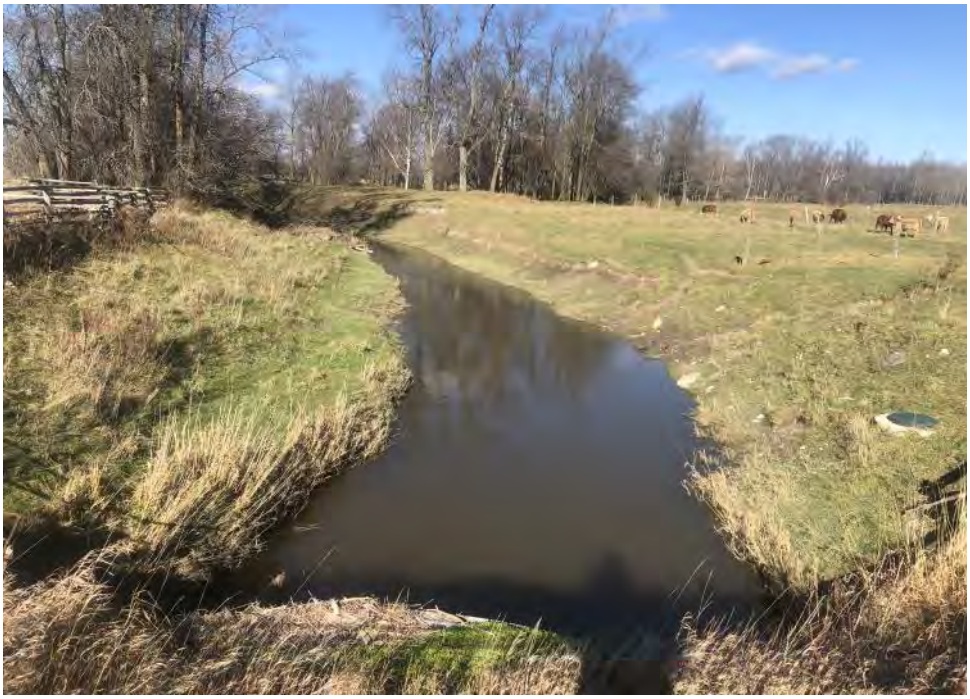


Photo 16-5: View of watercourse downstream

Date of Photos: Nov. 12, 2020

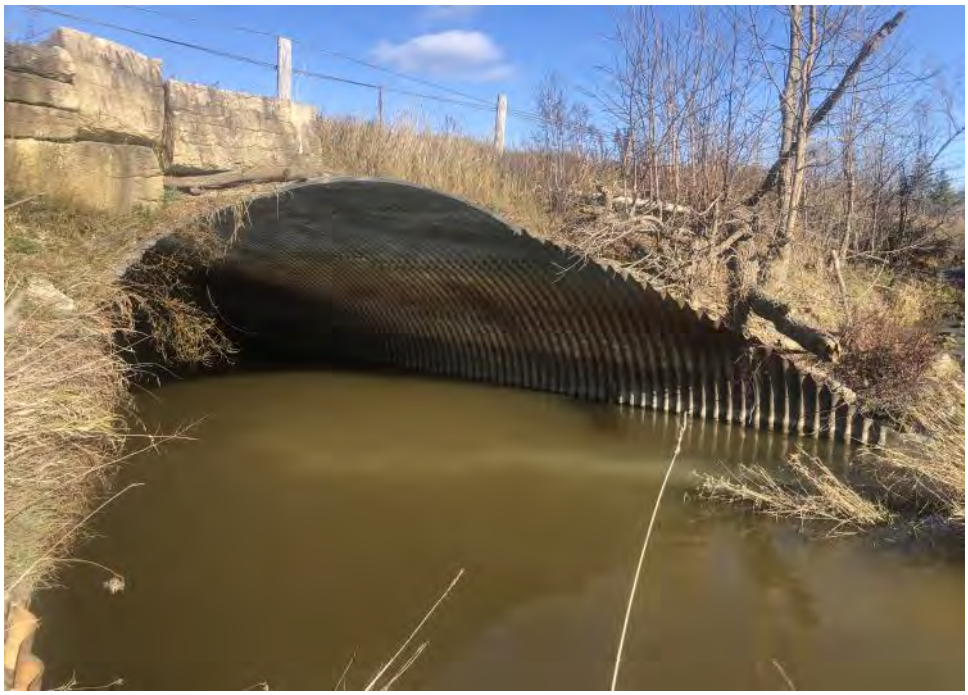


Photo 16-6: Culvert barrel interior

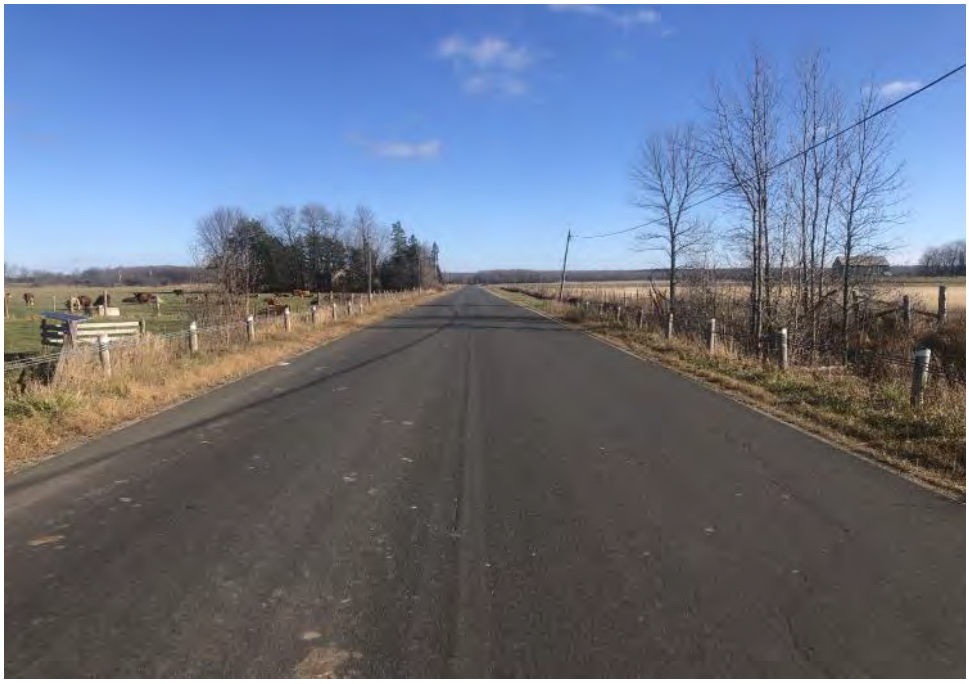


Photo 16-7: View of structure from approach

Date of Photos: Nov. 12, 2020

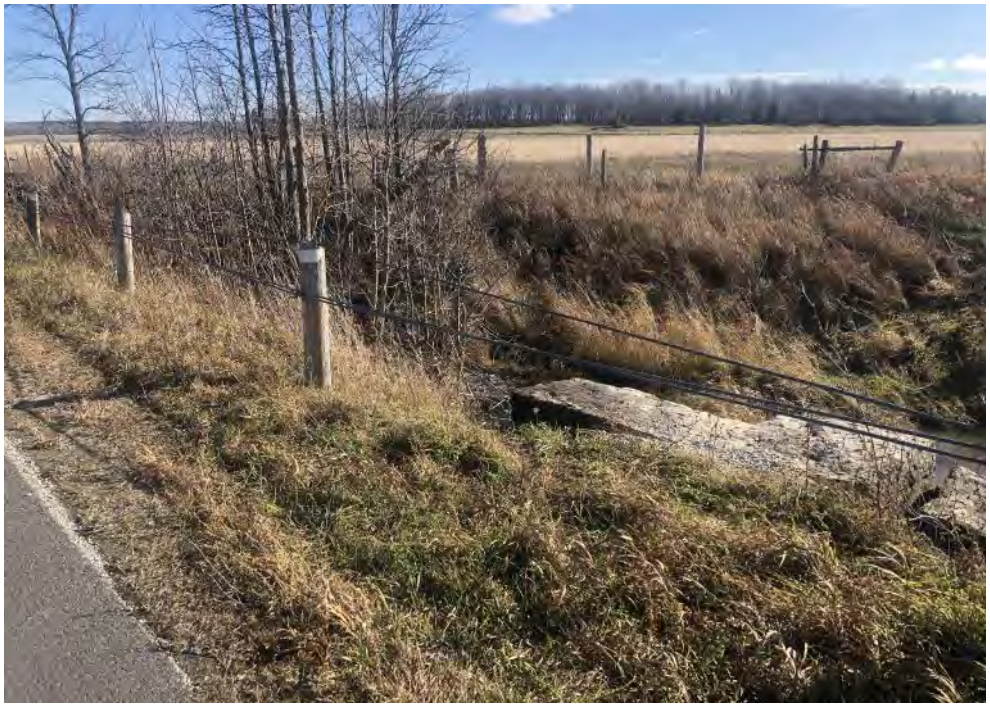


Photo 16-8: Loose cable on barrier protection

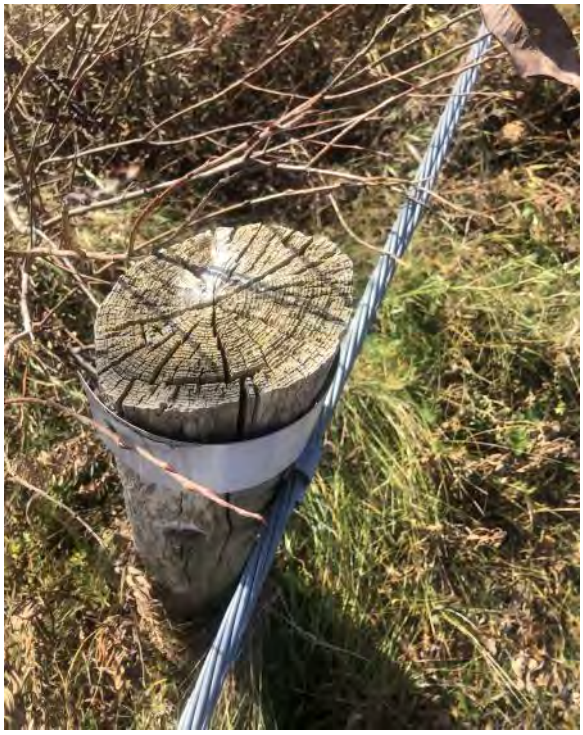
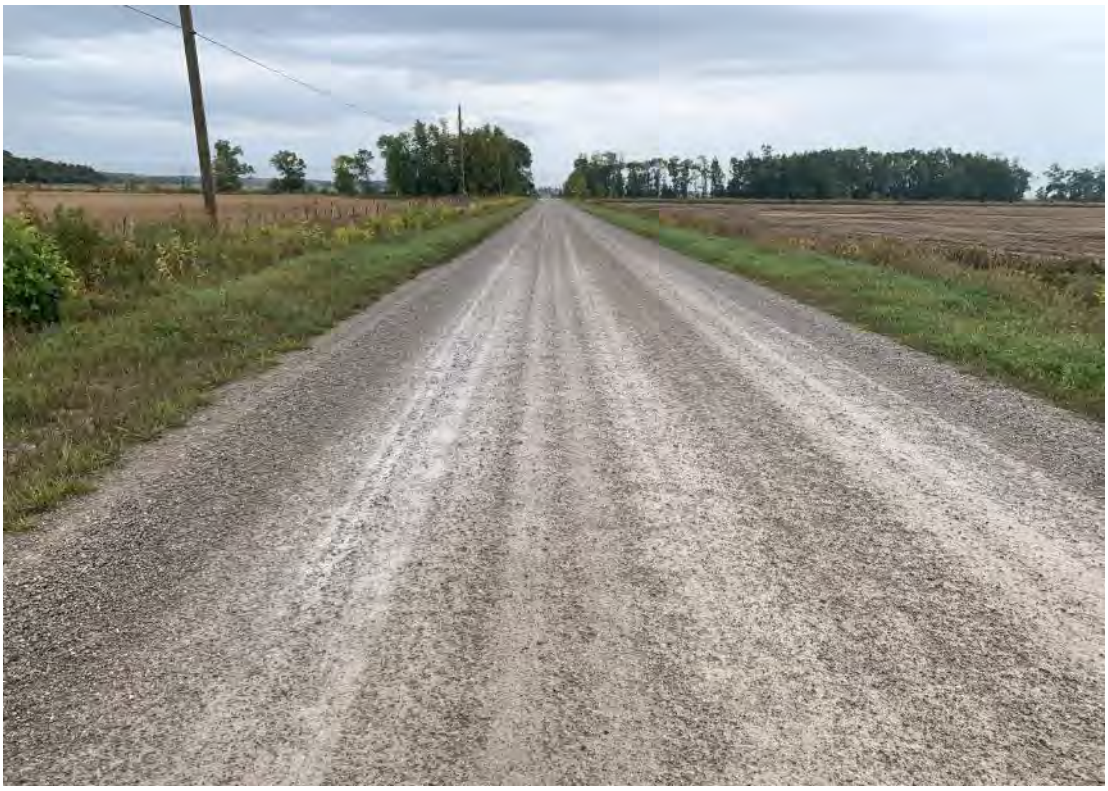


Photo 16-9: Wooden post (typical)

Date of Photos: Nov. 12, 2020

Bridge/Culvert Inspection Report

Site Number	17	**Project Number**	201-01605-00		
Structure Name	Concession 4 Culvert N. of Barrow Bay Road	**Municipality**	Northern Bruce Peninsula		
MTO Region Code	30	**County**	Bruce	**Code**	02
MTO District Code	33	**Geographic Twp Code**	377		



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Concession 4 Culvert	Site Number	17
County	Bruce	Road Name	Concession 4
Municipality	Northern Bruce Peninsula	Road Type	Rural Coll.
Bridge or Culvert	Culvert	Owner	Northern Bruce Peninsula
Structure Type	Steel - SP - CSP - PA	AADT	250
Span (m)	3.6 No. 1	% Trucks	15%
Height (m)	2.41	Overall Structure Width (m)	18.4
Direction of Structure	East/West	Roadway Width (m)	5.8
Year Built/Rehabilitated	1985	Total Deck Length (m)	3.8
Current Load Limit	None	Total Deck Area (s.m.)	N/A
Detour Length (km)	6	Heritage Des.	None
Waterway	Branch Judges Creek		

Inspection Data

Date of Inspection	September 24, 2020
Name of Inspector	Katherine Hemstock, EIT
Equipment Used	Tape, pick, hammer
Weather Conditions	Overcast
Temperature	16°C
Last Inspection	November 8, 2018

Photos:

17-1 - Title Page

17-2 - View of structure and approach wearing surface

17-3 - View of watercourse upstream and inlet culvert end

17-4 - View of watercourse downstream and outlet culvert end

17-5 - View of culvert in elevation and inlet components

17-6 - View of posted speed limit signage

17-7 - View of culvert barrel interior

Additional Investigation Required	None
Total Rehabilitation	Install barrier and approach protection to Code. Install end hazard signs and replace the narrow structure sign. Place rip-rap slope protection.
Total Rehabilitation Budget Costing	$55,000
Next Inspection	September 2022
Justification	Due to good condition, rehabilitation is recommended to extend the safe service life. Install barrier and approach protection. Maintain posted speed at 35 km/hr. until installed.

Element Data

Structure:	**17**

Element Group:	Decks	Length:	
Element Name:	Wearing Surface	Width:	
Location:		Height:	
Material:	Gravel	Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			85	15	Yes	Yes

Comments: Some wheel path rutting was observed. Grade the wearing surface annually.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Grade the wearing surface annually.

Element Data

Element Group:	Barriers	Length:	
Element Name:	Barrier	Width:	
Location:	Each Side	Height:	
Material:		Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%					Yes	

Comments: No barrier protection

Recommended Work: None 6-10 Years 1-5 Years < 1 Year [Urgent]

Install barrier to provide vehicle safety

Element Data

Element Group:	Culverts	Length:	
Element Name:	Inlet Component	Width:	
Location:	End	Height:	
Material:	Stone and Earth	Count:	
Element Type:	Stone Head Wall and Steel Culvert	Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			

Comments: Minor erosion at corners.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Place rip-rap slope protection.

Element Data

Structure:	**17**

Element Group:	Culverts	Length:	
Element Name:	Outlet Components	Width:	
Location:	West End	Height:	
Material:	Stone and Earth	Count:	
Element Type:	Stone and Steel Culvert	Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			

Comments: Minor erosion at corners.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Place rip-rap slope protection.

Element Data

Element Group:	Culvert	Length:	
Element Name:	Barrel	Width:	
Location:		Height:	
Material:	Steel	Count:	
Element Type:	Pipe Arch	Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	Galvanized		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		50	50			

Comments: The west side has a slight deformation.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Element Data

Element Group:	Foundation	Length:	
Element Name:	Foundation (below grade)	Width:	
Location:		Height:	
Material:	Stone/Gravel	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	Yes
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs

Comments: The foundation is not visible for inspection, however the culvert appears stable.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Element Data

Structure:	**17**

Element Group:	Streams/Embankments	Length:	
Element Name:	Streams and Waterways	Width:	
Location:		Height:	
Material:		Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		50	50			

Comments: Some silt deposits (outlet).

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Element Group:	Streams/Embankments	Length:	
Element Name:	Embankment	Width:	
Location:	Each Corner	Height:	
Material:		Count:	
Element Type:		Total Quantity:	
Environment:		Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		50	50			

Comments: Heavily vegetated with minor signs of erosion.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Element Group:	Signs	Length:	
Element Name:	Signs	Width:	
Location:	Each Corner	Height:	
Material:		Count:	2
Element Type:		Total Quantity:	2
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		1		1	Yes	Yes

Comments: Two speed limit/narrow structure signs. The south sign is damaged and requires replacement (narrow structure portion only).

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent
Install end hazard signs and maintain reduced speed limit signs prior to guiderail protection placement.

Element Data

Structure:	**17**

Element Group:	Approaches	Length:	
Element Name:	Wearing Surface	Width:	
Location:	Each End	Height:	
Material:	Gravel	Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				Yes

Comments: At the time of inspection, the wearing surface was in overall good condition. Continue annual grading.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Continue annual maintenance (annual grading).

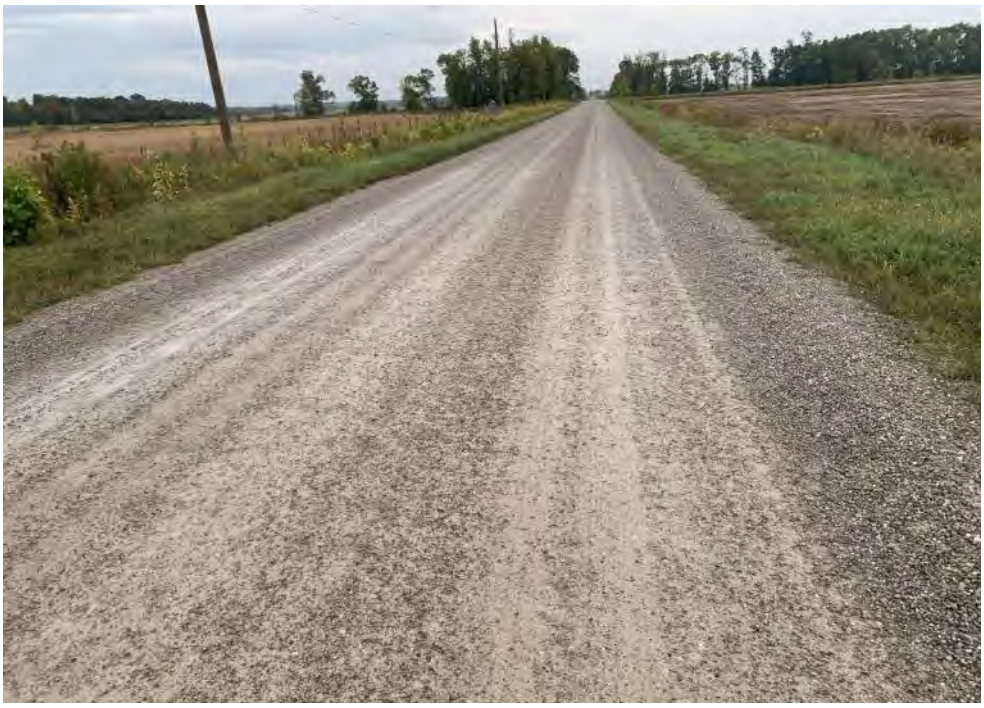


Photo 17-2: View of structure and approach wearing surface

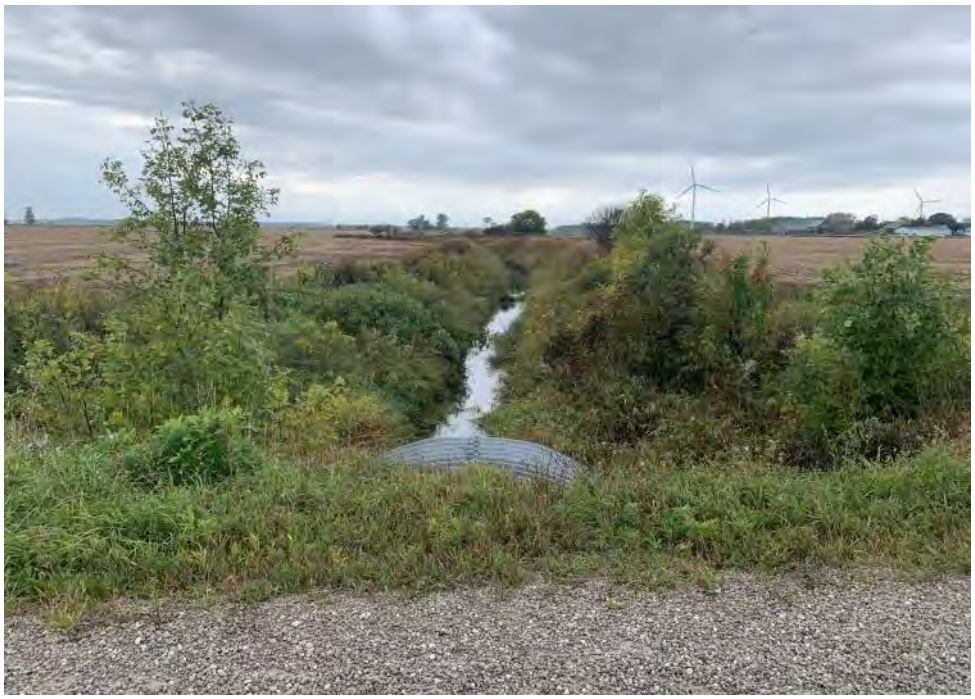


Photo 17-3: View of watercourse upstream and inlet culvert end

Date of Photos: Sept. 24, 2020

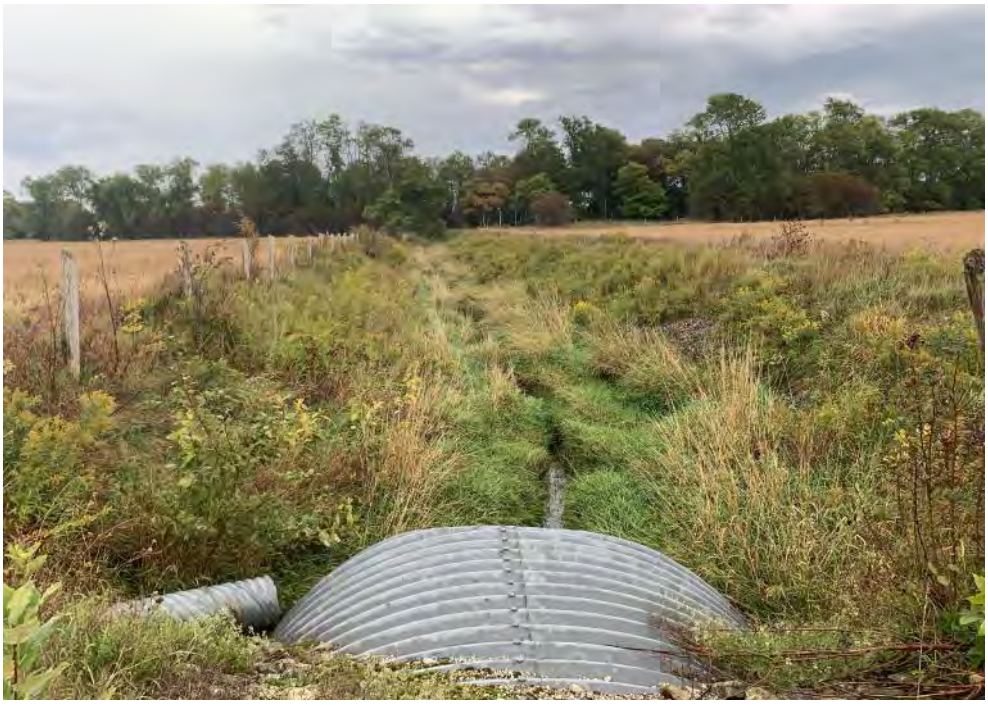


Photo 17-4: View of watercourse downstream and outlet culvert end

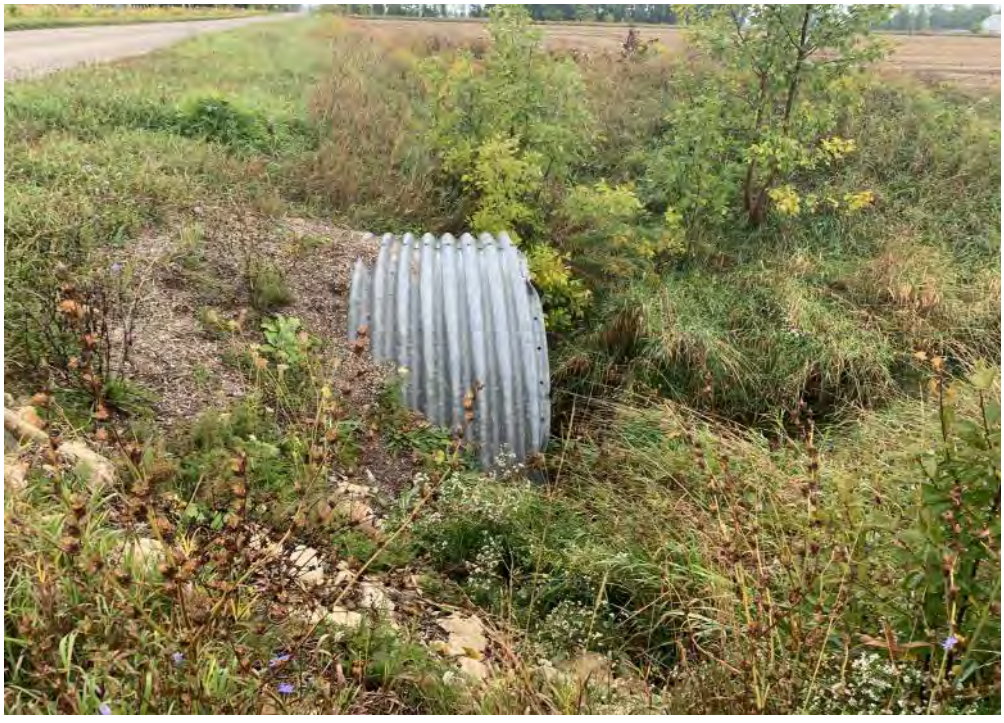


Photo 17-5: View of culvert in elevation and inlet components

Date of Photos: Sept. 24, 2020

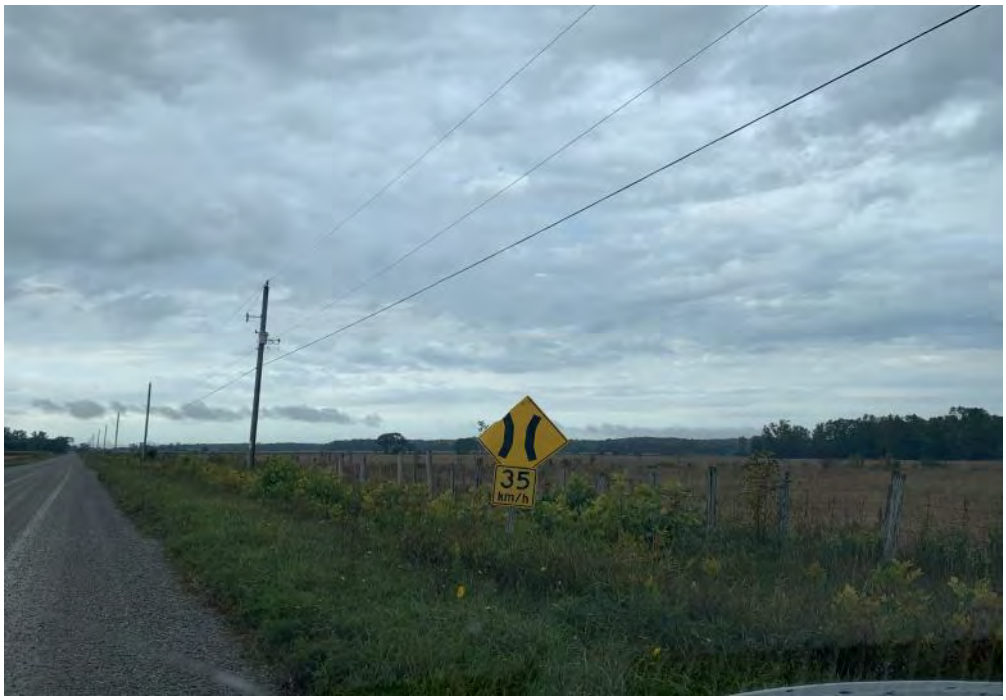


Photo 17-6: View of posted speed limit signage

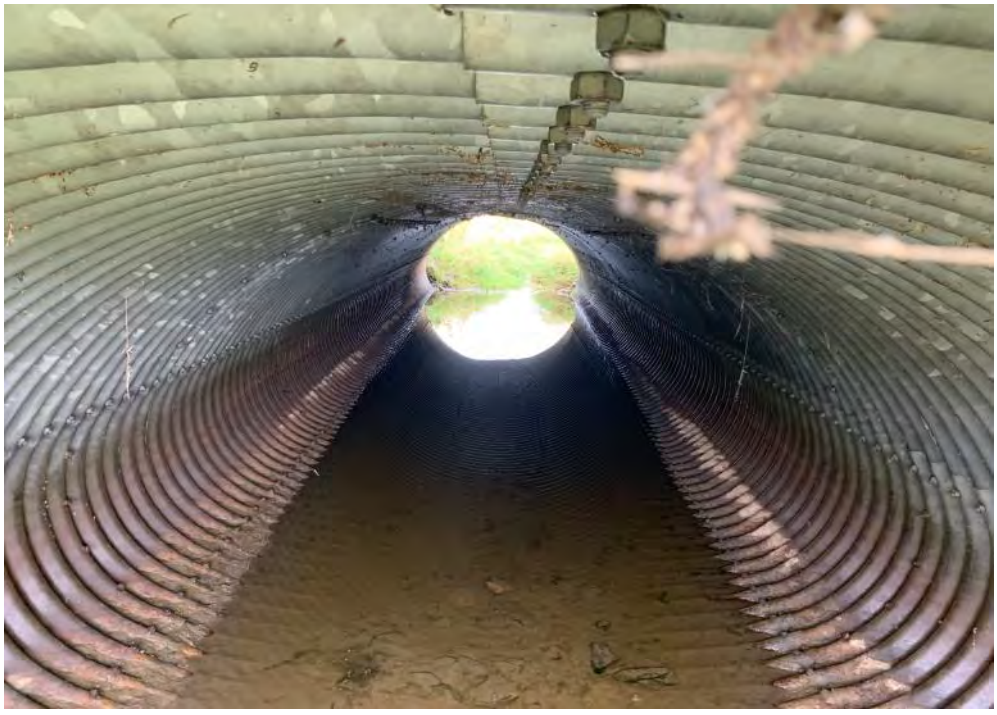
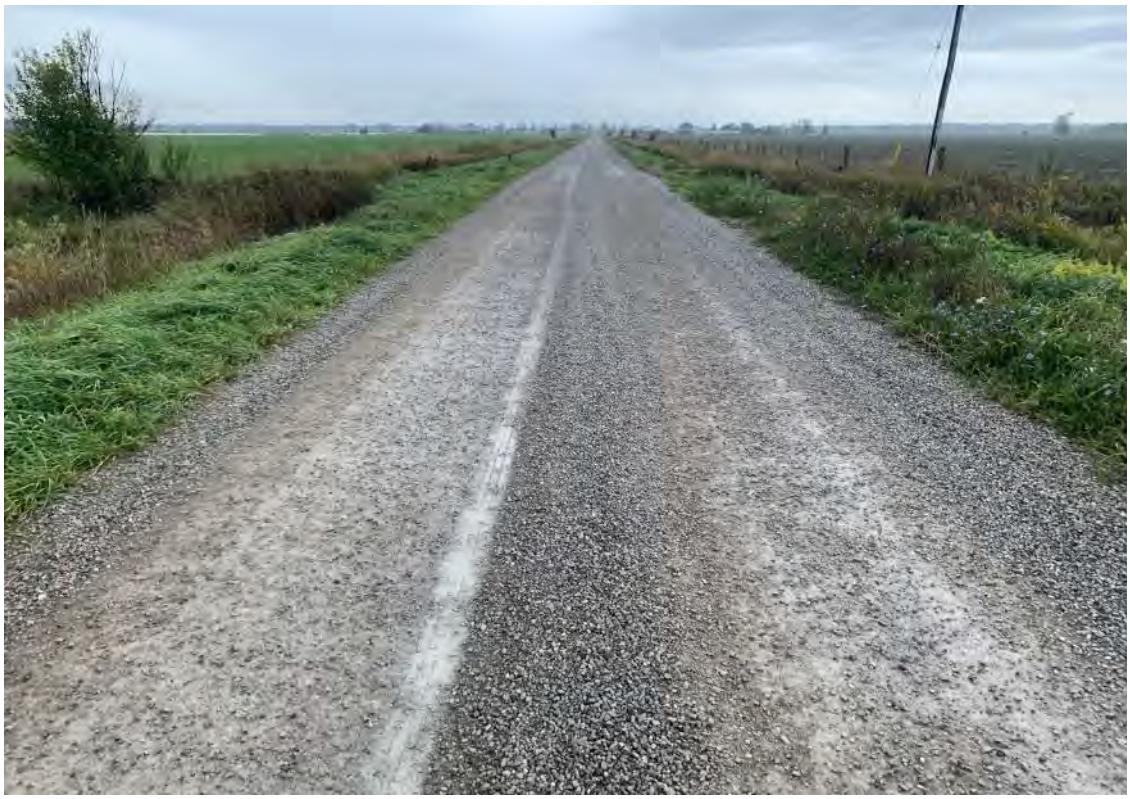


Photo 17-7: View of culvert barrel interior

Date of Photos: Sept. 24, 2020

Bridge/Culvert Inspection Report

Site Number	18	**Project Number**	201-01605-00		
Structure Name	10th Sideroad Culvert	**Municipality**	Northern Bruce Peninsula		
MTO Region Code	30	**County**	Bruce	**Code**	02
MTO District Code	33	**Geographic Twp Code**	377		



1450 - 1st Avenue West, Suite 101
Owen Sound, Ontario N4K 6W2

Tel: 519-376-7612
Fax: 519-376-8008
Website: www.wspgroup.com

Bridge/Culvert Inspection Report

Inventory Data

Structure Name	10th Sideroad Culvert	Site Number	18
County	Bruce	Road Name	10th Sideroad
Municipality	Northern Bruce Peninsula	Road Type	Rural Local
Bridge or Culvert	Culvert	Owner	Northern Bruce Peninsula
Structure Type	Twin Steel - CSP	AADT	150
Span (m)	1.5 No. 2	% Trucks	15%
Height (m)	1.5	Overall Structure Width (m)	11.1
Direction of Structure	North/South	Roadway Width (m)	4.6
Year Built/Rehabilitated	1990	Total Deck Length (m)	3.6
Current Load Limit	None	Total Deck Area (s.m.)	40
Detour Length (km)	6	Heritage Des.	None
Waterway	Branch Judges Creek		

Inspection Data

Date of Inspection	September 24, 2020
Name of Inspector	Katherine Hemstock, EIT
Equipment Used	Tape, pick, hammer
Weather Conditions	Overcast
Temperature	16° C
Last Inspection	November 8, 2018

Photos:

18-1 - Title Page

18-2 - View of structure wearing surface

18-3 - View of culvert in elevation and outlet end components

18-4 - View of watercourse upstream and inlet ends

18-5 - View of watercourse downstream and outlet culvert ends

18-6 - View of erosion of embankment and between pipes

18-7 - Erosion at the haunch of the outlet pipe

18-8 - View of east culvert barrel interior

18-9 - View of west culvert barrel interior

Additional Investigation Required	None
Total Rehabilitation	Install approach and barrier protection. Place inlet/outlet erosion protection and place non-shrinkable fill in the armourstone void.
Total Rehabilitation Budget Costing	$60,000
Next Inspection	September 2022
Justification	Repair and install approach/barrier protection recommended due to current good condition to extend the safe service life of the structure. Maintain posted speed of 35 km/hr. until approach/barrier protection is installed. Install end hazard signs and repair erosion at both inlet and outlet ends.

Element Data

Structure:	**18**

Element Group:	Decks	Length:	
Element Name:	Wearing Surface	Width:	
Location:		Height:	
Material:	Gravel	Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			Yes

Comments: Minor wheel path rutting and beginning stages of pot holes were observed.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Grade the wearing surface annually.

Element Data

Element Group:	Culverts	Length:	
Element Name:	Inlet Component	Width:	
Location:	South End	Height:	
Material:	Stone and Rip-Rap	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			80	20	Yes	

Comments: Erosion was observed between pipes and at southeast corner. There is observed medium corrosion of the barrel at the water line with no section loss.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Repair erosion and place rip rap slope protection.

Element Data

Element Group:	Culverts	Length:	
Element Name:	Outlet Components	Width:	
Location:	North End	Height:	
Material:	Stone and Rip-Rap	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			80	20	Yes	

Comments: Large rocks (blocks) and rip-rap protect the embankment. There is a void between the pipes, a scour developing at the culvert end, and a void beneath the culvert ends. Medium corrosion with no section loss was observed at the waterline.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Add rip-rap slope protection and fill the void between the pipes.

Element Data

Structure:	**18**

Element Group:	Culvert	Length:	
Element Name:	Barrel	Width:	
Location:		Height:	
Material:	Steel	Count:	
Element Type:	CSP (circular)	Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	Galvanized		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			

Comments: Minor corrosion was observed near water level.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Element Group:	Foundation	Length:	
Element Name:	Foundation (below grade)	Width:	
Location:		Height:	
Material:	Stone	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	Yes
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
						Yes	

Comments: The culvert appears stable however the outlet end pipes are undermined with a void.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent
Fill the void beneath the outlet pipes and protect from further erosion.

Element Data

Element Group:	Streams/Embankments	Length:	
Element Name:	Streams and Waterways	Width:	
Location:		Height:	
Material:	Earth	Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		30	40	30		

Comments: Waterway bank erosion was observed.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent
Provide erosion protection.

Element Data

Structure:	**18**

Element Group:	Streams/Embankments	Length:	
Element Name:	Embankment	Width:	
Location:	Each Corner	Height:	
Material:	Earth / Rip-Rap	Count:	6
Element Type:		Total Quantity:	6
Environment:		Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each			4	2	Yes	

Comments: The embankments are heavily vegetated with signs of erosion upstream and downstream from culverts. There is erosion under the armour stone at the southeast quadrant, and between the north (outlet) culvert ends.

Recommended Work: None 6-10 Years 1-5 Years < 1 Year [Urgent]

Add rip-rap to stabilize the embankment slope and non-shrink fill at the southeast corner under armour stone.

Element Data

Element Group:	Approaches	Length:	
Element Name:	Wearing Surface	Width:	
Location:	Each End	Height:	
Material:	Gravel	Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			100			Yes

Comments: Minor wheel path rutting and pot holes starting to develop at the time of inspection.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent

Continue annual grading of the wearing surface.

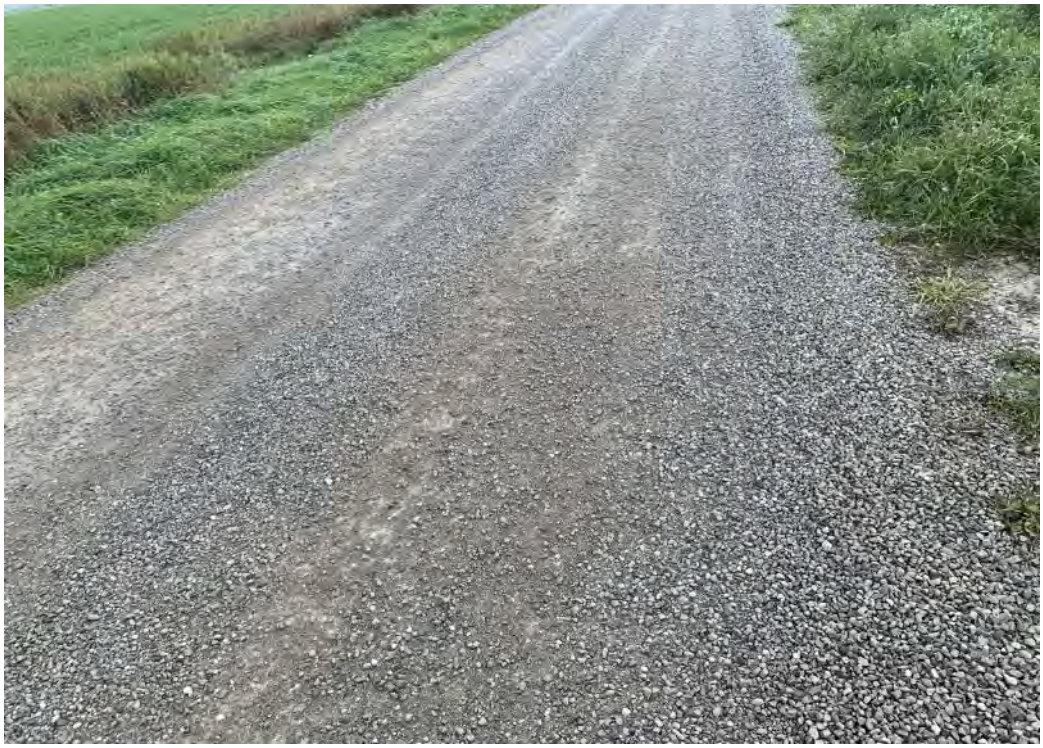


Photo 18-2: View of structure wearing surface

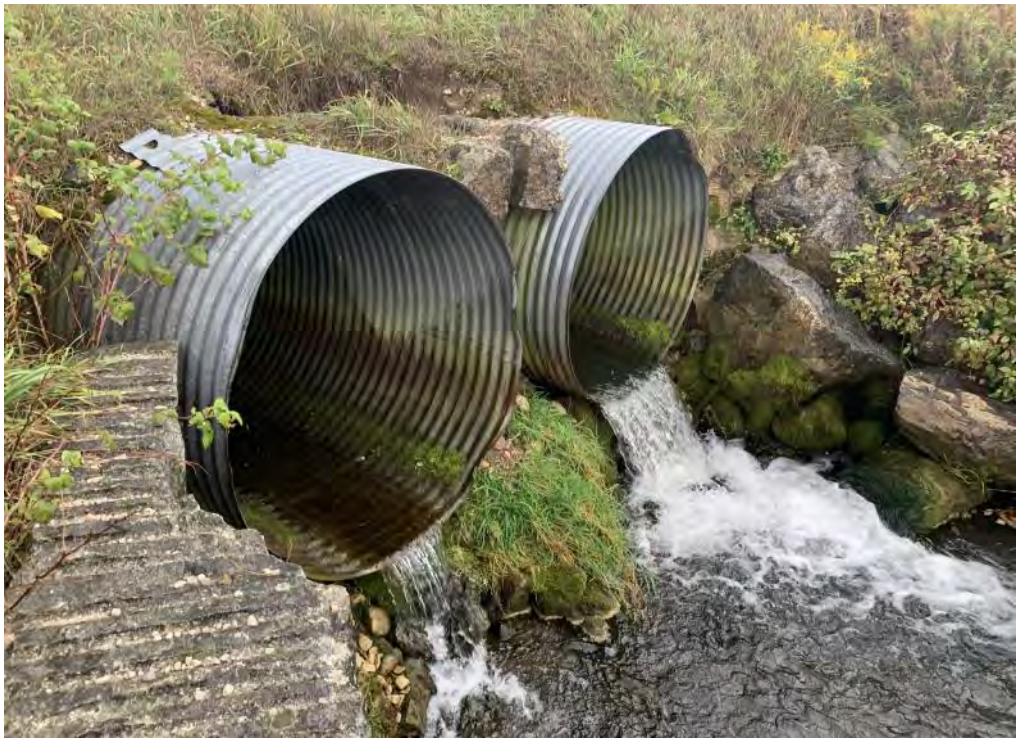


Photo 18-3: View of culvert in elevation and outlet end components

Date of Photos: Sept. 24, 2020

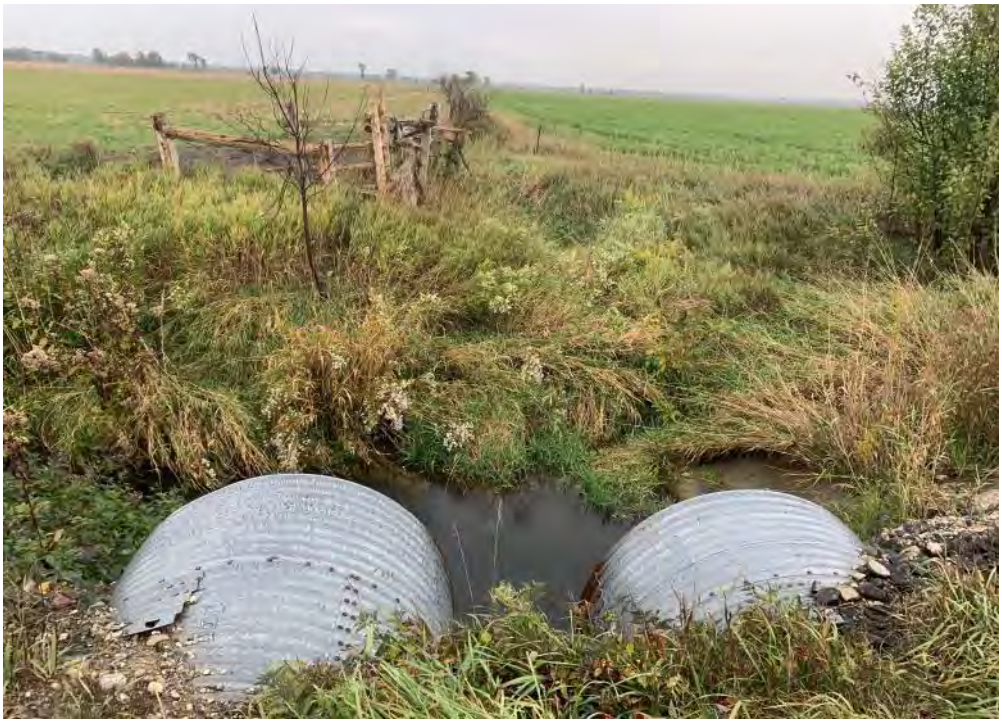


Photo 18-4: View of watercourse upstream and inlet ends

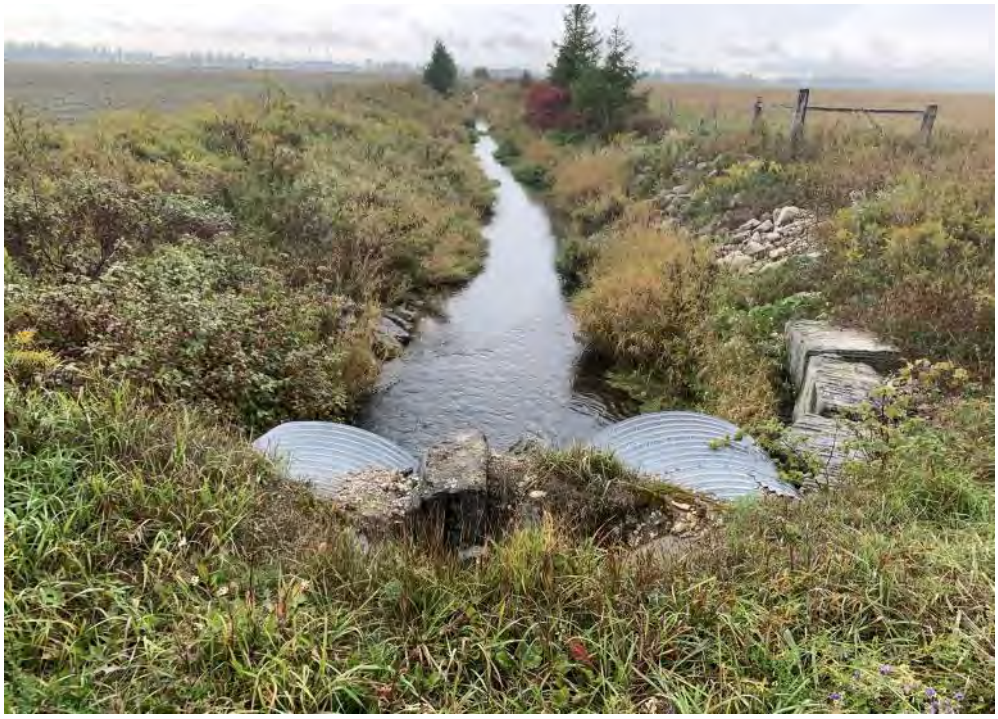


Photo 18-5: View of watercourse downstream and outlet culvert ends

Date of Photos: Sept. 24, 2020

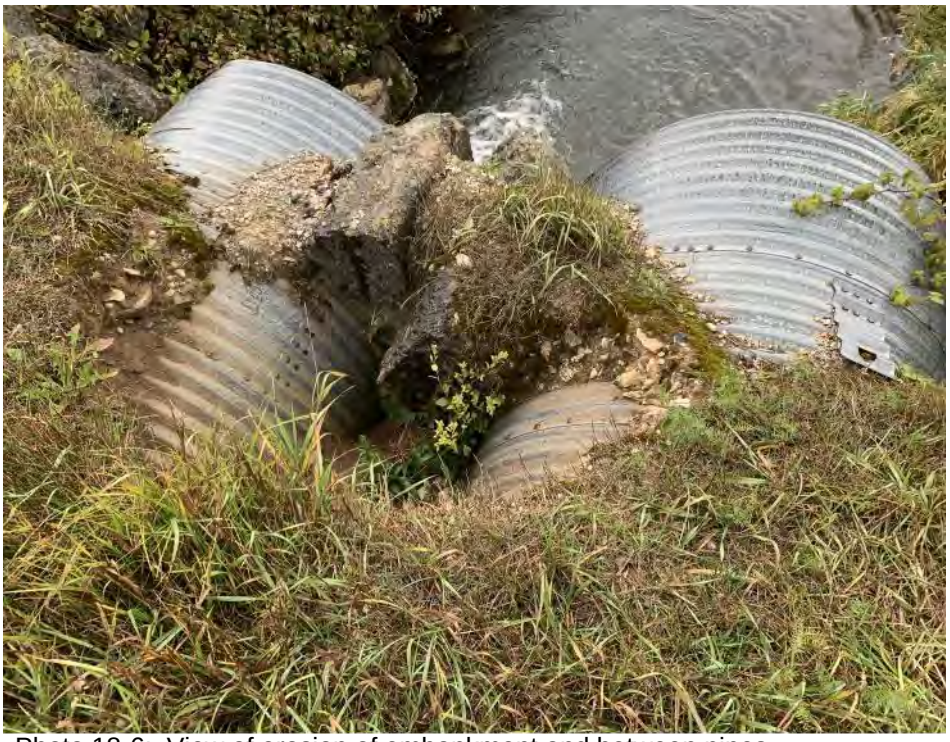


Photo 18-6: View of erosion of embankment and between pipes

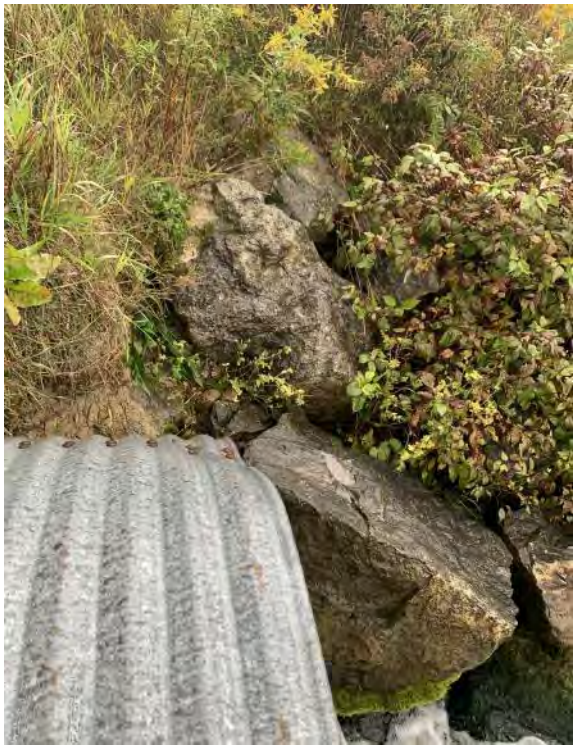


Photo 18-7: Erosion at the haunch of the outlet pipe

Date of Photos: Sept. 24, 2020

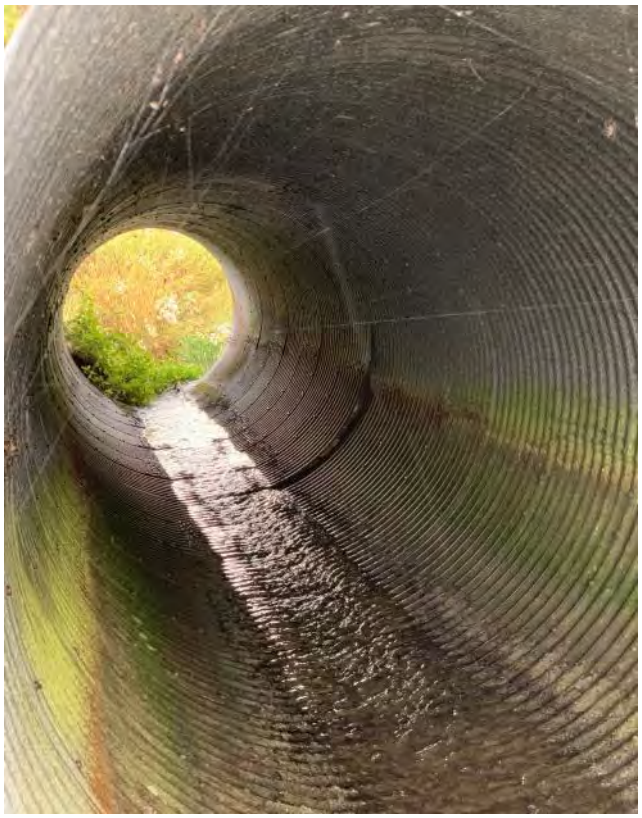


Photo 18-8: View of east culvert barrel interior

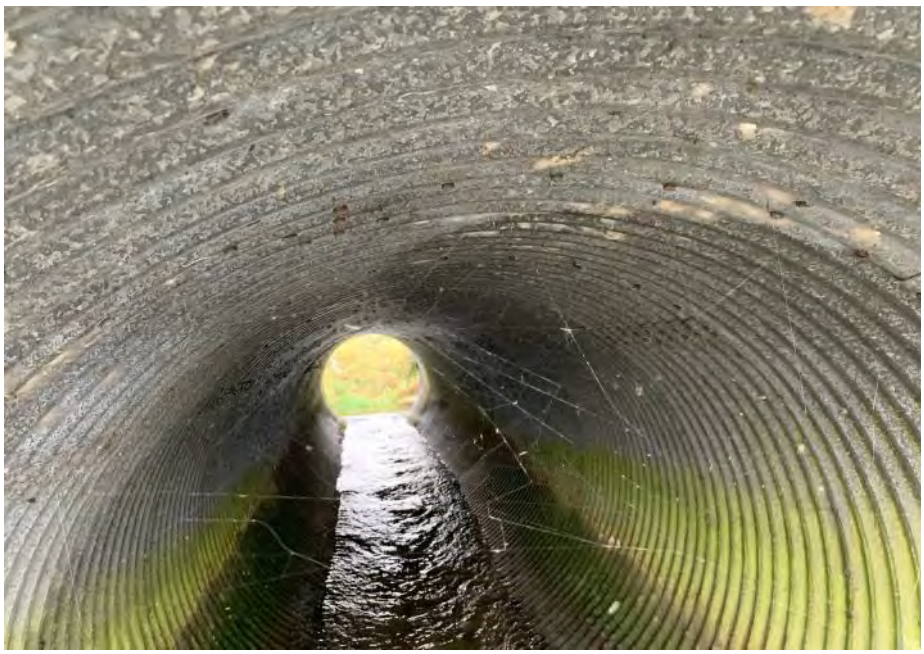
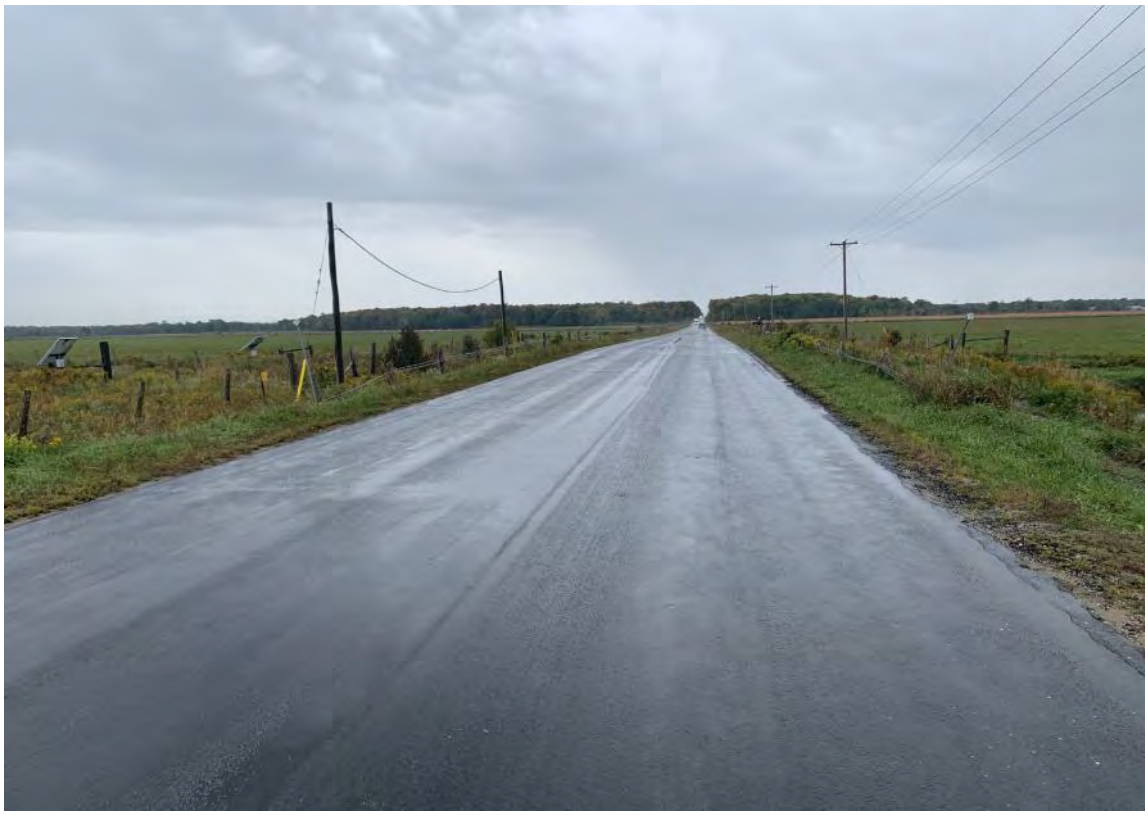


Photo 18-9: View of west culvert barrel interior

Date of Photos: Sept. 24, 2020

Bridge/Culvert Inspection Report

Site Number	19	**Project Number**	201-01605-00		
Structure Name	Pike Bay Road Culvert	**Municipality**	Northern Bruce Peninsula		
MTO Region Code	30	**County**	Bruce	**Code**	02
MTO District Code	33	**Geographic Twp Code**	377		



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Bridge/Culvert Inspection Report

Inventory Data

Structure Name	Pike Bay Road Culvert	Site Number	19
County	Bruce	Road Name	Pike Bay Road
Municipality	Northern Bruce Peninsula	Road Type	Rural Coll.
Bridge or Culvert	Culvert	Owner	Northern Bruce Peninsula
Structure Type	Steel SP-CSP-PA	AADT	350
Span (m)	4.5 No. 1	% Trucks	15%
Height (m)	3	Overall Structure Width (m)	18.9
Direction of Structure	North/South	Roadway Width (m)	6.7
Year Built/Rehabilitated	1990	Total Deck Length (m)	4.5
Current Load Limit	None	Total Deck Area (s.m.)	N/A
Detour Length (km)	6	Heritage Des.	None
Waterway	Judges Creek		

Inspection Data

Date of Inspection	September 24, 2020
Name of Inspector	Katherine Hemstock, EIT
Equipment Used	Tape, pick, hammer
Weather Conditions	Overcast
Temperature	16℃
Last Inspection	November 9, 2018

Photos:

19-1 - Title Page

19-2 - View of culvert in elevation and inlet components

19-3 - View of culvert in elevation and outlet components

19-4 - View of culvert barrel interior

19-5 - Impact damage to the northeast barrier protection post

19-6 - Typical wooden post rot (2018)

19-7 - View of structure barrier protection (typical)

19-8 - View of watercourse upstream

19-9 - View of watercourse downstream

19-10 - View of structure and approach wearing surface

Additional Investigation Required	None
Total Rehabilitation	Repair the 3-cable guiderail and place rip-rap erosion protection. Realign signage.
Total Rehabilitation Budget Costing	$15,000
Next Inspection	September 2022
Justification	Maintain safe barrier protection and realign signage for road user safety. Complete erosion repairs to maximize the lifespan of the culvert.

Element Data

Structure:	19

Element Group:	Decks		Length:				
Element Name:	Wearing Surface		Width:				
Location:			Height:				
Material:	Surface Treatment		Count:				
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		90	10		Yes	

Comments: Minor ponding directly above the culverts. Recent surface tretment completed.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Regrade and compact the at next resurfacing to avoid ponding water. Consider installing a frost taper.

Element Data

Element Group:	Barriers		Length:				
Element Name:	Barrier		Width:				
Location:	Each Side		Height:				
Material:			Count:	14 posts			
Element Type:			Total Quantity:				
Environment:	Severe		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			50	50	Yes	Yes

Comments: 3-cable guiderail barrier protection cable needs to be tightened. Some post deterioration at the northeast corner.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Repair the cable/post system.

Element Data

Element Group:	Culverts		Length:				
Element Name:	Inlet Component		Width:				
Location:	South End		Height:				
Material:	Stone / Earth		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		50	50			

Comments: Bevelled end, minor erosion. Minor corrosion at water line.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

Place rip-rap slope protection.

Element Data

Structure:	19

Element Group:	Culverts		Length:				
Element Name:	Outlet Components		Width:				
Location:	North End		Height:				
Material:	Stone and Earth		Count:				
Element Type:	Stone Head Wall and Steel Culvert		Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		50	50			
Comments:	Minor erosion was observed around the bevelled end, as well as minor corrosion of the barrel at the waterline.						
Recommended Work:	None	6-10 Years	1-5 Years	< 1 Year	Urgent		
	Place rip-rap slope protection.						

Element Data

Element Group:	Culvert		Length:				
Element Name:	Barrel		Width:				
Location:			Height:				
Material:	Steel		Count:				
Element Type:	Pipe Arch		Total Quantity:				
Environment:	Moderate		Limited Insp'n:				
Protection System:	Galvanized						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		50	50			
Comments:	Minor corrosion was observed at the water line.						
Recommended Work:	None	6-10 Years	1-5 Years	< 1 Year	Urgent		

Element Data

Element Group:	Foundation		Length:				
Element Name:	Foundation (below grade)		Width:				
Location:			Height:				
Material:	Gravel / Stone		Count:				
Element Type:			Total Quantity:				
Environment:	Moderate		Limited Insp'n:	Yes			
Protection System:	None						
Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%						
Comments:	Limited inspection due to cover, however the structure appears stable.						
Recommended Work:	None	6-10 Years	1-5 Years	< 1 Year	Urgent		

Element Data

Structure:	**19**

Element Group:	Streams/Embankments	Length:	
Element Name:	Streams and Waterways	Width:	
Location:		Height:	
Material:		Count:	
Element Type:		Total Quantity:	
Environment:	Moderate	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		50	50			

Comments: Heavy vegetation of the stream embankments.

Recommended Work: [None] 6-10 Years 1-5 Years < 1 Year Urgent

Element Data

Element Group:	Streams/Embankments	Length:	
Element Name:	Embankment	Width:	
Location:	Each Corner	Height:	
Material:		Count:	6
Element Type:		Total Quantity:	6
Environment:		Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	Each		6				

Comments: Heavily vegetated with minor signs of erosion observed.

Recommended Work: None 6-10 Years [1-5 Years] < 1 Year Urgent
Place rip-rap slope protection.

Element Data

Element Group:	Signs	Length:	
Element Name:	Signs	Width:	
Location:	Each Corner	Height:	
Material:		Count:	
Element Type:		Total Quantity:	4
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%			4			Yes

Comments: The sign posts are loose and require straightening vertically and alignment with traffic.

Recommended Work: None 6-10 Years 1-5 Years [< 1 Year] Urgent
Realign signage.

Element Data

Structure:	**19**

Element Group:	Approaches	Length:	
Element Name:	Wearing Surface	Width:	
Location:	Each End	Height:	
Material:	Surface Treatment	Count:	
Element Type:		Total Quantity:	
Environment:	Severe	Limited Insp'n:	
Protection System:	None		

Condition Data:	Units	Exc.	Good	Fair	Poor	Perform. Deficiencies	Maint. Needs
	%		100				

Comments: Recently placed surface treatment is in good condition.

Recommended Work: None | 6-10 Years | 1-5 Years | < 1 Year | Urgent

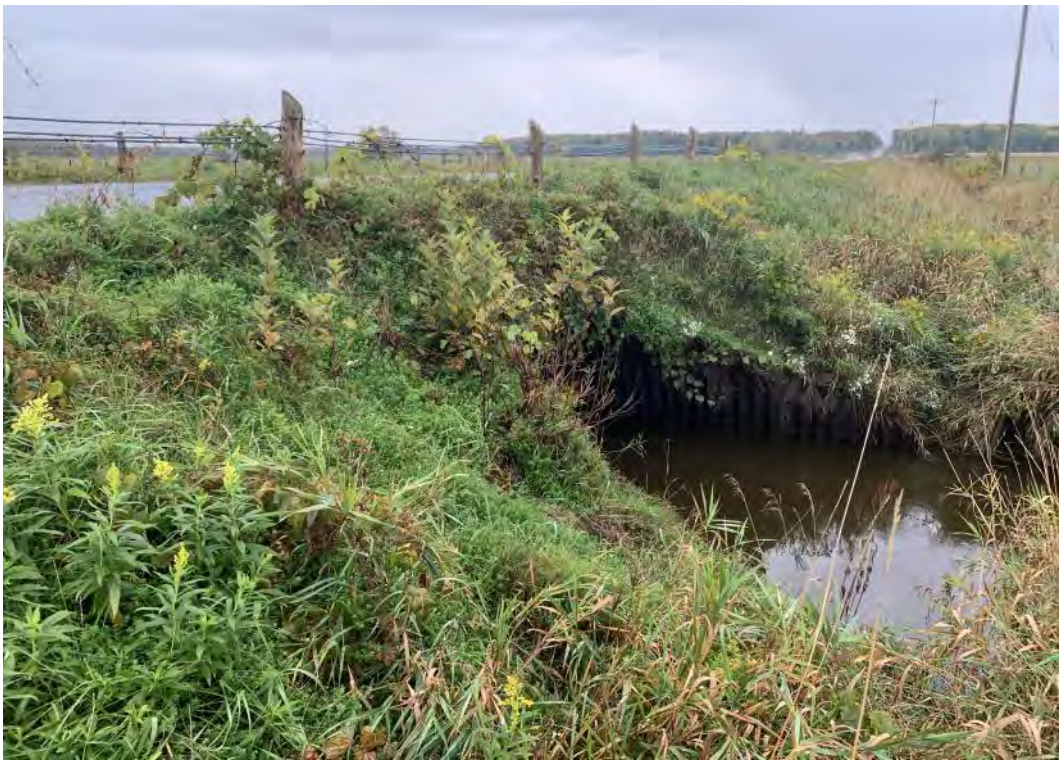

Photo 19-2: View of culvert in elevation and inlet components

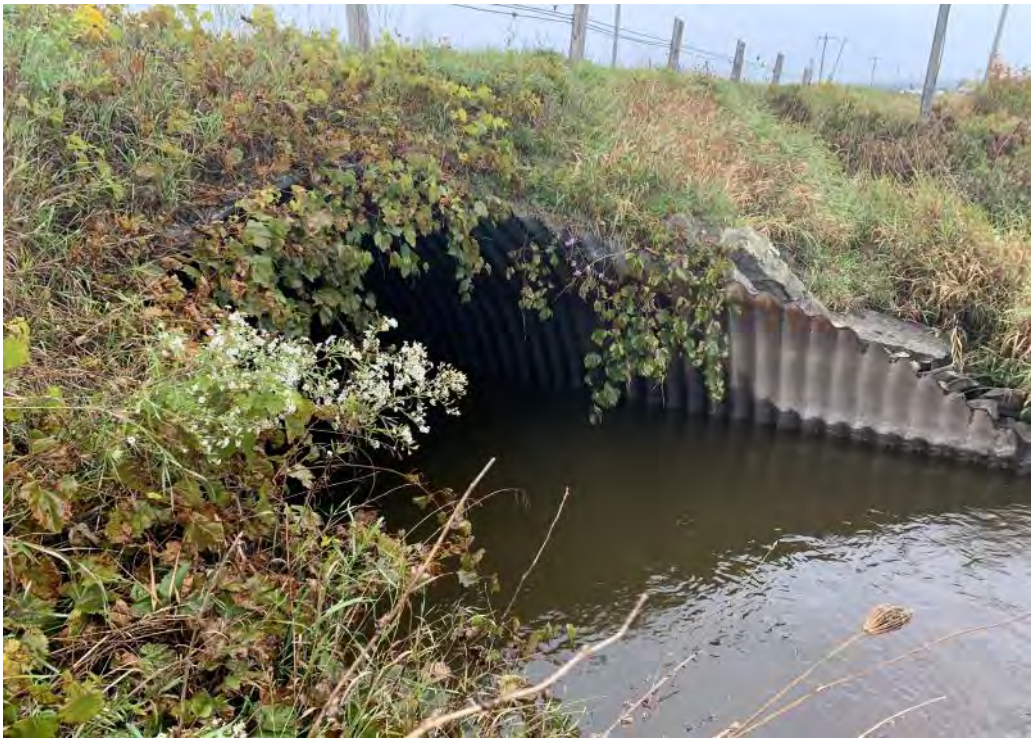

Photo 19-3: View of culvert in elevation and outlet components

Date of Photos: Sept. 24, 2020

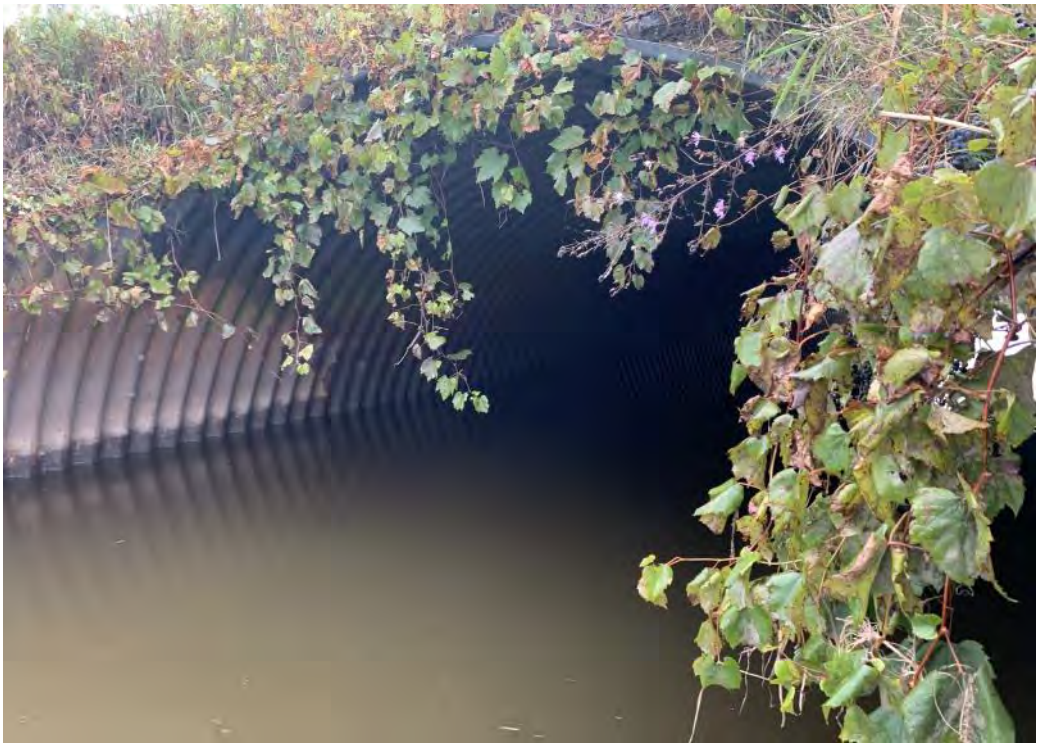

Photo 19-4: View of culvert barrel interior

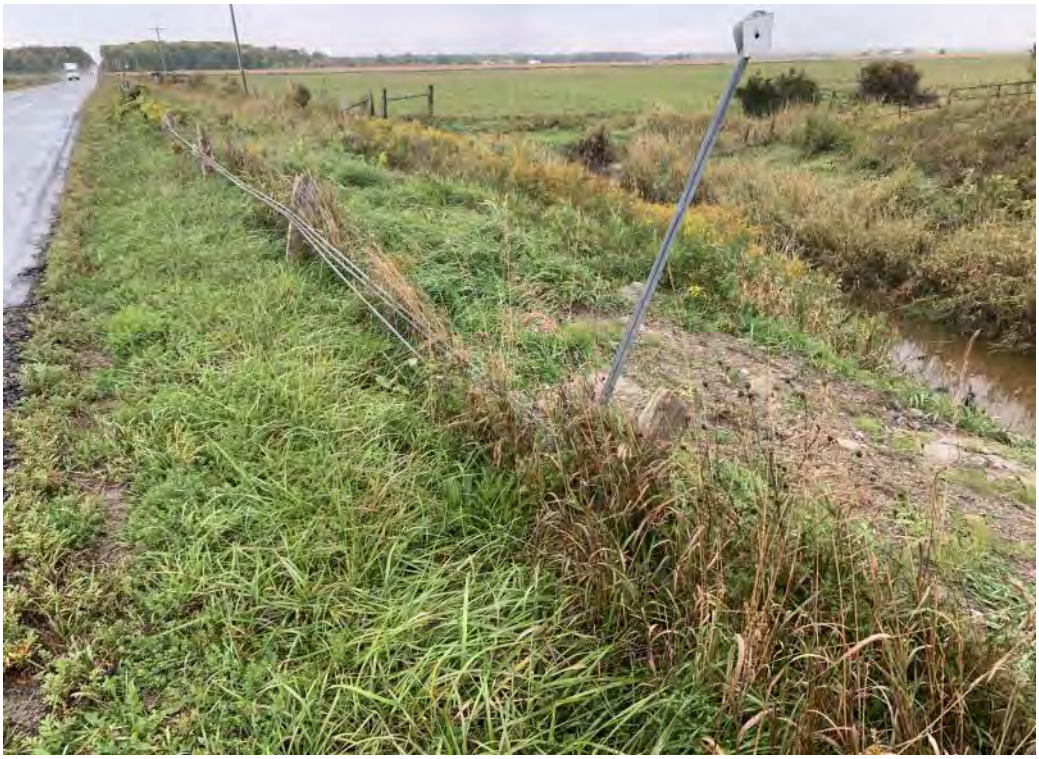

Photo 19-5: Impact damage to the northeast barrier protection post

Date of Photos: Sept. 24, 2020

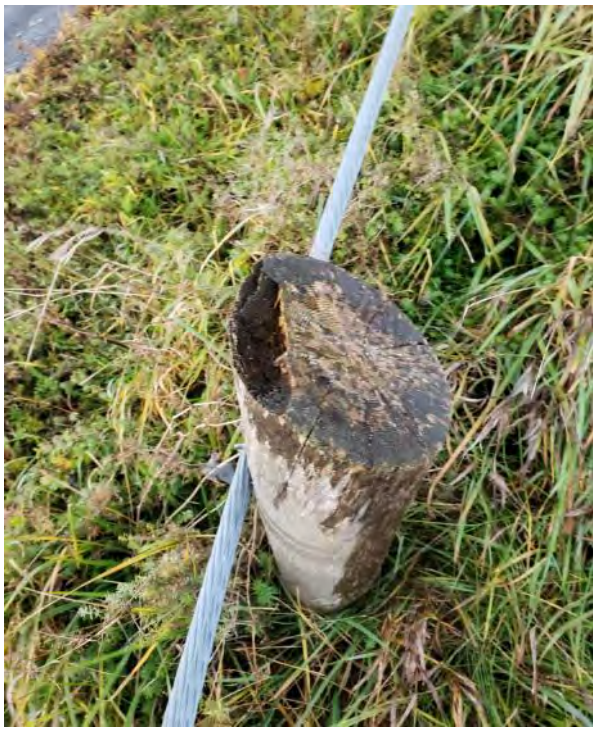

Photo 19-6: Typical wooden post rot (2018)

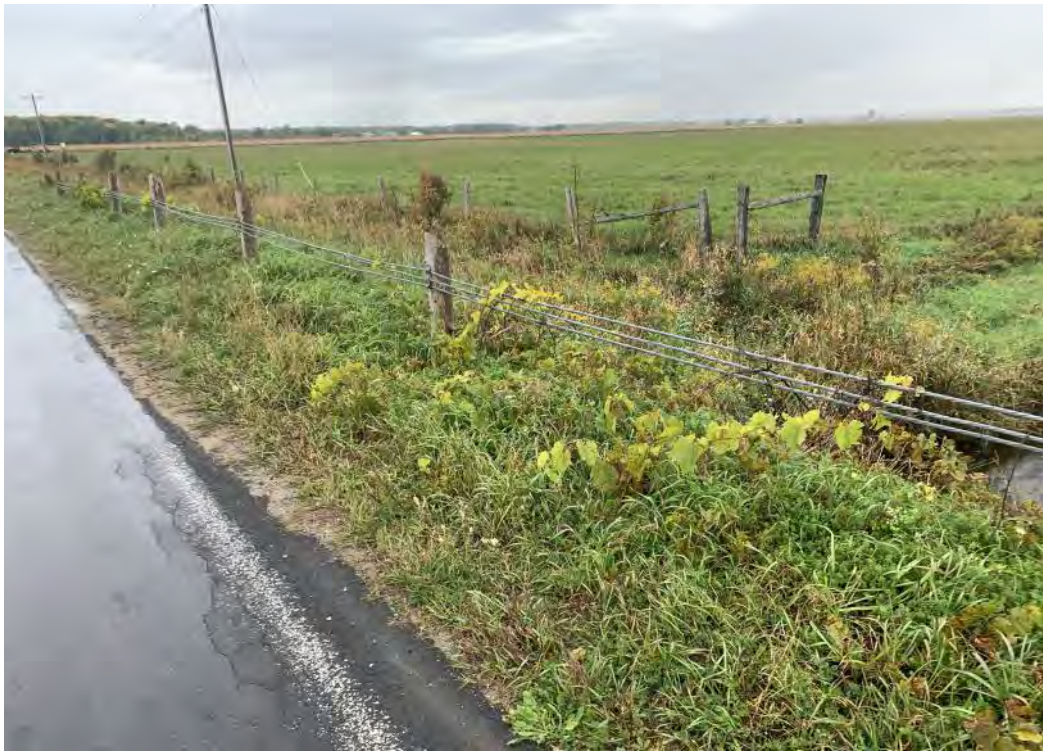

Photo 19-7: View of structure barrier protection (typical)

Date of Photos: Sept. 24, 2020

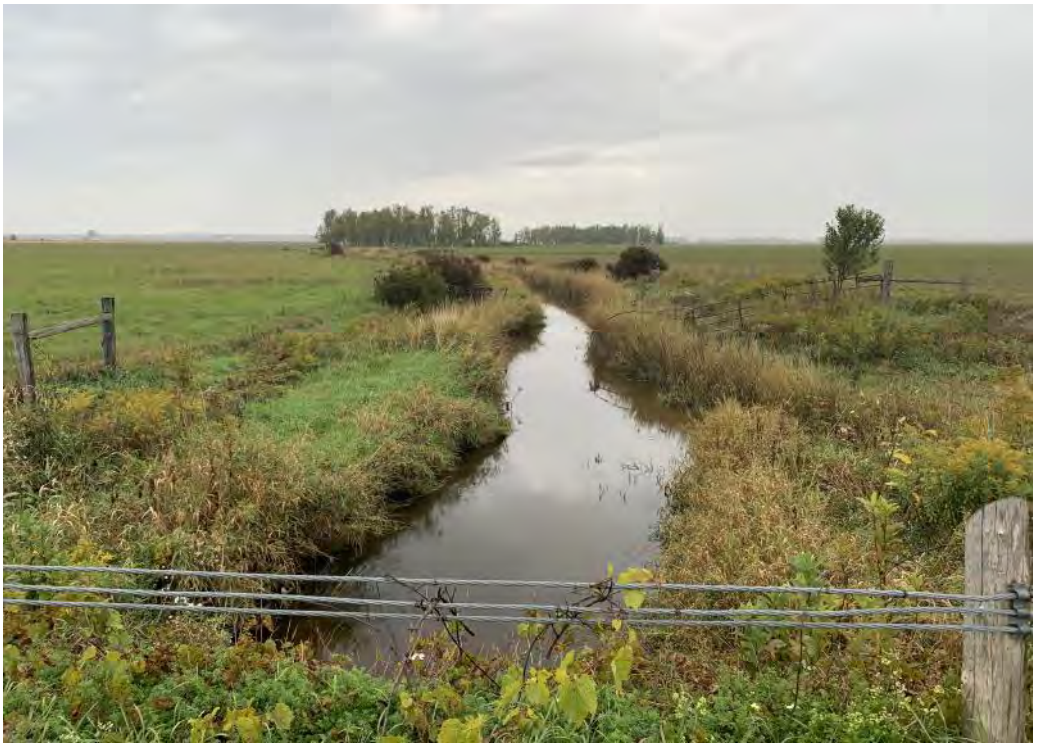

Photo 19-8: View of watercourse upstream

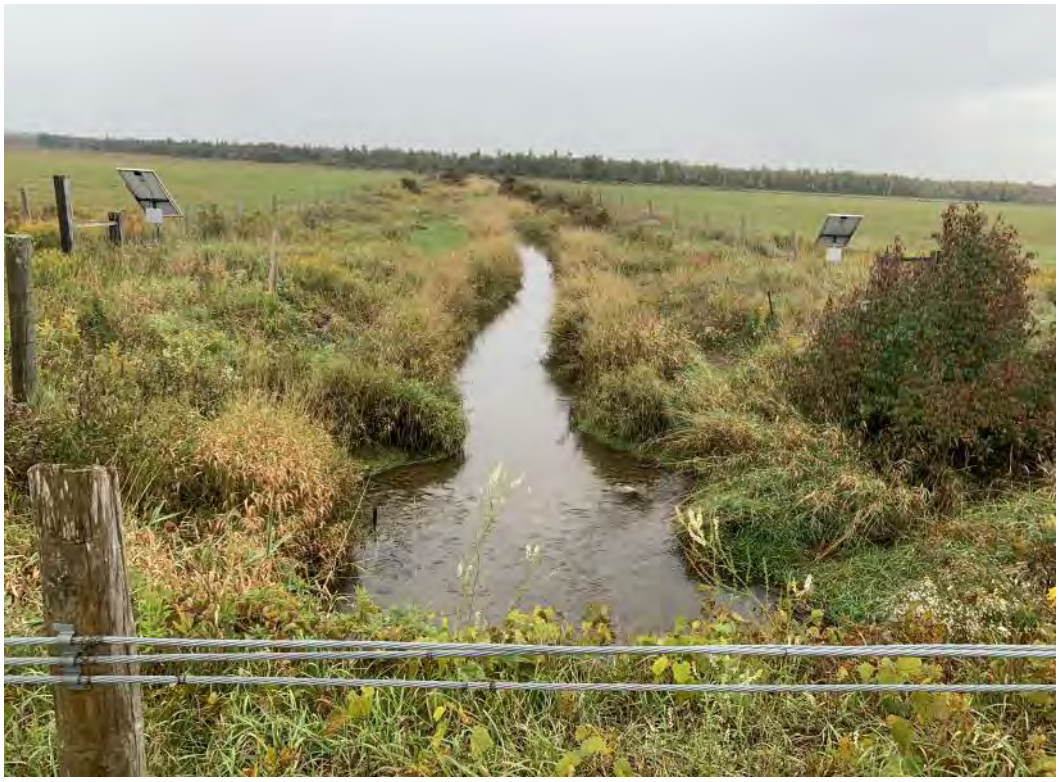

Photo 19-9: View of structure downstream

Date of Photos: Sept. 24, 2020

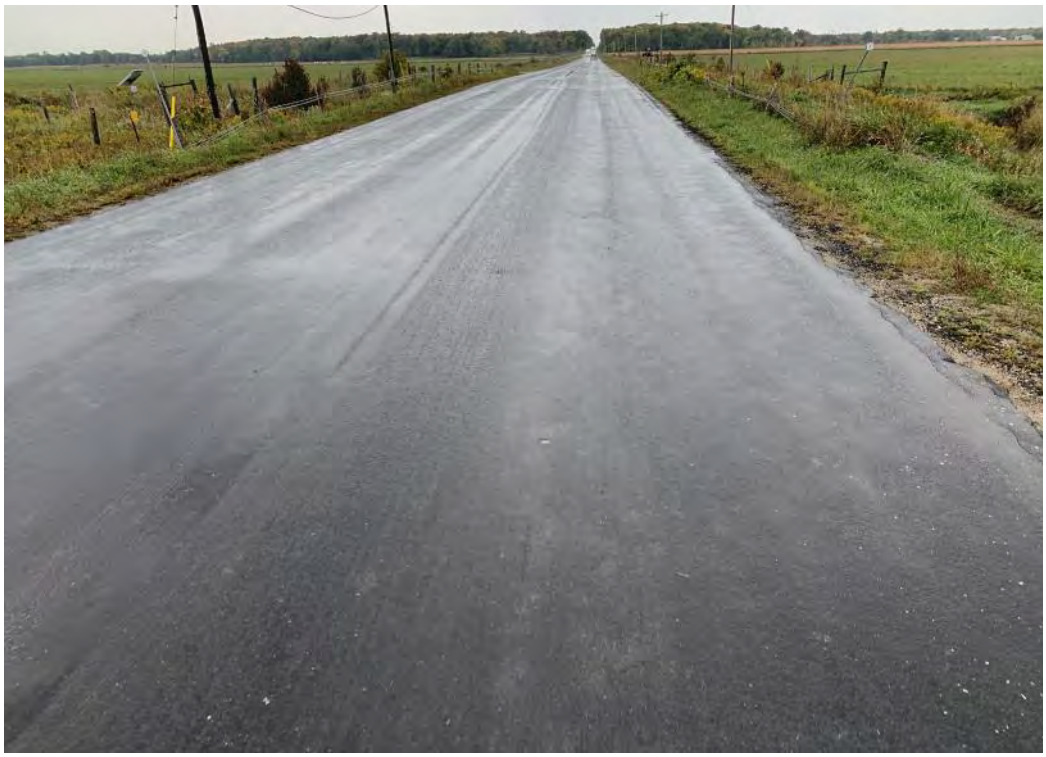

Photo 19-10: View of structure and approach wearing surface

Date of Photos: Sept. 24, 2020