

UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 2796

10<sup>TH</sup> AVENUE

OVER THE

MISSISSIPPI RIVER

HENNEPIN COUNTY, CITY OF MINNEAPOLIS

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OCTOBER 29, 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 unit inspected at Bridge 2796, Pier 12, was in satisfactory condition below water with no structurally significant defects observed. The minor defects observed included light to moderate corrosion and various construction-related gaps between the sheet piling surrounding the pier base concrete on all sides of the pier. The topside concrete surface exhibited gaps and cracking up to 1 foot wide. The channel bottom was stable with no evidence of significant scour or appreciable changes since the previous inspection. Overall, the conditions at the bridge have not changed appreciably since the last inspection.

INSPECTION FINDINGS:

- (A) The channel bottom material, within 10 feet of the substructure unit, typically consisted of tightly packed riprap from 1 foot to 3 feet in size. Along the downstream end, the channel sloped up at a steep angle and was located approximately 2 feet below the waterline. The downstream channel bottom material consisted of cobbles less than 6 inches in size and riprap from 1 foot to 4 feet in size.
- (B) Gaps in the lines of construction (not at interlocks), were observed in the steel sheeting at the east and west upstream  $\frac{1}{4}$  points with maximum widths located at the channel bottom. The west gap measured 15 inches in width and had a maximum penetration of 6 inches. The east side gap measured 36 inches in width and had no penetration.
- (C) A void between the horizontal C-channels and the vertical sheeting was observed at the east side upstream  $\frac{1}{4}$  point of the pier at 2.5 feet below the waterline with a height of 2.5 feet and 3.5 feet of maximum penetration.
- (D) The steel sheeting was in good condition with a uniform  $\frac{1}{8}$  inch layer of surface corrosion extending from the top of the sheeting to the channel bottom.

- (E) The steel sheet piling was slightly separated from the concrete around the base of the pier for a length of approximately 20 feet along the east and west sides.
  
- (F) The topside concrete surface within the sheeting was sound, however, gaps/cracks up to 1 foot maximum width were observed on both east and west sides of Pier 12.

RECOMMENDATIONS:

- (A) Reinspect the submerged substructure unit 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,

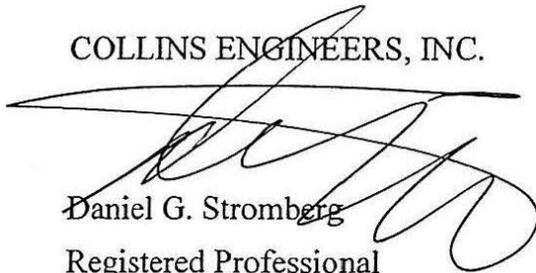
PROFESSIONAL ENGINEER

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: 2796

Feature Crossed: The Mississippi River

Feature Carried: 10<sup>TH</sup> Avenue

Location: Hennepin County, City of Minneapolis

Bridge Description: The superstructure consists of an open-spandrel reinforced concrete arch supporting a reinforced concrete deck. The superstructure is supported on two reinforced concrete abutments and 19 reinforced piers numbered from the west end of the bridge. Only Pier 12 is located within the channel. No information on the foundation of Pier 12 was shown on the design drawings provided.

2. INSPECTION DATA

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

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

Date: October 29, 2012

Weather Conditions: Cloudy, 40° F

Underwater Visibility: 0.5 Feet

Waterway Velocity: 1.0 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Pier 12

General Shape: The pier consists of an oblong rectangular shaft with rounded ends. The base of the pier shaft is encased with steel sheet piling encasement (protection) system which is pointed at the upstream end and filled with concrete.

Maximum Water Depth at Substructure Inspected: Approximately 17.6 feet.

4. WATERLINE DATUM

Water Level Reference: Spring line at Pier 12.

Water Surface: The waterline was approximately 10.4 feet below reference.  
Waterline Elevation = 724.9.

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

Item 60: Substructure: Code 6

Item 61: Channel and Channel Protection: Code 8

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

Item 113: Scour Critical Bridges: Code U/96

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	110	LF		110			
361	Scour Smart Flag	1	EA	1				
985	Slopes and Slope Protection	1	EA	1				



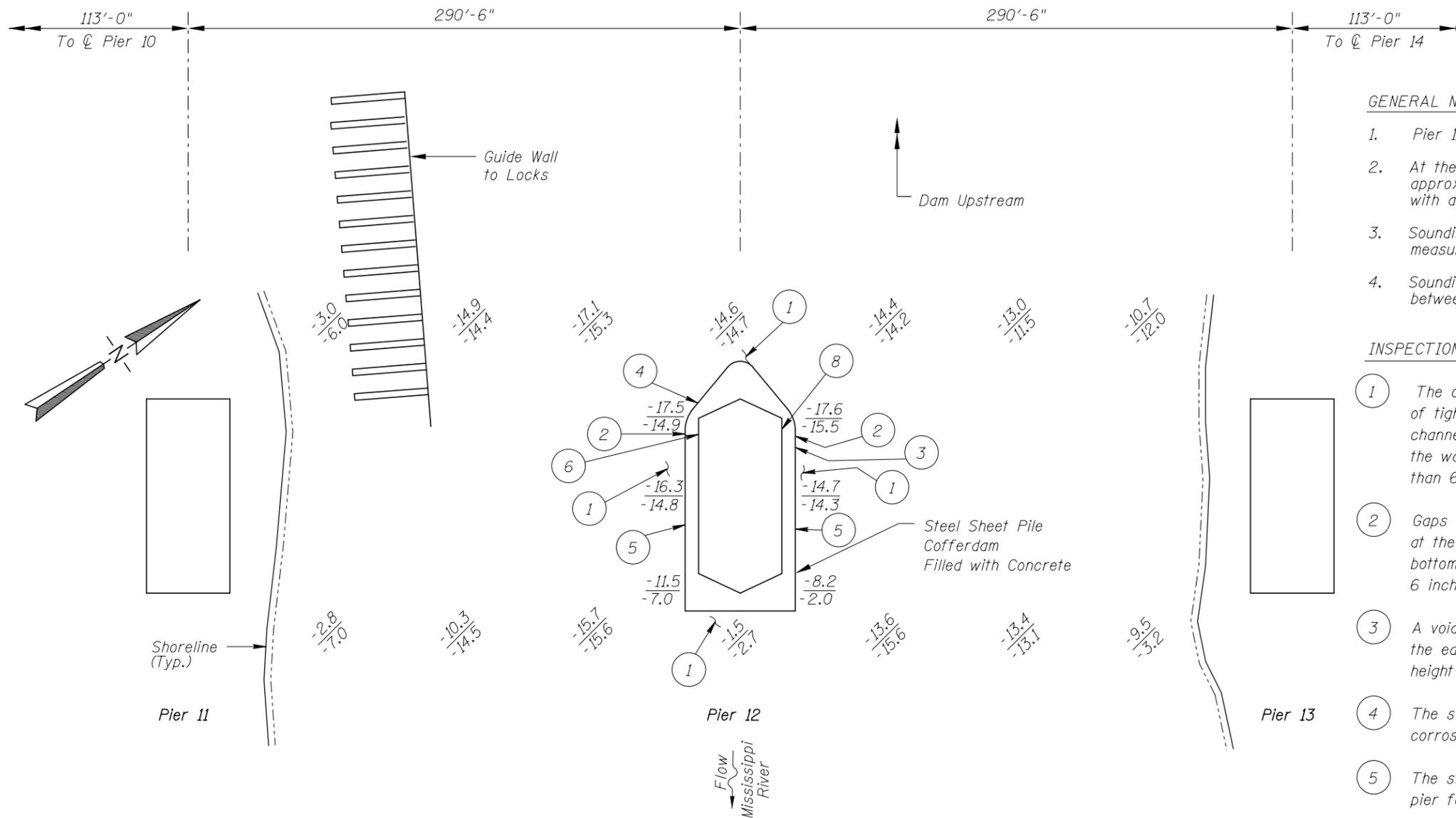
Photograph 1. View of Pier 12, Looking Southwest.



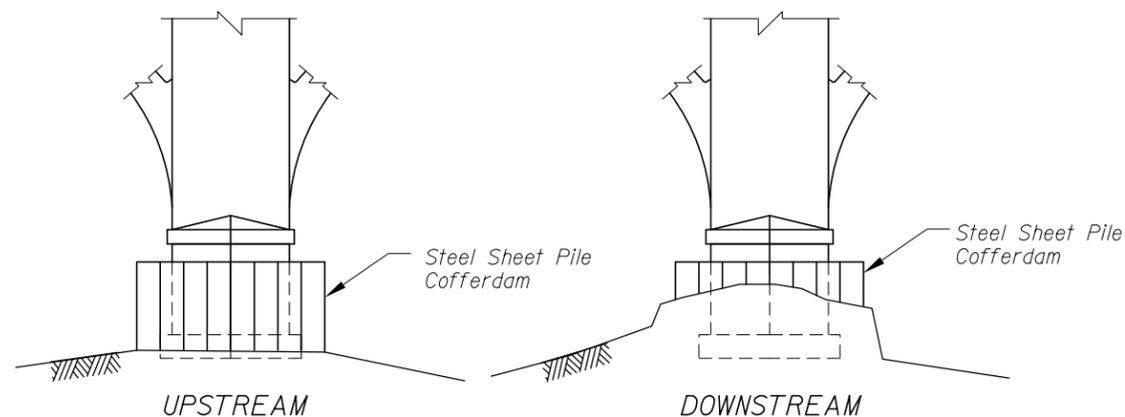
Photograph 2. View of Pier 12, Looking Northeast.



Photograph 3. Overall View of Structure, Looking North.



**SOUNDING PLAN**



**TYPICAL END VIEW OF PIER 12**

**GENERAL NOTES:**

1. Pier 12 was inspected underwater.
2. At the time of inspection on October 29, 2012 the waterline was located approximately 10.4 feet below the spring line at Pier 12. This corresponds with a waterline elevation of 724.9
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 about 1/4 point intervals between the substructure units.

**INSPECTION NOTES:**

- ① The channel bottom material, within 10 feet of the substructure unit, typically consisted of tightly packed riprap from 1 foot to 3 feet in size. Along the downstream end, the channel sloped up at a steep angle and was located approximately 2 feet below the waterline, the downstream channel bottom material consisted of cobbles of less than 6 inches in size and riprap from 1 foot to 4 feet in size.
- ② Gaps in the lines of construction (not at interlocks), were observed in the steel sheeting at the east and west upstream 1/4 points with maximum widths located at the channel bottom. The west gap measured 15 inches in width and had a maximum penetration of 6 inches. The east side gap measured 36 inches in width and had no penetration.
- ③ A void between the horizontal C-channels and the vertical sheeting was observed at the east side upstream 1/4 point of the pier at 2.5 feet below the waterline with a height of 2.5 feet and 3.5 feet of maximum penetration.
- ④ The steel sheeting was in good condition with a uniform 1/8 inch layer of surface corrosion extending from the top of the sheeting to the channel bottom.
- ⑤ The steel sheet piling was slightly separated from the concrete around the base of the pier for a length of approximately 20 feet along the east and west sides.
- ⑥ The topside concrete surface within the sheeting was sound, however, gaps/ cracks up to 1 foot maximum width were observed on both east and west sides of Pier 12.

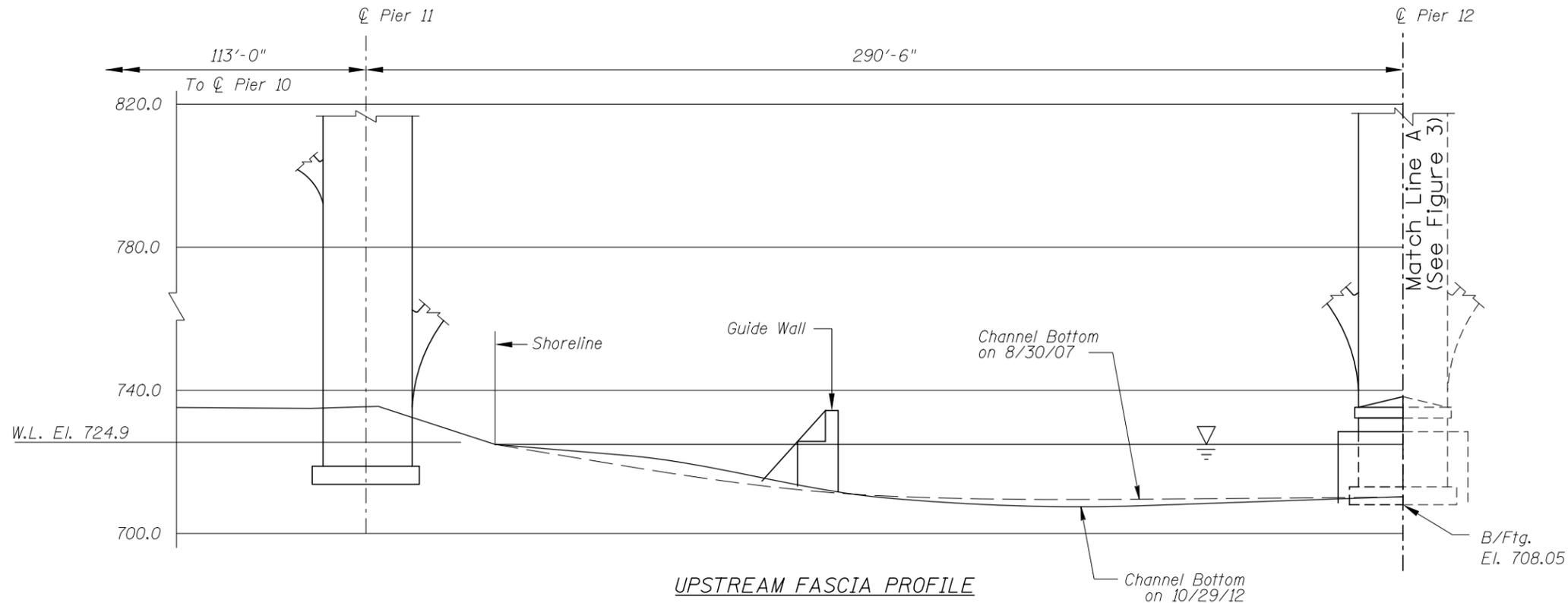
**Legend**

- 14.0 Sounding Depth (10/29/12)
- 14.7 Sounding Depth (8/30/07)

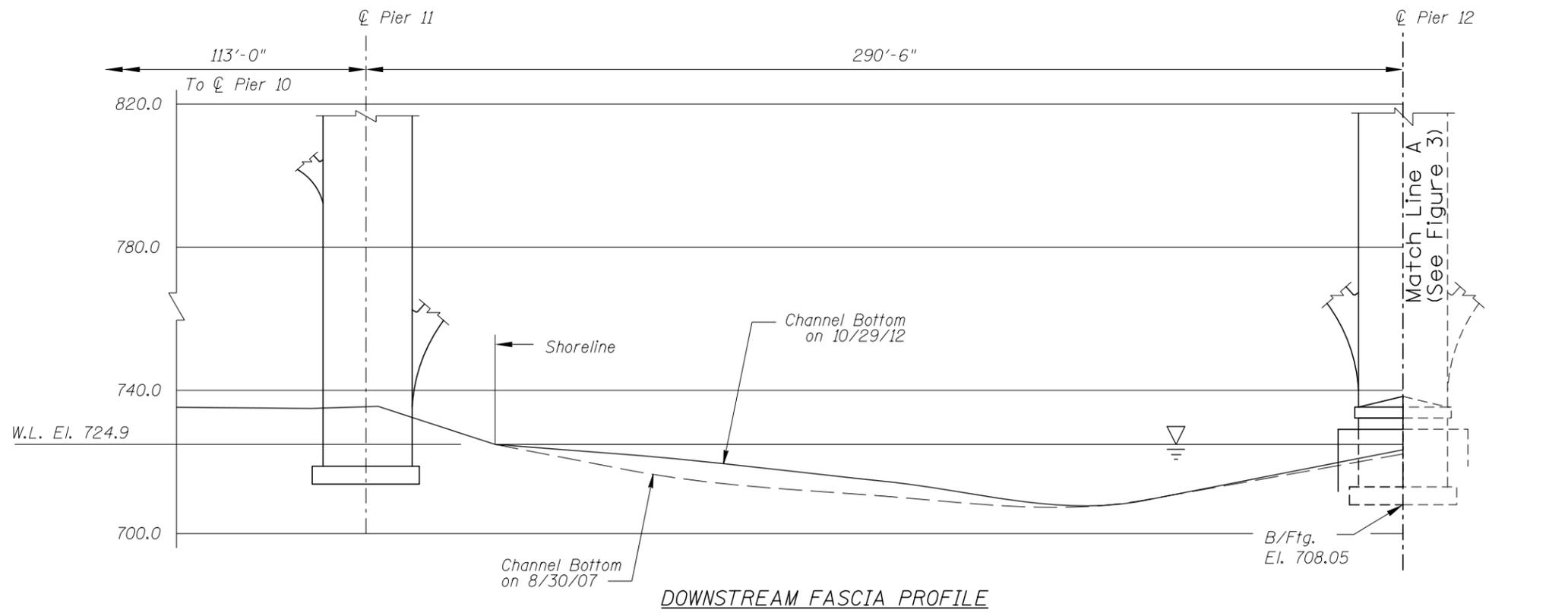
**Note**

All soundings based on 2012 waterline location.

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 2796 OVER THE MISSISSIPPI RIVER HENNEPIN COUNTY, CITY OF MINNEAPOLIS		
<b>INSPECTION AND SOUNDING PLAN</b>		
Drawn By: CRE	<b>COLLINS ENGINEERS</b> <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-4300 www.collinsengr.com</small>	Date: OCT., 2012
Checked By: LJ		Scale: NTS
Code: 74232796	<small>ILLINOIS PROFESSIONAL DESIGN FIRM LICENSE NO. 184-000993</small>	Figure No.: 1



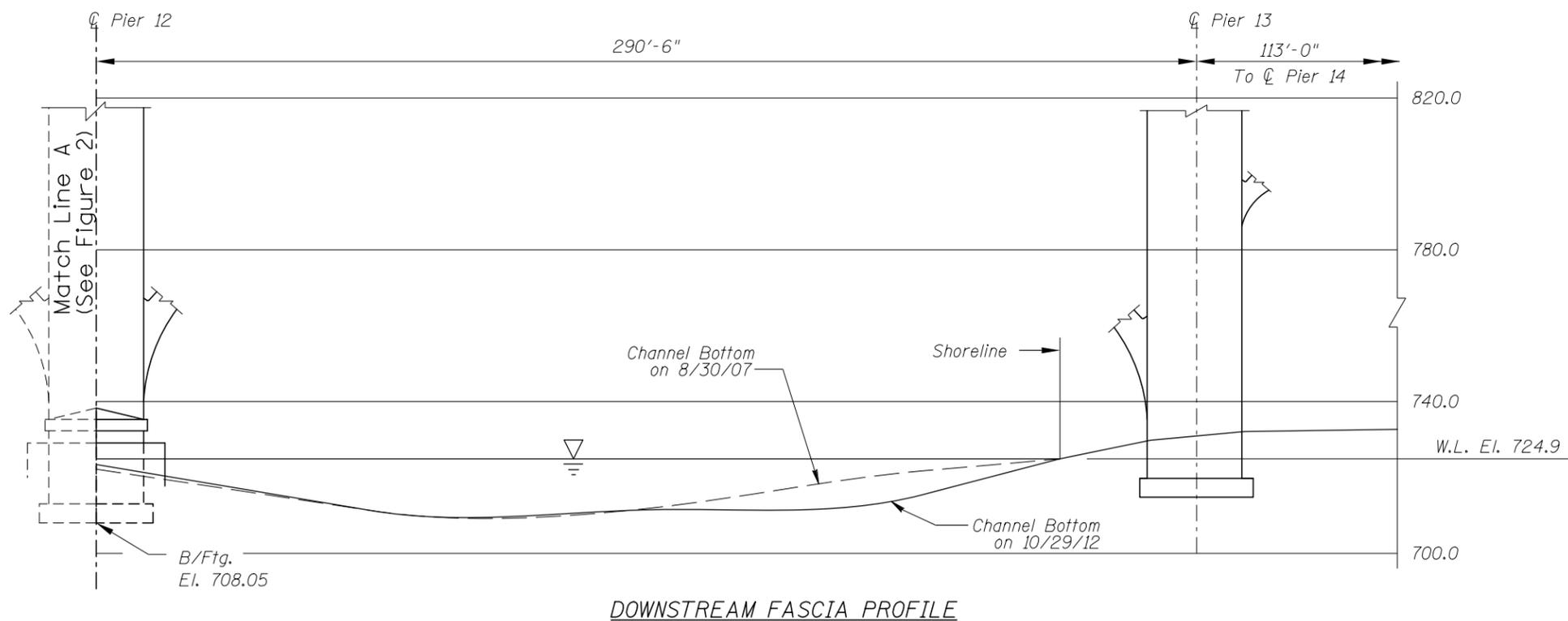
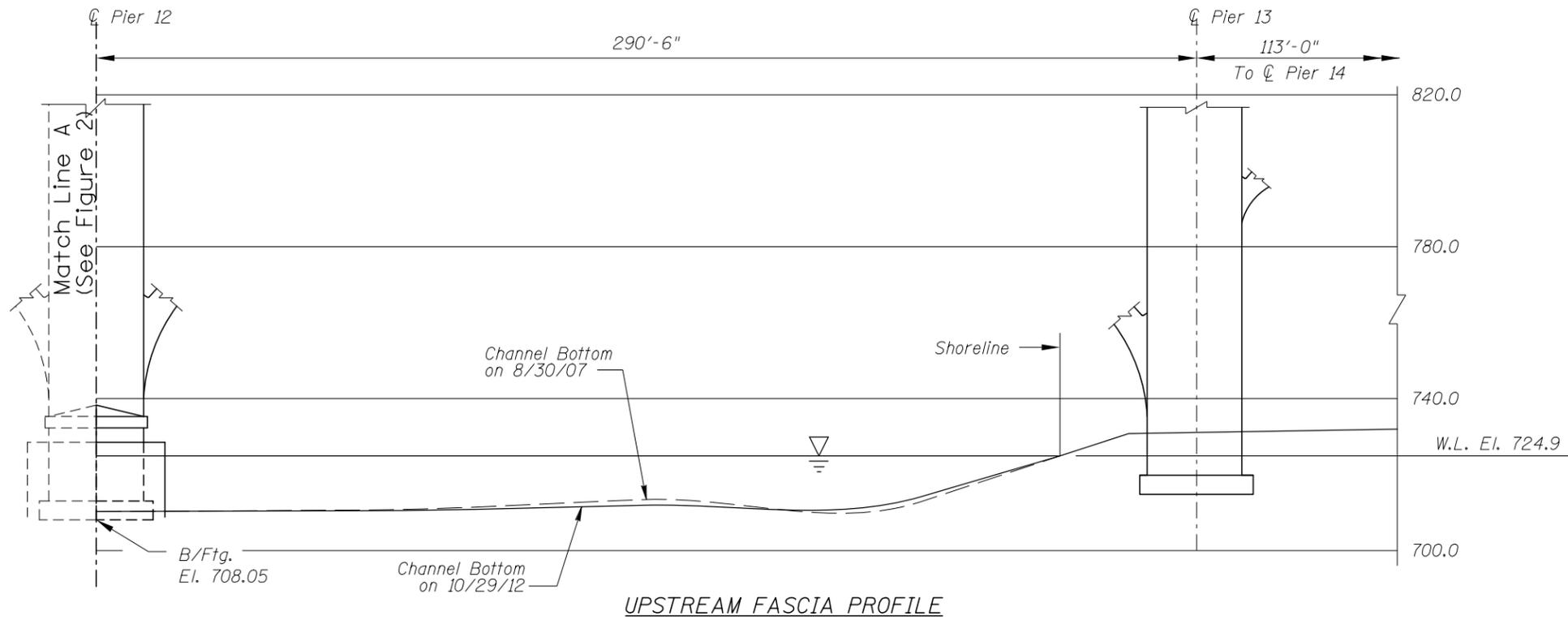
UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:  
Refer to Figure 1 for General Notes.

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STRUCTURE NO. 2796 OVER THE MISSISSIPPI RIVER HENNEPIN COUNTY, CITY OF MINNEAPOLIS		
<b>UPSTREAM AND DOWNSTREAM FASCIA PROFILES</b>		
Drawn By: CRE	<b>COLLINS ENGINEERS</b> <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"=40'
Code: 74232796		Figure No.: 2
<small>ILLINOIS PROFESSIONAL DESIGN FIRM LICENSE NO. 184-000993</small>		



Note:  
Refer to Figure 1 for General Notes.

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 2796 OVER THE MISSISSIPPI RIVER HENNEPIN COUNTY, CITY OF MINNEAPOLIS		
<b>UPSTREAM AND DOWNSTREAM FASCIA PROFILES</b>		
Drawn By: CRE	<b>COLLINS ENGINEERS</b> <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-0300 www.collinsengr.com ILLINOIS PROFESSIONAL DESIGN FIRM LICENSE NO. 184-000993</small>	Date: OCT., 2012
Checked By: LJ		Scale: 1"=40'
Code: 74232796		Figure No.: 3

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

INSPECTORS: Collins Engineers, Inc. DATE: October 29, 2012

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

BRIDGE NO: 2796 WEATHER: Cloudy, 40° 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, Probe Rod, 14 foot Boat,  
Camera, Fathometer

TIME IN WATER: 12:00 P.M.

TIME OUT OF WATER: 12:25 P.M.

WATERWAY DATA: VELOCITY 1.0 ft/sec

VISIBILITY 0.5 Feet

DEPTH 17.6 feet maximum at Pier 12

ELEMENTS INSPECTED: Pier 12

REMARKS: Overall, the pier was in satisfactory condition with no structurally significant defects observed. The minor defects observed included light to moderate corrosion and various construction-related gaps between the sheet piling surrounding the pier base concrete on all sides of the pier. The topside concrete surface exhibited gaps and cracking up to 1 foot wide. The channel bottom was stable with no evidence of significant scour or appreciable changes since the previous inspection. Overall, the conditions at the bridge have not changed appreciably since the last inspection.

FURTHER ACTION NEEDED:  YES  NO

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. 2796  
 INSPECTORS Collins Engineers, Inc.  
 ON-SITE TEAM LEADER Barritt R. Lovelace, P.E. (WSB)  
 WATERWAY CROSSED Mississippi River

INSPECTION DATE October 29, 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 12	17.6'	6	6	N	8	N	6	8	8	8	N	8	N	7	N	7	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the pier was in satisfactory condition with no structurally significant defects observed. The minor defects observed included light to moderate corrosion and various construction-related gaps between the sheet piling surrounding the pier base concrete on all sides of the pier. The topside concrete surface exhibited gaps and cracking up to 1 foot wide. The channel bottom was stable with no evidence of significant scour or appreciable changes since the previous inspection. Overall, the conditions at the bridge have not changed appreciably since the last inspection.

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.