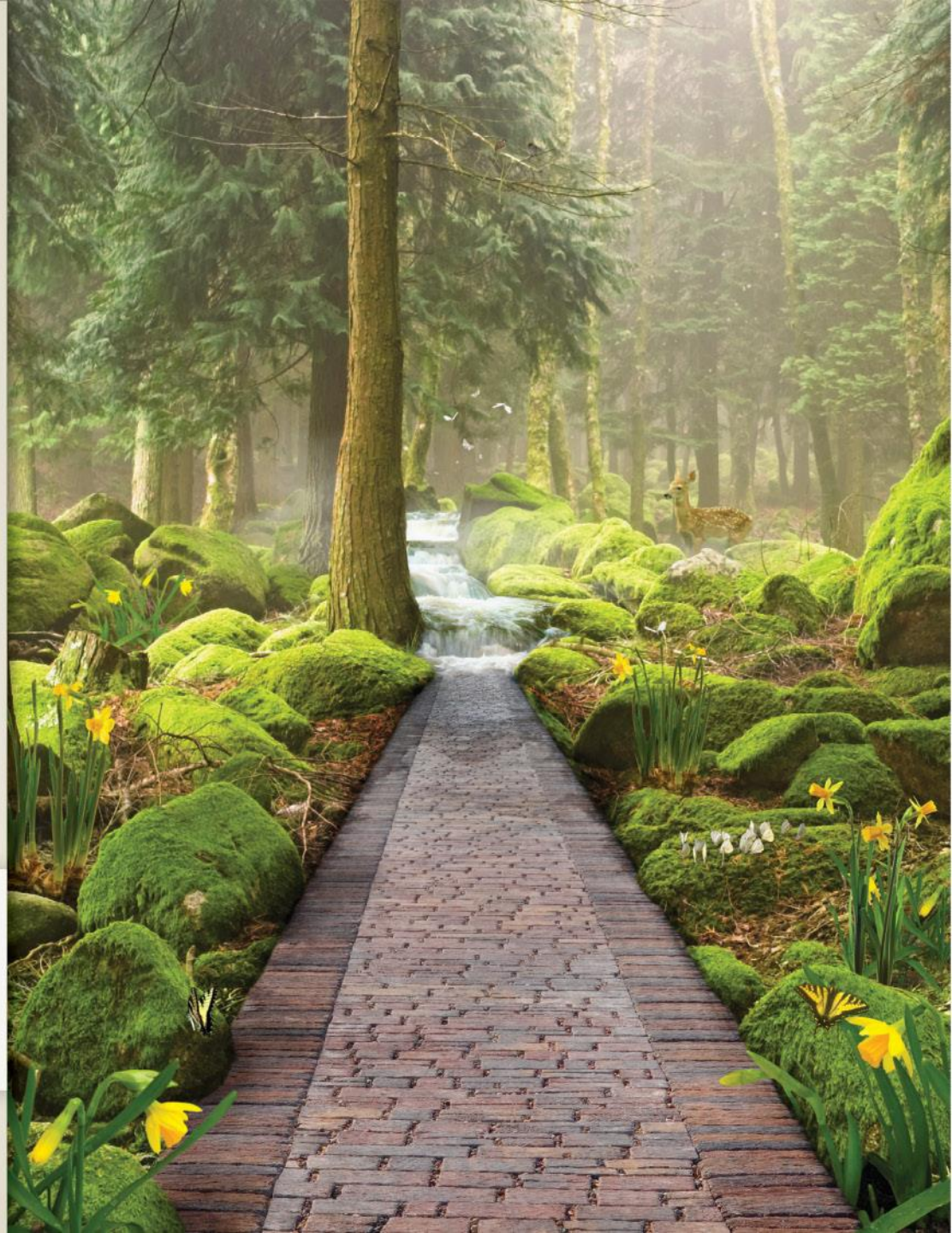
Nashville
Retrofit of Fulton Municipal Parking Plaza

IAFSM

Bloomington, IL

March 6, 2013

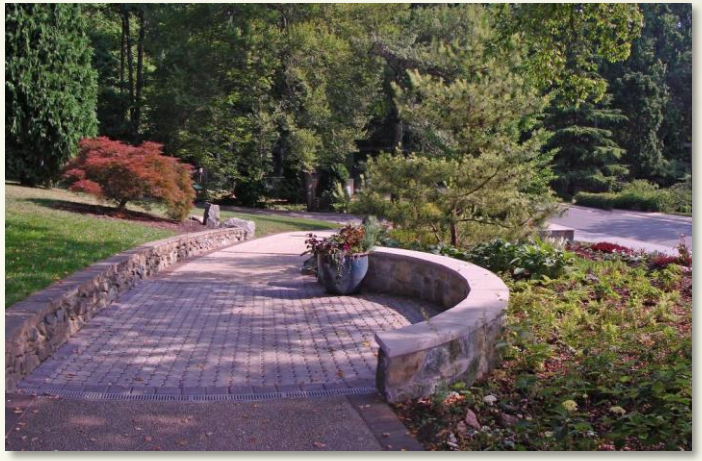
BELGARD
–environmental–





Sustainable Solutions that Last

Sustainable Site Pavement Systems



Minimize the hydrologic impacts of development

Sustainable Site Pavement Systems

Low Impact Design

Sustainable Site Pavement Systems

Water Quantity

Sustainable Site Pavement Systems

Water Quality

Sustainable Site Pavement Systems

Water Quality

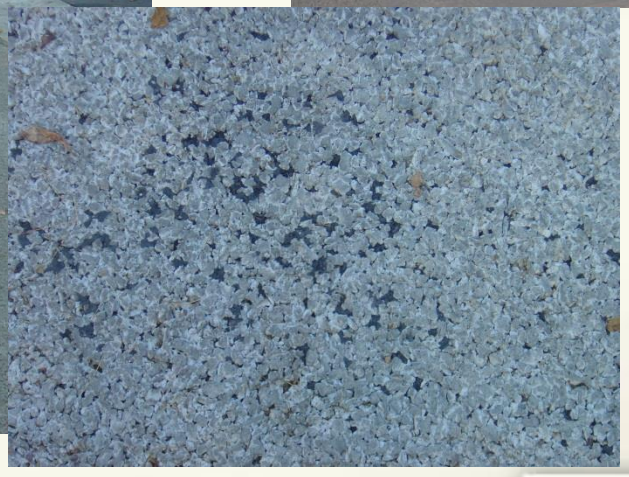
Sustainable Site Pavement Systems

Conventional Pavements

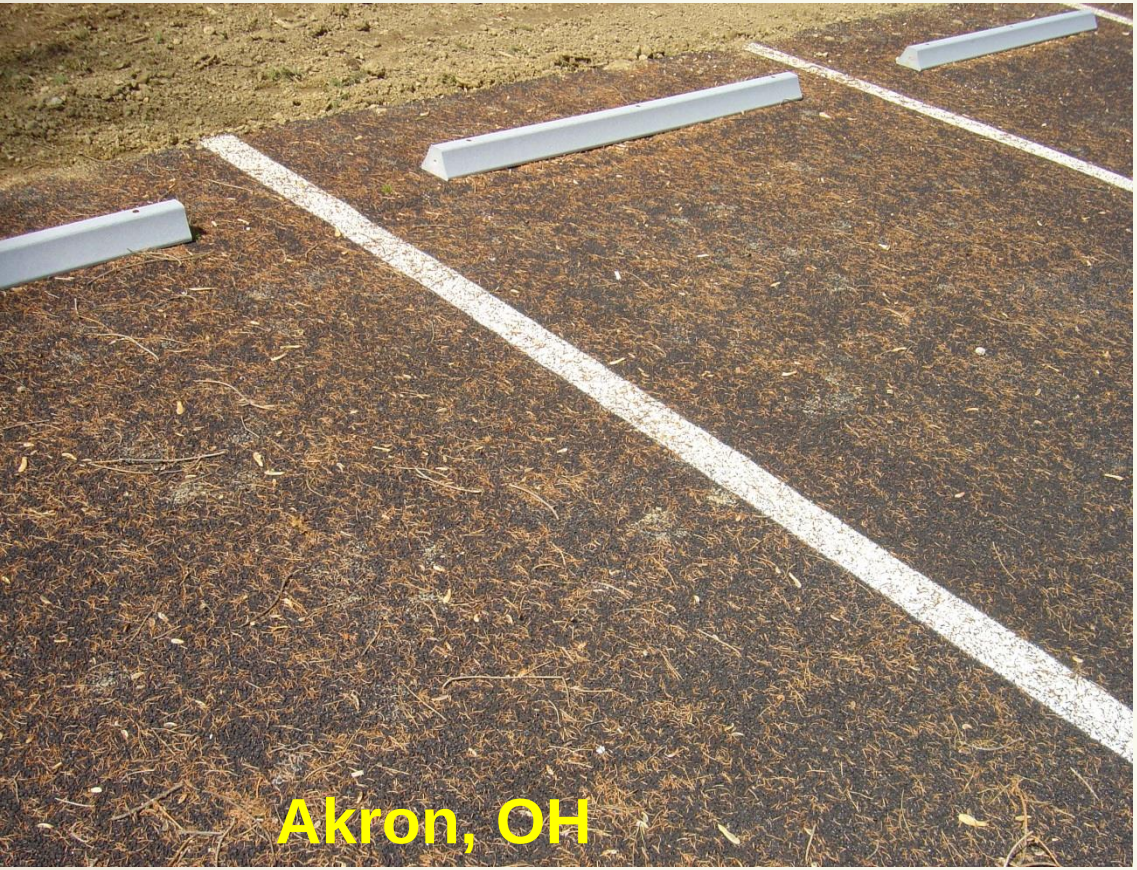
Promote

- First Flush Pollutants
- Poor Winter Performance
- High Maintenance
- Poor Life Cycle Costing

Pervious/Porous Concrete



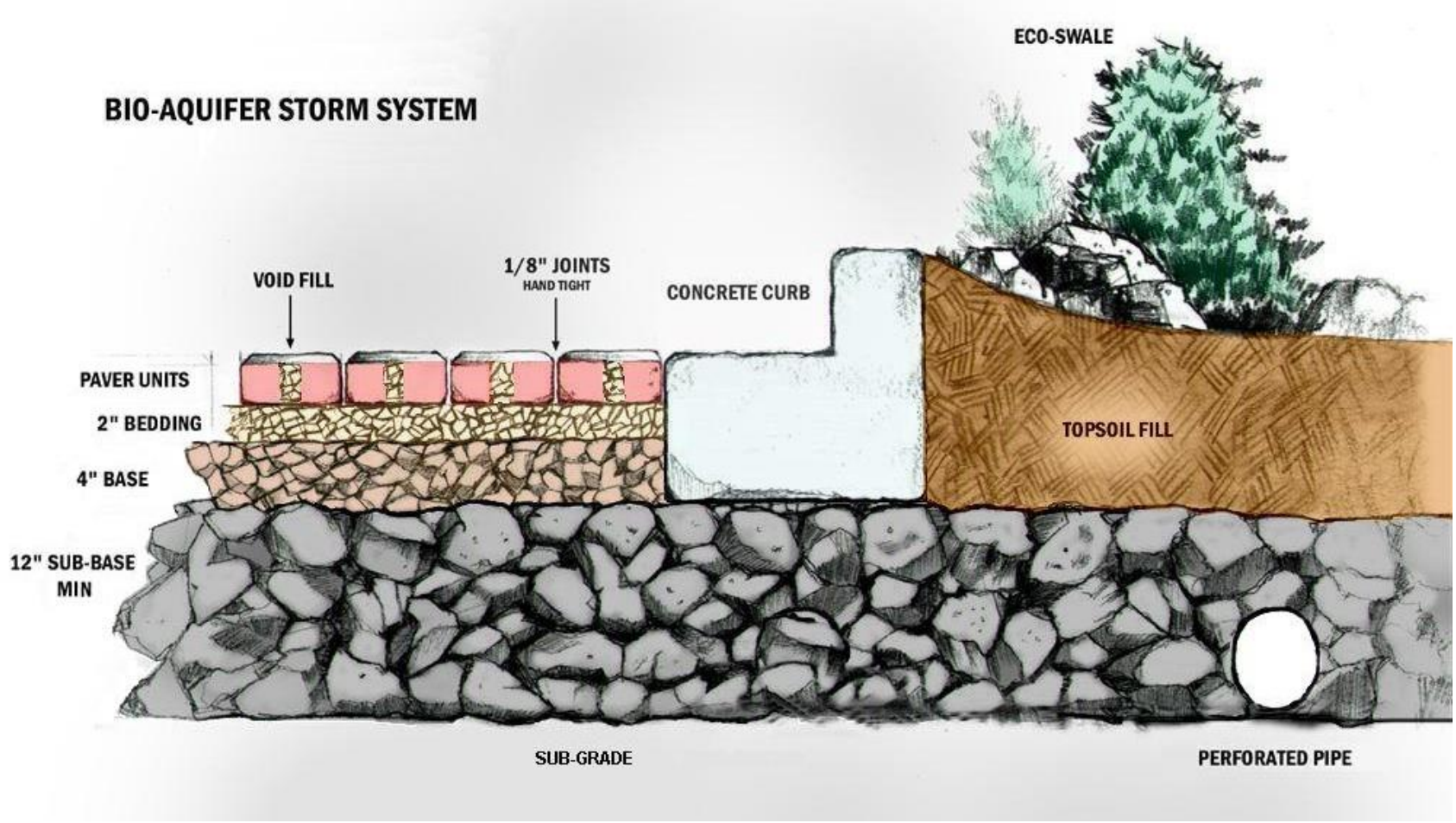
Porous Asphalt



Perception in the Marketplace

- Expensive to build
- Expensive to maintain/clogging
- Cannot drive heavy vehicles on pavement
- Cannot use in cold climates

Stormwater Management



Richard H. Fulton Complex

Low Impact Development Parking Lot

ASHWORTH *ENVIRONMENTAL* DESIGN
Landscape Architecture
Environmental Graphic Design
Plant Community Restoration
www.ashworthenvironmental.com

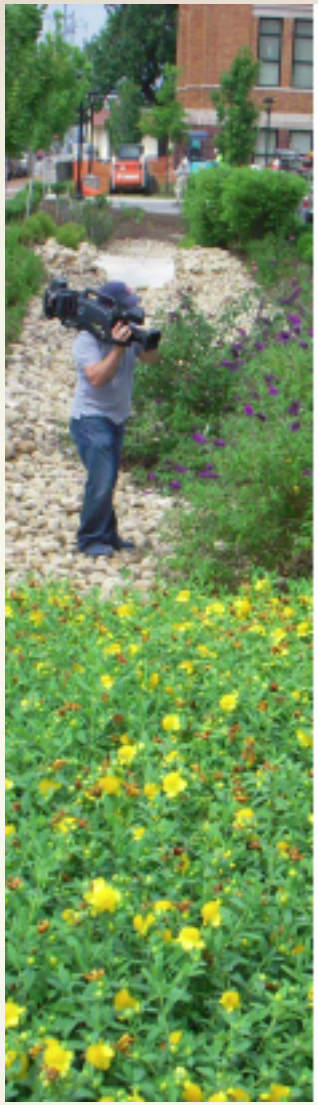
Site Location

Overview

- Project Background
- Project Details
- Cost Implications
- Lessons Learned

Low Impact Development
Parking Lot- June 2009

Sustainable Site Pavement Systems

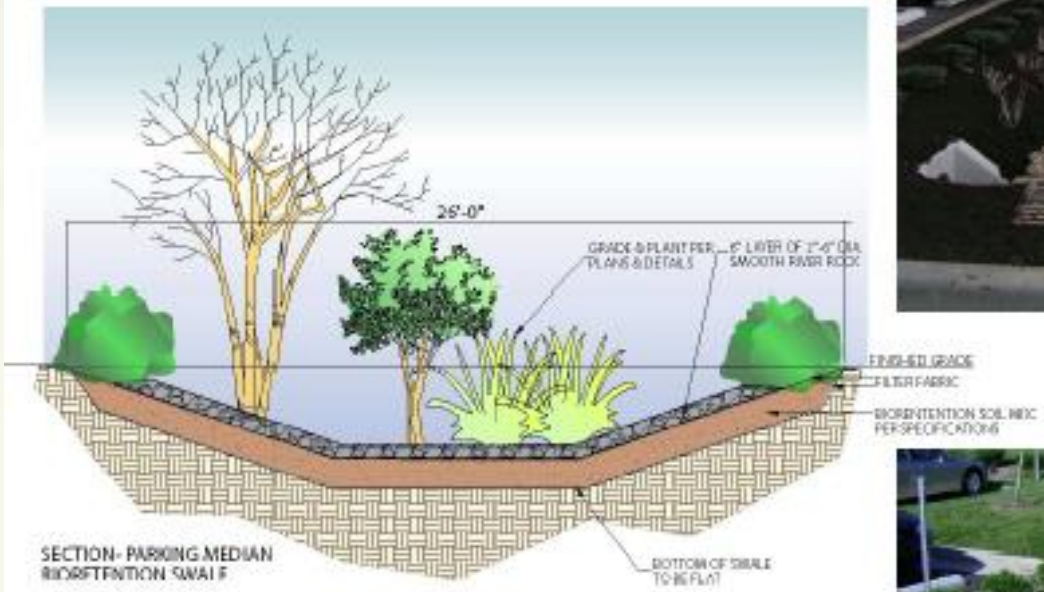


Project Background

- Design begun in 2003, construction completed 2005
- Space constraints- Dense, heavily used, urban site
- Bedrock subgrade
- Complex underground infrastructure- Historic site from 1850's
- Drainage problems at intersection of 2nd Ave So & Lindsley Ave
- Originally combined storm and sanitary sewer system
- **Pioneer project** for **Low Impact Development** (LID) practices
- Metro wanted lot to be used as **demonstration site**
- Metro Stormwater Management Manual update in 2006 to include LID

- Project presentation June 2008 to Cumberland River Compact, Building Outside the Box, Local Officials Community Water Curriculum- ***Green Parking Workshop***
- To be featured on segment of WNPT's ***Volunteer Gardner*** summer of 2009

Bioretention Swale Detail



During construction

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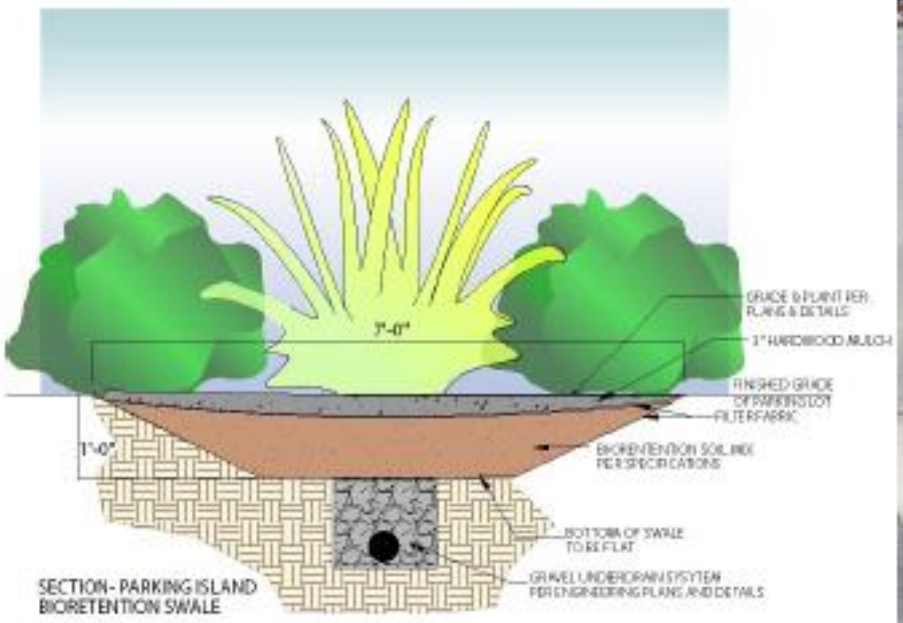
Bioretention Parking Island



SECTION - PARKING ISLAND BIORETENTION SWALE

Sustainable Site Pavement Systems

Cost Implications:

- LID costs less than conventional stormwater management systems to construct and maintain, in part, because of fewer pipes, fewer below-ground infrastructure requirements, and less impervious surface.
- Costs are site-specific due to site's conditions
- Asphalt or conventional concrete stormwater management paving system costs between $9.50 and $11.50 per square foot, compared to a permeable paving stormwater management system at $4.50 to $6.50 a square foot.

Bioretention- $3 to $4 per square foot, depending on soil conditions and the density and types of plants used. Commercial, industrial and institutional site costs- $10 to $40 per square foot, based on the need for control structures, curbing, storm drains and underdrains.

Permeable Paving-

- Porous Concrete- $2.00 to $6.50/s.f.
- Grass/Gravel Pavers- $1.50 to $5.75/s.f.
- Interlocking Concrete Pavers- $5.00 to $10.00/s.f.
- Porous Asphalt- approx. $4.00/s.f.

Site Specific Cost Implications

Paid premium on asphalt due to limited contractor experience in the area

Equipment availability caused scheduling problems

Relatively small size of lot

Underdrain system due to bedrock

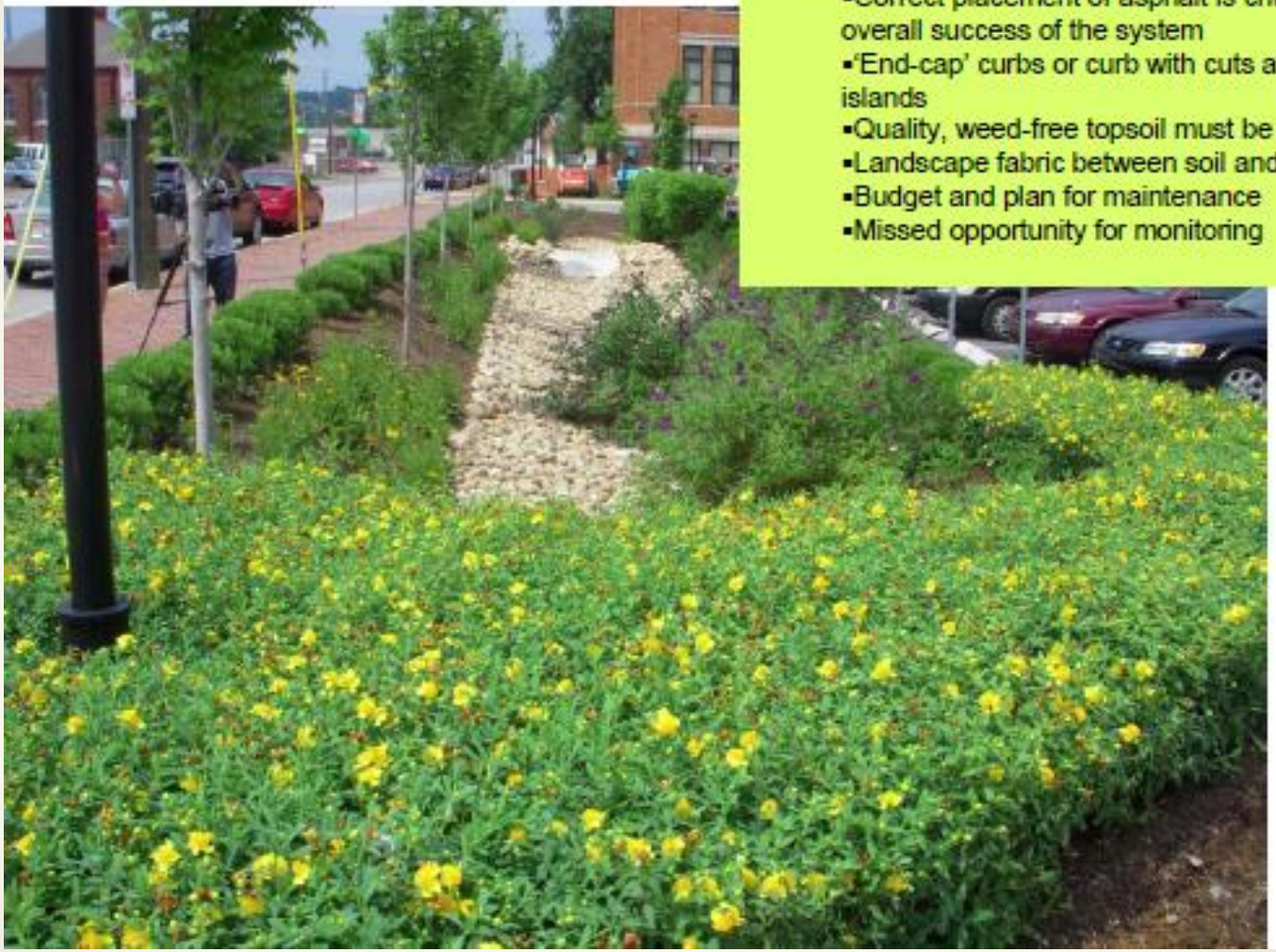
Landscape Design Considerations

- Naturalized –vs- Manicured look
- Use native plants suited to moisture, light and soil conditions
- Mulch options are rock, wood chips or shredded hardwood depending on site specific need
- Biosoil- 10% native soil,
  30% composted material and
  60% gravelly sand

PLANT LIST FOR RHPC PARKING Latin Name	Common Name
Trees	
Acer saccharum	Sugar Maple
Acer Rubrum 'Armstrong'	Armstrong Maple
Cladrastis lutea	Yellowwood
Platanus acerifolia	London Planetree
Quercus phellos	Willow Oak
Shrubs	
Buddleia davidii	Butterfly bush
Cephalanthus occidentalis	Button Bush
Hibiscus moschautos	Swamp Mallow
Hypericum frondosum	Goldcrest St. John's Wort
Ilex crenata 'Green Luster'	Green Luster Holly
Ilex glabra 'Densa'	Dwarf Inkberry
Itea virginica	Virginia Sweetspire
Prunus laurocerasus 'Otto Luyken'	Otto Luyken Laurel
Viburnum rhytidophyllum	Leatherleaf Viburnum
Herbaceous	
Echinacea purpurea	Purple coneflower
Iris pseudacorus	Yellowflag Iris
Rudbeckia fulgida 'Goldsturm'	Black-eyed Susan
Grasses & Sedges	
Chasmanthium latifolium	Upland Sea Oats

Sustainable Site Pavement Systems

2009



Lessons Learned

- Correct placement of asphalt is critical to the overall success of the system
- 'End-cap' curbs or curb with cuts around islands
- Quality, weed-free topsoil must be used
- Landscape fabric between soil and mulch
- Budget and plan for maintenance
- Missed opportunity for monitoring

Sustainable Site Pavement Systems

Fulton Municipal Parking Plaza

Sustainable Site Pavement Systems

Demonstrations-Performance

Neighborhood Redevelopment

Sustainable Site Pavement Systems

Maintained Access to Office Building

LID Preserved

Sustainable Site Pavement Systems

A Demonstration of the Effectiveness of Permeable Pavers installed at the Fulton Campus. August 24, 2012 -produced by Metro 3
http://www.youtube.com/watch?v=Ih_O8Xey08M

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TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION

Sustainable Site Pavement Systems

Investment in your Future

Sustainable Site Pavement Systems

- **Hydrologic Design**
- **Structural Design**
- **Static/Dynamic**
- **ESALS**
- **50 year Pavement Design**

Service Life

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1-2 times per year

Post-structural Inspection Report

Normal Maintenance

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Snow Maintenance

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Spring Clean-up

Sediment Build-up

Stains-Oils – Food - Tire

Sustainable Site Pavement Systems

Estimated 15-20 year cycles

Vacuum Type Sweeper

Remedial Maintenance

Sustainable Site Pavement Systems

Forensic Documentation

Morton Arboretum Workshop
Dr. Wm. Hunt-NCSU 2009

Sediment travel limited to 1”-1 ½”

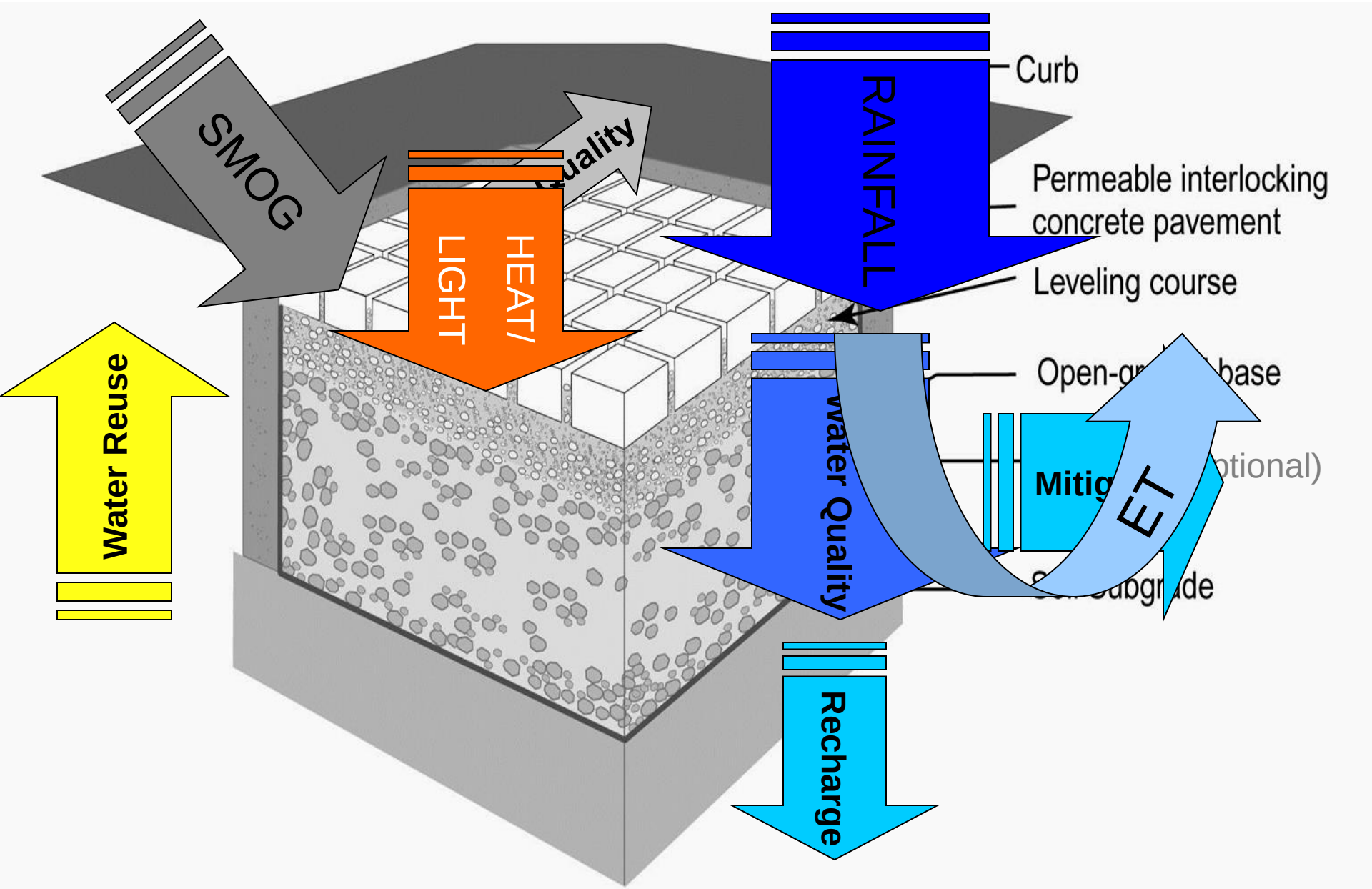
Sedimentation Travel

Sustainable Site Pavement Systems

CA-16 **7 Years** **CA-7**

Sustainable Site Pavement Systems

BASS Multi-Tasking Eco-Machine



You Can make a Difference

Sustainable Site Pavement Systems

BELGARD®
COMMERCIAL

This concludes the presentation!

What questions do you have?

For more information contact:

Charles Taylor

Chuck.Taylor@oldcastle.com