StormTree™

Tree Filter Systems for Stormwater Management

"Thinking outside the concrete box™"
Conventional Development
Centralized End-of-Pipe
Best Management Practices (BMPs)

BMP Issues:

- Trash
- Invasive Species
- Mosquitoes
- Safety
- Maintenance
- Loss of Land $$
Low Impact Development (LID) 
Decentralized BMPs

**LID Options:**

- Rain Gardens
- Rain Barrels
- Pavers
- Swales
- Vegetation Strips
- Bioretention Cells
- Tree Filters
Bioretention is a water quality and quantity control practice that uses the physical, chemical and biological properties of plants, microbes and sorption for removal of pollutants from storm water runoff.

All New England states and the U.S EPA National Pollutant Discharge Elimination System (NPDES) recognize “Bioretention (e.g., tree filters, rain gardens) as Treatment Best Management Practices (BMPs).
Street Tree + Stormwater Collection (Catch Basin) = Tree Filter Systems
IMPLEMENTATION CONSIDERATIONS (BIORETENTION/TREE FILTERS)

- Capital Cost: M
- Maintenance Burden: M

Residential/Subdivision Use: Yes
High Density/Ultra-Urban: Yes
Drainage Area: 5 acres max.

Soils: *Planting soils must meet specified criteria; No restrictions on surrounding soils, except the depth above water table.*

Key: L=Low M=Moderate H=High

POLLUTANT REMOVAL – ALL FILTERS

- F Phosphorus
- G Nitrogen
- G Metals - Cadmium, Copper, Lead, and Zinc removal
- G Pathogens - Coliform, Streptococci, E. coli removal

Key: G=Good F=Fair P=Poor
Precast Concrete Frame
e.g. 5’ X 7’  5’ X 9’  4’ X 11’
5’ High

- Pretreatment Sump
- Gravel Base
- Collection/Discharge Pipe
Overflow/Bypass Pipe

Engineered Media
- High Infiltration (>60 in/hr)
- Organic Component e.g. mulch, coir, peat moss
- Expanded clay and other additives

Depth: 24” – 36”
INTERIOR PRETREATMENT
SUMP

ATTACHED CATCH BASIN
Pollutant Removal Mechanisms

Physical/Chemical Processes
• Sediment Collection
• Filtration through mulch and media
• Binding to roots

Biological Processes
• Microbial Decomposition
• Plant Uptake
High Pollutant Removal Rates

- **Total Suspended Solids:** >80%
- **Total Nitrogen:** >50%
- **Total Phosphorus:** >60%
- **Heavy Metals:** >70%
- **Oil and Grease:** >75%
- **Fecal Coliform/E. Coli:** >90%

Based on 3rd party testing of generic and proprietary tree filter systems, and other bioretention facilities.
Sizing Based on Underground Storage

- Multiple ways to configure
- Non-woven geotextile liner
- Single unit can treat 0.50+ acres
- Gravel or stormwater chambers
Roots do not go to China, they migrate **horizontally**

Roughly 85% of a mature tree’s root system reside within 20 inches of the surface
Large Variety of Suitable Trees

- *Acer buergerianum*, Trident Maple
- *Acer campestre*, Hedge Maple
- *Acer ginnala*, Amur Maple
- *Acer griseum*, Paperback Maple
- *Acer truncatum*, Shantung Maple
- *Amelanchier arborea*, Serviceberry
- *Cercis canadensis*, Eastern Redbud
- *Chionanthus restusus*, Chinese Fringetree
- *Cornus mas*, Cornus Mas
- *Cornus officinalis*, Japanese Cornel Dogwood
- *Cotinus obobatus*, American Smoketree
- *Crataegus viridis*, Winter King Hawthorn
- *Gleditsia triacanthos*, Honeylocust “Shademaster”
- *Koelreuteria paniculata*, Goldenrain Tree
- *Maackia amurensis*, Amur Maackia
- *Malus various species*, Flowering Crabapple
  - Sargent, Cardinal, Prairefire, Snowdrift, Zumi, Donald Wyman, Indian Summer, Callaway, etc.
- *Ostrya Virginiana*, American Hophornbeam
- *Prunus various species*, Flowering Cherry
  - Plum, Dream Catcher, Thundercloud, Newport, etc.
- *Pyrus calleryana*, Callery Pear
  - Bradford, Redspire, Cleveland, etc.
- *Syringa reticulata*, Japanese Tree Lilac
  - Regent, Summer Snow, etc.
- *Tilia Cordata*, ‘Cultivars’ Little Leaf Linden
- *Ulmus (carpinifolia x parvifolia)*, Hybrid Elm
  - Frontier Hybrid Elm, etc.
Greater Infiltration and Aeration

Existing Soil  
< 10 inches/hr

Engineered Soil  
> 80 inches/hr
AESTHETIC FEATURES

- Colored Concrete
- Pavers

ADA Compliant Grating
 &
High Heel Friendly
Fiberglass Versus Iron or Steel Grating

- Opening can be enlarged to prevent trunk damage
- Common power and hand tools
- Will not rust
- Anti skid surface
- Supports 500 lbs/ft²
- H-20 (traffic) loading with support bars
- Can be bolted
- Less cost
Sidewalk lifting with street trees
Low Maintenance

• Remove Trash and sand annually with vactor
• Easy Access – No Confined Space
• No Specialized Equipment Needed
• Minimal Cost
After October 2013

100’ Long Bioretention Filter Bed
Pretreament Sumps
LEED Points

Sustainable Sites:

• Stormwater Design: Quantity Control (1 point)
• Stormwater Design Quality Control (1 point)

Materials and Resource Selection:

• Recycled Content (1-2 points)
• Regional Materials (1-2 points)
StormTree™
Low Impact Stormwater Management Solutions

Thank You

Represented by

Paul Iorio
Tel: 401-626-8999
www.storm-tree.com