

UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 30507

CSAH NO. 5

OVER THE

RUM RIVER

DISTRICT 3 - ISANTI COUNTY

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JULY 27, 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 at Bridge No. 30507, Piers 1 and 2, were found to be in good to satisfactory condition with no structurally significant defects observed. A light to moderate accumulation of timber debris was observed at Piers 1 and 2. A 3 feet deep scour depression was observed along the entire west face of Pier 2, exposing the top of footing with no vertical exposure present. The extent of scour and footing exposure at Pier 2 and timber debris at both piers was comparable to the conditions found during the last inspection.

INSPECTION FINDINGS:

- (A) A 2-foot-long by 6-inch-high area of moderate scaling with a penetration of ½ inch was observed at the northwest corner of Pier 1 extending from 3.5 foot to 4 feet below the waterline.
- (B) Two 1 foot high areas of moderate to heavy scaling were observed on the east face of Pier 1, 5 feet below the waterline. The first one was 2 feet long with 1 inch penetration located 6 feet south of the upstream nose. The second area was 1 foot long with ½ inch penetration located 14 feet south of the upstream nose.
- (C) A 3 feet deep scour depression was present along the entire west face of Pier 2, extending up to 5 feet off the pier face.
- (D) A portion of the top of footing along the west side of Pier 2 was exposed, with no vertical exposure, extending from midpoint to the downstream quarter point of the pier shaft. The surface of the exposed footing exhibited moderate scaling with penetrations of up to 1/4 inch in depth.
- (E) Light to moderate accumulations of timber debris were observed at Piers 1 and 2, with debris around the upstream nose at Pier 1 and along the west side at Pier 2.

RECOMMENDATIONS:

- (A) Monitor the timber drift that has accumulated around the piers, and if found to be progressing to the point of influencing or becoming excessive, then removal operations may become necessary.
  
- (B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months. Continue to monitor the footing exposure at Pier 2 during future inspections.

WSB and Associates



Barritt Lovelace  
Registered Professional Engineer  
Bridge Safety Inspection Team Leader

Respectfully submitted,

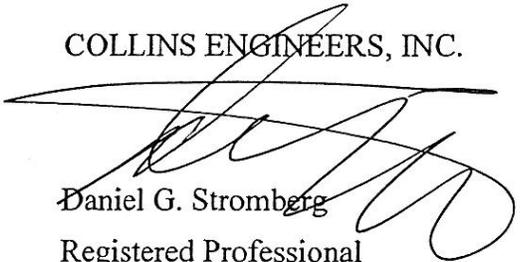
PROFESSIONAL ENGINEER

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: 30507

Feature Crossed: Rum River

Feature Carried: CSAH No. 5

Location: District 3 - Isanti County

Bridge Description: The bridge superstructure consists of three spans of multiple precast concrete girders supported by two concrete hammerhead type piers and two concrete abutments. The piers are numbered 1 and 2 starting from the west end of the bridge.

2. INSPECTION DATA

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

Dive Team: Brad Robinson (WSB), John Loftus (Collins)

Date: July 27, 2012

Weather Conditions: Sunny, 75° F

Underwater Visibility: 1.0 foot

Waterway Velocity: 2.0 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2.

General Shape: Each pier consists of an oblong rectangular shaft with rounded noses which rests upon a rectangular concrete footing supported on timber piles.

Maximum Water Depth at Substructure Inspected: Approximately 11.9 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the bridge seat on the upstream end of Pier 2.

Water Surface: The waterline was approximately 13.6 feet below reference.  
Waterline Elevation = 900.4.

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 6

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

Item 113: Scour Critical Bridges: Code O/96

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	89	LF	84	5			
361	Scour Smart Flag	1	EA	1				
985	Slopes and Slope Protection	1	EA		1			



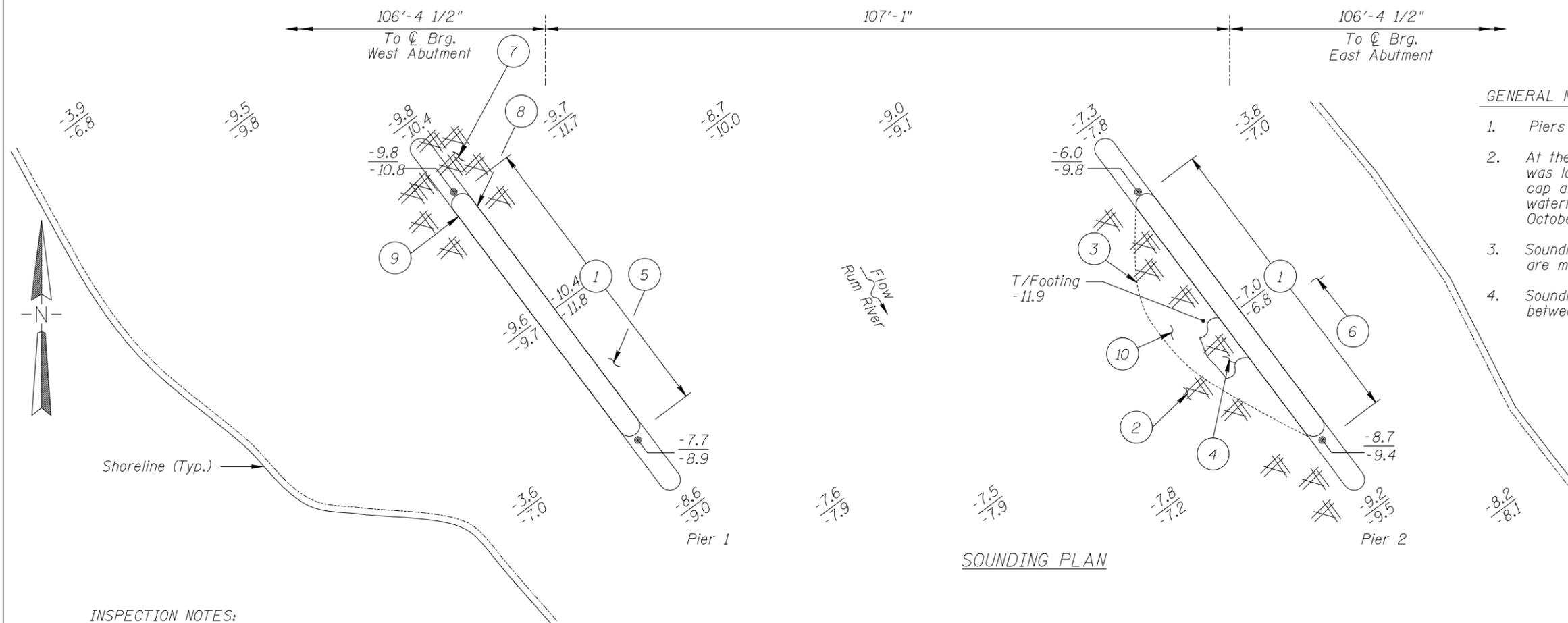
Photograph 1. Overall View of Structure, Looking South.



Photograph 2. View of Pier 1, Looking East.



Photograph 3. View of Pier 2, Looking West.

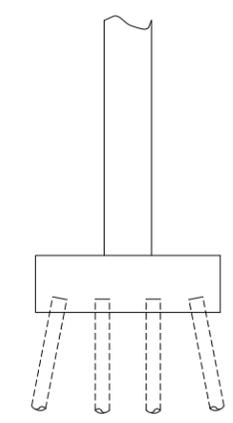


- GENERAL NOTES:**
- Piers 1 and 2 were inspected underwater.
  - At the time of inspection on July 27, 2012, the waterline was located approximately 13.6 feet below the top of the pier cap at the upstream end of Pier 2. This corresponds to a waterline elevation of 900.4 based on the previous report dated October 16, 2007.
  - 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:**

- All concrete surfaces from 3 feet below the waterline to the channel bottom exhibited light scaling with random pockets of poor consolidation with typical penetrations of 1/8 to 1/4 inch in depth.
- A light accumulation of timber debris consisting of 4-inch-diameter and smaller logs and branches extended along the entire west face of Pier 2 and from the channel bottom up 2 feet.
- A 5-foot-wide, 3-foot-deep scour pocket was observed along the entire west side of Pier 2.
- The top of the footing was partially exposed along the west side of Pier 2 from the midpoint of the shaft to the downstream 1/4 point, and the exposed surface exhibited light scaling with typical penetrations of 1/8 to 1/4 inch in depth.
- The channel bottom consisted of silty sand with 3 inches of probe rod penetration with scattered random riprap around the perimeter of Pier 1.
- The channel bottom consisted of 1-foot-diameter riprap with some sand and gravel with no appreciable probe rod penetration.
- A light to moderate accumulation of 8-inch-diameter and smaller timber debris was observed at the upstream nose of Pier 1 and extended from the channel bottom up 4 feet.
- Two 1-foot-high areas of moderate scaling were located on the east face of Pier 1 at 5 feet below the waterline. One area was 2 feet long with up to 1 inch of penetration and was located 6 feet south of the upstream nose. The other area was 1 foot long with up to 1/2 inch of penetration and was located 14 feet south of the upstream nose.
- A 2-foot-long area of moderate scaling was located at the western upstream side of Pier 1 and extended from 3.5 to 4 feet below the waterline with up to 1/2 inches of penetration.
- The channel bottom consisted of sand with up to 3 inches of probe rod penetration.

**Note:**  
All soundings based on 2012 waterline location.

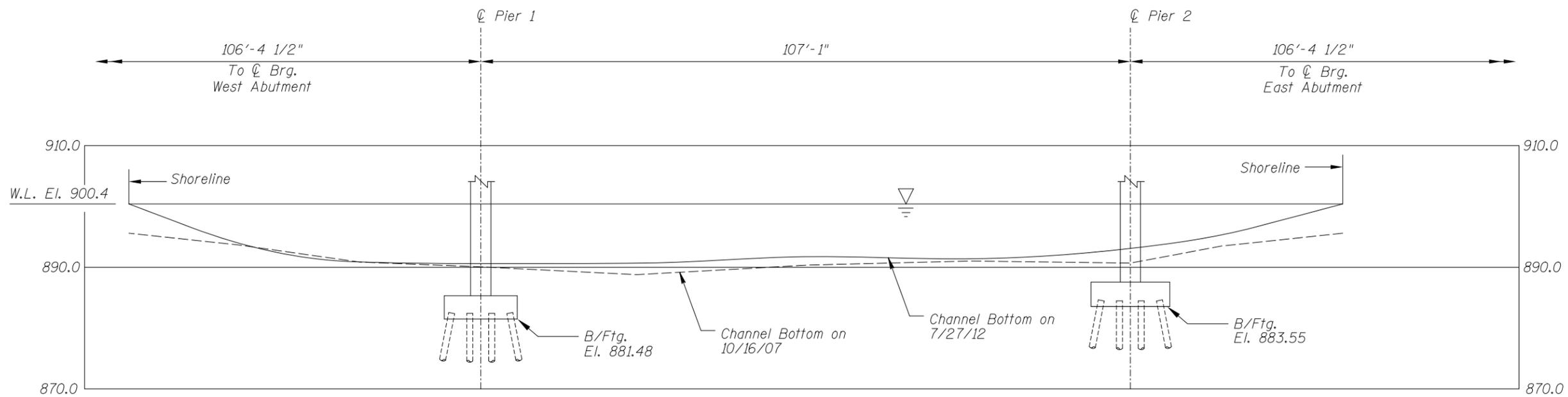


TYPICAL END VIEW OF PIERS

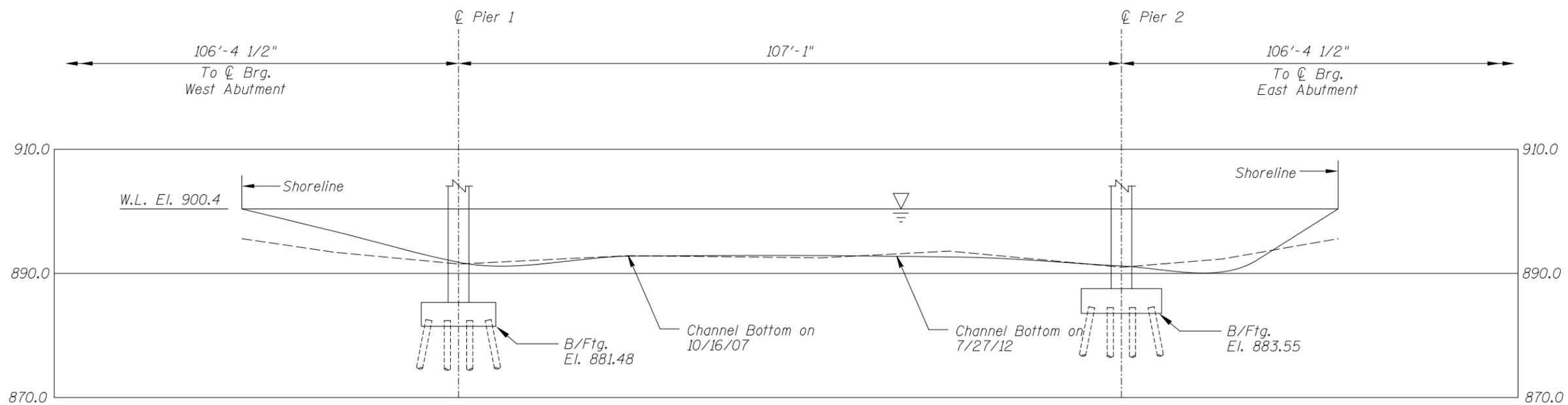
- Legend**
- 2.0 Sounding Depth (7/27/12)
  - 5.2 Sounding Depth (10/16/07)
  - Timber Debris
  - Scour Depression

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 30507 OVER THE RUM RIVER DISTRICT 3, ISANTI COUNTY		
<b>INSPECTION AND SOUNDING PLAN</b>		
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: NTS
Code: 52210076		Figure No.: 1

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INFRASTRUCTURE • ENGINEERING • PLANNING • CONSTRUCTION



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.



**MINNESOTA  
 DEPARTMENT OF TRANSPORTATION  
 UNDERWATER BRIDGE INSPECTION**

STRUCTURE NO. 30507  
 OVER THE RUM RIVER  
 DISTRICT 3, ISANTI COUNTY

UPSTREAM AND DOWNSTREAM  
 FASCIA PROFILES

Drawn By: BJR  
 Checked By: BRL  
 Code: 52210076

**COLLINS  
 ENGINEERS**  
 123 North Wacker Drive  
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Date: JULY 2012  
 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 27, 2012

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

BRIDGE NO: 30507 WEATHER: Sunny, 75°F

WATERWAY CROSSED: Rum River

DIVING OPERATION:  SCUBA  SURFACE SUPPLIED AIR  
OTHER

PERSONNEL: Brad Robinson (WSB), John Loftus (Collins)

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

TIME IN WATER: 13:15

TIME OUT OF WATER: 14:15

WATERWAY DATA: VELOCITY 2.0 ft/sec

VISIBILITY 1.0 foot

DEPTH 11.9 feet maximum at Pier 2.

ELEMENTS INSPECTED: Piers 1 and 2

REMARKS: Overall, the submerged concrete of Piers 1 and 2 was in good to satisfactory condition with no structurally significant defects observed. A 2-foot-long, 6-inch-high area of moderate scaling with a penetration of ½ inch was observed at the northwest corner of Pier 1. Two 1 foot areas of moderate scaling with up to 1 inch of penetration were observed on the east face of Pier 1 located 5 feet below the waterline. A 3 foot deep scour depression was present along the entire west face of Pier 2, extending up to 5 feet off the pier face. A portion of the top of footing along the west side of Pier 2 was exposed within the scour with no vertical exposure. Light to moderate accumulations of timber debris were observed at both piers.

FURTHER ACTION NEEDED:  YES  NO

Monitor the timber drift that has accumulated around the piers, and if found to be progressing to the point of influencing or becoming excessive, then removal operations may become necessary.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months. Continue to monitor the footing exposure at Pier 2 during future inspections.

MINNESOTA DEPARTMENT OF TRANSPORTATION  
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 30507  
 INSPECTORS WSB & Associates, Inc. and Collins Engineers, Inc.  
 ON-SITE TEAM LEADER Barritt Lovelace, P.E.  
 WATERWAY CROSSED Rum River

INSPECTION DATE July 27, 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	9.8'	N	6	N	8	N	6	8	6	6	6	6	6	N	N	N	N	N
	Pier 2	11.9'	N	7	7	8	N	7	6	6	6	7	6	7	N	N	N	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the submerged concrete of Piers 1 and 2 was in good to satisfactory condition with no structurally significant defects observed. A 2-foot-long, 6-inch-high area of moderate scaling with a penetration of ½ inch was observed at the northwest corner of Pier 1. Two 1 foot areas of moderate scaling with up to 1 inch of penetration were observed on the east face of Pier 1 located 5 feet below the waterline. A 3 foot deep scour depression was present along the entire west face of Pier 2, extending up to 5 feet off the pier face. A portion of the top of footing along the west side of Pier 2 was exposed within the scour with no vertical exposure. Light to moderate accumulations of timber debris were observed at Piers 1 and 2.

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.