

2016 UNDERWATER BRIDGE INSPECTION REPORT



BRIDGE # 36508 CSAH 6 over STREAM

DISTRICT: District 1

COUNTY: Koochiching

CITY/TOWNSHIP: T - 151 R - 27

STATE: Minnesota

Date of Inspection: 06/04/2016

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. 36508, the East and West Abutments, were found to be in satisfactory condition below water. The upstream pile of the West Abutment was split through to the middle from the top of the pile to the channel bottom. The downstream pile on the West Abutment exhibited a 1/2 inch wide split allowing 3 inches of penetration on the south face. The backwall and wingwall planking exhibited minor movement and displacement at the East Abutment, but no loss of fill was observed. The channel bottom around the substructure units appeared stable with no evidence of significant scour.

INSPECTION FINDINGS

A) The channel bottom consisted of 1 foot diameter cobbles and riprap allowing no probe rod penetration. B) The timber piles were mostly in satisfactory and sound condition with occasional checking up to 1/8 inch wide. C) Pile 1 at the West Abutment exhibited an up to 1.5 inch wide split with decay in several locations extending through to the middle of the pile. D) Pile 8 at the West Abutment exhibited a split up to a 1/2 inch wide on the south face extending from the top of the pile down 3 feet allowing up to 3 inches of penetration. E) The East Abutment backwall exhibited 1/4 inch wide gaps between the planks with minor movement of the planks detected, but with no loss of fill. F) A 1/4 inch wide split in the wall planking was observed 1 foot above the waterline and extended between Pile 1 and Pile 5 of the East Abutment. G) The second board from the top at the East Abutment backwall exhibited an outward rotation of 1 inch.

RECOMMENDATIONS

(A) Ideally, the cracked and decayed pile at West Abutment should be replaced to restore full load carrying capacity of the structure. If pile is not replaced or assisted with a helper pile, the existing pile should be monitored during future inspections.

(B) 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 #: 36508
Feature Intersected: STREAM
Facility Carried: CSAH 6
District: District 1
County: 036 - Koochiching

Bridge Description:

The bridge superstructure consists of a timber deck and stringers supported by timber pile and planking end bents (abutments with wingwalls).

2. INSPECTION DATA

Professional Engineer/Team Leader: Daniel G. Stromberg
Inspection Diver: Daniel G. Stromberg
Date of Underwater Inspection: 06/04/2016
Weather Conditions: Cloudy, 60°F
Underwater Visibility (feet): 2 feet
Waterway Velocity (ft/sec): Negligible

3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) Inspected: East and West Abutments.

General Shape:

The abutments and their skewed wingwalls are constructed of horizontal timber planking retained in place by a single row of piles along the abutment breastwall (with cap) and wingwalls.

Maximum Water Depth at Substructure(s) Inspected (feet): Approximately 3.0 feet

4. WATERLINE DATUM

Water Level Reference: The top of the pile cap at the upstream end of the East Abutment.
Waterline Elevation (feet): 94.3 feet
Description: The waterline was approximately 5.7 feet below reference.

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: 7
Item 62: Culvert: Code:
Item 92B: Underwater Inspection: Code: Y 48 06/2016

Item 113: Scour Critical Bridge:

Code: J

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	102	LF		92	10	
228	Timber Piling	16	EA		15		1
885	Scour	1	EA	1			

UNDERWATER INSPECTION

INSPECTION PROCEDURES

The routine underwater inspection of Bridge 36508 (CSAH6 over a Stream) was completed on 6/04/2016. 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. Due to waterway conditions at the time of the inspection, the inspection could be accomplished by wading 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 consisted of two timber pile and planking end bents. 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: 36508

CSAH 6 over STREAM

Date: 08/11/2016

+ GENERAL +	+ ROADWAY +	+ INSPECTION +																				
Agency Br. No. Crew District 01 Maint. Area County 036 - Koochiching City Township 36004 - T - 151 R - 27 Desc. Loc. 1.6 MI W OF JCT CR 12 Sect., Twp., Range 6 - 151N - 27W Latitude 47 ° 55 ' 52.41 " Longitude 94 ° 9 ' 23.90 " Custodian 02 - County Highway Agency Owner 02 - County Highway Agency BMU Agreement Year Built 1969 MN Year Reconstructed FHWA Year Reconstructed MN Temporary Status Bridge Plan Location 0 - NO PLAN Date Opened to Traffic 10/1/1969 On - Off System 1 - ON Legislative District 03A Potential ABC 2 - N/A	Bridge Match ID (TIS) 0 Roadway O/U Key Route On Structure Route Sys 04 - CSAH Number 6 Roadway Name or Description CSAH 6 Level of Service 1 - MAINLINE Roadway Type 2 - 2-way traffic Control Section (TH Only) Reference Point 006+00.320 Detour Length 10.0 mi. Lanes ON 2 UNDER 0 ADT 90 YEAR 2008 HCA DT ADTT % Functional Class 07 - Rural - Major Collector	Userkey 76 Structurally Deficient N Functionally Obsolete N Sufficiency Rating 86.4 Routine Inspection Date 09/11/2015 Routine Inspection Frequency 12 Inspector Name Stromberg, Dan Status A - Open																				
	+ RDWY DIMENSIONS +	+ NBI CONDITION RATINGS +																				
	If Divided NB-EB SB-WB Roadway Width 30.30 ft. ft. Vertical Clearance ft. ft. Max. Vert. Clear. ft. ft. Horizontal Clear. ft. ft. Lateral Clearance ft. ft. Appr. Surface Width 32.0 ft. Bridge Roadway Width 30.3 ft. Median Width On Bridge ft.	Deck 7 Unsound Deck % Superstructure 7 Substructure 5 Channel 7 Culvert N																				
+ STRUCTURE +	+ MISC. BRIDGE DATA +	+ NBI APPRAISAL RATINGS +																				
Service On 1 - Highway Service Under 5 - Waterway Main Span Type 7 - Timber 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: 1 APPR: 0 TOTAL: Main Span Length 14.0 ft. Structure Length 16.0 ft. Deck Width (Out-to-Out) 31.6 ft. Deck Material 8 - Wood or Timber Wear Surf Type 6 - Bituminous Wear Surf Install Year Wear Course/Fill Depth 0.16 ft. Deck Membrane 0 - None Deck Rebars N - Not Applicable (no deck) Deck Rebars Install Year Structure Area (Out-to-Out) 506 sq. ft. Roadway Area (Curb-to-Curb) 484 sq. ft. Sidewalk Width 50A. Lt 0.00 ft. 50B. Rt 0.00 ft. Curb Height Lt 0.67 ft. Rt 0.67 ft. Rail Type Lt 38 Rt 38	Structure Flared 0 - No flare Parallel Structure N - No parallel structure Field Conn. ID Abutment Foundation (Material/Type) 2 - TIMBER Pier Foundation (Material/Type) 4 - PILE BENT Historic Status N - N/A Historic Status 5 - Not eligible	Structure Evaluation 5 Deck Geometry 7 Underclearances N Waterway Adequacy 8 Approach Alignment 8																				
	+ PAINT +	+ SAFETY FEATURES +																				
	Year Painted Unsound Paint % Painted Area sq. ft. Primer Type Finish Type	Bridge Railing 0 - SUBSTANDARD GR Transition 0 - SUBSTANDARD Appr. Guardrail 0 - SUBSTANDARD GR Termini N - NOT REQUIRED																				
	+ BRIDGE SIGNS +	+ IN DEPTH INSP. +																				
	Posted Load 0 - Not Required Traffic 0 - Not Required Horizontal 1 - Object Markers Vertical N - Not Applicable	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">Y/N</th> <th style="text-align: center;">Freq</th> <th style="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;">00</td> <td style="text-align: center;">06/04/2016</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		00	06/04/2016	Pinned Asbly.				Spec. Feat.			
	Y/N	Freq	Date																			
Frac. Critical																						
Underwater		00	06/04/2016																			
Pinned Asbly.																						
Spec. Feat.																						
		+ WATERWAY +																				
		Drainage Area (sq. mi.) Waterway Opening (sf.) 80 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 J - SCOUR Year 1992																				
		+ CAPACITY RATINGS +																				
		Design Load 4 - H 20 Operating Rating 2 - HS TRUCK 26.4 Inventory Rating 2 - HS TRUCK 19.0 Posting VEH: SEMI: DBL: Rating Date 04/20/2012 Overweight Permit Codes A N - N/A B N - N/A C N - N/A																				

MINNESOTA BRIDGE INSPECTION REPORT

09/09/2016

Inspector: CO Bridge

BRIDGE 36508 CSAH 6 OVER STREAM

County: Koochiching	Location: 1.6 MI W OF JCT CR 12	Length: 16.0 ft.
City:	Route: 04 - CSAH 6 Ref. Pt.: 006+00.320	Deck Width: 31.6 ft.
Township: 36004 - T - 151 R - 27	Control Section:	Rdwy. Area/ Pct. Unsnd: 484 sq. ft. / %
Section: 6 Township: 151N Range: 27W Maint. Area:		Paint Area/ Pct. Unsnd: sq. ft. / %
Span Type: 7 - Wood or Timber 2 -	Local Agency Bridge Nbr.:	Culvert: N/A
List: Stringer/Multi-beam or Girder		Postings:
NBI Deck: 7 Super: 7 Sub: 5 Chan: 7 Culv: N	Open, Posted, Closed: A - Open	
	MN Scour Code: J - SCOUR SUSCEPT	
Appraisal Ratings - Approach: 8 Waterway: 8		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 86.4

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	08/11/2016	506 SF	506	0	0	0
		Migrated Values		506 SF	506	0	0	0
	Notes: [2016] Migrator assumed CS1.							
	510 - Wearing Surfaces	Underwater	08/11/2016	484 SF	474	0	10	0
		Migrated Values		484 SF	474	0	10	0
54	Timber Slab	Underwater	08/11/2016	506 SF	506	0	0	0
		Migrated Values		506 SF	506	0	0	0
	Notes: [2016] Migrator assumed CS1.							
	510 - Wearing Surfaces	Underwater	08/11/2016	484 SF	474	0	10	0
		Migrated Values		484 SF	474	0	10	0
	Notes: 2015 - Longitudal crack near centerline. 2012 - East approach has a bit patch, but still a dip. 2011 - Long crack at centerline. 2009 - Crack at W Abut & at Centerline. Grass @ curblines.							
156	Timber Floor Beam	Underwater	08/11/2016	32 LF	32	0	0	0
		Migrated Values		32 LF	32	0	0	0
	Notes: [2016] Migrator assumed the presence of one timber floorbeam in CS1.							
216	Timber Abutment	Underwater	08/11/2016	102 LF	0	92	10	0
		Migrated Values		102 LF	0	92	10	0
	Notes: [2016] Migrator added 40 LF to abutment quantity to account for wingwalls (CS1:0 CS2:30 CS3:10 CS4:0). 2015 - 6th plank down from cap is deteriorating. 2014 - Aging 2006 - water is 0 to 3" at abut. Wingwall notes: 2015 - NE cap is missing, NW cap is 4" above piling. 2014 - NE wingwall is missing in center. Piling are not under 3 of the 4 caps. 2012 - NE wingwall is rotten in center 2010 - NE cap still missing. 2009 - NE cap still missing. NE CAP MISSING. 2005 - NE cap still missing.							

BRIDGE 36508 CSAH 6 OVER STREAM

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	08/11/2016	16 EA	0	15	0	1
		Migrated Values		16 EA	0	15	0	1
Notes: 2014 - Some delamination at water 2013 - NW pile - 2" split for 5'. 2" SPLIT - NW PILE - SPLIT TO WATERLINE & 1 MINOR SPLIT - SE PILE								
235	Timber Pier Cap	Underwater	08/11/2016	69 LF	67	2	0	0
		Migrated Values		69 LF	67	2	0	0
Notes: 2015 - NW cap has chunk split off. 2012 - SW pier cap has multiple splits. 2010 - Splits in SW cap. SE cap slip all way thru. 2009 - Cap on piling this year. 2006 - Replace cap - approx. 12' long. Previous - Cap is sitting on all abut piling this year. NW CORNER OF CAP - SPLIT. CAP ON PILING EXCEPT FOR SE CORNER IN 2004. SE & SW ENDS - MINOR SPLIT.								
311	Movable Bearing	Underwater	08/11/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes:								
313	Fixed Bearing	Underwater	08/11/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes:								
332	Timber Bridge Railing	Underwater	08/11/2016	33 LF	0	33	0	0
		Migrated Values		33 LF	0	33	0	0
Notes: 2015 - Major split - S side, Second East post. 2012 - 8 out of 8 with minor splits. Steel plate beam. 2009 - 5 out of 8 with minor splits. 2008 - couple of posts with splits.								
800	Critical Deficiencies or Safety Hazards	Underwater	08/11/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: NO CRITICAL FINDINGS OBSERVED DURING THE LAST INSPECTION.								
822	Bituminous Approach Roadway	Underwater	08/11/2016	2 EA	0	2	0	0
		Migrated Values		2 EA	0	2	0	0
Notes: 2014 - Bump cast side 2013 - Bump at SE corner. Agg. is polishing. 2007 - slight dip on east end. 2006 and before - Agg polishing NEW OVERLAY IN 2004. Overlay is approximately 12" from curb.								
885	Scour	Underwater	08/11/2016	1 EA	1	0	0	0
891	Other Bridge Signing	Underwater	08/11/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes:								
892	Slopes & Slope Protection	Underwater	08/11/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: Use this element to rate the condition of slopes and slope protection.								

BRIDGE 36508 CSAH 6 OVER STREAM

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	08/11/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: Use this element to rate the condition, function, and adequacy of the drainage system.								
895	Sidewalk, Curb, & Median	Underwater	08/11/2016	1 EA	0	1	0	0
		Migrated Values		1 EA	0	1	0	0
Notes: Timber is drying out.								
900	Protected Species	Underwater	08/11/2016	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: 2015 - D. Grindall, Erickson Engineering. Grass on banks is tall. Water is 18" deep.
 2014 - Inspected by D. Grindall Erickson Engineering. Water 18" deep west abutment.
 2013 - Inspected by D. Grindall Erickson Engineering.
 2011 - DG & WH. 8" diameter riprap at east abutment & 6" at west. 36" water at east abutment & 24" at west. 2010 - DG & WH. Water depth is 48" on east side and 36" on west side.
 2009 - DG. 24' Rdwy with 2' to 3' shldr. Water is 3' deep at Abut. 6' from low timber to water.
 2008 - DG.
 2007 - DG. Lots of bird nests. Small riprap at abut. Water - up to 18" deep.
 2006 - Water is 18" in middle. 6" to 12" riprap at abut. DG - inspector. Small 4' to 6' riprap on east side. Previous comments > PONTIS inspection comments - No changes from before. DG PONTIS inspection comments - *FROST GENERALLY LIFTS CAPS APPROX. 1" ABOVE WATER. NO SLOPE UNDER BRIDGE. NW PILE SPLIT TO WATERLINE & SW PILE - 1/2" SPLIT. 6.5" TO WATER. SE PILE NOT UNDER CAP. NW PILE CRACKED TWO WAYS - 2". ABUT. PLUMB. NO RIPRAP.
 1/93 COMMENTS - SE PILE SPLIT.
 12/93 COMMENTS - NW PILE IS WORSE. NW CAP - MINOR SPLIT. CAP ON ALL PILING TODAY EXCEPT FOR WING CAPS.
 Underwater Inspection - 6/4/2016 - Collins Engineers, Inc
 1/95 COMMENTS - CAP IS BACK ON THE E ABUT PILING. CAP IS 1" ABOVE W ABUT PILING.
 1/96 COMMENTS - COUPLE RAIL POSTS HAVE CRACKS.
 1/97 COMMENTS - 4" TO WATER. NE WING CAP SPLIT.
 1/98 - NW PILE 3/4" SPLIT. DELINEATORS LOW & FADED.
 1999 COMMENTS - WATER - 18" DEEP. SUBSTRUCTURE INSPECTED ON 12/16/00.
 1/2001 COMMENTS - 6" TO WATER. Inspector - DG. Substructure inspected further on 12/30/04 by DG. 2005 - DG inspector. Water from 18" to 30" deep. Lots of bird nests.

- 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:

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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Inventory Notes:

Inspector's Signature

Reviewer's Signature

Pictures



Photo 1 - Overall View of Structure, Looking Northwest



Photo 2 - Overall View of West Abutment, Looking Southwest

Pictures



Photo 3 - Overall View of East Abutment, Looking Southeast

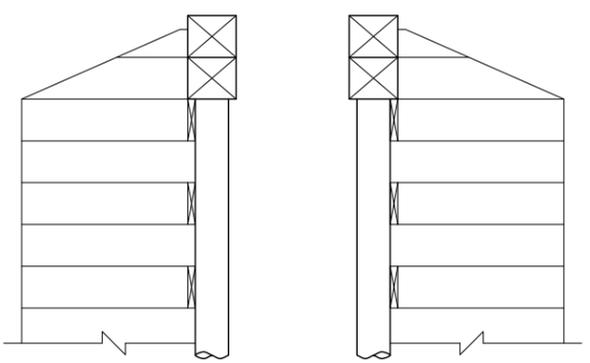
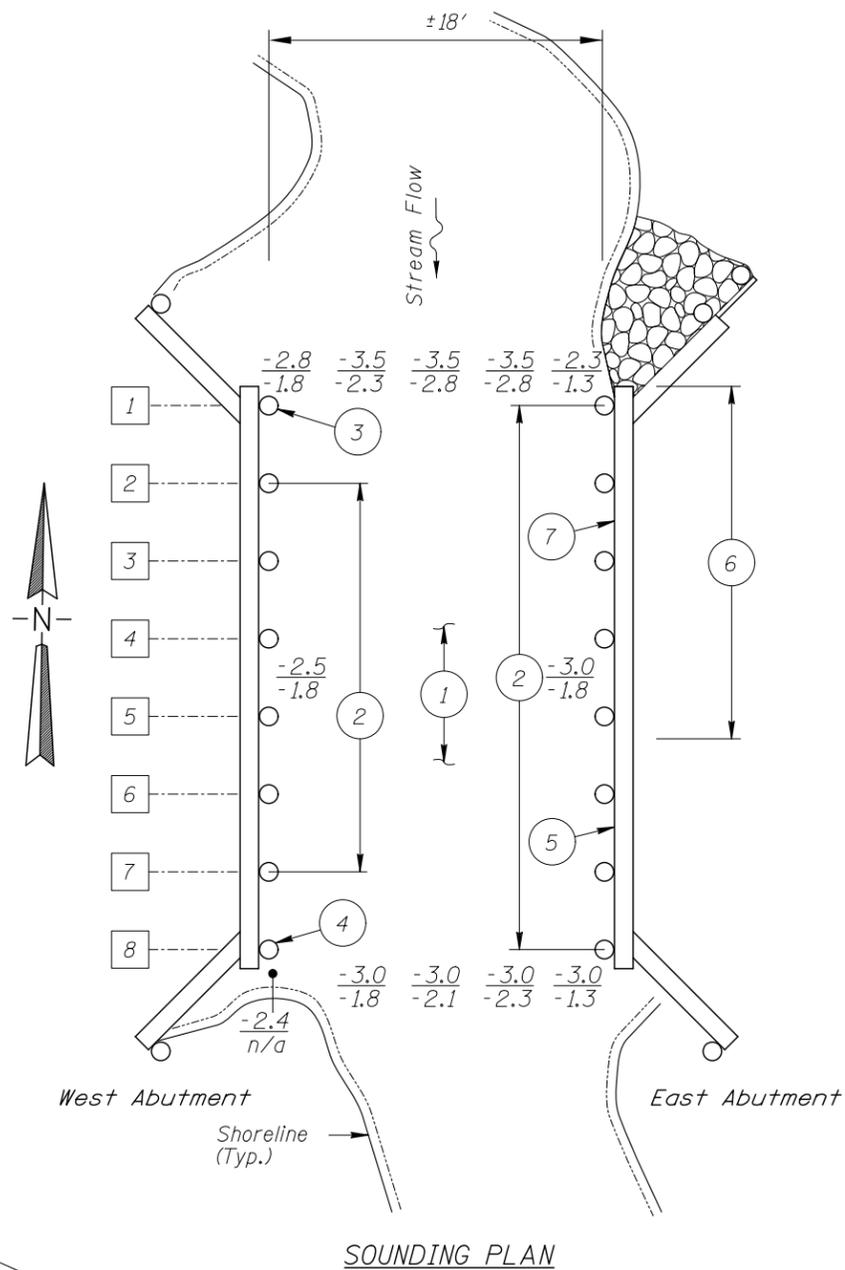


Photo 4 - Split in Upstream Pile of the West Abutment, Looking West

Pictures



Photo 5 - Split in East Abutment Backwall, Looking Southeast



TYPICAL END VIEW OF ABUTMENTS

GENERAL NOTES:

- The West and East Abutments were inspected underwater.
- At the time of inspection on June 4, 2016, the waterline was located approximately 5.7 feet below the top of the pile cap at the upstream end of the East Abutment. Since design plans were not available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 94.3.
- Soundings indicate the water depth at the time of inspection and are measured in feet.
- Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

INSPECTION NOTES:

- The channel bottom consisted of 1 foot diameter cobbles and riprap allowing no probe rod penetration.
- The timber piles were mostly in satisfactory and sound condition with occasional checking up to 1/8 inch wide.
- Pile 1 at the West Abutment exhibited an up to 1.5 inch wide split with decay in several locations extending through to the middle of the pile.
- Pile 8 at the West Abutment exhibited a split up to a 1/2 inch wide on the south face extending from the top of the pile down 3 feet and allowing up to 3 inches of penetration.
- The East Abutment backwall exhibited 1/4 inch wide gaps between the planks with minor movement of the planks detected, but with no loss of fill.
- A 1/4 inch wide split in the wall planking was observed 1 foot above the waterline and extended between Pile 1 and Pile 5 of the East Abutment.
- The second board from the top, at the East Abutment backwall, exhibited an outward rotation of 1 inch.

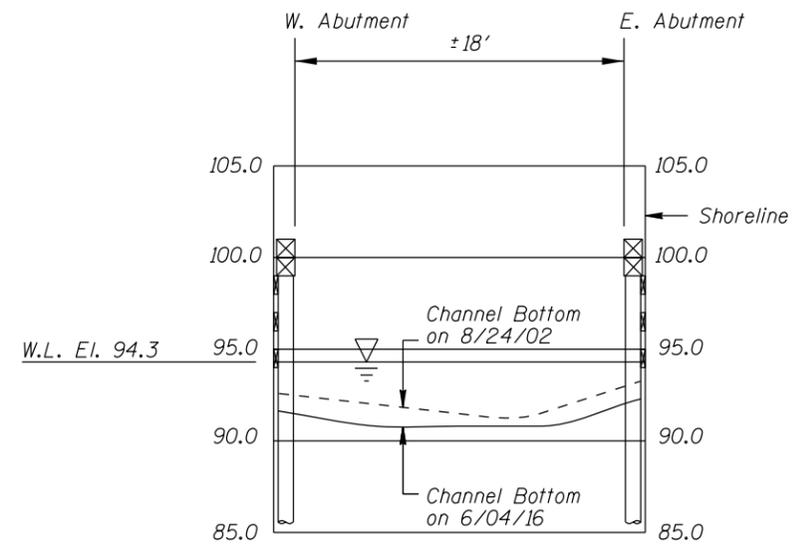
Legend

- 3.0 Sounding Depth from Waterline (6/04/16)
- 1.3 Sounding Depth from Waterline (8/24/02)
- Timber Pile
- ⊗ Riprap

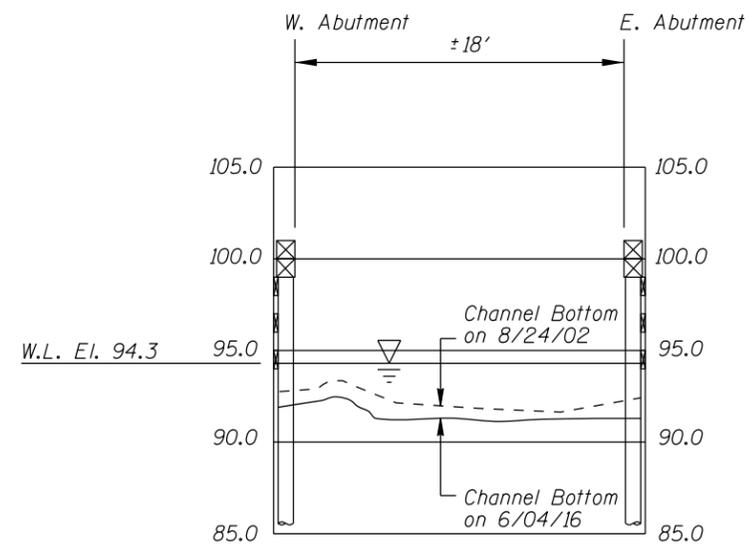
Note

All soundings based on 2016 waterline location.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 36508 OVER A STREAM DISTRICT 1, KOOCHICHING COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: MRS	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: JUNE 4, 2016
Checked By: DGS		Scale: NTS
Code: 968736508		Figure No.: I



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 36508 OVER A STREAM DISTRICT 1, KOOCHICHING COUNTY UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: MRS	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: JUNE 4, 2016
Checked By: DGS		Scale: 1"=10'
Code: 968736508		Figure No.: 2