

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 7001

CASCADE STREET

OVER THE

OTTER TAIL RIVER

DISTRICT 4 - OTTER TAIL COUNTY, CITY OF FERGUS FALLS



PREPARED FOR THE
MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 3512 (CEI 60)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 7001, the Center Pier and the North and South Abutments, were found to be in good to satisfactory condition. The Center Pier cap exhibited heavy scaling with exposed and corroded reinforcing steel and up to 6 inches of penetration. The South Abutment also exhibited moderate scaling along the downstream half of the breastwall. Footing exposure was observed at the center and downstream columns of the pier with up to 1 foot of vertical face exposure detected. The channel bottom appeared stable with no significant scour or appreciable changes since the previous inspection.

INSPECTION FINDINGS:

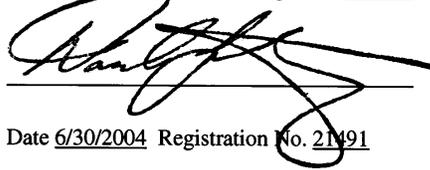
- (A) The upstream and downstream ends of the pier cap exhibited heavy scaling from 1.5 feet below to 3.2 feet above the waterline with exposed and corroded reinforcing steel and up to 6 inches of penetration. In addition, the bottom edge of the pier cap exhibited moderate scaling along the full length of the pier from 1 foot above to 1.5 feet below the waterline. The most extensive deterioration was near the upstream and downstream ends with exposed reinforcing steel and penetrations up to 1 inch.
- (B) The downstream half of the South Abutment exhibited moderate scaling from 1 foot above the waterline to the channel bottom with up to 1 inch of penetration.
- (C) The top of the footing was exposed around the entire center column with up to 6 inches of vertical face exposed along the north side. The top of the footing was also exposed around the entire downstream column with up to 1 foot of vertical face exposed along the south side.
- (D) A minor accumulation of branchy timber debris was observed at the upstream column of the Center Pier.

RECOMMENDATIONS:

- (A) Repair the areas of scaling noted on the pier cap by removing all loose or deteriorated concrete and reforming or resurfacing as required with a concrete grout mix designed to promote high durability and low permeability.
- (B) The extent of the pier footing exposure should be monitored during future inspections.
- (C) 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.

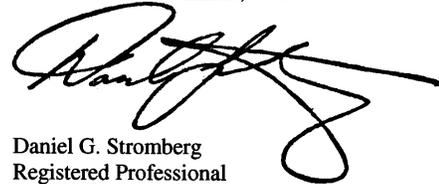
Daniel G. Stromberg



Date 6/30/2004 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: 7001

Feature Crossed: Otter Tail River

Feature Carried: Cascade Street

Location: District 4 - Otter Tail County, City of Fergus Falls

Bridge Description: The bridge consists of a two span, multiple steel stringer superstructure supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and one reinforced concrete pier. The footings of the pier and both abutments are founded on untreated timber piles. The bridge is oriented in a north-south direction.

2. INSPECTION DATA

Professional Engineer/Team Leader: Shirley M. Walker, P.E.

Dive Team: Michelle D. Koerbel, Clayton G. Brookins

Date: October 30, 2002

Weather Conditions: Cloudy, " 25EF

Underwater Visibility: " 5 Feet

Waterway Velocity: " 1 f.p.s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: North and South Abutments and the Center Pier

General Shape: The Center Pier consists of a rectangular cap with partially tapered ends supported by three hexagonal shafts. Each shaft has its own rectangular footing. The South and North Abutments are each closed, full-height, counterfort stems with rectangular footings.

Maximum Water Depth at Substructure Inspected: Approximately 12.5 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the east end of the Center Pier.

Water Surface: The waterline was approximately 3.5 feet below reference.

Waterline Elevation = 1180.5.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 6

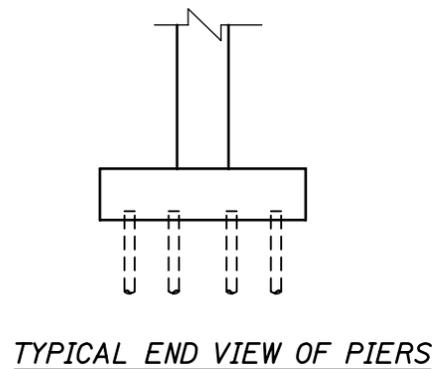
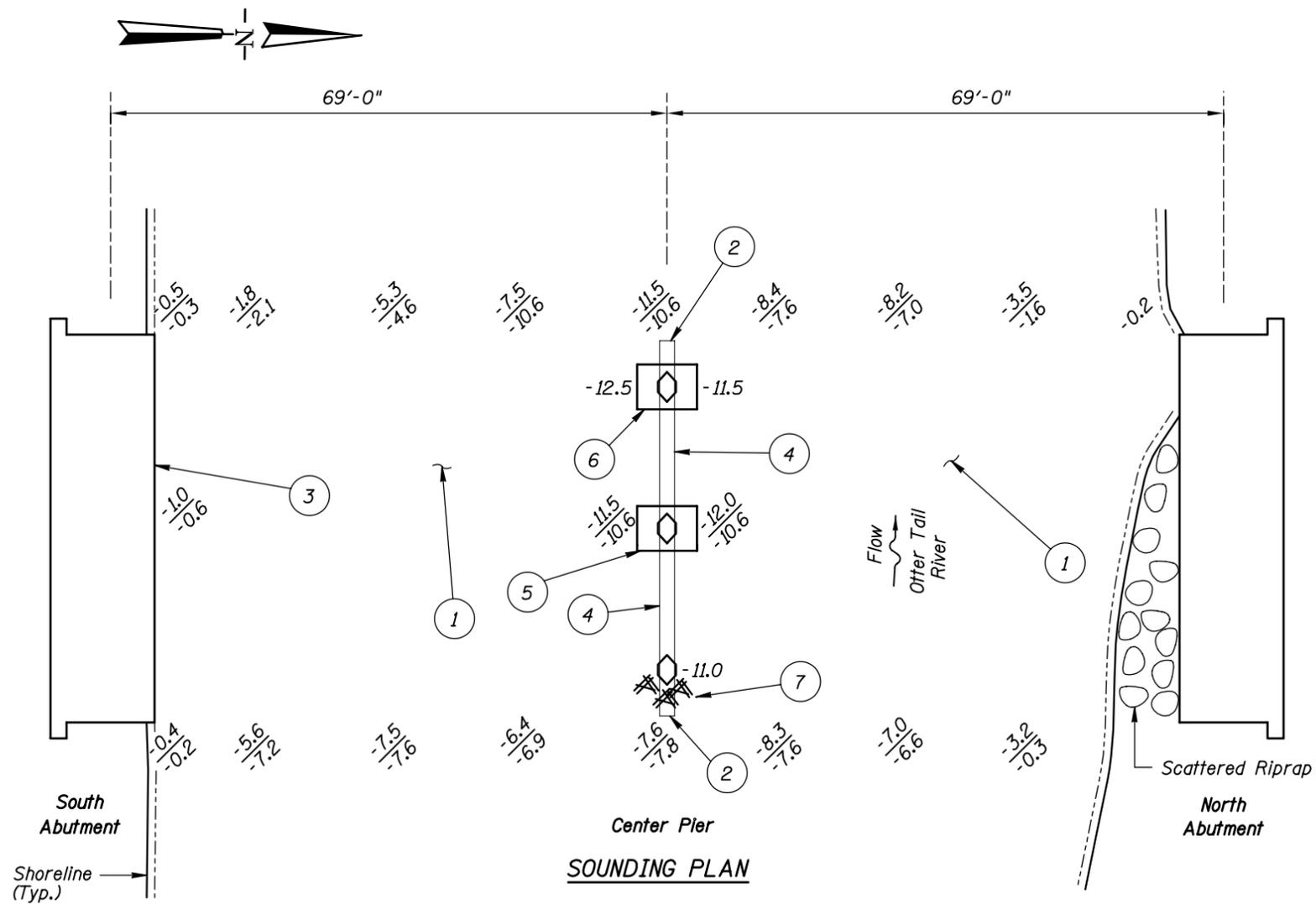
Item 61: Channel and Channel Protection: Code 7

Item 92B: Underwater Inspection: Code B/10/02

Item 113: Scour Critical Bridges: Code N/96

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

Yes No



GENERAL NOTES:

1. The North and South Abutments and Center Pier were inspected underwater.
2. At the time of inspection on October 30, 2002, the waterline was located approximately 3.5 feet below the top of the pier cap at the upstream end of the Center Pier. This corresponds with a waterline elevation of 1180.5 based on the previous report dated September 4, 1997.
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 unit.

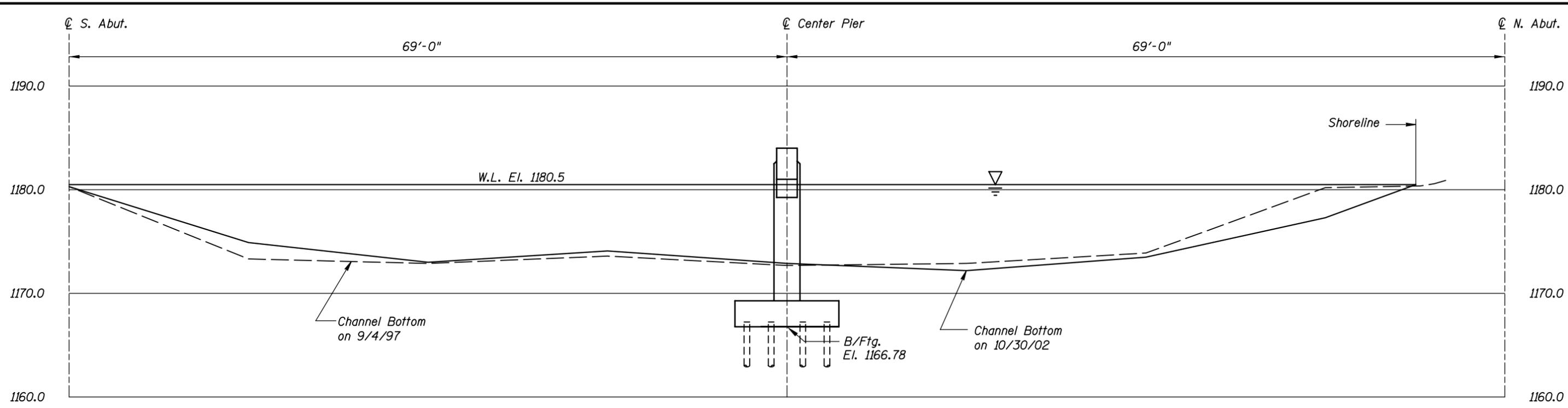
INSPECTION NOTES:

- ① The channel bottom consisted of silty gravel with scattered riprap up to 3 feet in diameter.
- ② The upstream and downstream ends of the pier cap exhibited heavy scaling from 1.5 feet below to 3.2 feet above the waterline with exposed and corroded reinforcing steel and up to 6 inches of penetration.
- ③ The downstream half of the South Abutment exhibited moderate scaling from 1 foot above the waterline to the channel bottom with up to 1 inch of penetration.
- ④ The bottom edge of the pier cap exhibited moderate scaling along the full length of the pier from 1 foot above to 1.5 feet below the waterline. The most extensive deterioration was near the upstream and downstream ends with exposed reinforcing steel and penetrations up to 1 inch.
- ⑤ The top of the footing was exposed around the entire center column with up to 6 inches of vertical face exposed along the north side.
- ⑥ The top of the footing was exposed around the entire downstream column with up to 1 foot of vertical face exposed along the south side.
- ⑦ A minor accumulation of branchy timber debris was observed at the upstream column of the Center Pier.

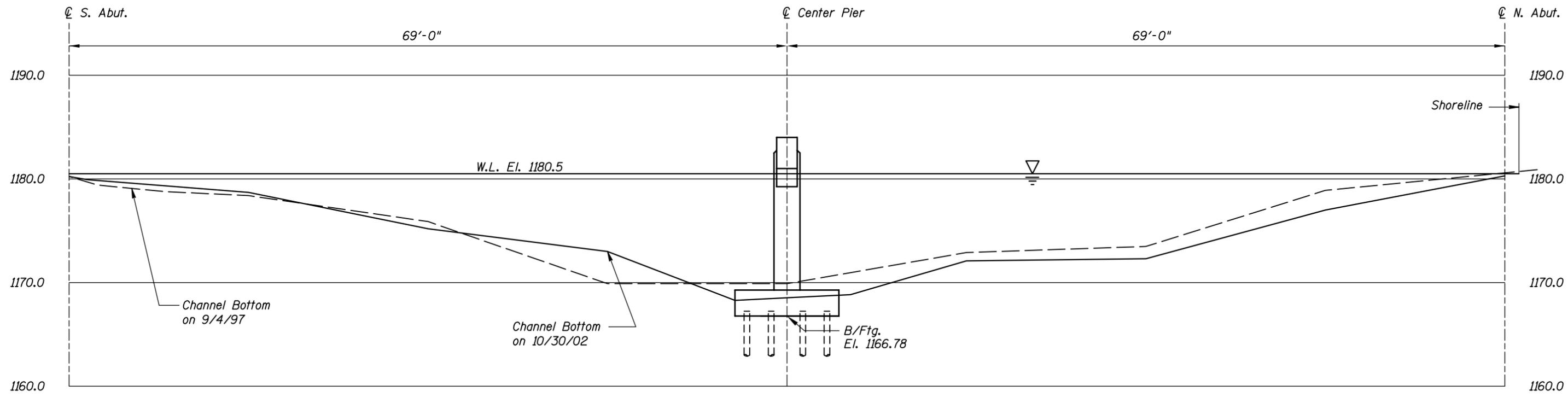
Legend

- 2.0 Sounding Depth from Waterline (10/30/02)
- 5.2 Sounding Depth from Waterline (9/4/97)
- ⌘ Timber Debris

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 7001 OVER THE OTTER TAIL RIVER DISTRICT 4, OTTER TAIL COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: OCT. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: 1"=10'-0"
Code: 35120060		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. 7001 OVER THE OTTER TAIL RIVER DISTRICT 4, OTTER TAIL COUNTY UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: PRH	 COLLINS ENGINEERS, INC. 300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Date: OCT. 2002
Checked By: MDK		Scale: 1"=10'
Code: 35I20060		Figure No.: 2



Photograph 1. Overall View of the Structure, Looking Southwest.



Photograph 2. View of North Abutment, Looking Northwest.



Photograph 3. View of South Abutment, Looking East.



Photograph 4. View of Upstream End of the Center Pier, Looking Southwest.



Photograph 5. View of Upstream End of the Center Pier, Looking South.



Photograph 6. View of Downstream End of the Center Pier, Looking Southwest.

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

INSPECTORS: Collins Engineers, Inc. DATE: October 30, 2002
ON-SITE TEAM LEADER: Shirley M. Walker, P.E.
BRIDGE NO: 7001 WEATHER: Cloudy, " 25EF
WATERWAY CROSSED: Otter Tail River
DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR
OTHER

PERSONNEL: Michelle D. Koerbel, Clayton G. Brookins
EQUIPMENT: Scuba, U/W Light, Scraper, Sounding Pole, Lead Line, Probe Rod, Camera
TIME IN WATER: 7:10 a.m.
TIME OUT OF WATER: 7:30 a.m.
WATERWAY DATA: VELOCITY " 1 f.p.s.
VISIBILITY " 5 Feet
DEPTH 12.5 feet maximum at the Center Pier

ELEMENTS INSPECTED: North and South Abutments, and Center Pier

REMARKS: The Center Pier and the North and South Abutments were found to be in good to satisfactory condition. The Center Pier cap exhibited heavy scaling with exposed and corroded reinforcing steel and up to 6 inches of penetration. The South Abutment also exhibited moderate scaling along the downstream half of the breastwall. Footing exposure was observed at the center and downstream columns of the pier with vertical face exposure of up to 6 inches at the center footing and up to 1 foot at the downstream column. A minor accumulation of timber debris was observed at the upstream column of the Center Pier.

FURTHER ACTION NEEDED: X YES _____ NO

Repair the areas of scaling noted on the pier cap by removing all loose or deteriorated concrete and reforming or resurfacing as required with a concrete grout mix designed to promote high durability and low permeability.

The extent of the pier footing exposure should be monitored 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. 7001
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Shirley M. Walker, P.E.
WATERWAY CROSSED The Otter Tail River

INSPECTION DATE October 30, 2002
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 (FOOTING EXPOSURE)	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
	Center Pier	12.5'	N	5	7	9	N	5	6	N	N	7	7	5	N	N	6	N	N
	South Abutment	1.0'	N	6	N	9	N	6	7	8	8	N	7	6	N	N	7	N	N
	North Abutment	0.2'	N	7	N	9	N	7	7	8	8	N	7	7	N	N	7	N	N

*UNDERWATER PORTION ONLY

REMARKS: The Center Pier and the North and South Abutments were found to be in good to satisfactory condition. The Center Pier cap exhibited heavy scaling with exposed and corroded reinforcing steel and up to 6 inches of penetration. The South Abutment also exhibited moderate scaling along the downstream half of the breastwall. Footing exposure was observed at the center and downstream columns of the pier with vertical face exposure of up to 6 inches at the center footing and up to 1 foot at the downstream column. A minor accumulation of timber debris was observed at the upstream column of the Center Pier.

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.