

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. L7352
TWP NO. 140
OVER THE
RABBIT RIVER
DISTRICT 4 - WILKIN COUNTY



PREPARED FOR THE
MINNESOTA DEPARTMENT OF TRANSPORTATION
BY
COLLINS ENGINEERS, INC.
JOB NO. 5221 (CEI 59)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. L7352, the North and South Abutments and Pier 1, were generally in satisfactory condition with no defects of structural significance observed. The channel bottom around the substructure units appeared stable with no significant scour and no appreciable changes observed since the previous inspection.

INSPECTION FINDINGS:

- (A) Light to moderate scaling, with a maximum penetration of 1 inch, was observed on the concrete surfaces of the pier and the abutments and extended from the waterline to 2 feet above.
- (B) A 2.5-foot-diameter tree and a heavy accumulation of timber debris extended from the north embankment to midway between Pier 1 and the South Abutment along the upstream fascia of the bridge.
- (C) Several vertical cracks, up to 1/8 inch wide, were observed on Pier 1 and the North and South Abutments that extended from the beam seat to the channel bottom.
- (D) A construction joint, 3 inches below the waterline, exhibited random areas of section loss along both faces of Pier 1 with a maximum penetration of 1 inch.
- (E) An area of section loss, 6 inches in diameter with 1 inch of penetration, was observed at 2 feet above the waterline on the North abutment.
- (F) The top of the footing was exposed along the north face of Pier 1 with up to 4 inches of vertical face detected.

(F) The top of the footing was exposed along the North Abutment with no vertical face exposure detected.

(G) The backfill behind each abutment wingwall was missing due to erosion making the area steeply sloped.

RECOMMENDATIONS:

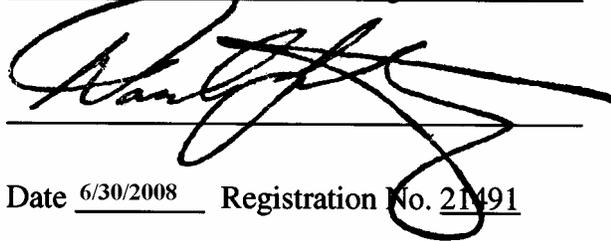
(A) Remove the large tree and heavy accumulations of timber debris extending along the upstream fascia to eliminate the potential for continued accumulation and adverse affects on the bridge.

(B) Because no information about the footings was available, monitor the extent of the local scour and footing exposure at the pier and both abutments during future inspections. If scour conditions and footing exposure increase, a scour evaluation, which has presently not been made, and/or countermeasures may be warranted.

(C) Reinspect the 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.

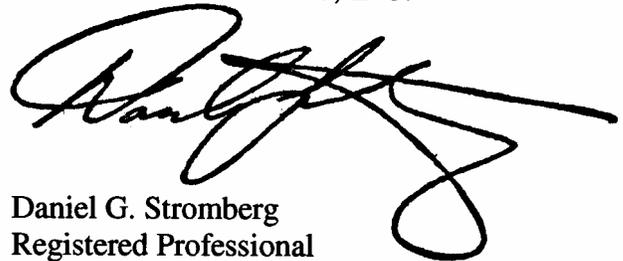
Daniel G. Stromberg



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: L7352

Feature Crossed: Rabbit River

Feature Carried: TWP No. 140

Location: District 4 - Wilkin County

Bridge Description: The superstructure consists of two spans of multiple steel beams supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and one reinforced concrete pier. No design drawings were available with foundation information.

2. INSPECTION DATA

Professional Engineer/Team Leader: Daniel G. Stromberg, P.E., S.E.

Dive Team: Denis Redzic, Valerie Rouston.

Date: September 17, 2007

Weather Conditions: Cloudy, 62°F

Underwater Visibility: 2.0 feet

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: North and South Abutments and Pier 1.

General Shape: The abutments consist of a reinforced concrete breastwall with skewed, tapered wingwalls. The pier consists of an oblong rectangular reinforced concrete shaft which has a pointed upstream nose with a mounted steel angle for ice damage protection and a square downstream nose. No design drawings with footing details were available.

Maximum Water Depth at Substructure Inspected: Approximately 3.7 Feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the east end of Pier 1.

Water Surface: The waterline was approximately 11.6 feet below reference.
Assumed Waterline Elevation = 88.4.

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 5

Item 92B: Underwater Inspection: Code B/09/07

Item 113: Scour Critical Bridges: Code G

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. View of South abutment, Looking Southwest.



Photograph 2. View of Pier 1, Looking Southwest.



Photograph 3. View of North Abutment, Looking Northwest.



Photograph 4. View of Pier 1 and Timber Debris, Looking West.



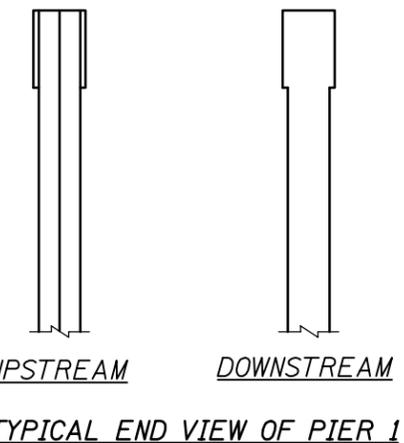
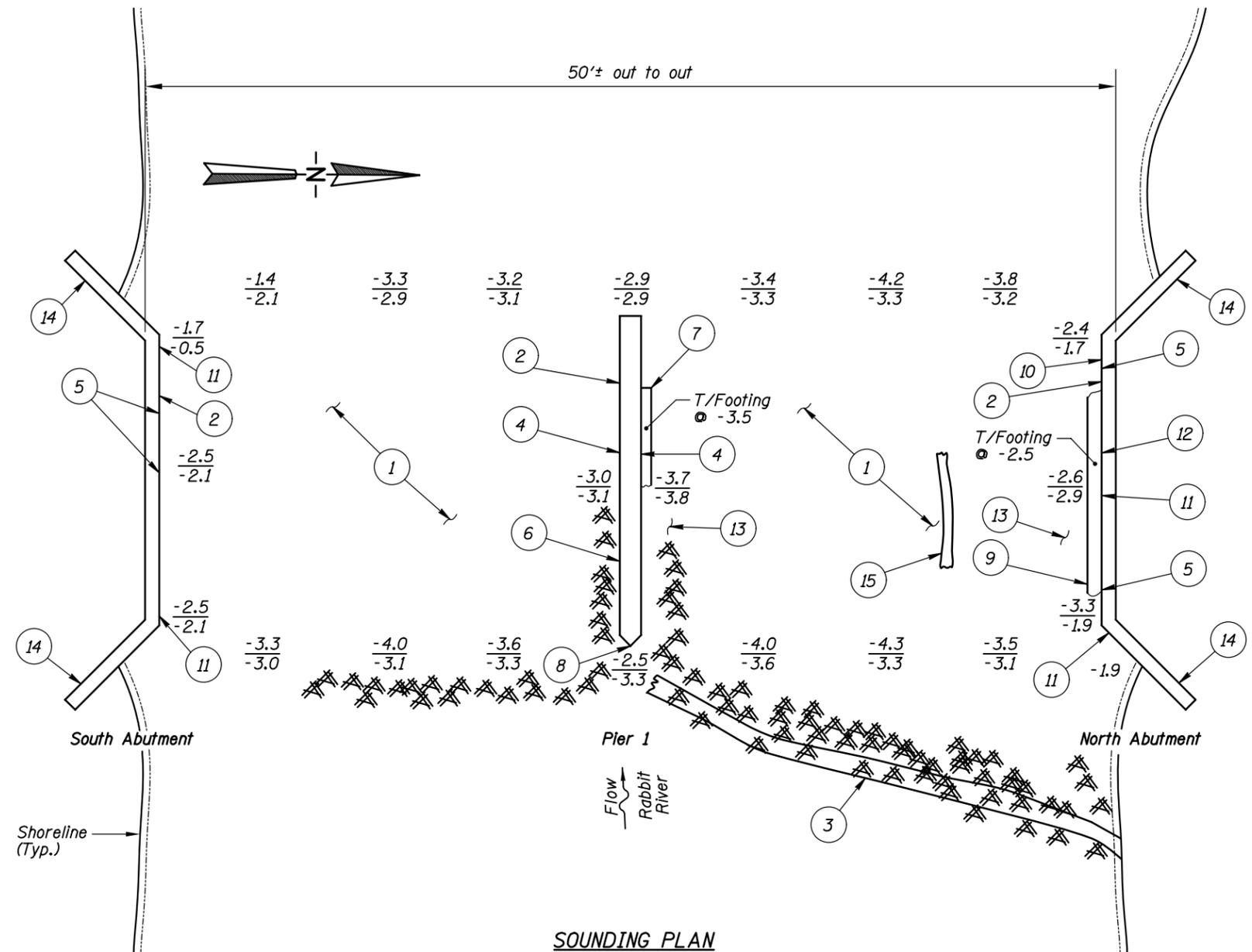
Photograph 5 View of Northeast Wingwall, Looking down at Erosion.



Photograph 6. View of Southwest Corner of Deck, Looking Southwest



Photograph 7. View of Southeast Corner of Deck, Looking Southeast.



- GENERAL NOTES:**
- The North and South Abutments and Pier 1 were inspected underwater.
 - At the time of inspection on September 17, 2007 the waterline was located approximately 11.6 feet below the top of the pier cap 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 88.4.
 - Soundings indicate the water depth at the time of inspection and are measured in feet.
 - Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

- INSPECTION NOTES:**
- The channel bottom material consisted of hard clay overlaid with silt and random gravel with a maximum probe rod penetration of 6 inches.
 - Light to moderate scaling was observed around the perimeter of the pier and along the breastwalls of both abutments, with a maximum penetration of 1 inch, extending from the waterline to 2 feet above.
 - A moderate accumulation of 1-foot-diameter and smaller timber debris was observed along the upstream fascia, extending from the North Abutment to midway between the pier and the South Abutment. A 2.5-foot-diameter tree along with a heavy accumulation of timber debris was also observed extending from the north embankment of Pier 1.
 - Vertical crack, extending from the beam seat to the channel bottom with a maximum width of 1/8 inch, was observed on both sides of the pier.
 - Vertical crack, extending from the beam seat to the channel bottom with a maximum width of 1/8 inch, was observed on the breast wall.
 - A construction joint 3 inches below the waterline exhibited areas of section loss around the entire perimeter of the pier with a maximum penetration of 1 inch.
 - Footing exposure was detected at Pier 1 from the midpoint to 6 feet west with a maximum vertical exposure of 4 inches along the north side of pier. Timber forms were exposed along the footing face.
 - Steel ice damage nosing protection extended from the top of the pier cap to 2 foot above the waterline.
 - Footing exposure was observed along the North Abutment with no vertical face exposure observed.
 - Area of section loss, 6 inches in diameter, was observed 2 feet above the waterline with a penetration of 1 inch.
 - Vertical crack, extending from the beam seat to the channel bottom with a maximum width of 1/16 inch, was observed on the breast wall.
 - Vertical crack, extending from the beam seat to the channel bottom with a maximum width of 1/32 inch, was observed on the breast wall.
 - Scattered timber debris consisting of 3-inch-diameter and smaller branches was observed along the North Abutment and the north face of Pier 1.
 - Backfill behind wingwalls was eroded making it steeply sloped.
 - A 1.5-foot-diameter log was observed along the face of the North Abutment.

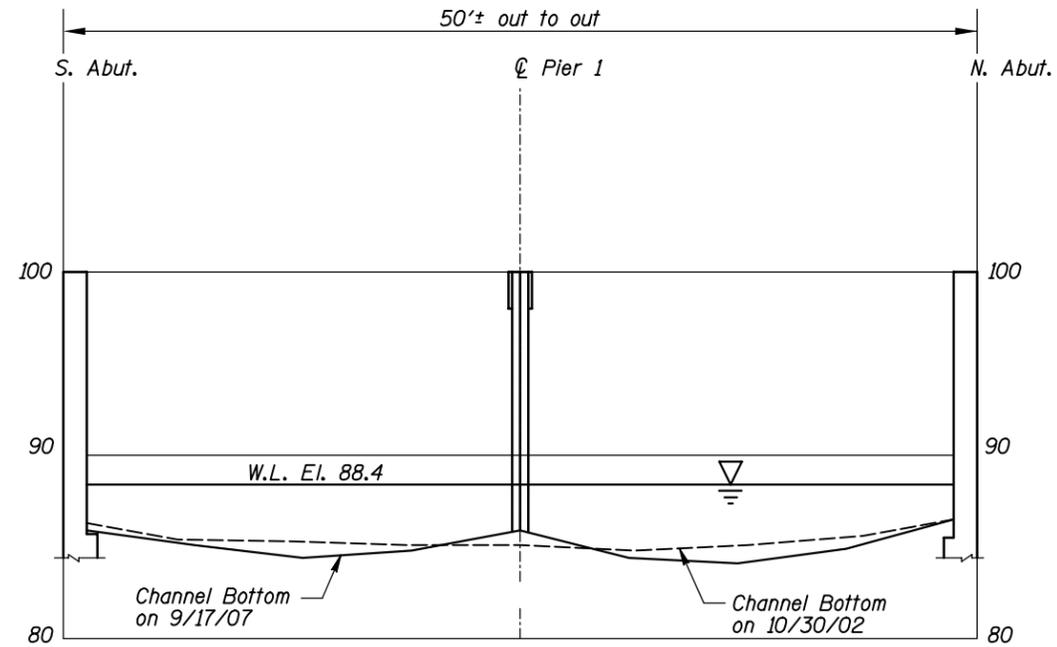
Legend

-2.0 Sounding Depth (9/17/07)
-5.2 Sounding Depth (10/30/02)

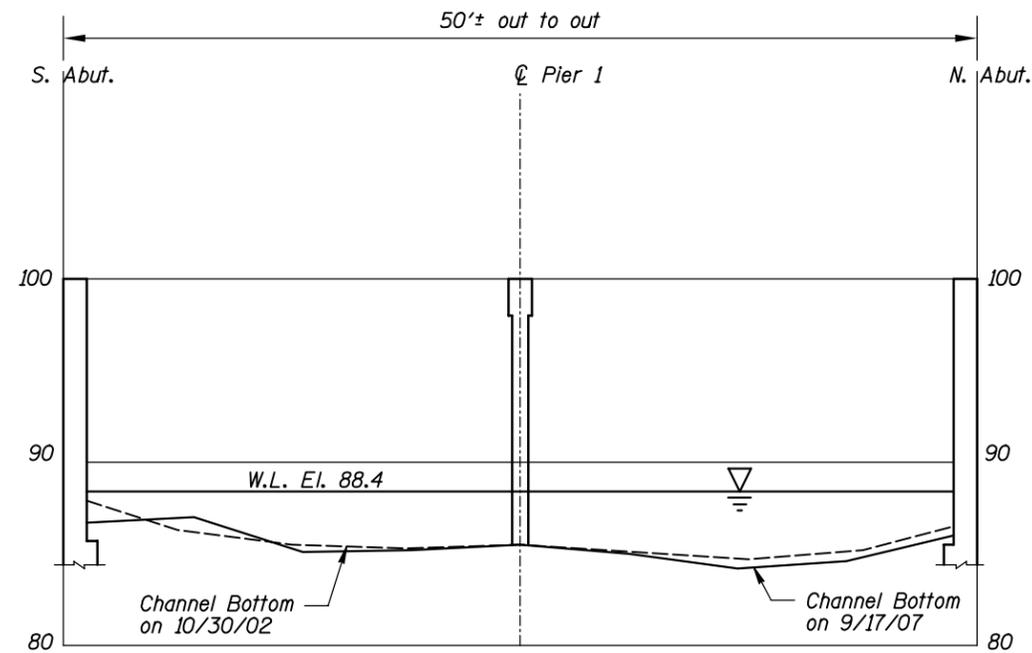
Timber Debris

Note:
All soundings based on 2007 waterline location.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. L7352 OVER THE RABBIT RIVER DISTRICT 4, WILKIN COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: PRH	COLLINS ENGINEERS	Date: SEPT. 2007
Checked By: MDK	<small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Scale: NTS
Code: 52210059		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.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. L7352 OVER THE RABBIT RIVER DISTRICT 4, WILKIN COUNTY		
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: SEPT. 2007
Checked By: MDK		Scale: NTS (U.O.N.)
Code: 52210059		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: September 17, 2007

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

BRIDGE NO: L7352 WEATHER: Cloudy, 62°F

WATERWAY CROSSED: Rabbit River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR

OTHER _____

PERSONNEL: Denis Redzic, Valerie Roustan

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

TIME IN WATER: 11:40 a.m.

TIME OUT OF WATER: 1:20 p.m.

WATERWAY DATA: VELOCITY Negligible/None

VISIBILITY 2.0 feet

DEPTH 3.7 feet maximum at Pier 1

ELEMENTS INSPECTED: North and South Abutments and Pier 1

REMARKS: Overall, the pier and both abutments were in satisfactory condition with minor vertical cracks and areas of section loss detected. Light to moderate scaling was also observed at the waterline on the pier and both of the abutments with up to 1 inch of penetration. A 2.5-foot-diameter tree with heavy accumulations of timber debris extended from the north embankment to south of Pier 1 along the upstream fascia. The top of the footing was exposed along the north face of Pier 1 and along the North Abutment with up to 4 inches of vertical face exposure detected at the pier.

FURTHER ACTION NEEDED: YES NO

Remove the large tree and heavy accumulations of timber debris extending along the upstream fascia to eliminate the potential for continued accumulation and adverse affects on the bridge.

Monitor the extent of the local scour and footing exposure at the pier and both abutments during future inspections. If scour conditions and footing exposure increase, a scour evaluation, which has presently not been made, and/or countermeasures may be warranted.

Reinspect the 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. L7352
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.
 WATERWAY CROSSED Rabbit River

INSPECTION DATE September 17, 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	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
	North Abutment	2.6'	N	6	7	9	N	6	6	8	8	5	5	6	N	N	N	N	N
	Pier 1	3.7'	N	6	7	9	N	6	6	N	N	5	5	6	N	N	N	N	N
	South Abutment	2.5'	N	7	N	9	N	7	7	8	8	N	7	7	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS Overall, the pier and both abutments were in satisfactory condition with minor vertical cracks and areas of section loss detected. Light to moderate scaling was also observed at the waterline on the pier and both of the abutments with up to 1 inch of penetration. A 2.5-foot-diameter tree with heavy accumulations of timber debris extended from the north embankment to south of Pier 1 along the upstream fascia. The top of the footing was exposed along the north face of Pier 1 and along the North Abutment with up to 4 inches of vertical face exposure detected at the pier.

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.