

Flooding and Green Infrastructure in Tewksbury

Monday, May 23rd

Tewksbury Public Library

Slides available online for download: tewksbury-ma.gov/flooding



MVP

Municipal Vulnerability
Preparedness

Weston & SampsonSM

MRWC
MERRIMACK RIVER
WATERSHED COUNCIL



AGENDA

- Introduction to the project
- MentiMeter Poll
- Past Stormwater issues
- Future Impacts of Climate change
- Green Infrastructure and potential new solutions
- Past and Future Stormwater Management
- Questions via MentiMeter

PROJECT TEAM

On the Steering Committee:

- The Town of Tewksbury
- Tewksbury Department of Public Works
- Tewksbury Conservation Commission
- Tewksbury Housing Authority
- Tewksbury Open Space and Recreation Plan Committee
- Weston & Sampson
- Merrimack River Watershed Council

Presenting today:

- Town of Tewksbury
- Merrimack River Watershed Council
- Weston & Sampson

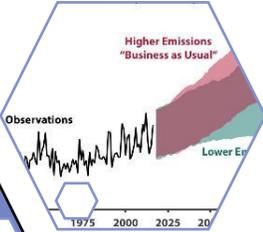
MUNICIPAL VULNERABILITY PREPAREDNESS



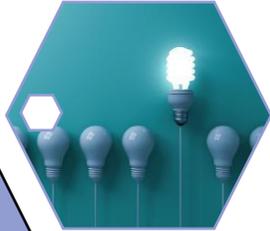
Multiple benefits to a broad cross-section of the community



Proactive solutions supported by climate data



Prioritize Nature-based Solutions



Think outside the box (& borders)

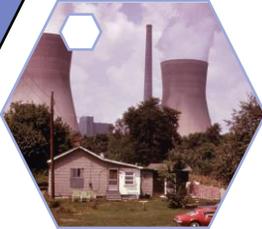


Address identified climate change impacts

Project monitoring & maintenance for continued success



Focus on Environmental Justice (EJ) Populations



Knowledge Sharing (successes & failures)



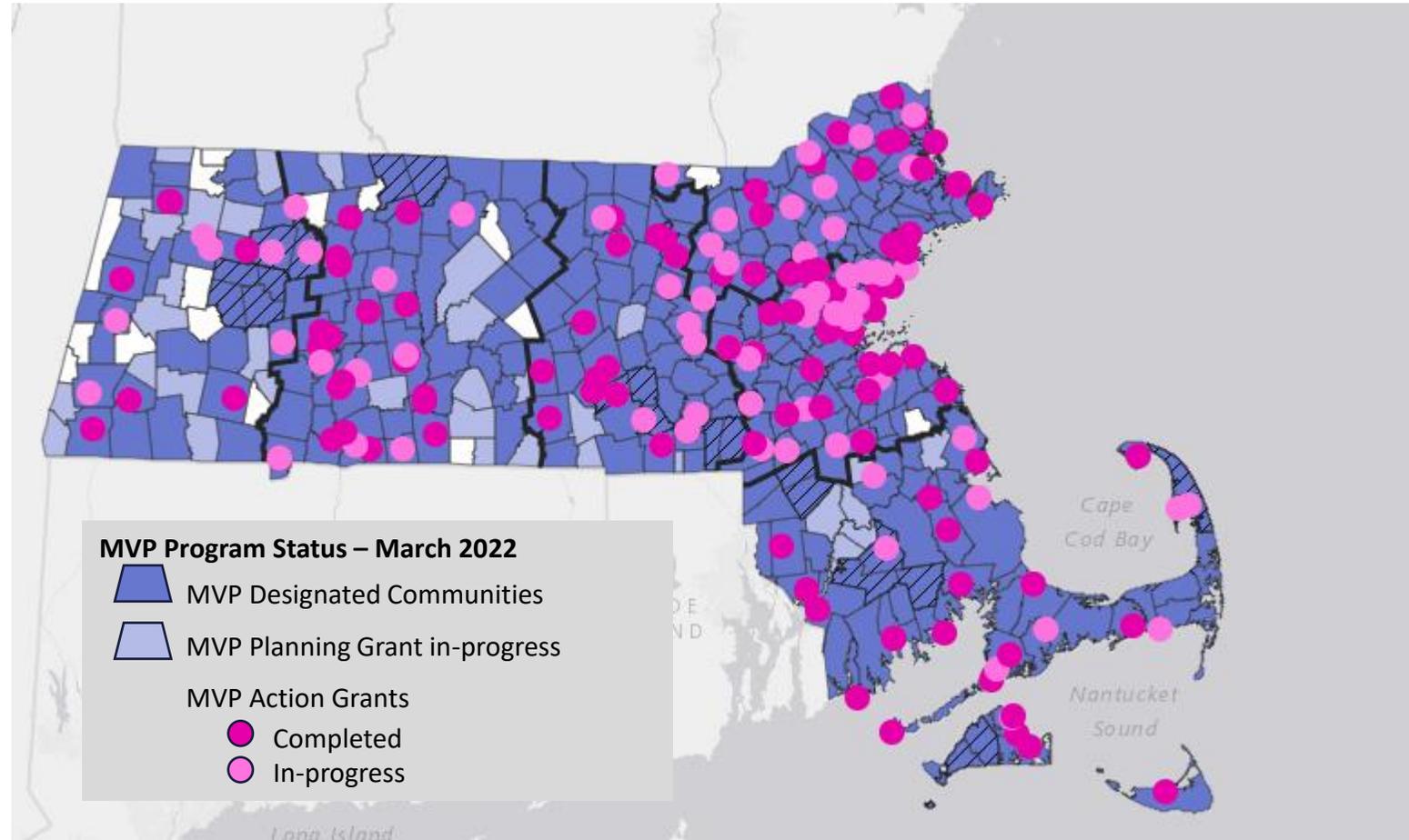
MUNICIPAL VULNERABILITY PREPAREDNESS

1. MVP Planning Grant

- Define climate hazards
- Identify community vulnerabilities and strengths
- Develop and prioritize adaptation actions
- Received MVP designation in 2020

2. MVP Action Grant

- Implement priority adaptation actions identified during the planning process
- **This project is funded by an MVP Action Grant awarded in August 2021**



Learn more: resilientma.org/mvp

PROJECT GOALS

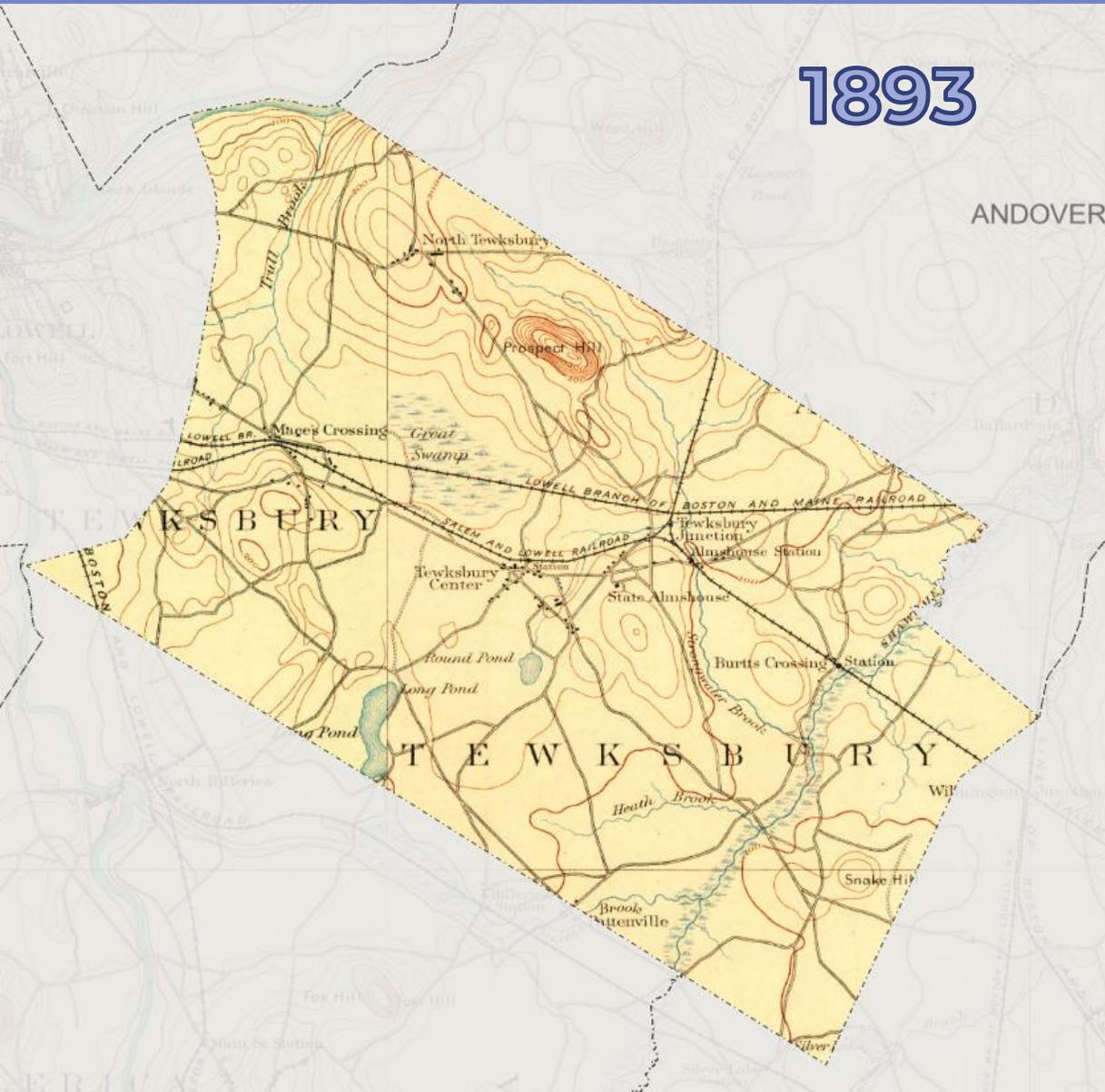
1. Understand residents' experience with flooding through a town-wide survey
2. Determine what town-owned parcels of land would be best utilized for green infrastructure and flood management. Develop conceptual designs.
3. Consider locations for flood-resilient affordable housing development

MENTIMETER POLL

Go to

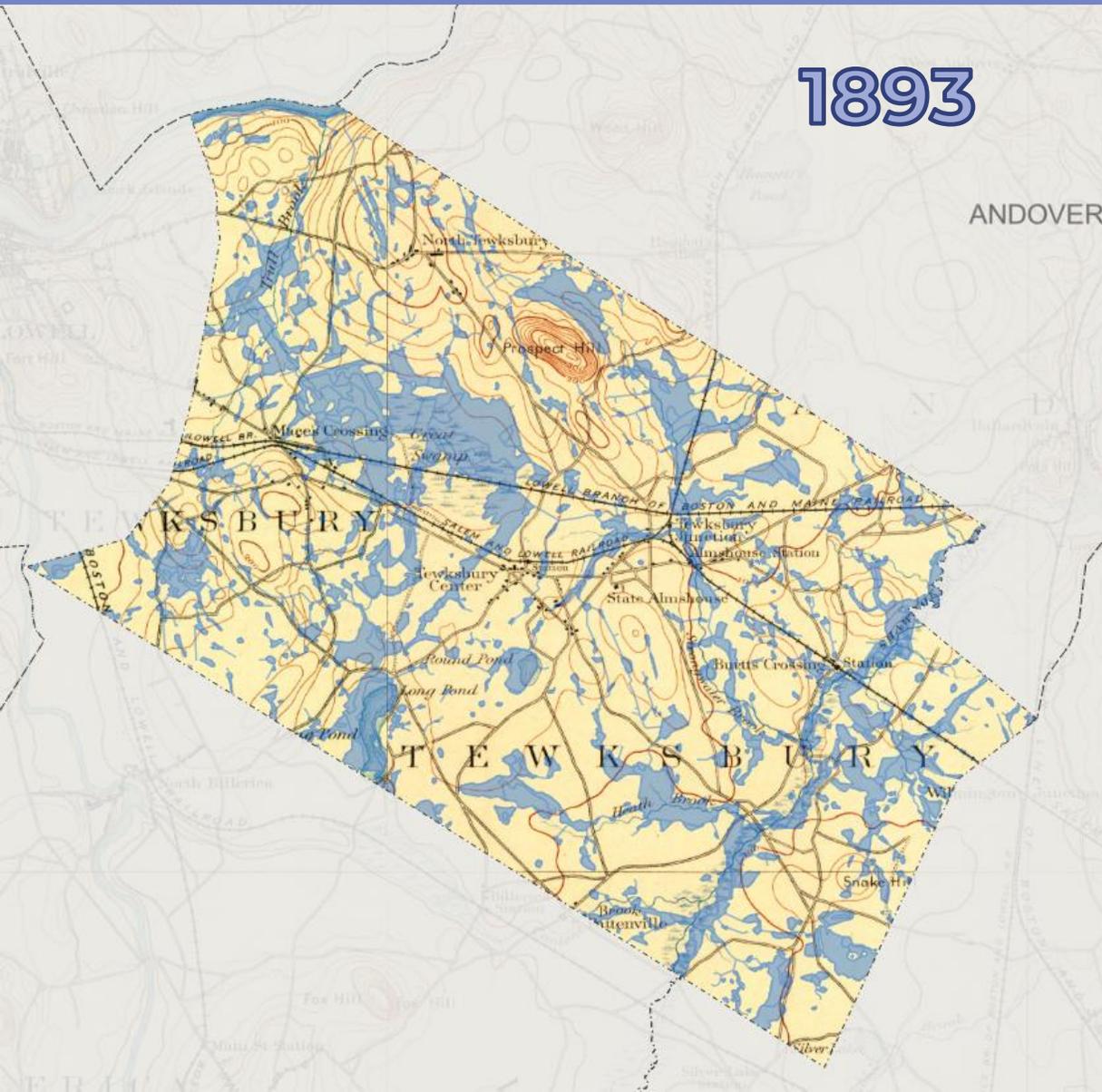
www.menti.com

WHY IS STORMWATER AN ISSUE?

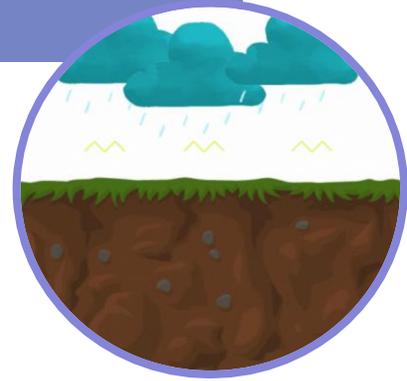


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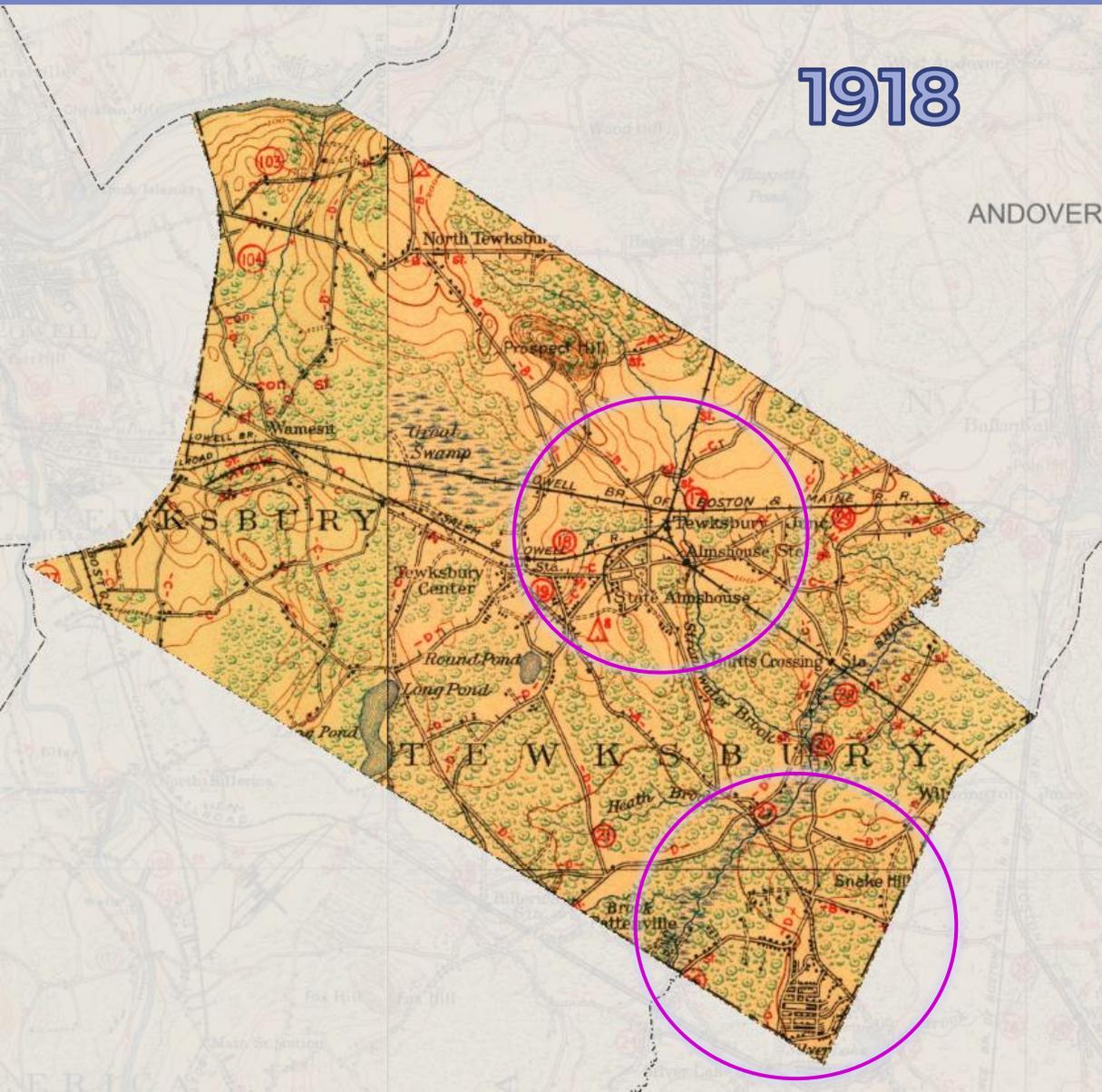
WHY IS STORMWATER AN ISSUE?



- Historically wet area means a high water table, many wetlands
 - Water can infiltrate
 - Rivers can use floodplains
 - Stormwater is good for natural wetland and river ecosystems

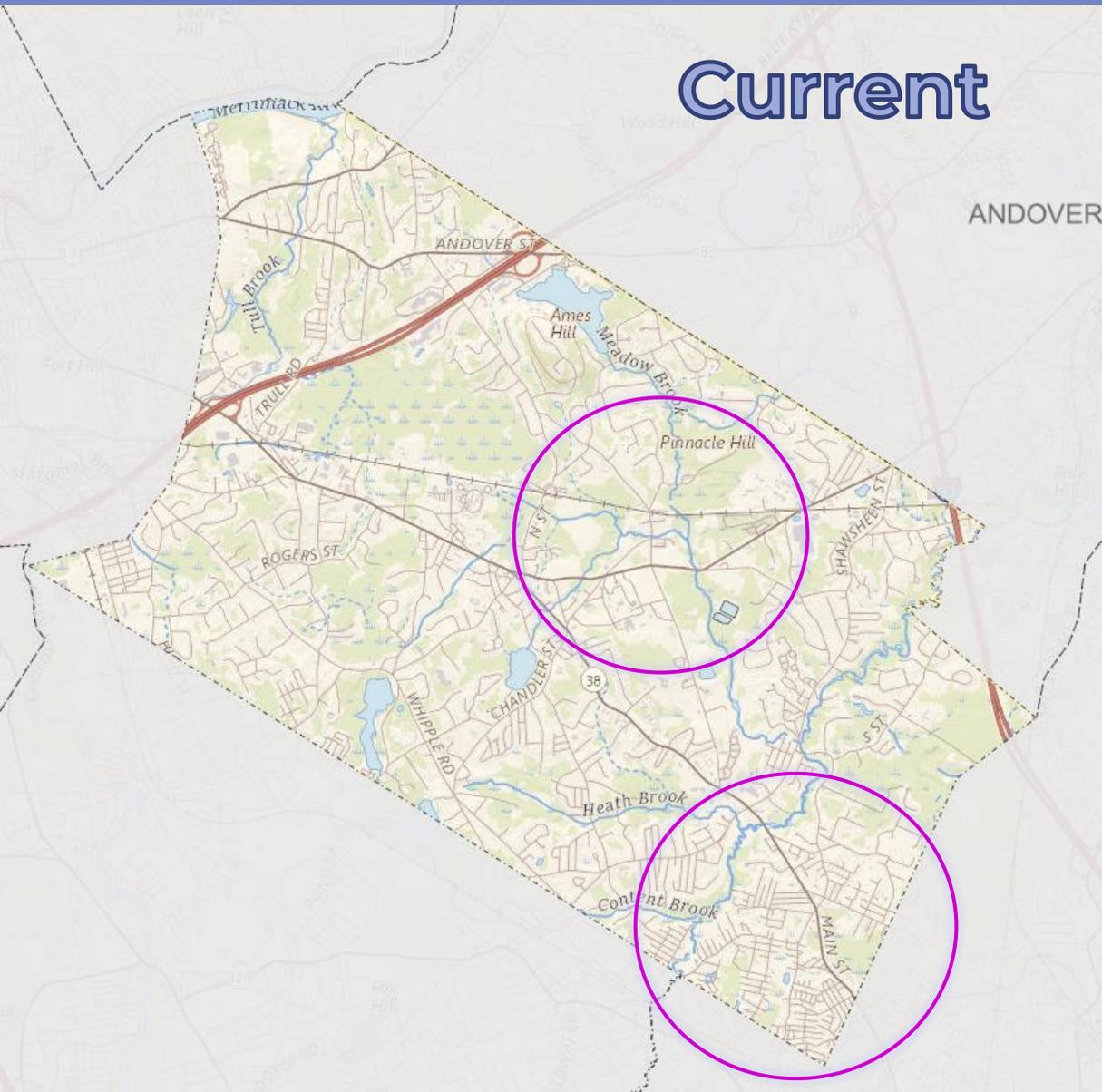


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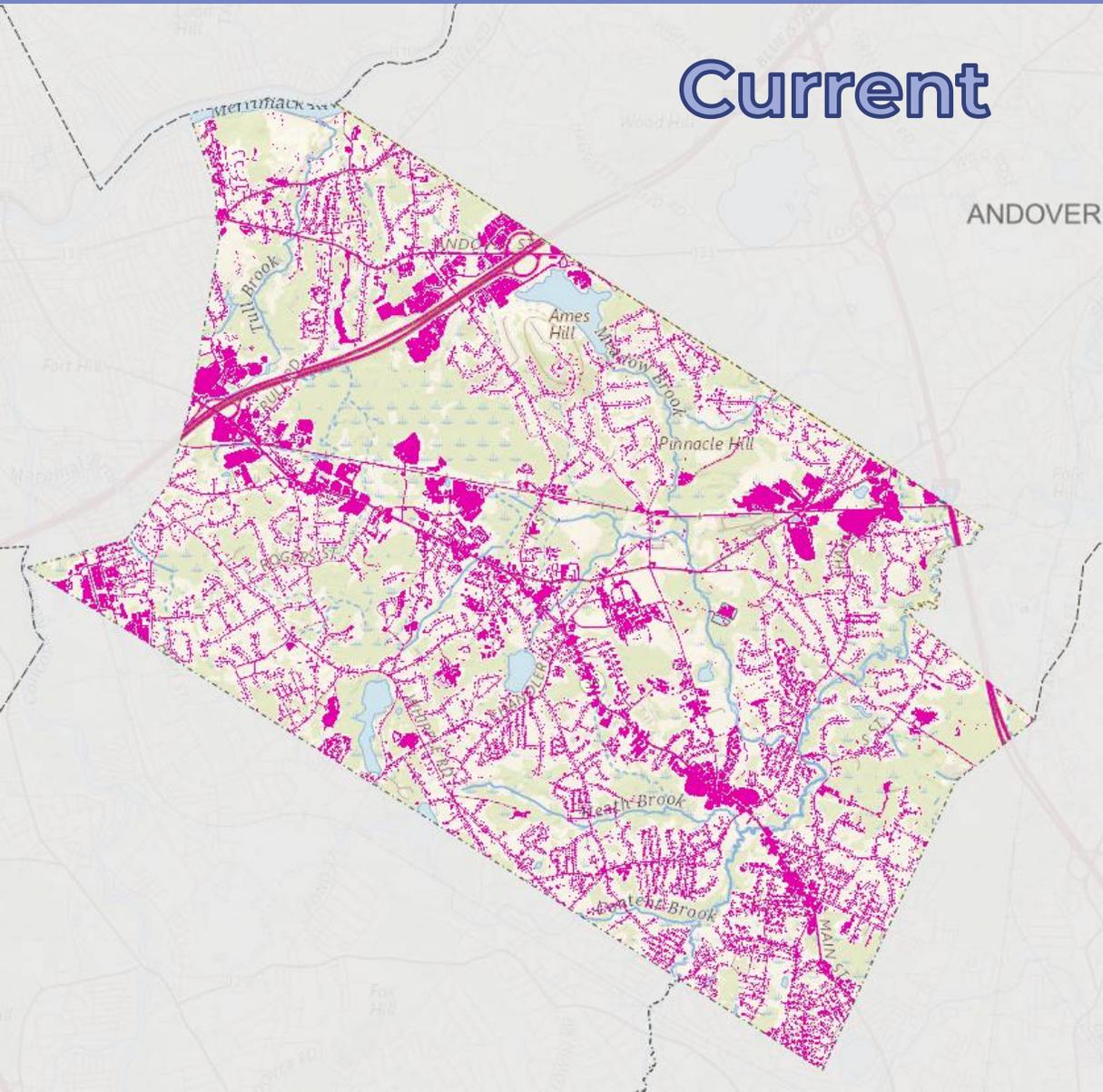
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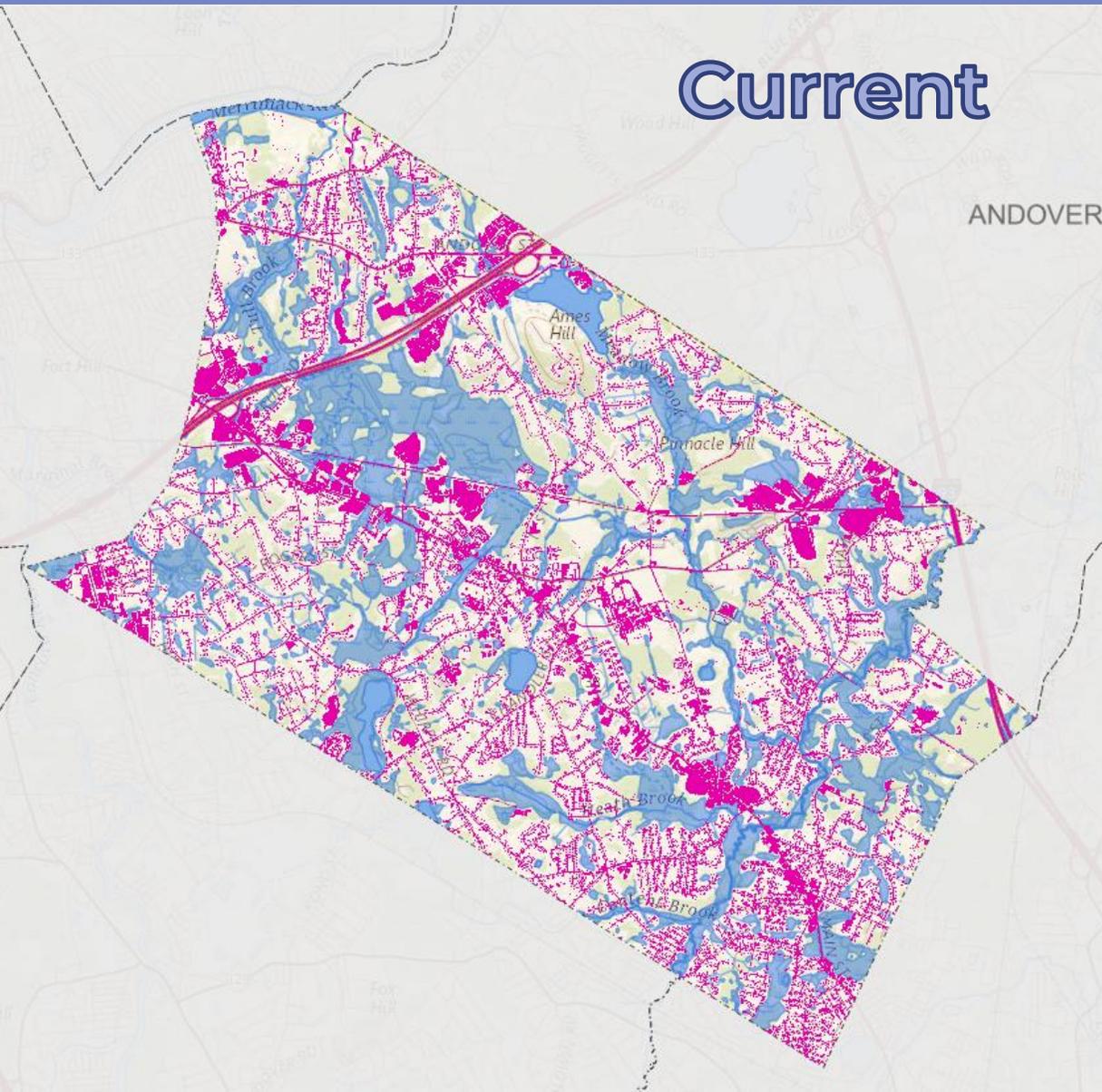
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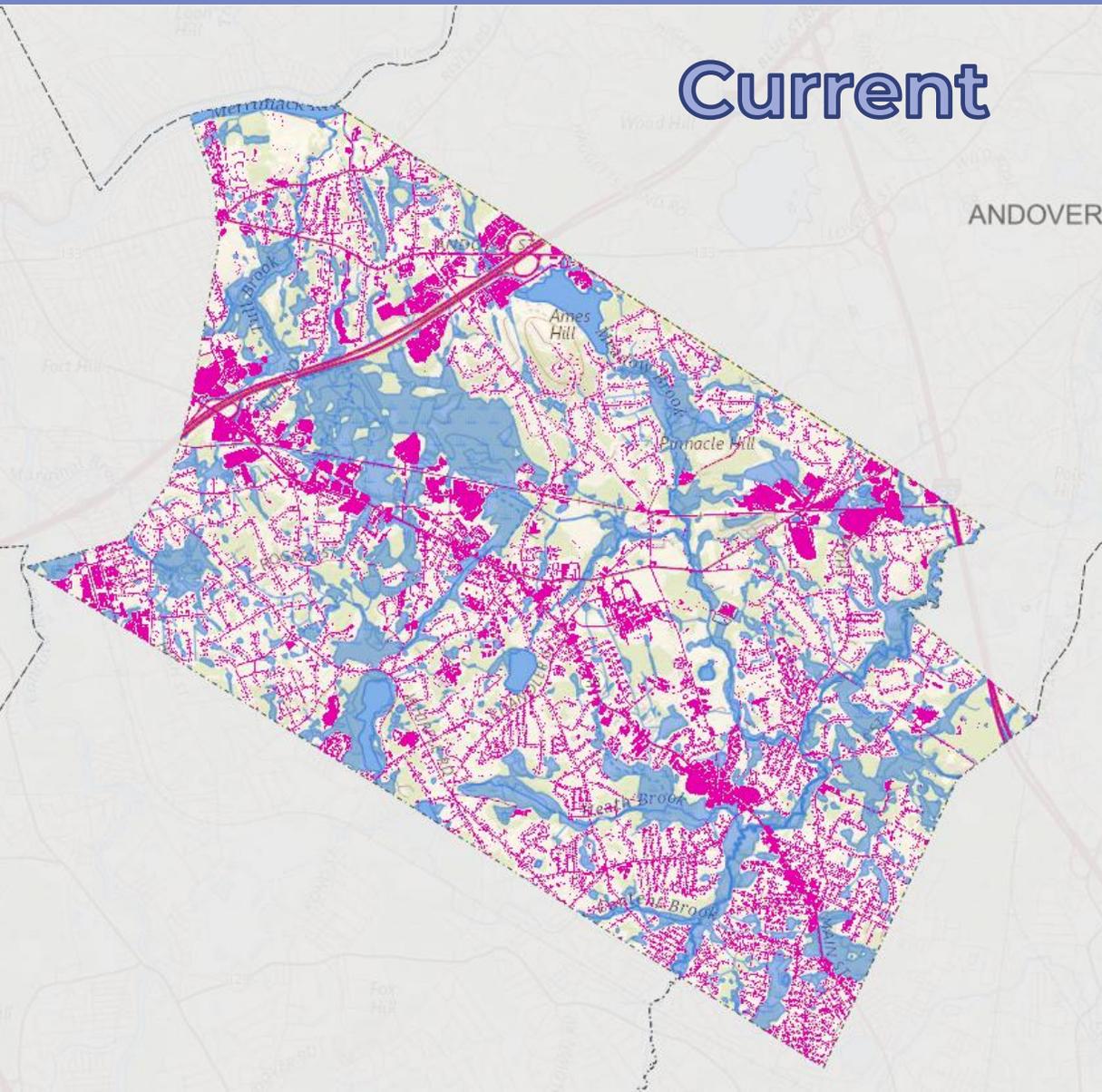
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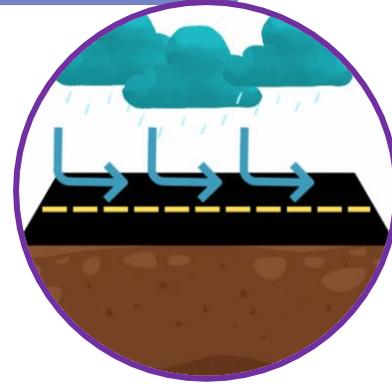


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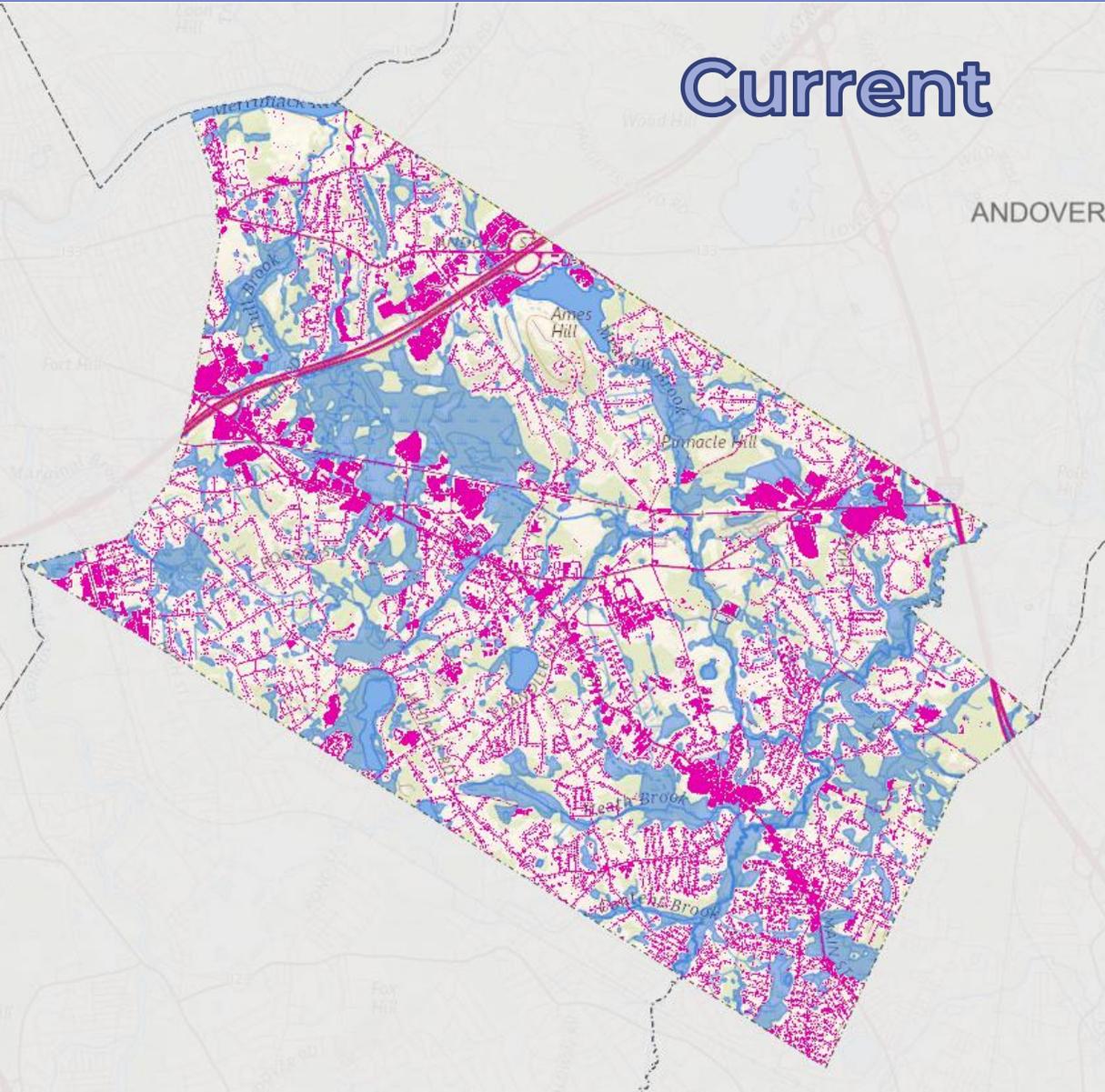


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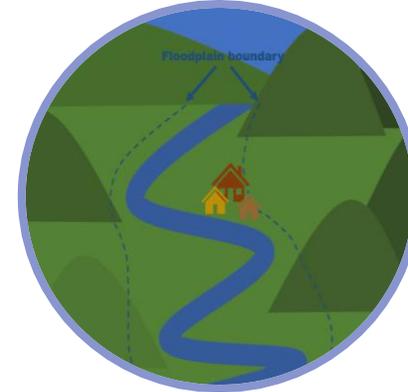
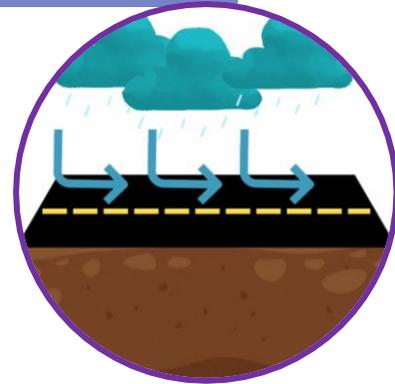


WHY IS STORMWATER AN ISSUE?

Current



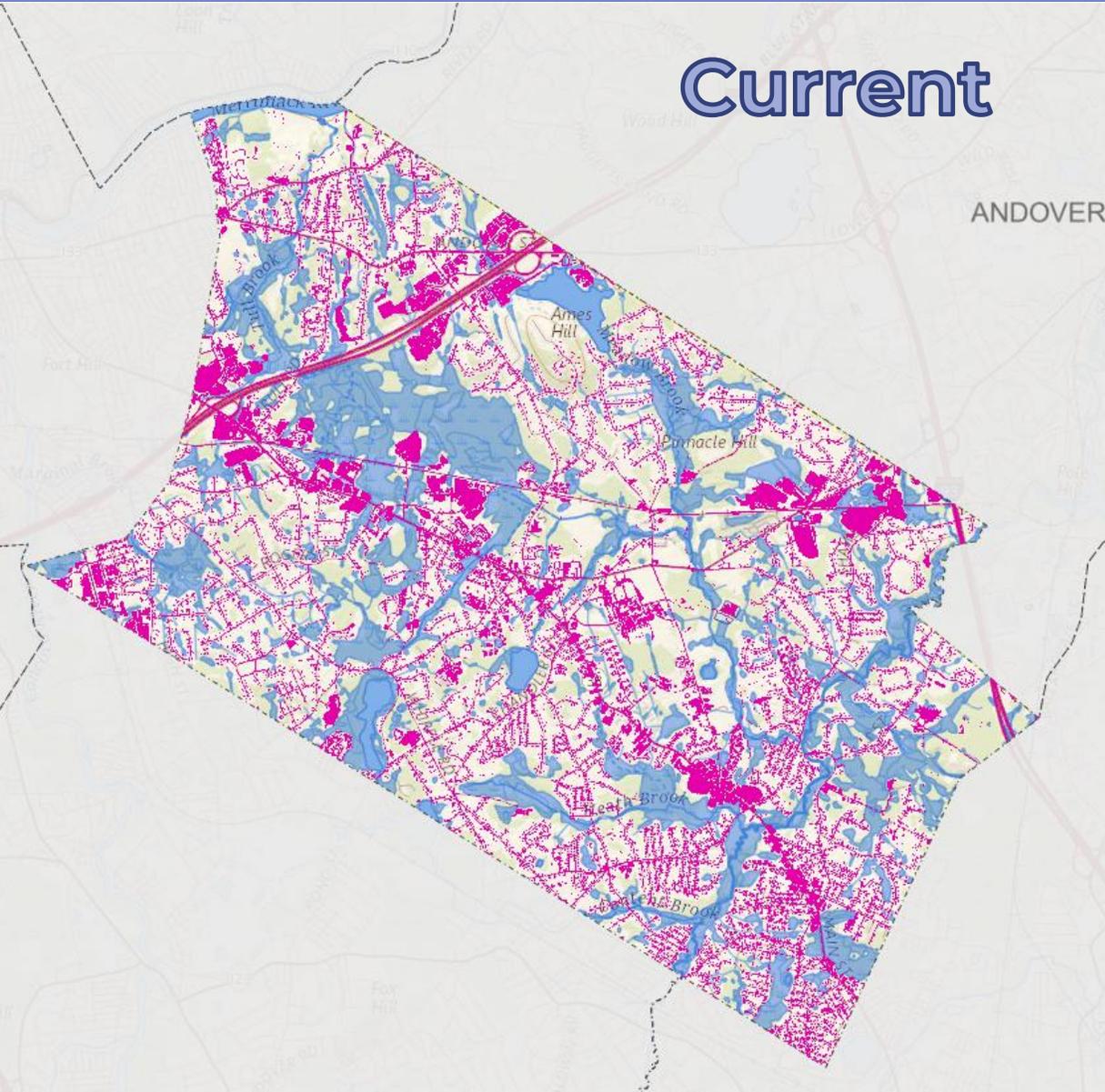
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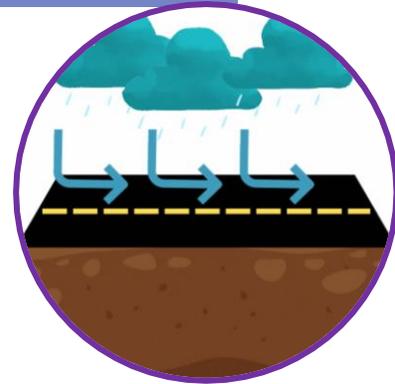
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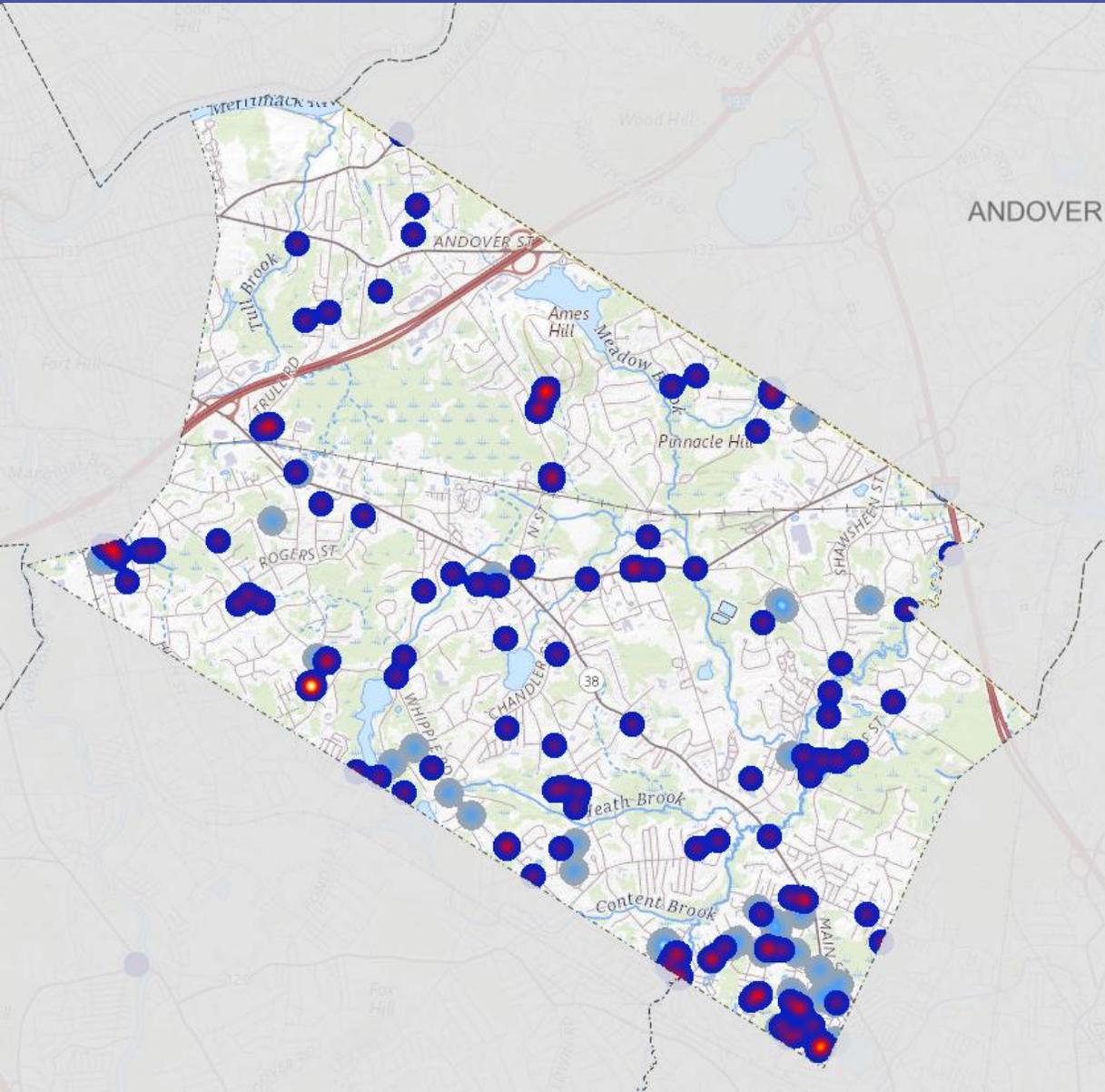
ANDOVER



- Historically wet area means a high water table, many wetlands
- Increased development
 - Increased runoff
 - Restricted floodplain
 - Stormwater becomes problematic for people



FLOODING IN TEWKSBURY TODAY



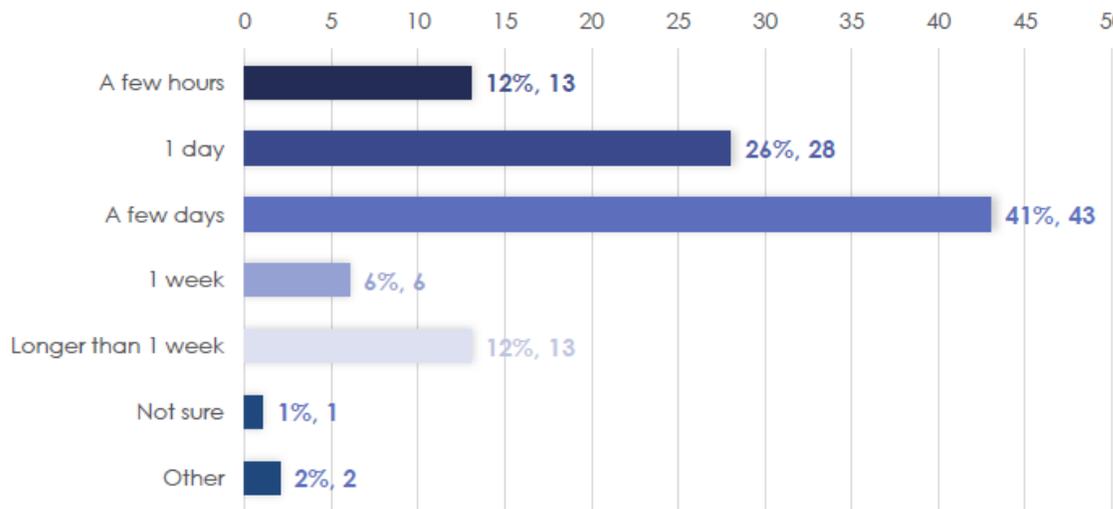
- Completed survey on flooding, green infrastructure and affordable housing
- Conducted between Jan 14-March 25, 2022
- Available in Spanish and English online and in print
- 123 responses

FLOODING IN TEWKSBURY TODAY

- 106 people experience regular flooding
- 57 experience extreme event flooding

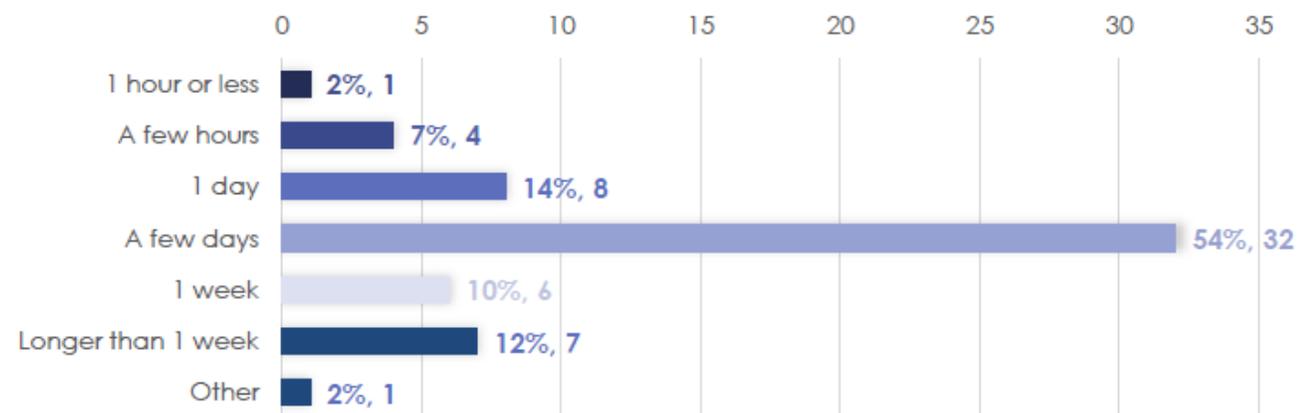
Regular Flooding

How long does the flooding typically last?



Extreme Event Flooding

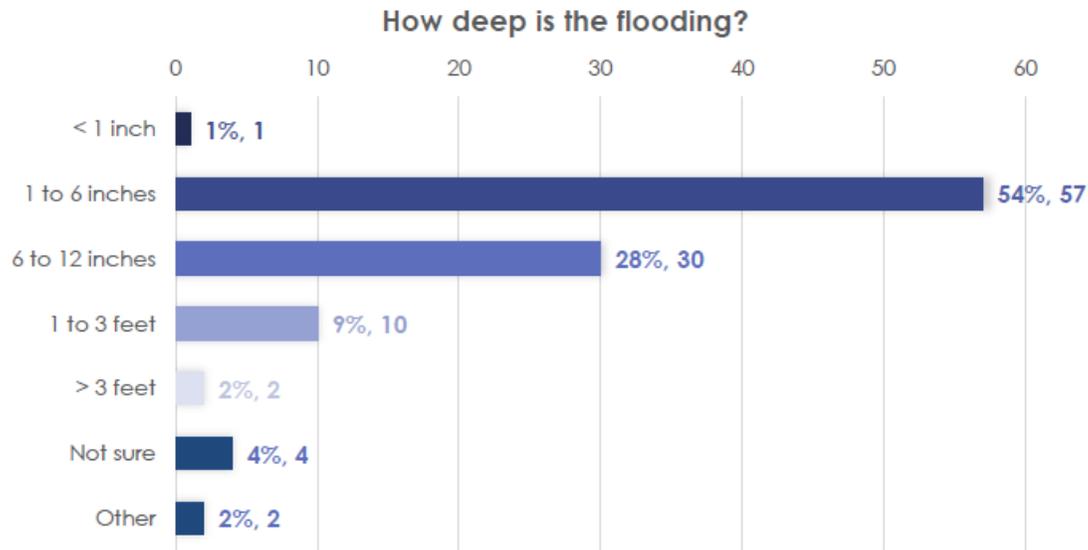
How long did the flooding last?



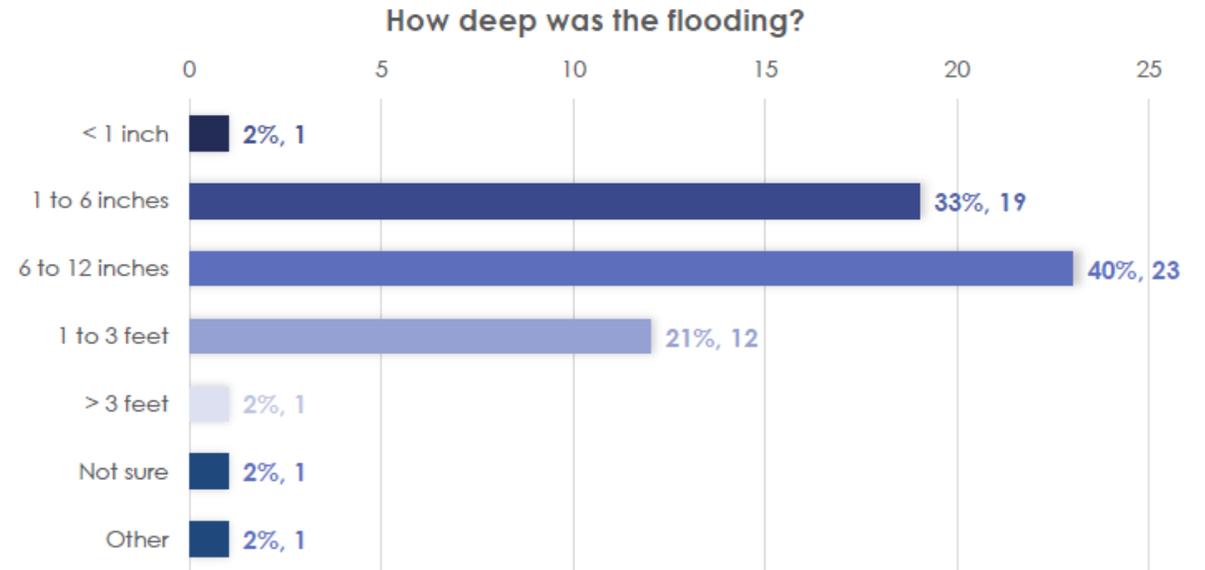
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Regular Flooding



Extreme Event Flooding

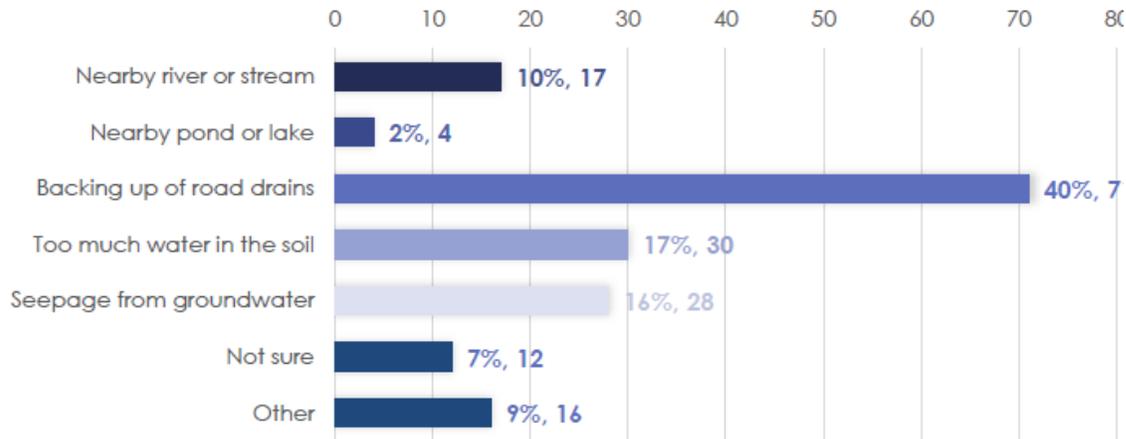


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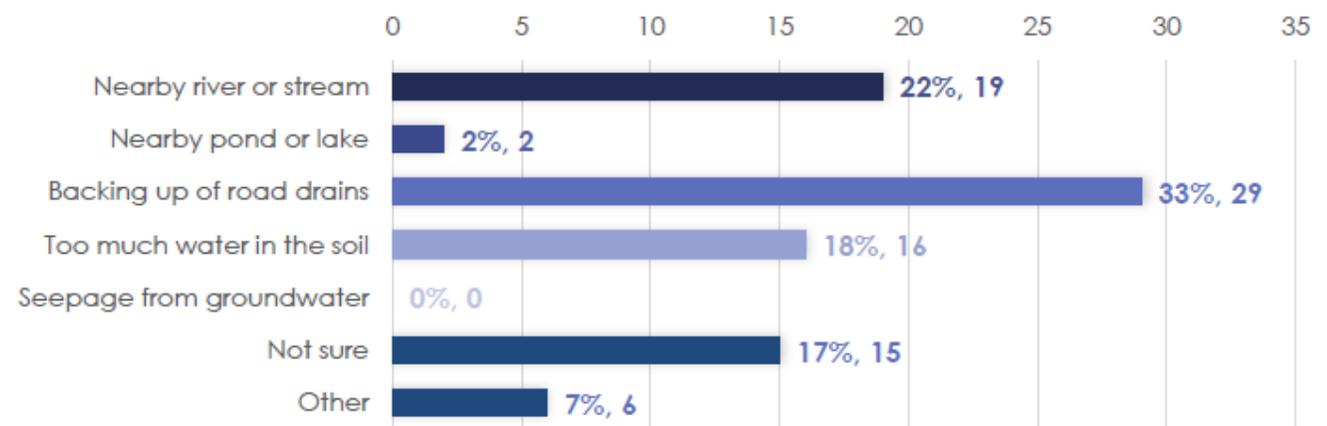
Regular Flooding

What is the main source of flooding?



Extreme Event Flooding

What was the main source of flooding?



- 105 people (85% of respondents) would like to see more public outreach about green infrastructure – both general and Tewksbury-specific information

FUTURE IMPACTS OF CLIMATE CHANGE



CHANGES IN PRECIPITATION

MORE **INTENSE & FREQUENT** EXTREME RAIN EVENTS

PRECIPITATION DURING
HEAVY EVENTS IN THE
N O R T H E A S T

INCREASED
BY MORE THAN

70%

BETWEEN 1958-2010

FUTURE IMPACTS OF CLIMATE CHANGE

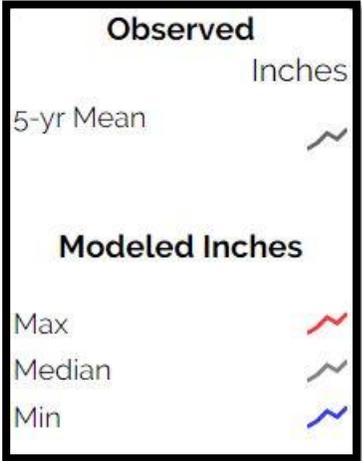
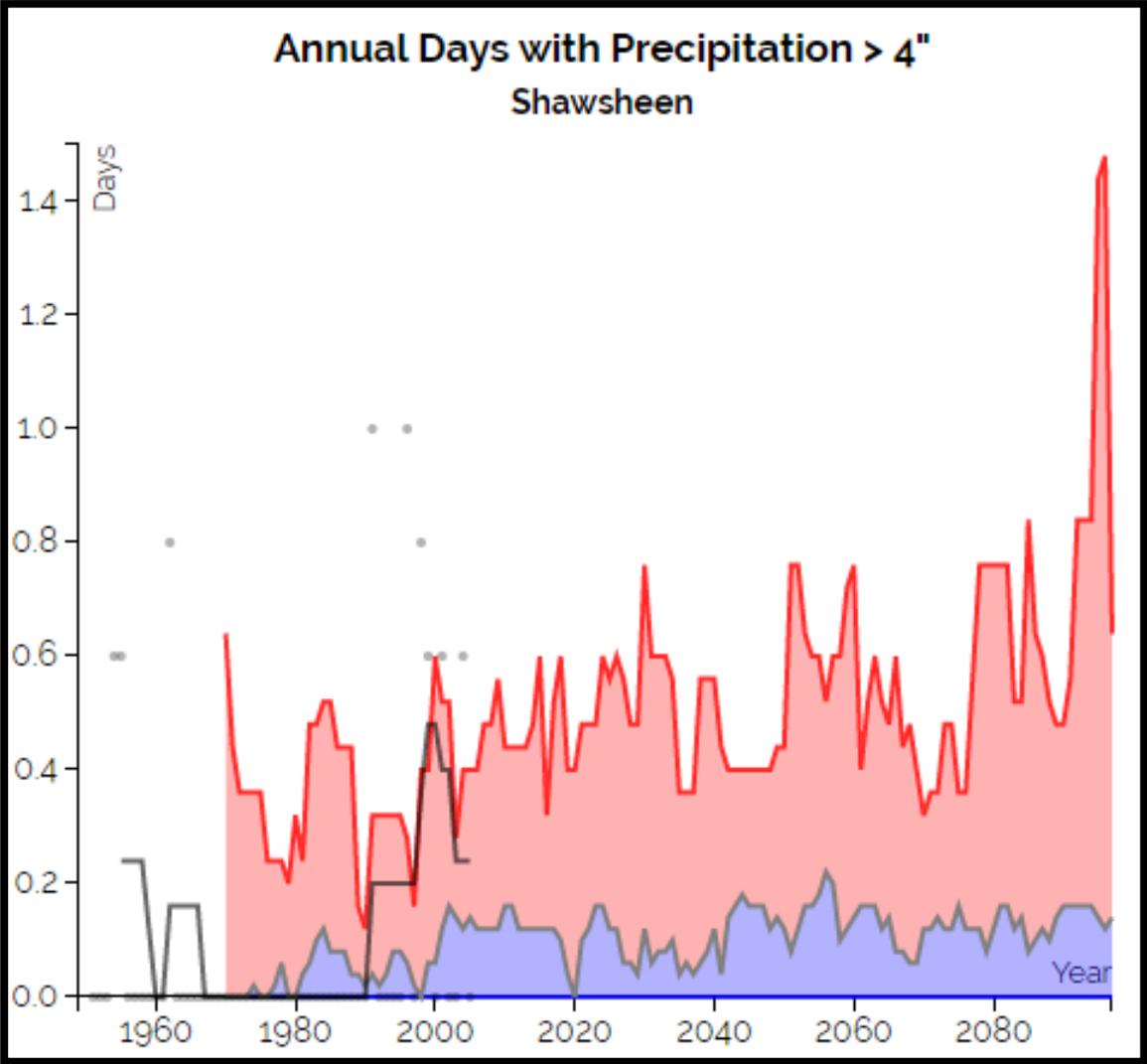
Weston & Sampson

CHANGES IN PRECIPITATION



Sources: NOAA TP-40 (1961) and NOAA Atlas Volume 10 (2015)

FUTURE IMPACTS OF CLIMATE CHANGE



FUTURE IMPACTS OF CLIMATE CHANGE

8%

**Increase in extreme
precipitation events in
the northeastern U.S.
by midcentury**

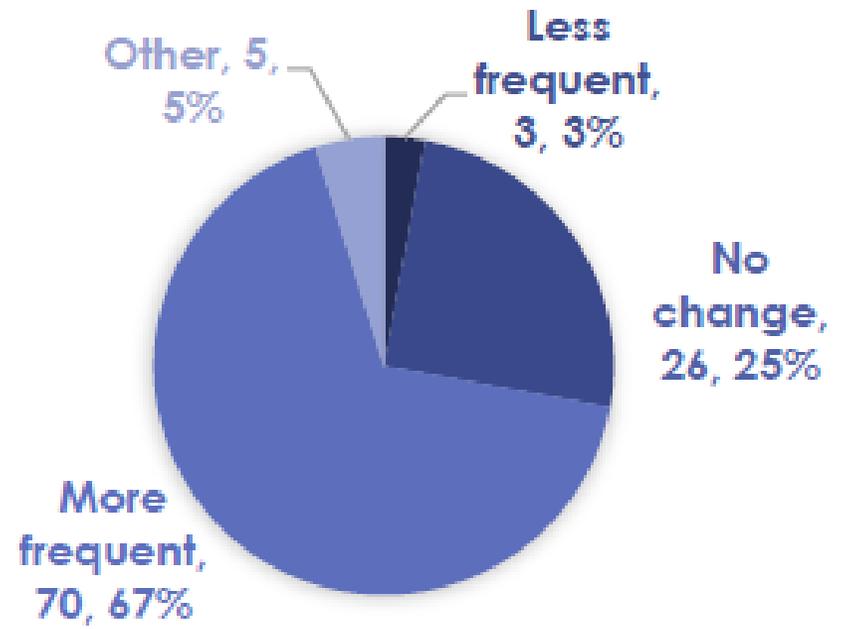
13%

**Increase in extreme
precipitation events in
the northeastern U.S.
by 2100**

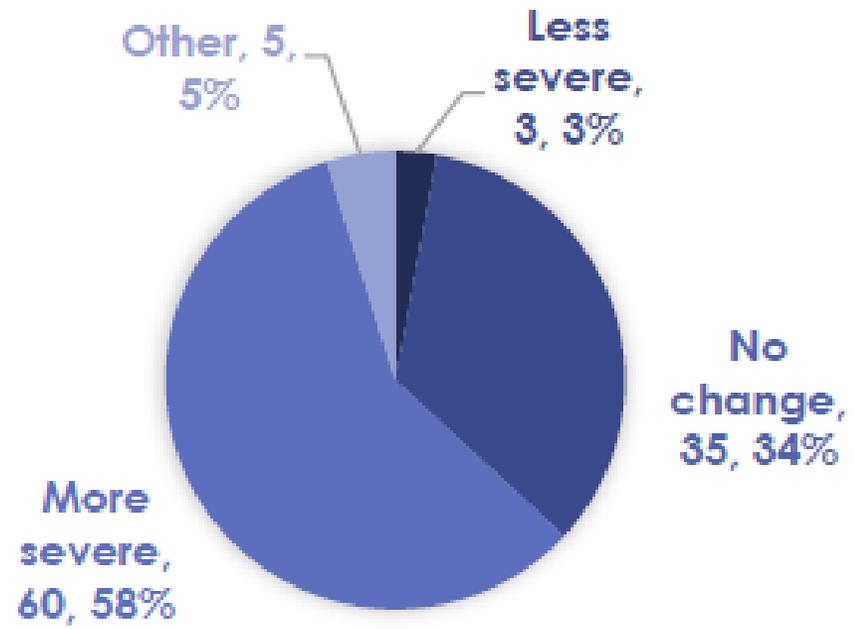
FUTURE IMPACTS OF CLIMATE CHANGE

Tewksbury Resident Feedback

In your experience, has the frequency of flooding changed over time?



In your experience, has the severity of flooding changed over time?



NATURE-BASED SOLUTIONS

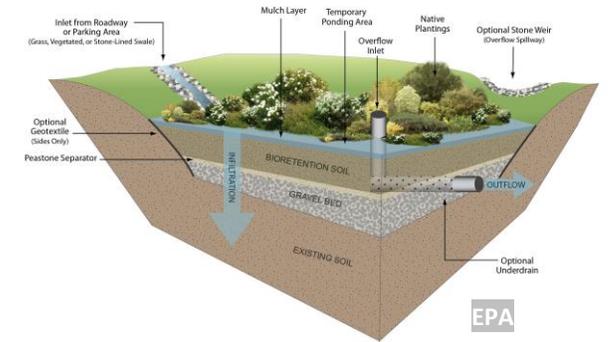


- Flood reduction
- Water quality improvement
- Urban Heat Island reductions
- Ecological Habitat
- Maintenance reduction
- Increase Property Values

NATURE-BASED SOLUTIONS

Bioretention Basin

- Areas with size constraints
- Parking lot medians or edges, sidewalks, along roadways



Permeable Paving

- Open areas that must remain paved (i.e. parking lots) that do not have significant tree cover or heavy traffic
- Walkways / community paths

Note: this includes porous pavement & permeable pavers



NATURE-BASED SOLUTIONS

Planter Box

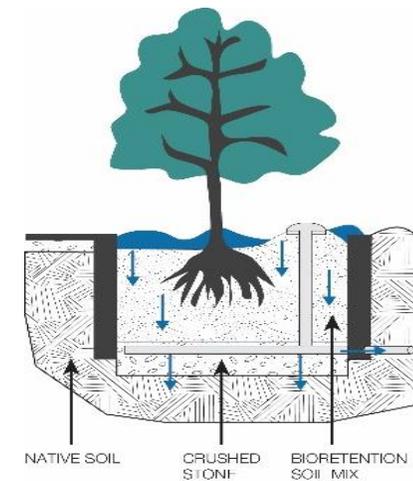
- Areas with size constraints
- Parking lot medians or edges, sidewalks, along roadways

Main difference between planters and bioretention basins is engineered soils and piping!



Tree Box Filter

- Areas with size constraints
- Parking lot medians or edges, sidewalks, along roadways



NATURE-BASED SOLUTIONS

Swale

- Linear transport of water, can be used in tandem with other nature-based solutions
- Road side or in open areas (fields), sloped to encourage directional flow



Underground Storage

- Large open spaces
- Can be placed underneath pervious or impervious landscapes (i.e. parking lots and athletic fields)



SITE PRIORITIZATION

- Green Infrastructure Suitability
 - Soil Classification and Infiltration Properties with the Soil Type
 - Space Constraints
 - Surrounding Drainage Infrastructure
 - Acceptance and Ease of Implementation of an Infiltration BMP



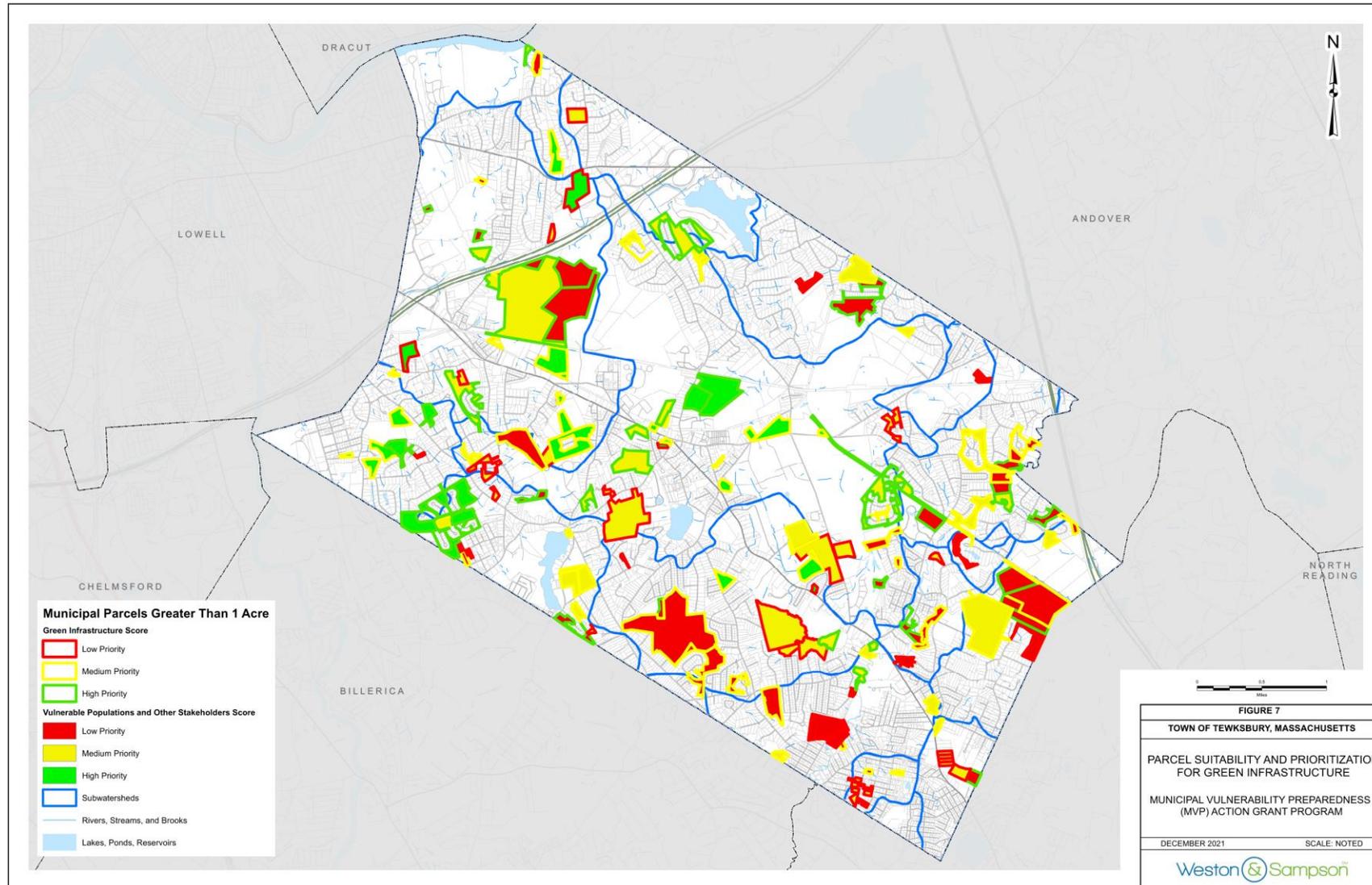
SITE PRIORITIZATION

- Climate Vulnerable Populations
 - Seniors and Children
 - Residents with Limited English Proficiency
 - Residents Burdened by Housing Costs
 - Residents in Poverty
 - Disabled Residents
 - Residents with Health Concerns



South and Bridge Street

SITE ANALYSIS AND PRIORITIZATION

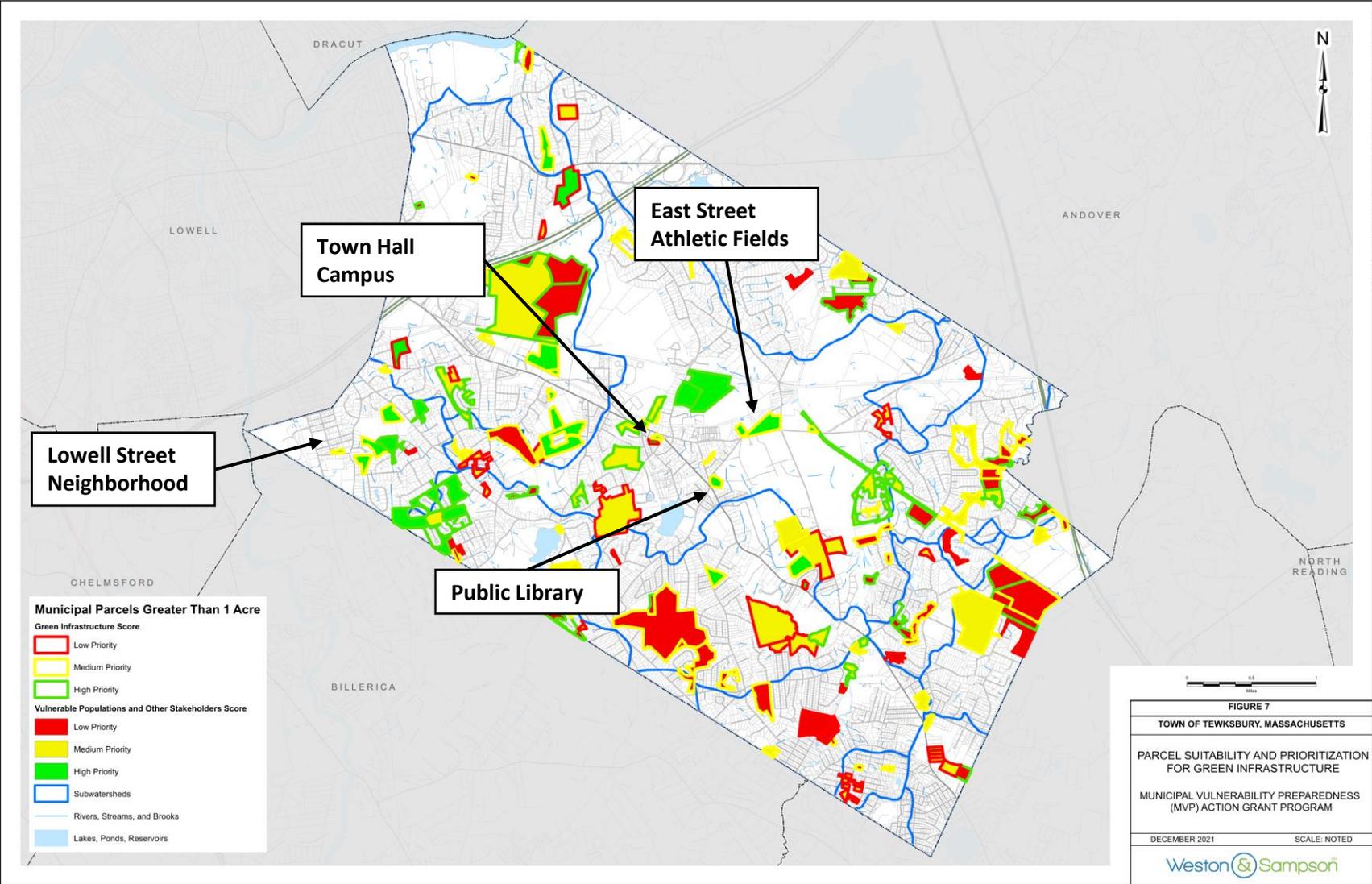


PRIORITY SITES

- 38 Parcels Identified as Priority
- Further Site-Specific Assessment
- Discussion with Steering Committee Members
- Identification of Top 5 Sites
- Site Visits and Concept Development



PRIORITY SITES



TOWN HALL AVENUE – EXISTING CONDITIONS



TOWN HALL AVENUE – PROPOSED GREEN INFRASTRUCTURE



EAST STREET – EXISTING CONDITIONS



EAST STREET – PROPOSED GREEN INFRASTRUCTURE



LOWELL STREET – EXISTING CONDITIONS



LOWELL STREET – PROPOSED GREEN INFRASTRUCTURE



PAST STORMWATER MANAGEMENT

- Development History and Regulations
- Lack of Infrastructure
- Stormwater Management Regulations – 1997 & 2008
- Aging Infrastructure
- EPA General Permit for Small MS4 Communities
- Stormwater Funding
- Infrastructure Improvements
- Stormwater Enterprise
- Challenges Facing the Community

PAST STORMWATER MANAGEMENT



PAST STORMWATER MANAGEMENT



Pinnacle Street - Before



Pinnacle Street - During



Pinnacle Street - After

PAST STORMWATER MANAGEMENT



PAST STORMWATER MANAGEMENT



PAST STORMWATER MANAGEMENT

Long Pond Raingardens



PAST STORMWATER MANAGEMENT



Wells Drive



Wells Drive

NEXT STEPS FOR STORMWATER MANAGEMENT

- Project Next steps:
 - Modeling of green streets is still ongoing
 - Development of costs and final details on green infrastructure projects is forthcoming
 - Come visit us at the first Farmer's Market to receive updates: June 16th
- More info on the website www.tewksbury-ma.gov/flooding
 - Interactive StoryMap, available now, new information will be added as available
 - Full survey report
 - Final project report will be available in July
- **This is just the beginning** – this project provides a roadmap to integrate green infrastructure into town projects and redevelopment

QUESTIONS/COMMENTS?

Go to

www.menti.com

Thank you!

Kevin Hardiman
Alex Lowder

Susie Bresney
Lauren Zielinski

Jaurice Schwartz
Jennie Moonan
Andrew Wojciak



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