

UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. L7352  
TWP NO. 140  
OVER THE  
RABBIT RIVER  
DISTRICT 4 - WILKIN COUNTY

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SEPTEMBER 24, 2012  
PREPARED FOR THE  
MINNESOTA DEPARTMENT OF TRANSPORTATION  
BY  
AYRES ASSOCIATES & COLLINS ENGINEERS, INC.  
JOB NO. 7423

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. L7352, the North and South Abutments and Pier 1, were generally in satisfactory condition with no defects of structural significance observed. The concrete of the substructure units exhibited random 1/32 to 1/8 inch wide vertical cracking and some minor areas of section loss, no greater than 1 inch deep penetration. The channel bottom around the substructure units appeared stable with no appreciable changes observed since the previous inspection. However, a heavy amount of timber debris accumulation was observed obstructing the waterway along the upstream fascia of the bridge.

INSPECTION FINDINGS:

- (A) Light to moderate scaling, with a maximum penetration of 1 inch, was observed on the concrete surfaces of the pier and the abutments and extended from the waterline to 2 feet above.
- (B) A 2.5-foot-diameter tree and a heavy accumulation of timber debris extended from the south embankment to midway between Pier 1 and the north abutment along the upstream fascia of the bridge. The debris extended from the channel bottom to 5 feet above the waterline
- (C) Several vertical cracks, up to 1/8 inch wide, were observed on Pier 1 and the North and South Abutments that extended from the beam seat to the channel bottom.
- (D) A construction joint, 3 inches below the waterline, exhibited random areas of section loss along both faces of Pier 1 with a maximum penetration of 1 inch.
- (E) An area of section loss, 6 inches in diameter with 1 inch of penetration, was observed at 2 feet above the waterline on the North Abutment.

- (F) The top of the footing was partially exposed along the North Abutment with up to 6 inches of vertical face exposure detected.
- (G) The backfill behind each abutment wingwall was missing due to erosion making the area steeply sloped.

RECOMMENDATIONS:

- (A) Remove the large tree and heavy accumulations of timber debris extending along the upstream fascia to eliminate the potential for continued accumulation and adverse affects on the bridge.
- (B) Because no information about the footings was available, monitor the extent of the local scour and footing exposure at North Abutment during future inspections. If scour conditions and footing exposure increase, a scour evaluation, and/or countermeasures may be warranted.
- (C) Reinspect the substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

Inspection Team Leader

Ayres Associates, Inc.



Brian K. Schroeder  
Registered Professional Engineer  
State of Minnesota

Respectfully submitted,

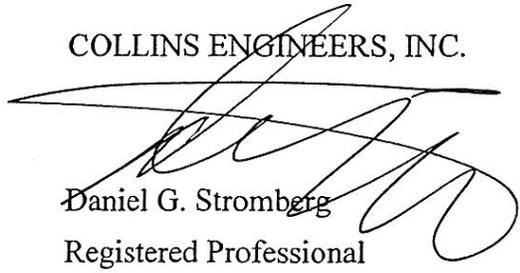
PROFESSIONAL ENGINEER

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: L7352

Feature Crossed: Rabbit River

Feature Carried: TWP No. 140

Location: District 4 - Wilkin County

Bridge Description: The superstructure consists of two spans of multiple steel beams supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and one reinforced concrete pier. No design drawings were available with foundation information.

2. INSPECTION DATA

Professional Engineer/Team Leader: Brian K. Schroeder, P.E.

Dive Team: Jason A. Cook, Ricardo S. Narvaez

Date: September 24, 2012

Weather Conditions: Sunny, 45°F

Underwater Visibility: 6.0 inches

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: North and South Abutments and Pier 1.

General Shape: The abutments consist of a reinforced concrete breastwall with skewed, tapered wingwalls. The pier consists of an oblong rectangular reinforced concrete shaft which has a pointed upstream nose with a mounted steel angle for ice damage protection and a square downstream nose. No design drawings with footing details were available.

Maximum Water Depth at Substructure Inspected: Approximately 3.5 Feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the east end of Pier 1.

Water Surface: The waterline was approximately 11.4 feet below reference.  
Assumed Waterline Elevation = 88.6.

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 4

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

Item 113: Scour Critical Bridges: Code G

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	22	EA		22			
215	Concrete Abutment	43	LF	13	30			
361	Scour	1	EA	1				
387	Concrete Wingwall	4	EA		4			
985	Slopes and Slope Protection	1	EA		1			



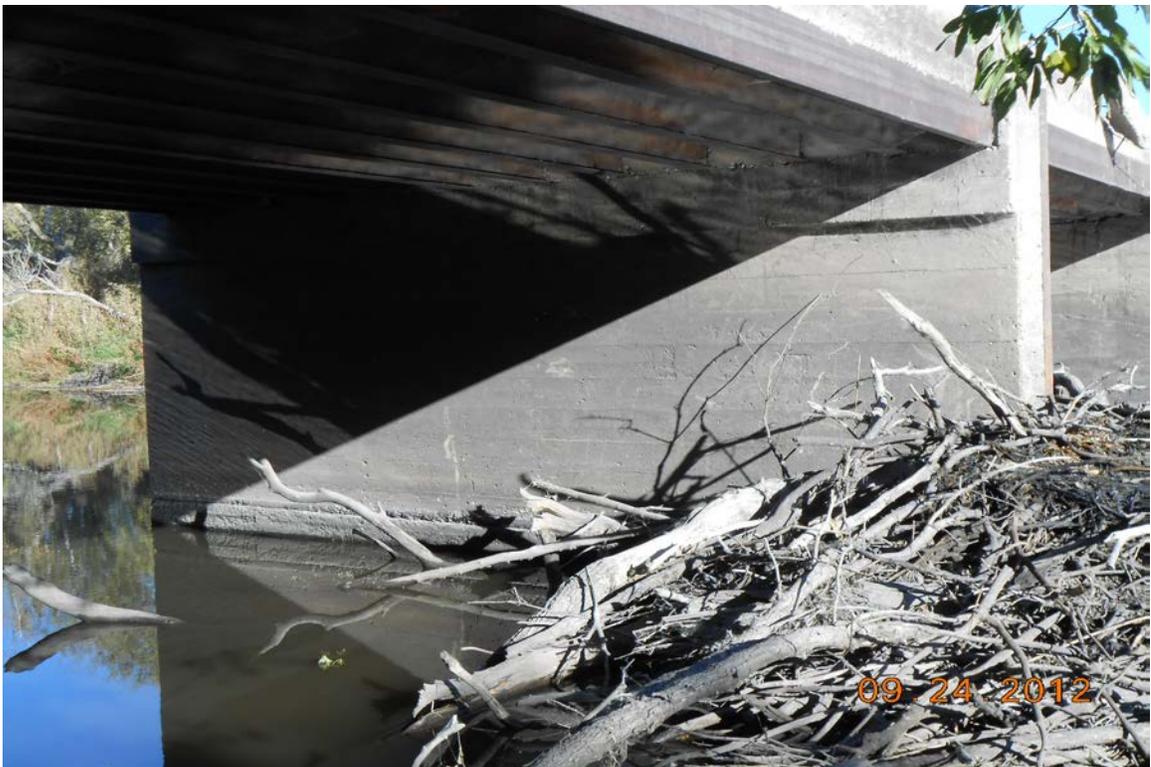
Photograph 1. View of South abutment, Looking Southwest.



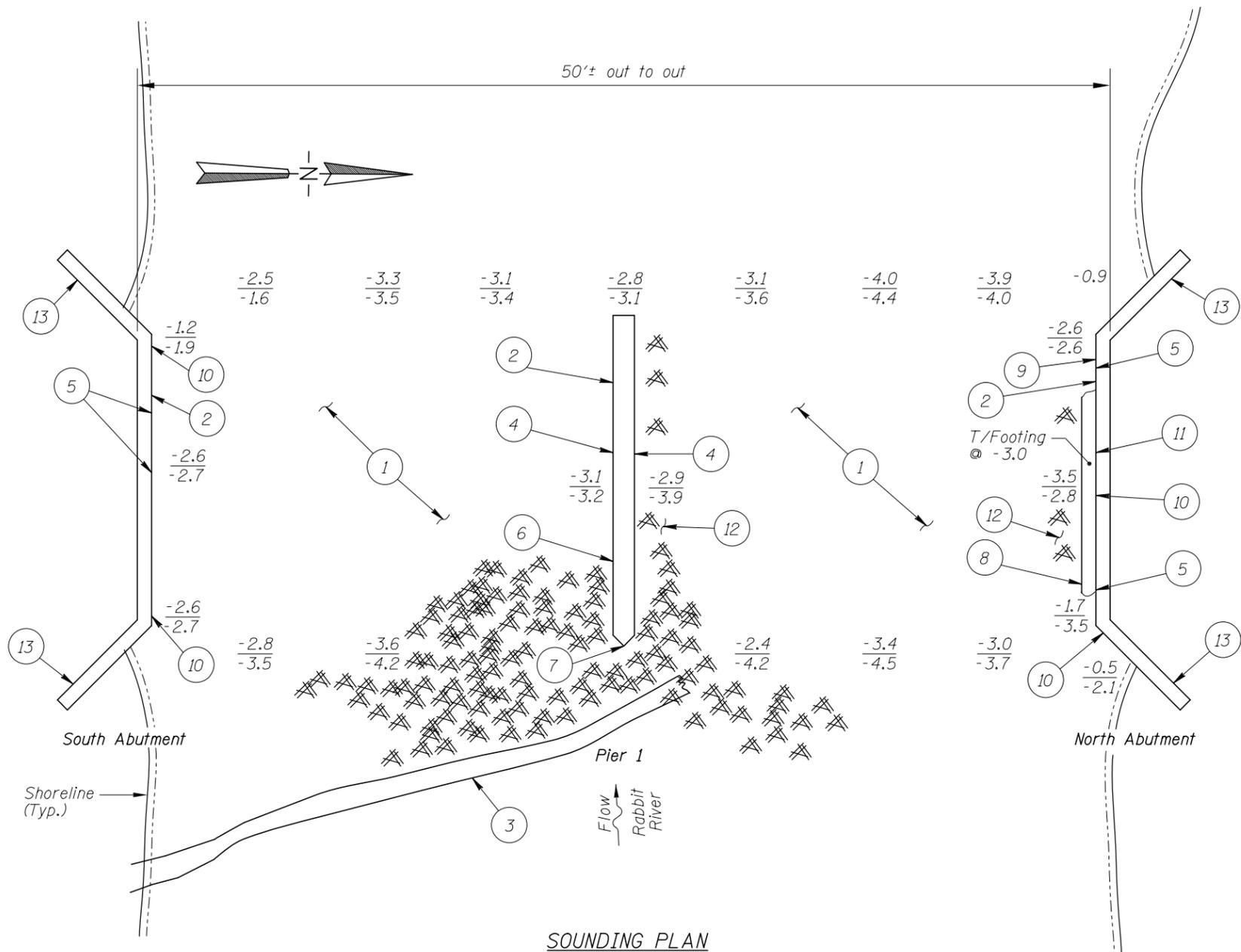
Photograph 2. View of Pier 1, Looking Southwest.



Photograph 3. View of North Abutment, Looking Northwest.



Photograph 4. View of Pier 1 and Timber Debris, Looking Northwest.



**INSPECTION NOTES:**

- 1 The channel bottom material consisted of hard clay overlaid with silt and random gravel with a maximum probe rod penetration of 6 inches.
- 2 Light to moderate scaling was observed around the perimeter of the pier and along the breastwalls of both abutments, with a maximum penetration of 1 inch, extending from the waterline to 2 feet above.
- 3 A 2.5-foot-diameter tree along with a heavy accumulation of timber debris was observed along the upstream fascia extending from the south embankment to midway between Pier 1 and the North Abutment.
- 4 Vertical crack, extending from the beam seat to the channel bottom with a maximum width of 1/8 inch, was observed on both sides of the pier.
- 5 Vertical crack, extending from the beam seat to the channel bottom with a maximum width of 1/8 inch, was observed on the breast wall.
- 6 A construction joint 3 inches below the waterline exhibited areas of section loss around the entire perimeter of the pier with a maximum penetration of 1 inch.
- 7 Steel ice damage nosing protection extended from the top of the pier cap to 2 foot above the waterline.
- 8 Footing exposure was observed along the North Abutment with up to 6 inches of vertical face exposure observed.
- 9 Area of section loss, 6 inches in diameter, was observed 2 feet above the waterline with a penetration of 1 inch.
- 10 Vertical crack, extending from the beam seat to the channel bottom with a maximum width of 1/16 inch, was observed on the breast wall.
- 11 Vertical crack, extending from the beam seat to the channel bottom with a maximum width of 1/32 inch, was observed on the breast wall.
- 12 Scattered timber debris consisting of 3-inch-diameter and smaller branches was observed along the North Abutment and the north face of Pier 1.
- 13 Backfill behind wingwalls was eroded making it steeply sloped.

**GENERAL NOTES:**

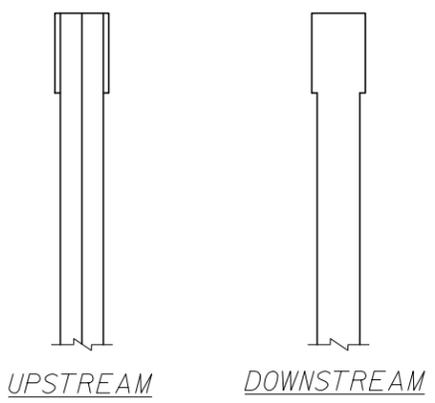
1. The North and South Abutments and Pier 1 were inspected underwater.
2. At the time of inspection on September 24, 2012 the waterline was located approximately 11.4 feet below the top of the pier cap at the upstream end of Pier 1. Since insufficient bridge elevation information was available, a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 88.6.
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.
5. The presence of heavy debris accumulation prohibited collecting soundings at Span 1, 3/4 point along the upstream fascia and the upstream nose of Pier 1.

**Legend**

- 2.0 Sounding Depth (9/24/12)
- 5.2 Sounding Depth (9/17/07)
- Timber Debris

**Note:**

All soundings based on 2012 waterline location.

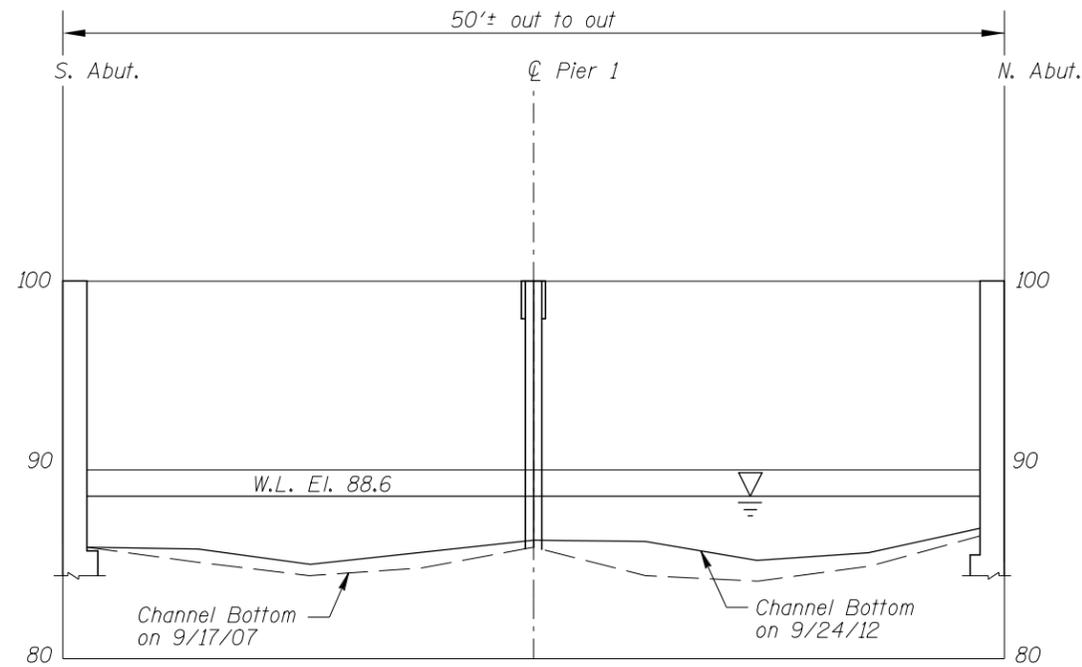


TYPICAL END VIEW OF PIER 1

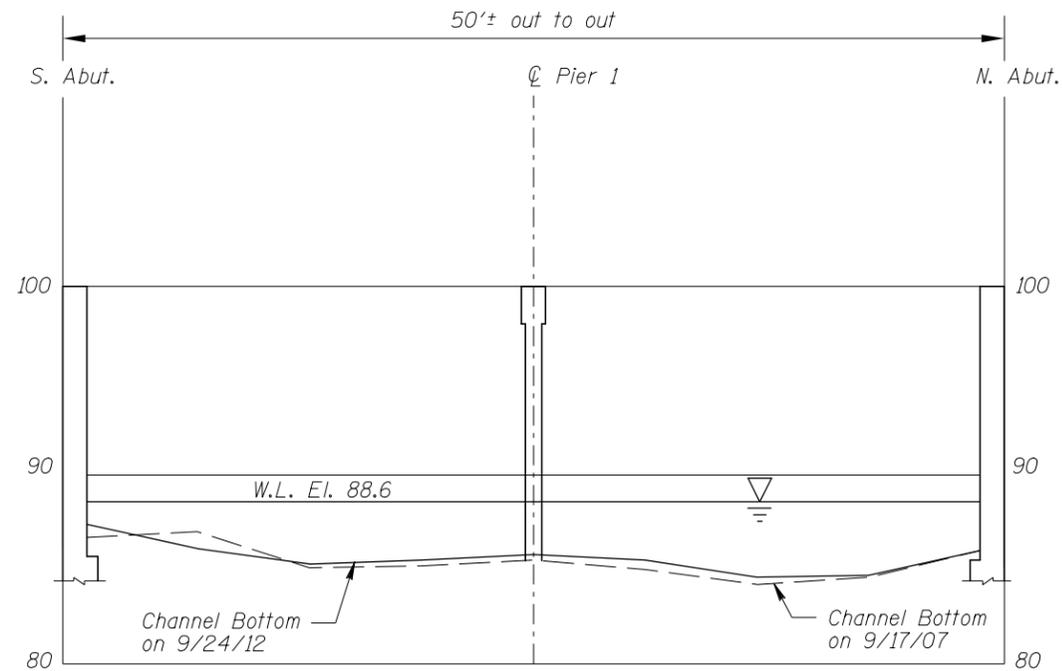
**COLLINS ENGINEERS**  
 123 North Wacker Drive  
 Suite 300  
 Chicago, IL 60606  
 (312) 704-9300  
 www.collinsengr.com

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>	
STRUCTURE NO. L7352 OVER THE RABBIT RIVER DISTRICT 4, WILKIN COUNTY	
<b>INSPECTION AND SOUNDING PLAN</b>	
Drawn By: JAC	Date: NOV. 2012
Checked By: BKS	Scale: NTS
Code: 52210059	Figure No.: 1

**AVRES ASSOCIATES**  
 3433 Oakwood Hills Parkway  
 Eau Claire, WI 54701  
 www.AyresAssociates.com



**UPSTREAM FASCIA PROFILE**  
Vertical Scale: 1"=10'-0"



**DOWNSTREAM FASCIA PROFILE**  
Vertical Scale: 1"=10'-0"

Note:  
Refer to Figure 1 for General Notes.

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. L7352 OVER THE RABBIT RIVER DISTRICT 4, WILKIN COUNTY		
<b>UPSTREAM AND DOWNSTREAM FASCIA PROFILES</b>		
Drawn By: JAC	<b>AVRES ASSOCIATES</b> 3433 Oakwood Hills Parkway Eau Claire, WI 54701 www.AyresAssociates.com	Date: NOV. 2012
Checked By: BKS		Scale: NTS (U.O.N.)
Code: 52210059		Figure No.: 2

**COLLINS ENGINEERS**  
123 North Wacker Drive  
Suite 300  
Chicago, IL 60606  
(312) 704-9300  
www.collinsengr.com

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

INSPECTORS: Ayres Associates DATE: September 24, 2012

ON-SITE TEAM LEADER: Brian K. Schroeder, P.E.

BRIDGE NO: L7352 WEATHER: Sunny, 45°F

WATERWAY CROSSED: Rabbit River

DIVING OPERATION: \_\_\_\_\_ SCUBA \_\_\_\_\_ SURFACE SUPPLIED AIR  
X OTHER Wade

PERSONNEL: Jason A. Cook, Ricardo S. Narvaez

EQUIPMENT: Dry Suit, Hammer, Sounding Pole, Probe Rod, Camera

TIME IN WATER: 9:30 AM

TIME OUT OF WATER: 9:50 AM

WATERWAY DATA: VELOCITY Negligible/None

VISIBILITY 6.0 Inches

DEPTH 3.5 feet maximum at North Abutment

ELEMENTS INSPECTED: North and South Abutments and Pier 1

REMARKS: Overall, the pier and both abutments were in satisfactory condition with minor vertical cracks and areas of section loss detected. Light to moderate scaling was also observed at the waterline on the pier and both of the abutments with up to 1 inch of penetration. A 2.5-foot-diameter tree with heavy accumulations of timber debris extended from the south embankment to the center of the north span along the upstream fascia. The footing was exposed along the North Abutment with up to 6 inches of vertical face exposure detected.

FURTHER ACTION NEEDED: X YES \_\_\_\_\_ NO

Remove the large tree and heavy accumulations of timber debris extending along the upstream fascia to eliminate the potential for continued accumulation and adverse affects on the bridge.

Monitor the extent of the local scour and footing exposure at the North Abutment during future inspections. If scour conditions and footing exposure increase, a scour evaluation, and/or countermeasures may be warranted.

Reinspect the 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. L7352  
 INSPECTORS Ayres Associates  
 ON-SITE TEAM LEADER Brian K. Schroeder, P.E.  
 WATERWAY CROSSED Rabbit River

INSPECTION DATE September 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	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
	North Abutment	3.5'	N	6	7	9	N	6	6	6	6	6	6	6	N	N	N	N	N
	Pier 1	3.3'	N	6	7	9	N	6	6	N	N	4	4	6	N	N	N	N	N
	South Abutment	2.6'	N	7	N	9	N	7	7	6	6	5	5	7	N	N	N	N	N

\*UNDERWATER PORTION ONLY

REMARKS Overall, the pier and both abutments were in satisfactory condition with minor vertical cracks and areas of section loss detected. Light to moderate scaling was also observed at the waterline on the pier and both of the abutments with up to 1 inch of penetration. A 2.5-foot-diameter tree with heavy accumulations of timber debris extended from the south embankment to the center of the north span along the upstream fascia. The footing was exposed along the North Abutment with up to 6 inches of vertical face exposure.

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.