

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 58520

CSAH NO. 61

OVER THE

KETTLE RIVER

DISTRICT 1 - PINE COUNTY



PREPARED FOR THE
MINNESOTA DEPARTMENT OF TRANSPORTATION

BY
COLLINS ENGINEERS, INC.

JOB NO. 5221 (CEI 71)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 58520, Piers 1 and 2, were found to be generally in good condition with no structurally significant defects observed. The steel piles exhibited coating failure with light surface corrosion and some minor pitting. A moderate accumulation of timber debris was observed at the upstream end of Pier 1, and along the south side of Pier 2. The channel bottom around the substructure units and the shorelines appeared stable with no significant scour or appreciable changes since the previous inspection.

INSPECTION FINDINGS:

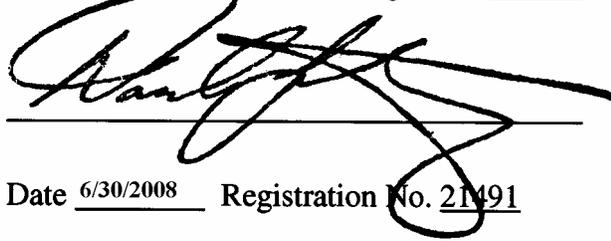
- (A) The steel piles exhibited coating failure on 80 to 100 percent of the surface area, and light surface corrosion with rust nodules and up to 3/16 inch deep pitting on 50 percent of the surface area, from 3 feet above the waterline to the channel bottom. Deterioration was heaviest from 1 foot above the waterline to 1 foot below the waterline.
- (B) A moderate accumulation of timber debris consisting of 1 foot diameter and smaller logs and branches, including a 12-inch-diameter tree, was observed at the downstream end of Pier 1, and an 18-inch-diameter tree was observed extending along the south side of Pier 2.

RECOMMENDATIONS:

- (A) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years. Monitor the drift accumulations at the piers during future inspections.

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.

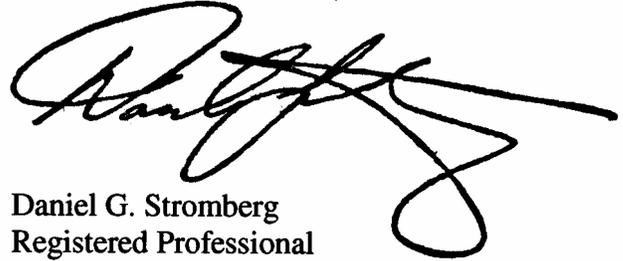
Daniel G. Stromberg



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: 58520

Feature Crossed: Kettle River

Feature Carried: CSAH No. 61

Location: District 1 - Pine County

Bridge Description: The superstructure consists of three spans of multiple concrete beams supporting a reinforced concrete deck. The superstructure is supported by two abutments and two concrete filled steel shell pile piers. The piers are numbered 1 and 2 starting from the south 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: 1.0 foot

Waterway Velocity: 0.5 f.p.s

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2

General Shape: The piers consist of a single line of ten concrete filled steel shell piles supporting a reinforced concrete pier cap.

Maximum Water Depth at Substructure Inspected: Approximately 5.8 feet.

4. WATERLINE DATUM

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

Water Surface: The waterline was approximately 20.2 feet below reference.
Water Elevation = 1010.6.

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 J/97

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

 Yes X No



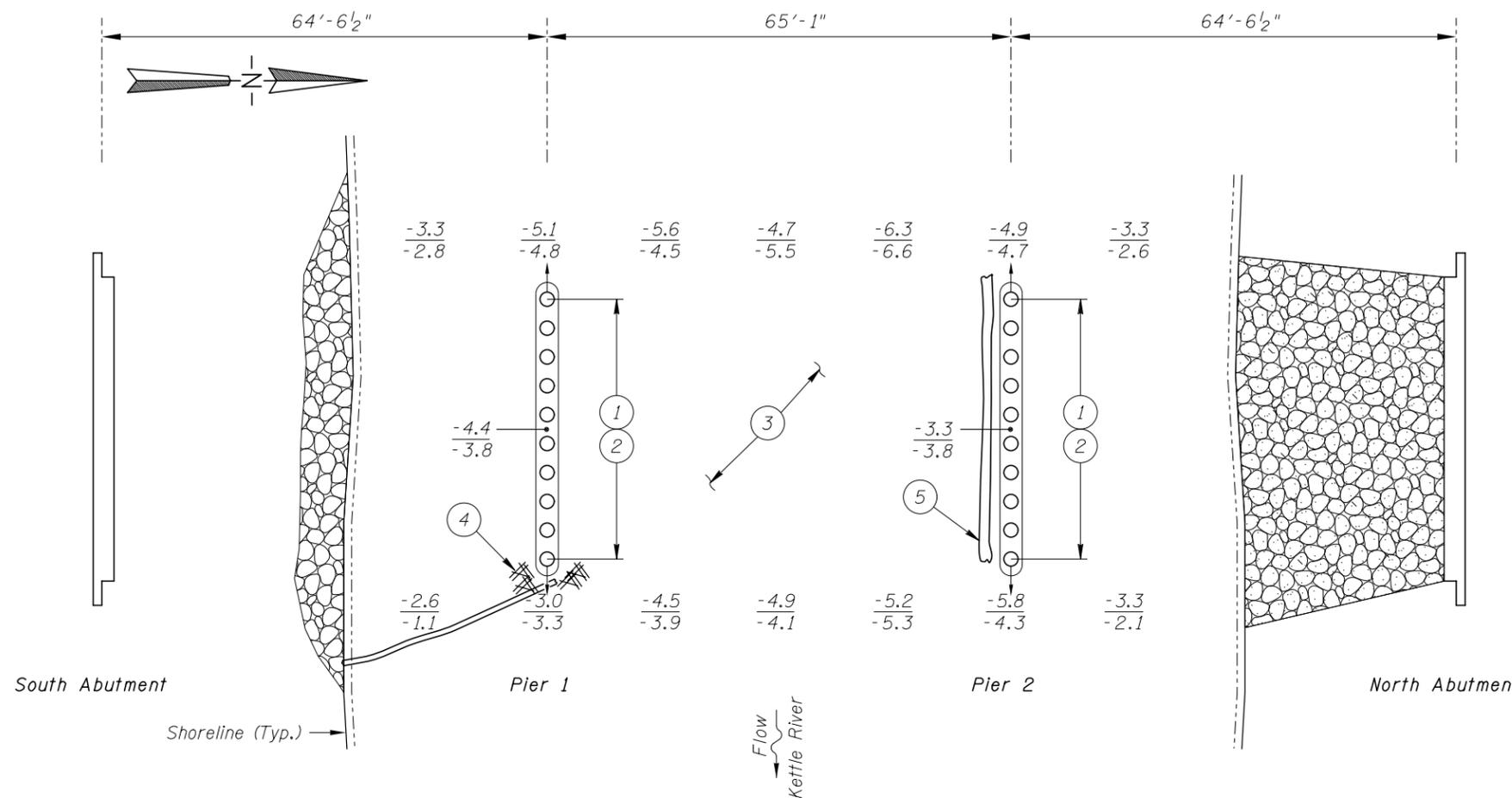
Photograph 1. View of Structure, Looking Northeast.



Photograph 2. View of Pier 1, Looking Southeast.



Photograph 3. View of Pier 2, Looking Northeast.



SOUNDING PLAN

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 20.2 feet below the top of the pile cap on the upstream end of Pier 1. This corresponds to a waterline elevation of 1010.6 feet based on the previous report dated September 25, 2002.
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 steel piles exhibited coating failure on 80 to 100 percent of the surface area from 4 feet above the waterline to the channel bottom.
- ② The steel piles exhibited light surface corrosion with rust nodules and up to 3/16 inch of pitting on up to 50 percent of the surface area from 3 feet above the waterline to the channel bottom. Deterioration was heaviest from 1 foot above waterline to 1 foot below waterline.
- ③ The channel bottom material consisted of sandy gravel and approximately 4-inch-diameter cobbles with random larger rocks on banks with up to 2 inches of probe rod penetration.
- ④ A moderate accumulation of timber debris consisting of 1 foot diameter and smaller logs and branches, including a 12-inch-diameter tree, was observed at the downstream end of Pier 1.
- ⑤ An 18-inch-diameter tree was observed along the south side of Pier 2.

South Abutment

Pier 1

Pier 2

North Abutment

Shoreline (Typ.)

Flow
Kettle River

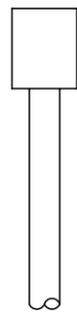
Legend

- 2.0 Sounding Depth (8/23/07)
- 5.2 Sounding Depth (9/25/02)
- Concrete Filled Steel Pile
- Concrete Filled Battered Steel Pile
- ⌘ Timber Debris
- ⊠ Sand Infilled Riprap
- ⊠ Riprap

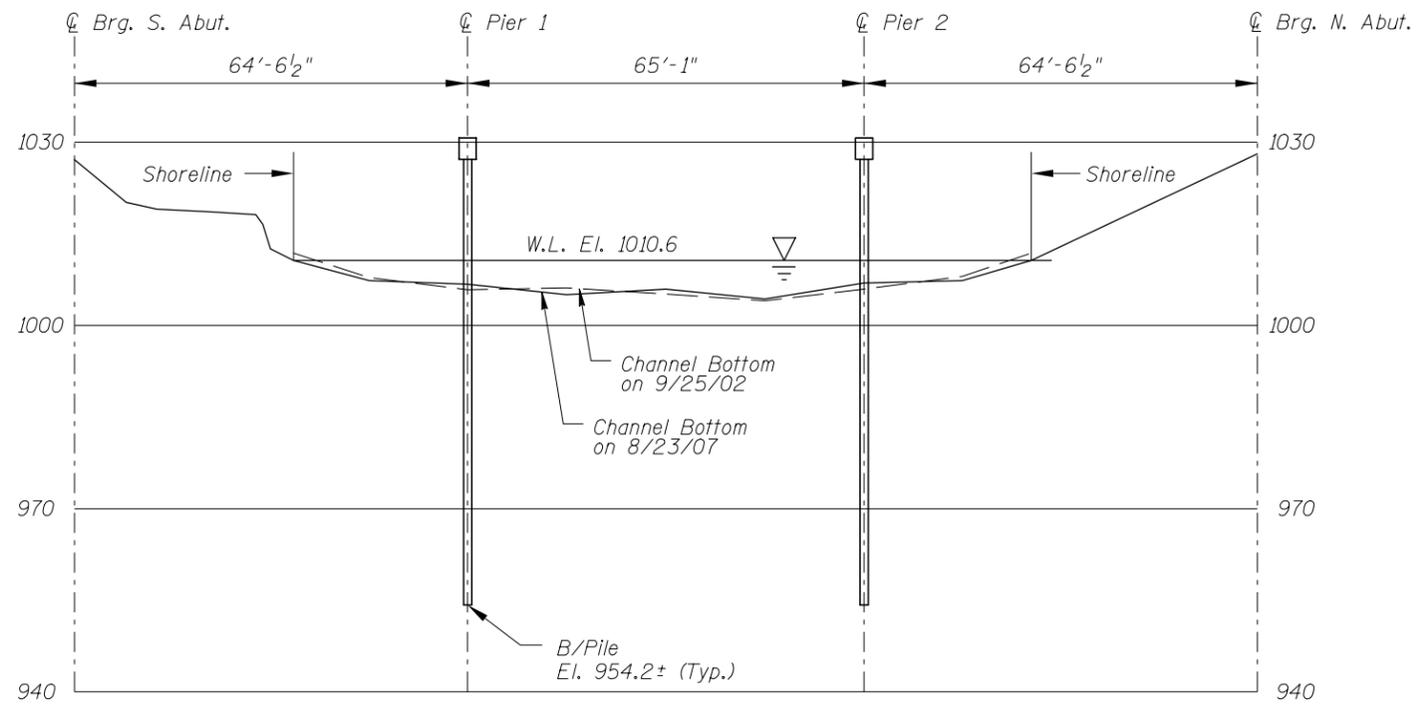
Note:

All soundings based on 2007 waterline location.

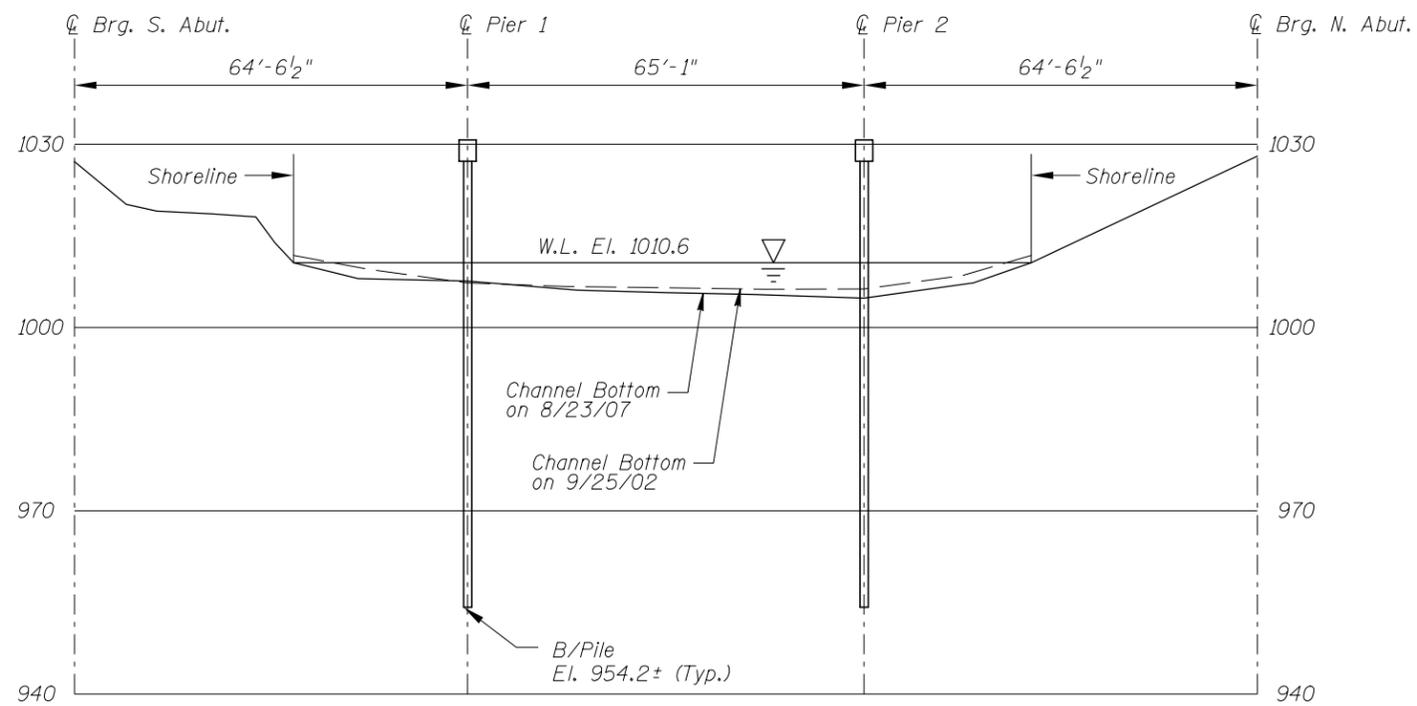
TYPICAL END VIEW OF PIERS



MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 58520 OVER THE KETTLE RIVER DISTRICT 1, PINE COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: PRH	COLLINS ENGINEERS	Date: AUGUST, 2007
Checked By: MDK	<small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Scale: NTS
Code: 52210071		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. 58520 OVER THE KETTLE RIVER DISTRICT I, 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: AUGUST, 2007
Checked By: MDK		Scale: 1"=30'
Code: 52210071		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: 58520 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: 4:10 p.m.

TIME OUT OF WATER: 4:40 p.m.

WATERWAY DATA: VELOCITY 0.5 f.p.s

VISIBILITY 1.0 foot

DEPTH 5.8 feet maximum at Piers 1 and 2

ELEMENTS INSPECTED: Piers 1 and 2

REMARKS: Overall, the steel piles were generally in good condition with no structurally significant defects observed. The steel piles exhibited coating failure on 80 to 100 percent of the pile surfaces and rust nodules with up to 3/16 inch deep pitting on up 50 percent of the surface area from 3 feet above the waterline to the channel bottom. A moderate accumulation of timber debris was observed at the downstream Pier 1, and along the south side of Pier 2. The channel bottom appeared stable with no evidence of significant scour.

FURTHER ACTION NEEDED: YES NO

Monitor the drift accumulations at the piers during future inspections.

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. 58520
 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 (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
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	5.1'	7	N	N	9	N	7	8	8	8	6	6	N	7	N	7	N	N
	Pier 2	5.8'	7	N	N	9	N	7	8	8	8	7	7	N	7	N	7	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the steel piles were generally in good condition with no structurally significant defects observed. The steel piles exhibited coating failure on 80 to 100 percent of the pile surfaces and rust nodules with up to 3/16 inch deep pitting on up 50 percent of the surface area from 3 feet above the waterline to the channel bottom. A moderate accumulation of timber debris was observed at the downstream Pier 1, and along the south side of Pier 2. The channel bottom appeared stable with no evidence of significant scour.

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.