

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 18505

MSAS NO. 126 (COLLEGE DR)

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. 18505, Piers 1 and 2, were found to be in good condition with no defects of structural significance observed. The concrete shafts and exposed footing were typically smooth and sound with light scaling present above the waterline. The channel bottom consisting of sand and gravel around the substructure units and moderate accumulation of timber debris was observed at the upstream noses of both piers. Footing exposure was observed at Pier 1 with up to 2 feet of vertical face exposure.

INSPECTION FINDINGS:

- (A) Footing exposure was observed at the upstream nose, along the upstream quarter of the pier on west side, and along the entire east side of Pier 1 with up to 2 feet of vertical face exposure.
- (B) A moderate accumulation of timber debris, with logs and branches up to 12 inches in diameter, was observed from the channel bottom up 3 feet located around the upstream nose of both piers. The debris extended 5 to 10 feet off the pier faces.
- (C) The channel bottom material consisted of sand and gravel with cobbles. Overall, probe rod penetration was negligible.
- (D) Below the waterline the concrete of the pier shafts and exposed footing were typically smooth and sound with random minor areas of poor consolidation with penetration up to 1/4 inch.
- (E) Scaling was observed around the entire pier shaft of both piers typically extending from the waterline up 4 feet with a maximum penetration of 1/4 inch. The scaling was heaviest at the upstream nose where it extended up to 10 feet above the waterline.

RECOMMENDATIONS:

- (A) Monitor the extent of the timber debris accumulation at both piers, and if found to be increasing, consider removing during routine maintenance operations.
- (B) Monitor the footing exposure at Pier 1 during future underwater inspections, and if found to be increasing, further action may be required at that time.
- (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,

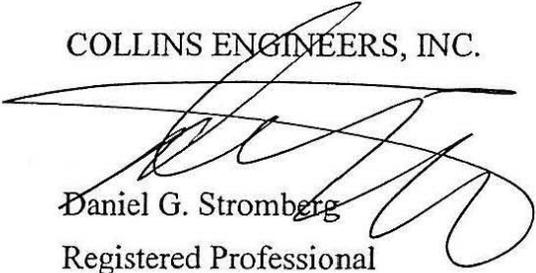
PROFESSIONAL ENGINEER

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
OFFICE OF BRIDGES AND STRUCTURES

DAILY DIVING REPORT

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

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

BRIDGE NO: 18505 WEATHER: Cloudy, 50° F

WATERWAY CROSSED: Mississippi River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

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

EQUIPMENT: Commercial Scuba, U/W Light, Scraper, Lead Line, Sounding Pole,
Probe Rod, Camera, 21 foot Boat.

TIME IN WATER: 9:00 A.M.

TIME OUT OF WATER: 9:40 A.M.

WATERWAY DATA: VELOCITY 2.0 ft/sec

VISIBILITY 4.0 feet

DEPTH 11.2 feet maximum at Pier 1

ELEMENTS INSPECTED: Piers 1 and 2

EMARKS: Overall, Piers 1 and 2 were found to be in good condition with no defects of structural significance observed. The concrete shafts and footing were typically smooth and sound. The channel bottom consisting of sand and gravel around the substructure units and was presently stable. Footing exposure was observed at Pier 1 with up to 2 feet of vertical face exposure present.

FURTHER ACTION NEEDED: YES NO

Monitor the extent of the timber debris accumulation at both piers, and if found to be increasing, consider removing during routine maintenance operations.

Monitor the footing exposure at Pier 1 during future underwater inspections, and if found to be increasing, further action may be required at that time.

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

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 18505

Feature Crossed: Mississippi River

Feature Carried: MSAS No. 126 (College Drive)

Location: District 3 – Crow Wing County, City of Brainerd

Bridge Description: The bridge superstructure consists of three spans of prestressed concrete beams. The superstructure is supported by two reinforced concrete abutments and two reinforced concrete piers. The abutments and piers are founded on steel H-piles. The piers are numbered 1 and 2 starting from the west end of the bridge.

2. INSPECTION DATA

Professional Engineer Diver: Barritt R. Lovelace, P.E. (WSB)

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

Date: October 24, 2012

Weather Conditions: Cloudy 50° F

Underwater Visibility: 4.0 Feet

Waterway Velocity: 2.0 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2

General Shape: Piers consist of oblong rectangular shafts with rounded ends, supported by rectangular footings founded on steel H-piles.

Maximum Water Depth at Substructure Inspected: Approximately 11.2 feet.

4. WATERLINE DATUM

Water Level Reference: Top of the pier cap at the south end of Pier 2.

Water Surface: The waterline was approximately 21.9 feet below the reference.

Waterline Elevation 1148.9

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 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
210	Reinforced Concrete Pier Wall	180	LF	180				
361	Scour Smart Flag	1	EA	1				
220	Reinforced Concrete Footing	1	EA	1				
985	Slopes and Slope Protection	1	EA	1				



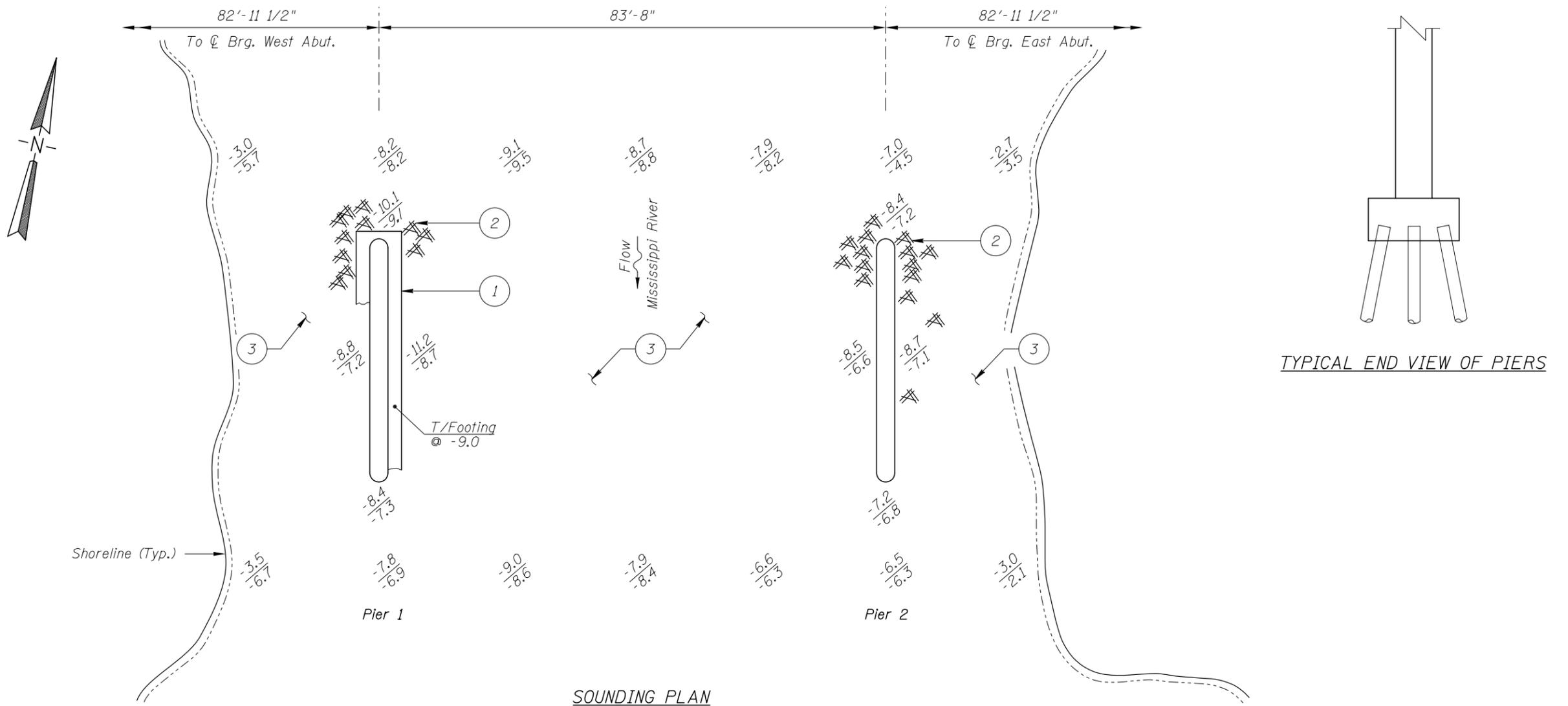
Photograph 1. Overall View of the Structure, Looking South.



Photograph 2. View of Pier 1 and West Abutment, Looking Southwest.



Photograph 3. View of Pier 2 and East Abutment, Looking Southeast.



GENERAL NOTES:

1. Piers 1 and 2 were inspected at this bridge.
2. At the time of inspection on October 24, 2012, the waterline was located 21.9 feet below the top of pier cap at the downstream end of Pier 2. This corresponds to a waterline elevation of 1148.9 feet based on design drawings.
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.

INSPECTION NOTES:

- | | |
|--|---|
| <p>① Footing exposure was observed at the upstream nose, along the upstream quarter on west side, and along the entire east side of Pier 1 with up to 2 feet of vertical face exposure.</p> <p>② A moderate accumulation of timber debris, with logs and branches up to 12 inches in diameter, was observed from the channel bottom up three feet around the upstream nose of both piers. The debris extended approximately 5 to 10 feet off the pier faces.</p> <p>③ The channel bottom material consisted of sand and gravel with cobbles. Probe rod penetration was negligible.</p> | <p>④ Above and below the waterline the concrete at pier shafts and footing (where exposed) was typically smooth and sound with random minor areas of poor consolidation with penetration up to 1/4 inch.</p> <p>⑤ Scaling was observed around the entire pier shaft of both piers typically extending from the waterline up 4 feet with maximum penetration of 1/4 inch. The scaling was heaviest at the upstream nose where it extended up to 10 feet above the waterline.</p> |
|--|---|

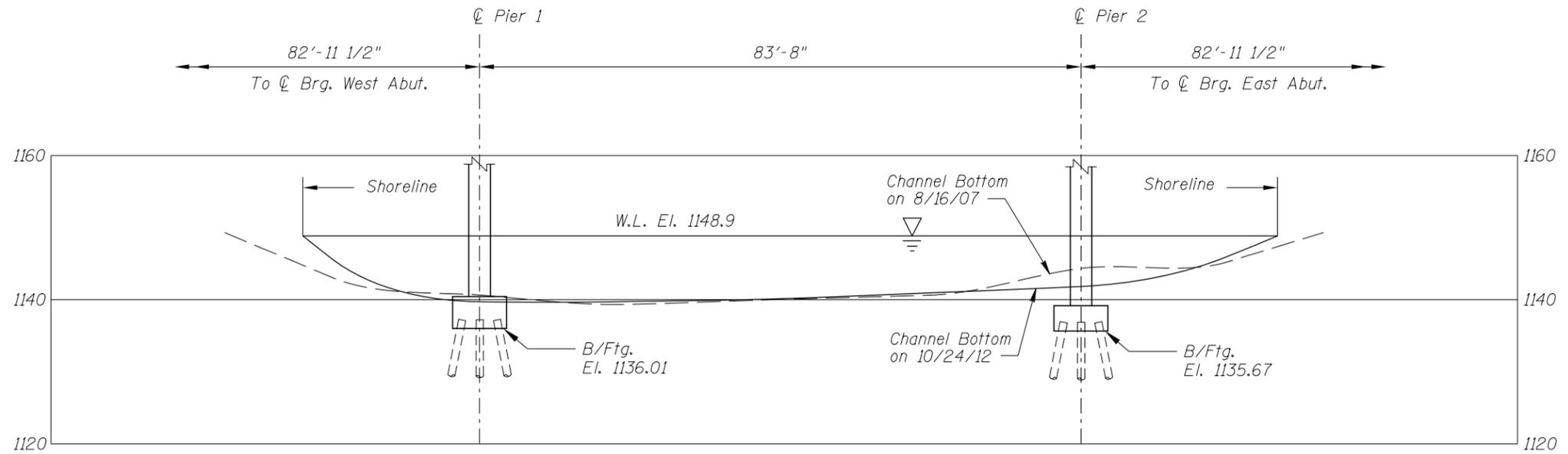
Legend

- 3.0 Sounding Depth (10/24/12)
- 3.0 Sounding Depth (8/16/07)

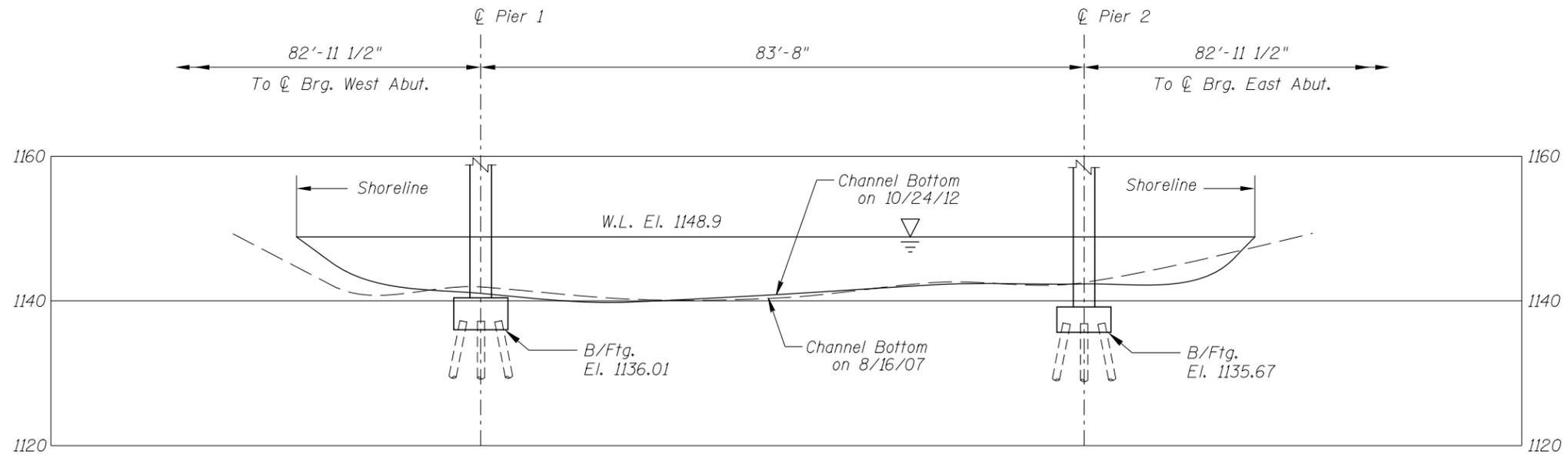
Note:

All soundings based on 2012 waterline location.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 18505 OVER THE MISSISSIPPI RIVER DISTRICT 3, CROW WING COUNTY, CITY OF BRAINERD		
INSPECTION AND SOUNDING PLAN		
Drawn By: CRE	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: OCT., 2012
Checked By: LJ		Scale: NTS
Code: 742318505		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 18505 OVER THE MISSISSIPPI RIVER DISTRICT 3, CROW WING COUNTY, CITY OF BRAINERD		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: CRE	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: OCT., 2012
Checked By: LJ		Scale: 1"=20'
Code: 742318505		Figure No.: 2

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 18505
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Barritt R. Lovelace, P.E. (WSB)
 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 (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
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	11.2'	N	7	7	8	N	7	6	N	8	6	6	7	N	N	N	N	N
	Pier 2	8.7'	N	7	N	8	N	7	N	N	8	6	6	7	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, Piers 1 and 2 were found to be in good condition with no defects of structural significance observed. The concrete shafts and footing were typically smooth and sound. The channel bottom consisting of sand and gravel around the substructure units and was presently stable. Footing exposure was observed at Pier 1 with up to 2 feet of vertical face exposure present.

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.