

STRUCTURE S-252A
INSPECTION DATE: 4/2/2020



Two Barrels, 60" Diameter x 126' Long

Location:	USJRB South
	Levee L-78
Latitude:	27.6411 N
Longitude:	80.7255 W
Type:	Gated Culvert
No. Barrels:	Two
Inspection	
Start Date:	4/2/2020
End Date:	4/2/2020

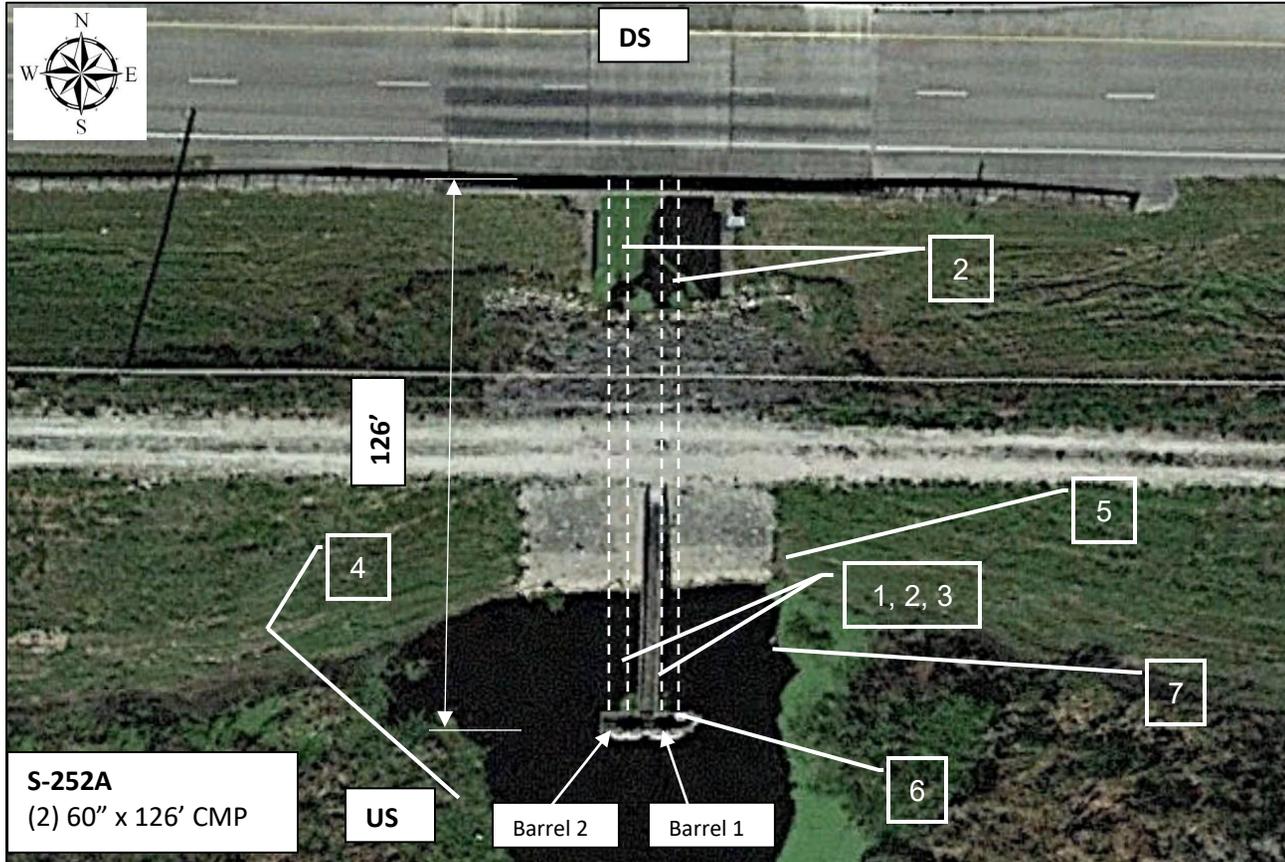
TEAM MEMBERS	
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Diver	Jordan Klingler
Diver – Standby	Natasha Daniel
Dive Tender	Ben Harpel
Dive Tender	
Animal Control	TJ McDonagh
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Respectfully Submitted,
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Aerial View of Structure



No.	Item No.	Inspection Item	Rating	Deficiency
1	US115	Culverts	C-4	Heavy corrosion on the clamps, 7' from the gates.
2	DS115	Culverts	C-4	Moderate corrosion throughout and major corrosion at both ends of the barrels.
3	US114	Structural Support, Bracing	C-3	Corrosion on hardware located underwater for timber pier.
4	DS1000	Additional Items	C-3	Timber rot and missing numbers on southwest staff gauge.
5	US1	Slope/Banks of Channel	C-2	Cracked and broken poured concrete on slope.
6	US151	Structure Gates	C-2	Corrosion on the gate brackets for the stem bolts.
7	DS1000	Additional Items	C-2	Minor to moderate rot and mod. corrosion on metal gauge plate on eastern staff gauge.

Structure Description and Method of Underwater Inspection

Structure S-252A is a gated culvert comprised of two barrels, extending south (gated end) to north under Levee L-78. The barrels are CMP, 60 inches diameter by 126' feet long. The south end has an access pier comprised of timber piles and a timber superstructure.

The underwater inspection was performed by a 5-person dive team on April 2, 2020. The dive team worked from a dive trailer, using surface-supplied air, and accessed the structure areas from the bank.

The scope of services included the underwater inspection of the submerged structure components. The area extended 20 feet beyond the structure edges. There were no boat barriers.

The air temperature was 72 degrees F. and the weather was mostly clear. The underwater visibility ranged from 1' to 3'. The upstream water level was 12.0 Ft per the eastern staff gauge and approximately 24.5 Ft per the southwestern staff gauge. There was no downstream staff gauge.

Rating System

- C-1: No action needed
- C-2: Monitor condition at next dive inspection (5 years)
- C-3: Schedule repair/replacement (for routine items)
- C-4: Schedule repair/replacement (for safety or operational items)
- C-5: Repair/replace immediately (for structural items)
- C-6: Critical - Repair/replace immediately (for operational items)

Summary of Observations

Items Rated C-5 and Above

There were no items rated C-5 and above.

Items Rated C-4

- Item US115: The clamps on the exterior of the culverts, located 7' from the gate, typically have moderate corrosion overall, with moderate to major corrosion from 11:00 to 1:00 across the crown with some corrosion holes exposing the gasket.
 - Recommended Action: Replace the clamps over each barrel.
- Item DS115: (1) The downstream 20' of each barrel has moderate to major corrosion with corrosion holes. The crown of the barrels has full section loss from corrosion. (2) Both barrels have moderate corrosion throughout the length covering 50-70% of the surface area with pitting up to 1/64" deep. (3) The southern 20' of each barrel, up to the gates, had small corrosion holes across the crown from 10:00 to 02:00.
 - Recommended Action: Schedule culvert relining or replacement for both barrels.

Items Rated C-3

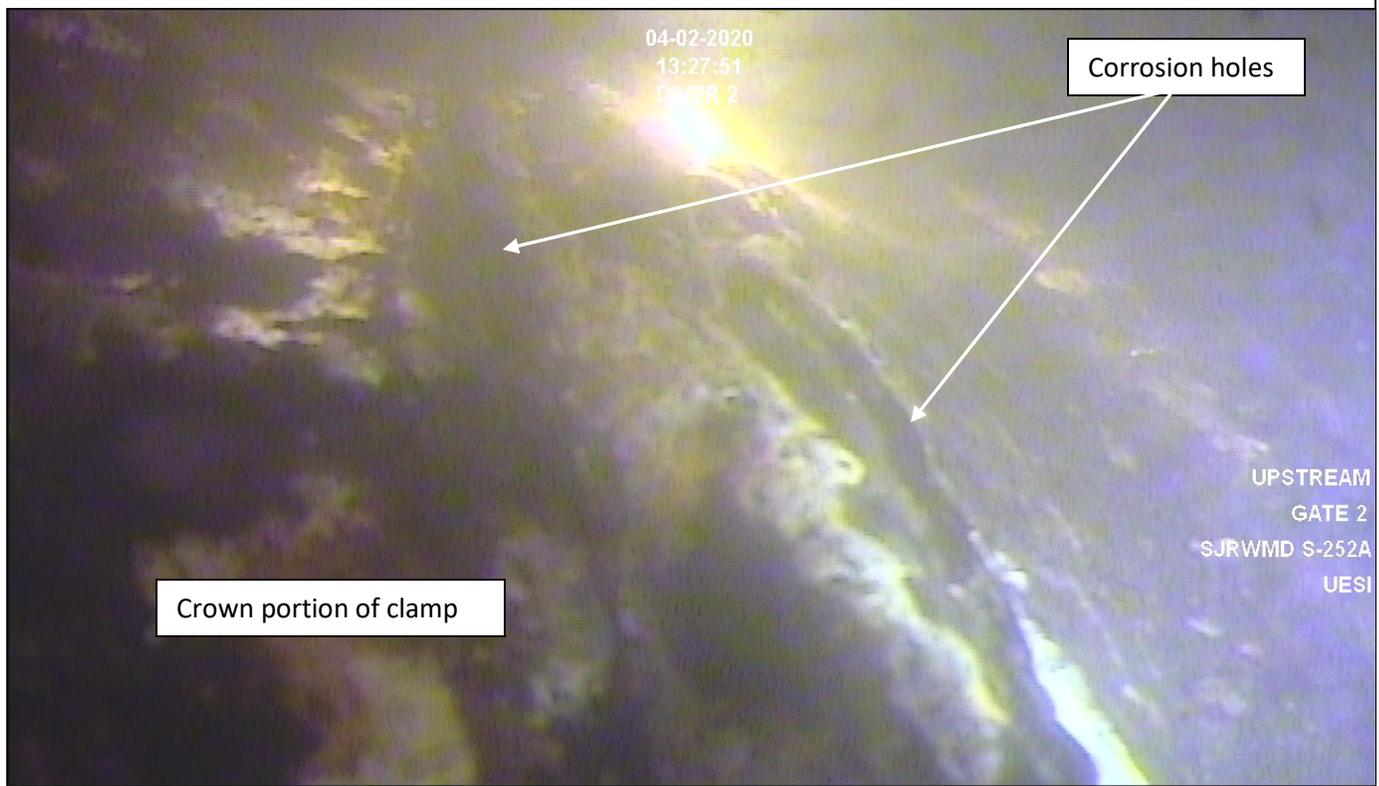
- Item US114: The hardware for the cross bracing for the timber pier has heavy corrosion below water with 50% section loss.
 - Recommended Action: Replace the timber pier hardware below the waterline.
- Item DS1000: The upstream side has two staff gauges. The southwestern staff gauge timber 2x12 board has moderate wood rot just above the waterline, 2' tall x 6" wide x 1" deep. The gauge is missing numbers below 26.5 Ft.
 - Recommended Action: Replace the southwest staff gauge timber and metal boards if they are still used.

Items Rated C-2

- Item US1: The embankment east of the structure has poured concrete placed over rock which has cracked and broken in a 10' x 2' area.
 - Recommended Action: Monitor the embankment for erosion or sloughing.
- Item US151: The brackets for both gates for the stem attachment have minor to moderate pitting corrosion up to 1/16".
 - Recommended Action: Monitor the upstream 1.5' of the CMP for advanced corrosion and/or section loss.
- Item DS1000: The eastern staff gauge timber board has minor to moderate rot. The metal gauge board has moderate corrosion along the edges of the plate.
 - Recommended Action: Monitor the eastern staff gauge board for advanced decay and the metal board for advanced corrosion.
- Item US114: The hardware (bolts and Ogee washers) above water for the timber pier has minor corrosion.
 - Recommended Action: Monitor the timber pier hardware above water for advanced corrosion and/or section loss.
- Item DS115: Barrel 1 has an offset at the joint at 41' in from the downstream end. the north section is lower by 1/2" to 1". Gasket is present all around.
 - Recommended Action: Refer to DS115 Rated C-4 for recommended action.
- Item DS1000: The eastern staff gauge timber board has minor to moderate rot. The metal gauge board has moderate corrosion along the edges of the plate.
 - Recommended Action: Monitor the eastern staff gauge board for advanced decay and the metal board for advanced corrosion.

PHOTOGRAPHS

Item No.: US115 Culverts	Rating: C-4	Photo Description: Heavy corrosion on barrel clamps
Deficiency: The clamps on the exterior of the culverts, located 7' from the gate, typically have moderate corrosion overall, with moderate to major corrosion from 11:00 to 1:00 across the crown with some corrosion holes exposing the gasket.		
Probable Cause: The corrosion was due to chemical attack from the water and galvanic corrosion due to contact of dissimilar metals.		
Recommendation: Replace the clamps over each barrel.		



Item No.: DS115 Culverts	Rating: C-4	Photo Description: Heavy corrosion on barrels
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Deficiency: (1) The downstream 20' of each barrel has moderate to major corrosion with corrosion holes. The crown of the barrels has full section loss from corrosion. (2) Both barrels have moderate corrosion throughout the length covering 50-70% of the surface area with pitting up to 1/64" deep. (3) The southern 20' of each barrel, up to the gates, had small corrosion holes across the crown from 10:00 to 02:00.

Probable Cause: The corrosion was due to chemical attack from the water and galvanic corrosion due to contact of dissimilar metals.

Recommendation: Schedule culvert relining or replacement for both barrels.



Item No.: US114 Structural Support	Rating: C-3	Photo Description: Corrosion on hardware underwater
Deficiency: The hardware for the cross bracing for the timber pier has heavy corrosion below water with 50% section loss.		
Probable Cause: The corrosion was due to chemical attack from the water.		
Recommendation: Replace the timber pier hardware below the waterline.		



Item No.: DS1000 Additional Items	Rating: C-3	Photo Description: Missing gauge numbers on SW gauge
Deficiency: The upstream side has two staff gauges. The southwestern staff gauge timber 2x12 board has moderate wood rot just above the waterline, 2' tall x 6" wide x 1" deep. The gauge is missing numbers below 26.5 Ft.		
Probable Cause: The timber decay is normal damage from its age and environment. The loss of numbers is from loss of screws due to corrosion.		
Recommendation: Replace the southwest staff gauge timber and metal boards if they are still used.		



APPENDIX

CHECKLISTS

Structure No. S-252A

UPSTREAM EROSION CONTROL

Finding #	Inspection Item	Rating	Comments	Recommended action	Probable cause
US1	Slope/Banks of Channel	2	The embankment east of the structure has poured concrete placed over rock which has cracked and broken in a 10' x 2' area [13:45].	Monitor the embankment for erosion or sloughing.	The concrete cracked from loss of soil support under the poured section, which is common on the edges of poured concrete over rock.
US2	Rip Rap	1	No deficiencies noted		
US3	Exposed erosion-Control Fabric	1	No deficiencies noted		
US4	Evidence of stone displacement (bedding stone)	1	No deficiencies noted		
US5	Channel Stabilization and erosion control	1	No deficiencies noted		

UPSTREAM GENERAL

Finding #	Inspection Item	Rating	Comments	Recommended action	Probable cause
US50	Structural - General Concrete Condition	NA	Item not present		
US51	Structural - General Metal Condition	4	Refer to US115		
US52	Structural - General Timber Condition	3	Refer to DS1000		
US53	Construction Joints (Bolts, Welds)	NA	Item not present		
US54	Channels for Stoplogs or Flashboards	NA	Item not present		
US55	Settlement	1	No deficiencies noted		
US56	Shoaling/Scour	1	No deficiencies noted		
US57	Fouling/Marine Growth	1	No deficiencies noted		
US58	Debris	NA	Item not present		
US59	Stilling Wells	NA	Item not present		
US60	Underwater Controls/Instruments	1	No deficiencies noted		
US61	Fenders	NA	Item not present		

UPSTREAM STRUCTURE

Finding #	Inspection Item	Rating	Comments	Recommended action	Probable cause
US100	Wingwalls	NA	Item not present		
US101	Buttresses (support arms for wall)	NA	Item not present		
US102	Abutments	NA	Item not present		
US103	Retention Walls	NA	Item not present		
US104	Headwall	NA	Item not present		
US105	Expansion/Construction Joints	NA	Item not present		
US106	Sheetpiles and Bulkheads	NA	Item not present		
US107	Wales/Tiebacks	NA	Item not present		
US108	Intake Bays	NA	Item not present		
US109	Piers	NA	Item not present		
US110	Foundation	NA	Item not present		
US111	Weir/Weir crest	NA	Item not present		
US112	Baffles	NA	Item not present		
US113	Underwater Apron Slabs	NA	Item not present		
US114	Structural Support, Bracing or Frames	3	(1) C-3: The hardware for the cross bracing for the timber pier has heavy corrosion below water with 50% section loss [13:37]. (2) C-2: The hardware (bolts and Ogee washers) above water for the timber pier has minor corrosion [13:11].	Replace the timber pier hardware below the waterline. Monitor the timber pier hardware above water for advanced corrosion and/or section loss.	The corrosion was due to chemical attack from the water.

Structure No. S-252A

US115	Culverts	4	Refer also to DS115. The clamps on the exterior of the culverts, located 7' from the gate, typically have moderate corrosion overall, with moderate to major corrosion from 11:00 to 1:00 across the crown with some corrosion holes exposing the gasket [13:21, 13:30].	Replace the clamps over each barrel.	The corrosion was due to chemical attack from the water and galvanic corrosion due to contact of dissimilar metals.
US116	Risers	NA	Item not present		

UPSTREAM GATES

Finding #	Inspection Item	Rating	Comments	Recommended action	Probable cause
US151	Structure Gate(s)	2	The brackets for both gates for the stem attachment have minor to moderate pitting corrosion up to 1/16" [13:02, 13:44].	Monitor gate stem brackets for advanced corrosion and/or section loss.	The corrosion was due to chemical attack from the water and galvanic corrosion from contact of dissimilar metals.
US152	Gate Guides and Gate Control	1	No deficiencies noted		
US153	Gate Seals & Mating Surface	1	No deficiencies noted		
US154	Cathodic Protection (entire structure)	NA	Item not present		
US155	Operator/Actuator Components	2	See US151		
US156	Emergency Closure Gates	NA	Item not present		
US306	Navigation Lock Miter Gates	NA	Item not present		

Structure Name/No.: S-252A

DOWNSTREAM EROSION CONTROL

Finding #	Inspection Item	Rating	Comments	Recommended action	Probable cause
DS1	Slope/Banks of Channel	1	No deficiencies noted		
DS2	Rip Rap	1	No deficiencies noted		
DS3	Exposed erosion-Control Fabric	1	No deficiencies noted		
DS4	Evidence of stone displacement (bedding stone)	1	No deficiencies noted		
DS5	Channel Stabilization and erosion control	1	No deficiencies noted		

DOWNSTREAM GENERAL

Finding #	Inspection Item	Rating	Comments	Recommended action	Probable cause
DS50	Structural - General Concrete Condition	NA	Item not present		
DS51	Structural - General Metal Condition	4	Refer to DS115		
DS52	Structural - General Timber Condition	NA	Item not present		
DS53	Construction Joints (Bolts, Welds)	NA	Item not present		
DS54	Channels for Stoplogs or Flashboards	NA	Item not present		
DS55	Settlement	1	No deficiencies noted		
DS56	Shoaling/Scour	1	No deficiencies noted		
DS57	Fouling/Marine Growth	1	No deficiencies noted		
DS58	Debris	NA	Item not present		
DS59	Stilling Wells	NA	Item not present		
DS60	Underwater Controls/Instruments	NA	Item not present		
DS61	Fenders	NA	Item not present		

DOWNSTREAM STRUCTURE

Finding #	Inspection Item	Rating	Comments	Recommended action	Probable cause
DS100	Wingwalls	NA	Item not present		
DS101	Buttresses (support arms for wall)	NA	Item not present		
DS102	Abutments	NA	Item not present		
DS103	Retention Walls	NA	Item not present		
DS104	Headwall	NA	Item not present		
DS105	Expansion/Construction Joints	NA	Item not present		
DS106	Sheetpiles and Bulkheads	NA	Item not present		
DS107	Wales/Tiebacks	NA	Item not present		
DS108	Intake Bays	NA	Item not present		
DS109	Piers	NA	Item not present		
DS110	Foundation	NA	Item not present		
DS111	Weir/Weir crest	NA	Item not present		
DS112	Baffles	NA	Item not present		
DS113	Underwater Apron Slabs	NA	Item not present		
DS114	Structural Support, Bracing or Frames	NA	Item not present		

Structure Name/No.: S-252A

DS115	Culverts	4	<p>(1) C-4: The downstream 20' of each barrel has moderate to major corrosion with corrosion holes. The crown of the barrels has full section loss from corrosion [10:56, 11:46]. (2) C-4: Both barrels have moderate corrosion throughout the length covering 50-70% of the surface area with pitting up to 1/64" deep [10:56 to 12:12]. (3) C-4: The southern 20' of each barrel, up to the gates, had small corrosion holes across the crown from 10:00 to 02:00 [11:13, 12:08]. (4) C-2: Barrel 1 has an offset at the joint at 41' in from the downstream end. the north section is lower by 1/2" to 1". Gasket is present all around [11:05]. (5) Note: Both barrels switch from steel to aluminum at 121' in from the downstream end.</p>	Schedule culvert relining or replacement for both barrels.	The corrosion was due to chemical attack from the water.
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DOWNSTREAM GATES

Finding #	Inspection Item	Rating	Comments	Recommended action	Probable cause
DS151	Structure Gate(s)	1	No deficiencies noted		
DS152	Gate Guides and Gate Control	NA	Item not present		
DS153	Gate Seals & Mating Surface	1	No deficiencies noted		
DS154	Cathodic Protection (entire structure)	NA	Item not present		
DS155	Operator/Actuator Components	NA	Item not present		
DS156	Emergency Closure Gates	NA	Item not present		
DS157	Navigation Lock Miter Gates	NA	Item not present		
DS1000	Additional Items and Comments	3	<p>The upstream side has two staff gauges. (1) C-3: The southwestern staff gauge timber 2x12 board has moderate wood rot just above the waterline, 2' tall x 6" wide x 1" deep. The gauge is missing numbers below 26.5 Ft [13:55]. (2) C-2: The eastern staff gauge timber board has minor to moderate rot. The metal gauge board has moderate corrosion along the edges of the plate [13:45].</p>	Replace the southwest staff gauge timber and metal boards if they are still used. Monitor the eastern staff gauge board for advanced decay and the metal board for advanced corrosion.	The timber decay is normal damage from its age and environment. The loss of numbers is from loss of screws due to corrosion. Corrosion on the screws and on the plate edges is due to chemical attack from the water.