CITY OF ALTAMONTE SPRINGS
COMMISSION AGENDA
MARCH 15, 2016

7:00 P.M. REGULAR MEETING
INVOCATION
PLEDGE OF ALLEGIANCE
APPROVAL OF MINUTES OF REGULAR MEETING OF MARCH 1, 2016
APPROVAL OF MINUTES OF SPECIAL MEETING OF MARCH 4, 2016
INFORMAL COMMUNICATIONS FROM THE FLOOR

1.	**PUBLIC HEARING**		**Resolution 1322-** Adoption of Seminole County Floodplain Management Plan
2.	**REQUEST FOR APPROVAL**		Reappointment of Commissioner Sarah Reece to Seminole County Community Service Block Grant Advisory Board
3.	**FINANCE ITEMS**	**A.**	**Orange Avenue & West Town Parkway Utility Extension, contract BVP14-156** - Approve utilizing Polk County's contract with Killebrew, Inc. for the Orange Avenue and West Town Parkway utility extension in the amount of $224,926.46.

Persons with disabilities needing assistance in participating in any of these proceedings should contact the City Clerk Department ADA Coordinator 48 hours in advance of the meeting at 407-571-8122 (Voice) or 407-571-8126 (TDD).

Persons are advised if they wish to appeal any decision made at the hearing/meetings, they will need to ensure that a verbatim record of the proceedings is made which includes the testimony evidence upon which the appeal is to be based, per Chapter 286.0105, Laws of Florida. The City of Altamonte Springs does not provide this verbatim record.

REGULAR MEETING OF THE CITY COMMISSION

MARCH 1, 2016

Pursuant to due notice, a regular meeting of the Commission of the City of Altamonte Springs, Seminole County, was held at 225 Newburyport Avenue, in said City on March 1, 2016 at 7:00 p.m.

PRESENT WERE:	Mayor Bates, Commissioners Hussey, Reece, and Wolfram.		
ABSENT WERE:	Commissioner Batman		
ALSO PRESENT WERE:	Frank Martz	-	City Manager
	Skip Fowler	-	City Attorney
	Erin O'Donnell	-	City Clerk

The meeting was called to order by Mayor Bates at 7:00 p.m.

INVOCATION:

PLEDGE OF ALLEGIANCE

APPROVAL OF MINUTES

Motion: Moved by Commissioner Wolfram, seconded by Commissioner Hussey, to approve the minutes of the regular Commission Meeting of February 16, 2016 as presented. Motion carried unanimously.

INFORMAL COMMUNICATION FROM THE FLOOR: None

1. REQUEST FOR APPROVAL Reduction of Code Enforcement Fines for 612 Majorca Avenue (Bank of New York Mellon)

Jennifer Ngoie, representing the Bank of New York Mellon, addressed the Commission and explained she was there to make a motion to reduce or release the Code Enforcement fines on the property.

Frank Martz informed the Commission he did speak with Ms. Ngoie earlier and explained that the bank is in a difficult spot. The bank is the mortgage holder for the past owner who let the property fall into disrepair, and the bank stepped in and began cleaning up the property before foreclosure was completed. Mr. Martz explained that in a typical situation where the owner was not responsible for the violations, we have considered reducing the fine by 1/3 and leaving the lien in place. After a certain amount of time, with no code enforcement actions, the lien is then released.

Mr. Martz recommended a little different action to the Commission, one that reduces the fine by 1/3 to $26, 130.65 and to waive the remainder. Mr. Martz commented that it is the City's best interest to also release the lien, which would not cloud the title and make it easier to sell the property. Mr. Martz stated that he had discussed the situation with Mr. Ngoie and she appears to be in agreement. Mr. Martz reiterated his recommendation to Commission to reduce the fine to $26,130.65, waive the remainder of the fine, and if payment is received within 45 days, the lien would be released.

Commissioner Reece asked if the property was vacant and asked for clarification that the bank is the owner. Ms. Ngoie confirmed that the property is vacant and the bank is the owner. Commissioner Reece then asked what if the property does come out of compliance after the fine is paid, and Mr. Martz explained it would just go back as a normal Code Enforcement violation.

Motion: Moved by Commissioner Wolfram, seconded by Commissioner Hussey to reduce the fine amount to $26,130.65 and release the lien if payed within 45 days.

2. REQUEST FOR APPROVAL Waive Formal Solicitation and Authorize the Purchase of Additional Professional Consulting Services Related to the Mobility Fee Program

Motion: Moved by Commissioner Hussey, seconded by Commissioner Wolfram to waive the formal solicitation process and authorize the purchase of additional professional consulting services and not to exceed $24,000.00 for Nue Urban Concepts to finalize the mobility ordinances and assist with the adoption of mobility fees. Motion carried unanimously.

3. FINANCE ITEMS

A. **Emergency Repair and Replacement of Sanitary Force Main at Interstate 4 and Northlake Boulevard** – Approve Change Order No. 1 for Killebrew, Inc. in the amount of $19,801.00

B. **Change Order No. 2 - Spring Oaks East–Pre-Chlorinated Pipe Bursting with Site Restoration, Contract #AB15028A01** - Approve Change Order No. 2 for Murphy Pipeline Contractors Inc. for a reduction of $67,877.65

C. **Regional Water Reclamation Facility Headworks Improvements Amendment 1 – Atkins North America, Inc. Engineering Services, Contract No. RFP14006** – Approve Regional Water Reclamation Facility Headworks Improvements Amendment 1 with Atkins North America, Inc. Engineering Services in the amount of $58,913.40

D. **ITB-16-011-CE – Bio-Solid Transportation and Disposal-Annual Requirements** – Award ITB-16-011-CE to Compost USA of Sumter County in the bid amount of $445,900.00

E. **Repair of Water Main Pipe located between Oakland Road and Glen Arden Way** - Approve the repair of a water main pipe by Murphy Pipeline Contractors Inc. in the amount of $50,685.01.

Motion: Moved by Commissioner Reece, seconded by Commissioner Hussey to approve finance items A-E. Motion carried unanimously.

INFORMAL COMMUNICATION FROM THE FLOOR: None

REPORTS:

CITY ATTORNEY- None

CITY CLERK- None

CITY MANAGER

Recognized the Information Services group for being very progressive and innovative. Mr. Martz stated the group recently won five GIS related awards from the Public Technology Institute in areas of Public Safety, Sustainability, Data and Performance Metrics and Community Resilience. In addition, they also won five Achievement Awards.

Mr. Martz complimented Shelley Nooft, Leisure Services Director and her group for an outstanding Opening Day of baseball for the Altamonte Springs Babe Ruth League and Altamonte Springs Baseball Academy. Mr. Martz mentioned that registration is up and how wonderful it was to see the Buddy Ball group. Mr. Martz mentioned several employees from Ms. Nooft's group for their great effort and work.

Mr. Martz also mentioned that he walked Cranes Roost that morning, and that the board walks are now open. He was very thankful of the staff for their hard work. He also stated that the park will not be completely finished until June and that walkers are directed around some areas, but it looks great. He encouraged the Commission to get out and walk the park, and to notice where the City is now compared to 25 years ago.

COMMISSIONER REECE

Thanked the Recreation Department for their work on Opening Day. She thanked Daniel Yarborough, Richard Handwerk, and Ryan Thompson for helping get the "Buddies" for Buddy Ball, which included help from softball and Bath Ruth players. She also thanked Brighthouse for their donation and commitment.

COMMISSIONER HUSSEY

Echoed Commissioner Reece's comments and also recognized Brighthouse for being such and outstanding partner with the City. Mr. Martz mentioned that Brighthouse has also helped with Science Incubator and that they are a very willing partner.

COMMISSIONER WOLFRAM

Commented on all the hard work being done at Cranes Roost, noting that people questioned how to get it all done, but it is getting done.

MAYOR BATES

Mayor Bates asked to send her congratulations to the IS Department on their achievements. The Mayor also mentioned all the compliments she received for Opening Day. She added how great the park is looking.

The meeting adjourned at 7:19 p.m.

ATTEST:

_____ _____

MAYOR CITY CLERK

SPECIAL MEETING OF THE CITY COMMISSION

MARCH 4, 2016

Pursuant to due notice, a special meeting of the Commission of the City of Altamonte Springs, Seminole County, was held at 225 Newburyport Avenue, in said City on March 4, 2016 at 9:00 a.m.

PRESENT WERE:	Mayor Bates, Commissioners Batman, Hussey, Reece, and Wolfram (who arrived late and did not vote but was present for discussion)		
ALSO PRESENT WERE:	Frank Martz	-	City Manager
	Skip Fowler	-	City Attorney
	Erin O'Donnell	-	City Clerk

The meeting was called to order by Mayor Bates at 9:00 a.m.

INVOCATION:

PLEDGE OF ALLEGIANCE

INFORMAL COMMUNICATION FROM THE FLOOR: None

Mr. Martz started the special meeting by discussing the items on the agenda in greater detail. He noted that the contract between the City of Altamonte Springs and Uber Technologies is before them this morning and Christine Mitchell of Uber is in Chambers. More than a decade ago, the City embarked on a cutting edge project to make transit convenient called FlexBus. Unfortunately, the story didn't end well but the City has always been willing to look for ways to help the residents and businesses of our City. Ride-hail technology like Uber is here to stay and it's a good fit for us based on their desire to innovate and operate which we can learn from.

The pilot program before them is for a year and will cost us about a third of what was the projected expense for operating FlexBus. Working with the private sector has its advantages, and we took an opportunity to find a company that mirrors our willingness to succeed. The City started to meet with Uber back in the fall and with their approval, this will be the first fully integrated city in America. This means that even though Uber has a variety of other partnerships with cities, counties, and schools, this will be the first time they've partnered with someone to provide citywide mobility.

The second item is a resolution to help with mobility by incentivizing private taxi cab companies who currently pay for Business Tax Receipts and then relieving network technology providers (Uber) from obtaining a Business Tax Receipt during this pilot program.

He entertained any questions from the Commission at this time and invited Christine Mitchell of Uber to address the Commission. Ms. Mitchell stated that Mr. Martz covered their partnership well but she added that she was

excited to work with the first city to offer broad spread mobility. It's been a pleasure working with Mr. Martz and his team to enable more people in the City to have access to safe and reliable transportation at the tap of a button. She thanked the Commission for having her here and was able to answer any other questions.

Mayor Bates thanked her for being there. Commissioner Hussey added that he looks forward to this partnership. Commissioner Reece wanted to know about the marketing of Uber to our residents. Mr. Martz replied that they are launching this on March 21st and in the meantime, Uber is working on all the hardware and technology they need to provide us billing services. We are going to continuously work our current methods of media (newsletter, social media platforms, etc.) as well as partner with local businesses and Seminole State College to promote the accessibility and ease of the program. Uber is also going to market it and help the branding across all platforms. Commissioner Reece asked if that they'd be marketing it to large employee businesses like Florida Hospital. Mr. Martz added that the City has very strong private partners who care about the community and Florida Hospital has contributed close to $50,000.00 towards this program.

There being no further questions, the Commission continued to the agenda for motions and any further discussions.

1. REQUEST FOR APPROVAL Pilot Project Agreement with Uber

Motion: Moved by Commissioner Hussey, seconded by Commissioner Batman to approve the pilot project agreement. Motion carried unanimously.

2. PUBLIC HEARING **Resolution 1323**- Authorizing a Transportation Incentive Program

No members of the public appeared before the Commission.

Motion: Moved by Commissioner Reece, seconded by Commissioner Batman to pass and adopt Resolution 1323. Commissioner Batman – yes; Commissioner Hussey – yes; Commissioner Reece – yes; Mayor Bates – yes. Motion carried 4-0.

INFORMAL COMMUNICATION FROM THE FLOOR: None

REPORTS:

CITY ATTORNEY- None

CITY CLERK- None

CITY MANAGER
Extended his congratulations to the Commission.

COMMISSIONER BATMAN
Extended his thanks to Mr. Martz and Ms. Mitchell.

COMMISSIONER HUSSEY
Only wanted to add that this was a proud day in Altamonte Springs.

COMMISSIONER REECE
Commented that she heard the announcement of this partnership on the radio on her way in. Mr. Martz added that several significant news and media outlets have picked up the story and he feels that one of the significant advantages of this partnership is for others to piggyback on the program and embrace technology and different ways to think.

COMMISSIONER WOLFRAM
Echoed Commissioner Hussey's comments.

MAYOR BATES
Stated she was happy to start this partnership and wishes it much success. She will now have to wait till the announcement later in the morning at 10 a.m.

Mr. Martz closed the meeting by stating that one of the most distinctive indicators of forward thinking are the number of people who line up against it.

The meeting adjourned at 9:09 a.m.

ATTEST:

_____ _____

MAYOR CITY CLERK

Meeting Date: March 15, 2016 From: FOR ET Ed Torres, Director of Public Works and Utilities Approved: _____ Franklin D. Martz, II, City Manager	***Official Use Only*** Commission Action: _____ City Manager: _____ Date: _____

SUBJECT: Resolution 1322 – Adoption of the Floodplain Management Plan to supplement Seminole County's Local Mitigation Plan.

SUMMARY EXPLANATION & BACKGROUND:
The Floodplain Management Plan (FMP) is to be adopted to supplement Seminole County's Local Mitigation Strategy (LMS) and provides Seminole County and all municipalities within the County with a blueprint for reducing the impacts of these flood hazards on people and property.

This plan is the first FMP for Seminole County that includes all municipalities. Adoption of the FMP by the City of Altamonte Springs fulfills the federal mitigation planning requirements and qualifies for Community Rating System (CRS) credit. The FMP is a living document that will continue to be updated and adopted by the County and its municipalities every five years.

FISCAL INFORMATION: N/A

RECOMMENDED ACTION: Approve Resolution 1322 – Adoption of the Floodplain Management Plan to supplement Seminole County's Local Mitigation Plan.

Initiated by, Ed Torres, Public Works

RESOLUTION NO. 1322

A RESOLUTION OF THE CITY OF ALTAMONTE SPRINGS, FLORIDA, ADOPTING THE 2015-2020 FLOODPLAIN MANAGEMENT PLAN FOR SEMINOLE COUNTY AND ITS MUNICIPALITIES; PROVIDING FOR IMPLEMENTATION, CONFLICTS, SEVERABILITY AND FOR AN EFFECTIVE DATE.

WHEREAS, the City of Altamonte Springs has adopted an emergency management plan that incorporates preparation, response and recovery efforts to natural and man-made disasters; and

WHEREAS, an important component of the City's emergency management plan is the Floodplain Management Plan; and

WHEREAS, the City has recognized that a common and anticipated disaster caused by flooding from storm events can result in substantial disruption of utilities, services, transportation as well as property damage, and that mitigation practices incorporated by planning efforts reduces the potential negative impact of such storm events; and

WHEREAS, the City participates with Seminole County and the other municipalities in Seminole County in implementing a regionalized approach towards disaster response including mitigation techniques; and

WHEREAS, the City of Altamonte springs has participated in the development of the 2015-2020 Floodplain Management Plan for Seminole County and its Municipalities; and

WHEREAS, the adoption of the Floodplain Management Plan also provides credit towards the National Flood Insurance Program (NFIP) and financial insurance savings to the consumers; and

WHEREAS, the Federal Government has implemented new standards in the Code of Federal Regulation (C.F.R.) and the Floodplain Management Plan complies with the Federal Hazard Mitigation Planning Standards contained in 44 C.F.R. Part 201 (2015).

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COMMISSION OF THE CITY OF ALTAMONTE SPRINGS, FLORIDA, AS FOLLOWS:

SECTION 1. Adoption of Floodplain Management Plan. The City Commission hereby adopts the 2015-2020 Floodplain Management Plan for Seminole County and its Municipalities, attached as **Exhibit "A"**.

SECTION 2. Implementation. The City Manager or his designee is hereby authorized and directed to take such actions as he may deem necessary and appropriate in order to implement the provisions of this Resolution.

SECTION 3. Conflicts. All Resolutions or parts of Resolutions in conflict with any of the provisions of this Resolution are hereby repealed.

SECTION 4. Severability. If any Section of portion of a Section of this Resolution proves to be invalid, unlawful, or unconstitutional, it shall not be held to invalidate or impair the validity, force or effect of any other Section or part of this Resolution.

SECTION 5. Effective Date. This Resolution shall become effective immediately upon its passage and adoption.

PASSED AND ADOPTED by the City Commission of the City of Altamonte Springs this 15th day of March, 2016.

_____
PAT BATES, MAYOR
City of Altamonte Springs, Florida

ATTEST:

_____
ERIN O'DONNELL, CITY CLERK

Approved as to form and legality
for use and reliance of the City
of Altamonte Springs, Florida

_____
JAMES A. FOWLER, CITY ATTORNEY

EXHIBIT “A”

2015-2020 FLOODPLAIN MANAGEMENT PLAN FOR SEMINOLE COUNTY AND ITS MUNICIPALITIES

(ATTACH SAME)

Floodplain Management Plan

---

for

Seminole County

And its

Municipalities

SEMINOLE COUNTY

FLORIDA'S NATURAL CHOICE

2015-2020

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1 Introduction

The Problem: Seminole County, Florida, is subject to natural hazards that threaten life and health and that have caused extensive property damage. Floods inundated the County following Tropical Storm Fay in 2008, following Hurricane Frances in 2004, and Tropical Storm Gabrielle in 2001. Extensive flooding occurred in 1960 after Hurricane Donna brought heavy rainfall. During the summer of 1953, rainfall over the St. Johns River basin was above normal, and when a tropical storm passed nearby, bringing additional heavy rainfall, Lake Monroe flooded lakefront areas. To better understand these hazards and their impacts on people and property, and to identify ways to reduce those impacts, the County's Department of Public Safety undertook this Floodplain Management Plan as an appendix to the County's Local Hazard Mitigation Strategy (LMS).

"Hazard mitigation" does not mean that all hazards are stopped or prevented. It does not suggest complete elimination of the damage or the disruption caused by such incidents. Natural forces are powerful and most natural hazards are well beyond our ability to control. Mitigation does not mean quick fixes. It is a long-term approach to reducing hazard vulnerability. As defined by the Federal Emergency Management Agency (FEMA), "hazard mitigation" means any sustained action taken to reduce or eliminate the long-term risk to life and property from a hazard event.

Why Plan: Every community faces different hazards and every community has different resources to draw upon in combating problems and different interests that influence the solutions to those problems. Because there are many ways to deal with flood hazards and many agencies that can help, there is no one solution for managing or mitigating their effects. Planning is one of the best ways to develop a customized program that will mitigate the impacts of hazards while taking into account the unique character of a community. The plan provides a framework for all interested parties to work together and reach consensus on how to move forward. A well-prepared flood mitigation plan will ensure that all possible activities are reviewed and implemented so that the problem is addressed by the most appropriate and efficient solutions. It can also ensure that activities are coordinated with each other and with other goals and activities, preventing conflicts and reducing the costs of implementing each individual activity.

This Floodplain Management Plan was developed under the guidance of a Floodplain Management Planning Committee (FMPC). The Committee's representatives included representatives of Seminole County departments, interested municipalities, federal and state agencies, citizens, and other stakeholders. All municipalities in the County were also invited to attend and participate in the planning process.

Mitigation activities require funding. A mitigation plan is now a requirement for Federal mitigation funds. Section 104 of the Disaster Mitigation Act of 2000 (42 U.S.C. 5164) states that as of November 1, 2003, local governments applying for pre-disaster mitigation funds must have an approved local mitigation plan. Similarly, as of November 1, 2004, a plan is also needed for

post-disaster mitigation funds under the Hazard Mitigation Grant Program. These requirements are detailed in 44 Code of Federal Regulations Part 201.

Thus a mitigation plan will both guide the best use of mitigation funding and meet the prerequisite for obtaining such funds from FEMA. FEMA also recognizes plans through its Community Rating System (CRS), a program that reduces flood insurance premiums in participating communities.

This Plan: This Floodplain Management Plan identifies activities that can be undertaken by both the public and the private sectors to reduce safety hazards, health hazards, and property damage caused by floods. The Plan fulfills the federal mitigation planning requirements, qualifies for CRS credit, and provides the County with a blueprint for reducing the impacts of these flood hazards on people and property.

1.1 Planning Approach

This Floodplain Management Plan is the product of a rational thought process that reviews alternatives and selects and designs those that will work best for the situation. This process is an attempt to avoid the need to make quick decisions based on inadequate information. It provides carefully considered directions to the County government by studying the overall damage potential and ensuring that public funds are well spent.

1.1.1 Planning Committee

This Flood Hazard Mitigation Plan was developed under the guidance of the FMPC with oversight from the Department of Public Safety. The Committee includes representatives from the County and other local, state and federal agencies that serve Seminole County and private citizens and other stakeholders. The member organizations and participants who were members of the FMPC are shown in Table 5 in section 2.1.1 of this plan. The FMPC met and developed the plan from May 2015 to August 2015. Sign-in sheets from these meetings are shown in Appendices E through H. The plan development included identifying the unique flood risks that affect the County, identifying mitigation actions for these risks, and discussing how to involve the public in the development of the plan.

Technical support for the development and implementation of the Floodplain Management Plan is provided by the Seminole County Office of Emergency Management and Development Services.

1.1.2 Planning Process

The Floodplain Management Planning Committee followed the CRS 10-Step Planning Process, based on the guidance and requirements of FEMA and the 2013 *CRS Coordinator's Manual*. The process is explained in further detail in Chapter 2 – Planning Process.

1.1.3 Public Involvement

Step 2 of the planning process was to obtain input from the public, particularly residents and businesses that have been affected by natural hazards. The public was invited to participate in the process through any or all of the following ways:

- Attending and participating in meetings of the FMPC. five meetings were held over a four-month period.
- Contact with committee members.
- Public meetings held at the beginning of the planning process to inform the public of the planning process and obtain comments on the flood hazards and a public meeting at the end of the planning process to gain comments on the draft plan.

Examples of these public involvement measures are included in Appendices B, D and E.

1.1.4 Coordination

Existing plans and programs were reviewed during the planning process. During the planning process, contacts were made with a variety of regional, state and federal agencies and organizations. Many of these agencies were members of the FMPC and provided review of and support for this planning effort.

Seminole County also coordinated with representatives from the municipalities in the County, who were invited to participate and attend the FMPC meetings. Citizens representing various areas of the County were members of the FMPC and provided valuable support. At the end of the planning process, these same agencies and organizations reviewed the draft plan and provided feedback.

1.1.5 Hazard Assessment and Problem Evaluation

The Committee addressed Steps 4 and 5 of the planning process (Assess the Hazard and Evaluate the Problem) during meetings of the Committee. The Committee's assessment and evaluation of the flood hazard are covered in the meeting minutes of the FMPC, which can be found in Appendix B of this plan. The FMPC evaluated flooding data, including localized drainage, repetitive loss, hurricanes and tropical storms.

1.1.6 Goals

The Committee conducted goal setting exercises at one of its meetings. During the meeting, a list of potential goals was discussed and then the Committee agreed upon a final list of goals and objectives. These goals and objectives are discussed in Chapter 4 of this plan.

1.1.7 Mitigation Strategies

The FMPC considered everything that could impact the flood hazards and reviewed a wide range of possible alternatives. They are organized under six general strategies for reaching the goals. These strategies are the subject of Chapters 5 – 10 of this plan.

- Preventive Measures: zoning, building codes and other development regulations
- Property Protection Measures: relocation out of harm's way, retrofitting buildings, etc.
- Natural and Beneficial Functions: preserving natural areas to protect species and habitats or developing in ways that are more protective of species and habitats
- Emergency Services: warning, response, evacuation
- Structural Projects: levees, reservoirs, channel improvements

- Public Information: outreach projects, technical assistance to property owners, and other measures

1.1.8 Action Plan

After reviewing the various alternatives, the Committee drafted an action plan to identify recommended projects, parties responsible for each of the projects, and a schedule for project completion. The action plan is included in Chapter 11 of this document.

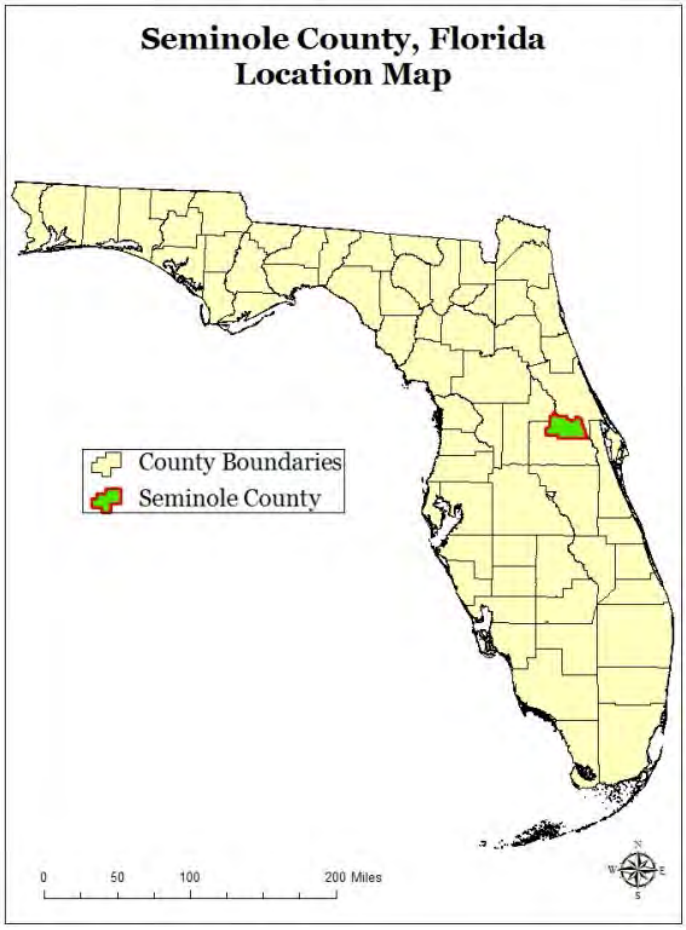
It should be noted that this Plan only serves to recommend mitigation measures. Implementation of these recommendations depends on the adoption of this Plan by the Seminole County Board of County Commissioners.

1.2 Topography and Land Use

Seminole County is located in the central part of Florida and is part of the Orlando-Kissimmee-Sanford Metropolitan Statistical Area. The City of Sanford is the county seat. Seminole County covers 345 square miles, 37 square miles of which is water. The floodplains of Seminole County consist of lowlands adjacent to streams and lakes. The topography of the County is relatively flat, with some gently rolling hills. Ground elevations in Seminole County range from less than five feet North American Vertical Datum of 1988 (NAVD) to 130 feet NAVD.

The City of Sanford, the county seat, is located on the southern shore of Lake Monroe in the northern part of the County. In the southwestern part of the County are the Cities of Longwood, Winter Springs, Casselberry and Altamonte Springs. The City of Oviedo is in the south central portion of the County. The City of Lake Mary borders Sanford, in the western part of the County.

Figure 1: Seminole County Location Map



Seminole County's climate is characterized by long, warm summers and mild, dry winters. The average annual rainfall is about 51 inches. The majority of the rain falls from June through September and is associated with tropical storms or depressions which means that precipitation for any given month can vary greatly from year to year.

Seminole County is bounded on the north and east by the St. Johns River and on the west primarily by the Wekiva River. The St. Johns River is brackish. There are many lakes in Seminole County, and more than 120 of these are larger than five acres. Most occur in karst areas on the sand ridges. In addition to Lake Monroe which straddles the northern border of the County, Lake Jesup bisects much of the northern half of the County and Lake Harney sits along the County's eastern border.

Seminole County's physiography consists of alternating ridges and valleys with abundant

lakes. According to the USDA's Soil Survey of Seminole County, Florida,

"The Osceola Plain is a broad, flat area of low, local relief and is generally between 60 and 70 feet in elevation. Most of the western part of the county is made up of this plain. The Orlando Ridge is an area of higher elevation that is generally parallel to the other surrounding ridges outside of Seminole County, such as the Mount Dora Ridge to the west. It is possible that the Orlando Ridge once was part of a relic, 'Cape Orlando,' which resulted from progressive progradation that formed Cape Canaveral and False Cape in Brevard County from marine processes. The northern tip of the Orlando Ridge extends a few miles into Seminole County in the area of Altamonte Springs.

The Eastern Valley is generally 20 to 25 feet in elevation and is characterized by a broad, flat area through which the St. Johns River flows. Most of the eastern part of Seminole County is composed of this valley. The Wekiva Plain is a flat area in western Seminole County dominated by the Wekiva River. In eastern Seminole County, the Geneva Hill is a high area in the Eastern Valley in the vicinity of Geneva."

In terms of geology, Seminole County is underlain by a thick sequence of limestone and dolostones upon which a relatively thin section of sand, silt, shell material and clay was deposited.

According to the USDA's Soil Survey of Seminole County, Florida, there are 10 soil map units in Seminole County, described below.

Mineral soils on the uplands:

1. *Urban Land-Pomello-Paola.* This unit is about 4% of Seminole County and consists of moderately well drained and excessively drained soils that are sandy.
2. *Urban Land-Astatula-Apopka.* This unit is about 22% of Seminole County, and is more than half urban land. The rest is excessively drained soils that are sandy and well drained sand soils that have a loamy subsoil.
3. *Urban Land-Tavares-Millhopper.* The soils in this unit are moderately well drained and sandy or have a loamy subsoil. This unit covers 23% of the County.

Mineral soils on the flatwoods and in sloughs and depressions between the upland ridges and the floodplains, depressions and swamps:

4. *Myakka-EauGalle-Urban Land.* These are poorly drained soils that are sandy or have a loamy subsoil. This unit covers 24% of the County.
5. *St. Johns-Malabar-Wabasso.* This unit makes up 8% of Seminole County. These soils in the central part of the County are poorly drained and sandy or have a loamy subsoil.
6. *Basinger-Smyrna-Delray.* These soils, covering about 7% of the County, are poorly drained and very poorly drained soils that are sandy throughout or have a loamy subsoil.

Mineral and organic soils on the floodplains and in depressions and swamps:

7. *Nittaw-Felda-Floridana.* These are very poorly drained and poorly drained mineral soils;

some with a clayey subsoil and some sandy with a loamy subsoil. They exist on floodplains and in depressions and make up about 4% of the County.

8. *Nittaw-Okeelanta-Terra Cela.* The soils in this unit, which covers about 4% of the County, are on the floodplains adjacent to Lake Monroe and Lake Jesup and subject to frequent flooding. They are very poorly drained mineral and organic soils, some are mucky with a clayey subsoil, some are mucky with a sandy layer, and some are mucky throughout.
9. *Brighton-Samsula-Sanibel.* These soils are south of Lake Jesup and are ponded. They are very poorly drained organic and mineral soils. They make up about 1% of the County. Some are mucky throughout, some are mucky and have a sandy layer beneath, and some are sandy throughout. They exist in depressions and swamps.
10. *Pompano-Nittaw-Basinger.* The soils in this map unit are in floodplains adjacent to the Wekiva, St. Johns and Econlockhatchee Rivers and Lake Jesup. They make up about 3% of the county, and are poorly drained and very poorly drained mineral soils, some are sandy throughout and some are mucky with a clayey subsoil.

The Floridian Aquifer underlies all of Seminole County and supplies at least 95 percent of the County's freshwater. Most of the County's soils are sandy and low in natural fertility, but they support forests and wildlife. In addition, ornamental plants, vegetables and other plant products are grown in the County

1.3 Development, Redevelopment and Population Trends

Seminole County's convenient location between Volusia and Orange Counties has made it one of the fastest growing counties in Florida. The Seminole County 2008 Comprehensive Plan has certain goals for future development. The goals and objectives outlined in the Future Land Use Section are:

- Protection and preservation of the environment, including water resources, air quality, regionally significant natural areas, open space and recreational areas;
- Creation and support of diverse, globally competitive economic conditions favorable to higher wage jobs;
- Provision of a range of affordable housing opportunities and choices;
- Provision of adequate services and facilities, including a variety of transportation choices;
- Maintenance of established residential neighborhoods, revitalization of declining neighborhoods and creation of new energy-efficient communities with education, health care and cultural amenities;

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- Maintenance of established residential neighborhoods, revitalization of declining neighborhoods and creation of new energy-efficient communities with education, health care and cultural amenities;
- Protection of rural and agricultural areas; and
- Protection of property rights.

Chapter 3 provides information on the number and location of building permits issued in Seminole County between January of 2005 and September of 2010. During this time period more than 5,000 building permits were issued for single-family, multi-family, commercial and government buildings. The table to the right from the Seminole County Comprehensive Plan indicates the various land use categories and the acreage for each. The map on the following page identifies future land use proposed for Seminole County.

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- Protection of property rights.

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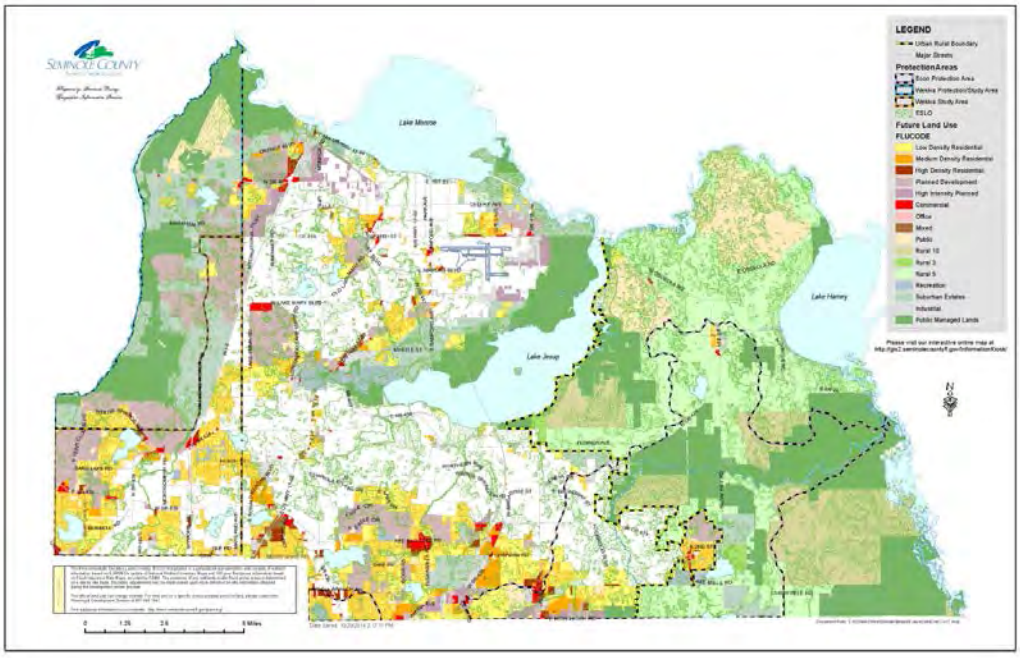
Table 1: Acres of Land by Land Use Category

Existing Land Use Categories	*Acres*	*Percent*
Residential Single Family	54,059	29%
Agriculture	30,117	16%
Managed Environmental Land	27,170	14%
Dedicated Common Open Space	13,902	7%
Vacant Other	12,877	7%
Public	11,026	6%
Public Other	4,499	2%
Residential Multifamily	4,462	2%
Residential Mobile Home	3,966	2%
Commercial	3,832	2%
Vacant Residential	3,659	2%
Vacant Commercial	2,942	2%
Transportation	2,669	1%
Industrial	2,538	1%
Institutional	2,531	1%
Recreation	2,295	1%
Education	1,906	1%
Office	1,801	1%
Vacant Industrial	1,172	1%
Hotel/Motel	143	0%
Vacant Institutional	91	0%
TOTAL *(Includes city acres)*	187,657	100%

There has not been a significant amount of re-development within Seminole County. All development must follow the guidance of the Comprehensive Plan and must comply with all current floodplain management regulations.

Figure 2: Seminole County Future Land Use Map



1.4.1 Population Trends

In 2014, the estimated population of Seminole County was 431,044 people, a 4.3% increase over the year 2009 population. According to the Orlando Economic Development Commission, the population of Seminole County is expected to increase to 465,128 people by 2020, a 7.3% increase in the next five years. By 2025, the population is expected to increase another 5%, to 488,075 people. These figures include both the incorporated and unincorporated areas of the County. The Seminole County Comprehensive Plan indicates the population for the unincorporated portion of the County in 2025 will be approximately 255,075.

1.5 The Community Rating System

FEMA's National Flood Insurance Program (NFIP) administers the CRS. Under the CRS, flood insurance premiums for properties in participating communities are reduced to reflect the flood protection activities that these communities are implementing. This program can have a major influence on the design and implementation of flood mitigation activities, so a brief summary is provided here.

A community receives a CRS classification based on the credit points it receives for activities. It can undertake any mix of activities that reduce flood losses, such as enhanced mapping, regulatory changes, public information programs, flood damage reduction, or flood warning and preparedness programs. There are 10 CRS classes: class 1 requires the most credit points and

gives the largest premium reduction; class 10 receives no premium reduction (see Table 3). A community that does not apply for the CRS or that does not obtain the minimum number of credit points is a class 10 community. On May 1, 2011, the County was rated a Class 6 and policy holders within the SFHA enjoy a 20 percent reduction on the cost of flood insurance.

Table 2: Community Rating System Premium Reductions

Class	Points	Premium in Floodplain	Reduction Outside Floodplain
1	4500+	45%	10%
2	4,000-4,499	40%	10%
3	3,500-3,999	35%	10%
4	3,000-3,499	30%	10%
5	2,500-2,999	25%	10%
6	2,000-2,499	20%	10%
7	1,500-1,999	15%	5%
8	1,000-1,499	10%	5%
9	500-999	5%	5%
10	0-499	0%	0%

1.5.1 Program Incentive

The CRS provides an incentive not just to start new mitigation programs, but to keep them going. There are two requirements that encourage a community to implement flood mitigation activities. First, the County will receive CRS credit for this plan, once it is adopted. To retain that credit, the County must submit an evaluation report on progress made towards implementing this plan to FEMA by October 1st of each year. That report must be made available to the media and to the public. Second, the County must annually recertify to FEMA that it is continuing to implement its CRS credited activities. Failure to maintain the same level of involvement in flood protection can result in a loss of CRS credit points and a resulting increase in flood insurance rates to residents.

It is expected that this undesirable impact of loss of CRS credit for failure to report on the plan's progress or for failure to implement flood loss reduction projects will be a strong incentive for the County to continue implementing this plan in dry years when there is less interest in flooding.

1.5.2 Benefits of CRS Participation

Table 4 below shows the direct dollar benefit to Seminole County and the County's policy holders for participation in the CRS. The savings per policy are for properties in the FEMA mapped 100-year floodplain ("Special Flood Hazard Area"). The savings are lower for policies outside the mapped floodplain.

Table 3: Seminole County Policy Savings for CRS Participation

	Total Policies	Policies in SFHA	X-STD/AR/A99	PRP
Number of Policies	4,251	1,400	78	2,773
Total Premiums	$2,147,157	$966,542	$98,136	$1,082,479
Average individual annual premium	$505	$690	$1,25	$390
Class 9 savings per floodplain policy	$15	$43	$70	$0
Class 9 savings for community	$65,861	$60,409	$5,452	$0
Class 8 savings per floodplain policy	$30	$86	$70	$0
Class 8 savings for community	$126,271	$120,819	$5,452	$0
Class 7 savings per floodplain policy	$44	$129	$140	$0
Class 7 savings for community	$186,679	$181,227	$10,904	$0
Class 6 savings per floodplain policy	$59	$173	$140	$0
Class 6 savings for community	$252,541	$241,637	$10,904	$0

In addition to the direct financial reward for participation in the CRS, there are many other reasons to participate. As FEMA staff often say, “if you are only interested in saving premium dollars, you’re in the CRS for the wrong reason.” The other benefits that are more difficult to measure in dollars include:

1. The activities credited by the CRS provide direct benefits to residents, including:
    - Enhanced public safety,
    - A reduction in damage to property and public infrastructure,
    - Avoidance of economic disruption and losses,
    - Reduction of human suffering, and
    - Protection of the environment.
2. A community’s flood programs will be better organized and more formal. Ad hoc activities, such as responding to drainage complaints rather than an inspection program, will be conducted on a sounder, more equitable basis.
3. A community can evaluate the effectiveness of its flood program against a nationally recognized benchmark.
4. Technical assistance in designing and implementing a number of activities is available at no charge from the Insurance Services Office.
5. The public information activities will build a knowledgeable constituency interested in supporting and improving flood protection measures.
6. A community will have an added incentive to maintain its flood programs over the coming years. The fact that the community’s CRS status could be affected by the elimination of a flood-related activity or a weakening of the regulatory requirements for new developments will be taken into account by the governing board when considering such actions.
7. Every time residents pay their insurance premiums, they are reminded that the community is working to protect them from flood losses, even during dry years.

More information on the Community Rating System can be found at http://www.fema.gov/business/nfip/crs.shtm.

1.6 References

1. *Community Rating System Coordinator's Manual,* FEMA, 2007.
2. *Example Plans,* FEMA/Community Rating System, 2006.
3. *Getting Started – Building Support for Mitigation Planning,* FEMA, FEMA-386-1, 2002.
4. *Local Multi-Hazard Mitigation Planning Guidance,* FEMA, 2008.
5. "Population by City," Metro Orlando Economic Development Commission. Retrieved December 9, 2010 at http://www.businessinseminole.com/gm/ecodev/pdf/Population_by_City.pdf.
6. *Soil Survey of Seminole County, Florida,* USDA Soil Conservation Service, 1990.
7. *State and Local Plan Interim Criteria under the Disaster Mitigation Act of 2000,* FEMA, 2002.
8. *Seminole County Comprehensive Plan,* Seminole County Planning and Development Department, 2008.

2 Planning Process

2.1 Planning Approach

This Floodplain Management Plan is the product of a rational thought process that reviews alternatives and selects and designs those that will work best for the situation. This process is an attempt to avoid the need to make quick decisions based on inadequate information during an emergency. It provides carefully considered directions to the County government by studying the overall damage potential and ensuring that public funds are well spent. The development of this plan also followed FEMA's CRS 10-Step Planning Process.

2.1.1 Planning Committee

This Flood Hazard Mitigation Plan was developed under the guidance of a Floodplain Management Planning Committee (FMPC) with oversight from the Seminole County Emergency Manager. The Committee included representatives from various County departments, other local, state and federal agencies that serve the County, and citizens from throughout the County. Some of these citizen members of the FMPC had been flooded in the past. The County department representatives, citizens and stakeholders who make up the FMPC are shown in Table 5 below.

Table 4: FMPC -- Floodplain Management Planning Committee

Position	Name	Agency
Co-Chair	Alan Harris	Seminole County Emergency Management
Member	Amanda Kortus	City of Oviedo
Member	April Verpoorten	City of Altamonte Springs
Member	Danielle Koury	City of Lake Mary
Member	Danielle Marshall	City of Altamonte Springs
Member	David Hamstra	City of Longwood
Member	David Waller	City of Oviedo
Member	James Potter	Seminole County Development Review
Member	Jay Zembower	Citizen
Member	Josh Sheldon	Seminole County Emergency Management
Member	Katherine Peters	Citizen
Member	Kelley Brock	City of Casselberry
Member	Kim Fisher	Seminole County Development Services
Member	Marie Lackey	Seminole County Public Works
Member	Mark Flomerfelt	Seminole County Public Works
Member	Michelle Bernstein	Citizen
Member	Mike Cash	City of Sanford
Member	Nancy Dunn	Citizen
Member	Owen Reagan	Seminole County Public Works
Member	Phil Riebiel	Citizen
Member	Robert King	Citizen
Member	Robert Potts	Citizen
Member	Roland Raymundo	Seminole County Public Works
Co-Chair	Steven Lerner	Seminole County Emergency Management
Member	Tina Dantuma	Resident- Longwood
Member	Zynka Perez	City of Winter Springs

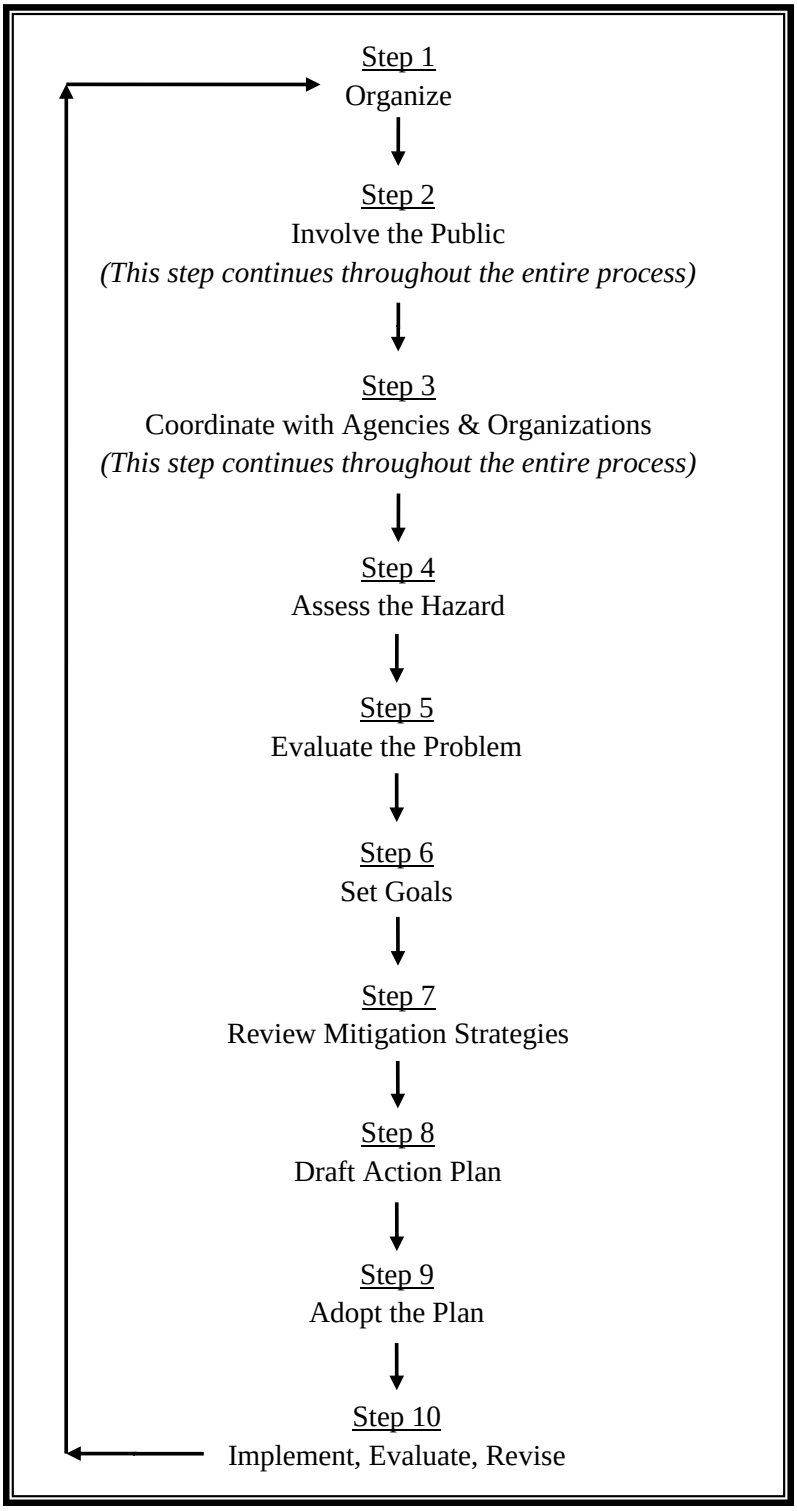
The plan development included identifying the unique flood risks that affect the County, identifying mitigation actions for these risks, and discussing how to involve the public in the development of the Plan.

The Seminole County Board of County Commissioners passed Resolution which established the planning process and created the FMPC (see Appendix A).

2.1.2 Planning Process

The FMPC followed a standard 10-step process, based on the guidance and requirements of FEMA. The process is summarized in the flow chart in the figure on the right. The Committee assessed the flood hazards affecting the County, set goals, and reviewed a wide range of activities that can mitigate the adverse affects of the hazards. The FMPC met four times over the course of the planning process in development of this plan. An agenda and sign-in sheet for each of the meetings can be found in Appendices F, G, H and I. The schedule for the development of the plan is shown in Table 6 on the next page.

Figure 3: Mitigation Planning Process



2.1.3 Public Involvement

Step 2 of the planning process was to obtain input from the public, particularly residents and businesses that had been affected by flooding. The public was invited to participate through:

North Branch Library – Sanford, FL

- Attending and participating in meetings of the Floodplain Management Planning Committee. Five meetings were held over a four-month period.
- Attending a public meeting that was held at the beginning of the planning process to inform the public of the planning process and to solicit concerns over flooding.
- Contacting committee members.
- Attending public meetings that were held on August 20th and 27th, 2015, to receive comments on the draft plan.

2.1.3.1 Public Meetings

A public meeting was held at the beginning of the planning process to inform the public of the floodplain management planning process and to solicit comments and concerns about flooding in the County. This meeting was held May 5, 2015, at the Seminole County Emergency Operations Center The location of the meeting was central to many who were recently affected by flooding from Tropical Strom Fay. Two more public meetings in which the FPMC was present were conducted on June 5th and June 16th, 2015. Public comment was solicited on August 20th,2015 at the North Branch Library and again on August 27th , 2015 at the Central Branch Library. This advertisement, along with an agenda from the meeting and a sign-in sheet, can be found in Appendix D.

2.1.3.2 Other Public Involvement Methods

Seminole County promoted the floodplain management plan through its established Local Mitigation Strategy Committee, which includes members from a cross-section of the community and who represent a variety of local organizations.

A meeting of the Seminole County Floodplain Planning Management Committee.

2.1.4 Coordination

Existing plans and programs were reviewed during the planning process. In addition, contacts were made with regional, state and federal agencies and organizations during the planning process. Representatives of the State of Florida National Flood Insurance Program (NFIP), the State of Florida Division of Emergency Management, FEMA Region IV,

ISO/CRS, the St. Johns County Water Management District, the National Weather Service and American Red Cross were invited to participate in the FMPC. A letter was also sent to a variety of stakeholder organizations and agencies to determine how their programs affect or could support the County's mitigation efforts and to request participation on the FMPC.

2.1.4.1 Solicitation of Comments

Members of the FMPC included representatives from homeowners' associations and community organizations. These stakeholders provided valuable comments throughout the planning process.

2.1.4.2 Neighboring Communities

All incorporated municipalities within Seminole County were made aware of the planning process via e-mail and letters. Each incorporated municipality was invited to attend the FMPC meetings. All municipal agencies were present through the planning process and community profiles are included as appendices to this plan for each community.

2.1.4.3 Contacting Other Agencies and Meetings with Agencies

Because Seminole County is not a coastal county, the Florida Department of Environmental Protection's Coastal Management Program was not contacted for this planning effort.

2.1.5 Hazard Assessment and Problem Evaluation

The Committee addressed Steps 4 and 5 of the planning process (Assess the Hazard and Evaluate the Problem) during the October meeting of the LMS. The flood hazard data and vulnerability to critical facilities, buildings and infrastructure and the impact of the flood hazard on life, health and safety is covered in Chapter 3 of this document. The LMS provided data and support for Hazard Assessment and Problem Evaluation during the first three months of the planning process.

2.1.6 Goals

The Committee conducted goal setting exercises at Seminole County's Emergency Operations Center at the June 5th, 2015 FMPC meeting. During this meeting, a list of potential goals was discussed and then the Committee agreed upon a final list of goals and objectives. These goals are discussed in Chapter 4 of this document.

2.1.7 Mitigation Strategies

During the June 16th, 2015 meeting of the FMPC, the Committee reviewed and debated various mitigation measures which could help to reduce or eliminate the flood hazards. The Committee went through a comprehensive list of potential mitigation options based on the following six general cagories:

- Preventive Measures
- Property Protection Measures
- Natural Resource Protection Measures
- Emergency Services Measures
- Structural Measures

- Public Information Measures

2.1.8 Action Plan

After reviewing the various alternatives, the Committee drafted an action plan to identify recommended projects, parties responsible for implementation, a schedule for project completion, and identification of funding sources. The action plan is included in Chapter 11 of this document.

Selected mitigation measures were prioritized based on benefit to the County and available funding necessary for implementation. Projects which may be eligible for FEMA grant funding were also evaluated based on benefits and cost using the "STAPLEE" criteria (see box).

This Floodplain Management Plan serves only to recommend mitigation measures. Implementation of these recommendations depends on adoption of this plan by the Seminole County Board of County Commissioners.

Figure 4: The STAPLEE Criteria

Social

Technical

Administrative

Political

Legal

Economic

Environmental

3 Flood Risk Assessment

Flooding is the deadliest and most costly storm-related natural hazard in the United States. Many deaths due to flooding can be avoided by not driving through flooded roads and paying attention to evacuation warnings.

Types of Flooding: The most common and most damaging floods occur along rivers and streams. This type of flooding is called overbank flooding. Overbank flooding of rivers and streams can be caused for any of the following reasons:

1. There is more precipitation in the watershed than the waterways and the storm system can convey;
2. There are obstructions in a channel, such as a beaver dam,
3. There is a large release of water when a dam or other obstruction fails; or
4. A combination of these factors.

Most floods are caused because of the first factor, a larger amount of precipitation than the watershed can manage. Another contributor to flooding is stormwater runoff. This problem has recently become more critical because of development in areas subject to urban flooding.

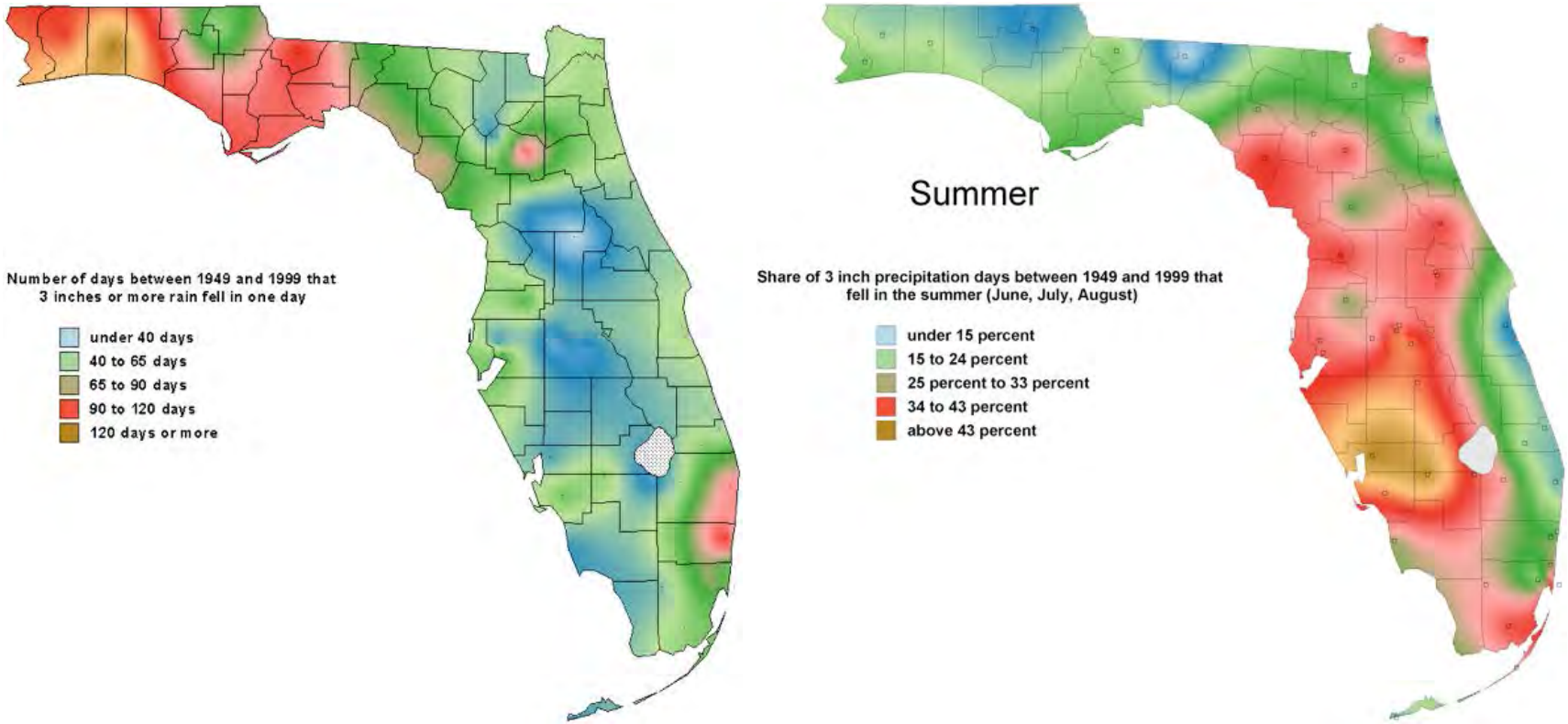
Causes of Flooding: For most of Seminole County, the primary causes of flooding are tropical systems and afternoon thunderstorms. These storms generally occur during the rainy season, from June through November. The rain associated with hurricanes and tropical storms can produce extreme amounts of rainfall in short periods of time, which can overwhelm the capacity of streams, channels, or drainage infrastructure. In addition, certain areas of Seminole County are low-lying, which makes them subject to flooding from rising water.

Historical Floods: Since 1994, Seminole County has experienced seven major floods. These floods have disrupted life for community members by closing streets and causing property damage to homes and businesses, and one of these floods even caused the death of a Seminole County resident. To address flood control and protection issues, Seminole County is developing this comprehensive flood hazard management plan.

3.1 Precipitation in Seminole County

Seminole County receives an average of 51 inches of rain each year. However, this rainfall is not spread out evenly from month to month or across all parts of the County. Most precipitation occurs during the rainy season, from June to October, as shown in the graphic on the next page.

Figure 5: Rainfall Distribution across Florida



The map on the left depicts the number of days between 1949 and 1999 in which three or more inches of rain fell across Florida. The map on the right depicts the percentage of those days that occurred during the summer. As can be seen from the images, Seminole County was among the parts of Florida that received more days of heavy rainfall during the summer.

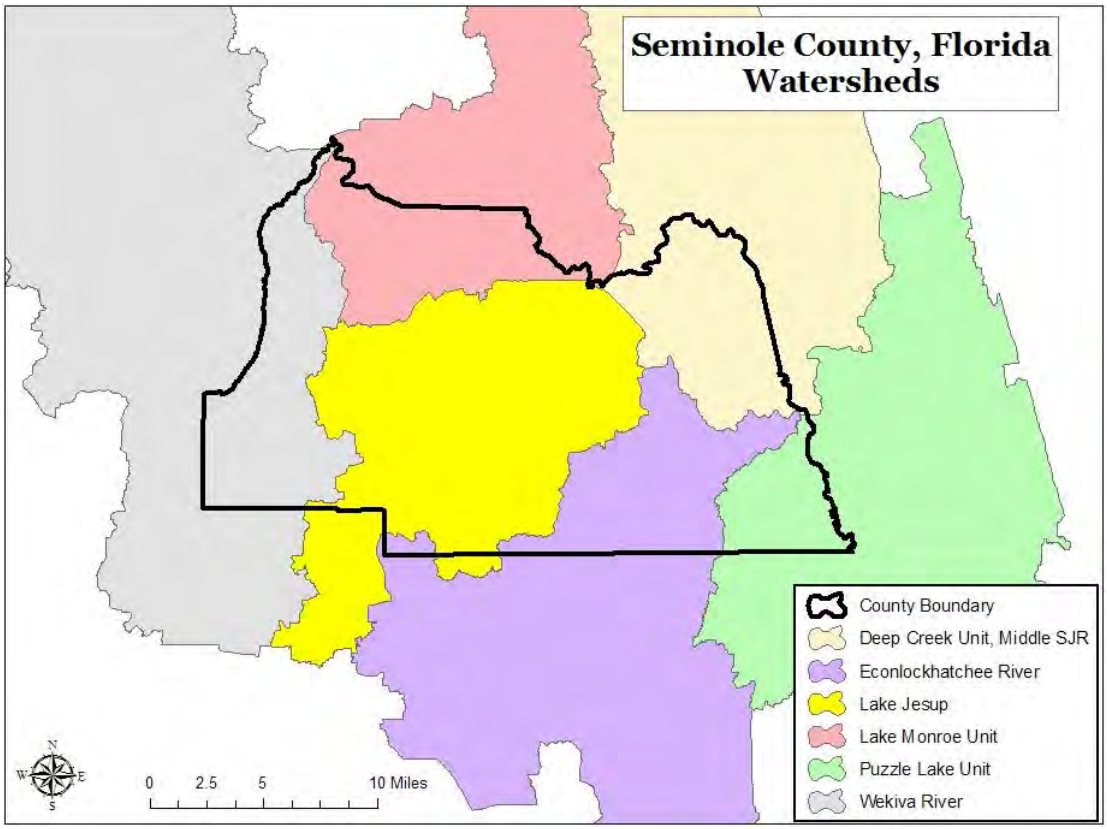
3.2 Seminole County Water Resources and Watersheds

Seminole County has an abundance of surface water resources. The St. Johns River and Econlockhatchee River as well as three large lakes – Lake Monroe, Lake Jesup and Lake Harney – fall at least partly within the County boundaries.

There are also six watersheds that fall partly within Seminole County, as shown in Figure 6. Within these six major watersheds are smaller subwatersheds that drain into the tributaries. Each of these streams has adjacent floodplains that are inundated during a flood.

The condition of the land in the watershed affects what happens when precipitation falls. For example, more rain will run off the land and into streams if the terrain is steep, if the ground is already saturated from previous rains, if the watershed is significantly covered with impervious pavement and parking lots, or if depressional storage areas (like swamps) have been filled in. Thus urban development in the watershed can contribute to flooding. Each of the watersheds in Seminole County contains urban as well as rural areas, except for Deep Creek, which is mostly rural. Watersheds that are more urbanized tend to flood more quickly than rural watersheds.

Figure 6: Watersheds within Seminole County



3.3 Flood Risks

3.3.1 Tropical Cyclones

Flooding in Seminole County is often the result of hurricanes, tropical storms, or tropical depressions, all of which are tropical cyclones. These storms bring heavy rainfalls and high winds to Seminole County, which can cause significant damage. These storms can last for several days, and therefore they have the potential to cause sustained flooding and high wind conditions. Rain combined with high winds can also create wave action on the three lakes and can damage properties adjacent to these bodies of water.

Historically, many hurricanes and tropical storms have passed near or through Seminole County, as shown in Table 7.

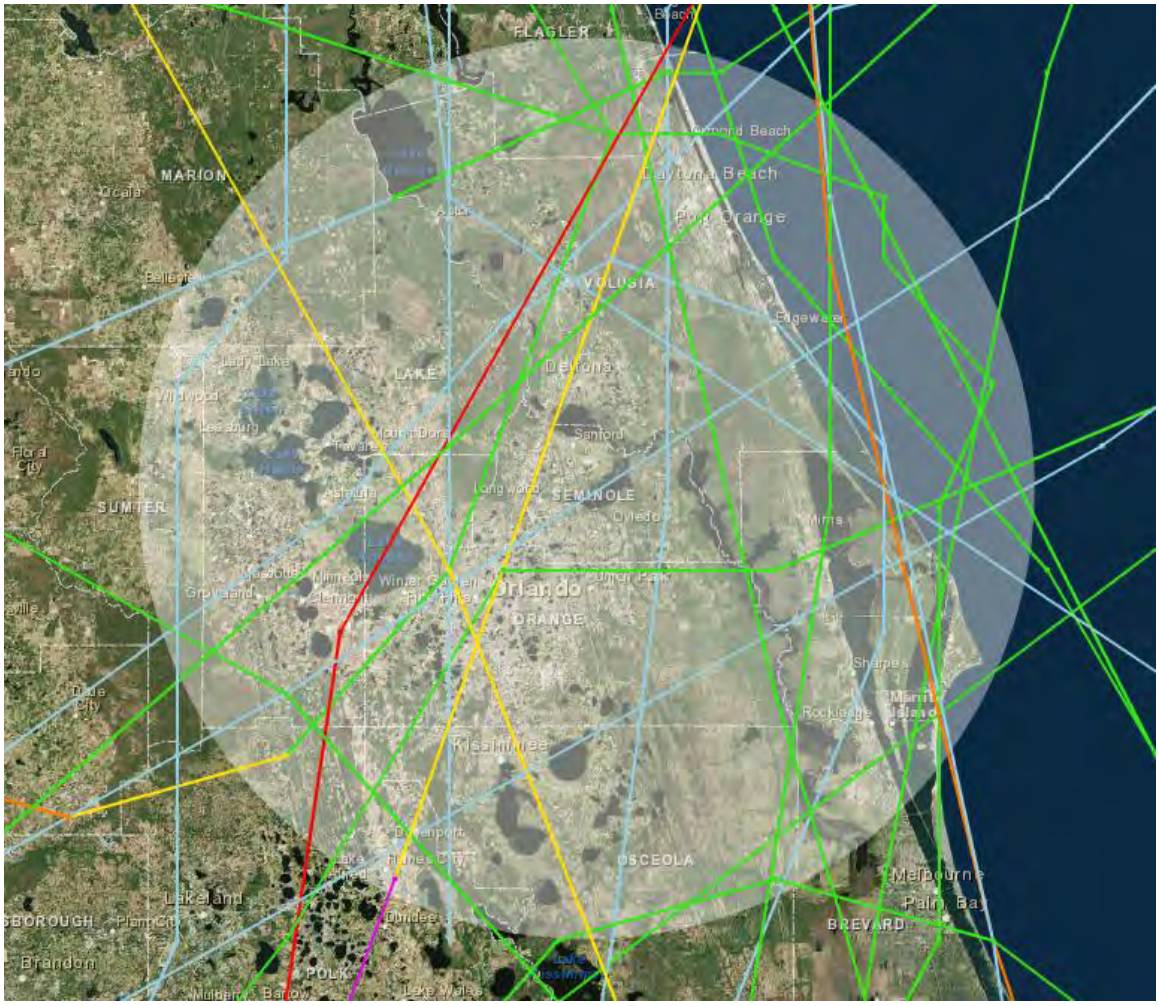
Table 5: Major Storms near Seminole County, Florida (1980 to 2010)

Date	Storm Type	Deaths (FL)	Injuries (FL)	Property Damage
8/24/2008	Tropical Storm Fay	5	0	$390,000,000 (FL)
2/3/2007	Severe Storms and Tornadoes	0	0	$43,000,000 (FL)
8/24/2006	Hurricane Ernesto	0	0	$500,000,000 (US)
10/5/2005	Tropical Storm Tammy	0	0	< $25,000,000 (US)
9/24/2004	Hurricane Jeanne	3	0	$6,900,000,000 (US)
9/16/2004	Hurricane Ivan	14	0	$8,300,000,000 (FL)
9/4/2004	Hurricane Frances	5	0	$8,000,000,000 (FL)
8/13/2004	Hurricane Charley and Tropical Storm Bonnie	9	0	$14,000,000,000 (FL)
9/3/2003	Tropical Storm Henri	0	2	"minor"
9/2/2002	Tropical Storm Edouard	0	0	"minor" (roadway flooding in Seminole County)
9/13/2001	Tropical Storm Gabrielle	2 (1 in Seminole)	0	$230,000,000 (FL)
10/4/2000	Tropical Storm Leslie	3	0	$700,000,000 (FL)
10/20/1999	Hurricane Irene	8	3	$8,000,000 (FL)
10/22/1998	Hurricane Mitch	2	65	$20,000,000 (FL
9/15/1998	Hurricane Georges	0	0	$20,000,000 (FL)
8/22/1995	Tropical Storm Jerry	0	0	$30,000,000 (FL)
7/31/1995	Hurricane Erin	0	0	$700,000,000 (FL)
11/8/1994	Tropical Storm Gordon	8	0	$400,000,000 (FL)
9/28/1992	Tropical Storm Earl	0	0	
8/15/1981	Hurricane Dennis	0	0	

Sources: National Oceanic and Atmospheric Administration's National Hurricane Center and the Federal Emergency Management Agency

Of particular importance to communities susceptible to hurricane damage is the track of an approaching storm. Proximity and direction of hit are important when determining impacts and subsequent damage from the storm. Figure 7 on the next page shows the historical tracks of storms that have passed through or near Seminole County.

Figure 7: Historical Storm Tracks near Seminole County (1950 to 2014)



3.3.2 Flash Floods

A second source of flooding in Seminole County is flash flooding. Flash floods are generated by severe storms that drop a large amount of rainfall in a short period of time. Flash floods strike quickly and end quickly. Areas with steep slopes and narrow stream valleys are particularly vulnerable to flash flooding, as are the banks of small tributary streams. In hilly areas, the high velocity flows and short warning times make flash floods hazardous and destructive.

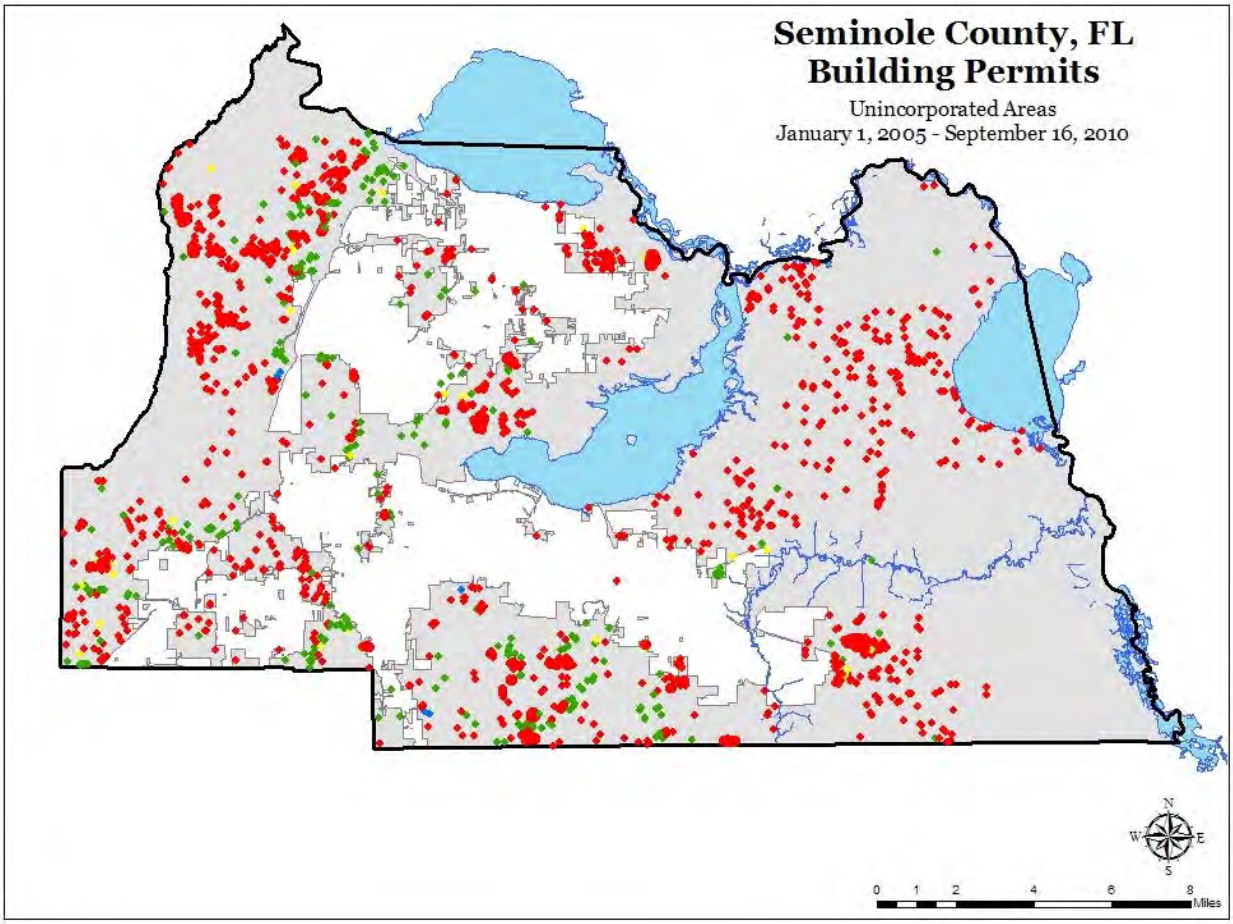
In urban areas, flash flooding can be triggered by increased stormwater runoff due to land development. When we construct buildings on open spaces, hard surfaces like parking lots and rooftops replace forests, swamps, fields, and other natural land covers. When rainfall hits these impervious surfaces, it runs off of them rather than infiltrating into the soil that was once there. Along the way, stormwater runoff picks up sediment, debris and pollutants on the hard surfaces and carries them to streams or rivers. Thus developed land absorbs less rainfall than undeveloped land, and also increases pollution in local waterways. As we develop land, the amount and speed of stormwater runoff increases. As a result, flash floods often occur in urban areas where much of the watershed is covered in impervious surfaces.

According to the U.S. Census Bureau, the population of Seminole County increased 13% between 2000 and 2009, after increasing 27% between 1990 and 2000. Land development in Seminole County has increased rapidly to accommodate this growth. As shown in Table 8 on the next page, before the economic downturn in 2009, Seminole County was permitting nearly 1,000 new buildings per year. Figure 8 shows the distribution of building permits issued from 2005 to late 2010. New development such as this can trigger more flash floods.

Table 6: Number of Permits for New Construction per Year in Seminole County

January 2005 - September 16, 2010							
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**Total**
Commercial	59	111	82	54	52	24	**382**
Single Family Res	1,444	789	874	634	425	380	**4,546**
Multi-Family Res	0	2	25	8	0	3	**38**
Government	9	6	10	8	11	29	**73**
Total	**1,512**	**908**	**991**	**704**	**488**	**436**	**5,039**

Figure 8: Location of Permits for New Construction from January 1, 2005 to September 16, 2010



Flash flooding can also be caused by dam failure or the collapse of debris obstructing a waterway. Flash floods often occur in smaller watersheds and are therefore not shown on most floodplain maps.

3.3.3 Dam Failure

Dams are designed to hold back large amounts of water. If they fail or are overtopped, they can produce a dangerous flood situation because of high velocities and large volumes of water released. A break in a dam can occur with little or no warning on clear days when people are not expecting rain or a flood. Breaching often occurs within hours after the first visible signs of dam failure, leaving little time for evacuation.

Dam failures are usually caused either by structural problems with the dam or by hydrologic problems. Structural problems include seepage, erosion, cracking, sliding and overturning resulting from the age of the dam or a lack of maintenance. Hydrologic problems typically occur when there is excessive runoff due to heavy precipitation. For example, a dam failure can occur if the dam has to impound more water than it was designed to, or if the spillway capacity is inadequate for the amount of water that needs to pass downstream.

Figure 9: Dams in Florida, based on the 2009 National Inventory of Dams for Florida, courtesy the Association of State Dam Safety Officials

A dam can suffer a partial failure or a complete failure, but the potential energy of the water stored behind even a small dam can cause loss of life and great property damage downstream. There are currently no dams located within Seminole County, but there are dams located to the north, west and south of the County.

3.3.4 Obstructions

Obstructions can affect a channel, such as small bridge openings or log jams, or they can affect an entire floodplain, such as road embankments, fill and buildings. Channel obstructions will cause smaller, more frequent floods, while floodplain obstructions impact the larger, less frequent floods where most of the flow is overbank, outside the channel. Obstructions can be either natural or manmade. Natural obstructions like log jams can be washed away during larger floods. Manmade obstructions pose a more serious problem, because they tend to be more permanent.

3.4 Historical Flooding

Seminole County has experienced several flooding events in the past, including a flood on September 15, 2001 that caused one death. This occurred in the City of Winter Springs during the aftermath of Tropical Storm Gabrielle, which brought wind gusts to around 45 miles per hour, causing minor damage across much of east central Florida. Following the storm, a 15-year-old boy drowned while playing with friends in Gee Creek near Winter Springs after he was pulled underwater by branches and other debris in the fast-moving water. Raising awareness about the danger of currents following heavy rains, as well as the potential for debris in floodwaters, can help prevent similar accidents in the future.

Flooding in Seminole County following Tropical Storm Fay in 2008 (photos courtesy Gary Exner, Advantage Consulting LLC).

In 2008, Tropical Storm Fay made four landfalls in Florida. While crossing central Florida, Fay unexpectedly strengthened over land to just under hurricane intensity with 70 mph winds. The storm caused extensive flooding in east central Florida, including historic flooding on the St. Johns River. The total rainfall in Seminole County from August 18th to August 23rd was 76.7 inches. Many roadways and about 500 homes were damaged as the river's water level continued to climb after the storm had passed. Seminole County schools were closed due to impassable roads. The pictures in the box to the left show floods from Tropical Storm Fay in Seminole County.

In 1994, two storms brought heavy rain to most of peninsular Florida during the last half of September. Rivers and streams overflowed, flooding streets and some urban areas. A flash flood on July 21, 2001 produced by heavy rain inundated the Tuskawilla area of Winter Springs, flooding three homes and causing $15,000 worth of property damage. On August 19, 2002, three inches of rapidly falling rain flooded streets and six homes in

Sanford. This led to $60,000 of property damage. A thunderstorm brought rainfall and widespread flooding of major roadways in Seminole County on August 29, 2002. The roadway flooding occurred about three miles south of Oviedo. On September 5, 2004, Hurricane Frances brought eight to 10 inches of rain across much of Seminole County, flooding homes and streets. Four days later, the rain from Hurricane Frances had caused water levels to reach flood stage in the middle St. Johns River Basin. Levels continued to rise and then fell slightly until Hurricane Jeanne followed the same track across Florida as Hurricane Frances had. Significant flooding followed, and the Lake Harney gauge reached a record crest of 10.1 feet. Near Geneva, roads, nurseries and homes along Lake Harney were flooded. Water came over the seawall in Sanford and flooded numerous structures along the south shore of Lake Monroe. The total amount of property damages due to these events was $4.8 million.

Historical occurrences of floods in the County are listed in Table 9 below.

Location	Date	Time	Type	Deaths	Injuries	Property Damages
Florida	9/15/1994	NA	Flooding	0	0	$500,000
Winter Springs	7/21/2001	5:00 PM	Flash Flood	0	0	$15,000
Winter springs	9/15/2001	1:00 PM	Urban/Small Stream Flood	1	0	$0
Sanford	8/19/2002	4:45 PM	Flash Flood	0	0	$60,000
Oviedo	8/29/2002	4:38 PM	Flash Flood	0	0	$0
Seminole County	9/5/2004	1:30 AM	Flash Flood	0	0	$0
City of Geneva and Sanford	9/9/2004	7:00 AM	Flooding	0	0	$4,800,000
Seminole County	9/23/14	6:00 PM	Flooding	0	0	$3,650,000

Source: National Oceanic and Atmospheric Administration's National Environmental Satellite, Data, and Information Service and the U.S. Department of Commerce's National Climatic Data Center

3.5 Locally Identified Flood Areas

While many floodplain boundaries are mapped by NFIP, floods sometimes go beyond the mapped floodplains or change courses due to natural processes, such as erosion and sedimentation, or human development, such as filling in floodplains to build houses, increased imperviousness within the watershed from new development, or debris.

The County has approximately 5,500 homeowners and 500 businesses that could be affected by flooding during a 100-year flood. These businesses and homeowners have been identified by address and GIS mapping. In many flood prone areas, the terrain is heavily wooded with vast areas of marshlands, which receive the overflows from Lake Monroe, Lake Harney, Lake Jesup and the St. Johns River. Another problem area is U.S. Highway 17-92, where it runs parallel to Lake Monroe. According to the flood prone map, this main artery will be under water after 10 inches of rain.

3.6 The National Flood Insurance Program

In 1968, Congress created the National Flood Insurance Program (NFIP), which enables property owners in participating communities to purchase insurance from the federal government against losses due to flooding. The program is designed as an alternative to disaster assistance. Participation in the NFIP is based on an agreement between local governments and the NFIP that the local government will adopt and enforce a floodplain management ordinance to reduce future

flood risks to new construction in Special Flood Hazard Areas, while the federal government will make flood insurance available within the community.

More properties are insured for flood damages under NFIP in Florida than in any other state. Seminole County participates in the NFIP, which means that NFIP flood insurance is available to residents living anywhere in the unincorporated area. According to the NFIP, in Seminole County there were 4,850 NFIP flood insurance policies in effect, for a total of $1,242,102,400 in insurance, as of August 31, 2010. Single-family residences account for 91% of the 4,850 flood insurance policies in Seminole County, whereas 94 of the policies are non-residential. The remaining 358 policies are for multifamily properties. The total closed paid losses made to policy holders in Seminole County between 1978 and August 31, 2010 was $3,640,195. More details on flood insurance policies in Seminole County are shown in section 3.8.5.

3.7 Future Flood Risk

Flooding can occur along all waterways in Seminole County, including the St. Johns River, Lake Harney, and Lake Jesup. Because there are numerous surface water bodies throughout the County, many locations in the County may be subject to flooding. Areas identified as vulnerable to flooding are depicted on FEMA's Flood Insurance Rate Maps (FIRMs), which are developed through the NFIP and are the official floodplain maps for Seminole County. Many of the County's floodplain management regulations are based on the floodplain limits shown in these maps. It is important to realize that on an annual basis more than 30 percent of all flood losses occur outside any mapped floodplain.

FEMA's flood zones represent the areas of risk for flooding. These zones are based on the statistical risk of future flooding, which is extrapolated from historical records to determine the statistical potential that storms and floods of a certain magnitude will recur. Such events are measured by their "recurrence interval," i.e., a 10-year storm or a 50-year flood. A 10-year storm means that there is a 1 in 10 chance, or 10% chance, of that storm occurring in any given year. A 50-year flood has a 1 in 50 chance, or 2% chance, of occurring in any given year. Because these identifiers are based on statistics, such a flood could occur twice in one year, or could not occur at all over the course of 100 years.

Table 7: Flood Recurrence Intervals

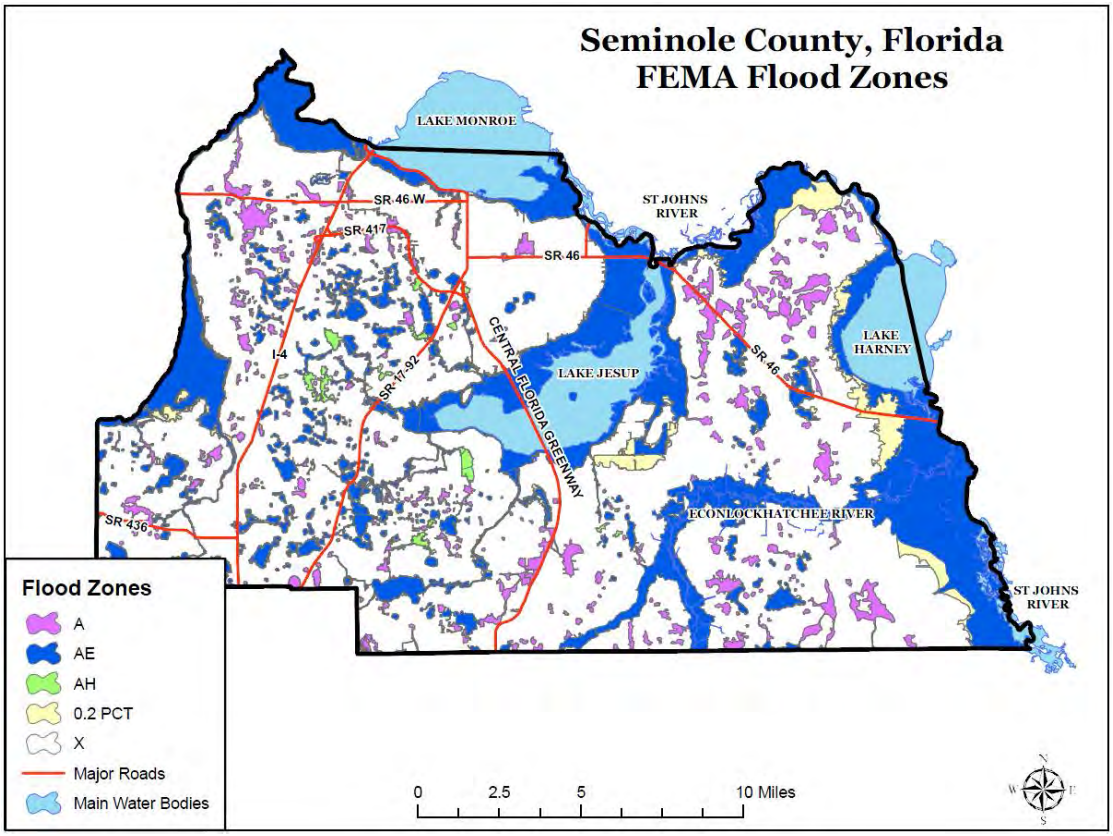
Time Period	Chance of Flooding over a Period of Years			
	Flood Size			
1 Year	10%	4%	2%	1%
10 Years	65%	34%	18%	10%
20 Years	88%	56%	33%	18%
30 Years	96%	71%	45%	26%
50 Years	99%	87%	64%	39%

The map below shows flood zone areas within Seminole County. Areas marked as Zone A have a 1% annual chance of flooding, which translates to a 26% chance of flooding over the life of a 30-year mortgage. This area is the base flood for Seminole County. Detailed analyses are not performed for Zone A, thus flooding depths and base flood elevations are not shown for Zone A areas. Zone AE areas have a 1% annual chance of flooding. These have been determined using detailed methods, thus base flood elevations – the level to which flood waters are expected to

rise – are available in these areas. Zone AH are areas subject to 1% annual chance flooding, usually as ponding, with average depths between one and three feet.

Areas in yellow have a moderate flood hazard. These are places susceptible to a 0.2% annual chance of flooding. Zone X shows areas where flood hazards are minimal, and have a less than 0.2% annual chance of flooding.

Figure 10: FEMA Flood Zones in Seminole County



3.8 Flood Impacts

The impacts of floods affect people, buildings, and the economy. These impacts are discussed in this section.

3.8.1 Safety

Floods can be extremely dangerous, and even six inches of moving water can knock over a person given a strong current. A car will float in less than two feet of moving water and can be swept downstream into deeper waters. This is one reason floods kill more people trapped in vehicles than anywhere else. During a flood, people can also suffer heart attacks or electrocution due to electrical equipment short outs. Residents in Seminole County should be aware of the following flood safety measures:

3.8.2 Health

While such problems are often not reported, three general types of health hazards accompany floods. The first comes from the water itself. Floodwaters carry anything that was on the ground that the upstream runoff picked up, including dirt, oil, animal waste, and lawn, farm and industrial chemicals. Pastures and areas where cattle and hogs are kept or their wastes are stored can contribute polluted waters to the receiving streams.

Floodwaters also saturate the ground, which leads to infiltration into sanitary sewer lines. When wastewater treatment plants are flooded, there is nowhere for the sewage to flow. Infiltration and lack of treatment can lead to overloaded sewer lines that can back up into low-lying areas and homes. Even when it is diluted by flood waters, raw sewage can be a breeding ground for bacteria such as e.coli and other disease causing agents.

The second type of health problem arises after most of the water has gone. Stagnant pools can become breeding grounds for mosquitoes, and wet areas of a building that have not been properly cleaned breed mold and mildew. A building that is not thoroughly cleaned becomes a health hazard, especially for small children and the elderly.

Another health hazard occurs when heating ducts in a forced air system are not properly cleaned after inundation. When the furnace or air conditioner is turned on, the sediments left in the ducts are circulated throughout the building and breathed in by the occupants. If a water system loses pressure, a boil order may be issued to protect people and animals from contaminated water.

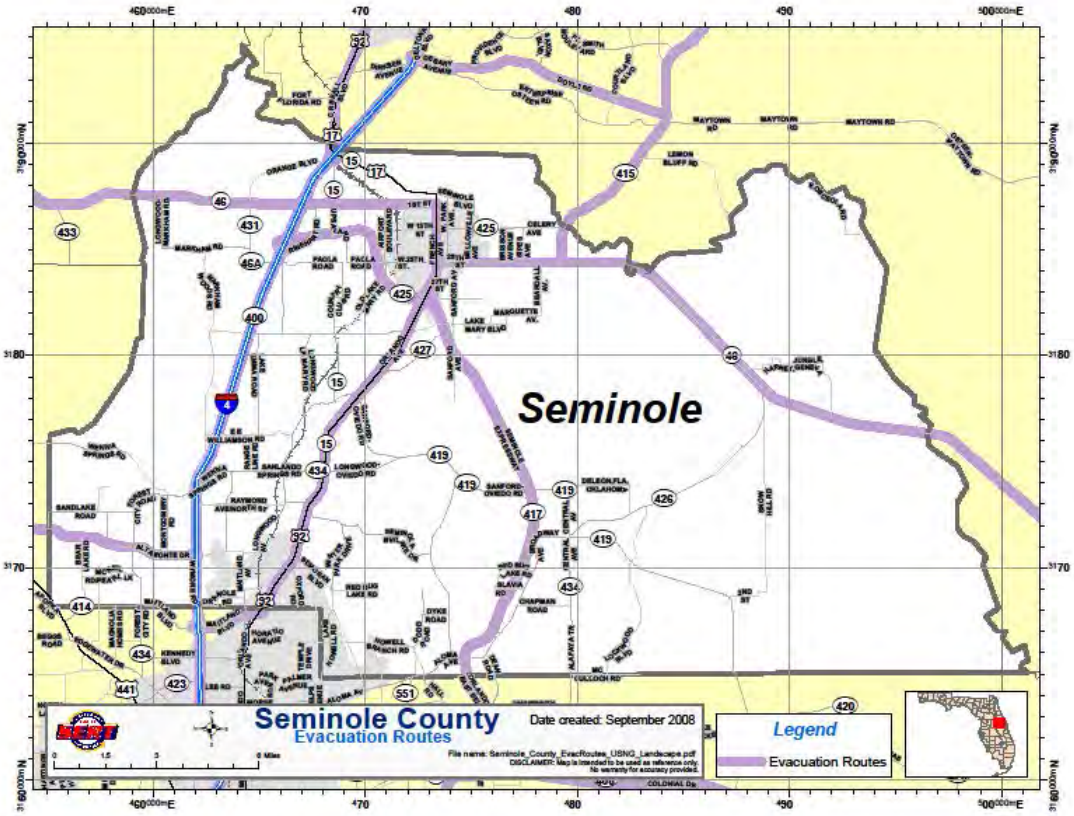
The third problem is the long-term psychological impact of having been through a flood and seeing one’s home damaged and irreplaceable keepsakes destroyed. The cost and labor needed to repair a flood-damaged home puts a severe strain on people, especially the unprepared and uninsured. There is also a long-term problem for those who know that their homes can be flooded again. The resulting stress on floodplain residents takes its toll in the form of aggravated physical and mental health problems.

3.8.3 Evacuation of Residents and Visitors

A key evacuation and safety concern is when roads and bridges go under water. Generally, the larger the road, the less likely it is to flood, but this is not always the case. In addition, a bridge does not have to be under water to be damaged or to cut off an evacuation route. In some cases the bridge is high, but the access road may be flooded. In other cases, the bridge or culvert can be washed out. This is especially dangerous if a person drives on a flooded road and assumes that the bridge is still there.

Residents and visitors within Seminole County should be made aware of evacuation routes. It is important that the County work with both public and private entities to ensure that everyone knows which roads and thoroughfares are designated for evacuation. Below is a map from the Florida Division of Emergency Management which indicates the designated evacuation routes for Seminole County.

Figure 11: Evacuation Routes for Seminole County



3.8.4 Critical Facilities

Seminole County's FMPC identified several types of critical facilities including some roads and bridges. FEMA does not have a specific definition of a critical facility, but the FMPC decided that critical facilities are those facilities that provide a critical function and should be protected from flood damage. There are 215 critical facilities in Seminole County.

3.8.5 Building Damage

Floods can cause severe damage to buildings, which can be costly to repair. Although flood insurance can help pay for repairs to buildings damaged by floods, not all property owners obtain insurance. Moreover, preventing damage to buildings is less costly, less disruptive, and less dangerous than sustaining damage.

In a few situations, deep or fast moving waters will push a building off its foundation, but this is rare. More frequently, structural damage is caused by the weight of standing water, known as "hydrostatic pressure." Basement walls and floors are particularly susceptible to damage by hydrostatic pressure. Not only is the water acting on basement walls deeper, but a basement is also subject to the combined weight of water and saturated earth. In addition, water in the ground underneath a flooded building will seek its own level, resulting in uplift forces that can break a concrete basement floor.

The most common type of property damage inflicted by a flood is soaking. When soaked, many materials change their composition or shape. Wet wood will swell and, if dried too quickly, will crack, split or warp. Plywood can fall apart. Gypsum wallboard will fall apart if it is bumped before it dries. The longer these materials remain wet, the more moisture, sediment and pollutants they will absorb.

Soaking can cause extensive damage to household goods. Wooden furniture may become so badly warped that it cannot be used. Other furnishings, such as upholstery, carpeting, mattresses, and books, are usually not worth drying out and restoring. Electrical appliances and gasoline engines will not work safely until they are professionally cleaned and dried. While a building may appear sound and unharmed after a flood, the water may have caused a lot of damage. To properly clean a flooded building, the walls and floors should be stripped, cleaned and allowed to dry before being recovered. This can take weeks and is a costly process.

Table 12 below shows the appraised value of all buildings in unincorporated Seminole County by FEMA flood zone. All of the buildings in these zones are at risk of flood damage.

Table 8: Appraised Value of Buildings in Unincorporated Seminole County by Flood Zone

	Zone A		Zone AE		Zone AH		Zone X		Total Bldg Value
Row Labels	Bldg Value	Sum of Building Num	Bldg Value	Sum of Building Num	Bldg Value	Sum of Building Num	Bldg Value	Sum of Building Num	
Agricultural	$654,698.00	22	$773,346.00	24	$14,582.00	1	$13,582,937.00	449	$15,025,563.00
Commercial	$11,904,404.00	51	$11,792,783.00	326			$778,373,478.00	2342	$802,070,665.00
Government	$219,721.00	1					$24,440,820.00	271	$24,660,541.00
Industrial	$4,187,086.00	10	$3,230,400.00	181			$200,652,779.00	1650	$208,070,265.00
Institutional	$15,032,229.00	295	$3,859,425.00	120	$2,506,942.00	21	$239,887,934.00	5201	$261,286,530.00
Multi Family Residential	$97,251.00	1	$370,161.00	5			$1,020,316,134.00	23165	$1,020,783,546.00
Misc Residential	$22,574.00	4	$1,137,125.00	30			$1,199,230.00	129	$2,358,929.00
Open Space	$1,210,624.00	21	$1,252,499.00	116			$3,176,005.00	135	$5,639,128.00
Single Family Residential	$208,964,392.00	1346	$327,271,101.00	2233	$9,359,446.00	96	$9,673,145,338.00	66482	$10,218,740,277.00
Grand Total	**$242,292,979.00**	**1751**	**$349,686,840.00**	**3035**	**$11,880,970.00**	**118**	**$11,954,774,655.00**	**99824**	**$12,558,635,444.00**

Flood insurance claims figures do not include those items that are not covered by a flood insurance policy, like cars and landscaping, or the value of family heirlooms. They also do not include damages to uninsured or underinsured properties.

3.8.6 Economic Impacts

Although repairing structural flood damages can be costly, they can also have economic impacts beyond building repairs. Floods can close down businesses for days, weeks, or longer. Businesses can lose their inventories, customers are unable to reach them, and employees are

often unable to work. Below is a table which indicates the largest employers in Seminole County which make up much of the tax base.

Table 9: Seminole County Major Employers

Employer	Number Employed
Seminole County School Board	8,632
Florida Hospital	1,945
Seminole State College of Florida	1,571
Seminole County Board of County Commissioners	1,295
Seminole County Sheriffs Office	1,295
G & A Outsourcing INC	1,073
Convergys Cust MGMT-US	1,010
South Seminole Hospital	928
Chase Bankcard Services INC	887
Seminole Memorial Hospital	887
Mitsubishi Hitachi Power Systems AM	856
Symantec Corporation	794
JP Morgan Chase Bank	765
The American Automobile Association	685
Sears Roebuck and Co	655
Greenberg Dental Associates	620
Sprint Corp	609
Brasfield & Gorrie LLC	538
Tri-City Electrical Contractors INC	535
City of Sanford	508
HF Management Services LLC	507
United Parcel Services	499
Del Air Heating & Refrigeration	498
Gander Mountain Company	493
Verizon Corporate Resources Group	473
City of Altamonte Springs	461
Aue Staffing INC	451
Central Florida Educators Federal C	425
Soi 23 of Fl INC	424
AHS Information Services	416
Wal-Mart Associates INC	413
Duke Energy Florida INC	410
Farmers Group INC	400

As of June 2009 there were approximately 241,667 workers in the labor force for Seminole County according to the Florida Agency for Workforce Innovation, Labor Market Statistics. It is estimated that 29.7% of the workforce are employed in blue collar occupations and 70.3% are employed in white collar occupations. According to the Florida Agency Workforce for Innovation, CES, in June2009, 19.5% of the workforce in Seminole County was employed in the leisure and hospitality industry, 15.9% in professional and business services, 10.6% in government, 11.6% in education and health care and 11% in retail. The table below indicates the taxation value from 2008 through 2010 according to the County Property Appraiser.

Table 10: Seminole County Taxable Value

Year	Value	% Change
2012	$23,594,964,485	-1.13%
2013	$4,292,150,212	2.95%
2014	$25,643,774,089	5.56%

3.8.7 Repetitive Loss Properties

A repetitive loss property is a property that has experienced repeated flooding that caused financial losses. The National Flood Insurance Program (NFIP) is continually faced with the challenge of balancing the financial soundness of the program with the competing expectations of keeping premiums affordable. Repetitive loss properties are one of the largest obstacles to achieving financial soundness.

A repetitive loss property is defined as any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling 10-year period since 1978. Two of the claims paid must be more than 10 days apart but, within 10 years of each other. A repetitive loss property may or may not be currently insured by the NFIP.

A severe repetitive loss property is defined by the Flood Insurance Reform Act of 2004 as any one- to four-family residence that has had four or more claims of more than $5,000, or at least two claims that cumulatively exceed the building's value.

Repetitive loss properties are the biggest draw on the National Flood Insurance Fund. Repetitive loss properties are not only costly; they also disrupt and threaten residents' lives. These properties may be sponsored by state or local government programs that mitigate the flood losses or provide information on how to mitigate flood losses through such measures as elevating buildings above the level of the base flood, demolishing buildings, removing buildings from the Special Flood Hazard Area, or local drainage improvement projects.

In Seminole County, there are a total of 15 repetitive loss properties, only 12 of which are insured under the NFIP. These 15 repetitive loss properties have experienced a total of 33 losses, and 26 of those losses occurred while the building was insured under NFIP. Three of the repetitive loss properties are post-FIRM buildings, meaning that they were built after the effective date of the first Flood Insurance Rate Map for the County.

The repetitive loss properties in Seminole County are shown in Figure 13 on the next page. The map also identifies repetitive loss properties which have been mitigated and those properties which have only had one loss since 2000. It is important to identify single loss properties as they have the potential to be the County's next repetitive loss properties. Detailed areas of repetitive loss are shown in the following figures.

Figure 12: Countywide Repetitive Loss Properties, Mitigated Properties, and Single Loss Properties since 2000

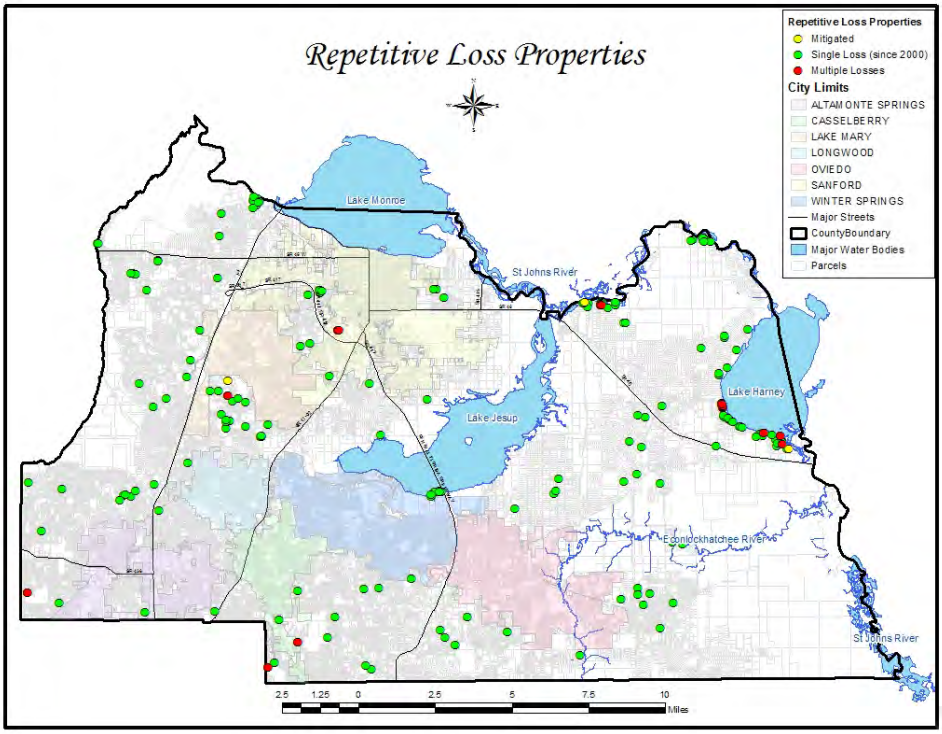


Figure 13: Repetitive Loss Properties Area 1

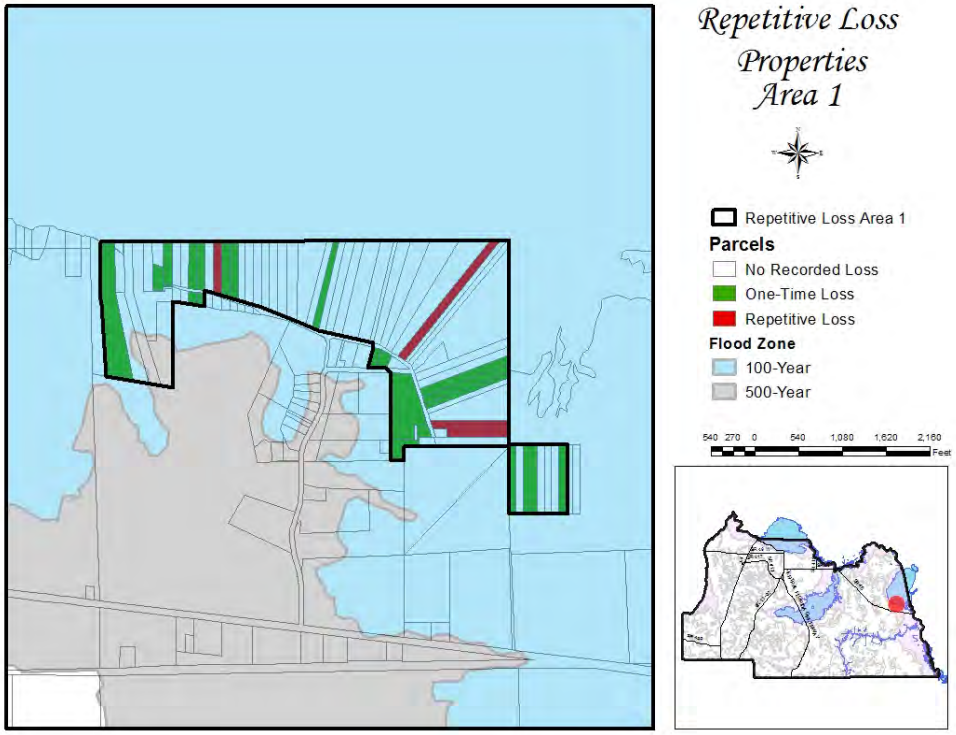


Figure 14: Repetitive Loss Properties Area 2

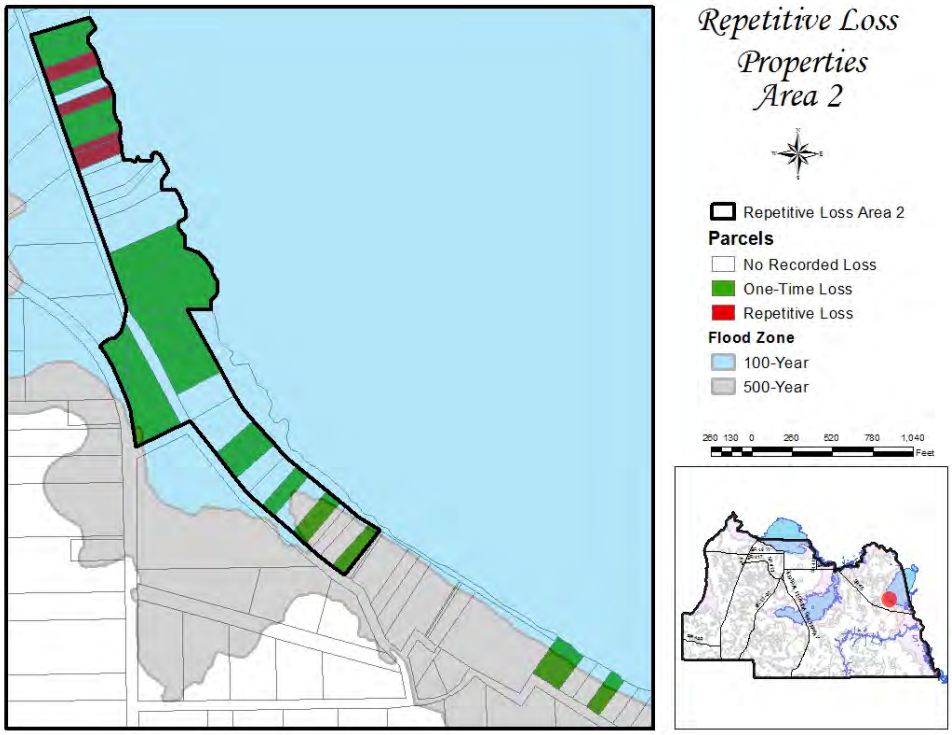


Figure 15: Repetitive Loss Properties Area 3

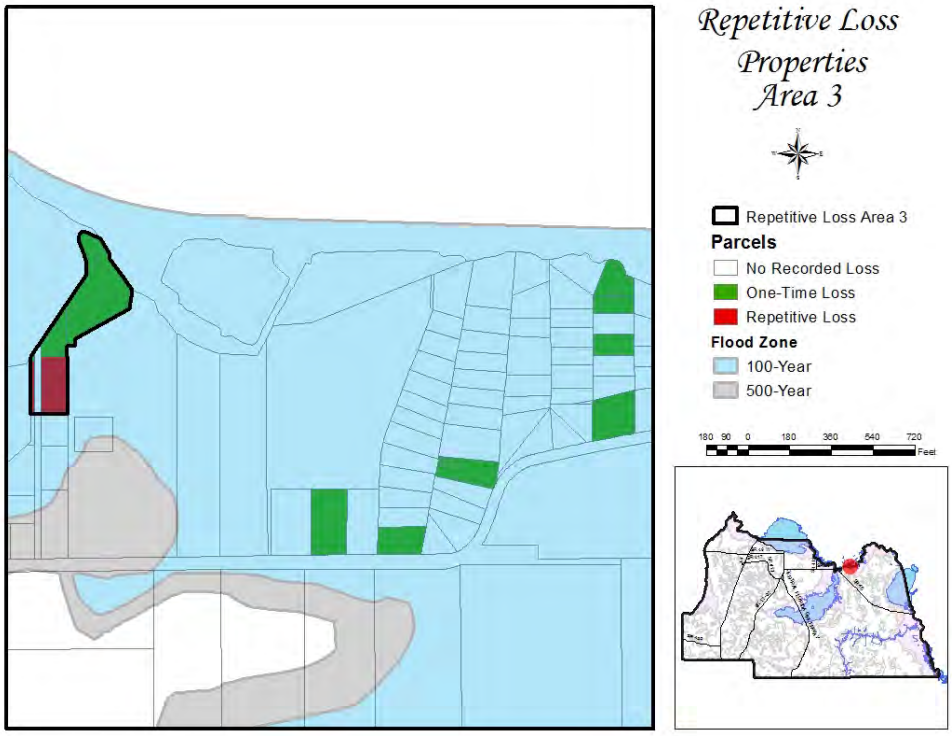


Figure 16: Repetitive Loss Properties Area 4

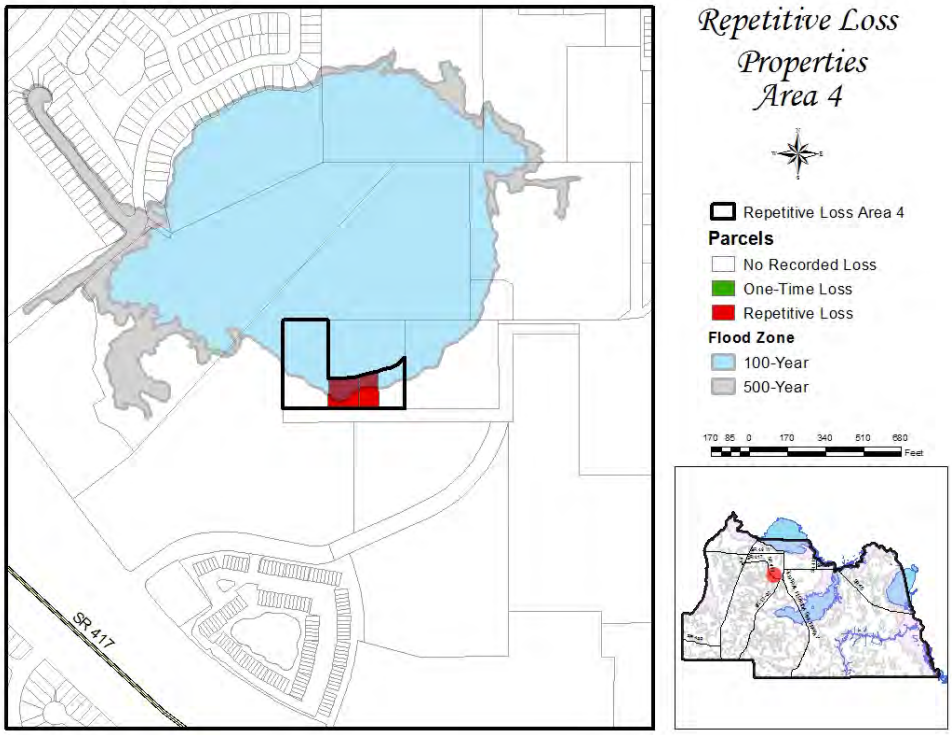


Figure 17: Repetitive Loss Properties Area 5

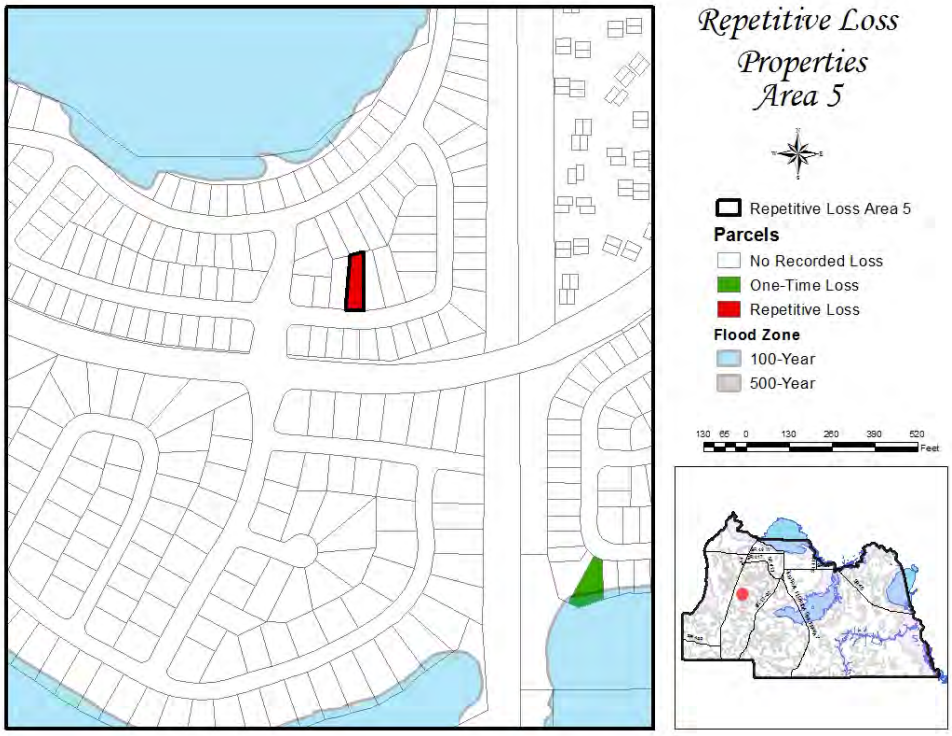


Figure 18: Repetitive Loss Properties Area 6

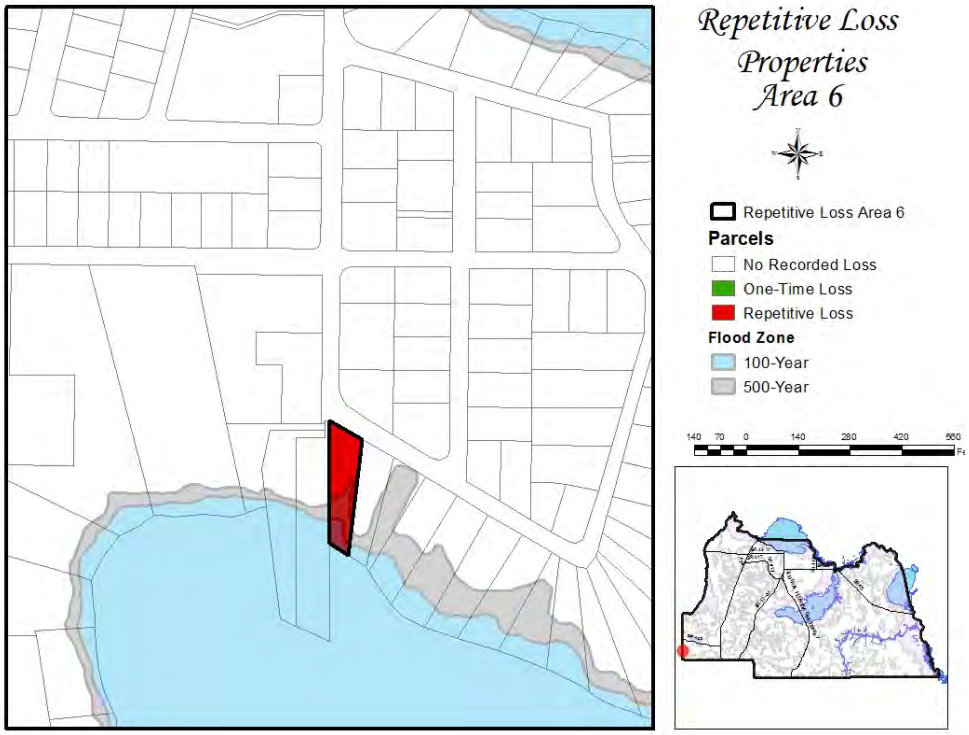


Figure 19: Repetitive Loss Properties Area 7

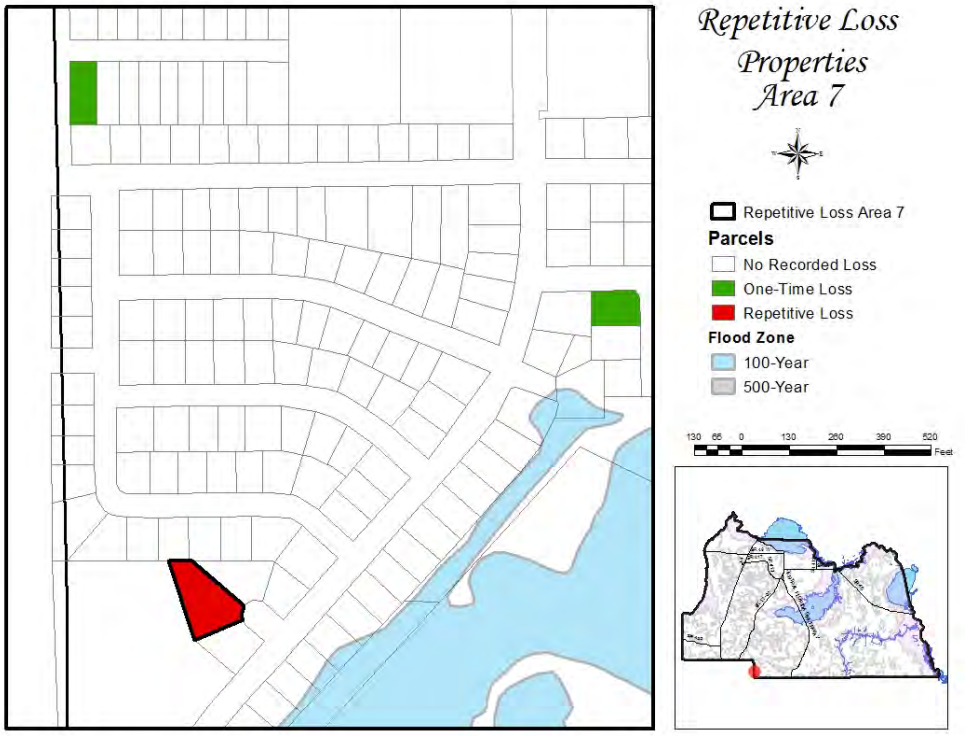
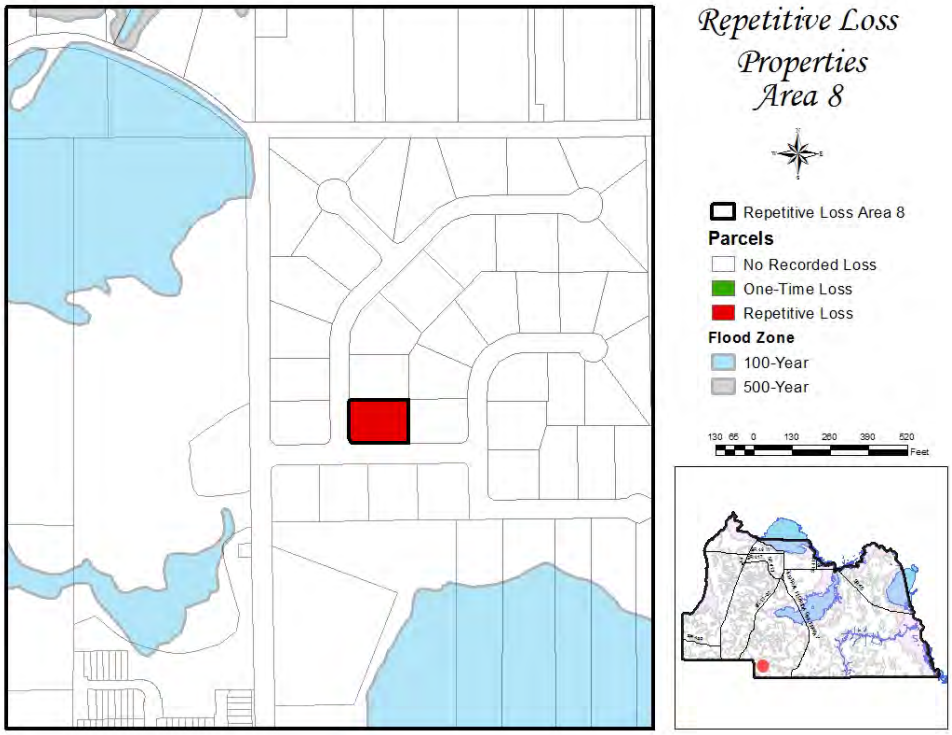


Figure 20: Repetitive Loss Properties Area 8



3.9 Flood Warning Systems

Seminole County residents can sign up for the Alert Seminole Emergency Notification System, which will contact those registered in the event of an emergency that may require evacuation. Residents can also stay prepared by listening to NOAA weather radio, particularly during hurricane season, by visiting Seminole County's Hurricane and Storm Information website at http://www.seminolecountyfl.gov/guide/hurricane.asp, or by calling the citizen information hotline at (407) 665-0311.

3.10 Natural and Beneficial Areas

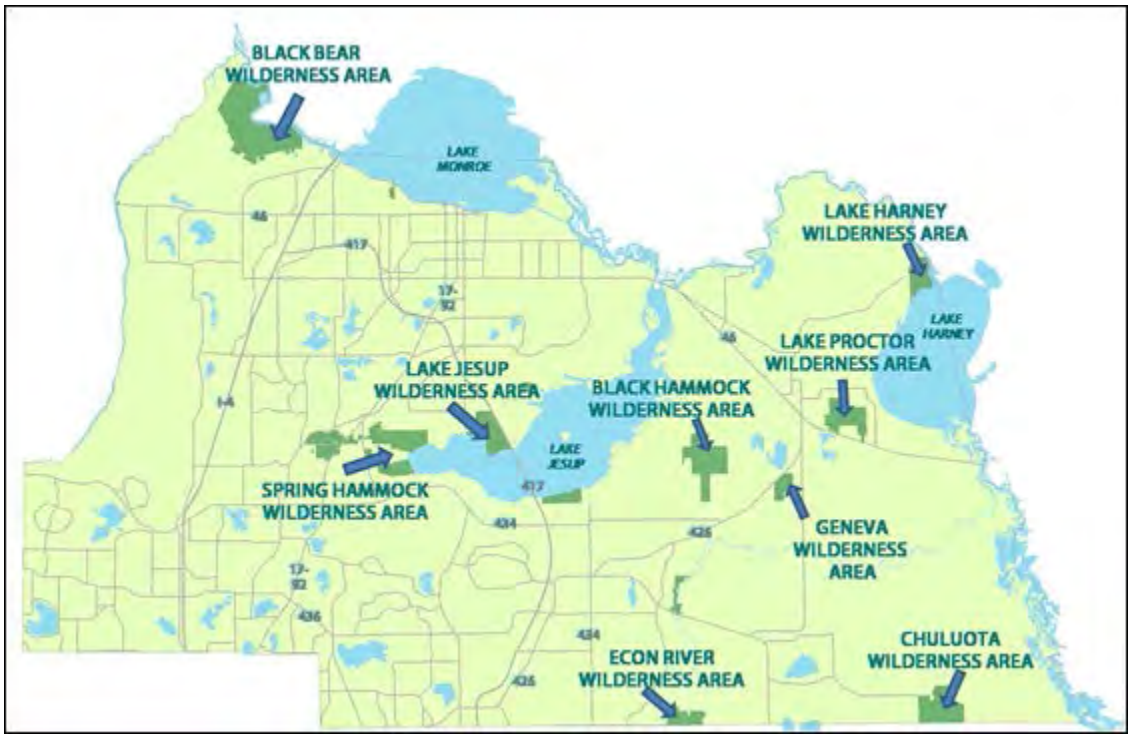
In their natural, undeveloped state, floodplains play an important role in flooding. They allow flood waters to spread over a large area, reducing flood velocities and providing flood storage to reduce peak flows downstream. Natural floodplains reduce wind and wave impacts and their vegetation stabilizes soils. Natural cover acts as a filter for runoff and overbank flows, improving water quality and minimizing the amount of sediment transported downstream and

Wetlands at the Lake Jesup Wilderness Area in Seminole County.

the impurities in that sediment. Floodplains can be recharge areas for groundwater and reduce the frequency and duration of low flows of surface water. They provide habitat for diverse species of plants and animals, some of which cannot live in other habitats. Floodplains are particularly important as breeding and feeding grounds. Natural floodplains also moderate water temperature, reducing potential harm to aquatic plants and animals.

Seminole County preserves and manages several wilderness areas to protect biodiversity of species, wildlife corridors, and water resources while offering passive recreation areas for Seminole County residents. Through a voter approved referendum in 1990, a $20 million bond was established, creating the Seminole County Natural Lands Program. The primary purpose of this program is to systematically assess, rank and purchase environmentally significant lands throughout the County. These lands are purchased to preserve or restore their important ecological functions as well as to provide sites for passive, resource based recreational activities. Since the program's inception, Seminole County has purchased just over 6,600 acres. Several of these sites have been opened for public access, as shown in Figure 22 on the next page.

Figure 21: Wilderness Area Open to the Public in Seminole County



3.11 Historical Storms

In evaluating the localized threat of hurricanes and tropical storms to the City, NOAA hurricane track data from 1851 to 2015 was analyzed to identify storms that may have posed a threat to the County. Based on this data, 47 storms, including hurricanes, tropical storms, tropical depressions, extratropical storms, subtropical storms, and subtropical depressions, passed within 25 miles of Seminole County during that time period. Of these 47 storms, 16 were tropical depressions, subtropical depressions and extratropical storms (winds <39 mph), 20 were tropical storms (winds of 39-73 mph), and 11 were hurricanes. One was a Category 3 hurricane (winds of

111-130 mph), Hurricane Donna in 1960. Four were Category 2 hurricanes (winds of 96-110 mph) and six were Category 1 hurricanes (winds 74-95 mph).

3.12 The St. Johns River

The St. Johns River is a northwardly flowing river that stretches through Florida. This river is the longest river in Florida stretching 310 miles. This river is responsible for draining the eastern half of Central Florida. The issue with this river is when it rains and floods, it always gets bigger. When this river fills up, it is hard to divert the water. In the past ten years, there have been times when the river flooded causing damage in Seminole County. The most recent time of flooding occurred at the end of September to the beginning of October 2014.

3.13 References

1. Flood insurance claims records for Seminole County, FEMA.
2. *Flood Insurance Rate Map for Seminole County and Incorporated Areas,* FEMA.
3. *Local Mitigation Strategy for Seminole County and its Municipalities,* Seminole County.
4. *Seminole County Comprehensive Plan,* Seminole County, 2008.
5. "Storm Events for Florida," NOAA. Retrieved December 13, 2010 from http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms.

4 Goals and Objectives

Chapter 3 documents the flood risk that threatens the unincorporated areas of Seminole County, the vulnerability of structures, infrastructure, and critical facilities to floods, and the capacity the County has to reduce the flood hazard. The intent of Goal Setting is to identify areas where the County's existing capabilities (in terms of policies and programs) can be enhanced so that the community's overall vulnerability to flood hazards is reduced. Goals are also necessary to guide the review of possible mitigation measures. At the same time, this plan needs to ensure that recommended actions are consistent with what is appropriate for Seminole County. Mitigation goals need to reflect community priorities and be consistent with other plans for the County.

4.1 Background

4.1.1 Seminole County Local Mitigation Strategy

The goals of this plan need to be consistent with and complement the goals of other planning efforts. The primary planning document that this Floodplain Management Plan must complement and be consistent with is the Seminole County Local Mitigation Strategy. This plan will be adopted as an appendix to Seminole County Local Mitigation Strategy; therefore the goals in both planning documents should align and not conflict. The eight goals of the Seminole County Local Mitigation Strategy are:

- **Goal 1:** Local government shall make every reasonable effort to identify, develop, implement, and reduce hazard vulnerability through effective mitigation programs.
- **Goal 2:** All sectors of the community will work together to create a disaster resistant community.
- **Goal 3:** Reduce the vulnerability of critical infrastructures and public facilities from the effects of all hazards.
- **Goal 4:** Strengthen continuity planning for local government operations to avoid significant disruptions.
- **Goal 5:** Develop policies and regulation to support effective hazard mitigation programming throughout the community.
- **Goal 6:** Encourage economic vitality of the community by providing businesses continuity education, disaster planning, and diversifying employment opportunities.
- **Goal 7:** Strengthen community's infrastructure to minimize significant disruption from a disaster.

4.2 Goals

Following the exercises, the FMPC agreed upon five general goals for this planning effort. The goals were refined and objectives in support of the goals were also added.

Goal 1: Protect the lives, health, safety and welfare of the citizens of Seminole County from the effects of flooding

- **Objective 1.1:** Focus natural hazard mitigation efforts on flooding resulting from heavy rainfall which causes runoff, overbank, backwater, and stormwater issues to keep the problem from getting worse
- **Objective 1.2:** Implement regulatory measures to encourage new development in areas that are less likely to be exposed to the effects of flood damage
- **Objective 1.3:** Preserve open space in hazardous areas, especially where there are sensitive natural areas and agricultural lands
- **Objective 1.4:** Protect the environmental integrity of the natural water systems in Seminole County by focusing on water quality and best management practices

Goal 2: Promote emergency management and warning system measures to provide better protection to the residents of Seminole County

- **Objective 2.1:** Leverage state and federal emergency management funding for planning, training and equipment
- **Objective 2.2:** Seek funding for the installation of stream and river gages to help provide increased flood warning capability

Goal 3: Promote a public education program to encourage self-help and self-protection measures to mitigate the effects of flood damage on private property

- **Objective 3:1:** Encourage residents to assume an appropriate level of responsibility for their own protection
- **Objective 3.2:** Promote flood insurance as a property protection measure against flood damage

Goal 4: Protect critical and cultural facilities and public infrastructure from flood damage

- **Objective 4.1:** Seek County, State and Federal support for projects
- **Objective 4.2:** Identify critical infrastructure in need of protection from flood damage

Goal 5: Identify and implement specific projects to mitigate flood damage where cost-effective and affordable to include reducing the number of repetitively damaged structures

- **Objective 5.1:** Leverage state and federal grant funding to facilitate buyouts, elevations and other mitigation efforts
- **Objective 5.2:** Target repetitive loss properties for implementation of mitigation projects

5 Preventive Measures

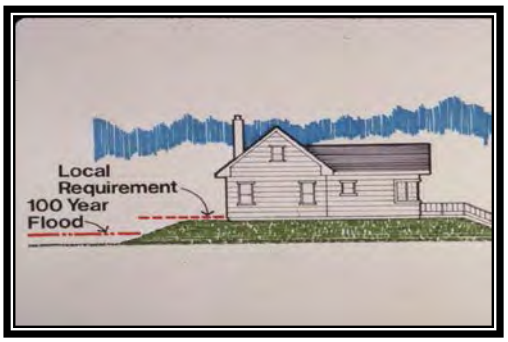
Preventive measures are designed to keep a problem such as flooding from occurring or from getting worse. The objective of preventive measures is to ensure that future development is not exposed to damage and does not cause an increase in damages to other properties. Building, zoning, planning and code enforcement offices usually administer preventive measures. Some examples of types of preventive measures include:

- Building codes
- Planning and zoning
- Open space preservation
- Floodplain regulations
- Stormwater management

5.1 Building Codes

Building codes provide one of the best methods of addressing flood hazards. When properly designed and constructed according to code, the average building can withstand many of the impacts of natural hazards. Hazard protection standards for all new and improved or repaired buildings can be incorporated into the local building code. Building codes can ensure that the first floors of new buildings are constructed to be higher than the elevation of the 100-year flood (the flood that is expected to have a one percent chance of occurring in any given year). Building codes in Seminole County also require that driveways are sloped so as to prevent flood waters from draining into a building.

Figure 22: Elevated Home



Just as important as having code standards is the enforcement of the code. Adequate inspections are needed during the course of construction to ensure the builder understands the requirements and is following them. Making sure a structure is properly anchored requires site inspections at each step.

Seminole County's Code of Ordinances adopts the Florida Building Code by reference, and the State of Florida has some of the most stringent building codes in the nation. Nonetheless, during planning meetings where the mitigation strategies were evaluated, the FMPC discussed possible ways to strengthen Seminole County's building codes. There is relatively no cost involved in strengthening codes, but since the County adopts the Florida Building Code, the possibility of exceeding current code requirements is extremely slim. Another possibility discussed was to increase the number of elevation reference benchmarks available in the County. The benefit to construction and development of having more elevation reference marks is that developers are able to measure elevation more accurately for new structures, thereby ensuring that the County's construction code requirements for structure elevations are met.

5.1.1 Manufactured Homes

Manufactured or mobile homes are usually not regulated by local building codes. They are built in a factory and out of state, and they are shipped to a site. They do have to meet construction standards set by the U.S. Department of Housing and Urban Development. All mobile homes constructed after 1976 must comply with HUD's National Manufactured Home Construction and Safety Standards. These standards apply uniformly across the country and it is illegal for a local unit of government to require additional construction requirements. Local jurisdictions may regulate the location of these structures and their on-site installation.

The NFIP allows communities to exempt mobile homes in existing mobile home parks from some of the flood protection requirements. The CRS provides up to 50 points if the community does not use this exemption. Seminole County does not use this exemption.

5.1.2 Local Implementation

Seminole County uses the 2014 Florida Building Code. The County's floodplain management ordinance requires development in areas of special flood hazard to be reasonably safe from flooding. This means that new construction and substantial improvements shall be designed or modified and adequately anchored to prevent flotation, collapse or lateral movement of the structure resulting from flooding. New construction and substantial improvements must also be constructed using methods that minimize flood damage. New construction or substantial improvement of any residential structure, including manufactured homes, must have the lowest floor, including the basement, elevated to no lower than one foot above the base flood elevation. In addition, manufactured homes must be anchored to prevent flotation, collapse, or lateral movement. For commercial properties, the first floor must be elevated to one foot above the base flood or they must be flood-proofed in lieu of being elevated.

5.1.3 CRS Credit

The CRS encourages strong building codes. It provides credit in two ways: points are awarded based on the community's BCEGS classification and points are awarded for adopting the International Code series. Seminole County's BCEGS rating is a Class 3 for both residential and commercial. Seminole County uses the 2014 Florida Building Code

The CRS also has a prerequisite for a community to attain a CRS Class 8 or better: the community must have a BCEGS class of 6 or better. To attain a CRS Class 4 or better, the community must have a BCEGS class of 5 or better. Seminole County's BCEGS class is 3/3.

5.2 Planning and Zoning

Building codes provide guidance on how to build in hazardous areas. Planning and zoning activities direct development away from these areas, especially floodplains and wetlands. They do this by designating land uses that are compatible with the natural conditions of lands prone to flooding, such as open space or recreation. Planning and zoning activities can also provide

benefits simply by allowing developers more flexibility in arranging improvements on a parcel of land through the planned development approach.

5.2.1 Comprehensive Plans

These plans are the primary tools used by communities to address future development. They can reduce future flood-related damages by indicating open space or low density development within floodplains and other hazardous areas. Unfortunately, natural hazards are not always emphasized or considered in the specific land use recommendations.

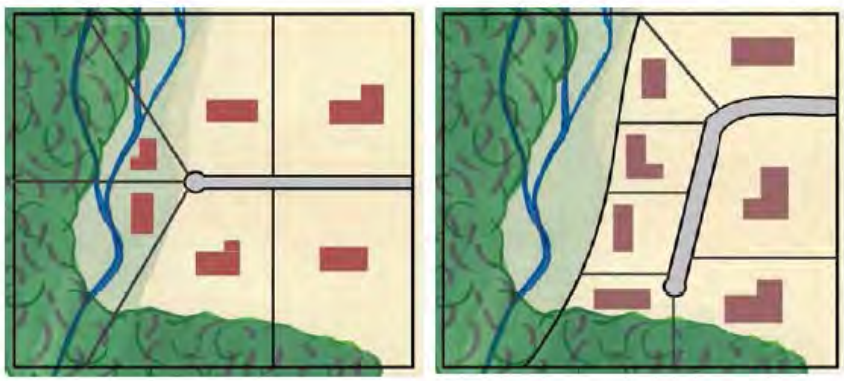
Generally, a plan has limited authority. It reflects what the community would like to see happen. Its utility is that it guides other local measures, such as capital improvement programs, zoning ordinances, and subdivision regulations.

5.2.2 Zoning Regulations

A zoning ordinance regulates development by dividing a community into zones and setting development criteria for each zone. Zoning codes are considered the primary tool to implement a comprehensive plan's guidelines for how land should be developed. Zoning ordinances can limit development in hazardous areas, such as reserving floodplain zones for agricultural uses. Often, developers will produce a standard grid layout. The ordinance and the community can allow flexibility in lot sizes and location so developers can avoid hazardous areas.

One way to encourage such flexibility is to use a planned unit development (PUD) approach. This approach allows developers to incorporate flood hazard mitigation measures into projects. Open space or floodplain preservation can be facilitated as site design standards and land use densities can be adjusted to fit the property's specific characteristics, as shown in Figure 26.

Figure 23: Planned Unit Developments



PUD: In the standard zoning approach (left), the developer considers six equally-sized lots without regard for the flood hazard. Two properties are subject to flooding and the natural stream is disrupted. An alternative, flexible, PUD approach is shown on the right. The floodplain is dedicated as public open space. There are seven smaller lots, but those abutting the floodplain have the advantage of being adjacent to a larger open area. Four lots have riverfront views instead of two. These amenities compensate for the smaller lot sizes, so the parcels are valued the same. The developer makes the same or more income and the future residents are safer.

5.2.3 Capital Improvement Plans

A capital improvement plan will guide a community's major public expenditures for a five- to 20-year period. Capital expenditures may include acquisition of open space within the hazardous areas, extension of public services into hazardous areas, or retrofitting existing public structures to withstand a hazard.

5.2.4 Local Implementation

The *Seminole County Comprehensive Plan* includes conservation goals to address the long-range implementation of programs aimed at meeting environmental regulations and preserving the County's natural amenities. Seminole County uses a multi-faceted system to direct incompatible land uses away from wetlands. To date, this system has managed to preserve most of the wetland acreage in the urban area. There are three primary methods by which the County directs incompatible land uses away from wetlands, and several secondary methods. The primary methods are:

1. **Identification of environmentally sensitive lands.** These lands are to be preserved during the development process.
2. **Land acquisition.** Seminole County also protects wetlands through land acquisition via the County's Natural Lands Program. In combination with the efforts of the U.S. Army Corps of Engineers, the Florida Department of Environmental Protection and the St. Johns River Water Management District, over 18,000 acres of the County's 41,000 acres of wetlands are in public ownership. This is roughly 44% of County lands.
3. **Special areas.** The County and the State have designated areas for special consideration to protect wetlands, including the Wekiva River Protection Area, the Econlockhatchee River Protection Zone, and the East Rural Area. These three areas make up roughly 75 percent of the County's unincorporated area. Development within these areas is managed and regulated to protect natural resources and maintain their rural character.

The secondary methods of directing incompatible uses away from wetlands are through the implementation and execution of the *Comprehensive Plan's* Future Land Use designations and Seminole County's Land Development Code.

1. **Special Techniques.** For example, allowing clustering of development, or planned development, in exchange for preserving open areas which protects natural resources from development.
2. **Environmentally Sensitive Land Overlay.** Seminole County maintains an Environmentally Sensitive Lands Overlay Area, as defined in the Comprehensive Plan. The Environmentally Sensitive Lands Overlay Area includes any areas flooded during a 100-year flood event or identified by NFIP as Zone A or Zone V, as well as wetlands as defined by the St. Johns River Water Management District. This designation is used to limit permitted uses on wetland properties and direct development away from environmentally sensitive lands.
3. **The Urban/Rural Boundary.** This boundary forms the foundation for both wetland regulation and for the land uses that are assigned throughout the County. Having established that the East Rural Area contains a high quality mosaic of valuable wetland and upland systems, the County has adopted a limited number of land use designations of very low density in the Rural Area to protect these resources.

5.2.5 CRS Credit

The CRS provides flood insurance discounts to those communities that implement various floodplain management activities that meet certain criteria. Comparing local activities to those national criteria helps determine if local activities should be improved.

Up to 100 points are provided for regulations that encourage developers to preserve floodplains or other hazardous areas from development. There is no credit for a plan, only for the enforceable regulations that are adopted pursuant to a plan. Up to 600 points are provided for setting aside floodplains for low density zoning, such as five acre lots or conservation.

5.3 Open Space Preservation

Keeping the floodplain and other hazardous areas open and free from development is the best approach to preventing damage to new developments. Open space can be maintained in agricultural use or can serve as parks, greenway corridors and golf courses.

Comprehensive and capital improvement plans should identify areas to be preserved by acquisition and other means, such as purchasing an easement. With an easement, the owner is free to develop and use private property, but property taxes are reduced or a payment is made to the owner if the owner agrees to not build on the part set aside in the easement.

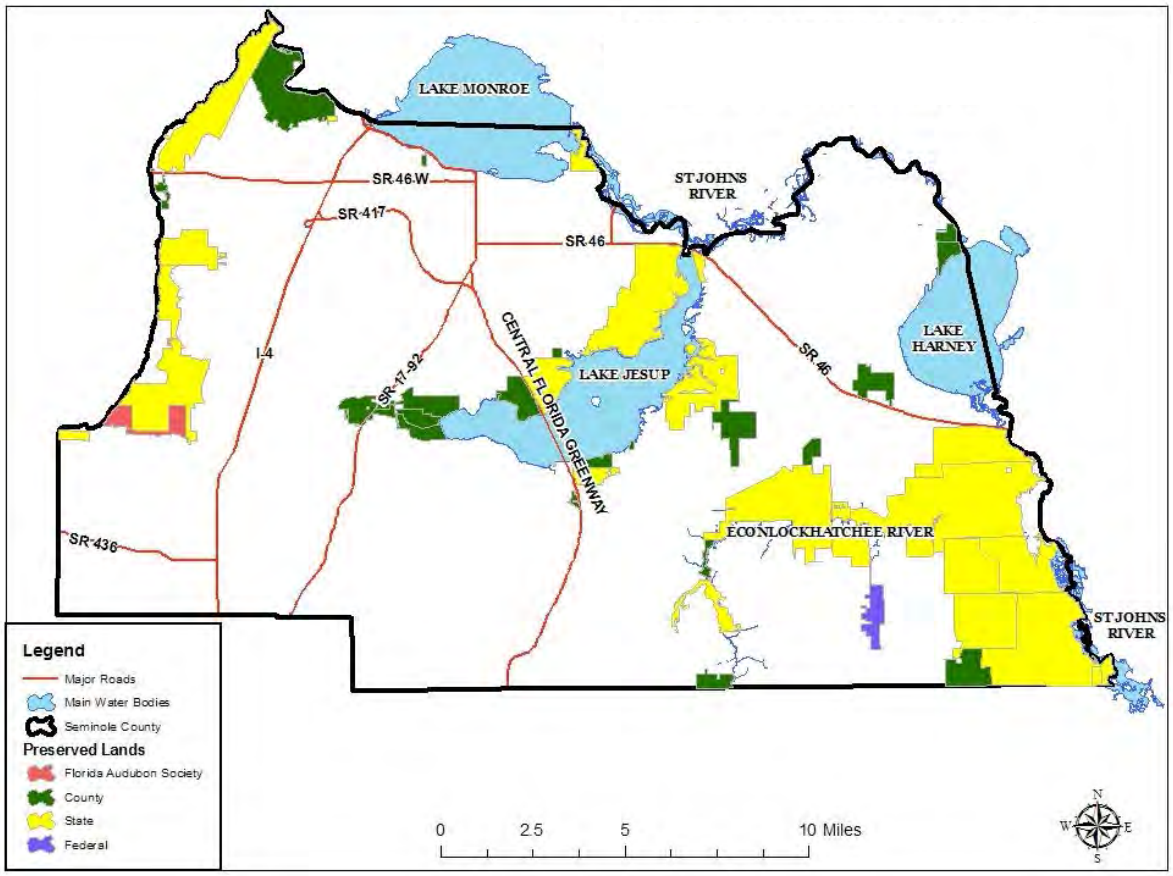
Although there are some federal programs that can help acquire or preserve open lands, open space lands and easements do not always have to be purchased. Developers can be encouraged to dedicate park land and required to dedicate easements for drainage and maintenance purposes. These are usually linear areas along property lines or channels. Maintenance easements also can be donated by streamside property owners in return for a community maintenance program.

5.3.1 Local Implementation

In 1990, the voters of Seminole County approved a $20 million dollar bond which created the Seminole County Natural Lands Program (NLP). The NLP established a system to access, rank and purchase environmentally significant lands throughout the County. In 2000, a voter-approved referendum provided for $25 million dollars with $20 million dollars of support of the County trails program and $5 million dollars for natural lands. The County used these funds to purchase land to preserve or restore their important ecological functions, as well as provide sites for passive resource-based recreational activities. Since the inception of the program, Seminole County has purchased and currently manages just over 6,600 acres of land through the NLP.

The County's adoption of flood prone and wetland ordinances were critical steps in providing countywide protection of wetlands. The County's wetlands protection program has established an extensive network of wetlands under conservation easements. Land acquisition efforts by Seminole County and the State of Florida have led to the conservation of major wetland systems in the Econlockhatchee, Wekiva, St. Johns, and Lake Jesup Basins. An ongoing focus on the conservation of intact wetland systems in the rural portion of the County supplements these acquisition programs. Preserved lands in Seminole County are shown in the figure below.

Figure 24: Preserved Lands in Seminole County



Wilderness areas and trails created from these referendums include the Black Bear, Black Hammock, Geneva, Chuluota, Lake Proctor, Econ River, Lake Jesup, and Spring Hammock Preserve. These environmental assets are open to the public for environmental education and passive recreation. The County designated these lands as “Preservation/Managed Lands” on the Future Land Use Plan Map in 2008. The County will continue to manage the more than 6,600 acres of Natural Lands acquired through these bond referendum for the preservation of significant natural habitats, open space areas and greenways.

In addition, the Comprehensive Plan states that the County shall include in its Land Development Code neighborhood performance standards for “common, liked and usable open space for active and/or passive recreation, including interconnected walkways, bikeways, trails and greenways” as well as “Preservation of onsite natural lands.” The County’s Land Development Code requires that all new development, unless otherwise specified within the Code, include a minimum amount of urban, suburban or rural open space and that open space areas within a development be connected to each other. The amount and type of required open space varies with the character of the proposed development and surrounding land uses. For commercial developments, the open space ratio is a minimum of 25% of the parcel.

5.3.2 CRS Credit

Preserving flood prone areas as open space is one of the highest priorities of the Community Rating System. Up to 700 points can be given, based on how much of the floodplain is in parks, wildlife refuges, golf courses, or other uses that can be depended on to stay open (Activity 420 – Open Space Preservation).

5.4 Subdivision Regulations

Subdivision regulations govern how land will be subdivided and set construction standards. These standards generally address roads, sidewalks, utilities, storm sewers, and drainageways. They can include the following flood protection standards:

- Requiring that the final plat show all hazardous areas
- Requiring that each lot be provided with a building site above the flood level
- Requiring that all roadways be no more than one foot below the flood elevation

5.4.1 Local Implementation

Seminole County's subdivision regulations require:

- Final subdivision plats require the 100-year floodplain boundary to be identified.

5.5 Floodplain Regulations

Most communities with a flood problem participate in the National Flood Insurance Program (NFIP). The NFIP sets minimum requirements for the participating communities' standards for development, subdivision of land, construction of buildings, installation of mobile homes, and improvements and repairs to buildings. These are usually spelled out in a separate ordinance.

The NFIP minimum requirements are summarized in the box on the next page. It should be stressed that these are minimum requirements. To gain credit in the CRS, communities must adopt and implement floodplain regulations that go above and beyond the minimum requirements of the NFIP.

5.5.1 Enforcement

To ensure that communities are meeting the NFIP standards, FEMA periodically conducts a Community Assessment Visit. During this visit, the maps and ordinances are reviewed, permits are checked, and issues are discussed with staff. Failure to meet all of the requirements can result in one or more consequences:

- Reclassification under the Community Rating System to a higher class
- Probation, which entails a $50 surcharge on every flood insurance policy in the community, or
- Suspension from the NFIP.

In 2004, Lafourche Parish, Louisiana, was cited and reclassified from a CRS Class 9 to a Class 10, in effect kicking the P+arish out of the CRS. Suspension is more serious. It means that the community is out of the NFIP and the following sanctions are imposed:

- Flood insurance will not be available. No resident will be able to purchase a flood insurance policy.
- Existing flood insurance policies will not be renewed.
- No direct federal grants or loans for development may be made in identified flood hazard areas under programs administered by federal agencies, such as HUD, EPA, and the Small Business Administration.
- Federal disaster assistance will not be provided to repair insurable buildings located in identified flood hazard areas for damage caused by a flood.
- No federal mortgage insurance or loan guarantees may be provided in identified flood hazard areas. This includes policies written by FHA, VA, and others.
- Federally insured or regulated lending institutions, such as banks and credit unions, must notify applicants seeking loans for insurable buildings in flood hazard areas that there is a flood hazard and the property is not eligible for federal disaster relief.

These sanctions can be severe for any community with a substantial number of buildings in the floodplain. Most communities with a flood problem have joined the NFIP and are in full compliance with their regulatory obligations.

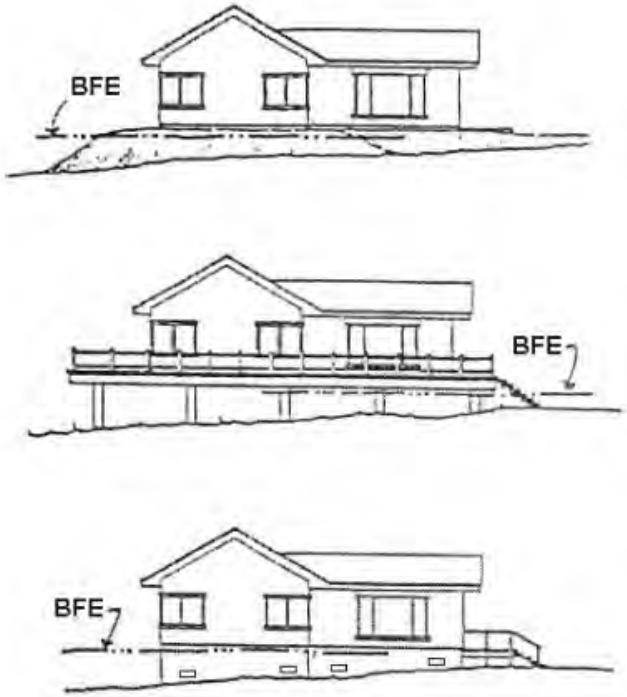
One way to assure good administration and enforcement is to have Certified Floodplain Managers on staff. The Association of State Floodplain Managers administers the national Certified Floodplain Manager (CFM®) program. Certification involves a three hour exam and a requirement for continuing education each year. The exam covers the regulatory standards of the National Flood Insurance Program as well as mapping, administration, enforcement and flood hazard mitigation.

5.5.2 Minimum NFIP Regulatory Requirements

The NFIP is administered by FEMA. As a condition of making flood insurance available for their residents, communities that participate in the NFIP agree to regulate new construction in the area subject to inundation by the 100-year (base) flood. The floodplain subject to these requirements is shown as an A or V Zone on the Flood Insurance Rate Map (FIRM).

There are five major floodplain regulatory requirements. Additional floodplain regulatory requirements may be set by state and local laws.

Communities are encouraged to adopt local ordinances that are more comprehensive or provide more protection than the federal criteria. The NFIP's Community Rating System provides insurance premium credits to recognize the additional flood protection benefit of higher regulatory standards.



5.5.3 Local Implementation

Seminole County's Floodplain Ordinance meets all of the NFIP's floodplain

regulatory requirements. The County's Floodplain Ordinance exceeds minimum NFIP standards for a number of elements that are credited in the CRS.

5.5.4 CRS Credit

There are many higher regulatory standards that warrant CRS credit. These standards include:

- Delineating a floodway, the area of higher hazard near the channel. This would allow development outside the floodway (called the "floodplain fringe") without engineering studies to determine their impact on others.
- Requiring all new construction to be elevated one or two feet above the base flood elevation to provide an extra level of protection from waves and higher floods. This extra protection is reflected in a distinct reduction in flood insurance rates.
- Having all developers (not just the larger ones) provide flood data where none are available.
- Specifications to protect foundations from erosion, scour and settling.
- Prohibiting critical facilities from all or parts of the floodplain.
- Prohibiting hazardous materials.
- Requiring buffers adjacent to streams or natural areas.
- Restrictions on use of enclosures below elevated buildings.
- Flood storage lost due to filling and construction must be compensated for by removal of an equal volume of storage.
- The CRS also provides credit for having trained staff and a higher credit if the staff members are Certified Floodplain Managers.

It should be noted that one of the prerequisites for participation in the CRS is that the community be in full compliance with the minimum requirements of the NFIP. A community with a number of "potential violations" risks being removed from the CRS entirely.

Seminole County's Floodplain Ordinance requires that residential construction is built with the lowest floor no lower than one foot above the base flood elevation, which is an extra requirement beyond NFIP's minimum requirements. An additional requirement beyond the minimum for Seminole County is that the ordinance sets specific restrictions on the use of enclosures below elevated buildings.

The County has a total of ten Certified Floodplain Managers on staff, four of whom are in the Building Division.

Buffers are required within wetlands to protect the natural and beneficial functions of the floodplain.

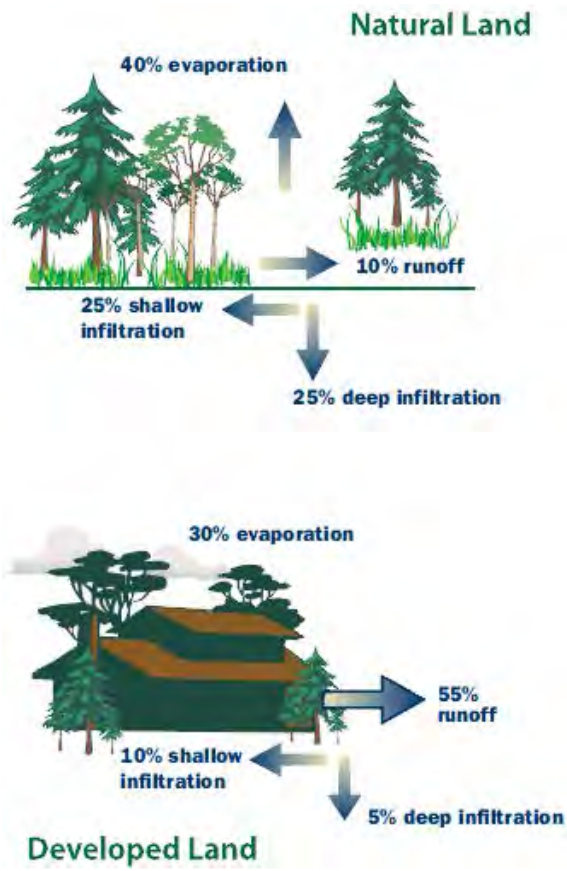
Seminole County has a floodplain storage capacity requirement that requires that if fill is brought into a development, an equal amount of fill must be removed somewhere in the floodplain to maintain the floodplain storage capacity.

5.6 Stormwater Management

Development in floodplains is development in harm's way. New construction in the floodplain increases the amount of development exposed to damage and can aggravate flooding on neighboring properties.

Development outside a floodplain can also contribute to flooding problems. Stormwater runoff is increased when natural ground cover is replaced by urban development (see graphic). Development in the watershed that drains to a river can aggravate downstream flooding, overload the community's drainage system, cause erosion, and impair water quality.

Figure 26: Effect of Development on Stormwater



There are three ways to prevent flooding problems caused by stormwater runoff:

1. Regulating development in the floodplain to ensure that it will be protected from flooding and that it won't divert floodwaters onto other properties, and
2. Regulating all development to ensure that the post-development peak runoff will not be greater than it was under pre-development conditions.
3. Set construction standards so buildings are protected from shallow water.

Most communities participate in the NFIP, which sets minimum requirements for regulating development in the floodplain. The State of Florida has more stringent requirements than the NFIP, including a requirement that all new buildings must be elevated to no lower than one foot above the base flood elevation.

Stormwater runoff regulations require developers to build retention or detention basins to minimize the increases in the runoff rate caused by impervious surfaces and new drainage systems. Generally, each development must not let stormwater leave at a rate higher than what existed under pre-development conditions.

Standards for drainage requirements are typical in subdivision regulations. Standards for storm sewers, ditches, culverts, etc., are best set when an area is laid out and developed. Traditionally, the national standard is to require that the local drainage system carry the 10-year storm. Recently, communities are finding that older estimates of the 10-year storm understated the true hazard, so they are addressing larger storms.

One problem with requiring the drainage system to carry water away is that runoff increases with urban development. The runoff equivalent of a 10-year storm occurs more frequently, and from smaller storms. The problem is just sent downstream onto someone else's property.

Accordingly, modern subdivision regulations require new developments to ensure that the post-development peak runoff will not be greater than it was under pre-development conditions. This is usually done by constructing retention or detention basins to hold the runoff for a few hours or days, until flows in the system have subsided and the downstream channels can accept the water without flooding.

If the storm sewers or roadside ditches cannot handle a heavy rain, the standard subdivision design uses the streets to carry excess runoff. If the flows exceed the streets' capacity, adjacent properties will flood. Therefore, the third approach to protecting from stormwater flooding is to make sure new buildings are elevated one or two feet above the street or above adjacent grade.

5.6.1 Local Implementation

The County's surface water management standards, within the Land Development Ordinance, set requirements for managing runoff from new developments. The standards require the storage and controlled release or retention on-site and infiltration into the ground of excess stormwater runoff from any commercial, industrial, and residential developments such that runoff from the site and peak attenuation rates will not be greater post-development than they were prior to development.

The procedure for disposing of excess stormwater runoff varies depending on the Hydrologic Soil Classification of the soils within the proposed development. For pervious soils (types A and B), the required overall stormwater management strategy is on-site retention and infiltration into the ground. For impervious soils (types C and D) or high ground water table areas (types A/D, B/D and C/D) the required overall stormwater management system is providing detention basins to attenuate the peak from the contributory drainage area and to settle solids washed off or eroded.

The Land Development Ordinance also encourages the use of natural vegetative cover in controlling erosion. The ordinance provides for two overlay districts that protect the Wekiva River and the Econlockhatchee River by requiring design standards that establish high quality development that is rural, maintains existing vegetation, protects wetlands, and minimizes disturbance to certain species and their habitats. Within the Wekiva River zoning overlay, development activity and the placement or depositing of fill is prohibited within wetlands and the 100-year floodplain. Within the Econlockhatchee zoning overlay, native plants must be used and removal of vegetation minimized in landscaping to the greatest extent practical and peak discharge rates for stormwater BMPs shall not exceed the pre-development rate for the mean annual storm event (24 hour, 2.3 year return period) and the 25-year storm. In some parts of the Econlockhatchee zoning overlay, development is prohibited within 550 feet of the stream's edge of channels of the Big Econlockhatchee River and the Little Econlockhatchee River except for the creation of wetlands and passive recreational uses.

5.6.2 CRS Credit

CRS credit is provided for both higher regulatory standards in the floodplain and stormwater management standards for new developments. Credit is based on how those standards exceed the minimum NFIP requirements.

The County's Surface Water Management Ordinance has the following provisions that would be recognized by the CRS (in addition to provisions discussed in previous sections):

- Standards for retention and detention basis
- Requirements for erosion and sedimentation control,

The County should receive at least 156 points for these provisions.

5.7 Conclusions

1. Installation of new mobile homes appears to be adequately administered to ensure proper tie downs and flood protection.
2. The majority of the comprehensive and land use plans address floodplains and the need to preserve these hazardous areas from intensive development. However, most zoning ordinances do not designate floodprone areas for any special type of land use.
3. Standards in subdivision regulations for public facilities should account for the hazards present at the site. New building sites, streets, and water systems should facilitate access and use by fire and emergency equipment.
4. A percentage of the county's floodplain is open space in public ownership. Because some of the floodplain is still undeveloped and not preserved as open space preventive measures can have a great impact on future flood damages. There are more opportunities to preserve more open space, especially when new developments are proposed.
5. The County's floodplain development and stormwater management regulations exceed minimum national and state standards, for the most part, and will be helpful in preventing flood problems from increasing.

5.8 Recommendations

1. The County planning and engineering staff should develop example subdivision ordinance language that requires new infrastructure to have hazard mitigation provisions, such as:
    a. Buried utility lines and
    b. Storm shelters in new mobile home parks.
2. The County should use every opportunity to preserve floodplain areas as open space or other uses compatible with the flooding hazard.
3. The County should continue to enforce its existing regulations for development and mobile homes and consider other higher standards to further protect the residents of Seminole County.

5.9 References

1. *CRS Coordinator's Manual,* FEMA, 2007.
2. *Design and Construction Guidance for Community Shelters,* FEMA, 2000.
3. *Manufactured Home Installation in Flood Hazard Areas,* FEMA, 1985.

4. *Multi-Hazard Identification and Risk Assessment*, FEMA, 1997.
5. Seminole County Code of Ordinances and Land Development Code, Seminole County.
6. *Subdivision Design in Flood Hazard Areas,* American Planning Association and FEMA, PAS Report 473, 1997.
7. *State of Florida Flood Damage Prevention Ordinance for Non-Coastal Communities with Regulatory Floodways*, Model Ordinance, 2009.

6 Property Protection Measures

Property protection measures are used to modify buildings or property subject to damage. Property protection measures fall under three approaches:

- Modify the site to keep the hazard from reaching the building,
- Modify the building so it can withstand the impacts of the hazard, and
- Insure the property to provide financial relief after the damage occurs.

Property protection measures are normally implemented by the property owner, although in many cases technical and financial assistance can be provided by a government agency. These are discussed later in this chapter.

6.1 Keeping the Hazard Away

Generally, natural hazards do not damage vacant areas. As noted earlier, the major impact of hazards is to people and improved property. In some cases, properties can be modified so the hazard does not reach the damage-prone improvements. For example, a berm can be built to prevent floodwaters from reach a house.

6.1.1 Flooding

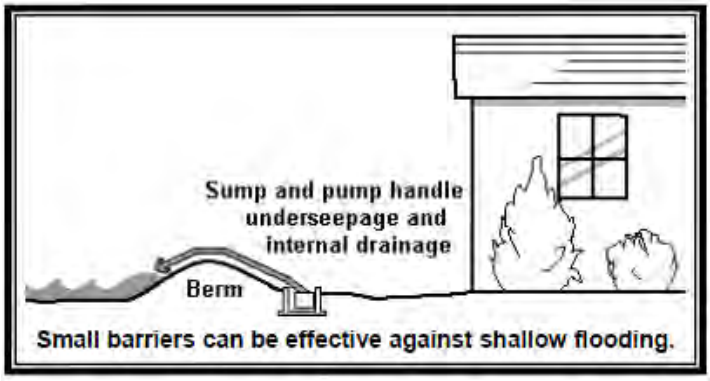
There are five common methods to keep a flood from reaching and damaging a building:

1. Erect a barrier between the building and the source of the flooding.
2. Move the building out of the floodprone area.
3. Elevate the building above the flood level.
4. Demolish the building.
5. Replace the building with a new one that is elevated above the flood level.

6.1.2 Barriers

A flood protection barrier can be built of dirt or soil (a “berm”) or concrete or steel (a “floodwall”). Careful design is needed so as not to create flooding or drainage problems on neighboring properties. Depending on how porous the ground is, if floodwaters will stay up for more than an hour or two, the design needs to account for leaks, seepage of water underneath, and rainwater that will fall inside the perimeter. This is usually done with a sump or drain to collect the internal groundwater and surface water and a pump and pipe to pump the internal drainage over the barrier.

Figure 27: Flood Protection Barrier



Barriers can only be built so high. They can be overtopped by a flood higher than expected. Barriers made of earth are susceptible to erosion from rain and floodwaters if not properly sloped, covered with grass, and properly maintained. A berm can also settle over time, lowering its protection level. A floodwall can crack, weaken, and lose its watertight seal. Therefore, barriers need careful design and maintenance (and insurance on the building, in case of failure).

This low floodwall has landscaping to minimize the adverse impact on the property's appearance.

6.1.3 Relocation

Moving a building to higher ground is the surest and safest way to protect it from flooding. While almost any building can be moved, the cost increases for heavier structures, such as those with exterior brick and stone walls, and for large or irregularly shaped buildings. However, experienced building movers can handle any job.

Small, wood frame buildings are the easiest to relocate

Source: Kennedy House Movers, Huntsville, AL

In areas subject to flash flooding, deep waters, or other high hazard, relocation is often the only safe approach. Relocation is also preferred for large lots that include buildable areas outside the floodplain or where the owner has a new flood-free lot (or portion of the existing lot) available.

6.1.4 Building Elevation

Raising a building above the flood level can be almost as effective as moving it out of the floodplain. Water flows under the building, causing little or no damage to the structure or its contents.

Raising a building above the flood level is cheaper than moving it and can be less disruptive to a neighborhood. Elevation has proven to be an acceptable and reasonable means of complying with floodplain regulations that require new, substantially improved, and substantially damaged buildings to be elevated above the base flood elevation.

One concern with elevation is that it may expose the structure to greater impacts from other hazards. If not braced and anchored properly, an elevated building may have less resistance to the shaking of an earthquake and the pressures of high winds.

6.1.5 Demolition

Some buildings, especially heavily damaged or repetitively flooded ones, are not worth the expense to protect them from future damages. It is cheaper to demolish them and either replace them with new, flood protected structures ("pilot reconstruction"), or relocate the occupants to a safer site. Demolition is also appropriate for buildings that are difficult to move – such as larger, slab foundation or masonry structures – and for dilapidated structures that are not worth protecting. Generally, demolition projects are undertaken by a government agency, so the cost is not borne by the property owner, and the land is converted to public open space use, like a park.

Demolishing a repetitively flooded home

One problem that sometimes results from an acquisition and demolition project is a "checkerboard" pattern in which nonadjacent properties are acquired. This can occur when some owners, especially those who have and prefer a waterfront location, are reluctant to leave their homes. Creating such an acquisition pattern in a community simply adds to the maintenance costs that taxpayers must support.

6.1.6 Pilot Reconstruction

If a building is not in good shape, elevating it may not be worthwhile or it may even be dangerous. An alternative is to demolish the structure and build a new one on the site that meets or exceeds all flood and wind protection codes. This was formerly known as "demo/rebuild." FEMA funding programs refer to this approach as "pilot reconstruction." It is still a pilot program, and not a regularly funded option.

Certain rules must be followed to qualify for federal funds for pilot reconstruction:

- Pilot reconstruction is only possible after it has been shown that acquisition or elevation are not feasible, based on the program's criteria.
- Funds are only available to people who owned the property at the time of the event for which funding is authorized.
- It must be demonstrated that the benefits exceed the costs.
- The new building must be elevated to the advisory base flood elevation.
- The new building must not exceed more than 10% of the old building's square footage.
- The new building must meet all flood and wind protection codes.
- There must be a deed restriction that states the owner will buy and keep a flood insurance policy.
- The maximum federal grant is 75% of the cost, up to $150,000. FEMA is developing a detailed list of eligible costs to ensure that disaster funds are not used to upgrade homes.

6.1.7 Local Implementation

Seminole County has had experience with acquisition, demolition, or elevation to protect buildings from flooding. The County has received grants from FEMA to manage these programs. The County is currently in the process of removing structures from the floodplain.

6.1.8 CRS Credit

The CRS provides the most credit points for acquisition and relocation, because this measure permanently removes insurable buildings from the floodplain. Under Activity 520 – Acquisition and relocation, Seminole County could receive up to 100 points for Option 2.

The CRS credits barriers and elevating existing buildings (Activity 530 – Flood Protection). Elevating a building above the flood level will also reduce the flood insurance premiums on that individual building. A CRS score of up to 84 points is possible. Because barriers are less secure than elevation, not as many points are provided.

Higher scores are possible, but they are based on the number of buildings removed compared to the number remaining in the floodplain.

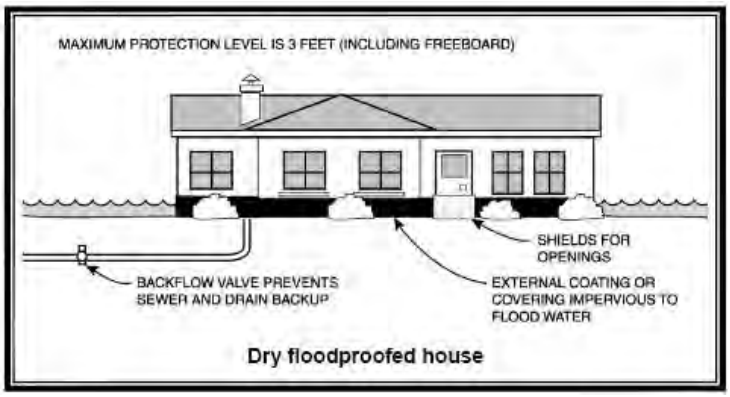
6.2 Retrofitting

An alternative to keeping the hazard away from a building is to modify or retrofit the site or building to minimize or prevent damage. There are a variety of techniques to do this, as described below.

6.2.1 Dry Floodproofing

Dry floodproofing entails making all areas below the flood protection level watertight. Walls are coated with waterproofing compounds or plastic sheeting. Openings, such as doors, windows and vents, are closed, either permanently, with removable shields, or with sandbags. Dry floodproofing of new and existing nonresidential buildings in the regulatory floodplain is permitted under state, FEMA and local regulations. Dry floodproofing of existing residential buildings in the floodplain is also permitted as long as the building is not substantially damaged or being substantially improved. Owners of buildings located outside the regulatory floodplain can always use dry floodproofing techniques.

Figure 28: Dry Floodproofing



Dry floodproofing is only effective for shallow flooding, such as repetitive drainage problems. It does not protect from the deep flooding along lakes and larger rivers caused by hurricanes or other storms.

6.2.2 Wet Floodproofing

The alternative to dry floodproofing is wet floodproofing: water is let in and everything that could be damaged by a flood is removed or elevated above the flood level. Structural components below the flood level are replaced with materials that are not subject to water damage. This is the approach used for the first floor of the elevated homes described in the previous section.

For example, concrete block walls are used instead of wooden studs and gypsum wallboard. The furnace, water heater and laundry facilities are permanently relocated to a higher floor. Where the flooding is not deep, these appliances can be raised on blocks or platforms. This practice is not generally used in central and southern Florida where most structures are slab on grade.

6.2.3 Local Implementation

It is likely that some properties in Seminole County have been retrofitted to protect them from flooding. However, because these projects are often so small, they generally do not require a building permit and there are no records of them.

6.2.4 CRS Credit

Credit for dry and wet floodproofing is provided under Activity 530 – Retrofitting. Because these property protection measures are less secure than barriers and elevation, not as many points are provided.

6.3 Insurance

Technically, insurance does not mitigate damage caused by a natural hazard. However, it does help the owner repair, rebuild, and hopefully afford to incorporate some of the other property protection measures in the process. Insurance offers the advantage of protecting the property, as long as the policy is in force, without human intervention for the measure to work.

Figure 29: Example Flood Insurance Premiums

Building Exposure	Premium
In the Special Flood Hazard Area (AE Zone)	$1,689
Pre-FIRM ("subsidized") rate	
Post-FIRM (actuarial) rates	
2 feet above the base flood elevation	$440
1 foot above the base flood elevation	$643
At the base flood elevation	$1,167
1 foot below the base flood elevation	$4,379
Outside the Special Flood Hazard Area	$1,029

Premiums are for $150,000 in building coverage and $75,000 in contents coverage for a one-story house with no basement and a $500 deductible, using the October 2008 Flood Insurance Manual. Premiums include the 5% Community Rating System discount. Premiums are higher for local governments that do not participate in the CRS.

6.3.1 Private Property

Although most homeowner's insurance policies do not cover a property for flood damage, an owner can insure a building for damage by surface flooding through the NFIP. Flood insurance coverage is provided for buildings and their contents damaged by a "general condition of surface flooding" in the area.

Most people purchase flood insurance because it is required by the bank when they get a mortgage or home improvement loan. Usually these policies just cover the building's structure and not the contents. Renters can buy contents coverage, even if the owner does not buy structural coverage on the building.

6.3.2 Public Property

Governments can purchase commercial insurance policies. Larger local governments often self-insure and absorb the cost of damage to one facility, but if many properties are exposed to damage, self-insurance can drain the government's budget. Communities cannot expect federal disaster assistance to make up the difference after a flood.

Under Section 406(d) of the Stafford Act:

> "If an eligible insurable facility damaged by flooding is located in a [mapped floodplain] … and the facility is not covered (or is underinsured) by flood insurance on the date of such flooding, FEMA is required to reduce Federal disaster assistance by the *maximum* amount of insurance proceeds that would have been received had the buildings and contents been fully covered under a National Flood Insurance Program (NFIP) standard flood insurance policy. [Generally, the maximum amount of proceeds for a non-residential property is $500,000.]
>
> [Communities] Need to:
>
> - Identify all insurable facilities, and the type and amount of coverage (including deductibles and policy limits) for each. The anticipated insurance proceeds will be deducted from the total eligible damages to the facilities.
> - Identify all facilities that have previously received Federal disaster assistance for which insurance was required. Determine if insurance has been maintained. *A failure to maintain the required insurance for the hazard that caused the disaster will render ineligible for Public Assistance funding…*
> - [Communities] *must* obtain and maintain insurance to cover [their] facility – buildings, equipment, contents and vehicles – for the hazard that caused the damage in order to receive Public Assistance funding. Such coverage must, at a minimum, be in the amount of the eligible project costs. FEMA will not provide assistance for that facility in future disasters if the requirement to purchase insurance is not met. – FEMA Response and Recovery Directorate Policy No. 9580.3, August 23, 2000

In other words, the law expects public agencies to be fully insured as a condition of receiving federal disaster assistance.

6.3.3 Local Implementation

Data on private insurance policies is not available. NFIP flood insurance is available in Seminole County. As of September 30, 2010, there were 4,695 flood insurance policies in Seminole County. These policies are shown in Table 15 on the next page and shown by occupancy of building in Table 16.

Table 11: Flood Insurance Policies in Seminole County

	Total	Group Flood Insurance	Manufactured Homes
Number of Policies	4262	0	43
Total Premiums	$2,148,872	$0	data unavailable
Insurance in Force	$1,193,487,100	$0	data unavailable
Number of Closed Paid Losses	200	0	6
$ Value of Closed Paid Losses	$3,885,609	$0	$78,449

Table 12: Flood Insurance Policies by Occupancy in Seminole County

Occupancy	Policies in Force	Insurance in Force	Number of Closed Paid Losses	Value of Closed Paid Losses
Single Family	3,987	$1,897,809	190	$3,667,535
2-4 Family	41	$10,970	0	$0
All Other Residential	121	$54,251	0	$0
Non-Residential	113	$185,842	10	$218,074
Total	4,262	$2,148,872	200	$3,885,609

The number of flood insurance policies by FEMA flood zone is also available, as shown in Tables Table 13: Flood Insurance Policies by Flood Zone and 18, below.

Table 13: Flood Insurance Policies by Flood Zone

	Pre-Firm		Post-Firm		Total	
Zone	Policies in Force	Insurance in Force	Policies in Force	Insurance in Force	Policies in Force	Insurance in Force
A Zones	506	$379,797	1,005	$470,025	1,511	$849,822
V Zones	0	$0	0	$0	0	$0
X Zones	834	$285,649	2,349	$821,946	3,183	$1,107,595

Table 14: Number and Value of Losses by Flood Zone

	Pre-Firm		Post-Firm		Total	
Zone	Number of Closed Paid Losses	Value of Closed Paid Losses	Number of Closed Paid Losses	Value of Closed Paid Losses	Number of Closed Paid Losses	Value of Closed Paid Losses
A Zones	57	$1,863,346	70	$1,031,601	127	$2,894,947
V Zones	0	$0	0	$0	0	$0
X Zones	42	$564,204	23	$171,974	65	$736,178

6.3.4 CRS Credit

There is no credit for purchasing flood insurance, but the CRS does provide credit for local public information programs that explain flood insurance to property owners. The CRS also reduces the premiums for those people who do buy NFIP coverage.

6.4 The Government's Role

Property protection measures are usually considered the responsibility of the property owner. However, local governments should be involved in all strategies that can reduce flood losses, especially acquisition and conversion of a site to public open space. There are various roles the County or a municipality can play in encouraging and supporting implementation of these measures.

6.4.1 Government Facilities

One of the first duties of a local government is to protect its own facilities. Fire stations, water treatment plants and other critical facilities should be a high priority for retrofitting projects and insurance coverage. Often public agencies discover after the disaster that their "all-hazard" insurance policies do not cover the property for the type of damage incurred. Flood insurance is even more important as a mitigation measure because of the Stafford Act provisions discussed above.

6.4.2 Public Information

Providing basic information to property owners is the first step in supporting property protection measures. Owners need general information on what can be done. They need to see examples, preferably from nearby. Public information activities that can promote and support property protection are covered in Chapter 9.

6.4.3 Financial Assistance

Communities can help owners by helping to pay for a retrofitting project. Financial assistance can range from full funding of a project to helping residents find money from other programs. Some communities assume responsibility for sewer backups, street flooding, and other problems that arise from an inadequate public sewer or public drainage system. Less expensive community programs include low interest loans, forgivable low interest loans and rebates. A forgivable loan is one that does not need to be repaid if the owner does not sell the house for a specified period, such as five years. These approaches don't fully fund the project, but they cost the community less and they increase the owner's commitment to the flood protection project. Often, small amounts of money act as a catalyst to pique the owner's interest to get a self-protection project moving.

The more common outside funding sources are listed below. Unfortunately, the last three are only available after a disaster, not before, when damage could be prevented. Following past disaster declarations, FEMA and the Florida Division of Emergency Management have provided advice on how to qualify and apply for these funds.

Pre-disaster funding sources:

- FEMA's Pre-Disaster Mitigation (PDM) grants (administered by the Florida Division of Emergency Management)

- FEMA's Flood Mitigation Assistance (FMA) grants (administered by the Florida Division of Emergency Management)
- Community Development Block Grants (administered by the Florida Division of Housing and Community Development)
- The Florida Department of Environmental Protection
- Conservation organizations, although generally these organizations prefer to purchase vacant land in natural areas, not properties with buildings on them.

Property Protection Rebates

The Village of South Holland, Illinois received national recognition for its rebate program to help property owners fund retrofitting projects that protect against surface and subsurface flooding. If a project is approved, installed and inspected, the Village will reimburse the owner 25% of the cost up to $2,500. Over 450 floodproofing and sewer backup protection projects have been completed under this program. Perhaps not surprisingly,

Post-disaster funding sources:

- Insurance claims
- The NFIP's Increased Cost of Compliance (ICC). This provision increases a flood insurance claim payment to help pay for a flood protection project required by code as a condition to rebuild the flooded building. It can also be used to help pay the non-federal cost-share of an elevation project.

Post-disaster funding sources, federal disaster declaration needed

- FEMA's disaster assistance (for public properties). However, the amount of assistance will be reduced by the amount of flood insurance that the public agency should be carrying on the property. (administered by the Florida Division of Emergency Management)
- Small Business Administration disaster loans (for non-governmental properties)
- FEMA's Hazard Mitigation Grant Program (administered by the Florida Division of Emergency Management)

6.4.4 Acquisition Agent

The community can be the focal point in an acquisition project. Most funding programs require a local public agency to sponsor the project. The local government could process the funding application, work with the owners, and provide some, or all, of the local share. In some cases, the local government would be the ultimate owner of the property, but in other cases another public agency, such as Florida State Parks, could assume ownership and the attendant maintenance responsibilities.

6.4.5 Mandates

Mandates are considered a last resort if information and incentives are insufficient to convince a property owner to take protective actions. An example of a retrofitting mandate is the requirement that communities have to disconnect downspouts from the sanitary sewer line.

There is a mandate for improvements or repairs made to a building in the mapped floodplain. If the project equals or exceeds 50% of the value of the original building, it is considered a

"substantial improvement." The building must then be elevated or otherwise brought up to current flood protection codes.

Another possible mandate is to require less expensive hazard protection steps as a condition of a building permit. For example, many communities require upgraded electrical service as a condition of a home improvement project. If a person were to apply for a permit for electrical work, the community could require that the service box be moved above the base flood elevation or the installation of a separate ground fault interrupter circuits in the basement.

6.4.6 Local Implementation

As discussed in Chapter 1, there are many critical facilities, most of which are not subject to flooding and have no requirement for protection from flooding.

There have most likely been some flood protection measures implemented by homeowners in the County. In the past there has been one demolition/rebuild project and currently Seminole County is in the process of acquiring structures through FEMA's Hazard Mitigation Grant Program.

6.4.7 CRS Credit

Except for public information programs, the CRS does not provide credit for efforts to fund, provide incentives, or mandate property protection measures. CRS credits are provided for the actual projects after they are completed. However, to participate in CRS, a community must certify that it has adequate flood insurance on all properties that have been *required* to be insured. The minimum requirement is to insure those properties in the mapped floodplain that have received federal aid, as specified by the Flood Disaster Protection Act of 1973.

6.5 Repetitive Loss Properties and Analysis

Chapter 2 explains the criteria for designation of the County's repetitive loss areas. These properties deserve special attention because they are more prone to damage by natural hazards than any other properties in the County. Further, protecting repetitive loss buildings is a priority with FEMA and Florida Division of Emergency Management mitigation funding programs.

Flood insurance policies and paid amounts for repetitive loss properties in Seminole County are shown in Table 19 on the next page.

Table 15: Flood Insurance for Repetitive Loss Properties

	A Zones	V Zones	X Zones	Total
RL Buildings (total)	9	0	6	15
RL Buildings (insured)	5	0	5	10
RL Losses (total)	20	0	13	33
RL Losses (insured)	11	0	0	11
RL Payments (total)	$711,301.87	$0.00	$140,102.94	$851,404.81
Buildings	$666,441.90	$0.00	$115,490.42	$781,932.32
Contents	$44,859.97	$0.00	$24,612.52	$69,472.49
RL Payments (insured)	$211,529.05	$0.00	$128,390.10	$339,919.15
Buildings	$188,835.74	$0.00	$103,777.58	$292,613.32
Contents	$22,693.31	$0.00	$24,612.52	$47,305.83

6.6 Conclusions

1. There are several ways to protect individual properties from damage by natural hazards. The advantages and disadvantages of each should be examined for each situation.
2. Property owners can implement some property protection measures at little cost, especially for sites in areas of low hazards (e.g., shallow flooding, sewer backup, and thunderstorms). For other measures, such as relocation and elevation, the owners may need financial assistance.
3. Only 9.4% of the buildings in the County's floodplains are covered by flood insurance.
4. Local government agencies can promote and support property protection measures through several activities, ranging from public information to financial incentives to full funding.
5. It is unlikely that most government properties, including critical facilities, have any special measures to protect them from flooding.
6. Property protection measures can protect the most damage-prone buildings in the County: repetitive loss properties.

6.7 Recommendations

1. Public education materials should be developed to explain property protection measures that can help owners reduce their exposure to damage by floods and the various types of insurance that are available.
2. Because properties in floodplains will be damaged at some point, a special effort should be made to provide information and advice to floodplain property owners. Special attention should be given to repetitive loss and high hazard areas.
3. All property protection projects should be voluntary. Other than state and federally mandated regulations, local incentives should be positive as much as possible, such as providing financial assistance.
4. A standard checklist should be developed to evaluate a property's exposure to damage from floods. It should include a review of insurance coverage and identify where more information

can be found on appropriate property protection measures. The checklist should be provided to each agency participating in this planning process and made available to the public.

5. Seminole County should evaluate its own properties using the standard checklist. A priority should be placed on determining critical facilities' vulnerability to damage and whether public properties are adequately insured.
6. Seminole County should protect its own publicly owned facilities with appropriate mitigation measures.
7. Seminole County should establish cost sharing programs, such as rebates, to encourage low cost (under $10,000) property protection measures on private property, for example:
    - Surface and subsurface drainage improvements,
    - Berms and regrading for shallow surface flooding, and
    - Relocating heating and air conditioning units above the base flood elevation.
8. The County should seek state and federal funding support for higher cost measures, such as elevation, relocation and acquisition of high priority properties. High priority properties are:
    - Those properties in repetitive loss areas.
    - Critical facilities in the floodway or subject to flood depths of more than two feet.

6.8 References

1. *Disaster Mitigation Guide for Business and Industry*, Federal Emergency Management Agency, FEMA-190, 1990.
2. *Engineering Principles and Practices for Retrofitting Flood Prone Residential Buildings*, FEMA, FEMA-259, 1995.
3. *Flood Insurance Agent's Manual*, FEMA, 2000.
4. *Flood Proofing Techniques, Programs and References*, U.S. Army Corps of Engineers National Flood Proofing Committee, 1991.
5. *Homeowner's Guide to Retrofitting: Six Ways to Protect Your House from Flooding*. FEMA, FEMA-312, 1998.
6. *Local Flood Proofing Programs*, U.S. Army Corps of Engineers, 1994.

7 Natural Resource Protection

Resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. These activities enable the naturally beneficial functions of fields, floodplains, wetlands, and other natural lands to operate more effectively. Natural and beneficial functions of watersheds, floodplains and wetlands include:

- Reduction in runoff from rainwater and snow melt in pervious areas
- Infiltration that absorbs overland flood flow
- Removal and filtering of excess nutrients, pollutants and sediments
- Storage of floodwaters
- Absorption of flood energy and reduction in flood scour
- Water quality improvement
- Groundwater recharge
- Habitat for flora and fauna
- Recreational and aesthetic opportunities

As development occurs, many of the above benefits can be achieved through regulatory steps for protecting natural areas or natural functions. The regulatory programs are discussed in Chapter 5 – Preventive Measures. This chapter covers the resource protection programs and standards that can help mitigate the impact of natural hazards, while they improve the overall environment. Seven areas are reviewed:

- Wetland protection
- Erosion and sedimentation control
- River restoration
- Best management practices
- Dumping regulations
- Urban forestry
- Farmland protection

7.1 Wetland Protection

Wetlands are often found in floodplains and depressional areas of a watershed. Many wetlands receive and store floodwaters, thus slowing and reducing downstream flows. They also serve as a natural filter, which helps to improve water quality, and they provide habitat for many species of fish, wildlife and plants.

Wetlands that are determined to be part of the waters of the United States are regulated by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency (US EPA) under Section 404 of the Clean Water Act. Before a “404” permit is issued, the plans are reviewed by

several agencies, including the Corps and the U.S. Fish and Wildlife Service. Each of these agencies must sign off on individual permits.

There are also nationwide permits that allow small projects that meet certain criteria to proceed without individual permits. Wetlands not included in the Corps' jurisdiction or that are addressed by a nationwide permit may be regulated against by local authorities.

If a permit is issued by the Corps or the County, the impact of the development is typically required to be mitigated. Wetland mitigation can include creation, restoration, enhancement or preservation of wetlands elsewhere. Wetland mitigation is often accomplished within the development site, however, mitigation is allowed off-site and sometimes in another watershed. The appropriate type of mitigation is addressed in each permit.

Some developers and government agencies have accomplished the required mitigation by buying into a wetland bank. Wetland banks are large wetlands created for the purpose of mitigation. The banks accept money to reimburse the owner for setting the land aside from development.

Wetlands in the Lake Jesup Wilderness Area in Seminole County, Florida

When a wetland is mitigated at a separate site there are drawbacks to consider. First, it takes many years for a new wetland to approach the same quality as an existing one. Second, a new wetland in a different location (especially if it is in a different watershed) will not have the same flood damage reduction benefits as the original one did.

7.1.1 Local Implementation

Seminole County's Land Development Code includes a "Wetlands Overlay Zoning Classification" in which all property containing a wetland of a half-acre or larger, any wetlands with a direct hydrologic connection a half-acre or larger, and their adjacent areas are included. The zoning classification strives to protect wetland functions by minimizing disruption of wetlands by development activities, regulating development activities on wetlands according to wetland significance, and providing for mitigation measures for wetlands development on a site-specific basis. Wetlands less than a half-acre may not require such mitigation, unless they are located in the Econlockhatchee River Basin Zone or the Wekiva River Protection Area. No loss of wetlands is permitted in these areas.

Wetland and surface water impacts require a state permit from the Florida Department of Environment Protection or, if the parcel is within the Wekiva River Protection Area, it is

permitted through the St. Johns River Water Management District. County permits are also required.

In addition, Seminole County's Natural Lands Program preserves and manages natural areas within Seminole County, including wetlands, to enhance or promote biodiversity, wildlife corridors, water resources, and passive resource-based recreation. Since the program began in 1990, Seminole County has purchased over 6,600 acres of natural land.

The County's *Comprehensive Plan* adopts a policy to regulate wetlands to protect and sustain their functions and values, and states that in conjunction with the Land Development Code, the County "will evaluate the need to provide additional criteria which will allow for mitigation of impacts to wetlands caused by the development actions." The Comprehensive Plan calls for the establishment of a County-run comprehensive wetland mitigation program partly funded by fees in lieu of performing mitigation.

7.1.2 CRS Credit

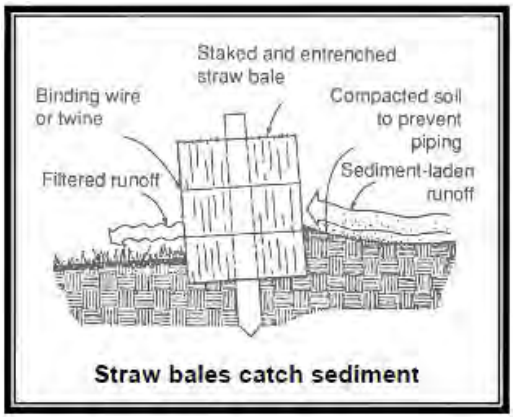
CRS focuses on activities that directly affect flood damage to insurable buildings. While there is no credit for relying on the Corps of Engineers' 404 regulations, there is credit for preserving open space in its natural condition or restored to a state approximating its natural condition. The credit is based on the percentage of the floodplain that can be documented as wetlands protected from development by ownership or local regulations.

7.2 Erosion and Sedimentation Control

Farmlands and construction sites typically contain large areas of bare exposed soil. Surface water runoff can erode soil from these sites, sending sediment into downstream waterways. Erosion also occurs along streambanks and shorelines as the volume and velocity of flow or wave action destabilize and wash away the soil.

Sediment suspended in the water tends to settle out where flowing water slows down. This can clog storm drains, drain tiles, culverts and ditches and reduce the water transport and storage capacity of river and stream channels, lakes and wetlands. When channels are constricted and flooding cannot deposit sediment in the bottomlands, even more sediment is left in the channels. The result is either clogged streams or increased dredging costs.

Figure 30: Straw Bales



Not only are the drainage channels less able to perform their job, but the sediment in the water reduces light, oxygen and water quality, and often carries chemicals, heavy metals and other pollutants. Sediment has been identified by the US EPA as the nation's number one nonpoint source pollutant for aquatic life.

There are two principal strategies to address these problems: minimize erosion and control sedimentation. Techniques to minimize erosion include phased construction, minimal land clearing, and stabilizing bare ground as soon as possible with vegetation and other soil stabilizing practices.

If erosion occurs, other measures are used to capture sediment before it leaves the site. Silt fences, sediment traps and vegetated filter strips are commonly used to control sediment transport. Runoff from the site can be slowed down by terraces, contour strip farming, no-till farm practices, hay or straw bales, constructed wetlands, and impoundments (e.g., sediment basins and farm ponds). Slowing surface water runoff on the way to a drainage channel increases infiltration into the soil and reduces the volume of topsoil eroded from the site.

Erosion and sedimentation control regulations mandate that these types of practices be incorporated into construction plans. They are usually oriented toward construction sites rather than farms. The most common approach is to require applicants for permits to submit an erosion and sediment control plan for the construction project. This allows the applicant to determine the best practices for the site.

7.2.1 Local Implementation

Standards for erosion and sedimentation control during and following project construction are included in the Seminole County Surface Water Management Ordinance. Erosion and sediment control planning is encouraged. The Ordinance also places an emphasis on efforts that prevent and reduce erosion rather than having to control sediments that are created due to construction.

7.2.2 CRS Credit

Seminole County's Surface Water Management Ordinance includes erosion and sedimentation control provisions and should qualify for 45 points, the maximum credit available.

7.3 River Restoration

There is a growing movement that has several names, such as "stream conservation," "bioengineering," or "riparian corridor restoration." The objective of these approaches is to return streams, streambanks and adjacent land to a more natural condition, including the natural meanders. Another term is "ecological restoration," which restores native indigenous plants and animals to an area.

A key component of these efforts is to use appropriate native plantings along the banks that resist erosion. This may involve retrofitting the shoreline with willow cuttings, wetland plants, or rolls of landscape material covered with a natural fabric that decomposes after the banks are stabilized with plant roots.

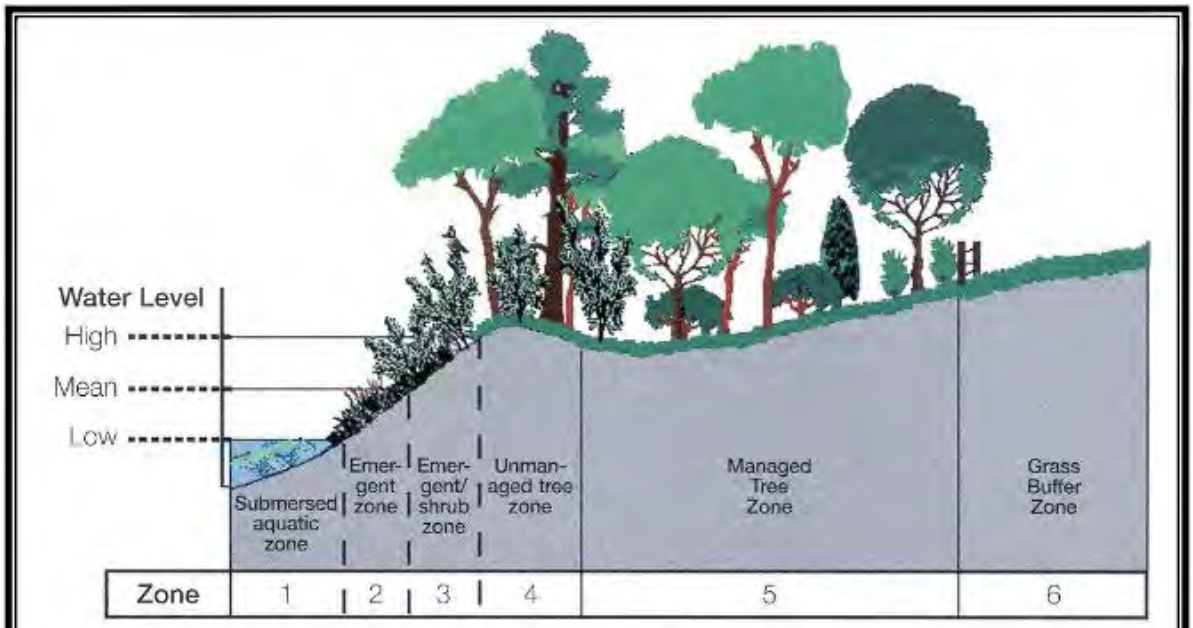
In all, restoring the right vegetation to a stream has the following advantages:

- Reduces the amount of sediment and pollutants entering the water
- Enhances aquatic habitat by cooling water temperature
- Provides food and shelter for both aquatic and terrestrial wildlife
- Can reduce flood damage by slowing the velocity of water
- Increases the beauty of the land and its property value
- Prevents property loss due to erosion
- Provides recreational opportunities, such as hunting, fishing and bird watching

- Reduces long-term maintenance costs

The last bullet deserves special attention. Studies have shown that after establishing the right vegetation, long-term maintenance costs are lower than if the banks were concrete. The Natural Resources Conservation Service estimates that over a ten-year period, the combined costs of installation and maintenance of a natural landscape may be one-fifth of the cost for conventional landscape maintenance, e.g., mowing turf grass.

Figure 31: Aquatic and Ripairian Buffer Plant Zones



Aquatic and riparian buffer plant zones

Different types of plants are used in different buffer zones along a channel. Zone 1 plants are normally submerged while zone 2 plants are inundated during much of the growing season. Zone 3 plants are water tolerant, but are flooded only during high water. By using the proper plants in each zone, they stabilize streambanks, filter polluted runoff, and provide habitat. *Source: Banks and Buffers – A Guide to Selecting Native Plants for Streambanks and Shorelines*, Tennessee Valley Authority

7.3.1 Local Implementation

Seminole County has been active in pursuing and completing restoration projects. Volunteers have contributed over 350 hours of time to restoring Spring Lake and helped to plant the Myrtle Lake shoreline.

The Seminole County Lake Management Program offers restoration studies and other assistance for unincorporated County lakes. Community participation is an integral component of the program.

7.3.2 CRS Credit

The Community Rating System focuses on activities that directly affect flood damage to insurable buildings. However, there are credits for preserving open space in its natural condition

or restored to a state approximating its natural condition. There are also credits for channel setbacks, buffers and protecting shorelines.

7.4 Best Management Practices

Point source pollutants come from pipes such as the outfall of a municipal wastewater treatment plant. They are regulated by the US EPA and the Florida Department of Environmental Protection. Nonpoint source pollutants come from non-specific locations and are harder to regulate. Examples of nonpoint source pollutants are lawn fertilizers, pesticides, other chemicals, animal wastes, oils from street surfaces and industrial areas, and sediment from agriculture, construction, mining and forestry. These pollutants are washed off the ground's surface by stormwater and flushed into receiving storm sewers, ditches and streams.

The term "best management practices" (BMPs) refers to design, construction and maintenance practices and criteria that minimize the impact of stormwater runoff rates and volumes, prevent erosion, protect natural resources and capture nonpoint source pollutants (including sediment). They can prevent increases in downstream flooding by attenuating runoff and enhancing infiltration of stormwater. They also minimize water quality degradation, preserve beneficial natural features onsite, maintain natural base flows, minimize habitat loss, and provide multiple usages of drainage and storage facilities.

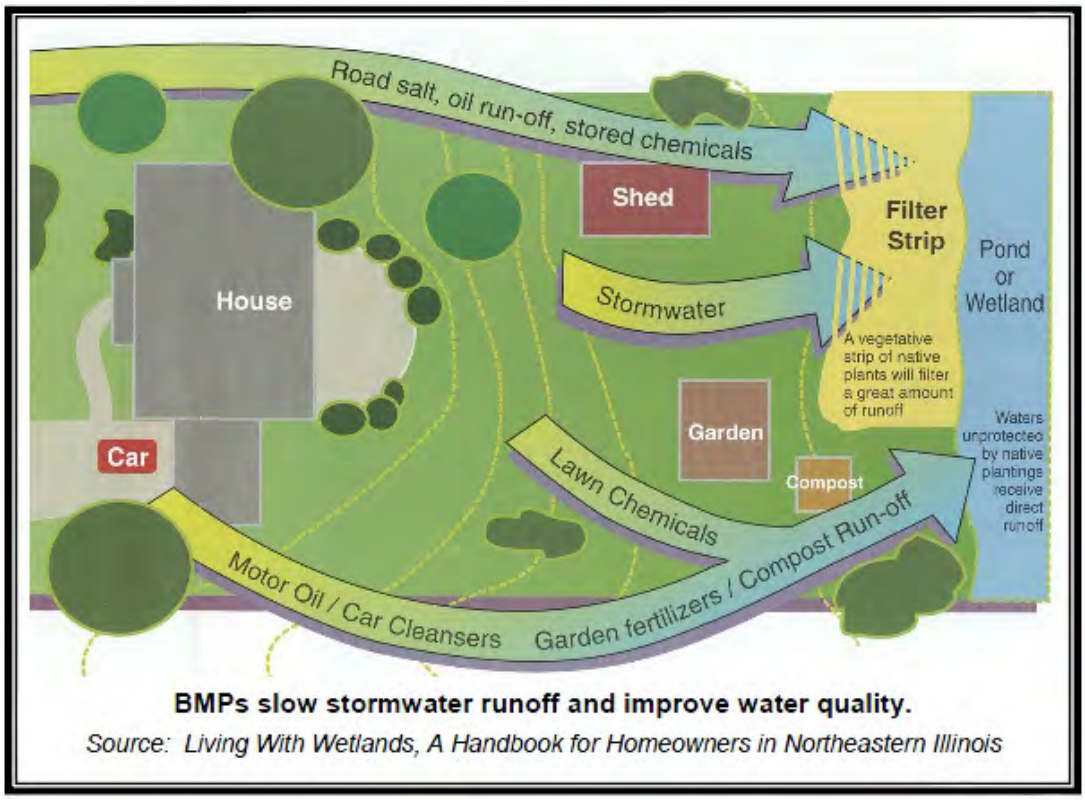
7.4.1 Local Implementation

BMPs have been incorporated throughout the Seminole County Surface Water Management Ordinance. The County also has an NPDES Phase I permit and maintains compliance with all of its requirements.

7.4.2 CRS Credit

Under Activity 450 – Stormwater Management, credit is given for both water quality and water quantity. Water quality credit under activity is given to a community who implements best management practices.

Figure 32: BMPs and Stormwater



7.5 Dumping Regulations

BMPs usually address pollutants that are liquids or are suspended in water that are washed into a lake or stream. Dumping regulations address solid matter, such as shopping carts, appliances and landscape waste that can be accidentally or intentionally thrown into channels or wetlands. Such materials may not pollute the water, but they can obstruct even low flows and reduce the channels' and wetlands' abilities to convey or clean stormwater.

Many cities have nuisance ordinances that prohibit dumping garbage or other "objectionable waste" on public or private property. Waterway dumping regulations need to also apply to "nonobjectionable" materials, such as grass clippings or tree branches, which can kill ground cover or cause obstructions in channels. Regular inspections to catch violations should be scheduled.

Many people do not realize the consequences of their actions. They may, for example, fill in the ditch in their front yard without realizing that is needed to drain street runoff. They may not understand how regrading their yard, filling a wetland, or discarding leaves or branches in a watercourse can cause a problem to themselves and others. Therefore, a dumping enforcement program should include public information materials that explain the reasons for the rules as well as the penalties.

7.5.1 Local Implementation

The Seminole County Code of Ordinances makes it unlawful for anyone to dispose of waste except at a facility designated by the County. In addition, illicit discharges are also prohibited. Illicit discharges are defined as any discharge to the County's municipal separate storm sewer system or to waters of the United States that is not entirely composed of stormwater, unless exempted pursuant to the County code. Exemptions include water line flushing, street cleaning, landscape irrigation, air conditioning condensate and others.

7.5.2 CRS Credit

The CRS provides up to 30 points for enforcing and publicizing a regulation that prohibits dumping in the drainage system. Seminole County should be eligible for this credit.

7.6 Farmland Protection

Farmland protection is quickly becoming an important piece of comprehensive planning and zoning throughout the United States. The purpose of farmland protection is to provide mechanisms for prime, unique, or important agricultural land to remain as such, and to be protected from conversion to nonagricultural uses.

Frequently, farm owners sell their land to residential or commercial developers and the property is converted to non-agricultural land uses. With development comes more buildings, roads and other infrastructure. Urban sprawl occurs, which can create additional stormwater runoff and emergency management difficulties.

Preserving floodplain farmland prevents damage to buildings

Farms on the edge of cities are often appraised based on the price they could be sold for to urban developers. This may drive farmers to sell to developers because their marginal farm operations cannot afford to be taxed as urban land. The Farmland Protection Program in the United States Department of Agriculture's 2002 Farm Bill (Part 519) allows for funds to go to state, tribal, and local governments as well as nonprofit organizations to help purchase easements on agricultural land to protect against the development of the land. Eligible land includes cropland, rangeland, grassland, pastureland, or forest land that is part of an agricultural operation. Certain lands within historical or archaeological resources are also included.

The hazard mitigation benefits of farmland protection are similar to those of open space preservation, as discussed in Chapter 5 – Preventive Measures:

- Farmland is preserved for future generations,
- Farmland in the floodplain keeps damageable structures out of harm's way,
- Farmland keeps more stormwater on site and lets less stormwater runoff downstream,
- Rural economic stability and development is sustained,
- Ecosystems are maintain, restored or enhanced, and
- The rural character and scenic beauty of the area is maintained.

7.6.1 Local Implementation

The policies of the "Future Land Use" element of the County's *Comprehensive Plan* include "Protection and preservation of the environment and farmlands." The "Conservation" element of the plan also emphasizes the protection and preservation of farmlands. In addition, the East Seminole County Scenic Corridor Overlay District Ordinance recognizes that "agricultural activities in East Seminole County are an important historical, cultural and economic resource." Limited development activities are allowable in this zone, such as agricultural uses and commercial uses designated on the future land use map. Landscaping must be done using native species.

7.6.2 CRS Credit

Credit is given for preserving open space in the floodplain, regardless of why it is being preserved. Credit is also provided for density zoning of floodprone areas. Agricultural zones that require minimum 10- or 20-acre lots would qualify.

7.7 Conclusions

1. A hazard mitigation program can use resource protection programs to support protecting areas and natural features that can mitigate the impacts of natural hazards.
2. The current regulations on wetland protection, erosion and sediment control, and best management practices have effective standards.
3. There are excellent examples of wetland protection and river and shoreline restoration projects managed by Seminole County that demonstrate the benefits of these measures.
4. The County's Code of Ordinances prohibits illicit discharges into waters of the state and into the County's MS4.
5. Preserving farmland in the floodplain will prevent damage to homes, businesses, and other development.

7.8 Recommendations

1. Seminole County should continue to enforce the wetland protection, erosion and sediment control and BMP provisions of the Surface Water Management Ordinance.
2. The public and decision makers should be informed about the hazard mitigation benefits of restoring rivers, wetlands and other natural areas. Restoration and protection techniques should be explained.
3. Seminole County should publicize its illicit discharge rules more widely.
4. The public should be informed about the need to protect streams and wetlands from dumping and inappropriate development along with the relevant codes and regulations.

7.9 References

1. *Banks and Buffers – A Guide to Selecting Native Plants for Streambanks and Shorelines*, Tennessee Valley Authority, 1997.

2. *CRS Coordinator's Manual*, Community Rating System, FEMA, 2002.
3. *Stream Corridor Restoration Principles, Processes and Practices*, Federal Interagency Stream Restoration Working Group, 1998.

8 Emergency Services Measures

Emergency services measures protect people during and after a disaster. A good emergency management program addresses all hazards, and it involves all local government departments. At the state level, emergency services programs are coordinated by the Florida Division of Emergency Management. Seminole County emergency services are coordinated through the Seminole County Division of Emergency Management.

Seminole County Division of Emergency Management Mission:

Provide a resilient emergency management structure dedicated to provide for the safety and welfare of the public through the preservation of life, health, property and the environment.

This chapter reviews emergency services measures following a chronological order of responding to an emergency. It starts with identifying an impending problem (threat recognition) and continues through post-disaster activities.

8.1.1 Threat Recognition

The first step in responding to a flood, storm or other natural hazard is knowing when weather conditions are such that an event could occur. With a proper and timely threat recognition system, adequate warnings can be disseminated.

Tropical Storms and Hurricanes. The National Weather Service' National Hurricane Center in Miami monitors all tropical storm and hurricane activity. It uses computer models to estimate where the storm will make landfall, the predicted wind speeds, and the likely storm surge levels. These predictions are updated periodically and disseminated to the media and through emergency management channels.

The Hurricane Center runs the predicted storm through a computer model called SLOSH (Sea, Lake, and Overland Surges from Hurricanes). This provides information on how deep and how far inland storm surges are expected to be.

Floods. A flood recognition system predicts the time and height of the flood crest. This can be done by measuring rainfall, soil moisture, and stream flows upstream of the community and calculating the subsequent flood levels.

On larger rivers, this measuring and calculating is performed by the National Weather Service, a part of the U.S. Department of Commerce's National Oceanic and Atmospheric Administration (NOAA). Support for NOAA's efforts is provided by cooperating partners from state and local agencies.

Forecasts of expected river stages are made through the Advanced Hydrologic Prediction Service (AHPS) of the National Weather Service. Flood threat predictions are disseminated on the NOAA Weather Wire or NOAA Weather Radio. NOAA Weather Radio is considered by the federal government as the official source for weather information.

On smaller rivers, locally established rainfall and river gauges are needed to establish a flood threat recognition system. The National Weather Service may issue a "flash flood watch." This is issued to indicate current or developing hydrologic conditions that are favorable for flash flooding in and close to the watch area, but the occurrence is neither certain nor imminent. These events are so localized and so rapid that a "flash flood warning" may not be issued, especially if no remote threat recognition equipment is available. In the absence of a gauging system on small

streams, the best threat recognition system is to have local personnel monitor rainfall and stream conditions. While specific flood crests and times will not be predicted, this approach will provide advance notice of potential local or flash flooding.

Severe Weather. The National Weather Service is the prime agency for detecting meteorological threats, such as tornadoes, thunderstorms and winter storms. Severe weather warnings are transmitted through NOAA's Weather Radio System. As with floods, federal agencies can only look at the large scale, e.g., whether conditions are appropriate for the formation of a thunderstorm. Local emergency managers can provide more site-specific and timely recognition by sending out National Weather Service trained spotters to watch the skies when the Weather Service issues a watch or a warning.

Severe snow storms can often be forecast days in advance of the expected event, which allows time for warning and preparation. Though more difficult, the National Weather Service can also forecast ice storms.

Dam Failure. A key part of a dam safety program is for the emergency management office to be in touch with the operators of upstream dams. There should be periodic communication checks and clear criteria for when a dam appears threatened and when the community should notify downstream properties.

8.1.2 Local Implementation

The Seminole County Division of Emergency Management is responsible for performing technical work in the development, implementation, and management of countywide disaster response, recovery, mitigation, risk reduction, prevention, and preparedness for the County. The Division provides countywide planning, training and exercise programs in order to be prepared for natural, technological, or man-made emergencies.

Severe Weather: Seminole County recognizes impending thunderstorms through radar and reports from the National Weather Service.

Floods: The National Weather Service monitors five stream gages in Seminole County. It issues periodic updates of current river levels. For the gages it monitors, the National Weather Service can issue a specific prediction of when and how high a river will crest. Forecasts for the St. Johns River near Sanford are issued as needed during times of high water, but are not routinely available. River gauge information is disseminated on the NOAA Weather Wire and is available to the public at www.srh.noaa.gov/lix/html/rvs.shtml.

On larger streams, the United States Geological Survey (USGS) operates stream and rain gages in cooperation with Seminole County and the St. Johns

USGS Stream Gages in Seminole County

Little Econlockhatchee River near Oviedo

Econlockhatchee River near Oviedo

Econlockhatchee River near Chuluota

St. Johns River above Lark Harney near Geneva (2 gages)

St. Johns River at Osceola

Howell Creek near Altamonte Springs

Howell Creek near Slavia

Howell Creek near Oviedo

Soldier Creek near Longwood

Gee Creek near Longwood

Lake Jesup Outlet near Sanford

St. Johns River at Highway 415 near Sanford

St. Johns River near Sanford

Little Wekiva River near Altamonte Springs

Wekiva River near Sanford

Seminole 125 Well at Longwood

Lake Sylvan Park near Paola

River Water Management District. The USGS provides stream stage and stream flow information for the 18 sites listed in the box above. Real-time stream gauge readings for these sites can be accessed on the Internet at http://waterdata.usgs.gov/fl/nwis/rt. This site provides the current stream conditions.

The National Weather Service is able to issue a specific prediction of when and how high a river will crest.

Dam Failure. There are no dams in Seminole County, and dam failure is not considered a likely threat.

8.1.3 CRS Credit.

Credit can be received for using National Hurricane Center warnings and river flood stage predictions for the National Weather Service's gages. The actual score is based on how much of the community's floodplain is affected by these systems. A total of 40 points is possible under Activity 610 – Flood Warning Program.

8.2 Warning

After the threat recognition system tells the emergency management office that a flood, tornado, thunderstorm, hurricane or other hazard is coming, the next step is to notify the public and staff of other agencies and critical facilities. The earlier and the more specific the warning, the greater the number of people that can implement protection measures.

The National Weather Service issues notices to the public using two levels of notification:

Watch: conditions are right for flooding, thunderstorms, tornadoes or winter storms.

Warning: a flood, tornado, etc., has started or been observed.

A more specific warning may be disseminated to the public by the community in a variety of ways. The following are the more common methods:

- Commercial or public radio or TV stations
- The Weather Channel
- Cable TV emergency news inserts
- Telephone trees/mass telephone notification
- NOAA Weather Radio
- Tone activated receivers in key facilities
- Outdoor warning sirens
- Sirens on public safety vehicles
- Door-to-door contact
- Mobile public address systems
- Email notifications

Multiple or redundant systems are most effective – if people do not hear one warning, they may still get the message from another part of the system. Each has advantages and disadvantages:

- Radio and television provide a lot of information, but people have to know when to turn them on. They are most appropriate for hazards that that develop over more than a day, such as a tropical storm, hurricane, or winter storm.
- NOAA Weather Radio can provide short messages of any impending weather hazard or emergency and advise people to turn on their televisions for more information, but not everyone has a Weather Radio.
- Outdoor warning sirens can reach many people quickly as long as they are outdoors. They do not reach people in tightly-insulated buildings or those around loud noise, such as at a factory, during a thunderstorm, or in air conditioned homes. They do not explain what hazard is coming, but people should know to turn on a radio or television when they hear the siren.

NOAA Weather Radios

NOAA Weather Radio is a nationwide network of radio stations that broadcasts warnings, watches, forecasts and other hazard information 24 hours a day. For Seminole County, information comes from transmitters in Melbourne, Florida.

NOAA weather radios can be very effective for notifying people, businesses, schools, care facilities, etc. of weather threats. They have a monitoring feature that issues an alarm when activated by the Weather Service.

To program a new weather radio, the FIPS code for Seminole County is 012117. The channels that broadcast information for Seminole County are 162.4 Mhz (Channel 1) and 162.475 Mhz (Channel 4). You can also listen online, by visiting http://www.srh.noaa.gov/mlb/?n=nwr#maps.

- Automated telephone notification services are also fast, but can be expensive and do not work when phone lines are down. Nor do they work for unlisted numbers, call screening services, or cellular service, unless people sign up for notifications.
- Where a threat has a longer lead time, going door-to-door and manual telephone trees can be effective.

Just as important as issuing a warning is telling people what to do in case of an emergency. A warning program should have a public information aspect. Citizens should know the difference between a tornado warning (when they should seek shelter in a low spot), a flood warning (when they should stay out of low areas), and other appropriate warnings and responses.

8.2.1 StormReady

The National Weather Service established the StormReady program to help local governments improve the timeliness and effectiveness of hazardous weather related warnings for the public.

To be officially StormReady, a community must:

- Establish a 24-hour warning point and emergency operations center,
- Have more than one way to receive severe weather warnings and forecasts and to alert the public,

- Create a system that monitors weather conditions locally,
- Promote the importance of public readiness through community seminars, and
- Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises.

Being designated a StormReady community by the National Weather Service is a good measure of a community's emergency warning program for weather hazards. It is also credited by the CRS.

8.2.2 Local Implementation

The Division coordinates emergency warning and notifications through a multimodal approach including, but not limited to, NOAA weather radios, Civil Emergency Messages, Emergency Broadcast System, Emergency Alert System, electronic text/media notification, cable interrupt, and reverse calling systems. The Division also funds a reverse answering system to notify citizens of threats prior to a disaster. These warnings are sent via telephone to groups using GIS mapping or to the entire County.

Alert Seminole is a way for Seminole County residents to sign up for emergency notifications from the Seminole County Emergency Management Agency. Notifications can be sent to a cell phone, pager, or email address.

Officials with the National Weather Service in Melbourne, Florida awarded Seminole County the designation of "StormReady." This nationwide program assesses the capability of a community to receive and disseminate severe weather information. The designation is only granted to those communities that have established a high degree of readiness for natural disasters such as hurricanes, tornadoes and floods.

8.2.3 CRS Credit

Community Rating System points are based on the number and types of warning media that can reach the community's floodprone population. Depending on the location, communities can receive up to 25 points for the telephone calling system and more points if there are additional measures, like telephone trees. Being designated as a StormReady community can provide 25 additional points. These credits are in Activity 610 – Flood Warning Program.

8.3 Response

The protection of life and property is the most important task of emergency responders. Concurrent with threat recognition and issuing warnings, a community should respond with actions that can prevent or reduce damage and injuries. Typical actions and responding parties include the following:

- Activating the emergency operations center (emergency preparedness),
- Closing streets or bridges (sheriff or public works),
- Shutting off power to threatened areas (utility company),
- Passing out sand and sandbags (public works),

- Holding children at school/releasing children from school (school superintendent),
- Opening evacuation shelters (the American Red Cross),
- Monitoring water levels (engineering), and
- Establishing security and other protection measures (police/sheriff).

An emergency action plan ensures that all bases are covered and that the response activities are appropriate for the expected threat. These plans are developed in coordination with the agencies or offices that are given the various responsibilities.

Planning is best done with adequate data. One of the best tools is a map that shows which areas would be affected under different conditions. Even though Seminole County is not a coastal County, it may be beneficial to consider developing a map which directs residents to evacuate based on the different hurricane categories.

A flood stage forecast map shows areas that will be under water at various flood stages. Different flood levels are shown as color coded areas, so the emergency manager can quickly see what will be affected. Emergency management staff can identify the number of properties flooded, which roads will be under water, which critical facilities will be affected, who to warn, etc. With this information, an advance plan can be prepared that shows problem sites and determines what resources will be needed to respond to the predicted flood level.

Emergency response plans should be updated annually to keep contact names and telephone numbers current and to ensure that supplies and equipment that will be needed are still available. They should be critiqued and revised after disasters and exercises to take advantage of the lessons learned and of changing conditions. The end result is a coordinated effort implemented by people who have experience working together so that available resources will be used in the most efficient manner possible.

8.3.1 Local Implementation

The Seminole County Emergency Operations Center (EOC) is the central command and coordination point for disaster preparedness, training, response and recovery efforts for the County. The purpose of the EOC is to provide a centralized and specialized location to communicate, organize and manage natural or manmade disasters and make strategic decisions necessary to protect the residents and property of Seminole County.

The EOC is staffed with personnel and equipment necessary to properly manage significant events. The 3,525 square foot main room has two attached breakout rooms for amateur radio operations and Seminole Government Television (SGTV) communication. In addition, there are multiple EOC support rooms.

Seminole County's EOC is organized using the National Incident Management System (NIMS) guidelines, and is separated into Command and General Staff, 18 Emergency Support Functions (ESF), and the Municipal Branch. Each ESF, municipality, utility provider, and the Orlando-Sanford International Airport provide staffing to improve communication and coordination during emergencies.

To ensure all of the available information is transmitted into the EOC, the main room is equipped with state of the art, computerized audio-visual equipment, GIS mapping software, interoperable communications, traffic monitoring, satellite technology for redundant communications, and

video cameras for live EOC streaming during activations. The room is also equipped with computer software that tracks emergency management resources.

The integration of these data and communications systems provides an essential on-site decision-making platform plus an excellent training room. In the event of a large-scale disaster, the EOC is equipped with two backup generators, potable water, shower facilities, and dormitories.

8.3.2 CRS Credit

Up to 255 points of credit is available for a fully credited flood warning system. Credit is based on a variety of factors and is cumulative, which includes the previous credits mentioned.

8.4 Evacuation and Shelter

In an area subject to the tremendous forces that accompany hurricanes, evacuation is a prime life safety concern. Given the one to two days of lead time provided by the National Hurricane Center, evacuation on a large scale is a realistic lifesaving task. In other situations, such as a tornado, it is safer to keep people where they are rather than expose them to danger from an event that gives little warning.

According to *Emergency Management: Principles and Practice*, "The principle of evacuation is to move citizens from a place of relative danger to a place of relative safety, via a route that does not pose significant danger." There are six key ingredients to a successful evacuation:

Adequate routes and traffic control are two key ingredients for an evacuation

Source: FEMA

- Adequate warning
- Adequate routes
- Proper timing to ensure the routes are clear
- Traffic control
- Knowledgeable travelers
- Care for special populations (e.g., handicapped, prisoners, hospital patients, and schoolchildren)

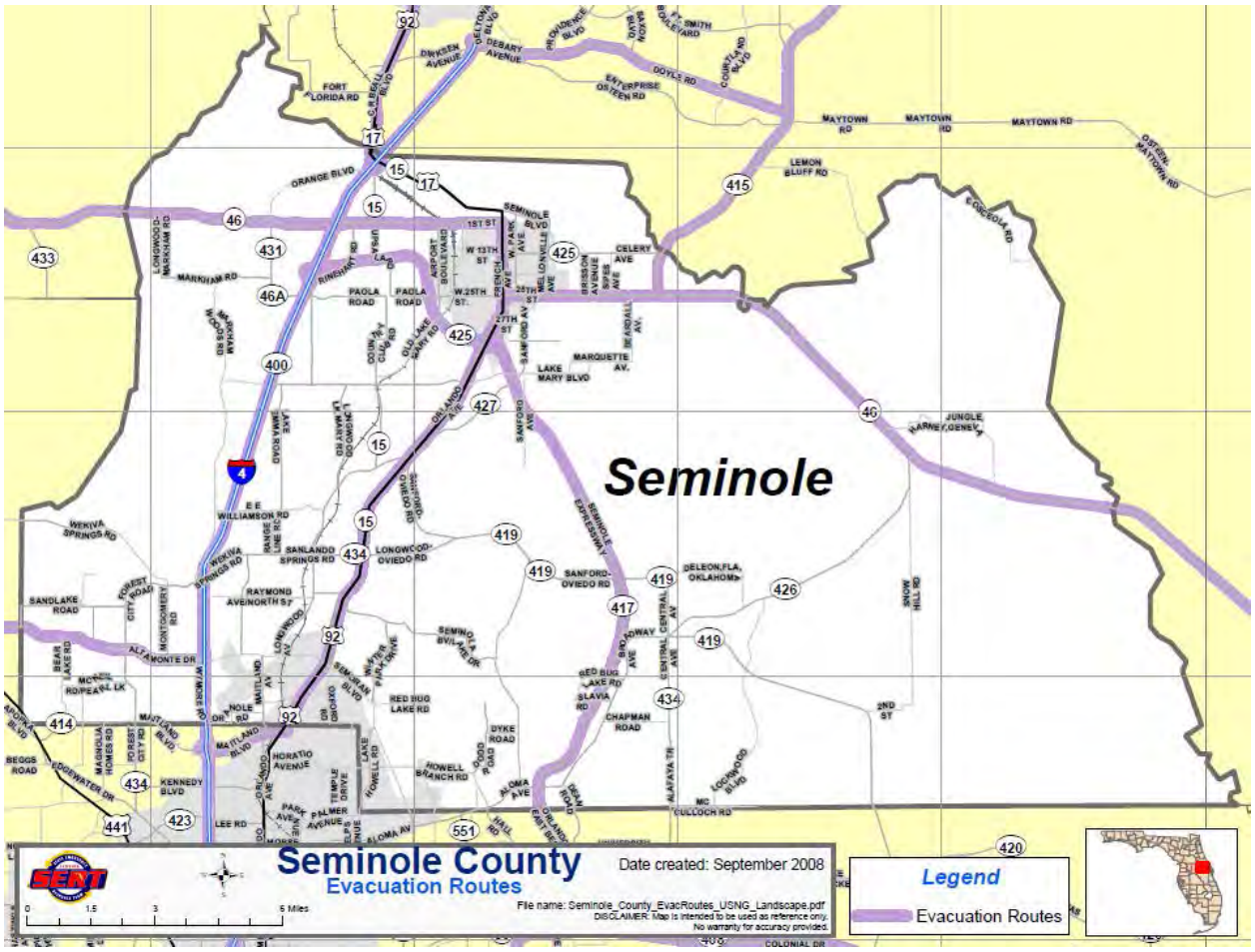
Those who cannot get out of harm's way need shelter. For tropical storms, a stick-built house (not a mobile home) often suffices, but for hurricanes, something sturdier is required. That is why schools so often serve as shelters during a storm as well as a place for those who have lost their homes after the storm.

Typically, the American Red Cross will staff a shelter and ensure that there is adequate food, bedding, and wash facilities. Shelter management is a specialized skill. Managers must deal with problems like scared children, families that want to bring their pets in, and the potential for an overcrowded facility.

8.4.1 Local Implementation

Evacuation routes for Seminole County are shown in the map below.

Figure 33: Seminole County Evacuation Routes



8.4.2 CRS Credit

Because it is primarily concerned with protecting insurable buildings, the CRS does not provide any special credit for evacuation or sheltering of people. It is assumed that the emergency response plan would include all necessary actions in response to a flood.

8.5 Post-Disaster Recovery and Mitigation

After a disaster, communities should undertake activities to protect public health and safety and facilitate recovery. Appropriate measures include:

- Patrolling evacuated areas to prevent looting,
- Providing safe drinking water,
- Monitoring for diseases,
- Vaccinating residents for tetanus and other diseases,

- Clearing streets, and
- Cleaning up debris and garbage.

Throughout the recovery phase, everyone wants to get "back to normal." The problem is that "normal" means the way they were before the disaster, exposed to repeated damage from future disasters. There should be an effort to help prepare people and property for the next disaster. Such an effort would include:

- Public information activities to advise residents about mitigation measures they can incorporate into their reconstruction work,
- Evaluating damaged public facilities to identify mitigation measures that can be included during repairs,
- Identifying other mitigation measures that can lessen the impact of the next disaster,
- Acquiring substantially or repeatedly damaged properties from willing sellers,
- Planning for long-term mitigation activities, and
- Applying for post-disaster mitigation funds.

8.5.1 Regulating Reconstruction

Requiring permits for building repairs and conducting inspections are vital activities to ensure that damaged structures are safe for people to reenter and repair. There is a special requirement to do this in floodplains, regardless of the type of disaster or the cause of damage. The NFIP requires that local officials enforce the substantial damage regulations. These rules require that if the cost to repair a building in the mapped floodplain equals or exceeds 50% of the building's market value, the building must be retrofitted to meet the standards of a new building in the floodplain. In most cases, this means that a substantially damaged building must be elevated above the base flood elevation.

After a disaster, all buildings need to be inspected to determine if they are safe to reenter. A substantially damaged building needs to be "red tagged" to stop repairs unless it will meet code requirements.

This requirement can be very difficult for understaffed and overworked offices following a disaster. However, if these activities are not carried out properly, not only does the community miss a tremendous opportunity to redevelop or clear out a hazardous area, it may be violating its obligations under the NFIP. The sanctions for failure to properly enforce the floodplain reconstruction regulations are spelled out in Chapter 5 – Preventive Measures. In some areas, mutual aid agreements have been established so building inspectors from a community not affected by the disaster can work in the communities that were hit the hardest.

8.5.2 Local Implementation

The County's Floodplain Management Ordinance includes the NFIP requirements for determining if a building is substantially damaged. The County's practice is to wait until reconstruction applicants come to the County to request a permit. Repairs that are cosmetic only (for example, replacing flooring, cabinets and painting) do not need permits.

There are no special public information activities to tell people to apply for a permit. Residents interested in a mitigation project funded by the NFIP's Increased Cost of Compliance do apply and request a substantial damage determination.

These practices could permit many substantially damaged properties to be repaired without inspection. The result could jeopardize the County's standing in the NFIP. These practices also mean that the County misses opportunities to inform disaster victims about property protection measures that they can incorporate during repairs.

8.5.3 CRS Credit

Seminole County should formally establish post-disaster mitigation polices outlined in this Plan in the section above.

8.6 Conclusions

1. There are several threat recognitions systems that can provide the County with advance notice of an impending emergency.
2. Additional stream and river gauges can help protect more residents in the County.
3. The County depends on telephones and the media to warn residents. These media should reach most people who need to know of a threat.
4. The *Seminole County Emergency Operations Plan* contains general guidance on responding to many different kinds of hazards. There are additional documents, such as annexes and checklists that provide specific guidance for responding to individual natural hazards. Such guidance could be very helpful when things happen quickly and for hazards that have predictable impacts, such as tropical storms and flooding.
5. The plans and guidance documents on post-disaster inspections and capitalizing on post-disaster mitigation opportunities are lacking. In fact, current procedures do not adequately ensure that the County's obligations to the NFIP will be met. They also mean that the County could miss opportunities to advise people on property protection measures they can implement during repairs and reconstruction.

8.7 Recommendations

1. The *Seminole County Emergency Operations Plan* should be reviewed in detail to determine where improvements can be made and how to maximize credit under CRS. The *Plan* should then be submitted for credit under CRS, and CRS will provide a critique of the plan to show what further improvements are needed.
2. The County should consider all possible local, state and federal funding options for installation of additional stream and river gauges to provide a higher level of protection to its residents.
3. The County should ensure that all steps are being taken to alleviate traffic jams during an evacuation of the county.

4. The County's emergency preparedness, public information, and permits staffs should work together to develop post-disaster procedures for public information, reconstruction regulation and mitigation project identification.

8.8 References

1. *CRS Coordinator's Manual*, FEMA, 2007.
2. *CRS Credit for Flood Warning Programs*, FEMA, 2006.
3. *Emergency Management: Principles and Practice for Local Government*, International City/County Management Association, 1991.
4. *Flood Fight Operations*, FEMA, 1995.
5. *Guide for All-Hazard Emergency Operations Planning*, FEMA SLG-101, 1996.

9 Structural Project Measures

Flood control projects have traditionally been used by communities to control or manage floodwaters. They are also known as "structural" projects that keep flood waters away from an area as opposed to "non-structural" projects, like retrofitting, that do not rely on structures to control flows.

9.1 Flood Control Measures

Four general types of flood control projects are reviewed here: levees, reservoirs, diversions, and dredging. These projects have three advantages not provided by other mitigation measures:

- They can stop most flooding, protecting streets and landscaping in addition to buildings,
- Many projects can be built without disrupting citizens' homes and businesses, and
- They are constructed and maintained by a government agency, a more dependable long-term management arrangement than depending on many individual private property owners.

However, as shown below, structural measures also have shortcomings. The appropriateness of using flood control depends on individual project area circumstances.

Pros and Cons of Structural Flood Control Projects

Advantages	Disadvantages
They may provide the greatest amount of protection for land area used.	They can disturb the land and disrupt the natural water flows, often destroying wildlife habitat.
Because of land limitations, they may be the only practical solution in some circumstances.	They require regular maintenance, which if neglected can have disastrous consequences.
They can incorporate other benefits into structural project design, such as water supply and recreational uses.	They are built to a certain flood protection level that can be exceeded by larger floods, causing extensive damage.
Regional detention may be more cost-efficient and effective than requiring numerous small detention basins.	They can create a false sense of security, as people protected by a project often believe no flood can ever reach them.
	Although it may be unintended, in many circumstances they promote more intensive land use and development in the floodplain.

9.1.1 Levees and Floodwalls

Probably the best known flood control measure is a barrier of earth (levee) or concrete (floodwall) erected between the watercourse and the property to be protected. Levees and floodwalls confine water to the stream channel by raising its banks. They must be well designed

to account for large floods, underground seepage, pumping of internal drainage, and erosion and scour. Key considerations when evaluating the use of a levee include:

- Design and permitting costs,
- Right of way acquisition,
- Removal of fill to compensate for the floodwater storage that will be displaced by the levee,
- Internal drainage of surface flows from the area inside the levee,
- Cost of construction,
- Cost of maintenance,
- Mitigation of adverse impacts to wetlands and other habitats,
- Loss of river access and views, and
- Creating a false sense of security, because while levees may reduce flood damage for smaller more frequent rain events, they may also overtop or breach in extreme flood events and subsequently create more flood damage than would have occurred without the levee.

The failure of the New Orleans levee system during Hurricane Katrina made it harder to get support for new levees.

Levees placed along the river or stream edge degrade the aquatic habitat and water quality of the stream. They also are more likely to push floodwater onto other properties upstream or downstream. To reduce environmental impacts and provide multiple use benefits, a setback levee is the best project design. The area inside a setback levee can provide open space for recreational purposes and provide access sites to the river or stream.

Floodwalls perform like levees except they are vertical-sided structures that require less surface area for construction. Floodwalls are constructed of steel sheet pile or reinforced concrete, which makes the expense of installation cost prohibitive in many circumstances. Floodwalls also degrade adjacent habitat and can displace erosive energy to unprotected areas of shoreline downstream.

Seawalls are barriers or retaining walls that are built facing a large lake, ocean or the Gulf of Mexico. They are intended to protect the land from erosion by wave action. However, they often have an adverse impact on the shore and on neighboring properties and the movement of sand. The natural forces that transport sand and replenish beaches are disrupted by the wall, often increasing shoreline erosion on adjacent properties. Therefore, they are not encouraged and are even prohibited in many areas.

9.1.2 Reservoirs and Detention

Reservoirs reduce flooding by temporarily storing flood waters behind dams or in storage or detention basins. Reservoirs lower flood heights by holding back, or detaining, runoff before it

can flow downstream. Flood waters are detained until the flood has subsided, then the water in the reservoir or detention basin is released or pumped out slowly at a rate that the river can accommodate downstream.

Reservoirs can be dry and remain idle until a large rain event occurs. Or they may be designed so that a lake or pond is created. The lake may provide recreational benefits or water supply (which could also help mitigate a drought).

Retention pond

Flood control reservoirs are most commonly built for one of two purposes. Large reservoirs are constructed to protect property from existing flood problems. Smaller reservoirs, or detention basins, are built to protect property from the stormwater runoff impacts of new development.

Regardless of size, reservoirs protect the development that is downstream from the reservoir site. Unlike levees and channel modifications, they do not have to be built close to or disrupt the area to be protected. Reservoirs are most efficient in deeper valleys where there is more room to store water, or on smaller rivers where there is less water to be stored.

In urban areas, some reservoirs are simply manmade holes, excavated to store floodwaters. Reservoirs in urban areas are typically constructed adjacent to streams (though usually outside of the floodplain). When built in the ground, there is no dam for these retention and detention basins and no dam failure hazard. Wet or dry basins can also serve multiple uses by doubling as parks or other open space uses.

There are several considerations when evaluating use of reservoirs and detention:

- There is the threat of flooding the protected area should the reservoir's dam fail,
- There is a constant expense for management and maintenance of the facility,
- They may fail to prevent floods that exceed their design levels,
- Sediment deposition may occur and reduce the storage capacity over time,
- They can impact water quality as they are known to affect temperature, dissolved oxygen and nitrogen, and nutrient levels, and
- If not designed correctly, in-stream reservoirs may cause backwater flooding problems upstream.

9.1.3 Diversion

A diversion is a new channel that sends floodwaters to a different location, thereby reducing flooding along an existing watercourse. Diversions can be surface channels, overflow weirs, or tunnels. During normal flows, the water stays in the old channel. During floods, the floodwaters spill over to the diversion channel or tunnel, which carries the excess water to a receiving lake or river.

Diversions are limited by topography; they will not work in some areas. Unless the receiving water body is relatively close to the floodprone stream and the land in between is low and vacant, the cost of creating a diversion can be prohibitive.

A diversion sends high flows from one stream to a lake or larger river

9.1.4 Dredging

Dredging is often viewed as a form of conveyance improvement. However, it has the following problems:

- Given the large volume of water that comes downstream during a flood, removing a foot or two from the bottom of the channel will have little effect on flood heights.
- Dredging is often cost prohibitive because the dredged material must be disposed of somewhere.
- Unless in-stream or tributary erosion are corrected upstream, the dredged areas usually fill back in within a few years, and the process and the expense have to be repeated.
- If the channel has not been disturbed for many years, dredging will destroy the habitat that has developed.

Dredging

To protect the natural values of the stream, federal law requires a U.S. Army Corps of Engineers permit before dredging can proceed. This can be a lengthy process that requires a lot of advance planning and many safeguards to protect habitats, which adds to the cost of the project.

9.1.5 Channelization

Channelization has traditionally been the common method for dealing with local drainage or flooding problems. Channelization involves straightening, deepening and /or widening a stream or river channel. With this approach, there are several concerns to keep in mind:

- Channelized streams can create or worsen flood problems downstream as larger amounts of water are transported at a faster rate.

- Channelized streams rise and fall faster. During dry periods the water level in the channel is lower than it should be which creates water quality problems and degrades habitat.
- Channelized waterways tend to be unstable and experience more erosion. The need for periodic reconstruction and silt removal becomes cyclic, which makes channel maintenance very expensive.

Channel work

On the other hand, properly sloped and planted channels are more aesthetically and environmentally appealing and can be cheaper to maintain.

9.1.6 CRS Credit

Structural flood control projects that provide 100-year flood protection and that result in revisions to the Flood Insurance Rate Map are not credited by the CRS in order to avoid duplicating the larger premium reduction provided by removing properties from the mapped floodplain.

The CRS credits smaller flood control projects that meet the following criteria:

- They must provide protection to at least the 25-year flood,
- They must meet certain environmental protection criteria,
- They must meet federal, state and local regulations, such as the Corps of Engineers' 404 permit and Florida dam safety rules, and
- They must meet certain maintenance requirements.

These criteria ensure that credited projects are well-planned and permitted. Any of the measures reviewed in this section would be recognized under Activity 530 – Flood Protection, although it would be very hard to qualify a dredging project. Credit points are based on the type of project, how many buildings are protected, and the level of flood protection provided.

9.1.7 Local Implementation

The County has initiated a study on the Mullet Lake Road Stormwater Improvement Project to help provide a solution to stormwater and localized flooding in the St. Johns and Lake Harney Basins. This project in eastern Seminole County involves a drainage area of approximately 2,890 acres or 4.5 square miles. Residents within the Mullet Lake Park Road Basin experience both yard and structure flooding during greater than average rainfall events. The study defined the primary cause of flooding to be an inadequate conveyance system and accumulation of runoff from upstream areas which overload the current system. The study was completed in 2006 but construction of the project has yet to be completed.

9.2 Conclusions

1. Continue to require onsite retention and detention facilities to manage runoff from sites to avoid overloading drainage systems. There is a benefit to ensuring that post-development runoff does not exceed pre-development conditions.

2. Consider the benefits of regional upper watershed retention and detention to help mitigate the amount of conveyance of downstream flows.
3. Levees and floodwalls don't appear to be practical solutions for the County as the areas in need of protection would require these structures to be located on private property. The constant maintenance of these facilities can be quite expensive.
4. Improvement to channels should be considered in terms of the immediate benefit for increased conveyance and the long-term cost of maintaining them.
5. The Mullet Lake Park Road Stormwater Improvement Project should be given a higher priority for implementation to reduce flooding and help avoid future repetitive loss properties.

9.3 Recommendations

1. The County should continue to require developers to provide on-site detention and retention to lessen the runoff from developed sites.
2. The County should consider the benefits of upper watershed regional detention as a way to reduce downstream flow. This approach could be combined with the preservation of open space of sensitive lands.
3. The County should encourage one approach of the Mullet Lake Park Road Stormwater Improvement Project for implementation to avoid future repetitive loss properties.

9.4 References

1. *CRS Coordinator's Manual*, FEMA, 2007.
2. *CRS Credit for Drainage System Maintenance*, FEMA, 2006.
3. *Kane County, IL Natural Hazards Mitigation Plan*, January, 2009
4. *Mullet Lake Park Road Stormwater Improvement Project*, Inwood Consulting Engineers, 2006

10 Public Information Measures

A successful hazard mitigation program involves both the public and private sectors. Public information activities advise property owners, renters, and businesses about hazards and ways to protect people and property from these hazards. These activities can motivate people to take the steps necessary to protect themselves and others.

Information can bring about voluntary mitigation activities at little or no cost to the government. Property owners mitigated their flooding problems long before government funding programs existed. The typical approach to delivering information involves two levels of activity. The first is to broadcast a short and simple version of the message to everyone potentially affected. The second level provides more detailed information to those who respond and want to learn more.

This chapter starts with activities that reach out to people and tell them to be advised of the hazards and some of the things they can do. It then covers additional sources of information for those who want to learn more. It ends with an overall public information strategy.

10.1 Outreach Projects

Outreach projects are the first step in the process of orienting property owners to the hazards they face and the concept of property protection. They are designed to encourage people to see out more information in order to take steps to protect themselves and their properties.

Research has shown that outreach projects work. However, awareness of the hazard is not enough; people need to be told what they can do about the hazard, so projects should include information on safety, health and property protection measures. Research has also shown that a properly run local information program is more effective than national advertising or publicity campaigns. Therefore, outreach projects should be locally designed and tailored to meet local conditions.

Community newsletters/direct mailings: The most effective types of outreach projects are mailed or distributed to everyone in the community. In the case of floods, they can be sent only to floodplain property owners.

News media: Local newspapers can be strong allies in efforts to inform the public. Press releases and story ideas may be all that's needed to whet their interest. After a flood in another community, people and the media become interested in their flood hazard and how to protect themselves and their property. Local radio stations and cable TV channels can also help. These media offer interview formats and cable TV may be willing to broadcast videos on the hazards.

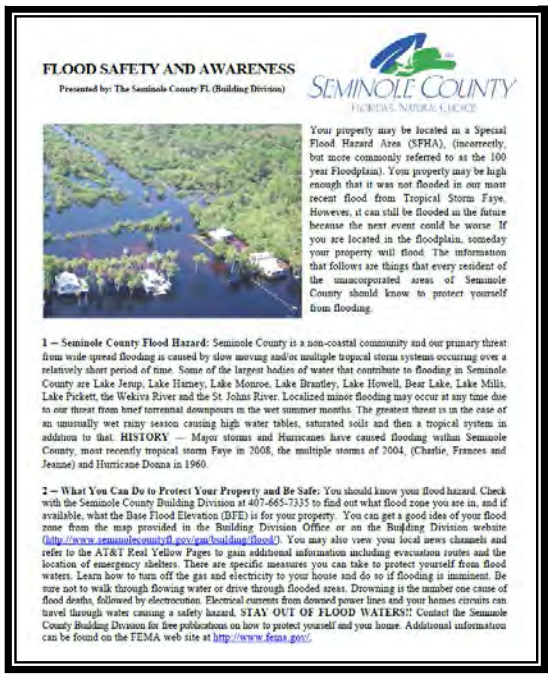
Other approaches: Examples of other outreach projects include:

- Presentations at meetings of neighborhood, civic or business groups,
- Displays in public buildings or shopping malls,
- Signs in parks, along trails and on waterfronts that explain the natural features (such as the river) and their relation to the hazards (such as floods),
- Brochures available in municipal buildings and libraries, and
- Special meetings, workshops and seminars.

10.1.1 Local Implementation

There are several types of outreach projects implemented in Seminole County. The County's website features a page describing flood facts and flood safety measures. The County also distributes a brochure titled "Flood Safety and Awareness" to all property owners in the County. There is also a hurricane and storm information page on the County's website, which contains emergency information when a storm is threatening the area. In addition, news releases are posted to the County's website, which contain safety information related to natural hazards when appropriate. The County holds a Hurricane Expo to disseminate information about hurricane safety and give residents hurricane safety kits, including a guide to hurricane safety, a flashlight, and a DVD about hurricane safety. The County also advertises safety information on local billboards.

Figure 34: Brochure Distributed to Floodplain Residents



FLOOD SAFETY AND AWARENESS

Presented by: The Seminole County FL (Building Division)

SEMINOLE COUNTY
FLORIDA'S NATURAL CHOICE

Your property may be located in a Special Flood Hazard Area (SFHA), (incorrectly, but more commonly referred to as the 100 year Floodplain). Your property may be high enough that it was not flooded in our most recent flood from Tropical Storm Faye. However, it can still be flooded in the future because the next event could be worse. If you are located in the floodplain, someday your property will flood. The information that follows are things that every resident of the unincorporated areas of Seminole County should know to protect yourself from flooding.

1 – Seminole County Flood Hazard: Seminole County is a non-coastal community and our primary threat from wide spread flooding is caused by slow moving and/or multiple tropical storm systems occurring over a relatively short period of time. Some of the largest bodies of water that contribute to flooding in Seminole County are Lake Jesup, Lake Harney, Lake Monroe, Lake Brantley, Lake Howell, Bear Lake, Lake Mills, Lake Pickett, the Wekiva River and the St. Johns River. Localized minor flooding may occur at any time due to our threat from brief torrential downpours in the wet summer months. The greatest threat is in the case of an unusually wet rainy season causing high water tables, saturated soils and then a tropical system in addition to that. **HISTORY** — Major storms and Hurricanes have caused flooding within Seminole County, most recently tropical storm Faye in 2008, the multiple storms of 2004, (Charlie, Frances and Jeanne) and Hurricane Donna in 1960.

2 – What You Can Do to Protect Your Property and Be Safe: You should know your flood hazard. Check with the Seminole County Building Division at 407-665-7335 to find out what flood zone you are in, and if available, what the Base Flood Elevation (BFE) is for your property. You can get a good idea of your flood zone from the map provided in the Building Division Office or on the Building Division website (http://www.seminolecountyfl.gov/gm/building/flood/). You may also view your local news channels and refer to the AT&T Real Yellow Pages to gain additional information including evacuation routes and the location of emergency shelters. There are specific measures you can take to protect yourself from flood waters. Learn how to turn off the gas and electricity to your house and do so if flooding is imminent. Be sure not to walk through flowing water or drive through flooded areas. Drowning is the number one cause of flood deaths, followed by electrocution. Electrical currents from downed power lines and your homes circuits can travel through water causing a safety hazard. **STAY OUT OF FLOOD WATERS!!** Contact the Seminole County Building Division for free publications on how to protect yourself and your home. Additional information can be found on the FEMA web site at http://www.fema.gov/.

Finally, various brochures are available in the community at various departments such as in the Building Division to provide residents with flood safety and property protection advice.

10.1.2 CRS Credit

The Community Rating System provides up to 380 points for projects on flood topics. One hundred of these points are for having a public information program strategy. This plan qualifies for the strategy credit.

10.2 Real Estate Disclosure

Many times after a flood or other natural disaster, people say they would have taken steps to protect themselves if they had known they had purchased a property exposed to a hazard. There are some federal and state requirements about such disclosures, but they have their limits.

Federal law: Federally regulated lending institutions must advise applicants for a mortgage or other loan that is to be secured by an insurable building whether the property is in a floodplain as shown on the Flood Insurance Rate Map. If so, flood insurance is required for buildings located within the floodplain if the mortgage or loan is federally insured. However, because this requirement has to be met only 10 days before closing, the applicant is often already committed to purchasing the property when he or she first learns of the flood hazard.

State law: State laws set standards for real estate sales and licensing of agents and brokers. In addition, Florida has a natural hazards disclosure law, which requires the seller of real estate to give the buyer a document outlining whether the property is in an area prone to flooding, hurricanes or tornadoes. The shortcoming of such a law is that because of the sporadic nature of flooding, a property owner may legitimately not be aware of past or potential flooding problems.

10.2.1 Local Implementation

The County has one additional law related to natural hazard disclosure. The final plat for development plans must include the limits of the floodplain, indicating the flood elevation for the 100-year flood. This only provides information for developments that have been platted since the requirement went into effect and then only if the title search sees it and advises the buyer. The multiple listing service does not include a listing of whether a property is in a flood zone or wetland. Disclosure practices are left up to the individual broker or agent.

10.2.2 CRS Credit

Communities in Florida should be eligible for five points under the "Other disclosure requirements" for the state law requiring sellers to notify the buyer of natural hazards. Seminole County is eligible for 5 points for including the limits of the floodplain on all final plats.

10.3 Libraries and Websites

The two previous activities tell people that they are exposed to a hazard. The next step is to provide information to those who want to know more. The community library and local websites are obvious places for residents to seek information on hazards, hazard protection, and protecting natural resources.

Books and pamphlets on hazard mitigation can be given to libraries, and many of these can be obtained for free from state and federal agencies. Libraries also have their own public information campaigns with displays, lectures and other projects, which can augment the activities of the local government. Today, websites are commonly used as research tools. They provide fast access to a wealth of public and private sites for information. Through links to other websites, there is almost no limit to the amount of up to date information that can be accessed on the Internet.

In addition to online floodplain maps, websites can link to information for homeowners on how to retrofit for tornadoes and floods or a website about floods for children. The "FEMA for Kids" website teaches children how to protect their home and what to have in a family disaster kit.

10.3.1 Local Implementation

A search of the Seminole County Library catalog on December 14, 2010 showed that the library has 38 publications about floods and 64 publications about hurricanes. The documents about floods represent a broad range of topics, from flood proofing construction guidance to a review of flood policies to a guide to reading flood maps.

The County's website, www.seminolecountyfl.gov, is kept updated with information on the County's activities, including the mitigation planning process. FEMA's floodplain maps for the County are available at http://www.seminolecountyfl.gov/gm/building/flood/firm.asp.

10.3.2 CRS Credit

The Community Rating System provides up to 30 points for having a variety of flood references in the local public library and up to 36 more for similar material on municipal websites (Activity 350 – Flood Protection Information).

10.4 Technical Assistance

10.4.1 Hazard Information

Many benefits stem from providing map information to inquirers. Residents and business owners that are aware of the potential hazards can take steps to avoid problems or reduce their exposure to flooding. Real estate agents and house hunters can find out if a property is floodprone and whether flood insurance may be required.

Communities can easily provide map information from FEMA's Flood Insurance Rate Maps (FIRMs) and Flood Insurance Studies. They may also assist residents in submitting requests for map amendments and revisions when they are needed to show that a building is located outside the mapped floodplain.

Some communities supplement what is shown on the FIRM with information on additional hazards, flooding outside mapped areas and zoning. When the map information is provided, community staff can explain insurance, property protection measures and mitigation options that are available to property owners. They should also remind inquirers that being outside the mapped floodplain is no guarantee that a property will never get wet.

10.4.2 Property Protection Assistance

While general information provided by outreach projects or the library is beneficial, most property owners do not feel ready to retrofit their buildings without more specific guidance. Local building department staffs are experts in construction. They can provide free advice, not necessarily to design a protection measure, but to steer the owner onto the right track.

Building or public works department staffs can provide the following types of assistance:

- Visit properties and offer protection suggestions,
- Recommend or identify qualified or licensed contractors,
- Inspect homes for anchoring of roofing and the home to the foundation,
- Provide advice on protecting windows and garage doors from high winds, and
- Explain when building permits are needed for home improvements.

There is a concern that a local official might provide the wrong information and the community would be sued if a project failed. To counter this, there are guidelines for local programs and training on how to identify the right measures. FEMA conducts a free week-long course at its Emergency Management Institute on property protection measures for flooding. FEMA and the Corps of Engineers periodically conduct one- or two-day retrofitting workshops.

10.4.3 Local Implementation

FEMA floodplain maps are available on the County's website, as described above. The Building Division will also provide maps to anyone who requests them.

10.4.4 CRS Credit

The Community Rating System provides 140 points for providing map information to inquirers. Up to 71 points are available for providing one-on-one flood protection assistance to residents and businesses and for making site visits. Both services must be publicized.

10.5 Public Information Program Strategy

A public information program strategy is a document that receives CRS credit. It is a review of local conditions, local public information needs, and a recommended plan of activities. A strategy consists of the following parts, which are incorporated into this plan:

- The local flood hazard (discussed in Chapter 3 of this plan)
- The property protection measures appropriate for the flood hazard (discussed in Chapter 6)
- Flood safety measures appropriate for the local situation (flood safety measures are discussed on page 110 and hurricane safety is discussed in the phonebook and other publications)
- The public information activities currently being implemented within the community, including those being carried out by non-government agencies (discussed above in sections 10.1 and 10.4)
- Goals for the community's public information program (discussed in Chapter 4)
- The outreach projects that will be done each year to reach the goals (discussed in the Recommendations section of this chapter and in Chapter 11)
- The process that will be followed to monitor and evaluate the projects (discussed in Chapter 11)

10.5.1 Public Information Topics

At its 2015, meeting series, the FMPC reviewed the various public information activities currently underway with the goals of this Floodplain Management Plan in mind. The members of the FMPC discussed improving the current County website to make it easier for residents to find the information they need, using social media such as Facebook and Twitter to convey information, and using faith-based organizations and homeowners' associations to help spread information to as many residents as possible.

Flood Safety

Pay attention to evacuation orders. Listen to local radio or TV stations for forecasts and emergency warnings. Know about evacuation routes and nearby shelters and have plans for all family members on how to evacuate and where to meet if you're split up during an emergency.

Do not drive through a flooded area. During a flood, more people drown in their cars than anywhere else. Don't drive around road barriers; the road or bridge may be washed out.

Do not walk through flowing water. Flash flooding is the leading cause of weather-related deaths in the U.S. Currents can be deceptive; 6 inches of moving water can knock you off your feet in a strong current. If you walk in standing water, use a stick to help you locate the ground.

Stay away from power lines and electrical wires. Electrical currents can travel through water. Report downed power lines to the police or sheriff by calling 911.

Have the power company turn off your electricity. Some appliances, like TV sets, keep electrical charges even after they've been unplugged. Don't use appliances or motors that have gotten wet unless they have been taken apart, cleaned and dried.

Look before you step. After a flood, the ground and floors are covered with debris like broken bottles and nails. Floors and stairs that are covered with mud can also be slippery.

Be alert for gas leaks. Use a flashlight to inspect damage. Don't smoke or use candles, lanterns, or open flames unless you know the gas has been shut off and the area has been ventilated.

Look out for animals that may have been flooded out of their homes and who may seek shelter in yours. Use a pole or stick to turn things over and scare away small animals.

Carbon monoxide exhaust kills. Use a generator or other gasoline-powered machine outdoors. The same goes for camping stoves. Charcoal fumes are especially deadly – cook with charcoal outdoors.

Clean everything that got wet in the flood. Floodwaters have picked up sewage and chemicals from roads, farms, factories, and storage buildings. Spoiled food, and flooded cosmetics and medicines can be health hazards. When in doubt, throw it out.

Take care of yourself. Recovering from a flood is a big job. It is tough on both the body and the spirit and the effects a disaster has on you and your family may last a long time.

10.5.2 CRS Credit

The CRS provides 100 points for a public information program strategy. A mass mailing to all properties can earn up to 60 more points and can meet the publicity requirements to receive credit for several other activities.

10.6 Conclusions

1. There are many ways that public information can be used so that people and businesses will be more aware of the hazards they face and how they can protect themselves.
2. Many of the public information activities can be implemented by community staff. By formalizing its activities, a community can earn nearly 500 points under the Community Rating System.
3. Outreach projects, libraries, websites and the Hurricane Expo are currently being used as public information tools in Seminole County.
4. The most important topics to cover in public information activities are:
   - Safety precautions for all types of hazards, but especially storms, floods and fog.

Evacuation is recognized as the most important safety precaution for tropical storms and hurricanes.

- Flood protection measures, including rules for new construction and insurance.
- Keeping drainage ways clear and protection from local drainage problems.
- Family and emergency preparedness measures.
- What the County is doing and sources of assistance.
- Protecting water quality and wetlands and the benefits of open space.

The most appropriate ways to spread this information are:

- Websites and social media
- Mailings to everyone, in utility bills or otherwise
- News releases or newspaper articles
- Newsletters
- Displays, particularly at special events such as the Hurricane Expo
- Handouts, flyers and other materials, which can distributed at special events and presentations

10.7 Recommendations

1. The County's website should be improved to make navigation to flood hazard and safety information more intuitive.
2. The County should increase its presence on social media, such as Facebook and Twitter, to maximize the number of people reached with flood hazard and safety information.
3. The County should continue to distribute brochures about hurricanes to those living in the mapped floodplain.
4. The County should continue to hold Hurricane Expo and give away preparedness kits at the event.
5. Staff should reach out to homeowners' associations and faith-based organizations to help spread the word about flood hazards and safety measures.
6. The County's website should have a mitigation page.
7. The County should consider implementation of an outreach program strategy for credit under the CRS.

10.8 References

1. *Are You Ready? A Guide to Citizen Preparedness,* FEMA, 2002.
2. *CRS Coordinator's Manual,* Community Rating System, FEMA, 2007.
3. *CRS Credit for Outreach Projects,* FEMA, 2006.

4. "What is a Natural Hazard Disclosure?" Retrieved December 14, 2010 from http://www.wisegeek.com/what-is-a-natural-hazard-disclosure.htm.

11 Revisions and Maintenance

The FMP Plan will be housed in the in the Office of Emergency Management for Seminole County. The LMS Working Group meets on a quarterly basis at a minimum, as well as after times of natural disaster events, and any other time deemed appropriate by the Working Group Chairperson, to update and revise the FMP. The criteria used to evaluate the FMP document and activities should include, but not be limited to the following:

- Federal and/or State Requirements
- Changes in development trends and land use that could affect infrastructure
- Storms or other natural events that have altered Seminole County's hazard areas
- Completion of existing mitigation projects and introduction of new goals
- Changes in policy, procedure or code
- Changes in building codes and practices
- Review of legislative actions that could affect funding of mitigation efforts
- Changes in Flood Insurance Rate Maps, National Flood Insurance Program, etc.

On an annual basis the Office of Emergency Management will generate a FMP progress report that will evaluate the successes or areas of improvement for the FMP. The report will be available to the public, as well as provided to all jurisdictional governing bodies. This annual report also satisfies the CRS program requirements for an annual report for the floodplain management plan. This will allow people to re-acquaint themselves with the FMP document and the processes that it identifies, so any recommendations, suggestions, and updates, can be properly reviewed and weighed for consistency with the direction of the FMP Committee.

The plan is periodically reviewed and adopted by the participating jurisdictions' governing bodies to ensure that the mitigation actions taken by their organizations are consistent with each community's larger vision and goals, as well as their overall unique needs and circumstances. The adoption process includes instructing the jurisdictions' agencies and organizations to continue to refine, expand and implement the plan.

Seminole County
Floodplain Management Planning Committee

AGENDA

May 4, 2015

9:30AM-10:30AM

Seminole County EOC

150 Bush Blvd.
Sanford, FL 32773

- Call to Order
- Welcome/Introductions
- Overview of New Plan
- Review of Existing Action Plan
- Create New Action Plan
- Adjournment

SEMINOLE COUNTY
FLORIDA'S NATURAL CHOICE

ICS 211A CHECK IN LIST Seminole County EOC	1. INCIDENT NAME: Floodplain Management Meeting	2. DATE: 5/4/15	3. INCIDENT TIME: 9:30am-10:30am	4. CHECK IN LOCATION Sanford, FL

5. INFORMATION

PERSONNEL NAME	AGENCY	TIME IN	EMAIL
Danielle Marshall	City of Altamonte	9:20	dmarshall@altamonte.org
ZYNKA PEREZ	CITY OF WINTER SPGS	9:20	zperez@winterspringsfl.org
Tina Santuma	Seminole County EM	9:24	TDantuma@seminolecountyfl.gov
Breiby Lister	Seminole County EM	9:24	
Kelly Brock	City of Casselberry	9:24	kbrock@casselberry.org
Shandeh Berry	Seminole County EM	9:25	
DAVID Waller	Oviedo	930	dwaller@cityofoviedo.net
AMANDA KOZTUS	Oviedo	930	akoztus@cityofoviedo.net
MIKE CASH	SANFORD	9:25	MICHAEL.CASH@SANFORDFL.GOV
Marie Lackey	SCPW	9:25	
Josh Shelton	Seminole County EM	9:30	
JAMES POTTER	Seminole County DEV REV	9:30	JPOTTER@SEMINOLECOUNTYFL.GOV
Alan Harris	Seminole County OEM	930	aharris@seminolecountyfl.gov
Danielle Koury	City of Lake Mary	9:32	dkoury@lakemaryfl.com

ICS 211A SC EOC	6. NUMBER OF PAGES: ____ of ____	7. PREPARED BY (RESOURCE UNIT):	8. MISSION NUMBER

ICS 211A CHECK IN LIST Seminole County EOC	1. INCIDENT NAME: Floodplain Management Meeting	2. DATE: 5/4/15	3. INCIDENT TIME: 9:30am-10:30am	4. CHECK IN LOCATION Sanford, FL

5. INFORMATION

PERSONNEL NAME	AGENCY	TIME IN	EMAIL
DAVID HAMSTRA	CITY OF LONGWOOD	9:15	DAVID@PEGASUSENGINEERING.NET
PHIL RIEBEL		9:25	407-349-9522
Robert Potts	Citizen	9:35	RPotts@ESciencesInc.com

ICS 211A SC EOC	6. NUMBER OF PAGES: _____ of _____	7. PREPARED BY (RESOURCE UNIT):	8. MISSION NUMBER

Seminole County
Floodplain Management Planning Committee

AGENDA

June 5, 2015

9:00AM-11:00AM

Seminole County EOC

150 Bush Blvd.
Sanford, FL 32773

- Call to Order
- Welcome/Introductions
- Review New Goals and Objectives
- Create New Action Plan
- Adjournment

SEMINOLE COUNTY
FLORIDA'S NATURAL CHOICE

ICS 211A CHECK IN LIST Seminole County EOC	1. INCIDENT NAME: Floodplain Management Planning Meeting	2. DATE: 6/5/15	3. INCIDENT TIME: 0900-1100	4. CHECK IN LOCATION Sanford, FL

5. INFORMATION

PERSONNEL NAME	AGENCY	TIME IN	EMAIL
Zunka Perez	City of Winter Springs	8:50A	zperez@winterspringsfl.org
Nancy Dunn	Bear Lake Preservation Assn	8:50	nancylynn@cfl.rr.com
Mark Flomerfelt	Sem Co	8:54	MFlomerfelt@SemCo...
Danielle Koury	City of Lake Mary	8:55	
Michelle Bernstein	Geneva FL	"	on file

ICS 211A SC EOC	6. NUMBER OF PAGES: _____ of _____	7. PREPARED BY (RESOURCE UNIT):	8. MISSION NUMBER

ICS 211A CHECK IN LIST Seminole County EOC	1. INCIDENT NAME: Floodplain Management Planning Meeting	2. DATE: 6/5/15	3. INCIDENT TIME: 0900-1100	4. CHECK IN LOCATION Sanford, FL

5. INFORMATION

PERSONNEL NAME	AGENCY	TIME IN	EMAIL
Steven Lerner	Seminole OEM	0847	slerner@seminolecountyfl.gov
Tina Dantuma	SC OEM	8:49	tdantuma@seminolecountyfl.gov
Josh Shelton	SC EM	850	JSheldon@Seminolecountyfl.gov
Jim POTTER	SC	8:50	JPOTTER@ SEMINOLECOUNTYFL.GOV
Kelly Brock	City of Casselberry	8:50	kbrock@ casselberry.org
Owen Reagan	Sem Co. PW	8:55	oreagan@ seminolecountyfl.gov
Robert King	Public	9:05	SALVAGE859@ AOL.com

ICS 211A SC EOC	6. NUMBER OF PAGES: _____ of _____	7. PREPARED BY (RESOURCE UNIT):	8. MISSION NUMBER

Seminole County
Floodplain Management Planning Committee

AGENDA

June 16, 2015

9:00AM-11:00AM

Seminole County EOC

150 Bush Blvd.
Sanford, FL 32773

- Call to Order
- Welcome/Introductions
- Continue Action Items
- Adjournment

SEMINOLE COUNTY
FLORIDA'S NATURAL CHOICE

COURSE NAME: Floodplain Management Plan Committee	DATE: 6/16/15	LOCATION: Seminole EOC

CLASS INFORMATION

#	AGENCY	NAME	TIME IN	EMAIL ADDRESS	SIGNATURE
1	SC Public Works	Roland Raymundo	8:46	rraymundo@seminolecountyfl.gov	[illegible]
2	Resident	Tina Dantuma	8:46	tdantuma@seminolecountyfl.gov	[illegible]
3	Resident	Katherine Peters	8:48	k8tiiiie@gmail.com	Katie Peters
4	SCOEM	SLADE DOWNS	8:48	SDOWNS@SEMINOLECOUNTYFL.GOV	[illegible]
5	City of Lake Mary	Danielle Koury	8:45	dkoury@lakemaryfl.com	[illegible]
6	CITY OF WINTER SPRINGS	ZYNKA PEREZ	8:50	zperez@winterspringsfl.org	[illegible]
7	CITY OF OVIEDO	DAVID WALLER	8:50	dwaller@cityofoviedo.net	[illegible]
8	SemCo PW	Owen Reagan	8:52	oreagan@seminolecountyfl.gov	Owen D. Reagan
9	City of Casselberry	Kelly Brock	8:59	kbrock@casselberry.org	Kelly Brock
10	Seminole County	Jim Potter	8:59	JPOTTER@SEMINOLECOUNTYFL.GOV	[illegible]
11	PUBLIC	ROBERT KING	9:00	SALVAGE859@AOL.com	[illegible]
12	Seminole Co.	Kim Fischer	9:00	KFischer@SeminoleCountyfl.gov	[illegible]
13	RESIDENT	PHIL RIEBEL	9:00		
14	CITY OF ALTAMONTE SPRINGS	APRIL VERPOORTEN	9:05	AVERPOORTEN@ALTAMONTE.ORG	[illegible]
	NUMBER OF PAGES: 1 of 1		PREPARED BY:		

Orlando Sentinel

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Seminole County Public Safety - CU00461893
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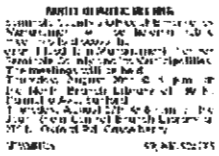
150 Bush Blvd
Sanford, FL, 32773-6706



3481346

Orlando Sentinel

Published Daily
ORANGE County, Florida

STATE OF FLORIDA

COUNTY OF SEMINOLE

Before the undersigned authority personally appeared **Sheri Schmitz / Adeliris DelValle / Brian Hall / Charity Casas / Jean M. Gailie**, who on oath says that he/ she is an Advertising Representative of the ORLANDO SENTINEL, a DAILY newspaper published in ORANGE County, Florida; that the attached copy of advertisement, being a Legal Notice in the matter of **August 20th and 27th @ 6PM**, in **SEMINOLE** County Florida, was published in said newspaper in the issues **08/09/15, 08/16/15, 08/23/15**

Affiant further says that the said ORLANDO SENTINEL is a newspaper published in said ORANGE County, Florida, and that the said newspaper has heretofore been continuously published in said ORANGE County, Florida, each day and has been entered as periodicals matter at the post office in ORANGE County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement; and affiant further says that he or 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.

Charity Casas
Printed Name of Affiant

Charity Casas
Signature of Affiant

Sworn to and subscribed before me on this **25** day of **August, 2015** by above said affiant, who is personally known to me **(X)** or who has produced identification ( ).

Signature of Notary Public (Typed, Printed or Stamped)

DEBORAH M. TONEY
NOTARY PUBLIC
STATE OF FLORIDA
MY COMMISSION # FF 065219
EXPIRES. November 18, 2017

Ad No. 3481346

NOTICE OF PUBLIC MEETING
Seminole County's Office of Emergency Management will be holding public meetings to discuss the draft Floodplain Management Plan for Seminole County and its Municipalities. The meetings will be held:
Thursday, August 20th @ 6 p.m. at the North Branch Library at 150 N. Palmetto Ave, Sanford
Thursday, August 27th @ 6 p.m. at the Jean Rhein Central Branch Library at 215 N. Oxford Rd, Casselberry

SEM3481346

NOTICE FOR PUBLIC MEETING

DATE: Thursday, August 20th 2015

TIME: 6:00 P.M.

LOCATION: North Branch Library (150 N. Palmetto Ave. Sanford)

SUBJECT: Draft Floodplain Management Plan

Seminole County's Office of Emergency Management will solicit public input on the Draft Seminole County Floodplain Management Plan.

PERSONS WITH DISABILITIES NEEDING ASSISTANCE TO PARTICIPATE IN ANY OF THESE PROCEEDINGS SHOULD CONTACT THE HUMAN RESOURCES, ADA COORDINATOR 48 HOURS IN ADVANCE OF THE MEETING AT 407-665-7941.

FOR ADDITIONAL INFORMATION REGARDING THIS NOTICE, PLEASE CONTACT THE COUNTY MANAGER'S OFFICE, AT 407-665-7224. PERSONS ARE ADVISED THAT, IF THEY DECIDE TO APPEAL DECISIONS MADE AT THESE MEETINGS / HEARINGS, THEY WILL NEED A RECORD OF THE PROCEEDINGS AND FOR SUCH PURPOSE, THEY MAY NEED TO INSURE THAT A VERBATIM RECORD OF THE PROCEEDINGS IS MADE, WHICH INCLUDES THE TESTIMONY AND EVIDENCE UPON WHICH THE APPEAL IS TO BE BASED, PER SECTION 286.0105, FLORIDA STATUTES.

NOTICE FOR PUBLIC MEETING

DATE: Thursday, August 27th 2015

TIME: 6:00 P.M.

LOCATION: Jean Rhein Central Branch Library (215 N. Oxford Rd., Casselberry)

SUBJECT: Draft Floodplain Management Plan

Seminole County's Office of Emergency Management will solicit public input on the Draft Seminole County Floodplain Management Plan.

PERSONS WITH DISABILITIES NEEDING ASSISTANCE TO PARTICIPATE IN ANY OF THESE PROCEEDINGS SHOULD CONTACT THE HUMAN RESOURCES, ADA COORDINATOR 48 HOURS IN ADVANCE OF THE MEETING AT 407-665-7941.

FOR ADDITIONAL INFORMATION REGARDING THIS NOTICE, PLEASE CONTACT THE COUNTY MANAGER'S OFFICE, AT 407-665-7224. PERSONS ARE ADVISED THAT, IF THEY DECIDE TO APPEAL DECISIONS MADE AT THESE MEETINGS / HEARINGS, THEY WILL NEED A RECORD OF THE PROCEEDINGS AND FOR SUCH PURPOSE, THEY MAY NEED TO INSURE THAT A VERBATIM RECORD OF THE PROCEEDINGS IS MADE, WHICH INCLUDES THE TESTIMONY AND EVIDENCE UPON WHICH THE APPEAL IS TO BE BASED, PER SECTION 286.0105, FLORIDA STATUTES.

2015-2020 Floodplain Management Plan

Public Comment Form

Name: _____

Address: _____

Comment:_____
_____
_____
_____
_____
_____
_____

If you would like to be contacted regarding your comment please leave an email address or phone number on the next line.

_____

Thank you for your participation!

2015-2020 Floodplain Management Plan

Public Comment Form

Name: _____

Address: _____

Comment:_____
_____
_____
_____
_____
_____
_____

If you would like to be contacted regarding your comment please leave an email address or phone number on the next line.

_____

Thank you for your participation!

SEMINOLE COUNTY'S FLOODPLAIN MANAGEMENT PLAN

2015-2020

Meeting Overview

- Community Rating System
- Floodplain Management Committee
- Threat of flooding in Seminole County
- Flood Map
- Plan Goals and Objectives
- Action Items
- Public Input

Community Rating System (CRS)

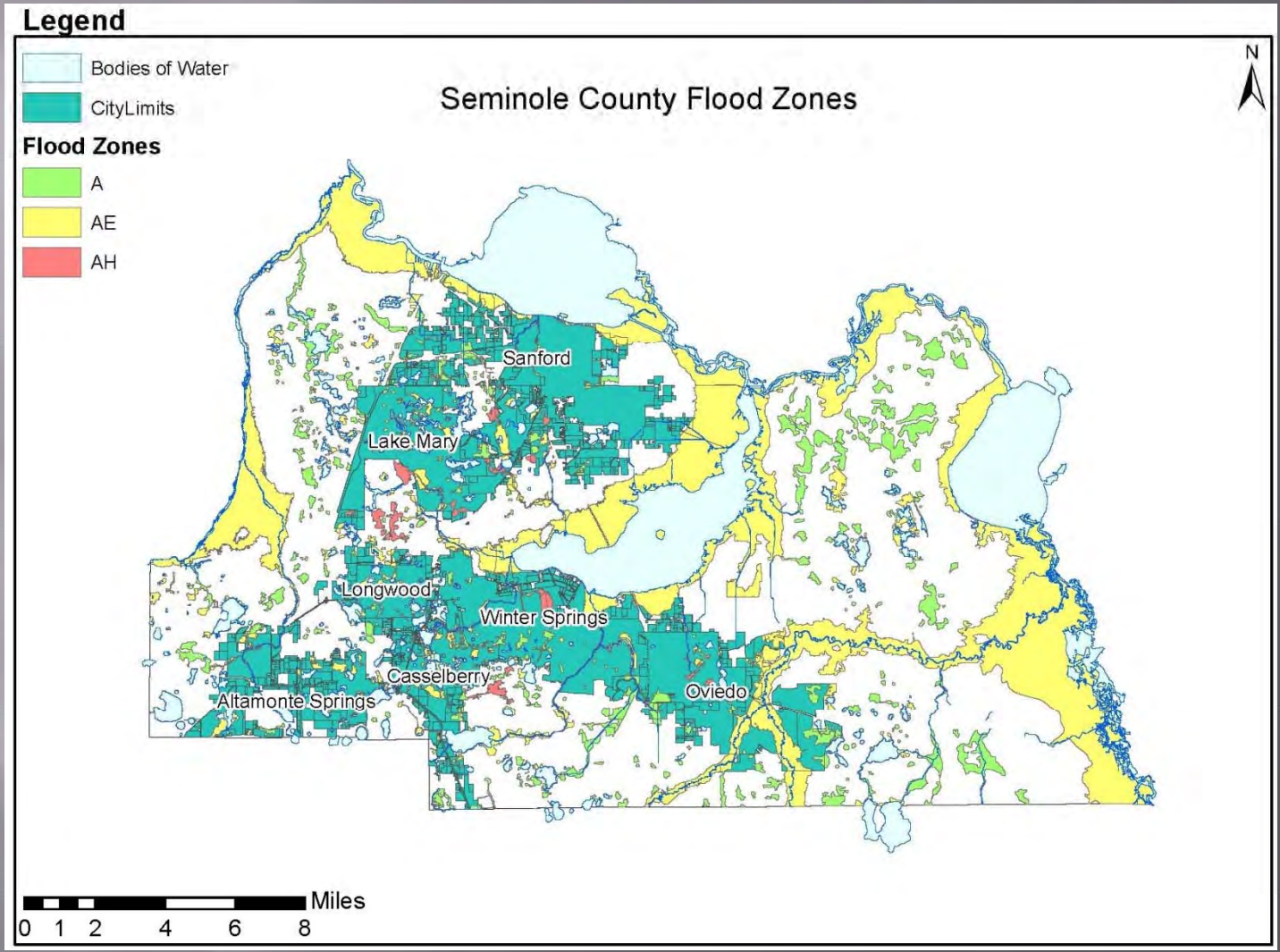
- Nation-wide program to ensure government agencies are making an effort to reduce the impacts of flooding in communities
- Passes on a flood insurance discount to residents based on CRS Rating
- Seminole County Current CRS Rating: 6
  - 20% Discount for residents on Flood Insurance Policy

Floodplain Management Committee

Name	Agency
Bernstein, Michelle	Citizen
Brock, Kelly	City of Casselberry
Cash, Mike	City of Sanford
Dantuma, Tina	Citizen
Downs, Slade	Citizen
Dunn, Nancy	Bear Lake Preservation Association
Fisher, Kim	Seminole County
Flomerfelt, Mark	Seminole County Public Works
Hamstra, David	City of Longwood
Harris, Alan	Seminole County Emergency Management
King, Robert	Citizen
Kortus, Amanda	City of Oviedo
Koury, Danielle	City of Lake Mary
Lackey, Marie	Seminole County Public Works
Lerner, Steven	Seminole County Emergency Management
Marshall, Danielle	City of Altamonte Springs
Perez, Zynka	City of Winter Springs
Peters, Katherine	Citizen
Potter, James	Seminole County Development Services
Potts, Robert	Citizen
Raymundo, Roland	Seminole County Public Works
Reagan, Owen	Seminole County Public Works
Riebiel, Phil	Citizen
Sheldon, Joshua	Seminole County Emergency Management
Verpoorten, April	City of Altamonte Springs
Waller, David	City of Oviedo
Zembower, Jay	Citizen

Threat of Flooding in Seminole County

- Based on County's Local Mitigation Strategy
  - 62% Risk for Flooding (High Relative Risk)
  - 5,500 homeowners and approx. 500 businesses affected by 100 year floodplain
- Bodies of water in Seminole County posing serious threat for flooding
  - St. John's River, Lake Jesup, Lake Kathryn, Wekiva River, Little Wekiva River, and Econlockatchee River



Zone A: Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage.

Zone AE: The base floodplain where base flood elevations are provided.

Zone AH: Areas with a 1% annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage.

Floodplain Management Goals and Objectives

- **Goal 1: Protect the lives, health, safety and welfare of the citizens of Seminole County from the effects of flooding.**
  - Objective 1.1: Focus natural hazard mitigation efforts on flooding resulting from heavy rainfall which causes runoff, overbank, backwater, and storm water issues to keep the problem from getting worse.
  - Objective 1.2: Implement regulatory measures to encourage new development in areas that are less likely to be exposed to the effects of flood damage.
  - Objective 1.3: Encourage preservation of open space in hazardous areas, especially where there are sensitive natural areas and agricultural lands.
  - Objective 1.4: Protect the environmental integrity of the natural water systems and associated floodplains in Seminole County by focusing on water quality and best management practices.

Floodplain Management Goals and Objectives

- **Goal 2: Promote emergency management and warning system measures to provide better protection to the residents, visitors and businesses of Seminole County.**
  - Objective 2.1: Leverage and pursue state and federal emergency management funding to enhance planning, training and equipment.
  - Objective 2.2: Seek funding for the installation of rain and stage gages at critical locations to help provide increased flood warn

Floodplain Management Goals and Objectives

- **Goal 3: Promote a public education program to encourage personal protection measures and to mitigate the effects of flooding events on personal safety and private property.**
  - Objective 3.1: Encourage residents and businesses to assume an appropriate level of responsibility for their own protection.
  - Objective 3.2: Promote flood insurance as a property protection measure against flood damage.

Floodplain Management Goals and Objectives

- **Goal 4: Protect critical and cultural facilities and public infrastructure from flood damage.**
  - Objective 4.1: Identify critical infrastructure in need of protection from flood damage.
  - Objective 4.2: Seek Municipal, County, State and Federal support for flood mitigation and prevention projects.

Floodplain Management Goals and Objectives

- **Goal 5: Identify and implement specific projects to mitigate flood damage.**
  - Objective 5.1: Leverage and pursue state and federal grant funding to facilitate buyouts, elevations and other mitigation efforts.
  - Objective 5.2:Target repetitive loss properties for implementation of mitigation projects.

Action Items

- 19 Action items have been noted as part of the planning process
- All action items will receive a completion date of 2020
- All action items will be assigned to County Departments and status updated annually.

Action Item 1

- The County staff should review all development ordinance language pertaining to development in the Special Flood Hazard Area (SFHA) to would require new/improved infrastructure to have hazard mitigation provisions.

Action Item 2

- The County should use every opportunity to encourage preservation of floodplain areas as open space or other uses compatible with the flooding hazard to preserve floodplain storage capacity and reduce the potential for damage to structures.

Action Item 3

- The County should continue to enforce its existing regulations for development and mobile homes and explore the cost and benefits of other higher standards to further protect the residents of Seminole County, such as a higher freeboard requirements.

Action Item 4

- Promote and distribute the Homeowners Property Evaluation Checklist.

Action Item 5

- A property owner's checklist should be developed to evaluate a property's exposure to damage from floods. It should include a review of insurance coverage and identify where more information can be found on appropriate property protection measures.

Action Item 6

- Seminole County should evaluate potential cost sharing programs both public and private, such as grants, rebates, tax, insurance credits, to encourage low cost property protection measures on private property.

Action Item 7

- The County should seek state and federal funding support for higher cost measures, such as elevation, relocation and acquisition of high priority properties. The Hazard Mitigation Grant Program, Flood Mitigation Assistance Program, Pre-Disaster Mitigation Program, should be investigated for all eligible properties. High priority properties are:
  - Those properties in repetitive loss areas.
  - Critical facilities in the special flood hazard area or subject to flood depths of more than two feet.

Action Item 8

- Seminole County should continue to enforce the floodplain management, wetland protection, erosion and sediment control and BMP provisions of all water management ordinances.

Action Item 9

- The Seminole County Emergency Operations Plan should be reviewed in detail on an annual basis to determine where updates and improvements can be made and how to maximize credit under CRS. The Plan should then be submitted periodically for credit under CRS, and CRS will provide a critique of the plan to show what further improvements are needed.

Action Item 10

- The County should consider all possible local, state and federal funding options for installation of additional and/or improved lake, stream ,river gauges to provide a higher level of protection to its residents. The investigation of additional gauging stations should be done in cooperation with the National Weather Service, St. Johns River Water Management District, the United States Geological Survey and FEMA.

Action Item 11

- The County should ensure that all steps are being taken to alleviate traffic during an evacuation of the County. Based on current and future population projections, the County should ensure that there is adequate roadway to carry residents and evacuees to safety.

Action Item 12

- The County's emergency preparedness, public information, and permits staffs should work together to formalize the post-disaster procedures for public information, reconstruction regulation and mitigation project identification. Those ideas should be expanded, further developed and adopted as a clear set of policies and procedures.

Action Item 13

- The County should continue to require developers to provide on-site detention and retention to lessen the volume and/or rate of runoff from developed sites. The County should evaluate the inspection and maintenance of these facilities to ensure that the designed storage is maintained and outfalls and piping remain in good condition.

Action Item 14

- The County should consider the benefits of upper watershed regional detention as a way to reduce downstream flow. This approach could be combined with the preservation of open space.

Action Item 15

- The County should encourage one approach of the Mullet Lake Park Road Stormwater Improvement Project for implementation to reduce flooding and avoid future repetitive loss properties. This project is already recognized on the Seminole County Capital Improvement Plan.

Action Item 16

- The public and decision makers should be informed about the flood hazard mitigation benefits of restoring rivers, wetlands and other natural areas. Restoration and protection techniques should be explained. This should include publicizing the need to protect lakes, streams, rivers and wetlands from illegal dumping and/or filling and inappropriate development. This campaign can be conducted through direct mail, website development, and/or neighborhood meetings.

Action Item 17

- Public education materials should be developed to explain property protection measures that can help owners reduce their exposure to damage by floods and the various types of insurance that are available. Because properties in floodplains may be damaged at some point, a special effort should be made to provide information and advice to floodplain property owners. Special attention should be given to repetitive loss and high hazard areas.

Action Item 18

- The County should maintain a public information outreach program strategy for credit under the CRS and to prepare a program that evaluates the County's current outreach program in terms of what is currently working and what is not working.

Action Item 19

- The County should identify critical facilities whose functionality may be impacted by flood hazards and develop mitigation measures for protection.

Public Input

- Please fill out a Public Comment Form in order to ensure your comments are collected and verified for input into the Floodplain Management Plan

SEMINOLE COUNTY FLOODPLAIN MANAGEMENT MEETING MINUTES

SEMINOLE COUNTY NORTH BRANCH LIBRARY
150 N PALMETTO AVE, SANFORD FL 32771

THURSDAY, AUGUST 20, 2015 6:00 PM

I. Call to Order:
- The meeting was called to order at 6:05 PM

II. Welcome / Introductions:

III. Attendance:
- Those in attendance were:
  - Steven Lerner, LMS Secretary
  - Shirley Exner, LMS President
  - Domingo Elias, Resident

IV. Purpose:
- The meeting was held to promote the Floodplain Management Plan and educate citizens on what they can do to protect their property.

V. Presentation:
- A PowerPoint presentation was given on the Floodplain Management Plan. Key issues, goals and objectives, and action items were discussed.
- An overview of what the Community Rating System (CRS) is and how it works. Seminole County's CRS rating and floodplain map with overview of what the colors on the map meant. And discounts to residents who have flood insurance.
- Water bodies in the County posing serious flooding threats.
- There are 5 Goals in the Floodplain Management Plan and 19 Action Items with 5.2 being emphasized as one of the most important.

VI. Goal / Action Items Discussed:
- Goal #1: protect lives, health, and safety of the citizens in Seminole County.
  - Action Item #1:
    Keeping the preservation of open spaces located in hazardous areas near natural areas and agricultural lands are of concern. There's a heavy emphasis on Mitigation efforts to control rainfall runoff. Annually a status update is posted on the Seminole County Development Services Dept. website as part of the CRS requirement. All ordinances are reviewed specific to flood hazard areas requiring new or improved provisions to the ordinance.

- Goal #2: Promote EM and warning system to provide protection or citizens, visitors and business in the County.
  - Action item #2:
  - Measures are in place to look at target areas that are a threat of flooding and regulations to ensure measures are in place and enforced. The Office of Emergency Management pursues state and federal funding to plan, educate the public, train and purchase equipment (i.e. river gauges) in critical locations.
  - Preservation of floodplain areas are encouraged to preserve and reduce potential damage to structures.

- Goal #3: Promote public education to encourage citizens to protect against flooding on private property.
  - Action item #3:
  - The County provides education on protective measures to citizens for their private property and encourages flood insurance when appropriate.

- Goal #4: protection of critical infrastructures from flooding.
  - Action item #4: Critical infrastructures are assessed in the County to protect from flood damage.

- Goal #5: Identify and Implement protective measures for flood damage.
  - Action item #5:
    The County keeps a checklist for evaluation of exposures to hazards. The checklist also targets repetitive loss properties. Property owners should develop a checklist for their property's exposure to flooding.

  - Action item #6:
    The County should evaluate and reward homeowners for doing mitigation on their property. Possibly give permit credit or insurance credit to homeowners.

  - Action item #7:
    The County seeks state and federal funding to support elevation, relocation and acquisition of properties with repetitive flooding.

  - Action item #8:
    The County should continue to enforce floodplain management in wetland areas for erosion and sediment control.

  - Action item #9:
    County emergency plans are reviewed and updated annually for improvements to meet CRS standards.

  - Action item #10:
    The County seeks funding for installation of river gauging stations in corporation with the NWS, St. Johns River Water Management District and FEMA.

  - Action item #11:
    Emergency Management works closely with the State and East Central Florida Planning Council for evacuation planning based on current and future population projections.

  - Action item #12:
    The County is working to formalize procedures to help citizens acquire permitting quicker post disaster for temporary housing on their property.

  - Action item #13.
    Storm water management continues to work on inspection and maintenance of facilities for outfall of rainwater to eliminate flooding.

  - Action item #14:
    Monitoring of higher evaluation areas with water flowing downstream and looking at solutions to protect the properties.

- Action item #15:
  Mullet Lake Park Road is on the County's Capital Improvement list due to repetitive flooding.

- Action item #16:
  An informational campaign for stakeholders on the benefits of restoring and protecting rivers and wetlands should be done through websites, or neighboring meetings. These projects should be prioritized by need.

- Action item #17:
  Materials should be developed to educate citizens on protection measures for their property in floodplain areas.

- Action item #18:
  The County should maintain an outreach program to received credit under the CRS.

- Action item #19:
  Critical infrastructures should be identified and measures taken to mitigate these buildings.

VII. Questions

- No questions were asked, no comment forms were recieved

VIII. Adjourned:

- Meeting was adjourned at 7:10PM

ICS 211A CHECK IN LIST	1. INCIDENT NAME: Floodplain Management Plan Public Meeting Sign In Sheet	2. DATE: August 20, 2015		4. CHECK IN LOCATION Sanford Library

5. INFORMATION

NAME	ADDRESS	INITALS
Domingo Elias	Volusia County.	

SEMINOLE COUNTY FLOODPLAIN MANAGEMENT MEETING MINUTES

SEMINOLE COUNTY CENTRAL BRANCH LIBRARY
215 N. OXFORD Rd., CASSELBERRY FL 32707

THURSDAY, AUGUST 27, 2015 6:00 PM

I. Call to Order:
- The meeting was called to order at 6:02 PM

II. Welcome / Introductions:

III. Attendance:
- Those in attendance were:
  - Alan Harris, Office of Emergency Management

IV. Purpose:
- The meeting was held to promote the Floodplain Management Plan and educate citizens on what they can do to protect their property.

V. Presentation:
- A PowerPoint presentation was given on the Floodplain Management Plan. Key issues, goals and objectives, and action items were discussed.
- An overview of what the Community Rating System (CRS) is and how it works. Seminole County's CRS rating and floodplain map with overview of what the colors on the map meant. And discounts to residents who have flood insurance.
- Water bodies in the County posing serious flooding threats.
- There are 5 Goals in the Floodplain Management Plan and 19 Action Items with 5.2 being emphasized as one of the most important.

VI. Goal / Action Items Discussed:
- Goal #1: protect lives, health, and safety of the citizens in Seminole County.
  - Action Item #1:
    Keeping the preservation of open spaces located in hazardous areas near natural areas and agricultural lands are of concern. There's a heavy emphasis on Mitigation efforts to control rainfall runoff. Annually a status update is posted on the Seminole County Development Services Dept. website as part of the CRS requirement. All ordinances are reviewed specific to flood hazard areas requiring new or improved provisions to the ordinance.

- Goal #2: Promote EM and warning system to provide protection or citizens, visitors and business in the County.
  - Action item #2:
  - Measures are in place to look at target areas that are a threat of flooding and regulations to ensure measures are in place and enforced. The Office of Emergency Management pursues state and federal funding to plan, educate the public, train and purchase equipment (i.e. river gauges) in critical locations.
  - Preservation of floodplain areas are encouraged to preserve and reduce potential damage to structures.

- Goal #3: Promote public education to encourage citizens to protect against flooding on private property.
  - Action item #3:
  - The County provides education on protective measures to citizens for their private property and encourages flood insurance when appropriate.

- Goal #4: protection of critical infrastructures from flooding.
  - Action item #4: Critical infrastructures are assessed in the County to protect from flood damage.

- Goal #5: Identify and Implement protective measures for flood damage.
  - Action item #5:
    The County keeps a checklist for evaluation of exposures to hazards. The checklist also targets repetitive loss properties. Property owners should develop a checklist for their property's exposure to flooding.

  - Action item #6:
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- Action item #18:
  The County should maintain an outreach program to received credit under the CRS.

- Action item #19:
  Critical infrastructures should be identified and measures taken to mitigate these buildings.

VII. Questions

- No questions were ask and no public comment forms were recieved

VIII. Adjourned:

- Meeting was adjourned at 6:58PM

ICS 211A CHECK IN LIST	1. INCIDENT NAME: Floodplain Management Plan Public Meeting Sign In Sheet	2. DATE: August 27, 2015		4. CHECK IN LOCATION Casselberry Library

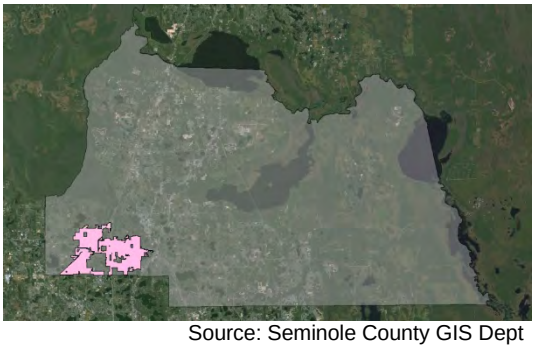
5. INFORMATION		
NAME	ADDRESS	INITALS

Introduction

Overview

The City of Altamonte Springs was incorporated in 1920. It is located in the southern portion of Seminole County, bordered by Orange County to the south. The City of Winter Springs is to the east of Altamonte Springs, the City of Longwood is to the north, and unincorporated areas to the west of Altamonte Springs. Altamonte Springs currently covers 9.01 square miles. The current population is 41,496 people.

Figure 1. City of Altamonte Springs



Source: Seminole County GIS Dept

Involvement with the National Flood Insurance Program (NFIP)

Altamonte Springs became eligible for the National Flood Insurance Program's (NFIP) Community Rating System (CRS) on October 1, 1994. The CRS is a voluntary program for NFIP-participating communities. The goals of the CRS are to reduce flood losses, to facilitate accurate insurance rating, and to promote the awareness of flood insurance. The CRS was developed to encourage communities to go beyond the minimum NFIP requirements to further reduce flood losses. The incentives are in the form of premium discounts.

The City continues to participate in the CRS program and is currently ranked as a Class 7. With the Class 7 ranking, the discount percentage applied to insurance premiums for properties located in a Special Flood Hazard (SFHA) is 15%. The premium discount available to property owners not located in a SFHA is 5%.

Figure 2. Severe Weather

Risk Assessment

This section of the community profile assesses the potential of risk with respect to floodplain management in Altamonte Springs. Communities must address four components when assessing risk. They are identifying hazards, profiling hazard events, inventorying assets, and estimating losses. This process measures the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards by assessing the vulnerability of people, buildings, and infrastructure to natural hazards (FEMA). There are six categories that address the four components identified in risk assessment as defined through the Federal Emergency Management Agency (FEMA): identifying flood zones within the city, identifying surface water locations, identifying property value within each flood zone, identifying insurance statistics, identifying vulnerable populations, and identifying critical facilities.

FEMA Flood Zone

Figure 3. FEMA Flood Zone,

Percentage of Acreage for the City of Altamonte Springs, 2013,

Non-Submerged Acres

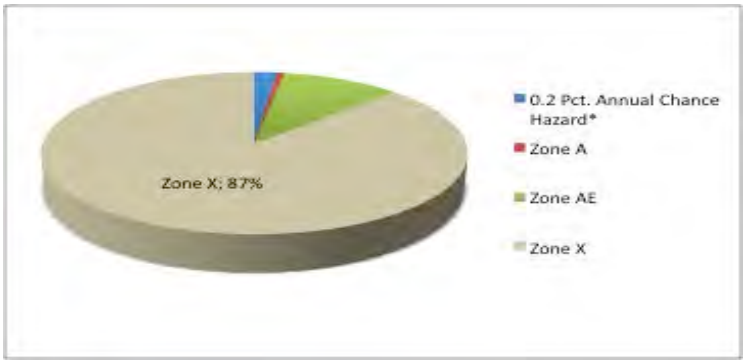


Figure 3 shows that the percentage of non- submerged acreage found in Altamonte Springs. Non-submerged acreage refers to land not inundated by surface water. Close to half of this category can be found in the northeast section of the city in the outlier sections of Cranes Roost Lake. The largest percentage of non- submerged acreage in Altamonte Spring is Flood Zone X accounting for 87.17%. The 0.2 percent Annual Chance Flood Hazard of the 100 Year Flood accounts for 2.0% of the total percentage of non- submerged acreage. Flood Zone A accounts for 0.6% of total percentage, 87% of this flood zone can be located in the southern segment of Altamonte Springs. Flood Zone AE accounts for 10.28% of the total percentage of non- submerged acreage. This zone is found throughout the city.

Surface Water

Table 1. Percentage of Total Surface Water

Surface Water Name	Percentage, %
Total Surface Water	**10.9**
Lake Orienta	20.5
Prairie Lake	17.8
Spring Lake	12.3

Source: Seminole County GIS Dept.

There are 23 bodies of surface water located in Altamonte Springs. Surface water accounts for 10.9% of the total land make- up. Table 1 displays the three largest bodies of water and their percentage of total surface water in Altamonte Springs

All bodies of water are located in or within close proximity of the SFHA.

The vast majority of these lakes are closed basin lakes with no outlets. Rainfall causes closed basin lakes to rise faster than drain. The result is a variation in water elevation that can lead to flooding.

Lake Orienta is the largest surface water body accounting for 20.5% (INSERT ACRES) . The lake is located in the southeast section of the city.

The second largest body of water is Prairie Lake at 17.8% of the total percentage of surface water. The location of this lake is on the City's eastern boundaries with the county.

The third largest lake is Spring Lake, the lake accounts for 12.3% of the total surface water in Altamonte Springs.

Figure 4. Lake Orienta, Aerial View

Source: Seminole County Water Atlas

Figure 5. Prairie Lake

Source: Seminole County Water Atlas

Property Value

Table 2. Total Appraised Value by Flood Zone, 2014

Flood Zone	Total Appraised Value
0.2 Pct. Annual Chance Flood Hazard*	$512,906,384.00
Zone A	$37,259,116.00
Zone AE	$826,953,321.00
Zone X	$2,939,451,187.00
Grand Total	$4,316,570,008.00

*of the 100 Year Floodplain

Source: Seminole County GIS Dept.

Altamonte Springs has over $4,316,570,008 in property and building value that could be at risk in the event of a flood hazard. The 0.2 Percent Annual Chance Flood Hazard of the 10-year flood contains over one percent of the total appraised value. Flood Zone A contains 0.08 % of the total appraised value. Flood Zone AE comprises 19% of the property value that could be exposed to risk. Flood Zone X accounts for 68% of the total property value.

Insurance Statistics

Table 3. Policy Statistics for the City of Altamonte Springs, as of 12/31/2013

Policies in- Force	Insurance in-Force Whole	Written Premiums in- Force
699	$143,463,600	$347,677

Source: FEMA

Altamonte Springs has 699 insurance policies in force according to the Federal Emergency Management Agency. The total coverage amount for these insurance policies $143,463,600 while the average premium paid for them was $347,677.

Table 4. Loss Statistics for the City of Altamonte Springs, as of 12/31/2013

Total Losses	Closed Losses	Open Losses	CWOP Losses	Total Payments
57	32	0	25	$340, 400.40

Source: FEMA

Total property losses in Altamonte Springs are numbered at 57 properties since 1978. Losses that had been paid in full accounted for 32 claims while losses that had been closed without payment (CWOP) were numbered at 25. There were no losses that had not been paid in full (Open Losses). Total payments made to claimants since 1978 is $340,400.40.

Vulnerable Population

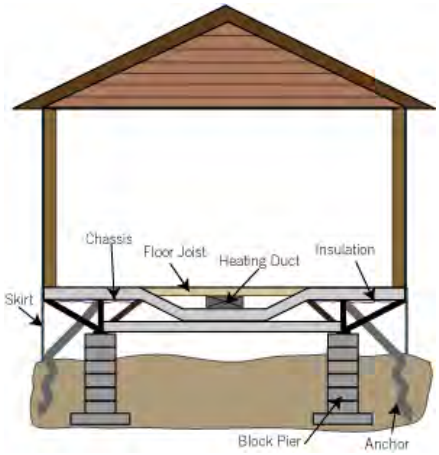
Vulnerable populations are those segments of the community considered to be most prone to risk in the time of a hazard. In Altamonte Springs, 12.5% of the population is over the age of 65 and 9.3% of the population has a disability. Most of the people who have a disability are over the age of 65.

Repetitive Loss Property

Repetitive Loss properties are defined as those properties that have been flooded on more than one occasion. Altamonte Springs has one repetitive loss property(ask for location).

Manufactured Homes

Figure 6. Manufactured Home Foundations



Source: Livingwithmyhome.com

Chassis are the steel frames of manufactured homes. Block piers and anchors are building methods utilized to mitigate flood damage.

In the event that properties do begin to meet that criteria then there are buy out programs that can be initiated to purchase the property. These measures protect residents from harm and remove development from the floodplain (Schwab, 2014). Altamonte Springs is limited in the number of manufactured homes located throughout its boundaries. For those manufactured homes located in the Special Flood Hazard (SFHA) mitigation policies that reduce flood damage include elevating the foundation to one foot above the base flood elevation (BFE). Manufactured homes must also be anchored to a foundation system to prevent floatation or varying forms of movements.

Critical Facilities

Critical facilities are defined as those facilities that provide a critical function and should be protected from flood damage. Seminole County has identified 22 critical facilities throughout Altamonte Springs and the emergency function they provide in times of crisis. No facility is located in the SFHA.

Mitigation Measures

Mitigation is the effort to reduce loss of life and property by lessening the impact of disasters (FEMA). The policies adopted by Altamonte Springs work to achieve these objectives and prevent flood damage. This community profile analyzes mitigation policies including Future Land Use, Environmental Efforts, Stormwater Management, and Building Practices all identified through the city's Comprehensive Plan and Land Development Code. Altamonte Springs is an active member of the Local Mitigation Strategy and works to make sure all plans are up to date.

Future Land Use

An analysis of the Future Land Use Map by Flood Zone for the City of Altamonte Springs is aggregated below by percentage of total acreage in the flood zone. This analysis reflects the potential hazards that come with planning for growth in flood prone areas.

Table 5. 0.2 Percent Annual Chance Flood Hazard* by Future Land Use (FLU), 2011

Altamonte Springs Future Land Use	Percentage of Acres, %
0.2 Pct Annual Chance Flood Hazard*	**2.00**
Regional Business Center Core East	36.15
Low Density Residential	23.62
Medium Density Residential	18.99
Regional Buisness Center Core West	4.37
Regional Business Center Activity Center	3.95
Institutional	3.62
West Town Center	2.42
Office/ Residential	2.38
Conservation	2.25
Industrial	2.20

*of the 100 Year Flood

Source: Seminole County GIS Dept.

In Altamonte Springs, 36.15% of the total percentage of acreage for the 0.2 Percent Annual Chance Hazard of the 100-year flood is planned for Regional Business Center Core East. Regional Business Centers and Town Centers are a variation of mixed-use districts. The second largest future land use for the zone is Low Density Residential at 23.62%. Medium Density Residential developments account for 18.99%. Conservation composes 2.25% of the total future land use for this flood zone.

Table 6. Flood Zone A by Future Land Use (FLU), 2014

Altamonte Springs Future Land Use	Percentage of Acres, %
Flood Zone A	**0.55**
Gateway Activity Center	91.60
Medium Density Residential	4.34
Industrial	2.73
Commercial/Office	1.30

Source: Seminole County GIS Dept.

In Flood Zone A 91.60% of all future land use is planned for the Gateway Activity Center. This future land use is a variation of a mixed-use district. The remaining future uses are Medium Density Residential Development at 4.34%. Industrial comprises 2.73% and Commercial/ Office at 1.30% of the total.

Table 7. Flood Zone AE by Future Land Use (FLU), 2014

Altamonte Springs Future Land Use	Percentage of Acres, %
Flood Zone AE	**10.28**
Low Density Residential	23.15
Conservation	21.42
Medium Density Residential	19.39
Regional Business Center Core East	10.93
Gateway Activity Center	8.34
Institutional	5.51
Commercial/Office	3.16
Regional Business Center Core West	2.21
East Town Center	1.89
Regional Business Center Activity Center	1.07
Office/ Residential	1.05
West Town Center	1.04

Source: Seminole County GIS Dept.

In Altamonte Springs, 23.15% of the total future land use for flood zone AE is identified as Low Density Residential. Conservation comprises 21.42% of the total make- up. Medium Density Residential also has a notable percentage of the total acreage in this zone at 19.39%. The Regional Business Center Core East and Gateway Activity Center account for 10.93% and 8.34%. Institutional makes up 5.51% of the total percentage of acres. Commercial and office is 3.16% and Regional Business Center Core West is 2.21% of the total percentage of acreage. East Town Center and Regional Business Center Activity Center are 1.89% and 1.07% of the total percentage of acreage. Office and residential and West Town Center complete the remaining future land use of this zone with 1.05% and 1.04%.

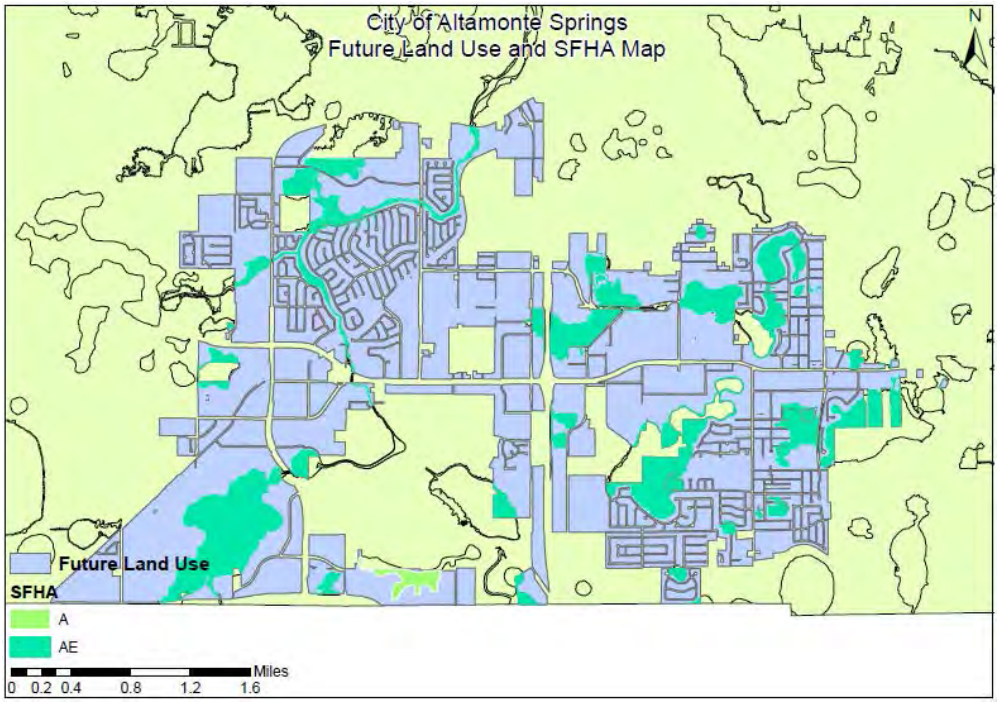
Table 8. Flood Zone X by Future Land Use (FLU), 2014

Altamonte Springs Future Land Use	Percentage of Acres, %
Flood Zone X	**87.17**
Low Density Residential	28.13
Medium Density Residential	12.01
Regional Buisness Center Activity Center	10.24
West Town Center	8.29
Gateway Activity Center	7.88
Regional Buisness Center Core East	7.14
Regional Buisness Center Core West	5.24
Commercial/ Office	5.10
East Town Center	3.89
Institutional	3.89
Industrial	3.23
Office/ Residential	2.88
Conservation	2.07

Source: Seminole County GIS Dept.

In Flood Zone X, 28.13% of the total percentage of acreage is classified as Low Density Residential. The second most planned use in this flood zone is Medium Density Residential at 12.01%. Regional Business Activity Center is 10.24% and West Town Center and Gateway Activity Center at 8.29% and 7.88% of the total percentage of acreage. Regional Business Center Core East and West make up 7.14% and 5.24% of the total acreage. Commercial and office comprises 5.10% and East Town Center is 3.89%. Industrial, Office and Residential and Conservation complete the future land uses for this Flood Zone with 3.23%, 2.88%, and 2.07%.

Figure 7. Future Land Use and Special Flood Hazard Areas (SFHA)

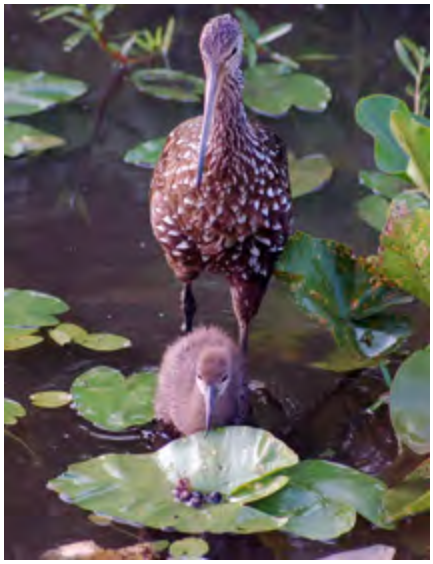


Environmental Efforts

Environmental policies are a means to which a municipality values its natural heritage. Best management practices in Floodplain Management mitigation include preserving natural areas located in floodplains or directing open space/ recreation uses towards them.

Altamonte Springs has committed itself to the protection of wetlands. The city enforces Flood Hazard Avoidance Regulations and conserves wetlands where habitats act as wildlife corridors. Wetlands act as a natural mitigation measure in mitigating flood damage.

Figure 8. Wetland Protection



Altamonte Springs protects wetlands because they act as a natural mitigation measure.

Erosion and Sedimentation Control

The City of Altamonte Springs is working on plans to improve the basin for the Little Wekiva River.

Along the Little Wekiva River, certain areas are prone to soil erosion. The City of Altamonte Springs in coordination with Seminole County, Orange County, and the SJRWMD implemented several erosion and sedimentation control project along the Little Wekiva River identified in the Little Wekiva River Master Plan.

Figure 9. Wetland Protection

Area along the Little Wekiva River Basin where soil erosion is visible.

Stormwater Management

Stormwater management practices are an essential component in mitigating flood damage. Policies enacted at the municipal level are essential in controlling stormwater run- off, minimizing damage on property.

The City of Altamonte Springs has established many LOS standards for stormwater quality and quantity.

There are currently 186 stormwater ponds as well as many other facilities such as pump stations, roadside drainage, and control structures.

The city also protects wetlands so there is also a natural drainage system in the area.

The city also adheres to best management practices that reduce run-off and improve water quality.

In the next few years, Altamonte Springs will have to update their current stormwater master plan. This is because of the current development and growth in the city.

Figure 10. Stormwater Pond

Stormwater pond located in Altamonte Springs.

Building Practices

Building Practices are essential in mitigating flood damage to structures located in flood prone zones. There are different practices that help protect property and citizens. The City of Altamonte Springs is currently working to adopt a variation of the State Model Floodplain ordinance that incorporates recent changes to the Florida Building Code. The City is evaluating the feasibility of incorporating higher regulatory standards.

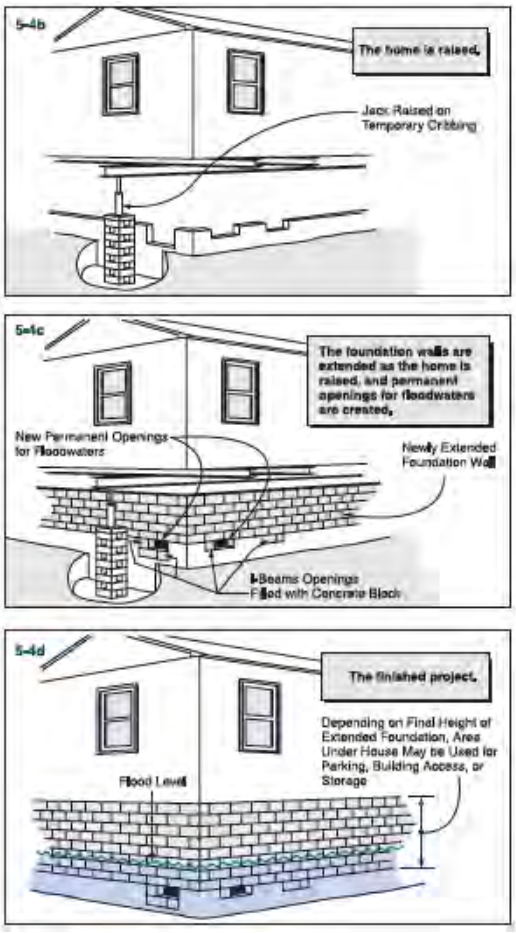
Altamonte Springs mandates that new residential and non- residential construction or substantial improvements to existing ones should have their lowest floor including basement elevated to at a foot above the base flood elevation (BFE).

Buildings where there is an enclosed area below the lowest floor elevation are required to be designed for the entry and exit of floodwater. Dry floodproofing techniques such as these reduce damage from flooding while allowing waters to enter the structure.

Most forms of development in the floodway are prohibited unless certification by a professional engineer is issued stating that the development will result in no increase in flood levels.

Standards for subdivisions are required to build utilities that minimize flood damage and must provide adequate drainage.

Figure 11. Home elevation



Home elevation is a dry floodproofing technique that reduces damage from flooding by allowing water to enter the structure.

	Responsible party	Deadline
	Altamonte Springs	

Goal 1: Update the City's floodplain ordinance in accordance with Florida Department of Emergency Management requirements.

Objective 1.1-Adopt revisions to City ordinance in calendar year 2015

Objective 1.2-Include higher standards in floodplain ordinance

Goal 2: Maintain the condition of the City's MS4 to reduce flooding

Objective 1.1-Perform on-going maintenance and repair of city's MS4

Objective 1.2-Repair MS4 facilities as necessary and in a timely manner

Introduction

Overview

The City of Casselberry was incorporated in 1940 in Seminole County. It is located in the southern portion of the county east of the Cities of Longwood and Altamonte Springs and to the west of Winter Spring. Casselberry covers 7.5 square miles. The city's population is 27,057.

Figure 1. City of Casselberry

: Seminole County GIS

Involvement with the National Flood Insurance Program (NFIP)

Casselberry has no history of participation in Community Rating System (CRS) but has a history with the National Flood Insurance Program's (NFIP).

Figure 2. National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

Risk Assessment

Communities must address four components when assessing risk. They are identifying hazards, profiling hazard events, inventorying assets, and estimating loss. This process measures the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards by assessing the vulnerability of people, buildings, and infrastructure to natural hazards (FEMA). This section of the community profile assesses the potential of risk with respect to floodplain management in Casselberry. There are six categories that address the four components identified in risk assessment as defined through the Federal Emergency Management Agency (FEMA): identifying flood zones within the city, surface water locations, property value within each flood zone, insurance statistics, vulnerable populations, and critical facilities.

FEMA Flood

*of the 100 Year Flood

Figure 3. FEMA Flood Zone, Percentage of Acreage for the City of Casselberry, 2013, Non-Submerged Acres

Zones

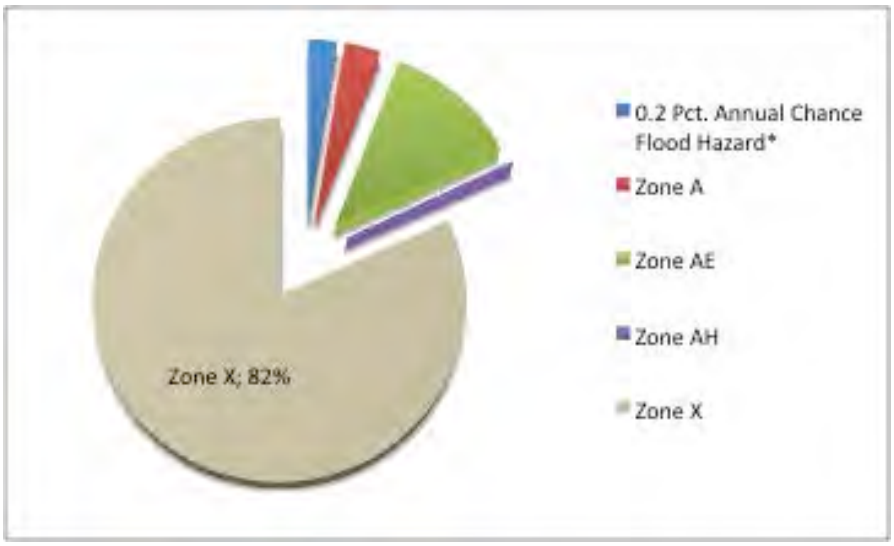


Figure 1 shows that the percentage of non- submerged acreage found in the 0.2 percent Annual Chance Flood Hazard of the 100 Year Floodplain; 0.5%. Non-submerged acreage refers to land not inundated by surface water. The largest quantity of the acreage is found in the northern portion of the city by Lake Kahryn and along the flood way situated towards Gee Creek Flood Zone A accounts for 3.31% of the floodplain total. Flood Zone AE comprises 12.13% of the city's total non- submerged acreage, Zone AH accounts for 0.31% and Zone X covers 82%.

Surface Water

Table 1. Percentage of Total Surface Water

Surface Water Name	Percentage, %
Total Surface Water	**15.9**
Lake Howell	49.1
Lake Kathryn	9.1
Mddle Lake Triplet	5.4

Source: Seminole County GIS Dept.

Figure 4. Lake Howell

Source: Seminole County Water Atlas

Figure 5. Lake Kathryn

Source: Seminole County Water Atlas

There are 39 bodies of surface water located in Casselberry. Surface water accounts for 15.9% of the total land make– up. Table 1 displays the three largest bodies of water and their percentage of total surface water in Casselberry.

All bodies of water are located in or within close proximity of the Special Flood Hazard Area (SFHA).

Lake Howell is the largest body of water, accounting for 49.1 % of the total percentage of surface water. It is located in the southeast section of the city and the boundaries are shared with Seminole County.

The second largest body of water is Lake Kathryn comprising 9.1% of the total percentage of surface water. The lake is located in the northern portion of the city.

Middle Lake Triplet is located the central section of the city and spans 5.4% of the total percentage of surface water.

Property Value

Table 2. Total Appraised Value by Flood Zone, 2014

Flood Zone	Total Appraised Value
0.2 Pct. Annual Chance Flood Hazard	$161,881,012
Zone A	$109,977,638
Zone AE	$450,112,577
Zone AH	$27,383,896
Zone X	$1,421,360,260
Grand Total	**$2,170,715,383**

*of the 100 Year Flood

Source: Seminole County GIS Dept.

Casselberry has over two billion dollars of appraised property value that could be vulnerable to flood risk damage. The largest property value is found in Flood Zone X where 65% of the city's total property value is found. Flood Zone AE contains the second largest appraised value that could be vulnerable to flood risk damage at 21% of the total value of Casselberry. There is close to $300 million dollars of property value at risk in the remaining flood zones.

Flood Insurance

Table 3. Policy Statistics for the City of Casselberry, as of 12/31/2013

Policies in- Force	Insurance in-Force Whole	Written Premiums in- Force
365	$78,364,300	$190,703

Source: FEMA

Casselberry has 365 insurance policies in force according to the Federal Emergency Management Agency. The total coverage amount for these insurance policies is $78,364,300.00, while the premium paid for them is $190,703.00.

Table 4. Loss Statistics for the City of Casselberry, as of 12/31/2013

Total Losses	Closed Losses	Open Losses	CWOP Losses	Total Payments
19	5	0	14	$69,681.08

Source: FEMA

Total property losses in Casselberry are numbered at 19 properties since 1978. Losses that had been paid in full accounted for 5 claims and losses that had been closed without payment (CWOP) were counted at 14 claims. There were no losses that had not been paid in full (Open Losses). Total payments made to claimants since 1978 is numbered at $69,681.08.

Vulnerable Population

Vulnerable populations are those segments of the community who are considered to be most prone to risk in the time of hazard. In Casselberry, 14.1% of the population is over the age of 65.

Repetitive Loss Property

Repetitive Loss properties are defined as those properties that have been flooded on more than one occasion. Casselberry does not have repetitive loss properties. In the event that properties do begin to meet that criteria then there are buy out programs that can be initiated to purchase the property. These measures protect residents from harm and remove development from the floodplain (Schwab, 2014).

Manufactured Homes

There are over one thousand manufactured homes located in Casselberry.

The two largest communities are Lake Kathryn Park and Seminole Speedway. While the vast majority of these manufactured homes are located in Flood Zone X, there are a considerable number of ones that are not.

Casselberry restricts manufactured home placement to existing manufactured parks homes or sub-divisions. The city's land development code regulates standards for manufactured homes.

Those found in the Special Flood Hazard Area (SFHA) are required to elevate the lowest floor on a permanent foundation to no lower than one foot above the base flood elevation and must be properly anchored to resist flotation, collapse or any form of movement. Drainage paths around structures are also required to be designed to guide water away from manufactured homes.

Figure 6. Selected Manufactured Homes in Floodplain Hazard

Critical Facilities

Critical facilities are defined as those facilities that provide a critical function and should be protected from flood damage. Seminole County has identified four critical facilities throughout Casselberry and the emergency function they provide in times of crisis. No facility is located in the Special Flood Hazard Area (SFHA).

Mitigation Measures

Mitigation is the effort to reduce loss of life and property by lessening the impact of disasters (FEMA). The policies adopted by Casselberry work to achieve these objectives and prevent flood damage. This community profile analyzes mitigation policies including Future Land Use, Environmental Efforts, Stormwater Management, and Building Practices all identified through the city's Comprehensive Plan and Land Development Code. Casselberry is an active member of the Local Mitigation Strategy and works to make sure all plans are up to date.

Future Land Use

An analysis of the Future Land Use Map by Flood Zone for the City of Casselberry is aggregated below. This analysis reflects the hazards that come with developing in flood prone areas.

Table 5. 0.2 Percent Annual Chance Flood Hazard* by Future Land Use (FLU), 2014

Casselberry Future Land Use	Percentage of Acres, %
0.2 Pct Annual Chance Flood Hazard*	**2.52**
LDR- Low Density Residential	41.76
MDR- Medium Density Residential	30.90
REC- Recreation/ Open Space	9.52
COMM- Commercial	5.79
PUB- Public Service	4.71
IND- Industrial	3.61
HDR- High Density Residential	1.43
WATER- Water	1.21

*of the 100 Year Flood

Source: Seminole County GIS Dept.

In Casselberry 41.76% of the total Future Land Use in the 0.2 Percent Annual Chance Flood Hazard is planned for Low- Density Residential. Medium Density Residential accounts for 30.90% of the total future land use. Recreation and Open Space makes up 9.52%. The remaining uses account for 15% of the total make- up.

Table 6. Flood Zone A by Future Land Use (FLU), 2014

Casselberry Future Land Use	Percentage of Acres, %
Flood Zone A	**3.31**
MDR- Medium Density Residential	33.55
LINR- Low Density Non-Res/ Medium Density Res.	23.08
REC- Recreation/ Open Space	16.12
LDR- Low Density Residential	10.74
PUB- Public Service	9.16
MTMU- Major Thoroughfare Mixed Use	4.99
IND- Industrial	1.75

Source: Seminole County GIS Dept.

A third of Flood Zone A is planned for Medium Density Residential. The next largest future planned use is for Low- Density Non- Residential/ Medium Density Residential at 23.08%. Recreation and Open Space is the third largest future land use in the zone at 16.12%. Low- Density Residential future is also a notable make- up of the zone with 10.74%. The Future Land Use indicates that the city has planned residential units for over 60% of Flood Zone A. The remaining uses account for close to 16% of the total future make- up.

Table 7. Flood Zone AE by Future Land Use (FLU), 2014

Casselberry Future Land Use	Percentage of Acres, %
Flood Zone AE	**12.13**
LDR- Low Density Residential	49.26
REC- Recreation/ Open Space	17.37
MDR- Medium Density Residential	11.86
COMM- Commercial	5.09
LINR- Low Density Non-Res/ Medium Density Res.	4.08
MTMU- Major Thoroughfare Mixed Use	3.98
PUB- Public Service	4.46
IND- Industrial	1.44
HINR- High Density Non-Res/ Medium Density Res.	0.90
IND M- Industiral Medium	0.79
HDR- High Density Residential	0.67

Source: Seminole County GIS Dept.

The largest Future Land Use category in Flood Zone AE is Low Density Residential at 49.26%. Recreation and Open Space accounts for 17.37% of the total acreage followed by Medium Density Residential at 11.86%.The following most notable future uses include Commercial at 4.09%, Low- Density Non- Res/ Medium Density Residential at 4.08% and Major Thoroughfare Mixed Use at 3.98%. The remaining future uses account for close to 10% of the total of acreage.

Table 8. Flood Zone AH by Future Land Use (FLU), 2014

Casselberry Future Land Use	Percentage of Acres, %
Flood Zone AH	**12.13**
MTMU- Major Thoroughfare Mixed Use	48.32
COMM- Commercial	29.53
LINR- Low Density Non-Res/ Medium Density Res.	13.46
LDR- Low Density Residential	4.57
MDR- Medium Density Residential	2.21
REC- Recreation/ Open Space	1.88

Source: Seminole County GIS Dept.

The largest Future Land Use category in the Flood Zone AH is Major Thoroughfare Mixed Use at 48.32%. The second largest future use is Commercial at 29.53 followed by Low- Density Non- Residential/ Medium Density Residential at 13.46%. The remaining uses account for close to eight percent of the total percentage of acres.

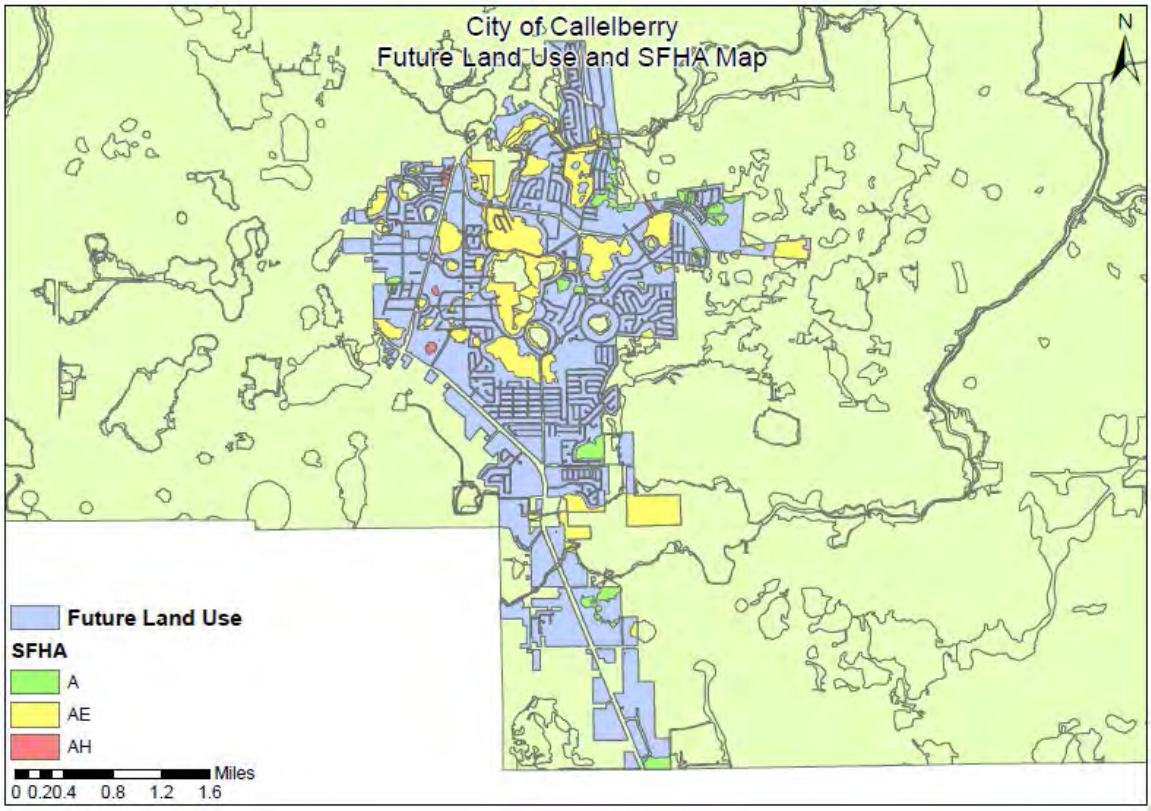
Table 9. Flood Zone X by Future Land Use (FLU), 2014

Casselberry Future Land Use	Percentage of Acres, %
Flood Zone X	**81.81**
LDR- Low Density Residential	34.77
MDR- Medium Density Residential	17.82
MTMU- Major Thoroughfare Mixed Use	13.18
COMM- Commercial	7.80
LINR- Low Density Non-Res/ Medium Density Res.	5.42
PUB- Public Service	4.62
IND- Industrial	4.54
REC- Recreation/ Open Space	5.26
HDR- High Density Residential	3.08
HINR- High Density Non-Res/ Medium Density Res.	1.82
IND M- Industiral Medium	1.55

Source: Seminole County GIS Dept.

Low Density Residential comprises 34.77% of Flood Zone X. The next largest future uses are Medium Density Residential 17.82% and Major Thoroughfare Mixed Use at 13.18%. Commercial future use accounts for 7.38% of the total floodplain followed by Low Density Non- Residential/ Medium Density Residential at 5.42%. The remaining future uses account for the remaining quarter of the floodplain.

Figure 7. Land Use and Special Flood Hazard Areas (SFHA)



Environmental Efforts

Environmental policies are a means to which a municipality values its natural heritage. Best practices in Floodplain Management mitigation include preserving natural areas located in floodplains or directing open space/ recreation uses towards them.

Casselberry's policies require that natural functions of wetlands and floodplains be protected. Land use restrictions have been implemented on the specific use of floodplains. These include, limits on natural vegetation removal, limitations on intensities and densities of development, and restrictions on fill placement in floodplains.

Figure 8. Wetland Protection

Casselberry has identified Wetland Protection as a policy in which to help mitigate against flood damage.

Erosion and Sedimentation Control

The city's comprehensive plan sets objectives to protect minerals, soils and vegetation. These policies protect bodies of water and wetlands from siltation.

Best management practices have been identified to control erosion and restrictions on clearing of sites prior to development.

Sediment controls include temporary and permanent sodding and seeding, sediment basins and rock dams, silt fences, and vegetative buffers.

These practices help reduce harmful pollutants in stormwater runoff from the construction site.

Figure 9. Sediment Basins

Sediment Basins are temporary ponds built on construction sites to capture eroded or disturbed soils. Casselberry requires this sedimentation practice.

Stormwater Management

Stormwater management practices are an essential component in mitigating flood damage. Policies enacted at the municipal level are essential in controlling stormwater run- off to create minimal damage impact on property.

In 2007, Casselberry adopted a Stormwater, Lake Management and Water Quality Master Plan. This plan guides stormwater management for the city and identifies stormwater policies that are integral in maintaining a quality system.

Casselberry is committed to protecting water resources and maintaining the natural drainage systems and watercourses.

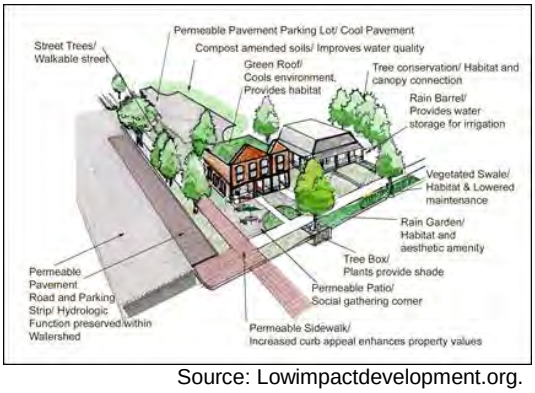
The city also adheres to best management practices that reduce run-off and improve water quality.

Casselberry's objectives are met by implementing policies such as dry retention/ detention facilities, wet detention/ retention facilities and promoting techniques such as low-impact development, which adheres to pre- development hydrologic conditions.

Figure 10. Wet Retention/ Detention Facility

Dry Detention/ Detention facilities are used to drain between rainfall events.

Figure 11. Low Impact Development



Source: Lowimpactdevelopment.org.

Low Impact Development is a form of development that adheres to pre-development conditions. Examples include green roofs and permeable surfaces.

Building Practices

Building Practices are essential in mitigating flood damage to structures located in flood prone zones. There are different practices that help protect property and citizens.

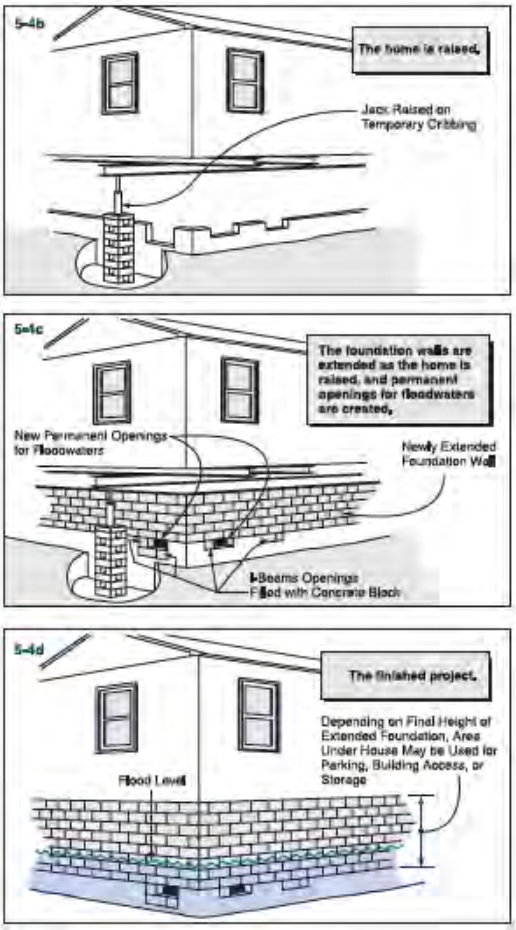
Casselberry mandates that new residential and non- residential construction or substantial improvements to existing ones should have their lowest floor including basement elevated to at a foot above the base flood elevation (BFE).

Buildings where there is an enclosed area below the lowest floor elevation are required to be designed for the entry and exit of floodwater. Dry floodproofing techniques such as these reduce damage from flooding while allowing waters to enter the structure.

Most forms of development in the floodway are prohibited unless certification is by a professional engineer is issued stating that the development will result in no increase in flood levels.

Standards for subdivisions are required to build utilities that minimize flood damage and must provide adequate drainage.

Figure 12. Home Elevation



Source: FEMA

Home elevation is a dry floodproofing technique that reduces damage from flooding by allowing water to enter the structure.

City of Casselberry Floodplain Management Goals, Objectives, & Action Items

Goal 1: Improve codification and implementation of local floodplain and stormwater regulations to help better meet acceptable levels of service respective to flood risk, flood attenuation, and water quality protection.

Objective 1.1 Improve local floodplain and stormwater ordinances/codes to provide clarity, better meet community needs, and help improve consistency with federal and state regulations and/or guidelines.

Objective 1.2 Implement updated local regulations (once adopted) through the City's permitting processes.

Action Item 1.1 Pursuant to Objective 1.1., complete a draft analysis and draft recommended changes to the City's Code of Ordinances related to floodplain and stormwater regulations.

Responsible Party: City of Casselberry Public Works Department

Deadline: December 31, 2016

Goal 2: Maintain and improve the City's drainage infrastructure to help mitigate flood risk, where feasible, sustainable, and appropriate in context.

Objective 2.1 Continue and, where feasible, improve routine maintenance of the City's key drainage infrastructure components, such as major pipes, ditches, and key control structures.

Objective 2.2 Continue and, where feasible, improve routine maintenance of street drainage infrastructure such as gutters, inlets, swales, and pipes to reduce instance of nuisance flooding.

Objective 2.3 Improve understanding of and information base for the City's drainage infrastructure.

Objective 2.4 Identify and evaluate potential capital improvement projects to help mitigate flood risk.

Action Item 2.1 Pursuant to Objective 2.3, perform an inventory update for key components of the City's drainage infrastructure in the City's GIS (Geographic Information System).

Responsible Party: City of Casselberry Public Works Department

Deadline: December 31, 2017

Action Item 2.2 Pursuant to Objective 2.3, complete updates to the Gee Creek ICPR stormwater model.

Responsible Party: City of Casselberry Public Works Department

Deadline: December 31, 2017

Action Item 2.3 Pursuant to Objective 2.4, evaluate flooding concerns associated with Lake Lotus and identify potential improvements to help reduce flood risk and/or lessen duration of extended flooding conditions.

Responsible Party: City of Casselberry Public Works Department

Deadline: December 31, 2017

Action Item 2.4 Pursuant to Objective 2.1, 2.2, and 2.4, complete an update to the City's Stormwater, Lakes Management, and Water Quality Master Plan (including identifying capital improvement projects and potential improvements to operational processes.)

Responsible Party: City of Casselberry Public Works Department

Deadline: December 31, 2017

Goal 3: Mitigate local economic impacts associated with flood risk.

Objective 3.1 Continue and/or improve activities to ensure basic NFIP compliance for continued participation.

Objective 3.2 Consider local program enhancements (beyond basic NFIP compliance) that may help further mitigate local economic impacts.

Action Item 3.1 Pursuant to Objective 3.2., ensure the local floodplain administrator completes CRS (Community Rating System) training, in order to help the City determine whether participating in CRS is advisable.

Responsible Party: City of Casselberry Public Works Department

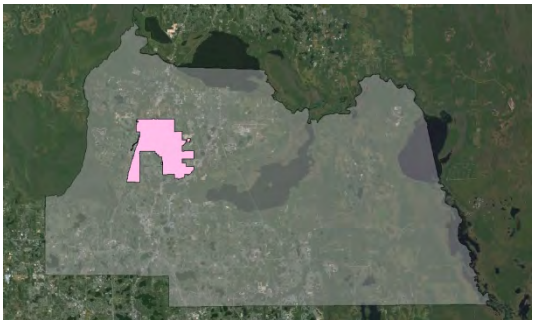
Deadline: December 31, 2016

Introduction

Overview

The City of Lake Mary was incorporated in 1973 in Seminole County. It is located in the northern section of the county, with the city of Sanford located to the north and east, the city of Longwood to the south, and unincorporated areas to its west. Lake Mary covers 9.16 square miles. The city's population is 13,822.

Figure 1. City of Lake Mary



Source: Seminole County GIS

Involvement with the National Flood Insurance Program (NFIP)

Lake Mary became eligible for the National Flood Insurance Program's (NFIP) Community Rating System (CRS) on October 1, 2009. The municipality ranked a class eight rating, receiving 1,000-1,499 Credit Points (cT) during its classification.

The discount percentage for properties found in the Special Flood Hazard (SFHA) is ten percent while the percent discount for non Special Flood Hazard Area (SFHA) properties is five percent. The city's participation in the program is listed as current.

Figure 2. National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

Source: Seminole County GIS

Risk Assessment

Communities must address four components when assessing risk. They are identifying hazards, profiling hazard events, inventorying assets, and estimating loss. This process measures the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards by assessing the vulnerability of people, buildings, and infrastructure to natural hazards (FEMA). This section of the community profile assesses the potential of risk with respect to floodplain management in Lake Mary. There are six categories that address the four components identified in risk assessment as defined through the Federal Emergency Management Agency (FEMA): identifying flood zones within the city, surface water locations, property value within each flood zone, insurance statistics, vulnerable populations, and critical facilities.

Figure 3. FEMA Flood Zone, Percentage of Acreage for the City of Lake Mary, 2013, Non-Submerged Acres

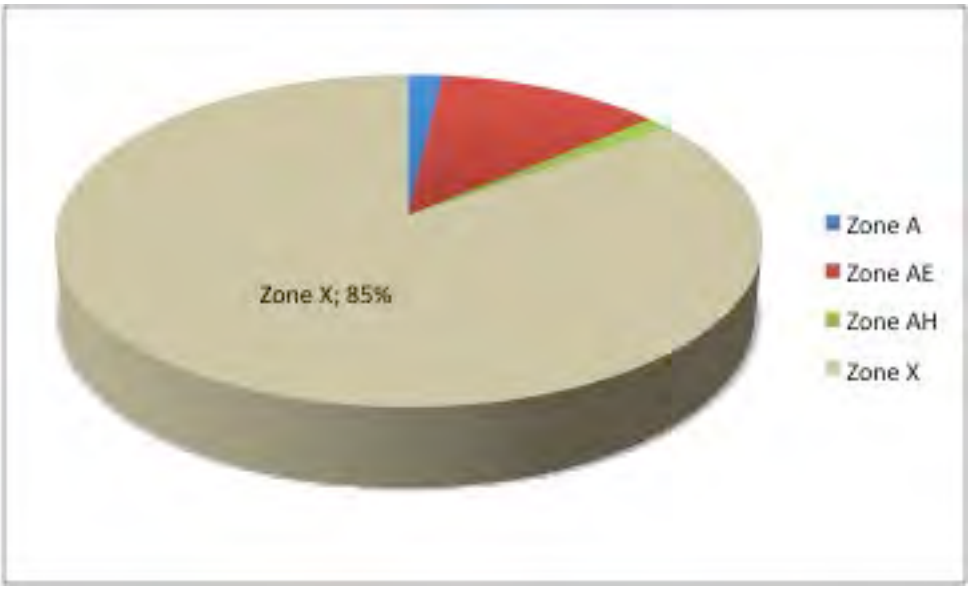


Figure 3 shows that the percentage of non- submerged acreage found in Lake Mary. Flood Zone A accounts for 1.87% of the total percentage of non- submerged acres. Non- submerged acreage refers to land not inundated by surface water. Flood Zone AE accounts for 11.86% of the total percentage of acres and AH accounts for 1.20%. Flood Zone X accounts 85.07% of the total percentage of non- submerged acres found in the Lake Mary.

Surface Water

Table 1. Percentage of Total Surface Water

Surface Water Name	Percentage, %
Total Surface Water	**12.2**
West Crystal Lake	26.5
East Crystal Lake	15.4
Big Lake Mary	12.2

Source: Seminole County GIS Dept.

There are 29 bodies of surface water located in Lake Mary. Surface water accounts for 12.2 % of the total land make– up. Table 1 displays the three largest bodies of water and their percentage of total surface water in the city boundaries.

All bodies of water are located in or within close proximity of the Special Flood Hazard Area (SFHA).

The vast majority of these lakes are closed basin lakes with no outlets. Rainfall causes closed basin lakes to rise faster than drain. The result is a variation in water elevation that can lead to flooding.

The largest body of surface water is West Crystal Lake accounting for 26.5% of the total surface water. The lake is located in the Special Flood Hazard Area (SFHA).

The second largest body of surface water is East Crystal Lake comprising 15.4% of the total surface water.

Big Lake Mary is 12.2% of the total surface water in Lake Mary.

Figure 4. West Crystal Lake

Source: Seminole County Water Atlas

Figure 5. East Crystal Lake, Aerial View

Source: Seminole County Water Atlas

Property Value

Table 2. Total Appraised Value by Flood Zone, 2014

Flood Zone	Total Appraised Value
Zone A	$149,895,356.00
Zone AE	$473,599,465.00
Zone AH	$103,370,759.00
Zone X	$4,124,761,486.00
Grand Total	$4,851,627,066.00

*of the 100 Year Floodplain

Source: Seminole County GIS Dept.

Lake Mary has over $4,851,627,066 dollars in property value that could be exposed to flood damage. Flood Zone A accounts for three percent of the total appraised value found in Lake Mary. Flood Zone AE has close to ten percent of appraised value that could be at risk in the event of flooding. In AH there is two percent of all appraised value. 85% of the appraised value is found in Flood Zone X.

Insurance Statistics

Table 3. Policy Statistics for the City of Lake Mary, as of 12/31/2013

Policies in- Force	Insurance in-Force Whole	Written Premiums in- Force
290	$81,821,200	$141,009

Source: FEMA

Lake Mary has 290 policies in force according to the Federal Emergency Management Agency. The total amount coverage for these insurance policies $81,821,200, while the premium paid for them was $141,009.

Table 4. Loss Statistics for the City of Lake Mary, as of 12/31/2013

Total Losses	Closed Losses	Open Losses	CWOP Losses	Total Payments
8	2	0	6	$3,015.68

Source: FEMA

Total property losses in Lake Mary are numbered at 8 properties since 1978. Losses that had been paid in full were accounted for 2 claims and losses that had been closed without payment (CWOP) was numbered at 6. There were no losses that had not been paid in full (Open Losses). Total payments made to claimants since 1978 is $3,015.68.

Vulnerable Population

Vulnerable populations are those segments of the community who are Considered to be most prone to risk in the time of hazard. 14.1% of the population is over the age of 65.

Repetitive Loss Property

Repetitive Loss properties are defined as those properties that have been flooded on more than one occasion. Lake Mary does not have repetitive loss properties.

In the event that properties do begin to meet that criteria then there are buy out programs that can be initiated to purchase the property. These measures protect residents from harm and remove development from the floodplain (Schwab, 2014).

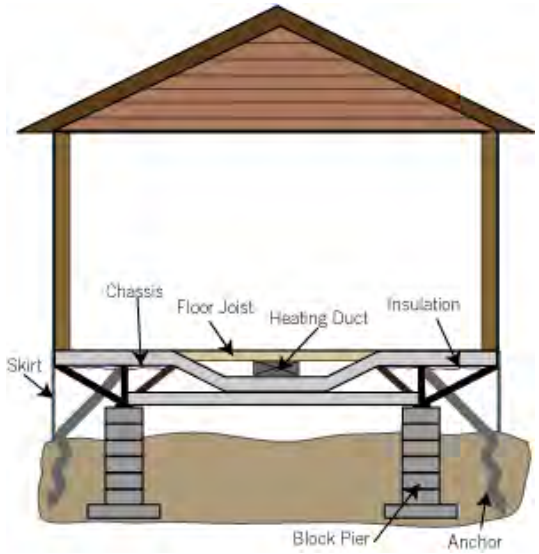
Manufactured Homes

Lake Mary is limited in the number of manufactured homes located throughout its boundaries.

For those manufactured homes located in the Special Flood Hazard (SFHA) mitigation policies that reduce flood damage include elevating the foundation to or at above the base flood elevation (BFE).

Manufactured homes must also be anchored to a foundation system to prevent floatation or varying forms of movements.

Figure 6. Manufactured Home Foundations



Chassis are the steel frames of manufactured homes. Block piers and anchors are building methods utilized to mitigate flood damage.

Critical Facilities

Critical facilities are defined as those facilities that provide a critical function and should be protected from flood damage. Seminole County has identified 16 critical facilities throughout Lake Mary and the emergency function they provide in times of crisis. No facility is located in the Special Flood Hazard Area (SFHA).

Mitigation Measures

Mitigation is the effort to reduce loss of life and property by lessening the impact of disasters (FEMA). The policies adopted by Lake Mary work to achieve these objectives and prevent flood damage. This community profile analyzes mitigation policies including Future Land Use, Environmental Efforts, Stormwater Management, and Building Practices all identified through the city's Comprehensive Plan and Land Development Code. Lake Mary is an active member of the Local Mitigation Strategy and works to make sure all plans are up to date.

Future Land Use

An analysis of the Future Land Use Map by Flood Zone for the City of Lake Mary is aggregated below by percentage of total acreage in the flood zone. This analysis reflects the potential hazards that come with planning for growth in flood prone areas.

Table 5. Flood Zone A by Future Land Use (FLU), 2014

Lake Mary Future Land Use	Percentage of Acres, %
Flood Zone A	**1.87**
COM- Commercial	21.45
LDR- Low Density Residential	17.53
IND- Industrial	14.31
REC- Recreation	10.57
PUB- Public/ Semi- Public	8.00
HIPTI- High Intensity Planned Development	6.18
RCOM- Restricted Commercial	6.00
HDR- High Density Residential	4.58
DDD- Downtown Development District	3.75
MDR- Medium Density Residential	2.53
RR- Rural Residential	1.96
OFF- Office	1.68
LMDR- Low/ Medium Density Residential	1.43

Source: Seminole County GIS Dept.

Commercial is the largest future planned use for Flood Zone A with 21.54% of the total percentage of acreage. The second largest planned use is Low Density Residential at 17.53%. Industrial comprises 14.31% and Recreation consists of 10.57% of the total percentage acreage. Public and Semi Public is eight percent and High Intensity Planned Development is 6.18%. Restricted Commercial and High Density Residential are six percent and 4.58%. The remaining future uses account for 11.35% of the flood zone.

Table 5. Flood Zone AE by Future Land Use (FLU), 2014

Lake Mary Future Land Use	Percentage of Acres, %
Flood Zone AE	**11.86**
LDR- Low Density Residential	33.00
RR- Rural Residential	25.65
REC- Recreation	16.14
LMDR- Low/ Medium Density Residential	8.38
MDR- Medium Density Residential	6.00
PUB- Public/ Semi- Public	3.59
COM- Commercial	3.26
IND- Industrial	1.49
OFF- Office	0.78
DDD- Downtown Development District	0.71
RCOM- Restricted Commercial	0.61
HDR- High Density Residential	0.36

Source: Seminole County GIS Dept.

Low Density Residential accounts for 33% of the total percentage of acreage in Flood Zone AE. Rural Residential comprises 25.65% of future land use. Recreation is planned for 16.14% of the flood zone. Low/ Medium Density Residential accounts for 8.38% of the planned future use in Lake Mary. Public and Semi Public future use makes up 3.59%; Commercial is 3.26%. The remaining categories account for the last 3.95% of the future land use in Lake Mary.

Table 6. Flood Zone AH by Future Land Use (FLU), 2014

Lake Mary Future Land Use	Percentage of Acres, %
Flood Zone AH	**1.20**
LDR- Low Density Residential	74.37
IND- Industrial	18.27
COM- Commercial	4.94
PUB- Public/ Semi- Public	2.35
RCOM- Restricted Commercial	0.06

Source: Seminole County GIS Dept.

Flood Zone AH is dominated by Low Density Residential future use at 74.37% of the total percentage of acreage. The next largest category is Industrial at 18.27%. Commercial accounts for 4.94% of future land use. Public/ Semi- Public and Restricted Commercial compete the future make- up with 2.35% and 0.06%.

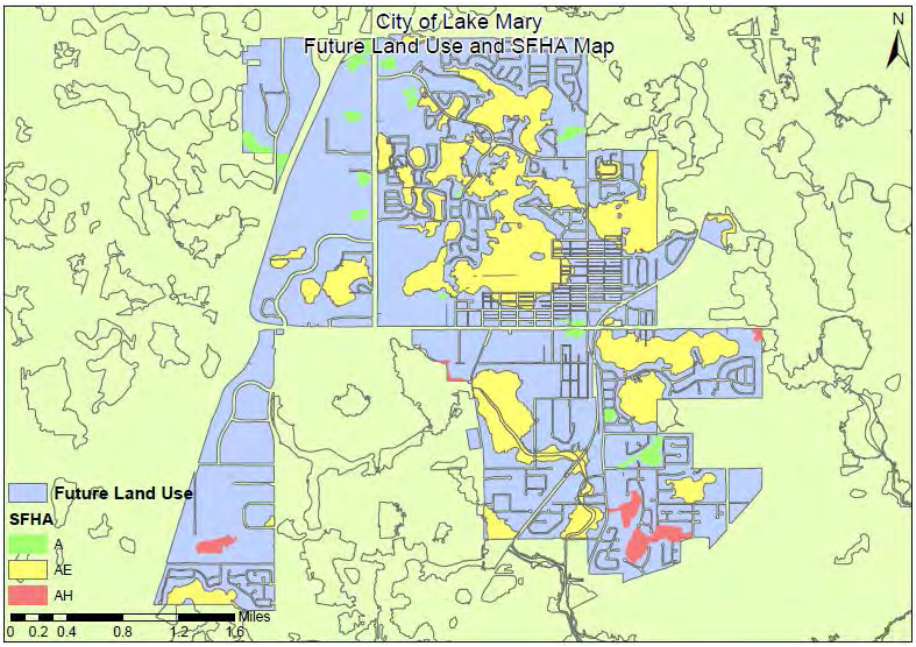
Table 6. Flood Zone X by Future Land Use (FLU), 2014

Lake Mary Future Land Use	Percentage of Acres, %
Flood Zone X	**85.07**
LDR- Low Density Residential	25.88
IND- Industrial	15.33
COM- Commercial	12.02
LMDR- Low/ Medium Density Residential	8.10
RR- Rural Residential	7.71
MDR- Medium Density Residential	6.96
PUB- Public/ Semi- Public	4.48
REC- Recreation	4.16
RCOM- Restricted Commercial	3.56
HDR- High Density Residential	3.47
DDD- Downtown Development District	3.14
HIPTI- High Intensity Planned Development	2.93
OFF- Office	2.19

Source: Seminole County GIS Dept.

In Lake Mary Low Density Residential accounts for 25.88% of the total percentage of acreage in Flood Zone X. The next largest future land use category is Industrial with 15.33%. Commercial accounts for 12.02% of the total future land use in Flood Zone X. Rural Residential is 7.71%of the total make- up. Medium Density Residential and Public/Semi Public account for 6.96% and 4.48%. Restricted Commercial is 3.56% of the total percentage of acreage for Flood Zone X. The remaining future land uses account for 11.73% of the total make- up.

Figure 7. Future Land Use and Special Flood Hazard Areas (SFHA)



Environmental Efforts

Environmental policies are a means to which a municipality values its natural heritage. Best practices in Floodplain Management mitigation include preserving natural areas located in floodplains or directing open space/ recreation uses towards them.

Lake Mary has multiple policies to protect the shorelines, flood hazard areas, watercourses, and natural wetlands to help create natural flood mitigation.

By doing this, Lake Mary believes they can minimize flood damage, keep a stable tax base, and minimize the amount of future projects needed to protect against floods. The city abides to the requirements set in the Tile 44 Code.

Figure 8. Wetlands in Lake Mary

Erosion and Sedimentation

The city's comprehensive plan sets objectives to protect minerals, soils and vegetation. These policies protect bodies of water and wetlands from siltation.

The City of Lake Mary tries to manage dredging, mining, paving, grading, filling, and drilling to protect against erosion in the city.

Figure 9. Shore erosion in Lake Mary

Stormwater Management

Stormwater management practices are an essential component in mitigating flood damage. Policies enacted at the municipal level are essential in controlling stormwater run- off to create minimal damage impact on property.

Lake Mary has plenty of retention ponds and drainage facilities to manage run-off.

Recently, Lake Mary raised stormwater fees to make sure the fund doesn't dry up and money is set aside to fix drains and other facilities.

Building Practices

Building Practices are essential in mitigating flood damage to structures located in flood prone zones. There are different practices that help protect property and citizens

Lake Mary mandates that new residential and non- residential construction or substantial improvements to existing ones should have their lowest finished floor including basement elevated to at a foot and a half above the base flood elevation (BFE).

In areas delineated on the FIRM and base flood elevation (BFE), Flood Plain Administrators must follow certain steps. They must try to find any flood data from state and federal governments. When information can't be found, the structure must be built three and a half feet above the tallest adjacent ground.

When a developer wants to build in a regulatory floodway, an analysis must take place in order to prove the base flood elevation (BFE) won't rise.

Structures must be built to minimize or eliminate flood damage. There must be enough drainage to reduce flooding.

Figure 10. House elevation

This house in Lake Mary that has been built above the base flood elevation (BFE). As you can see, the house has been built on stilts to keep it from flooding, a common technique of dry floodproofing.

Goal 1: Develop policies and regulation to support effective floodplain management.

Objective 1.1- Develop and enforce land use policies, plans and regulations to discourage or prohibit inappropriate location of structures or infrastructure components in areas of high risk to flooding

Objective 1.2- Participate fully in the National Flood Insurance Program and the associated Community Rating System.

Objective 1.3- Develop and enforce building and land development codes that are effective in addressing the flooding hazards threatening the community.

Objective 1.4- Establish and enforce regulations to ensure that public and private property maintenance is consistent with minimizing vulnerabilities to flooding.

Goal 2: Work in conjunction with the County and other local governments to create and support floodplain management throughout the county.

Objective 2.1- Participate fully in the countywide Floodplain Management Plan and associated Floodplain Management Team working group.

Objective 2.2- Coordinate with the County and other local government agencies to develop and administer outreach programs to gain participation in mitigation programs by business, industry, institutions and community groups.

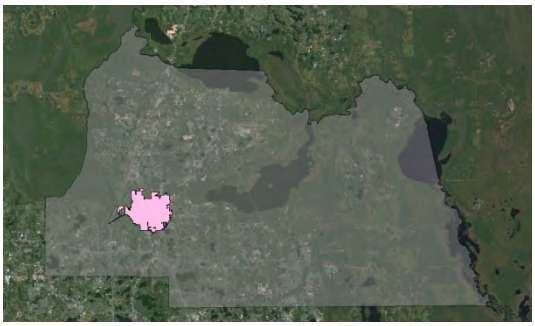
Objective 2.3- Comply with interagency agreements and collaborate with the County and other local governments to improve multi-jurisdiction / multi-agency coordination

Introduction

Overview

The City of Longwood was incorporated in 1923 in Seminole County. It is centrally located in the county, bordered by the City of Altamonte Springs to the south, City of Lake Mary to the north, the Cities of Winters Spring and Casselberry to the east and unincorporated Seminole County to its west. Longwood covers 5.45 square miles. The city is the smallest municipality with respect to geographic size and has a population of 13,657 inhabitants.

Figure 1. City of Longwood



Source: Seminole County GIS Dept

Involvement with the National Flood Insurance Program (NFIP)

Longwood became eligible for the National Flood Insurance Program's (NFIP) Community Rating System (CRS) on October 1, 1996. The municipality ranked in classes ten, receiving 0- 499 Credit Points (cT) during its classification.

The discount percentage for Special Flood Hazard (SFHA) and the percent discount for non Special Flood Hazard Area (SFHA) was zero percent. The city's participation in the program was rescinded October 1, 2010.

Figure 2. Flood Inundated Streets

Risk Assessment

Communities must address four components when assessing risk. They are identifying hazards, profiling hazard events, inventorying assets, and estimating loss. This process measures the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards by assessing the vulnerability of people, buildings, and infrastructure to natural hazards (FEMA). This section of the community profile assesses the potential of risk with respect to floodplain management in Longwood. There are six categories that address the four components identified in risk assessment as defined through the Federal Emergency Management Agency (FEMA): identifying flood zones within the city, surface water locations, property value within each flood zone, insurance statistics, vulnerable populations, and critical facilities.

FEMA Flood Zones

Figure 3. FEMA Flood Zone, Percentage of Acreage for the City of Longwood, 2013, Non-Submerged Acres

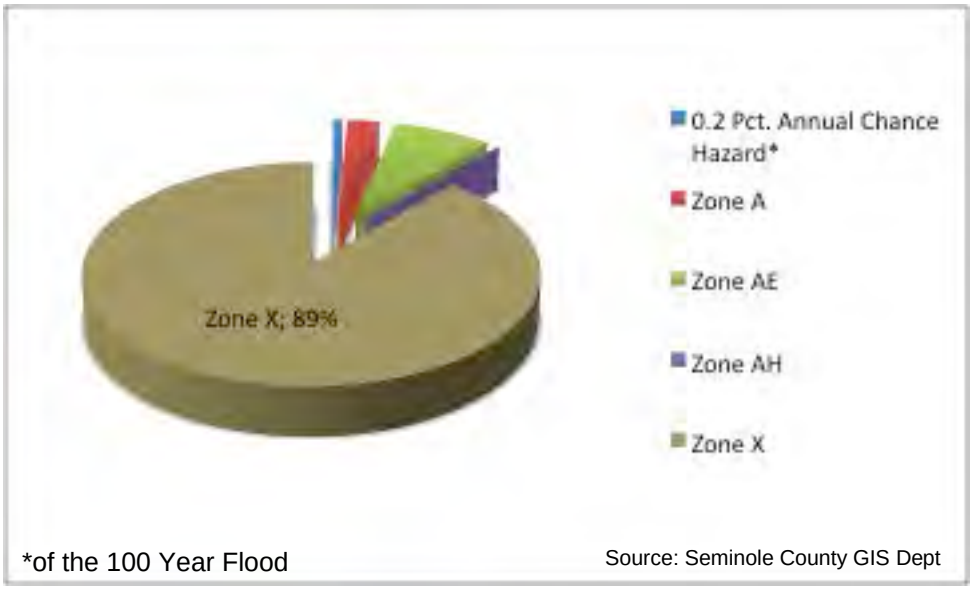


Figure 3 shows the percentage of non- submerged acreage found within Longwood. The 0.2 percent Annual Chance Flood Hazard of the 100 Year Floodplain accounts for 0.77% of the total percentage of non- submerged acreage. Non- submerged acreage refers to land not inundated by surface water. Much of the land coverage for this flood zone can be found in the surrounding outliers of Lake Wildmere, Island Lake, and Fairy Lake, as well as portions in the central part of the city. The largest percentage of this acreage is found in the northern portion of the city **by Lake Katherine** and along the flood way situated towards Gee Creek. Flood Zone A accounts for 2.94% of total percentage, 87%

of this flood zone can be located in the southern portions of Longwood. Flood Zone AE is 8.70% of the total acreage Close to a third of the total acreage of that zone is located in the north central part of the municipality Flood Zone AH is the least prevalent zone at 1.87%. Flood Zone X is the most prevalent at 87.51%.

Surface Water

Table 1. Percentage of Total Surface Water

Surface Water Name	Percentage, %
Total Surface Water	**9.5**
Island Lake	39.1
Fairy Lake	15.5
Lake Wildmere	10.1

Source: Seminole County GIS Dept.

There are 19 bodies of surface water located in Longwood. Surface water accounts for 9.5% of the total land make– up. Table 1 displays the three largest bodies of water and their percentage of total surface water in Longwood.

All bodies of water are located in or within close proximity of the Special Flood Hazard Area (SFHA).

Rock Lake is the only body of water in the City of Longwood that presently does not have a discharge outlet.

Island Lake is the largest body of surface water accounting for 39.1% of the total surface water make- up. The lake is located in the southwest section of Longwood.

The next largest body of water is Fairy Lake, which makes up 14.3% of the total surface water.

The third largest body of water is Lake Wildmere making up 11.5% of the total surface water in Longwood.

Figure 4. Island Lake, Aerial View

Source: Seminole County Water Atlas

Property Value

Table 2. Total Appraised Value by Flood Zone, 2014

Flood Zone	Total Appraised Value
0.2 Pct. Annual Chance Flood Hazard*	$52,038,481
Zone A	$80,747,661
Zone AE	$170,163,144
Zone AH	$455,690
Zone X	$1,075,562,815
Grand Total	**$1,378,967,791**

*of the 100 Year Floodplain

Source: Seminole County GIS Dept.

Longwood has over 1.3 billion dollars in appraised value that could be vulnerable to flood risk damage. The largest property value risk is found in Flood Zone X, 78%. Flood Zone AE accounts for the second largest appraised value that could be vulnerable to flood risk damage at 12% of the total value of Longwood. The following most notable zone for risk to property value is Flood Zone A at 5.8%. The remaining Flood Zones account for close to 58 million dollars worth of property value.

Insurance Policies

Table 3. Insurance Policies In-Force

Policies in- Force	Insurance in-Force	Written Premiums in- Force
251	$68,783,300	$167,409

Source: FEMA

Longwood has 251 insurance policies in force according to the Federal Emergency Management Agency. The total coverage amount for these insurance policies is $68,783,300, while the premium paid for them is $167,409.

Table 4. Loss Statistics for the City of Longwood, as of 12/31/2013

Total Losses	Closed Losses	Open Losses	CWOP Losses	Total Payments
25	9	0	16	$154,127.05

Source: FEMA

Total property losses in Longwood are numbered at 25 properties since 1978. Losses that had been paid in full accounted for nine claims and losses that had been closed without payment (CWOP) were counted at 16 claims. Total payments made to claimants since 1978 is numbered at $154,127.05.

Vulnerable Population

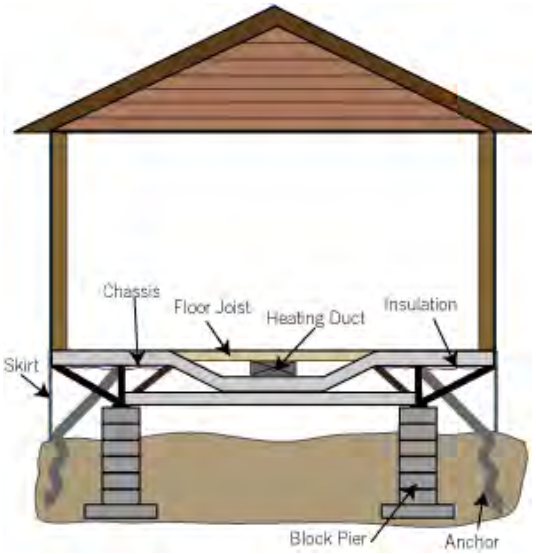
Vulnerable populations are those segments of the community who are considered to be most prone to risk in the time of hazard. 16.4% of the population are over the age of 65.

Repetitive Loss Property

Repetitive Loss properties are defined as those properties that have been flooded on more than one occasion. Longwood does not have repetitive loss properties. In the event that properties do begin to meet that criteria then there are buy out programs that can be initiated to purchase the property. These measures protect residents from harm and remove development from the floodplain (Schwab, 2014).

Manufactured Homes

Figure 5. Manufactured Home Foundations



Chassis are the steel frames of manufactured homes. Block piers and anchors are building methods utilized to mitigate flood damage.

There are limited numbers of manufactured homes located in Longwood. The City's Land Development Code sets standards for these forms of residencies. For those manufactured homes located in the Special Flood Hazard (SFHA) there are mitigation policies that reduce flood damage include elevating the foundation to one foot above the base flood elevation (BFE). Manufactured homes must also be anchored to a foundation system to prevent flotation or varying forms of movement.

Critical Facilities

Critical facilities are defined as those facilities that provide a critical function and should be protected from flood damage. Seminole County has identified 11 critical facilities throughout Longwood and the emergency function they provide in times of crisis. No facilities are located in the Special Flood Hazard Area (SFHA).

Mitigation Measures

Future Land Use

An analysis of the Future Land Use Map by Flood Zone (non-submerged acres) for the City of Longwood is aggregated below. This analysis reflects the hazards that come with developing in flood prone areas.

Table 5. 0.2 Percent Annual Chance Flood Hazard* by Future Land Use (FLU), 2014

Longwood Future Land Use	Percentage of Acres, %
0.2 Pct. Annual Chance Flood Hazard*	**0.77**
LDR- Low Density Residential	46.12
IMU- Infill and Mixed Use	19.47
CON- Conservation	11.43
IND- Industrial	10.36
NCMU- Neighborhood Commercial Mixed- Use	8.54
MDR- Medium Density Residential	4.04

*of the 100 Year Flood

Source: Seminole County GIS Dept.

In Longwood, 46.12% of the total percentage of acreage for the 0.2 Percent Annual Chance Hazard of the 100-year flood is planned for Low Density Residential. The second largest future use for the zone is Infill and Mixed- Use at 19.47%. Conservation use is planned for 11.43% of total use followed by Industrial at 10.36%. Neighborhood Commercial Mixed- Use and Medium Density Residential complete the remaining future use.

Table 6. Flood Zone A by Future Land Use (FLU), 2014

Longwood Future Land Use	Percentage of Acres, %
Flood Zone A	**2.94**
IND- Industrial	43.93
MDR- Medium Density Residential	32.07
CON- Conservation	16.73
P/I- Public/ Institutional	3.77
IMU- Infill and Mixed Use	1.65

Source: Seminole County GIS Dept.

Future land use for Flood Zone A is dominated by Industrial at 43.93% and Medium Density Residential at 32.07%. Conservation is the third most prevalent use at 16.73%. Public/Institutional and Infill and Mixed- Use complete the remaining future of zone A at 3.77% and 1.65%.

Table 7. Flood Zone AE by Future Land Use (FLU), 2014

Longwood Future Land Use	Percentage of Acres, %
Flood Zone AE	**8.70**
LDR- Low Density Residential	37.10
CON- Conservation	31.15
IMU- Infill and Mixed Use	10.69
MDR- Medium Density Residential	5.14
Water	4.64
IND- Industrial	4.12
HV Overlay	2.86
P/I- Public/ Institutional	1.85
NCMU- Neighborhood Commercial Mixed- Use	1.64
DH- Downtown Historic	0.78

Source: Seminole County GIS Dept.

Low- Density Residential accounts for 37.10% of the total percentage of acreage for zone AE. Conservation is planned for 31.15% of the future use. The third most prevalent future use is Infill and Mixed Use. The remaining future uses in Table 6 complete the composition of zone AE.

Table 8. Flood Zone AH by Future Land Use (FLU), 2014

Longwood Future Land Use	Percentage of Acres, %
Flood Zone AH	**1.87**
LDR- Low Density Residential	100.00

Source: Seminole County GIS Dept.

Flood Zone AH's sole future use is planned for Low Density Residential.

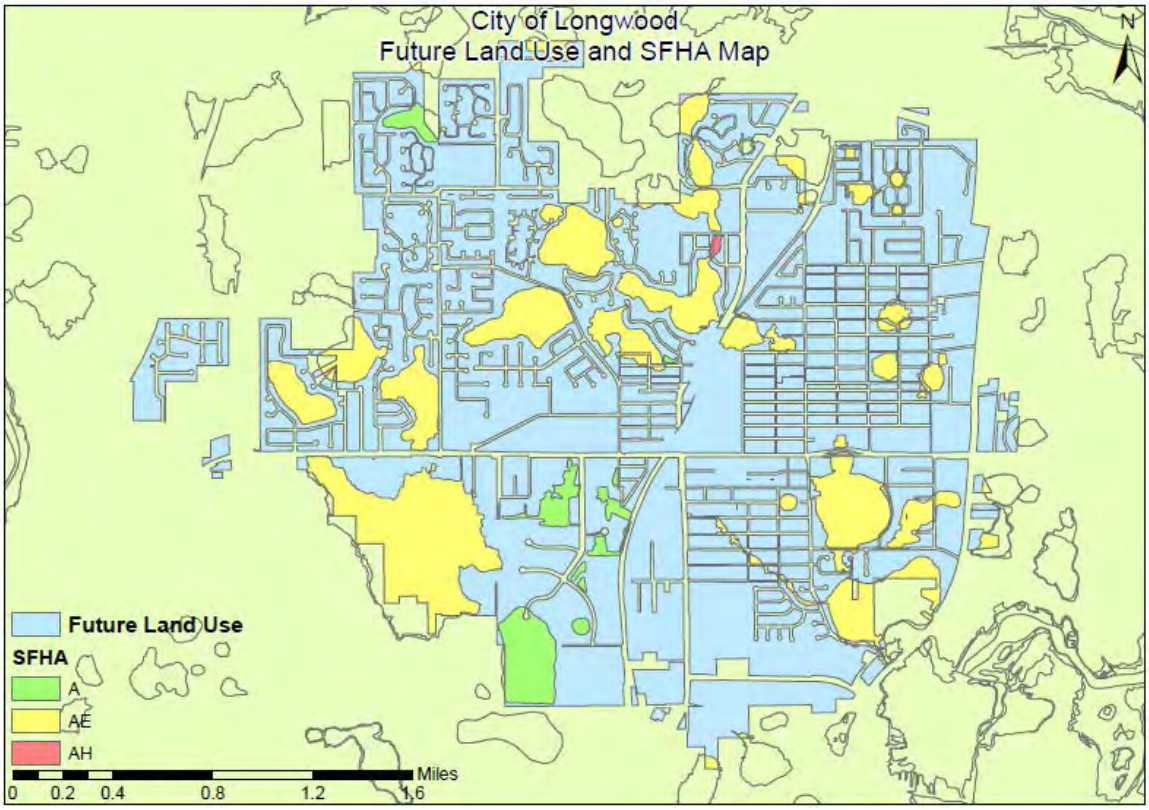
Table 9. Flood Zone X by Future Land Use (FLU), 2014

Longwood Future Land Use	Percentage of Acres, %
Flood Zone X	**87.51**
LDR- Low Density Residential	35.67
IMU- Infill and Mixed Use	21.43
IND- Industrial	13.32
MDR- Medium Density Residential	8.54
P/I- Public/ Institutional	5.74
HV Overlay	4.21
CON- Conservation	3.73
DH- Downtown Historic	2.89
NCMU- Neighborhood Commercial Mixed- Use	2.51
Water	1.91

Source: Seminole County GIS Dept.

Low- Density Residential is planned for 35.67% of the total future use for Flood Zone X. The next largest future use is Infill and Mixed Use at 21.43%. Industrial accounts for 13.32% and Medium Density Residential composes 8.54% of the total future use. The remaining future uses found in Table 8 complete the future land use make- up.

Figure 6. Future Land Use and Special Flood Hazard Areas (SFHA)



Environmental Efforts

Environmental policies are a means to which a municipality values its natural heritage. Best practices in Floodplain Management mitigation include preserving natural areas located in floodplains or directing open space/recreation uses towards them.

Longwood's policies require that natural functions of wetlands and floodplains be protected. Land use restrictions have been implemented on the specific use of floodplains. These include, limits on natural vegetation removal and limitations on intensities and densities of development.

All development affecting wetlands in Longwood that have been identified in the Comprehensive Plan Goals shall fall into their respected requirements.

It is Longwood's goal to avoid any wetland impact.

There shall always be at least 20 feet between development and wetlands.

Erosion and Sedimentation Control

The city's comprehensive plan sets objectives to protect minerals, soils and vegetation. These policies protect bodies of water and wetlands from siltation.

Figure 7. Protected wetland in Longwood

Figure 8. Building near water

This image shows a barrier between a shoreline and the development near the water.

Longwood prohibits development where public safety can be interrupted due to erosion.

Areas with indigenous vegetation are used to protect shorelines. It is required that 25 feet of vegetation must be in between shores and development.

Stormwater Management

Stormwater management practices are an essential component in mitigating flood damage. Policies enacted at the municipal level are essential in controlling stormwater run-off to create minimal damage impact on property.

Longwood tries to use “Best management practice” when it comes to managing stormwater.

This means that the best practice is usually a combination of different practices to better reduce damage and water pollution.

Stormwater may also be discharged into natural or manmade drainage facilities.

There are many retention ponds in the city to collect storm water.

Non-residential areas can reuse stormwater and collect it in ponds, reservoirs, or cisterns for irrigation.

Figure 9. Vegetation barrier

Vegetation barrier between a shoreline and development.

Figure 10. Storm retention pond

Storm retention pond in the City of Longwood.

Building Practices

Building Practices are essential in mitigating flood damage to structures located in flood prone zones. There are different practices that help protect property and citizens.

Longwood mandates that new residential and non-residential construction or substantial improvements to existing ones should have their lowest floor including basement elevated to at least one foot (1) above the base flood elevation (BFE).

Buildings where there is an enclosed area below the lowest floor elevation are required to be designed for the entry and exit of floodwater. Dry floodproofing techniques such as these reduce damage from flooding while allowing waters to enter the structure.

Most forms of development in the floodway are prohibited unless certification is by a professional engineer is issued stating that the development will result in no increase in flood levels.

Standards for subdivisions are required to build utilities that minimize flood damage and must provide adequate drainage.

Longwood has standards in place to balance the needs of the development community with the protection of sensitive areas.

All buildings must be at least 20 feet away from the shorelines.

A permit is required to clear 1,000 square miles of shoreline vegetation.

Figure 11. Building practices

This is a foundation being built above the base flood elevation. As you can see, the building is raised a foot higher than the ground.

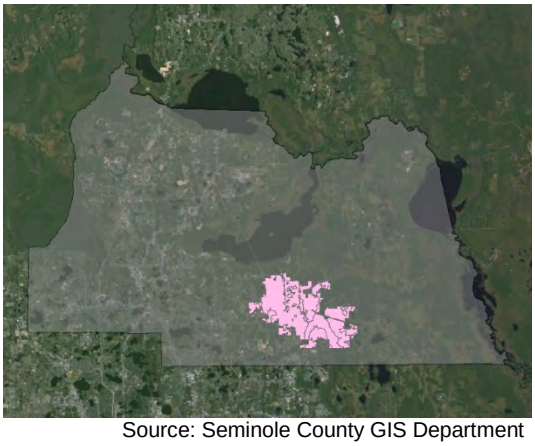
	Responsible party	Deadline
Goal 1: Update the City's stormwater master plan that was originally developed circa 1979.		
Objective 1.1- Phase 1: Aerial Mapping		Completed in December 2010
Objective 1.2- 2A: Drainage Structure Inventory		Completed in March 2011
Goal 2: Improve flood protection within the City.		
Objective 1.1- - Phase IV: Stormwater Capital Improvement Program (CIP)		
Underway		

Introduction

Overview

The City of Oviedo was incorporated in 1925 in Seminole County, FL. It is located in the southern portion of the county, bordered by Orange County to the south, the City of Winter Springs to the west and rural unincorporated Seminole County to the north and east. The city currently covers 16 square miles. The current population is 34,965 people.

Figure 1. City of Oviedo



Source: Seminole County GIS Department

Involvement with the National Flood Insurance Program (NFIP)

Oviedo became eligible for the National Flood Insurance Program's (NFIP) Community Rating System (CRS) on October 1, 2008.

The municipality is currently ranked in class six. Class six implies that Oviedo received 2,000- 2,499 Credit Points (cT) during its classification. The discount percentage for Special Flood Hazard Areas (SFHA) is 20% while the percent discount for non-Special Flood Hazard Area (SFHA) is 10%. This classification within the NFIP is held until October 01, 2018 and subject to further reviews.

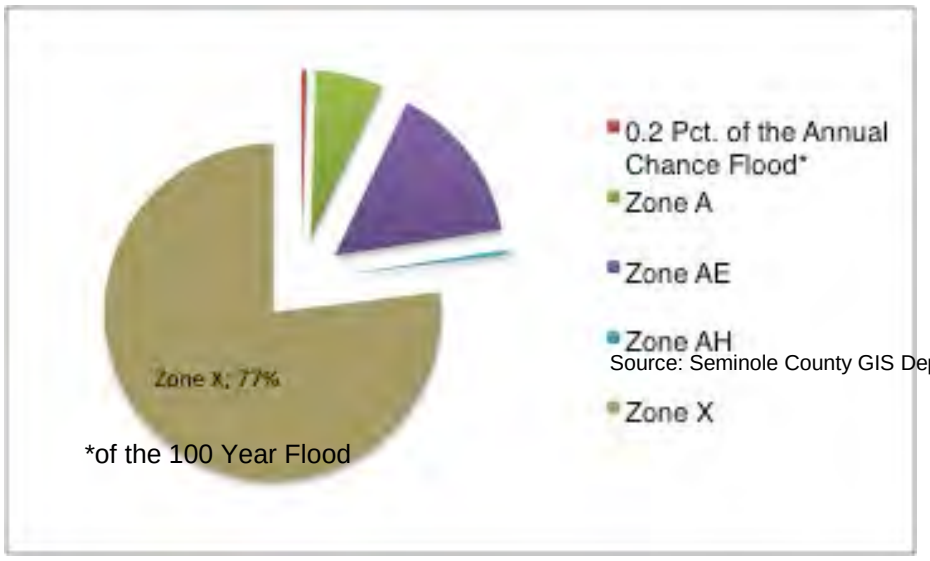
Figure 2. Flood Damage

Risk Assessment

Communities must address four components when assessing risk. They are identifying hazards, profiling hazard events, inventorying assets, and estimating loss. This process measures the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards by assessing the vulnerability of people, buildings, and infrastructure to natural hazards (FEMA). This section of the community profile assesses the potential of risk with respect to floodplain management in Oviedo. There are six categories that address the four components identified in risk assessment as defined through the Federal Emergency Management Agency (FEMA): identifying flood zones within the city, surface water locations, property value within each flood zone, insurance statistics, vulnerable populations, and critical facilities.

FEMA Flood Zones

Figure 3. FEMA Flood Zone, Percentage of Acreage for the City of Oviedo, 2013, Non-Submerged Acres



Source: Seminole County GIS Dept.

Figure 3 shows that the percentage of non- submerged acreage found in the 0.2 percent Annual Chance Flood of the 100 Year Floodplain; 0.06%. Non- submerged acreage refers to land not inundated by surface water. The largest quantity of that acreage is found in the southeast corner of the city on the edges of Horse Shoe Lake, with over five acres. Flood Zone A accounts for 6.52% acres of the municipality. Over 200 acres of this zone is located in the southwest corner and the second largest allocation of Flood Zone A accounts for over 190 acres located in the southeast portion in proximity to Horse Shoe Lake. Flood Zone AE accounts for over 15.57% of the total. Over 88% of Flood Zone AE is found in the floodway running in tandem with the Little Econlockhatchee and Econlockhatchee River. Flood Zone AH accounts for 0.49% of the total acreage. Flood Zone X has moderate to minimal risk of flooding and accounts for over 77% of the total acreage of Oviedo.

Surface Water

Table 1. Percentage of Total Surface Water

Surface Water Name	Percentage, %
Econlockhatchee River	44.8
Horseshoe North Lake	13.3
Little Econlockhatchee River	7.4

Source: Seminole County GIS Dept.

Figure 4. Econlockhatchee River

Source: Seminole County Water Atlas

Figure 5. Horseshoe North Lake

Source: Seminole County Water Atlas

There are 19 bodies of surface water that are located throughout Oviedo and they cover close to 5% of the total land use; all located within the Special Flood Hazard Area (SFHA). Table 1 displays the three largest bodies of water and their percentage of total surface water in Oviedo.

The vast majority of these lakes are closed basin lakes with no outlets. Rainfall causes closed basin lakes to rise faster than drain. The result is a variation in water elevation that can lead to flooding.

The largest surface water in Oviedo is the Econlockhatchee River, which is located in the eastern portion of the city. It consists of 44.8% of the total surface water.

Horseshoe North Lake accounts for 13.3% of the total surface water and is located in the southeast area of Oviedo.

The third largest body of surface water is the Little Econlockhatchee River, which covers 7.4%. This river is also found in the eastern area of the city.

Property Value

Table 2. Total Appraised Value by Flood Zone, 2014

Flood Zone	Total Appraised Value
0.2 Pct. Annual Chance Flood Hazard*	$14,211,860.00
Zone A	$196,289,664.00
Zone AE	$208,256,476.00
Zone AH	$6,614,284.00
Zone X	$2,623,084,524.00
Grand Total	**3,048,456,808.00**

*of the 100 Year Flood

Source: Seminole County GIS Dept.

Oviedo has over three billion dollars in appraised property value that could be vulnerable to flood risk damage. While close to 86% of the appraised property value is found in Flood Zone X. It is important to note that over half a billion dollars in property value is found in the Special Flood Hazard Areas (SFHA).

Flood Insurance

Table 3. Policy Statistics for the City of Oviedo, as of 12/31/2013

Policies in- Force	Insurance in-Force Whole	Written Premiums in- Force
698	$199,092,900	$292,680

Source: FEMA

Oviedo has 698 insurance policies in force according to the Federal Emergency Management Agency. Total property losses in Oviedo are numbered at 34 properties since 1978. The total coverage amount for these insurance policies is $199,092,900.00, while the premium paid for them is $ 292,680.00

Table 4. Loss Statistics for the City of Oviedo, as of 12/31/2013

Total Losses	Closed Losses	Open Losses	CWOP Losses	Total Payments
34	17	0	17	$125,372.67

Source: FEMA

Losses that had been paid in full accounted for 17 claims and losses that had been closed without payment (CWOP) were counted at 17 claims. There were no losses that had not been paid in full (Open Losses). Total payments made to claimants since 1978 is numbered at $125,372.67.

Vulnerable Population

Vulnerable populations are those segments of the community who are considered to be most prone to risk in the time of hazard. 7.4% of the population is over the age of 65.

Repetitive Loss Property

Repetitive Loss properties are defined as those properties that have been flooded on more than one occasion. Oviedo does not have repetitive loss properties.

In the event that properties do begin to meet that criteria then there are buy out programs that can be initiated to purchase the property. These measures protect residents from harm and remove development from the floodplain (Schwab, 2014).

Manufactured Homes

Oviedo is limited in the number of manufactured homes located throughout its boundaries; there is one mobile home park in Oviedo and it is located in Flood Zone A.

Manufactured homes located within the flood hazard zones must be comply with construction practices including elevation requirements and adequate anchored foundations.

Critical Facilities

There are 20 critical facilities found in Oviedo. None of these facilities are located in the SFHA

Mitigation Measures

Future Land Use

An analysis of the Future Land Use Map by Flood Zone (non- submerged acres) for the City of Oviedo is aggregated below. This analysis reflects the hazards that come with developing in flood prone areas.

Table 5.2 Percent Annual Chance Flood Hazard* by Future Land Use (FLU), 2014

Oviedo Future Land Use	Percentage of Acres, %
0.2 Pct. Annual Chance Flood Hazard*	**0.06**
PLU- Planned Unit Development	78.16
LDR- Low Density Residential	12.89
RL- Rural	8.93

*of the 100 Year Flood

Source: Seminole County GIS Dept.

In Oviedo 78.16% of the total Future Land Use in the 0.2 Percent Annual Chance Flood Hazard is planned for Planned Unit Development (PLU). The remaining acreage is planned Low Density Residential (LDR), 12.89% and Rural (RL) at 8.93%.

Table 6. Flood Zone A by Future Land Use (FLU), 2014

Oviedo Future Land Use	Percentage of Acres, %
Flood Zone A	**6.52**
C-Conservation	37.57
PLU- Planned Unit Development	26.23
RL- Rural	9.81
LDR- Low Density Residential Seminol CO	8.51
CM- Commercial	6.11
LDR- Low Density Residential	4.28
IN- Industrial	2.45
MDR- Medium Density Residential	2.35
OFF- Office	1.25
LDR-T- Low Density Residential Transitional	0.48
P- Public	0.41

Source: Seminole County GIS Dept.

Flood Zone A accounts for 6.52% of the total non- submerged acreage in Oviedo. The breakdown of this Flood Zone shows that 37.57% of the Future Land Use is planned for Conservation (C) and 26.23% in the Flood Zone is zoned for Planned Unit Development (PLU). The next largest aggregated Future Planned Uses are Rural (R) and Low-Density Residential (LDR). Medium Density Residential (MDR) accounts for 2.35% percent of the Total Future Land Use Acreage. Those residents residing in Low- Density and Medium Density Residential Uses are most at risk for flood prone hazard.

Table 7. Flood Zone AH by Future Land Use (FLU), 2014

Oviedo Future Land Use	Percentage of Acres, %
Flood Zone AH	**0.49**
DMU- Downtown Mixed- Use District	40.48
MDR- Medium Density Residential	30.23
CM- Commercial	17.45
PLU- Planned Unit Development	10.58
LDR- Low Density Residential	1.22

Source: Seminole County GIS Dept.

The Downtown Mixed- Use District attributes to the highest total percentage of acreage for Zone AH at 40.48.The second largest make- up is Medium Density Residential (MDR) at 30.23 percent. The remaining Future Land Use uses account for 30 percent of the Flood Zone including Commercial (CM) at 17.45%, Planned Unit Development (PLU) at 10.58%, and Low- Density Residential (LDR) at 1.2%.

Table 8. Flood Zone AE by Future Land Use (FLU), 2014

Oviedo Future Land Use	Percentage of Acres, %
Flood Zone AE	**15.57**
C-Conservation	62.83
PLU- Planned Unit Development	18.29
LDR- Low Density Residential	10.41
P- Public	3.54
DMU- Downtown Mixed- Use District	1.51
RL- Rural	0.74
MDR- Medium Density Residential	0.82
CONS	0.65
OFF- Office	0.52
CM- Commercial	0.33
LDR-T- Low Density Residential Transitional	0.30

Source: Seminole County GIS Dept.

Flood Zone AE shows that over 62 % of the land use is planned for Conservation (C). The next largest planned categorization is for Planned Unit Development (PLU), 18.29%, followed by Low- Density Residential (LDR) at 10.41%. The remaining Future Land Uses account for nine percent of the total acreage.

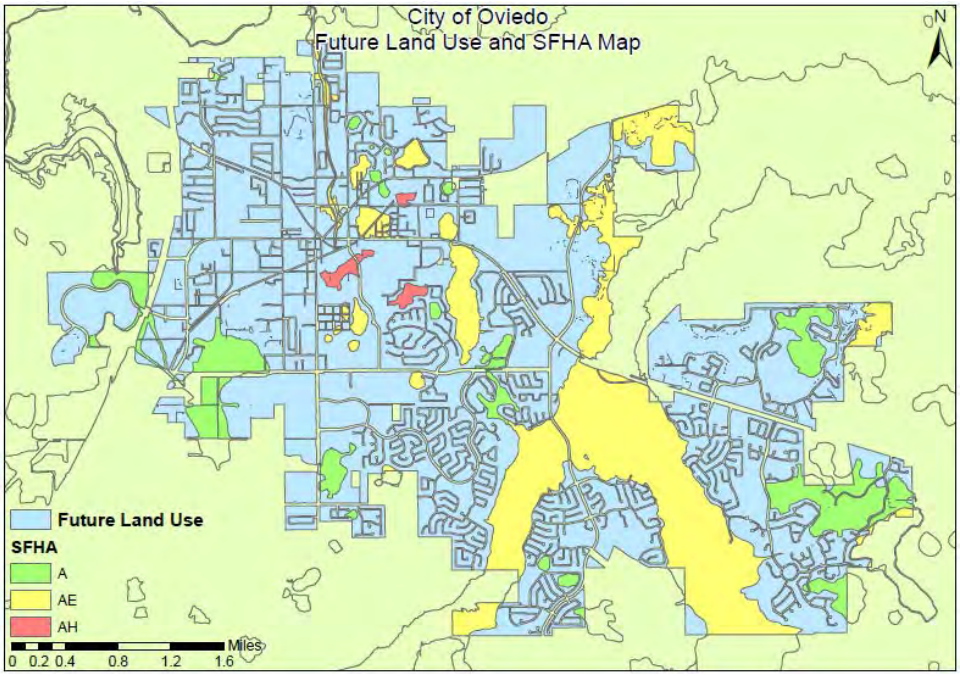
Table 9. Flood Zone X by Future Land Use (FLU), 2014

Oviedo Future Land Use	Percentage of Acres, %
Flood Zone X	**77.36**
PLU- Planned Unit Development	28.67
LDR- Low Density Residential	21.12
C-Conservation	9.80
CM- Commercial	6.68
P- Public	6.66
DMU- Downtown Mixed- Use District	6.01
MDR- Medium Density Residential	5.04
RL- Rural	4.14
OFF- Office	2.86
LDR-T- Low Density Residential Transitional	2.15
IN- Industrial	1.80
LDR*- Low Density Residential Seminol CO	1.75
LDR*- Low Density Residential Seminol CO	1.75

Source: Seminole County GIS Dept.

The largest percentage of acres in Flood Zone X in Oviedo is Planned Unit Development (PLU) at 28.67%. The next largest percentage of acreage is 21.12% with Low Density Residential. These two future land uses account for nearly half of the Flood Zone make-up. The conservation future use designation is the next notable make– up with 9.80%, followed by Commercial at 6.68% and Public at 6.66%. The remaining future uses account for a quarter of the total aggregation.

Figure 6. Future Land Use and Special Flood Hazard Areas (SFHA)



Environmental Efforts

Oviedo prohibits construction within the floodway that would diminish the functional floodway capacity.

An analysis of the Future Land Use Map found in Section 2.2 found that 37% of Future Use is designated for Conservation in Flood Zone A and over 62% in Flood Zone AE. There is no conservation found in the Future Land Use for Flood Zone AH. As mentioned, these zones are part of the Special Flood Hazard Area (SFHA).

Municipal policies intended towards minimizing potential flood damage is achieved through directing recreation, conservation and common open space to those areas within the Flood Zone. This restricts development to occur outside the 100 Year Floodplain, which creates clusters of residential developments.

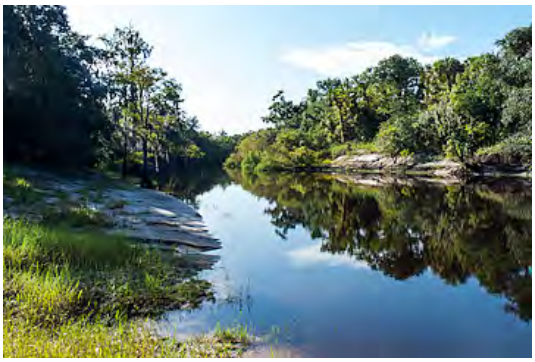
Erosion and Sediment Control

Oviedo's mitigation policies are intended to minimize erosion and control sedimentation. Construction projects associated with the development order application are required to submit an erosion and sediment control plan to ensure that certain measures are properly addressed. These measures are also required to follow through with state environmental standards.

Mitigation policies intended to support minimizing erosion and controlling sedimentation include leaving steep slopes and wetlands undisturbed and promoting natural vegetative cover.

The benefits included in these policies include but are not limited to reducing the velocity of run-off and increasing infiltration into the soil.[1] Other policies identified to control sedimentation from construction sites are practicing run- off control measures and sediment trapping measures.

Figure 7. Econ Corridor Project



The Econ Corridor Project is a conservation effort to protect environmentally sensitive lands. These form of mitigation policies prevent development in flood prone area

[1] Section 10.2 Drainage and Stormwater Management and Erosion Control, Article X. Floodways, Floodplains, Drainage, and Erosion of Oviedo's Land Development Code

Stormwater Management

Stormwater run– off is an essential component in helping to mitigate flood damage. Figure 4 illustrates storm water management policy process found in Oviedo's Land Development Code.

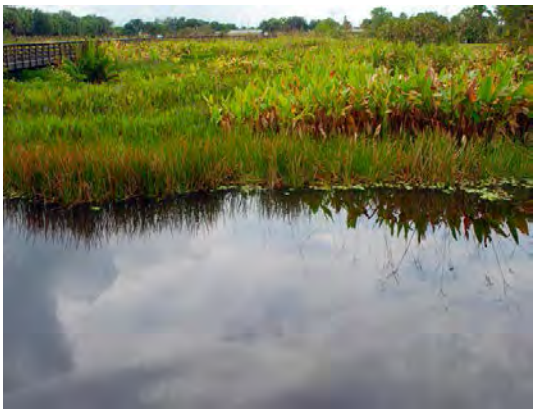
Oviedo requires that development adhere to the natural drainage system. This policy promotes conservation efforts to protect wetlands throughout the city. The functions of these natural resources are to retain and filtrate water.

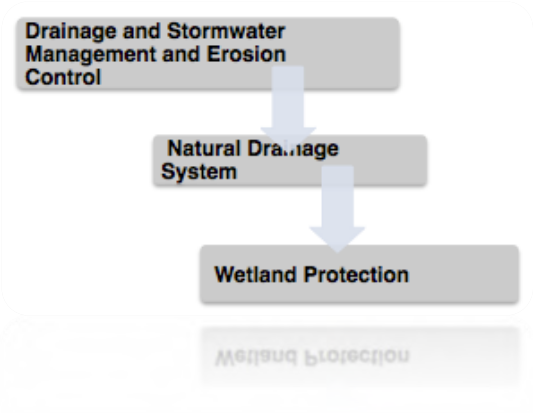
Performance and design standards for stormwater management are found in Oviedo's Engineering Standards Manual. These standards are directed toward implementing effective policies that help circumvent extensive damage in the event of severe stormwater flooding.

Performance standards include implementing best management practices requiring the retention/detention of stormwater, managing discharge levels and protecting water quality.

Design standards include proper maintenance, having accessible entrance channels, and designing under drain systems for the purpose of removing stormwater.

Figure 8. Oviedo Drainage and Stormwater Management & Erosion Control





Building Practices

Oviedo building practices mandate that developments orders or permits cannot be issued within floodplains until development adheres to certain goals.

These goals include that all developments and all public facilities are located and constructed to minimize or eliminate flood damage and that adequate drainage is provided.

As annotated earlier, no new construction is permitted in the floodway.

Construction in the floodplain also mandates that no new construction or improvements take place unless the lowest floor is elevated to no lower than two foot above the base flood elevation (BFE).

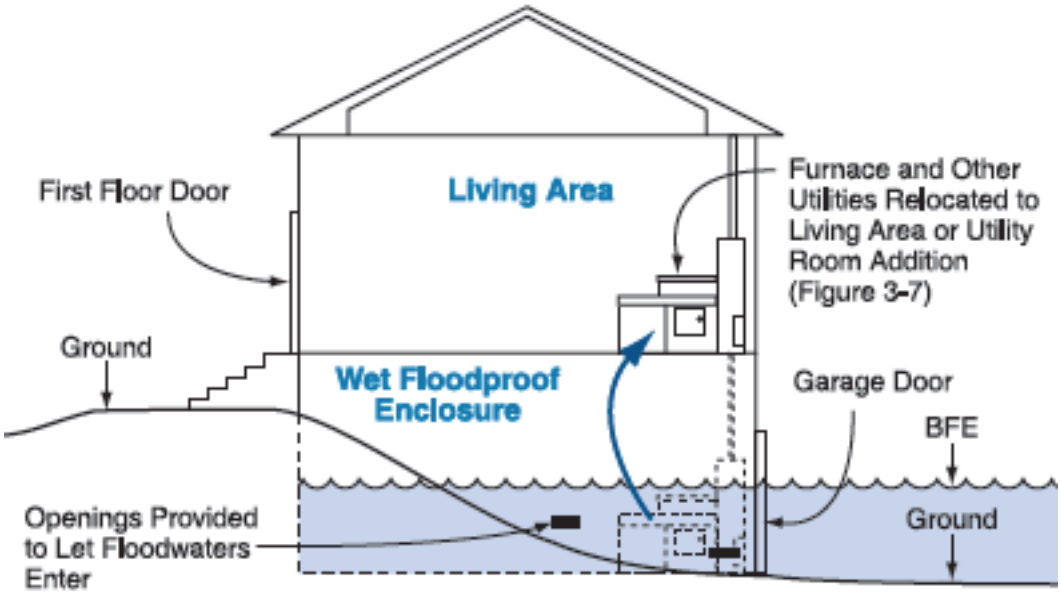
For non- residential buildings, flood-proofing techniques can be used in lieu of elevation. These techniques are required to be certified by a professional engineer or architect.

Floodproofing techniques identified by the city are intended to withstand flood depths, pressure, impact, and prevent the passage of water in buildings below the base flood.

Figure 7 displays several FEMA floodproofing techniques including, situating the primary residence above the Base Flood Elevation (BFE) and elevating HVAC equipment to an upper floor.

In subdivision regulations, final plat approvals are not authorized unless the boundaries of the floodplain are identified on the plat. All new residential and commercial structures located within or near a Special Flood Hazard Area are required to submit an original Elevation Certificate to the Engineering Department prior to a Certificate of Occupancy being issued.

Figure 9. FEMA Floodproofing Techniques



Source: FEMA

	Responsible party	Deadline
	City of Oviedo	Annual

Goal 1: To maintain the condition of the stormwater ponds in Oviedo

Objective 1.1- Perform on-going maintenance of tributaries and canals.

Objective 1.2- Perform on-going maintenance of city wide storm water master system.

	City of Oviedo	Annual

Goal 2: To maintain the quality of the street drainage facilities in Oviedo

Objective 2.1- Perform on-going maintenance of street cleaning and storm drains.

Objective 2.2- Perform on-going maintenance of street culverts and storm water pond inlets and outfalls.

	City of Oviedo	Annual

Goal 3: To improve the quality of water in Oviedo

Objective 3.1- Perform measures to further reduce pollutants from the cities MS4 systems to surface water within the incorporated limits.

Objective 3.2- Perform measures to further identify and reduce localized flash flooding to roadways from heavy rainfall weather events and implement infrastructure improvements when financially feasible and appropriate.

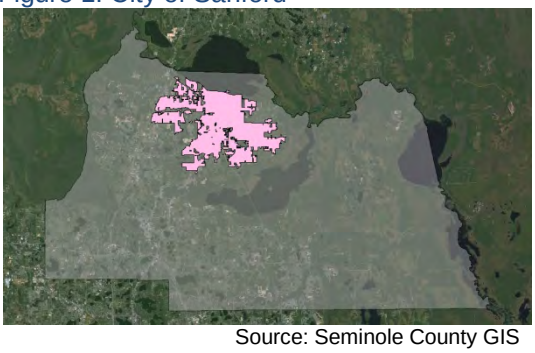
Introduction

Overview

The City of Sanford was incorporated in 1891 in Seminole County. It is located in the northern section of the county, with the City of Lake Mary located to the south and Volusia County to the north. Unincorporated Seminole County borders Sanford on its west and east boundaries.

Sanford covers 22.96 square miles making it the largest municipality within Seminole County. The city's population is 53,570.

Figure 1. City of Sanford



Source: Seminole County GIS

Involvement with the National Flood Insurance Program (NFIP)

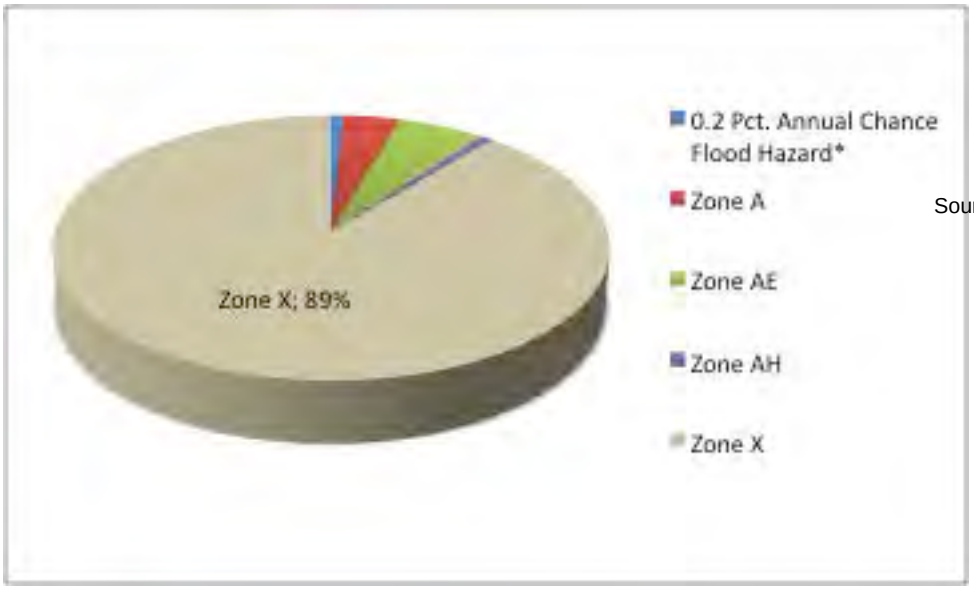
Sanford has no history of participation in the National Flood Insurance Program's (NFIP) Community Rating System (CRS).

Figure 2.National Flood Insurance Program

Risk Assessment

Communities must address four components when assessing risk. They are identifying hazards, profiling hazard events, inventorying assets, and estimating loss. This process measures the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards by assessing the vulnerability of people, buildings, and infrastructure to natural hazards (FEMA). This section of the community profile assesses the potential of risk with respect to floodplain management in Sanford. There are six categories that address the four components identified in risk assessment as defined through the Federal Emergency Management Agency (FEMA): identifying flood zones within the city, surface water locations, property value within each flood zone, insurance statistics, vulnerable populations, and critical facilities.

Figure 3. FEMA Flood Zone, Percentage of Acreage for the City of Sanford, 2013, Non-Submerged Acres



*of the 100 Year Flood

Source: Seminole County GIS Dept

Figure 3 shows that the percentage of non- submerged acreage found in Sanford. The 0.2 percent Annual Chance Flood Hazard of the 100 Year Floodplain accounts for 0.9% of the total percentage of non- submerged acreage. Much of this zone is located near the banks of Lake Monroe. Non- submerged acreage refers to land not inundated by surface water. Flood Zone A accounts for 3.6% of the total percentage of non-submerged acres. Flood Zone AE comprises 5.7% and is predominately found in the surrounding areas of Lake Monroe. Flood Zone AH is 0.79% of the total make- up. Flood Zone X is 89% of the total percentage of non- submerged acres.

Surface Water

Table 1. Percentage of Total Surface Water

Surface Water Name	Percentage, %
Total Surface Water	**6.2**
Lake Monroe	53.8
Little Lake Mary	5.6
Lake Ada	5.4

Source: Seminole County GIS Dept.

There are 23 bodies of surface water located in Sanford. Surface water accounts for 6.2% of the total land make– up. Table 1 displays the three largest bodies of water and their percentage of total surface water in Sanford.

All bodies of water are located in or within close proximity of the Special Flood Hazard Area (SFHA).

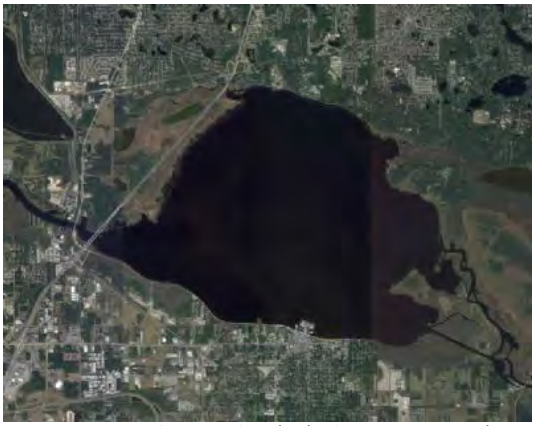
The vast majority of these lakes are closed basin lakes with no outlets. Rainfall causes closed basin lakes to rise faster than drain. The result is a variation in water elevation that can lead to flooding. Lake Monroe is a notable exception connecting to the St. Johns River.

Lake Monroe is the largest lake in Sanford accounting for 53.8% of the total surface water make up of the city. The body of water is located to north of the city.

Little Lake Mary is the second largest body of water comprising 5.6% of the total surface water and is located in the southern section of this jurisdiction.

Lake Ada is also located in the southern portion of Sanford. This body of water makes up 5.4% of the total percentage of surface water.

Figure 4. Lake Monroe, Aerial View



Source: Seminole County Water Atlas

Figure 5. Little Lake Mary

Source: Seminole County Water Atlas

Property Value

Table 2. Total Appraised Value by Flood Zone, 2014

Flood Zone	Total Appraised Value
0.2 Pct. Annual Chance Flood Hazard*	$236,451,857.00
Zone A	$356,266,164.00
Zone AE	$505,196,676.00
Zone AH	$21,979,736.00
Zone X	$3,174,186,826.00
Grand Total	$4,294,081,259.00

*of the 100 Year Floodplain

Source: Seminole County GIS Dept.

Sanford has over 4.2 billion dollars in appraised value that could be vulnerable to flood risk damage. The largest property value risk is found in Flood Zone X, 74%. Flood Zone AE accounts for the second largest appraised value that could be vulnerable to risk at 12%. The next most notable flood zone that has high-appraised value is A with over 356 million dollars in property value. Those properties within the 0.2 Pct. Annual Chance Hazard of the 100 year flood have over 236 million dollars of property risk.

Insurance Policies

Table 3. Policy Statistics for the City of Sanford, as of 12/31/2013

Policies in- Force	Insurance in-Force Whole	Written Premiums in- Force
618	$152,232,400	$342,110

Source: FEMA

Sanford has 618 insurance policies in force according to the Federal Emergency Management Agency. The total coverage amount for these insurance policies is $152,232,400, while the premium paid for them averaged $343,110.

Table 4. Loss Statistics for the City of Sanford, as of 12/31/2013

Total Losses	Closed Losses	Open Losses	CWOP Losses	Total Payments
69	41	0	28	$454,772.10

Source: FEMA

Total property losses in Sanford are numbered at 69 properties since 1978. Losses that had been paid in full accounted for accounted for 41 claims and losses that had been closed without payment (CWOP) were totaled at 28 claims. There were no losses that had not been paid in full. Total payments made to claimants since 1978 is valued at $454,772.10.

Vulnerable Population

Vulnerable populations are those segments of the community who are considered to be most prone to risk in the time of hazard. 9.3% of the population is over the age of 65.

Repetitive Loss Property

Repetitive Loss Properties are defined as those properties that have been flooded on more than one occasion. Sanford has one of these properties which are located at 2010 Lake Reservoir Rd.

In the event that properties do begin to meet that criteria then there are buy out programs that can be initiated to purchase the property. These measures protect residents from harm and remove development from the floodplain (Schwab, 2014).

Manufactured Homes

Figure 6. Manufactured Home Flood Hazard

Manufactured home communities, such as the one showed above in Sanford are vulnerable populations susceptible to flood hazard without proper mitigation measures.

Sanford has a large mobile home park located in its southern jurisdiction that could be vulnerable to flood inundation. Figure 6 illustrates the potential risk. The City's Land Development Code sets standards for these forms of residences. Mitigation policies that help protect flood damage to manufactured homes include setting the permanent foundation to no lower than two feet above the base flood elevation and must have an adequate anchored foundation system to circumvent flotation and other forms of movement.

Critical Facilities

Critical facilities are defined as those facilities that provide a critical function and should be protected from flood damage. Seminole County has identified 47 critical facilities throughout Sanford and the emergency function they provide in times of crisis. No facility is located in the Special Flood Hazard Area (SFHA).

Mitigation Measures

Mitigation is the effort to reduce loss of life and property by lessening the impact of disasters (FEMA). The policies adopted by Sanford work to achieve these objectives and prevent flood damage. This community profile analyzes mitigation policies including Future Land Use, Environmental Efforts, Stormwater Management, and Building Practices all identified through the city's Comprehensive Plan and Land Development Code.

Future Land Use

An analysis of the Future Land Use Map by Flood Zone (non-submerged acres) for the City of Sanford is aggregated below. This analysis reflects the hazards that come with planning for growth in flood prone areas.

Table 5. 0.2 Percent Annual Chance Flood Hazard* by Future Land Use (FLU), 2014

Sanford Future Land Use	Percentage of Acres, %
0.2 Pct Annual Chance Flood Hazard*	**0.89**
WDBD- Waterfront Downtown Business District	44.81
LDRSF- Low Density Res.Single Family	16.19
MDR15- Med. Density Res. 15 units/ acre	6.39
AIC- Airport Industry & Commerce	6.15
RP- Resource Protection	6.10
GC- General Commercial	4.62
PRO- Parks, Recreation, Open Space	3.69
HDR- High Density Residential	3.45
ROI- Residential, Office/ Institutional	2.97
PSP- Public/ Semi Public	2.11
NC- Neighborhood Commercial	1.96
I-Industrial	1.55

*of the 100 Year Flood

Source: Seminole County GIS Dept.

In Sanford, 44.81% of the total percentage of acreage for the 0.2 Percent Annual Chance Hazard of the 100-year flood is planned for the Waterfront Business District, mixed use district. The next largest future land use is Low Density Residential Single Family at 16.19%. Medium Density Residential districts of 15 units per acre are the third largest future use in this flood hazard area at 6.39%. Airport Industry & Commerce, another variation of a mixed- use district accounts for 6.15%. Resource Protection comprises 6.10%.

Table 6. Flood Zone A by Future Land Use (FLU), 2014

Sanford Future Land Use	Percentage of Acres, %
Flood Zone A	**3.64**
RP- Resource Protection	40.35
LDRSF- Low Density Res.Single Family	13.00
WIC- Westside Industry & Commerce	12.14
HI-I-4 High Intensity	8.90
MDR10- Med. Density Res. 10 units/acre	7.39
MDR15- Med. Density Res. 15 units/ acre	5.01
GC- General Commercial	3.43
PRO- Parks, Recreation, Open Space	2.58
NC- Neighborhood Commercial	2.24
AIC- Airport Industry & Commerce	2.04
HDR- High Density Residential	1.39
ROI- Residential, Office/ Institutional	0.83
LDRMH- Mobile Home	0.69

Source: Seminole County GIS Dept.

Resource protection accounts for 40.35% of the total future land use in Flood Zone A. Low Density Residential Single Family comprises 13.00% of the total future land use. The third largest planned future use in this flood hazard area is Westside Industry & Commerce at 12.14%. I-4 High Intensity, a variation of a mixed-use district accounts for 8.90% of the total make- up.

Table 7. Flood Zone AE by Future Land Use (FLU), 2014

Sanford Future Land Use	Percentage of Acres, %
Flood Zone AE	**5.68**
RP- Resource Protection	51.40
WDBD- Waterfront Downtown Business District	12.27
LDRSF- Low Density Res.Single Family	11.38
HDR- High Density Residential	4.93
MDR15- Med. Density Res. 15 units/ acre	4.51
PRO- Parks, Recreation, Open Space	3.23
GC- General Commercial	2.58
PSP- Public/ Semi Public	2.02
MDR10- Med. Density Res. 10 units/acre	1.90
AIC- Airport Industry & Commerce	1.34
I-Industrial	0.84
ROI- Residential, Office/ Institutional	0.81
LDRMH- Mobile Home	0.78
NC- Neighborhood Commercial	0.77
HI-I-4 High Intensity	0.72
SE- Suburban Estates	0.53

Source: Seminole County GIS Dept.

In Flood Zone AE Resource Protection comprises 51.40% of the total future land use. The next largest future use is Waterfront Downtown Business District with 12.27% of the total make- up. Low Density Residential Single Family is 11.38%.

Table 8. Flood Zone AH by Future Land Use (FLU), 2014

Sanford Future Land Use	Percentage of Acres, %
Flood Zone AH	**2.52**
RP- Resource Protection	71.91
HDR- High Density Residential	11.79
PSP- Public/ Semi Public	7.94
LDRMH- Mobile Home	3.15
GC- General Commercial	2.52
LDRSF- Low Density Res.Single Family	1.13
ROI- Residential, Office/ Institutional	0.79
MDR15- Med. Density Res. 15 units/ acre	0.44
PRO- Parks, Recreation, Open Space	0.32

Source: Seminole County GIS Dept.

Sanford's Flood Zone AH is predominately planned for Resource Protection at 71.91% of the total future acreage. The next largest future use is High Density Residential development at 11.79%. Public and Semi Public comprises 7.94%.

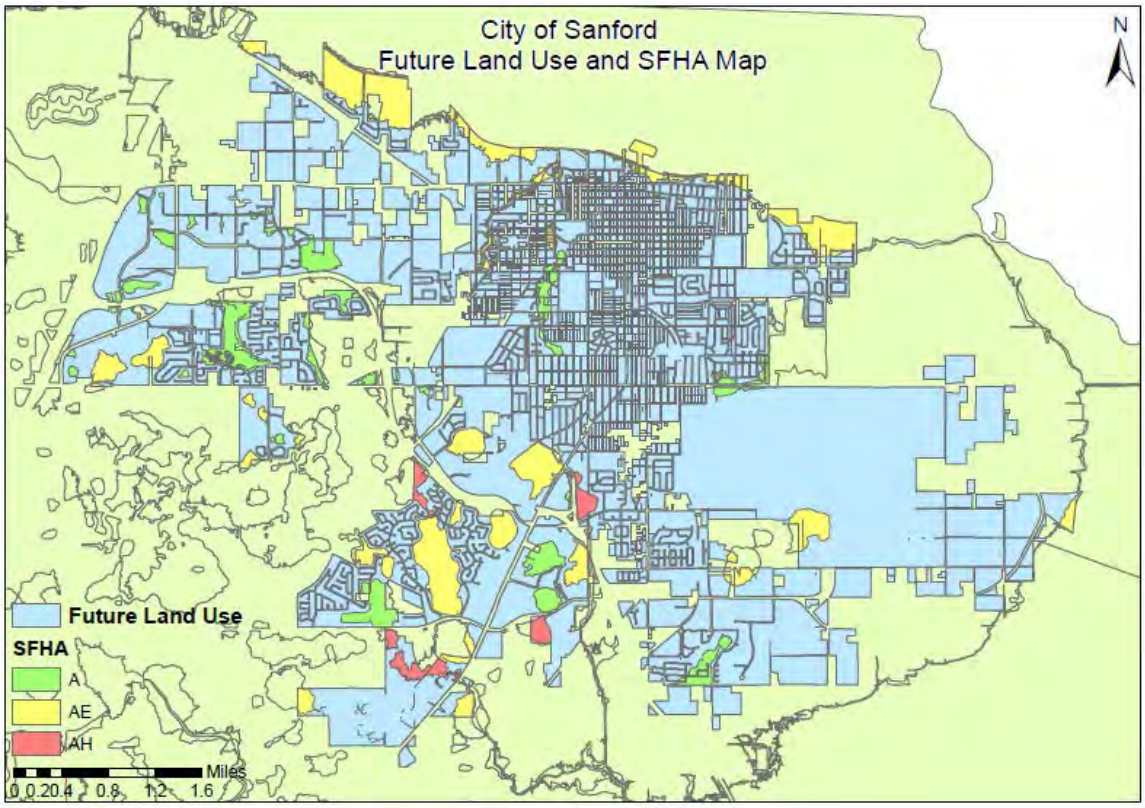
Table 9. Flood Zone X by Future Land Use (FLU), 2014

Sanford Future Land Use	Percentage of Acres, %
Flood Zone X	**88.99**
AIC- Airport Industry & Commerce	19.91
LDRSF- Low Density Res.Single Family	19.06
WIC- Westside Industry & Commerce	10.08
GC- General Commercial	6.49
I-Industrial	6.27
PSP- Public/ Semi Public	5.91
MDR15- Med. Density Res. 15 units/ acre	5.52
HI-I-4 High Intensity	3.93
WDBD- Waterfront Downtown Business District	3.82
PRO- Parks, Recreation, Open Space	3.52
RP- Resource Protection	3.18
MDR10- Med. Density Res. 10 units/acre	3.06
HDR- High Density Residential	2.85
NC- Neighborhood Commercial	1.78
ROI- Residential, Office/ Institutional	1.70
SE- Suburban Estates	1.55
LDRMH- Mobile Home	1.37

Source: Seminole County GIS Dept.

Airport Industry & Commerce comprise 19.91% of the total future land use in Flood Zone X. Low Density Residential- Single Family are also a significant make- up of this flood zone at 19.06% Westside Industry & Commerce accounts for 10.08% of the total future use of percentage of acres for Flood Zone X. General Commercial and Industrial comprise 6.49% and 6.27%.

Figure 7. Future Land Use and Special Flood Hazard Areas (SFHA)



Environmental Efforts

Environmental policies are a means to which a municipality values its natural heritage. Best practices in Floodplain Management mitigation include preserving natural areas located in floodplains or directing open space/ recreation uses towards them.

Sanford has committed itself to the protection of wetlands, aquatic habitats, floodways, and drainage ways. In only certain circumstances, minimal development is permitted if the reason is reasonable.

Under Policy 1-1.14.2, the City of Sanford is part of the St. Johns River Management District.

Figure 8. Wetlands

Wetlands from the St. Johns River that are protected from development.

Erosion and Sedimentation Control

The city's comprehensive plan sets objectives to protect minerals, soils and vegetation. These policies protect bodies of water and wetlands from siltation.

The City of Sanford tries to protect certain soils and areas with erosion by trying not to develop on lands that have been impacted.

Policy 1-14.1 is the city's new development plan. Under this, Objective 1-14.1, protects natural resources such as impacted soil types and protects areas that have already experienced erosion.

Under Objective 1-1.2, the City of Sanford maintains land development regulations that address erosion.

Figure 9. Development along the St. Johns River

Stormwater Management

Stormwater management practices are an essential component in mitigating flood damage. Policies enacted at the municipal level are essential in controlling stormwater run-off to create minimal damage impact on property.

The City of Sanford has many policies and objective to help with the management of stormwater. All of these provide guidelines on where and how many drainage systems are built.

Under Objective 1-1.2, there must be adequate stormwater management to allow for more people in residential areas.

Policy 1-1.10.2 states that stormwater drainage is considered a Regional Activity Center. Under this policy, it is required for adequate Regional Activity Centers for the amount of people living in the area.

Policy 1-1.14.4 states the owner/developer of a site is responsible for managing the stormwater run-off.

Goal No.5 pertains to the airport and developing stormwater management plans within the vicinities. These plans have to be compatible with the St. Johns River Management district and FAA criteria.

Policy 1-1.1.6 regulates areas that are subject to flooding and makes sure they have adequate draining.

Figure 10. Proper Stormwater Management

None of the stormwater has reached the property due to proper stormwater management practices.

Building Practices

Building Practices are essential in mitigating flood damage to structures located in flood prone zones. There are different practices that help protect property and citizens.

Sanford uses the current Florida Building Code, with some modifications and higher standards. One of the higher standards dictates that the lowest floor level of any new structure, including the basement, shall be a minimum of 2-feet above the base flood elevation.

Before development can begin, permits must be submitted about the nature, location, dimensions, and elevations of the area under consideration for development.

A structure must be certified after placement of the lowest floor and proper floodproofing has been constructed. If they aren't certified or meet standards, all construction must cease.

Figure 11. Proper Building Practices

The correct way to prepare a property for development.

	Responsible party	Deadline
	CITY OF SANFORD	Annual

Goal 1: Engage in risk-based mitigation planning resulting in sustainable actions that reduce or eliminate risks to life and property from flooding.

Objective 1.1- Participate in Local Mitigation Strategy meetings and communicate concerns and issues.

Objective 1.2-Coordinate with the County and other local government agencies to develop and administer outreach programs to gain participation in mitigation programs by business, industry, institutions and community groups.

Goal 2: Enforce proper building and stormwater objectives and practices.

Objective 1.1- Continue training and review of building codes.

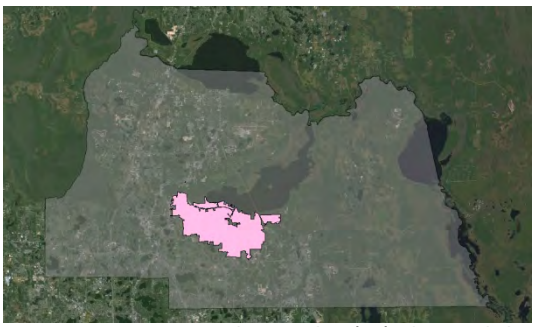
Objective 1.2- Perform ongoing maintenance of city streets, storm drains, street culverts, and storm water pond inlets and outfalls.

Introduction

Overview

The City of Winter Springs was incorporated in 1959 in Seminole County. It is located in the central section of the county, with the City of Longwood to its west and the City of Oviedo to its east. Unincorporated Seminole County borders Winter Springs to the north and south. Winter Springs covers 15 square miles. The city's population is 34,000.

Figure 1. City of Winter Springs



Source: Seminole County GIS

Involvement with the National Flood Insurance Program (NFIP)

Winter Springs became eligible for the National Flood Insurance Program's (NFIP) Community Rating System (CRS) on October 1, 1993. The municipality ranked a class six rating, receiving 2,000-2,499 Credit Points (cT) during its classification.

The discount percentage for those properties in the Special Flood Hazard (SFHA) is twenty (20%) percent while the percent discount for non Special Flood Hazard Area (SFHA) is ten (10%) percent. The city's participation in the program is listed as current.

Figure 2. National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

Risk Assessment

Communities must address four components when assessing risk. They are identifying hazards, profiling hazard events, inventorying assets, and estimating loss. This process measures the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards by assessing the vulnerability of people, buildings, and infrastructure to natural hazards (FEMA). This section of the community profile assesses the potential of risk with respect to floodplain management in Winter Springs. There are six categories that address the four components identified in risk assessment as defined through the Federal Emergency Management Agency (FEMA): identifying flood zones within the city, surface water locations, property value within each flood zone, insurance statistics, vulnerable populations, and critical facilities.

Figure 3. Flood Zone, Percentage of Acreage for the City of Winter Springs, 2013, Non-Submerged

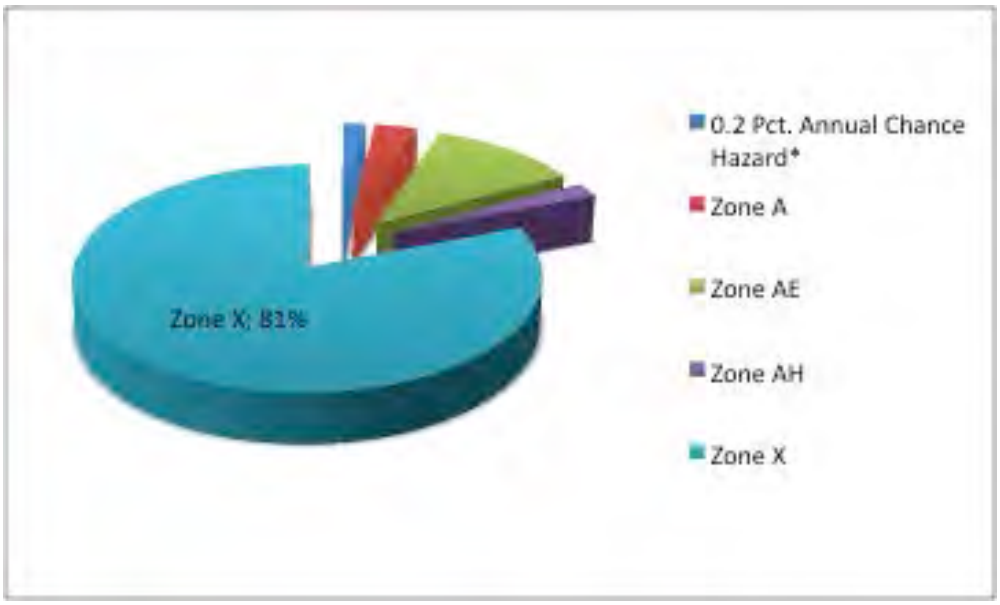
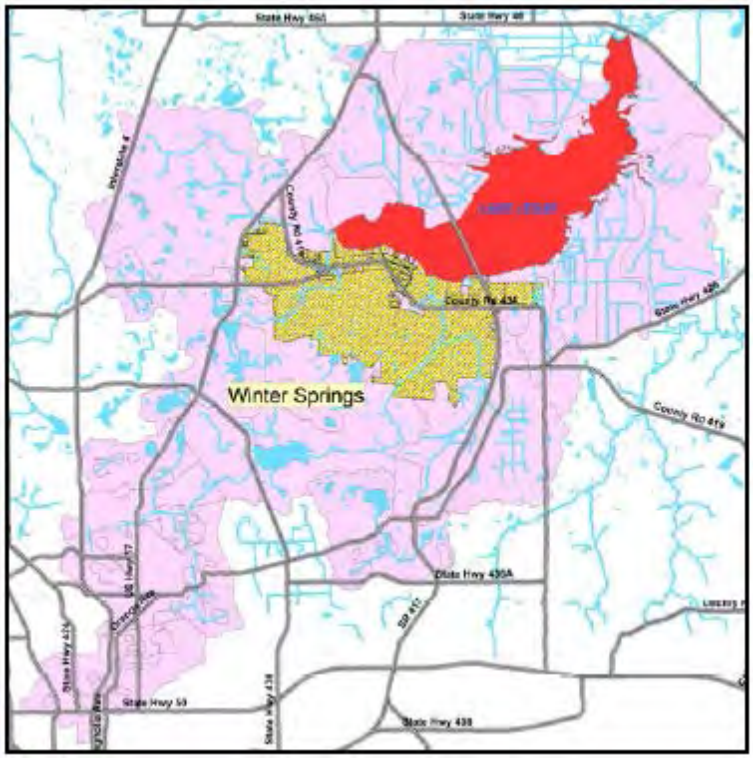


Figure 3 shows that the percentage of non- submerged acreage found in Winter Springs. 0.2 Percent Annual Chance Hazard of the 100 year flood accounts for 1.76% of the total percentage of non- submerged acreage. Non- submerged acreage refers to land not inundated by surface water. Flood Zone A comprises 3.42% of the total make-up. Flood Zone AE is 11.78% and Flood Zone AH is 2.09%. Flood Zone X accounts for 80.91% of the total percentage of non-submerged acres.

Surface Water

Figure 4. Surface water runoff



The majority of the City's surface water runoff into Lake Jesup and is conveyed by three of its main tributaries, Howell Creek, Gee Creek and Soldiers Creek.

Howell Creek runs through the central portion of the City and has an approximate 3750 tributary area, thirty eight (38 %) percent in the City. Bear Creek, a tributary to Howell Creek, also runs through a portion of the City and converges with Howell Creek just north of Winter Springs Boulevard.

Gee Creek runs through the southwestern portion of the City and has an approximate 2,464 acre tributary in the area, twenty six (26 %) percent of the City. No Name Creek is a tributary to Gee Creek and converges with Gee Creek just south of SR 434.

A very small portion of the City about nine (9 %) percent is with the Soldiers Creek Basin, approximately 884 acres. The creek itself enters the City's limits near the SR 419 crossing before discharging into the western part of Lake Jesup.

The 100-year flood plains in the City are located along the creeks, along the shores of lakes and in some landlocked low spots.

Property Value

Table 2. Total Appraised Value by Flood Zone, 2014

Flood Zone	Total Appraised Value
0.2 Pct. Annual Chance Flood Hazard*	$191,184,305.00
Zone A	$85,792,173.00
Zone AE	$368,088,713.00
Zone AH	$1,609,778.00
Zone X	$2,321,701,467.00
Grand Total	$2,968,376,436.00

*of the 100 Year Flood

Source: Seminole County GIS Dept.

Winter Springs has over 2.9 billion dollars in appraised value that could be vulnerable to flood risk damage. The largest property value risk is found in Flood Zone X, 78%. Flood Zone AE accounts for the second largest appraised value that could be vulnerable to risk at 12%. The next most notable flood zone that has high-appraised value is A with over 85 million dollars in property. Those properties within the 0.2 Pct. Annual Chance Hazard of the 100 year flood have over 191 million dollars of property risk.

Insurance Policies

Table 3. Policy Statistics for the City of Winter Springs, as of 12/31/2013

Policies in- Force	Insurance in-Force Whole	Written Premiums in- Force
724	$193,875,900	$294,912

Source: FEMA

Winter Springs has 724 insurance policies in force according to the Federal Emergency Management Agency. The total coverage amount for these insurance policies is $193,875,900 while the premium paid for them averaged $294,912.

Table 4. Loss Statistics for the City of Winter Springs, as of 12/31/2013

Total Losses	Closed Losses	Open Losses	CWOP Losses	Total Payments
19	10	0	9	$154,179.38

Source: FEMA

Total property losses in Winter Springs are numbered at 19 properties since 1978. Losses that had been paid in full accounted for accounted for 10 claims and losses that had been closed without payment (CWOP) were totaled at 9 claims. There were no losses not paid in full. Total payments made to claimants since 1978 is valued at $154,179.38.

Vulnerable Population

Vulnerable populations are those segments of the community who are considered to be most prone to risk in the time of hazard. 13.3% of the population is over the age of 65.

Repetitive Loss Property

Repetitive Loss properties are defined as those properties that have been flooded on more than one occasion. Winter Springs does not have repetitive loss properties.

In the event that properties do begin to meet that criteria, there are buy out programs that can be initiated to purchase the property. These measures protect residents from harm and remove development from the floodplain (Schwab, 2014).

Manufactured Homes

Figure 5. Manufactured Home Flood Hazard

Manufactured home communities, such as the one showed above in Winter Springs are vulnerable populations susceptible to flood hazard without proper mitigation measures. Manufactured homes are symbolized as red points.

Winter Springs has one (1) manufactured home communities located in its jurisdiction that could be vulnerable to flood inundation. Figure 6 illustrates the potential risk. The City's Land Development Code sets standards for these forms of residences. Mitigation policies that help protect flood damage to manufactured homes include setting the elevation above the base flood level and must be anchored. The foundation must be anchored in order to prevent flotation or any varying form of movement.

Critical Facilities

Critical facilities are defined as those facilities that provide a critical function and should be protected from flood damage. Seminole County has identified 16 critical facilities throughout Winter Springs and the emergency function they provide in times of crisis. There are no facilities located in the Special Flood Hazard Area (SFHA).

Mitigation Measures

Mitigation is the effort to reduce loss of life and property by lessening the impact of disasters (FEMA). The policies adopted by Winter Springs work to achieve these objectives and prevent flood damage. This community profile analyzes mitigation policies including Future Land Use, Environmental Efforts, Stormwater Management, and Building Practices all identified through the city's Comprehensive Plan and Land Development Code.

Future Land Use

An analysis of the Future Land Use Map by Flood Zone (non-submerged acres) for the City of Winter Springs is aggregated below. This analysis reflects the hazards that come with planning for growth in flood prone areas.

Table 6. 0.2 Percent Annual Chance Flood Hazard* by Future Land Use (FLU), 2014

Winter Springs Future Land Use	Percentage of Acres, %
0.2 Pct Annual Chance Flood Hazard*	**1.76**
Low Density Residential	39.96
Conservation	14.64
Rural Residential	8.26
Medium Density Residential	8.15
Recreation	5.87
Town Center District	5.62
Public/ Semi- Public	4.95
Greenway Interchange District	4.47
High Density Residential	2.54
Industrial	2.48
Mixed- Use	1.55
Commercial	1.51

*of the 100 Year Flood

Source: Seminole County GIS Dept.

In Winter Springs, 39.96% of the total percentage of acreage for the 0.2 Percent Annual Chance Hazard of the 100-year flood is planned for Low Density Residential. The second largest planned use is Conservation at 14.64%. The next largest future land use in this flood hazard area is Rural Residential at 8.26%. Medium Residential and Recreation comprise 8.15% and 5.87%. Town Center District, which is a variation of a mixed- use district, is 5.62% of the total make up.

Table 6. Flood Zone A by Future Land Use (FLU), 2014

Winter Springs Future Land Use	Percentage of Acres, %
Flood Zone A	**3.42**
Low Density Residential	30.58
Rural Residential	24.77
Recreation	20.22
Conservation	17.34
Medium Density Residential	2.98
Public/ Semi- Public	2.46
High Density Residential	1.65

Source: Seminole County GIS Dept.

Low Density Residential accounts for 30.58% of the total percentage of acreage in Flood Zone A. The next largest future planned use is Rural Residential at 24.77%. Recreation and Conservation account for 20.22% and 17.34%. Medium Density Residential comprises 2.98% and Public/Semi-Public is planned for 2.46% of the total percentage of acreage.

Table 7. Flood Zone AE by Future Land Use (FLU), 2014

Winter Springs Future Land Use	Percentage of Acres, %
Flood Zone AE	**11.78**
Conservation	52.32
Low Density Residential	16.79
Town Center District	6.88
Greenway Interchange District	6.71
Recreation	5.27
Medium Density Residential	3.33
Rural Residential	3.10
High Density Residential	1.47
Commercial	1.37
Industrial	1.14
Mixed- Use	0.85
Public/ Semi- Public	0.77

Source: Seminole County GIS Dept.

In Flood Zone AE Conservation is designated for 52.32% of the total percentage of acres of future land use. The next largest future is Low Density Residential at 16.79%. Town Center District and Greenway Interchange District comprise 6.88% and 6.71%. Recreation accounts for 5.27% of the total future use in this flood prone area.

Table 8. Flood Zone AH by Future Land Use (FLU), 2014

Winter Springs Future Land Use	Percentage of Acres, %
Flood Zone AH	**2.09**
Conservation	97.90
Medium Density Residential	1.57
Low Density Residential	0.37
Rural Residential	0.09

Source: Seminole County GIS Dept.

Conservation accounts for 97.90% of the total future land use in Flood Zone AH. Medium Density comprises 1.57%.

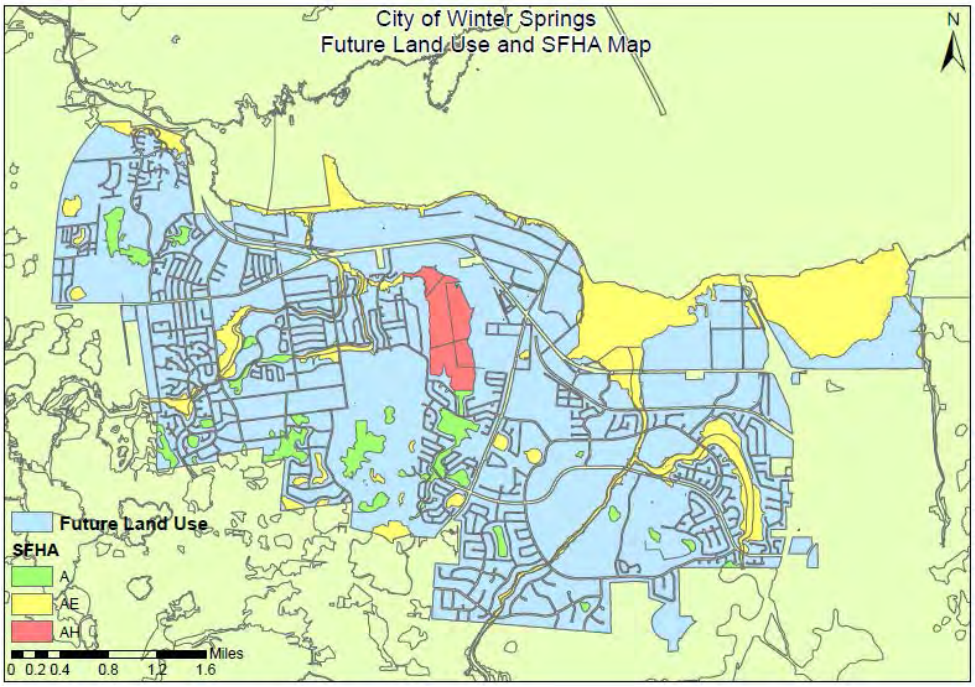
Table 9. Flood Zone X by Future Land Use (FLU), 2014

Winter Springs Future Land Use	Percentage of Acres, %
Flood Zone X	**80.91**
Low Density Residential	29.55
Medium Density Residential	12.78
Rural Residential	12.20
Public/ Semi- Public	7.34
Recreation	7.31
Town Center District	7.01
Conservation	6.35
Commercial	4.58
Greenway Interchange District	3.99
High Density Residential	3.69
Mixed- Use	2.74
Industrial	2.45

Source: Seminole County GIS Dept.

The largest future planned use in Flood Zone X is Low Density Residential at 29.55% of the total make- up. Medium Density Residential accounts for 12.78% and Rural Residential is 12.20%. Public/ Semi Public comprises 7.32% of the total make- up. Recreation accounts for 7.31% of the future planned use in this flood zone.

Figure 6. Future Land Use and Special Flood Hazard Areas (SFHA)



Environmental Efforts

Environmental policies are a means to which a municipality values its natural heritage. Best practices in Floodplain Management mitigation include preserving natural areas located in floodplains or directing open space/ recreation uses towards them.

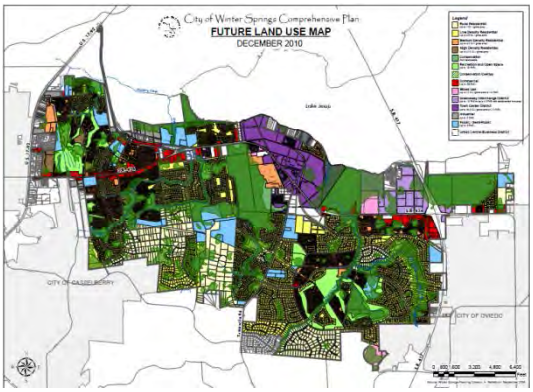
In recent years, development in areas of Lake Jesup, wetlands, and the 100-year flood plain have become much stricter. Figure 8 shows where these areas that is in the Conservation Overlay. Conservation Overlay in regards to the Future Land Use Map- 2030. Even thought this map exists, it does not prohibit development in these areas, rather point out sensitive areas. If these areas are deemed not sensitive, development may be allowed.

In Winter Springs, most of the wetlands are found near Lake Jesup. These wetlands are considered palustrine which consist of wet prairie, hydric hammocks and hardwood swamps, bayhead, and areas of cypress. These areas are being protected because they are in the floodzone and create a natural mitigation against floods.

Erosion and Sedimentation Control

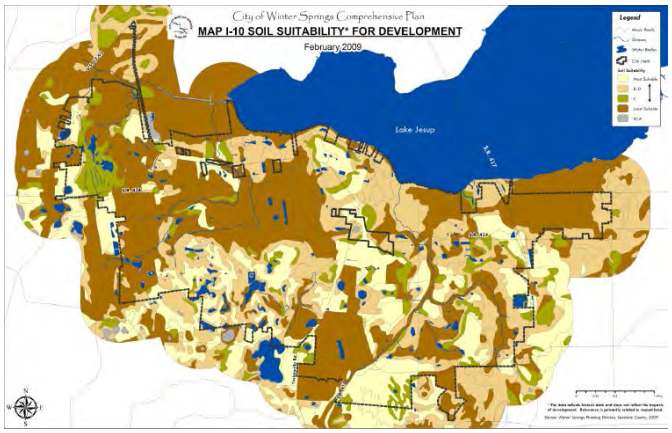
The city's comprehensive plan sets objectives to protect minerals, soils and vegetation. These policies protect bodies of water and wetlands from siltation. The regulations for water quality, erosion and sedimentation control for both the city and state regulatory agencies are enforced during the development review process and the implementation of the capital improvements, private new developments and re-developments.

Figure 7. Conservation Overlay



Conservation Overlay in Winter Springs.

Figure 8. Soil Suitability



Areas where soil is most suitable for development.

In Winter Springs, development is impacted by the type of soil present. This is determined by how well they drain and how much load they can bear. Figure 9 shows the areas where soil is approved for development by the Soil Conservation Service.

The two main soil types in Winter Springs are Urban Land-Tavares-Millhopper and Urban Land-Astatula-Apopka. Both of these soils are known for being well drained.

Stormwater Management

Stormwater management practices are an essential component in mitigating flood damage. Policies enacted at the municipal level are essential in controlling stormwater run- off to create minimal damage impact on property.

There are 86 stormwater retention ponds in Winter Springs.

In Winter Springs, there are many policies that help with stormwater management.

Policy 1.2.8 states that stormwater management codes in the Code of Ordinances must set the standards for onsite stormwater systems and ways to lessen the amount of untreated run- off into the city's lakes.

Policy 1.2.9 is the Stormwater Master Plan. This policy states development is not allowed unless it abides to the Stormwater Master Plan.

Policy 1.10.1 is the Public Utility System Land Requirements. This policy states that proposed development in relation to the existing utility and land needs systems must be adequate. Stormwater management falls in this category.

Figure 9. The Soils

On the left is the Urban Land-Tavares-Millhopper Soil and the right is the Urban Land-Astatula-Apopka Soil.

Building Practices

Building Practices are essential in mitigating flood damage to structures located in flood prone zones. There are different practices that help protect property and citizens.

Policy 1.2.7 requires all new construction or substantial improvement must fall into the standards of the National Flood Insurance Program.

The lowest floor of a structure must be eighteen inches above the Base Flood Elevation established in the 100- year plan.

The City Code of Ordinances states many codes that help prevent flood damage.

In 2011, Winter Springs adopted the 2010 Florida Building Codes Chapter 16.

The City's Building Department maintained a BCEGS Class 4/4 as of the 2012 certification review.

Goal 1: City's Floodplain Management Implementation Activities (Annual Basis)

Objective 1.1 – Continue to maintain the City's Community Rating System (CRS) Class 6

Objective 1.2 – Continue to provide accessible flood protection information and public outreach.

Objective 1.3 – Continue to preserve open space areas.

Objective 1.4 – Continue to enforce the flood management provisions.

Objective 1.5 – Continue to provide the inspection and maintenance of the drainage infrastructure and system.

Goal 2: Work in conjunction with the county, the cities and other local governments to create and support the floodplain management throughout the county

Objective 2.1- Participate in the countywide Floodplain Management Plan and associated Floodplain Management Team working group

Objective 2.2- Coordinate with the County and other local government agencies to develop and administer outreach programs by business, industry, institutions, and community groups.

Floodplain Management Plan Action Items Matrix 2015-2020

Action #	Description	Quarterly Review	1	2	3	4
		On Target				
		Ongoing				
		Complete				
		Not complete				
	Special Flood Hazard Ordinance					
1	The County staff should review all development ordinance language pertaining to development in the Special Flood Hazard Area (SFHA) that would require new/improved infrastructure to have hazard mitigation provisions. Ordinance Improvements					
	Responsible Agency	Seminole County Development Services				
	Deadline	June 1, 2020				
	Project Status					
	Notes					
	Open Space Preservation					
2	The County should use every opportunity to encourage preservation of floodplain areas as open space or other uses compatible with the flooding hazard to preserve floodplain storage capacity and reduce the potential for damage to structures.					
	Responsible Agency	Seminole County Development Services				
	Deadline	June 1, 2020				
	Project Status					
	Notes					
3	**Evaluate Increasing Higher Standards**					
	The County should continue to enforce its existing regulations for development and mobile homes and explore the cost and benefits of other higher standards to further protect the residents of Seminole County, such as a higher freeboard requirements.					
	Responsible Agency	Seminole County Development Services				
	Deadline	June 1, 2020				
	Project Status					
	Notes					

4	**Promote and Distribute Homeowner Property Evaluation Checklist**	
	Promote and distribute the Homeowners Property Evaluation Checklist. Vulnerable Populations, other languages, links on websites, during permit distribution, local media outlets, realtors,insurance agencies, banking institutions.	
	Responsible Agency	Seminole County Development Services and Office of Emergency Management
	Deadline	June 1 2020
	Project Status	
	Notes	
5	**Property Owners Checklist**	
	A property owner's checklist should be developed to evaluate a property's exposure to damage from floods. It should include a review of insurance coverage and identify where more information can be found on appropriate property protection measures. The checklist should be provided to each agency participating in this planning process and made available to the public. This checklist should also be applied to Seminole County's own properties. A priority should be placed on those critical facilities in the floodplain and whether public properties are adequately insured. Target Audiences: Businesses, Farm Lands, Rural Area	
	Responsible Agency	Seminole County Development Services and Office of Emergency Management
	Deadline	June 1 2020
	Project Status	
	Notes	
6	**Cost Sharing Programs**	
	Seminole County should evaluate potential cost sharing programs both public and private, such as grants, rebates, tax, insurance credits, to encourage low cost property protection measures on private property. For example: • Surface and subsurface drainage improvements, • Berms and regrading for shallow surface flooding, and • Relocating heating and air conditioning units above the base flood elevation • May offer free permit to citizens for flood mitigation measures	
	Responsible Agency	Seminole County Development Services
	Deadline	June 1, 2020
	Project Status	
	Notes	
7	**Funding Options**	

	The County should seek state and federal funding support for higher cost measures, such as elevation, relocation and acquisition of high priority properties. The Hazard Mitigation Grant Program, Flood Mitigation Assistance Program, Pre-Disaster Mitigation Program, should be investigated for all eligible properties. High priority properties are: • Those properties in repetitive loss areas. • Critical facilities in the special flood hazard area or subject to flood depths of more than two feet.	
	Responsible Agency	Seminole County Office of Emergency Management
	Deadline	June 1, 2020
	Project Status	
	Notes	
8	**Water Management Ordinance**	
	Seminole County should continue to enforce the floodplain management, wetland protection, erosion and sediment control and BMP provisions of all water management ordinances.	
	Responsible Agency	Seminole County Development Services and Seminole County Public Works
	Deadline	June 1, 2020
	Project Status	
	Notes	
9	**Emergency Operations Plan**	
	The Seminole County Emergency Operations Plan should be reviewed in detail on an annual basis to determine where updates and improvements can be made and how to maximize credit under CRS. The Plan should then be submitted periodically for credit under CRS, and CRS will provide a critique of the plan to show what further improvements are needed.	
	Responsible Agency	Seminole County Emergency Management
	Deadline	June 1, 2020
	Project Status	
	Notes	
10	**Gauge Funding**	
	The County should consider all possible local, state and federal funding options for installation of additional and/or improved lake, stream ,river gauges to provide a higher level of protection to its residents. The investigation of additional gauging stations should be done in cooperation with the National Weather Service, St. Johns River Water Management District, the United States Geological Survey and FEMA.	

	Responsible Agency	Seminole County Public Works and Office of Emergency Management
	Deadline	June 1, 2020
	Project Status	
	Notes	
11	**Review and Update Regional Evacuation Plan**	
	The County should ensure that all steps are being taken to alleviate traffic jams during an evacuation of the County. Hurricane warnings versus toxic fumes may require different routes to be used for evacuation. Based on current and future population projections, the County should ensure that there is adequate roadway to carry residents and evacuees to safety.	
	Responsible Agency	Seminole County Office of Emergency Management
	Deadline	June 1, 2020
	Project Status	
	Notes	
12	**Review and Update Post- Disaster Emergency Permitting**	
	The County's emergency preparedness, public information, and permits staffs should work together to formalize the post-disaster procedures for public information, reconstruction regulation and mitigation project identification. Those ideas should be expanded, further developed and adopted as a clear set of policies and procedures.	
	Responsible Agency	Seminole County Development Services
	Deadline	June 1, 2020
	Project Status	
	Notes	
13	**Continued On-Site Detention and Retention and Evaluation of County Maintenance of Facilities**	
	The County should continue to require developers to provide on-site detention and retention to lessen the volume and/or rate of runoff from developed sites. The County should evaluate the inspection and maintenance of these facilities to ensure that the designed storage is maintained and outfalls and piping remain in good condition.	
	Responsible Agency	Seminole County Development Services and Seminole County Public Works
	Deadline	June 1, 2020
	Project Status	
	Notes	
14	**Regional Detention**	

	The County should consider the benefits of upper watershed regional detention as a way to reduce downstream flow. This approach could be combined with the preservation of open space.	
	Responsible Agency	Seminole County Development Services
	Deadline	June 1, 2020
	Project Status	
	Notes	
15	**Mullet Lake Park Road Stormwater Project**	
	The County should encourage one approach of the Mullet Lake Park Road Stormwater Improvement Project for implementation to reduce flooding and avoid future repetitive loss properties. This project is already recognized on the Seminole County Capital Improvement Plan.	
	Responsible Agency	Seminole County Public Works
	Deadline	June 1, 2020
	Project Status	
	Notes	
16	**Outreach Projects for Flood Hazard Mitigation Benefits**	
	The public and decision makers should be informed about the flood hazard mitigation benefits of restoring rivers, wetlands and other natural areas. Restoration and protection techniques should be explained. This should include publicizing the need to protect lakes, streams, rivers and wetlands from illegal dumping and/or filling and inappropriate development. This campaign can be conducted through direct mail, website development, and/or neighborhood meetings.	
	Responsible Agency	Seminole County Public Works
	Deadline	June 1, 2020
	Project Status	
	Notes	
17	**Outreach Projects for Property Protection**	

	Public education materials should be developed to explain property protection measures that can help owners reduce their exposure to damage by floods and the various types of insurance that are available. Because properties in floodplains may be damaged at some point, a special effort should be made to provide information and advice to floodplain property owners. Special attention should be given to repetitive loss and high hazard areas. Explore local incentives for voluntary protection measures. This can be accomplished through the following techniques: • The County's website should be improved to make navigation to flood hazard and safety information more intuitive. • The County should increase its presence on social media, such as Facebook and Twitter, to maximize the number of people reached with flood hazard and safety information. • The County should continue to distribute brochures about hurricanes to those living in the mapped floodplain. • The County should continue to hold the Hurricane Expo and give away preparedness kits at the event. • Staff should reach out to homeowners' associations and faith-based organizations to help spread the word about flood hazards and protection and safety measures. • The County's website should have a dedicated mitigation page.	
	Responsible Agency	Seminole County Development Services and Seminole County Office of Emergency Management
	Deadline	June 1, 2020
	Project Status	
	Notes	

18	**Public Information Strategy**	
	The County should maintain a public information outreach program strategy for credit under the CRS and to prepare a program that evaluates the County's current outreach program in terms of what is currently working and what is not working.	
	Responsible Agency	Seminole County Community Information Division and Office of Emergency Management
	Deadline	June 1, 2020
	Project Status	
	Notes	

19	**Critical Facility Protection**	
	Identify critical facilities whose functionality may be impacted by flood hazards and develop mitigation measures for protection.	
	Responsible Agency	Seminole County Office of Emergency Management and Seminole County Development Services
	Deadline	June 1, 2020
	Project Status	
	Notes	

Meeting Date: March 15, 2016 From: Erin O'Donnell, City Clerk Approved: Franklin J. Martz, III, City Manager	***Official Use Only*** Commission Action: _____ City Manager: _____ Date: _____

SUBJECT: Reappointment of Commissioner Sarah Reece to Seminole County Community Service Block Grant Advisory Board

SUMMARY EXPLANATION & BACKGROUND:

Commissioner Reece currently serves on the Seminole County Community Service Block Grant Advisory Board. She has expressed interest in serving again and needs to be reappointed by the Commission every year.

FISCAL INFORMATION: N/A

RECOMMENDED ACTION: Approve the reappointment of Commissioner Sarah Reece to the Seminole County Community Service Block Grant Advisory Board.

Meeting Date: March 15, 2016

From: _____
Mark B. DeBord, Finance Director

Approved: _____
Franklin W. Martz, II, City Manager

Official Use Only

Commission Action: _____

City Manager: _____

Date: _____

SUBJECT: Orange Avenue and West Town Parkway Utility Extension, contract BVP14-156

SUMMARY EXPLANATION & BACKGROUND: Public Works is requesting to utilize Polk County's contract BVP14-156 with Killebrew, Inc. for utility services. This is to complete the utility extension of water and sewer services along Orange Avenue and West Town Parkway, which includes design and construction drawings, constructions of sewer and potable water mains, and the abandonment of existing wells on customers' properties. The project will cost $224,926.46.

FISCAL INFORMATION:
Fund: Water and Sewer Repair and Replacement
Dept/Div: Utilities
Activity/Element: City Utility System
Account Number: 40208100-563700-15030
Amount: $224,926.46

RECOMMENDED ACTION: Approve utilizing Polk County's contract with Killebrew, Inc. for the Orange Avenue and West Town Parkway utility extension in the amount of $224,926.46.

KILLEBREW, INC.

Construction & Engineering

Date: March 9, 2016

To: Karen McCullen

From: Ian Lund

Re: Orange Ave & West Town Parkway Utility Extension

The cost estimate for the engineering design and construction of the Orange Ave & West Town Parkway Utility Extension is $224,926.46. The completion time for design and permitting is 3 months from PO issuance with the construction to be completed 6 months after completion of the design and permitting.

The cost estimate is based on GIS and survey data provided by Karen McCullen and subsequent meetings with Karen McCullen and Chris Rader which outlined scope and intent. A brief outline is provided below of the proposed work.

- Design and permit complete construction drawings utilizing data provided by SES who is working under a separate contract with the City of Altamonte Springs.
- Construct the extension of an 8" PVC gravity sewer main and 6" PVC potable water main +/- 250'. Extension will included necessary appurtenances to provide both sanitary service and potable water service to the new customers. Work also includes the abandonment of existing wells on the customers property after connection to the new water main.
- Submission of clearance packages and project closeout.

Utility Department	City of Altamonte Springs	Killebrew Inc.
Karen McCullen, P.E.	Pat Bates, Mayor	Ian Lund, Senior PM
3/9/16		3/9/16
Date	Date	Date

Killebrew, Inc. • P.O. Box 6258, Lakeland, FL 33807 • tel: (863) 701-0273 • fax: (863) 701-0621
www.killebrewinc.net

BVP 14-156 Utilities Construction Services

BUDGET

PROJECT NAME: Orange Ave and West Town Pkwy Utility Extension **DATE:** December 9, 2015

Item #	M & P Item #	Technical Section No.	Description	Quantity	UOM	Unit Price	Extended Price
			Mobilization Reimbursement per Work Order Total				
3		N/A	$50,001 And Over	1	EA	$6,800.00	$6,800.00
			Audio-Video Records, Unit Price Includes Cost of Pre-Construction and Pot-Construction Record				
4		Spec II	Audio-Video Tape, (Per Foot of Pipeline) (Pre-construction)	1,500	LF	$0.45	$675.00
			Restoration, Includes Maintaining for 30 Days After Completion				
7		31.5	Sodding - Bahia	1,000	SY	$2.00	$2,000.00
8		31.5	Sodding - St. Augustine	500	SY	$3.50	$1,750.00
9		31.5	Water (1,000 gallons)	10	1,000 gal.	$50.00	$500.00
			Control and Abatement of Erosion and Water Pollution				
12		FDOT	Staked Silt Fence	700	LF	$2.00	$1,400.00
			Clearing and Grubbing				
13		31.2	Clear Right-of- Way and Haul Off and Dispose Offsite (truck measure)	400	CY	$45.00	$18,000.00
			Earthwork				
14		32.7	Excavation of Unsuitable Material - Haul Offsite and Dispose (truck measure)	108	CY	$25.00	$2,700.00
15		32.7	Borrow (truck measure)	108	CY	$25.00	$2,700.00
16		32.4	Pipe Bedding - Crushed Stone	66	CY	$50.00	$3,300.00
			Asphaltic Concrete Surface and Friction Courses				
17		31.5	1-1/2" Asphalt, Type S-III	50	SY	$37.00	$1,850.00
20		31.5	Limerock Base, 12" Thick	50	SY	$40.00	$2,000.00
21		32.9	Roadway Density Test	50	EA	$75.00	$3,750.00
22		32.9	Proctor	2	EA	$250.00	$500.00
24		31.5	Concrete, Miscellaneous, Reinforced (3,000 psi)	20	CY	$650.00	$13,000.00
27		FDOT	Remove and Dispose of Existing Asphalt and Concrete (truck measure)	150	CY	$40.00	$6,000.00
			Traffic Control Devices				
32		30.3,30.4	Barricade Type I or II, With Warning Light	200	ED	$1.50	$300.00
			PVC, C900 DR 18, for Water & Reclaimed Water Mains, 0' - 6' Depth				

BVP 14-156 Utilities Construction Services

BUDGET

PROJECT NAME: Orange Ave and West Town Pkwy Utility Extension **DATE:** December 9, 2015

Item #	M & P Item #	Technical Section No.	Description	Quantity	UOM	Unit Price	Extended Price
61		40, 60	6" C900 DR 18 PVC-BLUE	250	LF	$13.65	$3,412.50
			C153 Mechanical Joint Cement Lined Fittings or Flanged Without Accessories				
161		40, 55, 60	6" 45 Degree Bend	4	EA	$92.00	$368.00
162		40, 55, 60	6" 90 Degree Bend	2	EA	$105.00	$210.00
173		40, 55, 60	6" Long Solid Sleeve Coupling	2	EA	$96.00	$192.00
179		40, 55, 60	Miscellaneous C153 MJ Fittings Not Listed (Sold By The Pound)	200	LB	$7.00	$1,400.00
			Gate Valve and Box, Resilient Seated				
182		42, 55, 62	6" Gate Valve and Box	1	EA	$820.00	$820.00
			Directional Boring				
216		34	2" DR9 HDPE DIPS, Roadway Undercrossing	100	LF	$20.00	$2,000.00
			Gravity System Service Lateral Connection				
303		53	4" x 8" Inserta tee/ saddle	3	EA	$70.00	$210.00
			Water Main Blow Off Assembly				
353		PW106	2" Autoflush Blowoff Assembly	1	EA	$3,800.00	$3,800.00
			Fire Hydrant Assembly				
354		42.6	Fire Hydrant Assembly	1	EA	$4,766.00	$4,766.00
			Restrained Joint Devices, Bell Restraint, for Ductile Iron Pipe or PVC				
356		35, 3, 35.4	Meg-a-Lug Series 1100 or Equal, Bell Restraint, 6"	20	EA	$140.00	$2,800.00
			Restrained Joint Devices, Fitting Restraint, for Ductile Iron Pipe or PVC				
367		35, 3, 35.4	Meg-a-Lug Series 1100 or Equal, Fitting Restraint, 6"	25	EA	$148.00	$3,700.00
			Cast-in-Place Thrust Block				
377			Cast-in-Place Thrust Block	2	CY	$150.00	$300.00
			Tapping Sleeve and Valve and Line Stops				
379		36.2	Tapping Sleeve and Valve 6" x 6"	1	EA	$3,200.00	$3,200.00

BVP 14-156 Utilities Construction Services

BUDGET

PROJECT NAME: Orange Ave and West Town Pkwy Utility Extension **DATE:** December 9, 2015

Item #	M & P Item #	Technical Section No.	Description	Quantity	UOM	Unit Price	Extended Price
			Initial Repair Excavation, for the First 20-Feet of Excavation at the Following Pipe Depths				
407		40, 50, 60	Over 6' - up to 8' Depth	1	EA	$2,100.00	$2,100.00
408		40, 50, 60	Over 8' - up to 10' Depth	1	EA	$2,531.00	$2,531.00
413		40, 50, 60	Over 18' - up to 20' Depth	1	EA	$4,500.00	$4,500.00
			Additonal Repair Excavation, per Foot in Excess of 20-Feet at the Following Pipe Depths (to be paid for under separate pay items)				
415		40, 50, 60	Over 6' - up to 8' Depth	380	LF	$45.00	$17,100.00
416		40, 50, 60	Over 8' - up to 10' Oepth	100	LF	$59.00	$5,900.00
417		40, 50, 60	Over 10' - up to 12' Depth	50	LF	$60.00	$3,000.00
			Dewatering				
422		32.6	Well Point Pump Initial Set Up	1	EA	$25.00	$25.00
424		32.6	Well Point Header System Initial Set Up (251' - 500')	500	LF	$11.00	$5,500.00
426		32.6	Well Point Pump Operation and Maintenance	40	ED	$880.00	$35,200.00
428		32.6	Well Point Header System Operation and Maintenance (251'-500')	500	LF-ED	$1.50	$750.00
			By-Pass Pumping of Sewers, Equipment Set Up (back-up pumps are paid for separately as additional pumps)				
430		Spec II	By-Pass Pump 4" Discharge	1	EA	$50.00	$50.00
434		Spec II	Add on for "Quite Zone" Pump 4" & 6" Discharge	1	EA	$10.00	$10.00
			By-Pass Pumping of Sewers, Equipment Operation (back-up pumps are paid for separately as additional pumps)				
436		Spec III	By-Pass Pump 4" Discharge	5	ED	$500.00	$2,500.00
440		Spec III	Add on for "Quite Zone" Pump 4" & 6" Discharge	5	ED	$90.00	$450.00
			By-Pass Discharge Piping				
442		Spec III	4" Discharge Pipe w / Fittings	50	LF-ED	$3.00	$150.00
			Sewer Plugs				
446		N/A	Up to 8" Plug	1	EA	$30.00	$30.00
			Gravity Sewer Pipe				

BVP 14-156 Utilities Construction Services

BUDGET

PROJECT NAME: Orange Ave and West Town Pkwy Utility Extension **DATE:** December 9, 2015

Item #	M & P Item #	Technical Section No.	Description	Quantity	UOM	Unit Price	Extended Price
450		50 to 54	4" SDR 26 PVC Service Pipe	300	LF	$2.00	$600.00
452		50 to 54	8" SDR 26 PVC Service Pipe	250	LF	$10.00	$2,500.00
			Gravity Sewer Pipe Fittings				
460		50 to 54	8" x 6" SDR 26 PVC Wye	3	EA	$100.00	$300.00
465		50 to 54	6" Clean Out Assembly	3	EA	$175.00	$525.00
			Manhole Drop Connection - Outside				
483		52	8" Main, 2' - Up to 4' (vertical) Drop	1	EA	$600.00	$600.00
			Install New Pre-cast Manhole Including Ring, Cover and Associated Appurtenances				
496		52	4' Diameter Manhole Up to 6'	1	EA	$1,435.00	$1,435.00
497		52	4' Diameter Manhole Over 6' - Up to 8' Depth	1	EA	$1,627.00	$1,627.00
			Pipeline "Pigging"				
512		38	Clean New Pipeline With a "Pig", 4" - 8" Diameter Pipeline	250	LF	$2.25	$562.50
			Pipeline Pressure Testing				
516		37	Pipeline Pressure Testing Up To 8" Pipeline	250	LF	$1.00	$250.00
			Pipeline Chlorination / Sterilization in Accordance With PCHD Regulation				
520		37	Chlorinating up to 8" Pipeline	250	LF	$0.30	$75.00
			Vacuum and CCTV Truck Service				
524		52.6	Jet and Vacuum Truck Service	20	PH	$225.00	$4,500.00
525		52.6	CCTV Truck Service	10	PH	$175.00	$1,750.00
			Water Services				
527		40.6	6" x 2" Saddle, 2" Corporation Cock and 2" Curb Stop Assembly	4	EA	$576.00	$2,304.00
536		40.6	2" Blue PE Tubing, Installation	150	LF	$7.00	$1,050.00
540		40.6	2" x 3/4" Meter Connection - Single Service Line and Meter Box	4	EA	$488.00	$1,952.00
			Final Record Documents (4 originals signed and sealed by RSM) **Locations to be in Accordance with State Plane Coordinate System**				
544		30.18	Surveyor (Include Construction Layout)	60	HR	$135.00	$8,100.00

BVP 14-156 Utilities Construction Services

BUDGET

PROJECT NAME: Orange Ave and West Town Pkwy Utility Extension **DATE:** December 9, 2015

Item #	M & P Item #	Technical Section No.	Description	Quantity	UOM	Unit Price	Extended Price
			Out of Scope				
Out of Scope			Abandon Wells	2	EA	$5,000.00	$10,000.00
Out of Scope			Fencing	1	LS	$7,500.00	$7,500.00
Out of Scope			Irrigation Repair	1	LS	$1,500.00	$1,500.00
Out of Scope			Electrical Repair	1	LS	$11,000.00	$11.00
545		N/A	Public Construction Bond in the amount of $500,000	1	EA	$3,585.46	$3,585.46
						GRAND TOTAL:	$224,926.46