

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 58506
CSAH NO. 7
OVER THE
SNAKE RIVER
DISTRICT 1 - PINE COUNTY



JUNE 7, 2012
PREPARED FOR THE
MINNESOTA DEPARTMENT OF TRANSPORTATION
BY
COLLINS ENGINEERS, INC.
AND
WSB & ASSOCIATES, INC.
JOB NO. 2107

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 58506, North Abutment and Piers 1 through 9, were found to be in satisfactory condition. No defects of major structural significance were observed. Light to moderate accumulations of timber debris were observed at Piers 2, 3, 7, and 8. Heavy accumulations of timber debris were observed at Piers 4 and 5. The channel bottom around the substructure units and the shorelines appeared to be in stable condition with no significant scour or appreciable changes since the previous inspection. An adjacent retaining wall at the southeast shoreline was leaning into the channel and has failed. A number of cross-bracing members, which exhibited excessive deterioration during previous underwater inspection, have since been replaced and were typically sound.

INSPECTION FINDINGS:

- (A) The retaining wall located east of Pier 8 exhibited excessive deformation and was leaning into the channel.
- (B) The majority of the timber piles were in fair condition with weathering and random vertical checking present with widths of up to 1/4 inch. The only significant pile distress found was as follows:
 - * The middle pile of Pier 2 was cracked, splintered and soft to a depth of 1/2 inch. This condition existed from 1 foot above the waterline to the channel bottom. Below this 1/2 inch softer outer layer, the wood material was sound and firm.
 - * The outer 1 1/2 inch shell of the end pile at west end of Pier 3 was cracked and splintered. This condition was present from 6 inches below the waterline to 1.5 feet above the waterline.
 - * The outer 2 inch shell was cracked, splintered, soft, and delaminated at the second pile from the west end of Pier 4.

- * The westernmost pile on the south side of Pier 7 was splintered over a 12 inch high by 6 inch wide and 3/4 inch deep area. This area was located 2 feet below the waterline. The material beneath the splintered material was soft to an estimated depth of 1/4 inch. The total loss of cross-section at this location was estimated to be between 10 and 20 percent.

- (D) Light accumulations of timber debris, consisting of 6 inch diameter and smaller limbs and branches, was observed at the upstream noses of Piers 2, 3, and 7.

- (E) Heavy accumulation of timber debris, consisting of 18 inch diameter and smaller logs and branches, was observed around the upstream pile of Piers 4 and 5 extending from the channel bottom to the waterline.

RECOMMENDATIONS:

- (A) The timber debris accumulations at Piers 4 and 5 may cause excessive scour and lateral loads on the piers, as well as obstruct the channel flow. Therefore, it is recommended to remove the debris at this time.

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

WSB and Associates



Barritt Lovelace
Registered Professional Engineer
Bridge Safety Inspection Team Leader

Respectfully submitted,

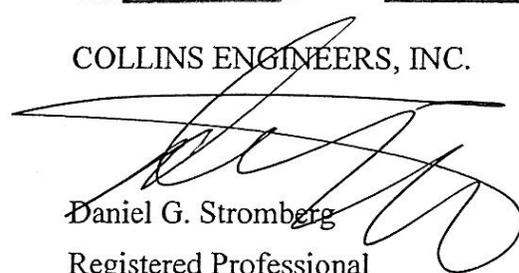
PROFESSIONAL ENGINEER

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: 58506

Feature Crossed: Snake River

Feature Carried: CSAH No. 7

Location: District 1 - Pine County

Bridge Description: The superstructure consists of ten spans of timber deck on multiple timber stringers supported by nine timber pile piers and two timber pile abutments. The piers are numbered 1 through 9 starting from the north end of the bridge.

2. INSPECTION DATA

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

Dive Team: Kasey L. Yoder (WSB), Ryan Breen (Collins)

Date: June 7, 2012

Weather Conditions: Sunny, 85° F

Underwater Visibility: 1.5 feet

Waterway Velocity: 1 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: North Abutment and Piers 1 through 9.

General Shape: Each pier consists of a timber cap supported by timber piles. Timber cross-bracing is present between the piles. The number of piles at each pier varies from two rows of five piles (Piers 3 and 7) to one row of seven piles (all other piers). In addition, Piers 3 and 7 have a steel nosing pile at the upstream end.

Maximum Water Depth at Substructure Inspected: Approximately 11.3 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap at east end of Pier 8.

Water Surface: The waterline was approximately 6.3 feet below reference.
Water Elevation = 936.2.

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 5

Item 92B: Underwater Inspection: Code B/06/12

Item 113: Scour Critical Bridges: Code J/97

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

 Yes X No



Photograph 1. Overall View of Downstream Fascia, Looking Southwest.



Photograph 2. Overall View of Downstream Fascia, Looking Southeast.



Photograph 3. Overall View of Upstream Fascia, Looking West.



Photograph 4. Overall View of Upstream Fascia, Looking East.



Photograph 5. View of Pier 1, Looking Southeast.



Photograph 6. View of Pier 7, Looking Southwest.

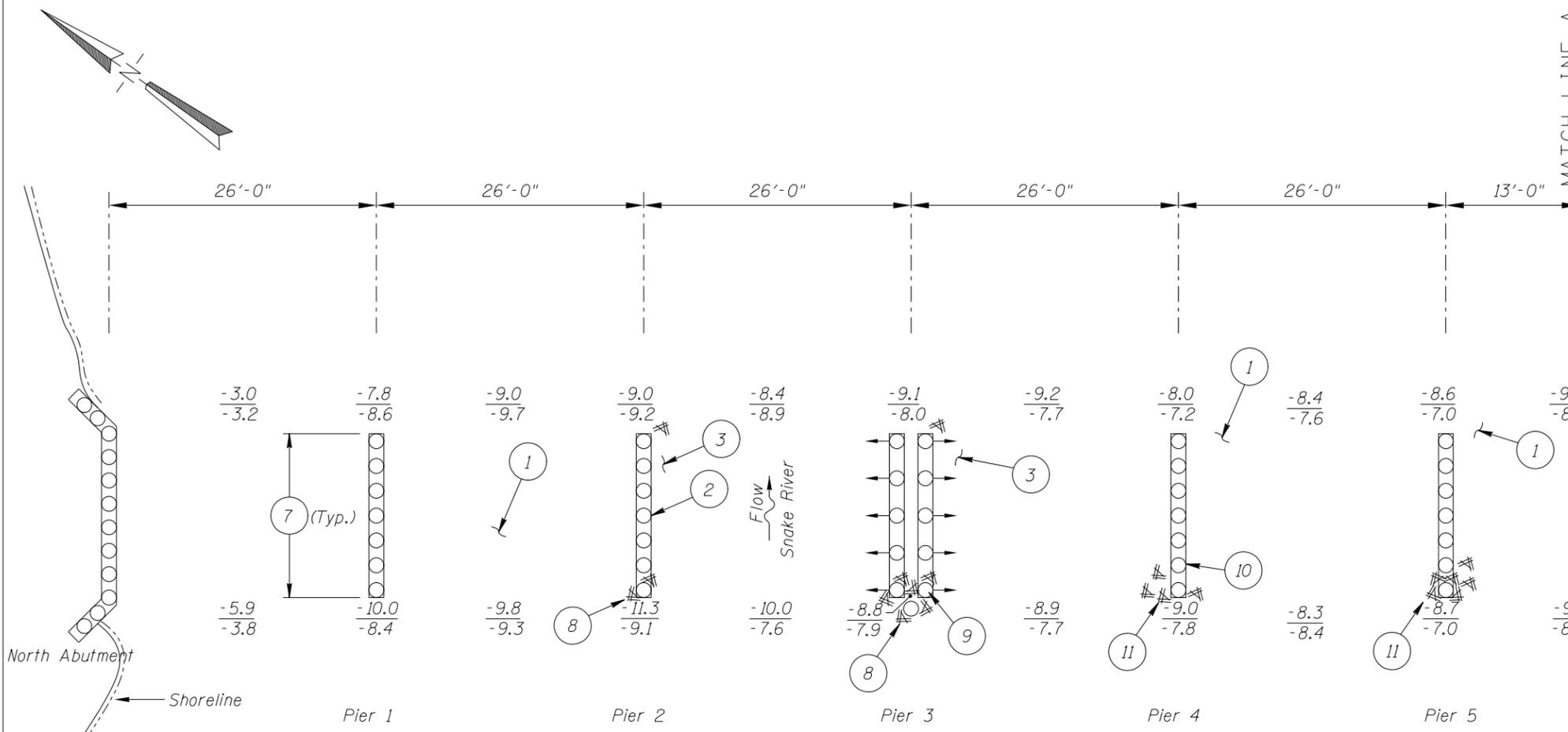


Photograph 7. View of Pier 8, Looking Southwest.

Mid Span INSPECTION NOTES:

MATCH LINE A
(See Figure 2)

- 1 The channel bottom consisted of silty sand with random scattered riprap and up to 6 inches of probe rod penetration.
- 2 The outer shell of the fourth pile from the west end of pier was cracked, splintered, soft, and delaminated. This condition was present from the channel bottom to 1 foot above the waterline. Probing revealed the wood beneath the outer shell to be sound.
- 3 The channel bottom at Piers 2 and 3 consisted of sand and riprap up to 6 inches in diameter with no appreciable probe rod penetration.
- 4 A 12 inch high by 6 inch wide and 3/4 inch deep portion of the outer shell of this pile has splintered outward. The wood beneath this area was soft to a depth of 1/4 inch. The estimated loss in cross sectional area was 10 to 20 percent. This condition occurred at 2 feet below the waterline.
- 5 The channel bottom at Piers 7 through 9 consisted of a mixture of gravel and riprap with no appreciable probe rod penetration.
- 6 The retaining wall exhibited excessive deformation.
- 7 All of the piles exhibited random checking up to 1/4 inch wide, and a softer out pile shell up to 1/4 inch thick with 1/4 inch wide splits.
- 8 Light accumulation of timber debris, consisting of 6 inch diameter and smaller logs and branches, was observed at the upstream noses of Piers 2, 3, and 7.
- 9 The outer 1 1/2 inch shell of end pile at west end of Pier 3 was cracked and splintered. This condition was present from 6 inches below the waterline to 1 1/2 feet above the waterline.
- 10 The outer 2 inch shell was cracked, splintered, soft and delaminated at the second pile from the west of Pier 4. The defect extended from channel bottom to 1.5 feet above the waterline.
- 11 Moderate to heavy accumulation of timber debris, consisting of up to 1.5 foot diameter drift pieces, was observed around the upstream end of Piers 4 and 5 extending from channel bottom to waterline.
- 12 A moderate accumulation of timber debris, consisting of 6 inch diameter and smaller limbs and branches, was observed along the south face of Pier 8. It extended from channel bottom to waterline.



SOUNDING PLAN

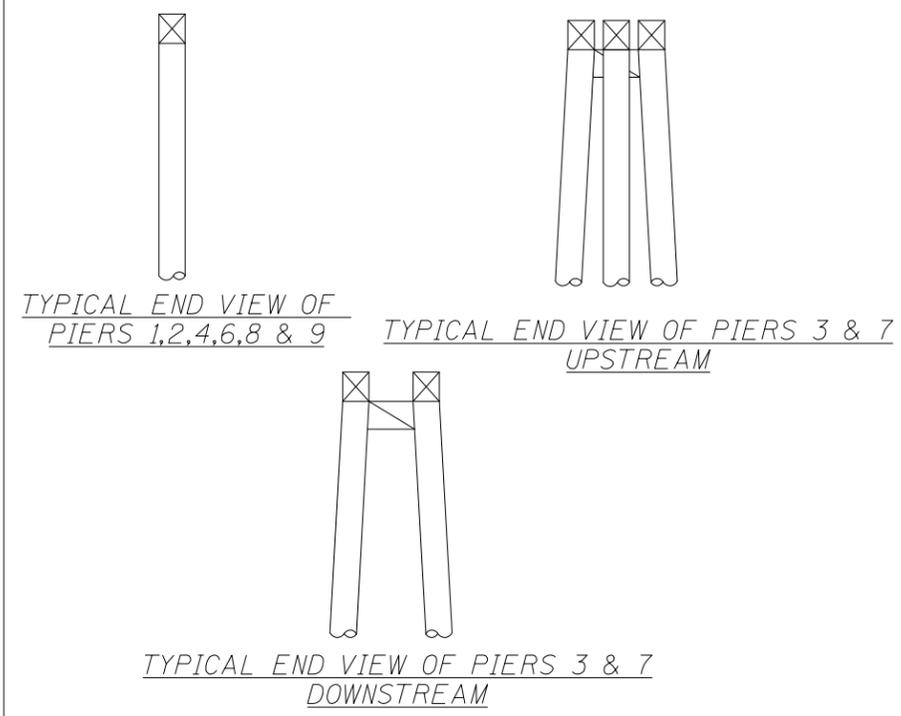
GENERAL NOTES:

1. The North Abutment and Piers 1 through 9 were inspected underwater.
2. At the time of inspection on June 7, 2012, the waterline was located 6.3 feet below the top of cap on the downstream end of Pier 8. This corresponds to a waterline elevation of 936.2.
3. Soundings indicate the water depth at the time of the inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at the mid points between the substructure units.

Legend

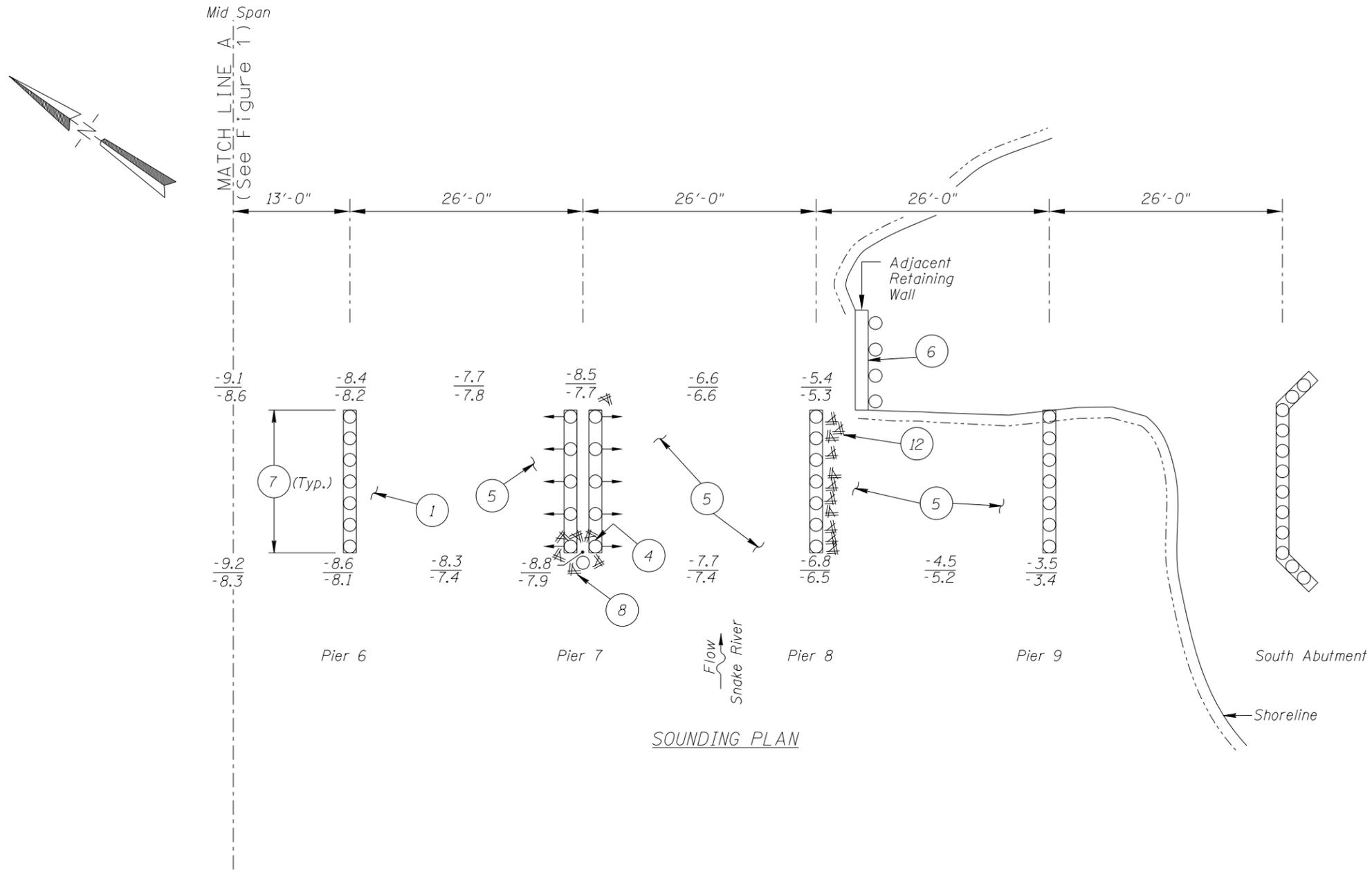
-7.0	Sounding Depth (6/7/12)
-7.1	Sounding Depth (8/23/07)
○	Timber Pile
○→	Battered Timber Pile
⊘	Timber Debris

Note:
All soundings based on 2012 waterline location.



MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 58506 OVER THE SNAKE RIVER DISTRICT I, PINE COUNTY		
INSPECTION AND SOUNDING PLAN I		
Drawn By: BJR	COLLINS ENGINEERS	Date: JUNE 2012
Checked By: BRL	<small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Scale: NTS
Code: 522I0073	<small>701 Xenia Avenue South, Suite 300 Minneapolis, MN 55416 www.wsbg.com</small>	Figure No.: I

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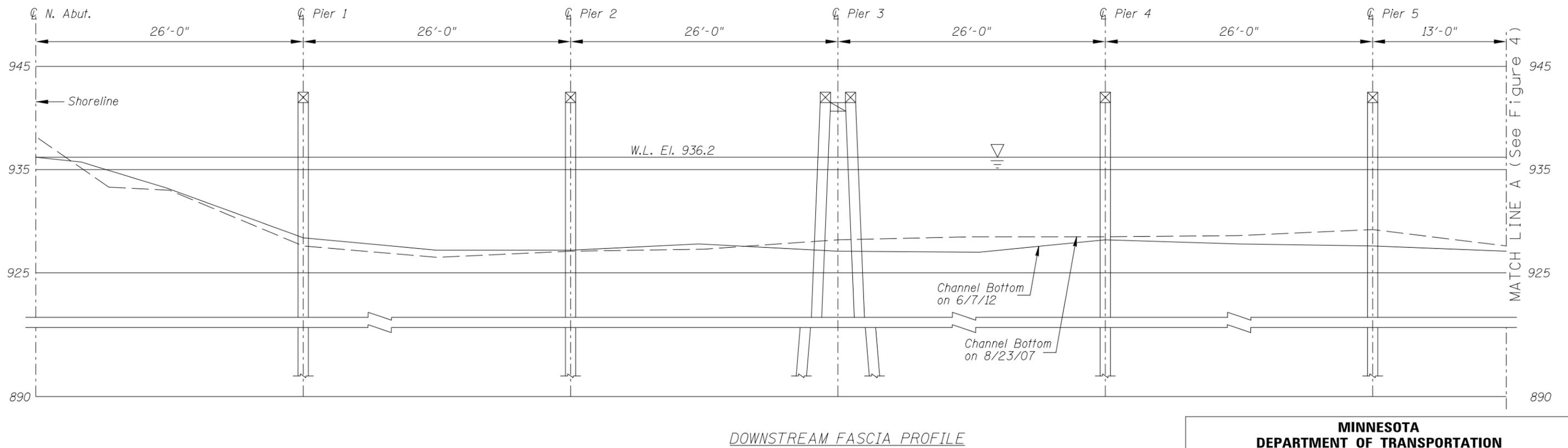
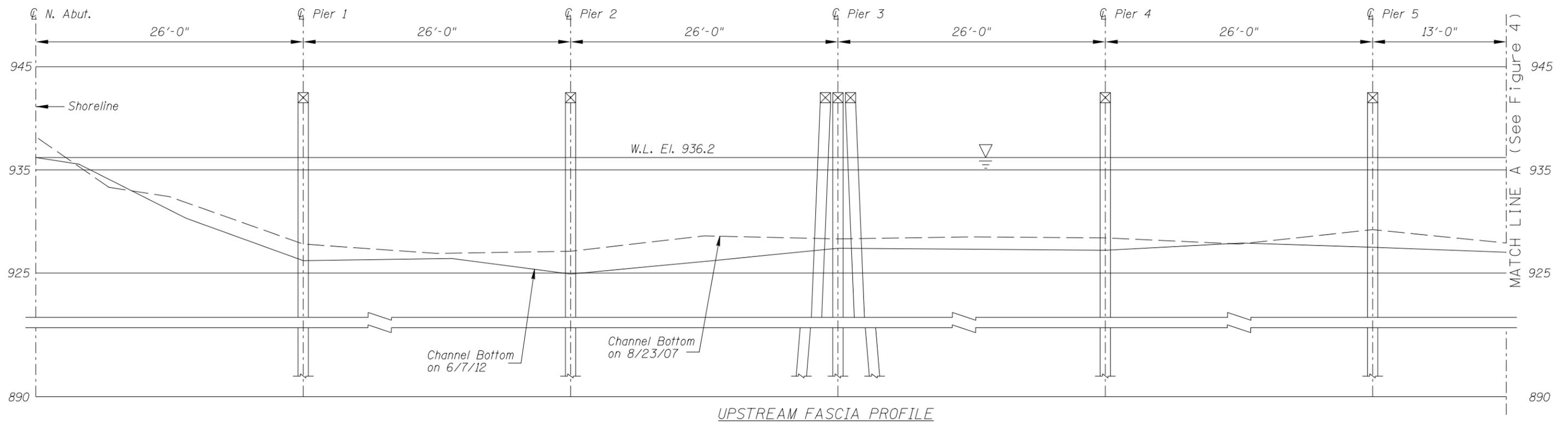
SOUNDING PLAN

Notes:
 Refer to Figure 1 for General Notes.
 Refer to Figure 1 for Inspection notes.
 All soundings based on 2012 waterline location.

- Legend
- 7.0 Sounding Depth (6/7/12)
 - 7.1 Sounding Depth (8/23/07)
 - Timber Pile
 - Battered Timber Pile
 - ⌘ Timber Debris

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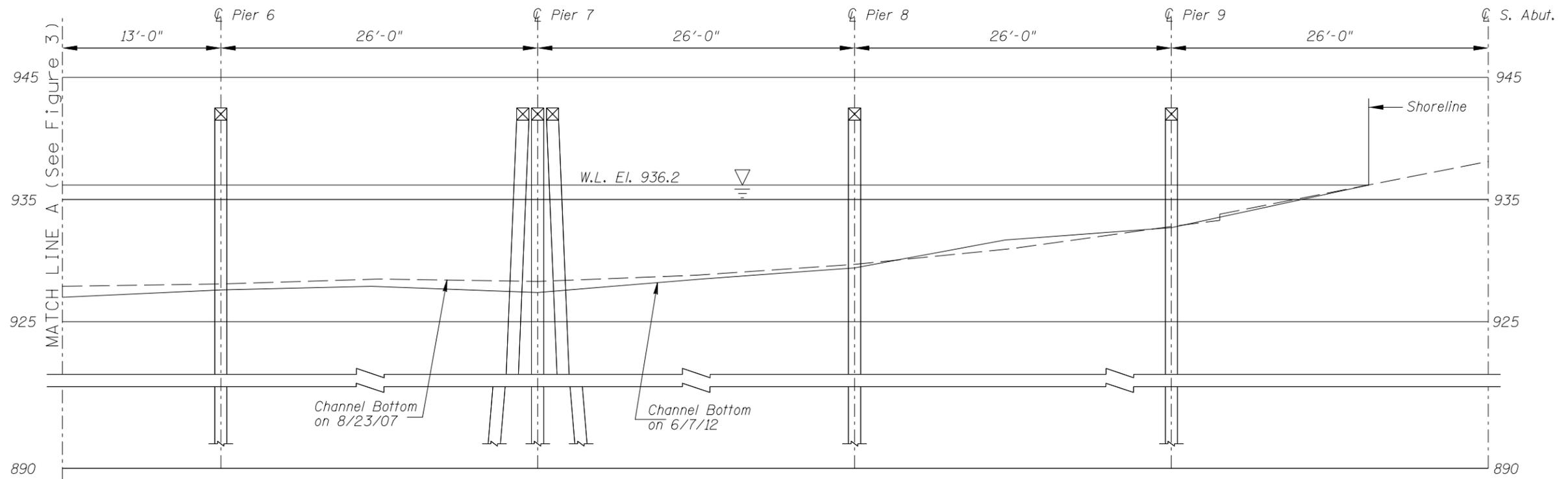
MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 58506 OVER THE SNAKE RIVER DISTRICT 1, PINE COUNTY		
INSPECTION AND SOUNDING PLAN II		
Drawn By: BJR	COLLINS ENGINEERS	Date: JUNE 2012
Checked By: BRL		Scale: NTS
Code: 52210073		Figure No.: 2



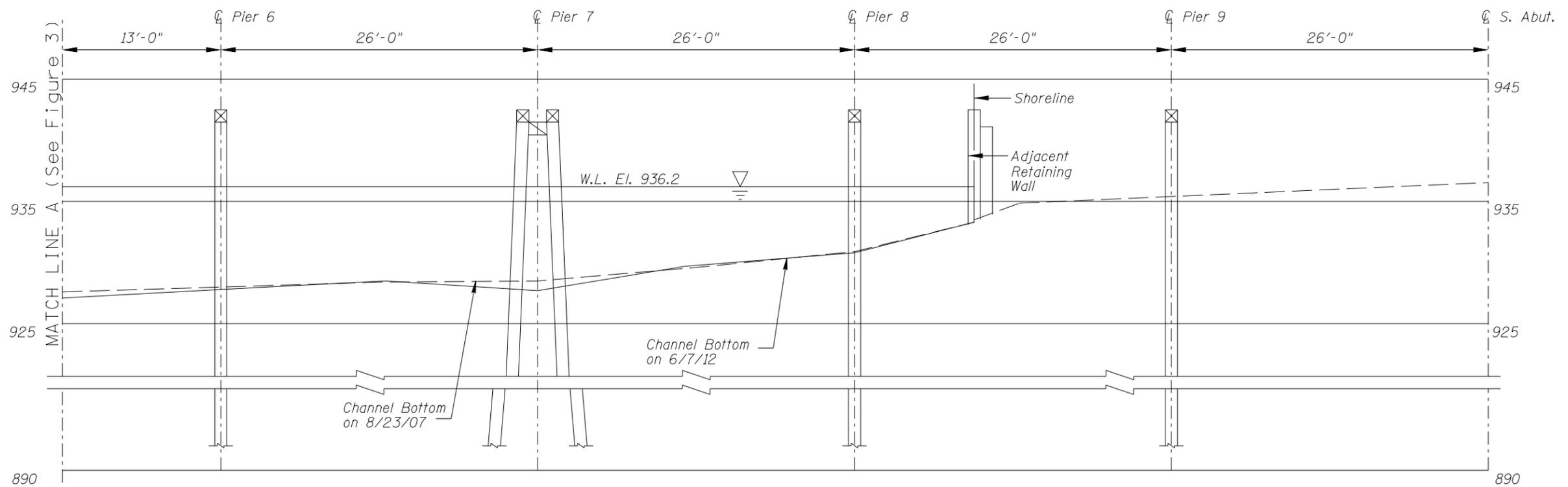
Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 58506 OVER THE SNAKE RIVER DISTRICT I, PINE COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES I		
Drawn By: BJR	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: JUNE 2012
Checked By: BRL		Scale: 1"=10'
Code: 52210073		Figure No.: 3

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UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 58506 OVER THE SNAKE RIVER DISTRICT I, PINE COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES II		
Drawn By: BJR	COLLINS ENGINEERS	Date: JUNE 2012
Checked By: BRL		Scale: 1"=10'
Code: 52210073		Figure No.: 4

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

INSPECTORS: WSB & Associates and Collins Engineers, Inc. DATE: June 7, 2012

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

BRIDGE NO: 58506 WEATHER: Sunny, 85° F

WATERWAY CROSSED: Snake River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Kasey Yoder (WSB), Ryan Breen (Collins)

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

TIME IN WATER: 3:00 p.m.

TIME OUT OF WATER: 3:35 p.m.

WATERWAY DATA: VELOCITY 1 ft/sec

VISIBILITY 1.5 feet

DEPTH 11.3 feet maximum at Pier 2

ELEMENTS INSPECTED: North Abutment and Piers 1 through 9

REMARKS: Overall, the piles were in satisfactory condition with random 1/4 inch checking and splitting. The retaining wall adjacent to Pier 8 was leaning and has failed. Light to moderate accumulations of timber debris were observed around the upstream pile of Piers 2, 3, 7, and 8. Heavy timber accumulation was found on Piers 4 and 5. The channel bottom material typically consisted of 6 to 12 inch diameter riprap with random deposits consisting of silty sand and organic material. The channel bottom appeared to be stable with no evidence of significant scour.

FURTHER ACTION NEEDED: YES NO

The timber debris accumulations at Piers 4 and 5 may cause excessive scour and lateral loads on the piers, as well as obstruct the channel flow. Therefore, it is recommended to remove the debris at this time.

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. 58506
 INSPECTORS WSB & Associates, Inc. / Collins Engineers, Inc.
 ON-SITE TEAM LEADER Barritt Lovelace P.E.
 WATERWAY CROSSED Snake River

INSPECTION DATE June 7, 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
	North Abutment	1'	6	N	N	8	N	6	8	6	5	6	5	N	N	6	N	N	N
	Pier 1	10'	6	N	N	8	6	6	8	7	7	N	6	N	N	6	N	N	N
	Pier 2	11.3'	6	N	N	8	6	6	8	N	N	6	6	N	N	6	N	N	N
	Pier 3	9.1'	6	N	N	8	6	6	8	N	N	6	6	N	N	6	N	N	N
	Pier 4	9.0'	6	N	N	8	6	6	8	N	N	5	5	N	N	6	N	N	N
	Pier 5	8.7'	6	N	N	8	6	6	8	N	N	5	5	N	N	6	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the piles were in satisfactory condition with random 1/4 inch checking and splitting. The retaining wall adjacent to Pier 8 was leaning and has failed. Light to moderate accumulations of timber debris were observed around the upstream pile of Piers 2, 3, 7, and 8. Heavy timber accumulation was found on Piers 4 and 5. The channel bottom material typically consisted of 6 to 12 inch diameter riprap with random deposits consisting of silty sand and organic material. The channel bottom appeared to be stable with no evidence of significant scour.

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.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 58506
INSPECTORS WSB & Associates, Inc. / Collins Engineers, Inc.
ON-SITE TEAM LEADER Barritt Lovelace P.E.
WATERWAY CROSSED Snake River

INSPECTION DATE June 7, 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.

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UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	SUBSTRUCTURE					CHANNEL					GENERAL						
			PIILING	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 6	8.6'	6	N	N	8	6	6	8	N	N	N	7	N	N	6	N	N	N
	Pier 7	8.8'	6	N	N	8	6	6	8	N	N	6	6	N	N	6	N	N	N
	Pier 8	6.8'	6	N	N	8	6	6	8	N	N	6	6	N	N	6	N	N	N
	Pier 9	3.5'	6	N	N	8	6	6	8	7	N	N	7	N	N	6	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the piles were in satisfactory condition with random 1/4 inch checking and splitting. The retaining wall adjacent to Pier 8 was leaning and has failed. Light to moderate accumulations of timber drift were observed around the upstream pile of Piers 2, 3, 7, and 8. Heavy timber accumulation was found on Piers 4 and 5. The channel bottom material typically consisted of 6 to 12 inch diameter riprap with random deposits consisting of silty sand and organic material. The channel bottom appeared to be stable with no evidence of significant scour.

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.