



**Stormwater Advisory Team  
(SWAT)  
County-Wide Stormwater  
Recommendation Report**

**July 28, 2015**

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## 1.0 Executive Summary

The Stormwater Advisory Team (SWAT) was established by Escambia County after heavy rains and flooding in early 2014. The SWAT has been considering many of the challenges associated with stormwater management in Escambia County; this effort has resulted in two sets of recommendations:

1. Infrastructural Priorities that feature high-impact, cost effective projects
2. Policy Enhancements including more precise design requirements, updates to storm water basin data, GIS database upgrades and the adoption of new Low Impact Design Standards

As a collaborative effort, this report includes a wide range of public and stakeholder ideas and input. The resulting recommendations provide environmentally sound, comprehensive, cost effective solutions for many of our local stormwater challenges.

The SWAT has concluded that for stormwater repairs and upgrades to be effective and efficient, a County-wide approach must be taken. Escambia County contracted with Baskerville-Donovan, Inc. to create a Stormwater Needs Assessment, bringing together all known recommendations for stormwater improvement projects in one location, including the April 2014 Flood projects noted by SWAT. The Stormwater Needs Assessment, which is a stand-alone document and submitted with this paper, indicates all known stormwater infrastructure needs to-date along with their rankings (priority) and other critical information. The SWAT intends this document to be a planning tool which will form the structure of future improvement and funding priorities as the County moves forward with a Stormwater Infrastructure Improvement Program.

In addition to the physical improvements that can be made to the County's stormwater system, there are also improvements that can be made to the stormwater policies and Land Code of Escambia County.



The SWAT's recommendations seek to ensure the safety and protection of public and private property with future .

First, the County should consider updating its precipitation frequency estimates to reflect the latest available research from NOAA's National Weather Service. This should be done in conjunction with the Florida Department of Transportation to obtain a broadly acceptable standard.

Secondly, the County should produce a Low Impact Design Manual for use in the County and provide incentives for its implementation.

Thirdly, continue to develop basin studies for more areas of the County as well as updating older studies.

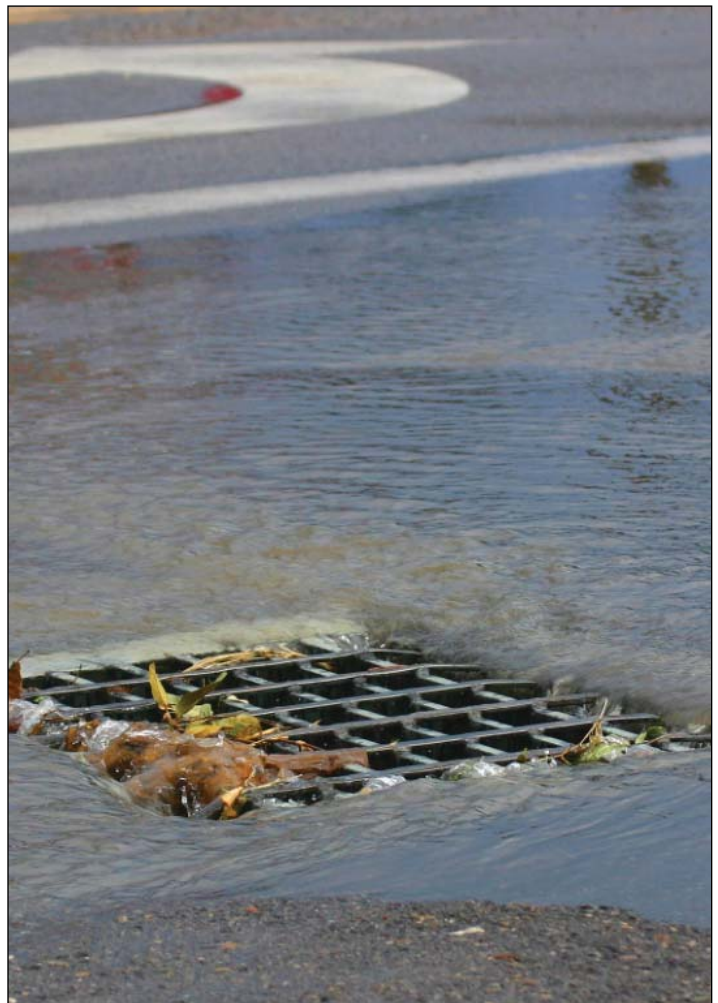
Lastly, the County should seek to further integrate and coordinate GIS, asset management, and stormwater infrastructure through the Review Committee's as-built certification process.

## 2.0 Introduction

### 2.1 Background

On the night of April 29, 2014, a historic rain event occurred in Pensacola and its surrounding regions. By some accounts the rainfall exceeded 20 inches overnight. The previous day the area had already experienced a relatively large storm event which had produced some minor flooding itself. The unnoticed effect of the early storm event was that the ground had become saturated as the rainfall infiltrated the topmost layers of soil. When the record rainstorm of the 29<sup>th</sup> finally reached the Pensacola area, the ground was already nearly incapable of accepting stormwater and practically all of the rainfall was converted to runoff. These conditions combined to produce historic flooding in the Pensacola and surrounding areas. The rainfall itself would later be described as approaching the 500-yr storm and the flooding may have been of an even greater degree due to the compounding factors.

The flooding resulting from the storm affected all types of infrastructure. Most privately owned infrastructure, typically being designed for a 25-yr storm, was quickly overwhelmed and began discharging the runoff with little to no attenuation (decrease) of the peak intensity.



All of this stormwater entered the public infrastructure system which was also overwhelmed in many areas. Throughout Escambia County, stormwater overtopped roads where culverts and stormwater collection systems lacked the capacity to carry the historic runoff. The stresses involved in roadway overtoppings caused erosion of surrounding soils which in the most severe cases caused failure of the roadways rendering them incapable of carrying traffic.

As the stormwater met these systems with insufficient capacity, the depth of flooding increased. Where there was no relief for the increasing depths, floodwaters began flooding homes as well as public and private buildings alike. By the time the flooding receded, Escambia County was left with displaced residents, washed out roadways and in excess of \$25M in damage to public facilities alone (*Escambia County Flood Recover: 1-year Anniversary Report*).



*Blue Springs Drive*

As local governments began to assess the damage and attempt to repair and reopen necessary facilities, the needs of the existing stormwater infrastructure began to become apparent. It also became apparent to most of those affected that the stormwater system should be upgraded while repairs were taking place.

In order to efficiently and effectively make repairs and upgrades to its stormwater system, Escambia County sought to develop recommendations for public stormwater infrastructure from both technical and community sources. To that end the Board of County Commissioners established the Stormwater Advisory Team (SWAT) consisting of seven members of the professional community: five (5) members appointed by the Escambia County Commission and two (2) members appointed by the City of Pensacola. Specifically, Escambia County Resolution R2014-110 (provided in Appendix A) sets forth the purpose of SWAT in the following directives:

- Assist the staff in identifying conditions associated with the April flooding event
- Review and comment on staff's recommendations prior to the staff's presentation to the Board of County Commissioners for its review

The following representatives were appointed to the SWAT:

- Mary Gutierrez, District 3 – SWAT Chair; Exec. Dir. Earth Ethics, Inc.; Principle, Stella Maris Consortium, LLC
- Phil Turner, City of Pensacola – SWAT Vice-Chair; Director, Arch. & Eng. Services, Inst. for Human and Machine Cognition

- Dr. Elizabeth Benchley, City of Pensacola – Director, Archaeology Dept. & Archaeology Institute, University of West Florida
- John Cheney, District 5 – Vice President, Mathes Electric Supply Co., Inc.; former Escambia County Engineering staff
- Glenn Niblock, District 2 – Mechanical Engineer (ret.); MBA, Business, Quantitative Analysis
- Garrett Walton, District 4 – Attorney; Developer; Chief Executive Officer, Rebuild Northwest Florida
- Nathan White, District 1 – Outside Sales Professional; former Escambia County employee

The Stormwater Advisory Team began meeting with Escambia County and City of Pensacola staff in December of 2014. Since that time monthly meetings have been held to review the current state of the City and County's stormwater infrastructure.

Discussions have focused on those locations that received the most severe damage during the April storm and has included funding, alternatives, and current status. In addition to the current state of the area's infrastructure the SWAT has discussed and reviewed important stormwater issues affecting . Several of these discussions have resulted in recommendations that will be explained herein. Meeting minutes from the SWAT meetings have been provided in Appendix H.

For technical and administrative support, Baskerville-Donovan, Inc. was contracted to assist the SWAT in the directives established by the Commission. Specifically, Baskerville-Donovan was tasked with providing the following:

- Stormwater Needs Assessment List with Rankings
- White Paper on the Countywide Stormwater System Program

As a parallel activity, the City of Pensacola commissioned several studies to suggest improvements within its own drainage basins. Results of these studies have been published on the City of Pensacola's website (<http://cityofpensacola.com/recovery>) and cover such areas as Piedmont Road Area, Aragon Court, Downtown Pensacola, Long Hollow Basin, and others. These studies along with the recommendations that they produced have been discussed by the SWAT team in cooperation with Escambia County and City of Pensacola staff. These discussions have taken place in context of County-wide drainage issues. A compilation of the City's recommended improvements has been included in summary in Appendix C and can be reviewed in detail on their website referenced above.

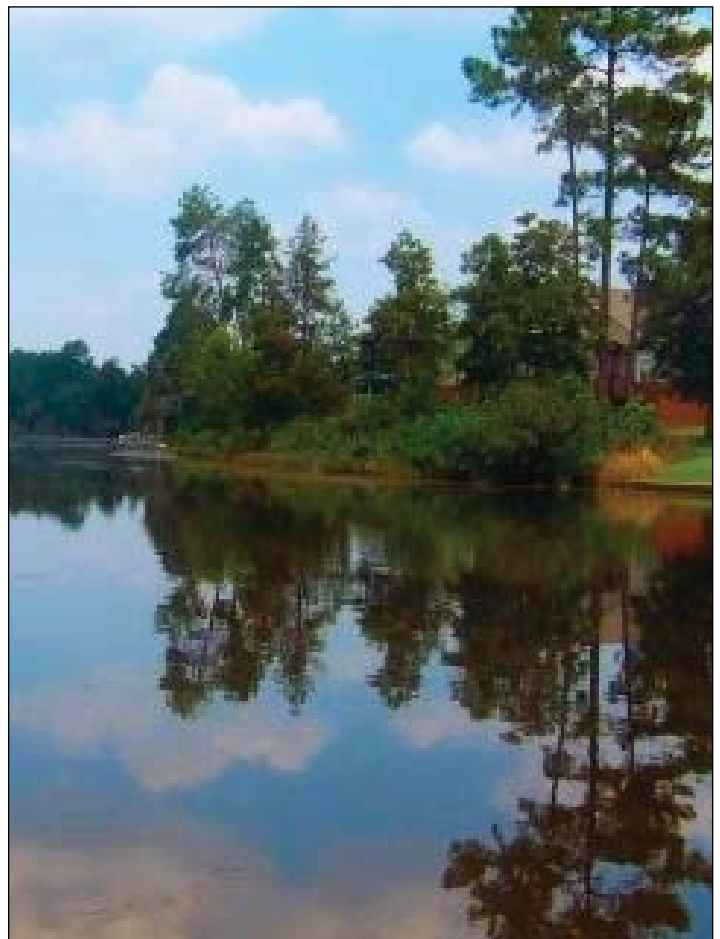
Cooperation between Escambia County and the City of Pensacola began soon after the April 2014 storm events. Specifically the cooperation focused on one specific basin shared with the City of Pensacola, the Pensacola Bay Basin which includes the Long Hollow Basin, Aragon, and the majority of the downtown area. The northern portion of this basin is the "Delano" Basin, which "pops off" into the Long Hollow Pond. There have been multiple studies by the City for the City portion of the Basin and multiple studies / updates by the County for the Delano Area (Herman Street, Fairfield, L Street, and Leonard Street) to consider downstream impacts as a supplement to the Pensacola Bay Basin Study.

The City teamed up with the County to compete for the National Disaster Resilience Competition (NDRC) Ph1 funds to address flooding issues in the Pensacola Bay Basin. Though our area did not make the cut for Phase 1, County and City are continuing to work together to put together a package, to include a holistic basin model / study, for the Phase 2 submittal. As the City and County continue to work together, multiple coordination meetings have taken place and will take place as needed. Currently, the City is attempting to acquire a consultant to assist in the Phase 2 submittal which will include this holistic model of the subject basin.

Another funding source is FEMA's Local Mitigation Strategy (LMS), in which, the #3 project is the Delano Basin for Escambia County. This was required for subsequent submittal, for Hazard Mitigation Grant

Program (HMGP), to Florida Division of Emergency Management (FDEM).

Coordination of this type has its challenges. In the Delano area, the County needs the appropriate properties for pond sites, and acquiring the properties has been challenging. A potential coordinated effort is the Spring Street - Leonard Street - Pensacola High School Drainage, which would be a Joint Drainage project between the City, the County, and School Board to address flooding on Spring Street and Pensacola High School. The School Board requested the County to work together on a project for this area. There is difficulty in the City portion of the Basin, with many split upon the type of design approach to be used to begin a remedy to the downtown flooding issues. However, the partnership between the City and the County is strong and hopes are high that the Phase 2 Grant will prove financially beneficial to the City and the County. In the future, the cooperative efforts intend to continue so that the Pensacola Bay Basin stormwater issues can be accessed, prioritized, funded, and constructed.

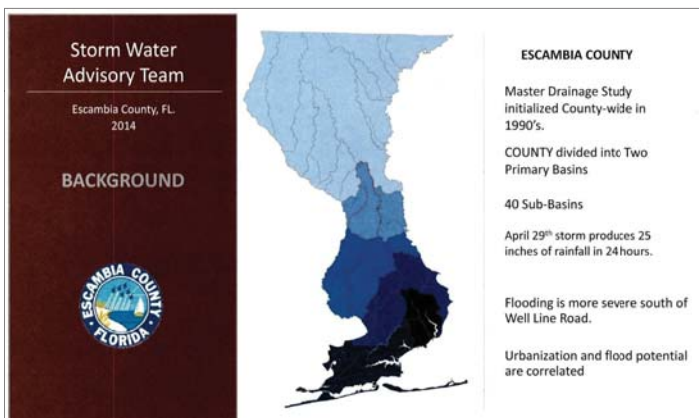


## 2.2 SWAT Overview

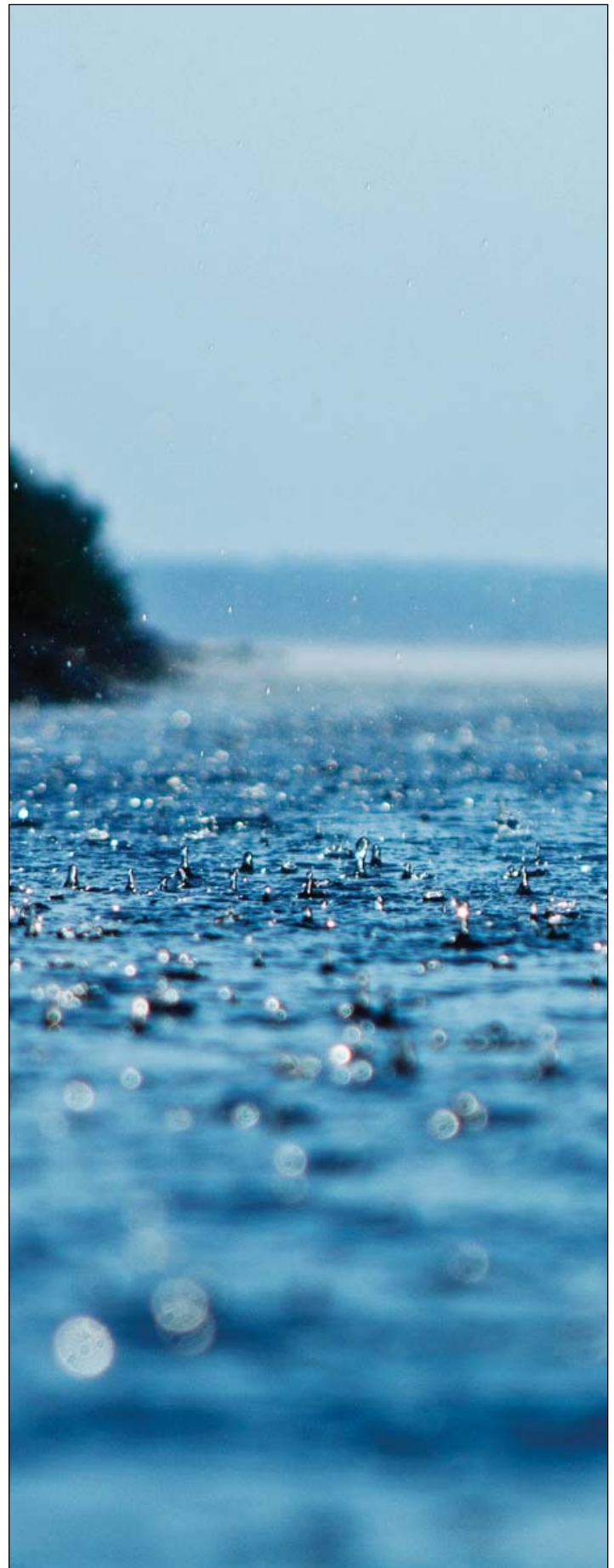
The Stormwater Advisory Team first met in December 2014 and has held seven public meetings. A summary of stormwater topics from the meetings is provided below and the minutes of each meeting may be reviewed in Appendix H.

### December 2014 SWAT Meeting:

The December meeting was SWAT's first meeting and included much dealing with the nature and process of public meetings. The main stormwater focus of the meeting was a stormwater presentation provided by Escambia County staff. The presentation described the background and current state of the county's stormwater infrastructure. The county is divided into two primary basins corresponding to the Escambia and Perdido River basins. These can be further subdivided into smaller drainage basins typically corresponding to a single outfall to one of these rivers. The County contains 40 of these drainage basins, many of which have already been studied with the intention of completing studies for the entire county.



The presentation also included information regarding Sustainable Drainage which is closely associated with Low Impact Design. The purpose is to develop drainage features that imitate natural drainage as closely as possible. Basic principles include managing runoff close to its source and managing it on the surface with natural features. Some examples of design features include green roofs, bioretention, and permeable pavement. Developing in this manner can provide multiple benefits including water quality, groundwater recharge, and aesthetics.







Among the other topics discussed were:

- Low Impact Design
- Funding opportunities
- Public information
- Storm repair and mitigation
- Possibilities of revising the Land Development Code

#### January 2015 SWAT Meeting:

The January meeting began with a presentation providing an overview of the April 2014 storm event. A graphic was presented of rainfall totals across the county showing that some locations received more than 21" of rainfall. The rainfall caused damage to public and private facilities across the county, but mostly in the southern area. County teams recorded 2,318 infrastructure damage sites, most of which occurred south of Muscogee Road in Cantonment.

Some drainage background was also provided with the presentation. The terms associated with drainage design were defined, focusing on the 100-year design storm. The 100-year storm is defined as a storm with a 1% chance of occurring in any given year.

Several locations of specific concern were discussed. For each location an overview of the damage and current status was given. The Lake Charlene area had over 100 properties that flooded. This area is under review for improvements to the drainage system and \$2 million in funding has already been applied for. The Crescent Lake dam is another area of concern. The dam forming the lake washed out during the storm leading to more than 40 properties with flooding or access problems. The County already has a study underway to recommend improvements for both repair and mitigation of this area.

Lastly the Delano Area of the Pensacola Bay Basin received large scale flooding, which affected several government facilities including the Escambia Central Office Complex. A study is underway for this area and \$4.4 million has been applied for in funding.



Among the other topics discussed were:

- Low Impact Design
- Storm readiness
- Maintenance of existing drainage system
- City and County cooperation
- Long Hollow pond
- Carpenter’s Creek

February 2015 SWAT Meeting:

At the February SWAT meeting an update was given by staff on the South Old Corry Road Bridge project. The road was completely washed out during the storm after its multiple barrel culvert was overcome. Initial concepts were to replace the culvert with a bridge while repairing the roadway. Issues related to relocating utilities threatened to slow the plan so the decision was made to rebuild the road in a temporary fashion while the utility issues are reconciled. The County will give notice when the project is ready to continue with final construction.

A report of the status of the Lake Charlene area was also given. As noted above in the January Meeting section, this area received severe damage. Items discussed included the following:

- Canal dredging
- Alternatives and cost estimates
- Available funding
- Flood mitigation eligibility



*Damage to South Old Corry Road*

A member of the SWAT presented the team with a review of research regarding the County's standards for precipitation frequency. Presently the County's standard follows that of the Florida Department of Transportation (FDOT). FDOT's standards are derived from research during the 1950's which was based on data from the previous 50 years (approx.). A brief review of rainfall records since that time indicates that what was considered a 100-year storm in those studies has now been experienced by the Escambia County area four times in the last 80 years. The suggestion was made that the County should work towards updating the research with the last 50 years of data to create a standard that is specific to the area.

accepted by the Planning Board, which suggested a 50-year standard instead. Staff will still submit the requested revisions to the BOCC with the 100-year standard. Discussion then turned to the ways that SWAT could aid staff in supporting the revision.

Low Impact Design was discussed by SWAT and it was suggested that one of the members would give a presentation at the following meeting. The presentation would be in support of two changes that will be requested of the BOCC:

- Incorporate Low Impact Design into the Land Development Code (LID)
- Provide incentives in the LDC to encourage the use of LID

Among the other topics discussed were:

- Executive Order for the Federal Flood Risk Management
- Pensacola Basin simulator
- Basin Studies



*Provided to Escambia County by a community member*

Among the other topics discussed were:

- Community involvement
- Grant funding opportunities
- Non-construction areas
- LDC environmental standards

#### March 2015 SWAT Meeting:

During the March SWAT meeting, staff and SWAT discussed the progress of the new design storm standards. Staff is planning on submitting Land Development Code revisions to the Board of County Commissioners (BOCC) that would increase the required attenuation (peak runoff decrease) from the 25-year storm to the 100-year storm. Unfortunately the recommendation was not



### April 2015 SWAT Meeting:

At the April meeting the SWAT heard a presentation from City of Pensacola staff on the findings of the City's Drainage Study. The city has had four studies produced which focus on the following areas: Piedmont Road, Aragon, Long Hollow, and Downtown. These studies are being used to produce a City-wide Master Plan. In addition the City has increased its design storm standard to the 100-year event.

A SWAT member made a presentation on LID measures and possible revisions to the Land Development Code. The presentation focused on how LID could be incorporated into the LDC. In addition the topic of how to encourage LID usage with incentives was discussed. The presenter made a motion that the SWAT approve a recommendation to the BOCC that a review be made of LID and LDC for stormwater issues. SWAT passed the recommendation and staff indicated that the County is currently moving forward with creating a Technical Advisory Committee to address LID priorities.

Among the other topics discussed were:

- Floodplain management
- Capital improvement projects

## 3.0 Infrastructure Recommendations

Escambia County is continually assessing and upgrading its stormwater infrastructure system. For two decades it has been developing formal basin studies for that exact purpose. The studies take a global approach to stormwater within a given basin or watershed and each provides recommendations for improvements within that basin. However, these recommendations remain on separate lists and separate from other basin improvement needs and areas of importance.

As Escambia County assesses and upgrades its stormwater infrastructure in light of the April 2014 flooding, it is necessary to view stormwater on a countywide scale. For this reason, staff and SWAT have sought to provide one location for all stormwater recommendations within the county, the Stormwater Needs Assessment. The development of the Stormwater Needs Assessment List is enclosed with this paper.



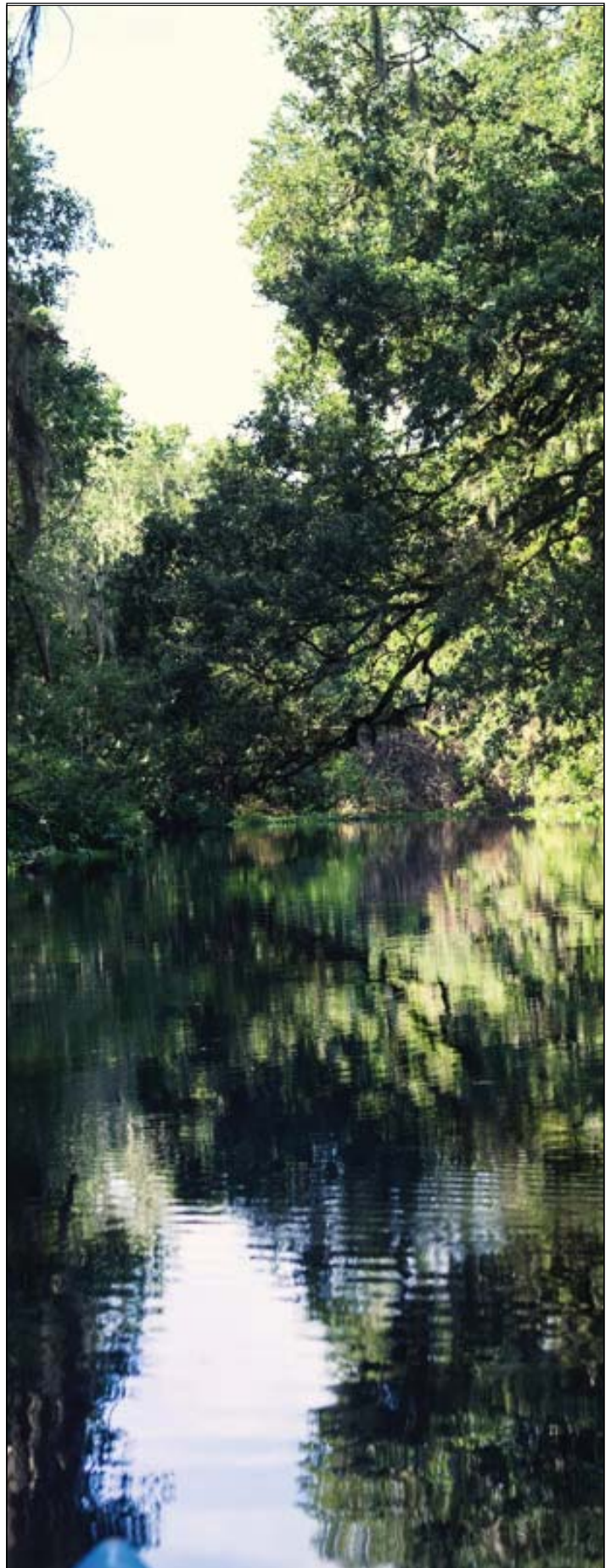
### 3.1 Stormwater Needs Assessment List

The Stormwater Needs Assessment seeks to bring together all of the known stormwater needs (projects) within Escambia County along with the most pertinent information of each (Refer to Appendix B). Each of the projects needs ranking so overall comparisons can be made and priorities can be set.

To begin, working with Escambia County Engineering staff, recommendations were taken from each of the basin studies as well as those needs highlighted during the April storm. In addition, recommendations from other smaller studies were taken as suggested by County staff. The following is a list of the reports and previous lists that have been compiled:

- 13 Basin Studies covering mostly the south end of the county
- Project list developed from April 2014 storm damage assessment and pre-storm drainage priorities
- Delano Area Study
- Pensacola Beach (Stormwater) Infrastructure Improvement Program

Each of the projects produced by these reports was reviewed and described individually. The individual reports were consulted to gain an understanding of the nature and scope of each project, which was summarized with a short description. The basin study was also used to determine the location of each project which was then shown on a map indicating its location in the county and in relation to the other projects.





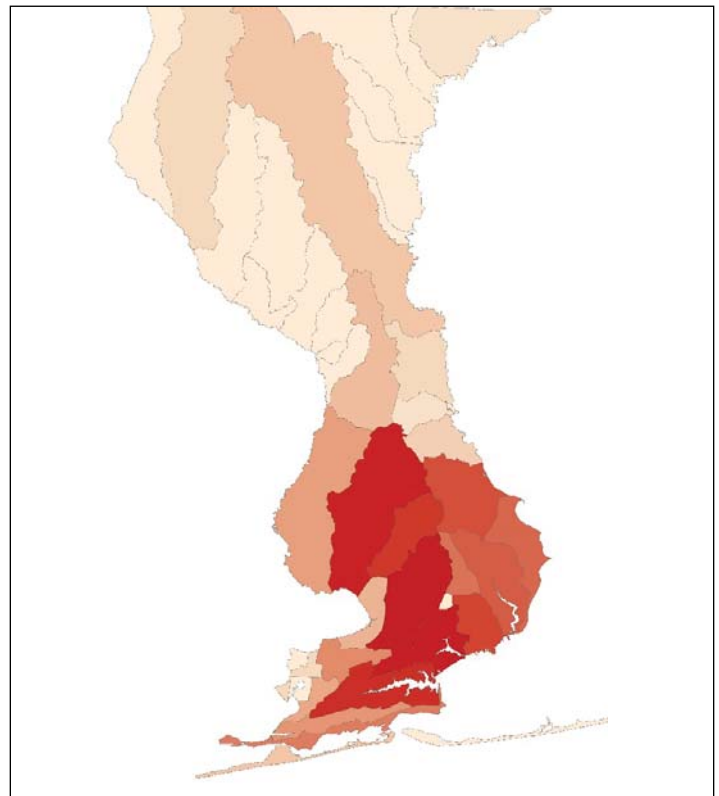
Project costs are needed to determine costs versus benefits. For this reason, construction costs have been added to the project information when provided in the original studies. Because the original studies were completed over the last twenty years the costs needed to be converted to estimates of current construction costs.

This was accomplished by correcting for inflation using factors published by RS Means, an organization which carefully tracks construction costs nationwide.

When Escambia County produces a new basin study, it is required of the study to score and rank projects to determine priorities. The scoring uses criteria established in the Basin Study Guidelines which consists of several categories listed below:

- Improves Flooding Conditions (20 pts)
- Improves Water Quality (10 pts)
- Provides for Future Growth / Development (10 pts)
- Construct-ability (10 pts)
- Permit-ability (10 pts)
- Impacts Environmentally Sensitive Areas (10 pts)
- Dependent/Independent (10 pts)
- Cost vs. Benefit (20 pts)

Scores given to each project in the original study were added to the information provided in the Stormwater Needs Assessment list. Most of the basins studies had scorings using the above criteria. In general, the most recent studies used this criteria while older studies, some completed in 1994, used a different criteria.



*Damage Heat Map by Drainage Basin*

Projects from the older studies as well as any other studies lacking scores were scored by Baskerville-Donovan and staff while attempting to remain as consistent as possible with their original scores where applicable. With the projects scored, they were then ranked with the highest scoring project receiving the highest rank (No. 1). The Stormwater Needs Assessment list and map book denotes each project by its overall rank.

All of the data described above was placed in a series of maps (map book) covering those areas where projects have been recommended. Each page of the map book has an associated page with the information described above.

Review of the map book will show that nearly all of the projects on the needs list are located on the south end of the county. While the south end could rationally have more needs since it contains most of the development, a greater population density and receives greater rainfall, this is also where the majority of the basin studies have focused.

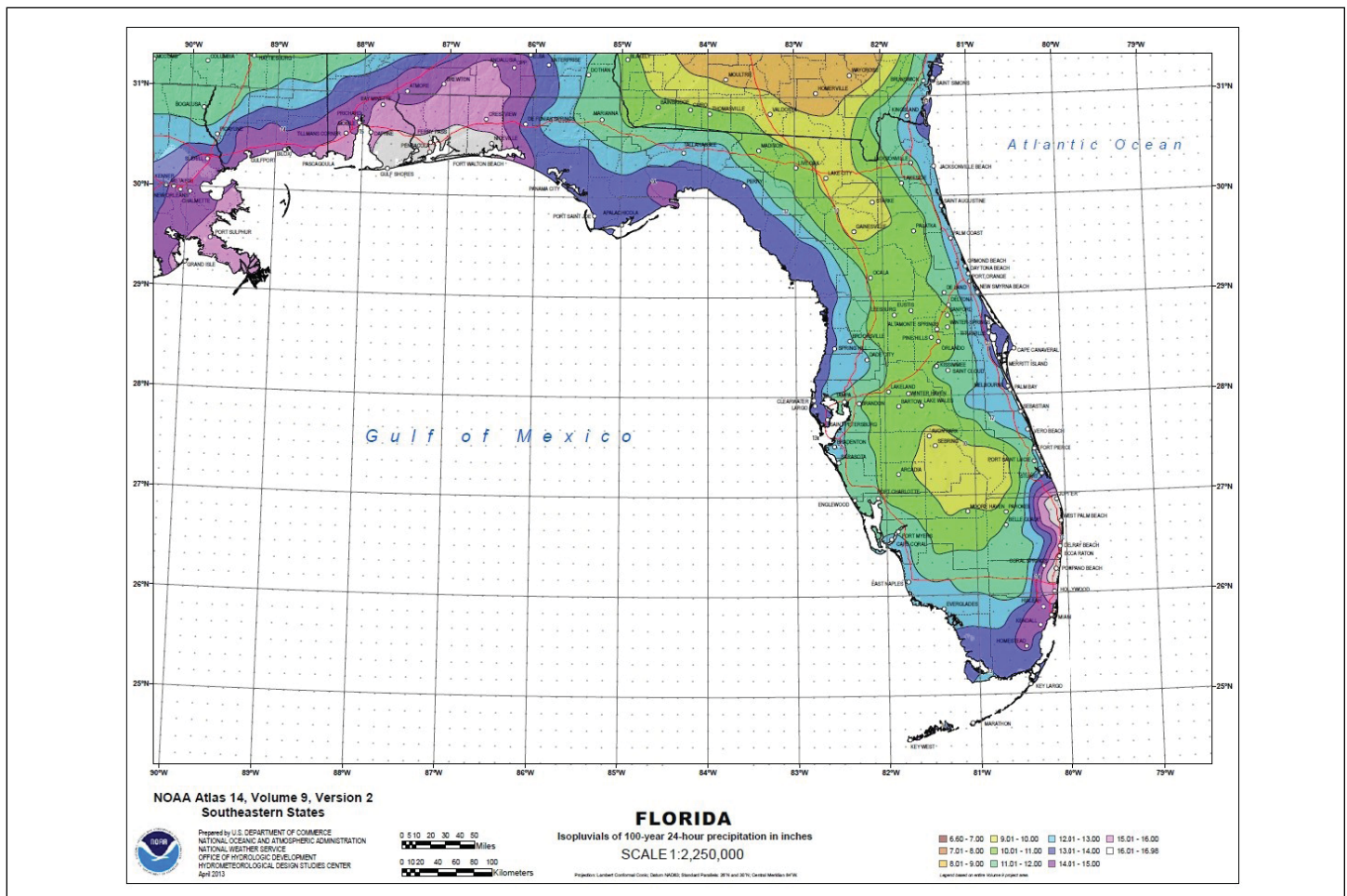
The top thirty ranking projects have been mapped by themselves and can be reviewed in the first pages of the Stormwater Needs Assessment List, included with this document. They have been placed on a “damage heat map” which indicates highest occurrences of flooding reports and damage received by the county per stormwater basin. These are the projects which by the County’s established criteria should have the greatest priority. In addition, while creating the needs list it was determined that many of the projects recommended in the past have been completed. These projects were removed from the needs list, but have been retained for documentation.

By its nature the Stormwater Needs Assessment should be considered a living document. It will need to be revised on a regular basis in order to serve the purpose for which it’s intended. As basin studies are completed the list should be updated and when projects are completed they should be removed.

Revision should take place on a yearly or semi-yearly basis as even without additions to the project list, the costs will not remain current.

## 4.0 Policy Recommendations

To this point, the discussion has focused on what can physically be done to reduce and prevent flooding problems. However, it is recommended that the County should be proactive in adopting new policies and procedures that will help reduce the creation of infrastructure flooding problems in the future. The remainder of this paper will discuss recommended steps that can be taken to reduce the number of flooding problems created by further development such as developments submitting 100 yr flood elevations to show structures are outside the floodplain, working with the state to impliment updated rainfall estimates, and determining what LID practices aid development.



Isopluvial Map published in NOAA Atlas 14, Vol. 9 (Also included in Appendix D)

## 4.1 Design Storms and Precipitation Frequency

Any discussion to reduce the potential for flooding problems from future development must start with design storms. The requirement for development to attenuate the 25 year storm did not match the expectation for protection of homes and commercial structures. The adoption of the 100 year attenuation requirement will help to match the performance of the infrastructure with expectations.

The development should submit 100 year flood elevations for the entire system, showing that all planned structures are outside of this floodplain. In addition to the requirement to estimate the 100 year floodplain internal to the development, the plans should contain contingencies if certain facilities were to fail. For example, ponds with berms should be designed with a hardened emergency overflow that will allow flows in excess of the 100 year flood to discharge without compromising the berm of the pond. By adding additional protection for the retaining structure of the pond, extreme flooding downstream caused by failure of the pond can be reduced.

Designing with contingencies for record rainfall events also helps as our climate changes. Although it is not certain how and to what degree changes in the climate will affect runoff, the general trend in our area has been to have higher intensity storms and more rainfall. Because runoff can increase from climate change, it is more important now to work with the State to update rainfall estimates as new data becomes available.

SWAT meetings have included discussions and recommendations regarding hydrologic data on several occasions. Generally, the consensus has been that the current precipitation frequency estimates for our area (FDOT Zone 1 IDF curves) do not seem to accurately reflect the amounts of rainfall that is currently being experienced. In addition, NOAA's National Weather Service has recently updated rainfall depths and frequencies for the southeastern United States. Escambia County should begin using these rainfall totals on all county projects and implement FDOT's new Intensity-Duration-Frequency (IDF) curves in the Land Development Code as soon as they are released, which could occur as soon as the release of the 2016 Drainage Manual.

Additionally, changes in meteorological data should be tracked and any new studies affecting changes to rainfall in our area should be reviewed. The background to these recommendations has been explained in a document produced by the SWAT and may be reviewed in Appendix E.



## 4.2 Low Impact Design

Low Impact Design (LID) has been a priority in discussions among the SWAT members and with County staff. Among the issues discussed have been: what LID practices would aid development in Escambia County, how to incentivize the use of LID practices, and what changes could be made to the Land Development Code to encourage LID. Several presentations were made to the SWAT during the April meeting that summarize these issues. The presentations can be reviewed included with the meeting minutes in Appendix H.

A Low-Impact Design Manual addressing these concerns should be developed for Escambia County to work with the Land Development Code. A Low-Impact Design (LID) Manual would encourage an approach to development that emphasizes conservation and use of a site's natural features



to manage the quality of stormwater runoff and protect downstream water bodies. The SWAT also recommends that all suggested LID measures be reviewed for stormwater benefits/impacts prior to incorporation in the LDC.

On an LID site, stormwater controls and stormwater treatment processes could be located throughout the site, and importance be placed on reducing impervious surfaces and minimizing changes to the site's natural hydrology. This can be accomplished through use of pervious pavements, swale systems, multi-functional landscape areas, and infiltration trenches, among other alternatives. On sites that require a storage area, water reuse systems can be installed to use the stormwater for irrigation. Instead of routing all stormwater runoff to a central location, stormwater runoff is controlled and treated in smaller areas throughout the site. This reduces negative impacts from runoff accumulation.

Additionally, some LID measures improve water quality, and allow for a greater percentage of the site's groundwater to be recharged than traditional development methods.

Incentives should be provided for voluntary implementation of LID practices in new development and redevelopment projects. Leaving LID implementation voluntary will allow for improvements without impeding development, since implementation of any measures with higher up-front cost will be at the discretion of the developer. LID incentives can help offset those costs, as well as encouraging more thoughtful site design. Some of the incentives currently used in other areas include waiving plan review fees, reducing stormwater detention requirements, grants, recognition programs, and zoning density upgrades.

Incentives should also be considered with respect to encouraging timely maintenance of LID stormwater systems (especially the alternatives with more intensive long-term maintenance), or to encourage retrofitting of existing systems. Incentives are especially important for redevelopment of existing sites. Currently, post-development stormwater runoff rates are required to be less than pre-development rates.

For the redevelopment of a site with a large amount of existing impervious area, the only change necessary to fulfill this requirement is the removal of a small portion of the existing impervious area. Instead,



voluntary LID incentives can encourage a developer to change a larger portion of the site back to pervious or semi-pervious area, further decreasing the storm-water runoff rate and allowing replenishment of the site's groundwater.

In addition to LID, the County should consider green infrastructure and smart growth principles for future LDC revisions. Whereas LID covers development and design, these principles relate to land use as a whole.

"Green Infrastructure is the strategically planned and managed networks of natural lands, working landscapes and other open spaces that conserve ecosystem values and functions and provide associated benefits to human populations. Green infrastructure allows for numerous social components including economic development, establishment of transportation corridors and active agricultural and silvicultural operations. In the process, provisions are made for retaining green spaces of various types, protecting water quality, and promoting tourism by providing both active and passive recreational activities. Management activities result in healthy ecosystems with high quality habitat for both terrestrial and aquatic wildlife species. Green infrastructure networks enhance the effectiveness of existing comprehensive planning efforts by promoting smart growth principles and healthy community practices." (*Benedict, Z. Mark A., "Green Infrastructure: A Strategic Approach to Land Conservation," American Planning Association PAS Memo, October 2000*).

Following some of these principles, there are local groups that have suggested the daylighting of existing streams in areas of downtown Pensacola where they have been hardened or covered over. Daylighting would expose/uncover these streams in order to restore the movement/flow of water back to its more natural state. In addition, daylighting would allow for the reestablishment of the streams riparian areas. This methodology allows for a more natural way of addressing storm water and water quality issues.

Smart growth is a collection of land use and development principles that aim to enhance our quality of life, preserve the natural environment, and save money over time. Smart growth principles ensure that growth is fiscally, environmentally, and socially responsible and recognizes the connections between development and quality of life. Smart

growth enhances and completes communities by placing a priority on infill, redevelopment, and densification strategies.

### 4.3 Basin Studies

Most of the area that was devastated by the flooding in April of 2014 had been previously studied. However, in some of the areas the studies need to be updated. The areas that need to be studied or updated include:

- Catholic High Basin
- Garcon Swamp
- Southwest Side
- Scenic Hills

The remainder of the County should be studied in the future. While the majority of flooding problems occur in the south end of the County, the majority of the growth for Escambia County will occur in the north end. Problem areas should be identified prior to development occurring in these flood prone areas. These studies will allow the County to use more stringent discharge requirements to keep future development from exacerbating existing flooding problems.

Consideration should be given to reevaluating the evaluation criteria. The current criteria tends to favor projects that are easier to permit and construct, leaving problems that could affect large areas lower in the list. New criteria could add factors and/or current factors may need to be reweighted.

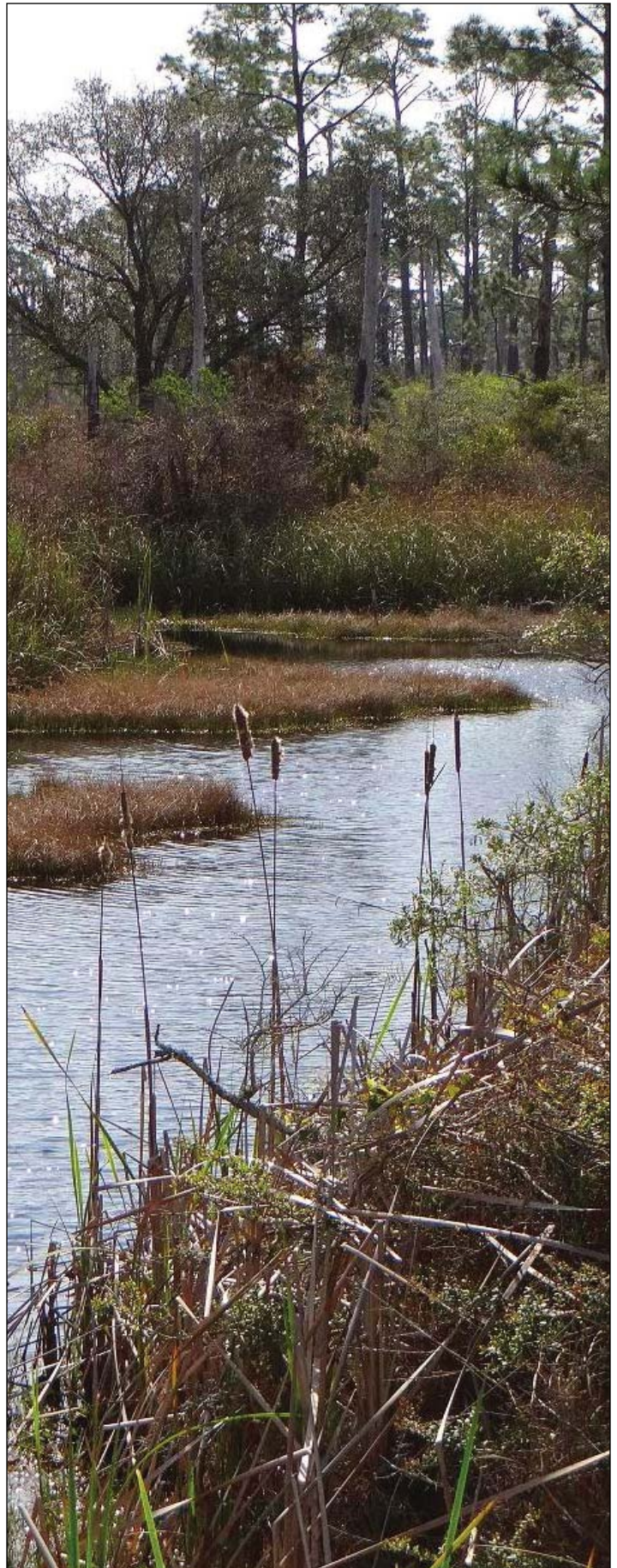


Ultimately, the basin studies could be used to incorporate models of proposed developments to view their impact on downstream drainage systems during the Development Review process. Use of the models from the basin studies to estimate impacts from proposed development will require additional information and processes to keep the models current.

#### 4.4 Development Submittals

Asset management systems and large-scale modeling are increasingly interfacing with GIS. The Development Review Committee (DRC) process could be modified to include submittal of as-builts for stormwater infrastructure in a County approved GIS format. Ideally the data would also integrate with the County's asset management system, so new ponds, inlets, channels, and pipes could immediately be included in any routine maintenance or easily accounted for in the event of a disaster.

The GIS data would also streamline the process of updating basin studies. Initially a consultant could be given the data for the watershed they are studying, but the County could eventually update the model in order to determine how new developments would affect drainage patterns prior to construction. To aid in this effort, the County could pursue grant funding to take all existing as-builts (paper and AutoCAD) and convert/georeference them into the County's GIS system. Developing and maintaining a program of this nature could require training of staff in order to provide continual updates to the County's data.



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# Appendix A

## Escambia County SWAT Resolution

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9/25/2014 CAR I-15

**RESOLUTION NUMBER R2014 - 110**

**A RESOLUTION OF THE BOARD OF COUNTY COMMISSIONERS OF  
ESCAMBIA COUNTY, FLORIDA, ESTABLISHING THE STORM-WATER  
ADVISORY TEAM (SWAT); PROVIDING FOR AN EFFECTIVE DATE.**

**WHEREAS**, during April 2014, Escambia County suffered a catastrophic rain and flooding event that caused substantial and widespread damage to private and public property and infrastructure; and

**WHEREAS**, as a result of this disaster, the Escambia County Board of County Commissioners, with the concurrence of state, local, and private agencies, has concluded that it should conduct a comprehensive, countywide assessment of current storm water capabilities; and

**WHEREAS**, the Board of County Commissioners through the County Administrator, the County Engineer, and other appropriate county staff will conduct an assessment of current storm water capabilities, review and propose alternatives and solutions to alleviate current and future storm water issue in consultation and collaboration with subject matter experts from FEMA, FDEM, FDEP, NFWFMD, UWF, as well as staff from the City of Pensacola and ECUA; and

**WHEREAS**, the Board of County Commissioners finds that an advisory group reviewing the staff's proposed alternatives and solutions would provide a valuable

*S. Casew*  
Date: 10/16/2014 Verified By:

service to our community and be helpful to the Board therefore advancing the public health, safety, and welfare of community.

**NOW THEREFORE, BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF ESCAMBIA COUNTY, FLORIDA, AS FOLLOWS:**

**SECTION 1.            RECITALS.**

The aforementioned recital clauses are hereby incorporated into this Resolution.

**SECTION 2.            ESTABLISHMENT.**

The Escambia County Board of County Commissioners hereby establishes the Storm Water Advisory Team.

**SECTION 3.            DUTIES OF STAFF.**

Staff shall have the following duties and responsibilities:

- A. Conduct an assessment of current storm water capabilities, review and propose alternatives and solutions to alleviate current and future storm water issue in consultation and collaboration with subject matter experts from FEMA, FDEM, FDEP, NFWFMD, UWF, as well as staff from the City of Pensacola and ECUA
- B. Evaluate alternatives for future action based on goal-driven objectives with consideration given to alignment to needs and proposed funding mechanisms and the comprehensive plan.
- C. Identify preferred alternatives and further develop these alternatives with appropriate technical research.



D. Prepare and submit a final report and recommendations to the Escambia County Storm Water Advisory Team (SWAT) and Board of County Commissioners for its review.

**SECTION 4. DUTIES OF THE STORM-WATER ADVISORY TEAM.**

A. Assist the staff in identifying conditions associated with the April flooding event.

B. Review and comment on staff's recommendations prior to the staff's presentation to the Board of County Commissioners for its review.

**SECTION 4. COMPOSITION OF THE TEAM.**

The Group shall consist of Seven (7) members who shall be appointed by the Board of County Commissioners as follows:

A. Each County Commissioner shall appoint one (1) civilian representative to the Group.

B. Two (2) civilian representatives appointed by the City of Pensacola, Florida.

**SECTION 5. TERMS OF TEAM MEMBERS.**

Team members shall serve on the Team until recommendations are completed as determined by the Board of County Commissioners. The Team may recommend to the Board of County Commissioners the removal of a Group member who accrues three

unexcused absences from regularly-scheduled meetings of the Team during the calendar year.

**SECTION 6.**        **OFFICERS.**

A.    Chairperson.    The Team shall elect a Chairperson to preside at all meetings. The Chairperson shall be elected at its first meeting and shall serve for the following year or until resignation, whichever occurs sooner. There shall be no term limits for a member to serve as Chairperson.

B.    Vice-Chairperson.    The Team shall elect a Vice-Chairperson to preside and act on behalf of the Chairperson during his or her absence. The term of office and method of election for the Vice-Chairperson shall be the same as the Chairperson.

**SECTION 7.**        **QUORUM AND VOTING.**

Four (4) Team members shall constitute a quorum for the purpose of conducting business. Each member shall exercise one vote on all matters subject to a vote of the Group. All matters shall be decided by a majority vote of the members present. No member shall abstain from voting unless the member has a conflict of interest.

**SECTION 8.**        **SPECIAL MEETINGS.**

The Chairperson may call a special meeting of the Team on his or her initiative and shall call a special meeting at the request of any of the seven (7) members.

**SECTION 9.**            **LOCATION OF MEETING.**

Team meetings shall be held in a public facility of sufficient size to accommodate those present and at such locations as the Team may determine from time to time.

**SECTION 10.**        **RULES OF PROCEDURE.**

To the extent practicable, the Team shall conduct its meeting in accordance with the current edition of Robert's Rules of Order, except to the extent that the provision thereof is inconsistent with this Resolution.

**SECTION 11.**        **SUNSHINE LAW.**

The Team shall be subject to and each member shall be responsible for compliance with the Florida Sunshine Law and the Florida Public Records Act.

**SECTION 12.**        **AGENDA.**

The Chairperson shall prepare an agenda for all meetings. Any Team member may request that a matter be placed on the agenda during any public meeting of the Team. The agenda and related materials shall be distributed at least one day prior to the meeting date.

**SECTION 13.**        **MINUTES.**

Minutes shall be kept at each Group meeting. The written summary of each meeting shall be submitted for approval of the members at the next regular meeting. Each written summary shall reflect the persons in attendance, items discussed, each

action taken at the meeting, and the vote of the members on each item presented at the meeting.

**SECTION 14. NOTICE OF PUBLIC MEETING.**

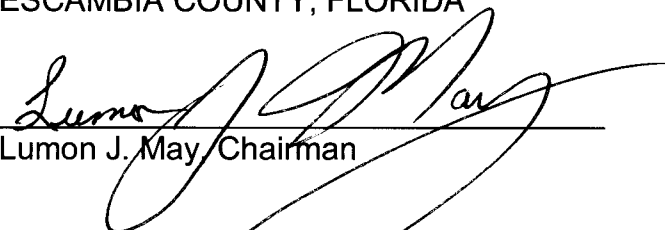
Notice of regular or special meetings of the Group and the time and location of each meeting shall be published to the public.

**SECTION 15. EFFECTIVE DATE.**

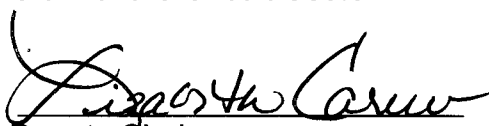
That this Resolution shall become effective immediately upon adoption by the Board of County Commissioners.

ADOPTED this 25th day of September 2014

BOARD OF COUNTY COMMISSIONERS  
ESCAMBIA COUNTY, FLORIDA

  
Lumon J. May, Chairman


ATTEST: Pam Childers  
Clerk of the Circuit Court

  
Deputy Clerk

Date Executed  
10/16/2014



This document approved as to form and legal sufficiency.

By:   
Title: County Attorney  
Date: 10/10/14

# Appendix B

## Escambia County Needs Assessment List

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# Escambia County Stormwater Needs Assessment List

Rank	Project Name	Construction Estimate
<b>1</b>	<b>Crescent Lake</b> <i>Construct drainage system and new ponds on east side of Crescent Lake through the Blue Springs Drive drainage system up to Glass Street and Sun valley Drive</i>	\$4,000,000
<b>2</b>	<b>Spring Street - Leonard Street - PHS Drainage</b> <i>Joint Drainage project between the City and School Board to address flooding on Spring Street and School Area.</i>	\$500,000
<b>3</b>	<b>Frinchez Heights (Sabra, Erwin, Whitmire, Ernestene Area)</b> <i>Proposed drainage capacity improvements in the Frinchez Heights area including Sabra Dr, Erwin Dr, Whitmire Dr, Ernestene Rd (North of Olive Rd) which will likely require a ditch conversion into a pond site</i>	\$400,000
<b>4</b>	<b>Muldoon Road and Saufley Field Rd Area</b> <i>Drainage improvements are needed to address existing drainage capacity from Blue Angel to Muldoon Road. FDOT is currently (2015) reviewing partial drainage with sidewalk projects.</i>	\$3,000,000
<b>5</b>	<b>Flood Plain Management, Wetland Restoration, and Regional Pond Construction in 11-Mile Creek Basin</b> <i>A large scale project to provide channel, stream, and flood plain restoration improvements, including at minimum of 9 regional stormwater management faculties (ponds). Project completion will require multiple grants to provide a complete realization of the 11-Mile Creek Basin Study Recommendations. The total estimated project costs is over at least a 10-year period.</i>	\$46,538,265
<b>6</b>	<b>Willowbrook Lake Dam</b> <i>Restore dam and overflow structure at Willowbrook dam East of Chemstrand Road to provide Water Quality</i>	\$500,000
<b>7</b>	<b>Ensley Drairage - Caro-Mayflower Pond Area</b> <i>Expansion of the Caro-Mayflower pond, to address drainage issues south of Caro Street, north of Johnson Ave between Hwy 29 and Palafox Street, including repetitive flooding loss on Orange Avenue.</i>	\$1,300,000
<b>8</b>	<b>Delano Drainage Area (L Street, Leonard, Fairfield, Herman, and Fairfield Area)</b> <i>Drainage System Improvements to include new regional pond(s) and rehab of existing ponds for water quality and flood control</i>	\$6,488,476
<b>9</b>	<b>Beach Haven Area Drainage and Sewer Northeast Phase 1</b> <i>Roadway/drainage and sewer improvements; currently under design (NE of Decatur Ave to Gulf Beach Highway; from Mills Ave to Decatur Ave including ponds for Phase 1 &amp; 2)</i>	\$10,887,839
<b>10</b>	<b>Beach Haven Area Drainage and Sewer Northeast Phase 2</b> <i>Roadway/drainage and sewer improvements; currently under design (NE of Fairfield and Gulf Beach Highway; Fairfield Dr to Colbert)</i>	\$7,823,000
<b>11</b>	<b>Muldoon-Saufley Field-Velma (Pond Expansion)</b> <i>Property purchase and drainage improvement design to provide positive outfall for two County ponds, expand the Velma St Pond, and provide outfall to Bayou Marcus Creek. Refer to Bayou Marcus Basin Study -Velma Dr Pond Outfall Branch C to be modified by property acquisition and Velma pond expansion.</i>	\$3,450,000
<b>12</b>	<b>Beach Haven Area Drainage and Sewer (South)</b> <i>Roadway/drainage and sewer improvements; currently under design (NE of Fairfield and Gulf Beach Highway; Fairfield Dr to Colbert)</i>	\$12,000,000
<b>13</b>	<b>Bristol Creek Property Acquisition</b> <i>A large scale project, with a Property Acquisition Plan for repeatedly flooded property and easement acquisition. Project will be partially funded by HMGP grant if approved. Related to project "Flood Plain Management, Wetland Restoration, and Regional Pond Construction in 11-Mile Creek Basin."</i>	\$6,189,380
<b>14</b>	<b>Beverly Parkway Basin Zone H- Loretta Street, between Kelly Ave and North "P" Street</b> <i>Construct new ponds and expand the stormwater collection system in the area around Loretta Street.</i>	\$6,499,810
<b>15</b>	<b>North 61st Property Purchase and flood plain restoration</b> <i>Purchase of 10 properties for the purposes of flood plain restoration, and stream restoration</i>	\$700,000
<b>16</b>	<b>Old Corry Outfall Property Purchase and Flood Plain Restoration</b> <i>Pete Moore ditch- Jackson Creek flood plain and habitat restoration.</i>	\$978,881
<b>17</b>	<b>Avery Street Drainage (Kupfrian Park/Hernandez and Lakeview)</b> <i>Continued drainage for the Kupfrian Park area to include stormwater pond(s) for flood control/water quality, and conveyance system to address flooding issues on Hernandez and Lakeview between Pace and J Street.</i>	\$998,563
<b>18</b>	<b>Myrtle Grove System A (remaining portion)</b> <i>Completion of System A to included drainage improvements including acquisition for easement and pond site on 72nd and 73rd Ave, South of Jackson, and North of Harvey St</i>	\$450,000
<b>19</b>	<b>Ponderosa Drive Area Drainage</b> <i>Expand existing pond to accommodate contributing basin</i>	\$2,243,000

## Escambia County Stormwater Needs Assessment List

Rank	Project Name	Construction Estimate
<b>20</b>	<b>Kingfisher, Bush Street, and Interstate Circle Drainage</b> <i>Eight Mile Creek Priority 5 Drainage to construct a regional pond to address flooding for Kingfisher, Blue Jay Way, Bush Street, and Interstate Circle</i>	\$2,500,000
<b>21</b>	<b>Pin Oak Lane Drainage (Phase 1) and Flood Plain Restoration Project (Phase 2)</b> <i>Construct a new roadway connection to Quintette Road at North end. Also purchase property to restore flood plain at South end.</i>	\$725,277
<b>22</b>	<b>West Roberts Drainage Improvements and Regional Pond (Regional Pond in 11-Mile Creek Basin)</b> <i>Regional pond and conveyance system on West Roberts Road utilizing on FDOT pit (Part of 11 Mile Creek Basin Plan to reduce flood stage in Bristol Creek/Bristol Park/Ashbury Hills)</i>	\$1,500,000
<b>23</b>	<b>Bellview Avenue Branch E Drainage Chestnut-Hogan Pit expansion</b> <i>Bellview between Rosewood Estates and Hogan Road, includes expansion of the Chestnut-Hogan Pit</i>	\$1,500,000
<b>24</b>	<b>Chandler Road Drainage</b> <i>Alleviate lot flooding by installing a conveyance system in the area connected to the main trunk line currently being installed by FDOT. This line drains to the Holsberry pond, part of the Hwy 29 lane widening project</i>	\$600,000
<b>25</b>	<b>Ten Mile Road Drainage and Roadway Improvements</b> <i>Address capacity and drainage problems from Chemstrand to Palafox to address flooding in the area of Holsberry Lane. May involve property acquisition.</i>	\$5,000,000
<b>26</b>	<b>11 Mile Creek Basin Study Zone 5</b> <i>Increase capacity of pipe under green hills rd. and construct a pond near urban drive to alleviate area flooding</i>	\$3,619,643
<b>27</b>	<b>Beverly Parkway Basin Branch G- Andrew Ave and Coons Ave</b> <i>Extend the stormwater collection system along Andrew Avenue and Coons Avenue.</i>	\$1,319,873
<b>28</b>	<b>Dorothy &amp; Lydia Avenue Area Drainage</b> <i>Improve existing drainage system causing lot flooding. The surrounding area drains to private Rolling Hills borrow pit, causing sediment problems at Crescent Lake</i>	\$400,000
<b>29</b>	<b>South Gulf Manor Private Pond Rehab</b> <i>Upgrade to county standards a private pond that has failed to accommodate flow from South Gulf Manor Phase 1 on numerous occasions. This has resulted in flooding of around 15 homes.</i>	\$200,000
<b>30</b>	<b>Avondale Estates - Bayou Marcus Branch E</b> <i>Roadway/drainage improvements for Cerny Road area and area North of Cerny to provide possible pond outfall solutions for Saufley Field -Muldoon Area Ponds. Concept plans requires further study for alternate pond outfall options considering Velma Pond.</i>	\$3,300,000
<b>31</b>	<b>Palafox Street @ Oakfield/Kenmore/Pacific/Majors/Pinestead Drainage</b> <i>Drainage Project currently under design to address Beverly Parkway Basin Study Improvements Branches N, O, P, &amp; Q</i>	\$4,900,000
<b>32</b>	<b>Old Corry Field Area Drainage</b> <i>Construct a new stormwater collection system along Old Corry Field Road from Border Street to Jackson Creek.</i>	\$2,000,000
<b>33</b>	<b>Catholic High Basin Zone A North - North end of the basin around Mission Street</b> <i>Expand pond storage by expanding existing pond and constructing a new pond as well as expanding and increasing existing collection to prevent home and street flooding. This improvement will not have negative impacts on downstream properties.</i>	\$3,330,648
<b>34</b>	<b>Intersection of Hwy 29 and Hwy 97</b> <i>Construct a dry pond and conveyance pipes at the corner of Highway 97 and Crabtree Church Road to contain and control downstream stormwater runoff. Increase the capacity of culverts running under Highway 29 to reduce roadway flooding.</i>	\$558,137
<b>35</b>	<b>Helms/Beulah School Road</b> <i>Increase capacity of drainage structures crossing Helms Road to prevent roadway overtopping and decrease upstream flood stages.</i>	\$207,509
<b>36</b>	<b>Carver Park Area Drainage Improvements West of 297A</b> <i>Four-phase roadway and drainage improvement project for the area south of Muscogee Road, north of the Road Camp, east of Booker, and west of Ransom, requiring property pond acquisition and drainage conveyance improvements.</i>	\$2,250,000
<b>37</b>	<b>Haley Lane and Eagle Street</b> <i>Reconstruct the Brookhollow collection system and construct a new collection system along 10 Mile Road to reduce roadway flooding. Improvements may have a negative effect on downstream properties.</i>	\$584,279
<b>38</b>	<b>Raise berm east of landfill (Perdido River South Basin)</b> <i>Raise the berm east of the landfill to prevent an existing pond from overtopping.</i>	\$623,519



## Escambia County Stormwater Needs Assessment List

Rank	Project Name	Construction Estimate
39	<b>West Highlands (Green and Lloyd) and Lloyd up to Mallory Street</b> <i>Address property flooding in an area North of Mobile Hwy West of Dominguez Street, and at Green St</i>	\$650,000
40	<b>Carver Park/West Booker Road</b> <i>Reduce area flooding by increasing the capacity of area conveyance structures as well as constructing a new pond.</i>	\$1,327,654
41	<b>Ferry Pass Drainage Zone 5</b> <i>Drainage System Improvements on Boyd Ave and adjoining Beagles St, Geeker St, De Loach St, and Raines St; dependent upon Olive Rd drainage system upgrades</i>	\$950,000
42	<b>Delano Area North Kelly Avenue Basin</b> <i>Drainage System Conveyance Improvements for area between Pace Blvd, Massachusetts Av, W" St., and Truman to improve conveyance to Kelly Avenue pond, as well as provide for an improved outfall system. Project requires coordination with CRA improvements on Massachusetts Avenue for sidewalks and drainage improvements</i>	\$400,000
43	<b>Nims Lane Drainage Project</b> <i>Nims Lane receives stormwater from a basin of approximately 29 acres. This basin extends just east of Holsberry Road and just north of Holsberry Lane. This area is prone to flooding due a lack of a positive outfall or stormwater conveyance system. Discharge from this conveyance system is expected to be routed to the Holsberry Pond</i>	\$400,000
44	<b>Lake Charlene Area Drainage (including future phases not covered by grant)</b> <i>Increase outfall capacity of Lake Charlene by implementing some of the drainage system improvements from the 2007 Warrington Master Plan and the 2015 Lake Charlene Warrington Study.</i>	\$1,992,309
45	<b>Treasure Hills Drainage</b> <i>Install drainage upgrades, stormwater pond w/pond site purchase, and drainage rehabilitation in area of Avon, Medina, and Gulf Beach Hwy</i>	\$760,000
46	<b>Beverly Parkway Basin Branch C- Twelve Oaks Area</b> <i>Construct a new collection system for the Twelve Oaks Area with a discharge to the FDOT system. Connection to the FDOT system will limit design to the 3 year event.</i>	\$2,522,301
47	<b>Beverly Parkway Basin Zone D-Brentwood</b> <i>Expand the stormwater systems on Cary Memorial Drive and Armenia Drive to Carolyn Way, Jacquelyn Way, Virginia Way, Palm Court, Concordia Street, and Chimes Way and tie into the existing system on Hardy Place. Connection to the FDOT system will limit design to the 3 year event.</i>	\$3,596,439
48	<b>Dogtrack South –Coral Creek – Mariners Village-Hampton Lakes</b> <i>Stream and wetland restoration and construction of an attenuation pond. Two creeks merge north of Coral Creek, resulting in upstream flooding the affects Mariners Village to the northwest and a creek along Dog Track Road to the northeast.</i>	\$3,400,000
49	<b>Westview Lane &amp; Lewis St Area Drainage</b> <i>Drainage improvements to address stormwater and groundwater from Lewis Street and Moose Lodge 557 impacting lots along Westview Lane</i>	\$200,000
50	<b>Klondike Road North of Mobile Highway</b> <i>Increase capacity of structure under Klondike Road to prevent roadway overtopping.</i>	\$22,571
51	<b>Catholic High Basin Zone A South - South of Avery Street</b> <i>Construct new collection system to prevent street flooding. This improvement will not have negative impacts on downstream improvements.</i>	\$1,440,259
52	<b>N 69th Ave- Bayou Marcus/Millview Study Branch D</b> <i>Expand the stormwater collection system along 69th Avenue to reduce flooding in the area.</i>	\$1,963,878
53	<b>Well Line Rd Home Flooding</b> <i>Increase the capacity of the culvert under Well Line Road to reduce roadway and home flooding. Connect the Well Line Road culvert to the culvert running under Forrest Street to minimize water flowing across the property (this will require permission or easements from two property owners).</i>	\$67,472
54	<b>Hwy 29 (North of Bet Raines Rd)</b> <i>Increase the capacity of culverts under Highway 29 and modify the surrounding ditch area to reduce roadway flooding.</i>	\$323,506
55	<b>Willowside Drive and Westlake Subdivision Drainage</b> <i>Address home, yard, and street flooding on 72nd Avenue and Willowside Drive through the Westlake Subdivision: Reference Warrington Basin Study-St James Branch C. May require modifications.</i>	\$750,000
56	<b>Elsa Area Drainage</b> <i>Drainage project to address flooding in the area of Elsa Avenue South of Lillian from 48th Avenue over to Feldor Avenue including 49th, 50th, 52nd, State Street, Kinear Avenue, and Martha Ave</i>	\$2,600,000

## Escambia County Stormwater Needs Assessment List

Rank	Project Name	Construction Estimate
<b>57</b>	<b>Ranch Lands - Sagebrush Trail</b> <i>Repetitive loss flooding along Sagebrush Trail (Ranch Lands Subdivision) requires purchase of a pond site and improved drainage conveyance to address FDOT channel capacity. Refer to 8 Mile Creek basin Study Priority 3 for detailed information.</i>	\$500,000
<b>58</b>	<b>International Paper Area</b> <i>Increase capacity of drainage system in order to reduce roadway overtopping and upstream flood stages.</i>	\$367,980
<b>59</b>	<b>Sunset/Patton/Elite/Gulf Beach Hwy Drainage Outfall</b> <i>Realign the drainage outfall line beginning at Gulf Beach Hwy and Elite Drive to flow down Sunset St. in order to correct non-functioning sections and routing beneath homes.</i>	\$220,000
<b>60</b>	<b>Velma Pond Outfall</b> <i>Construct outfall for the Velma Pond to prevent overtopping during a 100 year event.</i>	\$905,319
<b>61</b>	<b>Beverly Parkway Basin Branch B- South Portion- Michael Drive</b> <i>Construct a stormwater pond on Michael Drive.</i>	\$623,567
<b>62</b>	<b>System improvements between Interstate 10 and Hwy 297A</b> <i>Reconstruct Eleven Mile Creek in this area to incorporate more volume for flood control within the stream in lieu of constructing detention ponds to prevent flooding of homes between I-10 and Hwy 297A. Report also suggests requiring attenuation of the 100 year event upstream of this area.</i>	\$48,315,410
<b>63</b>	<b>Ten Mile Road at Stefani Dr.</b> <i>Increase the collection system size along Stefani Drive and Ten Mile Road and increase the capacity of the culverts under Midway Drive to reduce extensive flooding in the area. Improvement may have a negative effect on downstream properties.</i>	\$393,265
<b>64</b>	<b>Ten Mile Creek from Pine Forest to Stefani Dr.</b> <i>Reconstruct Ten Mile Creek from Pine Forest to Stefani Drive to provide additional storage capacity to reduce extensive flooding in the area. Improvement may have a negative effect on downstream properties</i>	\$8,988,914
<b>65</b>	<b>Ten Mile Creek from Stefani Drive to Roberts Rd.</b> <i>Reconstruct Ten Mile Creek from Stefani Drive to Roberts Road to provide additional storage capacity to reduce extensive flooding in the area. Improvement may have a negative effect on downstream properties.</i>	\$10,674,335
<b>65</b>	<b>Ten Mile Creek from Stefani Drive to Roberts Rd.</b> <i>Reconstruct Ten Mile Creek from Stefani Drive to Roberts Road to provide additional storage capacity to reduce extensive flooding in the area. Improvement may have a negative effect on downstream properties.</i>	\$10,674,335
<b>66</b>	<b>Jamison Street Branch F -Warrington Basin Study</b> <i>Construct new stormwater system along Jamison Street and Rue Max Street with direct discharge to Bayou Chico to reduce discharges to the Barrancas Avenue System. Connect to Lexington Terrace stormwater ponds to provide water quality improvement prior to discharge to the wetlands.</i>	\$2,000,000
<b>67</b>	<b>Beach Haven Area Drainage and Sewer Northwest</b> <i>Roadway/drainage and sewer improvements (NW of Fairfield to Gulf Beach Highway)</i>	\$4,000,000
<b>68</b>	<b>Tate Road North of Petty St</b> <i>Increase capacity of roadway culvert crossings to prevent overtopping of Tate Road</i>	\$13,269
<b>69</b>	<b>Filley Rd</b> <i>Increase capacity of culvert crossing to prevent overtopping of Filley Rd</i>	\$4,283
<b>70</b>	<b>Amanda Rd</b> <i>Increase capacity of culvert at Creekwood Drive to prevent roadway overtopping</i>	\$6,896
<b>71</b>	<b>Chestnut Rd to Hwy 29</b> <i>Remove accumulated sediment from the upstream side of the Chestnut Road bridge in order to lower downstream velocities. Replace the culverts under Molino Road and Chestnut Road with bridges to prevent roadway overtopping and increase flow capacity.</i>	\$1,027,014
<b>72</b>	<b>Ashland Park Joint ECUA funded sewer and driange</b> <i>Improve Box Culverts at Rodney, Joel and Childers Streets.</i>	\$100,000
<b>73</b>	<b>Yupon/Pebble Creek/Deerfield</b> <i>Reduce area flooding by enlarging existing ponds and increasing area culvert capacities.</i>	\$663,784
<b>74</b>	<b>Stagecoach/Wilshire/Mobile Highway</b> <i>Increase capacity of drainage structure at Mobile Highway and improve downstream channel to prevent roadway overtopping and residential flooding.</i>	\$70,698
<b>75</b>	<b>Bayou Grande Basin K1- Gulf Beach to Winthrop SS</b> <i>Replace the outfall trunk line from Gulf Beach Hwy through Winthrop Ave. to prevent roadway flooding.</i>	\$174,160

## Escambia County Stormwater Needs Assessment List

Rank	Project Name	Construction Estimate
76	<b>Beverly Parkway Basin Branch E- west side of Hwy 29 on Mason Lane</b> <i>Construct a new collection system along Hwy 29 and Mason Lane along with a new pond for the system to connect to.</i>	\$1,077,800
77	<b>Navy Point Drainage North</b> <i>Construct treatment swales within Navy Point to treat stormwater as it flows to the discharge point per Bayou Grande Basin Study.</i>	\$20,000
78	<b>Navy Point Drainage South</b> <i>Construct treatment swales within Navy Point to treat stormwater as it flows to the discharge point per Bayou Grande Basin Study.</i>	\$25,000
79	<b>Beverly Parkway Basin Branch I- Moss Lane tie in at Van Pelt Lane</b> <i>Construct new stormwater system along Moss Lane.</i>	\$237,810
80	<b>Frank Reeder Rd &amp; Rebel Rd</b> <i>Reconstruct the swale in the area near Rebel Road and construct a culvert under Frank Reeder Road.</i>	\$49,521
81	<b>Emory Drive- Warrington Basin Study Branch K</b> <i>Construct a new stormwater system along Emory Drive, Stanford Road, Stetson Road, and Vanderbilt Road with a new stormwater pond at the eastern end of Tulip Drive.</i>	\$637,509
82	<b>Navy Point Drainage and Sanitary Sewer</b> <i>Roadway/drainage and sewer improvements; currently under design (NE of Fairfield and Gulf Beach Highway; Fairfield Dr to Colbert)</i>	\$300,000
83	<b>Bayou Grande Basin Study P1- Bainbridge Culvert</b> <i>Replace existing culvert on Bainbridge with a larger pipe to prevent road overtopping.</i>	\$44,945
84	<b>Hwy 97 (East of Hwy 29)</b> <i>Increase the capacity of the culverts under Highway 97 to decrease likelihood of roadway flooding.</i>	\$201,759
85	<b>Lake Charlene/Querido Heights- Warrington Basin Branch B</b> <i>Reconstruct Lake Charlene overflow structure and outfall ditch. Reconstruction of the 69th Avenue drainage system to reduce discharges to Lake Charlene, increase the capacity of the 61st Avenue drainage system, and increase the capacity of the 61st Ave, Kittyhawk Drive, Lake Charlene Lane, and Myrtle Hill Circle drainage system. Solutions are currently under evaluation.</i>	\$6,765,919
86	<b>Johnson Ave Drainage ( East of Briese Ln)</b> <i>Remove/Replace faulty storm pipe from Pine Ridge Lane to Johnson Ave, Address pipe flow Crystal Wells pond, Address two 24" pipe feeding one 24" pipe down to outfall in Gulf Power Easement.</i>	\$400,000
87	<b>Olive Manor &amp; Lincoln Park Drainage</b> <i>Drainage System Improvements with a creek restoration/preservation</i>	\$1,200,000
88	<b>Shadow Ridge Drive - Meadowview Lane</b> <i>Drainage Improvements proposed within unopened County right-of-way in coordination with adjacent property to address property damage and erosion for the accumulation of development.</i>	\$30,000
89	<b>Hwy 29 (North of Quintette Rd.)</b> <i>Replace the existing culverts under (divided) Highway 29 north of Quintette Road with two bridge structures to increase flow capacity and prevent roadway overtopping.</i>	\$2,412,936
90	<b>Hwy 29 (Jack's Branch Q13)</b> <i>Replace the existing culverts under (divided) Highway 29 with two bridge structures to increase flow capacity and prevent roadway overtopping.</i>	\$2,410,815
91	<b>Hwy 29 (South of Omega Drive)</b> <i>Increase the capacity of the culverts under Highway 29 south of Omega Drive to reduce roadway flooding.</i>	\$331,272
92	<b>Hwy 29 (North of Hwy 97)</b> <i>Increase the capacity of the culverts under Highway 29 near North Highway 95A to prevent flooding.</i>	\$283,017
92	<b>Hwy 29 (North of Hwy 97)</b> <i>Increase the capacity of the culverts under Highway 29 near North Highway 95A to prevent flooding.</i>	\$283,017
93	<b>Hwy 97 at Elementary School</b> <i>Increase the capacity of the two culverts under Highway 97 near the Molino School and connect them with an earthen ditch. This will prevent roadway flooding.</i>	\$297,927
94	<b>Old Corry Field Rd- Warrington Basin Branch H</b> <i>Construct a new stormwater collection system along Old Corry Field Road from Border Street to Jackson Creek.</i>	\$2,126,280
95	<b>Midas- Muldoon Area including West side of Green Acres</b> <i>Miscellaneous drainage improvements in this area to address flooding, including a small pond and conveyance improvements</i>	\$250,000

## Escambia County Stormwater Needs Assessment List

Rank	Project Name	Construction Estimate
<b>96</b>	<b>Frank Reeder Rd &amp; Beulah Rd</b> <i>Reconstruction of the ditch and installation of culverts where necessary to provide a defined drainage path.</i>	\$64,153
<b>97</b>	<b>Helms Rd &amp; Woods Lane</b> <i>Construct a new culvert under Woods Lane and reconstruct the ditch feeding to the existing culvert.</i>	\$69,780
<b>98</b>	<b>Lakewood/Millwood Terrace- Warrington Basin Branch F</b> <i>Construct new stormwater collection system in the Lakewood Road area with a stormwater pond at Lakewood Road and Addison Avenue with an outfall under Lakewood Drive to Bayou Chico.</i>	\$4,510,975
<b>99</b>	<b>Shoshone and Doug Ford Drive Drainage</b> <i>Evaluate pipe system and obtain permits to restore flow the wetlands and alleviate home flooding along Shoshone Drive.</i>	\$240,000
<b>100</b>	<b>Lanette Drive</b> <i>Construct new stormwater system for the area around Lanett Drive to reduce flooding in the area.</i>	\$1,000,000
<b>101</b>	<b>Hwy 29/Tate School Road</b> <i>Increase capacity of culverts to prevent overtopping of Tate Road</i>	\$187,331
<b>102</b>	<b>Bayou Grande Basin Study P7- Bay Meadows Treatment Pond</b> <i>Provide treatment pond for existing residential development north of Bay Meadows Dr. This will not affect downstream properties.</i>	\$112,361
<b>103</b>	<b>Ten Mile Creek from Roberts Rd North to Kingsfield Rd</b> <i>Reconstruct the creek to provide additional storage volume and increase the culvert capacity under Roberts Road, Dolphin Street, Tate Road, and Kingsfield Road to prevent flooding to structures. Improvements may have a negative effect on downstream properties.</i>	\$4,494,457
<b>104</b>	<b>Pine Forest/Klondike Road</b> <i>Construct two new retention/detention ponds and increase capacity of driveway culverts along Klondike Rd to reduce peak flows downstream, and reduce scour.</i>	\$2,116,233
<b>105</b>	<b>Bayou Grande Basin Study S2- Athens Ave Culvert</b> <i>Enlarge the existing culvert on Athens in order to prevent road flooding. This improvement will not negatively impact downstream properties or other improvements.</i>	\$18,000
<b>106</b>	<b>Bayou Grande Basin Study S1- Americus Ave Culvert</b> <i>Enlarge the existing culvert on Americus in order to prevent road flooding. This improvement may impact other improvements.</i>	\$12,000
<b>107</b>	<b>Carrington Lakes</b> <i>Repair outfall erosion at the private subdivision pond to prevent further erosion and possible wetland impacts.</i>	\$276,893
<b>108</b>	<b>Ashton Brosnaham Park</b> <i>Construct a new stormwater pond at the end of Bet mark Lane with a ditch connecting runoff from the recreational center to the pond.</i>	\$1,568,145
<b>109</b>	<b>Myrtle Grove System E (McNair Ln and 57th)</b> <i>Decrease drainage impacts on Lake Charlene through drainage improvements on 72nd and 73rd Ave, South of Jackson and North of Harvey St.</i>	\$100,000
<b>110</b>	<b>Northcreek and Valley Ridge Area Drainage Joint Sanitary Sewer Project</b> <i>Drainage and sanitary sewer improvements in Northcreek Subdivision and in the adjacent Deer Run and Valley Ridge subdivisions, as well as on Bison Road and Motley Court</i>	\$250,000
<b>111</b>	<b>Tributary 10-A of Eight Mile Creek Basin Study</b> <i>Increase the capacity of the culvert under Pine Forest Road at Lake Francis to decrease roadway flooding and accommodate the improved secondary sewer system.</i>	\$58,307
<b>112</b>	<b>Rittenberry Drive</b> <i>Increase the capacity of the culverts under Rittenberry Drive and Madrid Road and deepen the roadside ditches to prevent home flooding.</i>	\$70,597
<b>113</b>	<b>Well Line Rd</b> <i>Increase the capacity of the culverts under Well Line Road to reduce roadway flooding. Clear debris and large pieces of concrete pipe from the downstream channel to facilitate stormwater flow.</i>	\$58,461
<b>114</b>	<b>Stacey Rd (at the bridge)</b> <i>Clear and grade the existing channel area and construct an improved concrete outfall channel to provide adequate stormwater conveyance and reduce yard and building flooding.</i>	\$45,289
<b>115</b>	<b>Stacey Rd at Quintette Rd</b> <i>Increase the capacity of the culverts under Stacey Road and Quinette Road and construct a ditch that connects them to prevent roadway and home flooding.</i>	\$127,811

# Escambia County Stormwater Needs Assessment List

Rank	Project Name	Construction Estimate
116	<b>Quintette Rd (North of Welcome Circle)</b> <i>Increase the capacity of the culverts under West Quinette Road and replace the existing grate inlet to decrease roadway flooding. These improvements may have a negative impact on downstream properties.</i>	\$59,474
117	<b>Muldoon-Cerney-Velma-Fresno Area Drainage</b> <i>Drainage System Improvements including Velma pond expansion, outfall, and drainage conveyance to Velma Pond; better outfall for Muldoon Area Ponds</i>	\$2,200,000
118	<b>St Johns North of PCC</b> <i>Purchase property for pond site and connect to 48" pipe across PCA. Add conveyance from system to the North per Beverly Parkway Basin Study Zone F including upgrades to system from Oleander drive to Cummings Street. This will address flooding problems at Cummings Street and St. John's before tying into the PCA Campus.</i>	\$450,000
119	<b>West Highlands</b> <i>Proposed new system located on Kirk Street and extend from West Avery Street to West Gonzalez Street and the surrounding area. This new system requires the acquisition and construction of a new retention/detention pond. (see Branch I in Warrington Master Plan)</i>	\$2,700,000
120	<b>Breise Lane between Jeffry and Olive Road</b> <i>Extend existing Johnson Ave drainage system to relieve roadway and yard flooding.</i>	\$100,000
121	<b>Ellyson Industrial Park Drianage</b> <i>Miscellaneous Infrastructure drainage improvements to address roadway flooding at Grow Road, Copter Road, and East pond expansion</i>	\$1,000,000
122	<b>Bayou Grande Basin Study E1 - Gulf Beach Hwy Outfall Improvement</b> <i>Increase the culvert size along Gulf Beach Hwy culvert between Brigadier and Richmond. The downstream channel to Winthrop St will be regraded and shaped to provide positive flow to the Winthrop culvert. This improvement will not affect downstream properties.</i>	\$73,035
123	<b>Bronson Airfield design 3 (entire)</b> <i>Construct a pond over the entire Bronson Airfield property.</i>	\$27,631,968
124	<b>Edgewater Drive - Warrington Basin Study Branch F</b> <i>Extend and increase the capacity of the stormwater system on Edgewater and Chaseville Streets. Construct an outfall ditch and discharge pipe into Bayou Chico.</i>	\$1,572,096
125	<b>Bayou Grande Basin Study CC1- Sidney Culvert</b> <i>Enlarge existing culvert to prevent road flooding along Sidney Rd.</i>	\$10,000
126	<b>Bayou Grande Basin Study R1- Weller Dr. Culvert</b> <i>Replace and increase the existing culvert along Weller Dr. to prevent road overtopping. This improvement will not negatively impact downstream properties.</i>	\$55,000
127	<b>Muldoon R. Improvements</b> <i>Improve the drainage system along Muldoon road.</i>	\$386,830
128	<b>Tributary 16-A of Eight Mile Creek begins at Belgium Rd south of Holly Hill Rd and enters the main channel north of Pine Forest Rd</b> <i>Increase the capacity of the structures at Belgium Road and Lillie Lane to minimize roadway flooding.</i>	\$50,273
129	<b>Beulah Road Ditch</b> <i>Clean out existing culvert and construct a new ditch to convey stormwater to the culvert.</i>	\$90,039
130	<b>Bridlewood Rd (at Mobile Hwy)</b> <i>Construct two stormwater ponds, remove the culvert under Bridlewood and construct a new culvert under Nine Mile Road to prevent yard and road flooding.</i>	\$929,651
131	<b>West Cervantes at Westworth</b> <i>Correct road flooding in area with no drainage system</i>	\$600,000
132	<b>Magaha Area/Nine Mile Road</b> <i>Improve channel and increase capacity of the upstream structure along Nine Mile Road to prevent roadway overtopping and yard flooding.</i>	\$1,240,677
133	<b>11 Mile Creek Basin Study Zone 6</b> <i>increase culvert capacity under Amanda lane and 9 1/2 mile road (seems to be partial overlap with 94 priority 19)</i>	\$258,586
134	<b>11 Mile Creek Basin Study Zone 8</b> <i>Increase culvert capacity to reduce area flooding.</i>	\$99,466
135	<b>Godwin Lane - bayou Marcus/Millview Study Branch F</b> <i>Construct new stormwater system for the area around Godwin Lane including two stormwater ponds.</i>	\$5,320,591
136	<b>Pensacola Heights- Branch F</b> <i>Modify the existing collection system serving Pensacola Heights and construct a new detention pond.</i>	\$4,352,877

## Escambia County Stormwater Needs Assessment List

Rank	Project Name	Construction Estimate
137	<b>South Bronson Airfield Ditch Block</b> <i>Construct ditch blocks in the ditch south of Bronson Airfield. (Treatment only)</i>	\$142,730
138	<b>Citrus Street Area Drainage</b> <i>Drainage System Improvements on Citrus per Warrington Basin Study Branch G (Study modification required to consider existing County parcel for pond site and conveyance system).</i>	\$1,300,000
139	<b>Bayou Grande Basin Study P3- Fairfield Storm Sewer at Gulf Beach</b> <i>Replace existing storm collection with a larger system to prevent road overtopping.</i>	\$106,743
140	<b>Bayou Grande Basin Study BB9- Carrier Dr Channel Improvements</b> <i>Clear and regrade channel downstream of the culvert on Carrier Dr. to alleviate road flooding.</i>	\$8,427
141	<b>Brookshill Drive</b> <i>Replace the existing culverts under Brookshills Drive with a bridge span to increase flow capacity under the road and decrease roadway, yard, and home flooding. Set a minimum finished floor elevation for any new homes built along the road in order to prevent structure flooding.</i>	\$409,429
142	<b>Piney Lane</b> <i>Construct a ditch along the road and a culvert under Piney Lane.</i>	\$101,294
143	<b>Frank Reeder Rd culvert and swales</b> <i>Construct drainage swale adjacent to roadway and culvert under Frank Reeder Road.</i>	\$100,168
144	<b>Shelby Lane</b> <i>Construct a ditch along the road and a culvert under Shelby Lane.</i>	\$95,666
145	<b>Bayou Grande Basin Study Y2- Kinard Drainage System</b> <i>Increase and extend existing roadside ditch system along Kinard Ave. and Robertson Rd. to control road and yard flooding.</i>	\$179,778
146	<b>Perdido Rd West of Balboa Road</b> <i>Increase the capacity of the culverts under Perdido Road to decrease roadway and yard flooding. This will negatively effect downstream properties and should be performed in conjunction with other Balboa Road improvements.</i>	\$43,814
147	<b>Daylilly Road</b> <i>Increase the capacity of the culverts under Daylilly Road to decrease roadway overtopping. This improvement may have a negative effect on downstream homes, so the downstream ditch should be considered in construction plans.</i>	\$49,488
148	<b>Stacey Rd (at the bend)</b> <i>Regrade the right-of-way and increase the capacity of the culverts under Stacey Road to prevent roadway and yard flooding.</i>	\$93,335
149	<b>Schaag Rd at Stokes Pond</b> <i>Place riprap along the channel from Stokes Pond to the cross drain inlet to prevent channel erosion. Replace the upstream headwall to prevent headwall failure and roadway undermining.</i>	\$98,040
150	<b>Crabtree Church Rd at Abbott Lane</b> <i>Replace the existing culverts under Crabtree Church Road with a bridge to reduce roadway flooding.</i>	\$927,730
151	<b>Bet Raines Rd (East of Bridge)</b> <i>Increase the capacity of the culverts underneath Bet Raines Road and construct an earthen ditch to improve flows and reduce yard flooding.</i>	\$75,991
152	<b>Bridge on Bet Raines Rd</b> <i>Improve flow conditions through the bridge area by removing trees and brush from the flow path and ensuring a 6 foot clearance below the bottom of the bridge.</i>	\$17,001
153	<b>Chestnut Rd South</b> <i>Increase the capacity of the culverts under Chestnut Road to decrease roadway flooding and possible home flooding.</i>	\$101,837
154	<b>Bronson Airfield design 2 (Eastern Side)</b> <i>Construct a pond on the eastern side of the Bronson Airfield property.</i>	\$9,767,981
155	<b>Quintette Rd (at Welcome Rd)</b> <i>Increase the capacity of the culverts under Quinette Road and improve the downstream channel in order to reduce roadway flooding.</i>	\$51,489
156	<b>Schaag Rd Bridge at Jack's Branch Tributary P</b> <i>Replace the existing bridge with a new bridge that has sufficient hydraulic capacity to prevent roadway overtopping.</i>	\$695,188
157	<b>Bayou Grande Basin Study P2- Gulf Beach Storm Sewer at Fairfield</b> <i>Replace existing storm collection with a larger system to prevent road overtopping.</i>	\$78,653

## Escambia County Stormwater Needs Assessment List

Rank	Project Name	Construction Estimate
158	<b>Chestnut Rd North</b> <i>Raise the elevation of Chestnut Road increase the flow capacity of the culverts to decrease roadway flooding.</i>	\$271,465
159	<b>Via DeLuna Drainage at Pensacola Beach RV Resort</b> <i>System should be cleaned of sediment and checked regularly. Increased system capacity should be considered.</i>	\$287,470
160	<b>Corto, Largo, and Rio Vista Drives Drainage</b> <i>Repaving at Corto Drive and Rio Vista Drive. Regrading at Largo Drive from Avenida 17 to the sound. Stabilizing along Rio Vista Drive south of Largo Drive.</i>	\$735,389
161	<b>Isaacs Rd</b> <i>Construct a ditch along Isaacs Road and a new culvert under Beulah Road.</i>	\$114,800
162	<b>Muscogee Rd &amp; Beulah Rd</b> <i>Reconstruct the ditches in the area of the intersection and construction of a culvert under Beulah Road.</i>	\$59,651
163	<b>Thompson Bayou - Scenic Hills Basin Study Tributary A</b> <i>Construct a new stormwater pond between University Parkway and Shoal Creek Drive.</i>	\$1,736,479
164	<b>Thompson Bayou Main Channel</b> <i>Construct new stormwater pond at Airway Drive near the end of the Thompson Bayou main channel and increase the capacity of the existing culvert at Airway Drive.</i>	\$2,009,815
165	<b>Eaton Rd - Warrington Basin Study Branch K</b> <i>Construct a new stormwater system along Eaton Road from Feldor to Adkinson Drive with a discharge to an existing county pond per Warrington Basin Study Branch K.</i>	\$1,219,351
166	<b>Coral Village Storm Drainage Replacement</b> <i>Reduce flooding by replacing failing storm pipe within drainage easement.</i>	\$300,000
167	<b>Royal Pines - Bayou Marcus/Millview Study Branch B</b> <i>Construct new stormwater system for the Royal Pines subdivision to reduce flooding in the area.</i>	\$2,908,721
168	<b>Tributary 21-A of Eight Mile Creek (south of Site 6, through the pit at Bush Street and enters the main channel south of Detroit Blvd)</b> <i>Increase the capacity of the pond south of Bush Street. Increase the capacity of the culvert at Bush Street to prevent roadway flooding. Expand the channel in this area to increase capacity and prevent out-of-bank flooding. Relocate and increase the capacity of the structure at Nine Mile Road to line up with the improved channel.</i>	\$1,628,083
169	<b>Main channel crossing at Mobile Hwy</b> <i>Raise the elevation of the Mobile Highway Bridge 2.5 feet to prevent over-topping.</i>	\$2,539,817
170	<b>Bayou Grande Basin Study BB4- Windward Ct Outfall Improvements</b> <i>Clean and grade ditch outfall from Windward Court in Coral Creek.</i>	\$13,483
171	<b>Bayou Grande Basin Study BB3- Coral Island Dr. Outfall Improvements</b> <i>Provide stormwater collection along Coral Island Dr. in order to alleviate flooding along the roadway.</i>	\$36,517
172	<b>Ridgewood Park - bayou Marcus/Millview Study Branch B</b> <i>Construct new stormwater system for the Ridgewood Park subdivision to reduce flooding in the area.</i>	\$2,524,333
173	<b>Riola Place - Bridge Creek/Heron Bayou Study Branch E</b> <i>Lower pipe inverts and increase the capacity of the culvert under Riola Place to decrease out-of-bank channel flooding.</i>	\$189,379
174	<b>Risen Drive and Bonanza Drive</b> <i>Upgrade the culvert under Bonanza Drive and obtain drainage easement over downstream ditch to reduce roadway flooding at the intersection. Improvement may have a negative effect on downstream properties.</i>	\$101,125
175	<b>Pensacola Beach Blvd Stormwater Outfall Upgrades</b> <i>Installing stormwater treatment on the outfall in the vicinity of the marina within the existing stormwater easement</i>	\$401,121
176	<b>River Annex Road bridge</b> <i>Reconstruct the bridge over River Annex Road to a higher elevation.</i>	\$623,519
177	<b>Roosevelt - Warrington Basin Study Branch K</b> <i>Construct a new stormwater system along 61st, 59th, 60th, 63rd, and 65th streets with a new stormwater pond west of 61st street.</i>	\$4,512,150
178	<b>SR 297-A/Meander Road</b> <i>Increase capacity of culverts to prevent overtopping of State Road 297-A</i>	\$61,024
179	<b>Bayou Grande Basin Study P6- Athens St. Ditch Improvements</b> <i>Improve and regrade existing ditch along Athens and Gulf Beach Hwy to decrease road flooding.</i>	\$8,427

## Escambia County Stormwater Needs Assessment List

Rank	Project Name	Construction Estimate
180	<b>Bayou Grande Basin Study Y1- Robertson Channel Improvements</b> <i>Increase and extend existing roadside ditch system along Robertson Rd to control road and yard flooding.</i>	\$106,743
181	<b>Deerwood Drive - Bayou Marcus/Millview Study Branch F</b> <i>Increase the capacity of the Deerwood Drive stormwater system and outfall pipe.</i>	\$1,971,838
182	<b>Perdido Rd at Saverna Park</b> <i>Increase the capacity of the culverts near Perdido Road to prevent roadway overtopping.</i>	\$166,774
183	<b>Cedar Tree Lane (Hwy 29 Side Drain)</b> <i>Lower and increase the capacity of the culverts under Cedar Tree Lane to prevent roadway flooding. Rebuild the downstream ditch in order to provide a positive grade away from the cross drain.</i>	\$137,132
184	<b>Cedar Tree Lane (at Cedar Point Rd)</b> <i>Increase the capacity of the culverts under Cedar Tree Lane to prevent roadway flooding. The roadway in this area should also be paved to decrease sediment buildup in the culverts.</i>	\$85,872
185	<b>Welcome Rd (at the bend)</b> <i>Increase the capacity of the culvert under Welcome Road to prevent roadway overtopping and add end treatments and riprap to prevent erosion.</i>	\$47,062
186	<b>Hernandez Street pond site 3</b> <i>Construct a new pond on Hernandez St. to reduce flood staging in surrounding and downstream. This improvement will not negatively impact downstream properties/impacts.</i>	\$1,195,738
187	<b>New 36 Inch Pipe Outlet Along Hernandez Street</b> <i>Construct a new collection system and outfall connection to the existing system to decrease flood stages in the surrounding areas. This improvement could have impacts on all downstream properties.</i>	\$2,232,399
188	<b>Serenity Circle (pond)</b> <i>Construction of stormwater pond adjacent to Serenity Circle.</i>	\$113,944
189	<b>Beverly Parkway Basin Branch B- North Portion- Lookout Drive</b> <i>Construct a stormwater system along Lookout Drive West Michigan Avenue, and Rock Island Place with a discharge to the FDOT pit.</i>	\$1,128,009
190	<b>Bayou Grande Basin Study L1- Cousineau Rd. Outfall</b> <i>Replace the outfall from Cousineau Rd. to Bayou Grade by an outfall ditch in order to prevent street flooding.</i>	\$25,281
191	<b>Bayou Grande Basin Study BB10- Liberty Church Discharge Structure</b> <i>Provide stormwater pond at Liberty Church with a discharge structure to control the water level and time of detention.</i>	\$14,045
192	<b>Bayou Grande Basin Study CC2- Sidney Culvert</b> <i>Enlarge existing culvert to prevent road flooding along Sidney Rd.</i>	\$16,854
193	<b>Bayou Grande B1- New Storm Drainage System</b> <i>Construct a new street collection system consisting of roadside swales and culverts along 1st and 2nd streets to reduce roadway flooding. Improvement is an independent project and will not affect downstream properties.</i>	\$308,994
194	<b>Calle Juela Drainage at Via DeLuna</b> <i>Regrade to a grate inlet with outfall through an exfiltration pipe</i>	\$93,595
195	<b>Calle Traviesa Drainage at Via DeLuna</b> <i>Regrade to a grate inlet with outfall through an exfiltration pipe</i>	\$93,595
196	<b>Siguenza Drive Drainage</b> <i>Construct a small retention area at the bend adding a new inlet at the location of the flooding</i>	\$93,595
197	<b>Frank Reeder Rd ditch</b> <i>Construct a ditch along Frank Reeder Road.</i>	\$68,655
198	<b>Hurst Hammock</b> <i>Construct an additional culvert under Hurst Hammock and install flap valves on the downstream side of the culverts to prevent the propagation of seawater from tidal action.</i>	\$61,902
199	<b>Bayou Grande Basin Study P5- Grundy Culvert</b> <i>Enlarge the existing culvert on Grundy in order to prevent road flooding. This improvement may impact other improvements.</i>	\$25,843
200	<b>Sal Tillo - Bayou Marcus/Millview Study Branch C</b> <i>Improve the stormwater collection system serving the area around Sal Tillo Street.</i>	\$188,068
201	<b>Perdido Bay Country Club Estates Unit 7</b> <i>Drainage and resurfacing projects to address flooding and groundwater problems</i>	\$170,000



# Escambia County Stormwater Needs Assessment List

Rank	Project Name	Construction Estimate
202	<b>Bayou Grande Basin Study E2-Brigadier St. Culvert</b> <i>Increase the culvert size on Brigadier St. to prevent road flooding. This Improvement may have a negative impact on downstream roadway flooding.</i>	\$33,708
203	<b>Bayou Grande Basin Study P4- Bay Meadows Dr. Culvert</b> <i>Replace the existing culvert on Bay Meadows Dr. with larger pipes to prevent road flooding.</i>	\$56,181
204	<b>Bayou Grande Basin Study BB8- Vonna Jo Discharge Structure</b> <i>Provide stormwater pond on Vonna Jo Circle with a discharge structure to control the water level and time of detention.</i>	\$14,045
205	<b>Imperial Drive - Bayou Marcus/Millview Study Branch B</b> <i>Construct new stormwater system for the area around Imperial Drive to reduce flooding in the area.</i>	\$526,033
206	<b>49th Av - Warrington Basin Study Branch K</b> <i>Construct a new stormwater system along 49 the Ave with a discharge to the existing county pond on Lillian Highway.</i>	\$1,648,952
207	<b>Carrollwood Subdivision Resurfacing &amp; Drainage Rehabilitation</b> <i>Replace older cross drain at Stillbrook Road and repair existing drainage system on Pickwood including grading/resurfacing on Candlewood Circle</i>	\$1,200,000
208	<b>Crabtree Church Rd (East of Chestnut Rd)</b> <i>Increase the capacity of the culverts under Crabtree Church Road to decrease roadway flooding.</i>	\$51,767
209	<b>Saint James Place-Warrington Basin Study Branch C</b> <i>Construct a new stormwater system for the St James Place/Dowdy Drive area.</i>	\$902,785
210	<b>Bayou Grande Villas</b> <i>Roadway/drainage and sewer improvements; currently under design (NE of Fairfield and Gulf Beach Highway; Fairfield Dr to Colbert)</i>	\$200,000
211	<b>Aileron Ave - Bridge Creek/Heron Bayou Basin Branch B</b> <i>Install a new storm sewer system along Aileron Avenue and increase the capacity of the existing culvert under Dog Track Road to reduce roadway flooding.</i>	\$189,379
212	<b>Tatnall Street - Bridge Creek/Heron Bayou Basin Branch D</b> <i>Extend the existing ditch northward into the bayou to reduce flooding.</i>	\$163,750
213	<b>Main channel crossing at a private driveway located between Asland Rd and Interstate 10</b> <i>Raise the road height by constructing a bridge at the private driveway crossing of the main channel to prevent road overtopping and reduce flooding.</i>	\$92,885
214	<b>Schaag Rd (North of Hwy 196)</b> <i>Raise the surface elevation of a portion of Schaag Road and increase the capacity of the culverts underneath to prevent roadway overtopping.</i>	\$351,943
215	<b>Catholic High Zone C Drainage</b> <i>Re-evaluate previous basin study solution (a new discharge trunk line with storm sewer extensions, treatment swales, and underground vaults) to determine whether ponds or direct piping produces the greatest impact.</i>	\$9,000,000
216	<b>Via DeLuna Side road Connection Drainage Improvements</b> <i>Drainage Improvements</i>	\$334,268
217	<b>Visitor Information Center Access Road Drainage</b> <i>Regrading and repaved roadway to add slope and positive outfall to drainage inlets</i>	\$93,595
218	<b>Beulah Rd sag near bridge</b> <i>Regrade Beulah Road to prevent overtopping. Improvement may have a negative effect on downstream properties.</i>	\$248,732
219	<b>Windham Pond Outfall</b> <i>Construct an outfall for the Windham Pond. This improvement could cause negative effects to other properties.</i>	\$293,987
220	<b>Felton Pond Outfall</b> <i>Construct an outfall to connect the Felton Pond to the Windham Pond. This improvement could cause negative effects to other properties.</i>	\$342,660
221	<b>Catholic High Basin Zone B - Intersection of "S" Street and Avery Street and consist of a large storm sewer system running up "S" Street to Leonard Street</b> <i>Increase and expand existing storm collection system and provide stormwater treatment. Provide tie-ins to outfall proposed in "Begins at the intersection of Avery Street and run south to Gonzalez Street, west to "U" Street and south on "U" Street to its discharge point to Maggie's Ditch." This improvement can only be constructed after the completion of the proposed outfall trunk line.</i>	\$3,850,727
222	<b>Pearson Rd- Bayou Marcus/Millview Basin Branch C</b> <i>Construct new stormwater system for the area around Pearson Road to reduce flooding in the area.</i>	\$1,364,488

## Escambia County Stormwater Needs Assessment List

Rank	Project Name	Construction Estimate
<b>223</b>	<b>Improve Open Ditch Outlet Terminating at Fairfield Drive</b> <i>Enlarge outlet orifice for open ditch flowing to Fairfield Drive. This will not negatively impact downstream properties/improvements.</i>	\$20,990
<b>224</b>	<b>Ailanthus Drive and Bauer Drive (culverts)</b> <i>Upgrade culvert near intersection of Ailanthus Drive and Bauer Drive.</i>	\$301,051
<b>225</b>	<b>Monroe Avenue</b> <i>Increase the capacity of the culverts under Monroe Avenue to decrease roadway flooding. This may have negative impacts on downstream properties.</i>	\$90,647
<b>226</b>	<b>Bronson Airfield design 1 (northeast corner)</b> <i>Construct a pond in the northeast corner of the Bronson Airfield property.</i>	\$1,017,098
<b>227</b>	<b>Bellview and East Fence/Saufley Road</b> <i>Provide conveyance system to Saufley Field C&amp;D Pond from Bellview</i>	\$1,500,000
<b>228</b>	<b>61st Ave - Bayou Marcus/Millview Basin Branch D</b> <i>Increase the capacity of the 61st Avenue stormwater system to reduce flooding in the area.</i>	\$374,139

# Appendix C

## City of Pensacola Stormwater Needs List

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## **City of Pensacola Stormwater Primary Needs Assessment List**

### **Fisher Street and 11<sup>th</sup> Avenue (12<sup>th</sup> Ave. and Cross St.) Pond Rehab**

Stormwater enhancement project to rehab and potentially expand existing stormwater pond at this location to help abate flooding issues in this area.

Const. Estimate:                 \$1,300,000

### **Lee Street Pond Rehab**

Stormwater enhancement project to rehab and potentially expand existing stormwater pond at this location. Rehab work would include expansion of pond sand chimney to facilitate more effective pond percolation and increased pond retention volume to address flooding issues in this area.

Const. Estimate:                 \$700,000

### **“L” Street Pond Construction**

Stormwater enhancement project to construct new stormwater pond at this location to address flooding issues in this area.

Const. Estimate:                 \$2,225,000

### **Hollis T. Williams Stormwater Park**

Project to create a public stormwater management facility within the existing park beneath I-110 to serve the subject stormwater basin pollution reduction goals and assist in the abatement of downstream flooding

Const. Estimate:                 \$3,750,000

### **Government Street at Corinne Jones Park**

Project will create a public stormwater management facility within the existing park to serve the subject stormwater basin pollution reduction goals, which currently has no stormwater treatment prior to discharge directly into Pensacola Bay.

Const. Estimate:                 \$3,000,000

### **“R” Street Outfall at Maggie’s Ditch**

Proposed project would use stormwater treatment units to reduce pollution loading into Maggie’s Ditch.

Const. Estimate:                 \$750,000

### **Bill Gregory Park Stormwater Outfall at Bayou Chico**

Project will create a public stormwater management facility within the existing park to serve the subject stormwater basin pollution reduction goals, which currently has no stormwater treatment prior to discharge directly into the eastern branch of Bayou Chico.

Const. Estimate:                 \$2,300,000

### **Downtown Stormwater Outfall to Pensacola Bay**

Project will create a new stormwater conveyance and subsequent outfall to Pensacola Bay to help alleviate flooding issues in the Palafox corridor area of downtown.

Const. Estimate:       \$31,000,000

### **Aragon Court Drainage Rehab**

Stormwater enhancement project to construct additional stormwater drainage conveyance and outfall to Pensacola Bay to address flooding issues in this area.

Const. Estimate:       \$2,500,000

### **Old Blount School Site Stormwater Park**

Project to create a public stormwater management facility within the existing block of the former Blount School site to serve the subject stormwater basin pollution reduction goals and assist in the abatement of downstream flooding

Const. Estimate:       \$2,300,000

### **Bayou Drive Outfall at Bayou Chico**

Stormwater enhancement project to decrease pollution loading from subject area into Bayou Chico and Pensacola Bay.

Const. Estimate:       \$325,000

### **Woodcliff Drive at Livingston Outfall to Escambia Bay**

Subject residential area currently discharges to Escambia Bay untreated. Proposed project would address current storm sewer issues and provide stormwater treatment for this area by the construction of an underground treatment unit.

Const. Estimate:       \$800,000

### **19<sup>th</sup> Ave. and Blackshear Outfall at Bayou Texar**

Proposed project would use a stormwater treatment unit to reduce pollution into Bayou Texar and provide standard piping and inlet replacements to help eliminate nuisance flooding issues.

Const. Estimate:       \$550,000

### **Bayou Chico Stormwater Outfall Retrofits**

Various smaller stormwater outfalls have been identified as contributors of sediment into Bayou Chico and this project would help to address the sedimentation and localized flooding issues.

Const. Estimate:       \$1,500,000

### **E. Cross Street and Yates Ave. Outfall at Bayou Texar**

Proposed project would use a stormwater treatment unit to reduce pollution into Bayou Texar and help to abate nominal flooding issues.

Const. Estimate:               \$450,000

### **Clematis Street at Carpenter Creek**

Proposed project would use stormwater treatment units to reduce pollution into Carpenter's Creek and would help abate nominal flooding issues.

Const. Estimate:               \$767,400

### **Scenic Heights Discharge at Gaberonne Swamp (Langley Ave. Outfall into Escambia Bay)**

The project will serve as a major pollutant reduction mechanism for Escambia Bay and help restore the ecology of Gaberonne Swamp.

Const. Estimate:               \$3,500,000

### **Davis Highway @ Carpenter's Creek (North side)**

Proposed project would use stormwater treatment units to reduce pollution loading into Carpenter's Creek.

Const. Estimate:               \$500,000

### **Alcaniz Street Outfall to Pensacola Bay**

Proposed project would use stormwater treatment units to reduce pollution into Pensacola Bay and would help eliminate nominal flooding issues in the area.

Const. Estimate:               \$1,200,000

### **Bayou Blvd at Tyler Street discharge**

Proposed project would use stormwater treatment units to reduce pollution into Bayou Texar and help to abate nominal flooding in the area.

Const. Estimate:               \$700,000

### **Cordova Square Pond at 12<sup>th</sup> Avenue Pond Rehab**

Stormwater enhancement project to rehab and potentially expand existing stormwater pond at this location to help abate area flooding issues.

Const. Estimate:               \$600,000

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# Appendix D

## City of Pensacola Land Development Code Revisions

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SECTION 2. Section 12-9-6 of the Code of the City of Pensacola, Florida, is hereby amended to read as follows:

Sec. 12-9-6. - Design standards for stormwater management system.

- (A) General.
- (a) The design of stormwater management facilities including all water retention or detention structures and flow attenuation devices shall comply with applicable state regulations (i.e., Chapter 62-25 62-330, Florida Administrative Code) and shall be subject to approval of the city engineer pursuant to the following requirements. In the event of conflict between the provisions of this chapter and the provisions of the applicable state regulations, the more strict requirements shall prevail.
  - (b) All stormwater management facilities shall be designed for a minimum of fifty-year life, have low maintenance cost and easy legal access for periodic maintenance.
  - (c) All proposed stormwater management facilities shall be designed to prevent flooding, safety or health hazards and shall not contribute to the breeding of mosquitoes and arthropods.
  - (d) The use of drainage facilities and vegetated buffer zones for open space, recreation, and conservation areas shall be encouraged.
  - (e) The use of alternative permeable surface materials are encouraged for private parking lots will be given due consideration in drainage plan review.
- (B) Water quality.
- (a) The first one (1) inch of runoff shall be retained on the development site. At the discretion of the city engineer, retention standards may be increased beyond the one-inch minimum standard on a site-specific basis to prevent flooding and drainage problems, and to protect environmentally sensitive water bodies.
  - (b) Stormwater management facilities that receive stormwater runoff from areas containing a potential source of oil and grease contamination including, but not limited to, any land use involving the sale or handling of petroleum products or any land use involving the repair, maintenance or cleaning of motor vehicles shall include a baffle, skimmer, grease trap, or other suitable oil and grease separation mechanism.
  - (c) Channeling runoff directly into water bodies is prohibited. Runoff shall be routed through stormwater management systems designed to increase time of concentration, decrease velocity, increase infiltration, allow suspended solids to settle, and remove pollutants.
- (C) Erosion and sedimentation.
- (a) Erosion and sediment control best management practices shall be used during construction to retain sediment on-site. These management practices shall be designed by an engineer or other competent professional experienced in the fields of soil conservation or sediment control according to specific site conditions and shall be shown or noted on the plans of the stormwater management system. The engineer or designer shall furnish the contractor with information pertaining to

the construction, operation and maintenance of the erosion and sediment control practices.

(b) The area of land disturbed by development shall be as small as practicable. Those areas that are not to be disturbed shall be protected by an adequate barrier from construction activity. Whenever possible, natural vegetation shall be retained and protected.

(c) No clearing, grading, cutting, filling or alteration to the site of any kind shall be commenced until adequate erosion and sedimentation structural controls have been installed as per plan between the disturbed area and waterbodies, watercourses, and wetlands and inspected by the building official. Limited clearing shall be permitted as necessary to allow the installation of the structural controls.

(d) Land that has been cleared for development and upon which construction has not commenced shall be protected from erosion by appropriate techniques designed to temporarily stabilize the areas.

(e) Sediment shall be retained on the site of the development, unless discharged into an approved off-site drainage facility as provided for in section 12-9-7

(f) Erosion and sedimentation facilities shall receive regular maintenance during construction to ensure that they continue to function properly.

(g) Vegetated buffer strips shall be created or, where practicable, retained in their natural state along the banks of all watercourses, waterbodies, or wetlands. The width of the buffer shall be sufficient to prevent erosion, trap the sediment in overland runoff, maintain natural drainage patterns to the waterbody, and allow for periodic flooding without damage to structures.

(D) Design frequency.

(a) Stormwater management facilities with approved positive outfall shall be designed to attenuate the ~~twenty-five (25)~~ one-hundred (100) year/critical duration storm event. The city engineer may waive or reduce this requirement if the stormwater management facility discharges directly into a natural outfall after treatment, does not contribute to potential or existing flooding conditions and does not increase pollutant loading.

(b) Retention facilities that fall within a closed drainage basin and have no positive outfall shall retain the entire runoff volume from a one-hundred (100) year storm event and shall include all storm durations up to and including the twenty-four-hour duration. This retention volume must be recovered within seventy-two (72) hours of the contributing storm event by natural percolation or other approved means.

(c) Detention and/or retention facilities that connect directly to the city's storm drainage system shall be designed so that the post-development discharge rate does not exceed the pre-development discharge rate for a ten (10) year/critical duration storm event. Where the existing capacity of the city storm drainage system is not adequate to accept the discharge from a ten (10) year storm event, the city engineer may reduce the allowable post-development discharge rate from the detention facility to an acceptable level. Detention and/or retention facilities which do not connect directly to the city storm system or have a direct impact on the system shall be allowed to discharge up to the pre-development rate for the ~~twenty-five (25)~~ one-

hundred (100) year/critical duration storm event or as otherwise approved by the city engineer.

(d) The drainage area used in runoff calculations shall be the total natural watershed area including areas beyond proposed site limits (offsite runoff).

(E) Stormwater retention and/or detention facilities.

(a) General requirements.

1. Recovery time for treatment/retention volume shall be a maximum of seventy-two (72) hours. Recovery time for facilities that are underdrained or side drained shall be thirty-six (36) hours.

2. Minimum freeboard for retention and/or detention facilities shall be one (1) foot between design high water and top of facility. The city engineer may waive or reduce this requirement for shallow ponds and swales.

3. Stormwater retention and/or detention facilities shall include appropriate access for periodic maintenance as approved by the city engineer.

4. Stormwater retention and/or detention facilities located adjacent to a public right-of-way shall be landscaped with a visual screen installed in accordance with the provisions of section 12-2-32(D) through (G) or landscaped as a part of the overall landscaping for the development with plant species that are suitable for individual pond characteristics and that provide an effective and visually pleasing screen for the retention and/or detention facility. All landscaping shall be maintained in accordance with the provisions of section 12-6-5

5. Designs for stormwater detention and/or retention facilities that use predominantly non-angular, freeform, curvilinear contouring that functions to visually integrate the facility into the overall design and landscaping of the development shall be encouraged.

(b) Public facilities. Stormwater retention and/or detention facilities to be dedicated to the city for maintenance shall comply with the following requirements in addition to the general requirement specified in section 12-9-6(E)(a) above.

1. Slide slopes of facilities shall be no steeper than four (4) horizontal feet for every one (1) vertical foot (4:1) out to a depth of two (2) feet below the control elevation. Grades steeper than 4:1 may be allowed where unique circumstances exist as approved by the city engineer.

2. Side slopes shall be stabilized with sod or other materials as approved by the city engineer.

3. Dry stormwater retention and/or detention facilities that contain side slopes that are steeper than 4:1 and have a retention depth greater than thirty (30) inches shall be completely enclosed by a six-foot fence constructed of chain link, wrought iron or other material as approved by the city engineer. Chain link fences and related appurtenances (posts, gates, etc.) shall be vinyl-coated (dark green or black). The fence shall have a minimum twelve (12) foot wide (fifteen (15) foot maximum) gate opening. The maximum clearance from the bottom of the fence to existing grade shall be no more

than three (3) inches. This provision does not apply to shallow swales with a retention depth of thirty (30) inches or less.

4. Permanently wet retention and/or detention facilities that contain side slopes that are steeper than 4:1 shall be fenced or otherwise restricted from public access in accordance with Chapter Chapter ~~62-25~~ 62-330 of the Florida Administrative Code. Where a fence is proposed it shall be constructed according to the provisions of section 6(E)(b)3. above.

(c) Private facilities. Stormwater retention and/or detention facilities to be maintained shall comply with the following requirements in addition to the general requirement specified in section 12-9-6(E)(a) above.

1. Side slopes of facilities with earthen slopes shall be no steeper than two (2) horizontal feet for every one (1) vertical foot (2:1). Grades steeper than 2:1 may be allowed where unique circumstances exist as approved by the city engineer.

2. Side slopes shall be stabilized with sod or other material as approved by the city engineer.

3. Private facilities with side slopes that are steeper than 4:1 shall be fenced or otherwise restricted from public access in accordance with Chapter 62-330 of the Florida Administrative Code. Private stormwater retention and detention facilities that are located adjacent to a public right-of-way or easement shall be fenced in accordance with section 12-9-6(E)(b)3. above.

SECTION 3. If any word, phrase, clause, paragraph, section or provision of this ordinance or the application thereof to any person or circumstance is held invalid or unconstitutional, such finding shall not affect the other provision or applications of the ordinance which can be given effect without the invalid or unconstitutional provisions or application, and to this end the provisions of this ordinance are declared severable.

SECTION 3. All ordinances or parts of ordinances in conflict herewith are hereby repealed to the extent of such conflict.

SECTION 4. This ordinance shall become effective on the fifth business day after adoption, unless otherwise provided pursuant to Section 4.03(d) of the City Charter of the City of Pensacola.

Adopted: \_\_\_\_\_

Approved: \_\_\_\_\_  
President of City Council

Attest:

\_\_\_\_\_  
City Clerk

# Appendix E

## SWAT Design Storm and Precipitation Frequency Paper

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# STORM WATER ADVISORY TEAM REPORT

MARCH 2015

## EXECUTIVE SUMMARY

The design basis rainfall amount for Escambia County has been specified as the 25-year storm rainfall of critical duration. Specifically, it is the rainfall amount given in the Florida Department of Transportation Drainage Manual. The 24-hour rainfall level (11 inches) was exceeded four times during the last 100 years, including the most recent rainfall and the previous County record rainfall. In fact a rainfall level of 13 inches was equaled or exceeded four times in the last 100 years. The empirical 25-year rainfall exceeds 13 inches.

The 24-hour, 100-year rainfall for storm water design is given as 14 inches. It has been exceeded twice in the last 100 years. The storm last April 29-30 was officially reported as 19.56 inches, a record 24-hour 100-year rainfall. The rainfall profile (intensity vs. time) is a significant factor in producing flooding and was especially intense in the evening of April 29 – considered by the National Weather Service to be a 200 to 500-year event.

The design rainfall for Florida storms is given by a U.S. Department of Agriculture (USDA) paper published in 1961 that did not use data gathered after 1958. The data recorded after 1958 indicate that the design rainfall probably should be higher.

It seems prudent to the Team that the County adopt the 24-hour 100-year storm from the Drainage Manual as the current design basis rainfall. The County relied upon the Federal and State documents for storm water design and those documents may

have understated the rainfall amounts associated with risk levels that could be expected.

## DISCUSSION

None of us can know with certainty when the next intense storm will arrive. Nor can we know how hard it will rain and how long it will rain. Those aspects of the next intense storm are uncertain.

Uncertainty makes decisions difficult. The goal of the Storm Water Advisory Team (Team), according to the resolution, is to “assist the staff in identifying conditions associated with the April flooding and review and comment on staff’s recommendations prior to the staff’s presentation to the Board of County Commissioners for its review.” The type design storm is a condition to be identified as it had direct effects on the resulting flooding associated with the Apr. 29/30th event.

We may not know future events with certainty but we can use probabilities to aid in judging the risk associated with the decisions regarding how to proceed with storm water management. This judgment of the appropriate level of risk is one of the early steps in defining the response for the County to take.

The risk level is generally implied in what is called the return period of the storm. What is called a 25-year storm has a rate of one storm per 25 years. A 100-year storm has a rate of one storm per 100 years. In fact, though, that is shorthand for saying a 25-year storm has a 4% probability of occurring each year; a 100-year storm has a 1% probability of occurring each year.

At present the Escambia County Code of Ordinances Land Development Code (LDC)<sup>1</sup> specifies the design basis rainfall as a 25-year storm; an annual probability of 4%. Given the April 29-30 intense rainfall event there is some question about whether the design basis should be a 24-hour 100-year storm; one having an annual probability of 1%.

The current design guidance is based on the 2015 Florida Department of Transportation Drainage Manual. We believe it will be helpful for you to know how the data in that manual was developed.

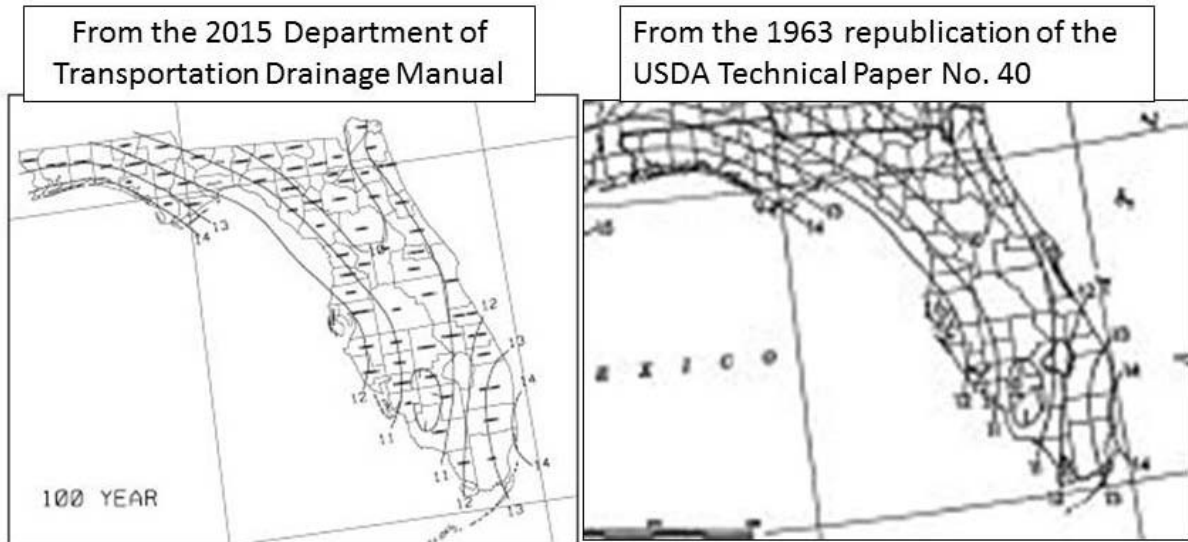
In May 1961 the U.S. Department of Agriculture published Technical Paper No. 40<sup>2</sup>, with charts showing constant rainfall (isopluvial) lines for various return periods (probabilities), and specified rainfall durations. The work reported in Technical Paper No. 40 relied on rainfall data processed from the earliest available data through 1958. The data sample was large but the average time spans for recording stations ranged from 14 to 47 years. The data was recorded through 1958.

The charts in Technical Paper No. 40 were intended to provide the design basis for hydrological analysis of the entire United States. This paper was repaginated and republished in 1963. It is a monumental work, and excellent in every regard. As good as it is, though, Technical Paper No. 40 has the limitation of being based on rainfall data taken before 1959.

The rainfall isopluvial lines were published again in 1975 and 1986 as Technical Report No. 55. That report was referenced in the 2015 Department of Transportation Drainage Manual with the charts made available on-line as a separate document. The charts can be found in the on-line document linked to Appendix B of the manual. Charts

with the 24-hour 100-year isopluvial lines are shown below and it is evident that those from Technical Paper No. 40 are indistinguishable from those in the 2015 DOT Drainage Manual. This is true also of the 24-hour 25-year rainfall.

The conclusion we may draw from this is that the charts currently approved for storm water management design in Florida are based on data that was gathered before



1959. That data has not been updated since then, some 55 years.

The previous Escambia County record 24-hour rainfall of 15.29 inches was set in 1934. This was exceeded in 2014 with a 19.56 inch rainfall that the National Weather service lists as the full day rainfall for April 29-30, 2014<sup>3</sup>.

The 24-hour 25-year rainfall shown on the design manual charts is approximately 11 inches, and the 24-hour 100-year rainfall on the same isopluvial line is 14 inches.

Looking back 100 years there have been four rainfall events equaling or exceeding the 25-year design basis (11 inches). Worse than that, those four rainfall events equaled or exceeded a 13-inch rainfall. Using the 24-hour 25-year rainfall as the Storm Water management design basis has been shown by experience to be inadequate.

In that same 100 year period the County experienced 24-hour rainfalls of 15.29 inches and 19.56 inches, yielding a 24-hour 50-year storm rainfall greater than 15.29 inches; an annual probability of 2% .

The storm of last April 29-30 had the greatest 24-hour rainfall. It was the largest 24-hour storm in the last 100-years, officially reported as 19.56 inches. This storm was unusual in several respects, it was a large total rainfall and the rainfall intensity for a 1-hour period was 5.68 inches, estimated to be a 200 to 500 year event.

Considering only this limited sample of empirical evidence one could conclude that neither the current 25-year design basis (11 inches) nor the potential 100-year design basis (14 inches) are sufficient for the long term. It appears that both would fall short of the design basis needed to prevent surprises from intense rainfalls in the future.

It is little consolation to know that neighboring communities also suffered damage from flooding

because of similarly high rainfalls.

Rainfall totals are shown in the table alongside for

Station <sup>1</sup> Number	Station Name	Daily Precip Sum (in)
AL-MB-50	Mobile 5.1 S	17.20
AL-BW-45	Silverhill 5.0 SW	21.80
AL-BW-9	Foley 0.5 ESE	20.76
AL-BW-27	Orange Beach 2.1 NE	20.53
FL-ES-21	Pensacola 9.2 NW	19.56
FL-SR-9	Milton 10.9 SSW	20.39

communities from Mobile to Milton. This does illustrate, however that storms of this magnitude are not just a problem for the City of Pensacola but are a County-wide, even area-wide problem.

The extreme rainfall from the April 29-30 storm was caused by a cold front that slowed the progress of the storm inland. Storms slowed in their passage inland are most unusual but have accounted for other even larger rainfall events. The record rainfall for Florida of 38.7 inches occurred in 1950 when Hurricane Easy was stalled by a front to the North of Yankeetown. Tropical storm Claudette's passage was also hindered by a blocking front. Claudette produced the one-day record rainfall for the contiguous United States of 42 inches at Alvin, Texas (near Houston) in 1979.

One of the Team members prepared an evaluation of the last 50 years of the maximum daily rainfall at the Pensacola Airport. The data appeared to be represented fairly well by a lognormal probability distribution. The evaluation indicates that considering the data missing from the charts referenced in the design basis could produce significantly different results, and more difficult design criteria.

The results of that evaluation are based on a relatively small sample, though, and other probability distributions (e.g., Gumbel, Extreme Value) may be more appropriate. A more practical consideration is that it may differ from the rainfall used in FEMA flood analysis. It seems advisable to have the County's basis for flood analysis consistent with that used by FEMA. As yet the Storm Water Advisory Team has not been able to determine the rainfall values used by FEMA.

## CONCLUSIONS/RECOMMENDATIONS

It was reasonable for the County to rely on the design guidance related to rainfall amounts provided by the State and Federal governments. Certainly, in the past, the County could not have been expected to supplant the agencies of the Federal government. It does seem, though, that the County must treat the present design guidance with some skepticism and if necessary use the data from state/federal agencies to develop more location specific design criteria.

The Team recommends that Escambia County adopt the 100-year storm defined by the FDOT in the Drainage Manual as the current basis for the design of storm water management facilities. The Team also recommends that the Board of County Commissioners pursue a scientific study to aid the BCC in judging the probability of the time between extreme storms of various intensities as an aid in planning and prioritizing mitigation work.

### End Notes:

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<sup>11</sup> 7.15.06. *Design and performance standards for stormwater management plans.* Stormwater management plans shall ...meet the following standards:

A. The hydrography for the developed or redeveloped site shall not exceed the rate of flow of runoff procured by conditions existing before development or redevelopment for the 25-year storm of critical duration. [emphasis added] ...

<sup>2</sup> Technical Paper No. 40. Rainfall Frequency Atlas of The United States, for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years. Prepared by David M. Hershfield, Cooperative Studies Section, Hydrologic Services Division for Engineering Division, Soil Conservation Service, U.S. Department of Agriculture

<sup>3</sup> National Weather Service. North Central Gulf Coast Historic Flash Flood Event – 29-30 April 2014. [http://www.srh.noaa.gov/mob/?n=flashflood\\_04292014](http://www.srh.noaa.gov/mob/?n=flashflood_04292014)

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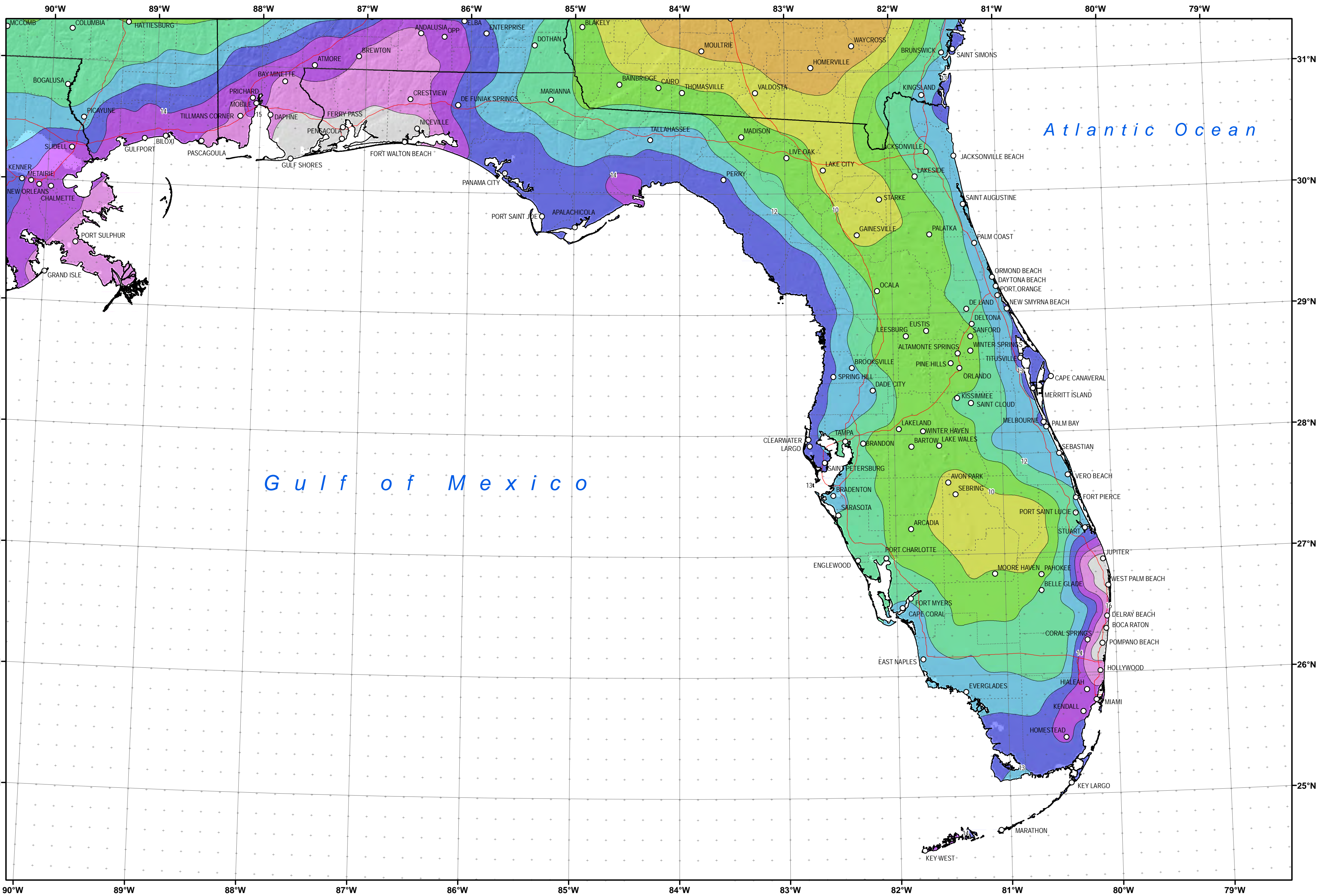


# Appendix F

## NOAA Atlas 14, Vol. 9 Isopluvial Map

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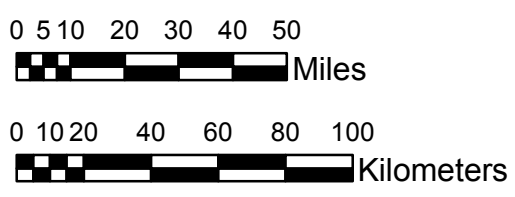




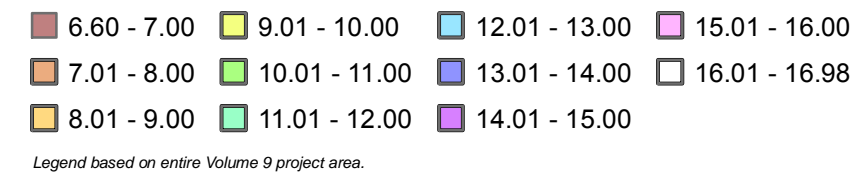
**NOAA Atlas 14, Volume 9, Version 2**  
**Southeastern States**



Prepared by U.S. DEPARTMENT OF COMMERCE  
 NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
 NATIONAL WEATHER SERVICE  
 OFFICE OF HYDROLOGIC DEVELOPMENT  
 HYDROMETEOROLOGICAL DESIGN STUDIES CENTER  
 April 2013



**FLORIDA**  
**Isopluvials of 100-year 24-hour precipitation in inches**  
**SCALE 1:2,250,000**



Projection: Lambert Conformal Conic; Datum NAD83; Standard Parallels: 26°N and 30°N; Central Meridian 84°W.

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# Appendix G

## Archeology Policies

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**SECTION III: Policies and Procedures Relating to Operations of Certain  
Departments Under the Board of County Commissioners**

**POLICY NUMBER: E.1**

**TITLE: Archaeological Review Procedure**

**ADOPTED: December 7, 2000**

**DEPARTMENT: Neighborhood and Environmental Services**

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**1. Intent**

The following archaeological review procedure shall apply to all proposed construction projects on property owned or developed by Escambia County or in rights-of-way. This procedure is patterned after the Federal archaeological review procedure established in Section 106 of the National Historic Preservation Act of 1966 as amended. The procedure is designed to identify, evaluate and preserve the limited non-renewable archaeological remains and artifacts on County-owned or developed property or in rights-of-way. Where possible, the intent of this policy is to undertake the review procedure in early stages of project planning so that no construction delays occur.

**2. Responsibility**

The Neighborhood and Environmental Services Department shall be responsible for coordinating the archaeological review procedure for County-owned or developed property. Technical assistance in the review procedure shall be provided by a professional archaeologist meeting the standards of the Register of Professional Archaeologists and having substantial experience in the archaeology and history of Pensacola.

**3. Procedure**

A. **Initial Determination.** Prior to the development of preliminary plans for proposed County projects, the Director of the Neighborhood and Environmental Services Department, the County Department Head responsible for the proposed project, the County Administrator and the appointed Professional Archaeologist shall confer to review the nature and extent of the ground disturbance associated with the project. Proposed construction projects include but are not limited to building construction, renovation, additions, landscaping, underground utility activities, stormwater management facilities, sanitary sewers, road construction and maintenance and disturbances within street rights-of-way.

**Section III**  
**E.1**

- B. Review of Project Impact.** Based on the preliminary review required in Section III. A. above, if the proposed project is determined not to cause ground disturbance to the property, or there is no potential for archaeological deposits, then the archaeological review procedure will cease. If the proposed project is determined to cause ground disturbance to the property and there is a potential for archaeological deposits, then the following review procedure shall be initiated:
1. The Department Head responsible for the proposed project shall work with the Professional Archaeologist to determine if the site proposed for development contains significant archaeological resources. The criteria used to make this determination shall include, but not be limited to:
    - a) National Register of Historic Places Criteria set forth in 36CFR800.10 which include sites:
      - (1) That are associated with events that have made a significant contribution to the broad patterns of our history; or
      - (2) That are associated with the lives of persons significant in our past; or
      - (3) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
      - (4) That have yielded, or may be likely to yield, information important in prehistory or history.
    - b) Listing on the Florida Master Site File the Florida Bureau of Historical Archaeological Research; and
    - c) The results of the archaeological field survey of County-owned properties prepared by the University of West Florida Archaeology Institute or other accredited public or private archeological organizations.
  2. If the presence of archaeological deposits is unknown and the location is at least of moderate potential for archaeological sites, a field assessment survey and possible testing (limited exploratory excavation) of that property shall be conducted, subject to the approval of the County Administrator.
  3. Determination of Effect. For each property determined to contain significant



**Section III**  
**E.1**

or potentially significant archaeological resources, the Professional Archaeologist and the applicable Department Head shall determine if the proposed project will affect the archaeological resources. The findings of effect shall include: 1) no adverse effect, or 2) adverse effect. If the findings indicate no adverse effect, then the archaeological review procedure stops. If the findings indicate an adverse effect, then a preliminary case report stating such findings shall be prepared.

4. Preliminary Case Report. The Professional Archaeologist shall prepare a written preliminary report presenting the archaeological significance of the site, the determination of effect findings and the recommended archaeological activity, if any, to preserve the archaeological resources. This report shall be forwarded to the Neighborhood and Environmental Services Department, the applicable Department Head, the County Administrator and the State Historic Preservation Office for comments.
  - a) Contents of the report shall address: a verification of the legal and historical status of the property; an assessment of the historical, architectural, archaeological, or cultural significance of the property; a statement indicating the special value of features to be most affected by the undertaking; an evaluation of the total effect of the undertaking upon the property; a critical review for any known feasible and prudent alternatives and recommendations to remove or mitigate the adverse effect.
5. Memorandum of Agreement. In consultation with the Director of the Neighborhood and Environmental Services Department, the applicable Department Head, the County Administrator and the Professional Archaeologist, a proposed memorandum of agreement shall be prepared specifying actions to be taken to avoid or mitigate any adverse effects. Estimates of costs for such actions proposed to avoid or mitigate adverse effects shall be addressed in the memorandum. The proposed memorandum of agreement will be presented to the Board of County Commissioners or Administrator for review and approval.

**4. Funding**

- A. Public Lands. All archaeological activities established in this policy may be funded by the County, by private or other public entities or in the case of a lease site or franchise holder, the assigned lessee.
  1. Initial determination, review of project impact and preliminary case report

**Section III**

**E.1**

activities performed by the Professional Archaeologist will be compensated through a limited work-as-needed contract approved by the Board of County Commissioners.

2. Funding for implementing memorandums of agreement shall be decided on a case by case basis by the Board of County Commissioners.
3. Funding from other sources, such as the State of Florida and private sources to undertake archaeological activities will also be pursued by the County and the Professional Archaeologist.

**5. Prohibitions**

It shall be the policy of the Board of County Commissioners to prohibit the search for and/or removal of any archaeological material greater than 50 years old on County property except with the explicit permission of the Board of County Commissioners. If such removal occurs, it would be considered a theft of County property which shall be referred to the Escambia County Sheriff's Department for investigation and the State Attorney's Office for prosecution.

**6. Disposition of Archaeological Materials**

All archaeological materials excavated under this policy shall become the property of Escambia County. Such materials shall be housed by the County, its agent or other approved archeological organization in facilities which meet the standards set forth by the federal government in 36CFR79. While such materials cannot be sold, the materials may be loaned or donated to appropriate State or non-profit associations with standard curatorial facilities.

**7. Archaeological Review of Private Property**

The Professional Archaeologist shall be informed of all meetings of the Development Review Committee in order to monitor the sub-surface impact of proposed private construction projects and make suggestions to the owners and/or developers of the project site to perform voluntary archaeological activities. All archaeological activities suggested by the Professional Archaeologist and agreed to by the private property owner shall be funded by the private property owner.

**Section III**

**E.1**

**8. Definitions**

- A. **Impact area** - the land area, or areas, where land may be disturbed or the environment changed in such a way as to effect their historic value.
- B. **Significant data** - data that can be used to answer research questions, including questions of present importance to scholars and questions that may be posed in the future.
- C. **Archaeological material** - material remains (artifacts, refuse, etc.) produced purposely or accidentally by human beings, and the spatial relationships among such remains.
- D. **Archaeological artifacts** - objects made or used by humans in historic or prehistoric times greater than 50 years old.
- E. **Ecofacts** - plant and animal remains associated with past human activities.

**CITY OF PENSACOLA**

**POLICIES  
OF THE  
CITY COUNCIL**

**Adopted by Resolution 21-10  
Effective Noon, January 10, 2011  
Amended by Resolution 30-10, 31-10, 41-10, 42-10  
Effective Noon, January 10, 2011  
Amended by Resolution 24-11**

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## **I. CONSTRUCTION PROJECTS**

## **ARCHAEOLOGICAL REVIEW PROCEDURE**

Adopted by Resolution November 14, 1985, Amended by Resolution August 21, 2010 effective Noon, January 10, 2011

### **I Intent**

The following archaeological review procedure shall apply to all proposed construction projects on property owned by the City of Pensacola and identified on the attached map. This procedure is patterned after the Federal archaeological review procedure established in Section 106 of the national Historic Preservation Act of 1966. The procedure is designed to identify, evaluate and preserve the limited non-renewable archaeological remains and artifacts on City-owned property. Where possible, the intent of this policy is to undertake the review procedure in early stages of project planning so that no construction delays occur.

### **II Responsibility**

The Mayor shall be responsible for coordinating the archaeological review procedure for City-owned property. Technical assistance in the review procedure shall be provided by a professional archaeologist meeting the standards of the Society of Professional Archaeology and having substantial experience in the archaeology and history of Pensacola. Said archaeologist will be appointed by the City Council to serve in this capacity.

### **III Procedure**

A. Initial Determination. Prior to the development of preliminary plans for proposed construction projects on City-owned property, the Mayor and the appointed Archaeologist shall confer to review the nature and extent of the ground disturbance associated with the project. Proposed construction projects include but are not limited to building construction, renovation, additions, landscaping underground utility activities, and disturbances within street rights-of-way.

B. Review of Project Impact. Based on the preliminary review required in III.A. above, if the proposed project is determined not to cause ground disturbance to the property, or there is no potential for archaeological deposits, then the archaeological review procedure will not be undertaken. If the proposed project is determined to cause ground disturbance to the property and there is a potential for archaeological deposits then the following review procedure shall be initiated.

1. The Mayor shall work with the appointed Archaeologist to determine if the site proposed for development contains significant archaeological resources. The criteria used to make this determination shall include, but not be limited to:

- a) National Register of Historic Places Criteria set forth in 36CFR800.10 which include sites:
    - (1) That are associated with events that have made a significant contribution to the broad patterns of our history; or
    - (2) That are associated with the lives of persons significant in our past; or
    - (3) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
    - (4) That have yielded, or may be likely to yield, information important in prehistory or history
  - b) Inventory of significant archaeological sites identified by the Florida Bureau of Archaeological Research; and
  - c) Field survey of City-owned properties for possible archaeological potential prepared by UWF Archaeology Department.
2. If the presence of archaeological deposits is unknown and the location is at least of moderate potential for archaeological sites, a field assessment survey and possible testing (limited exploratory excavation) of that property shall be conducted, subject to the approval of the Mayor.
3. Determination of Effect. For each property determined to contain significant archaeological resources, the appointed Archaeologist and the Mayor shall determine if the proposed project will affect the archaeological resources. The findings of effect shall include: 1) no adverse effect, or 2) adverse effect. If the findings indicate no adverse effect, then the archaeological review procedure stops. If the findings indicate an adverse effect, then a preliminary case report stating such findings shall be prepared.



4. Preliminary Case Report. The appointed Archaeologist shall prepare a written preliminary report presenting the archaeological significance of the site, the determination of effect findings and the recommended archaeological activity, if any, to preserve the archaeological resources. This report shall be forwarded to the Mayor and the State Historic Preservation Office for comments.
  - a) Contents of the report shall address: a verification of the legal and historical status of the property; an assessment of the historical, architectural, archaeological, or cultural significance of the property; a statement indicating the special value of features to be most affected by the undertaking; an evaluation of the total effect of the undertaking upon the property; a critical review of any known feasible and prudent alternatives and recommendations to remove or mitigate the adverse effect.
5. Memorandum of Agreement. In consultation with Mayor and the appointed Archaeologist, a proposed memorandum of agreement shall be prepared specifying actions to be taken to avoid or mitigate any adverse effects. Estimates of costs for such actions proposed to avoid or mitigate adverse effects shall be addressed in the memorandum. The proposed memorandum of agreement will be presented to the City Council for review and approval.

#### IV. Funding

- A. Public Lands. All archaeological activities established in this policy shall be funded by the City, or in the case of a leased site, the assigned leasee
  1. Initial determination, review of project impact and preliminary case report activities performed by the appointed Archaeologist will be compensated through a limited work-as-needed contract approved by the Mayor.
  2. Funding for implementing memorandums of agreement shall be decided on a case-by-case basis by the City Council.
  3. Funding from other sources, such as the State of Florida and private sources to undertake archaeological activities will also be pursued by the City and appointed Archaeologist.

V. Prohibitions

It shall be the policy of the City Council to prohibit the search for and/or removal of any archaeological material greater than 50 years old on City property. If such removal occurs, it will be considered a theft. This prohibition includes employees of the City and contractors working on City-owned property.

VI. Disposition of Archaeological Materials

All archaeological materials excavated under this policy shall become the property of the City of Pensacola. Such materials shall be housed in facilities that meet the standards set forth in the Society for American Archaeology Standards for Quality Control. While such materials cannot be sold, the materials may be loaned or donated to appropriate State or non-profit associations with standard curatorial facilities.

VII. Archaeological Review of Private Property

The appointed Archaeologist shall be informed of all meetings of the Architectural Review Board and the Planning Board in order to monitor the sub-surface impact of proposed private construction projects and make suggestions to the owners and/or developers of the project site to perform voluntary archaeological activities. All archaeological activities suggested by the appointed Archaeologist and agreed to by the private property owner shall be funded by the private property owner.

VIII Definitions

- A. **Impacted area** – the land area, or areas, where land may be disturbed or the environment changed in such a way as to effect their historic value.
- B. **Significant date** – data that can be used to answer research questions, including questions of present importance to scholars and questions that may be posted in the future.
- C. **Archaeological data** – material remains (artifacts, refuse, etc.) produced purposely or accidentally by human beings, and in the spatial relationships among such remains.
- D. **Archaeological artifacts** – objects made or used by humans in historic or prehistoric times greater than 50 years old.
- E. **Ecofacts** – plant and animal remains associated with past human activities.

**NOTE:** This procedure was amended by adoption of Resolution No. 3-88 on January 14, 1988 so as to extend the application of such procedures to all public rights-of-way within the boundaries of the City of Pensacola which are maintained by the City government.

# Appendix H

## Swat Meeting Minutes

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## Storm Water Advisory Team – SWAT Meeting Minutes

December 2, 2014  
3:30 PM

Attendees:

**Staff:** Jack Brown, Kristin Hual, Colby Brown, Keith Wilkins

**Committee:** Mike Whitehead, Mary Gutierrez, Garrett Walton, John Cheney,  
Dr. Elizabeth Benchley, Phil Turner, Glenn Niblock

**Citizens:** Barbara Albrecht

- Sunshine Presentation – Kristin Hual
  - Kristin Hual gave a presentation and distributed a handout on the Sunshine Law (see attached).
- Welcome – Colby Brown
  - Colby Brown welcomed the SWAT Team. All members introduced themselves and provided a brief background (sign in sheet attached).
- Meeting Properly Advertised – Proof of Publication dated November 22, 2014
- Review Resolution – Colby Brown
  - Colby reviewed the Resolution with the Committee
- SWAT Presentation – Jack Brown / Colby Brown (see attached)

- Discussion
  - Jack Brown gave an overview of the Delano area – County and City collaboration
  - It was noted that for additional dollars, work with CERTS / Restore / LOST / Grant Mitigation Funds (available for wind, what about flood)
  - Mary Gutierrez encouraged Low Impact Development (LID) Incentives
  - Mike Whitehead would like SWAT to be more Proactive and Project Oriented and not just a review of a White Paper Report
  - Jack Brown stated that the white paper is only part of the picture and that there will be specific projects discussed
    - Look at County-wide storm water system
    - County is buying property
    - Would like SWAT to get project specific
  - Mike Whitehead would like to use SWAT as public information / outreach
  - Mike Whitehead noted that all seems to be repair and we need to focus on mitigation
  - Jack Brown noted that the first effort is to repair while planning to mitigate
  - Phil Turner would like to have access to all Drainage Basin Studies.
  - Mike Whitehead –
    - Something we can do now - Change Development Guidelines – Redevelopment Guidelines to address amount of storm water in that area. Offer Commercial Incentive, Property Tax Credits, Grant mitigation, etc.
    - FDOT Pit at Rambler & Pipeline should become a County pond
  - Garret Walton would like a large scale overview of the flood and its impacts
  
- Action Items / Agenda Items
  - Staff to provide SWAT detailed information regarding the April Storm.
    - Largest impact areas and associated costs
    - What happened in the devastated areas
    - How we intend to move forward
    - What is staff direction
    - Explain storm events (25 year, 100 year, etc.)
  - Staff to bring SWAT Projects (mitigation)
    - Including properties acquired or attempting to acquire
  - Provide access to Drainage Basin Studies

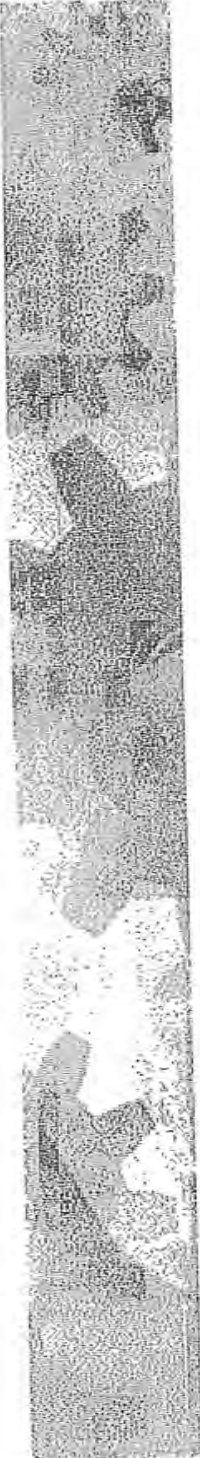
- Election of Chairperson – Colby Brown
  - Mary Gutierrez nominated herself for Chair
  - John Cheney nominated Phil Turner
  - Motion to close nomination by Mike Whitehead and Seconded by Garrett Walton, All in favor
  - Motion by Mike Whitehead to accept Mary Gutierrez as Chair and Phil Turner as Vice Chair. Seconded by Phil Turner, All in favor
  
- Scheduling of Next Meeting
  - Next meeting scheduled for Tuesday Jan 6<sup>th</sup> at 10:30 AM in the 4<sup>th</sup> Floor Training Room
  
- Adjourn
  - Mary Gutierrez made a motion
  - Seconded by Elizabeth Benchley
  - All in favor
  - Meeting adjourned

# Florida's Government in the Sunshine Law

Article I, section 24, Florida Constitution and  
Section 286.011, Florida Statutes








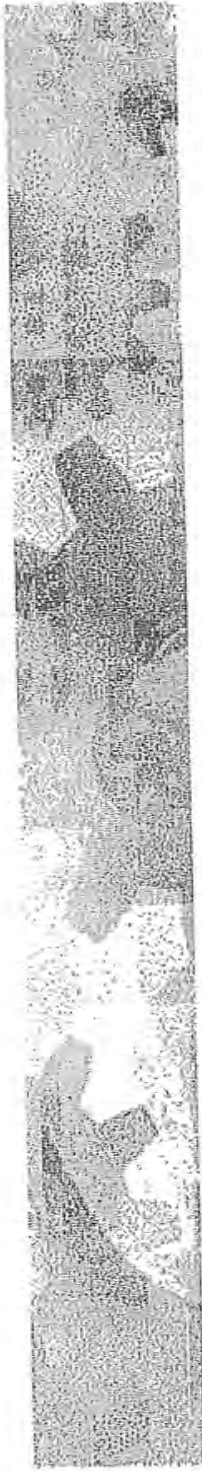
# What is the purpose of Florida's Sunshine Law?

- ✿ To give citizens a right of access to governmental proceedings



# How does the Sunshine Law give citizens access to governmental proceedings?

- ✿ Meetings of public boards or commissions must be open to the public
- ✿ Reasonable notice of such meetings must be given
- ✿ Minutes must be taken



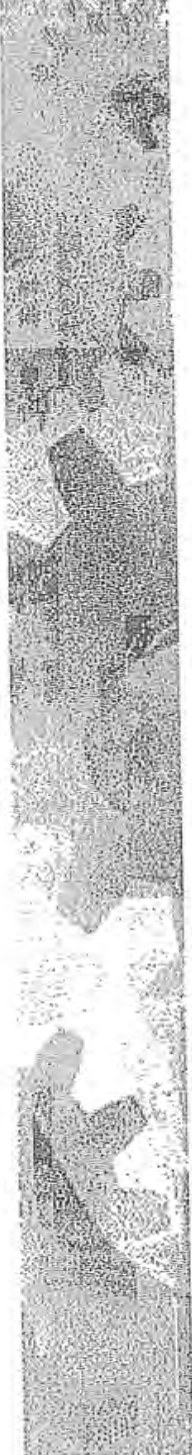
# Why is public access to governmental proceedings so important?

- ✿ Citizens have the right to know the entire decision-making process
- ✿ Every expressed thought or affirmative act of a public official as it relates to official duties is a matter of public concern
- ✿ In 1992, the Florida Constitution was amended to include the open meetings requirement



# What is “a meeting subject to the Sunshine Law?”

- ✱ **Any gathering or interaction**, formal or casual, of **two or more members** of the **same** public board, commission, or committee to discuss a matter on which **foreseeable** action will be taken by such public board, commission, or committee




# What entities are subject to the Sunshine Law?

- ✿ Any board, commission, agency, authority, or advisory committee of the County
  - ✿ This applies to both elected officials and appointed members
  - ✿ This applies to both permanent and temporary or ad hoc committees such as a task force

# Are there any exemptions?

- ✿ Yes—exemptions are created by general law or caselaw
- ✿ An advisory body established for *fact finding or information gathering which has no decision-making authority* is not subject to the Sunshine Law



# How do you determine if an advisory body is exempt?

- ✱ An advisory committee or board is participating in a decision-making process and is not exempt when it has the **discretion to accept or reject options** to be presented to the final decision-making authority
- ✱ Where a committee is formed to report facts back to the public entity, it is exempt

# Does the Sunshine Law apply to staff?

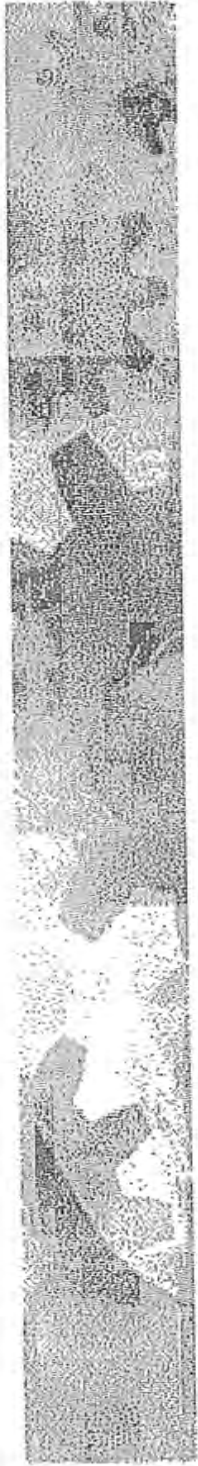
- ✱ Not unless the staff member has been delegated decision-making functions outside his or her normal staff functions
- ✱ The focus is on the *nature of the act performed*: a staff committee making non-binding recommendations or assisting in evaluating proposals **would** be subject; a staff committee relaying facts **would not** be subject





☀ The law is not violated when:

- ☀ a government executive uses staff for a fact-finding and advisory function in fulfilling his or her *executive* duties
- ☀ informal meetings are held between a county commissioner and staff,
  - ☀ where the discussions are merely informational
  - ☀ where no one has the authority to make a final decision during that meeting, and
  - ☀ no formal action is or could be taken




May members of the same board or committee provide written position statements to each other on subjects that will be discussed at a public meeting?



- ☀ Yes, so long as

- ☀ There is no interaction related to the report among the members
  - ☀ The report is not used as a substitute for action at a public meeting, and
  - ☀ The written report is maintained by the records custodian as a public record
- ☀ The circulation of a written report which does not result in an exchange of comments or responses on subjects requiring board action is not a *meeting* subject to the Sunshine Law




# Are telephone conversations and e-mails subject to the Sunshine Law?


- ✿ Yes! Members of the *same board or committee* should not call or e-mail each other on matters which may *foreseeably* come before that board or committee




# What are the consequences for noncompliance?

- ✿ Any member of a board, commission, committee or agency of the county who **knowingly** violates the Sunshine Law is guilty of a misdemeanor of the second degree
- ✿ Persons convicted of this may be sentenced to jail for up to 60 days and/or fined up to \$500


- 
- ✿ **Knowing** violation of the Sunshine Law may also result in suspension of an elected or appointed public officer by the Governor
  - ✿ Where an inadvertent violation occurs, such public officer is guilty of a **non-criminal infraction**, punishable by a fine not to exceed \$500
  - ✿ Any citizen of this County may apply to the Circuit Court for issuance of an injunction to remedy past and future violations



How does a violation of the  
Sunshine Law affect the  
validity of the action taken?


- 
- ✿ Any official action of a public board, agency or committee, which does not comply with the requirements of the Sunshine Law is *void*
  - ✿ The public board, agency or committee must hold a full, open public meeting and take independent final action to cure the violation
  - ✿ Curing the violation does not shield the individuals who violated the Sunshine Law from liability







# What are the guidelines for complying with the notice requirement?


- ✱ The notice should contain the time, date and place of the meeting *and*, if available, an agenda or subject matter summation
- ✱ It should be prominently displayed in the area the County sets aside for that purpose

- 
- ☀ Emergency sessions should be afforded the most appropriate and effective notice under the circumstances
  - ☀ Special meetings should have at least 24 hours reasonable notice to the public
  - ☀ The use of press releases and/or phone calls to the wire services is effective
  - ☀ Advertising in the local newspapers of general circulation would be appropriate

- 
- ✿ There are additional notice requirements when a public board or committee acts as a quasi-judicial body or takes action on matters that affect the individual rights of citizens:
    - ✿ If notice is required, there should be advice as to the requirements for appealing the decision:
      - ✿ Individual must ensure that a verbatim record of the proceeding is made
      - ✿ The record must include the testimony and evidence upon which the appeal is based



How can members of public boards or committees avoid liability for Sunshine violations relating to notice and access to the public?



☀ If a board or committee member cannot determine whether a meeting is subject to the Sunshine Law:

☀ Leave the meeting, or make sure:

☀ That the meeting was properly noticed or advertised

☀ There are no barriers to public access or ADA access to the meeting place

☀ Minutes of the meeting are taken



# StormWater Advisory Team – SWAT

Sign-in Sheet

December 2, 2014

Name	Signature	Phone #/Email Address
Mike Whitehead		324 3129 mike.whitehead@cox.net 549 7472
Mary Gutierrez		mary.earthethics@cox.net
Garrett Walton	✓	✓
John Cheney		John@MATHSELECTRICAL.COM 850 474-3015
Dr. Elizabeth Benchley		ebenchle@uwf.edu 202-4407
Phil Turner		PTURNER@IHMC.US (850) 490-5905
Jack Brown		jrbrown@myescambia.com
Colby Brown		595-3433 csbrown@myescambia.com
Kristin Hual		
Glenn Niblock		455-8133 gnib@att.net Barbara@
Barbara Albrecht		384-6696 Barbara@watershed.org
Keith Wilkins		595-4958 ESC.COM

# Storm Water Advisory Team

Escambia County, FL.  
2014



## Order of Discussion:

1. BACKGROUND
2. METHODS
3. S.W.A.T. OBJECTIVES



# Storm Water Advisory Team

Escambia County, FL.  
2014

## BACKGROUND



**Massive capital damage to business, private residences, infrastructure, public facilities, non-profits and institutional facilities.**

**Substantial Point and non-point impacts to local environment.**

**April 29, 2014**



# Storm Water Advisory Team

---

Escambia County, FL.  
2014

## BACKGROUND



## ESCAMBIA COUNTY

Master Drainage Study  
initialized County-wide in  
1990's.

# Storm Water Advisory Team

Escambia County, FL.  
2014

## BACKGROUND



## ESCAMBIA COUNTY

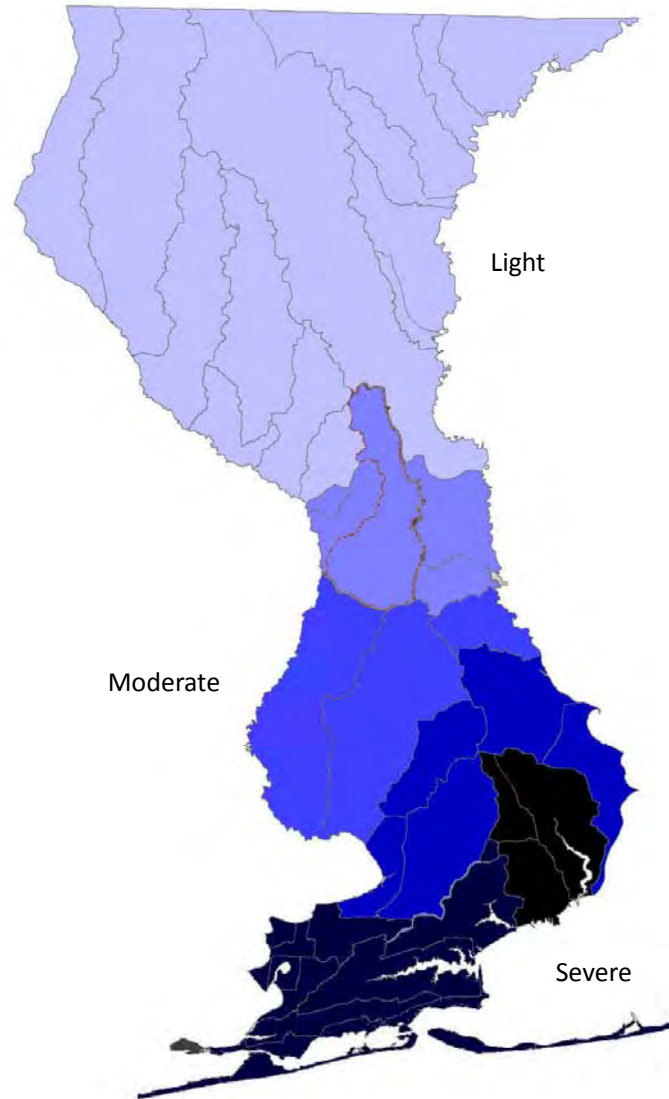
Master Drainage Study  
initialized County-wide in  
1990's.

COUNTY divided into Two  
Primary Basins

# Storm Water Advisory Team

Escambia County, FL.  
2014

## BACKGROUND



## ESCAMBIA COUNTY

Master Drainage Study  
initialized County-wide in  
1990's.

COUNTY divided into Two  
Primary Basins

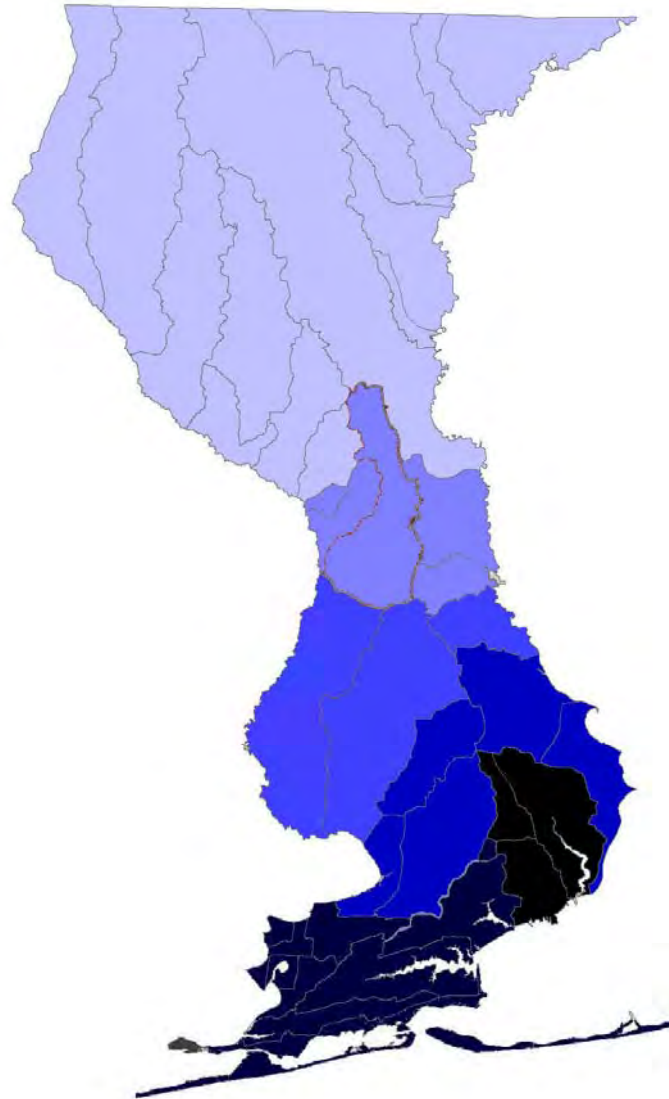
40 Sub-Basins

April 29<sup>th</sup> storm produces 25  
inches of rainfall in 24 hours.

# Storm Water Advisory Team

Escambia County, FL.  
2014

## BACKGROUND



## ESCAMBIA COUNTY

Master Drainage Study  
initialized County-wide in  
1990's.

COUNTY divided into Two  
Primary Basins

40 Sub-Basins

April 29<sup>th</sup> storm produces 25  
inches of rainfall in 24 hours.

Flooding is more severe south of  
Well Line Road.

Urbanization and flood potential  
are correlated

# Storm Water Advisory Team

Escambia County, FL.  
2014

## BACKGROUND

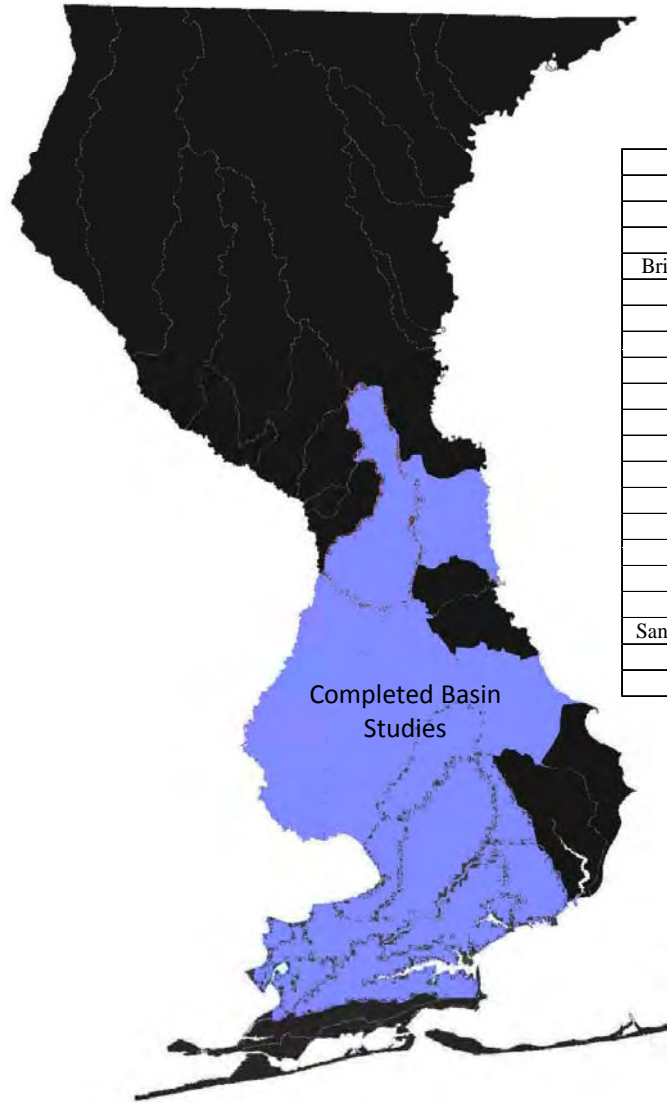


Table 1. Model Prefixes for Escambia County Basin Studies

Basin Name	Model Prefix	Basin Name	Model Prefix
Alligator Creek	01	Bayou Grande	02
Bayou Marcus Creek	03	Beverly Parkway	04
Boggy Creek	05	Bowman Creek	06
Bridge Creek Herron Bayou	07	Bronson Field	08
Brushy Creek	09	Canoe Creek	10
Carpenters Creek	11	Century	12
Catholic High School	13	Churchhouse Branch	14
Cotton Creek	15	Cowdevil Creek	16
Eight Mile Creek	17	Eleven Mile Creek	18
Escambia Bay	19	Fletcher Creek	20
Garcon Swamp	21	Jacks Branch	22
McDavid Creek	23	Millview	24
Mitchell Creek	25	Paradise Beach	26
Penasula Creek	27	Pensacola Bay	28
Williams Creek	29	Perdido River North	30
Perdido River South	31	Pine Barren Creek	32
Pritchett Mill Branch	33	Rock Creek	34
Sandy Creek Weekley Bayou	35	Scenic Hills	36
Southwest Side	37	Spanish Mill Creek	38
Tarkiln Bayou	39	Warrington	40

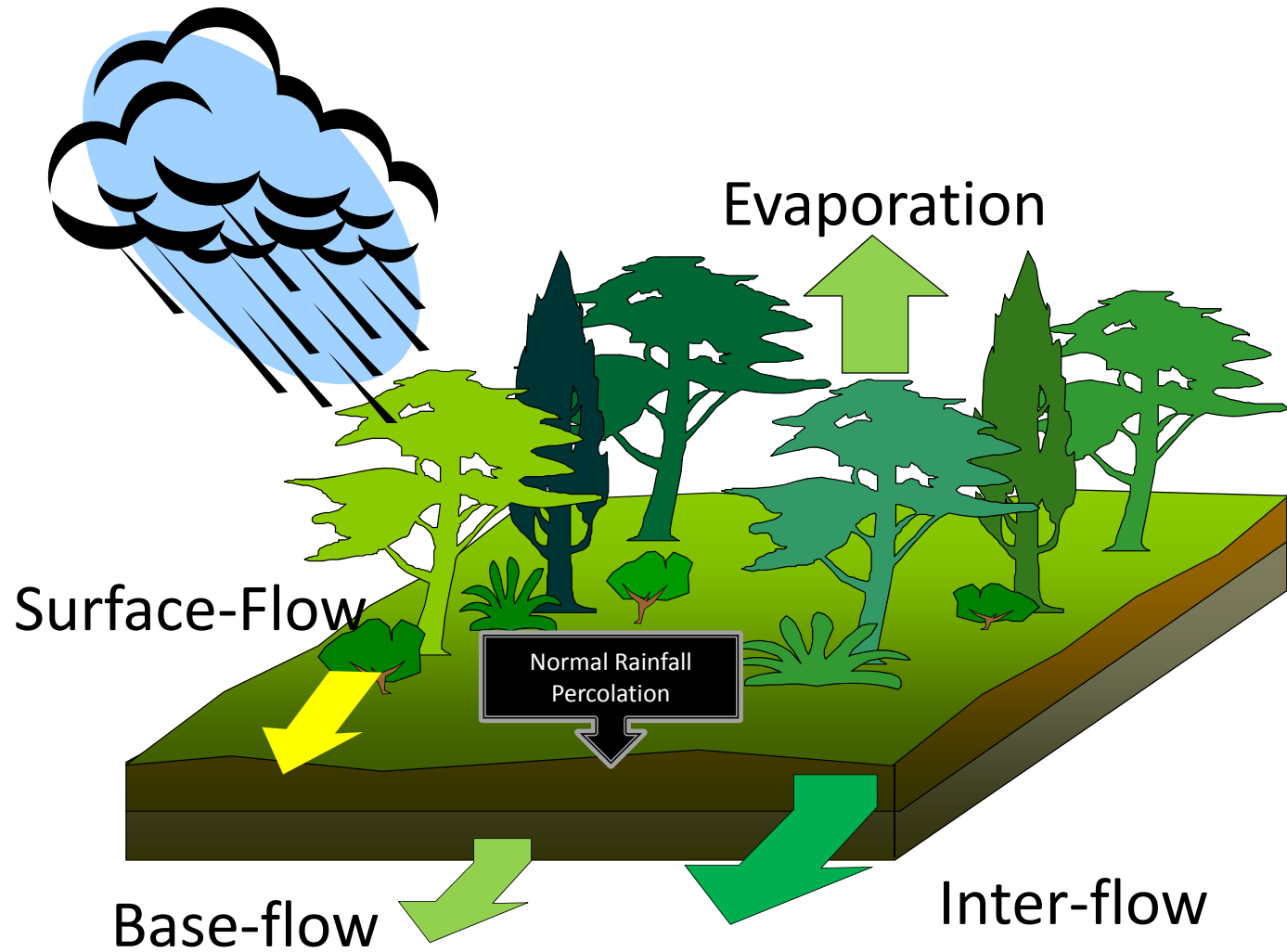
Objective: generate working digital models of all 40 basins.

Digital models allow for flooding analysis of any storm event, including the actual storm that generated widespread flooding in April 2014.

# Storm Water Advisory Team

Escambia County, FL.  
2014

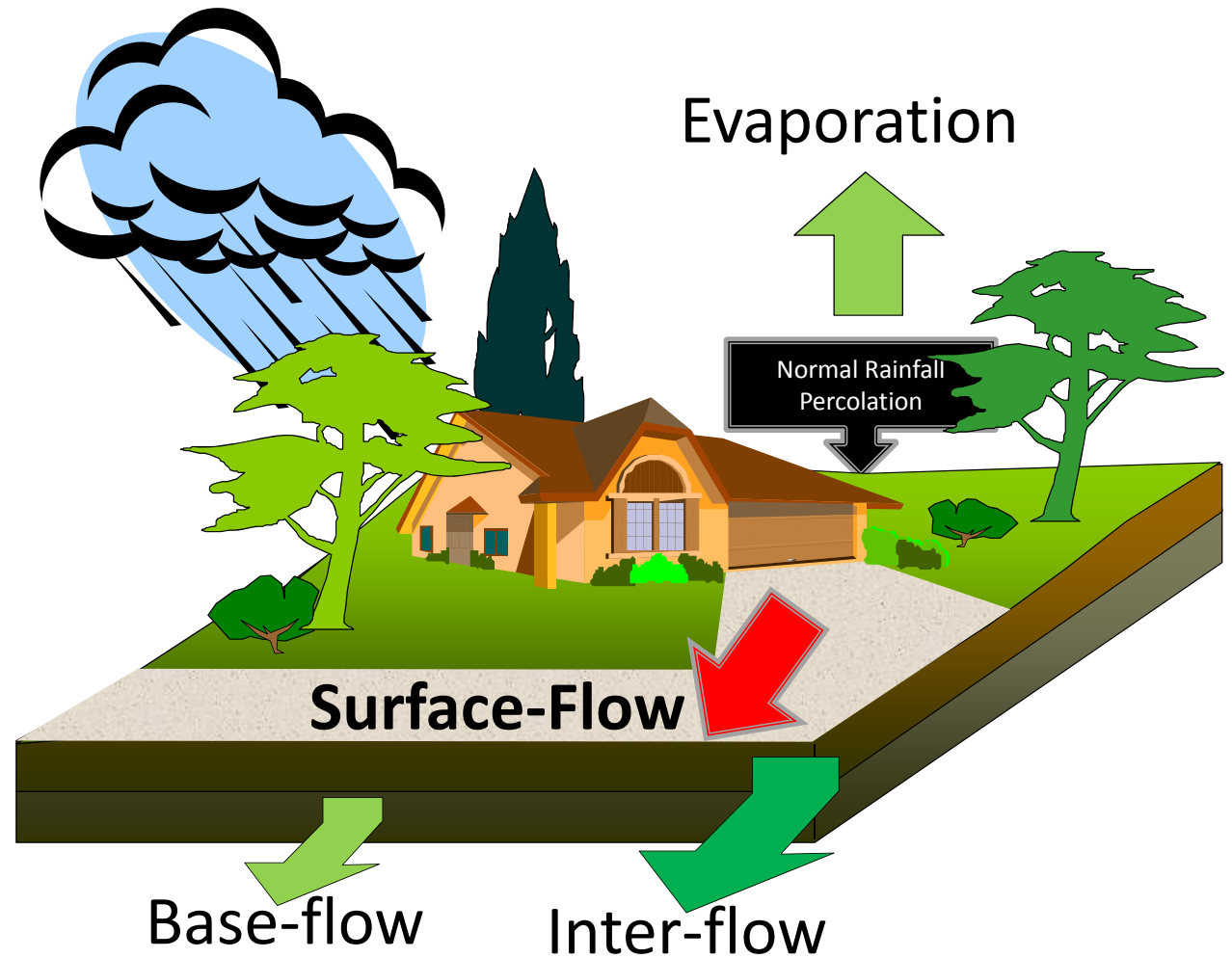
## Sustainable Drainage Natural Water Catchment (Greenfield)



# Storm Water Advisory Team

Escambia County, FL.  
2014

## Sustainable Drainage Developed Catchment



# Storm Water Advisory Team

Escambia County, FL.  
2014

# Sustainable Drainage SuDs



## Sustainable Drainage (SuDs) Principles

- **The Drainage Train** – SuDs components in interconnecting series
- **Percolation and slow flow** – Runoff is percolated and the flow slowed to reduce culminating cascading effect downhill
- **Source Control** – Runoff managed as close as possible to where it falls as rain
- **Sub-Catchment** – Divisions into small areas with different drainage characteristics and land use.



# Storm Water Advisory Team

Escambia County, FL.  
2014

## Sustainable Drainage SuDs



SuDS scheme at Stamford

Robert Bray Associates

## SuDs Philosophy

- Mimic natural drainage
- Where possible manage water on the surface
- Manage water close to the source
- Provide multiple benefits

# Storm Water Advisory Team

Escambia County, FL.  
2014

## Sustainable Drainage

### SuDs



## Challenges of Drainage

- Abundance of impervious surfaces decreases chance for percolation
- Rapid runoff
- Once retention pond overflows then what?
- Maintenance
- Cost
- Enhancing esthetics and biodiversity

# Storm Water Advisory Team

Escambia County, FL.  
2014

## Sustainable Drainage SuDs



## Sustainable Drainage (SuDs) Schemes

- **Variety of Components** – SuDs components depends on site opportunities and constraints
- **Provide Management and Treatment Train**
- **Enhanced Percolation and Pervious Surface**
- **Shallow Systems are normally better and cheaper than deep systems**
- **Trees consume more water than grass.**

# Storm Water Advisory Team

Escambia County, FL.  
2014

## Sustainable Drainage SuDs



## SuDs Examples

- Grass drainage ditches versus concrete with shrubbery
- Grass Swells
- Retention ponds with enhanced vegetation to help clean and reclaim water

# Storm Water Advisory Team

Escambia County, FL.  
2014

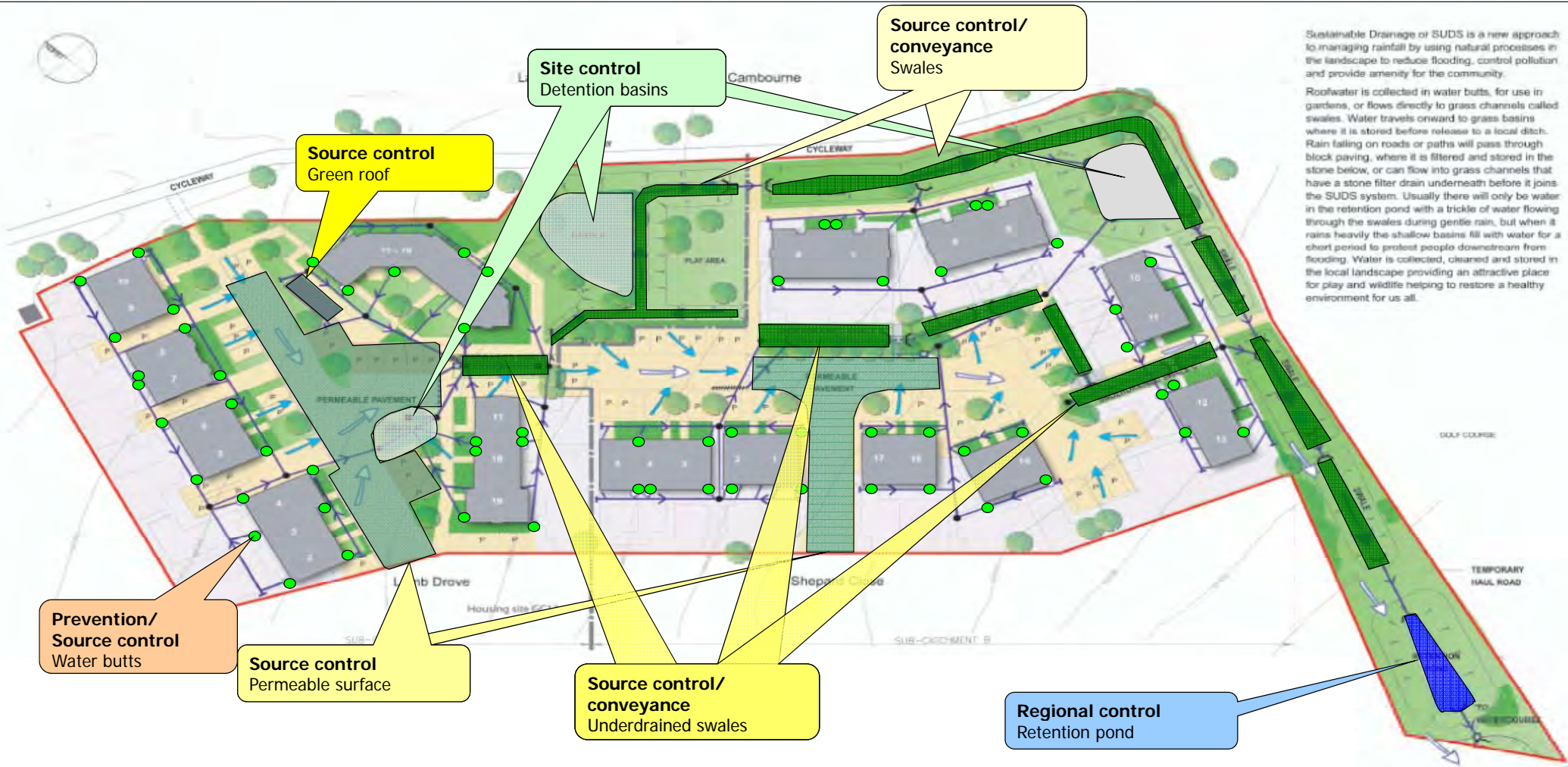
## Sustainable Drainage

### SuDs



## SuDs Examples

- **Grass Roof**
- **Bioretention**
- **Permeable pavement** – Replacement of non-permeable surfaces with permeable.



**Site control**  
Detention basins

**Source control/ conveyance**  
Swales

**Source control**  
Green roof

**Prevention/ Source control**  
Water butts

**Source control**  
Permeable surface

**Source control/ conveyance**  
Underdrained swales

**Regional control**  
Retention pond

Sustainable Drainage or SUDS is a new approach to managing rainfall by using natural processes in the landscape to reduce flooding, control pollution and provide amenity for the community.

Roofwater is collected in water butts, for use in gardens, or flows directly to grass channels called swales. Water travels onward to grass channels called swales where it is stored before release to a local ditch. Rain falling on roads or paths will pass through block paving, where it is filtered and stored in the stone below, or can flow into grass channels that have a stone filter drain underneath before it joins the SUDS system. Usually there will only be water in the retention pond with a trickle of water flowing through the swales during gentle rain, but when it rains heavily the shallow basins fill with water for a short period to protect people downstream from flooding. Water is collected, cleaned and stored in the local landscape providing an attractive place for play and wildlife helping to restore a healthy environment for us all.

GOLF COURSE

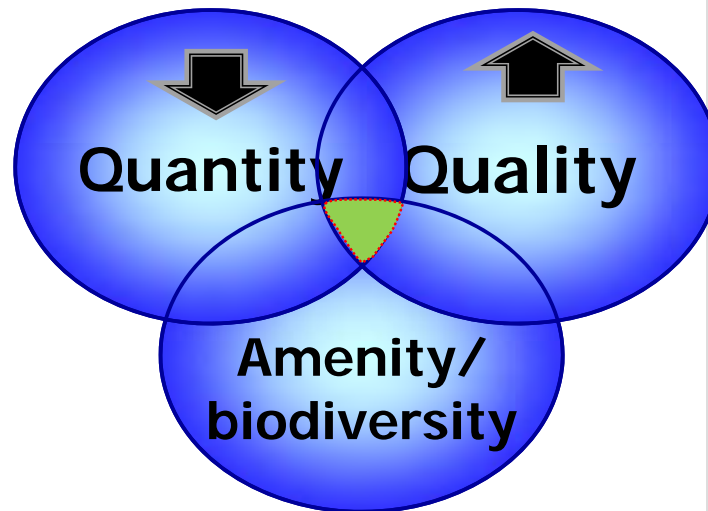
TEMPORARY HALL ROAD

TO WHITEHOUSE

# Storm Water Advisory Team

Escambia County, FL.  
2014

## Sustainable Drainage SuDs



The SuDS Triangle

## SuDs Multiple Benefits

- Reduce flood risk
- Improve Water Quality
- Increased level of green space
- Enhanced biodiversity

# Storm Water Advisory Team

Escambia County, FL.  
2014

## Sustainable Drainage

### SuDs



## SuDs Examples

- **Grass Roof**
- **Bioretention**
- **Permeable pavement** – Replacement of non-permeable surfaces with permeable.



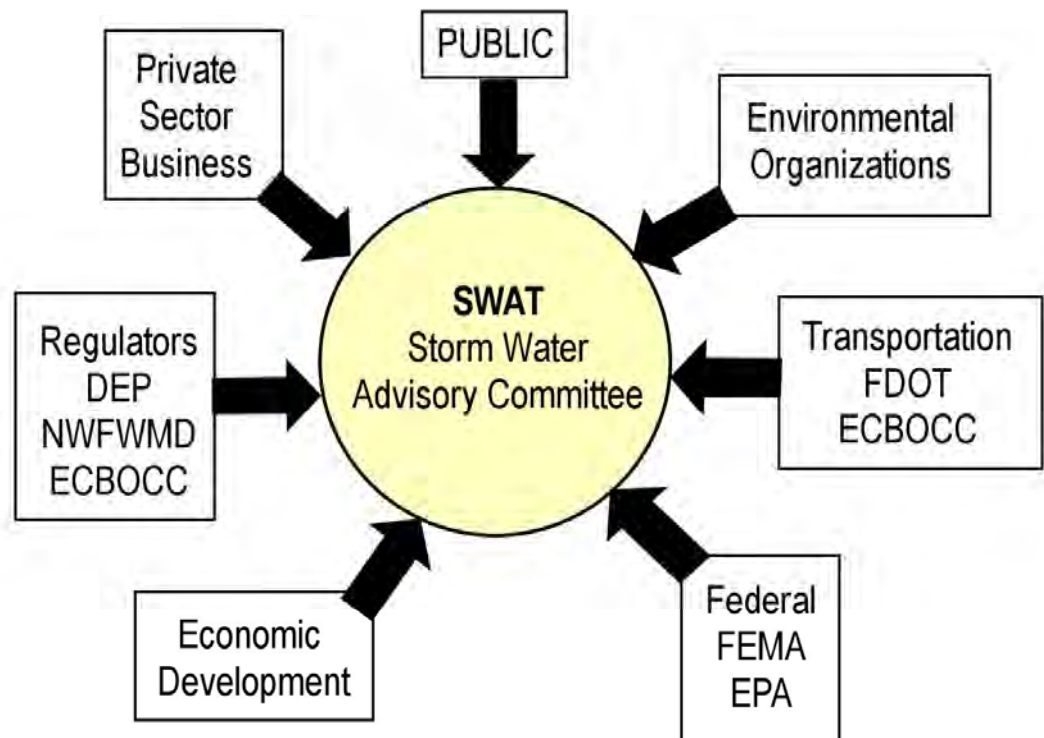
# Storm Water Advisory Team

Escambia County, FL.  
2014

## Organization



## Organizational Inputs



# Storm Water Advisory Team

Escambia County, FL.  
2014

## Objectives



## Potential SWAT Objectives

### Establish existing conditions.

Ensure that the empirical problems associated with the April flood are identified and incorporated into a master database.

### Evaluate Alternatives.

Prioritize investment opportunities and identify funding sources. Develop alternatives with alignment to needs and funding.

### Identify Preferred Alternative.

Preferred alternative should be further developed with the appropriate technical research.

### Report.

Prepare and submit final report and recommendations to ECBOCC for review.



## Storm Water Advisory Team – SWAT Meeting Minutes

January 6, 2015  
4:05 PM

Attendees:

**Staff:** Jack Brown, Joy Blackmon, Colby Brown, Keith Wilkins, Derrik Owens

**Committee:** Mary Gutierrez, Garrett Walton, John Cheney, Dr. Elizabeth Benchley, Phil Turner, Glenn Niblock

**Citizens:** (See Sign-In Sheets)

- Welcome – Mary Gutierrez
  - Mary Gutierrez welcomed the SWAT members and citizens. All members introduced themselves and provided a brief background (sign in sheet attached).
- Meeting Properly Advertised – Proof of Publication dated December 27, 2014 and January 3, 2015
  - Welcome – Jack Brown greeted the citizens and reiterated the County's commitment to work with City staff regarding funding, Interlocal agreements, securing grant funding; and in spending tax dollars wisely. Mr. Brown requested the public's participation throughout this process.
- Overview / April 29, 2014 Storm Presentation – HDR, Inc / Allen Vinson
  - Allen Vinson gave an overview of the 40+ basins located in Escambia County. A 100 Year Storm Event was defined, as were area basins, and technical background. The County's Master Stormwater Plan was

covered and mapping of the April 2014 Event presented showing Damage Assessment of over 2300 sites and rainfall levels County wide. Specific areas of damage and the respective funding opportunities for each were discussed:

- Lake Charlene – Over 100 residents received damage; 19-21” of rainfall recorded.
- Crescent Lake – Over 40 residents were impacted; right-of-ways washed out; emergency repairs have been completed and reconstruction has begun.
- Pensacola Bay Basin – 16” – 18” of recorded rainfall in this area. Hazard Mitigation Grant Program opportunities of \$4,000,000 may be available for this area.
- Mr. Vinson advised citizens of the information available on the County’s website and gave instructions on how to view the Damage Assessment areas and related project information, funding and repairs.
- Break                            4:19p.m. – 4:21 p.m.
- Public Forum                 4:21 p.m. – 5:00 p.m.
  - Bill Trushel
    - Maintenance improvements are needed in existing stormwater drainage systems.
  - Mary Gutierrez
    - Drainage repairs and readiness for future events needs to be addressed.
    - Changes in stormwater development (Implementation of Low Impact Development) should be made.
  - Jack Brown
    - Called for citizens’ participation in notification of pond and drainage maintenance issues.
  - Denise Windham
    - Stated that Aragon Home Owners Association indicated their desire to participate and become involved in the improvements process.
  - Gary Huston
    - Requested that the Committee address City/County jurisdiction as related to funding.

- Submitted photos to the Chair of the inoperable stormwater retention system on South 9<sup>th</sup> Avenue (Old Admiral Mason Park) stating that ditches are always full and are not draining.
- Suggested that Developers Incentives should be implemented.
- Jack Brown
  - Explained that FEMA approval is required on permanent repairs, FEMA does not reimburse. The County is making every effort to spend tax dollars wisely.
  - Asked Joy Blackmon to update the audience regarding property purchases for stormwater retention.
  - Joy Blackmon gave details on the following: Ponderosa Pond, Crescent Lake, Delano, Aragon, and Olive Road. Stating that drainage improvements made resulted in minor damage from the most recent rain events, specifically in Ferry Pass, Ensley, & Maplewoods (Hazard Mitigation Grant Program funded).
- Eric Olson
  - Reiterated that the City and County are committed to working together.
  - Requested citizens' involvement addressing needs, making priorities according to public feedback; and securing funding.
- Melanie Nichols
  - Pond on Palafox at Avery and Tarragona stays full and does not drain properly.
  - Maintenance needs improvement.
  - The Cervantes Street Bridge exceeded the stormwater cutoff and sand has since filled the drains.
- Derrik Owens
  - Addressed Long Hollow Pond issues:
    - The pond was formerly a borrow pit.
    - It is a wet facility and is under capacity.
    - A drainage study is underway and should be finalized in two weeks.
    - Requested that citizens contact him regarding maintenance concerns. (850) 435-1755 or Dispatch #311.
- Mary Gutierrez
  - Asked what could be done now.
  - Stated that Long Hollow is under a DEP permit.
- Joy Blackmon
  - Advised citizens to contact the County's Work Order Desk at (850) 494-5860.

- Sherri Myers
  - As District 2 City Council member, she inspects drainage issues after each rainfall event to identify problem stormwater areas, impassable streets, and commercial parking lots/restorations.
  - Suggests implementing incentives for restorations.
  - USEPA handbook provides information on commercial impervious to pervious parking conversions.
  - Suggests Pond Greening & Maintenance Improvements at Lanier Pond and others (Raising mower blades).
- Joy Blackmon
  - County will coordinate with City on maintenance improvements.
- Derrik Owens
  - Stated the City's Environmental Advisory Board revisions recently included increasing pond maintenance mower blade heights from 2"- 3" to 4" – 6".
- George Mead
  - Concentrate on larger issues.
  - Capital & Infrastructural Planning crossing City/County boundaries.
- Linda Austin
  - Reserve at Carpenter's Creek has trees in the creek and the banks are eroding 20' – 30' across several lots.
- Derrik Owens
  - Addressed Carpenter's Creek issues stating the Creek is under the jurisdiction of FDEP.
  - Carpenter's Creek has qualified for eligibility and has been placed on the Department of Agriculture's waiting list for their Bank Erosion Program.
- Garret Walton
  - Discussed funding cooperative efforts to secure all available funding. Priority aggressive efforts are needed.
  - Mr. Walton commended the City and County staff on working together.
- Barry Goodson
  - Priorities need to be set.
  - Developers need to do more to follow environmentally friendly procedures; using the environment to help stormwater management and not just asphalt and concrete.
- Jack Brown
  - Sustainable Urban Development is being addressed.

- Pervious pavement has been installed at Escambia County's Central Office Complex and Mahogany Mill Boat Ramp.
- Scheduling of Next Meeting
  - Next meeting scheduled for 10:30 a.m. Tuesday, February 3, 2015 at 221 Palafox Place, in the 4<sup>th</sup> Floor Training Room
    - Area of Discussion: Lake Charlene
      - Basin Study
      - Damage Assessment
      - Planned Improvements
      - Funding Options
- Adjourn
  - Mary Gutierrez made a motion to adjourn; the motion was seconded and carried unanimously.
  - Meeting adjourned at 5:15 p.m.
- Pensacola Bay Basin Report - Arcadis Staff 5:15p.m. – 5:55 p.m.
  - Joy Duperault and Kelli Thurson gave an informative twenty-minute presentation regarding areas of impact, engineering assessments and proposals, prioritized recommendations, solutions (pervious pavement, rain gardens and swales, etc.), suggestions for funding opportunities; and the basis for needed documentation for securing funding. A public input handout was distributed.

Published Daily-Pensacola, Escambia County, FL

**PROOF OF PUBLICATION**

State of Florida

County of Escambia:

Before the undersigned authority personally appeared **Anna Hammes** who, on oath, says that she is a personal representative of the Pensacola News Journal, a daily newspaper published in Escambia County, Florida; that the attached copy of advertisement, being a Legal in the matter of:

**Meeting Schedule**

Was published in said newspaper in the issue(s) of:

**January 3, 2015**

Affiant further says that the said Pensacola News Journal is a newspaper published in said Escambia County, Florida, and that the said newspaper has heretofore been published in said Escambia County, Florida, and has been entered as second class matter at the Post Office in said Escambia County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement; and affiant further says that she has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in the said newspaper.

Sworn to and subscribed before me this 5th day of **January, 2015**, by **Anna Hammes**, who is personally known to me.

Anna Hammes Affiant  
[Signature] Notary Public

**CHERYL MANISCALCO**  
 Notary Public - State of Florida  
 Comm. Expires August 4, 2018  
 Comm. No. FF 147531

**Board of County Commissioners - Escambia County, Florida**  
 Meeting Schedule  
 January 5-January 9, 2015

*One or more of the Escambia County Commissioners may attend the following meetings:*

DAY	DATE	TIME	MEETING	LOCATION
Mon	01/05	4:00pm	RESTORE Advisory Committee	3363 West Park Place
Mon	01/05	6:30pm	Pits Operation Meeting	BCC Meeting Room*
Tue	01/06	8:30am	Planning Board/Rezoning Meeting	3363 West Park Place
Tue	01/06	1:30pm	Environmental Enforcement Special Magistrate Hearing	3363 West Park Place
Tue	01/06	4:30pm	Storm Water Advisory Team Meeting	201 East Gregory Street
Wed	01/07	8:30am	Contractor Competency Board Exam Committee	3363 West Park Place
Wed	01/07	9:00am	Contractor Competency Board Meeting & Public Hrgs.	3363 West Park Place
Wed	01/07	1:00pm	Development Review Committee	3363 West Park Place*
Wed	01/07	5:30pm	Wedgwood Community Meeting Re: Borrow Pits	6405 Wagner Road
Thu	01/08	8:30am	Incident Review Board	221 Palafox Place, Rm 0201
Thu	01/08	9:00am	Board of County Commissioners Agenda Work Session	BCC Meeting Room*
Thu	01/08	4:30pm	Board of County Commissioners Public Forum	BCC Meeting Room*
Thu	01/08	5:30pm	Board of County Commissioners Public Hearings & Reports	BCC Meeting Room*
Fri	01/09	8:30am	Visit Pensacola Destination 2020 Summit	201 East Zaragoza Street

\*Ernie Leo Magaha Government Building, 221 Palafox Place, First Floor  
 \*\*To View DRC Agenda go to: <http://www.mvscambia.com/government>

**NEXT WEEK'S NOTE:**

Mon	01/12	1:30pm	Selection Committee (Director of Development Services)	221 Palafox Place, 4 <sup>th</sup> Floor Training Rm
Mon	01/12	3:00pm	West Florida Regional Planning Council	198 North Wilson Street, Crestview
Mon	01/12	6:30pm	Marine Advisory Council (MAC)	3363 West Park Place
Tue	01/13	8:30am	Planning Board Meeting-Pits	3363 West Park Place
Tue	01/13	1:30pm	Environmental Enforcement Special Magistrate Meeting	3363 West Park Place

Note: A copy of the agenda for the meetings initiated by the Board of County Commissioners containing specific items to be considered in the order of presentation may be obtained from the County Administrator's Office, Suite 420, Escambia County Government Complex, 221 Palafox Place, Any Person needing accommodations to attend or participate, pursuant to the Americans with Disabilities Act, should contact Angela Crawley, 595-4947, at least 72 hours in advance of the meeting. Those who are hearing or speech impaired may Contact Mrs. Crawley via e-mail at [AngelaCrawley@mvscambia.com](mailto:AngelaCrawley@mvscambia.com) Any person who decides to appeal any decision made by any board, agency, or commission with respect to any matter considered at its meeting or hearing, will need a record of the proceedings of the meeting. Since the Board of County Commissioners does not make verbatim records of its meetings, such person may need to independently secure a record that should include the testimony or evidence on which the appeal is to be based. All Board of County Commissioners meetings are broadcast live and rebroadcast on ECTV, Digital Channel 58 on Cox Cable, BrightSource and Mediacom and the Regular Board of County Commissioners Meetings beginning at 5:30 p.m. are broadcast live on WUWF Channel 4. The meetings can also be seen live via the web at <http://www.mvscambia.com>.

What's on ECTV at [www.mvscambia.com](http://www.mvscambia.com)





# StormWater Advisory Team – SWAT

Sign-in Sheet

January 6, 2015

Name	Signature
Mike Whitehead	ABSENT
Mary Gutierrez	Mary Gutierrez
Garrett Walton	Garrett Walton
John Cheney	John Cheney
Dr. Elizabeth Benchley	Elizabeth Benchley
Phil Turner	Phil Turner
Glenn Niblock	Glenn C. Niblock
Jack Brown	ATTENDED - DID NOT SIGN-IN
Joy Blackmon	ATTENDED - DID NOT SIGN-IN
Colby Brown	Colby Brown
Keith Wilkins	Keith Wilkins



# Storm Water Advisory Team – SWAT

Sign-in Sheet

January 6, 2015

Name	Signature	Phone #/Email Address
Jennifer Fleming	Jennifer Fleming	flemingjr@bellsouth.net
Ed CARSON	Ed Carson	EDCARSON@CARSONWORKS.COM
Jeff Helms	Jeff Helms	jeff.helms@att.net
HUGA ESTUNOR	HUGA ESTUNOR	hutorov@jwo.com
Franziska Marie Torchi	Franziska Marie Torchi	FLTAVSM9@Bellsouth.net
Glenn & Judy Niblock	Glenn Niblock	gnib@att.net
Chips Kirschenfeld	Chips Kirschenfeld	jtkirsche@myescambia.com
Charles Bare	Charles Bare	cbare@cityofpensacola.com
Dean Monson	Dean Monson	DeanWMonson@gmail.com
Mike Haite	Mike Haite	850 232 3584
Christian Wagley	Christian Wagley	christianwagley@earthlink.net
Clyde E. Ad	Clyde E. Ad	850-261-4724
TIM HAAG	Tim Haag	969-3300 tim.haag@ecva.fl.gov



# VISITORS

## Storm Water Advisory Team – SWAT

Sign-in Sheet

January 6, 2015

Name	Signature	Phone #/Email Address
Bree Windham		850-982-3833 johnfwindham@jmcw.com
John McWilliams		419-310-7908 jmcwilliams76@gmail.com
RH Wilson		b-brown@cox.net 850-305-1502
Mary Jane Craven		MARYJ50434@gmail.com
Kelli Thurson		kelli.thurson@arcadis-us.com
Joy Duperault		Joy.duperault@arcadis-us.com
Derrick Owens		downsecityofpensacola.com
ROBERT WOOD		698 0103 wawndt1@yuc
Mick Beault		mbeault@waterfrontmission.com
DEVIN SIMMONS		devin.k.simmons@gmail.com
Robert Montgomery		robert@montgomeryrealtors.com 850.574.2792
BOB McLAUGHLIN		McLAUGHLIN@ADL.com



# VISITORS

## Storm Water Advisory Team – SWAT

Sign-in Sheet

January 6, 2015

Name	Signature	Phone #/Email Address
Suzanne Zukaski	Suzanne Zukaski	
Milce Sheehan	Milce Sheehan	
Sheri Myers	Sheri Myers	(850) 484-0902 SPMADA@aol.com
Rob Johnson	Rob Johnson	850 825 - 5919
Bill TRUSHEL	Bill Trushel	534-1387
MaryEllen Huston	MaryEllen Huston	469-8829
Eric Olson	Eric Olson	eolson@cityofpensacola.com 595-3419
CHRIS CURB	Chris Curb	ccurb@myescambia.com
Traci Goodhart	Traci Goodhart	traci.goodhart@wfrpc.org
Rhela McLay	Rhela McLay	rhela_rancom@myesc...
Denise Windham	Denise Windham	denisemwindham@gmail.com
MICHELLE MACHIEL	Michelle Machiel	mrm@architecturalaffairs.com



Board of County Commissioners • Escambia County, Florida

Jack R. Brown  
County Administrator

## STORM-WATER ADVISORY TEAM (SWAT) MEETING

Pensacola Bay Center

Tuesday, January 6, 2015

4:00 p.m.

Speaking Request

Print Clearly

(Note: Each speaker will be allowed three minutes.)

NAME: BILL TRUSHEL PHONE: 486-1057  
ADDRESS: 7786 GRUNDY ST 32507  
SUBJECT: MAINTENANCE OF EXISTING DRAINS



Board of County Commissioners • Escambia County, Florida

Jack R. Brown  
County Administrator

8

## STORM-WATER ADVISORY TEAM (SWAT) MEETING

Pensacola Bay Center

Tuesday, January 6, 2015  
4:00 p.m.

Speaking Request  
Print Clearly

(Note: Each speaker will be allowed three minutes.)

NAME: Denise Windham PHONE: (850) 516-7230  
ADDRESS: 562 E. Romana St  
SUBJECT: Flood - Stormwater Management



Board of County Commissioners • Escambia County, Florida

Jack R. Brown  
County Administrator

## STORM-WATER ADVISORY TEAM (SWAT) MEETING

Pensacola Bay Center

Tuesday, January 6, 2015  
4:00 p.m.

Speaking Request  
Print Clearly

(Note: Each speaker will be allowed three minutes.)

NAME: Gary Huston PHONE: 434-9200  
ADDRESS: 536 E. Romana St. 32502  
SUBJECT: Flooding



Board of County Commissioners • Escambia County, Florida

Jack R. Brown  
County Administrator

## STORM-WATER ADVISORY TEAM (SWAT) MEETING

Pensacola Bay Center

Tuesday, January 6, 2015  
4:00 p.m.

Speaking Request  
Print Clearly

(Note: Each speaker will be allowed three minutes.)

NAME: Melanie Nichols PHONE: 221-1586  
ADDRESS: H E. Gonzalez St.  
SUBJECT: Stormwater Retention pond at Avery & Palafox





Board of County Commissioners • Escambia County, Florida

Jack R. Brown  
County Administrator

## STORM-WATER ADVISORY TEAM (SWAT) MEETING

Pensacola Bay Center

Tuesday, January 6, 2015  
4:00 p.m.

Speaking Request  
Print Clearly

(Note: Each speaker will be allowed three minutes.)

NAME: Sherrri Myers PHONE: (850) 484-0902  
ADDRESS: 526 Parker Dr -  
SUBJECT: Stormwater



Board of County Commissioners • Escambia County, Florida

Jack R. Brown  
County Administrator

## STORM-WATER ADVISORY TEAM (SWAT) MEETING

Pensacola Bay Center

Tuesday, January 6, 2015

4:00 p.m.

Speaking Request

Print Clearly

(Note: Each speaker will be allowed three minutes.)

NAME: GEORGE R. MEAD PHONE: 434-3541

ADDRESS: 1005 N. Rens St.

SUBJECT: DAMAGE Report / STUDIES / SOLUTION



Board of County Commissioners • Escambia County, Florida

Jack R. Brown  
County Administrator

## STORM-WATER ADVISORY TEAM (SWAT) MEETING

Pensacola Bay Center

Tuesday, January 6, 2015

4:00 p.m.

Speaking Request

Print Clearly

(Note: Each speaker will be allowed three minutes.)

NAME: Lynda Austin PHONE: 712-5749  
ADDRESS: 5935 Creek Side Circle  
SUBJECT: Carpenter's Creek

## Neighborhood Flood Mitigation Workshop

January 6, 2015

### Part I: Presentation Notes

As these mitigation measures are presented, please jot down any notes you'd like about the different project types.

- Detention or retention ponds: Ponds that serve to capture stormwater overflow until the water evaporates, soaks into the ground, or flows to another location
- Culverts: Concrete underground drainage systems used to move large amounts of stormwater runoff quickly
- Channelizing: Allows stream or stormwater runoff to be exposed
- Stream restoration/ stabilization: Manipulated but open streams in urban or semi-urban areas. This option is typically more natural-looking than channelizing.
- Rain gardens & swales: Natural areas proximate to large impervious surfaces that allow rain water and stormwater runoff to accumulate and soak into the ground. Usually lined with native plants
- Parking lot run-off solutions: May be implemented by both private and public property owners.

- Pervious surfaces: Allow for water to filtrate through “hardscape” such as parking lots and streets.
- Open space/dry use areas: Open public areas, such as parks, that are meant to hold water accumulation during rain events
- Chain of parks: Incorporates several open space/dry use areas to create a man-made floodway that also promotes community resiliency
- Elevation & floodproofing: Serves to protect individual structures from flooding, usually providing protection against the 100-year base flood
- Flood barriers: Includes temporary or permanent measures such as sandbags and flood walls
- Flow control: Helps minimize flooding by slowing outflow of above ground creeks or streams

**Part II Small Group Discussion**

Neighborhood \_\_\_\_\_

Which types of flood mitigation projects appeal to you? Why?

Are there places in the community where you feel that one particular type of project would be preferable? Please give specifics.

Are there any project types that you feel would not be good options? Why not?

Think of a place where flooding has been a personal inconvenience for you. Please describe the location and check any of the items below that apply to this flooding:

Location Description\*:  
\_\_\_\_\_

- Water builds up in the street
- Water accumulates on private property such as in a yard or driveway
- Water flows into a structure such as a garage or lanai area
- Water floods my home or business
- The flooding prohibits free flow of traffic on a street
- The flooding prevents free flow of traffic at an intersection
- The flooding fills a public area such as a park or parking lot
- Other \_\_\_\_\_

\_\_\_\_\_  
(\*Please use reverse side if necessary.)

# Storm Water Advisory Team

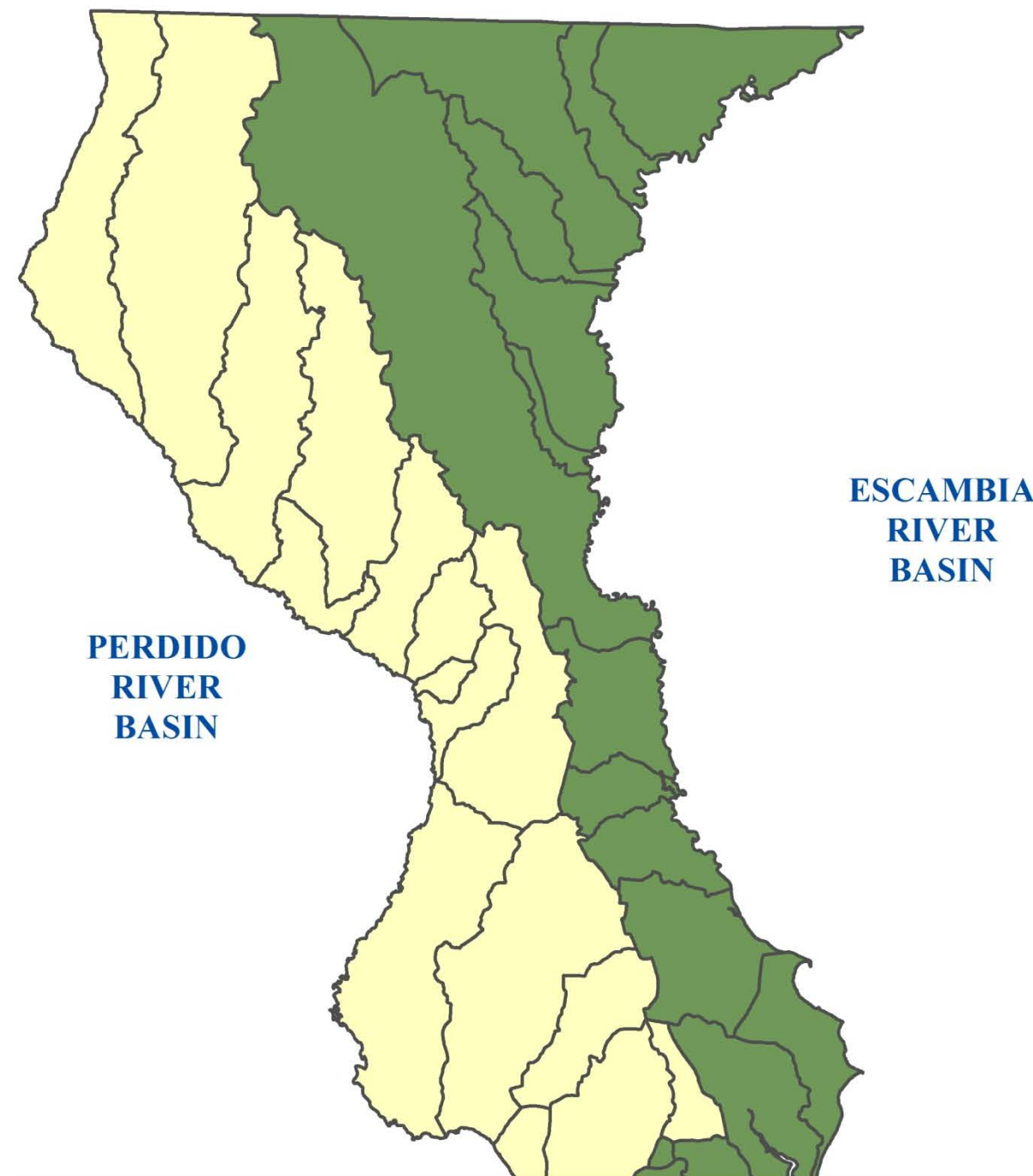
Escambia County, FL  
January 6, 2015

## Overview of Basin Studies



**Escambia County Engineering**

Joy D. Blackmon, P.E.



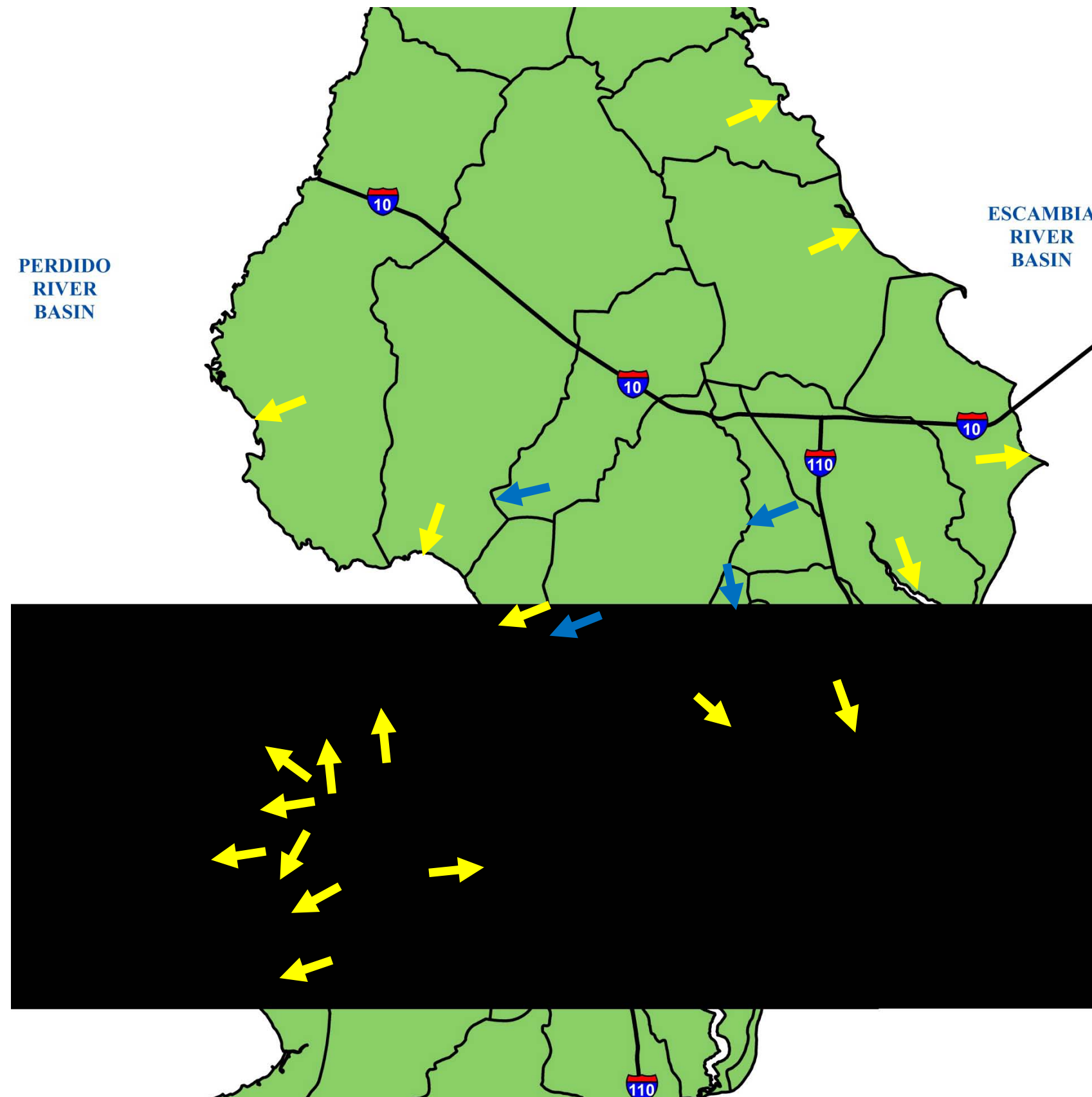
### ESCAMBIA COUNTY

- County divided into two primary watersheds
- Watersheds subdivided into 40 drainage basins

# Storm Water Advisory Team

Escambia County, FL  
January 6, 2015

## Overview of Basin Studies



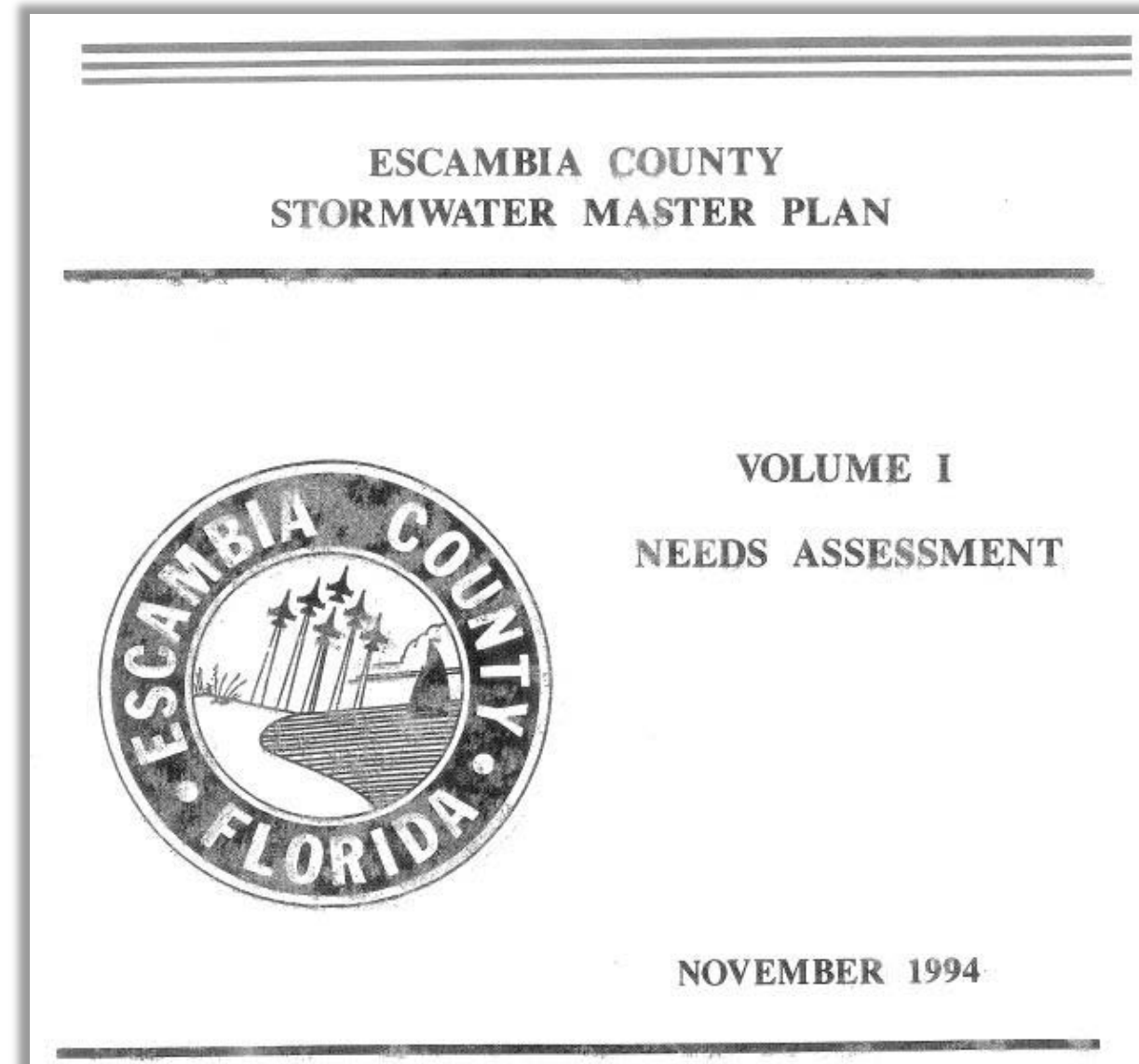
- Drainage basins are primarily independent in function
- Basins are typically divided from one another by topographic features such as ridges
- Arrows indicate areas where basins outfall



# Storm Water Advisory Team

Escambia County, FL  
January 6, 2015

## Master Stormwater Plan



### ESCAMBIA COUNTY

- Master Drainage Study initialized County-wide in 1990's
- Addressed specific locations of concern
- Basis for detailed basin study needs moving forward

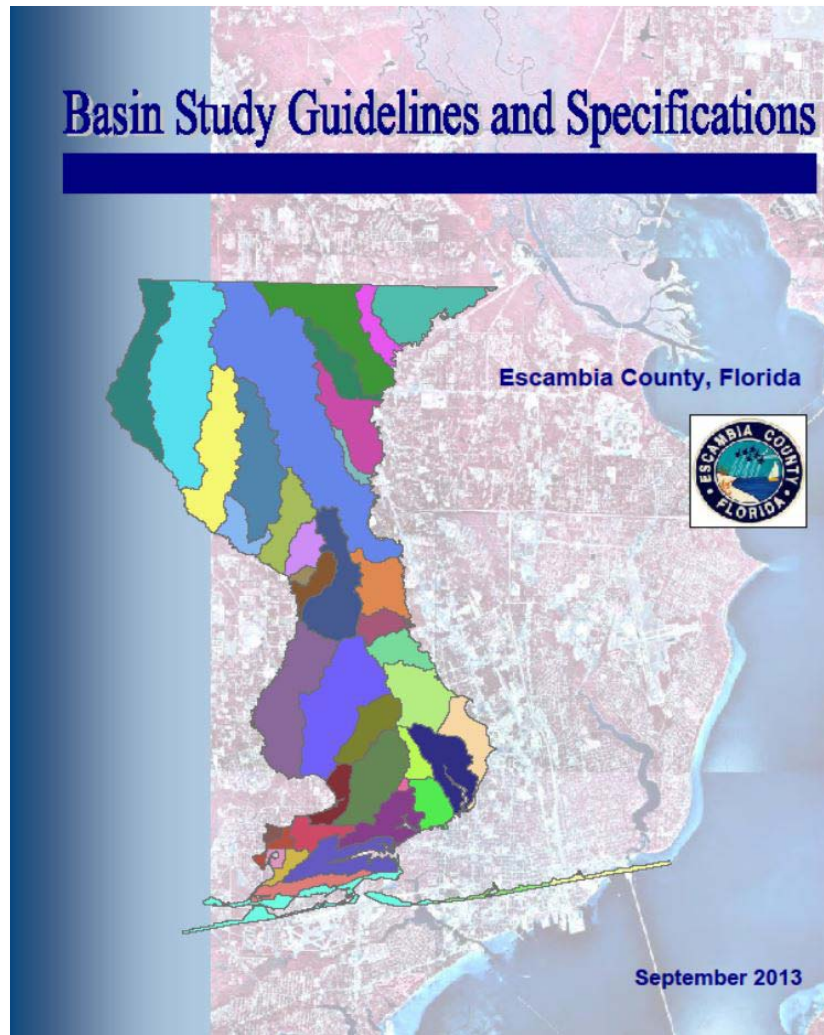
# Storm Water Advisory Team

Escambia County, FL  
January 6, 2015

## Master Stormwater Plan



### Basin Study Guidelines and Specifications



Basin Name	Completed	Basin Name	Completed
Alligator Creek		Bayou Grande	2008
Bayou Marcus Creek	2007	Beverly Parkway	2003
Boggy Creek		Bowman Creek	
Bridge Creek Herron Bayou	2007	Bronson Field	2008
Brushy Creek		Canoe Creek	
Carpenters Creek		Century	
Catholic High School	2003	Churchhouse Branch	
Cotton Creek		Cowdevil Creek	
Eight Mile Creek	1994	Eleven Mile Creek	'94, '99, '08
Escambia Bay		Fletcher Creek	
Garcon Swamp	CIP list	Jacks Branch	2011
McDavid Creek		Millview	2007
Mitchell Creek		Paradise Beach	2008
Penasula Creek		Pensacola Bay	2007
Williams Creek	2007	Perdido River North	
Perdido River South	2009	Pine Barren Creek	
Pritchett Mill Branch		Rock Creek	
Sandy Creek Weekley Bayou	2008	Scenic Hills	1994
Southwest Side	CIP list	Spanish Mill Creek	
Tarkiln Bayou	2008	Warrington	2007

### ESCAMBIA COUNTY

- County published Basin Study Guidelines for consistency
- 18 basin studies performed to date
- Millions spent to date on study recommendations
- Other studies planned
- Study priority based on populated areas
- Studies analyze several storm events including the 100 year event

# Storm Water Advisory Team

Escambia County, FL  
January 6, 2015

## Technical Background



Event	Probability in any given year	Percent Chance in any given year
10 year	1 in 10	10%
25 year	1 in 25	4%
100 year	1 in 100	1%
500 year	1 in 500	0.2%

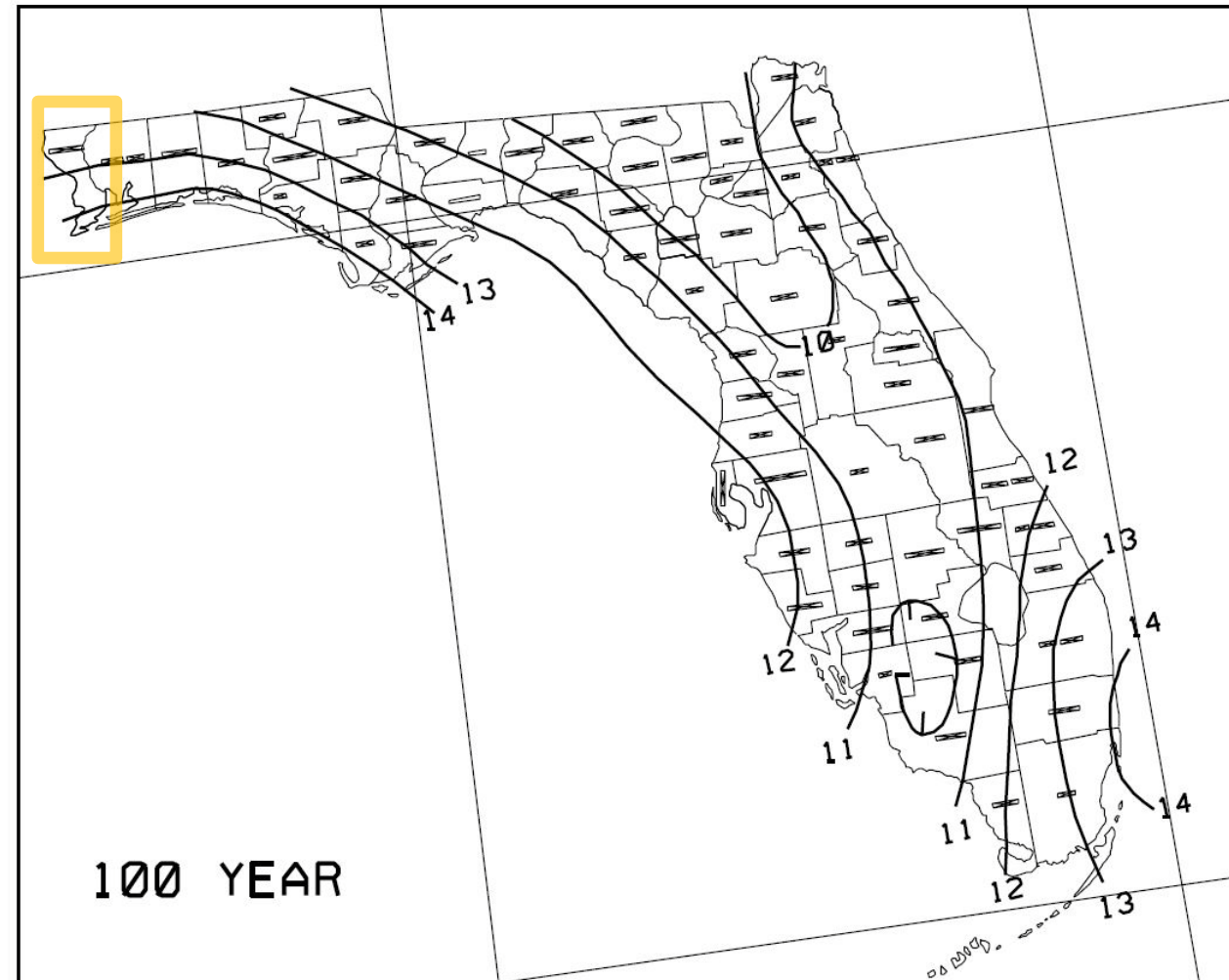
### So what is a 100 year storm?

- A 100 year storm is a storm event that has a 1% chance of occurring in any given year
- The resulting stormwater produced by a numerical event is specific to a region; for instance the Pensacola area is different from Atlanta

# Storm Water Advisory Team

Escambia County, FL  
January 6, 2015

## Technical Background



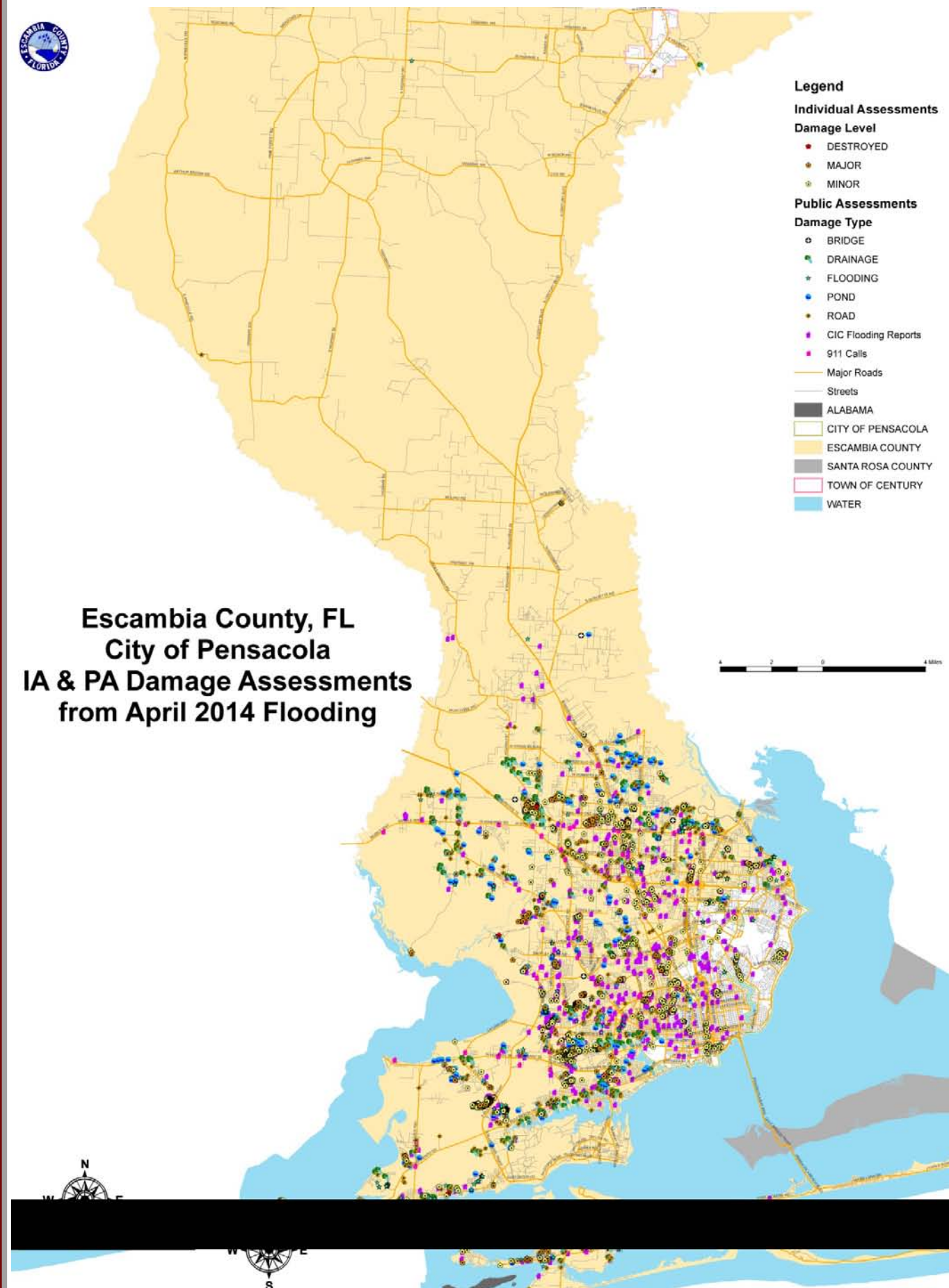
### So what is a 100 year storm?

- As illustrated in the figure produced by FDOT, Escambia County could expect a different amount of rainfall for a 100 year event than other parts of the state.
- The IDF curves for this area show that the amount rainfall during a 100 year event over 24 varies from 13-14 inches

# Storm Water Advisory Team

Escambia County, FL  
January 6, 2015

## Mapping of April Event & the Damage Assessment



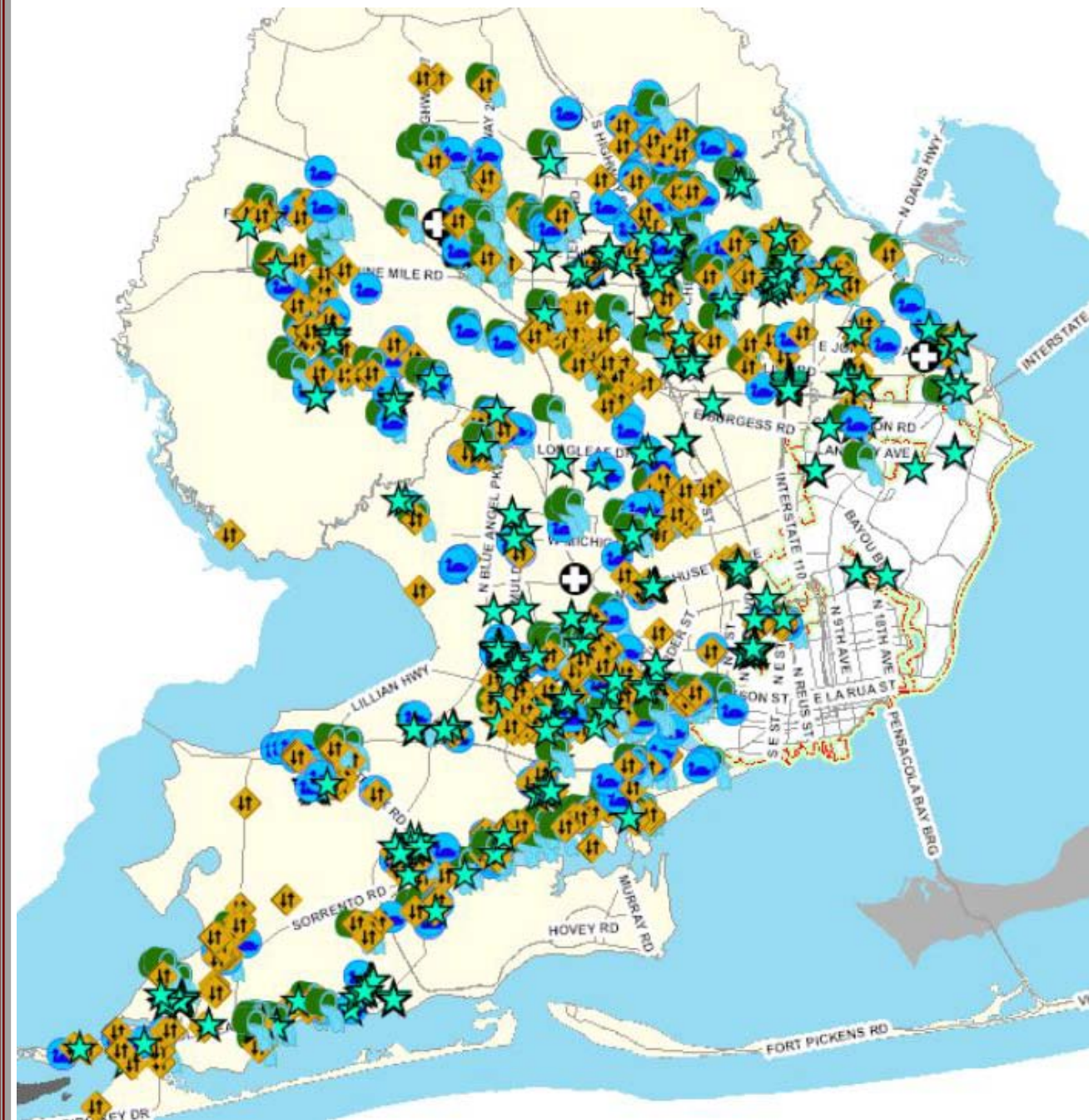
## ESCAMBIA COUNTY

- 2,318 infrastructure damage sites identified by County teams.
- Additionally, 100's of private property flooding sites identified
- Infrastructure sites divided into Roadway, Drainage, Ponds, and Flooded Areas

# Storm Water Advisory Team

Escambia County, FL  
January 6, 2015

## Mapping of April Event & the Damage Assessment



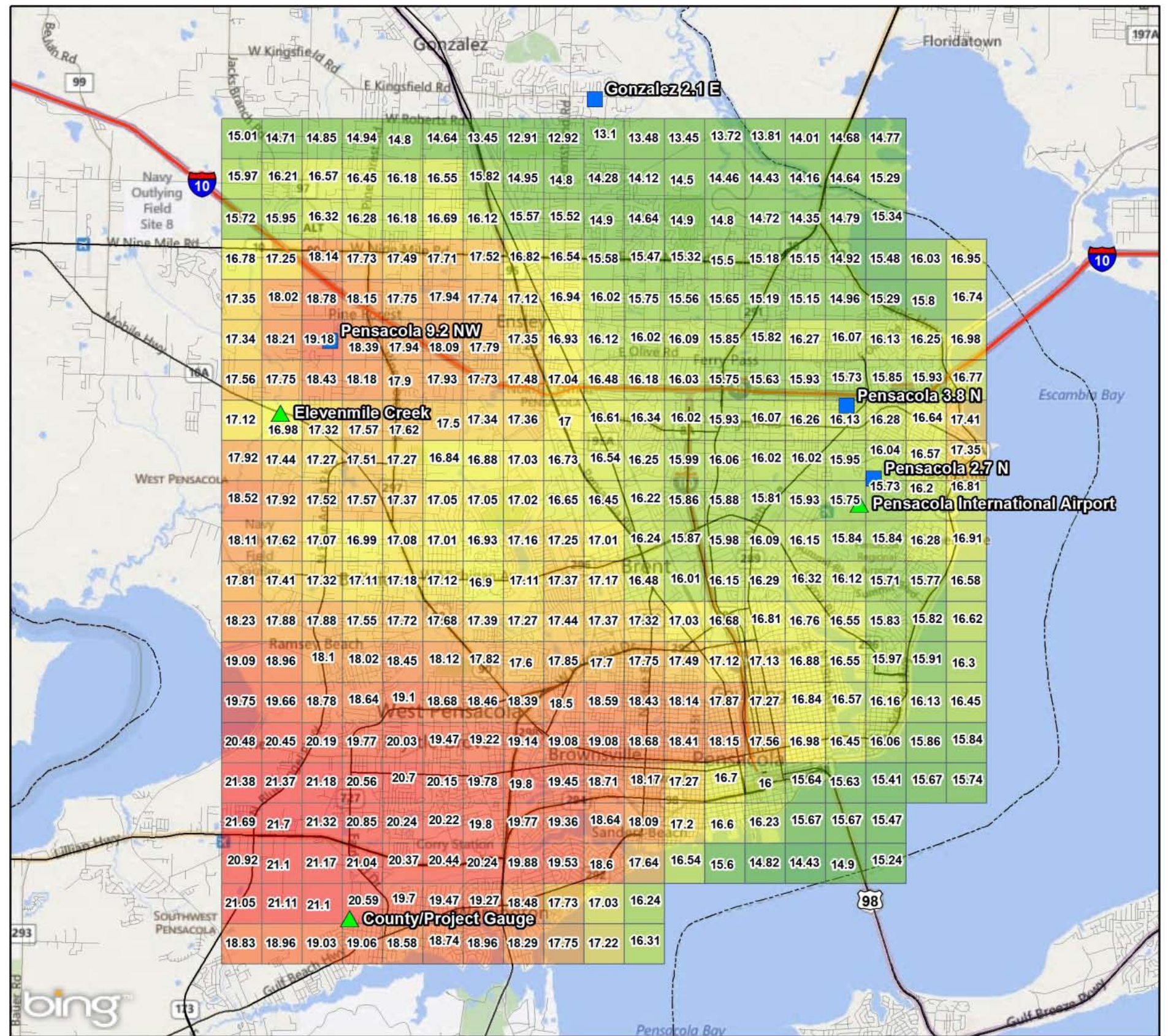
### ESCAMBIA COUNTY

- Majority of sites located south of Muscogee Road
- County storm event recreation was performed which shows a grid of 24 hour rainfall totals on following slides
- Totals range from 12-22 inches over southern Escambia County

# Storm Water Advisory Team

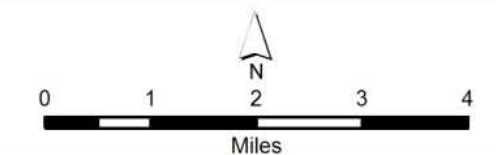
Escambia County, FL  
January 6, 2015

## Mapping of April Event & the Damage Assessment



**Legend**  
 Hourly Gauges  
 Daily Gauges (CoCoRaHS)  
 Escambia County

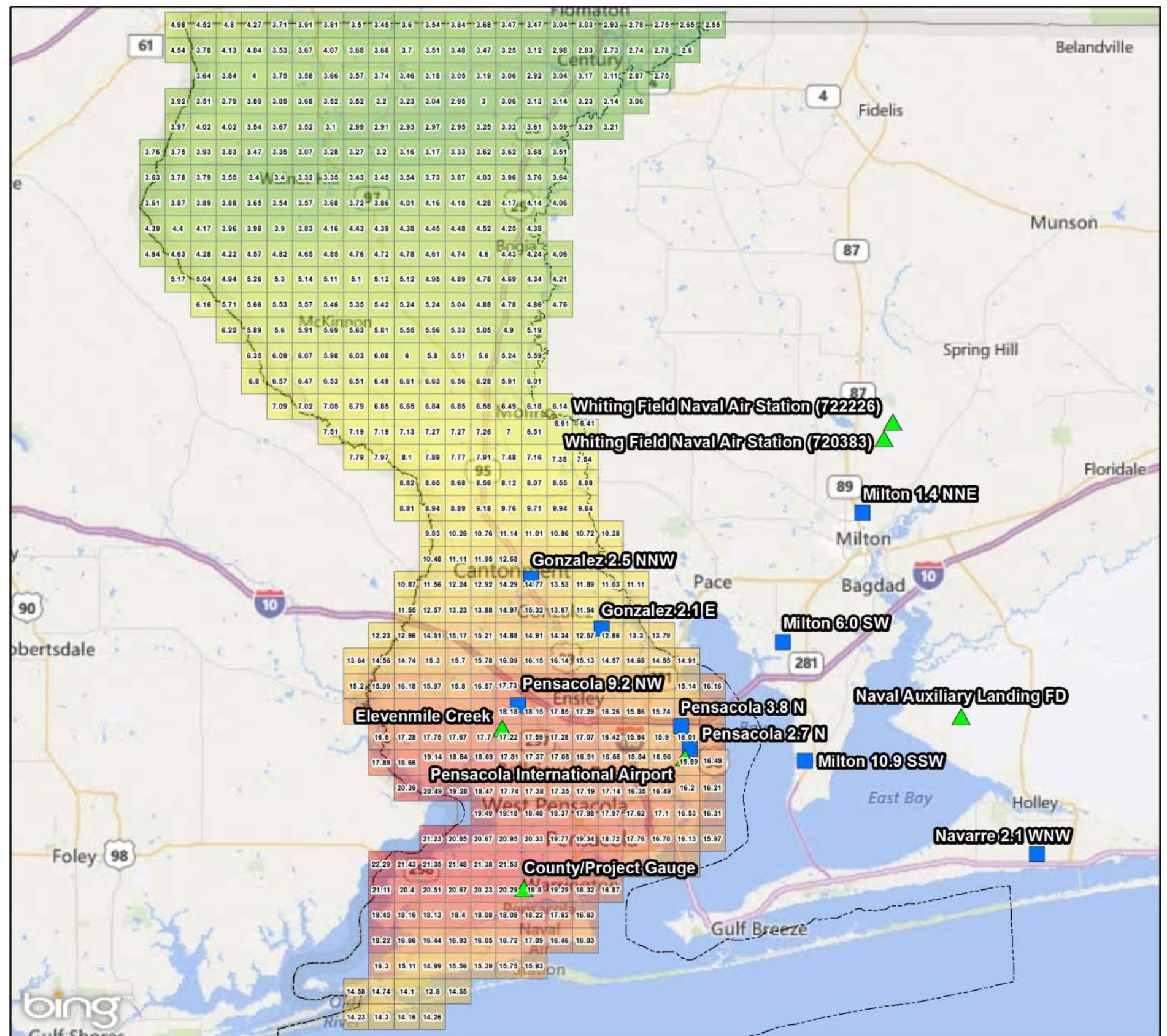
**4/29-30/2014**  
**Rainfall Event Total**  
**1 KM x 1 KM Grid**



# Storm Water Advisory Team

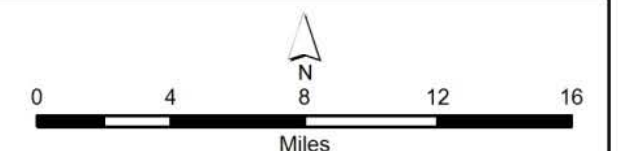
Escambia County, FL  
January 6, 2015

## Mapping of April Event & the Damage Assessment



**Legend**  
 Hourly Gauges  
 Daily Gauges (CoCoRaHS)  
 Escambia County

**4/29-30/2014**  
**Rainfall Event Total**  
**2 KM x 2 KM Grid**





# Storm Water Advisory Team

Escambia County, FL  
January 6, 2015

## Areas of Damage



### LAKE CHARLENE AREA

- Located west of Navy Blvd and north of US 98
- More than 100 properties flooded
- 19-21 inches of Rainfall over 24 hours in contributing area
- Drainage Study underway
- Applied for nearly \$2million in HMGP funds for improvements

# Storm Water Advisory Team

Escambia County, FL  
January 6, 2015

## Areas of Damage



### CRESCENT LAKE AREA

- Located west of W Street and north of Michigan Avenue
- More than 40 properties with flooding or access issues; Crescent Lake Dam destroyed
- 16-18 inches of Rainfall over 24 hours in contributing area
- Emergency repairs to restore property access
- Drainage Study and infrastructure reconstruction underway

# Storm Water Advisory Team

Escambia County, FL  
January 6, 2015

## Areas of Damage



### DELANO AREA OF PENSACOLA BAY BASIN

- Areas within and around Leonard Street, Pace Boulevard, & Palafox Street
- Several public & private properties flooded including Sherriff Complex, Town & Country, Escambia COC, ECAT, & Waterfront Rescue Mission
- 16-18 inches of Rainfall over 24 hours in contributing area
- County performed Drainage Study & applied for over \$4.4million in HMGP funding

# Storm Water Advisory Team

Escambia County, FL  
January 6, 2015

## Areas of Damage



## ESCAMBIA COUNTY STATUS

### Damage Inventory/Projects

- Over 80% of original 2,318 damage sites addressed or repaired
- Remainder of damages are under design or repair.
- Over 100 County projects seeking FEMA reimbursement
- 22 County projects seeking FHWA reimbursement
- 9 County projects seeking NRCS reimbursement
- Over 80 additional flooded areas were identified that do not qualify for FEMA-PA, FHWA, or NRCS funding; County is working on funding solutions including LOST

### Additional Efforts

- Over 200 Flooding Questionnaires returned from public
- Project updates, Flooding Questionnaires, and damage maps located in County Website

# Storm Water Advisory Team

Escambia County, FL  
January 6, 2015

## Web Site



## WEB LINKS FOR ADDITIONAL INFORMATION

### April Storm Damage Updates:

<http://myescambia.com/beready/news/public-works-department-april-storm-damage-recovery-update>

Note - At this website you will find links to the following:

- Brief Flooding Survey
- Detailed Flooding Questionnaire
- Interactive Map of Damages

### S.W.A.T. Agendas, Presentations, & Information:

(webpage under construction)

### Disaster Educational Information:

- <http://www.floridadisaster.org/Recovery/PublicAssistance/Index.htm>
- <https://www.fema.gov/disaster/4177>
- <http://www.fhwa.dot.gov/fldiv/erpfaq.cfm>
- <http://www.nrcs.usda.gov/wps/portal/nrcs/main/fl/programs/financial/ewp/>
- <http://water.usgs.gov/edu/100yearflood.html>

# Storm Water Advisory Team

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Escambia County, FL  
January 6, 2015

Public Comment



***PUBLIC COMMENT PERIOD***



# Storm Water Advisory Team – SWAT

## February 3, 2015 Meeting Minutes

221 Palafox Place, 4<sup>th</sup> Floor Training Room

### In Attendance:

**Committee:** Mary Gutierrez, Garrett Walton, John Cheney, Dr. Elizabeth Benchley, Phil Turner, & Glenn Niblock

**Staff:** Joy Blackmon, Colby Brown, Keith Wilkins, Chris Curb, Carrie Stevenson, Chips Kirschenfeld

**Citizens:** Tim Haag, Roger Dreher, Lynda Austin, Jim Lee, Barbara Albrecht, Stella Wilson, Jim Jones, Dean Kirschner, Kyle Ross, R.H. Wilson, Christian Wagley, Vicki Rabb, Jim Waite, Daniel Broxson, Richard Brown, Jim Hunt, Joe Brewer, Karl Bayer, Fred Martin, Kenneth Owen

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- **Welcome** – Mary Gutierrez
  - Mary Gutierrez, Chair, called the meeting to order at 10:35 a.m.
- **Meeting Properly Advertised** – Proof of Publication dated 1/24/15 and 1/31/15 in the Pensacola News Journal.
- **Approval of 01-06-15Minutes** - Ms. Gutierrez made a motion to approve the January 6, 2015 minutes. The motion was seconded by Mr. Niblock and carried unanimously.
- Mary Gutierrez announced to the committee that District 1 appointee, Mike Whitehead, had resigned his appointment and Colby Brown informed the committee that District 1 replacement , Nathan White, was being presented to the BCC on 2/5/15 for approval.
- Joy Blackmon gave an update on the Corry Bridge Replacement Project:
  - AT&T Fiber Optics Security Issue – Extensive utility conflicts caused the need for a temporary bridge to be installed until the utility issues are resolved.
  - Notice will be given when the project is able to move forward with the permanent bridge replacement.

- **Community Updates –**

- Mary Gutierrez discussed community involvement in District 3 and encouraged the other members to continue with community interactions.
- The lack of maintenance at Lake Charlene was discussed among committee members based upon citizens input at the last meeting.
- Joy Blackmon expressed the importance of following grant processes to take advantage of available funding.
- Allen Vinson continued the funding discussion stating that the Local Mitigation Strategy LMS committee makes recommendations to FEMA; March 9<sup>th</sup> deadline for application. Available options for funding are: FEMA, Public Assistance, Hazard Mitigation Grant Program (substantial funding available: \$750,000 for Jackson Creek with a 25% County Match; RESTORE: \$11M for Bayou Chico Water Quality Improvements & Flood Plain Capacity Improvements. Amendment 1: \$10 billion over the next 20 years available through multiple agencies; Water Management District: \$600M with available beginning in early summer.
- Chris Curb mentioned that the FDEM application alone is 850 pages long.
- Dr. Benchley – Discussed the need for implementation of Non-Construction Areas such as Aragon and other low lying wetland areas of the community. Joy Blackmon explained that codes have been updated to bring about sensible improvements; and that Grandfathering must be addressed.
- Keith Wilkins added that LDC efforts regarding environmental issues and property rights are being brought to a minimum in the LDC because the State requirements will prevent further damage. Chips Kirschenfeld stated that wetland buffer proposals are being submitted through ERP requirements. Keith Wilkins added that the Planning Board has Water Quality stand points for protection discussions underway that will later be submitted to the BCC.
- Phil Turner – Requested that the City identify and summarize areas of impact.
- Mary Gutierrez asked staff how we can ensure that impervious pavement doesn't continue to create or worsen current projects. Allen Vinson and Joy Blackmon discussed policy changes and LDC modeling for new development; and basin outfalls flowing through the same areas.



- **Grant Writing** – Ms. Gutierrez asked members to identify one small scale project from each district to be considered for grant funding and offered to write the grant applications.
  
- **Lake Charlene Discussion** – Allen Vinson gave an overview presentation of the Lake Charlene Basin Study, (13 square miles), Damage Assessment, Planned Improvements, and Funding Options. (Local Mitigation Strategies (LMS) recommendations to FEMA, Public Assistance, and Hazard Mitigation Grant Programs (HMGP) were all discussed.
  - Dean Kirschner addressed the committee stating that the dredging of the Lake Charlene canal and other projects need to begin to prevent property values from dropping and Lake Charlene being made into a flood zone.
  - Garrett Walton asked staff if there is a cost estimate for repairing the Lake Charlene drainage basin. Allen Vinson stated that an estimated \$5M/25 year storm event. Chris Curb further stated that basin lines are crossed; there is a concept to take \$2M staying in the same basin; which would take 89 homes out of the flood area. \$11M written, going to the BCC within the next month covering Bayou Chico, beach Haven, and Jackson Creek. Garret Walton asked if \$2M would take 89 homes out of the flood area; and \$1M of the \$11M from NFWF helps Jones Creek / Bayou Chico outfall; then what would be left. Chris Curb responded that 11 homes would be left in the 100 year flood plain out of the 100 homes that flooded during the April 2014 flood event.
  - Mary Gutierrez requested staff to provide an executive summary of grant funding available for Lake Charlene.
  - The group discussed flood mitigation eligibility and availability; and Garret Walton discussed NFIP annual notifications. Joy Blackmon stated that staff would be willing to contact the 11 homeowners in Lake Charlene regarding their mitigation options.
  - Glenn Niblock review handouts & charts with Committee members stating that in 53 years curves have not been updated and suggested that weather and statistic professionals be hired to evaluate the area's past 55 year history. Daniel Broxson explained that the NOAH Atlas has been updated and is in the process for adoption by the State; and that we are using updated numbers.
  
- **Public Comments** – The committee heard comments from the following:
  - Crescent Lake citizens, Fred and Melinda Martin, of 6105 East Shore Drive, indicated that they had not been contacted by County staff and

needed assistance. Chris Curb took their contact information and stated that he would be in touch with them.

- Carrie Stevenson – Discussed availability of Problem Areas & Flood Plain Maps.
- Tim Haag – Inflow & Infiltration in Area Waterways 15 Year Program  
Working with the County makes future storm water problems come to light
- **White Paper – Draft** – Mary Gutierrez commented that a team has been hired to prepare the Scope; Committee input will be added at a later date; and finally Public Input Outreach will begin.
- **Next meeting Agenda/Date/Time** – Mary Gutierrez presented options for upcoming meetings. The committee agreed upon setting meetings on the **3<sup>rd</sup> Tuesday of each month beginning March 17<sup>th</sup>**. Meetings will begin at 4:00 p.m. depending upon the availability of a meeting room at the Central Office Complex.
  - a. Area of Discussion: Downtown Stormwater Study & Aragon – Presentation - Derrick Owens, City of Pensacola
    - i. Colby Brown - Basin Focus
    - ii. Garrett Walton – Problem Areas List (Including Where Each Project is on the list)
    - iii. Garrett Walton – LID Consideration Driven by Incentives
    - iv. Glenn Niblock – Open Items List
- 2. Adjourn – 12:24 p.m.

February 3, 2015

To: Storm Water Advisory Team

Elizabeth Benchley, City of Pensacola      John Cheney, District 5  
Mary Gutierrez, District 3      Phil Turner, City of Pensacola  
Garrett Walton, District 4      Mike Whitehead, District 1

Copy to: Colby Brown

Subject: Intense Storm Rainfall Events

The design basis rainfall event raises a compound question of risk assessment. That compound question is: which rainfall events are likely to produce extensive flooding in Escambia County and what level of risk is considered acceptable? A design basis risk is generally stated in terms of the rainfall return period. It might be once per 25 years, once per 100 years, or an even higher value such as once per 500 years.

The U. S. Department of Agriculture prepared an extensive study of rainfall in the contiguous states and published it as Technical Report 40 in May 1961. It was repaginated and republished in 1963. A copy of the cover sheet for that report is attached as Exhibit 1.

A chart that shows lines of constant rainfall taken from Technical Paper No. 40 is attached as Exhibit 2. Note that the once per 100 year rainfall levels for Escambia County are 14 inches near the coast, 13 inches at mid-county, and 12 inches near the Alabama border. It is not easy to read but is the best copy I could get.

The USDA published *Urban Hydrology for Small Watersheds* as Technical Report 55 (TR-55) in 1975, and a second edition in 1986 that contained curves of constant rainfall. Exhibit 3 shows a chart with lines of constant rainfall taken from the TR-55 document. Please note that the lines of constant rainfall appear identical with those in the first chart. You may also note that the TR-55 report is referenced in the Warrington Basin report we just reviewed.

A presentation to SWAT on January 6, 2014 included another depiction of the TR-55 data as can be seen in Exhibit 4. The curves of constant peak rainfall show a rainfall intensity for a 100-year rainfall of 14 inches near the coast of Escambia County; 13 inches at mid-county; and 12 inches near the Alabama border, the same as in Technical Paper No. 40, and TR-55. The data has not been updated in over 50 years.

There is reason to suspect that the data used by the County understates the amount that should be used for the drainage system design basis. There have been four storms with intense rainfall that led to flooding since the county record rainfall of 15.29 inches in 1934. Those are tabulated in Exhibit 5. A frequency of four storms exceeding 13 inches in 80 years implies that the 100-year rainfall should be expected to be greater than 13 inches.

Exhibit 5 presents the results of an analysis of fifty years of maximum rainfall data for the Pensacola Airport. Maximum rainfall is the greatest 24-hour rainfall in a given year. More data are available but 50 years was selected as a large enough sample that gave some weight to more recent events. The 100-year (1% probability) rainfall from this analysis is 20.5 inches. For purposes of the analysis the April 29-30, 2014 rainfall was taken as 23 inches. To give some perspective, the raw data from NOAA are shown, as is a data point representing the four 13-inch or greater events in an 80 year span, along with the record 24-hour rainfall for Florida which occurred during Hurricane Easy (1950).

All of this data was transmitted to County engineers and managers months ago. I am baffled that there has not been more interest in an evaluation to establish a sound scientific basis for rainfall events specific to Escambia County. The design basis rainfall is the fundamental criterion for design of the storm water management system. If the design basis is lower than should reasonably be expected, we can count on a continuation of intermittent severe floods that occur more frequently than expected. In short, GIGO for the hydrological models that forecast flooding, and a flawed design basis.

The County can continue to use rainfall curves developed around 1961, which ignore data from the last 53 years, and keep relying on data that are not specific to Escambia County. But it seems prudent for the County to have weather and statistics experts evaluate data that includes many years and is specific to Escambia County. That is what I've recommended from the first. I recommend that the Storm Water Advisory Committee request an updated assessment of the rainfall design basis.

Respectfully submitted,

Glenn Niblock  
District 2

U.S. DEPARTMENT OF COMMERCE  
LUTHER H. HODGES, Secretary

WEATHER BUREAU  
F. W. REICHELDERFER, Chief

TECHNICAL PAPER NO. 40

RAINFALL FREQUENCY ATLAS OF THE UNITED STATES

for Durations from 30 Minutes to 24 Hours and  
Return Periods from 1 to 100 Years

Prepared by  
DAVID M. HERSHFIELD  
Cooperative Studies Section, Hydrologic Services Division  
for  
Engineering Division, Soil Conservation Service  
U.S. Department of Agriculture

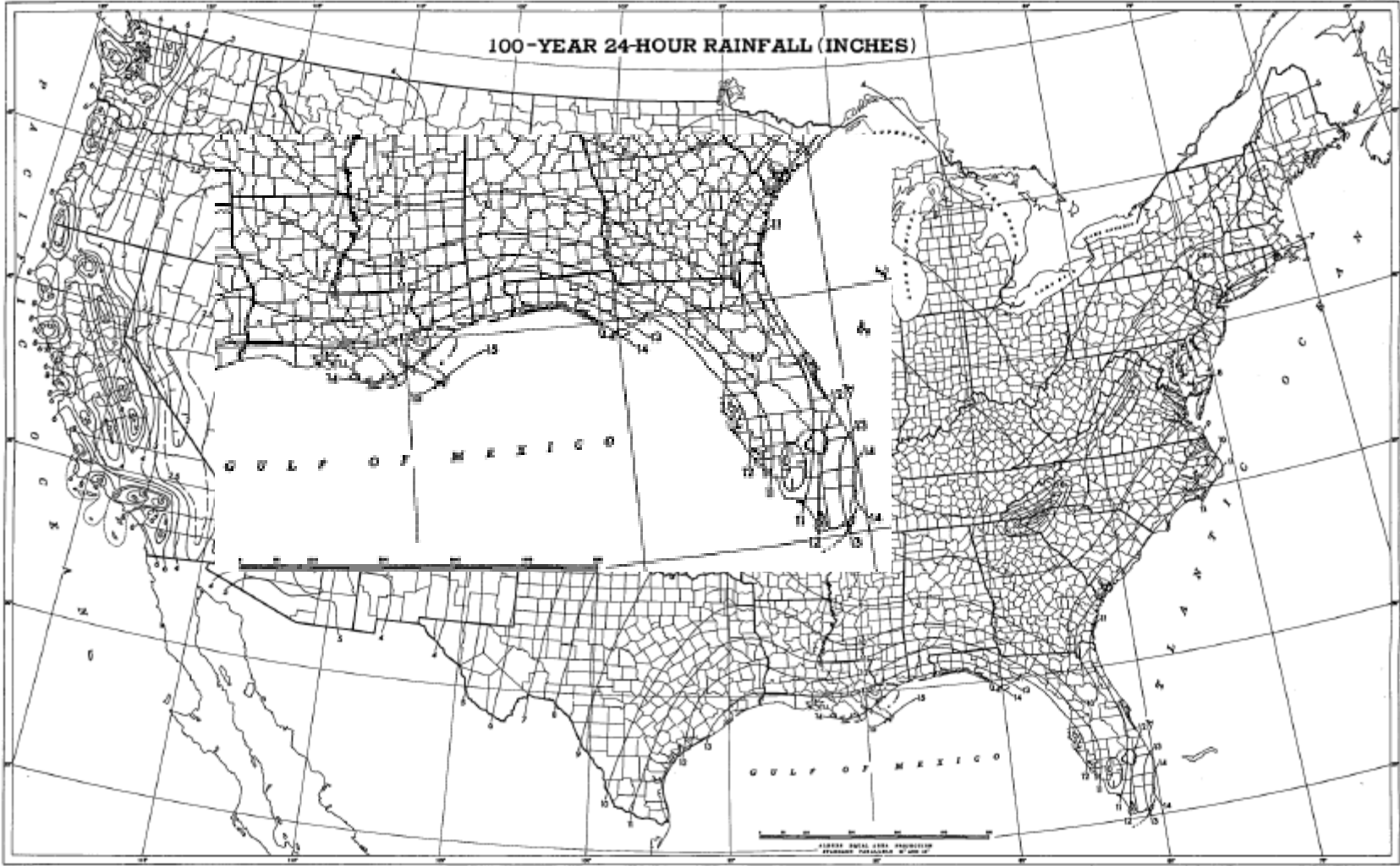


WASHINGTON, D.C.

May 1961

Repaginated and Reprinted January 1963

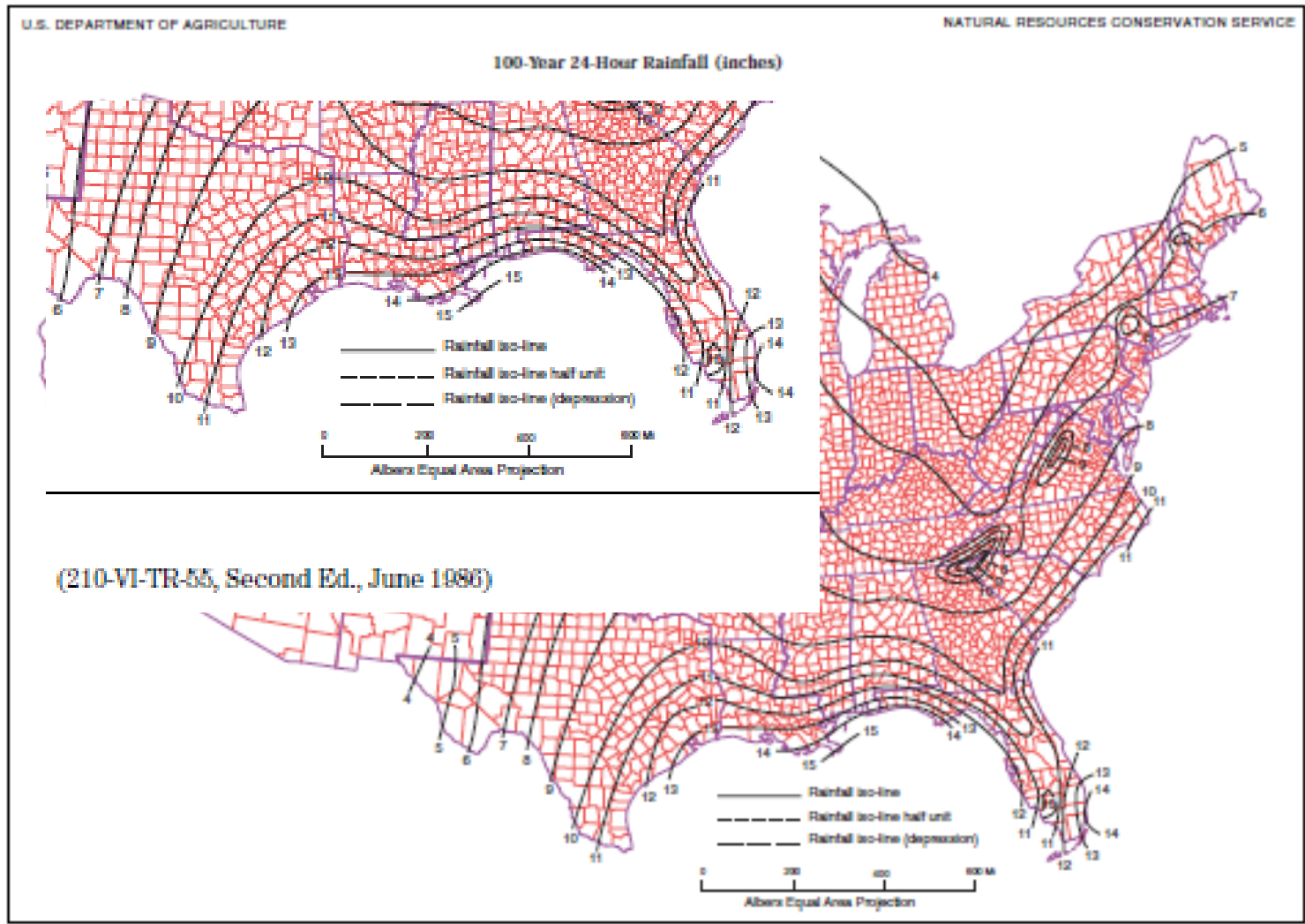
# 1961 Rainfall Data from Technical Paper 40



# 1975 & 1986 Rainfall Data from TR-55

Exhibit 3

Figure B-8 100-year, 24-hour rainfall



# Storm Water Advisory Team

Escambia County, FL  
January 6, 2014

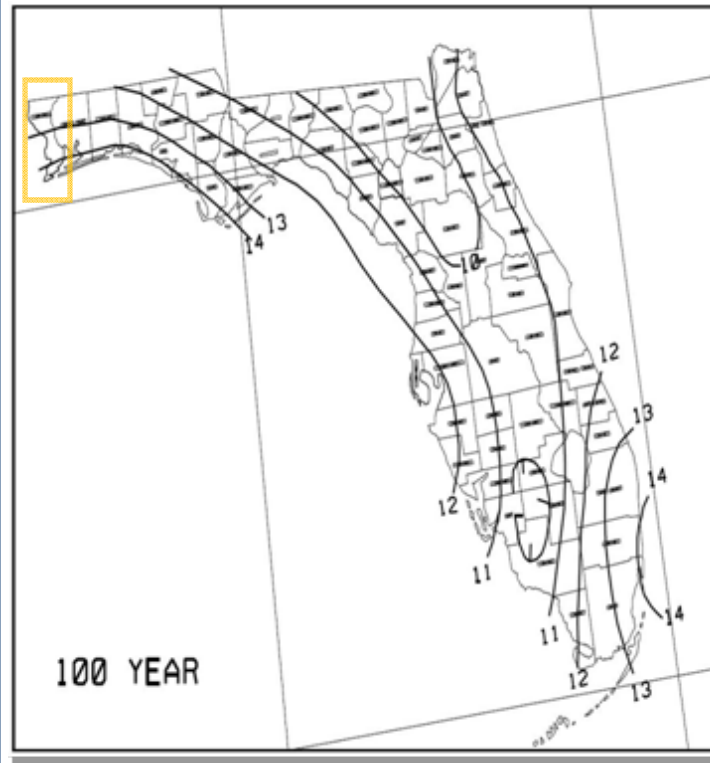
## Technical Background



### Exhibit 4

#### So what is a 100 year storm?

- As illustrated in the figure produced by FDOT, Escambia County could expect a different amount of rainfall for a 100 year event than other parts of the state.
- The IDF curves for this area show that the amount rainfall during a 100 year event over 24 varies from 13-14 inches





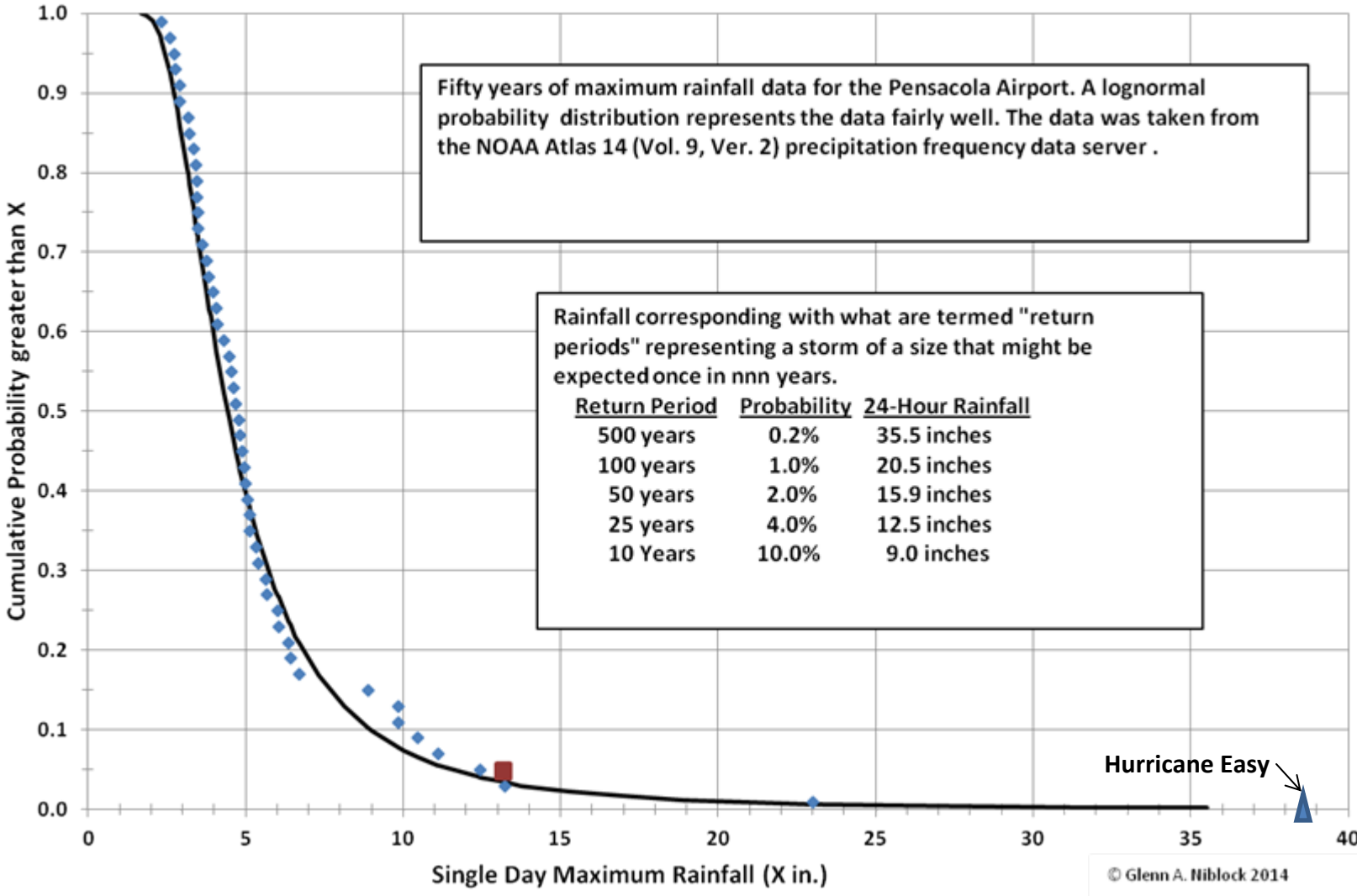
# High Rainfall Events

Pensacola has had four intense flood-producing 24-hour rainfall totals over the last 80 years as tabulated below:

Year	24-Hour Rainfall (inches)
1934	15.29 inches
2005	13.96 inches
2012	13.22 inches
2014	20 inches (approx.)

This shows a rate of 4 rainfalls of at least 13.22 inches over a period of 80 years. This rate of 4 per 80 years is a frequency (probability) of 0.05 (5%).

# Pensacola Airport Single Day Maximum Rainfall



# Conclusions/Next Steps

Exhibit 7

- Rainfall data (curves) used by FDOT and Escambia County were developed over 50 years ago and have not been updated
- The basis for the rainfall curves was not specific to Escambia County
- Difficulties in determining probabilities of infrequent events may not have been as well known then
- More recent intense rainfall events indicate the 100-year storm rainfall is greater than the County's design basis
- The County should hire experts in weather and statistics to establish a design basis rainfall with more up-to-date rainfall data



# Storm Water Advisory Team – SWAT

## March 17, 2015 Meeting Minutes

221 Palafox Place, 4<sup>th</sup> Floor Training Room

### In Attendance:

**Committee:** Mary Gutierrez, Nathan White, Glenn Niblock , Dr. Elizabeth Benchley, Phil Turner, & Garrett Walton **Absent:** John Cheney

**Staff:** Colby Brown, Chips Kirschenfeld

**Citizens:** Barbara Albrecht, Daniel Broxson, Allen Vinson

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- Welcome – Mary Gutierrez
  - Mary Gutierrez, Chair, called the meeting to order at 4:36 p.m.
- Meeting Properly Advertised – Ms. Gutierrez verified with staff that the meeting had been advertised and staff presented Proof of Publication dated 3/7/15 and 3/14/15 in the Pensacola News Journal.
- **Approval of 02-17-15 Minutes** - Ms. Gutierrez called for approval of the February 3, 2015 minutes, Dr. Benchley made a motion to approve, the motion was seconded by Mr. Niblock and carried unanimously. (Mr. White abstained due to his absence from the meeting.)
- Mary Gutierrez introduced and welcomed, Nathan White as the new District 1 appointee.
- Baskerville Donovan, Inc. White Paper Drafting & Scope Review (Daniel Broxson)
  - Daniel Broxson reviewed the Task & Scope of Work by Baskerville-Donovan, Inc. (BDI). Colby Brown discussed white paper prioritizations; and informed the Team that the April 2014 Project List is posted on the SWAT page of the County web site.
- Executive Order for Federal Flood Risk Management
  - Mary Gutierrez read information provided by Keith Wilkins regarding the President’s Executive Order for Federal Flood Risk Management. Keith Wilkins’ message stated that Escambia County already has a 2’-3’

freeboard established. A discussion regarding the City's freeboard specifications took place; and it was requested that this issue be added to next month's agenda. Mr. Walton requested verification that the City of Pensacola designs for a 100-Year Storm and suggested that this information be used as additional support to move forward with the 100-Year design standards.

- The Design Storm Issues in the Land Development Code (LDC) will be presented to the BCC at their first meeting in April. Staff's goal is to create Design Standards that are less cumbersome; more standard and more technical. Colby Brown explained that The Planning Board did not accept Staff's recommendation of 100-Year Design Standards; but suggested a 50-Year Design. Staff will re-present the 100-Year Storm Criteria to the BCC. As it is currently written with a 25-Year Open; and 100-Year Closed Basin. The Public Hearing is scheduled for April 2, 2015.
- Mr. Walton also asked for the number of Closed Basins in Escambia County and what the design standard requirements would be for Private Ponds. Phil Turner made a motion to move forward with presenting the Executive Summary to the BCC; the motion was seconded by Mr. White, and passed unanimously.
- Ms. Gutierrez directed staff to submit a letter of support of the 100-Year Design Standards to be presented to the Board on March 19<sup>th</sup> and nominated Phil Turner to present with Glenn Niblock assisting with the presentation to the Board.
- Colby Brown informed the SWAT that the Pensacola Basin simulator had been posted to the SWAT page of the County web site and requested that all review. Mary Gutierrez discussed her opposition to the City's approach and Dr. Benchley addressed the Longhollow area demonstrating that the historic areas of the City were built in low lying wetland areas; and stated that she would like to see the wetlands used as natural stormwater capture zones and discourage bordering area development. Ms. Gutierrez added that she would like to see the County move forward in increasing the wetlands buffer rather than minimizing to 30'. Colby Brown stated that these uses are still under review by the LCD.
- Garret Walton stated that he would like to present Low Impact Development to the BCC and the City requesting that they take actions to 1: Incorporate Low Impact Development standards; and 2: Changes to the LDC should be prefiltered by technical standards and incentivized actions; charging the Staff; BCC and City Council to adopt Low Impact Development Standards. Mr. Walton will present more LID information at the April 21<sup>st</sup> SWAT meeting. Mary Gutierrez indicated that she may have a PowerPoint presentation regarding Low Impact Development and Ecological Impacts. Colby Brown suggested bringing forward recommendations for incentivizing; by offering a supportive group in the development community.

- Ms. Gutierrez informed the SWAT that she had attended a Climate Change workshop and provided a handout of links to informative websites containing current, historical and future scenarios.
- Public Comments
  - Colby Brown announced the Nature Conservancy /Sam Brody meeting scheduled for April 10<sup>th</sup>. Mr. Brown gave a brief explanation of the 41 drainage basins and 16 basin studies already performed.
  - Chips Kirschenfeld stated that the 16 studies address issues and make recommendations for problems in the south portion of the County.
  - Phil Turner expressed that we all must be using the same reference points.
  - Barbara Albreacht addressed the SWAT, discussing definition of riparian zones and what the County is doing regarding them, who has authority over them and how water quality is being addressed; the City's EWP work on Carpenter's Creek due to private property erosion; hardening urban streams; suggesting integration; LIDAR needing to be calibrated and the need for GIS funding to update the LIDAR data; she asked Daniel Broxson (BDI) about the Scope and if the County is working on a comprehensive watershed plan. Mr. Broxson stated this is a first step in that direction and they are looking at what has already been done and where and how we need to move forward.
- Old Business
  - District 1 SWAT position
  - Community meeting updates
  - Grant writing
  - Area of Discussion: Lake Charlene
  - Mr. Niblock Questions/Comments (Handout)
  - Public Comments
- Other items for consideration
  - Agenda for April 21, 2015
    - Freeboard: City & County
    - Flood Plain Managers
    - Garrett Walton – Low Impact Development Paper
    - Invite Derek Owens, City Engineer
      - Tying Studies Together
      - Current Standards
      - Address the City's plans from here forward
- General
  - Ms. Gutierrez thanked the SWAT and staff and stated that she hopes the public will stay involved.
- Adjourn
  - The meeting was adjourned at 6:13 p.m.

Published Daily-Pensacola, Escambia County, FL

**PROOF OF PUBLICATION**

State of Florida

County of Escambia:

Before the undersigned authority personally appeared Anna Hammes who, on oath, says that she is a personal representative of the Pensacola News Journal, a daily newspaper published in Escambia County, Florida; that the attached copy of advertisement, being a Legal in the matter of:

**Meeting Schedule**

Was published in said newspaper in the issue(s) of:

April 11, 2015

Affiant further says that the said Pensacola News Journal is a newspaper published in said Escambia County, Florida, and that the said newspaper has heretofore been published in said Escambia County, Florida, and has been entered as second class matter at the Post Office in said Escambia County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement; and affiant further says that she has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in the said newspaper.

Sworn to and subscribed before me this 13th day of April, 2015, by Anna Hammes, who is personally known to me.

Anna Hammes Affiant  
Clair J. [Signature] Notary Public

HELEN MANNING CALICO  
 Notary Public - State of Florida  
 Comm. Expires August 4, 2018  
 Comm. No. FF 147551

**Board of County Commissioners - Escambia County, Florida**  
 Meeting Schedule  
 April 13- April 17, 2015

One or more of the Escambia County Commissioners may attend the following meetings:

DAY	DATE	TIME	MEETING	LOCATION
Mon	04/13	4:00pm	Community Economic Development Association Board	117 West Garden Street
Tue	04/14	1:00pm	Environmental Enforcement Special Magistrate	3363 West Park Place, Room 104
Tue	04/14	2:00pm	Local Mitigation Strategy Board Meeting (LMS)	3363 West Park Place, Room 104
Tue	04/14	5:00pm	Ment System Protection Board (MSPB)	235 Palatka Place, Room 205***
Tue	04/14	5:00pm	Escambia County Housing Finance Authority	760 South Palatka Street, Suite 210
Wed	04/15	8:00am	Escambia Soil & Water Conservation District Board	151 Highway 97, Molokai
Wed	04/15	8:30am	Board of Adjustment	3363 West Park Place
Wed	04/15	1:00pm	Development Review Committee (DRC)	3363 West Park Place**
Wed	04/15	1:30pm	Witness Committee Meeting	221 Palatka Place, Room 200
Wed	04/15	2:00pm	Benefits Committee Meeting	221 Palatka Place, Room 200
Wed	04/15	3:00pm	Escambia County Disability Awareness Committee (ECDAC)	3363 West Park Place, Room 104
Thu	04/16	9:00am	Special BCC Meeting - RESTORE Act	291 East Gregory Street****
Thu	04/16	5:00pm	Special BCC Meeting Public Hrg-LDC Ordinance	BCC Meeting Room*

One or more Planning Board members may attend the above meeting.

\*Ernie Leo Magaha Government Building, 221 Palatka Place, First Floor  
 \*\*To View DRC Agenda go to: <http://www.mvescambia.com/government>  
 \*\*\*Old Courthouse Board Chambers  
 \*\*\*\*Pensacola Bay Center

**NEXT WEEK'S NOTE:**

Mon	04/20	3:30pm	West Florida Regional Planning Council	152 North Wilson Street, Crestview
Tue	04/21	1:00pm	Visit Pensacola Finance Meeting	101 West Main Street
Tue	04/21	1:00pm	Environmental Enforcement Special Magistrate	3363 West Park Place, Room 104
Tue	04/21	3:00pm	Visit Pensacola Marketing Meeting	161 Airport Lane
Tue	04/21	4:30pm	Storm Water Advisory Team (SWAT)	3363 West Park Place
Wed	04/22	12:00pm	Enterprise Zone Development Agency (EZDA)	117 West Garden Street
Wed	04/22	1:00pm	Development Review Committee (DRC)	3363 West Park Place**
Wed	04/22	3:00pm	Visit Pensacola Board Meeting	2 Via de Luna, Pensacola Beach
Thu	04/23	8:45am	Santa Rosa Island Authority Committee Meeting	1 Via de Luna, Pensacola Beach
Thu	04/23	9:00am	Community Redevelopment Agency Meeting	BCC Meeting Room*
Thu	04/23	4:30pm	Board of County Commissioners Agenda Work Session	BCC Meeting Room*
Thu	04/23	5:30pm	Board of County Commissioners Public Forum	BCC Meeting Room*
Fri	04/24	1:00pm	Santa Rosa Island Authority Board Member Workshop	1 Via de Luna, Pensacola Beach

Note: A copy of the agenda for the meetings initiated by the Board of County Commissioners containing specific items to be considered in the order of presentation, may be obtained from the County Administrator's Office, Suite 425, Escambia County Government Complex, 221 Palatka Place. Any Persons needing accommodations to attend or participate, pursuant to the Americans with Disabilities Act, should contact Angela Crawley, 595-4947, at least 72 hours in advance of the meeting. Those who are hearing or speech impaired may Contact Mrs. Crawley via e-mail at [ajcrawley@mvescambia.com](mailto:ajcrawley@mvescambia.com). Any person who decides to appeal any decision made by any board, agency, or commission with respect to any matter considered at its meeting or hearing, will need a record of the proceedings of the meeting. Since the Board of County Commissioners does not make verbatim records of its meetings, such person may need to independently secure a record that should include the testimony or evidence on which the appeal is to be based. All Board of County Commissioners meetings are broadcast live and rebroadcast on ECTV, Digital Channel 58 on Cox Cable, BrightHouse and Mediacom and the Regular Board of County Commissioners Meetings beginning at 5:30 p.m. are broadcast live on WUWF Channel 4. The meetings can also be seen live via the web at <http://www.mvescambia.com>.

Legal No. 1640164 1T April 11, 2015 What's on ECTV at [www.mvescambia.com](http://www.mvescambia.com)



## StormWater Advisory Team – SWAT

### Committee Members Sign-in Sheet

April 21<sup>st</sup>, 2015

Name	Signature
District 1 - Nathan White	
District 2 - Glenn Niblock	
District 3 - Mary Gutierrez, Chair	
District 4 - Garrett Walton	
District 5 - John Cheney	
City of Pensacola - Dr. Elizabeth Benchley	
City of Pensacola - Phil Turner Vice-Chair	







# StormWater Advisory Team – SWAT

## Citizens/Public Sign-in Sheet

April 21<sup>st</sup>, 2015

Name

Address

Phone #/Email

*\* STAFF*

*HARRY T. GIBSON*

*BID - ESCAMBIA Co*

*(850) 554-2826  
htgibson@myescambia.com*

*JIM WHITE*

*BDI*

*777-6888*

*DERRIK OWENS*

*CITY of PICO LA*

*435-1645*

*DANIEL BROXSON*

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*489661*

*Chips Kirschenfeld*

*Esc. County*

*595-3449*

*\* STAFF*

*Chris Curl*

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*cacurl@myescambia.com  
595-3419*



# Storm Water Advisory Team – SWAT

April 21, 2015 Meeting Minutes

221 Palafox Place, 4<sup>th</sup> Floor Training Room

## In Attendance:

**Committee:** Mary Gutierrez, Nathan White, Glenn Niblock, Dr. Elizabeth Benchley, Phil Turner, Garrett Walton, & John Cheney

**Staff:** Colby Brown, Keith Wilkins, & Chips Kirschenfeld, Harry Gibson, Chris Curb

**Citizens:** Jim Waite, Derrik Owens, Daniel Broxson, Barbara Albrecht

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- **Welcome** – Mary Gutierrez
  - Mary Gutierrez, Chair, called the meeting to order at 4:35 p.m.
- **Verification of Meeting Advertisement** – Ms. Gutierrez verified with staff that the meeting had been advertised and staff presented Proof of Publication dated 4/11/15 in the Pensacola News Journal.
- **Approval of 03-17-15 Minutes** - Ms. Gutierrez called for approval of the March 17, 2015 minutes, John Cheney made a motion to approve, the motion was seconded by Dr. Benchley and carried unanimously.
- **City of Pensacola Drainage Study Findings**
  - Derrik Owens, City Engineer, gave a brief summary of the Drainage Study Findings which were presented at the February 25<sup>th</sup> City Council Meeting. There are four studies posted on the City's web site. The City's ultimate goal is to combine the North and South Basins into a living model. Mr. Owens stated that the City continues working out issues with the current Standards to obtain this goal. The Storm Water Master Plan will be outdated in FY'16-'17. A complete City-Wide Master Plan update (separate from tying models together) is underway. Deficiencies are being identified and sustainable recommendations are being reviewed. A 100 Year Design Storm Standard passed recently, and is soon to be adopted from 25 Year to 100 Year Standards. FEMA, FDOT, FDEP, have all requested the 100 Year Standards. Grant funding is available when the 100 Year Design Standards are used.

- **Freeboard – City & County**
  - Harry Gibson, Escambia County Floodplains Manager and Derrik Owens addressed questions regarding Freeboard standards for the City and County. Derrik Owens stated that generally, it depends on the area; the City's current A&E standard is three feet.
  
- **Baskerville Donovan, Inc. White Paper Update**
  - Daniel Broxson reviewed White Paper Project Maps stating that prioritization of Capital Improvement Program projects are based on damage assessments, the ability to permit (and probability of permitting with cost considerations), and constructability to create a weighted score. This information will be posted on the SWAT page of the County web site. 16 of the 47 basins in the south end of the County have been studied. 90% through needs assessment list is being prioritized. A draft will be available for review in June.
  - The committee raised questions for consideration related to archeology site identification and superfund sites. Mr. Broxson stated that BDI is primarily addressing flooding and that superfund sites would be viewed from more of a water quality perspective. Mary Gutierrez requested a draft be distributed and Colby Brown stated that it is still in the early stages as a working document. Phil Turner requested that the distribution be made at least one week prior to the next SWAT meeting.
  
- **Low Impact Development (LID)**
  - Garret Walton gave an overview of a prepared handout of Land Development Code recommendations the City and County should consider for LID techniques which is incentives based and aggressively moving forward. Mr. Walton stated that the proposed changes to the LDC and their storm water impacts need review (handout attached); and the State wants to be involved with funding. Mr. Walton made a motion that LID and LDC Review for Stormwater Issues be presented to the BCC, Mr. Turner seconded the motion, and the motion passed with Ms. Gutierrez abstaining.
  - Colby Brown commented that, under the direction of Joy Blackmon, Public Works Director, staff is moving forward with the creation of a Technical Advisory Committee (TAC) saying that LID is a high priority for Public Works. The TAC will be comprised of community professionals to make recommendations to the Planning Board for future changes to the LDC. Specifically addressing issues related to the Design Standards Manual. The Storm water aspect will be addressed in LDC updates. The TAC Selection Process will be brought before the BCC and will include Professional Engineers, Builders, Developers, Professional Environmental Scientists, etc.
  - Chips Kirschenfeld added that a 319 Grant from the Florida Department of Environmental Protection Agency grant proposal was submitted last week

for our region. If accepted for funding, the grant will provide funding to develop Low Impact Development Manuals for the City of Pensacola and Escambia County. The grant funds would also be used to conduct four workshops (expected in October 2015) for architects, engineers, and land use planners to discuss LID principles and how they can be incentivized in the local area.

- **April 16<sup>th</sup> BCC Meeting SWAT Representation Ratification**
  - Phil Turner was not able to represent the SWAT at the April 16<sup>th</sup> BCC meeting (2<sup>nd</sup> Public Hearing). Nathan White made a motion to ratify Mary Gutierrez, SWAT Chair, speaking on behalf of the SWAT regarding the 100 Year Storm Water Design Standards. The motion was seconded by Phil Turner, and passed unanimously.
  
- **Approval of Mary Gutierrez, SWAT Chair, Speaking Engagement at 2015 Environmental Symposium on Monday, April 27, 2015 at the UWF Commons**
  - John Cheney made a motion to approve Mary Gutierrez' speaking engagement as a representative on behalf of the SWAT at the Bay Area Resource Council's 2015 Environmental Symposium. Nathan White seconded, and all were in favor.
  
- **Approval of Mary Gutierrez, SWAT Chair, Speaking Engagement at the Gulf Coast Diplomacy Council, May 12, 2015**
  - Nathan White made a motion to approve Mary Gutierrez' speaking engagement as a representative on behalf of the SWAT at the Gulf Coast Diplomacy Council meeting on May 12, 2015. Phil Turner seconded, and the motion passed unanimously.
  
- **Public Comments**
  - Christian Wagley commented on watershed level aspects and protecting our streams and waterways. He impressed upon the SWAT the importance of developing community parks in higher density suburban area developments to help maintain watershed levels.
  
- **Old Business**
  - Phil Turner gave an update on the March 19<sup>th</sup> BCC meeting stating that this was a precursor to the BCC meeting regarding the Planning Board's recommendation to stay with a 25 Year Storm Water Design Standard.
  
- **Other Items for Consideration**
  - Review White Paper (Send to SWAT Members prior to next meeting.)
  
- **Adjourn**
  - Mary Gutierrez made a motion to adjourn; Phil Turner seconded and the meeting was adjourned at 5:50 p.m.

## STORM WATER ADVISORY TEAM RECOMMENDATIONS (4/21/15)

In an effort to advance the mitigation of future, adverse storm water impacts, the Storm Water Advisory Team recommends to both the Escambia County Board of County Commissioners, and the City of Pensacola, that, with respect to their respective land development codes, each, forthwith and with deliberateness, undertake:

- 1) Development and incorporation of appropriate low storm water impact development techniques, with particular emphasis on suitability for the more flood prone drainage basins (such as the Pensacola Bay Eastern Sub Basin) within their respective governmental boundaries, together with suitable incentives to encourage implementation of such techniques by both the private and public sectors; and
- 2) Subject any, and all, future, proposed modifications of such land development codes to a prior storm water impact analysis, with such analysis to thereafter conspicuously accompany all such modifications throughout the entirety of the formulation, review, consideration and enactment process.

# Pensacola Bay Eastern Sub-Basin 2015 Action Plan

## Stormwater Flood Reduction Recommendations

City of Pensacola | Escambia County



This diagram gives an overview of the recommendations gathered in the Sub-basin Action Plan. The actions listed on this page have originated in the basin studies, community plans and reports, and public engagement workshops held in January 2015. For more complete information read the actual Action Plan provided by the City of Pensacola and Escambia County on their respective websites.

[www.cityofpensacola.com](http://www.cityofpensacola.com) [www.myscambia.com](http://www.myscambia.com)



**A** **Develop a fully dynamic hydrologic and hydraulic model** for the entire eastern sub-basin. The right combination of projects could be phased within the model resulting in proper coordination and savings.

**B** **Delano Street Drainage Improvements** should be implemented according to the 2014 study update prepared by HDR. These projects will help to alleviate flooding throughout the sub-basin.

**C** **Englewood CRA recommendations** for Pace Blvd. & Englewood Park, include integration of green low-impact development with traditional stormwater management techniques.

**D** **The Long Hollow retention pond** no longer provides the necessary storage for stormwater run-off in this part of the City. After the Delano project is implemented, the new H&H study will offer insight into appropriate solutions for this area.

**G** **Update stormwater master plans** as needed; the City's plan dates from the late 1980's, while the County's plan dates from the early 1990's. So much development has taken place since then, and a new H&H model will inform the update process.

**I** **The Town & Country shopping center** is an under-utilized complex that would benefit from low-impact strategies, after the Delano projects have been constructed.

**K** **A joint City-County Impervious Area Plan** has been recommended by Atkins in their Long Hollow Drainage Report. Such a coordinated plan would go a long way toward reducing stormwater run-off throughout the basin in the future.

**O** **"Chain of parks" and greenway concepts** give stormwater places to go during the rain, but can be enjoyed by the public on sunny days. These project types are highly favored by the community, and should be incorporated into as many traditional projects as possible.

**E** **An on-site retention program** is a basin-wide project that includes everyone! If each property owner does their best to keep rain on their property, there will be less run-off to deal with throughout the entire basin.

**H** **The City's 2015 Downtown Drainage Study** conducted by HMM-HDR offers a number of potential solutions to downtown flooding, but recommends further coordination to bring about the best option for controlling flooding at an affordable cost.

**J** **The Tarragona Street Streambed** is a concept that might prove to be useful. A safely constructed dry streambed that can openly convey stormwater during rain events, outfalling into stormwater conveyance systems closer to the bay may help to avoid more costly underground systems.

**L** **Downtown drainage projects** can include exciting economic revitalization and community-partnerships when green infrastructure is included. The Urban Redevelopment Advisory Committee has suggested that the City should "develop and fund a streetscape program for the central core."

**P** **The historic Spring Street spring** was once the source of the San Gabriel (Washerwoman) Creek. What if this spring and creek could once again move visibly through the downtown area, with pretty streamside cafes and shops?

**M** **The San Miguel Creek** once flowed from a marsh in the eastern part of downtown, through the Gateway area. Flooding still flows along the historic path of the creek, which presents ideas for a green approach.

**Q** **The I-10 terminus** needs improvement for better traffic flow into the downtown area. This needed traffic project can be a catalyst for a number of green low-impact projects such as greenways or a chain of parks, incorporated into traditional stormwater conveyance systems.

**Recommended Policies:**

- Consider adopting a 100-year design flood event
- Consider adopting a stormwater retrofit policy
- Consider waiving or amending height restrictions under particular circumstances
- Take every opportunity to incorporate green infrastructure into local projects
- Restore or re-create historic streams wherever possible

**F** **The Palafox- Maxwell intersection** is a depressed area that holds water during even average rain events. Atkins recommends raising this intersection and surrounding roads to eliminate the sump condition.

**N** **The Aragon Court Drainage Basin Concept Report** prepared by Atkins in 2014 demonstrates the difficulty of dealing with the amount of stormwater that enters the lower portion of the sub-basin. The dynamic H&H model recommended may help to focus efforts for Aragon more effectively.

**R** **The Main Street Road Diet** proposed by the Community Redevelopment Agency sets the goal of creating a beautiful eastern gateway to the City. How attractive to enter the downtown area by crossing a perfect bridge over the restored estuary of green marshes and blue bay waters!





# Storm Water Advisory Team – SWAT

## June 16, 2015 Meeting Minutes

Central Office Complex - 3363 West Park Place, Pensacola, FL 32505

### In Attendance:

**Committee:** Mary Gutierrez, Glenn Niblock, Dr. Elizabeth Benchley, Phil Turner, Garrett Walton, & John Cheney  
**Absent:** Nathan White

**Staff:** Colby Brown, Chris Curb, Chips Kirschenfeld, Brent Wipf

**Citizens:** Ryan Weed, Jim Waite, Fred Donovan, Jr., Judy Niblock, Barbara Albrecht, Christian Wagley, Jim Hunt

- 
- **Welcome** – Mary Gutierrez, Chair, called the meeting to order at 4:35 p.m.
  - **Meeting Properly Advertised**
    - Ms. Gutierrez verified with staff that the meeting had been advertised and staff presented Proof of Publication dated 6/15/15 for the 6/13/15 advertisement in the Pensacola News Journal.
  - **Approval of 04-21-15 Minutes**
    - Ms. Gutierrez called for approval of the April 21, 2015 minutes, noting the addition of Christian Wagley in attendance of the meeting. Mr. Cheney made a motion to approve; the motion was seconded by Mr. Turner and carried unanimously.
  - **BDI White Paper Update** – Colby Brown and Ryan Weed
    - Colby Brown reviewed the timeline and schedule for the Storm Water Advisory Team. The next SWAT meeting will be held on July 21, 2015, to approve the final white paper which will then be presented to the Board of County Commissioners at their regular meeting on August 6, 2015. Mr. Brown stated that staff will work into the final paper any additional comments by the SWAT from tonight's discussion and any following comments he receives via email. Mr. Brown reviewed the layout and format of the white paper and asked for approval. Ms. Gutierrez shared her comments, requested using Low Impact "**Design**" rather than Low Impact "**Development**" throughout the paper, and then opened the floor.



- Ryan Weed asked if comments were to be included in the Low Impact Design (LID) Manual or the white paper document. Mr. Brown stated that the Technical Committee would be preparing the LID manual separately and comments could be forwarded to be included.
- Dr. Benchley asked staff if the white paper includes both the city and county. Mr. Brown responded that the initiative included the county only but that city and county coordination efforts can be included. Phil Turner stated that Derrick Owens, City Engineer, has almost completed the city's project list. Mr. Brown assured the SWAT that a draft of the white paper would be sent to Mr. Owens.
- Mr. Weed opened a discussion regarding basin studies versus flooding complaints and flood control issues, and addressed questions by the SWAT regarding flood control issues. The white paper draft was briefly reviewed page by page.
- Ms. Gutierrez asked about the selection process and scheduling for the LID Technical Advisory Committee. Mr. Brown indicated that he had discussed the process and timeline with Joy Blackmon, County Engineer. Ms. Gutierrez asked staff to include district-specific project maps for review.
- Mr. Weed stated that he is using rankings by previous consultants, for consistency, and has prepared project summaries based upon those rankings.
- Mr. Turner commented that the paper should be detailed and simplified in laymen's terms and should include references to the coordinated efforts between the city and the county, and requested that SWAT members' names also include reference to the district or agency represented.
- Mr. Turner stated that he would like to see the Aragon/Longhollow areas mentioned in the white paper since they had been discussed at previous meetings and that the city may wish to include their input and projects.
- Ms. Gutierrez added that the city's studies, which had been discussed in previous SWAT meetings, need to be mentioned in the white paper. Mr. Brown said that the Pensacola Bay Basin Study overlaps to Delano and an inclusive paragraph regarding the city's studies could be included in the body.
- Dr. Benchley expressed her concern regarding the issue of the downtown area ignoring historical wetland areas, and stated she believes the city isn't addressing engineering and development changes that are affecting flooding issues. She reiterated that she would like the matter of

archeology to be addressed in the white paper and to assure that references to city and county policies are made and implemented.

- Mr. Walton stated that the city may not be clear on their role. This was to be a joint city/county committee. He believes that the city's role, projects and studies need to be included. "The big story here is city/county cooperation. Same-source funding is crucial, surprising and good to hear."
- Mr. Brown briefed the SWAT on the Hazard Mitigation Grant Program (HMGP) grant where the city and the county overlap in the Pensacola Bay Basin, and how staff is incorporating Delano and Pensacola Bay language. He also mentioned the concerted efforts of both agencies working together to move forward projects with available grant funding.
- Mr. Walton commented that he hopes the county will not spend much money on developing a new manual since there are so many available online, and further, that all LDC changes should go through a stormwater impacts filter. Mr. Walton also said that he is not excited about more studies. He would rather see money spent on the projects that have already been identified rather than spending money studying what can be done in the future. He believes that reasonable criteria have been used, and that the county should not deviate from the consistent historical considerations and guidelines.
- Mr. Niblock stated that the county is understaffed to complete the ~\$405 million project workload. He commented that the white paper verbiage should be "punchier" and more detailed. He is concerned with the project ranking, and prefers ranking by cost plus the engineers' judgments using comparative studies in a Consumer Reports type ranking, although he understands the pressure and deadlines.
- Ms. Gutierrez asked Mr. Brown to state the Needs Assessment ranking process used. Mr. Brown responded that the guidelines used were by drainage basin studies which consist of existing and approved guidelines based on nationwide research. Ryan Weed then summarized the Needs Assessment list ranking.
- Mr. Turner added that he would like the white paper to include the number of households and/or people affected, both positively and negatively. Mr. Niblock and Ms. Gutierrez both agreed with the historical consistency and that the current list should be used based on the historical evaluations.
- Mr. Brown stated that project maps would be used, and Mr. Weed added that the top thirty ranked projects have been reviewed by the following criteria: severe flooding; water quality; and permitting problems/issues. He responded to Mr. Turner that the number of households and/or people affected is not always available in previous basin studies. Mr. Brown gave

as an example, that a single roadway washout would affect an entire neighborhood, quantities could be tied to different types of projects, but it is difficult to tie to the total number of households/people affected.

- Mr. Brown stated that the white paper would be updated with modifications from today's meeting and would then be posted to the county's web site, on the SWAT page.

- **Daylighting**

- Ms. Gutierrez brought up the topic of daylighting, based on recent and past walking tours that assessed daylighting in the downtown Pensacola area. At the first tour, Eric Meade provided several examples and resources on daylighting. Ms. Gutierrez asked if daylighting would create stormwater benefits by opening streams such as San Gabriel Creek, Washer Woman's Creek & Connect Creek that have been covered for decades. If daylighting is relevant, it should be included or at least mentioned in the white paper. Dr. Benchley added that a review should be made of ways to spread out the daylighted streams and slow down the surface water. Some creeks have been draining since 1776. There have been discussions about opening the daylighted creek on the west side of the Pensacola Bay Basin, but the east side has not been discussed. She was also under the impression that the SWAT white paper was going to include city projects.

- **Low Impact Design**

- Ms. Gutierrez expressed her concern with the time frame, asked where we stand with the LID incentive-based initiatives being brought to the Planning Board, and asked if this has to be done by the Technical Advisory Committee or if could it be done earlier and separately. Mr. Brown stated that the TAC would make recommendations to the Board of County Commissioners, and we should not "leap frog" the Planning Board.

- **Public Comments**

- Ms. Gutierrez opened the floor for public comments. (None were received.)

- **Other items for consideration**

- Agenda for July 21, 2015: White Paper Revisions Incorporated

- **Adjourn**

The meeting adjourned at 6:14 p.m.



# Storm Water Advisory Team – SWAT

## July 21, 2015 Meeting Minutes

Central Office Complex - 3363 West Park Place, Pensacola, FL 32505

### In Attendance:

**Committee:** Mary Gutierrez, Glenn Niblock, Phil Turner, Garrett Walton, & John Cheney. **Absent:** Dr. Elizabeth Benchley & Nathan White

**Staff:** Colby Brown, Chips Kirschenfeld

**Public:** Jim Waite, Christian Wagley, Barbara Albrecht, Michael Langston

- 
- **Welcome** – Chairman Mary Gutierrez
    - Chairman Gutierrez called the meeting to order at 4:31 p.m.
  - **Proof of Publication** – Ms. Gutierrez verified with staff that the meeting had been advertised on 7/11/15 and 7/18/15 in the Pensacola News Journal.
  - **Approval of 06-16-15 Minutes** - Ms. Gutierrez called for approval of the June 16, 2015 minutes. Mr. Niblock requested one minor change on page 3, in the fifth paragraph; to replace “environmental impact” with “comparative”. Mr. Cheney made a motion to approve; the motion was seconded by Mr. Turner and carried unanimously.
  - **City of Pensacola Stormwater Management Changes**
    - Ms. Gutierrez brought to the SWAT’s attention that the City of Pensacola, in recent meetings, has made changes to their stormwater policies and procedures. This information has been added to the White Paper.
  - **Whaley Avenue – City of Pensacola**
    - Ms. Gutierrez presented, for general information, that she had attended a recent City Council meeting where stormwater issues were discussed. Ms. Gutierrez raised questions regarding the Whaley Avenue property, including whether it was located in one of the sub basins and what type of

mediation was taken. She stated that she was satisfied with how the city and county are responding to these types of stormwater issues.

- Colby Brown stated that this was a localized sub basin within the city limits and that he had a discussion with Derrik Owens, City Engineer, regarding the Whaley Avenue area, and that the proposed work was primarily surface work to address erosion and rehabilitation of the area from a subsurface perspective.

- **Old Business**

- Draft Stormwater White Paper Updates & Comments
- Chairman Gutierrez reviewed her comments related to the white paper changes requested in the June meeting:
  - Change Low Impact Development to Low Impact Design in the Executive Summary and consistently throughout the document.
  - Use the LID acronym only once.
  - Expand the definition of daylighting as it relates to the White Paper. Chairman Gutierrez will submit a paragraph to Colby Brown to be included.
  - Check dates throughout the document (page 5, change April 29, 2015, to April 29, 2014; page 8, change December 2015 to December 2014 twice.)
  - Address specific District numbers.
  - The city needs assessment list is being added to the White Paper.
  - Expand Basin Studies to include the city basin studies in the White Paper and reference the city's web address.
  - Ensure that city and county archeological projects are added.
  - Page 8, change grass roofs to green roofs.
  - Include comments regarding city/county collaboration.
- Mr. Turner requested that a city council district map be included. Colby Brown said he would check on acquiring the map.
- Mr. Niblock noted that he had seen much improvement in the document. Using highlighted pages from the draft White Paper, he suggested that recommendations be summarized and then allow for additional reading using links to expanded information.

- **Public Comments**

- Ms. Barbara Albrecht, (1528 E. Brainerd Street, Pensacola), inquired as to the total cost for all identified projects; and if these projects have been prioritized. Mr. Brown responded that a combined total had not been generated and that the projects have been prioritized.

- **Other Items for Consideration**

- August 13th, 2015, Committee of the Whole Presentation of Final White Paper
  - Mr. Brown reviewed the SWAT schedule, including deadlines, and briefly discussed the presentation of the Final White Paper to the Committee of the Whole on August 13, 2015.
- Ms. Gutierrez then opened the floor for questions.
- Mr. Niblock asked how to go about and who is in charge of obtaining funding for the high priority projects, and if a funding discussion could be added to the agenda of a future meeting. Colby Brown and Chips Kirschenfeld both briefed the SWAT on available funding sources such as: Local Option Sales Tax (LOST) Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies Act (RESTORE), National Resource Conservation Service (NRCS), Emergency Watershed Program (EWP), and the Hazard Mitigation Grant Program (HMGP).
- Ms. Gutierrez inquired about the length of service of the SWAT. Mr. Brown responded that the resolution did define the goal of the committee and that the Board of County Commissioners would ultimately need to sunset the committee. He suggested that the August Committee of the Whole would be a good time to discuss this issue.

- **Adjourn**

- Having no further questions, Chairman Gutierrez called to adjourn the meeting at 5:25 p.m.

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 **BASKERVILLE-DONOVAN, INC.**  
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BDI Job Number: 25899.02