UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. L4665

TWP 48

OVER THE

SOUTH FORK ROOT RIVER

FILLMORE COUNTY

OCTOBER 4, 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. L4665, the North and South Abutments, were found to generally be in satisfactory to fair condition with some defects of structural significance. A heavy accumulation of timber debris was observed under the bridge span, at the upstream fascia of the bridge, and about 10 to 15 feet upstream of the bridge and each abutment. The concrete of the abutments was rough and irregular with scaling that had up to 1 inch of maximum penetration. In the west of the South Abutment there was a 5 foot long (horizontally) cavity in the backwall. The cavity (apparent section loss) was up to 6 inches high with up to 2 feet of penetration, and appeared to be allowing some minor deck displacement at the southwest corner of the bridge. The steel beams of the superstructure showed mostly light surface corrosion with no notable loss of section. The underside of the deck was in satisfactory condition with random cracking in isolated timber deck plank members.

INSPECTION FINDINGS:

(A) A heavy accumulation of timber debris was observed under the bridge span at the upstream fascia of the bridge, and about 10 to 15 feet upstream of the bridge and each abutment. The accumulations typically consisted of 1 foot diameter and smaller logs and branches extending from the channel bottom to 1 foot above the waterline. Although not as heavy, there is moderate accumulations of the debris directly along both abutments.

(B) The concrete of both the abutments was rough, with scaling that had 1 inch maximum penetration.

(C) The steel beams of the superstructure (minimal free headroom between the beams and waterline) showed light surface and nodular corrosion with no detectable loss of section.

(D) The underside of the deck was in satisfactory condition with random isolated cracking of timber deck plank members.

(E) At the west side of the face of the South Abutment there was a 5 foot long (horizontally) cavity in the backwall just below the steel channel beam seat. The cavity (apparent section loss) was up to 6 inches high with up to 2 feet of penetration, and appeared to be allowing some minor deck displacement at the southwest corner of the bridge.

RECOMMENDATIONS:

(A) Remove the heavy accumulation of timber debris, which is significantly restricting the channel at the bridge and has the potential to exert considerable lateral load on the bridge superstructure.

(B) The cavity in the South Abutment backwall should be filled with a suitable repair material to inhibit further section loss and to restore the abutment wall section and the bridge superstructure support.

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

Respectfully submitted,

Inspection Team Leader:
Daniel G. Stromberg, 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: L4665

Feature Crossed: South Fork Root River

Feature Carried: TWP 48

Location: Fillmore County

Bridge Description: The bridge superstructure consists of a single span of multiple steel beams (I-beams) supporting a timber plank deck. The superstructure is supported by two concrete abutments.

2. INSPECTION DATA

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

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

Date: October 4, 2012

Weather Conditions: Sunny, 50°F

Underwater Visibility: 3.0 Feet

Waterway Velocity: 0.5 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: North and South Abutments.

General Shape: Solid wall concrete abutment.

Maximum Water Depth at Substructure Inspected: Approximately 3.0 feet.

4. WATERLINE DATUM

Water Level Reference: The bottom of the beam at the southwest corner of the bridge.

Water Surface: The waterline was approximately 0.7 feet below reference.
Assumed Waterline Elevation = 99.3

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 4

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

Item 113: Scour Critical Bridges: Code G

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

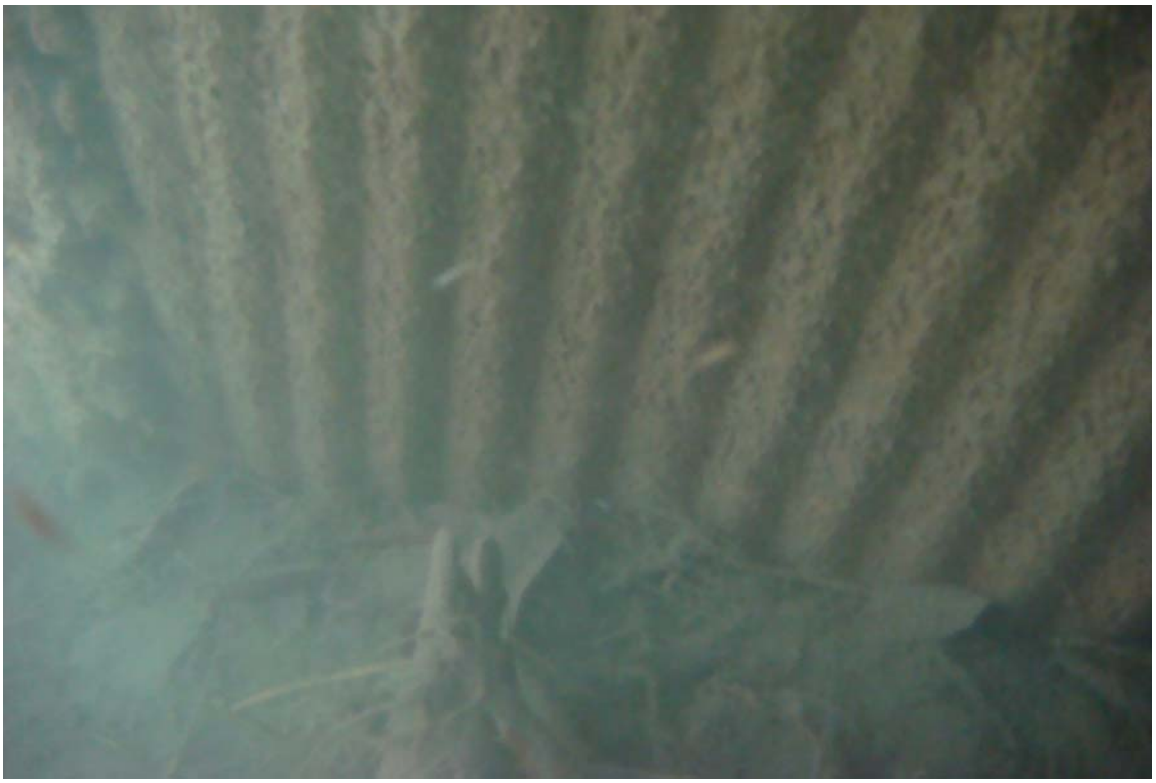
_____Yes X No

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

Photograph 2. View of the North Abutment between Beams 4 and 5, Looking North. Note heavy timber debris accumulation.

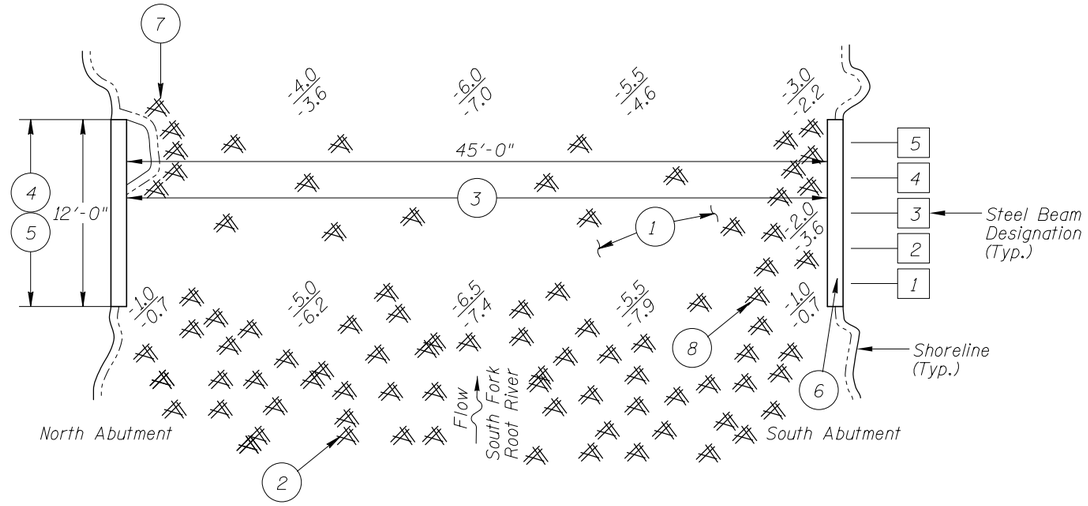
Photograph 3. View of the South Abutment between Beams 1 and 2, Looking South.

Photograph 4. View of the Typical Steel Beam Condition, Looking Northeast. Note the Surface and Nodular Corrosion.



Photograph 5. View of the Corrugated Face of the South Abutment Underwater between Beams 4 and 5, Looking South.

Photograph 6. View of the Cavity between the Bottom of the Beam Seat Channel and the Top of the Corrugated Wall at the South Abutment between Beams 1 and 2, Looking South.



INSPECTION NOTES:

1. Channel bottom consisted of soft organics and silt with up to 2 feet of probe rod penetration and some scattered 2 feet diameter and smaller rocks.
2. A heavy accumulation of timber debris was observed under the bridge span, at the upstream fascia of the bridge, and extended approximately 10 to 15 feet upstream of the bridge. The timber debris consisted of 1 foot diameter and smaller logs and branches and extended from the channel to 1 foot above the waterline.
3. Concrete was rough and scaling was present with approximately 1 inch of maximum penetration.
4. The steel beams showed light surface and nodular corrosion with no notable section loss.
5. The underside of deck exhibited random cracking in isolated deck plank members.
6. At the west end of the South Abutment, between Beams 1 and 2 and half the way to Beam 3, there was a cavity in the abutment backwall just below the steel beam seat channel. Overall, cavity due to apparent section loss was 5 feet long horizontally and a maximum of 6 inches high vertically with a maximum penetration back into the wall of approximately 2 feet. In this area, the seat channel appears to be sagging down somewhat with a corresponding drop to the southwest corner of the bridge deck.
7. A moderate accumulation of 1 foot diameter and smaller timber debris was observed extending from the channel bottom to 1 foot above the waterline at Beams 4 and 5 along the North Abutment.
8. A moderate accumulation of 6 inch diameter and smaller timber debris was observed extending from the channel bottom to the waterline all along the South Abutment.

GENERAL NOTES:

1. The North and South Abutments were inspected underwater.
2. At the time of inspection, on October 4, 2012, the waterline was located approximately 0.7 feet below the bottom of the beam at the southwest corner of the bridge. No bridge plans were available, so the reference point was taken to be at Elevation 100 feet. This corresponds to the assumed waterline elevation of 99.3 feet.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to north and south fascias at 1/4 point intervals.

Legend

-5.5	Sounding Depth (10/4/12)
-0.4	Sounding Depth (10/25/07)
	Timber Debris

Note

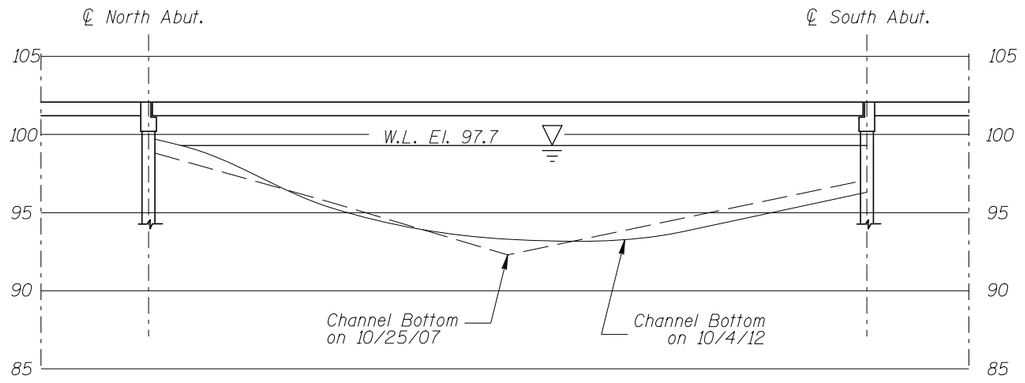
All soundings based on 2012 waterline location

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

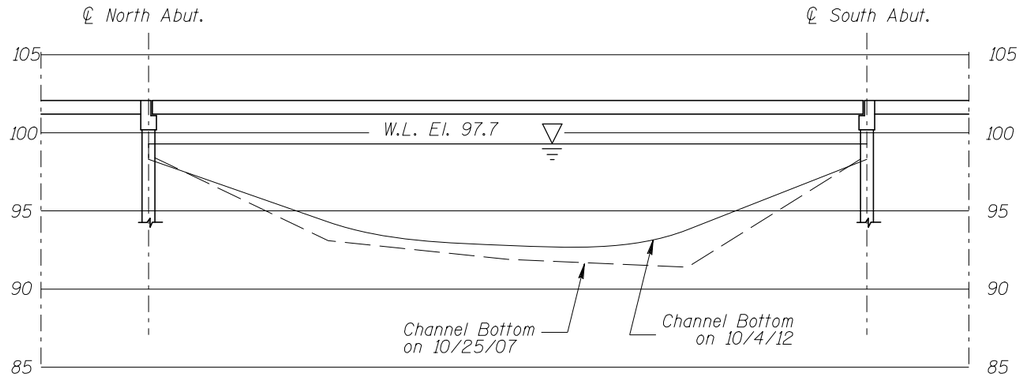
STRUCTURE NO. L4665
TWP 48 OVER THE SOUTH FORK RIVER
FILLMORE COUNTY, CITY OF SHELVIN

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: JAN., 2013
Checked By: LJ		Scale: NTS
Code: 7423L4665		Figure No.: 1



DOWNSTREAM FASCIA PROFILE



UPSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

MINNESOTA
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UNDERWATER BRIDGE INSPECTION

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UPSTREAM AND DOWNSTREAM
FASCIA PROFILES

Drawn By: MBP	COLLINS ENGINEERS 123 North Wacker Drive Suite 900 Chicago, Il. 60606 (312) 704-9300 www.collinsengr.com	Date: JAN., 2013
Checked By: LJ		Scale: 1"=10'
Code: 7423L4665		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: October 4, 2012

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

BRIDGE NO: L4665 WEATHER: Sunny, 50°F

WATERWAY CROSSED: South Fork Root River

DIVING OPERATION: X SCUBA _____ SURFACE SUPPLIED AIR

_____ OTHER _____

PERSONNEL: Marc B. Parker, Breanne M. Stromberg

EQUIPMENT: Commercial Scuba, Probe Rod, Lead Line, Sounding Pole, Scraper, Camera

TIME IN WATER: 1:15 P.M.

TIME OUT OF WATER: 1:45 P.M.

WATERWAY DATA: VELOCITY 0.5 ft/sec

VISIBILITY 3.0 feet

DEPTH 3.0 feet maximum at South Abutment

ELEMENTS INSPECTED: North and South Abutments

REMARKS: Overall, the North and South Abutments, were found to generally be in satisfactory to fair condition with some defects of structural significance. A heavy accumulation of timber debris was observed under the bridge span, at the upstream fascia of the bridge, and about 10 to 15 feet upstream of the bridge and each abutment. The concrete of the abutments was rough and irregular with scaling that had up to 1 inch of maximum penetration. In the west of the South Abutment there was a 5 foot long (horizontally) cavity in the backwall. The cavity (apparent section loss) was up to 6 inches high with up to 2 feet of penetration, and appeared to be allowing some minor deck displacement at the southwest corner of the bridge. The steel beams of the superstructure showed mostly light surface corrosion with no notable loss of section. The underside of the deck was in satisfactory condition with random cracking in isolated timber deck plank members.

FURTHER ACTION NEEDED: _____ YES ___X___ NO

Remove the heavy accumulation of timber debris, which is significantly restricting the channel at the bridge and has the potential to exert considerable lateral load on the bridge superstructure.

The cavity in the South Abutment backwall should be filled with a suitable repair material to inhibit further section loss and to restore the abutment wall section and the bridge superstructure support.

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. L4665
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E.
WATERWAY CROSSED South Fork Root River

INSPECTION DATE October 4, 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.		MAXIMUM DEPTH OF WATER	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
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	North Abutment	1.0’	N	6	N	9	N	6	8	N	N	4	4	6	6	N	N	N	N
	South Abutment	3.0’	N	5	N	6	N	5	8	N	N	4	4	5	6	N	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.