New York State Water Resources Institute

Climate Smart Communities – Green Infrastructure Case Studies

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Presentation Outline

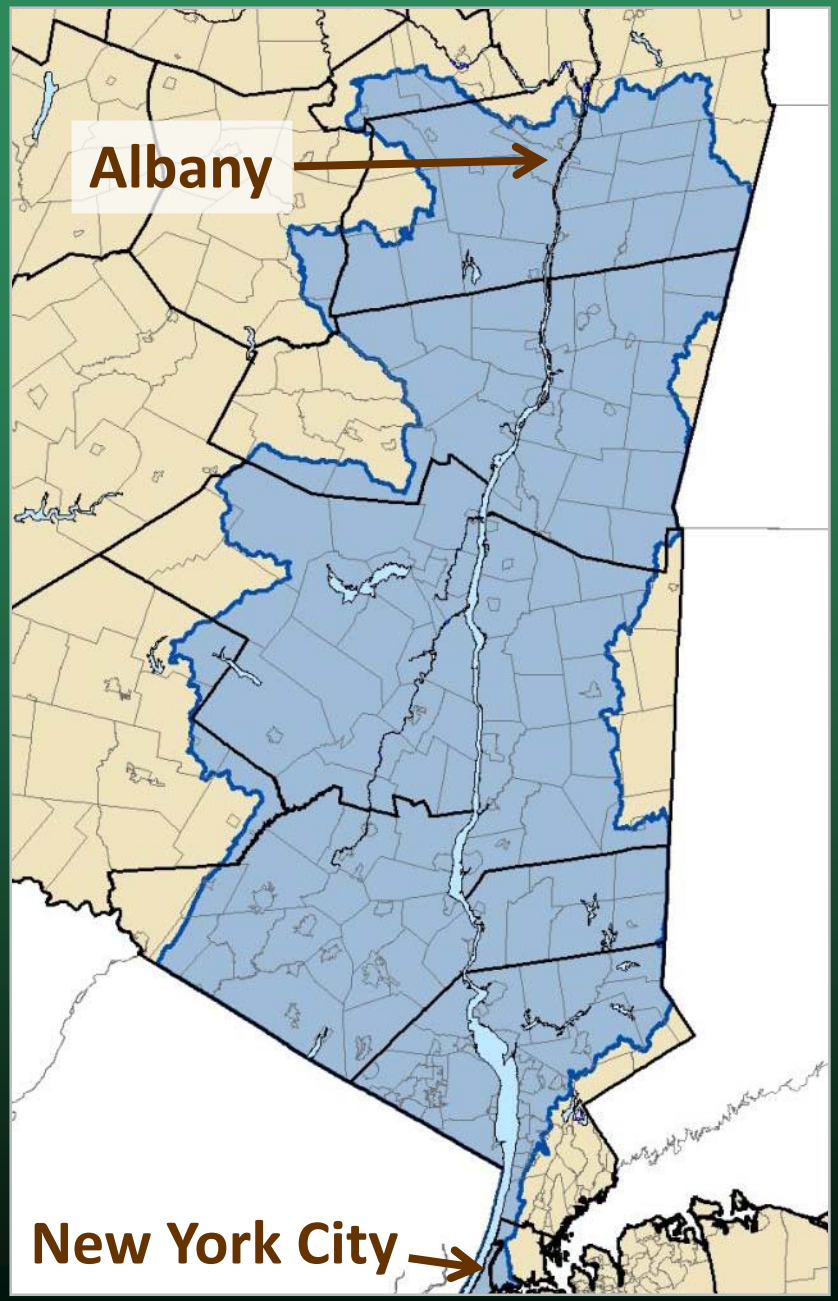
- Hudson River Estuary Program
- Impact of stormwater
- NYS Stormwater Management Design Manual
- Examples of practices
- Benefits
- What you can do

Rain garden, Piermont Library

Hudson River Estuary Program

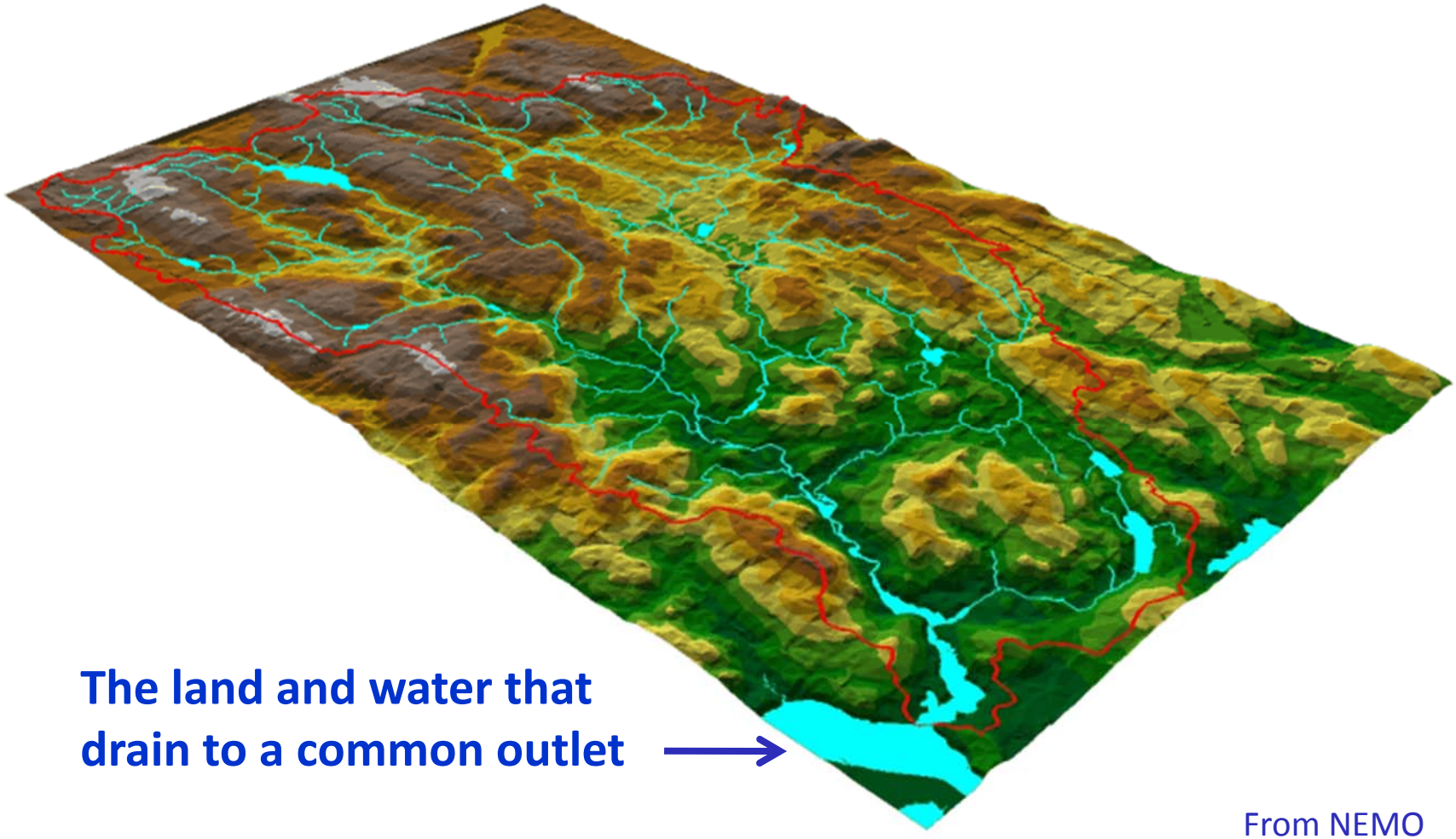
Core Mission

- Ensure ***clean water***
- Protect and restore fish, wildlife, and their ***habitats***
- Provide water recreation and river ***access***
- Adapt to ***climate change***
- Conserve world-famous ***scenery***



Hudson River Estuary Watershed

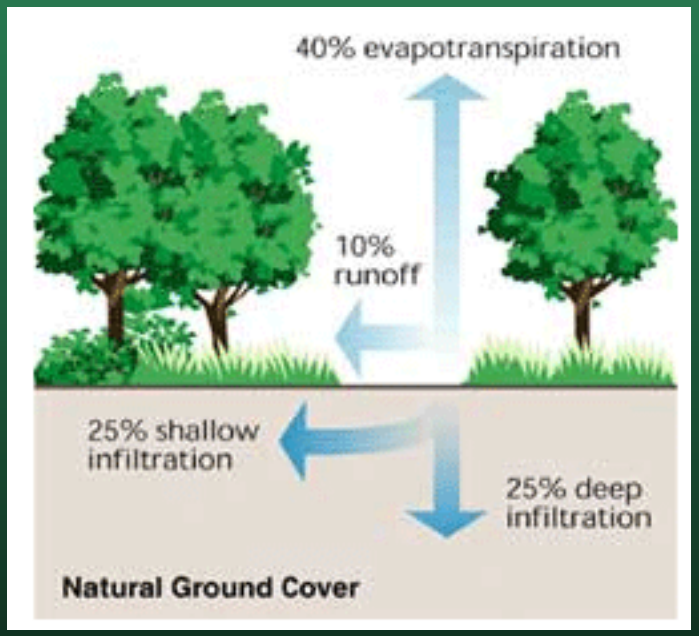
Importance of Watersheds

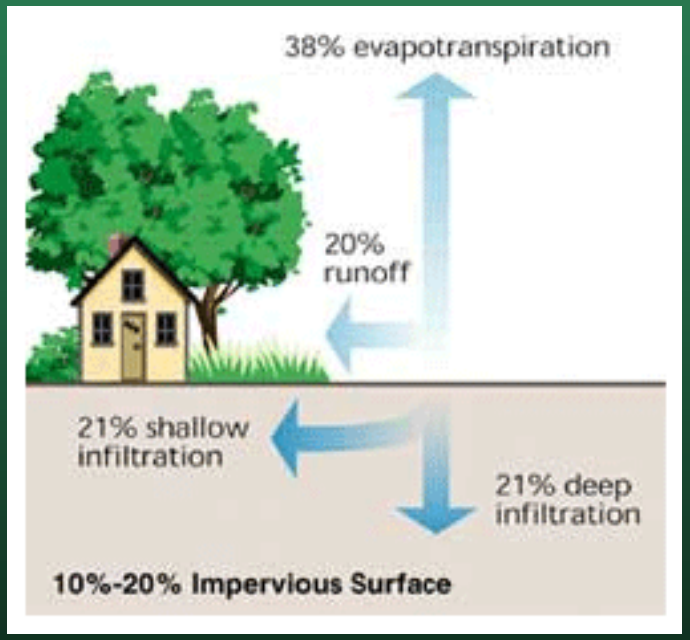


The land and water that drain to a common outlet →

From NEMO

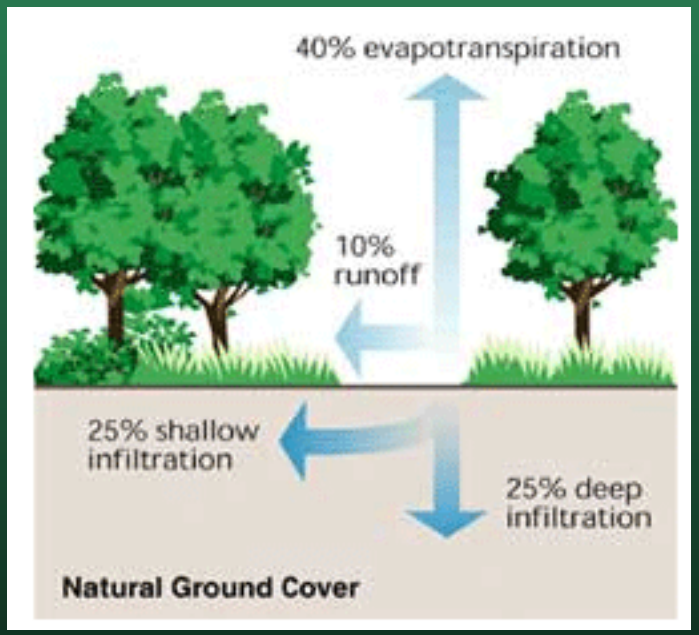
Impervious Surfaces and Stormwater

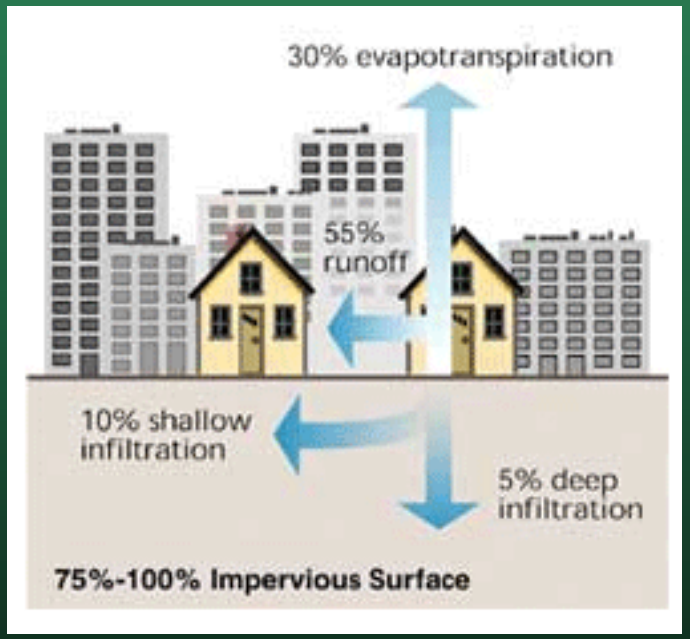




From EPA

The Problem with Impervious Surfaces





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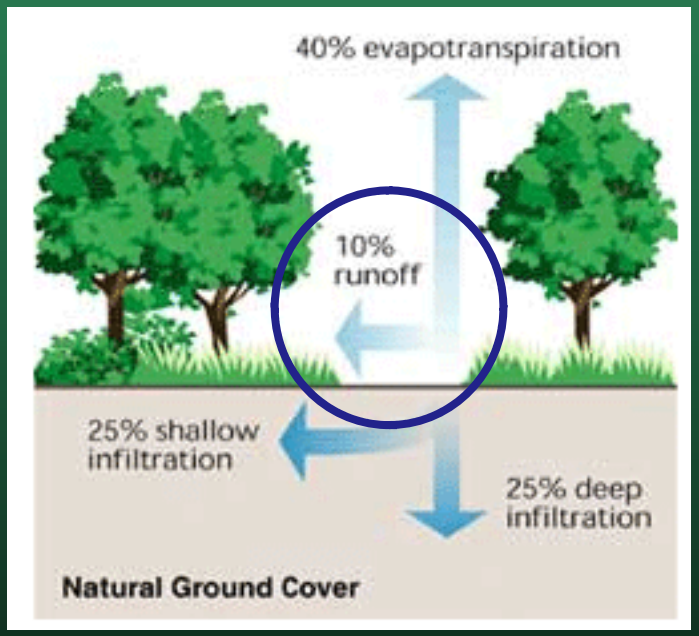

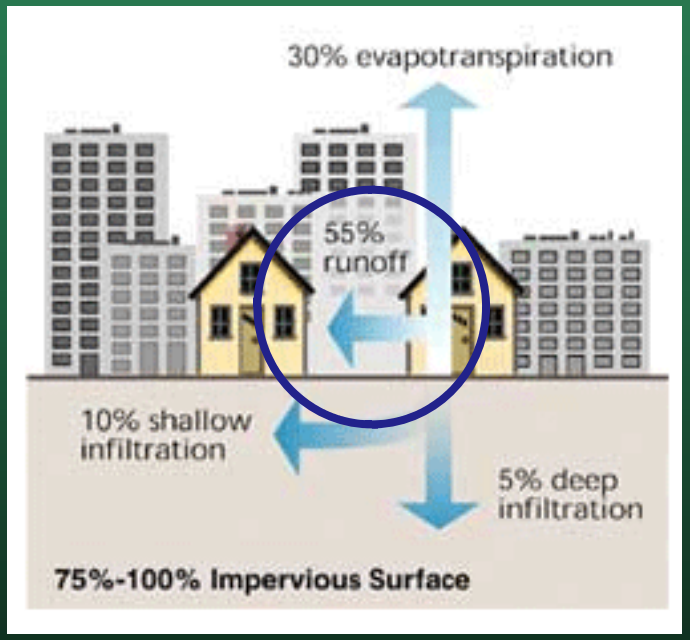

From EPA

Stormwater Carries Pollutants

- Most stream impairments in the Hudson Valley due to polluted runoff
  - Documented for ~35% of streams
- Traditional stormwater management
  - Impervious surface -> storm sewer -> streams

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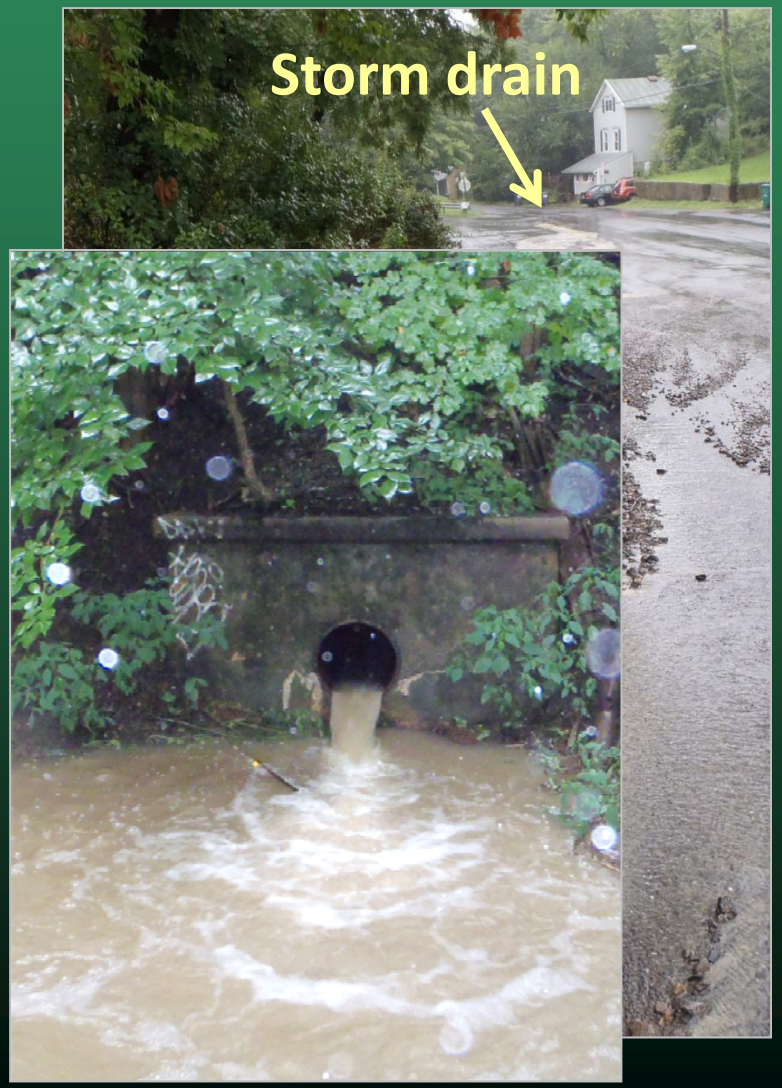


Stormwater Carries Pollutants

- Water ***quality*** problems
  - Sediment
  - Nutrients
  - Road salt
  - Oil/grease
  - Trash
- Water ***quantity*** problems
  - Flooding
  - Erosion

Overflowing Sewage

- Wet weather leads to overflows
  - Combined sewer or separated sewer
- Impacts public health, water recreation
- Degrades water quality

Sanitary sewer overflow, Poughkeepsie

Pump station, Piermont

What is Green Infrastructure?

- Different approach to stormwater - natural and engineered systems that mimic nature
- Manage runoff by maintaining or restoring natural hydrology
  - allow stormwater to ***infiltrate*** and be used by plants

Gray vs. Green Infrastructure

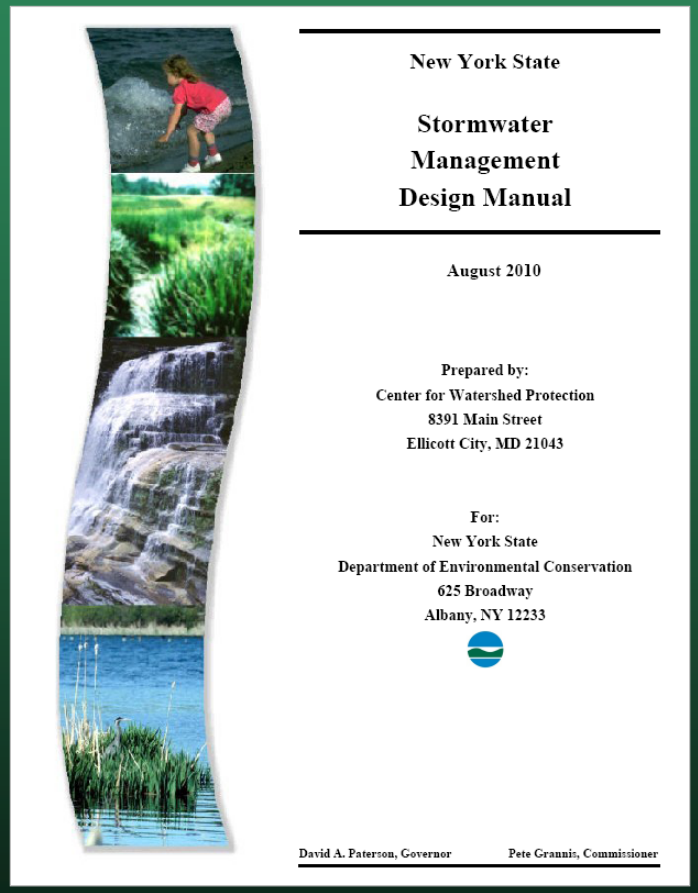
Green Infrastructure

- Scales – site, sewer-shed, municipality, watershed, region
- Provides multiple benefits
  - Slows the flow of runoff
  - Removes pollutants
  - Keeps water out of the storm sewer system
  - Adds vegetation to the landscape

Lower Esopus Creek

Green Infrastructure Requirements

- August 2010 - Updated NYS Stormwater Design Manual
- Chapter 5 – Green Infrastructure
- **New** development – use green infrastructure



NYS Stormwater Design Manual

1. Planning
   A. Preserving natural areas
   B. Reducing paved surfaces
2. Green infrastructure practices

NYS Stormwater Design Manual

1. Planning
   A. Preserving natural areas → Avoid stormwater
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1. Planning
   - A. Preserving natural areas → Avoid stormwater
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2. Green infrastructure practices → Manage stormwater

1. Green Infrastructure Planning

A. Preserve natural areas – reduce disturbance, cluster development

Traditional Subdivision

Conservation Subdivision

Dutchess County Greenway Guide

1. Green Infrastructure Planning

A. Preserve natural areas – reduce disturbance, cluster development

B. Reduce paved surfaces – driveways, parking lots, roads, etc.

Traditional Subdivision Conservation Subdivision

Dutchess County Greenway Guide

2. Green Infrastructure Practices

- Natural features and engineered practices that infiltrate runoff on-site
  - Treat stormwater closer to where the rain falls
  - Several small practices instead of one large one
- Examples on HREP website: http://www.dec.ny.gov/lands/58930.html