

2016 UNDERWATER BRIDGE INSPECTION REPORT



BRIDGE # L4198 CR 666 over SECOND CREEK

DISTRICT: District 1

COUNTY: St. Louis

CITY/TOWNSHIP: Hoyt Lakes

STATE: Minnesota

Date of Inspection: 06/23/2016

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 inspected at structure No. L4198, a corrugated steel pipe culvert, was found to be in satisfactory condition with no defects of structural significance below water. A band of light surface corrosion was observed with no loss of section. A light accumulation of timber debris was present at both openings of the culvert, but did not seem to hinder hydraulic flow. A routine inspection has previously assigned a culvert NBI rating (Item 62) of fair-5, however, since no significant deterioration or distortion was observed, the rating has been increased to satisfactory-6 to more accurately represent the condition of the structure.

INSPECTION FINDINGS

(A) The channel bottom material through the culvert consisted of a layer of silt allowing 10 to 12 inches of probe rod penetration.

(B) A light timber debris accumulation was observed at both ends of the culvert and extended across the width of the opening.

(C) The corrugated steel pipe exhibited light surface corrosion from 3 feet above the waterline to the channel bottom with no significant loss of section. The joints and alignment was satisfactory with no deflection or distortion.

RECOMMENDATIONS

(A) The inspection of the submerged substructure units of Structure No. L4198 can most likely be accomplished in the future without using a dive team. To perform the underwater inspection, a properly equipped and qualified inspector will have to perform the inspection during a period of low water and low flow. As channel bottom contours and water depths can change abruptly, it is recommended that lead line soundings of water depth be taken along the upstream and downstream openings to determine whether a wading inspection is possible prior to beginning the inspection. If conditions are unsafe for inspection by wading, then an underwater inspection with the use of a dive team will be required.

(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 #: L4198
Feature Intersected: SECOND CREEK
Facility Carried: CR 666
District: District 1
County: 069 - St. Louis
Bridge Description:
The structure consists of a corrugated steel pipe culvert.

2. INSPECTION DATA

Professional Engineer/Team Leader: Lukas Janulis
Inspection Diver: Lukas Janulis
Date of Underwater Inspection: 06/23/2016
Weather Conditions: Sunny, 75°F
Underwater Visibility (feet): 1 foot
Waterway Velocity (ft/sec): Negligible

3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) Inspected: Corrugated Steel Pipe Culvert.
General Shape:
10 foot Diameter Corrugated Steel Pipe.

Maximum Water Depth at Substructure(s) Inspected (feet): 2.1 feet

4. WATERLINE DATUM

Water Level Reference: Top of the Culvert pipe at the center of the upstream opening.
Waterline Elevation (feet): 95.4 feet
Description: The waterline was located approximately 4.6 feet below the top of the pipe at the upstream opening.

5. NBIS CODING INFORMATION

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

Item 60: Substructure: Code:
Item 61: Channel and Channel Protection: Code: 7
Item 62: Culvert: Code: 6

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

Item 113: Scour Critical Bridge: Code: E

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
240	Steel Culvert	50	LF		50		
885	Scour	1	EA	1			

UNDERWATER INSPECTION

INSPECTION PROCEDURES

The routine underwater inspection of Bridge L4198 (C.R. 666 over Second Creek) was completed on June 23, 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 openings to determine the presence, location and area of scour.

The bridge element inspected was the corrugated steel pipe culvert. 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: L4198

CR 666 over SECOND CREEK

Date: 11/01/2016

+ GENERAL +	+ ROADWAY +	+ INSPECTION +																				
Agency Br. No. 266 Crew District 01 Maint. Area County 069 - St. Louis City Hoyt Lakes Township Desc. Loc. 5.4 MI N OF JCT CSAH 110 Sect., Twp., Range 20 - 059N - 14W Latitude 47 ° 34 ' 50.57 " Longitude 92 ° 8 ' 47.84 " Custodian 02 - County Highway Agency Owner 02 - County Highway Agency BMU Agreement Year Built 1936 MN Year Reconstructed FHWA Year Reconstructed MN Temporary Status Bridge Plan Location 0 - NO PLAN Date Opened to Traffic On - Off System 0 - OFF Legislative District 05A Potential ABC 2 - N/A	Bridge Match ID (TIS) 0 Roadway O/U Key Route On Structure Route Sys 07 - CNTY Number 666 Roadway Name or Description CNTY 666 Level of Service 1 - MAINLINE Roadway Type 2 - 2-way traffic Control Section (TH Only) Reference Point 005+00.620 Detour Length 99.0 mi. Lanes ON 2 UNDER 0 ADT 520 YEAR 2003 HCA DT ADTT % Functional Class 08 - Rural - Minor Collector	Userkey 109 Structurally Deficient N Functionally Obsolete N Sufficiency Rating 70.8 Routine Inspection Date 05/24/2016 Routine Inspection Frequency 24 Inspector Name Janulis, Lukas Status A - Open																				
		+ NBI CONDITION RATINGS +																				
		Deck N Unsound Deck % Superstructure N Substructure N Channel 7 Culvert 6																				
	+ RDWY DIMENSIONS +	+ NBI APPRAISAL RATINGS +																				
	If Divided NB-EB SB-WB Roadway Width 40.00 ft. ft. Vertical Clearance ft. ft. Max. Vert. Clear. ft. ft. Horizontal Clear. ft. ft. Lateral Clearance ft. ft. Appr. Surface Width 40.0 ft. Bridge Roadway Width 0.0 ft. Median Width On Bridge ft.	Structure Evaluation 5 Deck Geometry N Underclearances N Waterway Adequacy 9 Approach Alignment 7																				
+ STRUCTURE +		+ SAFETY FEATURES +																				
Service On 1 - Highway Service Under 5 - Waterway Main Span Type 3 - Steel Main Span Design 15 - Pipe Arch Main Span Detail Appr. Span Type Appr. Span Design Appr. Span Detail Skew 0 Culvert Type 11'10"X7'7" Barrel Length 56 Cantilever ID	+ MISC. BRIDGE DATA +																					
	Structure Flared 0 - No flare Parallel Structure N - No parallel structure Field Conn. ID Abutment Foundation (Material/Type) N - N/A Pier Foundation (Material/Type) N - N/A Historic Status 5 - Not eligible	+ IN DEPTH INSP. +																				
		<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;">06/23/2016</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	06/23/2016	Pinned Asbly.				Spec. Feat.			
	Y/N	Freq	Date																			
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Underwater		60	06/23/2016																			
Pinned Asbly.																						
Spec. Feat.																						
	+ PAINT +	+ WATERWAY +																				
Number of Spans MAIN: 1 APPR: 0 TOTAL: Main Span Length 11.9 ft. Structure Length 12.0 ft. Deck Width (Out-to-Out) 0.0 ft. Deck Material N - Not Applicable Wear Surf Type 6 - Bituminous Wear Surf Install Year Wear Course/Fill Depth 5.00 ft. Deck Membrane N - Not Applicable (applies) Deck Rebars N - Not Applicable (no deck) Deck Rebars Install Year Structure Area (Out-to-Out) 0 sq. ft. Roadway Area (Curb-to-Curb) sq. ft. Sidewalk Width 50A. Lt 0.00 ft. 50B. Rt 0.00 ft. Curb Height Lt 0.00 ft. Rt 0.00 ft. Rail Type Lt NN Rt NN	Year Painted Unsound Paint % Painted Area sq. ft. Primer Type Finish Type	Drainage Area (sq. mi.) Waterway Opening (sf.) 71 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 E - CULVERT Year																				
	+ BRIDGE SIGNS +	+ CAPACITY RATINGS +																				
	Posted Load 0 - Not Required Traffic 0 - Not Required Horizontal 0 - Not Required Vertical N - Not Applicable	Design Load 0 - Other/Unknown Operating Rating 1 - H TRUCK 20.0 Inventory Rating 1 - H TRUCK 15.0 Posting VEH: SEMI: DBL: Rating Date 2/1/1991 Overweight Permit Codes A N - N/A B N - N/A C N - N/A																				

MINNESOTA BRIDGE INSPECTION REPORT

11/21/2016

Inspector: CO Bridge

BRIDGE L4198 CR 666 OVER SECOND CREEK

County: St. Louis	Location: 5.4 MI N OF JCT CSAH 110	Length: 12.0 ft.
City: Hoyt Lakes	Route: 07 - CNTY 666 Ref. Pt.: 005+00.620	Deck Width: 0.0 ft.
Township:	Control Section:	Rdwy. Area/ Pct. Unsnd: sq. ft. / %
Section: 20 Township: 059N Range: 14W Maint. Area:		Paint Area/ Pct. Unsnd: sq. ft. / %
Span Type: 3 - Steel 19 - Culvert (includes frame culverts)	Local Agency Bridge Nbr.: 266	Culvert: 11'10"X7'7"
List:		Postings:
NBI Deck: N Super: N Sub: N Chan: 7 Culv: 6		
	Open, Posted, Closed: A - Open	
	MN Scour Code: E - CULVERT	

Appraisal Ratings - Approach: 7	Waterway: 9	Unofficial Structurally Deficient	N
Required Bridge Signs - Load Posting: 0 - Not Required	Traffic: 0 - Not Required	Unofficial Functionally Obsolete	N
Horizontal: 0 - Not Required	Vertical: N - Not Applicable	Unofficial Sufficiency Rating	82.5

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
240	Steel Culvert	Underwater	11/01/2016	50 LF	0	50	0	0
		Routine	05/24/2016	50 LF	0	50	0	0
Notes: [2016-2013] Surface rust at waterline throughout pipe.								
515 - Steel Protective Coating		Underwater	11/01/2016	1947 SF	0	331	331	1285
		Routine	05/24/2016	1947 SF	0	331	331	1285
Notes: [2016] Galvanizing has failed on lower half of culvert. Culvert Top has light chalking. Area of culvert above water has heavy chalking.								
800	Critical Deficiencies or Safety Hazards	Underwater	11/01/2016	1 EA	1	0	0	0
		Routine	05/24/2016	1 EA	1	0	0	0
Notes: [2016-2014] No critical deficiencies or safety hazards found during this inspection.								
870	Culvert End Treatment	Underwater	11/01/2016	2 EA	0	2	0	0
		Routine	05/24/2016	2 EA	0	2	0	0
Notes: [2016] Surface rust at waterline throughout apron. E. end beveled edges pushed in approx 6" both sides.								
871	Roadway Over Culvert	Underwater	11/01/2016	1 EA	0	1	0	0
		Routine	05/24/2016	1 EA	0	1	0	0
Notes: [2016] Minor settlement along north edge of culvert. [2014] Slight settlement in road along south edge of culvert. Bituminous. No visible settlement.								
885	Scour	Underwater	11/01/2016	1 EA	1	0	0	0
892	Slopes & Slope Protection	Underwater	11/01/2016	1 EA	1	0	0	0
		Routine	05/24/2016	1 EA	1	0	0	0
Notes: [2016-2013] No notable erosion. Slopes protected by riprap and vegetation.								
894	Deck & Approach Drainage	Underwater	11/01/2016	1 EA	1	0	0	0
		Routine	05/24/2016	1 EA	1	0	0	0
Notes: [2016-2014] No notable ponding or drainage-related slope erosion.								
900	Protected Species	Underwater	11/01/2016	1 EA	1	0	0	0
		Routine	05/24/2016	1 EA	1	0	0	0
Notes: [2016] No evidence of protected species present.								

BRIDGE L4198 CR 666 OVER SECOND CREEK

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
	General Notes:	SLC District 6 Inspected by: [2016] CG, RL, JD : [2014] CG, BH : [2013] JRS, JDO Full to near top w/water, couldn't see through 2009. No Guardrail. Beaver dam East side.						
	58. Deck NBI:							
	36A. Brdg Railings NBI:							
	36B. Transitions NBI:							
	36C. Appr Guardrail NBI:	Roadway does not meet minimum requirements for Minnesota rule 8820.9920 for ADT 150 - 749. Guardrail required but not present.						
	36D. Appr Guardrail Terminal NBI:	Roadway does not meet minimum requirements for Minnesota rule 8820.9920 for ADT 150 - 749. Guardrail required but not present.						
	59. Superstructure NBI:							
	60. Substructure NBI:							
	61. Channel NBI:	[2016] Sediment and debris buildup on east end of culvert, possibly remnants of old beaver dam.						
	62. Culvert NBI:	[2016 U/W] A routine inspection has previously assigned a culvert NBI rating (Item 62) of fair-5, however, since no significant deterioration or distortion was observed, the rating has been increased to satisfactory-6 to more accurately represent the condition of the structure. [2016-2013] Surface rust at waterline throughout pipe. E. end beveled edges pushed in approx 6" both sides.						
	71. Waterway Adeq NBI:	[2016] Large wetland and railroad bridge to the east controlling amount of water flowing to culvert. Remote chance of overtopping.						
	72. Appr Roadway Alignment NBI:	[2016-2014] Curve to north affecting sight distance.						
	Inventory Notes:							

Inspector's Signature

Reviewer's Signature

Pictures



Photo 1 - Upstream Opening, Looking Southwest

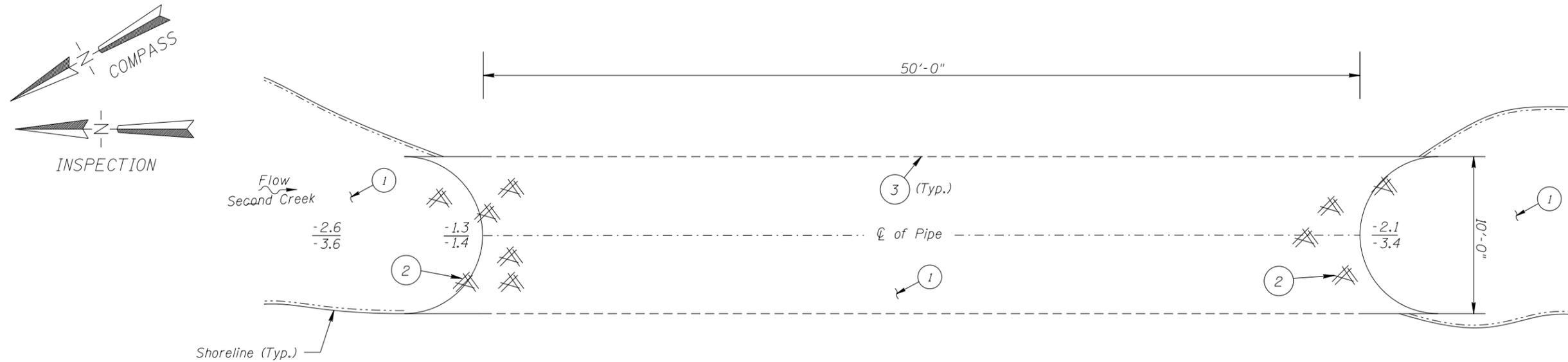


Photo 2 - Downstream Opening, Looking Northeast

Pictures



Photo 3 - Typical Steel Condition, Looking Southeast



SOUNDING PLAN

GENERAL NOTES:

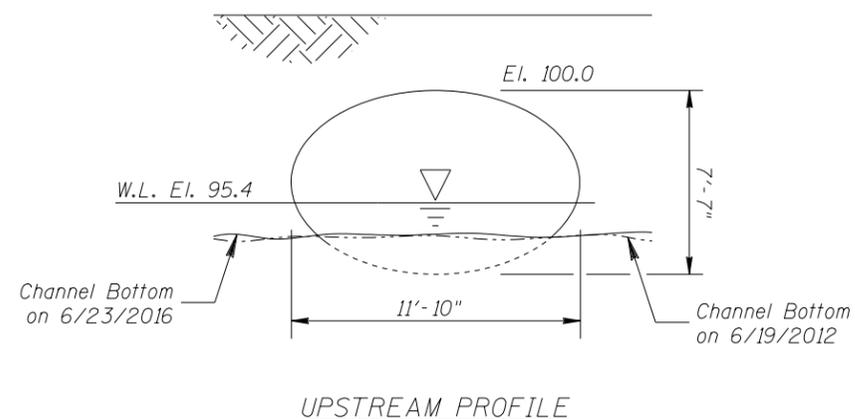
1. CMP Culvert was inspected underwater.
2. At the time of inspection, on June 26, 2016, the waterline was located approximately 4.6 feet below the top of the pipe at the upstream opening. Since insufficient elevation information was available, a reference elevation of 100.0 was assumed. This corresponds to a waterline elevation of 95.4.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.

INSPECTION NOTES:

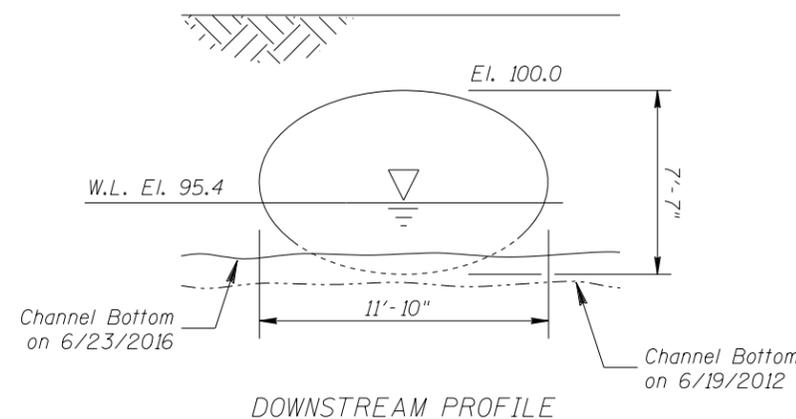
- ① The channel bottom material through the culvert consisted of a layer of silt allowing 10 to 12 inches of probe rod penetration.
- ② A light timber debris accumulation was observed at both ends of the culvert and extended across the width of the opening.
- ③ The corrugated steel pipe exhibited light surface corrosion from 3 feet above the waterline to the channel bottom with no significant loss of section. The joints and alignment was satisfactory with no deflection or distortion.

Legend

- 6.5 Sounding Depth (6/23/2016)
- 5.9 Sounding Depth (6/19/2012)
- X Timber Debris



UPSTREAM PROFILE



DOWNSTREAM PROFILE

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. L4198 CSAH 666 OVER SECOND CREEK DISTRICT I, ST LOUIS COUNTY INSPECTION, SOUNDING PLAN, AND FASCIA PROFILES		
DRAWN BY: ELN	COLLINS ENGINEERS <small>133 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	DATE: JUNE 23, 2016
CHECKED BY: LJ		SCALE: NTS
CODE: 9687L4198		FIGURE NO.: 1