



BREVARD COUNTY
BOARD OF COUNTY COMMISSIONERS

**INTER-OFFICE
MEMORANDUM**

To: Board of County Commissioners
Through: Stockton Whitten, Interim County Manager
Mel Scott, Assistant County Manager
From: Ernie Brown, Director, Natural Resources Management Office (NRMO)
Subject: **Tropical Storm Fay Post-Disaster Stormwater After-Action Report**
Date: June 5, 2009

As requested by the Board, Staff has prepared an overview of the Stormwater Program activities and efforts as a result of Tropical Storm Fay. This after action report highlights the actions taken beyond the maintenance and repair work of the drainage systems performed by the Public Works Department. Specifically, the Stormwater Program is responsible for planning, designing and construction of retrofit projects to mitigate flooding and meet mandated water quality criteria.

Storm overview

From August 19th through the 21st, 2008, Tropical Storm (T.S.) Fay delivered more rainfall to Brevard County than any other storm in recorded history (Figure 1). T.S. Fay overwhelmed many private and public stormwater systems that were designed for much less severe storm events. This led to widespread flooding of homes, businesses, streets, agricultural areas, back yards and vacant lands. While some areas remained flooded for up to two weeks, most of the county drained rapidly. Following is a summary of drainage-related activities that occurred before, during and after T.S. Fay.

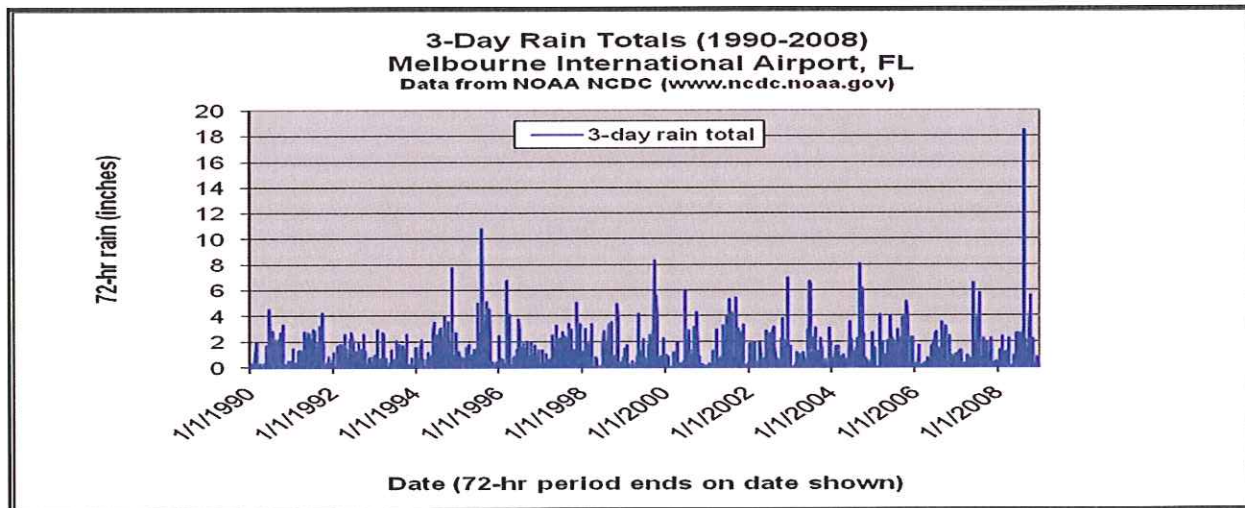


Figure 1. Tropical Storm Fay was unique in delivering extremely high rainfall for three consecutive days. This figure graphs the total rainfall recorded by the National Weather Service at the Melbourne International Airport for any three consecutive days since 1990. The 3-day total rainfall for T.S. Fay recorded in 2008 is more than double the total rainfall associated with Hurricane Wilma in 2005, Hurricanes Frances and Jeanne in 2004, Hurricane Irene in 1999, and nearly double Hurricane Erin of 1995. Rainfall recorded during T. S. Fay at the Melbourne Airport was significantly less than rainfall recorded in some parts of Brevard County that received over 25 to 30 inches.

Activities before and during the storm

The Natural Resources Management Office (NRMO) issued press releases immediately prior to the storm encouraging the public and home owners associations (HOAs) to check their neighborhood storm drain systems and ensure they were free of debris and ready to perform as designed. NRMO staff, along with many other County Departments and agencies, assisted with manning the Emergency Operations Center during the storm, coordinated opening of the Canaveral Locks with the Army Corp of Engineers to decrease flooding in North Merritt Island (D2), requested opening of the C-54 locks to reduce flooding risk in Districts 3 and 5, and performed county-wide field surveys of peak flood elevations and drainage performance during and following the storm. A helicopter survey was also made with SJRWMD to assess agricultural drainage performance in the St. Johns River basin, particularly adjacent to the Deer Run (D5) area. This data was necessary to compile a comprehensive understanding of flood conditions, cause and potential solutions. NRMO and the Public Works department coordinated closely through this process to ensure that efforts were maximized and resources were properly allocated.

Flood mitigation after the storm

During emergency operations, the Public Works Department serves as the lead coordinating agency with support from NRMO and other departments. Through this coordinated effort extensive mitigation efforts were undertaken. Specifically, crews set up pumps in areas of Merritt Island where waters could be pumped to reduce flooding inside homes. Staff also determined that a temporary weir installed at I-95 just north of Eau Gallie Blvd (D4) was impeding drainage of an adjacent residential area. Emergency authorization was secured from St Johns River Water Management District (SJRWMD) to remove the weir and within a few hours a Public Works crew demolished the weir. Subsequently, water elevations in the adjacent Eau Gallie Estates dropped approximately two feet in less than 5 hours. At Lamplighter Village (D5), staff worked with the Sheriff and the National Guard to remove major debris that would have impeded flood relief if not removed. Staff also worked with the legislative delegation, specifically Senator Altman and the Governor's office, to promote expedited assistance from the Florida Department of Transportation (FDOT) for flood relief under I-95.

After the storm flood receded, Public Works initiated necessary repairs to pipe systems and cleaned all major outfalls with extra emphasis on those outfalls associated with the areas where flooding was the worst, while NRMO staff began work on identifying, quantifying and designing retrofit projects. Those systems are currently in the best condition that Public Works' current funding levels will reasonably permit. A short list of those outfalls includes those along the following roads: James, Cox, Gray, Range, Pluckebaum, Pine Island, John Rodes, and Lake Drive. Significant pipe repairs have been completed throughout the County, some of which include systems in the Savannahs (Merritt Island) and Barefoot Bay, under John Rodes (Melbourne) and Satellite (Canaveral Groves) Boulevards, and in numerous other locations. With only a few exceptions, the known drainage and road systems under County jurisdiction have been restored or repaired from damage caused by T.S. Fay. Many of those systems are now in better condition than they were prior to the storm as failed aging and inferior pipe and other structures have been replaced with new and, in many cases, superior materials. Unfortunately, in most cases the capacity of these systems is not greater than it was previously, but the durability under extreme conditions is improved.

Damage reports and potential funding for improvements

Staff worked with the Federal Emergency Management Agency (FEMA) to develop Hazard Mitigation Grant Proposals in the areas of greatest storm flooding impact. Damage reports compiled by County Building Inspectors, and laser bathymetry and survey data were collected and analyzed to identify flood mitigation projects, support grant requests, and inform the public and elected officials of issues, opportunities, hurdles and funding needs. Public workshops were held in North Merritt Island (D2), West Cocoa (D2), Upper Eau Gallie (D4), and Lamplighter Village (D5). County and SJRWMD staff also met with representatives of Deer Run (D5).

Over 50 grant requests were prepared and submitted to FEMA/Division of Emergency Management, the Department of Environmental Protection, SJRWMD, National Resource Conservation Service (NRCS) and various other agencies that were potentially receiving stimulus funds. NRCS funds (\$365,700) were granted to redesign the failed drainage at Broadway Blvd (D1). Hazard Mitigation funds (\$3.3 M) were secured to increase drainage under I-95 at Lamplighter Village and a Hazard Mitigation grant (\$750,000) is anticipated to improve drainage in West Cocoa.

Project re-prioritization

As a result of T.S. Fay's impacts on the County Stormwater system, staff reassessed project priorities based on flood issues and re-aligned resources to accelerate those projects most likely to make a significant difference in the immediate future. Since T.S. Fay hit, NRMO has completed construction of the Lake Washington Pond (D4) and piping of the L-2 Canal (D5). Construction is nearly complete for the Upper Eau Gallie Drainage Improvements (D4) and Broadway Blvd (D1). Construction tasks are either underway or awarded for the West Melbourne Baffle Boxes (D3), Area One Watershed Improvements (D1), and Tequesta Harbor Baffle Box (D2). The following projects are expected to go to bid and begin construction within six months: Carpenter Rd (D1), Chase Hammock/Lake George (D2), West Cocoa Culvert Improvements-Phase I (D2), Merritt Island Baffle Boxes (D2), Merritt Island Airport Pond (D2), Washingtonia Intersection (D4), and Stage I of the Crane Creek/St. Johns Outfall project – the Culverts under I-95 at Lamplighter Village (D5). In addition, design and permitting is underway for Pine Island (D2), West Cocoa Culvert Improvements-Phase II (D2), Beach Outfalls (D3 and D5), Valkaria Lakes (D3), Sarno Lakes Phase II (D4), and Upper Eau Gallie Culvert Improvements (D5). Staff remains steadfast in implementing viable and timely drainage improvements in all of the County's most flood prone areas.

Looking Forward

It is recognized that current funding is insufficient to adequately address the known flood protection needs throughout the County. The re-prioritization of projects enabled staff to move forward with the most critical components of the major projects. However, it will take many years to accumulate sufficient funds to complete some of the indentified solutions for the priority project areas.

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The Board may desire a more thorough discussion on funding solutions to adequately address the needed flood protection response. Further, the Board may be prompted to consider other tools, such as ordinance revisions, to minimize future flood impacts to county residents. For more information on priority projects, go to <http://natres.brevardcounty.us/hottopics.cfm> or go directly to the following web addresses to view specific project presentations.

West Cocoa Drainage Presentation:

- http://natres.brevardcounty.us/documents/WestCocoaArea_02-24_2009Final_web.pdf

Crane Creek/M-1 Lamplighter Presentation

- http://natres.brevardcounty.us/documents/CraneCreekPresentation2_5_09.pdf
- <http://natres.brevardcounty.us/documents/CraneCreekFactSheet2-5-09rev.pdf>

North Merritt Island Post-TS Fay Drainage Evaluation Presentation

- http://natres.brevardcounty.us/documents/NorthMerrittIslandArea-web_000.pdf

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