

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 7799

CR NO. 547

OVER

WOLF CREEK

ST. LOUIS COUNTY



SEPTEMBER 25, 2012

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 7423

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 7799, the East and West Abutments and the Center Pier, were found to be generally in satisfactory condition. Since the previous inspection the scaling around the waterline has not increased significantly and the cracks in the Center Pier and East Abutment have not progressed significantly. The defects are still not of structural significance at this time. The flash boards that were severely bowed and failing during the previous inspection appear to have been replaced. The channel bottom inspected upstream and downstream of the substructure units was presently stable with no evidence of significant scour and no significant changes since the last inspection.

INSPECTION FINDINGS:

- (A) A vertical hairline crack was observed at both abutments, extending from the top corner of the south wingwall down the full wall height, with associated minor spalling up to 1/2 inch wide.
- (B) Moderate to heavy scaling was observed on all substructure units from 1.5 feet above the waterline to 6 inches below the waterline with up to 1 inch of penetration.
- (C) Four hairline to 1/16 inch wide vertical cracks were observed extending from the bridge deck to the waterline on the Center Pier and East Abutment (two cracks at each unit).
- (D) The concrete sill at the base of the upstream face of the dam was observed at 6.2 feet below the waterline and was typically covered by a 6 inch layer of silt. There was up to 1.5 feet of vertical sill face exposure at the west face of the centerwall. A heavy accumulation of 6-inch-diameter-and-smaller timber debris was observed resting against the sill.

RECOMMENDATIONS:

- (A) Monitor timber debris accumulation against the upstream dam sill during future inspections and if found to be increasing, removal operations may need to be considered.

- (B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

Inspection Team Leader:
Daniel G. Stromberg, P.E.

Respectfully submitted,

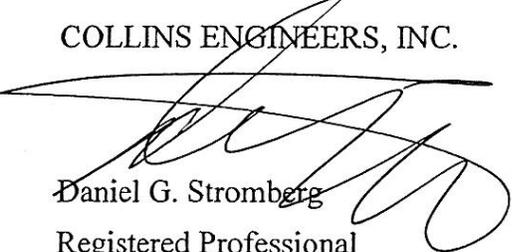
PROFESSIONAL ENGINEER

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Daniel G. Stromberg

Date 6/30/14 License # 21491

COLLINS ENGINEERS, INC.


Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 7799

Feature Crossed: Wolf Creek

Feature Carried: CR No. 547

Location: St. Louis County

Bridge Description: The structure consists of a two span concrete beam superstructure supported by two concrete abutments and a concrete center pier with a dam incorporated at the upstream end of the substructure units.

2. INSPECTION DATA

Professional Engineer Diver: Daniel G. Stromberg, P.E.

Dive Team: Clayton G. Brookins, Marc B. Parker

Date: September 25, 2012

Weather Conditions: Cloudy, 50° F

Underwater Visibility: 2 feet

Waterway Velocity: 1 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: The East and West Abutments and the Center Pier.

General Shape: The East and West Abutments and the Center Pier shaft are rectangular walls, and the abutments have perpendicular wingwalls upstream and downstream of the structure. The substructure sits on a monolithic base slab and incorporates a dam across the upstream side of the structure.

Maximum Water Depth at Substructure Inspected: Approximately 5.4 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the bridge seat on the upstream and downstream sides of the Center Pier.

Water Surface: The upstream waterline was approximately 3.2 feet below reference.
Assumed Water Elevation = 96.8
The downstream waterline was approximately 9.2 feet below reference.
Assumed Water Elevation = 90.8.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 6

Item 61: Channel and Channel Protection: Code 6

Item 92B: Underwater Inspection: Code B/09/12

Item 113: Scour Critical Bridges: 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

6. STRUCTURAL ELEMENT CONDITION RATING

Item #	Element Description	Quantity	Unit	Conditions				
				1	2	3	4	5
210	Reinforced Concrete Pier Wall	23	LF		23			
215	Concrete Abutment	46	LF		46			
985	Slopes & Slope Protection	1	EA	1				



Photograph 1. Overall View of the Structure, Looking North.



Photograph 2. View of the East Abutment, Looking Northeast.



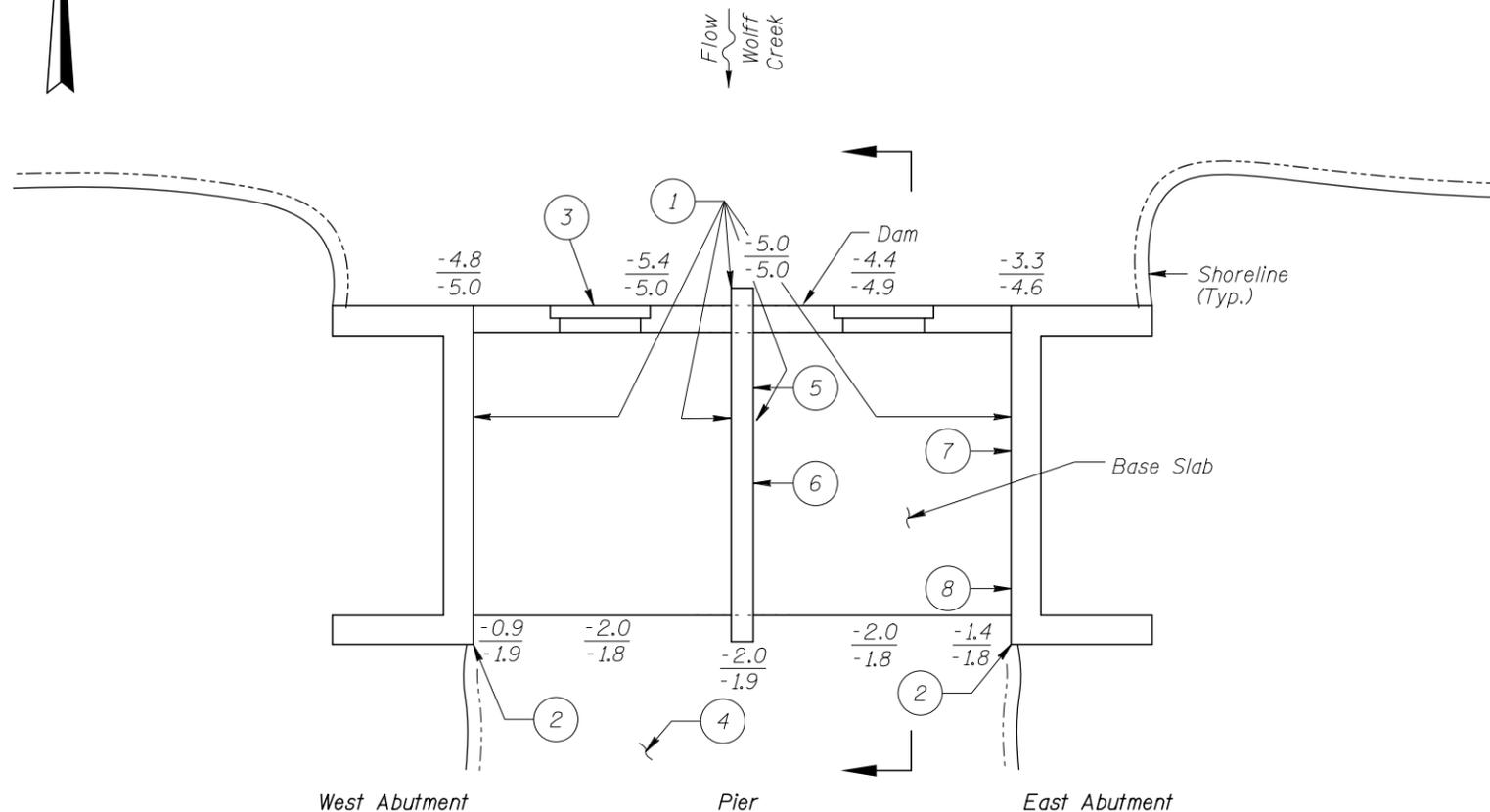
Photograph 3. View of the Center Pier, Looking Northeast.



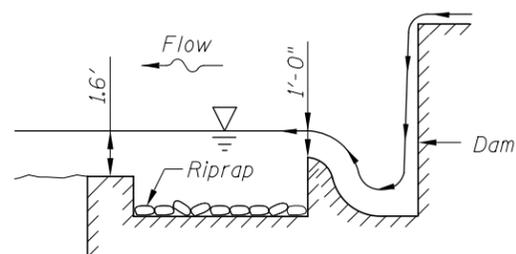
Photograph 4. View of the West Abutment, Looking Northwest.



Photograph 5. View of the Typical Concrete Scaling Around the Waterline at Center Pier, Looking Northwest.



SOUNDING PLAN



SECTION

GENERAL NOTES:

1. The Center Pier and the West and East Abutments were inspected underwater.
2. At the time of inspection on September 25, 2012, the waterline was located approximately 9.2 feet below the bridge seat at the downstream end of the Center Pier and approximately 3.2 feet below the bridge seat at the upstream end of the Center Pier. Since no elevation data was available, a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation at the upstream fascia was 96.8 and the waterline elevation at the downstream fascia was 90.8.
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 the mid points between the substructure units.

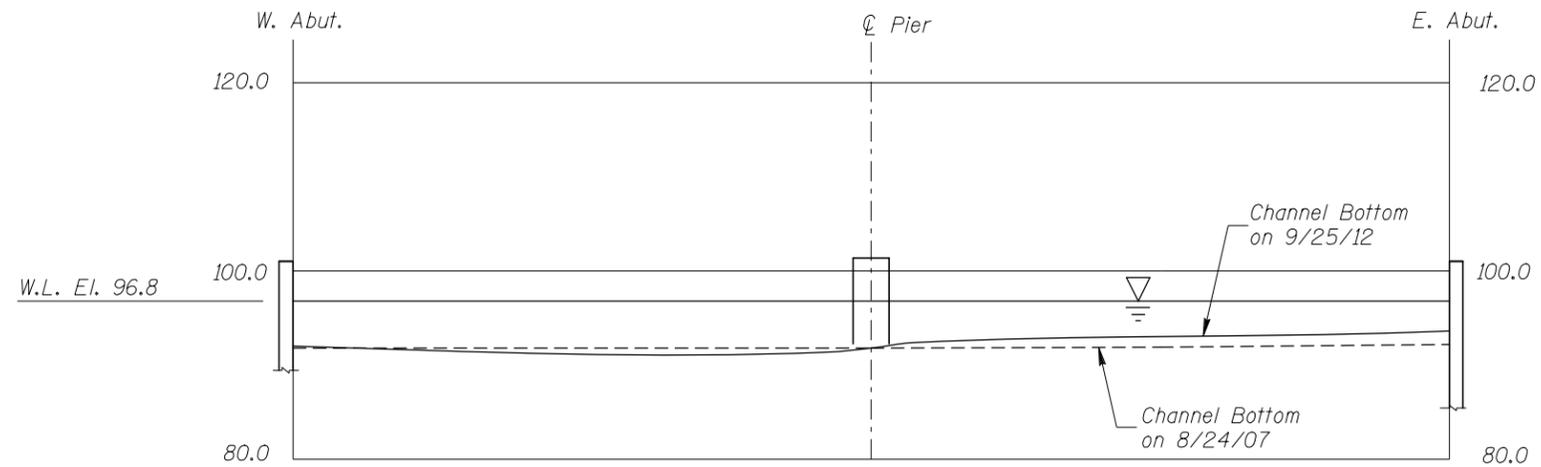
INSPECTION NOTES:

- 1 Moderate to heavy scaling was observed on all substructure units from 1.5 foot above the waterline to 6 inches below the waterline with up to 1 inch of penetration.
- 2 Hairline vertical crack, extending from the top corner of the wingwall down full height of wall, with associated minor spalling up to 1/2 inch wide.
- 3 The concrete sill at the base of the upstream dam was observed 4.2 feet below the waterline and was typically covered with a 6 inch layer of silt and a heavy accumulation of 6-inch-diameter and smaller timber debris against the face of the base slab. At the west face of the center wall the face of the sill was exposed up to 1.3 feet vertically.
- 4 Channel bottom consisted of sandy gravel and 0.5- to 1-foot-diameter riprap allowing less than 1 inch of probe rod penetration.
- 5 A hairline vertical crack with efflorescence extended from the bottom of the bridge deck to the lip of the spillway.
- 6 A hairline vertical crack extended from the bottom of the bridge deck to the base slab.
- 7 A vertical crack up to 1/16 inch wide extended from the bottom of the bridge deck to the base slab.
- 8 A vertical crack up to 1/32 inch wide with efflorescence extended from the bottom of the bridge deck to 3 feet above the waterline.

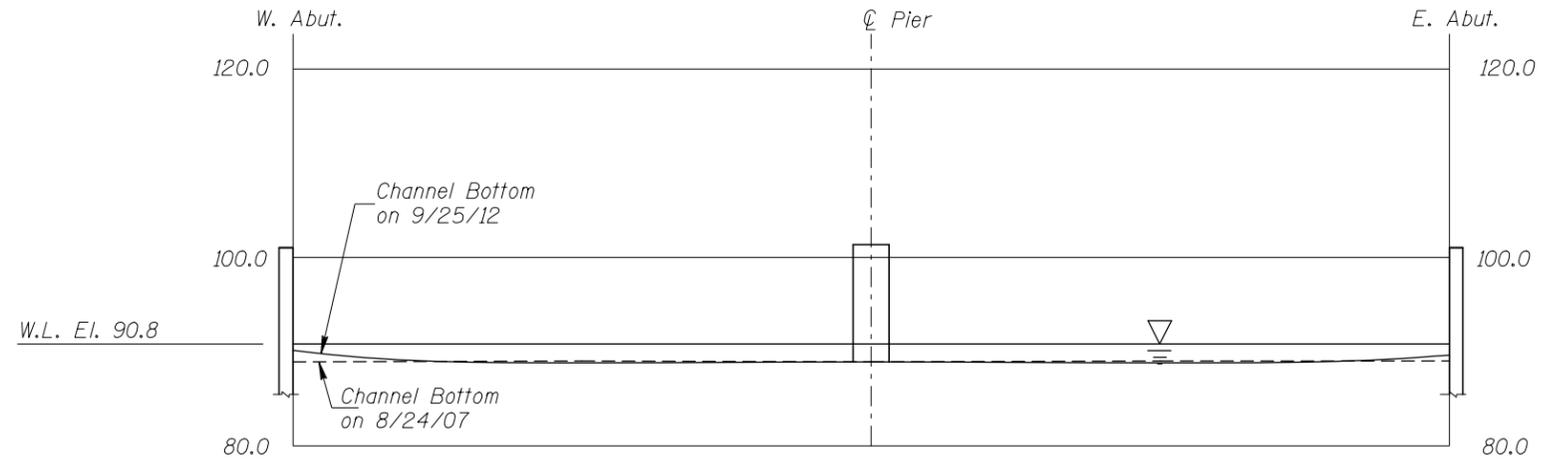
Legend

- 5.0 Sounding Depth (9/25/12)
- 5.5 Sounding Depth (8/24/07)

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 7799 CR 547 OVER THE WOLF CREEK ST. LOUIS COUNTY		
INSPECTION AND SOUNDING PLAN		
Drawn By: MBP	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: JAN., 2013
Checked By: LJ		Scale: NTS
Code: 74237799		Figure No.: 1



UPSTREAM FASCIA PROFILE
Vertical Scale: 1"=20'-0"



DOWNSTREAM FASCIA PROFILE
Vertical Scale: 1"=20'-0"

Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 7799 CR 547 OVER THE WOLF CREEK ST. LOUIS COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: MBP	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: JAN., 2013
Checked By: LJ		Scale: NTS (U.O.N.)
Code: 74237799		Figure No.: 2

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: September 25, 2012

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E.

BRIDGE NO: 7799 WEATHER: Cloudy, 50° F

WATERWAY CROSSED: Wolf Creek

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Clayton G. Brookins, Marc B. Parker

EQUIPMENT: Commercial Scuba, Lead Line, Probe Rod, Camera, Hand Tools

TIME IN WATER: 3:45 P.M.

TIME OUT OF WATER: 4:25 P.M.

WATERWAY DATA: VELOCITY 1.0 ft/sec

VISIBILITY 2 feet

DEPTH 5.4 feet upstream of dam.

ELEMENTS INSPECTED: East and West Abutments, and the Center Pier

REMARKS: Overall, the East and West Abutments and the Center Pier, were found to be generally in satisfactory condition. Since the previous inspection the scaling around the waterline has not increased significantly and the cracks in the Center Pier and East Abutment have not progressed significantly. The defects are still not of structural significance at this time. The flash boards that were severely bowed and failing during the previous inspection appear to have been replaced. The channel bottom inspected upstream and downstream of the substructure units was presently stable with no evidence of significant scour and no significant changes since the last inspection.

FURTHER ACTION NEEDED: YES NO

Monitor timber debris accumulation against the upstream dam sill during future inspection and if found to be increasing, removal operations may need to be considered.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 7799
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Daniel G. Stromberg, P.E.
 WATERWAY CROSSED Wolf Creek

INSPECTION DATE September 25, 2012

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	SUBSTRUCTURE					CHANNEL					GENERAL						
			PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER (DAM FLASH BOARDS)	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	West Abutment	4.8'	N	6	N	8	6	6	N	8	8	7	7	6	N	N	N	N	N
	Center Pier	5.0'	N	6	N	8	N	6	N	8	8	6	6	6	N	N	N	N	N
	East Abutment	3.3'	N	6	N	8	6	6	8	8	8	6	6	6	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the East and West Abutments and the Center Pier, were found to be generally in satisfactory condition. Since the previous inspection the scaling around the waterline has not increased significantly and the cracks in the Center Pier and East Abutment have not progressed significantly. The defects are still not of structural significance at this time. The flash boards that were severely bowed and failing during the previous inspection appear to have been replaced. The channel bottom inspected upstream and downstream of the substructure units was presently stable with no evidence of significant scour and no significant changes since the last inspection.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO. USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.