

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 69534

CSAH 48

OVER THE

CLOQUET RIVER

ST. LOUIS COUNTY



SEPTEMBER 26, 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 No. 69534, Bents 1 and 2, were found to be in good condition, with no defects of structural significance. The steel shell piles of Bent 1 exhibited minor corrosion with rust nodules. All the piles of Bent 2 were typically in good condition. The channel bottom appeared stable with no notable scour.

INSPECTION FINDINGS:

- (A) The channel bottom material around Bent 1 typically consisted of cobbles and gravel with a maximum probe rod penetration of 4 inches.
- (B) The channel bottom material around Bent 2 typically consisted of sand and gravel with a maximum probe rod penetration of 2 inches.
- (C) The steel piles of Bent 1 exhibited rust nodules, up to 1/2 inch diameter with up to 1/32 inch deep pitting, on approximately 30 percent of the pile surface area extending from the channel bottom to 1 foot below the waterline.
- (D) The steel piles of Bent 2 were in good condition with no appreciable coating loss or corrosion.

RECOMMENDATIONS:

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

- (B) The inspection of the submerged substructure units of Structure No. 69534 can most likely be accomplished in the future without using a dive team. To perform the underwater inspection, a properly equipped qualified inspector will have to enter the water during a period of low flow. As channel bottom contours and depths of flow can change quickly, it is recommended that lead line soundings of water depth be taken along the upstream and downstream fascias to determine whether wading is possible prior to beginning the inspection. If conditions are unsafe for inspection by wading, then an underwater inspection with the use of a dive team will be required.

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: 69534

Feature Crossed: Cloquet River

Feature Carried: CSAH 48

Location: St. Louis County

Bridge Description: The superstructure consists of a reinforced concrete deck supported by several precast concrete girders. The superstructure is supported by two reinforced concrete abutments and two pile bents.

2. INSPECTION DATA

Professional Engineer Diver: Daniel G. Stromberg, P.E.

Dive Team: Marc B. Parker, Clay G. Brookins

Date: September 26, 2012

Weather Conditions: Sunny, 50° F

Underwater Visibility: 2 feet

Waterway Velocity: 0.5 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Bents 1 and 2

General Shape: Each pile bent consists of 8 steel encased concrete piles supporting a concrete pile cap.

Maximum Water Depth at Substructure Inspected: Approximately 2.8 feet.

4. WATERLINE DATUM

Water Level Reference: Top of the pile cap at the upstream end of Bent 1.

Water Surface: The waterline was approximately 13.0 feet below the reference.
Waterline Elevation 87.0.

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 A/09/12

Item 113: Scour Critical Bridges: Code N/12

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
382	Cast-In-Place Piles	16	EA	8	8	0	0	n/a
985	Slopes and Slope Protection	1	EA	1	0	0	n/a	n/a



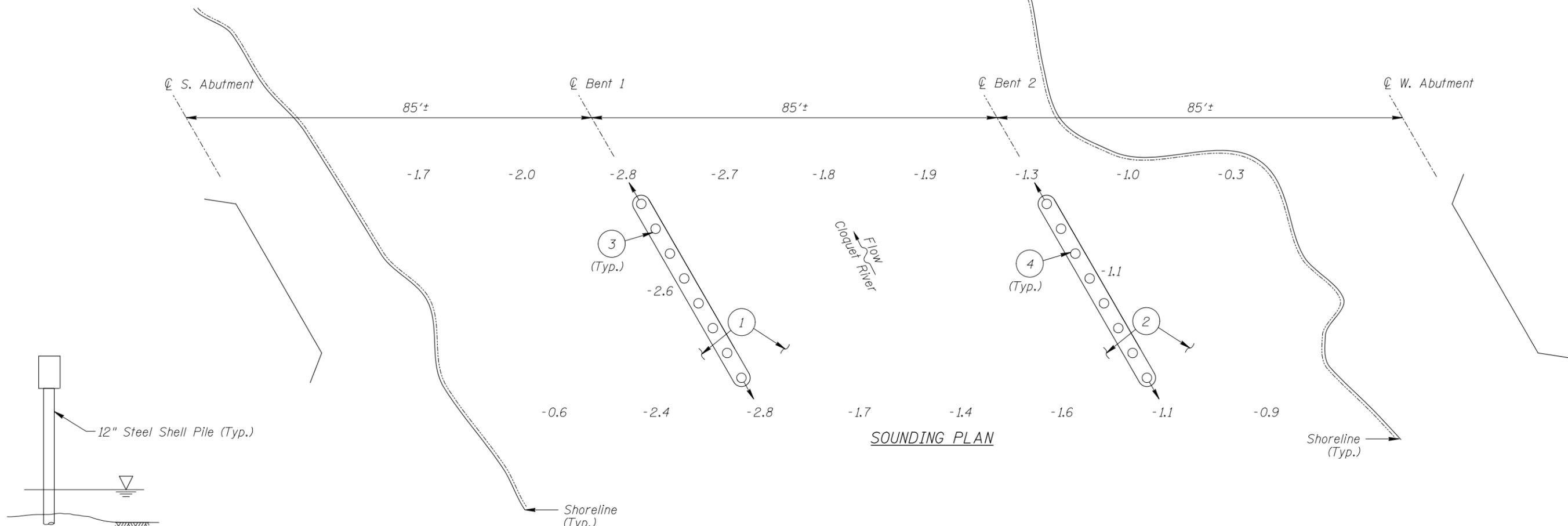
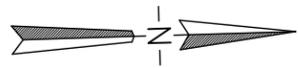
Photograph 1. Overall View of Structure, Looking Southeast



Photograph 2. View of the Bent 1, Looking Southeast.



Photograph 3. View of Bent 2, Looking Southeast.



TYPICAL END VIEW OF BENT

INSPECTION NOTES:

- 1 The channel bottom material around Bent 1 typically consisted of cobbles and gravel with a maximum probe rod penetration of 4 inches.
- 2 The channel bottom material around Bent 2 typically consisted of sand and gravel with a maximum probe rod penetration of 2 inches.
- 3 The steel piles of Bent 1 exhibited rust nodules, up to 1/2 inch diameter with up to 1/32 inch deep pitting, on approximately 30 percent of the pile surface area extending from the channel bottom to 1 foot below the waterline.
- 4 The steel piles of Bent 2 were in good condition with no appreciable coating loss or corrosion.

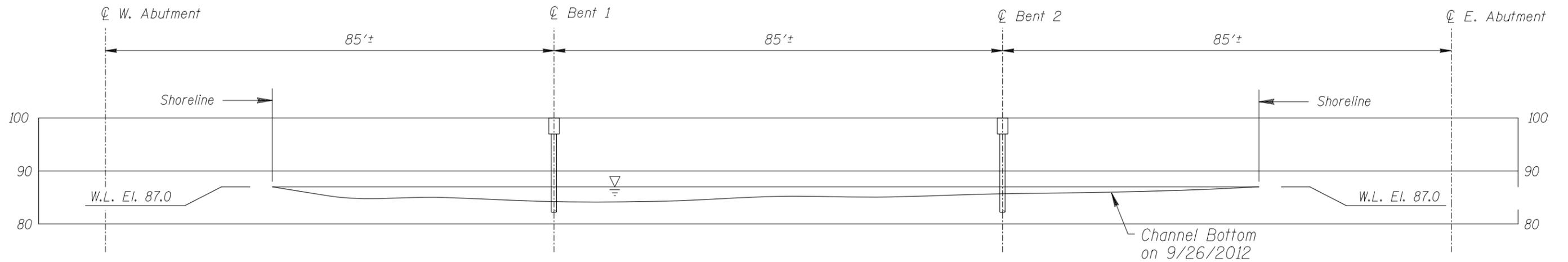
GENERAL NOTES:

- 1 Bents 1 and 2 were inspected during the underwater inspection.
- 2 At the time of inspection on September 26, 2012, the waterline was located approximately 13.0 feet below the top of the pile cap at the upstream end of the 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 87.0.
- 3 Soundings indicate the water depth at the time of inspection and are measured in feet.

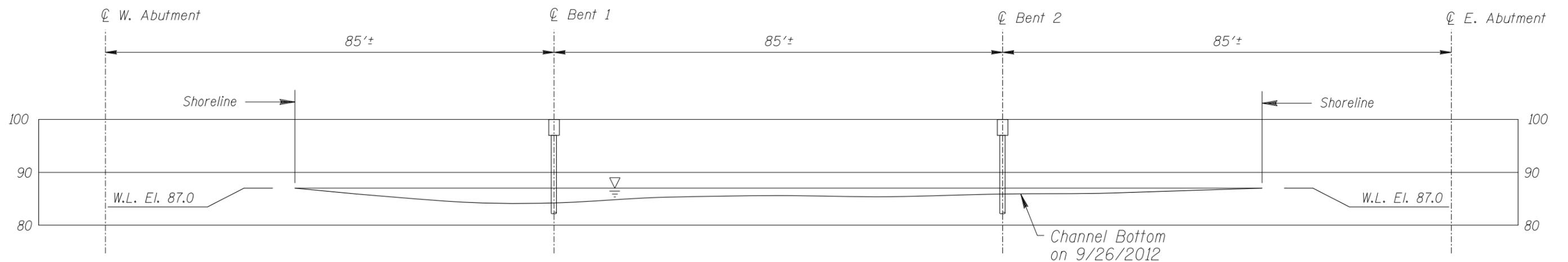
Legend

-17.0	Sounding Depth from Waterline (9/26/2012)
○	12-inch Diameter Steel Shell Pile
○→	Battered 12-inch Diameter Steel Shell Pile
①	Inspection Note Number

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 69534 CSAH 48 OVER THE CLOQUET 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: NOV. 2012
Checked By: LJ		Scale: NTS
Code: 742369534		Figure No.: 1



DOWNSTREAM FASCIA PROFILE



UPSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 69534 CSAH 48 OVER THE CLOQUET 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: NOV. 2012
Checked By: LJ		Scale: 1"=20'
Code: 742369534		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: September 26, 2012

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

BRIDGE NO: 69534 WEATHER: Sunny, 50° F

WATERWAY CROSSED: Cloquet River

DIVING OPERATION: _____ SCUBA _____ SURFACE SUPPLIED AIR
 OTHER Inspection by Wading

PERSONNEL: Marc B. Parker, Clayton G. Brookins

EQUIPMENT: Dry Suit, Probe Rod, Camera, Hand Tools

TIME IN WATER: 10:10 A.M.

TIME OUT OF WATER: 10:30 A.M.

WATERWAY DATA: VELOCITY 0.5 ft/sec

VISIBILITY 2 feet

DEPTH 2.8 feet maximum

ELEMENTS INSPECTED: Bents 1 and 2

REMARKS: Overall, the substructure units inspected underwater were found to be in good condition, with no defects of structural significance. The steel shell piles of Bent 1 exhibited light corrosion with rust nodules. All the piles of Bent 2 were in good condition. The channel bottom appeared stable with no notable scour.

FURTHER ACTION NEEDED: _____ YES NO

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

The inspection of the submerged substructure units of Structure No. 69534 can most likely be accomplished in the future without using a dive team. To perform the underwater inspection, a properly equipped qualified inspector will have to enter the water during a period of low flow. As channel bottom contours and depths of flow can change quickly, it is recommended that lead line soundings of water depth be taken along the upstream and downstream fascias to determine whether wading is possible prior to beginning the inspection. If conditions are unsafe for inspection by wading, then an underwater inspection with the use of a dive team will be required.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 69534
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Daniel G. Stromberg, P.E.
 WATERWAY CROSSED Cloquet River

INSPECTION DATE September 26, 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
	Bent 1	2.8'	N	7	N	N	N	7	N	N	6	N	6	N	7	N	N	N	N
	Bent 2	1.3'	N	8	N	N	N	8	N	N	6	N	6	N	8	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the substructure units inspected underwater were found to be in good condition, with no defects of structural significance. The steel shell piles of Bent 1 exhibited light corrosion with rust nodules. All the piles of Bent 2 were in good condition. The channel bottom appeared stable with no notable scour.

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.