UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 88663

SKUNK CREEK

OVER THE

SOUTH BRANCH WATER HEN CREEK

ST. LOUIS COUNTY

SEPTEMBER 20, 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. 88663, the North and South Abutments, were found to be in satisfactory condition, with minor defects of structural significance. The timber piles were typically sound allowing a maximum awl penetration of 1/8 inch and with random splits or checks up to 1/2 inch wide and 2 inches deep. Pile A of the North Abutment exhibited checking with a maximum penetration of 1 inch and allowing a maximum awl penetration of 3/4 inch, extending from the top of the pile down 3 feet. The timber backwall was typically sound with random gaps between boards up to 1 inch wide. Voids were observed at the bottom of the backwalls with 6 to 12 inches of penetration.

INSPECTION FINDINGS:

(A) The channel bottom material typically consisted of rocks and gravel with a maximum probe rod penetration of 2 inches.

(B) The timber piles were typically sound allowing a maximum awl penetration of 1/8 inch and random splitting or checking up to 1/2 inch wide and 2 inches deep.

(C) The timber back wall boards were typically sound with random gaps between the boards up to 1 inch wide and voids at the bottom with 6 to 12 inches of penetration.

(D) Pile A of the North Abutment exhibited more widespread checking with up to 1 inch of penetration and allowing a maximum awl penetration of 3/4 inch extending from the top of the pile down 3 feet.

RECOMMENDATIONS:

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

Respectfully submitted,

Inspection Team Leader:

Nicholas R. Triandafilou

Nicholas R. Triandafilou, P.E.

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: 88663

Feature Crossed: South Branch Water Hen Creek

Feature Carried: Skunk Creek

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 diameter timber piles, a 12 inch by 12 inch timber pile cap, and a timber backwall.

2. INSPECTION DATA

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

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

Date: September 20, 2012

Weather Conditions: Cloudy, 45^{o} F

Underwater Visibility: 1 foot

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 4.3 feet.

4. WATERLINE DATUM

Water Level Reference: Top of the pile cap at the downstream end of the South Abutment

Water Surface: The waterline was approximately 1.3 feet below the reference.
Waterline Elevation 98.7

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/09/12

Item 113: Scour Critical Bridges: Code J/12

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

_____ Yes ___X__ No

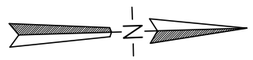
6. STRUCTURAL ELEMENT CONDITION RATING

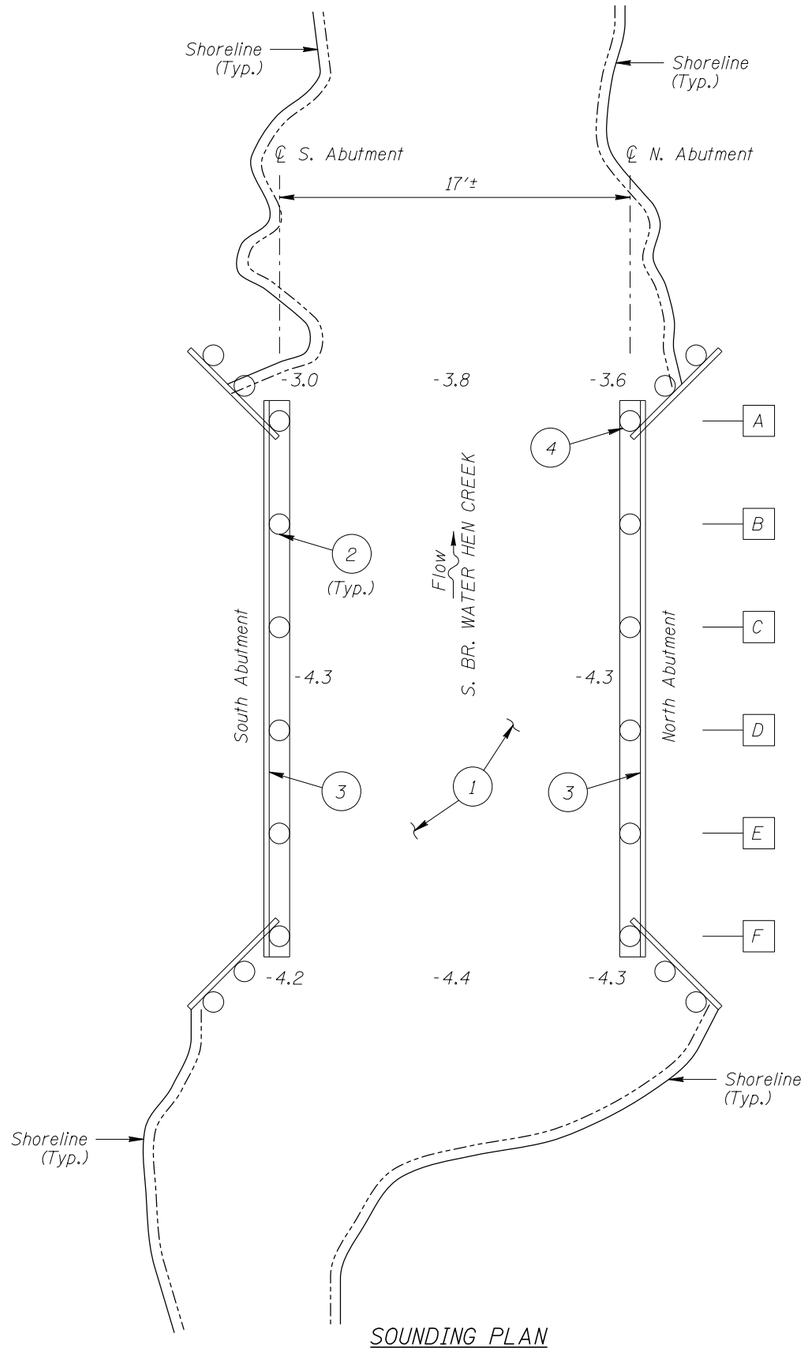
Item #	Element Description	Quantity	Unit	Conditions				
				1	2	3	4	5
228	Timber Piling	12	EA	11	1	0	0	n/a
216	Timber Abutment	49	LF	0	49	0	0	n/a
985	Slopes and Slope Protection	1	EA	1	0	0	n/a	n/a

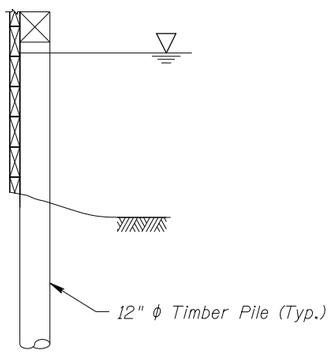
Photograph 1. Overall View of Structure, Looking Southeast.

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

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







TYPICAL END VIEW OF ABUTMENTS

SOUNDING PLAN

INSPECTION NOTES:

1. The channel bottom material typically consisted of rocks and gravel with a maximum probe rod penetration of 2 inches.
2. The timber piles were typically sound allowing a maximum awl penetration of $\frac{1}{8}$ inch and random splitting or checking up to $\frac{1}{2}$ inch wide and 2 inches deep.
3. The timber backwall boards were typically sound with random gaps between the boards up to 1 inch wide and voids at the bottom boards with 6 to 12 inches of penetration.
4. Pile A of the North Abutment exhibited more widespread checking with up to 1 inch of penetration and allowing a maximum awl penetration of $\frac{3}{4}$ inch extending from the top of the pile down 3 feet.

GENERAL NOTES:

1. The North and South Abutments were inspected during the underwater inspection.
2. At the time of inspection on September 20, 2012, the waterline was located approximately 1.3 feet below the top of the pile cap at the downstream end of the South Abutment. Since elevation information was not available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 98.7.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.

Legend

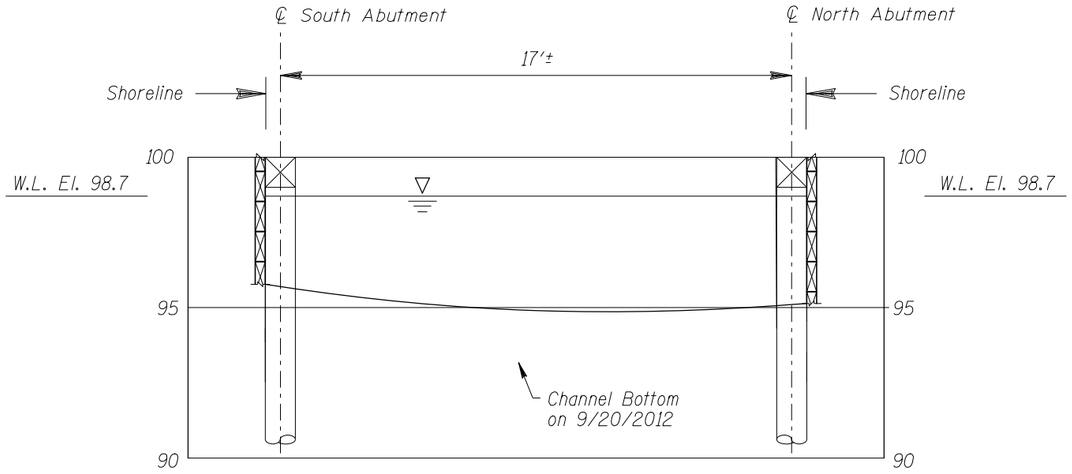
-1.0	Sounding Depth from Waterline (9/20/2012)
A	Pile Identification Designation
○	12 inch Diameter Timber Pile
1	Inspection Note Number

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

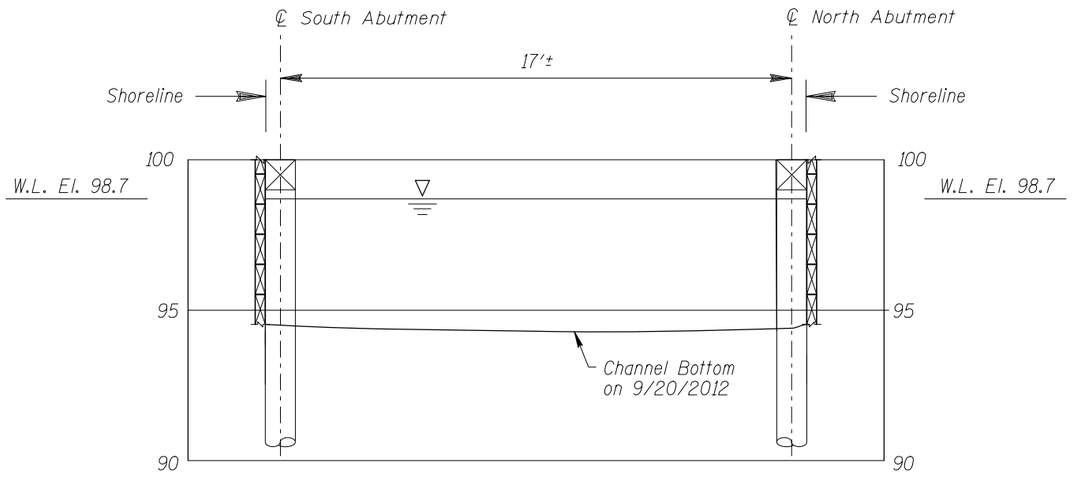
STRUCTURE NO. 88663
SKUNK CREEK OVER THE S. BR. WATER HEN CREEK
ST. LOUIS COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: MBP	COLLINS ENGINEERS, INC. 123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: NOVEMBER, 2012
Checked By: LJ		Scale: NTS
Code: 742388663		Figure No.: 1



DOWNSTREAM FASCIA PROFILE



UPSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 88663
SKUNK CREEK OVER THE S. BR. WATER HEN CREEK
ST. LOUIS COUNTY

UPSTREAM AND DOWNSTREAM FASCIA PROFILES

Drawn By: MBP	COLLINS ENGINEERS INC 123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: NOVEMBER, 2012
Checked By: LJ		Scale: 1"=5'
Code: 742388663		Figure No.: 2

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: September 20, 2012

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

BRIDGE NO: 88663 WEATHER: Cloudy, 45° F

WATERWAY CROSSED: Stream

DIVING OPERATION: X SCUBA _____ SURFACE SUPPLIED AIR

_____ OTHER _____

PERSONNEL: Marc B. Parker, Clayton G. Brookins

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

TIME IN WATER: 8:30 A.M.

TIME OUT OF WATER: 9:30 A.M.

WATERWAY DATA: VELOCITY None / Negligible

VISIBILITY 1 foot

DEPTH 4.3 feet maximum

ELEMENTS INSPECTED: The North and South Abutments

REMARKS: Overall, the substructure units inspected underwater were found to be in satisfactory condition, with minor defects of structural significance. The timber piles were typically sound allowing a maximum awl penetration of 1/8 inch and with random splits or checks up to 1/2 inch wide and 2 inches deep. Pile A of the North Abutment exhibited checking with a maximum penetration of 1 inch and allowing a maximum awl penetration of 3/4 inch, extending from the top of the pile down 3 feet. The timber backwall was typically sound with random gaps between boards up to 1 inch wide. Voids were observed at the bottom of the backwalls with 6 to 12 inches of penetration.

FURTHER ACTION NEEDED: _____ YES X NO

Reinspect the submerged substructure 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. 88663
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Nicholas R. Triandafilou, P.E.
WATERWAY CROSSED South Branch Water Hen Creek

INSPECTION DATE September 20, 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

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER (BACKWALL)	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
	North Abutment	4.3’	6	N	N	N	7	6	N	N	8	N	8	N	N	6	6	N	N
	South Abutment	4.3’	6	N	N	N	7	6	N	N	8	N	8	N	N	6	6	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the substructure units inspected underwater were found to be in satisfactory condition, with minor defects of structural significance. The timber piles were typically sound allowing a maximum awl penetration of 1/8 inch and with random splits or checks up to 1/2 inch wide and 2 inches deep. Pile A of the North Abutment exhibited checking with a maximum penetration of 1 inch and allowing a maximum awl penetration of 3/4 inch, extending from the top of the pile down 3 feet. The timber backwall was typically sound with random gaps between boards up to 1 inch wide. Voids were observed at the bottom of the backwalls with 6 to 12 inches 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.