

Raleigh Stormwater

Greening the City of Oaks: Advancing Stormwater Solutions that Bloom

April 19, 2024



Raleigh



Agenda

- Introduction: Raleigh Stormwater & GSI
- ARPA Opportunities & Challenges
- ARPA-supported GSI Initiatives
- Looking Ahead
- Q&A

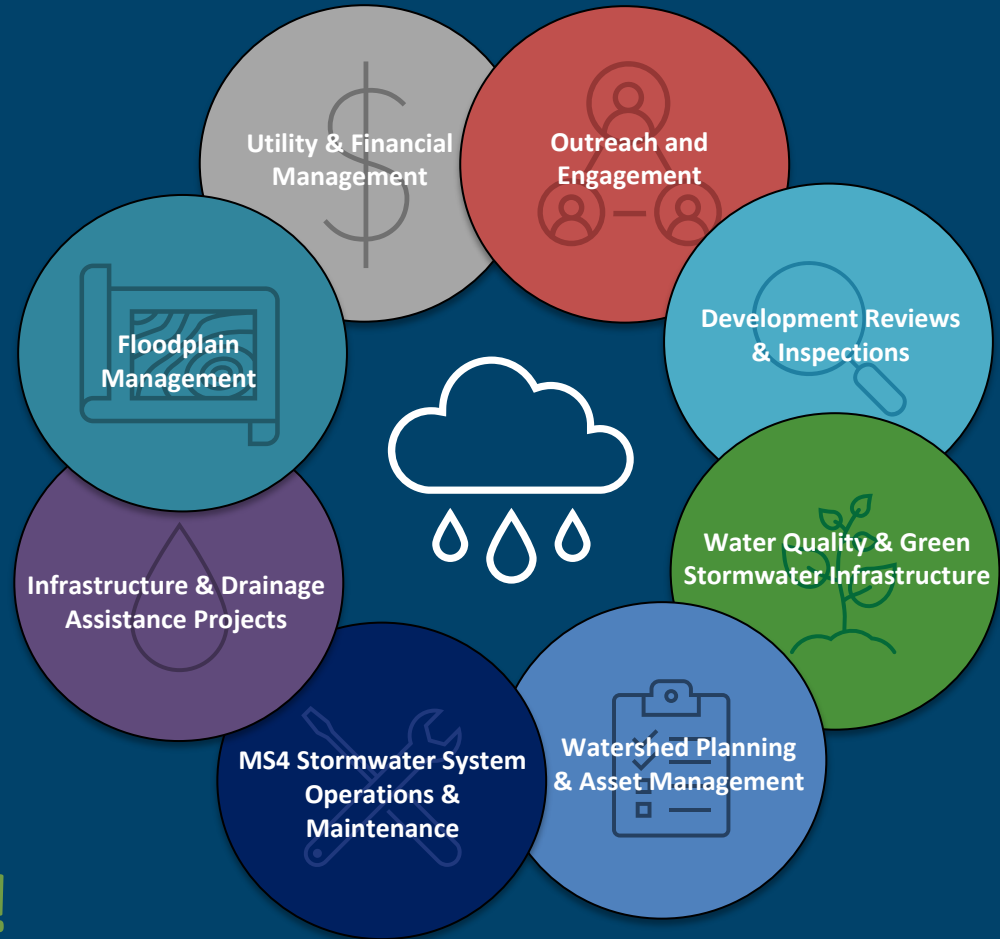
Mission Statement

Manage stormwater to preserve and protect life, support healthy natural resources, and complement sustainable growth for the community.

Vision Statement

Be the “smartest” stormwater program possible to economically and equitably achieve our mission.

Be Stormwater Smart!



Water Quality & Green
Stormwater Infrastructure



Raleigh's Advancing Green Stormwater Infrastructure (GSI)

GSI preserves natural features and/or mimics natural processes for water quality & stormwater management.

**City-wide GSI Evaluation Policy
approved in late 2023**

ARPA Funds – Opportunities & Challenges



Expediting GSI implementation



Providing seed money to grow innovative GSI programs



Fostering collaboration



Improving equity efforts related to GSI



Tight implementation timeframes

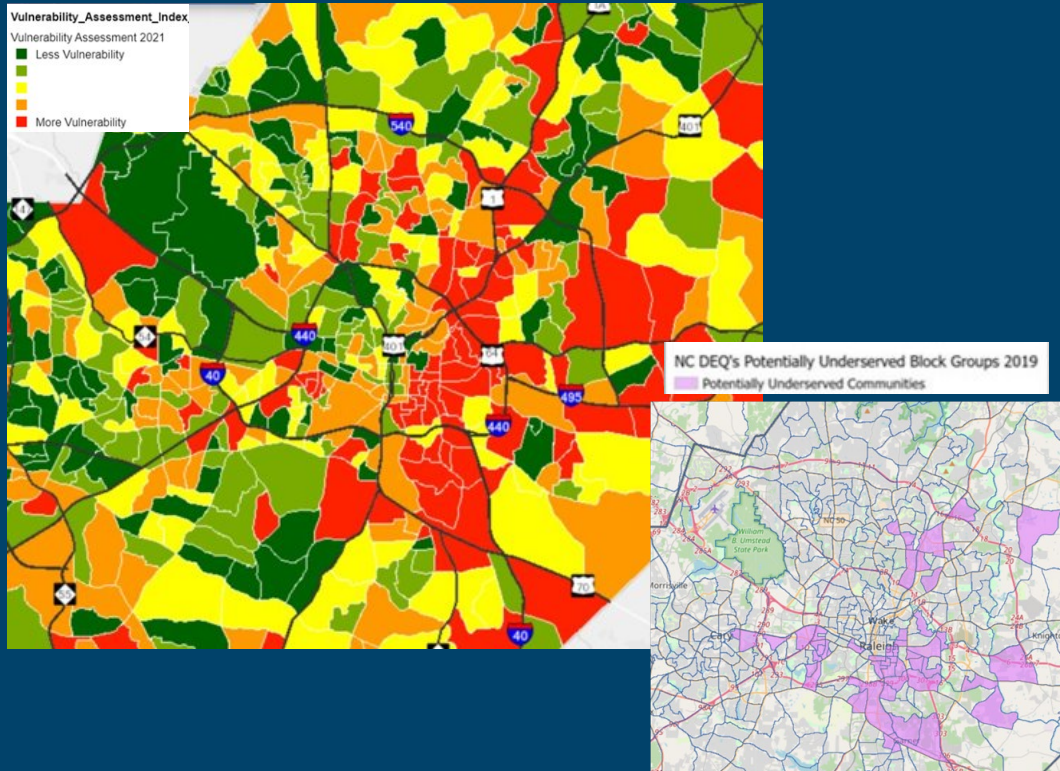


City/staff under-prepared to administer ARPA funds



No standard definition for "disproportionately impacted areas"

Disproportionately-Impacted Areas



Indicators:

- Poverty rate
- Racial/Ethnic composition
- % Unemployment
- % Youth/elderly
- % vacant housing units
- Adult education level

* Wake Co. Community Vulnerability Map & NCDEQ Potentially Underserved Communities Map

ARPA-Supported GSI Initiatives

- ✓ GSI to Mitigate Stormwater & Urban Heat Islands (UHI)
- ✓ Lion's Park GSI Retrofits
- ✓ Worthdale Park Stream Restoration & Stormwater Improvements
- ✓ Raleigh Rainwater Rewards Subsidy Program

GSI & Urban Heat Islands

NEW! GSI program to enhance community resiliency and mitigate the impacts of climate change

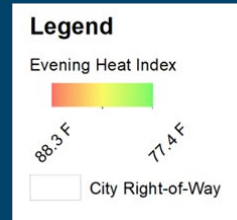
Planning, Design, Construction:
\$750,000 (ARPA)



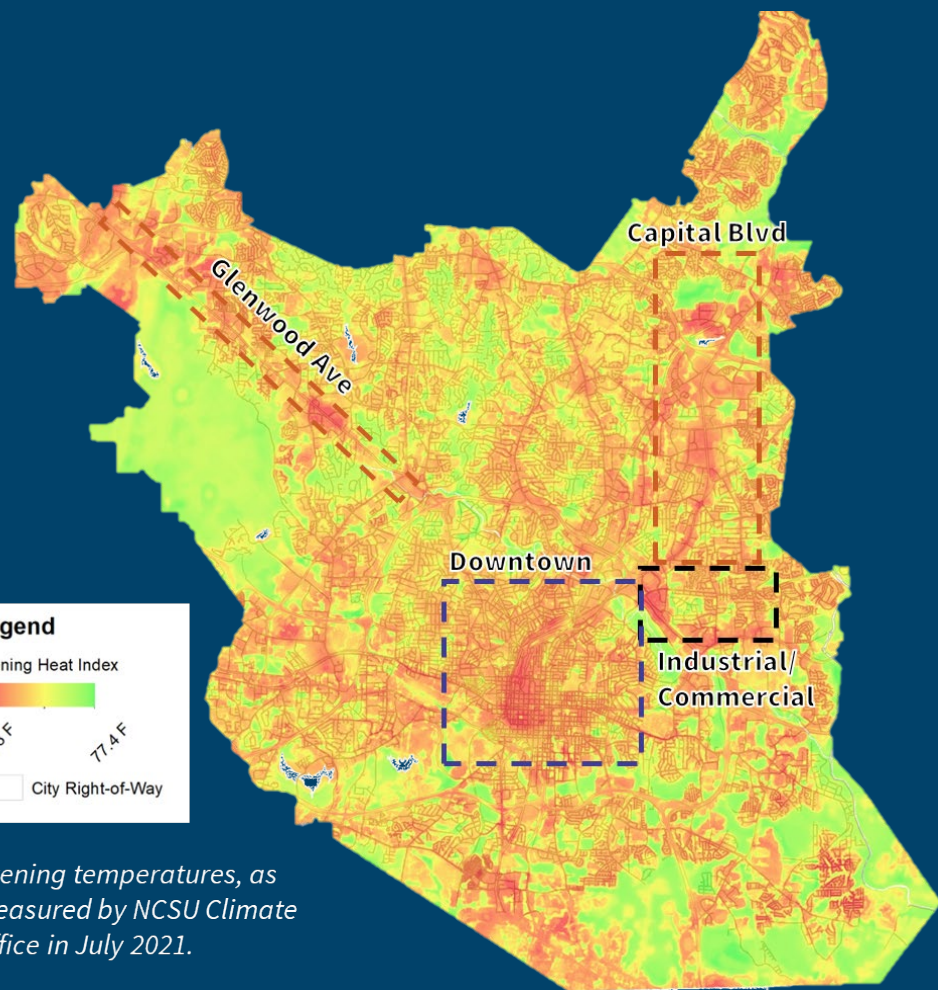
Raleigh's UHI

High heat areas:

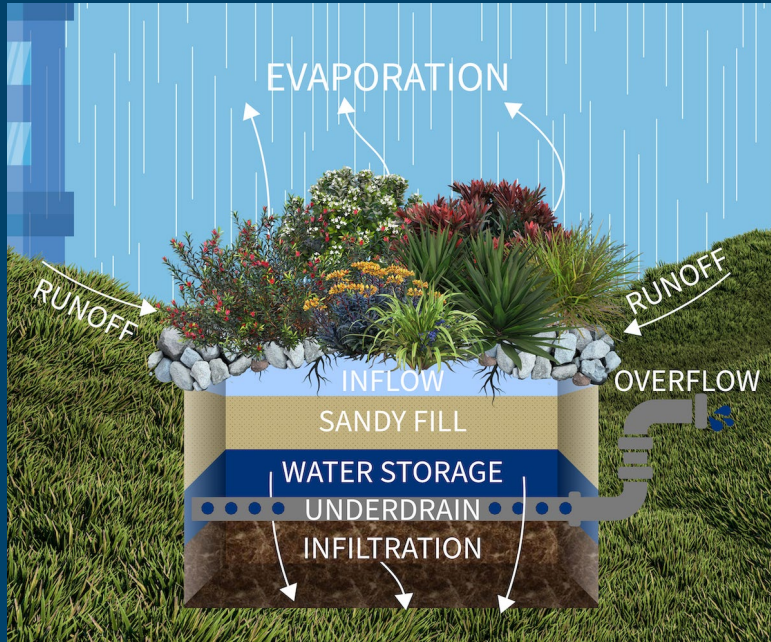
- Downtown and adjacent neighborhoods
- Roadway and transportation corridors
- Industrial areas



Evening temperatures, as measured by NCSU Climate Office in July 2021.



GSI Benefits



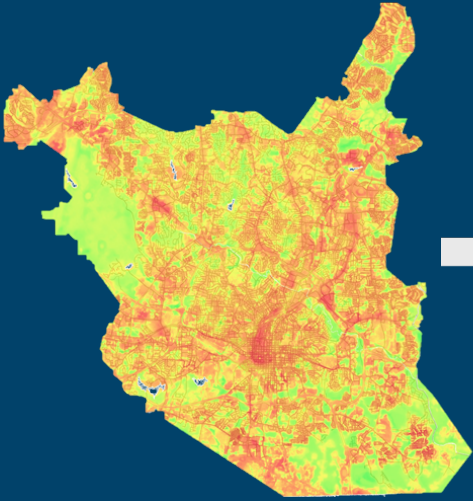
- Cooling of surrounding air
- Filtering of air pollution
- Providing wildlife/pollinator habitat
- Beautification

- Absorption of stormwater runoff
- Filtering of stormwater pollution
- Mimics natural hydrologic processes

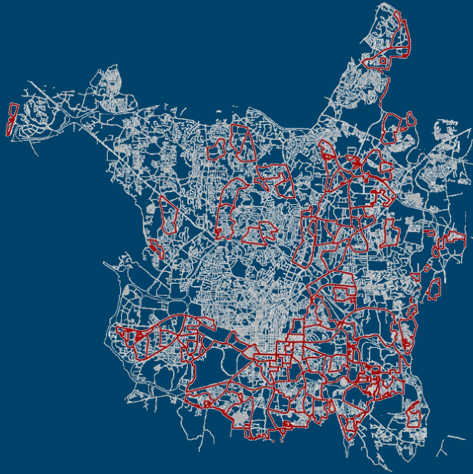
GSI Site Selection to Mitigate UHI

Potential GSI sites included City-owned parcels and ROW, ranked by:

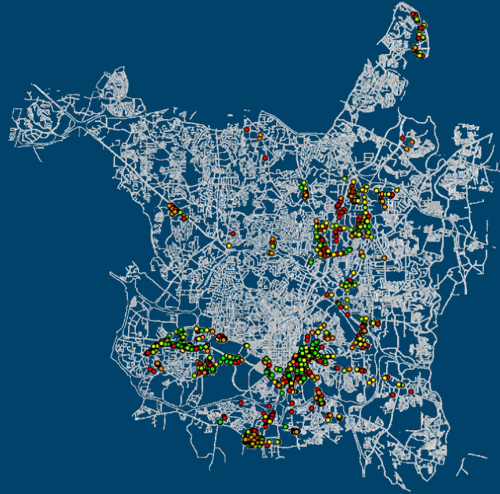
HEAT INDEX



HEAT-VULNERABLE AREAS



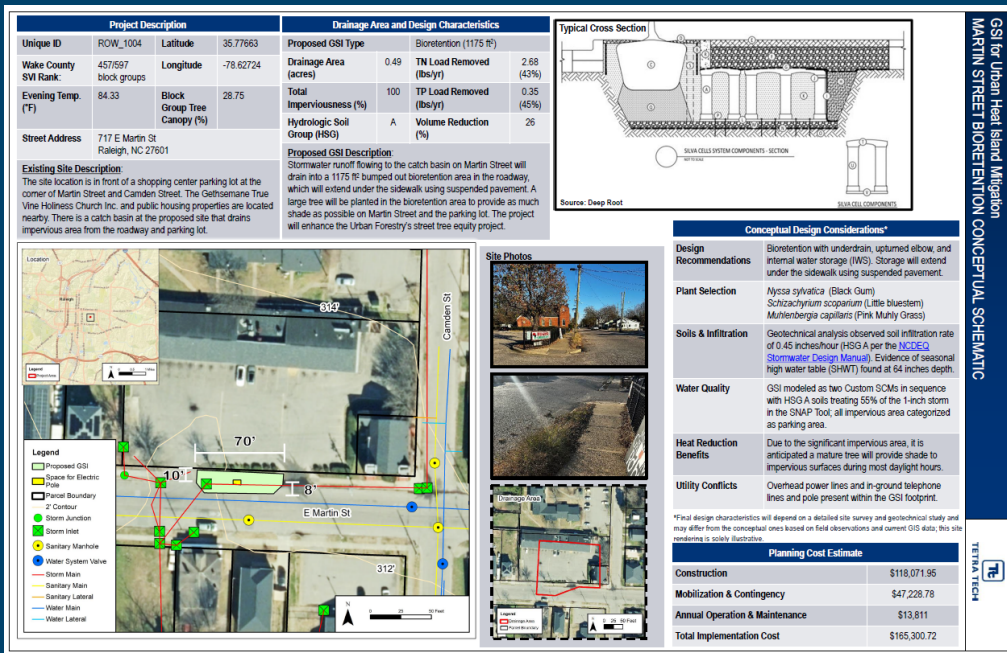
FACTOR SCORES



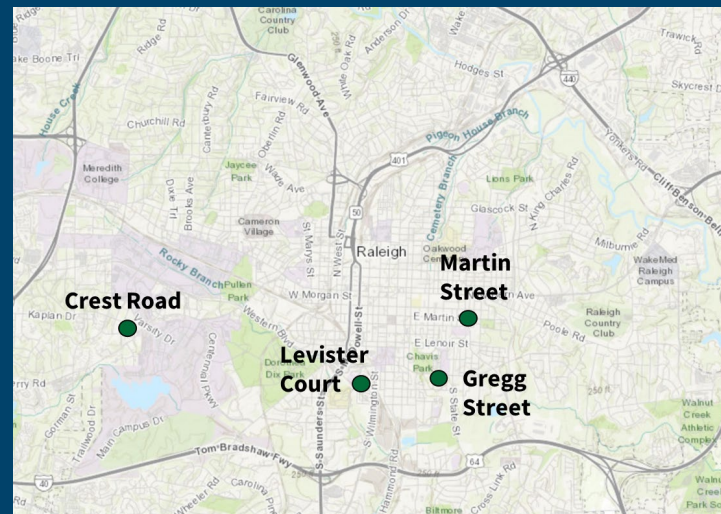
Site Prioritization Factors

High Priority	Medium Priority	Low Priority
Evening Heat Index (📍 temperature, 📍 score)	Available Space (📍 space available, 📍 score)	Presence of Other GSI (📍 distance, 📍 score)
Future Land Use (📍 density and/or residential)	Proximity to Bus Stop (📍 distance)	Soil Infiltration/Type (📍 infiltration rate)
Proximity to Stormwater Pipe (📍 distance)	Proximity to Greenway or Bike Lane (📍 distance)	Proximity to other City Stormwater Projects (📍 distance)
Tree Canopy Percentage (📍 coverage)		Proximity to City Tree Planting Projects (📍 distance)
		Proximity to City Traffic Calming Project (📍 distance)
		Proximity to Schools or Parks (📍 distance)
		Proximity to High-Risk Flood Zones (📍 distance)

Selected Project Locations



GSI for Urban Heat Island Mitigation
MARTIN STREET BIORETENTION CONCEPTUAL SCHEMATIC



Crest Road – Linear Bioretention

Attribute	Description
Nearest Address	1713 Crest Road
Proposed Green Infrastructure Type	Bioretention System
July Evening Heat Index	85 °F



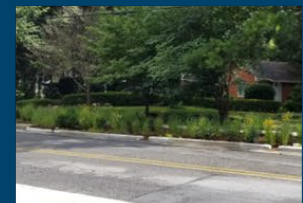
Existing Conditions



Proposed Conditions



**Check Dam
Example**



**Curb Bump Out
Bioretention
Example**

Levister Court – Suspended Pavement & Tree well

Attribute	Description
Nearest Address	98 Levister Court
Proposed Green Infrastructure Type	Tree Well with Suspended Pavement System
July Evening Heat Index	84 °F



Underground View of
Suspended Pavement



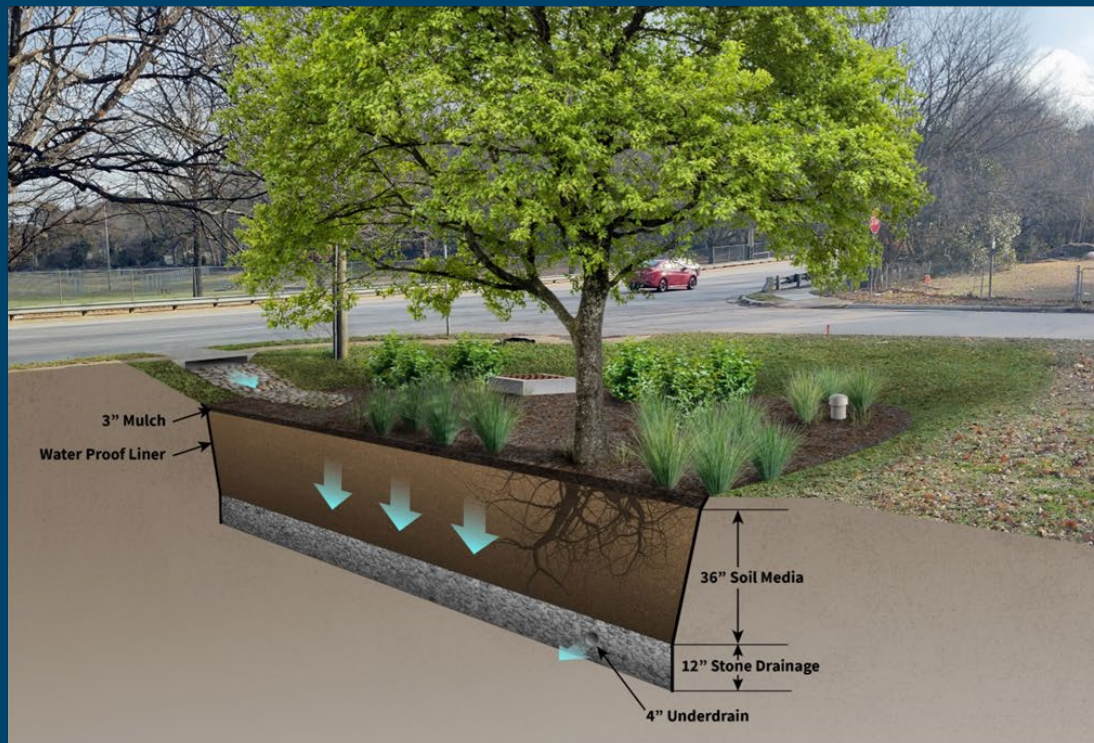
Example of a Tree
Well

Gregg Street – Bioretention Area

Attribute	Description
Nearest Address	1000 Gregg Street
Proposed Green Infrastructure Type	Bioretention System
July Evening Heat Index	86 °F



Existing Conditions



Proposed Conditions

Urban Heat Islands and GSI

Outreach & External Collaboration

- Urban Forestry Street Tree Equity
- Plant selection by residents
- Upcoming Pop-Up Meetings at project sites



IAP2 Spectrum of Public Participation

plans around the world, n process. The Spectrum is used internationally, and it is found in public participation

INCREASING IMPACT ON THE DECISION					
	INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
PUBLIC PARTICIPATION GOAL	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.	To obtain public feedback on analysis, alternatives and/or decisions.	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision making including the development of alternatives and the identification of the preferred solution.	To place final decision making in the hands of the public.
PROMISE TO THE PUBLIC	We will keep you informed.	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision.	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.	We will look to you for advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.	We will implement what you decide.

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Lions Park Bioswale & Subsurface Gravel Wetland



Lions Park Community Center Bioswale Rendering



Lions Park Bioswale & Subsurface Gravel Wetland

Design & Construction: est. \$583,000 (\$480K ARPA)

Opportunities:

- Improve Water Quality: **60,000+ gallons** of stormwater captured, pollutant removal
- Education & Amenities: Benches, signage, artwork
- Activate previously unused park land

Lions Park Bioswale & Subsurface Gravel Wetland

Outreach & External Collaboration

- Anticipated Artwork Installations
- New Public Engagement Feature: Yard Signs with QR Codes!



How did you hear about this project? (Select all that apply)

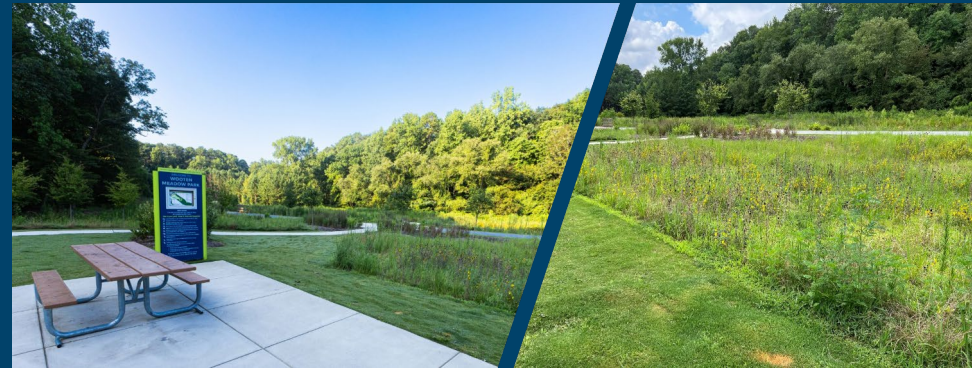
Percentage	Response	Count
50%	Yard sign at Lions Park	15 ✓
37%	Other	11 ✓
20%	Social media	6 ✓
20%	Neighborhood email list	6 ✓
13%	Word of mouth	4 ✓
0%	Postcard at Lions Park Community Center	0 ✓

30 Respondents

Worthdale Park Stream Restoration & GSI



Worthdale Park Stream Restoration & GSI



Worthdale Park Stream Restoration & GSI

Design & Construction: \$1.8M (\$820K ARPA)

Opportunities:

- Restore 2,000 LF of stream, riparian wetlands & new bioretention
- 265 fewer tons / year of sediment pollution
- New accessible boardwalk /paths & seating, benches
- Educational features for community center & nearby school

Worthdale GSI Outreach and Engagement



Interactive Activities



Potential Visual Monitoring

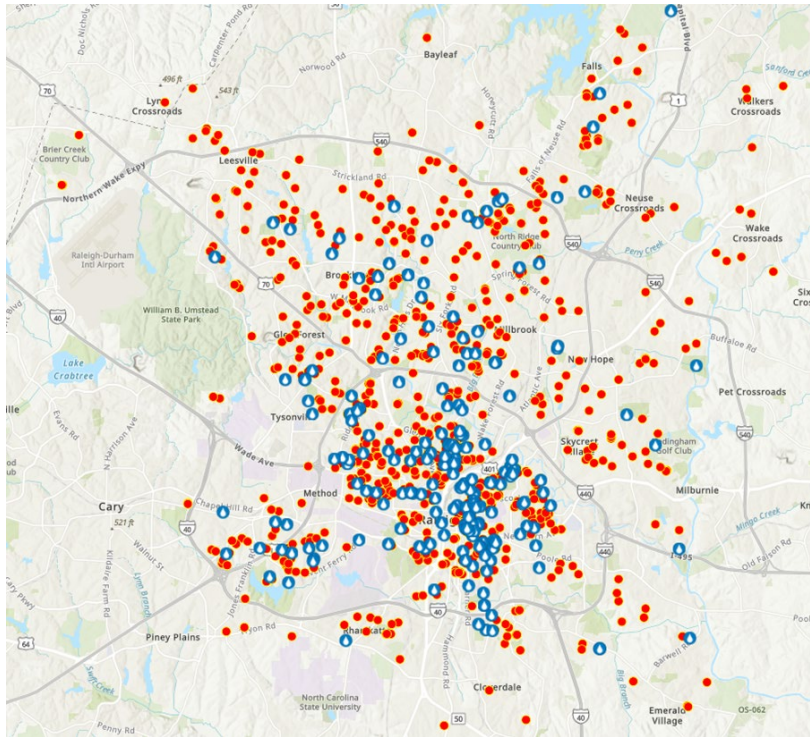


Field Trip with Adjacent School



Raleigh Rainwater Rewards (R3) Subsidy Program

Existing R3 Program



200+ projects since 2010 **1,000+ consults since 2018**

75% or 90% reimbursement for water quality projects that go above and beyond stormwater regulatory requirements



R3 Subsidy Program

City cost-share: \$150,000 (ARPA)

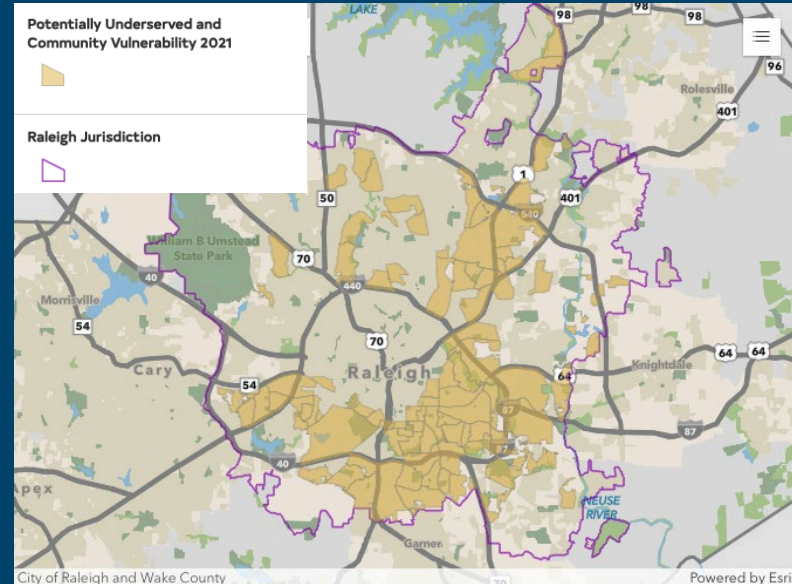
Opportunities:

- More city-funded GSI in disproportionately-impacted communities
- Neighbor-to-neighbor education/outreach
- Explore equitable outreach methods

R3 Subsidy Program - Eligibility

GSI site must be within disproportionately impacted areas and applicant be either/or:

- **Residential property owner** - income threshold applies
- **Non-profit / Place of Worship** - proof of non-profit status required
- **Rental property owner** - affordable rent threshold applies



* Wake Co. Community Vulnerability Map & NCDEQ Potentially Underserved Communities Map

R3 Subsidy Program

Outreach & External Collaboration

- Identified stakeholders of diverse organizations
- Created brochure in Spanish
- **Coming Soon!** Interviews with residents who participated in R3

Mejora de la calidad del agua en Raleigh
**Programa de
Recompensas de Agua
de Lluvia de Raleigh**



El programa de Recompensas de Agua de Lluvia de Raleigh (Raleigh Rainwater Rewards) ofrece una opción asequible para mejorar la calidad del agua en los lagos y arroyos de la comunidad. Además, proporciona financiación a los residentes que instalen en su propiedad un proyecto de calidad de las aguas pluviales que imita a la naturaleza absorbiendo las aguas pluviales y elimina la contaminación de las superficies impermeables, como en el techo o el camino de entrada) antes de que el agua desemboque en los desagües pluviales, ríos, lagos y arroyos locales.

R3 Subsidy Program Project Implementation

Projects underway/complete: 3 rain gardens, 1 cistern



Looking Ahead

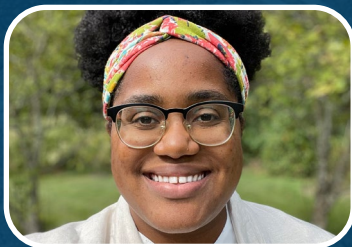
- Expansion of GSI to Mitigate UHI Impacts
- Funding for R3 Subsidy Program from Community Climate Action Grant
- Continued efforts to operationalize equity
- Building off success – new GSI Maintenance Crew, increased CIP budget for GSI-related programs, GSI Master Plan

Discussion and Questions



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