# UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 7182

CSAH 52

OVER THE

WHITEFACE RIVER

ST. LOUIS COUNTY

JULY 24, 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. 7182, Piers 1 and 2, were in good to satisfactory condition with no defects of structural significance. Light scaling was observed from 4 feet above the water line to the channel bottom, with a maximum of 1/8 inch penetration. Heavier extent of scaling was found near the waterline with 1/2 inch typical and 1 inch maximum penetration. Moderate timber debris was observed around the upstream column and west side of Pier 1 extending from the channel bottom to 5 feet above the waterline. The channel bottom appeared stable, and the substructure foundations were adequately embedded in the channel bottom.

INSPECTION FINDINGS:

(A) A moderate accumulation of timber debris consisting of logs and branches up to 12 inches in diameter was found around Pier 1 extending from the upstream column and up to 5 feet off the west faces. The debris extended from the channel bottom to 5 feet above the waterline.

(B) Light scaling was observed from 4 feet above the waterline to the channel bottom, with a maximum of 1/8 inch penetration. A heavy extent of scaling was found from 1 foot above the waterline to 1 foot below the waterline with 1/2 inch typical penetration and 1 inch maximum penetration.

(C) The channel bottom material consisted of sand and scattered rip rap, 12 inches in diameter and smaller.

RECOMMENDATIONS:

(A) Monitor the extent of scaling at both piers during future underwater inspections.

(B) Monitor the timber debris accumulation at Pier 1, during future inspections, and if found to be increasing to a more detrimental extent, removal operations may become warranted at that time.

(C) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

Respectfully submitted,

WSB and Associates

Barritt Lovelace
Registered Professional Engineer
Bridge Safety Inspection Team Leader

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: 7182

Feature Crossed: Whiteface River

Feature Carried: CSAH 52

Location: St. Louis County

Bridge Description: The superstructure consists of three spans of cast in place concrete beams supporting a reinforced concrete deck. The bridge is supported by two reinforced concrete abutments and two reinforced concrete piers.

2. INSPECTION DATA

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

Dive Team: Kasey Yoder (WSB), John Loftus (Collins)

Date: July 24, 2012

Weather Conditions: Sunny, 70° F

Underwater Visibility: 1.0 foot

Waterway Velocity: 1.0 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2

General Shape: The piers consisted of a pier cap supported by two concrete columns. The pier and abutments are supported on cast in place concrete piles. The piers are numbered 1 and 2 starting for the west end of the bridge.

Maximum Water Depth at Substructure Inspected: Approximately 3.5 feet.

4. WATERLINE DATUM

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

Water Surface: The waterline was approximately 12 feet below reference.
Waterline Elevation = 1290.4.

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/07/12

Item 113: Scour Critical Bridges: I/91

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

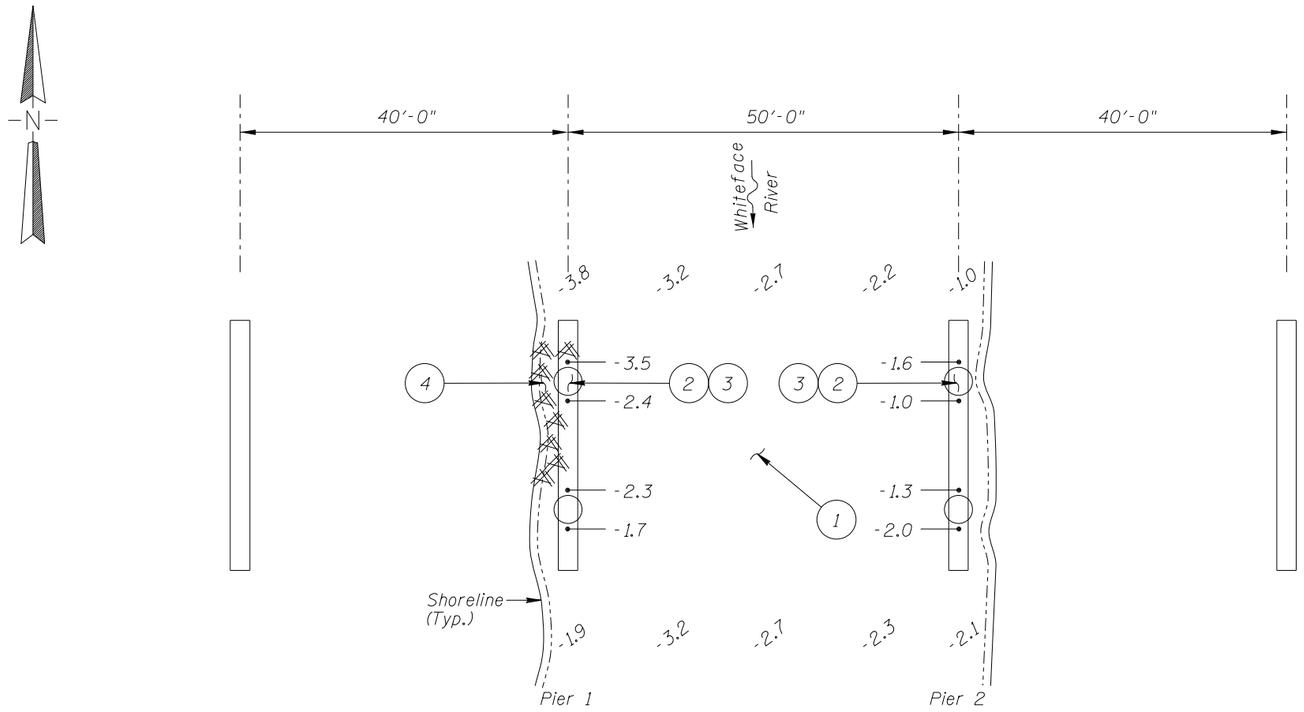
_____ Yes X No

6. STRUCTURAL ELEMENT CONDITION RATING:

| Item # | Element Description | Quantity | Unit | Conditions | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 1 | 2 | 3 | 4 | 5 |
| 205 | Reinforced Concrete Column | 4 | EA | 2 | 2 | | | |
| 985 | Slopes | 1 | EA | | 1 | | | |

Photograph 1. View of Pier 1, Looking Southwest.

Photograph 2. View of Pier 2, Looking Northwest.




SOUNDING PLAN

Legend

| | |
|---|---|
| -1.2 | Sounding Depth from Waterline (7/24/12) |
| | Timber Debris |

Note:

All soundings are based on 2012 waterline location.

GENERAL NOTES:

1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection on July 24, 2012, the waterline was located approximately 12.0 feet below the top of the pier cap at the downstream end of Pier 2. This corresponds with a waterline elevation of 1290.42 feet based on bridge design plans dated April 10, 1957.
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.

INSPECTION NOTES:

(1) The channel bottom consisted of sand and scattered riprap 12 inch diameter and smaller.

(2) Light concrete scaling, with up to 1/8 inch penetration was observed from 4 feet above waterline to channel bottom.

(3) Heavy concrete scaling, with 1/2 inch typical and 1 inch maximum penetration was observed from 1 foot above waterline to 1 foot below waterline.

(4) A moderate accumulation of timber debris, consisting of logs and branches 12" inch dia. and smaller, was observed around the upstream column of Pier 1 extending along the west side of the pier and up to 5 feet off the pier, from the channel bottom to 5 feet above the waterline.

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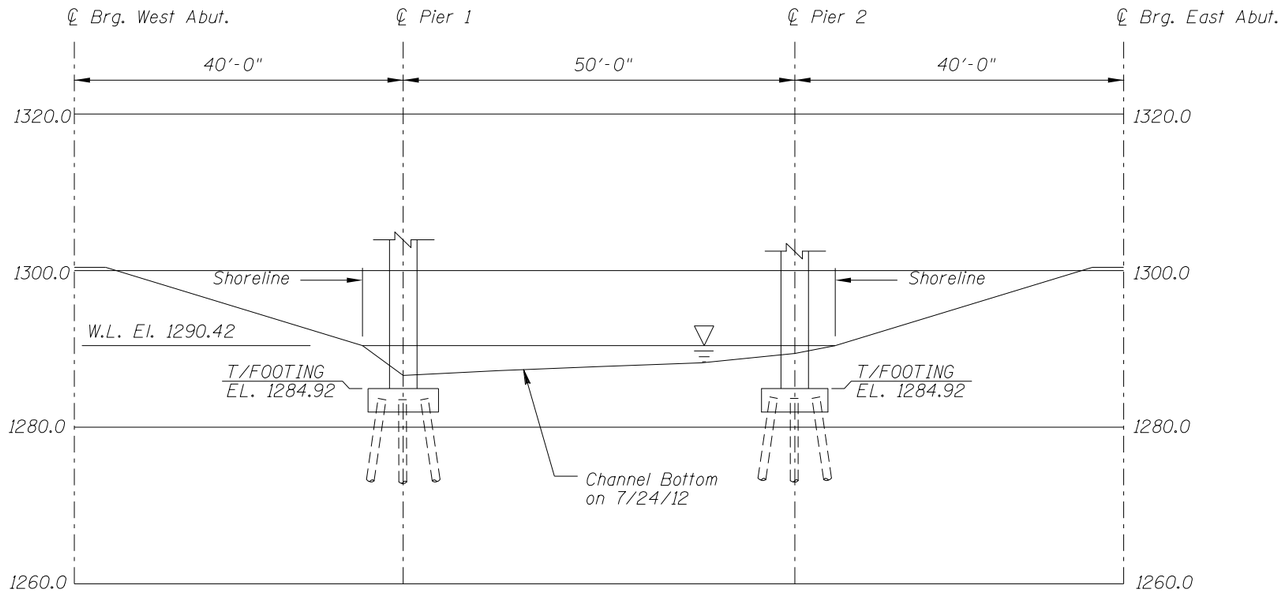
**MINNESOTA**
**DEPARTMENT OF TRANSPORTATION**
**UNDERWATER BRIDGE INSPECTION**

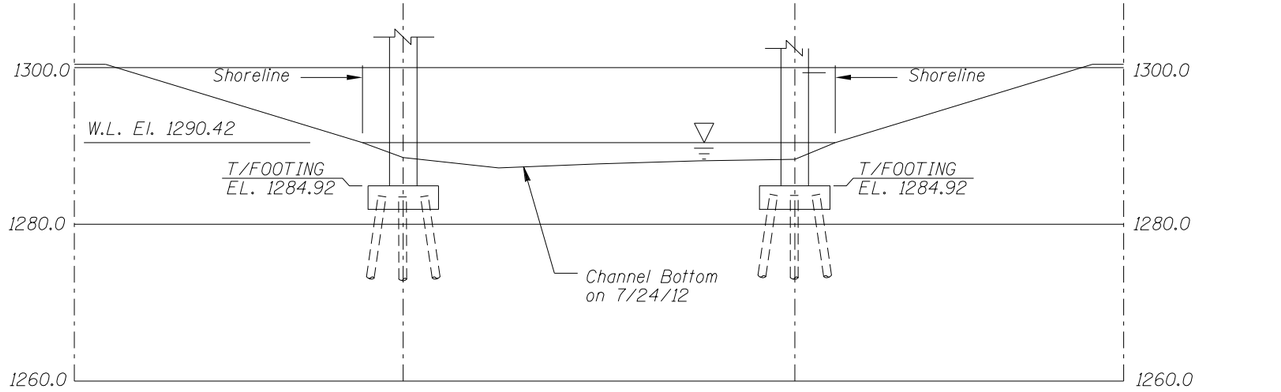
STRUCTURE NO. 7182
OVER THE WHITEFACE RIVER
DISTRICT 1, ST. LOUIS COUNTY

INSPECTION AND SOUNDING PLAN

| | |
|---|---|
| Drawn By: BJR | Date: JULY 2012 |
| Checked By: BRL | Scale: NTS |
| Code: --- | Figure No.: 1 |




UPSTREAM FASCIA PROFILE




DOWNSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

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STRUCTURE NO. 7182
OVER THE WHITEFACE RIVER
DISTRICT 1, ST. LOUIS COUNTY

# UPSTREAM AND DOWNSTREAM FASCIA PROFILES

| | |
|---|---|
| Drawn By: BJR | Date: JULY 2012 |
| Checked By: BRL | Scale: 1"=20' |
| --- | Figure No.: 2 |

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

INSPECTORS: WSB & Associates and Collins DATE: July 24, 2012
ON-SITE TEAM LEADER: Barritt Lovelace, P.E.
BRIDGE NO: 7182 WEATHER: Sunny, 70° F
WATERWAY CROSSED: Whiteface River
DIVING OPERATION: X SCUBA _____ SURFACE SUPPLIED AIR
_____ OTHER
PERSONNEL: Kasey Yoder (WSB), John Loftus (Collins)
EQUIPMENT: Commercial Scuba, U/W Light, Scraper, Lead Line, Sounding Pole, Probe Rod, Camera
TIME IN WATER: 19:15
TIME OUT OF WATER: 19:35
WATERWAY DATA: VELOCITY 1 ft/sec.
VISIBILITY 1 foot
DEPTH 3.5 feet maximum at Pier 1
ELEMENTS INSPECTED: Pier 1 and Pier 2
REMARKS: Overall, Piers 1 and 2 were in good to satisfactory condition with no defects of structural significance. There was light to heavy scaling of the concrete columns with penetration depths ranging from 1/8 inch, found from channel bottom to 4 feet above the waterline, to 1/2 inch typical and 1 inch maximum, found between 1 foot above to 1 foot below the waterline. Moderate timber debris was observed around Pier 1 extending from the channel bottom to 5 feet above the waterline.

FURTHER ACTION NEEDED: _____ YES X NO

Monitor concrete scaling during future inspections.

Monitor timber debris during future inspections.

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. 7182
INSPECTORS WSB & Associates, Inc. and Collins Engineers, Inc.
ON-SITE TEAM LEADER Barritt Lovelace, P.E.
WATERWAY CROSSED Whiteface River

INSPECTION DATE July, 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

| | | | SUBSTRUCTURE | | | | | | CHANNEL | | | | | GENERAL | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UNIT REFERENCE NO. | | MAXIMUM DEPTH OF WATER | PILING | COLUMNS, SHAFTS, OR FACES* | FOOTINGS | DISPLACEMENT | OTHER (BRACING) | 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 |
| | UNIT DESCRIPTION | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| | Pier 1 | 3.5’ | N | 7 | N | 8 | N | 7 | 8 | 7 | 7 | 7 | 7 | 7 | N | N | N | N | N |
| | Pier 2 | 2.0’ | N | 7 | N | 8 | N | 7 | 8 | 7 | 7 | 7 | 7 | 7 | N | N | N | N | N |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |

*UNDERWATER PORTION ONLY

REMARKS: Overall, Piers 1 and 2 were in good to satisfactory condition with no defects of structural significance. There was light to heavy scaling of the concrete columns with penetration depths ranging from 1/8 inch, found from channel bottom to 4 feet above the waterline, to 1/2 inch typical and 1 inch maximum, found between 1 foot above to 1 foot below the waterline. Moderate timber debris was observed around Pier 1 extending from the channel bottom to 5 feet above the waterline.

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.