

## **STRUCTURE 153**

This structure is a reinforced concrete, gated spillway with discharge controlled by two cable operated, vertical lift gates. Operation of the gates is controlled remotely or automatically on-site in accordance with the established operational criteria. The structure is located on the north side of the St. Lucie Canal about 0.67 miles east of U.S. Highway 441.

### **PURPOSE**

This structure maintains upstream water control stages in the Levee 65 Borrow Canal; it passes the design flood (30% of the Standard Project Flood) without exceeding the upstream flood design stage; restricts downstream flood stages and channel velocities to non-damaging levels; and it prevents backflow from high downstream stages.

### **OPERATION**

This structure is operated to maintain an optimum headwater elevation of 18.8, insofar as possible, through automatic controls as follows:

When the headwater elevation rises to 19.1 feet, the gates will open at six inches per minute;

When the headwater elevation rises or falls to elevation 18.8, the gates become stationary;

When the headwater elevation falls to 18.6, the gates will close at six inches per minute.

To meet structural and stability requirements, the maximum allowable hydrostatic head across the structure is 7.5 feet.

In order to protect the structural integrity of the Florida Power and Light Reservoir, located immediately north of the structure, special features prevent inadvertent lowering of the headwater stage. The first such feature is an automatic transfer switch, which energizes the standby generator in case of a commercial power failure. The second such feature is the horizontal separation of the gates into an upper and a lower half. Normally, only the upper half of the gate controls the headwater stage, either remotely or automatically. In the rare event when the upper half of the gate cannot control the headwater stage to the desirable level, the lower half of the gate is latched to the

upper and both halves are opened. The latching can only be done on-site.

### FLOOD DISCHARGE CHARACTERISTICS

	Design*	Standard Project Flood*
Discharge Rate	<u>2100</u> cfs	<u>4400</u> cfs
	<u>30</u> % SPF	<u>100</u> % SPF
Headwater Elevation	<u>19.5</u> feet	<u>23.0</u> feet
Tailwater Elevation	<u>18.5</u> feet	<u>18.8</u> feet
Type Discharge	uncontrolled <u>submerged</u>	uncontrolled <u>submerged</u>

\*For Standard Project Flood, headwater and tailwater elevations and maximum gate opening limit discharge to 2600 cfs.

### DESCRIPTION OF STRUCTURE

Type reinforced concrete, gated spillway

Weir Crest

Net Length 36.0 feet

Elevation 12.2 feet

Service Bridge Elevation 31.8 feet

Water Level which will by-pass structure 25.0 feet

Gates

Number 2

Size 8.8 ft. high by 18.8 ft wide (Both gates)

Top gate 4.0 ft. high; bottom gate 4.8 ft. high

Type vertical lift gate

Top Gates:

Bottom elevation of gates, full open 26.0 feet

Top elevation of gates, full closed 21.0 feet

Bottom Gates:

Bottom elevation of gates, full open 21.2 feet normal;

29.7 feet max.

Top elevation of gates, full closed 17.0 feet

Bottom of breast wall, 21.0 feet

Control On-site, automatic headwater control & remote computer control

Lifting Mechanism

Normal power source commercial electricity

Emergency power source LP engine driven generator

Type Hoist hydraulic cylinder actuated by electric motor driven pump and connected to gate by steel cables.

**ACCESS:** From U.S. Highway 441 along landside of the St. Lucie Canal North Tieback Levee

**HYDRAULIC AND HYDROLOGIC MEASUREMENTS**

Water Remote digital headwater & tailwater recorders

Gate Position Recorder Remote digital recorder on all gates.

Rain Gauge: Remote digital recorder

**DEWATERING FACILITIES**

Storage Okeechobee Field Station, 710 Compound

Type steel needle beam and aluminum needles

Size and Number (per bay)\_\_\_\_\_

Upstream

Beam 24WF130, 19'-10" long

Needles 3 @ 5' and 1 @ 3' wide

Downstream

Same