

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 7221

CR NO. 24

OVER

VERMILLION RIVER

ST. LOUIS COUNTY



JUNE 22, 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. 7221, Piers 1 and 2, were found to be generally in good condition. The concrete was typically sound with only light scaling present. Scour depressions, 6 feet in radius and a maximum of 2 feet deep, were observed at the upstream and downstream columns of Piers 1 and 2. Otherwise, the channel bottom at the bridge appeared stable.

INSPECTION FINDINGS:

- (A) Scaling was observed from 3 feet below the waterline to the channel bottom with a 1/4 inch typical penetration and a 1/2 inch maximum penetration at the upstream and downstream columns of Piers 1 and 2.
- (B) Scour depressions, 6 feet in radius with a maximum depth of 2 feet, were observed at the upstream and downstream columns of both piers.
- (C) A light accumulation of timber debris, consisting of logs up to 6 inches in diameter, was located on the channel bottom at the upstream column of Pier 2.
- (D) A light accumulation of timber debris, consisting of 8 inch diameter and smaller logs and branches, was observed on the channel bottom at the upstream column of Pier 1.
- (E) The channel bottom material consisted of scattered rocks up to 2 feet in diameter with sandy silt and gravel allowing up to 6 inches of probe rod penetration.

RECOMMENDATIONS:

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

Inspection Team Leader:
Daniel G. Stromberg, P.E.

Respectfully submitted,

PROFESSIONAL ENGINEER

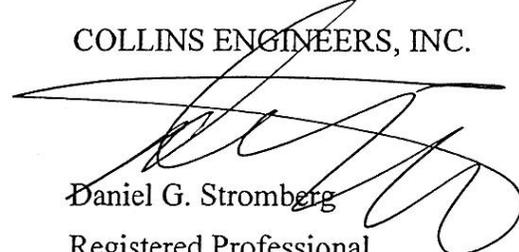
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

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: 7221

Feature Crossed: Vermillion River

Feature Carried: CR No. 24

Location: St. Louis County

Bridge Description: The superstructure consists of a three span, steel girder bridge supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and two reinforced concrete column bents. The columns are founded on rectangular footings keyed into bedrock. The piers are numbered 1 and 2, starting from the south end of the bridge.

2. INSPECTION DATA

Professional Engineer Diver: Daniel G. Stromberg, P.E., S.E.

Dive Team: Clayton Brookins, Breanne Stromberg

Date: June 22, 2012

Weather Conditions: Sunny, 75° F

Underwater Visibility: 4.0 feet

Waterway Velocity: 1.5 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2

General Shape: The piers consist of a rectangular reinforced concrete pile cap supported by two concrete columns.

Maximum Water Depth at Substructure Inspected: Approximately 8.0 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap at the upstream end of Pier 2.

Water Surface: The waterline was approximately 6.0 feet below reference.
Waterline Elevation = 1210.5.

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 7

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

Item 113: Scour Critical Bridges: Code F/12

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	Reinforced Concrete Column	4	EA	4				



Photograph 1. View of Upstream Fascia, Looking Southwest.



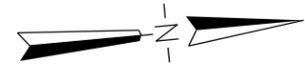
Photograph 2. View of Downstream Fascia, Looking Northeast.



Photograph 3. View of Pier 1, Looking Northeast.



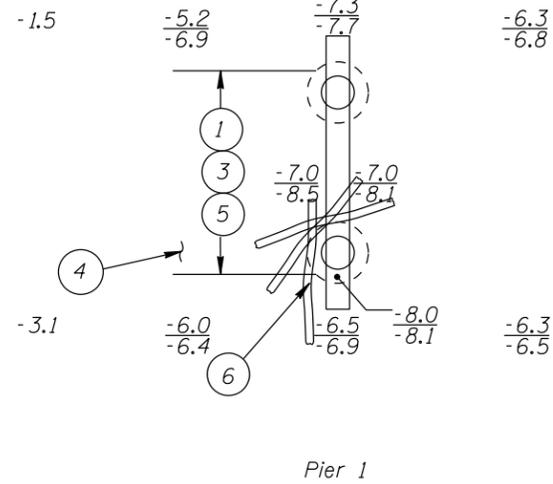
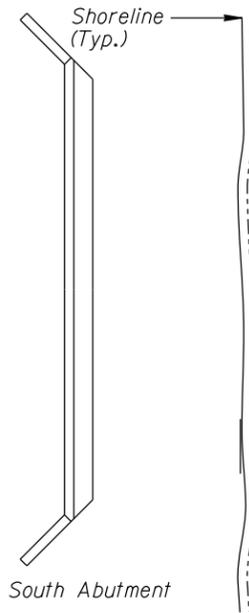
Photograph 4. View of Pier 2, Looking Southwest.



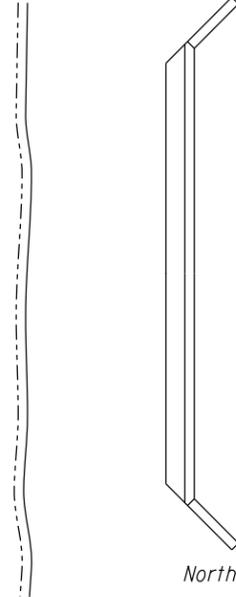
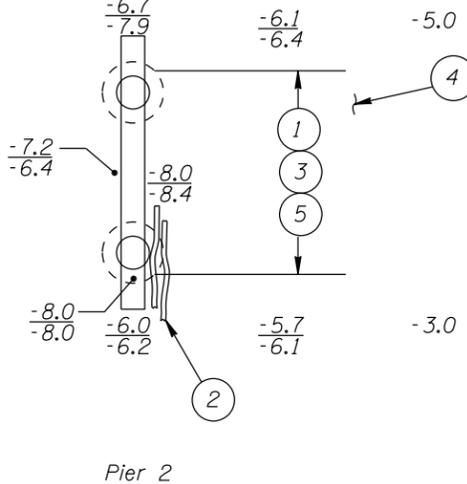
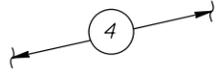
64'-0"

80'-0"

64'-0"



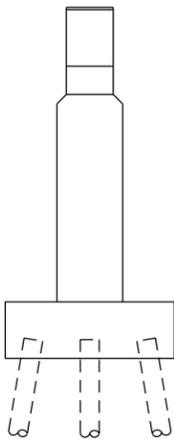
Flow
Vermillion River



INSPECTION NOTES:

- 1 Overall, the concrete was sound with no significant deterioration present.
- 2 A light accumulation of timber debris, consisting of two 6 inch diameter logs (approx. 10 feet long each), was located on the channel bottom across the upstream column of Pier 2.
- 3 Scaling was observed 3 feet below the waterline to channel bottom with a 1/2 inch maximum penetration (1/4 inch typical) at upstream and downstream columns of Piers 1 & 2.
- 4 Channel bottom material consisted of scattered rocks 2 feet in diameter and smaller, sandy silt, and gravel with up to 6 inches of probe rod penetration.
- 5 Scour depression 6 feet in radius, 2 feet deep was observed at upstream column of Piers 1 & 2. Also, scour depression 6 feet in radius, 1 foot deep was observed at downstream column of Piers 1 & 2.
- 6 A light accumulation of timber debris, consisting of three 8 inch diameter logs (approx. 15 feet long each), was located on the channel bottom across the upstream column of Pier 1.

SOUNDING PLAN



TYPICAL END VIEW OF PIERS

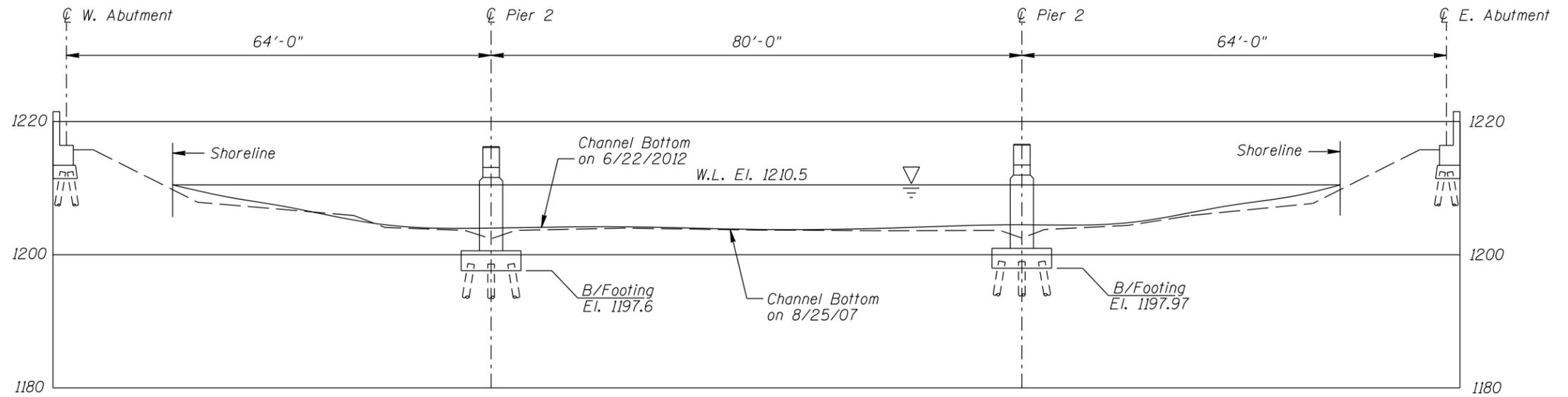
GENERAL NOTES:

1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection on June 22, 2012 the waterline was located approximately 6.0 feet below the top of the pier cap at the upstream end of Pier 2. This corresponds to a waterline elevation of 1210.5 based on design drawings.
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.

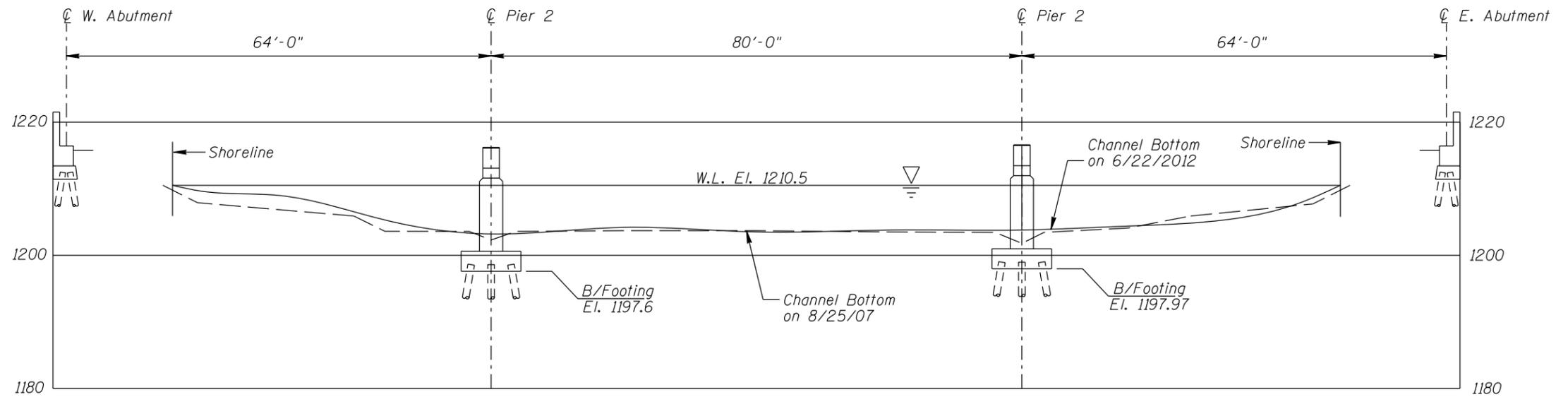
Legend

- 4.0 Sounding Depth (6/22/12)
- 4.0 Sounding Depth (8/25/07)
- Scour Depression

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 7221 CR 24 OVER THE VERMILLION RIVER ST. LOUIS COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: BMS	COLLINS ENGINEERS	Date: JUNE 2012
Checked By: LJ	<small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Scale: NTS
Code: 74237221		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. 7221 CR 24 OVER THE VERMILLION RIVER ST. LOUIS COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: BMS	COLLINS ENGINEERS	Date: JUNE 2012
Checked By: LJ		Scale: 1"=20'
Code: 74237221		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: June 22, 2012

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E., S.E.

BRIDGE NO: 7221 WEATHER: Sunny, 75° F

WATERWAY CROSSED: Vermillion River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Clayton Brookins, Breanne Stromberg

EQUIPMENT: Commercial Scuba, Hand Tools, Lead Line, Sounding Pole, Camera

TIME IN WATER: 2:30 P.M.

TIME OUT OF WATER: 3:30 P.M.

WATERWAY DATA: VELOCITY 1.5 ft/sec

VISIBILITY 4.0 feet

DEPTH 8.0 feet maximum at both piers

ELEMENTS INSPECTED: Piers 1 and 2

REMARKS: Overall, concrete was in good condition. Scaling was observed from 3 feet above the waterline to the channel bottom at the upstream and downstream columns of Piers 1 and 2. Scour depressions, 6-foot-radius with a maximum depth of 2 feet, were observed at the upstream and downstream columns of both piers. Light accumulations of timber debris were observed at the upstream columns of Piers 1 and 2.

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. 7221
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER. Daniel G. Stromberg, P.E., S.E.
 WATERWAY CROSSED Vermillion River

INSPECTION DATE June 22, 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	8.0'	N	7	N	8	N	7	7	8	8	7	7	7	N	N	N	N	N
	Pier 2	8.0'	N	7	N	8	N	7	7	8	8	7	7	7	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, concrete was in good condition. Scaling was observed from 3 feet above the waterline to the channel bottom at the upstream and downstream columns of Piers 1 and 2. Scour depressions, 6-foot-radius with a maximum depth of 2 feet, were observed at the upstream and downstream columns of both piers. Light accumulations of timber debris were observed at the upstream columns of Piers 1 and 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.