



MIAMI BEACH

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

COMMITTEE MEMORANDUM

TO: Sustainability and Resiliency Committee

FROM: Jimmy Morales, City Manager

DATE: July 19, 2019

SUBJECT: **DISCUSS THE
CITY'S PLAN TO ADDRESS FLOODING AS A RESULT OF EXTREME RAIN EVENTS
AS WELL AS ANY LESSONS LEARNED.**

BACKGROUND

On May 16, 2019, the City of Miami Beach experienced an extreme rain event that resulted in some street localized street flooding. Subsequently, a LTC was distributed on May 21, 2019 outlining some key facts associated with the event and the City's stormwater system handling of the event. The rain event, at its peak, had an intensity of 1.73 inches in a half hour and 0.50 inches in the subsequent half hour.

At the June 5, 2019 commission meeting an agenda item was referred to the Sustainability and Resiliency Committee to: 1) understand the anticipated frequency of these extreme rain events; 2) review how the City's systems performed during this specific extreme rain event and how the City measures performance; 3) identify any lessons learned for the City and community

ANALYSIS

Although each rain event is unique, the events are typically categorized by storm frequency. Events whose total rainfall (or rain intensity) fall at or near a 5 year storm, would be categorized as an event with a 5 year return period. Specifically addressing the rain event on May 16, 2019, the peak rain intensity of the event was 2.23 inches per hour or almost a 5 year storm. However, when taking into account the front-loaded precipitation distribution (1.73 inches in the first half hour), the rain event is actually more representative of a 25 year storm.

It is important to note that the nomenclature, which refers to storm events, implies that the return period of a storm is representative of its frequency. For example, a 10 year storm may imply that the storm will only occur once every ten years. This is not the case. Instead, the 10 year storm has a 10 percent chance of occurring in any given year. Applying this logic to the 5 year storm and the 25 year storm, their probability of occurrence would be 20% and 4%, respectively. Essentially, the storm can occur on a more frequent or less frequent basis than its return period.

Climate change appears to amplify the effects of extreme weather, thereby increasing the frequency of extreme storm events. Unfortunately, there is no clear consensus from the scientific community

on the extent to which storm frequencies will increase. Nonetheless, we know that rain events may occur much more frequently than their respective return periods.

During the event in question, the stormwater system functioned as expected. However, the peak precipitation rate exceeded the instantaneous capacity of the drainage system. Once rate of precipitation decreased to match system capacity, the standing water subsided in relatively short order.

Stormwater management systems are designed to provide a certain level of service, such as the 10 year 24 hour storm. However, in practice the capacity of these systems may be overwhelmed by larger, more intense, storm events. While these designs mitigate significant risk, they do not entirely eliminate the risk of flooding. Building infrastructure that addresses the most severe events would not be feasible from a cost, siting [permitting](#), and operational perspective. Additionally, there are events that exceed the capacity of even the most robust infrastructure – drainage systems designed for a 100 year storm cannot handle a 500 year storm event.

Public education and outreach is essential to help our residents and businesses better understand and mitigate risk. It is an important aspect of addressing these severe rain events effectively. This education is particularly important in low-lying areas that are susceptible to an increased risk of flooding. Through the City's various outreach and media channels, flood protection messaging is disseminated which continues to be enhanced and refined.

CONCLUSION

The following is presented to the Sustainability and Resiliency Committee for discussion and further direction.

JLM/ETC/RC/JJF

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