

**FACT SHEET
FOR
FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
INDUSTRIAL WASTEWATER FACILITY PERMIT**

Permit No.: FL0177954

Permit Writer: John Hallas

Application No.: FL0177954-003-IW7A

Application Date: February 25, 2005

1. SYNOPSIS

a. Name and Address of Applicant:

South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406

For:
Stormwater Treatment Area 5 (STA-5)

b. Type of Facility:

Primary SIC: 3822 Environmental Controls
Secondary SIC: Standard Industrial Codes not available
The facility is a combination of distribution components and treatment area. The treatment area is a designed and engineered flow through marsh system which utilizes natural biological processes to remove excess phosphorus in stormwater runoff from the C-139 Basin and other sources. STA-5 is a stormwater management system (SMS) as defined in Subsection 373.403(10), Florida Statutes (F.S.). At the present time, structural, operational and vegetation improvements and enhancements are under way in accordance with the Everglades Protection Area Tributary Basins Long Term Plan for Achieving Water Quality Goals (Long-Term Plan), to optimize performance as needed to achieve the phosphorus criterion in the Everglades Protection Area. Construction of these improvements and enhancements shall be completed in accordance with the schedules in the Long-Term Plan, and in the accompanying Administrative Order (AO-011-EV) Paragraph 19. Additional enhancements to STA-5 may occur as part of the adaptive implementation process envisioned in the Long-Term Plan.

c. Design Capacity of Facility:

STA-5 is designed to provide 6,190 acres of effective treatment area and treat a long-term average of approximately 159,100 acre-feet of stormwater runoff annually.

d. Applicant's Receiving Water

Monitoring Group D-001 (G-344A): Discharges to the Miami Canal, Class III Fresh waters.

Latitude: 26° 27' 30" N Longitude: 80° 53' 01" W

Monitoring Group D-002 (G-344B): Discharges to the Miami Canal, Class III Fresh waters.

Latitude: 26° 27' 04" N Longitude: 80° 53' 01" W

Permittee: South Florida Water Management District

Project: Stormwater Treatment Area 5

File No.: FL0177954-003-IW7A

Page 2 of 15

Monitoring Group D-003 (G-344C): Discharges to the Miami Canal, Class III Fresh waters.

Latitude: 26° 26' 34" N Longitude: 80° 53' 01" W

Monitoring Group D-004 (G-344D): Discharges to the Miami Canal, Class III Fresh waters.

Latitude: 26° 26' 11" N Longitude: 80° 53' 01" W

Monitoring Group D-005 (G-344E): Discharges to the Miami Canal, Class III Fresh waters.

Latitude: 26° 25' 46" N Longitude: 80° 53' 01" W

Monitoring Group D-006 (G-344F): Discharges to the Miami Canal, Class III Fresh waters.

Latitude: 26° 25' 20" N Longitude: 80° 53' 01" W

e. Associated Documents

The following documents are associated with the NPDES Permit No. 0177954-003:

1. **Administrative Order AO-011-EV**- This Order details a compliance schedule for achieving the conditions set forth in this permit. A summary of the associated schedules can be found in the Administrative Order section of this Fact Sheet.
2. **Exhibit A:** Technical Support Document for the STA-5 TBEL¹- This document establishes TBEL limits and identifies factors which may impact flows and loads associated with the treatment system.
3. **Exhibit B:** Dissolved Oxygen Site Specific Alternative Criteria Technical Support Document²- This document establishes an alternative criterion for dissolved oxygen in the Everglades Protection Area pursuant to Section 62-302.800, F.A.C.
4. **Exhibit C:** Stormwater Treatment Area 5 & 6 Pollution Prevention Plan (PPP)³- The PPP provides a summary of operations for STA-5, and describes factors which may impact those operations.
5. **Exhibit D:** The Everglades Protection Area Tributary Basins Long-Term Plan for Achieving Water Quality Goals⁴- The Long-Term Plan includes structural, vegetative, and operational improvements and enhancements which will aid in the optimization of the hydraulic distribution and phosphorous removal of the project. The Long-Term Plan also includes detailed schedules associated with the identified improvements and enhancements. Revisions to the Long-Term Plan are available on the District's webpage for the Long-Term Plan: <http://www.sfwmd.gov/sta>.
6. **Exhibit E:** Treatment Wetlands⁵- This document provides background on the characteristics of wetland treatment systems.
7. **Exhibit F:** Test for Determining Achievement of 50 Part Per Billion Phosphorus Initial TBEL For Everglades Stormwater Treatment Areas⁶

¹ Exhibit A: Goforth, G., N. Ircanin, S. Hill, S. Xue, T. Piccone, F. Nearhoof, and Ken. Weaver, *Technical Support Document for the STA-5 TBEL*. 2007.

² Exhibit B: Weaver, Ken, Florida Department of Environmental Protection, *Dissolved Oxygen Site Specific Alternative Criteria Technical Support Document*, January 2004.

³ Exhibit C: South Florida Water Management District, *Stormwater Treatment Area 5 Pollution Prevention Plan*, April 1999 and subsequent revisions

⁴ Exhibit D: South Florida Water Management District, *Everglades Protection Area Tributary Basins Long-Term Plan for Achieving Water Quality Goals*, October 2003 and subsequent revisions.

⁵ Exhibit E: Kadlec, Robert and Robert Knight, *Treatment Wetlands*, Boca Raton, pg. 474-475, 1996.

⁶ Exhibit F (Nearhoof *et al*, 2005)

f. Facility Description

The individual Everglades Construction Project (ECP) components included in STA-5 are as follows: The STA-5 Inflow Structures; STA-5 Interior Treatment Works; STA-5 Outflow Structures; STA-5 Discharge Canal and Associated Bridge; STA-5 Seepage Collection and Return Systems; STA-5 Water Supply Pump Stations; G-406 Structure; G-409 Pump Station; G-357 Structure; G-404 Pump Station; Southern L-4 Levee Gap; Deer Fence Canal Bridge and Deer Fence Road; Rotenberger Hydropattern Restoration; STA-5 Outlet Canal. Collectively, these components are referred to as the District's STA-5 Project (STA-5).

STA-5 Inflow Structures

The G-342A-F structures consist of a series of six gated concrete box culverts that control inflow into STA-5. G-342A and B direct flows into Flow-way 1, G-342C and D direct flows into Flow-way 2, and G-342E and F direct flows into Flow-way 3. Structures G-342A-D are situated along the western perimeter levee adjacent to the L-2 Borrow Canal. Structures G-342E and F are situated along the western perimeter levee adjacent to the L-3 Canal. Water is conveyed eastward from these structures to the upstream end of each flow-way by means of an inflow canal, and distributed to the treatment area by means of a spreader canal aligned north-south. Each of the six structures consists of a single 10-ft wide by 6-ft high reinforced concrete box culvert approximately 68 feet long. Each culvert is fitted with a 10-ft by 6-ft control gate at its upstream end.

STA-5 Interior Treatment Works

The STA-5 interior works are divided into three parallel treatment flow-ways, each consisting of two treatment cells in a series flowing in an easterly direction. Flow-way 1 (Cells 1A and 1B) and Flow-way 2 (Cells 2A and 2B) each provide approximately 2,055 acres of treatment area. The addition of Flow-way 3 (Cells 3A and 3B) provides approximately an additional 2,560 acres of treatment; thus, the total available treatment area of STA-5 is approximately 6,670 acres.

With the exception of Cell 1B, STA-5 Flow-ways 1 and 2 have been developed in emergent macrophyte vegetative communities; Cell 1B has developed as a submerged aquatic vegetation (SAV) community. As described in the District's Long-Term Plan, Cell 2B has been converted to an SAV community. In Flow-way 3, Cell 3A was developed as an emergent vegetative community and Cell 3B was developed as an SAV cell as described in the Long-Term Plan. Water flow and water elevations are controlled and directed through STA-5 via interior levees, canals, and the synchronized operation of water control structures (G-343A-J).

The G-343A-J structures consist of ten concrete box culverts with upstream gates that control water levels in the western treatment cells and flow into the eastern cells:

- structures G-343A-D control stages in Cell 1A;
- structures G-343E-H control stages in Cell 2A; and
- structures G-343I-J control stages in Cell 3A.

Each of the G-343A-H structures consists of a single 10-ft wide by 8-ft high reinforced concrete box culvert approximately 60 feet long. The invert elevation of each box is 5.0 ft NGVD. Structures G-343A-H have single 10-ft high by 8-ft wide vertical lift gates. Each of the G-343I & J structures will consist of a single 10-ft wide by 8-ft high reinforced concrete box culvert approximately 45 feet long. The invert elevation of each box will be 4.0 ft NGVD. Structures G-343I & J will have double leaf 10-ft high by 8-ft wide vertical lift gates. Local and remote operation of the G-343 gates are possible. Remote operation via telemetry is from the District's West Palm Beach Operations Control Center. Headwater, tailwater stage and gate position information are available to the remote operators, while headwater and tailwater staff gauges and gate position indicators are available for local operation. In the event of loss of electrical power at the site, the structures can be manually operated by means of a portable generator or truck-mounted motor.

STA-5 Outflow Structures

The G-344A-F outflow structures consist of six gated concrete box culverts controlling outflows from Flow-ways 1-3 to the STA-5 Discharge Canal. Structures G-344A-F are situated along the eastern perimeter levee adjacent to the Rotenberger Wildlife Management Area (WMA). Treated water is conveyed from these structures east to the STA-5 Discharge Canal where STA-5 discharges may be directed either to the Miami Canal (via the STA-5 Outlet Canal) or to Rotenberger WMA (via the G-410 Pump Station). Each of the G-344 structures consists of a single 10-ft wide by 10-ft high reinforced concrete box culvert approximately 55 feet long. Each culvert is fitted with a 10-ft wide by 10-ft high control gate at its upstream end. All of the outflow structures will be regularly operated to maintain STA-5 interior stages at desired levels. The structures will be fully closed only when interior stages fall below prescribed levels, when it is desirable to prevent STA-5 discharges or to close off a flow-way for maintenance.

STA-5 Discharge Canal and Associated Bridge

Treated water is directed to the STA-5 discharge canal via the outflow structures along the eastern perimeter levee. The Discharge Canal is located on the east side of STA-5 and continues along the western and northern boundary of the Rotenberger WMA, ultimately connecting to the Miami Canal. Approximately 1.0 mile of new discharge canal extension is being constructed along the eastern boundary of the project area to serve as a flow outlet for the new STA-5 Flow-way 3 treatment area. This canal will be a southerly extension of the existing STA-5 Discharge Canal.

In order to provide a means for vehicles to cross the STA-5 Discharge Canal and maintain a continuous access to the Miami Canal, a bridge was constructed across the STA-5 Discharge Canal along the northwestern portion of the Rotenberger Tract. Access along the west side of the Miami Canal follows the new East Perimeter Levee of the Rotenberger Tract.

STA-5 Seepage Collection and Return Systems

The existing STA-5 Seepage collection canals are located along the northern boundary of Flow-way 1 and the southern boundary of Flow-way 2. The seepage canals extend 8 to 14 feet below ground elevation into underlying layers of relatively porous limestone and sand.

STA-5 has the capacity to return seepage and re-circulate water as part of project operations. The function of the Flow-way 1 seepage collection canal is to return flow-way seepage to the upstream (western) portion of the Cells 1A and 1B. This seepage collection canal is located between the northern perimeter levee of Flow-way 1 and the adjacent private property to the north, and extends from the L-2 borrow canal to the STA-5 discharge canal.

Seepage return pump stations G-349A and G-349C maintain the water levels in the northern seepage collection canal. These structures are located on the north perimeter levee; with G-349A at approximately 0.5 mile east of the L-2 borrow canal, just east of structure G-360B, and G-349C located at the northwest corner of Cell 1B. The purpose of these stations is to return seepage from the seepage collection canal to the treatment cells. In addition, G-349A and C, working in conjunction with pump station G-349B (described below), can also be utilized in time of drought for the purpose of providing supplemental water to the treatment cells to prevent dryout. Each station has two (2) 20-inch diameter axial flow pumps with 60-HP electric powered engines. Each pump has a discharge capacity of 18-27 cfs depending on headwater and tailwater stages, for a combined capacity at each station of 36-54 cfs. This system serves Flow-ways 1 and 2 because the G-345 structure (described below) allows supplemental water entering Cell 1B to be passed into Cell 2B.

Due to the slope in ground topography from west to east, the Flow-way 1 seepage canal is divided into two separate operational sections. Control structure G-360B will control water levels within the seepage canal and limit drawdown in the western section of the canal to an elevation of 11.0 ft NGVD. The structure consists of a 55-ft long 3-ft diameter corrugated aluminum pipe with a 3-ft wide by 6-ft high flashboard riser and is located approximately one half mile east of the L-2 Borrow canal. A weir plate is attached to the riser and the plate has

a crest elevation of 10.5 ft NGVD. A single flashboard is installed above the weir crest to maintain the water level upstream (west end) of each structure. No operation is envisioned for this structure. However, flashboards may be added or removed to alter the weir crest height.

Additional water is passed into the northern seepage canal via the G-348 structure. G-348 is a single culvert located near the northeast corner of STA-5 and serves to transfer seepage flows from the discharge canal seepage canal to the north seepage canal. The discharge canal seepage collection canal is approximately 3.3 miles in length and extends from the northeast corner of STA-5 to just south of the Manley Canal. The discharge canal seepage collection canal is located between the discharge canal and adjacent farm fields. The G-348 structure is a 48-inch diameter pipe approximately 80 feet long. A flap gate on the west end of the pipe prevents unintended increases in stages east of G-348 during delivery of supplemental water to STA-5 (via G-349B to North Seepage Canal). G-348 has a maximum flow capacity of 18 cfs.

The function of the existing Flow-way 2 seepage collection canal (on the southern perimeter of Flow-way 2) was altered as a result of the addition of Flow-way 3. As part of the Flow-way 3 design, the canal area between Flow-ways 2 and 3 is entirely contained, and the area can be allowed to seek a water level equalized with the adjacent flow-ways. With this design, the existing G-350A pump station (located in the divide levee on the southern end of Flow-way 2, just east of the G-360A structure) can be abandoned and decommissioned, since it may become submerged and is no longer necessary to prevent seepage impacts to the adjacent properties. Water in this isolated canal area is anticipated to flow very slowly to the east due to seepage losses to the discharge canal along the east side of the STA. Temporary pumping equipment owned by the District will be used as required to pump water from the isolated canal area into the flow-ways.

STA-5 Water Supply Pump Stations

Pump station G-507 is located on the northeast side of STA-5, at the point that the discharge canal bends to the east. The purpose of this pump station is to provide supplemental water to the STA by moving water from the STA-5 discharge canal into Cell 1B during periods of drought. Supplemental water entering STA-5 Cell 1B may be passed into Cell 2B via the G-345 Structure. The station has a single 36-inch diameter pump with a 125-Hp diesel powered engine with a discharge capacity of 51 cfs. The pump can only be started manually on site as requested by the District's operations control center in West Palm Beach.

Pump station G-349B is also located on the northeast side of STA-5, at the point that the discharge canal bends to the east. The purpose of this pump station is to provide supplemental water to Cell 1A by moving water from the STA-5 discharge canal into the north seepage collection canal during periods of drought. In this mode, pump station G-349A will be activated along with G-349C to pump the water from the seepage collection canals into their respective treatment cells.

Pump station G-350B is located at the southeast corner of Flow-way 2 at the confluence of the isolated canal area (between Flow-ways 2 and 3) and the STA-5 Discharge Canal. Drought water supply will be provided to directly from the STA-5 discharge canal to the isolated canal area between Flow-ways 2 and 3, via the existing G-350B pump station.

Both G-349B and G-350B have a single 24-inch diameter axial flow pump with a 125-Hp electric powered engine, and each pump has a discharge capacity of 39 cfs.

G-406 Structure

As part of this project, the L-3 canal diversion levee associated with the G-406 Structure has been lowered by 4.25' (from elevation 21.75 ft. to elevation 17.50 ft.) to increase discharge of C-139 Basin stormwater into the L-3 canal.

G-409 Pump Station

Permittee: South Florida Water Management District

Project: Stormwater Treatment Area 5

File No.: FL0177954-003-IW7A

Page 6 of 15

G-409 is a pump station with a total capacity of 190 cfs. G-409 is located south of STA-6, Section 1, upstream of the G-155 structure on the existing levee which connects to the L-28 levee immediately to the east. It functions to supply irrigation water to the Seminole Tribe of Florida's Big Cypress Reservation.

G-357 Structure

G-357 is a two barrel box culvert with a twin lift gate control system. This structure prevents water movement between the Miami and L-4 canals during the operation of the G-404 pump station.

G-404 Pump Station

G-404 is a pump station with a total capacity of 570 cfs. G-404 is located at the confluence of the Miami Canal and the L-4 borrow canal. It functions to direct water into and move water westerly in the L-4 borrow canal in order to supply treated water to locations that historically received water from the L-3 borrow canal.

Southern L-4 Levee Gap

G-404 pump station in the L-4 borrow canal directs water into the L-3 canal extension for water delivery to western WCA 3A. At this location, a small canal connects the L-4 borrow canal to the existing L-3 extension canal.

Deer Fence Canal Bridge and Deer Fence Road

Deer Fence Canal Bridge is a 100 ft. two lane prestressed concrete bridge (Deer Fence Canal Bridge). Approximately 170 ft. of limerock road connects the bridge to Deer Fence Road. Deer Fence Road from the East line of County Road 835 right-of-way East has been paved (approximately 200 feet); Deer Fence Road from the end of the pavement to Deer Fence Bridge has been graded. A surface water management system associated with the paving of Deer Fence Road and two 72 inch culverts in the S&M Canal have been constructed. The Deer Fence Bridge and Deer Fence Road improvements provide the U.S. Sugar Corporation access to its Unit 2 Ranch. The two 72 inch culverts in the S&M Canal are necessary to access a 500 acre wetland tract to the north.

Rotenberger Hydropattern Restoration

The G-410 pump station allows a portion of STA-5 discharges to be routed to the Rotenberger WMA and ultimately to the Miami Canal via Rotenberger discharge structures G-402A-D. The remainder of STA-5 discharges are directed to the Miami Canal via the STA-5 Discharge and Outlet Canals.

Project features include 240 cubic foot per second (cfs) electric powered pump station (G-410) consisting of two 48-inch vertical axial pumps. Discharges from the G-410 pump station are distributed in Rotenberger through a one-mile long spreader canal which is parallel to the west perimeter levee of the Rotenberger. The spreader canal is connected to a 2-1/2 mile long borrow canal, for a total spreader canal length of 3-1/2 miles. Discharges out of Rotenberger are directed into the Miami Canal via three 54-inch diameter gated culverts (G-402 A-C) and one 42-inch diameter gated culvert (G-402D), along the east side of Rotenberger. There is also a 1/4 mile long collection canal upstream of each gated culvert.

The District operates the G-410 pump station to achieve an initial hydropattern restoration target based on a 31-year average stage prediction by the Natural Systems Model (NSM). The NSM and the South Florida Water Management Model are currently the best available technology to estimate historic water levels within the Everglades, including Rotenberger. Data will be collected during restoration and recommendations will be made for operational modifications to maximize environmental benefits to Rotenberger.

STA-5 Outlet Canal

The STA-5 Outlet Canal extends south along the eastern boundary of the Rotenberger WMA to connect with the Miami Canal downstream of the G-373 structure (STA-3/4 intake structure) to ensure that treated water from STA-5 is not directed into STA-3/4 for re-treatment.

Structural, Operational and Vegetation Enhancements

In accordance with the EFA, the District has conducted other structural, operational and vegetation enhancements to STA-5 designed to achieve compliance with state water quality standards. These are described in detail in the District's Long-Term Plan and are summarized below:

- The conversion of Cell 2B from emergent macrophyte vegetation to SAV.
- In their original form, the G-343 structures that subdivide Flow-way 1 and 2 inhibited the District's ability to control proper flow distribution across the STA, particularly in response to significant inflow events. The limited flexibility in the operation of the G-343 Structures led to a higher-than-intended frequency and volume of diversion (through Structure G-406), which would have continued to adversely impact the performance of STA-5. To address these limitations and afford the District increased flexibility in the operation of STA-5, the existing G-343 Structures have been modified through the addition of remotely operable gates, and the upstream weir controls removed. This modification also included the addition of telemetric control to the structures, coupled with the addition of stilling wells for water level data acquisition in the upper ends of Cells 1B and 2B. It was also necessary to extend an overhead power transmission line along the interior levee to service the modified water control structures.
- Flow obstructions in Cells 1B and 2B directly upstream of the G-344 outflow structures have been removed to maintain proper flow at the eastern end of the flow-ways.

Recreational Facilities

In fulfillment of the public access and recreation requirements of the EFA, Subsection 373.4592 (4)(a) F.S., and as further described in Subsections 373.1391(1)(a) and (b) F.S., recreational facilities are proposed at STA-5. The proposed recreational facilities shall be designed to ensure compatibility with the restoration goals of the ECP and the water quality and hydrological purposes of the STAs. The proposed STA-5 facilities include:

- an information kiosk, a composting toilet, an asphalt parking area, landscaping, pedestrian gates, signage and fencing as needed to define public access areas and to protect sensitive equipment.

STA Operations Summary.

STA-5 is designed to treat inflows (via the STA-5 Inflow Structures) from the L-2 and L-3 Borrow Canals which consist of agricultural runoff and discharges from the C-139 Basin and the C-139 Annex Basin. After introduction to STA-5, the water is treated within the existing treatment Flow-ways 1 and 2 utilizing natural, passive physical, and biological processes for nutrient removal. STA-5 has recently been expanded to include a third parallel flow-way (Flow-way 3) which will increase operational flexibility for the STA and reduce the phosphorus load on the current STA-5 footprint. Treated water exits STA-5 (via the STA-5 Outflow Structures) into the STA-5 Discharge Canal. Assuming normal operating conditions, the treatment path culminates with discharges directed either to the Miami Canal (via the STA-5 Outlet Canal) or to the Rotenberger WMA via the G-410 Pump Station. Discharges to the Rotenberger WMA are for the purpose of hydrologic restoration of the approximate 29,000-acre WMA. Wetlands and surface waters located within the receiving water bodies (Rotenberger WMA and the Miami Canal) are Class III waters; and the Rotenberger WMA is an Outstanding Florida Water, pursuant to Rule 62-302.700(9)(f)48, Florida Administrative Code (F.A.C.).

g. Description of Discharges (as reported by applicant)

Monitoring Groups D-001, D-002, D-003, D-004, D-005, and D-006: Discharge of treated stormwater from the C-139 Basin and C-139 Annex.

2. BASIS FOR EFFLUENT LIMITS AND MONITORING REQUIREMENTS

The following table provides the basis for Part I.A. provisions.

Table 1. Basis for Provisions of Part I.A: Outfall D-001 and D-002

Parameter	Units	Limit	Statistical Basis	Rationale
pH	SU	6.0	Daily Minimum	Rule 62-302.530(52), F.A.C.
pH	SU	8.5	Daily Maximum	Rule 62-302.530(52), F.A.C.
Phosphorus, Total (as P)	ppb	10 ⁷ See I.A.5 ⁸ See I.A.6	⁶	Rule 62-302.540 F.A.C
Oxygen, Dissolved (DO)	MG/L	See I.A.7 and Report	See attached DO SSAC	Rule 62-302.800, F.A.C.
Flow	CFS	See I.A.6	Daily Average	

The following were used as the basis of the permit limitations/conditions:

a. FAC refers to various portions of the Florida Administrative Code.

The effective dates of relevant provisions of FAC Rule Chapters cited in the permit and in this document are as follows:

<u>Chapter</u>	<u>Effective Date</u>
62-4	05-01-03
62-160	06-08-04
62-302	01-09-06
62-601	12-24-96
62-620	12-23-04
62-650	12-26-96
62-660	05-10-05

b. FS refers to various portions of the Florida Statutes.

c. CFR refers to various portions of the Code of Federal Regulations, Title 40.

The Department has concluded that the most appropriate way to measure whether the STA-5 project is achieving the design goal for phosphorus requires consideration of the known characteristics of wetland treatment systems. Wetland treatment systems reach optimal performance only after initial periods called “start-up” and “stabilization” phases. This conclusion is consistent with the findings of Kadlec and Knight (Exhibit E, pg. 474 – 475).

As treatment cells are constructed and managed to optimize performance, they will undergo three operational phases, each with different levels of performance:

Start-Up Phase. During the initial Start-Up Phase of a new cell or new flow-way, the permittee shall monitor phosphorus concentrations within the facility to demonstrate that the project is achieving a net reduction in phosphorus. Portions of STA-5 may operate independently of each other. Under those circumstances, Start-Up Phase operation and monitoring within the treatment area shall be performed as follows:

⁷ Monitoring results for this parameter shall be reported as a monthly average and as an annual average. The “monthly average” is a flow-weighted mean of the weekly effluent samples. The “annual average” shall be computed for each water year (May - April) and is equal to the flow-weighted mean concentration for the water year.

⁸ The 10 ppb effluent limit represents the phosphorus criterion set forth in Rule 62-302.540(4)(a), F.A.C. and is consistent with Section 301(b)(1)(C) of the CWA. A water quality based effluent limitation (WQBEL) for phosphorus will be established in accordance with Rule 62-650 F.A.C. and Section 373.4592 Florida Statutes by December 31, 2010 and will be a major permit modification. It is recognized that the ultimate WQBEL to be developed may be higher than a flow-weighted mean of 10 ppb. The antibacksliding provisions of the CWA and NPDES regulations do not apply to an effluent limitation with a delayed compliance date, until the date of compliance. In this case, restrictions on backsliding would not apply to the 10 ppb permit effluent limit until the established WQBEL takes effect at the end of the compliance schedule.

- i. **Establishment of Marsh Vegetation.** The permittee shall manage water depths in the treatment cells to facilitate the recruitment of marsh vegetation in accordance with the Operations Plan, which may include recirculating waters within the STA.
- ii. **Start-Up Monitoring.** On a weekly basis, the permittee shall monitor total phosphorus at the upstream side of inflow structure(s). Total phosphorus shall also be monitored on a weekly basis on the upstream side of the outflow structures.
- iii. **Phosphorus Start-Up Test.** The Phosphorus Start-Up Test for an individual flow-way or cell is based on when the above samples demonstrate, over a four-week period, a net reduction in phosphorus occurs. This net reduction shall be deemed to occur when the 4-week geometric mean total phosphorus water column concentration from samples collected at the applicable outflow structures is less than the 4-week geometric mean total phosphorus water column concentration collected at the applicable inflow structure(s).
- iv. **Discharge Operations.** Discharge operations, from an individual flow-way or cell that has passed the Phosphorus Start-Up Test described above, may commence once Initial Start-Up Phase documentation and all supporting data and analyses are submitted to the Department via regular or electronic mail. For flow-ways that have not met these tests within six months after issuance of the permit, the permittee shall submit status updates regarding progress toward and identifying strategies and timelines to achieve this test.
- v. **Initiation of Individual Flow-way (Stabilization and Routine Operation) Discharges and Monitoring.** Once flow-through discharges from a flow-way begin, the permittee shall initiate routine water quality monitoring for that flow-way consistent with the monitoring program described in Part I.A.1-7 of the NPDES permit..

Stabilization Phase (Flow-through Operations)– An STA enters the Stabilization Phase after any of four antecedent conditions: (1) once flow-through operations begin following the initial start-up of a new treatment cell; (2) when a treatment cell is taken off-line for implementation of Long-Term Plan enhancements that may have adverse impacts on STA performance, (3) planned/unplanned maintenance activities or (4) when a treatment cell is taken off-line for recovery activities associated with a major storm event that compromises the structural integrity or performance of the STA. During the Stabilization Phase the treatment vegetation will be maturing and the STA performance will generally be improving toward achieving the TBEL. However, the overall performance of the STA is extremely difficult to evaluate and predict. It is anticipated that the treatment vegetation will require one to three years after flow-through operations begin for the affected cells to achieve optimal performance. During the stabilization phase the TBEL shall apply. Once the facility achieves the TBEL it shall enter the Routine Operations Phase.

Routine Operations Phase - During the Routine Operations Phase, discharges from the STA shall achieve compliance with the TBEL as described in Section 6 below.

3. **ADDITIONAL MONITORING REQUIREMENTS**

In addition to the monitoring requirements set forth in Section I.A. of the permit, the following site specific monitoring requirements were included in Section I.E. of the permit.

As a condition of Order AO-011-EV, the permittee shall conduct monthly monitoring for Total Phosphorus at a series of sites located along a transect downstream of the G-410 Pump Station, located in the Rotenberger Wildlife Management Area (Rotenberger). The G-410 pump station operates to deliver STA-5 treated water into Rotenberger. The purpose of this transect monitoring will be to characterize the effects of the STA-5 discharge on adjacent marsh areas of the Rotenberger. The table below identifies three sampling sites located along a transect originating at RC1 sampling site directly downstream of G-410 and extending further into the

marsh at sampling sites RC2 and RC3. Upon demonstration that an additional sampling site or removal of an existing sampling site is warranted, the permittee may request a modification to the monitoring program as appropriate. The Department shall review and approve such requests on a case by case basis.

Table 2: Transect Monitoring Locations

Transect 1			
SITE	LAT_DEC	LONG_DEC	Category
RC1	26. 26.152	-80. 52.795	Impacted
RC2	26.25.944	-80.51.545	Impacted
RC3	26.25.833	-80. 50.458	Impacted ⁹

As a condition of the permit, the District is required to provide an annual assessment as to whether the facility is operating within or outside the operational envelope. It is assumed that the facility will operate routinely around the average values identified within the TBEL document. In order to provide the Department with a tool for monitoring operation within this “operational envelope”, the District shall submit an assessment based on annual inflow volumes and phosphorus loads and in comparison to the corresponding average flow and load values contained in the operational envelope (See Exhibit A, Goforth et al, 2007). If the annual inflow volumes or phosphorus loads exceed the corresponding average values of the operational envelope during an annual compliance period, the District shall conduct a review of potential causes and include this review in the annual report.

In addition to the operational envelope requirements of the permit, the associated Administrative Order requires that if annual inflow volumes or phosphorus loads exceed the corresponding maximum values of the operational envelope during an annual compliance period and such an exceedance is determined to have caused or contributed to the facility’s inability to achieve the effluent limitation, the District shall conduct a review of potential causes. This review shall include a comparison of the relationships between rainfall, runoff, and phosphorus loads from the compliance year with the rainfall/runoff/load relationships derived from the data used in deriving the TBEL as a condition of the associated Administrative Order.

4. REQUESTED VARIANCES OR ALTERNATIVES TO REQUIRED STANDARDS

Pursuant to the Everglades Forever Act (EFA, Subsection 373.4592(4)(e), F.S.), the Department and the District must evaluate existing water quality standards applicable to the Everglades Protection Area and Everglades Agricultural Area (EAA) canals. Annual assessments of the water quality standards within the Everglades Protection Area determined that dissolved oxygen (DO) concentrations below the current Class III standard of 5 mg/L (62-302.530, F.A.C.) commonly occurred in all areas of the Everglades Protection Area. These frequent excursions below the dissolved oxygen standard were not unexpected since it is widely recognized that dissolved oxygen concentrations in macrophyte dominated wetlands are normally low due to natural marsh processes. In response to these characteristics, the Department adopted the Everglades Marsh Dissolved Oxygen Site Specific Alternative Criteria (DO SSAC) which was adopted by Secretarial Order on January 26, 2004, and approved by the U.S. Environmental Protection Agency as a revision to the State of Florida’s water quality standards on June 16, 2004. Compliance with the DO SSAC shall be evaluated annually, and reported consistent with the requirements of Section I.E. 7 of the permit, using a statistical analysis to compare dissolved oxygen levels within facility discharges to predicted model values. The specific methods for determining compliance are set forth in the DO SSAC (Exhibit B).

On December 13, 2006, the District submitted an amendment to its permit application to include the use of moderating provisions pursuant to 62-302.540(6) F.A.C. Pursuant to the Rule, the use of net improvement

⁹ Transition site

Permittee: South Florida Water Management District

Project: Stormwater Treatment Area 5

File No.: FL0177954-003-IW7A

Page 11 of 15

moderating provisions is authorized until December 31, 2016 for discharges into or within the EPA upon a demonstration by the applicant that: the District will implement or cause to be implemented BAPRT as defined by Subsection 373.4592(2)(a), F.S., and further defined in the Rule, which shall include a continued research and monitoring program designed to reduce outflow concentrations of phosphorus; and, the discharge is into or within an impacted area. It is anticipated that the Department will act on the District's application for a moderating provision prior to the expiration of this permit. The issuance of an Administrative Order does not constitute agency action on or prejudice the adoption or denial of a moderating provision.

5. **ADMINISTRATIVE ORDER AND PERMIT SCHEDULES**

This permit is accompanied by an Administrative Order (Order) AO-011-EV, effective XXXXXXXX which includes a schedule of compliance. The AO is hereby incorporated by reference.

While significant reductions of phosphorus loads in water delivered to the Everglades Protection Area are anticipated to continue improving along with technological advancements, the Department recognizes that additional time is required in order to further optimize the STA-5 facility, develop and implement future phosphorus reduction measures (if necessary), and comply with the established numeric phosphorus criterion. Based on information collected to date identifying performance levels of the ECP components, the ongoing planning and design of regional water management projects, and the mechanism for identifying future improvements and enhancements through the PDE component of the Long-Term Plan, the Department has determined that the issuance of the accompanying Order, is necessary to provide the relief required for the continued success of the STA-5 facility.

Pursuant to Subsection 403.088(2)(f), F.S., the AO accompanying this permit establishes a schedule for achieving compliance with all permit conditions. The AO establishes schedules for the completion of structural, operational, and vegetation improvements and enhancements; schedules for associated project monitoring; schedules for reporting; schedules for coming back into compliance with permit conditions from transitional effects occurring as a direct result of structural, operational, and vegetation improvements and enhancements to the facility and/or any major event that effects the structural integrity of the facility or section(s) of the facility; and schedules for the planning and design of regional water management projects which will directly affect the STA-5 facility. In Addition, the Order recognizes the permittee's inability to achieve the established numeric phosphorus criterion and thereby provides relief in the form of a Technology-Based Effluent Limitation (See also Goforth *et al.*, 2007).

40 CFR Part 122.41(l)(2) and General Condition 17 of the permit require that the permittee give advance notice to the Department of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements. Since it is expected that implementation of the Long-Term Plan or any planned maintenance activities may have adverse short-term impacts on the facility's performance, the permit and AO require the permittee to provide the Department with a description of the anticipated activities; the estimated length of anticipated short term performance impacts, to include dates and times; and, strategies and timelines for the facility to achieve optimal performance.

6. **PROPOSED EFFLUENT LIMITS**

Section 373.4592(10), F.S., of the EFA requires the permittee to take such action as may be necessary to implement the Pre-2006 projects and strategies of the Long-Term Plan by December 31, 2006, so that water delivered to the Everglades Protection Area achieves state water quality standards including the phosphorus criterion. The Long-Term Plan is a comprehensive program of source controls, STAs (including STA-5), regulatory programs, and integrated Comprehensive Everglades Restoration Plan (CERP) projects to achieve phosphorus reductions for discharges to the Everglades Protection Area. The October 27, 2003 Long-Term Plan and subsequent revisions contain improvements and enhancements that were identified as part of an adaptive management process. These revisions identified several structural, vegetative, and operational enhancements for STA-5 to be completed prior to the expiration of the permit and will aid in the optimization

of the hydraulic distribution and phosphorous removal of this project. The Post 2006 improvements, enhancements, and strategies, in conjunction with the Pre 2006 projects, which are currently being completed, will continue being developed through the Long-Term Plan process to further optimize the facility's phosphorus reduction capabilities. The Department has determined that the improvements and enhancements identified for STA-5, through the iterative adaptive implementation process contained within the Long-Term Plan, are the most environmentally appropriate and expeditious means of achieving compliance with applicable phosphorus criterion in the Everglades Protection Area.

Consistent with the Long-Term Plan and Rule 62-302.540(5)(d), F.A.C., a TBEL for phosphorus has been derived in accordance with State rules, and is consistent with the Federal guidelines for best available technology economically achievable (BAT) set forth in 40 CFR Part 125.3(d). During the Routine and Stabilization Phase discharges from STA-5 via the G-344A-F outflow structures shall meet TBELs in accordance with Subsection 373.4592(10)(a), F.S., based upon BAPRT. The test for determining achievement of the STA-5 TBEL is set forth in Order AO-011-EV which accompanies this permit. The *Technical Support Document for the STA-5 Technology Based Effluent Limit* (Goforth *et al.*, 2007) further explains the derivation of the STA-5 TBELs, when the interim period limits apply, and factors which may impact flows and loads associated with the treatment system.

As part of the phased implementation of the Everglades restoration program, regional water management projects are underway that will influence the flows and phosphorus loads entering STA-5, and therefore its performance, over the life of the 5-year permits (2007-2012), and beyond. After the Stabilization Phase has been completed in the existing 2 flow-ways, and until the regional projects described below are complete, STA-5 will be in one of two **Interim Performance Periods**.

Interim Performance Period 1. Until the new Flow-way 3 has passed through Stabilization, the flows and loads to STA-5 will be treated in the two existing flow-ways, with higher phosphorus loading rates and higher TP in the outflow than anticipated in the EAA Regional Feasibility Study for the WY1995-2005 data set, which assumed all three flow-ways had passed through stabilization. The TBELs presented in this document were based on simulated STA performance during Routine Operations. In contrast, there is presently no available tool to accurately predict outflow concentrations from a stormwater treatment wetland during the Stabilization Phase, which complicates the forecasting of STA outflow concentrations. For the purpose of deriving a TBEL for the **Interim Performance Period 1**, the performance of STA-5 was forecast utilizing the WY1995-2005 inflow data set for Flow-ways 1 and 2.

Interim Performance Period 2. When the Flow-way 3 passes Stabilization, the Routine Operations – Interim Performance Period 2 will commence. This performance period will end when the STA enters the Long-term Performance Period (discussed below).

The following table summarizes the applicability of the two Interim Performance Period TBELs for STA-5. For additional information as to the derivation of the TBEL please refer to the *Technical Support Document for the STA-5 TBEL* (Exhibit A).

Table 4: Interim Performance Period TBEL Application Summary

Phase	Applicable TBEL	Applicable TBEL	Period Initiation	Period end date	No. of Flow-ways Operational
Routine Operations Interim Performance Period 1	TBEL 1	81 – 116 ppb	Upon issuance of the Permit	Flow-way 3 passes Stabilization, Facility achieves TBEL 1	2-3
Routine Operations Interim Performance Period 2	TBEL 2	43 -62 ppb	Flow-way 3 passes Stabilization, Facility is achieving TBEL 1	All approved regional water management projects and facility improvements and enhancements have been completed and have passed the stabilization test.	3
Routine Operations - Long-Term Performance Period	Long-term TBEL to be promulgated subsequent to completion of regional water management projects construction	Default to TBEL 2 until new TBEL is promulgated	Implementation of all regional water management projects and approved enhancements complete; facility is achieving TBEL 2; Long-term Performance Period TBEL has been approved by the Department.	New TBEL is established or facility meets WQBEL.	3
Stabilization Phase- Interim Performance Period 1	TBEL 1	81 -116 ppb	See Stabilization Operations description in Section 2.d.	Facility is achieving the TBEL	0-3
Stabilization Phase- Interim Performance Period 2	TBEL 2	43 – 62 ppb	See Stabilization Operations description in Section 2.d.	Facility is achieving the TBEL	0-3

At this time, a water quality based effluent limitation (WQBEL) has not been established under 62-650, F.A.C. as necessary to achieve the phosphorus criterion in 62-302.540 F.A.C. Research is currently ongoing to establish this relationship and establish a WQBEL. In the interim, until such a relationship is determined and a WQBEL established, discharges from STA-5, via the G-344A-F Pump Station, shall meet the TBEL identified in the Order accompanying this permit. The TBEL shall be revised as appropriate, consistent with the iterative implementation of BAPRT and 62-620.620(3), F.A.C., until such time that the TBEL becomes consistent with the water quality based effluent limitation (WQBEL) established to achieve the numeric phosphorus criterion in the Everglades Protection Area.

As stated above, it is envisioned that a WQBEL will be established under 62-650 F.A.C. to achieve the phosphorus criterion established under 62-302.540 F.A.C. Thus, the adoption of the WQBEL will be deemed to be a limitation as stringent as necessary to meet the underlying water quality criterion. This is consistent with the requirements of Clean Water Act (CWA) Section 301(b)(1)(C) and 40 Code of Federal Regulations (C.F.R.) Part 122.44(d)(5). This is also consistent with Florida's reasonable assurance requirements under 62-620.620(1)(g) F.A.C.

The applicant is being given a reasonable time to comply with the phosphorus criterion (and any derived WQBEL) through the schedule contained in the attached Order. In the interim, compliance with the TBEL is being required. Compliance with the TBEL shall be consistent with the provisions of the accompanying Order AO-011-EV. If the permittee achieves effluent levels equal to or lower than the WQBEL prior to the end of that schedule, the permittee will be in compliance with the WQBEL and the underlying phosphorus water quality criterion. At any subsequent permit renewal, because the WQBEL has been determined to be that effluent limit that is as stringent as necessary to provide reasonable assurance that the underlying phosphorus water quality criterion will be met, the permit will continue to require compliance with that WQBEL. There is no basis under the backsliding provisions of 40 CFR Section 122.44(l) to require an effluent limit more stringent than the WQBEL, even if the permittee has demonstrated that such lower effluent limits can be achieved.

7. DISCUSSION OF PREVIOUS PERMIT EFFLUENT LIMITS

Based upon BAPRT, the 1994 Conceptual Design of the ECP identified an initial TBEL for phosphorus at a long-term flow-weighted mean of 50 ppb. Pursuant to Subsection 373.4592(4)(e)2 of the EFA, the Department adopted a 10 ppb numeric criterion for phosphorus in the Everglades Protection Area, which was approved by the U.S. EPA on January 24, 2005. The compliance methodology for this criterion was revised and adopted by the Department on May 5, 2005, and the revised rule was approved by the U.S. EPA on July 27, 2005. Under the Long-Term Plan, the goal is to achieve the phosphorus criterion in the Everglades Protection Area, which will be accomplished through the iterative adaptive implementation process set forth in the Long-Term Plan. Structural, operational and vegetation enhancements are presently under way in accordance with the Long-Term Plan, and are designed to optimize performance as needed to achieve the phosphorus water quality standard. Construction of these improvements and enhancements shall be completed by 2016. Additional enhancements to STA-5 may occur as part of the adaptive implementation process envisioned in the Long Term Plan.

Prior to the Everglades Marsh Dissolved Oxygen Site Specific Criteria (DO SSAC) being adopted by the Department, the previous permit was accompanied by Administrative Order (AO-003-EV) issued in accordance with Section 403.088(2)(e), F.S. During the period of operation under the aforementioned Order, sufficient data was collected to determine that natural conditions existed within unimpacted areas of the Everglades Protection Area which would preclude the attainment of the Class III dissolved oxygen criterion within the water body. In response to these characteristics, the Department adopted the Everglades Marsh Dissolved Oxygen Site Specific Alternative Criteria (DO SSAC) which was adopted by Secretarial Order on January 26, 2004, and approved by the U.S. Environmental Protection Agency as a revision to the State of Florida's water quality standards on June 16, 2004.

8. NEW OR EXPANDED DISCHARGES TO SURFACE WATERS: ANTIDegradation INFORMATION

The Department has determined that operation and maintenance of the project is consistent with the anti-degradation requirements of Rules 62-4.242(1) and 62-302.300, F.A.C. and is clearly in the public interest pursuant to Subsection 373.4592(9)(a), F.S. and the requirements of Rule 62-4.242(2), F.A.C.

9. EFFECTS OF SURFACE WATER DISCHARGE ON THREATENED OR ENDANGERED SPECIES

The Department does not anticipate adverse impacts on threatened or endangered species as a result of permit issuance.

10. FDEP CONTACT

Additional information concerning the permit may be obtained during normal business hours from:

John Hallas

Permittee: South Florida Water Management District

Project: Stormwater Treatment Area 5

File No.: FL0177954-003-IW7A

Page 15 of 15

Florida Department of Environmental Protection
Water Quality Standards & Special Projects Program
2600 Blair Stone Road, MS 3560
Tallahassee, Florida 32399-2400
Telephone No. (850) 245-8052
Fax No.: (850) 412-0766

11. THE ADMINISTRATIVE RECORD

STA-5 previously operated under EFA Permit No.: 0131842-001 and NPDES Permit No. FL0177954-001. Additional related permits include FDEP Permit No. 0178018 which authorizes temporary dewatering activities for the construction of facilities within STA-1E, STA-1W, STA-2, STA-3/4, and STA-5 Hydropattern Restoration Projects; and the U.S. Army Corps of Engineers 404 Permit No. SAJ-1994-4532.

The administrative record including application, draft permit, fact sheet, public notice (after release), comments received, and additional information is available by writing FDEP or for public inspection during normal business hours at the location specified in item 10. Copies will be provided at a minimal charge per page.

The Department held a public meeting for the Notice of Draft Permits for STA-1W1E, STA-2, STA-5, and STA-6 on July 20, 2007, at the Department's Southeast District Office. The Public meeting was noticed in the Florida Administrative Weekly and a paper of general circulation at least 30 days prior to the meeting being held. The Department announced at the public meeting that it would extend the public comment period until July 25, 2007. The Department received written comments both at the public meeting and prior to the July 25, 2007 deadline. All public comments were taken into consideration by the Department prior to issuance of these permits

12. SCHEDULE FOR PERMIT ISSUANCE

Application Complete	December 23, 2003
Draft permit to Applicant and U.S. EPA	June 18, 2007
Applicant to Publish Public Notice by	June 20, 2007
End of Public Comment Period	July 25, 2007
Notice of Intent to Issue	July 31, 2007

-End of Fact Sheet-