

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 18509

MSAS NO. 104

OVER THE

MISSISSIPPI RIVER

DISTRICT 3 – CROW WING COUNTY, CITY OF BRAINERD



OCTOBER 24, 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. 18509, Piers 1, 2, and 3, were found to be in good and sound condition below water, with no defects of structural significance. The extent of footing exposure at Pier 2 has increased slightly since the last inspection, but the vertical exposure limits (only 2 inches maximum) were still not overly significant. The channel bottom configuration elsewhere within the channel was comparable to the previous inspection.

INSPECTION FINDINGS:

- (A) The channel bottom material consisted of firm sandy gravel with cobbles and rocks allowing a maximum 2 inches of probe rod penetration.
- (B) A scour depression was observed around the upstream half of Pier 2 with a radius of 8 feet and a depth of up to 2.5 feet. Top of footing was exposed around the upstream half of Pier 2 within the scour depression with maximum vertical exposure of 2 inches along the east face of the pier. Top of footing was rough with 1/4 inch irregularities.
- (C) Riprap 1 to 2 feet in diameter was located at the upstream nose of Piers 1 and 3.
- (D) A light accumulation of timber debris and a truck tire was observed along the upstream half of the east face of Pier 3 extending from the channel bottom up 3 feet and up to 6 feet off the pier face.
- (E) A scour depression was observed at the upstream end of Pier 1 with a radius of 6 feet and a depth up to 2.5 feet.
- (F) Above and below the waterline, the concrete was typically smooth and sound with random areas of minor delaminating, heaviest at downstream nose of Pier 2. In

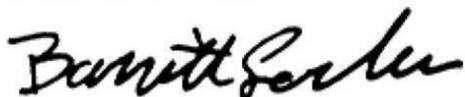
addition, hairline vertical cracks were observed in the webwall in all piers extending from top of webwall to the channel bottom.

- (G) A moderate accumulation of timber debris consisting of 2 foot diameter and smaller trees and branches was observed around the upstream half of Pier 1, extending from the channel bottom to 3 feet above the waterline.

RECOMMENDATIONS:

- (A) Monitor the extent of the footing exposure at Pier 2 during future inspections, and if found to be significantly progressing, then countermeasures may be warranted.
- (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

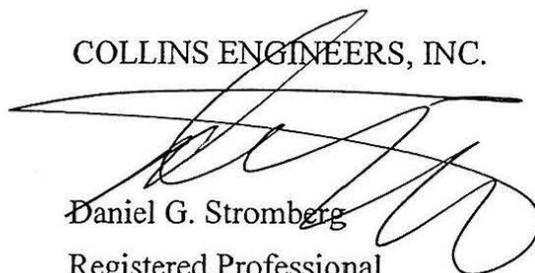
Respectfully submitted,

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: 18509

Feature Crossed: Mississippi River

Feature Carried: MSAS No. 104 – Laurel Street

Location: Crow Wing County, City of Brainerd

Bridge Description: The superstructure consists of four spans of prestressed concrete beams. The superstructure is supported by two reinforced concrete abutments and three reinforced concrete piers. The abutments and piers are founded on steel H-piles. The piers are numbered 1 through 3 starting from the west.

2. INSPECTION DATA

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

Dive Team: Lukas Janulis, P.E., Marc Parker

Date: October 24, 2012

Weather Conditions: Cloudy, 52°F

Underwater Visibility: 4.0 feet

Waterway Velocity: 2.0 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1, 2, and 3

General Shape: The piers each consist of two semi-circular reinforced concrete columns connected with a webwall supported by a rectangular footing founded on steel H-piles.

Maximum Water Depth at Substructure Inspected: Approximately 12.1 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the south end of Pier 2.

Water Surface: The waterline was approximately 56.0 feet below reference
Water Elevation = 1148.3.

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 6

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

Item 113: Scour Critical Bridges: Code I/92

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
205	Concrete Column	6	EA	6				
220	Concrete Footing	1	EA	1				
361	Scour	1	EA	1				
985	Slopes	1	EA		1			



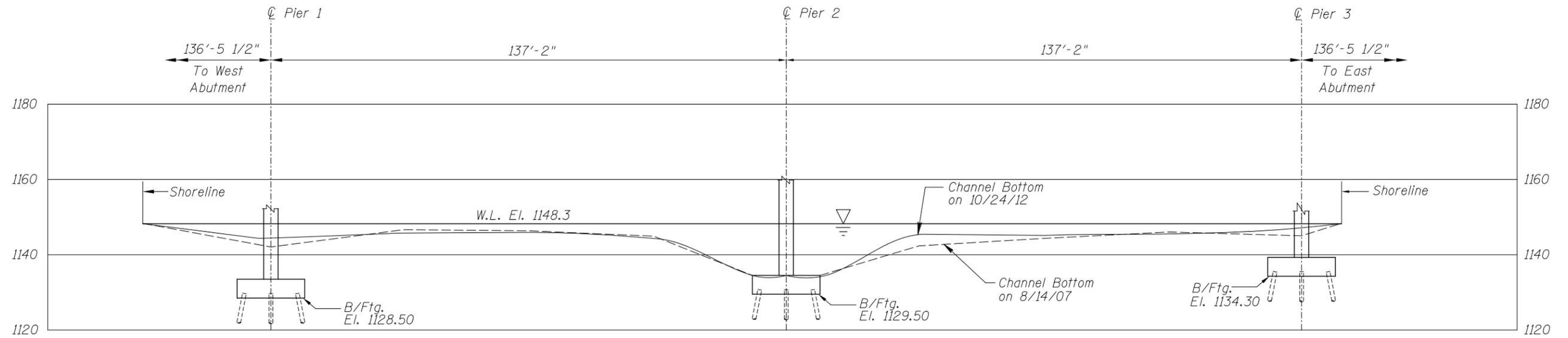
Photograph 1. View of Pier 1, Looking Northwest.



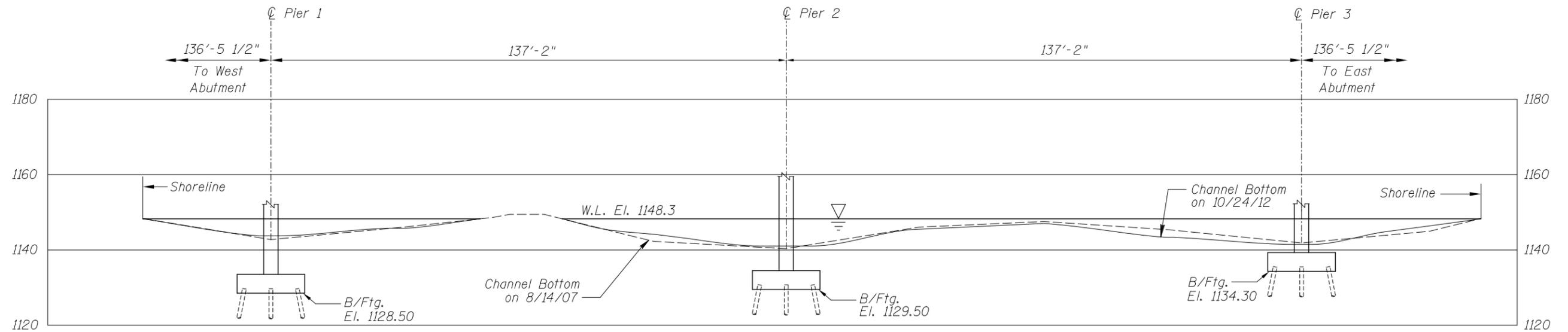
Photograph 2. View of Pier 2, Looking Northwest.



Photograph 3. View of Pier 3, Looking Southeast.



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 18509 OVER THE MISSISSIPPI RIVER DISTRICT 3, CROW WING COUNTY, CITY OF BRAINERD		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: JTF	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: 1"=30'
Code: 742318509		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: October 24, 2012

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

BRIDGE NO: 18509 WEATHER: Cloudy, 52°F

WATERWAY CROSSED: Mississippi River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Lukas Janulis, P.E., Marc Parker

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

TIME IN WATER: 10:30 A.M.

TIME OUT OF WATER: 10:50 A.M.

WATERWAY DATA: VELOCITY 2.0 ft/sec

VISIBILITY 4.0 feet

DEPTH 12.1 feet maximum at Pier 2

ELEMENTS INSPECTED: Piers 1, 2, and 3

REMARKS: Above and below the waterline, the concrete was typically smooth and sound with random areas of delamination/loss of section of the finishing grout. Footing exposure with 2 inches of vertical exposure was observed at the upstream nose of Pier 2. Scour depressions were observed at the upstream end of Piers 1 and 2 with a maximum depth of 2.5 feet. A light accumulation of timber debris was observed along the upstream half of the east face of Pier 3 and a moderate accumulation of timber debris was present around the upstream half of Pier 1, extending from the channel bottom to 3 feet above the waterline.

FURTHER ACTION NEEDED: YES NO

Monitor the extent of footing exposure at Pier 2 during future inspections, and if found to be significantly progressing, then countermeasures may be warranted.

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. 18509
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER. Barritt Lovelace, P.E.
 WATERWAY CROSSED Mississippi River

INSPECTION DATE October 24, 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 1	6.7'	N	7	N	8	N	7	6	7	8	6	6	7	N	N	N	N	N
	Pier 2	12.1'	N	7	7	8	N	7	6	N	N	N	6	7	N	N	N	N	N
	Pier 3	6.8'	N	7	N	8	N	7	7	7	8	7	7	7	N	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.