

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 55033
5th STREET NW
OVER THE
MIDDLE FORK, ZUMBRO RIVER
OLMSTED COUNTY



SEPTEMBER 12, 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 unit inspected at Bridge No. 55033, Pier 2, was found to be generally in good condition with no defects of structural significance observed. The concrete of the pier was smooth and sound throughout. Comparison of the current water depth soundings with the soundings recorded in 2008 indicates significant channel bottom infill as well as a significant reduction in the extent of foundation exposure at Pier 2. No foundation undermining was detected and the maximum vertical face footing exposure at Pier 2 measured only several inches. The channel bottom material consisted of random 12 inch diameter riprap with silty sand and gravel.

INSPECTION FINDINGS:

- (A) The concrete was smooth and sound with no notable deterioration.
- (B) The channel bottom material consisted of silty sand and gravel with up to 3 inches of probe rod penetration and random 12 inch diameter riprap.
- (C) A minor 2-foot-diameter by 6-inch-deep scour depression was observed along the upstream side of all pier columns.
- (D) A 0.5-foot-radius area of the top of the footing was partially exposed along the upstream side of the upstream column.
- (E) A 2-foot-radius area of the top of the footing was exposed at the upstream end of the middle and downstream columns with up to 3 inches of the maximum vertical face exposure.

RECOMMENDATIONS:

- (A) Monitor the minor scour depressions and footing exposure at Pier 2 during future underwater inspections and after (or during) periods of high water and high flows.
- (B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

Inspection Team Leader



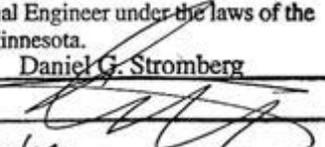
Roy A. Forsyth, PE
Date 6/30/2014 License# 49270

Respectfully submitted,

PROFESSIONAL ENGINEER

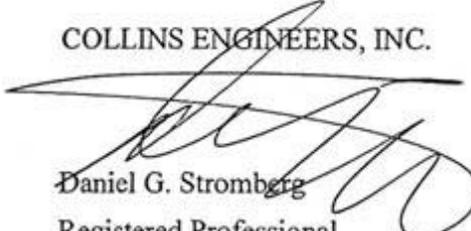
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

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: 55033

Feature Crossed: Middle Fork, Zumbro River

Feature Carried: 5th Street NW

Location: Olmsted County

Bridge Description: The superstructure consists of a concrete deck resting on three prestressed concrete multi-girder spans supported by two reinforced concrete abutments and two reinforced concrete multi-column piers. The substructure units are designated as North Abutment, Piers 1 and 2, and South Abutment.

2. INSPECTION DATA

Professional Engineer/Team Leader: Roy A. Forsyth, P.E.

Dive Team: Charles R. Euwema, Brandon Corr

Date: September 12, 2012

Weather Conditions: Overcast, 60° F

Underwater Visibility: 0.5 feet

Waterway Velocity: 0.5 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2.

General Shape: Each pier consists of a concrete pier cap supported by three round concrete columns founded on individual square concrete footings and driven H-piles.

Maximum Water Depth at Substructure Inspected: Approximately 1.9 feet.

4. WATERLINE DATUM

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

Water Surface: The waterline was approximately 18.3 feet below reference.
Waterline Elevation = 944.4

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 7

Item 92B: Underwater Inspection: Code A/09/12

Item 113: Scour Critical Bridges: Code R/07

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

X Yes _____ No

6. STRUCTURAL ELEMENT CONDITION RATING

Item #	Element Description	Quantity	Unit	Conditions				
				1	2	3	4	5
205	Reinforced Concrete Column	3	EA	3				
361	Scour	1	EA	1				
985	Slopes and Slope Protection	1	EA	1				



Photograph 1. View of Pier 1, Looking Northeast.



Photograph 2. View of Pier 2, Looking Northwest.



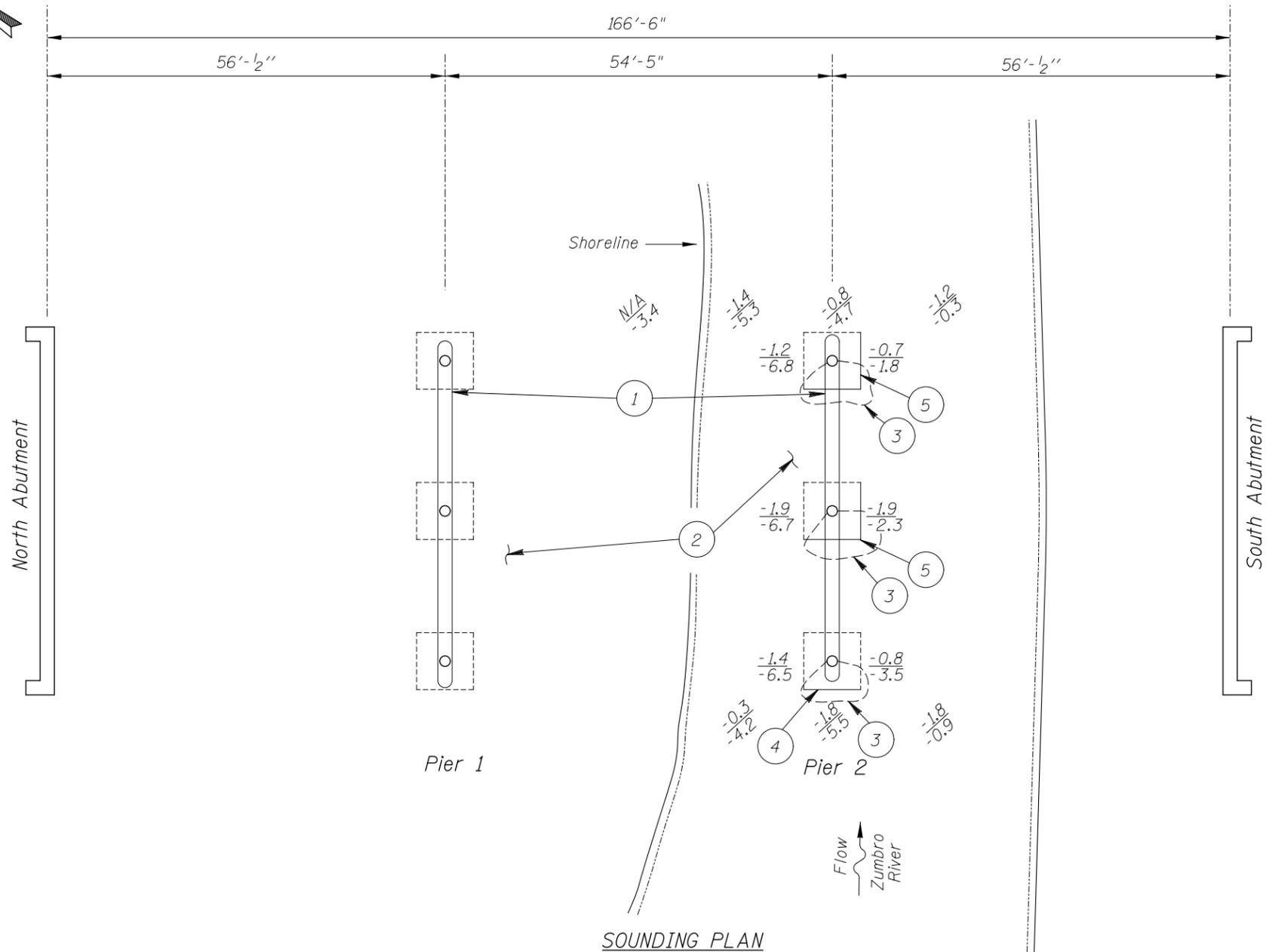
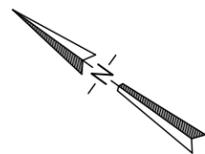
Photograph 3. View of South Abutment, Looking South.



Photograph 4. View of North Abutment, Looking North.



Photograph 5. Overall View of the Bridge, Looking East.



INSPECTION NOTES:

- ① The concrete was typically smooth and sound with no notable deterioration.
- ② The channel bottom material consisted of silty sand and gravel with up to 3 inches of probe rod penetration and random 12 inch diameter riprap.
- ③ A minor 2-foot-diameter by 0.5-foot-deep scour depression was observed at the upstream side of all Pier 2 columns.
- ④ The top of footing was partially exposed on the upstream side of the upstream column of Pier 2.
- ⑤ A 2-foot-radius area of the top of footing was exposed on the upstream side of the middle and downstream columns of Pier 2 with up to 3 inches of the vertical face exposure along the upstream side of the columns.

GENERAL NOTES:

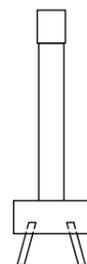
1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection, on September 12, 2012, the waterline was located approximately 18.3 feet below the top of the pier cap at the upstream end of Pier 2. This corresponds with the waterline elevation of 944.4 feet based on the bridge design plans dated February 15, 1985.
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

- 0.4 Sounding Depth from Waterline (9/12/12)
- 0.4 Sounding Depth from Waterline (10/21/08)

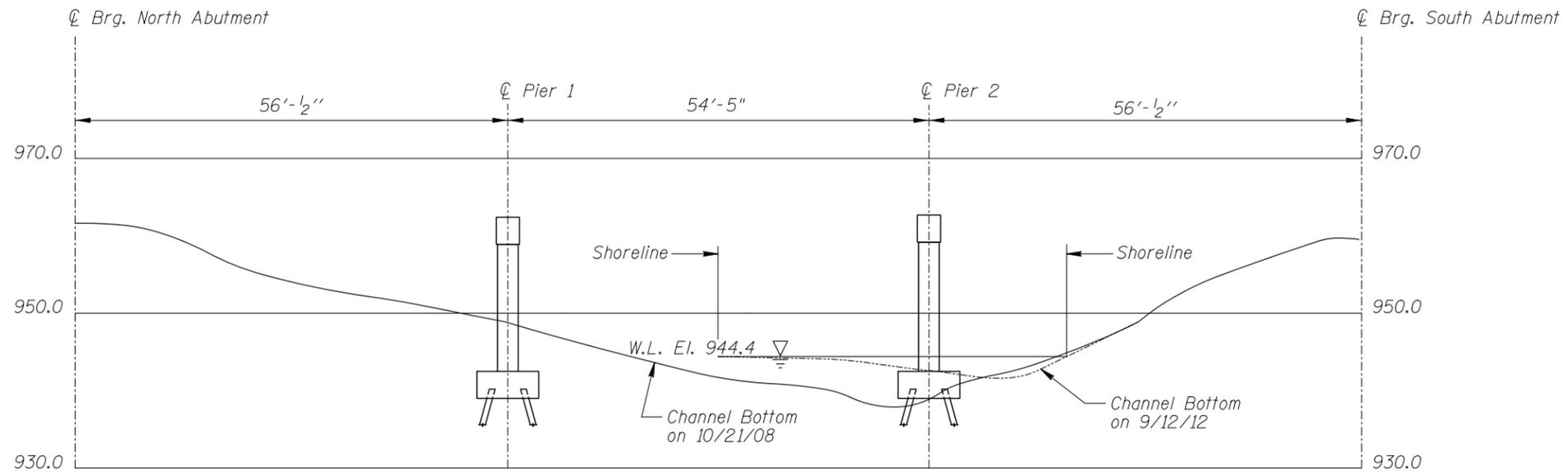
Note:

All soundings based on 2012 waterline location.

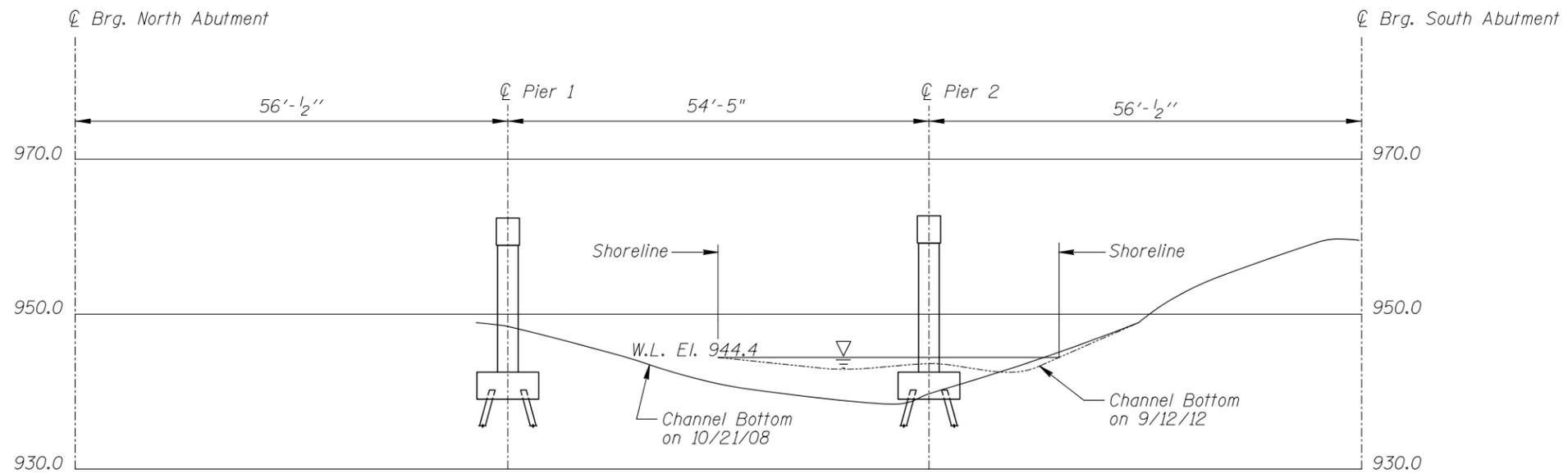


TYPICAL END VIEW OF PIERS

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 55033 OVER THE MIDDLE FORK OF THE ZUMBRO RIVER OLMSTED COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: CRE	COLLINS ENGINEERS	Date: SEPT. 2012
Checked By: LJ	123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Scale: NTS
Code: 742355033		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 55033 OVER THE MIDDLE FORK OF THE ZUMBRO RIVER OLMSTED COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: CRE	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: SEPT. 2012
Checked By: LJ		Scale: 1"=20'
Code: 742355033		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: September 12, 2012
ON-SITE TEAM LEADER: Roy A. Forsyth, P.E.
BRIDGE NO: 55033 WEATHER: Overcast, 60° F
WATERWAY CROSSED: South Branch, Middle Fork, Zumbro River
DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER Wading
PERSONNEL: Charles R. Euwema, Brandon Corr
EQUIPMENT: Camera, Sounding Pole, Tending Line
TIME IN WATER: 6:10 P.M.
TIME OUT OF WATER: 6:30 P.M.
WATERWAY DATA: VELOCITY 0.5 ft/sec
VISIBILITY 0.5 feet
DEPTH 1.9 feet at Pier 2

ELEMENTS INSPECTED: Piers 1 and 2
REMARKS: Overall, the concrete of Pier 2 was typically smooth and sound with no significant deficiencies observed. Comparison of the current water depth soundings with the soundings recorded in 2008 indicates significant channel bottom infill as well as a significant reduction in the extent of foundation exposure at Pier 2. No foundation undermining was detected and the maximum vertical face footing exposure at Pier 2 measured only several inches.

FURTHER ACTION NEEDED: YES NO

Monitor the minor scour depressions and footing exposure at Pier 2 during future inspections and after periods of high water and high flows.

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. 55033
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER. Roy A. Forsyth, P.E.
 WATERWAY CROSSED South Branch, Middle Fork, Zumbro River

INSPECTION DATE September 12, 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	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	0.0'	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	Pier 2	1.9'	7	7	N	8	N	7	6	7	7	N	7	7	7	N	8	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete of Pier 2 was typically smooth and sound with no significant deficiencies observed. Comparison of the current water depth soundings with the soundings recorded in 2008 indicates significant channel bottom infill as well as a significant reduction in the extent of foundation exposure at Pier 2. No foundation undermining was detected and the maximum vertical face footing exposure at Pier 2 measured only several inches.

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.