LOW IMPACT DEVELOPMENT

LID IN REGION 6

HARRIS COUNTY STORY

Nick Russo
Environmental Team Leader
Harris County Public Infrastructure Dept.

Introduction
Robert Adair, HLWSF
San Antonio
Karen Bishop, San Antonio River Authority
Tiffany Price, Bender Wells & Clark
Austin
Andy Johnston, PE, CFM, CPESC, Halff & Associates
Dallas-Fort Worth
Mikel Wilkins, PE, ISI ENV-SP, Verdunity
Oklahoma
Zach Roach, Ideal Homes
LID O&M Considerations: Policy and Practicality
David Batts, Construction EcoServices

Introduction
Robert Adair, HLWSF
Arkansas
Becky Roark, Illinois River Watershed Partnership
Louisiana
Dana Brown, PLA, ASLA, LEED AP, CSI, AICP, Dana Brown Associates
New Mexico
George Radnovich, ASLA, Sites Southwest
Harris County LID Projects

Nick Russo, Team Leader, Environmental Services
Harris County Public Infrastructure Department
Architecture & Engineering Division
Agenda

• Introduction
• Birnamwood Dr.
• Other Roadways
• Questions
LID Interest

- Right of way for detention & storm water quality.
- Cost effectiveness.
- Reduced maintenance/mowing.
- Improved water quality.

- Solutions to complex problems....
Low Impact Development (LID) is a comprehensive land planning and engineering design approach with the goal of maintaining, as the minimum, the pre-development hydrologic regime in a watershed without solely using conventional development and detention basin techniques to satisfy drainage and flood mitigation requirements.
HLWSF LID Competition

- Independence Pkwy-Design Category
- Design workshops- 2010
- LID Criteria Reviews and adoption April 2011.
- A roadway project came about that was near a park setting....
Spring Creek Greenway & LID projects
Birnamwood Drive

- East of I-45, North of Cypresswood.
- Road leads to Pct 4’s John Pundt Park & Spring Creek Greenway.
- First LID-roadway project in our region.
Birnamwood drive

LID roadway section

Floodplain mitigation
Median Bioswale

- Treats 1” water quality volume.
- Engineered soils at 2 outfalls.
- False back curb Inlets.
- No storm sewer- (outfalls only).

Water released downstream into bayous is cleaner:

1. Rainwater falls on the roadway and drains into the bioswale
2. Water is cleaned naturally by vegetation as it flows down the bioswale
3. Clean water drains into an outfall and into downstream bayous
Design Elements – center median - Bioswale

Center median bioswale, false curb inlets, berms, riprap

October 2011
January 2012
January 2012
December 2012
June 2012
Design Elements

Bioretention w/Engineered Soils and underdrain only at 2 outfall areas. Several native seed mixes and a variety of *mostly* native and adapted potted plants & trees.
Design Elements – Engineered Soil

- Focal Point Biofiltration System
  Treats the first 1” of runoff volume = between 2 to 3yr storm or (3-5 inches in 24hr.) at 2 outfalls.

- High Infiltration Rate – 100”/ hr

- Filtration areas offered a unique solution.

- Protection of media until vegetation is established was key.
Design Elements – Native Plants

- LID may encourage use, but not specify/require.
- Statewide interest in native grass/plants for public projects.
- What grass will work?
- Everyone likes, & everyone doesn’t like.
- Beauty is in the eye of...
Native / Adapted / Invasive Debate...
Not everyone is on board...

- Encourage native, caution criticism.
- Statewide interest in native grass/plants for public & oil/gas projects.
- What grass seed will work best?
- Everyone likes, & everyone doesn’t like.

[Images of signs and protests]

[Website: www.txsmartscape.com]
Design Elements – Native Plants

- We wanted to use natives/adapted plants but did not specify 100%.
- Several seed mixes from Native American Seed.
- Goal to reduce mowing.
- Positive Acceptance.
Re-seeding & establishment

October 16 2012
Swale mowed once since June 2012. (Feb 2014)
Cost Effectiveness

Total Project Cost = $2.6 million

Cost Savings compared to the traditional roadway:
- Eliminated offsite detention.
- Reduced our floodplain mitigation pond.
- Reduced wetland impact.
- Reduced right of way purchase.
- Reduced storm sewer.
- Reduced mowing to 2 times per year vs. 10 or more times.
- Saved at least $100 -$200K compared to traditional project cost but the main point is all of these LID elements were not more expensive.
Monitoring Plan

What we want to evaluate:

- **Water Quality**
  performance of the swale and the soil media
- **Runoff Reduction**
  from the swale and the soil media
- Monitoring of the southern outfall location (half of the project).
Equipment Installation 4/1
Seeding
6/9/14 rainfall – 1.49”
- North of I-10 East, close to Baytown.
- Adjacent to a proposed Chevron facility expansion
- A project by Harris County Precinct Two
Sjolander-Existing Conditions

- Two lane asphalt roadway with roadside ditches
- Twenty-six pipelines and a SJRA water canal cross the roadway
- Two outfall locations to existing channel systems
LID Design

- Four lane concrete roadway, about 1 mile
- Bioswale drainage system on western edge
- Minimal storm sewer for outfalls only
LID Design

- Focal Point Biofiltration System at outfall locations
Sjolander Rd. Bioswale Planting Concept
Option B
December 18, 2013
Economics & Benefits

• The LID design allowed for roadway expansion to occur with minimal impacts to the pipeline corridor.

• Cost savings of the lid design compared to a traditional approach with storm sewer & offsite detention was astronomical (multi-million cost savings).

• Estimated Traditional Cost:
  o Road, Detention and Storm Sewer $4.7 M
  o Pipeline adjustment (500Keach) $13M
  o Water Supply Canal Extension $0.85M
  
  Total $18.55 M

• LID Design Cost:
  o No water supply canal extension required
  o No pipeline adjustments required
  o No offsite detention

  Total $3.8 M
Planning considerations

- Consider the project goal
- Evaluate project costs
- Visualize the landscape plan
- Determine vegetation establishment
- Think outside the box.
Summary

• LID projects have been designed, constructed, and 1 is being monitored.

• LID has offered a cost-effective, unique solution, to complex issues.

• Several new projects moving into study and design phase that will evaluate LID as an option for the project.
Questions

• Nick.Russo@hcpid.org
Treaschwig-Cypress Creek Bridge
N. Main-native grass

Coastal Prairie Seed Mix hydromulched w/Flextterra less than 60 days prior to photo.
N. Main

TYP. RAIN GARDEN CROSS SECTION

Scale: 1/4"=1'-0"

NOTE:
1. CENTERLINE RAIN GARDEN SHALE ELEVATION SHALL BE 6'-12" BELOW THE LOWEST ADJACENT ELEVATION.
2. RAIN GARDENS SHALL NOT BE CONSTRUCTED UNTIL ALL CONTRIBUTING DRAINAGE AREAS HAVE BEEN STABILIZED.
N.Main - Wildflowers