

# MIAMI BEACH

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

## Item 7. COMMITTEE MEMORANDUM

TO: Land Use and Sustainability Committee

FROM: Alina T. Hudak, City Manager

DATE: March 4, 2022

**TITLE: DISCUSS SHORT-TERM FLOODING SOLUTIONS IN AREAS SUSCEPTIBLE TO FLOODING WITH NO FORTHCOMING INFRASTRUCTURE PROJECTS.**

### HISTORY:

The City of Miami Beach, a highly urbanized coastal community in southeast Florida and a major economic resource to the region, continues to be the leader in adapting to the impacts of climate change. The solutions to adapt present major challenges due to the relatively low-lying topography surrounded by intracoastal waterways with significant tidal influence, a subtropical climate with high intensity rainfalls, limited soil storage for infiltration, high amounts of impervious areas, and limited available surface storage. Despite of all these challenges, investments in community-wide adaptation strategies—such as elevating roads and seawalls and providing robust drainage systems—are essential to protect property and communities from extreme high tides, gradual sea level rise and intense rainfalls.

While the City recently approved major resilience adaptation strategies and the prioritization of neighborhood improvement projects (NIPs) city-wide, the implementation of these strategies will require a major financial undertake, and the implementation of all NIPs will take several years to complete. For these reasons, the administration recommended, and the Commission approved, to develop an interim plan to help reduce nuisance flooding.

At its September 17, 2021 meeting, the City Commission approved a referral to the Land Use and Sustainability Committee (LUSC) to discuss interim flooding solutions in areas susceptible to flooding with no forthcoming NIPs.

At the October 19, 2021 LUSC meeting, the Administration recommended to evaluate interim drainage solutions to alleviate nuisance flooding ahead of a NIP. The Public Works Department agreed to evaluate the areas in the city where interim flooding solutions may be applied, and to come back to the LUSC with recommendations and cost estimate for implementation.

### ANALYSIS:

Staff evaluated more than 900 historical flooding reports –city-wide flooding resident complaints—filed in the City's eGov application for a period two years, from October 2019 to October 2021. The locations of these reported flooding issues were analyzed and a "heat map" representation was created, highlighting areas where the density of flooding reports was greatest. Staff prioritized the areas that could benefit from interim flooding solutions and focused on developing conceptual plans for the top 10 areas identified.

As part of this evaluation, staff reviewed the existing topography, existing drainage system and the location of historical flooding complaints by the residents. Subsequently, two potential types of interim flooding solutions were considered:

- Option 1 consists of adding inlets, pipes and a connection to the nearest existing drainage system with an outfall.
- Option 2 also adds new drainage conveyance components, similar to Option 1, but it also includes the addition of a shallow injection well, for increased system discharge capacity.

Below are the proposed design criteria established for both options of the interim flooding solutions, considering the limitations of each. The design criteria for the City's stormwater program is also presented for comparison:

#### Option 1:

- Design rain 3 inches in 24 hours with a peak intensity of 1 inch per hour.
- Tailwater elevation =0.6 feet NAVD. This is the seasonal high-water elevation.

#### Option 2:

- Design rain 5 inches in 24 hours with a peak intensity of 1.5 inch per hour.
- Tailwater elevation =0.6 feet NAVD. This is the seasonal high-water elevation.

Design Criteria for the stormwater program for comparison:

- Design rain 8.75 inches in 24 hours with a peak intensity of 3 inches per hour.
- Tailwater elevation = 2.7 feet NAVD.

Table 1 presents the advantages and disadvantages, as well as the total estimated costs associated with these two options.

Table 1 – Interim Flood Solution Options – Advantages and Disadvantages:

	Option 1 – Expanded Conveyance	Option 2 – Expanded Conveyance plus Injection Well System
<b>Estimated Total Cost<sup>a</sup></b>	\$18M	\$26M
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Lower cost option.</li> <li>• Reduced flooding after rain has receded.</li> </ul>	<ul style="list-style-type: none"> <li>• Greater reduction to flooding after rain has receded.</li> <li>• Provides water quality treatment to storm water discharge.</li> <li>• Implemented injection wells can be re-used in future NIP's stormwater design.</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• Does not provide water quality benefits which may be required by regulators.</li> </ul>	<ul style="list-style-type: none"> <li>• More expensive than option 1.</li> </ul>
	<ul style="list-style-type: none"> <li>• Will not provide improvements for “Sunny Day” (tidal) flooding.</li> <li>• Flooding will occur when rain and/or tailwater exceed the design conditions.</li> <li>• Swales may need to be regraded at location of proposed inlets.</li> <li>• Pipes and inlets may not be salvaged in future NIP's implementation.</li> </ul>	

<sup>a</sup> Estimated costs to implement interim flood solutions for the top 10 identified areas include the following: Engineering, Construction, CEI and Contingency for class 5 level estimate. These cost estimates are high-level planning estimates (AACE 56R-08 Class 5), which will be refined through the detailed design process.

### **CONCLUSION AND RECOMMENDATION**

After careful evaluation of the proposed options, the Administration is recommending the implementation of Option 2, because it provides increased water quality benefits, along with increased flooding reduction. It is important to note that while these interim solutions provide some relief to the flooding hotspots, addressing some ponding and short-term flooding issues during the more frequent minor storm events, they will not mitigate flooding completely. Flooding will continue to occur when rain exceeds the proposed design for the interim solutions. NIP's, inclusive of road elevation, will ultimately still be needed to address severe rainfall-induced and sea-level rise tidal flooding issues in these areas.

Table 2 presents the recommended implementation plan for the interim flooding solutions to the top 10 priority areas. This plan estimates that 2 to 3 areas start design each year, and that construction of the interim solutions are constructed within the following year, estimating that the top ten areas would be addressed within a five-year period.

Table 2 – Proposed Implementation Plan for Top 10 Priority Areas

Priority	Neighborhood	Estimated Project Cost (Millions)	Project Implementation Plan					
			FY 23	FY 24	FY 25	FY 26	FY 27	FY 28
1	Nautilus D	\$3.2	Design	Construction				
2	La Gorce A	\$2.0	Design	Construction				
3	Lakeview A	\$2.6		Design	Construction			
4	La Gorce C	\$4.9		Design	Construction			
5	Flamingo/Lumms C	\$2.3			Design	Construction		
6	Flamingo/Lumms D	\$2.5			Design	Construction		
7	Flamingo/Lumms G	\$2.2				Design	Construction	
8	Nautilus B	\$1.4				Design	Construction	
9	City Center A	\$2.3					Design	Construction
10	Nautilus A	\$2.4					Design	Construction
	<b>Total</b>	<b>\$25.8</b>						

### **FISCAL IMPACT**

Based on planning level estimates, the interim drainage solution program requires a total budget in the amount of \$26M, \$5M of which may be used from the resilience funds. This results in a funding gap of \$21M. Below is the anticipated expenditure schedule for the total \$26M.

- FY23 \$5.2M
- FY24 \$7.5M
- FY25 \$4.8M
- FY26 \$3.6M

- FY27 \$4.7M

**Applicable Area**

Citywide

**Is this a "Residents Right to Know" item, pursuant to City Code Section 2-14?**

Yes

**Does this item utilize G.O. Bond Funds?**

No

**Departments**

Public Works

**ATTACHMENTS:**

	<b>Description</b>	<b>Type</b>
<input type="checkbox"/>	<a href="#">Exhibit 1-Heat map</a>	Other
<input type="checkbox"/>	<a href="#">Short Term Flooding Solutions.Presentation</a>	Other