

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 86515
CSAH NO. 42
OVER THE
MISSISSIPPI RIVER
DISTRICT 3 - WRIGHT COUNTY



OCTOBER 27, 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. 86515, Piers 1, 2, and 3, were found to be in good condition with no defects of structural significance observed. The pier concrete was typically smooth and sound with random minor areas of poor consolidation with up to ½ inch penetration. The Pier 3 footing was exposed around the entire perimeter, however no undermining was present. Light to moderate accumulations of timber debris were observed at Piers 1, 2 and 3. The channel bottom overall appeared to be in stable condition, however a localized scour depression was present at the upstream nose of Pier 2.

INSPECTION FINDINGS:

- (A) The channel bottom material consisted of sand, gravel and scattered cobbles, 1 foot diameter and smaller, allowing 6 to 12 inches of probe rod penetration.
- (B) A light accumulation of timber debris consisting of logs 1 foot diameter or smaller was observed at the upstream nose of Pier 2. Accumulation extended from the channel bottom up 2 feet, 5 feet long in the North-South direction by 3 feet wide in the East-West direction.
- (C) A moderate accumulation of 2 foot diameter and smaller timber debris was observed at the upstream nose of Pier 3 extending from the channel bottom up 10 feet, 10 feet long in the North-South direction and 4 feet wide in the East-West direction.
- (D) A 4 foot radius, 3 feet deep scour pocket was observed at the upstream nose of the Pier 2 and extended 15 feet down the south face of the pier.
- (E) The embankments consisted of 1 to 2 foot diameter cobbles.
- (F) A horizontal steel H-pile strut was observed 3 feet below the top of web wall and

protruded 4 inches from each side of the web wall. There was no associated spalling present.

- (G) A light accumulation of 10 inch diameter and smaller timber debris was observed at the upstream end of the Pier 1. The debris extended from channel bottom to 2 feet above waterline and was approximately 5 feet wide in the East-West direction by 15 feet long in the North-South direction and also extended along the entire south face.
- (H) The concrete of the columns and webwalls (Piers 1 through 3) and footing (Pier 3) were typically smooth and sound with random, minor areas of poor consolidation with penetration up to ½ inch.
- (I) Area of impact damage observed in the Southeast corner of the upstream column of Pier 2. The impact damage extended from waterline to 1 foot above. It was 8 inches wide and exhibited a maximum penetration of 1 inch with no exposed rebar.
- (J) The concrete footing was exposed around the entire Pier 3 with up to 3.5 feet of vertical exposure along the south face of the pier.

RECOMMENDATIONS:

- (A) Monitor the accumulation of timber debris around the piers, and if found to be increasing, removal may become necessary during future routine bridge maintenance.
- (B) Scour screening evaluation indicates bridge is at low risk due to scour; therefore, monitor the scour and footing exposure during future inspections.
- (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,

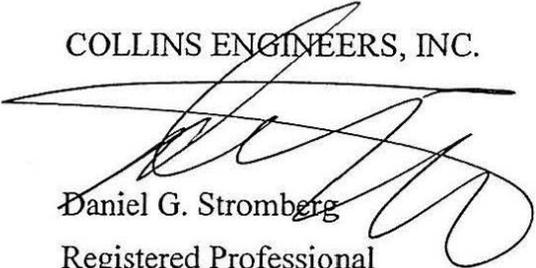
PROFESSIONAL ENGINEER

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: 86515

Feature Crossed: Mississippi River

Feature Carried: CSAH No. 42

Location: District 3 - Wright County

Bridge Description: The superstructure consists of four spans of multiple concrete girders. The superstructure is supported on two reinforced concrete abutments and three reinforced concrete piers. The pier and abutment footings are supported on steel piles. The piers are numbered 1 through 3 from the south end of the bridge.

2. INSPECTION DATA

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

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

Date: October 27, 2012

Weather Conditions: Cloudy, 40°F

Underwater Visibility: 2.0 Feet

Waterway Velocity: 2.0 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1, 2, and 3

General Shape: The piers consist of two octagonal, eight-sided columns, one on each end of a rectangular pile supported footing, supporting a hammerhead cap, with a connecting diaphragm wall between the lower half of the columns.

Maximum Water Depth at Substructure Inspected: Approximately 17.6 Feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the upstream end of Pier 3.

Water Surface: The waterline was approximately 23.8 feet below reference.
Waterline Elevation = 850.2.

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				
985	Slopes	1	EA	1				
220	Concrete Footing	1	EA	1				
361	Scour Smart Flag	1	EA	1				



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



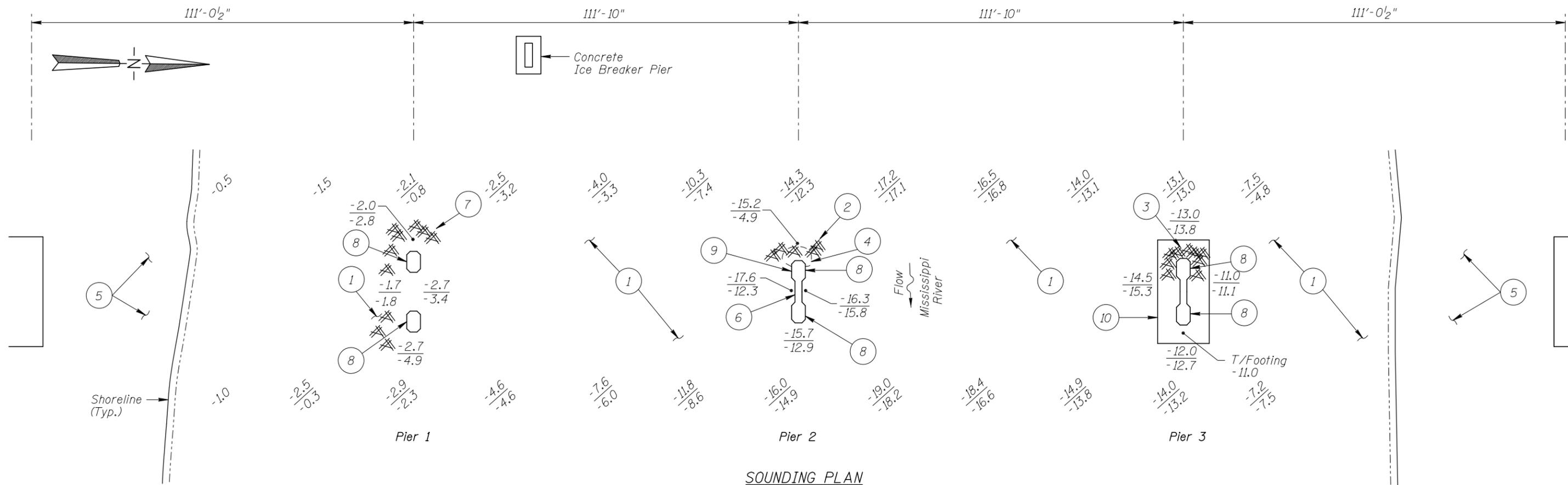
Photograph 2. View of Pier 1, Looking Southwest.



Photograph 3. View of Pier 2, Looking Southwest.



Photograph 4. View of Pier 3, Looking Southwest.



SOUNDING PLAN

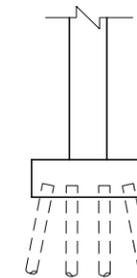
INSPECTION NOTES:

- ① The channel bottom material consisted of sand, gravel and scattered cobbles, 1-foot-diameter and smaller, allowing 6 to 12 inches of probe rod penetration.
- ② A light accumulation of timber debris consisting of logs 1-foot-diameter or smaller was observed at the upstream nose of Pier 2. Accumulation extended from channel bottom up 2 feet, 5 feet long in the North-South direction by 3 feet wide in the East-West direction.
- ③ A moderate accumulation of 2-foot-diameter and smaller timber debris was observed at the upstream nose of Pier 3 extending from the channel bottom up 10 feet, 10 feet long in the North-South direction and 4 feet wide in the East-West direction.
- ④ A 4-foot-radius, 3-foot-deep scour pocket was observed at the upstream nose of the Pier 2 and extended 15 feet down the south face of the pier.
- ⑤ The embankments consisted of 1- to 2-foot-diameter cobbles.
- ⑥ A horizontal steel H-pile strut was observed 3 feet below the top of web wall and protruded 4 inches from each side of the web wall. There was no associated spalling present.
- ⑦ A light accumulation of 10-inch-diameter and smaller timber debris was observed at the upstream end of the Pier 1. The debris extended from the channel bottom to 2 feet above the waterline and was approximately 5 feet wide in the East-West direction by 15 feet long in the North-South direction and also extended along the entire south face of the pier.

- ⑧ The concrete of the columns and webwalls (Piers 1 through 3) and footing (Pier 3) was typically smooth and sound with random, minor areas of poor consolidation with penetration up to 1/2 inch.
- ⑨ Area of impact damage observed in the South-East corner of the upstream column of Pier 2. The impact damage extended from waterline to 1 foot above. It was 8 inches wide and exhibited a maximum penetration of 1 inch with no exposed rebar.
- ⑩ The concrete footing was exposed around the entire perimeter of Pier 3 with up to 3.5 feet vertical exposure at the midpoint of the south face.

GENERAL NOTES:

1. Piers 1, 2, and 3 were inspected underwater.
2. At the time of inspection on October 27, 2012, the waterline was located approximately 23.8 feet below the top of the cap at the upstream end of Pier 3. This corresponds to a waterline elevation of 852.9.
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

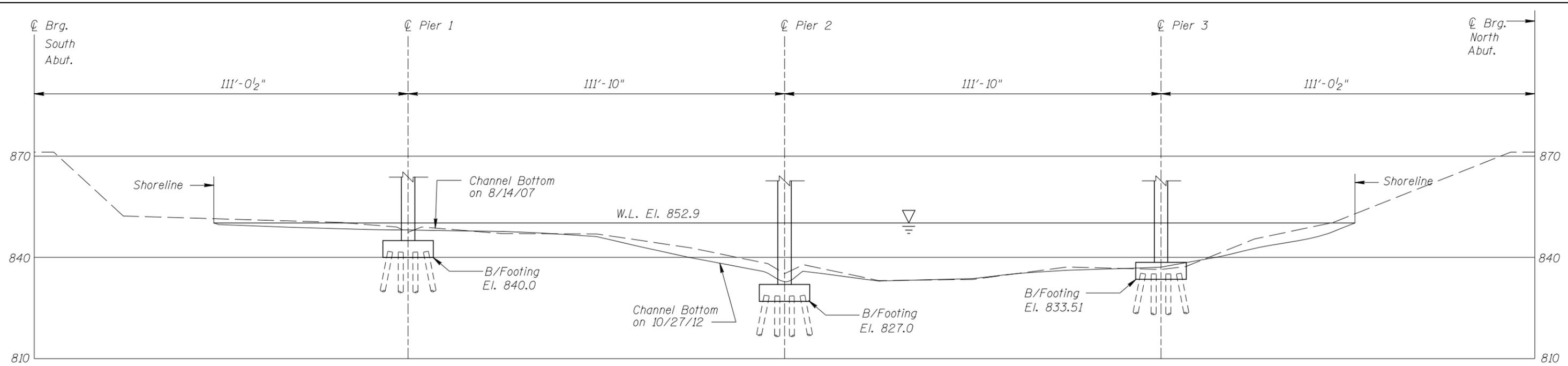
- 2.0 Sounding Depth (10/27/12)
- 5.2 Sounding Depth (8/14/07)
- Timber Debris

Note:

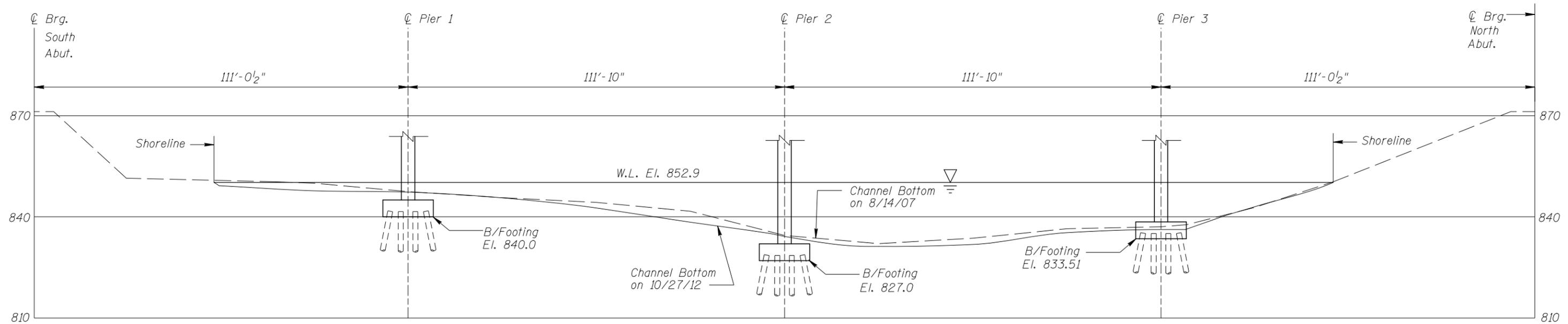
All soundings based on 2012 waterline location.

- Scour Depression

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 86515 OVER THE MISSISSIPPI RIVER DISTRICT 3, WRIGHT 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) 701-9300 www.collinsengr.com</small>	Scale: NTS
Code: 742386515		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note: _____
 Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 86515 OVER THE MISSISSIPPI RIVER DISTRICT 3, WRIGHT COUNTY		
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: 742386515		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: October 27, 2012

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

BRIDGE NO: 86515 WEATHER: Cloudy, 40°F

WATERWAY CROSSED: Mississippi River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Marc B. Parker, Lukas Janulis

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

TIME IN WATER: 11:10 A.M.

TIME OUT OF WATER: 11:40 A.M.

WATERWAY DATA: VELOCITY 2.0 ft/sec

VISIBILITY 2.0 feet

DEPTH 17.6 feet maximum at Pier 2

ELEMENTS INSPECTED: Piers 1, 2, and 3

REMARKS: Overall, the substructure units were found to be in good condition with no defects of structural significance observed. The pier concrete was typically smooth and sound with random minor areas of poor consolidation with up to 1/2 inch penetration. The Pier 3 footing was exposed around the entire perimeter, however no undermining was present. Light to moderate accumulations of timber debris were observed at Piers 1, 2 and 3. The channel bottom overall appeared to be in stable condition, however a localized scour depression was present at the upstream nose of Pier 2.

FURTHER ACTION NEEDED: YES NO

Monitor the accumulation of timber debris around the piers, and if found to be increasing, removal may become necessary during future routine bridge maintenance.

Scour screening evaluation indicates bridge is at low risk due to scour; therefore, monitor the scour and footing exposure during future inspections.

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

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 86515
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Barritt Lovelace, P.E. (WSB)
 WATERWAY CROSSED Mississippi River

INSPECTION DATE October 27, 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	2.7'	N	7	N	8	N	7	7	7	7	7	7	7	N	N	N	N	N
	Pier 2	17.6'	N	7	N	8	N	7	6	N	N	7	6	7	N	N	N	N	N
	Pier 3	14.5'	N	7	7	8	N	7	6	8	8	6	6	7	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the substructure units were found to be in good condition with no defects of structural significance observed. The pier concrete was typically smooth and sound with random minor areas of poor consolidation with up to 1/2 inch penetration. The Pier 3 footing was exposed around the entire perimeter, however no undermining was present. Light to moderate accumulations of timber debris were observed at Piers 1, 2 and 3. The channel bottom overall appeared to be in stable condition, however a localized scour depression was present at the upstream nose of Pier 2.

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.