

NACWA: 2011 Developments in Clean Water Law Seminar

A scenic view of the Philadelphia skyline across the Schuylkill River. The river flows from the foreground towards the city, reflecting the blue sky and clouds. The skyline features several prominent skyscrapers, including the Comcast Center (formerly One Liberty Place) on the right. Lush green trees line the right bank of the river.

Enforcement Roundup: Important Developments
for Clean Water Attorneys

November 18, 2011

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Green City, Clean Waters

City of Philadelphia's Combined Sewer Overflow Long-term Control Plan Update

www.phillywatersheds.org/lcpcu



2011 CONSENT ORDER & AGREEMENT - PADEP

Consent Order & Agreement

- Pollutant Mass Approach
- Stream/Wetland restoration removed
- \$200M additional funds
- 25 yr program
- \$1.2Billion (present value)
- 34% → 43.5% 'Greening'
- Approximately 12 'Deliverables'



June 1, 2011

25-year Program

June 1, 2036

Sewer-related Statistics

▶ Separate Sewer	40%
▶ Combined Sewer	60%
▶ Miles of Sewer	2,955
▶ # of Inlets	75,000
▶ # of Stormwater Outfalls	457
▶ # of Combined Sewer Outfalls	164
▶ Mean Annual Rainfall	41.3"
▶ Mean Rainfall Event	0.61"
▶ City-wide Impervious Area	47.4%
▶ Annual Stormwater Volume	12 BG
▶ Annual CSO Volume	14 BG

GREEN CITY, CLEAN WATERS

Implementation and Adaptive Management Plan: 2011-2016

Green Stormwater Infrastructure

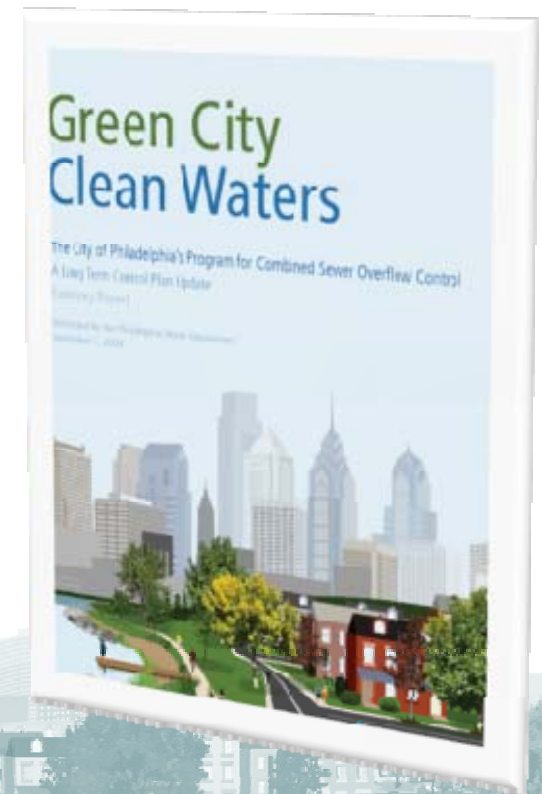
\$1.67 billion

Wet Weather Treatment Plant Upgrades

\$345 million

Adaptive Management

\$420 million



Implementation and Adaptive Management Plan

Delivery: December 1, 2011

Metric: All

A strategy for the first years
of Implementation

Adaptive Management

Capital Projects Planning

Policy and Streamlining

Operations and Maintenance

Program Monitoring

Public Outreach

Comprehensive Monitoring Plan

Delivery: December 1, 2012

Metric: Greened Acres

Monitoring, Modeling and Inspections

Natural Environment Monitoring

Tidal

Tributary

Groundwater

Rainfall

Sewer System Monitoring

Sewer
System Flows

CSO
Discharge

Model
Outputs

Green Infrastructure Performance

Soil and Vegetation

Underground
Infrastructure

Facility Concept Plans for Plant Expansion

Delivery: June 1, 2013

Metric: Overflow Reduction

Increase wet weather
treatment capacity to over
1.4 billion gallons
per day

215 MGD

- Increase wet weather capacity using secondary bypass

60 MGD

- Increase secondary treatment capacity

50 MGD

- Increase in secondary treatment capacity

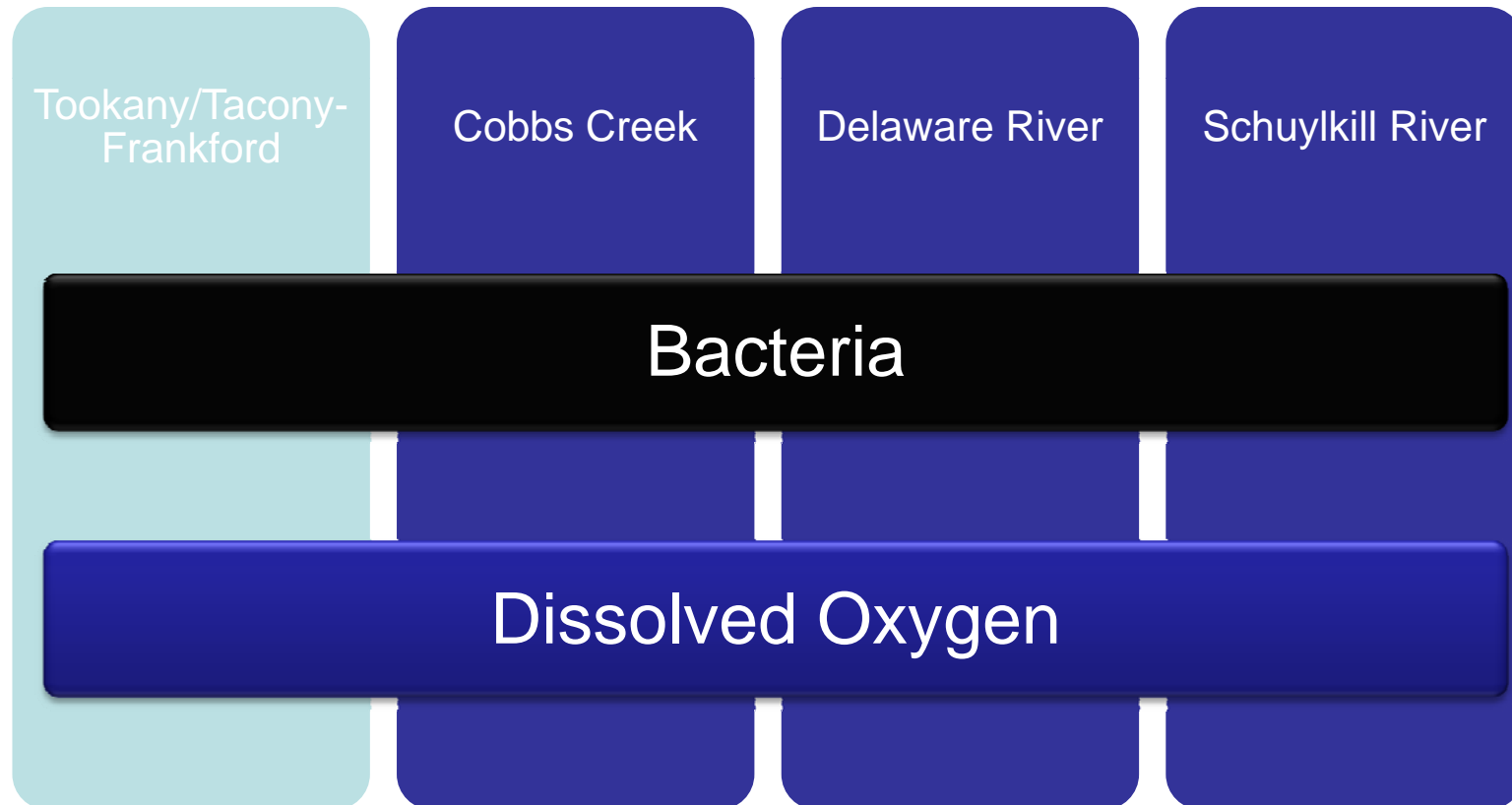


Delivery: 2013-2015

Water Quality Modeling

Metric: Progress Evaluation Tool

Assess the program and evaluate
alternative implementation options



WHAT IS A GREENED ACRE?

Greened Acre: acre of impervious cover that is retrofitted to utilize ***green stormwater infrastructure*** which manages stormwater using source controls such as infiltration, evaporation, transpiration, decentralized storage and reuse.

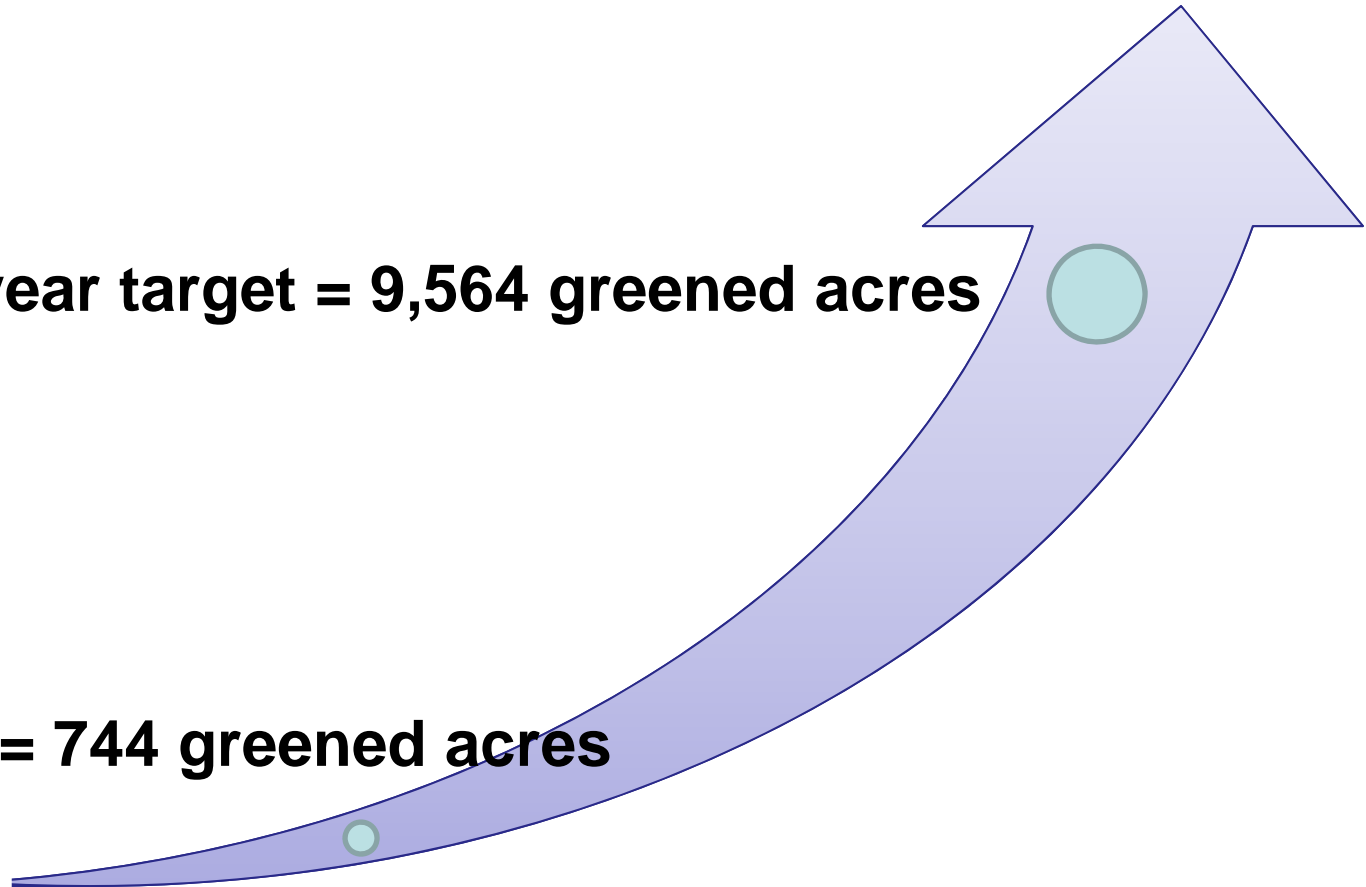
$$GA = IC * Wd$$

- **IC** is the impervious cover utilizing green stormwater infrastructure (acres). This quantity can include the area of the stormwater management feature itself, as well as the area that drains to it.
- **Wd** is the depth of water over the impervious surface that can be physically stored in the facility (inches). Green stormwater infrastructure designs will be aimed at controlling at least 1.0 inch of runoff, and up to 1.5 inches of runoff, unless otherwise deemed feasible by engineering design.
- One Greened Acre is equivalent to one inch of managed stormwater from one acre of drainage area or 27,158 gallons of managed stormwater.

TOTAL GREENED ACRE METRIC

25-year target = 9,564 greened acres

5-year target = 744 greened acres



Metric	Units	Year 0	Year 5	Year 10	Year 15	Year 20	Year 25
Total Greened Acres	Greened Acres	0	744	2,148	3,812	6,424	9,564

8 Green Programs

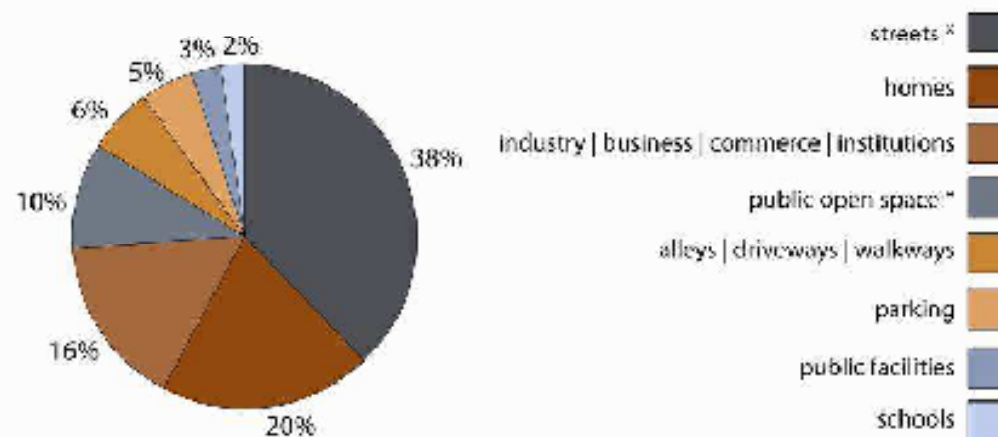
Public Lands

- Streets
- Schools
- Public Facilities
- Open Spaces

Private Lands

- Industrial/Commercial/Institutional
- Homes
- Parking
- Alleys, Driveways and Walkways

Percentage of Impervious Surface by Proposed Green Program



→ Green Streets

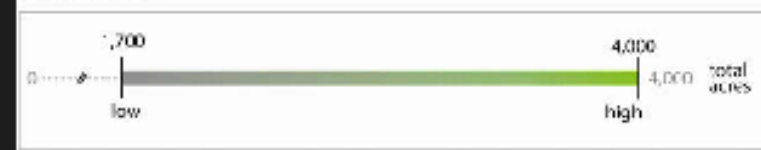
► Concept

- Streets represent **38%** of the impervious cover within the combined system
- Set a “Green standard” for all City Streets
- Variety of approaches
 - Tree cover, use of pervious pavements, stormwater planters, and underground infiltration/evapotranspiration/retention facilities

► During

- Storm Flood Relief construction
- Water & Sewer repair/replacement
- Utility construction (cable, gas, electric)
- City Street retrofit during Repaving
- Sidewalk Retrofits – Replacement Grant Program

green streets



Portland, OR



→ Green Schools

► Concept

- Represents **2%** of City's impervious cover in the combined system
- Highly visible locations associated with education
- Transforms heat trapping asphalt surfaces into cooler, green islands
- Capture local universities ambitious sustainability initiatives

► Potential Tools

- **Design Standards & Design Assistance**
- Interagency Agreements & Cost-Sharing
- Stormwater Bill Credits

green schools



Wissahickon Charter School



→ Green Public Facilities

► Concept

- Represents **3%** of impervious cover in the combined system.
- Retrofit all facilities to meet the new stormwater regulations.
- Develop cooperative greening initiatives with Rec/Fire/Police/Library/Airport

► Potential Tools

- Parcel-Based Stormwater Billing
- Interagency Agreements, cost sharing



→ Green Public Open Spaces

green public open space



► Concept

- Represents **10%** of City's impervious cover in combined system (including streets adjacent to public facilities)
 - Routing and managing stormwater from surrounding areas where possible without adversely impacting function of the public land itself.
- Vacant and Abandoned lands
 - Converted to pervious areas or that the SW regulations are implemented
- Bikeways/Trails designed for zero stormwater discharge
- Wetland creation/restoration and stream restoration near Park land
- Golf Courses and Plazas designed to manage stormwater



► Potential Tools

- Revision of Stormwater Ordinance
 - Evaluate application of SW regulations to disturbance of 5000 s.f. or more
- Watershed Mitigation Registry

→ Green Parking

► Concept

- Parking lots represent **20%** of the City's impervious cover in the combined system
- Numerous Retrofit Opportunities
 - infiltration beds
 - sand filters
 - tree pits
 - porous pavement
 - green roofs on parking garages
- Reduced summer temperatures
- No Parking loss during and after storms due to standing water
- Appearance improvements in commercial and business districts

► Potential Tools

- **Amended Zoning Code**
 - Require buffer, setback, and/or planted space be utilized to manage runoff
 - Require a set tree canopy cover

green parking



**Police Forensics Science Center
Philadelphia, PA**

→ Green Industry/Commercial/Institutional



green industry | business | commerce | institutions



► Concept

- Represents **16%** of all impervious cover in combined system
- Require compliance with **Stormwater Regulations**
- 1.0% redevelopment projection per year
- Supported by PWD – led by Commerce
- Churches / NGOs / Hospitals

► Potential Tools

- Parcel-Based Stormwater Billing
- Enhanced LEED Certification
- Public/Private Partnerships for SW run-on management



**Friends Center
Philadelphia, PA**



**Comcast Center
Philadelphia, PA**

→ Green Homes

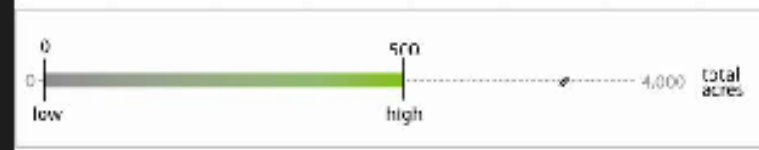
► Concept

- 20% of the City's impervious cover in the combines system is associated with residential rooftops
 - Low Cost - Rain barrels & Rain gardens & Downspout Disconnects
 - Higher Cost - Porous sidewalks, driveways and walkways / Green roof

► Potential Tools

- Model Neighborhood Program
- Design Assistance through PWD Contract
- Amended Plumbing Code
- Amended Building Code

green homes



→ Green Alleys, Driveways & Walkways

► Concept

- Alleys and Driveways represent **6%** of City's Impervious Cover
- Manage stormwater while improving aesthetics
- Potential flow pathways for harvested rainwater
- Infiltration or conveyance of stormwater to the end of the alleys or walkways

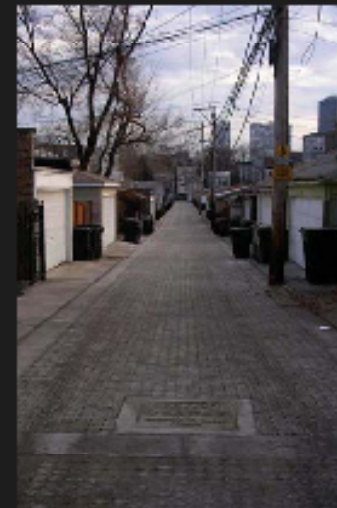
► Potential Tools

- **Evaluate amending Streets Department Specifications**
 - Allow or require porous asphalt or other porous pavement for alleyways and driveways

► Major Partners

- Philadelphia Streets Department
- Philadelphia Housing Authority
- Homeowner Associations
- Developers (nonprofit and for-profit)

green alleys | driveways | walkways



Chicago's Green Alley Program



Rain Garden



Wissahickon Charter School Philadelphia, PA

Pervious Pavement



Mill Creek Basketball Court Philadelphia, PA

Stormwater Wetland



Saylor Grove, Philadelphia, PA

Stormwater Tree Trench



West Mill Creek, Philadelphia, PA

Stormwater Planter



Columbus Square, Philadelphia, PA

Stormwater Bump-out



Green Roof



PECO Building, Philadelphia, PA

Rain Barrel



Row home, Philadelphia, PA

Flow-Through Planter



New Seasons Market Portland, OR