Green Stormwater Infrastructure Project Development
City of Newark, New Jersey

Maria Watt, PE

Passaic River Symposium
Montclair State University
7th Floor, University Hall
Montclair, New Jersey
Overview

- Why green stormwater infrastructure (GSI) in Newark?
- Potential pilot site selection
  - 3 neighborhoods
  - 12 locations
  - Concept designs
- Program development
  - Horticultural manual
  - Standard drawings and specifications
  - Procurement
  - Maintenance
  - Outreach
  - Funding
Why GSI in Newark?

Newark’s Sustainability Action Plan identified the implementation of GSI as a major strategy available to the City to manage stormwater and create a more sustainable environment.

- **Environmental benefits**
  - Improved water quality
  - Improved air quality from trees
  - Improved ground water recharge
  - Energy savings from reduced air conditioning
  - Reduced greenhouse gas emissions
  - Reduced urban heat stress
  - Reduced sewer overflow

- **Financial benefits**
  - Reduced construction costs compared with all-grey infrastructure, or compared with upsizing grey infrastructure for increased runoff

- **Other social benefits**
  - Improved aesthetics
  - More urban greenways
  - Increased public education on their role in stormwater management
  - Reduced flash flooding
  - Green jobs
  - Potential increase in economic development from improved aesthetics
Newark is in process of developing a comprehensive green infrastructure program to promote GSI on:

• City properties

• New development (to be addressed through amendments to Stormwater Ordinance)

• Existing private development (to be addressed through combination of grant-funded voluntary projects and incentives created by fees, which can be reduced through GSI credits)
The Long-Term Control Plan offers an important opportunity to:

- Identify potential GSI locations within problem sewersheds
- Evaluate GSI effectiveness for addressing combined sewer overflows (CSOs)
- Collaborate among City departments and partners on advancing GSI
- Engage stakeholders on GSI
Project Purpose

- Identify and develop concept designs for a range of broadly replicable GSI for Newark
- Develop approaches for site identification, cost-efficient interventions and combinations of interventions, performance characteristics, and selection of appropriate vegetation
- Lay the groundwork to advance several GSI pilot projects and help identify stewardship opportunities for maintenance support
GSI Neighborhood and Site Selection

GIS Data
- CSO Area
- Impervious cover
- Tax Parcel
  - City-owned
  - City-owned foreclosure
  - Vacant/derelict
- Elevation (DEM)
- Land Use/Land Cover

Community Considerations
- Neighborhood Character
- Community Groups/Partners
- Development/Redevelopment plans
- Municipal CIP
- Visibility
- Political/social equity

Neighborhood Focus for this project:
- East Ferry, Fairmont, and Lower Broadway

Potential Pilot Site Selection:
- 12 locations for neighborhood concept design
East Ferry Concept Designs
Fairmont Concept Designs

NEWARK GREENSTREETS INITIATIVE

CONCEPT DESIGN
North Star Academy Elementary School

SITE PHOTO

RAIN GARDEN DIAGRAM

PONDING DEPRESSION
ORGANIC MATTER
SAND INFILTRATION BED
BUFFER/BERM
INLET
WATERFLOW

STORMWATER CHANNEL
RETAINING & SEATING WALL
SHADE TREE PLANTING
EXISTING SHADE TREES
RAIN GARDEN
PUBLIC GATHERING SPACE
RAIN GARDEN
PEDESTRIAN PATH
LANDSCAPE PLANTINGS
STREET TREE PLANTER BOX
PERVIOUS CONCRETE SIDEWALK

SITE PLAN
Lower Broadway Concept Designs

Newark Greenstreets Initiative

Concept Design
Dr. Martin Luther King Jr. Blvd

Site Photo

Native Plants
Curb Inlet
Overflow to sewer system

Pervious Sidewalk

Stormwater Planter Diagram

StreetScape Rendering
Many cities are implementing GSI; many go-by examples available, and lessons learned.

- Concept designs for most all GSI have been developed.
- Specifications are also available from GSI cities.
GSI Program Development: Internal Capacity

- Work towards expanding the institutional capacity of City departments to implement and manage GSI through training, workflow and organizational alignment, partner development, and staff additions.
- Consider building in-house design support for standard/replicable installations.
- GSI should be built into existing asset management programs, with sufficient staff availability and budget for maintenance.
GSI Program Development: External Construction and Maintenance Capacity

• Contractor expertise w/GSI varies widely. Consider pre-qualifying experienced contractors. Once sufficient capacity is developed within the contractor community, consider unit-based contracting.

• Design should fully consider future maintenance needs (trash removal, replacement of vegetation, maintenance of drainage system, etc.)
  – Many GSI programs are engaging neighborhood residents as partners; creating a sense of ownership
  – GSI maintenance creates opportunity for new “green” jobs!
GSI Program Development: Stakeholder Coordination

- Continue working with stakeholders towards a shared public vision for stormwater management and community greening through
  - Outreach and coordination with key neighborhood associations to support design insight and maintenance
  - Leverage the Long-Term Control Planning process for public education and engagement
GSI Program Development: Diversify GSI Funding/Revenue

- New USEPA requirements for reducing CSOs will require spending that is significantly greater than past budget allocations.
- Increase the financial resources to implement green infrastructure through grants, partnerships, and potentially a dedicated revenue stream through utility fees.
- In many cases GSI/Low Impact Development (LID) costs are similar to or less than the costs of traditional grey piped and large volume storage.

LID and Conventional Cost Comparison ($ Millions)

Green infrastructure project costs from EPA (2007) and equivalent grey infrastructure costs (n=12). Projects below the dotted line have lower green infrastructure costs than equivalent grey infrastructure costs. Only one project evaluated had higher green than grey costs. Source: U.S. EPA, 2007.
Transforming Urban Spaces
Discussion