

STRUCTURE PS-2RO
INSPECTION DATE: 2/20/2020



Three Discharge Pipes, 78" x 83' Long CAP

Location:	FWMA
	Levee FWMA
Latitude:	27.7574 N
Longitude:	80.6929 W
Type:	Discharge Pipes w/Flap
No. Barrels:	Three
Inspection	
Start Date:	2/20/2020
End Date:	2/20/2020

TEAM MEMBERS	
Lead Engineer	Jeffrey O'Connor, P.E.
Dive Supervisor	Vince Trotta
Diver	Michael LaRocco
Diver – Standby	Ryan Duncan
Dive Tender	Natasha Daniel
Dive Tender	
Animal Control	TJ McDonagh
SJRWMD Agent	

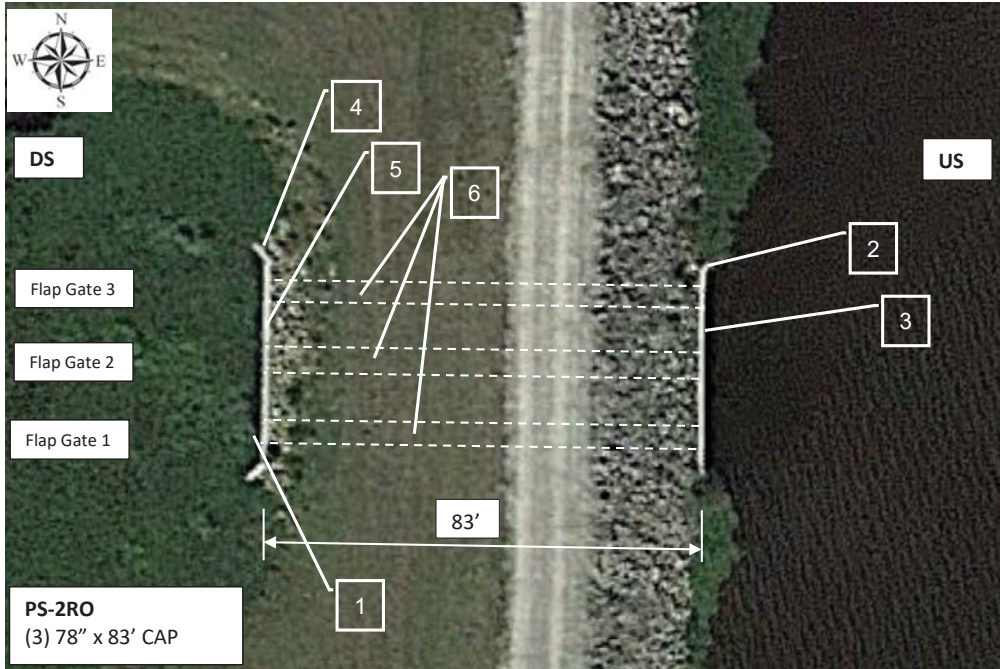
Respectfully Submitted,
UNDERWATER ENGINEERING SERVICES, INC.
3306 Enterprise Road
Fort Pierce, FL 34982
(772) 337-3116 Lic. No. CA3703
Jeffrey O'Connor, P.E. (FL 50914)
Vice President
Project Manager



Digitally signed by
Jeffrey H O'Connor
Date: 2020.06.25
10:58:20 -04'00'

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Aerial View of Structure



No.	Item No.	Inspection Item	Rating	Deficiency
1	PS206	Backflow Gates	C-3	Flap Gate #1 is missing one anchor.
2	US100	Wingwalls	C-2	Wingwalls have minor vertical cracks and a plugged drilled hole with corrosion staining.
3	US104	Headwall	C-2	Headwall has minor vertical cracks and 8 plugged drilled holes with corrosion staining.
4	DS100	Wingwalls	C-2	Wingwalls have 1 minor vertical crack and 1 unplugged drilled hole with no staining.
5	DS104	Headwall	C-2	Endwall has 2 minor vertical cracks and 11 unplugged drilled holes with minimal staining.
6	PS200-202	Discharge Pipes	C-2	Discharge pipes have minor corrosion pitting covering less than 5% of the area.

Structure Description and Method of Underwater Inspection

Structure PS-2RO is a pump station discharge structure comprised of three discharge pipes, extending east (upstream end) to west (flap gated end) under Levee FWMA. The discharge pipes are CAP, 78-inch diameter by 83 feet long.

The underwater inspection was performed by a 5-person dive team on February 20, 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 85 degrees F. and the weather was mostly clear. The underwater visibility ranged from 1 to 3 feet. The water level was unknown – there were no staff gauges present.

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

There were no items rated C-4.

Items Rated C-3

- Item PS206: Flap Gate #1 is missing one anchor under the north hinge.
 - Recommended Action: Install a new chemical anchor for Flap Gate 1. If there is interference with steel rebar, then do not install and monitor the other bolts for loosening.

Items Rated C-2

- Item US100: The south wingwall has one plugged drilled hole with corrosion staining. The north wingwall has two minor edge spalls, 6" x 2" x 1" penetration. The north wingwall has one vertical hairline crack from the top to the riprap, located 10' north of the headwall.
 - Recommended Action: Monitor the wingwalls for advanced staining, spalling or increase crack width.

- Item US104: The headwall has eight plugged drilled holes with corrosion staining. The headwall has four vertical hairline cracks from the top of the wall to the riprap or to the culvert.
 - Recommended Action: Monitor the headwall for advanced staining, spalling or increase crack width.
- Item DS100: The south wingwall has one unplugged drilled hole with no corrosion staining located 2' south of Gate 1. The north wingwall has one vertical hairline crack from the top to the riprap, located 8' north of the endwall.
 - Recommended Action: Monitor the wingwalls for staining, spalling or increase crack width.
- Item DS104: The endwall has five unplugged drilled holes with anchors with minimal corrosion staining up to Gate 2. The endwall has five unplugged drilled holes with anchors with minimal corrosion staining over Gate 3 and one north of Gate 3. The endwall has two vertical hairline cracks from the top of the wall to the riprap or to the top of the gate. The endwall has a higher concentration of bugholes/air pockets, up to 50% coverage, in a 2' x 2' area at 2' north of Flap Gate 2, just above the waterline.
 - Recommended Action: Monitor the headwall for advanced staining, spalling, scaling or increase crack width.
- Item PS200 to PS202: The discharge pipes have minor pitting corrosion with up to 1/64" pitting covering less than 5% of the area.
 - Recommended Action: Monitor the pipes for advanced corrosion pitting.

Item No.: PS206 Backflow Gates	Rating: C-3	Photo Description: Missing one anchor for Flap Gate 1
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Deficiency: Flap Gate #1 is missing one anchor under the north hinge.

Probable Cause: The anchor most likely was not installed during construction - possibly due to rebar interference.

Recommendation: Install a new chemical anchor for Flap Gate 1. If there is interference with steel rebar, then do not install and monitor the other bolts for loosening.



APPENDIX

CHECKLISTS

Structure Name/No.: PS-2RO

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	2	Refer to US100 and US104		
US51	Structural - General Metal Condition	2	Refer to 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	2	The south wingwall has one plugged drilled hole with corrosion staining [13:37]. The north wingwall has two minor edge spalls, 6" x 2" x 1" penetration [13:49]. The north wingwall has one vertical hairline crack from the top to the riprap, located 10' north of the headwall [13:50].	Monitor the wingwalls for advanced staining, spalling or increase crack width.	The plugged hole may have had water intrusion to rebar causing it to corrode. The edge spall was most likely caused during construction. The hairline crack is most likely a shrinkage crack.
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	2	The headwall has eight plugged drilled holes with corrosion staining [13:46]. The headwall has four vertical hairline cracks from the top of the wall to the riprap or to the culvert [13:42].	Monitor the headwall for advanced staining, spalling or increase crack width.	The plugged holes may have had water intrusion to rebar causing it to corrode. The hairline cracks are most likely shrinkage cracks.
US105	Expansion/Construction Joints	1	No deficiencies noted		
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	1	No deficiencies noted		

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US114	Structural Support, Bracing or Frames	NA	Item not present		
US115	Culverts	NA	Item not present		
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		

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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
DSS0	Structural - General Concrete Condition	2	Refer to DS100 and DS104		
DSS1	Structural - General Metal Condition	3	Refer to PS206		
DSS2	Structural - General Timber Condition	NA	Item not present		
DSS3	Construction Joints (Bolts, Welds)	NA	Item not present		
DSS4	Channels for Stoplogs or Flashboards	NA	Item not present		
DSS5	Settlement	1	No deficiencies noted		
DSS6	Shoaling/Scour	1	No deficiencies noted		
DSS7	Fouling/Marine Growth	1	No deficiencies noted		
DSS8	Debris	NA	Item not present		
DSS9	Stilling Wells	NA	Item not present		
DSS0	Underwater Controls/Instruments	NA	Item not present		
DSS1	Fenders	NA	Item not present		

DOWNSTREAM STRUCTURE

Finding #	Inspection Item	Rating	Comments	Recommended action	Probable cause
DS100	Wingwalls	2	The south wingwall has one unplugged drilled hole with no corrosion staining located 2' south of Gate 1 [14:28]. The north wingwall has one vertical hairline crack from the top to the riprap, located 8' north of the endwall [13:50].	Monitor the wingwalls for staining, spalling or increase crack width.	The unplugged hole was unfinished during construction. The hairline crack is most likely a shrinkage crack.
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 endwall has five unplugged drilled holes with anchors with minimal corrosion staining up to Gate 2 [15:01]. The endwall has five unplugged drilled holes with anchors with minimal corrosion staining over Gate 3 and one north of Gate 3 [15:11]. The endwall has two vertical hairline cracks from the top of the wall to the riprap or to the top of the gate [14:57]. The endwall has a higher concentration of bugholes/air pockets, up to 50% coverage, in a 2' x 2' area at 2' north of Flap Gate 2, just above the waterline [15:06].	Monitor the headwall for advanced staining, spalling, scaling or increase crack width.	The unplugged hole was unfinished during construction. The hairline cracks are most likely shrinkage cracks. The air pockets are minor construction defects.
DS105	Expansion/Construction Joints	1	No deficiencies noted.		

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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	1	No deficiencies noted.		
DS114	Structural Support, Bracing or Frames	NA	Item not present		
DS115	Culverts	NA	Item not present		

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	NA	Item not present		

Structure Name/No.: PS-2RO

PUMP STATION

Finding #	Inspection Item	Rating	Comments	Recommended action	Probable cause
PS14	Engine Cooling System (Underwater)	NA	Item not present		
PS100	Screens and Trash Racks	NA	Item not present		
PS102	Intake Bell and Impellor # 1 (18" north)	NA	Item not present		
PS103	Intake Bell and Impellor # 2 (36" middle)	NA	Item not present		
PS104	Intake Bell and Impellor # 3 (36" south)	NA	Item not present		
PS105	Intake Bell and Impellor # 4	NA	Item not present		
PS106	Intake Bell and Impellor #5	NA	Item not present		
PS107	Intake Bell and Impellor #6	NA	Item not present		
PS108	Bypass Gates (e.g. Slide Gates)	NA	Item not present		
PS200	Discharge Pipe #1 (South)	2	Discharge Pipe #1 has minor corrosion with up to 1/64" pitting covering less than 5% of the area [12:25].	Monitor the pipe for advanced corrosion pitting.	The corrosion is due to chemical attack from the water.
PS201	Discharge Pipe #2 (Middle)	2	Discharge Pipe #2 has minor corrosion with up to 1/64" pitting covering less than 5% of the area [12:57].	Monitor the pipe for advanced corrosion pitting.	The corrosion is due to chemical attack from the water.
PS202	Discharge Pipe #3 (North)	2	Discharge Pipe #3 has minor corrosion with up to 1/64" pitting covering less than 5% of the area [13:15].	Monitor the pipe for advanced corrosion pitting.	The corrosion is due to chemical attack from the water.
PS203	Discharge Pipe #4	NA	Item not present		
PS204	Discharge Pipe #5	NA	Item not present		
PS205	Discharge Pipe #6	NA	Item not present		
PS206	Backflow Gates	3	(1) C-3: Flap Gate #1 is missing one anchor under the north hinge [14:50]. (2) C-2: All flap gates have coating loss and minor corrosion with 1/64" pitting covering less than 30% of the area [14:53, 15:01, 15:08].	Install a new chemical anchor for Flap Gate 1. If there is interference with steel rebar, then do not install and monitor the other bolts for loosening. Monitor the flap gates for advanced coating loss and corrosion.	The anchor most likely was not installed during construction - possibly due to rebar interference. The coating loss is due to poor surface preparation or chemical attack from the water. The corrosion is due to chemical attack from the water.
PS207	Bypass Culvert Interior	NA	Item not present		