ANNEX C

DRAFT PROJECT OPERATING MANUAL

DRAFT February 2024

COMPREHENSIVE EVERGLADES RESTORATION PLAN

LAKE OKEECHOBEE COMPONENT A STORAGE RESERVOIR PROJECT

PROJECT OPERATING MANUAL

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

NOTICE TO USERS OF MAUAL

It is recommended that hardcopies of the final Project Operating Manual (POM) be preserved in good condition, so that inserts can be made to keep the POM complete and current. As revisions are incorporated into the Final POM, each page containing a revision, identified by the revision date at the bottom of the page, will be inserted at the appropriate location in the document (except at times when the entire POM is being replaced and superseded by a subsequent edition). It is anticipated that this draft POM will be updated to a preliminary POM and subsequently a final POM.

EMERGENCY REGULATION ASSISTANCE

If unusual conditions arise, emergency regulation assistance can be achieved by contacting the following, in the order listed.

U.S. Army Corps of Engineers, Jacksonville District (SAJ), Water Management Section	**Phone**
Water Management Section Staff	(904) 232-2665 (904) 575-0680
Water Management Section Chief	(904) 232-3034 (904) 402-5887

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

C DRAFT PROJECT OPERATING MANUAL

C.1 Introduction

The main purpose of this draft Project Operating Manual (POM) is for day-to-day use in start-up operations in water management for essentially all foreseeable conditions affecting the integration of the Lake Okeechobee Component A Storage Reservoir Project (LOCAR or Project). The Project will be operated in accordance with the final POM to achieve the goals, purposes, and benefits outlined in the LOCAR Feasibility Study (FS) Report, including the quantity, timing, and distribution of water for the natural system, and other water-related needs identified through the process outlined in Guidance Memorandum (GM) #4, from the CERP Programmatic Regulations, Six Program-Wide Guidance Memoranda (Corps and SFWMD 2007). Report preparation is pursuant to Engineering Regulation (ER) 1110-2-240 and is in accordance with guidance contained in Engineer Manual (EM) 1110-2-3600 (Corps 2017), ER 1110-2-8156 (Corps 2018), and the programmatic regulations in GM #5 (Corps and SFWMD 2007). All elevations referenced in this POM are in ft and reference the North American Vertical Datum of 1988 (NAVD88).

Modifications or revisions to the POM will occur during subsequent Project phases. Development of the POM is an iterative process that will continue throughout the life of the Project. The POM will be updated at specific intervals during the detailed design, construction, operational testing, and monitoring phases of the Project. Refinements to the operating criteria in the POM will be made as more information is obtained on Project detailed design, data, operational experience, and general information gained during these phases. It is also anticipated that once the POM is completed and the long-term operations and maintenance phase is underway, it may be necessary to revise the POM from time to time based on additional scientific information, a new Comprehensive Everglades Restoration Plan (CERP) or non-CERP activities being implemented, and new CERP updates. This draft POM is based upon preliminary designs and modeling assumptions during the planning process and is valid during the FS Report phase. The preliminary and final POMs will provide additional detail as it becomes available.

C.2 General Project Purposes, Goals, Objectives, and Benefits

LOCAR is a component of CERP, which was approved by Congress as a framework for the restoration of the natural system under Section 601 of WRDA 2000, as documented in the Central and South Florida (C&SF) Project Comprehensive Review Study report (Corps 1999). The LOCAR Project is identified as Component A of the Recommended Comprehensive Plan in the C&SF Project Comprehensive Review Study report and is described in section 9.1.1.1 of this report (Corps 1999).

The purpose of the Project is to construct a 200,000-acre-foot (ac-ft) reservoir to store water during wet periods north of Lake Okeechobee for later use during dry periods and offer operational flexibility to draw and store water from the lake and the basin to improve its littoral ecosystems. As shown in **Figure C-1**, the reservoir will be located northwest of Lake Okeechobee, along the north side of C-41A between Lake Istokpoga and Lake Okeechobee. Increased storage capacity provided by the reservoir would reduce the duration and frequency of both high and low water levels in Lake Okeechobee that are stressful to the lake's littoral ecosystems and cause large discharges from the lake that are damaging to the downstream estuary ecosystems.

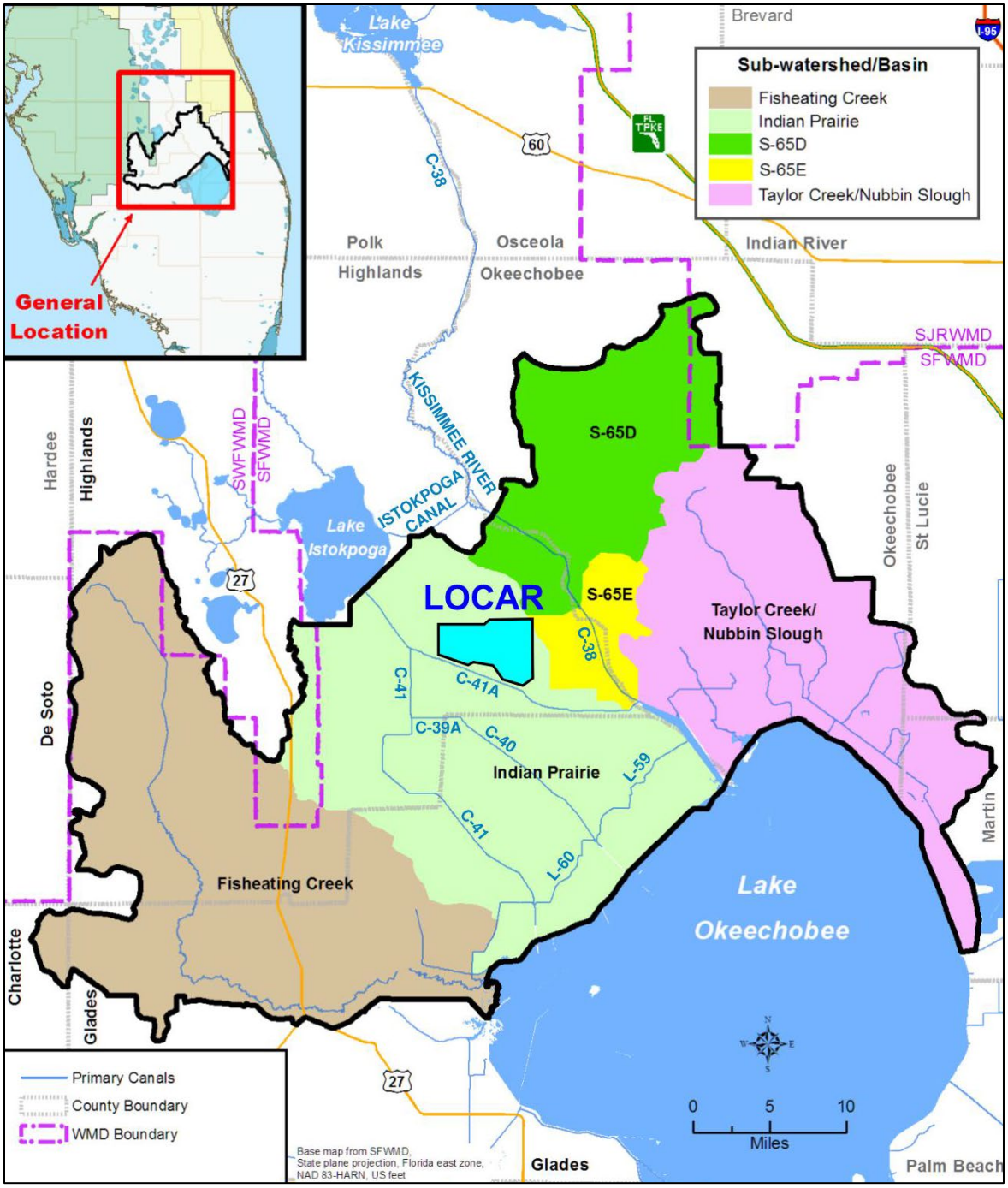

Figure C-1. LOCAR Location Map.

The goals of LOCAR include:

1. Enhance ecological values in Lake Okeechobee and the St. Lucie and Caloosahatchee Estuaries ecosystems.
2. Enhance economic values and social well-being.

3. Maintain the rights of the Seminole Tribe of Florida (STOF) under the Compact among the Seminole Indian Tribe of Florida, the State of Florida, and the SFWMD (Savings Clause [Section 601 (h)(5)(C) of WRDA 2000]).

The objectives of LOCAR include:

1. Improve quantity, timing, and distribution of flows into Lake Okeechobee to maintain ecologically desired lake stage ranges more often.
2. Improve the timing and volumes of freshwater flows from Lake Okeechobee to improve the salinity regime and the quality of habitats for oyster, submerged aquatic vegetation (SAV), and other estuarine communities in the Northern Estuaries.
3. Increase availability of the water supply to existing legal water users of Lake Okeechobee commensurate with improving Lake Okeechobee ecology.

The primary benefits of LOCAR include:

- Ecological benefits to Lake Okeechobee by increasing the amount of time the lake is within the ecologically preferred stage envelope.
- Ecological benefits to Northern Estuaries by reducing the frequency and duration of damaging flows to the Northern Estuaries caused by Lake Okeechobee regulatory releases.
- Water supply benefits to sub-basins that receive water supply flows from Lake Okeechobee as a result of increasing the amount of time the lake is within the ecologically preferred stage envelope, since the ecologically preferred stage envelope is above the water supply cutback trigger levels.

C.3 Project Features

LOCAR consists of multiple water management features that are intended to be integrated with the regional operation of the C&SF Project features, located within the LOCAR Study Area shown in **Figure C-2**, as well as integrated with the local operation of the C&SF Project features labeled in **Figure C-3.**

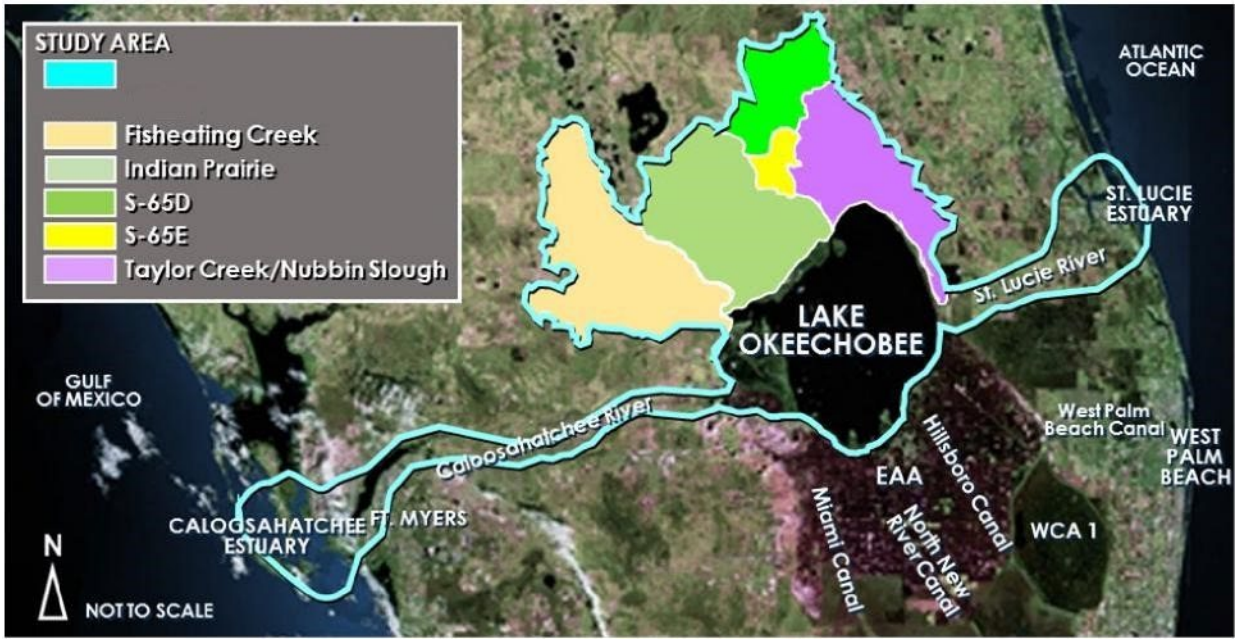

Figure C-2. LOCAR Study Area Map.

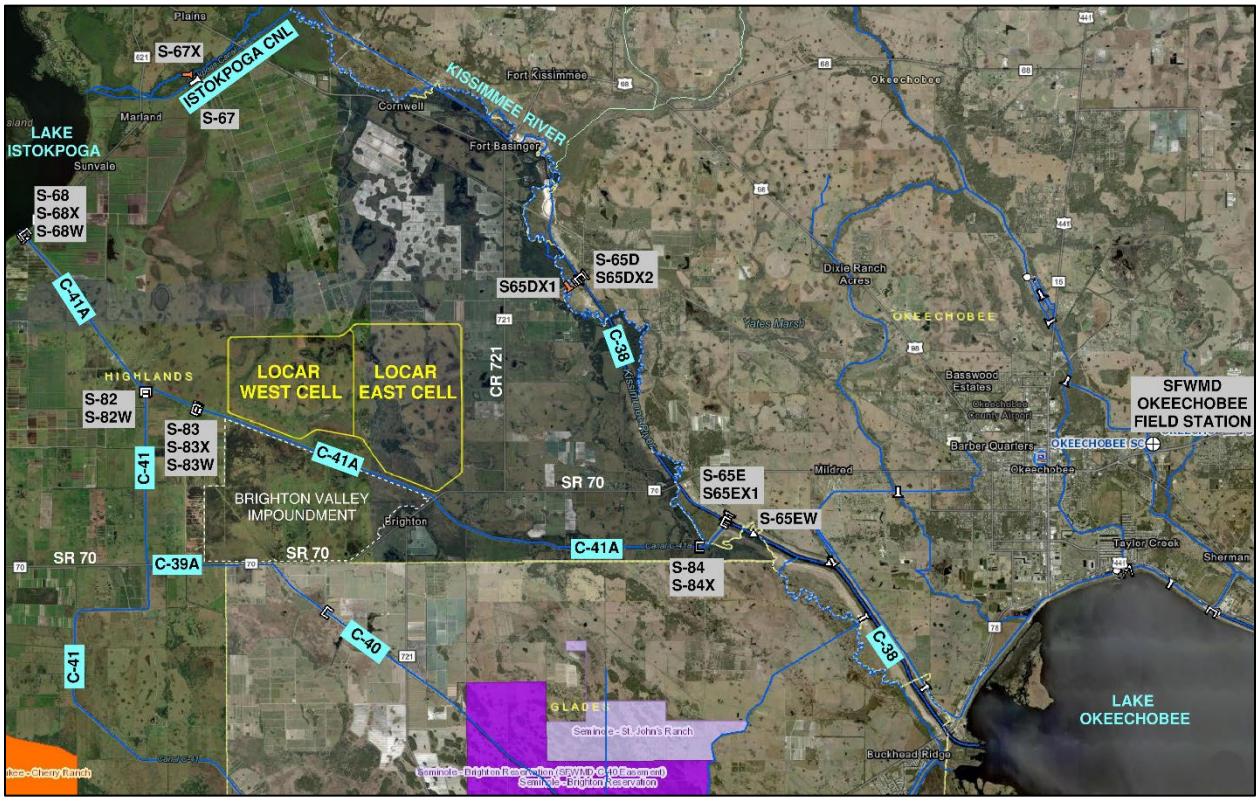

Figure C-3. LOCAR Project Vicinity Map.

C.3.1 Existing Features

A description of the existing C&SF Project features within the vicinity of the LOCAR Project site, shown in **Figure C-3,** which will be operated in conjunction with the LOCAR proposed Project features, are described below, and grouped according to their parent sub-basin.

C.3.1.1 Lake Istokpoga Sub-basin

S-68 & S-68X: Structure 68 (S-68) is a three-bay, reinforced concrete, gated spillway located on Canal 41A (C-41A) at the outlet of Lake Istokpoga in Highlands County. The structure consists of three (3) 10.2 foot (ft) high by 21.8-ft-wide gates with sill elevations of 30.0 ft NAVD88. Discharge from the structure is controlled by electric driven cable drum vertical lift gates. The gates can either be remotely operated from the SFWMD Operation Control Center or controlled onsite. The structure is currently maintained by the Okeechobee Field Station. In 1994, the 37.5-ft sheetpile step weir, S-68W, was constructed about 180 downstream of S-68 with upstream and downstream crest elevations of 16.8 and 13.1 ft NAVD88, respectively.

S-68X was constructed in 2009 to be operated in conjunction with S-68. S-68X is a one-bay, reinforced concrete gated spillway, located on the C-41A Canal adjacent to and approximately 230 ft northeast of S-68. The structure consists of one (1) 12.0-ft-high by 11.0-ft-wide gate with a sill elevation of 27.8 ft NAVD88. Discharge from the structure is controlled by an electric driven cable drum operated vertical lift gate. The gate can either be remotely operated from the SFWMD Operation Control Center or controlled onsite. The structure is currently maintained by the Okeechobee Field Station

S-68, together with S-68X and S-67/S-67X, maintains the optimum upstream water control stage in Lake Istokpoga. S-68 was designed to pass 30 percent of the Standard Project Flood (SPF) without exceeding the upstream flood design stage and restricts downstream flood stages and channel velocities to non-damaging levels. S-68, together with S-68X, passes sufficient discharge during dry periods to maintain downstream stages and water supply demands.

When Lake Istokpoga is in Zone A, S-68, together with S-68X, is operated for flood control in accordance with the Lake Istokpoga Regulation Schedule which ranges between elevations 37.05 to 38.3 ft NAVD88.

When Lake Istokpoga is in Zone B, S-68 and/or S-68X may make releases to maintain downstream flows for water supply, navigation, and environmental purposes. No releases are made when Lake Istokpoga is in Zone C. Structures, S-68X, S-83X, and S-84X, provide additional release capacity from Lake Istokpoga to C-41A. SFWMD has the flexibility to choose which structure (S-68 or S-68X, S-83 or S-83X, and S-84 or S-84X) will be utilized to make discharges based on the operating criteria for each structure.

C.3.1.2 S-65E Sub-basin (Within Kissimmee Basin)

S-65E & S-65EX1: S-65E is a six-bay, reinforced concrete gated spillway, located on Canal 38 (C-38) (Kissimmee River-Pool E) about 7.3 mi downstream of S-65D and about 9.5 mi north (upstream) of Lake Okeechobee, in Okeechobee County. S-S65E is the last key spillway on the Kissimmee River, and discharges from S-84/84X spillways combine with that of S-65E and flow south into Lake Okeechobee. There is also a navigation lock structure with two pairs of sector gates adjacent to and east of the structure. The structure consists of six (6) 13.8-ft-high by 27.8-ft-wide gates with sill elevations of 8.5 ft NAVD88. Discharge from the structure is controlled by six (6) hydraulically driven cable operated vertical

lift gates. The gates can either be remotely operated from the SFWMD Operation Control Center or controlled onsite. The structure is currently maintained by the Okeechobee Field Station.

S-65EX1 is a reinforced concrete, gated spillway located on the C-38 Canal (Kissimmee River) adjacent to and approximately 170 ft west of S-65E. The structure consists of three (3) 14.0-ft-high by 27.0-ft-wide gates with crest elevations of 8.5 NAVD88. Discharge from the structure is controlled by three (3) electric driven cable operated vertical slide gates. The gates can either be remotely operated from the SFWMD Operation Control Center or controlled onsite. Operation of the spillway gates are controlled in accordance with seasonal operational criteria with consideration for the river restoration criteria. The structure is currently maintained by Okeechobee Field Station.

S-65E, together with S-65EX1, maintains the optimum upstream water control stages in C-38 Canal and controls flow to the Kissimmee River. S-65E was designed to pass 30 percent of the SPF without exceeding the upstream flood design stage. S-65EX1 was designed to work in conjunction with S-65E, so that the two structures together can convey 100 percent of the Kissimmee River Restoration (KRR) SPF flow of 37,000 cubic ft per second (cfs), without exceeding desirable operating stages or velocities.

S-65E, together with S-65EX1, in so far as possible, normally operates to maintain a headwater stage ranging from 19.6 to 20.0 ft NAVD88, through automated controls.

C.3.1.3 Indian Prairie Sub-basin

S-82: S-82 is a two-bay, reinforced concrete gated spillway, located on Canal 41 (C-41) about 500 ft downstream of the intersection of C-41 and C-41A Canals and 5 mi downstream from Lake Istokpoga in Highlands County. It consists of two (2) 7.2-ft-high by 23.7-ft-wide gate with sill elevations of 25.5 ft NAVD88. Discharge from the structure is controlled by electric driven cable drum operated vertical lift gates. The gates can either be remotely operated from the SFWMD Operation Control Center or controlled onsite. The structure is currently maintained by the Okeechobee Field Station.

In 2000, the 60-ft wide sheetpile weir, S-82W, was constructed about 150 ft downstream of S-82 with upstream and downstream crest elevations of 23.4 and 12.9 ft NAVD88, respectively.

The structure maintains optimum upstream water stages in the C-41A Canal and restricts discharges from the C-41A Canal into the C-41 Canal during periods when the C-41 Canal capacity is required for local runoff; but it permits up to 2,100 cfs from Lake Istokpoga to be discharged down the C-41 Canal when downstream channel capacity is available. The structure can provide water supply releases of up to 800 cfs during dry periods. S-82 was designed to pass 30 percent of the SPF without exceeding upstream flood design stage and restricts downstream flood stages and discharge velocities to non-damaging levels.

S-82, together with S-83 and S-83X, in so far as possible, normally operates to maintain a headwater stage ranging from 30.6 to 31.4 ft NAVD88, through automated controls.

S-83 & S-83X: S-83 is a single-bay, reinforced concrete gated spillway, located on the C-41A Canal about 500 ft downstream from its junction with the C-41 Canal and 5 mi downstream from Lake Istokpoga in Highlands County. It consists of one (1) 13.6-ft-high by 25.8-ft-wide gate with a sill elevation of 17.2 ft NAVD88. Discharge from the structure is controlled by an electric driven cable drum operated vertical lift gate. The gate can either be remotely operated from the SFWMD Operation Control Center or

controlled onsite. The structure is currently maintained by the Okeechobee Field Station. In 1997, the 40-ft wide sheetpile weir, S-83W, was constructed about 150 ft downstream of S-83 with upstream and downstream crest elevations of 15.5 and 5.1 ft NAVD88, respectively.

S-83X was constructed in 2008 to be operated in conjunction with S-83. S-83X is a one-bay, reinforced concrete gated spillway, located on the C-41A Canal adjacent to and approximately 240 ft south of S-83. The structure consists of one (1) 10.0-ft-high by 11.0-ft-wide gate with a sill elevation of 20.8 ft NAVD88. Discharge from the structure is controlled by an electric driven cable drum operated vertical lift gate. The gate can either be remotely operated from the SFWMD Operation Control Center or controlled onsite. The structure is currently maintained by the Okeechobee Field Station.

S-83, in conjunction with S-83X, discharge the original design flood flow of the C-41A Canal with no discharge into the C-41 Canal. S-83 was designed to pass 30 percent of the SPF without exceeding upstream flood design stage and restricts downstream flood stages and discharge velocities to non-damaging levels. S-83X, in conjunction with S-83, allows for higher releases from Lake Istokpoga discharges (via S-68 & S-68X) when the lake is in Zone A. In addition, S-83X with S-84X provide additional discharge capacity of local runoff into the C-41A Canal. During dry periods, S-83 and S-83X permit downstream water supply releases into the C-41A Canal of up to 300 cfs.

S-83, together with S-83X and S-82, in so far is possible, normally operates to maintain a headwater stage ranging from 30.6 to 31.0 ft NAVD88, through automated controls. During dry conditions, the operating range may be raised by 0.2 ft to maintain a range of 30.8 to 31.2 ft NAVD88. During very wet conditions, the operating range may be lowered by 0.2 ft to maintain a range of 30.4 to 30.8 ft NAVD88.

S-84 & S-84X: S-84 is a two-bay, reinforced concrete gated spillway, located on the C-41A Canal about 12 mi downstream of S-83 and about a mile upstream from the junction of the C-41A Canal with C-38, the Kissimmee River, in Okeechobee County. It consists of two (2) 11.8-ft-high by 21.0-ft-wide gates with sill elevations of 12.0 ft NAVD88. Discharge from the structure is controlled by electric driven cable drum operated vertical lift gates. The gates can either be remotely operated from the SFWMD Operation Control Center or controlled onsite. The structure is currently maintained by the Okeechobee Field Station.

Spillway S-84X was constructed in 2008 to be operated in conjunction with S-84. S-84X is a one-bay, reinforced concrete gated spillway, located on the C-41A Canal adjacent to and approximately 70 ft north of S-84. The structure consists of one (1) 10.0-ft-high by 11.0-ft-wide gate with a sill elevation of 12.36 ft NAVD88. Discharge from the structure is controlled by an electric driven cable drum operated vertical lift gate. A major gate overhaul was performed in 2017. The gate can either be remotely operated from the SFWMD Operation Control Center or controlled onsite. The structure is currently maintained by the Okeechobee Field Station.

During Kissimmee River floods, water that would otherwise have exited Lake Istokpoga via the Istokpoga Canal can be rerouted downstream to C-41A Canal by using S-68, S-68X, S-83, S-83X, S-84, and/or S-84X.

Discharges from S-84 and 84X spillways combine with that of S-65E/S-65EX1 and flow south into Lake Okeechobee.

S-84, in conjunction with S-84X, maintains optimum upstream stages in the C-41A Canal. S-84 was designed to pass 30 percent of the SPF without exceeding upstream flood design stage and restricts downstream flood stages and channel velocities to non-damaging levels. When Kissimmee River floodplain water levels restrict S-67 and S-67X discharges to the Kissimmee River, S-84X, S-83X, and S-68X provide additional flow capacity (beyond the flow capacity of S-68, S-83, and S-84) to transfer Lake Istokpoga discharges to the C-41A Canal. In addition, S-83X with S-84X provide additional discharge capacity for local runoff accumulating in the C-41A Canal. S-84 and S-84X prevent backflow from Lake Okeechobee through the Kissimmee River during excessive lake stages, caused by floods or wind tides.

S-84, together with S-84X, in so far as possible, normally operates to maintain a headwater stage ranging from 23.1 to 24.0 ft NAVD88, through automated controls.

C.3.1.4 Lake Okeechobee Sub-basin

S-65EW: In early 2008, a bathymetry survey revealed a 20 ft deep scour and erosion hole downstream of S-65E. As a result, the 202 ft steel sheet pile weir, S-65EW, with bulkheads consisting of tall sheet pile sections arranged in connecting circular shapes from each bank of the C-38 Canal, was constructed about 0.83 mi downstream of S-65E. The weir increases the tailwater levels during large releases and provides buffer for energy dissipation of the flow jet downstream of S-65E. The crest elevation of this weir varies from -0.71 to -0.46 ft NAVD88.

C.3.2 Proposed Features

LOCAR's major proposed features are shown in yellow and orange in **Figure C-4** and summarized in the subsections below. These features will be operated in conjunction with the existing C&SF Project features for the purpose of filling and emptying the storage reservoir. A comprehensive summary table and map of the proposed LOCAR project features are provided in **Table C-1** and **Figure C-6**.

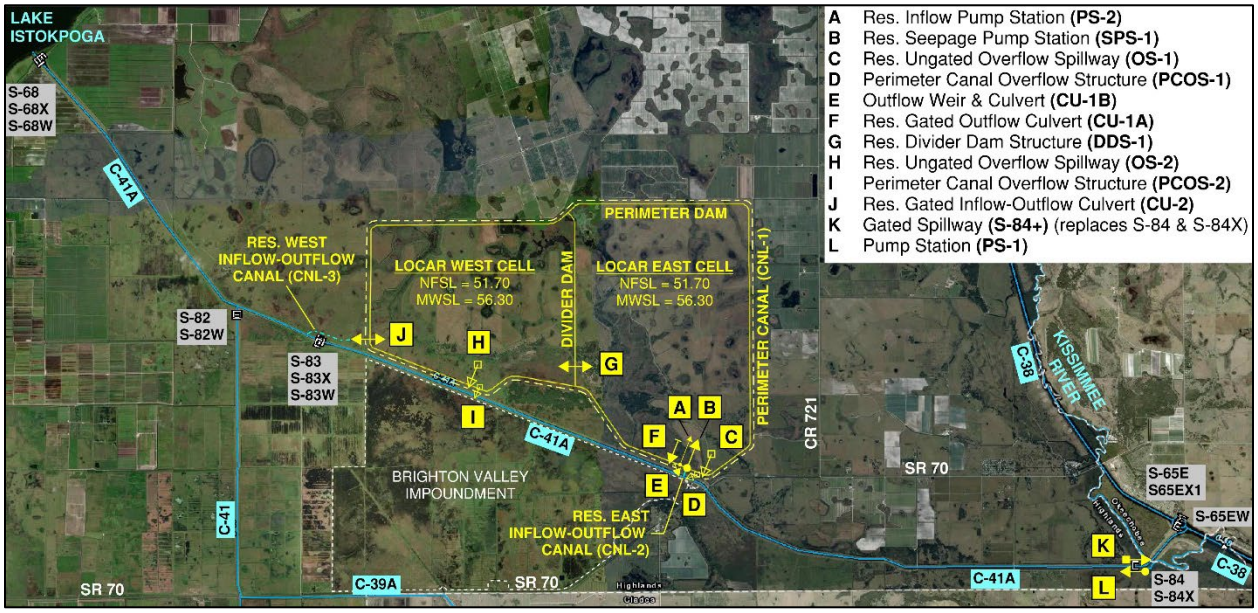

Figure C-4. LOCAR Major Project Features Map.

The location of the two reservoir gated outflow culverts, CU-1A and CU-2, allows for water to be released from the reservoir into the C-41A upstream and/or downstream of S-83/S-83X, to convey water to the Indian Prairie Sub-basin, via C-41A, C-41, C-39A, C-40 and/or C-38, as well as to Lake Okeechobee. CU-1A and CU-2 are each designed to provide a maximum outflow rate of 1,500 cfs.

During times when water is to be conveyed into the reservoir for storage, depending on the current and forecasted water management needs within the Study Area, the reservoir will be filled up to a level not to exceed its NFSL of 51.7 ft NAVD88, through one or a combination of the following methods:

LOCAR FILLING METHOD 1:

Method 1 includes the full or partial diversion of flow in C-41A, downstream of S-83/S-83X, into the reservoir at a maximum rate of 1,500 cfs by operating pump station PS-2. During reservoir filling operations, S-68, S-68X, S-82, S-83, S-83X and S84+ will be operated as needed to maintain the stage within each reach of C-41A within its normal operating range. For full diversion of C-41A flow, downstream of S-83/S-83X, into the reservoir, the S-84+ spillway gates will remain closed during reservoir filling operations. For partial diversion of C-41A flow, downstream of S-83/S-83X, into the reservoir, one or more of the S-84+ spillway gates will remain open during reservoir filling operations.

LOCAR FILLING METHOD 2:

Method 2 includes the full or partial diversion of flow in C-41A, upstream of S-83/S-83X, into the reservoir by gravity at a maximum rate of 1,500 cfs, through opening gated culvert CU-2. During reservoir filling operations, S-68, S-68X, S-82, S-83, S-83X and S84+ will be operated as needed to maintain the stage within each reach of C-41A within its normal operating range. For full diversion of C-41A flow, upstream of S-83/S-83X, into the reservoir, the S-82, S-83 and S-83X spillway gates will remain closed during reservoir filling operations. For partial diversion of C-41A flow, upstream of S-83/S-83X, into the reservoir, one or more of the S-82, S-83 and/or S-83X spillway gates will remain open during reservoir filling operations.

Unlike the other two methods, this method only allows for partial filling of the reservoir up to an elevation below the headwater stage at S-83/S-83X, which normally ranges from 30.6 to 31.0 ft NAVD88. **Figure C-5** shows the variation of the ground surface elevation across the reservoir. Water conveyed to the reservoir through this method would be stored mostly within the southern portions of each storage cell where the ground surface is the lowest. Stage-storage calculations for the Recommended Plan indicate that there is about 6,600 ac-ft of above-ground storage capacity in the reservoir at elevation 31.0 ft NAVD88 (3,800 ac-ft in East Cell and 2,800 ac-ft in West Cell), which is about 3 percent of the reservoir's total storage capacity of 200,000 ac-ft at its NFSL of 57.1 ft NAVD88.

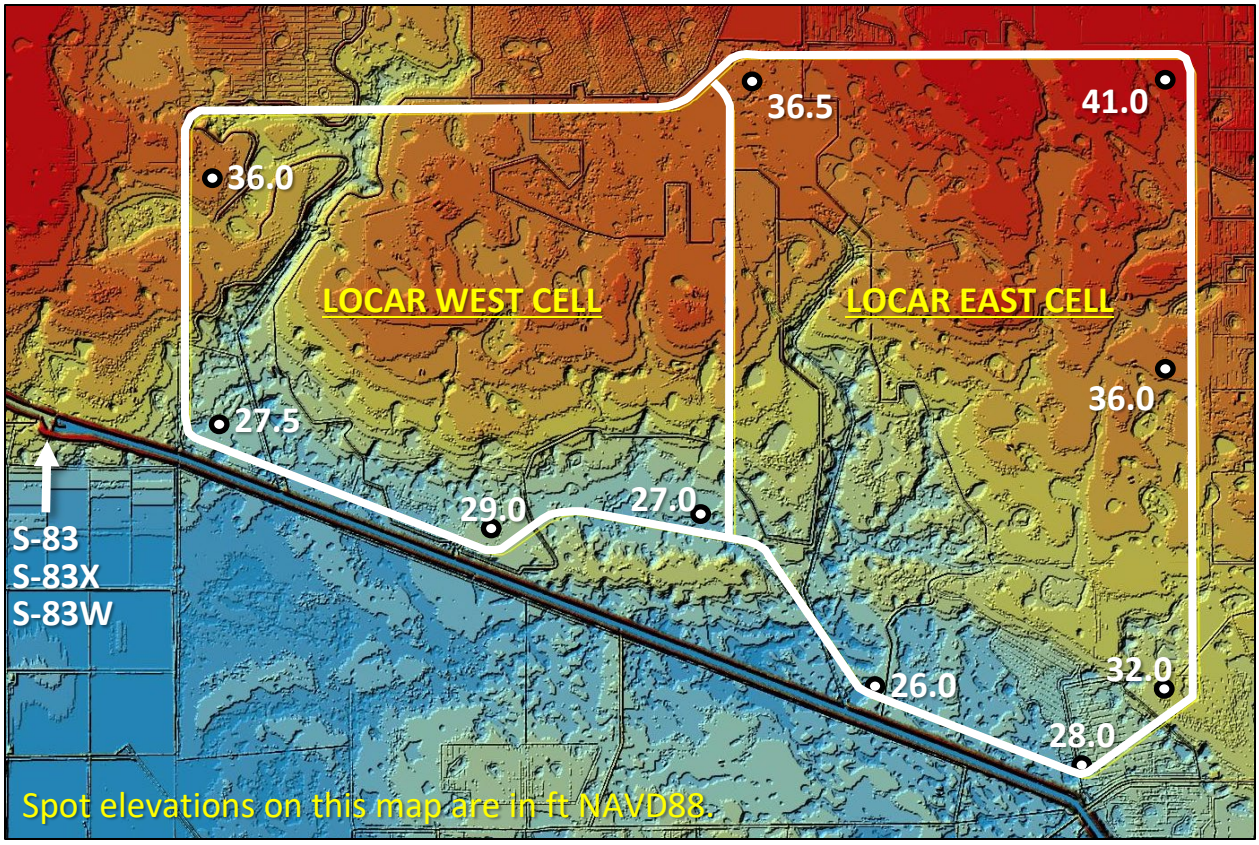

Figure C-5. Existing Ground Surface Topography at the LOCAR Site.

LOCAR FILLING METHOD 3:

Method 3 includes the back-pumping of water from Lake Okeechobee through C-38 and C-41A into the reservoir at a maximum rate of 1,500 cfs, by operating pump stations PS-1 and PS-2 concurrently. The first pump station, PS-1, to be located at the existing S-84 site, will move water in C-41A from the downstream (tailwater) side of the existing S-84 site into C-41A on the upstream (headwater) side of the existing S-84 site. The second pump station, PS-2, to be located between the reservoir's East Cell and C-41A, will pump water from C-41A via the reservoir east inflow-outflow canal (CNL-2), directly into the reservoir's East Cell. During reservoir filling operations the S-84+ spillway gates will remain closed; and S-68, S-68X, S-82, S-83 and S-83X will be operated as needed to maintain the stage within each reach of C-41A within its normal operating range.

Each reservoir storage cell includes one ungated overflow spillway, designed to convey excess water in the storage cell (water within the storage cell above the NFSL) to the reservoir perimeter canal (CNL-1), to then be discharged through the perimeter canal overflow structures into C-41A. Ungated overflow spillway OS-1, to be located along the south perimeter dam of the East Cell, is designed to provide a maximum outflow rate of 750 cfs. Ungated overflow spillway OS-2, to be located along the south perimeter dam of the West Cell, is designed to provide a maximum outflow rate of 750 cfs.

C.3.2.1 Proposed Features of the Storage Reservoir

LOCAR includes the construction of a 200,000-acre-foot (ac-ft), aboveground storage reservoir along the north side of C-41A with an inflow pump station (PS-2), gated gravity outflow structures (CU-1A and CU-2) and ungated overflow structures (OS-1 and OS-2). As stated in **Section C.3.2**, CU-2 can also function as a gated gravity inflow structure for the reservoir. The reservoir site, which includes the reservoir and its external features, including its perimeter canal, perimeter maintenance road, east inflow-outflow canal, and west inflow-outflow canal, would encompass an area of approximately 12,554 ac (19.62 square miles [mi^2]) outside of the C-41A right-of-way, of which the reservoir would occupy an area (within the centerline of its perimeter dam) of approximately 11,320 ac (17.69 mi^2). The reservoir's East and West storage cells will have an area (within the centerline of their perimeter and divider dams) of approximately 6,541 ac (10.22 mi^2) and 4,779 ac (7.47 mi^2), respectively. At its normal full storage level (NFSL) of 51.70 ft NAVD88, the reservoir would have an average storage depth of approximately 18 ft within each of its two storage cells since the average ground surface elevation within the storage cells is about 33.9 ft NAVD88. The reservoir's major features, which are shown in **Figure C-4**, include:

- Perimeter dam and interior divider dam that form its east and west storage cells.
- Perimeter canal, CNL-1, to collect and convey stormwater and reservoir seepage flows.
- Reservoir east inflow-outflow canal, CNL-2, to convey flows between the reservoir and C-41A, downstream of S-83.
- Reservoir west inflow-outflow canal, CNL-3, to convey flows between the reservoir and C-41A, upstream of S-83.
- Gated water control structure within the divider dam, DDS-1, for stage equalization between cells when the DDS-1 gates are kept open during normal operations, or for isolation of one cell from another when the DDS-1 gates are closed. The ability to isolate one cell from another, allows for one cell to be dewatered, such as for maintenance/inspection operations, without requiring that the other cell be dewatered. However, when the DDS-1 gates are closed, and a storage cell is taken out of service, the reservoir's filling and emptying operations will be limited to the operational capability of the storage cell and its structures that remain in service, until the DDS-1 gates are opened allowing for the reservoir to resume normal operations.
- Reservoir inflow pump station, PS-2, with a maximum design pumping capacity of 1,500 cfs, for pumping water from C-41A, via CNL-2, into the reservoir. PS-2 will include four electric motor driven 375 cfs pumps.
- Reservoir seepage return pump station, SPS-1, with a maximum design pumping capacity of 100 cfs, for pumping reservoir seepage water collected in the perimeter canal (CNL-1) back to the reservoir's storage cells. SPS-1 will include two electric motor driven 50 cfs pumps, and one electric motor driven auxiliary 50 cfs pump.
- East cell gated outflow culvert, CU-1A, with downstream perimeter canal outflow weir and culvert, CU-1B, for controlled releases at a maximum rate of 1,500 cfs to C-41A, downstream of S-83, via CNL-2.
- West cell gated inflow-outflow culvert, CU-2, for controlled releases at a maximum rate of 1,500 cfs to C-41A, upstream of S-83, via CNL-3. When the S-83 headwater stage is higher than the

reservoir west storage cell stage, CU-2 may be operated to allow for water from C-41A, upstream of S-83, to be conveyed into the reservoir west storage cell, via CNL-3.

- East cell ungated overflow spillway, OS-1, to convey stormwater overflows out of the reservoir and ultimately into C-41A, via discharge to CNL-1, followed by discharge through PCOS-1 into CNL-2. OS-1 is designed to provide a maximum outflow rate of 750 cfs.
- West cell ungated overflow spillway, OS-2, to convey stormwater overflows out of the reservoir and ultimately into C-41A, via discharge to CNL-1, followed by discharge through PCOS-2. OS-2 is designed to provide a maximum outflow rate of 750 cfs.

C.3.2.2 Proposed Features at S-84 Site

The proposed features at the S-84 site, which are shown in **Figure C-4**, include:

- Pump station (PS-1), with a maximum design pumping capacity of 1,500 cfs, for pumping water in C-41A from the downstream (tailwater) side of the existing S-84 site into the C-41A on the upstream (headwater) side of the existing S-84 site. PS-1 will include four electric motor driven 375 cfs pumps.
- Gated spillway (S-84+), with a maximum design flow capacity of 9,000 cfs, that will replace S-84 and S-84X, to maintain optimum upstream stages in the C-41A Canal, while designed to pass 100 percent of the SPF calculated peak discharge rate to C-41A (9,000 cfs) without exceeding upstream flood design stages and restricting downstream flood stages and channel velocities to non-damaging levels.

C.3.3 Removed Features

LOCAR includes removal of gated spillways S-84 and S-84X, to be replaced by gated spillway S-84+.

Table C-1. Summary of LOCAR Project Features.

Feature ID	Feature Description and Purpose	Design Capacity	Location	Electrical Service Required?	Notes
AGI-1	AGI to replace existing AGI R12	Storage capacity to be coordinated with and approved by landowner in accordance with the modification to SFWMD Permit No. 28-00146-S required for the construction and operation of AGI-1	N side of West Cell	No	During the preconstruction engineering and design (PED) phase, the design of AGI-1 will be coordinated with and approved by the landowner of the property where AGI-1 will be located.
AGI-OS-1	AGI Outfall Structure to attenuate stormwater discharge from AGI-1 to CNL-1 Reach 1B	Flow capacity to be coordinated with and approved by landowner in accordance with the modification to SFWMD Permit No. 28-00146-S required for the construction and operation of AGI-OS-1	SW side of AGI-1	No	AGI-OS-1 will be a fixed weir outfall control structure with a bleeder, similar to the outfall control structure for existing AGI R12. Invert elevation of the bleeder will be the control elevation of AGI-1, which will not be lower than the estimated seasonal high-water table (SHWT) elevation of the existing wetland within the AGI-1 site, nor will it be lower than the highest seasonal control elevation for CNL-1 Reach 1B. During the PED phase, the design of AGI-OS-1 will be coordinated with and approved by the landowner of the property where AGI-OS-1 will be located.
AGI-PS-1	AGI Inflow Pump Station	Pumping Capacity to be coordinated with and approved by landowner in accordance with the modification to SFWMD Permit No. 28-00146-S required for the construction and operation of AGI-PS-1	SE side of AGI-1	No	AGI-PS-1 will be the inflow pump station for AGI-1. AGI-PS-1 will replace existing AGI R12 west inflow pump station, since the Project includes the removal of AGI R12, its two inflow pump stations, and outfall structure. AGI-PS-1 will have one or more diesel engine driven pumps. During the PED phase, the design of AGI-PS-1, including the total pumping capacity and mix of pumps, will be coordinated with and approved by the landowner of the property where AGI-PS-1 will be located. Reuse of any components of existing AGI R12 pump stations for the construction of AGI-PS-1 will be evaluated with the landowner during the PED phase.
AGI-PS-2	AGI Inflow Pump Station	Pumping Capacity to be coordinated with and approved by landowner in accordance with the modification to SFWMD Permit No. 28-00146-S required for the construction and operation of AGI-PS-2	SE side of Existing AGI R11	No	AGI-PS-2 will be the inflow pump station for existing AGI R11. AGI-PS-2 will replace existing AGI R12 east inflow pump station, since the Project includes the removal of AGI R12, its two inflow pump stations, and outfall structure. AGI-PS-2 will have one or more diesel engine driven pumps. During the PED phase, the design of AGI-PS-2, including the total pumping capacity and mix of pumps, will be coordinated with and approved by the landowner of the property where AGI-PS-2 will be located. Reuse of any components of existing AGI R12 pump stations for the construction of AGI-PS-2 will be evaluated with the landowner during the PED phase.
BR-1	Bridge over the Reservoir East Inflow-Outflow Canal (CNL-2)	See notes	SE side of East Cell	No	Bridge configuration must maintain a minimum of 2 ft of vertical clearance between the bridge low member elevation and the design high water level of the reservoir east inflow-outflow canal (CNL-2). Bridge will have single travel lane; and be designed for LRFD HL-93 loading or SFWMD 44-ton, 55-ton, 60-ton, and newer truck crane loading with simultaneous 640 plf AASHTO distributed lane load, whichever loading is greater.
CNL-1	Reservoir Perimeter Canal to collect and convey stormwater and reservoir seepage flows	Design Storm Peak Flowrate + Seepage Peak Flowrate to CNL-1, as well as flow capacity needed to meet CERP GM #3 FPLOS Savings Clause requirement	Reservoir perimeter	No	The perimeter canal weirs (PCW-1 through PCW-10) divide CNL-1 into ten reaches. The perimeter canal weirs allow for the stage within each reach of CNL-1 to be maintained at its wet and dry season control elevations.
CNL-2	Reservoir East Inflow-Outflow Canal for conveyance from C-41A to PS-2 intake; and conveyance of outflows from CU-1B and PCOS-1 to C-41A	1,500 cfs	SE side of East Cell	No	
CNL-3	Reservoir West Inflow-Outflow Canal for reservoir water supply releases to C-41A, upstream of S-83, and inflow to the reservoir West Cell	1,500 cfs	SW side of West Cell	No	Releases from reservoir West Cell will outflow from CU-2 to CNL-3, which in turn will outflow to C-41A via CU-3. Water conveyance from C-41A, upstream of S-83, to reservoir West Cell, will flow from C-41A to CNL-3 via CU-3, which in turn will flow through CU-2 to the reservoir West Cell.
CU-1A	Reservoir Outflow Gated Culvert for reservoir water supply releases to C-41A, downstream of S-83	1,500 cfs	SE side of East Cell	Yes	Outflow from CU-1A to CNL-1 Reach 7 will be conveyed by CU-1B to CNL-2, which in turn will outflow to C-41A.

Feature ID	Feature Description and Purpose	Design Capacity	Location	Electrical Service Required?	Notes
CU-1B	Reservoir Outflow Weir and Culvert for reservoir water supply releases to C-41A, downstream of S-83	1,500 cfs	SE side of East Cell	Yes	Outflow from CU-1A to CNL-1 Reach 7 will be conveyed by CU-1B to CNL-2, which in turn will outflow to C-41A.
CU-2	Reservoir Inflow-Outflow Gated Culvert for reservoir water supply releases to C-41A, upstream of S-83, and inflow to the reservoir West Cell	1,500 cfs	SW side of West Cell	Yes	Releases from reservoir West Cell, will outflow from CU-2 to CNL-3, which in turn will outflow to C-41A via CU-3. Water conveyance from C-41A, upstream of S-83, to reservoir West Cell, will flow from C-41A to CNL-3 via CU-3, which in turn will flow through CU-2 to the reservoir West Cell.
CU-3	Reservoir Inflow-Outflow Ungated Culvert for reservoir water supply releases to C-41A, upstream of S-83, and inflow to the reservoir West Cell	1,500 cfs	C-41A, US of S-83	No	Releases from reservoir West Cell, will outflow from CU-2 to CNL-3, which in turn will outflow to C-41A via CU-3. Water conveyance from C-41A, upstream of S-83, to reservoir West Cell, will flow from C-41A to CNL-3 via CU-3, which in turn will flow through CU-2 to the reservoir West Cell.
DDS-1	Reservoir Divider Dam Gated Control Structure	1,500 cfs	S side of Divider Dam	Yes	DDS-1 gates will normally remain open to allow for the stage in the East Cell and West Cell to equalize. DDS-1 gates will be closed to allow for dewatering of the East Cell or West Cell for maintenance operations.
LOCAR	Lake Okeechobee Component A Reservoir	200,000 ac-ft	N side of C-41A	Yes	Summary of LOCAR features provided in this table. Layout of LOCAR features shown in **Figure A.1-4**.
ODCD-1	Offsite Drainage Collection Ditch No. 1 for collecting runoff from Offsite Drainage Area No. 7A and conveying it to C-41A via ODCD-OS-1 and the outflow structures along CNL-1 Reach 7	Design Storm Peak Flowrate (includes 750 cfs from OS-1 & 750 cfs from OS-2) + Seepage Peak Flowrate to CNL-1 Reach 7 and ODCD-1, as well as flow capacity needed to meet CERP GM #3 FPLOS Savings Clause requirement	S side of Reservoir	No	ODCD-1 extends from the west end of PCCU-2 to the east end of PCCU-4.
ODCD-2	Offsite Drainage Collection Ditch No. 2 for collecting runoff from Offsite Drainage Area No. 7B and conveying it to CNL-1 Reach 7 via OOS-7	Design Storm Peak Flowrate	SW side of West Cell	No	During the PED phase, the design of ODCD-2 will be coordinated with and approved by the landowner of the property where ODCD-2 will be located.
ODCD-3	Offsite Drainage Collection Ditch No. 3 for collecting runoff from Offsite Drainage Area No. 8 and conveying it to CNL-1 Reach 1B via OOS-8	Design Storm Peak Flowrate	NW side of West Cell	No	During the PED phase, the design of ODCD-3 will be coordinated with and approved by the landowner of the property where ODCD-2 will be located.
ODCD-OS-1	Offsite Drainage Collection Ditch No. 1 Outfall Structure that discharges to PC15N	Design Storm Peak Flowrate (includes 750 cfs from OS-1 & 750 cfs from OS-2) + Seepage Peak Flowrate to CNL-1 Reach 7 and ODCD-1, as well as flow capacity needed to meet CERP GM #3 FPLOS Savings Clause requirement	S side of East Cell	No	ODCD-OS-1 will be a fixed weir overflow structure for ODCD-1 and CNL-1 Reach 7 that will outflow to existing FBR structure PC15N via a ditch, which in turn will outflow to C-41A.
OOS-1	Offsite Outfall Structure for Offsite Drainage Area No. 1 (adjacent wetland) that will discharge to CNL-1 Reach 2B.	Design Storm Peak Flowrate	N side of East Cell	No	OOS-1 will be a fixed weir outfall control structure with a bleeder. Invert elevation of bleeder will not be lower than the estimated SHWT elevation of the existing wetland that will drain to OOS-1, nor will it be lower than the highest seasonal control elevation for CNL-1 Reach 2B. During the PED phase, the design of OOS-1 will be coordinated with and approved by the landowner of the property where OOS-1 will be located.
OOS-2	Offsite Outfall Structure for Offsite Drainage Area No. 2 (adjacent wetland) that discharges to CNL-1 Reach 2B.	Design Storm Peak Flowrate	N side of East Cell	No	OOS-2 will be a fixed weir outfall control structure with a bleeder. Invert elevation of bleeder will not be lower than the estimated SHWT elevation of the existing wetland that will drain to OOS-2, nor will it be lower than the highest seasonal control elevation for CNL-1 Reach 2B. During the PED phase, the design of OOS-2 will be coordinated with and approved by the landowner of the property where OOS-2 will be located.
OOS-3	Offsite Outfall Structure for Offsite Drainage Area No. 3 (adjacent wetland) that discharges to CNL-1 Reach 2B.	Design Storm Peak Flowrate	N side of East Cell	No	OOS-3 will be a fixed weir outfall control structure with a bleeder. Invert elevation of bleeder will not be lower than the estimated SHWT elevation of the existing wetland that will drain to OOS-3, nor will it be lower than the highest seasonal control elevation for CNL-1 Reach 2B. During the PED phase, the design of OOS-3 will be

Feature ID	Feature Description and Purpose	Design Capacity	Location	Electrical Service Required?	Notes
					coordinated with and approved by the landowner of the property where OOS-3 will be located.
OOS-4	Offsite Outfall Structure for Offsite Drainage Area No. 4 (adjacent wetland) that discharges to CNL-1 Reach 4.	Design Storm Peak Flowrate	E side of East Cell	No	OOS-4 will be a fixed weir outfall control structure with a bleeder. Invert elevation of bleeder will not be lower than the estimated SHWT elevation of the existing wetland that will drain to OOS-4, nor will it be lower than the highest seasonal control elevation for CNL-1 Reach 4. During the PED phase, the design of OOS-4 will be coordinated with and approved by the landowner of the property where OOS-4 will be located.
OOS-5	Offsite Outfall Structure for Offsite Drainage Area No. 5 (adjacent agricultural land) that discharges to CNL-1 Reach 6.	Design Storm Peak Flowrate	E side of East Cell	No	OOS-5 will be a fixed weir outfall control structure with a bleeder. Invert elevation of bleeder will not be lower than the surface water control elevation of the existing agricultural land that will drain to OOS-5, nor will it be lower than the highest seasonal control elevation for CNL-1 Reach 6. During the PED phase, the design of OOS-5 will be coordinated with and approved by the landowner of the property where OOS-5 will be located.
OOS-6	Offsite Outfall Structure for Offsite Drainage Area No. 6 (adjacent agricultural land) that discharges to CNL-1 Reach 6.	Design Storm Peak Flowrate	E side of East Cell	No	OOS-6 will be a fixed weir outfall control structure with a bleeder. Invert elevation of bleeder will not be lower than the surface water control elevation of the existing agricultural land that will drain to OOS-6, nor will it be lower than the highest seasonal control elevation for CNL-1 Reach 6. During the PED phase, the design of OOS-6 will be coordinated with and approved by the landowner of the property where OOS-6 will be located.
OOS-7	Offsite Outfall Structure for Offsite Drainage Area No. 7B (adjacent agricultural land) that discharges to CNL-1 Reach 7.	Design Storm Peak Flowrate	W side of West Cell	No	OOS-7 will be a fixed weir outfall control structure with a bleeder. Invert elevation of bleeder will not be lower than the surface water control elevation of the existing agricultural land that will drain to OOS-7, nor will it be lower than the highest seasonal control elevation for CNL-1 Reach 7. During the PED phase, the design of OOS-7 will be coordinated with and approved by the landowner of the property where OOS-7 will be located.
OOS-8	Offsite Outfall Structure for Offsite Drainage Area No. 8 (adjacent agricultural land) that discharges to CNL-1 Reach 1B.	Design Storm Peak Flowrate	NW side of West Cell	No	OOS-8 will be a fixed weir outfall control structure with a bleeder. Invert elevation of bleeder will not be lower than the surface water control elevation of the existing agricultural land that will drain to OOS-8, nor will it be lower than the highest seasonal control elevation for CNL-1 Reach 1B. During the PED phase, the design of OOS-8 will be coordinated with and approved by the landowner of the property where OOS-8 is will located.
OS-1	Reservoir Ungated Overflow Spillway for East Cell	750 cfs	S side of East Cell	No	Outflow from OS-1 to CNL-1 Reach 7 will be conveyed to C-41A mostly by PCOS-1, which will outflow to CNL-2, which in turn will outflow to C-41A.
OS-2	Reservoir Ungated Overflow Spillway for West Cell	750 cfs	S side of West Cell	No	Outflow from OS-2 to CNL-1 Reach 7 will be conveyed to C-41A mostly by PCOS-2, which will outflow to C-41A.
PCCU-1	Reservoir Perimeter Canal Ungated Culvert Crossing	Design Storm Peak Flowrate + Seepage Peak Flowrate to PCCU-1, as well as flow capacity needed to meet CERP GM #3 FPLOS Savings Clause requirement	N side of Divider Dam	No	PCCU-1 supports the unpaved roadway crossing of CNL-1 Reach 2, to be located near the Divider Dam crest road north access ramp.
PCCU-2	Reservoir Perimeter Canal Ungated Culvert that connects to ODCD-1	Design Storm Peak Flowrate (includes 750 cfs from OS-1 & 750 cfs from OS-2) + Seepage Peak Flowrate to CNL-1 Reach 7 and ODCD-1, as well as flow capacity needed to meet CERP GM #3 FPLOS Savings Clause requirement	S side of East Cell	No	PCCU-2 will be located under the reservoir perimeter maintenance road and will connect CNL-1 Reach 7 to the east end of the ODCD-1.
PCCU-3	Reservoir Perimeter Canal Ungated Culvert Crossing	Design Storm Peak Flowrate (includes 750 cfs from OS-1 & 750 cfs from OS-2) + Seepage Peak Flowrate to CNL-1 Reach 7 and ODCD-1, as	S side of Divider Dam	No	PCCU-3 supports the unpaved roadway crossing of CNL-1 Reach 7, to be located near the Divider Dam crest road south access ramp.

Feature ID	Feature Description and Purpose	Design Capacity	Location	Electrical Service Required?	Notes
		well as flow capacity needed to meet CERP GM #3 FPLOS Savings Clause requirement			
PCCU-4	Reservoir Perimeter Canal Ungated Culvert that connects to ODCD-1	Design Storm Peak Flowrate (includes 750 cfs from OS-1 & 750 cfs from OS-2) + Seepage Peak Flowrate to CNL-1 Reach 7 and ODCD-1, as well as flow capacity needed to meet CERP GM #3 FPLOS Savings Clause requirement	S side of West Cell	No	PCCU-4 will be located under the reservoir perimeter maintenance road and will connect CNL-1 Reach 7 to the west end of the ODCD-1.
PCW-1	Reservoir Perimeter Canal Weir No. 1 to control stage in CNL-1 Reach 1A	Design Storm Peak Flowrate + Seepage Peak Flowrate to Perimeter Canal Weir Structure, as well as flow capacity needed to meet CERP GM #3 FPLOS Savings Clause requirement	W side of West Cell	No	Manually adjustable weir located at downstream end of CNL-1 Reach 1A. Allowable range for adjustment of weir crest to be determined during PED phase, with consideration given to reservoir perimeter dam stability and seasonal fluctuation of groundwater and surface water levels within adjacent/nearby offsite properties.
PCW-2	Reservoir Perimeter Canal Weir No. 2 to control stage in CNL-1 Reach 1B	Design Storm Peak Flowrate + Seepage Peak Flowrate to Perimeter Canal Weir Structure, as well as flow capacity needed to meet CERP GM #3 FPLOS Savings Clause requirement	W side of West Cell	No	Manually adjustable weir located at downstream end of CNL-1 Reach 1B. Allowable range for adjustment of weir crest to be determined during PED phase, with consideration given to reservoir perimeter dam stability and seasonal fluctuation of groundwater and surface water levels within adjacent/nearby offsite properties.
PCW-3	Reservoir Perimeter Canal Weir No. 3 to control stage in CNL-1 Reach 2A	Design Storm Peak Flowrate + Seepage Peak Flowrate to Perimeter Canal Weir Structure, as well as flow capacity needed to meet CERP GM #3 FPLOS Savings Clause requirement	N side of West Cell	No	Manually adjustable weir located at downstream end of CNL-1 Reach 2A. Allowable range for adjustment of weir crest to be determined during PED phase, with consideration given to reservoir perimeter dam stability and seasonal fluctuation of groundwater and surface water levels within adjacent/nearby offsite properties.
PCW-4	Reservoir Perimeter Canal Weir No. 4 to control stage in CNL-1 Reach 2B	Design Storm Peak Flowrate + Seepage Peak Flowrate to Perimeter Canal Weir Structure, as well as flow capacity needed to meet CERP GM #3 FPLOS Savings Clause requirement	N side of East Cell	No	Manually adjustable weir located at downstream end of CNL-1 Reach 2B. Allowable range for adjustment of weir crest to be determined during PED phase, with consideration given to reservoir perimeter dam stability and seasonal fluctuation of groundwater and surface water levels within adjacent/nearby offsite properties.
PCW-5	Reservoir Perimeter Canal Weir No. 5 to prevent CNL-1 Reach 3A from discharging to CNL-1 Reach 2B under design flow conditions	Design Storm Peak Flowrate + Seepage Peak Flowrate to Perimeter Canal Weir Structure, as well as flow capacity needed to meet CERP GM #3 FPLOS Savings Clause requirement	N side of East Cell	No	Manually adjustable weir located at upstream end of CNL-1 Reach 3A. Allowable range for adjustment of weir crest to be determined during PED phase, with consideration given to reservoir perimeter dam stability and seasonal fluctuation of groundwater and surface water levels within adjacent/nearby offsite properties. PCW-5 weir crest to be set sufficiently higher than PCW-6 weir crest to ensure that PCW-6 is the outfall weir for Reach 3A under design flow conditions (i.e., design storm peak flow and seepage peak flow to Reach 3A).
PCW-6	Reservoir Perimeter Canal Weir No. 6 to control stage in CNL-1 Reach 3A	Design Storm Peak Flowrate + Seepage Peak Flowrate to Perimeter Canal Weir Structure, as well as flow capacity needed to meet CERP GM	NE side of East Cell	No	Manually adjustable weir located at downstream end of CNL-1 Reach 3A. Allowable range for adjustment of weir crest to be determined during PED phase, with consideration given to reservoir perimeter dam stability and seasonal fluctuation of groundwater and surface water levels within adjacent/nearby offsite properties.

Feature ID	Feature Description and Purpose	Design Capacity	Location	Electrical Service Required?	Notes
		#3 FPLOS Savings Clause requirement			
PCW-7	Reservoir Perimeter Canal Weir No. 7 to control stage in CNL-1 Reach 3B	Design Storm Peak Flowrate + Seepage Peak Flowrate to Perimeter Canal Weir Structure, as well as flow capacity needed to meet CERP GM #3 FPLOS Savings Clause requirement	E side of East Cell	No	Manually adjustable weir located at downstream end of CNL-1 Reach 3B. Allowable range for adjustment of weir crest to be determined during PED phase, with consideration given to reservoir perimeter dam stability and seasonal fluctuation of groundwater and surface water levels within adjacent/nearby offsite properties.
PCW-8	Reservoir Perimeter Canal Weir No. 8 to control stage in CNL-1 Reach 4	Design Storm Peak Flowrate + Seepage Peak Flowrate to Perimeter Canal Weir Structure, as well as flow capacity needed to meet CERP GM #3 FPLOS Savings Clause requirement	E side of East Cell	No	Manually adjustable weir located at downstream end of CNL-1 Reach 4. Allowable range for adjustment of weir crest to be determined during PED phase, with consideration given to reservoir perimeter dam stability and seasonal fluctuation of groundwater and surface water levels within adjacent/nearby offsite properties.
PCW-9	Reservoir Perimeter Canal Weir No. 9 to control stage in CNL-1 Reach 5	Design Storm Peak Flowrate + Seepage Peak Flowrate to Perimeter Canal Weir Structure, as well as flow capacity needed to meet CERP GM #3 FPLOS Savings Clause requirement	E side of East Cell	No	Manually adjustable weir located at downstream end of CNL-1 Reach 5. Allowable range for adjustment of weir crest to be determined during PED phase, with consideration given to reservoir perimeter dam stability and seasonal fluctuation of groundwater and surface water levels within adjacent/nearby offsite properties.
PCW-10	Reservoir Perimeter Canal Weir No. 10 to control stage in CNL-1 Reach 6	Design Storm Peak Flowrate + Seepage Peak Flowrate to Perimeter Canal Weir Structure, as well as flow capacity needed to meet CERP GM #3 FPLOS Savings Clause requirement	SE side of East Cell	No	Manually adjustable weir located at downstream end of CNL-1 Reach 6. Allowable range for adjustment of weir crest to be determined during PED phase, with consideration given to reservoir perimeter dam stability and seasonal fluctuation of groundwater and surface water levels within adjacent/nearby offsite properties.
PCOS-1	Reservoir Perimeter Canal Overflow Structure	Design Storm Peak Flowrate (includes 750 cfs from OS-1 & 750 cfs from OS-2) + Seepage Peak Flowrate to CNL-1 Reach 7 and ODCD-1, as well as flow capacity needed to meet CERP GM #3 FPLOS Savings Clause requirement	SE side of East Cell	No	PCOS-1 will be a fixed weir overflow structure for CNL-1 Reach 7 that will outflow to CNL-2, which in turn will outflow to C-41A.
PCOS-2	Reservoir Perimeter Canal Overflow Structure	Design Storm Peak Flowrate (includes 750 cfs from OS-1 & 750 cfs from OS-2) + Seepage Peak Flowrate to CNL-1 Reach 7 and ODCD-1, as well as flow capacity needed to meet CERP GM #3 FPLOS Savings Clause requirement	SE side of West Cell	No	PCOS-2 will be a fixed weir overflow structure for CNL-1 Reach 7 that will outflow directly to C-41A. PCOS-2 will replace existing flashboard riser (FBR) structure PC17N.
PCOS-3	Reservoir Perimeter Canal Overflow Structure	Design Storm Peak Flowrate (includes 750 cfs from OS-1 & 750 cfs from OS-2) + Seepage Peak Flowrate to CNL-1 Reach 7 and ODCD-1, as	SW side of West Cell	No	PCOS-3 will be a fixed weir overflow structure for CNL-1 Reach 7 that will outflow to existing FBR structure PC18N via a ditch, which in turn will outflow to C-41A.

Feature ID	Feature Description and Purpose	Design Capacity	Location	Electrical Service Required?	Notes
		well as flow capacity needed to meet CERP GM #3 FPLOS Savings Clause requirement			
PCOS-4	Reservoir Perimeter Canal Overflow Structure	Design Storm Peak Flowrate (includes 750 cfs from OS-1 & 750 cfs from OS-2) + Seepage Peak Flowrate to CNL-1 Reach 7 and ODCD-1, as well as flow capacity needed to meet CERP GM #3 FPLOS Savings Clause requirement	SW side of West Cell	No	PCOS-4 will be a fixed weir overflow structure for CNL-1 Reach 7 that will outflow to existing FBR structure PC20N via a ditch, which in turn will outflow to C-41A.
PS-1	Pump Station to be located at Existing S-84 Site	1,500 cfs	S-84 site within C-41A	Yes	PS-1 will include 4 electric motor driven pumping units, each with a design flow capacity of 375 cfs.
PS-2	Reservoir Inflow Pump Station	1,500 cfs	S side of East Cell	Yes	PS-2 will include 4 electric motor driven pumping units, each with a design flow capacity of 375 cfs.
S-84+	Spillway to replace existing S-84 and S-84X Spillway	9,000 cfs	S-84 site within C-41A	Yes	To accommodate the peak design outflow rate from LOCAR during Probable Maximum Precipitation (PMP) Scenarios 1 and 2, and improve operational flexibility of C-41A, S-84+ will have three 22’ wide x 14’ tall roller gates, that will provide a total design discharge capacity of 9,000 cfs.
SPS-1	Reservoir Seepage Pump Station for returning seepage outflow from the reservoir intercepted by CNL-1, and controlling the stage in CNL-1 Reach 7	100 cfs	S side of East Cell	Yes	SPS-1 will include 2 electric motor-driven pumping units, each with a design flow capacity of 50 cfs. SPS-1 will include an auxiliary, electric motor-driven pumping unit with a design flow capacity of 50 cfs. SPS-1 will include a back-up generator to provide electrical power to operate the seepage pumps, in the event of an electrical service outage.

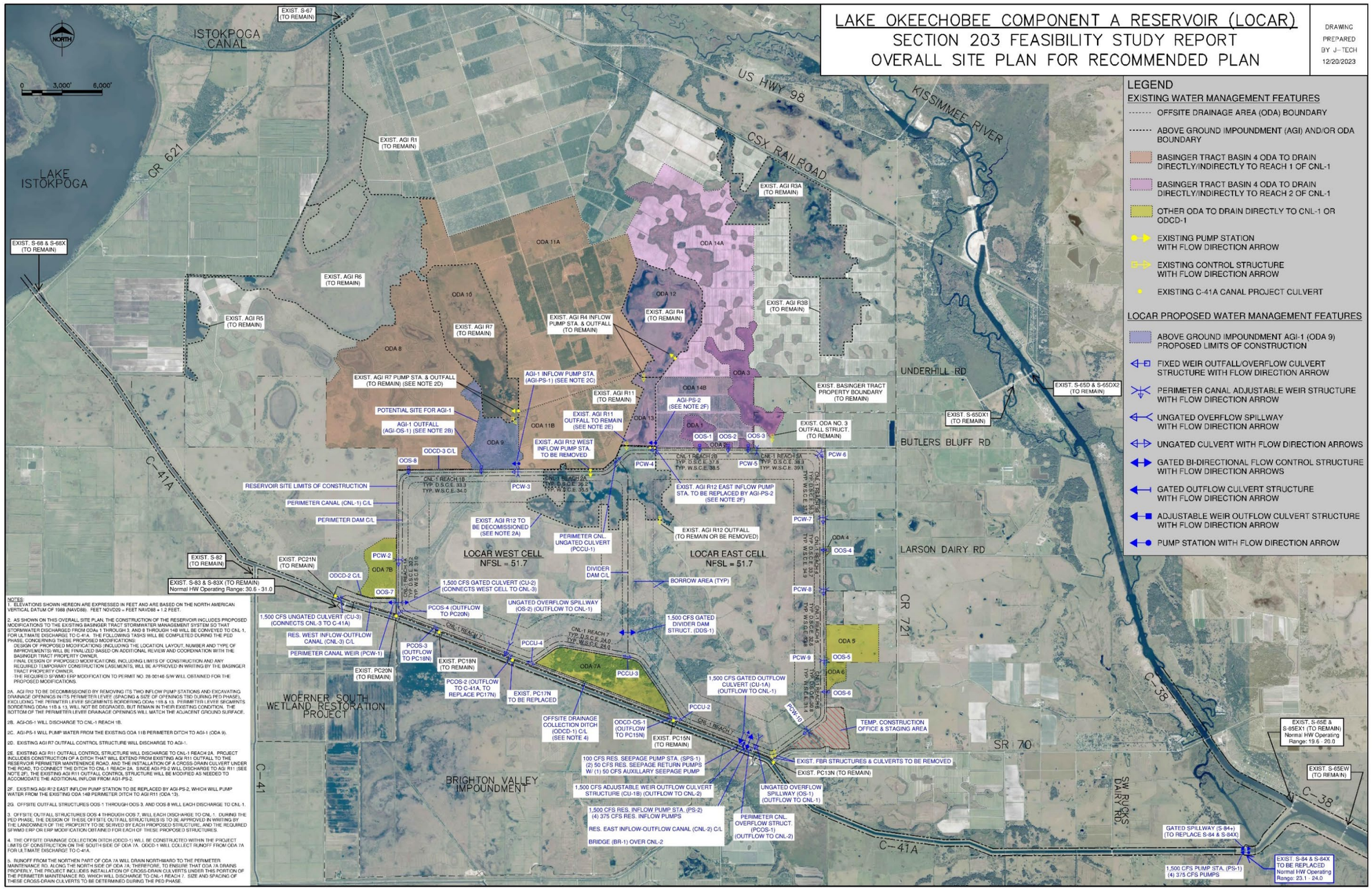

Figure C-6. Map of LOCAR Project Features.

C.4 Project Relationships

Several projects may affect or be affected by LOCAR. This plan has been developed based on the operations of existing related projects or related planned projects with approved operating plans, including both CERP and non-CERP activities. A summary of each related project and its relationship to LOCAR is provided below.

C.4.1 2008 Lake Okeechobee Regulation Schedule (2008 LORS)

The 2008 LORS is the current authorized regulation schedule used in the management of Lake Okeechobee water levels developed during HHD rehabilitation. Independent of LOCAR implementation, there is an expectation that revisions to the 2008 LORS or its replacement will be needed following the implementation of other CERP projects and Herbert Hoover Dike (HHD) infrastructure remediation. The Corps developed the Lake Okeechobee System Operating Manual (LOSOM) and is currently seeking authorization. LOSOM would replace the 2008 LORS as the authorized regulation scheduled for the management of Lake Okeechobee water levels. Changes to the Lake Okeechobee Regulation Schedule will be updated as additional water management and CERP projects are implemented to realize the full benefits of additional storge, treatment, and water distribution infrastructure being incorporated into the C&SF system.

C.4.2 C&SF Project System Operating Manual Features in the Kissimmee River – Lake Istokpoga Basin

The Kissimmee River and its water control structures are regulated by the System Operating Manual for Kissimmee River-Lake Istokpoga Basin (1994) and the updated Water Control Plan for S-67, S-67X, S-68X, S-83X, S-84, S-84X, S-65C, S-65D, S-65DX1, S-65DX2, and S-65EX1 (2016). An update of the above documents could impact LOCAR operations.

C.4.3 Indian River Lagoon-South

The Indian River Lagoon-South Restoration Project, which is now under construction, is intended to capture local runoff from the C-44 Basin, reducing average annual total nutrient loads and improving salinity in the St. Lucie Estuary and the southern portion of the Indian River Lagoon by providing new water storage and 3,600 acres of new wetlands. The Indian River Lagoon-South project employs a regional approach to address the Martin County and St. Lucie County portions of the lagoon. This project helps to balance the overall environmental needs as defined by LOCAR planning for the St. Lucie Estuary.

C.4.4 C-43 West Basin Storage Feature

The Caloosahatchee River (C-43) West Basin Storage Feature project, which is currently under construction, is intended to improve the timing, quantity, and quality of freshwater flows to the Caloosahatchee River and Estuary. The C-43 West Basin Storage Feature would help ensure a more natural, consistent flow of fresh water to the estuary. To restore and maintain the estuary during the dry season, the project would capture and store basin stormwater runoff along with a portion of water released from Lake Okeechobee. Managers would then slowly release water into the Caloosahatchee River, as needed. These features help to better balance the overall environmental needs as defined by LOCAR planning for the Caloosahatchee Estuary.

C.4.5 CERP Lake Okeechobee Watershed Restoration Project

The CERP Lake Okeechobee Watershed Restoration (LOWRP) project is currently in the planning phase. The LOWRP *Third Revised Draft Integrated Project Implementation Report and Supplemental Environmental Impact Statement Report* (Corps and SFWMD June 2022) includes the revised recommended plan project features listed below and shown in **Figure C-7**:

- 55 watershed aquifer storage and recovery (ASR) wells with a maximum storage volume of approximately 308,000 acre-ft per year (The ASR maximum storage capacity is a theoretical volume based on all ASR wells continuously recharging year-round.)
- Paradise Run (approximately 4,700 acres) and Kissimmee River–Center (approximately 1,200 acres) wetland restoration sites
- Recreational facilities at multiple sites in the wetland restoration sites

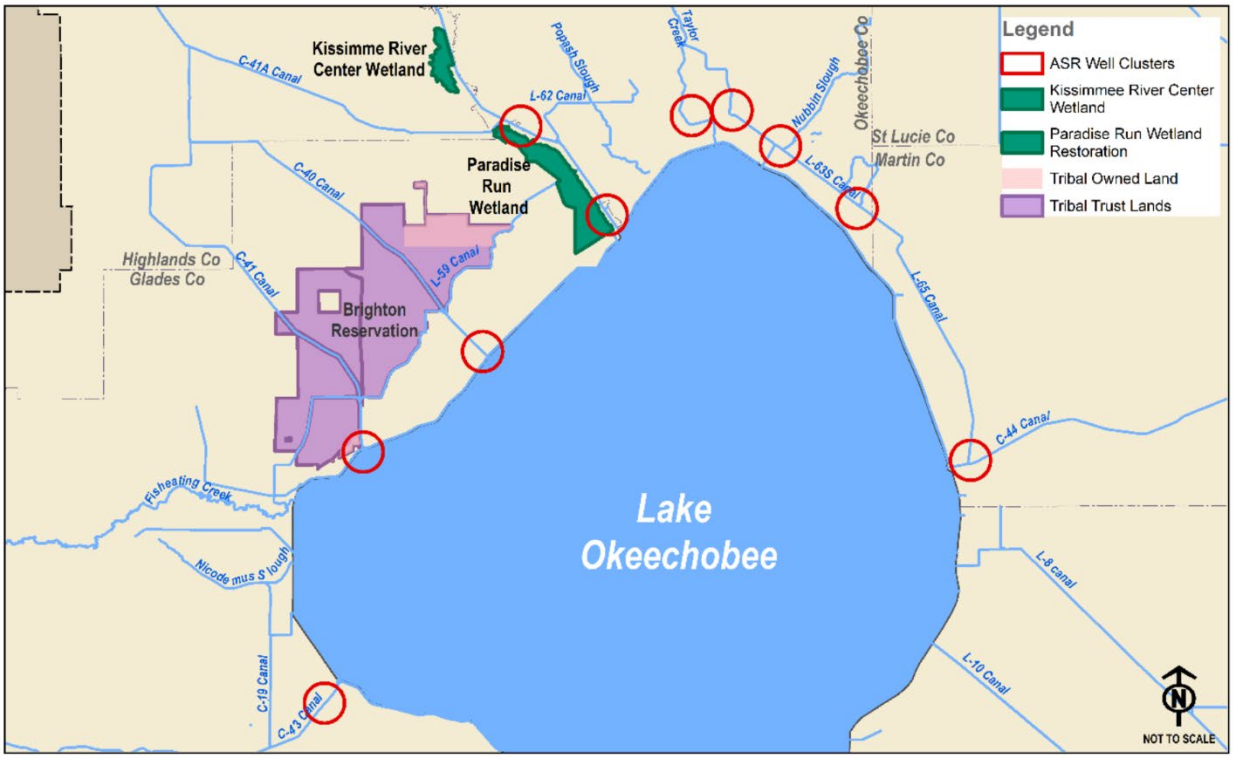

Figure C-7. Map of LOWRP Proposed Project Features.

The revised recommended plan for LOWRP is intended to 1) restore approximately 5,900 acres of historic Kissimmee River and floodplain wetland habitat; 2) increase the amount of time Lake Okeechobee stage levels are within the ecologically preferred stage envelope by approximately 1.4 percent and reduce frequency of extreme low lake water levels by approximately 1.3 percent that are undesirable for lake ecology; 3) increase availability of water supply to the existing legal water users of Lake Okeechobee by reducing water supply cutback volumes by approximately 35 percent when compared to FWO; 4) reduce the number and severity of freshwater flows from Lake Okeechobee to the Caloosahatchee and St. Lucie estuaries by 21 percent when compared to the FWO condition, thereby

improving the resiliency and health of these estuaries; and 5) provide for ecosystem-based recreational activities. In addition, the long-term storage provided by the ASR wells increases the operational flexibility within Lake Okeechobee in the lower portions of the lake regulation schedule. ASR increases the ability to provide beneficial dry season flows from the lake west to the Caloosahatchee estuary and south to the Everglades while reducing the risk of water shortage to municipal and agricultural water supply users. These goals and benefits are complimentary to the goals and benefits of the LOCAR Project.

C.5 Major Constraints

Major constraints related to the movement, storage, and utilization of water in the LOCAR Project Area are addressed below.

C.5.1 Existing Legal Users, Levels of Flood Damage Reduction, and Water Quality

Because LOCAR relies heavily on the redistribution of existing water, without due consideration during preliminary project design, the development of this operating plan, and adaptive management, there would be a risk of violating one or more of the constraints described below. Section 601(h)(5)(A) of the Water Resources Development Act (WRDA) requires that until a new source of water supply of comparable quantity and quality as that available on the date of enactment of this Act (11 December 2000) is available to replace the water to be lost because of implementation of the Plan, the Secretary and the non-federal sponsor shall not eliminate or transfer existing legal sources of water, including those for, “An agricultural or urban water supply; Allocation or entitlement to the Seminole Tribe of Florida under Section 7 of the Seminole Indian Land Claims Settlement Act of 1987 (25 U.S.C. 1772e); The Miccosukee Tribe of Indians of Florida; Water supply for Everglades National Park; or, Water supply for fish and wildlife.” Section 601(h)(5)(B) of the WRDA requires that implementation of the plan cannot reduce levels of service for flood protection that are in existence on the date of enactment of this Act (11 December 2000) and in accordance with applicable law.

Florida Statute 373.1501(5)(d) similarly requires that the quantity of water available to existing legal users shall not be diminished by implementation of project components to adversely impact existing legal users, that existing levels of flood protection would not be diminished outside the geographic area of the project component, and that water management practices would continue to adapt to meet the needs of the restored natural environment. Florida Statutes also require that all surface-water discharges meet state water-quality standards. Florida Statute Section 373.1502 requires that State water quality standards, encompassing water quality criteria and moderating provisions, must be adhered to. In no situation may a project element cause or contribute in breaching state water quality standards.

C.6 Standing Instructions to Project Operators

Once the LOCAR features operational testing and initial monitoring phase for the interim operations phase is concluded, the SFWMD will manage the day-to-day project operations of the newly constructed reservoir and its structures, as well as the newly constructed S-84+ Spillway and PS-1 Pump Station. Standing instructions for the SFWMD project operators would be further developed during the detailed design phase and then in the interim operations phase of the Project that include refinements in operations due to general and past operational experience, additional scientific information, CERP

updates, and new CERP or non-CERP activities that have been completed. The Corps will provide oversight and support if needed to SFWMD operations of these features. During normal conditions, the Project structures shall be operated in accordance with the approved operating manual. Deviations from the normal operations would be permitted as outlined in **Section C.13**.

C.7 Operational Strategy to Meet Project Objectives

The operational strategies described in this plan are intended to meet the goals, objectives, and benefits in the FS Report, and include restoration, preservation, and protection of the natural ecosystem while providing for the other water-related needs of the region and meeting the requirements for protection of health and public safety.

It is important to understand that the draft POM will develop over time as the details of the design of LOCAR components are developed and finalized. This document presents the first draft with the recognition that multiple revisions and operational fine tuning would occur over the life of the Project. Thus, the operations discussed herein represent the first draft of a start-up operational strategy recognizing that constraints in the system may be temporary due to the completion of many of the LOCAR components as well as other CERP and non-CERP projects.

As a general operational strategy, the LOCAR system would be operated to attenuate flows during the wet season and provide water during the dry season when the release to Lake Okeechobee would be beneficial to the environmental health and water supply from the lake.

C.7.1 Achieving Natural System Goals, Objectives, and Benefits

Reducing the inflows into Lake Okeechobee during wet periods, reducing the volume of flood control releases to the sensitive estuaries, and providing more stable lake levels during dry periods can benefit submerged aquatic vegetation as well as wildlife in the basin. A Project storage of 200,000 ac-ft provided by the reservoir can reduce the number of days that the estuaries will experience harmful large flows on both coasts as well as harmful low flows on the Caloosahatchee. As the designs are finalized for each component, operational specifics will be identified.

C.7.1.1 Reservoir Operations

To most efficiently utilize LOCAR's capabilities, the operational intent is to receive and store water in the reservoir at periods of high flows/stages in C-41A and high stages in Lake Okeechobee; and return water to C-41A and the lake during periods of low C-41A flows/stages and low lake stages. Based on the results of the initial optimization, the reservoir was modeled, and is intended to be operated as follows:

1. LOCAR will accept water from Lake Okeechobee (lake), when the official lake elevation is above the lower stage boundary of Zone BC of the authorized lake regulation schedule, and the water level within the LOCAR storge cell or cells receiving the water is below the reservoir's NFSL (51.7 ft NAVD88).
2. LOCAR will release water to the lake when needed to prevent the lake elevation from dropping below the authorized lake ecological envelope, or when the water level within one or both LOCAR storage cells is above the reservoir's NFSL (51.7 ft NAVD88).
3. LOCAR will accept water from C-41A that would otherwise be discharged to the lake through S-84+, provided that:

a. the lake elevation is not below the authorized lake ecological envelope;

b. the headwater stage at S-83 and S-84+ is maintained within its normal headwater operating range (30.6 to 31.0 ft NAVD88 for S-83 and 23.1 to 24.0 ft NAVD88 for S-84+) when water is conveyed to the LOCAR storage cell(s);

c. and the water level within the LOCAR storge cell or cells receiving the water is below the reservoir's NFSL (51.7 ft NAVD88).

4. LOCAR will release water to C-41A, upstream of S-83, to supply water to C-41, C-39A, and/or C-40 when needed to keep stages in C-41, C-39A, and/or C-40 within their normal operating range. LOCAR may also release water to C-41A, upstream of S-83 when S-83 is open, to supply water to C-41A downstream of S-83 when needed to keep stages in C-41A upstream and/or downstream of S-83 within their normal operating range.

5. LOCAR will release water to C-41A, downstream of S-83, to supply water to C-41A when needed to keep stages in C-41A, downstream of S-83, within their normal operating range.

6. LOCAR will be filled through one or a combination of the following methods:

a. LOCAR FILLING METHOD 1:

Method 1 includes the full or partial diversion of flow in C-41A, downstream of S-83/S-83X, into the reservoir at a maximum rate of 1,500 cfs by operating pump station PS-2. During reservoir filling operations, S-68, S-68X, S-82, S-83, S-83X and S84+ will be operated as needed to maintain the stage within each reach of C-41A within its normal operating range. For full diversion of C-41A flow, downstream of S-83/S-83X, into the reservoir, the S-84+ spillway gates will remain closed during reservoir filling operations. For partial diversion of C-41A flow, downstream of S-83/S-83X, into the reservoir, one or more of the S-84+ spillway gates will remain open during reservoir filling operations.

b. LOCAR FILLING METHOD 2:

Method 2 includes the full or partial diversion of flow in C-41A, upstream of S-83/S-83X, into the reservoir by gravity at a maximum rate of 1,500 cfs, through opening gated culvert CU-2. During reservoir filling operations, S-68, S-68X, S-82, S-83, S-83X and S84+ will be operated as needed to maintain the stage within each reach of C-41A within its normal operating range. For full diversion of C-41A flow, upstream of S-83/S-83X, into the reservoir, the S-82, S-83 and S-83X spillway gates will remain closed during reservoir filling operations. For partial diversion of C-41A flow, upstream of S-83/S-83X, into the reservoir, one or more of the S-82, S-83 and/or S-83X spillway gates will remain open during reservoir filling operations.

Unlike the other two methods, this method only allows for partial filling of the reservoir up to an elevation below the headwater stage at S-83/S-83X, which normally ranges from 30.6 to 31.0 ft NAVD88. **Figure C-5** shows the variation of the ground surface elevation across the reservoir. Water conveyed to the reservoir through this method would be stored mostly within the southern portions of each storage cell where the ground surface is the lowest. Stage-storage calculations for the Recommended Plan indicate that there is about 6,600 acre-ft of above-ground storage capacity in the reservoir at elevation 31.0 ft NAVD88 (3,800 acre-ft in East Cell and 2,800 acre-ft in West Cell), which is about 3 percent of the reservoir's total storage capacity of 200,000 acre-ft at its NFSL of 57.1 ft NAVD88.

c. LOCAR FILLING METHOD 3:

Method 3 includes the back-pumping of water from Lake Okeechobee through C-38 and C-41A into the reservoir at a maximum rate of 1,500 cfs, by operating pump stations PS-1 and PS-2 concurrently. The first pump station, PS-1, to be located at the existing S-84 site, will move water in C-41A from the downstream (tailwater) side of the existing S-84 site into C-41A on the upstream (headwater) side of the existing S-84 site. The second pump station, PS-2, to be located between the reservoir's East Cell and C-41A, will pump water from C-41A via the reservoir east inflow-outflow canal (CNL-2), directly into the reservoir's East Cell. During reservoir filling operations the S-84+ spillway gates will remain closed; and S-68, S-68X, S-82, S-83 and S-83X will be operated as needed to maintain the stage within each reach of C-41A within its normal operating range.

7. LOCAR will release water at a maximum rate of 1,500 cfs to C-41A, downstream of S-83, through first lowering CU-1B's adjustable weir to its lowest position which corresponds to a weir crest elevation of 24.0 ft NAVD88; and then opening one or more of CU-1A's gates.
8. LOCAR will release water at a maximum rate of 1,500 cfs to C-41A, upstream of S-83, through opening one or more of CU-2's gates.
9. The reservoir divider dam structure's (DDS-1) gates will be kept in the fully open position to ensure stage equalization between the storage cells, during normal reservoir operations, which includes the time periods when the reservoir is being filled or drained through the operation of PS-2 or CU-1A and/or CU-2, respectively. DDS-1's gates will be closed if needed during reservoir dewatering/maintenance operations.

The regional stormwater management modeling completed for the LOCAR Project, which forms the basis of the reservoir operations described above, is presented in the LOCAR Model Documentation Report, included in **Appendix A**, **Annex A-2.4** of the LOCAR Section 203 Feasibility Study (FS) Report.

C.7.2 Flood Damage Reduction

S-84 and S-84X, which have a combined designed flow capacity of 6,670 cfs (5,670 cfs provided by S-84, and 1,000 cfs provided by S-84X) will be replaced with S-84+, which will have a design flow capacity of 9,000 cfs, as part of the construction of the LOCAR project. Since this improvement will increase the downstream, gated spillway, design flow capacity of C-41A by 2,330 cfs or 35 percent, from 6,670 cfs to 9,000 cfs, the result will be a potential increase in flood damage reduction for the watersheds that drain to the C-41A Canal.

C.7.2.1 Normal and Emergency Operations

All criteria previously established for normal water-control operations would continue under LOCAR. Additional system components constructed as part of LOCAR would use operational criteria based on the modeling of alternatives documented in the LOCAR Section 203 FS Report or subsequent operational refinements during detailed design. Emergency operations have not yet been established but will be developed as the design is finalized.

C.7.2.2 Hurricane or Tropical Storm Operations

All system components with primary flood control requirements would follow the pre-storm protocols for the C&SF Project system.

Operation in anticipation of or during heavy rainfall from tropical storms or hurricanes is discussed in **Section C.8**. If a storm occurs in the LOCAR basin and storage is available in the reservoir, the normal operating condition would be followed to assist in Flood Risk Management.

C.7.3 Water Quality

LOCAR will be managed, operated, and maintained to conform to applicable federal and state standards.

C.7.4 Water-Supply Operations

The specific operation of LOCAR components will be developed during the design phases to ensure that existing legal water users are not adversely affected. Generally, LOCAR should improve water supply for Lake Okeechobee by releasing water from the storage reservoir during dry periods that may have otherwise been released to tide from Lake Okeechobee during wet periods. The additional available water will provide more stable water levels while also potentially providing more water in the lake for users during dry periods. At a minimum, the Project will maintain levels of water-supply service for legal users (Savings Clause [Section 601 (h)(5)(A) of WRDA 2000]), but it is anticipated that LOCAR will improve water supply service.

C.7.5 Recreation

Additional recreational opportunities are a benefit of LOCAR. As described in **Appendix F** of the LOCAR FS Report, public recreational facilities will be constructed within the storage reservoir site; however, no specific water-control regulations are required for this purpose. Water levels are not specifically managed for recreation, although levels do affect recreation facilities. For example, boat launching ramps, pleasure crafts, sightseeing vessels, and bank and small boat fishing are all influenced by water levels. Regulations concerning Corps public-use areas are contained in other publications.

C.7.6 Fish and Wildlife

The design of LOCAR components is such that hydrologic conditions would be established that significantly benefit fish and wildlife through improvements in the types and diversity of habitats. This includes anticipated estuarine improvements in the St. Lucie and Caloosahatchee Estuaries as well as the Lake Worth Lagoon by reducing the frequency and magnitude of undesirable releases from Lake Okeechobee.

C.7.7 Navigation

There are no authorized Project features for navigation.

C.7.8 Other

There is currently no further information for this section.

C.8 Pre-Storm/Storm Operations

C.8.1 Pre-Storm Operations

The Atlantic hurricane season is from 1 June through 30 November. In the event of a tropical depression(s), tropical storm(s), and/or hurricane(s) in the Atlantic/Caribbean Basin or Gulf of Mexico, the National Hurricane Center (NHC) issues products including tropical cyclone public advisories,

forecast advisories, forecast discussions, warnings and strike probability forecasts. The SFWMD meteorologists and the SFWMD Emergency Operations Center (EOC) also provide specific advisories for different regions of the district.

Pre-storm water level drawdowns of the C&SF Project canals associated with LOCAR may be initiated up to 72 hours in advance of a severe storm event based upon such forecasts, prevalent conditions within the Project Area, and/or emergency operations directive(s) by the SFWMD EOC. Any drawdowns would be consistent with SFWMD emergency operations procedures. Pre-storm drawdowns of the C&SF Project canals would be dependent on the severity of the storm, amount of predicted rainfall, and antecedent moisture condition in the watershed.

As described in **Annex A-2.1** of the LOCAR FS Report, LOCAR has been designed to safely convey excess stormwater from its storage cells into C-41A, during the Probable Maximum Precipitation (PMP) event for the reservoir (54 inches of rainfall over the reservoir in 72 hours) with the reservoir storage level at its NFSL of 51.7 ft NAVD88 at the start of the PMP event, and the reservoir storage level reaching a maximum water storage level (MWSL) of 56.3 ft NAVD88 during the PMP event. Therefore, provided that the reservoir is fully functional and authorized to operate within its design parameters, it should not be necessary to perform a pre-storm drawdown of LOCAR, unless it is anticipated that the total precipitation on the reservoir from the approaching storm will be greater than the precipitation from the reservoir PMP event.

The crest elevation of one or more of the perimeter (seepage) canal adjustable weirs, PCW-1 through PCW-10, may need to be lowered within allowable limits (to be determined during the PED phase), as part of CNL-1 pre-storm drawdown operations, to maintain stages within CNL-1 that are sufficiently low enough to avoid adverse flooding during storm events, within the reservoir site and adjacent offsite properties which drain to CNL-1. See **Section C.15**, **Table C-1**, and **Figure C-6** for additional information about CNL-1 and its adjustable weirs.

C.8.2 Storm Operations

In accordance with *Design Criteria Memorandum: DCM-2, Wind and Precipitation Design Criteria for Freeboard* (Haapala et al. 2006), the LOCAR ungated overflow spillways (OS-1 located on the south side of the East Cell, and OS-2 located on the south side of the West Cell) have been designed to safely convey excess stormwater in each cell to C-41A, resulting from the reservoir PMP event (54 inches of rainfall over the reservoir in 72 hours) causing the level in either reservoir cell to rise above its NFSL of 51.7 ft NAVD88. The ungated overflow spillways have each been designed to provide a maximum discharge capacity of 750 cfs during the reservoir PMP event.

Part 4 of Design Criteria Memorandum: DCM-3, Spillway Capacity and Reservoir Drawdown Criteria (DCM-3) (Arnold et al. 2006), states the following concerning discharges from CERP reservoirs:

> "The location and size of the spillways on the dam must consider the flood carrying capacity of the downstream conveyance system. Downstream flooding impacts from reservoir spillway discharges must be considered."
>
> "The receiving canals/river channel capacity must be considered and if feasible should be co-located with larger receiving channels when siting of the spillway(s). In some cases,

consideration should be given to increasing capacity of receiving channels in conjunction with construction of new spillways."

Considering these requirements from DCM-3, the allowable peak discharge rate from the reservoir via its gated outflow culverts and ungated overflow spillways to C-41A was determined to be 1,500 cfs for the PMP event (54 inches of rainfall over the reservoir in 72 hours) and storm events with lesser precipitation than the PMP event, with the provision that gated spillways S-84 and S-84X, which have a combined design flow capacity of 6,670 cfs (5,670 cfs S-84 capacity + 1,000 cfs S-84X capacity), would be replaced with gated spillway S-84+, which will have a design flow capacity of 9,000 cfs.

Since C-41A would convey stormwater discharges from the reservoir and continue to convey stormwater discharges from the C-41AN and C-41AS watersheds; plus convey the portion of the 3,000 cfs firm capacity released from S-68 that flows through S-83 (calculated to be 2,091 cfs, given the design flow capacities of S-82 and S-83), it was calculated that of the 9,000 cfs of proposed capacity for S-84+, that the reservoir could contribute up to 1,500 cfs, based on its contributing area of 11,374 ac (area within its perimeter dam that drains to its gated outflow culverts and ungated overflow spillways) and the total contributing area of 51,822 ac of watersheds C-41AN and C-41AS that drain to S-84/S-84X. This equates to a discharge rate from the reservoir of 84.4 cfs per square mile (CSM) to S-84+. The reservoir's allowable peak discharge rate to S-84+ via C-41A is expressed by the following formula. The formula is based on starting with the proposed design capacity of S-84+ and subtracting the estimated S-68 firm capacity flow through S-83; and then allocating a portion of the remaining S-84+ design capacity to the reservoir based on the reservoir's percentage of contributing area that it occupies within the total contributing area of the watersheds that drain to S-84+ via C-41A.

LOCAR Allowable Peak Discharge Rate = (Proposed S-84+ Design Capacity – Estimated S-68 Firm Capacity Flow through S-83) x (LOCAR contributing area for S-84+ / Total contributing for S-84+)

LOCAR Allowable Peak Discharge Rate = (9,000 cfs – 2,091 cfs) x (11,374 ac / 51,822 ac) = 1,516 cfs or 85.3 CSM

Use 1,500 cfs or 84.4 CSM for the LOCAR allowable peak discharge rate.

The crest elevation of one or more of the perimeter (seepage) canal adjustable weirs, PCW-1 through PCW-10, may need to be lowered within allowable limits (to be determined during the PED phase), as part of CNL-1 storm operations, to maintain stages within CNL-1 that are sufficiently low enough to avoid adverse flooding during storm events, within the reservoir site and adjacent offsite properties which drain to CNL-1. See **Section C.15**, **Table C-1**, and **Figure C-6** for additional information about CNL-1 and its adjustable weirs.

C.9 Consistency with the Identification of Water and Reservations of Allocations for the Natural System

The Programmatic Regulations [Section 385.28(a)(6)(vi)] for CERP require that the operating manual be consistent with the reservation or allocation of water for the natural system made by the state (in accordance with section 601 of WRDA 2000). In general, the operating criteria within this LOCAR Draft POM are consistent with the operating criteria used to identify the water available for the natural system as described in the FS Report. The operating criteria may be further refined during detailed

design and captured in the Preliminary POM phase. These refinements would need to be consistent with the reservations described in the FS Report.

C.10 Consistency with Savings Clause and State Assurances Provision

In accordance with WRDA 2000, CERP projects may not eliminate or transfer existing (as of December 2000) legal sources of water until a new source of water of comparable quantity and quality is available to replace the water lost caused by Project implementation. The implementation of LOCAR would not preclude operation of the C&SF Project to deliver water from Lake Okeechobee to meet agricultural water supply needs. Therefore, no additional sources of water need to be identified since Lake Okeechobee would continue to provide water to agricultural users, the WCAs, and ENP.

C.11 Drought Contingency Plan

Drought contingency plans are regulated by ER 1110-2-1941. There is no drought contingency plan in place for LOCAR. No additional water would be provided to LOCAR to prevent dry-out conditions and there is no minimum water depth for the storage reservoir.

The current drought contingency plan in place for the Lake Okeechobee and the Kissimmee River is located in the C&SF Project Master Water Control Manual, Volume 2 and 3, Appendix B.

C.12 Flood Emergency Action Plan

As discussed in **Sections A.5.1 and A.19** of the LOCAR FS Report, the reservoir as designed according to the Recommended Plan, is classified as a high hazard potential impoundment, and will need a comprehensive Flood Emergency Action Plan (EAP) that reflects its classification as a high hazard potential impoundment. The Flood EAP would need to be developed in conjunction with updates to the reservoir dam breach modeling performed during the PED phase of the Project.

The Flood EAP will define responsibilities and provides procedures designed to identify unusual and unlikely conditions that may endanger the reservoir and/or any of its structures in time to take mitigative action and to notify the appropriate emergency management officials of possible, impending, or actual failure of the reservoir and/or any of its structures. The Flood EAP will also be used to provide notification when stormwater releases from the reservoir may contribute to major flooding in Highlands, Glades, and/or Okeechobee County.

The Flood EAP will need to be completed and approved by the appropriate governmental agencies before the first filling of the reservoir.

C.13 Deviation from Normal Regulation

The Corps District Commander is occasionally requested by the non-federal sponsor to approve deviations from normal operating criteria. Prior approval for a deviation is required from Corps-South Atlantic Division (SAD) except as noted below. Deviation requests usually fall into the following categories:

C.13.1 Emergencies

Examples of emergencies that may result in a need to deviate from normal operating criteria include drowning and other accidents, failure of the operation facilities, chemical spills, treatment plant failures,

and other temporary pollution problems. Water-control actions necessary to abate the problem should be implemented immediately unless such action would create equal or worse conditions. SAD must be informed of the problem and the emergency operating changes as soon as practicable.

C.13.2 Unplanned Minor Deviations

There are unplanned instances that create a temporary need for minor deviations from the normal operating criteria, although they are not considered emergencies. Construction accounts for the major portion of these incidents requiring minor deviations. Examples of activities that may require short-term deviations include construction of utility stream/canal crossings, bridgework, and major construction contract. Changes in releases are sometimes necessary to carry out maintenance and inspection of facilities. Requests for changes in release rates generally involve time periods ranging from a few hours to a few days. Each request is analyzed on its own merits. In evaluating the proposed deviation, consideration is given to upstream watershed conditions, potential flood threat, the existing condition of the lake/reservoir/storage area, and possible alternative measures. In the interest of maintaining good public relations, requests for minor deviations are generally granted, providing there are no adverse effects on the overall regulation of the project for the authorized purposes. Approval for these minor deviations normally will be obtained from Corps-SAD by telephone. Written confirmation explaining the deviation and its cause will be furnished to the Corps-SAJ Water Management Section by the SFWMD. Corps-SAJ will communicate with Corps-SAD. In addition, USACE-SAJ will inform the non-federal sponsor, the State of Florida (FDEP), the DOI, the MTI, and the STOF as appropriate prior to approval.

C.13.3 Planned Deviations

Each circumstance should be analyzed on its own merits. The requesting agency will provide sufficient data on flood potential, lake/reservoir/storage area and watershed conditions, possible alternative measures, benefits to be expected, and probable effects on other authorized and useful purposes, letter to USACE-SAJ. USACE-SAJ will analyze each proposed deviation and will request approval from USACE-SAD. In addition, USACE-SAJ will inform the non-federal sponsor, the State of Florida (FDEP), the DOI, the MTI, and the STOF as appropriate prior to approval.

In the event that one of the reservoir's two storage cells will need to be taken out of service by isolating it from the other storage cell, such as when one cell must be dewatered to allow for inspection, maintenance, modification/replacement of existing features and/or construction of new features within or along the perimeter dam of one cell, a request will be submitted to USACE-SAJ for this type of planned deviation from normal reservoir operations. The basic steps for isolating and dewatering one of the cells, and then restarting normal operation of the cell include the following. Note, all applicable dam safety guidelines will be followed as part of any reservoir dewatering operations.

1. Close the DDS-1 gates to isolate the two cells from each other.
2. Follow the normal operating procedure for controlled release of water by gravity from the cell to be dewatered, until the water level in the cell reaches the desired elevation.
3. Discontinue the release of water from the dewatered cell by gradually closing either the CU-1A or CU-2 gates (depending on which cell is dewatered).

4. Repeat Steps 2 and 3 as needed to maintain the water level in the cell at the desired dewatered elevation, since the cell will slowly refill with seepage inflow from the adjacent cell as well as from direct rainfall over the cell.
5. During dewatering operations, follow all applicable dam safety guidelines, including but not limited to performing required geotechnical, structural, mechanical, and electrical monitoring and/or inspection of the reservoir dams and structures.
6. Before ceasing dewatering operations and refilling the dewatered cell, complete any required final geotechnical, structural, mechanical, and electrical monitoring and/or inspection of the reservoir dams and structures; and obtain final written approvals to refill the dewatered cell.
7. Refill the dewatered cell by first gradually closing either the CU-1A or CU-2 gates (depending on which cell is dewatered), and then gradually opening the DDS-1 gates to allow for the water level in the two cells to equalize.

Note, when the DDS-1 gates are closed, and a storage cell is taken out of service, the reservoir's filling and emptying operations will be limited to the operational capability of the storage cell and its structures that remain in service, until the DDS-1 gates are reopened, allowing for the reservoir to resume normal operations.

C.14 Rate of Release Change

Control structures should be opened and closed gradually. This provides an even transition to the new flow regime and minimizes hydraulic effects downstream. Special attention should be given to the maximum gate opening curve for each structure to ensure that the tailwater has a chance to build up before large scale openings are made.

C.15 Seepage Control

The total length of reservoir perimeter (seepage) canal (CNL-1) around the storage reservoir is approximately 18.6 mi. As described in **Section A.9** of the LOCAR FS Report, CNL-1 includes a series of cascading reaches (Reaches 1A through 6) controlled by adjustable weirs (PCW-1 through PCW-10), which drain to C-41A via Reach 7, that will be adjusted as needed, within allowable limits (to be determined during the PED phase), throughout the annual wet and dry seasons, so that the stage in each reach matches as closely as possible the average existing condition (or pre-project) groundwater table elevation of the adjacent offsite basins, in order to minimize impacts to the groundwater table in these basins resulting from LOCAR. Based on the existing topography of the reservoir site, and the control elevations recommended for each reach of CNL-1 in **Section A.9** of the LOCAR FS Report, CNL-1 will have two cascading flow paths, as shown in **Figure C-6**, which include:

- Western Flow Path: Reach 2B to Reach 2A to Reach 1B to Reach 1A to Reach 7
- Eastern Flow Path: Reach 3A to Reach 3B to Reach 4 to Reach 5 to Reach 6 to Reach 7

Among these two flow paths, the greatest amount of stormwater and seepage flow will be conveyed along the western flow path of CNL-1. Based on the 3D seepage modeling described in **Section A.9** of the LOCAR FS Report, the maximum combined total seepage flow from the western and eastern flow paths into Reach 7 is estimated to be 14.7 cfs.

The preliminary typical wet and dry season control elevations for each reach of CNL-1 is discussed in **Section A.9** of the LOCAR FS Report and shown in **Figure C-6** and **Table C-2**.

Table C-2. Preliminary Typical Wet and Dry Season Control Elevations for Perimeter Canal (CNL-1).

Reach	Typical Dry Season Control Elevation[1/] (ft NAVD88)	Typical Wet Season Control Elevation[1/] (ft NAVD88)	Flow Path
1A	30.2	31.0	Western
1B	33.3	34.0	Western
2A	35.2	35.5	Western
2B	37.8	38.5	Western
3A	38.3	39.1	Eastern
3B	36.3	37.1	Eastern
4	33.7	34.9	Eastern
5	32.6	33.8	Eastern
6	30.8	31.4	Eastern
7	24.0	24.0	N/A[2/]

1/ Typical wet and dry season control elevations to be updated and/or confirmed upon completion of additional 3D seepage modeling for the project during the PED phase of the project, as recommended in **Section A.9.4** of the LOCAR FS Report.
2/ Reach 7 is not part of either the western or eastern flow path. Reach 7 receives the total combined flow from the western and eastern flow paths.

The crest elevation of one or more of the perimeter (seepage) canal adjustable weirs, PCW-1 through PCW-10, may need to be lowered within allowable limits (to be determined during the PED phase), as part of CNL-1 operations before, during and after storm events, to maintain stages within CNL-1 that are sufficiently low enough to avoid adverse flooding during storm events, within the reservoir site and adjacent offsite properties which drain to CNL-1. The proposed wet and dry season typical control elevations of the CNL-1 reaches, as well as the number and limits of the CNL-1 reaches may be adjusted during the PED phase of the project, as part of the additional 3D seepage modeling to be performed during the PED phase, as recommended in **Section A.9.4** of the LOCAR FS Report.

The reservoir seepage pump station (SPS-1) will have two 50 cfs electric motor driven seepage pumps, as well as one axillary 50 cfs electric motor driven seepage pump, for moving water from the perimeter canal back into the reservoir, at a maximum design rate of 100 cfs. The reservoir seepage pump station (SPS-1) will have back-up power generators sized to run all of its electrical systems, including two 50 cfs pumps simultaneously, in the event of an electrical service outage. If the seepage pump station is not operational (e.g., the seepage pumps are out of service for maintenance, or the station's back-up power generator is not operating during an electrical service outage), the seepage collected in the perimeter canal will eventually overflow by gravity into the C-41A via overflow weir structures. There will be five overflow weir structures (PCOS-1 to PCOS-4, & ODCD-OS-1) in Reach 7 of the perimeter canal, that will each discharge the seepage water by gravity directly to C-41A or indirectly through an existing downstream Corps project culvert along C-41A.

C.16 Adaptive Management Plan for Reservoir Perimeter Canal (CNL-1)

Groundwater conditions around the reservoir will vary seasonally, annually, and in response to changes in agricultural operations of nearby farms (e.g. changes in stormwater management operations and irrigation/water supply pumping operations) as well as in response to potential changes in land use of nearby properties. In addition, extreme weather conditions such as severe and/or prolonged rainfall and droughts can also affect the surrounding water table.

In response to variations and fluctuations in the groundwater elevation within the drainage basins and properties that surround the reservoir, the crest elevation of one or more of the perimeter canal adjustable weirs, PCW-1 through PCW-10, will be adjusted as needed, within allowable limits (to be determined during the PED phase), to raise or lower the control elevation of Reaches 1 through 6 of CNL-1, in order to minimize impacts to the groundwater table within the drainage basins and properties that surround the reservoir site.

In response to storm events, including impending tropical storms/hurricanes, the crest elevation of one or more of the perimeter canal adjustable weirs, PCW-1 through PCW-10, may need to be lowered within allowable limits (to be determined during the PED phase), as part of CNL-1 operations before, during and after storm events, to maintain stages within CNL-1 that are sufficiently low enough to avoid adverse flooding during storm events, within the reservoir site and adjacent offsite properties which drain to CNL-1.

In order for the control elevations in the perimeter canal to be managed appropriately throughout the service life of the reservoir, in response to such variable conditions, an Adaptive Management Plan for the reservoir perimeter canal will be developed during the PED phase, in conjunction with the additional 3D seepage modeling to be performed during the PED phase, as recommended in **Section A.9.4** of the LOCAR FS Report. The plan may include, but not be limited to the following:

- Hydrometeorological and groundwater monitoring plan, involving the use of existing and potentially new monitoring stations to enable monitoring of surface water levels, rainfall and groundwater levels, to support decision making of when and where adjustments in perimeter canal control elevations are needed.
- Methodology/guidelines for determining optimum/appropriate control elevations for each reach of the perimeter canal, based on hydrometeorological and groundwater monitoring, meteorological predictions, and other factors.
- Protocols and communication plan for adjusting the weir crest elevation of weirs PCW-1 through PCW-10, in order to change the control elevations in Reaches 1 through 6.

C.17 Storage Reservoir Initial Filling Plan

The initial filling plan is the first opportunity to test whether the reservoir embankments, seepage control measures, canals, pumps, and structures, etc. are operating as designed. The Initial Filling Plan will be developed prior to the Operations Testing and Monitoring Phase (OTMP) of the Project and will be included as an exhibit to this POM. The plan will include, but is not limited to these items:

- Preferred filling rate, available options to control the filling rate, as well as the consequences of sole purpose operation to control the rate, water quality requirements for initial filling, and the most probable types of problems that may develop during initial filling.
- Description of the proposed hydrologic data collection and transmission system and the plans for reading and evaluating instrument data and making visual inspections of the embankments and downstream areas, both related to increments of pool level.
- Instructions for observers on conditions that require immediate attention of personnel authorized to make emergency decisions. Describe the agency/organization that is responsible for decisions and implementation of emergency plans as necessary. Include an emergency phone list that contains names/positions, telephone and pager numbers, and radio frequencies to be used.

C.18 Non-Typical Operations

No unforeseen non-typical operations have been identified in the LOCAR FS Report phase of the Project. This section would be updated in the future, if necessary, as non-typical operations may apply during periods of extreme drought, rainfall, routine maintenance or during situations where portions of the Project are offline or out of service.

C.19 Aquifer Storage and Recovery System Plan

Although LOCAR does not include any ASR wells, it is anticipated that LOCAR features will be operated in conjunction with the proposed LOWRP Project features (described in **Section C.4.5**), which include ASR wells to be installed around Lake Okeechobee, as shown in **Figure C-7**.

C.20 Water-Control Data Acquisition System Plan (WCDASP)

This WCDASP discusses data acquisition essential to the water-control management function. This will be a subset of the Water-Control Data System specific to CERP.

Some of the LOCAR pump stations and gates may be equipped with automation components. All the automation components, which are to be operated and maintained by the SFWMD, will conform to SFWMD standards of water-control data acquisition. Water-control data acquisition for operation of the pump stations will be performed via a real-time telemetry system known as Supervisory Control and Data Acquisition (SCADA). The communications for the pump stations will be through either microwave communication towers or through SFWMD's telemetry network.

When not manned, the pump stations will be operated via remote or automated water-level controls with close monitoring by operational staff. The pump stations will be manned, if needed, during the periods of high-flow events. During critical storm events such as tropical storms and hurricanes, the operation of the pump stations will follow the guidelines of SFWMD's Emergency Preparedness Manual - Suggested Hurricane Operating Procedures.

The stage recorders to be installed will be incorporated into the SFWMD real-time data acquisition network. Stage data from these sites, flow data, and pump on/off data will be accessible by the SFWMD and the Water Management Section, Jacksonville District, Corps via the present telemetry system

and/or Geostationary Operational Environmental Satellite telemetry or interagency data exchange procedures.

Stage, flow, and any precipitation data for the Project will be maintained in SFWMD and Corps databases. The data from the SFWMD-operated SCADA system such as stage, flow, and rainfall data will be available at a frequency of less than fifteen minutes.

C.21 Consistency with the Adaptive Management Program and Periodic CERP Updates

After initiation of long-term operations and maintenance of this Project, the operating manual may be further modified based on operating criteria approved by Corps and the SFWMD that results from CERP updates or recommendations from the adaptive assessment process as outlined in Section 6.3.1 of GM #6 (Corps and SFWMD 2007).

C.22 Interim Operations During Construction

Guidelines and requirements for interim operations during the construction of the Project will be developed during the PED phase of the Project, in conjunction with the development of the Project's detailed construction schedule during the PED phase. During the PED phase, this section of the POM (C.21) will be updated to include guidelines and requirements for interim operations during construction in accordance with the guidance provided in the following documents:

- Second paragraph of Section 5.5.1 of GM #5 (Corps and SFWMD 2007).
- Part III, 21. of GM #5, Attachment 5-A (Corps and SFWMD 2007).

The interim operations will preserve existing Central and Southern Florida (C&SF) Project authorized purposes and/or achieve the Comprehensive Everglades Restoration Plan (CERP) authorized purposes as identified in the C&SF Project Comprehensive Review Study report (Corps 1999). All interim operations will be conducted to meet the Assurances of Project benefits as set forth in WRDA 2000, and as discussed in the CERP Programmatic Regulations and the CERP Guidance Memoranda (Corps and SFWMD 2007).

C.23 Preliminary Operations During Operational Testing and Monitoring Phase (OTMP)

Guidelines and requirements for preliminary operations for the OTMP will be developed in conjunction with the plan for the OTMP and promulgated in the Preliminary POM. All preliminary operations will be conducted to meet the Assurances of Project Benefits as set forth in Section 601 of WRDA 2000 and as discussed in the CERP Programmatic Regulations and the CERP Guidance Memoranda (Corps and SFWMD 2007). Some items that may be included in this section of the POM (C.22) are (a) Operational Strategy to meet Project Objectives, (b) Project Relationships and interactions, and (c) Major Constraints. The assumptions and constraints may change in the Final POM.

C.24 Conceptual Description of Project Operations for Transition from the Initial Operating Regime to the Next-Added Increment

This draft POM is based on the initial operating regimen and known conditions. As design for the proposed structures and features is finalized, the conditions will be re-evaluated throughout and after

detailed design. Conditions of the final design will be incorporated into the Preliminary POM, which will be the next increment of this POM.

C.25 References

Corps (U.S. Army Corps of Engineers). 1999. Central and Southern Florida Project Comprehensive Review Study: Final Integrated Feasibility Report and Programmatic Environmental Impact Statement. Jacksonville District, Jacksonville, Florida. October. Available online at: https://usace.contentdm.oclc.org/digital/collection/p16021coll7/id/11299

Corps. 2017. Engineer Manual 1110-2-3600. Management of Water Control Systems. U.S. Army Corps of Engineers. 10 October 2017.

Corps. 2018. Engineer Regulation 1110-2-8156. Preparation of Water Control Manuals. U.S. Army Corps of Engineers. 30 September 2018.

Corps and SFWMD. 2007. Central and Southern Florida Project, Comprehensive Everglades Restoration Plan, Programmatic Regulations, Six Program-Wide Guidance Memoranda. U.S. Army Corps of Engineers Jacksonville District and South Florida Water Management District. July 2007. Available online at: https://www.evergladesrestoration.gov/cgm

Arnold, T., J. Haapala, S. Partney, Y. Shen., B. Trauger, and R. Tucker. 2005. Design Criteria Memorandum: DCM-1, Hazard Potential Classification. 12 September 2005.

Arnold, T., J. Haapala, P. Linton, and Y. Shen. 2006. Design Criteria Memorandum: DCM-3, Spillway Capacity and Reservoir Drawdown Criteria. 3 February 2006.

Haapala, J., T. Arnold, S. Partney, R. Tucker, L. Hadley, S. Smith, and Y. Shen. 2006. Design Criteria Memorandum: DCM-2, Wind and Precipitation Design Criteria for Freeboard. 6 February 2006.