

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 96026
MSAS 119 (RAILROAD ST.)
OVER
POND OUTLET
CITY OF DULUTH



JULY 26, 2012
PREPARED FOR THE
MINNESOTA DEPARTMENT OF TRANSPORTATION
BY
COLLINS ENGINEERS, INC.
AND
WSB & ASSOCIATES, INC.
JOB NO. 7423

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure inspected at Structure No. 96026, a concrete box culvert, was found to be in good condition with no defects of structural significance. Overall, the structure condition and channel configuration were essentially consistent to what was recorded during routine underwater inspection performed in May 2012.

INSPECTION FINDINGS:

- (A) Joints between culvert sections exhibited from ¼ to 1 inch maximum horizontal openings (acceptable for tongue and groove arrangement), and vertically, there was up to a 1/2 inch differential across various joints.

- (B) The channel bottom consisted of sand infill near the west opening. From the west opening to 15 feet into the structure, the channel bottom consisted of riprap on the culvert floor. In the remainder of the culvert the channel bottom consisted of sand and gravel on the culvert floor.

RECOMMENDATIONS:

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

Inspection Team Leader:

WSB and Associates



Barritt Lovelace
Registered Professional Engineer
Bridge Safety Inspection Team Leader

Respectfully submitted,

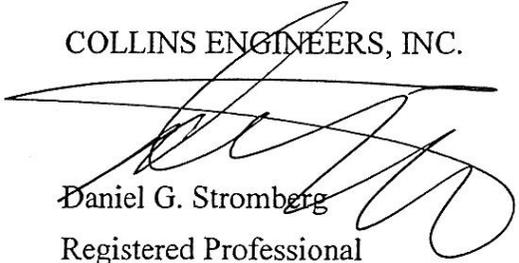
PROFESSIONAL ENGINEER

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: 96026

Feature Crossed: Pond Outlet

Feature Carried: MSAS 119 (Railroad St.)

Location: District 1 – St. Louis County, City of Duluth

Bridge Description: The structure consists of a precast concrete box culvert (10 foot wide opening).

2. INSPECTION DATA

Professional Engineer/Team Leader: Barritt Lovelace, P.E (WSB)

Dive Team: Kasey Yoder (WSB), John Loftus (Collins)

Date: July 26, 2012

Weather Conditions: Cloudy, 73° F

Underwater Visibility: 4 feet

Waterway Velocity: None / Negligible

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Culvert.

General Shape: Precast Box Culvert.

Maximum Water Depth at Substructure Inspected: Approximately 5.7 feet.

4. WATERLINE DATUM

Water Level Reference: Underside of culvert ceiling at west opening.

Water Surface: The waterline was approximately 0.2 feet below the reference.

Assumed Waterline Elevation 99.8.

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

Item 62: Culvert: Code 7

Item 61: Channel and Channel Protection: Code 8

Item 92B: Underwater Inspection: Code B/07/12

Item 113: Scour Critical Bridges: Code E/12

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:

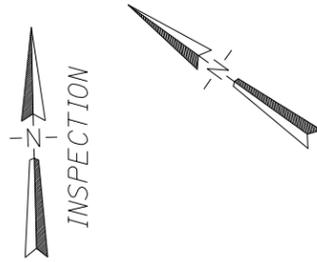
Item #	Element Description	Quantity	Unit	Conditions				
				1	2	3	4	5
241	Reinforced Conc. Culvert	224	LF	224				



Photograph 1. View of West Opening, Looking Northeast.

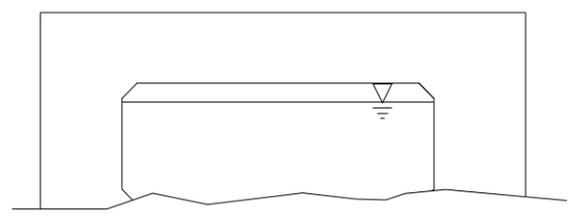
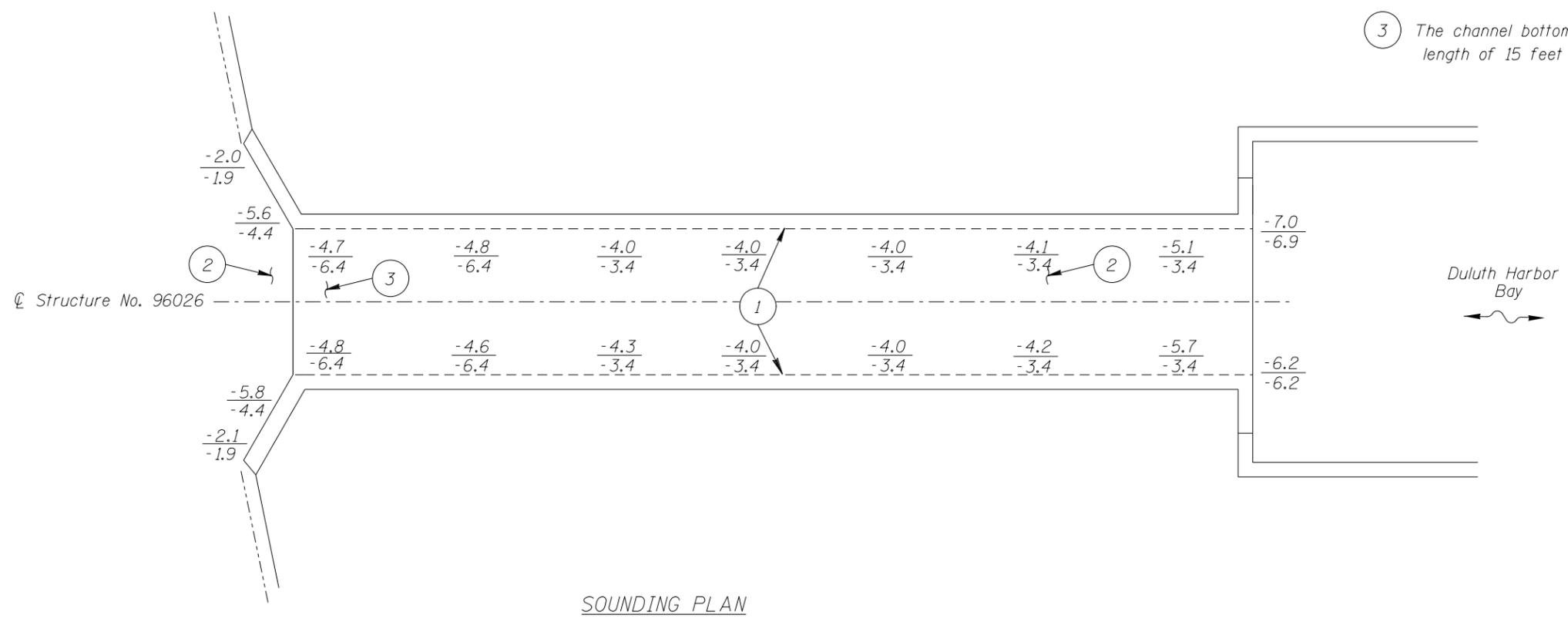


Photograph 2. View of East Opening, Looking Southeast.



INSPECTION NOTES:

- 1 The concrete was generally smooth and sound. The joints between culvert segments exhibited 1/4- to 1-inch-wide horizontal gaps (acceptable for tongue and groove joint arrangement) and up to 1/2-inch differentials across adjacent faces at various joints.
- 2 The channel bottom consisted of sand infill (up to 3 feet deep) on culvert floor.
- 3 The channel bottom consisted of riprap with no probe rod penetration for a length of 15 feet along the western end of the box culvert.



SOUTHEASTERN END VIEW OF CULVERT

GENERAL NOTES:

- 1. The entire length of the box culvert was inspected underwater.
- 2. At the time of inspection, on July 26, 2012, the waterline was located approximately 0.2 feet below the top of the box culvert opening at the westerly headwall. Since insufficient elevation information was available, a waterline reference of 100.0 was assumed. This corresponds to a waterline elevation of 99.8.
- 3. Soundings indicate the water depth at the time of inspection and are measured in feet.
- 4. Soundings were taken along the length of the box culvert.

Legend

- 0.4 Sounding Depth (7/26/12)
- 0.4 Sounding Depth (10/15/07)

Note:

All soundings based on 2012 waterline location.

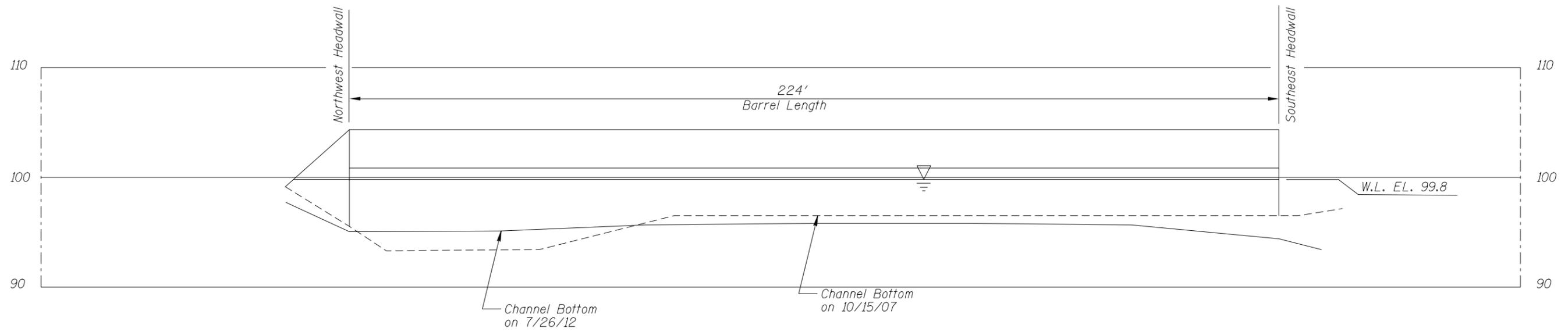
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**MINNESOTA
 DEPARTMENT OF TRANSPORTATION
 UNDERWATER BRIDGE INSPECTION**

STRUCTURE NO. 96026
 MSAS 119 (RAILROAD STREET) OVER STREAM
 CITY OF DULUTH

INSPECTION AND SOUNDING PLAN

Drawn By: BJR	COLLINS ENGINEERS	Date: JULY 2012
Checked By: BRL	123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Scale: NTS
Code: 742396026		Figure No.: 1



⌀ CULVERT PROFILE

Note:
Refer to Figure 1 for General Notes.

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MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 96026 MSAS 119 (RAILROAD STREET) OVER STREAM CITY OF DULUTH		
CENTERLINE ELEVATION PROFILE		
Drawn By: BJR	COLLINS ENGINEERS 123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	JULY 2012
Checked By: BRL		Scale: NTS
Code: 742396026		Figure No.: 2

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

DAILY DIVING REPORT

INSPECTORS: WSB & Associates and Collins DATE: July 26, 2012

ON-SITE TEAM LEADER: Barritt Lovelace, P.E.

BRIDGE NO: 96026 WEATHER: Cloudy, 73° F

WATERWAY CROSSED: Storm Sewer

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Kasey Yoder (WSB), John Loftus (Collins)

EQUIPMENT: Commercial Scuba, U/W Light, Scraper, Lead Line, Probe Rod, Camera

TIME IN WATER: 1:45 p.m.

TIME OUT OF WATER: 2:10 p.m.

WATERWAY DATA: VELOCITY None / Negligible

VISIBILITY 4 feet

DEPTH 7.0 feet maximum

ELEMENTS INSPECTED: Culvert

REMARKS: Overall, the concrete of the structure was smooth and sound with no notable deterioration. Joints between culvert sections exhibited from 1/4 to 1 inch maximum horizontal openings (acceptable for tongue and groove arrangement), and vertically, there was up to a 1/2 inch differential across various joints. The channel bottom consisted sand infill at the west opening. From the west opening to 15 feet into the structure, the channel bottom consisted of riprap on the culvert floor. In the remainder of the culvert, the channel bottom consisted of sand and gravel on the culvert floor.

FURTHER ACTION NEEDED: YES NO

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. 96026
 INSPECTORS WSB & Associates, Inc. and Collins Engineers, Inc.
 ON-SITE TEAM LEADER Barritt Lovelace, P.E.
 WATERWAY CROSSED Pond Outlet

INSPECTION DATE July 26, 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	CULVERT	FOOTINGS	DISPLACEMENT	OTHER (BRACING)	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
	Culvert	7.0'	N	7	N	8	N	7	N	N	N	N	8	7	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete of the structure was smooth and sound with no notable deterioration. Joints between culvert sections exhibited from ¼ to 1 inch maximum horizontal openings (acceptable for tongue and groove arrangement), and vertically, there was up to a ½ inch differential across various joints. The channel bottom consisted sand infill at the west opening. From the west opening to 15 feet into the structure, the channel bottom consisted of riprap on the culvert floor. In the remainder of the culvert, the channel bottom consisted of sand and gravel on the culvert floor.

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.