

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 70002

CSAH 101

OVER

THE MINNESOTA RIVER

METRO DISTRICT - SCOTT COUNTY



SEPTEMBER 14, 2012

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

AND

WSB & ASSOCIATES, INC.

JOB NO. 2107

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 70002, Piers 3, 4 and 5, were found to be in good condition with no structurally significant defects observed. Several vertical hairline cracks were observed on all piers. Very heavy accumulations of timber debris were observed at Piers 3 and 4. Comparison of water depth soundings with the data from the previous underwater inspection indicates apparent streambed degradation, possibly caused due to the heavy timber debris accumulation affecting the channel flow.

INSPECTION FINDINGS:

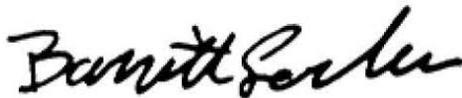
- (A) Several random vertical cracks with efflorescence were observed extending from top of the ledge in the pier shaft to the channel bottom. Typically there were two cracks on each pier located near the third points of the shaft.
- (B) A very heavy accumulation of timber debris, consisting of mixed size drift pieces up to 2.5 feet in diameter, was observed extending across the upstream nose and along both faces of Pier 3. The debris extended up to 50 feet off the pier nose and face and onto the south embankment.
- (C) A moderate accumulation of timber debris was observed from the upstream nose to the upstream quarter points on both sides of Pier 4.
- (D) A scour depression 5 feet in radius by 2 feet deep was observed at the upstream end of Pier 4.

RECOMMENDATIONS:

- (A) Remove the timber debris at Piers 3 and 4. The current extent of debris can adversely affect the scour conditions at the bridge and creates a potential for significant lateral forces exerted on the substructure.

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

Inspection Team Leader:
WSB and Associates



Barritt Lovelace
Registered Professional Engineer
Bridge Safety Inspection Team Leader

Respectfully submitted,

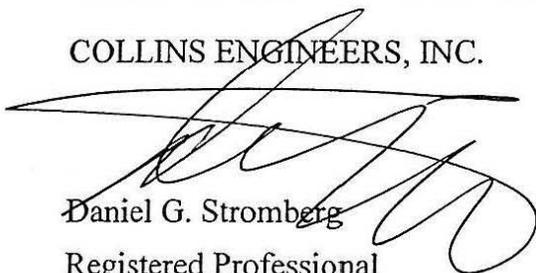
PROFESSIONAL ENGINEER

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: 70002

Feature Crossed: Minnesota River

Feature Carried: CSAH No. 101

Location: Metro District - Scott County

Bridge Description: The superstructure is a seven span, multiple concrete girder bridge. The superstructure is supported by two reinforced concrete abutments and six reinforced concrete piers. The piers are numbered 1 through 6 starting from the south end of the bridge.

2. INSPECTION DATA

Professional Engineer/Team Leader: Barritt Lovelace, P.E.

Dive Team: Kasey Yoder (WSB), Lukas Janulis (Collins)

Date: September 14, 2012

Weather Conditions: Sunny, 60° F

Underwater Visibility: 0.5 feet

Waterway Velocity: 1.0 ft/s

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 3, 4 and 5.

General Shape: All piers consist of oblong rectangular concrete shafts with rounded ends that rest on rectangular footings/seals founded on steel H-piles.

Maximum Water Depth at Substructure Inspected: Approximately 13.8 feet.

4. WATERLINE DATUM

Water Level Reference: The top of ledge in shaft at the downstream end of Pier 4.

Water Surface: The waterline was approximately 8.6 feet below reference.
Waterline elevation = 686.9.

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

Item 60: Substructure: Code 7

Item 61: Channel and Channel Protection: Code 5

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

Item 113: Scour Critical Bridges: Code N/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	168	LF	168				
985	Slopes & Slope Protection	1	EA	1				



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



Photograph 2. View of Pier 3, Looking Northwest



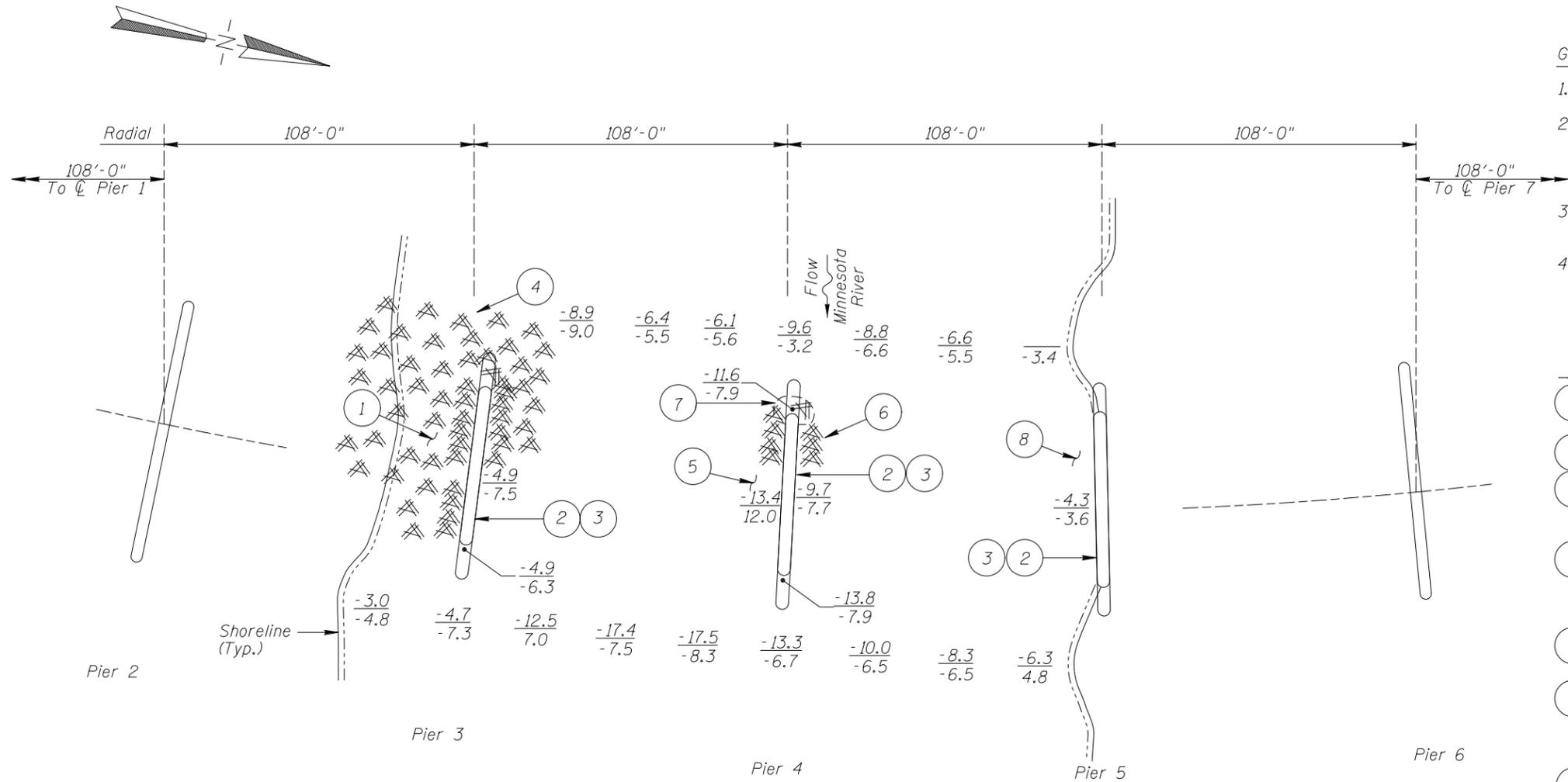
Photograph 3. View of Pier 4 and Timber Debris, Looking North.



Photograph 4. View of Pier 5, Looking North.



Photograph 5. View of Timber Debris at Pier 3, Looking Northwest.



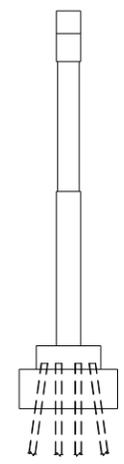
SOUNDING PLAN

GENERAL NOTES:

1. Piers 3, 4, and 5 were inspected underwater.
2. At the time of inspection on September 14, 2012, the waterline was located approximately 8.6 feet below top of ledge in shaft at the downstream end of Pier 4. This corresponds with a waterline elevation of 686.9 feet based on design drawings.
3. Soundings indicate the water depth at the time of the inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

INSPECTION NOTES:

- 1 The channel bottom at Pier 3 consisted of gravel with silt with up to 1 foot of probe rod penetration.
- 2 The concrete was smooth and sound at all of the piers.
- 3 Random vertical cracks with efflorescence were observed from the top of the shaft ledge to the channel bottom. There were typically two cracks on each pier located near the third points with 1/8 inch maximum width.
- 4 A very heavy accumulation of timber debris consisting of mixed sized drift pieces up to 2.5 feet in diameter, was observed extending across the upstream nose and along both faces of Pier 3. The debris extended up to 50 feet off the pier nose and face and onto the south embankment.
- 5 The channel bottom of Pier 4 consisted of silt, gravel, and clay with up to 6 inches of penetration.
- 6 A moderate accumulation of timber debris consisting of 12 inch diameter and smaller logs and branches was observed from the upstream nose to the upstream quarter points on both sides of Pier 4, extending from the channel bottom up approx. 5 feet.
- 7 A scour depression 5 feet in radius by 2 feet deep was observed at the upstream end of Pier 4.
- 8 The channel bottom of Pier 5 consisted of clay and silt with up to 1.5 feet of probe rod penetration and also stones 6 inches in diameter located at the upstream end.



TYPICAL END VIEW OF PIERS 3 THRU 5

Legend

- 7.0 Sounding Depth (9/14/12)
- 7.0 Sounding Depth (11/19/07)
- Timber Debris
- Scour Depression

WSB
 & Associates, Inc.
 701 Xenia Avenue South, Suite 300
 Minneapolis, MN 55416
 www.wsbeng.com
 763-541-4800 • Fax 763-541-1700
 INFRASTRUCTURE • ENGINEERING • PLANNING • CONSTRUCTION

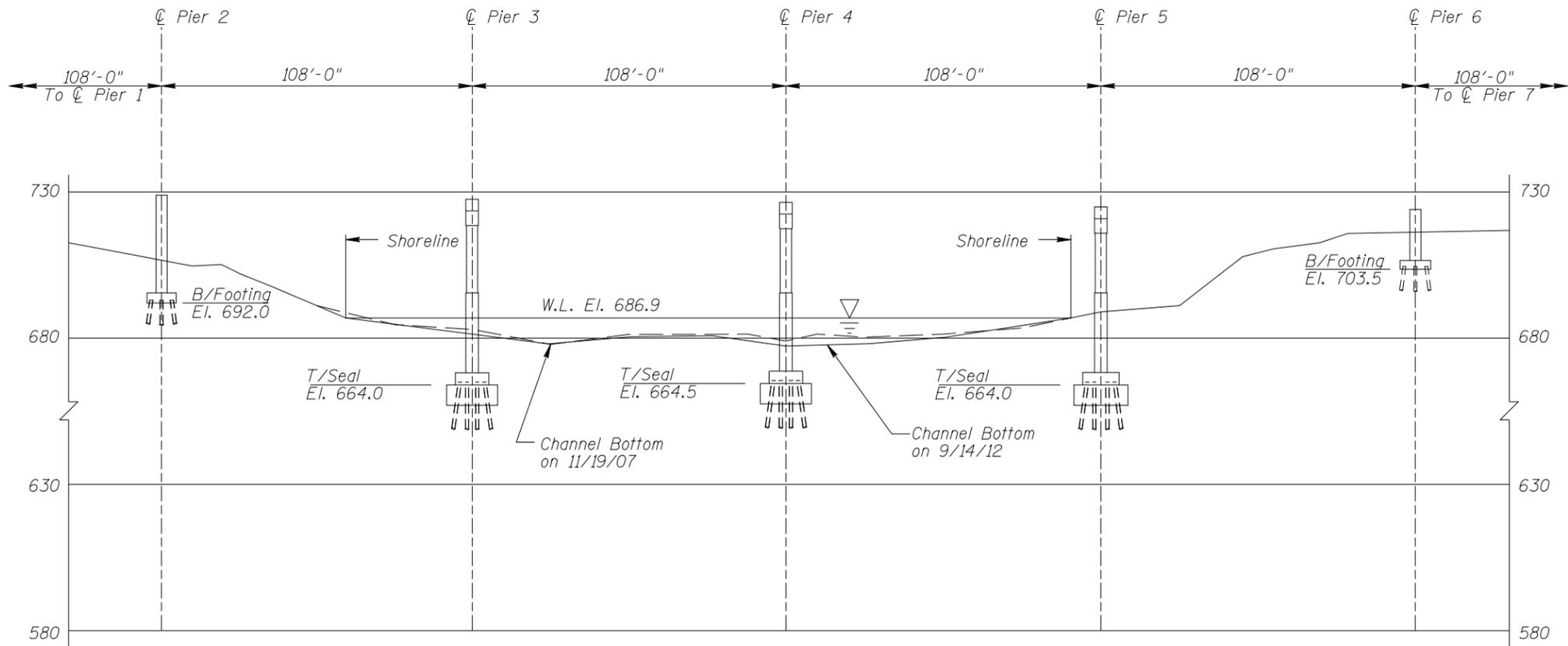
**MINNESOTA
 DEPARTMENT OF TRANSPORTATION
 UNDERWATER BRIDGE INSPECTION**

STRUCTURE NO. 70002
 OVER THE MINNESOTA RIVER
 METRO DISTRICT, SCOTT COUNTY,
 CITY OF SHAKOPEE

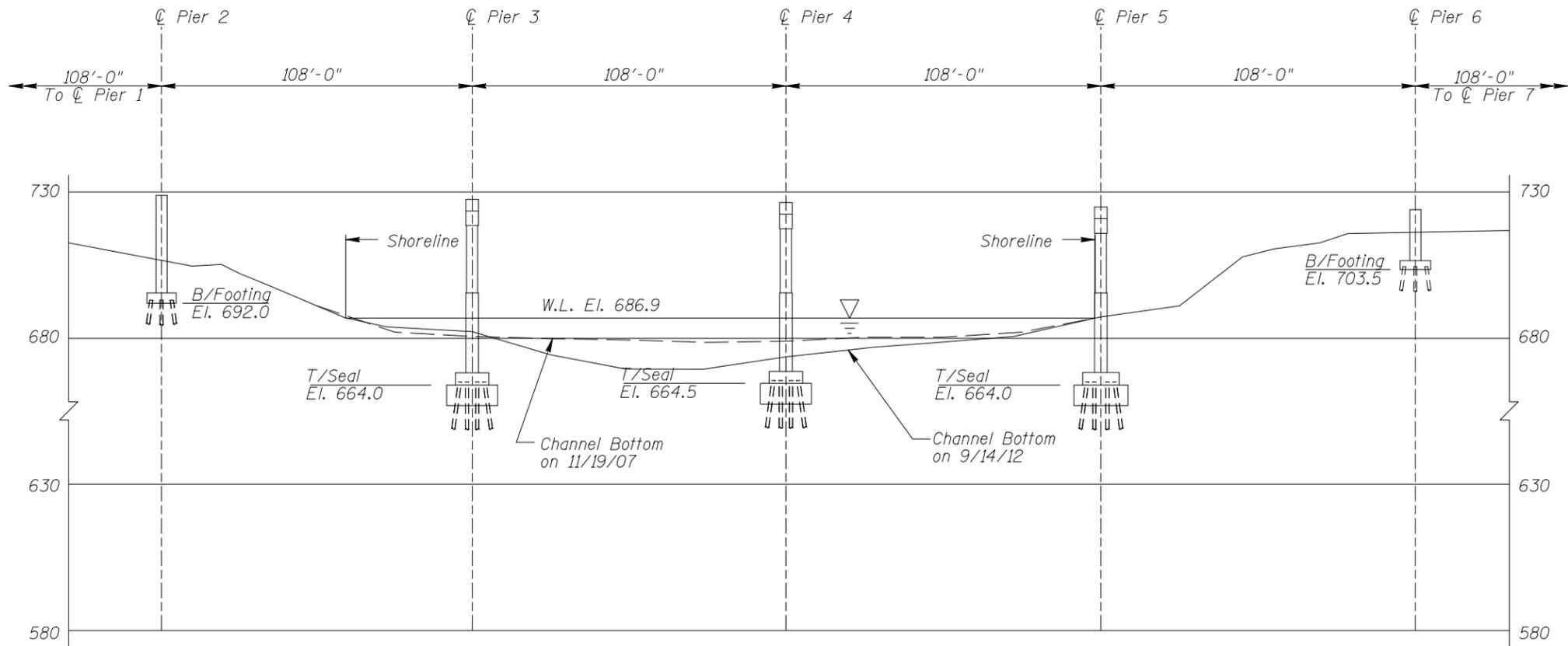
INSPECTION AND SOUNDING PLAN

Drawn By: BJR	COLLINS ENGINEERS	Date: SEP. 2012
Checked By: BRL		Scale: NTS
Code: 522170002		Figure No.: I

123 North Wacker Drive
 Suite 300
 Chicago, IL 60606
 (312) 704-9300
 www.collinsengr.com



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

WSB
 & Associates, Inc.
 701 Xenia Avenue South, Suite 300
 Minneapolis, MN 55416
 www.wsbeng.com
 763-541-4800 • Fax 763-541-1700
 INFRASTRUCTURE • ENGINEERING • PLANNING • CONSTRUCTION

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 70002
 OVER THE MINNESOTA RIVER
 METRO DISTRICT, SCOTT COUNTY,
 CITY OF SHAKOPEE
UPSTREAM AND DOWNSTREAM
FASCIA PROFILES

Drawn By: BJR	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: SEP. 2012
Checked By: BRL		Scale: 1"=50'
Code: 522140508		Figure No.: 2

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

INSPECTORS: WSB & Associates and Collins Engineers DATE: September 14, 2012

ON-SITE TEAM LEADER: Barritt Lovelace, P.E.

BRIDGE NO: 70002 WEATHER: Sunny, 60°F

WATERWAY CROSSED: Minnesota River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Kasey Yoder (WSB), Lukas Janulis (Collins)

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

TIME IN WATER: 10:30a.m.

TIME OUT OF WATER: 11:15 a.m.

WATERWAY DATA: VELOCITY 1.0 ft/sec

VISIBILITY 0.5 feet

DEPTH 13.8 feet maximum at Pier 4

ELEMENTS INSPECTED: Piers 3, 4 and 5

REMARKS: Overall, the concrete of the piers was smooth and sound. Several random vertical cracks were observed from top of the ledge in the pier shaft to the channel bottom with efflorescence. A very heavy accumulation of timber debris consisting of logs and branches 2.5 feet in diameter and smaller was observed along the south face, around the upstream nose and to near the mid-point on the north face of Pier 3 extending above the waterline. A moderate accumulation of timber debris was observed from the upstream nose to the upstream quarter points on both sides of Pier 4. A scour depression 5 feet in radius by 2 feet deep was observed at the upstream end of Pier 4.

FURTHER ACTION NEEDED: YES NO

Remove the timber debris at Piers 3 and 4.

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. 70002
 INSPECTORS WSB & Associates and Collins Engineers, Inc.
 ON-SITE TEAM LEADER Barritt Lovelace P.E.
 WATERWAY CROSSED Minnesota River

INSPECTION DATE September 14, 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	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
	Pier 3	4.9'	N	7	N	9	N	7	7	8	8	5	5	7	N	N	N	N	N
	Pier 4	13.8'	N	7	N	9	N	7	7	N	N	6	6	7	N	N	N	N	N
	Pier 5	4.3'	N	7	N	9	N	7	7	8	8	N	8	7	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete of the piers was smooth and sound. Several random vertical cracks were observed from top of the ledge in the pier shaft to the channel bottom with efflorescence. A very heavy accumulation of timber debris consisting of logs and branches 2.5 feet in diameter and smaller was observed along the south face, around the upstream nose and to near the mid-point on the north face of Pier 3 extending above the waterline. A moderate accumulation of timber debris was observed from the upstream nose to the upstream quarter points on both sides of Pier 4. A scour depression 5 feet in radius by 2 feet deep was observed at the upstream end of Pier 4.

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.