

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 36516

UT NO. 79

OVER

BEAVER BROOK

DISTRICT 1 - KOOCHICHING COUNTY



AUGUST 13, 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 unit inspected below water at Bridge No. 36516, Pier 1, was found to be in good condition with no defects of structural significance observed. The channel bottom appeared stable with no significant scour and no significant changes since the last inspection. The steel piles exhibited coating failure and minor corrosion consisting of small rust nodules with minimal pitting.

INSPECTION FINDINGS:

- (A) The channel bottom material consisted of silty sand and random scattered riprap with a maximum probe rod penetration of 6 inches.
- (B) Up to 50 percent coating failure and up to 25 percent nodular corrosion ranging in size from 1/4 inch to 2 inches in diameter was observed from 3 feet above the waterline to the channel bottom on all of the steel shell piles. Typical depth of pitting under the nodules was 1/32 inch with a maximum pitting of up to 1/8 inch deep.
- (C) The river banks in the vicinity of the bridge were protected by 6 inch to 3 feet diameter riprap.
- (D) Light timber debris consisting of branches and logs ranging from 6 inches to 1 foot in diameter was observed scattered among the piles.
- (E) There was an accumulation of timber debris consisting of an 18 inch diameter log extending from shore to shore across the upstream fascia.

RECOMMENDATIONS:

- (A) The inspection of the submerged substructure units of Structure No. 36516 can most likely be accomplished in the future without using a dive team. To perform the underwater inspection, a properly equipped qualified inspector will have to enter the water during a period of low flow. As channel bottom contours and depths of flow can change quickly, it is recommended that lead line soundings of water depth be taken along the upstream and downstream fascias to determine whether wading is possible prior to beginning the inspection. If conditions are unsafe for inspection by wading, then an underwater inspection with the use of a dive team will be required.
- (B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

Inspection Team Leader



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

Respectfully submitted,

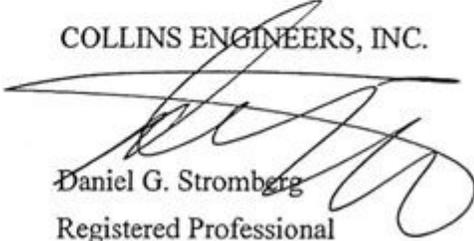
PROFESSIONAL ENGINEER

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: 36516

Feature Crossed: Beaver Brook

Feature Carried: UT No. 79

Location: District 1 - Koochiching County

Bridge Description: The superstructure consists of two spans of reinforced concrete beams and deck, which is supported by two reinforced concrete abutments and one steel shell pile bent pier.

2. INSPECTION DATA

Professional Engineer Diver: Roy A. Forsyth, P.E.

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

Date: August 13, 2012

Weather Conditions: Sunny, 80° F

Underwater Visibility: 1.0 foot

Waterway Velocity: Negligible

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Pier 1.

General Shape: Pier 1 consists of six concrete filled steel shell piles supporting a reinforced concrete cap.

Maximum Water Depth at Substructure Inspected: Approximately 2.3 feet.

4. WATERLINE DATUM

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

Water Surface: The waterline was approximately 12.5 feet below reference.
Waterline Elevation = 1114.1

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 A/08/12

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

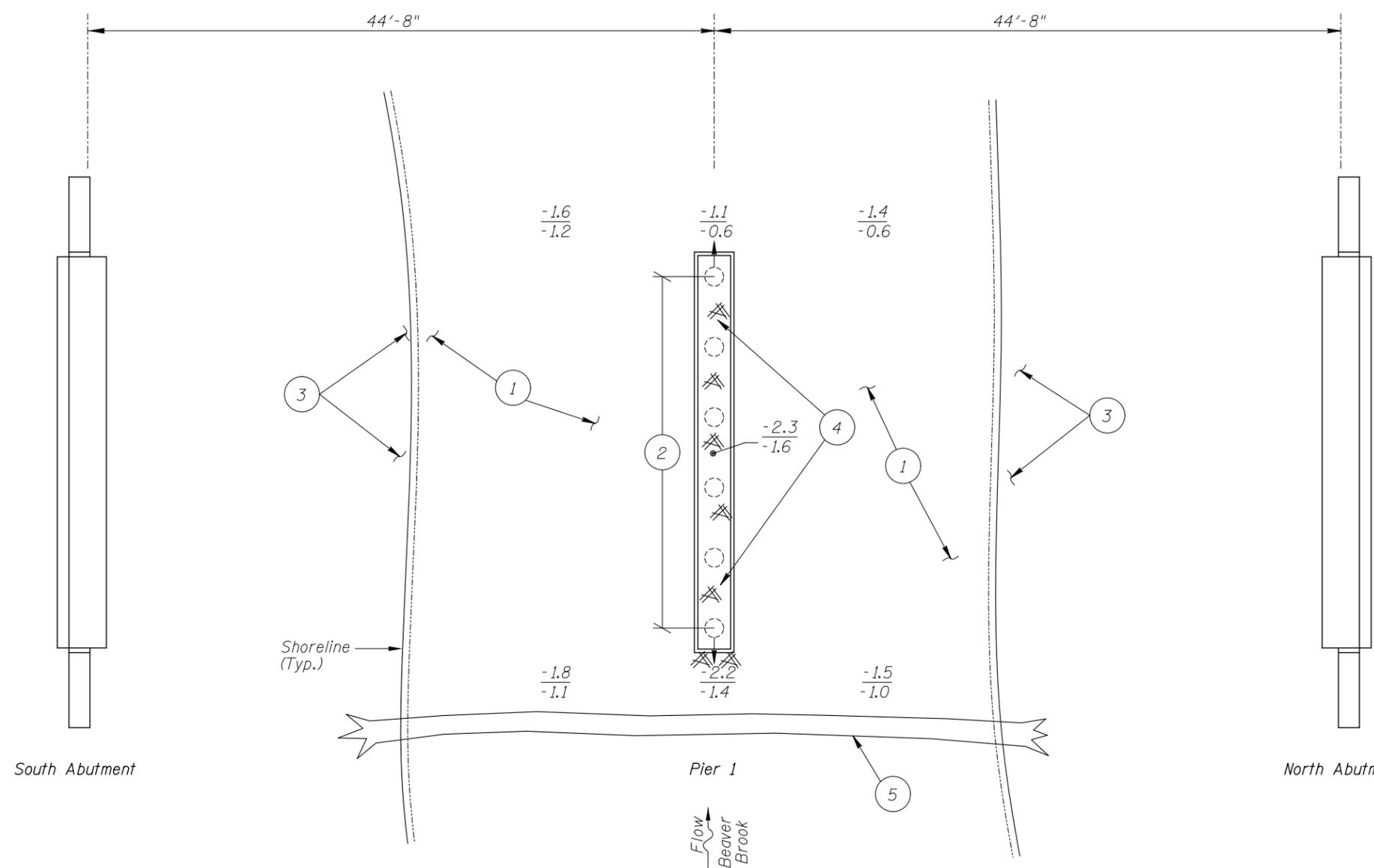
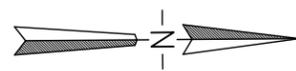
Item #	Element Description	Quantity	Unit	Conditions				
				1	2	3	4	5
382	Cast-In-Place Piling	6	EA		6			
985	Slopes and Slope Protection	1	EA	1				



Photograph 1. Overall View of the Bridge, Looking East.



Photograph 2. View of Pier 1, Looking Southeast.



GENERAL NOTES:

1. Pier 1 was inspected underwater.
2. At the time of inspection on August 13, 2012, the waterline was located approximately 12.5 feet below the top of pier cap at upstream fascia of Pier 1. This corresponds with a waterline elevation of 1114.1 feet based on previous report dated August 24, 2002.
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 material consisted of silty sand and random scattered riprap with a maximum probe rod penetration of 6 inches.
- 2 Up to 50 percent coating failure and up to 25 percent nodular corrosion ranging in size from 1/4 inch to 2 inches in diameter was observed from 3 feet above the waterline to the channel bottom on all of the steel shell piles. Typical depth of pitting under the nodules was 1/32 inch with a maximum pitting of up to 1/8 inch deep.
- 3 The banks were protected by 6 inch to 3 feet diameter riprap.
- 4 Light timber debris consisting of branches and logs ranging from 6 inches to 1 foot in diameter was observed scattered among the piles.
- 5 There was an accumulation of timber debris consisting primarily of an 18 inch diameter log extending from shore to shore across the upstream fascia.

South Abutment

North Abutment

Pier 1

Flow
Beaver
Brook

Shoreline
(Typ.)

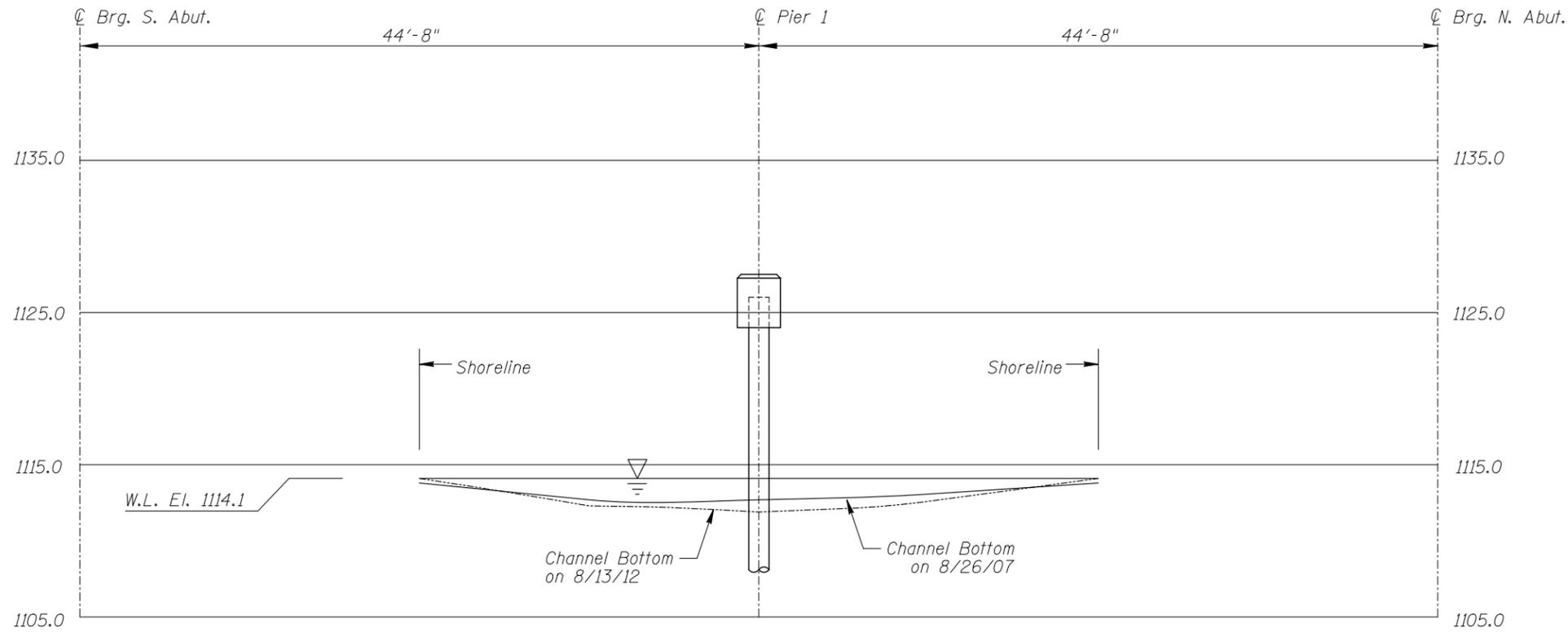


TYPICAL END VIEW OF PIER

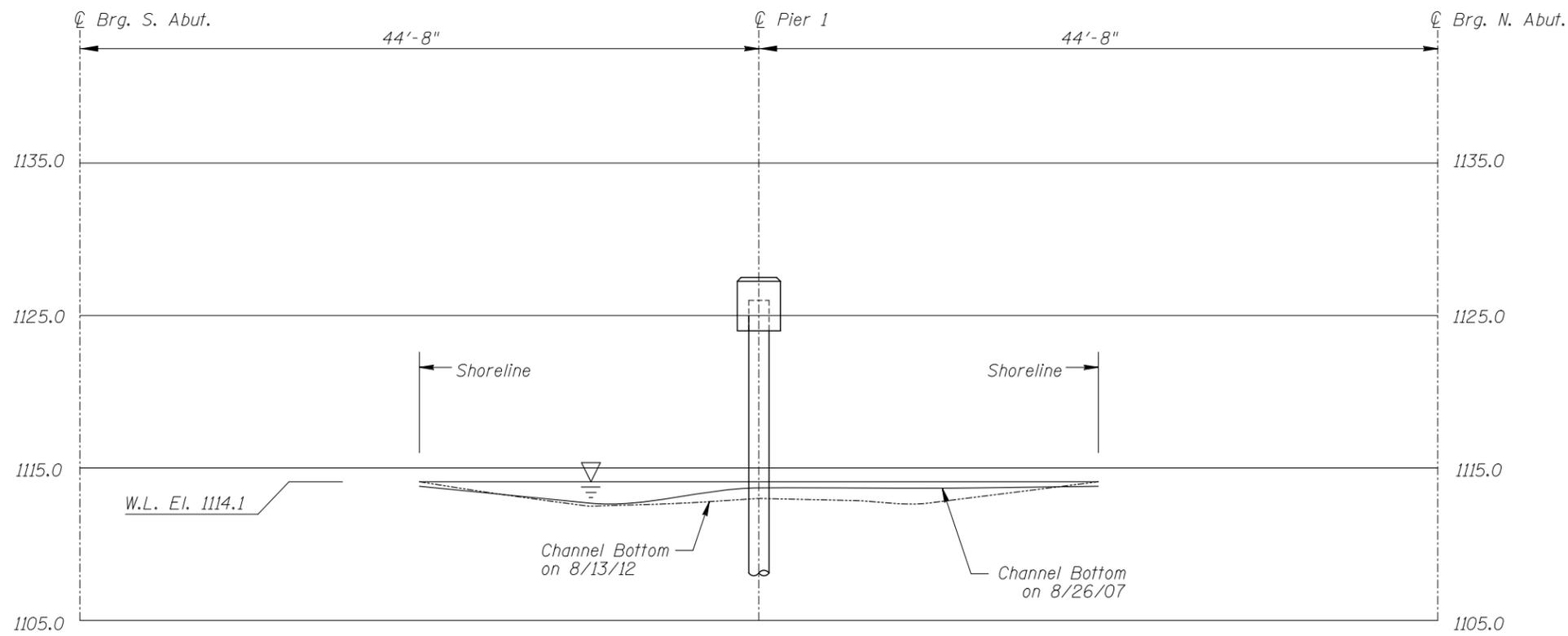
Note:
All soundings based on 2012 waterline location.

- Legend**
- 2.0 Sounding Depth (8/13/12)
 - 1.3 Sounding Depth (8/26/07)
 - Cast-In-Place Concrete Pile
 - Cast-In-Place Concrete Battered Pile
 - /// Timber Debris

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 36516 OVER BEAVER BROOK DISTRICT I, KOOCHICHING COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: JTF	COLLINS ENGINEERS	Date: AUGUST 2012
Checked By: DGS	123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Scale: NTS
Code: 522I005A		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. 36516 OVER BEAVER BROOK DISTRICT I, KOOCHICING COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: JTF	COLLINS ENGINEERS	Date: AUGUST 2012
Checked By: MDK		Scale: 1"=10'
Code: 5221005A		Figure No.: 2

123 North Wacker Drive
 Suite 900
 Chicago, IL 60606
 (312) 704-9300
 www.collinsengr.com

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

INSPECTORS: Collins Engineers, Inc. DATE: August 13, 2012

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

BRIDGE NO: 36516 WEATHER: Sunny, 80° F

WATERWAY CROSSED: Beaver Brook

DIVING OPERATION: _____ SCUBA _____ SURFACE SUPPLIED AIR
 OTHER Wading due to low water levels

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

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

TIME IN WATER: 3:40 P.M.

TIME OUT OF WATER: 4:00 P.M.

WATERWAY DATA: VELOCITY None

VISIBILITY 1.0 feet

DEPTH 2.3 feet maximum at Pier 1.

ELEMENTS INSPECTED: Pier 1

REMARKS: The steel shell piles were in good, sound condition, with 50% coating failure, and up to 25% nodular corrosion, with nodules ranging in size from 1/4 inch diameter to a maximum of 2 inch diameter. When removed, nodules revealed typical pitting with depths ranging from 1/32 inch penetration to 1/8 inch penetration. Channel bottom appeared stable with no significant changes since the last inspection.

FURTHER ACTION NEEDED: _____ YES ___X___ NO

The inspection of the submerged substructure units of Structure No. 36516 can most likely be accomplished in the future without using a dive team. To perform the underwater inspection, a properly equipped qualified inspector will have to enter the water during a period of low flow. As channel bottom contours and depths of flow can change quickly, it is recommended that lead line soundings of water depth be taken along the upstream and downstream fascias to determine whether wading is possible prior to beginning the inspection. If conditions are unsafe for inspection by wading, then an underwater inspection with the use of a dive team will be required.

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. 36516
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Roy A. Forsyth, P.E.
 WATERWAY CROSSED Beaver Brook

INSPECTION DATE August 13, 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	2.3'	7	N	N	8	N	7	8	8	8	7	7	N	7	N	7	N	N

*UNDERWATER PORTION ONLY

REMARKS: The steel shell piles were in good, sound condition, with 50% coating failure, and up to 25% nodular corrosion, with nodules ranging in size from 1/4 inch diameter to a maximum of 2 inch diameter. When removed, nodules revealed typical pitting with depths ranging from 1/32 inch penetration to 1/8 inch of penetration. Channel bottom appeared stable with no significant changes since the last 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.