

UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 5833  
LOST LOOP ROAD  
OVER THE  
NORTH BRANCH ROOT RIVER  
FILLMORE COUNTY

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OCTOBER 5, 2012  
PREPARED FOR THE  
MINNESOTA DEPARTMENT OF TRANSPORTATION  
BY  
COLLINS ENGINEERS, INC.  
JOB NO. 7423

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge 5833, Piers 1 and 2, were found to be in good to satisfactory condition with some defects of only minor structural significance observed. The masonry of both piers was in good and sound condition with no notable defects. The footing of Pier 2 was partially exposed with full height of vertical face exposure at the upstream corner and an undermining cavity measuring 3 inches vertically and allowing up to 1.5 feet of penetration.

INSPECTION FINDINGS:

- (A) The channel bottom material on the channel side of Pier 1 consisted of 1 foot diameter and smaller rocks allowing no probe rod penetration.
- (B) The channel bottom material on the channel side of Pier 2 consisted of soft silt allowing a maximum probe rod penetration of 2.5 feet.
- (C) The masonry of both piers was in good and sound condition. The mortar joints were sound and tight. The face of the masonry bricks exhibited minor surface weathering.
- (D) The footing of Pier 2 was exposed along the south face of the pier from the upstream nose to the downstream quarter point. The maximum vertical face exposure reached 2.5 feet (the height of the footing), and the footing was undermined at the southwest corner measuring a maximum vertical height of 3 inches and allowing up to 1.5 feet of horizontal penetration. The channel bottom material within the undermining cavity consisted of soft silt allowing up to 2 feet of penetration.

RECOMMENDATIONS:

- (A) Monitor the footing exposure and extend of undermining during future underwater inspection and if found to be increasing, scour countermeasures may be warranted.
- (B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

Inspection Team Leader:  
Daniel G. Stromberg, P.E.

Respectfully submitted,

PROFESSIONAL ENGINEER

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 6/30/14 License # 21491

COLLINS ENGINEERS, INC.

Daniel G. Stromberg

Registered Professional  
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 5833

Feature Crossed: North Branch Root River

Feature Carried: Lost Loop Road

Location: Fillmore County

Bridge Description: The superstructure consists of two steel beam approach spans and one steel truss main span. The superstructure is supported by two masonry abutments and two masonry piers. There were no plans for the substructure available at the time of inspection, thus, the foundation is unknown.

2. INSPECTION DATA

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

Dive Team: Marc B. Parker, Breanne M. Stromberg

Date: October 5, 2012

Weather Conditions: Sunny, 45°F

Underwater Visibility: 3.0 feet

Waterway Velocity: None/Negligible

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2.

General Shape: The piers consist of an oblong masonry tapered shaft. The piers are founded on rectangular concrete footing. The substructure plans were not available at the time of inspection, thus, the exact footing configuration is unknown.

Maximum Water Depth at Substructure Inspected: Approximately 3.3 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the upstream end of Pier 2.

Water Surface: The waterline was approximately 16.3 feet below reference.  
Assumed Waterline Elevation = 83.7

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 6

Item 92B: Underwater Inspection: Code B/10/12

Item 113: Scour Critical Bridges: Code K

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

       Yes   X   No

6. STRUCTURAL ELEMENT CONDITION RATING

Item #	Element Description	Quantity	Unit	Conditions				
				1	2	3	4	5
211	Masonry Pier Wall	52	LF		52			
220	Concrete Footing	1	EA		1			
361	Scour Smart Flag	1	EA	1				
985	Slope and Slope Protection	1	EA	1				



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



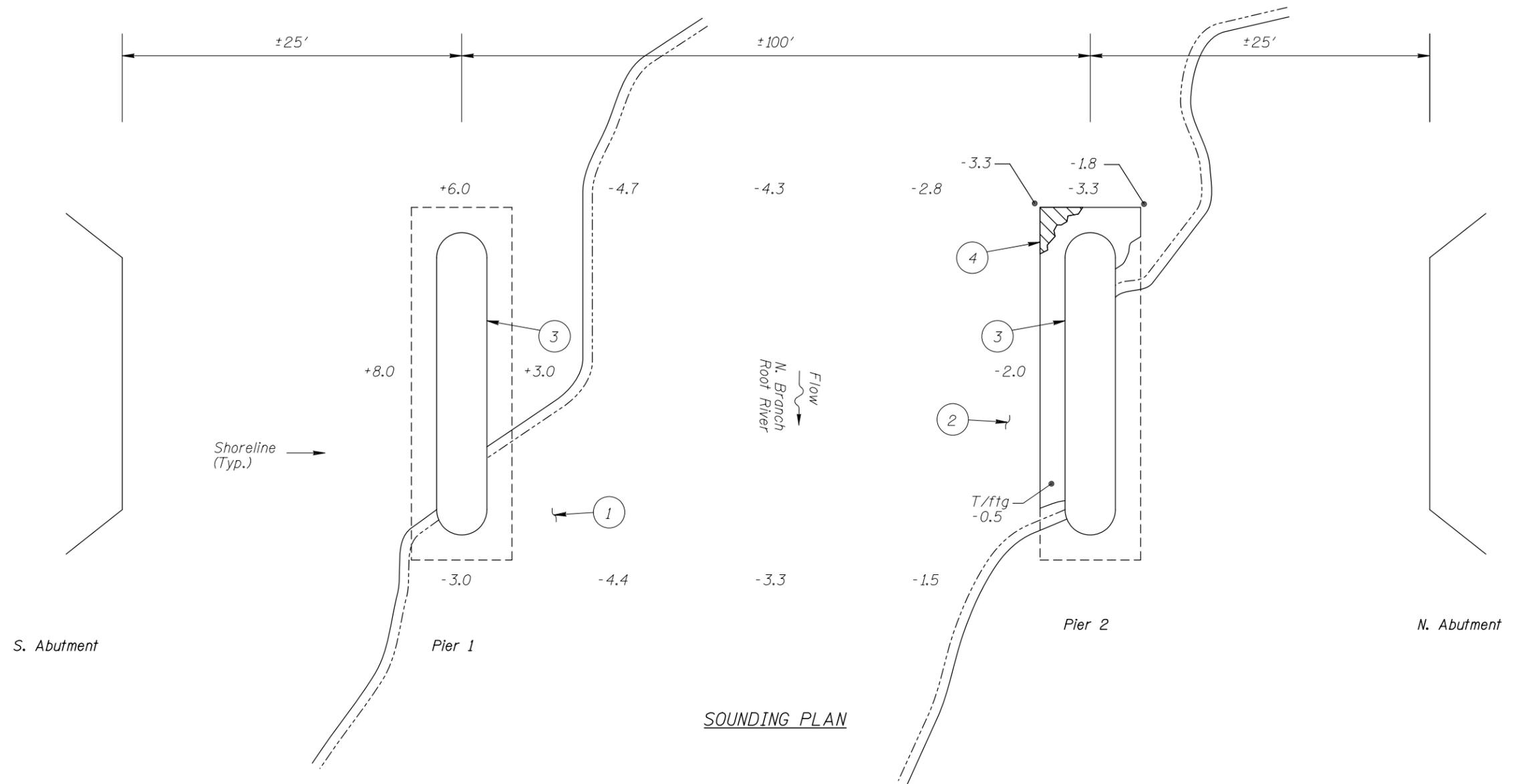
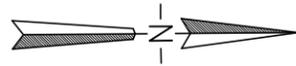
Photograph 2. View of the Submerged Portion of Pier 1, Looking West.



Photograph 3. View of Pier 2, Looking Northwest



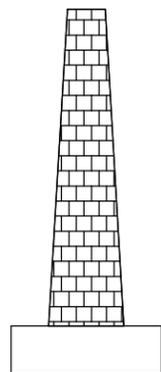
Photograph 4. View of the Typical Masonry Condition at Pier 2, Looking North.



**SOUNDING PLAN**

**INSPECTION NOTES:**

- 1 The channel bottom material consisted of 1 foot diameter and smaller rocks allowing no probe rod penetration.
- 2 The channel bottom material consisted of soft silt allowing a maximum probe rod penetration of 2.5 feet.
- 3 The masonry of both piers was in good and sound condition. The mortar joints were sound and tight. The face of the masonry bricks exhibited minor surface weathering.
- 4 The footing of Pier 2 was exposed along the south face and the upstream end of the pier. The footing was exposed with a maximum vertical face exposure of 2.5 feet (the height of the footing). The footing was undermined 4 feet north and east of the southwest corner measuring a maximum vertical height of 3 inches and allowing up to 1.5 feet of horizontal penetration. The channel bottom material within the undermining cavity consisted of soft silt allowing up to 2 feet of penetration.



**TYPICAL END VIEW OF PIER**

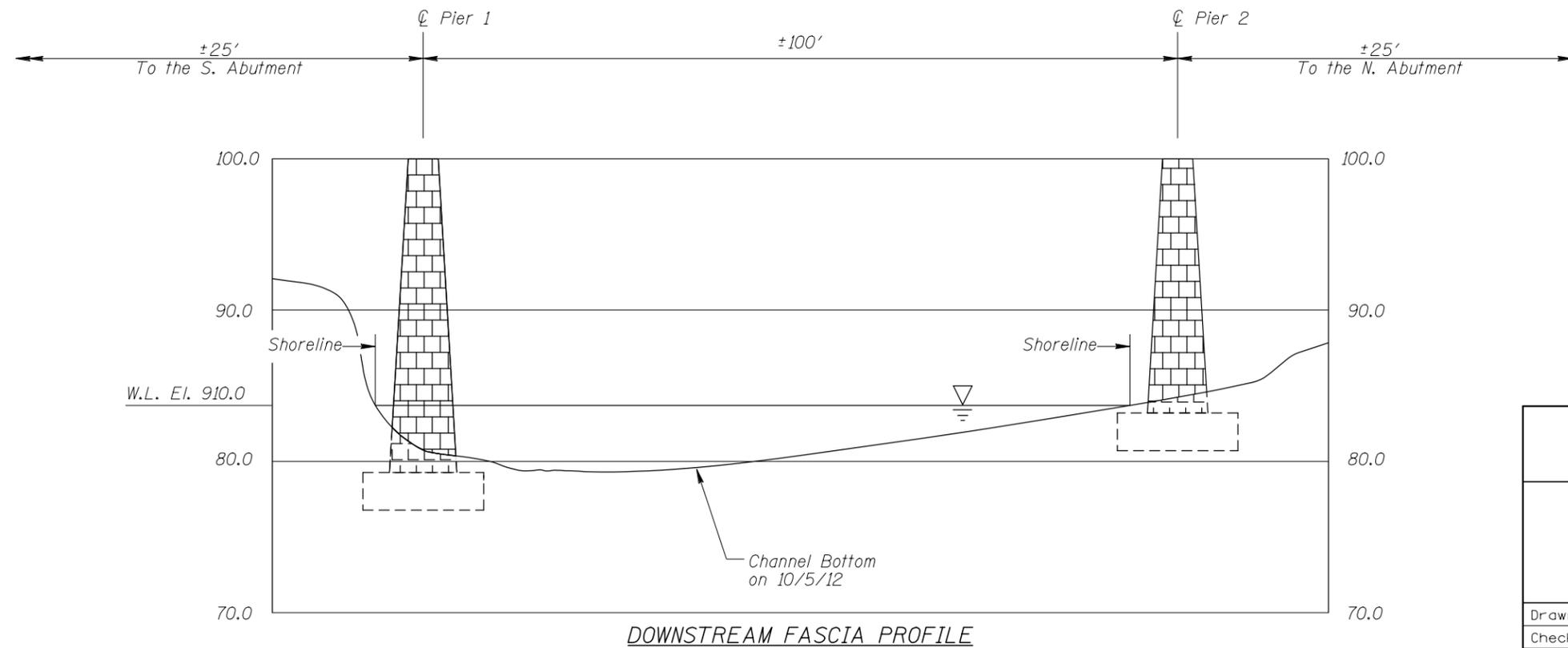
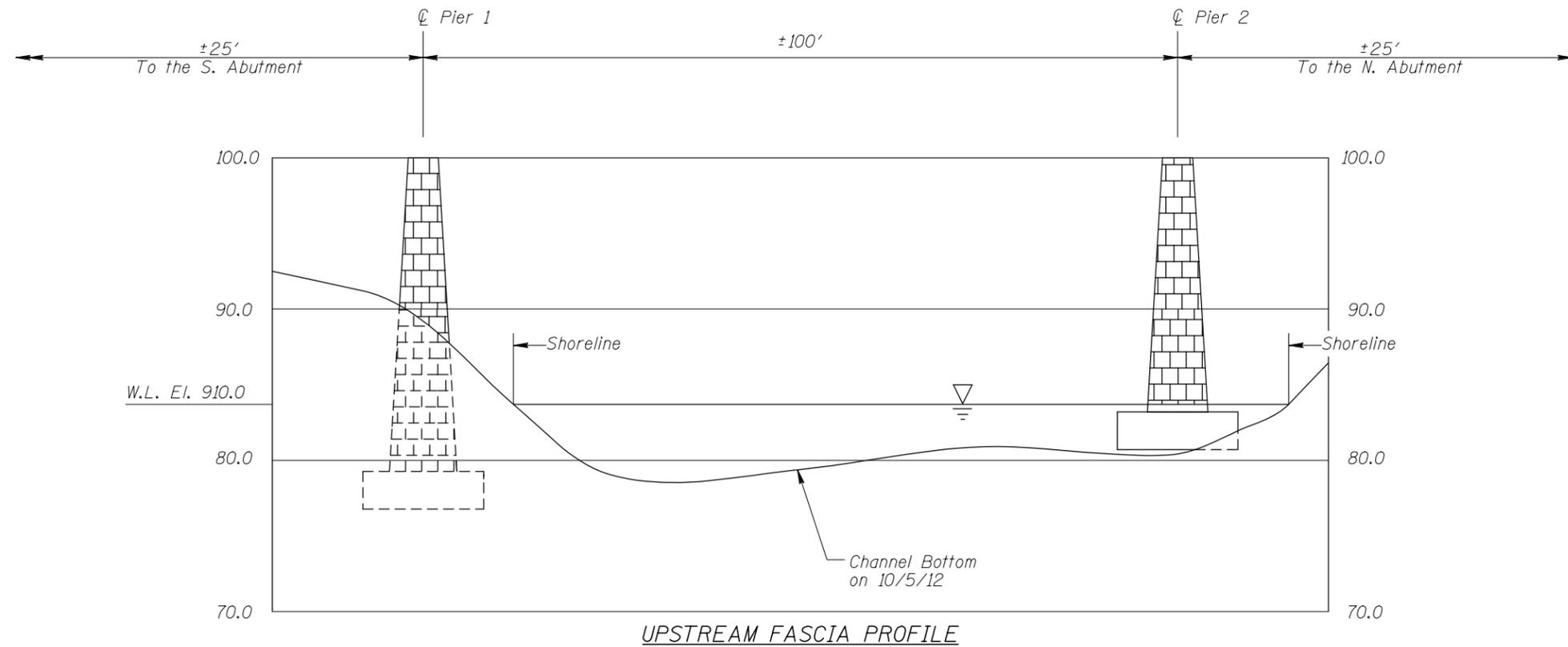
**GENERAL NOTES:**

- 1 Piers 1 and 2 were inspected underwater at this bridge.
- 2 At the time of inspection on October 5, 2012, the waterline was located approximately 16.3 feet below the top of the cap at the upstream end of Pier 2. Since no plans were available for the substructure at the time of the inspection, a reference elevation of 100.0 was assumed. The assumed waterline elevation was 83.7.
- 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.

**Legend**

- 9.0 Sounding Depth (10/5/12)
- Area of Undermining

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 5833 LOST LOOP ROAD OVER THE N. BR. ROOT RIVER FILLMORE COUNTY		
<b>INSPECTION AND SOUNDING PLAN</b>		
Drawn By: MBP	<b>COLLINS ENGINEERS</b>	Date: JAN., 2013
Checked By: LJ	<small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Scale: NTS
Code: 74235833		Figure No.: I



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

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 5833 LOST LOOP ROAD OVER THE N. BR. ROOT RIVER FILLMORE COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: MBP	<b>COLLINS ENGINEERS</b>	Date: JAN., 2013
Checked By: LJ	123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Scale: 1"=10'
Code: 74235833		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: October 5, 2012

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

BRIDGE NO: 5833 WEATHER: Sunny, 45°F

WATERWAY CROSSED: North Branch Root River

DIVING OPERATION:  SCUBA  SURFACE SUPPLIED AIR  
 OTHER

PERSONNEL: Marc B. Parker, Breanne M. Stromberg

EQUIPMENT: Commercial Scuba, Sounding Pole, Camera, Probe Rod, Hand Tools

TIME IN WATER: 10:15 A.M.

TIME OUT OF WATER: 11:00 A.M.

WATERWAY DATA: VELOCITY None/Negligible

VISIBILITY 3.0 feet

DEPTH 3.3 feet maximum at Pier 2

ELEMENTS INSPECTED: Piers 1 and 2

REMARKS: Overall, Piers 1 and 2, were found to be in good to satisfactory condition with defects of only minor structural significance observed. The masonry of both piers was in good and sound condition with no notable defects. The footing of Pier 2 was exposed and undermined at the upstream corner with an undermining cavity measuring 3 inches vertical and allowing up to 1.5 feet of penetration.

FURTHER ACTION NEEDED:  YES  NO

Monitor the footing exposure and extend of undermining during future underwater inspection and if found to be increasing, scour countermeasures may be warranted.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

MINNESOTA DEPARTMENT OF TRANSPORTATION  
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 5833  
 INSPECTORS Collins Engineers, Inc.  
 ON-SITE TEAM LEADER Daniel G. Stromberg, P.E.  
 WATERWAY CROSSED North Branch Root River

INSPECTION DATE October 5, 2012

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 (MASONRY)
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	3.0'	N	7	N	N	N	7	N	7	N	N	7	N	N	N	N	N	7
	Pier 2	3.3'	N	7	6	N	N	6	6	7	N	N	6	N	N	N	N	N	7

\*UNDERWATER PORTION ONLY

REMARKS: Overall, Piers 1 and 2, were found to be in good to satisfactory condition with defects of only minor structural significance observed. The masonry of both piers was in good and sound condition with no notable defects. The footing of Pier 2 was exposed and undermined at the upstream corner with an undermining cavity measuring 3 inches vertical and allowing up to 1.5 feet of penetration.

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.