

To: The Honorable Mayor and City Council

From: Jefferson Geimer, Capital Project Manager



Date: November 25, 2014

RE: **A Resolution of the Mayor and City Council of the City of North Miami, Florida, adopting the updated City of North Miami Floodplain Management Plan and extending the existence of the Floodplain Management Planning Committee for the purpose of conducting annual reviews of the Floodplain Management Plan; providing for an effective date and all other purposes.**

RECOMMENDATION

The Mayor and City Council adopt the attached resolution accepting the updated Plan and extending the existence of the Floodplain Management Planning Committee.

BACKGROUND

The original Floodplain Management Plan was prepared in 1999 with input from the Floodplain Management Planning Committee, staff, and outside agencies. The final document was presented at two public meetings and adopted by Council in February 2000. The Plan is one of the requirements for participation in the National Flood Insurance Programs (NFIP) Community Rating System (CRS) program. By participating in the program, City property owners are eligible for discounts on their flood insurance premiums. The City currently maintains a CRS rating of 5 (on a scale of 1 to 10), which ranks in the top 3% nationally. This rating correlates to a 25% discount for properties within the floodplain and a 10% discount for all other properties.

One of the stipulations for communities to maintain their CRS class rating is they must update their Floodplain Management Plan every five years. The last update was approved by Council on December 8, 2009. In order to comply with this requirement, staff and the Floodplain Management Planning Committee undertook the task of reviewing and updating the document. On November 5, 2014, the Floodplain Management Planning Committee unanimously accepted the plan and recommends adoption to the City Council.



776 N.E. 125 Street, North Miami, Florida 33161

Council Report

ADDITIONAL INFORMATION

Once adopted, the document will be forwarded to the Federal Emergency Management Agency for review and acceptance.

ATTACHMENTS

Proposed Resolution
Floodplain Management Plan (w/o Appendix)

RESOLUTION NO. _____

A RESOLUTION OF THE MAYOR AND CITY COUNCIL OF THE CITY OF NORTH MIAMI, FLORIDA, ADOPTING THE UPDATED CITY OF NORTH MIAMI FLOODPLAIN MANAGEMENT PLAN, IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE FLOODPLAIN MANAGEMENT PLANNING COMMITTEE ANNUAL REVIEW OF THE FLOODPLAIN MANAGEMENT PLAN; PROVIDING FOR AN EFFECTIVE DATE AND FOR ALL OTHER PURPOSES.

WHEREAS, on April 27, 1999, the Mayor and City Council of the City of North Miami ("City") passed and adopted Resolution Number R-99-28, establishing the Floodplain Management Planning Committee ("Committee"); and

WHEREAS, the duty and function of the Committee is to conduct annual reviews of the City Floodplain Management Plan ("Management Plan"), and to recommend to the Mayor and City Council updates to the Management Plan every five (5) years; and

WHEREAS, in addition to creating the Committee, Resolution Number R-99-28 contained a sunset provision terminating the Committee upon adoption of the Management Plan, unless the Committee's term was concurrently extended by the Mayor and City Council; and

WHEREAS, the Management Plan is one of the requirements for the City's participation in the National Flood Insurance Program and the Community Rating System Program ("Programs"); and

WHEREAS, by participating in these Programs, City property owners become eligible for discounts on their annual flood insurance coverage premiums; and

WHEREAS, in order for the City to reap the benefits of the Program, the Management Plan is required to be updated by the Mayor and City Council every five (5) years; and

WHEREAS, on December, 8, 2009, the Mayor and City Council passed Resolution Number R-2009-164, adopting the Management Plan in accordance with Committee recommendations, and also extended the existence of the Committee for the purpose of conducting annual reviews of the Management Plan; and

WHEREAS, on November 5, 2014, the Committee unanimously accepted an updated Management Plan in response to the requirements of maintaining the Program class rating; and

WHEREAS, the Committee respectfully recommends to the Mayor and City Council adoption of the updated Management Plan, in the best interest of the City.

NOW THEREFORE, BE IT DULY RESOLVED BY THE MAYOR AND CITY COUNCIL OF THE CITY OF NORTH MIAMI, FLORIDA:

Section 1. Adoption of Floodplain Management Plan. The updated Floodplain Management Plan prepared and presented by the Floodplain Management Planning Committee is hereby adopted by the Mayor and City Council, and the City administration is directed to implement the recommendations and programs of the Floodplain Management Plan, attached hereto as Exhibit "1".

Section 2. Continuation of Committee. The Floodplain Management Planning Committee shall continue to provide annual reviews of the Floodplain Management Plan, in order to recommend revisions to the Floodplain Management Plan. The Committee shall meet at least once annually for this purpose.

Section 3. Effective Date. This Resolution shall become effective immediately upon adoption.

PASSED AND ADOPTED by a _____ vote of the Mayor and City Council of the City of North Miami, Florida, this _____ day of November, 2014.

DR. SMITH JOSEPH
MAYOR

ATTEST:

MICHAEL A. ETIENNE, ESQ.
CITY CLERK

APPROVED AS TO FORM
AND LEGAL SUFFICIENCY:

REGINE M. MONESTIME
CITY ATTORNEY

SPONSORED BY: CITY ADMINISTRATION

Moved by: _____

Seconded by: _____

Vote:

Mayor Dr. Smith Joseph

Vice Mayor Philippe Bien-Aime

Councilperson Scott Galvin

Councilperson Carol Keys, Esq.

Councilperson Marie Erlande Steril

_____ (Yes) _____ (No)

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INTRODUCTION

The City of North Miami participates in the National Flood Insurance Program (NFIP) which enables property owners to purchase federally backed flood insurance to protect their homes and real estate assets against flood losses. The NFIP Community Rating System (CRS) is a program where the residents receive a discount on flood insurance commensurate with the community's willingness to undertake additional measures to reduce the likelihood of flooding. The CRS awards predetermined points for participation and implementation of 18 possible floodplain management and public information activities. Depending on a community's level of participation, the CRS will assign a rate class ranging from 1 to 10.

When North Miami's original Floodplain Management Plan was prepared in February 2000, the City had a class 7 rating, which corresponded to a 15% discount on flood insurance premiums for properties within the floodplain and a 5% discount on premiums for properties outside the floodplain. As of October 2014, North Miami ranks in the top 3% of all communities participating in the NFIP with a class rating of 5; this corresponds to a 25% discount on flood insurance premiums for properties within the floodplain and a 10% discount on premiums for properties outside the floodplain.

The floodplain management process associated with the development of a Floodplain Management Plan allows the City to improve the quality of life for all the residents and businesses located within our boundaries. The City Council has requested the Floodplain Management Planning Committee (FMPC) continue studying and evaluating a varied number of possible activities and ultimately evaluate their effectiveness and feasibility toward managing the floodplain and reducing future flood losses. Through the development of this plan, the City has been able to organize and better understand the singular activities implemented in recent years, as well as various studies and agreements with neighboring communities under one umbrella – The Floodplain Management Plan.

North Miami's History

North Miami can be traced back one hundred years to a settlement called Arch Creek. Arch Creek was a flourishing rural town where crops such as tomatoes, beans and pineapples grew abundantly. The City of North Miami was established in the early 1900's as a small farming area named Arch Creek after the river which runs through the basin. Historical sites such as the Arch Creek Natural Bridge link North Miami to its interesting past. Visitors arriving at the Arch Creek train station discovered a one-room school, a church, a narrow Main Street and 18 homes. The roaring '20s brought new challenges to the community as developers began pouring money into the area. Construction in South Florida was so brisk that the lack of construction workers and building materials were the only obstacles for developers.

On February 5, 1926, in the middle of the boom, Arch Creek was incorporated as the "Town of Miami Shores" which included the surrounding coastal area. Just as things seemed to be coming together for the newly established community, "The Great Miami Hurricane" of 1926 hit the area. Flooding and destruction was everywhere. Many of the surrounding beach areas had to secede from the Town in order to rebuild following the devastation. This hurricane was a big turning point for Dade County as development came to a screeching halt, and the economic decline associated with the great depression started three years early.

In 1930, the Town officially changed its name to North Miami. By 1947, the Town was once again growing rapidly with a population of about 5,000. Mother Nature had other plans, demonstrating her fury with two hurricanes within a month of each other and causing the worst flooding South Florida has ever seen. This even prompted a new drainage initiative known as the Central and Southern Florida Flood Control Project to improve

the canal drainage system and prevent widespread flooding; this is now managed by the South Florida Water Management District.

Over the next fifty years, North Miami's population has exploded to more than 60,000 residents that reside in over 22,000 housing units. This once small agricultural community has grown into a well-rounded city with a large residential community, four bustling business districts, an extensive park system and many public services. Newcomers today find nearly 20 houses of worship, public schools from elementary to university level, plentiful shopping and easy access to other parts of the region and the world.

CHAPTER 1 – PLAN ORGANIZATION

Flood Management Planning Committee

On April 27, 1999, the North Miami City Council adopted Resolution 99-28 (see Appendix A), which established the Floodplain Management Planning Committee. The Committee's duties included the development and recommendation of the City's original Floodplain Management Plan. Upon completion of the original plan, the Committee remained together to make recommendations on ways to enhance life within the floodplain. The Committee played a major role in the creation of the updated plan that will be presented to the public and City Council for final approval.

Tanya Wilson-Sejour, Manager of the City's Community Planning and Development Department, leads the Floodplain Management Planning Committee. Her knowledge of the City's plans and goals were utilized to prepare an updated plan that is consistent with the future of North Miami.

The Committee consists of:

- Tanya Wilson-Sejour – Manager of Community Planning and Development for the City of North Miami
- Jeff Geimer, CFM – Capital Project Manager for the City of North Miami
- Aleem Ghany, PE & CFM – City Manager for the City of North Miami
- Wisler Pierre-Louis, PE – Director of Public Works for the City of North Miami
- Carol Frances Keys, Esq. – North Miami Chamber of Commerce representative and floodplain resident
- Dr. James Tracton – Keystone Point Homeowners representative and floodplain resident

Staff and Other Resources

Corzo, Castella, Carballo, Thompson & Salman, P.A. (C3TS) was contracted as the City's engineering consultant to prepare the City's original Floodplain Management Plan and document the Committee's planning process. C3TS was also responsible for offering recommendations to assist the Committee in preparing a Floodplain Management Plan that encompasses a total solution to the City's flood prevention programs.

Jeff Geimer has served as the City's staff liaison to the Committee and has been the Floodplain Coordinator for the last twelve years; he has played an instrumental role in the organizational and planning efforts behind this document. Other City staff resources that are made available to the Committee on a regular basis include:

- George Balaban, PE, City Engineer for the City of North Miami;
- John Jackson, PE & CFM, Building Official for the City of North Miami; and
- Nixon Lebrun, CFM, Zoning Administrator for the City of North Miami.

The City also contracted Post, Buckley, Schuh & Jernigan, Inc. to develop Phase 2 of North Miami's Stormwater Master Plan. Phase 2 of the Plan analyzed the existing stormwater system and offered possible solutions to historic flooding within the City. Since the Plan was completed in 2000, millions of dollars worth of stormwater infrastructure improvements have been made.

City staff also works closely with staff from Miami-Dade County on floodplain management issues. This relationship has created a win-win situation for both parties as the sharing of resources has allowed both communities to accumulate enough CRS points to become NFIP class 5 communities.

Finally, the City along with five neighboring municipalities participated in the development of our original Local Mitigation Strategy. ICF Kaiser prepared the Strategy for our consortium and presented the completed document in 1999. The study identified specific goals for each municipality to reduce the escalating cost associated with recovery and rebuilding after a disaster. The City continues to update its Local Mitigation Strategy annually; a copy of the 2009 Strategy is included in the document (Appendix N). Additionally, Miami-Dade County hosts quarterly Local Mitigation Strategy meetings and updates the countywide Local Mitigation Strategy annually. This Local Mitigation Strategy contains information for the County as well as all of its municipalities.

Meetings

For preparation of the original Floodplain Management Plan, the Committee held a number of meetings between May 1998 and February 2000 when the City Council reviewed and approved the plan. During the planning process, a total of six committee meetings/work sessions (see appendix B) were held to review possible activities and prepare an action plan. Representatives from various agencies, including Miami-Dade County Department of Environmental Resources Management (DERM) and South Florida Water Management District (SFWMD) attended the meetings to offer expertise and insight on drainage systems and flooding.

All of the committee meetings were posted and open to the public. Two advertised Public Hearings were held allowing the residents of North Miami a chance to discuss and critique the plan. The first Public Hearing was held October 21, 1999 following the development of the draft Floodplain Management Plan. Additionally, this draft was disseminated to approximately 25 outside agencies for review and comments, with written comments received from National Marine Fisheries (see Appendix C). Oral comments were offered from several agencies including Linda Bell, Florida Department of Community Affairs; David Stroud, ISO/CRS Specialist; and David Clukie, ISO/CRS Specialist. The final public hearing was held on February 22, 2000, in conjunction with the City Council meeting where the Plan was officially adopted.

Since adoption of the original plan, the Floodplain Management Planning Committee has continued to meet on a regular basis to assess the progress of the Plan's implementation as well as recommend changes and improvements as necessary for the Floodplain Management Plans success. This review process is outlined in the annual OPS outreach strategy developed for the National Flood Insurance Program Community Rating System – Activity 330 (see Appendix Q). The Committee also regularly reviews the City Flood Ordinance and makes recommendations for modification to the City Council as needed.

The updated version of the Floodplain Management Plan was once again developed in a public setting. The updated plan was presented to the Floodplain Management Planning Committee during their September 24, 2014 meeting. This meeting was publically advertised and provided an opportunity for committee members, staff, and the public to provide input on the plan. Draft versions of the updated Floodplain Management Plan were mailed to Miami-Dade County Department of Regulatory and Economic Resources (RER) and Office of Emergency Management (OEM) as well as the Floodplain Coordinators for 20 South Florida municipalities for review and comments. The Committee held a public meeting on November 5, 2014 to discuss the draft Floodplain Management Plan. The Plan was presented and adopted at the November 25, 2014 Council meeting.

It is important to remember that proper floodplain management is an ongoing activity and the Floodplain Management Plan needs to be updated and improved as projects are completed and the City's circumstances change. The members of the Floodplain Management Planning Committee are best suited to ensure the implementation of the recommended activities. Through the planning process, they have become acutely aware of the hazards that threaten the city and the projects that can reduce the impact of future flood damage. They know the importance of the measures in protecting lives and properties of the residents of North Miami and will therefore make sure that these activities are implemented.

CHAPTER 2 – PUBLIC INVOLVEMENT

A major component of the Floodplain Management Plan planning process is public involvement. The long-term effectiveness of the Plan hinges upon accurate assessment of preventing problems and full participation from the constituent public. Most stormwater improvements or mitigation projects will directly affect the quality of life for the residents of North Miami. Their concerns and past experiences are crucial in developing a relevant and viable Plan. Public support for the projects in the Plan is essential for final approval and eventual accomplishment.

When the original Floodplain Management Plan was created, a number of public meetings were held to receive input on what should be included in the Plan and for comments on the Plan prior to its adoption. When the Plan was updated in 2004, the same procedures were followed. On November 16, 2004, December 16, 2004 and January 13, 2005 the Floodplain Management Planning Committee held meetings and provided an opportunity for the public to provide input on the Plan. When the Plan went before the City Council on January 25, 2005, the public was provided one last opportunity for comments before the updated Plan was adopted.

Since the forum for public input worked so well in 2004, we decided to follow the same process for the 2009 update. The Floodplain Management Planning Committee held meetings on October 22, 2009 and November 19, 2009 and solicited input on the Plan from the public. The Plan was taken to the City council on December 8, 2009 and the public was provided another opportunity for comments before the updated Plan was adopted.

Prior to creation of the original Floodplain Management Plan, the City established the Floodplain Management Planning Committee. This group provided a vital link to the community because representatives were chosen from organizations that reside in the floodplain. The following organizations assigned representatives to participate in the planning process:

- Central Homeowners Association
- Greater North Miami Chamber of Commerce
- Keystone Point Homeowners Association

Two of the three representatives that volunteered for this Committee when it was created (Councilwoman Carol Frances Keys, Esq. and Dr. James Tracton) have remained on the Committee through the creation of this updated Plan. In order to assure that the affected public was well represented during the planning process, three members of the Committee reside within the floodplain. Public participation during the planning process has helped underline the importance of this plan and ensure that the concerns of affected property owners are identified.

The City of North Miami has created a public outreach strategy, through the Floodplain Management Planning Committee, that establishes a plan to implement activities focused on educating the public (see Appendix Q). The City utilizes numerous resources to inform as many residents as possible about the hazards of local flooding. One of the methods used to educate the public is the City's Flood Hazard Information brochure (see Appendix D), which covers many topics related to floodplain management including an explanation of flood insurance. This brochure is sent to all City residents on an annual basis through direct mail.

In addition to this brochure, the City has sent a questionnaire to all residents and businesses within the floodplain requesting information on their experiences in the area. Utilizing our "local historians" to gather information on past flood experiences and recommendations for possible solutions, provided us with some pertinent historical information on the area (see Appendix E).

The City utilizes a varied public information system in order to disseminate flood hazard information to as many residents as possible. In addition to the Flood Protection brochure and the questionnaire, the City uses:

- The North Miami INFO – Automated Computer Information System (ACIS) is the City’s telephone information hotline, which offers information on flood insurance, flooding and emergency procedures.
- The City has a specified section in the public library for information on flooding, hurricanes and other related topics so that the public can have easy access to this information.
- Public Works staff currently visits our local elementary schools annually to teach children at an early age about the importance of preserving and managing their environment.
- The City utilizes its website to post relevant information on flooding and other natural disasters.

CHAPTER 3 – COORDINATION WITH OTHER AGENCIES

Coordination with other agencies was crucial for preparation of the original plan for several reasons. Local municipalities surrounding North Miami face similar problems and concerns including emergency preparation and mitigation for hurricanes, tornadoes and floods. Other State, regional and local organizations have agreements or regulations which impact North Miami's stormwater system. These contacts have been maintained over the last several years and information on possible activities that may impact the surrounding stormwater system is exchanged on a regular basis.

Several agencies were included in the planning process of the original Floodplain Management Plan. All of the agencies were contacted for input on the initial plan and received a copy of the draft Plan prior to its approval for review and comment. The included agencies were:

- City of North Miami
 - Community Planning and Development Department,
 - Police Department
 - Public Works Department
- Miami-Dade County Department of Regulatory and Economic Resources (formerly DERM)
- South Florida Water Management District (SFWMD)
- Miami-Dade County Office of Emergency Management
- South Florida Regional Planning Council
- U.S. Army Corps of Engineers (USACE)
- US Fish and Wildlife Service
- National Marine Fisheries Service
- National Weather Service
- Federal Emergency Management Agency (FEMA)
- Miami-Dade Fire Rescue Department
- Miami-Dade Public Works Department
- Surrounding Municipalities
 - City of Bay Harbor Islands
 - City of North Miami Beach
 - Village of Biscayne Park
- Insurance Service Organization (ISO)

City staff worked directly with representatives of Miami-Dade County and several other South Florida municipalities while creating the updated Floodplain Management Plan. Being located within Miami-Dade County, who is also a class 5 community, allows us the luxury of exchanging information with peers that have experienced similar conditions/challenges in the enhancement of the local stormwater system. A draft version of the updated Floodplain Management Plan was sent to Miami-Dade County (RER and OEM) for review and comments (see Appendix C). This resource was very beneficial when it came time to finalize the action plan.

Several canals within the City serve as outfall points for drainage basins within the floodplain. Some are owned and maintained by Miami-Dade County, but most of these canals and salinity control structures are owned and maintained by the South Florida Water Management District. The water levels within these canals are controlled by the District and are influenced by many variables, including the dry/wet season, antecedent rain (ground/soil conditions), and expected weather conditions. The City works directly with the District when necessary.

CHAPTER 4 – HAZARD ASSESSMENT

Climate

South Florida has a subtropical climate with heavy precipitation, mild to hot temperatures and high humidity. The average annual precipitation of North Miami is over sixty inches.

Temperatures in Miami-Dade County typically range from the 60s and 70s in the winter to 80s and 90s in the summer. The average high temperature for Miami-Dade County is 82 degrees and the average low temperature is 71 degrees. The abundance of water and high heat causes extremely high humidity throughout most of the year making the hot days feel muggy. The high humidity during the summer months contributes to the development of afternoon thunderstorms, which are a common occurrence.

After Hydrology

The City of North Miami is located in eastern Miami-Dade County, Florida, bordering Biscayne Bay (see Appendix G – City Map). North Miami is somewhat buffered from the Atlantic Ocean by offshore barrier islands. The terrain is very flat and low-lying with elevations ranging from eight to thirteen feet above sea level. There are four waterways within North Miami: Arch Creek North, Biscayne Canal, Little Arch Creek and Oleta River. The City's stormwater collection system discharges through outfalls to these canals that convey flood waters into Biscayne Bay.

The South Florida Water Management District operates a system of levees, canals and water control structures (including salinity structures) in order to reduce flooding during heavy storms and hurricanes, and provide a barrier against salt-water intrusion. The District must keep a delicate balance since the water level within these canals influences the Biscayne Aquifer, which is Miami-Dade County's source of drinking water. This task becomes even more difficult due to the extreme climate conditions experienced throughout South Florida: hurricanes, floods and droughts.

North Miami is divided into three sections with distinct drainage characteristics (see Appendix G – City Map).

The area west of the Biscayne Canal has elevations that range from ten to thirteen feet above sea level and is composed primarily of sand and limestone. The relatively high elevation and good percolation in this area produces good drainage conditions.

The area east of the Biscayne Canal to U.S. Highway 1 (US-1), which is comprised of the Biscayne Canal East, Arch Creek North and Arch Creek South drainage basins, is a low-lying area consisting of sand, marl, mucky soils and limestone rock. The drainage in this area can be difficult due to prior percolation, low elevations and a seasonally high water table. This area includes the majority of flood prone areas within the City.

The area east of US-1, which borders Biscayne Bay on the east, consists of the San Souci and Keystone residential areas, Florida International University, Oleta State Park, and a mangrove preserve. The residential community in this area is a canal development with few drainage problems due to numerous outfalls and proximity to the water. The other areas mentioned are approximately 90% open space, thereby reducing the possibility of flooding. The main hazard in this area is storm surge and tidal flooding.

Hazards

The South Florida area in general is prone to extreme and diverse weather conditions. The area has a long history of devastating hurricanes, heavy rainstorms (floods) and tornadoes, as well as drought conditions. The hazards in this area can, and have, caused great property damage and loss of life.

Hurricane and Flood History

South Florida has experienced its share of devastating weather events. Since 1900, 339 tropical or subtropical cyclones (this includes tropical storms and hurricanes) have reached Florida. This amazing number really stresses the extreme hazards that confront Florida.

To accurately assess the hazards, South Florida's past experiences with hurricanes and floods must be reviewed. The following is a summary of the storms that greatly affected Miami-Dade County:

- 1888 – Hurricane hits Miami and is categorized as the “Great” hurricane. Storm surge was reported at more than fourteen feet. Widespread damage was reported, however, Miami was a small community at the time and losses were limited.
- October 11, 1909 – One of the strongest hurricanes ever recorded hit the upper Florida Keys. Eight to ten inches of precipitation was reported in South Florida.
- Sept 18-21, 1926 – When the “Great Miami Hurricane” struck, Dade County was almost completely destroyed. The Town of Miami Shores (later North Miami) and its surrounding areas were devastated; buildings were demolished and the City experienced widespread flooding. The extreme hardships caused by this hurricane preceded the “Great Depression” by three years in Dade County, thereby halting the economic boom of the 1920s. Winds were recorded up to 132 mph and storm surge was estimated at twelve to fifteen feet. There was virtually no warning before the storm came ashore.
- November 4, 1935 – The “Yankee Hurricane” caused damages that were assessed at \$5.5 million dollars. The storm did not have extremely high winds (about 75 mph), but the relentless pounding of the waves (storm surge over six feet) punished coastal areas with severe damage to beaches, docks, marinas and low lying structures.
- September 15-16, 1945 – This was the strongest hurricane to hit Miami since 1926. Flooding of up to ten and a half feet was reported. Two weeks earlier, a tropical storm passed through the area saturating the ground. Wind gusts reached 196 mph. Economic losses in Florida approached \$60 million dollars.
- September 17, 1947 – Hurricane “George” was a Category 4 hurricane with winds of 121 mph. This large, slow-moving storm caused extreme flooding in Dade County. The hurricane made landfall in Fort Lauderdale, but flooding stretched as far south as Homestead, which was said “to resemble Venice, Italy”. At the time, City of Miami Mayor Richard Danner reported that “two hundred miles of streets were a total loss”.
- October 11-12, 1947 – Though not particularly powerful, Hurricane “King” was a wet hurricane that caused widespread floods and damages. In Hialeah, just west of North Miami, an average of 6-inches of rain fell every seventy-five minutes, with water reaching waist deep levels. More than 2,000 people throughout Dade County were left homeless. Travel in Dade was limited to small boats. This was the biggest flooding event ever seen in South Florida proving that the existing drainage system was not adequate. “Ultimately the

flooding prompted the construction of long levees to protect the region and the later development of the South Florida Water Management District.”

- October 5, 1948 – This hurricane caused widespread flooding through the area. Hialeah and Miami Springs were reportedly under three and a half feet of water. Rainfall near the airport exceeded nine and a half inches.
- October 17-18, 1950 – Another hurricane named “King” was small, but ferocious. Wind gusts up to 150 mph were reported. The hurricane was described as tornado-like, with marked path of destruction of seven to ten miles. Extensive damages in Miami alone totaled \$15 million.
- September 7-8, 1965 – Although its effects were concentrated in southern Dade and Monroe Counties, Hurricane Betsy was a monumental storm event. High winds accompanying the storm forced three barges to crash into the Rickenbacker Causeway; the only bridge that connects Key Biscayne to the mainland. The Miami River overflowed its banks, causing serious flooding of up to three feet. Storm surge was reported at over six feet.
- August 23-26, 1992 – Hurricane Andrew struck the coast just south of Miami with sustained winds of 145 mph and gusts of 175 mph. For Miami-Dade County this was the “BIG ONE,” causing approximately \$25 billion in damage, which at the time was the most destructive natural disaster in U.S. history. Record storm surges of approximately seventeen feet rolled through Biscayne Bay causing coastal flooding and beach erosion. Andrew left approximately 175,000 people homeless and 35 million tons of debris. Devastation was concentrated in southern Dade County but damages and destruction were everywhere. Over 90% of all homes in Dade County had some roof damage. “The zone of destruction left by Andrew’s winds was larger than the city of Chicago and virtually every structure in the zone was damaged.” For as bad as the storm was, it may have been worse if it brought the heavy rains associated with other hurricanes that have hit the area.
- October 15, 1999 – Hurricane Irene forms in the Caribbean/Gulf of Tampico area, makes an unexpected turn and delivers heavy rains over much of south and central Florida. Irene was a minimal hurricane (category 1), but produced an average of over nine inches of rain and a maximum of seventeen and a half inches in some areas. The municipalities of Sweetwater and West Miami were declared disaster areas, as drainage canals topped their banks and flooded hundreds of homes and businesses. The City of North Miami had some areas of localized street flooding and various reports of flooding in homes and businesses (see Appendix R). Affected areas were surveyed and mapped and found to coincide with the boundaries of the floodplain.
- October 2-3, 2000 – The effects of the “No Name Storm” of 2000 were mainly felt in Broward, Collier, Miami-Dade and Monroe counties. The storm came at the end of the rainy season when the aquifers were full and Lake Okeechobee was still low; unfortunately, the rain fell in the wrong place at the wrong time and resulted in massive flooding in numerous, rather small areas of South Florida. One of these areas was North Miami; unofficial rain gauge measurements at the City’s water plant tallied nineteen inches of rainfall over a twenty-four hour period. This storm along with Hurricane Irene the year before caused the City’s repetitive loss cases to swell from three to thirty-six.
- October 24, 2005 – Hurricane Wilma was the most intense tropical cyclone ever recorded in the Atlantic Basin. Wilma formed in the Caribbean Sea on October 15, and intensified into a tropical storm two days later. After heading westward as a tropical depression, Wilma turned abruptly southward after becoming a tropical storm. Wilma continued intensifying, and eventually became a hurricane on October 18. Shortly thereafter, extreme intensification occurred and became a Category 5 hurricane with winds of 185 mph.

- June 7-8, 2013 – As Tropical Storm Andrea passed across north Florida, A localized area of very heavy rain occurred over southeastern Broward and northeastern Miami-Dade Counties. Storm-total rainfalls in this area ranged from 8-15 inches, with a maximum of 15.28 inches measured just a few miles north of North Miami. The event caused severe street flooding, but did not flood any structures in North Miami.

As the long list implies, South Florida is thoroughly experienced when it comes to hurricanes and storms. Our history has taught us to fear Mother Nature, and above all – to be well prepared. Local flood events have been documented by the National Weather Service’s Miami Office and additional information can be found at http://www.srh.noaa.gov/mfl/?n=events_index. Pertinent sections of the City’s emergency preparation procedures are provided in Appendix H.

Hurricanes

The most common hazards associated with a hurricane are high winds, storm surge and heavy rains. The winds can cause structural damages to building and homes. Any debris like rocks, roof tile, garbage, and even coconuts can become deadly projectiles traveling at over 100 mph. The heavy and prolonged precipitation can overpower drainage facilities and cause severe flooding. Most 100 year storms in Florida are the result of wet, slow moving hurricanes causing ten to twenty inches of rain in a couple of days.

As a hurricane churns across open sea, the combined effects of the storms lowered barometric pressure and strong, inward-spiraling winds create a deep swirling column of water beneath the ocean’s surface. This effect causes the sea level to rise in the vicinity of the storm, creating a dome of water that may be a few feet high in the center and a hundred miles wide. This dome of water and underlying circulation advance with the hurricane, and when the storm thrusts toward land, the gradually shallowing seafloor forces the water dome to rise dramatically. Powerful hurricanes produce storm surges that can exceed twenty feet above sea level, bringing total devastation to all beachfront structures; these structures normally include homes and seawalls. The storm surge can also cause heavy flooding and can push water up streams and canals reeking havoc on drainage systems.

Tornadoes

The mixing of air masses of different speeds and velocities causes tornadoes. The nature and occurrence of tornadoes is not completely understood by meteorologists. When conditions in the atmosphere are right for the development of tornadoes, the National Weather Service will issue tornado watches and warnings. North Miami has not experienced a tornado in recent years; however the South Florida area is prone to conditions that spawn tornadoes.

Other Hazards

The following hazards were also considered but do not occur in the North Miami area:

- Uncertain flow paths
- Tsunamis
- Coastal erosion
- Ice subsidence
- Mudflows
- Closed basin lakes
- Dunes & beaches
- Ice jams

Flooding

The saying “when it rains, it pours” was probably thought up in South Florida, as heavy downpours are the norm in this area. Approximately 75% of the sixty-plus inches of yearly precipitation fall during the rainy season from May to September. During the summer season, daily afternoon thunderstorms can occur for weeks at a time pushing the drainage systems to their limits. Localized flooding occurs during this period because the drainage systems are unable to handle this persistent rain.

Urban Development

The changes in land use associated with urban development affect flooding in many ways. Removing vegetation and soil, grading the land surface, and constructing drainage networks increase runoff to streams from rainfall. The permeable soil is replaced by impermeable surfaces such as roads, roofs, parking lots, and sidewalks that store little water, reduce infiltration of water into the ground, and accelerate runoff to ditches and streams. Roads and buildings constructed in flood-prone areas are exposed to increased flood hazards.

CHAPTER 5 – PROBLEM ASSESSMENT

Repetitive Loss Cases

When the original Floodplain Management Plan was created, North Miami only had three repetitive loss properties within its boundaries. Two of the properties were located within the floodplain. These residential homes were built around 1946 with lowest floor elevations (LFE) approximately three feet below FEMA's current requirements for the area (Zone AE 7'). As a result, these homes would constantly flood, even during relatively minor storms. The City has since had these properties removed from the repetitive loss list by acquiring the two properties, razing the structures that occupied the space, and converting the land to open space.

The third repetitive loss site from the original Plan is located outside the floodplain. It is a commercial building constructed in 1953 with the lowest floor well below FEMA's requirements. The crown of the road in this area is approximately three feet higher than the LFE, which causes frequent flooding events. The City has improved the drainage system in front of the property and installed five curb and gutter inlets. Although the improvements have drastically improved drainage at this site, flooding can still be anticipated.

Due to the occurrences of two major storms, Hurricane Irene (1999) and the No Name Storm (2000), the number of repetitive loss cases in the City ballooned from three in 1998 to thirty-nine in 2000. These two storms caused an excessive amount of rainfall in a short period of time. A number of these properties have LFE's well below FEMA's current requirements. The additional properties are located within the City's repetitive loss area (Appendix I).

Stormwater System

North Miami's stormwater system is mainly a positive drainage system where water is conveyed through a series of pipes and pumping stations to various outfalls in the SFWMD canal system. There are also exfiltration systems and gravity drainage wells installed throughout the City.

The Arch Creek North Basin is the source for many flood problems in the area. This drainage basin is extremely low lying and has poor percolation characteristics. Modifications to the canal system in the area in the 1950s increased the elevation of the water table within the basin, forcing Miami-Dade County and North Miami to pump the water out of the basin into the nearby canals. Through the years, the basin was developed extensively, increasing the impervious area and stormwater flows. As a result, the stormwater piping system and pump stations became undersized, creating localized flooding for moderate to big storm events. The flooding in certain areas can be up to two feet in depth and remains for a couple of days.

The Arch Creek North Basin has several stormwater pump stations, creating two separate sub-basins. Miami-Dade County currently owns and operates the east part of the basin system. In recent years, the County has made a number of improvements to the existing pump stations and installed a new pump station in the basin.

In fulfilling the requirements of the Clean Water Act and other associated federal and state mandates, Miami-Dade County has required all municipalities to develop Stormwater Master Plans. In 1995, the City contracted with CH2M Hill to prepare Phase 1 of the Stormwater Master Plan (SMP), which is an assessment of existing hydraulic and hydrological water quality systems within the City. The North Miami Arch Creek Basin has been modeled, and was demonstrated incapable of handling a 5-year, 24-hour storm.

The Stormwater Master Plan – Phase 1 recommended increasing pipe sizes in the collection system and details required pipe sizes simulated as part of the model. This option was not viable for the City due to the associated capital expense and the fact that low elevations in the area will not permit the installation of large pipes towards the end of the system. The City has selected to run a parallel piping system to the stormwater pump station.

In its effort to continue Stormwater Master Plan development, the City contracted with Post, Buckley, Schuh and Jernigan (PBSJ) in 2012 to prepare Phase 2 of the Stormwater Master Plan. Phase 2 addresses the stormwater management issues, which included identifying and ranking stormwater problem areas to alleviate any prevailing adverse water quality and floodwater conditions. This activity will ultimately lead to the construction of new stormwater controls. The SMP addresses issues that promote public health, safety and general welfare and minimize public and private losses due to flood conditions in specific areas.

The City is considering a combination of approaches, including collection system improvements, a new stormwater pump station, inspection and repair of pipes to reduce possible infiltration into the system, stormwater detention areas, exfiltration trenches, and deep injection wells. The City is in process of acquiring properties within the basin and will take into consideration the best use of these properties to reduce the drainage problem in the area (i.e. detention pond, stormwater pump station or deep drainage wells). The City can install test wells to determine the viability and cost effectiveness of deep drainage wells in each of these sites.

Phase 2 of the Stormwater Master Plan also took into consideration other flood prone areas as identified via the complaint log maintained by the North Miami Public Works Department. A map of general flood prone areas has been prepared using the complaint logs (see Appendix J). This map shows three areas with frequent flooding complaints, which include the Arch Creek North Basin, an area south of the Little Arch Creek Basin near Biscayne Bay, and a small area in the Rucks Park Basin west of the Biscayne Canal near Miami Avenue between NE 119th Street and 135th Street.

Critical Facilities

Critical facilities are those facilities that must remain open during an emergency in order to ensure the health and safety of the residents. Principal roadways and evacuation route must remain passable during flooding and other emergencies. Critical facilities include but are not limited to the following:

- Police stations, fire stations, emergency vehicle and equipment storage facilities, emergency operation centers that are needed before, during and after an emergency, and public and private utility facilities necessary to maintaining or restoring services to resident.
- Hazardous facilities which produce, use or store highly volatile, flammable, explosive, toxic or water reactive materials.
- Hospitals, nursing homes, homes or other facilities where occupants are not able to avoid death or injury during a flood.

North Miami's critical facilities list was reviewed by the Floodplain Management Planning Committee and submitted to the Miami-Dade County Office of Emergency Management (Appendix K). The Committee discussed several projects aimed at protection of critical facilities.

Open Space

An important component to the City's overall plan to reduce flooding is the preservation of open space. Currently the City has over 1,500 acres designated as open space. A brief description of those properties, which include the Oleta River State Park, City-owned property, five spoil islands, jurisdictional wetlands and other parks, is provided in Appendix M. Also included are an open space map and a brief explanation of why these areas will not be developed and will continue as open space.

Open space has a dual purpose for residents of North Miami. It serves as protection from flooding by providing storage for floodwater during storm events. Also it preserves the environment in its natural state providing areas of recreation and leisure. The City of North Miami has many beautiful, green areas with many trees and natural vegetation. The preservation of these areas not only provides a service to the residents but also adds to their quality of life.

Flood Impact

The impacts of flooding can range from mere nuisance to severe property damage. In isolated cases, flooding can lead to serious injury and even death. The hazards in North Miami include hurricanes, heavy rainstorms and tornadoes that affect all residents. Flood insurance is a necessity as past experience has shown that flood damage can be extremely costly. Besides the monetary implications, a disaster such as a flood or hurricane can cause great anxiety and loss, as people struggle to obtain basic necessities such as food and water. It is the City's goal and duty to protect the residents of North Miami and their property from the adverse effects of flooding.

The following excerpt from North Miami's Comprehensive Plan gives a description of its land use within the coastal planning area and the economic base activities.

Land Uses within the Coastal Planning Area

The City's Comprehensive Plan - Future Land Use Element provides a detailed inventory of all the existing land uses within the City. The coastal planning area, lying generally east of Biscayne Boulevard, comprises approximately 3,117 acres, which is approximately 49 percent of the total land area (including water) within City limits.

The northern area of the coastal planning area is dominated by recreational, preserve, conservation, and educational land uses. The following features are included within this area is the Intracoastal Waterway, the Oleta River, the Oleta River State Park, Florida International University's North Campus, Biscayne Landing (formerly known as the Munisport site), the Arch Creek East Environmental Preserve, the North Miami Stadium, and Miami-Dade County Wastewater Treatment Plant.

The southern half of the coastal planning area is, by contrast, fully developed, consisting of high income residences/apartments, retail establishments and offices. Even though this is a much more intensively utilized area, few land use conflicts exist because the residential areas dominate the waterfront, leaving little room for other land uses. Three City parks, including the North Bayshore William Lehman Park, lie in this area along with the five spoil islands, two of which are State-owned.

Economic Base Activities

For this analysis, any activities that generate income and/or employment within the City of North Miami are referred to as the economic base for the coastal planning area. Economic activities within the coastal planning area are largely influenced by tourism-related business within Oleta River State Park and patronage to the various water-dependant uses. Future commercial uses in the coastal planning area bound to contribute to the future economic base include approximately 72 acres of commercial use.

Construction and real estate represent substantial economic activities as the Biscayne Landing site continues through phases of development. As the Biscayne Landing development occurs within the CRA boundary, significant property taxes shall be generated from the estimated three billion dollars of construction over the next coming decades.

The following excerpt from the Comprehensive Plan summarizes the land use profile for the entire City.

Residential, Single-Family – 1,697 acres

Residential, Low-Density Multi-Family – 152 acres

Residential, Townhouses – 23 acres

Residential, Two-Family (Duplexes) – 92 acres

Residential, Transient (Hotel/Motel) – 9 acres

Residential, Multi-Family – 99 acres

Residential, Mobile Home Parks – 2 acres

Shopping Centers, Commercial, Stadiums, Tracks – 205 acres

Office – 46 acres

Communications, Utilities, Terminals, Plants – 124 acres

Industrial – 94 acres

Institutional – 264 acres

Vacant, Government Owned – 68 acres

Parks (Including Preserves and Conservation Areas) – 1,331 acres

Water – 995 acres

Vacant Unprotected – 11 acres

Expressway Right of Way Open Areas – 11 acres

Streets/Roads, Expressways, Ramps – 1,177 acres

CHAPTER 6 – GOALS

In an effort to improve the quality of life for the residents of North Miami and reduce the potential for flood damage to local business and residential structures, the City of North Miami Floodplain Management Planning Committee has adopted the following goals:

- Reduce the number of repetitive loss properties within the City. Assist the property owners with acquiring funding to raise the LFE to current FEMA standards. If raising the structure or acquisition is not feasible or is cost prohibitive, the non-residential structures should be flood proofed and residential structures should be retrofitted.
- Preserve Spoil Islands in natural state. Impose a prohibition on any non-recreational development.
- Preserve existing mangroves and wetlands in natural state.
- Identify mitigation projects within the City and implement as funding becomes available.
- Implement a comprehensive public outreach program to inform residents of perils and mitigation measures applicable to flood prone areas.
- Identify and prioritize stormwater system improvement projects for flood prone areas to provide minimum 5-year flood level of service. Design and implement as funding becomes available.
- Enhance the flood warning system to give residents adequate time to prepare.
- Continue to research and apply for outside funding for capital improvement projects.
- Complete the construction and implementation phase of the Stormwater Master Plan.
- As part of the 2015 Comprehensive Plan update, include a section on climate change and its potential impact on the City.
- Work with local developers to make sure they understand the potential impact of developing in the Special Flood Hazard Area and find ways to mitigate prior to construction taking place.

These goals also take into consideration the requirements of the National Flood Insurance Programs Community Rating System.

CHAPTER 7 – REVIEW POSSIBLE ACTIVITIES

The Floodplain Management Planning Committee discussed many possible activities with regard to floods and flood damage. Information was gathered from staff, the public, and various studies including the Local Mitigation Strategy (LMS) Report, National Pollution Discharge Elimination System Report and the City's Stormwater Master Plan. The Committee also reviewed ongoing activities and programs to assess if changes were needed.

Preventive

Drainage System Maintenance – In compliance with the National Pollution Discharge Elimination System (NPDES) permit, the City performs a comprehensive maintenance program. Activities include the inspection of drainage structures and street sweeping (see Appendix L). This program was discussed and applauded for its preservation of our water resources. Furthermore, the City has Interlocal agreements with both Miami-Dade County and SFWMD for maintenance of all canals in North Miami (see Appendix P).

Planning and Zoning – Miami-Dade County development regulations require that residential finish floor elevations be above flood zone elevation, or eight inches above the existing adjacent crown of the road, whichever is higher (four inches for commercial property). The City of North Miami takes this one step further in its Flood Damage Prevention Ordinance (Appendix S) by requiring that the lowest floor be elevated no lower than one foot above the base flood elevation or the crown of the road abutting the property, whichever is greater; this requirement applies to all new construction and substantial improvement projects. For further information regarding relevant rules and regulations on development, you can also refer to North Miami's Comprehensive Plan (Appendix O).

Open Space Preservation – The Committee reviewed total open space (1,537 acres). They discussed the advantages of storage of stormwater in open space areas as well as the natural aesthetics of these areas (see Appendix M for open space map). The committee concluded that the City should continue its current policy ensuring the preservation of as much open space as possible.

Stormwater Management – The City hired a consultant to complete Phases 1 and 2 of its Stormwater Master Plan; this Plan analyzes the existing stormwater system and recommends solutions to current problem areas. The implementation portion of Phase 2 is in progress. The Committee discussed improving the City's standard of service for drainage to make sure all areas are protected from at least a 5-year storm.

The committee also discussed the City's GIS mapping initiative that will provide the City engineers with information to be used for analysis and maintenance of the stormwater system. The committee agreed that this program should be continued.

Dunes and Beaches – The City has no dunes or beaches except for Oleta River State Park's small man-made beach area that is maintained by the State of Florida Parks and Recreation Department.

Property Protection Measures

Relocation and Acquisition – The City has acquired two repetitive loss properties with multiple flood insurance claims and plans to continue the process as funds become available (see Chapter 5 for details).

Drainage improvements – The City has improved the drainage system and performed other measures in front of a commercial repetitive loss site in an attempt to resolve the flooding problem. Other sites will be evaluated for similar projects.

Insurance – One of the first goals of the Floodplain Management Planning Committee was to create a public awareness campaign to inform residents of the need for flood insurance, especially within the floodplain. At the recommendation of the Committee, the City established a Public Outreach Program that discusses flood insurance and numerous other items. This information is disseminated through direct mailings, speaking engagements, the City's library, the City's website and working with local insurance agents and realtors.

Building Elevation – The Committee discussed raising the floor elevation on floodprone houses and buildings but deemed it too expensive, since most of the City is already developed. In the case of substantial loss due to a disaster, current regulations regarding lowest floor elevations (LFE) for rebuilt buildings would be enforced requiring residents to build a minimum of one foot above the base flood elevation or the crown of the road abutting the property, whichever is greater.

Sewer Back-up Protection – The Local Mitigation Strategy of 1999 recommended several projects to protect area residents from sewer back up. These projects included providing emergency power to sanitary sewer lift stations, and re-lining manholes and sewer lines to eliminate infiltration. Over the last fifteen years, several improvements have been made to the sewer system and more are planned when funding becomes available. The current LMS list identifies a number of projects the City desires to complete for further protection.

Natural Resource Protection

Wetlands protection – The protection of the mangrove preserve and other wetlands within the City was unanimously encouraged by the Committee. The City has every intention of maintaining its existing wetlands.

Best Management Practices – Best Management Practices (BMPs) consists of schedules of activities, prohibition of practices, maintenance procedures and other management practices to prevent or reduce the pollution of waters of the United States. BMPs are currently practiced by the City as discussed in North Miami's Annual NPDES Report (see Appendix L). The Committee encouraged the continuation of this program and any activities aimed at preservation of our drinking water.

Coastal Barrier Protection – The beneficial aspects of the preservation of wetlands, natural vegetation, and mangroves was examined by the Floodplain Management Planning Committee. The City and Miami-Dade County RER view any development proposed for this area with the highest level of scrutiny.

Erosion and Sediment Control – As part of the NPDES program, the City enforces sediment control measures on all construction sites (see Appendix L for details). The City has provided staff with the training necessary to enforce these measures. Erosion is not a major problem in South Florida due to the flat terrain.

Emergency Services

Flood Warning – City staff reviews the current flood warning system, which utilizes the National Weather Service for information, on a regular basis. The existing system is not geared for the specific needs of the City but is aimed at providing information for the region. The possibility of studying past rain events and using rain gauges to give residents in flood prone areas an early warning was considered, but the Floodplain Management Planning Committee felt the existing system provided the most accurate information.

Flood Response – The City’s Public Works Department currently handles all flood complaints and is equipped to handle flooding situations that may cause a nuisance for residents. Should flooding incidents compromise public safety, The North Miami Police Department and Miami-Dade County Fire Department would be dispatched to handle the emergency.

Critical Facilities Protection – City staff developed a list of facilities that must remain operational during emergencies. This critical facilities list was reviewed and revised to include other facilities that the Committee members thought should be added. Critical facilities protection projects, including backup power to sewage pumping stations, installation of storm shutters on City buildings and the reconstruction of Keystone Point bridges were also considered (see Appendix N).

Structural Projects

Storm Sewer – Phase 2 of the North Miami Master Plan recommends improvements to the stormwater system and discusses how these improvements should be implemented. The Committee agrees that implementation is a very important activity since it had the potential to improve the system for larger problem areas. The implementation portion of phase 2 started in 2005 and is ongoing.

Seawalls – A program to repair 23 of the 28 seawalls in the Keystone and Sans Souci areas was completed with funding from FEMA. The Floodplain Management Planning Committee discussed the advantages of completing this project by repairing the remaining seawalls in the Sans Souci area; the Committee believes repairs would reduce flooding from potential storm surges and would be a viable property protection measure from tidal flooding. The Committee would like to see the seawall work performed in the Sans Souci area when funding becomes available.

Public Information

Outreach Projects – The Committee expressed that public education regarding floods and flood damage was one of the most important aspects of the proposed activities. The Committee members agreed that a public outreach strategy, which includes pamphlets, educational programming, an Automated Citizen’s Information System (ACIS), and the City’s website would be beneficial to the community (for details, see Chapter 2).

Map Information – The City’s current practice is to provide any interested or affected parties with flood zone determinations. These individuals can call or visit the City’s Building & Zoning Department to receive information on a specific property within two business days.

Real Estate Disclosure – Per the City’s Flood Damage Prevention Ordinance, real estate agents must disclose all flooding history to potential homeowners. The City provides flood zone determination and flood history information to all realtors as it is requested.

Library – Providing public flood information at the library was also encouraged. Currently, there is a section in the City’s library dedicated to floods, flood insurance, hurricanes, and other pertinent information.

Environmental Education – The City is engaged in a school education initiative to explain flood hazards and possible solutions to students. This program was started at the recommendation of the Floodplain Management Planning Committee as Committee members thought it was a great idea to develop environmental awareness at an early age.

CHAPTER 8 – ACTION PLAN

Scope

This action plan will recommend projects that will address the City of North Miami's flood problems in the most effective, yet cost beneficial manner, to avoid costly flood damage in the future. Additionally, the City updates its local mitigation strategy (Appendix N) on an annual basis. This update is then submitted to Miami-Dade County for inclusion in the countywide Local Mitigation Strategy. All activities have been thoroughly researched and discussed by the FMPC throughout the planning process.

Recommended Actions

Project 1: Flood Prevention and Mitigation: Drainage Basin 13

Stormwater Master Plan Priority Basin 13 includes two sub-basins in the Biscayne East system. The area is bounded by Biscayne Canal and NE Miami Ct., between NE 119th and NE 123rd Streets. While there currently exists a limited number of drainage structures in this area, they require critical updates including the installation of baffles and replacement of grates. The installation of additional structures with French drainage systems, as outlined in the Master Plan conceptual design, will prevent repetitive flooding, reduce damages to residential properties, and decrease the number of recurring insurance claims.

Budget: \$500,000

Project type: Infrastructure

Timetable: 50% complete; As funding becomes available

Project 2: Non-Critical Facilities Hazard Mitigation

The city has identified seven of its buildings as essential, but not critical facilities. These facilities support the restoration of essential city services after major storm events and other emergencies. Essential, but not critical facilities include five community centers (Enchanted Forest Community Center, Griffing Senior Adult Center, Gwen Margolis Community Center, Keystone Center and Sunkist Grove Community Center), the Museum of Contemporary Art and the Parks Operation Center. These buildings are used as staging facilities by city staff, FEMA, Red Cross, and other emergency response agencies. Over the years, building officials and staff have researched various types of protection, ranging from plywood to roll down fixed metal shutters and shields. These facilities are currently secured with plywood. Plywood requires considerable storage space and time-consuming installation. The installation of a combination of high impact/shatterproof windows, roll downs and/or hurricane proof screens in these facilities will reduce significantly the time, manpower and storage currently required to secure them. To date only the Building and Zoning Building has hurricane shutters installed.

Budget: \$400,000

Project type: Infrastructure

Timetable: As funding becomes available

Project 3: Surge Resistance and Flood Mitigation at Keystone Point and Sans Souci

The eastern boundary of North Miami borders Biscayne Bay for approximately three miles. Keystone Point and Sans Souci are the two subdivisions located along this eastern shoreline. There are five canal ends in Sans Souci currently in good condition and there are twenty-three canal ends in Keystone Point that have been repaired. When these subdivisions were developed, these canal ends were constructed to prevent soil erosion. The canal ends were not designed as seawalls and their structural integrity was not considered at the time. In 1998, the city received a Federal Emergency Management Agency grant to reconstruct nineteen of the twenty-eight seawalls. While two existing retaining walls do not need repairs, the remaining seven retaining walls need reconstruction to ensure structural integrity in the event of storm-related tidal surges. Approximately 50 homes will be affected if

the remaining retaining walls are damaged by a tidal surge. In addition, any surface or subterranean deterioration to the existing retaining walls will adversely impact the structural integrity of the swales directly behind the seawalls and subsequently damage underground utilities in close proximity to the retaining walls. This project will prevent repetitive flooding, reduce damages to residential properties, decrease the number of recurring insurance claims, and provide uninterrupted telephone, water and sanitary sewer services to residents.

Budget: \$500,000
Project type: Beach / Seawall
Timetable: 75% complete; As funding becomes available

Project 4: Sanitary Sewer Backup

The city maintains and operates forty-five sanitary sewer lift stations. These lift stations, located throughout the city, vary in size and configuration and allow sanitary sewage to flow through a pressurized sewer main system. This sewer system infrastructure is monitored regularly to ensure it functions properly. In the event that any lift station ceases to operate due to power failure or malfunction, the entire system fails as required pressures cannot be maintained. Sanitary sewage, then backs up into the system eventually entering homes as inflow/outflow pressures are reversed. More than half of the city's forty-five sanitary sewer lift stations have high priority needs for generators. Ten lift stations are constructed with the capability to house permanent stationary generators. Six of these ten lift stations currently have emergency backup generators that are permanently affixed to the facility. The remaining four (H, B, C & Breezeswept) require emergency generator back up to be installed.

Budget: \$700,000
Project type: Equipment
Timetable: 50% complete; As funding becomes available

Project 5: Safeguarding Availability of Potable Water

Six remote raw water wells provide water to the city's Winson Water Plant at Sunkist Grove and supply the water necessary to operate the Water Plant at full capacity. This project will provide emergency power to the six remote raw water wells. These emergency generators will ensure that the remote water wells remain operational during power outages caused by storm events, and that the Plant will operate at full capacity. This will provide an uninterrupted source of potable water for North Miami residents as well as residents in surrounding water service areas. In addition, it will also ensure interconnectivity with other municipalities and service areas including the City of Opa Locka, the City of North Miami Beach and Miami-Dade County.

Budget: \$325,000
Project type: Infrastructure
Timetable: As funding becomes available

Project 6: Emergency Portable Stormwater Pumps

The easternmost boundary of North Miami borders Biscayne Bay for approximately 3 miles. There are, therefore, several low-lying areas that flood during regular rainfall and major storm events. The city is seeking funds to purchase four portable emergency pumps to assist in the discharge of stormwater runoff. These four portable pumps will be housed at the Utility Operation Center located near low-lying coastal areas to ensure a timely response. These portable stormwater pumps will help prevent repetitive flooding, reduce damages to residential properties, and decrease the number of recurring insurance claims.

Budget: \$225,000
Project type: Equipment
Timetable: As funding becomes available

Project 7: Gravity Sewer Systems Improvements for Groundwater Infiltration Reduction

The city is seeking funds to implement remedial protocols, namely sanitary sewer pipe lining and manhole rehabilitation to reduce groundwater infiltration into the sanitary sewer collection system. The project calls for lining the interior of existing sewer lines. Lining the system will significantly reduce the inflow and infiltration of ground water into the sewer collection system. This, in turn, will reduce the total volume of water being treated at the Miami-Dade County Sewage Treatment Facility consequently reducing processing costs. In addition, this project will also reduce leakage of raw sewage from existing compromised lines into the environment, prevent groundwater contamination and ensure the public health, safety and general welfare of area residents.

Budget: \$6,000,000
Project type: Infrastructure
Timetable: As funding becomes available

Project 8: Emergency Power for Water and Sewer Utility Operations Center

The city's Water and Sewer Utility Operations Center is not manned during major storm events. The Center, however, must be operational immediately after an all-clear notice is issued. All Water and Sewer equipment, materials and supplies are stored at this location. In addition, repair crews are dispatched and monitored from the Center during storm events and other emergencies. The city is therefore seeking funds to install a stationary emergency generator at the Center.

Budget: \$90,000
Project type: Equipment
Timetable: As funding becomes available

Project 9: Replacement Generator for Police Station

The current generator, which is over 15 years old, supplies back up power for the North Miami Police Station. The Police Station is an integral part of Miami-Dade County's Emergency Management's Divisional Response Plan. The city of North Miami is one of seven municipalities identified as host cities (Division 2) housing a Divisional Emergency Operations Center and serving not only city residents but also residents from the Town of Bay Harbor Islands, the Village of Biscayne Park, the town of Surfside, Indian Creek and North Bay Village. The ability to operate and provide communications from a functional facility during manmade or natural disasters is of vital importance to the overall safety of the community and neighboring municipalities. The City is therefore seeking funds to replace the back-up generator at the Police Station.

Budget: \$325,000
Project type: Equipment
Timetable: As funding becomes available

Project 10: Correct Water Infiltration at City Hall (EOC) Basement

Constructed in 1963, City Hall was designed to house a civil defense bomb shelter in the basement. Over the years, the need for a bomb shelter has become obsolete and the basement has been used for offices, classrooms, employee break rooms and storage space for department supplies. City records are also stored in the basement. Currently, the basement also contains office space for five municipalities which participate in the North Miami Divisional Emergency Operations Center. These municipalities house emergency response teams and are the link to the Miami-Dade EOC during natural disasters. Since the basement is below the natural water table, the structural integrity of the walls and flooring has diminished causing water intrusion. The walls and flooring should be sealed and possibly excavated and sealed along exterior walls. Correcting the flooding problem in the basement, will ensure that vital facilities and staff are secure during major storm events.

Budget: \$45,300
Project type: Infrastructure
Timetable: As funding becomes available

Project 11: Replacement of U.P.S. for Police Station

The City of North Miami is an integral part of Miami-Dade County's Emergency Divisional Response Plan. The City of North Miami is one of seven municipalities identified as host cities, serving the Town of Bay Harbor Islands, the Village of Biscayne Park, the Town of Surfside, and the Town of Indian Creek. The Divisional Emergency Operations Center (EOC) facility houses staff and provides emergency planning, communication, and information receipt and dissemination services. During manmade or natural disasters, the ability to operate and provide communications from a protected and safe facility is of vital importance to the overall safety of the community and neighboring municipalities. The current Uninterruptible Power Supply (UPS) provides power during power failures and safeguards all communications equipment, computers and other vital electrical equipment. The current UPS is over five (5) years old; all batteries have reached the end of useful service life; and it is at its maximum capacity. The city is therefore seeking funds to replace the Uninterruptible Power Supply.

Budget: \$80,000

Project type: Infrastructure

Timetable: As funding becomes available

Project 12: Utility Operation Center Surge Suppression System

The city maintains and operates forty-five sanitary sewer lift stations. Most lift stations are monitored from the city's operation center located at 1815 NE 150th Street through a supervisory control and data acquisition (SCADA) system. All SCADA information is routed electronically through a server located at City Hall and relayed to either the operation center or the lift stations by way of radio. The SCADA system is susceptible to power fluctuations and spikes that damage equipment and disrupt communication between the operation center, City Hall and subsequently the lift stations. Surge suppression equipment will protect the system against damaging power fluctuations. It will eliminate the need for new equipment purchases and reduce personnel costs to manually control lift stations during storm events.

Budget: \$20,000

Project type: Infrastructure

Timetable: As funding becomes available

CHAPTER 9 – ADOPTION OF THE PLAN**Floodplain Management Planning Committee**

After a thorough review, the Committee unanimously accepted the updated Plan as part of its normal course of business at their November 5, 2014 meeting. The Committee also recommended that the City Council officially adopt the Plan at their November 25, 2014 meeting.

City Council

The City Council meeting, scheduled for November 25, 2014, will provide the public one last opportunity to comment on the updated Floodplain Management Plan. This public hearing will be included as part of the regular City Council meeting. Once the public hearing portion of the plan has concluded, the City Council will consider the plan for final adoption. A copy of the proposed resolution to adopt the plan is included (Appendix T).

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LIST OF APPENDICES

Appendix A	–	Resolution 99-28 – Creation of Floodplain Management Planning Committee Resolution 2000-18 – Adoption of Original Floodplain Management Plan Resolution 2005-3 - Adoption of Updated Floodplain Management Plan Resolution 2009-164 - Adoption of Updated Floodplain Management Plan
Appendix B	–	Floodplain Management Planning Committee Meeting Agendas (2014)
Appendix C	–	Sample – Coordination Emails and Responses
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Appendix K	–	City of North Miami Critical Facilities List
Appendix L	–	National Pollution Discharge Elimination System Annual Report
Appendix M	–	City of North Miami Open Space Map CRS Activity 420 Letter on Open Space
Appendix N	–	City of North Miami Local Mitigation Strategy, 1999 (pertinent sections only) Miami-Dade County Local Mitigation Strategy (Draft), 2014 (pertinent sections only)
Appendix O	–	Comprehensive Plan (pertinent sections only)
Appendix P	–	Interlocal Agreements for Stormwater Management
Appendix Q	–	City of North Miami’s Public Outreach Strategy and 2014 Review
Appendix R	–	Map of High Water Impact Areas – Hurricane Irene and No Name Storm
Appendix S	–	City of North Miami Flood Damage Prevention Ordinance (8.5)
Appendix T	–	Resolution 2015-___ - Adoption of Updated Floodplain Management Plan
Appendix U	-	City of North Miami Buildings by FEMA Flood Zone City of North Miami Residential Buildings by Year Built