

2016 UNDERWATER BRIDGE INSPECTION REPORT



BRIDGE # 36511 CSAH 15 over BATTLE RIVER

DISTRICT: District 1 COUNTY: Koochiching CITY/TOWNSHIP: T - 151 R - 29
STATE: Minnesota

Date of Inspection: 06/04/2016

Equipment Used:

Owner: County Highway Agency

Inspected By: Stromberg, Dan

Report Written By: Dan Stromberg

Report Reviewed By:

Final Report Date:



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UNDERWATER INSPECTION

REPORT SUMMARY

The substructure units inspected at Bridge No. 36511, the North and South Abutments, were founded to be in good to satisfactory condition with random checking and at times splitting at the timber piles and backwall planking, but with no defects of structural significance. The channel bottom appeared stable with no appreciable changes since the previous inspection.

INSPECTION FINDINGS

(A) The channel bottom material primarily consisted of silty clay and sand allowing up to 1.5 feet of probe rod penetration. (B) The channel bottom material at the North Abutment consisted of soft silt over firm clay and gravel allowing minimal probe rod penetration. (C) Split in pile at North Abutment, at the top 3 feet of the pile, 1/2 inch wide with 2 inches of penetration. (D) Wood splintered off breastwall plank of the North Abutment at the waterline, 2 inches wide by 3 feet long, with 6 inches of penetration. There appeared to be some gravel escaping from behind the breastwall. (E) The bottom of the wall planking of the North Abutment was observed 1 foot below the waterline with undermining and 6 inches of probe rod penetration into the backfill. (F) A 1/4 inch split, with up to 3 inches of penetration, was observed from the top of the pile down 2.5 feet on the second pile from the east end of the northeast wingwall.

RECOMMENDATIONS

(A) Monitor the areas of potential backfill loss at the North Abutment, and if it progresses repairs may be necessary. (B) 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 #: 36511
Feature Intersected: BATTLE RIVER
Facility Carried: CSAH 15
District: District 1
County: 036 - Koochiching

Bridge Description:

The superstructure is a single span multiple timber beam bridge. The superstructure is supported on two timber pile bent abutments. The abutments provide lateral support to the embankment fill with timber plank breastwalls, and skewed timber pile and plank wingwalls.

2. INSPECTION DATA

Professional Engineer/Team Leader: Daniel G. Stromberg
Inspection Diver: Daniel G. Stromberg
Date of Underwater Inspection: 06/04/2016
Weather Conditions: Cloudy, 60°F
Underwater Visibility (feet): 1.0 feet
Waterway Velocity (ft/sec): Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) Inspected: North and South Abutments

General Shape:

Vertical breastwall flanked by wingwalls flared at approximately 45 degrees back from the breastwall. Wingwall tapers vertically to match roadway fill slopes. Nine piles in front of each breastwall, and two piles at each wingwall.

Maximum Water Depth at Substructure(s) Inspected (feet): 1.0 feet

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap at the east end of the North Abutment
Waterline Elevation (feet): 92.7 feet
Description: The waterline was approximately 7.3 feet below the reference.

5. NBIS CODING INFORMATION

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

Item 60: Substructure: Code: 7
Item 61: Channel and Channel Protection: Code: 7
Item 62: Culvert: Code:
Item 92B: Underwater Inspection: Code: Y 48 06/2016

Item 113: Scour Critical Bridge:

Code: I

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
228	Timber Pile	26	EA	24	2		
216	Timber Abutment	112	LF		112		

UNDERWATER INSPECTION

INSPECTION PROCEDURES

The routine underwater inspection of Bridge 36511 (CSAH 15 over Battle River) was completed on June 4, 2016. The underwater inspection was conducted from shore. The inspection was conducted by a team consisting of a PE-Diver with a valid MnDOT Team Leader certification, a backup diver and dive tender. Due to waterway conditions at the time of the inspection, the inspection could be accomplished by wading 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 elements inspected consisted of the North and South Abutments. According to the bridge inventory, both abutments are founded on timber piles. Inspection procedures followed FHWA guidance and the MnDOT Bridge and Structure Inspection Program Manual with channel bottom probing to search for foundations. 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

08/09/2016

Inspector: CO Bridge

BRIDGE 36511 CSAH 15 OVER BATTLE RIVER

County: Koochiching	Location: 0.5 MI N OF JCT TH 1	Length: 24.0 ft.
City:	Route: 04 - CSAH 15 Ref. Pt.: 000+00.700	Deck Width: 33.3 ft.
Township: 36002 - T - 151 R - 29	Control Section:	Rdwy. Area/ Pct. Unsnd: 786 sq. ft. / %
Section: 21 Township: 151N Range: 29W Maint. Area:		Paint Area/ Pct. Unsnd: sq. ft. / %
Span Type: 7 - Wood or Timber 1 - Slab	Local Agency Bridge Nbr.:	Culvert: N/A
List:		Postings:
NBI Deck: 7 Super: 7 Sub: 7 Chan: 7 Culv: N	Open, Posted, Closed: A - Open	
	MN Scour Code: 1 - LOW RISK	

Appraisal Ratings - Approach: 8 Waterway: 8		Unofficial Structurally Deficient N
Required Bridge Signs - Load Posting: 0 - Not Required	Traffic: 0 - Not Required	Unofficial Functionally Obsolete N
Horizontal: 1 - Object Markers	Vertical: N - Not Applicable	Unofficial Sufficiency Rating 98.0

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
31	Timber Deck	Underwater	08/02/2016	799 SF	799	0	0	0
		Migrated Values		799 SF	799	0	0	0
	Notes: [2016] Migrator assumed CS1.							
510	- Wearing Surfaces	Underwater	08/02/2016	786 SF	770	0	16	0
		Migrated Values		786 SF	770	0	16	0
	Notes: 2015 - Patch on N end. 2014 - Aging 2012 - dip in bit. on north end. 2011 - repatched north end & still remains an issue. Two long. cracks. Transverse cracks at abutment. 2010 - patch on north end ok.							
54	Timber Slab	Underwater	08/02/2016	799 SF	799	0	0	0
		Migrated Values		799 SF	799	0	0	0
	Notes: [2016] Migrator assumed CS1.							
510	- Wearing Surfaces	Underwater	08/02/2016	786 SF	770	0	16	0
		Migrated Values		786 SF	770	0	16	0
	Notes: 2015 - Polishing Aggregate. 2014 - Aging 2012 - 2 minor longitudinal cracks in south bound lane. 2009 - Settlement at north approach. 2008 - 3 transverse and 2 longitudinal cracks. Previous - BIT SURF WITH NO CRACKS.							
156	Timber Floor Beam	Underwater	08/02/2016	33 LF	33	0	0	0
		Migrated Values		33 LF	33	0	0	0
	Notes: [2016] Migrator assumed the presence of one timber floorbeam in CS1.							
216	Timber Abutment	Underwater	08/02/2016	112 LF	0	112	0	0
		Migrated Values		112 LF	0	112	0	0
	Notes: [2016] Migrator added 40 LF to abutment quantity to account for wingwalls (CS1:0 CS2:40 CS3:0 CS4:0). 2013 - Gap - 4" wide by 18" long at NE corner. 2005 - So. abut is dry with a 2' high mound 2' from abutment.							
	Wingwall notes: 2011 - Should have read NE not NW pile. NW Wing pile seems to be cracked in half at the base.							

BRIDGE 36511 CSAH 15 OVER BATTLE RIVER

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
228	Timber Pile	Underwater	08/02/2016	18 EA	0	15	3	0
		Migrated Values		18 EA	0	15	3	0
<p>Notes:</p> <p>2015 - N Abut - 1 minor split. S abut no change.</p> <p>2014 - South abutment 5 minor splits. North middle piling delamination at water line.</p> <p>2013 - S. Abut - 1 plie - 1/2" split by 3'.</p> <p>2010 - 3 piling at south abutment have 1/4" x 3' very minor split.</p> <p>2008 - S abut piling have minor splits. S Middle piling has 1/2" X 3' crack. NW pile - 1/2" split for 3"</p>								
235	Timber Pier Cap	Underwater	08/02/2016	75 LF	0	70	5	0
		Migrated Values		75 LF	0	70	5	0
<p>Notes: 2012 - SE cap is split to first drift pin. SW has 10% minor split. NW - no splits. 2011 - NE corner has 20% split & SE has a 75% vert split. 2010 - 75% vertical split on SE cap. Minor 1/8". 2007 - West end has cracks. - Minor splits on east ends</p>								
330	Metal Bridge Railing	Underwater	08/02/2016	49 LF	0	49	0	0
		Migrated Values		49 LF	0	49	0	0
<p>Notes: [2016] Migrator assumed metal rail/timber post combination type rail.</p> <p>2013 - Minor split in couple of posts. 2012 - Steel plate beam guardrail. No splits in railpost. 2011 - No splits in railposts. Previously - 1 dent in w side. PL BM RAIL WITH 10 POSTS.</p>								
515	Steel Protective Coating	Underwater	08/02/2016	999 SF	999	0	0	0
		Migrated Values		999 SF	999	0	0	0
<p>Notes: [2016] Migrator assumed CS1 and a quantity of 999 SF.</p>								
332	Timber Bridge Railing	Underwater	08/02/2016	8 LF	0	8	0	0
		Migrated Values		8 LF	0	8	0	0
<p>Notes: [2016] Migrator assumed metal rail/timber post combination type rail. Post spacing assumed to be 5LF, each post 1LF.</p> <p>2013 - Minor split in couple of posts. 2012 - Steel plate beam guardrail. No splits in railpost. 2011 - No splits in railposts. Previously - 1 dent in w side. PL BM RAIL WITH 10 POSTS.</p>								
800	Critical Deficiencies or Safety Hazards	Underwater	08/02/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
<p>Notes: NO CRITICAL FINDINGS OBSERVED DURING THE LAST INSPECTION.</p>								
822	Bituminous Approach Roadway	Underwater	08/02/2016	2 EA	0	1	1	0
		Migrated Values		2 EA	0	1	1	0
<p>Notes:</p> <p>2014 - No approach dip, filled in with gravel.</p> <p>2007 - N App patched. Cracks in N bound lane.</p> <p>2006 - Just a bit. app. slab. Two settlement area in north approach.</p> <p>2005 - No. approach settling. 3 bad dips. Couple transverse cracks in n bound lane & 1 longitudinal crack in s bound lane.</p> <p>Transverse cracks at ends of bridge</p> <p>2004 - hole in blacktop of north approach</p>								
885	Scour	Underwater	08/02/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
<p>Notes:</p> <p>2014 - Rip rap has to added under south abutment mat.</p> <p>I - Screened. Low risk.</p>								
891	Other Bridge Signing	Underwater	08/02/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
<p>Notes: 2012 - SE delineator is leaning and needs to be straightened.</p>								
892	Slopes & Slope Protection	Underwater	08/02/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
<p>Notes: Use this element to rate the condition of slopes and slope protection.</p>								

BRIDGE 36511 CSAH 15 OVER BATTLE RIVER

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
894	Deck & Approach Drainage	Underwater	08/02/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: Use this element to rate the condition, function, and adequacy of the drainage system.								
895	Sidewalk, Curb, & Median	Underwater	08/02/2016	1 EA	0	1	0	0
		Migrated Values		1 EA	0	1	0	0
Notes: drying out.								
900	Protected Species	Underwater	08/02/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: Use this element to track the presence of protected species living on this structure.								

General Notes: 2015 - D. Grindall, Erickson Engineering. Water is 12" deep max. S side channel grassed in.
 2014 - Inspected by D. Grindall Erickson Engineering. Rip rap added on wingwall slopes, but not underneath. Water 18" deep max.
 2013 - Inspected by D. Grindall Erickson Engineering. Dip at NE Corner. Still need rip rap along south abut for scour. S. Abut - dray fro 6' width, N. Abut - 12" deep.
 2012 - DG & WH. Riprap has been installed against the wings. No water. Completely dry.
 2011 - DG & WH. S abut is dry. 18" water at N. abut. Get S abut. riraped for better scour rating.
 2010 - DG & WH. 44" to water.
 2009 - DG. 24' Rdwy with 4' grass shldrs. 32' br deck width. Soft mud bottom. 6' to water. Water is 0' to 18' deep. Minor riprap 2 north abutment.
 2008 - DG. Water is 6" to 18" deep. 1 old piling - 10' from south abut.
 2007 - only water on north side of bridge. DG
 2006 - Stream is dry. 7.5' from bottom of stream to low timber at deepest spot. 1 old piling near east side. 2005 - DG inspector. Stream dry 10' west of bridge. Water - 18" deep at no. abut. DG - inspector. S. Abut dry in 2003. PONTIS inspection comments - No changes. DG PONTIS inspection comments - 4" to water. Inspector - DG *WEARING SURF - BIT. 6" TO WATER. ALL TREATED TIMBER. NW PILE SPLIT. S ABUT - 3" SPLIT PILE.

1991 COMMENTS - DAM DOWNSTREAM

1/93 COMMENTS - DAM BLOWN. NE WING PILE SLIGHT CRACK.

12/93 COMMENTS - SE WING PILE - 1 MINOR SPLIT.

1/97 COMMENTS - NO CHANGE.

1/98 - 5" TO WATER. NO CHANGE.

1/99 - 5 TO WATER.

1999 COMMENTS - 1" - 2" WATER IN STREAM

1/2001 COMMENTS - 5.5" TO WATER. COUPLE BIRD NESTS 2004 - water knee deep at s. abut. DG inspector.

06/04/2016 Underwater Inspection - Collins Engineers

- 58. Deck NBI:
- 36A. Brdg Railings NBI:
- 36B. Transitions NBI:
- 36C. Appr Guardrail NBI:
- 36D. Appr Guardrail Terminal NBI:
- 59. Superstructure NBI:
- 60. Substructure NBI:
- 61. Channel NBI:
- 62. Culvert NBI:
- 71. Waterway Adeq NBI:

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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72. Appr Roadway
Alignment NBI:
Inventory Notes:

Inspector's Signature

Reviewer's Signature

Pictures



Photo 1 - Upstream Fascia, Looking Northwest



Photo 2 - Downstream Fascia, Looking Southeast

Pictures



Photo 3 - North Abutment, Looking Northeast

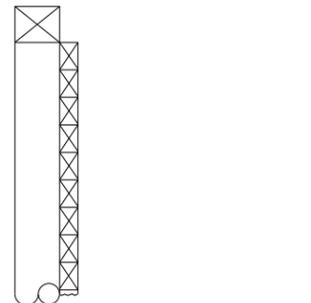
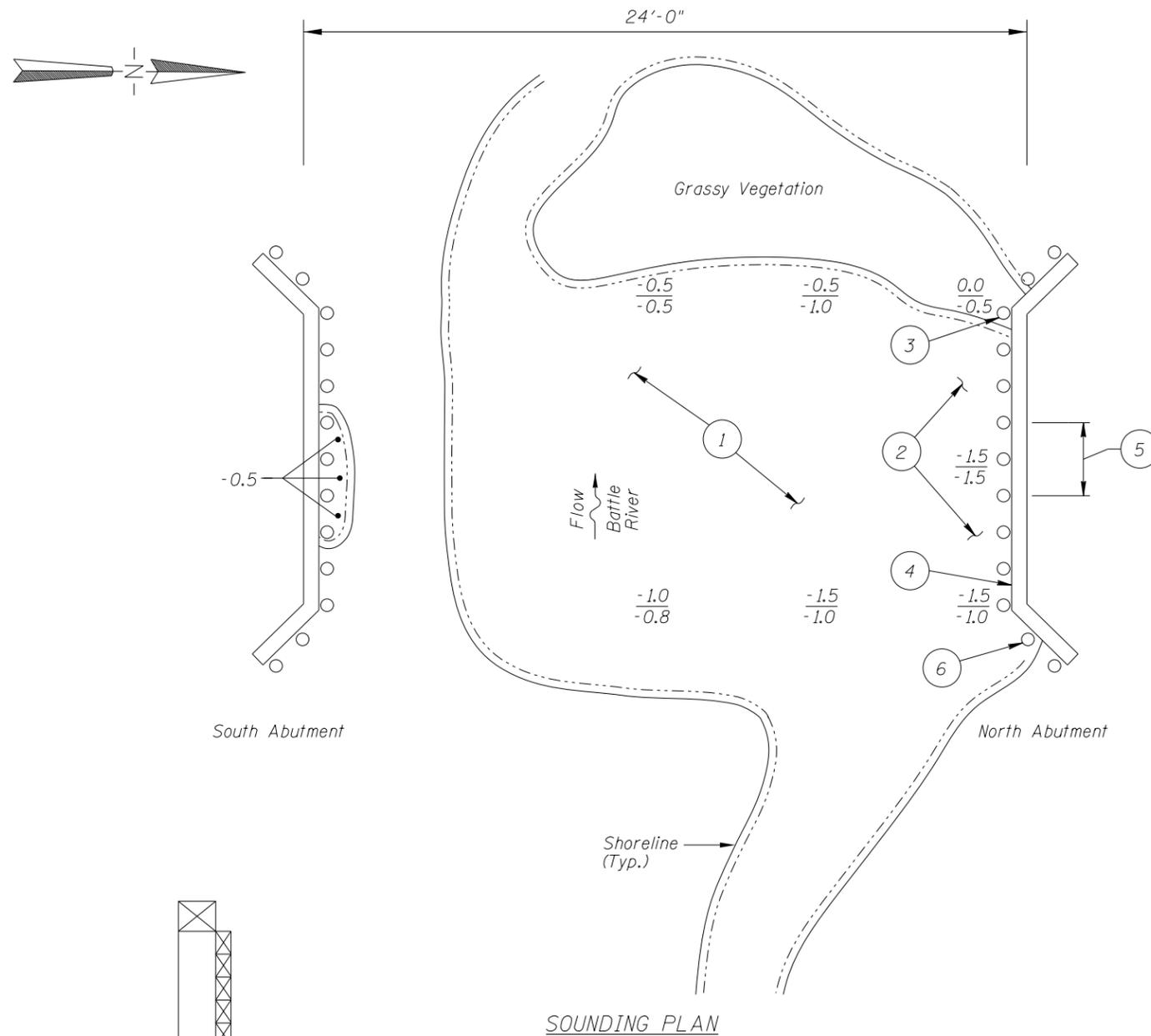


Photo 4 - South Abutment, Looking Southeast

Pictures



Photo 5 - Upstream End of North Abutment Backwall Gap, Looking Northeast



TYPICAL END VIEW OF NORTH ABUTMENT

GENERAL NOTES:

1. The North and South Abutments were inspected underwater.
2. At the time of inspection on June 4, 2016, the waterline was located approximately 7.3 feet below the top of pier cap at east end of the North Abutment. Design plans were not available, therefore a reference elevation of 100.00 was assumed. Based on the assumed reference the waterline elevation was 92.7.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 and mid-points between the abutments.
5. Random checking up to 1/8 inch wide was observed on all of the timber piles.

INSPECTION NOTES:

- 1 The channel bottom material primarily consisted of silty clay and sand allowing up to 1.5 feet of probe rod penetration.
- 2 The channel bottom material at the North Abutment consisted of soft silt over firm clay and gravel allowing minimal probe rod penetration.
- 3 Split in pile at North Abutment, at the top 3 feet of the pile, 1/2 inch wide with 2 inches of penetration.
- 4 Wood splintered off breastwall plank of the North Abutment at the waterline, 2 inches wide by 3 feet long, with 6 inches of penetration. There appeared to be some gravel escaping from behind the breastwall.
- 5 The bottom of the wall planking of the North Abutment was observed 1 foot below the waterline with undermining and 6 inches of probe rod penetration into the backfill.
- 6 A 1/4 inch split, with up to 3 inches of penetration, was observed from the top of the pile down 2.5 feet on the second pile from the east end of the northeast wingwall.

Legend

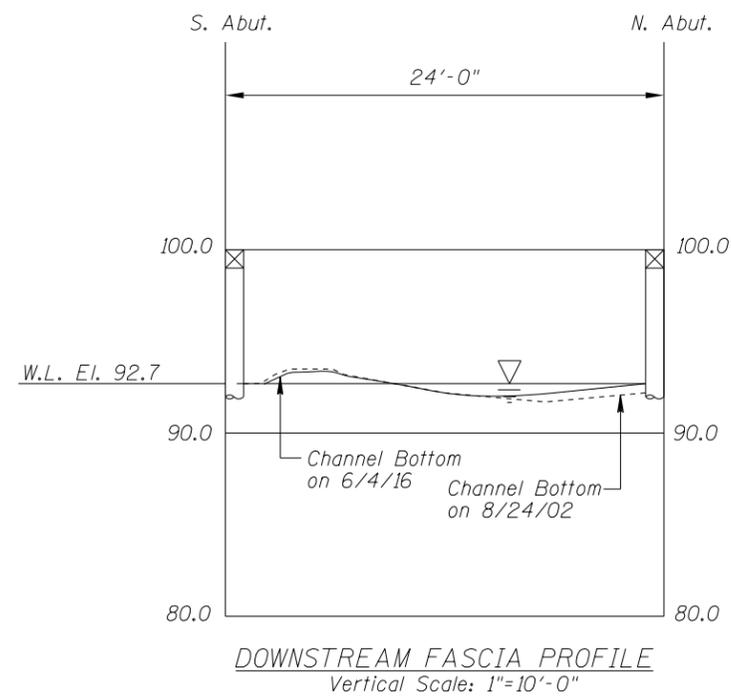
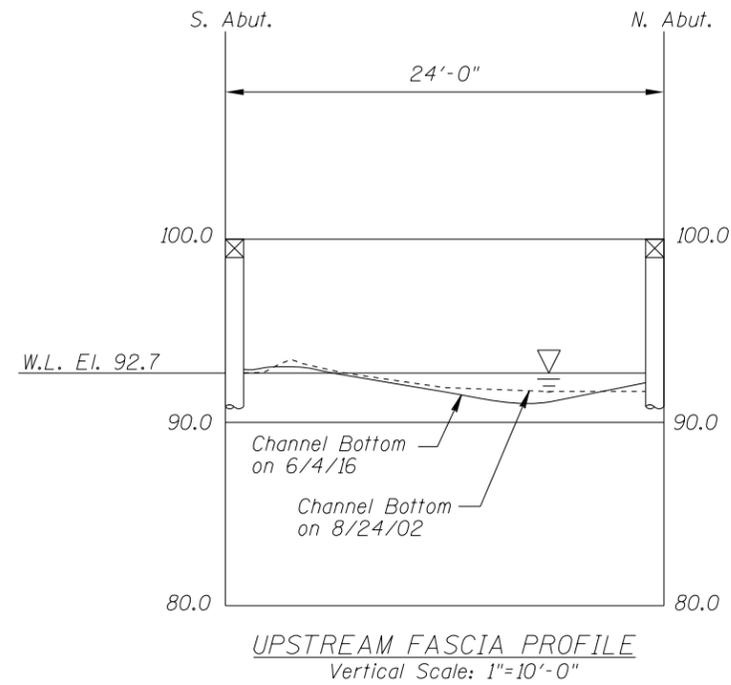
- 1.5 Sounding Depth from Waterline (6/4/16)
- 1.6 Sounding Depth from Waterline (8/24/02)

○ Timber Pile

Note:

All soundings based on 2016 waterline location.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 36511 OVER THE BATTLE RIVER DISTRICT I, KOOCHICHING COUNTY		
INSPECTION AND SOUNDING PLAN		
DRAWN BY: ELN	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	DATE: JUNE 4, 2016
CHECKED BY: DGS		SCALE: NTS
CODE: 968736511		FIGURE NO.: 1



Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 36511 OVER THE BATTLE RIVER DISTRICT I, KOOCHICHING COUNTY UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
DRAWN BY: ELN	COLLINS ENGINEERS <small>133 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	DATE: JUNE 4, 2016
CHECKED BY: DGS		SCALE: NTS (U.O.N.)
CODE: 968736511		FIGURE NO.: 2