

UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. L0888  
DIVERSION STREET  
OVER THE  
CHANNEL TO THE OTTER TAIL POWER COMPANY  
DISTRICT 4 – OTTER TAIL COUNTY

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PREPARED FOR THE  
MINNESOTA DEPARTMENT OF TRANSPORTATION  
BY  
COLLINS ENGINEERS, INC.  
JOB NO. 3512

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. L0888, the West Abutment, Pier 1 and the East Abutment, were found to be in satisfactory to fair condition with no defects of immediate structural significance observed. Heavy scaling was observed at the waterline along all of the substructure units. The channel bottom around the substructure units appeared stable. With no significant scour or other waterway concerns.

INSPECTION FINDINGS:

- (A) The concrete around Pier 1 and along both abutments exhibited heavy scaling from 1 foot above the waterline to 2 feet below the waterline with 3 inches of penetration typical and maximum penetrations of 6 inches.
- (B) The entire top corner of the downstream nose of Pier 1 exhibited heavy section loss with up to 12 inches of penetration, but with exposed reinforcing steel.
- (C) A 1/4 inch wide vertical crack was observed at the north end of the East Abutment extending from 2 feet to 5 feet below the waterline.

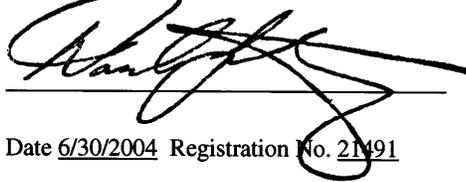
RECOMMENDATIONS:

- (A) Since there is still sufficient capacity and no exposed reinforcing steel, monitor the concrete deterioration on all of the substructure units, and if found to be worsening in the future, repair operations may become warranted.

- (B) 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

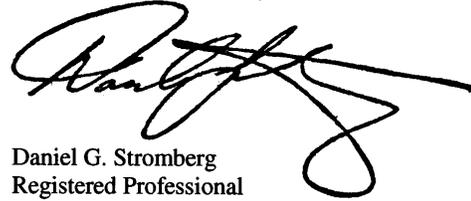


Daniel G. Stromberg

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: L0888

Feature Crossed: The Channel to the Otter Tail Power Company

Feature Carried: Diversion Street

Location: District 4 – Otter Tail County

Bridge Description: The bridge superstructure consists of a continuous two span reinforced concrete slab. The superstructure is supported by two reinforced concrete abutments and one reinforced concrete pier. Due to insufficient bridge plans the foundations of the pier and abutments are unknown.

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: Sunny, " 30E F

Underwater Visibility: " 6 Feet

Waterway Velocity: " 2.5 f.p.s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: West Abutment, Pier 1, and East Abutment

General Shape: Pier 1 is rectangular with a tapered upstream nose. Both abutments are closed-type abutments with wingwalls. Due to insufficient bridge plans the foundations of the pier and both abutments are unknown.

Maximum Water Depth at Substructure Inspected: Approximately 7.7 feet.

4. WATERLINE DATUM

Water Level Reference: The benchmark reference located on the West Abutment.

Water Surface: The waterline was approximately 3.3 feet below reference.  
Assumed Waterline Elevation = 96.7.

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

Item 60: Substructure: Code 6

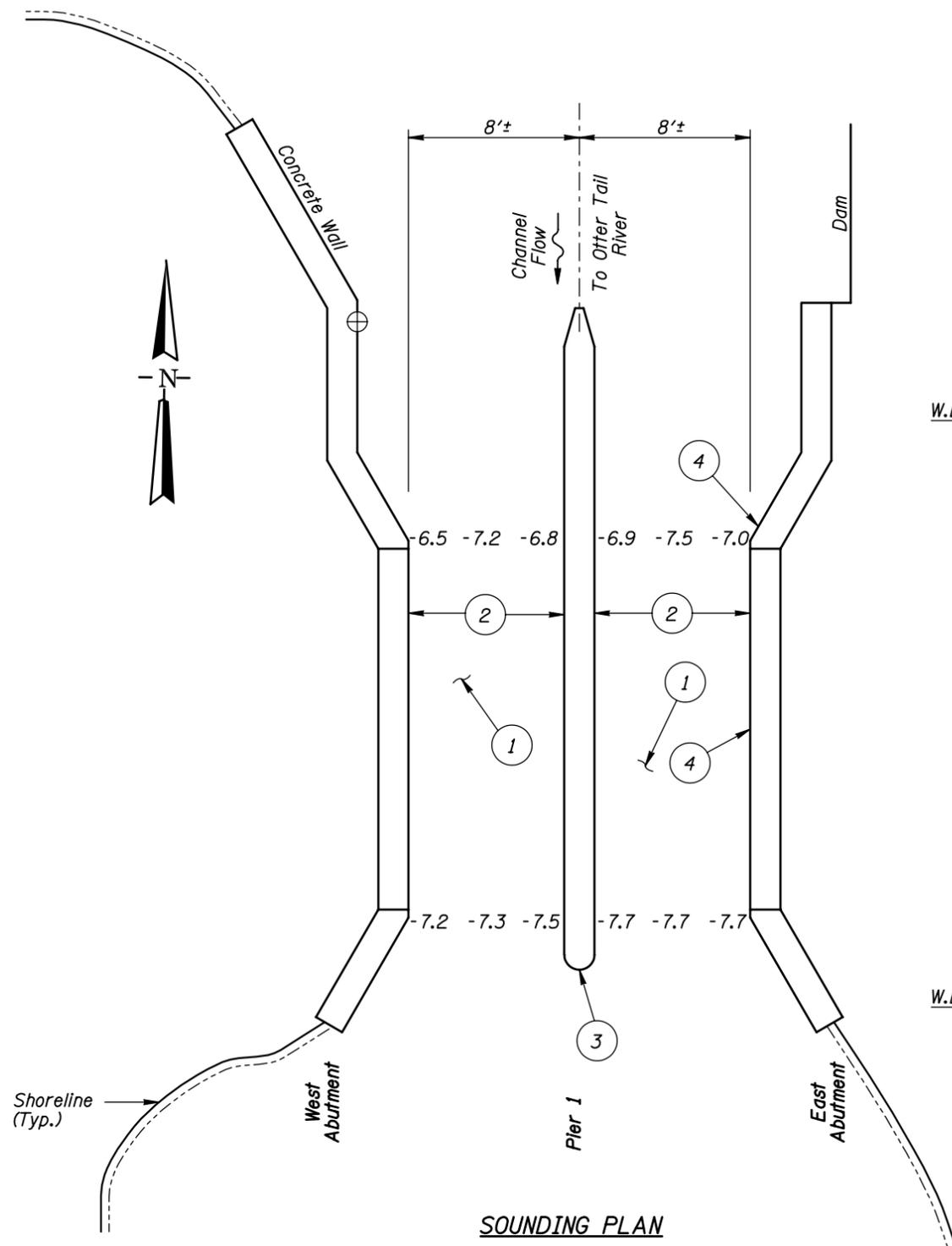
Item 61: Channel and Channel Protection: Code 8

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

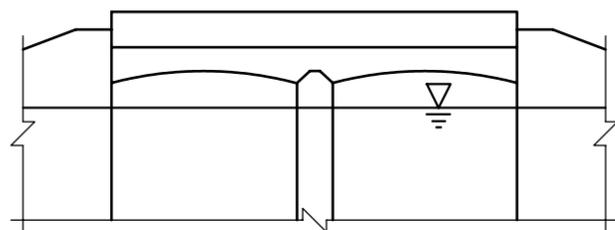
Item 113: Scour Critical Bridges: Code G/02

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

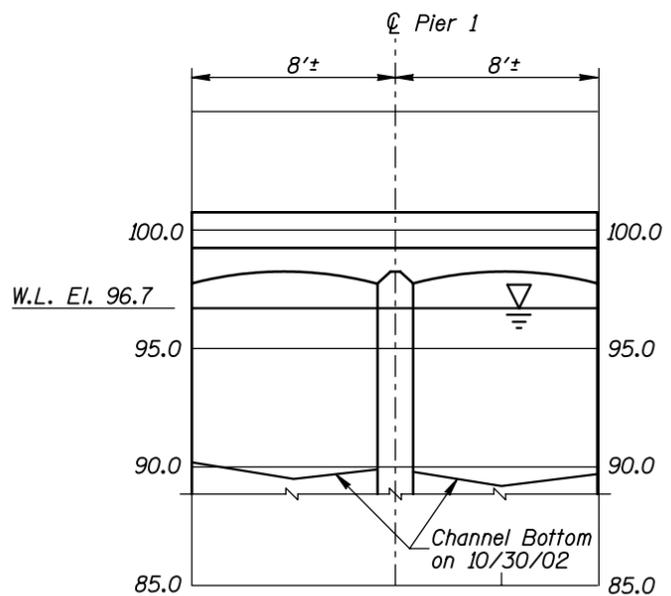
\_\_\_\_\_ Yes  X  No



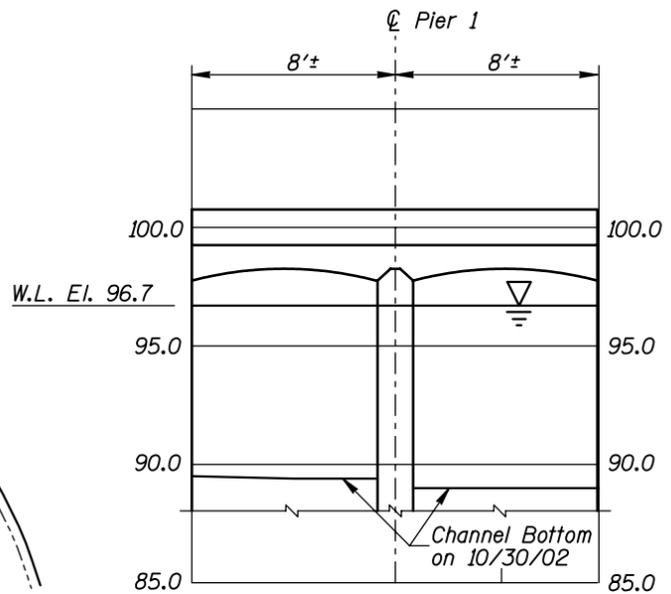
**SOUNDING PLAN**



**TYPICAL END VIEW OF**



**UPSTREAM FASCIA PROFILE**



**DOWNSTREAM FASCIA PROFILE**

**Legend**

-5.2 Sounding Depth from Waterline (10/30/02)

⊕ Water Gauge

**GENERAL NOTES:**

1. West Abutment, Pier 1, and East Abutment were inspected underwater. Structure is similar to a double arch culvert; however, in the absence of design plans, pier and abutment designations were used.
2. At the time of inspection on October 30, 2002, the waterline was located approximately 3.3 feet below the top of the upstream wingwall, next to the water gauge, of the West Abutment. Since insufficient structure elevation information was available, a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 96.7.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the structure at mid point intervals between the substructure units.

**INSPECTION NOTES:**

- 1 The channel bottom material consisted of gravel with 8 to 12 inch diameter stones allowing minimal probe rod penetration.
- 2 The concrete along the pier and abutments exhibited heavy scaling from 1 foot above the waterline to 2 feet below the waterline with 3 inches of penetration typical and maximum penetrations of 6 inches.
- 3 The entire top corner of the pier exhibited heavy section loss with up to 12 inches of penetration, but with no exposed reinforcing steel.
- 4 A 1/4 inch wide vertical crack was observed from 2 feet to 5 feet below the waterline.

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. L0888 OVER CHANNEL TO OTTER TAIL POWER COMPANY DISTRICT 4, OTTER TAIL COUNTY		
<b>INSPECTION AND SOUNDING PLAN AND UPSTREAM AND DOWNSTREAM FASCIA PROFILES</b>		
Drawn By: PRH	 <b>COLLINS ENGINEERS, INC.</b> 300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Date: OCT. 2002
Checked By: MDK		Scale: NTS
Code: 35120888		Figure No.: 1



Photograph 1. Overall View of Structure, Looking Northeast.



Photograph 2. View of Downstream End of Pier 1, Looking Northeast.



Photograph 3. View of Typical Scaling at Pier 1, Looking Northeast.



Photograph 4. View of the Upstream End of Pier 1, Looking East.

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: L0888 WEATHER: Sunny, " 30E F  
WATERWAY CROSSED: The Channel to the Otter Tail Power Company  
DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR  
OTHER

PERSONNEL: Michelle D. Koerbel, Clayton G. Brookins  
EQUIPMENT: Scuba, U/W Light, Probe Rod, Lead Line, Sounding Pole, Scraper, Camera  
TIME IN WATER: 9:00 a.m.

TIME OUT OF WATER: 9:35 p.m.

WATERWAY DATA: VELOCITY " 2.5 f.p.s.

VISIBILITY " 6 feet

DEPTH 7.7 feet maximum at East Abutment

ELEMENTS INSPECTED: West Abutment, Pier 1, and West Abutment

REMARKS: Overall, the concrete substructure units were in satisfactory to fair condition with no defects of immediate structural significance observed. There was heavy scaling and related section loss on all the substructure units at the waterline. Overall, however, the units have had minimal reduction in capacity due to the deterioration, and no reinforcing steel was found exposed.

FURTHER ACTION NEEDED: \_\_\_\_\_ YES \_\_\_\_\_ X \_\_\_\_\_ NO

Monitor the concrete deterioration on all of the substructure units, and if found to be worsening in the future, repair operations may become warranted.

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. L0888  
INSPECTORS Collins Engineers, Inc.  
ON-SITE TEAM LEADER Shirley M. Walker, P.E.  
WATERWAY CROSSED The Channel to the Otter Tail Power Company

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	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
	West Abutment	7.2'	N	6	N	7	N	6	N	N	8	N	8	6	N	N	6	N	N
	Pier 1	7.7'	N	5	N	7	N	5	N	N	8	N	8	5	N	N	5	N	N
	East Abutment	7.7'	N	6	N	7	N	6	N	N	8	N	8	6	N	N	6	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete substructure units were in satisfactory to fair condition with no defects of immediate structural significance observed. There was heavy scaling and related section loss on all the substructure units at the waterline. Overall, however, the units have had minimal reduction in capacity due to the deterioration, and no reinforcing steel was found exposed.

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.