

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 18505

MSAS NO. 126

OVER THE

MISSISSIPPI RIVER

DISTRICT 3 – CROW WING COUNTY, CITY OF BRAINERD



PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 5221 (CEI 67)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 18505, Piers 1 and 2, were found to be in good condition with no defects of structural significance observed. The channel bottom around the substructure units was presently stable with some timber debris accumulations. Footing exposure was observed at Pier 1, but no evidence of significant scour or appreciable changes since the previous inspection were observed.

INSPECTION FINDINGS:

- (A) Above and below water, the concrete of the pier shafts and footings (where exposed) was typically smooth and sound with random minor areas of poor consolidation with penetrations of up to $\frac{1}{4}$ inch.
- (B) Scaling was observed around the entire pier shaft at both piers, typically from the waterline up 4 feet with maximum penetrations of $\frac{1}{4}$ inch. The scaling was heaviest at the upstream nose where extended up 10 feet above waterline.
- (C) Footing exposure was observed at the upstream nose, along to the upstream quarter point on the west side, and along the entire east side of Pier 1 with up to 8 inches of vertical face exposure at the nose.
- (D) A moderate accumulation of timber debris consisting of logs and branches up to 12 inches in diameter was observed from the channel bottom up 3 feet around the upstream nose of both piers. The debris extended 10 feet to the east, 5 feet to the west, and 5 feet to the north.
- (E) The channel bottom material consisted of sand, gravel, and cobbles. Probe rod penetration was negligible.

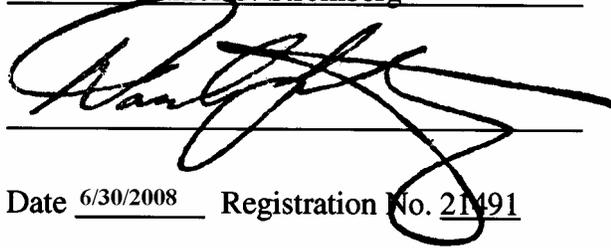
RECOMMENDATIONS:

- (A) Monitor the extent of the timber debris accumulation at both piers, and if shown to be increasing, remove during routine maintenance.

- (B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

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

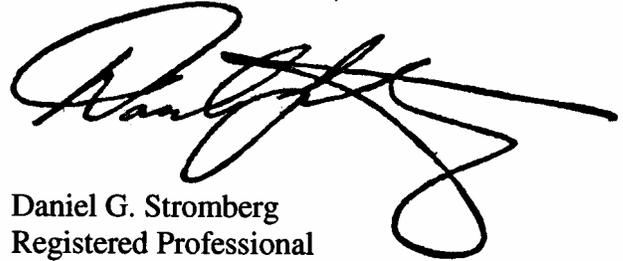


A large, stylized handwritten signature in black ink, appearing to read 'Daniel G. Stromberg', is written over a horizontal line. Below this line is another horizontal line, and below that, the text 'Date 6/30/2008 Registration No. 21491' is printed.

Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



A large, stylized handwritten signature in black ink, appearing to read 'Daniel G. Stromberg', is written over a horizontal line. Below this line is another horizontal line, and below that, the text 'Daniel G. Stromberg Registered Professional Engineer, State of Minnesota' is printed.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 18505

Feature Crossed: Mississippi River

Feature Carried: MSAS No. 126 – College Drive

Location: District 3 – Crow Wing County, City of Brainerd

Bridge Description: The bridge superstructure consists of three spans of prestressed concrete beams. The superstructure is supported by two reinforced concrete abutments and two reinforced concrete piers. The abutments and piers are founded on steel H-piles. The piers are numbered 1 and 2 starting from the west end of the bridge.

2. INSPECTION DATA

Professional Engineer Diver: Bradley A. Syler, P.E., S.E.

Dive Team: John J. Loftus, Valerie Roustan

Date: August 16, 2007

Weather Conditions: Sunny, 69° F

Underwater Visibility: 2.0 Feet

Waterway Velocity: 1.0 fps

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2

General Shape: Piers consist of oblong rectangular shafts with rounded ends, supported by rectangular footings founded on steel H-piles.

Maximum Water Depth at Substructure Inspected: Approximately 9.6 feet.

4. WATERLINE DATUM

Water Level Reference: Top of the pier cap at the south end of Pier 2.

Water Surface: The waterline was approximately 21.4 feet below the reference.
Assumed Waterline Elevation 1149.4.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 8

Item 61: Channel and Channel Protection: Code 7

Item 92B: Underwater Inspection: Code B/08/07

Item 113: Scour Critical Bridges: Code I/92

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

 Yes X No



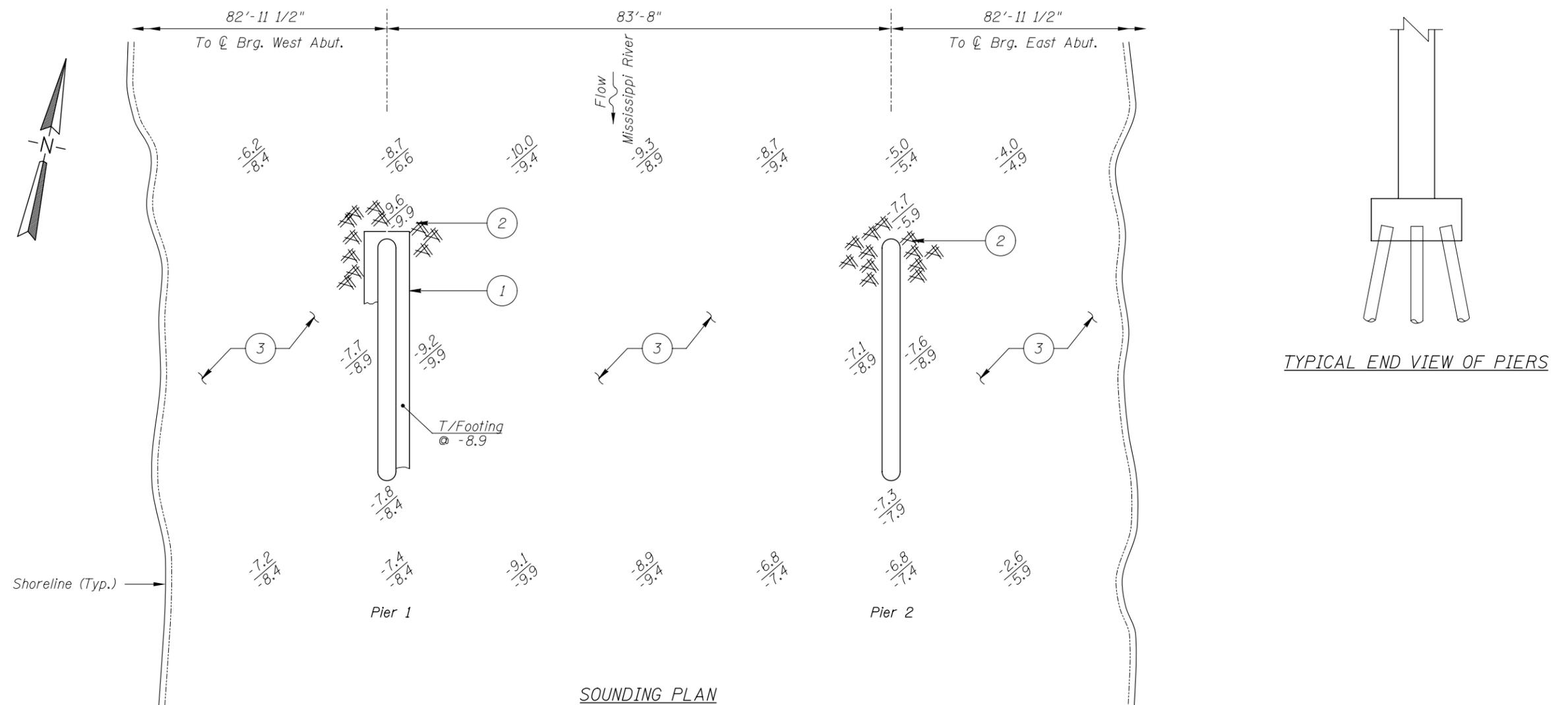
Photograph 1. Overall View of the Structure, Looking North.



Photograph 2. View of Pier 1 and West Abutment, Looking Southwest.



Photograph 3. View of Pier 2 and East Abutment, Looking Southeast.



SOUNDING PLAN

GENERAL NOTES:

1. Piers 1 and 2 were inspected at this bridge.
2. At the time of inspection on August 16, 2007, the waterline was located 21.4 feet below the top of pier cap at the downstream end of Pier 2. This corresponds to a waterline elevation of 1149.4 feet based on design drawings.
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 Footing exposure was observed at the upstream nose along to the upstream 1/4 on west side and along the entire east side of Pier 1 with up to 8 inches of vertical face exposure at the nose.
- ② A moderate accumulation of timber debris, with logs and branches up to 12 inches in diameter, was observed from the channel bottom up three feet around the upstream nose of both piers. The debris extends to the East by 10 feet, West by 5 feet, and North by 5 feet.
- ③ The channel bottom material consisted of sand and gravel with cobbles. Probe rod penetration was negligible.
- ④ Above and below the waterline the concrete at pier shafts and footings (were exposed) was typically smooth and sound with random minor areas of poor consolidation with penetration up to 1/4 inch.
- ⑤ Scaling was observed around the entire pier shafts at both piers typically from waterline up 4 feet with max penetration of 1/4 inch. The scaling was heaviest at the upstream nose where it extended up to 10 feet above the waterline.

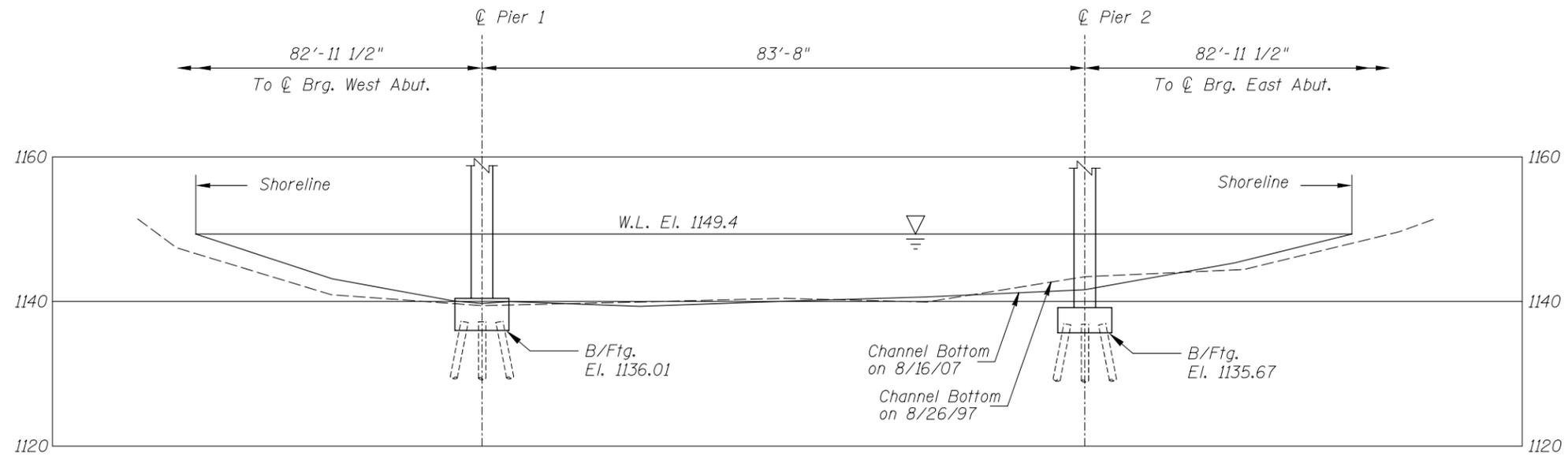
Legend

- 3.0 Sounding Depth (8/16/07)
- 3.0 Sounding Depth (8/26/97)

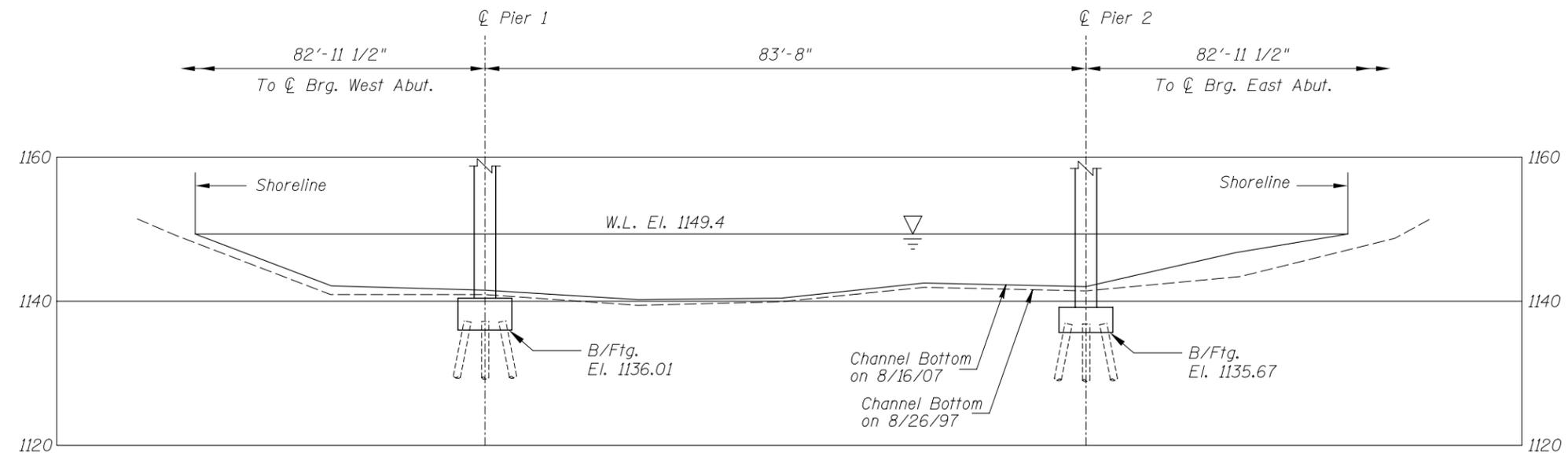
Note:

All soundings based on 2007 waterline location.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 18505 OVER THE MISSISSIPPI RIVER DISTRICT 3, CROW WING COUNTY, CITY OF BRAINERD		
INSPECTION AND SOUNDING PLAN		
Drawn By: PRH	COLLINS ENGINEERS	Date: AUG. 1997
Checked By: BAS		Scale: NTS
Code: 522118505		Figure No.: 1
<small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>		



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 18505 OVER THE MISSISSIPPI RIVER DISTRICT 3, CROW WING COUNTY, CITY OF BRAINERD		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: PRH	COLLINS ENGINEERS <small>133 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: AUG. 1997
Checked By: BAS		Scale: 1"=20'
Code: 522118505		Figure No.: 2

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: August 16, 2007

ON-SITE TEAM LEADER: Bradley A. Syler, P.E., S.E.

BRIDGE NO: 18505 WEATHER: Sunny, 69° F

WATERWAY CROSSED: Mississippi River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER _____

PERSONNEL: John J. Loftus, Valerie Roustan

EQUIPMENT: Scuba, U/W Light, Scraper, Lead Line, Sounding Pole, Probe Rod,
Camera, Fathometer.

TIME IN WATER: 4:50 P.M.

TIME OUT OF WATER: 5:20 P.M.

WATERWAY DATA: VELOCITY 1.0 fps

VISIBILITY 2.0 feet

DEPTH 9.6 feet maximum at Pier 1

ELEMENTS INSPECTED: Piers 1 and 2

EMARKS: Overall, above and below the water, the concrete at pier shafts and footings (where exposed) was typically smooth and sound with random minor areas of poor consolidation with penetrations up to ¼ inch. Scaling was observed around the entire pier shafts at both piers, typically from the waterline up 4 feet with maximum penetrations of ¼ inch. The scaling was heaviest at the upstream nose where extended up 10 feet above waterline. Footing exposure was observed at the upstream nose, along to the upstream quarter point on west side, and along the entire east side of Pier 1 with up to 8 inches of vertical face exposure at the nose. A moderate accumulation of timber debris consisting of logs and branches up to 12 inches in diameter was observed from the channel bottom up three feet around the upstream nose of both piers. The debris extended 10 feet to the east, 5 feet to the west, and 5 feet to the north.

FURTHER ACTION NEEDED: YES NO

Monitor the extent of the timber debris accumulation at both piers, and if shown to be increasing, remove during routine maintenance.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 18505
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Bradley A. Syler, P.E., S.E.
 WATERWAY CROSSED Mississippi River

INSPECTION DATE August 16, 2007
 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 (BRACING)	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	9.6'	N	8	8	9	N	8	8	7	N	7	7	8	N	N	N	N	N
	Pier 2	7.7'	N	8	N	9	N	8	8	7	N	7	7	8	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, above and below the water, the concrete at pier shafts and footings (where exposed) was typically smooth and sound with random minor areas of poor consolidation with penetrations up to 1/4 inch. Scaling was observed around the entire pier shafts at both piers, typically from the waterline up 4 feet with maximum penetrations of 1/4 inch. The scaling was heaviest at the upstream nose where extended up 10 feet above waterline. Footing exposure was observed at the upstream nose, along to the upstream quarter point on west side, and along the entire east side of Pier 1 with up to 8 inches of vertical face exposure at the nose. A moderate accumulation of timber debris consisting of logs and branches up to 12 inches in diameter was observed from the channel bottom up three feet around the upstream nose of both piers. The debris extended 10 feet to the east, 5 feet to the west, and 5 feet to the north.

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.