

UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 18501  
CSAH NO. 16  
OVER THE  
PINE RIVER (CROSS LAKE / RUSH LAKE)  
DISTRICT 3 – CROW WING COUNTY

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SEPTEMBER 9, 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 below water at Bridge No. 18501, Piers 1, 2, and 3, were found to be in good condition with coating failure and minor related corrosion below the waterline covering 15% to 20% of the surface area. The channel bottom around the substructure units appeared stable with no significant scour or debris accumulations and no notable changes since the last inspection.

INSPECTION FINDINGS:

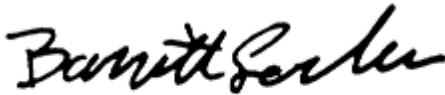
- (A) All of the piles at each of the piers exhibited coating failure covering 15% to 20% of the surface area below the waterline. Associated with the coating loss was minor surface corrosion and rust nodules. Aquatic growth was observed on all piles from the waterline to the channel bottom.

RECOMMENDATIONS:

- (A) 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,

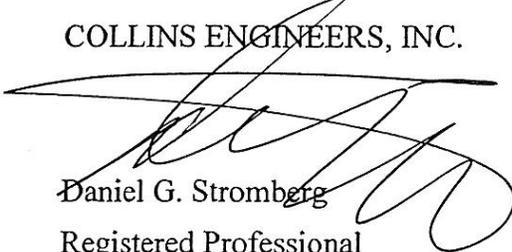
PROFESSIONAL ENGINEER

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: 18501

Feature Crossed: Pine River (Cross Lake / Rush Lake)

Feature Carried: CSAH No. 16

Location: District 3 – Crow Wing County

Bridge Description: The superstructure consists of four spans of multiple concrete beams. The superstructure is supported by two reinforced concrete abutments and three steel pipe pile bent piers. The piers are numbered 1 through 3 starting from the south end of the bridge.

2. INSPECTION DATA

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

Dive Team: Brad Robinson (WSB), Lukas Janulis (Collins)

Date: September 9, 2012

Weather Conditions: Sunny, 70°F

Underwater Visibility: 5.0 feet

Waterway Velocity: Negligible / None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1, 2, and 3.

General Shape: Piers 1, 2, and 3 consist of a single line of eight steel pipe piles supporting a reinforced concrete cap. Each abutment is a pile supported reinforced concrete abutment with a concrete slope wall.

Maximum Water Depth at Substructure Inspected: Approximately 7.5 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap at the west end of Pier 2.

Water Surface: The waterline was approximately 9.7 feet below reference.  
Assumed Waterline Elevation = 90.3

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 8

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

Item 113: Scour Critical Bridges: Code I/02

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 |
| 382    | Cast-In-Place Piling | 24       | EA   |            | 24 |   |   |   |
| 985    | Slope                | 1        | EA   |            | 1  |   |   |   |



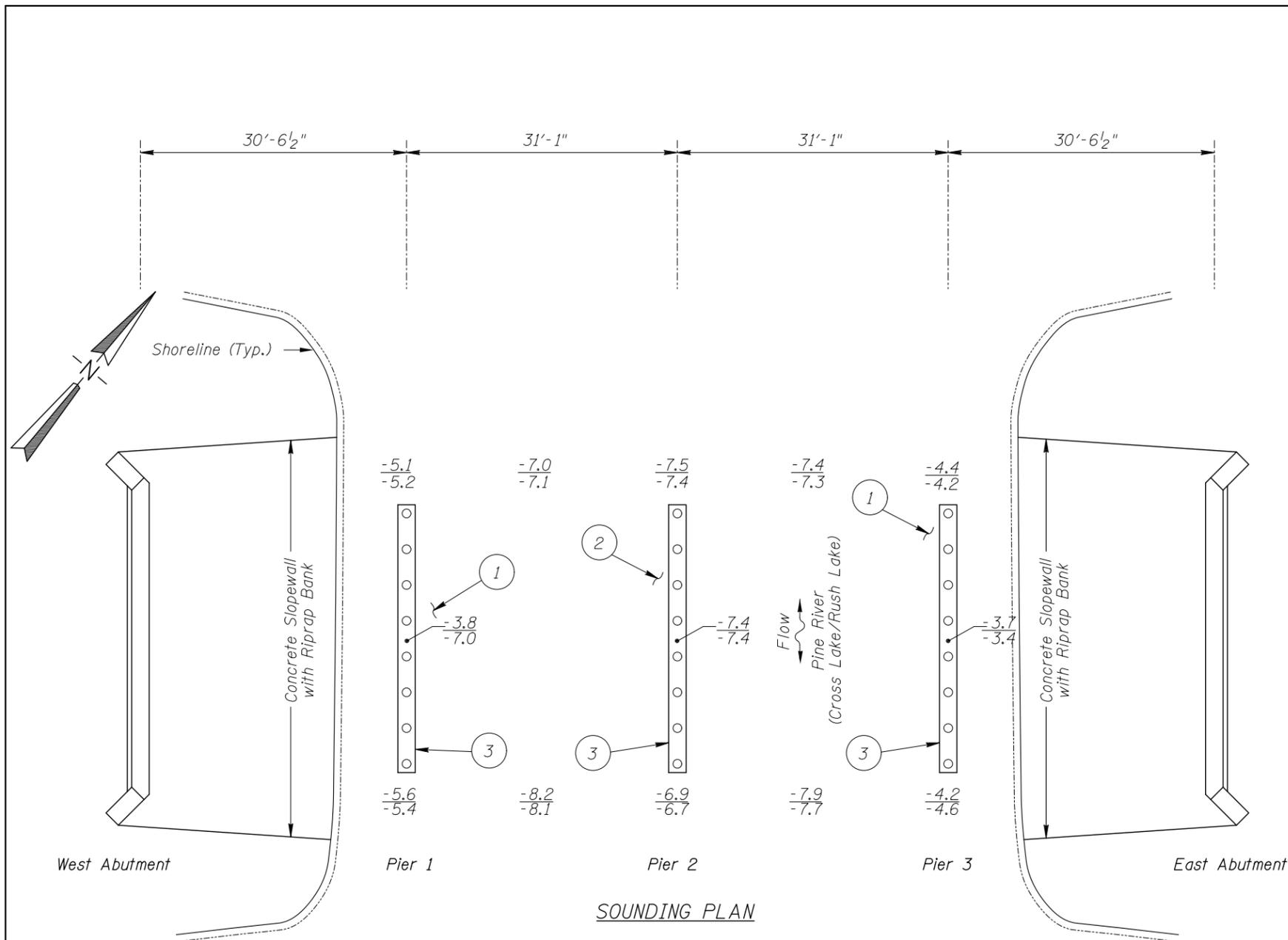
Photograph 1. View of Pier 1, Looking South.



Photograph 2. View of Pier 2, Looking South.



Photograph 3. View of Pier 3, Looking North.



SOUNDING PLAN

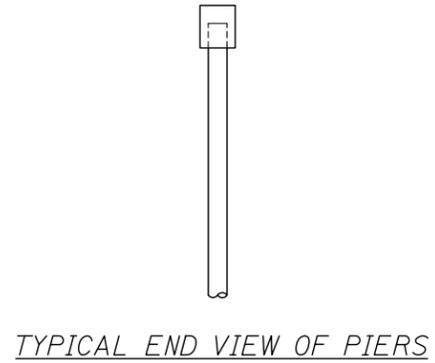
GENERAL NOTES:

- Piers 1, 2, and 3 were inspected underwater.
- At the time of inspection on September 9, 2012, the waterline was located approximately 9.7 feet below the top of the pile cap at the north end of Pier 2. Since insufficient bridge elevation information was available, a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 90.3.
- Soundings indicate the water depth at the time of inspection and are measured in feet.
- Soundings were taken parallel to the bridge at mid point intervals between the substructure units.

INSPECTION NOTES:

- The channel bottom around Piers 1 and 3 consisted of 1 to 2 foot diameter riprap.
- The channel bottom around Pier 2 consisted of gravel and sand and 4 to 6 inch diameter cobbles with up to 2 inches of probe rod penetration.
- The piles exhibited coating failure and minimal surface corrosion on 15% to 20% of the surface area below the waterline. All piles exhibited a layer aquatic growth from the waterline to the mudline.

Notes:  
All soundings based on 2012 waterline location.



TYPICAL END VIEW OF PIERS

Legend

- 5.2 Sounding Depth (9/9/12)
- 5.2 Sounding Depth (10/15/07)
- Steel Pipe, Cast-in-place Concrete Pile

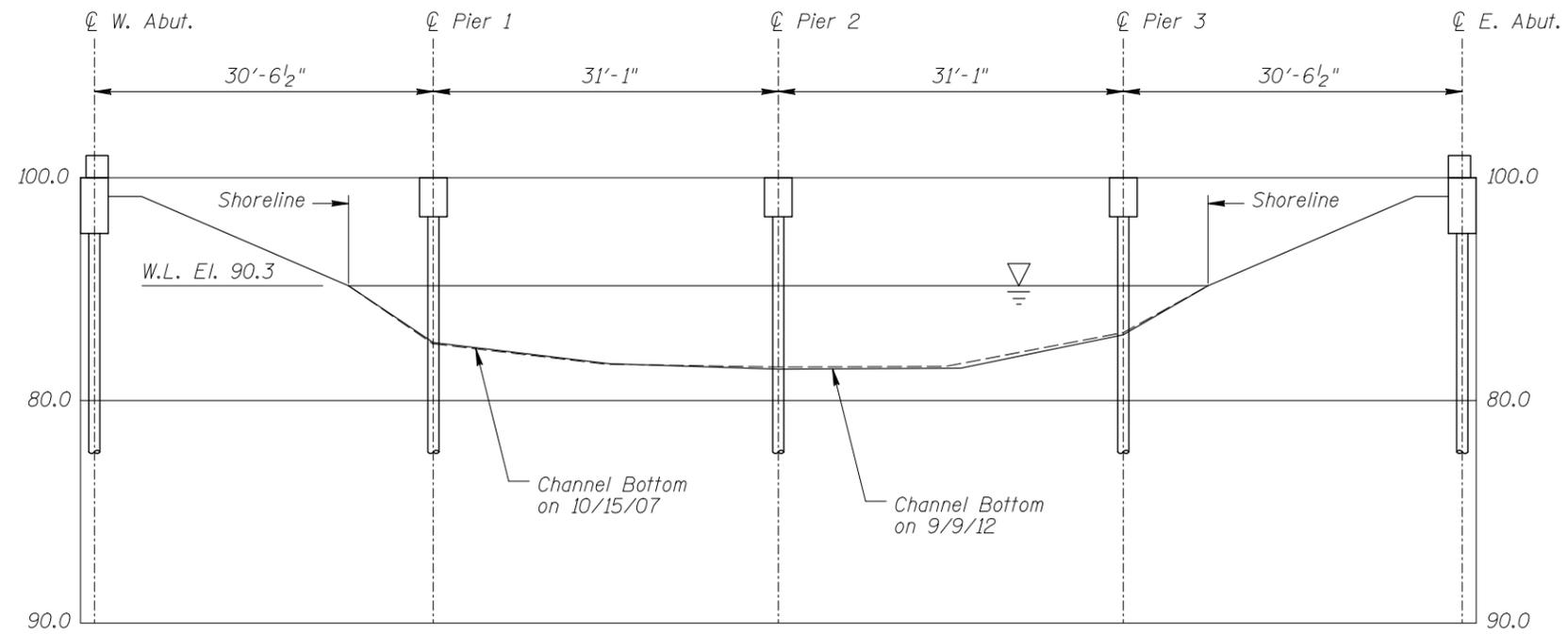
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**MINNESOTA  
DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION**

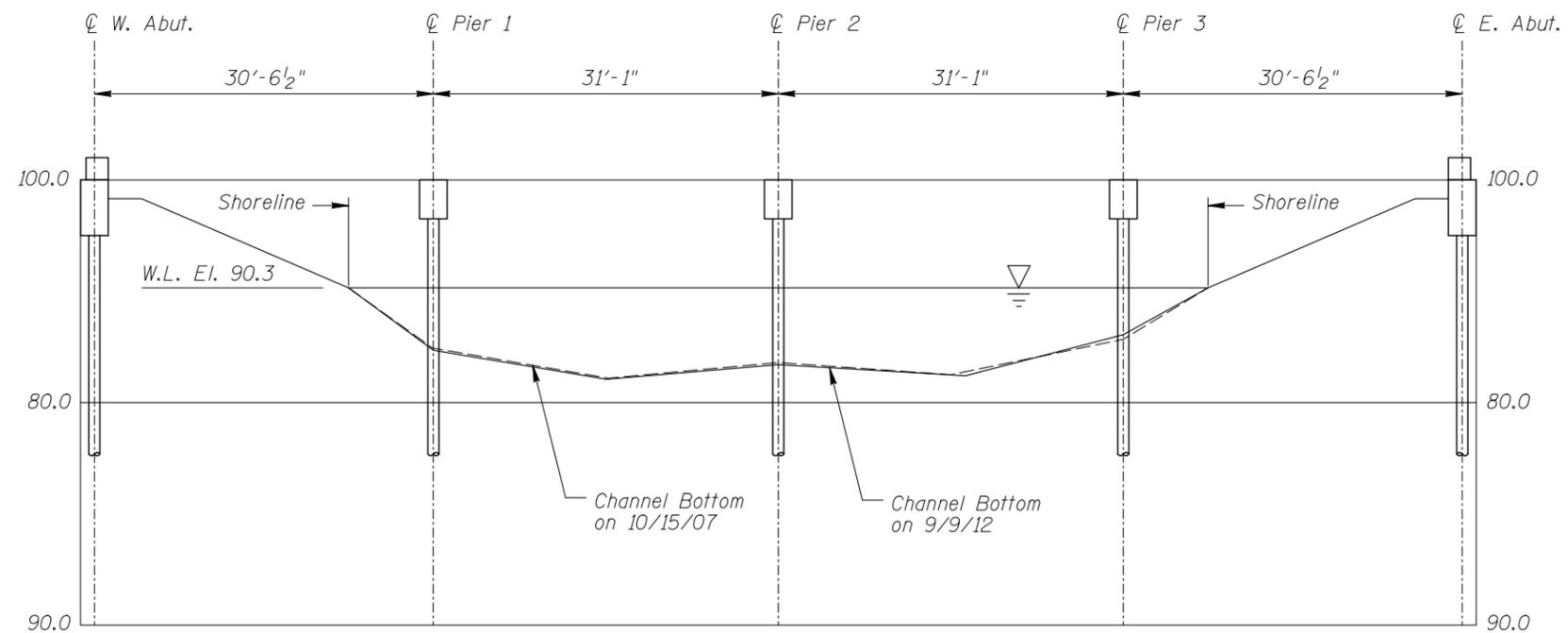
STRUCTURE NO. 18501  
OVER THE PINE RIVER (CROSS LAKE/RUSH LAKE)  
DISTRICT 3, CROW WING COUNTY

**INSPECTION AND SOUNDING PLAN**

|                 |   |                 |
|-----------------|---|-----------------|
| Drawn By: BJR   | <b>COLLINS ENGINEERS</b><br>123 North Wacker Drive<br>Suite 300<br>Chicago, IL 60606<br>(312) 704-9300<br>www.collinsengr.com | Date: SEP. 2012 |
| Checked By: BRL |   | Scale: NTS      |
| Code: 522118501 |   | Figure No.: 1   |



NORTH FASCIA PROFILE



SOUTH FASCIA PROFILE

Note:  
Refer to Figure 1 for General Notes.



|   |                              |                   |
|---|------------------------------|-------------------|
| <b>MINNESOTA<br/>DEPARTMENT OF TRANSPORTATION<br/>UNDERWATER BRIDGE INSPECTION</b>                |                              |                   |
| STRUCTURE NO. 18501<br>OVER THE PINE RIVER (CROSS LAKE/RUSH LAKE)<br>DISTRICT 3, CROW WING COUNTY |                              |                   |
| <b>NORTH AND SOUTH<br/>FASCIA PROFILES</b>  |                              |                   |
| Drawn By: BJR   | <b>COLLINS<br/>ENGINEERS</b> | Date: SEP. 2012   |
| Checked By: BRL   |                              | Scale: 1/16" = 1' |
| Code: 522118501   |                              | Figure No.: 2     |

123 North Wacker Drive  
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Chicago, IL 60606  
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MINNESOTA DEPARTMENT OF TRANSPORTATION  
OFFICE OF BRIDGES AND STRUCTURES  
DAILY DIVING REPORT

INSPECTORS: WSB & Associates and Collins Engineers      DATE: September 9, 2012

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

BRIDGE NO: 18501      WEATHER: Sunny, 70°F

WATERWAY CROSSED: Pine River (Cross Lake / Rush Lake)

DIVING OPERATION:  SCUBA       SURFACE SUPPLIED AIR  
 OTHER

PERSONNEL: Brad Robinson (WSB), Lukas Janulis (Collins)

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

TIME IN WATER: 10:55 a.m.

TIME OUT OF WATER: 11:05 a.m.

WATERWAY DATA: VELOCITY Negligible / None

VISIBILITY 5.0 feet

DEPTH 7.5 feet at Pier 2

ELEMENTS INSPECTED: Piers 1, 2, and 3.

REMARKS: Overall, the submerged portion of the steel piles were in good condition with coating failure and related minor corrosion covering 15 to 20% of the surface area below the waterline. There was minor rust nodules and overall minimum corrosion with section losses up to 1/32 inch deep. All piles exhibited aquatic growth from the waterline to the channel bottom. There was no significant scour or other channel bottom deficiencies. Overall the substructure condition was comparable to what was noted during the previous inspection.

FURTHER ACTION NEEDED:       YES       NO

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. 18501  
 INSPECTORS WSB & Associates and Collins Engineers, Inc.  
 ON-SITE TEAM LEADER Barritt Lovelace, P.E.  
 WATERWAY CROSSED Pine River (Cross Lake / Rush Lake)

INSPECTION DATE September 9, 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           | 5.6'                   | 7            | N                          | N        | 8            | N     | 7                                    | 8     | 8                  | 8                     | N                    | 8                                      | N        | 7     | N      | 7               | N                              | N     |
|                    | Pier 2           | 7.5'                   | 7            | N                          | N        | 8            | N     | 7                                    | 8     | N                  | N                     | N                    | 8                                      | N        | 7     | N      | 7               | N                              | N     |
|                    | Pier 3           | 4.4'                   | 7            | N                          | N        | 8            | N     | 7                                    | 8     | 8                  | 8                     | N                    | 8                                      | N        | 7     | N      | 7               | N                              | N     |
|                    |                  |                        |              |                            |          |              |       |                                      |       |                    |                       |                      |  |          |       |        |                 |                                |       |

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the submerged portion of the steel piles were in good condition with coating failure and related minor corrosion covering 15 to 20% of the surface area below the waterline. There was minor rust nodules and overall minimum corrosion with section losses up to 1/32 inch deep. All piles exhibited aquatic growth from the waterline to the channel bottom. There was no significant scour or other channel bottom deficiencies. Overall the substructure condition was comparable to what was noted during the previous inspection.

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.