

# 2016 UNDERWATER BRIDGE INSPECTION REPORT



## BRIDGE # 90700 CSAH 7 over N FK CROW RIVER

DISTRICT: District 3

COUNTY: Wright

CITY/TOWNSHIP: MIDDLEVILLE

STATE: Minnesota

Date of Inspection: 05/27/2016

Equipment Used:

Owner: County Highway Agency

Inspected By: Owens, Garrett

Report Written By: Garrett Owens

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
PICTURES	11
DRAWINGS	15

## **UNDERWATER INSPECTION**

### REPORT SUMMARY

The substructure units inspected at Bridge No. 90700, Piers 1 and 2, were found to be in good condition with timber piles in generally sound condition with negligible deterioration, and no defects of structural significance observed. The channel bottom had 1 foot deep scour depressions scour at each pile location. The channel bottom material consisted primarily of sand.

### INSPECTION FINDINGS

- (A) 1 foot deep scour is typical around each pile.
- (B) The channel bottom consists of sand with up to 6 inches of penetration.
- (C) Up to 6 inch diameter timber debris on both side of Pier 2.

### RECOMMENDATIONS

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 #: 90700  
Feature Intersected: N FK CROW RIVER  
Facility Carried: CSAH 7  
District: District 3  
County: 086 - Wright  
Bridge Description:

The bridge superstructure consists of three spans of multiple timber beams. The superstructure is supported by two timber pile abutments and two timber pile bent piers. The piers are numbered 1 and 2 starting from the south end of the bridge.

### 2. INSPECTION DATA

Professional Engineer/Team Leader: Barritt R. Lovelace, P.E.  
Inspection Diver: Barritt R. Lovelace, P.E.  
Date of Underwater Inspection: 05/27/2016  
Weather Conditions: Cloudy/Rain 65°F  
Underwater Visibility (feet): 1.0  
Waterway Velocity (ft/sec): 2.5

### 3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) Inspected: Piers 1 and 2  
General Shape:  
Piers 1 and 2 each consist of six 12 inch timber piles driven to bearing into the channel bottom.

Maximum Water Depth at Substructure(s) Inspected (feet): 7.6

### 4. WATERLINE DATUM

Water Level Reference: Top of cap at the upstream end of Pier 1; assumed elevation of 100.0 feet.  
Waterline Elevation (feet): 92.9  
Description: 7.1 feet below reference

### 5. NBIS CODING INFORMATION

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

Item 60: Substructure: Code: 6  
Item 61: Channel and Channel Protection: Code: 7  
Item 62: Culvert: Code:  
Item 92B: Underwater Inspection: Code: Y 48 05/2016

Item 113: Scour Critical Bridge:

Code: K

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 Pilings	26	EA	7	10	9	
885	Scour	1	EA		1		

## UNDERWATER INSPECTION

### INSPECTION PROCEDURES

The routine underwater inspection of Bridge 90700 (CSAH 7 over the North Fork of the Crow River) was completed on May 27, 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 a dive tender. The inspection utilized commercial dive equipment and techniques (SSA and/or SCUBA) in accordance with OSHA regulations. 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 Piers 1 and 2. According to the bridge inventory or design drawings, Piers 1 and 2 were founded on 12 inch 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 routine underwater inspection frequency is recommended to remain at a maximum of 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

09/28/2016

Inspector: CO Bridge

## BRIDGE 90700 CSAH 7 OVER N FK CROW RIVER

County: Wright	Location: 1.7 MI S OF JCT CSAH35	Length: 106.0 ft.
City:	Route: 04 - CSAH 7 Ref. Pt.: 005+00.590	Deck Width: 26.0 ft.
Township: 86012 - MIDDLEVILLE	Control Section:	Rdwy. Area/ Pct. Unsnd: 2648 sq. ft. / %
Section: 12 Township: 119N Range: 27W Maint. Area:		Paint Area/ Pct. Unsnd: sq. ft. / %
Span Type: 7 - Wood or Timber 2 -	Local Agency Bridge Nbr.: 90700	Culvert: N/A
List: Stringer/Multi-beam or Girder		Postings: 26 40 40

NBI Deck: 5 Super: 6 Sub: 5 Chan: 7 Culv: N  
 Open, Posted, Closed: P - Posted for Load  
 MN Scour Code: K - LIMITED RISK

Appraisal Ratings - Approach: 8	Waterway: 5	Unofficial Structurally Deficient	N
Required Bridge Signs - Load Posting: 2 - Vehicle & Semi (Type R12-5)	Traffic: 0 - Not Required	Unofficial Functionally Obsolete	N
Horizontal: 2 - Width Restrictions	Vertical: N - Not Applicable	Unofficial Sufficiency Rating	51.9

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	09/01/2016	2756 SF	2756	0	0	0
		Migrated Values		2756 SF	2756	0	0	0
Notes: [2016] Migrator assumed CS1.								
510	- Wearing Surfaces	Underwater	09/01/2016	2648 SF	2595	0	53	0
		Migrated Values		2648 SF	2595	0	53	0
Notes: [8-29-2014] [10-16-15] Bituminous surface has several areas of patching. Surface has several longitudinal and transverse cracks with areas of map cracking.								
111	Timber Open Girder/Beam	Underwater	09/01/2016	1483 LF	1028	455	0	0
		Migrated Values		1483 LF	1028	455	0	0
Notes: [8-29-2014] [10-16-15] Span 1 beams 1, 4-6, & 8-9 in cs2 due to longitudinal cracking on beam sides. Span 2 beams 6, 8, & 10 in cs2 due to longitudinal cracking on beam sides. Span 3 beams 9, 11-12, & 14 in cs2 due to longitudinal cracking on beam sides.								
216	Timber Abutment	Underwater	09/01/2016	92 LF	0	92	0	0
		Migrated Values		92 LF	0	92	0	0
Notes: [2016] Migrator added 40 LF to abutment quantity to account for wingwalls (CS1:0 CS2:40 CS3:0 CS4:0). [8-29-2014] minor to moderate deterioration. [10-16-15] minor to moderate deterioration but abutments are structurally sound. South abutment has signs of possible previous maintenance work. (Spikes protruding through abutment timbers from back side and backer boards visible through gaps between timbers.)  Wingwall notes: Moderate deterioration on planking at wingwalls. (2-17-2009)  [8-29-2014] [10-16-15] Moderate cracking/deterioration on wingwall planking and top plates.								
228	Timber Pile	Underwater	09/01/2016	26 EA	7	10	9	0
		Migrated Values		26 EA	7	10	9	0
Notes: [10-16-15] South abutment piles 1-7 in cs 1 Pier 1 piles 1-3 in cs 2, 4-6 in cs 3 Pier 2 piles 1-6 in cs 3 North abutment piles 1-7 in cs 2								
235	Timber Pier Cap	Underwater	09/01/2016	52 LF	0	52	0	0
		Migrated Values		52 LF	0	52	0	0
Notes: [8-29-2014] minor to moderate deterioration. corrected length.								

**BRIDGE 90700 CSAH 7 OVER N FK CROW RIVER**

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
330	Metal Bridge Railing	Underwater	09/01/2016	212 LF	0	192	0	20
		Migrated Values		212 LF	0	192	0	20
<p>Notes: [2016] Migrator assumed metal rail/timber post combination type rail. Timber rail is covered with flex beam railing. Appears some repairs have been made to east railing posts.(2-17-2009)</p> <p>(10-10-2012) corrected length.</p> <p>[8-29-2014]</p> <p>[10-16-15] Moved 20' to cs3 due to severe damage &amp; decay in NW corner curb attached to railing. Remainder in cs2 due to poor condition attached timber curb and weathering of timber rail posts.</p>								
515	Steel Protective Coating	Underwater	09/01/2016	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	09/01/2016	35 LF	0	32	0	3
		Migrated Values		35 LF	0	32	0	3
<p>Notes: [2016] Migrator assumed metal rail/timber post combination type rail. Post spacing assumed to be 5LF, each post 1LF. Timber rail is covered with flex beam railing. Appears some repairs have been made to east railing posts.(2-17-2009)</p> <p>(10-10-2012) corrected length.</p> <p>[8-29-2014]</p> <p>[10-16-15] Moved 20' to cs3 due to severe damage &amp; decay in NW corner curb attached to railing. Remainder in cs2 due to poor condition attached timber curb and weathering of timber rail posts.</p>								
800	Critical Deficiencies or Safety Hazards	Underwater	09/01/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
<p>Notes: [8-29-2014]</p> <p>[10-16-15]</p>								
822	Bituminous Approach Roadway	Underwater	09/01/2016	2 EA	0	2	0	0
		Migrated Values		2 EA	0	2	0	0
<p>Notes: [10-16-15] approaches have slight dips/bumps causing more traffic impact on bridge.</p>								
855	Secondary Members (Superstructure)	Underwater	09/01/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
<p>Notes: (10-10-2012) timber cross bracing on piers is split out on east end bottom.</p> <p>[8-29-2014]</p> <p>[10-16-15] cross bracing repaired. Wright County forces bolted new timbers over existing bracing. Moved to cs1.</p>								
885	Scour	Underwater	09/01/2016	1 EA	0	1	0	0
		Migrated Values		1 EA	1	0	0	0
<p>Notes: [2006] K - Limited risk. Monitoring required.</p> <p>[8-29-2014]</p> <p>[10-16-15] channel cross sections and bridge detour on file.</p> <p>[2016] Underwater Bridge Inspection - 1 foot deep scour is typical around each pile.</p>								
890	Load Posting or Vertical Clearance Signing	Underwater	09/01/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
<p>Notes: [2016] Structure requires a vertical clearance sign or load posting sign.</p>								
891	Other Bridge Signing	Underwater	09/01/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
<p>Notes: [8-29-2014]</p> <p>[10-16-15]</p>								

**BRIDGE 90700 CSAH 7 OVER N FK CROW RIVER**

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	09/01/2016	2 EA	2	0	0	0
		Migrated Values		2 EA	2	0	0	0
Notes: [10-16-15] Slopes have some settlement and in place rip rap is not evenly covering slopes. No serious erosion or loss of material.								
893	Guardrail	Underwater	09/01/2016	4 EA	4	0	0	0
		Migrated Values		4 EA	4	0	0	0
Notes: [8-29-2014] [10-16-15]								
894	Deck & Approach Drainage	Underwater	09/01/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: [10-16-15]								
900	Protected Species	Underwater	09/01/2016	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: All timber elements have cracks and splits. The most severe cracking located on pier columns. Photos & drawings of cracking in timber located in bridge file. Inspector: Hans A. Engstrom BSI#1101 PONTIS inspection comments - PONTIS inspection comments - Inspector William S. Augustin certification BSI 1011 \*1996

Insp. Mike McCann BSI#96130 and Nick Carlson.

Insp. Mike McCann BSI#96130 and Nick Carlson. (11-8-2010)

58. Deck NBI: [8-29-2014]  
[10-16-15] Bituminous surface has several areas of patching. Surface has several longitudinal and transverse cracks with areas of map cracking.

36A. Brdg Railings NBI: [8-29-2014]  
[10-16-15] Timber railings with steel plate cover.

36B. Transitions NBI: [8-29-2014]  
[10-16-15] Substandard rail anchorage, no double nesting.

36C. Appr Guardrail NBI: [8-29-2014]  
[10-16-15]

36D. Appr Guardrail Terminal NBI: [8-29-2014]  
[10-16-15] NW corner has radius into park entrance. No approved terminal.

59. Superstructure NBI: [8-29-2014]  
[10-16-15] Several beams with longitudinal cracking along center of beam side. No crushing or noted decay.

60. Substructure NBI: [8-29-2014]  
[10-16-15] moderate decay off timber pile at waterline.

61. Channel NBI: [8-29-2014]  
[10-16-15]

62. Culvert NBI: [8-29-2014]  
[10-16-15]

71. Waterway Adeq NBI: [8-29-2014]  
[10-16-15] Bridge at bottom of sag vertical curve over crow river. Detour on file for flooding or scour event.

72. Appr Roadway Alignment NBI: [8-29-2014]  
[10-16-15]

Inventory Notes:

Inspector's Signature

Reviewer's Signature

# Pictures



Photo 1 - West Elevation, Looking Southeast



Photo 2 - East Elevation, Looking Northwest

## Pictures



Photo 3 - View of Pier 1, Looking North



Photo 4 - View of Pier 2, Looking Southwest

## Pictures



Photo 5 - View of South Shoreline, Looking West



Photo 6 - View of North Shoreline and North Abutment, Looking Northwest

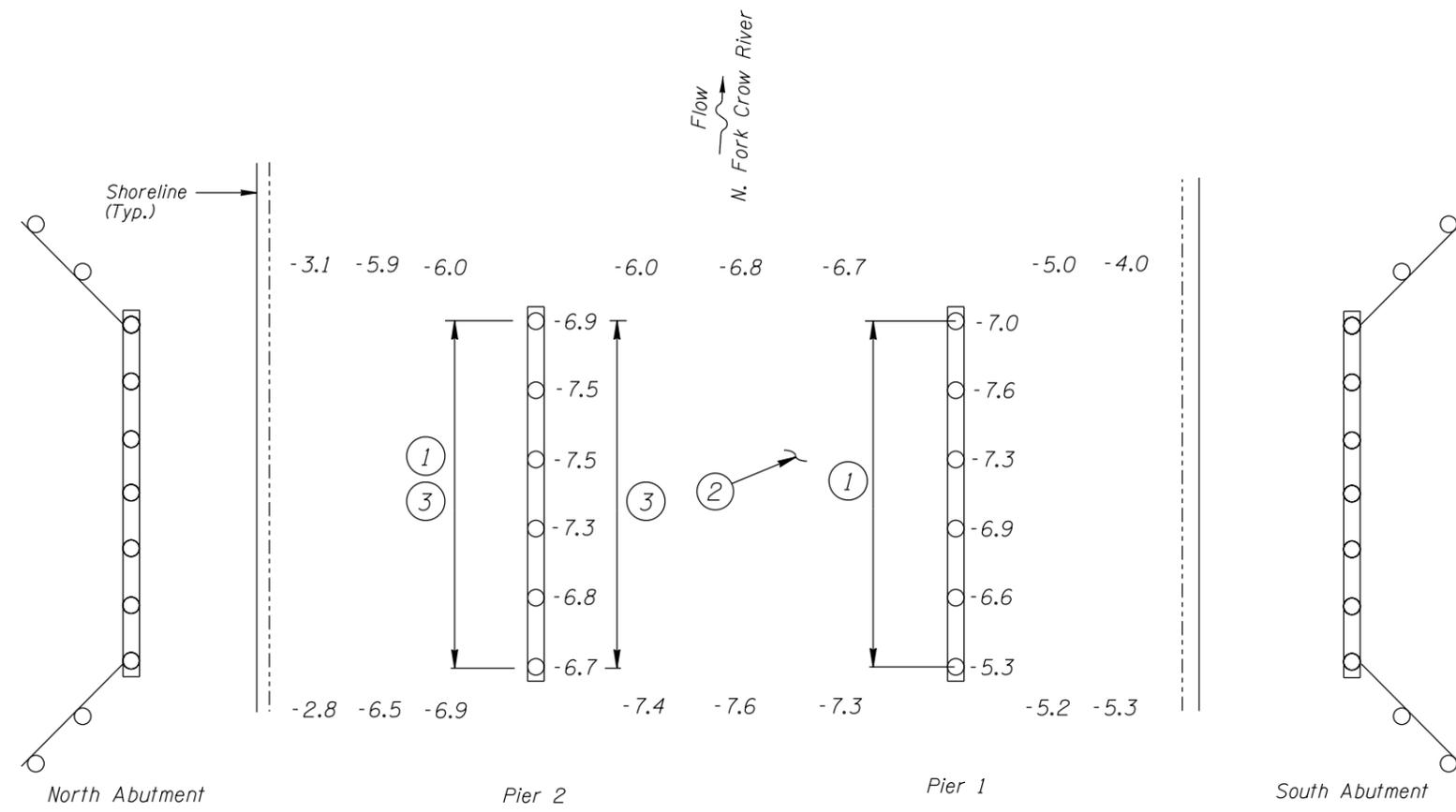
# Pictures



Photo 7 - Downstream Channel, Looking East

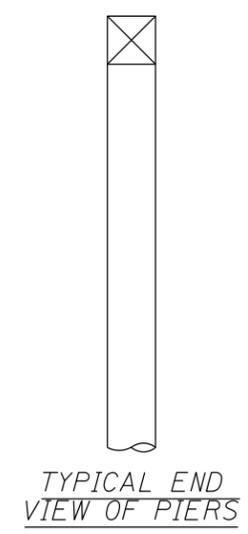
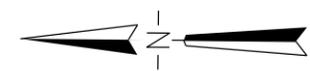


Photo 8 - Upstream Channel, Looking West



- Inspection Notes:
- ① 1 foot deep scour is typical around each pile.
  - ② The channel bottom consists of sand with up to 6 inches of penetration.
  - ③ Up to 6 inch diameter timber debris on both sides of Pier 2, extending from channel bottom to 3 feet below water line.

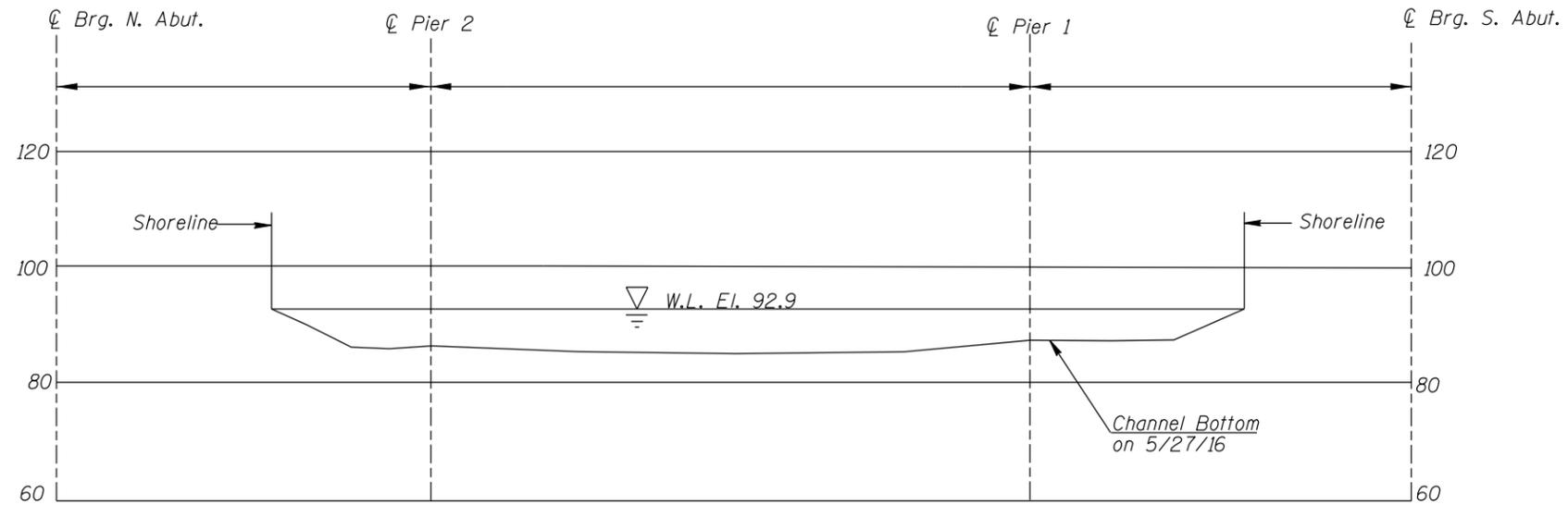
SOUNDING PLAN



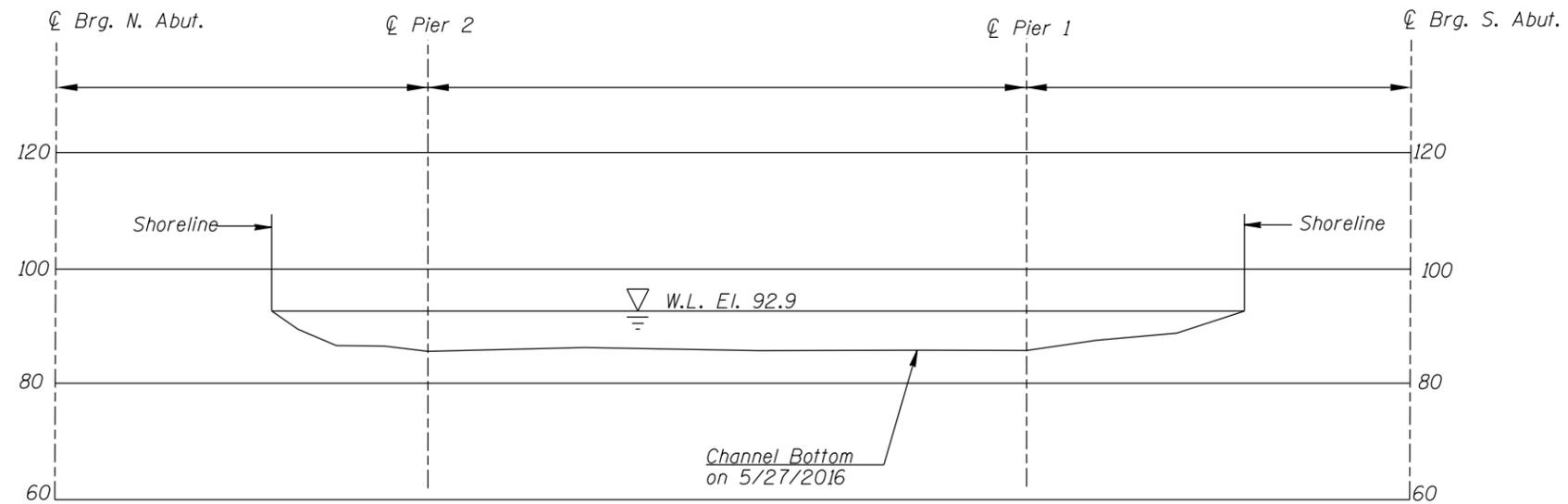
- GENERAL NOTES:
1. Timber Piers 1 and 2 were inspected underwater.
  2. At the time of inspection on May 27, 2016, the waterline was located approximately 7.1 feet below the top of the pier cap at pier 1. This corresponds to a waterline elevation of 92.9 feet, based on an assumed elevation of 100 feet at the top of the pier cap on Pier 1.
  3. Soundings were taken at 1/4 points of each span and at the piles.
  4. Soundings indicate water depth at the time of inspection and are measured in feet.
  5. First underwater inspection performed in 2016. No previous sounding information available.

- Legend
- 2.0 Sounding Depth (5/27/16)
  - Timber Pile

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 90700 OVER THE NORTH FORK CROW RIVER DISTRICT 3, WRIGHT COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: LBH	<b>COLLINS ENGINEERS</b>	Date: May 2016
Checked By: BRL	<small>1599 Selby Avenue Suite 206 St. Paul, MN 55104 (651) 646-8502 www.collinsengr.com</small>	Scale: NTS
Project: 63-9687		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:  
Refer to Figure 1 for General Notes.

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 90700 OVER THE NORTH FORK CROW RIVER DISTRICT 3, WRIGHT COUNTY UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: LBH	<b>COLLINS ENGINEERS</b> <small>1599 Selby Avenue Suite 206 St. Paul, MN 55104 (651) 646-8502 www.collinsengr.com</small>	Date: May 2016
Checked By: BRL		Scale: 1"=30'
Project: 63-9687		Figure No.: 2