

UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 7254

CSAH NO. 41

OVER THE

KETTLE RIVER

DISTRICT 1 – PINE COUNTY

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PREPARED FOR THE  
MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 3512

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 7254, Piers 1, 2, and 3, were found to be in good condition with no defects of structural significance observed. The timber piles and horizontal planks of the piers were typically firm and sound and exhibited only minor splits and checking. One of the diagonal braces was split through the upstream connection at Pier 1 and exhibited partial section loss. There was light to moderate accumulations of timber debris observed around all of the piers.

INSPECTION FINDINGS:

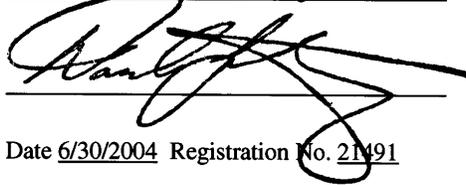
- (A) Overall, the timber piles and horizontal planks of the piers were in good and sound condition and exhibited only minor hairline splits and checking.
- (B) The diagonal cross brace at the upstream channel end of Pier 1 was split through the connection and exhibited partial section loss along the upstream half of the pier.
- (C) A light to moderate accumulation of timber debris was observed around the piers as follows: a minor accumulation of 6-inch-diameter branchy debris along the west face of Pier 1; two 12-inch-diameter trees, one with branchy debris along each side of Pier 2; and a moderate accumulation of debris at the upstream end of Pier 3 with two 3-foot-diameter logs extending along both faces.

RECOMMENDATIONS:

- (A) At this point, the timber drift accumulations at the bridge are not excessive; however, they should be monitored, and if found to be progressing to an extent where excessive lateral loads may be exerted on the piers or scour may be influenced, the drift may need to be removed at that time.
  
- (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



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: 7254

Feature Crossed: The Kettle River

Feature Carried: CSAH No. 41

Location: District 1 - Pine County

Bridge Description: The bridge superstructure consists of four spans of timber deck and stringers that are supported by three timber piers and two timber abutments. The piers are numbered 1 through 3 starting from the west end of the bridge. Each pier consists of a timber pier cap supported by eight timber piles.

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, " 40E F

Underwater Visibility: " 2 Feet

Waterway Velocity: " 0.5 f.p.s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1, 2, and 3

General Shape: Each pier consists of a timber pier cap supported by a single row of eight timber piles. Timber cross bracing and planking interconnect the piles.

Maximum Water Depth at Substructure Inspected: Approximately 7.7 feet.

4. WATERLINE DATUM

Water Level Reference: Top of the pile cap at the upstream end of Pier 2.

Water Surface: The waterline was approximately 15.7 Feet below reference.  
Assumed Waterline Elevation = 84.3.

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

Item 60: Substructure: Code 7

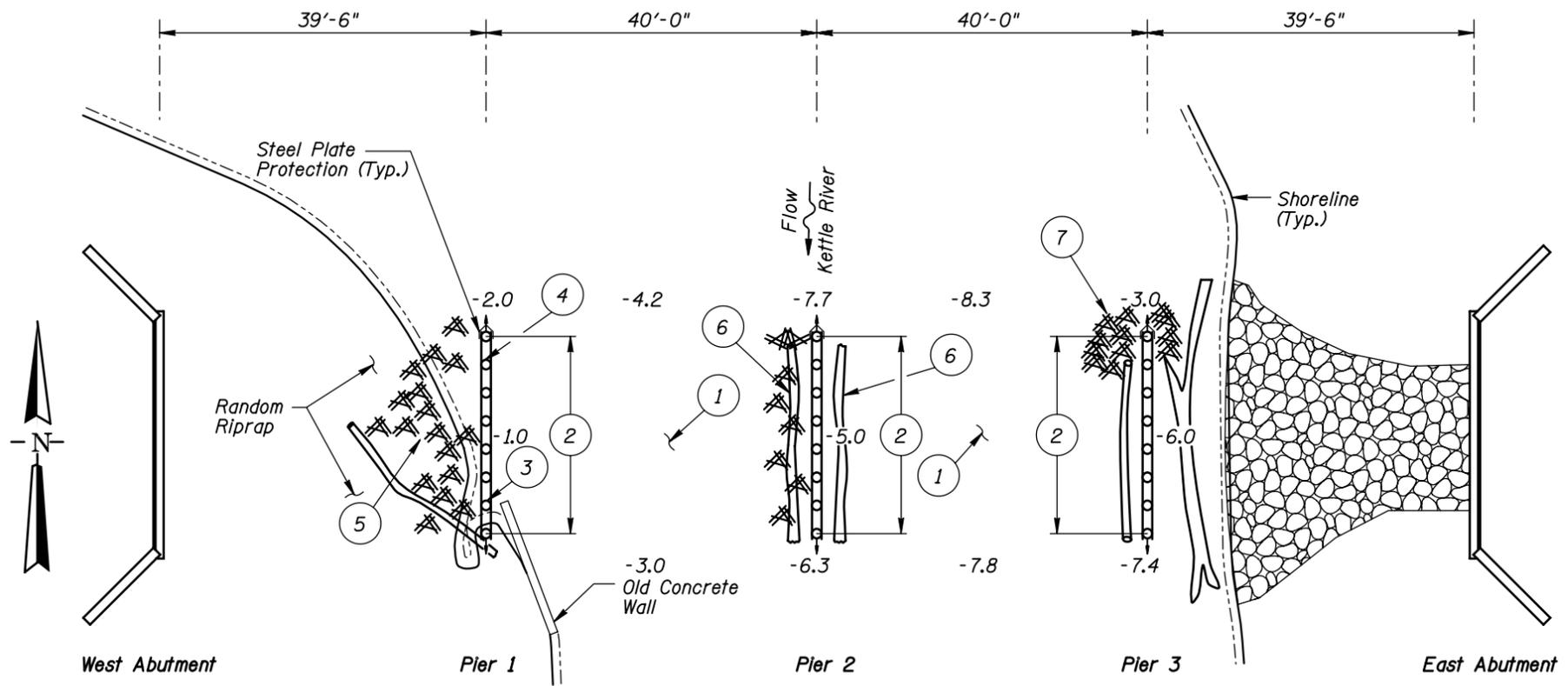
Item 61: Channel and Channel Protection: Code 6

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

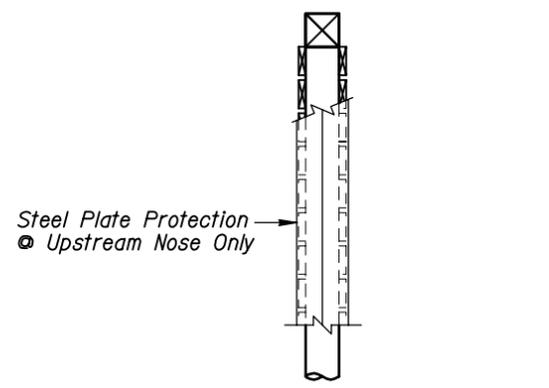
Item 113: Scour Critical Bridges: Code I/02

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

Yes  No



**SOUNDING PLAN**



**TYPICAL END VIEW OF PIERS**

**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 approximately 15.7 feet below the top of the pile cap at the upstream end of Pier 2. Since insufficient bridge elevation information was available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 84.3.
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 the mid points between the substructure units.

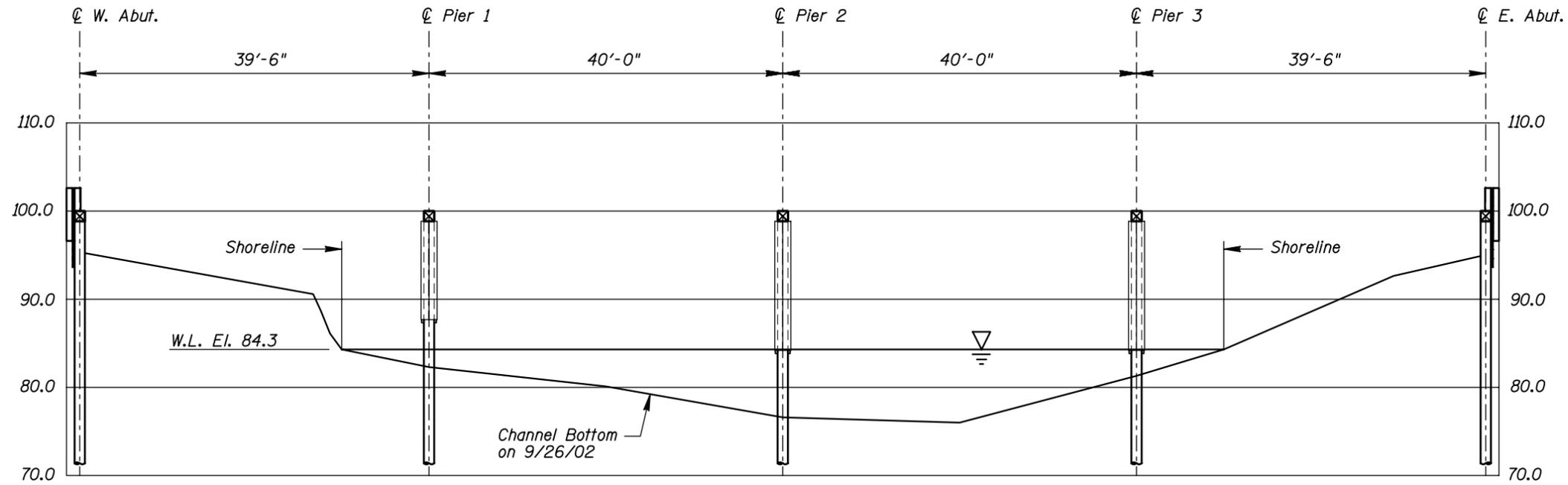
**INSPECTION NOTES:**

- 1 The channel bottom consisted of silty sand with up to 1 foot of probe rod penetration.
- 2 The timber piles exhibited minor vertical checking and vertical splits on the outside of the timber shell. Also, the horizontal planking exhibited minor splits and some checking.
- 3 The bottom of the horizontal planking was 2 feet above the waterline at Pier 1.
- 4 The diagonal cross bracing at the upstream end of Pier 1 was split through the connection and exhibited partial section loss along the upstream half of the pier.
- 5 A minor accumulation of 6-inch-diameter and smaller timber debris was observed along the west face of Pier 1.
- 6 A 12-inch-diameter tree trunk with branchy debris was observed along the west face of the pier, and a timber log on the channel bottom was observed along the east face.
- 7 A moderate accumulation of timber debris was observed at the upstream end of Pier 3 with 3-foot-diameter logs that extended along each face of the pier.

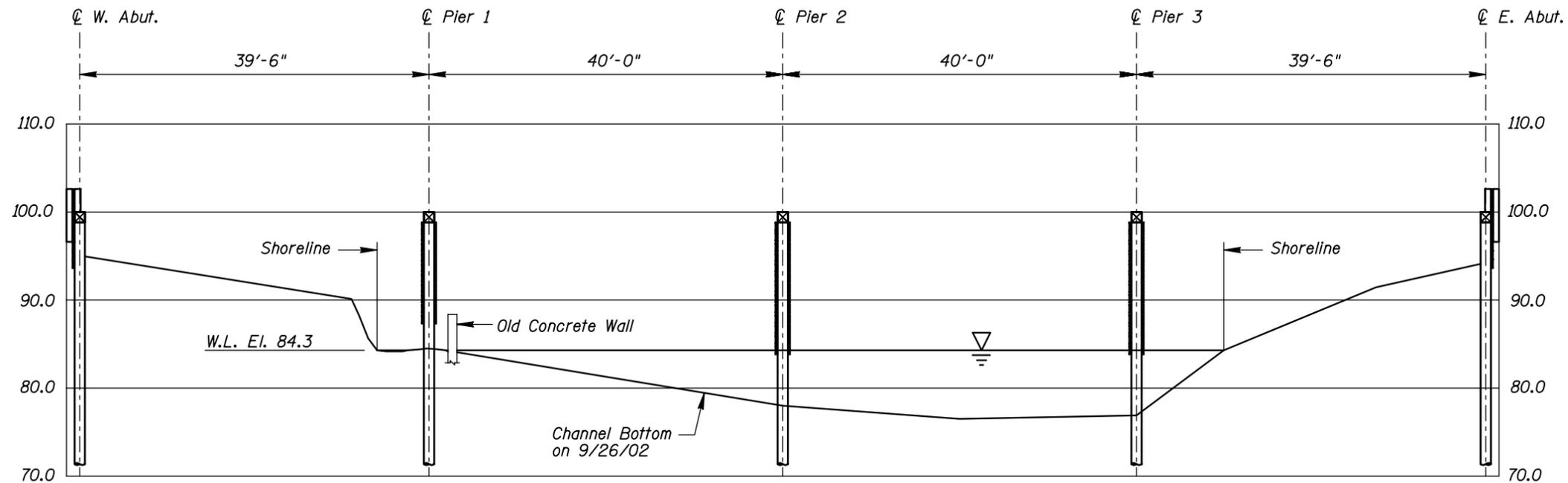
**Legend**

- 5.2 Sounding Depth from Waterline (9/26/02)
- Timber Pile
- ⊙ Battered Timber Pile
- ⊗ Timber Debris
- ⊞ Riprap

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 7254 OVER THE KETTLE RIVER DISTRICT 1, PINE 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: 35127254		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. 7254 OVER THE KETTLE RIVER DISTRICT 1, PINE COUNTY		
<b>UPSTREAM AND DOWNSTREAM FASCIA PROFILES</b>		
Drawn By: PRH	 <b>COLLINS ENGINEERS, INC.</b> 300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Date: SEPT. 2002
Checked By: MDK		Scale: 1/16"=1'
Code: 35127254		Figure No.: 2



Photograph 1. Overall View of Structure, Looking South.



Photograph 2. View of Pier 1, Looking Southwest.



Photograph 3. View of Pier 2, Looking Southwest.



Photograph 4. View of Pier 3, Looking Southwest.

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: 7254    WEATHER: Sunny, " 40E F  
WATERWAY CROSSED: The Kettle River  
DIVING OPERATION:    X            SCUBA                      SURFACE SUPPLIED AIR  
   OTHER

PERSONNEL: Michelle D. Koerbel, Clayton G. Brookings  
EQUIPMENT: Scuba, U/W Light, Scraper, Lead Line, Sounding Pole, Probe Rod, Camera  
TIME IN WATER: 9:25 A. M.  
TIME OUT OF WATER: 9:45 A.M.  
WATERWAY DATA: VELOCITY " 0.5 f.p.s.  
   VISIBILITY " 2 feet  
   DEPTH 7.7 feet maximum at Pier 2

ELEMENTS INSPECTED: Piers 1, 2, and 3

REMARKS: Overall, the timber piles and horizontal planks of the piers were in good, sound condition with only minor cracking and checking observed. One of the diagonal braces was split through the connection at the upstream end of Pier 1 with partial section loss, however, at the time of the inspection, the brace was still engaged at the fastener. Pier 1 exhibited a light accumulation of branchy timber debris along the west face. Piers 2 and 3 exhibited heavier accumulations of debris including 1- to 3-foot-diameter trees that extended along each face of the piers.

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

At this point, the timber drift accumulations at the bridge are not excessive; however, they should be monitored, and if found to be progressing to an extent where excessive lateral loads may be exerted on the pier or scour is influenced, the drift may need to be removed at that time.

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. 7254  
INSPECTORS Collins Engineers, Inc.  
ON-SITE TEAM LEADER Shirley M. Walker, P.E.  
WATERWAY CROSSED The Kettle 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 (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	2.0'	7	N	N	9	7	7	8	6	6	7	6	N	N	7	7	N	N
	Pier 2	7.7	7	N	N	9	7	7	8	N	N	6	6	N	N	7	7	N	N
	Pier 3	7.4'	7	N	N	9	7	7	8	8	8	6	6	N	N	7	7	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the timber piles and horizontal planks of the piers were in good, sound condition with only minor cracking and checking observed. One of the diagonal braces was split through the connection at the upstream end of Pier 1 with partial section loss, however, at the time of the inspection, the brace was still engaged at the fastener. Pier 1 exhibited a light accumulation of branchy timber debris along the west face. Piers 2 and 3 exhibited heavier accumulations of debris including 1- to 3-foot-diameter trees that extended along each face of the piers.

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.