

The Broad Meadow Brook Restoration Project

Achieving Ecological Outcomes in an Urban Headwaters



The City of
Worcester



Massachusetts Department of Fish and Game
Division of
Ecological
Restoration

Invested in Nature and Community



Weston & SampsonSM

Agenda & Presenters

- Setting the stage
- Broad Meadow Brook restoration plans
- Watershed study



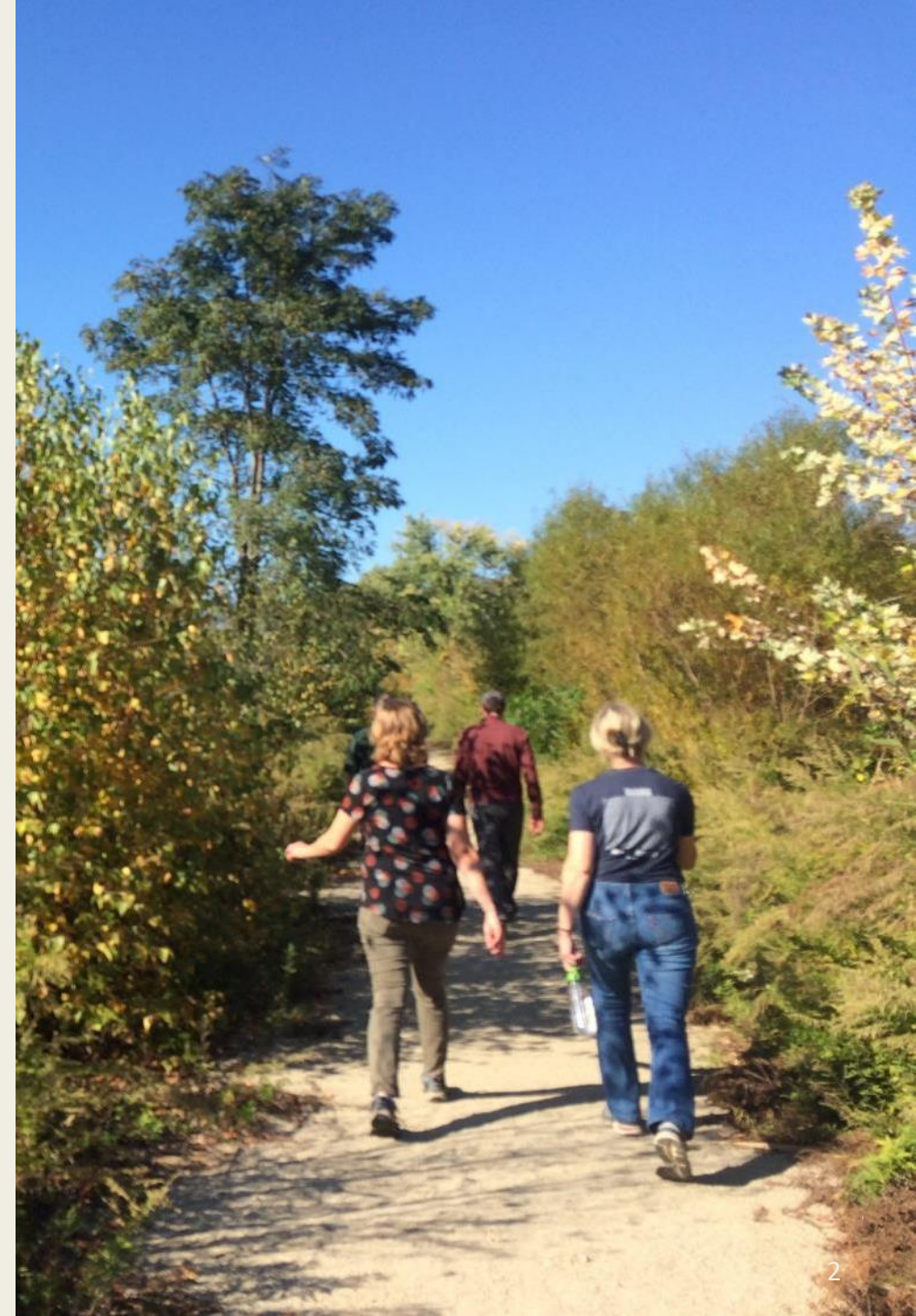
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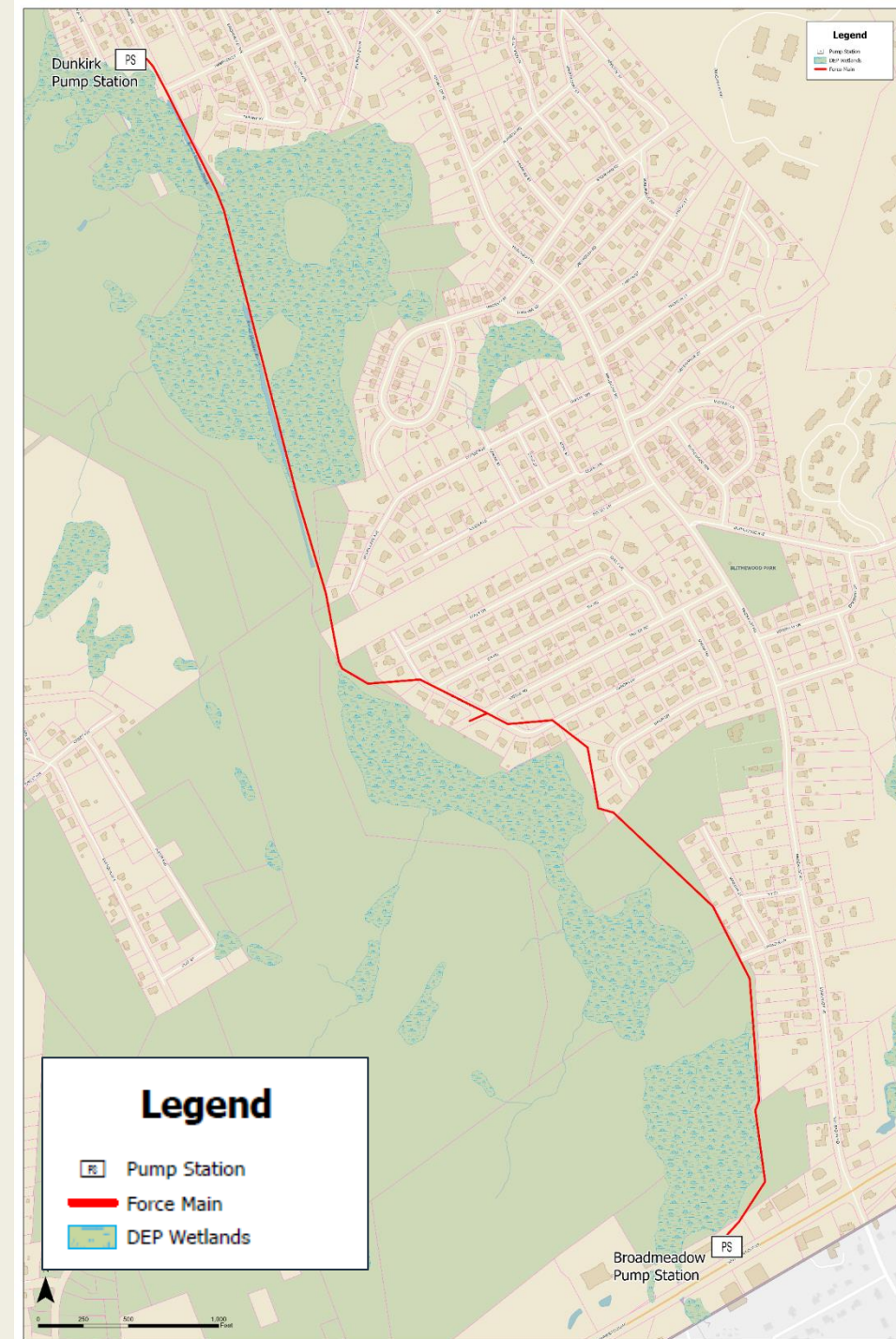
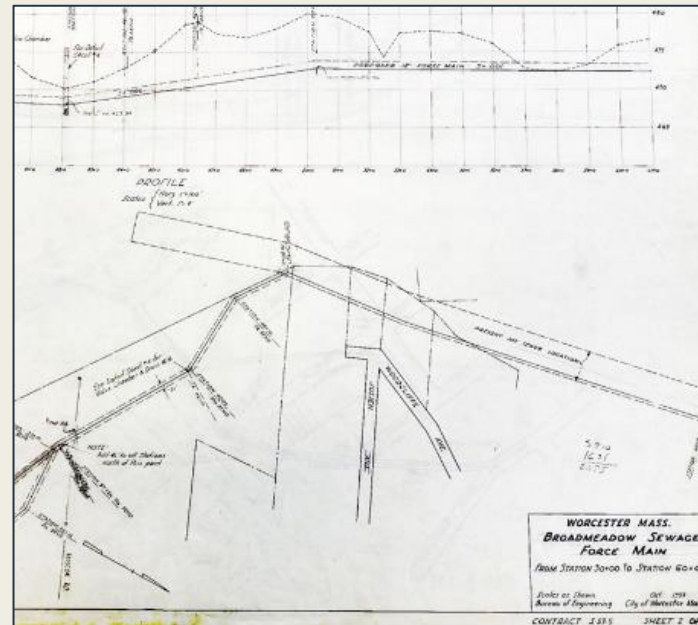
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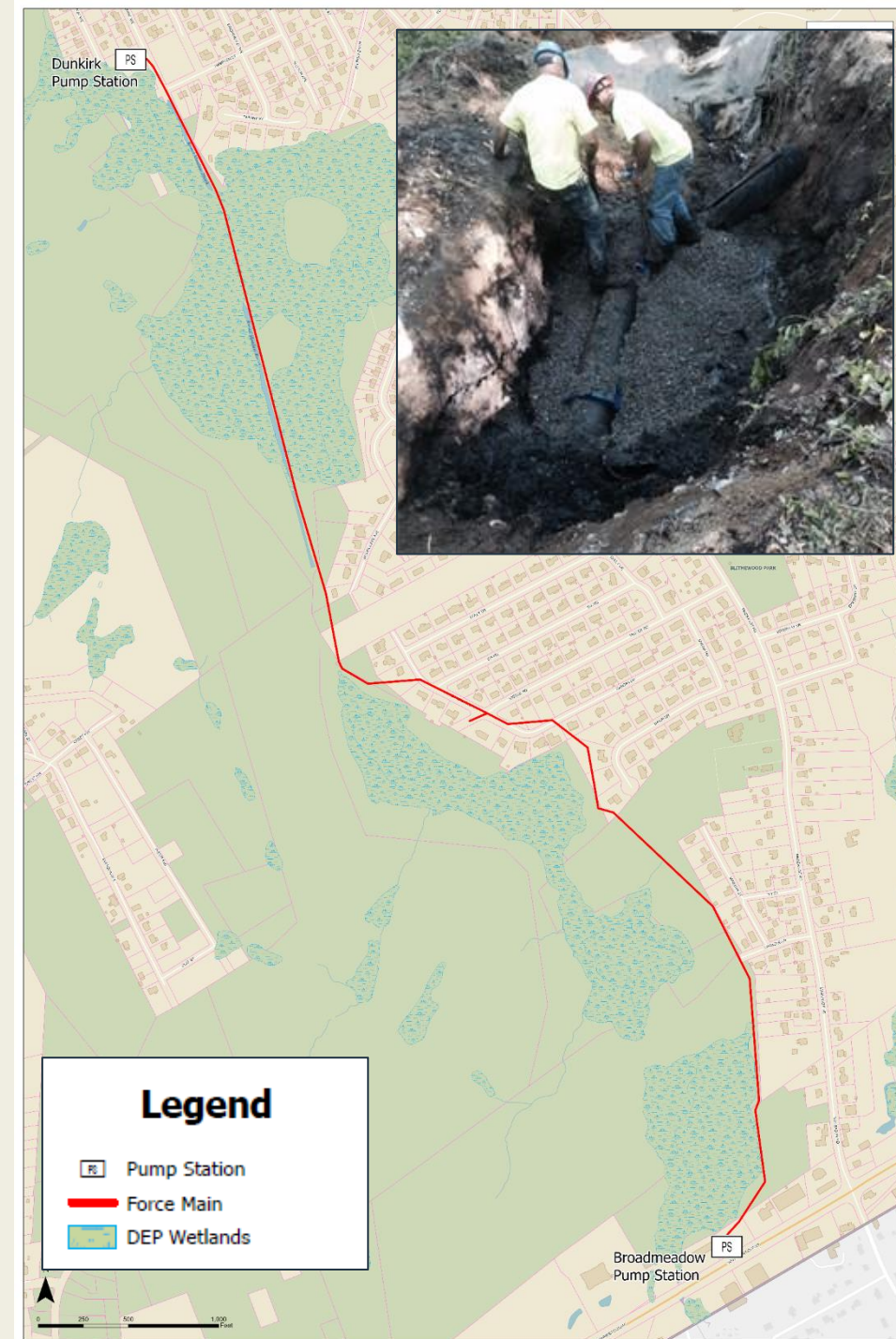
Infrastructure History

- **1890-1940:** City population doubled, requiring more sewer infrastructure
- **1932:** 100-foot-wide sewer easement constructed during housing development in the neighborhood
- **1957:** plan and profile for “Broadmeadow Sewage Force Main” project prepared
- **1965:** Pump station at Dunkirk Ave constructed with 8800-foot force main



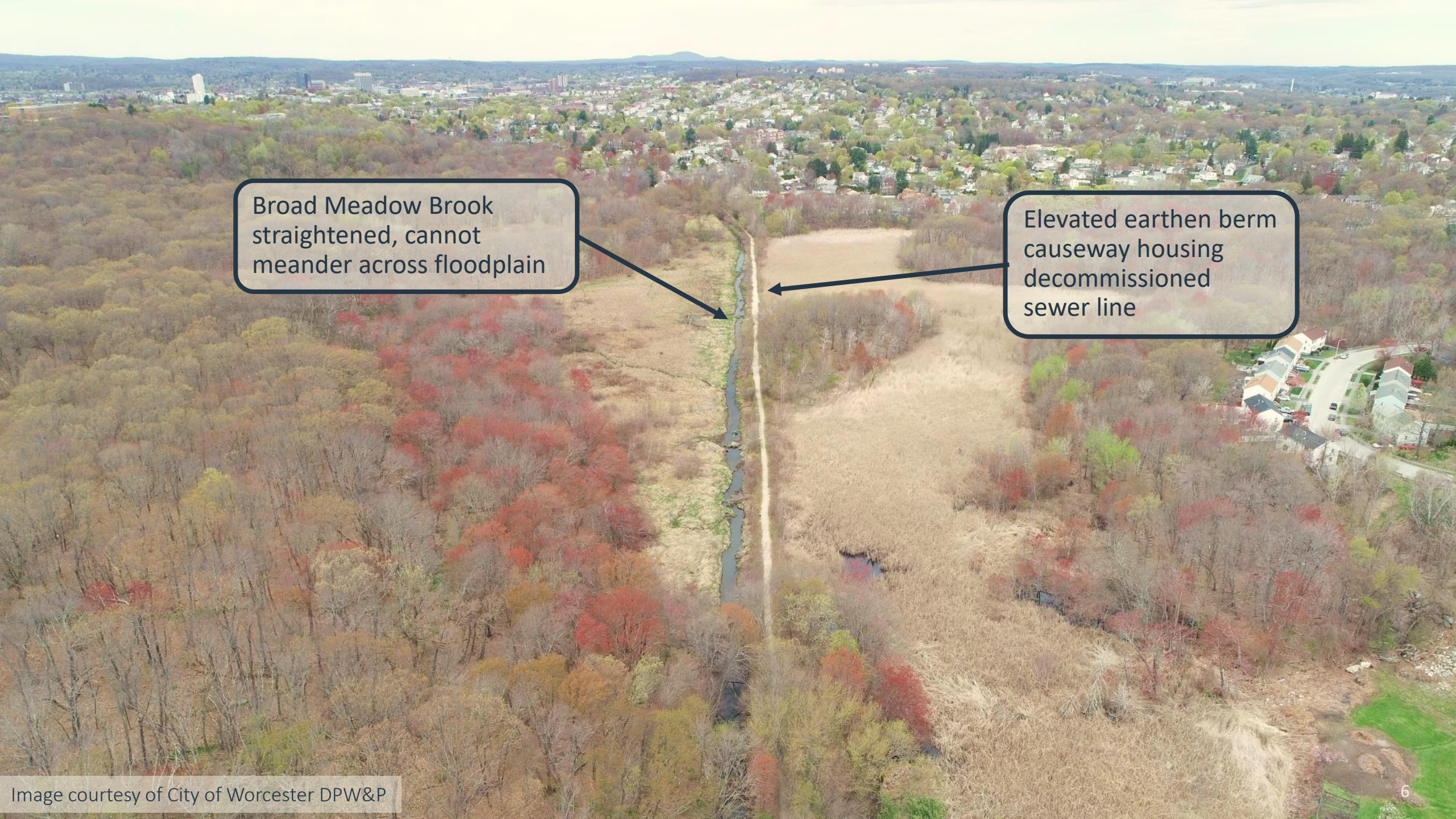
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- **1932:** 100-foot-wide sewer easement constructed during housing development in the neighborhood
- **1957:** plan and profile for “Broadmeadow Sewage Force Main” project prepared
- **1965:** Pump station at Dunkirk Ave constructed with 8800-foot force main, but oversized with lower flows and slower velocities over time
- **2011, 2015:** Corrosion issues in force main led to sewer leaks into the brook
- **2017:** Route 20 project approved to reconfigure flows in the southeastern part of the city and eliminate four outdated pump stations
- **2020:** Route 20 project completed with new Whitla pump station; sewer force main decommissioned



With the sewer line
no longer needed,
can this offer the
opportunity for restoration?

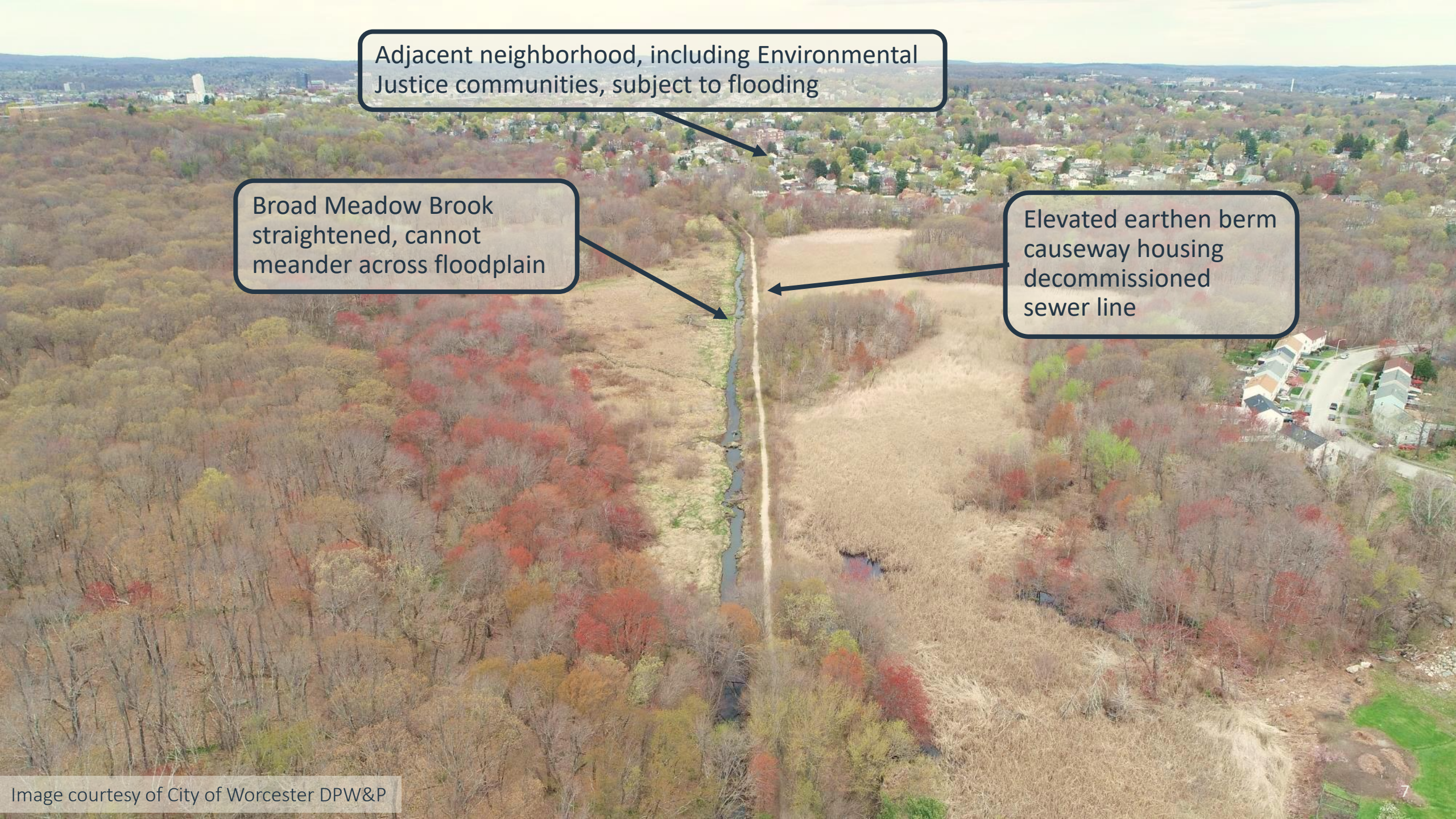




Broad Meadow Brook
straightened, cannot
meander across floodplain

This aerial photograph shows a section of Broad Meadow Brook in Worcester, Massachusetts. The brook is a narrow, straight waterway running vertically through the center of the image. To the left of the brook is a dense forest with trees in various shades of autumn (red, orange, yellow). To the right is a large, open, light-brown field. A straight, light-colored path or berm runs parallel to the brook on the right side. In the background, a residential neighborhood with many houses and trees is visible, followed by a city skyline under a cloudy sky. Two callout boxes with arrows point to specific features: one points to the straightened brook, and the other points to the elevated earth berm.

Elevated earthen berm
causeway housing
decommissioned
sewer line



Adjacent neighborhood, including Environmental Justice communities, subject to flooding

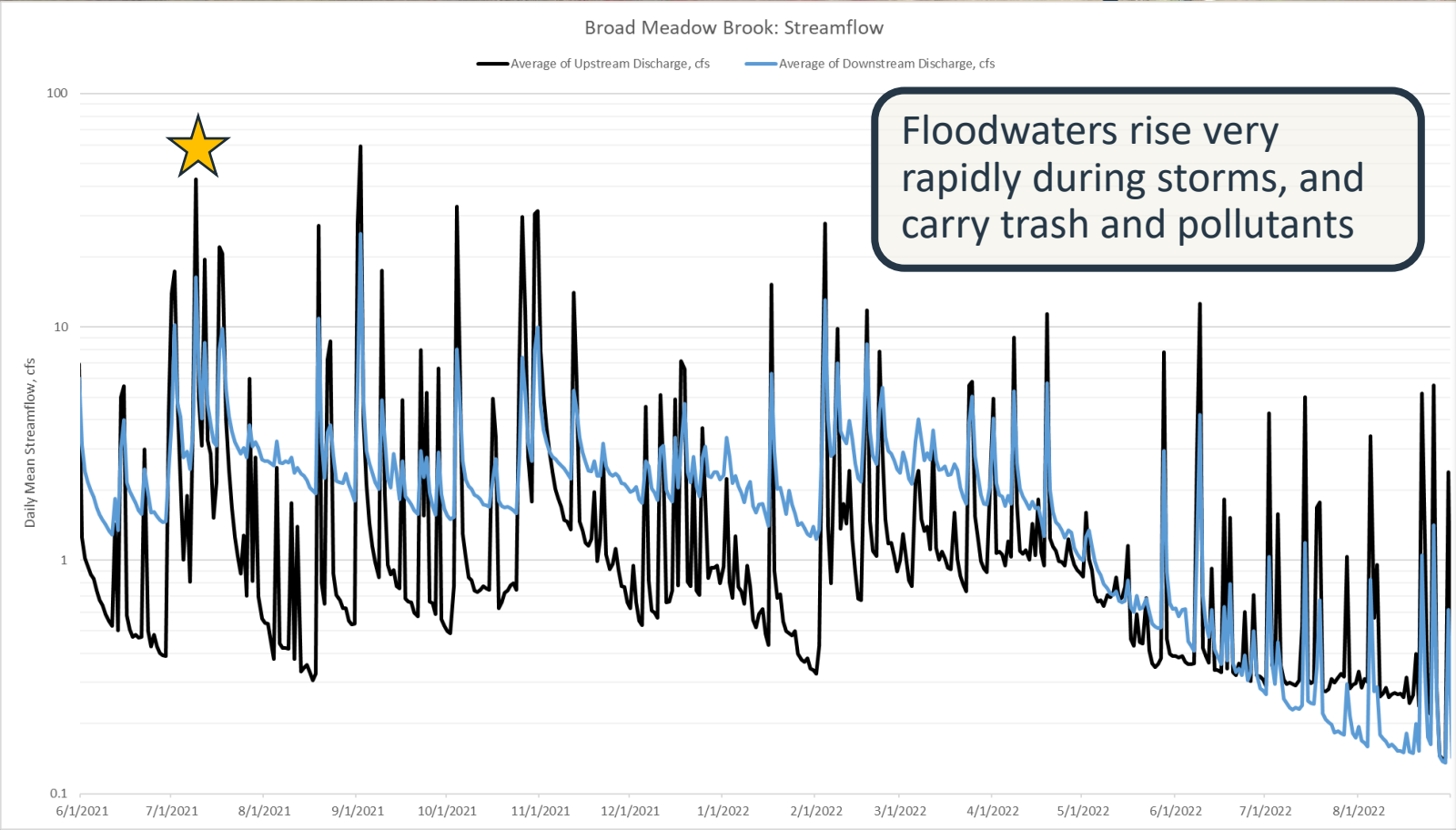
Broad Meadow Brook straightened, cannot meander across floodplain

Elevated earthen berm causeway housing decommissioned sewer line

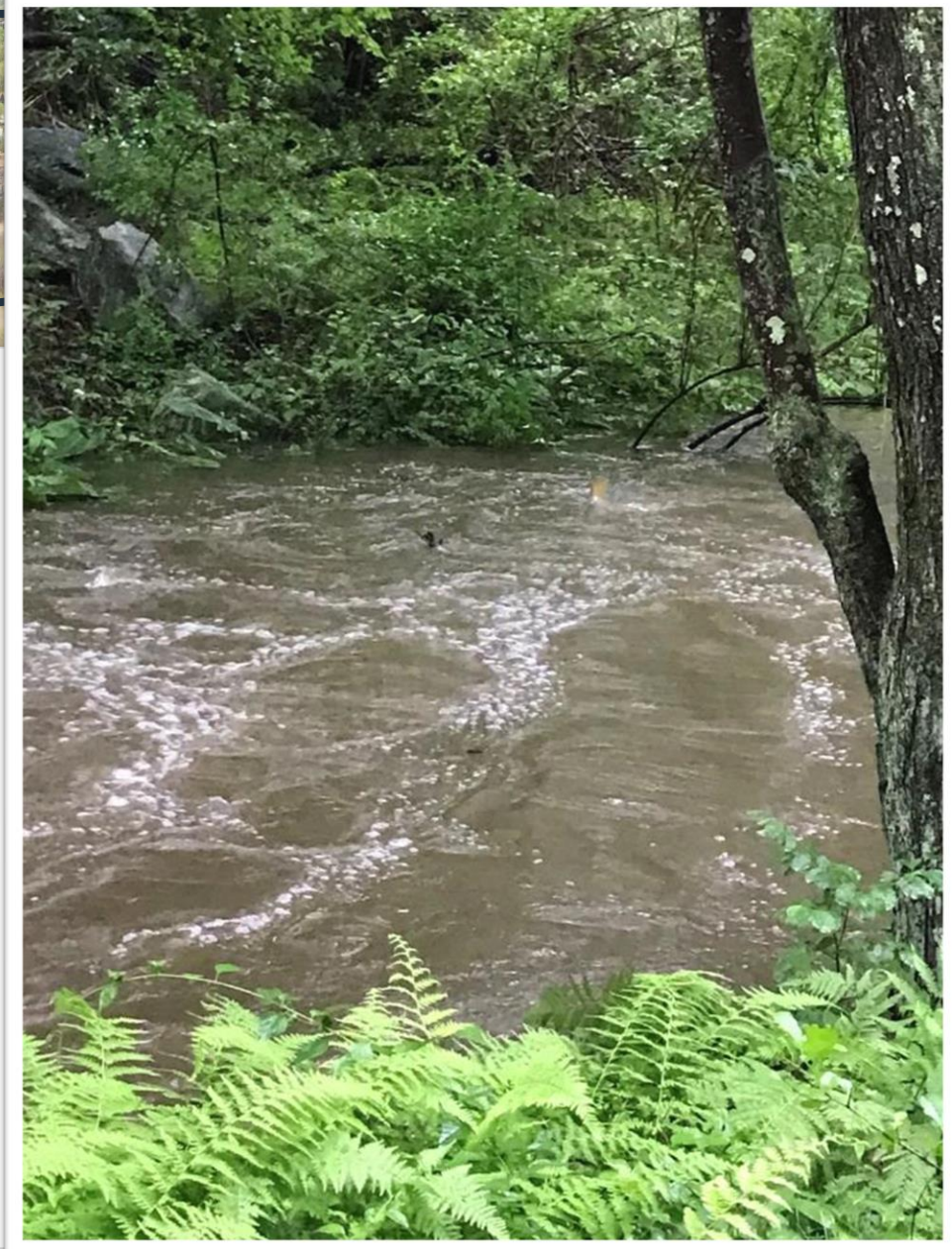


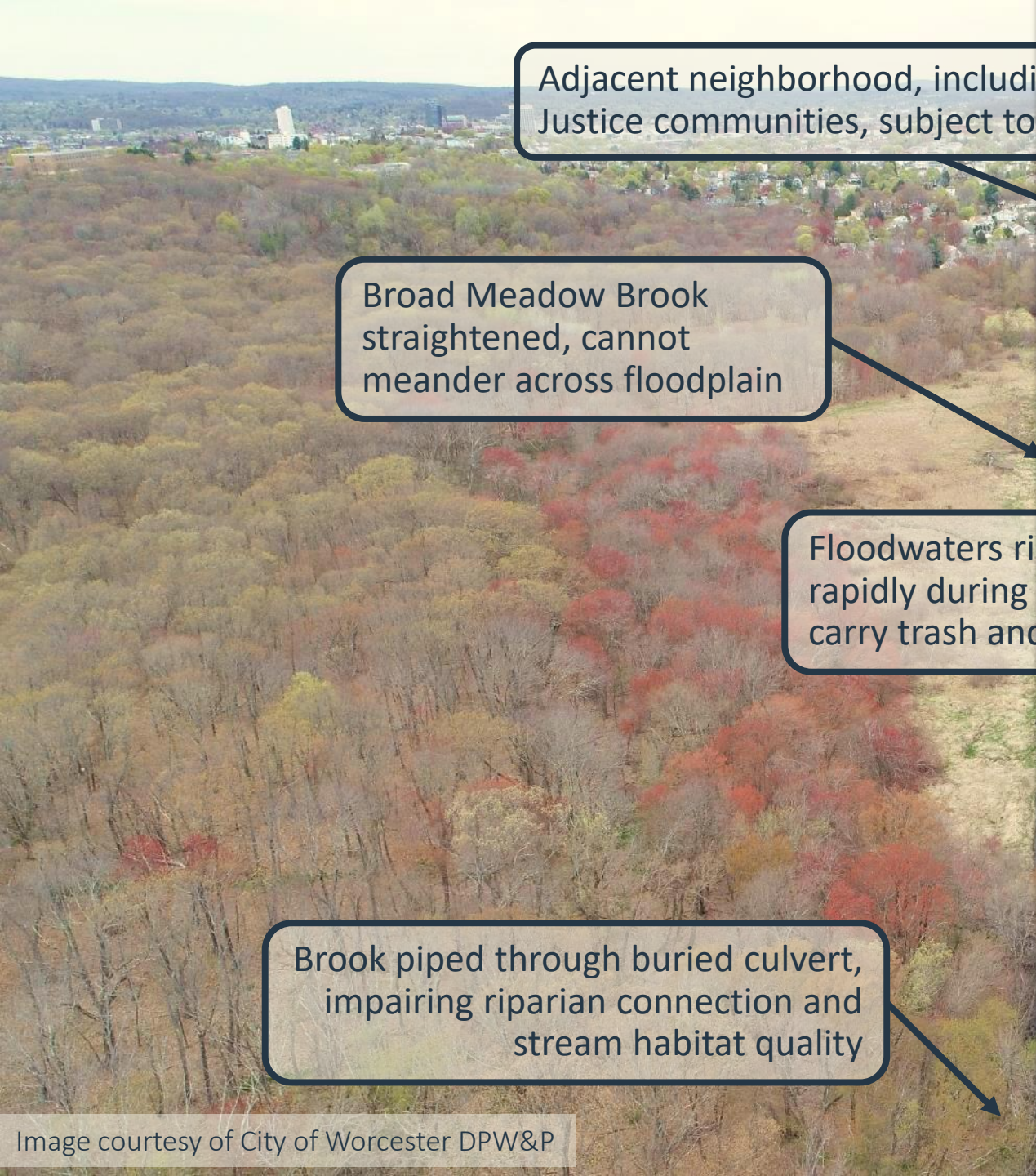
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Floodwaters rise very rapidly during storms, and carry trash and pollutants





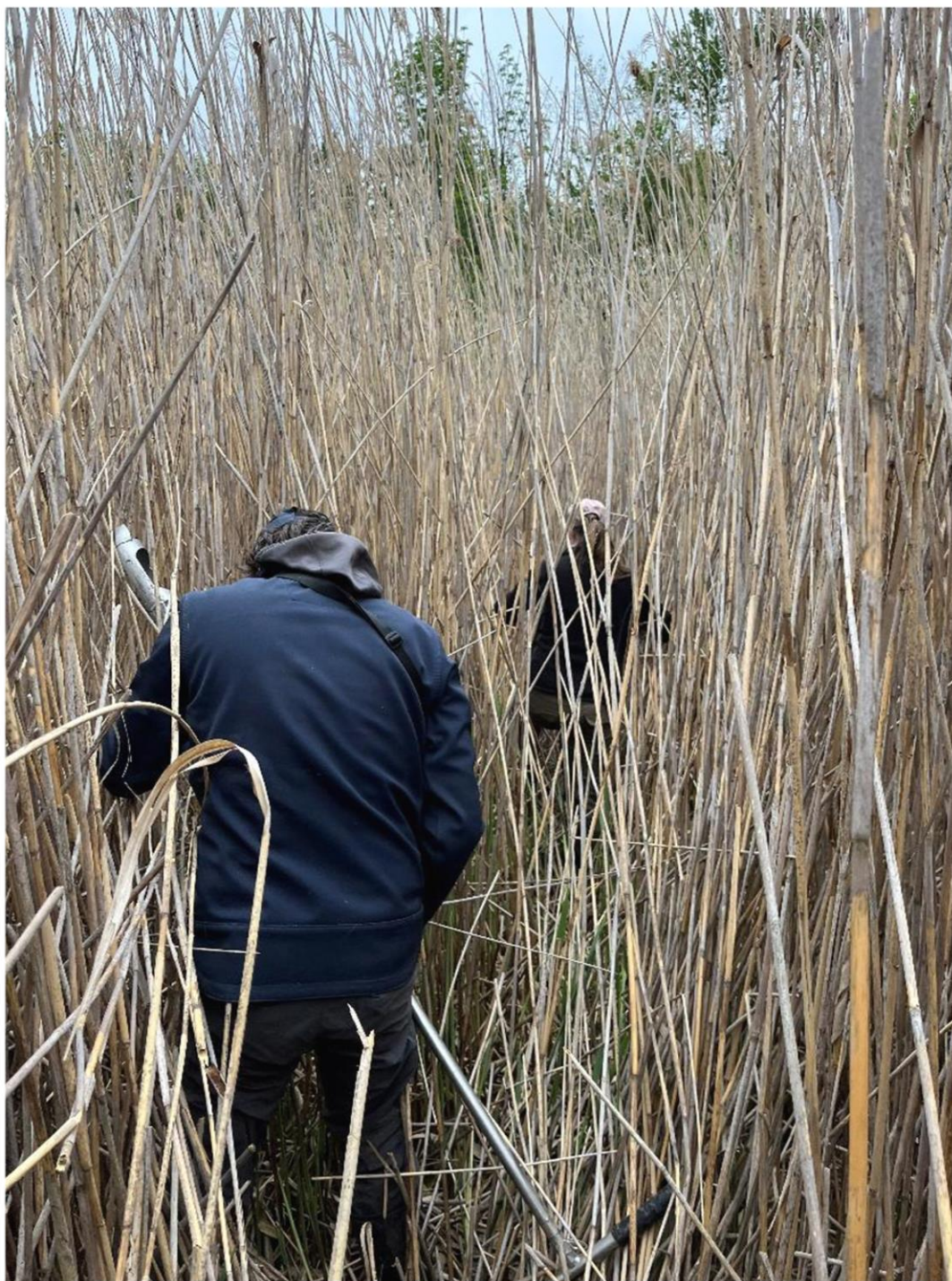
Adjacent neighborhood, including Justice communities, subject to

Broad Meadow Brook straightened, cannot meander across floodplain

Floodwaters rise rapidly during heavy rain, carry trash and

Brook piped through buried culvert, impairing riparian connection and stream habitat quality





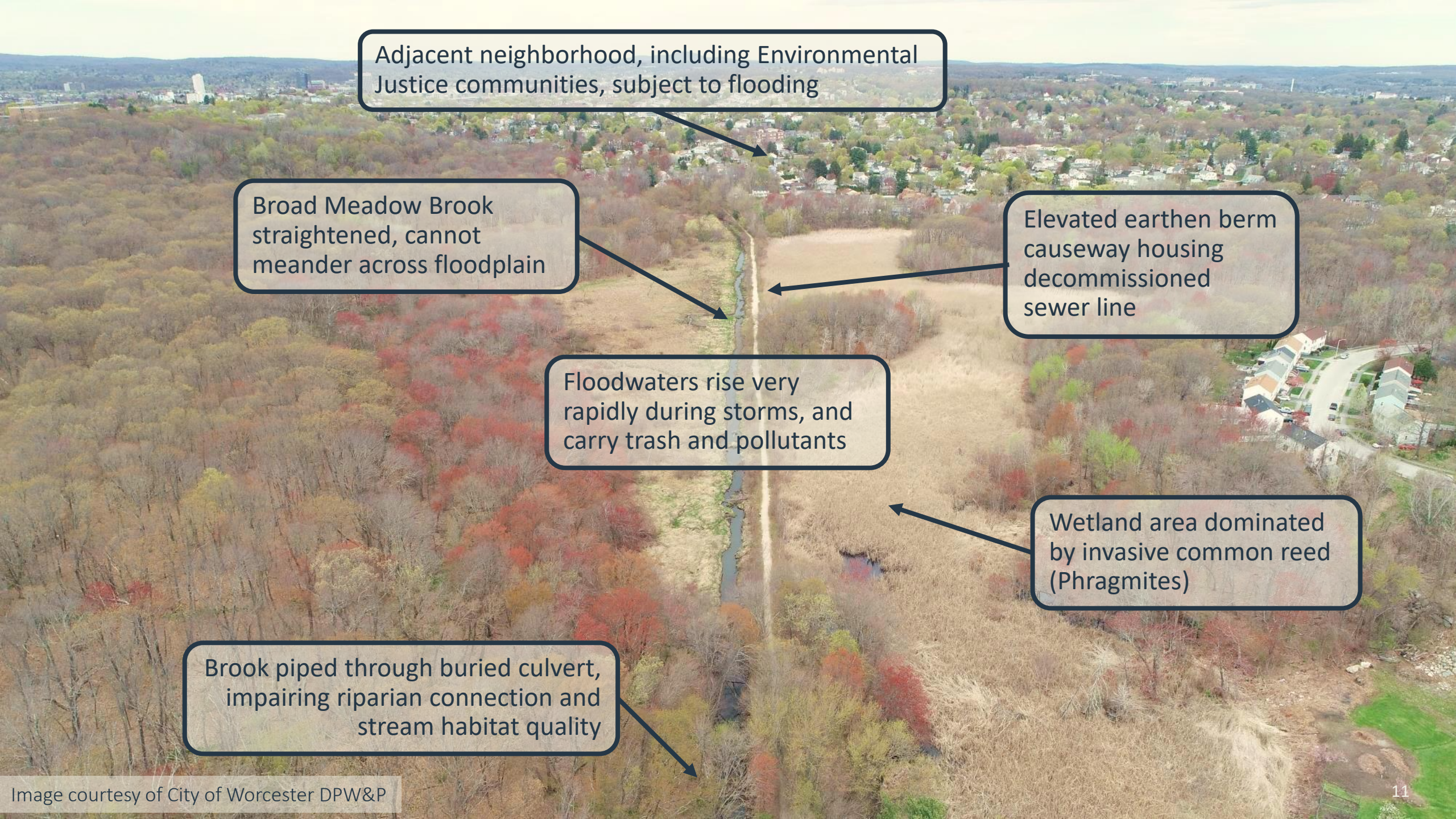
Environmental
coding



Elevated earthen berm
causeway housing
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sewer line

very
arms, and
pollutants

Wetland area dominated
by invasive common reed
(Phragmites)



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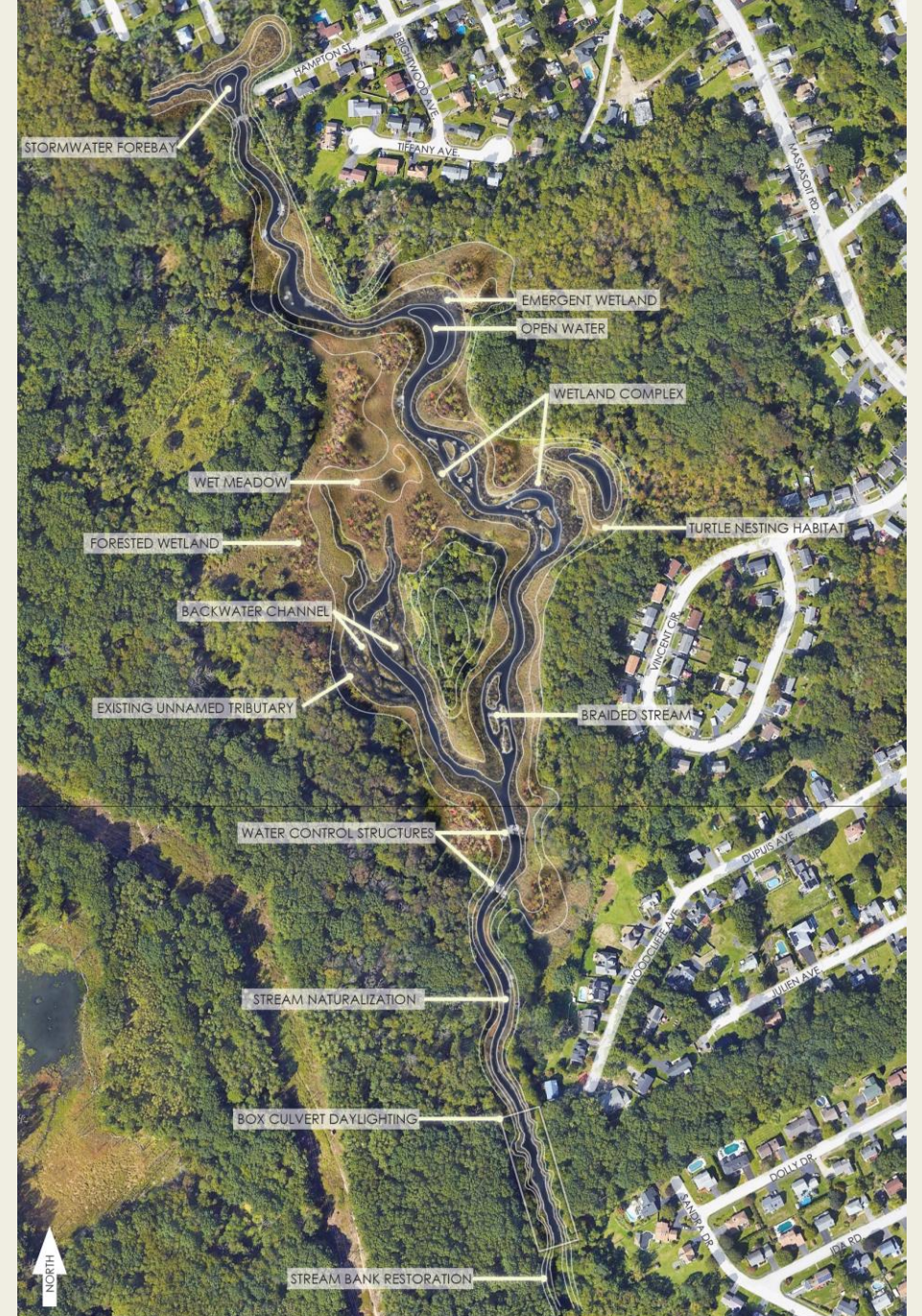
Vision:

A dynamic, diverse, and self-sustaining stream and wetland ecosystem that provides a full suite of ecosystem benefits, and is accessible for the benefit and enjoyment of neighbors, residents, and visitors



Conceptual design – draft sketch

- Treat stormwater entering the Sanctuary
- Add flood storage to slow down and absorb floodwaters
- Remove sections of the earthen berm to allow the brook to meander across the floodplain
- Improve wetland function for better sediment and nutrient processing
- Remove invasive species, especially Phragmites
- Add habitat complexity for variety of wildlife
- Provide new and enhanced visitor experiences through revitalized trail network and viewing platforms



CONCEPT B

MASS AUDUBON'S BROAD MEADOW BROOK
CONSERVATION CENTER AND WILDLIFE SANCTUARY

Community engagement

- Host community listening sessions
- Work with youth in schools and educational programming
- Conduct Sanctuary and project-based surveys
- Table and present at community events
- Develop authentic partnerships with community-based organizations



Isa Chachapoyas Ortiz
Community Engagement
Mass Audubon



Interested in engagement?
Contact Isa!
iortiz@massaudubon.org

Community listening sessions

- Held in August & November 2024
- More to come!



Broad Meadow Brook Wildlife Sanctuary

Community Forum



Broad Meadow Brook is the last remaining undeveloped wetland system in Worcester and we are working to improve its health.

We want to hear from you!
Change is coming—help us shape the vision.

- How do you engage with Broad Meadow Brook?
- What are your concerns about the brook?
- Do you feel welcome at Broad Meadow Brook?

August 6, 2024
5:30–7 pm EDT
414 Massasoit Road
Worcester, MA 01604
Spanish, Vietnamese, Twi, and Portuguese translations of materials will be available.

**FREE SNACKS
FAMILY FRIENDLY
GIFT GIVEAWAY**

RSVP 

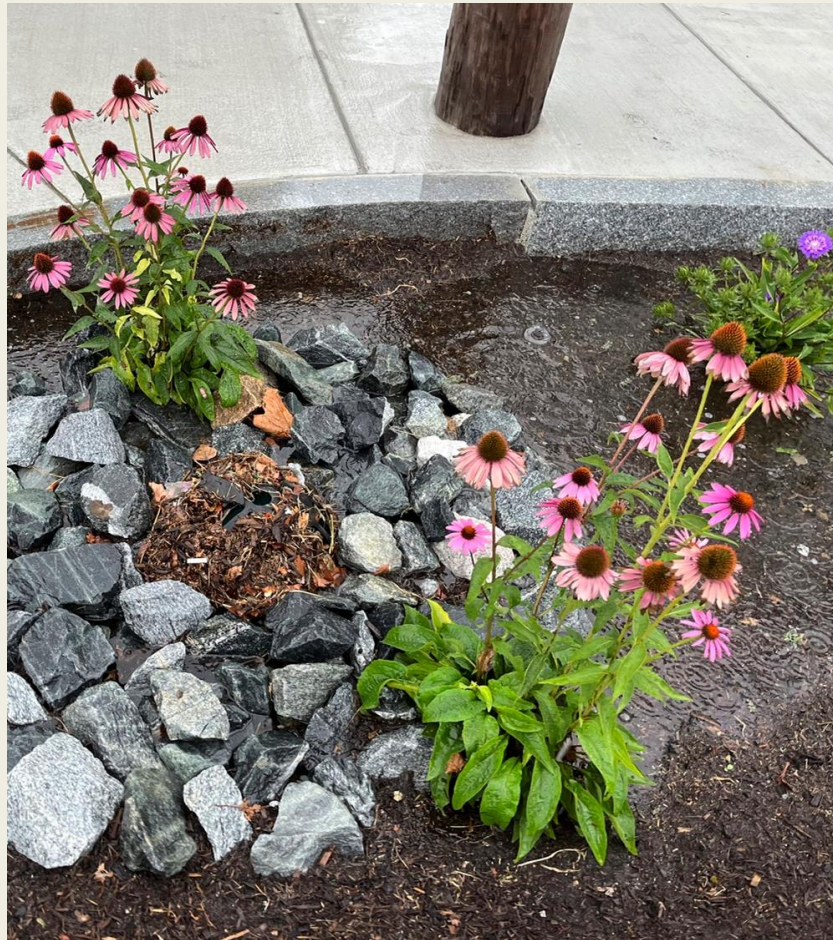
 Mass Audubon



SNEP
Southern New England Program

Watershed study

Green, Grey, & Watershed Solutions

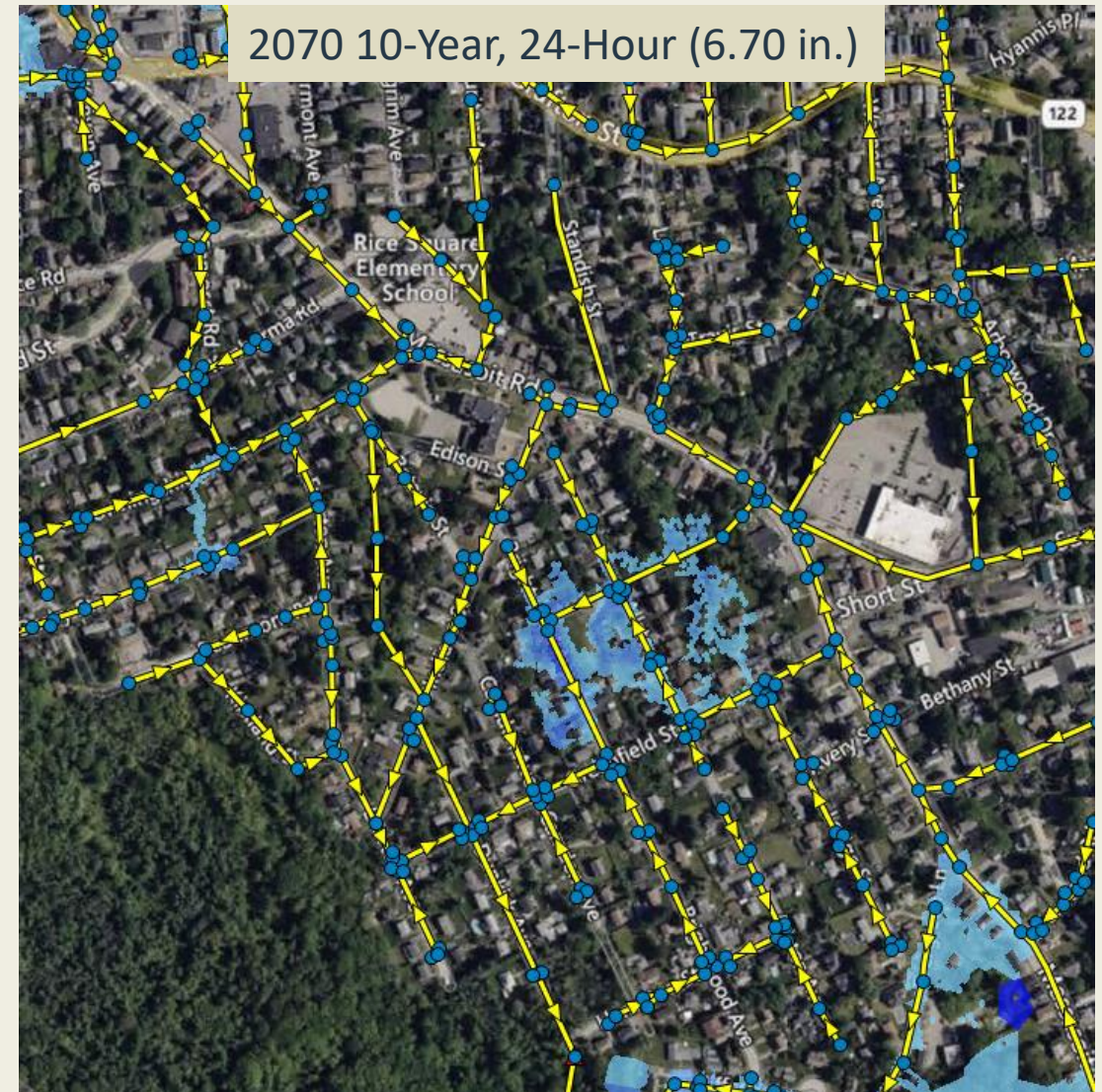
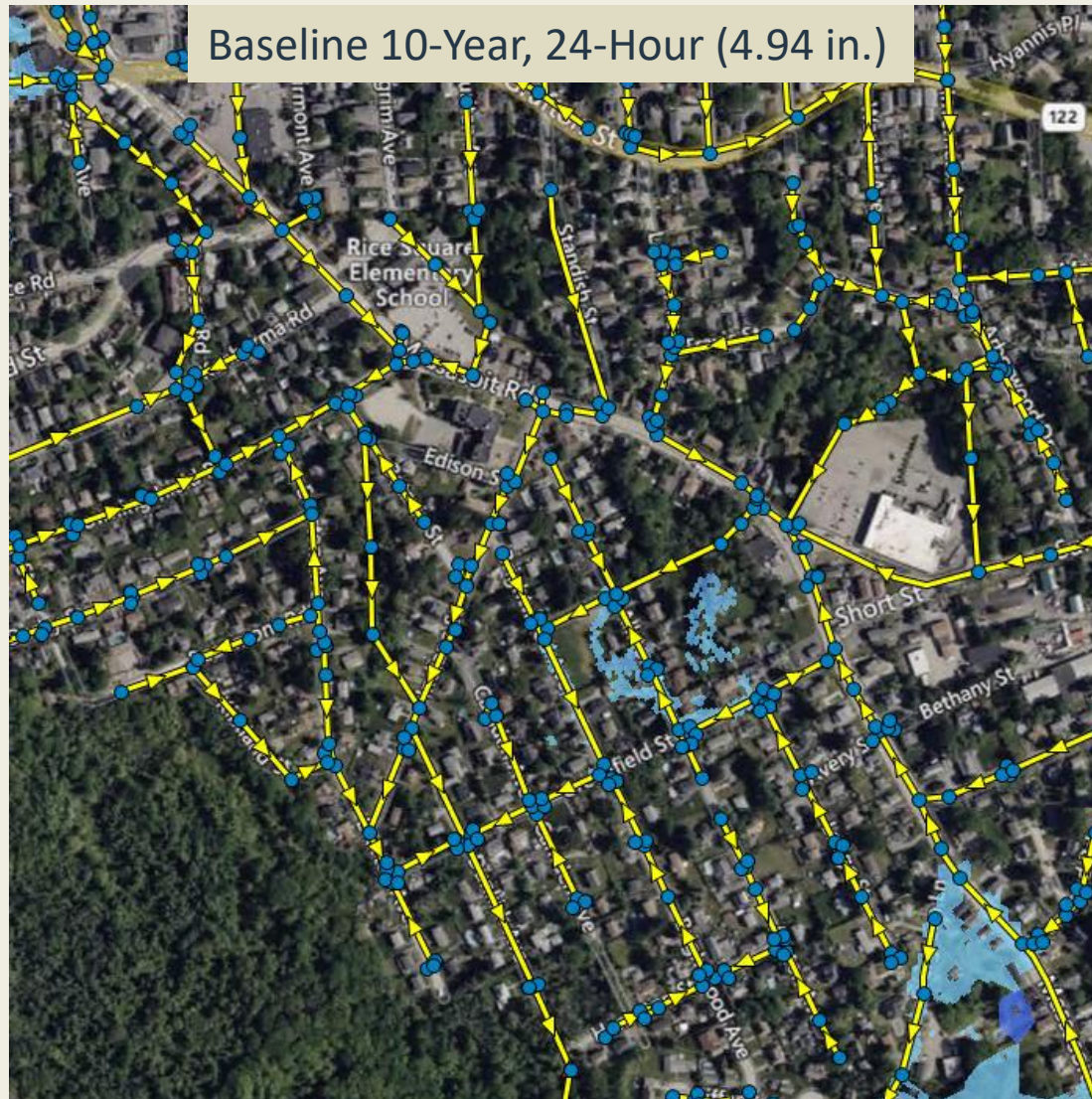


Broad Meadow Brook Project Area



Broad Meadow Brook Restoration Project - Site Location Map
Broad Meadow Brook Wildlife Sanctuary, Worcester, MA

Watershed Assessment - Future Climate Results



Gray & Watershed-Wide Mitigation Strategies

- **Five gray infrastructure solutions**
 - **Three** redirect runoff from Massasoit Road to other storm drain networks
 - **Two** provide relief drains in low-lying neighborhood historically prone to flooding
- **Gray solutions provide some flood reduction benefits, but do not eliminate flooding**
- Some gray solutions provide modest decreases in peak inflow while others **actually increased peak inflow**

- **Three mitigation strategies evaluated:**
 1. Implementing equivalent of 1 inch of storage for all impervious surfaces*
 2. Reducing impervious area throughout the watershed by 10%**
 3. Combination of 1 and 2
- **Impervious runoff storage was most efficient** due to presence of poor soils
- **Largest reductions occurred during** short duration, high intensity events
- Identified in coordination with ongoing City-wide drainage master plan

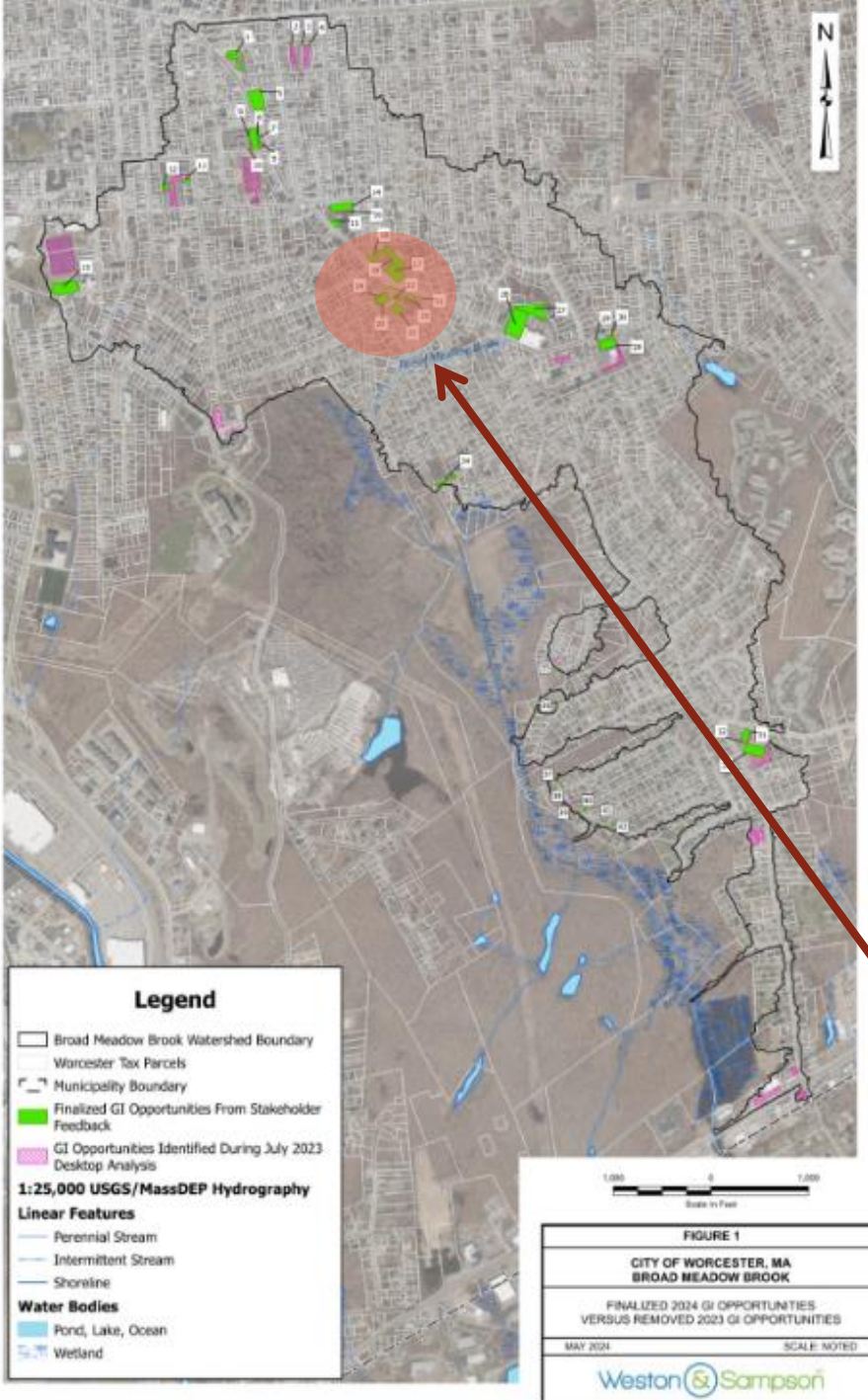
Why Nature-Based Solutions?

- Manage Stormwater Naturally
- Improve Water Quality
- Reduce Urban Heat Island Effect
- Create Habitat for Pollinators and Urban Wildlife
- Boost Climate Resilience



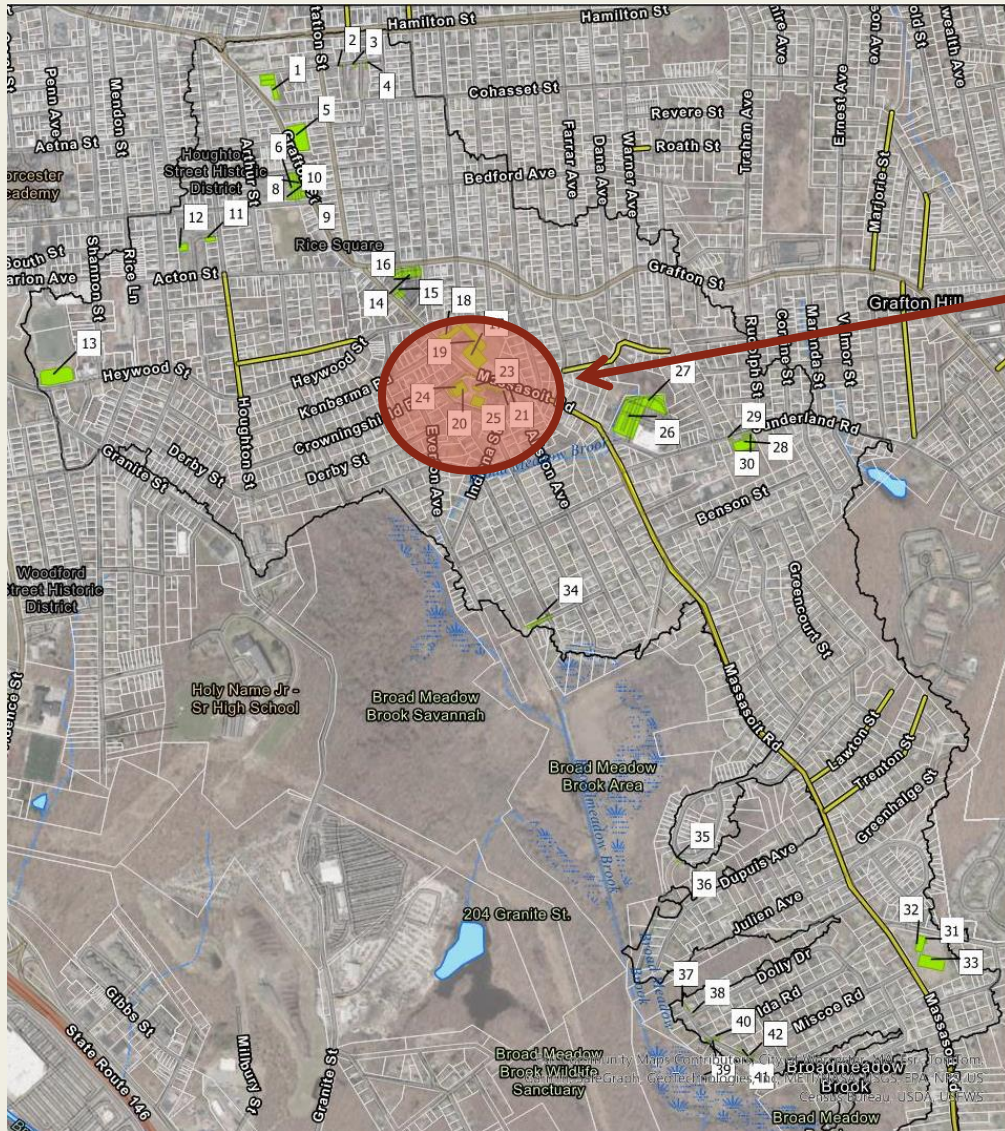
Project Identification & Design

- 42 Finalized Green Infrastructure Opportunities
- Identified highest priority project clusters
- Moved forward with draft concepts for selected project clusters



Rice Square

Rice Square Elementary Project Cluster



Pros

- Flood reduction
- Educational Opportunities
- City Property

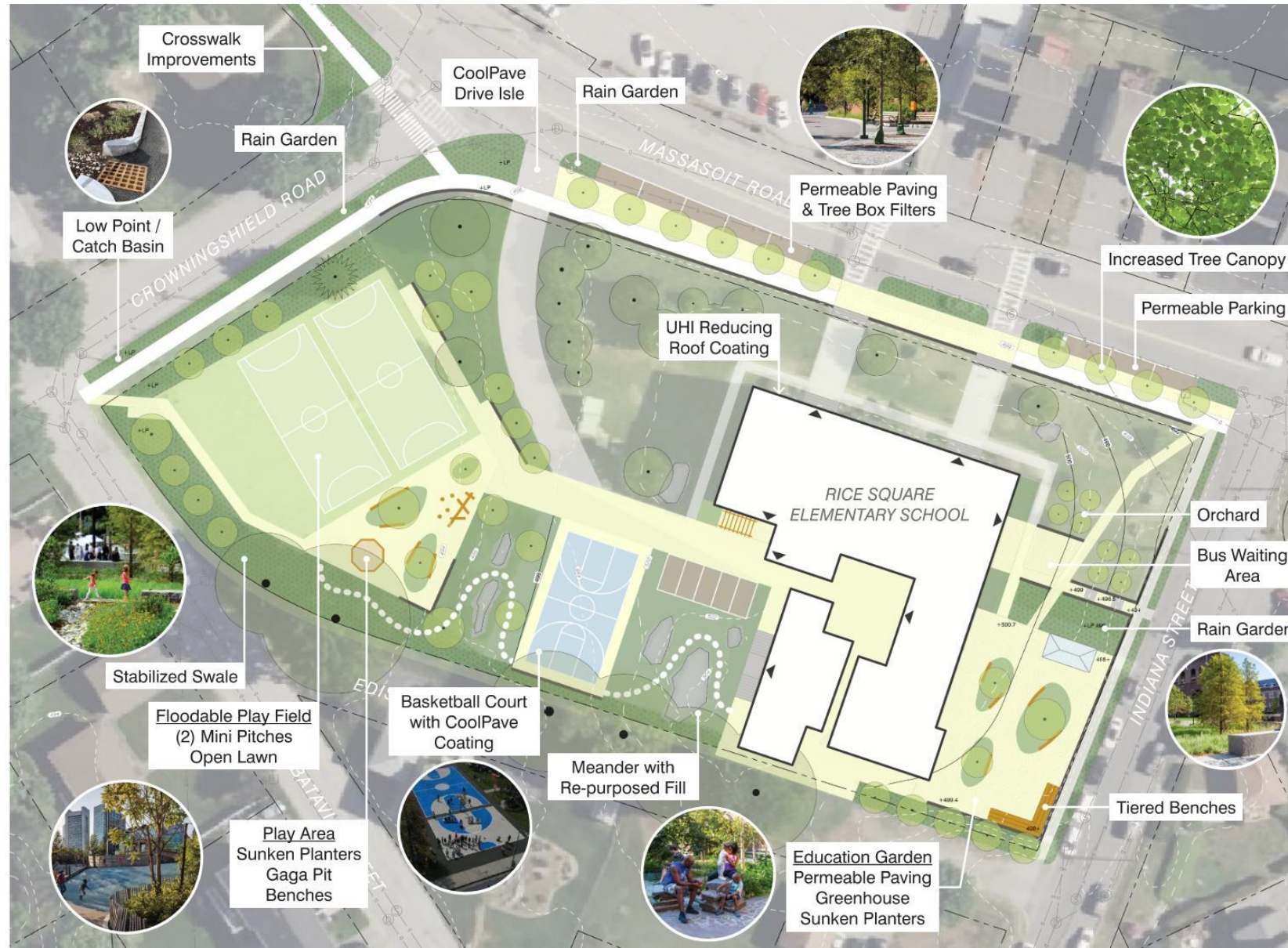
Next Steps

- Stakeholder engagement
- Identifying funding
- Survey



76 Massasoit Rd – Rice Square Elementary School

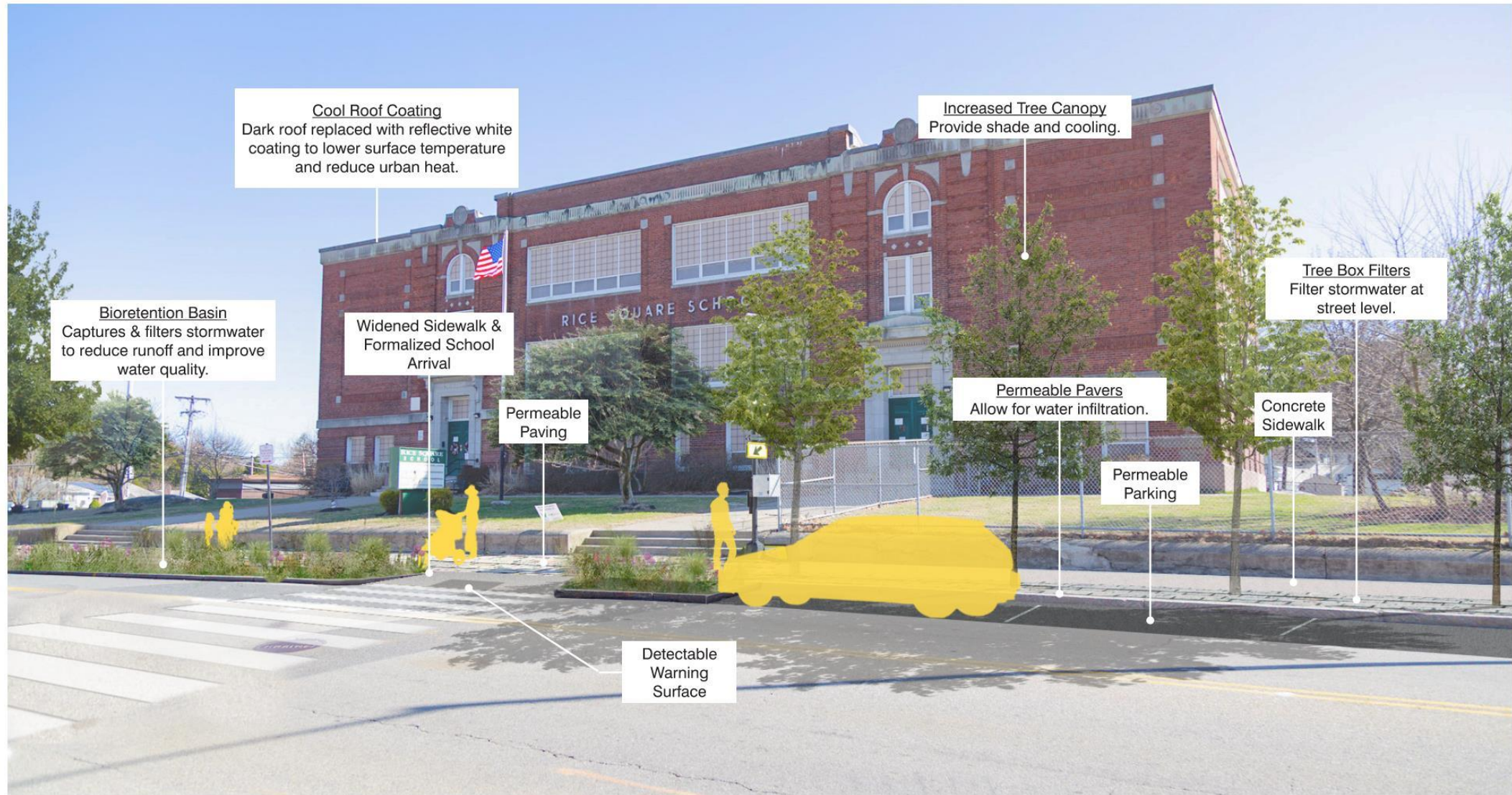
RUNOFF & RECESS DESIGN CONCEPT



Legend

- Walkway
- Flexi-Pave Walkway/Plaza
- Permeable Walkway/Plaza
- Permeable Parking
- Lawn / Playfield
- Planting Bed
- Rain Garden/Stabilized Swale

SCHOOL ARRIVAL CONCEPT SKETCH



WEST PLAYGROUND CONCEPT SKETCH



Project Team

Mass Audubon: Tom Lautzenheiser, Alex Hackman, Martha Gach,
Isabela Chachapoyas Ortiz, Isabella Chung
City of Worcester: Dave Harris, Jordan Vachon
MA DER: Kate Bentsen

Consultant Teams

Princeton Hydro: Casey Clapsaddle, Christiana Pollack & team
Weston & Sampson: Andrew Walker, Alex Simpson & team

Funding

Southeast New England Program (SNEP) Watershed Implementation Grant
& SNEP Opportunity to Advance Resilience (SOAR) Fund
Narragansett Bay Estuary Program (NBEP)
DER Priority Projects program
American Rescue Plan Act (ARPA)



**NARRAGANSETT BAY
ESTUARY PROGRAM**