

# Alewife Constructed Wetland:

stormwater attenuation, water quality improvements, ecological enhancements and recreational opportunities

Mystic Science Forum  
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# Project Beginnings

- MWRA Long-Term CSO Control Plan (LTCP) for Alewife Brook
  - reduce CSO volume to Alewife Brook by 85%
- Designed to meet the goals and objectives of DCR's Master Plan for Alewife Reservation
  - Provides significant public benefit and enhances ecological resources



# Project Background

## MWRA's LTCP for CSO Control

- Sewer separation of CAM004 (Huron A, Huron B and Concord Ave)
- Closure of the CAM004 regulator
- Reduces volume and frequency of CSOs to the Alewife Brook
  - 50mg annually → 7.3mg
  - 63 activations per year → 7





# New Outfall Required for Sewer Separation

## Original Objectives:

- Attenuate flows through detention
- Meet local, state and federal regulatory standards
- Lower maintenance/self-sustaining
- Enhance the quality of stormwater



# Conventional Stormwater Basin Design

- Designed to be normally dry
- Visually unappealing- vertical/steep sides
- Bland appearance- no relief
- Minimal water quality enhancement
- Little or no attention to habitat enhancement



Example of a dry detention pond

Source: TN EPSC

# Stormwater Wetland Systems

## A Better Option

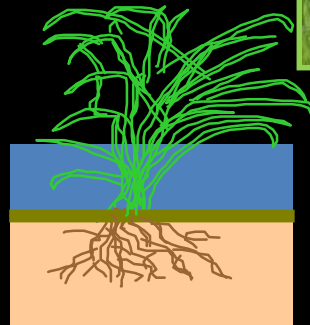


- Attenuates stormwater discharges
- Creates a sustainable and natural hydrology
- Reduce invasive plants, promote natives
- Maximizes pollutant removal
- Addresses components of the DCR Master Plan
  - ❖ Habitat, recreation, aesthetics



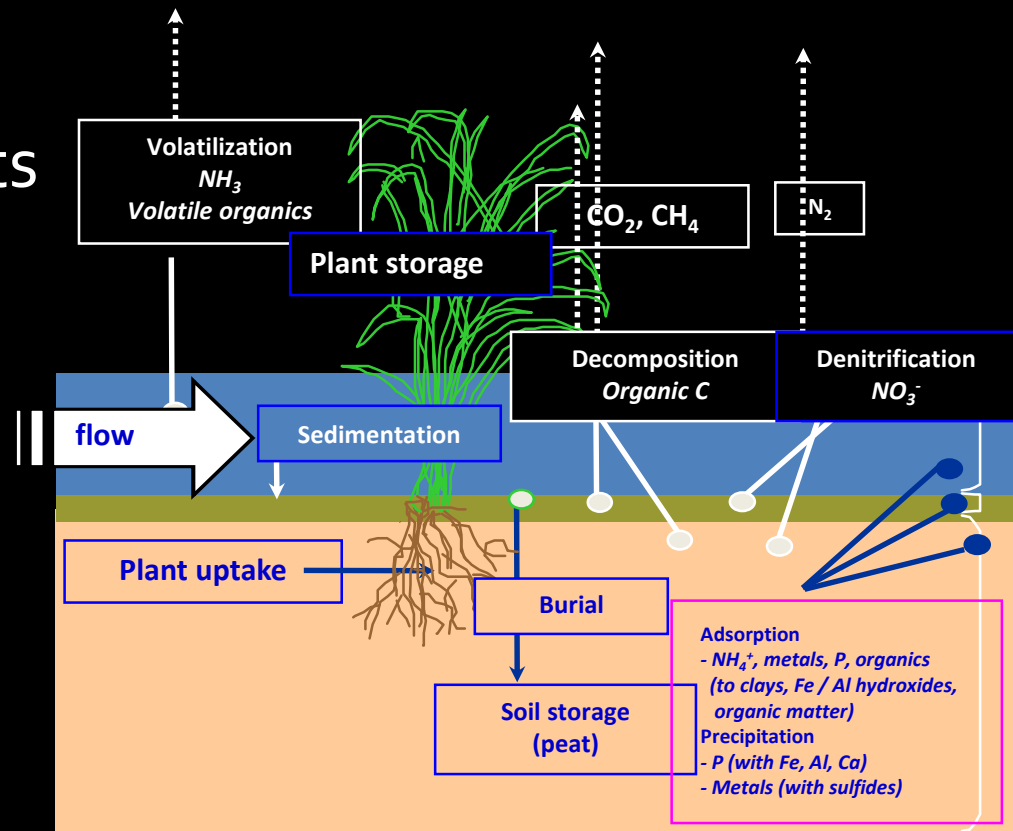
# Stormwater Wetlands and Water Quality

Stormwater wetlands provide water quality treatment through the interaction of the water, soil and plants.



# Pollutant Removal Pathways within a Stormwater Wetland

- Sedimentation
- Adsorption to Sediments
- Physical filtration
- Microbial breakdown
- Plant Uptake
- Extra Detention and/or Retention



Source: K.R. Reddy





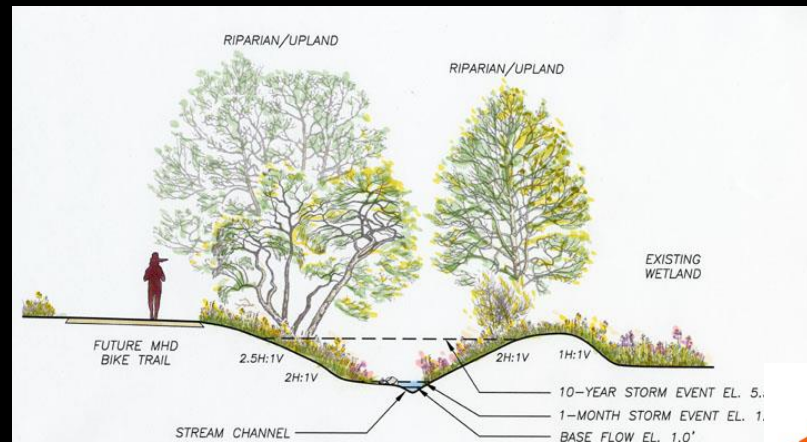
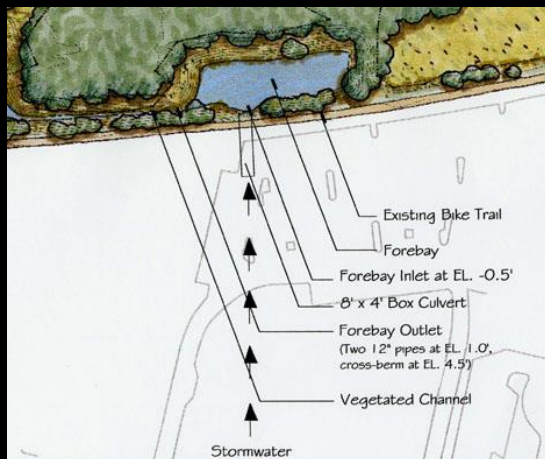


# Plan View of Wetland System





# Forebay and Swale



Typical Channel Section - 1-Month Storm Event

Scale: 1/4" = 1'



# Stormwater Wetland

## Stormwater Wetland

Footprint = 3.4 acres

Detention = 10.35 AF

## Habitat Diversity

Low Marsh

High Marsh

Open Water

Upland Island





# Outfall



36" outfall controlled with a 12" underflow and high level weir  
Maximize detention time

# Oxbow: Additional Wetland Creation

- Additional 0.71 acres
- Oxbow
  - Replaces wetland used in channel creation
  - Replaces floodplain volume taken to create the stormwater wetland.
  - Designed for possible River Herring spawning with pond and wetland fringe.





# Alewife Reservation Project Benefits

Fully integrated with DCR Alewife Reservation and Greenway Master Plan:

- Water Quality Improvements: 3.4 acre treatment wetland, and future closure of the CAM004 regulator
- Ecological enhancements of fish and wildlife habitat quality
- Mitigation of invasive plant species
- Improved site amenities
- Educational and recreational opportunities



# Habitat Creation



- Deep, emergent and high marsh
- Wet meadow, broadleaf floodplain and open water
- Scrub/shrub and riparian woodland
- Over 120,000 new wetland plants
- Over 3,800 new upland plants



# Site Amenities



- Multi-use connector path (Mass DOT)
- Trails and boardwalks (1,600 linear feet)
- Overlooks (3)
- Amphitheatre
- Benches and bike racks
- DCR Kiosk and interpretive signage



# Integrated Stormwater Treatment

## ■ Source Control

- Street Sweeping
- Renovate all existing catch basins to the BMP level
- Double number of catch basins
- Biobains/Rain Gardens
- Porous Pavement

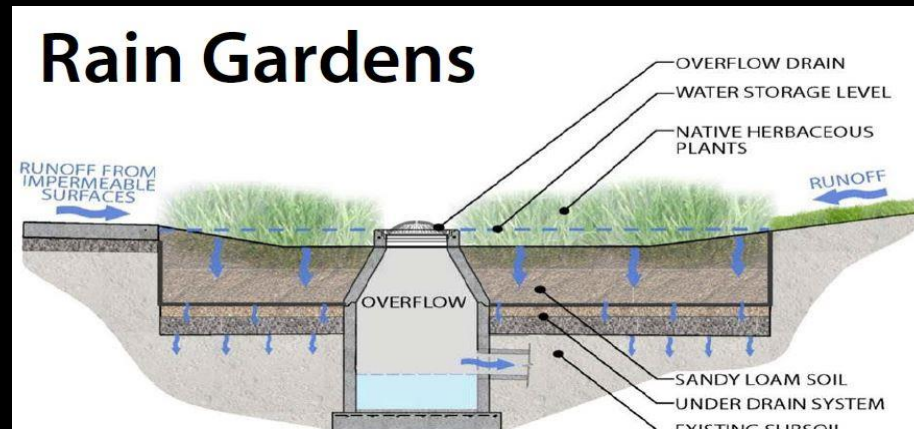


## ■ In-System Treatments

- Grit pits, flushing system
- Isolation chamber

## ■ Final Polishing

- Stormwater Wetland





# Sampling Locations



# Water Quality Results

|                            | 6/24/2014 |         | 8/26/2014 |         | 10/28/2014 |         |
|----------------------------|-----------|---------|-----------|---------|------------|---------|
|                            | Forebay   | Wetland | Forebay   | Wetland | Forebay    | Wetland |
| Fecal Coliform (col/100ml) | <100      | 1,000   | <100      | 100     | 1,000      | 100     |
| E. coli (MPN/100ml)        | <10       | <10     | <10       | 10      | 435        | 41      |
| Ammonia (mg/l)             | <0.1      | <0.1    | <0.1      | <0.1    | 0.2        | <0.1    |
| T. Phosphorous (mg/l)      | 0.11      | 0.14    | 0.14      | <0.02   | 0.07       | 0.06    |
| TSS (mg/l)                 | 19        | 16      | 6         | 2       | 8          | 5       |
| Oil & Grease (mg/l)        | ND        | 5       | ~         | ~       | ~          | ~       |
| pH                         | 8.03      | 6.96    | 8.19      | 7.5     | 6.98       | 6.47    |
| ~ denotes no data          |           |         |           |         |            |         |



# Questions

