

UNDERWATER BRIDGE INSPECTION REPORT

---

STRUCTURE NO. L4160

CSAH 5

OVER

DEMPSEY CREEK

ST. LOUIS COUNTY

---



---

SEPTEMBER 28, 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. L4160, the North and South CMP culverts, were found to be in satisfactory condition with some defects of only minor structural significance. The steel of both barrels exhibited light corrosion extending from 1 foot below to 1 foot above the waterline. A 1 foot sag was observed in the top of both barrels starting at 5 feet in from either end. The sag was consistent throughout the length of the barrels. The floor of both culverts was covered throughout their length with a layer of sandy silt ranging from 0.5 to 2.5 feet thick.

INSPECTION FINDINGS:

- (A) The channel bottom material at the upstream and downstream openings and throughout the length of the barrel of both culverts typically consisted of sandy silt allowing a maximum probe rod penetration of 6 inches. The culvert floor was covered by a layer of sandy silt ranging from 0.5 to 2.5 feet thick.
- (B) The steel of both barrels exhibited light corrosion with rust scaling up to 1/8 inch thick extending from 1 foot below to 1 foot above the waterline.
- (C) Both barrels exhibited a 1 foot sag in the top (ceiling) starting approximately 5 feet from the ends. The sag was consistent throughout the length of the barrel.
- (D) A 5 inch diameter log was lodged vertically in the south barrel at 20 feet in from the upstream opening.

RECOMMENDATIONS:

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

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

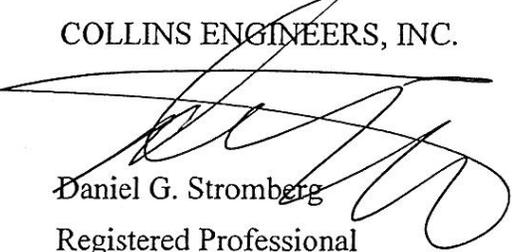
Respectfully submitted,

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: L4160

Feature Crossed: Dempsey Creek

Feature Carried: CSAH 5

Location: St. Louis County

Bridge Description: The substructure consists of two corrugated steel pipe (CMP) arch culverts.

2. INSPECTION DATA

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

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

Date: September 28, 2012

Weather Conditions: Cloudy, 50° F

Underwater Visibility: 1 foot

Waterway Velocity: None / Negligible

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: The North and South Barrels.

General Shape: The substructure consists of two corrugated steel pipe (CMP) arch culverts measuring 12 feet wide by 8 feet high and 76 feet long.

Maximum Water Depth at Substructure Inspected: Approximately 5.5 feet.

4. WATERLINE DATUM

Water Level Reference: Top of the North Barrel pipe at the upstream opening.

Water Surface: The waterline was approximately 2.0 feet below the reference.  
Waterline Elevation 98.0.

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

Item 62: Culvert Condition: Code 6

Item 61: Channel and Channel Protection: Code 6

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

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
240	Steel Culvert	151	EA	0	151	0	0	n/a
985	Slopes and Slope Protection	1	EA	1	0	0	n/a	n/a



Photograph 1. View of the Upstream Openings of the Structure, Looking West.



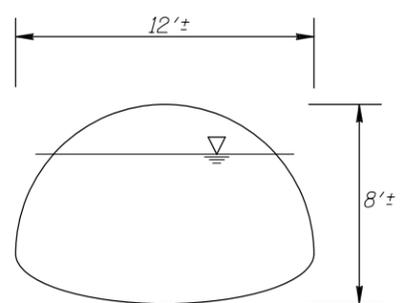
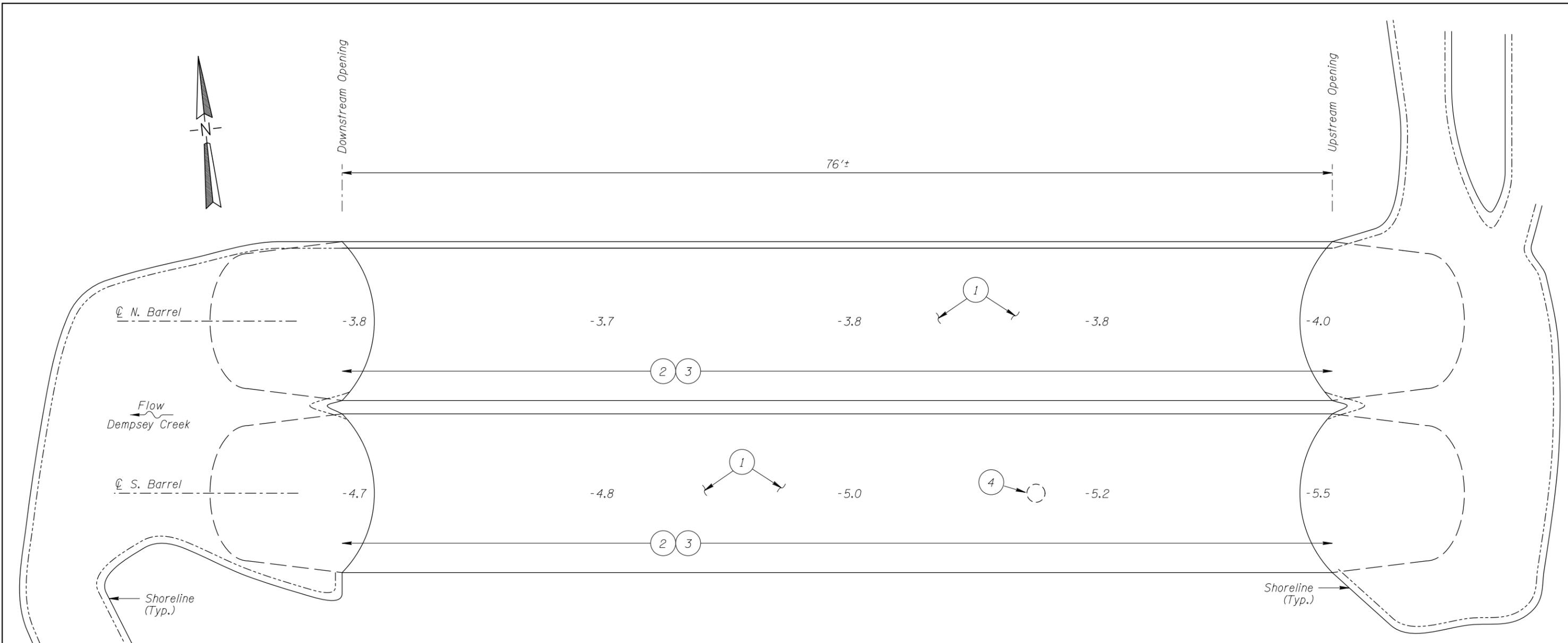
Photograph 2. View of the Downstream Openings of the Structure, Looking East.



Photograph 3. View of the Typical Steel Condition Near the Waterline, Looking Southeast.



Photograph 4. View Through the South Barrel Showing 1 foot Sag in top (ceiling), Looking East.



TYPICAL END VIEW OF CMP CULVERT

**INSPECTION NOTES:**

- ① The channel bottom material at the upstream and downstream openings and throughout the length of both barrels of the culvert typically consisted of sandy silt with a maximum probe rod penetration of 6 inches. The culvert floor was covered by a layer of sandy silt ranging from 0.5 to 2.5 feet thick.
- ② The steel of both barrels exhibited light corrosion with rust scaling up to 1/8 inch thick extending from 1 foot below to 1 foot above the waterline.
- ③ Both barrels exhibited a 1 foot sag at the top (ceiling) starting approximately 5 feet from each end. The sag was consistent throughout the length of the barrel.
- ④ A 5 inch diameter timber log was lodged vertically in the south barrel at 20 feet in from the upstream opening.

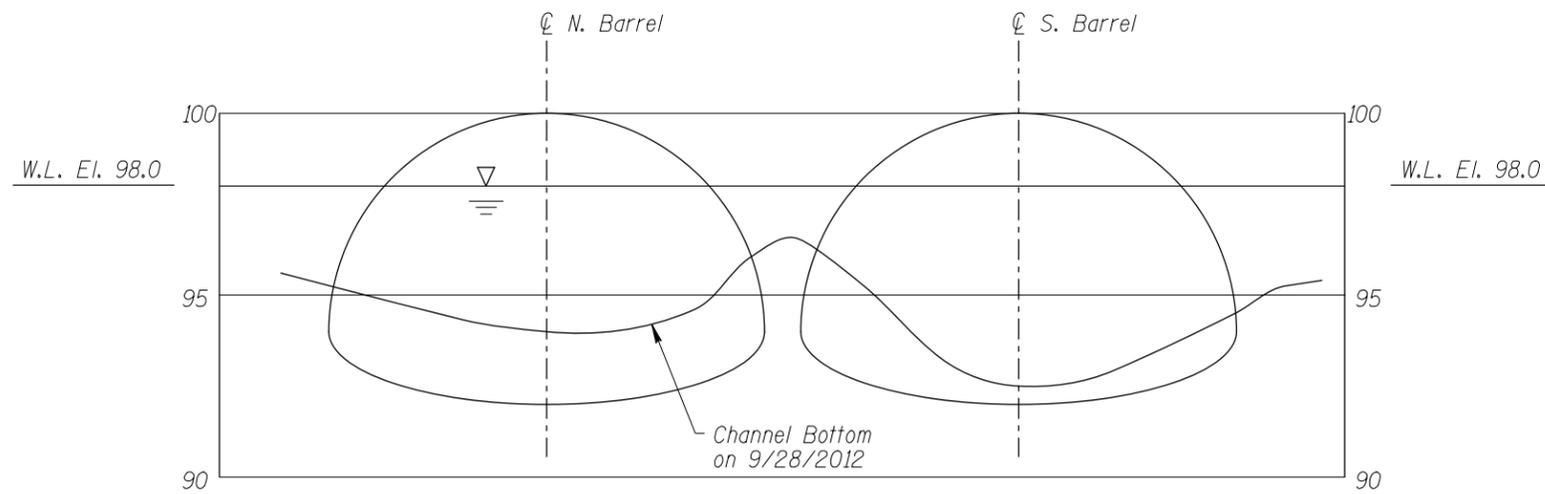
**GENERAL NOTES:**

- 1. The North and South Barrel CMP culverts were inspected during the underwater inspection.
- 2. At the time of inspection on September 28, 2012, the waterline was located approximately 2 feet below the top of the North Barrel at the upstream opening. Since elevation information was not available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 98.0.
- 3. Soundings indicate the water depth at the time of inspection and are measured in feet.

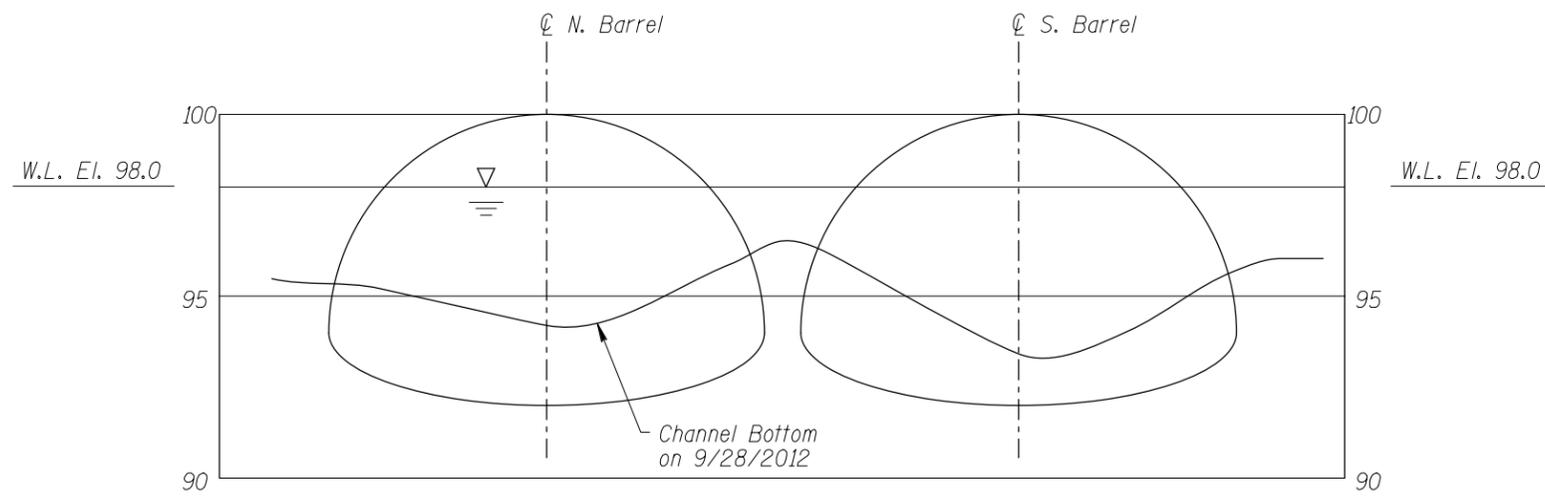
**Legend**

- 1.0 Sounding Depth from Waterline (9/28/2012)
- ① Inspection Note Number
- ⊘ 5 inch  $\phi$  Log

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. L4160 CSAH 5 OVER DEMPSEY CREEK ST. LOUIS COUNTY		
<b>INSPECTION AND SOUNDING PLAN</b>		
Drawn By: MBP	<b>COLLINS ENGINEERS</b>	Date: DEC. 2012
Checked By: LJ	<small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Scale: NTS
Code: 7423L4160		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

*Note:*  
 Refer to Figure 1 for General Notes.

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. L4160 CSAH 5 OVER DEMPSEY CREEK ST. LOUIS COUNTY		
<b>UPSTREAM AND DOWNSTREAM FASCIA PROFILES</b>		
Drawn By: MBP	<b>COLLINS ENGINEERS</b>	Date: DEC. 2012
Checked By: LJ		Scale: 1"=5'
Code: 7423L4160		Figure No.: 2

123 North Wacker Drive  
 Suite 900  
 Chicago, IL 60606  
 (312) 504-9300  
 www.collinsengr.com

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

INSPECTORS: Collins Engineers, Inc. DATE: September 28, 2012

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

BRIDGE NO: L4160 WEATHER: Cloudy, 50° F

WATERWAY CROSSED: Dempsey Creek

DIVING OPERATION:  SCUBA  SURFACE SUPPLIED AIR  
 OTHER

PERSONNEL: Marc B. Parker, Clayton G. Brookins

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

TIME IN WATER: 8:20 A.M.

TIME OUT OF WATER: 8:55 A.M.

WATERWAY DATA: VELOCITY None / Negligible

VISIBILITY 1 foot

DEPTH 5.5 feet maximum at the South Barrel upstream opening

ELEMENTS INSPECTED: The North and South Barrels

REMARKS: Overall, the substructure unit inspected underwater were found to be in satisfactory condition with some defects of only minor structural significance. The steel of both barrels exhibited light corrosion extending from 1 foot below to 1 foot above the waterline. A 1 foot sag was observed in the top of both barrels starting at 5 feet in from either end. The sag was consistent throughout the length of the barrels. The floor of both culverts was covered throughout their length with a layer of sandy silt ranging from 0.5 to 2.5 feet thick.

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. L4160  
 INSPECTORS Collins Engineers, Inc.  
 ON-SITE TEAM LEADER Daniel G. Stromberg, P.E.  
 WATERWAY CROSSED Dempsey Creek

INSPECTION DATE September 28, 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	CONCRETE PIPE CULVERT	FOOTINGS	DISPLACEMENT	OTHER (CMP CULVERT)	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
	North Barrel	4.0'	N	N	N	6	7	6	N	8	N	6	6	N	7	N	N	N	N
	South Barrel	5.5'	N	N	N	6	7	6	N	8	N	6	6	N	7	N	N	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the substructure unit inspected underwater were found to be in satisfactory condition with some defects of only minor structural significance. The steel of both barrels exhibited light corrosion extending from 1 foot below to 1 foot above the waterline. A 1 foot sag was observed in the top of both barrels starting at 5 feet in from either end. The sag was consistent throughout the length of the barrels. The floor of both culverts was covered throughout their length with a layer of sandy silt ranging from 0.5 to 2.5 feet thick.

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.