STRUCTURE NO. 89188

7th STREET

OVER THE

ZUMBRO RIVER

DISTRICT 6 - RICE COUNTY

PREPARED FOR THE
MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO.5221
REPORT SUMMARY:

The substructure units inspected below water at Bridge No. 89188, the West Abutment and Piers 1, 2, and 3, were found to be in good to satisfactory condition. Several hairline to 1/4-inch-wide cracks were noted along the pier shafts and the abutment wall, with a very slight, 1/16-inch differential noted along the northern quarter point of Pier 1. The channel bottom appeared to be stable, and the scour protection system in-place around the substructure units was in good condition. There were light to moderate accumulations of timber debris observed at the upstream ends of Piers 1 and 2.

INSPECTION FINDINGS:

(A) Two vertical 1/18-inch-wide cracks were observed at the upstream and downstream quarter points along the pier shaft at Piers 2 and 3 that extended from the top of the pier to the concrete scour protection at the channel bottom. All of the cracks extended through the full depth of the pier shafts.

(B) Four vertical hairline to 1/4-inch-wide cracks were observed along the pier shaft at Pier 1 that extended from the top of the pier to the concrete scour protection at the channel bottom. All of the cracks extended through the full depth of the pier shaft.

(C) A 1/16-inch-wide differential (in direction of pier shaft depth) was observed along one of the 1/4-inch-wide cracks at the downstream quarter point of Pier 1.

(D) A light accumulation of 3-inch-diameter and smaller timber debris was observed at the upstream end of Pier 2.

(E) A moderate accumulation of 3-inch-diameter and smaller timber debris was observed at the upstream end of Pier 1 that extended from the channel bottom up 2 feet.
(F) A 4-inch-diameter spall was observed at the upstream quarter point along the West Abutment with up to 2 inches of penetration and an associated hairline crack that extended to the wingwall.

(G) A 1/16-inch-wide vertical crack was observed along the entire center joint along the West Abutment.

(H) A hairline crack was observed at the downstream quarter point of the West Abutment that extended from the top of the abutment to the top of the concrete scour protection at the channel bottom.

(I) A vertical hairline crack extended from the bottom of the pier cap to the channel bottom at the downstream quarter point along the west side of Pier 2.

(J) A light accumulation of 6-inch-diameter and smaller timber debris was observed at the upstream end of Pier 1.
RECOMMENDATIONS:

(A) Monitor the cracking along the pier shafts at Piers 1, 2 and 3 and the West Abutment, with special attention to the minor 1/16-inch-wide differential along the northern end of Pier 1 for any further progression and/or movement.

(B) Monitor the extent of the timber debris accumulation at Piers 1 and 2, and if shown to be increasing, removal during routine maintenance may become necessary.

(C) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

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 6/30/2008  Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.

Daniel G. Stromberg
Registered Professional Engineer, State of Minnesota
MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 89188

Feature Crossed: Zumbro River

Feature Carried: 7th Street

Location: District 6 – Rice County

Bridge Description: The superstructure consists of three spans of multiple reinforced concrete beams supporting a reinforced concrete deck. The bridge is supported by two reinforced concrete abutments and three reinforced concrete piers, which are founded on timber piles. The piers are numbered 1 through 3 from the west to east.

2. INSPECTION DATA

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

Dive Team: Clayton G. Brookins, Valerie Roustan

Date: October 24, 2007

Weather Conditions: Sunny, 58°F

Underwater Visibility: 1.0 foot

Waterway Velocity: Negligible
3. **SUBSTRUCTURE INSPECTION DATA**

Substructure Inspected: West Abutment and Piers 1, 2, and 3.

General Shape: Oblong rectangular shafts with pointed upstream and downstream ends supported by rectangular footings that are founded on timber piles. A sloped concrete scour-protection apron surrounds each of the piers and also extends along the West Abutment.

Maximum Water Depth at Substructure Inspected: Approximately 6.3 feet.

4. **WATERLINE DATUM**

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

Water Surface: The waterline was approximately 8.6 feet below reference.

Waterline Elevation = 974.6.

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 7

Item 92B: Underwater Inspection: Code B/10/07

Item 113: Scour Critical Bridges: Code F/07

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

_____ Yes X No
Photograph 1. Overall View of the West Abutment, Looking Northwest.

Photograph 2. View of Pier 1, Looking Southeast.
Photograph 3. View of Pier 2, Looking Southeast.

Photograph 4. View of Pier 3, Looking Southeast.
Photograph 5. View of the East Abutment, Looking North.
GENERAL NOTES:

1. Piers 1 through 3 and the West Abutment were inspected underwater.

2. At the time of inspection, on October 24, 2007, the waterline was located approximately 8.6 feet below the top of Pier 2 on the north end. This corresponds to a waterline elevation of 974.6.

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 as well as around the pier structures.

LEGEND

-0.4 Sounding Depth (10/24/07)

Legend:

A Timber Debris

Note:

All soundings based on 2007 waterline location.
MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc.  DATE:  October 24, 2007
ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E., S.E.
BRIDGE NO: 89188  WEATHER: Sunny, 58° F
WATERWAY CROSSED: Zumbro River
DIVING OPERATION:  X  SCUBA  OTHER
PERSONNEL: Clayton G. Brookins, Valerie Roustan
EQUIPMENT: U/W Light, Scraper, Lead Line, Sounding Pole, Probe Rod, Camera
TIME IN WATER: 2:10 P.M.
TIME OUT OF WATER: 2:40 P.M.
WATERWAY DATA: VELOCITY Negligible
VISIBILITY 1.0 foot
DEPTH 6.3 feet maximum at Pier 2.
ELEMENTS INSPECTED: West Abutment and Piers 1, 2, and 3
REMARKS: The concrete was typically in smooth and sound condition with several hairline to 1/4-inch-wide cracks noted in the pier shafts that typically extended from the top of the piers to the top of the concrete scour protection at the channel bottom and that also extended through the full depth of the piers. A slight 1/16-inch-wide differential along one of the 1/4-inch-wide cracks at the downstream quarter point of Pier 1 was also noted. Light to moderate accumulations of timber debris were observed at the upstream ends of both Piers 1 and 2.

FURTHER ACTION NEEDED:  X  YES  NO

Monitor the cracking along the pier shafts at Piers 1, 2 and 3 and the West Abutment, with special attention to the minor 1/16-inch-wide differential along the northern end of Pier 1 for any further progression and/or movement.

Monitor the extent of the timber debris accumulation at both piers, and if shown to be increasing, removal during routine maintenance may become necessary.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.
**MINNESOTA DEPARTMENT OF TRANSPORTATION**
**OFFICE OF BRIDGES AND STRUCTURES**

**UNDERWATER INSPECTION CONDITION RATING FORM**

**BRIDGE NO.** 89188

**INSPECTION DATE** October 24, 2007

**ON-SITE TEAM LEADER** Daniel G. Stromberg, P.E. 21491

**WATERWAY CROSSED** Zumbro River

**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

<table>
<thead>
<tr>
<th>UNIT DESCRIPTION</th>
<th>MAXIMUM DEPTH OF WATER</th>
<th>PILING</th>
<th>COLUMNS, SHAFTS, OR FACES*</th>
<th>FOOTINGS</th>
<th>DISPLACEMENT</th>
<th>OTHER</th>
<th>OVERALL SUBSTRUCTURE CONDITION CODE</th>
<th>SCOUR</th>
<th>EMBANKMENT EROSION</th>
<th>EMBANKMENT PROTECTION</th>
<th>OTHER (DRIFT/DEBRIS)</th>
<th>OVERALL CHANNEL &amp; PROTECTION CONDITION</th>
<th>CONCRETE</th>
<th>STEEL</th>
<th>TIMBER</th>
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*UNDERWATER PORTION ONLY

**REMARKS:** The concrete was typically in smooth and sound condition with several hairline to 1/4-inch-wide cracks noted in the pier shafts that typically extended from the top of the piers to the top of the concrete scour protection at the channel bottom and that also extended through the full depth of the piers. A slight 1/16-inch-wide differential along one of the 1/4-inch-wide cracks at the downstream quarter point of Pier 1 was also noted. Light to moderate accumulations of timber debris were observed at the upstream ends of both 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.