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District of Columbia Water and Sewer Authority
George S. Hawkins, General Manager

FLOODING ISSUES IN BLOOMINGDALE AND LeDROIT PARK

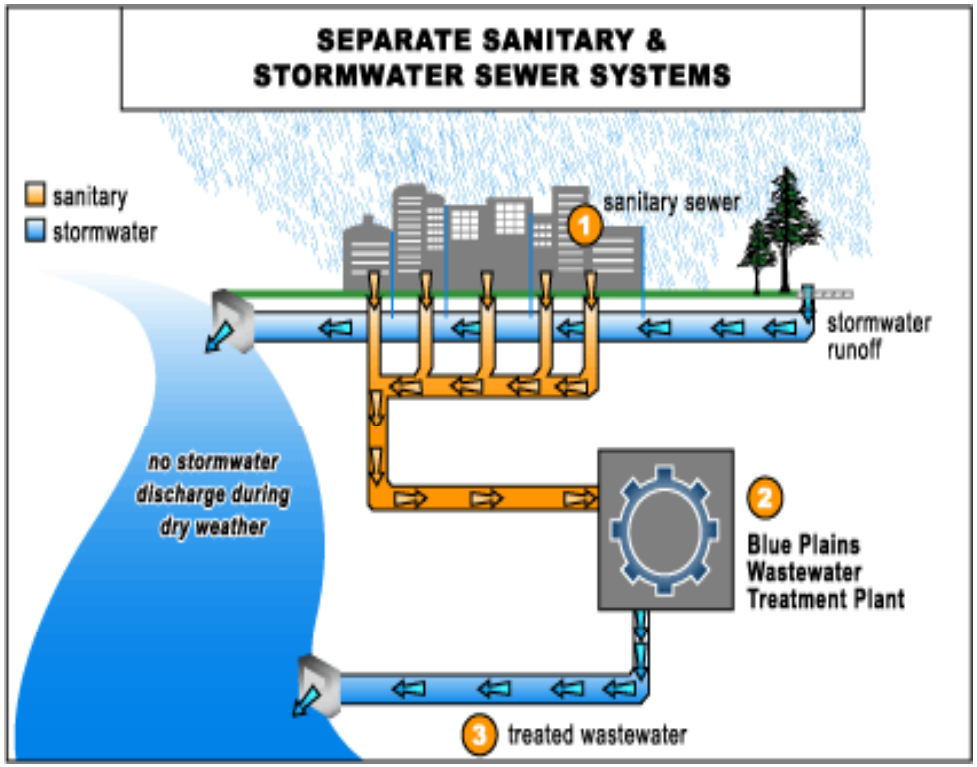
A DC Water Presentation
Given to the
Mayor's Task Force on the Prevention of Flooding in the Bloomingdale and LeDroit Park Areas

August 28, 2012

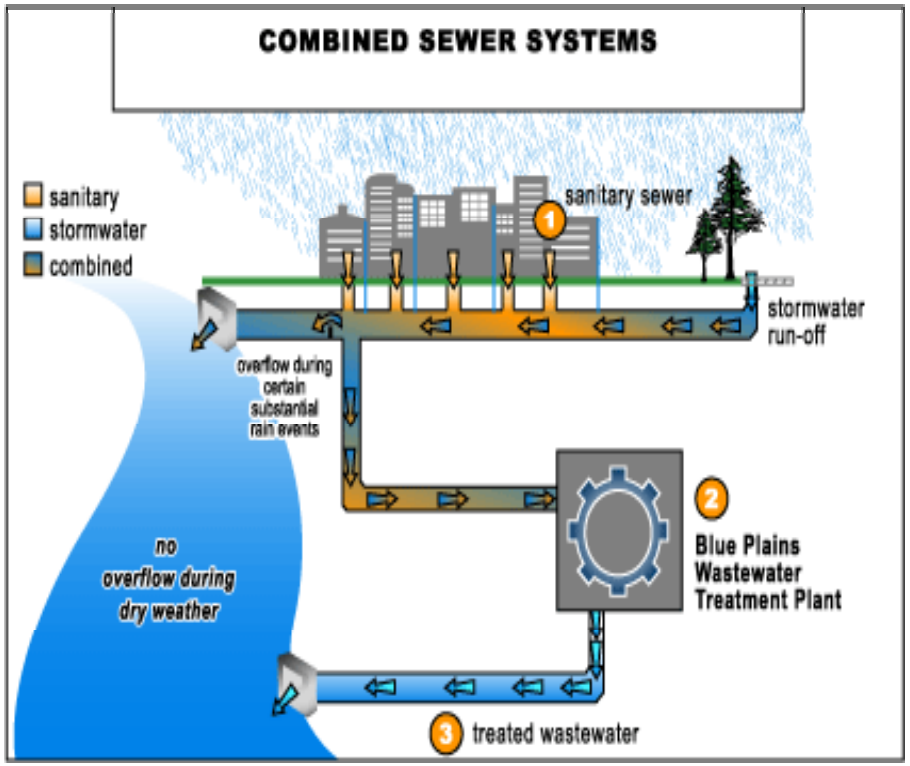
DCWATER.COM

Background
What is a CSO?

CSO = Combined Sewer Overflow



100% of Suburbs
67% of DC



0% of suburbs
33% of DC

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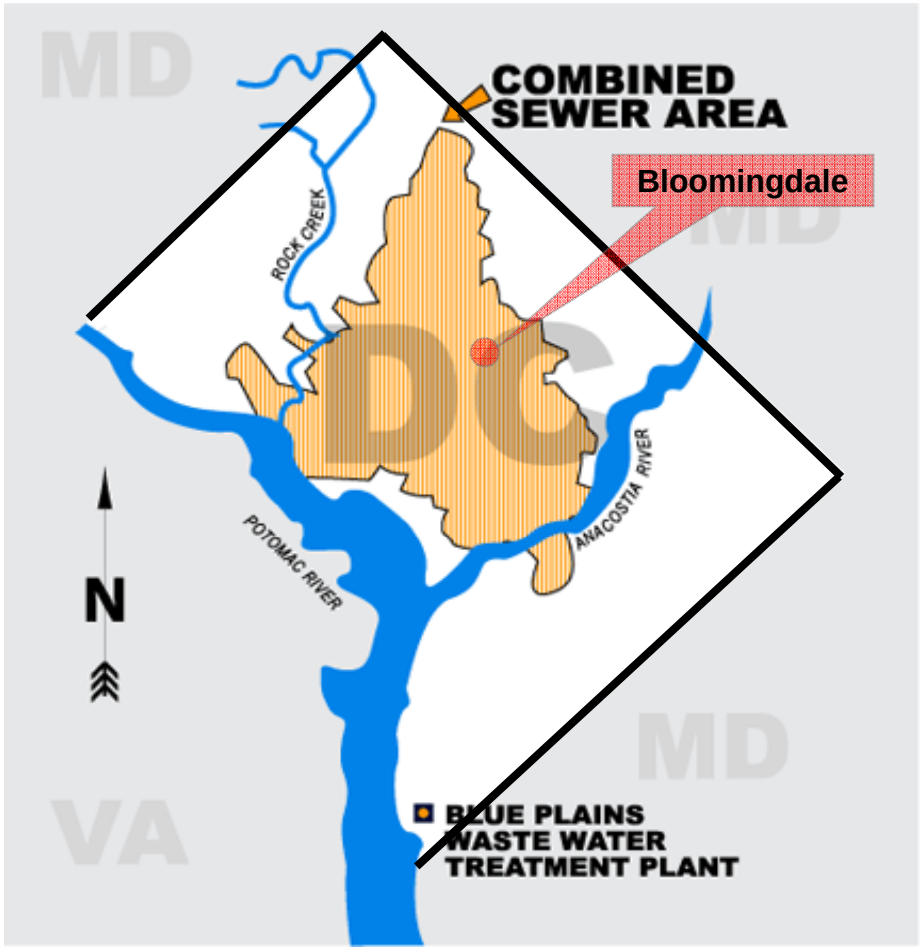
Background
DC Combined Sewer System



- 1/3 of the District is served by combined sewers (12,478 acres)
- 53 CSO outfalls
  - 15 to Anacostia
  - 10 to Potomac
  - 28 to Rock Creek
- Three receiving waters
  - Anacostia River
  - Potomac River
  - Rock Creek

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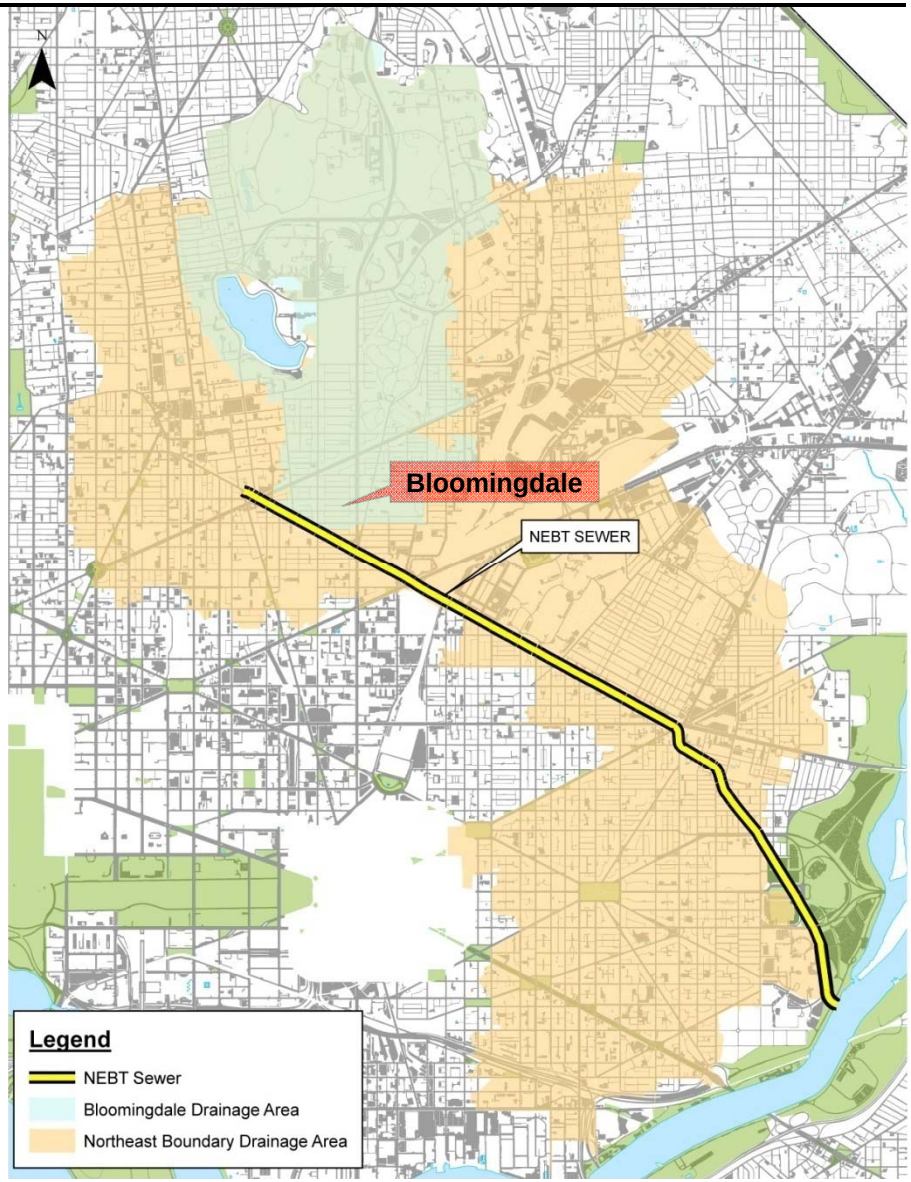
Background
NEB Drainage Area

Northeast Boundary Drainage Area (NEB) serves the Bloomingdale neighborhood

- Part of the District's Combined Sewer System
- One (1) pipe in street serves both sanitary collection and storm water runoff
- Built-out in the early 1900s

Northeast Boundary Trunk (NEBT) Sewer

- Major sewer serving the NEB Drainage area
- Constructed circa 1870-1880



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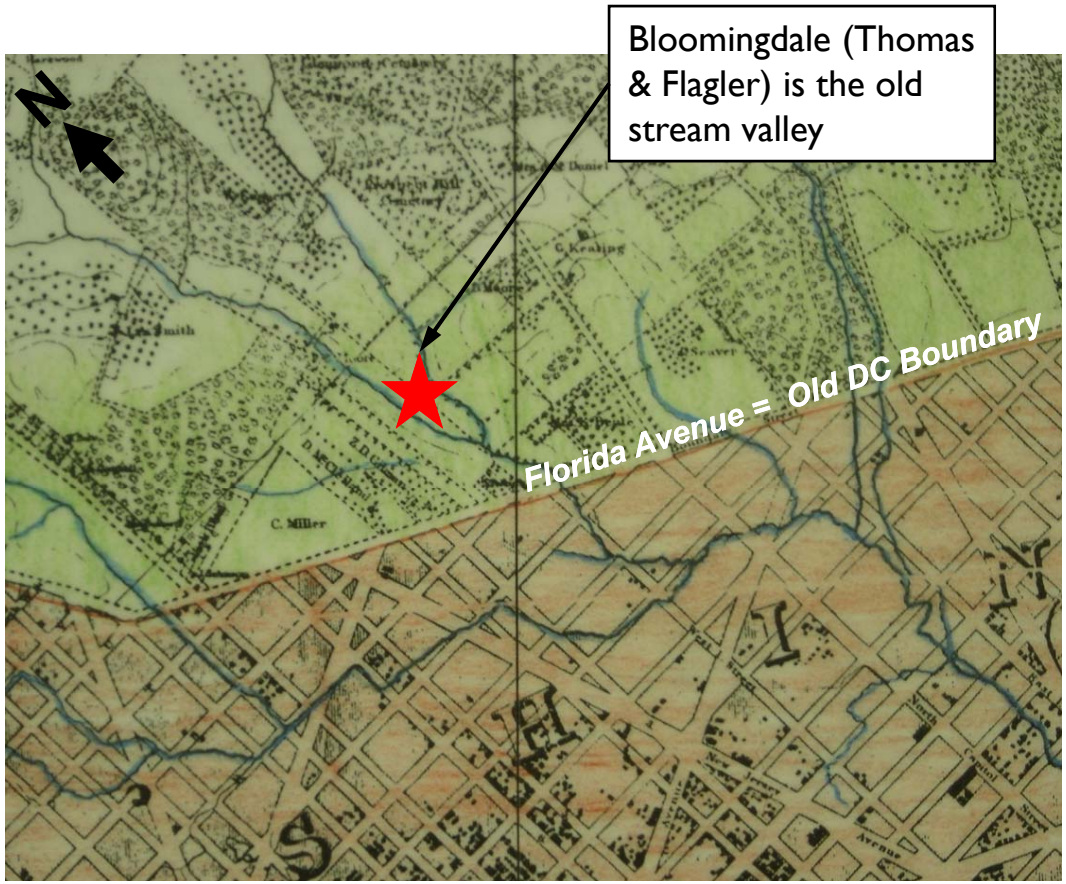
Background
History of Flooding

Flooding occurred soon after NEBT Sewer construction

- Recognition that sewer capacity was too low

Many studies have identified longstanding flooding issues in Northeast Boundary

- 1955 Sewer Investigation
- 1957 Board of Engineers
- 1968 Burns & MacDonald
- 1997 Alignment Study
- 1999 NEB Flooding Study
- 2002 CSO Long Term Control Plan
- 2006 Bloomingdale Flood Study



1860s Map of DC

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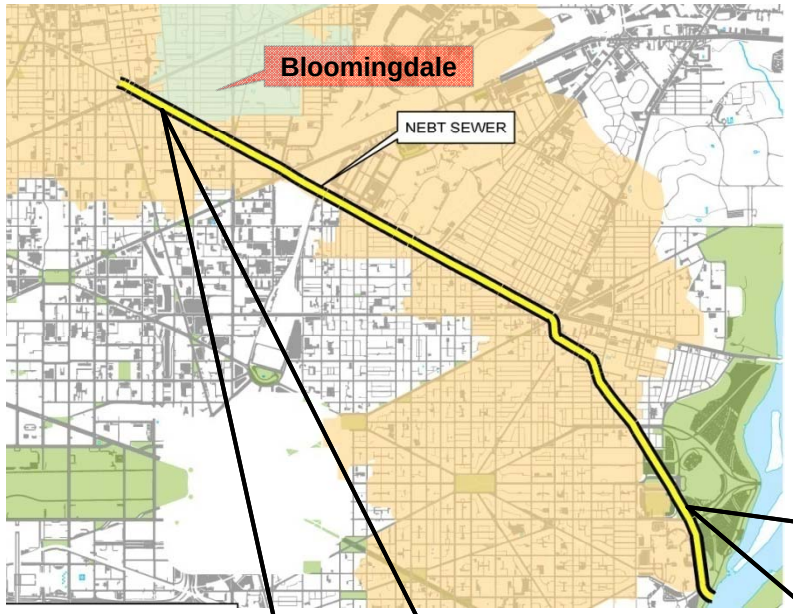
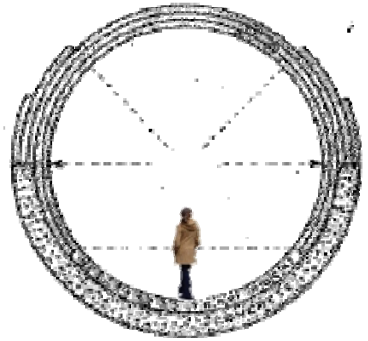
Background

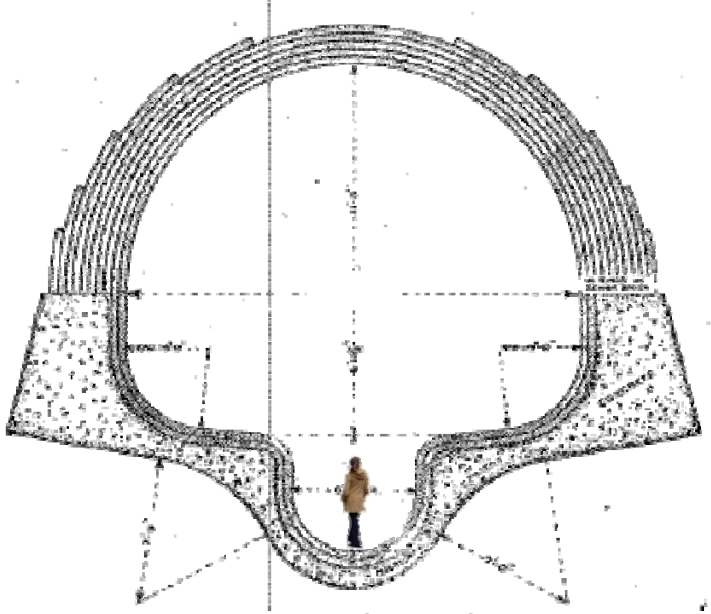
Why was Flooding not Addressed in the Past?



- Massive scale of project
- Not constructible without large disruption to neighborhoods and existing infrastructure without tunneling
- New tunneling technologies have made soft ground tunneling practical



Existing NEBT Sewer Section
(10'-0" Diameter)



Existing NEBT Sewer Section
(22'-0" 23'-6")

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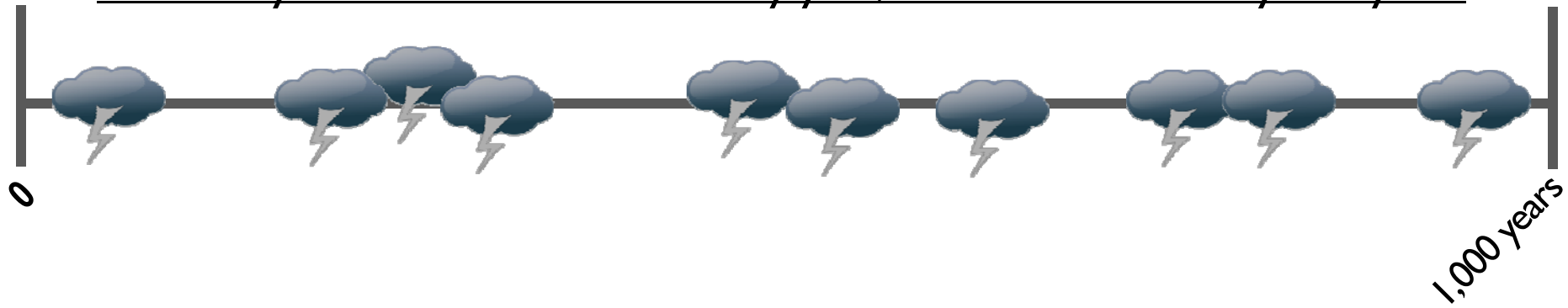
Background

What is Storm Frequency?

Long-term average = 10 storms ÷ 1,000 years = 1 % chance of 100 year storm

Probability of occurrence is 1% in any year, not one storm every 100 years



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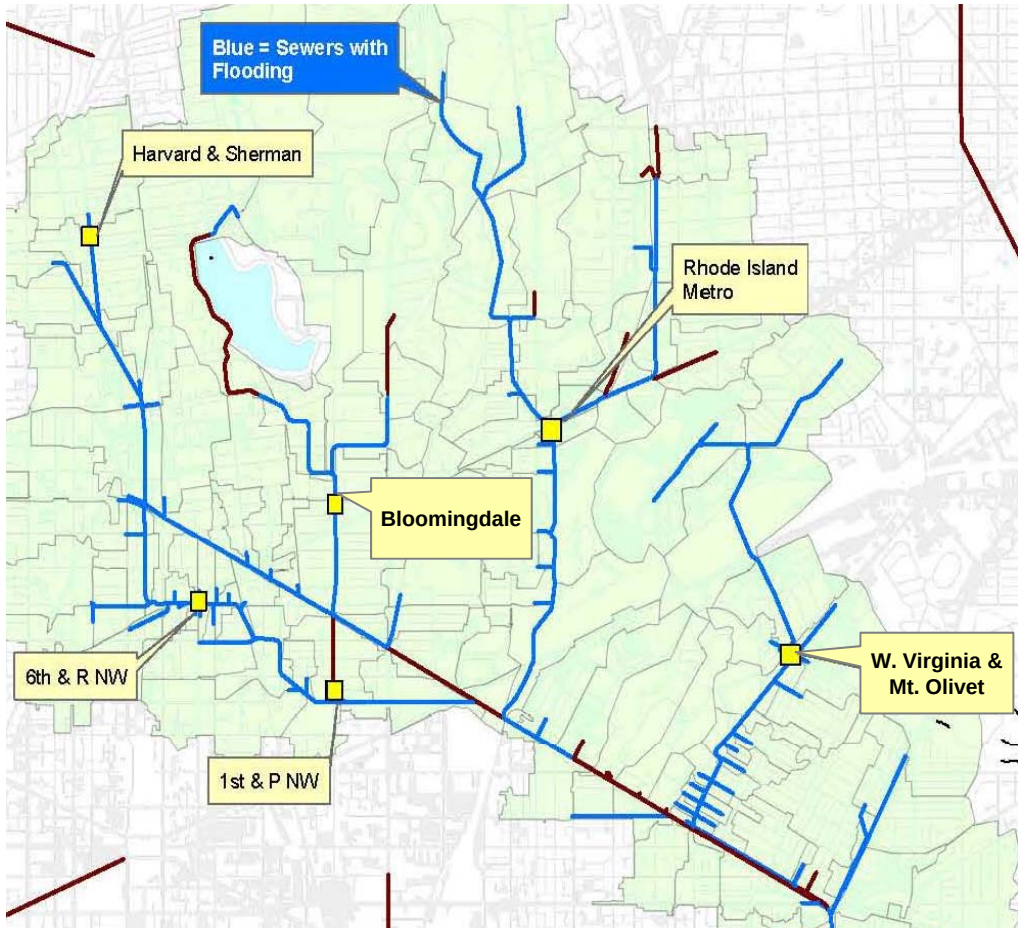
Background
Flood Areas

Known Chronic Flood Areas	Capacity of Current System (Storm Frequency)	Character-istic
W.Virginia & Mt Olivet	Less than 2 yr	Bowl
Rhode Island Metro	Less than 2yr	Bowl
1st & P St, 6th & R St NW	Less than 5 yr	Bowl
Bloomingdale	Less than 5 yr	Bowl
Harvard & Sherman NW	~ 2 yr	Hillside
NEBT Sewer	Most 2 yr, upper reach <2 yr	

Existing conditions 15-year 6-hour storm



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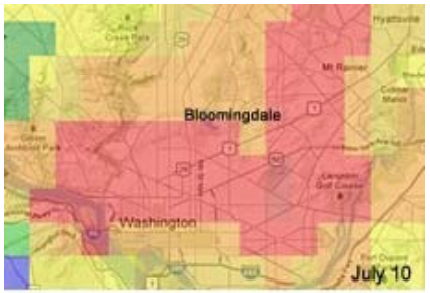
June/July 2012 Storm Events
Intensity Analysis

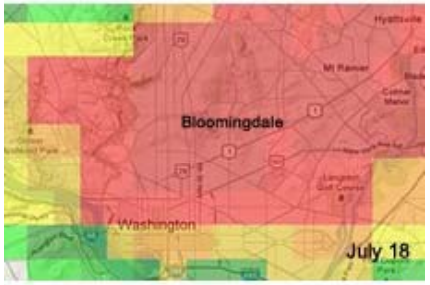
Peak Intensity of June/July 2012 Storms

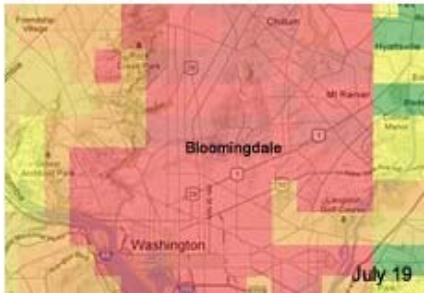
Date	Duration	Rainfall (inches)*	NOAA Point Precipitation Frequency (Nearly)
6/29/12 Derecho	30-min	0.50	< 1 year storm
7/10/2012	1-hour	1.96	10 year storm
7/18/2012	30-minute	1.35	5 year storm
7/19/2012	15-min	0.94	5 year storm

NOTES:

**Bryant Street Station Rain Gauge*







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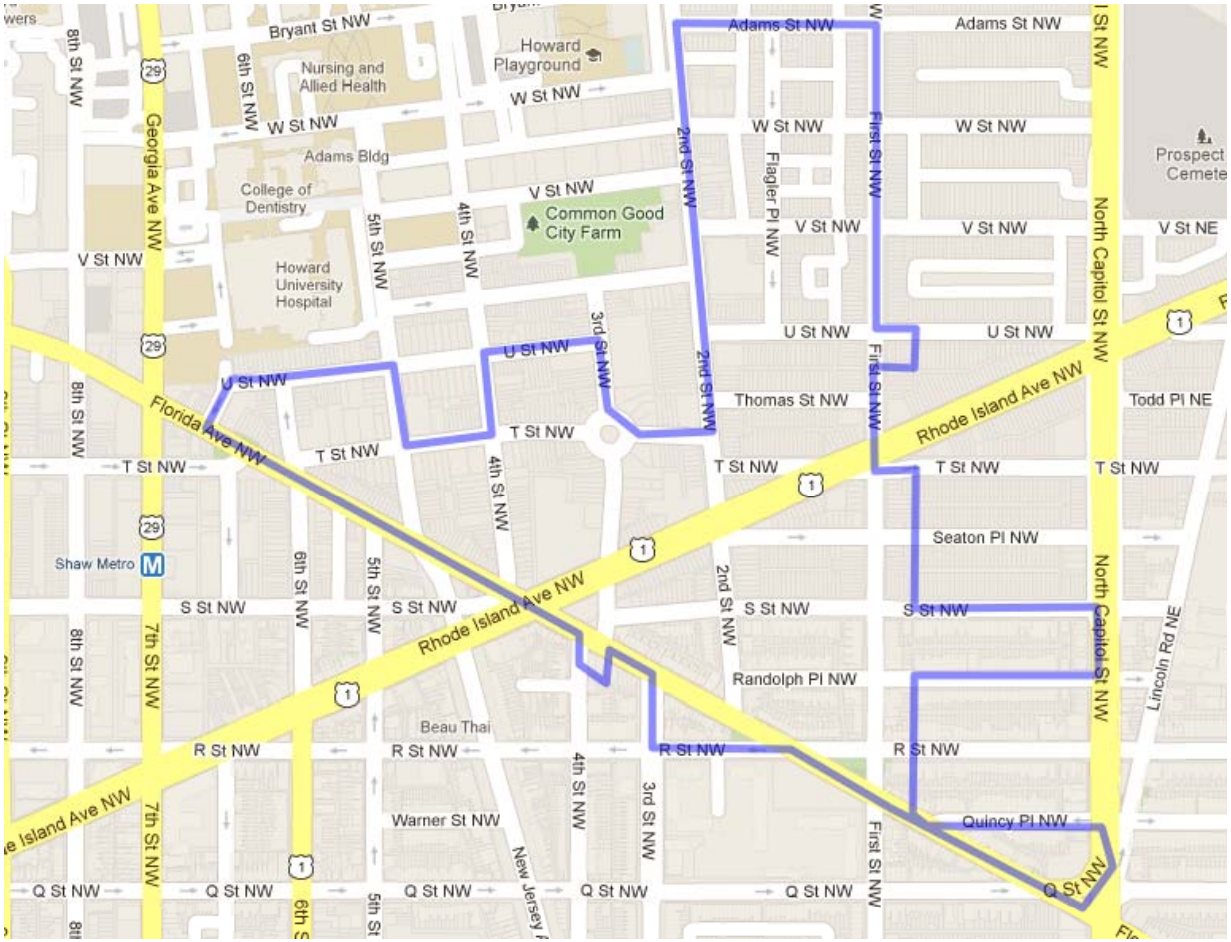
General Focus Area



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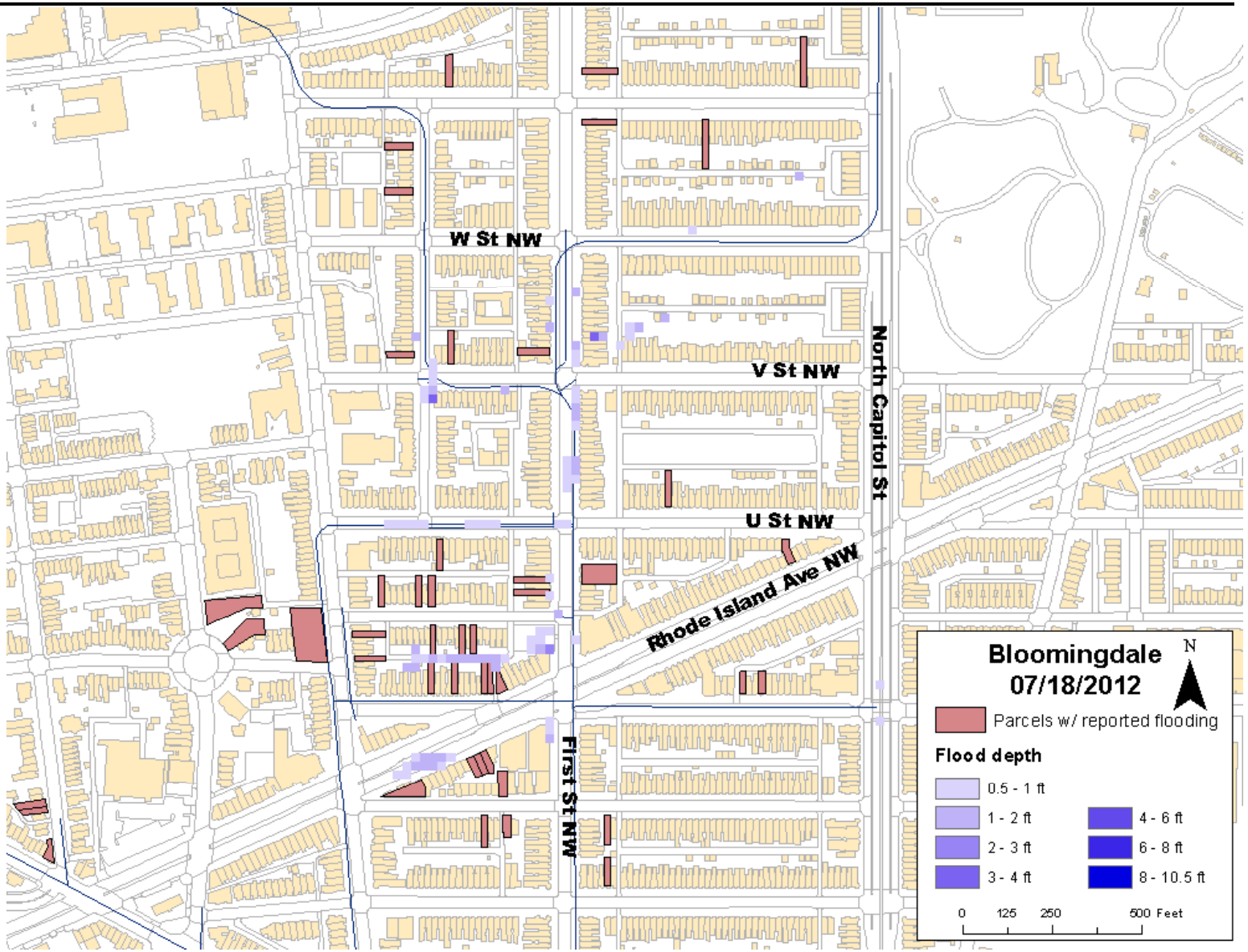
July 2012 Storm Events

Modeling Results – July 18th



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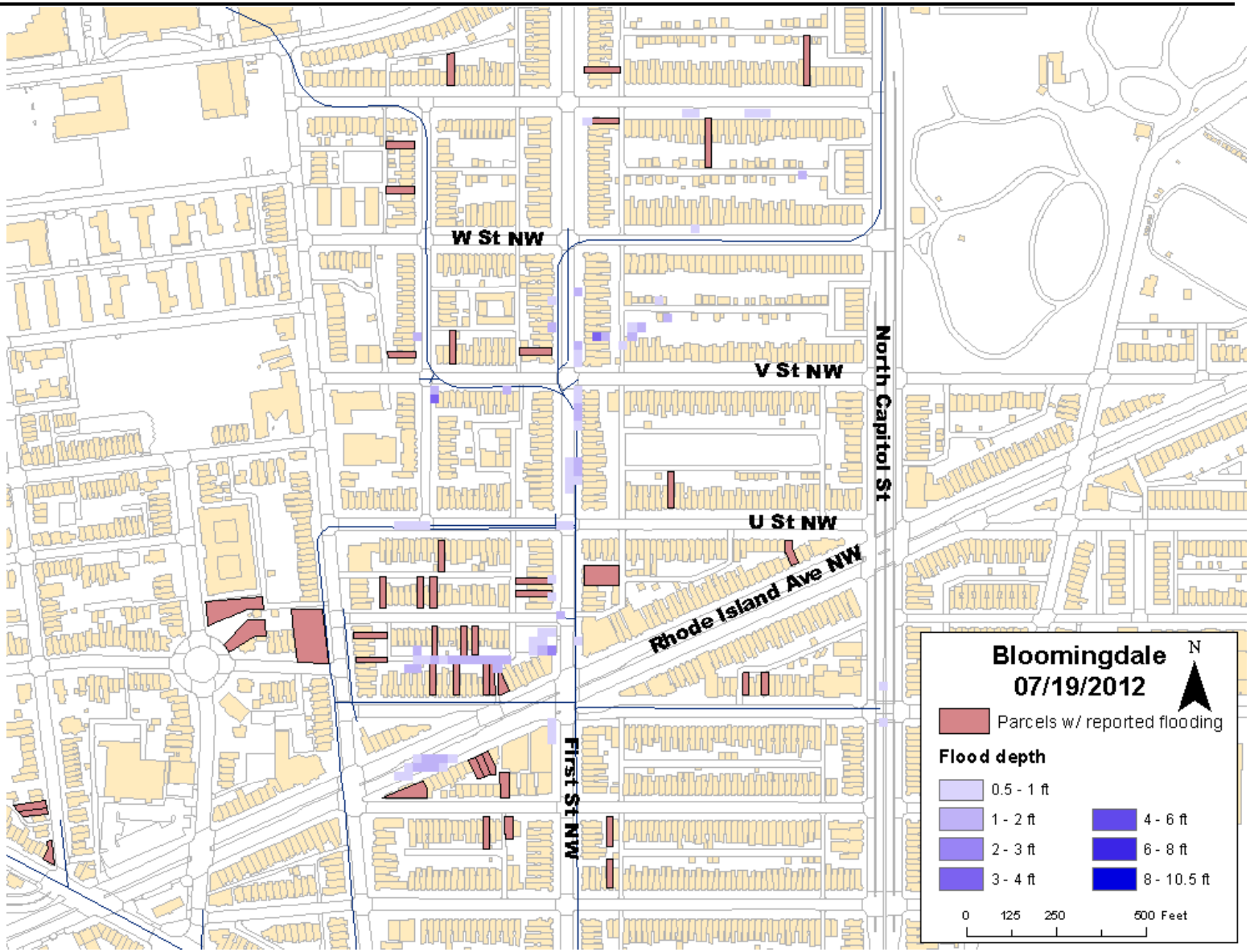
July 2012 Storm Events

Modeling Results – July 19th



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July 2012 Storm Events
Conclusions

- Sewers constructed in late 1800s were too small to accommodate development of District
- The amount of rainfall overwhelmed the sewer system, which resulted in flooding
- Continuing our detailed assessment and analysis of local sewers (sewer inspection by closed-circuit television camera and walk-through of sewers) to determine whether present condition of the sewers has measurable impact on flooding

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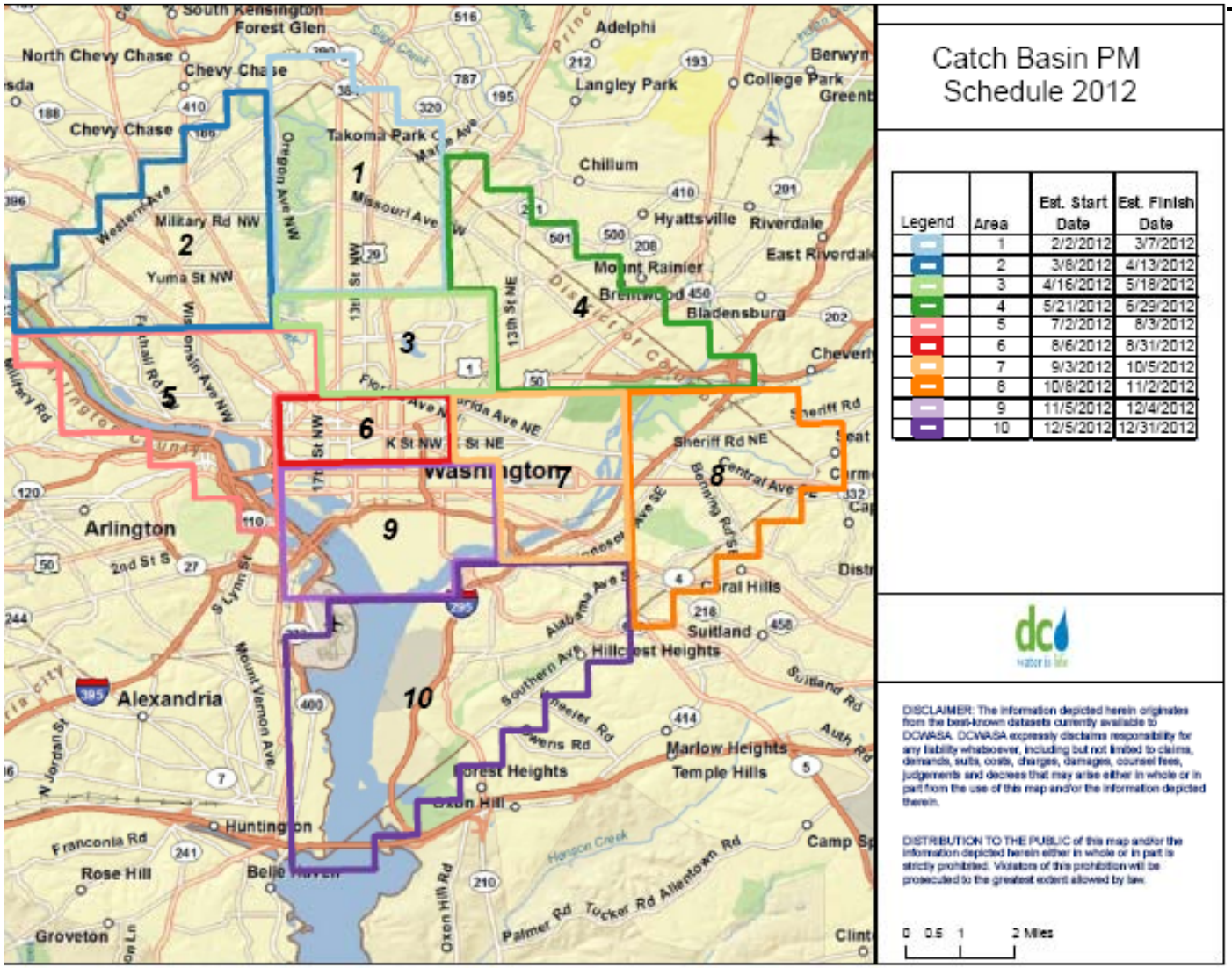
DC Water Catch Basin Cleaning Program



- Approximately 25,000 catch basins in the District
- Predetermined schedule for cleaning
- District is divided into 10 Catch Basin Cleaning areas
- Cleaning done in repetitive numerical order

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Bloomingdale Catch Basin Cleaning

- April 2010-Annual Catch Basin Cleaning (274 catch basins cleaned)
- August 2010-Service request (97 catch basins cleaned)
- April/ May 2011-Annual Catch Basin Cleaning (355 catch basins cleaned)
- August 2011-Hurricane Irene (191 catch basins inspected and cleaned)
- April/ May 2012-Annual Catch Basin Cleaning (371 catch basins cleaned)
- July 2012-Service request (225 catch basins inspected and cleaned)

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Bloomingdale/LeDroit Park Action Agenda

Information And Communications

- Launch of Bloomingdale/LeDroit Park specific web page
- Customer surveys (results next page)
- Implementation of Bloomingdale/LeDroit email and hotline for customer inquiries

Preparatory Assistance

- Coordination with the DC Department of Public Works (DPW) in sandbag distribution to community prior to anticipated heavy storms

Backflow Preventer Rebate Program

Engineering Consulting Services

Sewer inspection

- About 30,000 linear feet (1/3 of total) have been inspected by closed-circuit television camera. Remainder by end of Oct.

Flood Insurance Program

- According to the DC Department of the Environment (DDOE) and DC Homeland Security and Emergency Management Agency (HSEMA), Bloomingdale is categorized as a **low-risk flood zone area**. Reasonable flood insurance is made available through the Federal Emergency Management Agency (FEMA) and its National Flood Insurance Program.

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Bloomingdale/LeDroit Park Action Agenda

	Report Format	Issue Reported	Results
Total amount reported issues to date	Online surveys-45 reports	Overland flooding	Yes-62 No-28
	Survey postcards-43 reports	Sewer backup	Yes-61 No-32
	Email-20 reports	Interested in backflow preventer rebate program?	Yes-79 No-14
	Hotline-6 reports	Interested in engineering consultant services?	Yes-37 No-21
	August 4th meeting sign-in sheet-42 reports		

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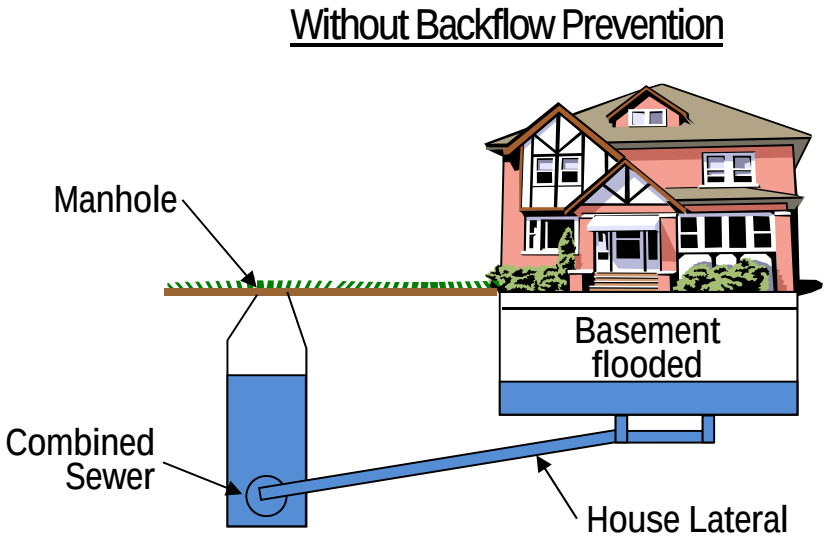
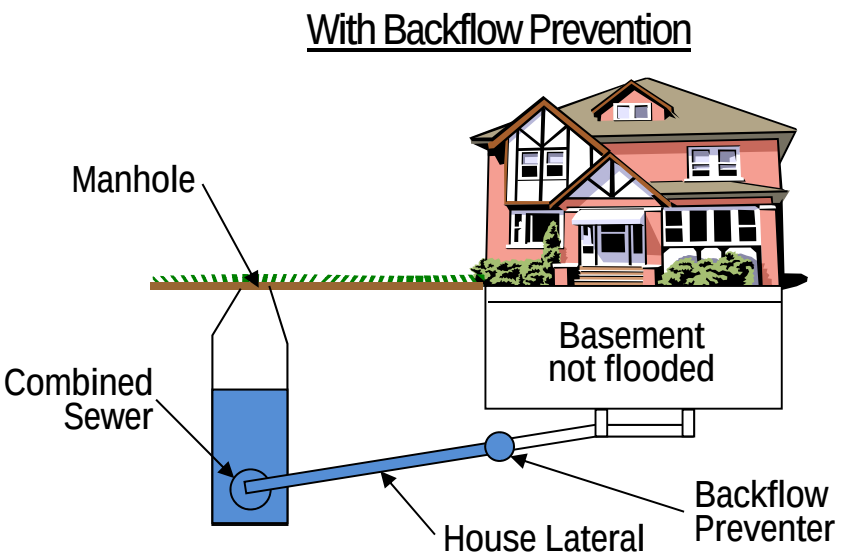
Backflow Prevention Device

- Backflow prevention device protects against basement backups



Rainfall overloads sewers – backs-up into basement



Backflow preventer stops flow from sewer from entering basement

DC Water rebate: 90 percent of purchase and installation cost, up to $3,000. Retroactive to July 1.

Community workshops: September 6 and 8.

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Other Floodproofing Measures

- Basement steps and door barriers protect against flooding from surface overflows

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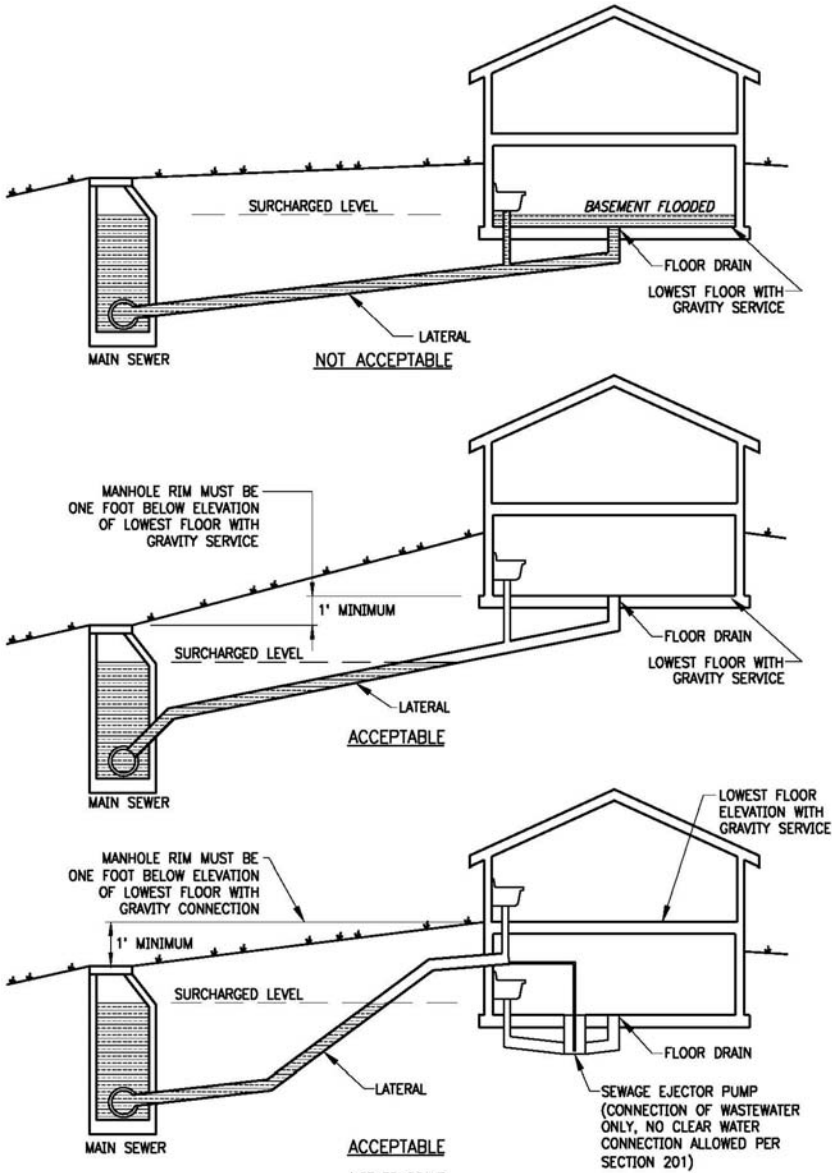
Design New Development to Prevent Sewer Backups

- Other cities have required:
  - New construction to have lowest floor with gravity service be above manhole rim
  - Backflow preventers
  - Basements disconnected from gravity service and equipped with sewage ejector pumps
- Potential for implementing similar plan in the District



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Exploring Medium-Term Engineering Solutions

1. Capture and temporary storage of stormwater upstream of the Bloomingdale area at available facilities
2. Installation of a relief sewer at designated portions along NEBT as a way to prevent backups
3. Disconnect connector lines from the main sewer and take flow directly to trunk sewers
4. Convey some flow to another major trunk sewer aside from NEBT

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Medium-Term: For Discussion with Other Agencies on the Task Force

HSEMA

- Work with DC Water to provide federal disaster relief funding for backflow preventer rebates.

DISB

- Require insurers to identify sewer-backup insurance as an option for homeowner and renter policies?

DDOE

- Consider expanding RiverSmart program to provide rain barrels or other green infrastructure to homeowners in the NEBT sewershed?

DDOT

- Work with DC Water to investigate drainage conditions and number of catch basins along Florida Avenue NW in LeDroit. Possibly improve.
- Consider alternative traffic plans, including closing Rhode Island Avenue, during flooding events.
- Investigate some type of inflatable or movable flood wall solution for Rhode Island Avenue?

DCRA

- Work with DC Water to ratify backflow unpermitted preventer installations between July 1 and August 10.
- Changes to plumbing code? Building code?

DMPED

- Work with DC Water to ensure additional planned development in the NEBT sewershed does not further overload the sewer system with stormwater runoff or residential/commercial wastewater.

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Long-Term Solution

Clean Rivers Project will Provide Flood Relief

ANACOSTIA RIVER PROJECTS

- System of deep tunnels
- 98% CSO Reduction
- Tunnels reach into NE DC and Bloomingdale to provide flood relief
- CSO portion in-service by 3/2018, flood relief by 3/2025 per Consent Decree

POTOMAC & ROCK CREEK PROJECTS

- System of deep tunnels
- Green infrastructure is being evaluated
- 93% CSO Reduction
- In-service by 3/2025

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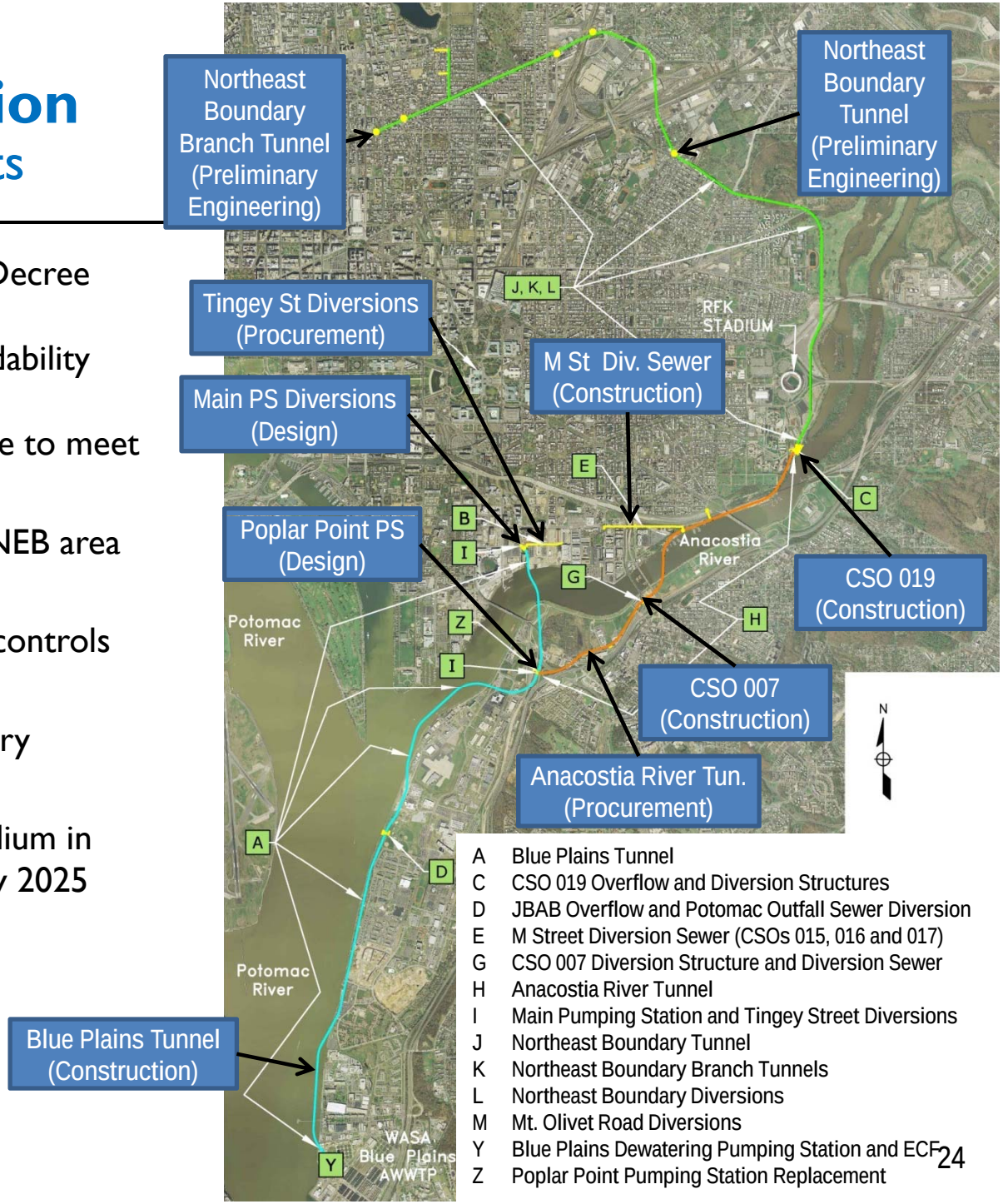
Long-Term Solution
Anacostia River Projects

- Schedule specified by Consent Decree with EPA
  - Schedule influenced by affordability concerns (rate impacts)
  - Stipulated penalties for failure to meet specified schedules
- Construction of tunnels in the NEB area to alleviate flooding
- Tunnels act as relief sewer that controls flooding in the NEB area
- DC Water performing preliminary engineering for NEB area <u>now</u>
- Place facilities south of RFK stadium in operation by 2018, remainder by 2025



A Blue Plains Tunnel
C CSO 019 Overflow and Diversion Structures
D JBAB Overflow and Potomac Outfall Sewer Diversion
E M Street Diversion Sewer (CSOs 015, 016 and 017)
G CSO 007 Diversion Structure and Diversion Sewer
H Anacostia River Tunnel
I Main Pumping Station and Tingey Street Diversions
J Northeast Boundary Tunnel
K Northeast Boundary Branch Tunnels
L Northeast Boundary Diversions
M Mt. Olivet Road Diversions
Y Blue Plains Dewatering Pumping Station and ECF
Z Poplar Point Pumping Station Replacement

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Long Term-Solution
Magnitude of Clean Rivers Project

- Tunnel Boring Machine is 26-ft in diameter to construct a 23-ft diameter tunnel
- Tunnel length: Blue Plains to NEB = 13-miles
- Tunnel is slightly larger than existing NEBT Sewer

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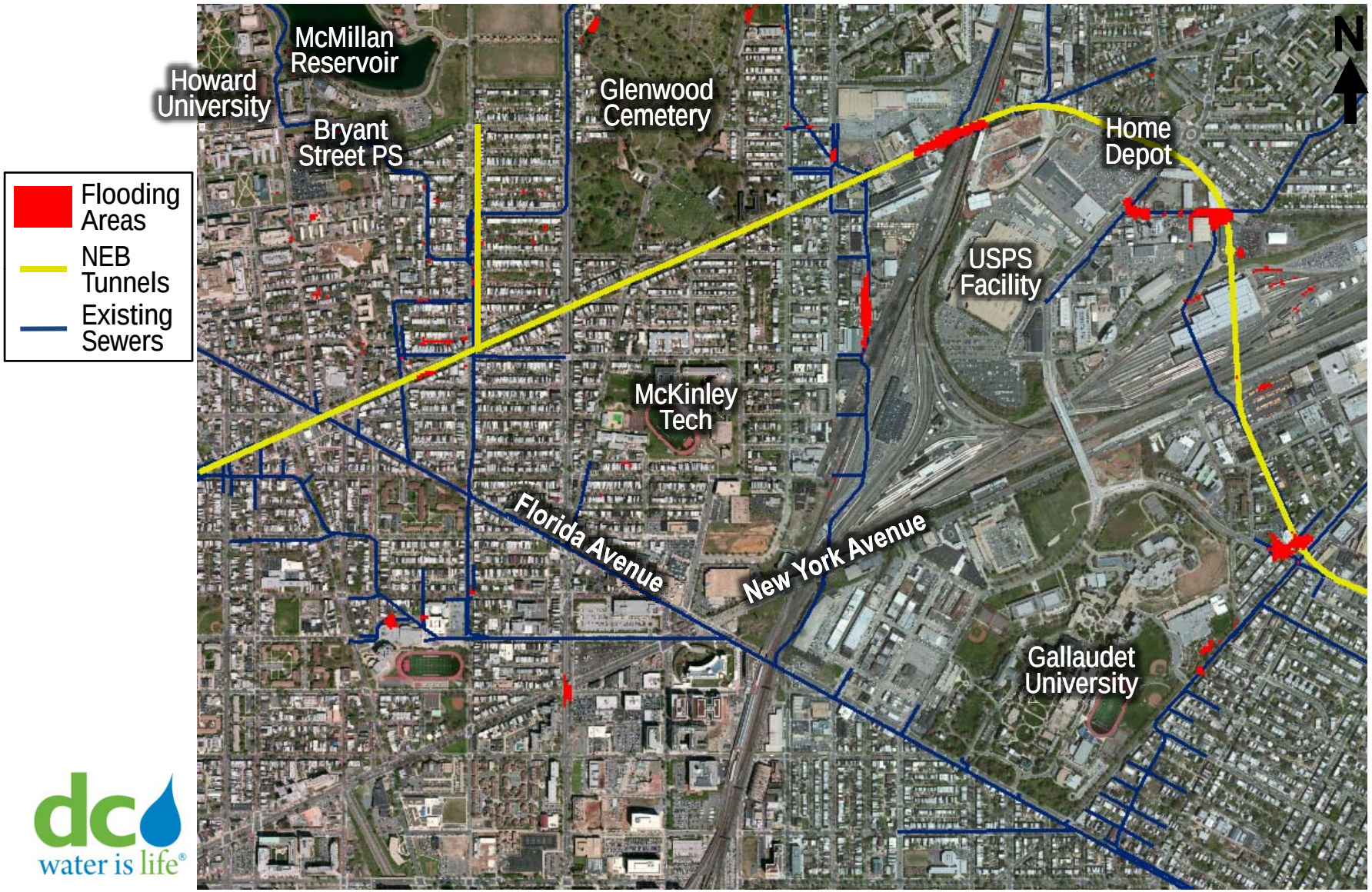
Long-Term Solution

NEB Tunnels Address Flooding Areas



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Long-Term Solution
Cost and Schedule

NEB Tunnel Design and Construction

	Dates
Preliminary Engineering and Procurement	**2012 – 2017**
Construction	**2018 – 2025**
Place into Operation	**2025**

DC Water is looking into the potential to accelerate, but the current schedule is ambitious. Support and collaboration from entire District Government is key to meeting deadlines.

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Questions?