

# **Catfish Creek Regional Stormwater Facility**

## **Final Project Report**

**June 21, 2010**

### **Abstract**

The project as constructed includes limited stormwater conveyance system improvements on Clark Road, combined with the construction of a regional stormwater facility. The 24-acre regional facility was constructed on an 18-acre parcel known as the Brannen property purchased by Sarasota County (County) and integrates two existing ponds contiguous to the Brannen property. This project provides additional flood protection from structural damage to 16 businesses and reduces street flooding on Clark Road, a major hurricane evacuation route. The project is also expected to improve water quality for 810 acres of the Upper Catfish Creek sub-basin through stormwater control and wetland plantings.

### **Report**

The area around Clark Road and Sawyer Loop Road in the County is prone to flooding. The County has studied this flooding pattern and had previous technical reports prepared to determine what types of drainage improvements could be made to reduce flooding. Recently, the County has refined the hydrologic and hydraulic stormwater studies; prepared construction plans; and completed construction of the regional stormwater management facility.

The County acquired a tract of land suitable for a large regional stormwater facility and obtained needed easements for project construction. The new regional stormwater lake is approximately 24 acres in size receiving and treating run-off from an 810-acre drainage basin including Clark Road SR 72 and the surrounding area. Water quality enhancement is expected as a result of this project.

As construction began, it was noted that a bald eagle's nest was established in a cell tower (#1202224) southeast of the intersection of Clark Road and McIntosh Road. Monitoring began in November 2008 and was conducted on days during which construction activities were occurring. Late Phase nest monitoring began in February 2009 and fledging took place in late March, 2009. Construction activities were conducted outside of the 330' buffer through one week after fledging. After supplemental monitoring events confirmed fledglings were absent from the site, construction activities began within the 330' buffer. All behavior, weather conditions, and relevant construction activity was recorded on the Bald Eagle Monitoring Data Reports as found within the Bald Eagle Monitoring Guidelines. Monitoring Data Reports have been signed by the observer and the observer's supervisor and will be kept on file for three years. The FWC was notified on April 3, 2009 of the fledging of both eaglets, per the BEMG.

The County constructed the project for a total of \$4,277,767.20. The Original bid was \$3,996,367.20. There was one change order for disposal of debris and stockpile of soils for \$281,400.00. Funding provided by the existing Catfish Creek basin assessments and grant assistance from Southwest Florida Water Management District Cooperative Funding.

## **Project Description**

Improvements to the existing drainage system comprise numerous elements of physical construction described as follows:

1. The FDOT stormwater pond and the Clark Industrial Center pond to the south of the project will be incorporated into the large planned regional stormwater lake. Other property has been acquired by the County and easements were obtained. Three properties used for drainage easements were acquired by eminent domain by the County.
2. The acquired Brannen property is the primary site of the regional stormwater management facility.
3. A 20-foot wide spillway was installed as the lake discharge, in addition to two existing outfalls into the rail road right-of-way.
4. The stream channel from Clark Road to 387 LF south of Clark Road is enclosed in two 5' x 12' concrete box culverts. The stream channel continues for 950 LF and discharges into the new lake. The open stream channel was widened / reshaped into a trapizoidal cross section between existing buildings and paved parking areas and lined with a hard surface on the side slopes for erosion protection and structural integrity. The bottom of the channel was not hardned. Drainage easements were acquired for a small portion of the channel.
5. A second culvert and catch basin inlet was installed at the corner of Sawyer Loop Road to reduce street flood levels.
6. The existing roadside ditch along Clark Road in front of Livingston's was left as a conveyance system and not reshaped. Some erosion was noticed and repaired by the County.
7. As part of the easement negotiations an aluminum fence sytem was installed at the southern portion of Clark Center Industrial Center for security and as a buffer between the lake and the commercial properties.
8. The final project construction is as follows:
  - The lake acreage has been maximized but is smaller than estimated previously by other studies due to the need for a maintenance berm around the perimeter of the project. The proposed project provides enhanced flood protection for the streets and businesses within the Clark Road corridor for a 100-year flood event and will meet stormwater level of service criteria set out in the Sarasota County Land Development Regulations upon completion of the Phase 2 improvements as permitted under ERP # 44027425.004.

- The proposed lake level is controlled at elevation 19.4 and is permitted through SWFWMD ERP # 44027425.003. A 15-foot maintenance berm will surround the lake with 4:1 slopes to a total lake depth of five feet at elevation 14.4. The lake sideslopes are sodded to the water elevation.
- The primary lake discharge is through an open, trapezoidal, hardlined spillway with a concrete weir set at elevation 19.4. At this location one noted Grand Tree (39-inch oak) was preserved by modifying the standard 4:1 lake sideslopes to a flatter grade.
- The downstream end of the spillway is reinforced with concrete rubble available on-site to resist erosion during significant rainfall events.
- Secondary lake discharges will be through an existing 48-inch CMP, to be sliplined at the northwest corner of the new lake. Only a portion of this pipe will need to be sliplined. A modification to the existing FDOT pond outfall drop structure to lower the weir notch by 1.0 foot (20.4-19.4) will be performed.
- Strategically placed culverts under the lake's maintenance berm convey off-site drainage into the stormwater management facility.
- The trapezoidal channel constructed in the drainage easement is 18 feet wide with 2:1 side slopes. Peak flow rate is approximately 300 cfs in the channel and the channel banks have been hardened for erosion protection.
- Flooding at the intersection of Sawyer Loop Road and Clark Road is more than previously predicted. A 4'x8' concrete box culvert was installed west from Clark Center Avenue to a junction box. A double 5' x 12' concrete box culvert was installed along the drainage easement from Clark Road to 387 LF south of Clark road. Water is then conveyed thru 950 LF of open channel to the stormwater management facility.
- The total drainage basin area draining through the lake is 810 acres. The lake contains approximately 80 acre-feet of permanent pool volume. Using a runoff coefficient of 0.65, a 122 day wet season and 32.5 inches of rainfall in the wet season, the residence time was determined to be 6.8 days and is based on a proposed lake depth of 5 feet.

## **Evaluation of the Stormwater Treatment Facility**

### **Pollution Reduction Strategy:**

The constructed 24-acre stormwater management facility alleviates flooding within the project area. Due to its large size, the new lake will also function to treat stormwater runoff from the contributing 810-acre watershed. Significant primary sedimentation and nutrient uptake will take place in the regional facility to reduce pollutants and to enhance water quality.

The primary BMP of the project will be the construction of the 24-acre wet detention lake. Hardening of the 2:1 slopes of the channel upstream of the lake is an erosion

protection BMP. This channel hardlining will reduce sediment loadings and provide stabilization to the channel banks. The bottom of the channel will remain natural.

**Estimated Polluted Load Reduction:**

The annual pollutant load reduction estimates (in kilogram/year and percent reduction) based on the complete BMP’s constructed including the 24-ac regional stormwater management facility for lake and swale area are:

<b>BMPs Installed</b>		<b>TSS kg/yr</b>	<b>TP kg/yr</b>	<b>TN kg/yr</b>	<b>Sediment kg/yr</b>	<b>BOD kg/yr</b>
24-acre lake						
<b>Pollutant Loads</b>	Pre-Project	444292	1441	5874	195229	22570
	Post-Project	177716	1275	4706	35381	16585
	Load Reduction	266574	166	1168	159848	5984
	% Reduction	60	11	19	81	26
Swale		<b>TSS kg/yr</b>	<b>TP kg/yr</b>	<b>TN kg/yr</b>	<b>Sediment kg/yr</b>	<b>BOD kg/yr</b>
<b>Pollutant Loads</b>	Pre-Project	444290	1441	5874	195048	22570
	Post-Project	155502	1371	5639	74390	20074
	Load Reduction	288788	70	23	120658	2496
	% Reduction	65	5	4	62	11

The EPA model available at the GIS Server website of <http://gis-server.tetrattech-ffx.com/step1> was used to estimate the pollutant load reduction provided by the lake regional stormwater lake. TSS reduction was estimated with the EPA Region 5 spreadsheet model dated August 7, 2003 for both a lake BMP and a swale BMP.

Input data for agricultural animals was obtained from the above website for the applicable hydrologic unit code (HUC). The 810-acre watershed to the regional lake was broken down into the various land uses based on the available data of land use types for the HUC. Urban land use distribution percentages were applied as provided in the model data for the subject location. Septic system data was also obtained at the website. Hydrologic Group B is applicable for area soils.

Model output is in pounds of pollutant per year and tons of sediment per year before and after installation of the lake BMP, swale BMP and the amount of each pollutant removed. The unit conversion to kilograms per year applies to the previous table.

## **Summary**

Based on the project record as-builts and certification of completion, the project was completed and constructed in substantial conformance with the design plans and the stormwater treatment facility functions as intended.

Catfish Creek Regional Stormwater Facility – Post Construction 4-22-10

