



Flood Action Alexandria Program Overview



January 2021



Types of Flooding

1

RIVER FLOOD

Conditions: Tropical storm system, persistent thunderstorms, combined rainfall and snowmelt.

What happens: Water levels rise over the top of river banks.



FLASH FLOOD

Conditions: Heavy or intense rainfall over a short period of time.

What happens: Raging torrents after heavy rains that rip through streams, streets or alleys.

3

ICONS: FREEPIK, SMASHICONS

What type of flood is that?

Alexandria experiences four types of floods.



SANITARY SEWER BACKUP

2

Conditions: Groundwater and inflow from stormwater get into the sanitary sewers through cracks and joints in pipes, roof downspouts and holes in manhole lids.



What happens: Water becomes surcharged to flood basement drains and walkout basement stairwells.

RIVERINE FLOOD (TIDALLY INFLUENCED)

Conditions: Higher than average high tide, worsened by heavy rainfall.

What happens: Water level in Potomac River rises and overflows its banks.

4



More Frequent, Intense (“Heavy”) Rainfall Events

- **2018:** Virginia’s wettest year on record, 20”+ over normal
- **July 8, 2019:** Regional Flood
- **July 23, 2020:** Local Flash Flood
 - 60-80% of monthly avg in 30 minutes
- **Sept. 10, 2020:** Local Flash Flood
 - 2.5-4” with rates up to 3”/hr in 10 mins
 - Daily rainfall record at National Airport
- **August 21, 202:** Very Local Flash Flood in single local watershed



Radar, September 10, 2020

Flood Action Alexandria: Public-Private Partnership to Address Flooding

City Leadership

- ✓ Guidance
- ✓ Funding – Stormwater Utility Fee increases

City Staff

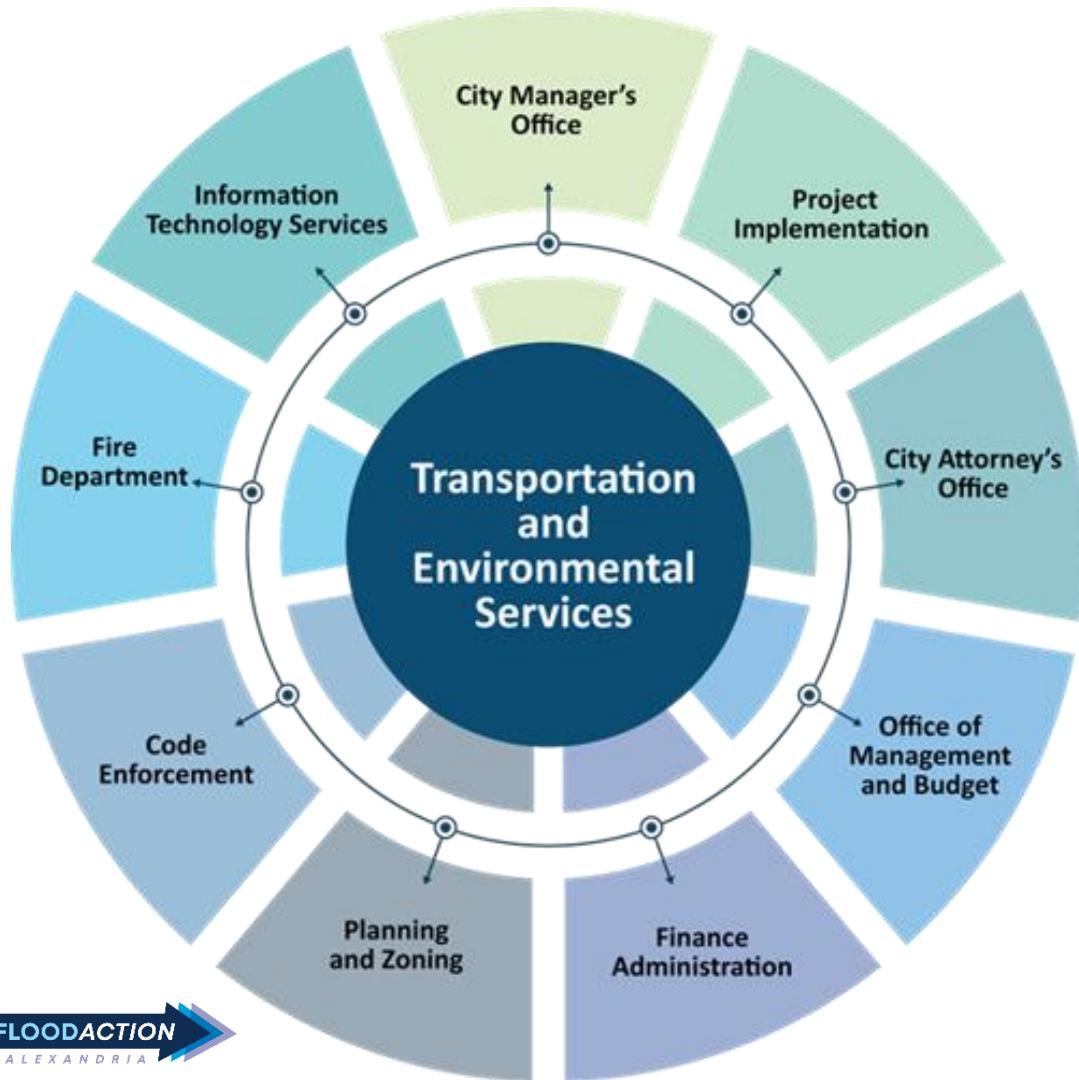
- ✓ Maintenance and Operation of the Stormwater and Sanitary Systems
- ✓ Neighborhood investigations and project identification
- ✓ Capital Improvement Program Projects
 - ✓ Large Capacity Projects
 - ✓ Spot Improvement Projects

Residents

- ✓ Report the issues via Alex311
- ✓ Work on floodproofing their property – Flood Grant
- ✓ Become involved



Flood Action Alexandria: Public-Private Partnership to Address Flooding



- ✓ **Create matrix organization /cross-functional** City staff and created Ad Hoc Advisory Group
- ✓ **Capital project acceleration and reprioritization of funding** from water quality to water quantity; enhance maintenance
- ✓ **Data collection** from residents and businesses, modeling and assessments, and regional weather
- ✓ **Enhanced communications** for web pages and Alex311 more user-friendly
- ✓ **Expand early warning** programs and tie into regional weather data and tracking
- ✓ **Legislative advocacy** for local residential floodproofing grant program
- ✓ **Neighborhood engagement** and technical assistance to understand scope and assist residents

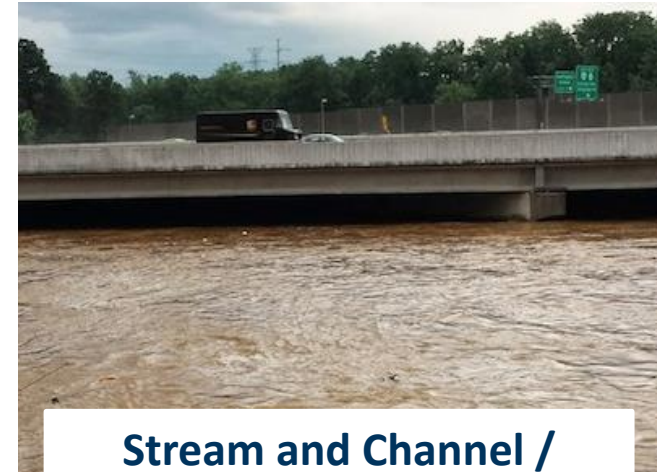
Stormwater Management: 5 Main Responsibilities



**Storm Sewer Capacity
Projects**



**Spot Improvements
Projects**



**Stream and Channel /
Infrastructure Maintenance**



**Infrastructure
Maintenance**



**Water Quality Projects
(Bay Mandates)**

FLOODACTION

ALEXANDRIA

Flood Mitigation Executive Team

*T&ES Director, DPI Director,
T&ES Deputy Director (IEQ), T&ES
Deputy Director (Operations)*

Ad Hoc Stormwater Utility and Flood Mitigation Advisory Group

Flood Mitigation Program Manager (DPI)

T&ES
Operations

T&ES
Stormwater

T&ES
Sanitary

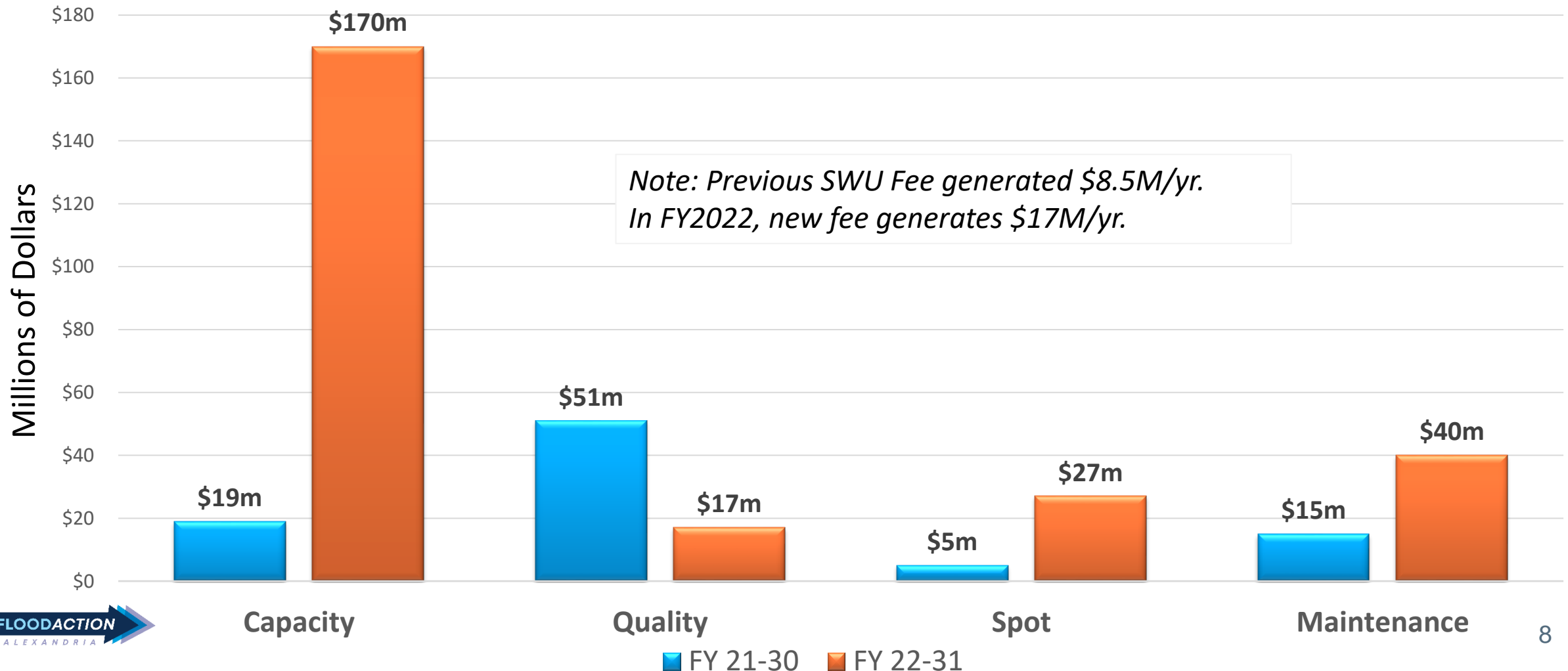
DPI – Project
Management

Other City Boards & Commissions:

- Environmental Policy Commission
- Energy and Climate Change Task Force
- Waterfront Commission

Reprioritized Stormwater Management Stormwater Utility 10-Yr Plan

Change in spending from prior 10-yr. plan, plus added resources



What is the City Doing to Mitigate Flooding Impacts?

Major Capacity
Capital Projects

Spot
Improvement
Capital Projects

Data Collection &
Early Warning
System

Sanitary Sewer
Improvements

Enhanced
Maintenance

Enhanced
Communications

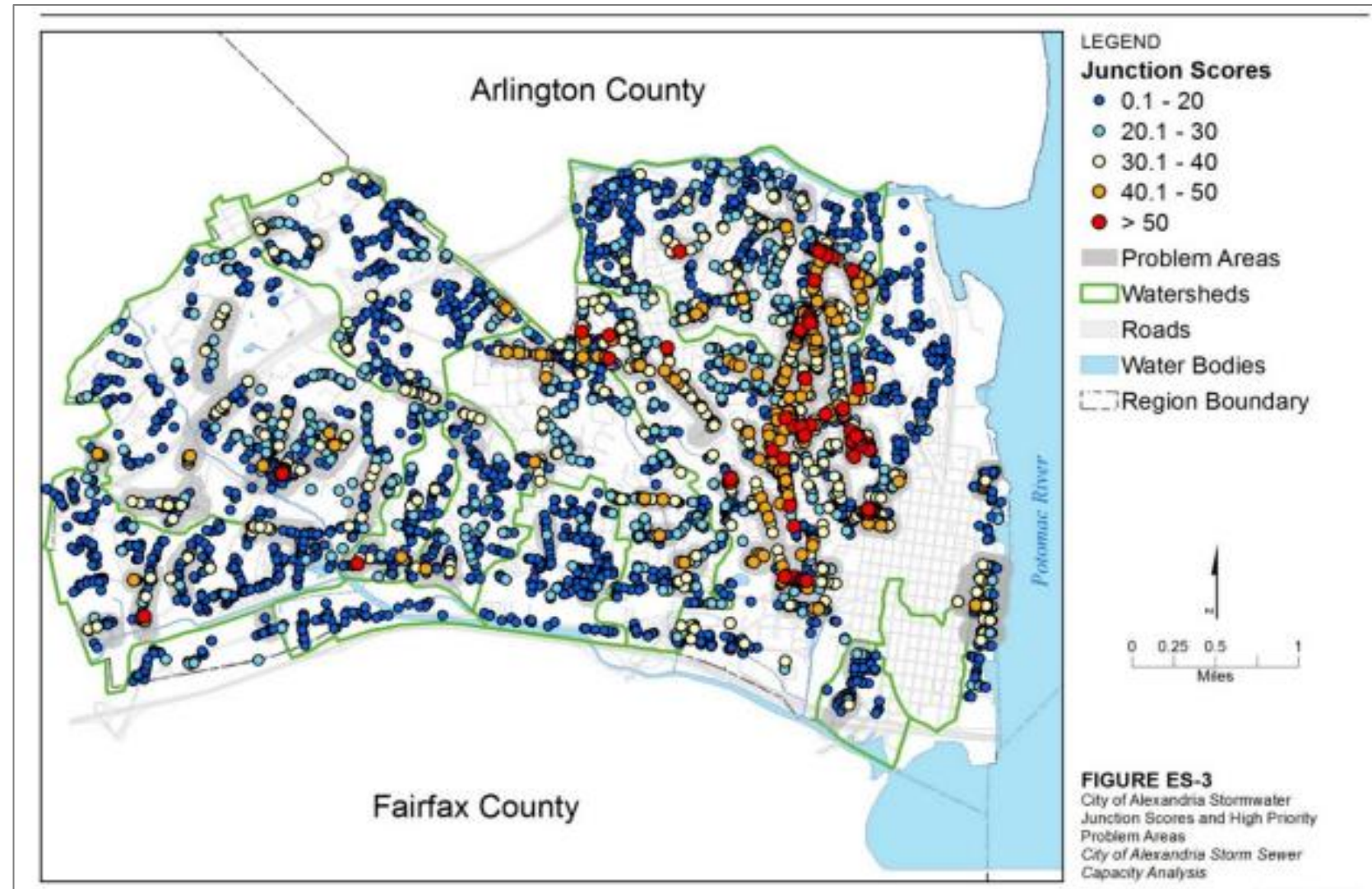
Legislative
Process and Flood
Mitigation Grant

Alternative
Funding

Large Capacity and Spot Improvement Projects

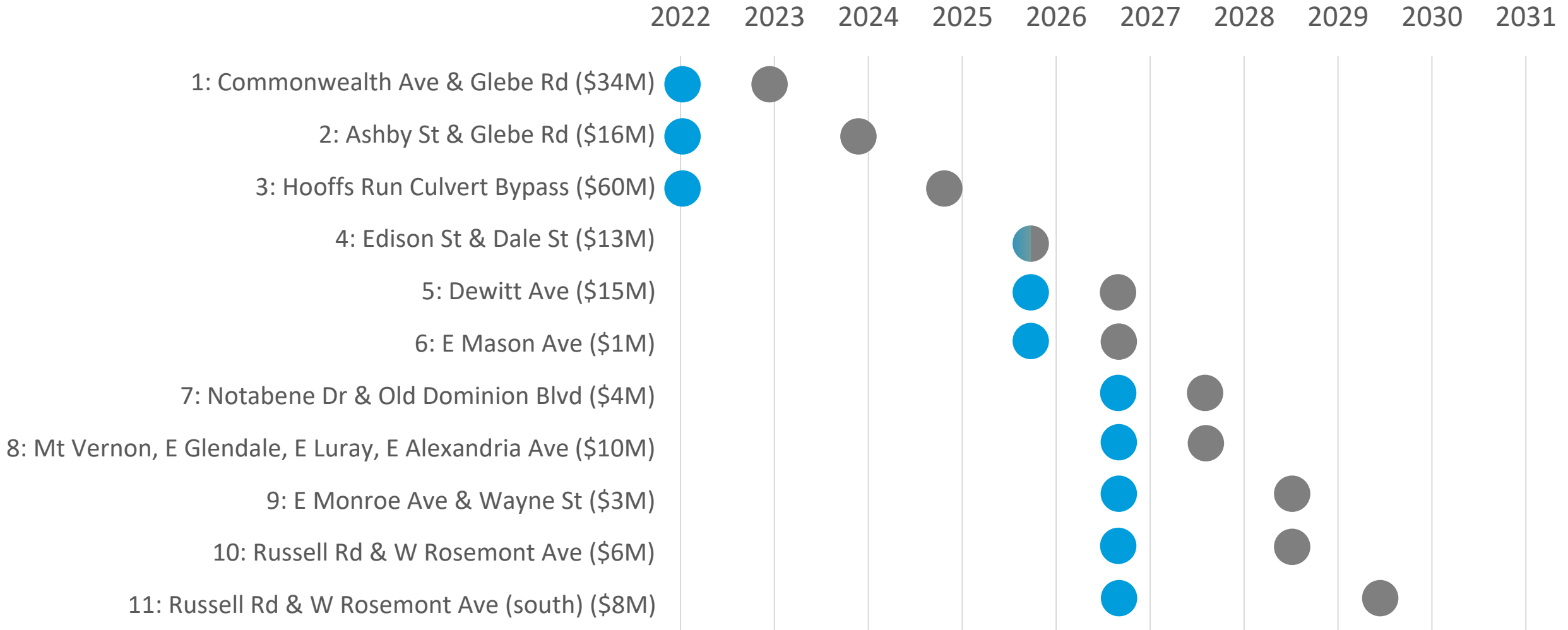
City of Alexandria Storm Sewer Capacity Analysis (CASSCA)

- Completed 2016 in response to increasingly frequent flood events
- Analyzed storm sewer capacity, identified problem areas, and recommended solutions
- 90 modeled problem areas identified as potential capacity issues*



Funding Timeline for FY 2022 – FY 2031 Capacity Projects (\$170M)

(For Planning & Budgeting Purposes, by Fiscal Year)

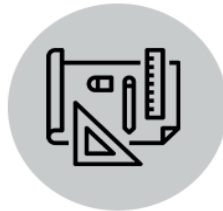


Large Capacity Capital Projects: Top 3

Snapshot of progress on upcoming projects. Timelines are estimates and subject to change.



Combined 2 projects to streamline design



Design for top 3 projects funded in FY 22: \$19.9 million



Construction estimates for FY 23, FY 24, FY 25: \$87.6 million

Design 1 & 2

E. Glebe Road and Commonwealth Ave. and Ashby St. and E. Glebe Road

Request for Qualifications: Late January 2022

Estimated Contract Award: Spring 2022

Design Completion Target: Spring 2025

Design 3

Hooff's Run Culvert Bypass

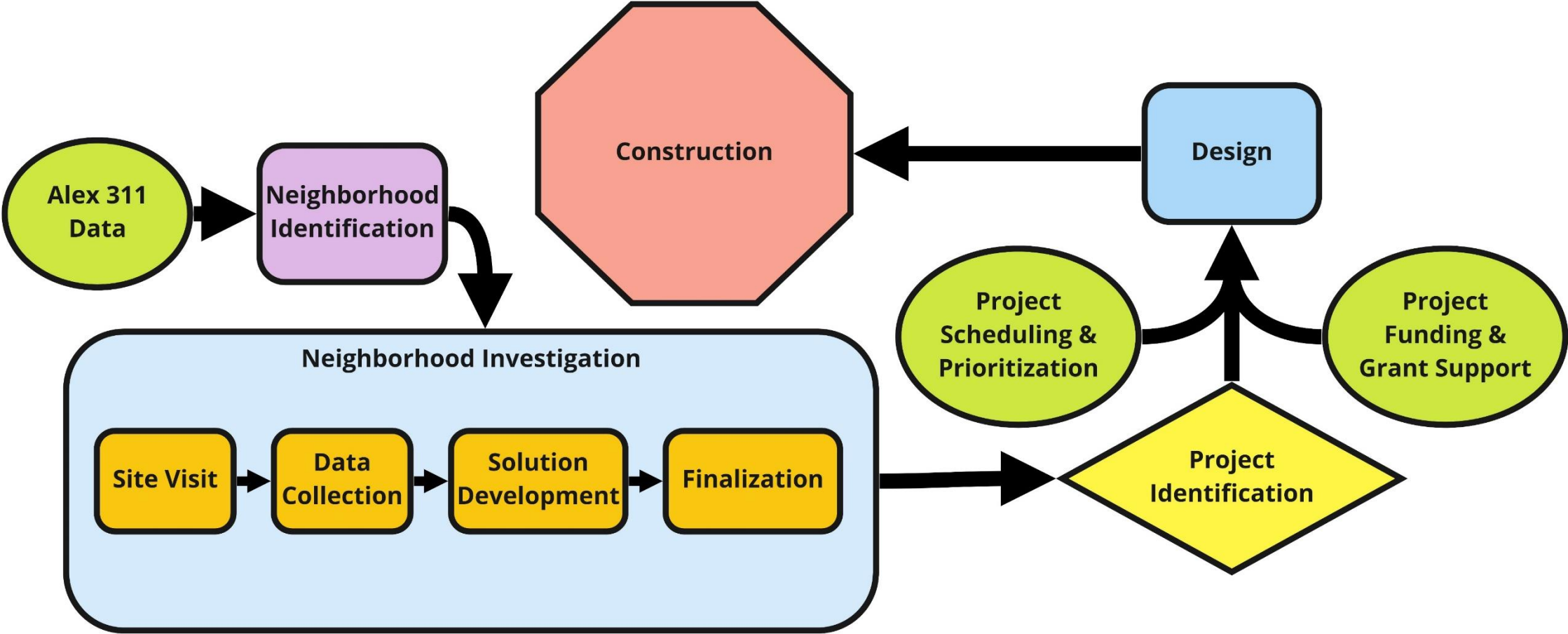
Request for Qualifications: April 2022

Estimated Contract Award: Summer 2022

Design Completion Target: Summer 2025

More information online at www.alexandriava.gov/124317

Neighborhood Spot Improvements Workflow



Neighborhood Engagement Meetings

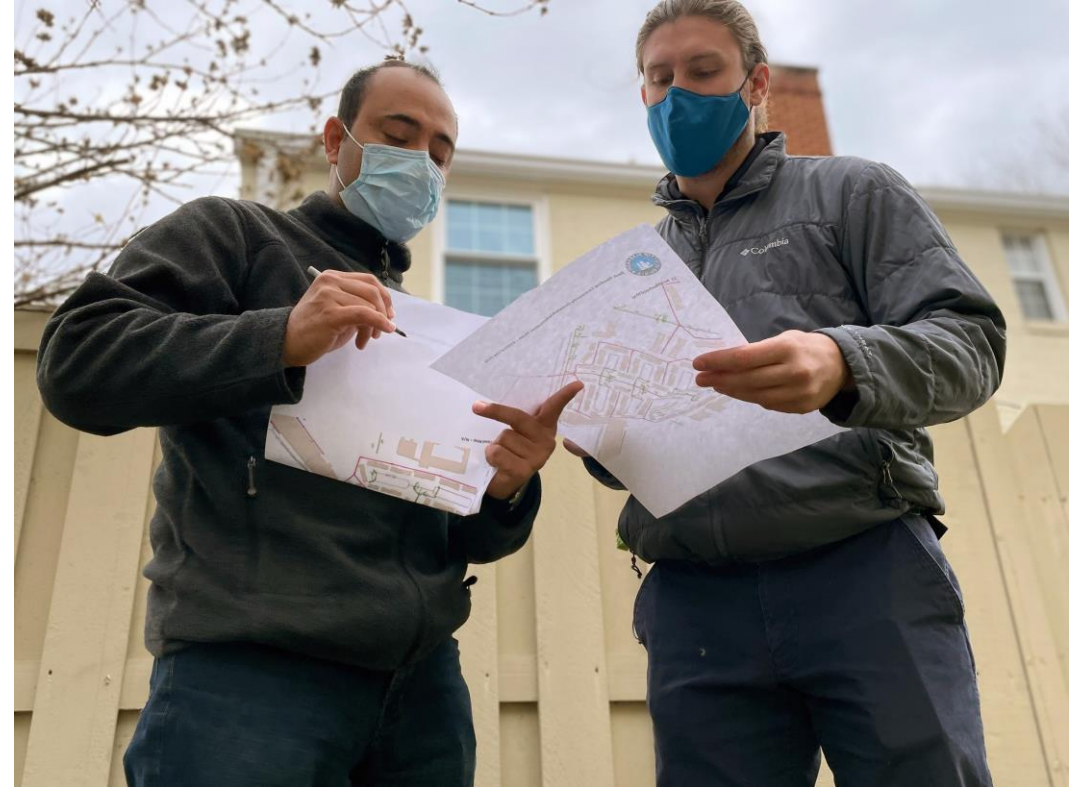


Topics discussed:

- Types and extent of flooding issues facing city homeowners
- Planned large capacity projects
- Potential Spot improvement projects
- Short-term / cost-effective solutions for residents to protect against flash flooding and sewer backups
- Flood Mitigation Pilot Grant Program

Neighborhood Investigations

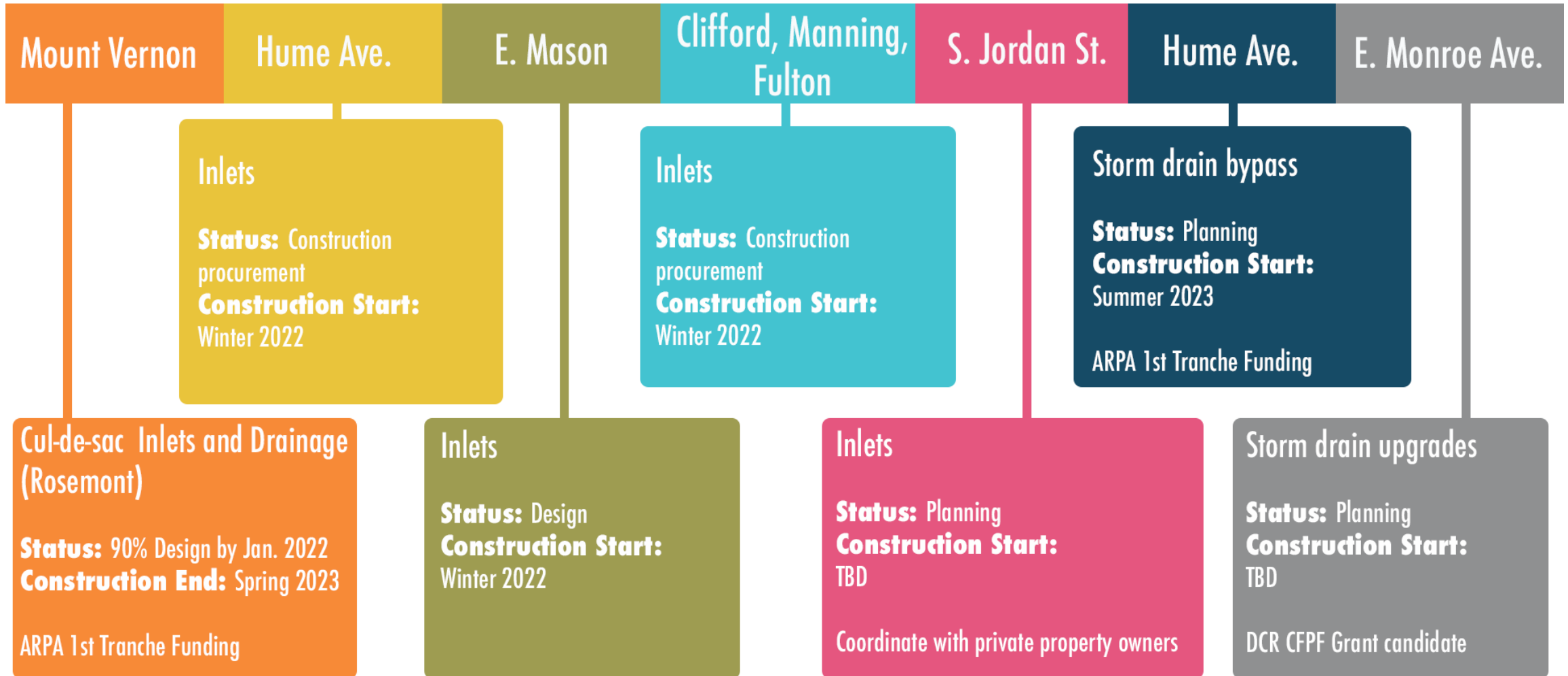
- Staff and consulting team perform follow up investigations to create potential solutions
- Continue to gather information from residents



TOP: Engineers Qais Ayubi and Mitch Dillon review a map of the City's sewer infrastructure while investigating solutions for flooding in a neighborhood near King Street on Dec. 3.

BOTTOM: Engineer Jessica Lassetter speaks with residents in a flood-prone neighborhood near King Street on Dec. 3.

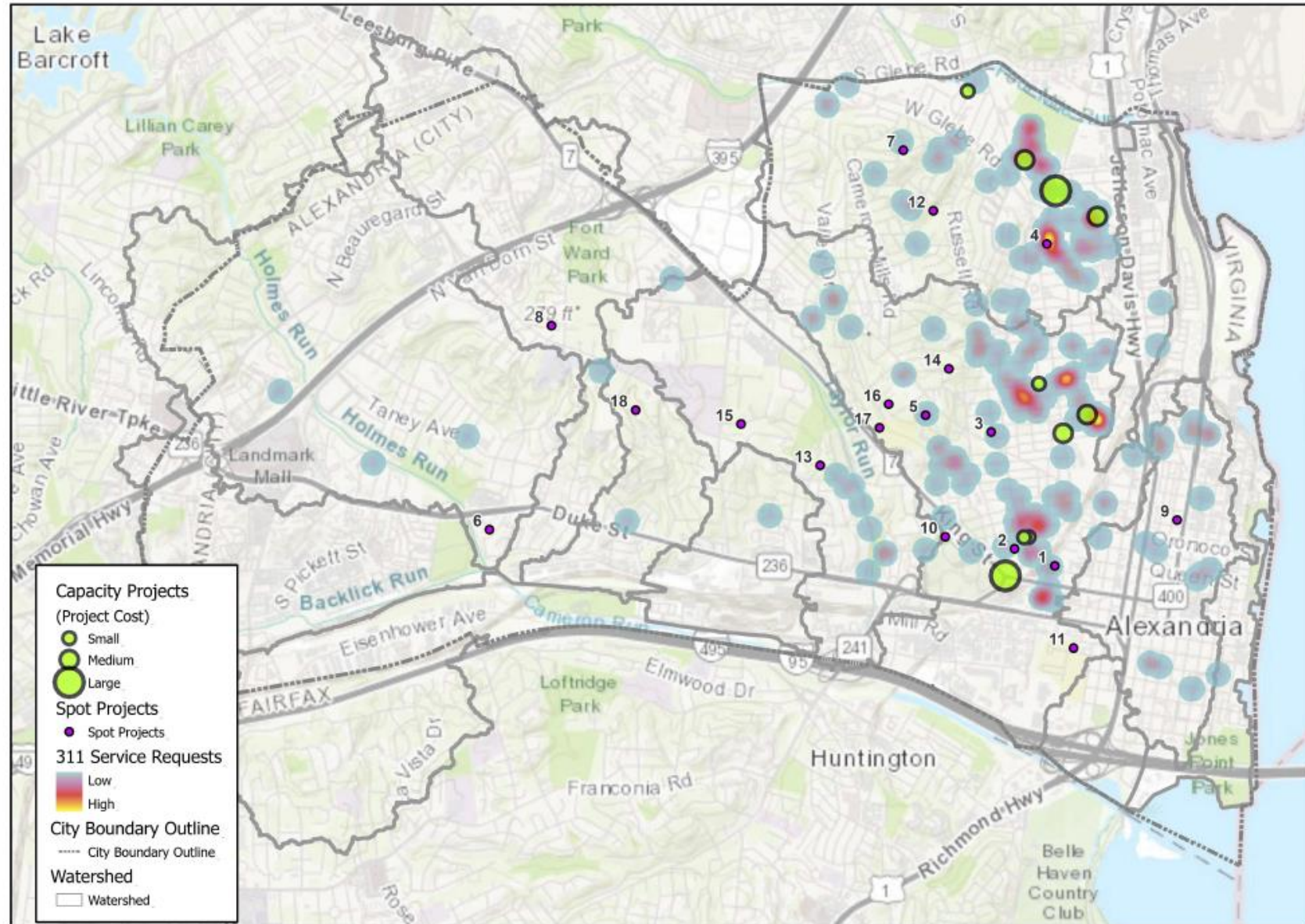
Neighborhood Spot Improvement Projects



More information online at www.alexandriava.gov/tes/stormwater/info/default.aspx?id=122680

Capacity and Spot Capital Projects

Capital Improvement Projects



For illustrative purposes only

Data Collection and Early Warning Systems

Data Collection & Early Warning

6 new rain gauges installed

2 new stream gauges installed

8 signs deployed warning that a “Road May Flood”

Interactive public-facing portal is completed

- <https://alxfloodwatch.onerain.com>

The screenshot displays the 'FLOODACTION ALEXANDRIA' website. At the top left is the City of Alexandria logo. The main heading is 'FLOODACTION ALEXANDRIA'. Below this, a welcome message reads: 'Welcome to the City of Alexandria Rain Gauge and Stream Flow tool. If you know your watershed of interest, please click the associated button to go to that page.' A sub-heading asks 'What is a "watershed"?' and provides a brief explanation. A map titled 'WHICH WATERSHED AM I IN?' shows the city divided into eight colored watershed areas. Below the map are eight buttons, each representing a watershed: Hooff's Run Watershed (yellow), Taylor Run Watershed (grey), Potomac River Watershed (light blue), Backlick Run Watershed (green), Four Mile Run Watershed (dark blue), Strawberry Run Watershed (red), Cameron Run Watershed (orange), and Holmes Run Watershed (purple). At the bottom, a weather forecast for Alexandria, VA is shown, including a current temperature of 90° and a 7-day outlook.

City of Alexandria logo

FLOODACTION ALEXANDRIA

Welcome to the City of Alexandria Rain Gauge and Stream Flow tool. If you know your watershed of interest, please click the associated button to go to that page.

To find what watershed you are in, click on the "WHICH WATERSHED AM I IN?" button and a new pop-up window will take you to a tool where you can identify the watershed you are located in by typing in your address.

What is a "watershed"?

The map to the right is our citywide view. All the city's rain gauges and stream flow gauges are shown. Data is available for all the city's gauges. A quick tutorial for accessing the gauge data can be found here: (TBD)

WHICH WATERSHED AM I IN?

2021-08-09 16:11:37

Map showing Alexandria, VA with various watersheds and gauges marked.

Buttons for Watersheds:

- Hooff's Run Watershed
- Taylor Run Watershed
- Potomac River Watershed
- Backlick Run Watershed
- Four Mile Run Watershed
- Strawberry Run Watershed
- Cameron Run Watershed
- Holmes Run Watershed

Weather for Alexandria, VA

More at [Dark Sky](#)

Today: 90° and falling
Humid and Partly Cloudy
Wind: 7 mph (S)

Day	Today	Tue	Wed	Thu	Fri	Sat	Sun	Mon
High	91°	94°	95°	98°	98°	91°	84°	84°
Low	72°	76°	77°	77°	78°	76°	69°	71°

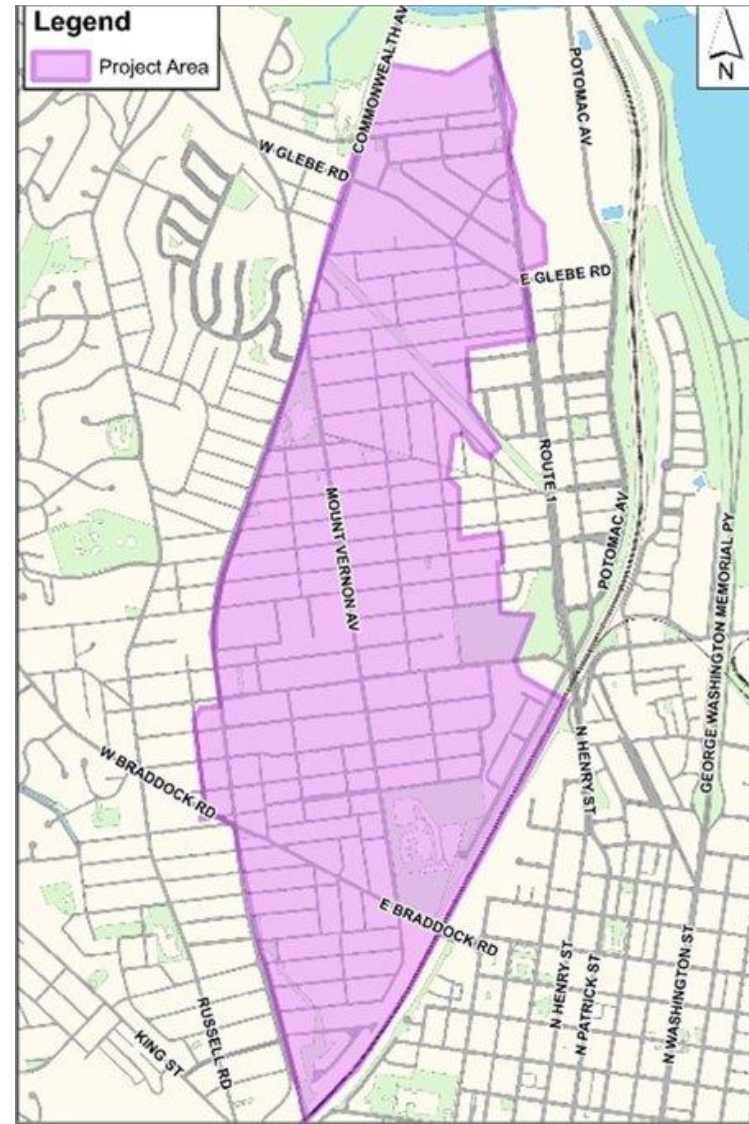
Sanitary Sewer Improvements

City of Alexandria Pilot Flood Mitigation Grant Program General Overview

Sanitary and Combined Sewers

- **Sanitary Sewer Master Plan**
 - City Council approval November 13
- **Sanitary Sewer Asset Renewal Program**
 - Phase 1 inspections completed
 - Phase 1 rehab recommendations early 2022
 - Phase 2 inspections early 2022
 - Rehabilitation contract under development

Phase 1 Asset Renewal Inspections



Sanitary and Combined Sewers

- **Combined Sewer Flooding**
 - Ongoing studies
 - Nethergate
 - Pitt/Gibbon
 - RFP for systemwide model in development



Enhanced Maintenance

Operations & Maintenance

- ✓ Inspecting and cleaning storm lines every 3-5 years
- ✓ Inspecting and clearing before storm events
- ✓ Repairing stormwater infrastructure as needed
- ✓ Stream and channel maintenance
- ✓ Maintaining large infrastructure components, such as cleaning Hooffs Run Culvert
- ✓ Inspecting internal sewers via CCTV
- ✓ Street sweeping & leaf removal
- ✓ Additional maintenance in response to service requests received via Alex311



Enhanced Communications

Enhanced Communications

FLOOD ACTION NEWSLETTER

Redesigned with reader experience in mind.



DECEMBER 2021 ISSUE 4

[ABOUT US](#) [ADVISORY GROUP](#) [ENEWS](#)

Manager's Message

A message from the Flood Action Program Manager.

Together, We Can Build Resilience to Extreme Rain Distressing Our City



I was six years old the first time I saw a major flood.

It happened in the working-class neighborhood in my hometown of Bogota, Colombia, where my family lived. Intense rains had caused a river nearby to overflow its banks and flood large swaths of the neighborhood.

Looking out a window on the second floor of the rental apartment where we lived, I saw the dirty floodwater barely a block away from our doorstep. A city bus was stranded on one of the flooded streets, with a few passengers onboard, thrashing in the water and unable to open the doors.

At that moment, a military truck arrived on the scene, and the commanding officer ordered the soldiers to get off. Their fatigues were wet and their faces weary because, indeed, they had been deployed to help



SOCIAL MEDIA

Creating informational and engaging content residents deserve.



VIDEO STORYTELLING

Expanding video storytelling on all platforms to give residents an inside look at projects and helpful information on programs.



Graphics

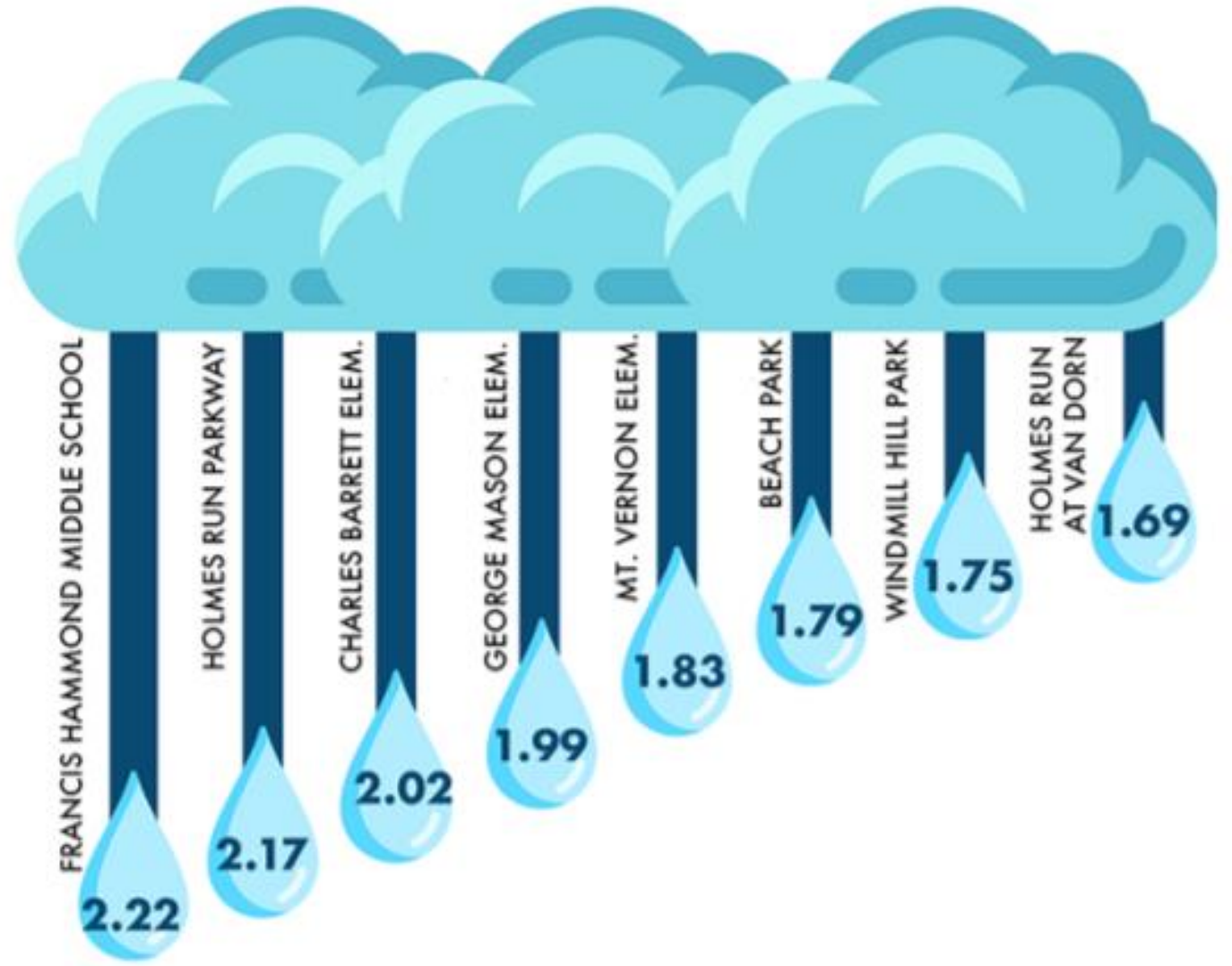
Visual representation of the rainfall data collected by the expanded rain gauge network

Tracking the data over time allows monitoring of rainfall patterns and trends

Pursuing discussions with regional partners to link gauge networks

RAINFALL LEVELS

City of Alexandria, Oct. 25, 2021



ARTIST: UMEICON, FREEPIK



Legislative Process and Flood Mitigation Grant

Legislative Process – Flood Mitigation Grant Program

- Previously not authorized to offer City grant funds for flood mitigation on private property
- Required Virginia Code legislative changes
- City helped secure legislative action to:
 - Enable municipalities to provide grant funding for floodproofing on private property
 - Allow Alexandria to initiate the Pilot Flood Mitigation Grant Program (July 2021)



Flood Mitigation Grant: Funding and Administration

FUNDING AVAILABLE FY 2022 SWU Fee

\$750,000

FUNDING MAXIMUM PER APPLICANT:

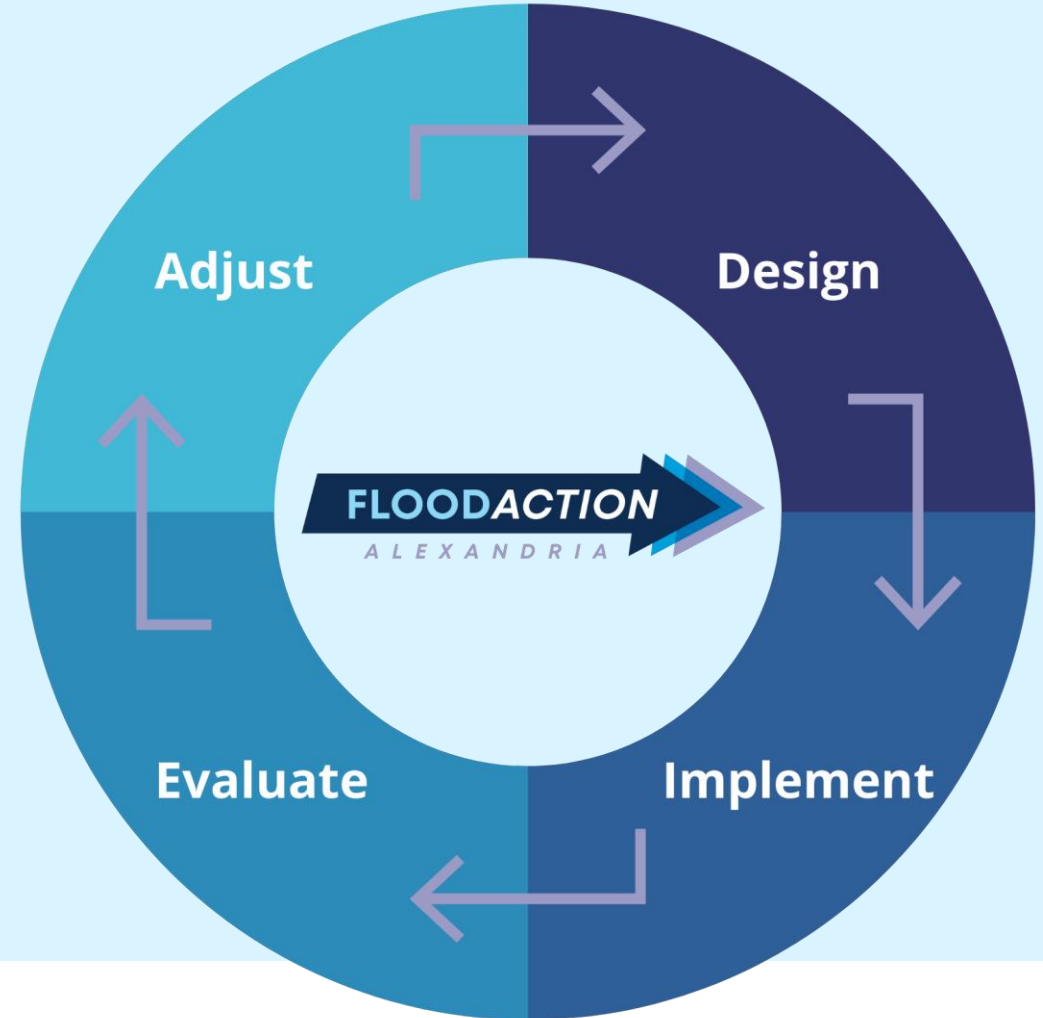
Up to \$5,000

FUNDING COST SHARE:

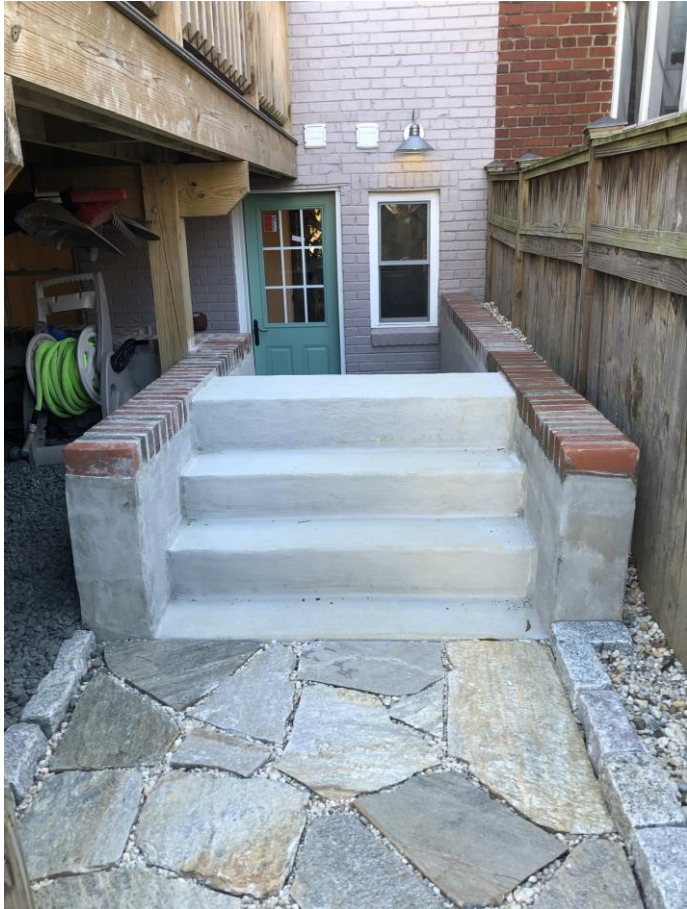
50% City / 50% Applicant

PROGRAM ADMINISTRATION:

Transportation & Environmental
Services (T&ES), Stormwater
Management Division



Floodproofing Practices



Alternative Funding

Additional Funding Sources

- Virginia Resources Authority, Virginia Department of Conservation and Recreation (DCR) Community Flood Preparedness Fund (CFPF) Grant
 - 9/5/2021 Solicitation: Awarded Commonwealth Ave / E. Glebe ST / Ashby St “Resilient Green Streets” design for the large capacity projects
 - 11/5/2021 Solicitation: Awarded Early Phase Edison and Dale Streets to accelerate #4 large capacity project (funding scheduled FY26); Awarded Waterfront Project early phase
 - Next application due April 8
 - Uncertain future due to potential changes with incoming governor
- Federal Grants



Thanks!



www.alexandriava.gov/FloodAction