UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 6518

TRUNK HIGHWAY NO. 25

OVER THE

MISSISSIPPI RIVER

DISTRICT 3 – CROW WING COUNTY

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 5221

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 6518, Piers 1, and 2, were found to be in satisfactory condition with no defects of structural significance and no appreciable changes since the last underwater inspection. The channel bottom configuration and footing exposure at Piers 1 and 2 was comparable to the last inspection.

INSPECTION FINDINGS:

(A) There was footing exposure at both piers with a maximum vertical exposure of 3.5 feet and a maximum seal exposure of 2.0 feet at Pier 1. At Pier 1, the 2-foot maximum seal exposure was at the middle of the north side. At pier 2, the 3-foot maximum footing exposure was at the southwest corner.

(B) There was moderate to heavy concrete scaling on both piers, typically from 6 inches above to 2 feet below the waterline with a maximum penetration of 6 inches at the noses. Typical penetrations were up to 2 inches.

(C) Spalls with 2 to 4 inches of penetration and exposed / corroded reinforcing steel were observed on the south face of Pier 2 from 6 feet to 8 feet above the waterline.

(D) The channel bottom material consisted of sand and cobbles up to 6 inch in diameter and a maximum of 4 inches of probe rod penetration. The channel bottom was overlaid by a 1 inch thick layer of fine silt.

(E) The steel icebreakers located at the upstream noses of both piers from 4 feet above the waterline to 6 inches below the waterline exhibited loss of coating and minor surface corrosion with no appreciable loss of section.

(F) There was a moderate accumulation of timber debris at the downstream nose of Pier 2.

RECOMMENDATIONS:

(A) Due to the presence of the piles under the footing, the extent of foundation exposure is not presently a concern and should just be monitored during subsequent inspections.

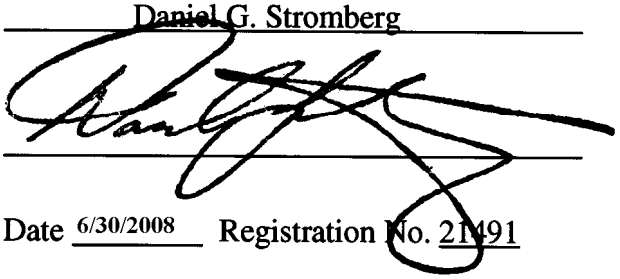
(B) Repair the spalls at Pier 2 by removing all unsound concrete, cleaning the reinforcing steel, and patching with a concrete mix designed to promote high durability and low permeability.

(C) The accumulation of timber debris at Pier 2 should be monitored during future underwater inspections, and if found to be progressing, removal measures may be warranted at that time.

(D) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years, and continue to monitor extent of footing exposure at all piers.

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.

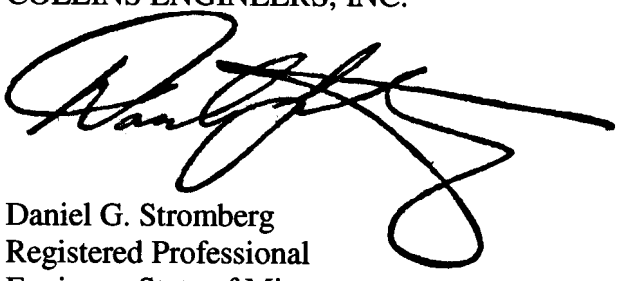
Daniel G. Stromberg



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: 6518

Feature Crossed: Mississippi River

Feature Carried: Trunk Highway No. 25

Location: District 1 – Crow Wing County

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

2. INSPECTION DATA

Professional Engineer/Team Leader: Bradley A. Syler, P.E., S.E.

Dive Team: John J. Loftus, Valerie Roustan

Date: August 16, 2007

Weather Conditions: Sunny, 70°F

Underwater Visibility: 2.0 feet

Waterway Velocity: 1.0 f.p.s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1and 2.

General Shape: The pier each consists of two rectangular reinforced concrete columns connected by a diaphragm wall, all of which is supported on a common rectangular footing founded on piles.

Maximum Water Depth at Substructure Inspected: Approximately 27.1 feet.

4. WATERLINE DATUM

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

Water Surface: The waterline was approximately 9.8 feet below reference
Water Elevation = 1182.39.

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 6

Item 92B: Underwater Inspection: Code B/08/07

Item 113: Scour Critical Bridges: Code I/92

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

_____Yes X No

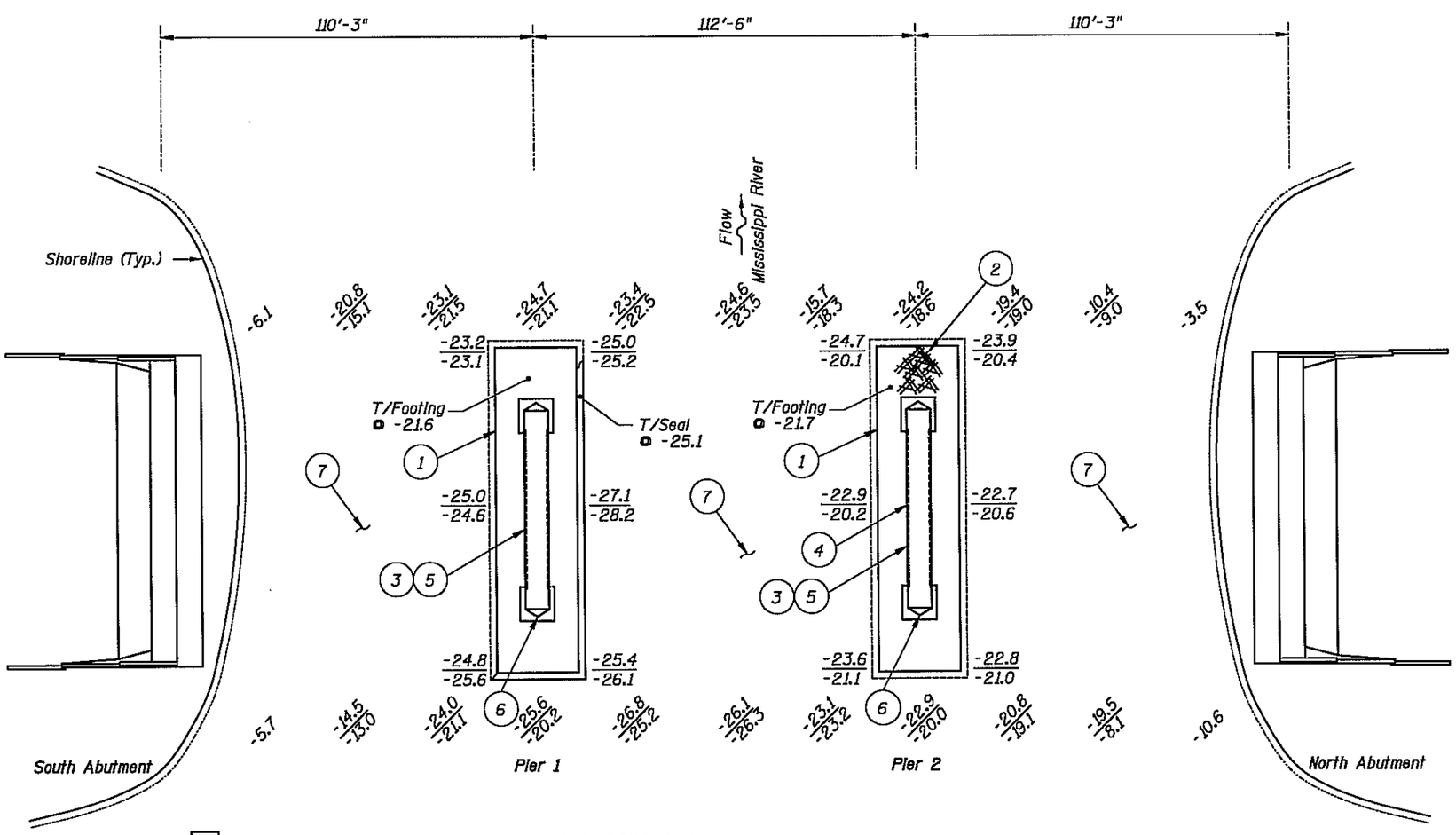
Photograph 1. View of Pier 1, Looking Southwest.

Photograph 2. View of Pier 2, Looking Northeast.

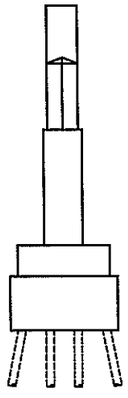
Photograph 3. Scaling at upstream nose of Pier 2, Looking Southeast.

Photograph 4. Scaling / Spalls at the south face of Pier 2, Looking North.

Photograph 5. Scaling/ Spalls at the south face of Pier 2 close to the upstream face, Looking North



SOUNDING PLAN



TYPICAL END VIEW OF PIERS

GENERAL NOTES:

1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection on August 16, 2007, the waterline was located approximately 9.8 feet below the top of the pier cap at the upstream end of Pier 1. This corresponds with a waterline elevation of 1182.4 feet based on previous report dated September 11, 2000.
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 inspection notes shown on this drawing represent either new or previously noted conditions of structural significance or previously noted conditions that have changed significantly. For additional conditions not noted herein, refer to the 2000 report.

INSPECTION NOTES:

1. There was footing exposure at both piers with a maximum vertical footing exposure of 3.5 feet and a maximum seal exposure of 2 feet (only) at Pier 1. At Pier 1, the 2 feet maximum seal exposure was at the middle of the north side. At Pier 2, the 3 feet maximum footing exposure was at the southwest corner.
2. There were logs up to 18-inch-diameter with associated branchy drift at the dowstream nose of Pier 2 extending from the channel bottom up 4 feet, 10 feet long and 10 feet wide.
3. There was moderate to heavy concrete scaling on both piers, typically from 6 inches above to 3 feet below the waterline with maximum penetration of 6 inches at the noses. Typical penetrations were up to 2 inches.
4. Spalls with 2 to 4 inches of penetration and exposed reinforcing steel were observed on the south face of Pier 2 from 6 feet above to 8 feet above the waterline.
5. Above and below the scaling, the concrete of the pier faces and footings (where exposed) was typically smooth and sound with random minor areas of poor consolidation with up to 1/2 inch maximum penetration and random vertical hairline cracks from top of pier to channel bottom.
6. The steel ice breakers located at the upstream nose of both piers from 4 feet above the waterline to 6 inches below the waterline exhibited loss of coating and minor surface corrosion with no appreciable loss of section.
7. The channel bottom consisted of sand and cobbles up to 6 inches in diameter up with up to 4 inch probe rod penetration. The channel bottom was overlain by a 1 inch thick layer of fine silt.

Legend

-5.2	Sounding Depth (8/16/07)
-5.2	Sounding Depth (9/11/00)
	Timber Debris

Note:

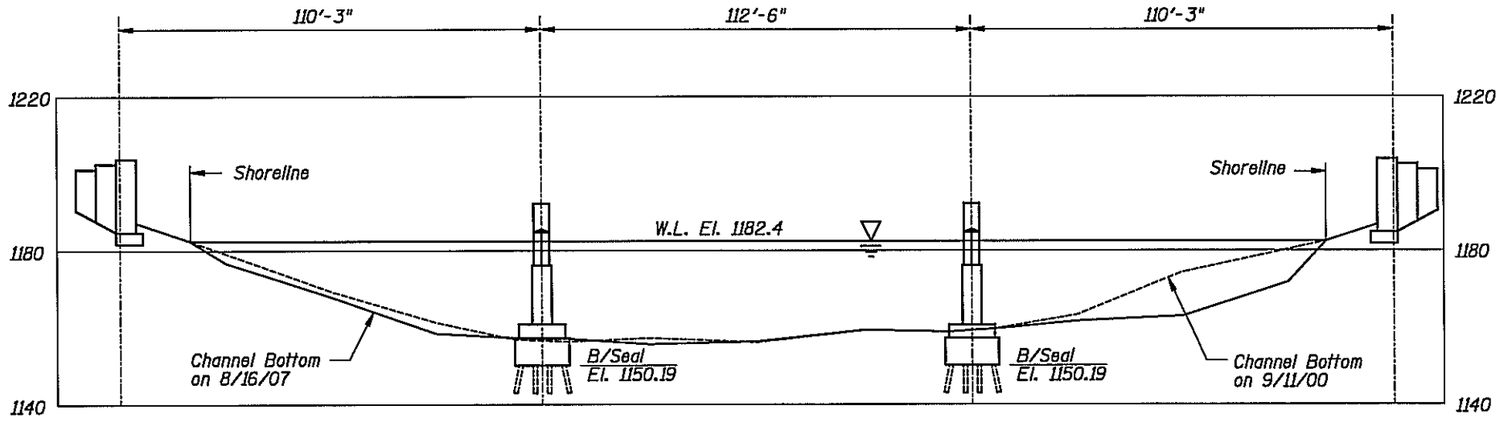
All soundings based on 2007 waterline location.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

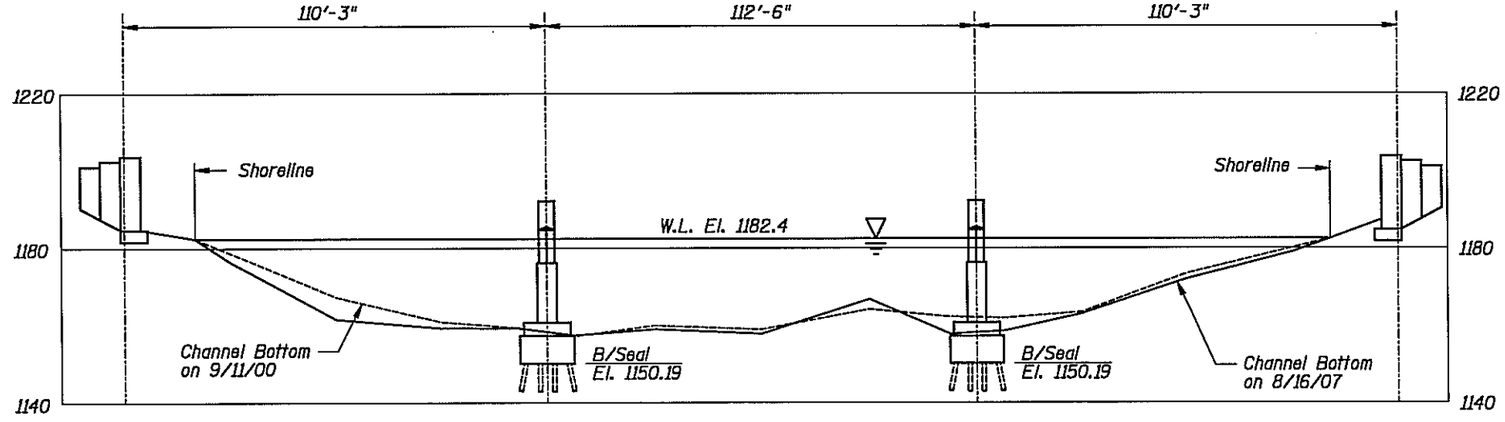
STRUCTURE NO. 6518
OVER THE MISSISSIPPI RIVER
DISTRICT 3, CROW WING COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS, INC. 123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9380 www.collinsengr.com	Date: AUGUST, 2007
Checked By: MDK		Scale: NTS
Code: 52216518		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

MINNESOTA
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UNDERWATER BRIDGE INSPECTION

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NORTH AND SOUTH
FASCIA PROFILES

Drawn By: PRH	COLLINS ENGINEERS, INC. 123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: AUGUST, 2007
Checked By: MDK		Scale: 1/16" =1'
Code: 52216518		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: August 16, 2007

ON-SITE TEAM LEADER: Bradley A. Syler, P.E., S.E.

BRIDGE NO: 6518 WEATHER: Sunny, 70°F

WATERWAY CROSSED: Mississippi River

DIVING OPERATION: X SCUBA _____ SURFACE SUPPLIED AIR

OTHER _____

PERSONNEL: John J. Loftus, Valerie Roustan

EQUIPMENT: SCUBA, U/W Light, Scraper, Lead Line, Sounding Pole, Fathometer, Probe Rod, Camera

TIME IN WATER: 1:25 P.M.

TIME OUT OF WATER: 2:50 P.M.

WATERWAY DATA: VELOCITY 1.0 f.p.s.

VISIBILITY 2.0 feet

DEPTH 27.1 feet maximum at Pier 2

ELEMENTS INSPECTED: Piers 1 and 2

REMARKS: Above and below the scaling at waterline, the concrete of pier faces and footings (where exposed) was typically smooth and sound with random areas of poor consolidation. There was footing exposure at both piers with a maximum vertical footing exposure of 3.5 feet and a maximum vertical seal exposure of 2.0 feet at Pier 1. There was moderate to heavy scaling on both piers, typically from 6 inches above to 2 feet below the waterline with a maximum penetration of 6 inches at the noses (2 inch typical penetration). Spalls with 2 to 4 inches penetration and exposed and corroded reinforcing steel were observed on the south face of Pier 2 from 6 feet to 8 feet above the waterline. The steel icebreakers located at the upstream nose of both piers from 4 feet above the waterline to 6 inches below the waterline exhibited loss of coating and minor surface corrosion with no appreciable loss of section. There was a moderate accumulation of 18 inch diameter and smaller timber debris around the downstream nose of Pier 2.

FURTHER ACTION NEEDED: ___X___ YES _____ NO

Due to the presence of the piles under the footing, the extent of foundation exposure is not presently a concern and should just be monitored during subsequent inspections.
Repair the spalls at Pier 2 by removing all unsound concrete, cleaning the reinforcing steel, and patching with a concrete mix designed to promote high durability and low permeability.

The accumulation of timber debris at Pier 2 should be monitored during future underwater inspections, and if found to be progressing, removal measures may be warranted at that time.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years, and continue to monitor extent of footing exposure at all piers.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 6518
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER. Bradley A. Syler, P.E., S.E.
WATERWAY CROSSED Mississippi River

INSPECTION DATE August 16, 2007

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	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	25.6’	N	6	6	8	N	6	6	7	7	N	6	6	N	N	N	N	N
	Pier 2	24.7’	N	6	6	8	N	6	6	7	7	7	6	6	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Above and below the scaling at waterline, the concrete of pier faces and footings (where exposed) was typically smooth and sound with random areas of poor consolidation. There was footing exposure at both piers with a maximum vertical footing exposure of 3.5 feet and a maximum vertical seal exposure of 2.0 feet at Pier 1. There was moderate to heavy scaling on both piers, typically from 6 inches above to 2 feet below the waterline with a maximum penetration of 6 inches at the noses (2 inch typical penetration). Spalls with 2 to 4 inches penetration and exposed and corroded reinforcing steel were observed on the south face of Pier 2 from 6 feet to 8 feet above the waterline. The steel icebreakers located at the upstream nose of both piers from 4 feet above the waterline to 6 inches below the waterline exhibited loss of coating and minor surface corrosion with no appreciable loss of section. There was a moderate accumulation of 18 inch diameter and smaller timber debris around the downstream nose of Pier 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.