UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 7787

CSAH 6

OVER THE

DUTCH SLOUGH

ST. LOUIS COUNTY

MAY 16, 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 below water at Structure No. 7787, the East and West barrels of the culvert, were found to be in fair condition with minor structural defects. A spall was observed on the entire east face of the center wall. The spall extended from 1 foot below to 6 inches above the waterline with maximum 3 inches of penetration. Two areas of section loss with exposed reinforcing steel were observed on the downstream east wingwall and downstream end of the center wall. Concrete in the interior of the barrel exhibited moderate scaling extending from the waterline to 3 inches above the waterline with 1 inch of penetration. A horizontal cold joint was observed along the entire face of the east wall of the East barrel with maximum width of 1 inch and penetration of 1.5 inches.

INSPECTION FINDINGS:

(A) The channel bottom material at the upstream and downstream ends of the structure consisted of gravel and riprap up to 8 inches in diameter.

(B) Two areas of minor concrete section loss were located at the upstream end of the northeast wingwall measuring 8 inches in diameter with 2 inches of penetration.

(C) A spall with exposed reinforcing steel was observed along the length of the west wall of the East barrel extending from 1 foot below to 6 inches above the waterline with up to 3 inches of penetration. Exposed reinforcing steel exhibited 10 percent loss of section.

(D) A horizontal cold joint was observed along the entire east wall of the East barrel located 1.5 feet above the waterline and measured up to 1 inch wide with up to 1.5 inches of penetration.

(E) Heavy concrete section loss with exposed reinforcing steel was observed along the downstream 2 feet of the southeast wingwall.

(F) Concrete section loss with exposed reinforcing steel was observed along the downstream end of the center wall with 2-3 inches of penetration.

(G) Areas of concrete section loss were observed along the upstream half on the east wall of the West barrel extending from the channel bottom to 4 inches above the waterline with up to 2 inches of penetration.

(H) Moderate scaling along the west wall of the West barrel and the east wall of the East barrel extending from the waterline to 3 inches above the waterline with typically 1 inch of penetration.

RECOMMENDATIONS:

(A) The spalls and associated concrete section loss are not structural concerns at this time; however, they should be repaired to prevent further deterioration. The repairs should include removal of concrete to a minimum of 1 inch behind the reinforcing steel, cleaning and replacing reinforcing steel as required, and placing concrete designed to provide high durability with low permeability.

(C) Consideration should be given to removing the silt infill/debris accumulation within the West barrel in order to restore the hydraulic capacity of the culvert and improve the flow of the channel.

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

Respectfully submitted,

Inspection Team Leader:

Ryan P. Breen, 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: 7787

Feature Crossed: Dutch Slough

Feature Carried: CSAH 6

Location: St. Louis County

Bridge Description: The culvert consists of two reinforced concrete culvert barrels designated as the West barrel and the East barrel.

2. INSPECTION DATA

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

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

Date: May 16, 2012

Weather Conditions: Sunny, 65°F

Underwater Visibility: 1.0 foot

Waterway Velocity: Negligible

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: West barrel and East barrel

General Shape: The culvert consists of two reinforced concrete box barrels measuring 12 feet wide and 40 feet long.

Maximum Water Depth at Substructure Inspected: Approximately 3.2 feet.

4. WATERLINE DATUM

Water Level Reference: The top of headwall on the southeast corner of the East Barrel.

Water Surface: The waterline was approximately 4.9 feet below reference.
Assumed Waterline Elevation = 95.1 feet.

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 5

Item 92B: Underwater Inspection: Code A/05/12

Item 113: Scour Critical Bridges: Code E/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 CONDITOIN RATING:

Item #	Element Description	Quantity	Unit	Conditions				
				1	2	3	4	5
241	Concrete Culvert	80	LF		60	20		
388	Culvert Wingwalls/Headwall	2	EA		2			

Photograph 1. View of the downstream end of the East Barrel, Looking Northwest.

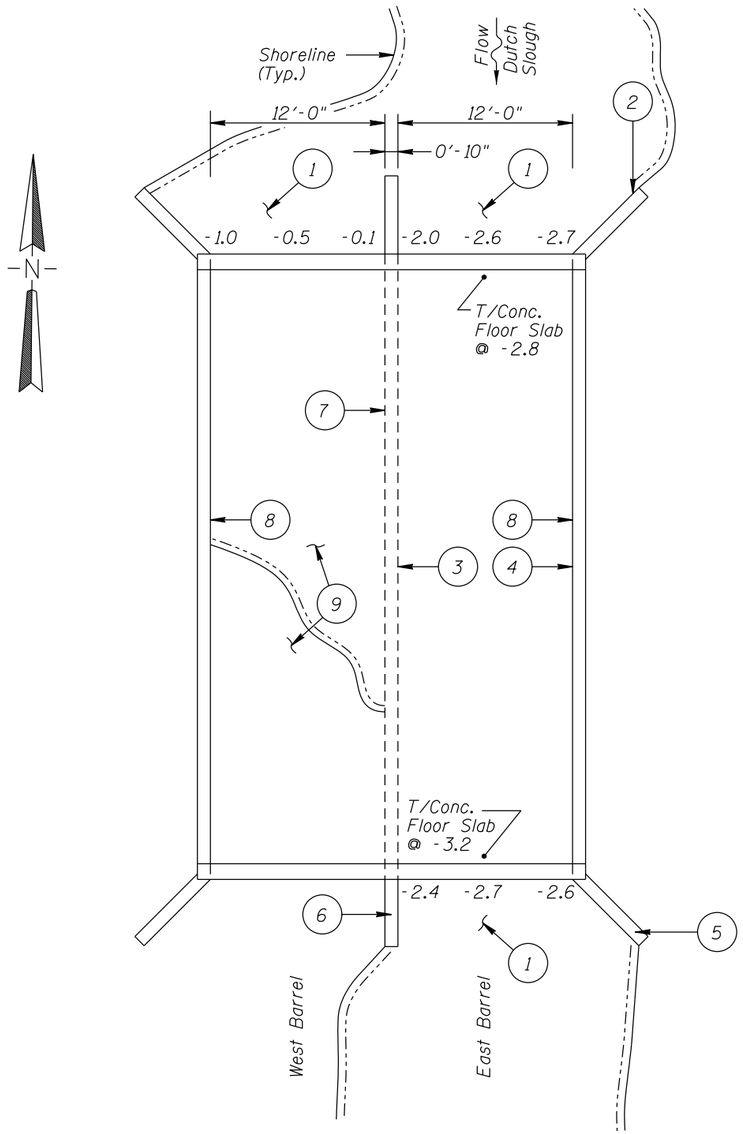
Photograph 2. View of the Upstream Face of the East Barrel, Looking South.

Photograph 3. View of the Upstream End of the West Barrel, Looking South.

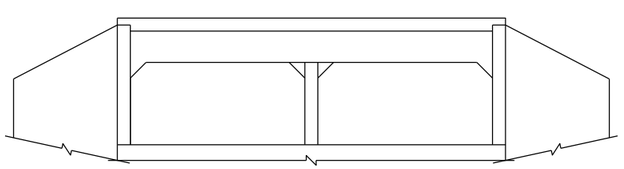
Photograph 4. View of Spall on East face of the Center Wall Extending the Length of the Barrel, Looking West.

Photograph 5. View of the Southeast Wingwall Spall with Exposed Reinforcing Steel, Looking East.

Photograph 6. View of the Section Loss along Downstream End of the Center Wall, Looking Down.



SOUNDING PLAN



TYPICAL END VIEW OF BARRELS

GENERAL NOTES:

1. The West and East barrels were inspected underwater.
2. At the time of inspection on May 16, 2012, the waterline was located approximately 4.9 feet below the top of the headwall at the southeast corner of the East Barrel. Since elevation information was not available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 95.1.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the upstream and downstream faces of the structure at 1/2 point intervals between the culvert walls.

INSPECTION NOTES:

1. Channel bottom material consisted of gravel and riprap up to 8 inches in diameter.
2. Two areas of minor concrete section loss located at the upstream end of the northeast wingwall measured 8 inches in diameter with 2 inches of penetration. No exposed reinforcing steel was observed.
3. Spall with exposed reinforcing steel located on the entire length of the west wall of the East barrel from the upstream to the downstream fascia extended from 1 foot below to 6 inches above the waterline with up to 3 inches of penetration. Exposed reinforcing steel exhibited 10 percent loss of section.
4. Horizontal cold joint along the entire east wall of the East barrel located 1.5 feet above the waterline measured up to 1 inch wide with up to 1-1/2 inches of penetration.
5. Heavy concrete section loss with exposed reinforcing steel located along the downstream 2 feet of the southeast wingwall.
6. Concrete section loss with exposed reinforcing steel located across the full width of the downstream end of the center wall with 2 to 3 inches of penetration.
7. Areas of concrete section loss located along the upstream half on the east wall of the West barrel extended from the channel bottom to 4 inches above the waterline with up to 2 inches of penetration.
8. Moderate scaling along the west wall of the West barrel and the east wall of the East barrel extended from the waterline to 3 inches above the waterline with typically 1 inch of penetration.
9. The culvert floor within the West barrel was covered with up to 4 feet thick layer of silty infill.

Legend

-17.0	Sounding Depth from Waterline (5/16/12)
1	Inspection Note Number

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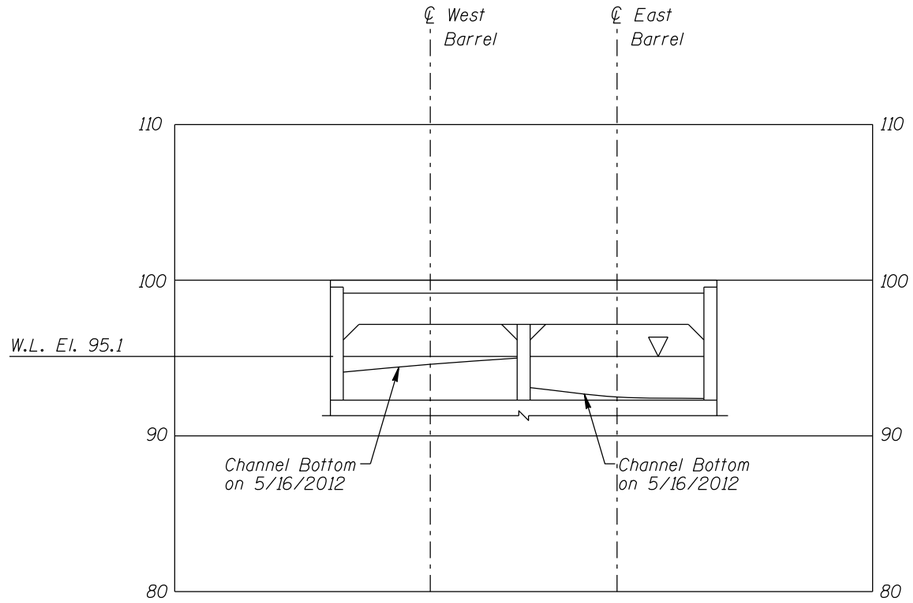
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

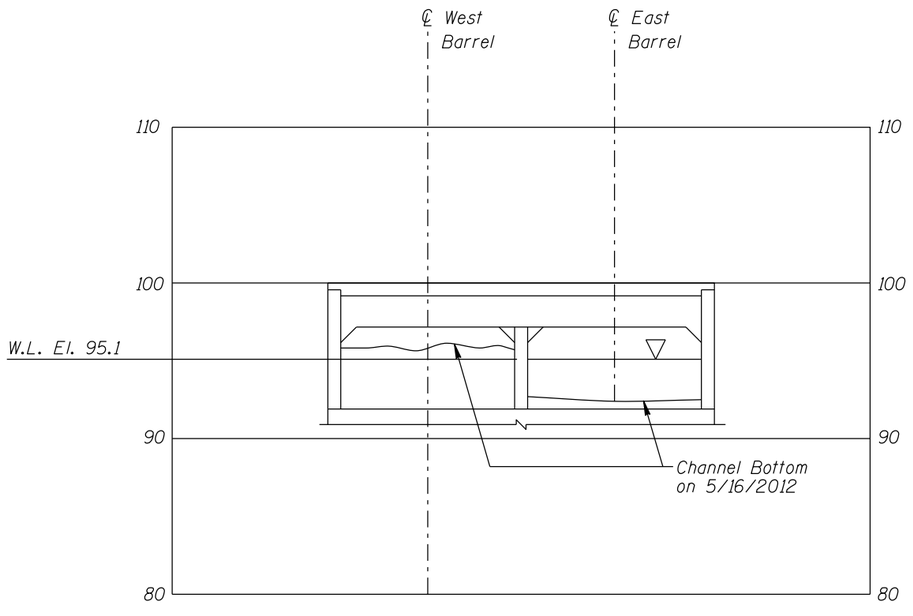
STRUCTURE NO. 07787
CSAH 6 OVER DUTCH SLOUGH
ST. LOUIS COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS, INC. 123 North Wacker Drive Suite 900 Chicago, Il. 60606 (312) 704-9300 www.collinsengr.com	Date: MAY, 2012
Checked By: RPB		Scale: NTS
Code: 742307787		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

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UPSTREAM AND DOWNSTREAM
FASCIA PROFILES

Drawn By: PRH	COLLINS ENGINEERS INC 123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: MAY, 2012
Checked By: RPB		Scale: 1"=10'
Code: 742307787		Figure No.: 2

MINNESOTA DEPARTMENT OF TRANSPORTATION

OFFICE OF BRIDGES AND STRUCTURES

DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: May 16, 2012

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

BRIDGE NO: 7787 WEATHER: Sunny, 65° F

WATERWAY CROSSED: Dutch Slough

DIVING OPERATION: _____ SCUBA _____ SURFACE SUPPLIED AIR

X OTHER Wading

PERSONNEL: Michael J. Banasiak, Marc B. Parker

EQUIPMENT: Dry Suit, Sounding Pole, Probe Rod, Camera, Hand Tools

TIME IN WATER: 9:00 a.m.

TIME OUT OF WATER: 9:30 a.m.

WATERWAY DATA: VELOCITY Negligible

VISIBILITY 1.0 foot

DEPTH 3.2 feet maximum in East barrel

ELEMENTS INSPECTED: West barrel, East barrel

REMARKS: Overall, the substructure units inspected were found to be in fair condition with minor structural defects. A spall was observed along the length of the west wall of the East barrel. The spall extended from 1 foot below to 6 inches above the waterline with up to 3 inches of penetration. The exposed reinforcing steel exhibited 10 percent loss of section. Areas of section loss with exposed reinforcing steel were observed on the downstream east wingwall and pier extension. Concrete in the interior of the barrels exhibited moderate scaling extending from the waterline to 3 inches above the waterline with 1 inch of penetration. A horizontal cold joint was observed along the entire east wall of the East barrel with a maximum width of 1 inch and penetration of 1.5 inches.

FURTHER ACTION NEEDED: ___X____ YES _____ NO

The spalls and associated concrete section loss are not structural concerns at this time; however, they should be repaired to prevent further deterioration. The repairs should include removal of concrete to a minimum of 1 inch behind the reinforcing steel, cleaning and replacing reinforcing steel as required, and placing concrete designed to provide high durability with low permeability.

Consideration should be given to removing the silt infill/debris accumulation within the West barrel in order to restore the hydraulic capacity of the culvert and improve the flow of the channel.

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

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 7787
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Ryan P. Breen, P.E.
WATERWAY CROSSED Cannon River

INSPECTION DATE May 16, 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 (HEADWALL/WINGWALL)	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
	West Barrel	1.0’	N	6	N	7	6	6	N	7	N	5	5	6	N	N	6	N	N
	East Barrel	3.2’	N	5	N	7	6	5	N	7	N	7	7	5	N	N	5	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the substructure units inspected were found to be in fair condition with minor structural defects. A spall was observed along the length of the west wall of the East barrel. The spall extended from 1 foot below to 6 inches above the waterline with up to 3 inches of penetration. The exposed reinforcing steel exhibited 10 percent loss of section. Areas of section loss with exposed reinforcing steel were observed on the downstream east wingwall and pier extension. Concrete in the interior of the barrels exhibited moderate scaling extending from the waterline to 3 inches above the waterline with 1 inch of penetration. A horizontal cold joint was observed along the entire east wall of the East barrel with a maximum width of 1 inch and penetration of 1.5 inches.

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.