

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 73540

10TH STREET BRIDGE (MSAS NO. 101)

OVER THE

MISSISSIPPI RIVER

DISTRICT 3 - STEARNS COUNTY, CITY OF ST. CLOUD



OCTOBER 26, 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. 73540, Piers 2, 3, 4 and 5, were found to be in good condition with no defects of structural significance observed. Minor deficiencies observed included, random areas of poor consolidation with ¼ inch maximum penetration. Footing exposure was observed at the upstream end of Piers 4 and 5. The extent of footing exposure was comparable to what was reported during the previous underwater inspection. A light to moderate accumulation of timber debris was observed around the entire perimeter of Piers 2 and 4, and at the upstream end of Pier 3. The channel bottom appeared stable with minor localized scour observed at the upstream end of the piers and no appreciable changes since the previous inspection.

INSPECTION FINDINGS:

- (A) The channel bottom material consisted of sandy gravel and random cobbles allowing a maximum probe rod penetration of 6 inches.
- (B) The channel bottom material consisted of silt allowing a maximum probe rod penetration of 2 feet at the upstream end of Pier 5.
- (C) Footing exposure was observed at the upstream end of Pier 4, extending 8 feet downstream on the east and west sides of the pier with a maximum vertical face exposure of 2.5 feet at the upstream nose.
- (D) Footing exposure was observed at the upstream end of Pier 5, extending 15 feet downstream on both sides of the pier, with a maximum vertical face exposure of 3 feet at the upstream nose.

- (E) A light to moderate accumulation of 8 inch diameter and smaller timber debris was observed around the entire perimeter of Piers 2 and 4 extending from the channel bottom up 6 feet and up to 3 feet off the pier noses and faces.
- (F) Minor scour depressions, typically 5 foot in radius and 2 to 3 feet deep, were observed around the upstream ends of Piers 3 through 5, resulting in footing exposure at Piers 4 and 5.
- (G) The submerged concrete of the piers and exposed footing was in smooth and sound condition with minor random areas of poor consolidation with ¼ inch maximum penetration.
- (H) A light accumulation of timber debris, consisting of up to 8 inch diameter branches, was observed on the upstream nose of Pier 3 from the channel bottom up 2 feet. The debris was approximately 8 feet long (E/W) by 3 feet wide (N/S).

RECOMMENDATIONS:

- (A) Scour screening assessment indicates stable rating and the extent of foundation exposure has not increased since the previous inspection, therefore, presently it is only recommended to monitor the extent of scour and footing exposure during future inspections.
- (B) Consider removal of the accumulated timber debris around the piers during routine bridge maintenance.
- (C) 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,

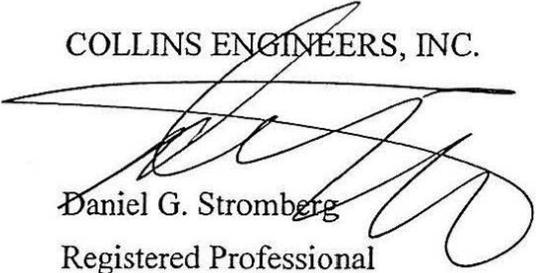
PROFESSIONAL ENGINEER

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: 73540

Feature Crossed: Mississippi River

Feature Carried: 10th Street Bridge (MSAS No. 101)

Location: District 3 - Stearns County, City of St. Cloud

Bridge Description: The superstructure consists of seven spans of multiple prestressed concrete beams. The superstructure is supported by two reinforced concrete abutments and six reinforced concrete piers. The piers are numbered 1 through 6 starting from the west end of the bridge. The footings of all the substructure units are supported on steel H-piles.

2. INSPECTION DATA

Professional Engineer/Team Leader: Barritt R. Lovelace, P.E. (WSB)

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

Date: October 26, 2012

Weather Conditions: Cloudy, 40°F

Underwater Visibility: 2.0 feet

Waterway Velocity: 0.5 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 2 through 5.

General Shape: Each of the piers consists of two flared columns which extend down to form a single oblong rectangular shaft, which is supported by a rectangular footing/seal combination founded on steel H-piles.

Maximum Water Depth at Substructure Inspected: Approximately 18.5 feet.

4. WATERLINE DATUM

Water Level Reference: The bottom of the pier cap at the south end of Pier 5.

Water Surface: The waterline was approximately 28.7 feet below reference.
Waterline Elevation = 980.4.

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 N/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	Reinforced Concrete Column	8	EA	8				
361	Scour Smart Flag	1	EA	1				
985	Slopes	1	EA	1				



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



Photograph 2. View of Pier 2, Looking Southeast.



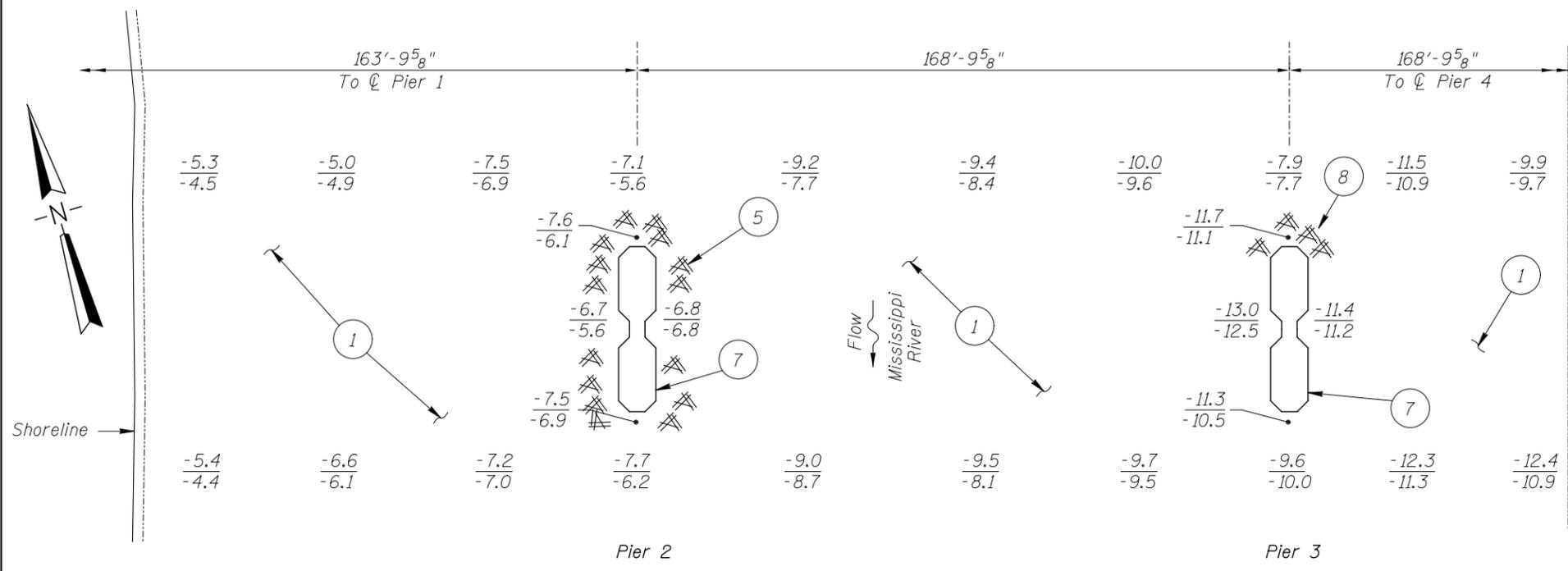
Photograph 3. View of Pier 3, Looking Southeast.



Photograph 4. View of Pier 4, Looking Southeast.



Photograph 5. View of Pier 5, Looking Southeast.



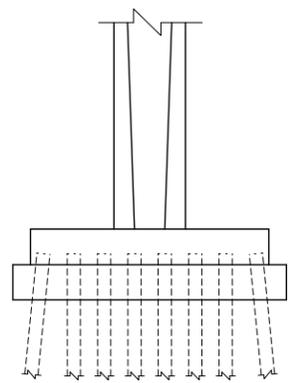
SOUNDING PLAN

INSPECTION NOTES:

- ① The channel bottom material consisted of sandy gravel and random cobbles allowing a maximum probe rod penetration of 6 inches.
- ② The channel bottom material consisted of silt allowing a maximum probe rod penetration of 2 feet at the upstream end of Pier 5.
- ③ Footing exposure was observed at the upstream end of Pier 4, extending approximately 8 feet downstream on the east and west sides of the pier with a maximum vertical face exposure of 2.5 feet at the upstream nose.
- ④ Footing exposure was observed at the upstream end of Pier 5, extending approximately 15 feet downstream on both sides of the pier, with a maximum vertical face exposure of 3 feet at the upstream nose.
- ⑤ A light accumulation of 8-inch-diameter and smaller timber debris was observed around the entire perimeter of Piers 2 and 4 extending from the channel bottom up 6 feet and up to 3 feet off the pier noses and faces.
- ⑥ Minor scour depressions, typically 5 feet in radius and 2 to 3 feet deep, were observed around the upstream ends of Piers 3, 4, and 5, resulting in footing exposure at Piers 4 and 5.
- ⑦ The submerged concrete of the piers and exposed footings was in smooth and sound condition with minor random areas of poor consolidation with 1/4 inch maximum penetration.
- ⑧ A light accumulation of timber debris, consisting of up to 8-inch-diameter branches, was observed at the upstream nose of Pier 3 from the channel bottom up 2 feet. The debris was approximately 8 feet long (E/W) by 3 feet wide (N/S).

GENERAL NOTES:

- 1. Piers 2 through 5 were inspected underwater.
- 2. At the time of inspection on October 26, 2012, the waterline was located approximately 28.7 feet below the bottom of the pier cap at the downstream end of Pier 5. This corresponds to a waterline elevation of 980.4.
- 3. Soundings indicate the water depth at the time of inspection and are measured in feet.
- 4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.



TYPICAL END VIEW OF PIERS

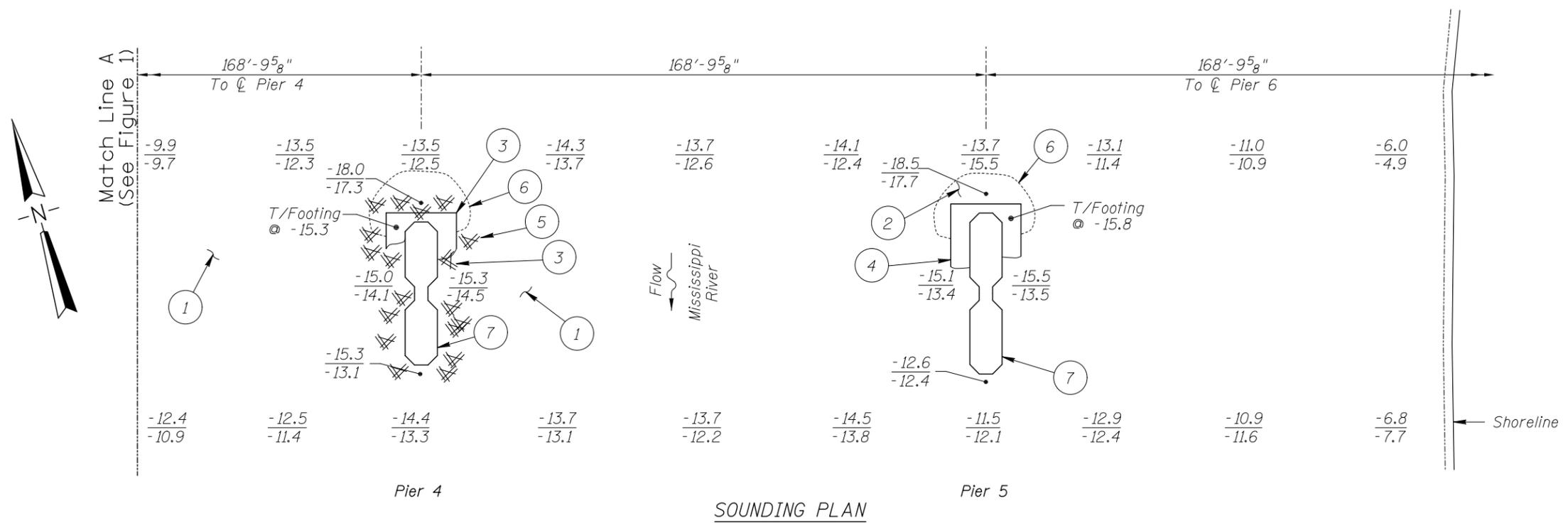
Legend

- 7.0 Sounding Depth (10/26/12)
- 6.8 Sounding Depth (8/15/07)
- Timber Debris
- Scour Depression

Note:

All soundings based on 2012 waterline location.

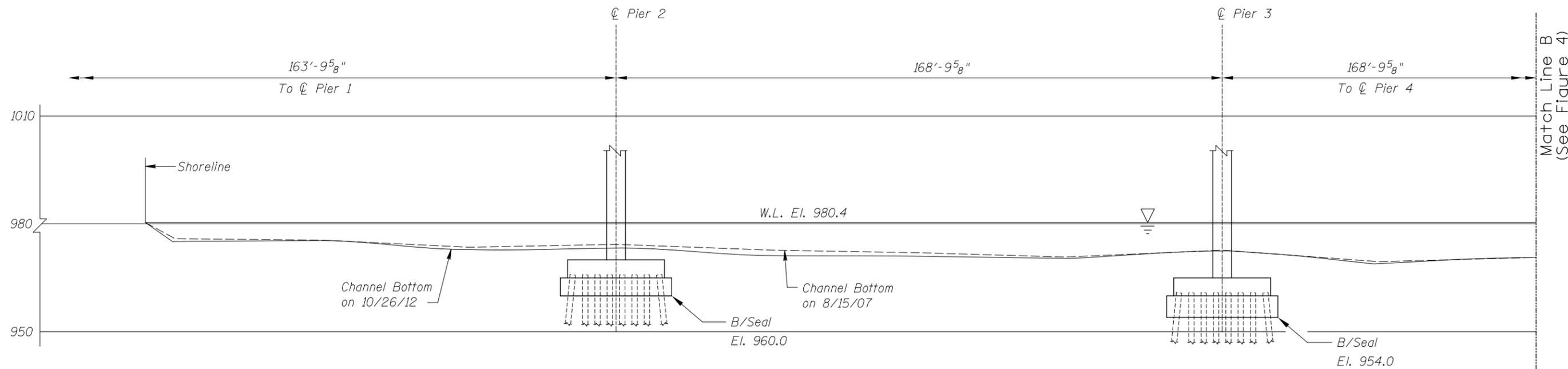
MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 73540 OVER THE MISSISSIPPI RIVER DISTRICT 3, STEARNS COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: JTF	COLLINS ENGINEERS	Date: OCTOBER, 2012
Checked By: LJ	<small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Scale: NTS
Code: 742373540		Figure No.: I



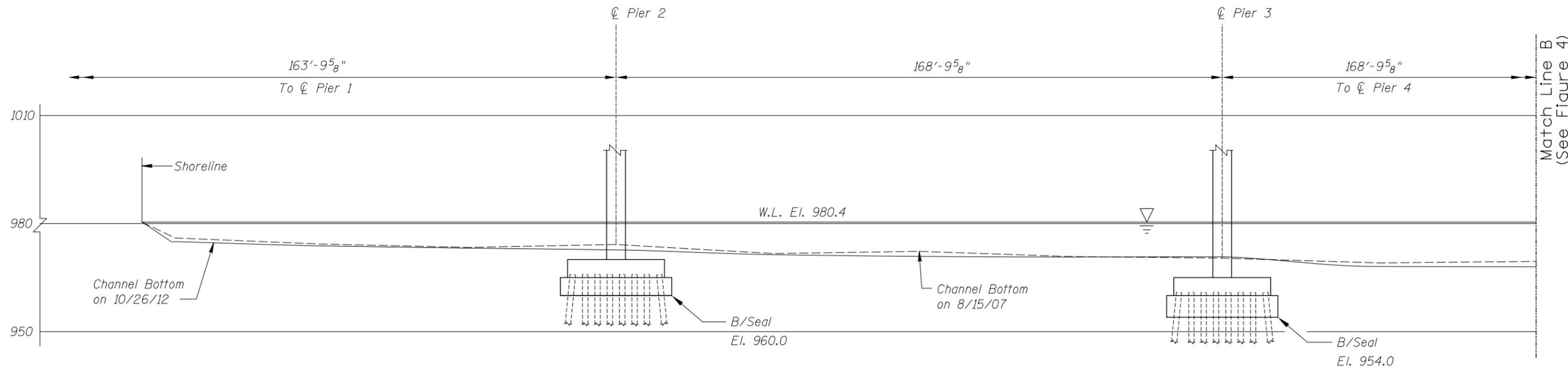
Notes:
 Refer to Figure 1 for General Notes.
 Refer to Figure 1 for Inspection Notes.

Legend
 -7.0 Sounding Depth (10/26/12)
 -6.8 Sounding Depth (8/15/07)
 Timber Debris
 Scour Depression
Note:
 All soundings based on 2012 waterline location.

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UPSTREAM FASCIA PROFILE

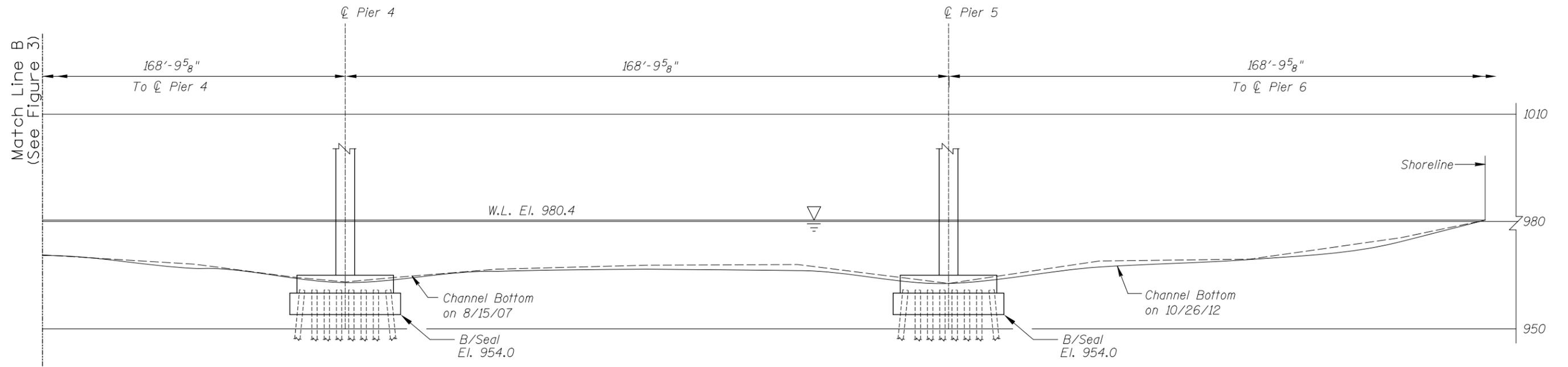


DOWNSTREAM FASCIA PROFILE

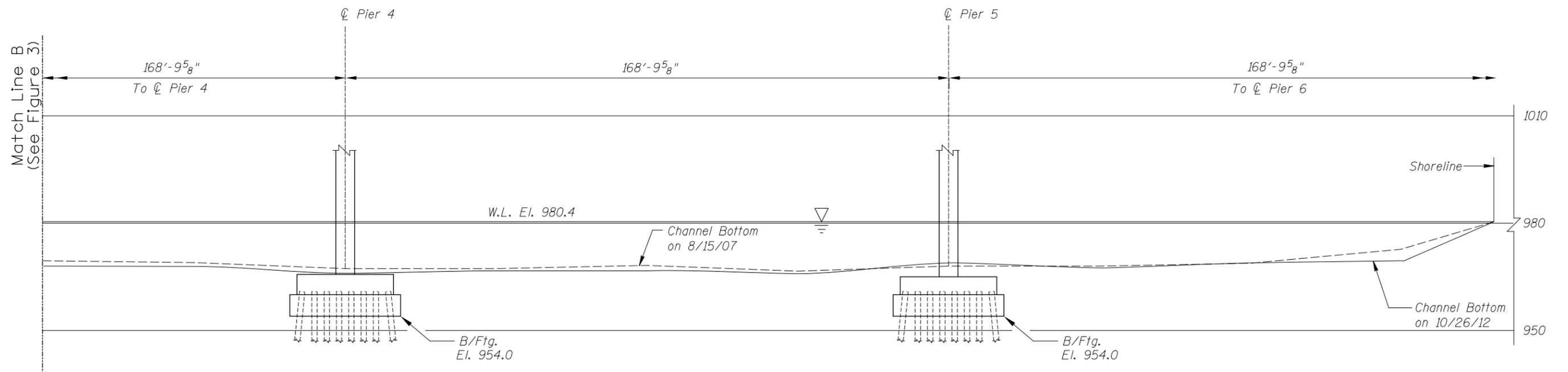
Notes:
 Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 73540 OVER THE MISSISSIPPI RIVER DISTRICT 3, STEARNS COUNTY UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: JTF	COLLINS ENGINEERS	Date: OCTOBER, 2012
Checked By: LJ		Scale: NTS
Code: 742373540		Figure No.: 3

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UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Notes:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 73540 OVER THE MISSISSIPPI RIVER DISTRICT 3, STEARNS COUNTY UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: JTF	COLLINS ENGINEERS	Date: OCTOBER, 2012
Checked By: LJ		Scale: NTS
Code: 742373540		Figure No.: 4

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

INSPECTORS: Collins Engineers, Inc. DATE: October 26, 2012

ON-SITE TEAM LEADER: Barritt R. Lovelace, P.E. (WSB)

BRIDGE NO: 73540 WEATHER: Cloudy, 40°F

WATERWAY CROSSED: Mississippi River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

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

EQUIPMENT: Commercial Scuba, U/W Light, Scraper, Fathometer, 14 ft Boat, Probe Rod, Camera.

TIME IN WATER: 14:15

TIME OUT OF WATER: 14:45

WATERWAY DATA: VELOCITY 0.5 ft/sec

VISIBILITY 2.0 feet

DEPTH 18.5 feet maximum at Pier 5.

ELEMENTS INSPECTED: Piers 2, 3, 4, and 5

REMARKS: Overall, the piers were found to be in good condition with no defects of structural significance observed. Minor defects observed included, random areas of poor consolidation with 1/4 inch maximum penetration. Footing exposure was observed at the upstream end of Piers 4 and 5 with up to 3 feet of vertical face exposure. A light to moderate accumulation of timber debris was observed around the entire perimeter of Piers 2 and 4, and at the upstream end of Pier 3. The channel bottom appeared stable with minor localized scour observed at the upstream end of the piers and no appreciable changes since the previous report.

FURTHER ACTION NEEDED: YES NO

Scour screening assessment indicates stable rating, therefore, only monitor extent of scour and footing exposure during future inspections.

Consider removal of the timber debris accumulation during routine bridge maintenance.

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. 73540
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Barritt R. Lovelace, P.E. (WSB)
 WATERWAY CROSSED Mississippi River

INSPECTION DATE October 26, 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 2	7.6'	N	7	N	8	N	7	N	N	N	6	6	7	N	N	7	N	N
	Pier 3	13.0'	N	7	N	8	N	7	7	N	N	7	7	7	N	N	7	N	N
	Pier 4	18.0'	N	7	7	8	N	7	6	N	N	6	6	7	N	N	7	N	N
	Pier 5	18.5'	N	7	7	8	N	7	6	N	N	N	6	7	N	N	7	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the piers were found to be in good condition with no defects of structural significance observed. Minor defects observed included, random areas of poor consolidation with ¼ inch maximum penetration. Footing exposure was observed at the upstream end of Piers 4 and 5 with up to 3 feet of vertical face exposure. A light to moderate accumulation of timber debris was observed around the entire perimeter of Piers 2 and 4, and at the upstream end of Pier 3. The channel bottom appeared stable with minor localized scour observed at the upstream end of the piers and no appreciable changes since the previous report.

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.