## Exceptions:

Not Applicable

## REFERENCES CITED:

Florida Department of Environmental Protection (FDEP). 2008. *Choctawhatchee-Pea Basin Road-Stream Crossings Assessment Report*. This document was produced under the provisions of a Section 319 Grant issued by the FDEP Nonpoint Source Management Section, Tallahassee, Florida to the Three Rivers Resource Conservation and Development Council, Inc., Milton, Florida.

## PROJECT 15: Melbourne Beach Stormwater Quality Improvements

| | | | | |
|---|---|---|---|---|
| **PROJECT FUNDING:** | $250,000 | **FY10 319** | $220,000 | **Match** |

**LEAD ORGANIZATION:** TOWN OF MELBOURNE BEACH

**CONTACT PERSON:** (Name, Address, Phone)
Jim Bursick, TOWN MANAGER
507 Ocean Ave
Melbourne Beach, Fl. 32951
321-724-5860
jimb@melbournebeachfl.org

**COOPERATING ORGANIZATIONS:**

**PROJECT ABSTRACT:** The Town of Melbourne Beach is undertaking a project to install stormwater Best Management Practices (BMP) in three basins to improve the quality of the stormwater runoff discharging to the Indian River Lagoon; a 303(d) listed impaired water body. The project will include improvements in Basin 6, Basin 7 and Basin 8 as delineated in the Melbourne Beach Stormwater Master Plan. See attached exhibits.
This project will retrofit the existing stormwater system to provide treatment of stormwater runoff in the target basins.
The improvements consist of the installation of approximately:

- 500 linear feet of shallow roadside swales.
- Two nutrient separating baffle boxes (NSBBs),
- Three curb inlet baskets (CIBs).
- 40 linear feet of exfiltration.

In addition, the project will replace approximately 1100 linear feet of stormwater pipe and associated structures, and regrade approximately 300 feet of First Avenue to reduce roadway ponding and spread runoff to roadside.

Based on STEPL modeling these improvements are anticipated to reduce pollutant loadings to the Indian River Lagoon as follows;
phosphorus 19%, nitrogen 23%, sediment 47%, and BOD 24%. See attached STEPL output.

**PROJECT LOCATION AND WATERSHED CHARACTERISTICS**: Melbourne Beach is in the Cape Canaveral watershed (HUC 03080202) of the Indian River Lagoon (IRL). The IRL was designated in the 1987 Surface Water Improvement and Management (SWIM) Act as a priority water body in need of restoration and special protection and in 1991, the IRL became a part of the National Estuary Program (NEP). The IRL bordering the southern portion of Melbourne Beach is designated as Outstanding Florida Water (OFW). It is the oldest beachside community in Brevard County. The Town consists of ~ 94% residential, 5% commercial and 1% Industrial development. However, the project area is 100% residential. The Indian River Lagoon is designated as an Impaired water body (Impaired Waters List ID FL-3129A). The primary impairments are nutrients and dissolved oxygen. The community uses the water body for various forms of recreation including swimming, fishing, and boating.

**Watershed Name:** Cape Canaveral
**Latitude:** Basin 7: 28.0697; Basin 8: 28.0661
**Longitude:** Basin 7: 80.5644; Basin 8: 80.5631
**Hydrologic Unit Code(HUC):** 3080202

**Land Uses within the Watershed** (acres and percentages of total):

| Land Use | Acres | % |
|---|---|---|
| Basin 6 = Residential 120 | 9.8 | 100 |
| Basin 7 = Residential 120 | 8.0 | 100 |
| Basin 8 = Residential 120 | 50.0 | 100 |
| **Land Use Totals (Acreage and %)** | 42.8 | 100% |

**POLLUTION REDUCTION STRATEGY:** This project is part of the Town's stormwater master plan (SMP). These improvements are designed to increase the amount of storage within the basins thereby reducing the amount of runoff discharging to the IRL and to improve the quality of the runoff that does discharge to the lagoon. The treatment train will use exfiltration and swales to capture and treat stormwater runoff. Runoff in excess of the upstream storage capacity will flow to CIBs and NSBBs to capture additional sediment and floating solids; including nutrient rich vegetation.

**PROJECT OBJECTIVE(S):** Primary impairments are dissolved oxygen and nutrients as noted in the Florida Department of Environmental Protection (FDEP) Water Quality Assessment Report, Indian River Lagoon, 2008. The overall goal will be to reduce, sediments, total phosphorous and total nitrogen.

**PROJECT DESCRIPTION:** The Town of Melbourne Beach is the oldest beach front community in Brevard County. Melbourne Beach consists of 94% residential, 5% commercial and 1% institutional land use. The community is almost completely developed limiting the options for stormwater treatment. Therefore, the treatment strategy involves adding stormwater treatment upstream of the outfalls and combining BMPs where possible. The BMPs chosen for this project are exfiltration, swales, CIBs, and NSBBs. This project will retrofit the existing stormwater system to provide increased treatment of stormwater runoff in the target basins.

- The retrofits in Basin 6 consist of the installation of CIBs in the three curb inlets at the intersection of Avenue B and Riverside Drive
- The improvements in Basin 7 include the installation of exfiltration pipes at the intersection of Pine Street and Avenue A, the replacement of approximately 700 linear feet of stormwater pipe and associated structures. In addition, the project will install two catch basins and a nutrient separating baffle box (NSBB) upstream of the Basin 7 outfall.
- The improvements in Basin 8 consist of the replacement approximately 700 linear feet of stormwater pipe and associated structures, the installation of approximately 500 linear feet of swale, and a NSBB at the Second Avenue outfall. In addition a portion of First Avenue will be regraded to reduce roadway ponding and spread runoff to the grassed right-of-way.

Based on STEPL modeling these improvements are anticipated to reduce pollutant loadings to the Indian River Lagoon as follows;
Phosphorus 19%, nitrogen 23%, sediment 47%, and BOD 24%. See attached STEPL output.

## ESTIMATED POLLUTANT LOAD REDUCTION:

| BMPs Installed | | TSS kg/yr | TP kg/yr | TN kg/yr | Sediment kg/yr | BOD kg/yr | Other kg/yr | Other kg/yr |
|---|---|---|---|---|---|---|---|---|
| Basin 6 - CIBs | | | | | | | ----- | ----- |
| Pollutant Loads | Pre-Project | ------ | 6.8 | 37.2 | 725.7 | 169.0 | ----- | ----- |
| | Post-Project | ------ | 6.2 | 29.7 | 453.6 | 147.1 | ----- | ----- |
| | Load Reduction | ------ | 0.6 | 7.5 | 272.2 | 22.0 | ----- | ----- |
| | % Reduction | ------ | 9.0% | 20.% | 37.0% | 13.0% | ----- | ----- |
| **BMPs Installed** | | **TSS kg/yr** | **TP kg/yr** | **TN kg/yr** | **Sediment kg/yr** | **BOD kg/yr** | **Other kg/yr** | **Other kg/yr** |
| Basin 7 - Exfiltration & NSBB | | | | | | | ----- | ----- |
| Pollutant Loads | Pre-Project | ------ | 5.5 | 30.4 | 635.0 | 138.0 | ----- | ----- |
| | Post-Project | ------ | 3.9 | 21.6 | 272.2 | 89.7 | ----- | ----- |
| | Load Reduction | ------ | 1.6 | 8.8 | 362.8 | 48.3 | ----- | ----- |
| | % Reduction | ------ | 28.8% | 28.8% | 53.3% | 35.0% | ----- | ----- |
| **BMPs Installed** Basin 8 – W1 - NSBB | | **TSS kg/yr** | **TP kg/yr** | **TN kg/yr** | **Sediment kg/yr** | **BOD kg/yr** | **Other kg/yr** | **Other kg/yr** |
| | | | | | | | ----- | ----- |
| Pollutant Loads | Pre-Project | ----- | 0.27 | 1.41 | 90.7 | 6.44 | ----- | ----- |
| | Post-Project | ----- | 0.14 | 1.41 | 90.7 | 2.81 | ----- | ----- |
| | Load Reduction | ----- | 0.13 | 0.0 | 0 | 3.63 | ----- | ----- |
| | % Reduction | ----- | 51% | 0% | 0% | 56.3% | ----- | ----- |
| **BMPs Installed** Basin 8 – W2 - Swale | | **TSS kg/yr** | **TP kg/yr** | **TN kg/yr** | **Sediment kg/yr** | **BOD kg/yr** | **Other kg/yr** | **Other kg/yr** |
| | | | | | | | ----- | ----- |
| Pollutant Loads | Pre-Project | ----- | 0.32 | 1.68 | 90.7 | 7.53 | ----- | ----- |
| | Post-Project | ----- | 0.23 | 1.50 | 0.0 | 5.28 | ----- | ----- |
| | Load Reduction | ----- | 0.09 | 0.18 | 90.7 | 2.25 | ----- | ----- |
| | % Reduction | ----- | 24.9% | 10.0% | 100.0% | 29.9% | ----- | ----- |
| **TOTAL** | | **TSS kg/yr** | **TP kg/yr** | **TN kg/yr** | **Sediment kg/yr** | **BOD kg/yr** | **Other kg/yr** | **Other kg/yr** |
| | | | | | | | ----- | ----- |
| Pollutant Loads | Pre-Project | ----- | 12.89 | 70.69 | 1,532.1 | 320.9 | ----- | ----- |
| | Post-Project | ----- | 10.47 | 54.21 | 816.5 | 244.9 | ----- | ---- |
| | Load Reduction | ----- | 2.42 | 16.48 | 715.6 | 76.0 | ----- | ----- |
| | Average % Reduction | ----- | 19% | 23% | 47% | 24% | ---- | ----- |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

**MODEL USED:** Spreadsheet Tool for the Estimation of Pollutant Load – (STEPL) - *Version 4.1*

**LAND OWNERSHIP STATUS:** All work is proposed in the Melbourne Beach right-of-way.

**OUTPUTS/DELIVERABLES:**

- Quarterly Progress Reports
- Draft Project Report
- Comprehensive Project Report

**PROJECT MILESTONES:**

| Task | Activity | Start | Complete |
|---|---|---|---|
| 1 | Contract with FDEP signed | | Month 1 |
| 2 | Field Investigations (survey/geotechnical) | Month 1 | Month 2 |
| 3 | Design/Permitting | Month 2 | Month 9 |
| 4 | Bid Phase/ Advertise and Award | Month 9 | Month 11 |
| 5 | Construction/BMP Implementation | Month 11 | Month 24 |
| 6 | Construction Closeout | Month 24 | Month 25 |
| 7 | Final Documentation Report | Month 24 | Month 25 |
| | Quarterly Progress Reports | Month 3 | Month 25 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

**PROJECT BUDGET**:

| Project Funding Activity | 319 (h) Amount | Matching Contribution | Match Source * |
|---|---|---|---|
| Engineering/Geotech/Survey /Permitting | 0 | $71,500 | Melbourne Beach |
| Bidding Advertise and Award | 0 | $12,000 | Melbourne Beach |
| Grant Monitoring | | $5,000 | Melbourne Beach |
| Construction/BMP Implementation | $250,000 | $117,000 | Melbourne Beach |
| Construction Observation | | $14,500 | Melbourne Beach |
| Other: | | | |
| **Total:** | $250,000 | $220,000 | |
| **Total Project Cost:** | $470,000 | $470,000 | |
| **Percentage Match:** | 53 | 47 | |

***If a stormwater utility or other dedicated recurring fee is contributing, put that information in the following table.**
**MATCH SOURCE INFORMATION:**

| Match Source Name | Description | ERU/Fee |
|---|---|---|
| Melbourne Beach | Town Bond Initiative for Stormwater Improvements | N/A |

**BUDGET BY TASK**:

| Project Funding Activity | 319 (h) Amount | Matching Contribution | Match Source |
|---|---|---|---|
| Geotechnical/Survey | | $13,400 | Melbourne Beach |
| Design | | $44,700 | Melbourne Beach |
| Permitting | | $13,400 | Melbourne Beach |
| Bid Phase (A&A) | | $12,000 | Melbourne Beach |
| Grant Monitoring | | $5,000 | Melbourne Beach |
| Construction | $250,000 | $117,000 | Melbourne Beach |
| Construction Observation | | $14,500 | Melbourne Beach |
| | | | |
| | | | |
| **Total:** | $250,000 | $220,000 | |
| **Total Project Cost:** | $470,000 | $470,000 | |
| **Percentage Match:** | 53 | 47 | |

**OTHER FUNDING (Not Match – such as land acquisition or other federal grants): N/A**

| Agency | Activity | Amount |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | **Total:** | 0 |

**OTHER INFORMATION: If this is a multi-year project, have you requested sufficient funds to complete the project (assuming funds requested herein are provided)? (State yes or no, and, if no, provide an explanation): Yes: ☒ No: ☐**

**The Lead Organization, as listed on the first page of this form, agrees to comply with all requirements specified in the guidance package and in the federal grant regulations. Checking "no" or "yes, except" will cause the project to have a lower ranking than similar projects by lead organizations that agree to the requirements:**

**Yes: ☒ No: ☐ Yes, except: ☐ (Note: List exceptions below.)**

**Exceptions:**

**REFERENCES CITED:**

Jones, Edmunds & Associates, 2007. *TOWN OF MELBOURNE BEACH STORMWATER MASTER PLAN 2007 UPDATE.* 3910 S. Washington Avenue, Titusville, Florida 32780

Florida Department of Environmental Protection, Division of Environmental Assessment and Restoration, Bureau of Watershed Restoration, 2008, *Water Quality Assessment Report, Indian River Lagoon,*
2600 Blair Stone Road, Mail Station 3565, Tallahassee, Florida 32399-2400

Tetra Tech, Inc., 2006. *Spreadsheet Tool for the Estimation of Pollutant Load (STEPL), Version 4.1,*
10306 Eaton Place, Suite 340, Fairfax, VA 22003

**NOTE: PLEASE SUBMIT ALL APPENDICES IN A SEPARATE WORD DOCUMENT. THIS MAY INCLUDE MAPS, FIGURES OR ANY OTHER INFORMATION YOU WOULD LIKE TO INCLUDE WITH YOUR APPLICATION**

**PROJECT 16:** **Elizabeth Place Hydrologic Enhancement Program**

**PROJECT FUNDING:** $400,000 **FY10 319** $414,000 **Match**

**LEAD ORGANIZATION:** Polk County Natural Resources Division

**CONTACT PERSON:** Robert J. Kollinger, P.E.
Water Resources Engineer
Polk County Natural Resources Division
4177 Ben Durrance Road
Bartow, Florida 33830
Phone: 863-534-7377
Fax: 863-534-7368
robertkollinger@polk-county.net

**COOPERATING ORGANIZATIONS:**

Polk County Natural Resources
Southwest Florida Water Management District
FEMA

**PROJECT ABSTRACT:**

Banana Lake (WBID – 1549B) is an open water body that outfalls directly to Lake Hancock, which is part of the Peace River drainage basin located within the jurisdiction of the Southwest Florida Water Management District (SFWMD). Flows from the Peace River ultimately discharge into Charlotte Harbor. Both Banana Lake and Lake Hancock are included on the Florida Department of Environmental Protection's (FDEP) verified list of impaired waters for the Group 3 Basin. Total Maximum Daily Loads (TMDL) have been established by the FDEP for both lakes requiring a reduction in the amount of nitrogen and phosphorus discharged from the watershed. This project focuses on creating an urban wetland / flow through marsh for stormwater treatment to improve the quality of the water discharged to Banana Lake, Lake Hancock, and the Upper Peace River system. Professional Engineering Consultants (PEC) was retained by Polk County to study this area, which began with an initial evaluation of approximately 700 acres south of Banana Lake, including a 15-acre open water body/wetland also known as Unnamed Lake that is hydraulically connected to Banana Lake via a conveyance canal. Note that although the majority of the 252-acre drainage basin that discharges directly into Unnamed Lake is mostly composed of residential areas with permitted stormwater management systems in place (retention ponds), approximately 35.1 acres of single-family residential and undeveloped lands discharge untreated stormwater runoff to Unnamed Lake (refer to **Figure 1** – Site Locator Map) before discharging into Banana Lake.

Over the past 10 years the entire drainage basin contributing flows to Unnamed Lake has been developed, changing in land use from agricultural to medium density residential use. This resulted in the Unnamed Lake receiving more direct runoff due to development of the land up-gradient, as well as subsurface flows from retention ponds on adjacent properties. In 2004, this increase combined with torrential rainfall from documented hurricane activity directly impacted four (4) homes located on the north end of the lake, causing one (1) to be permanently abandoned. In 2006, Polk County, in cooperation with the Southwest Florida Water

Management District (SWFWMD) and the Federal Emergency Management Agency (FEMA), purchased the 3.5-acre home site and demolished the structure, converting the land use back to open space.

Moreover, Polk County has recently acquired a 1.23-acre portion of the property located immediately east of the 3.5-acre parcel previously acquired, in order to maximize the benefits of the proposed improvements. Specifically, the Elizabeth Place Hydrologic Enhancement Program proposes to utilize the acquired parcels of land previously described, which are located immediately north of Unnamed Lake and south of the Elizabeth Place right-of-way, to construct a 4.7-acre regional urban wetland system. Such system will also entail removing existing nuisance plant species and establishing an extensive regrading and replanting program. The proposed modification of the existing parcels north of Unnamed Lake and their conversion into the proposed urban wetland system will increase the available open water area while allowing for an expanded littoral shelf that will be planted with desirable wetland vegetation to improve habitat and provide additional stormwater treatment benefits.

Under proposed conditions and solely following heavy rainfall events, stormwater runoff from Unnamed Lake will naturally discharge in a northerly direction into the proposed urban wetland system from where runoff will be directed via an outfall control structure into an existing conveyance canal located north of Elizabeth Place before outfalling into Banana Lake.

**PROJECT LOCATION AND WATERSHED CHARACTERISTICS**:

Unnamed Lake currently receives runoff from a 252-acre residential basin prior to discharging to Banana Lake. Banana Lake is a 242-acre lake that drains to Lake Hancock through Banana Creek, ultimately discharging to the Peace River. The proposed urban wetland site as well as Unnamed Lake are located within unincorporated Polk County, north of County Road 540A and west of U.S. Highway 98, approximately one-half mile southeast of the Lakeland city limits.

**Watershed Name:** Peace River Watershed – Saddle Creek Basin
**Latitude:** 27.978333
**Longitude:** 81.903056
**Hydrologic Unit Code (HUC):** 03100101

**Land Uses within the Watershed** (acres and percentages of total):
The following table depicts the land use breakdown of the portion of the 252-acre drainage area that presently discharges runoff into Unnamed Lake without any kind of prior stormwater treatment.

| Land Use | Acres | % |
|---|---|---|
| Residential – Single Family | 21.2 | 60.4 |
| Residential – Low Density | 6.4 | 18.2 |
| Roadways | 7.5 | 21.4 |
| **Land Use Totals (Acreage and %)** | 35.1 | 100% |

**POLLUTION REDUCTION STRATEGY**:

TMDL's were published by the Florida Department of Environmental Protection in October 2005

and November 2005 for Banana Lake and Lake Hancock, respectively. The TMDL's require Total Nitrogen and Total Phosphorus levels from the watersheds to be reduced by 79% for Banana Lake, and 75% for Lake Hancock. Polk County is working with the FDEP, local municipalities, and other stakeholders to develop a Basin Management Action Plan (BMAP) for the watershed. This entails identifying potential projects to improve the quality of water discharged to Banana Lake. A lake alum treatment was recently conducted to sequester available phosphorus and improve water quality within the lake as part of the pollution reduction strategy. The Elizabeth Place Hydrologic Enhancement Program project will augment this work by further reducing the nitrogen and phosphorus contributions to these lakes.

Presently, the approximately 252-acre contributing watershed that discharges treated and untreated stormwater runoff into Little Banana Lake and the Unnamed Lake is comprised of a combination of single-family residential and undeveloped land uses. From a field reconnaissance performed by PEC staff as well as upon reviewing the Polk County's stormsewer system maps, it was determined that the stormwater runoff generated from 216.9 acres of single-family residential lands are directed to onsite stormwater management facilities (i.e., dry bottom stormwater ponds) for water quality treatment and peak rate attenuation before discharging into the Unnamed Lake via roadside conveyance pipes and ditches while 35.1 acres comprised of single family residential and roadways (also referred to as the "Treatment Area") discharge untreated stormwater runoff into Unnamed Lake via existing roadside conveyance pipes and ditches (refer to **Figure 2** – Treatment Area Map) and eventually into Banana Lake.

The declining water quality of Banana Lake has been a serious concern for many years. The proposed urban wetland system will benefit Banana Lake as it will provide a water quality benefit to 35.1 acres of lands that would otherwise discharge untreated into Unnamed Lake and Banana Lake, as it can be corroborated by the attached pollutant removal calculations (refer to **Appendix C**). Note that the areas currently being treated by stormwater ponds (i.e., dry retention ponds) were excluded from the pollutant removal calculations for the proposed improvements.

The concept of a "Hydrologic Enhancement Program" was approved by the Southwest Florida Water Management District in order to demonstrate a net benefit to the watershed given the following components:

- Pollutant loading reduction to Banana Lake
- Removal of nuisance vegetation and undesirable species
- Regrading and replanting of desirable species to increase pollutant removal

In summary, by using the Harvey Harper methodology, SJRWMD Total Phosphorus loading methodology, and the STEPHL 2007 methodology to quantify sediment loads, the existing total pollutant loading (TSS, Total Phosphorus, Total Nitrogen, BOD, Total Zn, Total Pb, and Sediment) to Banana Lake for the 35.1-acre contributing drainage basin approximates 9,728 kg/yr (21,447 lbs/yr). The proposed total phosphorus loadings, after the implementation of the urban wetland system, are expected to be approximately 3,416 kg/yr (7,531 lbs/yr). Therefore, it can be concluded that the proposed drainage improvements will result in a net reduction of total pollutants to Banana Lake of approximately 6,312 kg/yr (13,916 lbs/yr).

**PROJECT OBJECTIVE(S):**

The project objectives are to reduce the amount of total pollutants, especially nitrogen and phosphorus, entering Banana Lake and subsequently discharging to Lake Hancock, and the upper Peace River. Providing additional stormwater treatment will result in lower chlorophyll levels and improved water quality. This will assist in meeting the target TSI levels established in the TMDL's of 62.8 for Banana Lake and 74.4 for Lake Hancock. In addition to improve water quality, the project provides public education addressing water quality and stormwater Best Management Practices (BMP's) through the construction of a boardwalk with an observation tower and signage. This project will implement pollution reduction strategies to meet objectives of the watershed management plans developed for Polk County, the Southwest Florida Water Management District (SWFWMD), and the Charlotte Harbor National Estuary Program (CHNEP) (refer to **Figure 3** – Detailed Site Map).

**PROJECT DESCRIPTION:**

**History**

The SWFWMD completed the ***Surface Water Improvement and Management (SWIM) Plan for Banana Lake*** in June 1989. According to this document, "Banana Lake was ranked as the number two SWIM priority waterbody (after Tampa Bay) in need of restoration or preservation in the Southwest Florida Water Management District". To address restoration of the lake, the City of Lakeland diverted 10 MGD of treated wastewater effluent discharge from Banana Lake to a wetland in the Alafia River basin for additional treatment. This was followed by the dredging of Banana Lake in 1991 by Polk County with the removal of 800,000 cubic yards of organic sediment. The 1995 update of the Banana Lake SWIM plan identified the improvements in water quality resulting from the dredging and diversion, but indicated that considerably more work would be required to meet the goal established by the plan of achieving good water quality. Initiative A.1.d of this plan is to "reduce levels of nutrients and other contaminants in urban stormwater so that concentrations in the discharge at a minimum meet the standards applicable to the waterbody". Implementation of this project will assist in achieving this goal from the Elizabeth Place contributing drainage area.

The December 1998 **Charlotte Harbor National Estuary Program (CHNEP)** ***Framework For Action*** **(Technical Report 98-04)** outlines the quantifiable objectives and proposed action plans for the Greater Charlotte Harbor watershed. Water quality objective WQ-5 states the goal is to "Restore and maintain Lake Hancock to Class III water quality standards (or better) and improve the Trophic State Index (TSI) value for the water exiting the lake from poor to good by the year 2010". The Elizabeth Place project addresses three of the 17 Action Plans listed to meet this objective. Specifically these include; item WQ-B, "Promote general public awareness and education on water quality issues and demonstration projects", WQ-E, "Install or retrofit Best Management Practices as necessary to maintain water quality, by not exceeding the assimilative capacity of the water body", and WQ-N, "Reduce non-point source pollutants associated with stormwater runoff". These objectives were incorporated by the CHNEP into the ***Comprehensive Conservation and Management Plan for the Greater Charlotte Harbor Watershed*** (CCMP) in March 2000.

Charlotte Harbor was designated as an "estuary of national significance" by the U.S. Environmental Protection Agency (EPA) in 1995 when it was accepted into the National Estuary Program. The SWFWMD ranked Charlotte Harbor sixth on the District's SWIM priority list, and adopted the ***Charlotte Harbor SWIM Plan*** in November 2000. The SWIM plan identifies water quality degradation as one of three management issues, and established six goals to improve

water quality within the Harbor. One of these goals is to "Reduce point and non-point sources of pollution to attain desired use of the estuary". The Plan specifies priority projects including one to "Develop a water and nutrient budget for Lake Hancock's water quality improvement" as the effects of the poor quality water discharged from Lake Hancock to the Peace River can be detected as far south as Charlotte Harbor. The Elizabeth Place project therefore may have a regional impact on water quality by improving the quality of stormwater discharged to Banana Lake and Lake Hancock.

The Peace River Watershed has been designated as a priority watershed in Volume I of the ***Peace River Comprehensive Watershed Management Plan***, SWFWMD 2001 (CWM). The watershed is also one of six Ecosystem Management Areas designated by the FDEP and a Resource Management Plan for the basin was recently completed by the Department. The Elizabeth Place Hydrologic Enhancement Project addresses three of the four goals established in the CWM Plan for improvement of Flood Protection, Water Quality, and Natural Systems. In particular, the project will help satisfy the number one recommended action stated in the Water Quality Area of Responsibility (AOR) of the Plan, which is to "Develop and implement a cost-effective water quality restoration plan for Lake Hancock".

Volume II of the ***Peace River Comprehensive Watershed Management Plan***, SWFWMD 2001, is the Strategic Action Plan of specific strategies within the four Areas of Responsibility. Issue No. 11 of the plan addresses development of a "Restoration Plan for Banana Lake". The plan states, "Specific restoration actions may range from whole lake dredging, stormwater treatment, habitat restoration, and improvements in wastewater treatment". Previous actions completed have addressed the whole lake dredging and wastewater treatment improvement components of the plan. The Elizabeth Place project targets the remaining two actions with development of a stormwater treatment facility that provides habitat through restoration of the existing wetland.

In July 2005 the SWFWMD released the ***District Water Management Plan*** which states "Considering the practical and fiscal constraints of reducing the nutrient loading by 80-90 percent, no further restoration efforts are proposed to improve water quality, other than those that are proposed to improve water quality in the watershed as it relates to the Peace River and Charlotte Harbor". It further indicates "The District will work with Polk County and the City of Lakeland if feasible projects are identified to improve water quality or habitat in and around Banana Lake". Accordingly, the District has approved cooperative funding for the Elizabeth Place Hydrologic Enhancement Program under the SWIM program.

In May of 2006 Polk County, in cooperation with the FDEP, established the Upper Peace River Basin TMDL / BMAP Working Group as a stakeholders group for developing a BMAP for Lake Hancock and the upper Peace River Basin. As the headwater of Lake Hancock, Banana Lake is included in the BMAP as an area of primary focus for pollutant loading reduction. Banana Lake was identified by Mr. Harvey Harper, PhD, PE, in the ***Lake Hancock Water and Nutrient Budget and Water Quality Improvement Project Final Report,*** December 1999, as contributing 11% of the Total Nitrogen load, and 8% of the Total Phosphorus load to Lake Hancock. The Elizabeth Place Hydrologic Enhancement Program satisfies the BMAP strategy of reducing nitrogen and phosphorus loads from the watershed to assist in meeting the TMDL's for both Lake Hancock and Banana Lake.

**Proposed Improvements**

In the summer of 2004 Polk County experienced three (3) hurricanes with a significant increase in the amount of rainfall and stormwater runoff normally experienced. This resulted in flooding

of four (4) home sites on Elizabeth Place, a roadway located north of Clubhouse Road and east of Dismuke Drive, in Lakeland Florida. One (1) of the homes was abandoned by the homeowners and a buyout was completed under the National Flood Insurance Program to compensate the owner for $250,000 of the cost of the dwelling. Polk County, in cooperation with FEMA and the SWFWMD, shared the remaining $70,000 cost of the 3.5-acre home site and the demolition cost. To reduce the potential of flooding of the remaining three (3) homes, the County retained the services of Professional Engineering Consultants, Inc. (PEC) to determine the contributing factors causing the flooding and to prepare a plan to not only mitigate against future losses but to also address potential water quality improvements within the basin.

In January 2007 PEC began the process of delineating the drainage basins and identified the limits of a 15-acre open water body / wetland, also known as Unnamed Lake, which is the controlling feature of water elevations within the floodplain. The wetland encompasses a portion of the 3.5- acre property purchased by the County and drains to the north through a control structure on this property. This outfall discharges under the Elizabeth Place right-of-way and into a conveyance canal that discharges directly into Banana Lake, which is impaired for nutrients and has TMDLs established for both nitrogen and phosphorus. PEC was tasked with determining the extent to which the 3.5-acre site could be used to address both flooding and water quality concerns. It was then agreed that in order to maximize the extent of the proposed urban wetland system, Polk County would pursue the purchase of an additional parcel of land, which took place in the Spring of 2009, when the County acquired a 1.23-acre portion of the property located immediately east of the 3.5-acre parcel previously purchased.
Water quality improvements encompassed as part of the proposed urban wetland system include an increase in the open water area of 0.59 acres along with the development of a large littoral shelf to assist in maintaining a viable wetland vegetative community (refer to **Figure 3** – Detailed Site Plan). The restored wetland will consist of native vegetation that will facilitate nutrient removal.

Monitoring the quality of water entering and leaving the site will be conducted by the County for three years following construction to determine the treatment efficiency of the system. Polk County has a NELAC certified laboratory that will conduct analysis of inflow and outflow samples collected from the project site in accordance with the monitoring plan in **Appendix A**. Results of all monitoring will be included in a summary report for reference. Any long term monitoring of the wetland restoration required as a condition of the ERP for the project will be contracted by the County following completion of construction. Funding for continued maintenance of the site and long term monitoring that may be required will be the responsibility of the County.

For this stormwater retrofit project, the proposed urban wetland system will provide the following benefits: The treatment volume for the 35.1-acre drainage basin consists of 10.4 ac-ft while the permanent pool volume to be provided will approximate 4.6 ac-ft. The residence time will be 16.5 days, and the treatment volume in inches of runoff will approximate 3.6 inches (8.3 inches of rainfall over the drainage basin which represents 90% of the storm events on an average annual basis). Refer to **Appendix C** for the complete Water Quality Computations.

A public educational component is included as part of this project. The 4.7-acre urban wetland system will provide an opportunity for walkers and joggers in the community to participate in passive recreation activities such as wildlife viewing. To encourage use of the site, a boardwalk and observation deck will be constructed on the perimeter of the urban wetland system. Information relative to water quality and stormwater Best Management Practices will be included on signage placed along the boardwalk for educational purposes. A description of the

watershed, and discussion of impaired waters and TMDLs will inform users of the purpose of the project, and encourage them to be good stewards of the environment.

**ESTIMATED POLLUTANT LOAD REDUCTION:**

| BMPs Installed | | TSS kg/yr | TP kg/yr | TN kg/yr | Sediment kg/yr | BOD kg/yr | Other kg/yr | Other kg/yr |
|---|---|---|---|---|---|---|---|---|
| BMP #1 Wet Detention | | | | | | | Zinc | Lead |
| Pollutant Loads | Pre-Project | 2,759 | 11.6 | 168 | 6,260 | 516 | 6.8 | 7.5 |
| | Post-Project | 635 | 4.5 | 106 | 2,540 | 129 | 1.0 | 1.2 |
| | Load Reduction | 2,124 | 7.1 | 62 | 3,720 | 387 | 5.8 | 6.3 |
| | % Reduction | 77% | 62% | 37% | 59% | 75% | 85% | 84% |

**MODELS USED:** The estimated pollutant loadings and removal efficiencies were based on the following two (2) documents authored by Mr. Harvey Harper, PhD, P.E., one (1) document authored by the St. Johns River Water Management District (SJRWMD), and one (1) spreadsheet created by Tetratech and used by FDEP:

1. Harvey H. Harper, Ph. D., P.E., *Stormwater Loading Rate Parameters for Central and South Florida*, October 1994.

2. Harvey H. Harper, Ph. D., P.E., *Evaluation of Current Stormwater Design Criteria within the State of Florida*, prepared for FDEP, June 2007.

3. St. Johns River Water Management District, *Evaluation of Water Quality Stormwater Regulations for the Lake Apopka Basin Final Report*, December 2002.
4. Tetra Tech Inc., *STEPHL Model* (for sediment estimate only), 2007.

**LAND OWNERSHIP STATUS:**

The footprint of the proposed urban wetland system is located within two parcels of land that have been acquired by the Polk County Board of County Commissioners.

**OUTPUTS/DELIVERABLES:**

Task 1 - Initiate FDEP Contract – Upon initiation of the Grant Agreement, Polk County will have completed the project final design and obtained the required Environmental Resource Permit from the Southwest Florida Water Management District (SWFWMD) and NPDES Construction Permit for the project.

Task 2 - Prepare and Submit Quality Assurance Project Plan (QAPP) – A project specific QAPP will be developed and submitted to FDEP for approval prior to initiating the monitoring activities. The monitoring results will be input into the Florida Stormwater Database.

Task 3 - Complete/Submit Quarterly Reports to FDEP – Quarterly project progress reports will be submitted along with a request for reimbursement of the grant portion of any expenditures made during the reporting period.

Task 4 - Obtain Construction Bids for Urban Wetland System – Polk County will solicit

competitive sealed bids through our Purchasing Division for construction of the stormwater treatment facilities.

Task 5 – Urban Wetland System Construction – FDEP will be notified of the successful bidder to verify the firm is satisfactory prior to executing the contract. Construction is expected to take up to 8 months to complete following notice to proceed to the contractor. The result will be a fully functional urban wetland system completed to the design plan and permit specifications.

Task 6 - Construction Engineering Inspection – Professional Engineering Consultants Inc. (PEC) will be retained to continue the Construction Engineering Services portion of the project.

Task 7 - Obtain Construction Quotes for the Boardwalk – Separate construction quotes will be solicited for the boardwalk facilities through the County's Purchasing Division.

Task 8 - Prepare/Submit As-Built Plans for Certification – PEC will complete record drawings in both digital and paper copies for the project based on a survey of the completed construction.

Task 9 - Boardwalk Construction – The product will be an ADA compliant boardwalk and wildlife observation deck adjacent to the urban wetland system.

Task 10 - Obtain Quotes for Educational Signage – Quotes for the public education signage will be requested through the County's Purchasing Division.

Task 11 - Complete/Install Public Education Signage – Upon completion of the sign panels, kiosks will be constructed along the boardwalk and observation deck to provide information to the public on water quality and stormwater management.

Task 12 - Monitoring Water Quality Treatment Efficiency – Upon completion of the stormwater treatment facilities, monitoring stations will be established at the project outfall and both inflows. Storm event runoff samples will be collected for a three-year period with samples analyzed in accordance with the monitoring plan submitted for this project.

Task 13 - Prepare/Submit FDEP Final Progress Report – Upon completion of construction, a draft final progress report will be prepared and submitted to FDEP for review. Five (5) hard copies and one (1) electronic CD version of the final project report will be submitted following completion of the monitoring and will include a summary of the analytical results for the project. The final project report will also include one copy of slides that have been taken throughout the duration of the project.

**PROJECT MILESTONES:**

| Task | Activity | Start | Complete |
|---|---|---|---|
| 1 | Initiate FDEP Contract | | Month 1 |
| 2 | Prepare and Submit QAPP | Month 1 | Month 3 |
| 3 | Complete/Submit Quarterly Reports to FDEP | Month 1 | Month 48 |
| 4 | Obtain Bids/Contract for Stormwater Pond | Month 1 | Month 3 |
| 5 | Stormwater Treatment Pond Construction | Month 4 | Month 12 |
| 6 | Construction Engineering Inspection | Month 4 | Month 12 |
| 7 | Obtain Construction Quotes/ Boardwalk | Month 12 | Month 13 |

| | | | |
|---|---|---|---|
| | Contract | | |
| 8 | Prepare/Submit As-Built Plans for Certification | Month 13 | Month 15 |
| 9 | Boardwalk Construction | Month 15 | Month 18 |
| 10 | Obtain Quotes/Contract for Educational Signage | Month 15 | Month 17 |
| 11 | Complete/Install Public Education Signage | Month 20 | Month 21 |
| 12 | Monitoring Water Quality Treatment Efficiency | Month 12 | Month 48 |
| 13 | Prepare/Submit FDEP Final Progress Report | Month 46 | Month 48 |

**PROJECT BUDGET**:

| Project Funding Activity | Section 319 Amount | Matching Contribution | Match Source * |
|---|---|---|---|
| Staff | $0.00 | $10,000.00 | Polk County |
| Travel | $0.00 | $0.00 | N/A |
| Equipment | $0.00 | $0.00 | N/A |
| Supplies | $0.00 | $0.00 | N/A |
| Final Design Services (Design, Permitting, Geotech, Survey and Environmental) | $0.00 | $150,000.00 | SWFWMD |
| BMP Implementation (construction) | $300,000.00 | $10,000.00<br>$114,000.00 | Polk County<br>SWFWMD |
| Construction Engineering and Inspections - Phase III | $0.00 | $10,000.00<br>$20,000.00 | Polk County<br>SWFWMD |
| Monitoring | $0.00 | $20,000.00 | Polk County |
| Public Education (boardwalk construction and signage) | $100,000.00 | $9,000.00<br>$71,000.00 | Polk County<br>SWFWMD |
| **Total:** | $400,000.00 | $414,000.00 | |
| **Total Project Cost:** | $814,000.00 | $814,000.00 | |
| **Percentage Match:** | 49% | 51% | |

***If a stormwater utility or other dedicated recurring fee is contributing, put that information in the following table.**

**MATCH SOURCE INFORMATION:**

| Match Source Name | Description of Match Contribution | ERU/Fee |
|---|---|---|
| Polk County BoCC | General Fund | Not Applicable |

**BUDGET BY TASK**:

| Project Funding Activity | 319 (h) Amount | Matching Contribution | Match Source |
|---|---|---|---|
| Initiate FDEP Contract with Board Approval | $0.00 | $500.00 | Polk County |

| | | | |
|---|---|---|---|
| Prepare and Submit QAPP | $0.00 | $1,500.00 | Polk County |
| Complete/ Submit Quarterly Reports to FDEP | $0.00 | $1,500.00 | Polk County |
| Final Design Services (Design, Permitting, Geotech, Survey and Environmental) | $0.00 | $150,000.00 | SWFWMD |
| Obtain Bids/ Contract for Urban Wetland System Construction | $0.00 | $1,500.00 | Polk County |
| Urban Wetland System Construction | $300,000.00 | $10,000.00<br>$114,000.00 | Polk County<br>SWFWMD |
| Construction Engineering Inspection | $0.00 | $10,000.00<br>$20,000.00 | Polk County<br>SWFWMD |
| Obtain Construction Quotes/ Contracts for Boardwalk | $0.00 | $1,000.00 | Polk County |
| Submit As-Builts Plans and Certification of Construction | $0.00 | $1,500.00 | Polk County |
| Boardwalk Construction | $100,000.00 | $5,000.00<br>$59,000.00 | Polk County<br>SWFWMD |
| Obtain Quotes/ Contracts for Educational Signage | $0.00 | $1,000.00 | Polk County |
| Complete/Install Public Education Signage | $0.00 | $4,000.00<br>$12,000.00 | Polk County<br>SWFWMD |
| Monitoring Water Quality Treatment Efficiency | $0.00 | $20,000.00 | Polk County |
| Prepare/Submit FDEP Final Progress Reports | $0.00 | $1,500.00 | Polk County |
| **Total:** | $400,000.00 | $414,000.00 | |
| **Total Project Cost:** | $814,000.00 | $814,000.00 | |
| **Percentage Match:** | 49% | 51% | |

**OTHER FUNDING (Not Match – such as land acquisition or other federal grants):**

| Agency | Activity | Amount |
|---|---|---|
| FEMA (National Flood Insurance Program) | Initial 3.5 acre property acquisition | $250,000.00 |
| Polk County | Remaining 3.5 acre property acquisition and demolition of existing structure. | $35,000.00 |
| SWFWMD | Remaining 3.5 acre property acquisition and demolition of existing structure. | $35,000.00 |
| Polk County | Additional 1.2 acre land acquisition/appraisals | $22,000.00 |
| SWFWMD (SWIM) | Additional 1.2 acre land acquisition/appraisals | $22,000.00 |
| | **Total:** | $364,000.00 |

**OTHER INFORMATION: If this is a multi-year project, have you requested sufficient funds to complete the project (assuming funds requested herein are provided)? (State yes or no, and, if no, provide an explanation):**

**Yes: X No:**

**The Lead Organization, as listed on the first page of this form, agrees to comply with all requirements specified in the guidance package and in the federal grant regulations. Checking "no" or "yes, except" will cause the project to have a lower ranking than similar projects by lead organizations that agree to the requirements:**

**Yes: X No: Yes, except: (Note: List exceptions below.)**

**Exceptions: None**

**REFERENCES CITED:**


Southwest Florida Water Management District, *Surface Water Improvement and Management Plan for Banana Lake*, June 1989.

Polk County Natural Resources Division - *National Pollutant Discharge Elimination System Part 2 Municipal Separate Storm Sewer System Permit Application for Polk County Florida,* May 1993.

Harvey H. Harper, Ph. D., P.E., *Stormwater Loading Rate Parameters for Central and South Florida*, October 1994.

Southwest Florida Water Management District, *Surface Water Improvement and Management Plan for Banana Lake*, Updated November 1995.

Harvey H. Harper, Ph. D., P.E., *Pollutant Removal Efficiencies for Typical Stormwater Management Systems In Florida*, October 1995.

Charlotte Harbor National Estuary Program – *Framework For Action*, *Quantifiable Objectives and Proposed Action Plans for the Greater Charlotte Harbor Watershed* (Technical Report No. 98-04), December 1998.

Southwest Florida Water Management District, *Peace River Comprehensive Watershed Management Plan,* July 1999

Harvey H. Harper, Ph. D., P.E., *Lake Hancock Water and Nutrient Budget and Water Quality Improvement Project Final Report*, December 1999.

Charlotte Harbor National Estuary Program, *Committing to Our Future*, *The Comprehensive Conservation and Management Plan for the Greater Charlotte Harbor Watershed, Volume 1,* March 2000.

Charlotte Harbor National Estuary Program, *Committing to Our Future*, *Preliminary Action Plans for the Greater Charlotte Harbor Watershed, Volume 2,* March 2000.

*Charlotte Harbor Surface Water Improvement and Management Plan,* SWFWMD, Spring 2000.

Harvey H. Harper, Ph. D., P.E., *Stormwater Chemistry and Water Quality: Estimating Pollutant Loadings and Evaluation of Best Management Practices for Water Quality Improvements,* 2000.

*Peace River Comprehensive Watershed Management Plan*, SWFWMD, 2001.

St. Johns River Water Management District, *Evaluation of Water Quality Stormwater Regulations for the Lake Apopka Basin Final Report*, December 2002.

Southwest Florida Water Management District, *District Water Management Plan,* July 2005.

Harvey H. Harper, Ph. D., P.E., *Evaluation of Current Stormwater Design Criteria within the State of Florida*, prepared for FDEP, June 2007.

Tetra Tech Inc., *STEPHL Model* (for sediment estimate only), 2007.

## PROJECT 17: Lake Seminole Regional Alum Treatment Facility

| | | | | |
|---|---|---|---|---|
| **PROJECT FUNDING:** | $500,000 | **FY10 319** | $1,376,000 | **Match** |

**LEAD ORGANIZATION:** Pinellas County Government

**CONTACT PERSON:**
**(Name, Address, Phone)**

Kelli Hammer Levy, Division Director
Pinellas County Environmental Management
Watershed Management Division
300 South Garden Ave.
Clearwater, FL 33756
(727) 464-3314
klevy@pinellascounty.org

**COOPERATING ORGANIZATIONS:** Southwest Florida Water Management District (design and construction) and City of Largo, City of Seminole, and Florida Department of Transportation (operation and maintenance).

**PROJECT ABSTRACT:** In 2003, Pinellas County entered into a contract with Environmental Research and Design, Inc to design, permit, and construct five regional alum treatment facilities as outlined in the Lake Seminole Watershed Management Plan (2001). As originally described, the project was anticipated to cost $2.9 million dollars; however, due to significant changes in the design approach, land acquisition requirements, and increases in construction costs, the new project budget is estimated at over $10 million dollars. To date, one of the systems is under construction, the second system (sub basin 3) is scheduled to be bid fall 2009, the third system (sub basin 6) is scheduled to be bid early in 2010, and the final two systems are scheduled for 2011. The project's overall goal is to remove 50% of the phosphorous (P) entering Lake Seminole from a 4100 acre urban watershed. Based on the design the pollutant loading estimates to the lake are 515 kg/yr Total P (TP), 1311 kg/yr Total Nitrogen (TN), and 50,150 kg/yr Total Suspended Solids (TSS). This project is critical to restoring water quality and beneficial aquatic habitat in Lake Seminole, an Outstanding Florida Water, and is a key component of the Federal and State approved Lake Seminole Reasonable Assurance Plan (2007).

**PROJECT LOCATION AND WATERSHED CHARACTERISTICS**: Sub basins 3 and 6 within the Lake Seminole watershed drain 621.3 and 281.52 acres respectively. The basins are comprised of older urban land uses (residential and commercial) largely built before stormwater regulations. Sub basin 3 is located on the west side of the lake and discharges through a channel south of County Rd. 296 (Bryan Diary Rd) into the area commonly referred to as the narrows. Sub basin 6 is located in the southern portion of the watershed on the west side of the lake and discharges to the area known as the south lobe (Appendix B).

| | |
|---|---|
| **Watershed Name:** | Lake Seminole |
| **Latitude:** | 27.865099 |
| **Longitude:** | -82.779438 |
| **Hydrologic Unit Code(HUC):** | 03100207 |

## ESTIMATED POLLUTANT LOAD REDUCTION:

| BMPs Installed | | TSS kg/yr | TP kg/yr | TN kg/yr | Sediment kg/yr | BOD kg/yr | Other kg/yr | Other kg/yr |
|---|---|---|---|---|---|---|---|---|
| Sub Basin 3 | | | | | | | | |
| Pollutant Loads | Pre-Project | 13770 | 290 | 1048 | | | | |
| | Post-Project | 3442 | 78 | 807 | | | | |
| | Load Reduction | 10328 | 212 | 241 | | | | |
| | % Reduction | 75 | 73 | 23 | | | | |
| Sub basin 6 | | TSS kg/yr | TP kg/yr | TN kg/yr | Sediment kg/yr | BOD kg/yr | Other kg/yr | Other kg/yr |
| Pollutant Loads | Pre-Project | 5310 | 65 | 625 | | | | |
| | Post-Project | 1327 | 17 | 481 | | | | |
| | Load Reduction | 3983 | 48 | 144 | | | | |
| | % Reduction | 75 | 73 | 23 | | | | |
| TOTAL | | TSS kg/yr | TP kg/yr | TN kg/yr | Sediment kg/yr | BOD kg/yr | Other kg/yr | Other kg/yr |
| Pollutant Loads | Pre-Project | 19,080 | 355 | 1673 | | | | |
| | Post-Project | 4769 | 95 | 1288 | | | | |
| | Load Reduction | 14,311 | 260 | 385 | | | | |
| | % Reduction | 75 | 73 | 23 | | | | |
| | | | | | | | | |

**MODEL USED:** Pollutant load removal efficiencies were provided by Harvey Harper of ERD, Inc. and the data used was based on storm water data collected by ERD in the sub basin 3 and 6 systems and subsequent jar testing of each sample. The design report which includes estimates for load reductions was produced by ERD, Inc.

**LAND OWNERSHIP STATUS:** ALL PROJECT LAND IS OWNED BY PINELLAS COUNTY

**OUTPUTS/DELIVERABLES:** Task 1: Submit copies of 100% construction plans, technical specifications, bid documents, ERP #52-0253864-001, NPDES NOI, and pre-construction photos.
Task 2: Public meetings were held prior to beginning construction on the sub basin 1 facility in June 2008. Project updates are posted on the project web site at www.pinellascounty.org/LakeSeminole which includes education on landscaping best management practices, aquascaping, and other lake friendly practices.
Task 3. Construction activities and construction quarterly reports including project aerials and construction photos.
Task 4. Complete and submit draft project report including the alum system operation and maintenance plans, aerial photos, construction photos, technical papers, and/or presentations within 3 months of construction completion.
Task 5. Initiate and complete BMP evaluation per approved QAPP (Appendix A). Provide detailed performance evaluation report and upload data to STORET and the Florida Stormwater Database within 3 months of evaluation completion.
Task 6. Complete and submit final project report within 2 months of receiving draft report comments.
Task 7. Install educational kiosk at sub basin 6 project site which is also configured as a community passive use park within 3 months of construction completion.

**PROJECT MILESTONES:**

| Task | Activity | Start | Complete |
|---|---|---|---|
| 1 | Finalize FDEP agreement | | Month 1 |
| 2 | Submit all construction processing documents | | Month 2 |
| 3 | Public education and notifications | Month 1 | Month 36 |
| 4 | Construction and Quarterly construction reports | Month 1 | Month 30 |
| 5 | Submit draft project report | Month 30 | Month 33 |
| 6 | BMP evaluations | Month 30 | Month 36 |
| 7 | Submit final project report | Month 37 | Month 39 |
| 8 | Install educational kiosk at sub basin 6 | Month 30 | Month 33 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

**PROJECT BUDGET**:

| Project Funding Activity | 319 (h) Amount | Matching Contribution | Match Source * |
|---|---|---|---|
| Staff (project mgmt, construction mgmt, monitoring hours) | | $110,000 | Pinellas County |
| Travel | | | |
| Equipment | | $60,000 | Pinellas County and SWFWMD |
| Supplies | | $1000 | Pinellas County and SWFWMD |
| Contractual | $500,000 | $1,200,000 | Pinellas County and SWFWMD |
| BMP Implementation | | | |
| Monitoring (lab fees) | | $3000 | Pinellas County |
| Public Education (kiosk only) | | $2000 | Pinellas County |
| Other: | | | |
| **Total:** | $500,000 | $1,376,000 | |
| **Total Project Cost:** | | $1,876,000 | |
| **Percentage Match:** | 27 | 73 | |

***If a stormwater utility or other dedicated recurring fee is contributing, put that information in the following table.**

**MATCH SOURCE INFORMATION:**

| Match Source Name | Description | ERU/Fee |
|---|---|---|
| Penny for Pinellas Infrastructure Tax | 1 penny sales tax used for capital improvement programs | 0.01/1.00 dollar spent |
| Pinellas Anclote Basin Board (SWFWMD) | Water Management District millage | 0.3866/$1,000 home value |
| | | |
| | | |
| | | |

**BUDGET BY TASK**:

| Project Funding Activity | 319 (h) Amount | Matching Contribution | Match Source |
|---|---|---|---|
| Task 1 Finalize FDEP Agreement | | $250 | Pinellas County |
| Task 2 Submit all construction processing documents | | $500 | Pinellas County |
| Task 3 Public education and notifications | | $1000 | Pinellas County |
| Task 4 Construction and Quarterly construction reports | $500,000 | $1,294,750 | Pinellas County and SWFWMD |
| Task 5 Submit draft project report | | $2400 | Pinellas County |
| Task 6 BMP evaluations | | $73,000 | Pinellas County and SWFWMD |
| Task 7 Submit final project report | | $1200 | Pinellas County |
| Task 8 Install educational kiosk at sub basin 6 | | $2900 | Pinellas County |
| **Total:** | $500,000 | $1,376,000 | |
| **Total Project Cost:** | | $1,876,000 | |
| **Percentage Match:** | 27 | 73 | |

**OTHER FUNDING (Not Match – such as land acquisition or other federal grants):**

| Agency | Activity | Amount |
|---|---|---|
| Pinellas County | Land Acquisitions | $576,250 |
| | | |
| | | |
| | | |
| | | |
| | **Total:** | $576,250 |

**OTHER INFORMATION: If this is a multi-year project, have you requested sufficient funds to complete the project (assuming funds requested herein are provided)? (State yes or no, and, if no, provide an explanation): Yes: ☒ No: ☐**

**The Lead Organization, as listed on the first page of this form, agrees to comply with all requirements specified in the guidance package and in the federal grant regulations. Checking "no" or "yes, except" will cause the project to have a lower ranking than similar projects by lead organizations that agree to the requirements:**

**Yes: ☒ No: ☐ Yes, except: ☐ (Note: List exceptions below.)**

**Exceptions:**

**REFERENCES CITED:**


1. PBS&J 2001. The Lake Seminole Watershed Management Plan.
2. PBS&J 2007. The Lake Seminole Reasonable Assurance Plan
3. ERD, Inc. 2005. Design of Regional Stormwater Treatment Facilities for Lake Seminole


**NOTE: PLEASE SUBMIT ALL APPENDICES IN A SEPARATE WORD DOCUMENT. THIS MAY INCLUDE MAPS, FIGURES OR ANY OTHER INFORMATION YOU WOULD LIKE TO INCLUDE WITH YOUR APPLICATION**

## PROJECT 18: Coconut Lane Outfall Improvements

**PROJECT FUNDING:** $119,415.00 **FY10 319** $278,635.00 **Match**

**LEAD ORGANIZATION:** Town of Ocean Ridge

**CONTACT PERSON:**
**(Name, Address, Phone)**

Kenneth N. Schenck, Jr.
Town Manager
6450 North Ocean Boulevard
Ocean Ridge, FL 33435

**COOPERATING ORGANIZATIONS:** N/A

**PROJECT ABSTRACT:** Coconut Lane Outfall Improvements is a construction-ready stormwater retrofit project that will provide stormwater treatment to a 4.8-acre watershed, currently discharging directly to the Lake Worth Lagoon without treatment. Water quality improvements will be accomplished by constructing a Nutrient Separating Baffle Box at the outfall and constructing raised inlets in the roadside swales. Signage will be placed in the public right-of-way educating the public on stormwater pollution prevention and the importance of protecting the receiving waters. These water quality improvement measures are expected to reduce TSS by 64%. Construction plans and specifications are complete, all construction permits are in place, and no land purchases are required to implement the proposed improvements.

**PROJECT LOCATION AND WATERSHED CHARACTERISTICS**: Coconut Lane is part of the Lake Worth Lagoon basin, in the Everglades watershed (HUC 03090202). The Lake Worth Lagoon basin receives stormwater runoff from eastern Palm Beach County, which includes the most heavily developed urban areas of the county. The Lake Worth Lagoon is the County's major estuarine resource, and it is a 303(d) listed water body (WBID #3226F and #3226E). The lagoon receives direct runoff from drainage basins immediately surrounding it, and indirect runoff from basins served by the regional canal system and spillways emptying into the lagoon.

Coconut Lane is located east of the Atlantic Intracoastal Waterway, one block north of State Road 804 (aka Ocean Avenue) in the Town of Ocean Ridge, Palm Beach County, Florida. The 4.8-acre watershed is situated at the south end of the Lake Worth Lagoon, on the barrier island separating the lagoon from the Atlantic Ocean. The narrow barrier island has a natural ridge formed along the Atlantic dune line causing the majority of the island to drain directly to the lagoon. Residential development within the Coconut Lane watershed dates back to the 1920's, well before water quality in the lagoon was a concern. Today, many of the smaller older homes are being replaced with larger homes and increased impervious areas; meanwhile the 1920's drainage system serving Coconut Lane remains in place.

**Watershed Name:** Coconut Lane/ Lake Worth Lagoon/ Everglades
**Latitude:** 26.528247
**Longitude:** 80.051280
**Hydrologic Unit Code(HUC):** 03090202

**Land Uses within the Watershed** (acres and percentages of total):

| Land Use | Acres | % |
|---|---|---|
| Urban-Single Family Residential | 4.8 | 100 |
| | | |
| | | |
| | | |
| **Land Use Totals (Acreage and %)** | 4.8 | 100 |

**POLLUTION REDUCTION STRATEGY:** This proposal will continue the process of reducing nonpoint source pollutants directly entering the Lake Worth Lagoon via stormwater runoff by implementing structural Best Management Practices (BMP) in one of the lagoon's many contributory urban watersheds. The Coconut Lane Outfall Improvements project meets an incremental need of the Lake Worth Lagoon Management Plan (March 2008 Revision, prepared by the Palm Beach County Department of Environmental Resources Management) by accomplishing the following goal identified in Chapter 4 (page 74) of the plan: SW-*3 Identify and Increase Stormwater Retrofit Projects. SW-3* is one of 13 water and sediment quality program goals for the lagoon outlined in Chapter 4 of the plan.

Additionally, the Lake Worth Lagoon is a Group 3, 303(d) listed water body, identified as WBID #3226F and #3226E. The lagoon has listed impairments including nutrients, dissolved oxygen, coliforms and heavy metals. The project discharges stormwater directly to the Lake Worth Lagoon and targets the impairments by reducing nutrients, suspended solids, heavy metals and hydrocarbons; therefore the proposed water quality improvements will benefit a listed water body.

The proposed water quality improvements consist of constructing a Nutrient Separating Baffle Box (NSBB) at the outfall and constructing raised inlets in the existing roadside swales. The pollution reduction strategy involves treating the stormwater runoff in two steps before discharging into the Lake Worth Lagoon. First, treatment will occur as runoff is collected and detained in the roadside swales as a result of the proposed raised inlets. The existing swales primary function is to convey runoff to the outfall and into the lagoon. With the addition of raised inlets, the swales will function as shallow dry detention areas capable of reducing suspended solids, nutrients, and the quantity of runoff by promoting groundwater recharge. Once the dry detention/ swale storage capacity is exceeded, runoff will enter the raised inlets and be conveyed to the proposed NSBB. The NSBB is capable of further reducing suspended solids and heavy metals, nutrients, and hydrocarbons before discharging runoff to the lagoon.

Implementing water quality improvements requiring very little space to construct was a primary factor in developing the proposed pollution reduction strategy. Vacant private property surrounding the public right-of-way is not available and property values are high on the barrier island, so constructing improvements on private property is not feasible. This eliminates the use of stormwater detention systems requiring large amounts of space. Alternative water quality treatment measures, such as a series of class 5 stormwater injection wells, were considered for the Coconut Lane watershed. The injection wells alternative could be constructed in the right-of-way and it would completely prevent stormwater runoff and associated pollutants from entering the lagoon. However, the wells are cost prohibitive for the watershed size (costing nearly three times as much as the proposed improvements).

**PROJECT OBJECTIVE(S):** As mentioned above, the Lake Worth Lagoon is a 303(d) listed water body. As of the 2005 FDEP listing, the lagoon impairments include nutrients, dissolved

oxygen, coliforms and heavy metals. The TMDL for these impairments is ranked medium and will be developed by the FDEP in 2010. The Lake Worth Lagoon Management Plan has set forth goals to address the impairments, one of which is to increase stormwater retrofit projects. This proposal is a stormwater retrofit project utilizing structural BMPs to implement water quality improvements. The water quality improvements are designed to reduce suspended solids and heavy metals, nutrients, and hydrocarbons in a manner consistent with the Lake Worth Lagoon Management Plan. The following improvements will achieve this objective:

- Constructing raised inlets in the existing roadside swales.

- Constructing a nutrient separating baffle box immediately upstream of the outfall pipe.

- Providing educational signage near the outfall (in the public right-of-way) to inform the public regarding objectives of this project.

- Implementing a pollution prevention program such as a storm drain inlet labeling project to heighten public awareness regarding discharge of pollutants to the lagoon.

- Conducting a post-construction BMP effectiveness evaluation on the proposed improvements.

**PROJECT DESCRIPTION:** The Coconut Lane Outfall Improvements project proposes to retrofit an existing municipal drainage system (currently providing no water quality treatment) in accordance with the goals of the Lake Worth Lagoon Management Plan. The retrofit project includes implementation of two stormwater best management practices (BMP), a public education component, and a BMP effectiveness evaluation. Appendix B contains maps of the project location, the treatment area, and a site map showing the location of the proposed improvements. This project is separate from, but a continuation of the Town of Ocean Ridge's recent stormwater projects including the South Phase Drainage Improvements project. The South Phase Drainage Improvements project received 319(h) funding under FDEP Agreement No. G0047 (FY2002).

- Raised Inlets: Two (2) FDOT Type E stormwater inlets will be constructed at the low point of watershed. The low point on Coconut lane falls in existing grassed swales on either side of the road (approximately 850 linear feet in length), in the public right-of-way. Each inlet will be raised 6 inches above the swale bottom, and contain v-notch bleed down devices to allow for recovery of the swales. The proposed inlets will capture the first flush of sediments from the watershed runoff by creating dry detention storage in the existing swales.

- Nutrient Separating Baffle Box (NSBB): One (1) NSBB will be constructed immediately upstream of the watershed outfall pipe in the public right-of -way. After runoff passes through the swales and into the two raised inlets, stormwater will be conveyed directly to the NSBB via underground stormwater pipe. The NSBB is designed provide treatment for flows up to 15 cubic feet per second, and has a peak flow capacity of 30 cubic feet per second (20 cubic feet per second is the approximate peak discharge rate from the Coconut Lane watershed). The NSBB is approximately 5 feet wide, 10 feet long and 7 feet deep. It contains a basket/ screen storage system capable of storing 49 cubic feet of biomass, three sediment chambers capable of storing a total of 145 cubic feet of sediment, a skimmer and a hydrocarbon absorption boom. The NSBB is a below ground structure with ground level

access hatches for maintenance of the system.

- Public Education: One (1) educational kiosk will be erected in the Coconut Lane public right-of-way near the outfall to the lagoon. The kiosk will provide information about the project including the watershed, receiving waters (Lake Worth Lagoon), nonpoint source pollution associated with stormwater, and pollution prevention measures being implemented by the Town and recommended non-structural BMPs for residents to implement. Also, stormwater inlets within the Coconut Lane watershed will be labeled to heighten public awareness regarding discharge of pollutants to the lagoon.

- Effectiveness Evaluation: After implementation of the proposed BMPs, the project will be monitored for effectiveness. The treatment train will be monitored as whole to demonstrate the environmental benefits of the project. A preliminary BMP Effectiveness Evaluation is included in the proposal as Appendix A.

Construction plans for project have already been prepared, and construction permits have been obtained. The proposed water quality improvements will be constructed in the public right-of-way and no additional land acquisition is required.

**ESTIMATED POLLUTANT LOAD REDUCTION:**

| BMPs Installed | | TSS kg/yr | TP kg/yr | TN kg/yr | Sediment kg/yr | BOD kg/yr | Other kg/yr | Other kg/yr |
|---|---|---|---|---|---|---|---|---|
| Combined BMP | | | | | | | | |
| Pollutant Loads | Pre-Project | 892.2 | 3.6 | 19.6 | N/A | 89.2 | N/A | N/A |
| | Post-Project | 319.4 | 2.1 | 16.8 | N/A | 52.4 | N/A | N/A |
| | Load Reduction | 572.8 | 1.5 | 2.8 | N/A | 36.8 | N/A | N/A |
| | % Reduction | 64.2 | 41.7 | 14.3 | N/A | 41.3 | N/A | N/A |
| | | **TSS kg/yr** | **TP kg/yr** | **TN kg/yr** | **Sediment kg/yr** | **BOD kg/yr** | **Other kg/yr** | **Other kg/yr** |
| Pollutant Loads | Pre-Project | | | | | | | |
| | Post-Project | | | | | | | |
| | Load Reduction | | | | | | | |
| | % Reduction | | | | | | | |
| **TOTAL** | | **TSS kg/yr** | **TP kg/yr** | **TN kg/yr** | **Sediment kg/yr** | **BOD kg/yr** | **Other kg/yr** | **Other kg/yr** |
| Pollutant Loads | Pre-Project | 892.2 | 3.6 | 19.6 | N/A | 89.2 | N/A | N/A |
| | Post-Project | 319.4 | 2.1 | 16.8 | N/A | 52.4 | N/A | N/A |
| | Load Reduction | 572.8 | 1.5 | 2.8 | N/A | 36.8 | N/A | N/A |
| | % Reduction | 64.2 | 41.7 | 14.3 | N/A | 41.3 | N/A | N/A |
| | | | | | | | | |

**MODEL USED:** Pollutant load reduction has been estimated using the *Spreadsheet Tool for Estimating Pollutant Load* (STEPL) model. The 4.8 acre watershed was modeled as 100% urban- single family residential land use. The BMP efficiency was modeled as a combined BMP using the STEPL BMP Calculator tools. Three standard BMPs contained in the model (dry detention, settling basin, and oil/grit separator) were modeled in series using default efficiencies to represent the proposed treatment train (dry detention in the swales and a NSBB). The default settings for event mean concentrations (EMCs) for urban-single family residential land use were used in the model to estimate pre- and post-project pollutant loads and load reductions. The model results reported above were converted from pounds per year to kilograms per year.

**LAND OWNERSHIP STATUS:** All water quality improvements will be constructed in the public right-of-way.

**OUTPUTS/DELIVERABLES:**
Task 1 – Construction Plans and Permitting
Construction plans and specifications were developed for the proposed project by the Town of

Ocean Ridge in 2008. The construction plans include detailed sediment and erosion control plans. Construction permits were also been obtained in 2008. Before commencing construction, all permits will be extended and/or renewed as necessary.

Task 2 – Public Education
The Town of Ocean Ridge will erect permanent educational signage in association with the proposed project. Signage will include an educational kiosk located at the western end of Coconut Lane (near the outfall) and stormwater inlet markings/labels in the project watershed.

Task 3 – Construction
Construction of the Coconut Lane Outfall Improvements project will take place after all permits have been renewed. The Town of Ocean Ridge (via the Town's consulting engineer) will provide construction inspection in order to assure that the improvements are built in accordance with the approved plans and specifications.

Task 4 – Effectiveness Evaluation
Project effectiveness monitoring will be provided in order to demonstrate the water quality benefits of the Coconut Lane Outfall Improvements project. A preliminary Effectiveness Monitoring Plan has been included in this proposal as Appendix A. A detailed water quality monitoring plan will be submitted for review within three months of grant award.

Task 5 – Project Administration
The Town of Ocean Ridge and the Town's engineering consultant will be responsible for construction firm selection, contract development and administration, and construction inspection. Administrative responsibilities will also include financial accounting and grant reporting to the Fl7orida Department of Environmental Protection.

Deliverables include:
- Quality Assurance Project Plan
- Construction Plans and Specifications
- Construction Permits
- Construction of Coconut Lane Outfall Improvements (including stormwater BMPs)
- Construction of Educational Signage
- Regular Progress Reports
- Draft Project Report
- Comprehensive Final Report

**PROJECT MILESTONES:**

| Task | Activity | Start | Complete |
|---|---|---|---|
| 1 | Contract w/FDEP Signed (Task 5) | | Month 1 |
| 2 | Prepare and Submit QAPP (Task 4) | Month 1 | Month 3 |
| 3 | Final Design/ Permitting (Task 1) | Month 1 | Month 2 |
| 4 | Construction Contract Award (Task 5) | Month 2 | Month 4 |
| 5 | Construction/ BMP Implementation (Task 3) | Month 4 | Month 11 |
| 6 | Public Education (Task 2) | Month 11 | Month 12 |
| 7 | Post-Implementation Monitoring (Task 4) | Month 11 | Month 14 |
| 8 | Prepare and Submit Draft Final Report (Task 4) | Month 14 | Month 15 |
| 9 | Prepare and Submit Final Report (Task 4) | Month 16 | Month 17 |
| 10 | Quarterly Progress Reports (Task 5) | Month 3 | Month 17 |
| | | | |
| | | | |

**PROJECT BUDGET**:

| Project Funding Activity | 319 (h) Amount | Matching Contribution | Match Source * |
|---|---|---|---|
| Staff | | | |
| Travel | | | |
| Equipment | | | |
| Supplies | | | |
| Contractual | | $20,000.00 | Town of Ocean Ridge |
| BMP Implementation | $119,415.00 | $218,635.00 | Town of Ocean Ridge |
| Monitoring | | $35,000.00 | Town of Ocean Ridge |
| Public Education | | $5,000.00 | Town of Ocean Ridge |
| Other: | | | |
| **Total:** | $119,415.00 | $278,635.00 | |
| **Total Project Cost:** | | $398,050.00 | |
| **Percentage Match:** | | 70% | |

***If a stormwater utility or other dedicated recurring fee is contributing, put that information in the following table.**

**MATCH SOURCE INFORMATION:**

| Match Source Name | Description | ERU/Fee |
|---|---|---|
| N/A | | |
| | | |

**BUDGET BY TASK**:

| Project Funding Activity | 319 (h) Amount | Matching Contribution | Match Source |
|---|---|---|---|
| Task 1 – Construction Plans and Permitting | | $1,000.00 | Town of Ocean Ridge |
| Task 2 – Public Education | | $5,000.00 | Town of Ocean Ridge |
| Task 3 – Construction | $119,415.00 | $218,635.00 | Town of Ocean Ridge |
| Task 4 – Effectiveness Evaluation | | $26,500.00 | Town of Ocean Ridge |
| Task 5 – Project Administration | | $24,000.00 | Town of Ocean Ridge |
| Task 6 – Draft Final Report | | $2,500.00 | Town of Ocean Ridge |
| Task 7 – Final Report | | $1,000.00 | Town of Ocean Ridge |
| | | | |
| **Total:** | $119,415.00 | $278,635.00 | |
| **Total Project Cost:** | | $398,050.00 | |
| **Percentage Match:** | | 70% | |

**OTHER FUNDING (Not Match – such as land acquisition or other federal grants):**

| Agency | Activity | Amount |
|---|---|---|
| N/A | | |
| | | |
| | | |
| | | |
| | **Total:** | N/A |

**OTHER INFORMATION: If this is a multi-year project, have you requested sufficient funds to complete the project (assuming funds requested herein are provided)? (State yes or no, and, if no, provide an explanation): Yes: ☒ No: ☐**

**The Lead Organization, as listed on the first page of this form, agrees to comply with all requirements specified in the guidance package and in the federal grant regulations. Checking "no" or "yes, except" will cause the project to have a lower ranking than similar projects by lead organizations that agree to the requirements:**

**Yes: ☒ No: ☐ Yes, except: ☐ (Note: List exceptions below.)**

**Exceptions:** N/A

**REFERENCES CITED:**

Palm Beach County Department of Environmental Resources Management, 2008. *Lake Worth Lagoon Management Plan.* 2300 North Jog Road, West Palm Beach, FL 33411.

Suntree Technologies, Inc. *Nutrient Separating Baffle Box Brochure.* 798 Clearlake Road, Cocoa, FL 32922.

## APPENDIX A: MONITORING PLAN

**BMP Effectiveness Evaluation for**
**Coconut Lane Outfall Improvements**

Sampling Locations: Inflow (at raised inlets) and outflow (discharge structure)

Frequency of Monitoring Events: Seven (7) to ten (10) storm events

Monitored Storm Events: Discrete rainfall events of generally greater than 0.2 inches and less than 1.5 inches. Daily rainfall (to the nearest 0.01 inch) will be measured at the sampling location with verification from the local weather station. Rainfall data should be provided for at least the week proceeding monitoring and day(s) of monitoring.

Flow Measurements: Flow is measured using flow activated flow meters.

Water Sampling Parameters to be Monitored:

| **Parameter** | **Detection Limit** | **Sampling Method*** |
|---|---|---|
| Total Cadmium | 1 mg/L | Composite |
| Total Chromium | 5 mg/L | Composite |
| Total Copper | 5 mg/L | Composite |
| Total Zinc | 10 mg/L | Composite |
| Nitrate/Nitrite (NO3/NO2) | 0.1 mg/L | Composite |
| Total Kjehldahl Nitrogen (TKN) | 0.05 mg/L | Composite |
| Total Ammonia | 0.05 mg/L | Composite |
| Total Phosphorus | 0.05 mg/L | Composite |
| Total Phosphate | 0.05 mg/L | Composite |
| Total Suspended Solids (TSS) | 1 mg/L | Composite |
| Oil/ Grease | 1 mg/L | Composite |

*Flow-weighted composite samples will be taken over the storm hydrograph. Typically the samples will be composited over the influent hydrograph at the inflow location and for up to a 36-hour period at the outflow station. Rainfall that does not result in at least a six hour discharge from the stormwater BMP shall not be considered a completed monitoring event. Each composite will include at least six evenly distributed sub-samples.

Estimation of Stormwater BMP Removal Pollutant Effectiveness: The pollutant removal efficiency of the proposed stormwater BMP will be estimated by calculating the percent reduction in the event mean concentration for the period of record. Water quality effectiveness of the BMP will be summarized in the final report in terms of annual load reduction for each pollutant reported in kg/yr.

## PROJECT 19: Lake Concord Alum Treatment and Baffle Box

**PROJECT FUNDING:** $516,079 **FY10 319** $344,053 **Match**

**LEAD ORGANIZATION:** Orlando Public Works Dept. Stormwater Utility

**CONTACT PERSON:** Kevin McCann, Assistant Division Manager
1030 South Woods Ave
Orlando, Fl. 32805
407-246-2234 Ext. 34
407-246-4050
Kevin.McCann@cityoforlando.net

**COOPERATING ORGANIZATIONS:**
Orlando Stormwater Utility

**PROJECT ABSTRACT:**

The City of Orlando is undertaking a series of projects to reduce pollutants in the Howell Branch Chain of Lakes that flow into Lake Jessup, a TMDL waterbody. Most recently the City completed two major studies/plans including, the Howell Branch Chain of Lakes Diagnostic Study (Boyle, 2008) and the Spring Lake Hydrological/Nutrient Budget and Management Plan (ERD, 2008). These studies identified a number of BMP alternatives for four major lakes flowing to Lake Jessup, including Lake Adair, Lake Concord, Lake Winyah, and Spring Lake.

This project proposes 2 stormwater improvement BMPs in the Lake Concord drainage basin, which is one of the four lakes in the Howell Branch Chain of Lakes where the City is currently implementing stormwater improvements for the TMDL listed waterbodies. The first planned stormwater improvement proposes a diversion of downtown drainage basins to the existing alum treatment pond at Lake Dot including the construction of a conveyance system, new inlets, and placement of a second-generation baffle box that will treat the diverted flows. The second planned stormwater improvement involves an expansion of the existing alum-injection system at Lake Dot to enable higher treatment capacity for the diverted flows from downtown.

This proposal is requesting $516,079 out of a $860,132 project, or 60% of the costs. The City of Orlando is committed to providing the remainder of the contribution. These improvements are anticipated to reduce pollutant loadings to Lake Concord and the chain of lakes system of phosphorus by 81% and nitrogen by 22%. Both a water quality monitoring and education program will be implemented to gain results.

**PROJECT LOCATION AND WATERSHED CHARACTERISTICS**:

The site is located in Section 26, Township 22 South, Range 29 East, in the City limits of Orlando, Orange County, Florida. The City of Orlando lies at the divide between waters which flow south to the Kissimmee River and the Everglades, and waters which flow northward to Lake Jessup and the Middle St. Johns River. Stormwater runoff from this project area flows northward with no treatment to Lake Concord (one of the headwaters for Lake Jessup), through a series of downstream lakes, and ultimately to Lake Jessup on the St. Johns River. Decades

of abuse and neglect have turned Lake Jessup from of Central Florida's greatest assets into one of the state's most degraded lakes. A restoration effort begun in 1994 offers hope that Lake Jessup will again be an asset for the more than two million citizens who will call Central Florida home by the year 2010, and for the hundreds of thousands of visitors to the area each year.

The drainage basin is the heart of the downtown area, bounded on the east by Magnolia Ave., on the south by Washington St., on the west by Division Ave., and on the north by Amelia St. The land uses are almost entirely high density commercial and highway. The treatment site is at the existing alum treatment facility on Lake Dot, on the north side of the Amway Arena sports complex. Groundwater levels are low in this area and soils are conducive to infiltration practices. There are very few pervious areas in the watershed.

Lake Concord is a listed TMDL impaired waterbody for nutrients in the Middle St. Johns River basin and is within the WIBID 2997R.

Lake Jessup is a listed TMDL impaired waterbody for ammonia and nutrients in the Middle St. Johns River basin and is within the WIBID 2981.

**Watershed Name:** Middle St. Johns
**Latitude:** 28.5482
**Longitude:** 81.3843
**Hydrologic Unit Code(HUC):** 03090101

**Land Uses within the Watershed** (acres and percentages of total):

| Land Use | Acres | % |
|---|---|---|
| High Intensity Commercial | 90.77 | 100 |
| | | |
| | | |
| **Land Use Totals (Acreage and %)** | 90.77 | 100 |

**POLLUTION REDUCTION STRATEGY:**

a. Identification of the causes and sources or groups of similar sources that will need to be controlled to achieve the load reductions estimated in this watershed-based plan.

• The City of Orlando's 10-year Capital Improvement Program: The project is listed for completion in the city's program. See exhibits. The Lake Jessup BMAP, which includes this project for implementation is currently under review with DEP for approval.

b. An estimate of the load reductions expected for the management measures described under item (c) below.

This project is anticipated to reduce estimated pollutant loadings of phosphorus by 81% and nitrogen by 22%.

c. A description of the NPS management measures that will need to be implemented to achieve the load reductions estimated under item (b) above and an identification of the critical areas in which those measures will be needed to implement plan.

This project proposes 2 stormwater improvement BMPs in the Lake Concord drainage basin, which is one of the four lakes in the Howell Branch Chain of Lakes where the City is currently implementing stormwater improvements for the TMDL listed waterbodies. The first planned stormwater improvement proposes the expansion of the capacity of an existing alum-injection facility on Lake Dot. The second planned stormwater improvement involves the construction of a conveyance system, new inlets, and the placement of a second generation baffle box that will treat the stormwater before it enters into the alum treatment facilities.

Lake Concord is a listed TMDL impaired waterbody for nutrients in the Middle St. Johns River basin and is within the WIBID 2997R.

Lake Jessup is a listed TMDL impaired waterbody for ammonia and nutrients in the Middle St. Johns River basin and is within the WIBID 2981.

d. An estimate of the amounts of technical and financial assistance needed, associated costs, and/or the sources and authorities that will be relied upon to implement this plan.

There are no technical challenges for the proposed project. The project involves the use of well-understood processes and construction methods. Total costs associated with implementation of the proposed improvements are estimated at of $860,132: of which $220,000 is for contractual services. Post-project monitoring is estimated to cost $100,000. Education costs are estimated at $5,000.

Total costs associated with implementation of all improvements noted in the City's 10-year CIP list are estimated in excess of $58,541,300.

e. An information/education component that will be used to enhance public understanding of the project and encourage their early and continued participation in selecting, designing, and the NPS management measures that will be implemented.

The City has actively involved the community in the development of its environmental program as well as the development of it Capital Improvement Program, which includes this project – involving the public in the planning stage and improvement of the project area. As with all of government major stormwater improvement projects, educational signage will be erected at the site, which describes the benefits of this project on stormwater systems.

As with all MS4 entities, the City is mandated to develop and implement a stormwater management program of quantifiable goals and BMPs for six minimum control measures. This project will assist the City in its effort to implement all six of these goals including (1) Public Education and Outreach, (2) Public Participation/Involvement, (3) Illicit Discharge Detection and Elimination, (4) Construction Site Runoff Control, (5) Post Construction Runoff Control, and (6) Pollution Prevention Good Housekeeping.

f. A schedule for implementing the NPS management measures identified in this plan that is reasonably expeditious.

The City has completed the study and planning process in early 2008. In the Fall 2009, the City will initiate the engineering and design for this project and has committed $120,000 towards that effort. The project construction will be completed prior to March 2012.

g. A description of interim, measurable milestones for determining whether NPS management measures or other control actions are being implemented.

Project's Projected Quarterly Completion Schedule

Final Design and Environmental Permitting: Third Quarter 2010
Bidding: First Quarter 2011
Construction: Fourth Quarter 2011
Education: Third Quarter 2010-Fourth Quarter 2011

h. A set of criteria that can be used to determine whether loading reductions are being achieved over time and substantial progress is being made toward attaining water quality standards and, if not, the criteria for determining whether this watershed-based plan needs to be revised or, if a NPS TMDL has been established, whether the NPS TMDL needs to be revised.

This waterbody is on DEP's Group 2 Verified List, with TMDLs being scheduled for development in late 2008. The BMAP for Lake Jessup is currently under review with DEP for approval.

i. A monitoring component to evaluate the effectiveness of the implementation efforts over time, measured against the criteria established under item (h) immediately above.

Post-project monitoring is planned for this project and a monitoring plan is proposed in Exhibit A for post-construction monitoring.

**PROJECT OBJECTIVE(S):**

The project water quality treatment improvement goals are to:

(1) expand the treatment capacity of an existing alum treatment facility, construct stormwater conveyance lines, diversion weirs and install a baffle box for treatment;

(2) reduce phosphorus by 81% and nitrogen by 22%;

(3) To implement an educational program that will highlight the benefits of this project to improve water quality in the Lake Jessup basin.

**PROJECT DESCRIPTION:**

The City of Orlando has recognized that there are heavy stormwater pollutant loads from the high intensity commercial areas of downtown. Retrofit projects are very difficult to implement in downtown areas due to lack of vacant land, high cost of land, deep and large trunk lines which drain the downtown area, heavy traffic, and numerous utilities. However, the City has recently completed two major studies including, the Howell Branch Chain of Lakes Diagnostic Study (Boyle, 2008) and the Spring Lake Hydrological/Nutrient Budget and Management Plan (ERD, 2008) that have identified alternatives for addressing untreated stormwater currently discharging into the Howell Branch Chain of lakes that eventually flow to Lake Jessup.

**Alum-Injected Wet Detention Pond Expansion at Lake Concord Sub-basins HB-26C & D**

Downtown Orlando sub-basins HB-26C and HB-26D discharge to the same conveyance

system that is located along Hughey Avenue and currently discharges untreated to Lake Concord. The total combined loads from sub-basins HB26C and HB-26D for TN and TP are 1,105.6 and 159.7 pounds per year, respectively. Approximately 77% of the annual stormwater runoff (307911 cubic feet) and the pollutant load occur during mean event rainfalls of less than 1.725 inches.

Sub-basin HB-26C is 42.3 acres and HB26C is 48.5 acres. The proposed treatment system for this sub-basin is to enhance an existing alum-injection system located on the south side of Lake Dot. New pumps, meters, and alum feed lines will be constructed. The alum facilities are located on city-owned property adjacent to Amway Arena sports complex.

An existing 24" stormdrain carries water from a small drainage basin on Hughey Street to the 108" stormdrain entering the alum plant. The 24" pipe will be removed and replaced with a deeper 36" pipe and corresponding inlets and manholes. A diversion weir on the Hughey Street stormdrain at the intersection of Amelia will divert the first inch of runoff from Basins HB-26C and HB-26D into the new 36" pipe. A treatment train will be constructed by installing a second-generation baffle box on the 36" pipe along Amelia Street to clean gross solids and trash before they enter Lake Dot. The first inch of runoff will be taken to the alum plant and treated and discharged to Lake Dot. Treated overflows from Lake Dot are carried by a stormdrain on West Colonial St. to Lake Concord.

An engineer's opinion of probable construction cost for this stormwater BMP treatment system is presented in this application's appendix section.

**ESTIMATED POLLUTANT LOAD REDUCTION:**

| **BMPs Installed** | | **TSS kg/yr** | **TP Kg/yr** | **TN kg/yr** | **Sediment kg/yr** | **BOD kg/yr** | **Other kg/yr** | **Other kg/yr** |
|---|---|---|---|---|---|---|---|---|
| Alum Wet Pond and BBS | | | | | | | | |
| **Pollutant Loads** | Pre-Project | | 159.7 | 1105.6 | | | | |
| | Post-Project | | 30.3 | 862.4 | | | | |
| | Load Reduction | | 129.4 | 243 | | | | |
| | % Reduction | | 81 | 22 | | | | |

**MODEL USED:** Harper and Baker, Evaluation of Current Stormwater Design Criteria within the State of Florida. Alum removal efficiencies are from the FDEP BMP Database.

**LAND OWNERSHIP STATUS:** City has full ownership of the project's property and right-of-ways.

**OUTPUTS/DELIVERABLES:**

**Task 1: Survey Project Site**
Description: The City's engineering consultant will prepare a complete survey of the improvement locations.
Deliverable: A complete survey of the project locations.

**Task 2: Engineering Design**

Description: The City's engineering consultant will prepare design specifications and construction documents for installation of the improvements. The improvements will be installed in existing City-owned properties.
Deliverables: A complete set of design and construction drawings with construction specifications with permits.

**Task 3: Prepare, Send, Receive, Evaluate and Award Construction Bid**
Description: City personnel and the City's engineering consultant will prepare, advertise for, send, receive, and evaluate bids for construction of the improvements. An award will be made, contracts signed, and notice to proceed given.
Deliverable: A construction contract with a Notice to Proceed given to the responsible low bidder.

**Task 4: Construction of Stormwater Facilities**
Description: The City's selected contractor will construct the stormwater BMP improvements.
Deliverable: The acceptance of the facilities as completed facilities according to design.

**Task 5: Post Grant Project Administration**
Description: After the grant has been awarded, the City's project manager shall provide ongoing monitoring of project schedules to assure compliance with timelines outlined in the grant contract. Required grant quarterly reports to DEP, construction contract coordination with DEP, stormwater monitoring reports, and preliminary and final project reports will be written by the City.
Deliverables: Quarterly reports to DEP, stormwater monitoring reports, and preliminary and final project reports will be written by the City.

**Task 6: Implementation of Education Component**
Description: The public education component will include coverage of the project in the news items in the Orlando Sentinel newspaper. Press releases will be distributed upon project completion and educational signage will be provided on site where the many citizens using the TD Waterhouse Center will be engaged. A kiosk telling the stormwater story will be erected adjacent to the BMP explaining the project's stormwater benefits.
Deliverables: Quarterly information regarding the status of the project conveyed to the public. Photos will be taken throughout the design and construction phases of the project and will be provided with the final report. Educational signage will be provided on site. This component will be completed by the City.

**Task 7. Draft and Final Project Report**
Description: A draft and final project report will be prepared summarizing the project. It will include photos taken during the entire project and results from the monitoring effort.
Deliverable: Five copies of the final report will be submitted to FDEP.

**PROJECT MILESTONES:**

| Task | Activity | Start | Complete |
|---|---|---|---|
| 1 | Surveying | Month 1 | Month 3 |
| 2 | Engineering Design | Month 4 | Month 12 |
| 3 | Bidding | Month 14 | Month 17 |
| 4 | BMP Construction | Month 18 | Month 25 |
| 5 | Grant Administration | Month 1 | Month 28 |

| | | | |
|---|---|---|---|
| 6 | Educational | Month 1 | Month 28 |
| | Times are in months from notification of contract award | | |

**PROJECT BUDGET**:

| Project Funding Activity | 319 (h) Amount | Matching Contribution | Match Source * |
|---|---|---|---|
| Staff | | 5,000 | OSU in-kind |
| Travel | | | |
| Equipment | | | |
| Supplies | | | |
| Contractual (Surveying, Eng. Design, WQ Monitoring) | | 195,000 | OSU |
| BMP Implementation | 516,079 | 119,053 | OSU |
| Public Education | | 5,000 | OSU |
| Other: Post-Award Grant Admin/Reports | | 20,000 | OSU |
| **Total:** | 516,0479 | 344,053 | |
| **Total Project Cost:** | 860,132 | | |
| **Percentage Match:** | 60% | 40% | |

***If a stormwater utility or other dedicated recurring fee is contributing, put that information in the following table.**

**MATCH SOURCE INFORMATION:**

| Match Source Name | Description | ERU/Fee |
|---|---|---|
| OSU | Orlando Stormwater Utility | $9.99 /month |

**BUDGET BY TASK**:

| Project Funding Activity | 319 (h) Amount | Matching Contribution | Match Source |
|---|---|---|---|
| Survey and Geoechical work on Site | | 20,000 | OSU |
| Engineering Design | | 95,000 | OSU |
| Bid Project | | 5,000 | OSU |
| Construct Stormwater Facilities | 516,079 | 119,053 | OSU |
| Post-Grant Project Administration | | 20,000 | OSU |
| Implement Education Component | | 5,000 | OSU-in kind |
| Monitoring | | 100000 | OSU |
| **Total** | 516,079 | 344,053 | |
| **Total Project Cost** | 860,132 | | |
| **Percentage Match** | 60% | 40% | |

**OTHER FUNDING (Not Match – such as land acquisition or other federal grants):**

| Agency | Activity | Amount |
|---|---|---|
| | | |
| | **Total:** | |

**OTHER INFORMATION: If this is a multi-year project, have you requested sufficient funds to complete the project (assuming funds requested herein are provided)? Not Multi-year**
**(State yes or no, and, if no, provide an explanation): Yes: ☒ No: ☐**

**The Lead Organization, as listed on the first page of this form, agrees to comply with all requirements specified in the guidance package and in the federal grant regulations. Checking "no" or "yes, except" will cause the project to have a lower ranking than similar projects by lead organizations that agree to the requirements:**

**Yes: ☒ No: ☐ Yes, except: ☐ (Note: List exceptions below.)**

**Exceptions:**

**REFERENCES CITED:**

FDEP BMP Database
Harper "Stormwater Loading Rate Parameters for Central and South Florida", 1994.
Howell Branch Chain of Lakes Diagnostic Study, Boyle Engineering, Orlando, April 2008.

**NOTE: PLEASE SUBMIT ALL APPENDICES IN A SEPARATE WORD DOCUMENT. THIS MAY INCLUDE MAPS, FIGURES OR ANY OTHER INFORMATION YOU WOULD LIKE TO INCLUDE WITH YOUR APPLICATION**

**FY 2010 SECTION 319 GRANT PROPOSAL APPLICATION**

**LAKE CONCORD ALUM TREATMENT AND BAFFLE BOX**

**EXHIBIT**
**SW SAMPLING PROTOCOL PLAN**

**EXHIBIT 1**
**STORMWATER SAMPLING PROTOCOL PLAN**

## MONITORING TO DETERMINE TREATMENT EFFECTIVENESS

**If this project is approved for funding, the applicant will be required to monitor the effectiveness of the stormwater BMP. BMP effectiveness data is required by EPA to demonstrate the environmental benefits of a project. The general monitoring requirements are set forth below. Please note that the final scope of work in the contract may include more specifics on particular monitoring requirements.**

Within six months before the completion of the project, the applicant will submit a detailed monitoring plan to the department for review and comment. The monitoring plan will specify the sampling locations, sampling instruments, and parameters to be sampled. The monitoring will include sampling of from seven to ten (10) storm events as described below. If possible, monitored events will be discrete rainfall events generally consisting of greater than 0.20 inches and less than 1.5 inches or rain. However, we want to monitor the real world to determine true efficiency. Therefore, remember this is a GENERAL guideline with respect to the storm event. Actual rainfall may vary depending on the type of BMP, the contributing drainage area, the amount of impervious area, and the time of concentration.

Monitoring will be conducted at two locations: inflows and outflows.

Monitoring will include the following parameters:

- Daily rainfall (to nearest 0.01 inch) measured at the sampling location with verification from the local weather station. Rainfall data should be provided for at least the week proceeding monitoring and day(s) of monitoring.

- Flow using approved flow activated flow meters

- Parameters as specified below

| Parameter | Detection Limit | Method |
|---|---|---|
| Total Cadmium | 1 ug/l | Composite* |
| Total Chromium | 5 ug/l | Composite* |
| Total Copper | 5 ug/l | Composite* |
| Total Zinc | 10 ug/l | Composite* |
| NO2+NO3 | 0.1 mg/l | Composite* |
| TKN | 0.3 mg/l | Composite* |
| Total Ammonia | 0.05 mg/l | Composite* |
| Or Total N | | Composite* |
| Total Phosphorus | 0.05 mg/l | Composite* |

| | | |
|---|---|---|
| Ortho Phosphate | 0.05 mg/l | Composite* |
| TSS | 1 mg/l | Composite* |
| Oil/Grease | 1 mg/l | Composite* |
| Fecal coliform | N/A | Grab** if possible |

*Flow weighted composite samples will be taken over the storm hydrograph. Typically, the samples will be composited over the inflow hydrograph at the inflow and for up to a 36 hour period at outflow station, depending upon the time of concentration and flow into and out of the BMP. Each composite will include at least six evenly distributed sub-samples.

**Grab samples to be collected within the drainage area time of concentration at influent and effluent stations described above.

The applicant should estimate the pollutant removal efficiency of the stormwater BMP by calculating the percent reduction in the event mean concentration (EMC) for the period of record [1-(Average Inflow EMC/Average Outflow EMC)]. For BMPs with multiple inflow (and/or outflow) points, the pollutant contributions for each inflow should be flow weighted. See the National Stormwater Best Management Practice database at http://www.bmpdatabase.org/ and Development of Performance Measures, Determining Urban Stormwater Best Management Practice Removal Efficiencies, 1999 by URS Greiner Woodward Clyde, ASCE and EPA at http://www.bmpdatabase.org/task3_1.pdf

From ASCE Data base

**3.1 Efficiency Ratio**

**Definition**

The efficiency ratio is defined in terms of the average event mean concentration (EMC) of pollutants over some time period:

$$ER = 1 - \frac{\text{Average outlet EMC}}{\text{Average inlet EMC}} = \frac{\text{average inlet EMC} - \text{average outlet EMC}}{\text{average inlet EMC}}$$

EMCs can be either collected as flow weighted composite samples in the field or calculated from discrete measurements. The EMC for an individual event or set of field measurements, where discrete samples have been collected, is defined as:

$$EMC = \sum ViCi / \sum Vi$$

where,

V: volume of flow during period i
C: average concentration associated with period i
n: total number of measurements taken during event

The arithmetic average EMC is defined as,

$$averageEMC = \sum EMCj / m$$

where,
m: number of events measured
In addition, the log mean EMC can be calculated using the logarithmic transformation of each EMC. This transformation allows for normalization of the data for statistical purposes.

Mean of the Log EMCs = $\sum Log(EMCj) / m$

Estimates of the arithmetic summary statistics of the population (mean, median, standard deviation, and coefficient of variation) should be based on their theoretical relationships (Appendix A) with the mean and standard deviation of the transformed data. Computing the mean and standard deviation of log transforms of the sample EMC data and then converting them to an arithmetic estimate often obtains a better estimate of the mean of the population due to the more typical distributional characteristics of water quality data. This value will not match that produced by the simple arithmetic
average of the data. Both provide an estimate of the population mean, but the approach utilizing the log-transformed data tends to provide a better estimator, as it has been shown in various investigations that pollutant, contaminant and constituent concentration levels have a log-normal distribution (NURP, 1983). As the sample size increases, the two values converge.

**Assumptions**
This method

- Weights EMCs from all storms equally regardless of relative magnitude of storm. For example a high concentration/high volume event has equal weight in the average EMC as a low concentration/low volume event. The logarithmic approach tends to minimize the difference between the EMC and mass balance calculations.
- Is most useful when loads are directly proportional to storm volume. For work conducted on nonpoint pollution (i.e., inflows), the EMC has been shown to not vary significantly with storm volume. This lends credence to using the average EMC value for the inflow but does not provide sufficient evidence that outflows are well represented by average EMC. Accuracy of this method will vary based on the BMP type.
- Minimizes the impacts of smaller/cleaner storm events on actual performance calculations. For example, in a storm by storm efficiency approach, a low removal value for such an event is weighted equally to a larger value.
- Allows for the use of data where portions of the inflow or outflow data are missing, based on the assumption that the inclusion of the missing data points would not significantly impact the calculated average EMC.

**Comments**
This method

- Is taken directly from nonpoint pollution studies and does a good job characterizing

inflows to BMPs but fails to take into account some of the complexities of BMP design. For example, some BMPs may not have outflow EMCs that are normally distributed (e.g., a media filter that treats to a relatively constant level that is independent on inflow concentrations).

Assumes that if all storms at the site had been monitored, the average inlet and outlet EMCs would be similar to those that were monitored.

## PROJECT 20: Lake Harris Water Quality Improvement Project—Lake Hollywood Sub-basin BMPs

| | | | | |
|---|---|---|---|---|
| **PROJECT FUNDING:** | $217,800.00 | **FY10 319** | $400,000.00 | **Match** |

**LEAD ORGANIZATION:** City of Leesburg

**CONTACT PERSON:**
**(Name, Address, Phone)**

Ray Sharp, Director of Environmental Services
223 South 5th Street
P.O. Box 490630
Leesburg, FL 34749-0630
(352) 728-9835

**COOPERATING ORGANIZATIONS:** City of Leesburg, Environmental Services Department
223 South Fifth Street
Leesburg, FL 34749-0630

**PROJECT ABSTRACT:** The City of Leesburg (City) developed conceptual plans to construct four new nutrient separating baffle boxes and a ditch block to enhance an existing wetland to treat non-point source pollution from stormwater runoff from the Lake Hollywood sub-basin to Lake Harris. Lake Harris is on the verified 303(d) list of impaired water bodies and the only lake addressed in the *Upper Ocklawaha River Watershed Basin Management Action Plan* (BMAP) that is not expected to meet the adopted Total Maximum Daily Load (TMDL) for Total Phosphorus (TP) upon completion of the projects included in the current BMAP. Nutrient Separating baffle boxes can be installed under ground in existing City owned right of ways where undeveloped land is otherwise not available. The proposed ditch block will enhance approximately 11 acres of forested wetlands associated with Lake Harris. The project is estimated to reduce the annual loads of the following pollutants by: TP 206 kg/yr (30% reduction), TN 1,165 kg/yr (20% reduction), TSS 78,940 kg/yr (77% reduction), and BOD 11,585 kg/yr (73% reduction). The pollutant load reductions realized by this project will be included in the next update to the BMAP.

### PROJECT LOCATION AND WATERSHED CHARACTERISTICS:

The City of Leesburg is located on the northwest side of Lake Harris in Lake County, Florida (Figure 1). The Lake Hollywood sub-basin, as it was defined in the City's *Stormwater Management Program and Master Plan* (Boyle 2008), includes approximately 797 acres including single family residential areas and major portions of the urbanized commercial corridors along US 27. This project includes BMPs that will treat approximately 457 acres of the Lake Hollywood sub-basin (Figure 2). Detailed land uses descriptions for the watershed are provided below for each specific BMP proposed.

**BMP #1 – South Street Outfall Baffle Box**

**Watershed Name:** Upper Ocklawaha River, Lake Harris (WBID 2838A)

**Latitude:** 28.803
**Longitude:** -81.886
**Hydrologic Unit Code(HUC):** 03080102

**Land Uses within the Watershed** (acres and percentages of total):

| Land Use | Acres | % |
|---|---|---|
| COMMERCIAL | 2.31 | 9% |
| RESIDENTIAL, MEDIUM DENSITY | 17.94 | 74% |
| TRANSPORTATION | 4.06 | 17% |
| WETLANDS | 0.06 | 0% |
| | | |
| **Totals** | **24.37** | **100%** |

## BMP#2 – Colfax Street Outfall Baffle Box

**Watershed Name :** Upper Ocklawaha River, Lake Harris (WBID 2838A)
**Latitude** 28.801
**Longitude** -81.887
**Hydrologic Unit Code (HUC):** 03080102

**Land Uses within the Watershed** (acres and percentages of total):

| Land Use | Acres | % |
|---|---|---|
| RESIDENTIAL, LOW DENSITY | 12.06 | 6% |
| RESIDENTIAL, MEDIUM DENSITY | 64.97 | 33% |
| RESIDENTIAL, HIGH DENSITY | 7.68 | 4% |
| COMMERCIAL | 75.03 | 38% |
| INDUSTRIAL | 0.69 | 0% |
| INSTITUTIONAL | 16.91 | 9% |
| AGRICULTURE - IMPROVED PASTURE | 1.48 | 1% |
| WATER | 5.64 | 3% |
| WETLANDS | 3.90 | 2% |
| TRANSPORTATION | 7.83 | 4% |
| **Totals** | **196.20** | **100%** |

## BMP#3 – Flamingo Pond Baffle Box

**Watershed Name :** Upper Ocklawaha River, Lake Harris (WBID 2838A)
**Latitude** 28.802,
**Longitude** -81.890
**Hydrologic Unit Code (HUC):** 03080102

**Land Uses within the Watershed** (acres and percentages of total):

| Land Use | Acres | % |
|---|---|---|
| RESIDENTIAL, MEDIUM DENSITY | 86.09 | 44% |
| RESIDENTIAL, HIGH DENSITY | 1.14 | 1% |
| COMMERCIAL | 16.68 | 8% |
| INDUSTRIAL | 11.71 | 6% |
| INSTITUTIONAL | 39.15 | 20% |
| AGRICULTURE - IMPROVED PASTURE | 4.19 | 2% |
| WATER | 4.38 | 2% |

| | | |
|---|---|---|
| WETLANDS | 23.63 | 12% |
| TRANSPORTATION | 6.07 | 3% |
| **Totals** | **197.51** | **100%** |

**BMP#4 – Emerson Street Outfall Baffle Box**

**Watershed Name :** Upper Ocklawaha River, Lake Harris (WBID 2838A)
**Latitude** 28.799
**Longitude:** -81.886
**Hydrologic Unit Code (HUC):** 03080102

**Land Uses within the Watershed** (acres and percentages of total):

| Land Use | Acres | % |
|---|---|---|
| RESIDENTIAL, MEDIUM DENSITY | 14.56 | 38% |
| COMMERCIAL | 23.52 | 62% |
| INSTITUTIONAL | 0.00 | 0% |
| | | |
| **Totals** | **38.08** | **100%** |

**BMP#5 – Ditch Blocks and Wetland Hydration BMP**

**Watershed Name :** Upper Ocklawaha River, Lake Harris (WBID 2838A)
**Latitude** 28 48.047
**Longitude** -81 53.16
**Hydrologic Unit Code (HUC):** 03080102

**Land Uses within the Watershed** (acres and percentages of total):

| Land Use | Acres | % |
|---|---|---|
| BMP 1 Watershed (see above) | 24.37 | 11 |
| BMP 2 Watershed (see above) | 196.20 | 85 |
| WETLANDS | 11 | 4 |
| | | |
| | | |
| Totals | **231.57** | **100** |

**POLLUTION REDUCTION STRATEGY:**

The City proposes to construct four nutrient separating baffle boxes and use an enhanced wetland to remove particulate matter from stormwater runoff and subsequently reduce pollutant loads to Lake Harris. Lake Harris (WBID 2838A) is listed on the federal Clean Water Act 303(d) list of impaired water bodies due to excessive nutrient loads. Particulate matter, such as sediment and leaf litter, is a significant source of pollutants to water bodies including TP. In urban areas where undeveloped land is scarce, the use of baffle boxes to capture and remove particulate matter in stormwater runoff is a practical and cost effective strategy to reduce pollutant loads. The City successfully completed the construction of one baffle box in 2009 funded in part by 319 grant funds and requests additional Section 319 funds to continue its strategy to employ new nutrient separating baffle boxes to reduce pollutant loads from stormwater runoff to Lake Harris. The new baffle boxes are located in the Lake Hollywood sub-basin, which was ranked 10$^{th}$ and 11$^{th}$among 94 sub-basins in the *Lake Harris / Little Lake Harris Water Quality Improvement Program* (PEC 2009). In addition, the Lake Hollywood sub-basin was ranked first in pollutant load per acre among 10 sub-basins in the City's *Stormwater Management Program and Master Plan* (Boyle 2008).

The baffle boxes will contribute to the long term goals and strategies of other state agencies to reduce pollutant loads to Lake Harris. Specifically, the St Johns River Water Management District identified stormwater retrofit projects as a priority to reduce nutrient loads to Lake Harris in the *Pollution Loading Reduction Goals (PLRG) for Seven Major Lakes in the Upper Ocklawaha River Basin* (2004). The *Upper Ocklawaha River Watershed BMAP* (FDEP 2007) proposed projects to reduce pollutant loads to Lake Harris. Lake Harris is the only lake addressed in the *Upper Ocklawaha River Watershed BMAP* that is not expected to meet the adopted TP TMDL upon completion of the current BMAP. BMAP stakeholders have since been attempting to develop additional BMPs to address the anticipated deficit in TP load reduction. The new BMPs will be incorporated into the updated BMAP.

The City requests Section 319 funds to complete construction of four new baffle boxes and a ditch block to enhance the hydroperiod of a wetland that will address pollutant loads from stormwater runoff to Lake Harris. Matching funds will be provided through the City's Stormwater Utility Fee.

**PROJECT OBJECTIVE(S):**

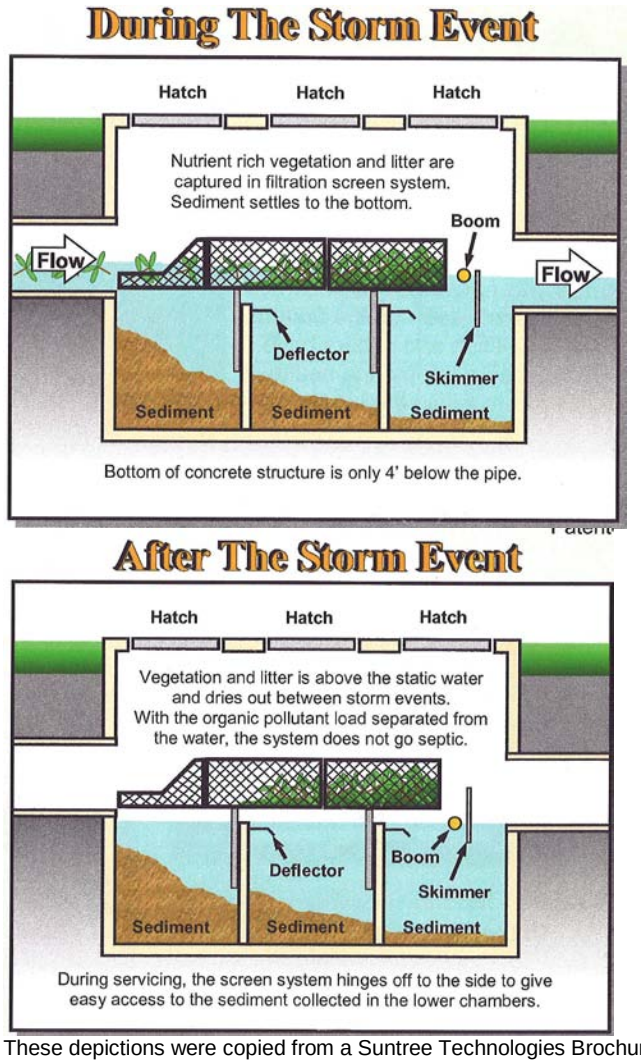
Lake Harris (WBID 2838A) is listed on the federal Clean Water Act 303(d) list of impaired water bodies. The Florida Department of Environmental Protection (FDEP) identified concentrations that cause impairment of Total Phosphorus (TP) 0.03 mg/l and a Total Nitrogen (TN) of 1.88 mg/l. and adopted a TP TMDL of 18,302 lbs/year (6,832 kg/yr). Lake Harris is not expected to meet the adopted TMDL based on the projects and load reductions in the current BMAP. New BMPs, not included in the current BMAP, have been conceptually designed and are anticipated to reduce the TP load from 677 kg/yr to 206 kg/yr. The new projects will be included in the BMAP update.

**PROJECT DESCRIPTION:**

The Lake Hollywood Sub-basin BMPs #1-4 include the construction of four nutrient separating baffle boxes designed to treat stormwater runoff from the City of Leesburg to Lake Harris. The outfalls to be retrofitted with baffle boxes discharge to a forested wetland system associated with Lake Harris. Ditches have been cut through the wetland forest to enhance the drainage of stormwater runoff from the designed stormwater outfalls. The result has been that the residence time and thus pollutant assimilative capacity of the forested wetland is impaired. The roots of older trees are exposed suggesting that there has been soil oxidation and indicating a general state of impaired hydrology. BMP#5 will install a ditch block in the primary constructed drainage ditch forcing stormwater runoff to sheet flow through the wetlands, which will enhance the hydrology of the wetland, promote growth of woody vegetation and hydric soil development, and pollutant assimilation and sequestration.

**Nutrient Separating Baffle Box Description**

A nutrient separating baffle box captures foliage, litter, sediment, and hydrocarbons. Nutrient rich vegetation and litter are captured in a filtration screen system while the sediment settles to the bottom of the box (see figure below). Turbulence deflectors are added to prevent captured sediment from re-suspending. Hydrocarbons collect in front of the skimmer and are absorbed by the storm boom. The unit is placed entirely underground, so that it is out of site of local residents. During maintenance, the hatches are opened and the foliage/sediment is vacuumed out of the unit. The trash screen system hinges off to the side to give easy access to the sediment collected in the lower chambers.



These depictions were copied from a Suntree Technologies Brochure. The proposed system is patented by Suntree Technologies.

Several sources of literature were researched to evaluate the pollutant load reduction obtained from these baffle boxes. Removal of sediments is reported to be as high as 95% as long as there is not re-entrainment during large storm events. Removal of TSS is reported to be as high as 85%. The removal of nutrients (TN and TP) are reported to be between 25 and 40% from this system. The FDEP is conducting a study of these types of baffle boxes to evaluate the overall effectiveness for pollutant removal.

**BMP #1 – South Street Outfall Baffle Box**

A nutrient separating baffle box will be placed in an existing 30-inch stormwater conveyance pipe located in the South Street right of way (Figure 3). No additional land procurement is anticipated. The baffle box dimensions will be 8 ft wide x 12 ft long x 8 ft high based on standard manufacturer size guidelines for conveyance systems. A slightly larger size is proposed due to the high amount of directly connected impervious surface causing high flows during large flash rain events. The contributing watershed (LH0086) consists of single family residential areas and a portion of SR 44 (Dixie Ave) (Figure 2). No stormwater treatment BMPs are currently employed in the sub-basin such that runoff is discharged to Lake Harris untreated and significant amounts of debris and litter are visible in the receiving wetland just south of

South St. The City recently completed a baffle box installation in the Venetian Gardens sub-basin to the east in cooperation with FDOT. This BMP will continue the effort by the City and FDOT to retroactively treat stormwater from many of the roads in the City.

**BMP #2 – Colfax Street Outfall Baffle Box**

The stormwater conveyance system that serves US 27 was constructed before stormwater treatment was required. The City has since tied into the FDOT stormwater system along US 27 and the two systems are difficult to separate. A nutrient separating baffle box (10 ft wide x 16 ft long x 8 ft high) will be placed in an existing 60-inch outfall pipe to Lake Harris east of the intersection of US 27 and Colfax Street (Figure 4). The property is an existing FDOT drainage easement and no additional land acquisition is anticipated. The contributing watershed that discharges through the outfall includes numerous land uses and most significantly approximately 3000 feet of directly connected impervious sections along the US 27 commercial corridor (Figure 2). The BMP #2 treatment area defined for this application does not include the contributing area that discharges to Flamingo Pond because it will first be treated by BMP#3 (see below). BMP #3 will serve to pre-treatment a portion of the flow to BMP#2 and the Colfax St outfall.

**BMP#3 – Flamingo Pond Baffle Box**

Flamingo Pond has been significantly impacted by shoreline modifications and changes to the drainage basin. These changes have resulted in large amounts of sediment being conveyed into the lake from a stormwater outfall from the upper portions of the Lake Hollywood sub-basin (Figure 2). Flamingo Pond filled with sediment from the upstream drainage basin and became choked with nuisance vegetation. The City recently cleaned the vegetation out of the lake from the lake and has plan to remove sediment from the lake to restore its storage and treatment volume capacity.

A nutrient separating baffle box (8 ft wide x 12 ft long x 8 ft high) will be placed in an existing 24-inch outfall pipe to Flamingo Pond off of Warehouse Drive (Figure 5). The 24-inch pipe passes below South St (SR44) connecting the upper portions of the Lake Hollywood sub-basin directly to Flamingo Pond, bypassing the FDOT systems on South St. Flamingo Pond discharges through a pipe located at southeast corner of the lake to the Colfax St. outfall, where BMP#2 will be located. BMP#3 will improve the water quality of Flamingo Pond and its capacity to assimilate and sequester pollutants in the treatment train to Lake Harris. BMP#3 will contribute to the productive management of Flamingo Pond and the nutrient reduction goals for Lake Harris and likely the efficiency of BMP#2.

**BMP#4 – Emerson Street Baffle Box**

The Emerson Street outfall is a 30-inch pipe that discharges to Lake Harris (Figure 6). The outfall conveys stormwater from residential, intensely developed commercial areas west of US 27, and portions of US 27 (Figure 2). A nutrient separating baffle box (10 ft wide x 16 ft long x 8 ft high) will be placed in the 30-inch outfall pipe to Lake Harris.

**BMP #5 – Wetland Enhancement**

The City's *Stormwater Management Program and Master Plan* identified the potential to further polish stormwater runoff from the South St. and Colfax St outfalls using the natural ecological process within the receiving forested wetland. Ditches were excavated in the wetland from both

outfalls prior to 1965 to enhance the conveyance of runoff to Lake Harris (Figure 7). The result is that the residence time and thus pollutant abatement capacity of the forested wetland is impaired. The root systems of many older trees are exposed suggesting that there has been soil oxidation and indicating a general state of impaired hydrology. A ditch block will be constructed in the primary drainage ditch resulting in the stormwater runoff to back up into the upper portions of the wetlands and forcing the runoff to sheet flow south through the wetlands (Figure 7). The ditch block will be constructed of fabric formed concrete and rip rap and designed with an emergency overflow in order to prevent flooding of homes. The restoration of sheet flow to these areas is expected to enhance the hydrology of the wetland, promote growth of woody vegetation, restore some balance to the amount of hydric soil development, which will increase the amount of assimilation and sequestration of pollutants. The area of wetland to be enhanced is detailed on Figure 7. Detailed survey of the wetland has not been provided so precise estimates of residence time and storage volume is not possible at this time. Further, detailed hydrology and hydraulic modeling of the wetland will need to be conducted to ensure homes that lie adjacent to the wetland are not adversely impacted by the enhanced hydroperiod. A conservative estimate of pollutant load is assumed for this conceptual plan to be equivalent to the sum of that from the Colfax St and South Street outfalls. The pollutant load from two other outfalls are assumed to be negligible in comparison to these larger outfalls.

A BMP Monitoring Plan will be performed to evaluate the effectiveness of the BMP. The following parameters will be included in the monitoring plan:

- water levels will be monitored to evaluate the effectiveness of the ditch block to enhance the hydroperiod of the wetlands,
- water quality (TP, TN, TSS) will be measured at the outfalls and in the wetland along a transect following the topographic gradient to evaluate the assimilative capacity of the wetland,
- wetland vegetation community will be evaluated to evaluate if the community structure of the wetland has shifted from nuisance mesic / upland species towards obligate and facultative desirable species.
- monitoring is anticipated to take place for a minimum of five years.

## ESTIMATED POLLUTANT LOAD REDUCTION:

| BMPs Installed | | TSS kg/yr | TP kg/yr | TN kg/yr | Sediment kg/yr | BOD kg/yr | Other kg/yr | Other kg/yr |
|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | |
| Pollutant Loads | Pre-Project | 917 | 6 | 39 | | 155 | | |
| | Post-Project | 183 | 4 | 25 | | 183 | | |
| | Load Reduction | 734 | 3 | 14 | | 124 | | |
| | % Reduction | 80 | 35 | 35 | | 80 | | |
| 2 | | TSS kg/yr | TP kg/yr | TN kg/yr | Sediment kg/yr | BOD kg/yr | Other kg/yr | Other kg/yr |
| Pollutant Loads | Pre-Project | 42465 | 240 | 1559 | | 6532 | | |
| | Post-Project | 8493 | 156 | 1014 | | 1306 | | |
| | Load Reduction | 33972 | 84 | 546 | | 5226 | | |
| | % Reduction | 80 | 35 | 35 | | 80 | | |
| 3 | | TSS kg/yr | TP kg/yr | TN kg/yr | Sediment kg/yr | BOD kg/yr | Other kg/yr | Other kg/yr |
| Pollutant Loads | Pre-Project | 34224 | 187 | 2586 | | 5150 | | |
| | Post-Project | 6845 | 122 | 764 | | 1030 | | |
| | Load Reduction | 27379 | 66 | 411 | | 4120 | | |
| | % Reduction | 80 | 35 | 35 | | 80 | | |
| 4 | | TSS kg/yr | TP kg/yr | TN kg/yr | Sediment kg/yr | BOD kg/yr | Other kg/yr | Other kg/yr |
| Pollutant Loads | Pre-Project | 16188 | 84 | 555 | | 2644 | | |
| | Post-Project | 3238 | 54 | 361 | | 529 | | |
| | Load Reduction | 12951 | 29 | 194 | | 2115 | | |
| | % Reduction | 80 | 35 | 35 | | 80 | | |
| **5** | | TSS kg/yr | TP kg/yr | TN kg/yr | Sediment kg/yr | BOD kg/yr | Other kg/yr | Other kg/yr |
| Pollutant Loads | Pre-Project | 8676 | 160 | 1039 | | 1489 | | |
| | Post-Project | 4772 | 136 | 1039 | | 1489 | | |
| | Load Reduction | 3904 | 24 | 0 | | 0 | | |
| | % Reduction | 45% | 15% | 0 | | 0 | | |
| | | | | | | | | |

**ESTIMATED POLLUTANT LOAD REDUCTION cont.**

| TOTALS | | TSS kg/yr | TP kg/yr | TN kg/yr | Sediment kg/yr | BOD kg/yr | Other kg/yr | Other kg/yr |
|---|---|---|---|---|---|---|---|---|
| Pollutant Loads | Pre-Project | 102470 | 677 | 5778 | | 15970 | | |
| | Post-Project | 23531 | 472 | 3203 | | 4537 | | |
| | Load Reduction | 78940 | 206 | 1165 | | 11585 | | |
| | % Reduction | 77% | 30% | 20% | | 73% | | |
| | | | | | | | | |

**MODEL USED:**

Pollutant load estimates were made using the Non-point Source Loading Management Model (NPSLMM). Event Mean Concentrations (EMCs) for each pollutant were based on the *Stormwater Loadings Rate Parameters for Central and South Florida* (Harper 1994). Runoff estimates were made based on the methodology provided in the *Evaluation of Current Stormwater Design Criteria within the State of Florida* (FDEP 2007). Baffle box pollutant load reduction efficiencies were provided by the manufacturer, Sun Tree. The pollutant load reduction capacity of wetlands was taken from the low end of the ranges as reported in *The Next Generation of Stormwater Wetlands. Center of Watershed Protection* (Cappiella, 2008).

**LAND OWNERSHIP STATUS:**

BMPs #1, #3, and #4 will be constructed in City owned right of way. BMPs # 2 and #5 will be constructed in FDOT drainage easements. FDOT authorization will be required. FDOT and the City worked collectively on a previous baffle box project at Venetian Gardens partially funded by Section 319 funds. No additional land acquisition is anticipated.

**OUTPUTS/DELIVERABLES:**

**Task 1 – Construction plans and permitting:** Construction plans, permit applications, and bid documents will be prepared for the five BMPs. Permits for the construction of the baffle boxes will include right of way permits from FDOT. The wetland enhancement (BMP#5) will require permits from the St. Johns River Water Management District, Florida Department of Environmental Protection, and the U.S. Army Corps of Engineers.

**Task 2 – Public Involvement:** The City hosts public meetings with the City Council to discuss the use of Stormwater Utility Funds for construction projects. A separate neighborhood public work shop will be held to discuss the details of the wetland enhancement project (BMP #5) with local residents.

**Task 3 - Construction of BMPs:** City of Leesburg will be responsible for the selection and management of a contractor. It is anticipated that all BMPs will be contracted at the same time and constructed sequentially or simultaneously. Construction oversight shall be provided by the City of Leesburg.

**Task 4 – BMP Monitoring Plan:** The FDEP is conducting a study of the effectiveness of nutrient separating baffle boxes. The City will rely on the FDEP study for substantiation of the effectiveness of the baffle box BMPs. The City records the amount of material removed from

baffle boxes during maintenance and will report the maintenance data in the Quarterly and Final Reports. The City is committed to demonstrate the effectiveness of the wetland enhancement BMP (#5) and implement changes if needed. A Monitoring Plan will be submitted to FDEP within six months of grant award for review and comment. A five year monitoring plan will be implemented to evaluate the effectiveness of the BMP. Annual status reports will be submitted with the Quarterly Reports required by contract with FDEP.

**Task 5 - Project Administration:** City of Leesburg will be responsible for consultant and construction firm selection, contract development and execution, construction inspections and the preparation and submittal of Quarterly Project Status Reports, BMP Monitoring reports, and the Final Comprehensive Report to FDEP.

**PROJECT MILESTONES:**

| Task | Activity | Start | Complete |
|---|---|---|---|
| 1 | Conceptual Plans Prepared and Submitted | | May 2009 |
| 2 | Contract w/ FDEP Signed | | August 2010 |
| 3 | Construction Plan Development | Sep 2010 | Dec 2010 |
| 4 | Construction Permit | Dec 2010 | Mar 2011 |
| 5 | Bid Package Preparation | Mar 2011 | April 2011 |
| 6 | Construction Contract Award | April 2011 | May 2011 |
| 7 | Construction | May 2011 | August 2011 |
| 8 | As-builts | August 2011 | August 2011 |
| 9 | City submits for reimbursement of construction | August 2011 | Sep 2011 |
| 10 | Quarterly Progress Reports | August 2010 | August 2016 |
| 11 | BMP# 5 Monitoring Plan | August 2011 | August 2016 |
| | | | |
| | | | |

**PROJECT BUDGET**:

| Project Funding Activity | 319 (h) Amount | Matching Contribution | Match Source * |
|---|---|---|---|
| Design Staff | | $165,000.00 | City of Leesburg |
| Travel | | | |
| Equipment | | | |
| Supplies | | | |
| Contractual | | $8,000.00 | City of Leesburg |
| BMP Implementation | $217,800.00 | $145,200.00 | City of Leesburg |
| Monitoring | | $75,000.00 | City of Leesburg |
| Public Education | | $6,8000.00 | City of Leesburg |
| Other: | | | City of Leesburg |
| **Total:** | $217,800.00 | $400,000.00 | |
| **Total Project Cost:** | | $617,800.00 | |
| **Percentage Match:** | 35% | 65% | |

***If a stormwater utility or other dedicated recurring fee is contributing, put that information in the following table.**

**MATCH SOURCE INFORMATION:**

| Match Source Name | Description | ERU/Fee |
|---|---|---|
| City of Leesburg | Stormwater Utility | $5/ERU/Month |
| | | |
| | | |
| | | |

**BUDGET BY TASK**:

| Project Funding Activity | 319 (h) Amount | Matching Contribution | Match Source |
|---|---|---|---|
| Construction Plan Development and Permitting | | $165,000.00 | City of Leesburg |
| Public Involvement | | $6,800.00 | City of Leesburg |
| Construction of BMPs | $217,800.00 | $145,200.00 | City of Leesburg |
| BMP# 5 Monitoring Plan Implementation | | $75,000.00 | City of Leesburg |
| Project Administration | | $6,000.00 | City of Leesburg |
| Final Report to FDEP | | $2000.00 | City of Leesburg |
| | | | |
| **Total:** | $217,800.00 | $400,000.00 | |
| **Total Project Cost:** | | $617,800.00 | |
| **Percentage Match:** | 35% | 65% | |

**OTHER FUNDING (Not Match – such as land acquisition or other federal grants):**

| Agency | Activity | Amount |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | **Total:** | |

**OTHER INFORMATION: If this is a multi-year project, have you requested sufficient funds to complete the project (assuming funds requested herein are provided)? (State yes or no, and, if no, provide an explanation): Yes: ☒ No: ☐**

**The Lead Organization, as listed on the first page of this form, agrees to comply with all requirements specified in the guidance package and in the federal grant regulations. Checking "no" or "yes, except" will cause the project to have a lower ranking than similar projects by lead organizations that agree to the requirements:**

**Yes: ☒ No: ☐ Yes, except: ☐ (Note: List exceptions below.)**

**Exceptions:**
**REFERENCES CITED:**

Basin Working Group, 2007. *Basin Management Action Plan for the Implementation of Total Maximum Daily Loads Adopted by the Florida Department of Environmental Protection in the Upper Ocklawaha River BMAP.* Florida Department of Environmental Protection, Tallahassee, Florida.

Brown, A.T., et al. 2008. *Stormwater Management Program and Master Plan*. Boyle Engineering, Orlando, Florida

Cappiella, K., et al. 2008. *The Next Generation of Stormwater Wetlands. Center of Watershed Protection*, Ellicott City, MD.

Fulton, R.S. III, et al., 2004. *Pollution Loading Reduction Goals (PLRG) for Seven Major Lakes in the Upper Ocklawaha River Basin*. St Johns River Water Management District, Palatka, Florida.

Harper, H.H., 1994. *Stormwater Loadings Rate Parameters for Central and South Florida*. Environmental Research and Design, Inc., Orlando, Florida.

Harper, H.H., Baker, M.E., 2007. *Evaluation of Current Stormwater Design Criteria within the State of Florida*. Florida Department of Environmental Protection, Tallahassee, Florida.

PEC, 2009. *Lake Harris / Little Lake Harris Water Quality Improvement Program.* Lake County Public Works, Tavares, Florida.

**NOTE: PLEASE SUBMIT ALL APPENDICES IN A SEPARATE WORD DOCUMENT. THIS MAY INCLUDE MAPS, FIGURES OR ANY OTHER INFORMATION YOU WOULD LIKE TO INCLUDE WITH YOUR APPLICATION**

PROJECT 21: Reconstruct Riberia Street and Revitalize the San Sebastian River

PROJECT FUNDING: $450,000 FY10 319, $921,537 Match

LEAD ORGANIZATION: City of St. Augustine

CONTACT PERSON: Martha Graham, P.E., Public Works Director
P.O. Box 210
St. Augustine, Florida 32085-0210
(904) 825-1040
mgraham@ci.st-augustine.fl.us

PROJECT ABSTRACT:
The City of St. Augustine is undertaking a project to provide treatment for approximately 30.26 acres (Phase 1 of 5) of previously untreated runoff from the Historic Lincolnville District of St. Augustine along Riberia Street. Untreated stormwater currently outflows to the San Sebastian River. Revitalizing the San Sebastian River will place innovative Best Management Practices (BMPs) into a 30.26-acre watershed that is about 99% urbanized. The BMP used in this project will be the StormCeptor units. The project proposes the construction of four StormCeptor Units to reduce the total suspended solids (TSS) and phosphorus load currently conveyed to the San Sebastian River. These BMPs are estimated to reduce TSS by at least 74% or 3.5 tons per year (3,183 kg/year) and total phosphorus by at least 9.8% or 3.4 pounds/year (1.5 kg/year). Monitoring will be performed to determine the units' effectiveness.

The project is currently at 90% design so this project is near ready to go to construction once funding is approved and a grant contract signed.

Signage will be installed at one StormCeptor Site that is adjacent to a public right-of-way and sidewalk. This informational sign will be designed to educate the public about stormwater pollution and treatment.

PROJECT LOCATION AND WATERSHED CHARACTERISTICS:
The project is located in the City of St. Augustine in the Historic Lincolnville District along Riberia Street. The project's stormwater discharges to the San Sebastian River which is located within the NPS priority Watershed defined by EPA as "Daytona-St. Augustine Watershed" with HUC code 03080201 and a Polygon ID of 16839.

The project is also located within the St. Johns River Water Management District (SJRWMD) Northern Coastal Basin within the Tolomato/Matanzas River Planning Unit 9C.

The project is located within the State TMDL basin No. 5 "Upper East Coast". The WBID is 2491. Please see Appendix B, Figure 1 and 1A for site location maps.

Watershed Name: Daytona-St. Augustine Watershed
Latitude: 81° 19' 05" W
Longitude: 29° 53' 30" N
Hydrologic Unit Code: 03080201

Land Uses within the Watershed or Project Area. The project watershed that is being treated is 30.26 acres. The urban area includes residential, commercial and marinas and fish camps (30.05 acres). The treatment area for the project (Phase 1 or Basin 1A, 1B, 1C, and 1D) is shown on Figure 2 in Appendix B. The land uses of this area are shown on additional maps in Appendix B.

| Land Use | Acres | % |
|---|---|---|
| Residential, High Density | 26.24 | 86.72 |
| Commercial and Services | 3.6 | 11.90 |
| Extractive, Marinas and Fish Camps | 0.21 | 0.69 |
| Herbaceous Dry Prairie | 0.21 | 0.69 |
| | | |
| | | |
| Land Use Totals | 30.26 | 100 |

POLLUTION REDUCTION STRATEGY:
This proposal will begin the process of reducing the quantity of nonpoint source pollutants in the San Sebastian River located within the St. Johns River Water Management District (SJRWMD) Northern Coastal Basin within the Matanzas River Planning Unit 9C. The implementation of Best Management Practices (BMPs) is needed to reduce pollutants due to urbanization of natural watersheds. The SJRWMD, with input from governments like the City of St. Augustine, prepared the *Northern Coastal Basin SWIM plan*.

According to Paul Haydt, SJRWMD Senior Project Manager of the *Northern Coastal Basin SWIM Program,* this SWIM plan outlines the procedure to identify, prioritize and implement stormwater retrofit initiatives and when coupled with ongoing DEP total maximum daily load (TMDL) program and the local NPDES initiatives will meet all nine required elements of a watershed plan identified by EPA. Therefore, this project qualifies for incremental funds for this grant.

The SJRWMD Surface Water Improvement and Management (SWIM) plan for the Northern Coastal Basin identifies "Stormwater Retrofit and Master Plan Implementation Initiative" on page 54 in the SWIM plan. The plan also identifies Strategy "Enhance and Maintain Surface Waters" on page 32 of the plan. The plan discusses prioritizing areas for optimal retrofit. The SJRWMD priority areas are shown on a map prepared by the SJRWMD for the Matanzas Planning Unit. As mentioned previously, the project is located within the Matanzas Planning unit. The priority areas on the map are areas that show little or no treatment. The project is located in one of these areas (see Map 1 in Appendix C).

This project provides stormwater treatment to an area having little or no stormwater treatment. The project will reduce pollutant loads to the San Sebastian by treating 30.26 acres of previously untreated stormwater with four StormCeptor units. Therefore this project meets the SWIM strategies identified in previous paragraph. A letter of support from the SJRWMD for this project is included in Appendix C.

The San Sebastian River has WBID 2491.

PROJECT OBJECTIVE:
The San Sebastian River was determined to either be “not impaired” or have “insufficient data” to accurately assess. Neither of these categories is on the Verified list. The San Sebastian River is within the Upper East Coast Basin (Group 5) and the determination of the BMAP is pending and will be revisited in 2010. However, the receiving water body for the San Sebastian River is the Matanzas River in which TMDLs are still in development.

The San Sebastian River is in a Priority 1 area for needed stormwater treatment by the SJRWMD of the *Northern Coastal SWIM Plan*.

Four stormceptors included in the proposal are designed to remove total suspended solids (TSS) and phosphorus. Implementation of the river restoration plan will reduce the amount of sediment suspended in the river during storm events and may consequently improve biological impairment. It is of the opinion of Paul Haydt from the SJRWMD that the implementation of these BMPs will reduce the TSS in the San Sebastian River and ultimately reduce pollutants in the Matanzas River receiving body.

PROJECT DESCRIPTION:
The City of St. Augustine is undertaking a project to alleviate the flooding of Riberia Street and provide stormwater treatment to approximately 85 acres of previously untreated runoff from the Historic Lincolnville District of St. Augustine in the form of multiple StormCeptor units. This grant proposal is for Phase 1 of this overall project which includes treating runoff for 30.26 acres of previously untreated runoff.

Lincolnville area dates back to 1866 when it used to be called “Africa” by the former slaves settling there. During this time period, Lincolnville, a historic African-American community, has seen many events from the freeing of slaves in the south to the civil rights movement of the 1960’s.

In the current condition, this area of Lincolnville is poorly drained and floods during most rain events. In addition to the need for improved drainage, this area also needs to have some method for stormwater treatment provided to treat the runoff which is currently discharging directly to the San Sebastian River. The area is build up with historic buildings and no land is available to put a stormwater pond.

The 90% design for this phase of the project has been completed and this project is nearly ready for bidding and construction.

The proposed grant proposal (Phase 1) consists of rebuilding Riberia Street from the King Street to Bridge Street. Phase 1 consists of Basin 1 (Subasins 1A, 1B, 1C, 1D). The proposed plan is to provide a two-lane, two-way street with a sidewalk on the west side. The underground utility mains (water and sewer) will also be upgraded. However, the utility main upgrades and roadway work are not included in the grant proposal.

The stormwater conveyance system on Riberia Street will be replaced with an upgraded system providing adequate relief to the flooding. The stormwater conveyance system will include treatment structures (four stormceptors) to provide treatment for the runoff from 30.26 acres of Lincolnville District which currently flows untreated directly into the San Sebastian River. These treatment structures will help improve the overall water quality of the San Sebastian River and the adjacent saltwater marsh.

Stormceptors were chosen as a BMP or treatment structure for this project due to the space limitations and historic nature of the area. Land was not available for a stormwater pond or other BMP. Due to the size and the layout of this drainage basin, four separate StormCeptor units have been proposed. One StormCeptor unit STC 7200 will be placed at Riberia Street at LaQuinta Place for Basin 1A runoff. One StormCeptor unit STC 7200 will be placed at Riberia Street and Cedar Street for Basin 1B runoff. One StormCeptor unit STC 4800 will be placed at Riberia Street and Bravo Street for Basin 1C runoff. One StormCeptor unit STC 16000 will be placed west of Riberia Street between Bravo Street and Bridge Street. The outfall to the San Sebastian River is at the StormCeptor STC 16000 location. Please see Figure 3,

Erosion and sediment control measures will be implemented for the project.

Since the grant proposal project is at 90% design, the project has had public meetings and public information brochures have been prepared for distribution (See Appendix F). If this project is selected for funding, the construction will be phased so that the installation of the BMP's will not commence until the 319(h) funding is made available. To notify the public, an additional neighborhood meeting will be held or public information sheets will be provided again following award but prior to construction.

A public education sign will be erected at one of the StormCeptor sites to educate the public about the stormwater treatment at the site and the effects it has on the San Sebastian River.

A monitoring plan will be developed with the minimum requirements required and shown in Appendix A; or negotiated with and approved of by FDEP. The monitoring will be conducted at each StormCeptor unit.

Estimated Pollutant Load Reduction:

| BMP installed | | TSS | TP | TN | Sediment | BOD | Other | Other |
|---|---|---|---|---|---|---|---|---|
| | | kg/yr | kg/yr | kg/yr | kg/yr | kg/yr | kg/yr | kg/yr |
| Pollutant Loads | Pre-project | 4,275.5 | 15.7 | 98.6 | ND | 444.7 | | |
| | Post Project | 1,092.6 | 14.2 | 98.6 | ND | 444.7 | | |
| | Load Reduction | 3,182.9 | 1.5 | 0 | ND | 0 | | |
| | % Reduction | 74.4 | 9.8 | 0 | ND | 0 | | |
| | | | | | | | | |

ND – no data

MODEL USED:
The estimated pollutant load reduction provided by the four Stormceptors for the Watershed identified as Phase 1 (30.26 acres) was estimated using the EPA STEPL (Spreadsheet Tool for Estimating Pollutant Load) model as identified in the grant application instructions. Efficiencies of the StormCeptor units were calculated from a StormCeptor design model through Rinker Materials Company. The total suspended solids (TSS) efficiencies of each unit was calculated using coarse and fine sand and then averaged. The average efficiency of the stormceptors

was 76.87% TSS load reduction.

The total phosphorus (TP) load reduction efficiency of 10% for the StormCeptor was determined from Eric Livingston, Chief of the Watershed Management Bureau, of the Florida Department of Environmental Protection (FDEP) in a paper titled *Instructions for Computing Nutrient Reductions from Street Sweeping and Structural Maintenance Activities for the Lower St. Johns main Stem BMAP* dated August 22, 2008.

The StormCeptor does not have any verified data to determine the load reduction efficiencies for total nitrogen (TN) or Biological Oxygen Demand (BOD). Therefore, the load reduction efficiencies for these parameters were considered zero.

As recommended in the grant application instruction guide, the EPA model STEPL was used to estimate load reductions for the watershed using the StormCeptor BMP. Although the model originally did not include the StormCeptor as a BMP, the model does allow for the addition of new BMPs. TetraTech, Inc. developed the STEPL model for the EPA. Sabu Paul from TetraTech (contact for all STEPL inquiries) was consulted for this project and the addition of the StormCeptor efficiencies into the STEPL model. The STEPL model computes the loads in pounds or tons per year which was converted to kilograms per year (kg/yr).

The StormCeptor BMP was not included in the National Stormwater Best Management Practice database http://www.bmpdatabase.org/ therefore the removal efficiency was found through StormCeptor models and studies.

LAND OWNERSHIP STATUS:
The land for the construction of the treatment infrastructure is either owned or has an easement by the City of St. Augustine.

OUTPUTS/DELIVERABLES:
Task 1. Construction Plans and Permitting: The 90% design of this project (Phase 1, Riberia Street Reconstruction) has been completed for the four stormceptors and drainage infrastructure. Final design, construction plans and construction permitting has not been completed and will be included as a task in this grant proposal. The construction documents will include detailed sediment and erosion control plans. Necessary construction permits will also be obtained.

Task 2. – Public Involvement and Public education: As mentioned, the design of the roadway work and stormwater treatment of Riberia Street Phase 1 is, as of May 2009, at 90% design. Construction of the work was scheduled for October 2009 but will be phased such that the BMP's will not be installed until the summer 2010 if this grant is awarded. Due to the thought that construction would begin in October 2009, neighborhood meetings on the work have already been conducted by the City of St. Augustine. Concerns of local residents were taken into consideration for the design and future construction activities.

An information sheet was also prepared and distributed to the neighborhood by the City of St. Augustine. The information sheet describes the history of the project area and why the area needs retrofitting and the benefits of the reconstruction.

Two neighborhood meetings as well as one formal public meeting have been held discussing the project and receiving local feedback. If this grant proposal is awarded, at least one

neighborhood meeting will be conducted following the award but prior to the construction date to update the public on the project schedule and funding. In addition, the current project information sheet will be updated and made available to the public as well as distributed to the neighborhood.

A public education sign will be erected at one of the StormCeptor sites to educate the public about the stormwater treatment at the site and the effects it has on the San Sebastian River.

Task 3. Construction: Construction of Riberia Street and revitalizing the San Sebastian River will take place once the final construction plans have been completed and the necessary permits have been obtained. Since this project is at 90% design, the SJRWMD permit applications have been submitted. The City of St. Augustine will provide construction inspection in order to assure that the improvements are built in accordance with the plans and specifications. These construction inspection services may be provided by experienced City staff directly or by the hiring of an outside Consultant experienced with construction inspection.

Task 4. Monitoring Plan Preparation: The effectiveness of the project will be determined by monitoring each of the four StormCeptor units. Reports will be provided in order to demonstrate the environmental benefits of the project. The minimum requirements of the monitoring plan are included as Appendix A. A detailed water quality monitoring plan will be submitted for review within three months of the grant contract. The minimum requirements of the monitoring plan shown in Appendix A may be altered after discussions with and approval from FDEP. A required Quality Assurance Project Plan (QAPP) will be also be submitted. Monitoring results will be input into the Florida Stormwater Database.

Task 5. Project Administration: The City of St. Augustine staff will be responsible for consultant and construction firm selection as well as contract development and administration and construction inspection. Administrative responsibilities will also include financial accounting to the Florida Department of Environmental Protection (FDEP).

Task 6. Draft and Final Grant Reports:
Grant reports may be conducted by a hired consultant of the City. The grant reports include the required quarterly progress reports, final project report, and comprehensive final project report.

Task 7. Monitoring Effectiveness Report: The monitoring, as described in the Monitoring plan, will be implemented and a monitoring report for such monitoring will be generated and submitted. Since the 90% design plans for this project are complete and construction will be implemented soon after the grant contract approval, the monitoring and monitoring report were included as a task for this project since this task will be complete within four years of the grant contract signage.

List of Outputs/Deliverables corresponding to tasks

1. Construction plans and specifications and Construction permits
2. Education materials and presentations
3. Construction of Stormceptors - asbuilts
4. Monitoring plan and QAPP
5. Financial accounting documents to the FDEP for grant award
6. Quarterly progress reports, Final Project Report, and Comprehensive Final Report
7. Monitoring Effectiveness reports

PROJECT MILESTONES:

| Task | Activity | Start | Complete |
|---|---|---|---|
| | Contract w/ FDEP – signed | | Month 1 |
| 1 | Final Design/permitting | Month 1 | Month 6 |
| 2 | Education materials | Month 1 | Month 2 |
| 3 | Construction/BMP Implementation | Month 6 | Month 18 |
| 4 | Prepare and Submit QAPP | Month 5 | Month 8 |
| 5 | Financial accounting documents | Month 1 | Month 39 |
| 6 | Post-Implementation Monitoring | Month 18 | Month 36 |
| 7 | Prepare and Submit Final Report | Month 36 | Month 38 |
| 8 | Prepare and Submit Final Report | Month 38 | Month 39 |
| | Quarterly Reports | Month 3 | Month 39 |

QAPP – Quality Assurance Project Plan

PROJECT BUDGET:

| Project Funding Activity | 319(h) Amount | Matching Contribution | Match Source |
|---|---|---|---|
| Staff | | $50,000 | City of St. Augustine |
| Travel | | | |
| Equipment | | | |
| Supplies | | | |
| Contractual | | | |
| BMP Implementation | $372,000* | $871,537* | City of St. Augustine |
| Monitoring | $50,000 | | |
| Public Education | $18,000 | | |
| Other: Reports | $10,000 | | |
| Total: | $450,000 | $921,537 | |
| Total Project Cost: | $1,371,537* | $1,371,537* | |
| Percentage Match: | 32.8% | 67.2% | |

*For the purpose of this grant application, Total Project Cost only includes cost associated with the following: Mobilization, Site Preparation, Drainage and Erosion Control.

Final construction plans and permitting costs are included in BMP implementation match portion.

Project Administration is shown under Staff.

MATCH SOURCE INFORMATION:
The match funding source will come solely from the City of St. Augustine. The City of St. Augustine has a recurring stormwater utility fee that is charged on the public's monthly water bill. The stormwater fee is at least $5 per month. Please see Appendix J for City ordinance language for the stormwater utility fee.

The SJRWMD does not have any funds this year to contribute to the Northern Coastal Basin in

which this project is located in.

BUDGET BY TASK:

| Project Funding Activity | 319(h) Amount | Matching Contribution | Match Source |
|---|---|---|---|
| Construction plans and permitting (final design) | | $50,000 | City of St. Augustine |
| Public Involvement and Public Education | $18,000 | | |
| Construction of Stormceptors | $391,800* | | |
| Construction of drainage infrastructure, site mobilization, and erosion sediment controls | | $821,537* | City of St. Augustine |
| Monitoring Plan Preparation and QAPP | $25,000 | | |
| Project Administration | | $50,000 | City of St. Augustine |
| Monitoring plan implementation and report | $50,000 | | |
| Final and Final grant reports | $10,000 | | |
| Total: | $494,800 | $921,537 | |
| Total Project Cost: | $1,415,217* | $1,415,217* | |
| Percentage Match: | 34.9 % | 65.1% | |

*See Appendix I for the Engineer's 90% Opinion of Probable cost.
For the purpose of this grant application, Total Project Cost only includes cost associated with the following: Mobilization, Site Preparation, Drainage and Erosion Control.

The design of utilities, maintenance of traffic, landscape, and roadway are included in the 90% design but not included as a match or 319(h) funds because they do not involve treatment of the San Sebastian River.

Since the 90% design plans for this project are complete and construction will be implemented soon after the grant contract approval, the monitoring and monitoring report were included as a task for this project and put under 319(h) amount since this task will be complete within four years of the signed grant contract.

OTHER FUNDING:
There is no other funding for this project besides the City of St. Augustine's general fund as mentioned previously.

OTHER INFORMATION:

If this is a multi-year project, have you requested sufficient funds to complete the project (assuming funds requested herein are provided)?
(State yes or no, and, if no, provide an explanation): Yes: X No:

The project proposal submitted is for Phase 1 of the reconstruction of Riberia Street. The construction of this project should be completed within an 18-month time frame.

The Lead Organization, as listed on the first page of this form, agrees to comply with all requirements specified in the guidance package and in the federal grant regulations. Checking "no" or "yes, except" will cause the project to have a lower ranking than similar projects by lead organizations that agree to the requirements:

Yes: X No: Yes, except: (Note: List exceptions below.)

Exceptions:

REFERENCES CITED:

Paul J. Haydt and Frazel, Inc., St. Johns River Water Management District, 2003. *Northern Coastal Basin, Surface Water Improvement and Management Plan*. SJRWMD, 4049 Reid Street, Palatka, Fl 32178, 386-329-4303
www.sjrwmd.com/programs/northerncoastalbasin.html

*National Stormwater Best Management Practice Database,*
http://www.bmpdatabase.org

Sabu Paul, STEPL program, TetraTech 703-385-6000
http://it.tetratech-ffx.com/stepl/

TetraTech, Inc., EPA, 2006,.U*ser's Guide, Spreadsheet Tool for the Estimation of Pollutant Load (STEPL),* TetraTech, Inc., 10306 Eaton Place, Suite 340, Fairfax, VA 22003.

Heather Ritchie, FDEP, 850-245-8682
Heather.ritchie@dep.state.fl.us.

Patty Sanzoni, FDEP, 850-245-7511

Mike Thomas, FDEP, 850-245-7513

Verified list for Basin 5:
http://www.dep.state.fl.us/water/tmdl/adopted_gp5.htm

Julie Espy, Watershed Assessment Section, 850-245-8416
julie.espy@dep.state.fl.us

Douglas J Holdener, StormCeptor representative, Rinker Materials Concrete Pipe Division, 561.352.8959
dholdener@cemexusa.com

PROJECT 22: North Lake Lawne Stormwater Treatment Project

PROJECT FUNDING: $60,000 FY10 319 $90,000 **Match**

LEAD ORGANIZATION: Orange County Environmental Protection Division

CONTACT PERSON: (Name, Address, Phone)
Rick Baird
OCEPD
800 Mercy Drive Orlando, FL 32808
Phone 407-836-1483
Fax 407-836-1499
Rick.baird@ocfl.net

COOPERATING ORGANIZATIONS: Orange County Board of County Commissioners
Pine Hills Safe Neighborhood Partnership

PROJECT ABSTRACT:
Trash, debris, sediments, nutrients, metals and hydrocarbons in urban settings are washed into lakes from thousands of stormdrains designed to convey runoff from the streets to lakes and streams, often without any form of treatment. In areas where there is little or no available land for traditional treatment pond creation, curb and grate inlet baskets, with hydrocarbon treatment booms, can be installed to capture these materials and associated nutrients from entering the lake. This project will install 110 curb and grate inlet baskets, with hydrocarbon absorbing booms, in the highly urbanized unincorporated portion of Pine Hills located on the north west side of Lake Lawne. The inlet baskets are designed to effectively capture the typical sediment and debris that would wash into the stormwater conveyance system and on into Lake Lawne. The baskets not only capture these materials but hold them out of the water stream in efforts to reduce leaching of nutrients and other pollutants of concern. The baskets are easily cleaned and maintained on a regular schedule. As a result, pollutant analysis and removal efficiencies can easily be collected, evaluated and reported.

PROJECT LOCATION AND WATERSHED CHARACTERISTICS:
The project area is located on the northwest side of the TMDL impaired Lake Lawne (WBID 3004C) bounded by Silver Star Road to the north, Pine Hills Road to the west, within the Little Wekiva River/Canal (WBID 3004). The area encompasses 498.9 acres (17%) of the residential, commercial and institutional land uses, out of a total 2,867 acre watershed.

| | |
|---|---|
| Watershed Name: | Little Wekiva River/Canal (Lake Lawne) |
| Latitude: | 28°33’14.61” N |
| Longitude: | 81°25’51.6” W |
| Hydrologic Unit Code(HUC): | 03080101 |

Land Uses within the Watershed (acres and percentages of total):

| Land Use | Acres | % |
|---|---|---|
| Single Family residential | 449.1 | 90 |
| Multi Family residential | 35.51 | 7 |
| Commercial | 9.44 | 2 |
| Institutional | 4.83 | 1 |
| | | |
| | | |
| | | |
| | | |
| **Land Use Totals (Acreage and %)** | 498.88 | 100 |

POLLUTION REDUCTION STRATEGY:
Lake Lawne has been verified by FDEP as a TMDL impaired waterbody within the Middle St. Johns Basin (WBID 3004C) of Group 2 for nitrogen and phosphorus. The total phosphorus and nitrogen loadings to Lake Lawne, after accounting for existing BMP's, was calculated to be 4,761 and 36,620 lbs/year respectively, (Gao, 2008). The TMDL load reduction goal for Lake Lawne was established to be 53% for TP, and 30% for TN. Therefore, the goal for nutrient removal from inputs to the lake should be 2,523 lbs/yr for phosphorus and 10,986 lbs/yr for nitrogen.

The phosphorus load reduction efficiency of curb inlet baskets was established at 5% based on the FDEP efficiency values provided for the Lake Jessup Basin Management Action Plan. The other values of TSS, TN, Zn and Pb are given by the manufacturer and attached in the appendices. In addition, the Orange County Environmental Protection Division (EPD) is monitoring over 300 recently installed curb and grate inlet baskets in other parts of the County. Information on composition and weights captured from these baskets is currently being monitored monthly for the first year after their installation.

Each month the baskets are cleaned and measurements of the percent of leaves, sediments, "trash" (typically defined as bottles, cans, cups, plastic bags or floatables), the percent fullness and the total weight of the material are collected. Preliminary analysis of the functionality of the inlet baskets in other parts of the County indicate that drop inlet baskets collect 20~23 lbs/month of total material on average in areas where weekly street sweeping is also performed. Grate inlets are averaging ~8 lbs/month with as much as 280 pounds of sediment from a single month. The difference in these two systems is how and where they are used. Generally speaking grate inlet baskets, in the subdivisions, are set flush with the grass swales. The grass and soils captures more runoff than the bare pavement would where curb inlet baskets are routinely placed.

Given the information EPD has collected on already, the 107 proposed curb inlets will remove up to 29,532 lbs/yr of material from the lake. It is estimated that the 3 proposed grate inlets will remove up to 288 lbs/yr of additional material from the lake. Together the inlet baskets will keep 29,820 pounds or almost 15 tons of material from entering Lake Lawne (exact TP and TN numbers are still being determined). Eventually, with the study EPD is doing on the efficiency of inlet baskets we will be able to more accurately identify pollutant load reductions.

Based on the initial 5% removal efficiency factor of Catch Basin Inserts/Inlet filters for Total Phosphorus, assigned by FDEP, this project will reduce the total phosphorus load, as a percentage of the entire Lake Lawne watershed (Gao, 2007), by 12.56 pounds or 0.26%. We

expect to document greater efficiencies of these devices in Orange County when combined with a comprehensive maintenance program. In addition, based on removal efficiencies information provided by SunTree Technologies, the collective assemblage of inlet baskets in this sub-basin of Lake Lawne will reduce the total nitrogen load within the Lake Lawne watershed by 4,707 pounds or 12.85%.

PROJECT OBJECTIVE(S): This project will install curb / grate inlet baskets on 110 stormdrains in a portion of the Lake Lawne watershed. These stomdrain baskets will collect debris, heavy metals, sediments and the associated nutrients, thereby reducing the nutrient loading to Lake Lawne in efforts to help meet the TMDL goal. In addition, the monitoring associated with the project will significantly increase the body of knowledge regarding the pollutant removal efficiency of inlet basket collection systems in Central Florida and throughout the State of Florida.

PROJECT DESCRIPTION:
Orange County EPD has identified 110 stormwater inlets within a 498 acre section of the Pine Hills area of unincorporated Orange County. The curb and grate inlet filter devices will capture and retain floatables, leaves and sediments above any standing water. This area was built in the 1950-60 during a period when the area was undergoing rapid development. As result, the original stormwater system has no treatment systems in place, but ultimately discharges to the Little Wekiva River via Lake Lawne or directly to the river/canal.

Curb inlet baskets are custom made to fit specific inlets. They are built to the maximum size, constrained only by the individual manhole. In the area being retrofitted there are no surcharged pipes, so each basket will be able to hold its material above the any standing water in the storm drains. The installation of curb inlet baskets at each stormdrain will provide reductions in nutrient loading, and other undesirable materials that would otherwise enter Lake Lawne.

Orange County will dedicate general funds to ensure that these devices are regularly cleaned and maintained. The units will be cleaned based on efforts to maximize the cost/removal efficiency. Currently, some three hundred (300) identical inlet baskets are being cleaned out monthly in other areas of the County.

Water quality and monitoring of the sediments and debris collected in the inlet baskets will be determined during the monitoring period of this project. A QAPP will be developed within 3 months of grant award for review and approval by FDEP. Chemical analysis and particle size will be determined to document the pollutant removal efficiency of the inlet baskets in this area. Orange County will commit to maintenance of these devices through an instrument acceptable to FDEP.

EDUCATIONAL COMPONENT:
Orange County EPD will partner is partnering with the Pine Hills Safe Neighborhood Partnership (support letter attached in Appendix C) to provide education awareness to the residents in the watershed. These residents have access to Barnett Park and Lake Lawne and use both facilities. However, due to the density of homes, most residents are likely not aware of the relationship between the quality of Lake Lawne and the streets they routinely drive. Through the help of the Pine Hills Safe Neighborhood Partnership stormdrain labels will be purchased and applied to all stormdrain retrofitted with the inlet basket filters. On a schedule determined by the Pine Hills Safe Neighborhood group, stormdrain labeling events will be arranged during the time period the inlet baskets are being installed. Youth groups from the schools in the area will volunteer to apply the labels in exchange for community service hours to be used for scholarships, or as otherwise needed. The stormdrains to be applied will include the admonishment not to dump waste down the drain and will include the phone number of the Orange County EPD, to call if improper practices are observed. This program will also support the goals of the Orange County NPDES Permit.

ESTIMATED POLLUTANT LOAD REDUCTION:
The re-project pollutant loads are based on existing Central Florida land use values reported in Harper 1994 and represent the cumulative totals of the three major land uses (residential, commercial and multi-family) within the project boundary/watershed. The reduction value for TP is given by Eric Livingston in the Lake Jessup BMAP document and the TSS, TN, Pb and Zn reduction values were provided by SunTree Technologies based on previous studies of inlet basket technology.

| BMPs | TSS | TP | TN | Sedimen | BOD | Other | Other |
|---|---|---|---|---|---|---|---|

| Installed | | kg/yr | kg/yr | kg/yr | t kg/yr | kg/yr | kg/yr | kg/yr |
|---|---|---|---|---|---|---|---|---|
| Inlet Baskets | | | | | | | Pb (Dissolved) | Zn (Dissolved) |
| Pollutant Loads | Pre-Project | 37,523 | 93.81 | 2,453.1 | | | 66.3 | 53.9 |
| | Post-Project | 12,570.2 | 89.12 | 696.7 | | | 4.64 | 25.33 |
| | Load Reduction | 24,952.8 | 4.69 | 1,756.4 | | | 61.66 | 28.57 |
| | % Reduction | 66.5 | 5 | 71.6 | | | 93 | 53 |

| | | TSS kg/yr | TP kg/yr | TN kg/yr | Sediment kg/yr | BOD kg/yr | Other kg/yr | Other kg/yr |
|---|---|---|---|---|---|---|---|---|
| Pollutant Loads | Pre-Project | | | | | | | |
| | Post-Project | | | | | | | |
| | Load Reduction | | | | | | | |
| | % Reduction | | | | | | | |

| | | TSS kg/yr | TP kg/yr | TN kg/yr | Sediment kg/yr | BOD kg/yr | Other kg/yr | Other kg/yr |
|---|---|---|---|---|---|---|---|---|
| Pollutant Loads | Pre-Project | | | | | | | |
| | Post-Project | | | | | | | |
| | Load Reduction | | | | | | | |
| | % Reduction | | | | | | | |

| TOTAL | | TSS kg/yr | TP kg/yr | TN kg/yr | Sediment kg/yr | BOD kg/yr | Other kg/yr | Other kg/yr |
|---|---|---|---|---|---|---|---|---|
| Pollutant Loads | Pre-Project | | | | | | | |
| | Post-Project | | | | | | | |
| | Load Reductio | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | n | | | | | | | |
| | % Reductio n | | | | | | | |
| | | | | | | | | |

MODEL USED**: Harper, H., *Stormwater Loading Rate Parameters for Central and South Florida* Revised October 1994, ERD.**

LAND OWNERSHIP STATUS: ALL INLET BASKETS WILL BE INSTALLED WITHIN THE RIGHT-OF-WAY OF COUNTY ROADS. THIS ROAD RIGHT-OF-WAY IS PART OF THE COUNTY ROAD INFRASTRUCTURE AND CAN BE VERIFIED BY THE ORANGE COUNTY PROPERTY APPRAISER'S WEBSITE AT WWW.OCPAFL.ORG

OUTPUTS/DELIVERABLES:
Task 1. GPS locations of each stormdrain to be retrofitted identified in GIS database.
Task 2. Obtain quote and typical design information for each grate or curb inlet basket.
Task 3. Install curb or grate inlet baskets. Verify proper installation of each inlet basket.
Task 4. Conduct educational event and stormdrain labeling
Task 5. Conduct monitoring and provide report of removal efficiencies

PROJECT MILESTONES**: Months based on start of project**

| Task | Activity | Start | Complete |
|---|---|---|---|
| 1 | Identify and GPS inlet locations | 1st mo. | 2nd mo. |
| 2 | Request Quote from contractor | 2nd mo. | 4th mo. |
| 3 | Construction/Installation | 4th mo. | 5th mo. |
| 4. | Educational | 6th mo. | On going |
| 5 | Monitoring | 6th mo. | 18th mo. |
| | | | |

PROJECT BUDGET:

| Project Funding Activity | 319 (h) Amount | Matching Contribution | Match Source * |
|---|---|---|---|
| Staff | | | |
| Travel | | | |
| Equipment | | | |
| Supplies | | | |
| BMP Implementation | $60,000 | $48,000<br>$12,000 | Orange County (CIP)<br>CBIR Grant |
| Monitoring | | $25,000 | Orange County (GF) |
| Public Education | | $5,000 | Orange County (GF) |
| Other: | | | |
| **Total:** | $60,000 | $90,000 | |
| **Total Project Cost:** | | $150,000 | |
| **Percentage Match:** | | 60% | |

***If a stormwater utility or other dedicated recurring fee is contributing, put that information in the following table.**

MATCH SOURCE INFORMATION:

| Match Source Name | Description | ERU/Fee |
|---|---|---|
| Orange County | Capital Improvements Program (CIP)<br>General fund (GF) | $48,000<br>$30,000 |
| FDEP CBIR | LP 6839 (little Wekiva Water Quality Improvement Initiative) | $12,000 |
| | | |
| | | |
| | | |

BUDGET BY TASK:

| Project Funding Activity | 319 (h) Amount | Matching Contribution | Match Source |
|---|---|---|---|
| 1. Design System | | | |
| 2. Permitting | | | |
| 3. Construction/Installation | $60,000 | $48,000<br>$12,000 | Orange County (CIP)<br>CBIR Grant (not counted in % match) |
| 4. Monitoring | | $25,000 | Orange County |
| 5. Education | | $5,000 | Orange County |
| | | | |
| | | | |
| **Total:** | $60,000 | $90,000 | |
| **Total Project Cost:** | | $150,000 | |
| **Percentage Match:** | | 60% | |

OTHER FUNDING **(Not Match – such as land acquisition or other federal grants):**

| Agency | Activity | Amount |
|---|---|---|
| FDEP LP6839 | Construction/Installation | $12,000 |
| | | |
| | | |
| | | |
| | | |
| | **Total:** | $12,000 |

OTHER INFORMATION: If this is a multi-year project, have you requested sufficient funds to complete the project (assuming funds requested herein are provided)?
(State yes or no, and, if no, provide an explanation): Yes: ☐ No: ☐

The Lead Organization, as listed on the first page of this form, agrees to comply with all requirements specified in the guidance package and in the federal grant regulations. Checking

"no" or "yes, except" will cause the project to have a lower ranking than similar projects by lead organizations that agree to the requirements:

Yes: X No: ☐ Yes, except: ☐ (Note: List exceptions below.)

Exceptions: Except for monitoring, this is not a multi-year project.

REFERENCES CITED:

Gao, X., 2007. *TMDL Report Nutrient TMDLs for Spring Lake (WBID 2987A), Lake Florida (WBID 2998A), Lake Orienta (WBID 2998C), Lake Adalaide (WBID 2998E), Lake Lawne (3004C), Lake Silver (WBID 3004D), and Bay Lake (3004G) in the Wekiva Study Area*, November 2, 2007, FDEP.

Harper, H., 1994. *Stormwater Loading Rate Parameters for Central and South Florida* Revised October 1994, ERD

NOTE: PLEASE SUBMIT ALL APPENDICES IN A SEPARATE WORD DOCUMENT. THIS MAY INCLUDE MAPS, FIGURES OR ANY OTHER INFORMATION YOU WOULD LIKE TO INCLUDE WITH YOUR APPLICATION

APPENDIX A: MONITORING PLAN

Draft Water Quality Monitoring Plan
For
North Lake Lawne Stormwater Treatment Project
BMP Effectiveness Evaluation Procedure for
Curb and Grate Inlet Baskets

Sampling Locations: Curb and Grate Inlet Baskets
Frequency of Monitoring: seven to ten storm events
Storm Events: Discrete rainfall events of generally greater than 0.2 inches and less than 1.5 inches. Daily rainfall (to nearest 0.01 inch) measured at the sampling location with verification from the local weather station. Rainfall data should be provided for at least the week proceeding monitoring and day(s) of monitoring.

Flow Measurements: Measurements will be made of stormwater water quality from inflow at the curb and effluent from the basket via a constructed reservoir beneath the basket to hold sufficient effluent for sampling purposes.

Parameters to be Monitored:

| Parameter | Detection Limit | Method |
|---|---|---|
| Total Cadmium | 1 ug/l | Composite* |
| Total Chromium | 5 ug/l | Composite* |
| Total Copper | 5 ug/l | Composite* |
| Total Zinc | 10 ug/l | Composite* |
| NO2+NO3 | 0.1mg/l | Composite* |
| TNK | 0.3 mg/l | Composite* |
| Total Ammonia or Total N | 0.05 mg/l | Composite* |
| Total Phosphorus | 0.05 mg/l | Composite* |
| Ortho Phosphate | 0.05 mg/l | Composite* |
| TSS | 1 mg/l | Composite* |
| Oil/Grease | 1 mg/l | Composite* |
| Fecal coliform | N/A | Grab if Possible** |

*Flow weighted composite samples will be taken over the storm hydrograph. Typically the samples will be composited over the inflow hydrograph at the inflow and for up to a 36 hour period at the outflow station. Rainfall that does not result in at least a six-hour discharge from the stormwater BMP shall not be considered a completed monitoring event. Each composite will include at least six evenly distributed sub-samples.

**Grab samples to be collected within the drainage area time of concentration at influent and effluent stations described above.

Material collected in the baskets will be sorted, composited and prepared according to FDEP SOP 001/01 FS 3000, FS 4000, FS 5000. It is possible that all three types of solids will be found in the baskets. Analyses will be done in accordance with the appropriate Standard Methods. The intent of this study is to determine on a mass loading basis, the amount of nutrients, metals and important parameters kept from entering the lake.