


City of Alexandria, Virginia

MEMORANDUM

DATE: SEPTEMBER 11, 2020

TO: THE HONORABLE MAYOR AND MEMBERS OF CITY COUNCIL

FROM: MARK B. JINKS, CITY MANAGER 

SUBJECT: RESPONSE TO SEVERE WEATHER AND FLASH FLOODING

ISSUE: Increasingly frequent flooding from storm events attributable to more frequent and intense climate change triggered storms.

BACKGROUND: The massive rainfall that some parts of Alexandria experienced yesterday, based on historical long-term data and experience, were highly unusual, but unfortunately may be the beginning of a longer term climate change triggered more frequent weather event. For Alexandrians, notable flooding events have typically been hurricanes: Agnes in 1972, Isabel in 2003. More recently, there was a major storm on June 25, 2006 and Tropical Storm Lee on September 8, 2011. *However, since just 2018 (which was the wettest year on record in Virginia with more than 20 inches over normal rain), the City has experienced multiple, super intense and frequent storms many of which caused flash flooding – not the coastal flooding common to Old Town.* On July 8, 2019 a flash flood caused major impacts regionally. On July 23, 2020 a local flash flood event in Alexandria dropped 60-80% of the monthly July average rainfall in 30 minutes. On August 28, 2020 a local flash flood dropped two inches of rain in 60 minutes at a rate of seven inches an hour for the peak five-minute period. Yesterday another local flash flood event dropped between 2.5 and 4 inches of rain with a peak intensity of up to three inches an hour for the 10-minute peak. The event was a daily rainfall record at Reagan National Airport and caused major flooding in the District of Columbia and Maryland. In each of these 2018-20 events, flooding included overland, storm sewer line surcharges and sanitary backups.

It is important to note that for more than three decades, Alexandria has designed and planned for our storm sewer system to handle a “10-year storm.” A “10-year storm” is an industry criterion for a rain event expected to have an historical 10% chance of happening every year. Put another way: The City designs its storm sewers to handle 90% of historical storms each year. For Alexandria, a “10-year storm” is one that produces 2.7 inches of rain in one hour and/or 5.3 inches over 24 hours. The City’s design capacity is consistent with or more protective than some of the City’s neighboring jurisdictions. However, the July 8, 2019 and the July 23, 2020 storms were more intense than this design standard, with the July 23 event about 30 times more intense. Also, notably, many older areas of the City have storm sewer infrastructure that was installed decades prior to the current design standards and already lack capacity for even the historical “10-year” storm.

DISCUSSION: The City manages and maintains more than 185 miles of storm sewers, over 13,500 stormwater structures and 26 miles of streams. The City has taken a proactive, aggressive approach to flood management and sewer maintenance and its stormwater program has been recognized repeatedly for its innovative and protective stormwater management. However, with climate change and the evident increase in major intense rain events which have caused major flooding, the City will need to reexamine and accelerate its stormwater planning and project implementation. The City in 2010 adopted a ½ cent real estate tax set aside that enabled about \$1 million per year for stormwater investments. In FY 2018, to fund the City's share of the unfunded state and federal mandates associated with the Chesapeake Bay cleanup, the City established a dedicated funding source for stormwater system improvements by adopting a stormwater utility fee. This increased annual investments into stormwater tenfold, to over \$11 million per year (including debt service) for both capacity and water quality projects.

With this funding, the City is planning major capital investments including significantly stepped up maintenance and future capacity improvements. (The City has made recent capacity investments including five projects totaling over \$750,000 in the last year.) The City is focusing its current resources in four critical areas:

1. Outreach & Technical Assistance

- Expand early warning system and signage
- Federal and Regional Partners: Including coordination with the Federal Emergency Management Agency on flood map updates in Alexandria
- Proposed Flood Mitigation Grant Pilot: Staff is researching a program for Council consideration in FY 2021 that would provide grants to City residents who have been repeatedly impacted by flooding to perform floodproofing initiatives on private property

2. Maintenance

- Hooff's Run Culvert Maintenance
- Continued routine system maintenance, plus capital maintenance to streams and channels

3. Spot Improvements

- Acceleration of small to mid-sized capital projects that address localized drainage issues

4. Major Capital Investments

- Improving stormwater system capacity in an equitable manner
- Expanding capital investment plans

The City has already conducted a major study to analyze the storm sewer system for problem flooding areas, develop high-level solutions, and prioritize solutions for those areas. It is also important to note that many of these recent storms exceeded the City's pipe design standards. *The City will need to study and consider new design standards, beyond designing for 10-year storms. If the City were to consider changing from a 10-year standard, a study of the costs, benefits, and strategies should be conducted before the current standard was changed.*

Staff will be prepared to discuss with Council at future work sessions the current CIP, options for accelerating elements in the CIP and order of magnitude cost increases if the City chooses to consider adopting a design standard higher than the City's current 10-year storm.