

UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 69609

CSAH 7

OVER THE

ST LOUIS RIVER

ST. LOUIS COUNTY

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JULY 24, 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 unit inspected below water at Bridge No. 69609, Pier 1, was in good condition with no defects of structural significance. Light concrete scaling was observed from 0.5 feet above to 1 foot below the waterline, with a maximum 1/4 inch penetration. Footing exposure was detected around the pier with a maximum vertical face exposure of 8 inches. Moderate timber debris accumulation was observed around Pier 1 consisting of logs and branches with up to 12 inch diameter. The debris extended from the channel bottom to 2 feet above the waterline.

INSPECTION FINDINGS:

- (A) A moderate accumulation of timber debris consisting of logs and branches up to 12 inches in diameter was found around the entire pier extending from 10 feet upstream of the upstream nose and up to 3 feet off the north and south faces. The debris extended from the channel bottom to 2 feet above the waterline.
- (B) The top of footing was exposed around the entire pier with a maximum of 8 inches vertical exposure on the south face of the pier.
- (C) Light concrete scaling was observed from 0.5 feet above to 1 foot below the waterline, with a maximum 1/4 inch penetration.
- (D) The channel bottom material consisted of sand and gravel (infill) allowing 2 to 3 inches of probe rod penetration, with random pieces of 12 inch diameter and smaller riprap.

RECOMMENDATIONS:

- (A) Monitor the extent of footing exposure at Pier 1 during future underwater inspections.
- (B) Monitor the timber debris accumulation at Pier 1, during future inspections, and if found to be increasing to a more detrimental extent, removal operations may become warranted at that time.
- (C) 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,

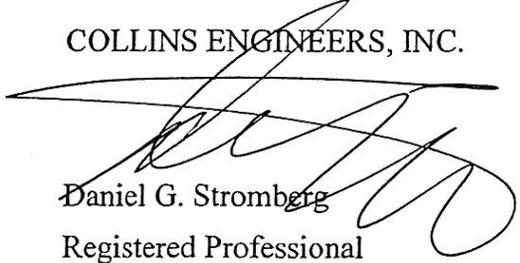
PROFESSIONAL ENGINEER

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: 69609

Feature Crossed: St Louis River

Feature Carried: CSAH 7

Location: St. Louis County

Bridge Description: The superstructure consists of two spans of precast beams supporting a reinforced concrete deck. The bridge is supported by two reinforced concrete abutments and one reinforced concrete pier.

2. INSPECTION DATA

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

Dive Team: Kasey Yoder (WSB), John Loftus (Collins)

Date: July 24, 2012

Weather Conditions: Sunny, 75° F

Underwater Visibility: 2.0 foot

Waterway Velocity: 0.5 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Pier 1

General Shape: The pier consisted of a hammerhead pier cap supported by an oblong concrete pier wall. The abutments and pier are founded on concrete footing supported by steel H piles.

Maximum Water Depth at Substructure Inspected: Approximately 6.9 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap at the downstream end of Pier 1.

Water Surface: The waterline was approximately 17 feet below reference.  
Waterline Elevation = 1299.28.

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 6

Item 92B: Underwater Inspection: Code B/07/12

Item 113: Scour Critical Bridges: M

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:

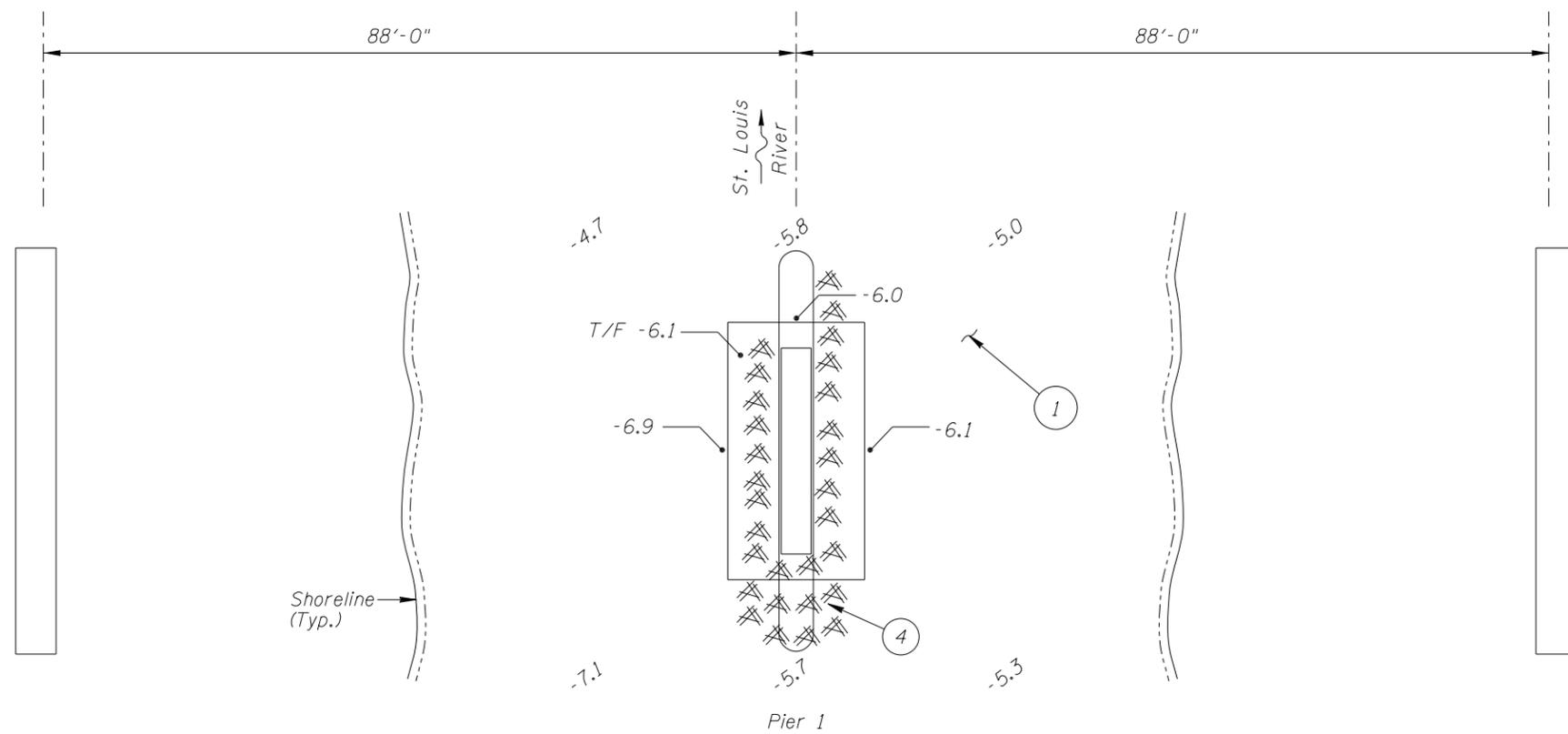
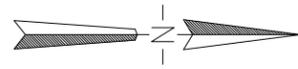
Item #	Element Description	Quantity	Unit	Conditions				
				1	2	3	4	5
210	Concrete Pier Wall	23	LF	23				
985	Slopes	1	EA	1				



Photograph 1. View of the Downstream Fascia, Looking East.



Photograph 2. View of Pier 1, Looking East.



SOUNDING PLAN

Legend

- 1.2 Sounding Depth from Waterline (7/24/12)
-  Timber Debris

Note:

All soundings are based on 2012 waterline location.

GENERAL NOTES:

1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection on July 24, 2012, the waterline was located approximately 17.0 feet below the top of the pier cap at the downstream end of Pier 1. This corresponds with a waterline elevation of 1299.28 feet based on bridge design plans dated Dec. 8, 1994.
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 material consisted of gravel and sand with random pieces of riprap 12 inch diameter and smaller, allowing up to 3 inches of probe rod penetration.
- ② Light concrete scaling, with 1/8 inch typical penetration and 1/4 inch maximum, was observed on Pier 1 from 6 inch above to 1 foot below the waterline.
- ③ The top of footing was exposed along both faces of the pier with a maximum vertical exposure of 8 inches on the south face.
- ④ A moderate accumulation of timber debris, consisting of logs and branches 12 inch diameter and smaller around the perimeter of the pier, extending 10 feet upstream off the upstream nose and 3 feet off of the north and south faces. The debris extended from the channel bottom to 2 feet above the waterline.

**MINNESOTA  
DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION**

STRUCTURE NO. 69609  
OVER THE ST. LOUIS RIVER  
DISTRICT 1, ST. LOUIS COUNTY

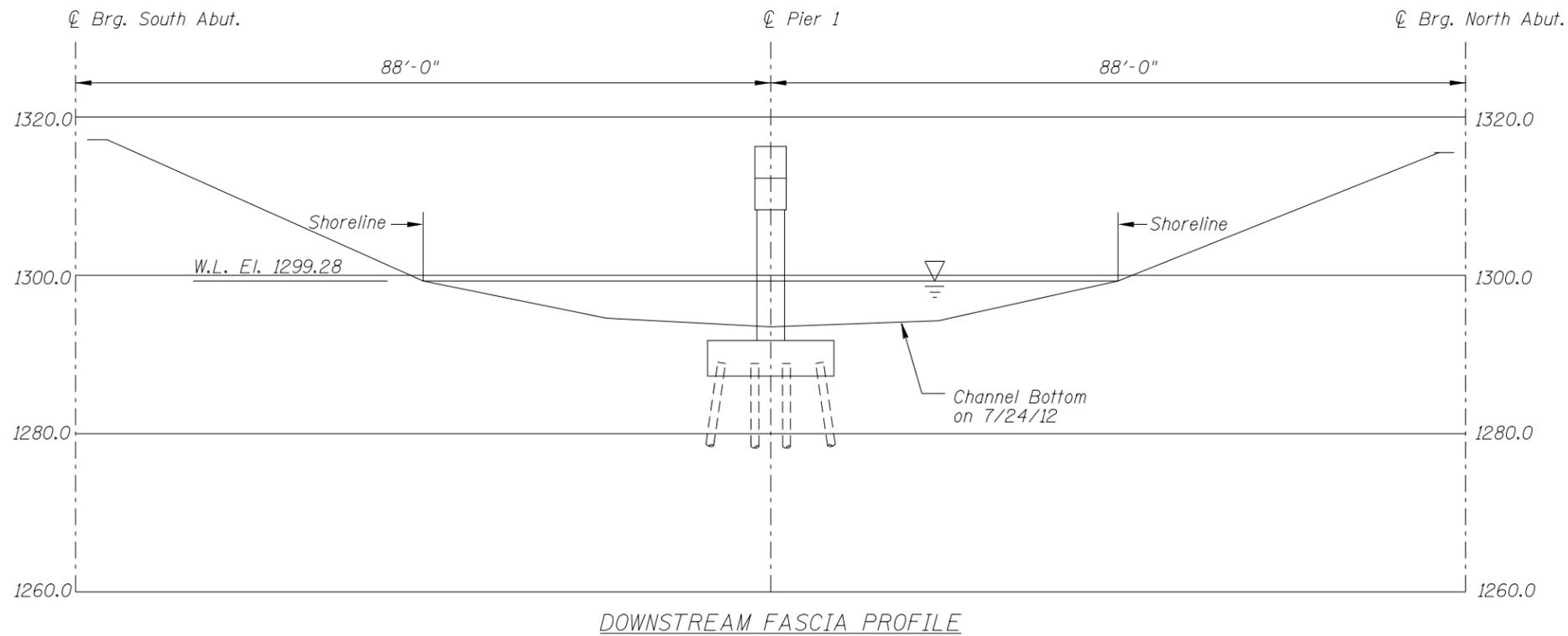
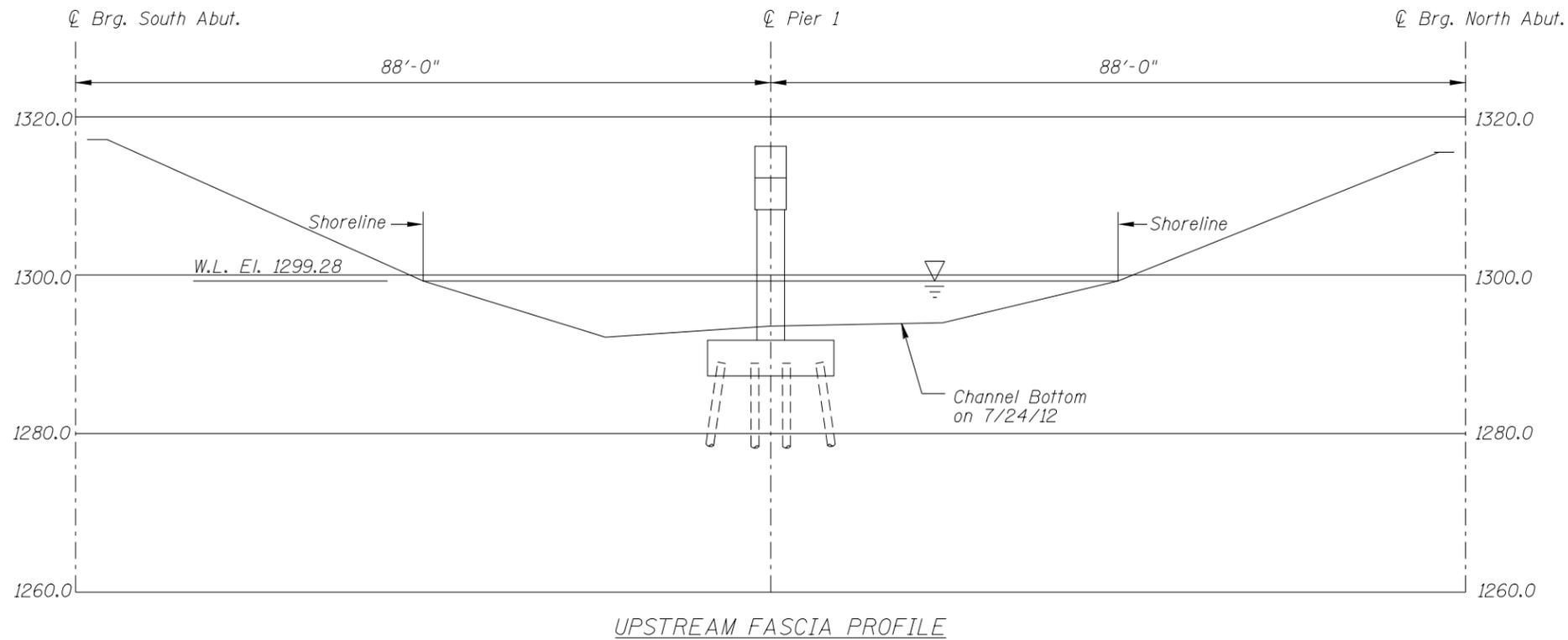
INSPECTION AND SOUNDING PLAN



Drawn By: BJR  
Checked By: BRL  
Code: ---

**COLLINS ENGINEERS**  
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Chicago, IL 60606  
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Date: JULY 2012  
Scale: NTS  
Figure No.: 1



Note:  
Refer to Figure 1 for General Notes.

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**MINNESOTA  
DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION**

STRUCTURE NO. 69609  
OVER THE ST. LOUIS RIVER  
DISTRICT I, ST. LOUIS COUNTY

UPSTREAM AND DOWNSTREAM  
FASCIA PROFILES

Drawn By: BJR	<b>COLLINS ENGINEERS</b>	123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: JULY 2012
Checked By: BRL			Scale: 1"=20'
---			Figure No.: 2

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

INSPECTORS: WSB & Associates and Collins DATE: July 24, 2012

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

BRIDGE NO: 69609 WEATHER: Sunny, 75° F

WATERWAY CROSSED: St Louis River

DIVING OPERATION:  SCUBA  SURFACE SUPPLIED AIR  
 OTHER

PERSONNEL: Kasey Yoder (WSB), John Loftus (Collins)

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

TIME IN WATER: 16:30

TIME OUT OF WATER: 17:05

WATERWAY DATA: VELOCITY 0.5 ft/sec.

VISIBILITY 2 feet

DEPTH 6.9 feet maximum

ELEMENTS INSPECTED: Pier 1

REMARKS: Overall, Pier 1 was in good condition with no defects of structural significance. There was no notable concrete deterioration, apart from only light to moderate scaling of the concrete pier wall and exposed footing surfaces. The footing was exposed on all sides with a maximum 8 inches of vertical exposure along the south face of Pier 1. Moderate timber debris accumulation was observed around the pier extending from the channel bottom to 2 feet above the waterline.

FURTHER ACTION NEEDED:  YES  NO

Monitor the extent of footing exposure during future underwater inspections.

Monitor timber debris during future underwater inspections.

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. 69609  
 INSPECTORS WSB & Associates, Inc. and Collins Engineers, Inc.  
 ON-SITE TEAM LEADER Barritt Lovelace, P.E.  
 WATERWAY CROSSED St Louis River

INSPECTION DATE July, 24, 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 (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	6.9'	N	7	6	N	N	6	6	7	7	6	6	7	N	N	N	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, Pier 1 was in good condition with no defects of structural significance. There was no notable concrete deterioration, apart from only light to moderate scaling of the concrete pier wall and exposed footing surfaces. The footing was exposed on all sides with a maximum 8 inches of vertical exposure along the south face of Pier 1. Moderate timber debris accumulation was observed around the pier extending from the channel bottom to 2 feet above the waterline.

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.