Regional Blue-Green Infrastructure Community Engagement and Planning Project

MWCOG Water Resources Technical Committee

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What was this project?

https://www.mwcog.org/environment/programs/regional-blue-green-infrastructure-bgi-flood-project/

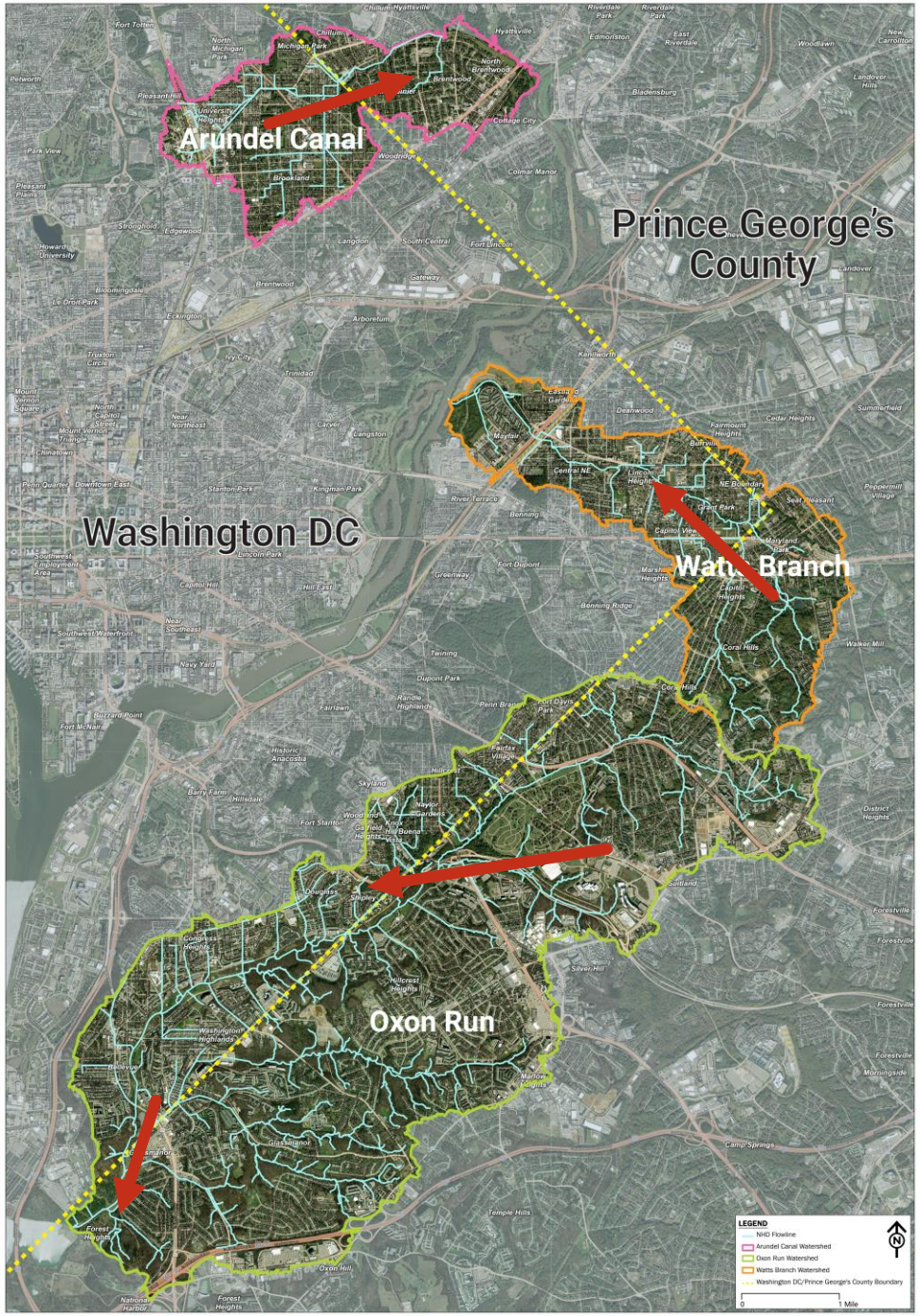
Completed in June 2025

Regional planning study focused on 3 cross-jurisdictional watersheds

Purpose: Identify Blue Green Infrastructure (BGI) solutions that will reduce flooding across boundaries, through community enhancement.

Our Watersheds

- Arundel Canal (Anacostia)
- Watts Branch (Anacostia)
- Oxon Run (Potomac)



Why this project matters

- Flooding is costly, crosses boundaries, and hits vulnerable communities hardest
- Confronts perception that BGI is too small scale for major flood reduction
- First coordinated flood planning study spanning the District and Prince Georges County

What if our community assets could also make neighborhoods more resilient, healthier, and more connected?

Mindset shift from “pipes and ponds” to “people and purpose.”

Goals and Outcomes

- Document a process to identify and advance great BGI projects
- Provide a framework to mitigate flood risk while enhancing quality of life
- Create a repeatable process to:
  - Collaborate across boundaries
  - Generate actionable project ideas
  - Prioritize actions
  - Translate actions into concepts
  - Find funders and build partnerships
  - Identify and engage communities meaningfully
- Demonstrate the process in action!

This project will serve as a model for other regional efforts.

Why Now?

- All three downstream communities have life and property at risk
- Climate change = increased risk
- Jurisdictional boundaries have historically limited regional watershed planning
- Communities most impacted are historically underserved

The Big Question

Can we quantifiably reduce the risk of flooding in a downstream community through the installation of community-forward Blue Green Infrastructure projects upstream?

YES*

(*If you approach it the right way)

Our Approach to BGI

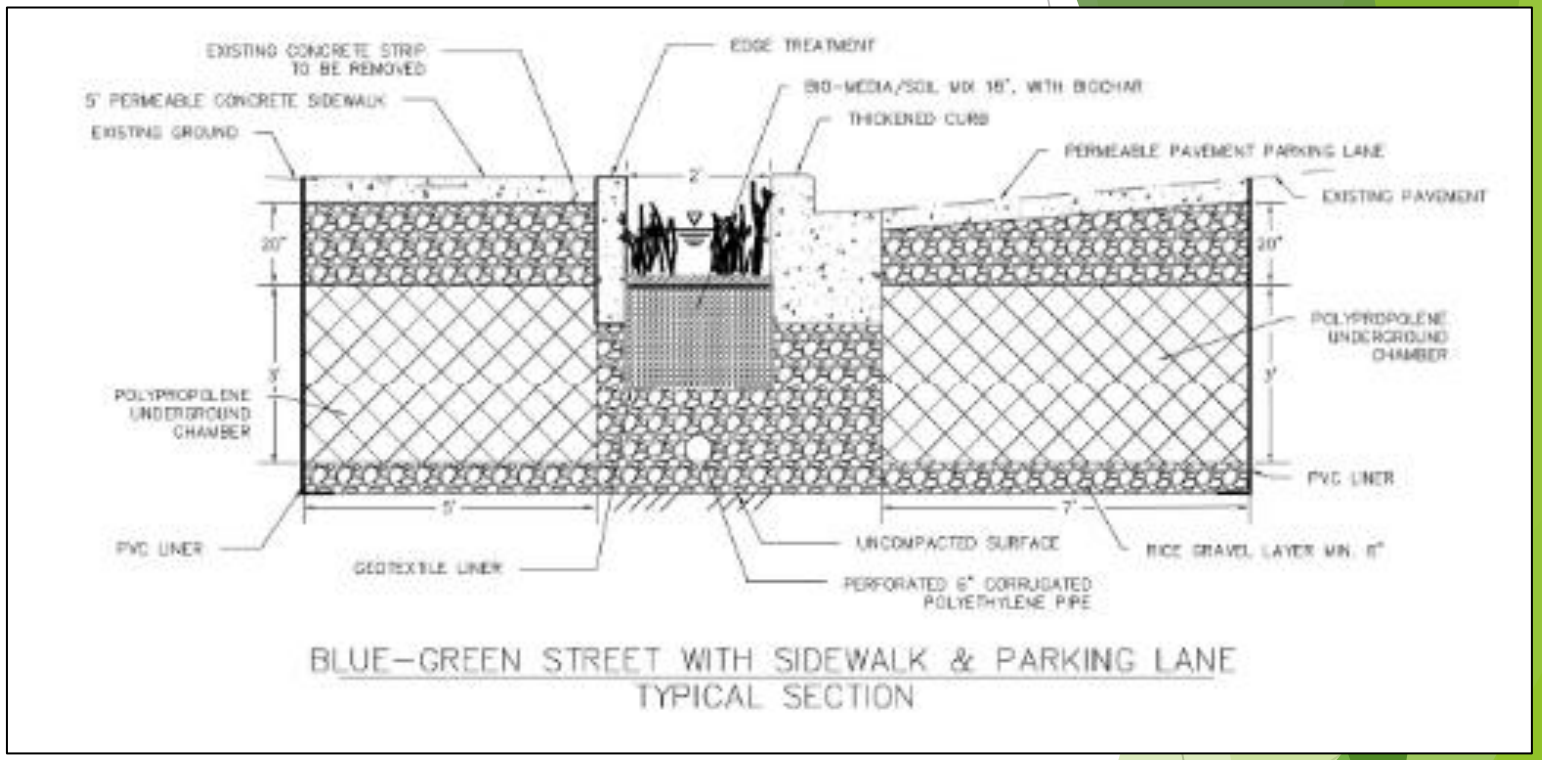
What is BGI and How Can it Reduce Flooding?

- Important to first define “BGI”
- Requires a mindset shift between water quality and practices that capture meaningful volumes and encourage infiltration and evapotranspiration
- Some details and examples

What is Blue-Green Infrastructure (BGI)?

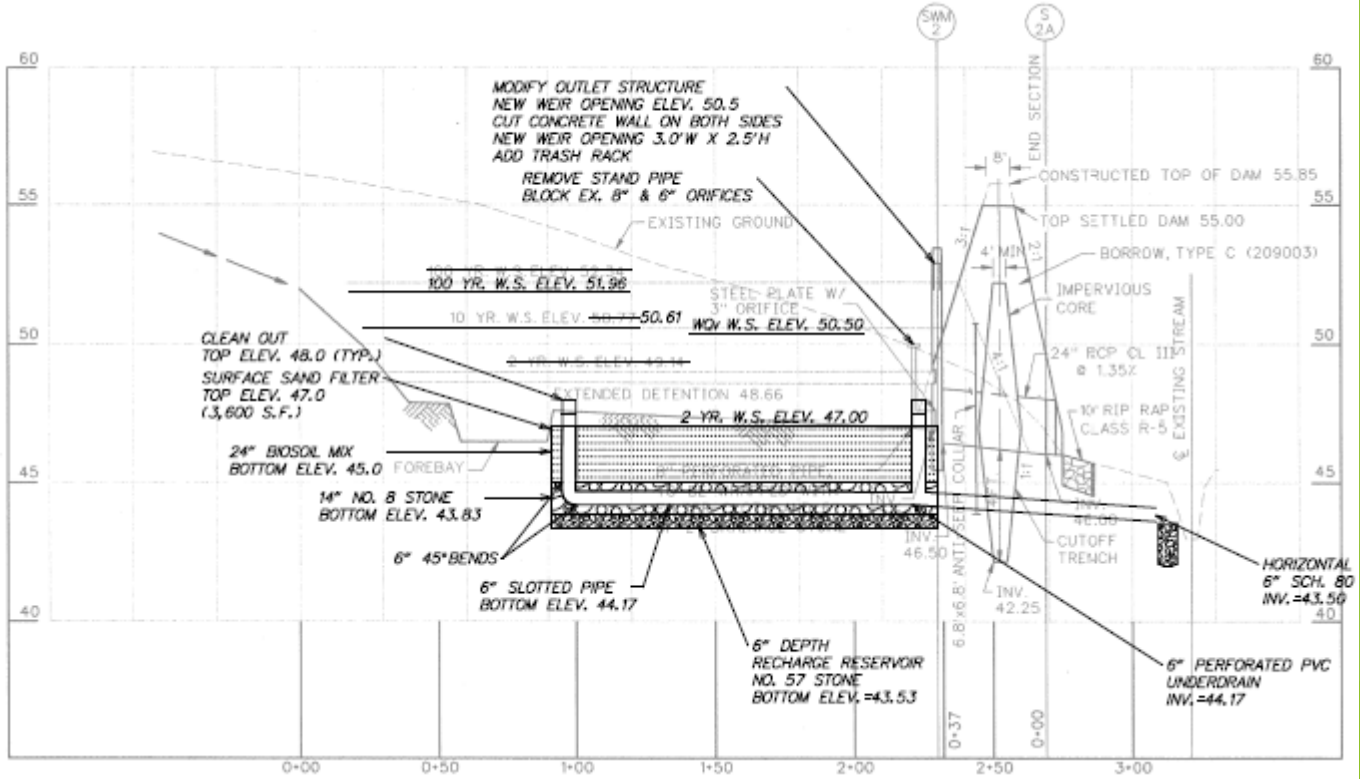
Blue-Green Streets

- Blue-Green Streets
  - Water quality improvements via filtration and vegetation
  - Soil and stone amendments including biochar to increase pore space, storage, evapotranspiration
  - Flow storage/attenuation below sidewalk, parking lanes and filter using course stone and underground chambers
  - Infiltration (large surface area)
  - Evapotranspiration



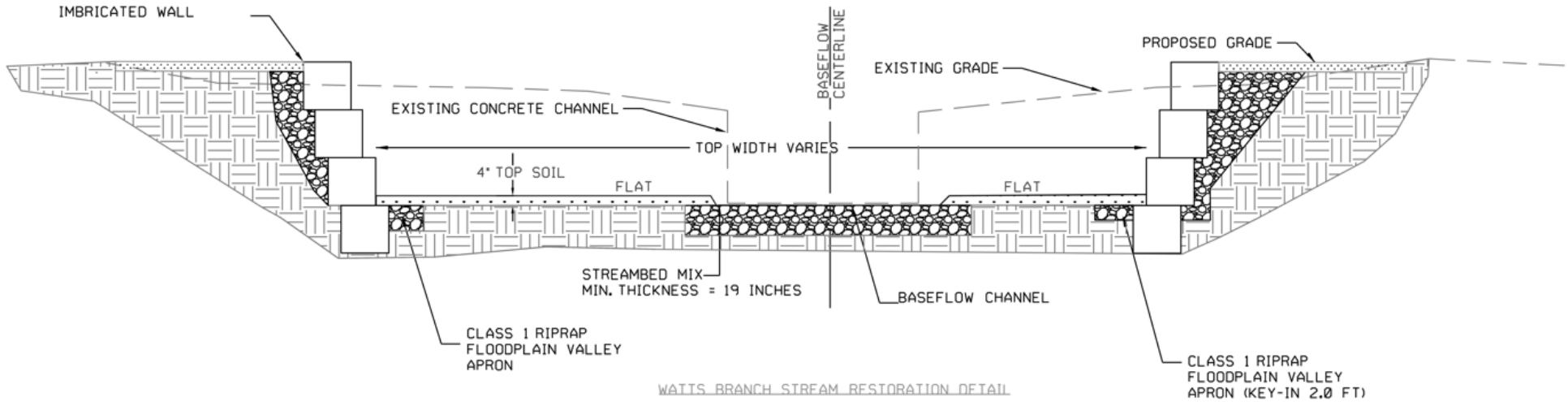
Pond Retrofits

- Pond retrofits
  - Water quality via filtering and vegetation
  - Add flow storage/attenuation via removing wet storage, sloped bottoms and/or benches
  - Pond bed soil amendments (sand, mulch and biochar)
  - Infiltration (large surface area)



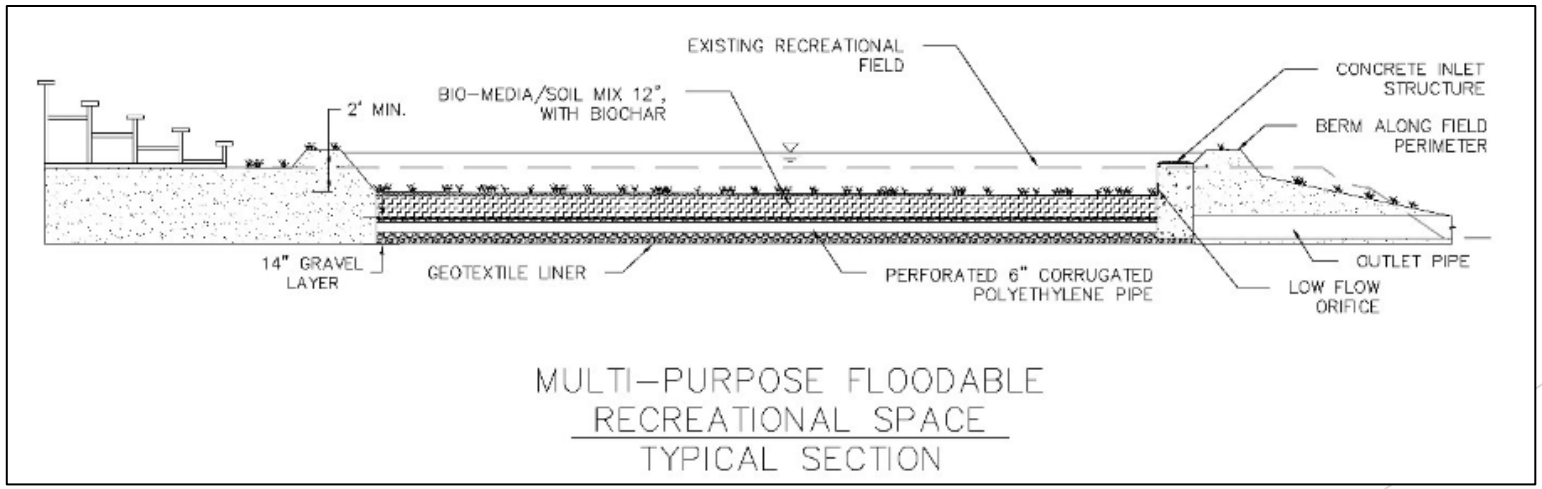
Stream and Floodplain Restoration

- Stream and Floodplain Restoration
  - Water quality via vegetation, hyporheic zone, infiltration
  - Add flow storage/attenuation
    - Modern sediment removal
    - Increased floodplain storage
  - Floodplain soil amendments (biochar, mulch, floodplain soil)
  - Infiltration (large surface area)
  - Evapotranspiration



Floodable Recreational Spaces

- Floodable Recreation Spaces
  - Multi-purpose vegetated or permeable paved areas
  - Flow storage/attenuation below recreational field, playground and/or permeable court
  - Recreational area bed soil amendments (sand, mulch and biochar)
  - Infiltration (large surface area)



Tree Planting

- Tree planting
  - Plant large open space areas
  - Comprehensive soil decompaction/amendments such as compost and biochar
  - Runoff reduction
  - Evapotranspiration

Example – Regional Watershed Approach

Multiple BGI techniques

- ✓ Floodable Recreational Field
- ✓ Stream/Wetland Restoration
- ✓ Green Stormwater Infrastructure
- ✓ Tree Planting
- ✓ Pond Retrofits

Results: 50% reduction in 100-year discharge

Benefits:

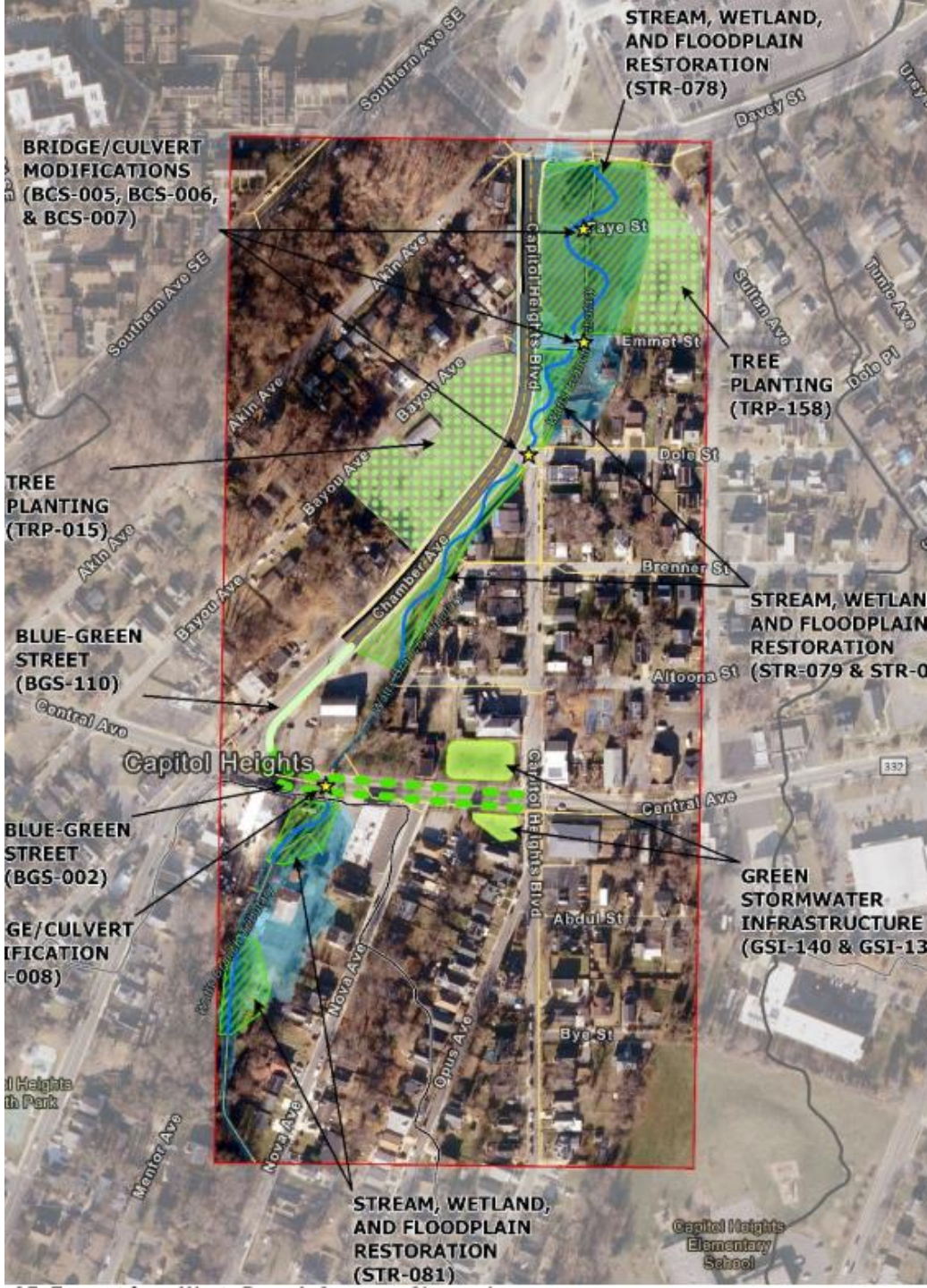
- New community park! With trails and recreational amenities.
- Returned unusable land to the community

Tweed's Park, Hockessin, DE

Study Components

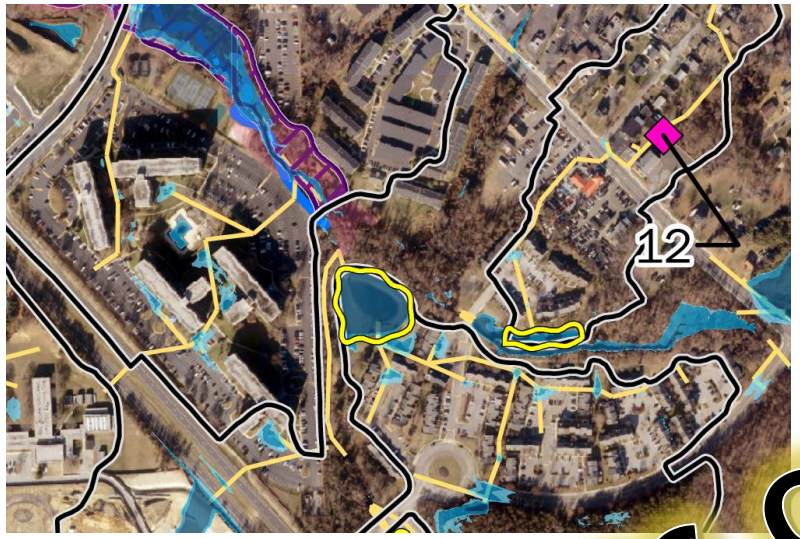
Deliverables at a Glance

- Mapped BGI Opportunities
- A customizable Prioritization Framework
- Three Fundable Concept Plans (one per watershed)
- A detailed modeling case study demonstrating flood reductions.
- Step-by-step guidance on how to replicate finding opportunities and developing concepts in other areas.



Comprehensive BGI Opportunities Mapping

1) Bridge and Culvert Modifications
2) Floodable Public Spaces
3) Green Stormwater Infrastructure
4) Blue-Green Streets
5) Impervious Reduction
6) Pond Retrofits
7) Storm Drain Outfall Retrofits
8) Stream Daylighting
9) Stream, Wetland, and Floodplain Restoration
10) Tree Planting



Example: Large Pond behind Oakcrest Apartments

Example: Tree planting in open space near Dupont Heights Park

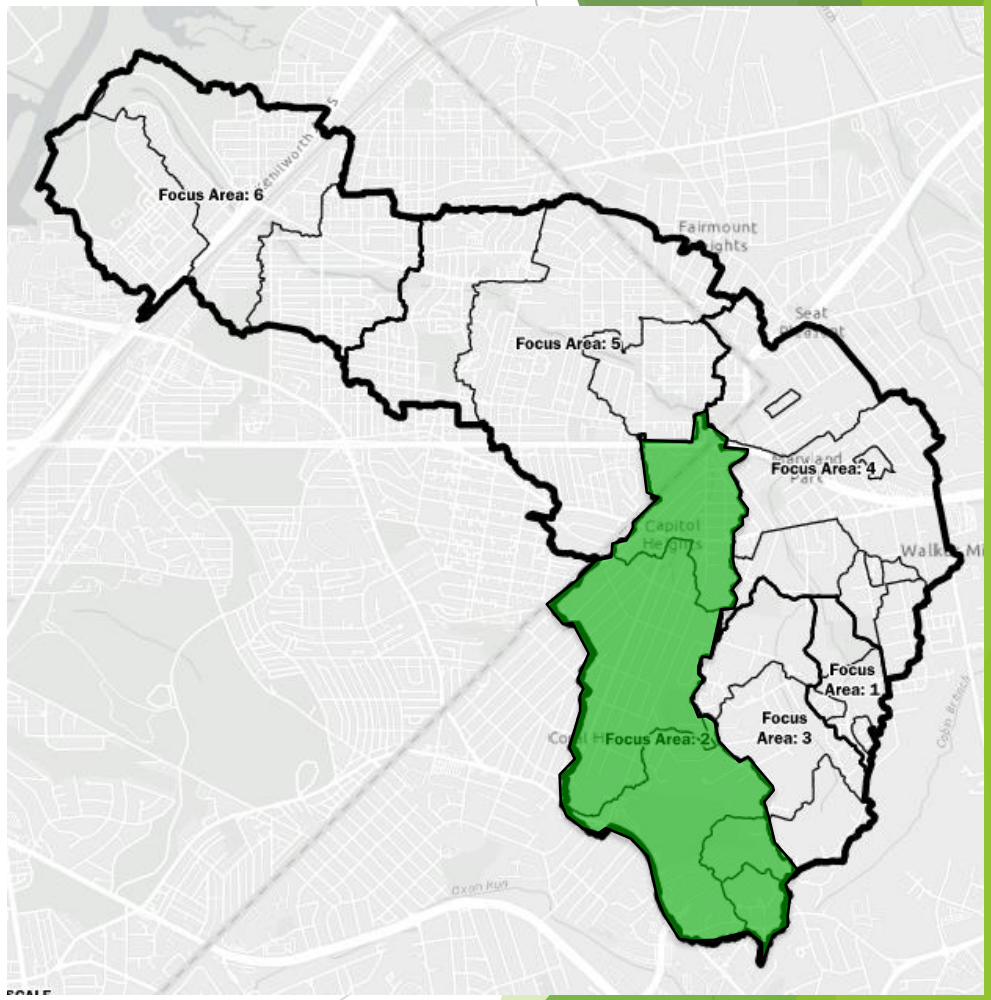
Example: Fort Drive between Towne Park Road and Crosier Street

210 Pages of Mapping!

Modeling Discussion

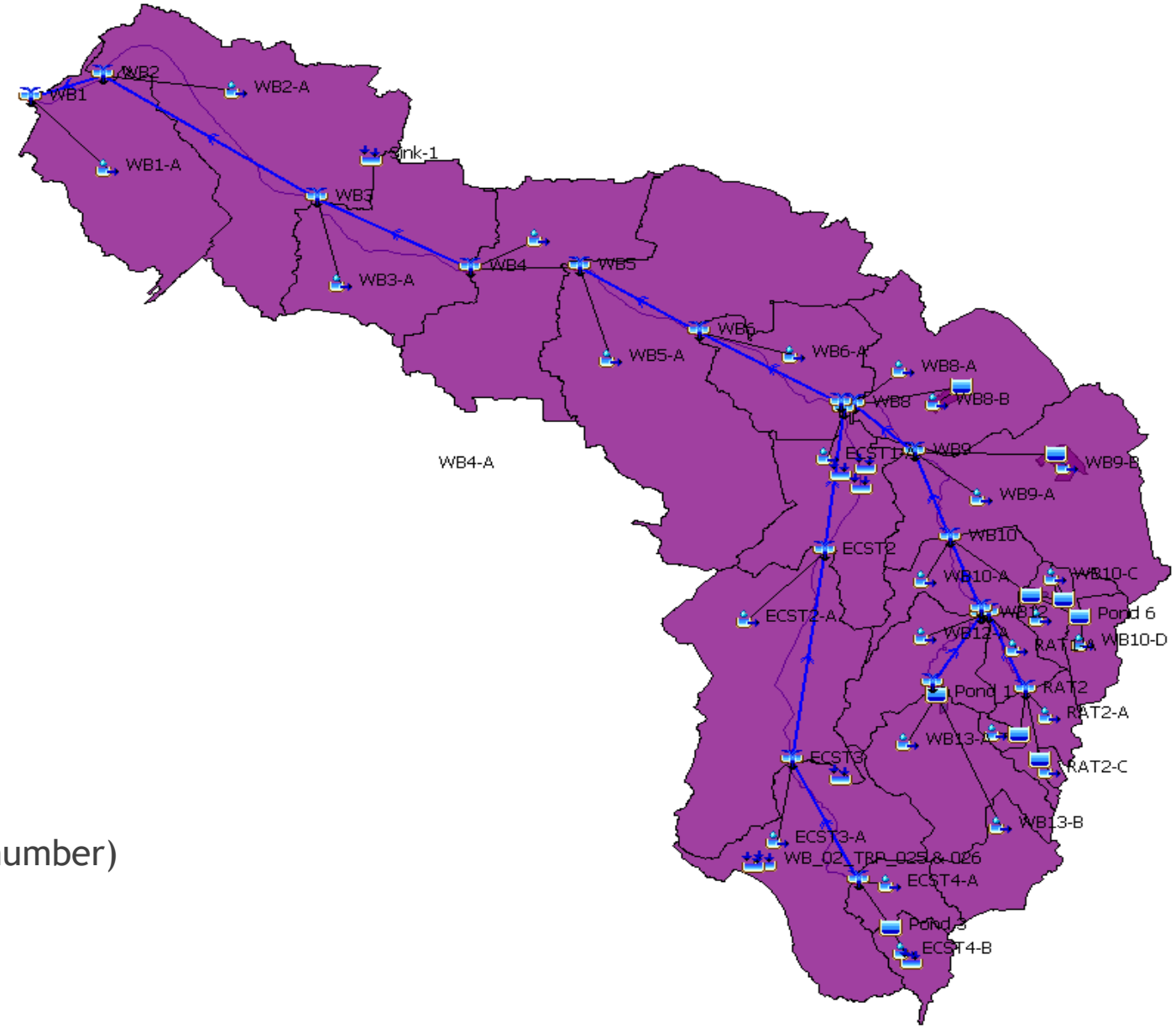
Watts Branch: Detailed Case Study

- We developed a replicable approach to model BGI effectiveness, relying primarily on the USACE HEC-HMS model.
- This a notable improvement over quantifying “volume” alone because it recognizes the position and timing of flows moving through the watershed.
- The outputs have meaningful implications.



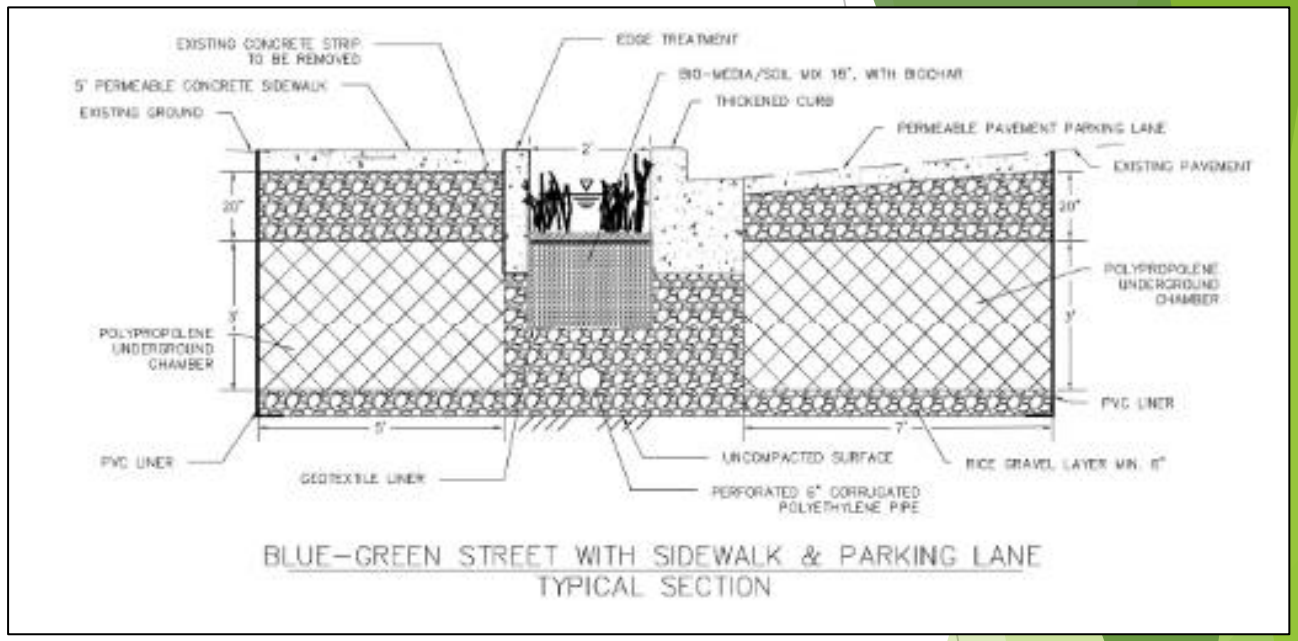
HEC-HMS Model Amendments

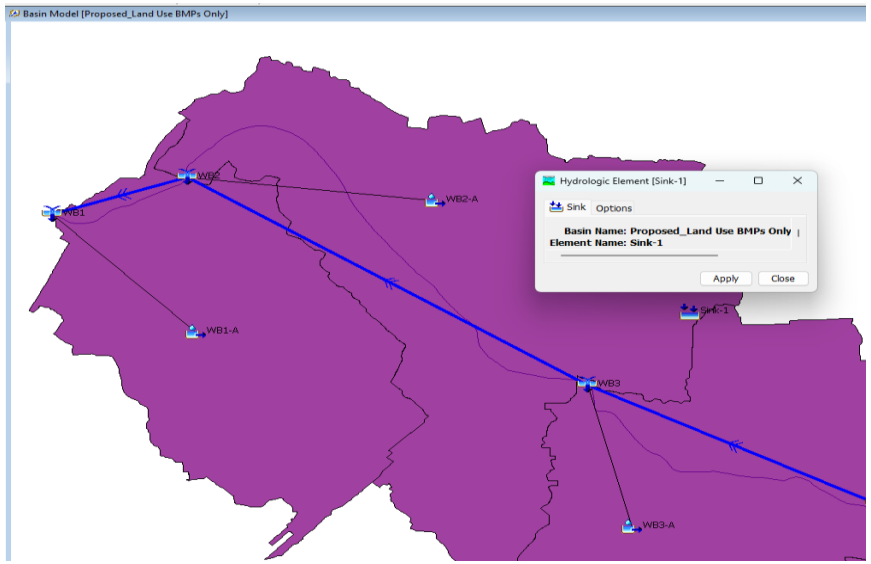
- Starting Point
  - Detailed USACE Watts Br. Model
  - Includes sub-basins & existing ponds
- Incorporated targeted BMPs
  - Volume storage and reduction
  - Existing pond retrofits
  - Land use/curve number modification
- HEC-HMS modeling tools
  - Reservoir creation
  - Reservoir modification
  - Reach routing modification
  - Flow diversion (infiltration)
  - Hydrologic element modification (curve number)

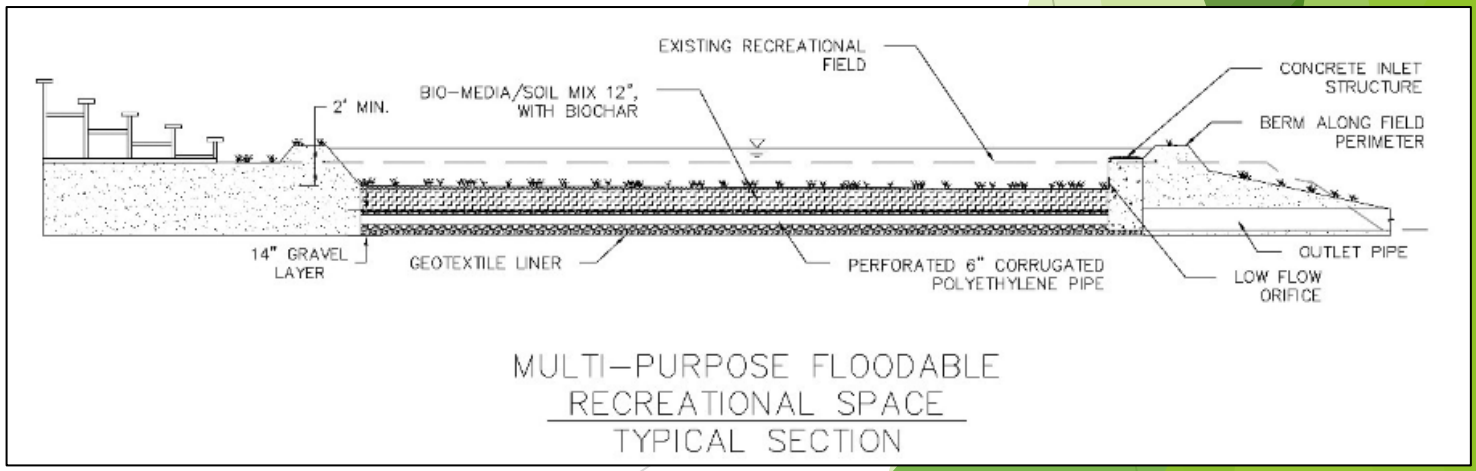


HEC-HMS Model Amendments

- Reservoir creation
  - Blue-Green Streets
    - Flow storage/attenuation
    - Flow diversion (infiltration)
  - Floodable Recreation Spaces
    - Flow storage/attenuation
    - Soil amendments
    - Flow diversion (infiltration)

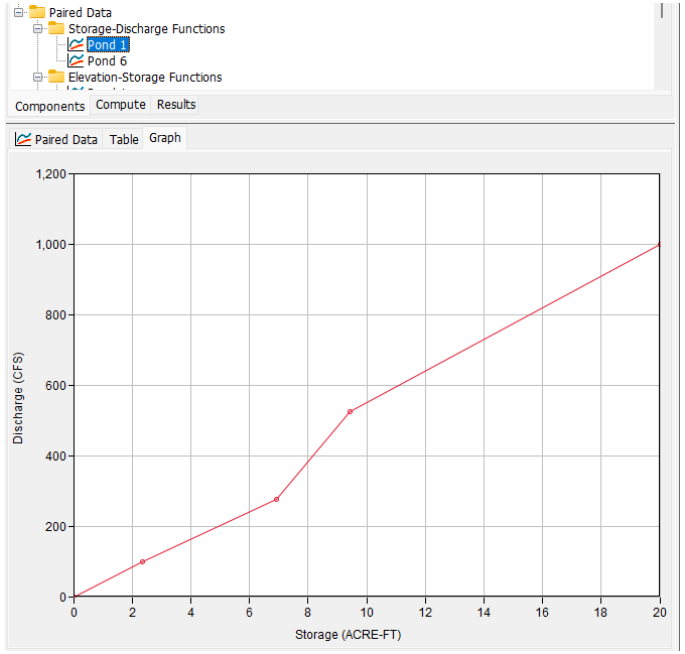


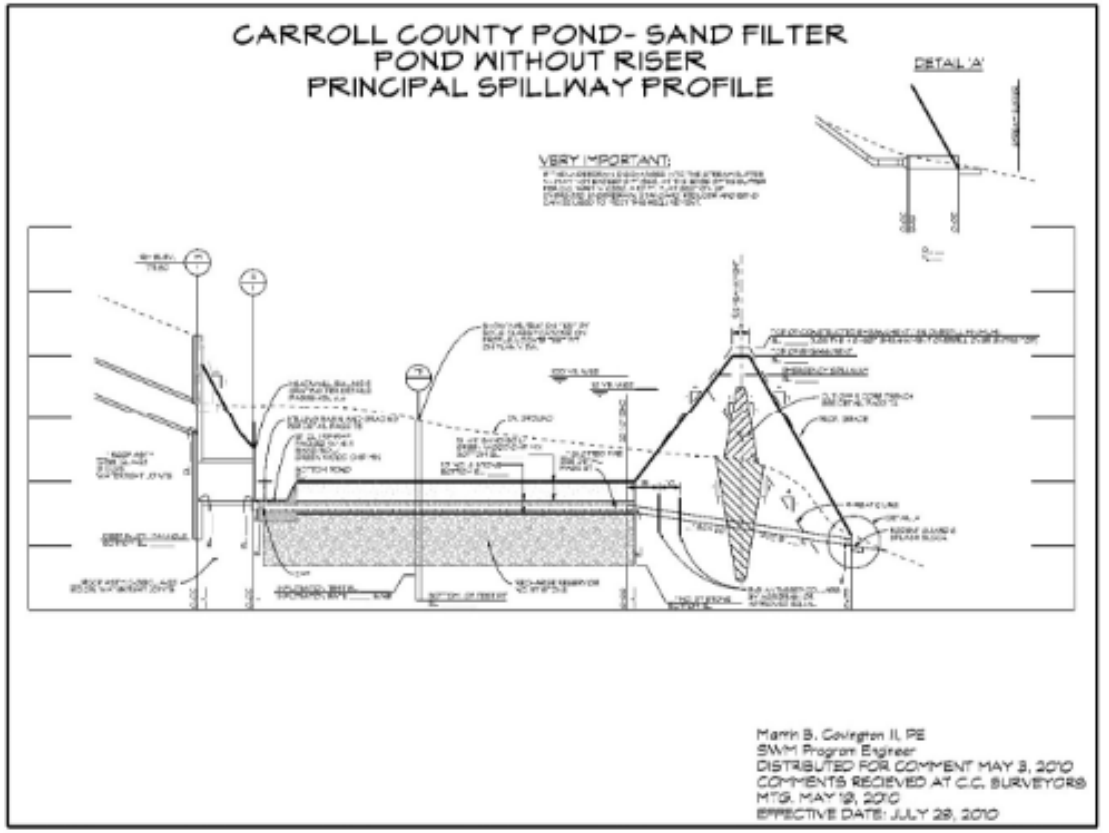




HEC-HMS Model Amendments

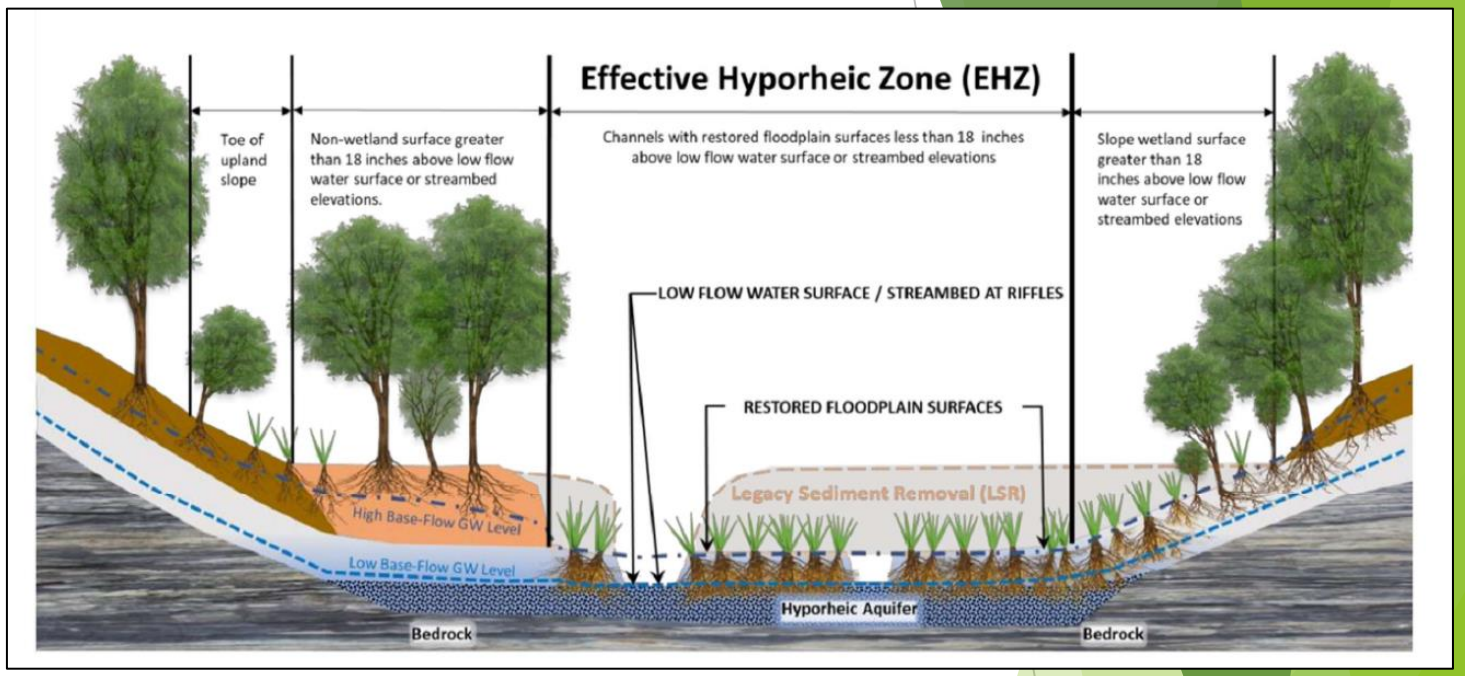
- Reservoir modifications
  - Pond retrofits
    - Add flow storage/attention (2-foot depth)
    - Pond bed soil amendments (sand filter)
    - Flow diversion (infiltration)

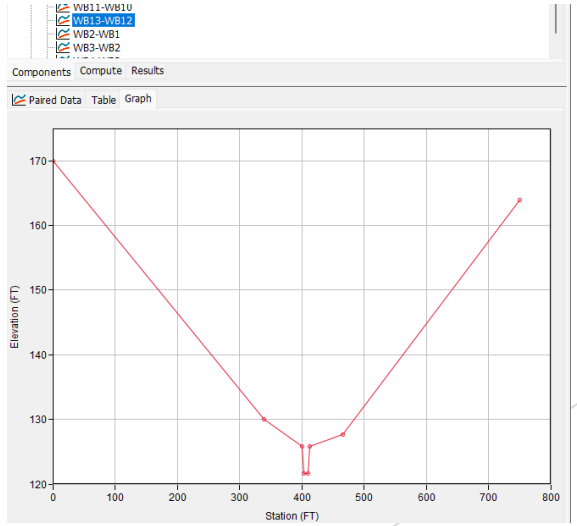


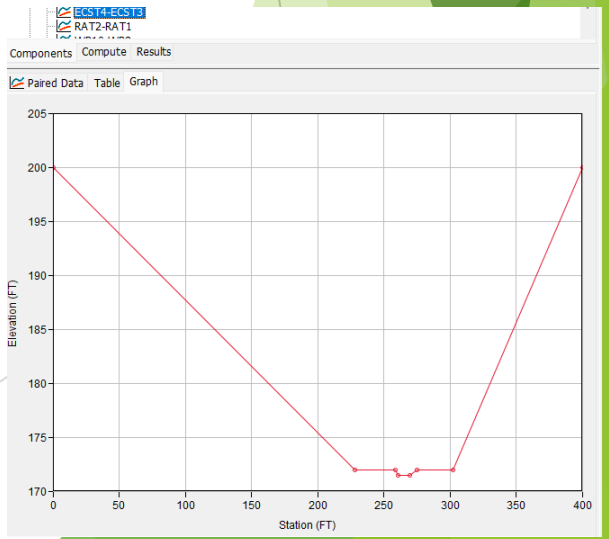


HEC-HMS Model Amendments

- Reach routing modification
  - Floodplain restoration
    - Cross section modification
      - Modern sediment removal
      - Increased floodplain storage
    - Flow diversion
      - Floodplain soil amendments
      - Infiltration uplift
      - Evapotranspiration uplift
      - Hyporheic exchange/recharge uplift

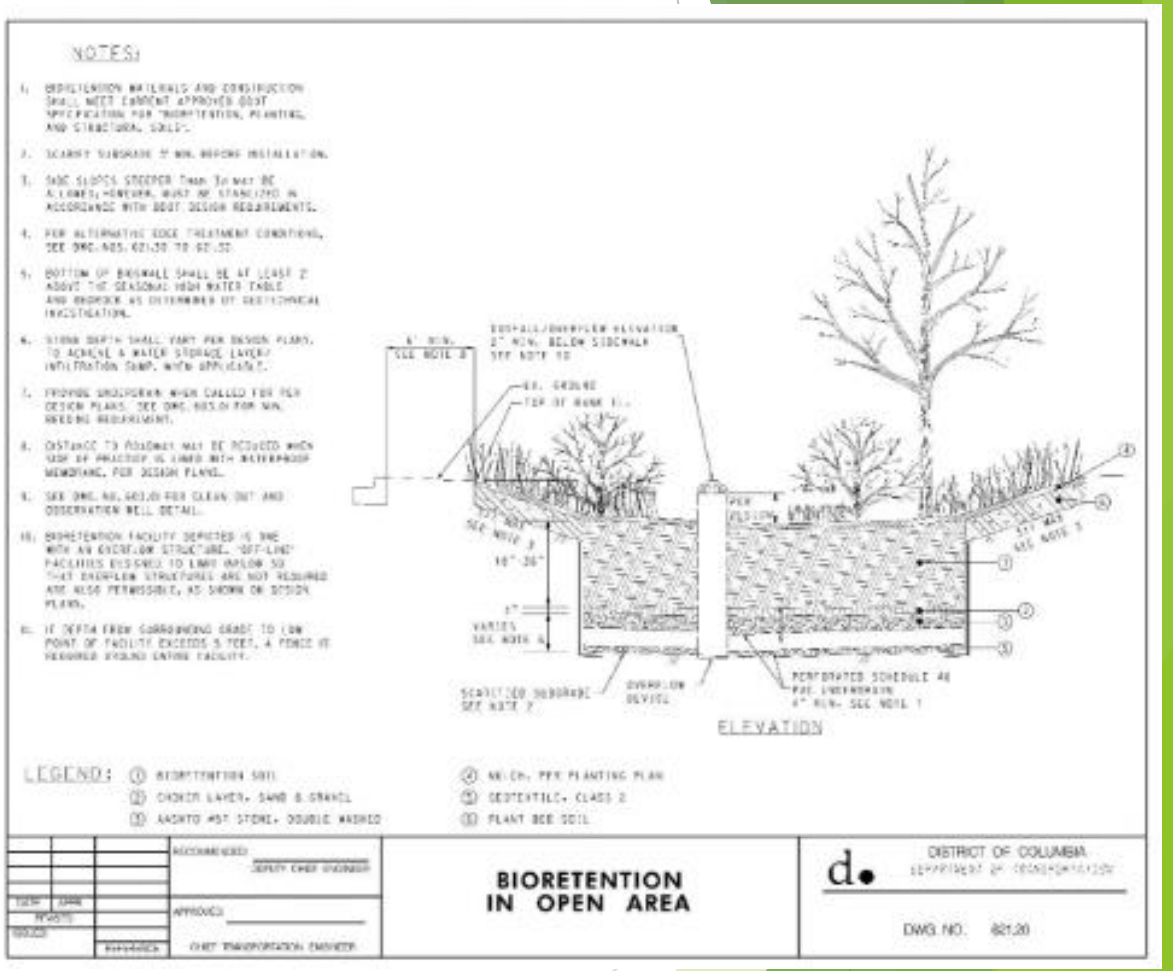






HEC-HMS Model Amendments

- Hydrologic element modification (CN)
  - Green stormwater infrastructure
    - Changed land use draining to practice
    - Soil decompaction/amendments
  - Tree planting zone
    - Changed land use
    - Comprehensive soil decompaction/amendments



HEC-RAS Model Comparisons

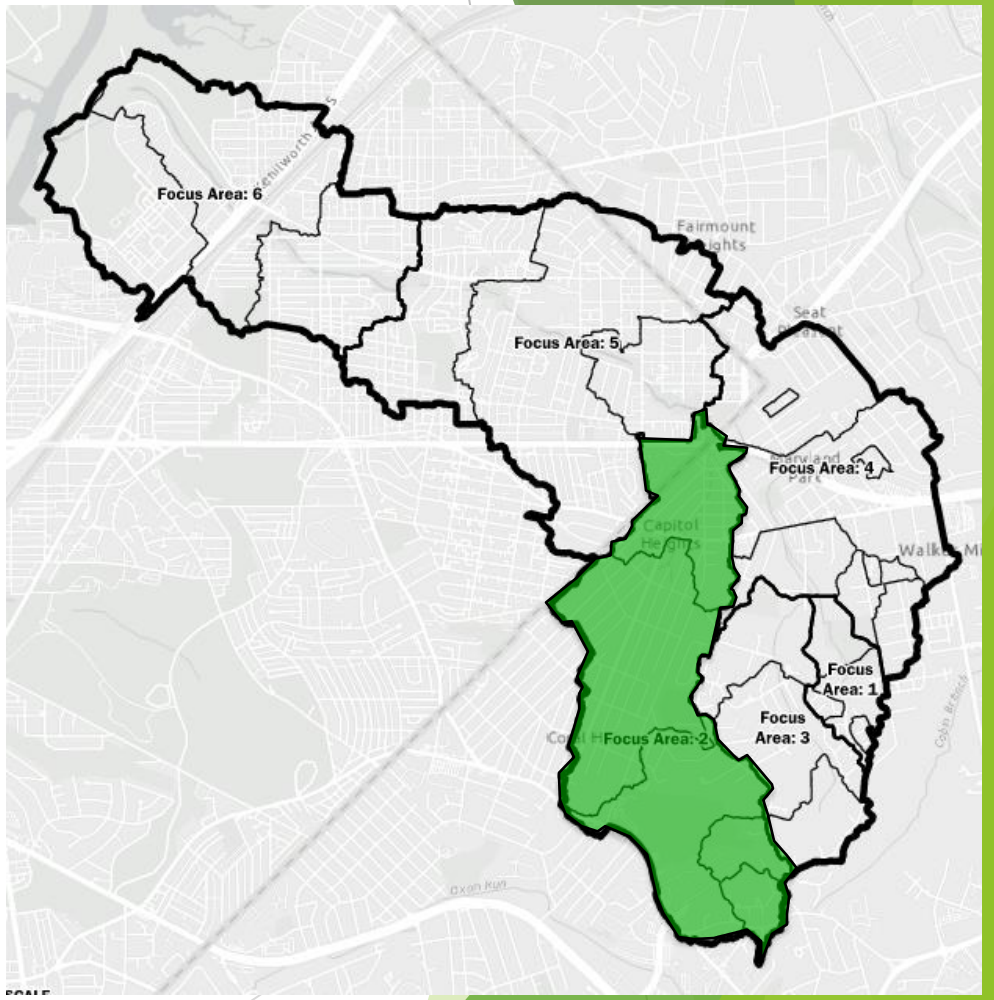
- Starting Point
  - Detailed USACE HEC-RAS Model
  - Includes DC territory and structures
- Analysis game plan
  - Based conditions - existing model discharge
  - Modified condition - proposed discharge reductions
  - Compare/contrast model differences
- Document flood reduction benefits

Results

Watts Branch: Detailed Case Study

The Watts Branch concept demonstrates how targeted, upstream BGI can:

- Substantially reduce peak runoff volumes;
- Lower flood elevations and reduce structure inundation;
- Provide measurable benefit under future climate scenarios;
- Decrease flood event frequency for a given storm size.



Watts Branch: Detailed Case Study

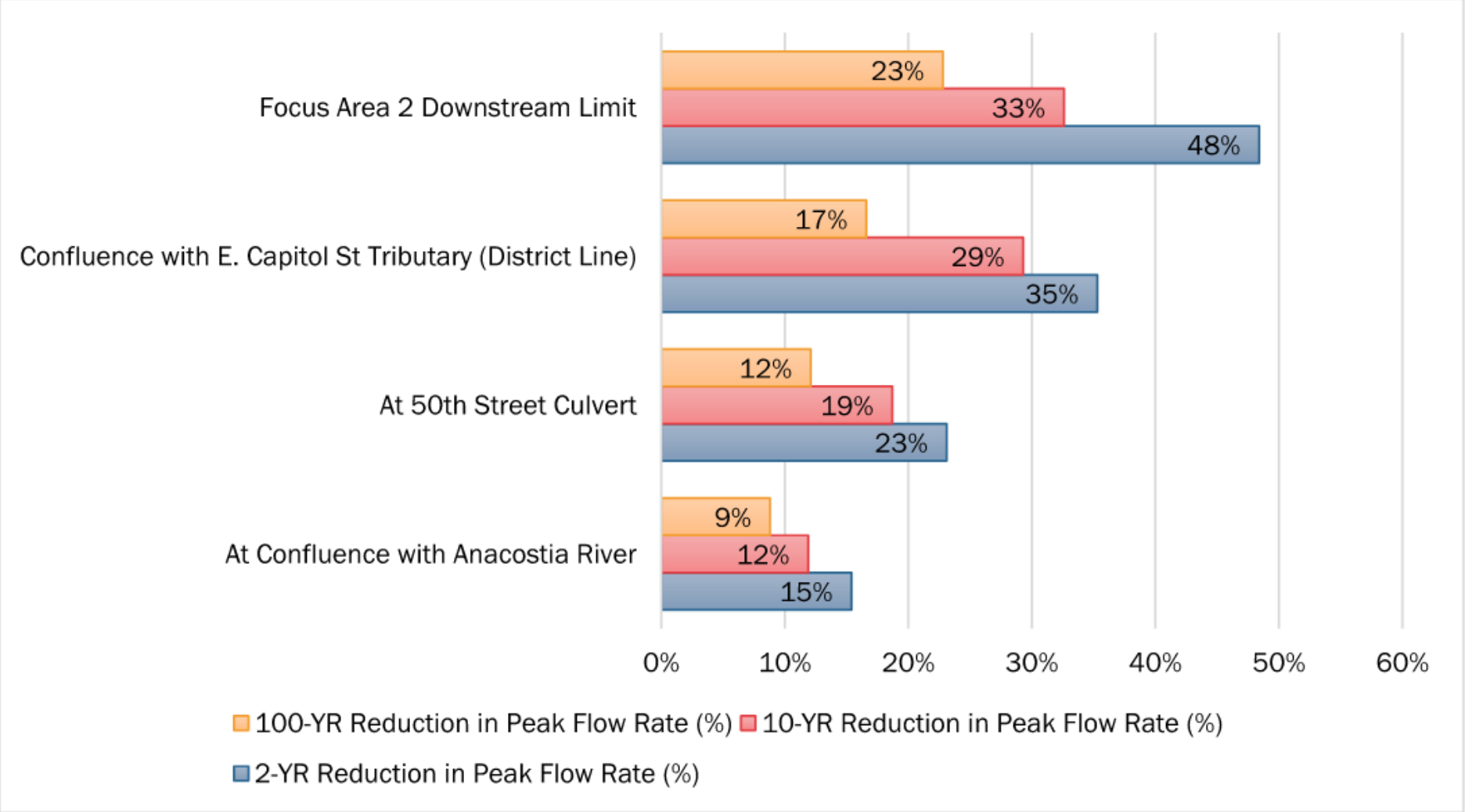
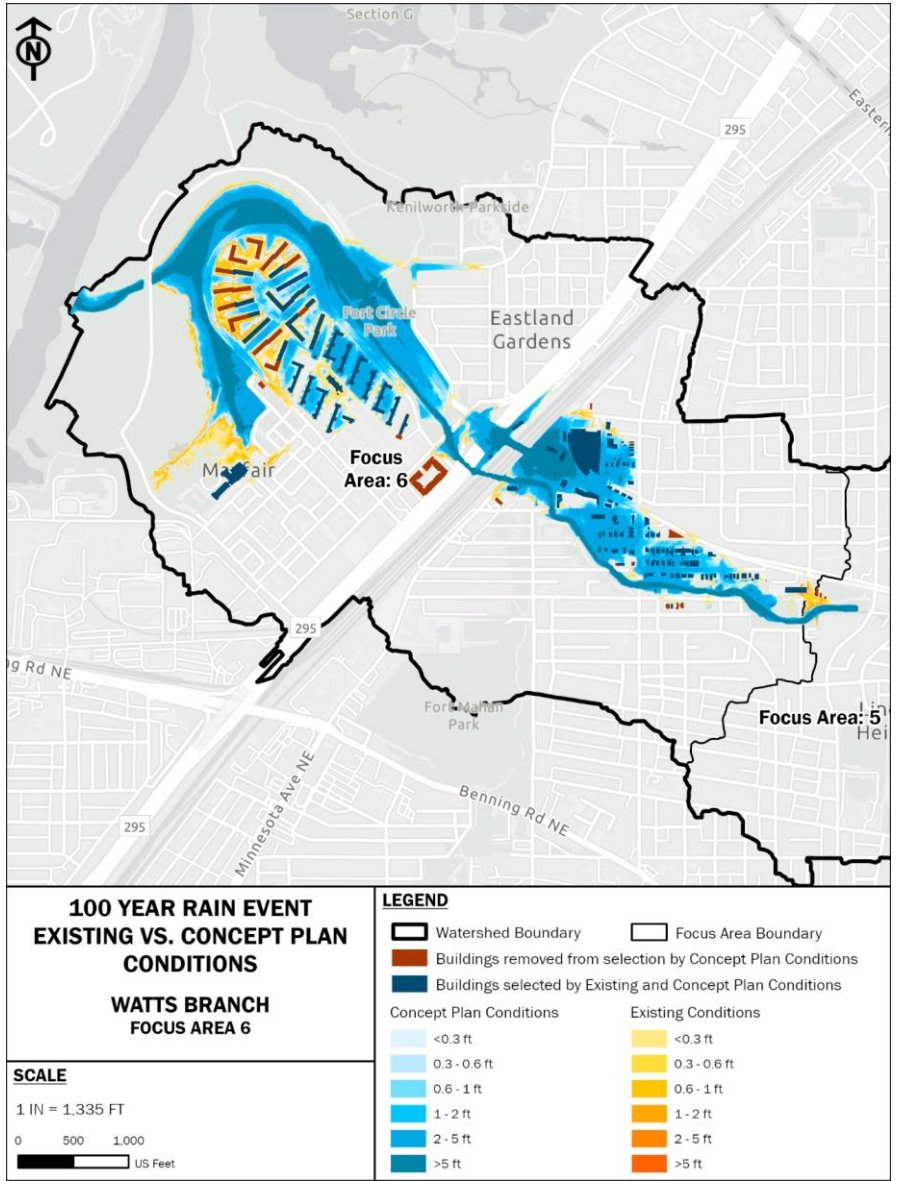
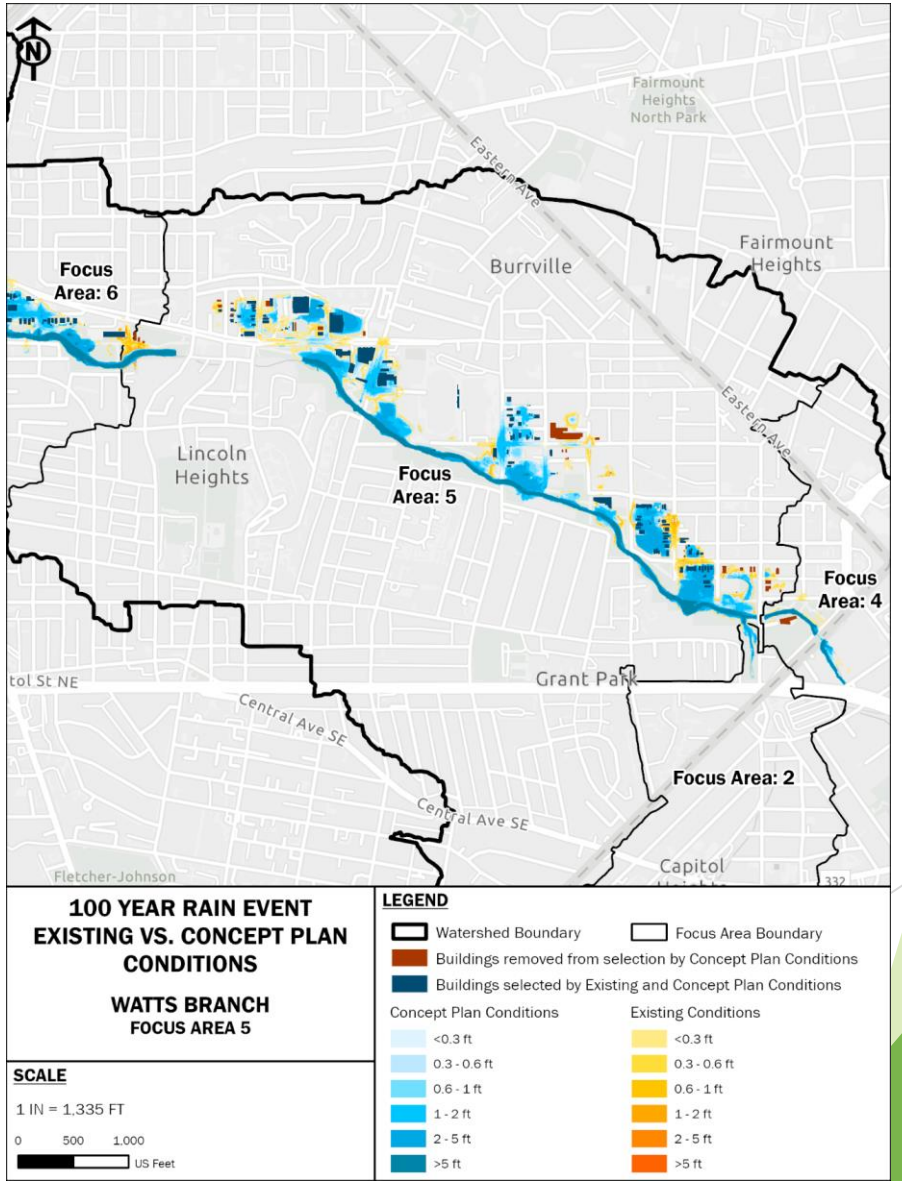


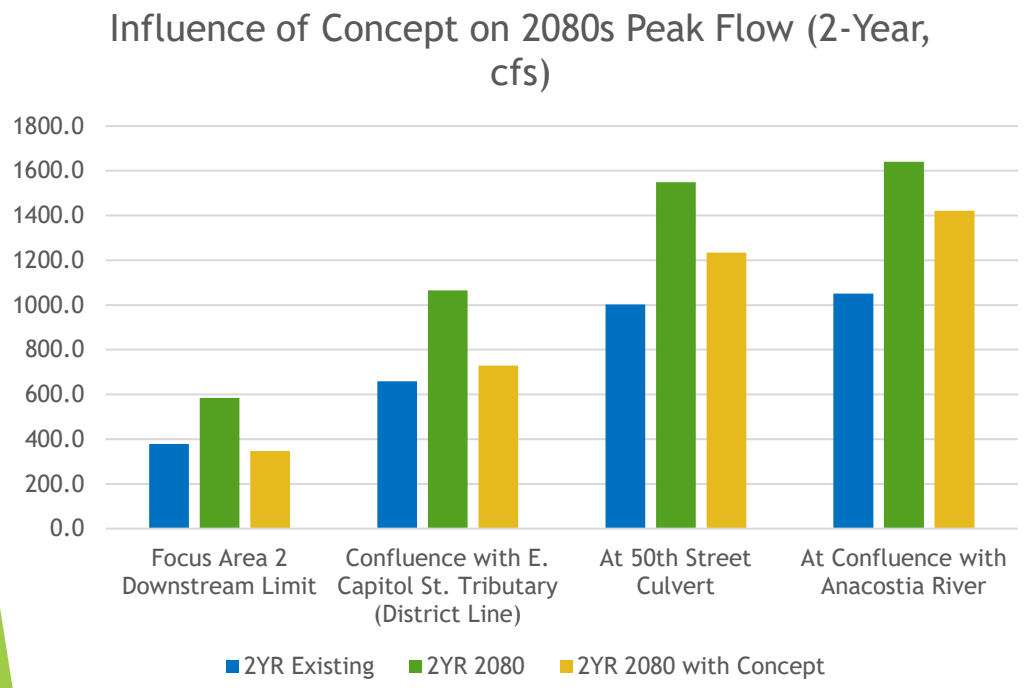
Figure 42: Watts Branch concept reductions in peak flow.

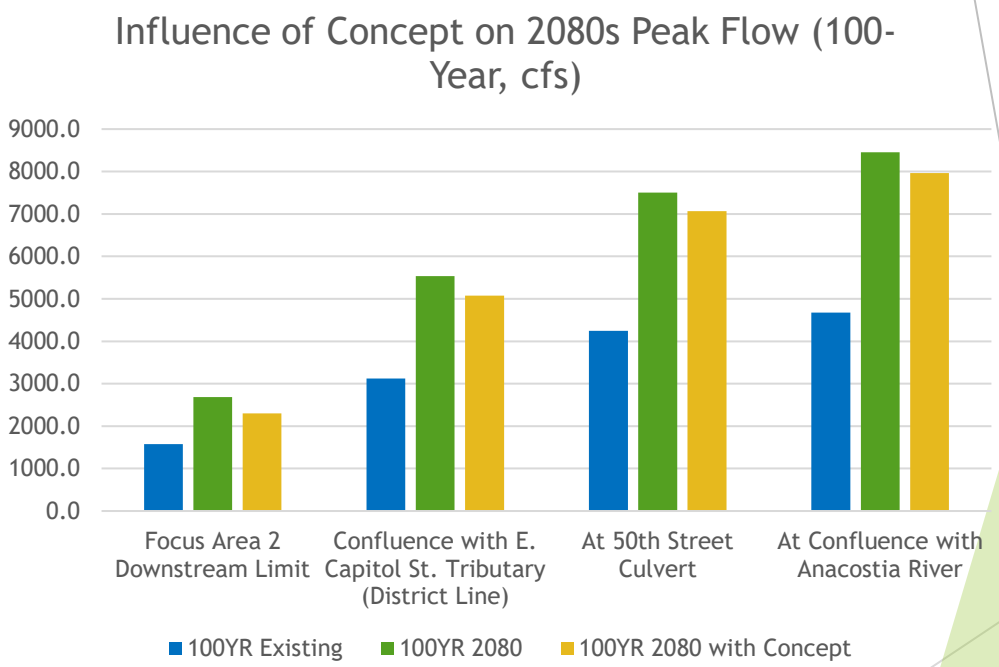
Watts Branch: Detailed Case Study



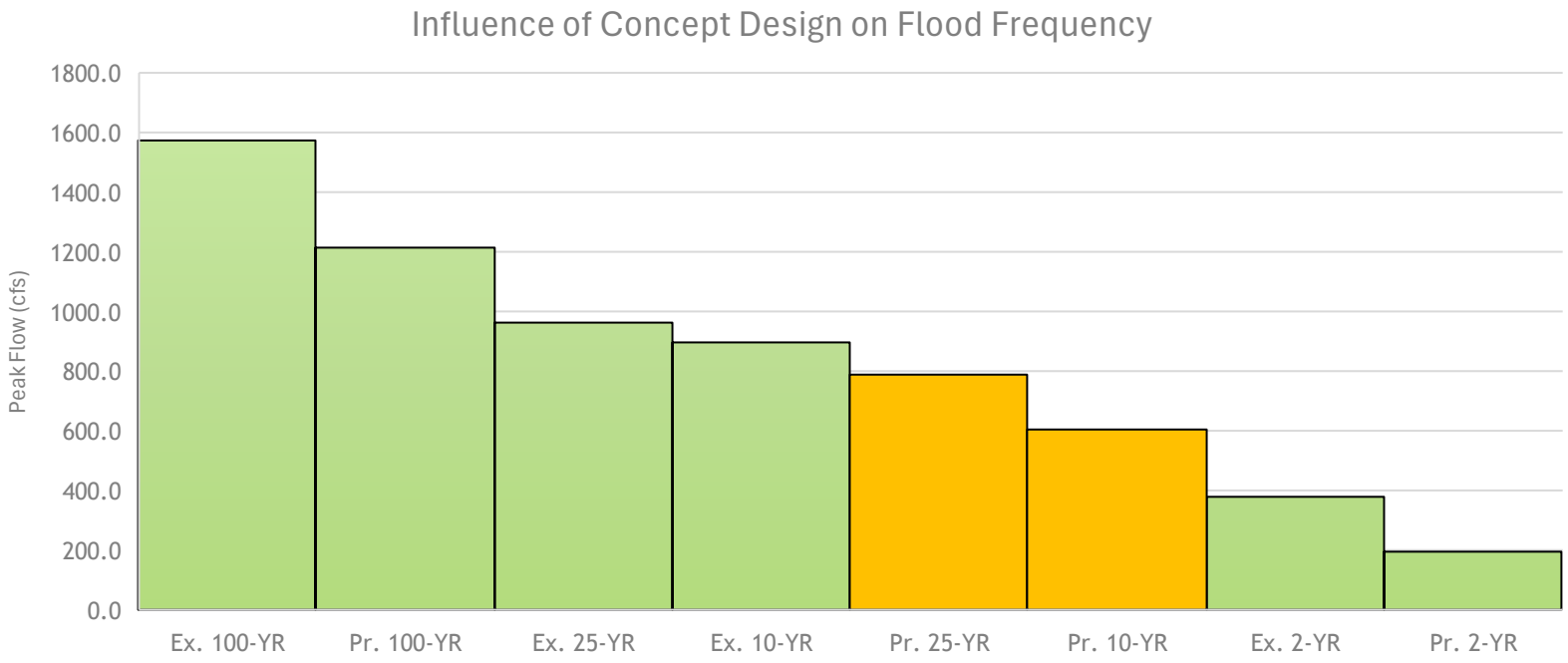


Watts Branch: Detailed Case Study





Watts Branch: Detailed Case Study



Runoff associated with a 1 in 10 year event today would be observed only once every 25 years.

Our Engagement Process

Community Engagement - Goals

- Identify future project stewards and ensure that our data serves them.
- Empower future project stewards with clear steps on how to generate fundable work from our study.
- Facilitate positive connections between like minded project stewards, funders, and their governments.

Regional Open House – Panel Discussions

- *Funding in Uncertain Times*
  - Grant funders shared keys to unlocking mitigation funding.
- *Implementation Partnerships*
  - CBO voices shared what it means to do effective outreach in these communities.

Big Picture Takeaways

Our study validates:

- Regional flood solutions require upstream planning. Success in these watersheds requires communication between the District and Prince George's County.
- A network of BGI solutions IS effective at creating measurable flood risk improvement.

What's Next?

- The Watts Branch Concept received funding from the Climate Smart Communities Initiative to further develop the design and continue engagement!
  - We need your help.
- More broadly:
  - These tools are designed to be used, shared, and adapted.
  - Our work positions the Arundel Canal, Oxon Run, and Watts Branch communities to secure partnerships and funding for implementation.
  - Our process can be used and repeated by our partners in neighboring areas.

Questions and Contacts:

- Project Website:
  - https://www.mwcog.org/environment/programs/regional-blue-green-infrastructure-bgi-flood-project/
- Email:
  - bgi@mwcog.org

- Our contacts:
  - Larry Trout, ltrout@straughanenvironmental.com
  - Drew Altland, daltland@straughanenvironmental.com
  - Joe Arrowsmith, jarrowsmith@straughanenvironmental.com