

2016 UNDERWATER BRIDGE INSPECTION REPORT



BRIDGE # 7819 CR 213 over STONE RIVER

DISTRICT: District 1

COUNTY: St. Louis

CITY/TOWNSHIP: MCDAVITT

STATE: Minnesota

Date of Inspection: 09/13/2016

Equipment Used:

Owner: County Highway Agency

Inspected By: Parker, Marc

Report Written By: Marc Parker

Report Reviewed By:

Final Report Date:



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UNDERWATER INSPECTION

REPORT SUMMARY

The substructure units inspected below water at Structure No. 7819, Box 1 and Box 2 of the culvert, were found to be in satisfactory condition with defects of only minor structural significance below water. The concrete typically exhibited moderate to heavy scaling. There was a diagonal crack typically 1/8 inch wide on both center wall extensions and the northwest, southwest, and southeast wingwalls. The floor of both boxes was covered in silt throughout the length of the culvert.

INSPECTION FINDINGS

(A) The channel bottom material through the length of both boxes and upstream and downstream of the culvert consisted of silt and scattered stones allowing a maximum probe rod penetration of 2 feet.

(B) Moderate scaling was observed on the walls and ceiling of both boxes with a typical penetration of 1/4 inch and a maximum penetration of 1/2 inch.

(C) The center wall extensions at both the upstream and downstream ends of the culvert and the northwest, southwest and southeast wingwalls exhibited a diagonal crack extending from the channel bottom to the top of the wall. The cracks were typically 1/8 inch wide.

(D) An area of heavy scaling was observed at the south upper wall haunch of Box 1 near the downstream opening. The area measured 3 feet long by 6 inches high with a maximum penetration of 2 inches. No reinforcing steel was exposed.

(E) An area of heavy scaling was observed at the north wall of Box 1 near the downstream opening. The area measured 2 feet long by 8 inches high with a maximum penetration of 2 inches. No reinforcing steel was exposed.

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 #: 7819
Feature Intersected: STONE RIVER
Facility Carried: CR 213
District: District 1
County: 069 - St. Louis
Bridge Description:

The culvert consists of two reinforced concrete culvert boxes designated as Box 1 and Box 2 from south to north.

2. INSPECTION DATA

Professional Engineer/Team Leader: Marc Parker
Inspection Diver: Marc Parker
Date of Underwater Inspection: 09/13/2016
Weather Conditions: Overcast, 60 °F
Underwater Visibility (feet): None/Negligible
Waterway Velocity (ft/sec): None/Negligible

3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) Inspected: Box 1 and Box 2
General Shape:

The culvert consists of two reinforced concrete box barrels measuring 10 feet wide by 4 feet high and 32 feet long.

Maximum Water Depth at Substructure(s) Inspected (feet): 4.0 feet

4. WATERLINE DATUM

Water Level Reference: The top of the culvert headwall at the upstream end near the center wall extension.
Waterline Elevation (feet): 97.9 feet
Description: The waterline was approximately 2.1 feet below reference.

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 09/16

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
241	Concrete Culvert	64	LF		64		
870	Culvert End Treatment	2	EA		2		
885	Scour	1	EA	1			

UNDERWATER INSPECTION

INSPECTION PROCEDURES

The routine underwater inspection of Bridge 7819 (CR 213 over the Stone River) was completed on September 13, 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 depth soundings were taken along the openings and along the length of the culvert to determine the presence, location, and area of scour.

The bridge elements inspected consisted of the precast concrete box 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: 7819

CR 213 over STONE RIVER

Date: 11/22/2016

+ GENERAL +	+ ROADWAY +	+ INSPECTION +																				
Agency Br. No. 397 Crew District 01 Maint. Area County 069 - St. Louis City Township 69043 - MCDAVITT Desc. Loc. 0.3 MI N OF JCT CSAH28 Sect., Twp., Range 28 - 055N - 18W Latitude 47 ° 12 ' 59.55 " Longitude 92 ° 38 ' 31.41 " Custodian 02 - County Highway Agency Owner 02 - County Highway Agency BMU Agreement Year Built 1939 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 05B Potential ABC 2 - N/A	Bridge Match ID (TIS) 0 Roadway O/U Key Route On Structure Route Sys 07 - CNTY Number 213 Roadway Name or Description CNTY 213 Level of Service 1 - MAINLINE Roadway Type 2 - 2-way traffic Control Section (TH Only) Reference Point 000+00.370 Detour Length 3.0 mi. Lanes ON 2 UNDER 0 ADT 35 YEAR 2003 HCA DT ADTT % Functional Class 09 - Rural - Local	Userkey 109 Structurally Deficient N Functionally Obsolete N Sufficiency Rating 97.3 Routine Inspection Date 09/22/2015 Routine Inspection Frequency 24 Inspector Name Parker, Marc Status A - Open																				
	+ RDWY DIMENSIONS +	+ NBI CONDITION RATINGS +																				
	If Divided NB-EB SB-WB Roadway Width 30.00 ft. ft. Vertical Clearance ft. ft. Max. Vert. Clear. ft. ft. Horizontal Clear. ft. ft. Lateral Clearance ft. ft. Appr. Surface Width 24.0 ft. Bridge Roadway Width 0.0 ft. Median Width On Bridge ft.	Deck N Unsound Deck % Superstructure N Substructure N Channel 7 Culvert 6																				
+ STRUCTURE +	+ MISC. BRIDGE DATA +	+ NBI APPRAISAL RATINGS +																				
Service On 1 - Highway Service Under 5 - Waterway Main Span Type 1 - Concrete Main Span Design 13 - Box Culvert Main Span Detail Appr. Span Type Appr. Span Design Appr. Span Detail Skew 0 Culvert Type W104D Barrel Length 32 Cantilever ID Number of Spans MAIN: 2 APPR: 0 TOTAL: Main Span Length 10.0 ft. Structure Length 22.0 ft. Deck Width (Out-to-Out) 0.0 ft. Deck Material N - Not Applicable Wear Surf Type 8 - Gravel Wear Surf Install Year Wear Course/Fill Depth 0.30 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	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	Structure Evaluation 6 Deck Geometry N Underclearances N Waterway Adequacy 7 Approach Alignment 8																				
	+ PAINT +	+ SAFETY FEATURES +																				
	Year Painted Unsound Paint % Painted Area sq. ft. Primer Type Finish Type	Bridge Railing N - NOT REQUIRED GR Transition N - NOT REQUIRED Appr. Guardrail 0 - SUBSTANDARD GR Termini 0 - SUBSTANDARD																				
	+ 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 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;">09/13/2016</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	09/13/2016	Pinned Asbly.				Spec. Feat.			
	Y/N	Freq	Date																			
Frac. Critical																						
Underwater		60	09/13/2016																			
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 E - CULVERT Year																				
		+ CAPACITY RATINGS +																				
		Design Load 0 - Other/Unknown Operating Rating 1 - H TRUCK 25.0 Inventory Rating 1 - H TRUCK 18.0 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

01/12/2017

Inspector: CO Bridge

BRIDGE 7819 CR 213 OVER STONE RIVER

County: St. Louis	Location: 0.3 MI N OF JCT CSAH28	Length: 22.0 ft.
City:	Route: 07 - CNTY 213 Ref. Pt.: 000+00.370	Deck Width: 0.0 ft.
Township: 69043 - MCDAVITT	Control Section:	Rdwy. Area/ Pct. Unsnd: sq. ft. / %
Section: 28 Township: 055N Range: 18W Maint. Area:		Paint Area/ Pct. Unsnd: sq. ft. / %
Span Type: 1 - Concrete 19 - Culvert (includes List: frame culverts)	Local Agency Bridge Nbr.: 397	Culvert: W104D
NBI Deck: N Super: N Sub: N Chan: 7 Culv: 6		Postings:
	Open, Posted, Closed: A - Open	
	MN Scour Code: E - CULVERT	

Appraisal Ratings - Approach: 8 Waterway: 7		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 97.3

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
241	Reinforced Concrete Culvert	Underwater	11/22/2016	64 LF	0	64	0	0
		Migrated Values		64 LF	0	64	0	0
	Notes: [2015] Water within 6" of culvert top. [2013] Moderate scaling throughout culvert exposing aggregates. Minimal to no aggregate loss. Cold joint in roof of both barrels 4' in from west end has efflorescence. Minor cracks in all walls.							

800	Critical Deficiencies or Safety Hazards	Underwater	11/22/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: [2015-2013] No critical findings found during this inspection.							

870	Culvert End Treatment	Underwater	11/22/2016	2 EA	0	2	0	0
		Migrated Values		2 EA	0	2	0	0
	Notes: [2015-2013] Moderate scaling throughout. 1/8" crack in all wings where they meet barrel. Center wings have 1/4" moment crack.							

871	Roadway Over Culvert	Underwater	11/22/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: [2015-2013] No signs of settlement or undermining. Gravel.							

885	Scour	Underwater	11/22/2016	1 EA	1	0	0	0
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891	Other Bridge Signing	Underwater	11/22/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
	Notes: [2015-2013] 2 culvert markers.							

892	Slopes & Slope Protection	Underwater	11/22/2016	2 EA	2	0	0	0
		Migrated Values		2 EA	2	0	0	0
	Notes: [2015-2013] Slopes are protected by vegetation. No signs of erosion.							

894	Deck & Approach Drainage	Underwater	11/22/2016	2 EA	2	0	0	0
		Migrated Values		2 EA	2	0	0	0
	Notes: [2015-2013] No notable ponding or drainage related slope erosion.							

900	Protected Species	Underwater	11/22/2016	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.							

BRIDGE 7819 CR 213 OVER STONE RIVER

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 7						
		Inspected by: [2015] CG, NB : [2103] CG, JS.						
		No Guardrail						
	58. Deck NBI:							
	36A. Brdg Railings NBI:	No rail present that is connected to culvert.						
	36B. Transitions NBI:	No rail present no transition required.						
	36C. Appr Guardrail NBI:	Back of headwall 15' from centerline. Culvert headwall is inside clear zone of 18' (from centerline) base on Minnesota rule 8820.9920 for ADT < 50. No guardrail present.						
	36D. Appr Guardrail Terminal NBI:	Back of headwall 15' from centerline. Culvert headwall is inside clear zone of 18' (from centerline) base on Minnesota rule 8820.9920 for ADT < 50. No guardrail present.						
	59. Superstructure NBI:							
	60. Substructure NBI:							
	61. Channel NBI:	[2016 U/W] Minor accumulation of sediment in both culvert barrels. [2015] Minor erosion along channel. [2013] Channel growing in on both ends of culvert.						
	62. Culvert NBI:	[2016 U/W] Minor to moderate scaling up to 1/2 inch penetration observed throughout. [2015] Water within 6" of culvert top. [2013] Moderate scaling throughout culvert exposing aggregates. Minimal to no aggregate loss. Minor cracks in all walls.						
	71. Waterway Adeq NBI:	[2015] Staining on headwall indicates that highwater is a few inches below the top headwall. Slight chance of overtopping. Large flood plain reduces chance of overtopping road.						
	72. Appr Roadway Alignment NBI:	[2015] No sight distance issues or speed reduction required.						
	Inventory Notes:	[2015] Edit SIA header to show Stone River instead of Stream.						

Inspector's Signature

Reviewer's Signature

Pictures



Photo 1 - Upstream Opening, Looking West

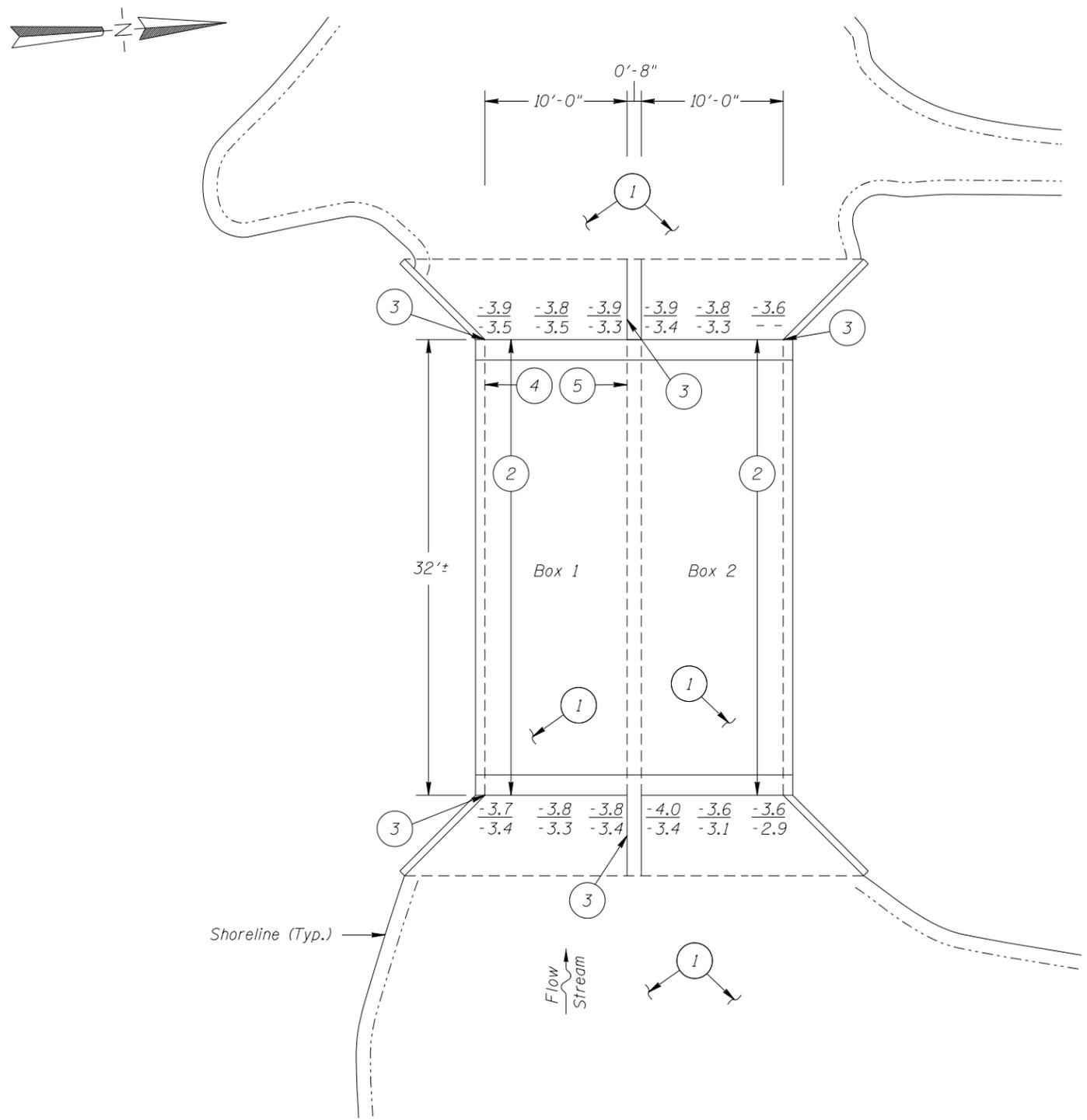


Photo 2 - Downstream Opening, Looking Northeast

Pictures



Photo 3 - Typical Concrete Condition at Waterline, Looking West



SOUNDING PLAN

GENERAL NOTES:

1. Box 1 and Box 2 of culvert were inspected underwater.
2. At the time of inspection, on September 13, 2016, the waterline was located approximately 2.1 feet below the top of the culvert headwall at the upstream end at the center wall. Since insufficient elevation information was available, an elevation of 100.0 was assumed. This corresponds to a waterline elevation of 97.9
3. Soundings indicate the water depth at the time of inspection and are measured in feet.

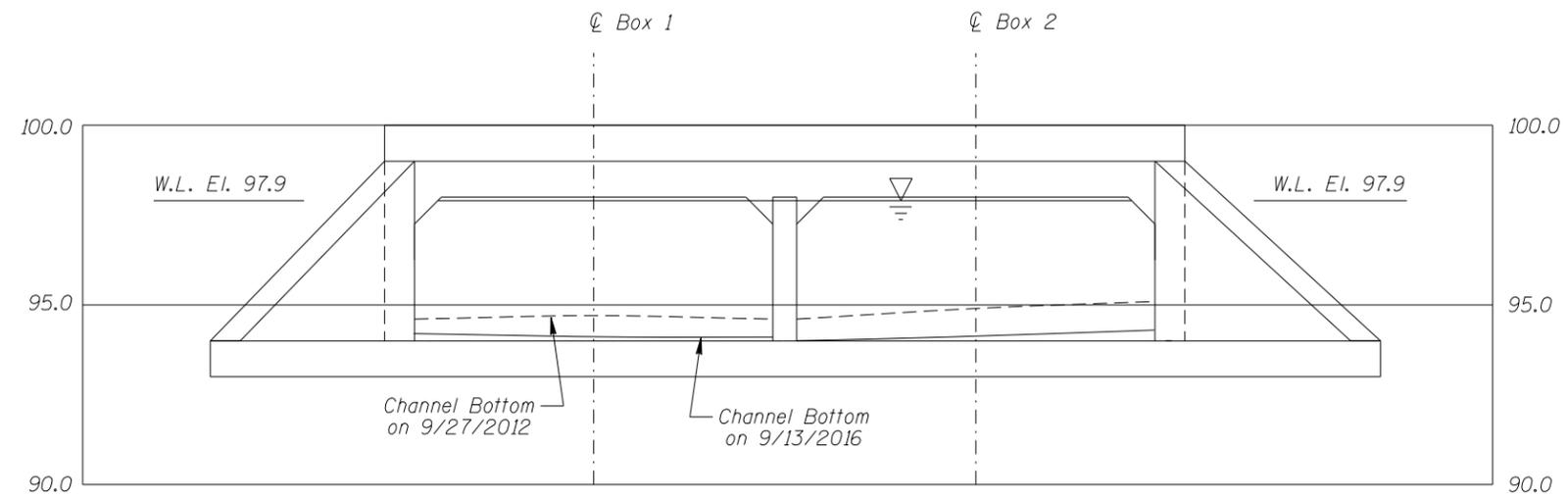
INSPECTION NOTES:

- 1 The channel bottom material through the length of both boxes and upstream and downstream of the culvert consisted of silt and scattered stones allowing a maximum probe rod penetration of 2 feet.
- 2 Moderate scaling was observed on the walls and ceiling of both boxes with a typical penetration of 1/4 inch and a maximum penetration of 1/2 inch.
- 3 The center wall extensions at both the upstream and downstream ends of the culvert and the northwest, southwest and southeast wingwalls exhibited a diagonal crack extending from the channel bottom to the top of the wall. The cracks were typically 1/8 inch wide.
- 4 An area of heavy scaling was observed at the south upper wall haunch of Box 1 near the downstream opening. The area measured 3 feet long by 6 inches high with a maximum penetration of 2 inches. No reinforcing steel was exposed.
- 5 An area of heavy scaling was observed at the north wall of Box 1 near the downstream opening. The area measured 2 feet long by 8 inches high with a maximum penetration of 2 inches. No reinforcing steel was exposed.

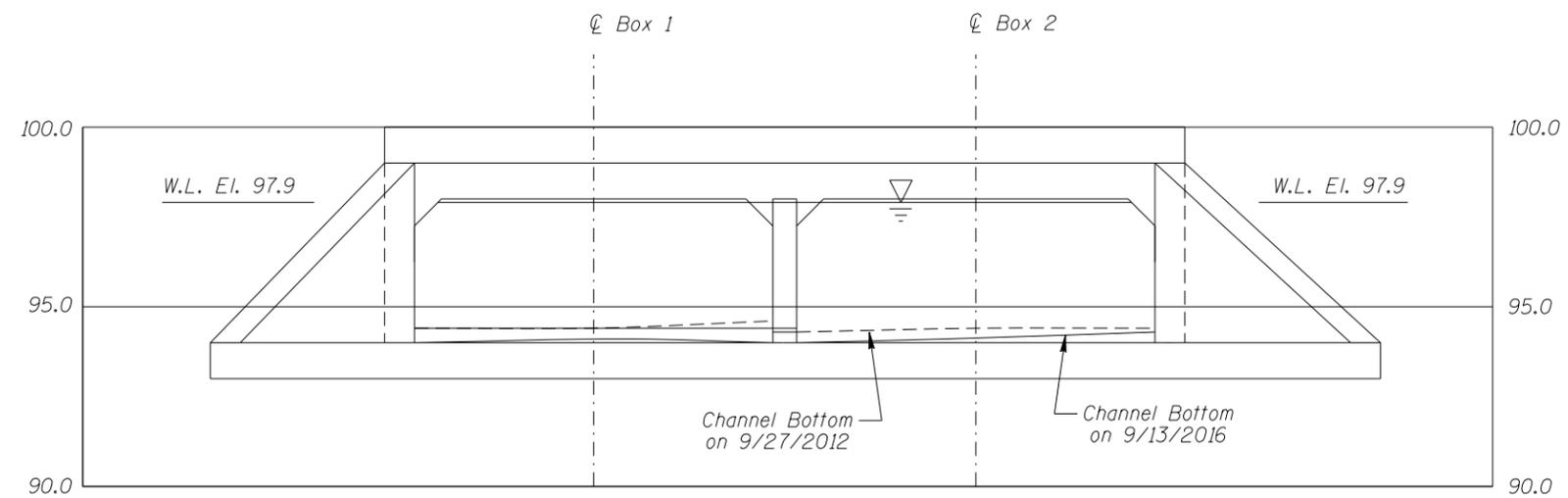
Legend

- 3.7 Sounding Depth (9/13/2016)
- 4.0 Sounding Depth (9/27/2012)
- 5 Inspection Note Number

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 7819 CR 213 OVER STONE RIVER DISTRICT 1, ST. LOUIS COUNTY		
INSPECTION AND SOUNDING PLAN		
DRAWN BY: RT	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	DATE: SEPT 13, 2016
CHECKED BY: MBP		SCALE: N.T.S.
CODE: 96877819		FIGURE NO.: 1



UPSTREAM OPENING PROFILE



DOWNSTREAM OPENING PROFILE

Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 7819 CR 213 OVER STONE RIVER DISTRICT 1, ST. LOUIS COUNTY UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
DRAWN BY: RT	COLLINS ENGINEERS <small>133 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	DATE: SEPT 13, 2016
CHECKED BY: MBP		SCALE: 1"=5'
CODE: 96877819		FIGURE NO.: 2