UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 24514

MSAS NO. 109 (FRONT ST.)

OVER THE

SHELL ROCK CHANNEL

DISTRICT 6 - FREEBORN COUNTY, CITY OF ALBERT LEA

SEPTEMBER 30, 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. 24514, Piers 1 and 2, were found to be in satisfactory to fair condition. The concrete abutments, located out of the waterway at the time of inspection, were in good condition with no structurally significant defects observed. However, the concrete encasements on the steel piles at the piers were heavily deteriorated and exhibited areas of considerable section loss and exposed steel reinforcing. The steel H-piles were generally in satisfactory condition below the waterline and exhibited coating failure and moderate surface corrosion. The channel bottom appeared stable no significant changes since the previous underwater inspection.

INSPECTION FINDINGS:

(A) The channel bottom material along the West Abutment consisted of silty sand with 4 inch to 2 feet of probe rod penetration.

(B) The channel bottom material at Piers 1 and 2 consisted of sandy gravel, cobbles, and rocks up to 2 feet in diameter with up to 8 inches of probe rod penetration.

(C) Overall, the concrete abutments were in smooth and sound condition with no structurally significant defects observed.

(D) The steel H-piles exhibited 100 percent coating failure with moderate surface corrosion and 1/4-inch typical to 1 inch maximum diameter rust nodules and 1/32-inch-deep pitting over approximately 50 percent of the surface area.

(E) The concrete encasements exhibited map cracking and widespread areas of section loss with up to 6 inches of penetration. Frequent areas of exposed reinforcing were also observed.

(F) Timber and steel formwork was still in place at bottom of the concrete encasements.

(G) A welded steel H-pile splice was observed 6 feet below the waterline and appeared to be in good condition.

(H) An area of section loss, 2 feet high by 2 feet wide, was observed above the waterline with up to 1 inch of penetration.

RECOMMENDATIONS:

(A) The concrete encasements of the steel H-piles have deteriorated to the point where repair is not cost-effective. It should be noted that the encasements are for cosmetic and pile protection reasons, and that overall pier and pile integrity has yet to be adversely affected by the encasement problems. If full protective encasement is considered necessary, encasement replacement would be the appropriate remedial measure.

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

Inspection Team Leader

Roy Forsyth

Roy A. Forsyth, PE
Date 6/30/2014 License# 49270

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: 24514

Feature Crossed: Shell Rock Channel

Feature Carried: MSAS No. 109

Location: District 6 - Freeborn County, City of Albert Lea

Bridge Description: The bridge consists of three spans of precast concrete double-tees. The superstructure is supported by two reinforced concrete abutments and two steel H-pile bents. The abutments are supported by footings on steel H-piles. The bents are labeled Piers 1 and 2 starting from the westerly direction.

2. INSPECTION DATA

Professional Engineer/Team Leader: Roy A. Forsyth, P.E.

Dive Team: Charles R. Euwema, Jordan T. Furlan, P.E.

Date: September 30, 2012

Weather Conditions: Sunny, 75°F

Underwater Visibility: 0.5 feet

Waterway Velocity: None/Negligible

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: The East and West Abutments (located out of the waterway at the time of inspection) and Piers 1 and 2.

General Shape: The abutments each consist of a reinforced concrete breastwall and two perpendicular reinforced concrete wingwalls that are all founded on steel H-pile supported footings. The piers consist of a single line of 10 steel H-piles each. The upper portions of the steel H-piles are protected in a cylindrical concrete encasement that runs from the pile cap to below water.

Maximum Water Depth at Substructure Inspected: Approximately 9.0 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pile cap on the north end of Pier 1.

Water Surface: The waterline was approximately 9.4 feet below reference.
Waterline Elevation = 60.9

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 8

Item 92B: Underwater Inspection: Code B/09/12

Item 113: Scour Critical Bridges: Code I/92

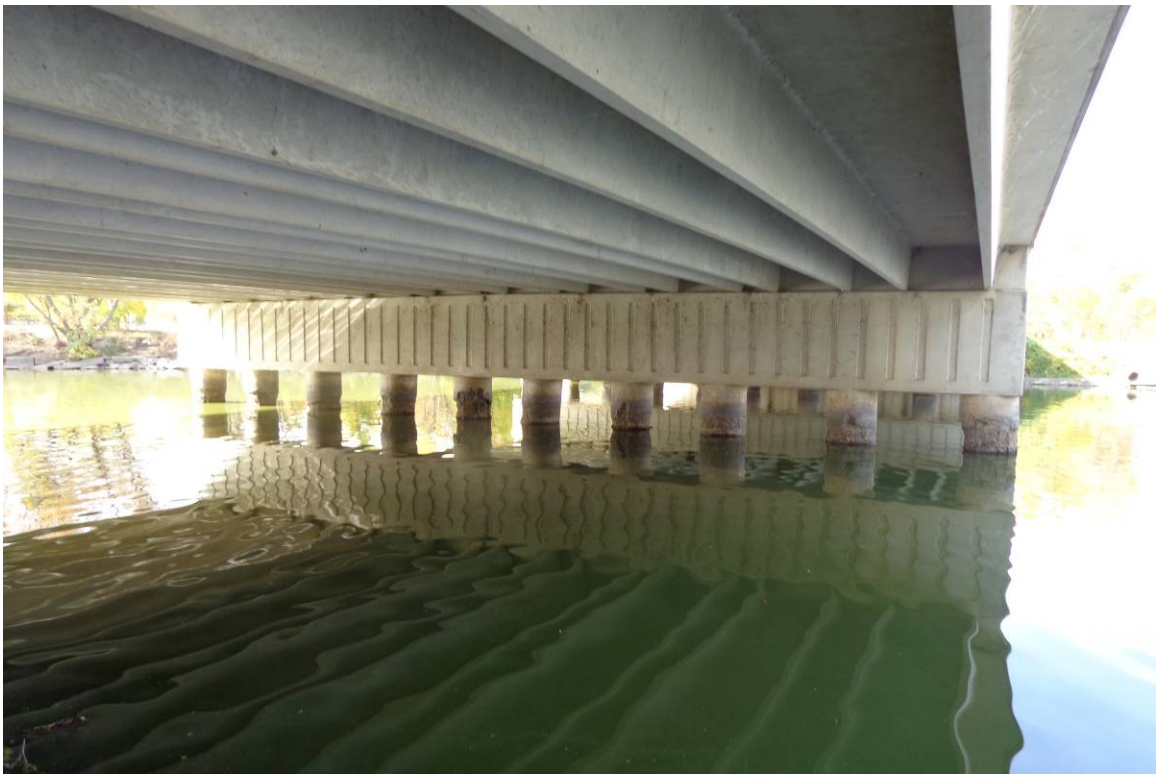
Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

_____Yes X No

6. STRUCTURAL ELEMENT CONDITION RATING

Item #	Element Description	Quantity	Unit	Conditions				
				1	2	3	4	5
419	Steel Piling	20	EA		20			
215	Reinforced Concrete Abutment	126	LF	124	2			

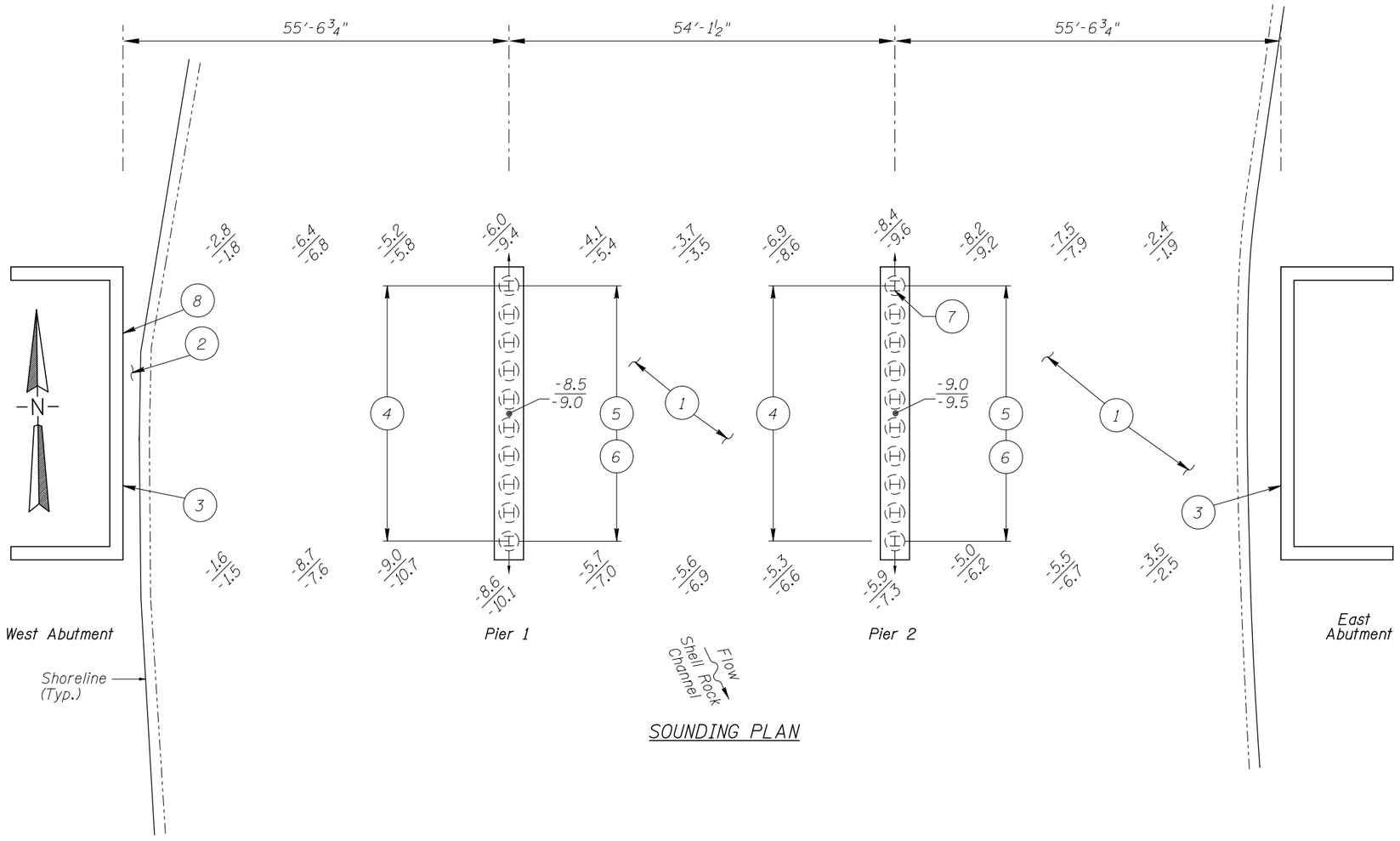
Photograph 1. View of Pier 1, Looking Southeast.



Photograph 2. View of Pier 2, Looking Southwest.

Photograph 3. View of Typical Concrete Section Loss Near the Waterline, Looking West.

Photograph 4. Overall View of the Structure, Looking Northwest.



SOUNDING PLAN

TYPICAL END VIEW OF PIERS

GENERAL NOTES:

1. Piers 1 and 2 were inspected underwater.
2. At the time of inspection on September 30, 2012, the waterline was located approximately 9.4 feet below the top of the pier cap at the north end of Pier 1. This corresponds with a waterline elevation of 60.9.
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 1/4 point intervals between the substructure units.

INSPECTION NOTES:

(1) The channel bottom consisted of silty sand with 4 inch to 2 feet of probe rod penetration.

(2) The channel bottom consisted of sandy gravel, cobbles and rocks up to 2 feet in diameter with up to 8 inches of probe rod penetration.

(3) Overall, the concrete abutments were in smooth and sound condition with no structurally significant defects observed.

(4) The steel H-piles exhibited 100 percent coating failure with moderate surface corrosion and 1/4-inch typical to 1 inch maximum diameter rust nodules and 1/32-inch-deep pitting over approximately 50 percent of the surface area.

(5) The concrete encasements exhibited map cracking and widespread areas of section loss with up to 6 inches of penetration. Frequent areas of exposed reinforcing were also observed.

(6) Timber and steel formwork was still in place at bottom of encasements.

(7) A welded steel H-pile splice was observed 6 feet below the waterline and appeared to be in good condition.

(8) An area of section loss, 2 feet high by 2 feet wide, was observed above the waterline with up to 1 inch of penetration.

Legend

-2.0	Sounding Depth (9/30/12)
-5.2	Sounding Depth (10/22/07)
H	Steel H-Pile
	Battered Steel H-Pile

Note:

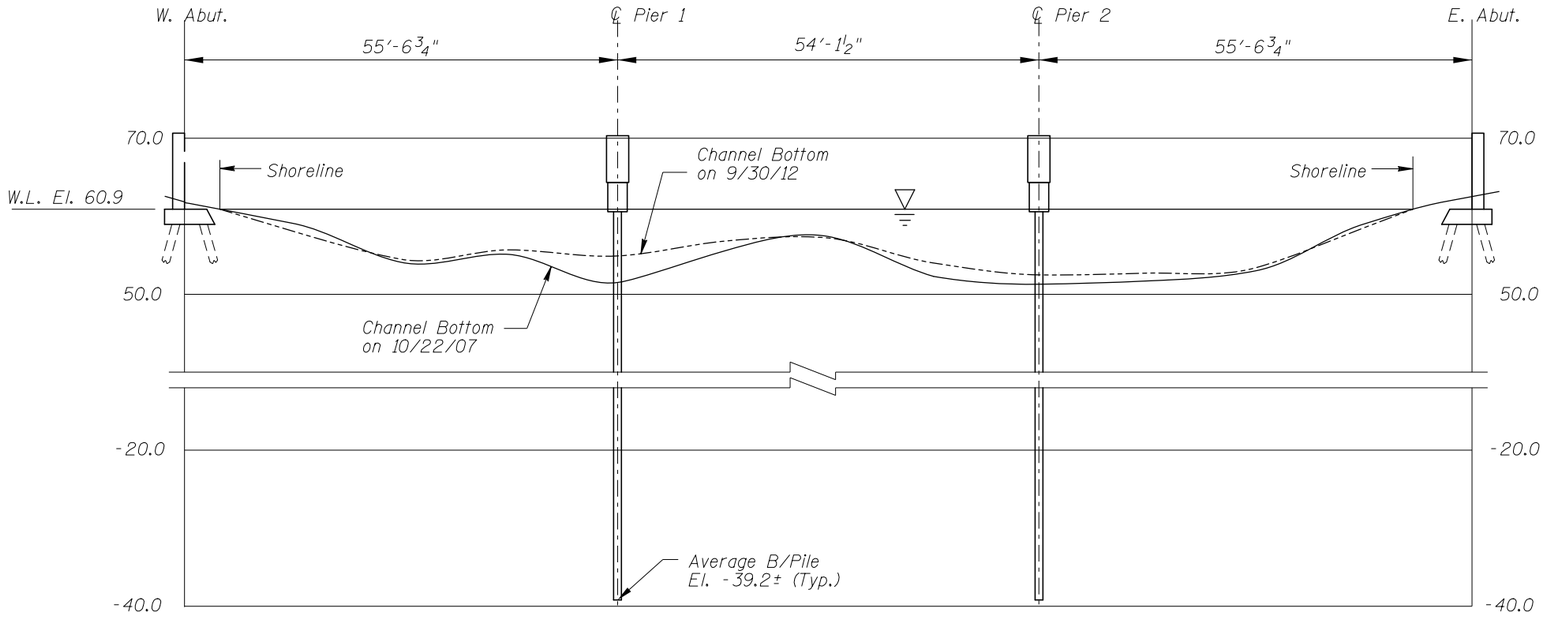
All soundings based on 2012 waterline location.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

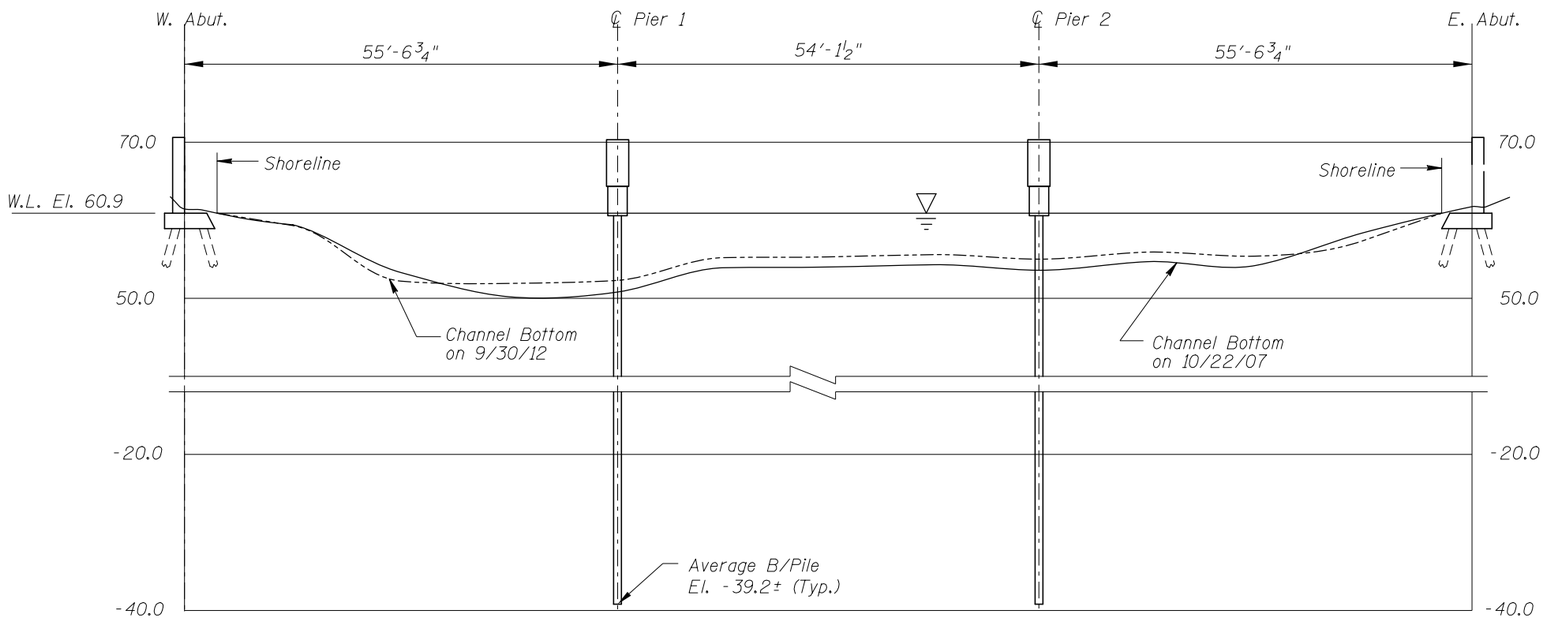
STRUCTURE NO. 24514
OVER THE SHELL ROCK CHANNEL
DISTRICT 6, FREEBORN COUNTY, CITY OF ALBERT LEA

INSPECTION AND SOUNDING PLAN

Drawn By: CRE	COLLINS ENGINEERS INC 123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: SEPT. 2012
Checked By: RAF		Scale: NTS
Code: 52210142		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. 24514
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DISTRICT 6, FREEBORN COUNTY, CITY OF ALBERT LEA

UPSTREAM AND DOWNSTREAM
FASCIA PROFILES

Drawn By: CRE	COLLINS ENGINEERS, INC. 123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: SEPT. 2012
Checked By: RAF		Scale: 1"=20'
Code: 52210142		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: September 30, 2012

ON-SITE TEAM LEADER: Roy A. Forsyth, P.E.

BRIDGE NO: 24514 WEATHER: Sunny, 75°F

WATERWAY CROSSED: Shell Rock Channel

DIVING OPERATION: X SCUBA _____ SURFACE SUPPLIED AIR

_____ OTHER _____

PERSONNEL: Charles R. Euwema, Jordan T. Furlan, P.E.

EQUIPMENT: Commercial Scuba, Sounding Pole, Lead Line, Probe Rod, Camera, Scraper

TIME IN WATER: 12:15 p.m.

TIME OUT OF WATER: 12:30 p.m.

WATERWAY DATA: VELOCITY 0.0 ft/s

VISIBILITY 0.5 feet

DEPTH 9.0 feet maximum at Pier 2

ELEMENTS INSPECTED: Piers 1 and 2

REMARKS: Overall Piers 1 and 2, were found to be in satisfactory to fair condition. The concrete abutments, located out of the waterway at the time of inspection, were in good condition with no structurally significant defects observed. However, the concrete encasements on the steel piles at the piers were heavily deteriorated and exhibited areas of considerable section loss and exposed steel reinforcing. The steel H-piles were generally in satisfactory condition below the waterline and exhibited coating failure and moderate surface corrosion. The channel bottom appeared stable no significant changes since the previous underwater inspection.

FURTHER ACTION NEEDED: ___X___ YES _____ NO

The concrete encasements of the steel H-piles have deteriorated to the point where repair is not cost-effective. It should be noted that the encasements are for cosmetic and pile protection reasons, and that overall pier and pile integrity has yet to be adversely affected by the encasement problems. If full protective encasement is considered necessary, encasement replacement would be the appropriate remedial measure.

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. 24514
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Roy A. Forsyth, P.E.
WATERWAY CROSSED Shell Rock Channel

INSPECTION DATE September 30, 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

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.		MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES* (ENCASEMENTS)	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
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	8.6’	7	5	N	8	N	5	8	N	N	N	8	5	7	N	N	N	N
	Pier 2	9.0’	7	5	N	8	N	5	8	N	N	N	8	5	7	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall Piers 1 and 2, were found to be in satisfactory to fair condition. The concrete abutments, located out of the waterway at the time of inspection, were in good condition with no structurally significant defects observed. However, the concrete encasements on the steel piles at the piers were heavily deteriorated and exhibited areas of considerable section loss and exposed steel reinforcing. The steel H-piles were generally in satisfactory condition below the waterline and exhibited coating failure and moderate surface corrosion. The channel bottom appeared stable no significant changes since the previous underwater 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.