

2016 UNDERWATER BRIDGE INSPECTION REPORT



BRIDGE # 7773 CSAH 116 over PICKET RIVER

DISTRICT: District 1

COUNTY: St. Louis

CITY/TOWNSHIP: PORTAGE

STATE: Minnesota

Date of Inspection: 06/19/2016

Equipment Used:

Owner: County Highway Agency

Inspected By: Janulis, Lukas

Report Written By: Lukas Janulis

Report Reviewed By:

Final Report Date:



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UNDERWATER INSPECTION

REPORT SUMMARY

The substructure units inspected at Bridge 7773 (CSAH 116 over Picket River), the West Abutment, Bents 1 and 2, and the East Abutment, were generally in fair condition below water with only minor defects of structural significance observed. The timber piles generally were sound with the timber typically allowing awl penetrations of 1/16 to 1/8 inch. The timber pile cap at the East Abutment was bearing on 3/4 inch shims placed on top of Piles A, B, C, E, and F. The pile cap at Pile F of the West Abutment was not fully bearing. The timber cross-bracing was missing on the west side of Bent 1 and there was splitting and splintering resulting in up to 100 percent section loss on the timber cross-bracing of Bents 1 and 2. A light accumulation of timber debris was noted at the upstream nose of Bent 1. The channel bottom appeared stable with no signs of degradation.

INSPECTION FINDINGS

- (A) The channel bottom material within the vicinity of Bents 1 and 2 consisted of silty sand allowing 12 inches of probe rod penetration.
- (B) The channel bottom material along both abutments consisted of riprap 1.5 feet in diameter and smaller.
- (C) The timber piles, cross-bracing, wingwalls, and backwall planking were generally sound allowing a typical timber awl penetration of 1/16 to 1/8 inch.
- (D) The timber pile cap at Piles A, B, C, E, and F of the East Abutment was bearing on shim.
- (E) A timber cross-brace was missing on the west and east side of Piles D through F of Bent 1.
- (F) The timber cross-bracing on the east side of Piles C and D of Bent 1 exhibited heavy deterioration and splitting with up to 100 percent section loss.
- (G) A split in the cross-brace, measuring up to 4 inches wide, was observed on the west side of Bent 1 extending from Pile D to Pile A. The cross-brace to pile connection at Pile D was compromised.
- (H) A split in the cross-brace, measuring up to 2 inches wide, was observed on the west side of Bent 2 extending from Pile C to Pile E. The cross-brace to pile connection at Pile D was compromised. Also, the cross-brace along the east side of the bent between Piles D and F was split approximately 1/2 inch (full depth).
- (I) A light accumulation of timber debris, consisting of 2 inch diameter and smaller branches, was noted around Pile A of Bent 1.
- (J) The timber pile cap at Pile F of the West Abutment was not fully bearing. Shims were installed, but appeared loose.

RECOMMENDATIONS

- (A) Repair or replace the deficient timber cross-bracing particularly the bracing at Bent 1.
- (B) Repair the bearing at Pile F of the West Abutment.
- (C) 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 #: 7773
Feature Intersected: PICKET RIVER
Facility Carried: CSAH 116
District: District 1
County: 069 - St. Louis

Bridge Description:

The superstructure consists of a timber deck supported by six steel I-beams. The superstructure is supported by two timber bents and two timber abutments each with a 12 by 12 inch timber caps. The abutments and bents each consist of six 12 inch diameter timber piles. The substructure units are designated as the East Abutment, Bents 1 and 2, and the West Abutment. The piles are designated A through F from south to north.

2. INSPECTION DATA

Professional Engineer/Team Leader: Lukas Janulis
Inspection Diver: Lukas Janulis
Date of Underwater Inspection: 06/19/2016
Weather Conditions: Overcast, 76°F
Underwater Visibility (feet): 2.0 feet
Waterway Velocity (ft/sec): Negligible

3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) Inspected: The West and East Abutments and Bents 1 and 2.

General Shape:

The West and East Abutments and Bents 1 and 2 each consist of six 12 inch diameter timber piles supporting a 12 inch by 12 inch timber cap. Five of the six piles on the East Abutment have wood shims to restore full bearing to the pile cap.

Maximum Water Depth at Substructure(s) Inspected (feet): 5.5 feet

4. WATERLINE DATUM

Water Level Reference: The top of the pile cap at the upstream end of Bent 1.
Waterline Elevation (feet): 95.3 feet
Description: The waterline was located approximately 4.7 feet below the reference.

5. NBIS CODING INFORMATION

(Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code: 4
Item 61: Channel and Channel Protection: Code: 7
Item 62: Culvert: Code:

Item 92B: Underwater Inspection: Code: Y 48 06/2016

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 No (Mark your selection with an X)

6. STRUCTURAL ELEMENT CONDITION RATING

ELEM #	Element Description	Quantity	Unit	Conditions			
				CS1	CS2	CS3	CS4
216	Timber Abutment	92	LF		20	72	
228	Timber Piling	32	EA			28	4
885	Scour	1	EA	1			

UNDERWATER INSPECTION

INSPECTION PROCEDURES

The routine underwater inspection of Bridge 7773 (CSAH 116 over Pickett River) was completed on June 19, 2016. The underwater inspection was conducted from 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 in accordance with OSHA regulations. Channel bottom 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 were Bents 1 and 2 and the West and East Abutments. According to the bridge inventory, Bents 1 and 2 are founded on timber piles. 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 Structure Inventory Report

Bridge ID: 7773

CSAH 116 over PICKET RIVER

Date: 10/31/2016

+ GENERAL +	+ ROADWAY +	+ INSPECTION +																				
Agency Br. No. 367 Crew District 01 Maint. Area County 069 - St. Louis City Township 69056 - PORTAGE Desc. Loc. 2.5 MI E OF JCT CSAH24 Sect., Twp., Range 36 - 066N - 17W Latitude 48 ° 9' 41.03 " Longitude 92 ° 28' 16.89 " Custodian 02 - County Highway Agency Owner 02 - County Highway Agency BMU Agreement Year Built 1954 MN Year Reconstructed FHWA Year Reconstructed MN Temporary Status Bridge Plan Location 0 - NO PLAN Date Opened to Traffic On - Off System 1 - ON Legislative District 06A Potential ABC 2 - N/A	Bridge Match ID (TIS) 0 Roadway O/U Key Route On Structure Route Sys 04 - CSAH Number 116 Roadway Name or Description CSAH 116 Level of Service 1 - MAINLINE Roadway Type 2 - 2-way traffic Control Section (TH Only) Reference Point 002+00.600 Detour Length 99.0 mi. Lanes ON 2 UNDER 0 ADT 210 YEAR 2008 HCA DT ADTT % Functional Class 07 - Rural - Major Collector	Userkey 109 Structurally Deficient Y Functionally Obsolete N Sufficiency Rating 42.4 Routine Inspection Date 06/01/2016 Routine Inspection Frequency 12 Inspector Name Janulis, Lukas Status P - Posted for Load																				
	+ RDWY DIMENSIONS +	+ NBI CONDITION RATINGS +																				
	If Divided NB-EB SB-WB Roadway Width 24.10 ft. ft. Vertical Clearance ft. ft. Max. Vert. Clear. ft. ft. Horizontal Clear. ft. ft. Lateral Clearance ft. ft. Appr. Surface Width 28.0 ft. Bridge Roadway Width 24.1 ft. Median Width On Bridge ft.	Deck 5 Unsound Deck % 5 Superstructure 5 Substructure 4 Channel 7 Culvert N																				
+ STRUCTURE +	+ MISC. BRIDGE DATA +	+ NBI APPRAISAL RATINGS +																				
Service On 1 - Highway Service Under 5 - Waterway Main Span Type 3 - Steel 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 37.5 ft. Structure Length 99.0 ft. Deck Width (Out-to-Out) 25.5 ft. Deck Material 8 - Wood or Timber Wear Surf Type 6 - Bituminous Wear Surf Install Year Wear Course/Fill Depth 0.20 ft. Deck Membrane 0 - None Deck Rebars N - Not Applicable (no deck) Deck Rebars Install Year Structure Area (Out-to-Out) 2525 sq. ft. Roadway Area (Curb-to-Curb) 2390 sq. ft. Sidewalk Width 50A. Lt 0.00 ft. 50B. Rt 0.00 ft. Curb Height Lt 0.50 ft. Rt 0.50 ft. Rail Type Lt 37 Rt 37	Structure Flared 0 - No flare Parallel Structure N - No parallel structure Field Conn. ID Abutment Foundation (Material/Type) 2 - TIMBER 4 - PILE BENT Pier Foundation (Material/Type) 2 - TIMBER 4 - PILE BENT Historic Status 5 - Not eligible	Structure Evaluation 4 Deck Geometry 5 Underclearances N Waterway Adequacy 8 Approach Alignment 8																				
	+ PAINT +	+ SAFETY FEATURES +																				
	Year Painted Unsound Paint % 30 Painted Area sq. ft. Primer Type Finish Type	Bridge Railing 0 - SUBSTANDARD GR Transition 0 - SUBSTANDARD Appr. Guardrail 0 - SUBSTANDARD GR Termini 0 - SUBSTANDARD																				
	+ BRIDGE SIGNS +	+ IN DEPTH INSP. +																				
	Posted Load 1 - Vehicle Only (Type R12-1A) Traffic 0 - Not Required Horizontal 1 - Object Markers Vertical N - Not Applicable	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;"></th> <th style="width: 10%; text-align: center;">Y/N</th> <th style="width: 10%; text-align: center;">Freq</th> <th style="width: 10%; text-align: center;">Date</th> </tr> </thead> <tbody> <tr> <td>Frac. Critical</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Underwater</td> <td></td> <td style="text-align: center;">60</td> <td style="text-align: center;">06/19/2016</td> </tr> <tr> <td>Pinned Asbly.</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Spec. Feat.</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Y/N	Freq	Date	Frac. Critical				Underwater		60	06/19/2016	Pinned Asbly.				Spec. Feat.			
	Y/N	Freq	Date																			
Frac. Critical																						
Underwater		60	06/19/2016																			
Pinned Asbly.																						
Spec. Feat.																						
		+ WATERWAY +																				
		Drainage Area (sq. mi.) Waterway Opening (sf.) 855 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 1995																				
		+ CAPACITY RATINGS +																				
		Design Load 0 - Other/Unknown Operating Rating 2 - HS TRUCK 21.4 Inventory Rating 2 - HS TRUCK 12.0 Posting VEH: 32 SEMI: DBL: Rating Date 11/15/2010 Overweight Permit Codes A N - N/A B N - N/A C N - N/A																				

MINNESOTA BRIDGE INSPECTION REPORT

11/14/2016

Inspector: CO Bridge

BRIDGE 7773 CSAH 116 OVER PICKET RIVER

County: St. Louis	Location: 2.5 MI E OF JCT CSAH24	Length: 99.0 ft.
City:	Route: 04 - CSAH 116 Ref. Pt.: 002+00.600	Deck Width: 25.5 ft.
Township: 69056 - PORTAGE	Control Section:	Rdwy. Area/ Pct. Unsnd: 2390 sq. ft. / 5%
Section: 36 Township: 066N Range: 17W Maint. Area:		Paint Area/ Pct. Unsnd: sq. ft. / 30%
Span Type: 3 - Steel 2	Local Agency Bridge Nbr.: 367	Culvert: N/A
List:		Postings: 32

NBI Deck: 5 Super: 5 Sub: 4 Chan: 7 Culv: N
 Open, Posted, Closed: P - Posted for Load
 MN Scour Code: I - LOW RISK

Appraisal Ratings - Approach: 8 Waterway: 8		Unofficial Structurally Deficient Y
Required Bridge Signs - Load Posting: 1 - Vehicle Only (Type R12-1A)	Traffic: 0 - Not Required	Unofficial Functionally Obsolete N
Horizontal: 1 - Object Markers	Vertical: N - Not Applicable	Unofficial Sufficiency Rating 42.4

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
31	Timber Deck	Underwater	10/31/2016	2525 SF	0	0	2525	0
		Routine	06/01/2016	2525 SF	0	0	2525	0
Notes: [2016] Wood preservative washed off due to leakage through deck. Deck boards sound of moderate decay in discolored areas. Vegetation growing on edges of deck due to gravel under curbs.								
510 - Wearing Surfaces		Underwater	10/31/2016	2390 SF	0	2151	239	0
		Routine	06/01/2016	2390 SF	0	2151	239	0
Notes: [2016-2015] Cracks in bituminous are 1" or narrower. Crack spacing in 5' and less, some areas less than 1'. Pot holes east and west ends, 1" deep. Deck boards sound of moderate decay in discolored areas. Vegetation growing on edges of deck due to gravel under curbs. [2014] Wood preservative washing off due to leakage through deck. [2013] Many trans. cracks throughout deck. Pot holes present on W. and E. ends of deck with exposed deck timbers on E. end. W. end exposed 5 feet by nearly full width.								
107	Steel Open Girder/Beam	Underwater	10/31/2016	594 LF	0	576	18	0
		Routine	06/01/2016	594 LF	0	576	18	0
Notes: [2016-2013] Paint flaked on bottom flange of all beams. West beam ends have flaking rust of 1 foot and East end beams have 2 feet of flaking rust. Paint flaking in areas and rusting where paint has flaked. No sheets of rust. Continuous.								
515 - Steel Protective Coating		Underwater	10/31/2016	4261 SF	0	1497	1539	1225
		Routine	06/01/2016	4261 SF	0	1497	1539	1225
Notes: [2016] Paint failing along bottom flange and bottom of web. Areas of flaking paint throughout with rust staining.								
216	Timber Abutment	Underwater	10/31/2016	92 LF	0	20	72	0
		Routine	06/01/2016	92 LF	0	20	72	0
Notes: [2016] Added 40 LF to abutment quantity to account for wingwalls. East wing piles pulling away from wings. [2015] Gravel deposits along tops of abutment caps. Some decay on south half of east cap. [2014] Cap on west abutment sliding off piling with half or less bearing on piles. [2013] Both abutment tops are out of alignment leaning inward. All piles show minor weathering and decay. More than others. East wings show much decay and pushing inward. Wingwall piles are decaying. Slight movement of wings. Slight misalignment of the abutments. East abutment pushing in more than West abutment.								

BRIDGE 7773 CSAH 116 OVER PICKET RIVER

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
228	Timber Pile	Underwater	10/31/2016	32 EA	0	0	28	4
		Routine	06/01/2016	32 EA	0	0	28	4
<p>Notes: [2016] East wing piles have pulled away from wings and have extensive decay. [2015] Pile 2 on pier 2 has large split to center of pile on north side. All piles have moderate to extensive weathering with splits spaced as little as 1" around pile surface. [2014] Shims on pile 1A are coming loose. [2013] All piles are bearing with or without shims. All abut. piles are out of alignment pushing in, and all pier piles are out of alignment settling downward. All piles show minor to moderate weathering and decay. W. not bearing on 1 pile, otherwise good bearing.</p>								
235	Timber Pier Cap	Underwater	10/31/2016	102 LF	0	38	64	0
		Routine	06/01/2016	102 LF	0	38	64	0
<p>Notes: [2016-2015] North half of pier 2 cap is hollowing due to splits in top allowing water to enter cap. Gravel deposits along tops of abutment caps. Some decay on south half of east cap. [2014] Cap on west abutment sliding off piling with half or less bearing on piles. [2013] Checks and splits in all caps. Abut. caps have rotated and show minor decay on ends.</p>								
313	Fixed Bearing	Underwater	10/31/2016	24 EA	0	24	0	0
		Routine	06/01/2016	24 EA	0	24	0	0
<p>Notes: [2016-2015] Some bearings have flaking rust with little section loss. [2014-2013] All rusting.</p>								
330	Metal Bridge Railing	Underwater	10/31/2016	197 LF	0	197	0	0
		Routine	06/01/2016	197 LF	0	197	0	0
<p>Notes: [2016-2013] Railing no longer has paint. Surface rust on all rail. Both rails have settled with piers. Metal Channel w/ I Beam Posts.</p>								
515 -	Steel Protective Coating	Underwater	10/31/2016	1083 SF	0	0	435	648
		Routine	06/01/2016	1083 SF	0	0	435	648
<p>Notes: [2016] Paint has failed on rail. Posts have chalking flaking paint with some surface rusting on exposed steel.</p>								
800	Critical Deficiencies or Safety Hazards	Underwater	10/31/2016	1 EA	1	0	0	0
		Routine	06/01/2016	1 EA	1	0	0	0
<p>Notes: [2016-2013] No critical deficiencies or safety hazards found during this inspection.</p>								
823	Gravel Approach Roadway	Underwater	10/31/2016	2 EA	0	2	0	0
		Routine	06/01/2016	2 EA	0	2	0	0
<p>Notes: [2016] Some potholing along edges of deck. Traffic impact on bridge has not been significantly increased. [2015-2013] No signs of settlement or undermining present.</p>								
855	Secondary Members (Superstructure)	Underwater	10/31/2016	1 EA	0	0	1	0
		Routine	06/01/2016	1 EA	0	0	1	0
<p>Notes: [2016-2013] Paint is beginning to fail on all diaphragms. East most showing flaking rust. 45 Intermediate diaphragms</p>								
881	Steel Section Loss	Underwater	10/31/2016	1 EA	1	0	0	0
		Routine	06/01/2016	1 EA	1	0	0	0
<p>Notes: [2016-2013] Minor section loss at beam ends at abutments.</p>								
884	Substructure Settlement & Movement	Underwater	10/31/2016	1 EA	0	1	0	0
		Routine	06/01/2016	1 EA	0	1	0	0
<p>Notes: [2016-2013] E. abut pushing in approx. 3". Piers are settling approx. 2.5" so beams are bowed in a vertical sag. All settled piles have been shimmed. Outside piles on both abuts are not supporting abut. (looks like the W. abut was shot in high at construction, spans 2 & 3 are flat. DC)</p>								
885	Scour	Underwater	10/31/2016	1 EA	1	0	0	0

BRIDGE 7773 CSAH 116 OVER PICKET RIVER

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
890	Load Posting or Vertical Clearance Signing	Underwater	10/31/2016	1 EA	1	0	0	0
		Routine	06/01/2016	1 EA	1	0	0	0
Notes: [2016-2015] 32T load posting signs present with no deterioration. Posting matches load rating from 2010. [2014] 32T Load Posting signs have been placed at the bridge plus weight limit advance warning signs.								
891	Other Bridge Signing	Underwater	10/31/2016	1 EA	1	0	0	0
		Routine	06/01/2016	1 EA	1	0	0	0
Notes: [2016-2013] All signs present with no deterioration. 4 Delineators								
892	Slopes & Slope Protection	Underwater	10/31/2016	1 EA	0	1	0	0
		Routine	06/01/2016	1 EA	0	1	0	0
Notes: [2016-2013] Slight washing of abut. slopes. Slopes have not failed. No riprap and sloped banks below abutments								
894	Deck & Approach Drainage	Underwater	10/31/2016	1 EA	0	0	0	1
		Routine	06/01/2016	1 EA	0	0	0	1
Notes: [2016-2015] Scuppers blocked with gravel north and south edge of deck with vegetation growing in gravel. Potholes in blacktop causing ponding on deck. [2014-2013] Build up of gravel on bridge deck has blocked drainage of scuppers. Approach drainage has no erosion.								
895	Sidewalk, Curb, & Median	Underwater	10/31/2016	1 EA	0	0	1	0
		Routine	06/01/2016	1 EA	0	0	1	0
Notes: [2016] Moderate to extensive decay from splits in tops of curb allowing water penetrate curbs. [2015] Damage from plows and graders along face of curb. 1st section of curb on east end of north curb is rotting. Split along top allowing water in. [2014-2013] Minor weathering of checks and splits. Scuppers.								
900	Protected Species	Underwater	10/31/2016	1 EA	1	0	0	0
		Routine	06/01/2016	1 EA	1	0	0	0
Notes: [2016] No evidence of protected species present.								

General Notes: SLC District 3
 Inspected by: [2016] CG, RL, JB : [2015] CG, TM : [2014] CG, BH : [2013] JRS, JDO.
 [2013] Bridge piles require Fakopp and resistance drill.
 No Guardrail.

58. Deck NBI: [2016-2015] Cracks in bituminous are 1" or narrower. Crack spacing in 5' and less, some areas less than 1'. Pot holes east and west ends. Deck boards sound of moderate decay in discolored areas. Vegetation growing on edges of deck due to gravel under curbs.
 [2014] Wood preservative washing off due to leakage through deck.
 [2013] Bit has many trans. cracks. West and East end has exposed timber. W. end exposed 5 feet by nearly full width. Timbers sound of slight decay on surface.

36A. Brdg Railings NBI: One-line steel bent plate railing with steel posts. Substandard for all speeds.

36B. Transitions NBI: Roadway slopes to steep guardrail required but not present.

36C. Appr Guardrail NBI: Roadway slopes do not meet Minnesota rule 8820.9920. Speed limit on roadway would require approach guardrail.

36D. Appr Guardrail Terminal NBI: Roadway slopes do not meet Minnesota rule 8820.9920. Speed limit on roadway would require approach guardrail.

59. Superstructure NBI: [2016-2014] Paint flaking and rust forming on intermediate diaphragms.
 [2013] Flaking paint on bottom flange of all beams. Abut beam ends have flaking rust, mostly at East abut. Beams have positive camber from settling piers.

60. Substructure NBI: [2016-2015] North half of pier 2 cap is hollowing due to splits in top allowing water to enter cap.
 [2014] Cap on west abutment sliding off piling with half or less bearing on piles.
 [2013] All piles show some level of weathering and minor decay. Some more than others. Both piers have settled resulting in approx. 2.5" sag at center of bridge. Both abut. tops leaning inward.

61. Channel NBI: [2016-2015] Banks have minor erosion.

BRIDGE 7773 CSAH 116 OVER PICKET RIVER

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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62. Culvert NBI:

71. Waterway Adeq NBI: [2016] Large floodplain with limited chance of overtopping bridge.

72. Appr Roadway [2016-2014] No sight distance issues or speed reduction required.
Alignment NBI:

Inventory Notes:

Inspector's Signature

Reviewer's Signature

Pictures



Photo 1 - Upstream Fascia, Looking Northeast



Photo 2 - Downstream Fascia, Looking Southwest

Pictures



Photo 3 - East Abutment, Looking Northeast



Photo 4 - Bent 1, Looking Northeast

Pictures



Photo 5 - Bent 2, Looking Northeast



Photo 6 - West Abutment, Looking Northwest

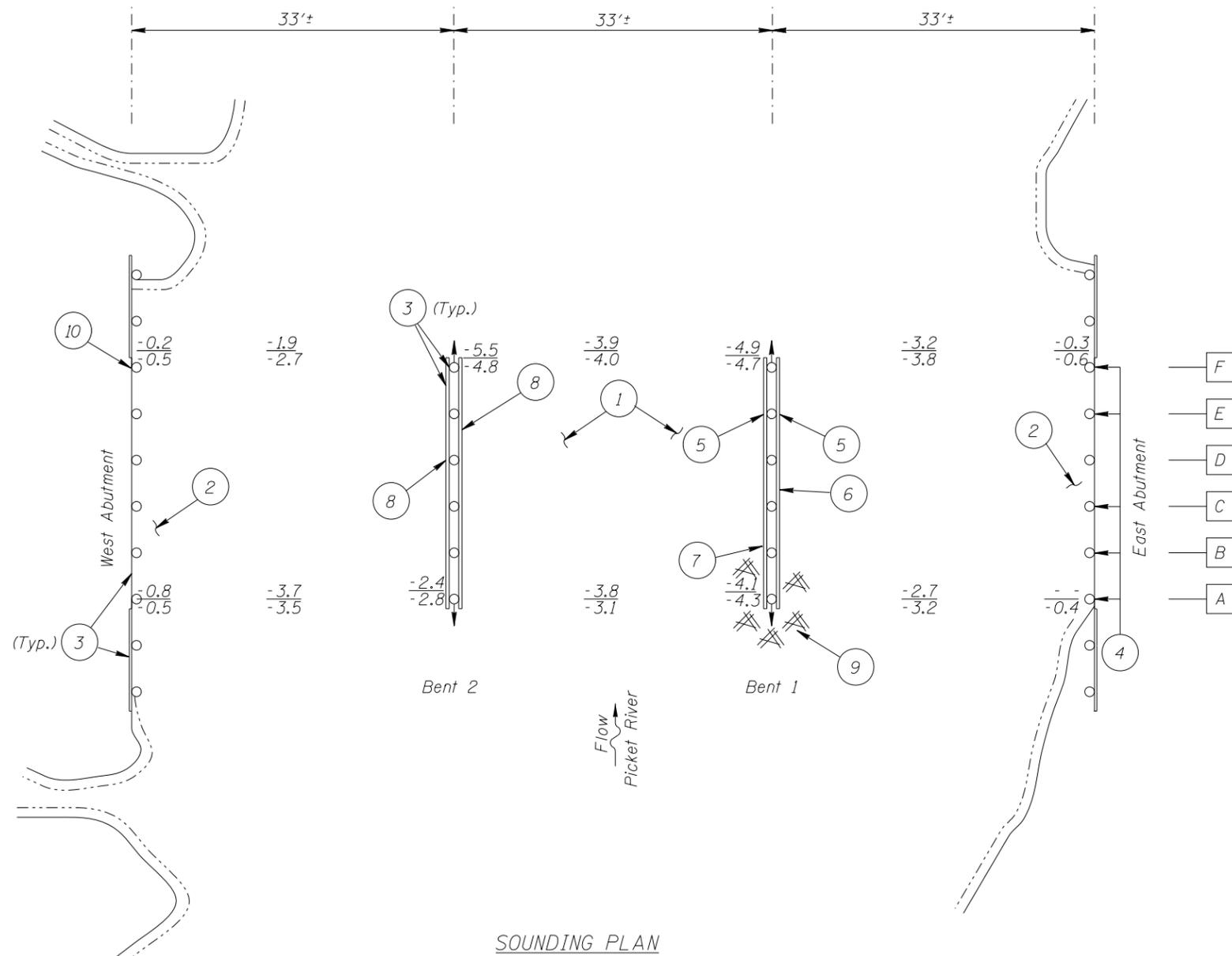
Pictures



Photo 7 - Loose Shim at Pile F of the West Abutment, Looking Southwest



Photo 8 - Split at Timber Cross Brace (Bent 2 Shown), Looking East



INSPECTION NOTES:

- 1 The channel bottom material typically consisted of silty sand allowing 12 inches of probe rod penetration.
- 2 The channel bottom material in the vicinity of both abutments consisted of riprap 1.5 feet in diameter and smaller.
- 3 The timber piles, cross-bracing, wingwalls, and backwall planking were generally sound allowing a typical timber awl penetration of 1/16 to 1/8 inch.
- 4 The timber pile cap at the East Abutment was bearing on shims at the top of Piles A, B, C, E, and F.
- 5 A timber cross-brace was missing on the west and east side of Piles D through F of Bent 1.
- 6 The timber cross-bracing on the east side of Piles C and D of Bent 1 exhibited heavy deterioration and splitting with up to 100 percent section loss.
- 7 A split in the cross-brace, measuring up to 4 inches wide, was observed on the west side of Bent 1 extending from Pile D to Pile A. The cross-brace to pile connection at Pile D was compromised.
- 8 A split in the cross-brace, measuring up to 2 inches wide, was observed on the west side of Bent 2 extending from Pile C to Pile E. The cross-brace to pile connection at Pile D was compromised. Also, the cross-brace along the east side of the bent between Piles D and F was split approximately 1/2 inch (full depth).
- 9 A light accumulation of timber debris, consisting of 2 inch diameter and smaller branches, was observed around Pile A of Bent 1.
- 10 Timber pile cap at Pile F of the West Abutment was not fully bearing. Shims were installed, but appeared loose.

SOUNDING PLAN

GENERAL NOTES:

1. The East and West Abutments and Bents 1 and 2 were inspected underwater.
2. At the time of inspection on June 19, 2016, the waterline was located approximately 4.7 feet below the top of the pile cap at the upstream end of Bent 1. Since elevation information was not available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 95.3.
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 1/2 point intervals between the substructure units.

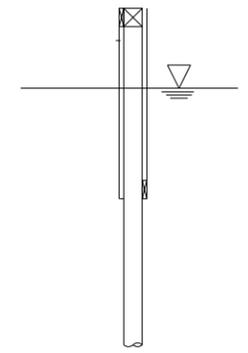
Legend

- 3.9 Sounding Depth from Waterline (6/19/16)
- 3.2 Sounding Depth from Waterline (6/22/12)
- A Pile Identification Designation
- 12"φ Timber Pile
- 12"φ Battered Timber Pile
- ⊗ Timber Debris

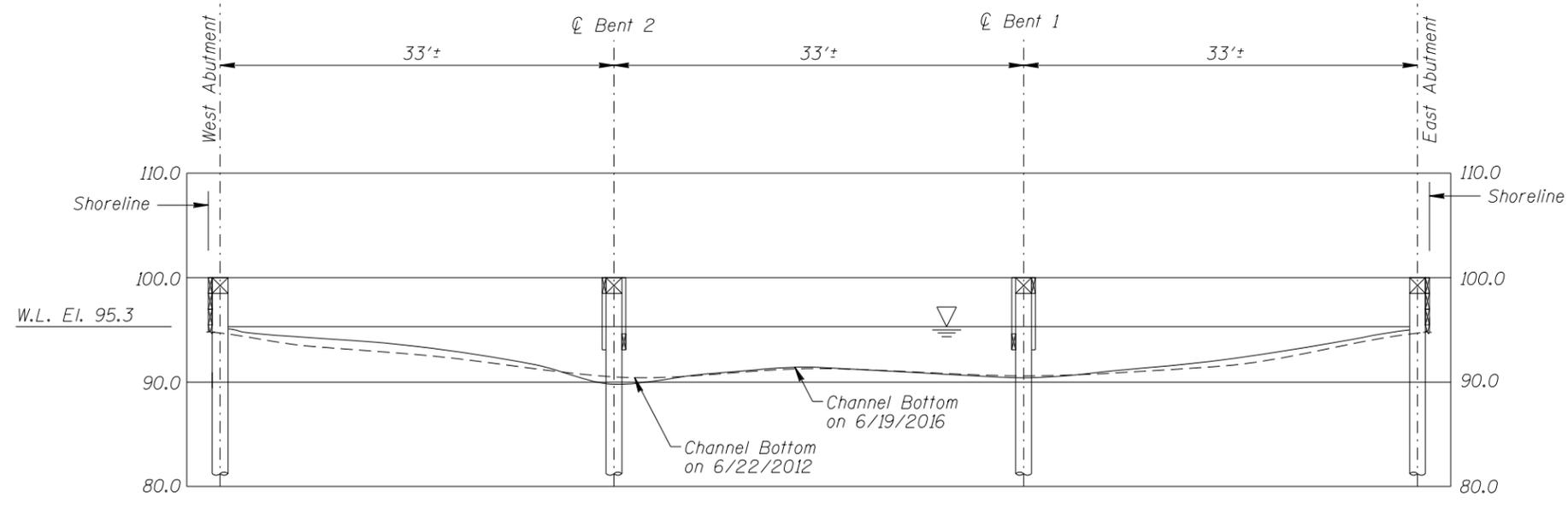
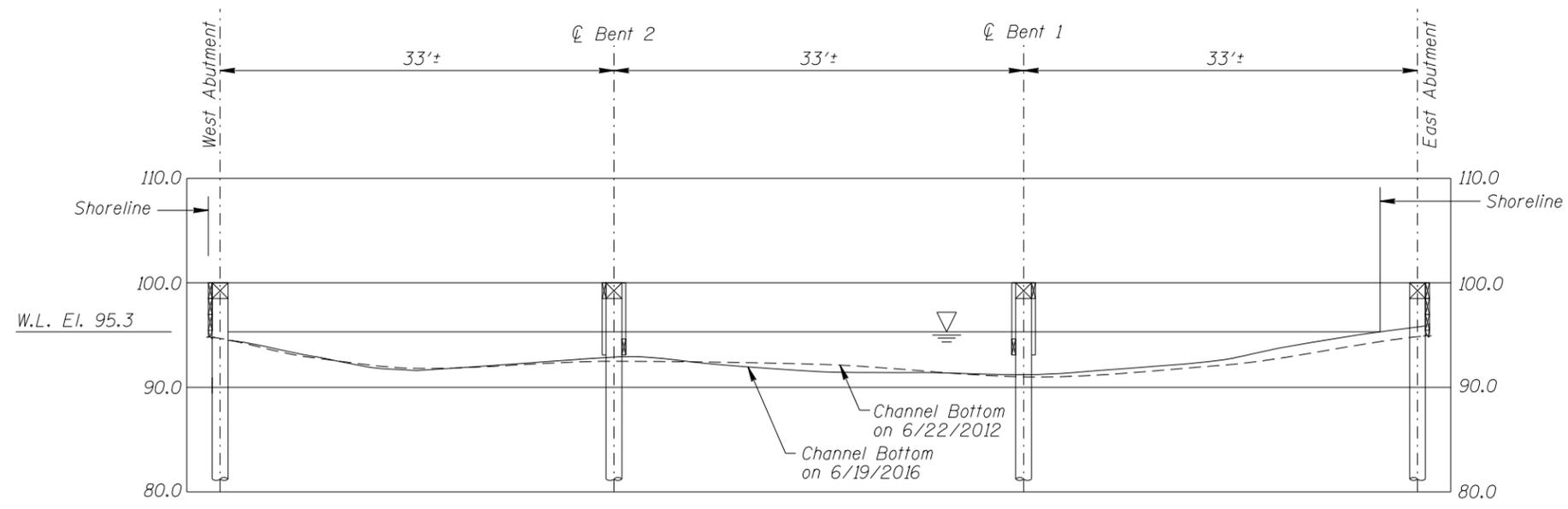
Note:

All soundings are based on 2016 waterline location.

TYPICAL END VIEW OF BENTS



MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 7773 CSAH 116 OVER PICKET RIVER DISTRICT 1, ST. LOUIS COUNTY		
INSPECTION AND SOUNDING PLAN		
DRAWN BY: PRH	COLLINS ENGINEERS	DATE: JUNE 22, 2016
CHECKED BY: LJ	<small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	SCALE: NTS
CODE: 96877773		FIGURE NO.: 1



Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 7773 CSAH 116 OVER PICKET RIVER DISTRICT 1, ST. LOUIS COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
DRAWN BY: PRH	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	DATE: JUNE 22, 2016
CHECKED BY: LJ		SCALE: 1"=15'-0"
CODE: 9687773		FIGURE NO.: 2