2016 UNDERWATER
BRIDGE INSPECTION REPORT

BRIDGE # 57517
CR 63 over THIEF RIVER

DISTRICT: District 2 **COUNTY:** Pennington **CITY/TOWNSHIP:** NORTH

STATE: Minnesota

Date of Inspection: 09/28/2016

Equipment Used:

Owner: County Highway Agency

Inspected By: Schroeder, Brian

Report Written By: Brian Schroeder

Report Reviewed By:

Final Report Date:

TABLE OF CONTENTS

UNDERWATER INSPECTION

REPORT SUMMARY

The substructure units inspected at Bridge No. 57517, Piers 1 and 2, were in good condition with no defects of structural significance observed. The channel bottom appeared to be stable with no evidence of significant scour.

INSPECTION FINDINGS

(A) The 20 inch diameter steel pile encasements of both piers from the top of pile down 6 feet were coated. The coating has minor random areas of coating loss on less than one percent of total surface area. In areas of coating loss, the exposed steel exhibited minor corrosion with no appreciable section loss.
(B) The 20 inch diameter steel pile encasement from 6 feet below the top of the pile to the channel bottom has no protective coating (primer only) and corrosion was observed on up to 75 percent of surface area consisting of rust nodules up to ½ inch diameter and minor pitting (less than 1/32 inch deep).
(C) A moderate accumulation of timber debris consisting of 1 foot diameter and smaller branches was observed along both sides and in between piles 1 to 3 at Pier 1.

RECOMMENDATIONS

(A) Monitor the timber debris, and if found to be increasing in the future, removal operations may become warranted.
(B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

Contractor: Ayres Associates & Collins Engineers, Inc.

Contractor Job Number: 9687

UNDERWATER INSPECTION

1. BRIDGE DATA

Bridge #: 57517

Feature Intersected: THIEF RIVER

Facility Carried: CR 63

District: District 2

County: 057 - Pennington

Bridge Description:

The Bridge is a three span structure consisting of a prestressed I-beam superstructure supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and two reinforced concrete pier caps founded on 7 piles. The piers are numbered 1 and 2 starting from the south end of the bridge. The abutment and pier footings are supported by steel H-piles.

2. INSPECTION DATA

Professional Engineer/Team Leader: Brian K. Schroeder, P.E.

Inspection Diver: Brian K. Schroeder, P.E.

Date of Underwater Inspection: 09/28/2016

Weather Conditions: Cloudy, 57°F

Underwater Visibility (feet): 1.0

Waterway Velocity (ft/sec): Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) Inspected: Piers 1 and 2

General Shape:

A 3.5 feet wide by 3.5 feet high reinforced concrete cap supported by seven driven steel H-piles encased by 20 inch diameter steel shell encasements.

Maximum Water Depth at Substructure(s) Inspected (feet): 9.9

4. WATERLINE DATUM

Water Level Reference: The top of the deck at the upstream end of Pier 1

Waterline Elevation (feet): 1110.9

Description: The waterline was approximately 14.5 feet below reference.

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 62: Culvert: Code:

Item 92B: Underwater Inspection: Code: Y 48 09/2016

Item 113: Scour Critical Bridge: Code: I

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

[ ] Yes [X] No (Mark your selection with an X)

6. STRUCTURAL ELEMENT CONDITION RATING

ELEM #	Element Description	Quantity	Unit	Conditions			
				CS1	CS2	CS3	CS4
202	Steel Column	14	EA	14			
885	Scour	1	EA	1			

UNDERWATER INSPECTION

INSPECTION PROCEDURES

The routine underwater inspection of Bridge 57517 (CR No. 63 over the Thief River) was completed on September, 28, 2016. The underwater inspection was conducted from shore. The inspection was conducted by a team consisting of a PE-Diver with a valid MnDOT Team leader certification, a backup diver and a dive tender. The inspection utilized commercial dive equipment and techniques (SSA and/or SCUBA) in accordance with OSHA regulations. Profiles were taken along the upstream and downstream faces of the bridge and around the periphery of substructure units to determine the presence, location and area of scour.

The bridge elements inspected consisted of two reinforced concrete piers. According to the bridge inventory or design drawings, a 3.5 feet wide by 3.5 feet high reinforced concrete cap is supported by seven driven steel H-piles encased by 20 inch diameter steel shell encasements. Inspection procedures followed FHWA guidance and the MnDOT Bridge and Structure Inspection Program Manual with channel bottom probing to search for foundations. The routine underwater inspection frequency is recommended to remain at 60 months based on those findings and risk factors. Also, inspection procedures should continue to follow the above approach and standard guidance with 100% Level I and 10% Level II intensity efforts.

Minnesota Structure Inventory Report

Bridge ID: 57517 **CR 63 over THIEF RIVER** Date: 01/10/2017

+GENERAL+

Agency Br. No.	**Crew**
District	02 **Maint. Area**
County	057 - Pennington
City	
Township	57011 - NORTH
Desc. Loc.	0.2 MI NE OF JCT CSAH 31
Sect., Twp., Range	27 - 154N - 43W
Latitude	48 ° 7 ' 54.03 "
Longitude	96 ° 10 ' 16.14 "
Custodian	02 - County Highway Agency
Owner	02 - County Highway Agency
BMU Agreement	
Year Built	1995
MN Year Reconstructed	
FHWA Year Reconstructed	
MN Temporary Status	
Bridge Plan Location	3 - COUNTY
Date Opened to Traffic	
On - Off System	1 - ON
Legislative District	01A
Potential ABC	2 - N/A

+STRUCTURE+

Service On	5 - Highway-pedestrian
Service Under	5 - Waterway
Main Span Type	5 - Prestress or Precast
Main Span Design	01 - Beam Span
Main Span Detail	
Appr. Span Type	
Appr. Span Design	
Appr. Span Detail	
Skew	0
Culvert Type	
Barrel Length	
Cantilever ID	

Number of Spans

MAIN: 3 **APPR:** 0 **TOTAL:**

Main Span Length	65.2 **ft.**
Structure Length	195.6 **ft.**
Deck Width (Out-to-Out)	52.8 **ft.**
Deck Material	1 - Concrete Cast-in-Place
Wear Surf Type	1 - Monolithic Concrete
Wear Surf Install Year	
Wear Course/Fill Depth	0.00 **ft.**
Deck Membrane	0 - None
Deck Rebars	1 - Epoxy Coated Reinforcing
Deck Rebars Install Year	1995
Structure Area (Out-to-Out)	10328 **sq. ft.**
Roadway Area (Curb-to-Curb)	8611 **sq. ft.**
Sidewalk Width	**50A. Lt** 0.00 **ft.** **50B. Rt** 6.00 **ft.**
Curb Height	**Lt** 0.00 **ft.** **Rt** 0.83 **ft.**
Rail Type	**Lt** 22 **Rt** 28

+ROADWAY+

Bridge Match ID (TIS)	0
Roadway O/U Key	Route On Structure
Route Sys	07 - CNTY **Number** 63
Roadway Name or Description	CNTY 63
Level of Service	1 - MAINLINE
Roadway Type	2 - 2-way traffic
Control Section (TH Only)	
Reference Point	013+00.230
Detour Length	4.0 **mi.**
Lanes	**ON** 2 **UNDER** 0
	ADT 320 **YEAR** 2003
HCADT	**ADTT** **%**
Functional Class	17 - Urban - Collector

+RDWY DIMENSIONS+

If Divided	**NB-EB**	**SB-WB**
Roadway Width	44.00 **ft.**	**ft.**
Vertical Clearance	**ft.**	**ft.**
Max. Vert. Clear.	**ft.**	**ft.**
Horizontal Clear.	43.9 **ft.**	**ft.**
Lateral Clearance	**ft.**	**ft.**

Appr. Surface Width	40.0 **ft.**
Bridge Roadway Width	44.0 **ft.**
Median Width On Bridge	**ft.**

+MISC. BRIDGE DATA+

Structure Flared	0 - No flare
Parallel Structure	N - No parallel structure
Field Conn. ID	
Abutment	1 - CONC
Foundation (Material/Type)	3 - FTG PILE
Pier Foundation (Material/Type)	3 - STEEL 4 - PILE BENT
Historic Status	5 - Not eligible

+PAINT+

Year Painted	
Unsound Paint %	
Painted Area	**sq. ft.**
Primer Type	
Finish Type	

+BRIDGE SIGNS+

Posted Load	0 - Not Required
Traffic	0 - Not Required
Horizontal	0 - Not Required
Vertical	N - Not Applicable

+INSPECTION+

Userkey	97
Structurally Deficient	N
Functionally Obsolete	N
Sufficiency Rating	99.9
Routine Inspection Date	10/22/2014
Routine Inspection Frequency	24
Inspector Name	Schroeder, Brian
Status	A - Open

+NBI CONDITION RATINGS+

Deck	8	**Unsound Deck %**
Superstructure	8	
Substructure	7	
Channel	7	
Culvert	N	

+NBI APPRAISAL RATINGS+

Structure Evaluation	7
Deck Geometry	9
Underclearances	N
Waterway Adequacy	8
Approach Alignment	8

+SAFETY FEATURES+

Bridge Railing	1 - MEETS STANDARDS
GR Transition	N - NOT REQUIRED
Appr. Guardrail	1 - MEETS STANDARDS
GR Termini	1 - MEETS STANDARDS

+IN DEPTH INSP.+

	Y/N	**Freq**	**Date**
Frac. Critical			
Underwater		60	09/28/2016
Pinned Asbly.			
Spec. Feat.			

+WATERWAY+

Drainage Area (sq. mi.)	1040.0
Waterway Opening (sf.)	2520
Navigation Control	0 - No nav. control on
Pier Protection	
Nav. Clr. (ft.)	**Vert.** 0.0 **Horiz.** 0.0
Nav. Vert. Lift Bridge Clear. (ft.)	
MN Scour Code	I - LOW RISK **Year**

+CAPACITY RATINGS+

Design Load	9 - HS 25 (OR GREATER)	
Operating Rating	2 - HS TRUCK	42.3
Inventory Rating	2 - HS TRUCK	25.3

Posting VEH: **SEMI:** **DBL:**

Rating Date 10/17/2013

Overweight Permit Codes

A N - N/A **B** N - N/A **C** N - N/A

BRIDGE 57517 CR 63 OVER THIEF RIVER

County: Pennington
City:
Township: 57011 - NORTH
Section: 27 Township: 154N Range: 43W
Span Type: 5 - Prestressed Concrete 2 - Stringer/Multi-beam or Girder
List:
NBI Deck: 8 Super: 8 Sub: 7 Chan: 7

Location: 0.2 MI NE OF JCT CSAH 31
Route: 07 - CNTY 63 Ref. Pt.: 013+00.230
Control Section:
Maint. Area:
Local Agency Bridge Nbr.:
Culv: N
Open, Posted, Closed: A - Open
MN Scour Code: I - LOW RISK

Length: 195.6 ft.
Deck Width: 52.8 ft.
Rdwy. Area/ Pct. Unsnd: 8611 sq. ft. / %
Paint Area/ Pct. Unsnd: sq. ft. / %
Culvert: N/A
Postings:

Appraisal Ratings - Approach: 8 Waterway: 8
Required Bridge Signs - Load Posting: 0 - Not Required Traffic: 0 - Not Required
Horizntal: 0 - Not Required Vertical: N - Not Applicable

Unofficial Structurally Deficient N
Unofficial Functionally Obsolete N
Unofficial Sufficiency Rating 99.9

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
38	Reinforced Concrete Slab	Underwater	09/28/2016	10328 SF	10328	0	0	0
		Migrated Values		10328 SF	10328	0	0	0
	Notes: SW CORNER SMALL CRACK. (2010) THE REST APPEARS TO BE IN GOOD CONDITION. (2010) NW corner minor crack with efflorescence. (2012) No Chg (2014)							
	510 - Wearing Surfaces	Underwater	09/28/2016	8611 SF	8611	0	0	0
		Migrated Values		8611 SF	8611	0	0	0
	Notes: Concrete Slab with Bituminous Overlay Notes: MINOR CRACKING, WEST END OF DECK. (2010) No Chg (2014)							
154	Prestressed Concrete Floor Beam	Underwater	09/28/2016	974 LF	974	0	0	0
		Migrated Values		974 LF	974	0	0	0
	Notes: APPEAR TO BE IN GOOD CONDITION. (2010) (2014)							
202	Steel Column	Underwater	09/28/2016	14 EA	14	0	0	0
		Migrated Values		14 EA	14	0	0	0
	Notes: COLUMNS IN GOOD CONDITION. (2010)(2012)(2014)							
	515 - Steel Protective Coating	Underwater	09/28/2016	999 SF	999	0	0	0
		Migrated Values		999 SF	999	0	0	0
	Notes: [2016] Migrator assumed quantity of 999 SF and estimated the condition states.							
215	Reinforced Concrete Abutment	Underwater	09/28/2016	152 LF	152	0	0	0
		Migrated Values		152 LF	152	0	0	0
	Notes: [2016] Migrator added 40 LF to abutment quantity to account for wingwalls (CS1:40 CS2:0 CS3:0 CS4:0). BOTH ABUTMENTS IN GOOD CONDITION. (2010) (2014) Wingwall notes: NE WINGWALL - IN GOOD CONDITION. (2010) NW WINGWALL - IN GOOD CONDITION. (2010) SW WINGWALL - IN GOOD CONDITION. (2010) SE WINGWALL - IN GOOD CONDITION. (2010)(All No Chg (2014)							
234	Reinforced Concrete Pier Cap	Underwater	09/28/2016	105 LF	105	0	0	0
		Migrated Values		105 LF	105	0	0	0
	Notes: BOTH CAPS IN GOOD CONDITION. (2010) (2014)							
311	Movable Bearing	Underwater	09/28/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: BEARINGS APPEAR TO BE IN GOOD CONDITION. (2010) (2014)							

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
313	Fixed Bearing	Underwater	09/28/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: BEARINGS APPEAR TO BE IN GOOD CONDITION. (2010) (2014)							
330	Metal Bridge Railing	Underwater	09/28/2016	197 LF	197	0	0	0
		Migrated Values		197 LF	197	0	0	0
	Notes: OVER ALL RAILING APPEARS TO BE IN GOOD CONDITION, BUT MISSING TWO NUTS. (2010) Nuts was replaced. Paint is pelling off, no sign of corrosion. (2014)							
	515 - Steel Protective Coating	Underwater	09/28/2016	999 SF	999	0	0	0
		Migrated Values		999 SF	999	0	0	0
	Notes: [2016] Migrator assumed CS1 and a quantity of 999 SF.							
331	Reinforced Concrete Bridge Railing	Underwater	09/28/2016	394 LF	394	0	0	0
		Migrated Values		394 LF	394	0	0	0
	Notes: APPEARS TO BE IN GOOD CONDITION. (2010) (2014)							
800	Critical Deficiencies or Safety Hazards	Underwater	09/28/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: No critical structural deficiencies or serious safety hazards are present on this structure.							
822	Bituminous Approach Roadway	Underwater	09/28/2016	2 EA	2	0	0	0
		Migrated Values		2 EA	2	0	0	0
	Notes: BOTH APPROACHES IN GOOD CONDITION. (2010) East approach minor settling. (2012) Moderate settling (2014) West minor settling (2014)							
883	Concrete Shear Cracking	Underwater	09/28/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: Use this element to monitor the presence of shear cracking on concrete elements. Pay particular attention to the prestressed concrete beams.							
885	Scour	Underwater	09/28/2016	1 EA	1	0	0	0
891	Other Bridge Signing	Underwater	09/28/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: NE END MARKER - UP AND MINOR CONDITION (2010) (2014) NW END MARKER - UP AND IN MINOR CONDITION (2010) (2014) SW END MARKER - UP AND IN GOOD CONDITION (2010) (2014) SE END MARKER - UP AND IN GOOD CONDITION (2010) Minor condition (2014)							
892	Slopes & Slope Protection	Underwater	09/28/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: EAST SLOPE - MINOR SETTLING (2010) (2014) WEST SLOPE - MINOR SETTLING (2010) (2014)							
893	Guardrail	Underwater	09/28/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: NE GUARD RAILING IN GOOD SHAPE. (2010) NW GUARD RAILING IN GOOD SHAPE. (2010) SW GUARD RAILING - MISSING FIVE NUTS. (2010) SE GUARD RAILING IN GOOD SHAPE. (2010) All missing nuts was replaced. All guard railing are in good shape. (2014)							

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
894	Deck & Approach Drainage	Underwater	09/28/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: NE WINGWALL - MINOR SETTLING, END IN GOOD SHAPE (2010) NW WINGWALL - MOD. SETTLING, END SEVERE SHAPE (2010) SW WINGWALL - NO SETTLING, END IN GOOD SHAPE (2010) SE WINGWALL - NO SETTLING, END MOD. TO SEVERE (2010) DECK DRAIN PART PLUG (2010) Need to be cleaned in the spring (2014)							
895	Sidewalk, Curb, & Median	Underwater	09/28/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: SIDEWALK - EAST END, THE APPROACH TO WALK HAS ABOUT 1" DROP. (2010) SIDEWALK - WEST END, THE APPROACH TO WALK HAS ABOUT 2 3/4" DROP. (2010) Sidewalk - West End, drop 3" to 4". (2012) No chg (2014)							
899	Miscellaneous Items	Underwater	09/28/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: MINOR DEBRIS AROUND PIERS (2010) SE WINGWALL SMALL TREES. (2010) BOTH SLOPES SMALL BRUSHES (2010) No chg (2014)							
900	Protected Species	Underwater	09/28/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: Use this element to track the presence of protected species living on this structure.							

General Notes: 12-5-06 BRUSH HAS BEEN REMOVED AROUND ABUTS, NO STRUCTURAL CHANGES. JJ
SEE ELEMENTS (2010)
See Elements (2012) Update report with underwater bridge inspection report Aug 16,2012
See Elements (2014)

58. Deck NBI:

36A. Brdg Railings NBI:

36B. Transitions NBI:

36C. Appr Guardrail NBI:

36D. Appr Guardrail Terminal NBI:

59. Superstructure NBI:

60. Substructure NBI:

61. Channel NBI:

62. Culvert NBI:

71. Waterway Adeq NBI:

72. Appr Roadway Alignment NBI:

Inspector's Signature

Reviewer's Signature

Pictures

Photo 1 - Upstream Profile

Photo 2 - Downstream Profile

Pictures

Photo 3 - North Abutment

Photo 4 - South Abutment

Pictures

Photo 5 - Pier 1 North Face

Photo 6 - Pier 1 South Face

Pictures

Photo 7 - Pier 2 North Face

Photo 8 - Pier 2 South Face

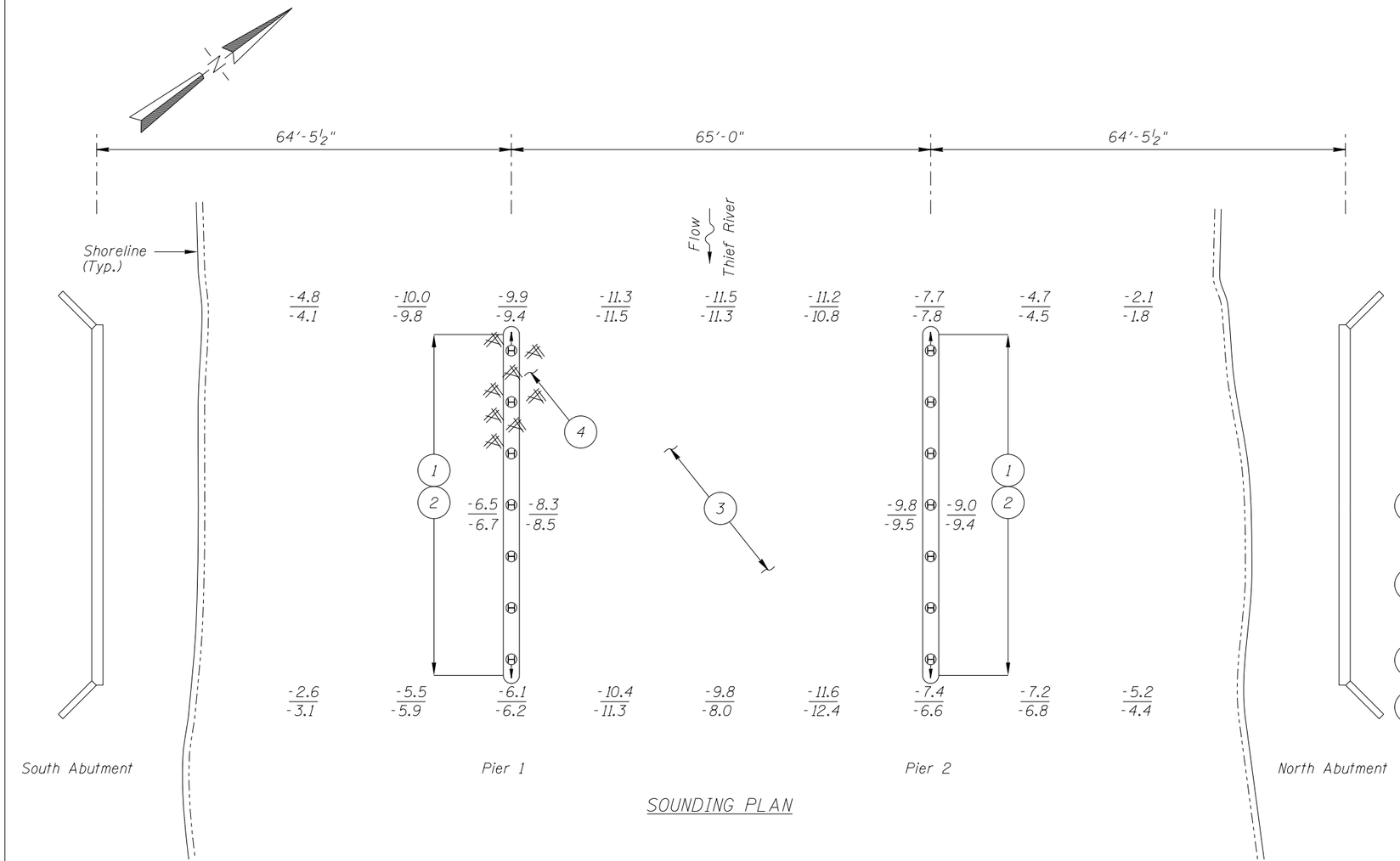
Pictures

Photo 9 - Typical Condition at Waterline

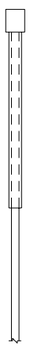
Photo 10 - Upstream Channel

Pictures

Photo 11 - Downstream Channel



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 28, 2016, the waterline was located approximately 14.5 feet below top of deck above the upstream end of Pier 1. This corresponds to a waterline elevation of 1110.9 feet based on design drawings.
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 1/4 point intervals between the substructure units.

GENERAL NOTES:

(1) The 20 inch diameter steel pile encasements of both piers from top of pile down 6 feet were coated. The coating has minor random areas of coating loss on less than 1% of total surface area. In areas of coating loss, the exposed steel exhibited minor corrosion with no appreciable section loss.

(2) The 20 inch steel pile encasements from 6 feet below the top of pile to channel bottom exhibited no coating (primer only) and corrosion was observed on up to 75% of surface area consisting of rust nodules up to 1/2 inches in diameter and minor pitting (less than 1/32 inch deep).

(3) The channel bottom around entire perimeter of Piers 1 and 2 consisted of silty clay with up to 12 inches of probe rod penetration.

(4) A moderate accumulation of debris consisting of 1 foot diameter or smaller branches was observed along both sides and in between piles 1 to 3 at Pier 1. The debris extended from the channel bottom up to 1 foot above the waterline.

Legend

-7.0	Sounding Depth (9/28/16)
-7.0	Sounding Depth (8/16/12)
⊖	Steel Shell Encased H-pile
⊖	Battered Steel Shell Encased H-Pile
	Timber Debris

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

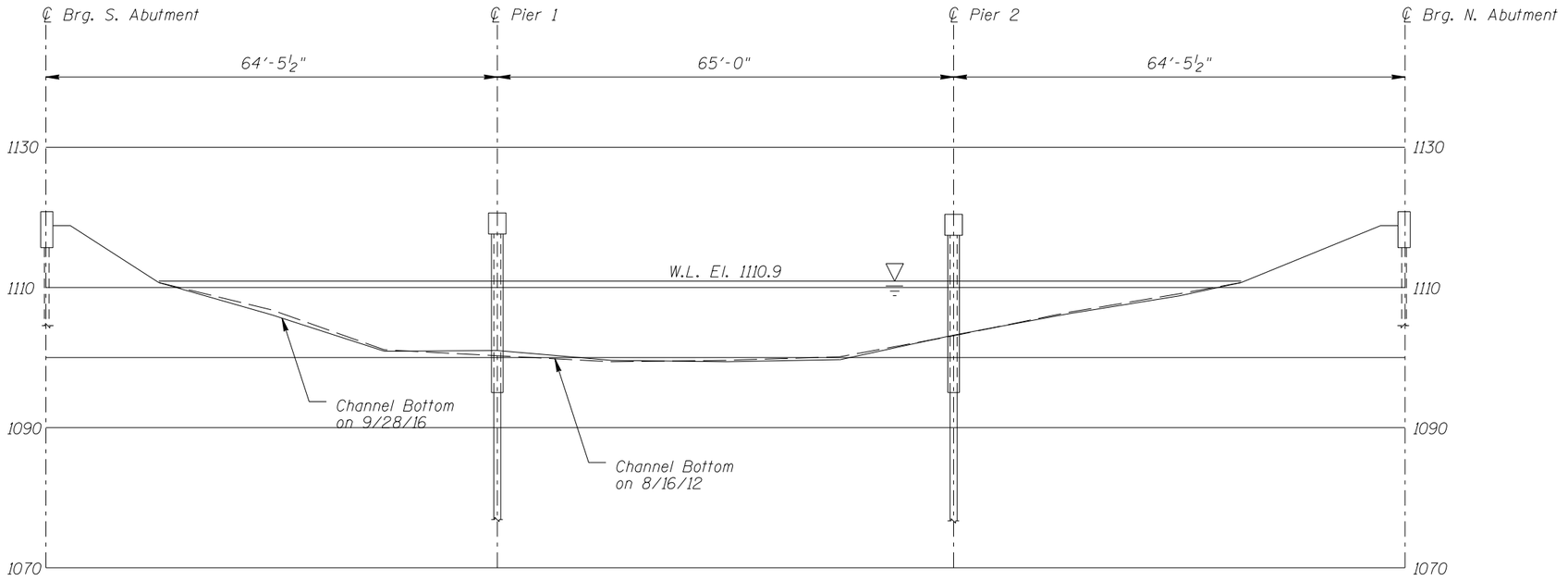
STRUCTURE NO. 57517
OVER THE THIEF RIVER
DISTRICT 2, PENNINGTON COUNTY,
CITY OF THIEF RIVER FALLS

INSPECTION AND SOUNDING PLAN

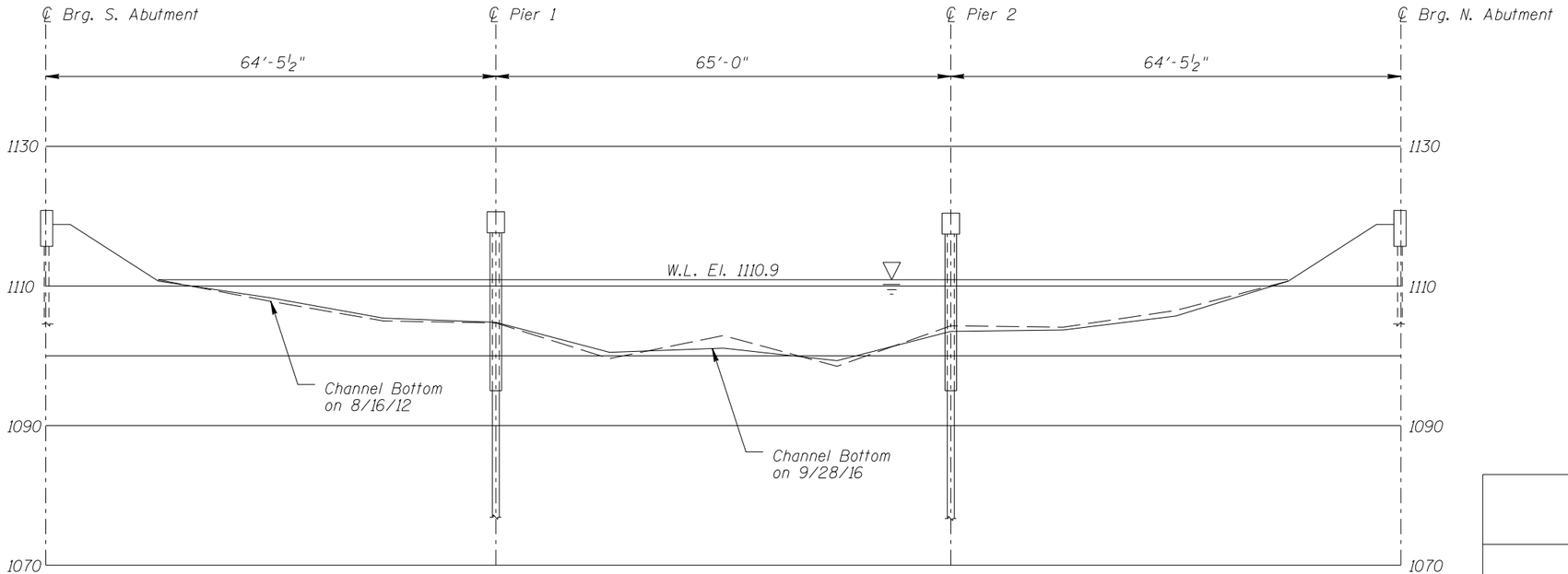
COLLINS ENGINEERS INC 1599 Selby Avenue Suite 206 St. Paul, MN 55104 (651) 646-8502 www.collinsengr.com

AYRES ASSOCIATES 3433 Oakwood Hills Parkway Eau Claire, WI 54701 www.AyresAssociates.com

Drawn By: JCK	Date: SEPT., 2016
Checked By: BKS	Scale: NTS
Project: 63-9687	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. 57517
OVER THE THIEF RIVER
DISTRICT 2, PENNINGTON COUNTY,
CITY OF THIEF RIVER FALLS
UPSTREAM AND DOWNSTREAM
FASCIA PROFILES

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Drawn By: JCK	Date: SEPT., 2016
Checked By: BKS	Scale: 1"=20'
Project: 63-9687	Figure No.: 2