Island Wharf Storm Water Project Completed

Work on the storm water treatment facilities for the lower village drainage system has been completed.

Planting of the landscaping, mulching, and hydro-seeding of the field was completed the first week of October. The finished system treats storm water from a 7.5 acre watershed[1] which includes the commercial areas on Front Street, Cottage Street, and Island Wharf Road.

Marked Area showing watershed to Island Wharf

Storm water from this area flowed off the roads, driveways and rooftops and was directed, through the Town's storm drain system directly into Sippican Harbor. Storm water runoff is now the leading cause of impairment to Marion's waterways. Roads and parking lots collect grease, oil, antifreeze, and other vehicle leakage; heavy metals from brake dust; as well as litter, other debris, and pathogens. All of these pollutants were flushed into Sippican Harbor by rain and melting snow. Treated runoff will now pass through one of seven biofilters which filter suspended sediments and other pollutants.

All About "Biofiltration" A relatively new alternative to detention ponds is to integrate the absorption of parking lot runoff into landscape islands. Commonly known as "biofiltration" areas, or "rain gardens," these landscaped islands treat storm water using a combination of microbial soil process, infiltration, and evaporation. Instead of the landscape island along Island Wharf Road that was set higher than paved grade, these new

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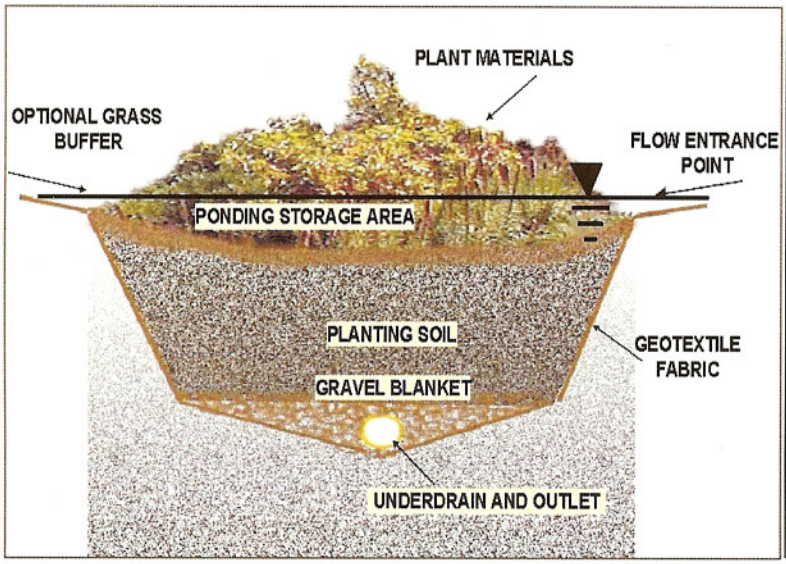
[1] About 12% of the size of the watershed that contributes to the Sprague's Cove storm water treatment system at the end of Front Street)

rain gardens, are recessed, with the pavement graded so that surface flow is into, rather than away from, these areas.

How it Works:



1. Storm water flows off the pavement into the Ponding/Storage Area

2. Storm water drains though the Planting Soil; a special mix of sand and compost

3. Solids are filtered by the sand, dissolved pollutants adsorb to the compost

4. Cleaned water enters the Underdrain and Outlet thereby being carried to the harbor

5. As surface mulch decays it adds to the organic content of the Planting Soil

6. The Plant Materials aid in infiltration and promote the growth of microorganisms.

Since there was little landscaped area between the General Store parking lot and Cottage Street, treatment of the runoff was achieved through the diversion to a large basin on the north edge of the Island Wharf field. Like many areas close to the water, Island Wharf field has a high water table. To work around the high water table, the design engineer's at Horsley & Witten, called for subsurface drains (under-drains) to prevent the creation of mosquito habitat and to ensure flow through the system.

One caveat is that the rain gardens will not provide complete "quantity control," or capacity for retention during very heavy rainfalls. A bypass was required to divert excess runoff directly into the Harbor in the larger, less frequent storms.

Maintenance for rain gardens is not much different from that required for a standard landscape island: annual testing of soil pH, mulching, inspection of plants for pests, pruning for shape and vigor, and regular litter removal.

Bio-filter Design Most Effective Practice for Clean Water

As stated above, runoff from paved and highly compacted surfaces may contain bacteria, sediment, heavy metals, pesticides, fertilizers, and petroleum products. The old storm water discharges adversely impacted our shellfish beds and the Island Wharf swimming area. The area just north of the bandstand at Island Wharf was continuously closed to shellfishing due to storm water pollution. The new rain gardens will ensure that over 90% of the annual rainfall is effectively treated.

The University of New Hampshire Environmental Research Group has determined that rain gardens are one of the best storm water treatment techniques. Rain gardens are a relatively recent innovation in storm water treatment that removes pollutants, attenuates peak flows, and provides a net reduction in flow volumes through evapotraspiration and infiltration.. Research from Australia indicates rain gardens are one of only two storm water management techniques that remove dissolved pollutants from runoff.

Soils Compacted from Construction

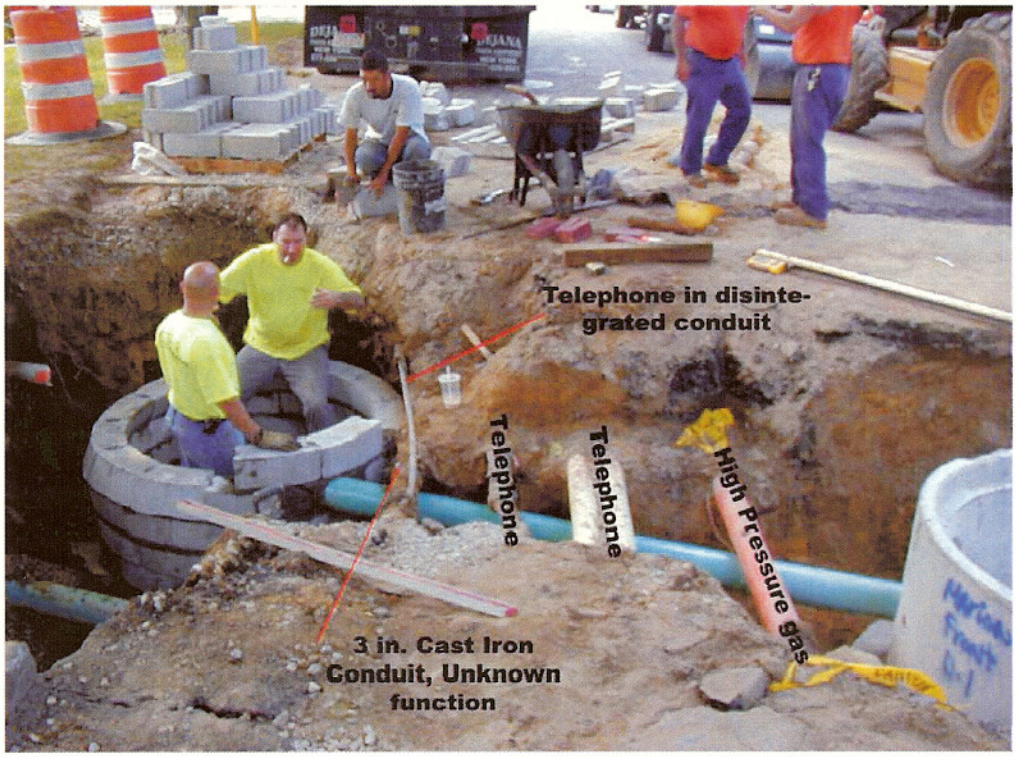
During the construction process, Island Wharf Field was used as a staging area for the rain garden construction. The field was compacted into a cement-like parking area by heavy machinery and trucks delivering construction materials for three months. In addition to the daily compaction from construction, the area was utilized for trailer storage and boat outfitting during the 420 North American Championship, and the BYC Junior Regatta. Although the runoff from this area would not be as great as a paved surface, the compacted soil was projected to infiltrate less than 16 percent of rainfall.

Restoring Healthy Soils with Compost

To restore soils in the field, the Town tilled in 4 inches of compost. This practice will significantly improve detention/infiltration and reduce storm runoff from the field. The compost will help to grow a healthy lawn with little water, fertilizer or pesticides. The compost amendments help the soil absorb and store water, and purifies runoff

Construction Problems Overcome

A final design for the project was dependent on the input of the neighbors. The Town held a community meeting on March 8, with representatives of the design engineer, the Town of Marion Department of Public Works and the Buzzards Bay National Estuary Program. The final design plan and permitting was fast-tracked with the assistance of Coastal Zone management and the Buzzards Bay National Estuary Program, and was completed by May 15th. Work started on June 1. Digging in the streets of older towns always presents a problem and this project ran true to form. The entire street drainage system was replaced with pipes that avoided the existing watermains, sewer pipes gas lines, telephone cables and underground electrical lines. Adding to the construction problems were depth to ground water and the discovery of previously unknown utilities.



Front Street on June 15, 2005

Cooperative Effort Pays Off!

Town of Marion Island Wharf Storm Water Project succeeded because of the dedicated efforts of Rob Zora, DPW Superintendent, and the DPW crew, the flexibility shown by Steve Lynch and Wayne Botelho, the owners of the construction firm Lynch Botelho, the financial assistance from the Buzzards Bay Project National Estuary Program (Municipal Grant Program, $20,000), Sippican Historical and Preservation Society ($18,000), and Massachusetts Coastal Zone Management (Coastal Pollution Remediation Grant $165,000) and donated services from Eden Landscaping and the Horsley Witten Group