

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. L8228
TWP NO. 31
OVER THE
SOUTH BRANCH OF THE BUFFALO RIVER
DISTRICT 4 - CLAY COUNTY



PREPARED FOR THE
MINNESOTA DEPARTMENT OF TRANSPORTATION
BY
COLLINS ENGINEERS, INC.
JOB NO. 5221 (CEI 49)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. L8228, the West Abutment and Piers 1 and 2, were in good to satisfactory condition with no defects of structural significance observed. The timber piles of the substructure units were in good condition with no instances of excessive decay. Random splitting at the connections was observed in numerous diagonal bracing members. A heavy accumulation of timber debris was observed at the upstream nose of Pier 2, and there was a much lighter accumulation of timber debris at the upstream end of Pier 1.

INSPECTION FINDINGS:

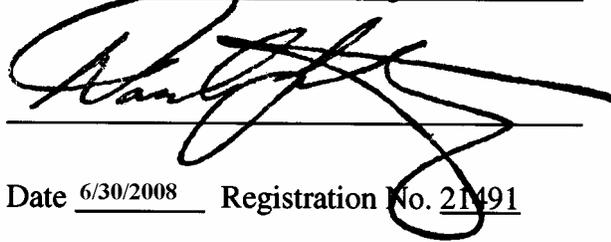
- (A) The diagonal timber braces were split through their connections at several locations at both piers. The splitting in the connections measured up to 2 inches wide by 8 feet in length.
- (B) A heavy timber debris accumulation was observed at the upstream nose of Pier 2 that extended 30 feet off the upstream nose. The debris consisted primarily of branches and trees up to 1 foot in diameter. The amount of debris and the potential for excessive lateral loads during high water and flow conditions is considerable.
- (C) A light to moderate accumulation of timber debris up to 1 foot in diameter was also present at the upstream nose of Pier 1.
- (D) All of the timber elements exhibited minor to moderate weathering with checks up to 1/2 inch wide and penetrations 1/4 to 3/4 inch deep. The galvanized connection hardware exhibited minor surface corrosion.

RECOMMENDATIONS:

- (A) Remove the heavy accumulation of timber debris from around the structure to eliminate the potential for continued accumulation, scour influence, and excessive lateral loads on bridge.
- (B) Repair/replace the split timber braces to restore lateral stability to the piers.
- (C) 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



Date 6/30/2008 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: L8228

Feature Crossed: South Branch of the Buffalo River

Feature Carried: TWP No. 31

Location: District 4 - Clay County

Bridge Description: The superstructure consists of three timber beam spans. The substructure consists of two timber pile abutments and two timber pile piers. The piers are numbered 1 and 2 starting from the west end of the bridge.

2. INSPECTION DATA

Professional Engineer/ Team Leader: Bradley A. Syler, P.E., S.E.

Dive Team: John J. Loftus, Valerie Rouston

Date: August 21, 2007

Weather Conditions: Cloudy, 70 °F

Underwater Visibility: 1.0 foot

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2, and the West Abutment.

General Shape: The piers consist of five vertical timber piles supporting a timber pile cap.
The abutments consist of five vertical timber piles supporting a timber pile cap and timber wall planking with adjacent timber pile and planking wingwalls.

Maximum Water Depth at Substructure Inspected: Approximately 2.9 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the timber curb at the south end of Pier 1.

Water Surface: The waterline was approximately 9.6 feet below reference.
Assumed Waterline Elevation = 90.4.

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

Item 60: Substructure: Code 5

Item 61: Channel and Channel Protection: Code 4

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

Item 113: Scour Critical Bridges: Code 1/95

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. Note Heavy Timber Debris Accumulation at Pier 2.



Photograph 2. View of Pier 1, Looking Southwest.



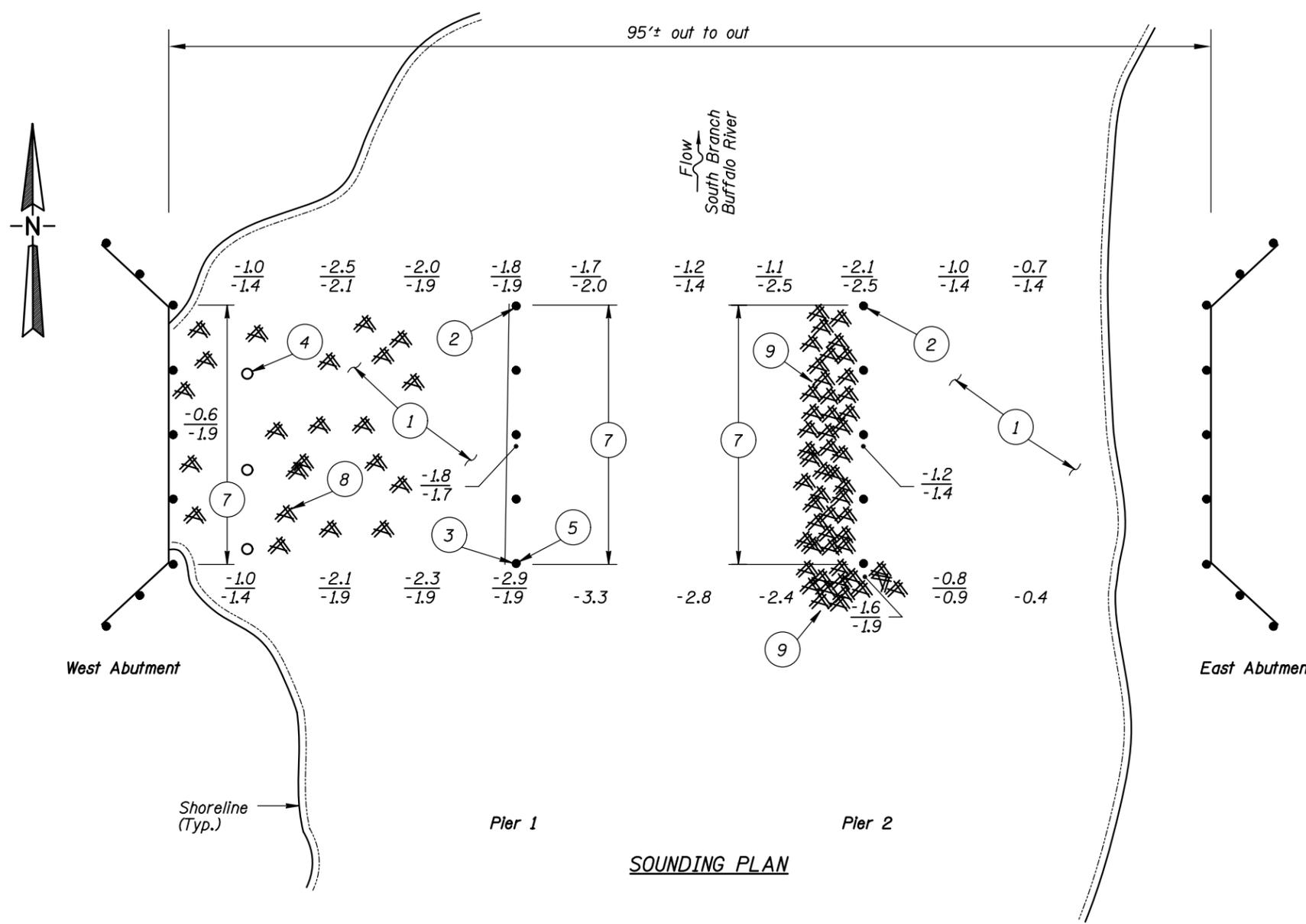
Photograph 3. View of Pier 2, Looking Northeast.



Photograph 4. View of West Abutment, Looking Southwest.



Photograph 5. View of East Abutment, Looking Northeast.



INSPECTION NOTES:

- 1 The channel bottom consisted of silt with up to 1 foot of probe rod penetration.
- 2 The diagonal bracing was split at the connection below the waterline, measuring 2 inches wide at the northernmost 8 feet of the diagonal bracing attached to the west face of Piers 1 and 2.
- 3 The diagonal bracing was split at the pile cap connection, measuring 1 inch wide at the southernmost 4 feet of the diagonal bracing attached to the west face of Pier 1.
- 4 Old cut off piles were observed protruding from the channel bottom up to 2 feet above the waterline (typical).
- 5 The diagonal bracing was split/broken for the southernmost 12 feet of the diagonal bracing attached of the East face of Pier 2.
- 6 The diagonal bracing was split for the southernmost 8 feet of the diagonal bracing attached to the East face of Pier 1.
- 7 All timber elements (piles, cross bracing, caps, and abutment sheeting) exhibited minor to moderate weathering with checks up to 1/2 inch wide and all penetrations 1/4 to 3/4 inch deep. The galvanized connection hardware exhibited only minor surface corrosion.
- 8 A light to moderate accumulation of timber debris consisting of 12-inch-diameter and smaller logs and branches was observed from the West Abutment to 10 feet West of Pier 2 throughout the entire channel under the structure and across the upstream nose of Pier 1. The debris extended from the channel bottom to 1 foot above the waterline.
- 9 A heavy accumulation of timber debris consisting of 12-inch-diameter and smaller logs and branches was observed along the entire west side and at the upstream nose of Pier 2. The debris extended from the channel bottom to 5 feet above the waterline and up to 10 feet off the west face and 30 feet off the upstream nose.

GENERAL NOTES:

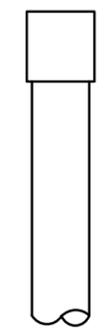
1. The West Abutment, and Piers 1 and 2 were inspected underwater.
2. At the time of inspection on August 21, 2007, the waterline was located approximately 9.6 feet below the top of the timber curb at the upstream end of Pier 1. Since insufficient bridge elevation information was available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 90.4.
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.

Legend

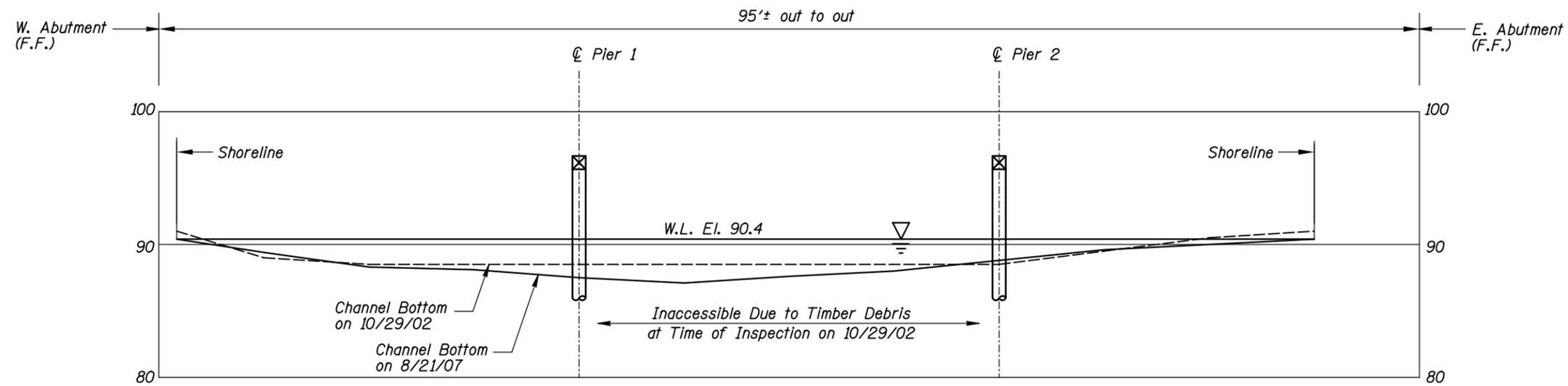
- 2.0 Sounding Depth (8/21/07)
- 5.2 Sounding Depth (10/29/02)
- Timber Pile
- Cut Off Timber Pile
- ⌘ Timber Debris

Note:
All soundings based on 2007 waterline location.

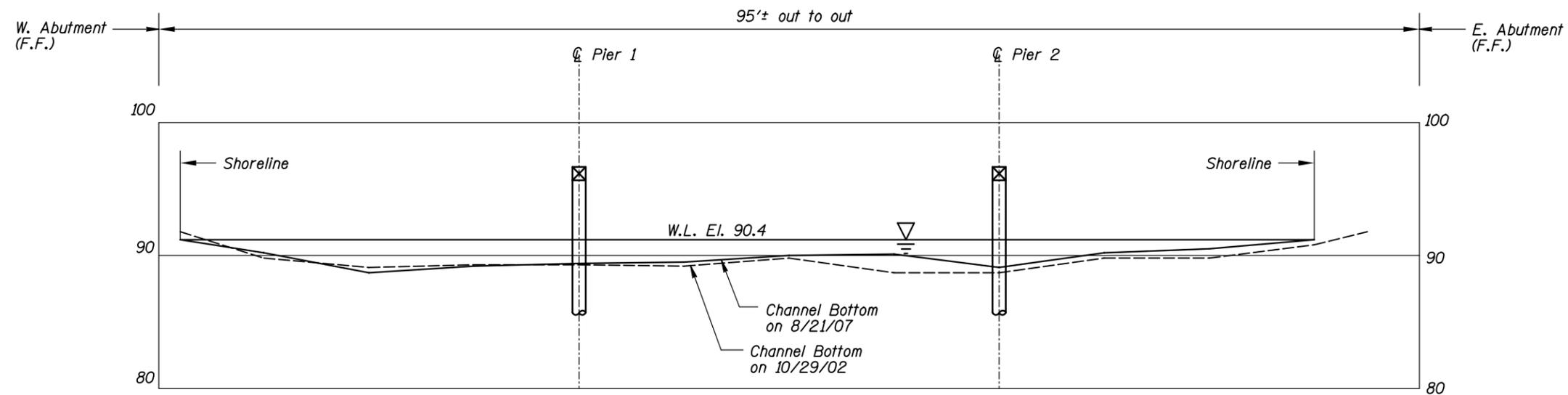
TYPICAL END VIEW OF PIERS



MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. L8228 OVER THE SOUTH BRANCH OF THE BUFFALO RIVER DISTRICT 4, CLAY COUNTY, GLYNDON TOWNSHIP		
INSPECTION AND SOUNDING PLAN		
Drawn By: PRH	COLLINS ENGINEERS	Date: AUGUST, 2007
Checked By: MDK	<small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Scale: NTS
Code: 52210049		Figure No.: 1



UPSTREAM FASCIA PROFILE
Vertical Scale: 1"=10'-0"



DOWNSTREAM FASCIA PROFILE
Vertical Scale: 1"=10'-0"

Note:
Refer to Figure 1 for General Notes.

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STRUCTURE NO. L8228 OVER THE SOUTH BRANCH OF THE BUFFALO RIVER DISTRICT 4, CLAY COUNTY, GLYNDON TOWNSHIP		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: PRH	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: AUGUST, 2007
Checked By: MDK		Scale: NTS (U.O.N.)
Code: 52210049		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: August 21, 2007

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

BRIDGE NO: L8228 WEATHER: Cloudy, ± 70 °F

WATERWAY CROSSED: South Branch of the Buffalo River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: John J. Loftus, Valerie Roustan

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

TIME IN WATER: 9:15 A.M.

TIME OUT OF WATER: 9:45 A.M.

WATERWAY DATA: VELOCITY Negligible/None

VISIBILITY ± 1 foot

DEPTH 2.9 feet maximum at Pier 1

ELEMENTS INSPECTED: The West Abutment, and Piers 1 and 2.

REMARKS: The timber piles of the substructure units inspected were found to be in good condition with no defects of structural significance observed. Numerous diagonal timber bracing members were split at their pile connections. All timber elements exhibited minor to moderate weathering and the galvanized connection hardware exhibited minor surface corrosion. There was a heavy timber debris accumulation along the upstream nose of Pier 2, extending up to 30 feet off the upstream nose. The overall amount of drift is considerable, and with high probability could increase lateral loads to the bridge during high flow conditions and should be removed as soon as possible. There was also a light to moderate accumulation of timber debris around the upstream nose of Pier 1.

FURTHER ACTION NEEDED: YES NO

Remove the heavy accumulation of timber debris from structure to eliminate the potential for continued accumulation, scour influence, and excessive lateral loads on bridge.

Repair/replace the split timber braces to restore lateral stability to the piers.

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

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. L8228
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Bradley A. Syler, P.E., S.E.
 WATERWAY CROSSED South Branch of the Buffalo River

INSPECTION DATE August 21, 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
	West Abutment	1.0'	7	N	N	9	N	7	8	7	N	5	5	N	N	7	N	N	N
	Pier 1	2.9'	7	N	N	8	5	5	8	N	N	5	5	N	N	7	N	N	N
	Pier 2	2.1'	7	N	N	8	5	5	8	N	N	4	4	N	N	7	N	N	N

*UNDERWATER PORTION ONLY

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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.