

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 93020

CR 916

OVER A

STREAM

ST. LOUIS COUNTY



SEPTEMBER 17, 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. 93020, the North and South Abutments, were found to be in satisfactory to fair condition, with only minor defects of structural significance. The timber piles were typically sound with random splits or checks up to 1/2 inch wide and 1/2 to 1 inch deep. Pile C at the North Abutment had a 1 inch gap between the top of the pile and the bottom of the pile cap, and therefore was not load bearing. The timber backwall was typically sound with random gaps between boards of up to 1 inch, with no appreciable loss of backfill observed. The channel bottom appeared to be stable with no evidence of significant scour.

INSPECTION FINDINGS:

- (A) The channel bottom material typically consisted of rocks up to 1 foot in diameter with no appreciable probe rod penetration.
- (B) The timber piles were typically sound with random splitting or checking up to 1/2 inch wide and 1/2 to 1 inch deep.
- (C) Pile C of the North Abutment had no bearing. There was a 1 inch gap between the top of the pile and the bottom of the pile cap. The pile cap above the pile was deflected downward approximately 1 inch.
- (D) The backwall boards were typically sound with random gaps between the boards of up to 1 inch wide. No appreciable loss of backfill was observed.
- (E) The second backwall board up from the waterline at the South Abutment was displaced 2 inches away from the channel.

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 93020

Feature Crossed: A Stream

Feature Carried: CR 916

Location: St. Louis County

Bridge Description: The superstructure consists of a timber deck supported by steel I-Beams. The superstructure is supported by two abutments consisting of six 12 inch timber piles, a 12 inch by 12 inch timber pile cap, and a timber back wall.

2. INSPECTION DATA

Professional Engineer Diver: Nicholas R. Triandafilou, P.E.

Dive Team: Marc B. Parker, Clay G. Brookins

Date: September 17, 2012

Weather Conditions: Cloudy, 50° F

Underwater Visibility: 2 feet

Waterway Velocity: None / Negligible

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: The North and South Abutments

General Shape: The North and South Abutments each consist of six timber 12 inch diameter piles with a 12 inch by 12 inch timber pile cap. The backwall and wingwalls were comprised of 3 inch by 12 inch timber boards.

Maximum Water Depth at Substructure Inspected: Approximately 3.3 feet.

4. WATERLINE DATUM

Water Level Reference: Top of the pile cap at the upstream end of the North Abutment

Water Surface: The waterline was approximately 2.8 feet below the reference.
Waterline Elevation 97.2

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

Item 60: Substructure: Code 5

Item 61: Channel and Channel Protection: Code 7

Item 92B: Underwater Inspection: Code B/09/12

Item 113: Scour Critical Bridges: Code K/12

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
228	Timber Piling	12	EA	0	11	1	0	n/a
216	Timber Abutment	2	LF	0	52	0	0	n/a
386	Timber Wingwalls	4	EA	0	4	0	0	n/a
360	Settlement	1	EA	0	1	0	n/a	n/a
361	Scour	1	EA	1	0	0	n/a	n/a
985	Slopes and Slope Protection	1	EA	1	0	0	n/a	n/a



Photograph 1. Overall View of Structure, Looking East



Photograph 2. View of the North Abutment, Looking Northeast.



Photograph 3. View of the South Abutment, Looking Southeast.



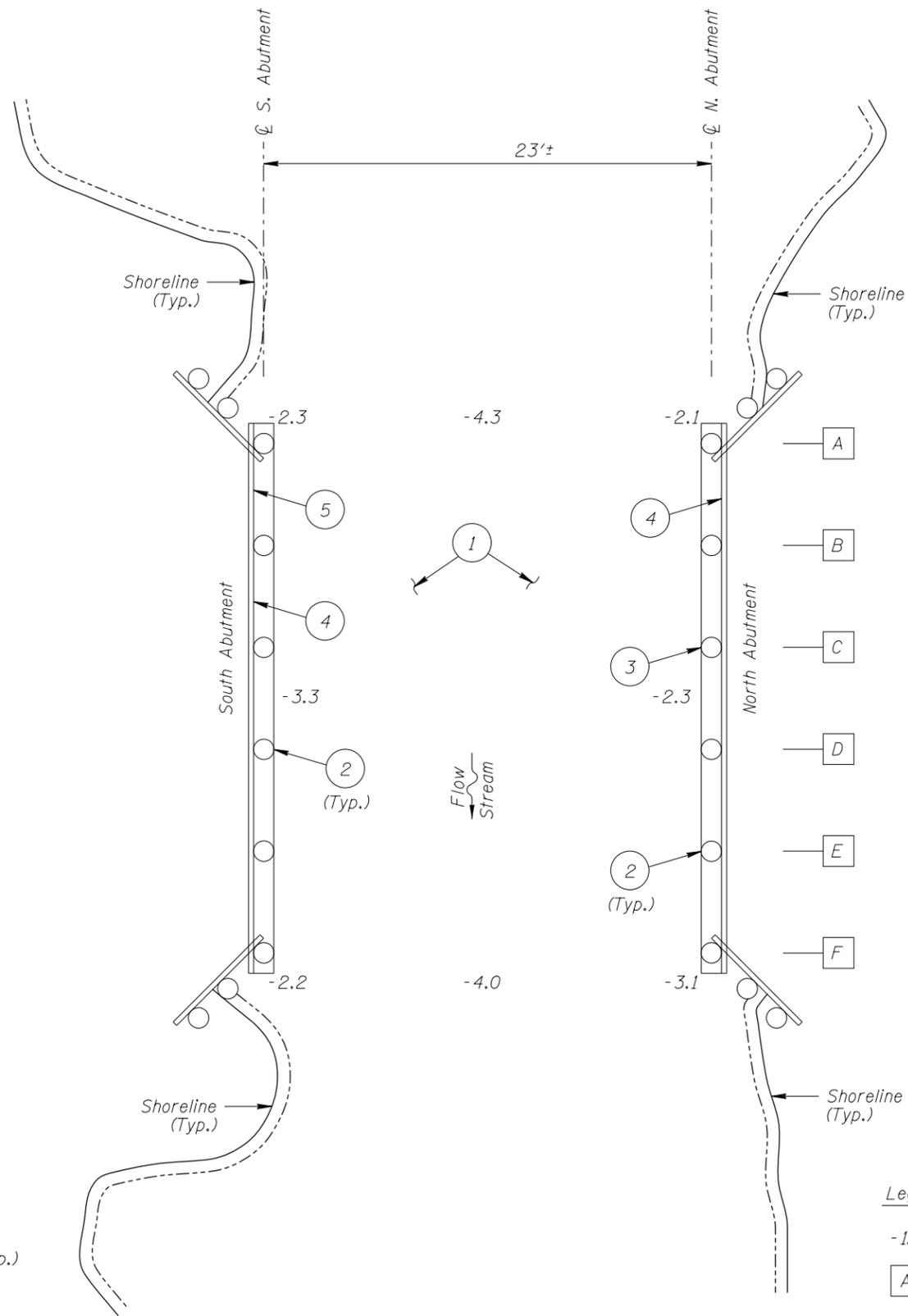
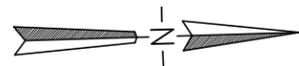
Photograph 4. View of the Typical Timber Pile Splitting, Looking North.



Photograph 5. View of the Gap between the Pile Cap and Pile C at the North Abutment, Looking Northeast.

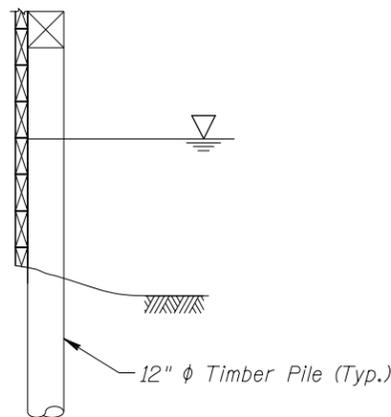


Photograph 6. View of the Deflection of the North Abutment Pile Cap, Looking West.



TYPICAL END VIEW OF ABUTMENTS

SOUNDING PLAN



INSPECTION NOTES:

- 1 The channel bottom material typically consisted of rocks up to 1 foot in diameter with no appreciable probe rod penetration.
- 2 The timber piles were typically sound with random splitting and checking up to 1/2 inch wide and 1/2 to 1 inch deep.
- 3 Pile C of the North Abutment had no bearing. There was a 1 inch gap between the top of the pile and the bottom of the pile cap. The pile cap above the pile was deflected downward approximately 1 inch.
- 4 The backwall boards were typically sound with random gaps between the boards of up to 1 inch wide. No appreciable loss of backfill was observed.
- 5 The second backwall board up from the waterline at the South Abutment was displaced 2 inches away from the channel.

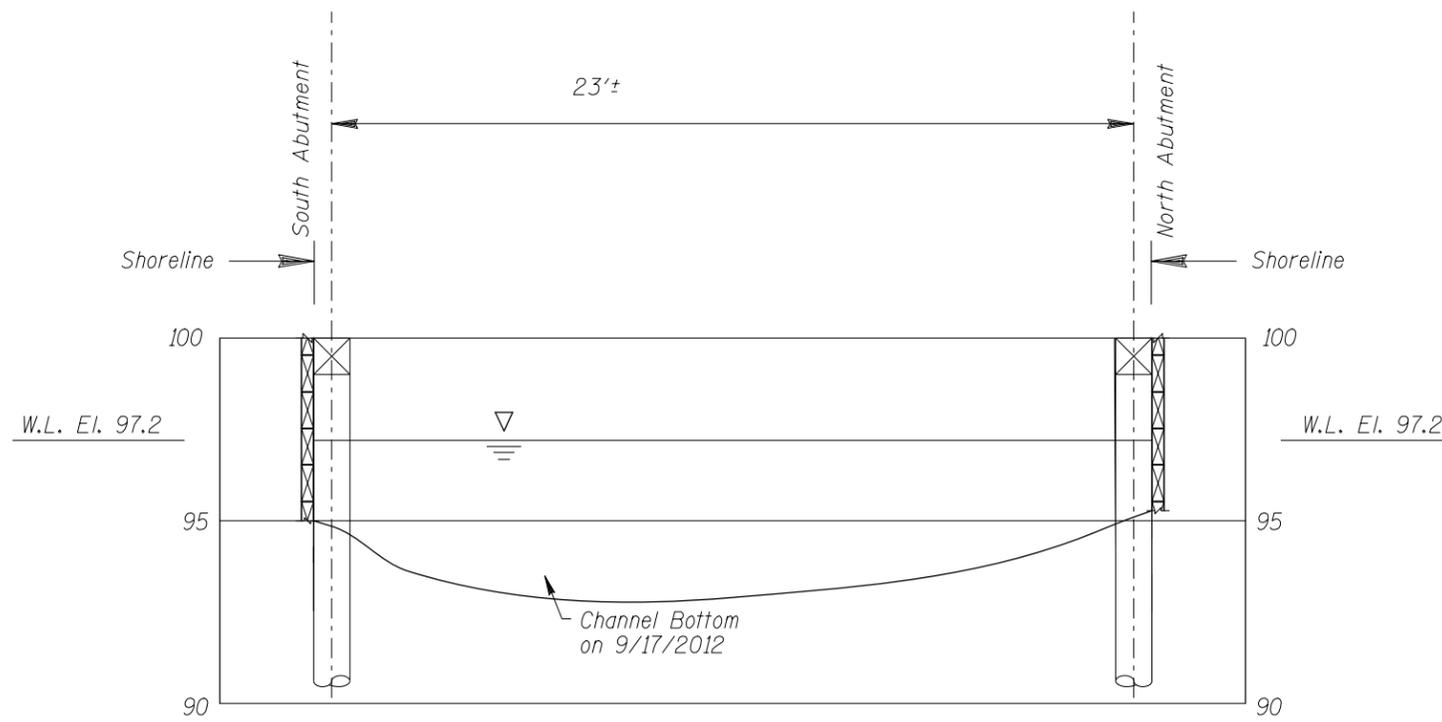
GENERAL NOTES:

1. The North and South Abutments were inspected during the underwater inspection.
2. At the time of inspection on September 17, 2012, the waterline was located approximately 2.8 feet below the top of the pile cap at the upstream end of the North Abutment. Since elevation information was not available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 97.2.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.

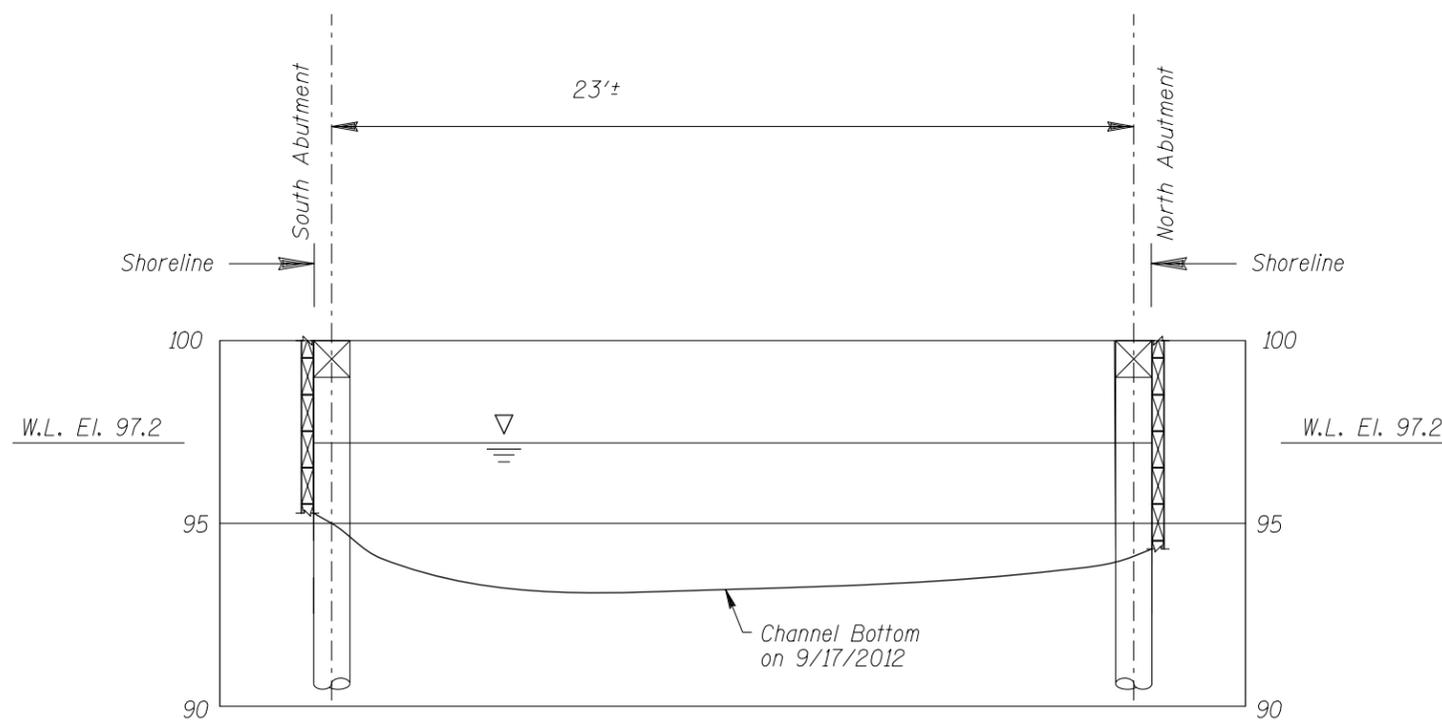
Legend

- 1.0 Sounding Depth from Waterline (9/17/2012)
- A Pile Identification Designation
- 12 inch Diameter Timber Pile
- ① Inspection Note Number

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 93020 CR 916 OVER A STREAM ST. LOUIS COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: MBP	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: OCTOBER, 2012
Checked By: LJ		Scale: NTS
Code: 742393020		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. 93020 CR 916 OVER A STREAM ST. LOUIS COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: MBP	123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: OCTOBER, 2012
Checked By: LJ	COLLINS ENGINEERS	Scale: 1"=5'
Code: 742393020		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: September 17, 2012

ON-SITE TEAM LEADER: Nicholas R. Triandafilou, P.E.

BRIDGE NO: 93020 WEATHER: Cloudy, 50° F

WATERWAY CROSSED: Stream

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Marc B. Parker, Clayton G. Brookins

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

TIME IN WATER: 2:10 P.M.

TIME OUT OF WATER: 2:40 P.M.

WATERWAY DATA: VELOCITY None / Negligible

VISIBILITY 2 feet

DEPTH 3.3 feet maximum at the South Abutment

ELEMENTS INSPECTED: The North and South Abutments

REMARKS: Overall, the North and South Abutments, were found to be in satisfactory to fair condition, with only minor defects of structural significance. The timber piles were typically sound with random splits or checks up to 1/2 inch wide and 1/2 to 1 inch deep. Pile C at the North Abutment had a 1 inch gap between the top of the pile and the bottom of the pile cap, and therefore was not load bearing. The timber backwall was typically sound with random gaps between boards of up to 1 inch, with no appreciable loss of backfill observed. The channel bottom appeared to be stable with no evidence of significant scour.

FURTHER ACTION NEEDED: YES NO

Place shims between the top of Pile C of the North Abutment and the pile cap to restore full bearing to the pile.

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. 93020
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Nicholas R. Triandafilou, P.E.
 WATERWAY CROSSED Stream

INSPECTION DATE September 17, 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					
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	North Abutment	3.1'	6	N	N	5	6	6	N	7	N	N	7	N	N	6	N	N	N
	South Abutment	3.3'	6	N	N	N	6	6	N	7	N	N	7	N	N	6	N	N	N

*UNDERWATER PORTION ONLY

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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.