

UNDERWATER BRIDGE INSPECTION REPORT

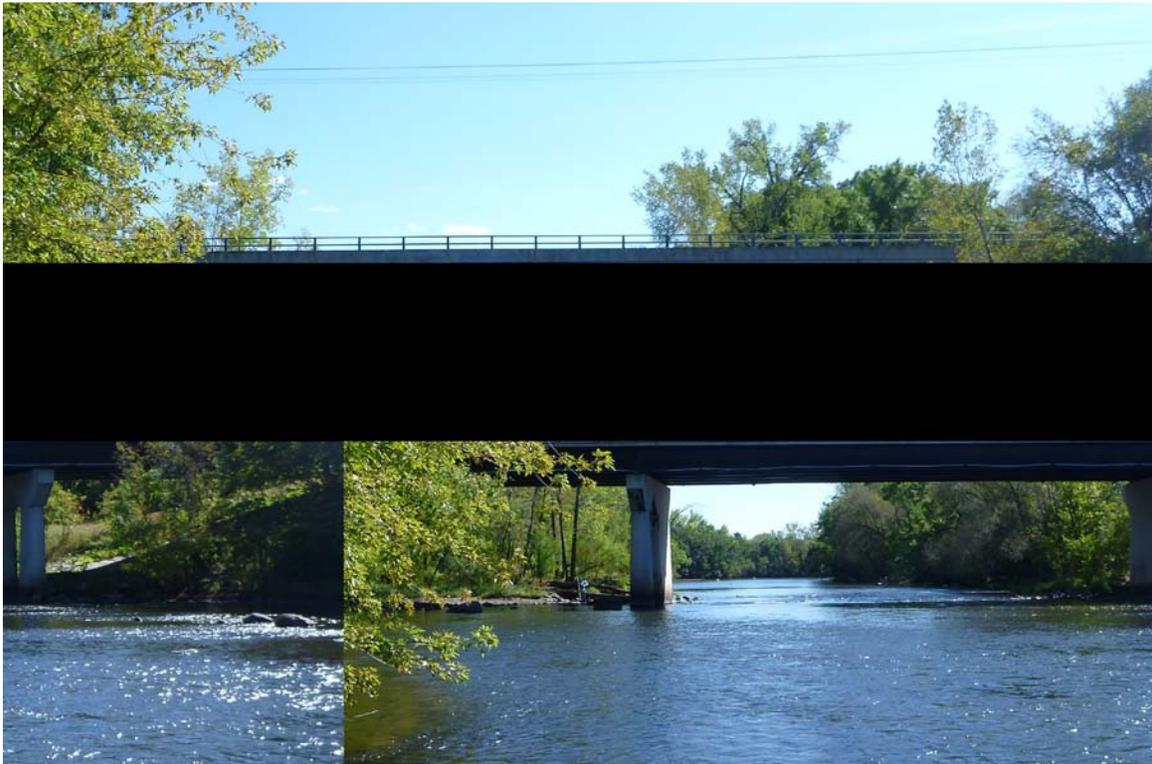
STRUCTURE NO. 02501

CSAH NO. 24

OVER THE

RUM RIVER

METRO DISTRICT - ANOKA COUNTY



SEPTEMBER 9, 2012

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

AND

WSB & ASSOCIATES, INC.

JOB NO. 2107

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 2501, Piers 1 and 2, were found to be in satisfactory condition with no defects of structural significance observed. At Pier 1, there was up to 1 foot of vertical footing exposure, with numerous cracks and voids observed on top of the downstream portion of the exposed footing. Moderate (Pier 2) to heavy (Pier 1) scaling was observed near the waterline at both piers. Partially exposed reinforcing steel was observed on the downstream end of the exposed Pier 1 footing. The channel bottom appeared to be stable with no evidence of significant scour or appreciable changes since the previous inspection.

INSPECTION FINDINGS:

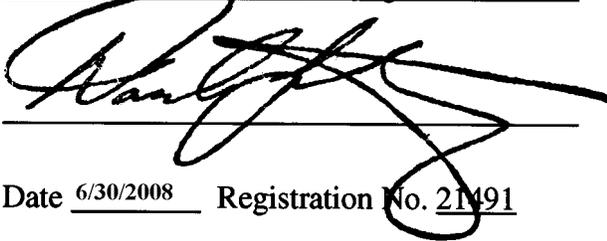
- (A) The top of footing and up to 1 foot of vertical face was exposed along the east side of Pier 1.
- (B) Moderate scaling was observed around the entire perimeter of the downstream shaft of Pier 2 from the channel bottom to 2 feet above the waterline with a maximum penetration of 2 inches. The heaviest scaling was along the west face and the upstream nose.
- (C) Heavy scaling, section loss and cracking were observed on the top of the downstream portion of the exposed footing of Pier 1 with penetrations of up to 8 inches. Numerous 1/16 inch to 1/2 inch wide cracks and areas of section loss were observed on the top of the footing between the pier shaft and the edge of the footing. Partially exposed reinforcing steel was present near the downstream end of the exposed Pier 1 footing.
- (D) The grouted riprap was deteriorated/missing from the west side of the upstream Pier 1 shaft to the slope protection mat for the western embankment.

RECOMMENDATIONS:

- (A) Monitor the concrete deterioration of the footing at Pier 1. If found to be progressing in the future, consideration could be given to repair by removing the unsound concrete and reforming with a concrete mix designed to promote high durability and low permeability.
- (B) Monitor the extent of the footing exposure at Pier 1.
- (C) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

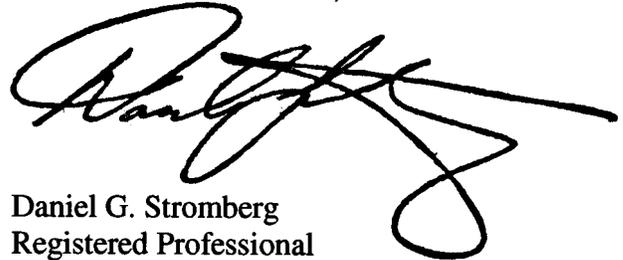
Daniel G. Stromberg



Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

WSB and Associates



Barritt Lovelace
Registered Professional Engineer
Bridge Safety Inspection Team Leader

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 2501

Feature Crossed: Rum River

Feature Carried: CSAH No. 24

Location: Metro District - Anoka County

Bridge Description: The superstructure consists of four spans of multiple steel beams supporting a reinforced concrete deck. The superstructure is supported by two concrete abutments and three concrete piers founded on piles. The piers are numbered 1 through 3 starting from the west end of the bridge.

2. INSPECTION DATA

Professional Engineer/Team Leader: Barritt Lovelace, P.E.

Dive Team: Brad Robinson (WSB), Lukas Janulis (Collins)

Date: September 9, 2012

Weather Conditions: Sunny, 70°F

Underwater Visibility: 3.0 feet

Waterway Velocity: 4.0 ft/s

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2.

General Shape: The piers each consist of two oblong rectangular shafts of hammerhead design with rounded noses supported by a rectangular footing founded on piles under each shaft.

Maximum Water Depth at Substructure Inspected: Approximately 1.1 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the upstream end of Pier 2.

Water Surface: The waterline was approximately 25.0 feet below reference.

Waterline Elevation = 883.7.

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 6

Item 92B: Underwater Inspection: Code A/10/12

Item 113: Scour Critical Bridges: Code N/96

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

 Yes X No

6. STRUCTURAL ELEMENT CONDITION RATING:

Item #	Element Description	Quantity	Unit	Conditions				
				1	2	3	4	5
210	Concrete Pier Wall	66	LF	44		22		
220	Reinforced Concrete Footing	2	EA	1	1			
985	Slopes and Protection	1	EA			1		



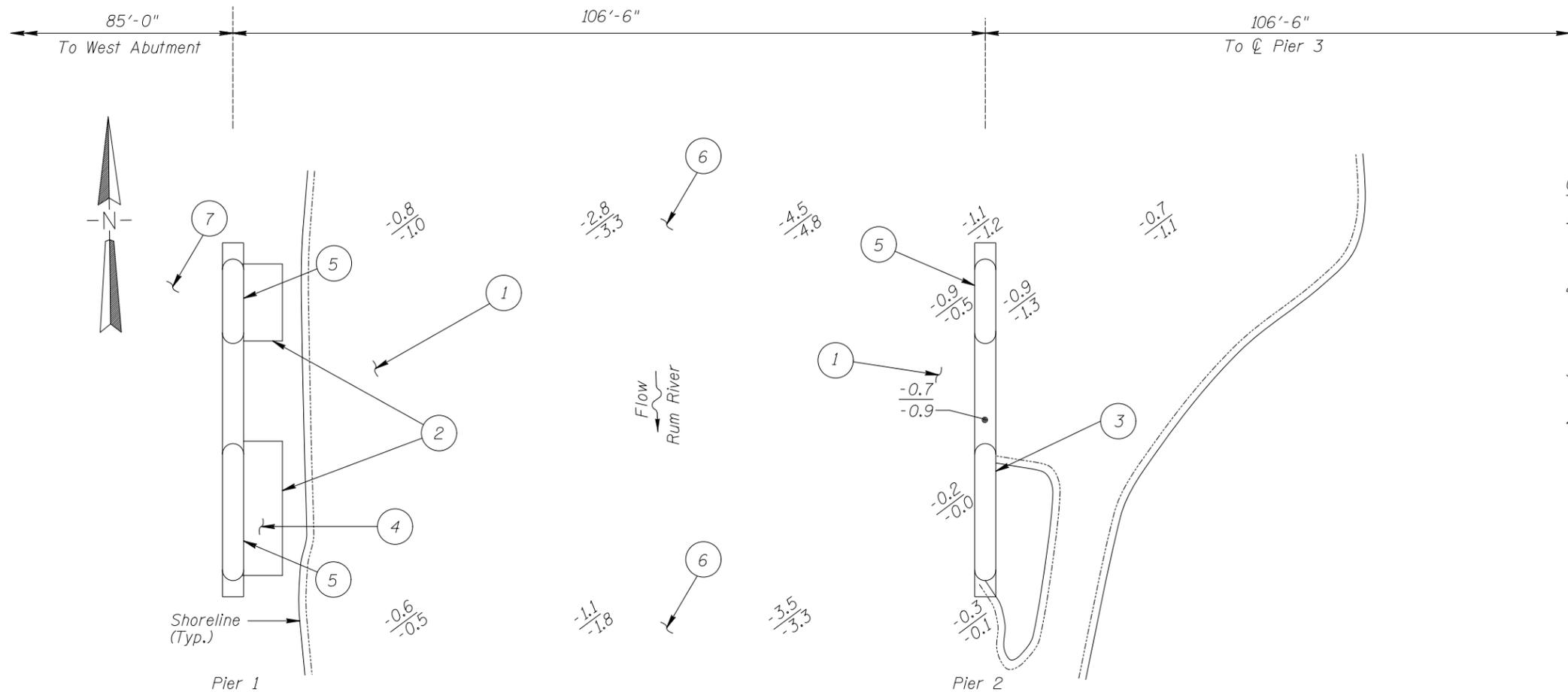
Photograph 1. View of Pier 1, Looking East.



Photograph 2. View of the Pier 2, Looking West.



Photograph 3. View of Pier 1 Showing Exposed Footings, Looking West.



GENERAL NOTES:

1. Pier 2 was inspected below water. In addition, Pier 1 (location out of the waterway at the time of inspection) was inspected up to the high water line.
2. At the time of inspection on September 9, 2012, the waterline was located approximately 25.0 feet below the top of the pier cap at the upstream end of Pier 2. This corresponds to a waterline elevation of 883.7 based on the previous report dated October 16, 2007.
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.

SOUNDING PLAN

INSPECTION NOTES:

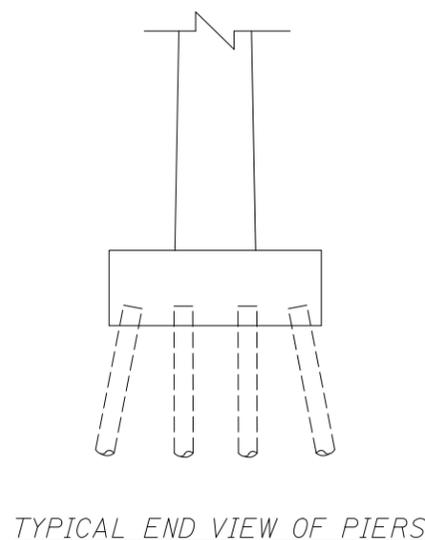
1. The channel bottom material consisted of 2-foot-diameter and smaller riprap.
2. The footing was exposed along the east side of Pier 1 with up to 1 foot of the vertical face exposed.
3. Moderate scaling was observed around the entire perimeter of the downstream shaft of Pier 2 from the channel bottom to 2 feet above the waterline with a maximum penetration of 2 inches. The heaviest scaling was along the west face and the upstream nose.
4. Heavy scaling and cracking was observed on the top of the footing from the shaft to the footing edge with a maximum penetration of 8 inches. Numerous 1/16 inch to 1/2 inch wide cracks and areas of section loss were also observed on the top of footing from the pier shaft to the edge of the footing with the cracks extending into the channel bottom along the vertical face of the footing. Partially exposed reinforcing steel was present at the downstream end of the exposed footing.
5. The concrete shaft was in smooth and sound condition with no noted deficiencies.
6. The waterline elevation was approximately 6 inches lower along the downstream fascia compared to the upstream fascia.
7. The grouted riprap was deteriorated with missing riprap extending from the west side of the upstream shaft of Pier 1 to the slope protection mat along the western embankment.

Legend

- 2.0 Sounding Depth (9/9/12)
- 0.5 Sounding Depth (10/16/07)

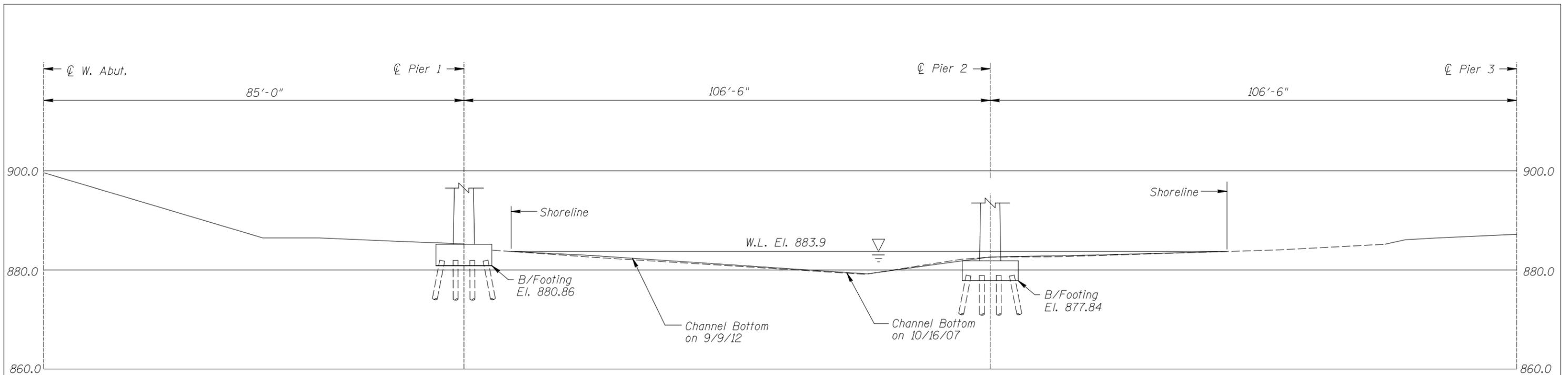
Note:

All soundings based on 2012 waterline location.

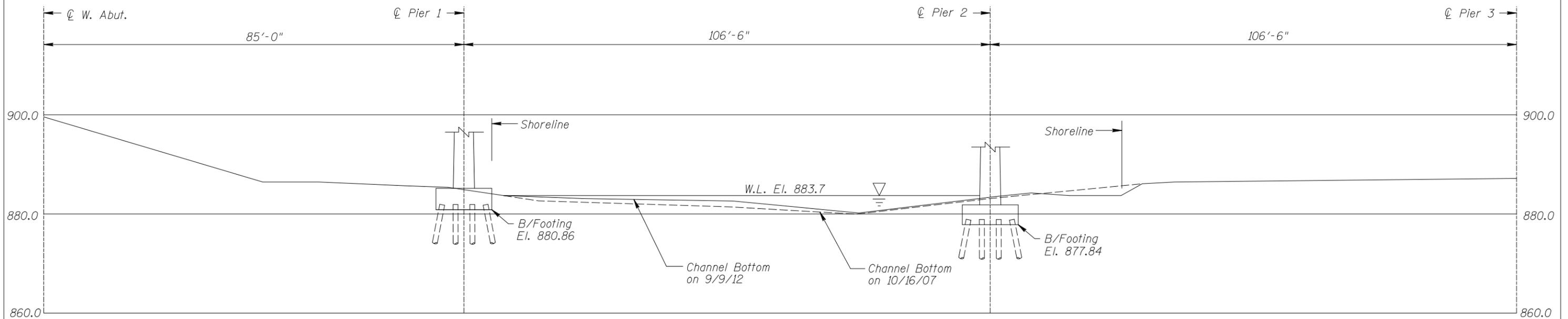


MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 02501 OVER THE RUM RIVER DISTRICT 5, ANOKA COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: BJR	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: SEP. 2012
Checked By: BRL		Scale: NTS
Code: 52210103		Figure No.: 1

WSB
& Associates, Inc.
701 Xenia Avenue South, Suite 300
Minneapolis, MN 55416
www.wsbeng.com
763-541-8000 • Fax: 763-541-1700
INFRASTRUCTURE • ENGINEERING • PLANNING • CONSTRUCTION



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

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MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 02501 OVER THE RUM RIVER DISTRICT 5, ANOKA COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: BJR	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: SEP. 2012
Checked By: BRL		Scale: 1"=20'
Code: 52210103		Figure No.: 2

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 02501
 INSPECTORS WSB & Associates and Collins Engineers, Inc.
 ON-SITE TEAM LEADER Barritt Lovelace, P.E.
 WATERWAY CROSSED Rum River

INSPECTION DATE September 9, 2012

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	SUBSTRUCTURE						CHANNEL					GENERAL					
			PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	Dry	N	7	5	8	N	6	6	6	6	N	6	7	N	N	6	N	N
	Pier 2	1.1'	N	6	N	8	N	6	7	6	6	N	6	7	N	N	6	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete was in satisfactory condition. The top of both column footings was exposed along the east side of Pier 1 with up to 1 foot of vertical exposure. Moderate scaling was observed around the entire perimeter of the downstream shaft of Pier 2 from the channel bottom to 2 feet above the waterline with a maximum penetration of 2 inches. Heavy scaling, section loss and cracking were observed along the top of the downstream portion of the exposed footing of Pier 1 with penetrations of up to 8 inches. The upstream shaft of Pier 2 was smooth and sound with no deficiencies. The grouted riprap was deteriorated/missing from the west side of the upstream pier shaft to the slope protection mat for the west embankment.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO. USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.