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TRIECA Conference

Reducing CSOs with
Distributed Green
Stormwater Infrastructure



Agenda

1. Background and Challenges
2. Alternatives Analysis
3. Philadelphia's Solution
4. Green Infrastructure Tools
5. Case Studies

TRIECA – Green Stormwater Infrastructure (GSI)

1. Background and Challenges

Philadelphia's Streams



Historic Streams (283 linear miles)



Current Streams (118 linear miles)

Philadelphia's Sewer Network



- 3,000 linear miles of sewers
- 3 wastewater treatment plants
- 455 separate sewer outfalls
- 164 combined sewer outfalls



TRIECA – Green Stormwater Infrastructure (GSI)

2. Alternatives Analysis

Implementation Alternatives Analysis



- Complete sewer separation
- Large-scale storage (tunnels)
- Plant expansion, satellite treatment
- GSI with increased transmission and treatment
- GSI with targeted traditional infrastructure

Implementation Alternatives Analysis



Economic Benefits

- Affordable
- Scalable
- Meets CSO policy goals
- Meets watershed-based planning goals
- Creates jobs



Environmental Benefits

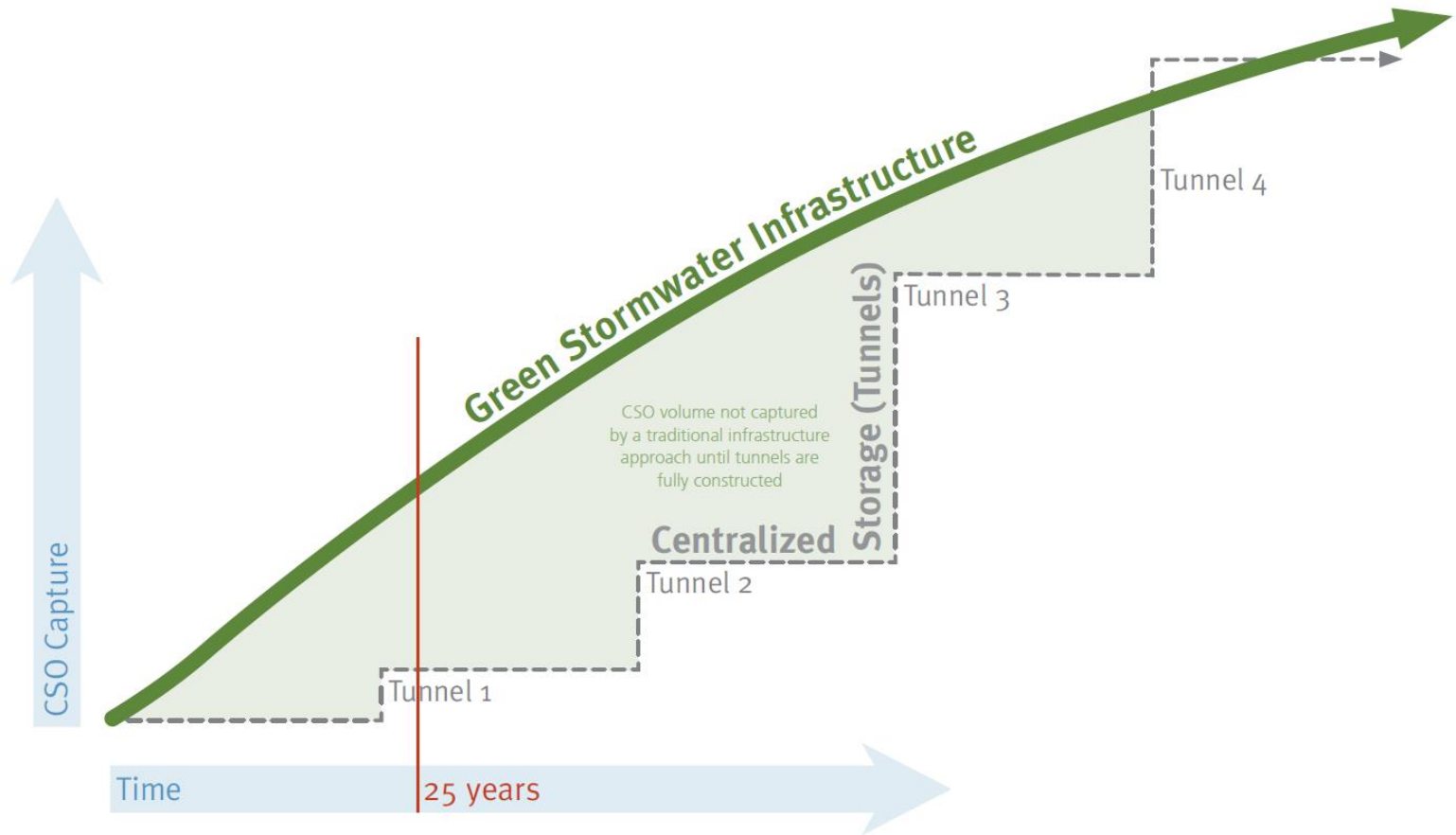
- Restores ecosystems
- Improves air quality
- Saves energy
- Offsets climate change



Social Benefits

- Enhances recreation
- Improves community quality of life
- Reduces effects of excessive heat

Implementation Alternatives Analysis



Implementation Alternatives Analysis



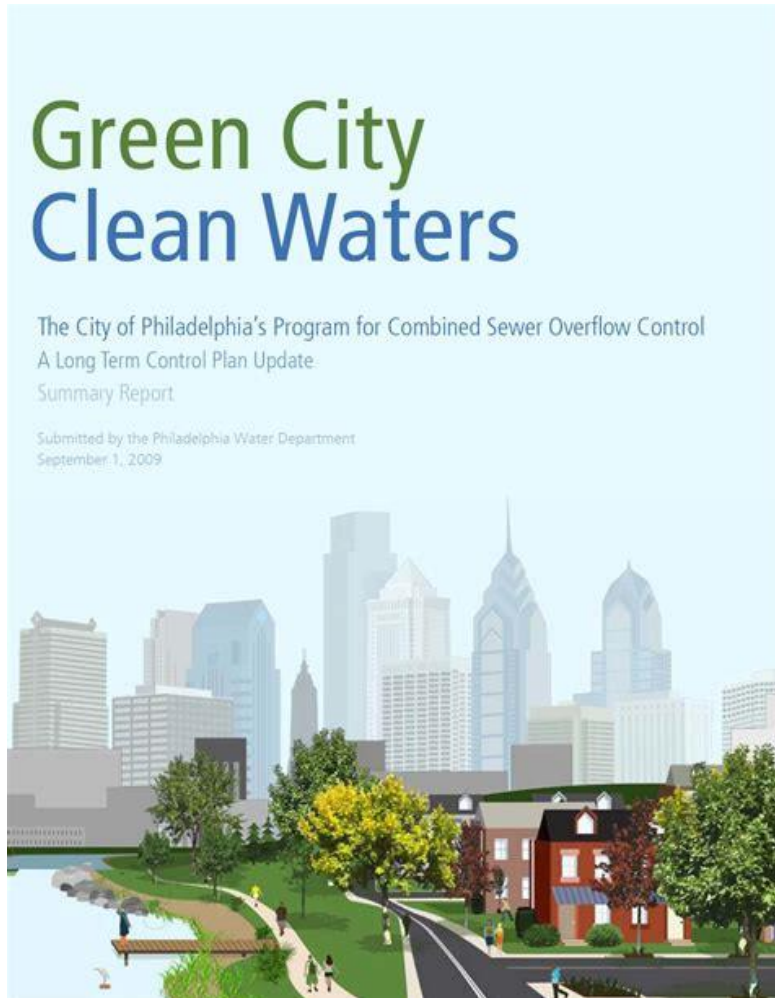
- Cost-effective
- Ability to leverage funding
- Meets watershed-based goals
- Maximizes triple bottom line
- Benefits accrued faster
- All watersheds/areas benefit
- Public wants it!

GSI with targeted traditional infrastructure

TRIECA – Green Stormwater Infrastructure (GSI)

3. Philadelphia's Solutions

Green City, Clean Waters



\$2.4 Billion Investment

- \$1.67 Billion Green Stormwater Infrastructure
- \$345 Million Wet Weather Plant Upgrades
- \$320 Million Adaptive Management

Goals

- Reduced CSO volumes by 85%
- Create 9,500 "Greened Acres"
- Meet water quality standards

Cost and Affordability

Private
Development

Private Development

- Stormwater Regulations
- 1% Redevelopment Rate
- \$1 Billion

Stormwater
Retrofits

Stormwater Retrofits

- Stormwater billing
- Stormwater credits
- Stormwater grants

Grants

Grants

- William Penn Foundation
- EPA
- Growing Greener (PADEP and DCNR)
- Army Corps of Engineers
- City agencies
- \$1 Billion

TRIECA – Green Stormwater Infrastructure (GSI)

4. Green Infrastructure Toolbox

Green Infrastructure Toolbox



- Tree Trenches
- Bumpouts
- Rain Gardens
- Bioswales
- Planters
- Pervious Pavement

Tree Trenches



Bumpouts



Rain Gardens



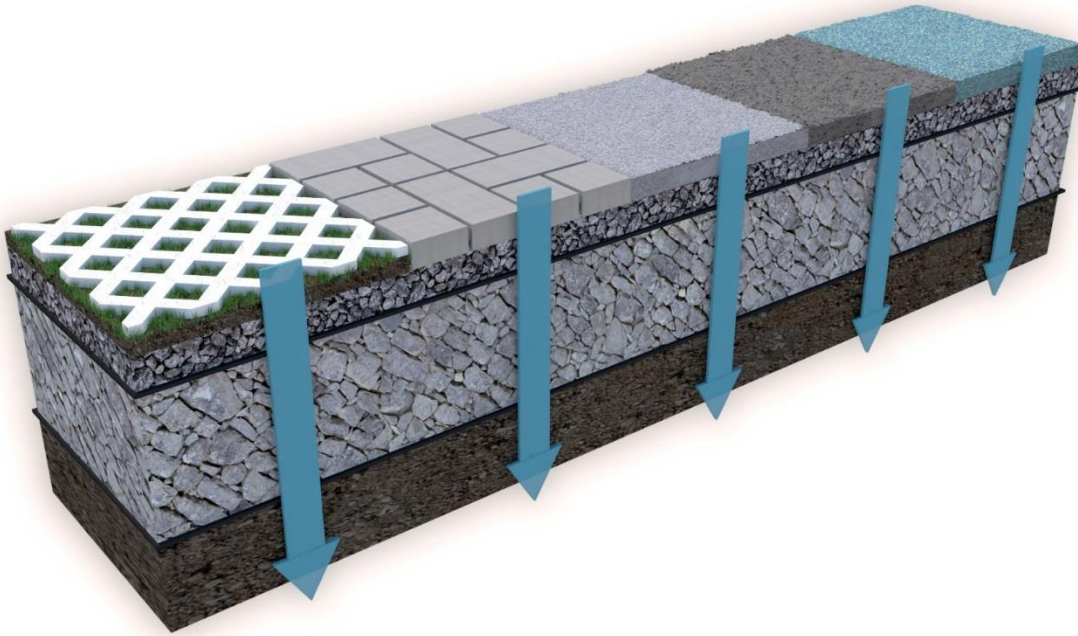
Bioswales



Planters



Porous Pavement



TRIECA – Green Stormwater Infrastructure (GSI)

5. Case Studies

Street Transformation

Public Right-of-Way

- Green Streets Initiative
- Partner: Parks and Recreation Department
- Stormwater Tree Trenches along three sidewalks surrounding park
- New sidewalks and street trees
- Coordinated design features with park upgrades

Managed Area = 22,500 SF



School Yard Transformation

Nebinger Elementary School

- Green Streets Initiative
- Partner: Parks and Recreation Department
- Stormwater Bioswale, Rain Garden, Porous Pavement, and Subsurface Storage
- Managed area = 45,500 SF (1.88 Greened Acres)
- Green City, Clean Waters School Curriculum
- Outdoor classroom

Managed Area = 45,500 SF



Playground Transformation

Jose Manuel Collazo Playground

- Trust for Public Land – Parks for People Initiative
- Partners: Trust for Public Land, Councilwoman Quinones Sanchez, DNCR, Public Property, Parks and Recreation, William Penn Foundation, National Recreation Foundation, McLean Contribution-ship
- Stormwater Rain Garden with subsurface storage
- Under-used, deteriorated playground, poor neighborhood with lack of green space
- New basketball courts, spray ground, tricycle track, playground equipment, hand ball courts

Managed Area = 54,800 SF



Vacant Land Transformation

Heston Gardens

- Green Parks Initiative
- Partners: Councilman Jones, Public Property, Parks and Recreation, Philadelphia Horticulture Society, Hestonville Community Groups, Mural Arts
- Stormwater Rain Garden with subsurface storage
- Managed Area – 28,700 SF (1.00 Greened Acres)
- Vacant lot with chain linked fence around perimeter
- Recipient of Soak It Up Adoption Grant

Managed Area = 28,700 SF





THANK YOU

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