



MIAMI BEACH

City of Miami Beach, 1700 Convention Center Drive, Miami Beach, Florida 33139, www.miamibeachfl.gov

COMMITTEE MEMORANDUM

TO: Members of the Land Use and Development Committee
FROM: Kathie G. Brooks, Interim City Manager *[Signature]* for KGB
DATE: January 23, 2013
SUBJECT: **ADDENDUM TO THE LAND USE AND DEVELOPMENT COMMITTEE MEETING AGENDA**

Attached, please find an Addendum to the Land Use and Development Committee Agenda.

- 7. DISCUSSION REGARDING THE CITY'S CURRENT PLAN TO CONTAIN RISING SEAS AND DESTRUCTIVE STORM SURGES.
(REQUESTED BY CITY COMMISSION
NOVEMBER 14, 2012 CITY COMMISSION MEETING, ITEM R9K)**

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FROM: Kathie G. Brooks, Interim City Manager *KGB for KGB*

DATE: January 23, 2012

SUBJECT: **DISCUSSION REGARDING CITY'S CURRENT PLAN TO CONTAIN RISING SEAS AND DESTRUCTIVE STORM SURGES**

It is generally agreed that sea levels are rising, degrading the stormwater systems of coastal communities like Miami Beach and making them more vulnerable to flooding from high tides and storm surges.

BACKGROUND

The City of Miami Beach recently adopted a new Stormwater Management Master Plan (SWMMP) that accounts for climate change and sea level rise. The consultant who developed the SWMMP made use of a variety of published resources and analyzed historic sea level data. In particular, the consultant used data from the National Oceanic and Atmospheric Administration to determine the existing mean high water (MHW) and projections from the Army Corps of Engineers (ACOE) to estimate historical, intermediate, and high rates of sea level rise.

Rising Seas

The SWMMP uses the ACOE intermediate projection for sea level rise over the next 20 years. As a result, for all new projects, a sea level elevation of 0.67 feet is being used for stormwater design purposes and an elevation of 3.2 feet is being used as a minimum for seawall elevations. The previous design criterion required by the City was 0.04 feet NAVD88 for sea level elevation. There was no minimum seawall elevation. (All elevations are NAVD88, which is a vertical control datum established in 1991.)

There is a large degree of uncertainty with the rate of sea level rise. As a result, the City has developed a flexible capital improvement plan that can accommodate various rates of sea level rise. The capital improvements will rely on backflow preventers at downstream of the last catch basin, more pump stations, raised seawalls, and stormwater storage. The City will need to monitor the rate of sea level rise and adjust the plan accordingly. As sea level rises, the stormwater system will rely more upon pumps, and as the existing pumps age, they will be replaced with larger pumps.

This SWMMP was approved with a 20-year planning horizon and the condition that the City Commission be given an update every three years of any regulatory or environmental changes that would impact the SWMMP.

Extreme Tides

Tides are primarily driven by the gravitational pull of the moon and sun. When the moon and sun are aligned during the moon's new and full phases, their gravitational pulls combine to produce higher tides called spring tides. The moon's gravitational pull is also greater when the moon is at its closest point to the earth, its perigee, which produces higher tides called perigean tides. These two astronomical events occur simultaneously several times per year and produce extreme tides called perigean spring tides or king tides. As sea levels rise, these perigean spring tides will also be higher, causing greater flooding over longer time periods.

Ocean storms and currents affect the tides by pushing water to the coast. Last October and November, Hurricane Sandy, followed by additional storms in middle of the Atlantic Ocean, coincided with perigean spring tides to produce exceptionally high tides.

Typical high tides in the City average about 0.3 feet. The perigean spring tides reach elevations around 1.6 feet. Last October and November, these high tides reached as high as 2.2 feet.

The National Weather Service, a branch of the National Oceanographic and Atmospheric Administration (NOAA), predicts tidal elevations at its tidal stations. At a conference call with staff from NOAA, it was explained that these latest extreme tides were between 0.5 and 1.5 feet higher than the predicted tides because of the storms. NOAA staff further indicated that it was rather difficult to predict more than one week in advance when the tides will be higher than predicted. However, the City is providing more detailed topographic data to NOAA so that it can provide more specific flooding forecasts to the City.

The City will experience perigean spring tides again in April 2013 and November 2013. At this time, the NOAA predicted tides will not be as high as those experienced last October and November. However, the City will be working with staff from NOAA in the week leading up to the expected tides to more accurately forecast the high tides and to be better able to mitigate for extreme high tides.

Staff has mapped the locations of tidal flooding in GIS and is developing short-term and longer term plans to reduce its impacts. Short term measures include closing travel and parking lanes, installing temporary inflatable seals in drainage piping, and installing temporary pumping systems.

Storm Surges

Models indicate that climate change will also likely cause more extreme weather events, which will result in more storms and storm surges. With higher sea levels, these storm surges will also be higher.

At this time, the Beach dune provides partial protection from storm surges. It ranges in height from 9 – 12 feet and protects the eastern side of the City. There is minimal protection from storm surge from the Bay.

CITY RESPONSE

The City is taking steps to reduce the impacts of rising seas and extreme tides. The SWMMP has developed order of magnitude cost estimates for the improvements required that total approximately \$200 million in needed infrastructure improvements. These improvements will need to be made over an estimated span of 20 years, contingent upon the rate of sea level rise.

Certain areas within the City begin to flood when the tide reaches an elevation of 0.5 feet. In some locations, there is nuisance flooding like ponding and birdbaths at the edge of the street. Other locations experience more severe flooding. These include:

- North Bay Road centered on 52nd Street and just north of 59th Street
- 5th Street intersections from West Avenue to Jefferson Avenue
- West Avenue from 6th Street to 9th Street
- 10th Street and Alton Road
- 14th Street and Alton Road
- Coconut Lane on Palm Island
- Sunset Harbour neighborhood

The Florida Department of Transportation (FDOT) is beginning work on three pump stations – at 5th Street and West Avenue, 10th Street and Alton Road, and 14th Street and Alton Road – in April 2013. This will relieve some of the worst flood-prone areas. The City is also planning to install check valves at other locations with low elevations along West Avenue and North Bay Road.

The SWMMP model has also been used to provide concurrency reviews of recently bid neighborhood improvement projects. These reviews have prompted changes to the stormwater designs of the neighborhoods due to inter-basin flows. As a result, the neighborhood improvements will be more effective in providing the required level of service and more flexible to account for the uncertainty relative to the rate of sea level rise. The neighborhoods reviewed to date are:

- Biscayne Point
- Central Bayshore
- Lower North Bay Road
- Lake Pancoast
- Sunset Islands I & II

In addition, the new criteria are being used in the preparation of the following projects:

- Star Island
- Palm and Hibiscus Islands
- Sunset Islands III & IV
- Sunset Harbour
- Flamingo 6th Street
- 16th Street
- La Gorce

Climate Action Plan

In 2010, Monroe, Miami-Dade, Broward and Palm Beach Counties agreed to work on climate change policy, mitigation, and adaptation planning as a region. This includes:

- Drafting policy statements each year for the State Legislative Session.
- Holding annual Climate Leadership Summits.
- Creating work products to inform implementation of initiatives to further reduce greenhouse gas emissions and make our communities more resilient to potential climate change impacts including:
 - a Regional Greenhouse Gas Emissions Inventory
 - a consensus on sea level rise projections for southeast Florida
 - an initial vulnerability analysis.

The Compact has just released the Regional Climate Action Plan that will serve as a framework for the Counties and their municipal and regional partners to work together on these issues. These work products, as well as additional information, are available on the Compact's website: <http://southeastfloridaclimatecompact.org/>. The Regional Climate Action Plan addresses the following areas related to climate change:

- Sustainable Communities and Transportation Planning
- Water Supply, Management and Infrastructure
- Natural Systems
- Agriculture
- Energy and Fuel
- Risk Reduction and Emergency Management
- Outreach and Public Policy

(Attached is the Executive Summary of the Regional Climate Action Plan)

As part of the evolving development of the Compact, the Counties have been reaching out to better engage municipal partners in this important work. As part of this engagement, each County invited one municipal staff representative to serve on the Compact Staff Steering Committee. Due to the City's leadership on the sea level rise issue in the development of its Stormwater Management Plan, I was recently selected as the Miami-Dade municipal representative.

As part of this effort, the counties and municipalities will be jointly working to develop longer range plans for mitigating the impacts of rising seas and storm surges. In addition, this planning effort will include proposed changes to the building code, land development policies, transportation policies, and emergency management functions.

At the last Southeast Florida Regional Climate Leadership Summit, held December 6 -7, 2012, Mayor Bower was in attendance and she endorsed the Mayors' Climate Action Pledge subject to the approval of the City Commission. The City's Sustainability Committee reviewed and endorsed the Mayors' Climate Action Pledge, which is being forwarded to the full Commission for endorsement at the February Commission meeting.

Potential Next Steps

There is still a significant amount of education and analysis that needs to be done and policy decisions that need to be made. A potential approach involves a series of

educational/informational meetings including the City planning boards and presentations by regional and national experts on the topics of:

- Sea level rise
- Cost/benefit analysis
- Building codes and land development policies

Policies that need to be discussed include requirements for:

- Raising public and private seawalls
- Underground storage for large developments and open spaces
- Minimum finished floor elevations

CONCLUSION

The above information is provided for discussion by members of the N/CAC.

Attachments

Regional Climate Action Plan – Executive Summary

KGB/JGG/FHB/JJF/RWS

I. Executive Summary

Welcome to the first Southeast Florida Regional Climate Action Plan. The Southeast Florida Regional Climate Change Compact (Compact), a unique and collaborative effort among Palm Beach, Broward, Miami-Dade, Monroe Counties, their municipalities and partners, has worked over the past two years to develop this plan with an initial five-year horizon. The plan is a critical milestone of the Compact, entered into by Palm Beach, Broward, Miami-Dade, and Monroe Counties in January 2010. Much of the Compact's work up to this point has served to unite, organize, and assess our region through the lens of climate change in setting the stage for action. Specific accomplishments include the development of regionally-consistent methodologies for mapping sea-level rise impacts, assessing vulnerability, and understanding the sources of regional greenhouse gas emissions. Collectively, these work products provide the foundation for this Regional Climate Action Plan, which calls for concerted action in reducing greenhouse gas emissions and adapting to regional and local impacts of a changing climate. The recommendations presented here aim to accomplish those goals while also serving to protect the assets of the region's unique quality of life and economy, guiding future investments, and fostering livable, sustainable and resilient communities.

The Compact was established with a strong recognition of the region's diversity and its commonalities. It accepted the varying degrees of progress in the areas of climate change adaptation and mitigation in order to inform, to improve, and to advance regional planning efforts together. This Regional Climate Action Plan too recognizes the diversity of Southeast Florida, yet provides the common framework for **Sustainable Communities and Transportation Planning** to be aligned across the region, as implemented. Inevitably this will occur at various stages and varying degrees, but with the benefit of working within a regional context. This is Southeast Florida, with all its uniqueness; the plan recognizes the need to protect and address our vulnerable **Water Supply, Management and Infrastructure** and preserve our fragile **Natural Systems and Agricultural** resources. The plan provides for steps to move toward resilience and reduce emissions through exploring alternatives and decreasing our use of **Energy and Fuel**. The plan builds upon our strength as effective emergency responders and integrates climate change hazards in **Risk Reduction and Emergency Management** planning. Finally, the Regional Climate Action Plan creates a common vocabulary for **Outreach and Public Policy** development to effectively communicate the steps from risk to resilience with the general public, voters, elected officials and decision makers in Southeast Florida, the state and the nation.

The specific recommendations put forth in this plan were developed through a collaborative process involving nearly 100 subject matter experts from a host of professions representing the

Southeast Florida is considered one of the most vulnerable areas to climate change and sea level rise.

public and private sectors, area universities, and not-for-profit organizations. These stakeholders brought to the table the knowledge of their “craft” as well as information on successful initiatives already underway locally or in other communities. Many of the recommendations build upon best practices sprinkled throughout our region, such as regional collaboration on transportation planning and land use criteria that foster walkable and healthy communities. Others delve into “new” frontiers in calling for the integration of climate change into planning and decision-making processes in ways that no local government has yet implemented.

The overall objective was and remains to integrate climate adaptation and mitigation into existing decision-making systems and to develop a plan that can be implemented through existing local and regional agencies, processes and organizations. It is in that spirit that this plan provides the common integrated framework for a stronger and more resilient Southeast Florida starting today and for tomorrow.

The 110 action items detailed in the plan’s seven goal areas are to be accomplished over the next five years with annual reports to mark progress. The policy recommendations will be implemented through several approaches including:

- **existing legal structures**, planning and decision-making processes;
- the development of **new policy guiding documents** by local and regional governing bodies; the development of **operational guidance documents**;
- the development of **consistent goals and progress indicators** throughout the various governments in the region;
- a coordinated **multi-disciplinary outreach and education program**; and
- processes for **focused and prioritized investments**



Every organization in the region has a role to play in making Southeast Florida a resilient and sustainable community of communities.