

UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 7183

CSAH 100

OVER

ST. LOUIS RIVER

DISTRICT 1 - ST. LOUIS COUNTY

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PREPARED FOR THE  
MINNESOTA DEPARTMENT OF TRANSPORTATION

BY  
COLLINS ENGINEERS, INC.

JOB NO. 3512 (CEI 8)

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 7183, Piers 1 and 2, were found to be in good condition. Since the previous inspection, the scaling around the waterline has increased in depth; however, there were still no defects of structural significance observed. The channel bottom inspected upstream and downstream of the substructure units appeared stable; however, a 2- to 3-foot-radius scour depression was observed around the upstream column of Pier 1. A light to moderate accumulation of timber debris was observed around both piers.

INSPECTION FINDINGS:

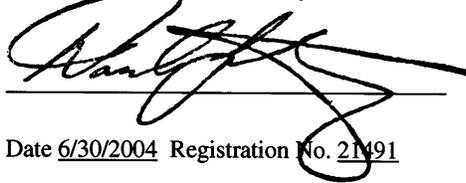
- (A) Light to moderate scaling with some aggregate exposure from 1.5 feet above the waterline to 3 feet below the waterline with typical penetrations of 1/8 inch and up to 1/4 inch maximum penetration was present at the upstream columns. Heavier scaling was observed at the downstream columns with a maximum penetration of 1/2 inch at Pier 2.
- (B) An area of section loss, 1-foot-high by 2.5-feet-wide, was observed at the waterline with a maximum penetration of 1 inch on the downstream column of Pier 1.
- (C) A scour depression measuring 2 to 3 feet in radius with a depth of 1 to 2 feet was observed at the upstream column of Pier 1. A light accumulation of 6-inch-diameter and smaller timber debris was observed in the depression.
- (D) A moderate accumulation of 6 inch diameter and smaller timber debris was observed on the channel bottom and extending up to the waterline at the upstream end of Pier 2. Two 6-inch-diameter logs were observed along the channel side of both Piers 1 and 2.

RECOMMENDATIONS:

- (A) Monitor the drift accumulations at both piers during future inspections, and if found to be increasing in size, removal of the timber debris during normal maintenance of the bridge may be 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



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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: 7183

Feature Crossed: St. Louis River

Feature Carried: CSAH 100

Location: District 1 - St. Louis County

Bridge Description: The structure consists of a three span concrete beam superstructure supported by two concrete abutments and two concrete piers. The piers are numbered 1 and 2 starting from the south end of the bridge

2. INSPECTION DATA

Professional Engineer Diver: Daniel G. Stromberg  
State of Minnesota, P.E., No. 21491

Dive Team: Michelle D. Koerbel, Matthew J. Lengyel

Date: August 30, 2002

Weather Conditions: Sunny,  $\pm 75^{\circ}$  F

Underwater Visibility:  $\pm 2.0$  Feet

Waterway Velocity:  $\pm 1.0$  f.p.s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2.

General Shape: Piers 1 and 2 consist of the reinforced concrete cap supported by two concrete columns at each pier. The concrete columns were supported by rectangular footings founded on piles.

Maximum Water Depth at Substructure Inspected: Approximately 7.5 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 7.9 feet below reference.  
Assumed Water Elevation = 92.1.

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

Item 60: Substructure: Code 7

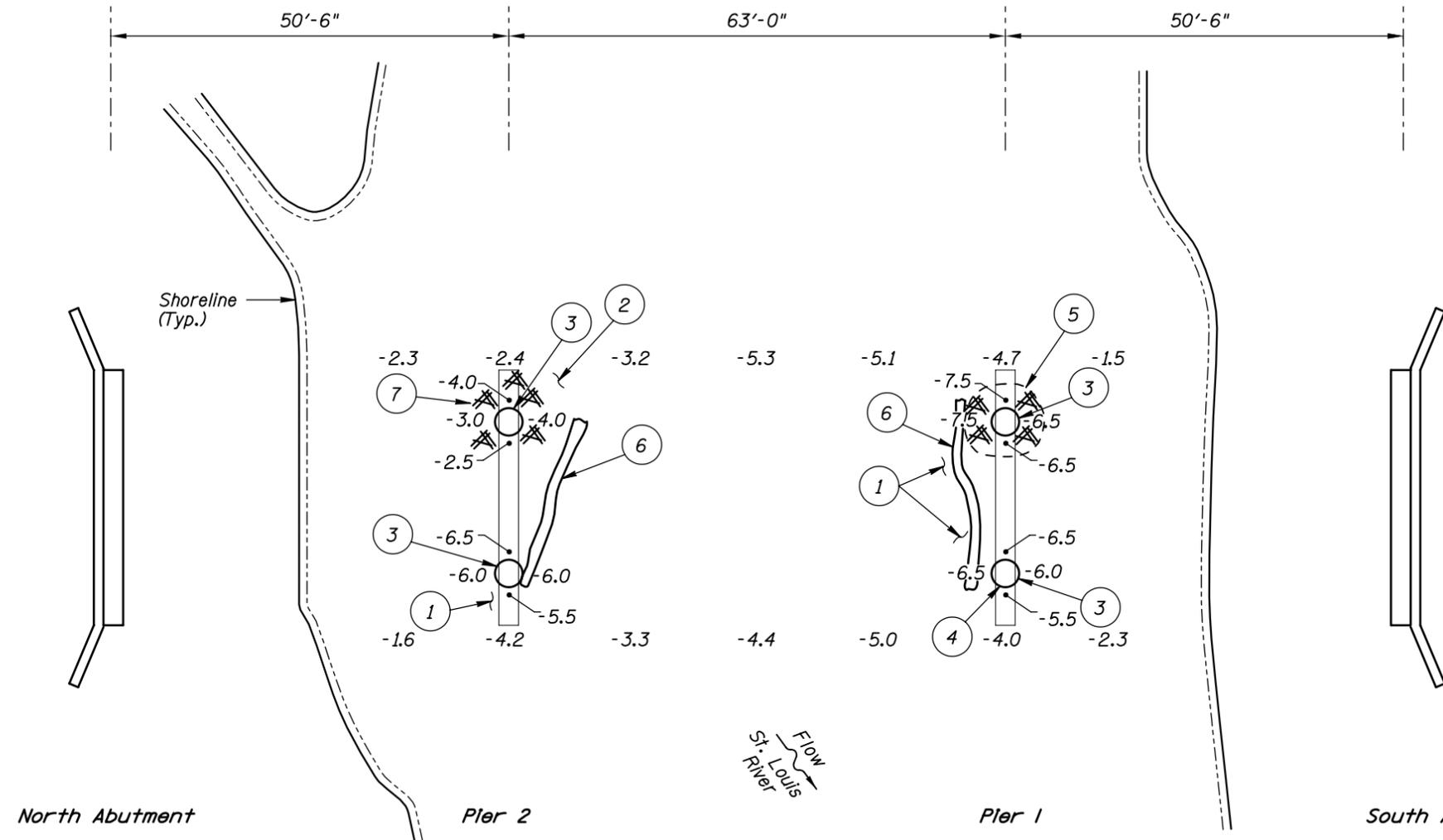
Item 61: Channel and Channel Protection: Code 6

Item 92B: Underwater Inspection: Code B/08/02

Item 113: Scour Critical Bridges: Code O/02

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

Yes  No



**SOUNDING PLAN**

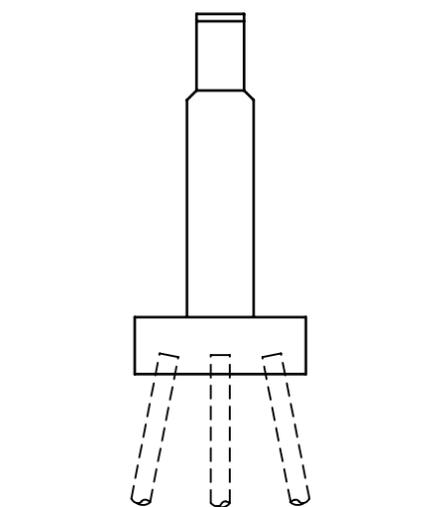
North Abutment

Pier 2

Pier 1

South Abutment

St. Louis River Flow



**TYPICAL END VIEW OF PIERS**

**GENERAL NOTES:**

1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection on August 30, 2002, the waterline was located approximately 7.9 feet below the top of the cap at the upstream end of Pier 1. Since insufficient bridge elevation information was available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 92.1.
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.

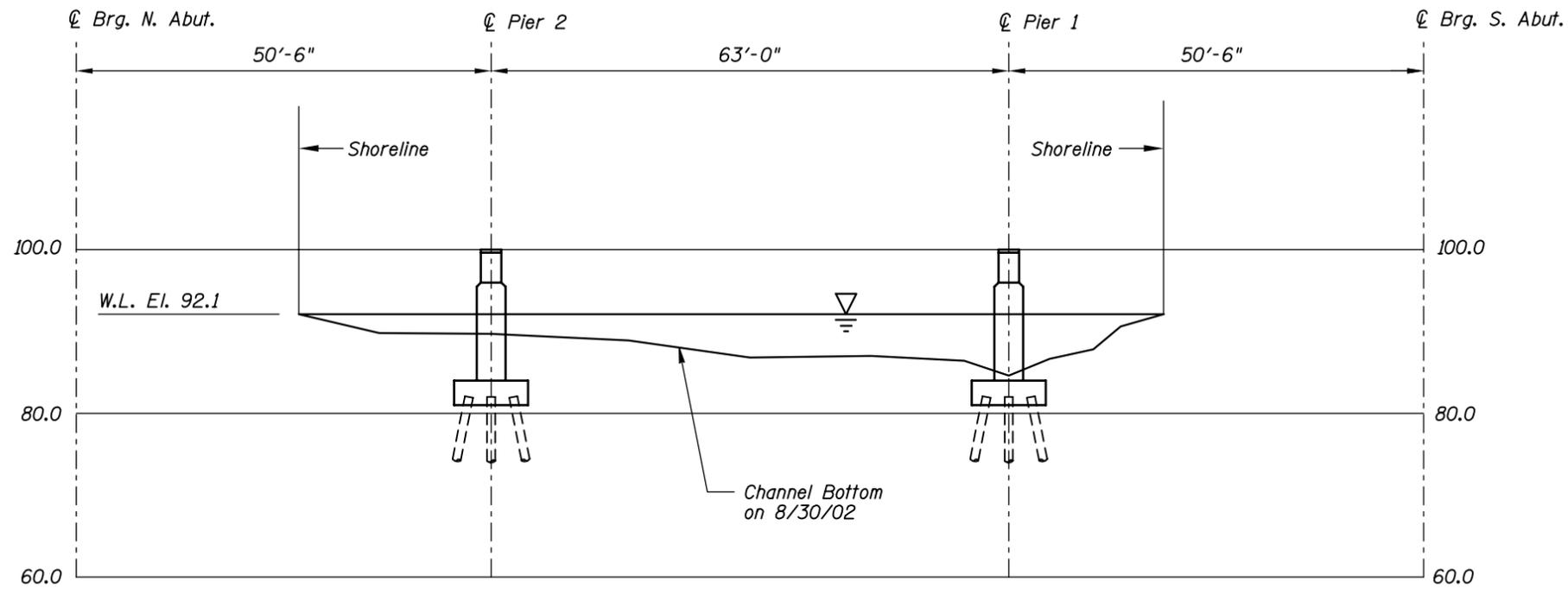
**INSPECTION NOTES:**

- 1 The channel bottom consisted of sand and gravel with 6-inch-diameter and smaller cobbles and random 1-foot-diameter riprap and a maximum probe rod penetration of 1 inch.
- 2 The channel bottom consisted of soft silt and organic material with 1.5 feet of probe rod penetration at the upstream column of Pier 2.
- 3 Light to moderate scaling with some aggregate exposure from 1.5 feet above the waterline to 3 feet below the waterline with typical penetrations of 1/8 inch and up to 1/4 inch maximum at the upstream columns. Heavier scaling was observed at the downstream columns with a maximum penetration of 1/2 inch at Pier 2.
- 4 An area of heavy scaling/section loss, 1-foot-high by 2.5-feet-wide, with a maximum penetration of 1 inch.
- 5 A scour depression, 2 to 3 feet in radius with a depth of 1 to 2 feet, was observed at the upstream column. A light accumulation of timber debris was observed in the depression.
- 6 6-to 12-inch-diameter log was observed on the channel bottom along the pier.
- 7 A moderate accumulation of 6-inch-diameter and smaller timber debris was observed on the channel bottom and extending up to the waterline.

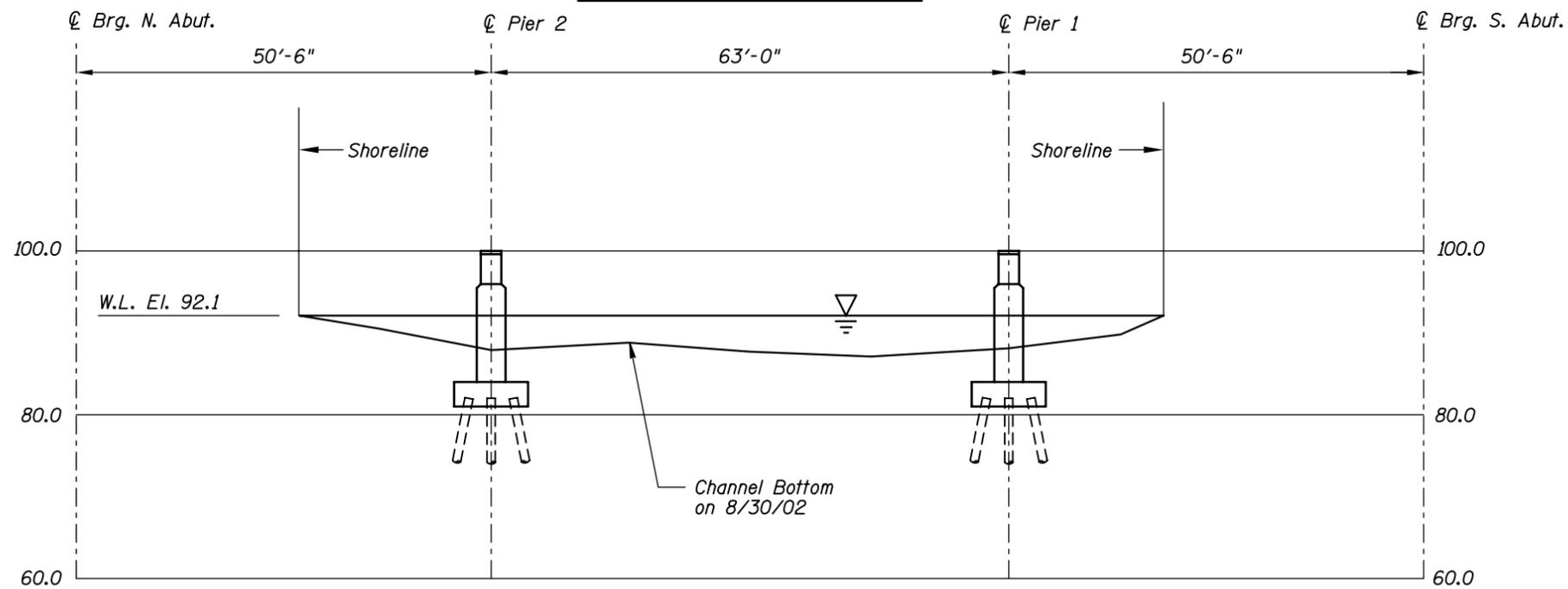
**Legend**

- 3.0 Sounding Depth from Waterline (8/30/02)
- Timber Debris
- Scour Depression

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 7183 OVER THE ST. LOUIS RIVER DISTRICT I, ST. LOUIS COUNTY		
<b>INSPECTION AND SOUNDING PLAN</b>		
Drawn By: PRH	<b>COLLINS ENGINEERS, INC.</b>	Date: AUG. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 35120008		Figure No.: 1



**UPSTREAM FASCIA PROFILE**



**DOWNSTREAM FASCIA PROFILE**

**Note:**  
Refer to Figure 1 for General Notes.

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 7183 OVER THE ST. LOUIS RIVER DISTRICT I, ST. LOUIS COUNTY		
<b>UPSTREAM AND DOWNSTREAM FASCIA PROFILES</b>		
Drawn By: PRH	<b>COLLINS ENGINEERS, INC.</b>	Date: AUG. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: 1"=20'
Code: 35I20008		Figure No.: 2



Photograph 1. Overall View of Structure, Looking Northwest.



Photograph 2. View of Pier 1, Looking Northeast.



Photograph 3. View of Pier 2, Looking Northeast.



Photograph 4. View of Typical Scaling at the Upstream Column of Pier 2, Looking Northwest.

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

INSPECTORS: Collins Engineers, Inc. DATE: August 30, 2002  
ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E.  
BRIDGE NO: 7183 WEATHER: Sunny,  $\pm$  75° F  
WATERWAY CROSSED: St. Louis River  
DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR  
OTHER

PERSONNEL: Michelle D. Koerbel, Matthew J. Lengyel  
EQUIPMENT: SCUBA, Scraper, Lead Line, Sounding Pole, Probe Rod, Camera  
TIME IN WATER: 11:45 A.M.  
TIME OUT OF WATER: 12:15 P.M.  
WATERWAY DATA: VELOCITY  $\pm$  1.0 fps  
VISIBILITY  $\pm$  2.0 feet  
DEPTH 7.5 feet at Pier 1

ELEMENTS INSPECTED: Piers 1 and 2

REMARKS: Overall, the concrete of the submerged substructure units was in good condition with light to moderate scaling with some exposed aggregate from 1.5 feet above to 3 feet below the waterline. The downstream side of the downstream column at Piers 1 and 2 exhibited areas of heavier scaling with penetrations of up to 1/2 inch at Pier 2 and 1 inch at Pier 1. A light to moderate accumulation of timber debris was observed at the upstream column of both piers and along the channel sides. A scour depression, with a radius of 2 to 3 feet and 1 to 2 feet of depth, was observed at the upstream nose of Pier 1.

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

Monitor the drift accumulations at both piers during future inspections, and if found to be increasing in size, removal of the timber debris during normal maintenance of bridge may be 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. 7183  
INSPECTORS Collins Engineers, Inc.  
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E. 21491  
WATERWAY CROSSED St. Louis River

INSPECTION DATE August 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
	Pier 1	7.5'	N	7	N	9	N	7	6	N	N	7	6	7	N	N	7	N	N
	Pier 2	6.0'	N	7	N	9	N	7	7	N	N	6	6	7	N	N	7	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete of the submerged substructure units was in good condition with light to moderate scaling with some exposed aggregate from 1.5 feet above to 3 feet below the waterline. The downstream side of the downstream column at Piers 1 and 2 exhibited areas of heavier scaling with penetrations up to 1/2 inch at Pier 2 and 1 inch at Pier 1. A light to moderate accumulation of timber debris was observed at the upstream column of both piers and along the channel sides. A scour depression, with a radius of 2 to 3 feet and 1 to 2 feet of depth, was observed at the upstream nose of Pier 1.

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.