Using Stormwater Management and Green Infrastructure to Promote Neighborhood Stabilization and Community Development

Sponsored by:
U.S. EPA Regions 5 & 7
Technical Assistance to Brownfields at Kansas State University
Great Lakes Environmental Planning

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Agenda

Intro: Green Infrastructure as an Element of Community Development (*Bob Newport*, EPA & *Eugene Goldfarb*, Great Lakes Environmental Planning)

Managing Wet Weather with Green Infrastructure (*Abby Hall*, EPA)

Community Pilots: Iowa and Milwaukee, WI (*Jeff Geerts*, Iowa Department of Economic Development & *Tom Price*, Conservation Design Forum)

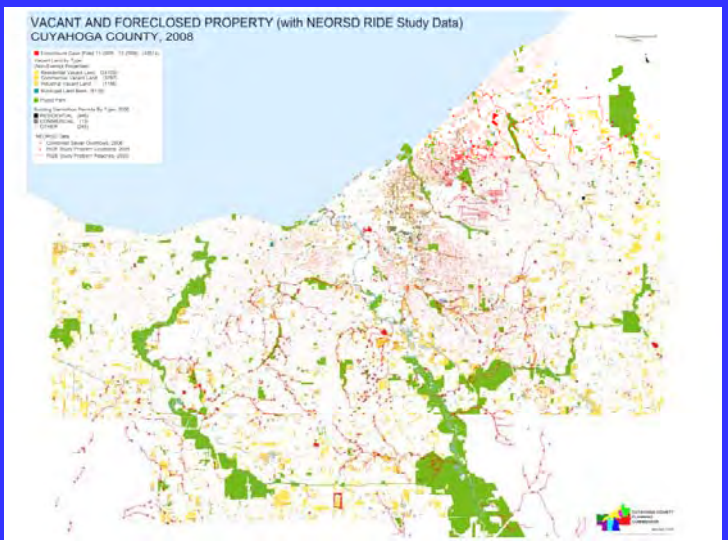
Q&A with HUD (*Ted Massey & Robert Poffenberger*), EPA *(Abby Hall & Bob Newport), Jeff Geerts, Tom Price, Tory Kress (Redevelopment Authority of the City of Milwaukee), Eugene Goldfarb*

Green Infrastructure

As an element of
Community Development
June 29, 2010

The Challenges:

- Widespread abandonment
- Economic Downturn
- Very poor market for Real Estate



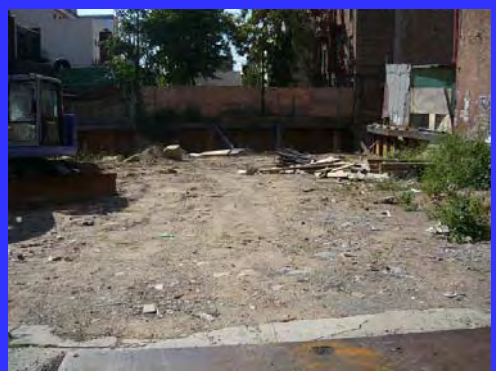
Numbers of vacant properties
Pittsburgh - 15,000
Buffalo - 40,000
St Louis - 40,000+
Indianapolis - 22,000
Philadelphia -30,000+
Baltimore - 42,000
Detroit - 90,000
Cleveland – 20,000

Required to Think Differently!

Vacant lots aren't harmless…

They tend to drag a neighborhood down

- Illegal dumping
- Crime
- Eyesores
- Lowers surrounding area property values



Helping to Stabilize Neighborhoods

Community Greening can make neighborhoods more livable

- Urban Agriculture and Community Gardens
- Green Infrastructure

In some cases there may be opportunities on vacant parcels

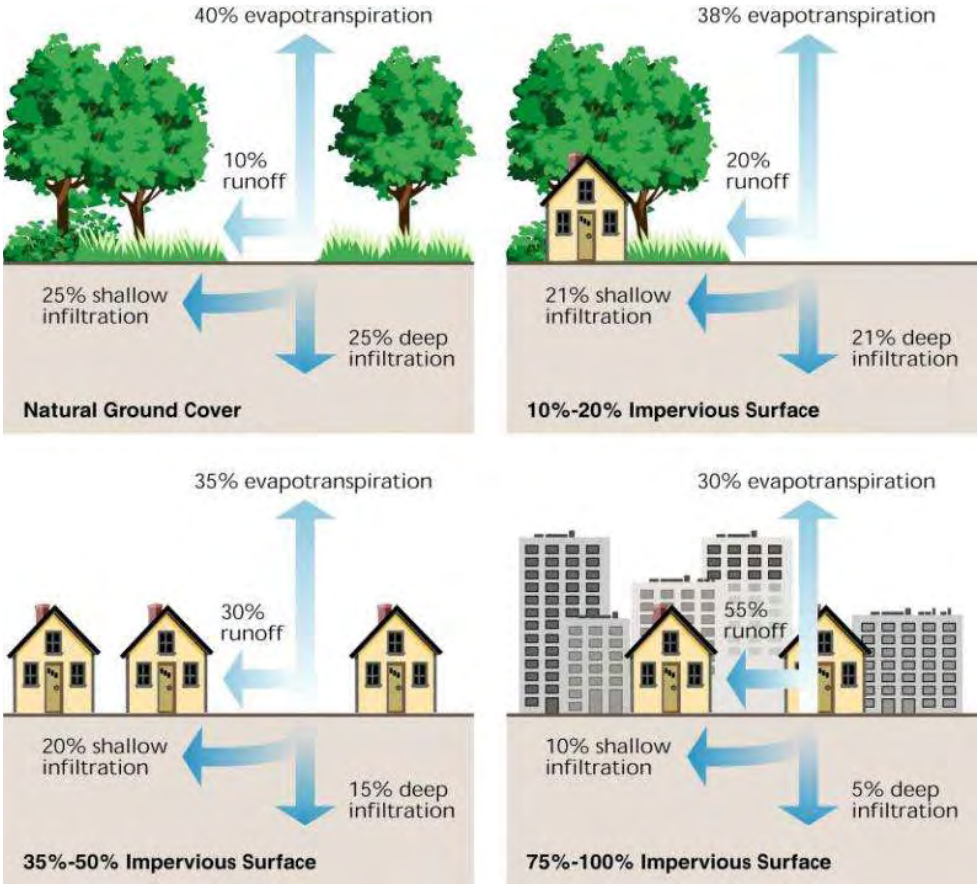
This is an emerging issue

- How does green infrastructure work in combination with traditional "grey" infrastructure – roads and sewers?
- How does it fit into the fabric of a community area?
- What hurdles will you likely encounter trying to implement green infrastructure practices?
- How do you pay for it?

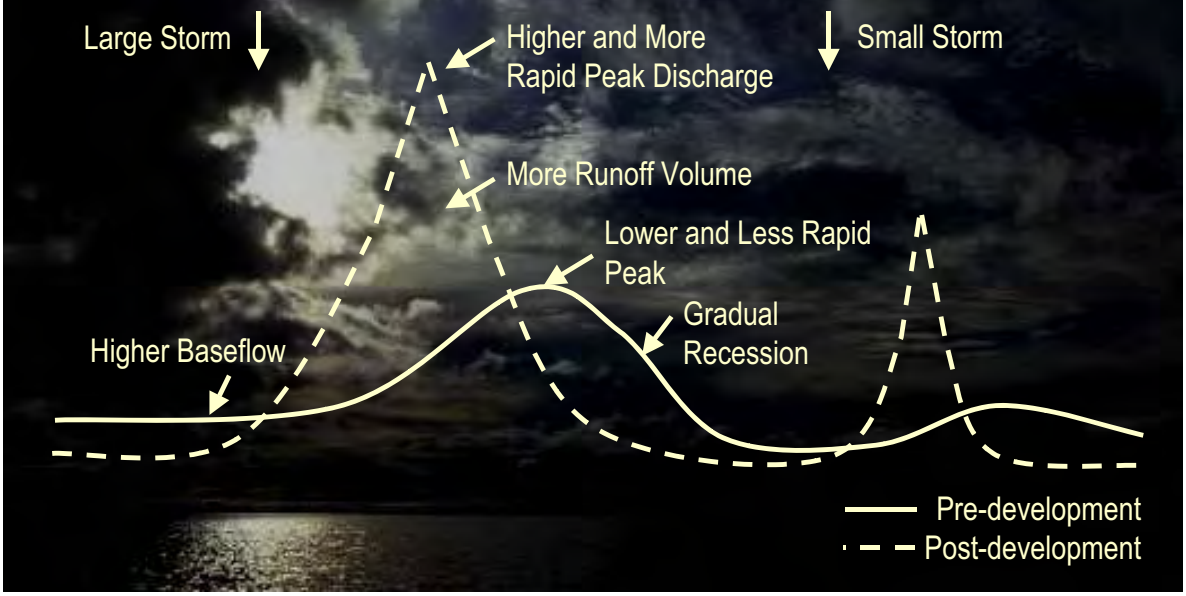
Goals for this webinar

- Begin to bring together people and programs from separate fields:
  - Green Infrastructure/Stormwater Management
  - Community Development
- Highlight some benefits and opportunities
- Kick off a dialogue on roles
  - Feds, State, Local Governments, NGOs
  - Transportation, housing, environmental agencies, planning departments

Managing Wet Weather with Green Infrastructure



Consequences of Development to Urban Streams

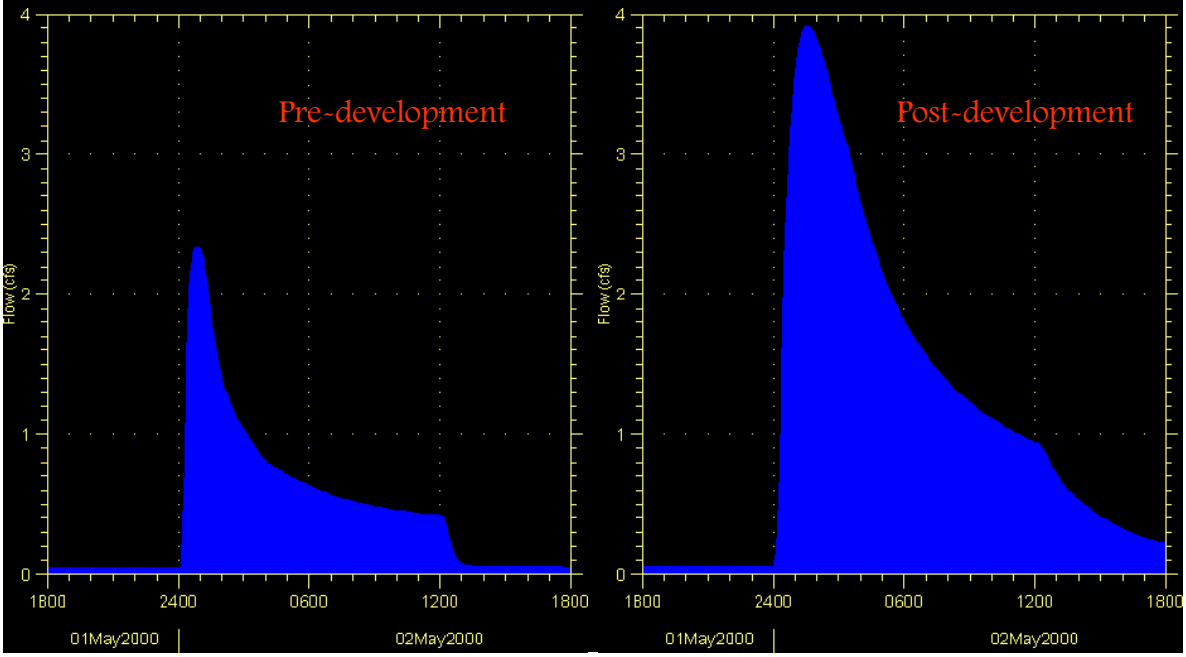


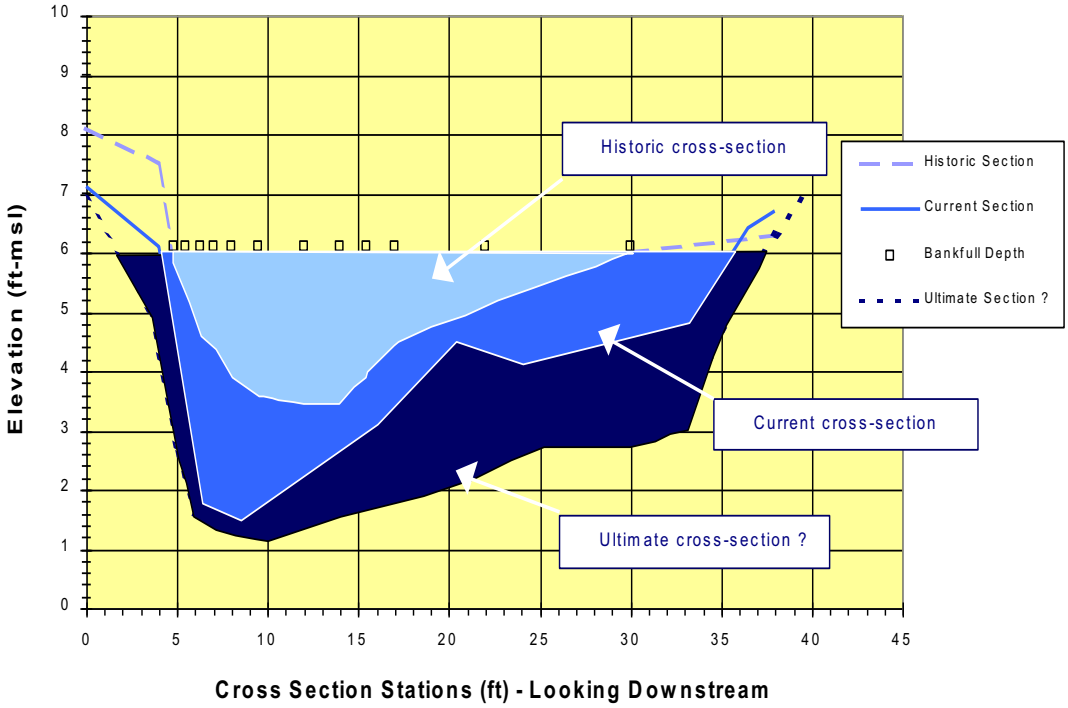
70% increase in peak flow.

170% increase in runoff volume.

Former instantaneous peak flow now lasts ~4 hours.

Blakeslee Creek, Michigan





Increased rates and volumes of storm water discharges lead to stream widening and down-cutting, or incision.

Era of the Big Basin

- Systems that manage only discharge rates often exacerbate the problem.
- Natural systems respond to volumes, frequencies, durations and temperatures.

Paradigm Shift:
Rain is a Resource, Not a Waste

- Drinking water
- Ground water recharge
- Stream baseflow
- Trees & other plants
- Aesthetic qualities
- Climate change

Green Infrastructure at 3 Scales

- Region
  - Open space, infill development, trees
- Neighborhood
  - Street networks, parking, mixed use
- Site
  - Rain gardens, green roofs, pervious pavers



Site-scale Green Infrastructure

Emery Station East, Emeryville, CA

Saylor Grove, Philadelphia, PA

- Uses vegetation and soils in urban and suburban areas to manage and treat precipitation naturally rather than collecting it in pipes.
- Preserves natural systems and uses engineered systems such as green roofs, rain gardens, and vegetated swales to mimic natural functions.
- Includes approaches that infiltrate, evapotranspire and capture and re-use stormwater.

Green Infrastructure Approaches

- Amended soils
- Impervious cover removal
- Bioretention
- Permeable pavements
- Green roofs
- Cisterns & rain barrels
- Trees & expanded tree boxes
- Reforestation & restoration
- Redevelopment
- Infill development
- Alternative parking & street designs
- Water conservation

Bioinfiltration

Open Swales




Parking Lot Infiltration Areas





Rain Gardens







Planters

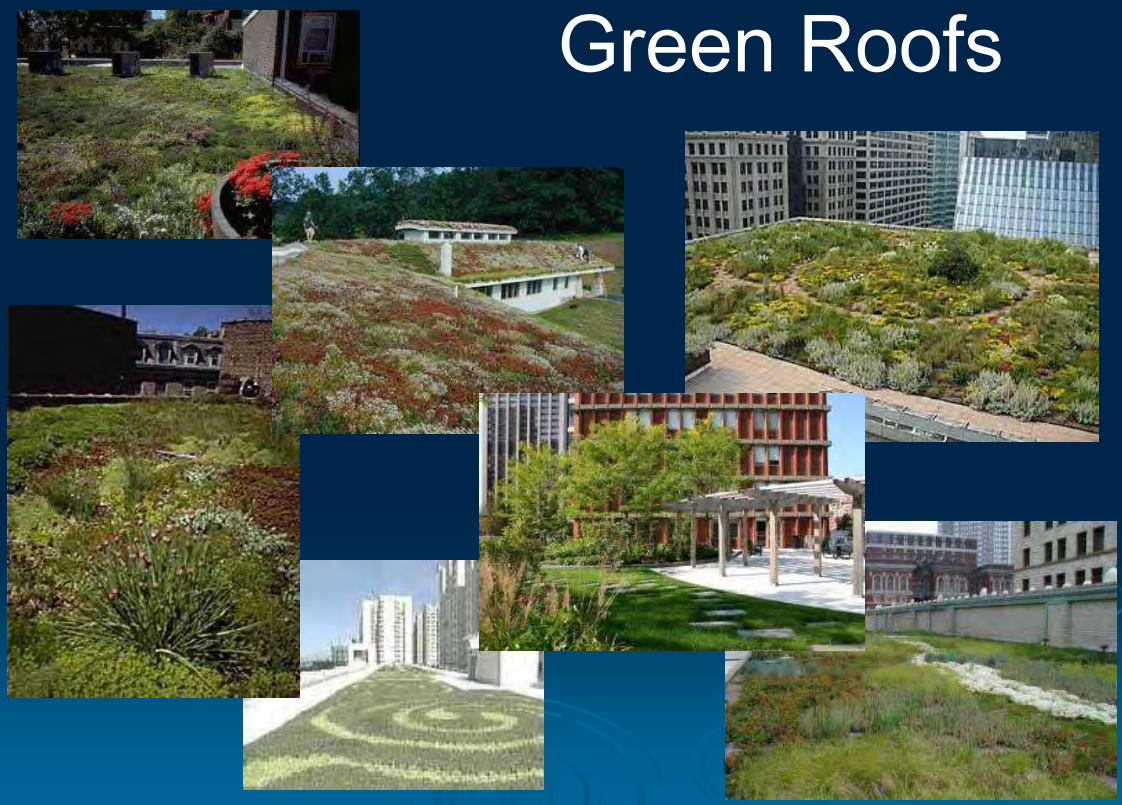






Permeable and Porous Pavements

Green Roofs



Green Walls







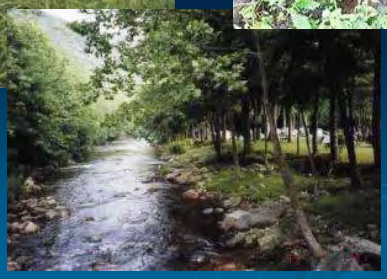

Pocket Wetlands






Vegetated Buffers & Landscaping



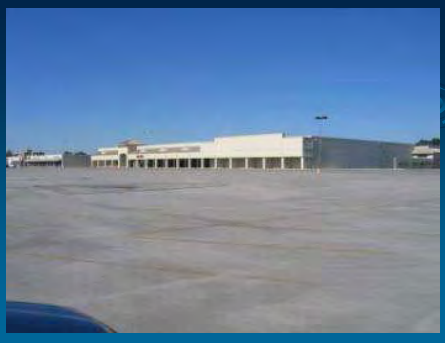

Rainwater Harvesting & Use






Redevelopment

- Sites already covered by impervious surfaces.
- Reduces runoff from the existing condition.
- Accommodates development that might otherwise occur on greenfield sites.



Infill and Brownfield Redevelopment

- Takes advantage of areas that are already served by transportation and infrastructure

- Can be coupled with green infrastructure practices to effectively manage stormwater

Innovative Parking

- Structured parking
- Modifying size & configuration
- Reducing number of spaces:
  - Shared parking
  - Parking lifts
  - Unpaved overflow lots
- Can be coupled with green infrastructure to manage runoff

Street Design

- Connectivity to reduce car trip lengths
- Multiple modes of transportation
- Narrower roads/ less pavement
- Sidewalks to facilitate more walking

Tree & Canopy Programs

- Trees intercept, and evapotranspire significant amounts of water
- Trees filter pollutants
- Canopies shade and cool paved surfaces

Water Conservation

- High efficiency fixtures and appliances:
  - low-flow toilets, urinals, showerheads, faucets
- Water recycling & reuse of wastewater:
  - sinks, kitchens, tubs, washing machines, and dishwaters for landscaping, flushing toilets, etc.
- Waterless technologies
  - composting toilets, waterless urinals
- Rain harvesting
  - rain barrels, cisterns

Vacant Land Reuse

Multiple Benefits

- **Environmental**
  - Improve air quality
  - Flood protection
  - Drinking water source protection
  - Replenish groundwater
  - Protect or restore wildlife habitat
  - Reduce sewer overflow events
  - Restore impaired waters
  - Meet regulatory requirements for receiving waters
- **Social**
  - Establish urban greenways
  - Provide pedestrian and bicycle access
  - Enhance livability and urban green space
  - Educate the public about their role in stormwater management
  - Urban heat island mitigation

- **Economic**
  - Reduce hard infrastructure construction costs
  - Maintain aging infrastructure
  - Increase land values
  - Encourage economic development
  - Reduce energy consumption and costs
  - Increase life cycle cost savings

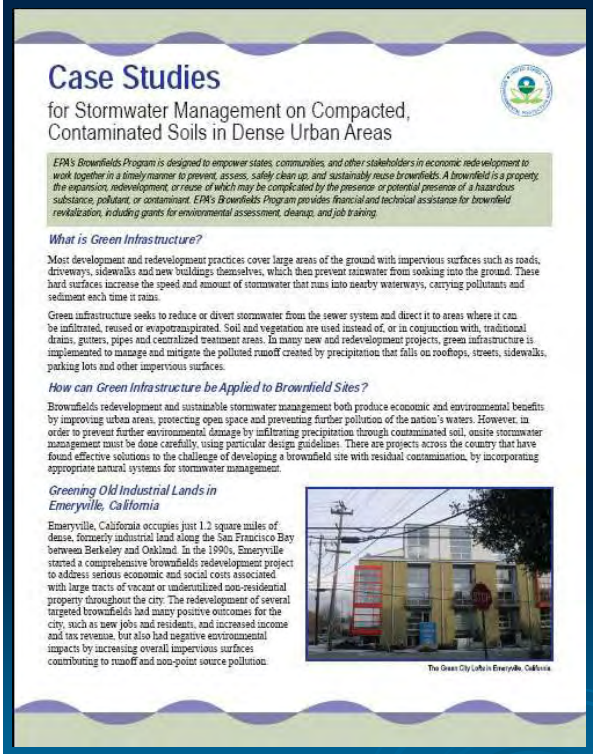
Federal Regulatory Context for Green Infrastructure

- Stormwater Permits
- Energy Independence and Security Act (2007)
- Proposed Stormwater Rulemaking

www.epa.gov/greeninfrastructure
www.epa.gov/npdes
www.epa.gov/npdes/stormwater/rulemaking.cfm

Green Infrastructure Website
www.epa.gov/greeninfrastructure

- General & Technical Info
- Municipal Guidebook
- Case studies
- Cost studies
- Funding
- Much more



Case Studies

for Stormwater Management on Compacted, Contaminated Soils in Dense Urban Areas

EPA's Brownfields Program is designed to empower states, communities, and other stakeholders in economic redevelopment to work together in a timely manner to prevent, assess, safely clean up, and sustainably reuse brownfields. A brownfield is a property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. EPA's Brownfields Program provides financial and technical assistance for brownfield revitalization, including grants for environmental assessment, cleanup, and job training.

What is Green Infrastructure?

Most development and redevelopment practices cover large areas of the ground with impervious surfaces such as roads, driveways, sidewalks and new buildings themselves, which then prevent rainwater from soaking into the ground. These hard surfaces increase the speed and amount of stormwater that runs into nearby waterways, carrying pollutants and sediment each time it rains.

Green infrastructure seeks to reduce or divert stormwater from the sewer system and direct it to areas where it can be infiltrated, reused or evapotranspirated. Soil and vegetation are used instead of, or in conjunction with, traditional drains, gutters, pipes and centralized treatment areas. In many new and redevelopment projects, green infrastructure is implemented to manage and mitigate the polluted runoff created by precipitation that falls on rooftops, streets, sidewalks, parking lots and other impervious surfaces.

How can Green Infrastructure be Applied to Brownfield Sites?

Brownfields redevelopment and sustainable stormwater management both produce economic and environmental benefits by improving urban areas, protecting open space and preventing further pollution of the nation's waters. However, in order to prevent further environmental damage by infiltrating precipitation through contaminated soil, onsite stormwater management must be done carefully, using particular design guidelines. There are projects across the country that have found effective solutions to the challenge of developing a brownfield site with residual contamination, by incorporating appropriate natural systems for stormwater management.

Greening Old Industrial Lands in Emeryville, California

Emeryville, California occupies just 1.2 square miles of dense, formerly industrial land along the San Francisco Bay between Berkeley and Oakland. In the 1990s, Emeryville started a comprehensive brownfields redevelopment project to address serious economic and social costs associated with large tracts of vacant or underutilized non-residential property throughout the city. The redevelopment of several targeted brownfields had many positive outcomes for the city, such as new jobs and residents, and increased income and tax revenue, but also had negative environmental impacts by increasing overall impervious surfaces contributing to runoff and non-point source pollution.

The Green City Lofts in Emeryville, California

Design Principles

for Stormwater Management on Compacted, Contaminated Soils in Dense Urban Areas

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How can Green Infrastructure be Applied to Brownfield Sites?

Preparing brownfields for redevelopment often requires capping of contaminated soils, creating even larger impervious surfaces. The challenge for managing stormwater on brownfield sites is allowing this capping while mitigating the impervious surface conditions that can negatively impact local waterways.

Unlike many conventional developments, impervious footprints on brownfields cannot always be minimized through site designs that incorporate more porous surfaces to allow for infiltration. Direct infiltration on a brownfield site may introduce additional pollutant loads to groundwater and nearby surface waters. However, green infrastructure practices exist that can retain, treat and then release stormwater without it ever coming in contact with contaminated soils.

A bioswale in Wilmington, Delaware, designed to absorb and retain stormwater runoff.

http://epa.gov/brownfields/tools/swdp0408.pdf

http://epa.gov/brownfields/tools/swcs0408.pdf

Water Quality Scorecard

- Communities can evaluate local policies
- Can set goals or objectives for making modifications to local plans, codes or ordinances
- Provides information and suggestions on how plans, codes or ordinances may be improved

October 2009

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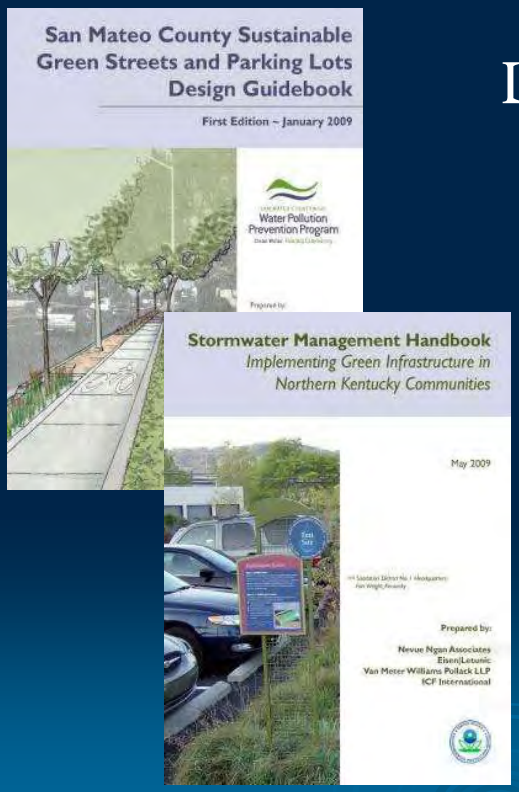
Design Guidebooks



Inspiration that allows designers, developers, and city staff to learn about a variety of green street and parking lot projects already built.

Education that gives the user an understanding of both the general and technical issues associated with design, construction, as well as the long-term care of sustainable stormwater projects.

Innovation that provides the "toolbox" of design strategies and concepts for various conditions within San Mateo County.

Green Streets Guide

- Describes green approaches for:
  - Residential Streets
  - Commercial Streets
  - Arterial Streets
  - Alleys
- Includes concept designs
- Discusses functions and applications

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Municipal Handbook

Series of guidance documents to help local officials implement green infrastructure in their communities. Chapters released as completed, including:

- Rainwater Harvesting Policies
- Green Streets
- Funding Options
- Retrofit Policies
- Municipal Incentives

Green Jobs Training Catalog

- Existing training and certification programs
  - Design construction & implementation
  - Operation & maintenance of green infrastructure

Clean Water State Revolving Fund

- Fact sheet released explaining the use of CWSRF for green infrastructure projects
- Stimulus: CWSRF $4 billion
- 20% green reserve

Clean Water State Revolving Fund

FACT SHEET

Green Infrastructure Approaches to Managing Wet Weather with Clean Water State Revolving Funds

This fact sheet identifies several ways in which states, communities, and individuals can use the Clean Water State Revolving Fund (CWSRF) to finance green infrastructure projects. A general overview of green infrastructure and the CWSRF program are provided, as well as case studies highlighting specific projects from across the country.

What is green infrastructure?

"Green infrastructure" is a relatively new and flexible term that has been used in a variety of contexts. For the purposes of this factsheet, the term "green infrastructure" refers to systems and practices that use or mimic natural processes to infiltrate, evapotranspire (the return of water to the atmosphere either through evaporation or transpiration), or reuse stormwater. Examples of green infrastructure approaches currently in use include green roofs, trees and tree boxes, rain gardens, vegetated swales, pocket wetlands, infiltration planters, permeable pavements, riparian buffers, and floodplains. Green infrastructure also includes decentralized harvesting approaches, such as the use of cisterns to capture water for flushing toilets or subsequent outdoor irrigation. These approaches reduce the amount of runoff discharging to surface waters and keep rainwater out of our sewer systems so it does not contribute to sewer overflows.

What are additional benefits of green infrastructure?

In addition to reducing the overall volume of stormwater runoff and the frequency of sewer overflows, green infrastructure can help communities enjoy a number of additional environmental and economic benefits, including:

- Cleaner Water
- Enhanced Water Supplies
- Cleaner Air
- Reduced Urban Temperatures
- Climate Change Benefits
- Increased Energy Efficiency
- Source Water Protection
- Community Benefits
- Cost Savings

Vegetated swale; capture and infiltrate runoff along this "green street" in Portland, Oregon.

These benefits make green stormwater development an attractive option for towns and cities looking to upgrade their infrastructure systems. Nevertheless, many local governments lack the financial resources needed to implement green infrastructure projects in their communities. That is where the CWSRF can help.

Read more about the benefits of green infrastructure at: www.epa.gov/npdes/greeninfrastructure

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202- 566-2086

http://picasaweb.google.com/buildgreeninfrastructure

West Union, Iowa Green Pilot

Jeff Geerts, Iowa Dept. of Economic Development
Tom Price, Conservation Design Forum

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West Union, Iowa

- Integrate program resources
- Place to “kick the tires”
- Living laboratory
- Model downtown sustainable revitalization
- Pick replicable sized communities

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West Union, Iowa

- County seat, 2,500
- Main Street Iowa
- Investor utilities
- Historic buildings, Courthouse
- Cold water streams
- SW infrastructure, streams
- Agency partnerships
  - IDALS, USDA, DCA, IDPH, DOT, DNR, DOE, SWCD, EPA, IEC, UIU, DOE

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West Union, Iowa

- Facets
  - Energy Efficiency
  - Capacity Building
    - Green Building Training
    - Environmental Programming
  - Streetscape
  - District Energy

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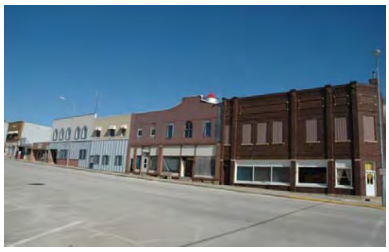
West Union, Iowa

- Energy Efficiency
  - 70+ audits
  - Incentive program
  - Contractor training



- Green Building
  - 13 workshops, Center on Sustainable Communities
- Environmental Programming
  - Weatherization, rain gardens, rain barrels, etc

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West Union, Iowa

- Streetscape
  - Porous Paver System
  - Rain Gardens/Bioretention Cells
  - LED Lighting
  - Plug-in Hybrid Vehicle Stations
  - Accessibility
  - Public Art
  - Walk-ability, Bike-ability

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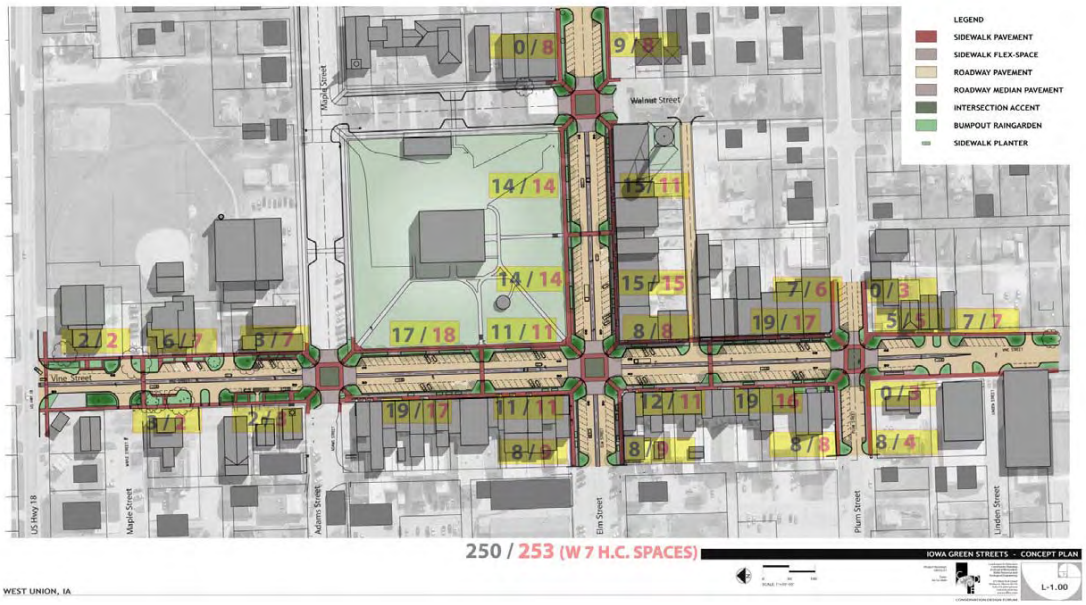
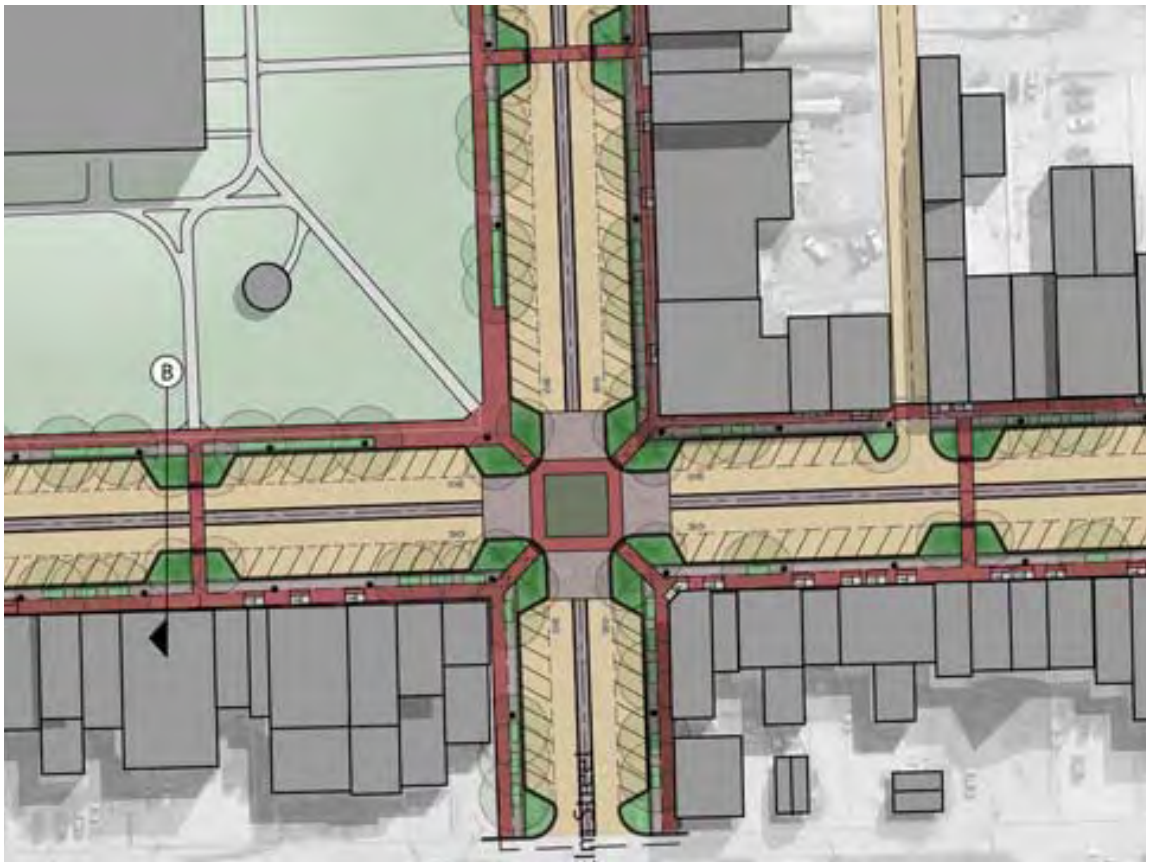
West Union, Iowa

- District Geothermal Heating & Cooling
  - 60 buildings
  - City operated
  - Property owners responsible for internal modifications



CONSERVATION DESIGN FORUM



Portland Pavement Demonstrations

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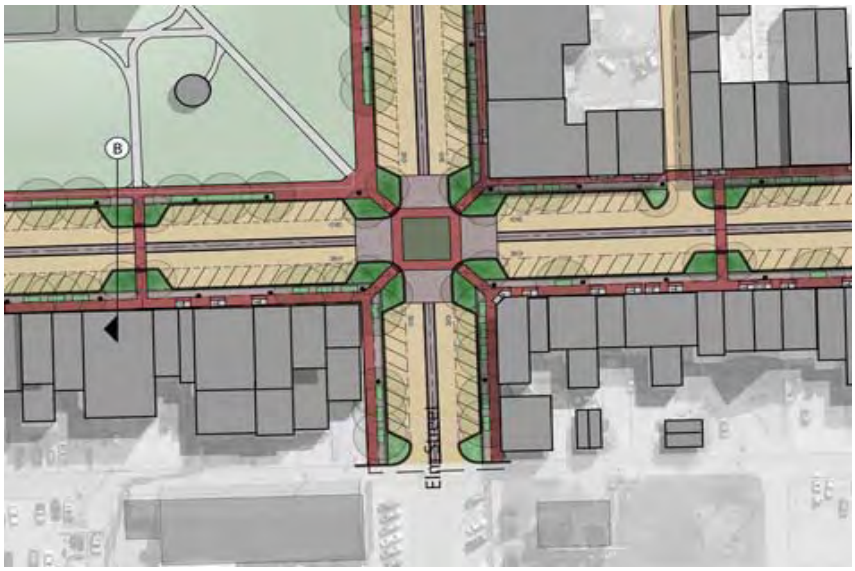

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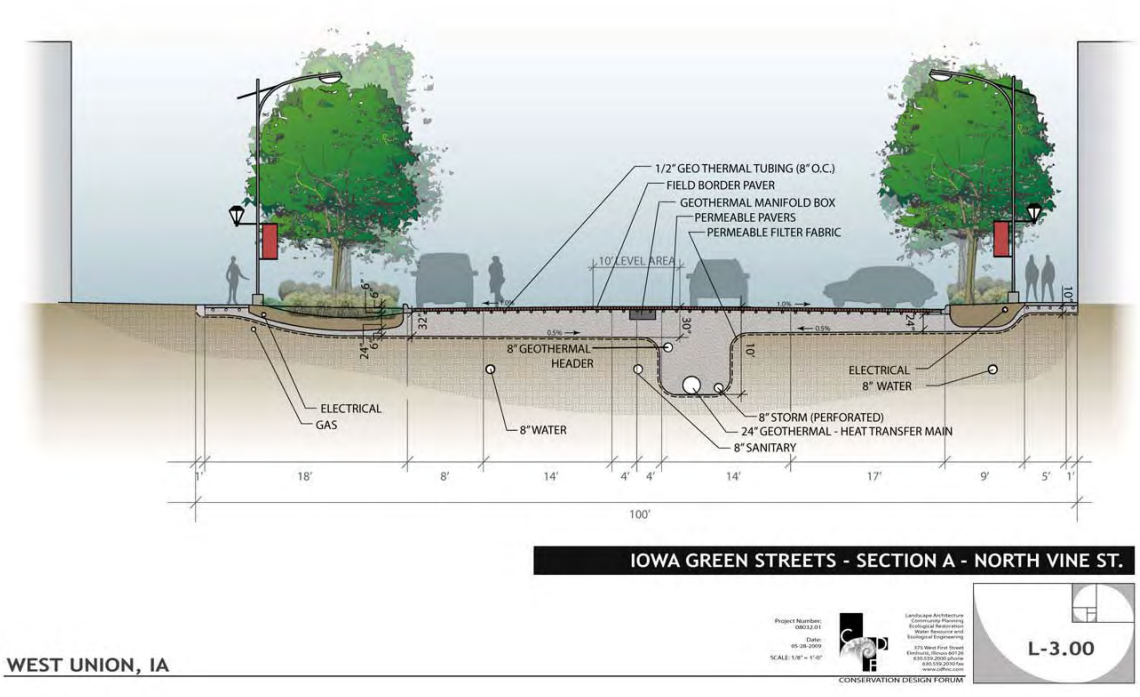

West Union, Iowa

- Budget ~$8.6 million (~ 6 blocks)
- Components
  - Permeable paver streets/sidewalks
  - Bump-outs, rain gardens
  - Energy-efficient lighting
  - District geothermal H/C
  - Accessibility
  - Amphitheatre, kiosks
  - Plug-in stations
  - Water, sewer, vault closings

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West Union, Iowa

- Funding (rounded numbers)
  - DOT $2.3 mil
  - CDBG $1.0 mil
  - DNR $0.1 mil
  - IDALS $0.5 mil
  - EPA $0.5 mil
  - DOE $1.0 mil
  - I-JOBS $1.2 mil
  - IA Great Places $0.2 mil
  - IDED $0.3 mil
  - Local $2-3 mil
  - **TOTALS** **$9-10 million**

Carbon Cliff Permeable Streets

CONSERVATION DESIGN FORUM

CONSERVATION DESIGN FORUM

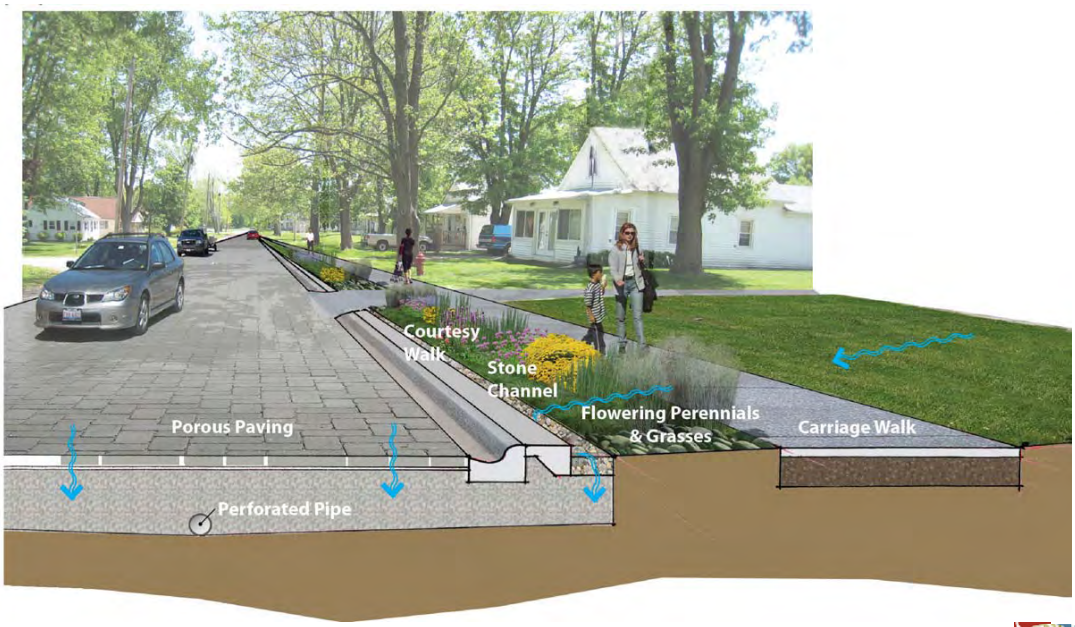
CONSERVATION DESIGN FORUM

Street View Character - 48/50/60/66' Right-of-Way Streets

Existing Conditions

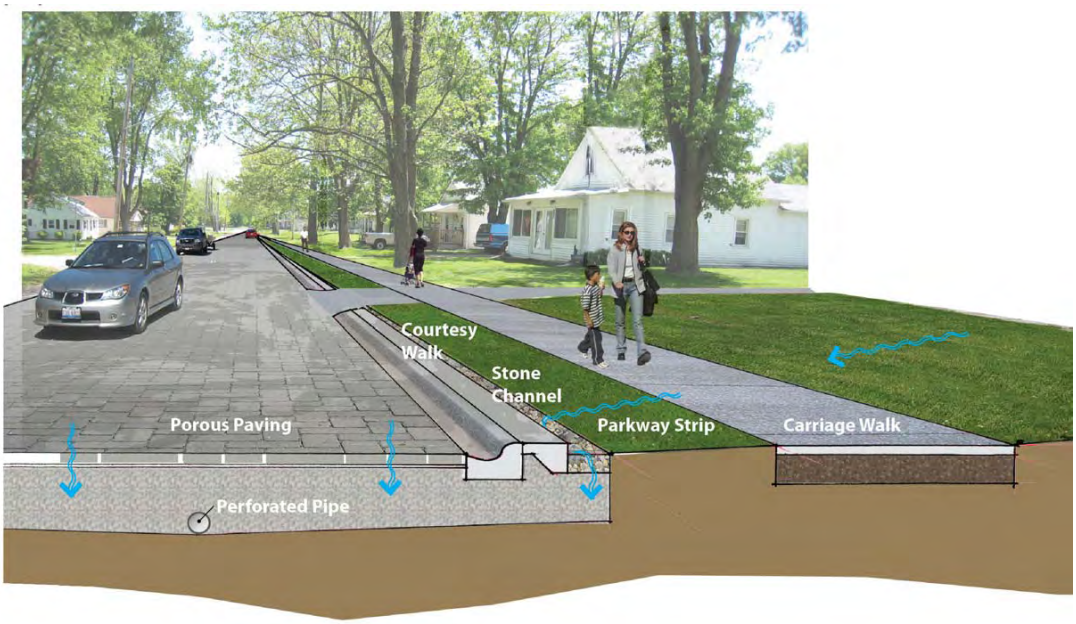
Street View Character - 48/50/60/66' Right-of-Way Streets

Proposed Alternate 2: *perennial edge*

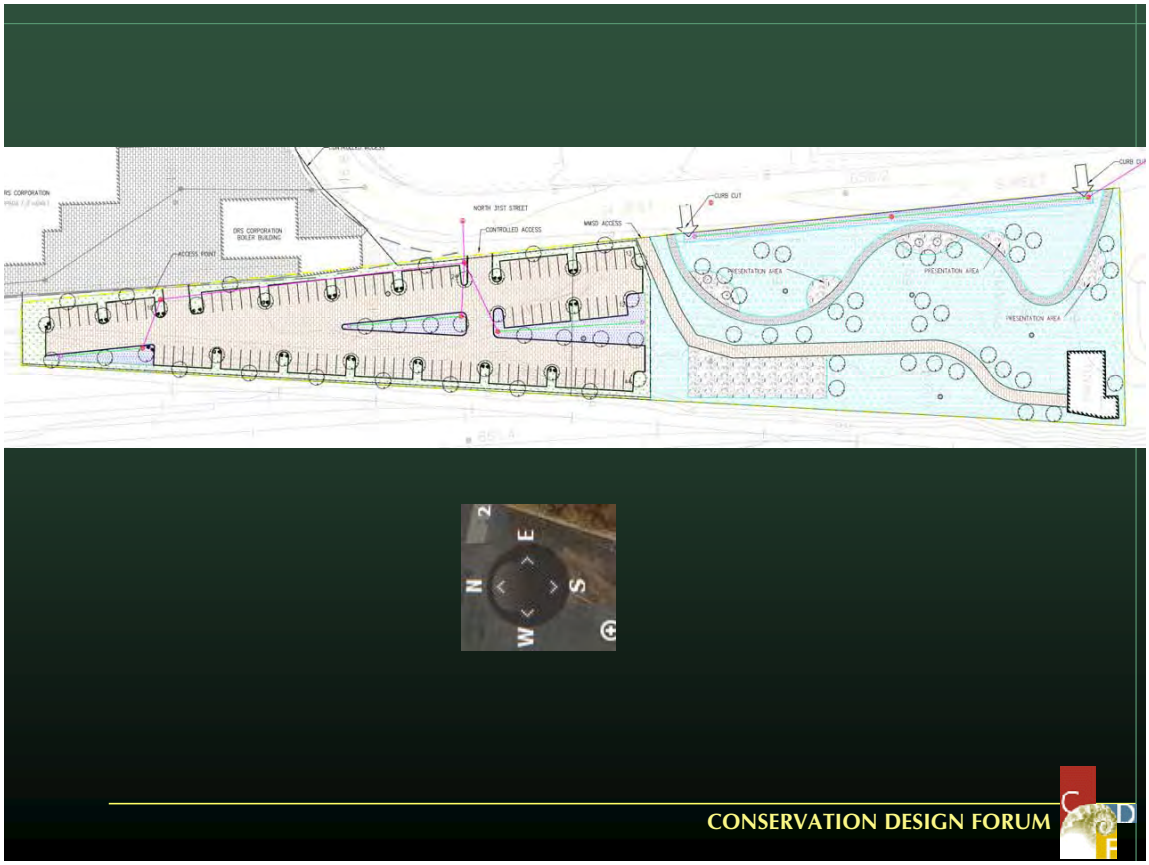


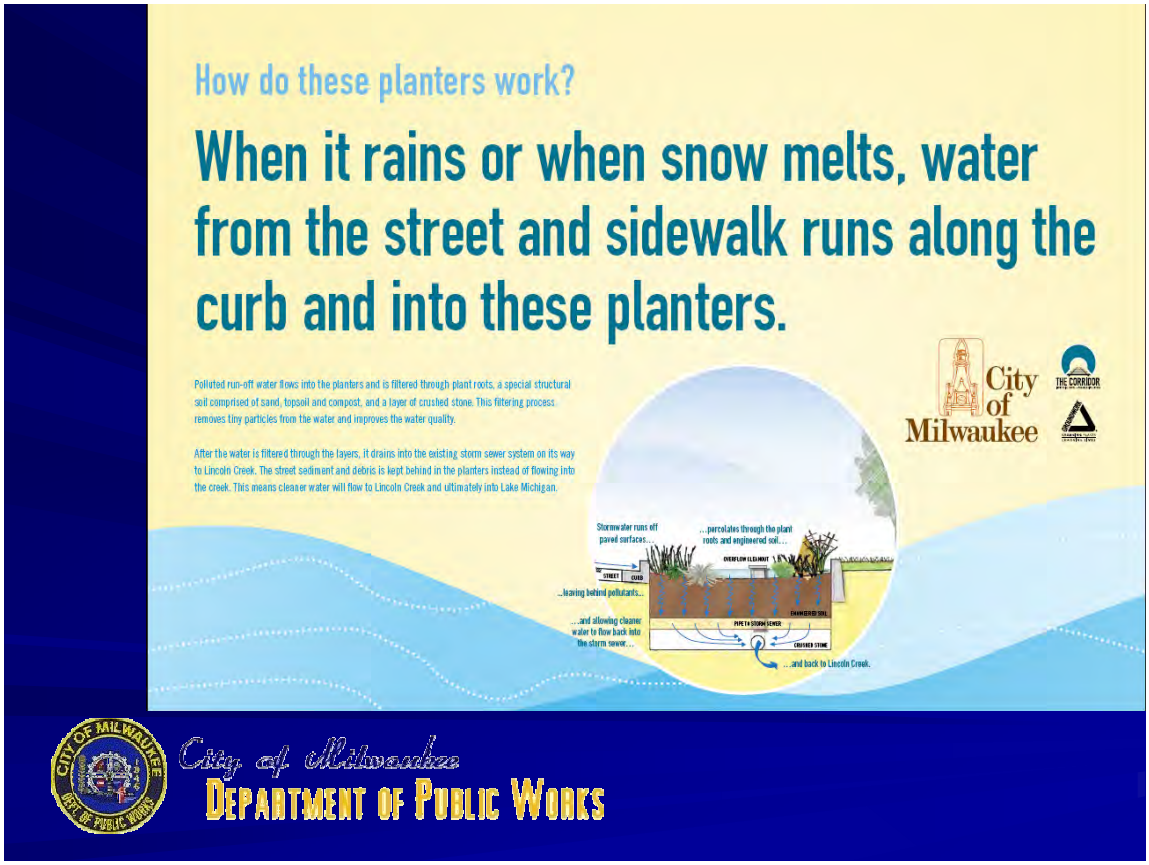
Street View Character - 48/50/60/66' Right-of-Way Streets

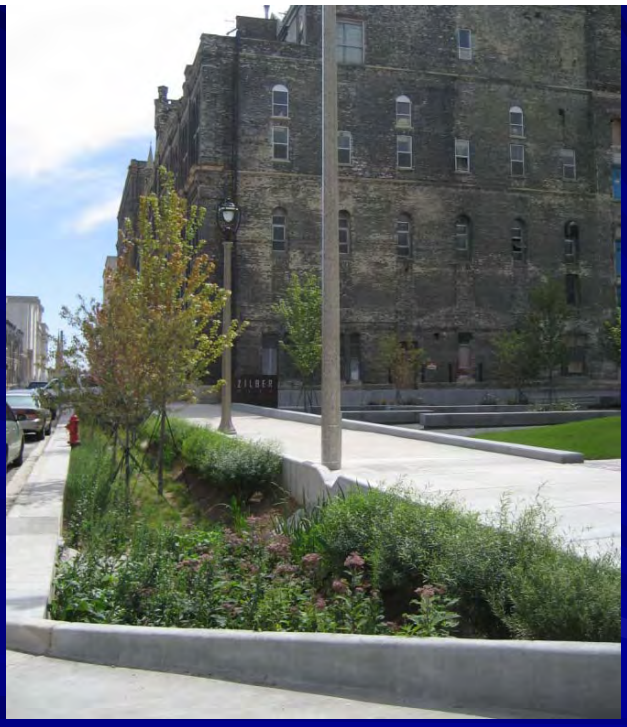
Proposed Alternate 2: *turf edge*



4101 N. 31st Street, Milwaukee, WI







City of Milwaukee
DEPARTMENT OF PUBLIC WORKS

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West Union, Iowa

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Green Stormwater Management Projects

HUD Resources for Communities

Office of Block Grant Assistance

Interested in using HUD funds?

- Identify the source of funding
- Understand the regulations
- Build strong local relationships
- Use HUD funds to leverage additional support

Potential Sources of HUD Funding

- Community Development Block Grants (CDBG)
- Neighborhood Stabilization Program (NSP)

Key Concepts from the Regs

- National Objective
  - LMA
  - LMI Limited Clientele
- Eligible Use
  - Public facilities/improvements
  - NSP1: Eligible Use E
  - NSP2: Eligible Use D

Strong Relationships are Essential

- Interested community groups should connect with their grantee
- Grantees should connect with their HUD field office

Leverage additional support

- Plan for both the development and operation of the project
- Understand funders' priorities and requirements
  - Seek out flexible funding sources to complement restricted funds

Other resources:

- NSP Resource Exchange: http://hudnsphelp.info/

- Local CDBG Contacts: http://www.hud.gov/offices/cpd/communitydevelopment/programs/contacts/