

TAKOMA PARK STORMWATER RESILIENCY STUDY

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Low Impact
Development
Center



AGENDA

- Study background
- Resident assistance
- Summary of study goals and focus
- Discussion of study areas
- Proposed projects
- Code Assessment
- Q&A

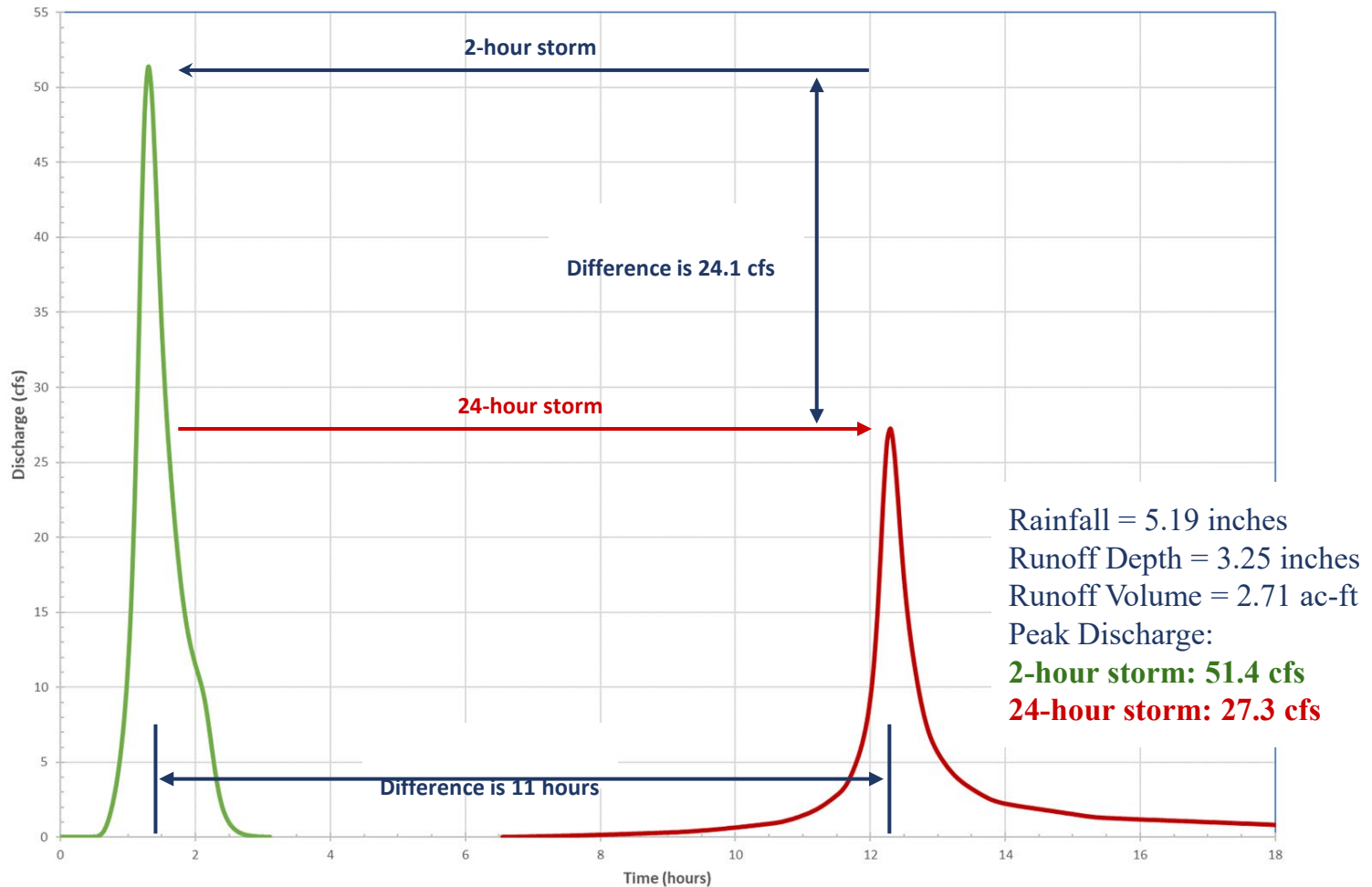


STUDY BACKGROUND

- Assess study areas compiled by City staff and outreach efforts
- Develop an understanding of key resiliency issues for the City
- Create dashboard for city residents with Rainplan and create resident assistance document
- Detailed study and model of smaller areas to identify future projects

EVERYTHING YOU NEED TO KNOW ABOUT CLIMATE CHANGE AND STORMWATER IN FIVE MINUTES

Runoff Hydrographs Comparing the 2-Hour and 24-Hour Duration Storms



Courtesy MDE

WHAT ARE THE KEY ISSUES?

- Life and Safety
- Not all flooding is in the floodplain
- How to prevent property damage
- Prioritization of capital improvements and resource needs
- What can private property owners do?
 - Guidance documents
 - Dashboard with links to assistance programs

DATA SOURCES

- Montgomery County GIS
- Washington DC GIS
- Tree survey
- Takoma Park DPW storm drain mapping
- Drainage Complaints
- Environmental Justice (MD, EPA, DNR)
- Desktop Analysis
- Field analysis with City and Resident input
- Weather data

Resident Assistance Document

Stormwater Runoff Management Techniques



Technique #1: Ensure that Positive Drainage is Maintained through Site Grading

Lawns and paved surfaces should be sloped or “graded” to maintain positive drainage. Surface runoff should be able to flow away from homes and other structures toward the public right-of-way. Depending on surrounding topography, maintaining positive drainage may require the use of graded landforms such as swales to direct water flow between lots and around buildings. When making grading adjustments, care must be taken to avoid changes that cause runoff to flow to a neighboring property.



Grading can be used to maintain positive drainage without directing runoff to neighboring properties.
Image Credit: City of Edmonton, AB, Canada
Image may not be reproduced without permission

Technique #2: Direct and Reinforce the Path of Overland Flow

Overland flow can be directed by creating a shallow swale for water to follow. A winding flow path lined with erosion-resistant material such as stone will help to slow water and reduce erosion. Vegetation can be used to further stabilize paths and reduce flow velocity. On particularly steep slopes, terracing may be necessary. Consult a professional landscape contractor to determine the best approach for your property.

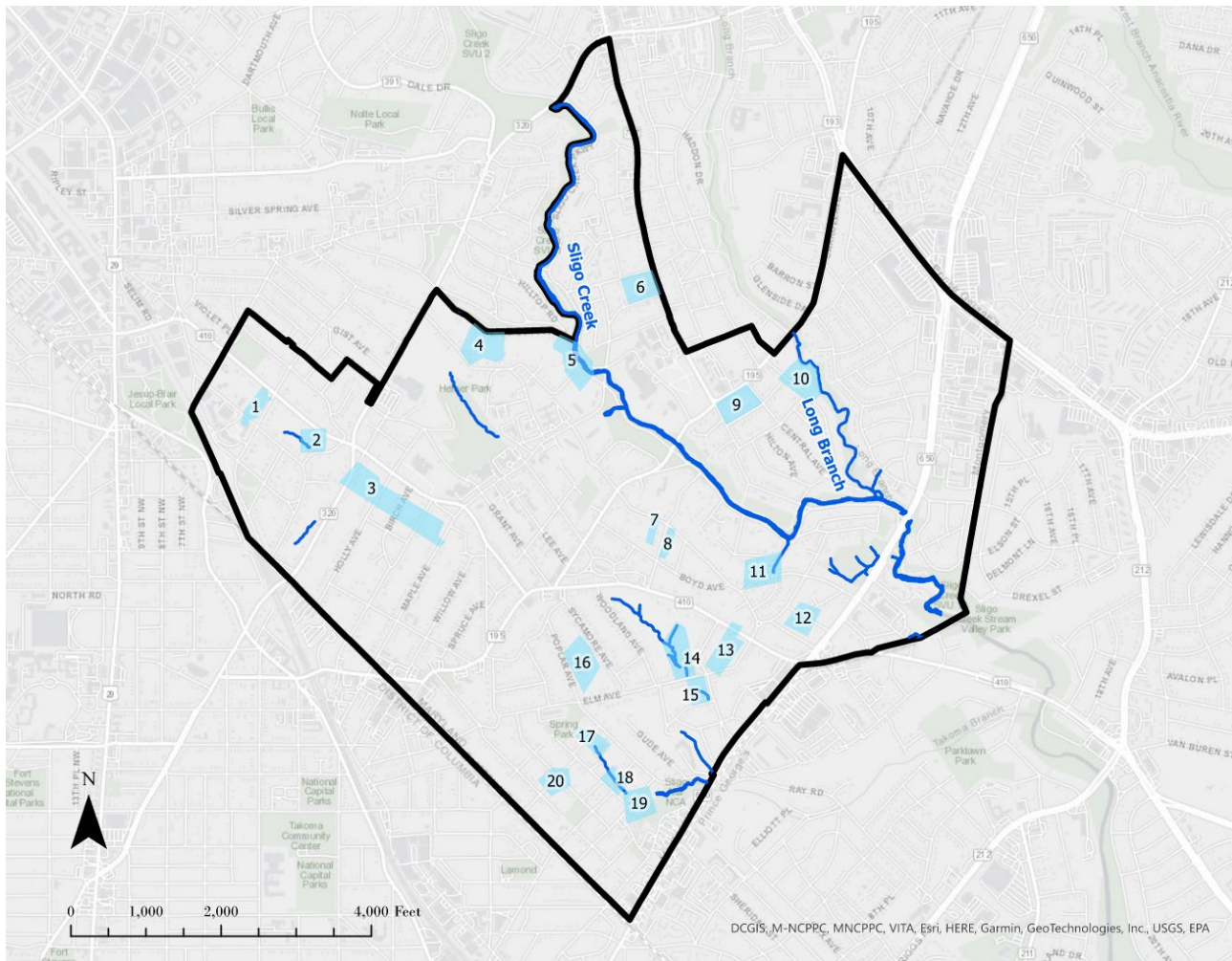


Overland flow paths can be used to direct storm water flows and reduce erosion.

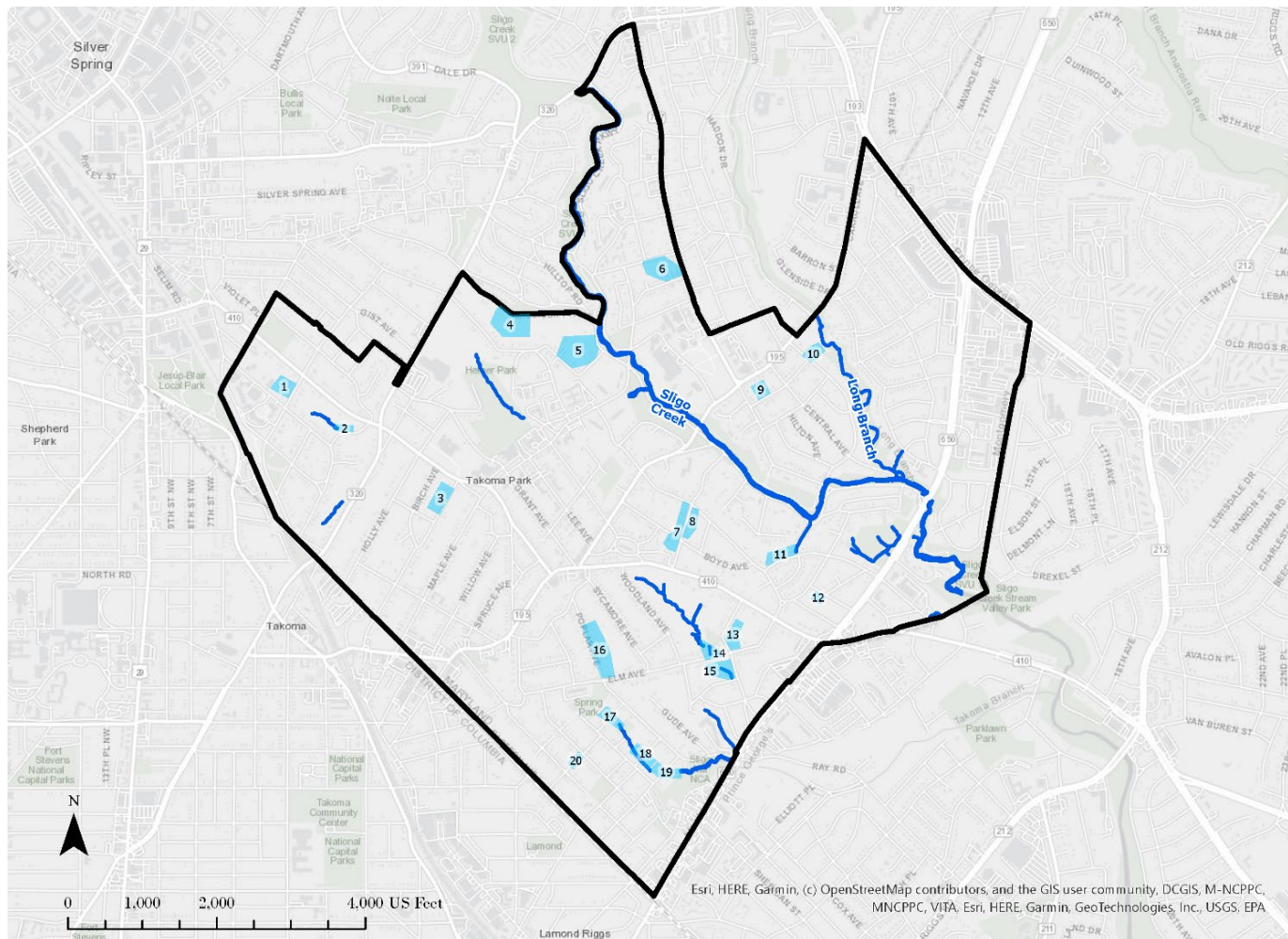
STUDY GOALS AND FOCUS

- Assess 20 study areas compiled by City staff and outreach efforts
- Provide recommendations and assistance
- Detailed study of smaller area to identify potential projects. Limited to model area.

Study Areas



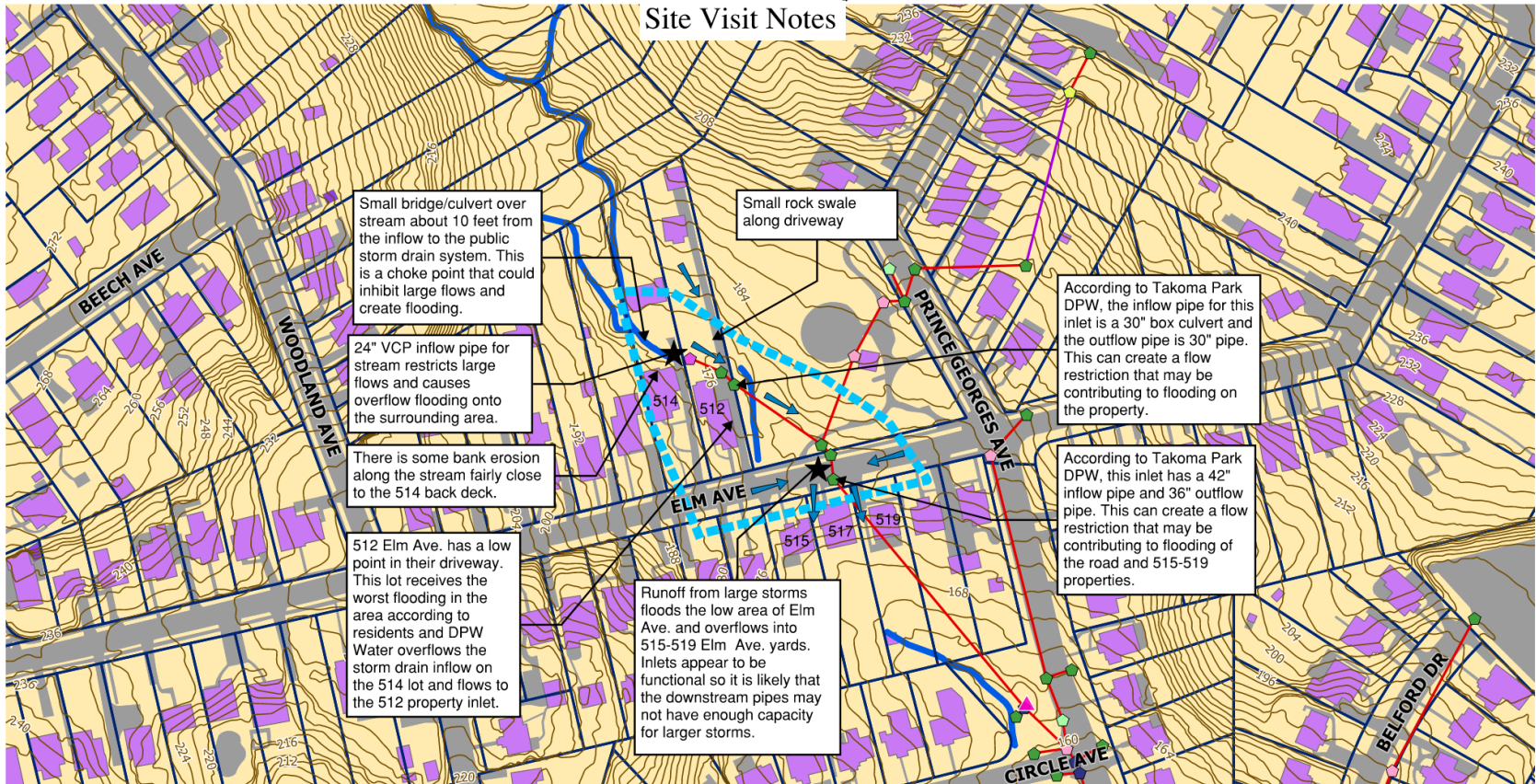
Study Area Refinement



Study Area Investigation

Takoma Park Study Area 14

Site Visit Notes



Small bridge/culvert over stream about 10 feet from the inflow to the public storm drain system. This is a choke point that could inhibit large flows and create flooding.

24" VCP inflow pipe for stream restricts large flows and causes overflow flooding onto the surrounding area.

There is some bank erosion along the stream fairly close to the 514 back deck.

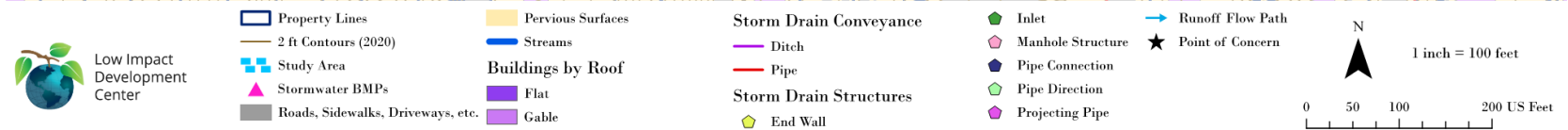
512 Elm Ave. has a low point in their driveway. This lot receives the worst flooding in the area according to residents and DPW. Water overflows the storm drain inflow on the 514 lot and flows to the 512 property inlet.

Small rock swale along driveway

Runoff from large storms floods the low area of Elm Ave. and overflows into 515-519 Elm Ave. yards. Inlets appear to be functional so it is likely that the downstream pipes may not have enough capacity for larger storms.

According to Takoma Park DPW, the inflow pipe for this inlet is a 30" box culvert and the outflow pipe is 30" pipe. This can create a flow restriction that may be contributing to flooding on the property.

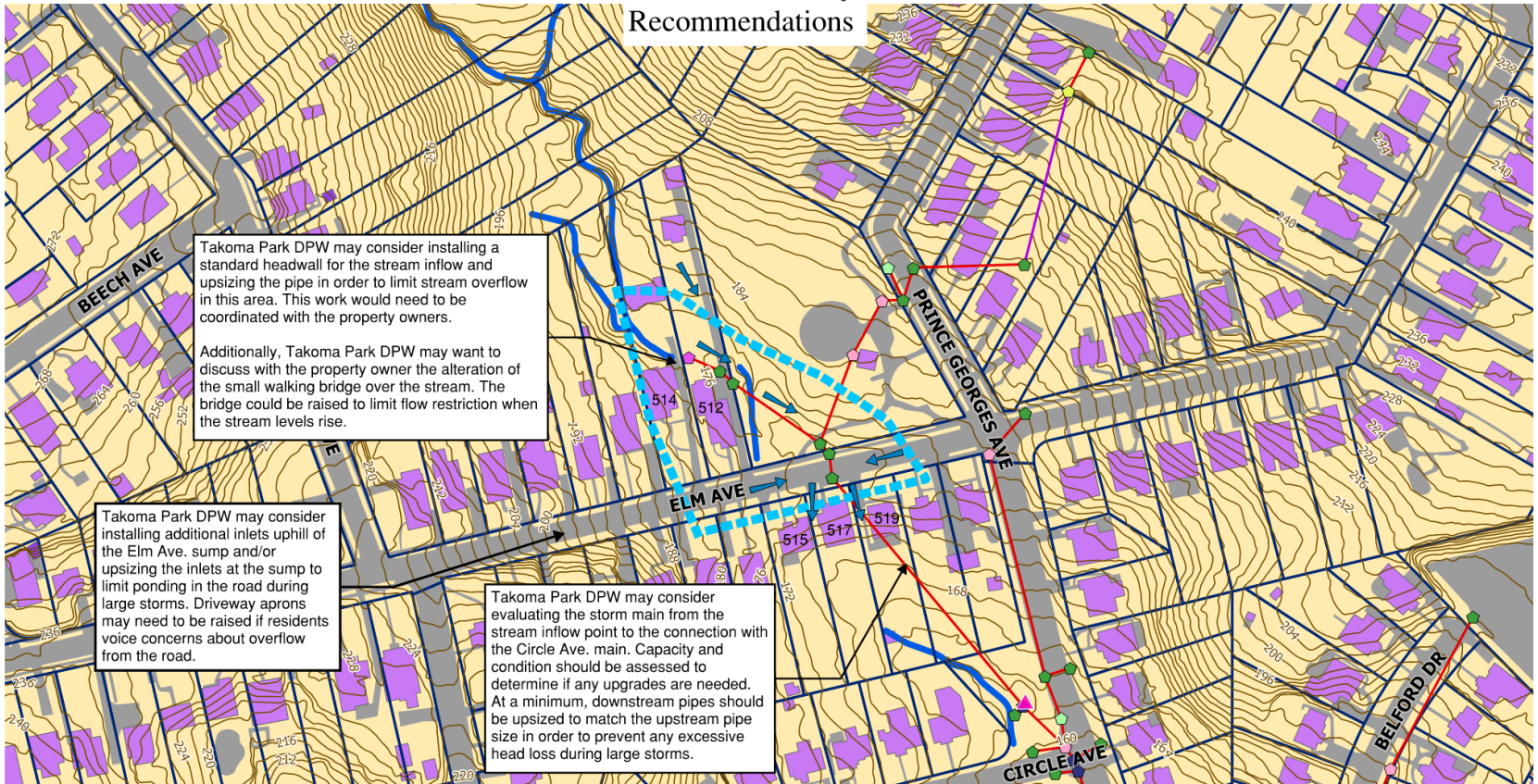
According to Takoma Park DPW, this inlet has a 42" inflow pipe and 36" outflow pipe. This can create a flow restriction that may be contributing to flooding of the road and 515-519 properties.



Study Area Recommendation

Takoma Park Study Area 14

Recommendations



Takoma Park DPW may consider installing a standard headwall for the stream inflow and upsizing the pipe in order to limit stream overflow in this area. This work would need to be coordinated with the property owners.

Additionally, Takoma Park DPW may want to discuss with the property owner the alteration of the small walking bridge over the stream. The bridge could be raised to limit flow restriction when the stream levels rise.

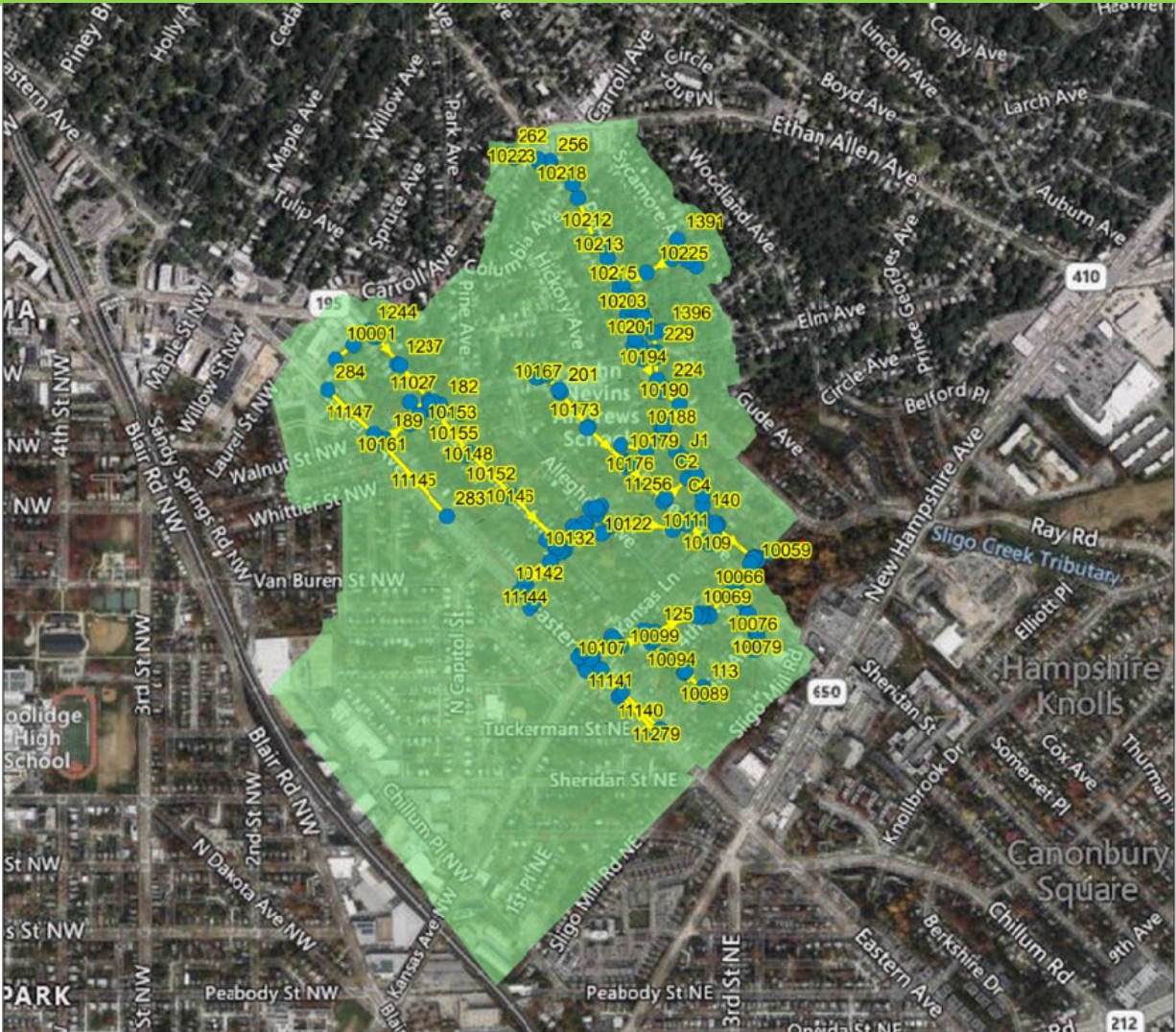
Takoma Park DPW may consider installing additional inlets uphill of the Elm Ave. sump and/or upsizing the inlets at the sump to limit ponding in the road during large storms. Driveway aprons may need to be raised if residents voice concerns about overflow from the road.

Takoma Park DPW may consider evaluating the storm main from the stream inflow point to the connection with the Circle Ave. main. Capacity and condition should be assessed to determine if any upgrades are needed. At a minimum, downstream pipes should be upsized to match the upstream pipe size in order to prevent any excessive head loss during large storms.



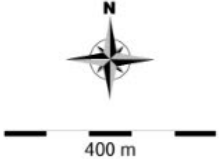
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|-----------------------------------|--------------------------|-------------------------------|-------------------|--|
| Property Lines | Pervious Surfaces | Storm Drain Conveyance | Inlet | Runoff Flow Path |
| 2 ft Contours (2020) | Streams | Ditch | Manhole Structure | N
1 inch = 100 feet
0 50 100 200 US Feet |
| Study Area | Buildings by Roof | Pipe | Pipe Connection | |
| Stormwater BMPs | Flat | Storm Drain Structures | Pipe Direction | |
| Roads, Sidewalks, Driveways, etc. | Gable | End Wall | Projecting Pipe | |

MODEL STUDY AREA



Legend

- Junctions
 - ▲ Outfalls
 - + Dividers
- Conduits
- Visible
 - Major System
 - ARM Subcatchments



Resiliency Projects

Table 1. Takoma Branch Potential Resiliency Projects

#	Project Name	Location	Scope	Flood Control Benefit	Water Quality Benefit	Priority	Time frame	Cost
1	Circle Woods Stream Inflow Replacement and Wetlands BMP	Circle Woods	Large	Large	Large			~\$750,000 - \$1,000,000
2	Circle Avenue and Poplar Avenue Drainage Improvements	Circle Avenue and Poplar Avenue	Small	Moderate	Small			~\$150,000 - \$300,000
3	Lake Street BMP and Peak Flow Attenuation System	Lake Street	Moderate	Moderate	Moderate			~\$200,000 - \$400,000
4	2 nd Avenue Inlet Improvements	2 nd Avenue between Alleghany Avenue and Westmoreland Avenue	Small	Moderate	Small			~\$50,000 - \$100,000
5	Columbia Avenue and Poplar Avenue BMP and Peak Flow Attenuation System	Columbia and Poplar	Moderate	Moderate	Moderate			~\$100,000 - \$300,000
6	VFW Parking Lot Green Drainage Improvements	VFW Parking Lot	Moderate	Moderate	Moderate			~\$200,000 - \$400,000
7	Orchard Avenue Green Street	Orchard Avenue	Large	Large	Large			~\$750,000 - \$1,250,000
8	Estrellitas Montessori BMP	Estrellitas Montessori School	Moderate	Moderate	Moderate			~\$200,000 - \$400,000
9	Hickory Avenue Uphill Storm Drain Extension	Hickory Avenue and Elm Avenue	Moderate	Moderate	Small			~\$250,000 - \$500,000
10	Citywide Inlet Upgrades	Takoma Park	Large	Large	Small			\$10,000 - \$20,000 *Per inlet

PROJECT #1: CIRCLE WOODS

Project #	1
Project Name	Circle Woods Stream Inflow Replacement and Wetlands BMP
Location	Circle Avenue and Cockerille Avenue Intersection
Project Scope	Large
Flood Reduction	Large
Water Quality Benefit	Large
Priority	TBD
Timeframe	TBD
Cost	~\$750,000-\$1,000,000
Coordinating Agencies	WSSC

Problem Description:

- The Circle Woods stream overflows the 48" inflow pipe during large storm events. This has led to substantial surface flooding of the surrounding residential properties, Circle Avenue, and downhill Cockerille Avenue properties. Takoma DPW has taken action to limit flooding by installing a high curb along Circle Avenue and a small culvert under the Circle Avenue asphalt path. These measures have been effective in limiting excessive downhill flooding; however, the area directly around the stream inflow still experiences flooding when stream levels rise. LID Center's preliminary stormwater modeling results suggest the stream inflow pipe could benefit from an increased capacity. The pipes in this area are on undeveloped WSSC lots with a large open grass area. WSSC plans to sell their properties in this area and the City has notified WSSC of their interest in acquiring the lots.

Project Recommendation:

- Purchase the WSSC lots if feasible and use the area for stormwater management. Replace the 48" pipe stream inflow with a large box culvert at least 6' wide and 4' high. The culvert will allow for increased capacity and decreased head losses as the stream enters the pipe system. A more detailed hydrologic and storm drain analysis will be required as part of the design.
- Design and install a large wetlands BMP in the open grass area. The BMP will store stormwater runoff thereby reducing overland flooding and peak flows in the storm drain system. The wetlands system will also filter stormwater pollutants and provide impervious area restoration credits towards the City's NPDES permit requirements. The BMP may be designed to take runoff from the road and/or divert flow from the nearby storm drain culverts. A detailed engineering assessment will be required to determine the size and configuration of this facility.



PROJECT #10: INLET UPGRADES

Project #	10
Project Name	Citywide Inlet Upgrades
Location	Takoma Park
Project Scope	Large
Flood Reduction	Large
Water Quality Benefit	Small
Priority	TBD
Timeframe	TBD
Cost	~\$10,000 – \$20,000 per inlet upgrade
Coordinating Agencies	N/A

Problem Description:

- There are a large number of older and smaller inlets around Takoma Park that do not drain well. DPW has successfully begun the process of replacing and enlarging these inlets. This project should continue and follow a few general guidelines.

Project Recommendation:

- Assess the condition and inflow capacity of inlets in areas with reports of flooding.
- All replaced inlets should have a minimum 10' width when feasible.
- Replace or restore any curb inlets with a less than 6" opening. The road and gutter can be rebuilt to provide an adequate opening, or the inlet can be fully replaced if appropriate.
- Primary inflow inlets can include a large catch basin chamber and/or weir wall to slow stormwater release into the outflow pipe. (Note: Inlets at pipe junctions should not include any weir wall or structure within the catch basin.)

Code Assessment

- Re-evaluate groundwater recharge requirements for stormwater management permits
- Consider “mini” review for small projects under current regulatory thresholds

QUESTIONS?

