

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 7773

CSAH 116

OVER THE

PICKET RIVER

ST. LOUIS COUNTY



JUNE 22, 2012

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 7423

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge 7773, the West Abutment, Bents 1 and 2, and the East Abutment, were generally in satisfactory condition below water with only minor defects of structural significance observed. The timber piles generally were sound with the timber typically allowing awl penetrations of 1/16 to 1/8 inch. The timber pile cap at the East Abutment was bearing on 3/4 inch shims placed on top of Piles A, B, C, E, and F. The timber cross-bracing was missing on the west side of Bent 1 and there was splitting and splintering resulting in up to 100 percent section loss on the timber cross-bracing of Bents 1 and 2. A light accumulation of timber debris was noted at the upstream nose of Bent 1. The waterline at the time of inspection was high resulting in the abutments being submerged. The channel bottom appeared stable with no signs of degradation.

INSPECTION FINDINGS:

- (A) The channel bottom material consisted of silty sand allowing 4 inches of probe rod penetration.
- (B) The channel bottom material along both abutments consisted of riprap 1.5 feet in diameter and smaller.
- (C) The timber piles, cross-bracing, wingwalls, and backwall planking were generally sound allowing a typical timber awl penetration of 1/16 to 1/8 inch.
- (D) The timber pile cap at Piles A, B, C, E, and F of the East Abutment was bearing on shim.
- (E) A timber cross-brace was missing on the west side of Piles D through F of Bent 1.

- (F) The timber cross-bracing on the east side of Piles C and D of Bent 1 exhibited heavy deterioration and splitting with up to 100 percent section loss.
- (G) A split in the cross-brace, measuring up to 4 inches wide, was observed on the west side of Bent 1 extending from Pile D to Pile A. The cross-brace to pile connection at Pile D was compromised.
- (H) A split in the cross-brace, measuring up to 2 inches wide, was observed on the west side of Bent 2 extending from Pile C to Pile E. The cross-brace to pile connection at Pile D was compromised.
- (I) A light accumulation of timber debris, consisting of 2 inch diameter and smaller branches, was noted around Pile A of Bent 1.

RECOMMENDATIONS:

- (A) Repair or replace the deficient timber cross-bracing particularly all the bracing at Bent 1.

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

Inspection Team Leader:
Daniel G. Stromberg, P.E.

Respectfully submitted,

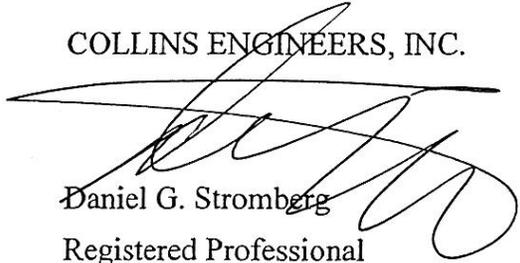
PROFESSIONAL ENGINEER

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 6/30/14 License # 21491

COLLINS ENGINEERS, INC.


Daniel G. Stromberg

Registered Professional

Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 7773

Feature Crossed: Picket River

Feature Carried: CSAH 116

Location: St. Louis County

Bridge Description: The superstructure consists of a timber deck supported by six steel I-beams. The superstructure is supported by two timber bents and two timber abutments each with a 12 by 12 inch timber caps. The abutments and bents each consist of six 12 inch diameter timber piles. The substructure units are designated as the East Abutment, Bents 1 and 2, and the West Abutment. The piles are designated A through F from south to north.

2. INSPECTION DATA

Professional Engineer/ Team Leader: Daniel G. Stromberg

Dive Team: Clayton Brookins, Breanne Stromberg

Date: June 22, 2012

Weather Conditions: Sunny, 75 °F

Underwater Visibility: 2 ft.

Waterway Velocity: None / Negligible

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: The West and East Abutments and Bents 1 and 2

General Shape: The West and East Abutments and Bents 1 and 2 each consist of six 12 inch diameter timber piles supporting a 12 inch by 12 inch timber cap. Five of the six piles on the East Abutment have wood shims to restore full bearing to the pile cap.

Maximum Water Depth at Substructure Inspected: Approximately 5.5 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap at the upstream end of Bent 1.

Water Surface: The waterline was approximately 4.0 feet below reference.

Assumed Waterline Elevation: 96.0

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 7

Item 92B: Underwater Inspection: Code B/06/12

Item 113: Scour Critical Bridges: Code I

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
228	Timber Piling	24	EA	19	5			
216	Timber Abutment	50	LF	50				



Photograph 1. View of the Upstream Fascia, Looking Northeast.



Photograph 2. View of the Downstream Fascia, Looking Southeast.



Photograph 3. View of the East Abutment, Looking Northeast.



Photograph 4. View of Bent 1, Looking Southeast.



Photograph 5. View of Bent 2, Looking Northeast.



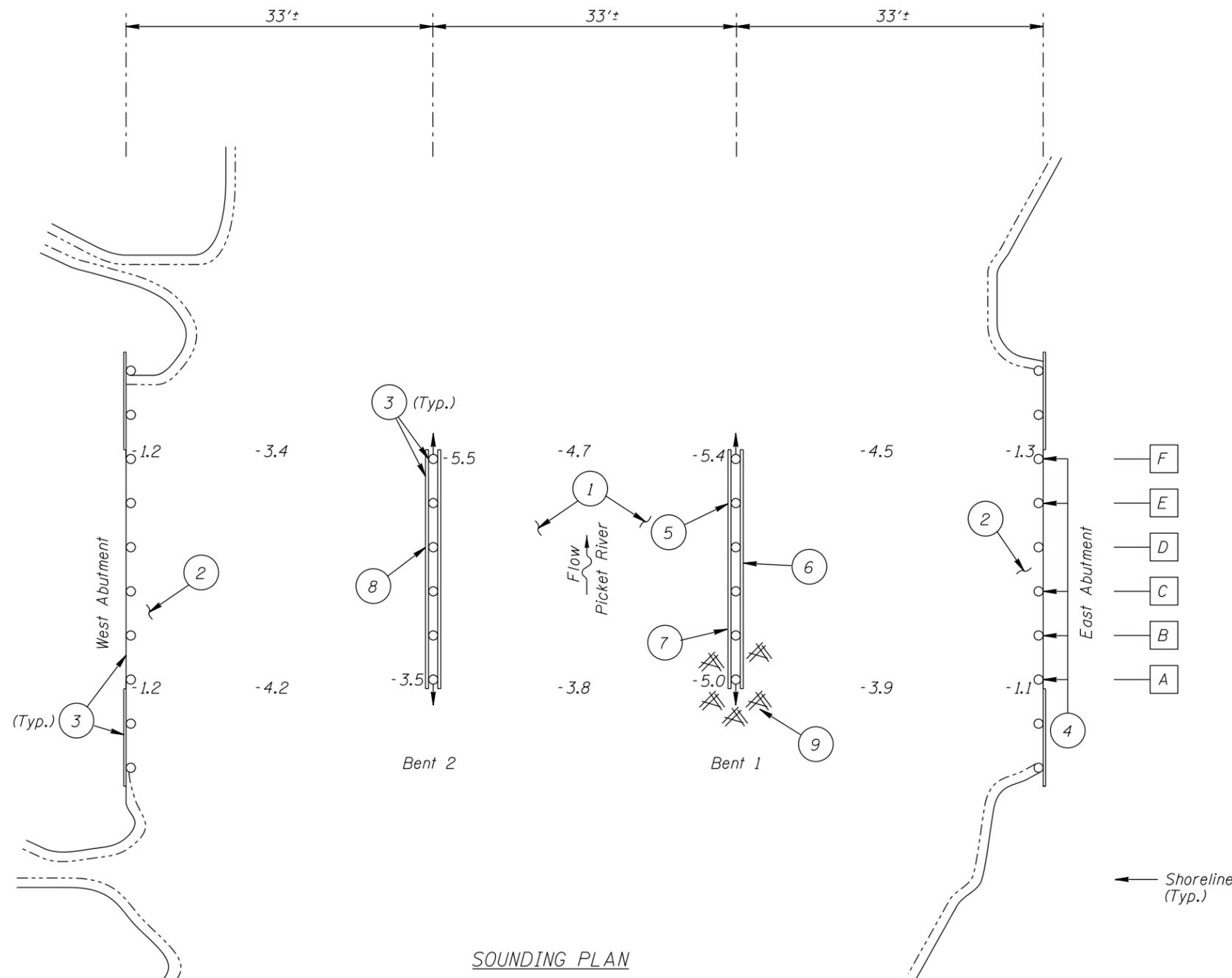
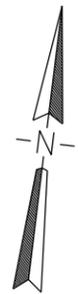
Photograph 6. View of the West Abutment, Looking Northwest.



Photograph 7. View of Timber Cross-brace Condition at Bent 2, Looking Northeast.



Photograph 8. View of Pile Cap and Shims at the East Abutment, Looking Southeast.



INSPECTION NOTES:

- 1 The channel bottom material typically consisted of silty sand allowing 4 inches of probe rod penetration.
- 2 The channel bottom material in the vicinity of both abutments consisted of riprap 1.5 feet in diameter and smaller.
- 3 The timber piles, cross-bracing, wingwalls, and backwall planking were generally sound allowing a typical timber awl penetration of 1/6 to 1/8 inch.
- 4 The timber pile cap at the East Abutment was bearing on shims at the top of Piles A, B, C, E, and F.
- 5 A timber cross-brace was missing on the west side of Piles D through F of Bent 1.
- 6 The timber cross-bracing on the east side of Piles C and D of Bent 1 exhibited heavy deterioration and splitting with up to 100 percent section loss.
- 7 A split in the cross-brace, measuring up to 4 inches wide, was observed on the west side of Bent 1 extending from Pile D to Pile A. The cross-brace to pile connection at Pile D was compromised.
- 8 A split in the cross-brace, measuring up to 2 inches wide, was observed on the west side of Bent 2 extending from Pile C to Pile E. The cross-brace to pile connection at Pile D was compromised.
- 9 A light accumulation of timber debris, consisting of 2 inch diameter and smaller branches, was observed around Pile A of Bent 1.

GENERAL NOTES:

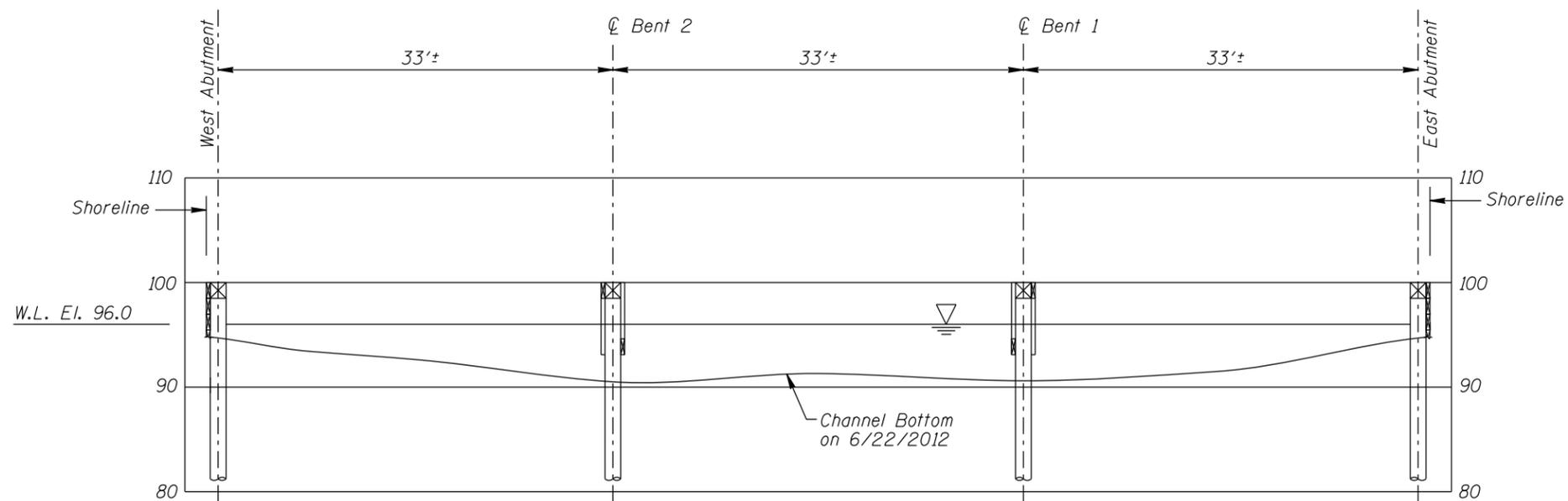
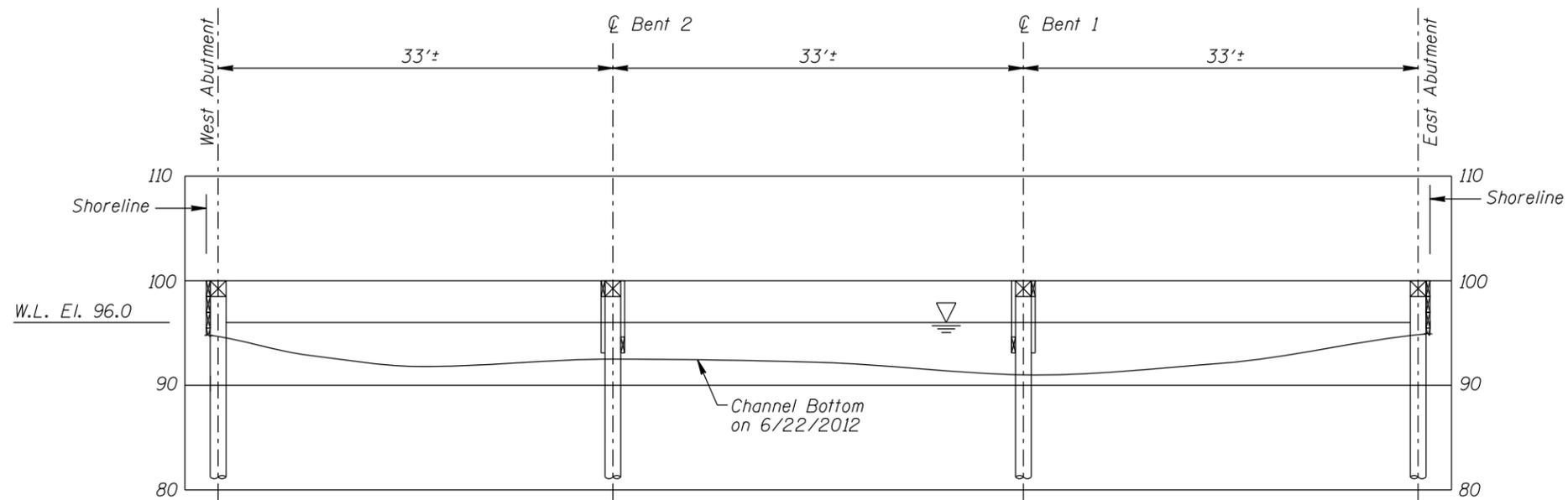
1. The East and West Abutments and Bents 1 and 2 were inspected underwater.
2. At the time of inspection on June 22, 2012, the waterline was located approximately 4.0 feet below the top of the pile cap at the upstream end of Bent 1. Since elevation information was not available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 96.0.
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 1/2 point intervals between the substructure units.

Legend

- 17.0 Sounding Depth from Waterline (6/22/12)
- A Pile Identification Designation
- 12"φ Timber Pile
- 12"φ Battered Timber Pile
- 1 Inspection Note Number
- Timber Debris

TYPICAL END VIEW OF BENTS

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 7773 CSAH 116 OVER THE THE PICKET RIVER ST. LOUIS COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: MBP	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: JUNE, 2012
Checked By: LJ		Scale: NTS
Code: 74237773		Figure No.: 1



Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 7773 CSAH 116 OVER THE THE PICKET RIVER ST. LOUIS COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: MBP	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: JUNE, 2012
Checked By: LJ		Scale: NTS
Code: 74237773		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: June 22, 2012

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E.

BRIDGE NO: 7773 WEATHER: Sunny, 75°F

WATERWAY CROSSED: Sunrise River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Clayton Brookins, Breanne Stromberg

EQUIPMENT: Commercial Scuba, U/W Light, Hand Tools, Sounding Pole, Lead Line, Probe Rod,
Camera

TIME IN WATER: 11:45 A.M.

TIME OUT OF WATER: 1:15 P.M.

WATERWAY DATA: VELOCITY None / Negligible

VISIBILITY 2 ft

DEPTH 5.5 feet maximum

ELEMENTS INSPECTED: West and East Abutment and Bents 1 and 2

REMARKS: Overall, the West Abutment, Bents 1 and 2, and the East Abutment were generally in satisfactory condition below water with only minor defects of structural significance observed. The timber piles generally were sound with the timber typically allowing awl penetrations of 1/16 to 1/8 inch. The timber pile cap at the East Abutment was bearing on 3/4 inch shims placed on top of Piles A, B, C, E, and F. The timber cross-bracing was missing on the west side of Bent 1 and there was splitting and splintering resulting in up to 100 percent section loss on the timber cross-bracing of Bent 1 and Bent 2. A light accumulation of timber debris was noted at the upstream nose of Bent 1. The waterline at the time of inspection was high resulting in the abutments being submerged. The channel bottom appeared stable with no signs of degradation.

FURTHER ACTION NEEDED: YES NO

Repair or replace the deficient timber cross-bracing including all the bracing at Bent 1.

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

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 7773
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Daniel G. Stromberg, P.E.
 WATERWAY CROSSED Picket River

INSPECTION DATE June 22, 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 (CROSS-BRACKING)	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
	East Abutment	1.3'	7	N	N	6	N	6	N	7	7	8	7	N	N	7	8	6	N
	Bent 1	5.0'	7	N	N	7	4	6	N	N	N	7	7	N	N	6	6	N	N
	Bent 2	5.5'	7	N	N	7	5	6	N	N	N	8	7	N	N	7	8	N	N
	West Abutment	1.5'	7	N	N	7	N	6	N	7	7	8	7	N	N	7	8	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the West Abutment, Bents 1 and 2, and The East Abutment were generally in good condition below water with only minor defects of structural significance observed. The timber piles generally were sound with the timber typically allowing awl penetrations of 1/16 to 1/8 inch. The timber pile cap at the East Abutment was bearing on 3/4 inch shims placed on top of Piles A, B, C, E, and F. The timber cross-bracing was missing on the west side of Bent 1 and there was splitting and splintering resulting in up to 100 percent section loss on the timber cross-bracing of Bent 1 and Bent 2. A light accumulation of timber debris was noted at the upstream nose of Bent 1. The waterline at the time of inspection was high resulting in the abutments being submerged. The channel bottom appeared stable with no signs of degradation.

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.