

DRAFT

WPA Feasibility Study Selected Plan Design Scope

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Compiled by: Keith Jones

Updates:

- 18 May 2001
 - Revised Hillsboro Impoundment scope to reflect a northern compartment and a southern compartment. The northern compartment has a western and eastern cell.
- 11May01
 - Revised Hillsboro S528B structure to be gated as opposed to weir control
 - Added flowage easement for FPL transmission line maintenance road in seep3a and seep3b design regions
- 15March01
 - Added at Bird Drive Recharge Area for C-504, 10,690' of canal is in close proximity of southbound lane of Krome Avenue where guardrail will be required
- 9March01
 - Revised Acme B design requirements
- 8March01
 - Added to Hillsboro scope a three foot high berm around perimeter of wetland buffer area to the south of the southern impoundment.
- 28Feb01
 - Revised Strazzulla design requirements
 - Removed Ag Reserve design requirements
- 27Feb01
 - Included revetment design requirements for Hillsboro Impoundment and corrected Hillsboro improvement to LWDD E-1 canal.
- 21Feb01
 - Revised levee and canal numbering for design regions (acme, straz, agres, and hills)
 - Re-ordered scope document from north to south order to follow future Engineering Appendix

- 12Feb01
 - Updated scope of dblc region to specify configuration at S-380E
- 2Feb01
 - Updated scope of C-9 and seep3b area to include stormwater runoff design assumptions
 - Included revetment design requirements for C-9 and C-11 impoundments
- 20Jan01
 - Updated scope for seep3a design region to include recommendation made for S-500A, S-500B, and S-500C configuration
 - Included stormwater runoff design assumptions for US-27 along seep3a and C-11 design regions
- 12Dec00
 - Moved S-504A un-gated tunnel to the C-11 design region
- 8Dec00
 - Added all structures associated with Strazzulla and Ag Reserve
 - Revised document to number bridges where required
 - Renamed S-522C to B-503, renamed S-522D to S-522C
- 27Nov00
 - Based on finalization of selected plan the following minor structural features are added:
 - C-11 Impoundment: S-505A, S-505B, S-505C, S-506
 - C-9 Impoundment: S-512A, S-512B, S-512C-E, S-512C-W, S-513A, S-513B
 - Hillsboro Impoundment: S-526A, S-526B, S-527A, S-527B, S-528A, S-528B, S-528C
 - Bird Drive Recharge Area: S-521A, S-521B, S-523A-E
- 01Nov00 -
 - Added Ag Reserve Impoundment to scope
 - The "S-518" structure designation will be used at the ungated crossing of C-503 and FPL maintenance access crossing at the Midway transmission lines corridor
 - S-519 will become S-519A and S-519B will be added at the intake pool to S-520
 - S-521 by design will be incorporated into the S-520 pump station. The S-520 pump station will be able to pump SDCS deliveries to C-504 or backpump C-4 to Bird Drive Recharge Area
- 18Sep00 -
 - Expanded scope details

- Added C-9 conveyance improvement east of US-27
 - Added C-6 conveyance improvement west of US-27
 - Pump station S-518 will not be designed in WPA Feasibility Scope
 - Miramar Expressway alignment changed to along Pembroke Road
 - Added stormwater runoff design from US-27 in seep3a, seep3b, c9 and c11 design regions
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- Structures are new unless stated otherwise.
 - Tunnel structures - A tunneled structure location could be one of several configurations that are not yet determined. They are listed to account for locations where canals cross some other existing or future feature.
 - Design Regions - PDF files of design region layouts from ArcView coverages can be found at the "Design Regions" link at the following web site:
<http://www.saj.usace.army.mil/hh/wpadesign/>

Design Region: acme (Acme B Basin)

Design:

- a) Design levees for 8' deep impoundment. Consider future ASR systems retrofit in design. Plug C-26 on southern boundary.
- b) Design gated culverts and a pump station for an 8' deep impoundment.
- c) Rebuild Acme Improvement District structure #66 approximately 3800 feet west of current location with an un-gated 72" concrete culvert, 50' length.
- d) Construct a soil-cement-bentonite/polymer liner across the entire impoundment which is approximately 600 acres. The soil-cement-bentonite/polymer liner will be 1 foot thick and shall be mixed in place with conventional scrapers, graders or other similar equipment.
- e) Design levees for 4' deep STA. Allow area for chemical treatment plant.
- f) Design pump stations for inflow and discharge for STA.
- g) Design seepage control and compartment water level control structures for STA.

Acme B Impoundment

Design Elevations (Ft-NGVD)

Top Of Levee 32.0

Surcharge Pool 27.0

Full Pool (Spillway Invert) 25.2

Normal Pool 24.0

Average Impoundment Ground 16.0

Excavation Max Depth 10.0

Storage Area = 575 Acres

Normal Pool Depth = 8 Feet

Storage = 4600 Acft

Pumps:

1. S-531 Impoundment inflow pump
2. S-533 STA inflow pump
3. S-534 STA discharge pump

Gated Culverts:

1. S-532 Impoundment discharge control structure
2. S-535 STA seepage control structures
3. S-536 STA compartment level control structures

Un-gated Culverts:

1. Acme #66 - Access to impoundment and features from the northern boundary

Levees:

1. L-505 STA impoundment levee
2. L-505I STA internal compartment levee
3. L-506 Impoundment levee

Canals:

1. C-505 STA seepage canal along outside boundary
2. C-505I STA internal distribution canals

Facilities:

1. Chemical pre-treatment facility prior to flowing through STA marsh

Utilities:

1. Phone and electric

Issues:

1. Chemical treatment plant design can possibly be obtained from SFWMD.
2. Conveyance between impoundment and STA has been stated as being appropriate.
3. Basin flood protection levels dependant on a combination of several factors including basin removal rates, impoundment drawdown rates and allowable drawdown routes and times.

Design Region: straz (Strazzulla Wetlands)

Design:

- a) Design berm along eastern boundary.
- b) Design slurry wall along northern boundary.
- c) Design conveyance canals to connect LWDD S9 canal to LWDD L-23W.
- d) Design gated culvert structure on LWDD L-23W canal and ungated culvert on LWDD S9 canal.
- e) Minor clearing and grubbing along berm alignment.

Gated Culverts:

1. S-530

Un-gated Culverts:

1. S-537A Allow flow from LWDD S9 canal to LWDD L-23W

Berm:

1. L-510 Eastern boundary, design height 19.0' NGVD

Slurry Wall:

1. L-510C Partial northern boundary, design depth to -10.0 ft-NGVD

Canals:

1. S9 Ext. Connects LWDD S9 canal to LWDD L-23W canal

Utilities:

1. High tension FPL power lines
2. Phone and electric

Issues:

Berm construction material will not be obtained by scraping to the east but will be placed from material obtained from off-site.

Design Region: hills (Hillsboro Impoundment)

Design:

- Design levees and seepage canals for 6' deep compartmentalized impoundment. Consider future ASR systems retrofit in design. Provide revetment for inside slope protection where sharp corners occur.
- Design gated spillway and a pump station for a 6' deep impoundment.
- Design gated culvert structures for seepage control and compartment water level control.
- Design conveyance improvements for the Hillsboro Canal to the LWDD E-1 canal (US-441).
- Determine if conveyance improvements for the C-536 canal (L-36 borrow canal) will be needed to handle 500 cfs North Springs Irrigation District (NSID) flows.
- Design a three foot high berm around perimeter of wetland buffer area to the south of the southern impoundment
- Minor clearing and grubbing within impoundment.

Hillsboro Impoundment - North

Design Elevations (Ft-NGVD)

Top Of Levee 24.0

Surcharge Pool 19.0

Full Pool (Spillway Invert) 17.4

Normal Pool 16.0

Average Impoundment Ground 10.0

Excavation Max. Depth 4.0

Storage Area = 1680 Acres

Normal Pool Depth = 6 Feet

Storage = 10080 Acft

Hillsboro Impoundment - South

Design Elevations (Ft-NGVD)

Top Of Levee 24.0

Surcharge Pool 19.0

Full Pool (Spillway Invert) 17.4

Normal Pool 16.0

Average Impoundment Ground 10.0

Excavation Max. Depth 4.0

Storage Area = 535 Acres

Normal Pool Depth = 6 Feet

Storage = 3210 Acft

Pumps:

1. S-525A Northern compartment inflow pump
2. S-525B Southern compartment inflow pump

Gated Culverts:

1. S-526A Northern compartment discharge control structure
2. S-526B Southern compartment discharge control structure
3. S-527A Northern compartment seepage control structure
4. S-527B Southern compartment seepage control structure
5. S-528A Northern compartment level control structure
6. S-528B Weir Control - Northern compartment level control structure
7. S-528C Control structure to allow discharges between northern and southern compartments

Levees:

1. L-508N Northern compartment levee
2. L-508S Southern compartment levee
3. L-508I Northern internal compartment levee
4. L-508M Wetland buffer strip berm

Canals:

1. C-508N Northern compartment seepage canal on eastern boarder
2. C-508S Southern compartment seepage and conveyance canal
3. C-536 Improved L-36 borrow - conveyance improvement is not anticipated
4. Hillsboro Canal Conveyance improvements for the Hillsboro Canal to the LWDD E-1 canal (US-441).

Utilities:

1. Phone and electric

Design Region: seep3a (WCA-3A Seepage Management Area)

Design:

- Design conveyance canals, levees, gated culverts, gated spillways, tunnels, siphon and a pump station.
- Provide flowage easement for FPL transmission line maintenance road by raising grade and installing culverts

Pumps:

1. S-500

Siphons:

1. S-502

Spillways:

1. S-502A
2. S-502B

NOTE: Griffin Road will be rerouted over S-502A and S-502B service bridge. This design will eliminate the need to bridge over C-500 and C-502.

Gated Culverts:

1. S-500A - See Note #2
2. S-501
3. S-502C

Un-Gated Culverts:

1. S-500B - See Note #2
2. S-500C - See Note #2

Levees:

1. L-502A
2. L-37 - Extension at northern end in proximity of US-27/I-75 interchange

Canals:

1. C-500A
2. C-502A - Due to the close proximity of US-27, earthwork will include 29000' in length of stormwater runoff design from US-27. The design will require earthwork grading to create a dry storage swale approximately 1' deep. Assume 20-30' width along the 29000' length. Assume one 10' long concrete weir every 500' (57 required).

Notes:

1. ROW - Eastern boundary limits begins approximately 70' from US-27 northbound lane.

2. S-500A, S-500B and S-500C configuration is based on a Type, Size and Location Study No.1 done by URS Group, Inc. recommendation in A/E Services Contract DACW17-99-D-0048, January 2001

Utilities:

1. Fiber optics along west side of US-27
2. FPL high power transmission lines
3. Phone and electric in northwestern section of interchange
4. Petroleum pipe in northwestern section of interchange

Design Region: seep3b (WCA-3B Seepage Management Area)

Design:

- a) Design conveyance canals, levees, gated culverts, gated spillways, tunnels, and a pump station.
- b) Clear and grub Melaleuca areas
- c) Provide flowage easement for FPL transmission line maintenance road by raising grade and installing culverts

Pumps:

1. S-507 Holy Lake Mobile Home Community

Spillways:

1. S-32 Remove and rebuild
2. S-32A Removal
3. S-514
4. S-516

Gated Culverts:

1. S-515

Gated Tunnels:

1. S-30 Removal and rebuild - flow under US-27
2. S-508 Flow under Krome Ave

Levees:

1. L-502B
2. L-502C Holly Lake Mobile Community

Canals:

1. C-500B
2. C-502B
 - Includes concrete flume section between US-27 and Holly Lake Mobile Community
 - Due to the close proximity of US-27, earthwork will include 35300' in length of stormwater runoff design from US-27. The design will require earthwork grading to create a dry storage swale approximately 1' deep. Assume 20-30' width along the 35300' length. Assume one 10' long concrete weir every 500' (69 required).
3. C-502C Holly Lake Mobile Home Community
4. C-6 Canal improvement to 2000 cfs for 2500' southeast of the confluence of C-500B and C-6
 - HW = 6.30 ft-NGVD
 - TW = 6.10 ft-NGVD

Bottom Elevation = -13.80 (20 ft deep)

WPA Feasibility Study – Documentation on Selected Plan Scope of Work
DRAFT – Subject to Revision

Bottom Width = 35 feet
Top Width = 75 feet (at ground)
Ground Elev used = 6.20 ft-NGVD (will need bank
levees)
Side Slopes (both) = 1 on 1
Flow = 2000 cfs
Length of Improvement = 2500 feet
Channel Velocity = 1.82 fps

Bridges:

1. B-500 FPL Substation over C-502B
2. B-501 Holly Lake Mobile Home Community over C-502B
3. B-502 Krome Ave crossing at C-6

Notes:

1. ROW - Eastern boundary limits begins approximately 70' from US-27 northbound lane.

Utilities:

1. Fiber optics along west side of US-27
2. FPL Substation
3. High tension FPL power lines
4. Phone and electric

Design Region: c11 (C-11 Impoundment)

Design:

- a) Design levees and seepage canals for 4' deep impoundment. Provide revetment for inside slope protection where sharp corners occur.
- b) Design gated spillway and a pump station for a 6' deep impoundment.
- c) Design gated culvert structures for seepage control.
- d) Degrade SW 26th and SW 36th St inside impoundment boundary.
- e) Clear and grub within impoundment.
- f) Relocate SBA communications tower outside impoundment.
- g) Partial backfill rock/sand mining pits within impoundment if they are deep enough to contribute to seepage problems.
- h) Provide parking, scenic overlook, and boat ramp in southwest area off of US-27.

C-11 Impoundment

Design Elevations (Ft-NGVD)
Top Of Levee 18.0
Surcharge Pool 13.0
Full Pool (Spillway Invert) 11.2
Normal Pool 10.0
Average Impoundment Ground 6.0
Excavation Max Depth -1.0

Storage Area = 1490 Acres
Normal Pool Depth = 4 Feet
Storage = 5960 Acft

Mitigation Area

Design Elevations (Ft-NGVD)
Top Of Levee 11.0
Maximum Mitigation Pool 8-8.5
Average Local Ground 6.5

Mitigation Storage Area = 205 Acres

Pumps:

1. S-503 Impoundment inflow
2. S-505C Seepage control on western boundary

Spillways:

1. S-504 Impoundment discharge

Gated Culverts:

1. S-505B Seepage control on eastern boundary

2. S-506 Control discharge from impoundment into mitigation area

Un-Gated Culverts:

1. S-505A Weir control to prevent backpumping from drawing down canal upstream

Un-Gated Tunnels:

1. S-504A

Levees:

1. L-511 4' deep impoundment levee
2. L-511M 2' deep impoundment area around mitigation

Canals:

1. C-511 Seepage canals around perimeter of impoundment - Due to the close proximity of US-27, earthwork will include 10500' in length of stormwater runoff design from US-27. The design will require earthwork grading to create a dry storage swale approximately 1' deep. Assume 20-30' width along the 10500' length. Assume one 10' long concrete weir every 500' (20 required).

Utilities:

1. Fiber optics along SW 26th St
2. SBA communications tower
3. Phone and electric

Design Region: c9 (C-9 Impoundment)

Design:

- a) Design levees and seepage canals for 4' deep impoundment. Consider future ASR systems retrofit in design. Provide revetment for inside slope protection where sharp corners occur.
- b) Design gated spillway and a pump station for a 6' deep impoundment.
- c) Design gated culvert structures for seepage control.
- d) Miramar Parkway future route is along Pembroke Road alignment through the 2' impoundment (mitigated wetland). Design for 120' width. Allow for flow between north and south areas. Possibly raise Miramar Parkway 120' ROW with fill to elevation 11.5-12.0 ft-NGVD to allow for future improvement.
- e) Clear and grub within impoundment.
- f) Provide parking and scenic overlook in southwest area off of US-27.

C-9 Impoundment

Design Elevations (Ft-NGVD)
Top Of Levee 16.5
Surcharge Pool 11.5
Full Pool (Spillway Invert) 9.7
Normal Pool 8.5
Average Impoundment Ground 4.5
Excavation Max Depth -2.0

Storage Area = 1650 Acres
Normal Pool Depth = 4 Feet
Storage = 6600 Acft

Mitigation Area

Design Elevations (Ft-NGVD)
Top Of Levee 9.5
Maximum Mitigation Area Pool 6.5
Average Local Ground 4.5

Mitigation Storage Area

North Of Miramar Pkwy = 240 Acres
South Of Miramar Pkwy = 120 Acres

Pumps:

1. S-509 Impoundment inflow
2. S-512A Seepage control of eastern boundary

Spillways:

1. S-510 Impoundment discharge

Gated Culverts:

1. S-511 C-9 water level control east of impoundment
2. S-512B Seepage control on western boundary
3. S-513A Control discharge from impoundment into mitigation area

Un-Gated Culverts:

1. S-512C-E Seepage control of eastern boundary of mitigation area between north and south areas separated by Miramar Parkway
2. S-512C-W Seepage control of western boundary of mitigation area between north and south areas separated by Miramar Parkway
3. S-513B Allow water level equalization between mitigation areas north and south of Miramar Parkway alignment

Levees:

1. L-509 4' deep impoundment levee
2. L-509M 2' deep impoundment area around mitigation

Canals:

1. C-509 Seepage canals around perimeter of impoundment - Due to the close proximity of US-27, earthwork will include 18000' in length of stormwater runoff design from US-27. The design will require earthwork grading to create a dry storage swale approximately 1' deep. Assume 20-30' width along the 18000' length. Assume one 10' long concrete weir every 500' (35 required).
2. C-9 Canal improvement to 2500 cfs for 5100' east of US-27
HW at S-30 = 4.00 ft-NGVD
TW at S-509 (PS) = 3.70 ft-NGVD
Mean channel velocity = 1.80 fps (OK)

Depth = 20 ft
Bottom Elevation = -16.15 ft-NGVD
Bottom Width = 50 feet
Top Width = 98 feet
Side Slopes are 1 on 1

Utilities:

1. Phone and electric

Notes:

1. ROW - Western boundary limits begins approximately 70' from US-27 northbound lane.

Issues:

1. ASR system is beneficial in controlling seepage by drawing down impoundment. Seepage cannot be controlled if impoundment is kept full.

Design Region: dblc (Dade-Broward Levee and Canal)

Design:

- a) Design conveyance canals, levees, gated culverts, gated spillways, tunnels, and a pump station.

Spillways:

1. S-335 Remove and rebuild

Gated Culverts:

1. S-517A Existing culvert, No change required
2. S-517B Wellfield Protection canal crossing under C-503
3. S-519A Discharge control from C-503 to pump station S-520
4. S-519B Discharge control from C-4 to pump station S-520

Ungated Culverts:

1. S-518 FPL maintenance access to Midway transmission line corridor that crosses C-503

Levees:

1. L-503W Western levee along C-503 length
2. L-503E Eastern levee along C-503 length

Canals:

1. C-501 Improved L-30 canal
2. C-503 New SDCS canal
3. C-4 Extension – From C-4 to S-519B into S-520 pool

Flow Barriers:

1. S-380E Dry season temporary flow barrier on C-4

Utilities:

1. High tension FPL power lines
2. Phone and electric
3. Fiber optics cable along Tamiami Trail

Issues:

1. The structure S-380E on C-4 is a dry-season only temporary flow barrier to divert flows to C-2. The configuration recommended will be an OHA pneumatic crest gate system manufactured by Obermeyer Hydro, Inc.
<http://www.obermeyerhydro.com/>

Design Region: bird (Bird Drive Recharge Area)

Design:

- a) Design levees for 4' and 2' deep impoundment. Levees are designed with minimal height so as minimize impacts to existing wetlands. Lower levee heights are planned for the design for the recharge area than would be planned for an impoundment that stores water. Modeling results have shown that depths in excess of 2' are not obtained because of the high permeability of the area.
- b) Design gated culverts and a pump station for a 4' deep impoundment.
- c) Design pump stations for seepage control.
- d) Design SDCS conveyance canal C-504.
- e) Minor clearing and grubbing within 2' impoundment.

Recharge Area

Design Elevations (Ft-NGVD)

Top Of Levee 10.5

Recharge Impoundment Pool 7.0-9.0

Average Impoundment Ground 5.5

Storage Area = 1420 Acres

Mitigation Area

Design Elevations (Ft-NGVD)

Top Of Levee 9.0

Maximum Pool 7.0-7.5

Average Impoundment Ground 5.5

Storage Area = 2360 Acres

Pumps:

1. S-520 SDCS deliveries and Impoundment inflow
2. S-523A Seepage control pump at northeast corner
3. S-523B Seepage control pump for southern footprint area

Gated Culverts:

1. S-521A Discharge to C-504 inside 4' impoundment
2. S-521B 4' impoundment inflow
3. S-522 Impoundment discharge of C-504 inside 4' impoundment
4. S-523E Seepage control return and possible backpumping of Bird Road canal to the east
5. S-524 Impoundment compartment level control structures (have not resolved the need - see no requirement if transmissivity is as high as anticipated out of 4' impoundment)

Un-gated Culverts:

1. S-523C Seepage control and return of southeastern boundary
2. S-523D Seepage control and return of northeastern boundary

Levees:

1. L-504 Impoundment perimeter of 2'-4' depth area
2. L-504M 1' deep impoundment area around mitigation

Canals:

1. C-504 SDCS deliveries - 10,690' of canal is in close proximity of southbound lane of Krome Avenue where additional guardrail will be require
2. C-1W Improvement

Tunnels or Bridges:

1. S-522A C-504 crossing under Krome Ave
2. S-522B C-504 crossing under North Kendall Drive
3. B-503 Railroad crossing - C-504 crossing under S.C.L.R.R.
4. S-522C C-504 crossing under county road

Utilities:

1. Phone and electric

Issues:

1. Southern impoundment levee alignment will account for proximity to DERM wellfield.
2. Route of C-504 south of impoundment has several crossing to make depending on chosen path. The route will have to be carefully analyzed.