Review of Green Infrastructure Design Construction and Maintenance Methods

Presenter:
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Agenda

- Soils
- Design
- Construction
- Maintenance
Soils: Typical Mix

Loamy Sand

- 50-60% Sand
- 20-30% Soil
- 20-30% Compost

½” – 2” per hour minimum drawdown
Soils: Issues

• Actual infiltration rates between 5”-12”/hr
• Soil media/porosity acts as control orifice
• Soil “manufacturing” is inconsistent
• Drain rate too high – short circuits system
Soils: Results

• GI is not wet all the time

• Using the wrong plants can lead to poor growth / no vegetation

• Plants can flourish in the right conditions
Design: Goals & Solutions

Goal:
Control Drawdown

Solution:
Outlet Weir / Orifice Plate / Control Orifice

NOTE: Standard Catch Basin (AA-S133) With Frame and Solid Lid

Design detail American Addition Phase 1, Courtesy of the City of Columbus
Design: Goals & Solutions

Goal:
Control Drawdown

Solution:
Maintain Sub-surface Water Level

Greensboro Science Center, Greensboro, NC
Design: Goals & Solutions

Goal:
Evaluate Alternate Soil Mix Using Compost

Solution:
70% topsoil
15% leaf compost
15% pine bark fines (≤ 5/8”)

No sand!!!

Soil mix proposed by:
Vivian Llambi & Associates, Inc.
Goal:
Design GI Systems That Provide Long Term Growth

Solution:
Consider a Drier Planting Palate

Planting Schedule: American Addition Phase 1, Courtesy of the City of Columbus
Design: Urban GI Issues

- Sidewalk widths
- Driveways
- Mature trees
- Location of bus stops
- Meters & traffic lights
- Intersections
- Vaults
- Fire hydrants
Goal:
Avoid Utility Conflicts

Solution:
Ground Penetrating Radar

New York City Right-of-Way Bioswale Project
Design: Urban GI Issues

Goal:
Reduce Geotech Cost

Solution:
Truck Mounted Geoprobe

Proposed Boring Location (20 ft depth)
Permeability Test (5 ft depth)
Design: Lessons Learned

- Keep it simple
- Incorporate redundancy
- Standardization to facilitate implementation

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Design: Lessons Learned

- Know your existing conditions
- Consider site history
Design: Lessons Learned

- Consider final surface elevations
- Design appropriate energy dissipation and trash collection devices
- Incorporate tolerance to allow for changes and flexibility during construction

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Safety: Lessons Learned

- Stagnant water and insect breeding
- Tripping hazards/vertical drops
- Trash prevention
- Change of traffic flow
- Obstructions to drivers or pedestrians
- Impacts to crosswalks/ADA ramps

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Aesthetics: Lessons Learned

• Make it look good
• Creative reuse of materials
• Blending of landscape into natural environment

Chattanooga Airport

Rendering courtesy of Andropogon
Construction: Lessons Learned

- Avoid compaction
- Use sod/plants rather than seed
- Gasket seal for subsurface storage
- Keep GI offline until stabilized

Photo Courtesy of the City of Columbus, Greensboro, NC
Construction: Lessons Learned

- Proper construction and inspection is critical
- Consider timing
  - Phasing
  - Seasonal

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Maintenance: Yes You Have to Do It!

- Consider Maintenance During Design
- Incorporate Access
- Warranty Periods
- Success Criteria
- Plant Materials
THANK YOU!

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