

# 2016 UNDERWATER BRIDGE INSPECTION REPORT



## BRIDGE # 96750 TH 38 over BURR CREEK

DISTRICT: District 1

COUNTY: Itasca

CITY/TOWNSHIP: STOKES

STATE: Minnesota

Date of Inspection: 06/04/2016

Equipment Used:

Owner: State Highway Agency

Inspected By: Stromberg, Dan

Report Written By: Dan Stromberg

Report Reviewed By:

Final Report Date:



## TABLE OF CONTENTS

	<b>PAGE NUMBER</b>
UNDERWATER SUMMARY	3
UNDERWATER INSPECTION	4
UNDERWATER INSPECTION PROCEDURES	6
STRUCTURE INVENTORY	7
ELEMENTS	8
PHOTOGRAPHS	10
BRIDGE 96750 UNDERWATER INSPECTION DRAWINGS 2016	12

## UNDERWATER INSPECTION

### REPORT SUMMARY

The concrete culvert substructure unit inspected at Bridge No. 96750, was found to be in serious condition below water with main defect of structural significance. The concrete of the culvert was typically in good condition with minor scaling on the culvert walls and roof. The joint between culvert sections approximately 20 feet from the upstream end of the culvert had a gap up to 6 inches wide in both walls with escaping fill that has accumulated on the south side of the barrel. The escaping fill has caused a significant cavity in the road bed, which has created an unsupported area of the roadway and a hole in the asphalt pavement above the joint has developed. The gap is the result of differential movement between two adjacent precast culvert sections. The gap also extends across the roof the culvert, but a steel plate is across the gap preventing the loss of any fill. At the north wall of the culvert, there is a larger rock behind the gap and less evidence of any escaping fill. Local DOT representatives were notified immediately after the inspection about the culvert condition and the cavity under the roadway.

### INSPECTION FINDINGS

(A) There was typically 2 to 3 feet of sediment on the floor of the culvert barrel and outlet apron. There was generally less sediment on the inlet apron floor. (B) The south side of the barrel contained a 2 foot high mound of fill material that was predominately by the open joint in the culvert. (C) The culvert joint located approximately 20 feet from the upstream end of the culvert was open along the roof for 8 to 10 inches wide with a steel plate over the gap. Along the walls, a gap up to 6 inches wide (width decreases moving downward) with exposed escaping fill was present on the south side of the culvert. The escaping fill on the south side has created a cavity (up to 3 feet high) in the roadbed under the asphalt pavement. At the north wall, there was a larger rock behind the gap and less evidence of fill loss. (D) The joint between the original barrel and left extension was up to 3 inches wide, but there was no exposed or escaping fill.

### RECOMMENDATIONS

(A) Corrective measures should be implemented immediately to repair the open culvert joint and eliminate the cavity beneath the roadway. (B) Assuming repairs are implemented, reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

Contractor: Collins Engineers, Inc.

Contractor Job Number: 9687

## UNDERWATER INSPECTION

### 1. BRIDGE DATA

Bridge #: 96750  
Feature Intersected: BURR CREEK  
Facility Carried: TH 38  
District: District 1  
County: 031 - Itasca  
Bridge Description:

The bridge consists of one precast concrete box culvert.

### 2. INSPECTION DATA

Professional Engineer/Team Leader: Daniel G. Stromberg  
Inspection Diver: Daniel G. Stromberg  
Date of Underwater Inspection: 06/04/2016  
Weather Conditions: Overcast, 58°F  
Underwater Visibility (feet): 0.5 feet  
Waterway Velocity (ft/sec): Negligible

### 3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) Inspected: Culvert  
General Shape:  
10'x8' Precast concrete box

Maximum Water Depth at Substructure(s) Inspected (feet): 9 feet

### 4. WATERLINE DATUM

Water Level Reference: The top of the culvert at the downstream end  
Waterline Elevation (feet): 97.0 feet  
Description: The waterline was approximately 3.0 feet below reference.

### 5. NBIS CODING INFORMATION

(Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code:  
Item 61: Channel and Channel Protection: Code: 6  
Item 62: Culvert: Code: 3  
Item 92B: Underwater Inspection: Code: Y 48 06/2016

Item 113: Scour Critical Bridge:

Code: E

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

Yes  No (Mark your selection with an X)

6. STRUCTURAL ELEMENT CONDITION RATING

ELEM #	Element Description	Quantity	Unit	Conditions			
				CS1	CS2	CS3	CS4
241	Concrete Culvert	32	LF	16	8	8	

## UNDERWATER INSPECTION

### INSPECTION PROCEDURES

The routine underwater inspection of Bridge 96750 (T.H. 38 over Burr Creek) was completed on June 4, 2016 . The underwater inspection was conducted from shore. The inspection was conducted by a team consisting of a Professional Engineer Diver with a valid MnDOT Team Leader certification, a backup diver and dive tender. The inspection utilized commercial dive equipment and techniques (SSA and/or SCUBA) in accordance with OSHA regulations. Channel bottom profiles were taken along the upstream and downstream faces of the bridge and around the periphery of substructure units to determine the presence, location, and area of scour. The bridge element inspected was the precast concrete box. Inspection procedures followed FHWA guidance and the MnDOT Bridge and Structure Inspection Program Manual with channel bottom probing to search for foundations. If necessary repairs are implemented immediately, then the maximum routine underwater inspection frequency is recommended to remain at 60 months based on those findings and risk factors. Also, inspection procedures should continue to follow the above approach and standard guidance with 100% Level I and 10% Level II intensity efforts.



**MINNESOTA BRIDGE INSPECTION REPORT**

08/04/2016

Inspector: CO Bridge

**BRIDGE 96750 TH 38 OVER BURR CREEK**

County: Itasca	Location: 3.3 MI S OF BIG FORK	Length: 11.3 ft.
City:	Route: 03 - MNTH 38 Ref. Pt.: 037+00.014	Deck Width: 0.0 ft.
Township: 31035 - STOKES	Control Section: 08	Rdwy. Area/ Pct. Unsnd: 366 sq. ft. / %
Section: 5 Township: 060N Range: 26W Maint. Area: 1B		Paint Area/ Pct. Unsnd: sq. ft. / %
Span Type: 1 - Concrete 19 - Culvert (includes frame culverts)	Local Agency Bridge Nbr.:	Culvert: PCST 108
List:		Postings:
NBI Deck: N Super: N Sub: N Chan: 6 Culv: 3		
	Open, Posted, Closed: A - Open	
	MN Scour Code: E - CULVERT	

Appraisal Ratings - Approach: 8 Waterway: 5	Unofficial Structurally Deficient	Y
Required Bridge Signs - Load Posting: 0 - Not Required	Unofficial Functionally Obsolete	N
Horizontal: 0 - Not Required	Unofficial Sufficiency Rating	52.2
Traffic: 0 - Not Required		
Vertical: N - Not Applicable		

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
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241	Reinforced Concrete Culvert	Underwater	08/02/2016	32 LF	16	8	8	0
		Routine	05/24/2016	32 LF	16	8	8	0

Notes: 2016- 2" Freeboard

2014 - 7 in. freeboard west 32 in. freeboard east.

2012 E freeboard 14in. W water 6in above top of opening.

2010 - 48 in. freeboard.

Noted 2005- 12 in. freeboard in. 38 in. freeboard out.

Note 2004- 9 in. - 33 in.

The apron has a 10 in. x 5 in. spall at the S.W. corner. There is 18 in. of free board at the inlet and 40 in. at the outlet. This is due to the last 4 sections at the West end sunk lower than the rest of the culvert.

800	Critical Deficiencies or Safety Hazards	Underwater	08/02/2016	1 EA	1	0	0	0
		Routine	05/24/2016	1 EA	1	0	0	0

Notes: 2016- Nothing at time of inspection

870	Culvert End Treatment	Underwater	08/02/2016	2 EA	2	0	0	0
		Routine	05/24/2016	2 EA	2	0	0	0

Notes: 2016/ 2014 - no change.

4 in. x 2 in. spall at N.W. culvert wing and the wing is cracked.

871	Roadway Over Culvert	Underwater	08/02/2016	1 EA	0	0	1	0
		Routine	05/24/2016	1 EA	0	0	1	0

Notes: 2016- Bituminous heavily raveled. Depression on edge of culvert SB filled with blacktop

2014 - No change.

New roadway in 1998. Roadway has slight dip in Southbound lane south side of culvert.

891	Other Bridge Signing	Underwater	08/02/2016	1 EA	1	0	0	0
		Routine	05/24/2016	1 EA	1	0	0	0

Notes: 2016/ 014 - no change.

There is no bridge sign.

**BRIDGE 96750 TH 38 OVER BURR CREEK**

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
892	Slopes & Slope Protection	Underwater	08/02/2016	1 EA	0	1	0	0
		Routine	05/24/2016	1 EA	0	1	0	0
Notes: 2016- East Slope 16" x 6" deep gully south edge of culvert								
893	Guardrail	Underwater	08/02/2016	1 EA	1	0	0	0
		Routine	05/24/2016	1 EA	1	0	0	0
Notes: 2016- End treatments substandard ELT								
2014 - no change.								
900	Protected Species	Underwater	08/02/2016	1 EA	1	0	0	0
		Routine	05/24/2016	1 EA	1	0	0	0
Notes: 2016- Nothing at time of inspection								

General Notes: Beaver Dam gone 2006. Elevation mark established, top  
 west apron ( x ) 1310.915, 2008  
 Float thru 2008. 05/29/2008 Inspection: P. Briski/B. Youngstrom  
 05/17/2010 Inspection: R. Edstrom/D. Briski  
 05/14/2012 Inspection: P Briski/ M Larson (high water)  
 05/12/2014 Inspection: D. Briski / M. Larson High Water  
 08/11/2014 update insp. : D. Briski / J. Feth ( unable to go through only 12 in. freeboard at inlet )  
 2016-5-24 Routine D Rychlak/ J. Feth  
 06/04/2016 Underwater Inspection - Collins Engineers

- 58. Deck NBI:
- 36A. Brdg Railings NBI:
- 36B. Transitions NBI: No Required
- 36C. Appr Guardrail NBI:
- 36D. Appr Guardrail Terminal NBI: ELT end treatments
- 59. Superstructure NBI:
- 60. Substructure NBI:
- 61. Channel NBI:
- 62. Culvert NBI: Changed rating due to settlement in the roadway alongside culvert  
 Changed rating due to gap in culvert joint that has resulted in a silt accumulation in the south portion of the barrel. (2016 UW)
- 71. Waterway Adeq NBI: Changed due to 2" Freeboard chance of overtopping roadway
- 72. Appr Roadway Alignment NBI:
- Inventory Notes:

Inspector's Signature

Reviewer's Signature

# Pictures



Photo 1 - Upstream Fascia, Looking Southeast

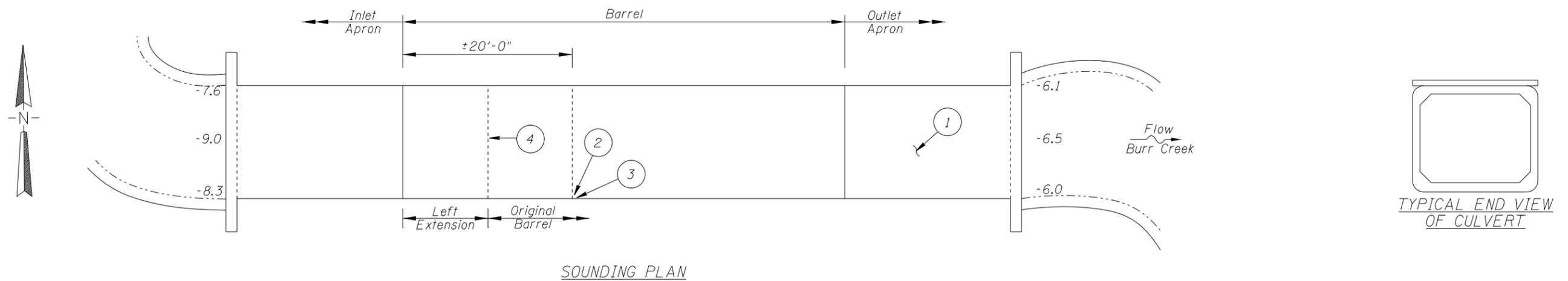


Photo 2 - Downstream Fascia, Looking Southwest

## Pictures



Photo 3 - Hole in Asphalt Patch above Open Culvert Joint, Looking Northeast



**GENERAL NOTES:**

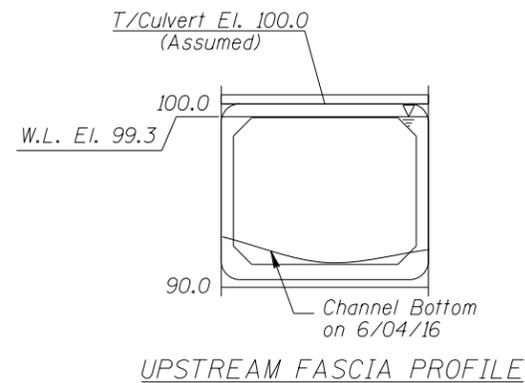
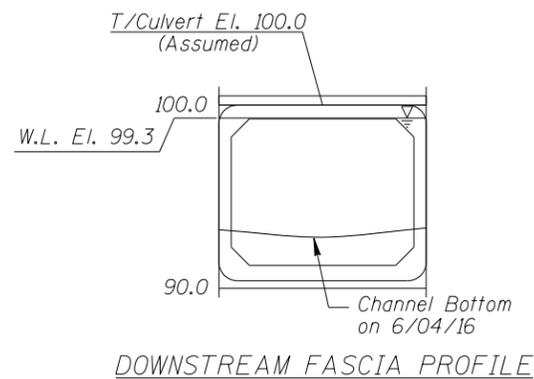
1. The Culvert barrel was inspected underwater.
2. At the time of inspection, on June 4, 2016, the waterline was located approximately 0.7 feet below the top of the Culvert at the east end. Since insufficient bridge elevation information was available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 99.3.
3. The concrete was typically in good condition with no notable deterioration and only minor scaling was present on the roof and wall surfaces. The scaling typically had up to 1/8 inch of penetration on the culvert surfaces.
4. The joints between the culvert section were typically tight and closed with no evidence of escaping fill except as noted in the Inspection Notes.
5. Soundings indicate the water depth at the time of inspection and are measured in feet.
6. Soundings were taken parallel to the culvert openings at both walls and the midpoint.

**INSPECTION NOTES:**

- ① There was typically 2 to 3 feet of sediment on the floor of the culvert barrel and outlet apron. There was generally less sediment on the inlet apron floor.
- ② The south side of the barrel contained a 2 foot high mound of fill material that was predominately by the open joint in the culvert.
- ③ The culvert joint located approximately 20 feet from the upstream end of the culvert was open along the roof for 8 to 10 inches wide with a steel plate over the gap. Along the walls, a gap up to 6 inches wide (width decreases moving downward) with exposed escaping fill was present on the south side of the culvert. The escaping fill on the south side has created a cavity (up to 3 feet high) in the roadbed under the asphalt pavement. At the north wall, there was a larger rock behind the gap and less evidence of fill loss.
- ④ The joint between the original barrel and left extension was up to 3 inches wide, but there was no exposed or escaping fill.

**Legend**

- 6.5 Sounding Depth (6/04/16)
- ⑤ Pile Number Designation



<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 96750 OVER BURR CREEK DISTRICT I, KOOCHICHING COUNTY INSPECTION, SOUNDING PLAN AND FASCIA PROFILES		
DRAWN BY: ELN	<b>COLLINS ENGINEERS</b>	DATE: JUNE 4, 2016
CHECKED BY: DGS		SCALE: NTS
CODE: 968796750		FIGURE NO.: 1