

UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 18510  
CSAH NO. 66  
OVER THE  
DAGGETT CHANNEL  
DISTRICT 3 – CROW WING COUNTY

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SEPTEMBER 9, 2012  
PREPARED FOR THE  
MINNESOTA DEPARTMENT OF TRANSPORTATION  
BY  
COLLINS ENGINEERS, INC.  
AND  
WSB & ASSOCIATES, INC.  
JOB NO. 2107

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected below water at Bridge No. 18510, Piers 1 and 2, were found to be in good condition with no defects of structural significance at this time. The piles exhibited coating failure from 9 inches above the waterline to the channel bottom with up to 30% of the surface area covered by rust nodules 1/2 to 1 1/2 inch in diameter. The piles exhibited only minor pitting and minimal section loss related to the corrosion. The channel bottom around the substructure units appeared stable with no significant scour or other channel bottom deficiencies.

INSPECTION FINDINGS:

- (A) The piles of Piers 1 and 2 exhibited coating loss from approximately 9 inches above the waterline to the channel bottom with up to 30% of the surface area covered with rust nodules 1/2 to 1 1/2 inch in diameter. The piles exhibited only minor pitting and minimal section loss up to 1/32 inch deep as a result of the present extent of corrosion.

RECOMMENDATIONS:

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

Inspection Team Leader:

WSB and Associates



Barritt Lovelace  
Registered Professional Engineer  
Bridge Safety Inspection Team Leader

Respectfully submitted,

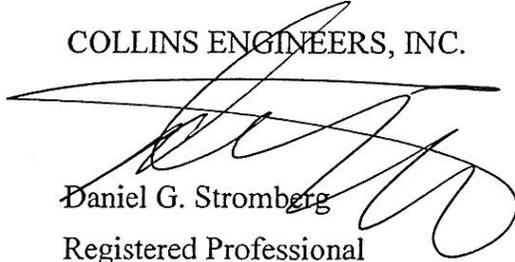
PROFESSIONAL ENGINEER

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: 18510

Feature Crossed: Daggett Channel

Feature Carried: CSAH No. 66

Location: District 3 – Crow Wing County

Bridge Description: The superstructure consists of three spans of multiple concrete beams. The superstructure is supported by two reinforced concrete abutments and two steel pipe pile bent piers. The piers are numbered 1 and 2 starting from the south end of the bridge.

2. INSPECTION DATA

Professional Engineer/Team Leader: Barritt Lovelace, P.E.

Dive Team: Brad Robinson (WSB), Lukas Janulis (Collins)

Date: September 9, 2012

Weather Conditions: Sunny, 70°F

Underwater Visibility: 5.0 feet

Waterway Velocity: Negligible / None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2.

General Shape: Piers 1 and 2 consist of a single line of 15 steel pipe piles supporting a reinforced concrete cap. Each abutment is a pile supported reinforced concrete abutment with a concrete slope wall.

Maximum Water Depth at Substructure Inspected: Approximately 10.0 feet.

4. WATERLINE DATUM

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

Water Surface: The waterline was approximately 9.5 feet below reference.  
Assumed Waterline Elevation = 90.5.

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 8

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

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

6. STRUCTURAL ELEMENT CONDITION RATING:

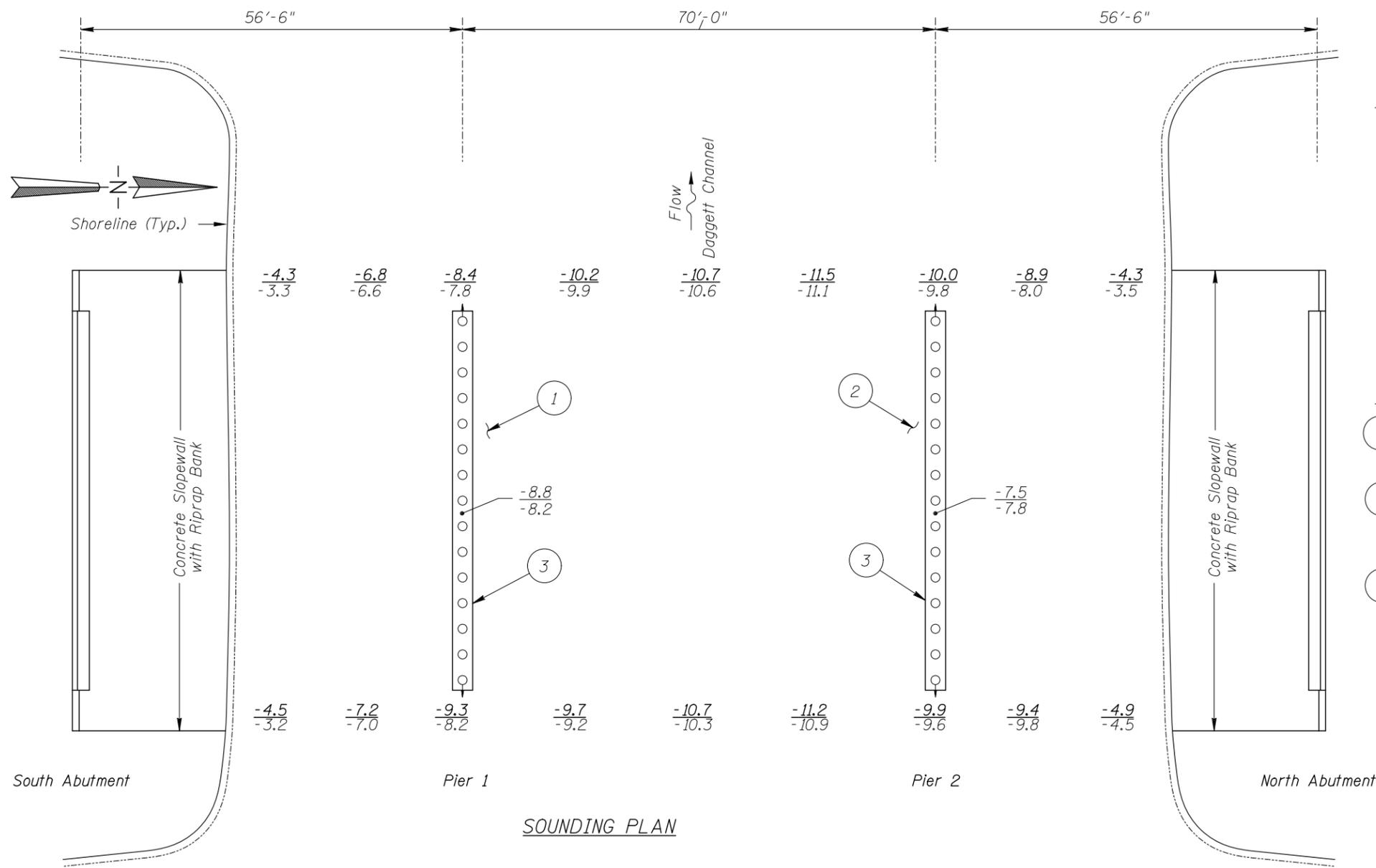
Item #	Element Description	Quantity	Unit	Conditions				
				1	2	3	4	5
382	Cast-In-Place Piling	30	EA		30			
985	Slopes	1	EA		1			



Photograph 1 View of Pier 1, Looking North.



Photograph 2 View of Pier 2, Looking Southeast.



**GENERAL NOTES:**

1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection on September 9, 2012, the waterline was located approximately 9.5 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 90.5.
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.

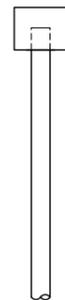
**INSPECTION NOTES:**

- 1 The channel bottom around Pier 1 consisted of sand with 6 to 8 inches of probe rod penetration.
- 2 The channel bottom around Pier 2 consisted of sand and 6- to 8-inch-diameter cobbles with 6 to 8 inches of probe rod penetration.
- 3 Piers 1 and 2 exhibited coating failure and surface corrosion from approximately 9 inches above the waterline to the channel bottom on approximately 30 percent of the surface area with 1/2-inch to 1.5-inch-diameter rust nodules and minimal section loss with pitting up to 1/32 inches deep.

**Note:**

All soundings based on 2012 waterline location.

TYPICAL END VIEW OF PIERS

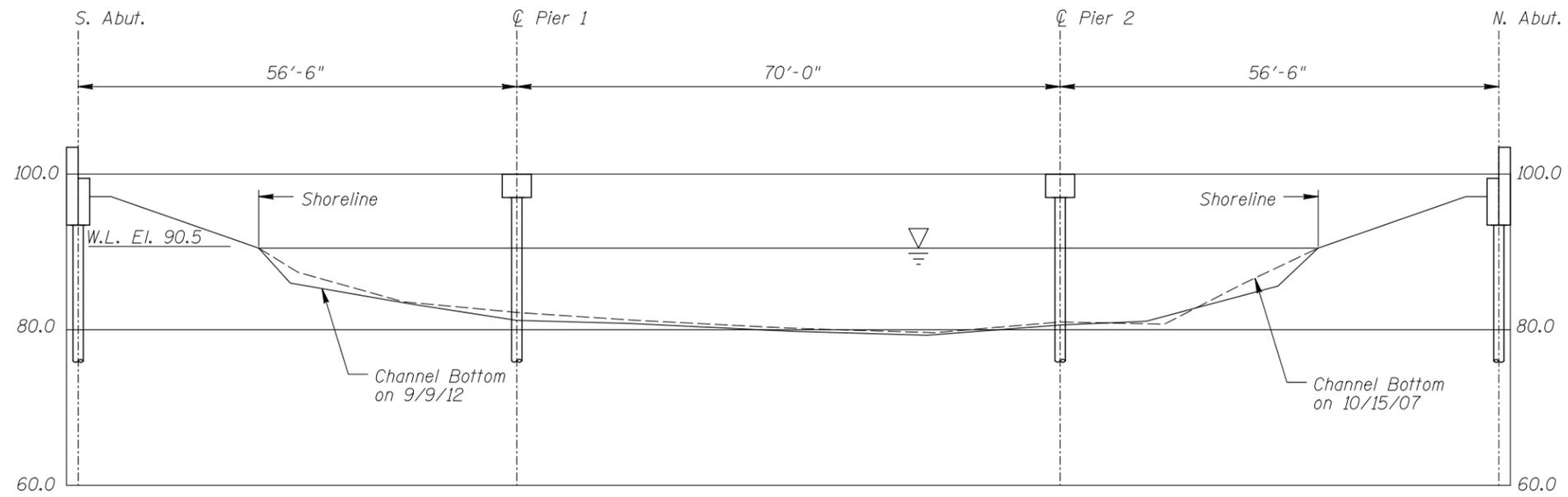


Legend

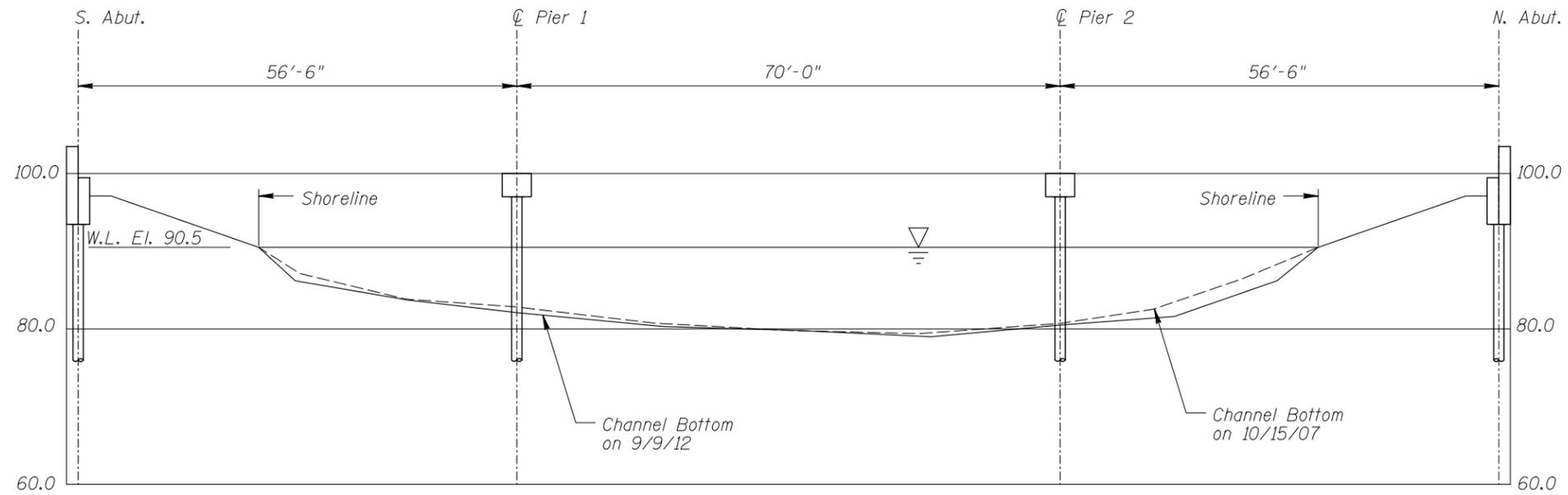
- 5.2 Sounding Depth (9/9/12)
- 5.2 Sounding Depth (10/15/07)
- Steel Pipe, Cast-in-place Concrete Pile
- ⊕ Battered Steel Pipe, Cast-in-place Concrete Pile

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<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 18510 OVER DAGGETT CHANNEL DISTRICT 3, CROW WING COUNTY		
<b>INSPECTION AND SOUNDING PLAN</b>		
Drawn By: BJR	<b>COLLINS ENGINEERS</b>	Date: SEP. 2012
Checked By: BRL		Scale: NTS
Code: 522118510		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. 18510 OVER DAGGETT CHANNEL DISTRICT 3, CROW WING COUNTY		
<b>UPSTREAM AND DOWNSTREAM FASCIA PROFILES</b>		
Drawn By: BJR	<b>COLLINS ENGINEERS</b>	Date: SEP. 2012
Checked By: BRL		Scale: 1"=20'
Code: 522118510		Figure No.: 2

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

INSPECTORS: WSB & Associates and Collins Engineers      DATE: September 9, 2012

ON-SITE TEAM LEADER: Barritt Lovelace, P.E.

BRIDGE NO: 18510      WEATHER: Sunny, 70°F

WATERWAY CROSSED: Daggett Channel

DIVING OPERATION:  SCUBA       SURFACE SUPPLIED AIR  
 OTHER

PERSONNEL: Brad Robinson (WSB), Lukas Janulis (Collins)

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

TIME IN WATER: 11:30 a.m.

TIME OUT OF WATER: 11:55 a.m.

WATERWAY DATA: VELOCITY Negligible / None

VISIBILITY 5.0 feet

DEPTH 10.0 feet maximum at Pier 2

ELEMENTS INSPECTED: Piers 1 and 2

REMARKS: Overall, the submerged portion of the steel piles was in good condition exhibiting coating failure from 9 inches above the waterline to the channel bottom with 30 percent of the surface area covered by rust nodules 1/2 to 1 1/2 inches in diameter. The piles exhibited only minor pitting (up to 1/32 inch deep) and minimal section loss related to the corrosion. No channel bottom deficiencies were encountered.

FURTHER ACTION NEEDED:       YES       NO

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. 18510  
 INSPECTORS WSB & Associates and Collins Engineers, Inc.  
 ON-SITE TEAM LEADER Barritt Lovelace, P.E.  
 WATERWAY CROSSED Daggett Channel

INSPECTION DATE September 9, 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	9.3'	7	N	N	8	N	7	8	8	8	N	8	N	7	N	7	N	N
	Pier 2	10.0'	7	N	N	8	N	7	8	8	8	N	8	N	7	N	7	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the submerged portion of the steel piles was in good condition exhibiting coating failure from up to 9 inches above the waterline to the channel bottom with 30 percent of the surface area covered by rust nodules 1/2 to 1 1/2 inches in diameter. The piles exhibited only minor pitting (up to 1/32 inch deep) and minimal section loss related to the corrosion. No channel bottom deficiencies were encountered.

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.