

STRUCTURE S-252C
INSPECTION DATE: 4/3/2020



Location:	USJRB South
	Levee L-78
Latitude:	27.6407 N
Longitude:	80.7046 W
Type:	Culvert (No gates)
No. Barrels:	One
Inspection	
Start Date:	4/2/2020
End Date:	4/2/2020

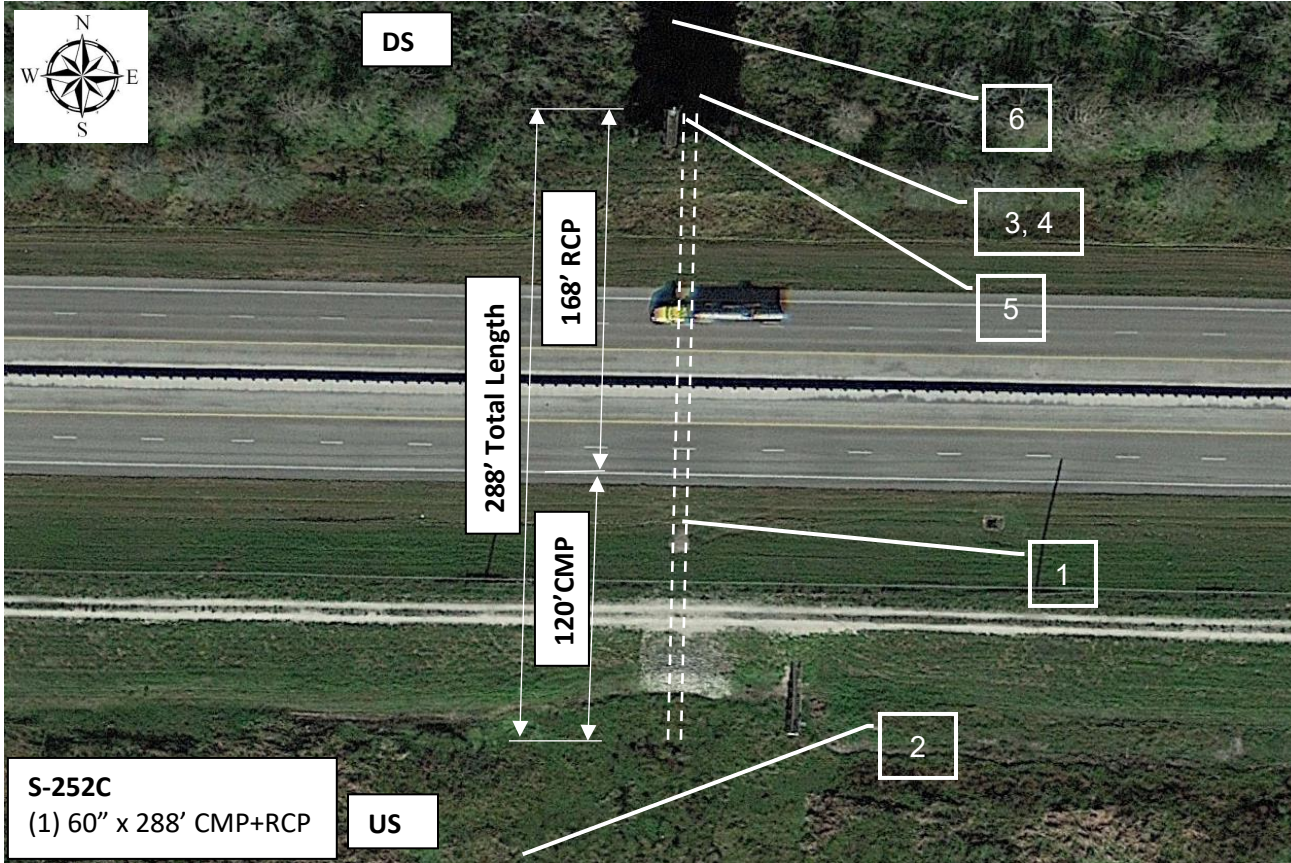
TEAM MEMBERS	
Lead Engineer	Jeffrey O'Connor, P.E.
Dive Supervisor	Jordan Klingler
Diver	Aaron Willard
Diver – Standby	Ben Harpel
Dive Tender	Natasha Daniel
Dive Tender	
Animal Control	TJ McDonagh
SJRWMD Agent	

Respectfully Submitted,
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Aerial View of Structure



No.	Item No.	Inspection Item	Rating	Deficiency
1	US115	Culverts	C-4	Major corrosion from 96' to 106' from south end, and at south end.
2	DS1000	Additional Items	C-3	The upstream staff gauge has missing numbers and hardware.
3	DS2	Riprap	C-2	Widely scattered riprap downstream of culvert.
4	DS3	Exposed Erosion-Control Fabric	C-2	One exposed area, 2 sf, at the end of the concrete overpour.
5	DS104	Headwall	C-2	The headwall has minor scaling up to 1/4" deep over 30% of the area.
6	DS114	Structural Support	C-2	The timber pier hardware below water has minor to moderate corrosion

Structure Description and Method of Underwater Inspection

Structure S-252C is an ungated culvert comprised of one barrel, extending south to north under Levee L-78 and under SR-60. The barrel is CMP for the southern 120' and RCP for the northern 168' (under SR-60), for a total of 288'. The south end has an access pier that was out of the water. The north end has a timber access pier north of the structure.

The underwater inspection was performed by a 5-person dive team on April 3, 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 0 to 1 ft. Each side had a staff gauge. The water level was 25.5 Ft per the 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: (1) The CMP has heavy corrosion from 96' to 106' from the south end. Multiple corrosion holes from 03:00 to 05:00, typically 18" long x 2" wide with 3" maximum penetration to stone. (2) The CMP has one corrosion hole at 1' in from the south end, from the 07:00 to 10:00 position across the invert, 5" wide.
 - Recommended Action: Schedule repair of 10-ft-long corroded section from 96 ft to 106 ft and the southern 1 ft. Consider relining the CMP portion of the barrel.

Items Rated C-3

- Item DS1000: The upstream staff gauge has numbers missing from 26' and below and has hardware missing below the waterline.
 - Recommended Action: Replace the staff gauge numbers. Install hardware below waterline.

Items Rated C-2

- Item DS2: Widely scattered riprap found under soft to medium mud.
 - Recommended Action: Monitor the downstream area for scour. Consider scour countermeasures if channel bottom is scouring.
- Item DS3: Erosion control fabric was exposed for a 2 sf area at the end of the concrete overpour.
 - Recommended Action: Monitor the downstream area for scour. Consider scour countermeasures if channel bottom is scouring.
- Item DS104: The headwall has minor scaling up to 1/4" deep over 30% of the area.
 - Recommended Action: Monitor the headwall for advanced scaling.
- Item DS114: The timber pier hardware below water has minor to moderate corrosion with 15% metal loss.
 - Recommended Action: Monitor the timber hardware for advanced corrosion or section loss.
- Item US115: (1) At 120', there is a joint at the transition from CMP to RCP. The joint gasket has minor damage and is protruding out slightly. (2) C-2 The CMP, outside of the corrosion holes, has moderate corrosion over 100% of entire barrel with pitting of 1/64" deep. (3) The concrete culvert has minor scaling, up to 1/16" with exposed aggregate covering 100% of entire barrel.
 - Recommended Action: Monitor the CMP for advanced corrosion or section loss. Monitor the RCP for advanced scaling.

PHOTOGRAPHS

Item No.: US115 Culverts	Rating: C-4	Photo Description: Heavy corrosion on barrels
Deficiency: The CMP has heavy corrosion from 96' to 106' from the south end. Multiple corrosion holes from 03:00 to 05:00, typically 18" long x 2" wide with 3" maximum penetration to stone [13:02]. (2)C-4: The CMP has one corrosion hole at 1' in from the south end, from the 07:00 to 10:00 position across the invert, 5" wide		
Probable Cause: The corrosion is due to chemical attack from the water.		
Recommendation: Schedule repair of 10-ft-long corroded section from 96 ft to 106 ft and the southern 1 ft. Consider relining the CMP portion of the barrel (120').		



Item No.: DS1000 Additional Items	Rating: C-3	Photo Description: Missing gauge numbers on US staff gauge
Deficiency: The upstream staff gauge has numbers missing from 26' and below and has hardware missing below the waterline.		
Probable Cause: The missing numbers and hardware is due to corrosion from chemical attack from the water.		
Recommendation: Replace the staff gauge numbers. Install hardware below waterline.		



APPENDIX

CHECKLISTS

Structure No. S-252C

UPSTREAM EROSION CONTROL

Finding #	Inspection Item	Rating	Comments	Recommended action	Probable cause
US1	Slope/Banks of Channel	1	No deficiencies noted		
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	See US115		
US52	Structural - General Timber Condition	NA	Item not present		
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	NA	Item not present		
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	NA	Item not present		

Structure No. S-252C

US115	Culverts	4	<p>The culvert barrel has 120 ft of CMP from the downstream end, then transitions to an RCP to the downstream end. The inspection started at the upstream end (no gate). (1) C-4: The CMP has heavy corrosion from 96' to 106' from the south end. Multiple corrosion holes from 03:00 to 05:00, typically 18" long x 2" wide with 3" maximum penetration to stone [13:02]. (2)C-4: The CMP has one corrosion hole at 1' in from the south end, from the 07:00 to 10:00 position across the invert, 5" wide [12:42]. (3) C-2: At 120', there is a joint at the transition from CMP to RCP. The joint gasket has minor damage and is protruding out slightly. (4) C-2 The CMP, outside of the corrosion holes, has moderate corrosion over 100% of entire barrel with pitting of 1/64" deep [12:45]. (5)C-2: The concrete culvert has minor scaling, up to 1/16" with exposed aggregate covering 100% of entire barrel [13:26]. (6) Note: The RCP has 18 typical bell and spigot joints with rubber gasket from 120' in from the south end and extending to the north end. No deficiencies noted.</p>	<p>Schedule repair of 10-ft-long corroded section from 96 ft to 106 ft and the southern 1 ft. Monitor the CMP for advanced corrosion or section loss. Consider relining the CMP portion of the barrel (120'). Monitor the RCP for advanced scaling.</p>	<p>The corrosion was due to chemical attack from the water. The concrete scaling is due to chemical attack from the water and possible long-term abrasion from flowing water.</p>
US116	Risers	NA	Item not present		

UPSTREAM GATES

Finding #	Inspection Item	Rating	Comments	Recommended action	Probable cause
US151	Structure Gate(s)	NA	Item not present		
US152	Gate Guides and Gate Control	NA	Item not present		
US153	Gate Seals & Mating Surface	NA	Item not present		
US154	Cathodic Protection (entire structure)	NA	Item not present		
US155	Operator/Actuator Components	NA	Item not present		
US156	Emergency Closure Gates	NA	Item not present		
US306	Navigation Lock Miter Gates	NA	Item not present		

Structure Name/No.: S-252C

DOWNSTREAM EROSION CONTROL

Finding #	Inspection Item	Rating	Comments	Recommended action	Probable cause
DS1	Slope/Banks of Channel	1	No deficiencies noted		
DS2	Rip Rap	2	Widely scattered riprap found under soft to medium mud [14:20].	Monitor the downstream area for scour. Consider scour countermeasures if channel bottom is scouring.	Riprap may be present, but just difficult to determine with the overlying mud, or it was not placed during construction.
DS3	Exposed erosion-Control Fabric	2	Erosion control fabric was exposed for a 2 sf area at the end of the concrete overpour [14:22].	Monitor the downstream area for scour. Consider scour countermeasures if channel bottom is scouring.	The exposed area is most likely from construction or minor movement of riprap.
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	2	See DS104		
DS51	Structural - General Metal Condition	2	See DS114		
DS52	Structural - General Timber Condition	1	No deficiencies noted		
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	1	No deficiencies noted		
DS59	Stilling Wells	1	No deficiencies noted		
DS60	Underwater Controls/Instruments	1	No deficiencies noted		
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	2	The headwall has minor scaling up to 1/4" deep over 30% of the area [14:08].	Monitor the headwall for advanced scaling.	The concrete scaling is due to chemical attack from the water and possible long-term abrasion from flowing water.
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	2	The timber pier hardware below water has minor to moderate corrosion with 15% metal loss [14:27].	Monitor the timber hardware for advanced corrosion or section loss.	The corrosion is due to chemical attack from the water.

Structure Name/No.: S-252C

DS115	Culverts	1	No deficiencies noted		
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DOWNSTREAM GATES

Finding #	Inspection Item	Rating	Comments	Recommended action	Probable cause
DS151	Structure Gate(s)	NA	Item not present		
DS152	Gate Guides and Gate Control	NA	Item not present		
DS153	Gate Seals & Mating Surface	NA	Item not present		
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	The upstream staff gauge has numbers missing from 26' and below and has hardware missing below the waterline [14:59].	Schedule repair/replacement of staff gauge numbers. Install hardware below waterline.	The missing numbers and hardware is due to corrosion from chemical attack from the water.