2010 UNF/EPB Environmental Symposium

Low Impact Development (LID)

Presentation by:

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- What is Low Impact Development (LID) and how is the City involved?
- How does LID fit into Comprehensive Strategy for Improving the health of the St. Johns River?

SSPAC

- Subdivision Standards Policy Advisory Committee (SSPAC)

- LID Subcommittee
  - Incorporate into City Design specifications and as appropriate into Land Development Procedures Manual (Redbook)
  - LID Manual for Duval County

LID Manual for Duval County

- Voluntary – Alternative to traditional development
- Consensus – Involve key stakeholders
- Guide for including LID in stormwater permitting (State and City).

LID Manual Duval County

The LID Manual is intended for use primarily by professionals engaged in the planning, design, construction, operations, and maintenance of building and development projects in Duval County. These potential users include but are not limited to stormwater design engineers, stormwater utility staff, natural resource managers, planning officials and administrators, building officials, architects, developers, landscape architects, site design specialists, and landscape operations and maintenance professionals.

LID is a stormwater management approach that uses a suite of hydrologic controls (structural and non-structural) distributed throughout the site and integrated as a treatment train (i.e., in series) to replicate the natural hydrologic functioning of the predevelopment landscape.

The fundamental goal of applying LID concepts, design, and practice is to improve the overall effectiveness and efficiency of stormwater management (reducing total and peak runoff volumes and improving the quality of waters discharged from the site).

LID Planning and design objectives:

- Preserve or conserve existing site features and assets that facilitate predevelopment hydrologic function.
- Minimize generation of runoff from impervious surfaces and contamination as close to the source as possible.
- Promote distributed retention, detention, treatment, and infiltration of runoff.
- Capture and reuse stormwater on site.
- Minimize site disturbance and compaction of soils through low impact clearing, grading, and construction measures.

LID Manual Duval County

- Site Planning and Design
- Preserving site assets
- Minimizing and Controlling Runoff Generation at the Source
- Promoting Infiltration
- Promoting Stormwater Reuse
- Minimizing Site Disturbance
- Detention with Biofiltration
- Shallow Bioretention
- Rainwater Harvesting

LID Manual Duval County

- Pervious Pavements
- Greenroof Stormwater Treatment Systems
- Swale Section Design
- Roadway Design (width)
- Sidewalk Design
- Safety Vehicle Access
- Right of Way – utilities, width, interceptor ponds, Rain Gardens
- Operation and Maintenance – Inspections and Enforcement (HOA issues)
- Incentives – Rebates / Density


Collect
Concentrate
Convey
Centralized
Control

Pervious Pavement

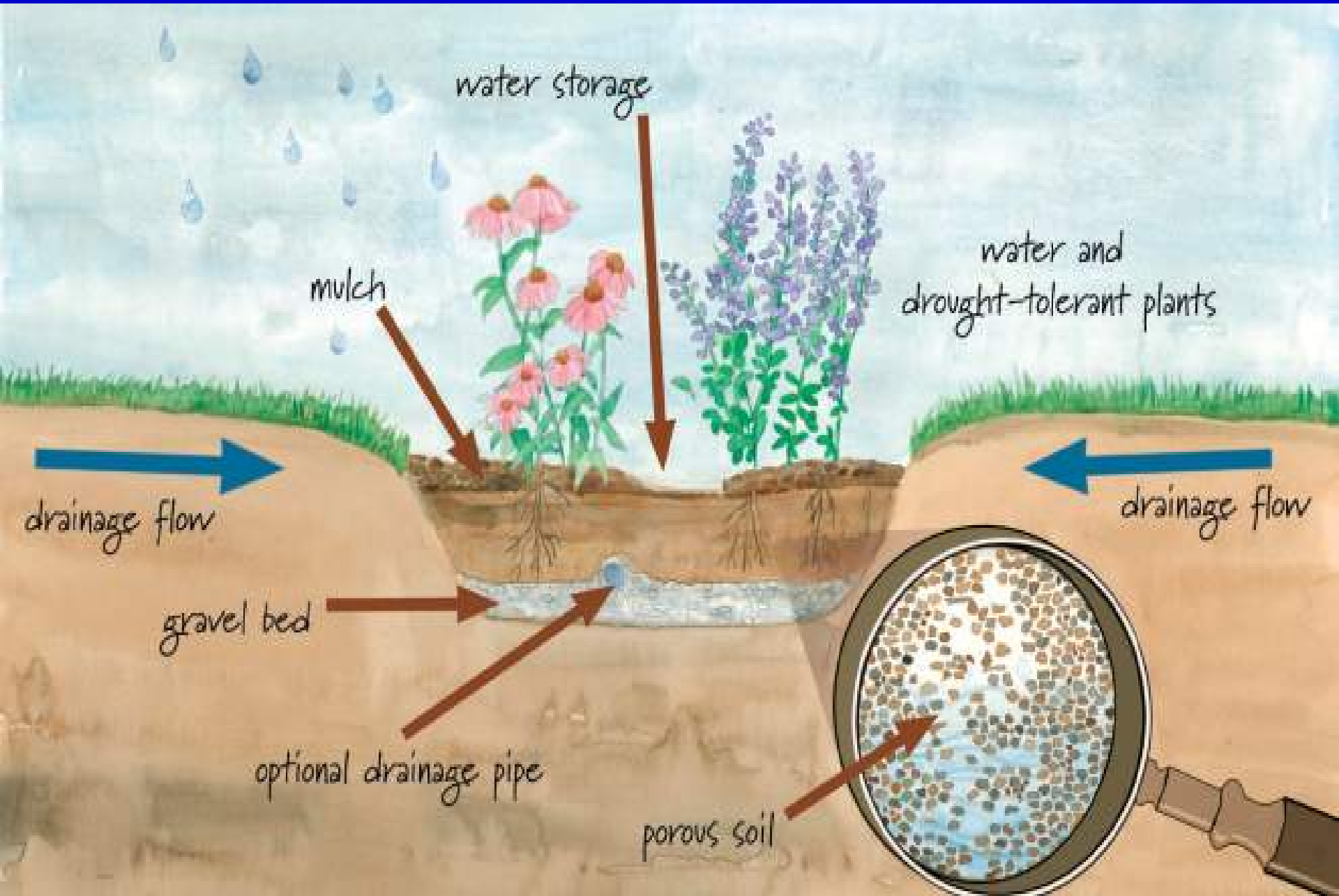
(a) (b) (c)

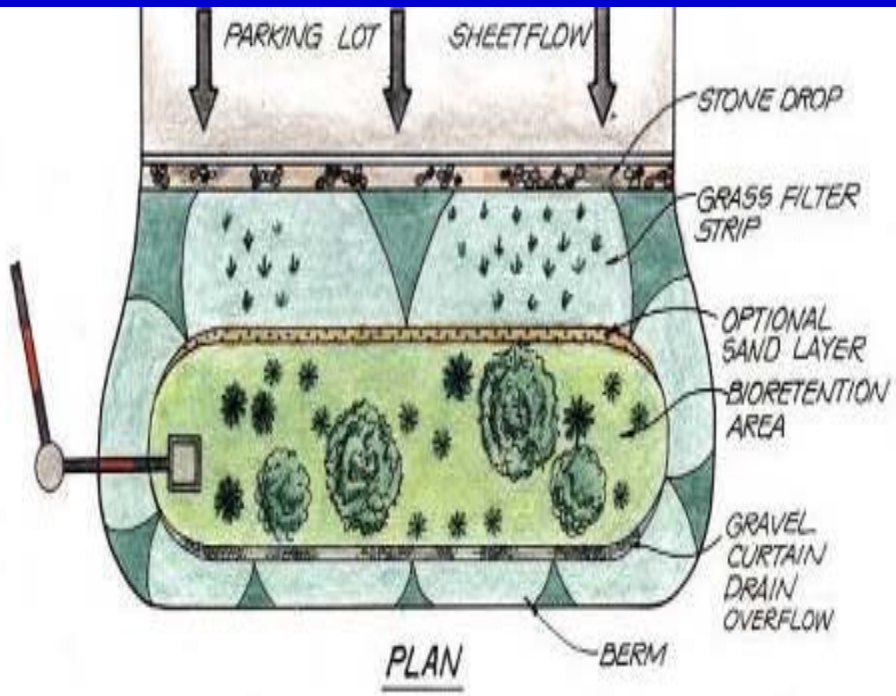
Figure 3-2-1 Common Pervious Pavement Materials: a) Permeable Interlocking Concrete Pavers, (b) Porous Concrete, (c) Flexi-pave™

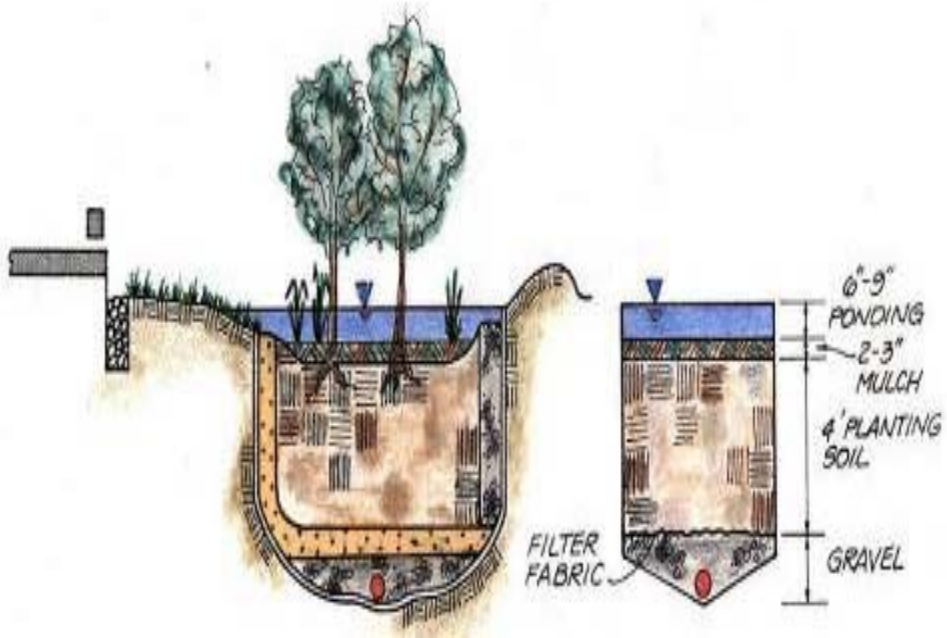
Why Raingardens?

- Reduce runoff volume
- Remove pollutants
- Provide functionality
- Enhance aesthetics
- Attract wildlife
- Recharge groundwater
- Consume CO_2

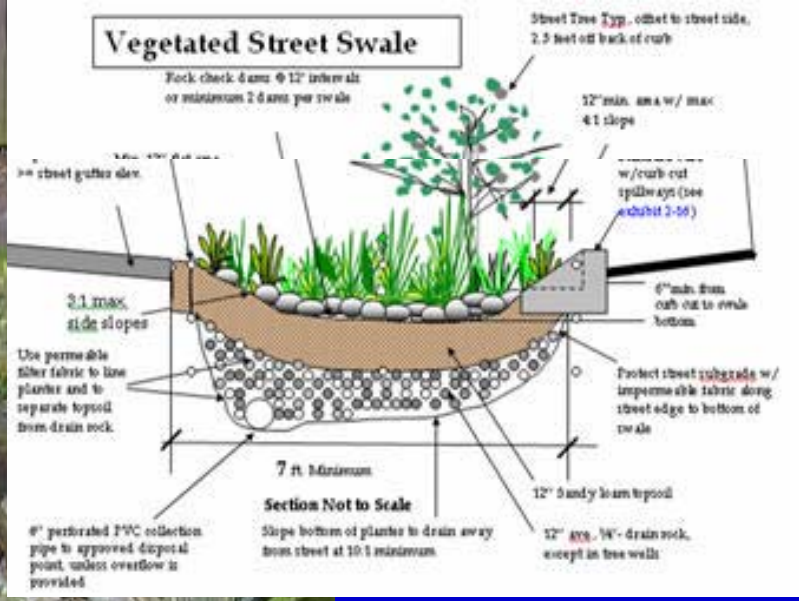
What is a Raingarden?




PARKING LOT
SHEETFLOW
STONE DROP
GRASS FILTER STRIP
OPTIONAL SAND LAYER
BIORETENTION AREA
GRAVEL CURTAIN DRAIN
OVERFLOW
BERM
PLAN


6"-9" PONDING
2-3" MULCH
4' PLANTING SOIL
FILTER FABRIC
GRAVEL

Examples of Raingardens


Vegetated Street Swale
Rock check dams @ 12' intervals or minimum 2 dams per swale
Street Tree Typ., offset to street side, 2.5 feet off back of curb
12" min. area w/ max 4:1 slope
>= street gutter elev.
w/curb cut spillways (see exhibit 3-56)
2:1 max. side slopes
6" min. from curb cut to swale bottom
Use permeable filter fabric to line planter and to separate topsoil from drain rock
Protect street subgrade w/ impermeable fabric along street edge to bottom of swale
7 ft. Minimum
Section Not to Scale
12" Sandy loam topsoil
6" perforated PVC collection pipe to approved disposal point, unless overflow is provided
Slope bottom of planter to drain away from street at 10:1 minimum
12" min. 3/4" drain rock, except in tree wells

Before

After.

NE Fremont Stormwater Curb Extension

Greenroof

- Vegetated Roof Cover
- Active (Intensive): Deep Media, Intended for Public Access and Aesthetics
- Passive (Extensive): Shallow Media, Intended for Maintenance Access Only.
- Credit is gained by retention of rainfall and if used with a cistern, additional credit for retention is earned.

Credit Dr. Marty Wanielista

Greenroof Stormwater Treatment System

- ***Greenroof Stormwater Treatment System***: A vegetated roof with a cistern that can be used for stormwater pollution control, volume reduction, and peak flow reduction.

Greenroof Benefits

- Effective stormwater treatment
- Longer roof life & warranty
- Decreases temperature fluctuations from more than 70º F to 5º F
- Office space with view of greenroof had rent increased by $8 per square foot in March 2005.
- Energy benefits - heat reduction of about 45% in a year

How will the City comply with the Lower St. Johns River Nutrient Basin Management Action Plan (BMAP) adopted by DEP in October 2008?

Microcystis Bloom - I-295 (north view) over mid-channel St. Johns River - 08.19.05 - 2:43pm

The Problem

Excess Nutrient Impacts

- Drainage impairment
- Algal blooms
- Fish kills
- Aesthetics
- Violations of Water Quality Standards

How will we get there?

BMAP Strategy

1. Master Stormwater Management Plan
   - River Accord
   - Stormwater Utility
     - Capital Improvement Projects
     - Structural Controls
     - Best Management Practices (LID)
2. Stormwater NPDES Program
   - Street Sweeping
   - Pollution Prevention (LID)
   - Education & Outreach – Florida-Friendly Landscaping (LID)
3. Water Quality Monitoring Program
   - River Report (Accord)
4. Water Quality Credit Trading

BMAP Strategy *cont'd*

5. Reuse Ordinance (Ch 752 O.C.)
6. Septic Tank Phase-out
7. Florida Friendly Landscape and Irrigation System Design - 2009-864 (LID)
8. Landscape Irrigation Ordinance (2008-030) (LID)
9. Fertilizer Ordinance (2008-028) (LID)

QUESTIONS?

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