

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 1232

4th STREET BRIDGE

OVER THE

CANNON RIVER

CITY OF NORTHFIELD



MAY 23, 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 No. 1232, Center Pier and East and West Abutments, were generally found to be in good condition with only random minor cracking of resurfacing repairs and no defects of structural significance. The channel bottom around the substructure units was well established and in stable condition with no notable scour.

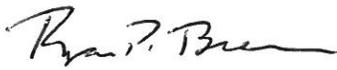
INSPECTION FINDINGS:

- (A) The concrete of the substructure units was smooth and sound with only random minor vertical cracking of the resurfacing repairs with efflorescence extending from the water line up 5 feet.
- (B) A 1/4-inch vertical crack was observed at the downstream nose of the center pier and extended from the channel bottom to 4 feet above the water line. A 4 inch wide by 4 inch long spall was observed along the crack near the water line with a maximum penetration of 1 inch.
- (C) A 1/8-inch vertical crack was observed at the downstream nose of the center pier and extended from the channel bottom to 2 feet above the water line.
- (D) A 2-foot diameter spall was observed on the downstream west face of the center pier at the water line with a maximum penetration of 2 inches. No reinforcing steel was exposed.
- (E) The channel bottom consisted of stone and natural bed rock with no probe rod penetration possible.

RECOMMENDATIONS:

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

Inspection Team Leader:



Ryan P. Breen, P.E.

Respectfully submitted,

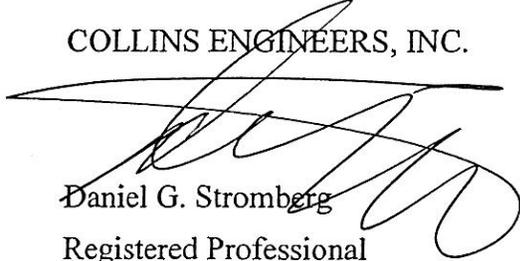
PROFESSIONAL ENGINEER

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: 1232

Feature Crossed: Cannon River

Feature Carried: 4th Street Bridge

Location: District 6 - Rice County

Bridge Description: The bridge superstructure consists of two concrete arch spans. The superstructure is supported on two reinforced concrete abutments and one reinforced concrete pier. The substructure units are keyed into bedrock.

2. INSPECTION DATA

Professional Engineer Diver: Ryan P. Breen, P.E.

Dive Team: Marc B. Parker, Michael J. Banasiak

Date: May 23, 2012

Weather Conditions: Sunny, 75° F

Underwater Visibility: 0.5 feet

Waterway Velocity: 3 f.p.s

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Center Pier and East and West Abutments.

General Shape: Piers consist of oblong rectangular shafts with rounded ends. Abutments consist of vertical walls. Substructure units are keyed into bedrock.

Maximum Water Depth at Substructure Inspected: 4.8 feet.

4. WATERLINE DATUM

Water Level Reference: Springline at the downstream end of Center Pier.

Water Surface: The waterline was approximately 3.7 feet below the reference.
Waterline Elevation 892.8.

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/05/12

Item 113: Scour Critical Bridges: Code G/07

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
210	Reinforced Concrete Pier Wall	45	LF		45			
215	Reinforced Concrete Abutment	80	LF		80			



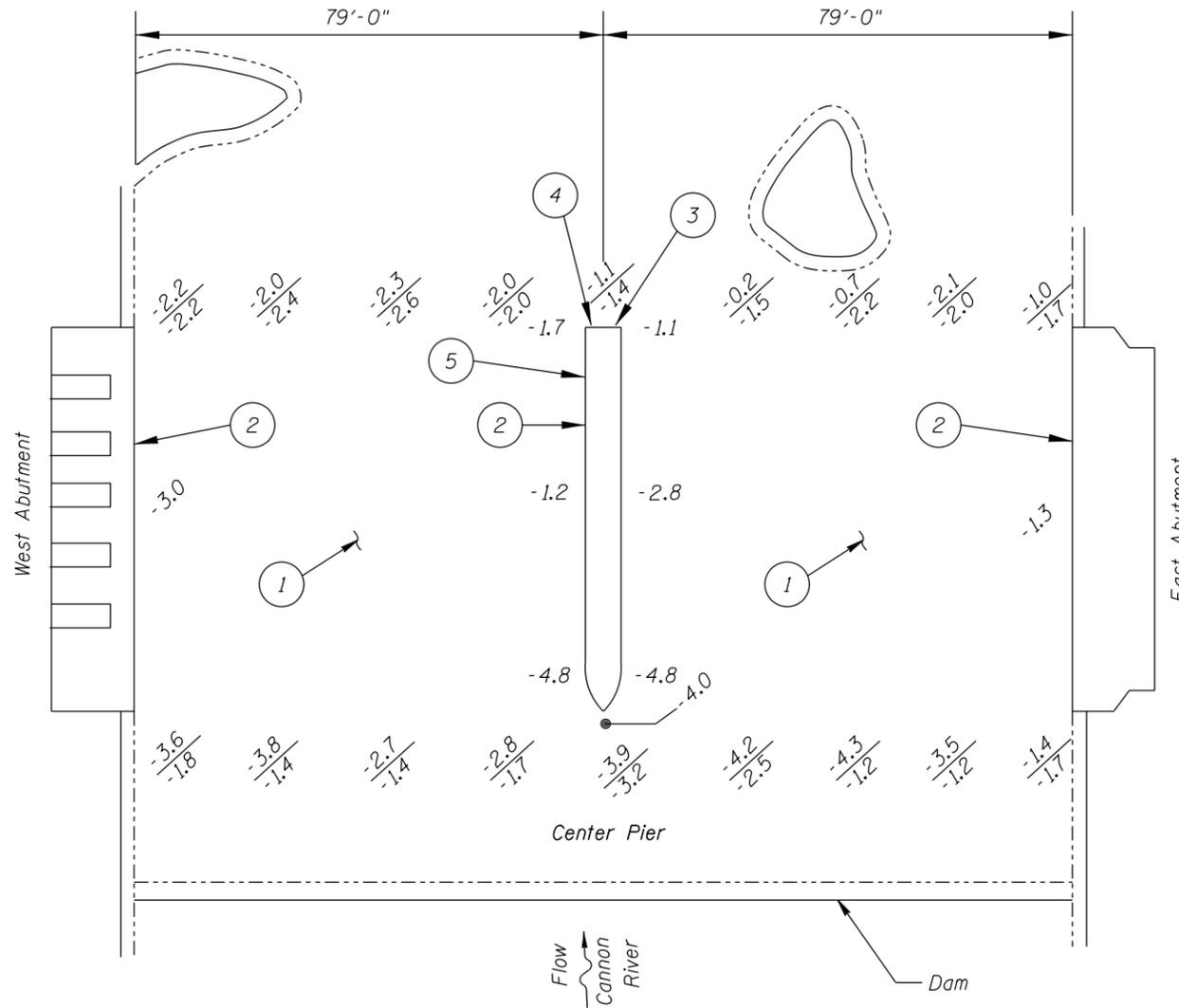
Photograph 1. View of East Abutment, Looking Southeast.



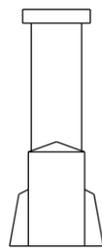
Photograph 2. View of Center Pier, Looking Southeast.



Photograph 3. View of West Abutment, Looking Southwest.



SOUNDING PLAN



TYPICAL END VIEW PIER

INSPECTION NOTES:

- 1 The channel bottom consisted of stone and natural bedrock with no probe rod penetration possible.
- 2 The concrete was generally smooth and sound with only random minor cracking of the resurfacing repairs.
- 3 Vertical crack 1/4 inch wide extended from 4 feet above waterline to channel bottom with a 4 inch by 4 inch spall at the waterline on the downstream nose of the center pier with a maximum penetration of 1 inch.
- 4 Vertical crack located on the downstream nose of the center pier was 1/8 inch wide and extended from channel bottom to 2 feet above the waterline.
- 5 Spall had a diameter of 2 feet at waterline and was located on west face of the center pier near the downstream nose. Maximum penetration was 2 inches. No steel reinforcement was exposed.
- 6 Random hairline cracks with efflorescence were observed at the waterline extending 5 feet above the waterline.

GENERAL NOTES:

1. The East and West Abutments and the Center Pier were inspected underwater.
2. At the time of inspection, on May 23, 2012, the waterline was located approximately 3.7 feet below the spring line at the downstream end of the Center Pier. This corresponds to a waterline elevation of approximately 892.8 feet based on design repair plans.
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 as well as around the substructure units.

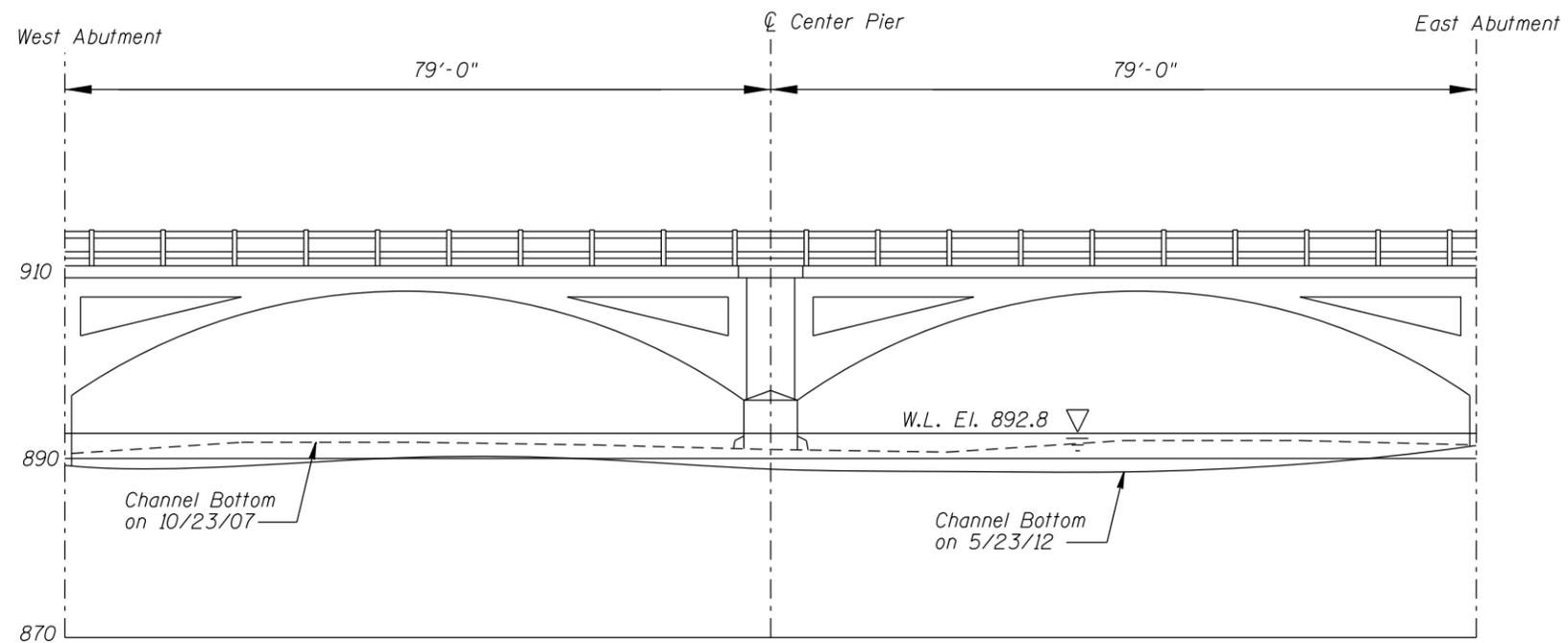
Legend

- 0.4 Sounding Depth (05/23/12)
- 0.6 Sounding Depth (10/23/07)

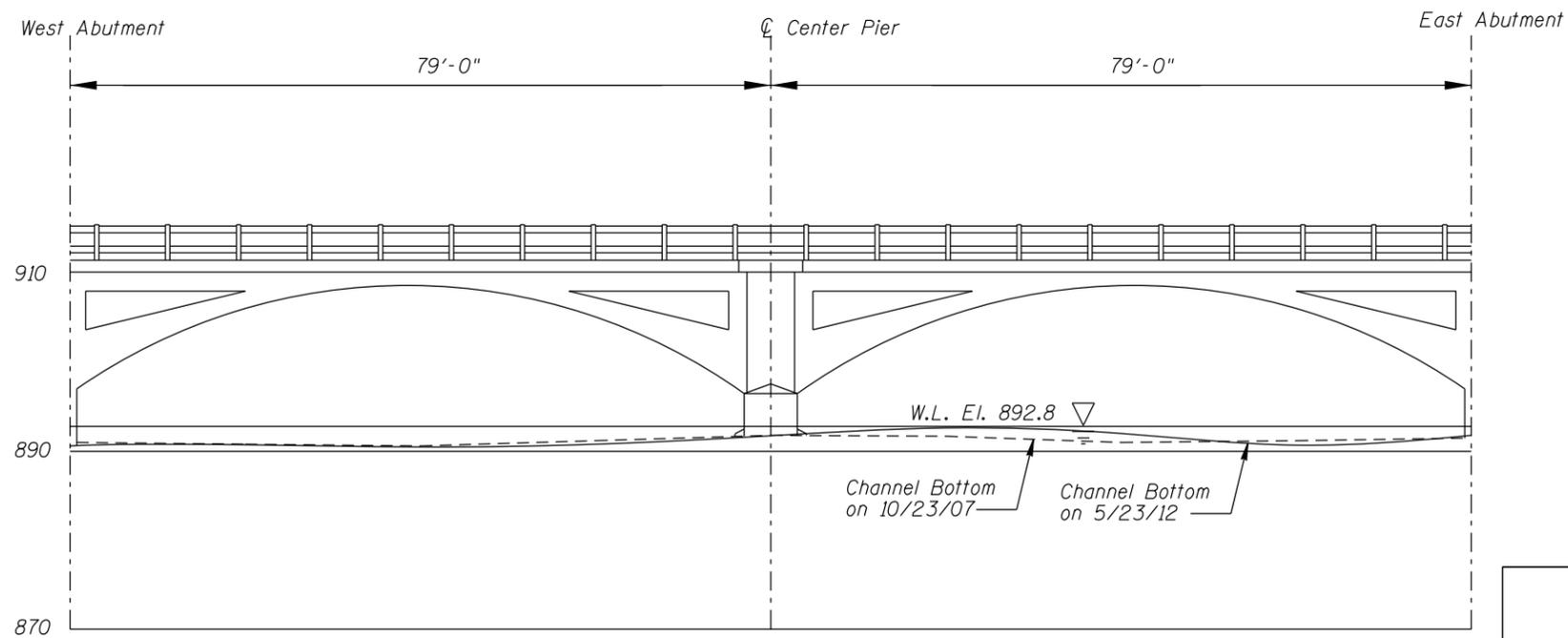
Note

All soundings based on 2012 waterline location.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 1232 4th STREET OVER THE CANNON RIVER CITY OF NORTHFIELD		
INSPECTION AND SOUNDING PLAN		
Drawn By: BMS	COLLINS ENGINEERS	Date: MAY 2012
Checked By: RPB	<small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Scale: NTS
Code: 74231232		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. 1232
4th STREET OVER THE CANNON RIVER
CITY OF NORTHFIELD

UPSTREAM AND DOWNSTREAM
FASCIA PROFILES

Drawn By: BMS

Checked By: RPB

Code: 74231232

**COLLINS
ENGINEERS**

123 North Wacker Drive
Suite 900
Chicago, IL 60606
(312) 704-9300
www.collinsengr.com

Date: MAY 2012

Scale: 1"=20'

Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: May 23, 2012

ON-SITE TEAM LEADER: Ryan P. Breen, P.E.

BRIDGE NO: 1232 WEATHER: Sunny, 75° F

WATERWAY CROSSED: Cannon River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Marc B. Parker, Michael J. Banasiak

EQUIPMENT: Commercial Scuba, U/W Light, Scraper, Lead Line, Probe Rod,
Camera, Fathometer

TIME IN WATER: 11:50 a.m.

TIME OUT OF WATER: 12:25 p.m.

WATERWAY DATA: VELOCITY 3.0 f.p.s

VISIBILITY 0.5 feet

DEPTH 4.8 feet maximum at Center Pier

ELEMENTS INSPECTED: Center Pier, East and West Abutments

REMARKS: Overall, the concrete below water was smooth and sound with only random minor cracking of the resurfacing repairs. The channel bottom consisted of stone and natural rock with no probe rod penetration and no conditions of concern.

FURTHER ACTION NEEDED: YES NO

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. 1232
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Ryan P. Breen, P.E.
 WATERWAY CROSSED Cannon River

INSPECTION DATE May 23, 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 (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
	Center Pier	4.8'	N	6	N	8	N	6	N	N	N	N	8	6	N	N	N	N	N
	West Abutment	3.6'	N	6	N	8	N	6	N	N	N	N	8	6	N	N	N	N	N
	East Abutment	1.4'	N	6	N	8	N	6	N	N	N	N	8	6	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete below water was smooth and sound with only random minor cracking of the resurfacing repairs. The channel bottom consisted of stone and natural rock with no probe rod penetration and no conditions of concern.

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.