

Presentation to  
**Connecticut LID and  
SGP Partners**

LID Overview

May 26, 2010



**FUSS & O'NEILL**  
*Disciplines to Deliver*

# *The Problem: Conventional Site Design*

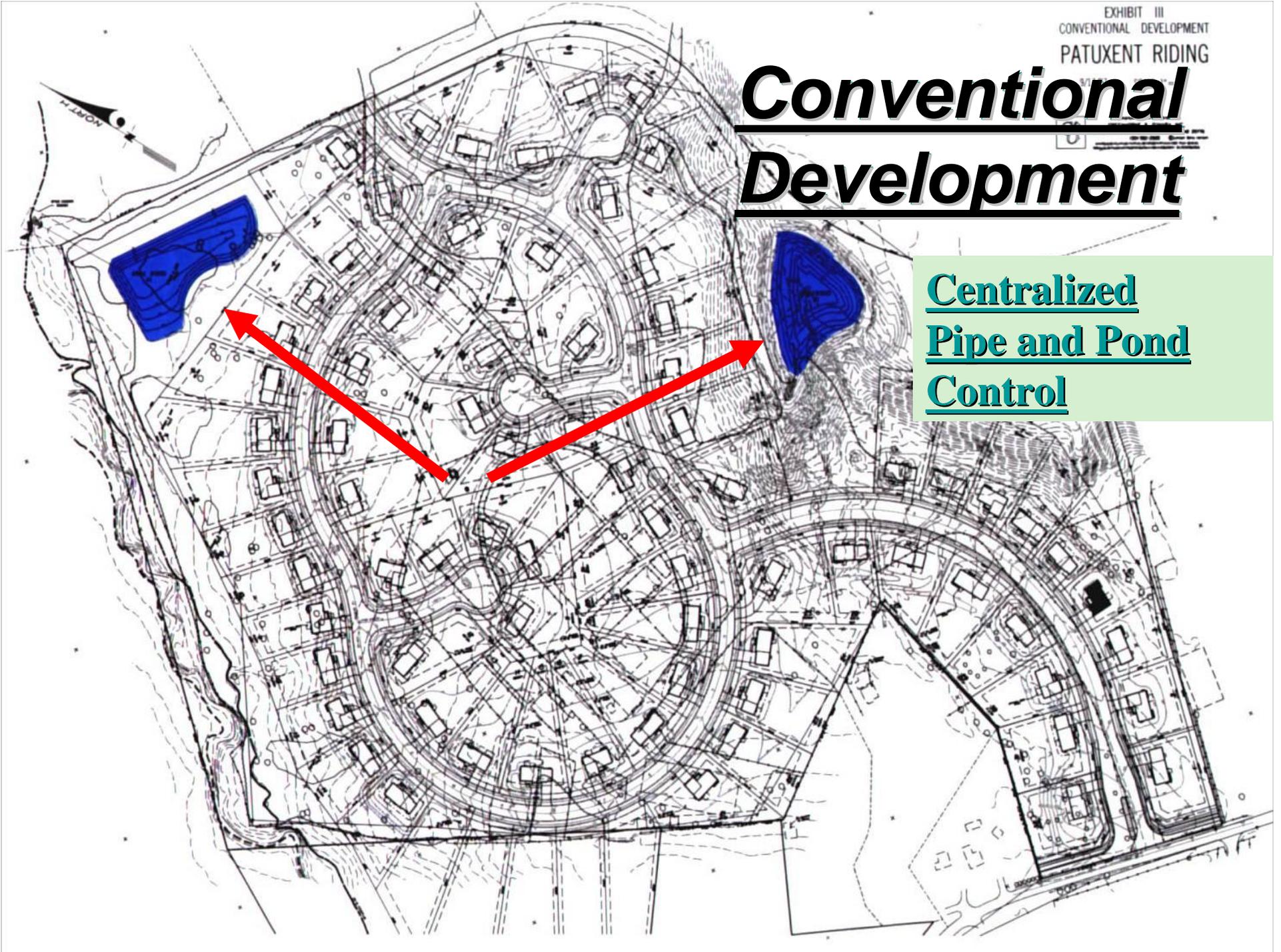
*Collect*  
*Concentrate*  
*Convey*  
*Centralized*  
*Control*



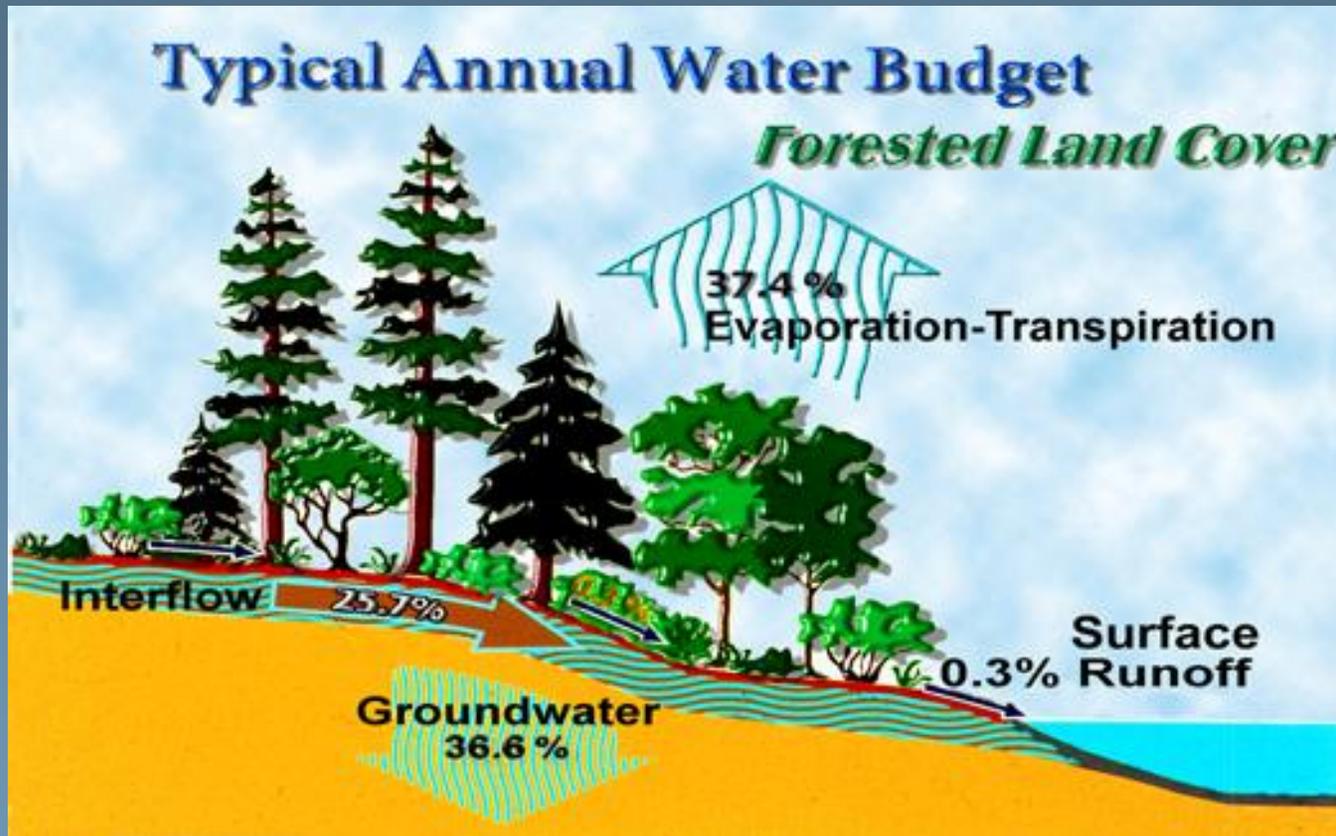
*Good Drainage Paradigm*

# Conventional Development

Centralized  
Pipe and Pond  
Control



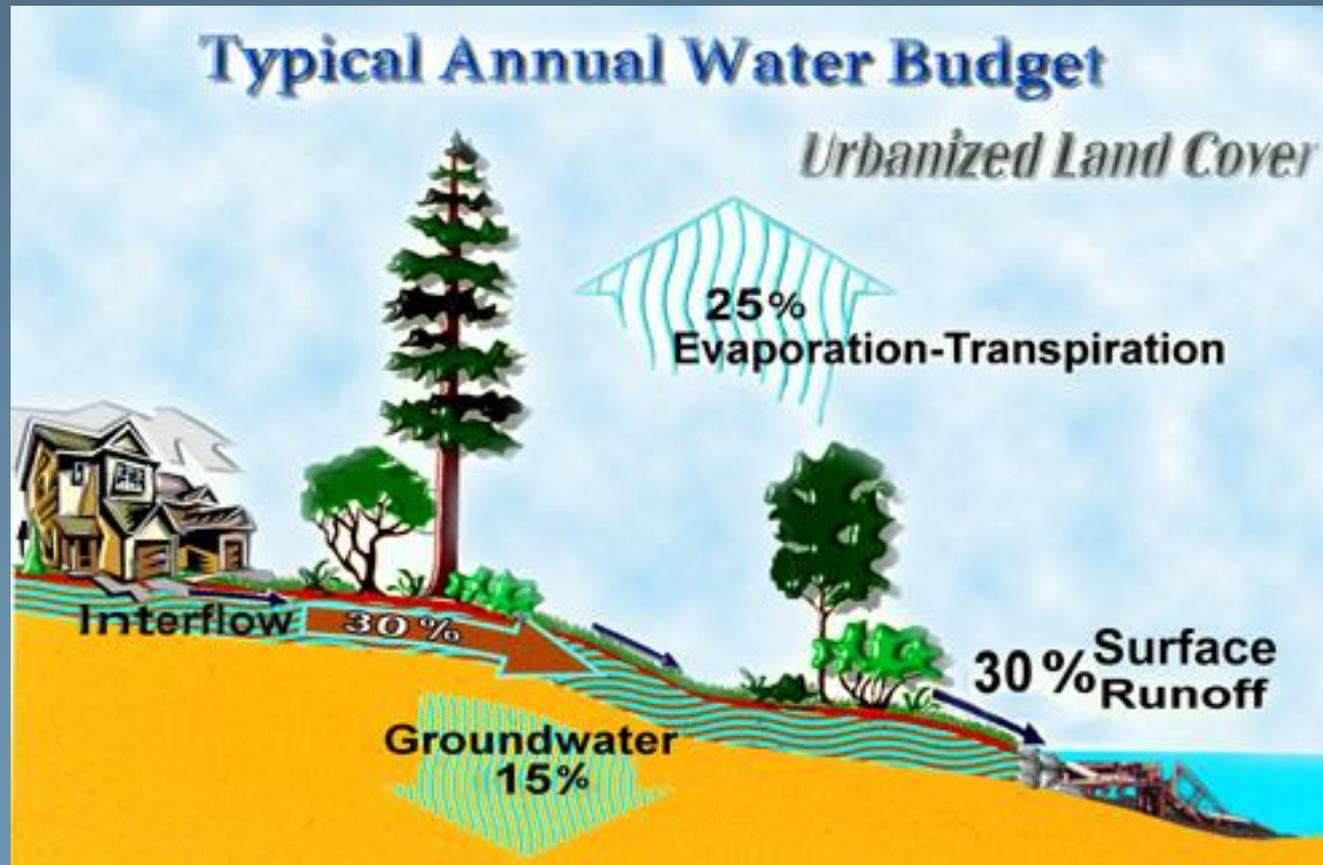
# Natural Conditions



Courtesy May, U of W



# Developed Conditions



# Low Impact Development Overview

- **New Philosophy**
  - *Maintaining Functional Relationships Between Terrestrial and Aquatic Ecosystems*
  - *Keep Water Where it Falls*
- **New Principles**
  - *Decentralized / Source Control*
  - *Distributed / Multi-functional / Multi-beneficial*
- **Old Approaches Used at a Small Scale**
  - *Retain / Detain / Filter / Infiltrate / Treat / Prevent / Use*
- **New Development Process**
  - *Conserve / Minimize / Maintain Timing / Integrate Control Practices / Prevention*



# Defining LID Technology

## Major Components

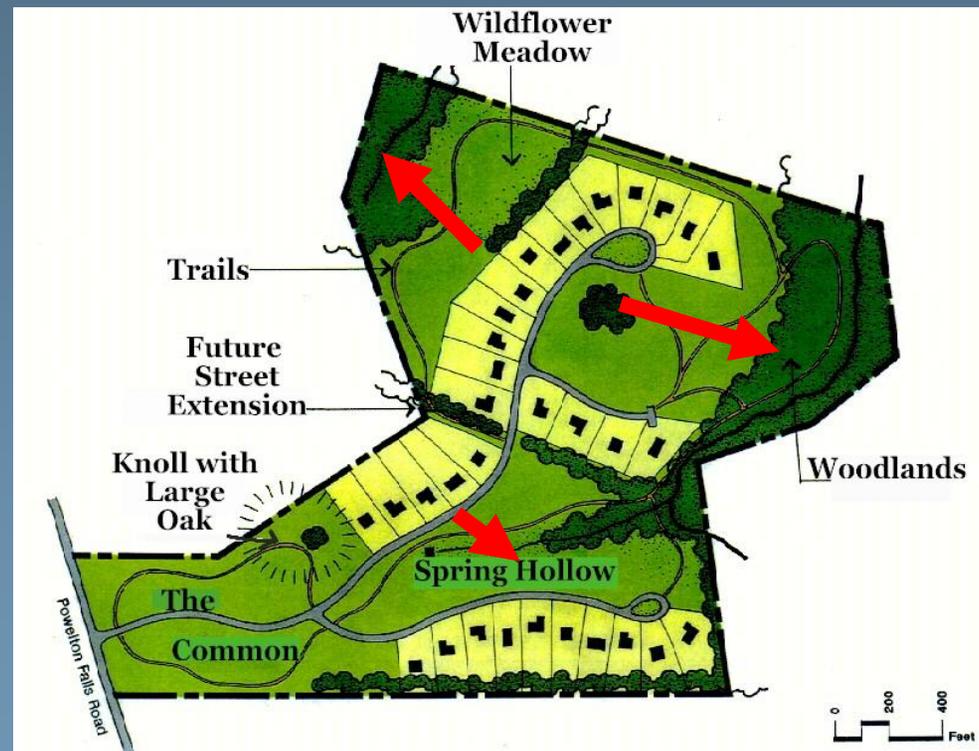
1. Conservation (Watershed and Site Level )
2. Minimization (Site Level)
3. Strategic Timing (Watershed and Site Level)
4. Integrated Management Practices (Site Level)  
*Retain / Detain / Filter / Recharge / Use*
5. Pollution Prevention  
*Traditional Approaches*



# 1. Conservation Plans / Regulations

- **Local Watershed and Conservation Plans**

- *Forest (Contiguous and Interior Habitat)*
- *Streams*
- *Wetlands*
- *Habitats*
- *Step Slopes*
- *Buffers*
- *Critical Areas*
- *Parks*
- *Scenic Areas*
- *Trails*
- *Shorelines*
- *Difficult Soils*
- *Ag Lands*
- *Minerals*



## 2. Minimize Impacts

- **Minimize clearing**
- **Minimize grading**
- **Save A and B soils**
- **Limit lot disturbance**
- **\* Soil Amendments**
- **Alternative Surfaces**
- **Reforestation**
- **Disconnect**
- **Reduce pipes, curb and gutters**
- **Reduce impervious surfaces**



### 3. Maintain Time of Concentration

- **Open Drainage**
- **Use green space**
- **Flatten slopes**
- **Disperse drainage**
- **Lengthen flow paths**
- **Vegetative swales**
- **Maintain natural flow paths**
- **Increase distance from streams**
- **Maximize sheet flow**



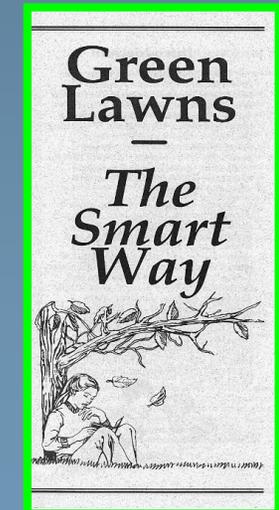
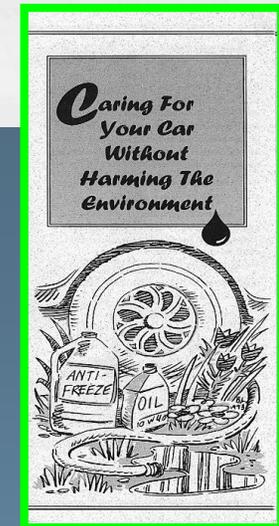
## 4. Storage, Detention & Filtration LID IMPs

- Uniform Distribution at the Source
  - *Open drainage swales*
  - *Rain Gardens / Bioretention*
  - *Smaller pipes and culverts*
  - *Small inlets*
  - *Depression storage*
  - *Infiltration*
  - *Rooftop storage*
  - *Pipe storage*
  - *Street storage*
  - *Rain Water Use*
  - *Soil Management*



## 5. Pollution Prevention

- BMP Maintenance
- Pollutants proper use, handling and disposal
  - *Individuals*
    - *Lawn / car / hazardous wastes / reporting / recycling*
  - *Industry*
    - *Good house keeping / proper disposal / reuse / spills*
  - *Business*
    - *Alternative products / Product liability*



## How Does LID Maintain or Restore The Hydrologic Regime?

- Creative ways to:
  - Maintain / Restore Storage Volume
    - interception, depression, channel
  - Maintain / Restore Infiltration Volume
  - Maintain / Restore Evaporation Volume
  - Maintain / Restore Runoff Volume
  - Maintain Flow Paths
  - Water Use
- Engineer a site to mimic the natural water cycle functions / relationships

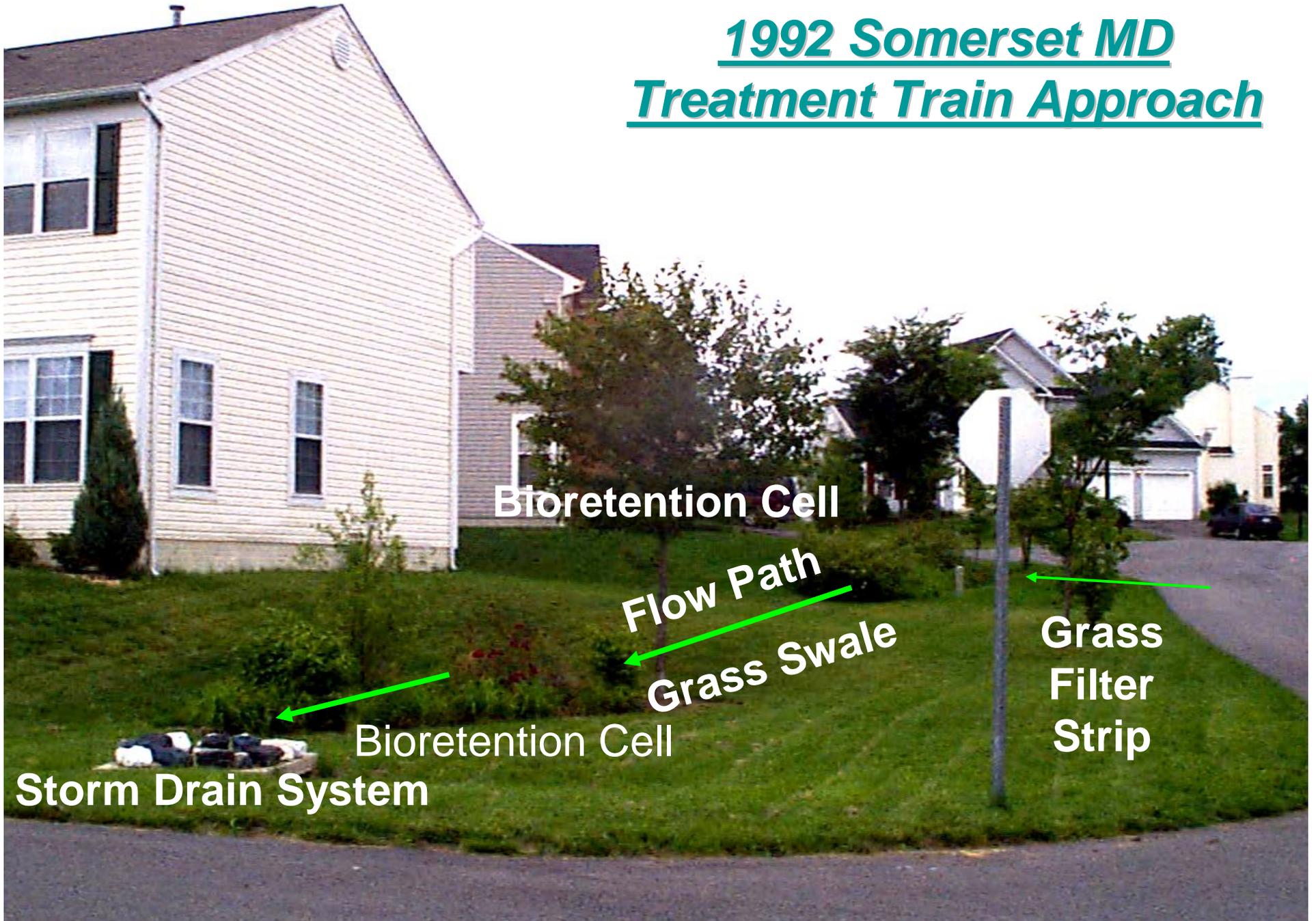


# Volume and Hydrology as the Organizing Principles

- **Unique Watershed Design**
  - *Match Initial Abstraction Volume*
  - *Mimic Water Balance*
- **Uniform Distribution of Small-Scale Controls**
- **Cumulative Impacts of Multiple Systems**
  - *filter / detain / retain / use / recharge / evaporate*
- **Decentralized / Disconnection**
- **Multifunctional Multipurpose Landscaping & Architecture**
- **Prevention**



**1992 Somerset MD**  
**Treatment Train Approach**



Bioretention Cell

Flow Path

Grass Swale

Grass  
Filter  
Strip

Bioretention Cell

Storm Drain System



**MAY 29 2001**



Rain Garden installed into a planter box on a 100% impervious cover residential mid-rise project in Old Town Alexandria. Roof-drains are within building façade.



*Structured Parking*

**Runoff Storage Filtration**



MAY 18 2001

**Buckman Heights courtyard with infiltration garden**

# Vegetated Conveyance

