

# 2017 UNDERWATER BRIDGE INSPECTION REPORT



## BRIDGE # 31510 CSAH 62 over MISSISSIPPI RIVER

DISTRICT: District 1

COUNTY: Itasca

CITY/TOWNSHIP: Cohasset

STATE: Minnesota

Date of Inspection: 09/29/2016

Equipment Used:

Owner: County Highway Agency

Inspected By: Stromberg, Dan

Report Written By: Dan Stromberg

Report Reviewed By:

Final Report Date:



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## UNDERWATER INSPECTION

### REPORT SUMMARY

The substructure units inspected at Bridge No. 31510, Piers 1, 2, and 3, were found to be in good to satisfactory condition with no defects of structural significance below water. The submerged steel of the piles at all piers exhibited coating failure and nodular corrosion from the waterline to the mudline. The overall extent of corrosion has minimal related section loss with most of the associated pitting exhibiting penetrations of no more than 1/32 inch. In isolated infrequent instances, the pitting was up to 1/16 inch deep. There was scattered, light to moderate, steel debris and/or timber drift on the channel bottom at each of the piers with a moderate accumulation of organic material and vegetation around the upstream ends of Pier 2 and Pier 3. A prior crack defect at a Pier 2 pile continues to be adequately repaired with a bolted collar. The previously noted deformed downstream battered pile on Pier 3 (possible installation related deformation) continues to be stable and not compromising the overall pier stability. Overall, the channel bottom configuration appeared to be in stable condition, with only two minor scour depressions observed at the upstream piles of Pier 2 and only minor changes in configuration since the last inspection.

### INSPECTION FINDINGS

1. The channel bottom material around Piers 1 and 2 consisted of soft silty sand allowing maximum probe rod penetrations of 1 to 1.5 feet.
2. Light to moderate corrosion with rust nodules covered 75% to 100% of the pile surfaces from the waterline to the channel bottom. Minimal section loss was observed with typical pitting up to 1/32 inch deep and maximum pitting in random instances up to 1/16 inch deep near the waterline.
3. Vertical crack along welded joint noted in previous inspection, August 27, 1997, has been repaired with a bolted steel collar extending from the underside of the pile cap to 3 feet below the waterline. The repair was in good and sound condition.
4. The channel bottom material around Pier 3 consisted of firm sandy gravel with 6 inch to 2 foot diameter rocks allowing probe rod penetrations of 2 to 4 inches.
5. Minor scour depressions, up to 2 feet deep with up to 5 feet radius, were observed around the upstream piles of Pier 2.
6. Moderate accumulation of organics/vegetation and two 1 foot diameter logs extended from the channel bottom up 2 feet at the upstream nose of Pier 3.
7. Timber debris consisting of a 2 foot diameter by 5 foot long log was observed on the channel bottom against the middle pile on the south side of Pier 2.
8. Area of reeds/grass from the waterline down 4 feet measured 3 feet in diameter at the upstream end of Pier 2.
9. Timber debris consisting of an 18 inch diameter log was observed on the channel bottom along the two downstream piles on the north side of Pier 2.
10. The downstream battered pile of Pier 3 exhibited a 15 degree bend (deformation) 5 feet below the waterline where the pile then extended vertically into the channel bottom. (Bend appears to be due to driving the pile during original bridge construction.)
11. Timber debris consisting of three 1 foot diameter logs was observed on the channel bottom along the downstream three vertical piles on the north side of Pier 3.

### RECOMMENDATIONS

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

Contractor: Collins Engineers, Inc.

Contractor Job Number: 9687

## UNDERWATER INSPECTION

### 1. BRIDGE DATA

Bridge #: 31510  
Feature Intersected: MISSISSIPPI RIVER  
Facility Carried: CSAH 62  
District: District 1  
County: 031 - Itasca

#### Bridge Description:

The superstructure consists of four spans of multiple prestressed concrete beams. The superstructure is supported by two reinforced concrete abutments and three steel shell (CIP) pile bent piers. The piers are numbered 1 through 3 starting from the south.

### 2. INSPECTION DATA

Professional Engineer/Team Leader: Daniel G. Stromberg  
Inspection Diver: Daniel G. Stromberg  
Date of Underwater Inspection: 09/29/2016  
Weather Conditions: Sunny, 60°F  
Underwater Visibility (feet): 5 feet  
Waterway Velocity (ft/sec): Negligible

### 3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) Inspected: Piers 1, 2, and 3.

#### General Shape:

Piers 1 and 3 consist of a single line of 10 steel shell (CIP) piles supporting a reinforced concrete cap. Pier 2 consists of two lines of 5 steel shell (CIP) piles supporting a reinforced concrete cap.

Maximum Water Depth at Substructure(s) Inspected (feet): 13.0 feet

### 4. WATERLINE DATUM

Water Level Reference: The top of the pier cap at the east end of Pier 3.  
Waterline Elevation (feet): 1272.9 feet  
Description: The waterline was located approximately 8.1 feet below the 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: 8  
Item 62: Culvert: Code:  
Item 92B: Underwater Inspection: Code: Y 48 09/2016

Item 113: Scour Critical Bridge:

Code: R

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

Yes

No

(Mark your selection with an X)

6. STRUCTURAL ELEMENT CONDITION RATING

ELEM #	Element Description	Quantity	Unit	Conditions			
				CS1	CS2	CS3	CS4
225	Steel Pile	30	EA		30		
885	Scour	1	EA	1			

## UNDERWATER INSPECTION

### INSPECTION PROCEDURES

The routine underwater inspection of Bridge 31510 (CSAH 62 over Mississippi River) was completed on September 29, 2016. The underwater inspection was conducted from the shore. The inspection was conducted by a team consisting of a Professional Engineer Diver with a valid MnDOT Team Leader certification, a backup diver and 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 three steel shell (CIP) pile bent piers. According to design drawings, the inspected substructure units are designated as Piers 1 through 3 from south to north. Inspection procedures followed FHWA guidance and the MnDOT Bridge and Structure Inspection Program Manual with channel bottom probing to search for foundations. The maximum 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 BRIDGE INSPECTION REPORT

01/27/2017

BRIDGE 31510 CSAH 62 OVER MISSISSIPPI RIVER

County: Itasca Location: 0.1 MI S OF JCT TH 2 Length: 303.3 ft.  
 City: Cohasset Route: 04 - CSAH 62 Ref. Pt.: 002+00.210 Deck Width: 43.1 ft.  
 Township: Control Section: Rdwy. Area/ Pct. Unsnd: 10915 sq. ft. / %  
 Section: 10 Township: 055N Range: 26W Maint. Area: Paint Area/ Pct. Unsnd: sq. ft. / %  
 Span Type: 5 - Prestressed Concrete 2 - Local Agency Bridge Nbr.: Culvert: N/A  
 List: Stringer/Multi-beam or Girder Postings:  
 NBI Deck: 7 Super: 7 Sub: 7 Chan: 8 Culv: N  
 Open, Posted, Closed: A - Open  
 MN Scour Code: R - CRIT - MONITOR

Appraisal Ratings - Approach: 8 Waterway: 9 Unofficial Structurally Deficient N  
 Required Bridge Signs - Load Posting: 0 - Not Required Traffic: 0 - Not Required Unofficial Functionally Obsolete N  
 Horizontal: 1 - Object Markers Vertical: N - Not Applicable Unofficial Sufficiency Rating 91.6

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
12	Reinforced Concrete Deck	Underwater	01/23/2017	13072 SF	13072	0	0	0
		Routine	11/03/2016	13072 SF	13072	0	0	0
Notes: [2016] No notable changes [2008-2012] Some transverse cracks.								
510 - Wearing Surfaces		Underwater	01/23/2017	10915 SF	10815	100	0	0
		Routine	11/03/2016	10915 SF	10815	100	0	0
Notes: Low Slump Overlay with Uncoated Rebar Notes: [2016] Minor size map cracking in areas, changed CS to reflect previous moderate cracks. [2014] Flood sealed deck and sealed moderate cracks. [2008-2012] All looks good, no major issues. 50 mm Low slump overlay install [1999].								
521 - Concrete Protective Coating		Underwater	01/23/2017	0 SF	0	0	0	0
		Routine	11/03/2016	0 SF	0	0	0	0
Notes: [2016] Flood sealed with silane 2014.								
109	Prestressed Concrete Open Girder/Beam	Underwater	01/23/2017	1211 LF	1210	0	1	0
		Routine	11/03/2016	1211 LF	1210	0	1	0
Notes: [2016] No changes since last inspection, change CS to reflect previously mentioned spall that may have been patched during construction, spall is over 1" deep and 6" in diameter with rusty rebar visible. [2014] Small spall with rusty rebar shown, about 6' out from south bearing ,on inside flange of second fascia beam from south, east side. [2008-2012] All look good.								
215	Reinforced Concrete Abutment	Underwater	01/23/2017	117 LF	115	0	2	0
		Routine	11/03/2016	117 LF	115	0	2	0
Notes: [2016] The two vertical crack are actual of moderate width with light leaching and rust staining. [2014] Couple minor vertical cracks (Typical). [2008-2012] Looks good, no issues.								
Wingwall notes: [2012-2016] No changes, All Look good.								
225	Steel Pile	Underwater	01/23/2017	30 EA	0	30	0	0
		Routine	11/03/2016	30 EA	0	30	0	0
Notes: [2016] Generally moderate corrosion with minimal section loss and 100% coating failure from waterline to mud line. The repair sleeve on Pier 2 cracked pile is in good and sound condition. The 15 degree deflection 5 feet below waterline on the downstream battered pile of Pier 3, continue to be stable and not compromising the overall pier stability. [2008-2014] All Looks good, paints fair from high water line up and repairs in tacked.								
515 - Steel Protective Coating		Underwater	01/23/2017	785 SF	0	471	157	157
		Routine	11/03/2016	785 SF	0	471	157	157
Notes: [2016] About the bottom foot of pile has 100% paint failure and surface corrosion, next foot up about 50% paint failure (moderate) and rest miner paint deterioration, chalking and fading.								

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
234	Reinforced Concrete Pier Cap	Underwater	01/23/2017	135 LF	135	0	0	0
		Routine	11/03/2016	135 LF	135	0	0	0
Notes: Look good, no issues.								
300	Strip Seal Expansion Joint	Underwater	01/23/2017	78 LF	0	78	0	0
		Routine	11/03/2016	78 LF	0	78	0	0
Notes: [2016] Minor to moderate deterioration, filled with debris, leakage. [2014] Look ok, full some dirt and debris. [2009-2013] On annual list to clean. (was)								
301	Pourable Joint Seal	Underwater	01/23/2017	180 LF	0	180	0	0
		Routine	11/03/2016	180 LF	0	180	0	0
Notes: [2016] Minor to moderate deterioration.								
311	Movable Bearing	Underwater	01/23/2017	8 EA	0	8	0	0
		Routine	11/03/2016	8 EA	0	8	0	0
Notes: [2016] Rusting and corrosion continues, recommend cleaning and lubrication maintenance of all bearings. [2008-2014] Starting to flake rust and corrode due to joint leakage, just abutment bearings are expansion type.								
313	Fixed Bearing	Underwater	01/23/2017	24 EA	0	24	0	0
		Routine	11/03/2016	24 EA	0	24	0	0
Notes: [2016] No changes since last inspection, recommend cleaning and lubrication maintenance of all bearings. [2012-2014] Some freckling rust noticed, pigeon nest build up on and around bearings.								
321	Reinforced Concrete Approach Slab	Underwater	01/23/2017	1440 SF	0	1440	0	0
		Routine	11/03/2016	1440 SF	0	1440	0	0
Notes: [2016] Minor to moderate deterioration, sealed moderate cracks, minor map cracking through out, changed CS to reflect. [2014] Moderate cracks in low slump overlay sealed, during 2014.								
330	Metal Bridge Railing	Underwater	01/23/2017	608 LF	608	0	0	0
		Routine	11/03/2016	608 LF	608	0	0	0
Notes: [2008-2016] Good shape, no issues.								
515 -	Steel Protective Coating	Underwater	01/23/2017	1500 SF	1500	0	0	0
		Routine	11/03/2016	1500 SF	1500	0	0	0
Notes: [2016] Little or no deterioration of galvanized coating.								
331	Reinforced Concrete Bridge Railing	Underwater	01/23/2017	607 LF	607	0	0	0
		Routine	11/03/2016	607 LF	607	0	0	0
Notes: [2016] No previous issues, front face and top painted in 2015 with TK Surfacer.								
800	Critical Deficiencies or Safety Hazards	Underwater	01/23/2017	1 EA	1	0	0	0
		Routine	11/03/2016	1 EA	1	0	0	0
Notes: No critical structural deficiencies or serious safety hazards are present on this structure.								
883	Concrete Shear Cracking	Underwater	01/23/2017	1 EA	1	0	0	0
		Routine	11/03/2016	1 EA	1	0	0	0
Notes: No shear cracks noticed.								
885	Scour	Underwater	01/23/2017	1 EA	0	1	0	0
		Routine	11/03/2016	1 EA	0	1	0	0
Notes: [04-14-2014 Scour POA: R - Scour critical. Monitoring required.] [2007-20016] No major scour found on underwater inspections every 5 years. Changed CS to reflect little scour. [2012] (UW Insp. Rpt.) Minor scour depression of up to 2 feet deep and up to 2 feet radius were observed around the two upstream pile of Pier 2. [2007-20016] No major scour found on underwater inspection every 5 years. Changed CS to reflect little scour.								

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
891	Other Bridge Signing	Underwater	01/23/2017	1 EA	1	0	0	0
		Routine	11/03/2016	1 EA	1	0	0	0
Notes: all in place								
892	Slopes & Slope Protection	Underwater	01/23/2017	1 EA	1	0	0	0
		Routine	11/03/2016	1 EA	1	0	0	0
Notes: [2016] No real changes since last notes. [2008-2014] The majority of the Grouted Rip-Rap is holding stable on South side, Blanketed Slope looks good and stable north side.								
893	Guardrail	Underwater	01/23/2017	1 EA	1	0	0	0
		Routine	11/03/2016	1 EA	1	0	0	0
Notes: No issues.								
894	Deck & Approach Drainage	Underwater	01/23/2017	1 EA	1	0	0	0
		Routine	11/03/2016	1 EA	1	0	0	0
Notes: Working as intended.								
895	Sidewalk, Curb, & Median	Underwater	01/23/2017	1 EA	1	0	0	0
		Routine	11/03/2016	1 EA	1	0	0	0
Notes: No issues.								
900	Protected Species	Underwater	01/23/2017	1 EA	0	1	0	0
		Routine	11/03/2016	1 EA	0	1	0	0
Notes: [2016] There is evidence of the presence of protected species living on this structure, look to be of the swallow type, mud nests hanging here and there.								

General Notes: Inspected on 2-21-02 by Gary Vangen. \*BUILT IN 1971. SLIDING TYPE EXPANSION DEVICE. SOME RUST LAMINATIONS ON BEARING DEVICES. DECK OUT TO OUT 43.1". RIP-RAP PUSHED INTO WATER. FULL TREATMENT STRUCT. PLATE GUARD RAIL. E. GUARD RAIL PART MISSING AND CHEWED UP. 36"-36" ROADWAY. CONC. DECK. SOME DELAMINATION OCCURING-WILL ADDRESS IN 96. HDR FINDING-CRITICAL MONITOR. WILL REHAB IN 1999. INSPECTED 01-19-2000. REHABBED IN 1999. MILLED DECK, ADDED OVERLAY, ADDED APPROACH PANELS, ADDED CATCH BASINS, REPAIRED GUARDRAIL, ADDED RIP-RAP AND GROUTED SAME, PAINTED RAILING, REHABBED BEARINGS. INSPECTED 12-20-2000. Inspected on 12-27-2004 by Gary Vangen. Inspected on 12-20-2005 by Gary Vangen. Inspected on 12-28-2006 by Gary Vangen. Inspected by Tony Ridlon, 2008, 2010, 2012, 2014,2016. Revisited by boat, 2008, 2010, 2016. Hydro platform 2014.

58. Deck NBI: [2016] No real changes since last notes. lower NBI to reflect minor cracks top and bottom. [2014] Crack sealed and flood sealed deck, a few isolated minor underside cracks. [2008-2012] No issues, Looks good [1999] Low Slump overlay.

36A. Brdg Railings NBI:

36B. Transitions NBI: ?

36C. Appr Guardrail NBI: 1:10, length?

36D. Appr Guardrail Terminal NBI: 1:10 slope.

59. Superstructure NBI: [2016] No real changes since last notes, lower NBI to reflect previous isolated spall with rebar visible. [2014] Looks to be a previously patched small spall or damaged area about 9-12", that may have been patched during construction or delivery, which is on the inside of bottom flange few feet out from south bearing seat, on the second easterly fascia beam from south. Spall area shows rusty rebar. [2008-2012] Beams look good.

60. Substructure NBI: [2016] Generally isolated minor deterioration, the two vertical crack are of moderate width with a spot of leaching and rust staining. [2014] Couple minor vertical cracks (Typical). [2008-2012]all looks good

61. Channel NBI: [2016] Little or no erosion. Slopes repaired 1999.

62. Culvert NBI:

71. Waterway Adeq NBI: Above flood water elevation.

72. Appr Roadway Alignment NBI: 30 mph, city traffic ,close to intersection, no speed reduction required to drive onto bridge.

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ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
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Inspector's Signature

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Reviewer's Signature

# Pictures



Photo 1 - Overall View of Upstream Fascia, Looking Southeast



Photo 2 - Overall View of Downstream Fascia, Looking Southwest

# Pictures



Photo 3 - View of Pier 1, Looking Southeast

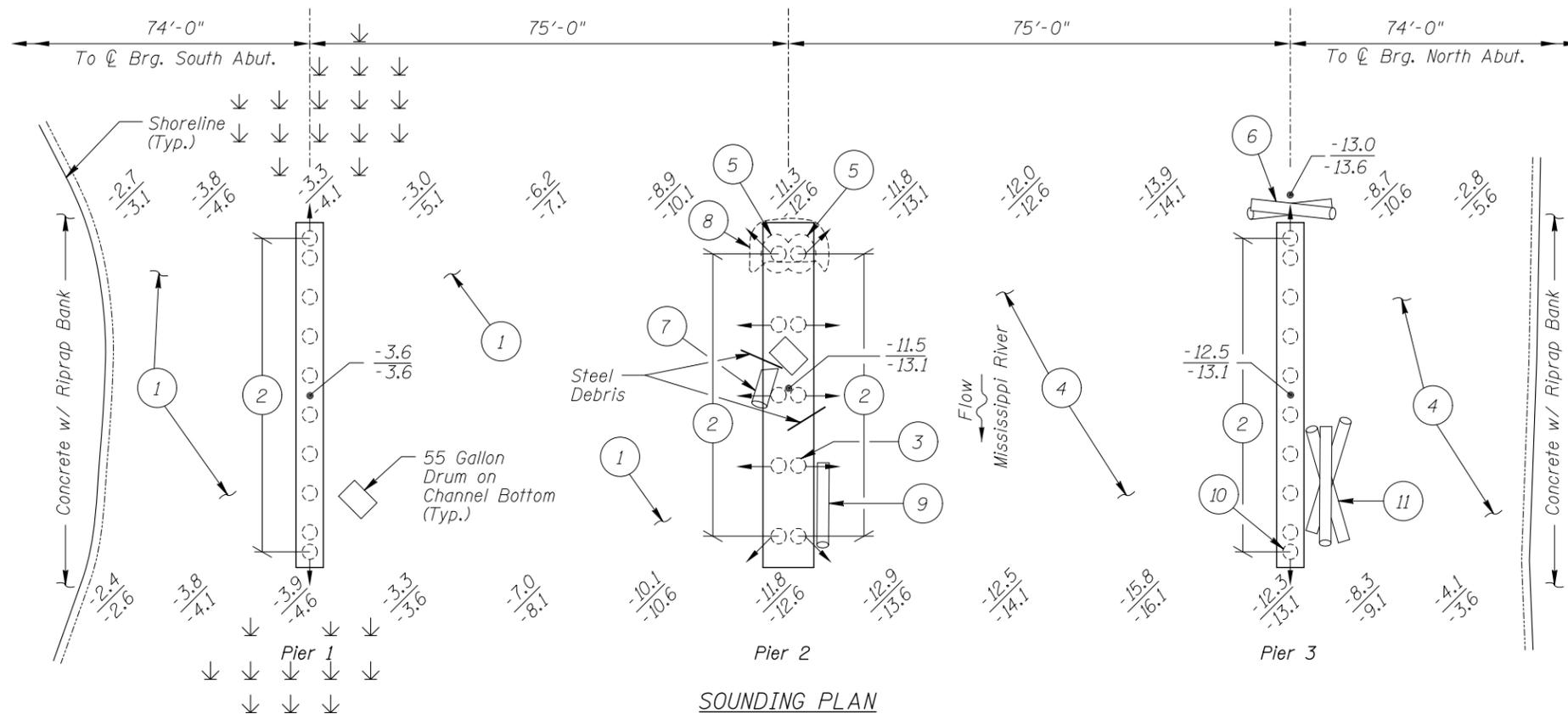
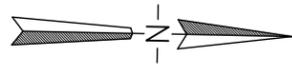


Photo 4 - View of Pier 2, Looking Southeast

## Pictures



Photo 5 - View of Pier 3, Looking Southeast



**SOUNDING PLAN**

**GENERAL NOTES:**

1. Piers 1, 2, and 3 were inspected underwater.
2. At the time of inspection on September 29, 2016, the waterline was located approximately 8.1 feet below the top of pier cap at east end of Pier 3. This corresponds to a waterline elevation of 1272.9 feet based on previous report dated October 1, 2016.
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 substructure units

**INSPECTION NOTES:**

- 1 The channel bottom material around Piers 1 and 2 consisted of soft silty sand allowing maximum probe rod penetrations of 1 to 1.5 feet.
- 2 Light to moderate corrosion with rust nodules covered 75% to 100% of the pile surfaces from the waterline to the channel bottom. Minimal section loss was observed with typical pitting up to 1/32 inch deep and maximum pitting in random instances up to 1/16 inch deep near the waterline.
- 3 Vertical crack along welded joint noted in previous inspection, August 27, 1997, has been repaired with a bolted steel collar extending from the underside of the pile cap to 3 feet below the waterline. The repair was in good and sound condition.
- 4 The channel bottom material around Pier 3 consisted of firm sandy gravel with 6 inch to 2 foot diameter rocks allowing probe rod penetrations of 2 to 4 inches.
- 5 Minor scour depressions, up to 2 feet deep with up to 5 feet radius, were observed around the upstream piles of Pier 2.
- 6 Moderate accumulation of organics/vegetation and two 1 foot diameter logs extended from the channel bottom up 2 feet at the upstream nose of Pier 3.
- 7 Timber debris consisting of a 2 foot diameter by 5 foot long log was observed on the channel bottom against the middle pile on the south side of Pier 2.
- 8 Area of reeds/grass from the waterline down 4 feet measured 3 feet in diameter at the upstream end of Pier 2.
- 9 Timber debris consisting of an 18 inch diameter log was observed on the channel bottom along the two downstream piles on the north side of Pier 2.
- 10 The downstream battered pile of Pier 3 exhibited a 15 degree bend (deformation) 5 feet below the waterline where the pile then extended vertically into the channel bottom. (Bend appears to be due to driving the pile during original bridge construction.)
- 11 Timber debris consisting of three 1 foot diameter logs was observed on the channel bottom along the downstream three vertical piles on the north side of Pier 3.

**Legend**

- 2.2 Sounding Depth (9/29/16)
- 3.0 Sounding Depth (10/1/12)
- Steel Pipe Pile
- Battered Steel Pipe Pile
- ↓ Vegetation/Grass
- ⊘ Timber Debris
- Scour Depression

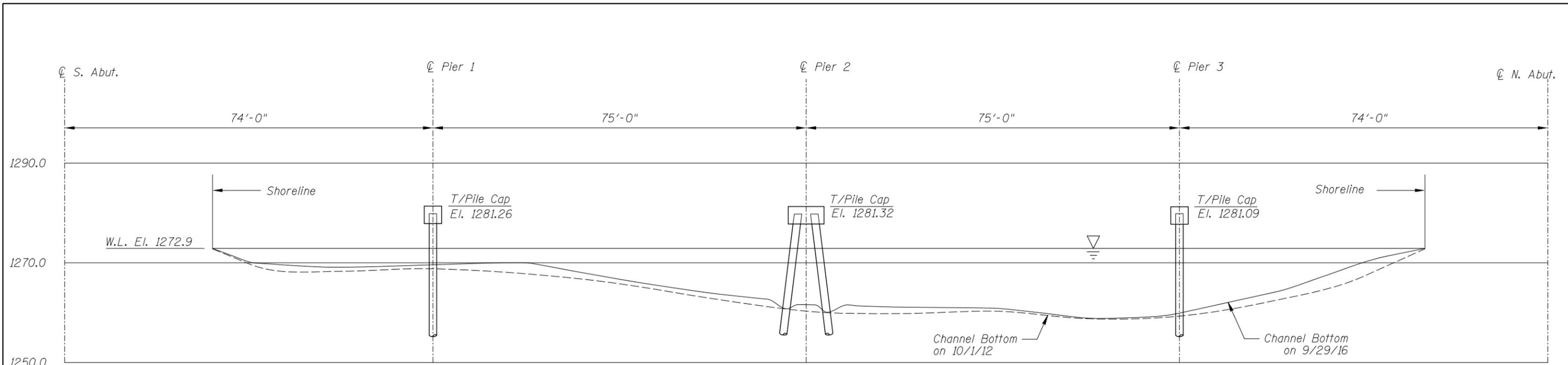
**Note:**

All soundings based on 2016 waterline location.

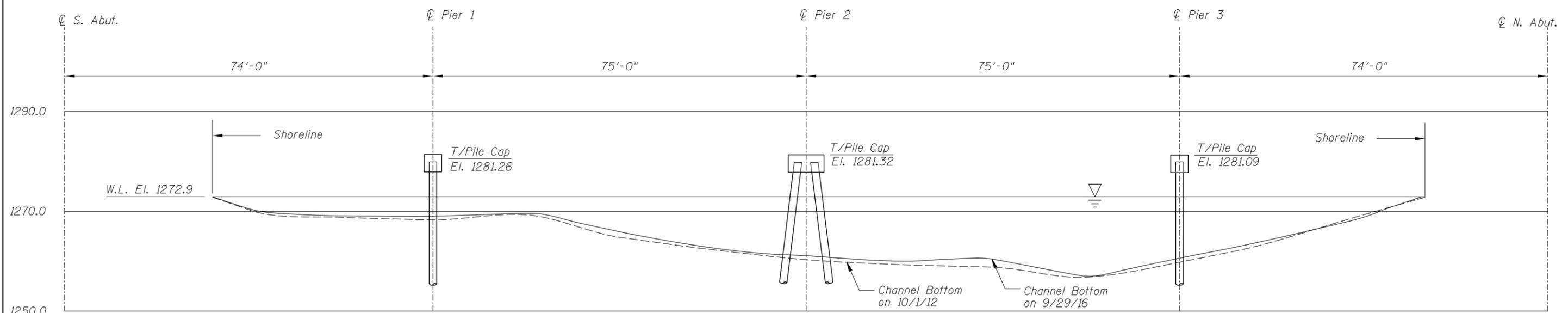
**PIERS 1 & 3 END VIEW**

**PIER 2 END VIEW**

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 31510 CSAH 62 OVER THE MISSISSIPPI RIVER ITASCA COUNTY		
<b>INSPECTION AND SOUNDING PLAN</b>		
Drawn By: PRH	<b>COLLINS ENGINEERS</b> <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: SEPT., 2016
Checked By: DGS		Scale: NTS
Code: 968731510		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:  
Refer to Figure 1 for General Notes.

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 31510 CSAH 62 OVER THE MISSISSIPPI RIVER ITASCA COUNTY		
<b>UPSTREAM AND DOWNSTREAM FASCIA PROFILES</b>		
Drawn By: PRH	<b>COLLINS ENGINEERS</b>	Date: SEPT., 2016
Checked By: DGS		Scale: 1"=20'
Code: 968731510		Figure No.: 2