

2016 UNDERWATER BRIDGE INSPECTION REPORT



BRIDGE # 5853 CSAH 52 over S BR BUFFALO RIVER

DISTRICT: District 4

COUNTY: Clay

CITY/TOWNSHIP: ELMWOOD

STATE: Minnesota

Date of Inspection: 10/18/2016

Equipment Used:

Owner: County Highway Agency

Inspected By: Schroeder, Brian

Report Written By: Brian Schroeder

Report Reviewed By:

Final Report Date:



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UNDERWATER INSPECTION

REPORT SUMMARY

The substructure units inspected at Bridge No. 5853, Piers 1 and 2 and the North and South Abutments, were in good condition below water with no defects of structural significance observed. The channel bottom appeared to be in stable condition with no evidence of significant scour or appreciable changes since the previous inspection.

INSPECTION FINDINGS

A) The concrete piers and abutments were in good condition. Both abutments displayed minor vertical and diagonal cracks at random locations, ranging in width from hairline to 1/8 inch.

(B) Abandoned concrete columns (two total) were observed in the channel 8 feet north of the South Abutment. The columns were removed below the channel bottom; however, the rebar from the columns extended from the bottom up to 1 foot above the waterline.

RECOMMENDATIONS

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

Contractor: Ayres Associates & Collins Engineers, Inc.

Contractor Job Number: 9687

UNDERWATER INSPECTION

1. BRIDGE DATA

Bridge #: 5853
Feature Intersected: S BR BUFFALO RIVER
Facility Carried: CSAH 52
District: District 4
County: 014 - Clay

Bridge Description:

The superstructure consists of three spans of multiple steel beams supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete piers and two reinforced concrete abutments. The piers are numbered 1 and 2 starting from the south end of the bridge. No design plans were available.

2. INSPECTION DATA

Professional Engineer/Team Leader: Brian K. Schroeder, P.E.
Inspection Diver: Brian K. Schroeder, P.E.
Date of Underwater Inspection: 10/18/2016
Weather Conditions: Sunny, 46°F
Underwater Visibility (feet): 0.5
Waterway Velocity (ft/sec): Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) Inspected: Piers 1 and 2, North and South Abutments

General Shape:

The piers consist of two circular concrete shafts supporting a common out pier cap. The abutments consist of concrete vertical walls with adjacent skewed wingwalls. Piers and abutments are founded on pile supported footings.

Maximum Water Depth at Substructure(s) Inspected (feet): 5.2

4. WATERLINE DATUM

Water Level Reference: The top of the cap on the West end of Pier 2
Waterline Elevation (feet): 89.7
Description: The waterline was approximately 10.3 feet below 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 10/2016

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
205	Reinforced Concrete Column	4	EA	4			
215	Reinforced Concrete Abutment	66	LF	60	6		
885	Scour	1	EA	1			

UNDERWATER INSPECTION

INSPECTION PROCEDURES

The routine underwater inspection of Bridge 5853 (CSAH No. 52 over the South Branch of the Buffalo River) was completed on October, 18, 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 two reinforced concrete abutments and two reinforced concrete piers. According to the bridge inventory or design drawings, the abutments and piers were founded on pile supported footings. 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 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

02/02/2017

BRIDGE 5853 CSAH 52 OVER S BR BUFFALO RIVER

County: Clay Location: 1.0 MI SE OF SABIN Length: 100.9 ft.
 City: Route: 04 - CSAH 52 Ref. Pt.: 014+00.970 Deck Width: 33.7 ft.
 Township: 14006 - ELMWOOD Control Section: Rdwy. Area/ Pct. Unsnd: 3025 sq. ft. / %
 Section: 17 Township: 138N Range: 47W Maint. Area: Paint Area/ Pct. Unsnd: 600 sq. ft. / 50%
 Span Type: 3 - Steel 2 - Stringer/Multi-beam or Local Agency Bridge Nbr.: 52-2 Culvert: N/A
 List: Girder Postings: 32 40 40
 NBI Deck: 8 Super: 6 Sub: 7 Chan: 7 Culv: N
 Open, Posted, Closed: P - Posted for Load
 MN Scour Code: I - LOW RISK

Appraisal Ratings - Approach: 8 Waterway: 7 Unofficial Structurally Deficient N
 Required Bridge Signs - Load Posting: 2 - Vehicle & Semi (Type Traffic: 0 - Not Required Unofficial Functionally Obsolete N
 R12-5)
 Horizontal: 0 - Not Required Vertical: N - Not Applicable Unofficial Sufficiency Rating 74.0

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
12	Reinforced Concrete Deck	Underwater	10/18/2016	3400 SF	3400	0	0	0
		Migrated Values		3400 SF	3400	0	0	0
	Notes: Underside of the deck has some areas of discoloration and minor conc. decay. No spalls however. (12)No change (14)No change (15)							
510	Wearing Surfaces	Underwater	10/18/2016	3025 SF	3025	0	0	0
		Migrated Values		3025 SF	3025	0	0	0
	Notes: Low Slump Overlay with Uncoated Rebar Notes: Bridge was rehabed under SP 14-652-09 in 2010. Milled off old asphalt, did Type 2 & 3 repairs to the concrete deck and did a low slump overlay. Looks Nice. (10) PCI did the bridge rehab portion. Raised the deck to a 8 to reflect the new overlay and slab repairs. Few small hairline cracks in wearing surface this yr. (12)No changes. (14)No change (15)							
107	Steel Open Girder/Beam	Underwater	10/18/2016	1716 LF	1287	429	0	0
		Migrated Values		1716 LF	1287	429	0	0
	Notes: ENDS OF SOME BEAMS GETTING PRETTY RUSTY ESPECIALLY ON THE BOTTOM WHERE THEY REST ON THE PIERS. SOME MINOR SECTION LOSS.(92)(93)(94)(95)(97)(99)(01)(02)LOWERED CONDITION STATE ON SOME OF THE BEAMS. (04)(06) Lowered beam ends to condition state 3. (08)Not any worse. (10)(12)No visible changes this yr. (14)No changes that can be seen. (15)							
515	Steel Protective Coating	Underwater	10/18/2016	600 SF	450	0	144	6
		Migrated Values		600 SF	450	0	144	6
	Notes: [2016] Migrator used inventory quantity of 600 SF and estimated the condition states.							
205	Reinforced Concrete Column	Underwater	10/18/2016	4 EA	4	0	0	0
		Migrated Values		4 EA	4	0	0	0
	Notes: Columns have a few minor cracks. (12)No changes. (14)No change (15)							
215	Reinforced Concrete Abutment	Underwater	10/18/2016	106 LF	100	6	0	0
		Migrated Values		106 LF	106	0	0	0
	Notes: [2016] Migrator added 40 LF to abutment quantity to account for wingwalls (CS1:40 CS2:0 CS3:0 CS4:0). During the bridge rehab it was discovered that the abutment diaphragms were completely crumbling so in order to dowel in bars for the approach slabs new diaphragms would have to be done. Removed the old ones and PCI replaced diaphragm concrete in between the beams on the ends of the bridge. Also poured new paving lips at that time. (10)SEVERAL SMALL CRACKS IN THE ABUTMENTS. (92)(93)(94)(95)(97)(99)(01)(02)(04)(06)(08)Nothing Major (10)(12)No changes. (14)No change (15) [2016] UW Inspection: 6 LF moved to condition state 2 based on minor vertical and diagonal cracks at random locations, ranging from hairline to 1/8 inch. Wingwall notes: Wing conc. in good shape with some minor cracks. (12)(14)No change (15)							
234	Reinforced Concrete Pier Cap	Underwater	10/18/2016	66 LF	66	0	0	0
		Migrated Values		66 LF	66	0	0	0
	Notes: SOUTH PIER HAS SEVERAL SMALL CRACKS IN THE TOP OF EACH END.(92)(93)(94)(95)(97)(99)(01)(02)(04)(06)(08)(10)(12) No changes. (14)No change (15)							

BRIDGE 5853 CSAH 52 OVER S BR BUFFALO RIVER

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
321	Reinforced Concrete Approach Slab	Underwater	10/18/2016	1440 SF	1440	0	0	0
		Migrated Values		1440 SF	1440	0	0	0
	Notes: [2016] Migrator assumed an approach slab length of 20FT and used the inventory quantity of 36FT for the width. Removed the old asphalt overlaid approach slabs and put in new approach slabs all concrete. (10)South slab in perfect condition. North slab has parallel crack just on East side of centline joint. (12)No change in width or deterioration. (14)Some slight settlement of the North approach panel. No other changes (15)							
331	Reinforced Concrete Bridge Railing	Underwater	10/18/2016	200 LF	200	0	0	0
		Migrated Values		200 LF	200	0	0	0
	Notes: Old railings were taken off and the existing curbs left in place. Then doweled bars into the curbs and poured a new railing on top of the curb. Looks good. (10) Will check to see if the element code should be changed. Some hairline cracks in railings. (12)No changes. (14)No change (15)							
800	Critical Deficiencies or Safety Hazards	Underwater	10/18/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: NO CRITICAL FINDINGS OBSERVED DURING THE LAST INSPECTION.							
881	Steel Section Loss	Underwater	10/18/2016	1 EA	0	1	0	0
		Migrated Values		1 EA	0	1	0	0
	Notes: SOME MINOR SECTION LOSS AT THE ENDS OF THE BEAMS WHERE THEY REST ON THE PIER CAP. NO PROBLEM YET. (95)(97)(99)(01)(02)(04)(06)(08)(10)(12)No visible changes. (14)No change (15)							
883	Concrete Shear Cracking	Underwater	10/18/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: Use this element to monitor the presence of shear cracking on concrete elements. Pay particular attention to the concrete pier caps.							
885	Scour	Underwater	10/18/2016	1 EA	1	0	0	0
890	Load Posting or Vertical Clearance Signing	Underwater	10/18/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: [2016] Structure requires a vertical clearance sign or load posting sign.							
891	Other Bridge Signing	Underwater	10/18/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: Signing all up and in new condition. (12)(14)No change (15)							
892	Slopes & Slope Protection	Underwater	10/18/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: No slopes under the bridge. Water sits up against. conc. abutments. Slopes off road ok. (12)Water from abutment to abutment this yr. (14)Water lower this year. No changes (15)							
893	Guardrail	Underwater	10/18/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: New condition. (12)Guardrails look good. (14)No change (15)							
894	Deck & Approach Drainage	Underwater	10/18/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: No issues. Deck clean and draining. (12)(14)No change (15)							
899	Miscellaneous Items	Underwater	10/18/2016	1 EA	0	0	0	1
		Migrated Values		1 EA	0	0	0	1
	Notes: New conduit on outside of East railing. Looks good. (12)No changes. (14)No change (15)							

BRIDGE 5853 CSAH 52 OVER S BR BUFFALO RIVER

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
900	Protected Species	Underwater	10/18/2016	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: BUILT IN 1939

Bridge was rehabed in 2010. Now has Conc. approach panels. (12)

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:

72. Appr Roadway
Alignment NBI:

Inspector's Signature

Reviewer's Signature

Pictures



Photo 1 - West Profile



Photo 2 - East Profile

Pictures



Photo 3 - North Abutment



Photo 4 - South Abutment

Pictures



Photo 5 - Pier 1 North Face

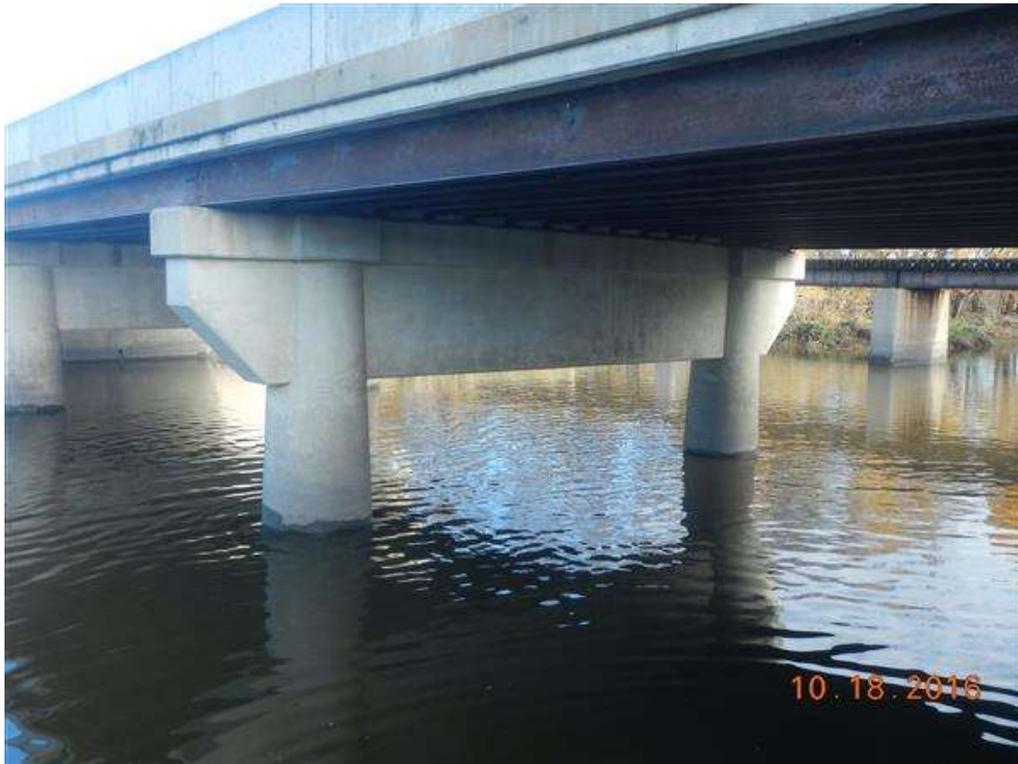


Photo 6 - Pier 1 South Face

Pictures



Photo 7 - Pier 2 North Face

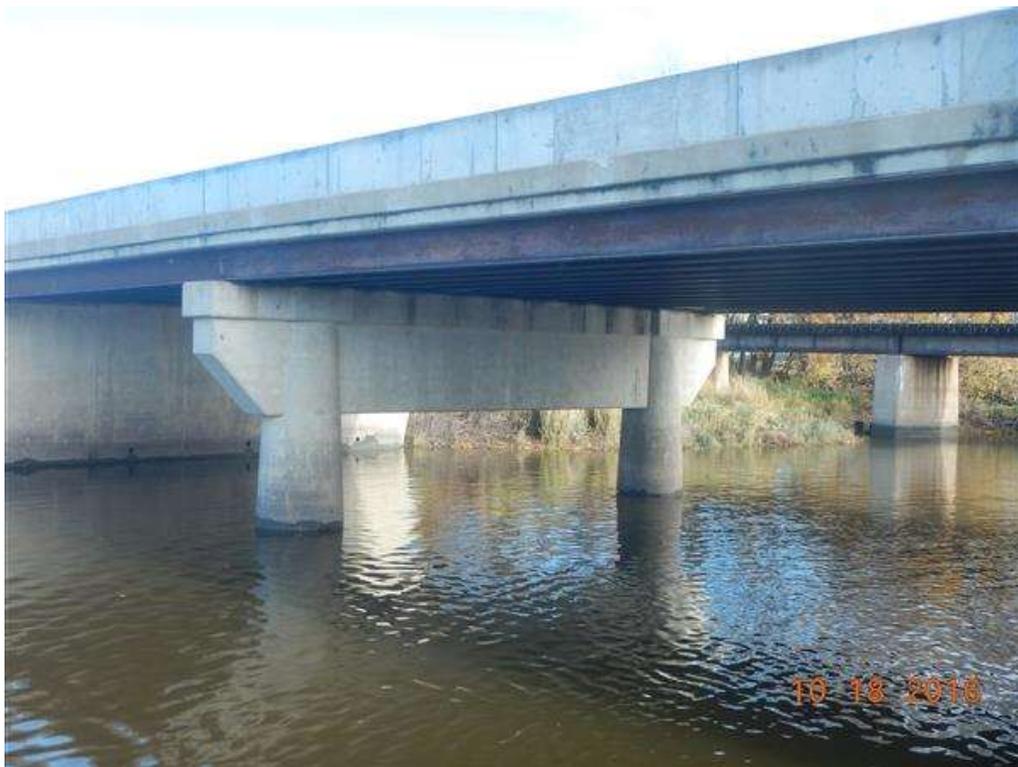


Photo 8 - Pier 2 South Face

Pictures



Photo 9 - Condition at Waterline

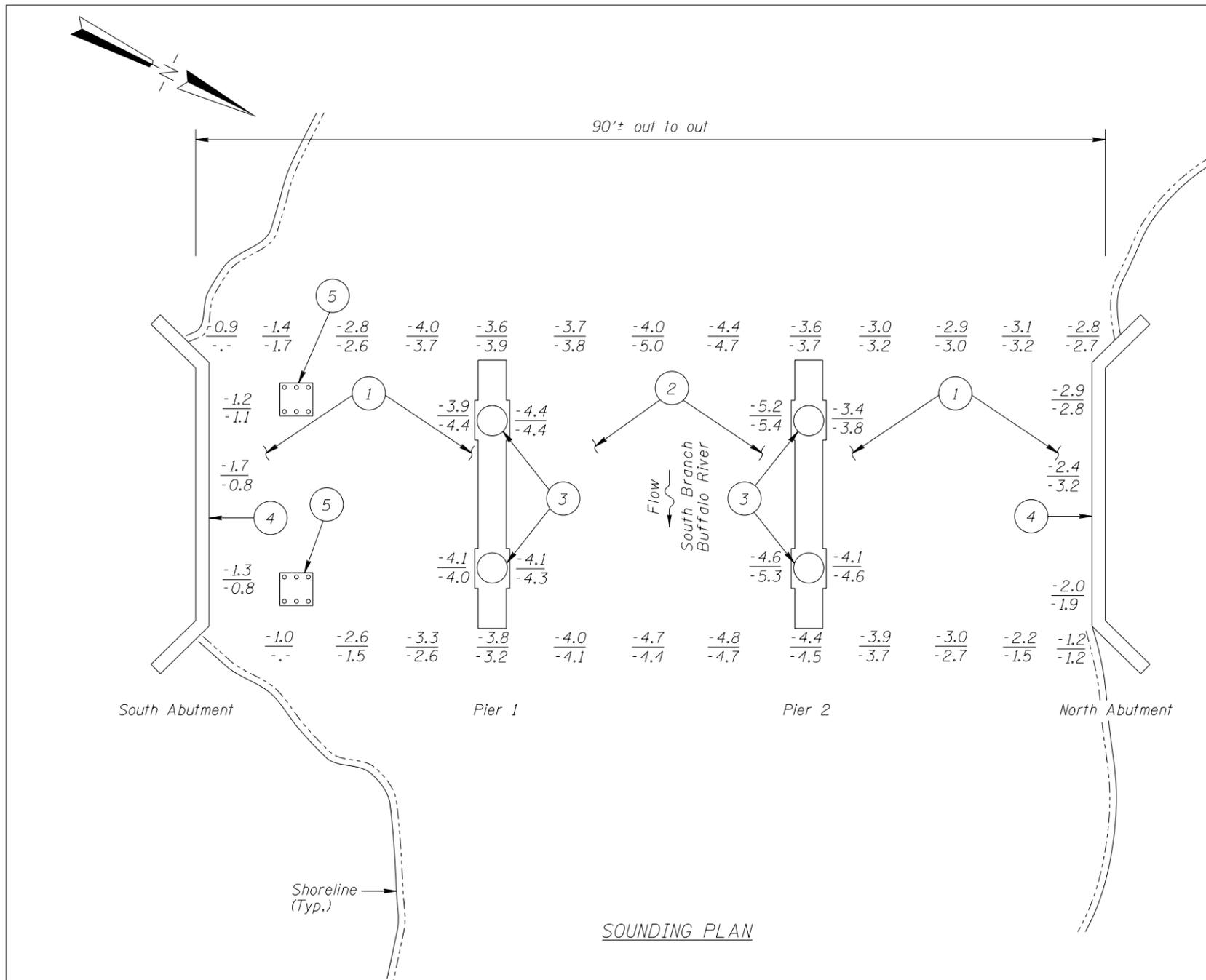


Photo 10 - Upstream Channel

Pictures



Photo 11 - Downstream Channel



GENERAL NOTES:

1. The North and South Abutments, and Piers 1 and 2 were inspected underwater.
2. At the time of inspection on October 18, 2016, the waterline was located approximately 10.3 feet below the top of the pier cap at the upstream end of Pier 2. Since insufficient bridge elevation information was available a reference elevation of 100.0 was assumed. Based on the assumed the reference the waterline elevation was 89.7.
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 point intervals between the substructure units.

INSPECTION NOTES:

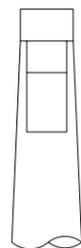
- ① The channel bottom between abutments and piers consisted of silt and random riprap up to 12 inches in diameter, with a maximum probe rod penetration of up to 2 feet.
- ② The channel bottom in between the piers consisted of silty clay and riprap, up to 12 inches in diameter, with a maximum probe rod penetration of 2 inches.
- ③ The concrete columns of Piers 1 and 2 were smooth and sound with random minor areas of poor consolidation with 1/4 inch maximum penetration.
- ④ The concrete of the abutments was typically smooth and sound with minor vertical and diagonal cracks at random locations, ranging in width from hairline to 1/8 inch.
- ⑤ Abandoned concrete columns (two total) were observed in the channel at 8 feet North of South Abutment. The columns were removed below the channel bottom; however, the rebar from the columns extended from the bottom up to 1 foot above the waterline.

Legend

- 2.0 Sounding Depth (10/18/16)
- 5.2 Sounding Depth (9/22/12)
- . Sounding Depth Not Previously Taken

Note:

All soundings based on 2016 waterline location.

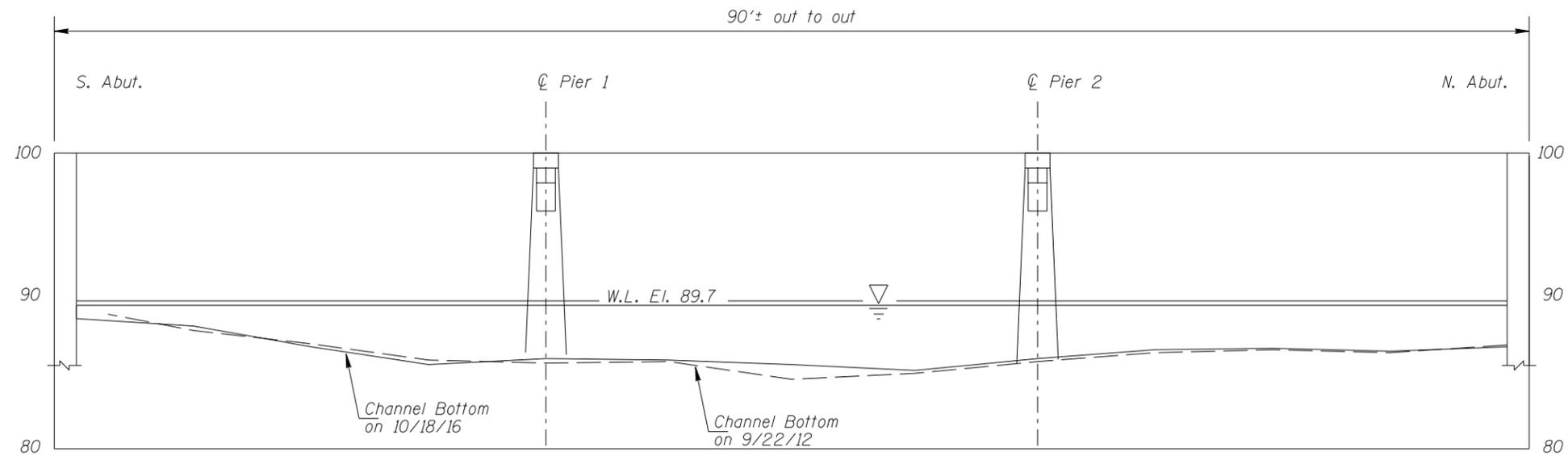


TYPICAL END VIEW OF PIERS

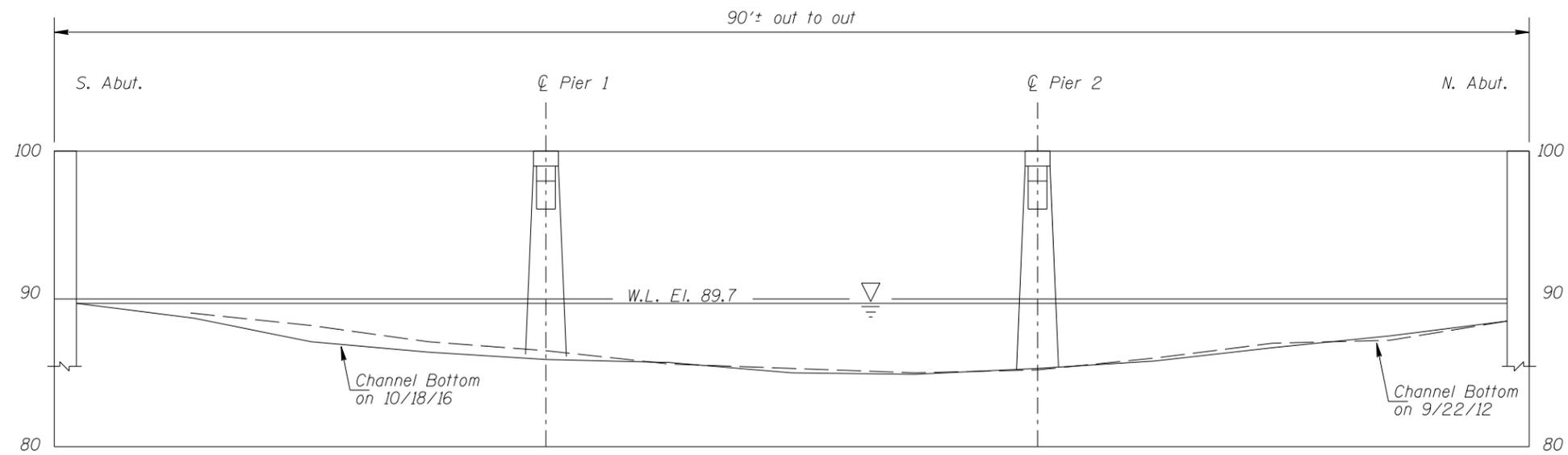
MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION	
STRUCTURE NO. 5853 OVER THE SOUTH BRANCH OF THE BUFFALO RIVER DISTRICT 4, CLAY COUNTY	
INSPECTION AND SOUNDING PLAN	
Drawn By: JJM	Date: OCT. 2016
Checked By: BKS	Scale: NTS
Project: 63-9687	Figure No.: 1

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UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION	
STRUCTURE NO. 5853 OVER THE SOUTH BRANCH OF THE BUFFALO RIVER DISTRICT 4, CLAY COUNTY	
UPSTREAM AND DOWNSTREAM FASCIA PROFILES	
Drawn By: JJM	Date: OCT. 2016
Checked By: BKS	Scale: 1"=10'
Project: 63-9687	Figure No.: 2

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