

Clean Waters ... Green City

Philadelphia's Watershed Approach to CSO Management



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Adding New Tanks to the Big Old Pipes



- **An approach used by many cities.**
- **But, does this approach just build on yesterday's engineering mistakes ?**
- **Is this approach sustainable?**
- **Will it get us to our environmental goals ?**
- **What else can we do with our limited \$\$\$s ?**



The Old Urban CSO Approach

- Build massive infrastructure
- Meet percent capture requirements
- Achieve water quality standards

- BUT

- Streambanks are eroded
- Habitat is missing
- Aquatic life is impaired
- People aren't swimming or boating
- Recreational access is limited or prevented
- Natural resource is not meaningfully improved

The standard approach won't fix this stream



A Broader Stewardship Approach

- We need to identify what is needed to truly accomplish real environmental results
- This requires considering a framework beyond water quality standards and overflows and use a stewardship approach to the water environment
- Start thinking like a fish, swimmer or boater!
- The damage done to these streams has taken place over 200 years, it will take at least that long to repair them
- Wet weather strategies need to consider periods of > 50 years and not be limited to 20 year time frames in order to be sustainable

CSO/Stormwater Management: Traditional vs. Watershed Approach

Traditional Approach

- Grey Infrastructure & Treatment Focused
- BMPs & BATs - “Plug and Play” Solutions
- Ordinances control development stormwater

Watershed Approach

- Environmental outcome focused
- Sustainable solutions for overall environment
- Green Infrastructure focused
- Flexible regulation, trading, social marketing & financial incentives

A New Paradigm for Urban Areas

- Old urban areas can reduce their effective impervious cover and recover habitat and aquatic life through a watershed & green infrastructure approach
- A dollar spent on stormwater/CSOs should be dollar that improves the natural resource and enhance the community (economic development)

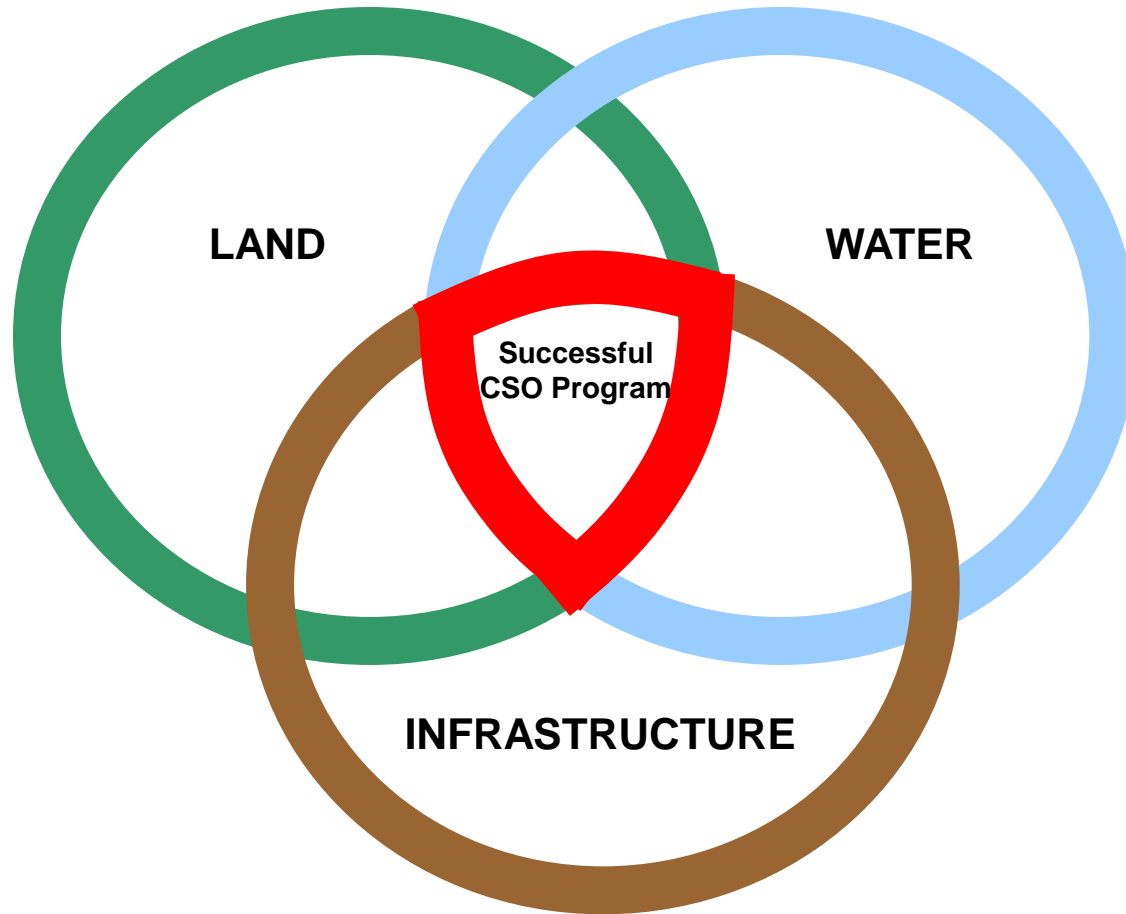
Philadelphia's Watershed Approach

- Target A – Dry Weather Water Quality and Aesthetics**
 - Streams need to look good, be accessible, and become an amenity to the community
 - Stream water quality during dry weather (about 60-65% of the time) should improve
 - Lining sewers, eliminate defective laterals, treatment, etc.

- Target B – Healthy Living Resources**
 - Focus on improved aquatic habitat and healthy fish populations
 - Stream restoration (bank, channel, riparian)
 - Fish passage (fish ladders, dam modification)

- Target C – Wet Weather Water Quality and Quantity**
 - LID, Green Infrastructure, Stormwater Regulations & Rates
 - Tanks & Tunnels

Watershed-Based CSO Control Program



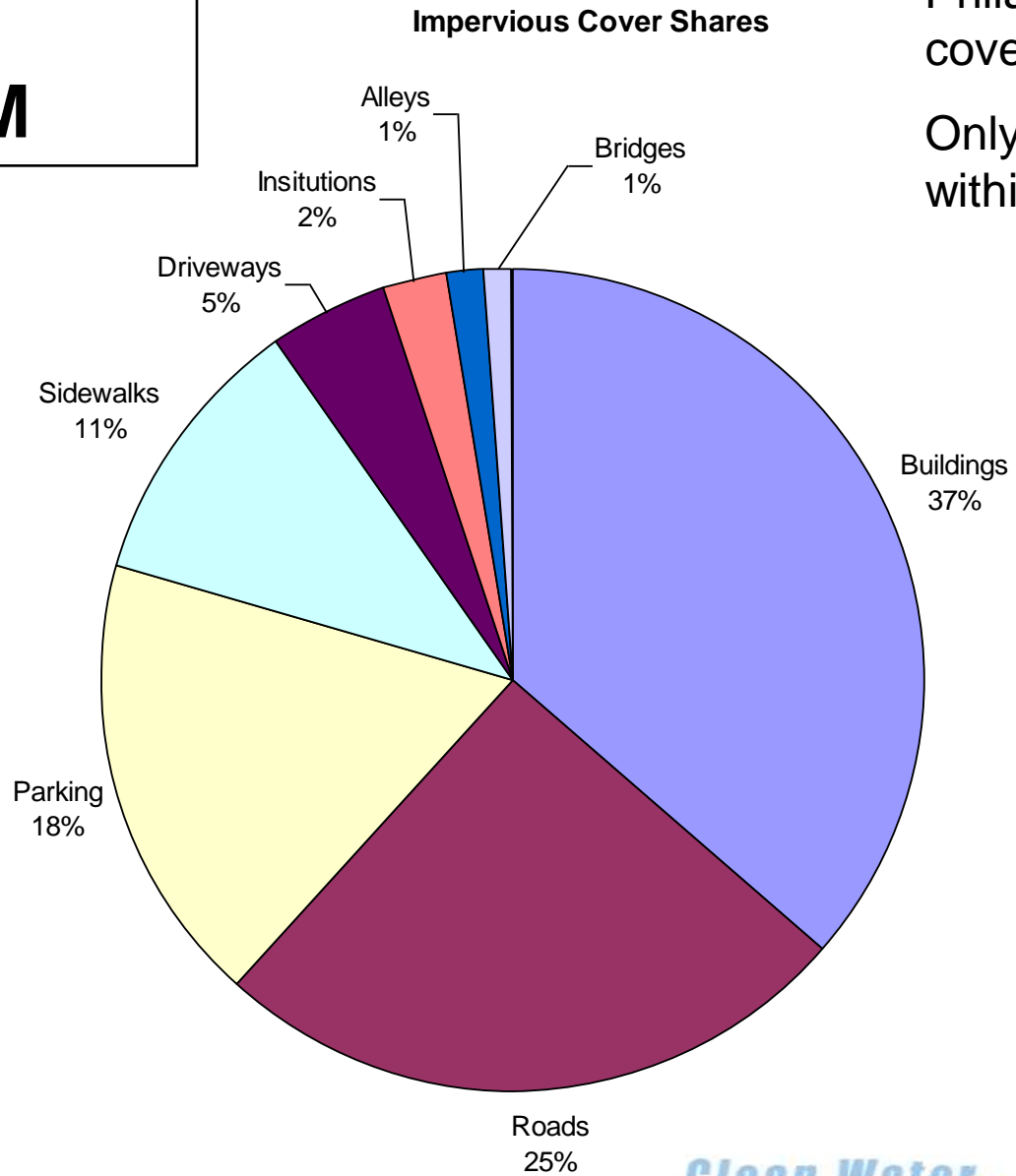
LAND

- ❑ Hydrologic Source Control**
 - ❑ New Stormwater Management Regulations**
 - ❑ Implementation of Stormwater BMPs**
 - ❑ Low Impact Development & Redevelopment (LID)**
 - ❑ Catch Basin Control Program**
 - ❑ Impervious Cover Disconnection**
 - ❑ Reforestation**
 - ❑ Green Building Technology & Water Conservation**
 - ❑ Assessment & Monitoring**

THE SOURCE OF THE PROBLEM

Approximately 45% of Philadelphia's impervious cover is in the right of way

Only 55% can be managed within property boundaries



Developers Are Friends Not Foes

	2006		
Re-development Rate (1 mi ² / yr)	1 mi ²		
Captured Runoff (per 1" event)	17 MG		
Avoided Tank Costs (@ \$2/gal)	\$34 M		

Potential Impact of New SW Regs First Inch Capture

Developers Are Friends Not Foes

	2006	20 years
Re-development Rate (1 mi ² / yr)	1 mi ²	20 mi ²
Captured Runoff (per 1" event)	17 MG	340 MG
Avoided Tank Costs (@ \$2/gal)	\$34 M	\$680 M

340 MG in storage = 7.5 mile tunnel = 5 BG or 30% CSO overflow reduction

Note: This is infrastructure that the City will not own, operate, or maintain so the future cost savings also need to include savings on O&M costs

University Partners @ 3925 Walnut

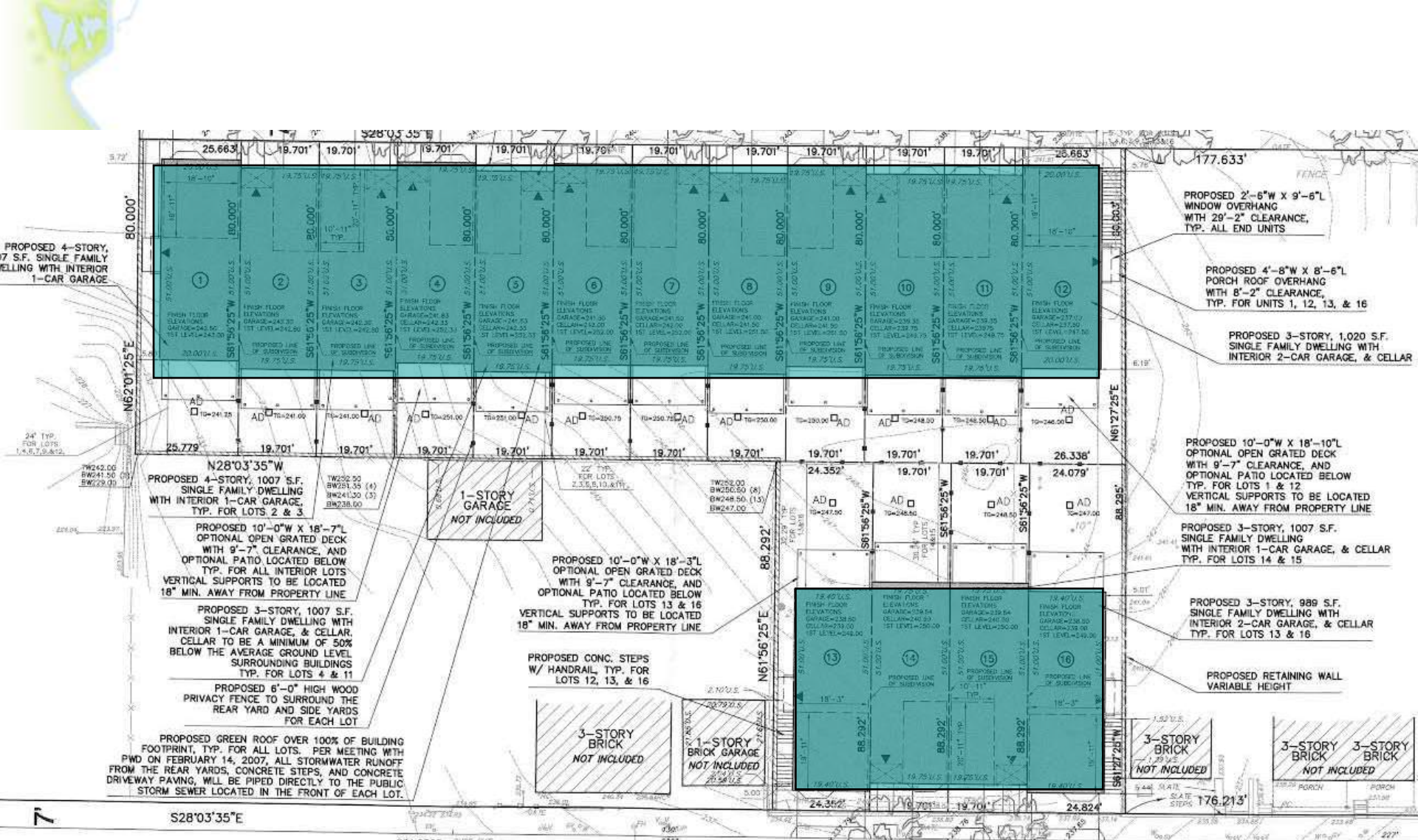


University Partners
3925 Walnut St

Erdy McHenry Architecture
2202 E. Second Street
Philadelphia, PA 19106
815.929.7000

emArchitecture

Pennoni Engineers / emArchitecture

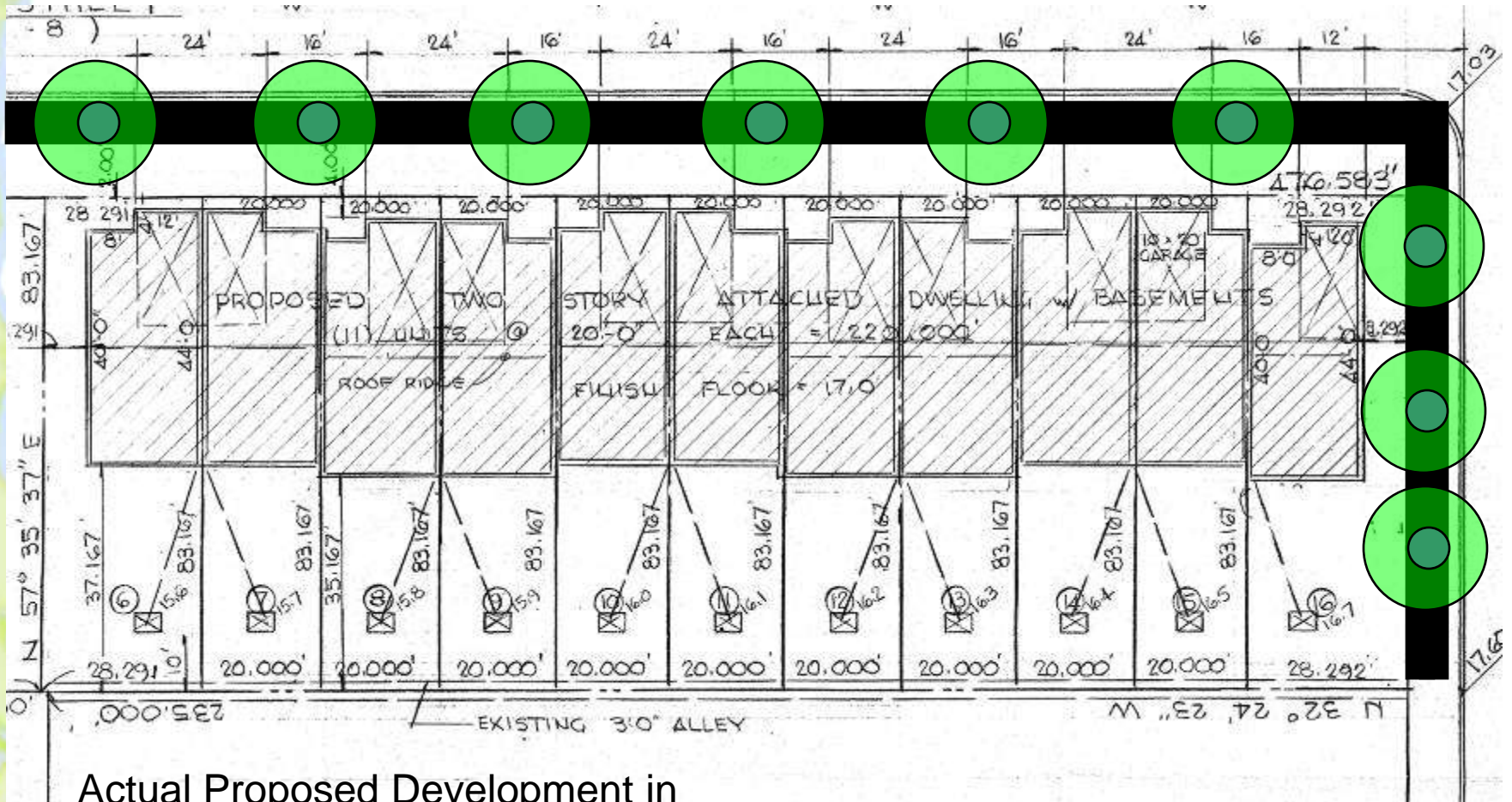


Green Roofs

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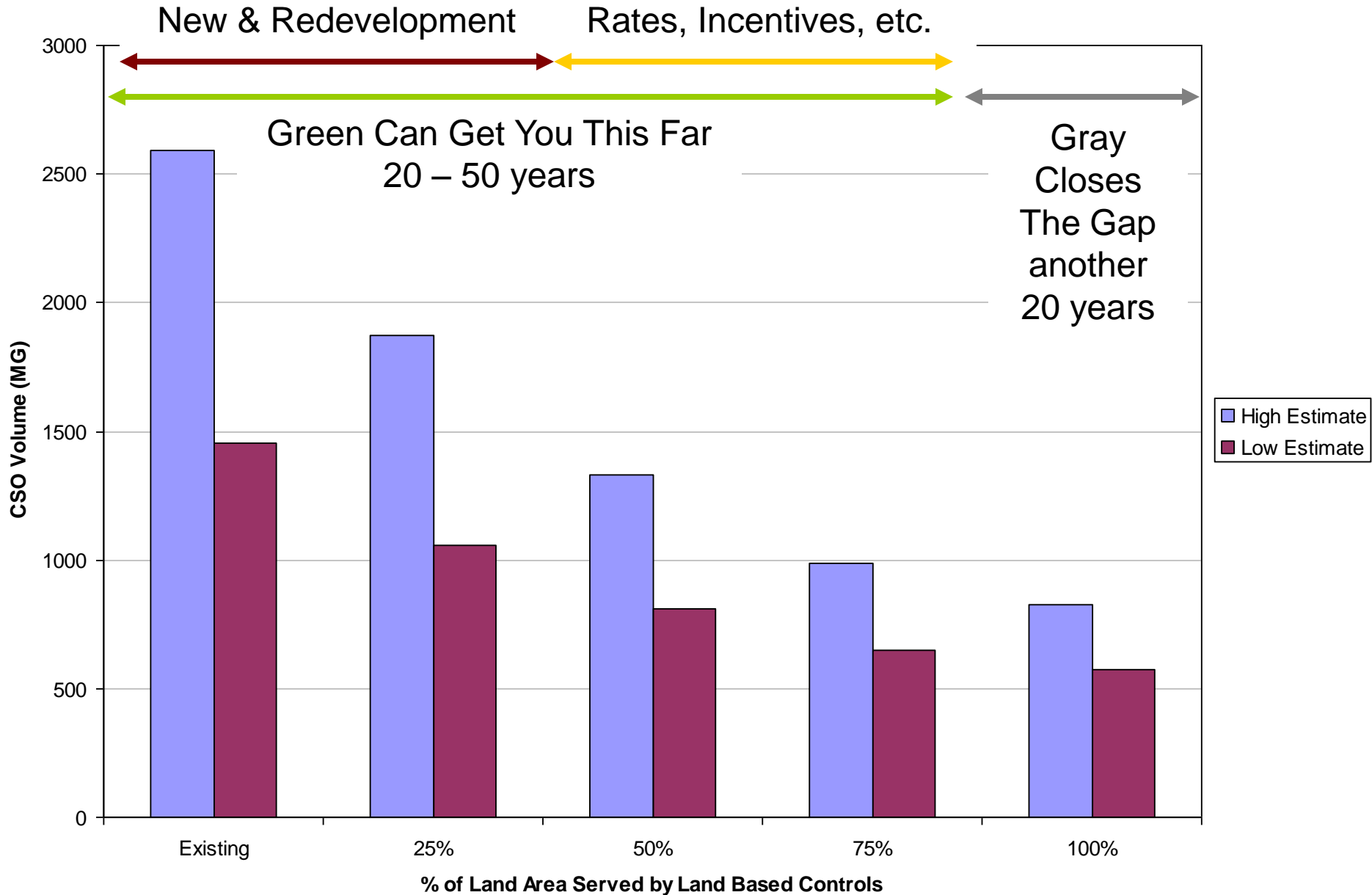


Tree Trenches and Green Sidewalks



Actual Proposed Development in Philadelphia

Potential Impact of LID in Philly – SE District



New Stormwater Rate Structure

- Gross/impervious cover
- From hidden costs to dedicated fees
- Truer cost of service
- Encourage BMP Retrofits



Create Financial Incentives for Better Land Management



Gross Area = 600,000
Imperv Area = 500,000

Existing Charge = \$ 400
New Charge = \$ 2,500

Rewarding Urban Redevelopment



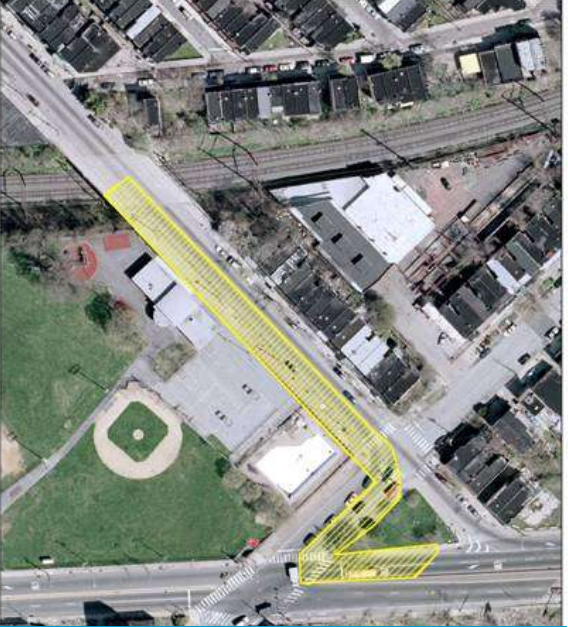
Gross Area = 24,000

Imperv Area = 24,000

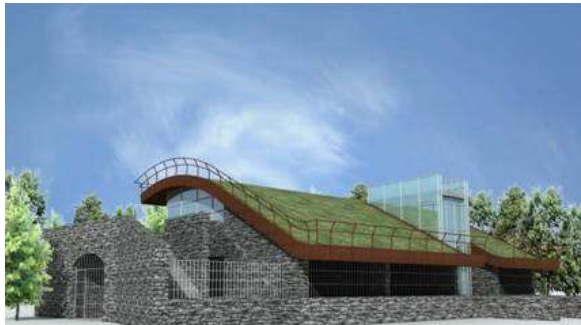
Existing Charge = \$ 4,700

New Charge = \$ 120

Public Lands Green Infrastructure Community Improvements



Traffic Triangles



*Green Roof
Pump Station*



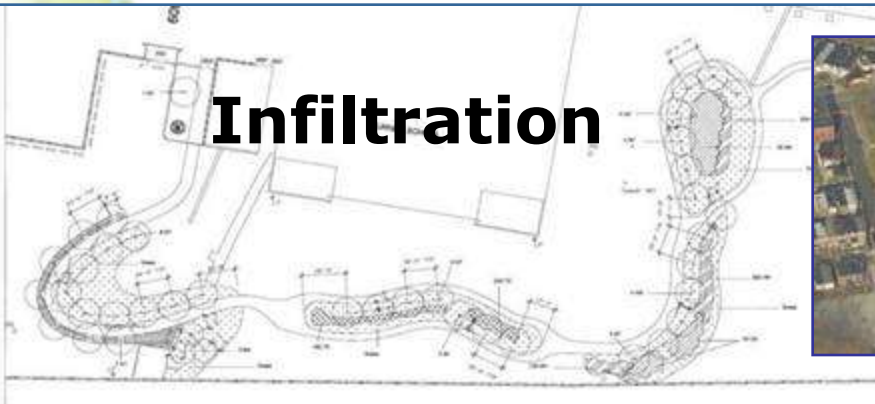
*Porous
Pavement
BB Court*



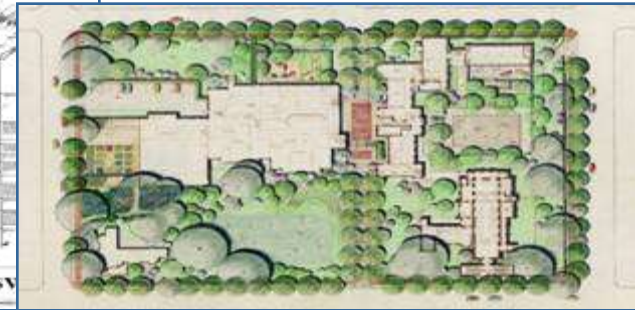
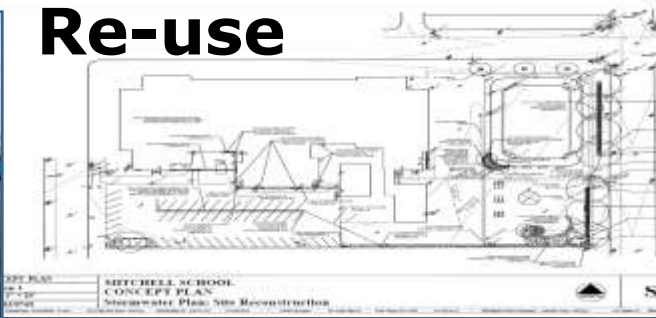
Street Tree Trenches

Campus Parks Initiatives

Infiltration



Re-use



Green Roofs



Porous Pavement



Bioretention



Mill Creek Pervious Basketball Court



Permeable Paving

Green Roof Opportunities

- City Council Proposed 25% Tax Credit for Green Roofs (up to \$100K)
- Incentives to save on stormwater bills based on impervious cover
- Development incentives for LID and reducing DCIA
- Over 12 proposed and several built at schools, businesses, & residences!

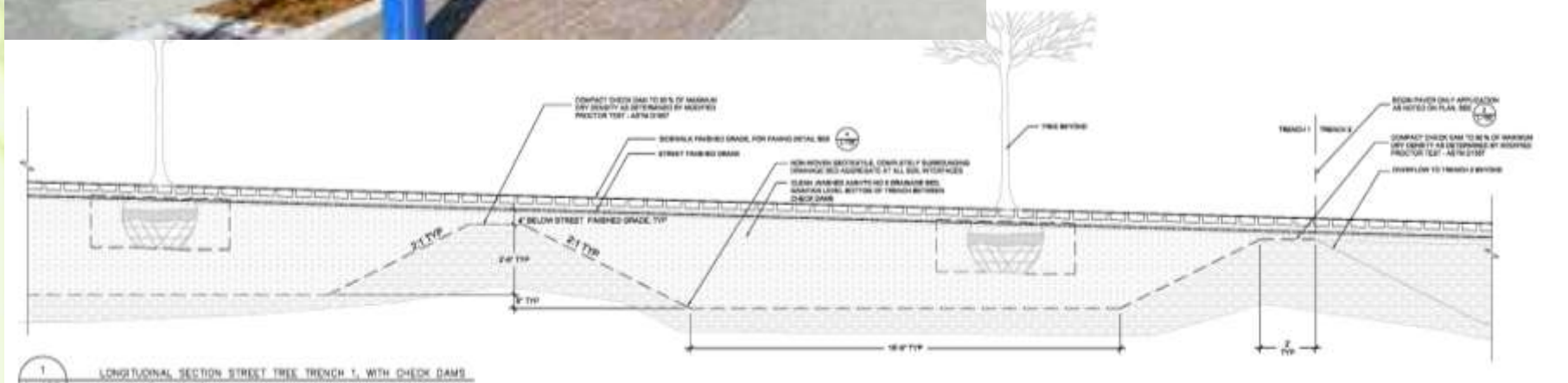
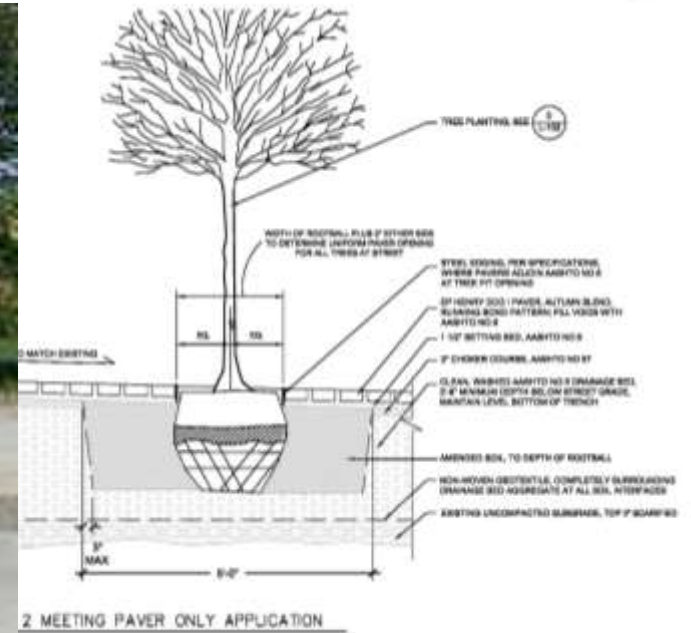


From Vacant Land to Community Parks



Clean

Tree Trenches and Green Sidewalks

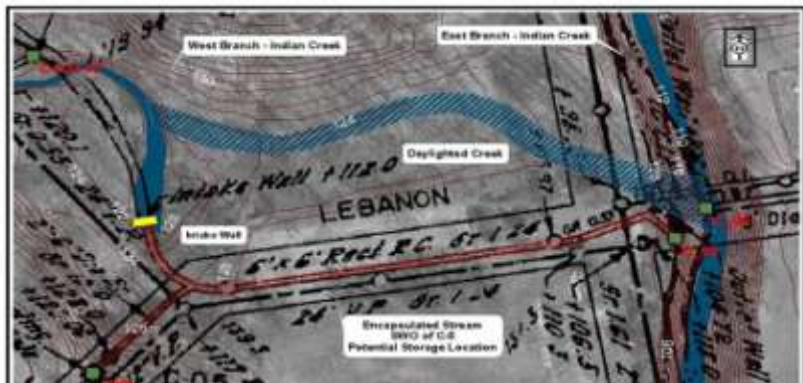


Water

- Ecosystem Restoration and Aesthetics**
 - Waterways Restoration Team**
 - Stream Habitat Restoration**
 - Constructed Wetlands**
 - Fish Passage Projects**
 - Floatables Skimming Vessels**
 - Riparian Buffer Creation & Enhancement**
 - Assessment & Monitoring**

Key Principles to Water Approach

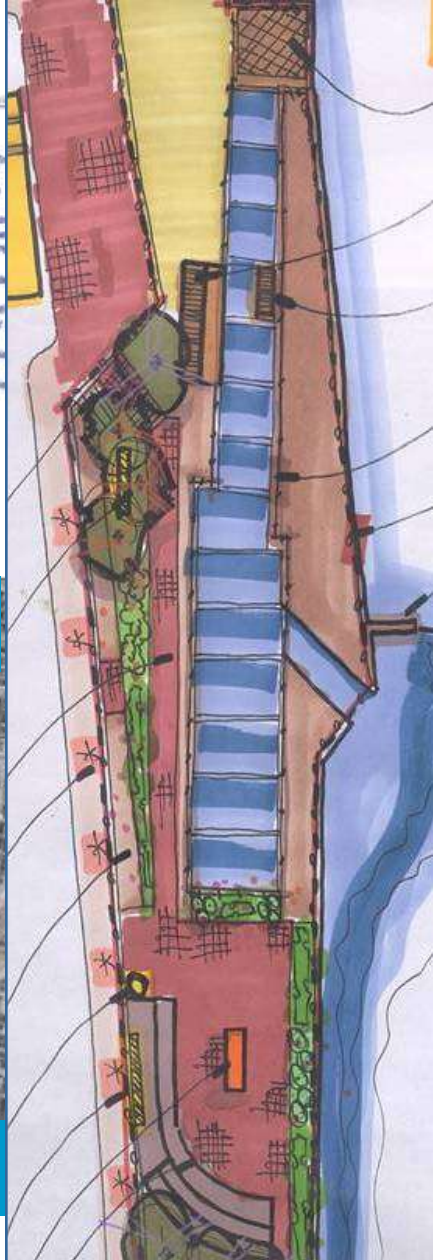
- Restore the habitat – “build it and they (the bugs and fish) will come”
- Eliminate migratory impediments
- Create access & safety for recreation
- Reduce dangerously eroded banks
- Protect infrastructure to increase service life and reduce I&I



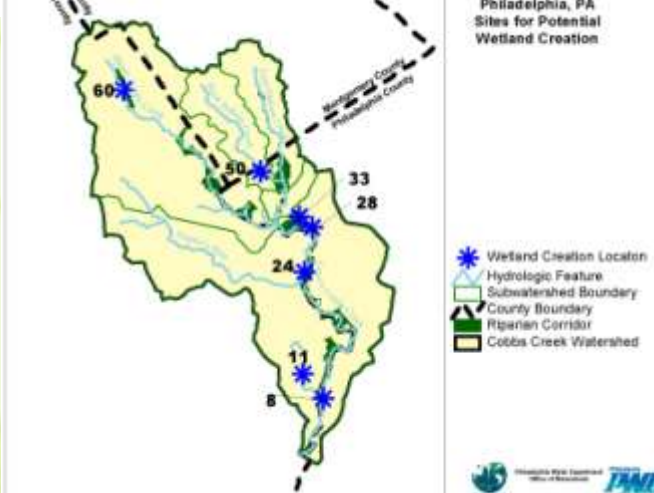
After



Wissahickon Creek Infiltration Basins and Meadow



Stream Daylighting



Wetlands Creation



Stream Buffers

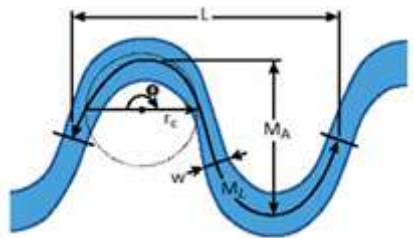
Habitat Creation

Natural Solutions On Public Lands

Fish Passage

Fluvial Geomorphology & Stream Restoration

Ecosystem Restoration



Natural Stream Channel Design



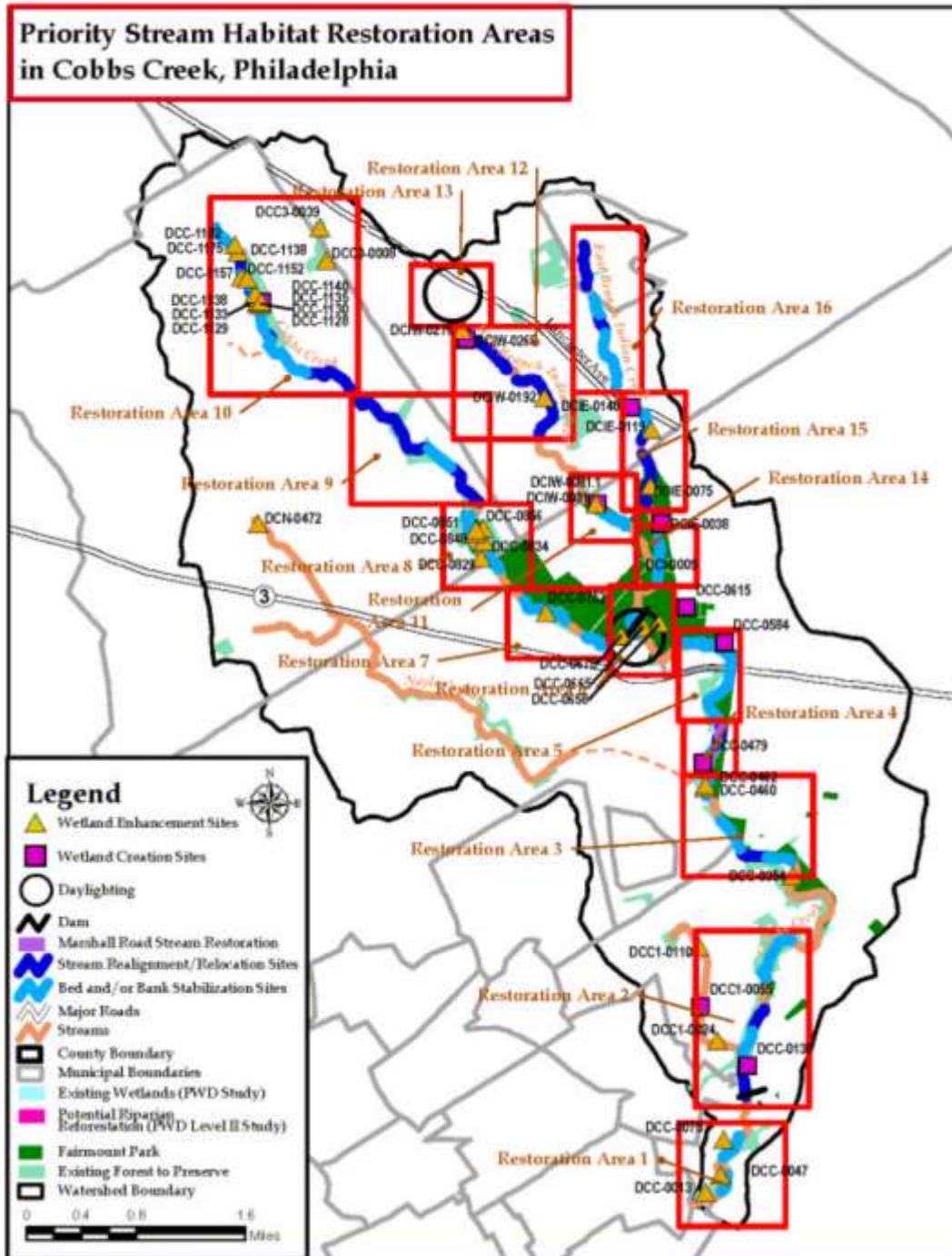


9/29/06

Wises Mill Restoration



Priority Stream Habitat Restoration Areas in Cobbs Creek, Philadelphia

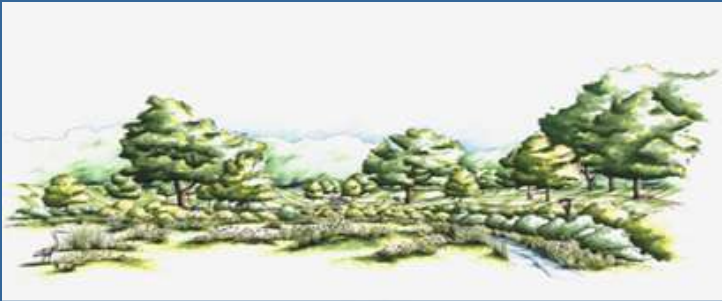


Watershed Management Plans & Watershed Registry

- 5 plans for every city watershed
- 3 completed, 2 underway
- 78 miles of stream restoration
- Projects for Target A, B, C goals
- Developed into registry for wetland and open water mitigation trades

Saylor Grove Stormwater Treatment Wetland

Ecosystem Restoration



Fish Passage



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Swimmable

- Cities are studying microbial risk, recreational contact, and bacteria water quality standards
 - Chicago’s recreational risk study
 - WERF
- Philadelphia started a recreational risk study with Drexel University
- Philadelphia uses Rivercast and is looking to expand and build upon public notification and education
- Philadelphia has groups looking at “swimming pools” in the river like the Hudson River
- Swimming vs. other recreational contact is a major issue and how to manage it

www.phillyrivercast.org

Real-Time Water Quality Forecast

PHILLY RIVERCAST

A Daily Forecast of Water Quality in the Schuylkill River Along Boathouse Row

Wednesday, March 9

Current RiverCast:

GREEN

What is the Philly RiverCast?

How does water quality affect my health?

Why does water quality change?

How is the RiverCast created?

RiverCast Trends

Links

Contact us

What is Philly RiverCast?

The Philadelphia Water Department has implemented a system to inform recreational river users of the water quality. The RiverCast advisory system is updated daily with...

The category definitions:

Green: It is safe for all uses of the river,...
Activities recommended are: swimming, boating...

Yellow: Limited exposure to the water,...
Activities include:

RiverCast Advisory System

GREEN

Water safe for all recreational uses

YELLOW

Water safe for non-direct contact uses.

RED

Recreational water use is not recommended



Site brought to you by
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with funding from the
Environmental Protection Agency

Disclaimer information...

MORE RECREATIONAL OPPORTUNITIES



Photo: Shazamm/ESPN



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A 55-lb Striped Bass caught at the Navy Yard

The Public Wants This



Not This

No Swimming at Any Time Sewer Overflows



During and immediately after rain, polluted water flows from these pipes or nearby pipes. To protect your health, do not come in contact with rivers and streams during this time.

For information on how to protect our waterways, visit: www.phila.gov/water.

Please report flows from pipes during dry weather to PWD's hotline: 215-685-6300.

Philadelphia Water Department

No Nades en Ningun Tiempo Desbordamiento de Aguas Negras

Durante e inmediatamente después de llover, las aguas contaminadas fluyen por este tubería o tubería cerca de aquí. Para proteger su salud evite el contacto con ríos y quebradas durante este tiempo.

Para información sobre como proteger nuestros cuerpos de agua visite: www.phila.gov/water.



Durante tiempos secos favor de reportar cualquier desbordamiento de ésta quebrada a la línea directa de PWD: 215-685-6300.

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