One Water: Building Resilience through Watershed Planning in New London, CT

NEWEA Annual Conference

January 2024

Agenda

Why a Watershed Management Plan?

What's in the Plan?

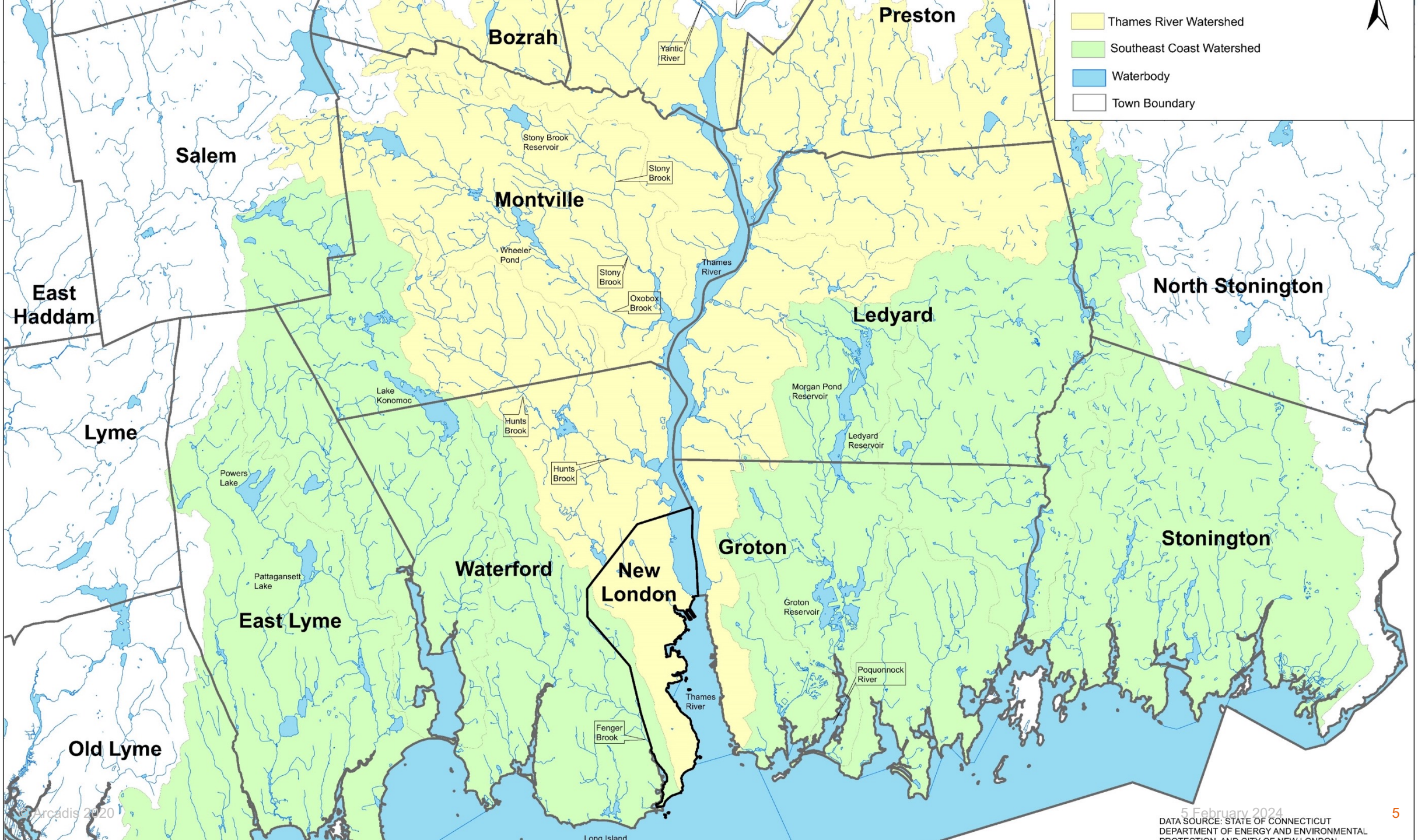
How does the Plan build Resilience?

What Next?

Why a Watershed Management Plan?

New London, CT

- Thames River and Long Island Sound
- One of only three deep harbors in CT
- State's smallest municipality: 5.7 square miles of land and 5.2 square miles of water
- ~ 130 acres considered freshwater wetlands
- MS4 community


Thames River Watershed
Southeast Coast Watershed
Waterbody
Town Boundary
Preston
Bozrah
Yantic River
Salem
Stony Brook Reservoir
Stony Brook
Montville
Wheeler Pond
Stony Brook
Thames River
Oxobox Brook
East Haddam
North Stonington
Ledyard
Lake Konomoc
Morgan Pond Reservoir
Hunts Brook
Ledyard Reservoir
Lyme
Hunts Brook
Powers Lake
Groton
Stonington
Waterford
New London
Pattagansett Lake
East Lyme
Groton Reservoir
Poquonnock River
Thames River
Fenger Brook
Old Lyme
Long Island
DATA SOURCE: STATE OF CONNECTICUT DEPARTMENT OF ENERGY AND ENVIRONMENTAL

Evolving Project Goals

From a watershed to a sub-watershed based plan with realistic goals that still help Long Island Sound

UPDATE MAPS & NATURAL RESOURCES INVENTORY

PROVIDE PUBLIC EDUCATION

ASSIST WITH SUSTAINABLE CT CERTIFICATION

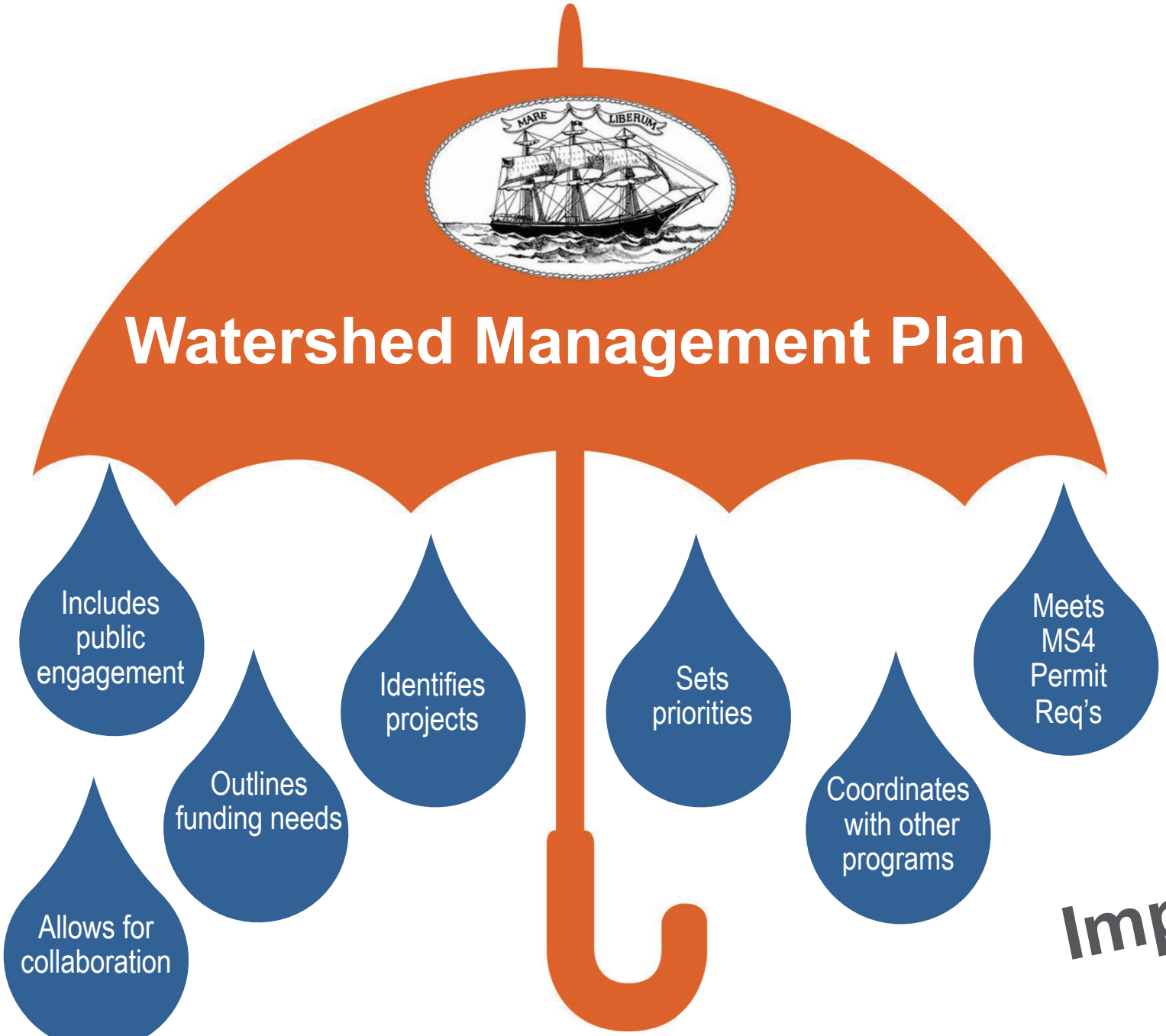
EXPAND & BUILD UPON EXISTING PROJECTS

ADDRESS IMPAIRED WATERS, MS4 PERMIT, AND SET PRIORITIES FOR MS4 OUTFALL CATCHMENT AREA INVESTIGATIONS

PROVIDE RECOMMENDED UPDATES TO THE PLAN OF CONSERVATION AND DEVELOPMENT

CONSIDER EQUITY

ADDRESS THE 9 ELEMENTS OF WATERSHED BASED PLAN TO QUALIFY FOR ADDITIONAL FUNDING

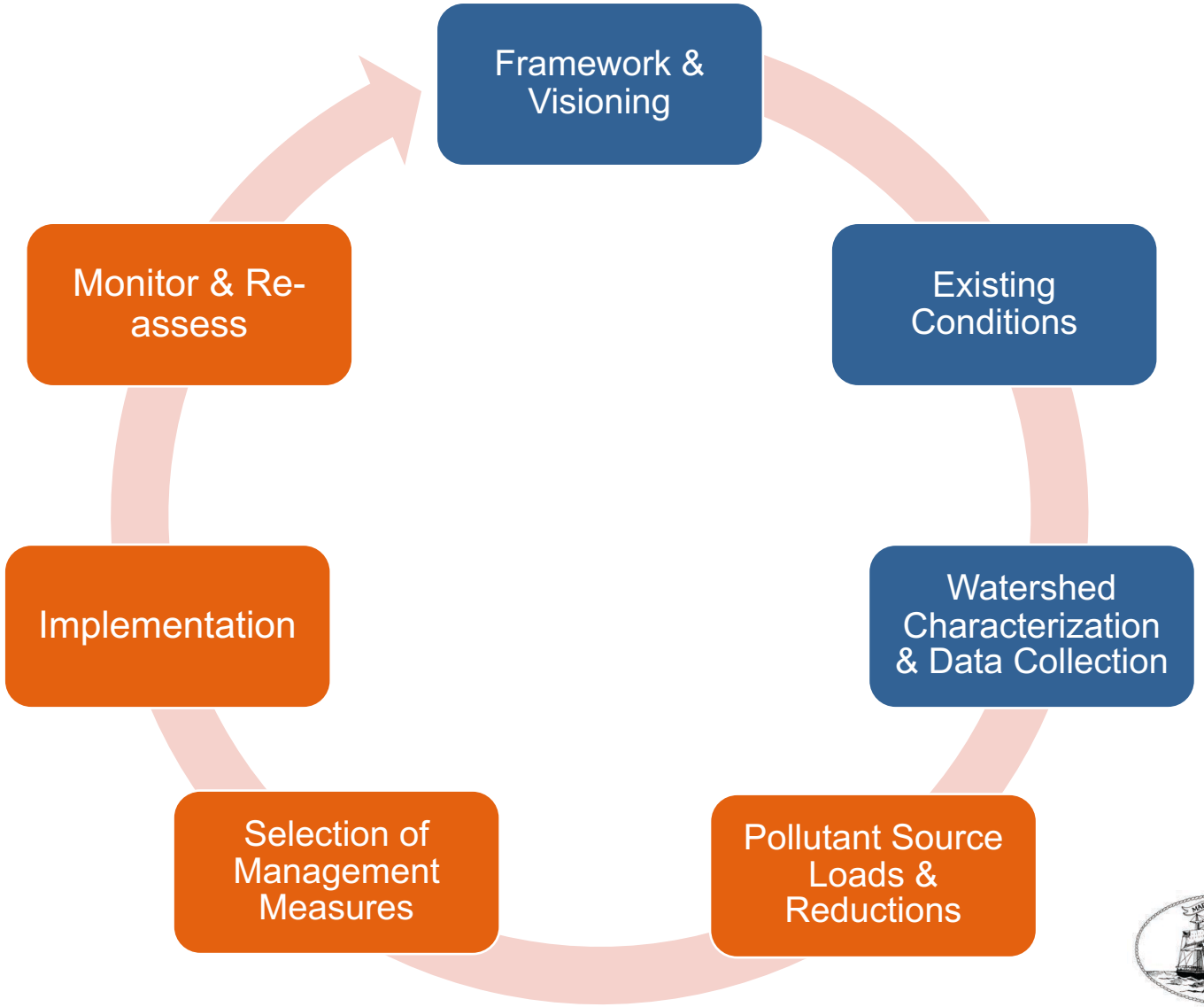


EPA's 9 Elements of a Watershed Based Plan

1. Identification of Pollutant Causes & Sources
2. Pollutant Load Reduction Estimates
3. Best Management Practices
4. Financial and Technical Assistance
5. Education and Outreach
6. Plan Implementation Schedule
7. Interim Milestones
8. Monitoring and Assessment
9. Plan Implementation Effectiveness

Improve Water Quality

Watershed Management Planning Process

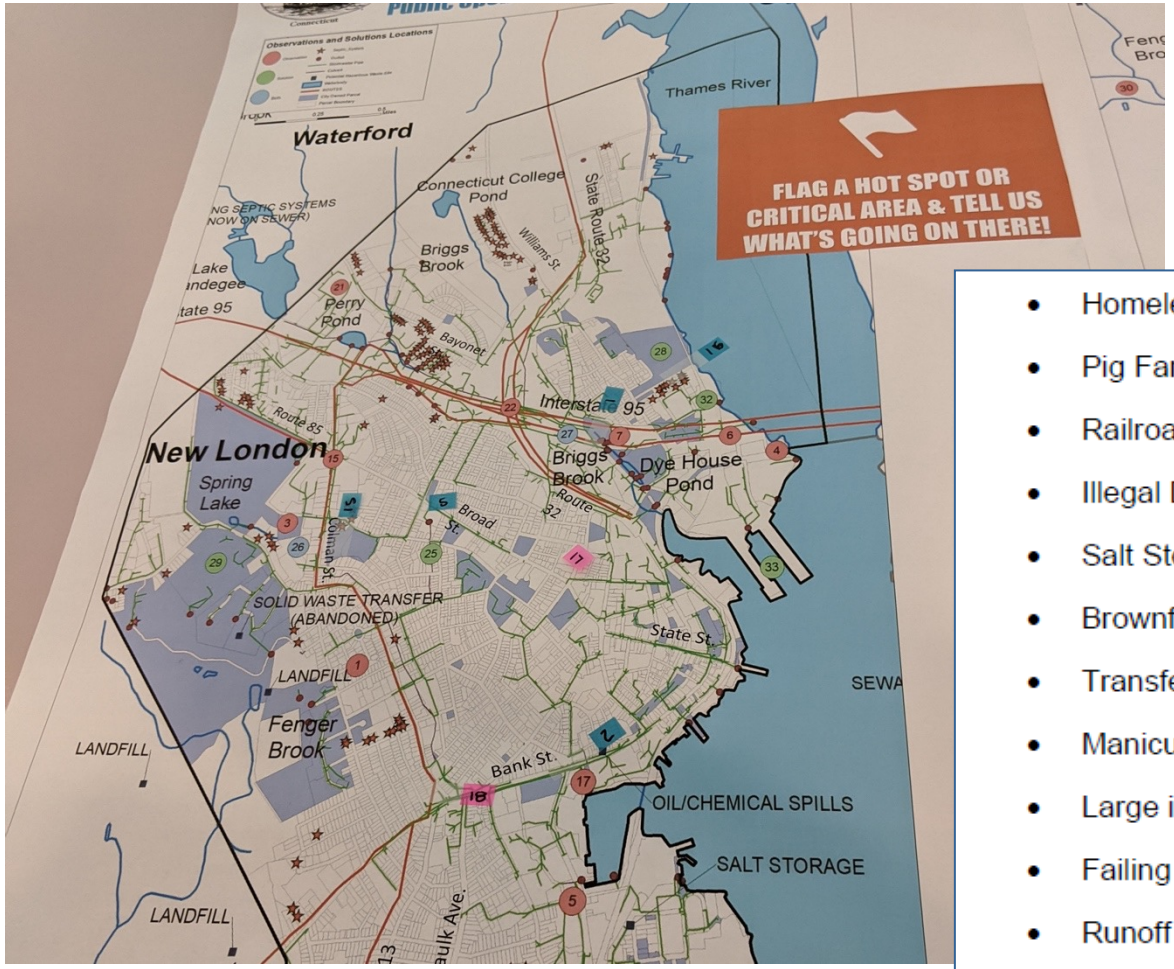


Phase 1 of the project created the Watershed Management Plan **Framework**

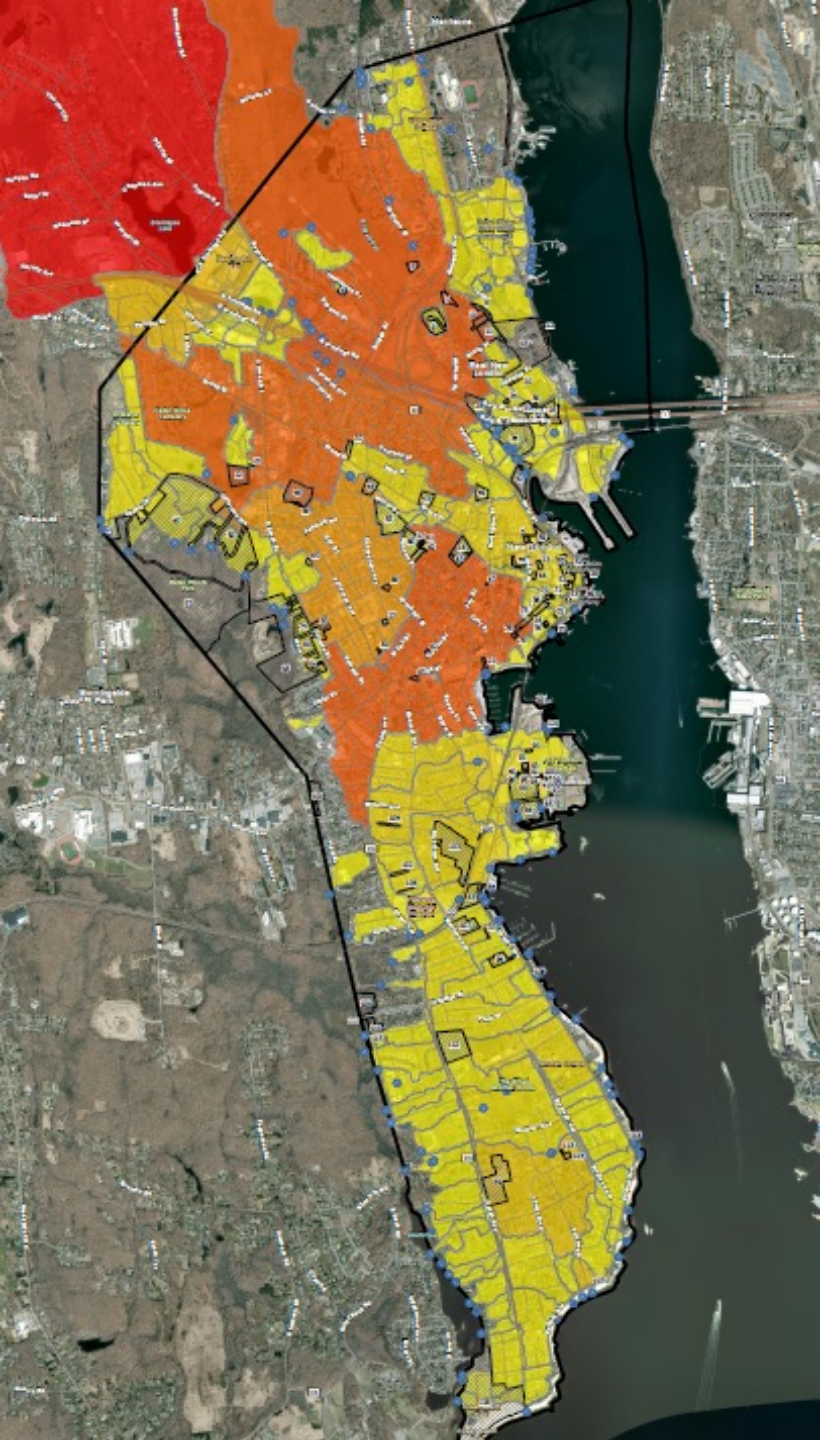
Phase 2 developed the full Plan:

- Estimation of nitrogen loads
- Evaluation of potential structural BMP improvements and pollutant load reductions
- Developing performance indicators and measures of success
- Implementation Planning

Stakeholder-Identified Potential Pollutant Sources



- Homeless Encampment
- Pig Farm
- Railroad
- Illegal Dumping
- Salt Storage and Excess Plowed Snow
- Brownfields
- Transfer Station
- Manicured lawns
- Large impervious areas – car dealerships, strip malls, etc.
- Failing infrastructure – collapsed culvert under the railroad
- Runoff from construction sites



Total Nitrogen Loading Analysis

- **Modeling procedure:**
  - Analyzed land use within each catchment area
    - Commercial? Residential? Open space?
  - Each land use is associated with an estimated nitrogen load
  - Hot spots and critical areas identified at previous Public Open House were used to enhance land use model
  - Utilized previously sampling results and targeted new sampling results to calibrate model
  - Final output: Total Nitrogen Loading and Concentrations for drainage areas

Site Selection Process

- **Technical Considerations:**
  - Average Annual Total Nitrogen Load
  - Amount of Impervious Area
  - Soil Infiltration Capacity
  - Depth to Water-table
- **Programmatic Considerations:**
  - Planned Capital improvements
  - Flooding Frequency
  - Ease of Maintenance
- **Social and Environmental Considerations:**
  - Sensitive Receptors
  - Vulnerable populations (SVI)

Scoring Criteria	1	2	3	4	5	Category Weight	Multiplier
Planned Capital Improvements	No planned improvements within 5 years	Planned improvements within 5 years	Planned improvements within 4 years	Planned improvements within 3 years	Planned improvements within 2 years	moderate	2
Flooding Frequency	Lowest flooding frequency and impact	Low flooding frequency and impact	Moderate flooding frequency and impact	High flooding frequency and impact	Highest flooding frequency and impact	moderate	2
Ease of maintenance	Is not accessible to maintenance personnel or equipment		Accessible to maintenance personnel, but not equipment		Accessible to maintenance personnel and equipment	moderate	2
Average Annual TN Load [lbs/year]	0-500 lbs/year	500-1000 lbs/year	1000-1500 lbs/year	1500-2000 lbs/year	loading > 2000 lbs/year	highest	4
Amount of Impervious Area	Parcel is < 30% impervious surface	Parcel is 30%-49% impervious surface	Parcel is 50%-69% impervious surface	Parcel is 70%-89% impervious surface	Parcel is > 90% impervious surface	highest	4
Soil Infiltration Capacity	Site is mostly Soil Group D	Site is mostly Soil Group C	Site is mostly Soil Group B	Site is mix of Soil Group A & B	Site is Mostly Soil Group A	high	3
Depth to Water-table	< 2ft to seasonal high groundwater table	2ft - 3 ft to seasonal high groundwater table	3ft - 4ft to seasonal high groundwater table	4ft - 5ft to seasonal high groundwater table	> 5ft to seasonal high groundwater table	moderate	2
Presence of Vulnerable Population(s)	0-20% Overall Social Vulnerability	20-40% Overall Social Vulnerability	40-60% Overall Social Vulnerability	60-80% Overall Social Vulnerability	80-100% Overall Social Vulnerability	low	1
Sensitive Receptors	more than 3 sensitive receptors in site vicinity	3 sensitive receptors in site vicinity	2 sensitive receptors in site vicinity	1 sensitive receptor in site vicinity	no sensitive receptors in site vicinity	low	1

BMPs are designed to reduce:

TSS

TOTAL SUSPENDED SOLIDS

15

P

PHOSPHORUS

7

N

NITROGEN

Best Management Practices (BMPs) role in stormwater management

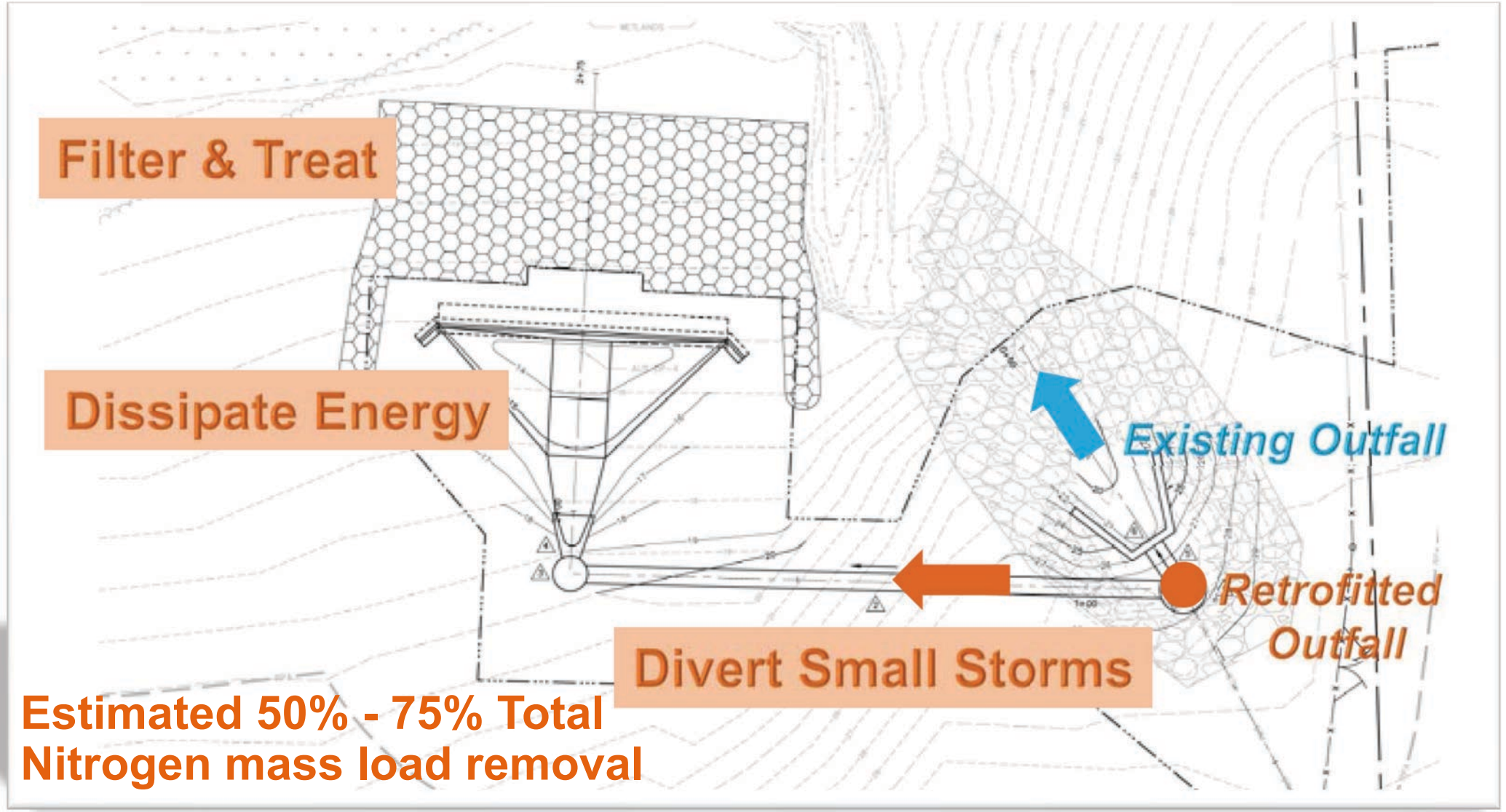
- Slows flow velocity to promote ground infiltration
- Provides treatment that reduces pollutant loads
- Reduces peak flows and control erosion
- Enhances resilience

BMP Retrofit: Lincoln Avenue Rotary

Parcel and Retrofit Overview

- Ownership: City of New London
- Soil Drainage Class: Well drained soils
- Parcel Impervious Area: 0%
- Impervious Area Disconnection: Up to approximately 3.5 acres
- Total Nitrogen Load to Proposed BMP: 113 lbs/year
- Estimated Total Nitrogen Removal: 68 lbs/year, approximately 60%
- Parcel has convenient existing drainage for stormwater overflow piping
- Location and open space allows for easy access and maintenance

Stormwater Outfall Retrofit



Estimated 50% - 75% Total Nitrogen mass load removal

Example of an Outfall Retrofit

Channel Restoration

Potential Benefits of Outfall Treatment and Channel Restoration

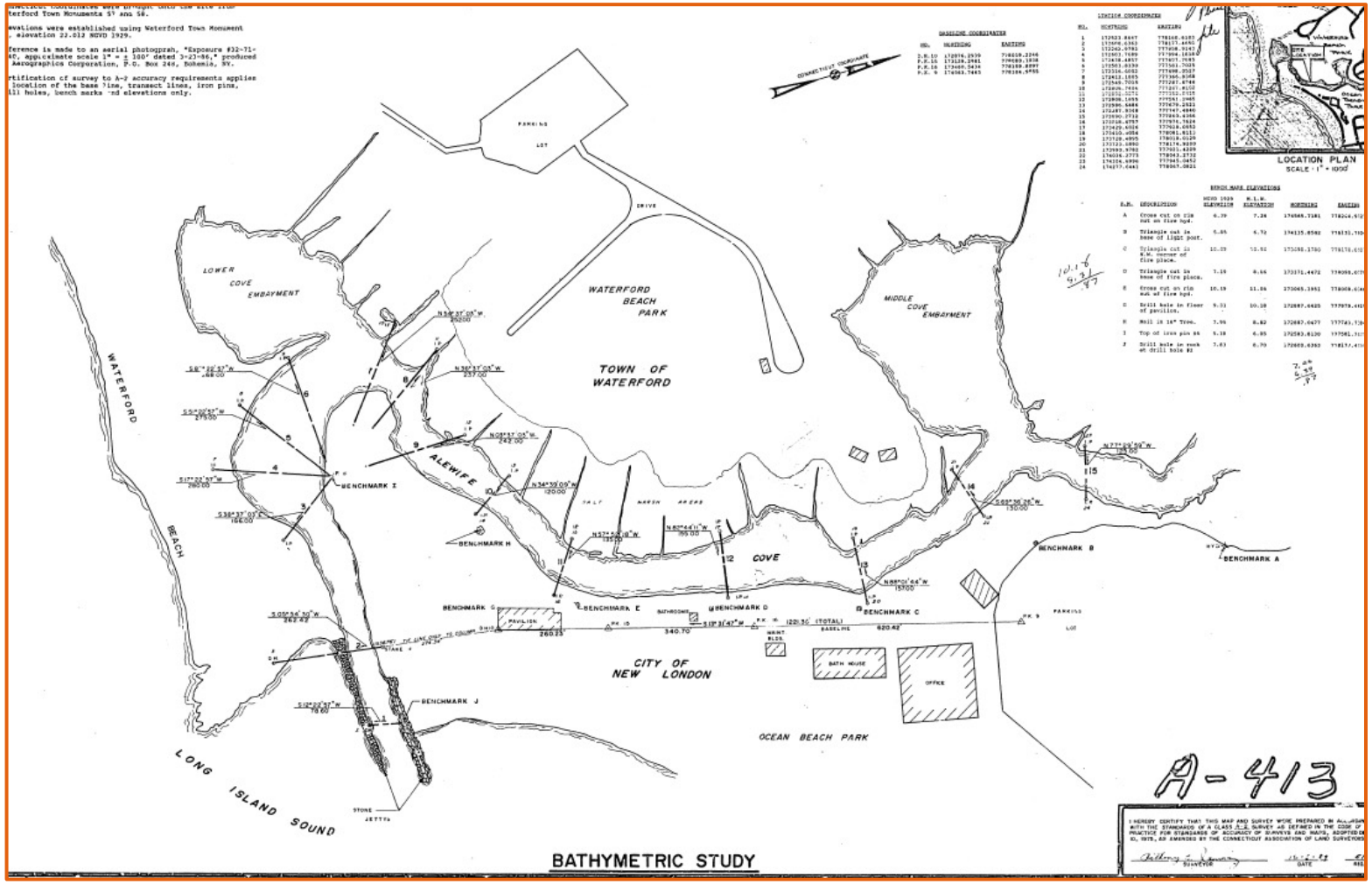
- *Combines water quality and quantity controls*
- *Improved aesthetics through landscaping*
- *Lower costs compared to other stormwater control measures (SCMs)*
- *Less maintenance compared to other SCMs*
- *Pollutant load reductions TMDLs*

How does the Plan build Resilience?

Alewife Cove - Problem

- Deposition of sand/sediment into the lower Cove
- Shoaling
- Alteration of channel depth and flow
- Continued erosion of the Ocean Beach jetty
- Negative impacts on spawning of fish species and ecosystem of local birds

Due to sediment transport, wave and wind patterns and significant storms like Irene (2011) and Sandy (2012)



Alewife Cove - Solution

- Alternatives Feasibility Analysis for Stabilization of Alewife Cove: Lower Channel and Cove Outlet
- LIS FF Grant – Collaboration with Waterford and Alewife Cove Conservancy

  Grant $400,000

  Match $125,000

  Total $525,000

- Shovel Ready nature-based community resilience project.
- Community Resilience, Conservation Efforts, Water Quality improvements
- Stabilize outlet, develop sustainable long-term solution to restore and promote resilience.

Photo: Alewife Conservancy

Hempstead Street Flooding

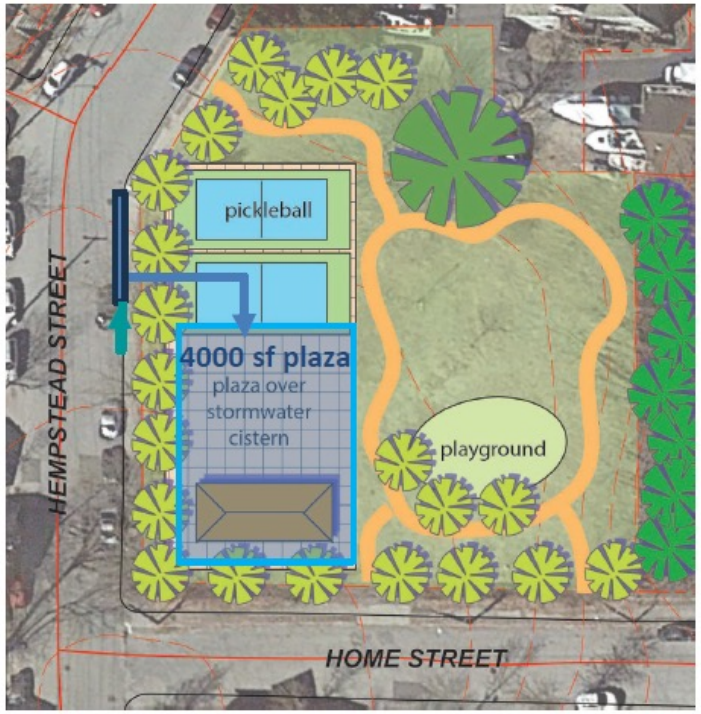
- Localized ponding of surface runoff
- 43 Hempstead Street (a Brownfield Site)

Opportunity to align a planned project with a beneficial watershed improvement.

Hempstead Street Park Project

- City purchased the vacant parcel to create a public park.
- Brownfield Cleanup and Assessment Grant program funding to cleanup the site.
- Planned improvements align with Watershed Management Plan concept

- 20-acre sewershed for storm sewer system
- Catchment point at Hempstead and Home
- 35-40% impervious – streets, parking lots, rooftops
- Approx. gallons of runoff from a one-inch storm = 29000



Water, Sewer, and Stormwater Ordinance Updates

Bylaw/Ordinance

Legal Authority

Rules & Regulations

Technical Requirements

Procedures

Guidance Materials

Examples & Details

BMPs

Enhanced Bacteria & Nitrogen Sampling Supports MS4 Program Goals

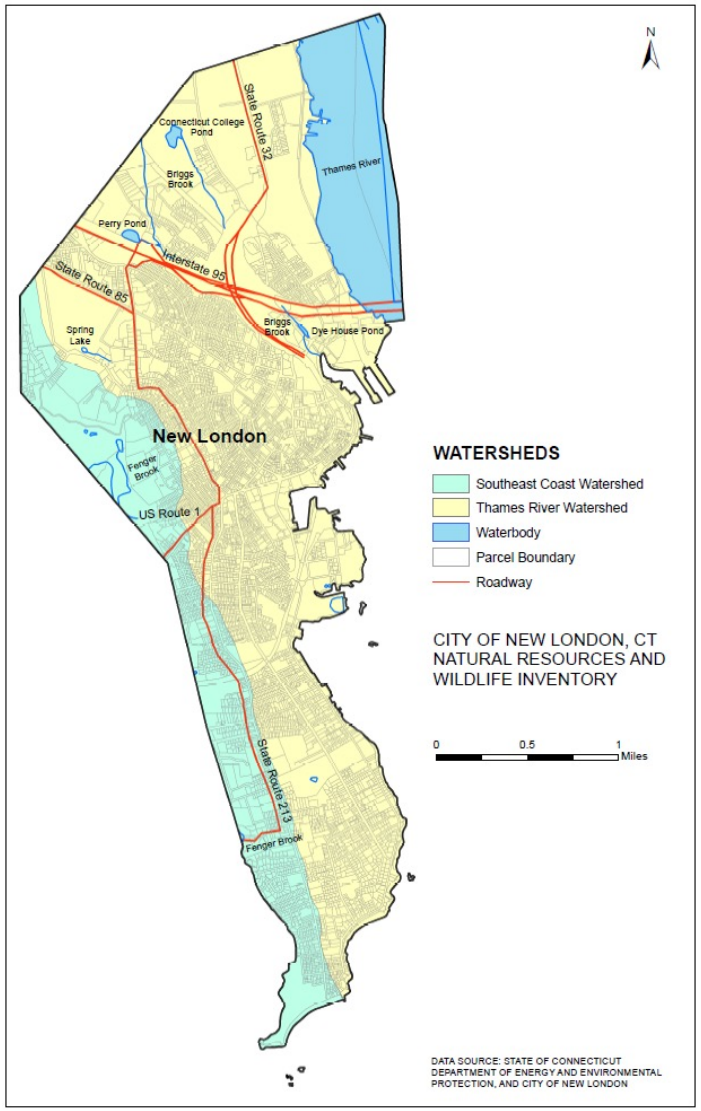
- Illicit Discharges identified through sampling
- Water Quality focus areas were identified based on sampling and nitrogen load modeling results.
- Top retrofit opportunity areas were identified for when funding is available.
- An approved Watershed Based Plan unlocks potential funding sources.

Lessons Learned

Lessons Learned and Next Steps

Implementation takes time, funding, and people resources!

- Grant / Funding Program Requirements – matching funds, QAPP - these take time and effort
- People resources are limited. Working to expand partnerships and identify partnering opportunities.
- The Plan is a living document. Over time, it can be adapted and expanded.



Kathryn B. Edwards, PE
Principal Engineer

Kate.Edwards@arcadis.com

Joseph Lanzafame, PE
Director of Public Utilities

jlanzafame@newlondonct.org

Arcadis. Improving quality of life.