

2017 UNDERWATER BRIDGE INSPECTION REPORT



BRIDGE # L1244 UTWN 388 over HASTY BROOK

DISTRICT: District 1

COUNTY: Carlton

CITY/TOWNSHIP: T - 49 R - 20

STATE: Minnesota

Date of Inspection: 09/24/2016

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. L1244, North and South Abutments, were found to be in fair condition with no structurally significant defects observed below water. A moderate accumulation of timber debris was present at the waterline along the entire upstream fascia and extending 5 feet upstream of the structure. The presence of the debris somewhat limited access to portions of the abutments, but in general, it could be determined that the timber of the abutments was sound, but aged and weathered. The channel bottom in the vicinity of the abutments consisted of sand and organics. A sinkhole was observed in the roadway behind the North Abutment. During the 2015 above water inspection, the bridge was closed for the foreseeable future due to its remote location and other considerations. The bridge has remained closed and was closed during the 2016 underwater inspection.

INSPECTION FINDINGS

- A. Channel bottom material in the vicinity of the abutments consisted of sand and organics allowing 1 foot of probe rod penetration.
- B. Moderate accumulation of timber debris up to 1 foot in diameter was observed at the waterline along the entire upstream fascia of the bridge and extended 5 feet upstream from the structure.
- C. The timber construction of the abutments was generally sound with no structurally significant deterioration observed. In general, timber was aged and weathered.
- D. A sink hole, 2 feet in diameter and 1.3 feet deep, was observed in the roadway behind the north abutment.

RECOMMENDATIONS

- (A) Since the bridge is closed for the foreseeable future, the limited access caused by the timber debris is not a concern at this time. Should, however, a decision be made to reopen the bridge (to vehicles other than snowmobiles), debris should be removed and the bridge re-examined.
- (B) Since the bridge is closed, consideration could be given to removing it from the underwater inspection list, otherwise 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 #: L1244
Feature Intersected: HASTY BROOK
Facility Carried: UTWN 388
District: District 1
County: 009 - Carlton
Bridge Description:

The bridge superstructure consists of a single span of timber deck that is supported by two timber pile abutments.

2. INSPECTION DATA

Professional Engineer/Team Leader: Garrett R. Owens
Inspection Diver: Garrett R. Owen
Date of Underwater Inspection: 09/24/2016
Weather Conditions: Overcast, 60°F
Underwater Visibility (feet): 1.0 feet
Waterway Velocity (ft/sec): Negligible

3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) Inspected: North and South Abutments
General Shape:

Each abutment consists of a timber pile cap supported by five timber piles with horizontal backwall planking and skewed wingwalls of similar construction.

Maximum Water Depth at Substructure(s) Inspected (feet): 5.3 feet

4. WATERLINE DATUM

Water Level Reference: Top of timber deck at upstream quarter point (south half of bridge).
Waterline Elevation (feet): 98.7 feet
Description: The waterline was located approximately 1.3 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: 3
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 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	33	LF			33	
228	Timber Piling	10	EA			10	
885	Scour	1	EA	1			

UNDERWATER INSPECTION

INSPECTION PROCEDURES

The routine underwater inspection of Bridge L1244 (UTWN 388 over Hasty Brook) was completed on September 24, 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 (SCUBA) in accordance with OSHA regulations, although access was limited due to extent of timber debris at bridge (sufficient access was obtained given that bridge is closed to vehicular traffic). Profiles were taken along the upstream and downstream faces of the bridge to determine the presence, location, and area of scour.

The bridge elements inspected consisted of two timber pile abutments. 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: L1244

UTWN 388 over HASTY BROOK

Date: 01/06/2017

+ GENERAL +	+ ROADWAY +	+ INSPECTION +																				
Agency Br. No. Crew District 01 Maint. Area County 009 - Carlton City Township 09027 - T - 49 R - 20 Desc. Loc. 0.7 MI NE OF JCT TH 73 Sect., Twp., Range 10 - 049N - 20W Latitude 46 ° 44 ' 26.89 " Longitude 92 ° 52 ' 21.95 " Custodian 02 - County Highway Agency Owner 02 - County Highway Agency BMU Agreement Year Built 1935 MN Year Reconstructed 1978 FHWA Year Reconstructed MN Temporary Status Bridge Plan Location 0 - NO PLAN Date Opened to Traffic On - Off System 0 - OFF Legislative District 08A Potential ABC 2 - N/A	Bridge Match ID (TIS) 0 Roadway O/U Key Route On Structure Route Sys 09 - UTWN Number 388 Roadway Name or Description UTWN 388 Level of Service 1 - MAINLINE Roadway Type 3 - One lane bridge for 2-way traffic Control Section (TH Only) Reference Point 000+00.740 Detour Length 5.0 mi. Lanes ON 1 UNDER 0 ADT 1 YEAR 2009 HCA DT ADTT % Functional Class 09 - Rural - Local	Userkey 49 Structurally Deficient Y Functionally Obsolete N Sufficiency Rating 31.0 Routine Inspection Date 11/05/2015 Routine Inspection Frequency 12 Inspector Name Stromberg, Dan Status K - Closed																				
		+ NBI CONDITION RATINGS +																				
		Deck 5 Unsound Deck % Superstructure 6 Substructure 4 Channel 3 Culvert N																				
	+ RDWY DIMENSIONS +	+ NBI APPRAISAL RATINGS +																				
	If Divided NB-EB SB-WB Roadway Width 15.90 ft. ft. Vertical Clearance ft. ft. Max. Vert. Clear. ft. ft. Horizontal Clear. ft. ft. Lateral Clearance ft. ft. Appr. Surface Width 20.0 ft. Bridge Roadway Width 15.9 ft. Median Width On Bridge ft.	Structure Evaluation 4 Deck Geometry 7 Underclearances N Waterway Adequacy 0 Approach Alignment 5																				
+ STRUCTURE +	+ MISC. BRIDGE DATA +	+ SAFETY FEATURES +																				
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: 1 APPR: 0 TOTAL: Main Span Length 22.8 ft. Structure Length 23.2 ft. Deck Width (Out-to-Out) 18.3 ft. Deck Material 8 - Wood or Timber Wear Surf Type 7 - Wood or Timber Wear Surf Install Year Wear Course/Fill Depth 0.00 ft. Deck Membrane 0 - None Deck Rebars N - Not Applicable (no deck) Deck Rebars Install Year Structure Area (Out-to-Out) 424 sq. ft. Roadway Area (Curb-to-Curb) 366 sq. ft. Sidewalk Width 50A. Lt 0.00 ft. 50B. Rt 0.00 ft. Curb Height Lt 0.25 ft. Rt 0.25 ft. Rail Type Lt 32 Rt 32	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) N - N/A N - N/A Historic Status 5 - Not eligible	Bridge Railing 0 - SUBSTANDARD GR Transition 0 - SUBSTANDARD Appr. Guardrail 0 - SUBSTANDARD GR Termini 0 - SUBSTANDARD																				
	+ PAINT +	+ IN DEPTH INSP. +																				
	Year Painted Unsound Paint % Painted Area sq. ft. Primer Type Finish Type	<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;">60</td> <td style="text-align: center;">09/24/2016</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	09/24/2016	Pinned Asbly.				Spec. Feat.			
	Y/N	Freq	Date																			
Frac. Critical																						
Underwater		60	09/24/2016																			
Pinned Asbly.																						
Spec. Feat.																						
	+ BRIDGE SIGNS +	+ WATERWAY +																				
	Posted Load 2 - Vehicle & Semi (Type R12-5) Traffic 0 - Not Required Horizontal 1 - Object Markers Vertical N - Not Applicable	Drainage Area (sq. mi.) Waterway Opening (sf.) 120 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 2011																				
		+ CAPACITY RATINGS +																				
		Design Load 0 - Other/Unknown Operating Rating 2 - HS TRUCK 12.8 Inventory Rating 2 - HS TRUCK 9.6 Posting VEH: 20 SEMI: 30 DBL: 30 Rating Date 01/31/2015 Overweight Permit Codes A N - N/A B N - N/A C N - N/A																				

MINNESOTA BRIDGE INSPECTION REPORT

01/11/2017

Inspector: CO Bridge

BRIDGE L1244 UTWN 388 OVER HASTY BROOK

County: Carlton Location: 0.7 MI NE OF JCT TH 73 Length: 23.2 ft.
 City: Route: 09 - UTWN 388 Ref. Pt.: 000+00.740 Deck Width: 18.3 ft.
 Township: 09027 - T - 49 R - 20 Control Section: Rdwy. Area/ Pct. Unsnd: 366 sq. ft. / %
 Section: 10 Township: 049N Range: 20W Maint. Area: Paint Area/ Pct. Unsnd: sq. ft. / %
 Span Type: 3 - Steel 2 - Stringer/Multi-beam or Local Agency Bridge Nbr.: Culvert: N/A
 List: Girder Postings: 20 30 30
 NBI Deck: 5 Super: 6 Sub: 4 Chan: 3 Culv: N
 Open, Posted, Closed: K - Closed
 MN Scour Code: I - LOW RISK

Appraisal Ratings - Approach: 5 Waterway: 0 Unofficial Structurally Deficient Y
 Required Bridge Signs - Load Posting: 2 - Vehicle & Semi (Type Traffic: 0 - Not Required Unofficial Functionally Obsolete N
 R12-5)
 Horizontal: 1 - Object Markers Vertical: N - Not Applicable Unofficial Sufficiency Rating 31.0

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	01/06/2017	424 SF	382	0	42	0
		Migrated Values		424 SF	382	0	42	0
Notes: [2015] No change, same conditions. [2014] No change to element...Covered with 2" water...2013 Weathering and splitting, but all planks appear to be securely fastened. Water has less than 1" before it is over top of deck.								
113	Steel Stringer	Underwater	01/06/2017	194 LF	0	194	0	0
		Migrated Values		194 LF	0	194	0	0
Notes: [2015] Unable to inspect, still completely submerged. [2014] Under water...2013 Made 2 trips, both times under water. 2012 under water. 3rd trip 2011.. Able to see stringers. 12" web by 5" flange very corroded with some pitting, not, not much section loss. 1st time I have ever been able to see beams. .2010 Underwater. Can't tell if their is any change in condition. Will monitor beaver activity and inspect if water lowers.								
	515 - Steel Protective Coating	Underwater	01/06/2017	999 SF	0	0	0	999
		Migrated Values		999 SF	0	0	0	999
Notes: [2016] Migrator assumed quantity of 999 SF and estimated the condition states.								
216	Timber Abutment	Underwater	01/06/2017	33 LF	0	0	33	0
		Migrated Values		33 LF	0	0	33	0
Notes: [2015] No change. [2014] Under water...2013 Under water.2012 No change. 2010 High water, can't see..								
228	Timber Pile	Underwater	01/06/2017	10 EA	0	0	10	0
		Migrated Values		10 EA	0	0	10	0
Notes: [2015] No change, still under water. [2014] Under water...2013 Under water...2012 cant see, under water 2010 No change...high water... Tried to push a range pole tip into reachable pile to determine soundness...feel solid. No movement noted in the deck.								
235	Timber Pier Cap	Underwater	01/06/2017	33 LF	0	0	33	0
		Migrated Values		33 LF	0	0	33	0
Notes: [2015] Still under water. [2014] Under water...2013 Under water...2012 under water 2011 3rd trip able to see top of Pier caps, they both appear to be in ok condition. Probably do not deteriorate much as they are always under water. 2009 High water, can not see.								
330	Metal Bridge Railing	Underwater	01/06/2017	49 LF	0	49	0	0
		Migrated Values		49 LF	0	49	0	0
Notes: [2015] No change. [2014] No changes from 2010 inspection. 2013 nc 2010 inspection....2010 Rusting, paint system has failed, leaning out toward the Hasty Brook.								
	515 - Steel Protective Coating	Underwater	01/06/2017	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.								

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
800	Critical Deficiencies or Safety Hazards	Underwater	01/06/2017	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.								
823	Gravel Approach Roadway	Underwater	01/06/2017	2 EA	0	0	0	2
		Migrated Values		2 EA	0	0	0	2
Notes: [2015] No change. [2014] Under water, with beach sand, all gravel has been washed away, not passable for trucks or cars..2013 no change from 2010....2010 Gravel approaches have extensive rutting and erosion. Under water.								
885	Scour	Underwater	01/06/2017	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: [2015] Under water, unable to detect scour. [2014] Under water...no scour noticed.2013 No scour was determined to be active around the structure.								
891	Other Bridge Signing	Underwater	01/06/2017	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: [2015] All 4 signs in place and in new condition. [2014] NC...[2013] NC....2012 All 4 Br. abut. del's were in place and in fair to good condition...1 minimum maintenance sign was up at the Trunk Highway connection...good condition. Load rating sign up at corner in good condition 26-40-40.								
892	Slopes & Slope Protection	Underwater	01/06/2017	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.								
894	Deck & Approach Drainage	Underwater	01/06/2017	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.								
900	Protected Species	Underwater	01/06/2017	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] Completely under water up to the top of timber curbs. Only able to inspect signing and railing. The approach roadway is under water approximately 300' south up to and including the bridge. Dropped waterway appraisal to "0" to reflect the closing of the bridge by the engineer for the foreseeable future until a plan can be developed for roadway-in-lieu due to the remote location and other considerations. Barricades will be placed and load posting signs removed. [2014] Under water...Not possible to inspect any elements...2013 Water high, less than 1" from overtopping deck. Can't detect any problems.... 2012 inspection. Water high, right up to bottom of the deck. There does not appear to be any problems. Probably only used by 4 wheelers and snowmobiles. 2011 High water. Two trips were made to this structure. First trip, entire bridge was underwater. Second trip was after beaver dam had been partially blown. Water level was at deck level. Structure nearly impossible to inspect. Approaches are underwater. 3rd trip this year I was able to look at stringers for the 1st time, they are corroding, but not much section loss. 3rd trip was worth making to get a better look at stringers. [2012] High water mark is approximately 1 to 2 feet above the deck of the bridge. Top of rail to water = 3.5 ft; top of rail to channel bottom (west side) = 8.2 ft; water depth = 4.7 ft.

58. Deck NBI: [2015] No change, still completely under water. [2014] Unable to see, covered with 2" of water.

36A. Brdg Railings NBI:

36B. Transitions NBI:

36C. Appr Guardrail NBI:

36D. Appr Guardrail Terminal NBI:

59. Superstructure NBI: [2015] No change, still under water. [2014] Cant see, under water.

60. Substructure NBI: [2015] Again completely under water. [2014] Cant see again this year. completely under water.

61. Channel NBI: [2015] No change. [2014] NO channel defined... Whole area is big bog with beaver dams.

62. Culvert 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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71. Waterway Adeq NBI: [2015] Still under water. [2014] Water on deck, road is unusable.

72. Appr Roadway
Alignment NBI:

Inventory Notes:

Inspector's Signature

Reviewer's Signature

Pictures



Photo 1 - Overall View of Upstream Fascia and Upstream Channel, Looking Southeast



Photo 2 - Overall View of Downstream Fascia, Looking East

Pictures



Photo 3 - View of Downstream Channel, Looking Northwest



Photo 4 - View of Roadway, Looking North

Pictures



Photo 5 - View of Roadway, Looking South

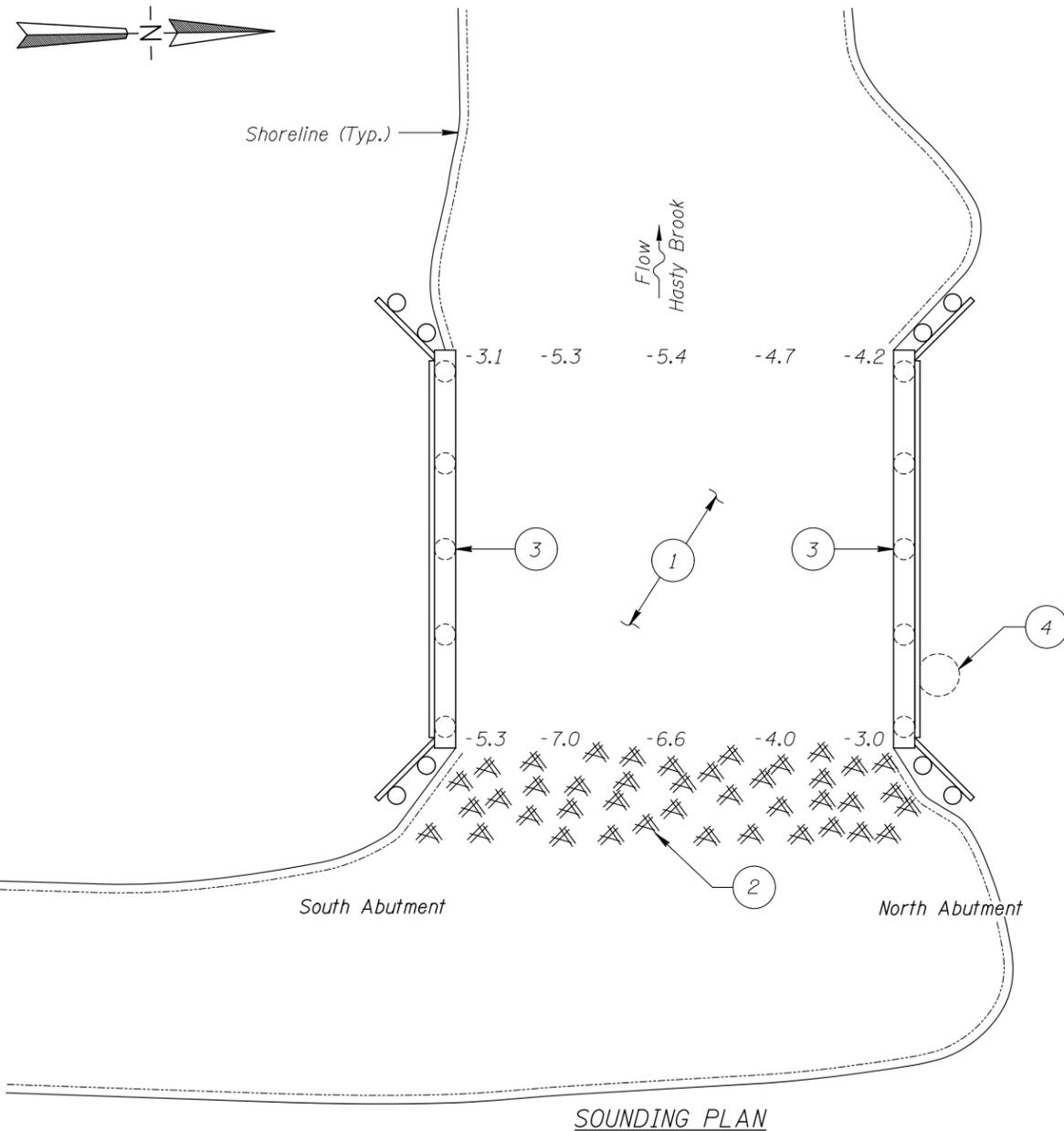


Photo 6 - Bridge Closed and Load Posting Sign, Looking North

Pictures



Photo 7 - "No Motorized Vehicles Permitted" Sign, Looking North



INSPECTION NOTES:

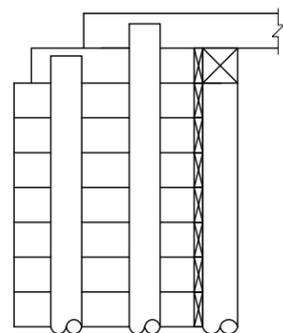
- ① Channel bottom material in the vicinity of the abutments consisted of sand and organics allowing 1 foot of probe rod penetration.
- ② Moderate accumulation of timber debris up to 1 foot in diameter was observed at the waterline along the entire upstream fascia of the bridge and extended 5 feet upstream from the structure.
- ③ The timber construction of the abutments was generally sound with no structurally significant deterioration observed. In general, timber was aged and weathered.
- ④ A sink hole, 2 feet in diameter and 1.3 feet deep, was observed in the roadway behind the north abutment.

GENERAL NOTES:

1. North and South Abutments were inspected underwater.
2. At the time of inspection on September 24, 2016, the waterline was located approximately 1.3 feet below the top of timber deck at the north quarter-point of the upstream fascia of the structure. Since elevation information was not available a reference elevation of 100.0 feet was assumed. Based on the assumed reference the waterline elevation was 98.7 feet.
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.

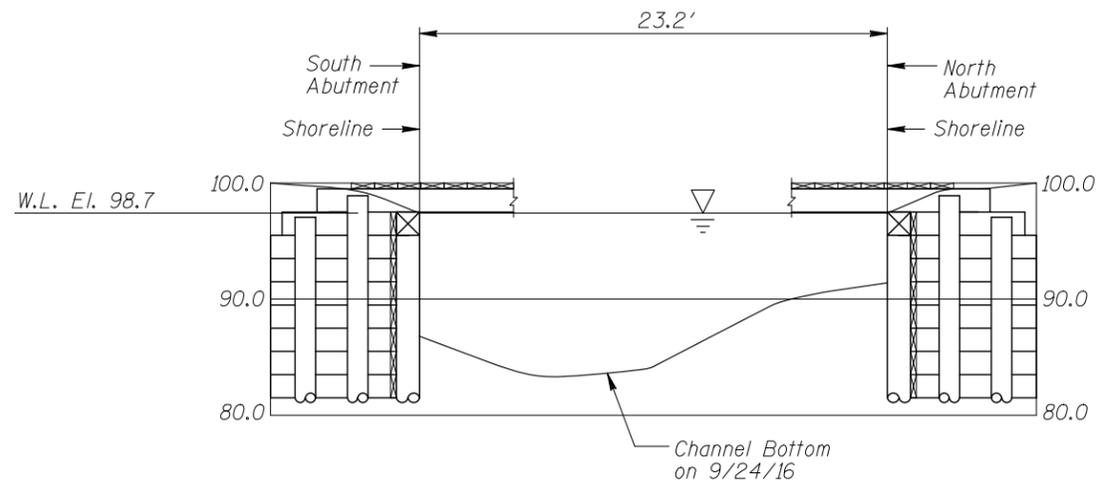
Legend

- 3.0 Sounding Depth from Waterline (9/24/16)
- Timber Debris

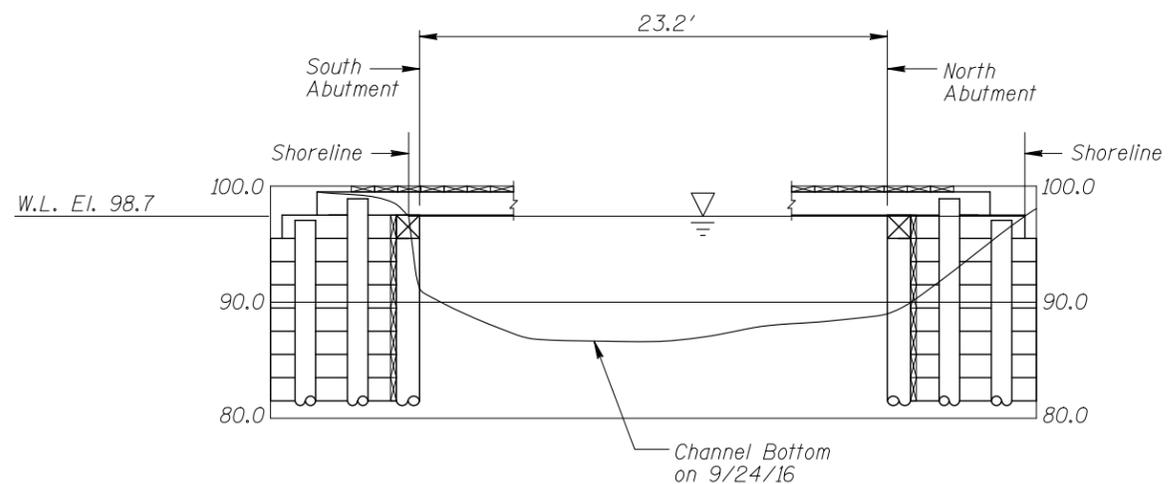


TYPICAL END VIEW OF ABUTMENTS
(Upstream End of South Abutment shown)

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. L1244 UTWN 388 OVER HASTY BROOK DISTRICT 1, CARLTON COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: PRH	COLLINS ENGINEERS <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: 9687L1244		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. L1244 UTWN 388 OVER HASTY BROOK DISTRICT I, CARLTON 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: SEPT., 2016
Checked By: DGS		Scale: NTS
Code: 9687L1244		Figure No.: 2