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NORTHWEST FLORIDA WATER MANAGEMENT DISTRICT

EASTPOINT REGIONAL STORMWATER MANAGEMENT SYSTEMS

FRANKLIN COUNTY, FLORIDA

FINAL REPORT – TFR 08-01

Florida Department of Environmental Protection Contract Number G0160

EASTPOINT REGIONAL STORMWATER MANAGEMENT SYSTEMS – FRANKLIN COUNTY

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EASTPOINT REGIONAL STORMWATER MANAGEMENT SYSTEMS

Florida Department of Environmental Protection Project Number G0160

Project 9 FY 2004: Eastpoint Regional Stormwater Management Systems

Funding: $251,000 FY2004 319 (h) Grant
$310,867 NWFWMD Matching Funds
Lead Organization: Northwest Florida Water Management District

Cooperating Organizations: Franklin County, Eastpoint Water and Sewer District, Florida Department of Transportation and Apalachicola National Estuarine Research Reserve

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Project Location: The project site is within the unincorporated community of Eastpoint, Franklin County, and the Apalachicola Bay watershed. The receiving water body is St. George Sound which is part of the Apalachicola Bay system.

Watershed:
Apalachicola River and Bay

Approximate geographic midpoint:
29º44'30" N. Latitude,
084º52'00" W. Longitude

Hydrologic unit code (HUC):
03130014

Introduction

The Apalachicola River and Bay system is renowned for its environmental quality and widely recognized as a water body of state and national significance. The bay has been designated an Outstanding Florida Water, a Florida Aquatic Preserve and a National Estuarine Research Reserve. Research reserves represent a network of 27 regions in the United States that are protected for long-term research, water quality monitoring and coastal stewardship. The Apalachicola River and Bay system is also the highest priority Surface Water Improvement and Management (SWIM) water body of the Northwest Florida Water Management District.

A multi-agency effort is underway to protect and restore the resources associated with the river and bay system and to sustain the noteworthy economic and quality of life benefits that system provides. State and federal agencies have made an extensive investment in acquiring and protecting lands within the watershed, local governments have implemented comprehensive plans and the State of Florida is engaged in intensive interstate negotiations to ensure that adequate flows from the 19,800 square mile Apalachicola-Chattahoochee-Flint rivers basin are sustained in the future.

As part of an overall water quality management strategy for Apalachicola Bay, the Northwest Florida Water Management District examined urban stormwater runoff entering the bay and identified potential problem areas (Marchman and Wooten 2000). Stormwater quality and quantity data were collected and analyzed for the cities of Apalachicola and Carrabelle and the unincorporated communities of Eastpoint and Lanark Village. Samples were analyzed for bacteria, suspended solids, nutrients, heavy metals and other water quality parameters of concern. Elevated levels of nutrients (nitrogen and phosphorus compounds), coliform bacteria and suspended solids were detected in stormwater runoff discharging to the bay.

Project Description: Stormwater is generated by rain events. It runs off roofs, roads, parking lots and other surfaces and flows into gutters, ditches and channels and eventually flows into lakes, rivers and bays. This runoff water can carry many types of pollutants like oil and grease, fertilizers, pesticides and sediment that have negative impacts on the biological communities

(oysters, shrimp, fish, sea grass, etc.) in the bay. Stormwater retrofit projects are designed to correct existing problems, reduce pollutants in stormwater runoff and promote conditions for improved aquatic habitat in bays, rivers and lakes.

The need for stormwater retrofit facilities in the Eastpoint area has been documented, by the Northwest Florida Water Management District (District) and others. However, as is often the case for retrofit projects, it is difficult to fund this type of capital improvement. Recent acts of the Florida Legislature, such as the Florida Forever program and the Surface Water Management and Improvement Act (SWIM) and the availability of EPA 319 funds have made this Eastpoint retrofit project possible.

This stormwater retrofit project included the installation of eight baffle boxes on stormwater outfalls that discharge directly into St. George Sound (see Figure 1). These boxes are designed to remove sediment, floating trash and other pollutants from the stormwater runoff before it flows into the bay. The installation of these treatment boxes were funded by a $251,000 EPA 319 grant and $310,867 in SWIM funding from the District. This project will provide treatment for stormwater conveyances that discharge into St. George Sound from the Avenue A drainage basin.

The Avenue A watershed is bounded on the north by Avenue A, by the St. George Sound to the south, by Old Ferry Road on the west and by 10th Street on the east (Figure 1). Drainage in this basin is through ditches and swales running along the north side of the highway, with several outfalls to St. George Sound. There is limited land along the south edge of Highway 98 in Eastpoint and no existing stormwater treatment. Stormwater flows directly off the road into the Sound. This basin is challenging to retrofit, because there is little land available to construct treatment systems. Stormwater treatment systems in this drainage basin are needed to address impacts from highway runoff, gas stations and residential and commercial development. Due to the existing constraints, the best treatment option was determined to be baffle box treatment vaults. While relatively maintenance intensive, these vaults provide a level of treatment where space is limited.

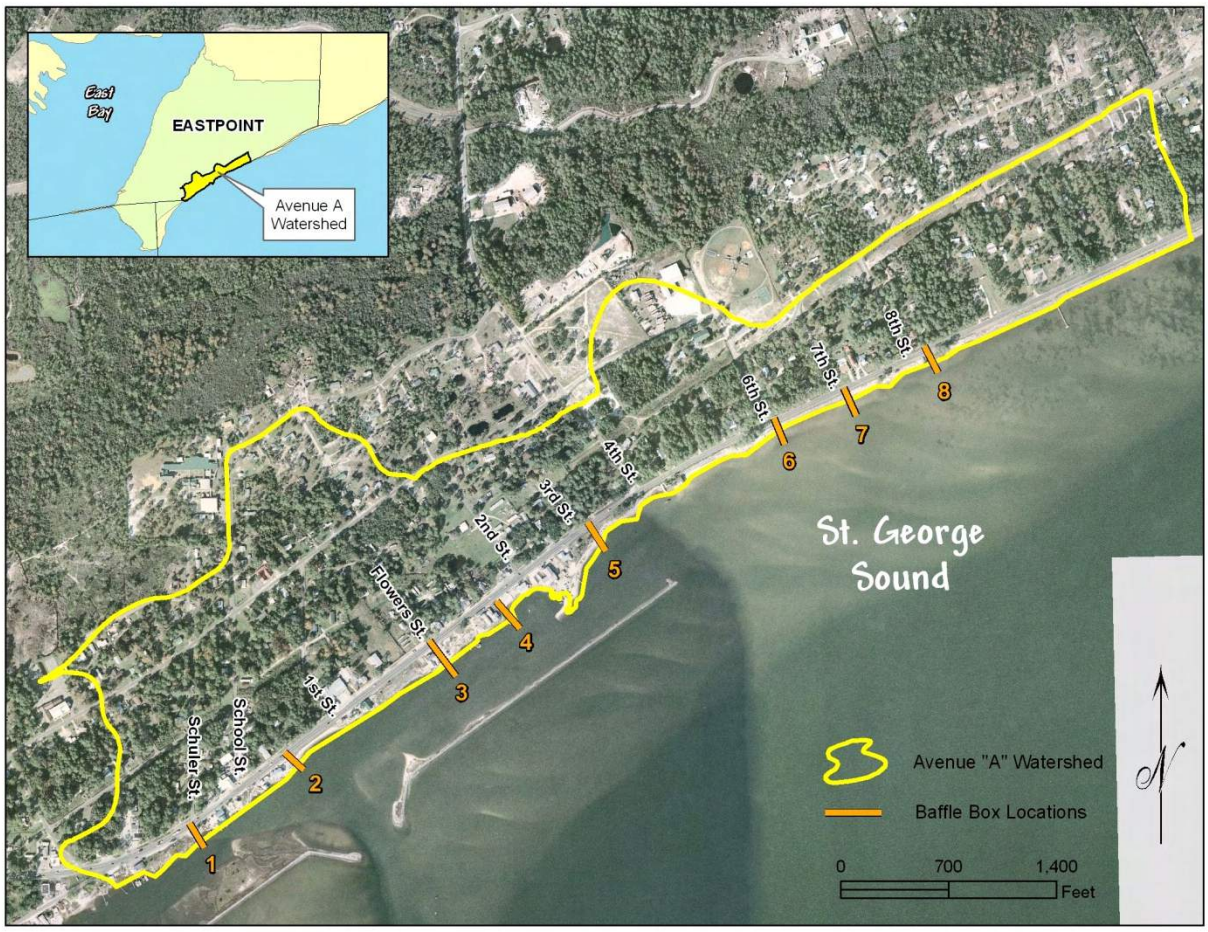

Figure 1: Avenue A Watershed

While new development is required to meet minimum state regulations for stormwater treatment, a substantial area of existing development continues to discharge untreated stormwater runoff into the estuary. Stormwater retrofit projects of this type are needed to reduce pollutants in stormwater runoff from existing development. As development intensifies in the area, the threat increases that cumulative nonpoint source pollution will cause ecological deterioration similar to what has impacted virtually every other estuarine system of comparable size in the State of Florida.

Baffle Box Description: The baffle boxes on this project are concrete structures containing a series of sediment settling chambers separated by baffles (Figure 2). The primary function of baffle boxes is to remove sediment, suspended particles and associated pollutants from storm

water. At the top of the baffle boxes are trash screens that capture floatable materials, such as leaves and small branches that contribute organic material and nutrients to the bay. Typically the screen systems are built with aluminum components which work well in fresh water applications. The screen systems for this project were constructed with stainless steel materials to minimize the corrosive effects of salt water from the bay. The screen systems are hinged to give easy access to the lower chambers, and were custom fabricated for each box to provide the best performance at each location. The vegetation and litter are captured in the screen system and held above the static water level in the boxes allowing it to dry out between storm events. With the organic pollutant load separated from the water, the system does not go septic. Hydrocarbons (oil, gasoline, etc.) that collect in front of the skimmer are absorbed by the hydrocarbon absorbing storm boom. The boxes were installed in-line on the storm drain pipes on the north and south side of Highway US 98 to treat the stormwater runoff before it empties into the bay. Figure 2 shows a typical baffle box design.

The use of baffle boxes for pollutant removal is based on the concept of slowing the flow velocity through the box, thereby allowing solids and associated pollutants to settle to the bottom of the box. Stormwater enters the box and begins to fill the first chamber. As water

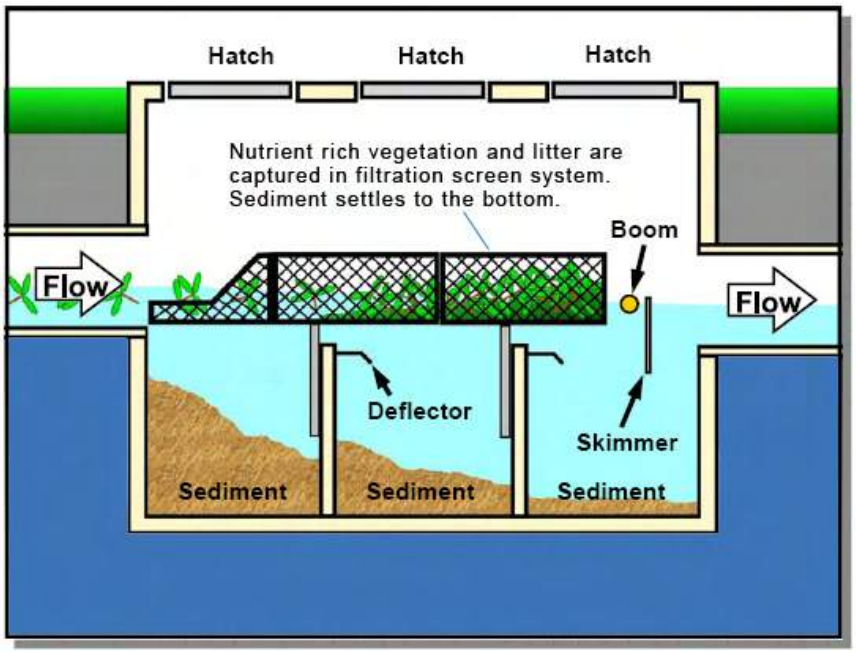

Figure 2: Schematic of a Baffle Box

encounters the baffles, flow velocity decreases, allowing particles with a settling velocity greater than the horizontal flow velocity to settle to the bottom of the box. In addition to decreasing flow velocities, the baffles impede particle movement. As suspended sediment particles strike the baffles they begin to settle. Larger particles usually settle out first and accumulate in the first chambers while smaller particles usually settle out in subsequent chambers. The boxes used on this project are designed with deflectors that reduce turbulence and re-suspension of accumulated sediment in the boxes.

Baffle boxes are an effective best management practice (BMP) to remove sediments from stormwater. A smaller percentage of other pollutants in the stormwater, such as heavy metals (e.g. lead, zinc, copper) and nutrients (nitrogen and phosphorus), attach to sediment particles and settle in the baffle boxes. Baffle boxes have been shown to remove up to 50,000 pounds of sediment per month, depending on the sediment load feeding into the baffle box. However, pollutant removal efficiencies (the percentage of pollutants removed by the boxes) depend on factors such as land use, drainage basin area, soil types, storm water velocities through the box and the frequency and thoroughness of box cleaning. Limited data exist on the pollutant removal efficiencies of baffle boxes. Only one laboratory and one field evaluation are complete, while several more field tests are scheduled for the future.

Sediment accumulation in baffle boxes varies greatly depending on the season and the amount and intensity of rainfall events. For example, Brevard County, Florida, monitored baffle boxes in the communities of Indialantic and Micco between 1992 and 1994 (Royal and Vanderbleek, 1994). In a one-month period between August 21 and September 22, 1992, the Indiatlantic baffle box removed 4,500 pounds of sediment. The monitoring was conducted during the summer season, which is characterized by high intensity, short duration storms. However, in contrast, over a four-month period from September 1992 through January 1993 (during the winter season of lower intensity, longer duration storms), the box removed only 4,000 pounds of sediment.

Description of the Contributing Drainage Basin Areas: Land use in the Avenue A watershed is composed primarily of medium density residential (84.7%). The remaining minor land uses include open space (5.1%), roadways (3.6%), commercial (2.8%), industrial (1.9%) and forest (1.9%). Land uses within the watershed were obtained from the 1995 NWFWMD land use classification provided by the Florida Department of Environmental Protection (FDEP). The land uses were updated using aerial photography in the area, as shown in Figure 3.

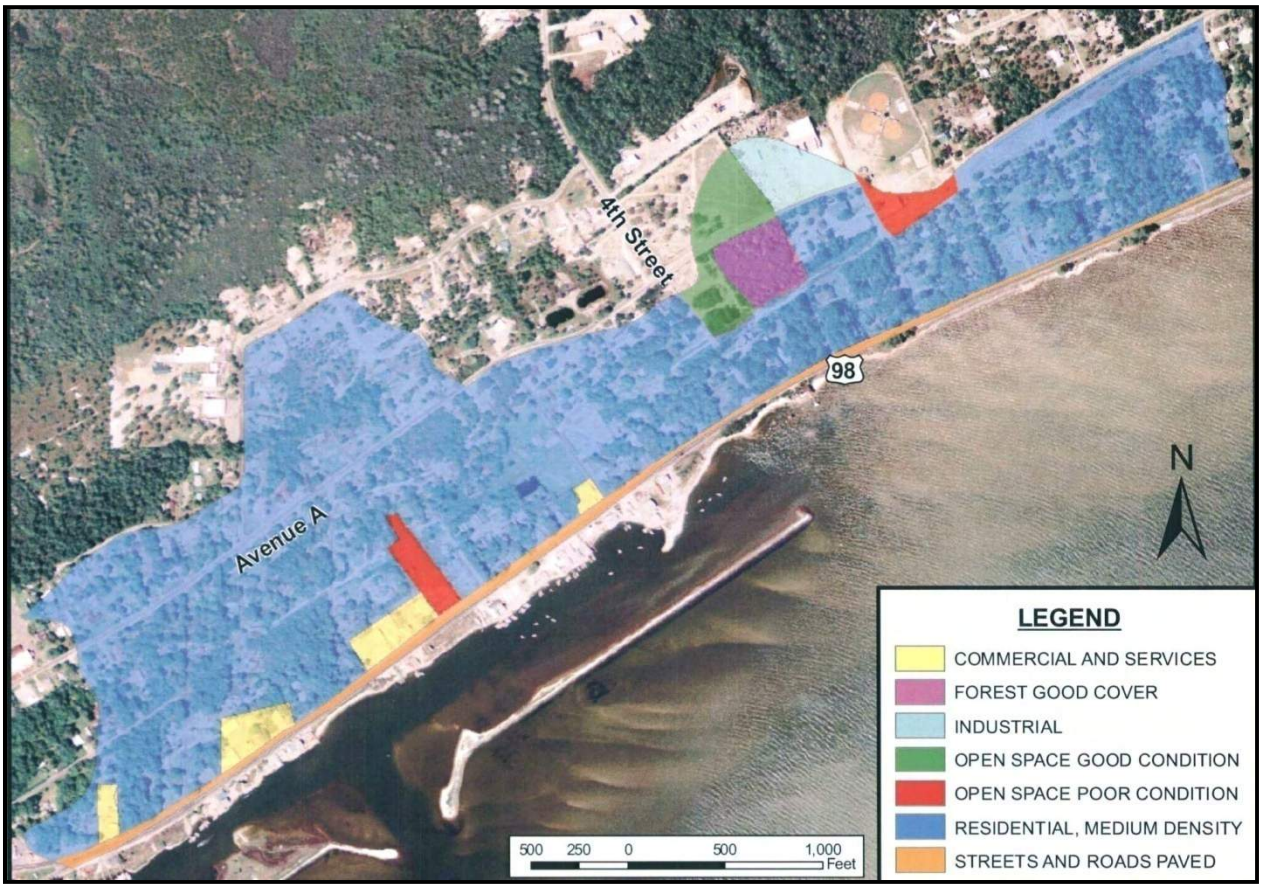

Figure 3: Land Use in the Avenue A Watershed

For stormwater modeling purposes, the Eastpoint area was divided into eight drainage basins, as shown in Figure 4. Basin boundaries were based on maps taken from a previous stormwater study of the area. The focus of this project was the Avenue A drainage basin that parallels US 98 and drains directly into St. George Sound with little or no treatment of the stormwater runoff.

The Avenue A drainage basin was further sub-divided into eight separate sub-basins that delineate the drainage areas contributing to the major outfall structures. These sub-basin areas were delineated using aerial photography, one-foot contours and USGS quad maps (Figure 5).

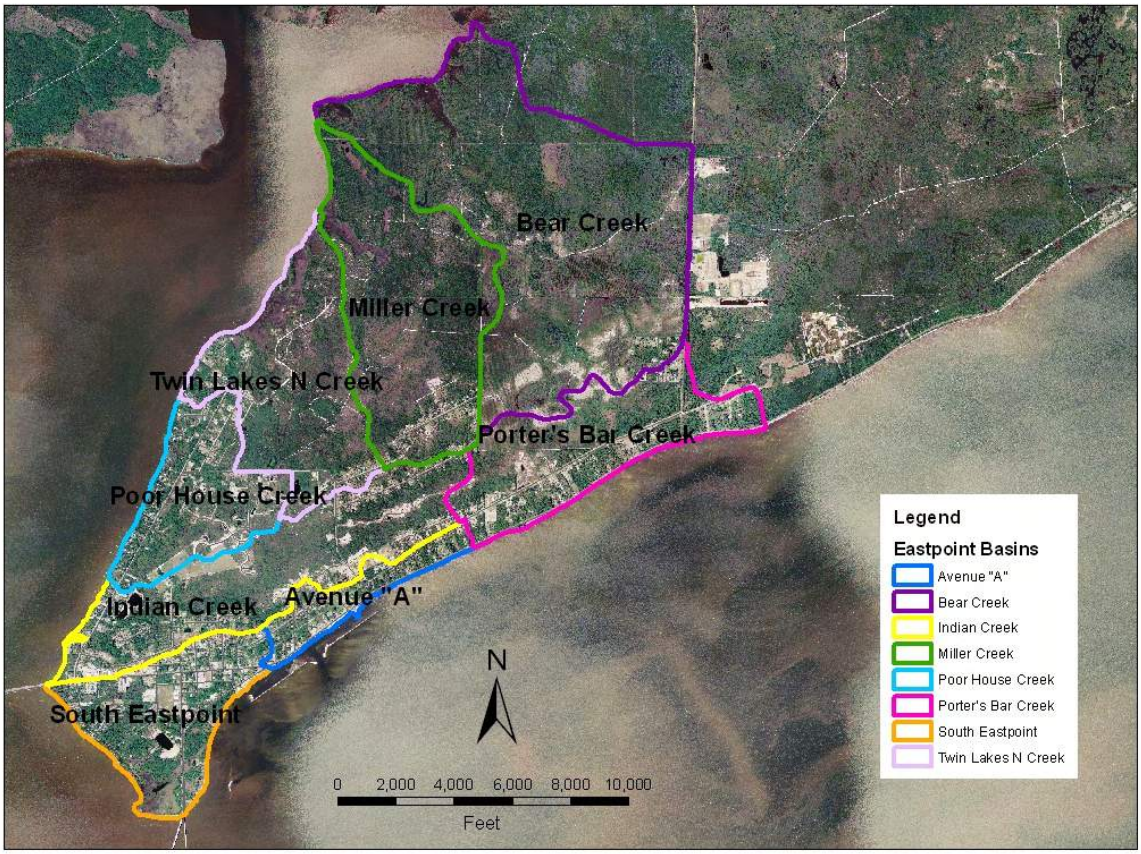

Figure 4: Eastpoint Drainage Basins

Each of the eight sub-basins in the Avenue A drainage basin have outfall structures consisting of one or more drainage pipes that discharge into the sound. These drainage pipes all cross under US 98, which has highway and drainage easements maintained by the Florida Department of Transportation (FDOT). These easements were used, with approval from FDOT, as the area for installation of the baffle boxes. This eliminated the need to acquire property for these stormwater retrofits, thereby greatly reducing the overall cost of the project.

The primary outfall pipes that carry stormwater from each sub-basin into the bay were selected

as sites for installation of the treatment boxes. The contributing drainage area that discharges through the eight baffle boxes installed on the project is 166 acres.

Basin 1 is located at the western end of the Avenue A drainage and includes an area of about 32

Figure 5: Avenue A Sub-basins and Outfall Structures

acres. St. George Sound is the southern basin boundary and Tip Tucker Road is the northern boundary. The east boundary is School Road and the western boundary is a divide east of Old Ferry Dock Road. Stormwater runoff from Basin 1 flows south under US 98 through Structure 1, a 30-inch reinforced concrete pipe (RCP), and discharges directly in St. George Sound. The primary land uses within Basin 1 (Table 1) includes medium-density residential (92.2%), commercial (4.4%) and roadways (3.4%).

Basin 2 drains an area approximately 16 acres in size. The basin is bounded to the north by Avenue A, St George Sound to the south, 1st Street to the east and School Road to the west.

Stormwater runoff from Basin 2 flows south under US 98 through Structure 2, a 36-inch RCP, and discharges directly into St. George Sound. The primary land uses within Basin 2 include medium-residential (79.8%), commercial (13.9%) and roadways (6.3%).

Basin 3 drains an area of about 40 acres. The basin extends from St. George Sound on the south to Tip Tucker Road about 2000 feet to the north. The east boundary runs along a basin divide west of Second Street and the west boundary is 1st Street. Stormwater runoff from Basin 3 flows south under US 98 through Structure 3, a 42-inch RCP, and discharges directly into St. George Sound. The primary land use in Basin 3 is medium-density residential (91.7%), the remaining land uses include open space (4.3%), roadways (2.8%) and commercial (1.2%).

Basin 4 is one of the smallest basins in the Avenue A drainage and covers about 5 acres. It is bounded by the St. George Sound to the south, Avenue A to the north, 2nd Street to the east and basin divide with Basin 3 to the west. Stormwater runoff from Basin 4 flows south under US 98 through Structure 4, a 30-inch RCP, and discharges directly into St. George Sound. The primary land uses in the basin include medium-density residential (83.6%), commercial (8.2%) and roadways (8.2%).

Basin 5 is the largest basin in Avenue A drainage area and includes an area of approximately 42 acres. The southern boundary of the basin is St. George Sound and it extends north to Avenue A on the western half of the basin and several hundred feet north of Avenue A on the eastern half of the basin. The eastern boundary of the basin is 6th Street and the western border is 2nd Street. Stormwater runoff from Basin 5 flows south under US 98 through Structure 5, a 30-inch RCP, and discharges directly into St. George Sound. The primary land uses within Basin 5 include medium-density residential (68.9%), open space (12.3%), industrial (7.7%), forest (7.5%) and roadways (3.6%).

Basin 6 is the smallest basin in the Avenue A drainage and is about 4.5 acres. The southern boundary of the basin is St. George Sound and the northern boundary extends slightly north of CC Land Road. The eastern border of the basin runs between 6th and 7th streets and the western boundary is 6th Street. Stormwater runoff from Basin 6 flows south under US 98

through Structure 6, a 30-inch RCP, and discharges directly into St. George Sound. The primary land uses within Basin 6 include medium-density residential (64.5%), open space (31.1%) and roadways (4.4%).

Basin 7 drains an area of approximately 6 acres that is bounded on the north by CC Land Road and St. George Sound to the south. The eastern boundary of the basin is a divide between 7th and 8th Streets and the western boundary is between 6th and 7th streets. Stormwater runoff from Basin 7 flows south under US 98 through Structure 7, a 30-inch RCP, and discharges into St. George Sound. The primary land uses within Basin 7 include medium-density residential (91.5%), open space (5.1%) and roadways (3.4%).

Basin 8 is located on the eastern end of the Avenue A drainage and includes an area of approximately 22 acres. Stormwater runoff from Basin 8 flows south under US 98 through Structure 8, a 30-inch RCP, and discharges into St. George Sound. The land use in the basin is primarily medium-density residential (96.8%) with roadways (3.2%) the next highest land use.

TABLE 1: Avenue A Watershed Land Use				Land Use (Acres)					
Basin	Drainage Area (acres)	Outfall Pipe	Baffle Box (L x W x H)	Med. Resident.	Comm.	Roadway	Open	Indust.	Forest
1	31.9	30 inch RCP	6'x12'x7'	29.4	1.4	1.1	--	--	--
2	15.8	36 inch RCP	8'x12'x8'	12.6	2.2	1	--	--	--
3	39.7	42 inch RCP	8'x12'x8'	36.4	0.5	1.1	1.7	--	--
4	4.9	30 inch RCP	6'x12'x7'	4.1	0.4	0.4	--	--	--
5	41.5	30 inch RCP	6'x12'x7'	28.6	--	1.5	5.1	3.2	3.1
6	4.5	30 inch RCP	6'x12'x7'	2.9	--	0.2	1.4	0.004	--
7	5.9	30 inch RCP	6'x12'x7'	5.4	--	0.2	0.3	--	--
8	21.8	30 inch RCP	6'x12'x7'	21.1	--	0.7	--	--	--
TOTAL	166			140.5	4.5	6.2	8.5	3.2	3.1

The soils found within the watershed include Dorovan, Leon, Mandarin, Resota, Rutlege and Scranton. Dorovan soils are very poorly drained, moderately permeable soils that formed from well decomposed plant materials. Dorovan soils are typically found in depressions and drainways where the water table is at or near the surface. Leon soils consist of very deep, poorly drained and very poorly drained, sandy soils that formed in sandy marine sediments. Leon soils are typically found in broad flats in flatwoods and on knolls or low ridges in titi bogs. Mandarin soils are somewhat poorly drained, moderately permeable nearly level soils that formed in sandy marine and dune environments. The surface layer is very dark gray fine sand. The subsurface layer is light brownish gray fine sand and the underlying material is white fine sand. Mandarin soils are found on low coastal ridges and knolls in flatwoods. Resota series consist of moderately well drained to rapidly permeable soils formed in sandy marine deposits. Resota soils are found on coastal ridges and remnant dunes. Rutlege series soils are very poorly drained rapidly permeable soils that formed in sandy marine sediments and are found in low areas adjacent to streams, titi bays and depressions. Scranton series are poorly drained and very poorly drained soils, nearly level soils that formed in marine sediments. Scranton soils are in broad areas in flatwoods and sloughs. Since most of the soils found within the Avenue A watershed are poorly drained soils and the area has a high water table, the use of stormwater retrofits and BMPs that depend on infiltration were not a viable option.

Hydrologic soil groups (HSGs) are used to estimate runoff potential from rainfall. Soils are assigned to one of four groups (A-D) based on infiltration of water when soils are thoroughly wet and receive rainfall. Group A soils are well drained with a high infiltration rate, Group B soils have a moderate infiltration rate, Group C soils have a slow infiltration rate and a layer that impedes downward movement of water and Group D soils have a very slow infiltration rate and high runoff potential. Soil types can be classified in one or more hydrologic groups depending on the characteristic and runoff potential. The most common hydrologic soil group found within the watershed is Type B/D soil covering approximately 67% of the watershed area. The remaining soil types include HSG Type A/D soils covering approximately 11% of the watershed area, HSG Type C soils covering 10% of the watershed area and HSG Type D soils

covering approximately 3% of the watershed area. Soil types per the Franklin County Soil Conservation Service Soil Survey within the watershed are shown in Figure 6.

Figure 6: Soils in the Avenue A Watershed

Implementation

The primary objective of this project was to reduce pollutant loads from stormwater runoff from the Avenue A drainage basin that discharge directly into St. George Sound. This was accomplished by the successful installation of eight stormwater baffle box treatment systems in the Avenue A basin. Maintenance of the treatment boxes is also a key component of the project. Routine cleaning to remove sediment and other materials that are captured in the boxes is important to maintain the effectiveness of the boxes for reducing pollutant loads to the sound. Franklin County signed an agreement with the District to provide long term maintenance of baffle box treatment systems. The District will provide training and technical assistance to the County to properly maintain the boxes. The monitoring requirements that are normally associated with EPA 319 projects were waived because of ongoing baffle box research by FDEP and the District's commitment to provide technical assistance and guidance to the County on maintenance of the baffle boxes. The District will maintain detailed maintenance records for each structure to estimate the amount of floatable material and sediment captured in the boxes. These maintenance records will be evaluated and compared with the baffle box research results to help determine the overall effectiveness of theses treatment systems.

A second component of the project was public education and awareness to inform the residents and visitors in the area about the impacts of stormwater runoff to the water resources in the Eastpoint area. The public awareness campaign provides information about the importance of the local water resources for the economy of the community and provides common sense tips on how residents and visitors can help protect the resources. Planning and implementation of these components was a cooperative effort of the Northwest Florida Water Management District, Eastpoint Water & Sewer District and Franklin County.

A challenge that was encountered during the planning phase of the project was the high cost and limited availability of land for installing stormwater retrofits in the Avenue A drainage basin. The Avenue A drainage basin extends about 1.5 miles along the shoreline of St. George Sound and is only about a ¼ mile wide. The Avenue A drainage has eight sub-basins with separate outfall structures that are spread out along the length of the basin (Figure 5). Due to

the location of the outfalls and land acquisition limitations it was not feasible to construct conventional structural stormwater improvements such as holding ponds or wetland treatment systems that would provide treatment for the majority of the Avenue A drainage basin. The stormwater baffle box treatment systems were determined to be the best alternative to provide treatment for the majority of the Avenue A basin.

The Florida Department of Transportation (FDOT) right-of-way easement along US 98 was determined to be the best location for the treatment boxes. The primary benefit of installing the boxes in the existing FDOT right-of-way was that no land acquisition costs were accrued. This allowed the available funding to be used for installing the stormwater treatment systems. The stormwater outfall structures for the eight Avenue A sub-basins that discharge into the sound are all located within the FDOT right-of-way on US 98. Installing the treatment boxes at these locations allowed the majority of the stormwater in each sub-basin to receive treatment through the boxes.

Design: The District contracted with a consulting firm to assist with engineering, permitting and developing plans for installing the stormwater baffle boxes. The consulting firm has extensive experience with stormwater baffle box treatment projects. Since this was a stormwater retrofit project designed to treat existing stormwater runoff, the only permit required for the project was a drainage connection permit from FDOT. The elements required in the permit included: affidavit of ownership, legal description, location map, grading plan, soil borings, water table/percolation rates, site survey, photographs of existing conditions, modeling computations and certification by a registered engineer.

The drainage permit included a hydrologic and hydraulic modeling evaluation of each of the eight sub-basins to determine runoff characteristics and ensure the stormwater boxes can convey the stormwater flows for up to 100-year storm events and will not cause hydraulic restrictions in the drainage pipes and conveyances where they are installed. Hydrologic and hydraulic parameters were developed for the contributing area for each sub-basin that included

impervious areas, land use characteristics, soil types, time of concentration and other model constituents. The Interconnected Channel and Pond Routing Model (ICPR) was the model used for the project. The permit was reviewed and approved by FDOT on 08/22/2007.

A site survey for each location was required to determine the size and location of the drainage pipes and drop inlet structures and the location of all underground utilities. The four types of underground utilities identified along US 98 in the right-of-way were a water supply line (water main), forced main sewer line, vacuum sewer line and buried telephone cable. Initially all eight treatment boxes were planned for the north side of US 98 to provide more long term protection from storm surge events. The installation of the treatment boxes was restricted to the FDOT the right-of-way easement which limited the ability to adjust the locations and the position of boxes for utility conflicts and drainage connection issues. After site evaluations were completed, it was determined that baffle box structures 1-4 should be located on the south side of US 98 due to underground utility conflicts with sewer mains and stormwater drainage connection complications. Of these four sites, three boxes that were moved to the south side of US 98 are located behind the breakwater in Eastpoint, providing protection from storm surge. Structure 2 is protected by a seawall and the box for this site was designed with an anti-flotation footer with poured concrete reinforcement to prevent damage from storm surge.

Construction: After completion of the construction plans, technical specifications and drainage permit, an Invitation to Bid (ITB) was issued by the District for construction services to install eight stormwater treatment baffle boxes in Eastpoint. The ITB was advertised in the State Vendor Bid System, two panhandle newspapers and construction advertising services. A mandatory pre-bid meeting was held at the District on 11/07/2007 to provide project information to bidders to and answer questions. Only bidders that attended the pre-bid meeting were qualified to submit bids on the project. The meeting was attended by District staff, the project engineer and representatives from eleven construction companies. The

attendees were provided with a bid package and a compact disk containing construction plans, technical specifications, soil boring data and the FDOT drainage permit for the project. The bids were opened at 2:00 pm on 12/4/2007. Four companies submitted qualified bids on the project. The bids that were submitted ranged from $434,787.00 to $577,027.00. After review, staff recommended and the District's Governing Board approved the low bid at a Board meeting on 01/24/2008. A contract was executed with the successful contractor on 02/11/2008. A pre-construction meeting was held at the District on 02/14/2008 with the contractor, District staff and the project engineer to discuss all construction related activities and requirements. A Notice To Proceed was executed at the meeting between the District and the contractor with a requirement to complete construction within six months.

The first baffle box was ordered in February and took approximately two months to fabricate and deliver on site. Construction started on structure 8 at the east end of the project area on 04/28/2008. Installation of the eighth baffle box, structure 3, was completed on 07/11/2008. Final project activities were completed during the last two weeks of July and included asphalt replacement, final site dressing, debris removal and equipment demobilization. The final project inspections were completed on 08/05/2008.

Descriptions of the installation details for each structure are provided below. Figure 1 shows the location of each structure in the Avenue A drainage basin. Shop drawings for each structure illustrating the dimensions and specifications are provided in Appendix A. A project schedule with the major milestones can be found in Appendix B.

Site 1: This site is located on the western end of the project area across from Shuler Street in Eastpoint (Figure 1). The baffle box installation at this site was initially planned for the north side of US 98. The site survey revealed several underground utility conflicts

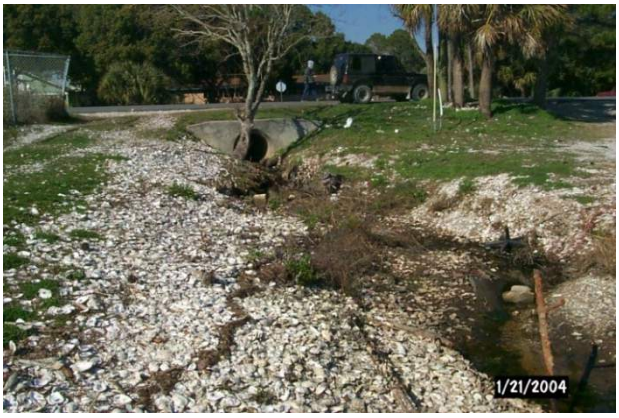

Figure 7: Site 1 - Pre-construction, Looking North.

in the proposed excavation area and three inflow drain pipes entering the drainage connection box on the north side of the highway. These site constraints required locating this structure on the south side of US 98. The baffle box is protected behind a headwall and the breakwater further protects the shoreline from storm surge (Figure 7). The structure at this site is a 6' x 12' nutrient separating baffle box with two aluminum access hatches and a manhole cover. The shop drawing with the specifications is provided in Appendix A.

The installation of structure 1 started on 06/17/08 with the installation of a well point system for de-watering the site and turbidity barriers in the outfall channel. The baffle box was set in place on 06/20/08 and final site grading and sod replacement were completed on 06/23/08. There were no utility conflicts on the south side of US 98 and there was one inflow and outflow pipe into the baffle box. During the excavation and culvert removal, the existing headwall was damaged and required replacement. The contractor did not encounter any problems during excavation and placement of the box (Figure 8). When the box was in place, the headwall was formed and poured in place (Figure 9). After the headwall replacement, the site was dressed with sod, seeded and mulched (Figures 10 and 11). New object markers were placed along the sides of the baffle box to keep cars from driving or parking on top of the non-load bearing aluminum access hatches.

Figure 8: Site 1 – Baffle Box Installation

Figure 9: Site 1 - Headwall Replacement

Figure 10: Site 1 – Sod Replacement

Figure 11: Site 1 – Completed Installation

Site 2: This site is located on the western end of the project area between School Street and 1st Street in Eastpoint (Figure 1). Structure 2 was also originally planned for installation on the north side of US 98. The site survey indicated a forced main sewer line conflict and two separate drop inlet boxes that would have made installation on the north side of the roadway difficult and costly. The installation for this treatment box was moved to the south side of US 98 where there were no utility conflicts and one drainage pipe that made it a better location for the box. The treatment box at this location is located behind a seawall that provides an extra measure of protection from storm surge and wave action (Figure 12). The structure at this site is an 8' x 12' nutrient separating baffle box with two access hatches and a manhole cover (Appendix A).

The installation of structure 2 started on 06/24/08 with the installation of the well point system for de-watering the site and turbidity barriers in the outfall channel. The baffle box was set in place on 06/27/08 and final site grading and sod replacement were completed on 06/30/08.

Figure 12: Site 2 – Protective Seawall

This structure was larger than most used on the project and was constructed as a single unit with a top slab. The added weight and size of the box required a larger 100 ton crane to set the structure (Figure 13). The overhead power lines were temporarily shut off by the local electric utility, Progress Energy, due to safety considerations when the crane set the box. Only one business, Lynn's Quality Oysters, was affected for about an hour. Eastpoint has a breakwater that parallels the shoreline for the majority of the community and provides an energy break from coastal storms. Structure 2 is located in an area of the shoreline where there is a gap in the breakwater for boat traffic. Additional measures, including an anti-flotation footer and concrete reinforcement were added to the box at this location to provide more protection from potential storm surge and wave action (Figure 14). Before installation of the treatment box, the shoreline area at site 2 was covered with concrete rubble and debris from Hurricane Dennis storm surge damage in 2005 that had not been cleaned up. During the installation of the treatment boxes the debris was removed and the sites were graded, seeded and mulched (Figure 15). After the box was set, the drain pipes were connected then grouted and the hole was backfilled and compacted. The site was dressed with sod, seeded and mulched. Asphalt

was replaced along the shoulder of the highway and new object markers were placed along the baffle box to keep cars from driving or parking on top of the aluminum access hatches.

Figure 13: Site 2 – Box Installation

Figure 14: Site 2 – Footer and Reinforcement

Figure 15: Site 2 – Shoreline Before and After Installation

Figure 16: Site 2 – Completed Installation

Site 3: This site is located in the middle of the project area across from Flowers Street in Eastpoint (Figure 1). This structure was planned for installation on the north side of US 98, but was moved to the south side of the highway due to a conflict with a forced sewer main line that runs underground along the north side of the road. This location has a wide section of land between the treatment box and the shoreline, a headwall and a breakwater that provides protection from coastal storm damage (Figure 17). This structure is an 8' x 12' nutrient separating baffle box. The shop drawing is provided in Appendix A. Construction on this site started on 07/08/08 with the installation of the well point system and turbidity barriers in the outfall channel. The baffle box was set in place on 07/11/08 and final site grading and sod replacement were completed on 07/15/08. This structure was one of the larger boxes installed on the project and was constructed as a single unit with a top slab; the added weight and size of the box required a larger 100 ton crane to set the structure (Figure 18). This structure was constructed with two inflow and outflow pipes (42-inch and 24-inch) to accommodate the two existing drainage pipes. The box and pipe sizes were designed to prevent any constriction or backflow through the structure during storm events (Figure19 and 20).

Figure 17: Site 3 – Pre-construction, Looking South.

The location of structure 3 is in a high traffic area used by local oystermen for parking their vehicles and boat trailers. The lid on this structure was constructed with three load bearing manhole covers in place of non-load bearing aluminum hatches to prevent damage to the boxes or vehicles (Figure 21). After completion, the site was dressed with oyster shell (which was the existing cover before construction) to stabilize the site and prevent erosion (Figure 22).

Figure 18: Site 3 – Box Placement

Figure 19: Site 3 - Box Openings

Figure 20: Site 3 – Inside Box

Figure 21: Site 3 – Top With Load Bearing Manholes

Figure 22: Site 3- Completed Installation

Site 4: This site is located in the middle of the project area between Flowers Street and 2nd Street in Eastpoint (Figure 1). As with sites 1, 2 and 3, this site was initially planned for installation on the north side of US 98 but was moved to the south side of the roadway due to underground utility conflicts (Figure 23). The structure at this site is a 6' x 12' nutrient separating baffle box with two aluminum hatches and a load bearing manhole cover located on the shoulder of the road. The shop drawing with the specifications is provided in Appendix A. The installation of structure 4 started on 06/05/08 with the installation of the well point system for de-watering the site and

Figure 23: Site 4 - Before Construction, Looking North

turbidity barriers on the outfall pipe. The baffle box was set in place on 06/06/08 and final site grading and sod replacement were completed on 06/10/08. The baffle box used at this site was made in two halves, which required a smaller crane and made placement and adjustments easier during installation (Figures 24 and 25). The drainage pipe at this site between the

Figure 24: Site 4 – Lower Section Placement

baffle box and the shoreline was a corrugated metal pipe. When the hole was excavated and the drainage pipe uncovered it was found to be rusted away on the bottom due to exposure to salt water and required replacement (Figure 26). Replacement of this 80 feet length of pipe was unexpected and a change order was executed with the contractor for the replacement of the pipe. Franklin County had 80 feet of the proper size ADS plastic pipe (30-inch diameter) that they provided at no charge (Figure 27).

The shoreline area was covered with concrete rubble and debris from Hurricane Dennis storm surge damage prior to construction. After the installation of the baffle box and new drainage pipe, the site was cleaned and graded (Figure 28). Oyster shell was used to dress the site after

final site grading (Figure 29). Object markers were placed along the sides of the box to keep cars off the aluminum access hatches (Figure 30).

Figure 25: Site 4 – Upper Section Placement

Figure 26: Site 4 – Rusted Existing Culvert

Figure 27: Site 4 – Pipe Replacement

Figure 28: Site 4 – Site Cleaning and Stabilization

Figure 29: Site 4 – Oyster Shell Cover

Figure 30: Site 4 – Completed Installation

Site 5: This structure was installed on the north and east side of the intersection of US 98 and 3rd Street in Eastpoint (Figure 1). The structure at this site is a 6' x 12' nutrient separating baffle box that was installed at the location of a drop inlet box that had two 24-inch diameter inflow pipes, one from the west and one from the east, and one 30-inch outfall pipe running south under US 98 (Figure 31). The stainless steel trash rack in this baffle box was modified to accommodate the inflow pipes on the sides of the box (shop drawing provided in Appendix A). The installation began on 06/11/08 with the installation of the well point system for de-watering the site. The baffle box was set in place on 06/13/08 and final site grading and sod replacement were completed on 06/16/08. A vacuum sewer line underground running east to west along the north side of US 98 required relocating during the installation of this structure. The contractor and the District worked with the local utility, Eastpoint Water and Sewer District, to temporarily close and reposition the vacuum line around the north end of the baffle box pit (Figure 32). The vacuum pipe was cut, temporarily capped and relocated around the site in a few hours with no disruption to service. Once the relocation was complete, the structure was set in place (Figures 33 and 34). After the baffle box was installed, the inflow and outflow pipes were connected and grouted and the site was backfilled and compacted. Sod was replaced so that only the top of the box is visible (Figure 35). Object markers were placed along the sides of the box to prevent cars from driving or parking on top of the aluminum hatches.

Figure 31: Site 5 – Pre-construction, Looking East.

Figure 32: Site 5 - Vacuum Sewer Relocation

Figure 33: Lower Section Placement

Figure 34: Site 5 - Upper Section Placement

Figure 35: Site 5 – Completed Installation

Site 6: Structure 6 was installed on the northeast corner of the intersection of US 98 and 6th Street in Eastpoint (Figure 1). The site has grassed swale ditches that drain to a 24-inch pipe that runs under US 98 and discharges to the sound (Figure 36). A 6' x 12' nutrient separating baffle box was installed at this site with an inflow opening on the north end to capture and treat runoff from the swale ditch (shop drawing in Appendix A). There were no underground utility conflicts at this site. The well point system was setup on 05/27/08, the baffle box was set in place on 05/29/08 and final site grading and sod replacement were completed on 06/02/08. A buried box culvert was uncovered during excavation of the site that was not located during the survey or included on the site plan. The drainage pipe to this box culvert was re-routed to discharge into the ditch on the west side of the structure (Figure 37). During excavation, a large concrete collar around the outfall pipe was removed. This collar extended under the north shoulder of US 98 and required additional fill and compaction to stabilize the shoulder of the road (Figure 38). After the excavation was completed, a gravel base was laid and the upper and lower halves of the box were set (Figure 39). The site was graded and dressed with sod on the road shoulder and swale embankments (Figure 40). This baffle box is open on the north end and the 24-inch opening created a potential safety hazard for children and animals that could enter the structure from this opening. Stainless steel safety bars were installed horizontally over the end of the box with a 5-inch opening between the bars which will provide protection and not obstruct flow into the structure. Object markers were placed along the sides of the baffle box to keep cars from driving or parking on top of the aluminum hatches (Figure 41).

Figure 36: Site 6 – Pre-construction, Looking West.

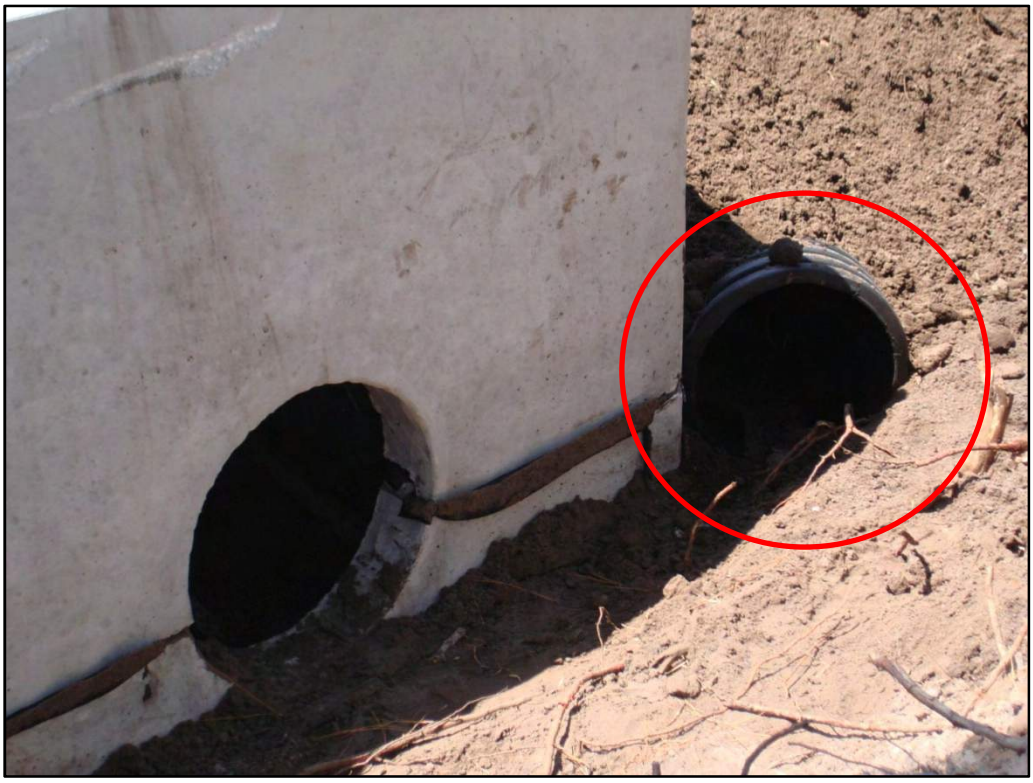

Figure 37: Site 6 - Culvert Re-route

Figure 38: Site 6 - Concrete Collar Removal

Figure 39: Site 6 – Box Installation

Figure 40: Site 6 –Sod Replacement

Figure 41: Site 6 – Completed Installation With Safety Bars

Site 7: This structure is located on the northeast corner of the intersection of US 98 and 7th Street in Eastpoint (Figure 1). The site is located on a grassed swale ditch where a 24-inch storm drain pipe crosses under US 98 and discharges into the sound (Figure 42). A 6' x 12' nutrient separating baffle box was installed at this site and is open on the north end as the inlet from the swale ditch (shop drawing in Appendix A). There were no underground utility conflicts at this site. The well point system and concrete barricades were set up on site on 05/06/08 (Figure 43) and excavation started the next day. The structure is located in the front yard of a well landscaped

Figure 42: Site 7 – Pre-construction, Looking South.

and maintained home and extra measures were taken to prevent damage to the yard by heavy equipment. A quiet diesel de-watering pump was used to minimize noise during the construction. The baffle box used at this site was made in two pieces, which required a

Figure 43: Site 7 De-watering Setup

smaller crane to set than the larger boxes. It was placed on 05/08/08 (Figures 44 and 45). Final grading and sod replacement were completed on 05/09/08. The south bank of the swale ditch west of the baffle box had a very steep slope and significant erosion prior to the start of construction. In addition, there is a cross drain pipe flowing into the ditch from the west under 7th Street. Due to these conditions, limestone riprap rock was used to dress the slope on the ditch west of the structure. The riprap will provide long term stability for the bank and allow the cross drain to function properly without scouring the bank or channel bottom. The property owners are pleased with the completed installation and feel it is a significant improvement over the previous condition (Figure 46).

Figure 44: Site 7 – Lower Box Installation

Figure 45: Site 7 – Upper Box Placement

Figure 46: Site 7 – Bank Stabilization

This baffle box is open on the north end and stainless steel safety bars were installed horizontally over the end of the box with a 5-inch opening between the bars which will keep children and animals from entering structure and not obstruct flow. Object markers were placed along the sides of the baffle box to keep cars from driving or parking on top of the aluminum hatches (Figure 47).

Figure 47: Site 7 – Completed Installation

Site 8: This structure is located on the north side of US 98 about 50 feet east side of 8th Street in Eastpoint (Figure 1). The grassed swale ditch at this site collects runoff from a 21.8-acre medium density residential land-use area that drains through a 30-inch pipe under US 98 to the sound (Figure 48). A 6' x 12' nutrient separating baffle box was installed at this location that is open on the north end providing the inflow orifice for the structure. The shop drawing is provided in Appendix A. This baffle box was the first structure installed on the project. The well point system was set up on 04/28/08 and excavation of the site started the next day. The culvert headwall at the ditch was excavated and removed. A second headwall was found near the road shoulder that had been left in place from a previous road widening. FDOT confirmed that it is standard practice to leave existing headwalls and bury them in place when widening roads. There was a vacuum sewer line conflict at this site that required relocating the sewer line around the north end of the structure (Figure 49). Eastpoint Water and Sewer District, the local utility that provides water and sewer service to the Eastpoint area, provided on site assistance and inspection for relocation of the sewer line. No waste was spilled or discharged from the pipe when the line was re-located. Once the vacuum sewer relocation was complete, the structure was set in place on 05/02/08 (Figure 50). After the drain pipe was connected and grouted, the site was backfilled, compacted and graded. The site was dressed with sod on 05/06/08. This baffle box is open on the north end to function as the drainage inlet to the structure. Stainless steel bars were installed horizontally over the end of the box with a 5-inch opening between the bars which will keep children and animals from entering structure and not obstruct flow.

Figure 48: Site 8 – Pre-construction, Looking East

Figure 49: Site 8 - Sewer Line Relocation

Figure 50: Site 8 - Box Installation

The structure has a load bearing manhole that is located near the shoulder of the road that is designed for vehicular traffic. Object markers were placed along the sides of the baffle box to keep vehicles from driving or parking on top of the aluminum hatches (Figure 51).

Figure 51: Site 8 – Completed Installation

Public Education: Public education and awareness are important components of the project to inform the residents and visitors about the impacts of stormwater runoff to area water resources. A public awareness campaign provides information about the importance of local water resources for the community economy and provides common sense tips on how residents and visitors can help protect the resources. Planning and implementation of these components in the Eastpoint area is an ongoing cooperative effort of the Northwest Florida Water Management District, Eastpoint Water and Sewer District and Franklin County. Public education and awareness elements that were used to get the message out to the public included:

1) Project construction sign installed in a prominent location on US 98 in Eastpoint

2) Public awareness brochures describing the project and the impacts of stormwater
3) Pollution awareness and prevention plaques, magnets and posters
4) Press releases in local newspapers and media to inform the public

Project Construction Sign: This sign was created to display in the Eastpoint area before, during and after the construction of retrofit sites (Figures 52). The sign provides citizens and visitors with information (*why, where and when*) about the project.

Figure 52: Project Construction Sign

The sign was originally placed near structure 3 (Figure 53). It was adjacent to a sidewalk that parallels US 98 in Eastpoint. At the suggestion of Hank Garrett with Eastpoint Water and Sewer District, the sign was re-located near structure 2 in a highly visible area along US 98.

Figure 53: Project Sign at Site 3

Figure 54: Project Sign at Site 2

Public awareness brochures: This brochure was created and provided to local businesses and government agencies to distribute to the community (Figures 55 and 56). It provided another communication tool to introduce our pollution prevention campaign to the public. Additional elements of the public information campaign will be discussed in more detail below.

Figure 55: Public Awareness Brochure, Page 1

Eastpoint Stormwater Retrofit Project

What is stormwater and why is it important? Stormwater is runoff generated by rain events. It runs off roofs, roads, parking lots and other surfaces and flows into gutters, ditches and channels and eventually flows into bays, rivers and lakes. This runoff water can carry all sorts of pollutants like oils and greases, fertilizers, pesticides and sediments that have negative impacts on the biological communities (oysters, shrimp, fish, seagrass, etc.) in the bay.

Stormwater retrofits are structural improvements that correct existing pollution problems caused by stormwater runoff. This project will reduce pollution and improve water quality as runoff drains into St. George Sound. This project included the installation of eight

baffle box treatment vaults on stormwater outfalls that discharge directly into the sound from the Avenue A Watershed.

The Avenue A watershed in Eastpoint is bounded by Avenue A to the north and St. George Sound to the south and includes about 205 acres. Prior to completion of this project, there was no treatment of stormwater along the south edge of US 98 before it flowed into the sound. US 98 runs along the shoreline of St. George Sound in Eastpoint, which limits the options for stormwater treatment in this watershed. Due to the limited space and other constraints, the baffle box treatment vaults were considered to be the best option for retrofitting the stormwater outfalls into the sound. These vaults provide treatment where space is limited.

Stormwater Technology - Baffle Boxes

The baffle boxes are concrete structures containing a series of sediment settling chambers separated by baffles. The primary function of baffle boxes is to remove sediments, suspended particles and associated pollutants from stormwater. The baffle boxes also contain trash screens and skimmers to capture larger materials, trash and floatables. They were installed in-line on the storm drain pipes north and south of highway US 98.

The use of baffle boxes for pollutant removal is based on the concept of slowing the flow velocity through the box, thereby allowing solids and associated pollutants to settle to the bottom of the box. Stormwater enters the box and begins to fill the first chamber. As water encounters the baffles, flow velocity decreases, allowing particles with a settling velocity greater than the horizontal flow velocity to settle to the bottom of the box. In addition, the baffles impede particle movement. As suspended solids strike the baffles they begin to settle. Larger particles usually settle out first and accumulate in the first chambers while smaller particles usually settle out in subsequent chambers.

Project Funding Sources

The Eastpoint retrofit project was funded by a U.S. Environmental Protection Agency (EPA) 319h grant and the Surface Water Improvement and Management (SWIM) program. The EPA section 319 Nonpoint Source Management Program is designed to fund state and local stormwater improvement efforts. The SWIM Act was created by the Florida Legislature in 1987 to develop and implement programs to restore, protect and preserve surface water resources and educate the public on the importance of protecting our water resources. In the Florida Panhandle, the SWIM program is being implemented by the Northwest Florida Water Management District (NWFWMD) in cooperation with the Florida Department of Environmental Protection, other agencies and local governments. The NWFWMD is completing the Eastpoint Regional Stormwater Improvement Project in partnership with the Florida Department of Environmental Protection, Eastpoint Water and Sewer District and Franklin County.

This project was made possible by the following organizations:

For more information, please contact:
Northwest Florida Water Management District - (850) 539-5999
Design & Photography: John Crowe Text: John Crowe & Nick Wooten
PIC #08-01

Figure 56: Public Awareness Brochure, Page 2

Public education plaques, magnets and posters: Plaques and magnets were designed using the same theme to educate and encourage citizens to "Dump No Waste" in stormwater conveyances because it flows directly into Apalachicola Bay (Figure 57). The metal plaques are 5" x 10" in size and are highly visible when installed outside. They were installed on the top of stormwater structures near sidewalks and other public areas in Eastpoint and Apalachicola. They increase public awareness about stormwater runoff and non-point source pollution (Figure 58). The magnets and brochures are being distributed to local businesses, government agencies and resource advocate organizations like the Apalachicola Riverkeeper to inform a wide audience. The District will also distribute the magnets and brochures at their information booth and educational exhibit during the 45th Annual Florida Seafood Festival in Apalachicola

on October 31st and November 1st. A poster was also created to promote the public awareness and pollution prevention campaign. It incorporates the design used for the plaques and magnets to increase recognition of stormwater conveyance structures when the plaques are seen around the community (Figure 59). The posters are being distributed to local businesses and government agencies and will be displayed at the seafood festival (Figure 60).

Figure 57: Pollution Prevention Plaques and Magnets

Figure 58: Plaques Mounted in Community

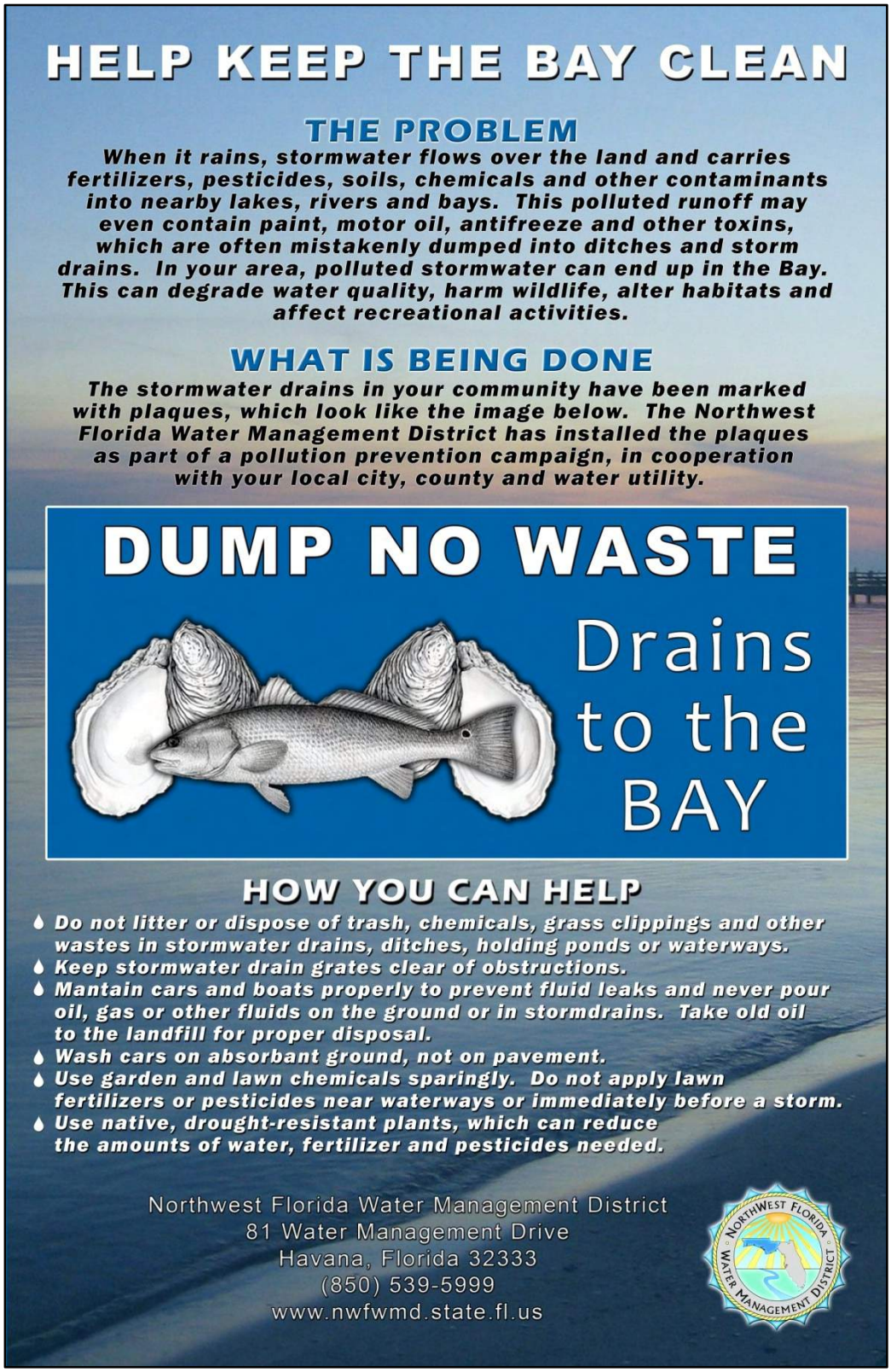

Figure 59: Public Awareness Poster

Figure 60: Posters in Local Businesses and Organizations

Press Releases: Press releases have been broadcast in print media and on the local radio station about the stormwater retrofit project in Eastpoint and the importance of non-point source stormwater issues for the community. The Florida Specifier, a state-wide publication, had a front page photo and an article about the Eastpoint project in the August 2008 issue (Figure 61). The Times ~ Apalachicola and Carrabelle, a local newspaper in Franklin County, printed a press release issued by the District in the July 25, 2008 issue (Figure 62). Oyster Radio, FM 100.5, a local station in Eastpoint aired a public service announcement about the project in July 2008. Additionally, a feature article about the project was submitted to Land and Water Magazine, a national publication, and has been accepted for a feature issue.

Florida Specifier

Practical Information For Environmental Professionals

Single Copy Price: $5

August 2008

Volume 30, Number 8

Photo by John Crowe, Northwest Florida Water Management District

Water quality and aquatic habitat on St. George Sound are expected to benefit from a stormwater treatment system, shown above during construction, designed by the Northwest Florida Water Management District. Stormwater that once discharged untreated directly to the bay will now flow through eight baffle boxes placed along U.S. Highway 98 easements in Eastpoint. See story inside on Page 16.

NWFWMD completes construction of stormwater system in Eastpoint

By FAITH EIDSE, PhD

Water quality and aquatic habitat are expected to benefit from a new stormwater treatment system recently completed on St. George Sound.

Stormwater that once discharged untreated directly to the bay will now flow through eight baffle boxes placed along U.S. Highway 98 in Eastpoint.

The system designed by the Northwest Florida Water Management District will reduce debris, suspended solids, heavy metals and other contaminants from a 1,049-acre drainage area, bounded by Avenue A, Old Ferry Road and 10th Street.

"The district has demonstrated the value of community water resources by constructing treatment systems in an area where there is little space to capture and filter flows," said Douglas E. Barr, executive director of NWFWMD.

The concrete boxes contain chambers separated by baffles, as well as a filtration screen system and skimmers to capture floating hydrocarbons. As stormwater passes through the baffles, flow velocity decreases, allowing particles to settle to the bottom of the box. Larger particles usually settle first and accumulate in the first chamber while smaller particles usually settle out in subsequent chambers.

"There will be less pollution from stormwater runoff entering the bay, which will have long term benefits for the aquatic habitat," said Nick Wooten, chief of the district's Surface Water Bureau. Runoff from roadways, gas stations commercial properties and residential areas will be treated by these vaults.

"The vaults have been shown to remove 500 to 50,000 pounds of sediment per month, depending on sediment load, season and rainfall," said John B. Crowe, an associate hydrologist at the district. "The percentage of pollutants removed depends on land use, drainage area, soil types, stormwater velocities and frequency, and thoroughness of box cleaning."

The retrofit project was funded through the Surface Water Improvement and Management program and U.S. Environmental Protection Agency 319 grant funds. The installation coincided this summer with a Florida Department of Transportation improvement placing linked block mats beneath the Highway 98 shoreline to improve storm surge resilience.

Faith Eidse, PhD, is a public information specialist at the Northwest Florida Water Management District in Havana. She can be reached at Faith.Eidse @nwfwmd.state.fl.us or (850) 539-5999.

Figure 61: Florida Specifier Cover Photo and Article

THE TIMES Apalachicola & Carrabelle Oyster Radio 100.5

Eastpoint Gets New Stormwater Treatment System

Apalachicola Times & Oyster Radio - July 25, 2008

Water quality and aquatic habitat are expected to benefit from a new stormwater treatment system completed Friday on St. George Sound.

Stormwater that once discharged untreated directly to the bay will now flow through eight baffle boxes placed along US 98 in Eastpoint. The system designed by the Northwest Florida Water Management District will reduce debris, suspended solids, heavy metals and other contaminants from a 1,049-acre drainage area, bounded by Avenue A, Old Ferry Road and 10th Street.

"The district has demonstrated the value of community water resources by constructing treatment systems in an area where there is little space to capture and filter flows," said Douglas E. Barr, executive director.

The concrete boxes contain chambers separated by baffles, as well as a filtration screen system and skimmers to capture floating hydrocarbons. As stormwater passes through the baffles, flow velocity decreases, allowing particles to settle to the bottom of the box. Larger particles usually settle first and accumulate in the first chamber while smaller particles usually settle out in subsequent chambers.

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"The vaults have been shown to remove 500 to 50,000 pounds of sediment per month, depending on sediment load, season and rainfall," said John B. Crowe, district associate hydrologist. "The percentage of pollutants removed depends on land use, drainage area, soil types, stormwater velocities and frequency and thoroughness of box cleaning."

The retrofit project was funded through $294,000 from the Surface Water Management and Improvement program, and $251,000 from Environmental Protection Agency 319 grant funds. The installation coincided this summer with a Florida Department of Transportation improvement placing linked block mats beneath the US 98 shoreline to improve storm surge resilience.

Figure 62: Times Article

FUNDING SOURCES and PROJECT BUDGET

The Eastpoint retrofit project was funded by a US Environmental Protection Agency (EPA) 319(h) grant and the Surface Water Improvement and Management (SWIM) program. The EPA section 319 Nonpoint Source Management Program is designed to fund state and local stormwater improvement efforts. The SWIM Act was created by the Florida Legislature in 1987 to develop and implement programs to restore, protect and preserve surface water resources and educate the public on the importance of protecting our water resources. In the Florida Panhandle, the SWIM program is being implemented by the Northwest Florida Water Management District (NWFWMD) in cooperation with the Florida Department of Environmental Protection, other agencies and local governments. The NWFWMD is completing the Eastpoint Regional Stormwater Management Plan in partnership with the Florida Department of Environmental Protection (FDEP), Eastpoint Water and Sewer District and Franklin County.

Total construction cost for the project was $451,435, of which $251,000 was provided by a 319(h) grant awarded by the US EPA, administered by the FDEP (Table 2). The remainder ($200,435 construction cost - *plus staff time)* was funded by the Apalachicola River and Bay SWIM program.

Table 2: Eastpoint Retrofit Construction Cost Summary

	Construction Costs	Unit	Quantity	Unit Price	Total Price
1	Structure No. 1	ls	1	$ 52,198.00	$ 52,198.00
2	Structure No. 2	ls	1	$ 62,948.00	$ 62,948.00
3	Structure No. 3	ls	1	$ 63,486.00	$ 63,486.00
4	Structure No. 4	ls	1	$ 51,661.00	$ 51,661.00
5	Structure No. 5	ls	1	$ 51,661.00	$ 51,661.00
6	Structure No. 6	ls	1	$ 51,661.00	$ 51,661.00
7	Structure No. 7	ls	1	$ 50,586.00	$ 50,586.00
8	Structure No. 8	ls	1	$ 50,586.00	$ 50,586.00
9	Change Order #1	ls	1		
	Additional Mobilization	ls	1	$ 2,000.00	$ 2,000.00
	Rip Rap - Structures 6 & 7	cy	22	$ 50.00	$ 1,100.00
	Structure 6 - 18 in ADS side drain	ls	1	$ 1,250.00	$ 1,250.00
	Structure 4 - 80 ft ADS drain to bay	ls	1	$ 2,800.00	$ 2,800.00
	Asphalt repair	ls	1	$ 360.00	$ 360.00
	Structure 2 - Class 1 concrete	ls	1	$ 1,138.00	$ 1,138.00
	Headwall Structure 1	ls	1	$ 2,750.00	$ 2,750.00
	60 CY oyster shell	ls	1	$ 1,300.00	$ 1,300.00
	Debris removal	ls	1	$ 3,950.00	$ 3,950.00
	Total Construction Cost				**$ 451,435.00**
	Engineering Cost				**$ 110,432.00**
	Project Funding				
	EPA 319 Federal Grant				$ 251,000.00
	NWFWMD Match				$ 310,867.00
	TOTAL				**$ 561,867.00**

OPERATION and MAINTENANCE

Maintenance of the treatment boxes is also a key component of the project. Routine cleaning to remove sediment and other materials that are captured in the boxes is important to maintain the effectiveness of the boxes to operate properly and continue to reduce pollutant loads to the sound. Franklin County signed an agreement with the District to provide long term maintenance of baffle box treatment systems. The District will provide technical assistance and support to the County to maintain the boxes.

The District and Franklin County entered into an agreement on 07/14/2006 that included the installation of the stormwater treatment baffle boxes by the District and the operation and

maintenance of the treatment systems by the County. The agreement has no expiration date. In the contract the District agrees to:

a. Provide or contract design, permitting, construction, on-site construction inspection, and administrative services associated with the implementation of the stormwater facility projects.
b. Include all necessary components for construction of the facilities and development and installation of interpretive/educational signage and displays.
c. Coordinate with COUNTY personnel for long-term for the operation and maintenance of constructed facilities

The County agrees to:

a. Own, operate and maintain the stormwater treatment facilities.
b. Provide in-kind services associated with implementation of the project and assign County personnel to coordinate with the District in planning and construction of the stormwater facilities.
c. Provide appropriate personnel and financial resources for the long term ownership, maintenance and monitoring of constructed projects.

The District coordinated a training session on September 4, 2008 with Franklin County Public Works staff who will be responsible for maintaining the baffle boxes. The meeting was held at the Public Works office in Eastpoint and included a presentation by the manufacturer of the baffle boxes, Suntree, Inc. The manufacturer demonstrated a working scale model of a baffle box that pumped water and showed how sediment and floatable materials are captured in the baffle boxes. Maintenance procedures for cleaning the boxes were demonstrated and discussed. The District will assist the County with monitoring the status of the boxes to determine when and how often they need to be cleaned.

Tropical Storm Fay moved through the area in late August 2008 after the baffle box installations were completed. The boxes were inspected by District staff after the storm and there was little floatable debris found in the trash screen and only a small amount of sediment in the bottom of the boxes. The District will continue to monitor the operation of the treatment boxes and work with the County to schedule maintenance as needed.

RECOMMENDATIONS:

Implementation of this project suggests that similar restoration and retrofit projects would be viable within other communities on Apalachicola Bay and other estuaries in the region. The experiences gained may also help provide some experience that could improve the efficiency and success of future projects. The following recommendations are offered based on observations made during the course of this project.

- Additional stormwater treatment needs are evident throughout much of the Apalachicola Bay basin. Within Eastpoint, these include installing treatment within the basins that currently have the highest density of development including Indian Creek, South Eastpoint and Poor House Creek basins. In areas where available land is limited, the use of baffle boxes or similar systems may be the most feasible approach. Nearby, within the Apalachicola and Carrabelle city limits, it appears that considerable untreated stormwater enters the river and bay from the developed areas. It is recommended that further assessment and planning consider the need and feasibility of stormwater retrofits in this area. Implementation of the Eastpoint Stormwater Master Plan that is in development will also build upon the initial accomplishments of this project and help improve conditions within the St George Sound and Apalachicola Bay.

- It is recommended that the District and FDEP continue to develop partnerships with local communities to explore the need and potential for stormwater retrofit projects and habitat restoration. Results obtained through this project may help establish realistic methods and funding needs.

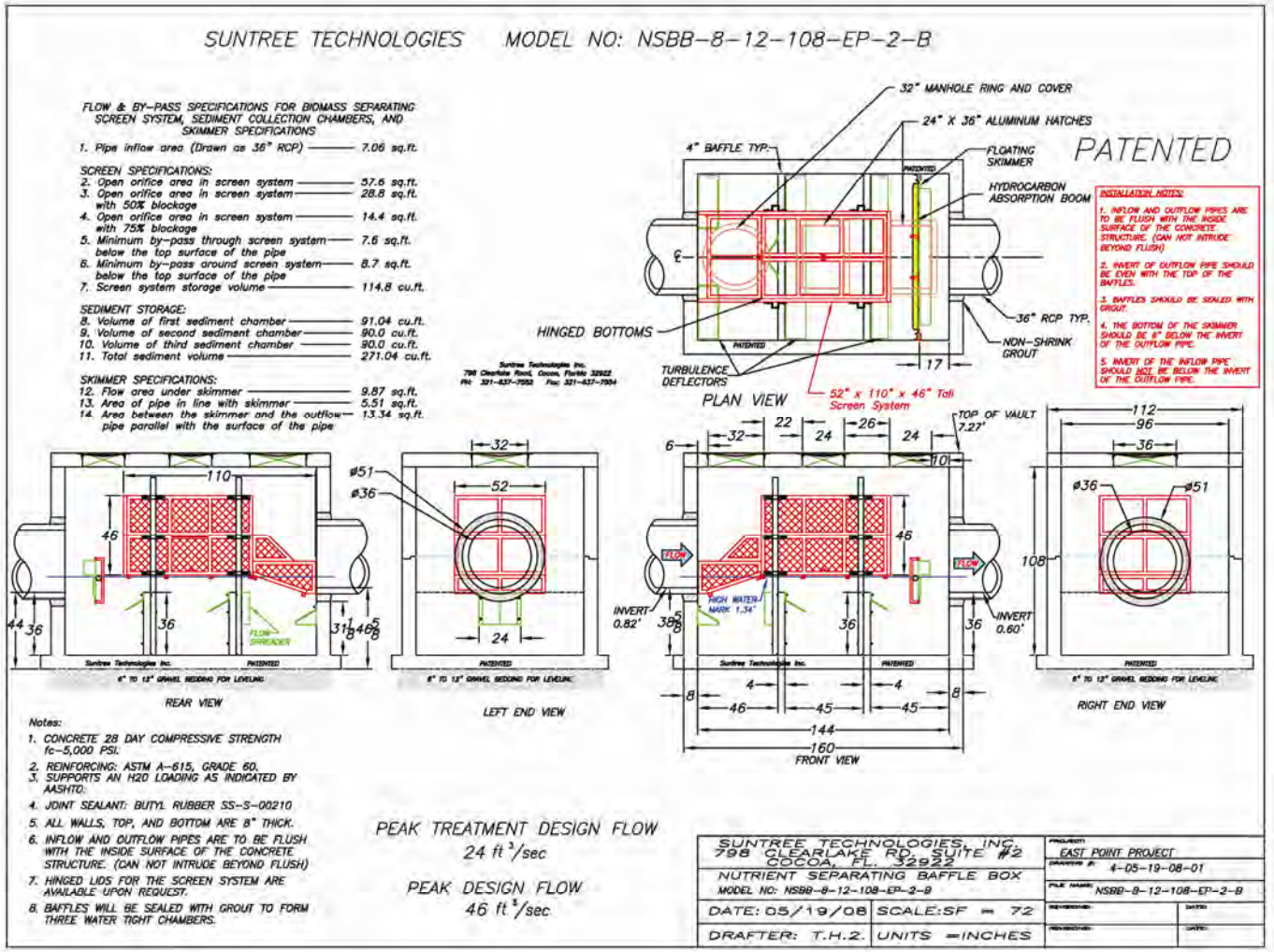
- Monitoring the performance of the stormwater treatment boxes will continue with the collection of observational data about the amount of floatable trash and debris that accumulates and the frequency of cleaning required. This information may provide guidance on the frequency of maintenance required based on criteria such as land use, basin size, types of conveyances and other considerations. Water quality monitoring of the treatment systems may be considered as a future research effort to provide quantitative data on the pollutant removal capabilities of these systems. In addition, the District will work with the County to monitor and observe the performance of structures 6, 7 and 8 to insure the cross bars at the box inlets don't create a dam effect from debris accumulation and subsequent upstream flooding. Structural modifications or temporary removal of the cross bars before large storm events will be implemented if conveyance problems are observed.

- Additional research is needed to develop more specific guidelines for modifying personal practices to reduce non-point source pollution. It is difficult to attribute specific outcomes to any particular set of actions residents may take to reduce their

contribution to non-point source pollution. We are currently unable to tell residents how much or when to apply fertilizer or pesticides to minimize detrimental effects to receiving water bodies. Cause and effect examples and specific guidelines on sustainable practices that will provide long term protection to aquatic habitats may help convince citizens not already committed to environmental protection to take the time and effort necessary to change their personal habits.

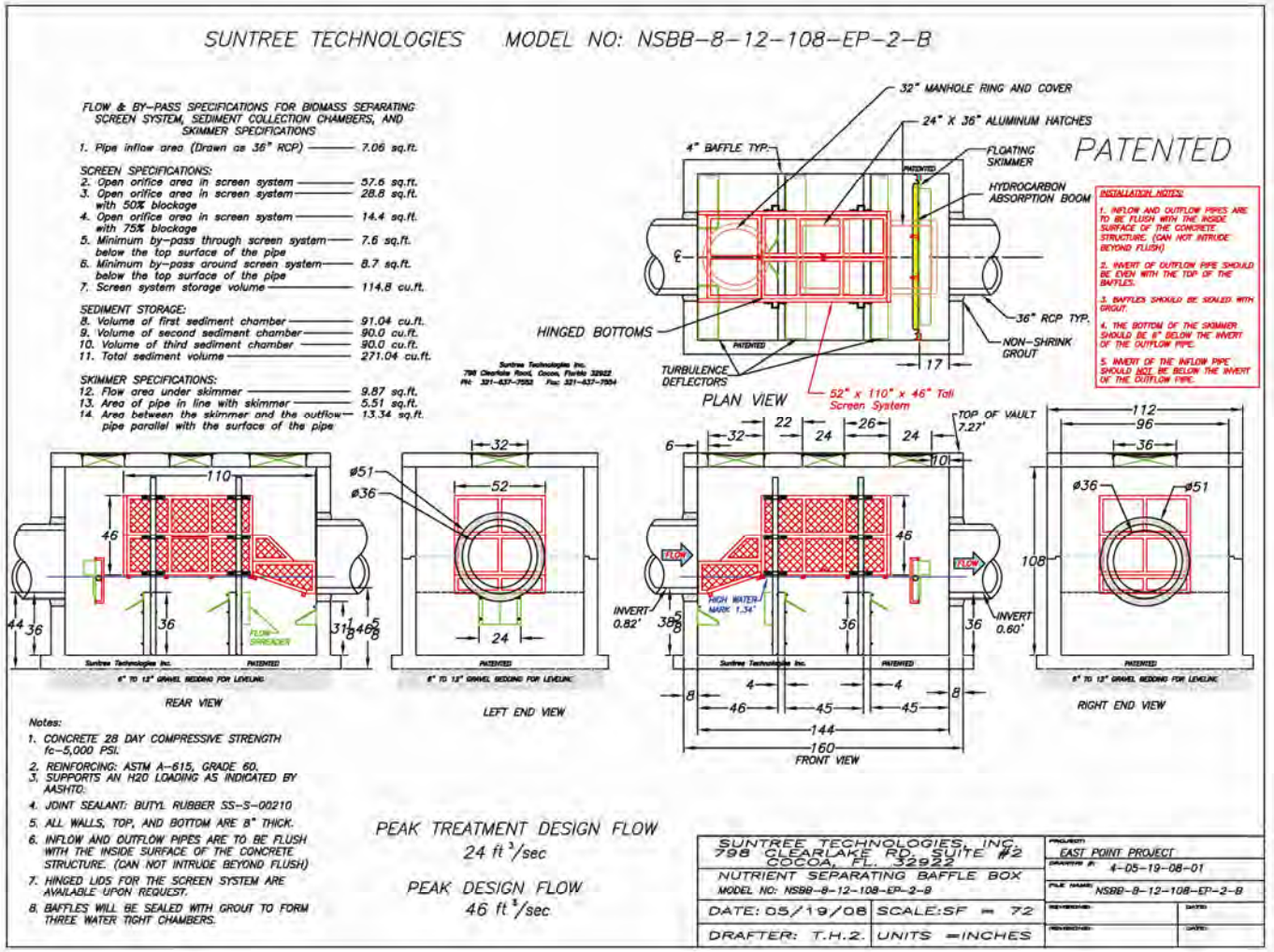
The Northwest Florida Water Management District continues to implement a watershed management program within the Apalachicola River and Bay watershed. Program components include resource protection, ecological restoration, water quality protection, public education and land management. While this specific grant project has concluded, sustained efforts will continue to protect and restore the water resources of the Apalachicola River and Bay system and the benefits it provides for the community.

APPENDIX A – Baffle Box Shop Drawings



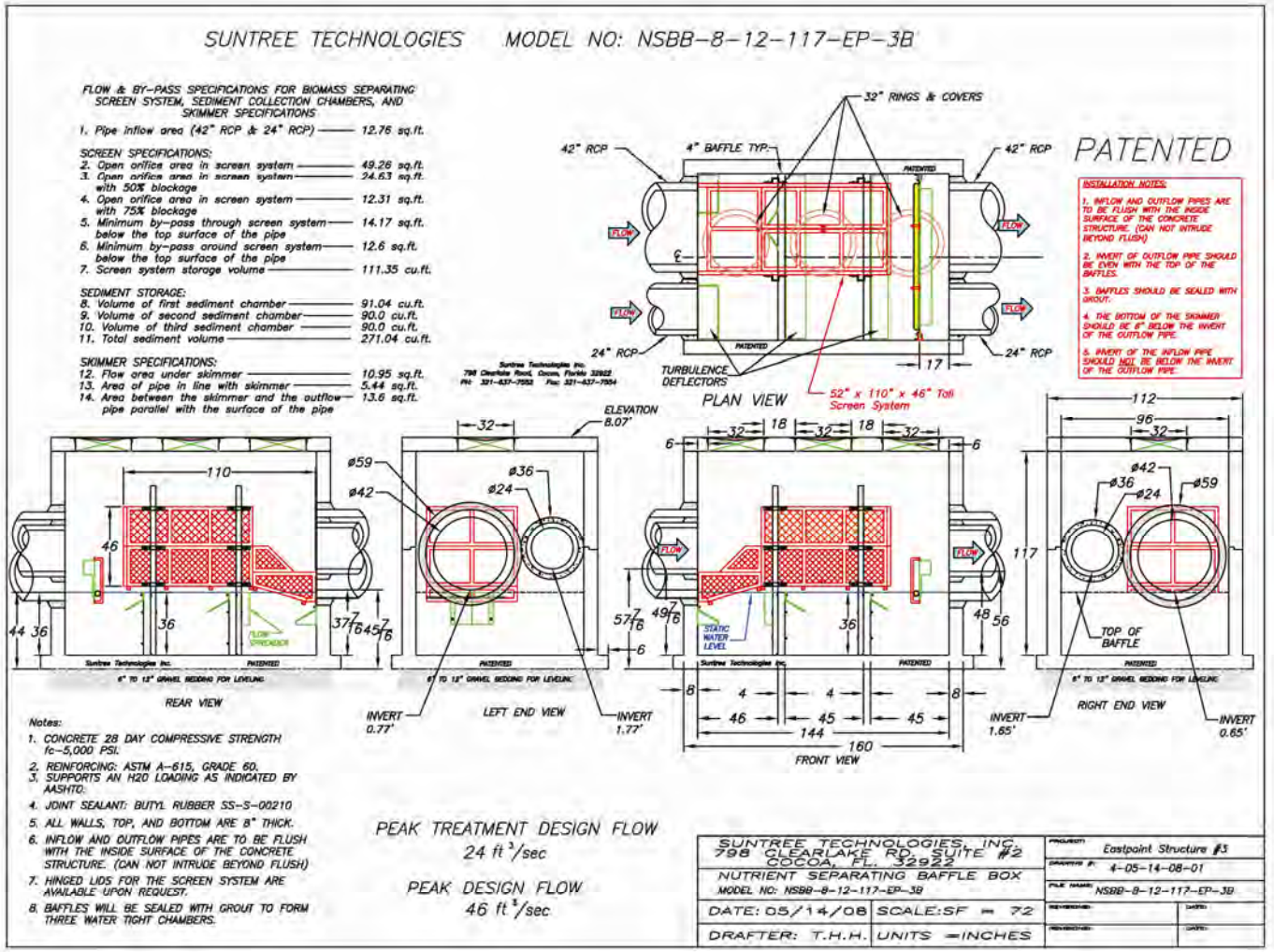
Structure 1

APPENDIX A – Baffle Box Shop Drawings



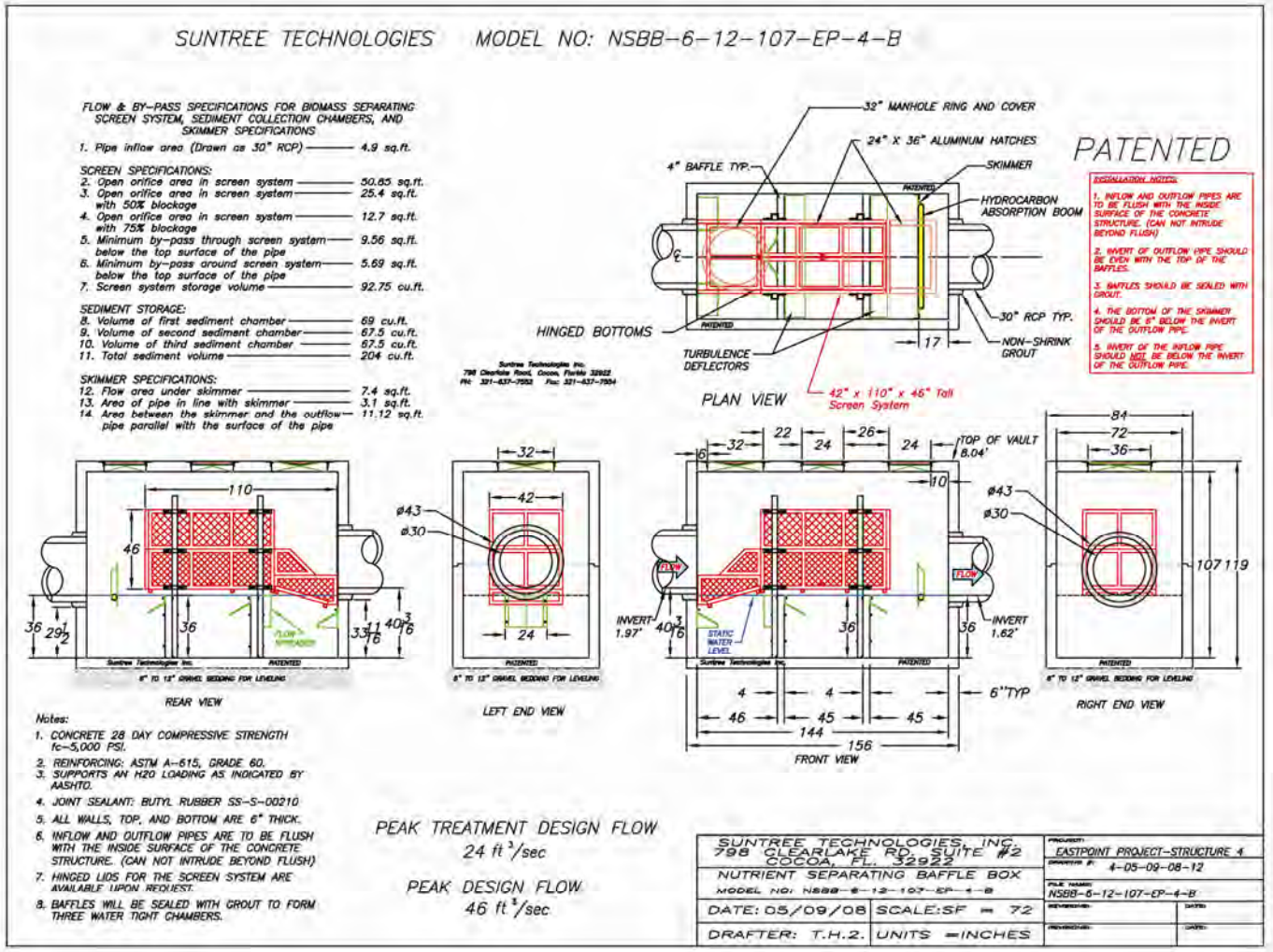
Structure 2

APPENDIX A – Baffle Box Shop Drawings



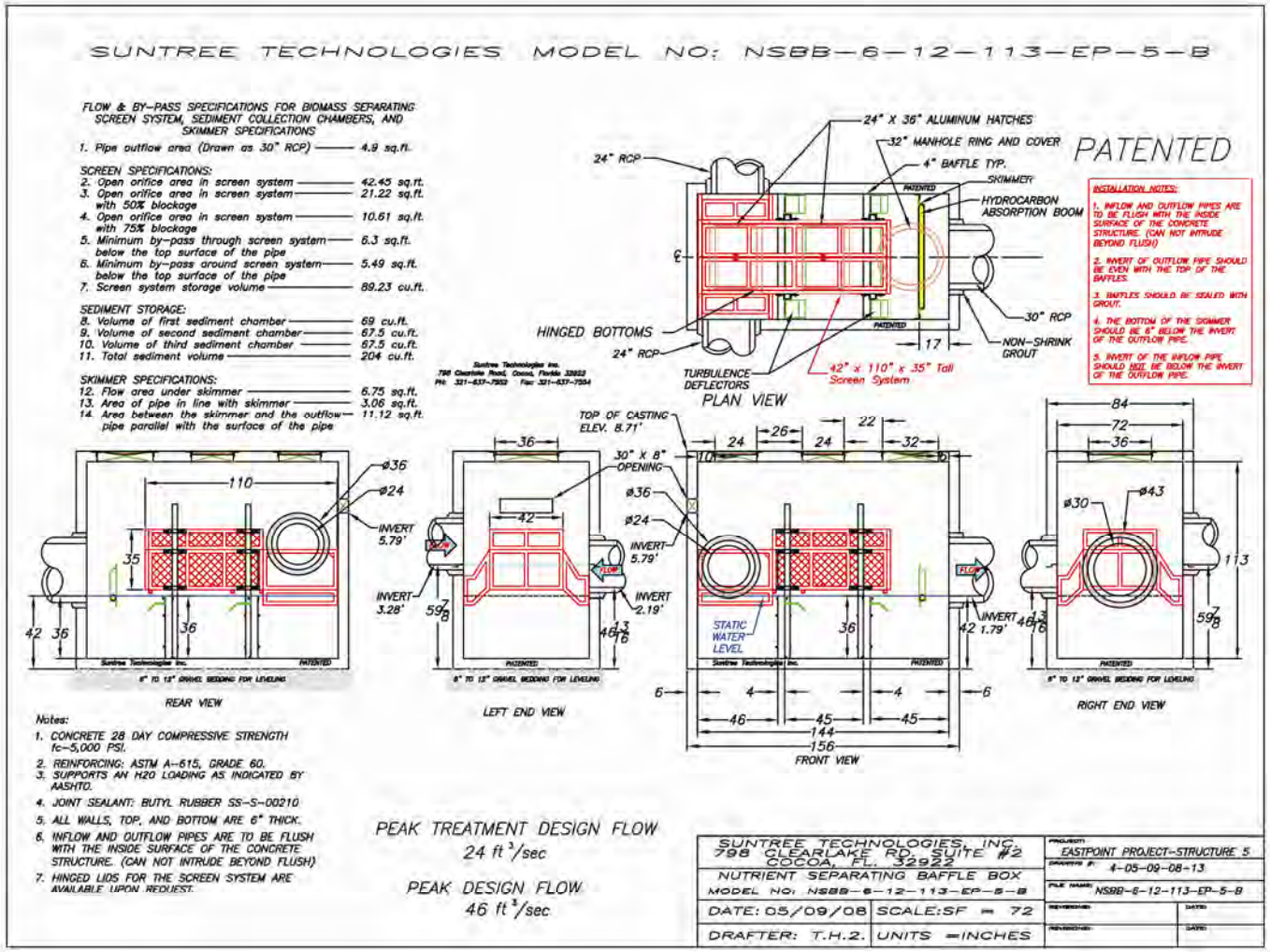
Structure 3

APPENDIX A – Baffle Box Shop Drawings



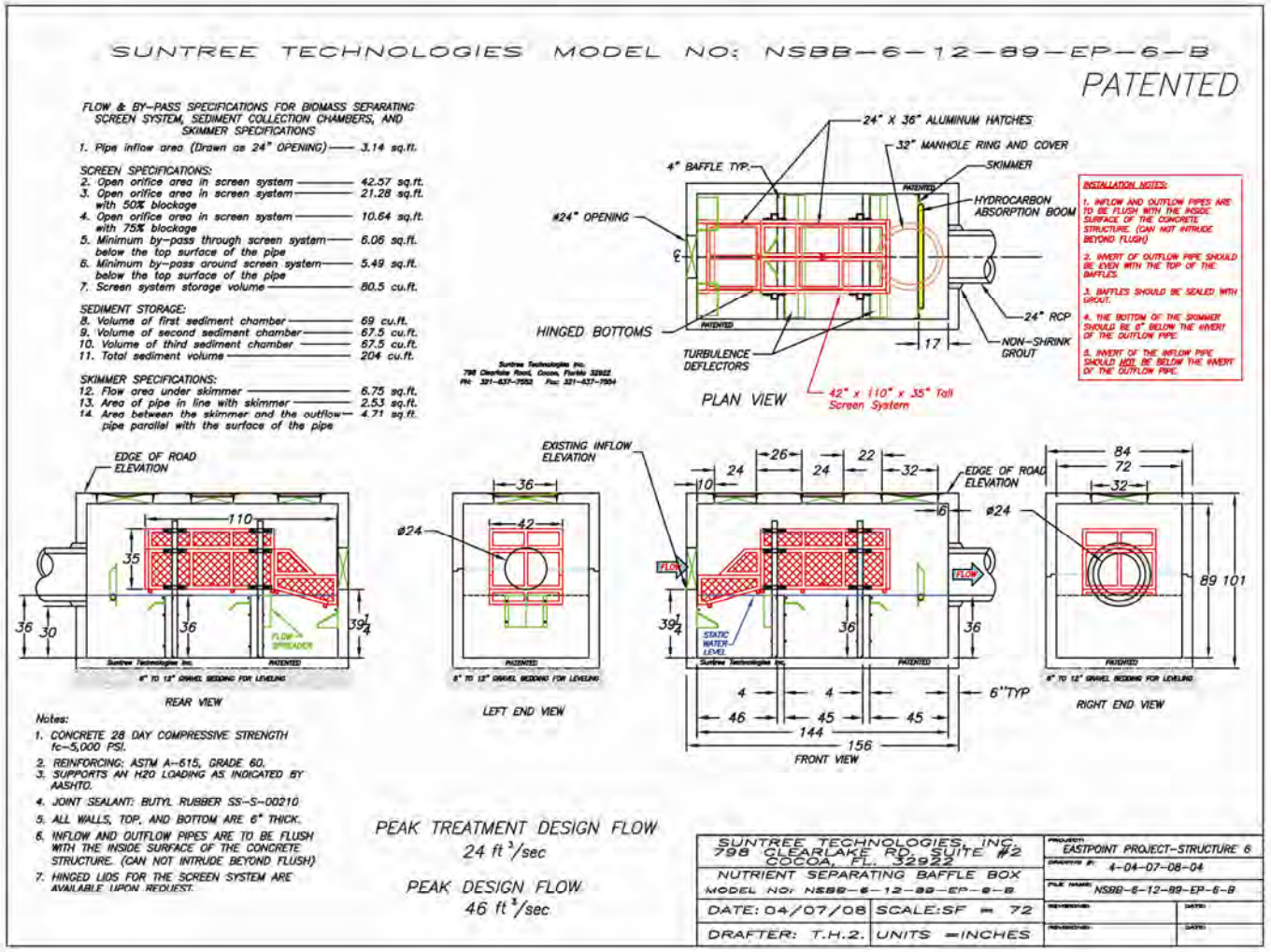
Structure 4

APPENDIX A – Baffle Box Shop Drawings



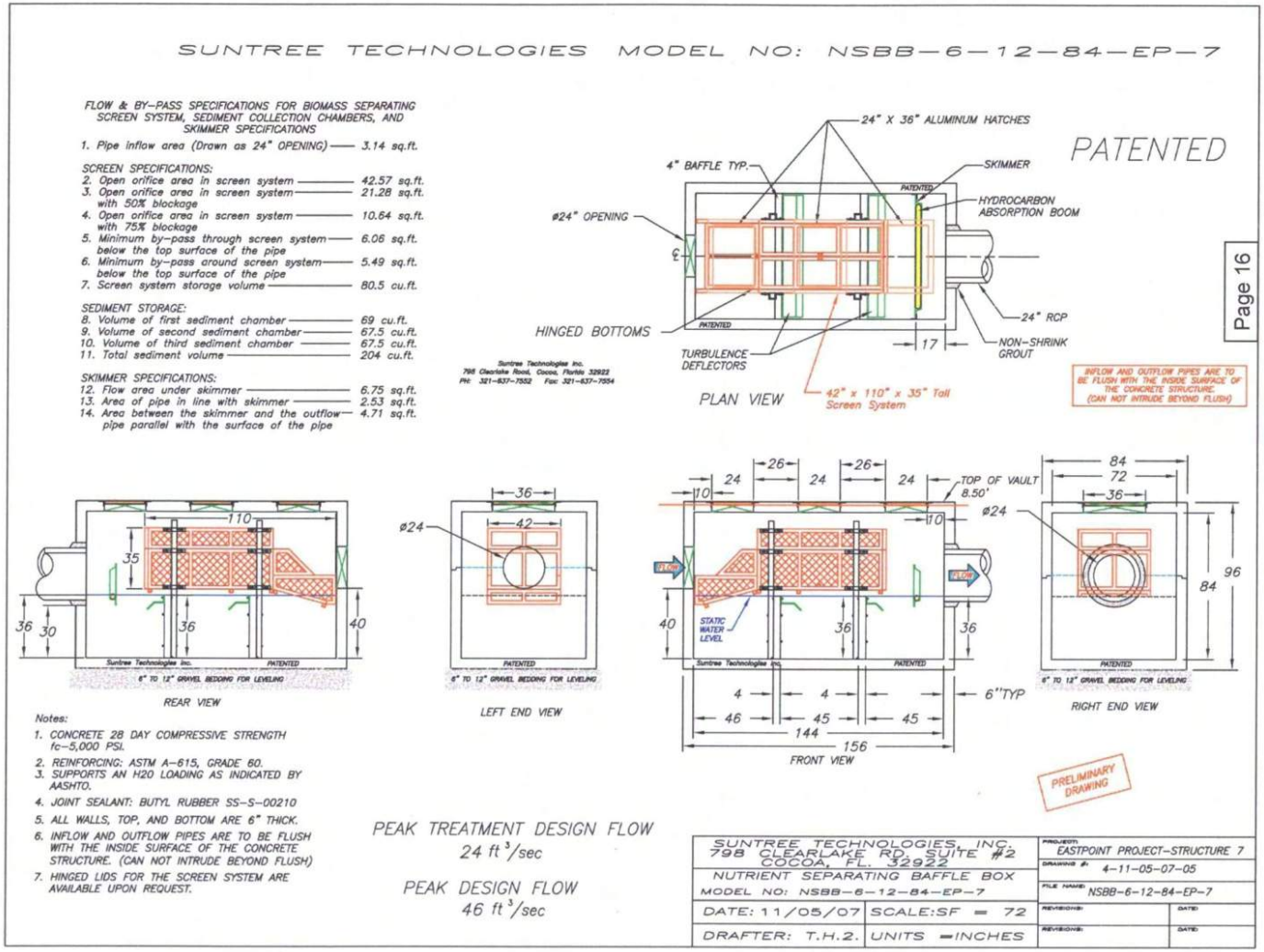
Structure 5

APPENDIX A – Baffle Box Shop Drawings



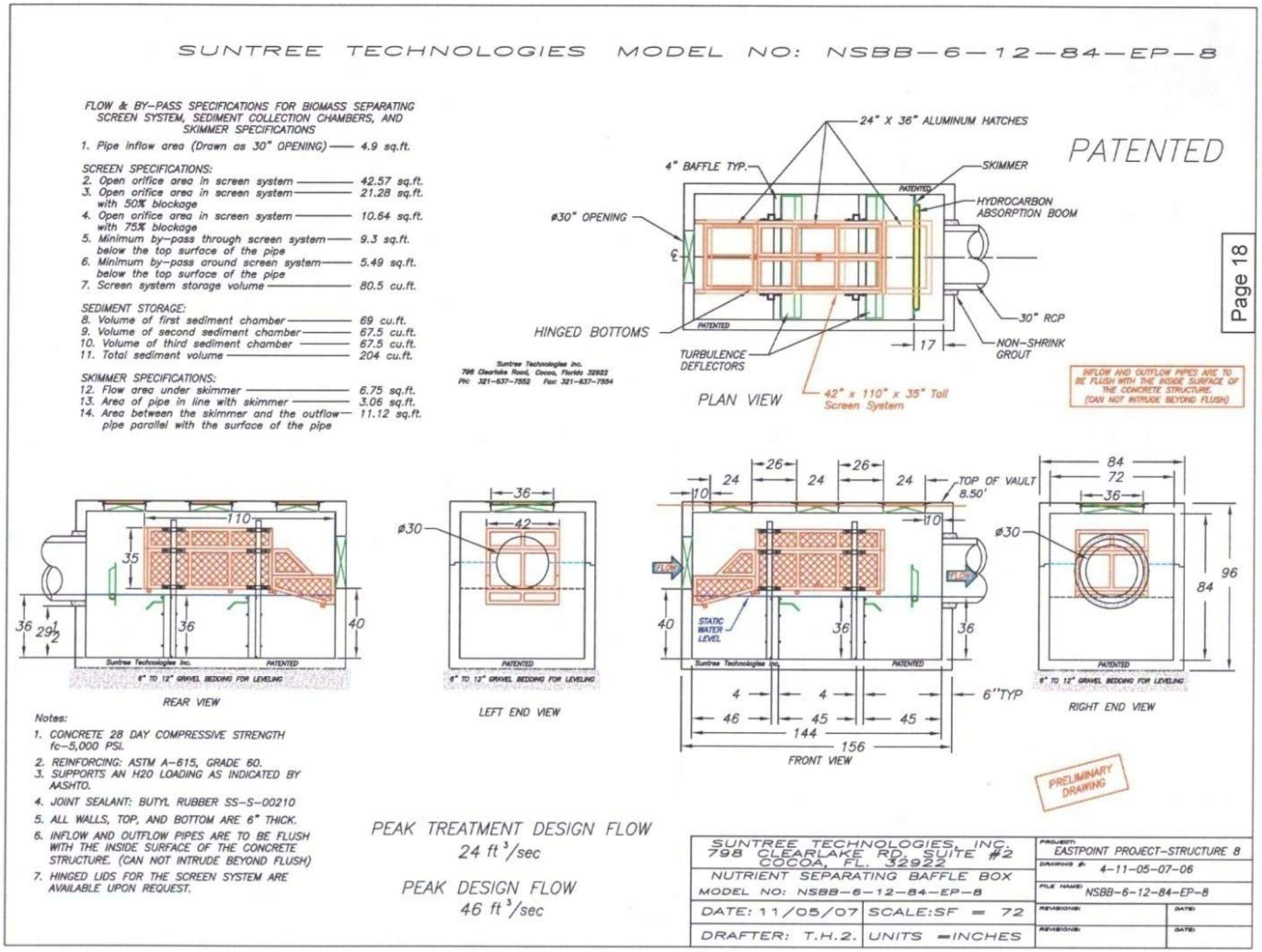
Structure 6

APPENDIX A – Baffle Box Shop Drawings



Structure 7

APPENDIX A – Baffle Box Shop Drawings



Structure 8

APPENDIX B – Project Schedule

Activity	Date
Grant Application Submission	10/07/05
Project Design Start Date	06/30/06
Final Design Completion Date	08/10/07
Drainage Connection Permit Submitted to FDOT	08/14/07
Drainage Connection Permit Approved	08/22/07
Invitation to Bid Issued	10/29/07
Pre-Bid Meeting	11/07/07
Bid Opening	12/04/07
District Governing Board Approves Bid and Contract	01/24/08
Contract Executed with Contractor	02/11/08
Pre-Construction Meeting/Notice to Proceed	02/14/08
Construction Begins	04/28/08
Construction Completed	07/30/08
Final Inspection	08/05/08
Final Report	09/30/08
Project Close-Out	10/07/08