

Attachment 1

ADAPTATION ACTION AREAS: FEASIBILITY ASSESSMENT

September 2015

Final report for Resolution R-44-15 in
support of the Sea Level Risk Task
Force final recommendations

BACKGROUND: THE NEED FOR ADAPTATION

Many communities within Miami Dade County (MDC) are already experiencing the effects of higher sea levels and more frequent flooding. Over the past several years the scientific understanding and ability to model future impacts from climate change and climate variability has improved greatly. As a result, dozens of studies have been published by local universities, regional, national and international organizations which have examined the vulnerability of our region and our economy to the impacts of sea level rise, tropical storms and variations in precipitation levels. While more work needs to be done, these studies have underscored the potential implications of climate change to the Southeast Florida region if proactive steps are not taken to minimize vulnerability. Left unaddressed, these vulnerabilities could affect property values, public safety, and insurance rates, potentially leaving the County more exposed in the event of a storm. Many tested approaches and technologies exist to reduce these vulnerabilities. It is important to move ahead with adapting to anticipated impacts of climate change and sea level rise even as we continue to refine and improve our vulnerability assessments and modeling efforts.

Communities such as Miami Beach have already begun this work and Miami-Dade County departments, such as the Water and Sewer Department, Public Works and Waste Management, Parks and Recreation, and Emergency Management, are already working to ensure our public infrastructure will continue to serve our residents in the face of extreme events and longer-term trends such as sea level rise. There are many adaptation measures that can be taken, such as beach nourishment and dune enhancement, which will have many additional co-benefits between storms and will improve the quality of life for residents and the experience for visitors.

While adapting to climate change is a new challenge, preparing for it and building resilience to it will build on many established policies and practices already employed by Miami-Dade County, such as preparing for hurricanes, managing stormwater and regional water resources, and planning for smart growth. However, addressing the complexity of climate change and interdependency of infrastructure networks requires new approaches to coordination and planning. Without this coordination there is the potential that repairs and retrofits will be done independently and/or incrementally, or using outdated approaches and technology, which could result in wasted time and resources and lost opportunities to leverage complementary efforts. For this reason, the Board of County Commissioners adopted Policies LU-3K and LU-3L addressing Adaptation Action Areas in the Comprehensive Development Master Plan and is again recommending their

implementation as one tool to help the County accelerate adaptation and develop best practices which are tailored to our needs and unique geography.

ADAPTATION ACTION AREAS: ONE TOOL IN THE TOOLBOX

Adaptation Action Areas (AAAs), as defined in the box below, have been used as one approach to bridge the gap between vulnerability assessments and implementation. Adaptation Action Areas can be used as a flexible tool to help begin the complicated task of addressing these interrelated risks more holistically. This concept has been recommended because it allows challenges to be addressed on a more manageable scale, creates an environment for testing and development of best practices, fosters collective learning and

The History of Adaptation Action Areas

In 2011 the Florida Legislature created Adaptation Action Areas (S.163.3177 Florida Statutes). This statutory policy tool which is an optional designation within the Coastal Management Element is defined as:

“Adaptation Action Area’ or ‘Adaptation Area’ means a designation in the coastal management element of a local government’s comprehensive plan which identifies one or more areas that experience coastal flooding due to extreme high tides and storm surge, and that are vulnerable to the related impacts of rising sea levels for the purpose of prioritizing funding for infrastructure needs and adaptation planning”

“At the option of the local government, develop an Adaptation Action Area designation for those low-lying coastal zones that are experiencing coastal flooding due to extreme high tides and storm surge and are vulnerable to the impacts of rising sea level. Local governments that adopt an Adaptation Action Area may consider policies within the coastal management element to improve resilience to coastal flooding resulting from high-tide events, storm surge, flash floods, stormwater runoff, and related impacts of sea-level rise. Criteria for the Adaptation Action Area may include, but need not be limited to, areas for which the land elevations are below, at, or near mean higher high water, which have a hydrologic connection to coastal waters, or which are designated as evacuation zones for storm surge.” Section 163.3177(6)(g)(10), F.S.

Adaptation Action Areas have been recommended as a policy tool by the Southeast Florida Regional Climate Action Plan (recommendations SP 3-6, 8-9 & PP-11), by the Miami-Dade Sea Level Rise Task Force in their final recommendations, and in Miami-Dade County’s Comprehensive Development Master Plan, which is explained in more detail subsequently.

The concept of AAAs has also been tested in Fort Lauderdale as part of a larger study led by the South Florida Regional Planning Council and the Florida Department of Economic Opportunity.

facilitates infrastructure investments and prioritization of capital improvement projects. The precise form and purpose of Adaptation Action Areas can be adjusted to the needs of each community.

RESOLUTION R-44-15

On January 21, 2015, the Board of County Commissioners (Board) passed seven (7) resolutions supporting the implementation of a recommendation included in the "Miami-Dade Sea Level Rise Task Force Report and Recommendations." One of these resolutions, R-44-15, directed the Mayor or his designee to study the feasibility of designating Adaptation Action Areas as recommended in the Comprehensive Development Master Plan (CDMP). The relevant policies of the CDMP which were adopted in 2013 are as follows:

***CDMP Policy LU-3K:** By 2017, Miami-Dade County shall determine the feasibility of designating areas in the unincorporated area of the County as Adaptation Action Areas as provided by Section 163.3177(6)(g)(10), Florida Statute, in order to determine those areas vulnerable to coastal storm surge and sea level rise impacts for the purpose of developing policies for adaptation and enhance the funding potential of infrastructure adaptation projects.*

***CDMP Policy LU-3L:** Miami-Dade County shall work with its local municipalities to identify and designate Adaptation Action Areas as provided by Section 163.3164(1), Florida Statute, in order to develop policies for adaptation and enhance the funding potential for infrastructure projects.*

Pursuant to R-44-15, the Department of Regulatory and Economic Resources (RER) Planning Division has studied the feasibility of designating Adaptation Action Areas and has determined the adoption is feasible and is recommending initiation of the first pilot project in 2016/2017. This determination was based on the careful review of the AAA pilot project implemented in the City of Fort Lauderdale in partnership with the South Florida Regional Planning Council, the Florida Department of Economic Opportunity, and Broward County. This project produced a comprehensive planning guidebook for local governments that outlined how other jurisdictions could establish adaptation action areas. This report, which is currently available only as a draft, was carefully reviewed by staff, who identified opportunities to adjust AAAs to better fit the County's unique planning needs. Staff consulted with the technical and project leads for the Fort Lauderdale pilot project to understand which program components were successful and which may need to be revised for more effective implementation in Miami-Dade. On the whole, it was the opinion of the Fort Lauderdale staff that the AAA pilot project had been a successful tool for them to facilitate planning and infrastructure investments. Fort Lauderdale staff reported very positive responses from their initial community engagement efforts in designated areas, and they are planning to continue and expand the AAAs in future years.

It is the opinion of the RER Planning Division staff that Adaptation Action Areas are a feasible approach to adopt in Miami-Dade County because they are largely consistent with other designations and planning approaches that have been, and are currently being, used successfully. This includes the Coastal High Hazard Areas and small area studies used by the Planning Division, the priority stormwater basins used by the Public Works and Waste Management Department, and the Resilient Redesign studies conducted by the Southeast Florida Regional Climate Change Compact and participating regional partners. These approaches have successfully helped direct planning resources, prioritize investment and capital improvement projects, and draw out innovative and forward-looking solutions for these unique areas. There are sufficient staffing resources and existing expertise to implement adaptation action areas on a pilot basis within Miami-Dade County. Most importantly, it is the flexibility and inherent ability to tailor and adjust these areas to fit the needs of our communities which makes this approach an appropriate and feasible way to accelerate implementation. There are several potential approaches to designating an AAA which are outlined in the following section.

ADAPTATION ACTION AREAS: A FLEXIBLE TOOL

Adaptation Action Areas are inherently flexible and can be adjusted to meet the needs of each community. As part of this feasibility assessment, staff considered several alternative approaches to adopting AAAs to best address the specific needs of Miami Dade County. The following section outlines four of these approaches, which are not necessarily entirely distinct. Elements from each approach can be selectively adopted into a final approach, if desired. These potential approaches can be further refined or adjusted depending on priorities and resources available.

1

PROJECT-BASED

Description:

To designate AAAs, appropriate staff could review the list of planned County projects that are designed to reduce flooding risks, improve drainage or otherwise reduce vulnerability to storms, sea level rise or climate disruptions. Those planned or on-going projects could be used as the 'anchor' for AAAs. The boundaries of the AAAs could be delineated by the area benefiting from the project and/or improvement. For example, if a new pump station was being installed, a boundary could be drawn around that area benefitting from the new pumps. This "designation" could be temporary and the areas could be reviewed periodically. In areas where the projects have addressed the identified vulnerabilities, the AAA designation could be dropped from the list and those areas needing further

improvements could continue to be designated as AAAs. Every review period would revise the map of AAAs and new areas could be added to the list as new investments and projects are planned for that area. The process for identifying AAAs would be reliant on existing mechanisms for prioritizing investments and projects. This approach is very similar to the approach used in Fort Lauderdale.

Advantages:

- Relatively quick process to designate AAAs because it would utilize an existing list of planned projects
- No new process needed to suggest “solutions” because the infrastructure projects have already been vetted and approved to address flooding or other risks
- The process would be no more and no less equitable than the existing planning and investment decisions
- This approach could draw directly from the experience of Fort Lauderdale

Disadvantages:

- Heavily focused on infrastructure and engineering solutions and does not explicitly include space for non-structural solutions or spatial planning
- May miss opportunities to improve community design, quality of life, or further economic or community development or goals
- May be better at addressing acute short-term challenges and less able to address longer-term slower changes such as rising sea levels
- May miss other community needs such as rising insurance costs, failing septic systems, business disruptions, or other challenges
- Would require careful management of expectations to ensure that the public did not mistakenly believe that the completion of one drainage project or other improvement within an AAA would mean that the area was no longer vulnerable to storm surge or sea level rise. In many neighborhoods, a sustained investment over several years will be required and even with these investments it will be impossible to completely reduce the risk from storm surge, coastal flooding, and sea level rise
- Working on a project-by-project basis may miss opportunities to provide more innovative, comprehensive, or effective solutions because it might miss opportunities to solve several issues simultaneously (such as integrating resiliency with planned road works or redevelopment projects)
- May miss areas that have not had historic problems but may likely be vulnerable to future changes

Description:

While climate change will exacerbate existing hazards, many of the challenges it will present are already partially known and understood, such as flooding due to heavy rains, storm surge from tropical storms, beach erosion, etc. Therefore, climate adaptation planning has significant overlap with on-going efforts such as the stormwater management planning, hazard mitigation planning, and maintaining compliance with the Federal Emergency Management Agency's (FEMA's) National Flood Insurance Program requirements and the Community Rating System. The County could take advantage of this overlap and use one of these existing plans as a starting point and expand upon it. For example, FEMA flood zones could be sub-divided into smaller neighborhood scales and then existing hazard mitigation plans could be rounded out with other considerations. For example, key stakeholders could be brought in to review the transportation, economic development, and drinking water vulnerabilities within these existing boundaries. Alternatively, the Stormwater Master Plan could be used as the starting point and particular stormwater basins that have already been identified as a priority by the Public Works and Waste Management Department (PWWMD) could be identified as the first AAAs. These priority basins could be identified as the boundaries of the AAAs and then a subsequent planning process could be used to enhance the Stormwater Master Plan with other considerations such as the vulnerability in other infrastructure systems (transportation, healthcare), or community and economic development goals.

Advantages:

- Baseline planning has already been completed. For example, planning efforts would be able to take advantage of the fact that flood depths have already been mapped within the FEMA flood zones, stormwater basins have already been prioritized, and capital projects identified in stormwater basins
- Baseline regulations may exist for these zones. For example, enhanced building requirements already exist for properties in FEMA flood zones (i.e. requiring certain building materials, prohibiting basements, specifying specific elevations for the first floor, etc.)
- Boundaries already exist, and in some cases, already carry additional legal requirements
- Additional review processes may already exist for planned projects within these areas

Disadvantages:

- May be difficult to subdivide existing boundaries into a manageable planning scale
- May be difficult to align existing boundaries with other existing neighborhoods and planning areas

- May not fully benefit from the most recent research and integrated modeling efforts (groundwater/surface water modeling) indicating which areas will be most vulnerable to the impacts of sea level rise and climate change

3

SYSTEMS-BASED ADAPTATION PLANNING

Description:

The County could work systematically through critical systems (water, sewer, power, transportation, health care, etc.) and identify areas of the highest vulnerability within each of these systems. Much of this information could likely be pulled from existing hazard mitigation plans, individual sector plans or through targeted meetings with key stakeholders familiar with each system. Meeting with stakeholders familiar with each system could reveal future projects and/or existing challenges and vulnerabilities that are known and may not be publicly discussed. The County could then identify areas where there is significant clustering of risk across major systems and designate these areas as Adaptation Action Areas. The County could then work with those same stakeholders to reduce the vulnerability to the major systems and potentially identify multi-purpose solutions to these vulnerabilities.

Advantages:

- Would highlight areas where there are potential synergies between sectors. For example, this approach could reveal where establishing a micro-grid could support a new healthcare facility, or where raising utilities could be combined with road work or new housing developments, to reduce total project costs
- Would also highlight areas where significant investment will be needed to just maintain the status quo and existing levels of service. This might allow the County to better prioritize resources and more efficiently allocate future resources and capital improvement projects
- May be easier to convene relevant stakeholders, develop adaptation solutions, and secure implementation funding because each individual is vested in their own system and is aware of potential funding sources
- May be easier to secure engagement and support from key decision-makers because adaptation would be addressing issues that have already been identified as key issues and priorities by various groups

Disadvantages:

- Might be more difficult to integrate community priorities and less tangible needs into the planning and infrastructure prioritization process

- Might be a more subjective and/or political process to identify the “risk clusters” that should be prioritized first
- This approach might have “blind spots” and wouldn’t necessarily identify all vulnerable areas. For example, this approach might miss areas of low population density, areas with fewer redevelopment projects, beaches, or natural areas, etc.
- May be more difficult to coordinate with private companies that are responsible for maintaining key infrastructure systems

AREA PLANNING FOR NEWLY-IDENTIFIED VULNERABLE AREAS

Description:

The County could use the best-available science on vulnerable areas (including the USGS integrated surface/groundwater modeling results) to designate Adaptation Action Areas on the basis of their vulnerability to climate change. These physical boundaries based on future inundation and groundwater heights could be smoothed to more closely conform to existing neighborhood and planning boundaries. Within these boundaries the County could do a comprehensive assessment of adaptation needs. All of the vulnerable areas could be designated as AAAs at the beginning of the program or they could be designated on a rolling basis. If they were to be selected on a rolling basis, pilot sites could be chosen with different existing conditions, growth forecasts, and demographic characteristics to inform broader deployment of the designation. The AAA designation could be temporary and removed if the vulnerabilities were substantially reduced.

To begin the planning process the County could hold an “in-house” charrette and bring together key personnel with expertise in stormwater, floodplain management, hazard mitigation, planning, economic development, redevelopment, transportation planning among others. These in-house charrettes could be used to understand what projects are in the pipeline and how they might be amended to better serve multiple purposes and be more robust in the face of future changes. These charrettes could also be used as a learning experience for the County to identify which key players would be needed for future planning efforts and to build up internal capacity. They could also help identify existing barriers to better decision making (for example where incentives are misaligned, where regulations are outdated, or conflicting mandates exist across agencies that may be encouraging vulnerable development). Subsequent public charrettes could identify ways to better incorporate and facilitate economic and community development objectives into the process.

Identifying the barriers in these AAAs would benefit the planning process by facilitating more effective recommendations for the adaptation planning procedure needed countywide, and could help identify the policy changes needed. The first round of AAAs could also be distributed between the unincorporated areas and within municipal boundaries to strengthen working relationships with municipal partners.

Advantages:

- Utilizes the best available science to identify the areas that will be most at risk to sea level rise and storm surge
- Facilitates a comprehensive review of community needs within a given area and may help identify ways to address multiple issues at once (for example, a coastal berm can reduce wave damage during storms and also serve as a linear park and bikeway between storm events)
- Utilizes an area planning approach (as opposed to an infrastructure project-based approach) which could create more opportunities to identify innovative ideas rather than just relying on off-the-shelf technologies
- Helps develop internal technical capacity to address the challenges of flooding and sea level rise which may reduce the need to contract with external experts in the future
- Illuminates policy barriers and misaligned incentives which are impeding more effective decision making and planning
- Facilitates grant applications for designated AAAs

Disadvantages:

- May be a more difficult and/or subjective process to choose pilot areas among all the vulnerable areas identified
- May require a phased approach with priorities identified first and implementable projects identified after

RECOMMENDED NEXT STEPS

As highlighted in the previous section, there are multiple approaches to designing the Adaptation Action Areas which can build upon existing processes, internal expertise, and the best available science. All four of the approaches above could feasibly be adapted and implemented with existing staff and resources. However, the fourth approach, area planning for newly-identified vulnerable areas, is the most desirable approach to begin implementing AAAs. This approach would allow for a more accurate assessment of vulnerability, a more comprehensive assessment of potential adaptation measures, and can help develop internal technical capacity and working relationships across departments, as well as the community. The intention is to partner

with select municipalities to work in tandem on AAAs within the incorporated and unincorporated areas of the County.

This approach will likely need to be adjusted and refined with time, therefore staff recommend beginning the AAAs with a pilot project in 2016. The USGS integrated surface/groundwater modeling outputs are currently pending and will be used by The Stormwater Master Planning staff to develop new inundation maps to highlight vulnerable areas. While the preliminary information is expected to be available to the RER Planning Division staff in the fall of 2015, it would be premature to use this information in lieu of a more comprehensive vulnerability analysis. A complete vulnerability analysis will require several months to a year to prepare. Nevertheless, pilot AAAs can be selected based on available information. This pilot phase will provide valuable experience and, most importantly, will help accelerate the development of innovative, cost-effective adaptation options appropriate to the unique geology and land use patterns of Southeast Florida.

The Planning staff will work with WASD and PWWMD staff during the fall of 2015 to obtain the preliminary map of areas vulnerable to sea level rise and storm surge. It is important to note that due to the County's geology, hydrology, and regional water management system, changing sea levels will have cascading impacts throughout the County, and not only on the coast. Areas in the western part of the County are expected to be affected by changing groundwater levels and by changes in the management of the regional water resources network, therefore AAAs may be designated in interior areas of the County as well.

This information about vulnerable areas will serve as the basis for the selection of initial pilot locations. The pilot location(s) in the unincorporated area of the County will be selected in early 2016. For vulnerable areas within incorporated areas, County staff will contact municipalities to solicit two (2) to four (4) partner communities that are willing to pursue a parallel planning process for an AAA within their municipality. County staff resources would be concentrated on organizing the meetings and planning efforts for the unincorporated areas while the municipalities would be expected to provide that support for their own communities. However, pursuing these efforts in parallel would allow County and municipal staff to gain insights and lessons from the other AAA sites, and would facilitate a more comprehensive and effective planning process.

Collaboration with municipalities is an important component of the AAA process because it will allow County staff to work in a variety of urban conditions and develop solutions that cross jurisdictional boundaries. Both the problems of, and the solutions to, climate change and sea level rise will be closely tied to the urban condition and will vary substantially across the County. For example, lower density areas may be more challenged by failing septic tanks, whereas more densely populated areas may be more impacted by flooded and impassable roadways, while more densely populated areas may be challenged to find the space to

accommodate protective structures and pump stations, and less densely populated areas may be more challenged to secure the needed funding for infrastructure improvements. Similarly, the social and economic conditions of different communities will strongly influence which solutions will be more appropriate, and/or more feasible. Therefore, it is important that AAAs span a representative range of conditions to help the County develop appropriate adaptation approaches which can be applied to the various urban conditions across the County.

After pilot AAA locations and partnerships with the municipalities are secured in early 2016, research can begin on the pilot sites through early 2016. During this phase, staff will gather information on the vulnerability of the area, existing infrastructure and critical facilities, demographic and community information, as well as compile existing area plans such as plans for redevelopment and capital projects. This phase will likely focus on identifying the key public and community sectors' stakeholders to participate in the in-house charrette. The charrettes would be scheduled in a staggered manner from late spring to early fall of 2016. The fall of 2016 would be used as a time for municipal and County officials to come together to finalize the products of the charrettes, exchange lessons learned, and develop recommendations for the final form of the Adaptation Action Areas. By then it is expected that a more detailed vulnerability assessment should be available to help support the designation of the next round of AAAs.

This approach is recommended because adapting to sea level rise will require extensive collaboration, coordination, and collective learning. Small changes in average sea levels will have cascading impacts throughout the system because of the interconnected nature of our regional water management systems. Addressing these changes often requires more than simple upgrades of the water and sewer infrastructure and therefore it is desirable to work across departments and directly with residents to find multi-purpose and cost-effective solutions. In many instances, it will be possible to find solutions that also enhance the quality of life in these neighborhoods between storms. For example, increasing the buffer areas along our canals, rivers, and the ocean can reduce the vulnerability to flooding while also creating an opportunity for new linear parks and green spaces. By creating Adaptation Action Areas and working with an interdisciplinary team to develop a suite of solutions for each area, it will be possible to continue to build the County's internal capacity to respond creatively to the challenges of climate change and changing sea levels.