2017 UNDERWATER
BRIDGE INSPECTION REPORT

BRIDGE # 08527
CSAH 13 over MINNESOTA RIVER

DISTRICT: District 7 **COUNTY:** Brown **CITY/TOWNSHIP:** MILFORD

STATE: Minnesota

Date of Inspection: 05/03/2017

Equipment Used:

Owner: County Highway Agency

Inspected By: Stuber, Cory

Report Written By: Cory Stuber

Report Reviewed By:

Final Report Date:

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UNDERWATER INSPECTION

REPORT SUMMARY

The substructure units inspected at Bridge No. 08527, Piers 1 - 2, and Bent 2, were found to be in good condition with no defects of structural significance observed. The concrete of the Piers was generally smooth and sound. A moderate accumulation of timber debris was noted at the channel bottom at the upstream end of Pier 2. A localized scour depression was observed at the upstream end of Pier 2, with a 5 foot radius and up to a 2 foot depth. Aside from the localized area of scour around Pier 2, the channel bottom around the substructure units has no other notable defects.

INSPECTION FINDINGS

(A) Channel bottom material consisted of silty sand with 1.5 feet of maximum probe rod penetration.

(B) Minor scour depression observed, with a 5 foot radius and a 1 to 2 foot depth, at the upstream end of Pier 2.

(C) Moderate accumulation of timber debris consisting of 1 foot diameter and smaller logs and branches was observed at the upstream end of Pier 2 from the channel bottom up 5 feet.

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 #: 08527

Feature Intersected: MINNESOTA RIVER

Facility Carried: CSAH 13

District: District 7

County: 008 - Brown

Bridge Description:

The superstructure consists of eight spans supported by a combination of reinforced concrete column piers, reinforced concrete pile bents with hinged pier walls and reinforced concrete abutments. The substructure units are designated as the South Abutment, Bents 1 - 2, Piers 1 - 3, Bents 3 - 4, and the North Abutment.

2. INSPECTION DATA

Professional Engineer/Team Leader: Cory Stuber, P.E.

Inspection Diver: Garrett Owens, P.E.

Date of Underwater Inspection: 05/03/2017

Weather Conditions: Rainy, 60°F

Underwater Visibility (feet): 0.5

Waterway Velocity (ft/sec): 2.0

3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) Inspected: Bent 2, Piers 1 - 2

General Shape:

Piers 1 - 2 consist of a reinforced concrete column pier with web walls, founded on a pile supported reinforced concrete footing. Pier 1 has two concrete columns connected with a reinforced concrete web wall supporting a concrete pier cap, and Pier 2 has four concrete columns connected with a reinforced concrete web wall. Bent 2 consists of a pile supported reinforced concrete pier cap with a hinged pier wall.

Maximum Water Depth at Substructure(s) Inspected (feet): 19.9

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap at the downstream end of Pier 1.

Waterline Elevation (feet): 798.0

Description: The waterline was approximately 12.0 feet below reference.

5. NBIS CODING INFORMATION

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

Item 60: Substructure: Code: 7

Item 61: Channel and Channel Protection: Code: 6

Item 62: Culvert: Code:

Item 92B: Underwater Inspection: Code: Y 48 05/2017

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 [X] No (Mark your selection with an X)

6. STRUCTURAL ELEMENT CONDITION RATING

ELEM #	Element Description	Quantity	Unit	Conditions			
				CS1	CS2	CS3	CS4
205	Reinforced Concrete Column	6	EA	6			
210	Reinfroced Concrete Pier Wall	54	LF	54			
885	Scour	1	EA		1		

UNDERWATER INSPECTION

INSPECTION PROCEDURES

The routine underwater inspection of Bridge 08527 (CSAH 13 over the Minnesota River) was completed on May 3, 2017. The underwater inspection was conducted from a 14 ft boat. The inspection was conducted by a team consisting of a PE-Diver with a valid MnDOT Team Leader certification, a backup diver and a dive tender. The inspection utilized commercial dive equipment and techniques (SSA and/or SCUBA) in accordance with OSHA regulations. 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 reinforced concrete column piers and one pile bent pier with hinged pier wall. According to the bridge inventory or design drawings, Piers 1 - 2 and Bent 2 were founded on pile supported reinforced concrete footings. Inspection procedures followed FHWA guidance and the MnDOT Bridge and Structure Inspection Program Manual with channel bottom probing to search for foundations. The routine underwater inspection frequency is recommended to remain at a maximum of 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: 08527 **CSAH 13 over MINNESOTA RIVER** Date: 05/18/2017

+GENERAL+

Agency Br. No.	**Crew**
District	07 **Maint. Area**
County	008 - Brown
City	
Township	08010 - MILFORD
Desc. Loc.	AT N CO LINE
Sect., Twp., Range	1 - 110N - 31W
Latitude	44 ° 21 ' 41.80 ''
Longitude	-94 ° 29 ' 53.35 ''
Custodian	02 - County Highway Agency
Owner	02 - County Highway Agency
BMU Agreement	
Year Built	1987
MN Year Reconstructed	
FHWA Year Reconstructed	
MN Temporary Status	
Bridge Plan Location	3 - COUNTY
Date Opened to Traffic	
On - Off System	1 - ON
Legislative District	21B
Potential ABC	2 - N/A

+STRUCTURE+

Service On	1 - Highway
Service Under	5 - Waterway
Main Span Type	4 - Steel Continuous
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	F - Friction Hinge

Number of Spans

MAIN: 8 **APPR:** 0 **TOTAL:**

Main Span Length	145.0 **ft.**
Structure Length	598.6 **ft.**
Deck Width (Out-to-Out)	43.3 **ft.**
Deck Material	1 - Concrete Cast-in-Place
Wear Surf Type	1 - Monolithic Concrete
Wear Surf Install Year	
Wear Course/Fill Depth	0.00 **ft.**
Deck Membrane	0 - None
Deck Rebars	1 - Epoxy Coated Reinforcing
Deck Rebars Install Year	1987
Structure Area (Out-to-Out)	25919 **sq. ft.**
Roadway Area (Curb-to-Curb)	23939 **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** 22 **Rt** 22

+ROADWAY+

Bridge Match ID (TIS)	0
Roadway O/U Key	Route On Structure
Route Sys	04 - CSAH **Number** 13
Roadway Name or Description	CSAH 13
Level of Service	1 - MAINLINE
Roadway Type	2 - 2-way traffic
Control Section (TH Only)	
Reference Point	
Detour Length	10.0 **mi.**
Lanes	**ON** 2 **UNDER** 0
	ADT 2100 **YEAR** 2005
HCADT	**ADTT** **%**
Functional Class	07 - Rural - Major Collector

+RDWY DIMENSIONS+

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	40.0 **ft.**
Median Width On Bridge	**ft.**

+MISC. BRIDGE DATA+

Structure Flared	0 - No flare
Parallel Structure	N - No parallel structure
Field Conn. ID	4 - Bolted
Abutment	1 - CONC
Foundation (Material/Type)	3 - FTG PILE
Pier Foundation (Material/Type)	1 - CONC 3 - FTG PILE
Historic Status	5 - Not eligible

+PAINT+

Year Painted	1987
Unsound Paint %	
Painted Area	**sq. ft.**
Primer Type	D - Organic Zinc - 3309
Finish Type	H - Vinyl

+BRIDGE SIGNS+

Posted Load	0 - Not Required
Traffic	0 - Not Required
Horizontal	1 - Object Markers
Vertical	N - Not Applicable

+INSPECTION+

Userkey	48
Structurally Deficient	N
Functionally Obsolete	N
Sufficiency Rating	96.4
Routine Inspection Date	11/03/2016
Routine Inspection Frequency	24
Inspector Name	Stuber, Cory
Status	A - Open

+NBI CONDITION RATINGS+

Deck	6	**Unsound Deck %**
Superstructure	7	
Substructure	7	
Channel	6	
Culvert	N	

+NBI APPRAISAL RATINGS+

Structure Evaluation	7
Deck Geometry	6
Underclearances	N
Waterway Adequacy	N
Approach Alignment	8

+SAFETY FEATURES+

Bridge Railing	1 - MEETS STANDARDS
GR Transition	0 - SUBSTANDARD
Appr. Guardrail	0 - SUBSTANDARD
GR Termini	0 - SUBSTANDARD

+IN DEPTH INSP.+

	Y/N	**Freq**	**Date**
Frac. Critical			
Underwater		60	05/03/2017
Pinned Asbly.			
Spec. Feat.			

+WATERWAY+

Drainage Area (sq. mi.)	9530.0
Waterway Opening (sf.)	8600
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** 1991

+CAPACITY RATINGS+

Design Load	5 - HS 20	
Operating Rating	2 - HS TRUCK	34.0
Inventory Rating	2 - HS TRUCK	24.0

Posting **VEH:** **SEMI:** **DBL:**

Rating Date 4/23/1991

Overweight Permit Codes

A N - N/A **B** N - N/A **C** N - N/A

BRIDGE 08527 CSAH 13 OVER MINNESOTA RIVER

County: Brown
City:
Township: 08010 - MILFORD
Section: 1 Township: 110N Range: 31W
Span Type: 4 - Steel Continuous 2 - Stringer/Multi-beam or Girder
List:
NBI Deck: 6 Super: 7 Sub: 7 Chan: 6

Location: AT N CO LINE
Route: 04 - CSAH 13 Ref. Pt.: 018+00.868
Control Section:
Maint. Area:
Local Agency Bridge Nbr.:
Culv: N
Open, Posted, Closed: A - Open
MN Scour Code: I - LOW RISK

Length: 598.6 ft.
Deck Width: 43.3 ft.
Rdwy. Area/ Pct. Unsnd: 23939 sq. ft. / %
Paint Area/ Pct. Unsnd: sq. ft. / %
Culvert: N/A
Postings:

Appraisal Ratings - Approach: 8 Waterway: N
Required Bridge Signs - Load Posting: 0 - Not Required Traffic: 0 - Not Required
Horizntal: 1 - Object Markers Vertical: N - Not Applicable

Unofficial Structurally Deficient N
Unofficial Functionally Obsolete N
Unofficial Sufficiency Rating 96.4

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
12	Reinforced Concrete Deck	Underwater	05/03/2017	25919 SF	25401	0	518	0
		Routine	11/03/2016	25919 SF	25401	0	518	0
	Notes: Effloresence mainly in the forth and fifth spans.							
	510 - Wearing Surfaces	Underwater	05/03/2017	23939 SF	23460	0	479	0
		Routine	11/03/2016	23939 SF	23460	0	479	0
	Notes: Top of Concrete Deck with Epoxy Reinforcement Notes: 2015-2016 Cracks in surface of deck.							
107	Steel Open Girder/Beam	Underwater	05/03/2017	3294 LF	0	3294	0	0
		Routine	11/03/2016	3294 LF	0	3294	0	0
	Notes: Weathering steel has minor dusting throughout structure. No section loss found. 2015-2016 Flaking of paint at cantilever ends.							
	515 - Steel Protective Coating	Underwater	05/03/2017	24705 SF	0	24705	0	0
		Routine	11/03/2016	24705 SF	0	24705	0	0
	Notes: 2016 Minor dusting of surface peeling paint at cantilever joints.							
205	Reinforced Concrete Column	Underwater	05/03/2017	19 EA	19	0	0	0
		Routine	11/03/2016	19 EA	19	0	0	0
	Notes: Staining of concrete from water infiltration through joints.							
210	Reinforced Concrete Pier Wall	Underwater	05/03/2017	125 LF	125	0	0	0
		Routine	11/03/2016	125 LF	125	0	0	0
	Notes: Staining of concrete from water infiltration through joints.							
215	Reinforced Concrete Abutment	Underwater	05/03/2017	121 LF	121	0	0	0
		Routine	11/03/2016	121 LF	121	0	0	0
	Notes: [2016] Migrator added 40 LF to abutment quantity to account for wingwalls (CS1:40 CS2:0 CS3:0 CS4:0).							
	Wingwall notes: Erosion under south wing walls.							
234	Reinforced Concrete Pier Cap	Underwater	05/03/2017	302 LF	302	0	0	0
		Routine	11/03/2016	302 LF	302	0	0	0
300	Strip Seal Expansion Joint	Underwater	05/03/2017	95 LF	95	0	0	0
		Routine	11/03/2016	95 LF	95	0	0	0
	Notes: Gland torn and falling out.Gland replaced fall 2008 in excellent shape at time of inspection. 2013-2016 gland intact but could be cleaned out.							

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
301	Pourable Joint Seal	Underwater	05/03/2017	95 LF	95	0	0	0
		Routine	11/03/2016	95 LF	95	0	0	0
311	Movable Bearing	Underwater	05/03/2017	16 EA	0	16	0	0
		Routine	11/03/2016	16 EA	0	16	0	0
	Notes: Corrosion and flaking rust on pins and nuts.							
313	Fixed Bearing	Underwater	05/03/2017	28 EA	0	28	0	0
		Routine	11/03/2016	28 EA	0	28	0	0
	Notes: Corrosion on pins and nuts .							
331	Reinforced Concrete Bridge Railing	Underwater	05/03/2017	1197 LF	0	1197	0	0
		Routine	11/03/2016	1197 LF	0	1197	0	0
	Notes: Intermideate cracking between deflection joints with minor spalls. No evidence of rebar corrosion during this inspection 12-15-04. 2015 Staining on railings, map cracking on face of rail no delamination found.							
800	Critical Deficiencies or Safety Hazards	Underwater	05/03/2017	1 EA	1	0	0	0
		Routine	11/03/2016	1 EA	1	0	0	0
	Notes: NO CRITICAL FINDINGS OBSERVED DURING THE LAST INSPECTION.							
810	Concrete Decks - Cracking & Sealing	Underwater	05/03/2017	0 LF	0	0	0	0
		Routine	11/03/2016	0 LF	0	0	0	0
	Notes: 2015 Cracks throughout deck some signifacant in size, many cracks holding water.							
822	Bituminous Approach Roadway	Underwater	05/03/2017	2 EA	0	2	0	0
		Routine	11/03/2016	2 EA	0	2	0	0
	Notes: 2015-2016 Minors ettlement both approaches, north approach has been seal coated and fog sealed.							
855	Secondary Members (Superstructure)	Underwater	05/03/2017	1 EA	1	0	0	0
		Routine	11/03/2016	1 EA	1	0	0	0
885	Scour	Underwater	05/03/2017	1 EA	0	1	0	0
	Notes: [2017] Underwater Inspection - Minor scour depression with a 5 foot radius and up to 2 foot depth at the upstream end of Pier 2.							
891	Other Bridge Signing	Underwater	05/03/2017	1 EA	1	0	0	0
		Routine	11/03/2016	1 EA	1	0	0	0
892	Slopes & Slope Protection	Underwater	05/03/2017	1 EA	0	0	0	1
		Routine	11/03/2016	1 EA	0	0	0	1
	Notes: Erosion under wing walls all four corners, erosion under abutment walls. 2013-2015 much of the rip-rap is missing possible throw into the river.							
893	Guardrail	Underwater	05/03/2017	1 EA	1	0	0	0
		Routine	11/03/2016	1 EA	1	0	0	0
	Notes: 2015-2016 Turn down guardrail, timbers are in good shape.							
894	Deck & Approach Drainage	Underwater	05/03/2017	1 EA	0	1	0	0
		Routine	11/03/2016	1 EA	0	1	0	0
	Notes: 2016 Road draining and eroding at south wingwalls. Drains creating erosion of soils under bridge.							

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
900	Protected Species	Underwater	05/03/2017	1 EA	1	0	0	0
		Routine	11/03/2016	1 EA	1	0	0	0

Notes: Use this element to track the presence of protected species living on this structure.

General Notes: *Located in section 1-110-31

96,98) Grease all bearing devices and rockers.
N. abutment east bearing missing nut & key.
S. abutment west bearing clean & paint.

126) Minor cracking and staining on underside of deck.

90) Clean expansion joints. Gland is torn in several places.

99) Bit. surface cracking and settling, need to seal and patch.

185) Erosion around SW wing wall causing settlement of the roadway

05/28/96 Snooper Inspection. L. Kilmer and P. Madden did closeup inspection of underside of deck, bearing asswmblies and cantiliver connections of girders.

90) Exspansion glands at both cantiliver joints are punctured.

96,98) Grease fittings are not provided on bearing assemblies. All appear to be functioning as intended.

7,50) No cracks, loose bolts or other problems were noted in girders or secondary steel members.

1999 Same as 1998 insp.

2000
90) Expansion joints are severly torn and should be replaced.

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: [2017] Underwater Inspection - Channel rating changed to 6 due to presence of scour at Pier 2.

62. Culvert NBI:

71. Waterway Adeq NBI:

72. Appr Roadway Alignment NBI:

BRIDGE 08527 CSAH 13 OVER MINNESOTA RIVER

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4

Inspector's Signature

Reviewer's Signature

Pictures

Photo 1 - Downstream Elevation Looking Southeast

Photo 2 - Upstream Elevation Looking Northeast

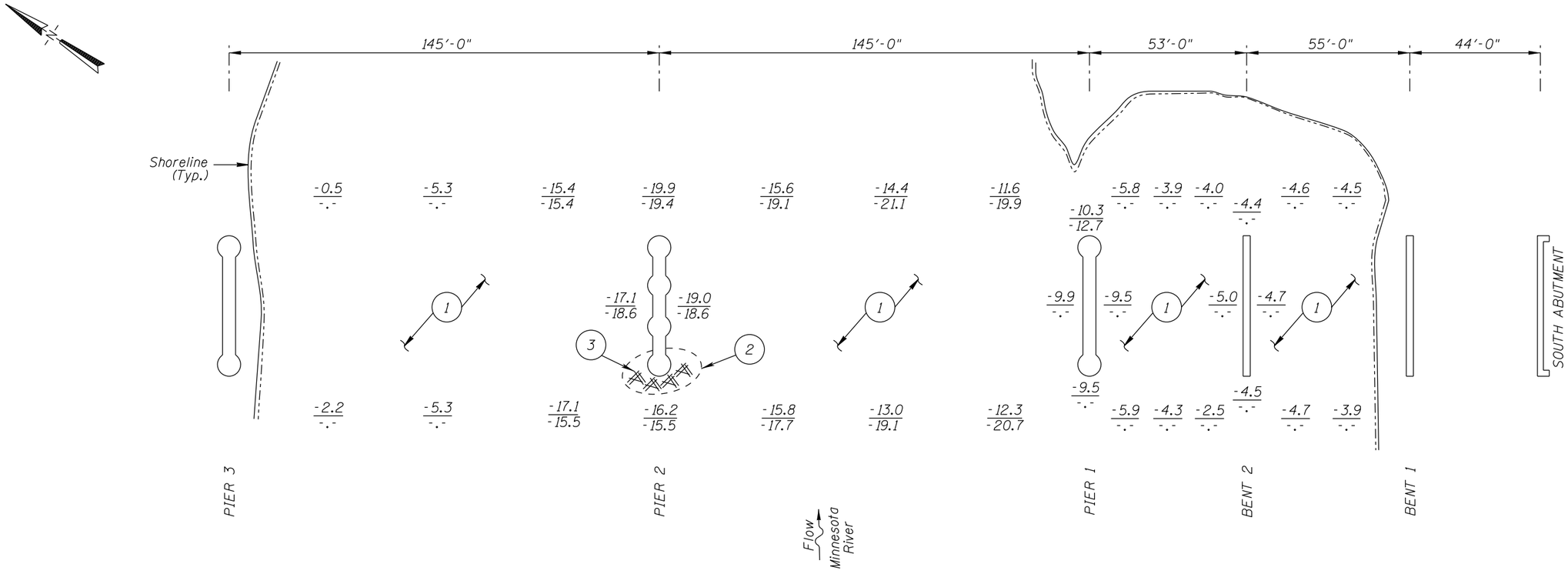
Pictures

Photo 3 - Bent 2 Looking Northwest

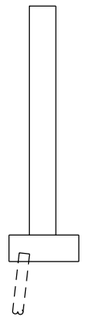
Photo 4 - Pier 1 Looking Northwest

Pictures

Photo 5 - Pier 2 Looking Southwest



SOUNDING PLAN



TYPICAL END VIEW OF EACH PIER SECTION

GENERAL NOTES:

1. Piers 1 and 2, and Bent 2 were inspected underwater.
2. At the time of inspection, on May 3, 2017, the waterline was located approximately 12.0 feet below the top of the pier cap of Pier 1 on the downstream end. This corresponds to a waterline elevation of 798.0.
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.

INSPECTION NOTES:

(1) Channel bottom material consisted of silty sand with 1.5 feet of maximum probe rod penetration.

(2) Minor scour depression observed, with a 5 foot radius and a 1 to 2 foot depth, at the upstream end of Pier 2.

(3) Moderate accumulation of timber debris consisting of 1 foot diameter and smaller logs and branches was observed at the upstream end of Pier 2 from the channel bottom up 5 feet.

Legend

-2.0 / -5.2 — Sounding Depth (5/3/2017) / Sounding Depth (9/12/2012)

Timber Debris

Scour Depression

Note:

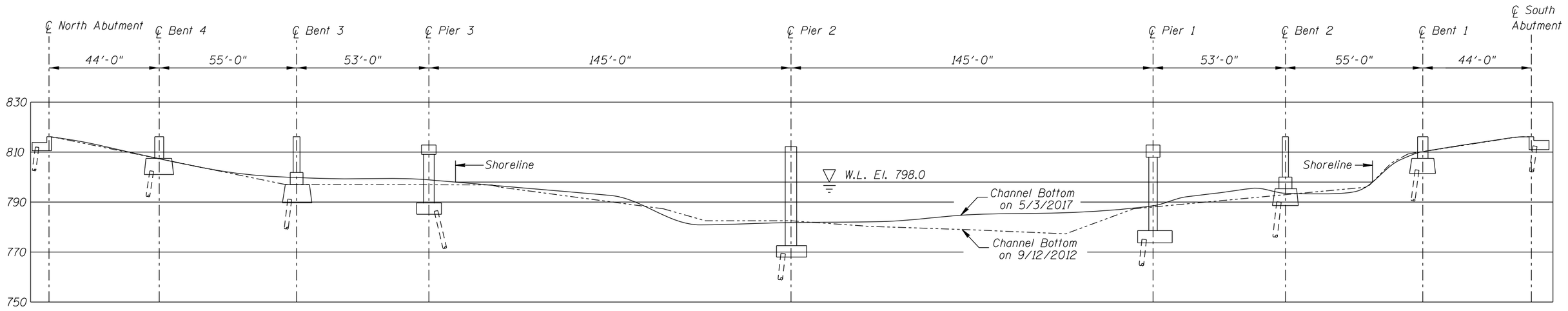
All soundings based on 2017 waterline location.

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

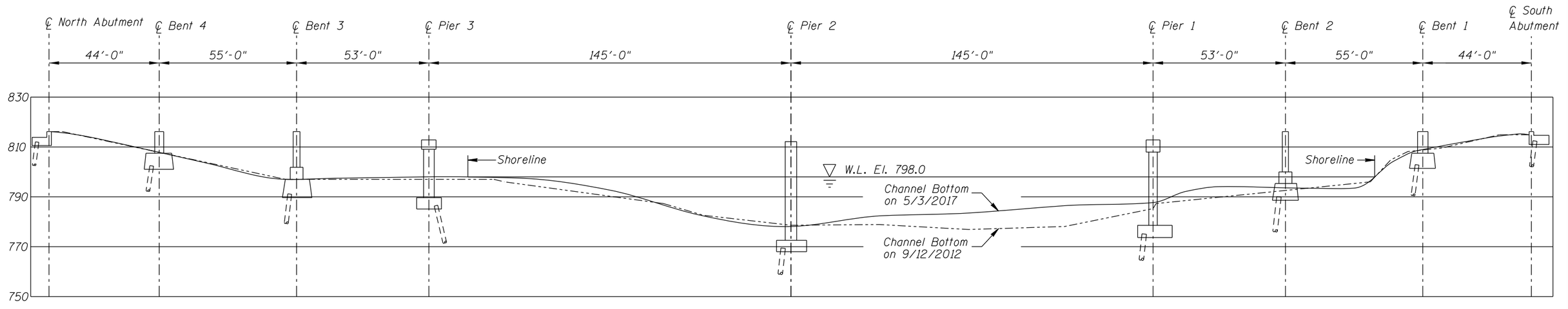
STRUCTURE NO. 08527
CSAH 13 OVER THE MINNESOTA RIVER
DISTRICT 7, BROWN COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: JMF	COLLINS ENGINEERS, INC. 1599 Selby Avenue Suite 206 St. Paul, MN. 55104 (651) 646-8502 www.collinsengr.com	Date: MAY 2017
Checked By: CRS		Scale: NTS
Code: 63-9687		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. 08527
CSAH 13 OVER THE MINNESOTA RIVER
DISTRICT 7, BROWN COUNTY

UPSTREAM AND DOWNSTREAM FASCIA PROFILES

Drawn By: JMF	COLLINS ENGINEERS, INC. 1599 Selby Avenue Suite 206 St. Paul, MN. 55104 (651) 646-8502 www.collinsengr.com	Date: MAY 2017
Checked By: CRS		Scale: 1"=40'
Code: 63-9687		Figure No.: 2