FLOODACTION
ALEXANDRIA

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ABOUT US ADVISORY GROUP ENEWS

MANAGER'S MESSAGE

The 100-Year Storm Myth: Why Rain Doesn't Follow a Schedule

When you hear terms like "100-year storm" or "500-year flood" in the news, they might sound like extremely rare events. Or perhaps you have heard City staff say that we aim to design our projects to convey the runoff produced by the 10-year storm. But these numbers don't mean what they seem! The return period is just a way scientists and engineers talk about probabilities, not a fixed schedule for storms. If it is not applied correctly, this concept can lead to misinformation and inaccuracies. Below, we bust common myths about return periods to help you better understand what they really mean.

Myth: A "100-year storm" happens exactly once every 100 years.

Reality: The term refers to probability, not a strict schedule. A 100-year storm has a 1% chance of occurring in any given year—not once every century.

Myth: The return period is a reliable way to plan infrastructure.

Reality: The concept of return period assumes that future rain will happen as it has in the past. However, climate change is shifting rainfall patterns. Engineers are exploring risk-based approaches to account for uncertainty instead of relying solely on historical return periods.

Myth: The media always accurately reports the return periods of precipitation events.

Reality: News outlets often use return periods as dramatic labels for extreme weather. While it's useful for public communication, it can lead to misunderstandings.

Myth: Return periods are uniform across a watershed.

Reality: Rainfall can be highly variable across a watershed; therefore, in some parts of the watershed the storm may have a high return period different from other locations in the watershed where the same storm may have a low return period.

Myth: A 100-year storm always produces a 100-year peak flow.

Reality: The return period refers to rainfall intensity, but peak flow (how much water moves through rivers or drainage systems) depends on factors like soil saturation, soil cover, land use, and other watershed variables. A "100-year storm" might not generate a "100-year flood."

We hope these myth busters bring some light to this subject.

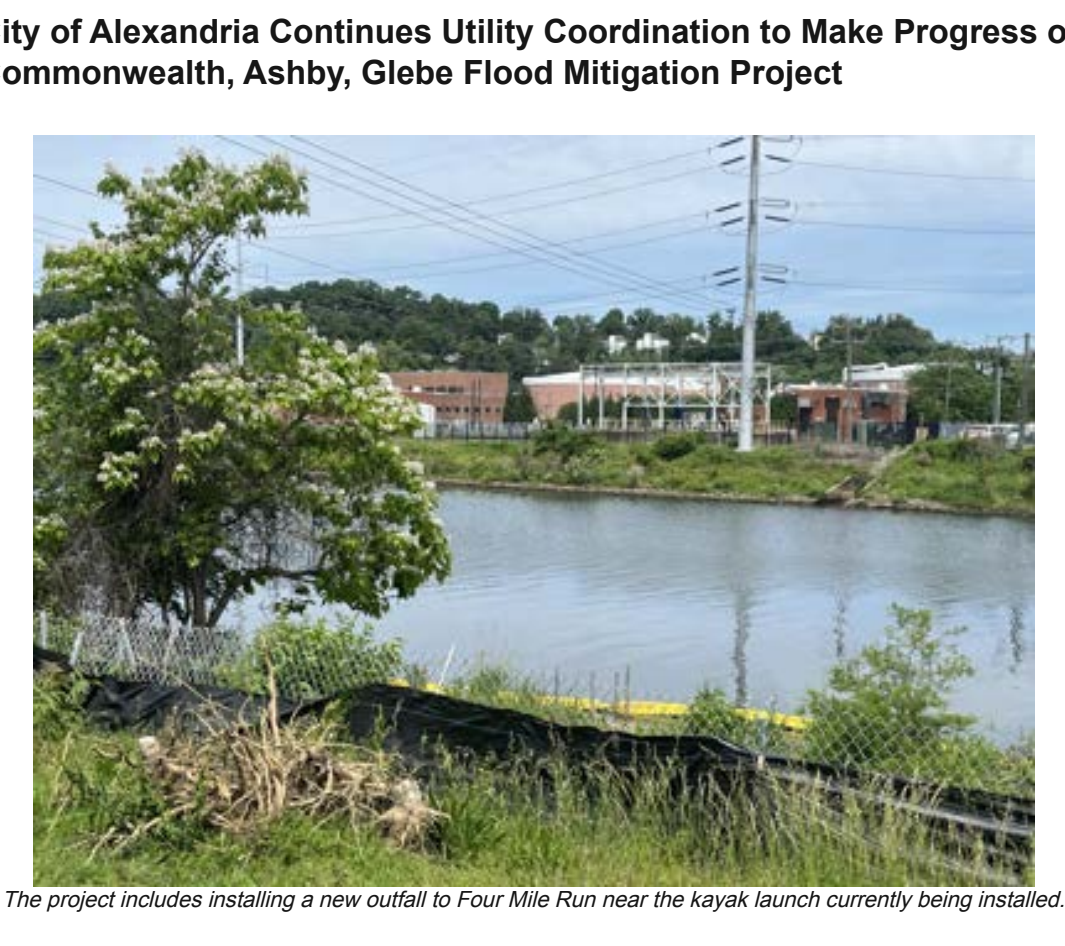
Dan Medina, Program Manager of Flood Action Alexandria.

Editor's note: The Manager's Message is a periodic editorial authored by senior leaders of the Flood Action Alexandria Program.

PROJECT UPDATES

LARGE CAPACITY PROJECTS

City of Alexandria Continues Utility Coordination to Make Progress on Commonwealth, Ashby, Glebe Flood Mitigation Project



The project includes installing a new outfall to Four Mile Run near the kayak launch currently being installed.

City staff continue designing a significant project to bring flood relief near Arlandria, Lynn Haven, Del Ray, and Cora Kelly school. With the final design stage approaching, staff are focused on meeting with utility, water, and gas companies to coordinate construction work and relocation needs.

The Commonwealth, Ashby, Glebe Flood Mitigation Project will reduce flooding near the intersections of Commonwealth Avenue and E. Glebe Road, and Ashby Street and E. Glebe. The estimated $50 million project plans include installing new parallel relief sewers to increase stormwater capacity on Commonwealth and E. Glebe. A junction will be installed on E. Glebe to connect the Ashby and Montrose Ave. storm sewer to the new one on E. Glebe. The City will also install a new outfall to discharge flows to Four Mile Run, new inlets along Commonwealth, Ashby, and Montrose, as well as green infrastructure elements on Commonwealth Ave. to enhance water quality.

The City finished test pit operations in April, a process of digging holes in a project area to help in locating underground utilities. Project staff will use the results of these tests to finalize the design and make any possible alignment adjustments.

This spring, following up on open house events, City staff met with several civic and homeowner associations to share information about the work included in the project, anticipated traffic impacts, and expected timeline. Staff also answered questions from association members.

Construction is expected to begin in the summer of 2026 and continue for about three years, completed in phases. More information about the project and its phases can be found in the virtual meeting room link on the project webpage.

See More Large Capacity Projects ➜

NEIGHBORHOOD SPOT IMPROVEMENT PROJECTS

Preparations Begin for Hume Avenue Bypass Project

Inlets help capture stormwater from the streets and into the underground storm sewer.

Utility relocation coordination is underway to prepare for the installation of new storm and sanitary sewer systems along Hume Avenue, East Raymond Avenue, and Dewitt Avenue.

Energy provider Dominion Energy will be installing a temporary overhead power line along Hume Avenue to replace the underground line. Underground lines will be reinstalled as part of the project's completion. Fiber, water mains, and gas mains along Hume, E. Raymond, and DeWitt will also be relocated to make space for the new storm sewer.

The Hume Avenue Bypass Project calls for installing an alternate storm sewer along Hume Ave. to bypass the existing pipe, as well as new storm sewers and inlets along E. Raymond Ave. to capture additional stormwater. The project will provide flood relief to homes fronting on Hume Ave. and E. Raymond Ave.

While this project is underway, the City will also be upgrading the sanitary sewer along E. Raymond, and Hume Ave. will be resurfaced. Approximately $5 million is invested in the project.

In June, the City will perform additional test pits, which helps locate underground utility infrastructure, like gas and water mains, and ensure the soil is suitable for the new infrastructure.

Power service relocation is also expected to be complete in June, with the relocation of fiber, water, and gas mains expected to immediately follow.

City Seeks Community Feedback on Valley Drive Storm Drain Improvement Project

VALLEY
CRESTWOOD

A new storm sewer will be installed along Crestwood Drive.

City staff want to hear from residents around Valley Drive, Crestwood Drive, Summit Avenue, and Dogwood Drive as design progresses to mitigate flooding in the area.

The Valley Drive Storm Drain Improvement Project will improve the local drainage system and capture floodwater before it ponds in low-lying areas and threatens homes.

Design plans include relocating the current storm pipe to align with the existing Valley Dr. right-of-way, and installing a new storm pipe along Crestwood Dr. to connect with the existing structure at the intersection with Valley Dr. The City will also install new inlets and manholes along Crestwood Dr., Valley Dr., and Summit Avenue, and upsize many of the existing inlets along Valley Dr. to increase capacity of the storm sewer.

The estimated $3.9 million project is in the 30 percent design phase, the first of three design milestones. The City applied for a Virginia Department of Conservation and Recreation (DCR) Community Flood Preparedness Fund (CFPF) grant to supplement local funding and is waiting for announcement of awards. During the current 30% design is phase the City is seeking community feedback from area residents through an online survey.

The survey is about ten questions focused on previous flooding experience, including the type of flooding and frequency, and information about structures and drainage systems on the property. The goal of the survey is to better understand current conditions and existing private connections to the storm sewer systems in the project area.

City staff expect to host outreach events following the 30 and 60 percent design phases in order to share progress updates and hear community feedback on the proposal. Once scheduled, those events will be announced to residents in the area.

To date, the City has received 61 survey responses.

The survey will be open through July 25. A link is available on the project webpage and above.

Coordination Continues to Relocate Water Mains for West Reed Avenue Curb Inlet Improvement Project

New inlets will be installed along W. Reed Ave. to alleviate flooding near Hume Springs Park.

The City is nearing the final design for a project to alleviate flooding near the Dale Street Community Garden and Hume Springs Park.

The 100 W. Reed Avenue Curb Inlet Improvement Project includes installing inlets along W. Reed Ave., as well as upgrading the pipes running under Hume Springs Park and Dale Street Community Garden. These measures will allow more stormwater to be captured and conveyed through the sewer system instead of ponding on the surface. The estimated $2.3 million project is another component of the Edison and Dale Large Capacity Project to provide flood relief to the Hume Springs neighborhood, which was accelerated after receiving a state CFPF grant.

In April the City completed test pitting, a process of digging underground to test the soil and locate utilities such as water mains and gas lines. These results were used to identify locations critical to the planned storm sewer upgrades.

The City will continue to work with water provider Virginia American Water to make sure relocations and protection measures are properly in place.

Project staff are also working with Washington Gas to relocate the existing gas main on Dale Street. These plans are currently underway.

The City expects to complete the final project design following review of all final relocation plans.

Construction Phase Nears on Edison Street Cul-de-Sac Drainage Improvement Project

The project will mitigate flooding near the Betty King Entrance to Four Mile Run Park off Edison St.

City staff are preparing to kick off the construction phase of a project to alleviate flooding near the Edison Street cul-de-sac.

The City is coordinating utility relocation in the project area as staff complete the final stages of design review.

As part of the approximately $980,000 project, the City will be upgrading the storm sewer system that collects water from the Edison St. cul-de-sac and discharges into Four Mile Run to increase its capacity and reduce flood risk. The City will also be installing additional inlets at the intersection of Edison St. and Mark Dr.

This project, along with the 100 W. Reed Avenue Curb Inlet Improvement Project, received grant funding from the state CFPF to accelerate these two portions of a future large capacity project to provide more flood relief to the Hume Springs area.

City staff will hold a community meeting with residents in the project area prior to the start of the construction bidding process. When available, information about that meeting will be available on the project webpage.

Additional Investigation Requested Ahead of Clifford, Fulton, Manning Design Milestone

The project will mitigate flooding near the alley between Fulton Street and Manning Street.

The City is making progress on a project to provide flood relief to townhomes along Fulton Street and Manning Street, and project managers are requesting additional underground testing.

The approximately $830,000 project calls for rebuilding the alley to better convey surface stormwater runoff, as well as installing inlets and underground storage to detain stormwater.

The City will be investigating the condition of the existing storm sewer in the alley using CCTV footage. Project staff will also be conducting additional soil testing to ensure it can support the work within the alley.

In March, City staff held a meeting with the neighborhood to discuss the project scope and goals. Staff expect to continue community outreach efforts during design.

The City expects to reach the 90 percent design phase in July after receiving the additional investigation results.

Kick-Off Meeting Held for Eisenhower Culvert Improvement Project

Culverts in Lake Cook carry water underneath Eisenhower Avenue to Cameron Run.

City staff are in the planning phase and are preparing to begin design of a project to improve drainage through the culverts underneath Eisenhower Avenue near Lake Cook.

The project includes inspecting the culverts, which carry water from Lake Cook to Cameron Run, and conducting any repairs that are needed. This work will help to reduce flood risk along Eisenhower Ave. and near Lake Cook, protect the surrounding environment, and prevent issues in the future.

The infrastructure of the culverts is aging. Preliminary investigations show deteriorating conditions with some corrosion and bending.

City staff hosted a neighborhood kick-off meeting on May 15 to introduce the project, current conditions of the culvert, discuss the project purpose and proposed timeline, and answer questions from community members.

Design on the estimated $2.1 million project is expected to extend through summer 2026, with the construction phase lasting an additional two years.

See More Spot Improvement Projects ➜

FLOODACTION
ALEXANDRIA
Explore the City's flood mitigation projects
Get the latest project status updates
Visit the City's interactive project map
alexandriava.gov/FloodAction

NEWS

Flood Action Alexandria Investment Continues with Approved City Budget

On April 30, the City Council adopted the FY 2026 operating and capital improvement budgets.

The approved budget includes a 5 percent increase in the fiscal year Stormwater Utility Fee rate from $324.10 to $340.30 for a typical single-family home. This revenue, generated along with new debt issuance, will fund about $37 million in capital project spending for FY 2026 to continue acceleration of capital projects and operation and maintenance (O&M) programs to mitigate flooding.

The budget also includes more than $280 million in planned capital funding in the approved FY 2026 – FY 2035 Capital Improvement Program (CIP).

In addition to funding capital infrastructure and O&M, the budget includes funding for water quality projects to meet regulatory requirements and the City's Flood Mitigation Grant Program. This Program provides a 50/50 match of up to $5,000 for installed eligible floodproofing practices for property owners, or a match of up to $25,000 for floodproofing practices installed by associations in common areas.

The approved budget continues to provide funding to accelerate projects and programs under Flood Action Alexandria that help mitigate flooding and make the City more resilient.

Community Outreach to Begin for the City's First Flood Resilience Plan

Riverine flooding like pictured above generally happens in a streams' waterbed when it exceeds capacity.

City staff are planning community outreach opportunities in the coming months to learn more about the impacts of flooding.

The outreach efforts are part of the City's development of its first Flood Resilience Plan. Identified in the City's Energy and Climate Change Action Plan and key to progressing the Flood Action Alexandria Program, the Flood Resilience Plan will address hazard identification, flood mitigation, flood preparedness and response, policies and regulations, funding strategies, and communication and information dissemination.

Working with a consultant, City staff launched a community survey to learn more about how people are impacted by flooding, and what kind of flooding they experience.

Last fall, the City received a $525,000 CFPF grant to develop the Plan to make the City more resilient to flooding issues. The grant is a 75/25 match, with the City providing $175,000 in local matching funds to develop the Plan, to bring total project funding to $700,000.

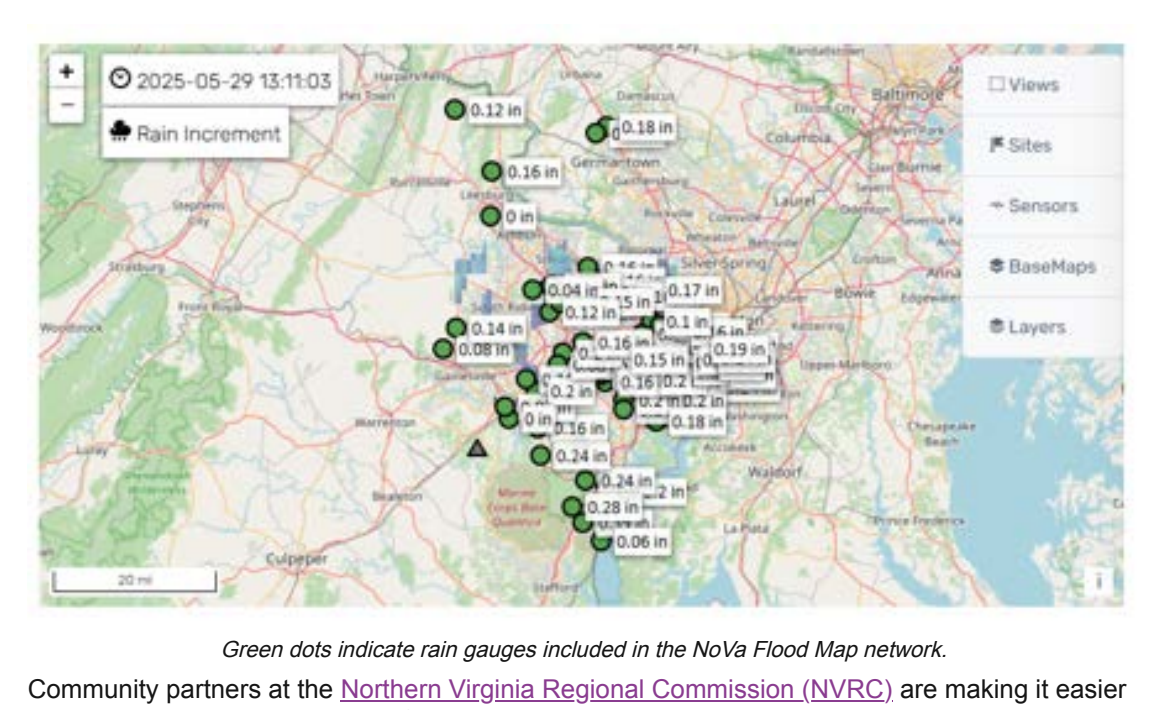
According to DCR, flood resilience is "the capability to anticipate, prepare, respond to and recover from flood hazards to minimize damage to social well-being, health, the economy, and the environment."

The survey is asking residents to share information about the types of flooding they have experienced and how they have been affected. Responses will help shape the future of the City's efforts to reduce flooding. It is available on the Flood Resilience Plan website through its closing in September.

The City will also be holding several pop-up events this summer, as well as a community meeting this fall. Information about those events will be released online, and on the Transportation and Environmental Services (T&ES) social media accounts.

More information about the Plan will also available on the City website.

Find Near Real-Time Rain Gauge Data in Region's First Collaborative Flood Map

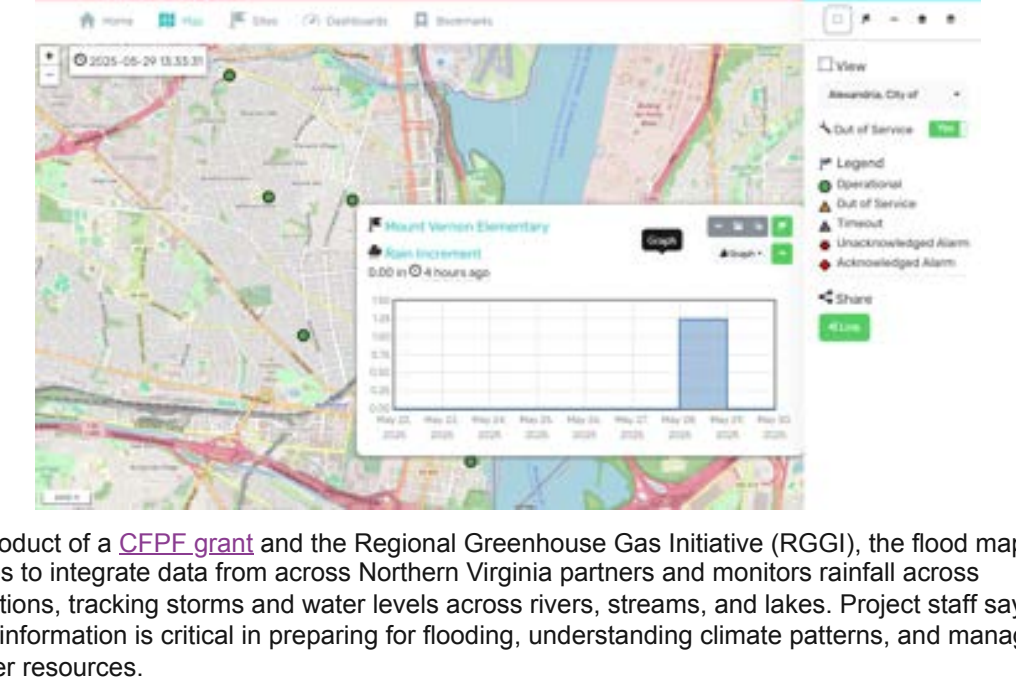


Green dots indicate rain gauges included in the NoVa Flood Map network.

Community partners at the Northern Virginia Regional Commission (NVRC) are making it easier to share rain data to learn about flood patterns and preparedness needs with the NoVa Flood Map rain gauge platform.

The City launched its public-facing rain gauge portal in 2021, which takes measurements at gauges across the eight local watersheds. The portal was launched as an effort to expand early warning information and better prepare for flash flood events.

As a response to Alexandria and other local jurisdictions launching rain gauge portals, NVRC began working on a platform to bring all this near real-time rain gauge information from different localities onto a synchronized location to make it accessible across Northern Virginia. Launched in March 2025, the NoVa Flood Map is the region's first rain gauge platform.

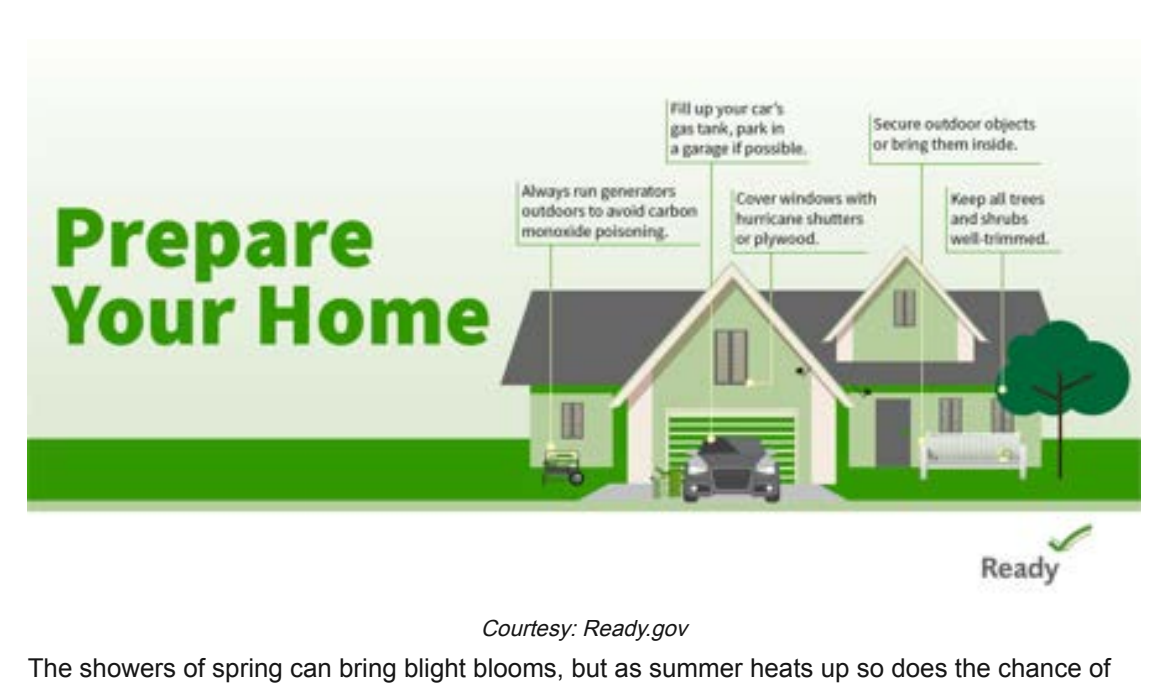


A product of a CFPF grant and the Regional Greenhouse Gas Initiative (RGGI), the flood map helps to integrate data from across Northern Virginia partners and monitors rainfall across locations, tracking storms and water levels across rivers, streams, and lakes. Project staff say this information is critical in preparing for flooding, understanding climate patterns, and managing water resources.

Users can browse the map, narrowing the search by rain gauge locality. Hover over a selected rain gauge to find more information and previous rainfall log. The measurements are updated every five minutes. Additional information can also be found using the tiles underneath the map.

The NVRC will have the platform for five years. During that time staff are exploring ways to grow, like expanding the rain gauge network with additional monitors, more options for dashboard specifications, or develop post-rain event data analysis.

Prepare Your Home for Hurricane Season


Prepare Your Home
Always run generators outdoors to avoid carbon monoxide poisoning.
Fill up your car's gas tank, park in a garage if possible.
Cover windows with hurricane shutters or plywood.
Secure outdoor objects or bring them inside.
Keep all trees and shrubs well-trimmed.
Ready

Courtesy: Ready.gov

The showers of spring can bring blight blooms, but as summer heats up so does the chance of stronger storms crossing our path.

The Atlantic hurricane season begins June 1 and continues through November 30. Colorado State University Department of Atmospheric Science is predicting above average activity in 2025, with 17 named storms.

Now is the time to prepare.

The Flood Mitigation Grant Program provides property owners with partial reimbursement for installing eligible flood proofing practices. Since its launch in 2021, the City has reimbursed more than $1.1 million.

The program offers up to 50 percent of the total project cost up to a maximum $5,000 for private property owners, and up to $25,000 for homeowner or condo association common areas.

There are nearly two dozen eligible practices including indoor and outdoor flood proofing. A full list is available on the Flood Mitigation Grant Program website.

The grant program aims to encourage property owners to take action while the City develops larger flood mitigation infrastructure projects.

But that's not the only line of defense.

Homeowners are encouraged to prepare for hurricane season by exploring options for flood insurance. Policies through the FEMA National Flood Insurance Program covers losses caused by flood, a gap in most homeowners insurance policies.

According to FEMA, more than $5 million of claims have been paid by NFIP in Virginia in the last ten years.

The City participates in the NFIP Community Rating System (CRS) program, a voluntary incentive program which encourages floodplain management practices which exceed federal minimum standards. The City holds a Class 6 Rating, which secures a flood insurance discount of up to 20 percent for Alexandria property owners.

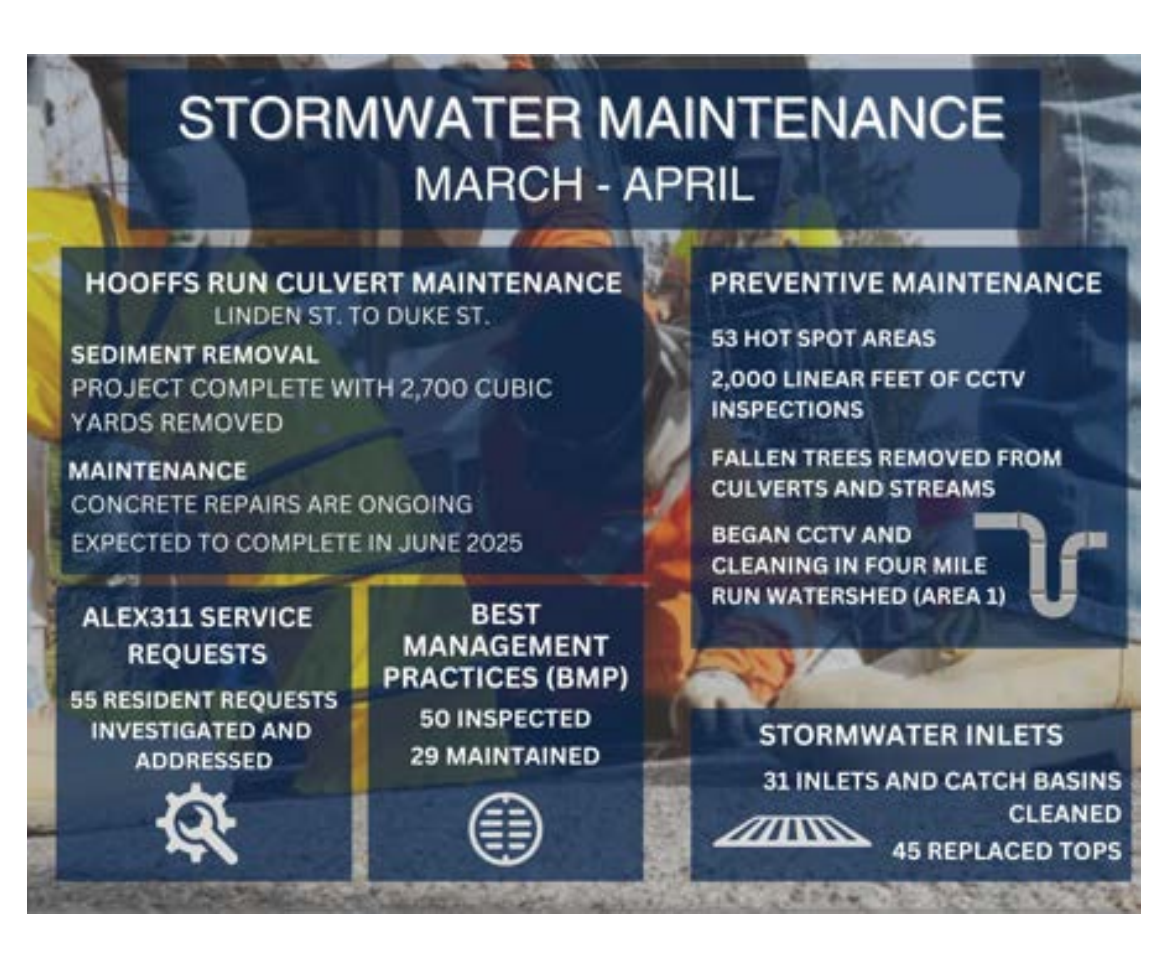
There are a few important things to keep in mind while exploring flood insurance options. Many policies have a 30-day waiting period before coverage is active. Secondly, it's important to understand the type of coverage included in your policy. Some may cover damage caused by specific types of flooding and not others. There also may be limitations for basement coverage.

Information on flood insurance and how to explore options is available on the City's flooding webpage.

As the heart of hurricane season approaches, residents are encouraged to contact Alex 311 to report any inlets that me be clogged with debris, downed trees, or any other cleanup needs.

Alex 311 can be contacted by phone, through the Alex 311 app, or on the Alex 311 website.

COMMUNITY MAINTENANCE WORK



STORMWATER MAINTENANCE
MARCH - APRIL

HOOFFS RUN CULVERT MAINTENANCE
LINDEN ST. TO DUKE ST.
SEDIMENT REMOVAL
PROJECT COMPLETE WITH 2,700 CUBIC YARDS REMOVED
MAINTENANCE
CONCRETE REPAIRS ARE ONGOING
EXPECTED TO COMPLETE IN JUNE 2025

PREVENTIVE MAINTENANCE
53 HOT SPOT AREAS
2,000 LINEAR FEET OF CCTV INSPECTIONS
FALLEN TREES REMOVED FROM CULVERTS AND STREAMS
BEGAN CCTV AND CLEANING IN FOUR MILE RUN WATERSHED (AREA 1)

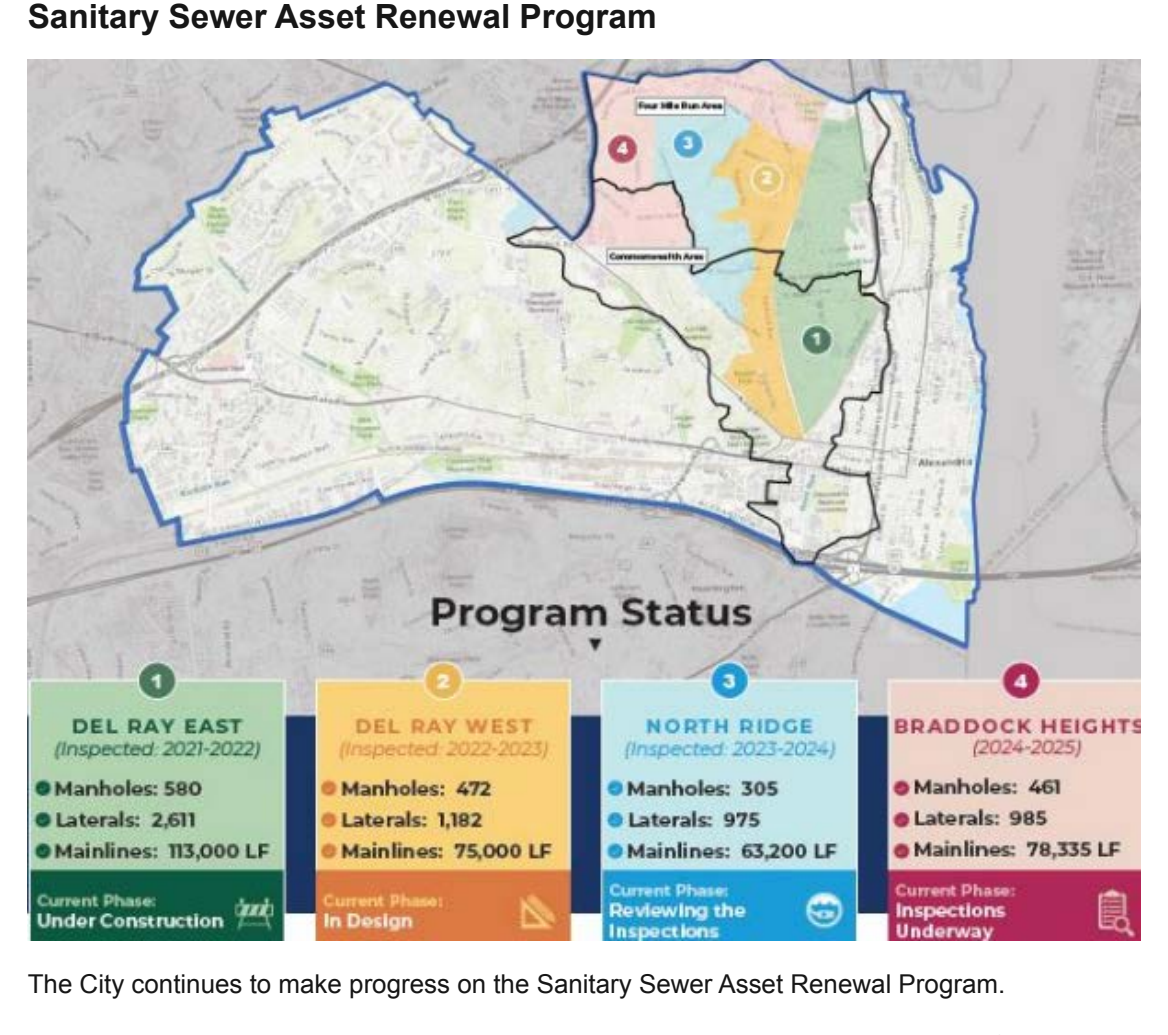
ALEX311 SERVICE REQUESTS
55 RESIDENT REQUESTS INVESTIGATED AND ADDRESSED

BEST MANAGEMENT PRACTICES (BMP)
50 INSPECTED
29 MAINTAINED

STORMWATER INLETS
31 INLETS AND CATCH BASINS CLEANED
45 REPLACED TOPS

SNAPSHOT

Sanitary Sewer Asset Renewal Program



1 DEL RAY EAST (Inspected: 2021-2022)
- Manholes: 580
- Laterals: 2,611
- Mainlines: 113,000 LF

Current Phase: Under Construction

2 DEL RAY WEST (Inspected: 2022-2023)
- Manholes: 472
- Laterals: 1,182
- Mainlines: 75,000 LF

Current Phase: In Design

3 NORTH RIDGE (Inspected: 2023-2024)
- Manholes: 305
- Laterals: 975
- Mainlines: 63,200 LF

Current Phase: Reviewing the Inspections

4 BRADDOCK HEIGHTS (2024-2025)
- Manholes: 461
- Laterals: 985
- Mainlines: 78,335 LF

Current Phase: Inspections Underway

The City continues to make progress on the Sanitary Sewer Asset Renewal Program.

Manhole and Mainline rehabilitation in the Del Ray East phase is complete, and the City is preparing to begin rehabilitating laterals. The Invitation to Bid (ITB) for this project is expected this summer.

The City is working to inspect and rehabilitate all City sanitary sewers, manholes, and City-owned portions of lateral sewers through the Sanitary Sewer Asset Renewal Program. Divided into four phases, this work will help preserve and protect existing City-owned sewer infrastructure, extend its useful life, and protect against pipe collapses and other emergency repairs. It also helps to reduce infiltration and inflow (I&I), which helps reduce sewer back-ups in homes and businesses.

Inspections on the Del Ray West and North Ridge phases are complete and are now underway in Braddock Heights.

The City is investing $36 million over ten years in the program.

FROM THE FLOOD ACTION ADVISORY GROUP

Stormwater Knows No Boundaries

Basement backups are the worst! It's bad enough when a severe rainstorm floods the roads and sidewalks and the rising rainwater laps against the front door sill. But when sewage flows in the opposite direction and starts coming out of your basement sink or toilet – that's the worst aspect of stormwater flooding.

Basement backups occur when rainwater flows into the sanitary sewer system through manhole covers, leaky pipes, and yes, even some roof downspouts and sump pumps that drain to the sanitary system. The excess water overwhelms the capacity of the sanitary sewer mains. With nowhere to go, the back pressure forces the unsightly mix of stormwater and sewage to the only available opening – a basement sink or toilet that is below street level.

So, are basement back-ups a sanitary sewer problem or a stormwater problem? Well, it's both. The Flood Action Program includes a ten-year effort to keep stormwater out of the sanitary sewer system – and expand the capacity of the sanitary system in those areas where basement back-ups are most severe.

The Stormwater Advisory Committee was recently briefed on the progress of this ten-year effort to reduce basement backups. This important work has been underway for about five years with the utterly undescriptive title, "The Sanitary Sewer Asset Renewal Project."

The amount of work that is underway is impressive. Here are some numbers:

- Over 1800 manholes are being inspected for leaks – many of these are being fitted with new waterproof covers.
- Almost 1600 lateral pipes that connect homes to the sewer mains are being inspected for leaks and repaired.
- Over sixty-five miles of sewer mains are being inspected by robot camera and, in many cases, relined with an impervious membrane to stop any rainwater inflow.

This work will keep rainwater out of the system. There are four other projects that go one step further – to expand the size of the sewer main so that it has the capacity to handle the extra rainwater that inevitably flows into the sanitary sewer system during the most severe rainstorms. You have probably seen the work crews digging up the streets around Alexandria. There is work being done in Del Ray, Rosemont, Old Town, Arlandria, and elsewhere. The old iron pipes are being replaced with new plastic pipes of much greater diameter.

Stormwater knows no boundaries. It always seeks the lowest level and will mix with whatever water is already down there. In any city, that's the sanitary sewer system. The Flood Action Program includes a comprehensive effort to keep that mix of storm and sewer water out of your basement.

John Hill
Chair, Stormwater Utility and Flood Mitigation Advisory Committee

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STORMWATER STEWARD

Technical Project Manager Jon Whiteleather (right) speaks with consultants during a site visit to the Commonwealth, Ashby, Glebe project area.

The City's engineers are dedicated to solving problems. With each project comes its own set of hurdles and challenges.

For Technical Project Manager Jonathan Whiteleather, these challenges push him towards progress.

"In this area with the Chesapeake Bay, it's a huge component. We're kind of on the vanguard of stormwater management in a lot of ways," Whiteleather said. "It has huge importance, and it's always tied to a lot of the things we do."

Whiteleather, a graduate of University of Maryland, has spent nearly 15 years working in stormwater management across Maryland and Virginia, spending about ten years in the private sector. Throughout this time his work focused on stormwater drainage, erosion and sediment control, helping to get projects permitted. He says while he was completing essential parts of a project, the purpose was not solving existing flooding problems.

"That was one of the things that made me want to join the City," Whiteleather said. "Working to try and address flooding problems, it's definitely something I valued. You can take a problem that's affecting somebody and use all those skills I learned to try and fix that."

Whiteleather joined the City in 2021, working on smaller spot projects, like the North Overlook Drainage Improvement project completed last year, and planning combined sewer projects.

He was also quickly brought on to manage the Flood Action Alexandria program's largest current infrastructure project: the Commonwealth, Ashby, Glebe Flood Mitigation Project.

Seeing ground moving on projects is rewarding, Whiteleather says, and important to the program and community to see projects cross the finish line. But the most important thing is making sure construction will go smoothly once started. That's why projects like Commonwealth, Ashby, Glebe take time, and continued dedication to solve problems, and improve the quality of life for the Alexandria community.

"It's very expensive to figure things out once you're already digging a hole in the ground. This is a very dense city, you really need to coordinate to make sure you can move everything out of the way to build these pretty large culverts and pipe systems," Whiteleather said. "We understand that these flooding issues have been going on for awhile and that has real life implications. Just know the time we're taking is really just to make sure we can do it, put a good project together, and we run smoothly once it starts."

Outside of his time in the office, Whiteleather enjoys playing guitar and spending time with his daughter.

The Flood Action Alexandria newsletter is produced by City staff. Email us at stormwater@alexandriava.gov.