

UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 49520  
CSAH NO. 1  
OVER THE  
CROW WING RIVER  
DISTRICT 3 - MORRISON COUNTY

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PREPARED FOR THE  
MINNESOTA DEPARTMENT OF TRANSPORTATION  
BY  
COLLINS ENGINEERS, INC.  
JOB NO. 3512 (CEI 65)

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 49520, Piers 1, 2, and 3, were found to be in very good and sound condition below water, with no defects of structural significance and no appreciable changes since the last underwater inspection. The extent of footing exposure at Piers 1 and 2 was comparable to the last inspection findings, and the channel bottom has remained mostly unchanged and stable with no significant scour.

INSPECTION FINDINGS:

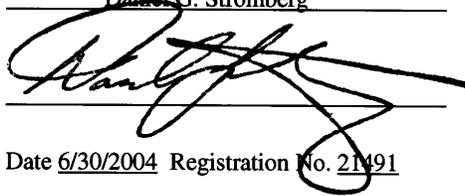
- (A) The top of the footing was exposed at Piers 1 and 2 with 2 inches of vertical exposure along the north face of Pier 1, and up to 2 feet of vertical exposure at the upstream end of Pier 2. A 1-foot-diameter area of section loss was also observed on the southwest corner of the exposed footing at Pier 2 with up to 1/2 inch of penetration.
- (B) Minor scour depressions were observed at the upstream end of each of the piers ranging from 1.5 feet deep with a radius of 3 feet at Pier 2 to 3 feet deep with a radius of 5 feet at Piers 1 and 3.
- (C) A moderate to heavy accumulation of 2-foot-diameter and smaller timber debris was observed at the upstream end and along both faces of Pier 2.

RECOMMENDATIONS:

- (A) Monitor the timber debris at Pier 2, and if found to be increasing in the future, removal operations may become warranted.
  
- (B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years, and continue to monitor extent of footing exposure at all piers.

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

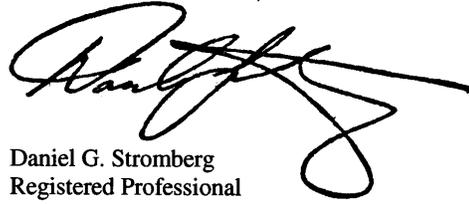


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Date 6/30/2004 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



Daniel G. Stromberg  
Registered Professional  
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 49520

Feature Crossed: The Crow Wing River

Feature Carried: CSAH No. 1

Location: District 1 - Morrison County

Bridge Description: The superstructure consists of four spans of multiple prestressed concrete beams. The superstructure is supported by two reinforced concrete abutments and three reinforced concrete piers. The abutments and piers are founded on timber piles. The piers are numbered 1 through 3 from south to north across the bridge.

2. INSPECTION DATA

Professional Engineer/Team Leader: Shirley M. Walker, P.E.

Dive Team: Michelle D. Koerbel, Clayton G. Brookins

Date: September 26, 2002

Weather Conditions: Sunny, 55EF

Underwater Visibility: " 4.0 Feet

Waterway Velocity: " 0.5 f.p.s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1, 2, and 3

General Shape: The pier shafts are oblong and rectangular with rounded ends, and are founded on rectangular footings supported by piles.

Maximum Water Depth at Substructure Inspected: Approximately 12.5 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap at the west end of Pier 2.

Water Surface: The waterline was approximately 17.0 feet below reference  
Water Elevation = 1175.1.

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

Item 60: Substructure: Code 8

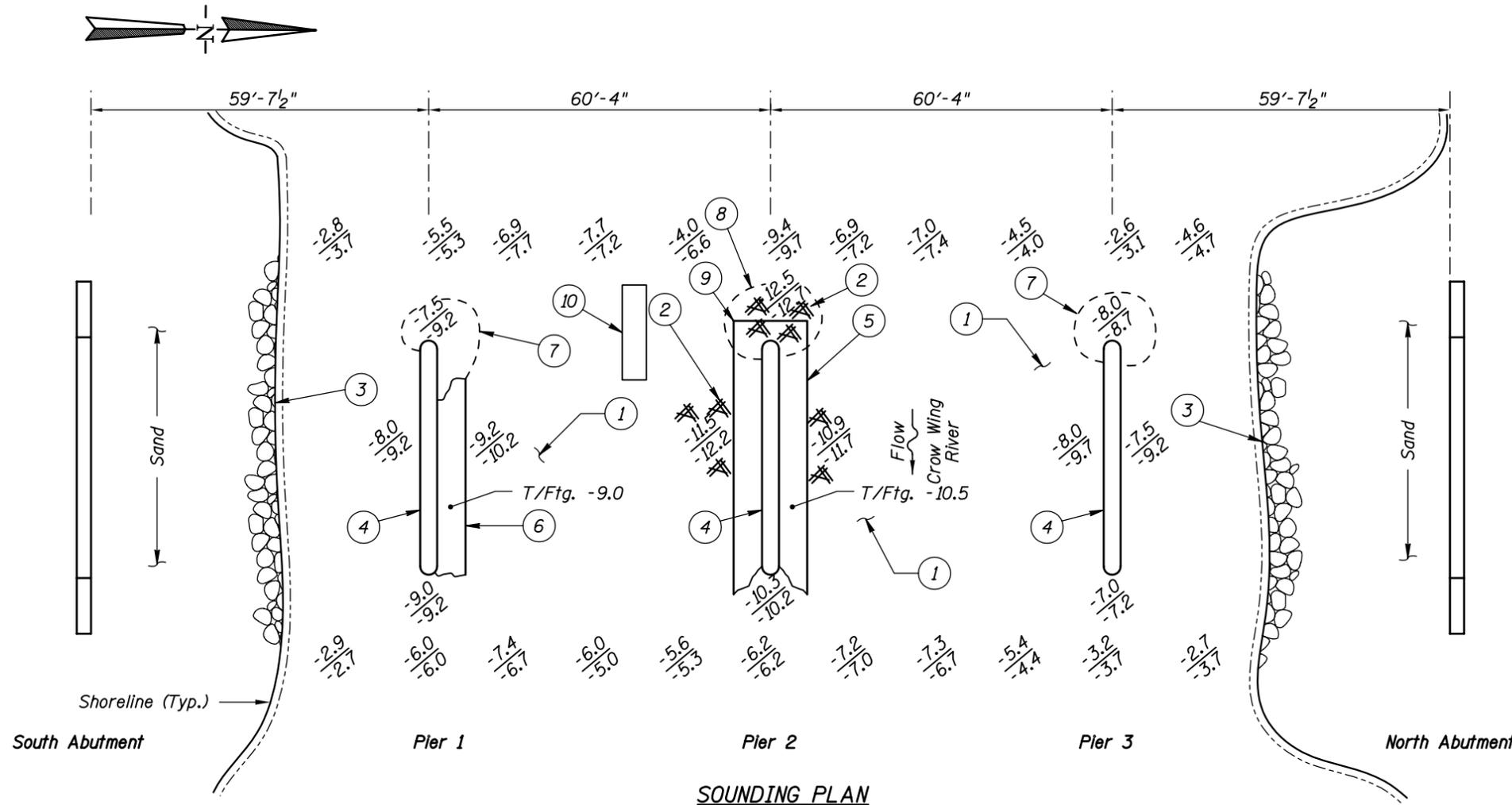
Item 61: Channel and Channel Protection: Code 6

Item 92B: Underwater Inspection: Code B/09/02

Item 113: Scour Critical Bridges: Code I/91

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

Yes  No



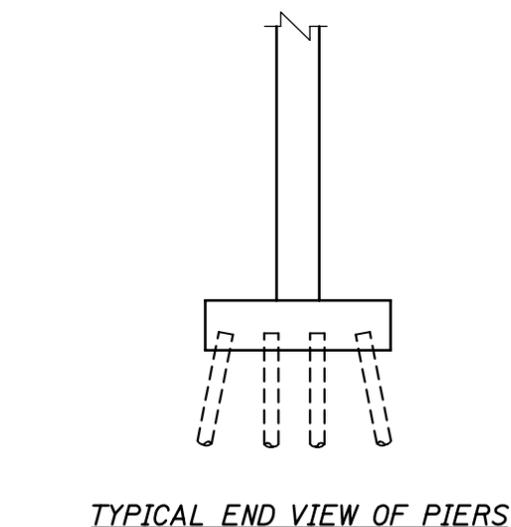
**SOUNDING PLAN**

**GENERAL NOTES:**

1. Piers 1, 2, and 3 were inspected underwater.
2. At the time of inspection on September 26, 2002, the waterline was located 17.0 feet below the top of cap on the upstream end of Pier 2. This corresponds to a waterline elevation of 1175.1 feet based on the previous report dated August 27, 1997.
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 consisted of firm sandy gravel, 6-inch cobbles, and occasional 1- to 2-foot-diameter riprap with a maximum probe rod penetration of 2 inches.
- ② A heavy accumulation of 2-foot-diameter and smaller timber debris was observed at the upstream end and along both faces of Pier 2.
- ③ The embankments consisted of sandy slopes with a 4-foot band of 1- to 2-foot-diameter riprap along the shoreline.
- ④ The concrete was generally in good condition with random areas of poor consolidation and up to 1/2 inch of penetration.
- ⑤ The footing was exposed around Pier 2 with up to 2 feet of vertical exposure at the upstream end of the pier.
- ⑥ The footing was exposed along the north side of Pier 1 with up to 2 inches of vertical exposure.
- ⑦ A 5-foot-radius, 3-foot-deep scour pocket was observed at the upstream end of Piers 1 and 3.
- ⑧ A 3-foot-radius, 1.5-foot-deep scour pocket was observed at the upstream end of Pier 2.
- ⑨ The southwest corner of the exposed footing exhibited a 1-foot-diameter area of section loss with up to 1/2 of inch of penetration.
- ⑩ A concrete pier from the previous bridge was encountered 2.5 feet below the waterline.

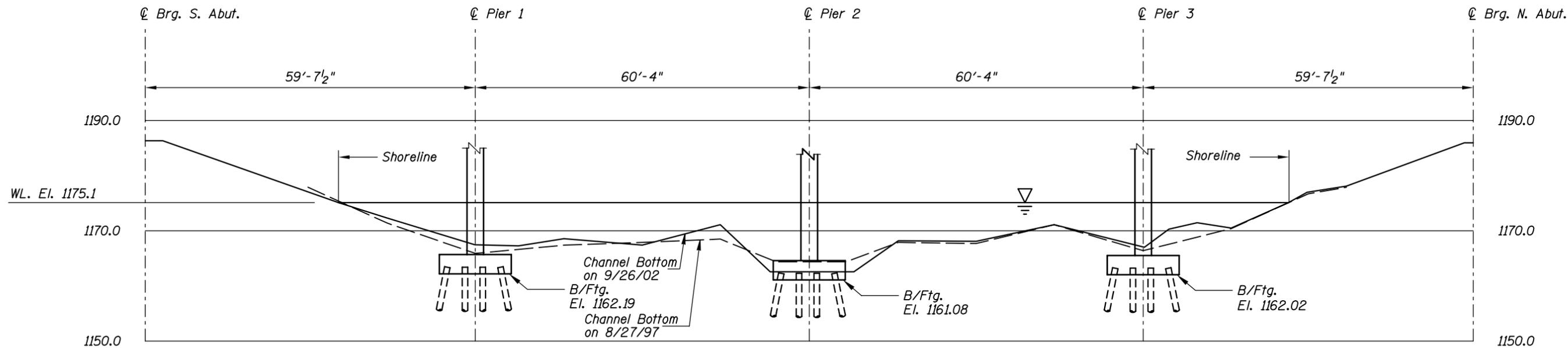


**TYPICAL END VIEW OF PIERS**

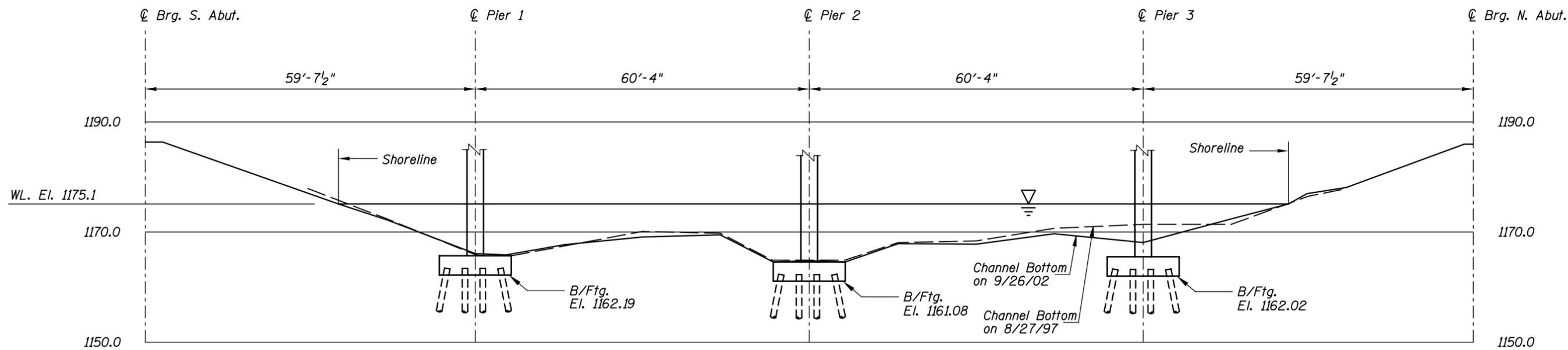
**Legend**

- 6.0 Sounding Depth from Waterline (9/26/02)
- 6.0 Sounding Depth from Waterline (8/27/97)
- Timber Debris
- Riprap

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 49520 OVER THE CROW WING RIVER DISTRICT 3, MORRISON COUNTY		
<b>INSPECTION AND SOUNDING PLAN</b>		
Drawn By: PRH	<b>COLLINS ENGINEERS, INC.</b>	Date: SEPT. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 35120065		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. 49520 OVER THE CROW WING RIVER DISTRICT 3, MORRISON COUNTY <b>UPSTREAM AND DOWNSTREAM FASCIA PROFILES</b>		
Drawn By: PRH Checked By: MDK Code: 35120065	 <b>COLLINS ENGINEERS, INC.</b> 300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Date: SEPT. 2002 Scale: 1"=20' Figure No.: 2



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



Photograph 2. View of Pier 1, Looking Southeast.



Photograph 3. View of Pier 2, Looking Southeast.



Photograph 4. View of Pier 3, Looking Southeast.

MINNESOTA DEPARTMENT OF TRANSPORTATION  
OFFICE OF BRIDGES AND STRUCTURES  
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc.

DATE: September 26, 2002

ON-SITE TEAM LEADER: Shirley M. Walker, P.E.

BRIDGE NO: 49520

WEATHER: Sunny, " 55EF

WATERWAY CROSSED: The Crow Wing River

DIVING OPERATION: X

SCUBA

SURFACE SUPPLIED AIR

OTHER

PERSONNEL: Michelle D. Koerbel, Clayton G. Brookins

EQUIPMENT: SCUBA, U/W Light, Scraper, Lead Line, Sounding Pole, Probe Rod, Camera

TIME IN WATER: 4:30 P.M.

TIME OUT OF WATER: 5:15 P.M.

WATERWAY DATA: VELOCITY " 0.5 f.p.s.

VISIBILITY " 4.0 feet

DEPTH 12.5 feet maximum at Pier 2.

ELEMENTS INSPECTED: Piers 1, 2, and 3

REMARKS: Overall, the submerged concrete of the piers was in very good, sound condition with no structurally significant defects observed. The top of the footing was exposed at Piers 1 and 2 with 2 inches of vertical exposure along the north face of Pier 1, and up to 2 feet of vertical exposure at the upstream end of Pier 2 with a 1-foot-diameter area of section loss observed on the southwest corner of the exposed footing with 1/2 inch penetration. A heavy accumulation of 2-foot-diameter-and-smaller timber debris was observed at the upstream end and along both faces of Pier 2. Each of the piers exhibited scour pockets at the upstream end of the piers ranging from 1.5 feet deep with a radius of 3 feet at Pier 2 to 3 feet deep with a radius of 5 feet at Piers 1 and 3.

FURTHER ACTION NEEDED: \_\_\_\_\_ YES  NO

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years, and continue to monitor extent of footing exposure at all piers.

MINNESOTA DEPARTMENT OF TRANSPORTATION  
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 49520  
INSPECTORS Collins Engineers, Inc.  
ON-SITE TEAM LEADER Shirley M. Walker, P.E.  
WATERWAY CROSSED The Crow Wing River

INSPECTION DATE September 26, 2002  
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	9.2'	N	8	7	9	N	8	7	N	7	N	7	8	N	N	N	N	N
	Pier 2	12.5'	N	8	7	9	N	8	6	N	N	6	6	8	N	N	8	N	N
	Pier 3	8.0'	N	8	N	9	N	8	7	N	7	N	7	8	N	N	N	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the submerged concrete of the piers was in very good, sound condition with no structurally significant defects observed. The top of the footing was exposed at Piers 1 and 2 with 2 inches of vertical exposure along the north face of Pier 1, and up to 2 feet of vertical exposure at the upstream end of Pier 2 with a 1-foot-diameter area of section loss observed on the southwest corner of the exposed footing with 1/2 inch penetration. A heavy accumulation of 2-foot-diameter-and-smaller timber debris was observed at the upstream end and along both faces of Pier 2. Each of the piers exhibited scour pockets at the upstream end of the piers ranging from 1.5 feet deep with a radius of 3 feet at Pier 2 to 3 feet deep with a radius of 5 feet at Piers 1 and 3.

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.