

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 58525
CSAH NO. 46
OVER THE
KETTLE RIVER
DISTRICT 1 - PINE 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. 58525, Piers 1 and 2, were found to be generally in good condition with no structurally significant defects observed. Each of the concrete pier columns exhibited minor scaling from 1 foot above the waterline to 1 foot below the waterline. A minor scour depression has exposed the top of the footing at the upstream end of Pier 1. Minor scour depressions were also observed at each of the three downstream columns of Piers 1 and 2. The channel bottom appeared stable with only the minor scour depressions detected around the piers.

INSPECTION FINDINGS:

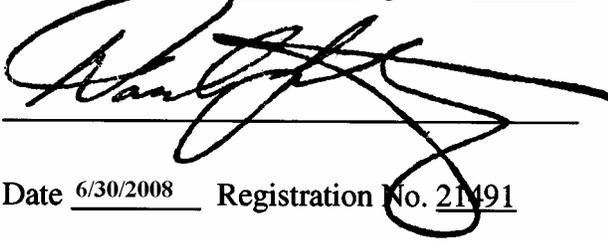
- (A) The concrete pier columns exhibited light scaling from 1 foot above the waterline to 1 foot below the waterline with up to ½ inch of penetration.
- (B) A scour depression, measuring 3 feet in radius and 1 foot deep, was observed at the upstream end of Pier 1. The scour depression has exposed the top of the footing at the upstream end of the pier with no vertical face exposure observed.
- (C) Scour depressions, measuring up to 2 feet in radius and up to 1 foot deep, were observed at each of the three downstream columns of Piers 1 and 2.
- (D) An area of poorly consolidated concrete was observed 3 feet above the waterline and measured 2 foot high by 1 foot wide with up to 1.5 inches of penetration at both upstream and downstream ends of the second column from the upstream end of Pier 2.
- (E) Two areas of poorly consolidated concrete and section loss with reinforcing steel exposed and 2 to 3 inches of penetration were observed at the second column from the downstream end of Pier 2 at the waterline.

RECOMMENDATIONS:

- (A) 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

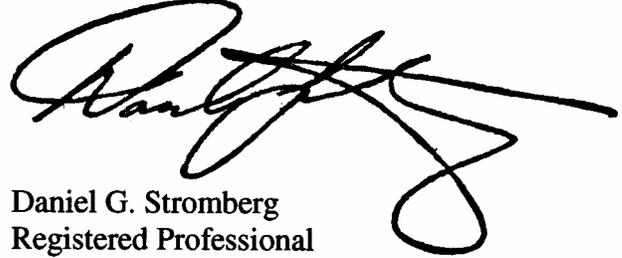


A large, stylized handwritten signature in black ink, appearing to read 'Dan G. Stromberg', is written over a horizontal line.

Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



A large, stylized handwritten signature in black ink, appearing to read 'Dan G. Stromberg', is written over a horizontal line.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 58525

Feature Crossed: Kettle River

Feature Carried: CSAH No. 46

Location: District 1 - Pine County

Bridge Description: The superstructure consists of three spans of pre-stressed concrete beams supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and two reinforced concrete piers, all founded on steel H-piles. The piers are numbered 1 and 2 starting from the west end of the structure.

2. INSPECTION DATA

Professional Engineer/Team Leader: Daniel G. Stromberg, P.E., S.E.

Dive Team: John J. Loftus, Valerie Roustan

Date: August 23, 2007

Weather Conditions: Cloudy, 81° F

Underwater Visibility: 3.0 feet

Waterway Velocity: 0.5 f.p.s

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2

General Shape: The piers consist of four reinforced concrete columns, which are connected by a 15 foot high concrete webwall above the waterline. The columns rest on a rectangular concrete footing that is founded on steel H-piles.

Maximum Water Depth at Substructure Inspected: Approximately 3.3 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the concrete column at the upstream end of Pier 1.

Water Surface: The waterline was approximately 24.9 feet below reference.
Water Elevation = 1054.3.

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 7

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

Item 113: Scour Critical Bridges: Code 1/02

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

 Yes X No



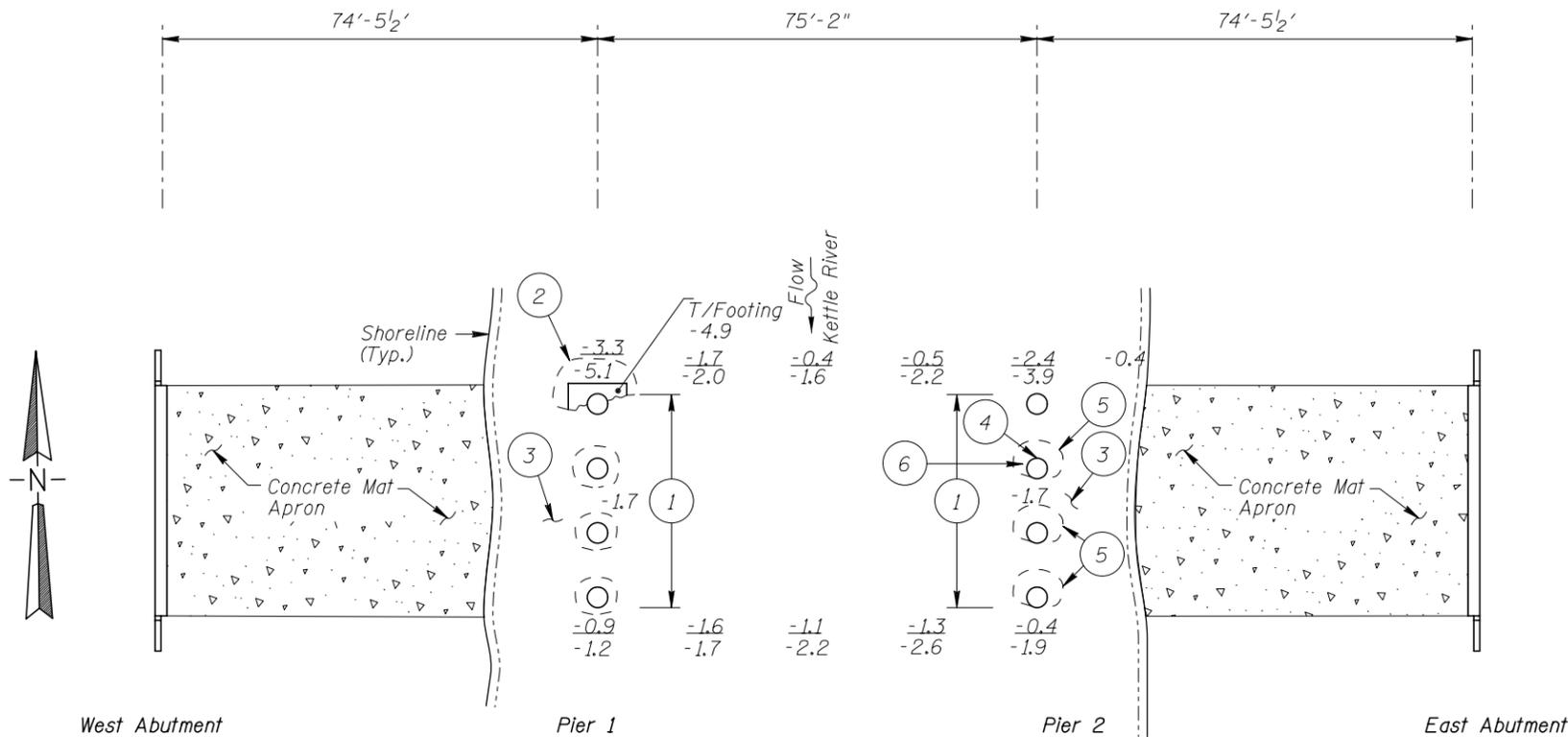
Photograph 1. View of Pier 1, Looking Southwest.



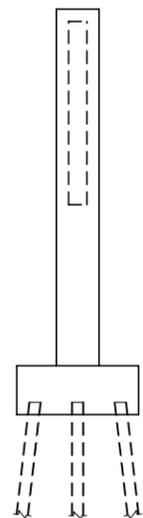
Photograph 2. View of Pier 2, Looking Southeast.



Photograph 3. View of Typical area of poor consolidation and exposed reinforcing steel on the second column from the upstream end of Pier 2, 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 23, 2007, the waterline was located approximately 24.9 feet below the top of the concrete column at the upstream end of Pier 1. This corresponds with a waterline elevation of 1054.3 based on design drawings.
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 concrete columns exhibited moderate scaling from 1 foot above the waterline to 1 foot below the waterline with up to 1/2 inch penetrations.
- 2 A scour depression, measuring 3 feet in radius and 1 foot deep, was observed at the upstream end of Pier 1. The scour depression has exposed the top of the footing at the upstream end of the pier with no vertical face exposure.
- 3 The channel bottom consisted of sandy gravel with cobbles up to 6 inches in diameter.
- 4 An area of poorly consolidated concrete was observed 3 feet above the waterline and measured 2 foot high by 1 foot wide with up to 1.5 inches of penetration at both upstream and downstream ends of the 2nd column from upstream end of Pier 2.
- 5 Scour depressions, measuring up to 2 feet in radius and up to 1 foot deep, were observed at each of the three downstream columns of Pier 1 and 2.
- 6 An area of poorly consolidated concrete and section loss was observed at waterline, 9 inches in diameter with 3 inch maximum penetration at the upstream end of second the column from upstream end of Pier 2. Also at waterline, an area of poorly consolidated concrete and section loss 1 foot high by 2.5 feet wide with 2 inch maximum penetration was observed at the downstream end of the second column from upstream end of Pier 2. Reinforcing steel was exposed in both places.

Legend

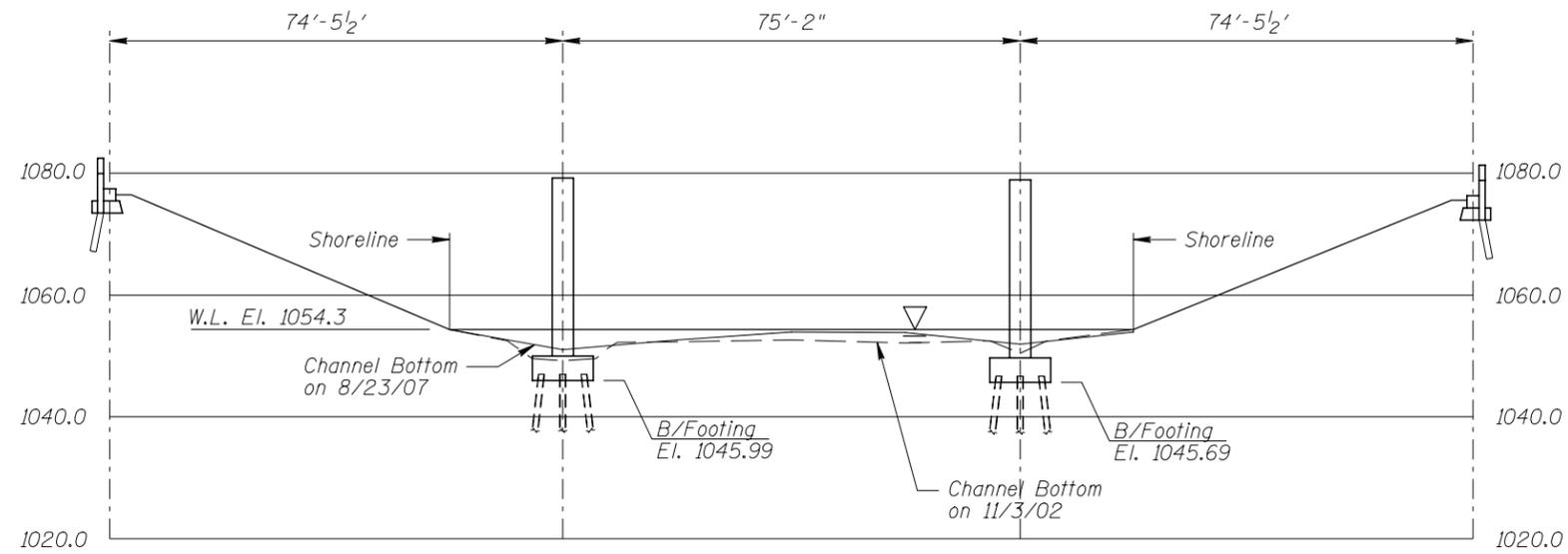
- 5.0 Sounding Depth (8/23/07)
- 5.2 Sounding Depth (11/3/02)
- (---) Scour Depression

**MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION**

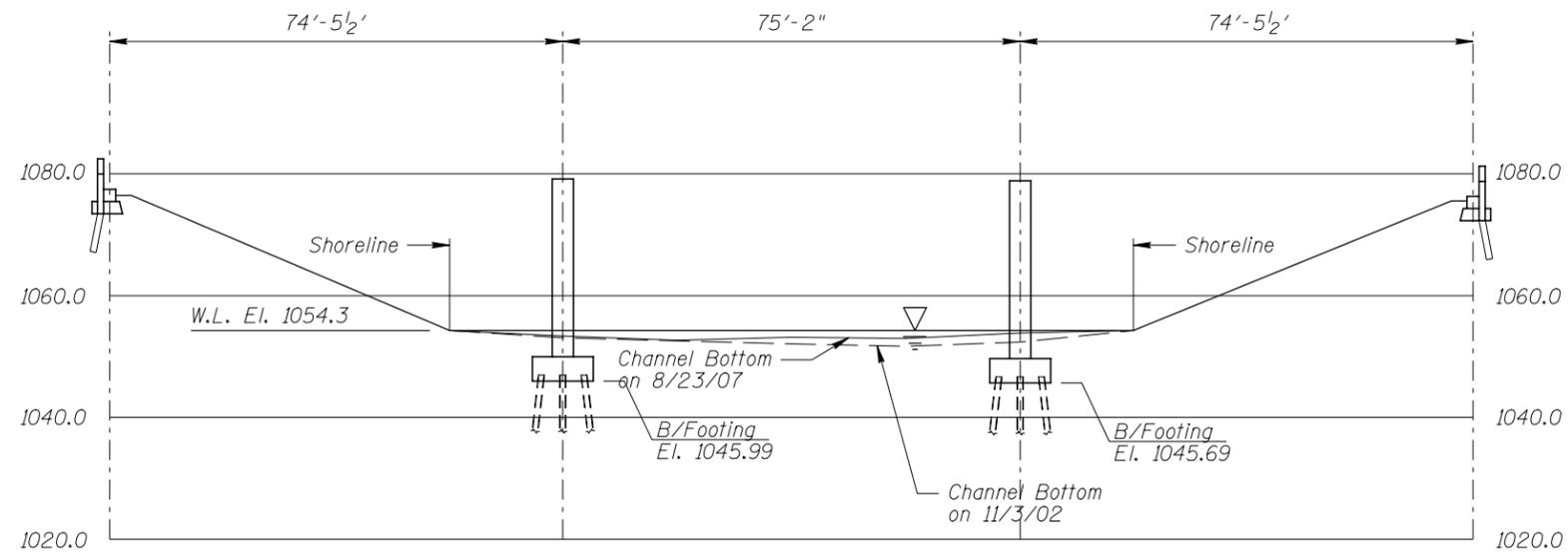
STRUCTURE NO. 58525
OVER THE KETTLE RIVER
DISTRICT 1, PINE COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS <small>133 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: AUG, 2007
Checked By: MDK		Scale: NTS
Code: 522158525		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 58525 OVER THE KETTLE RIVER DISTRICT 1, PINE COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: PRH	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: AUG. 2007
Checked By: MDK		Scale: 1"=30'
Code: 522158525		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: August 23, 2007

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E., S.E.

BRIDGE NO: 58525 WEATHER: Cloudy, 81° F

WATERWAY CROSSED: Kettle River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: John J. Loftus, Valerie Roustan

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

TIME IN WATER: 5:45 p.m.

TIME OUT OF WATER: 6:15 p.m.

WATERWAY DATA: VELOCITY 0.5 f.p.s

VISIBILITY 3.0 feet

DEPTH 3.3 feet maximum at Piers 1

ELEMENTS INSPECTED: Piers 1 and 2

REMARKS: Overall, the submerged concrete was found to be in good condition. Each of the concrete columns exhibited moderate scaling with up to ½ inch penetration from 1 foot above the waterline to 1 foot below the waterline. A scour depression measuring 3 feet in radius and 1 foot deep has exposed the top of the footing at the upstream column of Pier 1 with no vertical face exposure observed. Scour depressions, measuring up to 2 feet in radius and up to 1 foot deep, were observed at each of the three downstream columns of Piers 1 and 2. An area of poorly consolidated concrete was observed 3 feet above the waterline and measured 2 foot high by 1 foot wide with up to 1.5 inches of penetration at both upstream and downstream ends of the second column from the upstream end of Pier 2. Two areas of poorly consolidated concrete and section loss with reinforcing steel were exposed was observed at the second column from the downstream end of Pier 2.

FURTHER ACTION NEEDED: YES NO

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. 58525
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.
 WATERWAY CROSSED Kettle River

INSPECTION DATE August 23, 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

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	3.3'	N	7	N	9	N	7	7	8	8	N	7	7	N	N	N	N	N
	Pier 2	2.4'	N	7	N	9	N	7	7	8	8	N	7	7	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the submerged concrete was found to be in good condition. Each of the concrete columns exhibited moderate scaling with up to 1/2 inch penetration from 1 foot above the waterline to 1 foot below the waterline. A scour depression measuring 3 feet in radius and 1 foot deep has exposed the top of the footing at the upstream column of Pier 1 with no vertical face exposure observed. Scour depressions, measuring up to 2 feet in radius and up to 1 foot deep, were observed at each of the three downstream columns of Piers 1 and 2. An area of poorly consolidated concrete was observed 3 feet above the waterline and measured 2 foot high by 1 foot wide with up to 1.5 inches of penetration at both upstream and downstream ends of the second column from the upstream end of Pier 2. Two areas of poorly consolidated concrete and section loss with reinforcing steel were exposed was observed at the second column from the downstream end 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.