

STRUCTURE 40

This structure is a reinforced concrete, gated spillway with discharge controlled by two cable operated, vertical lift gates. Operation of the gates is automatically controlled so that the gate operating system opens or closes the gates in accordance with the operational criteria. The structure is located on Canal 15 and 500 feet east of U. S. Highway No. 1.

PURPOSE

This structure maintains optimum upstream water control stages in Canal 15; it passes the design flood (60% of the Standard Project Flood) without exceeding the upstream flood design stage, and restricts downstream flood stages and channel velocities to non-damaging levels; and it prevents saline intrusion.

OPERATING CRITERIA

The C-15 basin is interconnected with the C-16 and C-51 basins. Therefore, coastal control structures in all three basins control the common water level. Control gates are automatically operated.

The normal automatic operation is actuated by the headwater elevation as follows:

When the headwater elevation rises to 8.5 feet, the gates begin to open.

When the headwater elevation rises or falls to 8.2 feet, the gates become stationary.

When the headwater elevation falls to 7.9 feet, the gates begin to close.

During heavy flood periods, a temporary lower automatic operation is utilized, which is also actuated by the headwater stage as follows:

When the headwater elevation rises to 8.0 feet, the gates begin to open.

When the headwater elevation rises or falls to 7.7 feet, the gates become stationary.

When the headwater elevation falls to 7.3 feet, the gates begin to close.

Conditions at this structure are continuously monitored through the Communications and Control System. Moreover, close liaison is maintained with the Lake Worth Drainage District during major storm events, in which case they notify the District Control Center of intended openings of their Structures 11 and 12, which are directly tributary to the western end of C-15. During heavy storm events, the headwater at S-40 is lowered significantly below the normal automatic range either by the Communications and Control System or by on-site manual control as follows:

When the headwater elevation rises to 7.5 feet, the gates begin to open.

When the headwater elevation falls to 7.0 feet, the gates begin to close.

However, in no case shall the discharge exceed the values shown in the following tabulation:

S-40 HEADWATER ELEVATION (feet)	MAXIMUM DISCHARGE (cfs)
5.0	3570
6.0	3933
7.0	4305
8.0	4688

Gate openings are also always limited by the Maximum Gate Openings curve.

FLOOD DISCHARGE CHARACTERISTICS

	Design	Standard Project Flood
Discharge Rate	<u>4800*</u> cfs <u>60</u> % SPF	<u>5500*</u> cfs <u>100</u> % SPF
Headwater Elevation	<u>8.2*</u> feet	<u>9.0*</u> feet
Tailwater Elevation	<u>2.7</u> feet	<u>2.7</u> feet
Type Discharge	<u>uncontrolled</u> <u>free</u>	<u>uncontrolled</u> <u>free</u>

*Discharge values and water surface elevation given in DDM. Required headwater elevations for these discharges are 8.8 and 9.7. Maximum allowable gate opening requirements violated for low tide conditions.

DESCRIPTION OF STRUCTURE

Type reinforced concrete, gated spillway

Weir Crest

Net Length 50.0 feet

Elevation -0.4 feet

Service Bridge Elevation 11.5 feet

Water Level which will by-pass structure 11.5 feet

Gates

Number 2
Size 9.0 ft. high by 25.8 ft. wide
Type vertical lift gate
Bottom elevation of gates, full open 9.9 feet
Top elevation of gates, full closed 8.5 feet
Control Automatic, on-site, headwater actuated and remote computer controlled

Lifting Mechanism

Normal power source Commercial electricity
Emergency power source LP gas engine driven generator
Type Hoist Main gates - hydraulic cylinder activated by electric motor driven pumps with emergency hand pump, connected to gate by steel cables.

Date of Transfer: December 14, 1965

ACCESS: From U.S. Highway #1 via access road on south side on C-15

HYDRAULIC AND HYDROLOGIC MEASUREMENTS

Water Level Remote upstream and downstream digital recorders
Gate Position Recorder Remote digital recorder on both gates
Rain Gauge Remote digital recorder

DEWATERING FACILITIES

Storage West Palm Beach Field Station
Type Steel needle beams and aluminum needles
Size and Number (per bay) Upstream and downstream
Beams 33WF200, with 24" end sections, 26' -11" long.
Needles 5 @ 4', 1 @ 3', 1 @ 2' wide