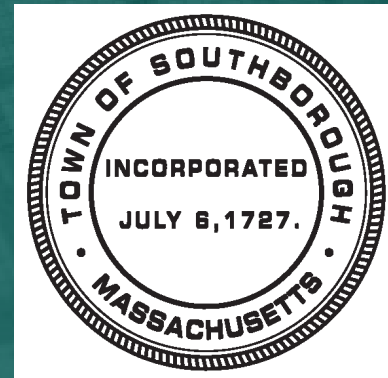


Nature Based Solutions

& How They Are Used in Southborough

Presented by: Melissa Danza, Conservation Agent
Funded By: MVP Action Grant



What We Will Cover

- What is the MVP Program
- Overview of MVP Action Grant
 - Impervious Surfaces Data Layer
- Impervious Surfaces and Their Implications to Climate Change
- Nature Based Solutions
 - What is the purpose
 - Benefits
 - How to Implement
- Examples of Nature Based Solutions in Southborough
 - Commercial Examples
 - Residential Examples

Municipal Vulnerability Preparedness Program

- MVP Program
- September 2020 – designated as MVP Community
 - Completed Community Resilience Building planning process
 - Funded through MVP Planning Grant & staff hours
 - Requires annual yearly progress reports
- Provides support for cities and towns to identify climate hazards, assess vulnerabilities, and develop action plans to improve resilience to climate change
- Required a meeting with community stakeholders
 - Board/committee members, local businesses, utility companies, builders, MWRA, DCR, schools, land trusts
 - Identified top hazards, vulnerabilities, and areas of concerns
 - Provided top recommendations to increase resilience
- Funded update of Local Hazard Mitigation Plan
- Summary of Findings found on Conservation Commission website



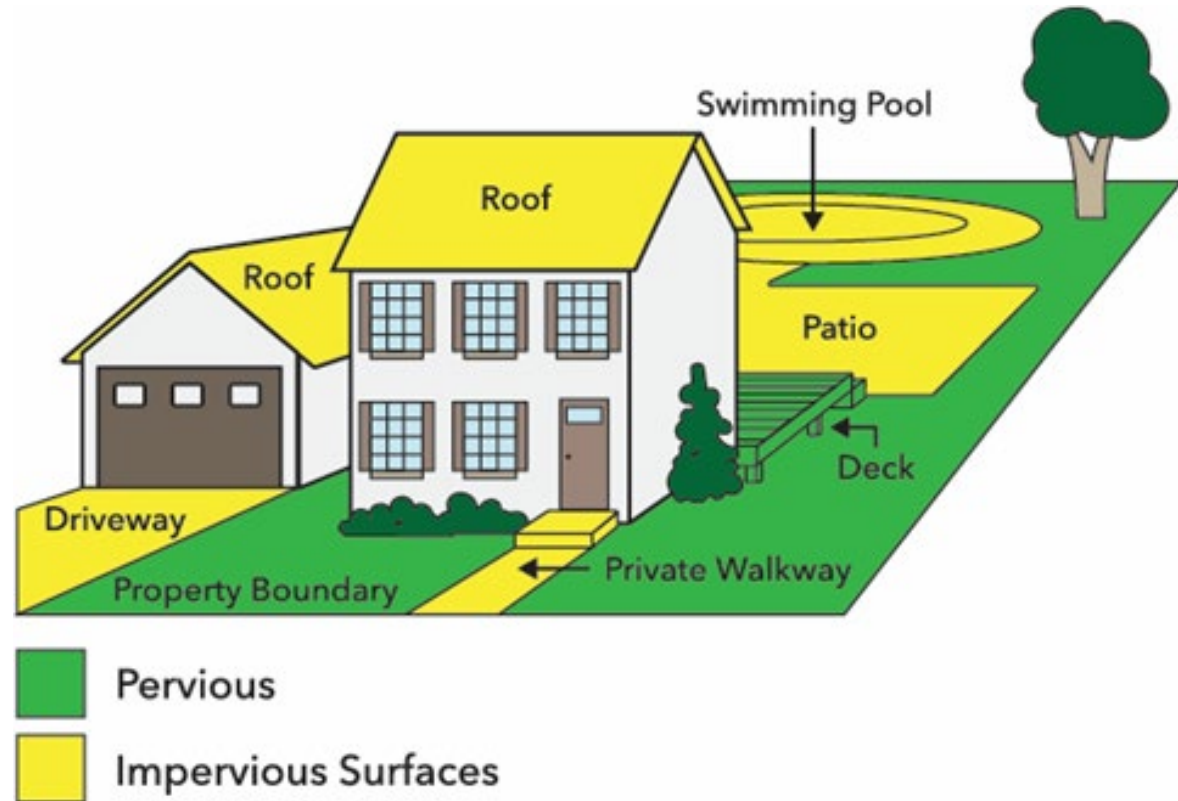
MVP Action Grant

- To implement priority climate adaptation actions identified by the community
- Preference for nature based solutions
- Eligible projects: vulnerability & risk assessment, education & outreach, local bylaw updates, redesign & retrofit, energy resilience strategies, chemical safety & climate vulnerabilities, nature based hazard reductions, acquisition of land, ecological restoration and habitat management to increase resiliency
- Application submitted – May 2021
- Grant received – July 2021
- Impervious Surfaces Data Layer
 - Create outline of all impervious surfaces within Southborough
 - Ability to determine sf per parcel
 - GIS data layer
- Will help to understand links between water quality/health and impervious surfaces around the Reservoir
- Be able to determine areas for potential improvement and/or reduction

What Are Impervious Surfaces?

Impervious Surfaces refer to hard surfaces that do not allow water to seep into the ground

- Driveways
- Parking Lots
- Roofs
- Sheds
- Roads
- Sidewalks
- Pavers, walkways, etc (cemented together)
- Compacted gravel
- Solid decks



Increased Impervious Surfaces are Intensifying Climate Change

- Decreases water quality and ecological health
 - Contaminants are often 'caught' on paved surfaces and directly discharged to waterbodies
- Hold and store heat
 - Increased surficial heating → increased localized temperatures
 - Increased surficial heating → warmer stormwater → warmer adjacent waterbodies
- Decreased groundwater recharge
 - Less stormwater infiltrating into the ground
 - Increasing rainfall amounts + decreased recharge = localized flooding

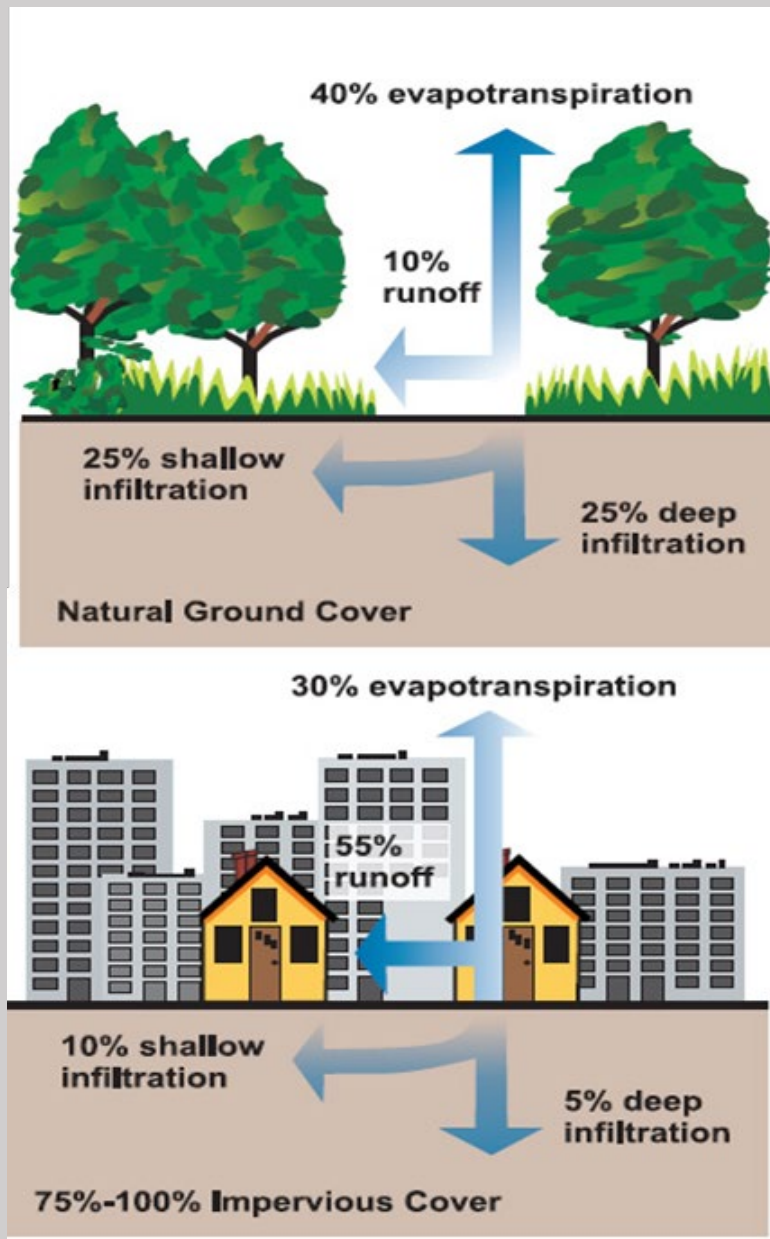
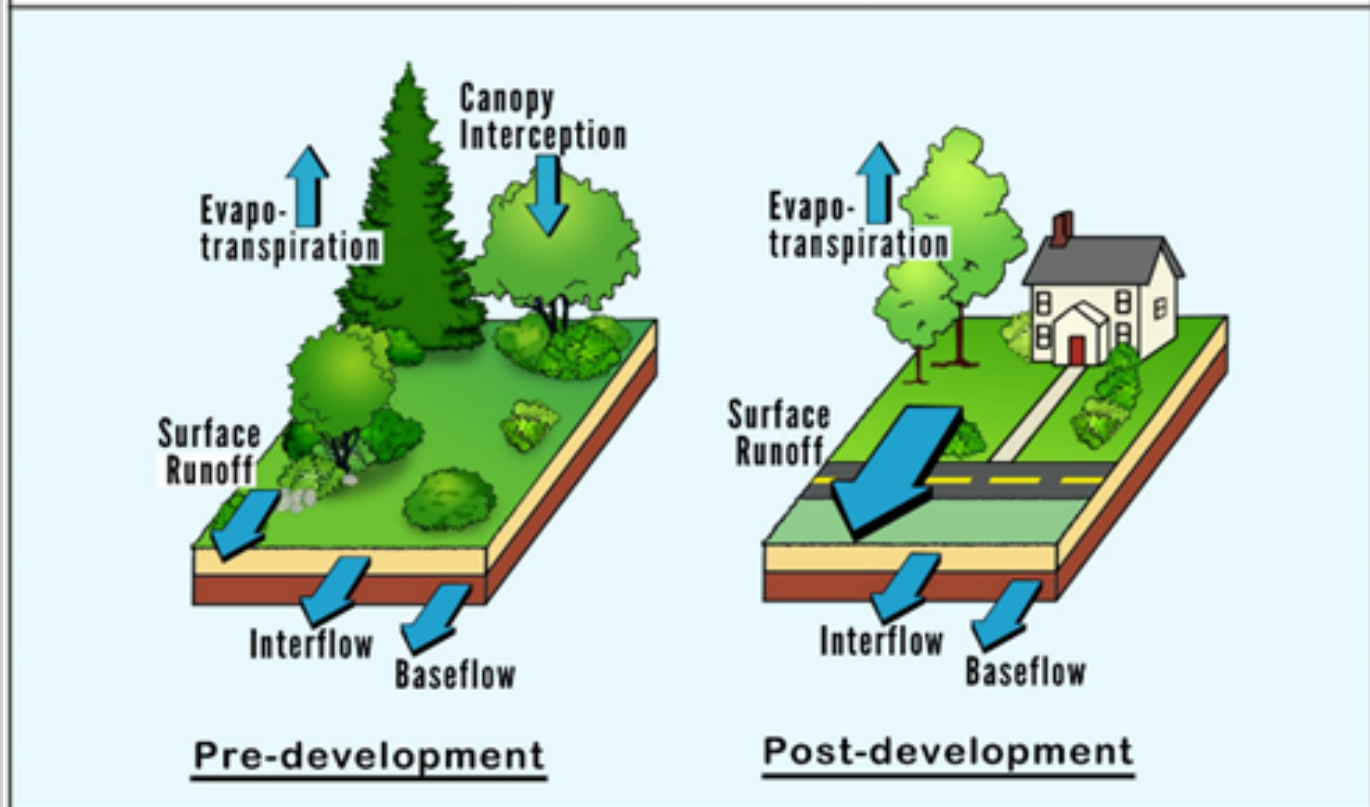


Figure 1.1 Water Balance at a Developed and Underdeveloped Site
(Source: Schueler, 1987)



Surface runoff is minimal in an undeveloped site, but dominates the water balance at a highly impervious site.

Nature Based Solutions (NBS)

- Use natural systems, mimic natural processes, or work in tandem with traditional approaches to address natural hazards
- To address challenges to provide a benefit for both human well-being and biodiversity
- Promote resilience and adaptation while being integrated into a community's built environment
- Works on **ANY** scale
- Used to mitigate climate change impacts such as:
 - Riverine flooding
 - Localized flooding
 - Erosion & sedimentation
 - Heat island effects

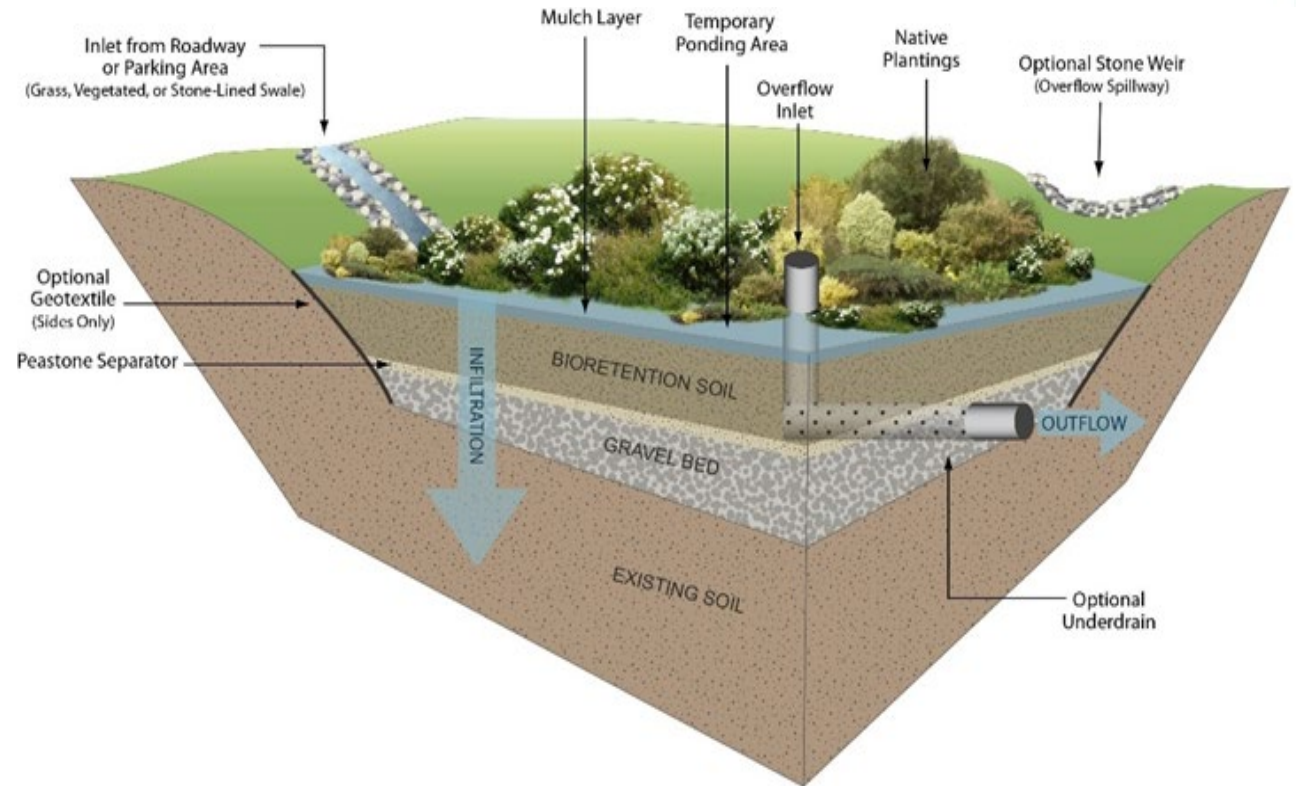
Benefits of Nature Based Solutions

- Flood storage → decreased localized flooding
- Improved water quality
- Healthier wildlife habitats
- Cooler localized temperatures
- Added recreational space
- Avoided costs
- Enhanced safety
- Often cheaper than conventional methods
- Hazard resilience
- Benefit to pollinators & biodiversity health

[illegible]

Types of Nature Based Solutions

- Large Scale (watershed/community)
 - Land conservation
 - Wetland restoration and protection
 - Floodplain restoration
 - Reconnection of wetland systems
- Small Scale (neighborhood or homes)
 - Rain gardens
 - Vegetated swales
 - Permeable pavement
 - Filter strips
 - Pervious pavers/uncemented walkways
 - Green roofs
 - Roof gutters discharge to pervious surface
 - Infiltration/detention basins
 - Constructed wetlands



How to Implement Nature Based Solutions (Town)

- Conserve -- Integrate -- Restore
- Incentivize/enforce the use of the Low Impact Development (LID) bylaw
- Impervious Surfaces Mitigation Plan
- Forest Management Plan
- Bylaw Review
- Public education
- Work with MassDOT to implement along Route 9
- Incorporate into Stormwater Management Permits
- Promote land conservation

How to Implement NBS & Reduce Impacts of Impervious Surfaces – Homeowner

- Divert your downspouts to pervious surfaces
- Plant a rain garden
- Replace impervious surfaces
- Don't wash your car in the driveway
- Pick up pet waste
- Reduce & limit fertilizer and pesticide use
- Replace lawn with native plants
- Reduce lawn watering and mowing
- Dispose of leaf litter/compost properly

How To Implement NBS & Reduce Impacts of Impervious Surfaces - Commercial

- During design: prioritize NBS
- Rain gardens
- Review parking requirements to decrease size
- Limit hardscaping
- Include native plants
- Seek out priority pollutant reduction opportunities
- Ensure compliance with O&M for stormwater systems
- Reduce & limit fertilizer and pesticide use

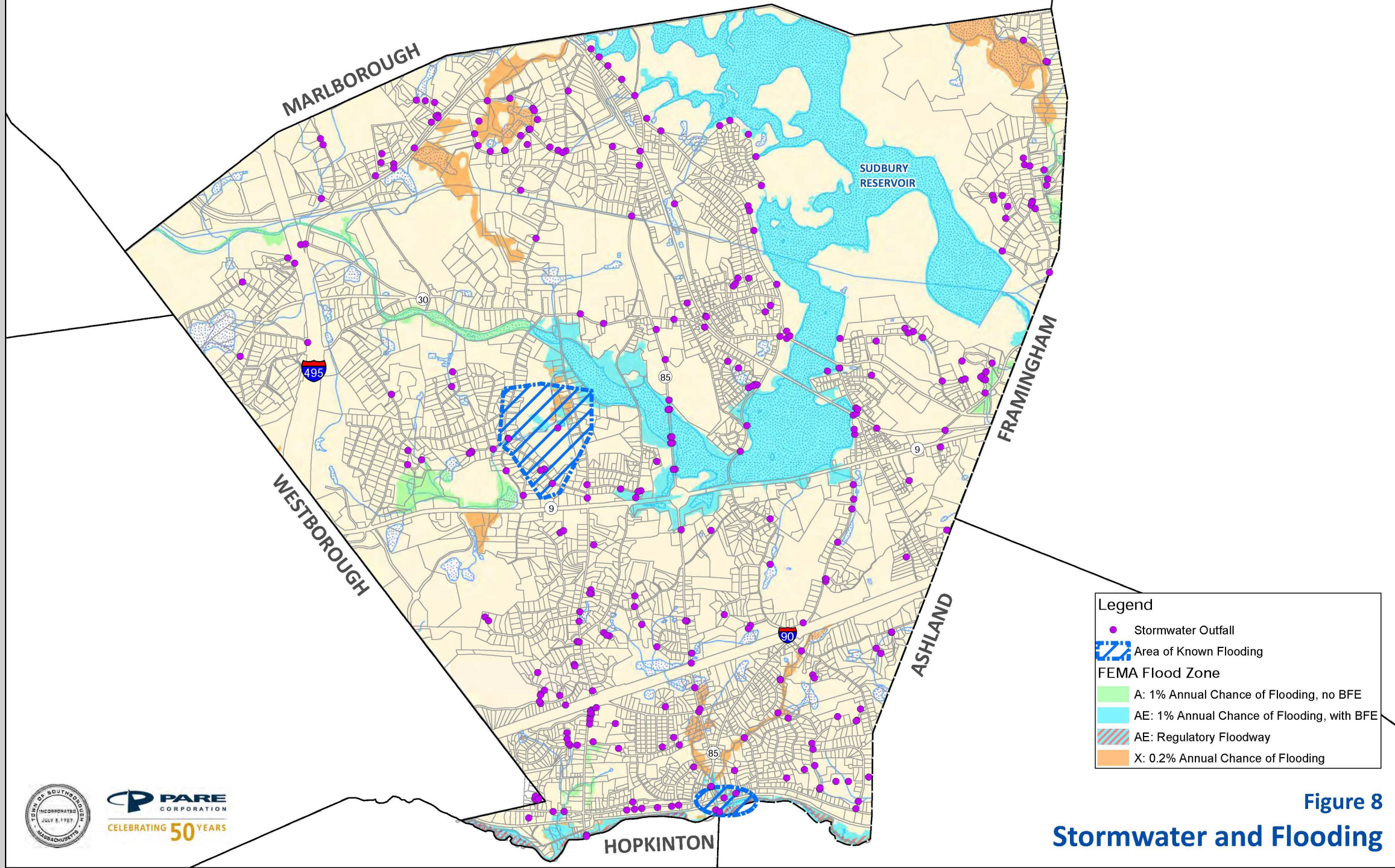
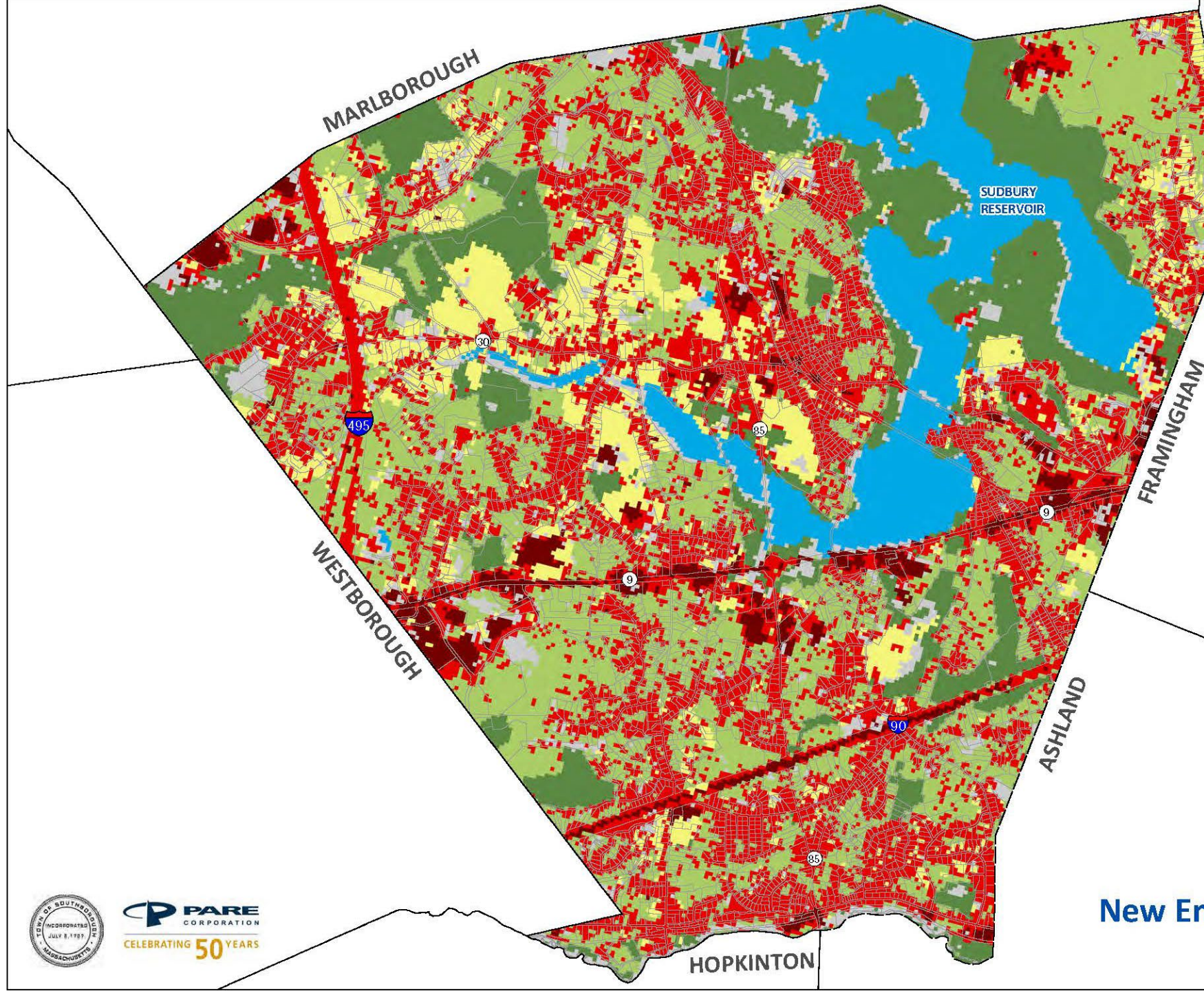


Figure 8
Stormwater and Flooding



Recent Trends
This is a future of continuing along the current path where forest cover is declining in all New England states. Based on recent trends, New England will lose 1.2 million acres of forest by 2060, reducing forest cover by 4% from about 75% of the total land area today to 71% by 2060. Recent trends of land use indicate a future New England landscape with less forest overall and increasing fragmentation of our remaining forests with sprawling development.

Legend

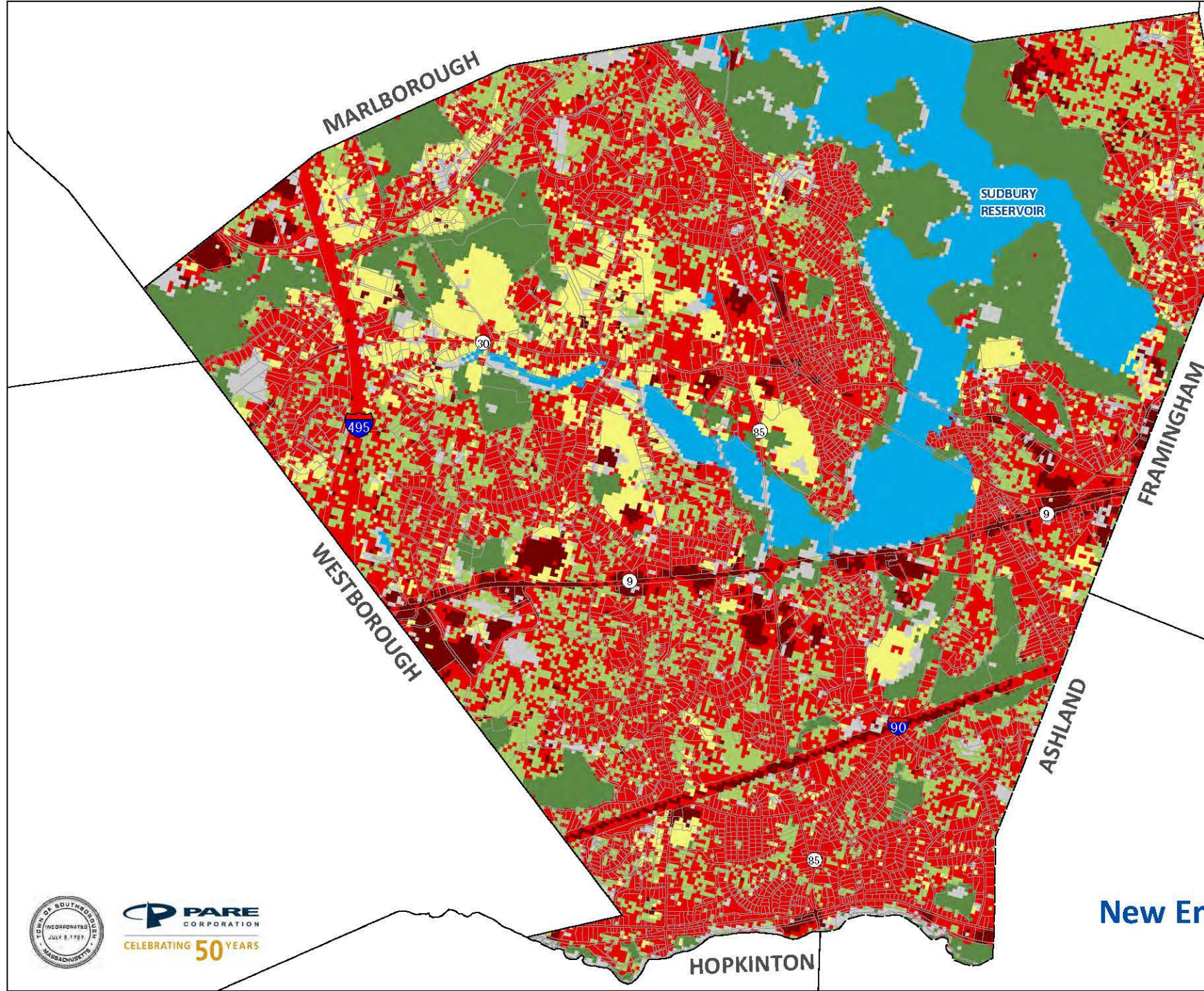
Recent Trends 2020

Value

- High Density Development
- Low Density Development
- Unprotected Forest
- Conserved Forest
- Agriculture
- Other
- Water

Figure 15
New England Landscape Futures
Current Use 2020





Recent Trends
 This is a future of continuing along the current path where forest cover is declining in all New England states. Based on recent trends, New England will lose 1.2 million acres of forest by 2060, reducing forest cover by 4% from about 75% of the total land area today to 71% by 2060. Recent trends of land use indicate a future New England landscape with less forest overall and increasing fragmentation of our remaining forests with sprawling development.

- Legend**
- Recent Trends 2060**
- Value**
- High Density Development
 - Low Density Development
 - Unprotected Forest
 - Conserved Forest
 - Agriculture
 - Other
 - Water

Figure 16
New England Landscape Futures
Recent Trends 2060



Commercial Examples

- 156 Northboro Road
 - Rain gardens
 - Native plants
 - Pervious pavement
 - Roof downspouts to pervious areas
- Ken's Foods – 325 Turnpike Road
 - Pervious pavement
 - Native plants
 - Wetland restoration
 - Naturalized detention pond (acting as a wetland)

156 Northboro Road (Contractor Bays)



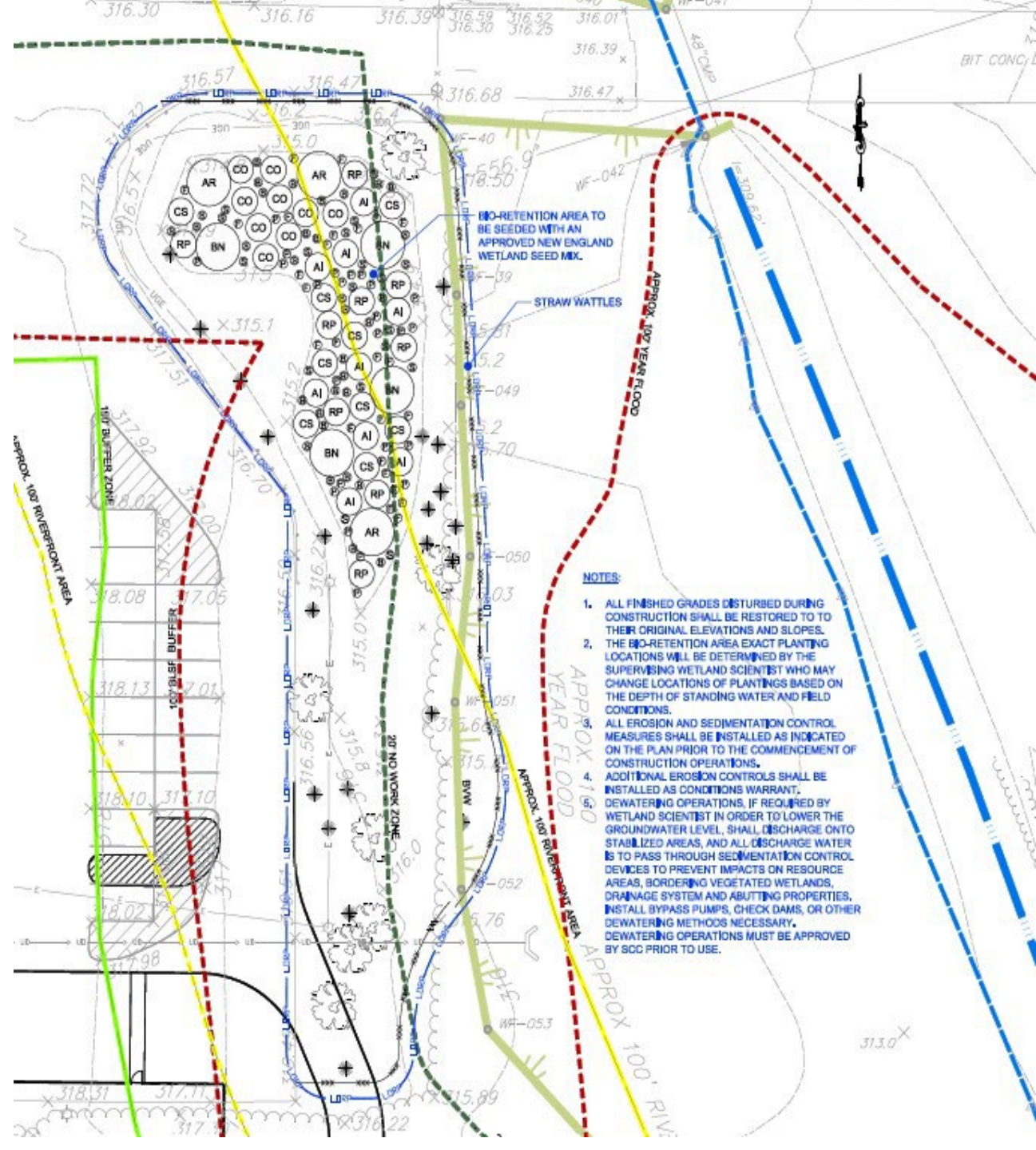


325 Turnpike Road (Ken's Foods)



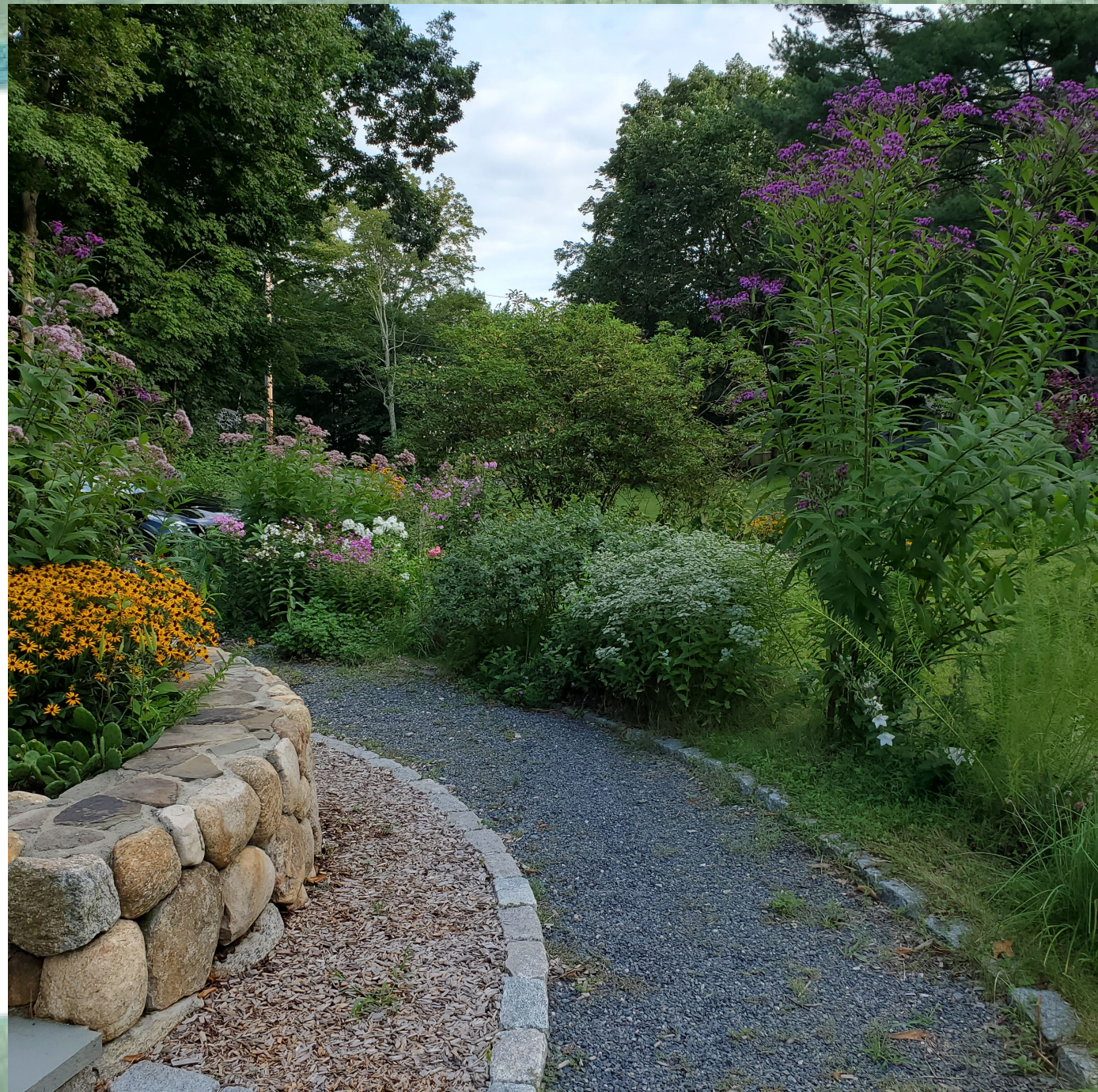
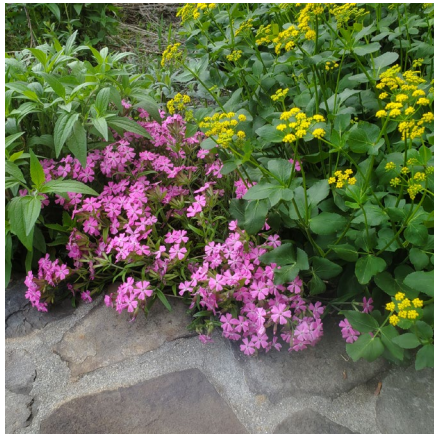


WID STRAW BALES



Residential Examples

- Pervious walkway
- Native Plants/Lawn Alternative
 - Black-eyed susans
 - Eastern prickly pear
 - Joe Pye Weed
 - Milkweed
 - Much more!





Leeds Way

Pollination Preservation Garden - Library





Upcoming Events

- Volunteers needed this weekend for Pollination Preservation Garden at Beals Preserve
 - Saturday June 18th @ 9am for soil preparation
 - Sunday June 19th @ Noon for planting
 - Come for an hour or several hours – we'll take all the help we can get
 - Bring work gloves, hat, sunscreen, insect repellent and **WATER!**
 - **Send email to Freddie Gillespie if you plan on attend with the day and times**
 - ospcnativeplantspollinators@gmail.com
 - This project is being hosted by the Southborough Open Space Preservation Commission (OSPC) in partnership with the Southborough Open Land Foundation (SOLF)
- OSPC Garden Tour
 - Join the OSPC showcase two Pollinator Preservation Gardens in town
 - Saturday June 25th @ 10am
 - Begin at Library Pollination Preservation Garden & Lawn Alternative (park at Library)
 - Pollination Preservation Garden @ Beals Preserve (immediately after Library)
 - Park on Main Street across from Northboro Road

Questions & Resources

- Contact Melissa Danza for additional questions
 - mdanza@southboroughma.com
 - 508-281-8984
- Other Useful Resources:
 - <https://www.southboroughtown.com/conservation-commission>
 - <https://www.mass.gov/municipal-vulnerability-preparedness-mvp-program>
 - <https://resilientma.org/mvp/index.html>

Thank You!