



## Green Infrastructure Webcast Series

Funding and Incentives  
Brownfield Redevelopment



## Guide to Our Webcasts

For Technical Support click the “*Help*” button

- ❑ ***To Ask a Question*** - Type your question in the text box located in the lower left-hand corner of your screen and click on the “Submit Question” button
- ❑ ***To Answer a Poll Question*** – Click on the radio button to the left of your choice and click submit. Do not type your answer in the “Ask a Question” box
- ❑ ***To See Closed Captioning*** – Turn your pop-up blocker off and click on the “closed captioning” button
- ❑ ***To Complete the Survey*** – Turn off your pop-up blocker
- ❑ ***To Obtain a Certificate*** – Watch 1 hour and 30 minutes of the webcast and then click “Download Certificate.” If you are in a room with multiple attendees please wait until the last slide to obtain the URL to customize your own certificates



## Green Infrastructure Webcast Series

Archived webcasts on the following topics:

- Benefits of Green Infrastructure
- Municipal Case Study: Philadelphia
- Revising Local Plans, Codes and Ordinances
- Water Harvesting
- Models & Calculators
- Municipal Case Study: Louisville
- Site Planning & Design Considerations
- Costs and WERF Cost Tool

Next Live Webcast: Tuesday, July 28, 2009

- Retrofits: Green Streets
- Operation & Maintenance

## Green Infrastructure Website www.epa.gov/greeninfrastructure



- General Information
- Key Resources
- Case Studies
- Performance Data
- Partnership Contacts
- Statement of Support

# Funding & Incentives

## Abby Hall

EPA Headquarters  
Development, Community and Environment  
Division



# Funding Options

- Stormwater Fees
- Clean Water State Revolving Fund
- Grants
- Local taxes and fees



# Stormwater Fees

- Impervious based billing
- Not a tax
- Managed by utility or existing agency

## Minneapolis's Stormwater Charge for Single Family Residences

Tier	ESU	Stormwater Charge
High	1.25	\$10.90
Medium	1.00	\$8.72
Low	0.75	\$6.54

# Grants

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- EPA
  - 319 grants
  - SRF
  - Targeted Watersheds Grants
- HUD
  - Community Development Block Grants
- Federal Highway Administration
  - Eco-logical Grant Program
- USDA Forest Service
  - Urban and Community Forestry Challenge Grants

# State Revolving Fund Program

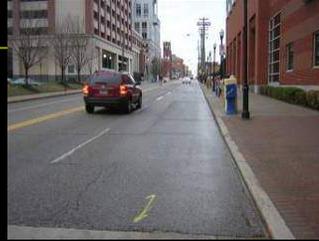
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- American Recovery and Reinvestment Act
- \$4 Billion for Clean Water
- \$2 Billion for Drinking Water
- Required 20% set aside for “green reserve”



## State Revolving Fund

- Recipients can include:
  - Communities
  - Utilities
  - Individuals
  - Citizen's groups
  - Nonprofits
  - Businesses



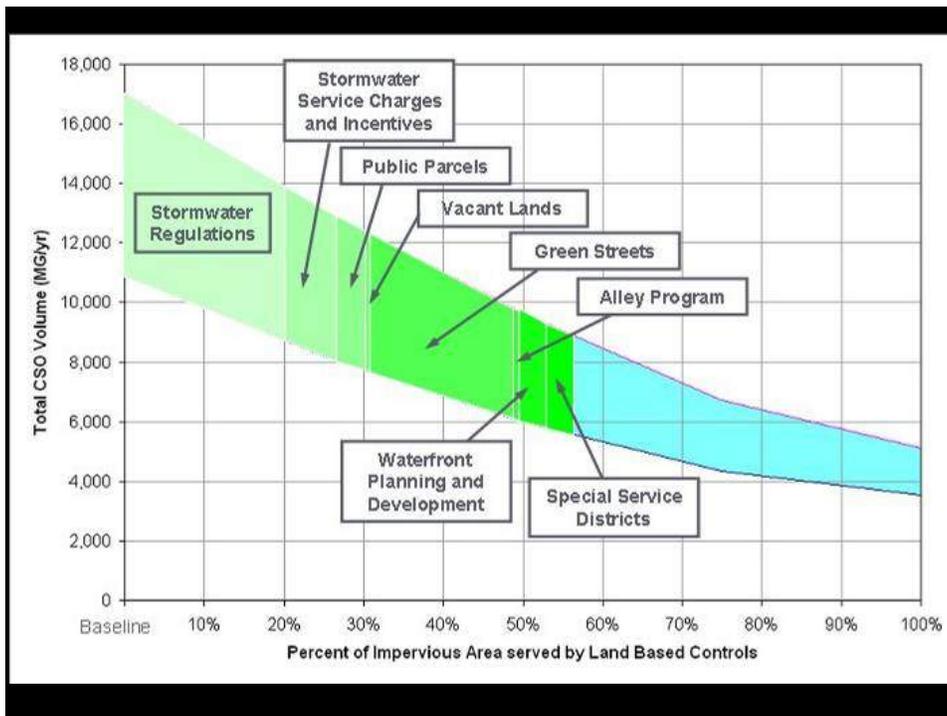
## State Revolving Fund Program

- Land Conservation
- Wetland Restoration
- Reforestation
- Parks & Greenways
- Tree Boxes
- Rain Gardens & Bioinfiltration
- Cisterns & Rain Barrels
- Permeable Pavements
- Downspout Disconnections
- Green Roofs



# Local taxes and fees

- Developer fees
  - Plan Review, Permits, Assessment
- Fee-in-lieu
- Impact fees
- Property taxes
- Sales tax



## Types of Incentives

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- Fee Discount
- Development Incentives
- Rebates & Installation Financing
- Stormwater Regulation
- Awards & Recognition Programs



## Fee-based Incentives

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## Portland, OR

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- Up to 100% discount off on-site fee, or 35% of total stormwater charge
- Single-family home discount based on roof runoff management
- Commercial, industrial, multi-family home discount based on runoff managed from roof *and* paved areas
- Partial credit for tree planting, ecoroofs and less than 1000 sq ft imperviousness

## Philadelphia, PA

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- 50% discount for residents and businesses
- Decrease directly connected impervious areas
  - Rain gardens, porous asphalt and sidewalks, swales, green roofs.





## Toledo, OH

- Credits available only for non-residential property owners
- Maximum credit of 50%
- Credit awarded for impervious area managed by practices that reduce runoff and pollution
- Different credit amounts for each practice
  - 10% credit for brownfield reuse
  - 30% credit for forested buffer or swale

## Other Fee-based Incentives

- Chesapeake, VA
- Denver, CO
- Sandy, OR
- Henry County, GA
- Marysville, WA



## Types of Incentives

- ❑ Fee Discount
- ❑ Development Incentives
- ❑ Rebates & Installation Financing
- ❑ Stormwater Regulation
- ❑ Awards & Recognition Programs



## Development Incentives

- ❑ Chicago
  - Green Permit Program
- ❑ Philadelphia
  - Green Roof Tax Credit
  - Unofficial expedited permitting
- ❑ Portland
  - Floor Area Ratio Bonus
- ❑ Seattle
  - Density Bonus



## Types of Incentives

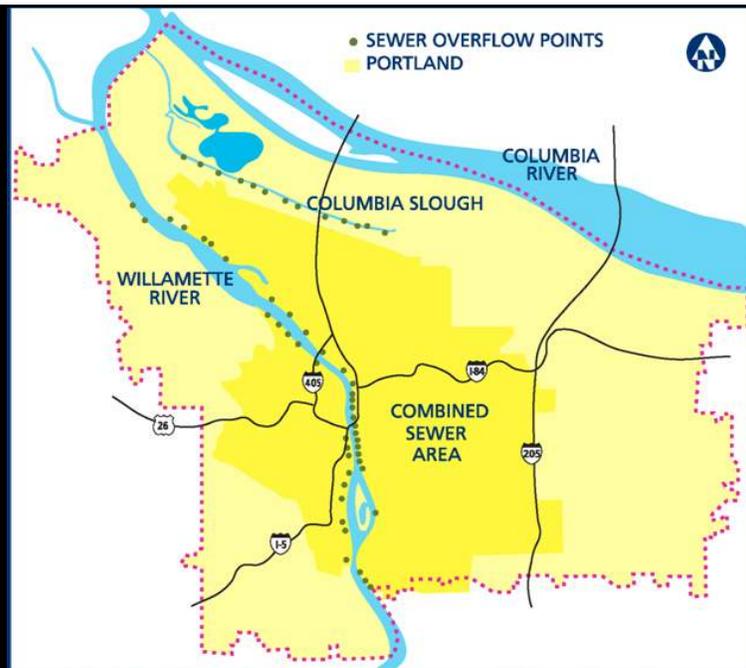
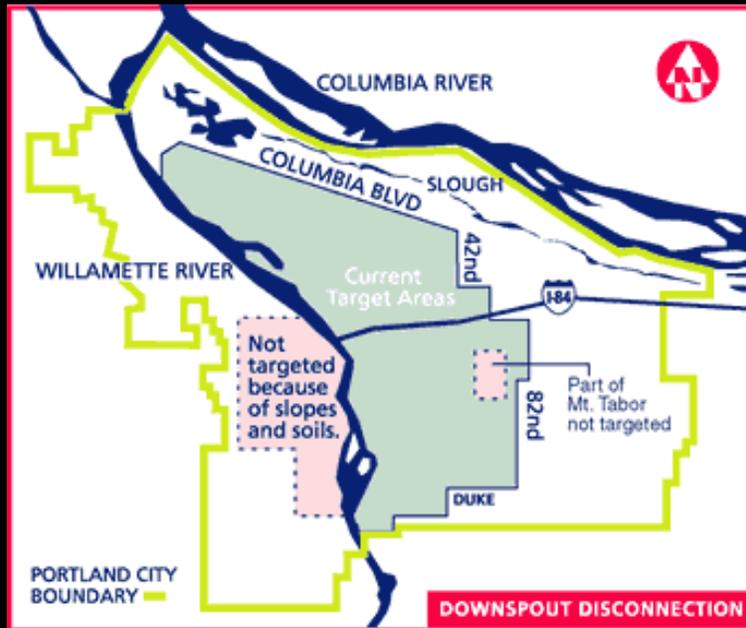
- Fee Discount
- Development Incentives
- Rebates & Installation Financing
- Stormwater Regulation
- Awards & Recognition Programs



## Rebates & Installation Financing

- Downspout disconnection
  - Portland
    - 60,000 downspouts
    - 1.5 billion gallons annually out of CSS
  - Seattle
    - Rainwise Incentive Program





More than half of Portland's residents are served by combined sewers. Areas developed since about 1960 have separate sanitary and storm systems.

## Rebates & Installation Financing

- **Austin:** Rebate for rain barrel and irrigation
- **DC:** River Smart Homes, \$1200
- **Montgomery County, MD:** RainScapes Rewards, \$1200 homes, \$5000 commercial & multi-family
- **Chicago:** Green Roof Grants, \$5000
- **Portland:** Community Watershed Stewardship Grants
- **Minneapolis:** \$2000 residential, \$30,000 commercial/government
- **Santa Monica:** Landscaping grants

## Types of Incentives

- Fee Discount
- Development Incentives
- Rebates & Installation Financing
- Stormwater Regulation
- Awards & Recognition Programs



# Stormwater Regulation

## □ Philadelphia's Stormwater Requirement

Requirement	New Development	Redevelopment
Water Quality	Comply	Comply
Channel Protection	Comply	May be Exempt
Flood Control	Comply	May be Exempt
Nonstructural Site Design	Comply	Comply

## □ San Jose

# Types of Incentives

- Fee Discount
- Development Incentives
- Rebates & Installation Financing
- Stormwater Regulation
- Awards & Recognition Programs



# Awards and Recognition Programs



- Chicago
  - Mayor Daley's GreenWorks Awards
- Portland
  - BEST (Businesses for an Environmentally Sustainable Tomorrow)
  - Eco-logical Business Program
- Philadelphia
  - Stormwater BMP Recognition Program
- King County, WA
  - Businesses for Clean Water
  - Greening In Place Awards

My Community
My Footprint
My Actions
Marketplace

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**Portlanders Take Action!**

Many Portland property owners have already taken action to create a more sustainable city. Use the map below to explore what others in our community have already done and get ideas about what you can do to go green and earn green in return.

Don't see your actions on the map? Log in above, add your actions, and the map will be updated automatically.

**Current Property**

2136 NE 10TH AVE, Portland, Oregon 97222

Find another Property:

Enter street address and zip code

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Region: City of Portland

**Most Popular Solutions in Portland**

- [Learn More](#)
- [Learn More](#)
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# Questions?

Abby Hall

[hall.abby@epa.gov](mailto:hall.abby@epa.gov)

202-566-2086



<http://picasaweb.google.com/buildgreeninfrastructure>



## Implementing Green Infrastructure on Brownfields – Opportunities and Considerations

June 23, 2009

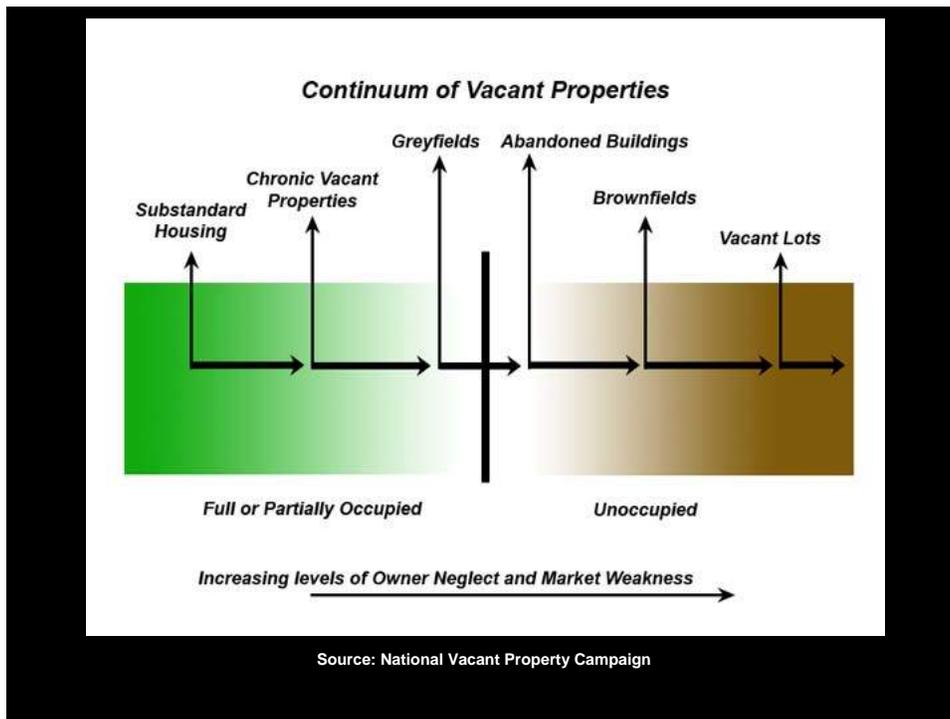
Stacy Swartwood & Bob Newport  
*US Environmental Protection Agency*

### What is the Definition of a Brownfield Site ?

**A Brownfield is**

**“real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.”**

*The Small Business Liability Relief and Brownfields Revitalization Act signed January 11, 2002.*





## What are Brownfields?

- Once-productive areas that have been abandoned; some are contaminated.
- Lenders, investors, and developers fear environmental liability and are more attracted to “greenfields.” This can lead to missed opportunities that result in sprawl development and additional impacts to local water bodies, including increased stormwater runoff and air deposition.



## Why is Brownfield Redevelopment Important?

Cleaning up contaminated properties for reuse can:

- Protect human health and the environment
- Catalyze the assessment and cleanup process;
- Result in more protective cleanups;
- Reinvigorate neighborhoods and whole communities;
- Preserve greenspace and prevent sprawl;
- Return unproductive land to tax rolls;
- Create public parks or restore natural habitat;
- Spur economic development by retaining or establishing new businesses and creating or retaining jobs.
- Protect clean land - one of our nation's most valuable resources



## Why is Stormwater Management on Brownfields Important?

- Restoration of hydrology in urban areas/ industrial areas
- Vacant land available
- Can be blended into redevelopment projects
- Environmental performance of sites after redevelopment can be better than before, providing a net benefit to the community on multiple levels



## EPA Brownfields and Land Revitalization Program History

- In the early 1990's, the U.S. Conference of Mayors pointed to brownfields as one of the most critical problems facing cities
- Brownfields pushed down property values and tax revenues
- Properties were not getting cleaned up and were contributing toward community blight
- EPA "pilots" provided seed money for helping communities and supporting new ideas



## Small Business Liability Relief and Brownfields Revitalization Act

- Success of the Brownfields Initiative led to legislative proposals
- Brownfields legislation signed in January 2002
- Expanded funding for brownfields assessment and cleanup competitive grants
- Clarified liability protections
- Increased support for State and Tribal programs



## EPA Brownfields and Land Revitalization Program

- Grants and technical assistance to support community revitalization
- Grants to support program development and enhancement to state and tribal partners
- Enforcement discretion tools and liability protection to increase certainty and encourage private investment



## Sustainable Revitalization

- Green cleanup
- Reuse and recycling of construction and demolition materials
- Green building and infrastructure design, including Low Impact Development
- Energy efficiency
- Water conservation
- Renewable energy development
- Native landscaping



Before - Former Sharon Steel Property, MI



After - New School Building



## Managing Stormwater

Many brownfields have residual contamination left in place, so stormwater management planning needs to take into account the need to prevent the mobilization of contaminants and their migration to groundwater and surface waters



[http://brownfieldaction.org/files/brownfield/images/bf\\_bronx.jpg](http://brownfieldaction.org/files/brownfield/images/bf_bronx.jpg)

## Green Infrastructure/ Low Impact Development

The goal is to try to make this... ...function like this



NEMO

# Green Infrastructure on Brownfield Sites

## Stormwater Management on a Brownfield Site in Flint, Michigan

Dave Laclergue Jennifer Dowdell Emily Marshall Rebekah VanWieren

Professor Joan Nassauer, FASLA, Advisor  
University of Michigan  
School of Natural Resources and Environment  
Funded by the Genesee County Land Bank



## Green Infrastructure on Brownfield Sites

- Brownfields redevelopment and sustainable stormwater management are both important to the revitalization of communities and protection of the environment
- Without careful consideration, however, the intersection of these two elements may potentially increase environmental concerns
  - Perhaps most importantly, infiltrating stormwater at sites where there are contaminants in the soil may mobilize the contaminants and increase the potential for contamination of groundwater
- But with careful consideration, green infrastructure practices can be implemented at Brownfield sites in ways that community revitalization goals and environmental protection goals are both achieved.

University of Michigan

# Guideline #1

## Differentiate between groups of contaminants

### CONTAMINANT CLASSES

- Nutrients
- Pesticides
- Industrial organic compounds
  - VOCs
  - PAHs
- Pathogenic microorganisms
- Heavy metals and other inorganic compounds



University of Michigan

## Differentiate Between Groups of Contaminants

Contaminant	Mobility/ Risk to Groundwater
Salts	High
VOCs (BTEX, methane, naphthalene)	High/moderate
Metals (Pb, Ag, Hg, Cu, Ni, Cr, Zn, Cd)	Low /moderate
PAHs	Low
Pesticides/ Herbicides (DDT, 2,4-D, methyl parathion)	Low/moderate
Bacteria	High
Nutrients (nitrates and phosphorous)	High

## Guideline #2

Keep clean stormwater separate from contaminated soils to prevent leaching, spread of contaminants

- Careful placement of buildings and other impervious surfaces to act as caps
- Modified LID: *detention/ filtration without infiltration*



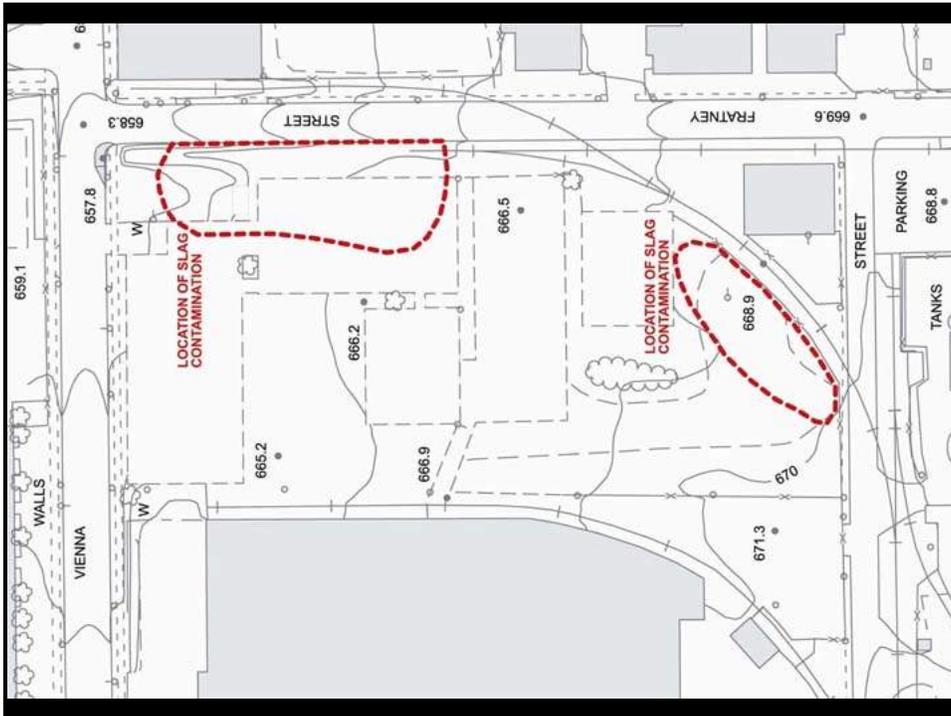
University of Michigan

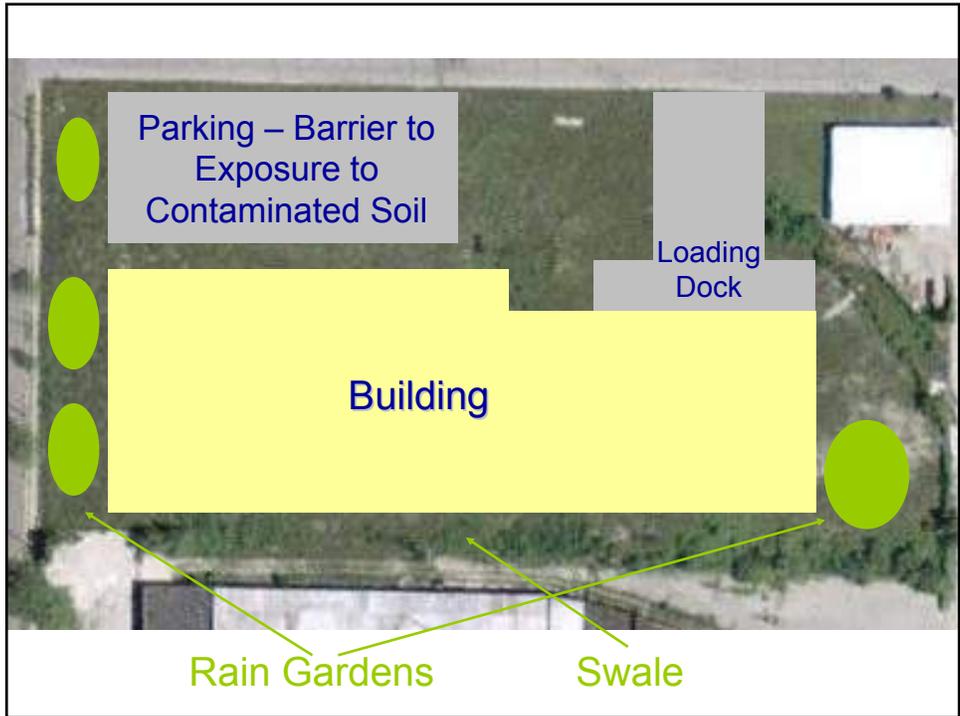
## Careful Placement of Buildings and Other Impervious Surfaces Case Study



This case study site is a vacant 4-acre, abandoned industrial property within a small cluster of industrial sites in Milwaukee, north of downtown

- The site is in a mixed-use neighborhood, with housing, retail and recreation within short walking distance. It is within an integrated street network with public transit routes, sidewalks, and bicycle routes.
- Stormwater management is an important issue in Milwaukee and on-site management of stormwater should be a part of the design proposal.





## Guideline #2

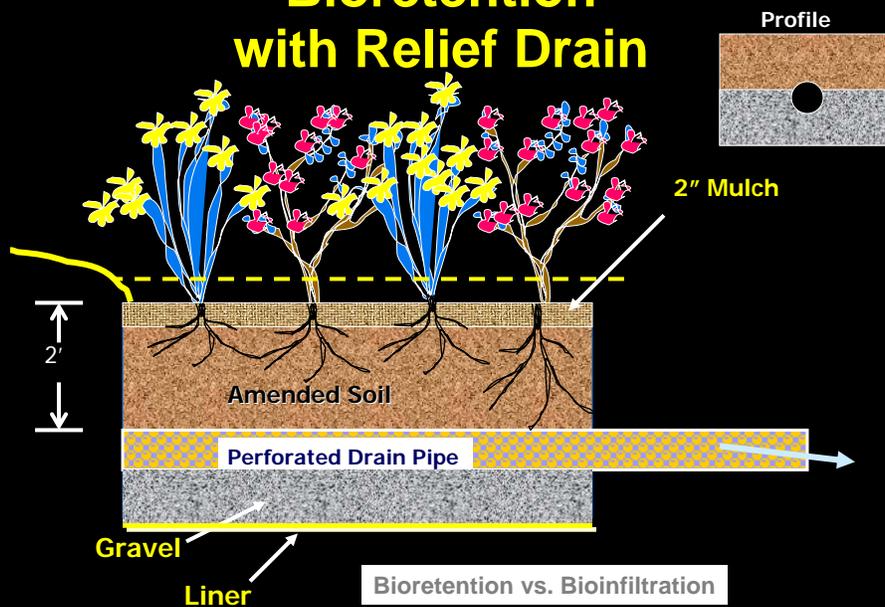
Keep clean stormwater separate from contaminated soils and water to prevent leaching, spread of contaminants

- Careful placement of buildings and other impervious surfaces to act as caps
- Modified LID: *filtration without infiltration*



University of Michigan

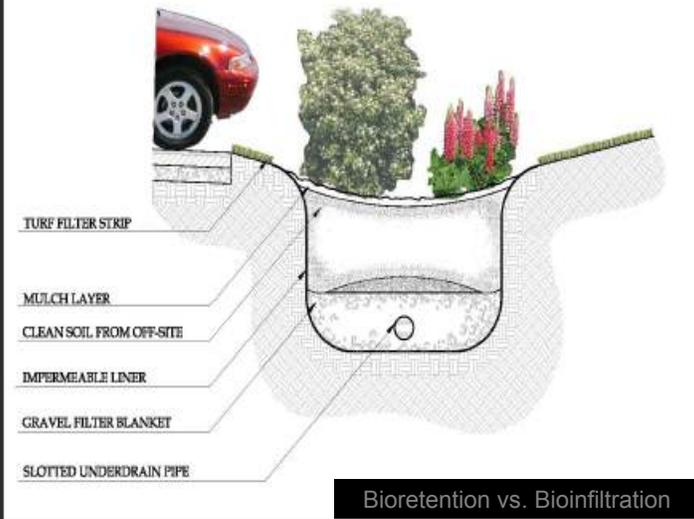
## Bioretention with Relief Drain



NEMO

## Guideline # 2

### Filtration Swale



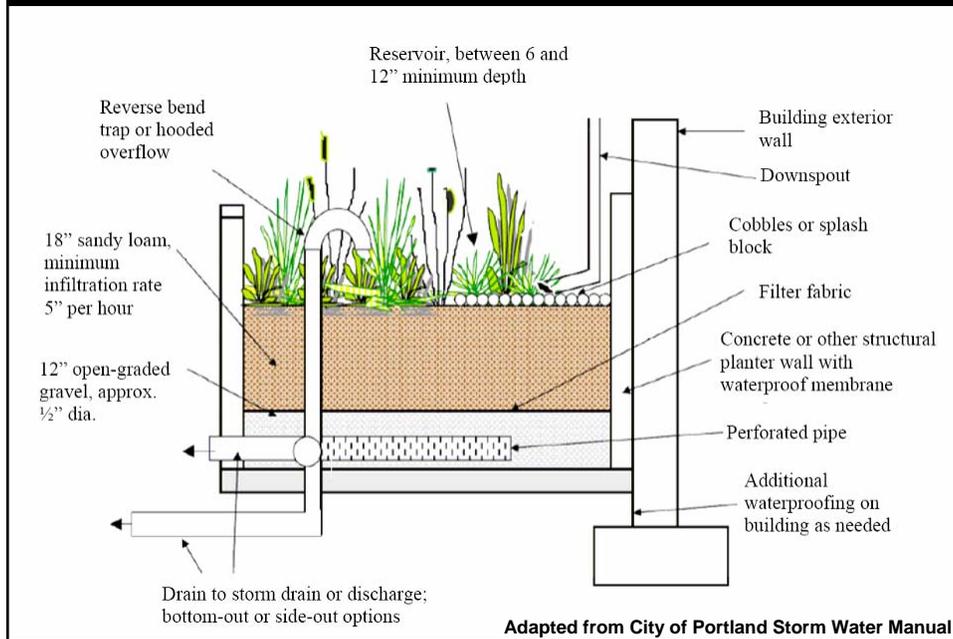
## Planter Boxes *Bioretention in a Box*



- Storage
- Evapotranspiration
- Filtration
- Aesthetically Pleasing
- Reduction of Peak Discharge Rate



# Planter Boxes



## Guideline #3

### Prevent soil erosion

#### Vegetative practices

- Choose appropriate plants
- Protect existing vegetation
- Plan new plantings to catch potential sediments

#### Structural practices

- Use swales to direct stormwater
- Use sediment basins to collect sediment-laden stormwater



<http://ceats.admin.virginia.edu/stormwater>

University of Michigan

## Guideline #4

All new development on and off the brownfield site should include measures to minimize runoff

- Green roofs
- Green walls
- Large tree retention/ installation
- Rooftop garden terraces
- Rainwater cisterns



University of Michigan



## Green Roofs

If buildings have been placed over contamination so that they can act as caps, a green roof can be placed on the building to mitigate the footprint of the building

**The Ford Motor Company assembly plant in Dearborn, MI**  
The green roof covers 10.4 acres





## Green Roofs - Public Buildings

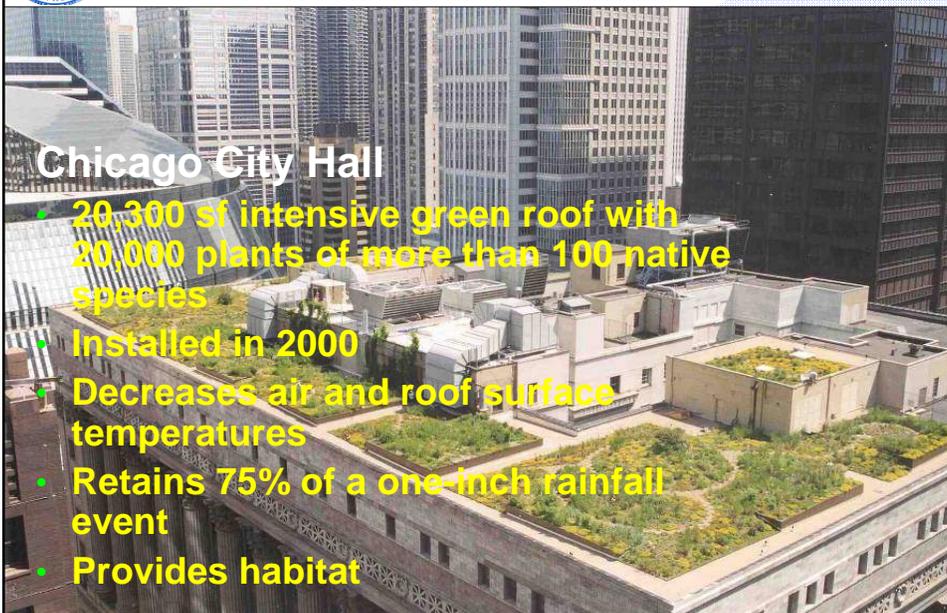


**Highland Gardens  
Milwaukee, WI**

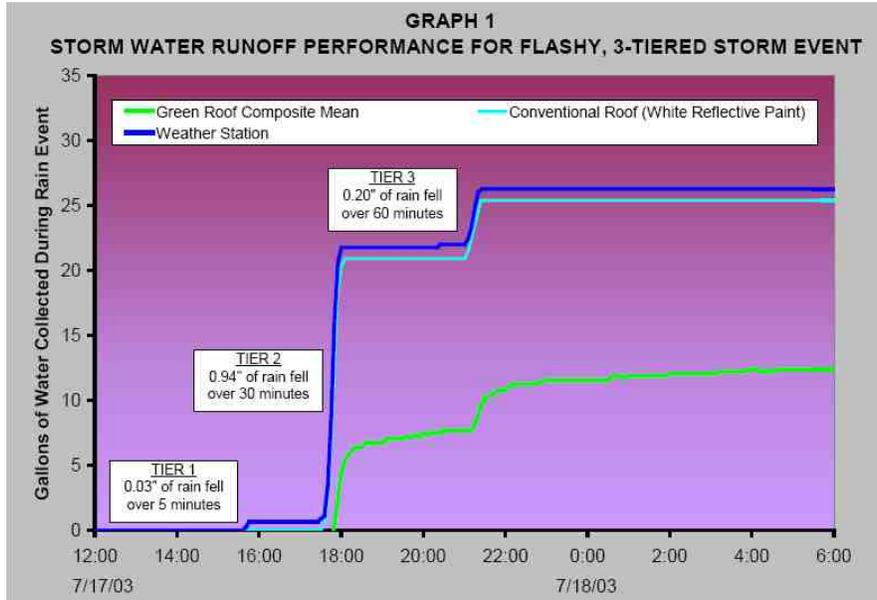
**Minneapolis Central  
Library**



## Green Roof Performance



## Chicago Center for Green Technology



Source: 2003 End of Year Project Summary Report, MWH, February 2004



## Green Infrastructure on Vacant Parcels

### Re-imagining a More Sustainable Cleveland

Neighborhood Progress, Inc.  
 1956 West 25th St., Suite 200  
 Cleveland, Ohio 44113  
[www.neighborhoodprogress.org](http://www.neighborhoodprogress.org)

Cleveland City Planning Commission  
 601 Lakeside Avenue  
 Cleveland, Ohio 44115  
[planning.city.cleveland.oh.us](http://planning.city.cleveland.oh.us)

Cleveland Urban Design Collaborative  
 Kent State University  
 820 Prospect Avenue  
 Cleveland, OH 44115  
[www.cudc.kent.edu](http://www.cudc.kent.edu)

*Financial Support*  
 The Surdna Foundation  
 330 Madison Avenue, 30th Floor  
 New York, NY 10017  
[www.surdna.org](http://www.surdna.org)





## Re-imagining a More Sustainable Cleveland

- Vacant land can be used to improve air and water quality, restore urban soils, increase biodiversity, and provide wildlife habitat.
- Vacant land within the city can be used to recreate the functions of healthy ecosystems, so that natural processes are harnessed for environmental benefits.
- Healthy ecosystems also contribute to the well-being of city residents. Studies show that access to nature - both the passive enjoyment of natural areas and active outdoor recreation - provide benefits such as better mental and emotional health, reduced stress, higher mental function and productivity, and community cohesion and resilience.



## Saylor Grove Philadelphia



156 acres drain to the 3 acre Fairmont Park for treatment in the 1 acre Saylor Grove wetland



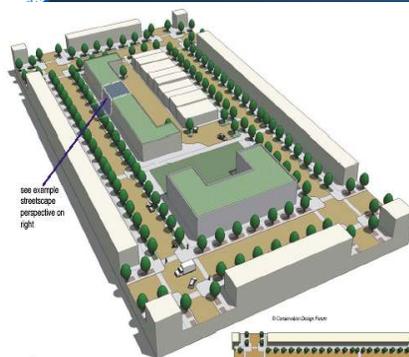
# Saylor Grove Philadelphia



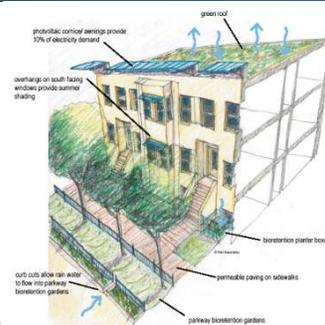
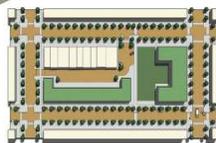
The goal is to treat 7/10" of runoff from most storms



## Green Infrastructure Applications for Brownfield Sites



- Key
- green roof
  - permeable paving
  - green space
  - bioswale
  - bioswale tree well
  - bioswale circulation
  - bioswale parking



Tom Price, PE, Principal  
Conservation Design Forum, Inc.



## CDF Philosophy & First Principles

# The Foundation for Sustainable Design BEGINS WITH WATER



**In Contrast to Conventional Stormwater Management Approaches based on Collection and Conveyance**

**Sustainable Water Resource Management Strategies are based on Decentralized, Integrated Systems Design: Capture rainfall, diffuse flow, cleanse, and absorb on-site; Restore historically stable patterns of infiltration and groundwater dominated hydrology**



## Green Infrastructure Practices

- **Native Landscape Systems**

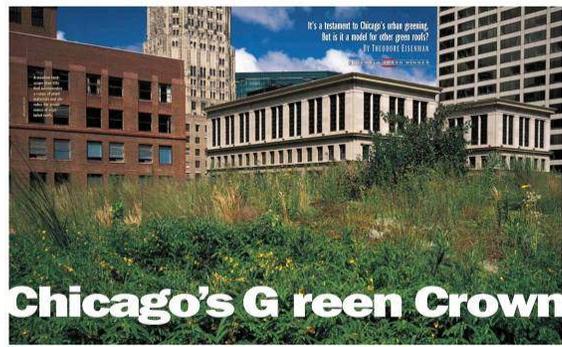


Tellabs Research and Development Facility  
Bolingbrook, IL



## Green Infrastructure Practices

- **Native Landscape Systems**
- **Green Roofs**



Chicago City Hall Green Roof Demonstration Project

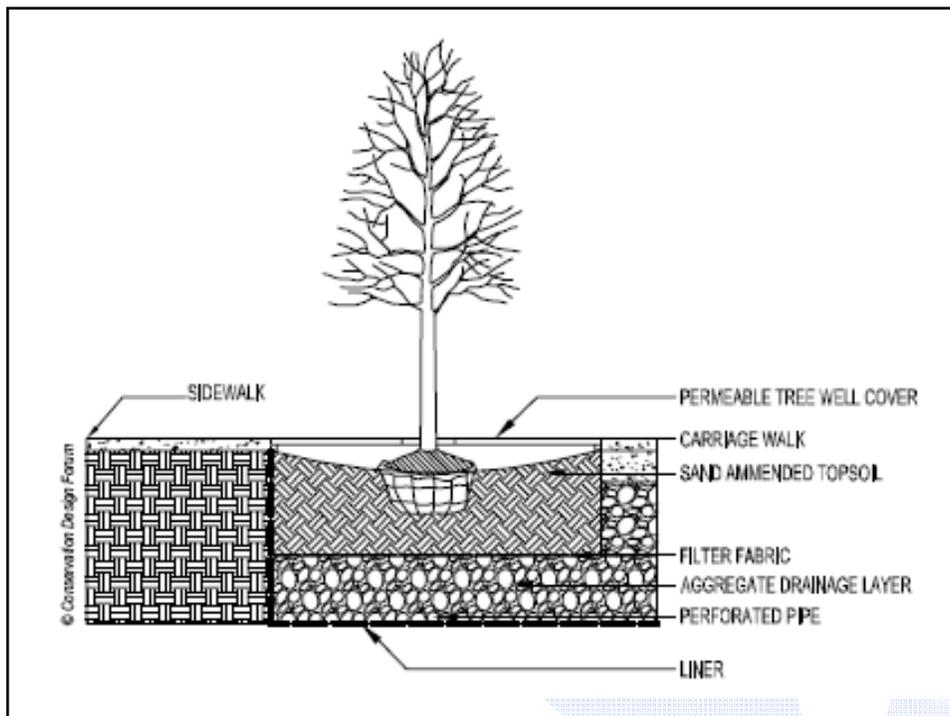


## Green Infrastructure Practices

- Native Landscape Systems
- Green Roofs
- Bioretention



Tellabs Headquarters  
Naperville, IL



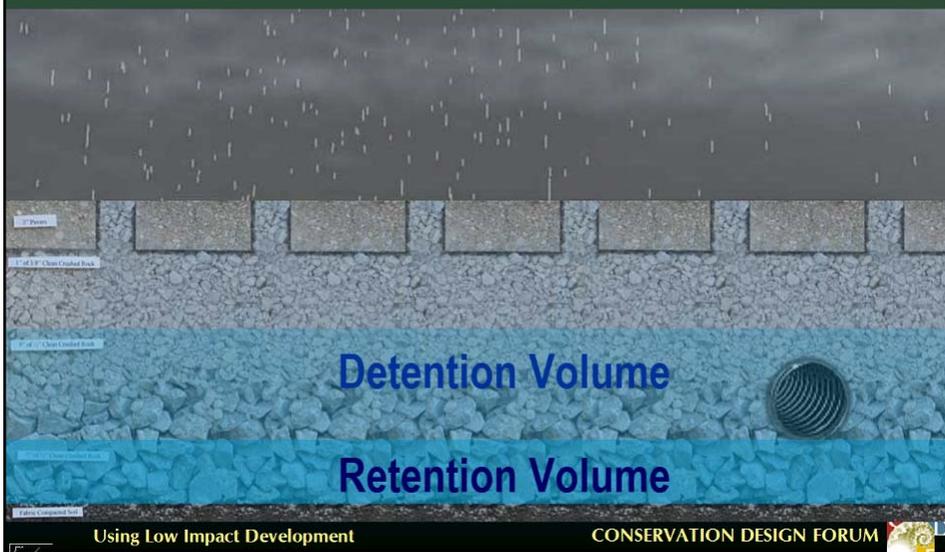


## Green Infrastructure Practices

- Native Landscape Systems
- Green Roofs
- Bio-swailes
- Porous Paving



### **Porous Pavement:** Infiltration (Retention) and Detention Capacity











## Sylvan Slough, Rock Island, IL



**Retain the Rain**

**Industrial decay to natural area**

It took seven years for the City of Rock Island to transform a tired industrial area into a natural park. Creating the Sylvan Slough Natural Area required patience and persistence. Its success is due to the dedication of the City, state and federal agencies, and the flexibility of a select group of contractors who believed in the project.

The opening of the Great River Recreational Trail showed a glimmer of light on the bright area obscured from public view by the industrial complex formerly occupied by International Harvester. Based on this five-acre site were three large buildings once home to a variety of industries including an egg-cracking facility, a slaughter house, and the fifty-year home of Midway City, a bulk oil distributor. The properties had deteriorated. Weeds were growing unchecked, and the grounds were covered with abandoned semi-trailers, cars and trucks with missing parts, tires, broken furniture, trash bags and other signs of illegal dumping.

**New England aster**  
New England aster

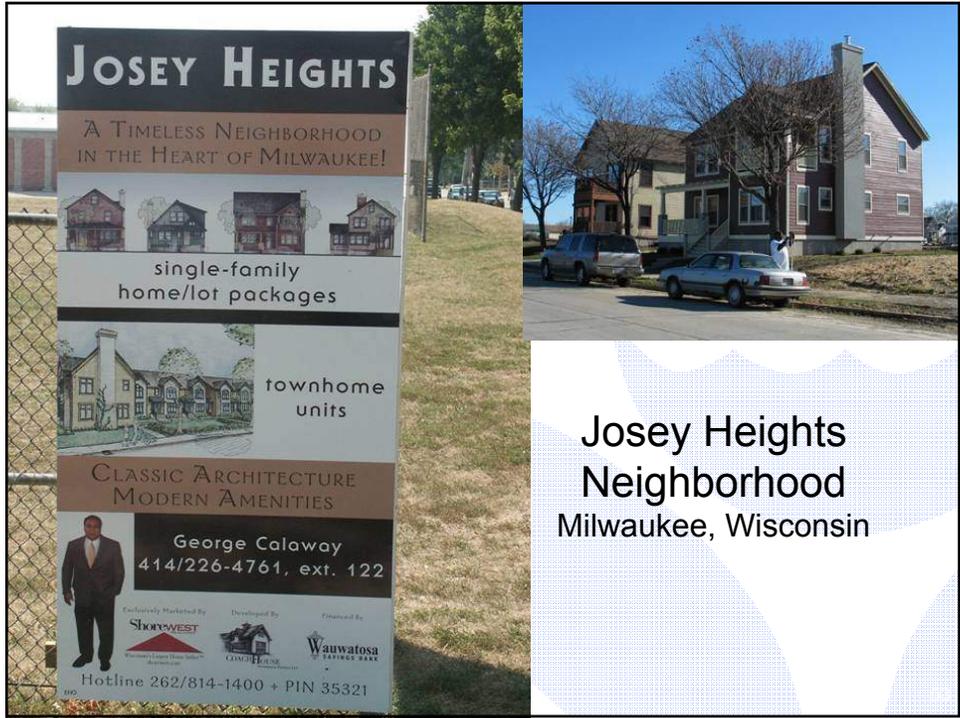
**Joe Pye weed**  
Joe Pye weed

**Before**

**Before**

Soil is the only prior to planting.

This project was supported through a partnership of River Action, Woodlawn Development Authority and the City of Rock Island. The Riverway Project is funded by a grant from the MacArthur Foundation, Mississippi, Minnesota, the River Action Trust, which is a national organization, and local government, business and individuals.



**JOSEY HEIGHTS**  
A TIMELESS NEIGHBORHOOD  
IN THE HEART OF MILWAUKEE!

single-family  
home/lot packages

townhome  
units

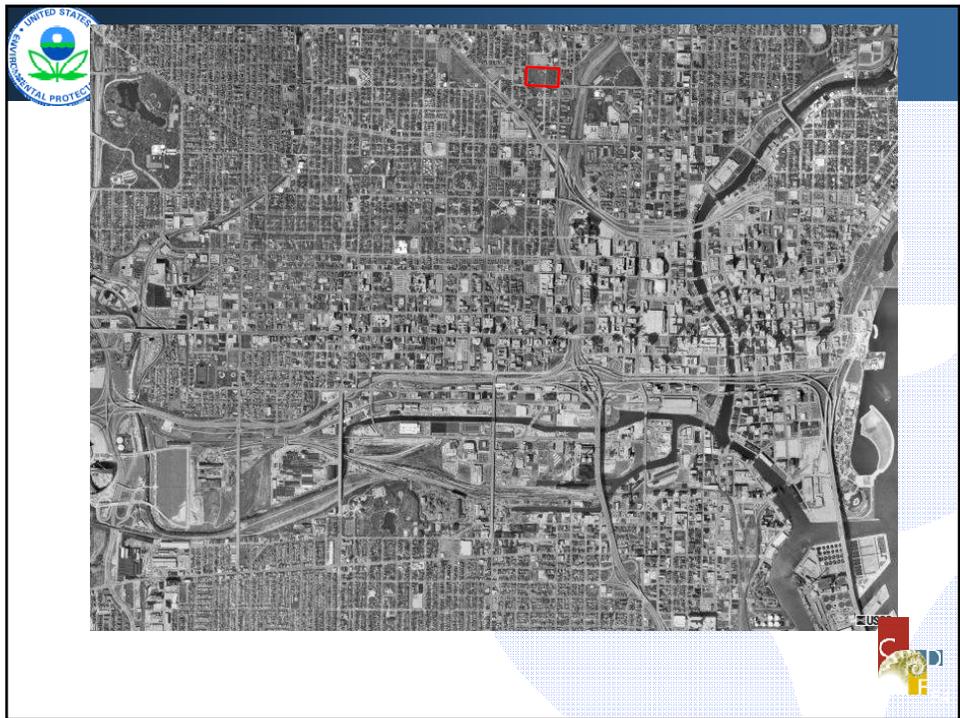
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Developed By: Camp House  
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Josey Heights  
Neighborhood  
Milwaukee, Wisconsin

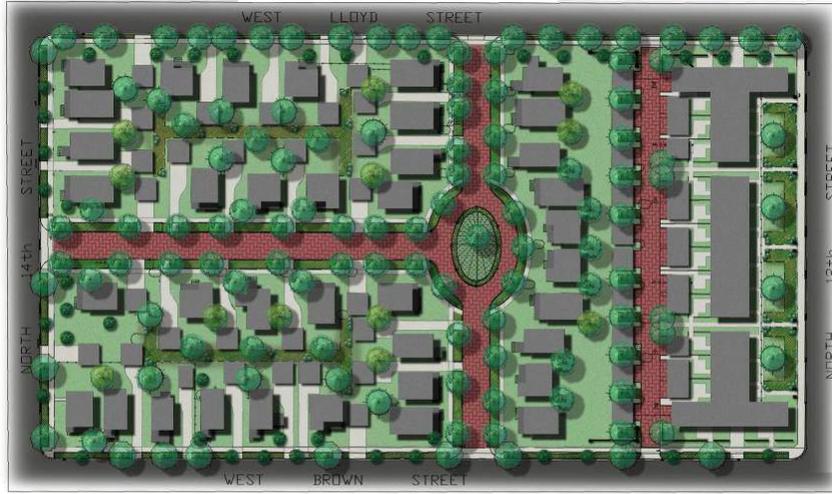




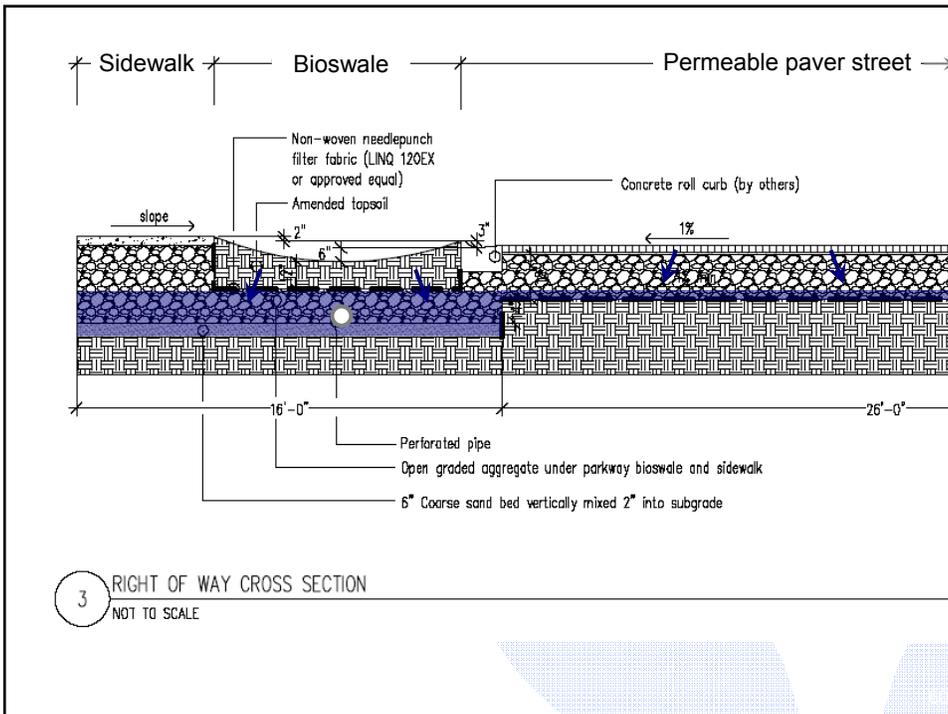


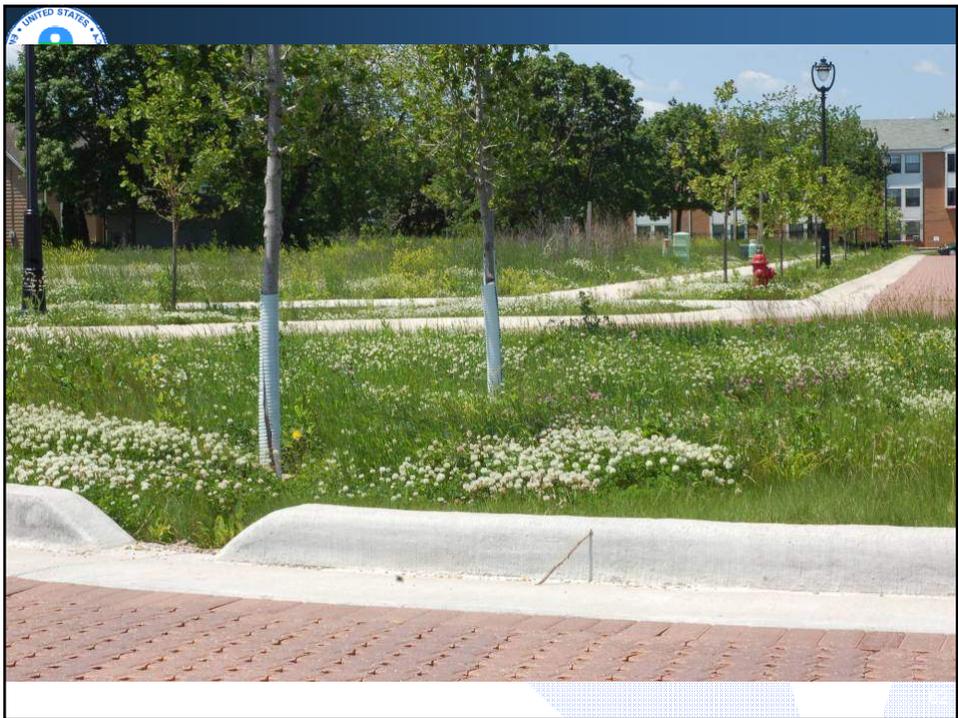


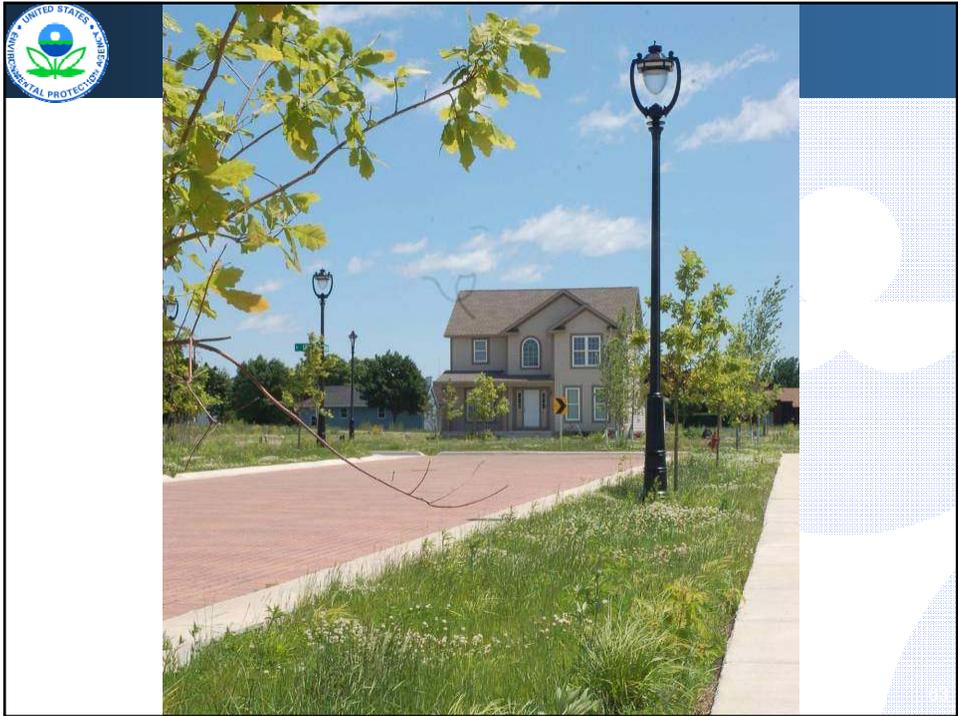
# Josey Heights



Rain Gardens    Street Bioswales    Permeable Paving









**East River District Sustainable Development Guidelines**  
 Detroit, MI

photovoltaic corner awnings provide 10% of electricity demand

overhang on south facing windows provide summer shading

green roof

multiple levels on

bioretention planter boxes

permeable paving on sidewalks

parkway bioretention gardens

curb cuts allow rain water to flow into parkway bioretention gardens

parkway rain garden

green roof

community rain garden

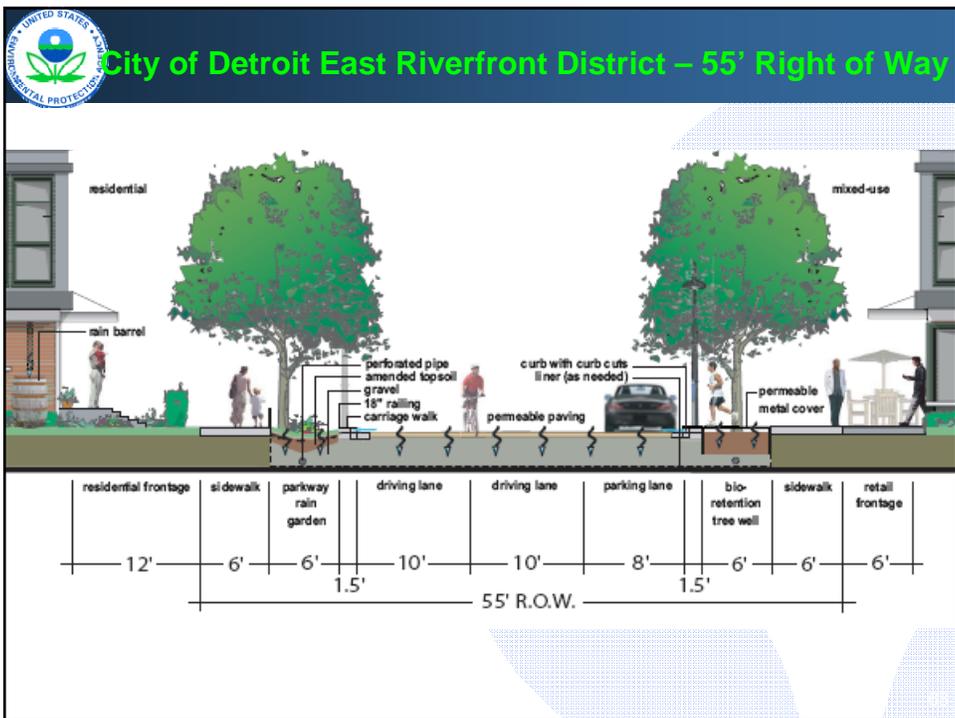
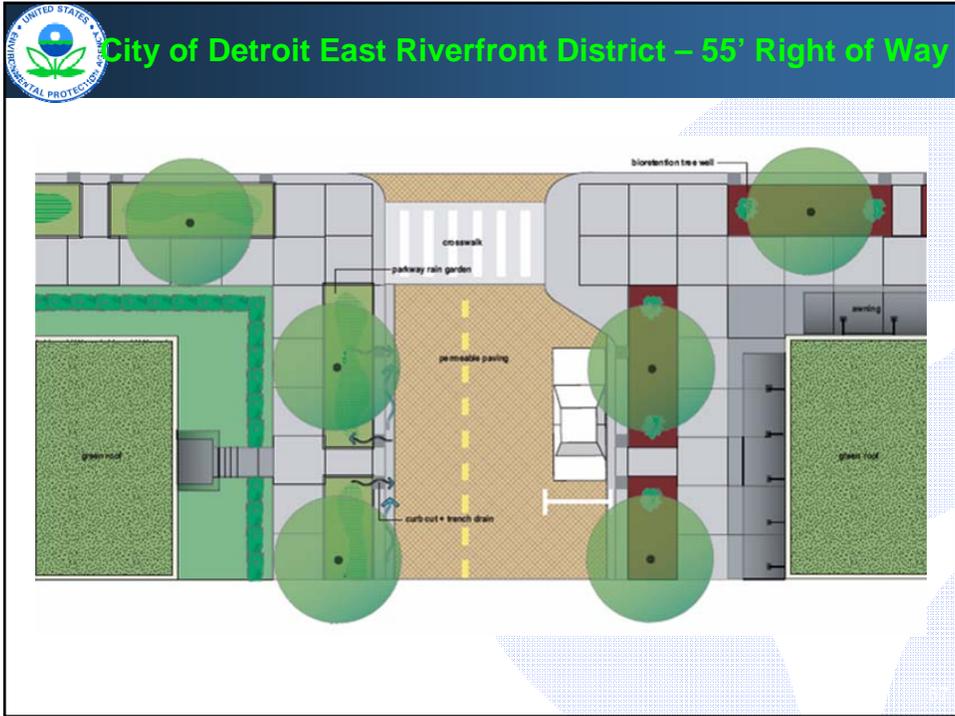
green space

bioretention tree well

pedestrian circulation

variable paving

8 Cornerstone Design Floor





# Windy City Harvest, Chicago, IL



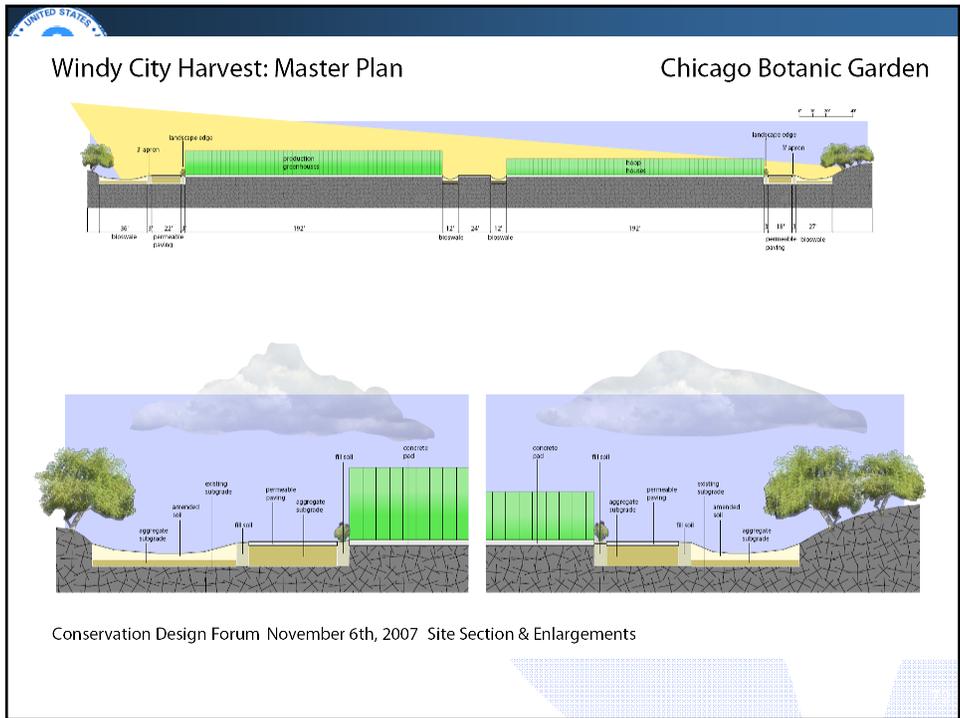
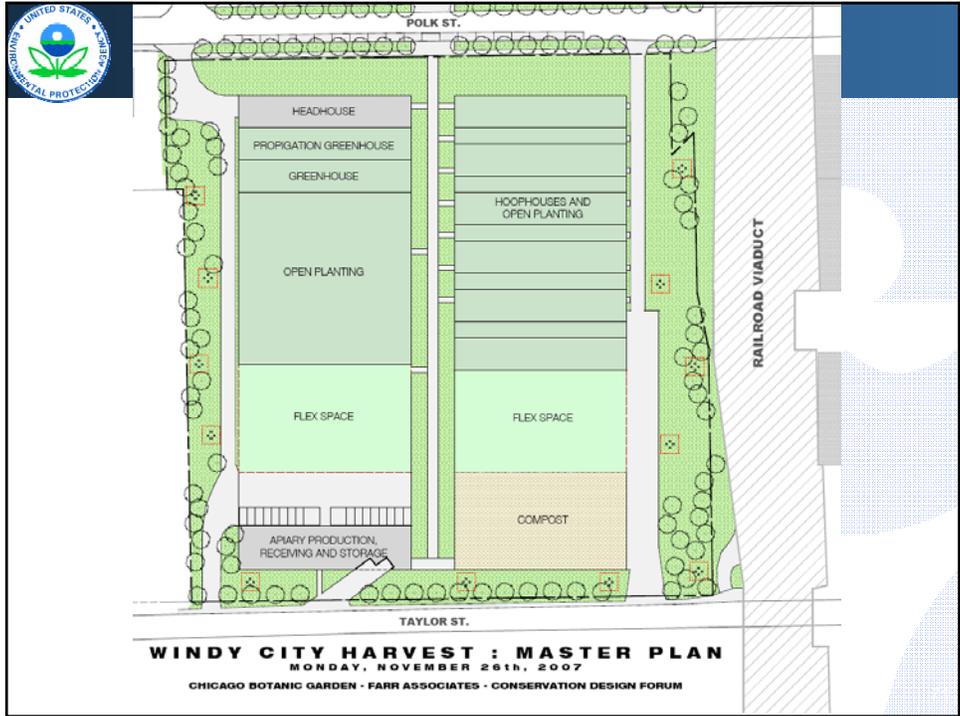
## Landscape & Water

### Landscape:

- Naturalized
- Brings color and seasonal interest
- Low maintenance
- Low water demand
- Supports food sources for the apiary
- Native or adapted to regional climate
- Is educational to the community

### Water

- Conserve and use on site as feasible
- Cool and cleanse before discharge
- Encourage an appreciation for its value
- Meet or exceed City release standards
- Integrate rainwater & landscape
- Be educational to the community





**Tom Price**  
**(630) 559-2004**  
**tprice@cdfinc.com**

**www.cdfinc.com**



Landscape Architecture  
Community Planning  
Ecological Restoration  
Water Resource &  
Ecological Engineering



**CONSERVATION DESIGN FORUM**

375 West First Street    Elmhurst, Illinois 60126    p 630.559.2000    f 630.559.2030    www.cdfinc.com



## More Info on Brownfields and Stormwater Management

- Using Brownfields Grants to Protect Watersheds Webcast  
(<http://www.epa.gov/owow/watershed/wacademy/webcasts/archives.html#20060920>)
- Fact Sheets: Stormwater Management on Compacted, Contaminated Soils in Dense Urban Areas
  - Design Principles (<http://www.epa.gov/brownfields/publications/swdp0408.pdf>)
  - Case Studies (<http://www.epa.gov/brownfields/publications/swcs0408.pdf>)



# Resources

- US EPA Brownfields Grants
- Targeted Brownfields Assessments
- State and Tribal Voluntary Cleanup Programs – Site Specific Assessments and Cleanups
- Technical Assistance to Brownfields Communities Programs
- Brownfields Sustainability Pilots
- Groundwork Trusts
- Clean Water SRF and Safe Drinking Water SRFs



# Groundwork Trust

January, 2009

## GroundworkUSA

Changing Places ~ Changing Lives

Development of the Groundwork USA network is supported by the National Park Service Rivers & Trails program in partnership with the Environmental Protection Agency Brownfields Program.

**LEGEND**

- Groundwork Trusts established
- Groundwork Trusts under development
- Hearing committees working to apply for Groundwork USA pilot funding and technical assistance
- Committees evaluating Groundwork for their community

**ENRICHMENT**

**Youth**  
Groundwork Tulsa  
From groundwork.org

**Business**  
Groundwork Midport  
From groundwork.org

**Land**  
Groundwork Council  
From groundwork.org

**Education**  
Groundwork Center  
From groundwork.org

**Communities**  
Groundwork Yuba  
From groundwork.org

**Brownfields**  
Groundwork Lawrence  
From groundwork.org

## Upcoming Events



- FY09 Brownfields Grant Awards Just Announced
  - Next round starts in Fall 2009
- Brownfields 2009
  - New Orleans, Nov 16-18, 2009



Villa Italia Mall, CO



## Questions?



*Farmers Market in Shelton, Connecticut during (left) and after renovation.*

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## Participation Certificate

- If you would like to obtain participation certificates for multiple attendees, click the link below
- You can type each of the attendees names in and print the certificates

[www.epa.gov/npdes/webcasts/certificate/gi\\_fundingincentives.pdf](http://www.epa.gov/npdes/webcasts/certificate/gi_fundingincentives.pdf)