Low Impact Development (LID) & Stormwater Management

How new is it really? The terms may be new but the concept is not

What is LID Low Impact Development?

LID is onsite water conservation.

The use of natural tendencies to infiltrate (or re-infiltrate) water as nature had been doing before any form of land disturbance occurred.

Thomas Jefferson
- Drainage design hasn’t changed in 2000 years!

Even the inlets are the same!
Stream Impacts

- Natural Ground Cover
  - 10% runoff
  - 25% shallow infiltration
  - 35% evapotranspiration

- 10%-20% Impervious Surface
  - 21% shallow infiltration
  - 21% deep infiltration
  - 30% evapotranspiration

- 25%-50% Impervious Surface
  - 55% runoff
  - 10% shallow infiltration
  - 15% deep infiltration
  - 30% evapotranspiration

- 75%-100% Impervious Surface
  - 65% runoff
  - 10% shallow infiltration
  - 5% deep infiltration
  - 30% evapotranspiration

Source: LID Design Strategies, Prince George’s County, Md.

Impervious Cover

- < 5%
- 8-10%
- > 65%
- 30%
- 20%
Increased Duration

Conventional SWM still releases an increased volume of runoff. It is detained and released at a slower rate, but for a longer duration.

“2 year discharge”

“Low Impact Development” Practices

Increased Volume

Increased Duration

Increased Frequency

What We Have Learned

Are we progressing or regressing?
Low Impact Design
Decentralized Controls
Roofs
Parking Lots
Open Drainage
Rain Barrels
Open Space
Turf
Educational components

Multifunctional Use of Landscape and Infrastructure
Can We Do Better?????

What is Conservation Landscaping?

- CL includes the reduction of turf grass and replacement of lawn with natural landscapes that feature locally native plants.
### REASONS FOR CONSERVATION LANDSCAPING

- Environmental concerns
- Habitat for Wildlife
- Improving Your Bottom Line
- Reduced Environmental Costs
- Aesthetics/Sense of Place
- Community Leadership

### Engineering & Design

- Water Quantity
- Long Term Costs
- Water Quality
- More Marketable
- Better/Effective Site Design

### EDUCATIONAL OPPORTUNITY

There are more than 925 different species of native insect and animal categories at risk as native plants are removed.

Plant Diversity = Wildlife Diversity
PLANT STRUCTURE:
Wildlife Needs Layers of Vegetation

Large Trees
Shrubs and Small Trees
Herbaceous
Current limit of channel

1937 Channel eliminated through development

Site 2007 Photo
What Is Next

Are the products available to help us now?

29.10.2001

Conventional Development

Pipe and Pond

Centralized Control

"Efficiency"

Uniform Distributed Small-scale Controls

LID Development

Maintaining Natural Hydrology Functions
Porous pavement and porous sidewalks

Underground receiving conduits

Porous Gutters
Hurricane Gaston Dropped 14” of Rain in Less than 24 Hours on this site within weeks of installation. The swale worked perfectly and suffered almost no damage.
Deerfield Subdivision
Wytheville, VA

Homes

Grass Swales

BioRetention

Amended Soils

Rain Gardens

Open Drainage

Rain Barrel

Porous Pavement

Conservation

Underground Cistern

LID Site

Reduced Carbon Footprint

Solar Shingles

Mini Hydro Electric Generator

Create a Hydrologically Functional Lot
Another method of infiltration: Green roofs capture rain water before it can run off

http://totalhabitat.com/P&P.html
Kenaf home grown and never used!

Innovation

10 ft wide dam!
How could it look?

Water Quality Retrofit

796 lbs of gross solids were captured in five months including phosphorus, regulated metals (copper, lead, nickel, zinc, etc.) and some nitrogen.
Okay, What do we do now?

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