Path to Flood Resilience
Crossman Run

Flood Resilient Arlington

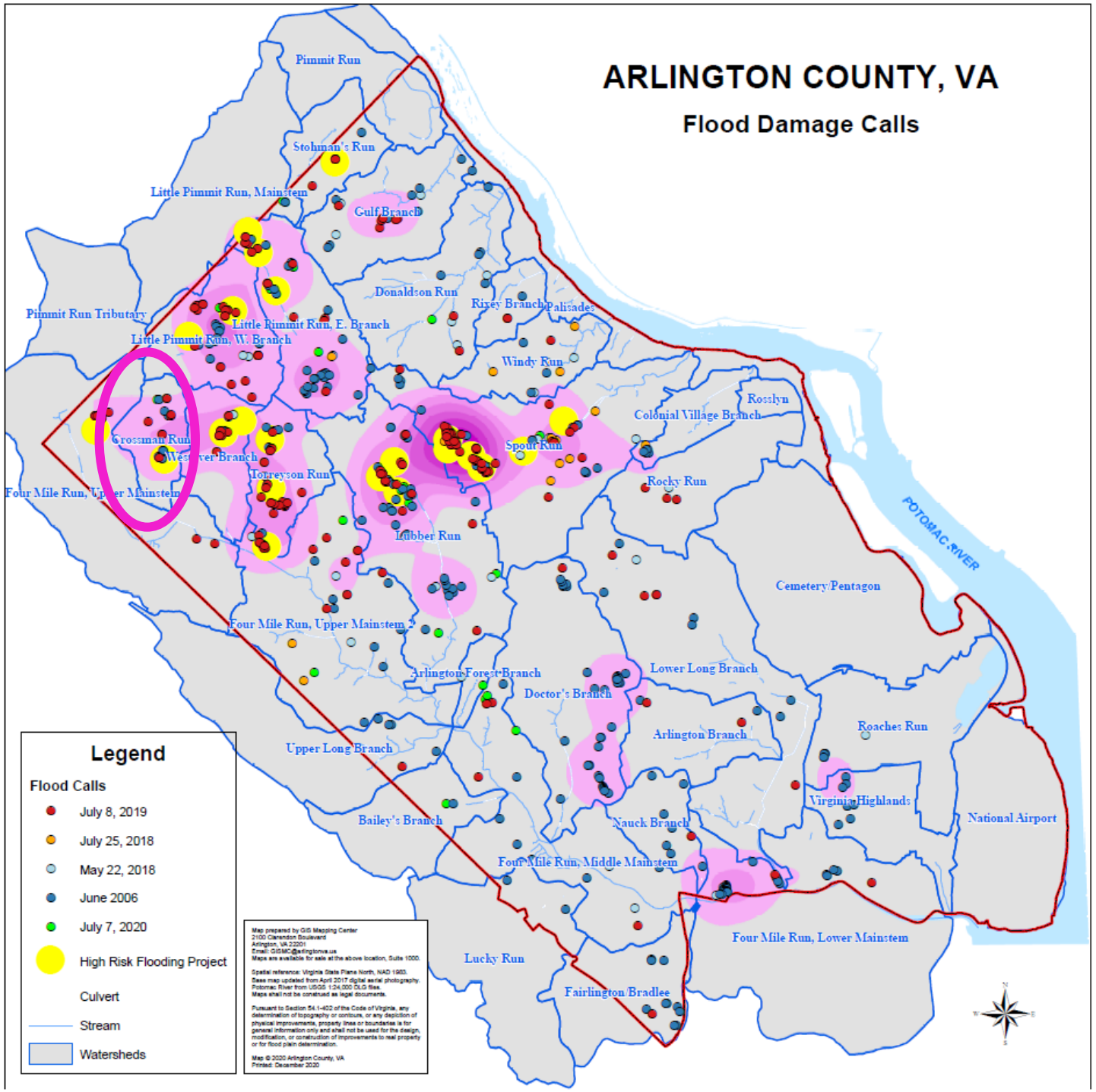
November 9, 2022

ARLINGTON
VIRGINIA

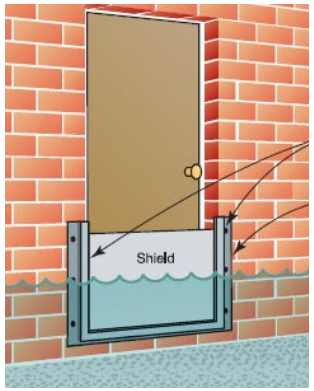
Agenda

- Why are we having this discussion?
- Flood Resilient Arlington
- Resilience
- Causes of Flooding and Overland Relief
- Progress since last meeting
- Discussion of Conceptual Design Options
- CIP Funding
- Brief Updates on other Initiatives
- Questions

Note: Crossman Run is one of the five critical watersheds that experienced severe flooding in 2019.



Key Elements of Flood Resilient Arlington



- Analytics and Data Assessment
- New Types and Locations for Capacity Projects
- Increased Stormwater Requirements
- Increased Funding
- Voluntary Property Acquisition
- Floodproofing Outreach

Mapping Program Investments

Legend

Watersheds

Storm Water Management Projects

Program / Status

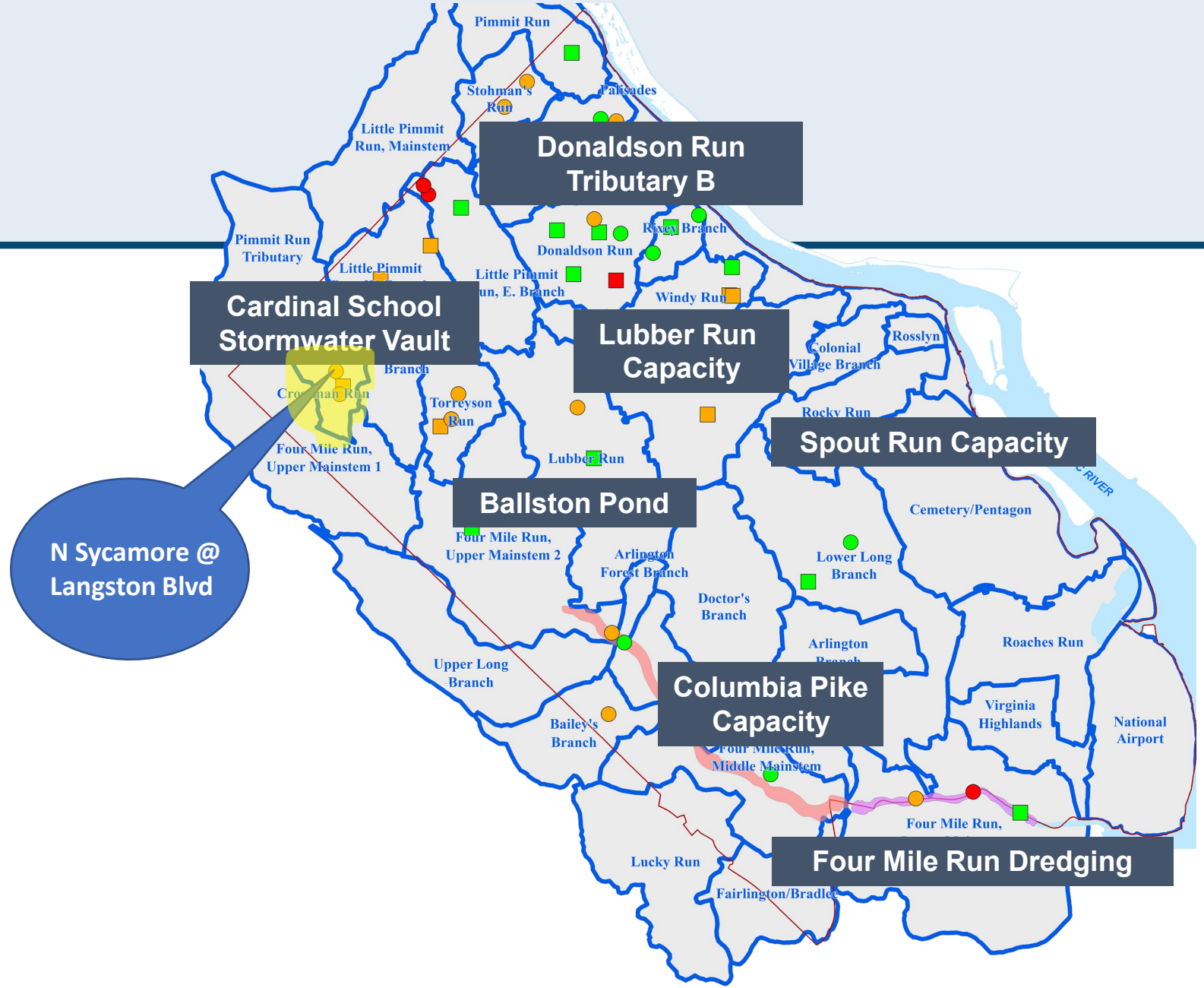
- Capacity Complete / Under Construction
- Capacity / Planned
- Maintenance Capital / Complete
- Maintenance Capital / Planned
- Water Quality / Complete
- Water Quality / Planned

Past Storm Water Management Initiatives

- Flood Control 1984
- Flood Plain Aquisition 60's-70's

Other Map Elements

- County Line
- Potomac River



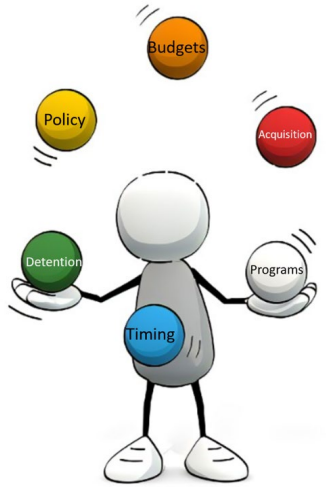
County Watersheds

Legend

- Watershed Boundary
- Stream and Open Channels
- Landmark Buildings
- Major Roads
- Potomac River
- County Line

Target program areas for Capacity Improvements program

Balancing Stormwater Priorities and Issues



Floodplain, Zoning and Building Code Regulations

Overland Relief Pathway Easement, Acquisition

Floodproof/Elevate structures, Remove fences blocking flow path, remove driveways sloping towards home

Infrastructure for safe conveyance – underground structures, flood walls, swales

The Stormwater Team is working on all of these priorities and has multiple initiatives underway

Causes of Flooding

Some properties are at a higher risk of flooding due to their location in former stream valleys.

- During Arlington's early development, there were no stormwater management regulations, and standards for storm systems were less rigorous than today.
- Streams were buried in stormwater pipes and homes and businesses were built within the former floodplains.
- Given the low topography in these former stream valleys, these areas remain at higher risk of flooding despite the presence of the underground stormwater pipes.

Stormwater System Design Standards and Overland Relief

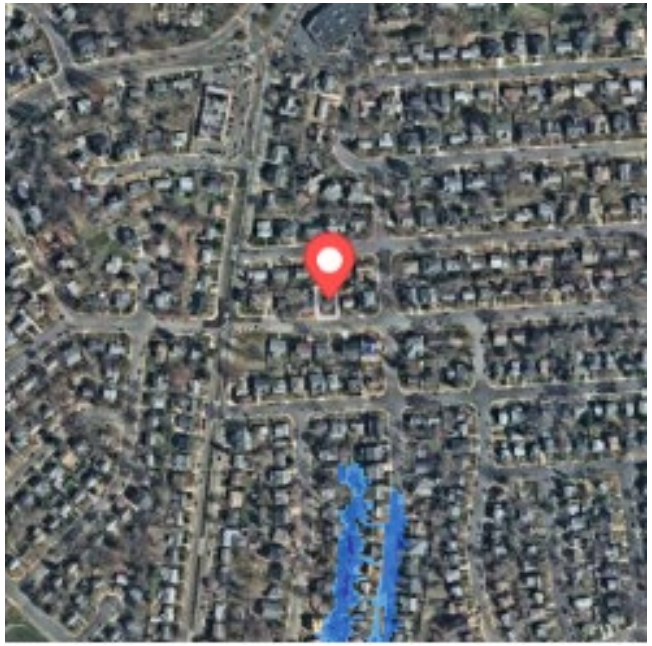
- Over time, the US government has collected rainfall data. This database of storm events is used to define the likelihood of a storm occurring.
- The 10-year storm is defined as having a 10% chance of happening each year, 100-year storm a 1% chance.
- Currently, stormwater systems are designed for a 10-year storm, with the assumption that there is overland relief present for larger storms.
- Overland relief is a safe pathway for stormwater to flow for storms greater than the 10-year storm.

Since many areas in Arlington developed before the adoption of stormwater design standards which included overland relief, there is limited, or no, overland relief in many watersheds, including Crossman Run.

Goal = 10-Year storm + Overland Relief

Overland relief does not exist for this area!
This area will always have some flood risk.

ARLINGTON VIRGINIA



Know Your Flood Risk

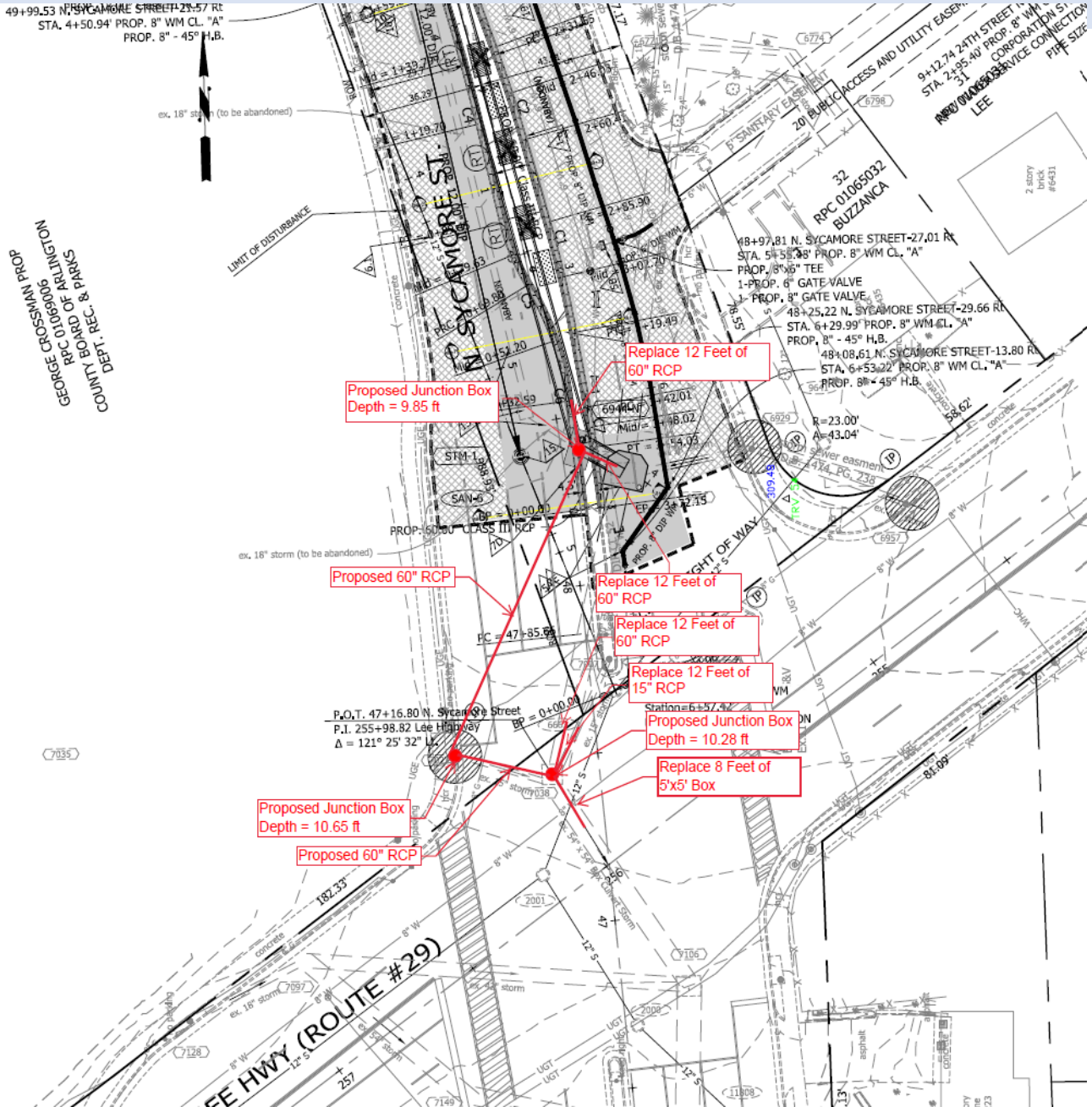
Riskfactor.com

Riskfactor.com provides risk assessment information to the public and is being promoted by major real estate listing websites such as Redfin,

Climate Alpha is another web tool which is a licensed service that projects property values over time as they may be impacted by climate change.

https://climatealpha.ai/

Progress in Crossman Run



Last met with Community June 1, 2022

- **Initiated Design of Improvements to Intersection at Langston Blvd and N Sycamore, in conjunction with Transportation projects. (See next slide.)**
- **First Land Acquisition (6415 24th St. N) completed**
  - **Demolition of house completed**
  - **Tree planting to begin soon**
- **Secured substantial CIP funding – see slide on CIP funding**

3 Related Projects

- **Crossman Run Storm Improvement project**
- **N Sycamore Complete Streets Project**
- **Bus Bay expansion at East Falls Church Metro Station**

The three projects are being coordinated in this area to reduce disruptions.

N Sycamore Street Complete Streets is in the Concept Design phase.

- **Engagement form on project page (closes Nov. 20)**

Links to all three projects are provided below:

Crossman Run Stormwater Improvements – Official Website of Arlington County Virginia Government (arlingtonva.us)

N Sycamore Street Complete Streets Project – Official Website of Arlington County Virginia Government (arlingtonva.us)

Bus Bay Expansion at East Falls Church Metro Station – Official Website of Arlington County Virginia Government (arlingtonva.us)

Crossman Run Stormwater Improvements @ Langston Blvd & N Sycamore (SD38)

- 60-inch pipes at Langston Blvd. tie into 72-inch pipes and a 5’x5’ concrete box culvert.
- Pipes will be enlarged at intersection (requires VDOT approvals)
- Project may be bid with Transportation plans for efficiency, but contractor will determine order of construction for various intersections.
- Work plans and schedules still under development
- Construction planned for Spring/Summer 2024

Crossman Run Stormwater Improvements – Official Website of Arlington County Virginia Government (arlingtonva.us)

Demolition

Of house at

6415 24th St. N

- Structure is demolished and gone.
- Sanitary sewer cap off completed
- SW repairs completed
- Permanent fence received and should be installed as soon as we can schedule the contractor

[Demolition and Microforest 6415 N. 24th St – Official Website of Arlington County Virginia Government (arlingtonva.us)]

6415 24th St. N

Microforest

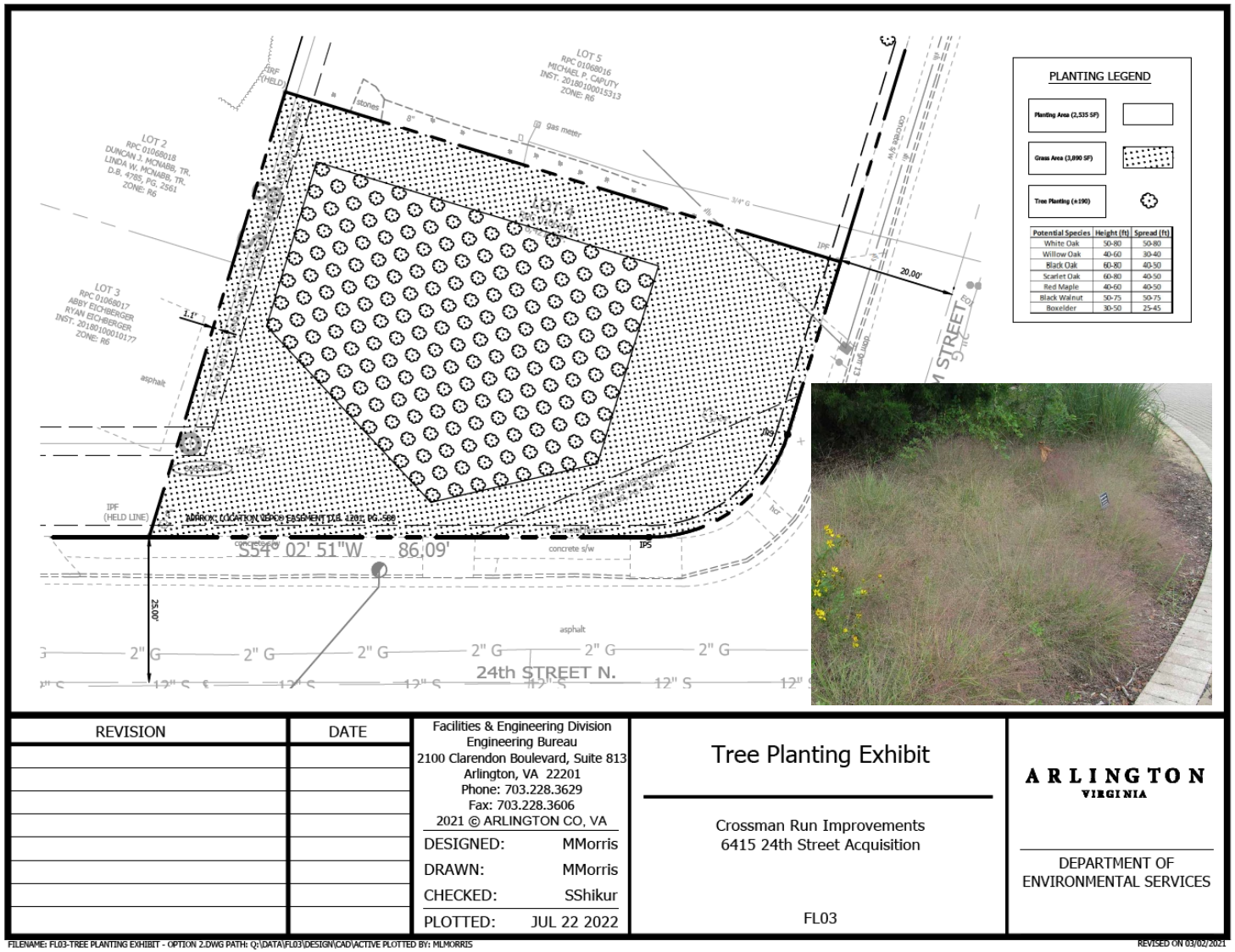
These species will be planted: white oak, willow oak, black oak, scarlet oak, red maple, black walnut, box elder

Native trees

White Oak

Willow Oak

Red Maple



Grass now specified as purple lovegrass

[Demolition and Microforest 6415 N. 24th St – Official Website of Arlington County Virginia Government (arlingtonva.us)]

- **Procurement of tree planting contractor is underway.**
- **Planting should begin soon.**

Additional Storm Drainage Improvements – Watershed Scale

Redirect Stormwater and Store in Underground Vaults

Conceptual cost estimates still under review.

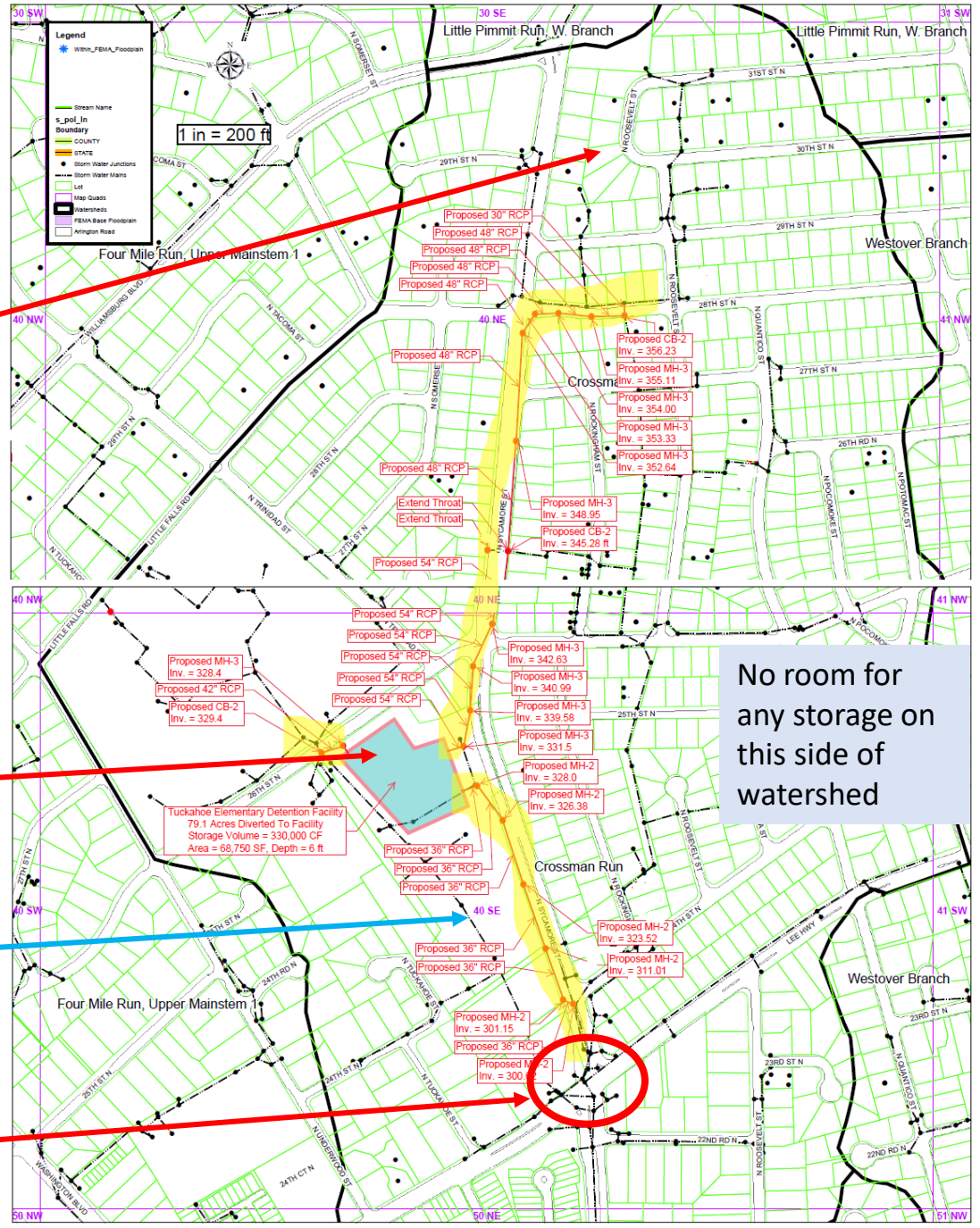
Idea is to divert runoff from upper portion of watershed to underground storage vaults.

Conceptual location for underground vault with minimum 330,000 cf storage: School property, or Park Property, possibly private property – various locations studied. Total volumes vary up to 480,000 depending on site characteristics, locations, etc.

Project SD38 –Stormwater Improvements at Langston Blvd and N Sycamore St.

For comparison, the Cardinal school vaults will store approximately 530,000 cf of water.

Space for Storage is only available along this trunk line



No room for any storage on this side of watershed

Overland relief exists along N Sycamore St. south of Langston Blvd.

Cardinal Elementary School Stormwater Detention Vault

Construction of stormwater detention vault underneath playing fields at Cardinal School.

Vault is now completely underground, covered with earth. Sod or grass will cover it completely and people can play on top when completed.

Additional Storm Drainage Improvements – Watershed Scale

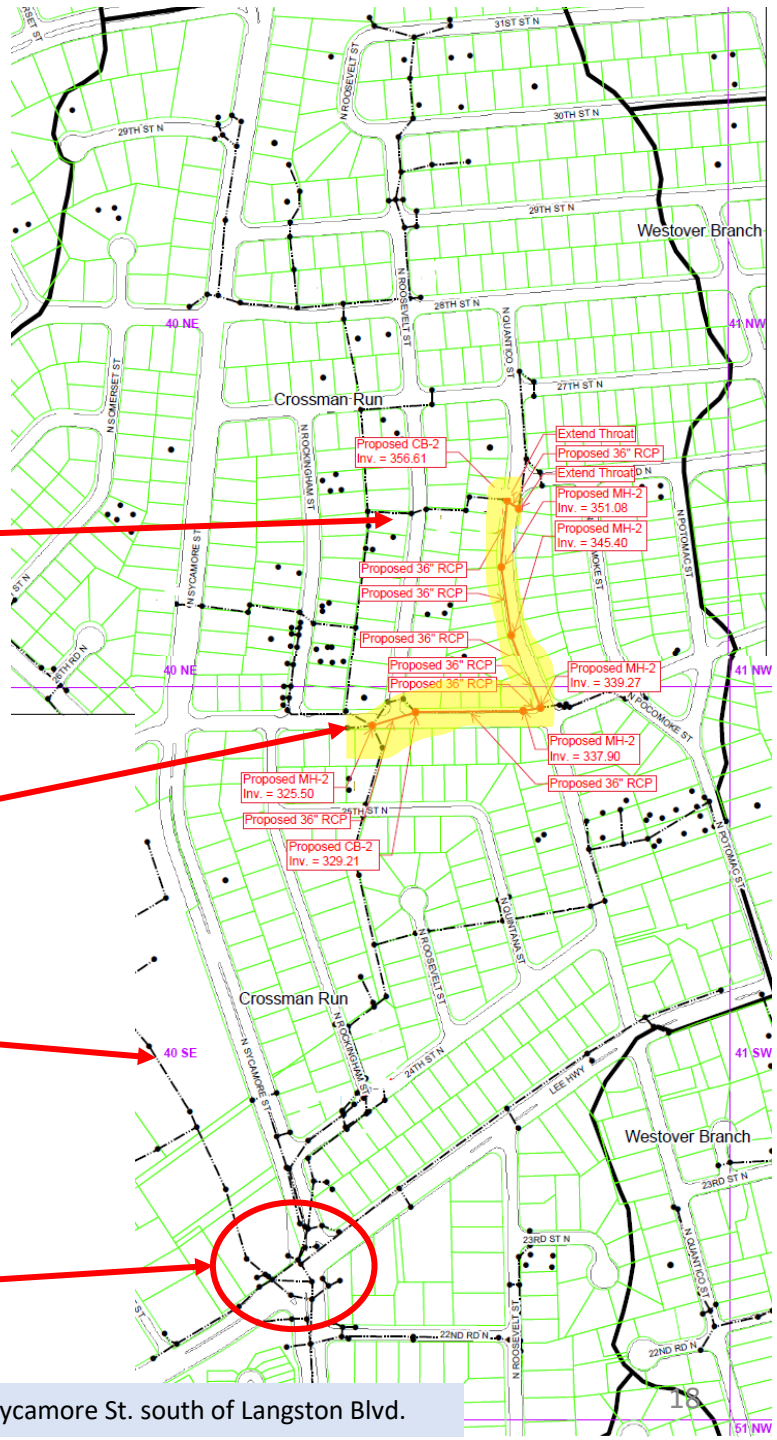
Conceptual cost estimates still under review.

Upgrades to this line not feasible due to extremely limited right-of-way. Hence could divert flow in alternative direction but could only be operational after storage shown in previous slide is in place.

Later phase of work (after storage constructed) would be improvements to N Quantico St.

Improvements to this trunk line made first

Project SD38 –Stormwater Improvements at Langston Blvd and N Sycamore St.



Overland relief exists along N Sycamore St. south of Langston Blvd.

Next Steps

- Plant trees at 6415 24th St. N.
- Continue with design of SD38 Stormwater Improvements at Langston Blvd. and N Sycamore St.
- Continue internal review of costs for various additional watershed scale improvements
    - Evaluate performance of Cardinal Vault (substantially complete in Spring 2023 with fields back in use Fall of 2023.)
    - Continue with Zoning Study (zoning actions may be required to construct underground storage facilities in some areas.)
- Report back to community Spring/Summer 2023

CIP Funding for Crossman Run

Restore

Adopted FY 23 – FY 32 CIP

10 YEAR CATEGORY SUMMARY (in $1,000s)

	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031	FY 2032	10 Year Total
5. Crossman Run Watershed Capacity Improvements	2,320	1,960	465	13,155	10,600	0	0	0	0	0	28,500

Note that funding for this FY is for design work, which is underway.

Note: The proposed level of funding for this projects begins to approach the funding levels for stormwater that sister jurisdictions already provide.

Updates on Other Stormwater Initiatives

- Voluntary Property Acquisition Program
- FEMA FIRM update
- Arlington County Floodplain Ordinance update
- RAMP update
- Stormwater Utility Update
- High Water Detection Sensors
- LDA 2.0
- Zoning Study
- Flood Resilient Design and Construction Manual

Since we know that you may hear about this from other Civic Leaders, we want to explain this to you also.
This is information only. Not currently planned for Crossman Run.

Proposed Supplemental Watershed Strategy for Some Watersheds

Voluntary Property Acquisition for Overland Relief and System Expansion

Restore

- None of the solutions evaluated can manage the updated 10-year storm.
- Designing for a 10-year storm event is only appropriate where overland relief is available for larger storm events.
- There may not be sufficient available space within existing rights-of-way to maintain the infrastructure, make resilient system upgrades, or to provide overland relief.
- **Upon completion of more detailed Engineering Studies, the long-term solution to reduce flood risk in Crossman Run may require overland relief. (Note that initially, voluntary property acquisition will focus on properties located in Spout Run Watershed.*)** (Some properties in Lubber Run are also under consideration.)
- Phased Property Acquisition is a necessary component of a resilient stormwater improvement program to provide overland relief or expand the system capacity and reduce flood risk to the community.

Since we know that you may hear about this from other Civic Leaders, we want to explain this to you also.
This is information only. Not currently planned for Crossman Run.

Proposed Supplemental Watershed Strategy for Some Watersheds
Voluntary Property Acquisition for Overland Relief and System Expansion

Restore

- Land acquisition of properties in 100-year inundation zone proposed to be phased in prioritized/tiered approach
- Property would become open space to maintain the infrastructure, enhance the system, or to provide overland relief. Properties would be protected from development encroachments by regulation
- Problematic flooding areas and stormwater overflow paths have been identified by numerous studies and empirical evidence:
    - Capacity Study, Stormwater Masterplan and Engineering Studies
    - Riskfactor.com
    - RAMP
    - Flood events (2006, 2018, 2019, 2020)
- Voluntary land acquisitions

Since we know that you may hear about this from other Civic Leaders, we want to explain this to you also.
This is information only. Not currently planned for Crossman Run.

FAQs Available Online

How do I know if the County is interested in purchasing my property? *The County's real estate team will begin contacting homeowners this fall -about potential property acquisitions by letter. Properties will be considered based on the degree that they can be used by the County for the purposes noted above and the flood risk present in specific areas of the watershed based on historic development patterns, topography, etc.*

What will the purchased properties be used for? *Properties acquired through voluntary acquisitions will be used to:*

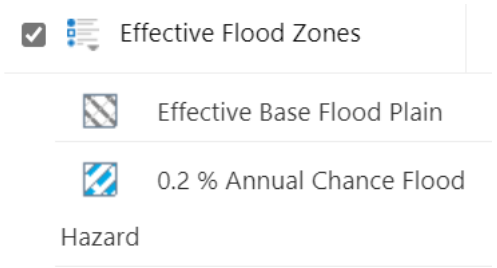
- *re-establish overland relief flow paths for water during large storm events for flood mitigation,*
- *provide access to existing stormwater infrastructure to conduct necessary maintenance or upgrades,*
- *locate future stormwater infrastructure stormwater detention facilities and/or water quality facilities*

Property Acquisition FAQs

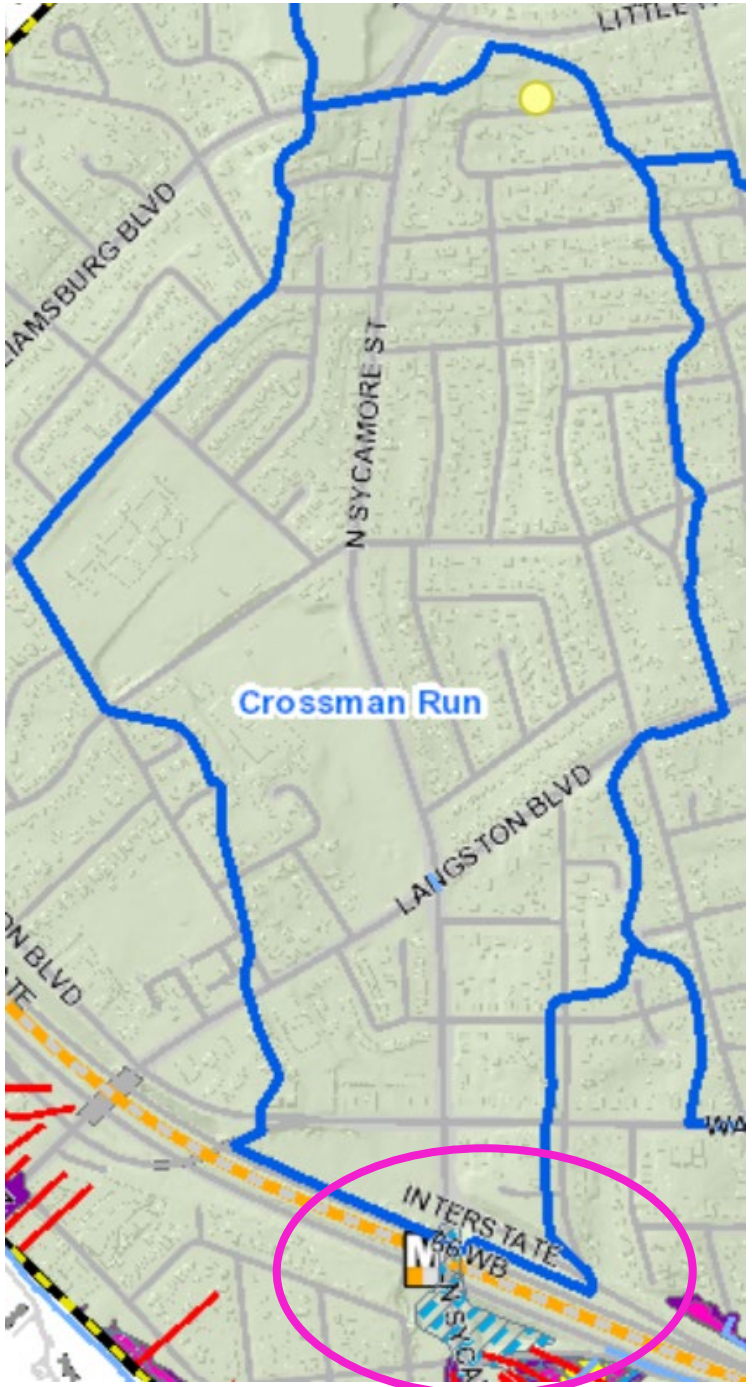
FEMA Floodplain Map Update

Effective Floodplains – there are none on private property in this watershed.

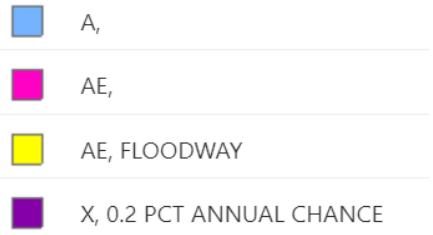
Preliminary Floodplains – there will be none in this watershed.



[ACMaps (arlingtonva.us)]



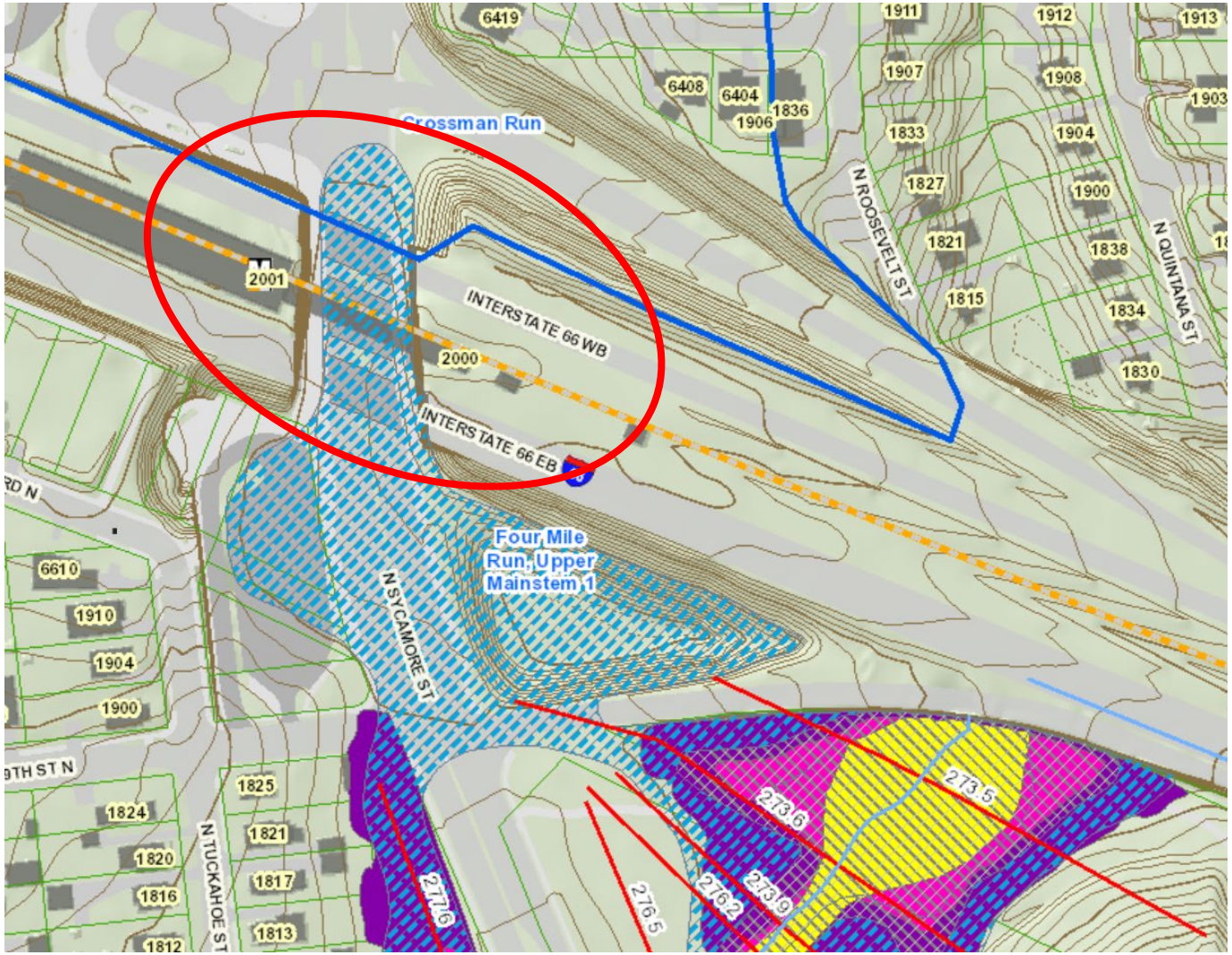
Detail



FEMA Floodplain Map Update

Detail of Preliminary floodplains

[ACMaps (arlingtonva.us)]



- A,
- AE,
- AE, FLOODWAY
- X, 0.2 PCT ANNUAL CHANCE

A few lots will now be in the 0.2% chance flood zone (aka 500-year flood zone) which will remain unregulated except for prohibition on storage of emergency service records, medical records or government records.

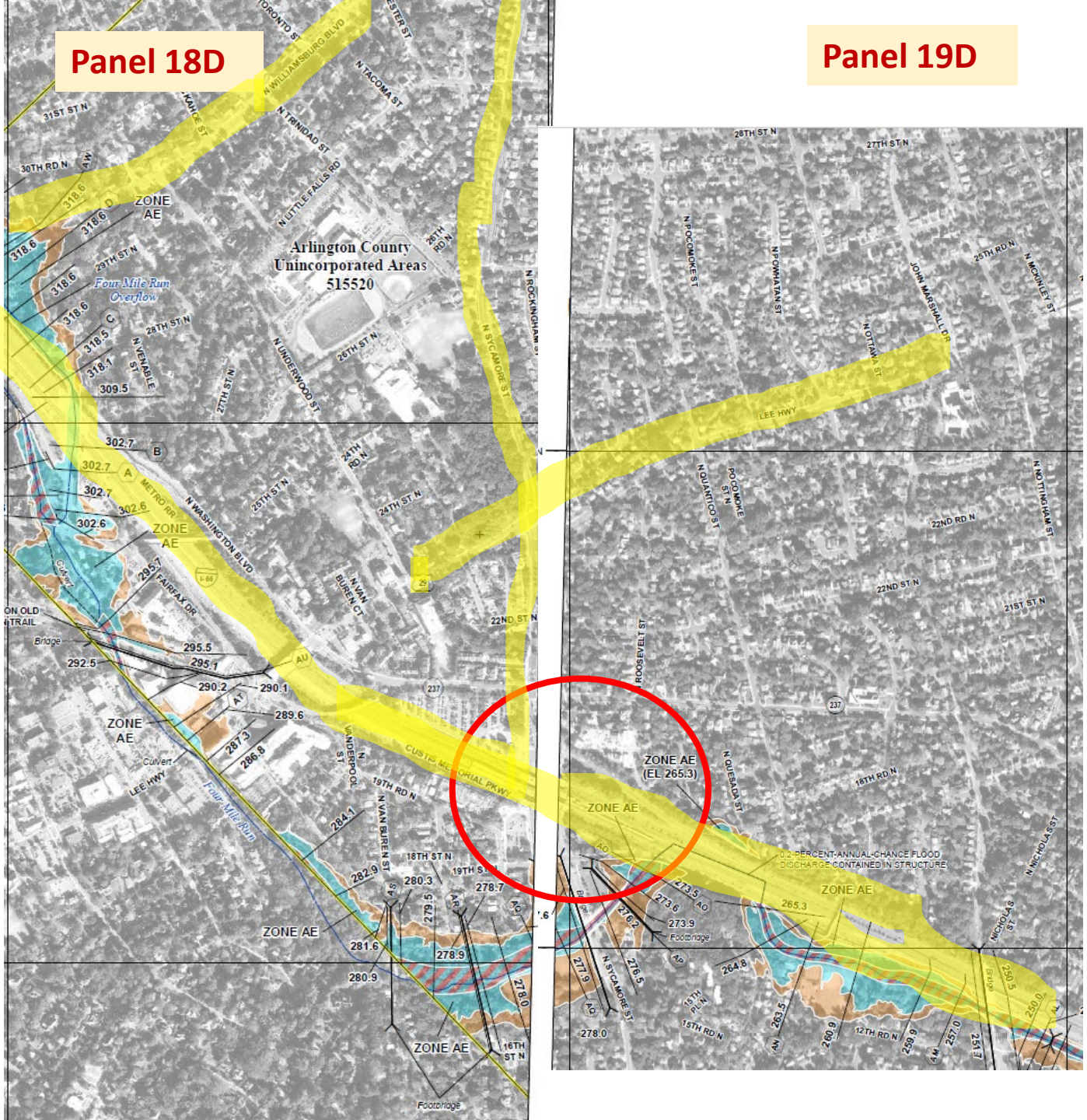
No Impact.

- 90 Day appeal of only three revised panels began October 6 –**doesn't affect this watershed**

Preliminary FIRM

Panel 18D

Panel 19D



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT HTTPS://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A, V, A99
	With BFE or Depth Zone AE, AO, AH, VE, AR
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
	Future Conditions 1% Annual Chance Flood Hazard Zone X
	Area with Reduced Flood Risk due to Levee See Notes. Zone X
	Area with Flood Risk due to Levee Zone D
OTHER AREAS	NO SCREEN Areas of Minimal Flood Hazard Zone X
	Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
	18.2 / 17.6 Cross Sections with 1% Annual Chance Water Surface Elevation
	Coastal Transect

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

ARLINGTON COUNTY, VIRGINIA
(All Jurisdictions)

PANEL 19 OF 83

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
ARLINGTON COUNTY	515520	0019	D

PRELIMINARY
9/18/2020

VERSION NUMBER
2.6.4.6
MAP NUMBER
51013C0019D
MAP REVISED

Tentative Schedule for updated FIRM and Floodplain Ordinance:

Step / Milestone	Start Date	End Date	Notes
Revised Preliminary Issued	04/29/2022	n/a	County received / downloaded files
30-Day comment period	04/29/2022	05/29/2022	County provided comments to FEMA
Prep work for Appeal Start	June 2022	July 2022	FEMA's contractor will begin prep work for the Appeal Period*
FR notice prepared, submitted, and published	July 2022 (submitted)	08/02/2022 (published)	FEMA's contractor will prepare and submit the *Federal Register* notice for publication
Newspaper publications (2)	09/29/2022 (tentative)	10/06/2022 (tentative)	FEMA's contractor will contact local newspaper and arrange for 2 publications
Appeal Period (90 days)	10/06/2022 (tentative)	01/06/2023 (tentative)	FEMA's contractor will mail out the Appeal Start letter
Prep work to ready the study for LFD	Jan. 2023	Mar. 2023	FEMA's contractor will begin prep work for completing the study*
Study is independently reviewed by another contractor	May 2023	June 2023	Independent contractor has 60 days to review and approve the study
Letter of Final Determination	June 2023	Nov 2023	Independent contractor has 60 days to review and approve the study
New Study Effective Date	Dec. 2023	n/a	County will receive new products

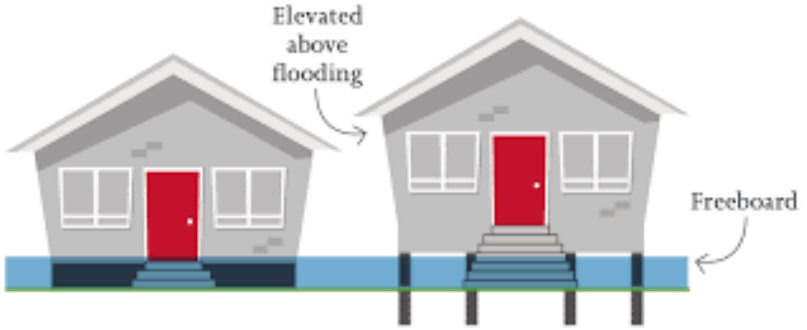
Floodplain Ordinance Update

- Required due to FIRM updates
- Must be approved by DCR and FEMA
- Must conform to model ordinance
- Must be adopted within 6 months after Letter of Final Determination (LOD) or approximately December, 2023

Overall, proposed changes are minor

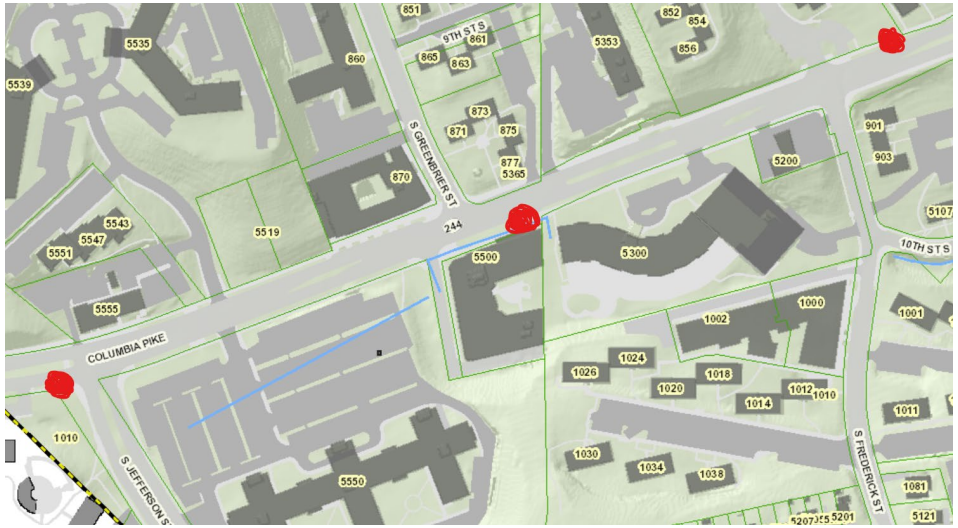
Proposed changes to Floodplain Ordinance

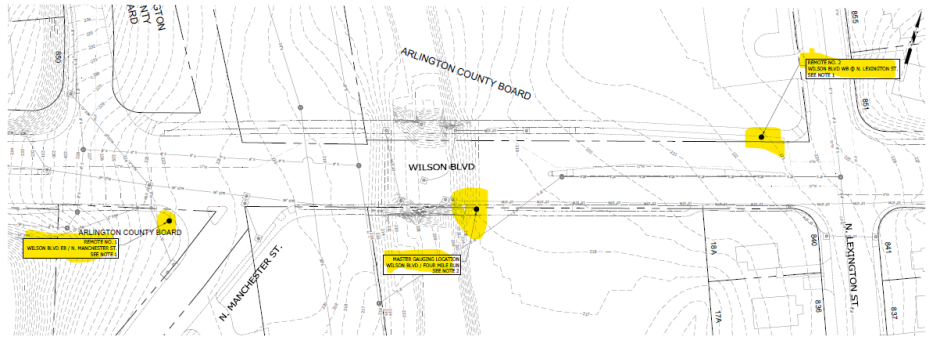
- Increase in required freeboard (distance above base flood elevation) from 12 to 18 inches, or
- Buildings in 100-year floodplain must be watertight 2 feet above the base flood elevation (previous requirement 1 foot)
- Accessory structures can not be larger than 600 feet
- No emergency service records, medical records or government records can be stored in 500 year floodplain



High Water Detection Devices

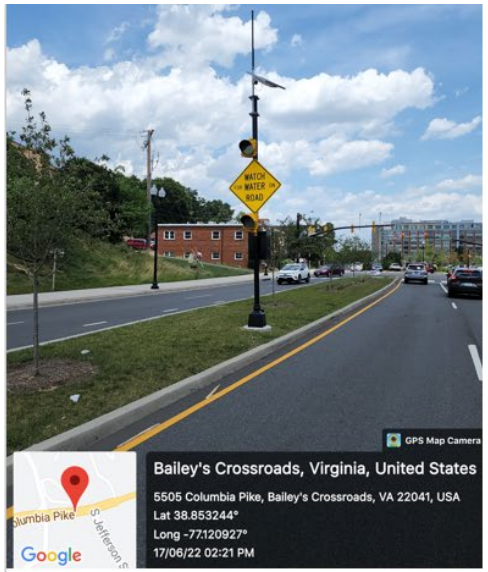
Two high water detection devices installed

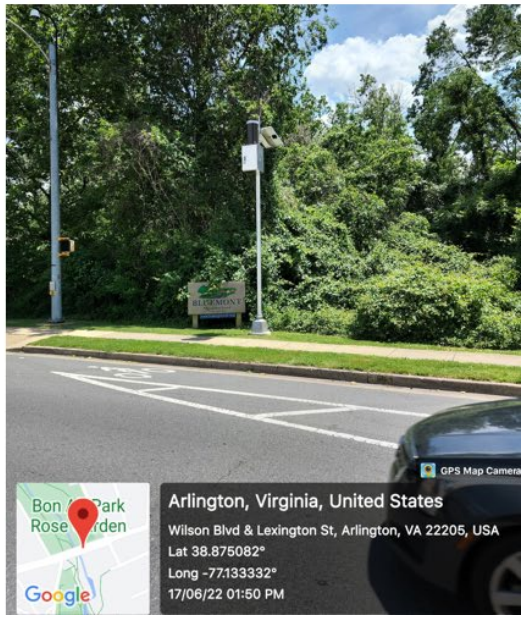




A third set of devices is slated for Kirkwood Rd. @ Langston Blvd.

Location #1: Columbia Pike near S Greenbrier St.





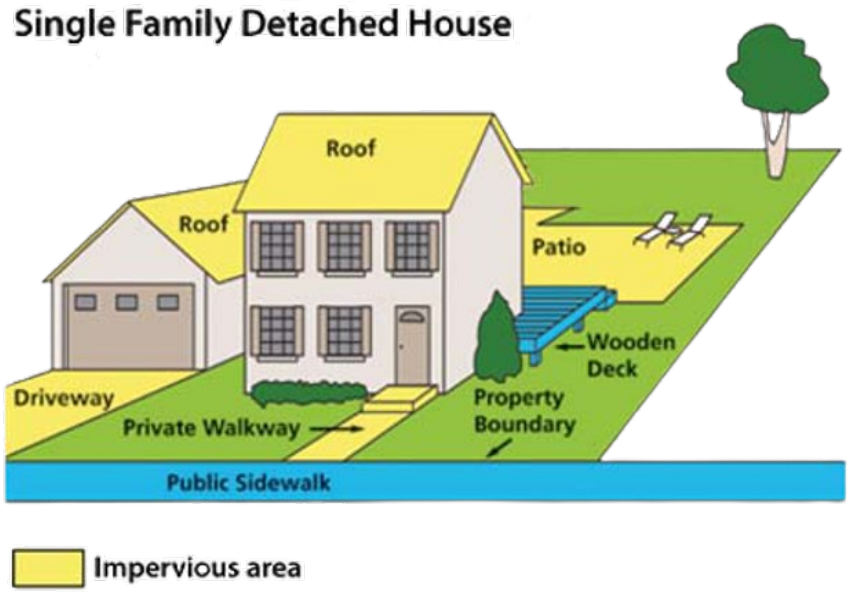
Location #2 Wilson Blvd. near N Lexington St. and N Manchester St.

Risk Assessment and Management Plan (RAMP)

- Maps the County's "urban" floodplains (outside FEMA floodplains)
- Provides updated 2040, 2070 and 2100 climate projections, for both inland flooding and sea-level rise/storm surge
- Delivers updated rainfall curves and 10-year design standard
- Developed vulnerability assessments, including public infrastructure and critical public facilities
- Calculates and defines economic, environmental and social risk, or "the cost of inaction"
- Informs flood resilient design and construction standards
- Demonstrates value of current investments against cost of inaction

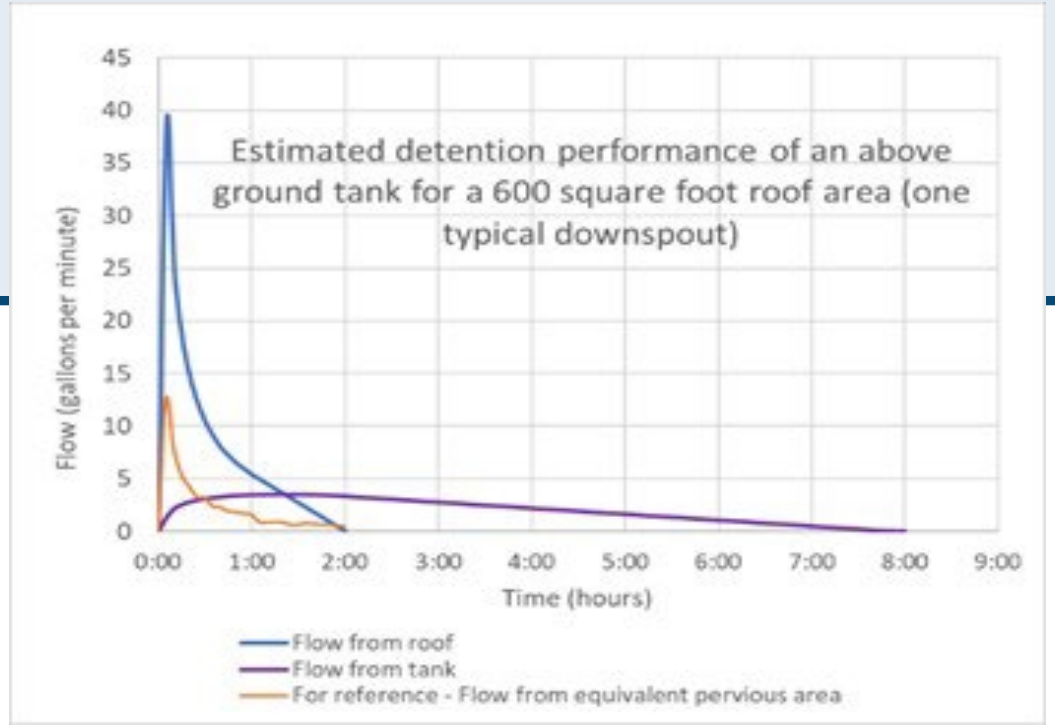
Stormwater Utility

- County is considering changing to a stormwater utility for funding the stormwater program
- Currently, property owners pay a stormwater tax based on property assessment
- Stormwater utility fee would instead be based on impervious cover on the lot (yellow areas on the diagram)
- Credit would be offered for actions taken to reduce runoff
- More information and resources on the web page



https://bit.ly/ArlingtonStormwaterUtility

LDA 2.0 - Increased Stormwater Management Requirements



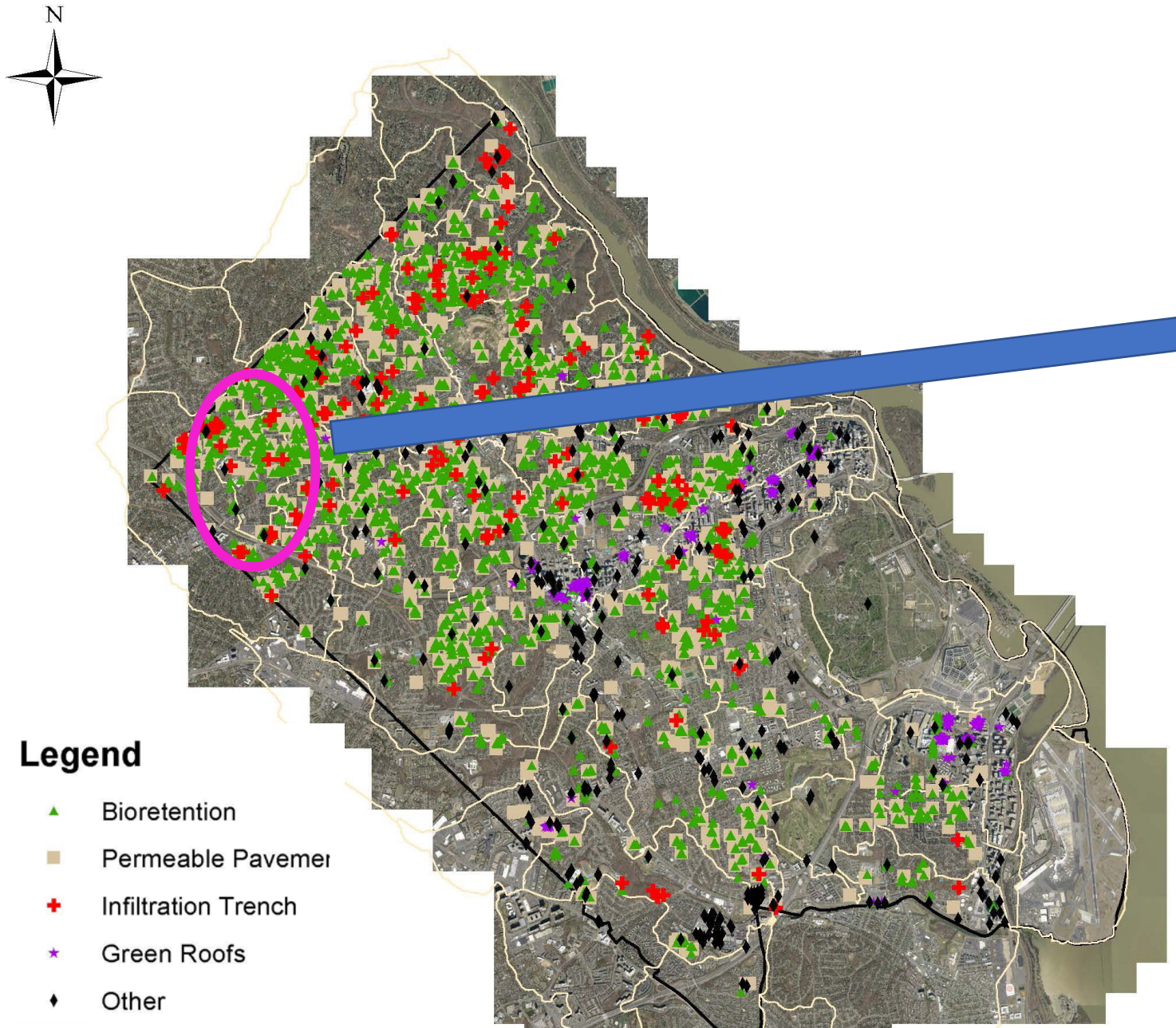
LDA = Land disturbing activity permit

With LDA 2.0, the County has increased stormwater management requirements for single-family home projects to reduce impacts to neighboring properties.

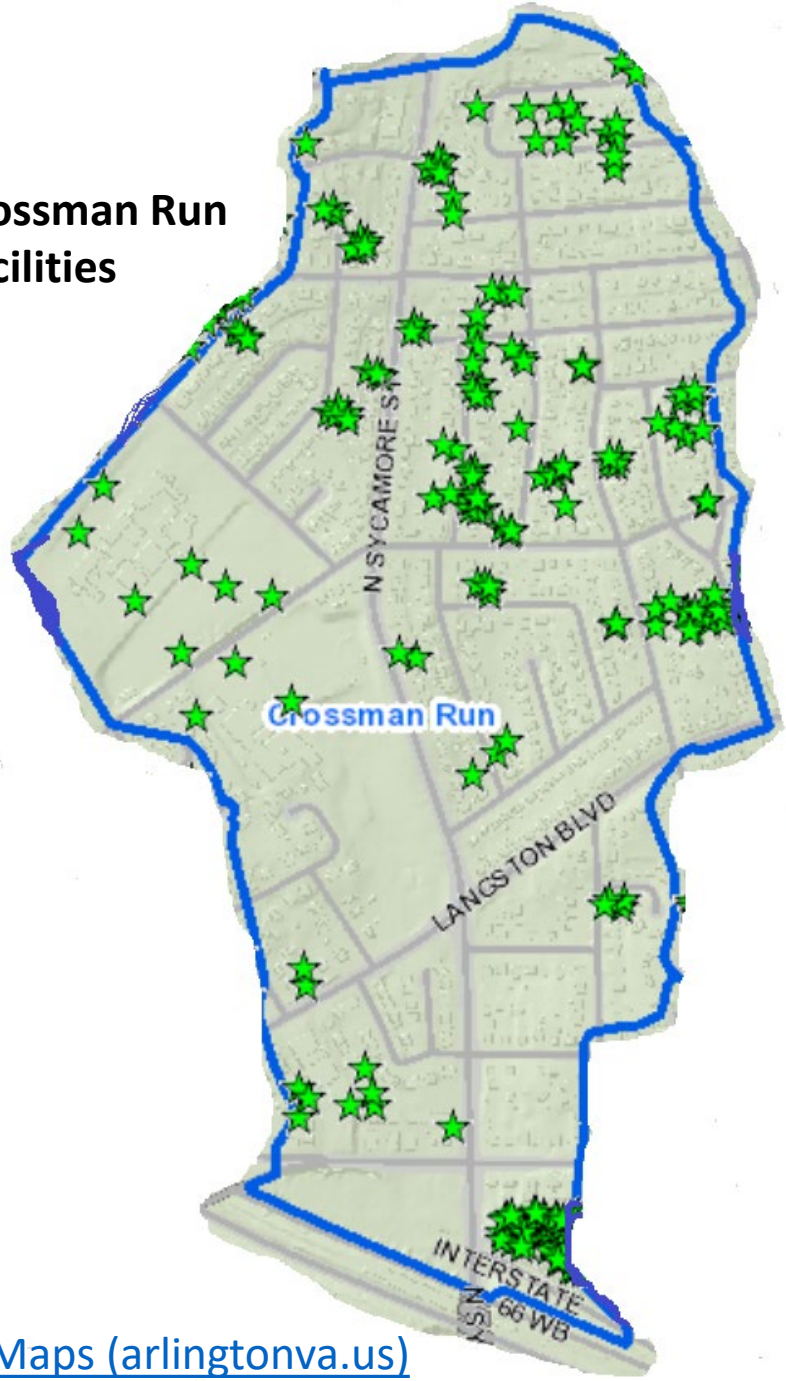
Took effect September 2021

Requirement to detain up to 3 inches of runoff from new impervious area on site and restore soil permeability after construction

Stormwater Management Facilities in Arlington



Crossman Run Facilities



[ACMaps (arlingtonva.us)]

Upcoming Zoning Study for Stormwater Facilities

Improve Consistency: The Zoning Ordinance treats stormwater systems differently for public zoned sites (ex., parks, schools) and also differs from how other water utilities are treated

Add Flexibility: The current zoning regulations do not readily enable the use of certain stormwater stormwater system components

Zoning study will take place over the next 6 months. Public meeting planned for December 14.

https://www.arlingtonva.us/Government/Projects/Plans-Studies/Environment/Stormwater-Management-Zoning-Study

- Work is beginning on a Flood Resilient Design Manual as well

Path to Flood Resilience
Crossman Run

Questions?

Project Team

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