

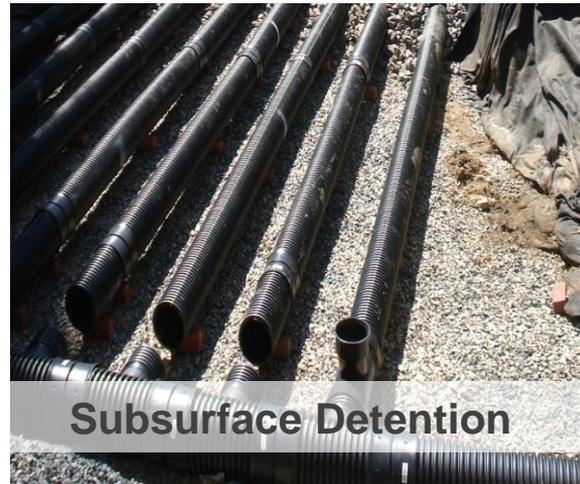
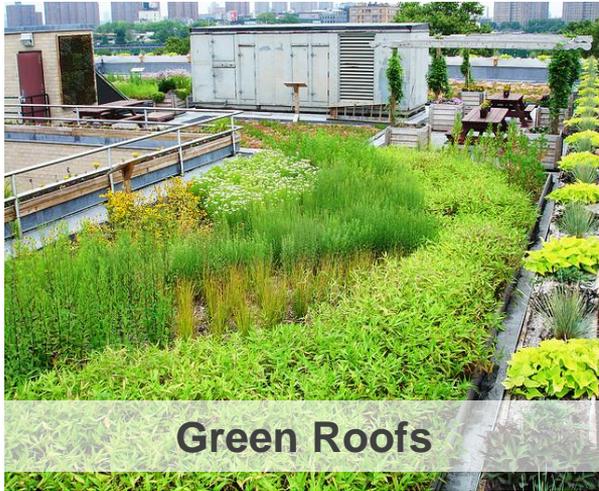


# Green Infrastructure Grant Program

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2013 Stormwater Calculations Workshop

# What is Green Infrastructure?



Techniques that detain or retain stormwater runoff from impervious surfaces (parking lots, rooftops, walkways) through capture and controlled release, infiltration into the ground, and/or vegetative uptake and evapotranspiration

**All proposed green infrastructure systems must manage a 1” volume of stormwater runoff from its impervious tributary area.**

- This requirement is meant to encourage cost-effective projects given that 90% of storms in NYC are 1.2” or less.
- Projects that propose to manage 3x, 4x, and 5x that amount are not necessarily better projects.

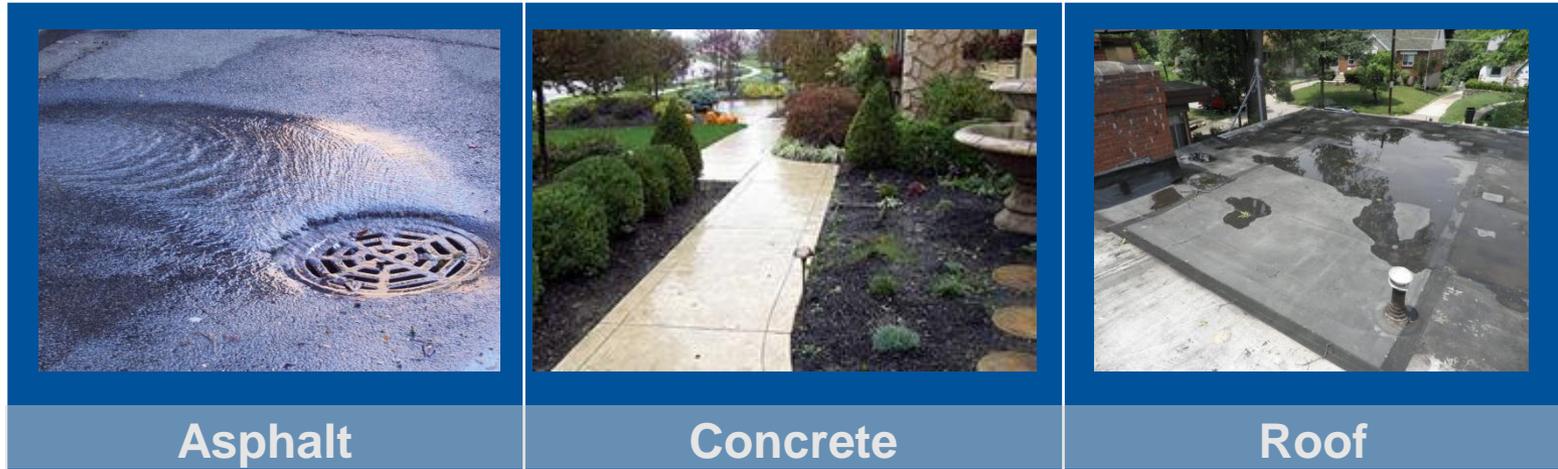
The Stormwater Calculations Template verifies that this minimum requirement is being met by:

1. Calculating the total impervious tributary area for the proposed project
2. Calculating the 1” stormwater volume over this impervious tributary area
3. Verifying that the proposed project will manage this 1” volume

# Calculating Impervious Tributary Area

- An impervious surface is any hard surface that prevents water from absorbing into the ground which generates stormwater runoff

Examples of impervious surfaces include:



- **Impervious tributary area** is the total square footage of impervious surfaces contributing stormwater runoff to the green infrastructure project.

- All proposed green infrastructure projects must manage at least the 1-inch stormwater volume from the impervious tributary area.
- This 1-inch volume (in cubic feet) is calculated by multiplying the impervious tributary area by a stormwater depth of 1" (or 0.083 feet).
- Convert cubic feet to gallons by multiplying the ratio of 7.48 gallons / cubic foot
- **The spreadsheet calculates the 1" volume automatically after entering the impervious tributary area.**



**Volume managed** is the sum of the infiltration volume (if applicable) and storage volume of all components of the proposed green infrastructure project.

Infiltration volume is the volume of water absorbed into the ground in a one-hour period. This is a function of the infiltration rate of the existing soil. **Use 0.5 in/hr if unknown.**

Storage volume is the total volume of void space in media layer/aggregate or detention system available to accommodate stormwater storage.

Void space is the percent of voids (or porosity) of the media/aggregate multiplied by its total volume (in cubic feet); or the capacity of a detention system

Types of media/aggregate layers include:



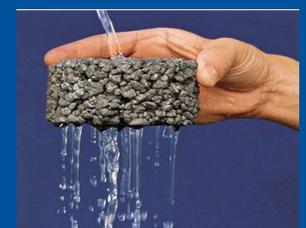
Soil Layers



Stone Layers



Drainage Layers



Porous Pavement

# Typical Porosities of Media/Aggregate

Media/Aggregate	Typical Porosity Ranges
Soil	15-20%
Broken Stone (ASTM #8)	25-35%
Pervious Concrete	15-25%
Green Roof (Growing Media)	See Manufacturer's Specs.
Drainage Layer	See Manufacturer's Specs.

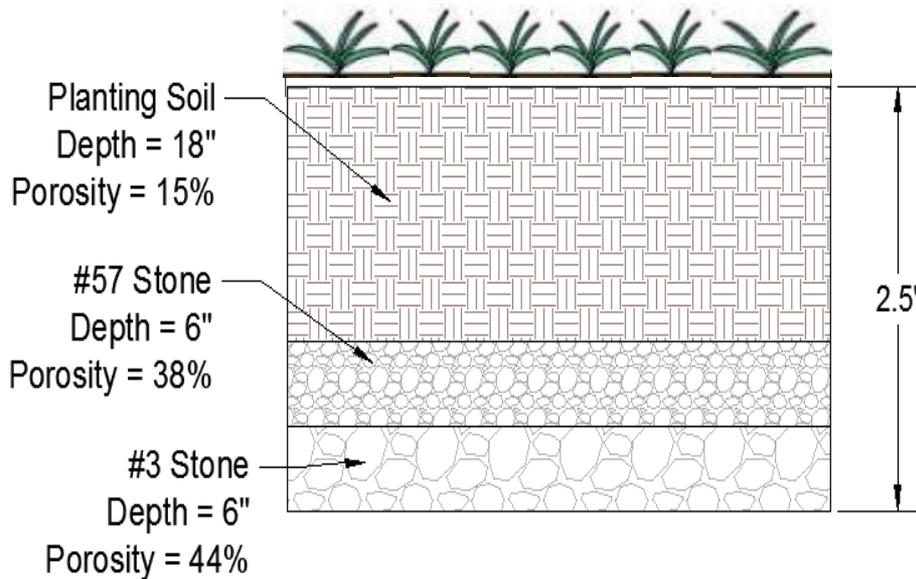
The above values are for preliminary estimation only. You must verify the porosity of each layer if Grant Application is accepted.

## Example: Proposed Rain Garden

Impervious Tributary Area = 16,000 ft<sup>2</sup>

Rain Garden Footprint Area = 2,000 ft<sup>2</sup>

### Proposed Rain Garden Cross-Section:



# Input Data to Grant Application

## 2013 Green Infrastructure Grant Program

### Stormwater Calculations Template

#### Instructions:

There are three tabs in this spreadsheet to assist Grant Applicants in calculating the stormwater volume to be managed and the total volume managed for the proposed project.

Review the list of tabs and examples below to select the tab most applicable to your project type. Note that there is a separate tab for green roof projects.

If your project contains multiple types of systems, complete the relevant tab for each type.

The summary table below will automatically compile the data from each of the three tabs. Enter the yellow values in the Summary Table into the online application

#### Tab 1: Vegetated or Infiltration Systems

- Rain Gardens
- Porous Paving
- Vegetated Swales
- Perforated Pipe

#### Tab 2: Green Roofs

- Vegetated Roof Systems

#### Tab 3: Non-Vegetated Systems

- Blue Roofs
- Cisterns
- Rainwater Harvesting / Reuse

#### Summary Table

	Impervious Tributary Area (SF)	1-Inch Stormwater Volume over Impervious Tributary Area (Gal)	Proposed Volume Managed (Gal)	
Vegetated or Infiltration Projects	0	0	0	From Tab 1
Green Roof Projects	0	0	0	From Tab 2
Non-Vegetated Projects	0	0	0	From Tab 3
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	Sum of Tabs 1, 2, and 3. Enter these values into the online application.

Input these values into Grant Application

#### Tips:

Non-vegetated projects should refer to the manufacturer and/or design specifications and enter them into the spreadsheet. Include the cut sheets/specification from the product supplier or manufacturer in your application.

For vegetated/infiltration systems, enter the void space ratio for each type of material. Add additional fields if necessary.

Blue roof projects should ensure that the slope is less than 2% to allow for adequate storage across the whole roof. Please refer to the DEP's Guidelines for the Design and Construction of Stormwater Management Systems for more information on designing a blue roof.

Green roof slopes should be less than 4%.

For green roofs, be sure to review the prospective growing media supplier's specification for their products. Enter the proposed growing media permeability rates into the table provided.

Include all of green roof system layers with retentive qualities in the table provided. Reference the manufacturer specifications for the maximum storage capacity for each layer.

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