

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 27549

42ND AVENUE

OVER THE

MISSISSIPPI RIVER

CITY OF MINNEAPOLIS, HENNEPIN COUNTY



OCTOBER 28, 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 concrete substructure units inspected at Bridge 27549, Piers 9 and 10, were generally in good condition with no structurally significant defects observed. Hairline vertical cracking was observed on both piers. The footing at Pier 9 was exposed around the entire perimeter with up to 2.5 feet of vertical face exposure along the west side. Light to moderate timber debris was observed at the upstream nose and the east side of Pier 9. The channel bottom appeared stable with no significant scour or appreciable changes since the previous inspection.

INSPECTION FINDINGS:

- (A) The channel bottom material around Pier 9 consisted of riprap up to 1 foot in diameter at the upstream nose and sand infilling around the rest of the pier that allowed up to 1.5 feet of probe rod penetration.
- (B) The top of the footing around the entire perimeter of Pier 9 was exposed with vertical face exposure between 1 foot at the upstream west corner, 2 to 4 inches along the downstream face, and a maximum of 2.5 feet along the west face.
- (C) An 18 inch diameter log was observed on the channel bottom at the upstream end of Pier 9.
- (D) A log that was 18 inches in diameter and 30 feet long was observed on the channel bottom along the east face of Pier 9.
- (E) Numerous vertical hairline cracks were observed extending from the top of the webwall to the waterline on both faces of Piers 9 and 10.
- (F) The channel bottom material around of Pier 10 consisted of 1 to 3 foot diameter riprap with sand infilling that allowed up to 8 inches of probe rod penetration.
- (G) A vertical 1/8 inches wide crack was observed extending from the top of the webwall

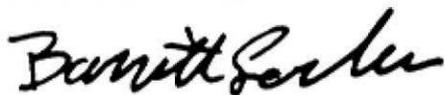
to the waterline on the west face of Pier 9.

- (H) Overall the concrete of Piers 9 and 10 was smooth and sound with some random minor areas of poor consolidation with ¼ inch maximum penetration.

RECOMMENDATIONS:

- (A) Monitor the timber debris at Pier 9 and 10, and if found to be increasing in the future, removal operations may become warranted.
- (B) Monitor the footing exposure at Pier 9 during future underwater inspections. The scour evaluation indicates that the pier foundations are stable for the calculated scour conditions.
- (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

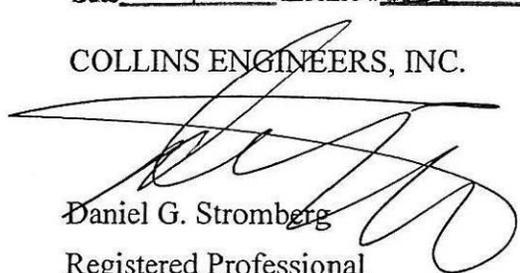
Respectfully submitted,

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: 27549

Feature Crossed: Mississippi River

Feature Carried: 42nd Avenue

Location: Hennepin County, City of Minneapolis

Bridge Description: The superstructure consists of a continuous steel girder structure supporting a reinforced concrete deck. The superstructure is supported by eleven reinforced concrete piers and two reinforced concrete abutments, all founded on piles. The piers in the water are numbered 9 and 10 from west to east according to the 1976 plans.

2. INSPECTION DATA

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

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

Date: October 28, 2012

Weather Conditions: Cloudy, 45°F

Underwater Visibility: 0.5 feet

Waterway Velocity: 1.0 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 9 and 10.

General Shape: The piers consist of two rectangular columns supporting a hammerhead pier cap. The columns are connected by a concrete webwall and are supported by rectangular concrete footings and seals that are founded on steel piles.

Maximum Water Depth at Substructure Inspected: Approximately 10.2 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the webwall at the downstream end of Pier 9.

Water Surface: The waterline was approximately 3.9 feet below reference.

Waterline Elevation = 798.6.

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/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	90	LF	90				
361	Scour Smart Flag	1	EA	1				
905	Slopes	1	EA	1				



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



Photograph 2. View of Pier 9, Looking Northeast.



Photograph 3. View of Pier 10, Looking Northeast.

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

INSPECTORS: Collins Engineers, Inc. DATE: October 28, 2012

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

BRIDGE NO: 27549 WEATHER: Cloudy, 45°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, Sounding Pole, Probe Rod, 22 foot Boat, Camera.

TIME IN WATER: 8:10 a.m.

TIME OUT OF WATER: 9:30 a.m.

WATERWAY DATA: VELOCITY 1.0 ft/sec

VISIBILITY 0.5 feet

DEPTH 10.2 feet maximum at Pier 10

ELEMENTS INSPECTED: Piers 9 and 10

REMARKS: Overall, the concrete piers were generally in good condition with no structurally significant defects observed. Hairline vertical cracking was observed on both piers. The footing at Pier 9 was exposed around the entire perimeter with up to 2.5 feet of vertical face exposure along the west side. Light to moderate timber debris was observed at the upstream nose and the east side of Pier 9. The channel bottom appeared stable with no significant scour or appreciable changes since the previous inspection.

FURTHER ACTION NEEDED: YES NO

Monitor the timber debris at Pier 9 and 10, and if found to be increasing in the future, removal operations may become warranted.

Monitor the footing exposure at Pier 9 during future underwater inspections. The scour evaluation indicates pier foundations are stable for the calculated scour conditions.

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. 27549
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Barritt Lovelace, P.E.
 WATERWAY CROSSED Mississippi River

INSPECTION DATE October 28, 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.

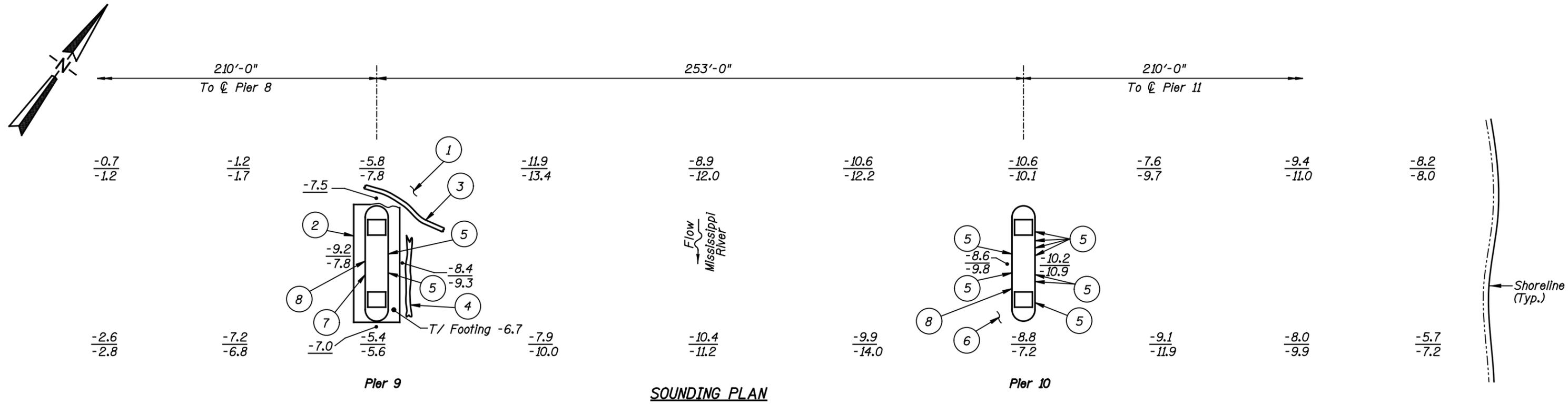
CONDITION RATING

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 9	9.2'	N	7	7	8	N	7	6	N	N	6	6	7	N	N	N	N	N
	Pier 10	10.2'	N	7	N	8	N	7	N	N	N	7	7	7	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete piers were generally in good condition with no structurally significant defects observed. Hairline vertical cracking was observed on both piers. The footing at Pier 9 was exposed around the entire perimeter with up to 2.5 feet of vertical face exposure along the west side. Light to moderate timber debris was observed at the upstream nose and the east side of Pier 9. The channel bottom appeared stable with no significant scour or appreciable changes since the previous 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.



SOUNDING PLAN

INSPECTION NOTES:

- 1 The channel bottom material around Pler 9 consisted of riprap up to 1 foot in diameter at the upstream nose and sand infilling around the rest of the pier that allowed up to 1.5 foot of probe rod penetration.
- 2 The top of the footing around the entire perimeter of Pler 9 was exposed with vertical face exposure between 1 foot at the upstream west corner, 2 to 4 inches along the downstream face, and a maximum of 2.5 feet along the west face.
- 3 An 18 inch diameter log was observed on the channel bottom at the upstream end of Pler 9.
- 4 A log that was 18 inches in diameter and 30 feet long was observed on the channel bottom along the east face of Pler 9.
- 5 Numerous vertical hairline cracks were observed extending from the top of the webwall to the waterline on both faces of Piers 9 and 10.
- 6 The channel bottom material around of Pler 10 consisted of 1 to 3 foot diameter riprap with sand infilling that allowed up to 8 inches of probe rod penetration.
- 7 A vertical 1/8 inch wide crack was observed extending from the top of the webwall to the waterline on the west face of Pler 9.
- 8 Overall, the concrete of Piers 9 and 10 was smooth and sound with some random minor areas of poor consolidation with 1/4 inch maximum penetration.

GENERAL NOTES:

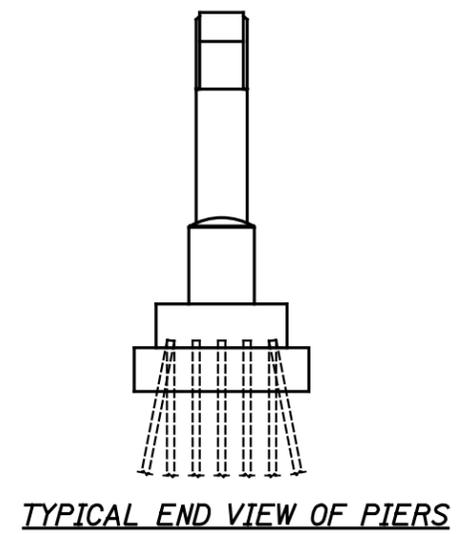
- 1 Piers 9 and 10 were inspected underwater.
- 2 At the time of inspection on October 28, 2012 the waterline was located approximately 3.9 feet below the top of the webwall at the downstream end of Pler 9. This corresponds with a waterline elevation of 798.6.
- 3 Soundings indicate the water depth at 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.

Note:

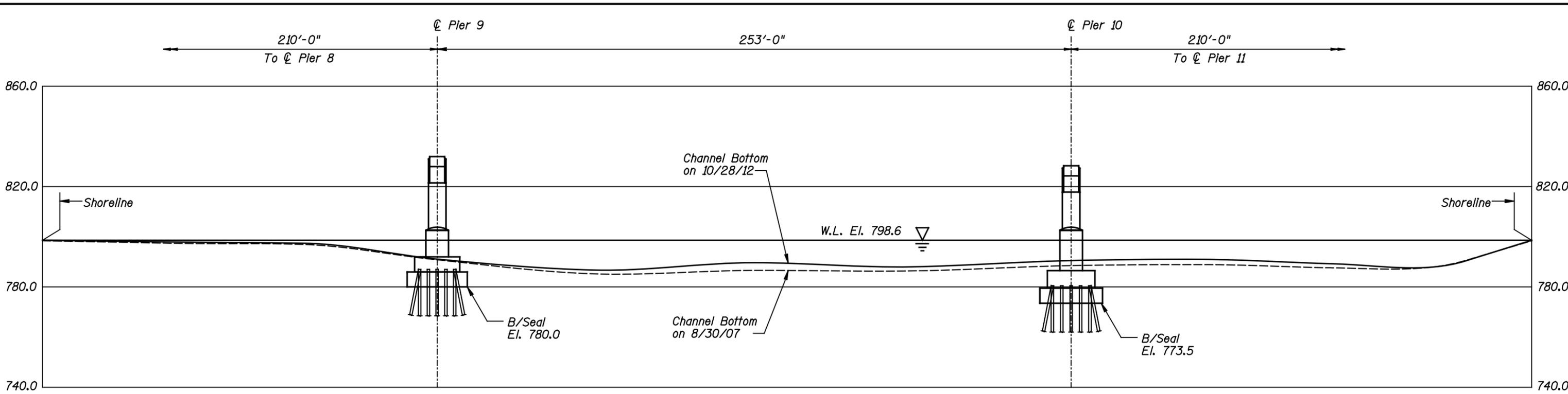
All soundings based on 2012 waterline location.

Legend

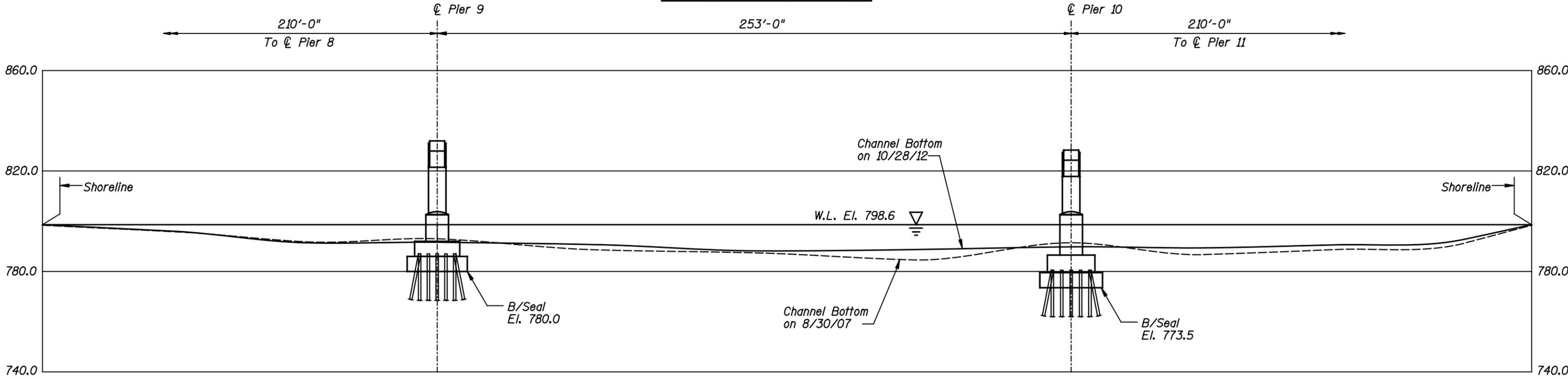
-6.0 Sounding Depth (10/28/12)
 -6.7 Sounding Depth (8/30/07)



MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 27549 OVER THE MISSISSIPPI RIVER HENNEPIN COUNTY, CITY OF MINNEAPOLIS		
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: 742327549		Figure No.: I



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 27549 OVER THE MISSISSIPPI RIVER HENNEPIN COUNTY, CITY OF MINNEAPOLIS		
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"=40'
Code: 742327549		Figure No.: 2