

# 2016 UNDERWATER BRIDGE INSPECTION REPORT



## BRIDGE # 96225 CR 923 over STREAM

DISTRICT: District 1

COUNTY: St. Louis

CITY/TOWNSHIP: STURGEON

STATE: Minnesota

Date of Inspection: 06/20/2016

Equipment Used:

Owner: County Highway Agency

Inspected By: Janulis, Lukas

Report Written By: Lukas Janulis

Report Reviewed By:

Final Report Date:



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## UNDERWATER INSPECTION

### REPORT SUMMARY

The culverts (Bridge No. 96225) inspected were found to be in satisfactory condition with no defects of structural significance below water. The concrete exhibited light scaling up to 1/8 inch deep along all exposed surfaces of the culverts. A 2 to 3 foot layer of silt infill was observed along the bottom of the culvert throughout the length of Pipes 1, 2, and 3, which was slightly restricting the hydraulic capacity of the structure.

### INSPECTION FINDINGS

- (A) The channel bottom material consisted of silty sand allowing 3 inches of probe rod penetration.
- (B) The exposed surfaces of concrete Pipes 1, 2, and 3 were typically sound with light scaling up to 1/8 inch deep.
- (C) Timber debris consisting of a 12 inch diameter log was observed at the upstream opening of Pipe 2.
- (D) Light accumulation of timber debris was located near the upstream end of Pipe 3.
- (E) A 2 to 3 foot thick layer of silt infill covered the bottom of Pipes 1, 2, and 3.

### RECOMMENDATIONS

- (A) Remove the sediment build up in the concrete pipes to restore the full hydraulic capacity.
- (B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) of sixty (60) months.

Contractor: Collins Engineers, Inc.

Contractor Job Number: 9687

## UNDERWATER INSPECTION

### 1. BRIDGE DATA

Bridge #: 96225  
Feature Intersected: STREAM  
Facility Carried: CR 923  
District: District 1  
County: 069 - St. Louis  
Bridge Description:  
The bridge consists of three precast concrete pipes.

### 2. INSPECTION DATA

Professional Engineer/Team Leader: Lukas Janulis  
Inspection Diver: Lukas Janulis  
Date of Underwater Inspection: 06/20/2016  
Weather Conditions: Sunny, 70°F  
Underwater Visibility (feet): 0.5 feet  
Waterway Velocity (ft/sec): 0.5 ft/sec

### 3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) Inspected: Pipes 1 through 3.  
General Shape:  
Precast concrete pipes.

Maximum Water Depth at Substructure(s) Inspected (feet): 5.0 feet

### 4. WATERLINE DATUM

Water Level Reference: Below the crest of the downstream opening of Pipe 3.  
Waterline Elevation (feet): 1275.2 feet  
Description: The waterline was located approximately 0.3 feet below the 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: 6  
Item 62: Culvert: Code: 6  
Item 92B: Underwater Inspection: Code: Y 48 06/2016

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	167	LF		167		
885	Scour	1	EA	1			

## UNDERWATER INSPECTION

### INSPECTION PROCEDURES

The routine underwater inspection of Bridge 96225 (C.R. 923 over Stream) was completed on June 20, 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 surface supplied air techniques in accordance with OSHA regulations. Channel bottom profiles were taken along the upstream and downstream openings of the culverts to determine the presence, location and area of scour.

The bridge elements inspected were the three precast pipe culverts. 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: 96225

CR 923 over STREAM

Date: 08/26/2016

+ GENERAL +	+ ROADWAY +	+ INSPECTION +																				
<b>Agency Br. No.</b> 730 <b>Crew</b> <b>District</b> 01 <b>Maint. Area</b> <b>County</b> 069 - St. Louis <b>City</b> <b>Township</b> 69063 - STURGEON <b>Desc. Loc.</b> 4.0 MI E OF JCT CSAH 5 <b>Sect., Twp., Range</b> 5 - 061N - 20W <b>Latitude</b> 47 ° 48 ' 27.59 " <b>Longitude</b> 92 ° 56 ' 2.17 " <b>Custodian</b> 02 - County Highway Agency <b>Owner</b> 02 - County Highway Agency <b>BMU Agreement</b> <b>Year Built</b> 1985 <b>MN Year Reconstructed</b> <b>FHWA Year Reconstructed</b> <b>MN Temporary Status</b> <b>Bridge Plan Location</b> 3 - COUNTY <b>Date Opened to Traffic</b> 6/1/1985 <b>On - Off System</b> 0 - OFF <b>Legislative District</b> 06A <b>Potential ABC</b> 2 - N/A	<b>Bridge Match ID (TIS)</b> 0 <b>Roadway O/U Key</b> Route On Structure <b>Route Sys</b> 07 - CNTY <b>Number</b> 923 <b>Roadway Name or Description</b> CNTY 923 <b>Level of Service</b> 1 - MAINLINE <b>Roadway Type</b> 2 - 2-way traffic <b>Control Section (TH Only)</b> <b>Reference Point</b> 004+00.090 <b>Detour Length</b> 99.0 <b>mi.</b> <b>Lanes</b> <b>ON</b> 2 <b>UNDER</b> 0 <b>ADT</b> 20 <b>YEAR</b> 2003 <b>HCA DT</b> <b>ADTT</b> % <b>Functional Class</b> 09 - Rural - Local	<b>Userkey</b> 109 <b>Structurally Deficient</b> N <b>Functionally Obsolete</b> N <b>Sufficiency Rating</b> 94.9 <b>Routine Inspection Date</b> 10/20/2015 <b>Routine Inspection Frequency</b> 48 <b>Inspector Name</b> Janulis, Lukas <b>Status</b> A - Open																				
		<b>+ NBI      CONDITION      RATINGS +</b>																				
		<b>Deck</b> N <b>Unsound Deck %</b> <b>Superstructure</b> N <b>Substructure</b> N <b>Channel</b> 6 <b>Culvert</b> 6																				
	<b>+ RDWY      DIMENSIONS +</b>	<b>+ NBI      APPRAISAL      RATINGS +</b>																				
	<b>If Divided</b> <b>NB-EB</b> <b>SB-WB</b> <b>Roadway Width</b> 24.00 <b>ft.</b> <b>ft.</b> <b>Vertical Clearance</b> <b>ft.</b> <b>ft.</b> <b>Max. Vert. Clear.</b> <b>ft.</b> <b>ft.</b> <b>Horizontal Clear.</b> <b>ft.</b> <b>ft.</b> <b>Lateral Clearance</b> <b>ft.</b> <b>ft.</b> <b>Appr. Surface Width</b> 28.0 <b>ft.</b> <b>Bridge Roadway Width</b> 0.0 <b>ft.</b> <b>Median Width On Bridge</b> <b>ft.</b>	<b>Structure Evaluation</b> 6 <b>Deck Geometry</b> N <b>Underclearances</b> N <b>Waterway Adequacy</b> 8 <b>Approach Alignment</b> 7																				
<b>+ STRUCTURE +</b>		<b>+ SAFETY      FEATURES +</b>																				
<b>Service On</b> 1 - Highway <b>Service Under</b> 5 - Waterway <b>Main Span Type</b> 5 - Prestress or Precast <b>Main Span Design</b> 14 - Pipe Culvert (Round) <b>Main Span Detail</b> <b>Appr. Span Type</b> <b>Appr. Span Design</b> <b>Appr. Span Detail</b> <b>Skew</b> 0 <b>Culvert Type</b> 6' DIA <b>Barrel Length</b> 56 <b>Cantilever ID</b>  <b>Number of Spans</b> <b>MAIN:</b> 3 <b>APPR:</b> 0 <b>TOTAL:</b> <b>Main Span Length</b> 6.0 <b>ft.</b> <b>Structure Length</b> 25.5 <b>ft.</b> <b>Deck Width (Out-to-Out)</b> 0.0 <b>ft.</b> <b>Deck Material</b> N - Not Applicable <b>Wear Surf Type</b> 8 - Gravel <b>Wear Surf Install Year</b> <b>Wear Course/Fill Depth</b> 3.00 <b>ft.</b> <b>Deck Membrane</b> N - Not Applicable (applies) <b>Deck Rebars</b> N - Not Applicable (no deck) <b>Deck Rebars Install Year</b> <b>Structure Area (Out-to-Out)</b> 0 <b>sq. ft.</b> <b>Roadway Area (Curb-to-Curb)</b> <b>sq. ft.</b> <b>Sidewalk Width</b> 50A. Lt 0.00 <b>ft.</b> 50B. Rt 0.00 <b>ft.</b> <b>Curb Height</b> <b>Lt</b> 0.00 <b>ft.</b> <b>Rt</b> 0.00 <b>ft.</b> <b>Rail Type</b> <b>Lt</b> NN <b>Rt</b> NN	<b>+ MISC.      BRIDGE      DATA +</b>																					
	<b>Structure Flared</b> 0 - No flare <b>Parallel Structure</b> N - No parallel structure <b>Field Conn. ID</b> <b>Abutment Foundation (Material/Type)</b> N - N/A <b>Pier Foundation (Material/Type)</b> N - N/A <b>Historic Status</b> 5 - Not eligible	<b>+ IN      DEPTH      INSP. +</b>																				
	<b>+ PAINT +</b>	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;"></th> <th style="width: 10%; text-align: center;">Y/N</th> <th style="width: 10%; text-align: center;">Freq</th> <th style="width: 20%; text-align: center;">Date</th> </tr> </thead> <tbody> <tr> <td><b>Frac. Critical</b></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Underwater</b></td> <td></td> <td></td> <td style="text-align: right;">06/20/2016</td> </tr> <tr> <td><b>Pinned Asbly.</b></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Spec. Feat.</b></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Y/N	Freq	Date	<b>Frac. Critical</b>				<b>Underwater</b>			06/20/2016	<b>Pinned Asbly.</b>				<b>Spec. Feat.</b>			
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	<b>+ BRIDGE      SIGNS +</b>	<b>+ WATERWAY +</b>																				
	<b>Year Painted</b> <b>Unsound Paint %</b> <b>Painted Area</b> <b>sq. ft.</b> <b>Primer Type</b> <b>Finish Type</b>	<b>Drainage Area (sq. mi.)</b> <b>Waterway Opening (sf.)</b> 84 <b>Navigation Control</b> 0 - No nav. control on <b>Pier Protection</b> - <b>Nav. Clr. (ft.)</b> <b>Vert.</b> 0.0 <b>Horiz.</b> 0.0 <b>Nav. Vert. Lift Bridge Clear. (ft.)</b> <b>MN Scour Code</b> E - CULVERT <b>Year</b>																				
		<b>+ CAPACITY      RATINGS +</b>																				
	<b>Posted Load</b> 0 - Not Required <b>Traffic</b> 0 - Not Required <b>Horizontal</b> 0 - Not Required <b>Vertical</b> N - Not Applicable	<b>Design Load</b> 5 - HS 20 <b>Operating Rating</b> 2 - HS TRUCK            36.0 <b>Inventory Rating</b> 2 - HS TRUCK            24.0 <b>Posting VEH:</b> <b>SEMI:</b> <b>DBL:</b> <b>Rating Date</b> 2/1/1991 <b>Overweight Permit Codes</b> <b>A</b> N - N/A <b>B</b> N - N/A <b>C</b> N - N/A																				

# MINNESOTA BRIDGE INSPECTION REPORT

09/02/2016

Inspector: CO Bridge

## BRIDGE 96225 CR 923 OVER STREAM

County: St. Louis	Location: 4.0 MI E OF JCT CSAH 5	Length: 25.5 ft.
City:	Route: 07 - CNTY 923 Ref. Pt.: 004+00.090	Deck Width: 0.0 ft.
Township: 69063 - STURGEON	Control Section:	Rdwy. Area/ Pct. Unsnd: sq. ft. / %
Section: 5 Township: 061N Range: 20W Maint. Area:		Paint Area/ Pct. Unsnd: sq. ft. / %
Span Type: 1 - Concrete 19 - Culvert (includes frame culverts)	Local Agency Bridge Nbr.: 730	Culvert: 6' DIA
List:		Postings:
NBI Deck: N Super: N Sub: N Chan: 6 Culv: 6	Open, Posted, Closed: A - Open	
	MN Scour Code: E - CULVERT	

Appraisal Ratings - Approach: 7	Waterway: 8	Unofficial Structurally Deficient	N
Required Bridge Signs - Load Posting: 0 - Not Required	Traffic: 0 - Not Required	Unofficial Functionally Obsolete	N
Horizontal: 0 - Not Required	Vertical: N - Not Applicable	Unofficial Sufficiency Rating	94.9

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	08/26/2016	167 LF	0	167	0	0
		Migrated Values		167 LF	0	167	0	0
Notes: [2015-2013] Water within 1' of top of outside pipes and .5' of center pipe. Hairline cracks along tops of culverts. Minor scale along wetted perimeter of all culverts. W culvert, both ends lifting and bow in center. All other ends lifting also. No signs of leakage or backfill infiltration.								
800	Critical Deficiencies or Safety Hazards	Underwater	08/26/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: [2015-2013] No critical findings during this inspection.								
871	Roadway Over Culvert	Underwater	08/26/2016	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	08/26/2016	1 EA	1	0	0	0
891	Other Bridge Signing	Underwater	08/26/2016	1 EA	0	0	1	0
		Migrated Values		1 EA	0	0	1	0
Notes: [2015-2013] No culvert markers present.								
892	Slopes & Slope Protection	Underwater	08/26/2016	2 EA	2	0	0	0
		Migrated Values		2 EA	2	0	0	0
Notes: [2015-2013] No notable erosion. Slopes protected by vegetation								
894	Deck & Approach Drainage	Underwater	08/26/2016	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	08/26/2016	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.								

General Notes: SLC District 3  
 Inspected by: [2015-2013] CG  
 No Guardrail.  
 [2015-2013] Possible addition to underwater inspections regular high water due to beaver activity.

**BRIDGE 96225 CR 923 OVER STREAM**

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
	58. Deck NBI:							
36A.	Brdg Railings NBI:	No rail attached to culvert.						
36B.	Transitions NBI:	Roadway meets minimum requirements for Minnesota rule 8820.9920 for ADT < 50. No guardrail present.						
36C.	Appr Guardrail NBI:	Roadway meets minimum requirements for Minnesota rule 8820.9920 for ADT < 50. No guardrail present.						
36D.	Appr Guardrail Terminal NBI:	Roadway meets minimum requirements for Minnesota rule 8820.9920 for ADT < 50. No guardrail present.						
59.	Superstructure NBI:							
60.	Substructure NBI:							
61.	Channel NBI:	[2015] Beaver activity in area keeping water high with little flow. Minor bank damage due to regular high water. Minor debris throughout channel.						
62.	Culvert NBI:	[2015-2013] Water within 1' of top of outside pipes and .5' of center pipe. Hairline cracks along tops of culverts. Minor scale along wetted perimeter of all culverts. W culvert, both ends lifting and bow in center. All other ends lifting also. No signs of leakage or backfill infiltration.						
71.	Waterway Adeq NBI:	[2015] Roadway low point 50' to the west of bridge. Large flood plain making limited chance of overtopping.						
72.	Appr Roadway Alignment NBI:	[2015-2013] Hill to the east and west affecting sight distance. No speed reduction required.						
	Inventory Notes:							

\_\_\_\_\_  
Inspector's Signature

\_\_\_\_\_  
Reviewer's Signature

# Pictures



Photo 1 - Upstream Opening, Looking South

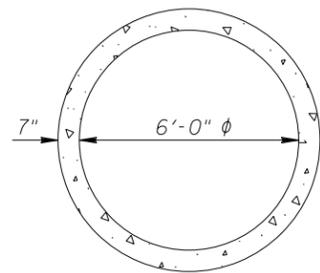


Photo 2 - Downstream Opening, Looking North

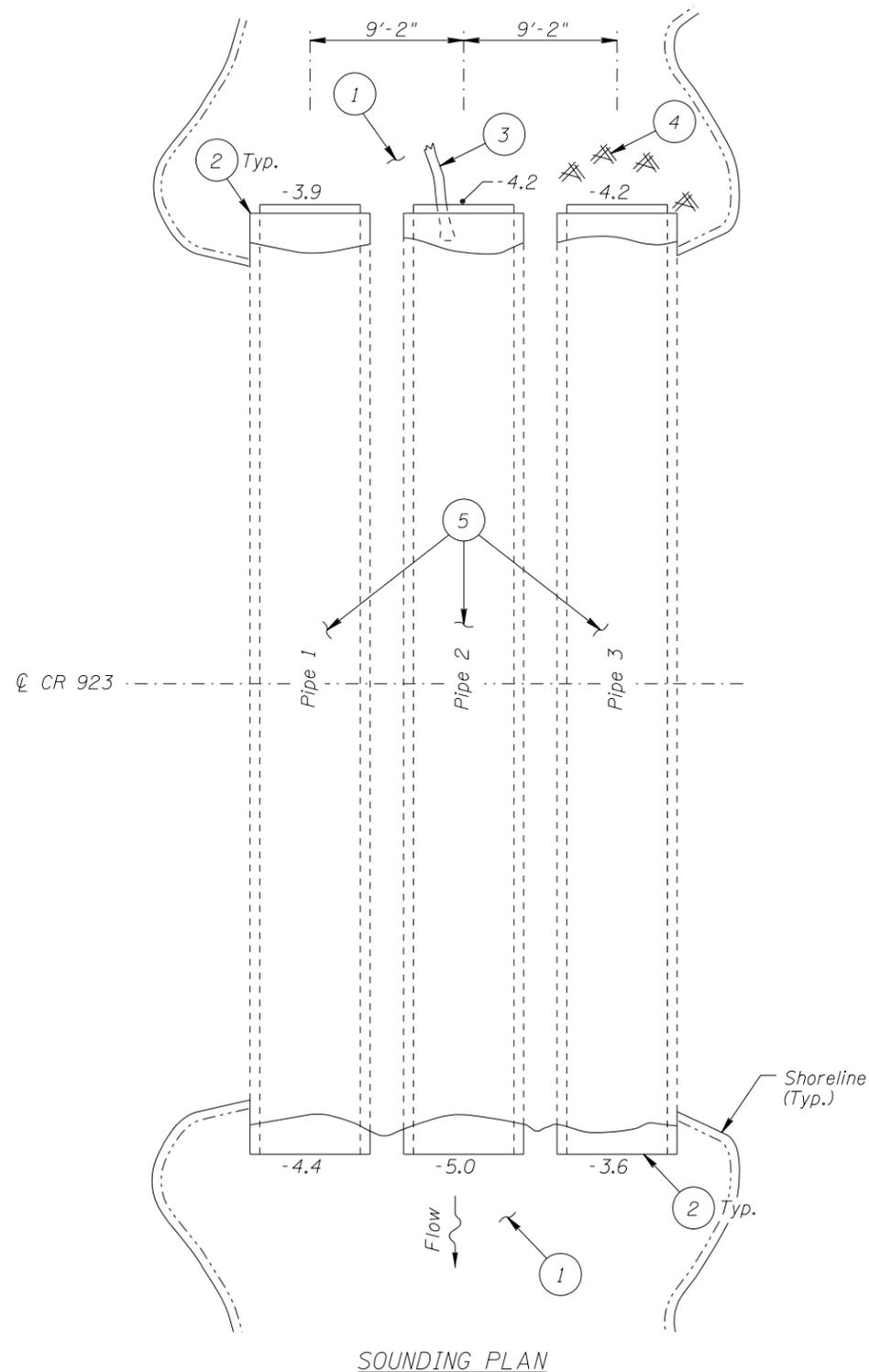
## Pictures



Photo 3 - Typical Concrete Pipe Condition (Pipe 3 Shown), Looking South



TYPICAL END VIEW OF PIPE



SOUNDING PLAN

GENERAL NOTES:

1. Pipes 1 through 3 were inspected underwater.
2. At the time of inspection on June 20, 2016, the waterline was located approximately 0.3 foot below the crest at the downstream opening of Pipe 3. This corresponds to a waterline elevation of 1275.2 based on available structure drawings.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the pipe structures at the upstream and downstream openings.

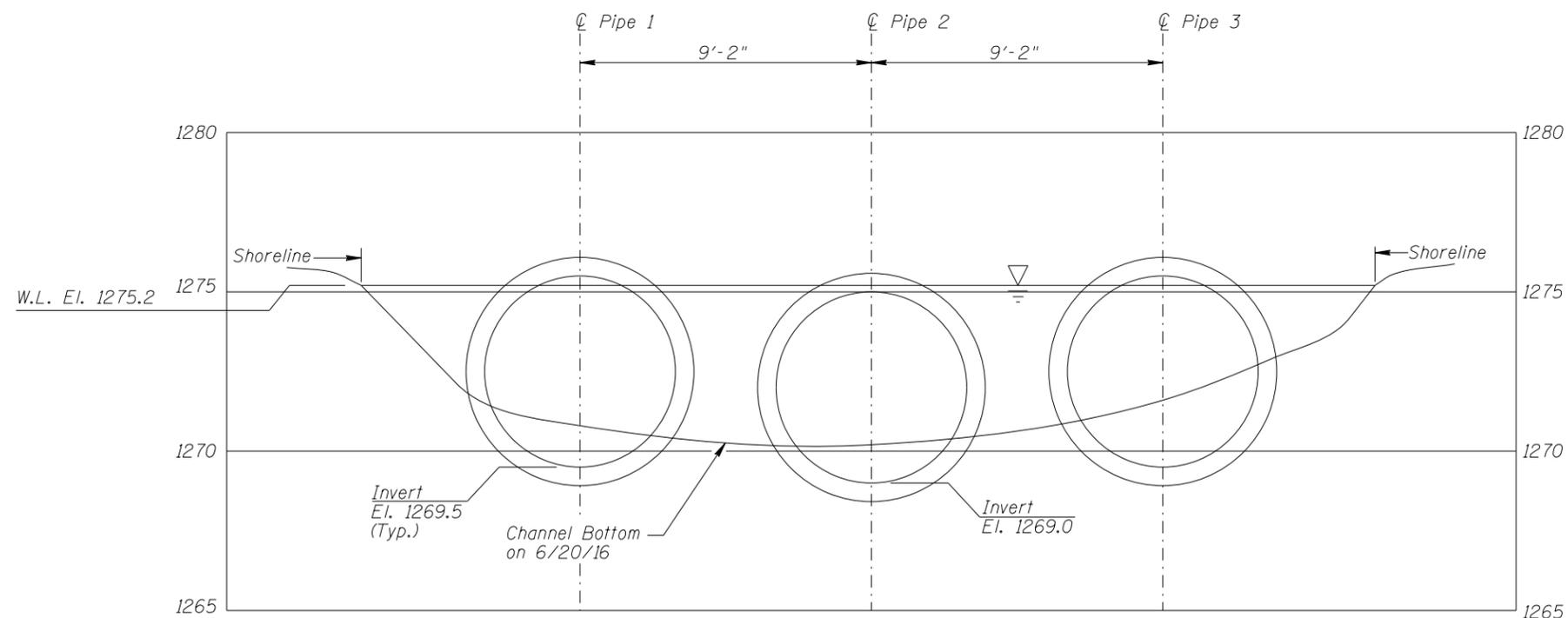
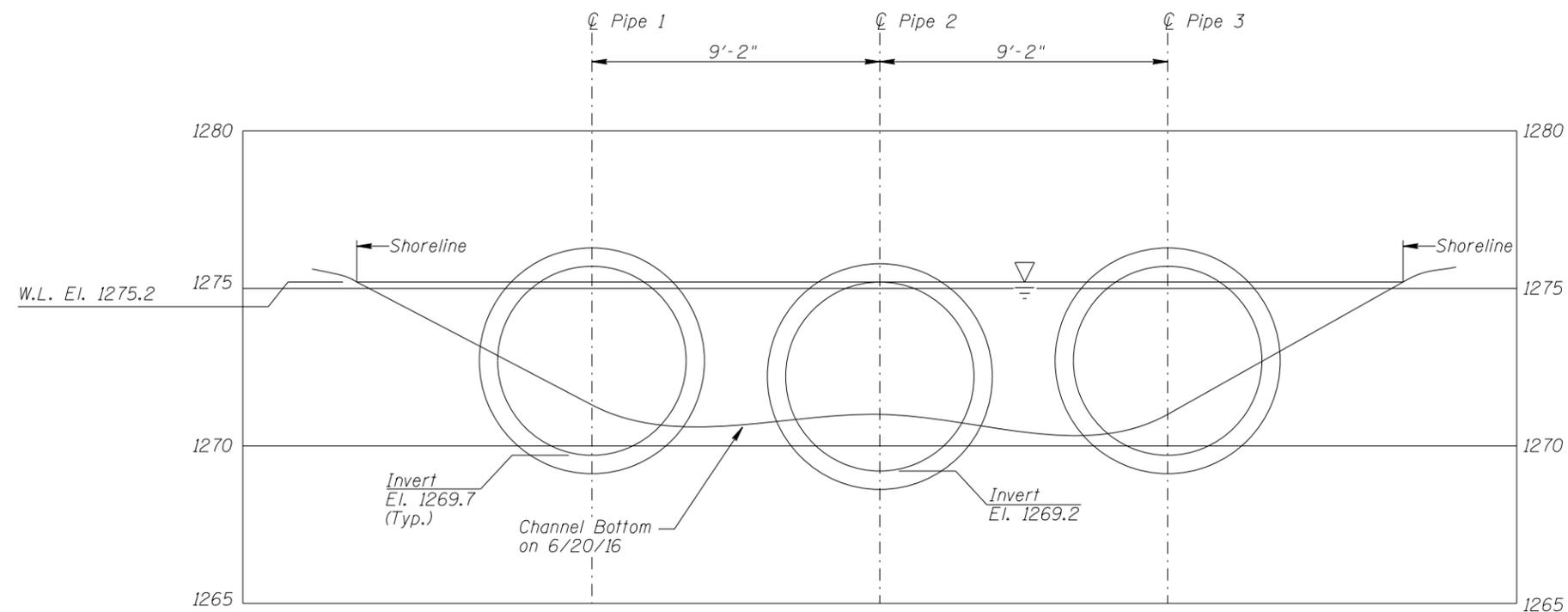
INSPECTION NOTES:

- 1 Channel bottom material consisted of silty sand allowing 3 inches of probe rod penetration.
- 2 Exposed surfaces of concrete Pipes 1, 2, and 3 were typically sound with light scaling up to 1/8 inch deep.
- 3 Timber debris consisting of a 12-inch diameter log was observed at the upstream opening of Pipe 2.
- 4 Light accumulation of timber debris was located near the upstream end of Pipe 3.
- 5 A 2 to 3 foot thick layer of silt infill typically covered the bottom of Pipes 1, 2 and 3.

Legend

- 5.8 Sounding Depth from Waterline (6/20/16)
- Timber Debris

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 96225 CR 923 OVER STREAM DISTRICT 1, ST. LOUIS COUNTY		
INSPECTION AND SOUNDING PLAN		
DRAWN BY: PRH	<b>COLLINS ENGINEERS</b> <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	DATE: JUNE 20, 2016
CHECKED BY: LJ		SCALE: NTS
CODE: 968796225		FIGURE NO.: 1



Note:  
Refer to Figure 1 for General Notes.

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 96225 CR 923 OVER STREAM DISTRICT 1, ST. LOUIS COUNTY <b>UPSTREAM AND DOWNSTREAM FASCIA PROFILES</b>		
DRAWN BY: PRH	<b>COLLINS ENGINEERS</b> <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	DATE: JUNE 20, 2016
CHECKED BY: LJ		SCALE: 1"=5'-0"
CODE: 968796225		FIGURE NO.: 2