

UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 58510

CSAH NO. 61

OVER THE

SNAKE RIVER

DISTRICT 1 - PINE COUNTY

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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. 58510, Piers 1 through 4, were found to be in fair condition with light to moderate corrosion and pitting along the pile surfaces. The steel deterioration has progressed since the previous inspection, but has still not compromised the piers' structural integrity. The channel bottom around the substructure units and the shorelines appeared stable with no significant scour or changes since the last inspection.

INSPECTION FINDINGS:

- (A) There was light to moderate corrosion, with up to 1/2 inch diameter nodular rust covering approximately 50% to 100% of the surface area of the piles with up to 1/8 inch deep pitting, extending from 1 foot below waterline to channel bottom.
- (B) Four deformations were found on the easternmost pile of Pier 4. These deformations measured up to 2 inches deep and 8 inches in diameter and were accompanied by moderate corrosion and some pitting.
- (C) Metal dock framing debris was observed around the two upstream piles of Pier 1.

RECOMMENDATIONS:

- (A) Monitor corrosion of the steel piles during future underwater inspections.
- (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,

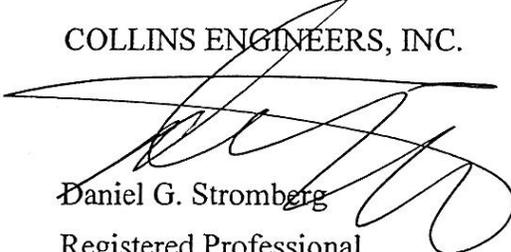
PROFESSIONAL ENGINEER

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: 58510

Feature Crossed: Snake River

Feature Carried: CSAH No. 61

Location: District 1 - Pine County

Bridge Description: The superstructure consists of five spans of precast concrete deck slabs. The superstructure is supported by four piers and two concrete abutments. The piers are numbered 1 through 4 starting from the south end of the bridge. Each pier consists of a concrete cap supported by twelve concrete filled, steel shell piles.

2. INSPECTION DATA

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

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

Date: June 7, 2012

Weather Conditions: Sunny, 75° F

Underwater Visibility: 2.0 feet

Waterway Velocity: 2.0 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 through 4.

General Shape: Each pier consists of a rectangular shaped concrete cap supported by twelve concrete filled, steel shell piles in a single row.

Maximum Water Depth at Substructure Inspected: Approximately 12.8 feet.

4. WATERLINE DATUM

Water Level Reference: The top of cap at the downstream end of Pier 1.

Water Surface: The waterline was approximately 7.5 feet below reference.  
Water Elevation = 935.3.

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

Item 60: Substructure: Code 5

Item 61: Channel and Channel Protection: Code 6

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 the Downstream Fascia, Looking Southwest.



Photograph 2. View of the Upstream Fascia, Looking South.



Photograph 3. View of the Upstream Facia, Looking Southeast.



Photograph 4. View of Pier 1 and South Abutment, Looking Southeast.



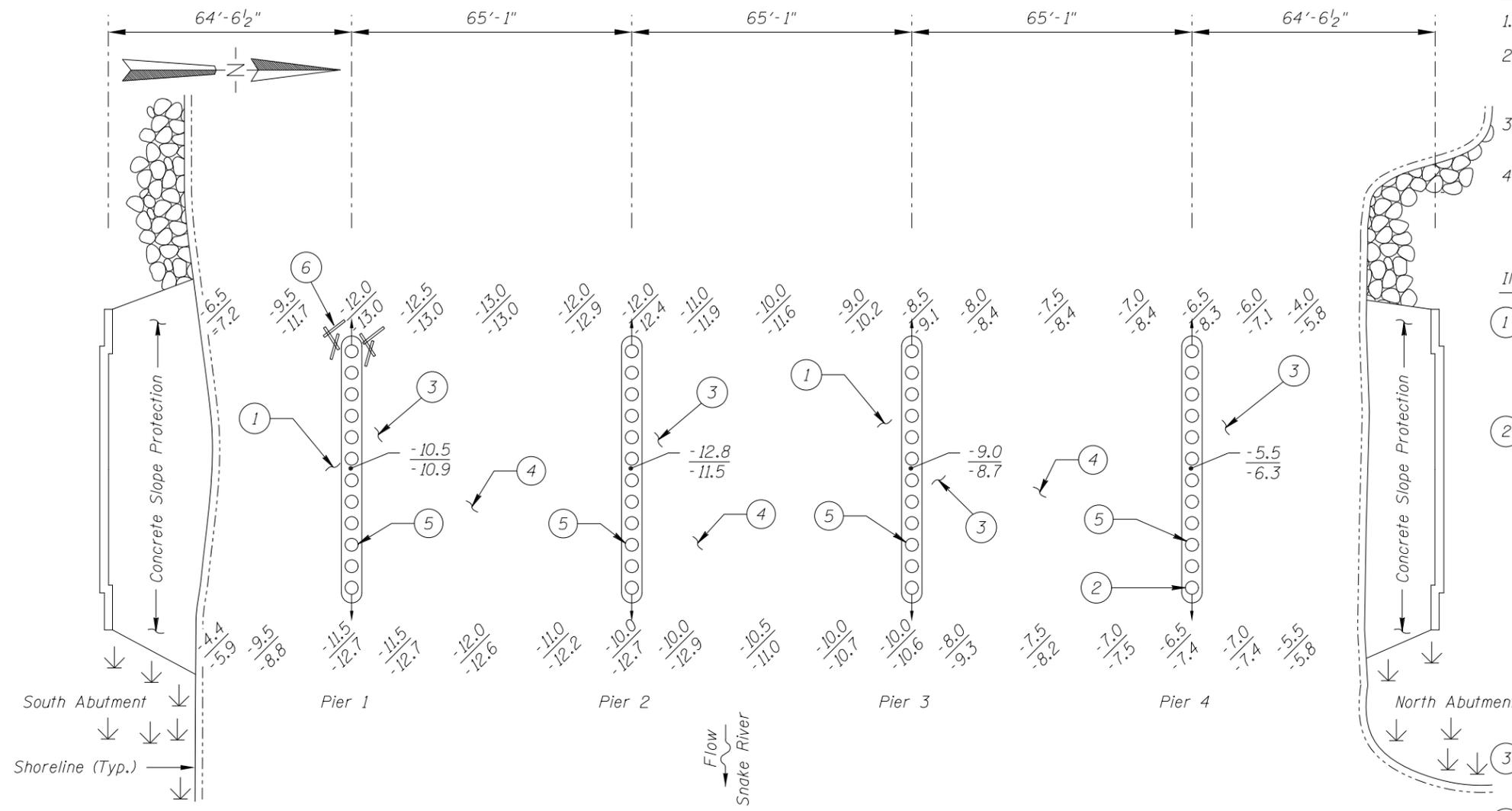
Photograph 5. View of Pier 2, Looking Southeast.



Photograph 6. View of Pier 3, Looking Southeast.



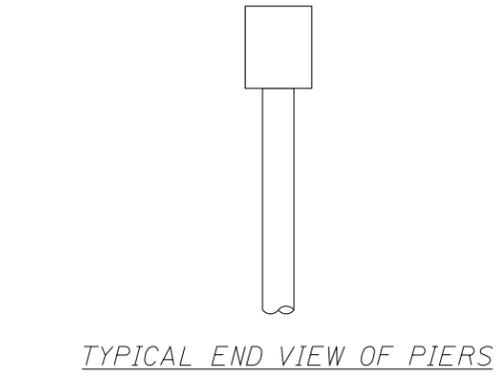
Photograph 7. View of Pier 4, Looking Southwest.



**SOUNDING PLAN**

- GENERAL NOTES:**
- Piers 1 through 4 were inspected underwater.
  - At the time of inspection on June 7, 2012, the waterline was located 7.5 feet below the top of the pile cap at the downstream end of Pier 1. This corresponds to a waterline elevation of 935.3.
  - Soundings indicate water depth at the time of inspection and are measured in feet.
  - Soundings were taken parallel to the bridge at 1/4 points intervals between the substructure units.

- INSPECTION NOTES:**
- A light amount of scattered timber debris, 3 inch diameter and smaller, was observed along the south side of Piers 1 and 2. A light to moderate accumulation of timber debris 6 inch diameter and smaller, was observed at the upstream half of Pier 3 extending from channel bottom to 3 feet below the waterline.
  - Four deformations were present on the east and south side of the easternmost pile:
    - A 6 inch wide by 3 inch high by 2 inch deep dent was located 4 feet below water on the south face.
    - A 6 inch by 3 inch high by 1 inch deep dent located at 3 feet below the waterline.
    - A 6 inch diameter by 2 inch deep dent located at the waterline. This dent was accompanied by 1/8 inch deep corrosion pitting.
    - An 8 inch diameter by 1 inch deep dent located at 1.5 foot below the waterline.
  - Timber piles from an earlier structure were located along the north side of each pier. The tops of the piles were located at 2 feet above channel bottom.
  - Channel bottom material consisted of gravelly sand with scattered riprap and cobbles allowing 2 inches of maximum probe rod penetration.
  - Light to moderate corrosion on all piles from bottom of cap to the channel bottom with up to 1/2 inch diameter rust nodules below water covering approximately 50% to 100% of the surface area of the piles, with a maximum of 1/8 inch deep pitting from 1 foot below waterline to channel bottom.
  - Metal dock framing debris was observed around the two upstream piles of Pier 1.



**TYPICAL END VIEW OF PIERS**

**Legend**

-2.0	Sounding Depth (6/7/12)
-5.2	Sounding Depth (8/23/07)
○	Concrete Filled Pipe Pile
○→	Concrete Filled Battered Pipe Pile
⊠	Riprap
↓	Grassy Vegetation

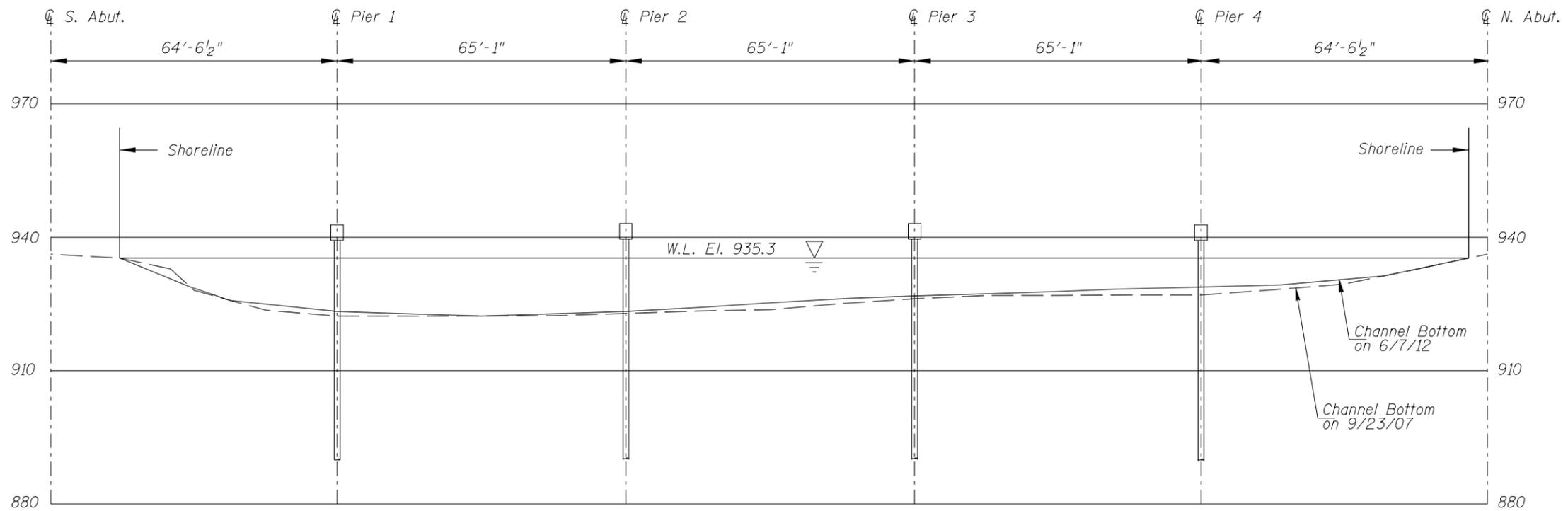
**Note:**  
All soundings based on 2012 waterline location.

**MINNESOTA  
DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION**

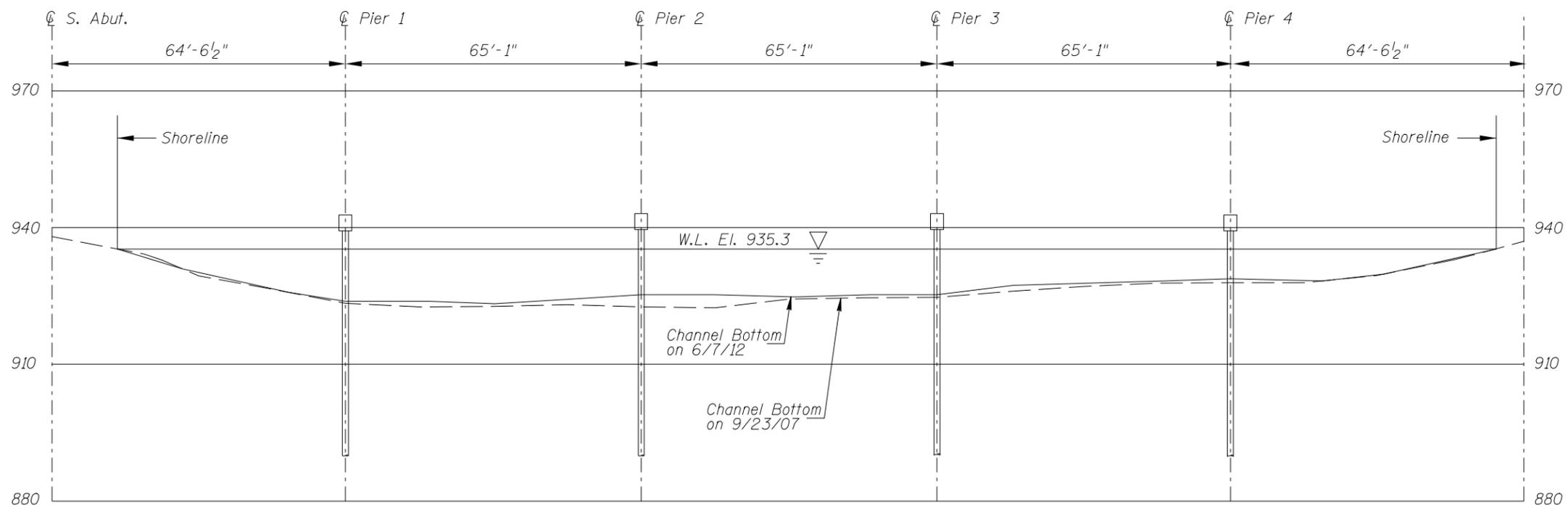
STRUCTURE NO. 58510  
OVER THE SNAKE RIVER  
DISTRICT 1, PINE COUNTY

**INSPECTION AND SOUNDING PLAN**

Drawn By: BJR	<b>COLLINS ENGINEERS</b>	123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: JUNE 2012
Checked By: BRL		Scale: NTS	
Code: 52210072		Figure No.: 1	



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

**MINNESOTA  
DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION**

STRUCTURE NO. 58510  
OVER THE SNAKE RIVER  
DISTRICT 1, PINE COUNTY

UPSTREAM AND DOWNSTREAM  
FASCIA PROFILES



Drawn By: BJR  
Checked By: BRL  
Code: 52210072

**COLLINS  
ENGINEERS**  
123 North Wacker Drive  
Suite 300  
Chicago, IL 60606  
(312) 704-9300  
www.collinsengr.com

Date: JUNE 2012  
Scale: 1"=30'  
Figure No.: 2

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: 58510 WEATHER: Sunny, 75° F

WATERWAY CROSSED: Snake River

DIVING OPERATION:  SCUBA  SURFACE SUPPLIED AIR  
 OTHER

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

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

TIME IN WATER: 12:00 p.m.

TIME OUT OF WATER: 1:30 p.m.

WATERWAY DATA: VELOCITY 2 ft/sec

VISIBILITY 2.0 feet

DEPTH 12.8 feet maximum at Pier 2

ELEMENTS INSPECTED: Piers 1 through 4

REMARKS: Overall, the steel piles were in fair condition with light to moderate corrosion and up to 1/2 inch diameter nodular rust covering approximately 50% to 100% of the surface area of the piles with up to 1/8 inch deep pitting extending from 1 foot below the waterline to channel bottom. Four dents were observed on the easternmost pile of Pier 4. Abandoned timber piles were observed in random locations along all piers protruding approximately 2 feet above the channel bottom. Light accumulations of timber debris were observed along south side of Piers 1 and 2, and the upstream half of Pier 3 had a light to moderate accumulation of debris from the channel bottom up 3 feet. Also, an accumulation of metal dock framing was observed at the upstream piles of Pier 1. The channel bottom consisted of sandy gravel with cobbles and appeared stable with no evidence of significant scour.

FURTHER ACTION NEEDED:  YES  NO

Monitor corrosion of the steel piles during future underwater inspections.

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. 58510  
 INSPECTORS WSB & Associates, Inc. / Collins Engineering, 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
	Pier 1	12'	5	N	N	8	N	5	8	8	8	6	6	N	5	N	5	N	N
	Pier 2	12.8'	5	N	N	8	N	5	8	N	N	6	6	N	5	N	5	N	N
	Pier 3	10'	5	N	N	8	N	5	8	N	N	6	6	N	5	N	5	N	N
	Pier 4	6.5'	5	N	N	8	N	5	8	8	8	7	7	N	5	N	5	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the steel piles were in fair condition with light to moderate corrosion and up to 1/2 inch diameter nodular rust covering approximately 50% to 100% of the surface area of the piles with up to 1/8 inch deep pitting extending from 1 foot below the waterline to channel bottom. Four dents were observed on the easternmost pile of Pier 4. Abandoned timber piles were observed in random locations along all piers protruding approximately 2 feet above the channel bottom. Light accumulations of timber debris were observed along south side of Piers 1 and 2, and the upstream half of Pier 3 had a light to moderate accumulation of debris from the channel bottom up 3 feet. Also, an accumulation of metal dock framing was observed at the upstream piles of Pier 1. The channel bottom consisted of sandy gravel with cobbles and appeared 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.