UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 08520

MSAS NO. 110

OVER THE

MINNESOTA RIVER

DISTRICT 7 - BROWN COUNTY, CITY OF NEW ULM

SEPTEMBER 12, 2012

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

AND

WSB & ASSOCIATES, INC.

JOB NO. 2107
REPORT SUMMARY:

The concrete surfaces of the substructure units inspected at Bridge No. 08520, Piers 1 through 3, were found to be in good condition with no defects of structural significance observed. In addition, Pier 1 exhibited footing exposure with up to 4.5 feet of vertical face exposure along the east face of the pier, and seal exposure with up to 8 inches vertical exposure. There was also up to 1.5 feet of vertical exposure for the footing at Pier 3 which was located in a scour depression on the easterly bank. Other than slightly increased foundation exposure at Pier 1, the channel bottom appeared stable with no appreciable changes since the previous inspection.

INSPECTION FINDINGS:

(A) The top of the footing was exposed at Pier 1 from the upstream quarter point on the west face, around the upstream and downstream nose, and along the entire east face with up to 4.5 feet of vertical face exposure along the east face. The seal was also partially exposed with up to 8 inches of vertical exposure.

(B) Pier 3 (located out of the waterway) exhibited footing exposure around the majority of the pier with up to 1.5 feet of vertical face exposure due to a scour depression 10 feet in radius within the easterly bank.

(C) A scour depression 6 feet in radius, 2 feet deep was observed at the upstream noses of Piers 1 and 2.
RECOMMENDATIONS:

(A) Because the bridge has been evaluated to be scour critical, consider countermeasures to mitigate scour at Piers 1 and 3 to prevent any further foundation exposure.

(B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months unless a period of high flow creates the need for a sooner inspection.

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
1. **BRIDGE DATA**

   Bridge Number: 08520

   Feature Crossed: Minnesota River

   Feature Carried: 20th Street (MSAS No. 110)

   Location: District 7 - Brown County, City of New Ulm

   Bridge Description: The superstructure consists of multiple steel beams over four spans. The superstructure is supported on two reinforced concrete abutments and three reinforced concrete piers. The pier and abutment footings are supported on steel piles. The piers are numbered 1 through 3 starting at the west end of the bridge.

2. **INSPECTION DATA**

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

   Dive Team: Kasey Yoder (WSB), Lukas Janulis (Collins)

   Date: September 12, 2012

   Weather Conditions: Cloudy, 60°F

   Underwater Visibility: 1.0 foot

   Waterway Velocity: 1.0 ft/s
3. **SUBSTRUCTURE INSPECTION DATA**

Substructure Inspected: Piers 1, 2, and 3

General Shape: Rectangular pier shafts with rounded noses that rest on rectangular footings founded on steel piles.

Maximum Water Depth at Substructure Inspected: Approximately 9.5 feet.

4. **WATERLINE DATUM**

Water Level Reference: The top of the pier cap on the south end of Pier 2.

Water Surface: The waterline was approximately 27.5 feet below reference. Waterline Elevation = 784.7.

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 B/09/12

Item 113: Scour Critical Bridges: Code R/95

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

___X___ Yes ______ No
### 6. STRUCTURAL ELEMENT CONDITION RATING

<table>
<thead>
<tr>
<th>Item #</th>
<th>Element Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>210</td>
<td>Reinforced Concrete Pier Wall</td>
<td>108</td>
<td>LF</td>
<td>108</td>
</tr>
<tr>
<td>361</td>
<td>Scour</td>
<td>1</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>985</td>
<td>Slopes &amp; Slope Protection</td>
<td>1</td>
<td>EA</td>
<td>1</td>
</tr>
</tbody>
</table>
Photograph 1. View of Pier 3, Looking Southwest.

Photograph 2. View of Pier 2, Looking Southwest.
Photograph 3. View of Pier 1, Looking Southwest.
GENERAL NOTES:

1. Piers 1 and 2 were inspected underwater.

2. At the time of inspection on September 12, 2022, the waterline was located approximately 27.5 feet below the top of the pier cap at the downstream end of Pier 2. This corresponds with a waterline elevation of 784.7.

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 0.4 point intervals between the substructure units.

INSPECTION NOTES:

1. The channel bottom consisted of firm gravel and riprap, typically 6 inches in diameter, with up to 2 inches of pride rock penetration.

2. The channel bottom around Pier 2 consisted of soft silt with up to 2 feet of pride rock penetration.

3. The top of the footing was exposed at Pier 1 from the upstream quarter point on the west face, around the upstream and downstream nose, and along the entire east face with up to 4.5 feet of vertical face exposure along the east face. The top of the footing was also exposed to 9 inch of vertical exposure.

4. The top of the footing was exposed at Pier 3 around the majority of the pier with up to 1.5 feet of vertical face exposure due to a scour depression measuring 10 feet in radius. Pier 3 was located out of the waterway of the time of inspection.

5. A scour depression 5 feet in radius, 2 feet deep was observed at the upstream noses of Piers 1 and 2.

6. Vertical bank erosion was observed upstream and downstream of the structure along the west embankment.
MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: WSB & Associates and Collins Engineers       DATE: September 12, 2012
ON-SITE TEAM LEADER: Barritt Lovelace, P.E.

BRIDGE NO: 08520                  WEATHER: Cloudy, 60°F
WATERWAY CROSSED: Minnesota River
DIVING OPERATION:       X       SCUBA       SURFACE SUPPLIED AIR
                        _____ OTHER________________________

PERSONNEL:  Kasey Yoder (WSB), Lukas Janulis (Collins)
EQUIPMENT: Commercial Scuba, Sounding Pole, Lead Line, Probe Rod, Camera

TIME IN WATER: 11:00 a.m.       TIME OUT OF WATER: 12:00 p.m.
WATERWAY DATA: VELOCITY 1.0 ft/s
                        VISIBILITY 1.0 foot
                        DEPTH 9.5 feet maximum at Pier 1

ELEMENTS INSPECTED: Piers 1, 2, and 3

REMARKS: Overall, the concrete of the pier shafts was in good condition with no structurally significant defects observed. The footing at Pier 1 was exposed from the upstream quarter point along the west face, around the upstream and downstream nose, and along the entire east face with up to 4.5 feet of vertical face exposed along the east face and with 8 inches of vertical exposure of the seal. A scour depression 6 feet in radius, 2 feet deep was observed at the upstream nose of Piers 1 and 2. The top of the footing was exposed at Pier 3 around the majority of the pier with up to 1.5 feet of vertical exposure due to a scour depression 10 feet in radius within the easterly bank of the waterway.

FURTHER ACTION NEEDED:       X       YES       ________ NO

Because the bridge has been evaluated to be scour critical, consider countermeasures to mitigate scour at Piers 1 and 3.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months unless a period of high flow creates the need for a sooner inspection.
**CONDITION RATING**

<table>
<thead>
<tr>
<th>UNIT REFERENCE NO.</th>
<th>SUBSTRUCTURE</th>
<th>CHANNEL</th>
<th>GENERAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MAXIMUM DEPTH OF WATER</td>
<td>PILING</td>
<td>COLUMNS, SHAFTS, OR FACES*</td>
</tr>
<tr>
<td>Pier 1</td>
<td>9.5' N 7 7 9 N 7</td>
<td>6 6 6 N 6</td>
<td>7 N N N N</td>
</tr>
<tr>
<td>Pier 2</td>
<td>4.4’ N 7 N 9 N 7</td>
<td>7 N N N N</td>
<td>7 N N N N</td>
</tr>
<tr>
<td>Pier 3</td>
<td>N N 7 7 9 N 7</td>
<td>6 7 7 N 6</td>
<td>7 N N N N</td>
</tr>
</tbody>
</table>

*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete of the pier shafts was in good condition with no structurally significant defects observed. The footing at Pier 1 was exposed from the upstream quarter point along the west face, around the upstream and downstream nose, and along the entire east face with up to 4.5 feet of vertical face exposed along the east face and with 8 inches of vertical exposure of the seal. A scour depression 6 feet in radius, 2 feet deep was observed at the upstream nose of Piers 1 and 2. The top of the footing was exposed at Pier 3 around the majority of the pier with up to 1.5 feet of vertical exposure due to a scour depression 10 feet in radius within the easterly bank of the waterway.

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.