

Chapter 5A: Restoration Strategies – Design and Construction Status of Water Quality Improvement Projects

Robert Shuford, Jose Otero, and Tarana Solaiman

Contributor: Olena Leskova

SUMMARY

To address water quality concerns associated with existing flows to the Everglades Protection Area (EPA), the South Florida Water Management District (SFWMD or District), Florida Department of Environmental Protection (FDEP), and United States Environmental Protection Agency (USEPA) engaged in technical discussions starting in 2010. The primary objectives were to establish a water quality-based effluent limit (WQBEL) that would achieve compliance with the State of Florida’s numeric total phosphorus (TP) criterion in the EPA and to identify a suite of additional water quality improvement projects to work in conjunction with the existing Everglades Stormwater Treatment Areas (STAs) to meet the WQBEL (SFWMD 2012b). Based on this collaborative effort, a suite of projects (**Figure 5A-1**) was identified that would achieve the WQBEL, as documented in the *Restoration Strategies Regional Water Quality Plan* (SFWMD 2012a).

On September 10, 2012, FDEP issued SFWMD an Everglades Forever Act (EFA) watershed permit (FDEP 2012b), a National Pollutant Discharge Elimination System (NPDES) watershed permit (FDEP 2012a), and associated consent orders for operations of the Everglades STAs that outline the additional facilities and structures required to achieve the WQBEL. The consent orders contain specific activities for each project identified in the *Restoration Strategies Regional Water Quality Plan* (SFWMD 2012a) and include deadlines for each activity. In addition, the consent orders recognize that Everglades STA discharges are not anticipated to meet the WQBEL until all the consent order activities are complete and sufficient discharge data exists to assess WQBEL compliance. In September 2017, FDEP issued SFWMD renewed EFA and NPDES Watershed permits with expiration dates of September 9, 2022 (FDEP 2017a, b).

Under the Restoration Strategies Program, the water quality improvement projects have been divided into three flow paths—Eastern, Central, and Western—that are delineated by the source basins that are tributaries to the existing Everglades STAs (**Figure 5A-1**). The identified projects primarily consist of flow equalization basins (FEBs), STA expansions, and associated infrastructure and conveyance improvements. The primary purpose of FEBs is to attenuate peak stormwater flows, temporarily store stormwater runoff, and improve inflow delivery rates to downstream STAs, thereby providing enhanced operation and phosphorus treatment performance. FEBs may also be able to assist in maintaining minimum water levels and reducing the frequency of dry-out conditions within STAs. The primary purpose of STAs is to utilize biological processes to reduce phosphorus concentrations to achieve the WQBEL.

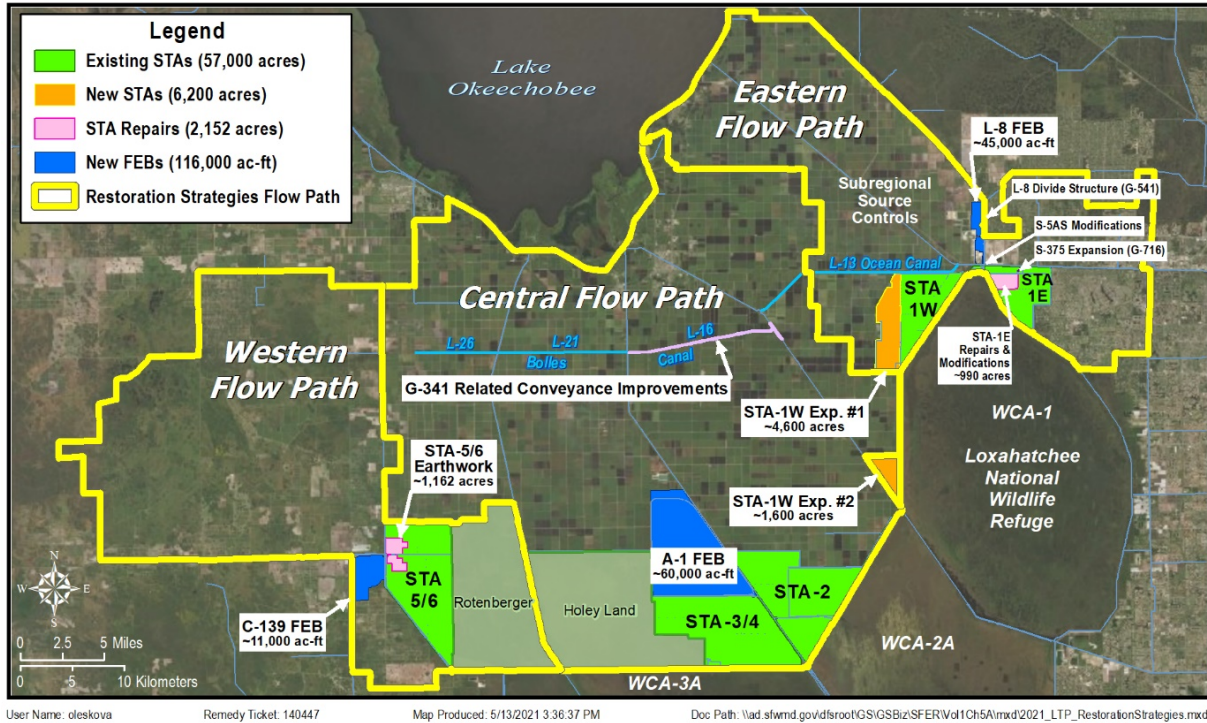


Figure 5A-1. Key projects of the *Restoration Strategies Regional Water Quality Plan*. (Note: ac-ft – acre-feet; STA-1E – STA-1 East; STA-1W – STA-1 West; and WCA – Water Conservation Area.)

The design and construction of Restoration Strategies projects is ongoing with completion of all projects expected by December 2025. In Water Year 2021 (WY2021; May 1, 2020–April 30, 2021), ten consent order milestones were completed on five projects: (1) STA-1 West (STA-1W) Expansion #1, (2) STA-1W Expansion #2, (3) G-341 Related Improvements, (4) C-139 FEB, and (5) STA-5/6 Internal Improvements.

The initial flooding and optimization period for STA-1W Expansion #1 was completed in December 2020 and reached operational status. In March 2021, a construction status report was submitted for G-341 Related Improvements. The design for STA-1W Expansion #2 was completed in July 2020 and construction began in August 2020. A construction status report was submitted in February 2021. The C-139 FEB final design was submitted in October 2020 and construction started in December 2020. A construction status report was submitted in February 2021. In May 2020, construction was completed for STA-5/6 Internal Improvements; a construction status report was submitted simultaneously. The project is now in the initial flooding and optimization period. A detailed overview of current Restoration Strategies projects, including status and activities completed during WY2021, is summarized below.

RESTORATION STRATEGIES PROJECTS

In accordance with the EFA and NPDES permits and associated consent orders, the following section describes the WY2021 status of Restoration Strategies projects within the Eastern, Central, and Western flow paths. Specific activities, associated deadlines, and completion dates during the WY2021 reporting period are summarized in **Table 5A-1**. **Tables 5A-2, 5A-3, and 5A-4** provide deadlines and completion dates for all consent order projects and activities for the Eastern, Central, and Western flow paths, respectively. Financial reporting for the Restoration Strategies Program and projects during Fiscal Year 2021 (FY2021; October 1, 2020–September 30, 2021) is provided in Appendix 1-3 of this volume.

Table 5A-1. Restoration Strategies project activities completed during WY2021.

Project	Activity	Consent Order Deadline	Date Completed
Eastern Flow Path			
STA-1W Expansion #1	Initial flooding and optimization period complete	12/31/2020	12/14/2020
STA-1W Expansion #2	Complete design	7/31/2020	7/16/2020
	Initiate construction	11/30/2020	8/13/2020
	Construction status report	3/1/2021	2/24/2021
G-341 Related Improvements	Construction status report	3/1/2023	3/3/2021
Western Flow Path			
STA-5/6 Internal Improvements	Construction status report	3/1/2024	5/4/2020
	Complete construction	12/31/2024	5/4/2020
C-139 FEB	Complete design	10/31/2020	10/6/2020
	Initiate construction	1/31/2021	12/23/2020
	Construction status report	3/1/2021	2/24/2021

Table 5A-2. Restoration Strategies Eastern Flow Path project activities, deadlines, and completion dates.

Project	Activity	Consent Order Deadline	Date Completed
STA-1W Expansion #1	Complete land acquisition	9/30/2013	4/21/2014
	Initiate design	9/30/2013	9/17/2013
	Submit state and federal permit applications	7/30/2014	7/22/2014
	Complete design	7/30/2015	6/22/2015
	Initiate construction	1/31/2016	11/12/2015
	Construction status report	3/1/2017	2/21/2017
	Construction status report	3/1/2018	2/23/2018
	Complete construction	12/31/2018	12/27/2018
	Initial flooding and optimization period complete	12/31/2020	12/14/2020
S-375 Expansion	Initiate design	9/30/2013	3/4/2013
	Complete design	7/30/2015	7/22/2015
	Initiate construction	1/31/2016	11/12/2015
	Complete construction	12/31/2018	4/3/2017
L-8 Divide Structure	Initiate design	10/1/2012	9/10/2012
	Complete design	9/30/2014	3/5/2014
	Initiate construction	10/1/2016	9/11/2014
	Complete construction	9/30/2018	7/7/2016
S-5AS Modifications	Initiate design	10/1/2012	9/10/2012
	Complete design	9/30/2014	4/17/2014
	Initiate construction	10/1/2014	9/11/2014
	Complete construction	9/30/2016	5/28/2016

Table 5A-2. Continued.

Project	Activity	Consent Order Deadline	Date Completed
STA-1W Expansion #2	Complete land acquisition	3/31/2018	1/31/2018
	Initiate design	10/1/2018	9/21/2018
	Submit state and federal permit applications	8/1/2019	7/26/2019
	Complete design	7/31/2020	7/16/2020
	Initiate construction	11/30/2020	8/13/2020
	Construction status report	3/1/2021	2/24/2021
	Construction status report	3/1/2022	
	Complete construction	12/31/2022	
	Initial flooding and optimization period complete	12/31/2024	
L-8 FEB	Submit state and federal permit applications	1/31/2014	5/13/2013
	Construction status report	3/1/2014	2/25/2014
	Construction status report	3/1/2015	2/26/2015
	Complete construction (multi-purpose operation begins)	12/31/2016	7/14/2017
	Long-term operations commence	12/31/2022	
G-341 Conveyance Improvements	Initiate design	10/1/2020	12/15/2014
	Submit state and federal permit applications	8/1/2021	4/17/2015
	Complete land acquisition (if required)	9/30/2021	
	Complete design	7/31/2022	
	Initiate construction	11/30/2022	8/13/2015
	Construction status report	3/1/2023	3/3/2021
	Construction status report	3/1/2024	
STA-1 East (STA-1E) Repairs and Modifications	Periphyton STA decommissioning complete	Prior to long-term operations commencing	8/21/2014
	Culvert repairs complete	Prior to long-term operations commencing	6/7/2017
	Cell 5 and 7 improvements complete	Prior to long-term operations commencing	

Table 5A-3. Restoration Strategies Central Flow Path project activities, deadlines, and completion dates.

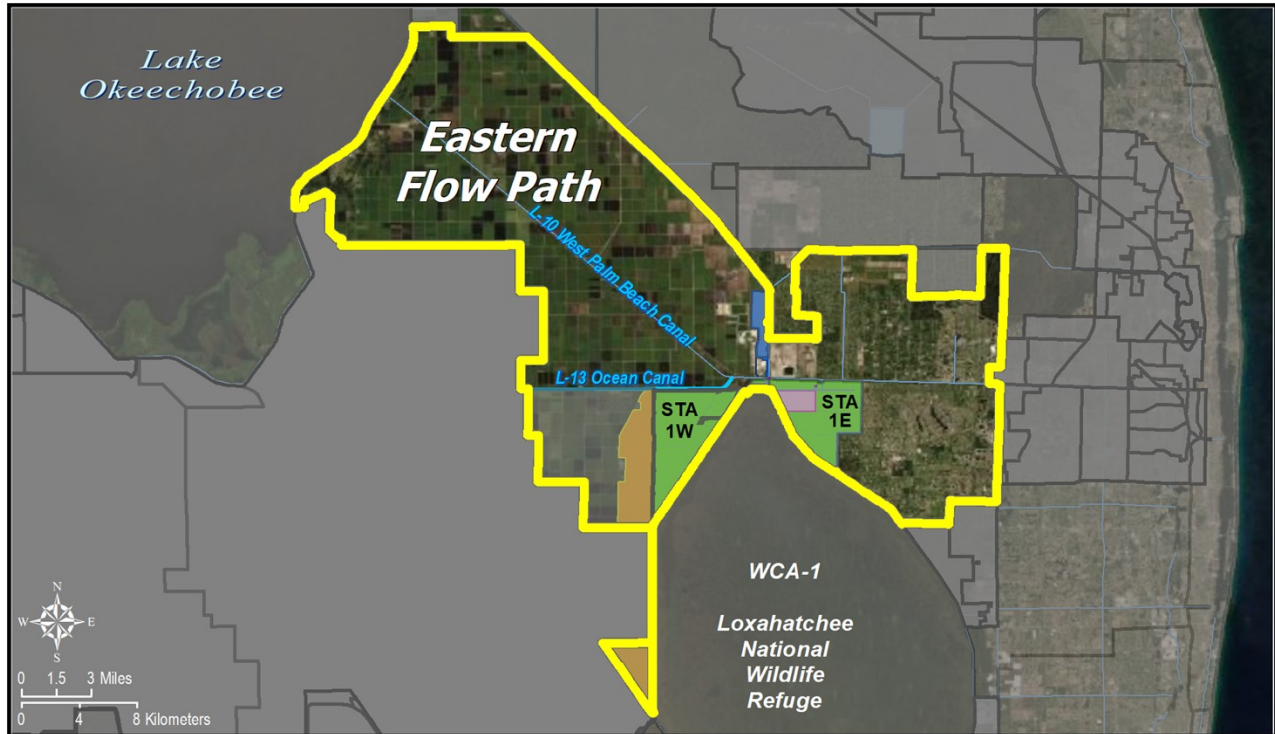
Project	Activity	Consent Order Deadline	Date Completed
STA-2 Expansion: Compartment B	Initial flooding and optimization period complete	5/31/2014	5/30/2014
	Initiate design	4/1/2012	12/16/2010
A-1 FEB	Submit state and federal permit applications	12/1/2012	9/17/2012
	Design status report	3/1/2013	2/1/2013
	Complete design	8/1/2013	7/24/2013
	Initiate construction	6/30/2014	10/10/2013
	Construction status report	3/1/2015	2/26/2015
	Construction status report	3/1/2016	12/4/2015
	Complete construction	7/30/2016	11/19/2015
	Operational monitoring and testing period complete	7/29/2018	7/29/2018

Table 5A-4. Restoration Strategies Western Flow Path project activities, deadlines, and completion dates.

Project	Activity	Consent Order Deadline	Date Completed
STA-5/6 Expansion: Compartment C	Initial flooding and optimization period complete	5/31/2014	5/30/2014
	Initiate design	10/31/2019	4/27/2018
STA-5/6 Internal Improvements	Submit state and federal permits	8/30/2020	8/14/2018
	Complete design	10/31/2021	9/24/2018
	Initiate construction	1/31/2022	9/25/2018
	Construction status report	3/1/2023	9/20/2019
	Construction status report	3/1/2024	5/4/2020
	Complete construction	12/31/2024	5/4/2020
	Initial flooding and optimization period complete	12/31/2025	
C-139 FEB	Initiate design	10/31/2018	8/22/2018
	Submit state and federal permits	8/30/2019	8/23/2019
	Complete design	10/31/2020	10/6/2020
	Initiate construction	1/31/2021	12/23/2020
	Construction status report	3/1/2021	2/24/2021
	Construction status report	3/1/2022	
	Construction status report	3/1/2023	
	Complete construction	12/31/2023	
Operational monitoring and testing period complete	12/31/2024		

EASTERN FLOW PATH

Ongoing Restoration Strategies projects in the Eastern Flow Path include the following: STA-1W Expansion #1, STA-1W Expansion #2, STA-1 East (STA-1E) Repairs and Modifications, and G-341 Related Conveyance Improvements (**Figures 5A-2**). The S-375 Expansion (G-716), L-8 FEB, L-8 Divide Structure (G-541), and S-5AS Modifications have been completed and are not referenced in this report.



User Name: hkostura Remedy Ticket: 91913 Map Produced: 7/23/2019 3:34:07 PM Doc Path: \\ad.sfwmd.gov\dfsroot\GIS\GSBz\SWPROJ\LongTermPlan\mxd\20190723_LTP_RestStratRegWQPlan_KeyProj_EasFlow.mxd

Figure 5A-2. Eastern Flow Path project components: L-8 FEB, STA-1E Repairs, STA-1W Expansion #1, STA-1W Expansion #2, and G-341 Related Improvements. Names preceded with an “S” denote structures constructed by the United States Army Corps of Engineers. Names preceded with a “G” denote structures constructed by SFWMD. (Note: WCA-1 – Water Conservation Area 1.)

STA-1W Expansion #1

The STA-1W Expansion project (**Figure 5A-3**), a 6,500-acre (2,630-hectare) expansion of STA-1W consisting of 5,900 acres (2,390 hectares) of effective treatment area that works in conjunction with the existing STA-1W and the other Eastern Flow Path projects to assist in achieving the WQBEL. STA-1W Expansion #1 consists of approximately 4,300 acres (1,740 hectares) of effective treatment area on 4,600 acres (1,860 hectares) of land located adjacent to and directly west of STA-1W. Both expansions were conceptualized during the design of STA-1W Expansion #1, but STA-1W Expansion #1 was permitted, designed, and constructed separately. The design of STA-1W Expansion #1 integrated the existing STA-1W and the associated infrastructure, configuration, and operational protocols needed to utilize both facilities in series to optimize performance. The design of STA-1W Expansion #1 also incorporated information learned from successful STA operational experiences and research conducted in other South Florida man-made wetlands (the best available information) to ensure appropriate vegetation partitioning and water depths.

Project Status: The project is complete.

WY2021 Update: Initial flooding and optimization was completed December 2020.



Figure 5A-3. STA-1W Expansion #1 Cell 6 during initial flooding and optimization period. The view is of the middle of the cell facing northwest. (Photo by SFWMD in June 2020.)

STA-1W Expansion #2

STA-1W Expansion #2 will provide approximately 1,600 acres (650 hectares) of effective treatment area within 2,130 acres (860 hectares) of land located north of pump station S-6. The design of STA-1W Expansion #2 will integrate the existing STA-1W and the associated infrastructure, configuration, and operational protocols needed to utilize both facilities in series to optimize performance. The design of STA-1W Expansion #2 will also incorporate the best available information to ensure appropriate vegetation partitioning and water depths.

Project Status: The project is in construction.

WY2021 Update: During WY2021, design was complete and construction was initiated. The first construction status report was submitted in March 2021.

STA-1E Repairs and Modifications

STA-1E is a 5,000-acre treatment wetland located northeast of Water Conservation Area (WCA) 1, also known as the Arthur R. Marshall Loxahatchee National Wildlife Refuge, in western Palm Beach County. STA-1E was authorized as a component of the C-51 West End Flood Control Plan in Section 315 of the Water Resources Development Act of 1996 and was constructed by the United States Army Corps of Engineers (USACE).

STA-1E Repairs and Modifications include the decommissioning of the periphyton-based stormwater treatment area (PSTA) research infrastructure in Cell 2, repairs to STA-1E culverts, and improvements to Cells 5 and 7. The PSTA research infrastructure in Cell 2 and culvert repairs were completed in 2014 and 2017, respectively. These projects are discussed in Chapter 5A of the *2019 South Florida Environmental Report – Volume I* (McBryan and Shuford 2019).

Cells 5 and 7 constitute nearly 50% of the total effective treatment area of the Western Flow-way of STA-1E. Surveys commissioned in 2005 indicated that these cells had greater depths relative to design elevations and the surrounding marsh (i.e., in excess of 0.73 feet [ft] in Cell 5 and 1.19 ft in Cell 7). These cells are located at the “head” of the flow-way, which are generally characterized by dense emergent vegetation communities, which act to reduce inflow velocities, retain undesirable floating aquatic vegetation (FAV), and initiate the treatment process. Depth differences in Cells 5 and 7 prevent the establishment of dense emergent vegetation growth and often result in floating tussocks (mobile islands of vegetation) that cause further damage to other vegetation communities within the cells. Regrading both cells to an appropriate elevation should ensure a uniform bottom surface for emergent vegetation growth. Currently, SFWMD is engaged in construction to address this corrective action (**Figure 5A-4**).

Project Status: Transport of fill material and regrading is ongoing for this project.

WY2021 Update: The design for improvements to Cells 5 and 7 was approved in March 2020. Construction began in April 2020.



Figure 5A-4. View of fill material staging area at the Northwest corner of STA-1E Cell 7 facing East. Cells 5 and 7 are undergoing regrade. (Photo by SFWMD in 2020.)

G-341 Related Conveyance Improvements

The G-341 Related Conveyance Improvements project is a multi-phase and multi-year project intended to improve conveyance within the Everglades Agricultural Area (EAA). The original design intent of structure G-341, which is in the Ocean Canal just north of the northwestern corner of STA-1W, was to enable the conveyance of up to 600 cubic feet per second (cfs) or 17 cubic meters per second (m³/s) of stormwater runoff from the western portion of the S-5A basin west via the Ocean Canal to the Hillsboro Canal for treatment in STA-2 (**Figure 5A-5**). The project is intended to achieve the design operation of the G-341 structure. Design, permitting, and construction activities of the G-341 Related Conveyance Improvements are occurring in several phases with all construction activities mandated to be complete by December 2024. The scope of the project consists of diverting a long-term annual average of 40,000 acre-feet (ac-ft; 4.9 x 10⁶ cubic meters [m³]) between structure G-341 and site S5AX along the Ocean (L-13) Canal, with maximum flows of 600 cfs (17 m³/s), either through Hillsboro (L-16) Canal, North New River (L-19) Canal, or a combination of both (**Figure 5A-6**). Construction of Segments 1, 2, and 3 of the Bolles East Canal is complete. Segment 5 work will commence after the completion of Segment 4 of the Bolles East Canal.

Project Status: Segment 3 of the Bolles East Canal is complete. Construction of the Bolles East Canal Segment 4 is ongoing.

WY2021 Update: Bolles East Canal Segment 3 construction is complete. Bolles East Canal Segment 4 is in construction phase. Segment 5 is in design phase.

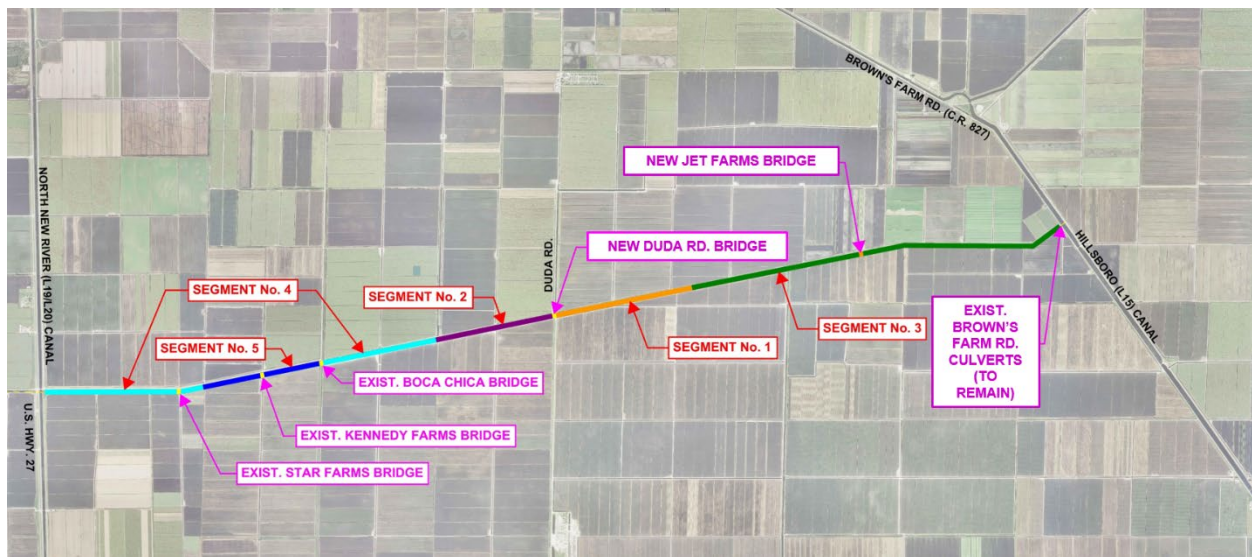


Figure 5A-5. Bolles East (L-16) Canal Conveyance Improvement segments and bridges. (Note: The New Duda Road Bridge was included in Segment No. 1.)



Figure 5A-6. View of Bolles East Canal looking west towards State Road 7. (Photo by SFWMD in 2020.)

CENTRAL FLOW PATH

Restoration Strategies projects in the Central Flow Path include the A-1 FEB and STA-2 Expansion (Figure 5A-7). These projects are complete.

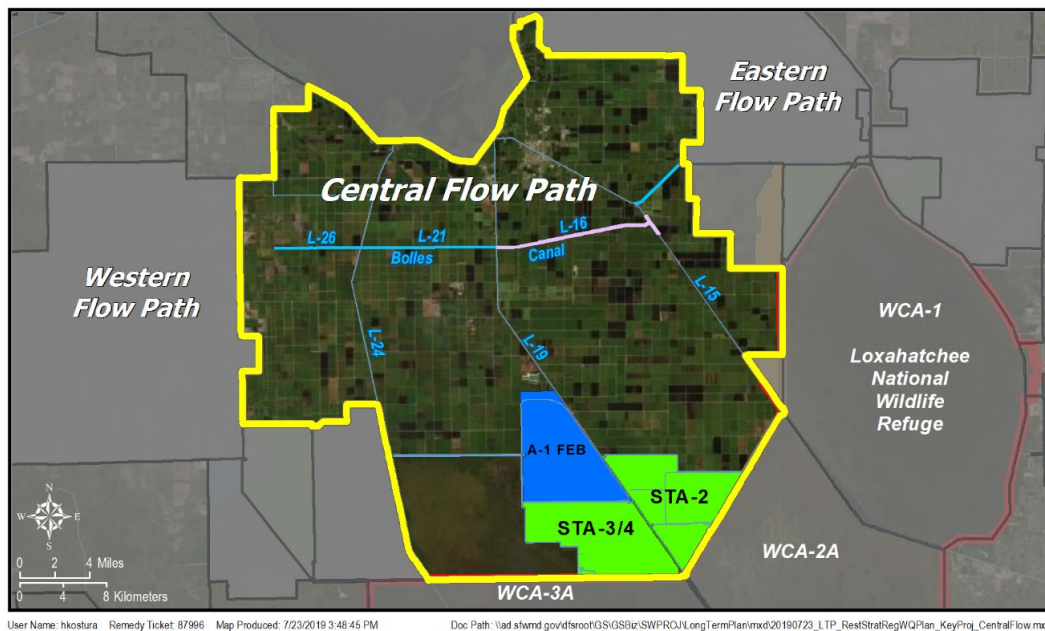


Figure 5A-7 Restoration Strategies Central Flow Path. Components include the A-1 FEB, Everglades STAs, and related canals.

WESTERN FLOW PATH

Restoration Strategies projects in the Western Flow Path include the C-139 FEB, STA-5/6 Expansion, and STA-5/6 Internal Improvements (**Figure 5A-8**). The compartment C build out (i.e., expansion) of STA-5/6 and initial flooding and optimization period was completed in May 2014 and is not included in this report. Earthwork for STA-5/6 Internal Improvements began in September 2018 and was completed in May 2020. A construction status report was also provided in May 2020. The C-139 FEB final design was submitted in October 2020. Construction began in December 2020 and a construction status report was submitted in February 2021.

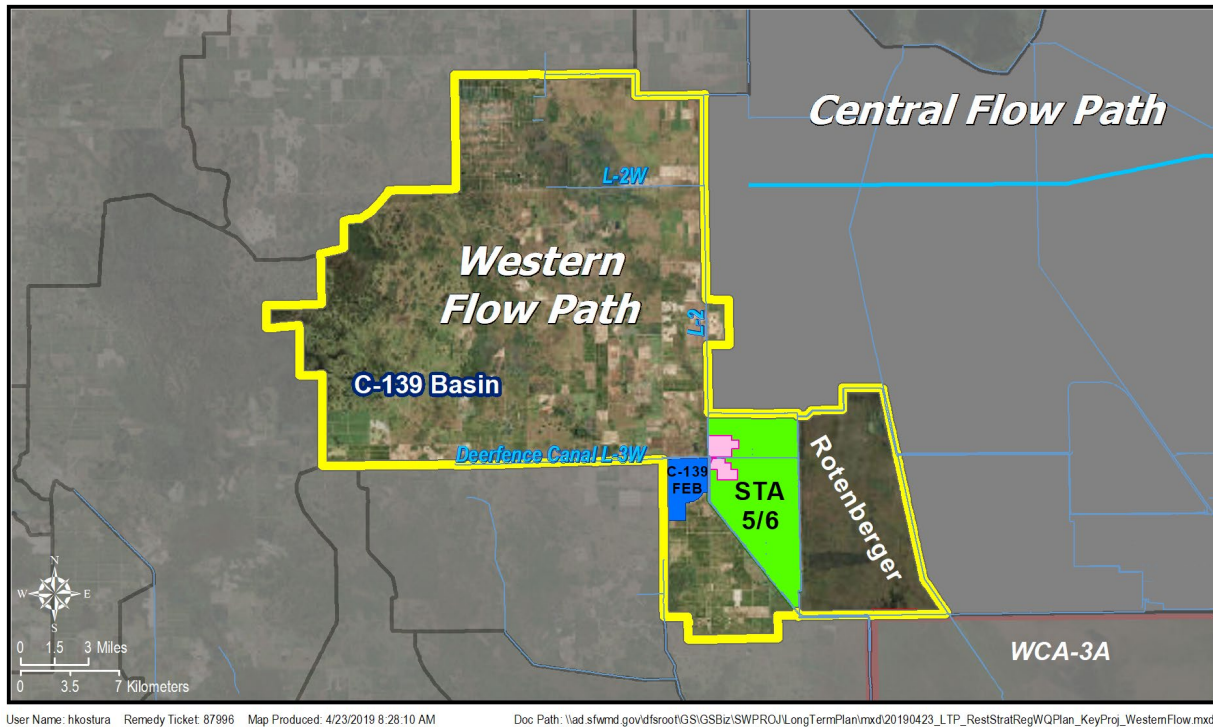


Figure 5A-8. Western Flow Path Project Components:
C-139 FEB and STA-5/6 Internal Improvements.

STA-5/6 Internal Improvements

STA-5/6 is in Hendry County. It is bounded to the east by the Rotenberger Wildlife Management Area, to the south and west by SFWMD-owned lands, and to the north and northwest by privately-owned land. STA-5/6 consists of eight flow-ways that allow water to move west to east. The western or upstream portions of Cells 5-2A and 5-3A have highly uneven topography. Average ground elevations ranged from 11.0 to 15.0 ft National Geodetic Vertical Datum of 1929 (NGVD29) within each of these cells, which prevents routine inundation and, therefore, inhibits the expansion of emergent wetland vegetation. As a result, these areas were considered “non-effective treatment areas”.

The STA-5/6 Internal Improvements project consists of internal earthwork and regrading activities within the non-effective treatment areas. The objective is to lower the ground elevation of the non-effective treatment areas of Cells 5-2A and 5-3A to achieve a more uniform elevation of 11.9 ft NGVD29, which approximates areas to the east within the same cell (**Figure 5A-9**). Earthwork will create a more uniform ground elevation within the cells, which is expected to improve water movement, enable recruitment of desirable wetland vegetation, increase the effective treatment area, and improve treatment performance.

Project Status: Construction is complete and the project is now in initial flooding and optimization.

WY2021 Update: Final construction report and status report were submitted in May 2020.



Figure 5A-9. STA-5/6 Internal Improvements.
View of earthwork in Cell 2A facing west (G-342C).
(Photo by SFWMD in November 2019.)

C-139 FEB

The proposed C-139 FEB is located west of STA-5/6 in Hendry County, approximately 20 miles south of the City of Clewiston on the northern end of the C-139 Annex property. Upon completion, the FEB will encompass approximately 2,800 acres (1,133 hectares) including associated perimeter levees and canals and provide approximately 11,000 ac-ft ($1.3 \times 10^6 \text{ m}^3$) of storage in the Western Flow Path (**Figure 5A-10**). The project includes a pump station with a capacity of 690 cfs ($19.54 \text{ m}^3/\text{s}$) and the outflow structure that will be located on the eastern levee. The inflow pump station will bring water from the Deer Fence Canal, or the L-3 canal, and discharge it directly into the C-139 FEB. The outflow, which will consist of a gated structure, will send water from the FEB to STA-5/6 through the L-3 canal. The FEB will be used to reduce peak discharges during storm events and supply water to STA-5/6 when available. The C-139 FEB is expected to increase the water quality performance of STA-5/6, consistent with the associated WQBEL.

Project Status: This project is in the construction phase.

WY2021 Update: Construction was initiated in December 2020. A construction status report was submitted in March 2021.

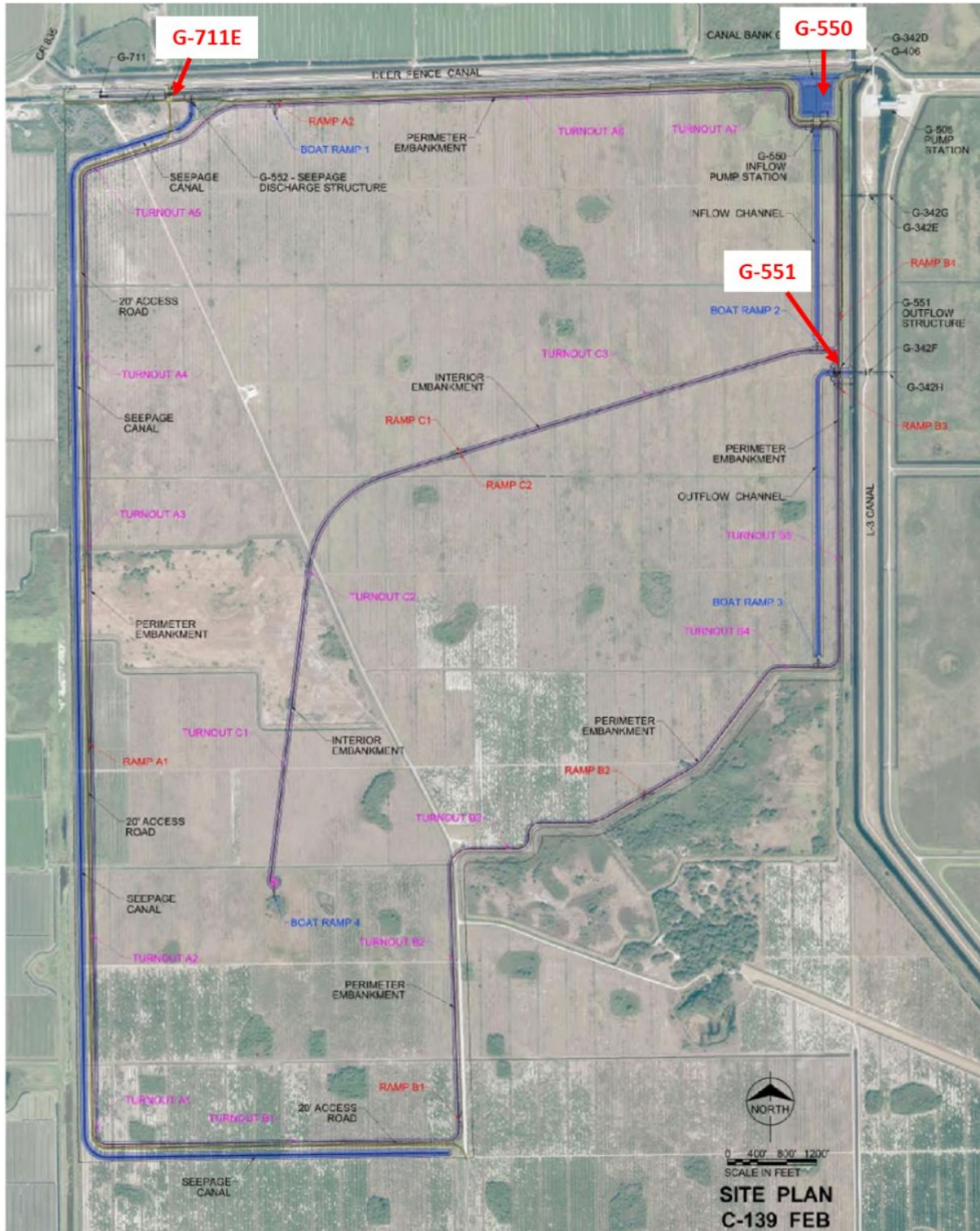


Figure 5A-10. Conceptual site plan for the C-139 FEB

ADDITIONAL COMPONENTS

Subregional Source Controls

The objective of Restoration Strategies subregional source control projects is to build upon the success of SFWMD's existing Best Management Practice (BMP) Regulatory Program by focusing on projects with the greatest potential to further improve water quality in the S-5A basin thereby reducing phosphorus loads to the STAs (SFWMD 2012a). These projects are intended to be primarily situated downstream of onsite BMP implementation by permittees subject to SFWMD Works of the District permits pursuant to Chapter 40E-63, Florida Administrative Code.

Potential subregional source control projects within the S-5A basin are being considered based on a combination of factors, including water quality of discharges, proximity and potential impact of discharges to STAs, and having willing local participants.

An initial subregional source control project, through a three-year cooperative agreement from 2013 to 2015, consisted of implementing a subregional canal cleaning demonstration project within the East Beach Water Control District (EBWCD) located in the northwestern portion of the S-5A basin. Results of this study are summarized in Hutchins et. al. (2017).

Subsequently, a subregional source control project completed in 2017 consisted of the summarization and documentation of existing water quality data and activities for the S-5A basin. The consolidation of historical information is an essential element for project formulation and consultation with stakeholders (CH2M 2016, 2017). Accordingly, S-5A basin flow, phosphorus load, and phosphorus concentration data from WY1980 to WY2016 (May 1, 1979–April 30, 2016) were evaluated. Data sets included the S-5A basin boundary structures and G-341 (Ocean Canal divide structure), monitoring stations within the West Palm Beach (C-51) Canal, and permitted subbasins discharging into the West Palm Beach and Ocean canals. Data sets were evaluated to quantify apparent trends and variation in the data across water years, wet and dry seasons, pre- and post-BMP implementation (WY1980–WY1988 and WY1996–WY2016, respectively) and pre- and post-diversion of EBWCD discharges from Lake Okeechobee to the STAs (WY1996–WY2000 and WY2001–WY2016, respectively). These analyses also evaluated the portion of dissolved and particulate phosphorus fractions in S-5A basin inflows, S-5A basin outflows, and runoff generated within the S-5A basin. The analyses for the period evaluated indicated that phosphorus levels in S-5A basin runoff had improved historically and particulate phosphorus was the predominant fraction in Lake Okeechobee inflows to the S-5A basin, while dissolved phosphorus is higher in S-5A basin outflows. The analysis also shed light on phosphorus transport and cycling in the West Palm Beach Canal during different conditions including Lake Okeechobee pass-through events. Findings documented lower TP concentrations in the southern portion of the West Palm Beach Canal, as compared to the northern portion of the canal (CH2M 2017).

Project Status: The project is in the conceptual project planning and monitoring phase.

WY2020 Update: Based on the results of the analyses performed to date, SFWMD continued development of preliminary subregional source control concepts and to seek participation from S-5A basin stakeholders. Additional concepts are expected to be developed as these discussions continue. More information is available in Appendix 4-1 of this volume.

LITERATURE CITED

- CH2M. 2016. *SFWMD Data and Documentation Summary for the Eastern Flow Path Water Quality, Task 3.3 Final Technical Memorandum for the East Beach Water Control District Data Summary and Evaluation*. Submitted to South Florida Water Management District, West Palm Beach, FL. November 8, 2016.
- CH2M. 2017. *SFWMD Data and Documentation Summary for the Eastern Flow Path Water Quality, Task 4.3 West Palm Beach Canal Data Summary and Evaluation*. Submitted to South Florida Water Management District, West Palm Beach, FL. April 7, 2017.
- FDEP. 2012a. STA Everglades Forever Act (EFA) Watershed Permit (Number 0311207) and Associated Consent Order (OGC 12-1149). Florida Department of Environmental Protection, Tallahassee, FL. September 10, 2012.
- FDEP. 2012b. STA National Pollutant Discharge Elimination System (NPDES) Watershed Permit (Number FL0778451) and Associated Consent Order (OGC 12-1148). Florida Department of Environmental Protection, Tallahassee, FL. September 10, 2012.
- FDEP. 2017a. STA Everglades Forever Act (EFA) Watershed Permit (Number 0311207-006) and Associated Consent Order (OGC 12-1149). Florida Department of Environmental Protection, Tallahassee, FL. September 10, 2017.
- FDEP. 2017b. STA National Pollutant Discharge Elimination System (NPDES) Watershed Permit (Number FL0778451) and Associated Consent Order (OGC 12-1148). Florida Department of Environmental Protection, Tallahassee, FL. September 10, 2017.
- Hutchins, J., S. Olson, C. Bedregal, and P. Wade. 2017. Chapter 4: Nutrient Source Control Programs. In *2018 South Florida Environmental Report – Volume I*, South Florida Water Management District, West Palm Beach, FL. March 1, 2018.
- McBryan, J., and R. Shuford. 2019. Chapter 5A: Restoration Strategies – Design and Construction Status of Water Quality Improvement Projects. In: *2019 South Florida Environmental Report – Volume I*, South Florida Water Management District, West Palm Beach, FL. March 1, 2019.
- SFWMD. 2012a. *Restoration Strategies Regional Water Quality Plan*. South Florida Water Management District, West Palm Beach, FL. April 27, 2012.
- SFWMD. 2012b. *Technical Support Document for Derivation of the Water Quality Based Effluent Limit for Total Phosphorus in Discharges from Everglades Stormwater Treatment Areas to the Everglades Protection Area*. South Florida Water Management District, West Palm Beach, FL. June 27, 2012.