

**VOLUSIA COUNTY STORMWATER UTILITY
PROJECTS & PROGRAMS
(UNINCORPORATED)**

1. Ongoing Swale Projects

Water quality and flood reduction benefits can be easily realized in certain areas that have sufficient right of way and relatively well-drained soils. The use of swales is an efficient and cost effective stormwater best management practice. Many older subdivisions have little or no stormwater treatment systems. This situation can be partially addressed by swales, which provide pollutant removal and collection and storage of roadway runoff. In addition to water quality and flood reduction benefits, the reduction of standing water on roadways helps improve traffic safety. Projects include John Anderson Dr., Tarpon Av., Dolphin Av., Margaret Rd. (North Peninsula area), Alcazar St, Alabama Dr., Carolina St. (Holly Hill area), Massachusetts Ave, Cumberland Rd., Cardinal Ln., Robin Ct., (DeLand area), Juno Trail, Alice Dr (Astor area). Ongoing program. Annual cost: \$25,000.

2. Old Tomoka Rd (West of Tomoka River)

Project involves paving of the roadway to reduce sediment discharge into the river, Outstanding Florida Water (OFW). Possible water quality BMP's to include a "hydro-dynamic separation devices" (CDS Unit). Due to the narrow roadway (prescriptive easement only), it will be necessary to secure drainage easement(s). Construction expected by June 2005. Estimated cost: \$140,000.

3. Raleigh Dr, Atlanta Dr, Culverhouse Dr, Derbyshire Rd, and Carmen Av Flooding

An older subdivision (20+ yrs.), with undersized/deteriorated pipes. Needs major drainage infrastructure replacement. Phase I drainage analysis for this sub basin complete. Land acquisition for large stormwater facility complete. Project is supported by a \$50,000 SJRWMD grant. Construction by October 2005. Projected cost is \$410,000. Tomoka River Basin. Engineering by Quentin-Hampton Associates.

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4. Riviera Oaks Stormwater Park, Phase II

Construction of large stormwater pond (8 acres) to reduce flooding in Riviera Oaks Subdivision, and provide water quality treatment prior to discharge into the Nova Canal. Park amenities to include a “Dog use area”, walking trails, educational signage, and a littoral zone planting plan. The dog use area is funded by a partnership between the City of Holly Hill, Daytona Beach, Ormond Beach, and Volusia County Parks. Phase II construction completed January 2002. Modifications to system currently under review (phase IIA) to provide additional pond capacity by rerouting offsite flows around the Rio Way collection system. Phase II project cost: \$380,000. Nova Canal Basin

5. Fleming Av & Calle Grande St Box Culvert

Replacement of undersized and deteriorated structures serving major stormwater conveyance systems. Engineering and permitting in January 2005. Estimated total cost: \$125,000. Fleming is in Tomoka basin. Calle Grande is in Nova basin.

6. Avocado Dr

During the hurricane events of 2004, heavy rainfall caused excessive flows in a double cross drain on Avacado Dr. This resulted in a severe road washout and pipe failure. The project will involve analysis of pipe capacity and armoring of headwall inlet and outlet to preserve the roadway during flood events. Engineering design is underway. Construction will be scheduled for FY 2005/2006. Project is located in Spruce Creek basin.

7. Erosion Control Projects Countywide

Many of the projects identified are a combination of maintenance and water quality issues, specifically related to erosion of property and sedimentation of lakes, rivers, and streams. During Tropical Storm Gabrielle, there were a variety of locations that experienced severe erosion, resulting in property damage, environmental impacts, and increased costs for restoration. Several projects have been identified that will serve as pilot efforts to incorporate more up to date erosion control techniques, including hydro-seeding, erosion blankets, geo-web, and paving of dirt road approaches at stream crossings. Examples of completed projects include Boy Scout Camp Rd. (Lake Ashby) and Tomoka Farms Rd and Avocado Dr. (Spruce Creek). Projected annual erosion control project cost: \$50,000.

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8. Kenard Street / Airport Salvage Retention Pond

Kenard St, (located off Turnbull Bay Rd. near the NSB Airport), has a history of flooding, resulting in the road closing. During T.S. Gabrielle, the road was impassable to emergency vehicles, as well as residents. Two project phases to this situation have been developed: the first has been to raise the road and install a cross drain. The second phase will be to construct a retention pond on adjacent property called "Airport Savage". The owner of this business is affected by the flooding and therefore has been agreeable to providing an area of land for the construction of a retention pond. This will require a drainage easement, which he has verbally agreed to. The project will be further developed pending a survey and signing of the easement. Estimated cost: \$125,000. Turnbull Bay watershed.

9. Debbie Street

Located in unincorporated New Smyrna Beach area, near Pioneer Trail and Wallace Rd. Debbie St. has some low lying elevations which result in water being "trapped" and backing up into adjacent lots, resulting in flooding of private property and street closing. To date, one home has flooded. The project proposes to construct an inlet and pipe network to connect with a modified drainage outlet along Pioneer Trail, to Turnbull Bay. Water quality inlets (filtration devices) will be installed at selected inlets. Estimated cost is \$75,000.

10. Turnbull Creek, Tributary "E" – Golk Property

Regional project to provide water quality benefits to Turnbull Creek, reduce freshwater discharge to estuarine system, provide aquifer recharge, and attenuate stormflows. State Water Advisory Panel grant contract from DEP for \$157,000. Land purchase complete. 21.7 acres to be used for both flood relief, water quality and public use benefits such as hiking trails and picnic areas. Survey and geo-technical work complete. Design and permitting completed by January 2004. Total estimated cost of project: is \$555,000. Pond excavation to begin October 2005. Engineering by ECT Inc.

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11. Gabordy Canal / Edgewater Canal

A joint project between the City of Edgewater, New Smyrna Beach, and the County. This project will involve the identification of parcels for retention ponds, increased maintenance activities, replacement/enlargement of culvert capacity at Tatum Blvd., Park Ave., and Old Mission Rd. This project has coverage within the Turnbull Creek basin and the Indian River Lagoon basin. Project goals are to reduce localized flooding, and provide water quality treatment. Conceptual scope of work has begun. PEC Engineers have completed initial phase of data collection, which includes 1-ft. aerial mapping and surveying completed August 2003. Completion of the “Gabordy Basin Stormwater Management Plan” will recommend capital projects, with priorities, costs/benefits. Initial improvements underway include acquisition of 8-acre parcel adjacent to Edgewater Canal (for regional retention area) and design of box culvert at Tatum Blvd. Estimated cost of basin plan: \$150,000. Capital costs for infrastructure upgrade/replacement and stormwater pond expansion estimate: \$420,000.

12. South Waterfront Park

Stormwater plan design by ECT Engineers. To provide positive overflow from closed drainage in cul-de-sacs, which result in street and yard flooding. Streets include: Charles St, Lewis St., Douglas St, and Coleman St (complete 9/03). Will need easements from selected property owners. Survey work is complete. Water quality component to include additional swales and water quality inlet boxes (sediment traps/filtration media). Permitting has been completed. Construction has been completed on Coleman St. Start date on remaining streets uncertain pending procurement of necessary easements from property owners. Estimated cost is \$50,000. Indian River Lagoon.

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13. McGarity Basin Outfall Improvements

During the summer of 2002, the unincorporated/Deltona area received an unusually large amount of rainfall (60 inches within 90 days). This situation resulted in flooding conditions, primarily due to lake systems rising and limited outfall capacity. The basin most affecting unincorporated county is the McGarity basin. The critical areas of concern begin at Lake Diane and proceeds through Big Lake, Lake Mitnik, Jenkins Pond, and the Barker Dr. outfall. All of these systems were causing adverse impacts to property, endangering homes, roads, and septic systems. The decision on outfall improvements will be based on engineering analysis regarding system capacity, costs/benefits, land acquisitions, and easement requirements. This will be a multi-year capital improvement program based on prioritization and funding. Engineering is completed. Cost of management plan: \$110,000. Estimated cost of capital improvements: \$580,000.

14. Spring Hill Projects

Thompson-Mathis Retention Pond Retro-fit

Expansion of existing pond for flood relief by purchase of adjacent land parcel. It is located in the Spring Hill area. This site will be utilized as a stormwater facility and a public use area, to consist of walking trails, picnic areas, and a small playground. Estimated Project Cost is \$120,000. DeLand Basin. Construction by Mosquito Control is complete.

Calvin Street Retention Pond Expansion

Calvin St is adjacent to an existing county retention pond and park facility. During the wet season the road floods and has to be closed. This flooding is due to the pond “backing up” into the street (the roadway being too low in relation to pond water levels). The road is usually closed for 3 to 5 months. On the north is an existing county park. The project proposes to permanently close Calvin St and expand the pond to include the abandoned roadway. The pond would be reshaped with flat side slopes, a perimeter walking trail, benches, and landscaping. It would be linked to the adjacent park by trails. The overall result would be a landscaped, esthetically pleasing “lake”, public recreational opportunities, and increased flood protection. Estimated cost is \$300,000. Planning stage.

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15. Highland Park Road/ Norris Dead River Restoration

Highland park Rd. is located in NW DeLand, adjacent to Lake Woodruff National Wildlife Refuge. The unpaved road conveys stormwater runoff from Audubon Ave. into a branch of the St. Johns River known as Norris Dead River. Uncontrolled runoff has eroded Highland Park Rd., resulting in severe down cutting of side ditches and rutting of the roadway. The accumulated sediment deposition into Norris Dead River has constricted its channel width by approximately 50%. The sediment bar has built up sufficient to support invasive vegetation. The roadway erosion is so severe that it is now closed to traffic. Because the terminus of Highland Park Rd. provides access to the river,, many vehicle ignore the road closure and park near the shoreline for fishing and small boat launching, thus increasing the shoreline damage.

A restoration effort to address this situation would include stabilization of the roadway, dredging of the sediment bar, establishment of desirable shoreline vegetation, and allowance for pedestrian access to the river for fishing, canoeing, picnicking, etc. Highland Park Rd would be permanently closed to traffic and be used as a pedestrian walkway. Estimated cost \$700,000.

16. Ponderosa Dr

Ponderosa Dr. is located east of state Rd 11, in unincorporated DeLand. During the hurricane events of 2004, there was severe street and home flooding. At least four homes flooded and many others were threatened with inundation. The situation is aggravated by sag in the roadway where water is “trapped” due to inconsistent driveway grades and culvert elevations. The project proposes to reconstruct driveways and install ex-filtration trenches for water quality. Discharge is easterly into a wetland system. The project is located in the Little Haw Creek basin.

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17. DeLeon Springs Roadway and Drainage Improvements

The DeLeon Springs road and drainage improvement project is a joint effort between Community Services, Road & Bridge, and the Stormwater Utility. The project is located in a CDBG 9community development block grant) zone. This designation qualifies the project for federal financial assistance, which is administered by Community Services. In this case, the construction phase of the project will be covered by the grant. The project proposes to pave existing dirt roads and construct drainage improvements, such as swales and a retention area.

The engineering portion of the project is funded by the stormwater utility. All construction will be done by road and bridge. The paving improvements will provide a better quality of roadway infrastructure and eliminate severe erosion and flooding caused by the steeply sloped and unstabilized roads. The retention area will be constructed on county owned land, at the intersection of Park Ave. and Cordova Ave. The road paving will include Quebec Ave., Cordova Ave., Alcazar Ave., and portions of Park Ave. Construction is anticipated by August 2005. The project is located in the St. Johns River basin.

18. Lower Lake Louise Water Control Structure

Lower Lake Louise has a designated “minimum flow and level” (MFL) established by the St. John River Water Management District. In order to insure the levels are maintained, a water control structure is proposed to be installed within the road right-of-way at McBride Rd. This project is a partnership/cost-share between the District and County. The District will provide the engineering and permitting and the County will construct the structure and assume the operation and maintenance role. Construction will be scheduled upon designation by SJRWMD of “minimum flow and level” of Lower Lake Louise. Estimated cost \$40,000. Lake George Basin.

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19. Middle Basin: Deep Creek Master Plan

The Middle Basin (SJRWMD) is a SWIM waterbody. As such, it is a priority for water quality improvements, planning, and funding assistance. The Volusia County coverage within the Middle Basin is Deep Creek. The Deep Creek basin, which includes Lake Ashby, is currently under increased development pressure, as it is bordered on the west by Deltona, and has S.R. 415 as a candidate for widening and connection with Seminole County Expressway. Water resource issues need to be addressed early on, so planning can be more long range and proactive, thus reducing or eliminating costly retrofit programs. Estimated cost of master plan: \$285,000. The first sub-basin work in the Deep Creek system is the current project "Daytona Park Estates". Estimated capital costs: \$400,000. Funding is scheduled for FY 2005/2006.

20. Daytona Park Estates Stormwater Master Plan

Project is a master plan for a large, platted subdivision located at the northerly headwaters of the Deep Creek basin. The planning area consists of approximately 2,000 acres, which includes Cypress Lake, Daytona Lake, Lake Byron, Lake Ruby, and Lake Charles. The initial phase of the study will be 1-ft. aerial contour mapping. Analysis will consist of defining existing hydrologic conditions and proposed improvements, including stormwater projects such as construction of retention areas, improved conveyance systems, and a programmed maintenance plan. Planning tools will consist of flood "level of service" analysis, such as 10-yr., 25-yr., and 100-yr. flood elevations. This project is supported by a \$30,000 grant from the St. Johns River Water Management District. Phase II will be a series of capital projects to identify known areas of flooding. Design is underway. Study phase completed December 2004. Cost: \$130,000. Estimated capital costs: \$270,000.

21. Northwest / Northeast Canal Cleaning

Major annual maintenance of important flood conveyances, which discharge to the Halifax River. Maintenance by Road & Bridge and Mosquito Control Divisions. Nova Canal Basin.

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22. Samsula Canal Cleaning

Major canal cleaning (6 miles, north of S.R. 44) undertaken to remove sediment and debris. This canal and ditch system has not been cleaned/maintained for at least 20 years. Current maintenance efforts include a canal network south of S.R. 44. Cost \$10,000. Spruce Creek Basin.

GIS Database Development

Consultant (CDM Engineers) currently under assignment to develop and support GIS based stormwater application, to be used for inventory and maintenance purposes. Basic project is complete, with allowances for needs assessment, to include tools such as mobile GIS applications for entering field data. This database will play a key role in developing a systematic, countywide approach to mapping and identifying major stormwater features; and will be indispensable for the upcoming NPDES permit process and the TMDL monitoring program, both administered by DEP. Support and maintenance of this program will be through the a GIS specialist dedicated to Public Works projects. Acquisition of sub-meter, portable GPS unit will assist staff in fieldwork to continue mapping efforts throughout the county. Estimated cost for initial implementation: \$125,000. Annual update/maintenance cost estimate: \$30,000.

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Programs

NPDES Phase II Program

Volusia County and its local governments are included in the NPDES (National Pollutant Discharge Elimination System) Phase II Permit Program. This is a EPA (federal program) administered by DEP that will require certain activities which will satisfy the six minimum measures to the “maximum extent practicable”; including having a stormwater management program, regulation of construction activities, identifying major outfalls into state waters, public involvement, and having a maintenance program. A series of workplans, produced by consultant CDM, has been assembled and distributed to all affected local governments (a total of 13 entities). Each workplan is accompanied by a meeting of the working group to discuss and define the tasks. Cost sharing has been addressed through interlocal agreements. Submittal to DEP: completed in June 2003. Cost for preparation: \$60,000. Annual reports due to show progress in measurable goals. Annual cost estimate: \$30,000.

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Stormwater Maintenance Program

An ongoing effort to provide a higher level of service and function of existing primary and secondary drainage features. Goals include more systematic identification and scheduling of needed maintenance activities in partnership with both Road and Bridge, and Mosquito Control. Additional equipment, such as street sweepers and a storm sewer video van will add value to the more proactive element in the program. The maintenance program thus far has included cleaning of canals, lining of deteriorated outfall pipes, stabilization of ditch systems, and vacuuming out sediment from pipe systems. A key component to a more active maintenance effort will be the integration of a GIS based database and inventory of maintenance priorities and scheduling.

Stormwater Master Planning Program

The county has five remaining basin plans to complete (in addition to above "Deep Creek"). Basin plans are a valuable planning and management tool. Basin plans provide multiple benefits, including flood plain and flood level analysis, water quality characterization, identification of infrastructure deficiencies, and recommended capital projects to address flooding and water quality issues. The remaining basins include Little Haw Creek, Middle Haw Creek, Lake George, Deer Creek, and St. Johns River. Estimated cost for completion of remaining plans: \$1.7 million. Estimated capital costs for plan implementation: \$5.0 million.

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TMDL Program

Water quality program to comply with the State Impaired Waters Rule and Federal Clean Water Act. A TMDL is the maximum amount of a given pollutant that a particular water body can assimilate without exceeding surface water standards. The program will require DEP to assess existing surface water quality data and to develop TMDL's for impaired waters. The TMDL program will be wrapped into the DEP's five-phase cycle, which rotates through Florida's basins every 5 years. The 5-year cycle provides the framework for focusing resources on specific basins, identifying impaired waters, conducting monitoring, and developing TMDL's where needed. Watershed management plans will be used and supplemented by additional stormwater modeling to define county projects that have intended results toward reducing pollutant loads. The cost of implementing a TMDL program is significant and will affect both public and private interests. A water resources consultant is providing the county with assistance in the TMDL program. This will involve coordination with monitoring; data analysis, public education, stakeholder meetings, watershed plan development, and TMDL load allocation support.

The group 2 Middle Basin (St. Johns River and tributaries) TMDL list is now verified. The next step is the development of a Basin Management Action Plan (BMAP). This will entail identifying stakeholders and allocating pollutant loads accordingly. This process will require additional funding resources to address potential capital projects. For planning purposes, the estimated capital cost for group 2 is \$400,000.

The group 5 Northern Coastal Basin (east coast) is now on a TMDL planning list of impaired waters (December 2004). This basin contains more water bodies and thus more potential impairment issues and costs than the Middle Basin. The estimated capital cost for projects associated with group 5 is \$750,000.

Additional resources (\$35,000) have been allocated to the Environmental Health Lab to support ongoing and additional targeted water quality monitoring efforts.

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Completed Projects

Airport Road Detention Area

This project involves the construction of a retention area located on Airport Rd., between Tymber Creek Rd. and Interstate 95 (Ormond area). It will be used to capture roadway runoff and provide water quality treatment and flood reduction benefits prior to discharge to the Tomoka River system. The design will include a vegetative planting plan. The project is supported by a \$52,000 grant from the St. Johns River Water Management District. Engineering design by Dyer, Riddle, Mills & Precourt. Design and permitting is complete. Construction in December 2004. Estimated cost: \$130,000.

B-19 Culvert Removal

Reduction of flood levels and stabilization of canal sections. Have secured an easement use agreement with FPL and the property owner. Design and permitting complete by August 2001. Construction completed February 2002. Cost is \$15,000 (design, permitting, and removal.) Discharges to Spruce Creek.

C-36 Canal Box Culvert

C-36 Canal is a primary stormwater conveyance, providing drainage for much of the Samsula area. A road crossing, just north of Pioneer Trail, has been the scene of repeated structure failures, due to undersized drainage structures and improper stabilization. This has resulted in erosion, downstream sedimentation, and flooding. The project includes the placement of a double 6' x 6' pre cast box culvert with concrete headwall. Construction by Road and Bridge in March 2003. Cost: \$140,000.

Colonial Lake Aeration/8th Street Stormceptor

Aeration installed to control algae growth. Installation of "Stormceptor" device for oil/sediment collection is complete. Both systems to benefit Colonial Lake, which discharges to the Nova Canal. A partnership project with the City of Daytona Beach and SJRWMD. Water Management Grant Fund: \$30,000. Cost for aeration: \$3,500. Cost for Stormceptor: \$40,000. Project completed in June 2001. Nova Canal Basin.

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Daytona High Ridge Estates Phase I

Retro-fit for flood relief and water quality. Land acquisition completed in January 2001. Conceptual plans complete. Final engineering plans completed May 2001. This is a retrofit of an older, pre-regulatory subdivision, characterized by undersized and deteriorated drainage infrastructure. The project will replace pipes, install new catch basins, pipes, construct swales, and a new retention area. Construction by Road and Bridge. This is a cost share with the St. Johns River Water Management District (\$20,000). Project cost is \$425,000. Tomoka River Basin. Project Complete March 2004.

Korona Canal Phase I and II

Expansion of existing canal to capture sediment prior to discharge into Bulow Creek. Project completed. Cost: \$425,000. Tomoka River Basin. Phase II will involve the removal of sediment at mouth of canal into Bulow Creek, velocity control weirs, and restoration plantings in areas disturbed by dredging. Funding is a partnership between the Port Authority, Mosquito Control, and Stormwater Utility. Estimated cost: \$100,000. Engineering/Permitting began in October 2003. Project to be complete by March 2005.

North Peninsula Stormwater Improvements - Phase I

Stormwater infrastructure improvements to address property and street flooding. The existing systems include open bottom inlets, undersized, closed pipe networks, and no dedicated overflow to the Halifax River. Improvements to include ex-filtration systems, larger size inlets/pipes, and expanded use of roadside swales. Water quality benefits provided by ex-filtration systems will provide significant water quality improvements for positive overflow to the Halifax River. Completed street include River Dr. Phase II will address Pinta St., Lynhurst St., and Aqua Vista Dr. Total Cost estimate: \$400,000.

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Oak Lane and Pine Tree Drive Infrastructure Improvements

Construction of a box culvert on Oak Lane to increase flow capacity and stabilize a channel between two homes/properties. This will upgrade the system to protect against flooding of roadway and possible private property damage. Oak Lane box culvert complete in July 2002. Pine Tree Drive project will replace deteriorated pipe and stabilize flow conveyance from Oak Lane system into the Ormond Lakes system along Pine tree Dr. Design by Quentin-Hampton Engineers. Construction completed December 2004. Estimated total cost is \$230,000.

Reed Canal Spoil Disposal/Sedimentation Basin

Regional project to provide a sediment trapping function and to allow site storage of dredged material from the Nova Canal. This site will provide a water quality function through stormwater treatment and sediment capture prior to discharge from Reed Canal into the Halifax River. This project is a partnership between the City of South Daytona, Volusia County, and the St. Johns River Water Management District. The County has contributed \$50,000 towards the project.

Grant funding is being discussed with the Florida Inland Navigation District (FIND). Project in design phase by ECT Engineers. Construction of Phase 1 complete. Nova Canal Basin.

Riverbreeze Park

Approx. 2 acres available for stormwater system at Riverbreeze county park, near Edgewater. To include water quality sampling and a public education component. The stormwater design is an innovative and experimental approach, which involves the use of wetland plants for nutrient and suspended solids removal. The project will utilize two stormwater ponds, one will be vegetated with wetland plants and the other will be sodded. The ponds will intercept stormwater from Ariel Canal and split flows between the 2 ponds. This approach will provide an opportunity to compare the pollutant removal capabilities of the ponds, as well as provide water quality benefits to the Indian River Lagoon. The project is supported in part by an EPA 319h grant (\$197,000). Indian River Lagoon funding assistance for educational amenities to be included. Construction completed in November 2004. Cost: \$360,000.

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Silver Sands Project

Multi-faceted project to include storm drain labeling, drainage infrastructure upgrades, swales, and installation of a sediment and oil/grease separator (Stormceptor). Stormceptor installation completed in May, 2002. Project is supported by a \$30,000 grant from the SJRWD-Indian River Lagoon funding program.

Tatum Blvd Box Culvert

Located in the Gabordy basin, this is a replacement of an undersized culvert, located on Tatum Blvd. This structure conveys stormwater from Edgewater Canal Rd to the Gabordy Canal. Then box culvert performed well during the hurricane events of 2004. Cost of the project: \$140,000.

Thayer Canal Weir

Thayer Canal is located in Bennett Swamp, a sub unit of Tiger Bay drainage basin. The purpose of the project is to re-hydrate wetlands and promote aquifer recharge. This will be accomplished by the construction of a water control structure in a drainage canal (Thayer). This project is a cost sharing between the St. Johns River Water Management District and Stormwater Utility. Construction completed in January 2004. After construction, the District will implement a 5-year monitoring program to determine the effectiveness of initial augmentation efforts. Cost is \$56,000. Tomoka River Watershed.

Tomoka Farms Rd. @ Old Daytona Rd Culvert Replacement

Undersized culvert causes flooding of property and requires frequent cleaning by Road and Bridge. Project under design by Quentin-Hampton Associates. Construction complete in February 2004. Cost: \$65,000. Spruce Creek basin.

West Minnesota Av Retention Pond

Flood reduction project complete for phase I. Includes pond expansion, new fence, and landscaping. Additional improvements include connection into Stetson Baptist Church pond and pond expansion. DeLand Basin. Project Complete.

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Wilbur By-The -Sea

Project to address flood prone areas at certain roadway locations. Will utilize 3 parcels for on site stormwater retention with landscaping. To include pipe and inlet upgrades, and ex-filtration system at selected intersections. Project will result in increased flood protection and water quality benefits to the Halifax River. Project cost is \$410,000. Halifax River Basin. Engineering and Construction inspection by ECT Inc. Project completed March 2003.