

PARKING LOT  
TREES BY OTHERS



3-VIB

# StormTech® and Green Infrastructure

## Key Benefits of StormTech

- Volumetric Reduction of Stormwater Through Infiltration
- Stormwater Quality Through Patented Isolator™ Row (TSS, TP and TPH removal)
- Reduction of Thermal Impacts
- Proven, Third Party Verified Performance
- Easily Constructed, Inspected and Maintained
- Meets ASTM product standard
- Designed to ASTM & AASHTO specifications



MC-3500

SC-740

SC-310



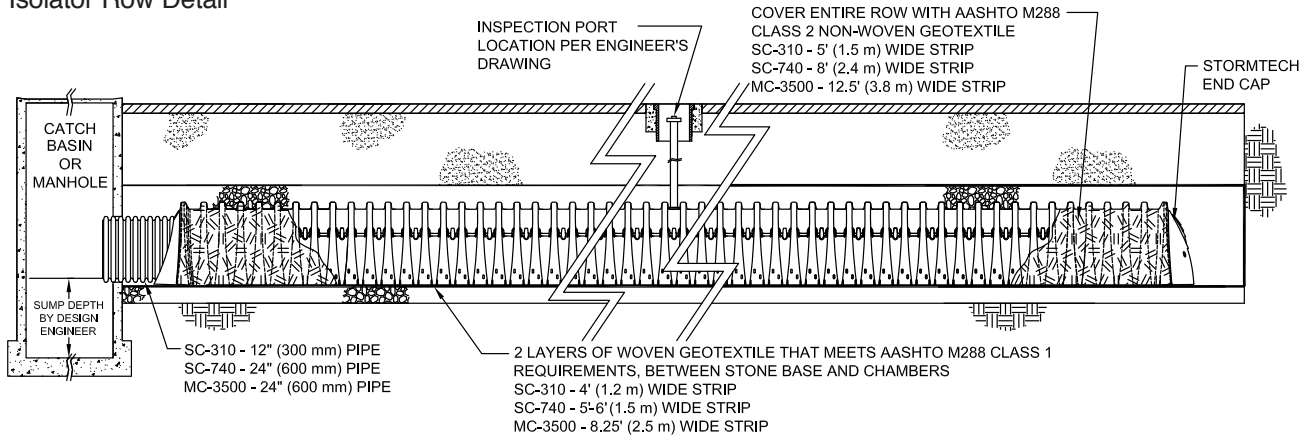
[www.stormtech.com](http://www.stormtech.com)



# StormTech and Stormwater Quality

StormTech's patented Isolator™ Row is a row of chambers wrapped in a geotextile which filters the stormwater trapping pollutants in the row. The Isolator Row provides a way to inspect and maintain the system.

## Isolator Row Detail



## Isolator Row Field Verification Testing at the University of New Hampshire Stormwater Center

- Field testing (TARP tier II protocol) of the Isolator Row has been ongoing since December 2006.
- Removal efficiencies have improved as the filter cake has built up on the bottom fabric of the Isolator Row.
- Current data shows a TSS average removal efficiency which exceeds 80%.

### Removal Efficiency Results:

- Total Suspended Solids = 80%
- Phosphorous = 49%
- Total Petroleum Hydrocarbons = 90%
- Zinc = 53%

**This system achieves a mean removal efficiency of 80% for TSS which meets most municipal recommended levels for water quality treatment.**



### Inspection and Maintenance

The Isolator Row can be inspected through the upstream manhole or optional inspection port.

Maintenance is easily accomplished with the JetVac process.

The frequency of inspection and maintenance varies by location. Contact StormTech for assistance with inspection and maintenance scheduling.





# StormTech and Recycled Materials

## Recycled Concrete Structural Backfill

- Thermoplastic structures utilize aggregate for conveyance, strength and volume
- Recycled, crushed concrete can be an excellent structural backfill.
- Care must be taken to ensure that the material is structurally competent before being used as a structural backfill for StormTech chambers.
- StormTech *Tech Sheet #4 Recycled Concrete Structural Backfill* provides guidance for the acceptability of recycled crushed concrete and limestone when used as the structural foundation (bedding) and embedment materials for StormTech chambers.

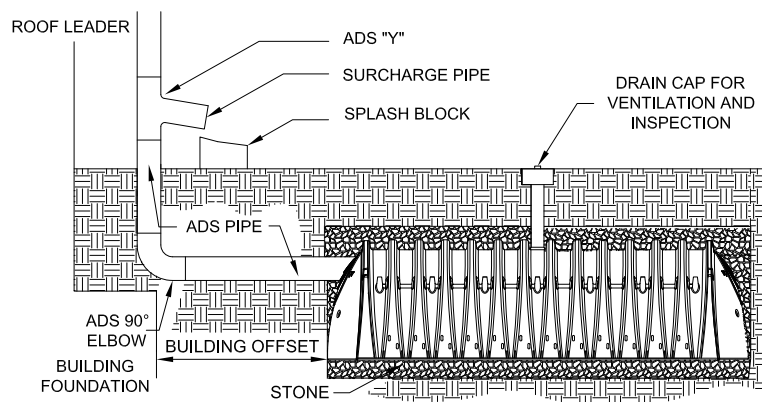


## Potential LEED Credits

- Materials and Resources Credits 4 & 5
  - 4.0 Intent is to increase demand for building products that incorporate recycled content materials, thereby reducing impacts resulting from extraction and processing of virgin materials.
  - 5.0 Intent is to increase demand for building materials and products that are extracted and manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.

## StormTech and Downspout Applications

The StormTech chamber system can connect with roof downspouts for commercial and residential applications.



# StormTech and Bioretention/Rain Gardens

## What is a Rain Garden?

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A shallow depression planted with suitable vegetation which is used to store and possibly treat stormwater runoff from impervious areas.

## Benefits of Using Rain Gardens

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- Bioretention
- Pollutant Removal – TSS, Phosphorous, Metals, Nitrogen, Hydrocarbons
- Groundwater recharge
- No standing water (proper design will allow water to infiltrate in a specified amount of time)
- Preserve pre-development hydrologic cycle
- Efficient land use & Aesthetics

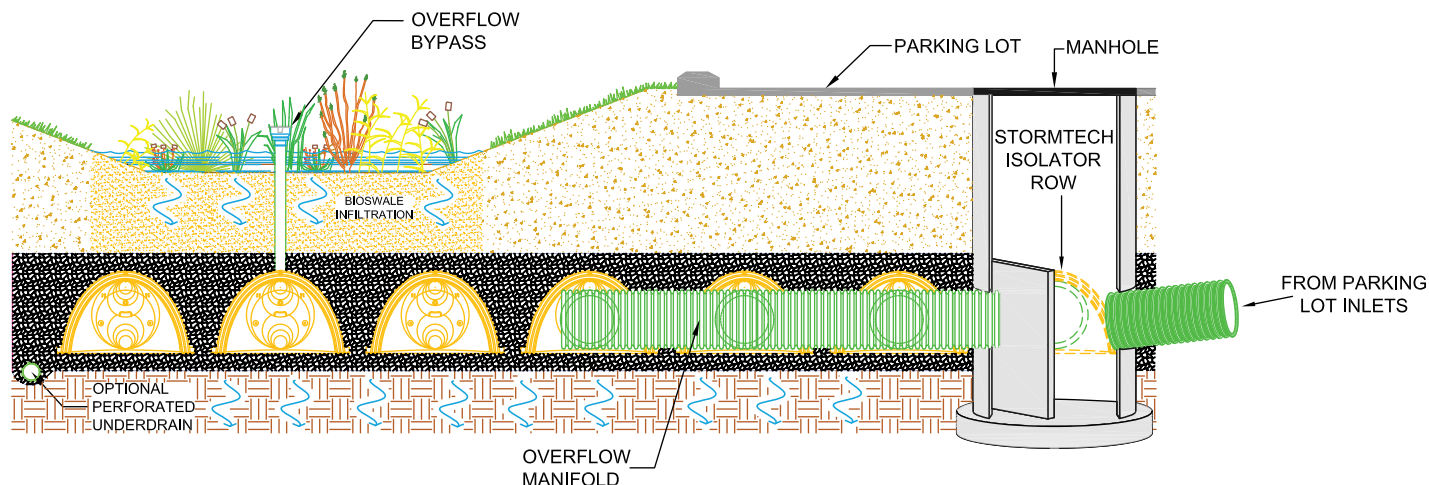
## Maintenance

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- Plant watering initially until plants are established, weeding
- Removal of dead plant material and replacement of mulch as needed
- Regular inspection and cleaning of any overflow structures



# StormTech and Bioretention/Rain Gardens



## Benefits of Rain Gardens and StormTech

- Increased storage capacity due to 100% chamber storage.
  - Enables the use of rain gardens in areas with low soil permeability.
- StormTech system can act as an emergency overflow to the rain garden.

## General Design Considerations

Always refer to local design specifications for rain garden design guidelines.

### Hydraulics:

- Soil infiltration rate
- Design flow rate (potential for erosion)
- Maximum ponding depth in rain garden
- Optional overflow bypass
- Proximity to buildings
- Depth to ground water

### Planting:

- Native plants are best – see local specifications for plant recommendations
- Root systems may govern the depth of soil

### Construction:

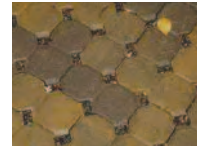
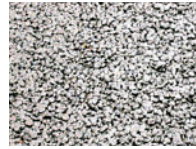
- Presoak soil for natural compaction after installation
- Limit compaction of soil during installation

# StormTech and Pervious Pavements

## What is Pervious Pavement?

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Paving methods for roads, parking lots and walkways that allow the movement of water and air through the paving material.



## Pervious Pavement

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### Environmental:

- May assist in groundwater recharge
- Flood mitigation
- Reduce runoff temperature

### Safety:

- Pervious pavement limits surface water
- No black ice
- Reduces hydroplaning

### Economic:

- Higher initial cost
- Efficient land use
- In colder climates, the use of pervious pavement may save money on deicing salts

## Maintenance

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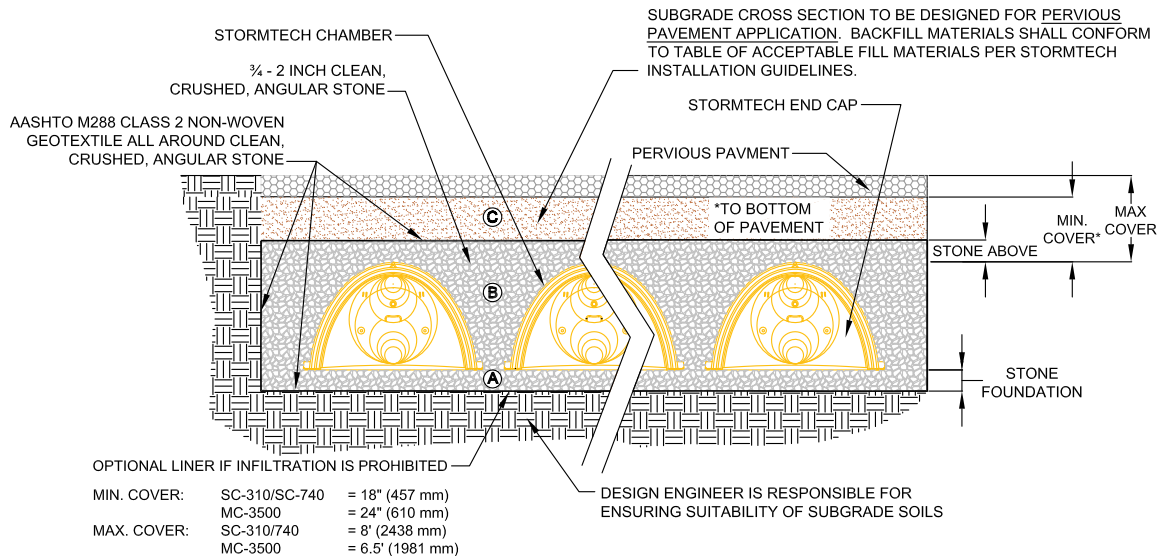
- Routine vacuum sweeping and/or jet hosing is required to prevent clogging which can reduce the infiltration rate of the pervious pavement.
- Installation of pervious pavement must be staged so no erosion or sediment debris enters pavement.

### Additional Resources for Pervious Pavement Information:

- National Asphalt Pavement Association – Porous Asphalt Pavements (2004) Information Series 131
- The UNH Stormwater Center, UNHSC Design Specifications for Porous Asphalt Pavement and Infiltration Beds
- Federal Highway Administration, Porous Pavement Fact Sheet, <http://www.fhwa.dot.gov/environment/ultraurb/3fs15.htm>
- National Ready Mixed Concrete Association (NRMCA 2004b)



# StormTech and Pervious Pavements



## Notes:

1. For minimum fill requirements for layers A, B and C, refer to StormTech Design Manual
2. Over drains can be utilized to pipe water to chambers – call StormTech for details

## StormTech with Pervious Pavement

- StormTech Chamber provides 100% void, increasing storage volume
- Bare chamber volume allows increased storage. Relying only on stone does not provide long-term factor of safety.
- Enables the use of pervious pavement in areas with low soil permeability.
- Reduced footprint
- Allows pretreatment in conjunction with Isolator Row.

## General Design Considerations

Always refer to local design specifications for pervious pavement design guidelines.

### Hydraulics:

- Underlying soil properties
- Pervious pavement infiltration rate/max. slope for design
- Separation from seasonal high groundwater table
- Proximity to buildings

### Construction:

- Contractor must be knowledgeable of pervious pavement installation
- Tight control must exist on batch quantities
- Pervious pavement can be installation sensitive
- Erosion and sediment control crucial

### Environmental:

- Measures for frost protection should be taken
- Pervious pavement is not recommended for sites containing potentially hazardous runoff (gas stations, industrial sites, etc.). **No pre-treatment mechanism!**

# StormTech and LEED 2009



List of LEED 2009 Credits that StormTech may contribute towards:

## Sustainable Sites

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- **SS Credit 5.1 - Site Development: Protect or Restore Habitat**  
Utilizing StormTech System beneath roadways, surface parking, walkways, etc. may reduce overall site disturbance
- **SS Credit 5.2 - Site Development: Maximize Open Space**  
Utilizing StormTech System can increase overall open space and may reduce overall site disturbance
- **SS Credit 6.1 - Stormwater Design: Quantity Control**  
Design StormTech System per local or LEED stormwater quantity requirements, whichever is more stringent
- **SS Credit 6.2 - Stormwater Design: Quality Control**  
Use of Isolator Row provides sediment removal, and can also promote infiltration and groundwater recharge
- **SS Credit 7.1 - Heat Island Effect: Non-Roof**  
Use of StormTech System may eliminate need for above ground detention ponds, thus reducing thermal impacts of stormwater runoff

## Water Efficiency

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- **WE Credit 1 - Water Efficient Landscaping**  
Utilize StormTech System to store captured rainwater for landscape irrigation
- **WE Credit 2 - Innovative Wastewater Technologies**  
Utilize StormTech System to store captured rainwater to reduce potable water demand.
- **WE Credit 3 - Water Use Reduction**  
Utilize StormTech System to store captured rainwater and allow reuse for non-potable applications

## Materials and Resources

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- **MR Credit 4 – Recycled Content**  
Utilize recycled concrete as the backfill material for the StormTech System.
- **MR Credit 5 – Regional Materials**  
Stone backfill material for the StormTech System will apply if extracted within 500 miles of project site.

## Innovation & Design

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- **ID Credit 1 – Innovation in Design**  
Utilize StormTech System to substantially exceed a performance credit

