COASTAL SMART GROWTH

## Low Impact Development Case Study

# Town of Cohasset – *Surface Water Supply Protection Plan and Remediation*

Highlight: *Cohasset demonstrates a low cost and low maintenance technique to improve stormwater quality throughout the town by constructing a stormwater management system that includes more than 40 rain gardens and vegetated swales to infiltrate and treat runoff before it is conveyed to the traditional stormwater collection system.*

### Why Low Impact Development?

Lily Pond and the Aaron River Reservoir are the sole sources for drinking water servicing approximately 7,100 people in the town of Cohasset. Due to concerns of possible contamination to the pond's surface and groundwater, the consultant to the Board of Water Commissioners, Norfolk Ram Group, LLC (Norfolk), developed a Surface Water Supply Protection Plan for the town. The purpose of the Plan was to prevent, eliminate, and control actual and potential sources of contamination within the watershed that could negatively impact the quality of drinking water provided by Lily Pond and the Aaron River Reservoir. The plan included recommendations for the use of Low Impact Development (LID) practices in developed portions of the watershed to reduce contaminants in stormwater runoff.

*Pretty and practical: A vegetated swale in Cohasset helps filter and hold stormwater that would otherwise end up having to be treated by artificial measures.*

### Which Low Impact Development Practices Were Applied?

Cohasset has undertaken the implementation of a four-phase project that has resulted in a complete retrofit of the existing stormwater drainage system. This LID project included the construction of more than 40 rain gardens (bioretention cells) and several vegetated swales to treat suburban stormwater runoff prior to entering the town's stormwater collection system. The rain gardens are constructed within the town right-of-way and are designed to capture the first flush storm events. Norfolk selected the design storm based on rainfall data collected at the Lily Pond Treatment Plant. The 90% storm event (the storm that produces 0.9 inches of rainfall) was identified and was used in sizing the basins. All storms that generate 0.9 inches or less are routed in their entirety through the rain gardens. Larger storm events (or rainfall after the first flush volume is treated) are allowed to bypass the rain gardens for discharge into the existing infrastructure. Specifically, runoff infiltrates through the bioretention soil mix and any excess water is discharged via an underdrain to the existing stormwater collection system.

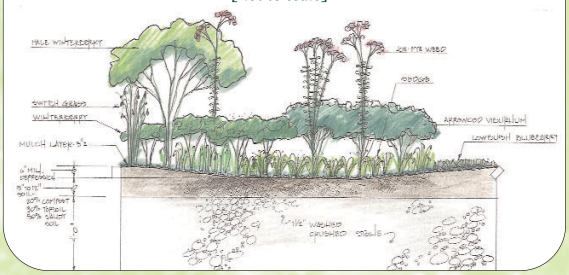
### What Is the Project Scope, Timeline, and Budget?

The scope of the project included a demonstration rain garden at Lily Pond; four rain gardens on municipal sites; the Route 3A project that includes rain gardens, vegetated swales, and buffers; and 40 additional rain gardens—all of which were constructed in a two-year period.

Some of the additional components of the project included the development of Quality Assurance and Long-Term Operation and Maintenance Plans, both pre- and post-construction water quality monitoring, and the development of an outreach and education program used to increase the awareness of sub-watershed Best Management Practices (BMPs).

Cross section of a bioretention cell

*[not to scale]*




To finance the project, the town used a Section 319 Non Point Source Competitive Grant provided by the U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MassDEP), and a loan through MassDEP's Clean Water State Revolving Fund (SRF).

## What Are the Benefits?

The improved system benefits the town by preventing pollutants and waterborne diseases from entering the water supply and lowering the costs associated with filtration and disinfection requirements. Specifically, this system will provide:

- Substantial reduction of trash and litter (nearly 100%) and substantial reduction in total suspended solids (more than 80%). Material will be physically removed during maintenance of the rain gardens.
- Substantial removal of phosphorous (80%) and nitrogen (up to 50%) through uptake by the plants and soils.
- Reduction in metals, oils, grease, and volatile organics, which are adsorbed by the organic soils.
- Reduction in peak flows as the stormwater slows as it infiltrates through the system.
- Reduction in water temperature as runoff is cooled during the infiltration process.

The new stormwater system may serve as a model project for other communities and for future nonpoint source reductions within other areas of the watershed.

*Rain garden at Lily Pond.*

## What Type of Operation and Maintenance (O&M) Is Required?

Cohasset intends to contract with a landscape company to maintain the rain garden beds, remove debris and sediment, re-mulch, and maintain the vegetation by removing damaged limbs and replacing diseased plants. No fertilizers will be used, and only native species will be planted. Operation and maintenance costs have not been generated to date but are estimated at $4,000 to $7,000 per year for the entire project.

## What Were the Obstacles or Lessons Learned?

The neighborhoods in Cohasset that have been selected for the installation of the rain gardens consist of well maintained and landscaped yards. Therefore, the biggest initial obstacle was garnering support from residents in the neighborhood who had expressed concern about the visual effects of the rain gardens that will lie in the right-of-way adjacent to their yards. To overcome these obstacles, a public outreach campaign was initiated, including the release of newspaper articles, presentations at state and local organizations, and the involvement of the Cohasset Garden Club in the selection of plant material suitable for Cohasset rain gardens. The success and beauty of the demonstration project at Lily Pond will also help to ease any concern about aesthetics.

As another component of the public outreach campaign, an informational newsletter was developed to explain the purpose of the BMPs and the locations of the LID improvements. The newsletter will also report the water quality monitoring results for nitrogen, phosphorus, and total suspended solids taken at the sampling locations within the watershed. The newsletter is expected to raise the awareness of the importance of stormwater management.

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## Production Notes

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