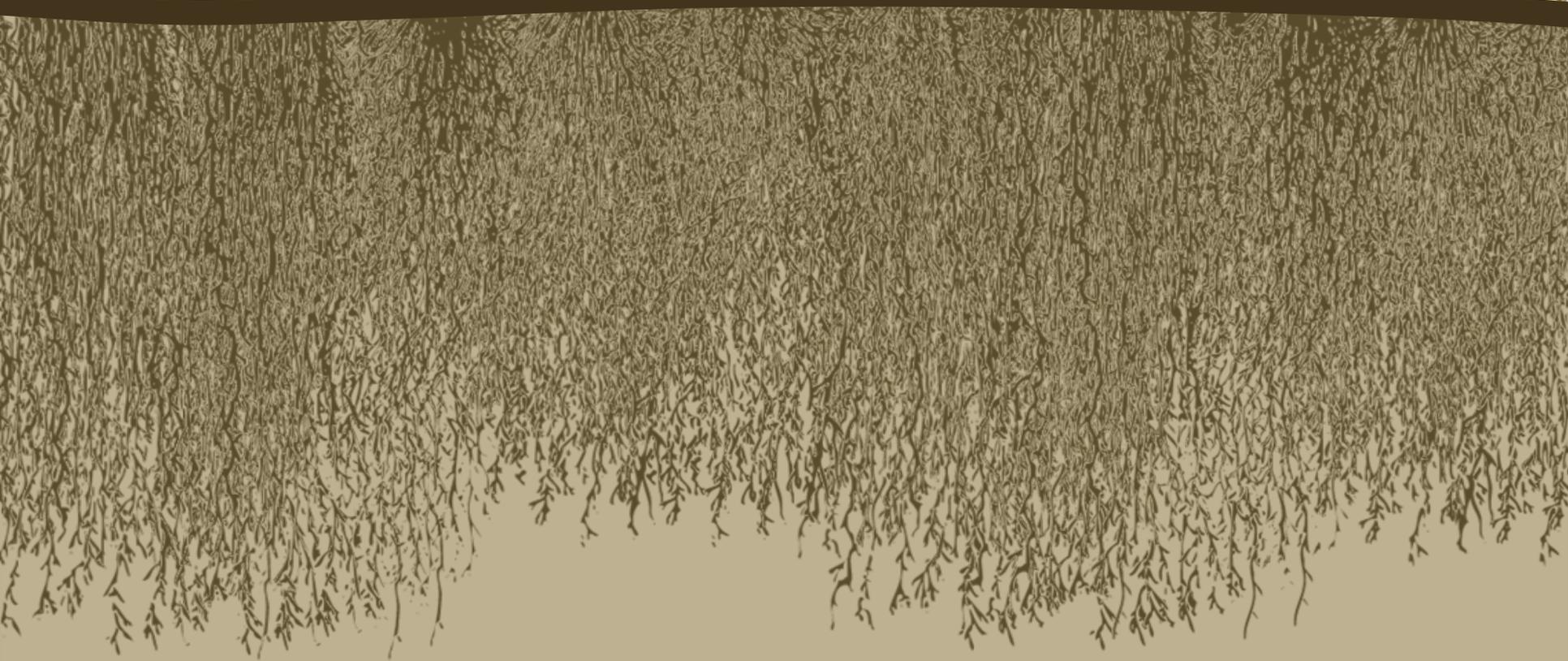


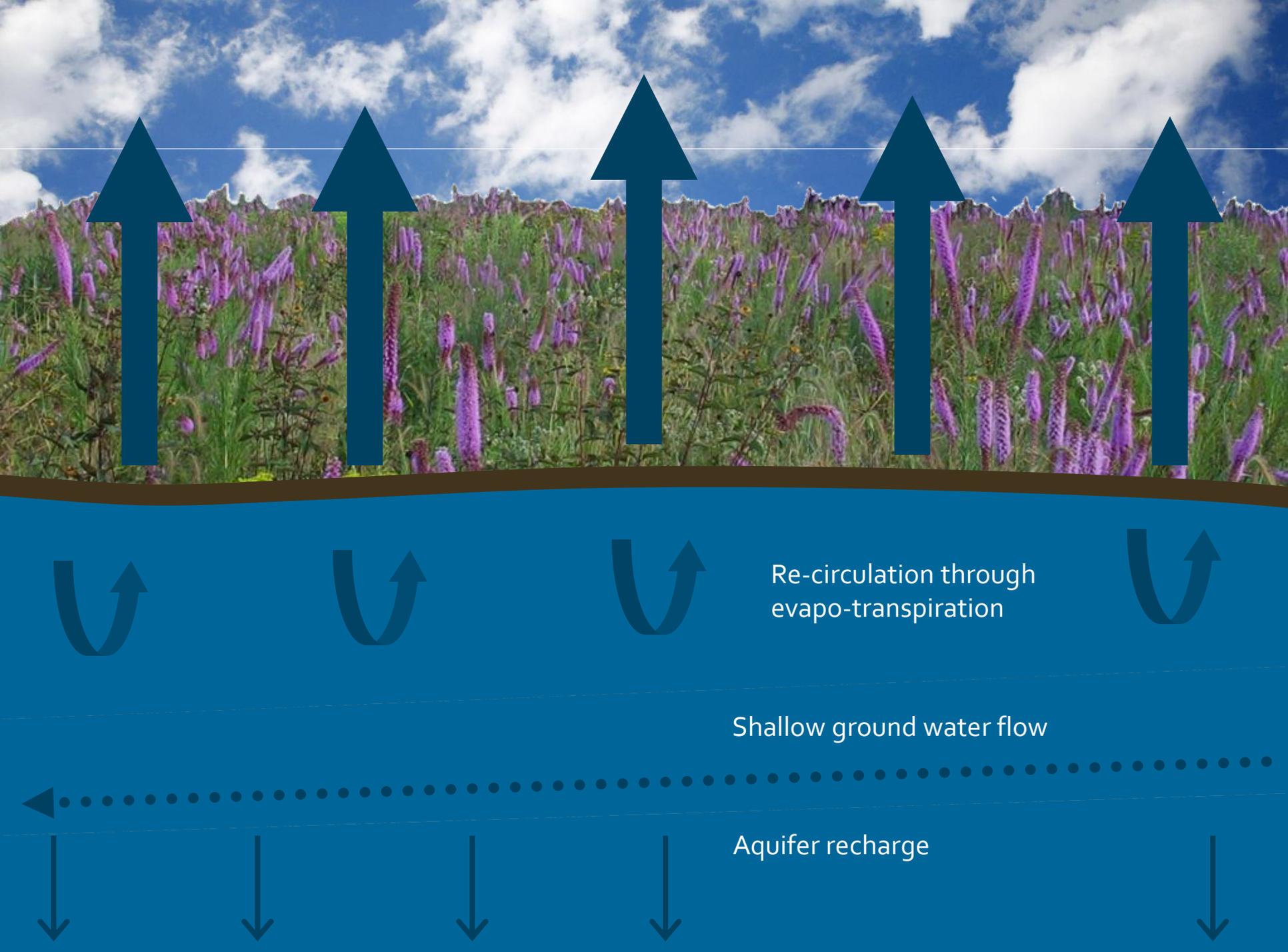
# Water: The Key to Restorative Design

**CDF**  
15 years of sustainability

James Patchett, FASLA, LEED AP  
Conservation Design Forum, Inc.







Re-circulation through  
evapo-transpiration

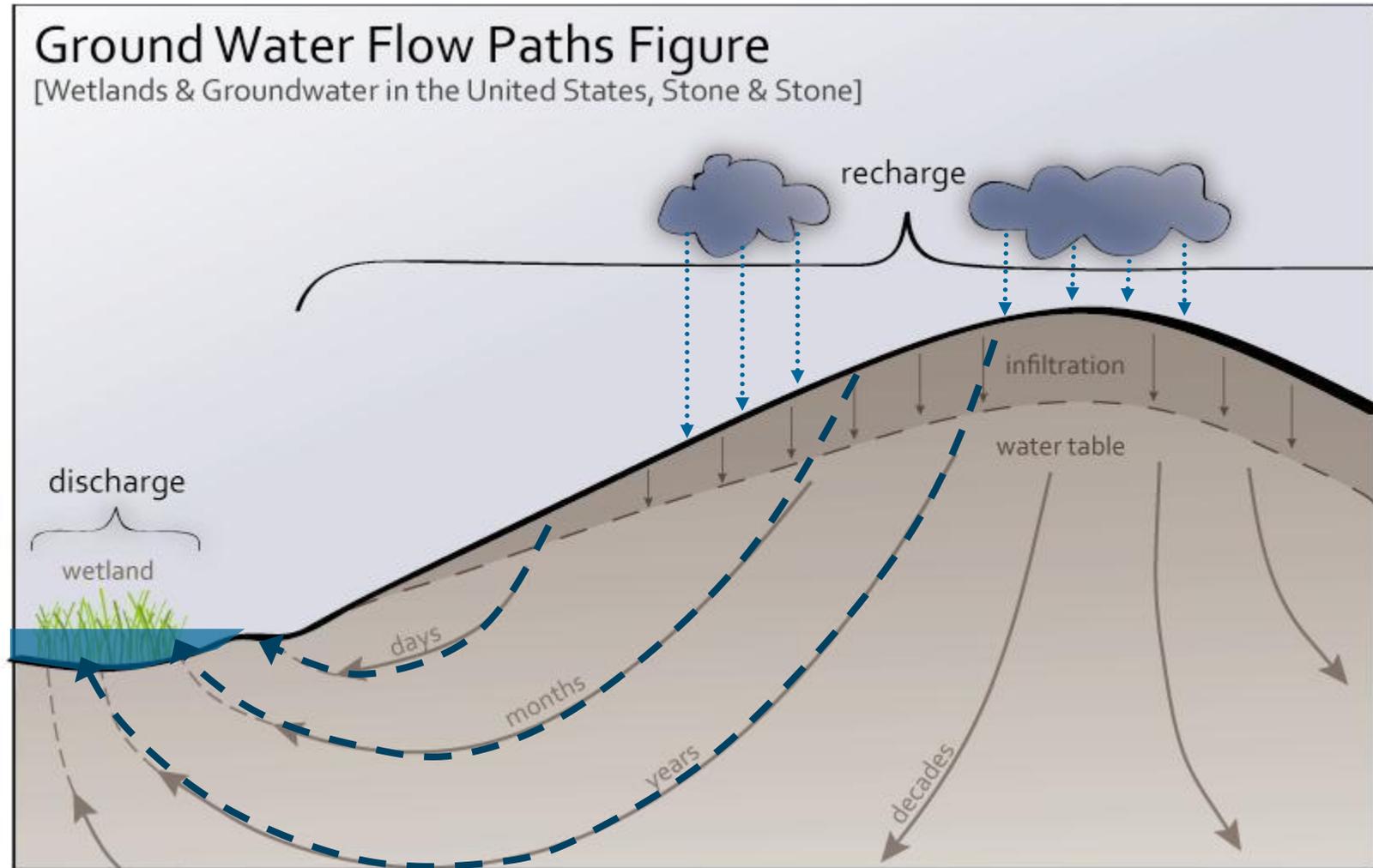
Shallow ground water flow

Aquifer recharge

# Historical Patterns of Hydrology

Recharge Zone: Uplands

Discharge Zones: Lowlands – rivers, streams, ponds, wetlands

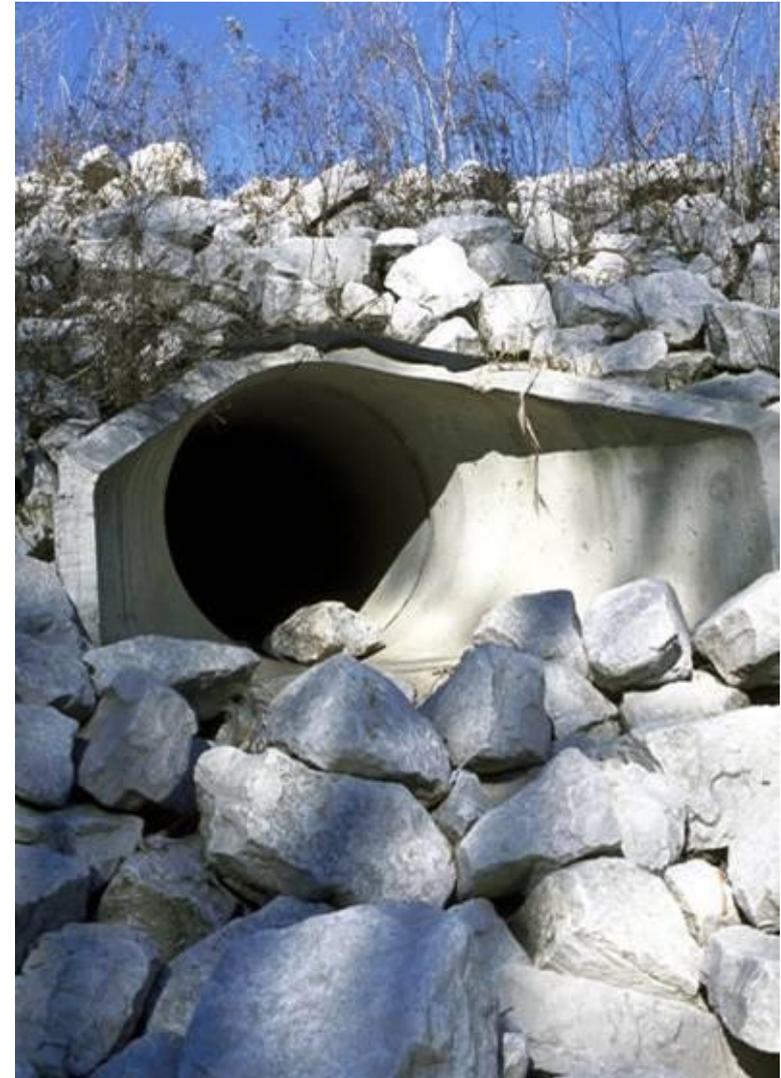


Constant, clean discharge flows, year round to sustain stable surface water hydrology with constant water temperature and chemistry

# Water in Contemporary Urban, Suburban & Rural Environments



**Traditional Stormwater Management Approach:** Collect and convey water away from the site just as quickly and efficiently as the law will allow through enclosed storm sewer systems designed with concentrated points of discharge that generate a velocity and volume of flow that is nearly impossible to mitigate.





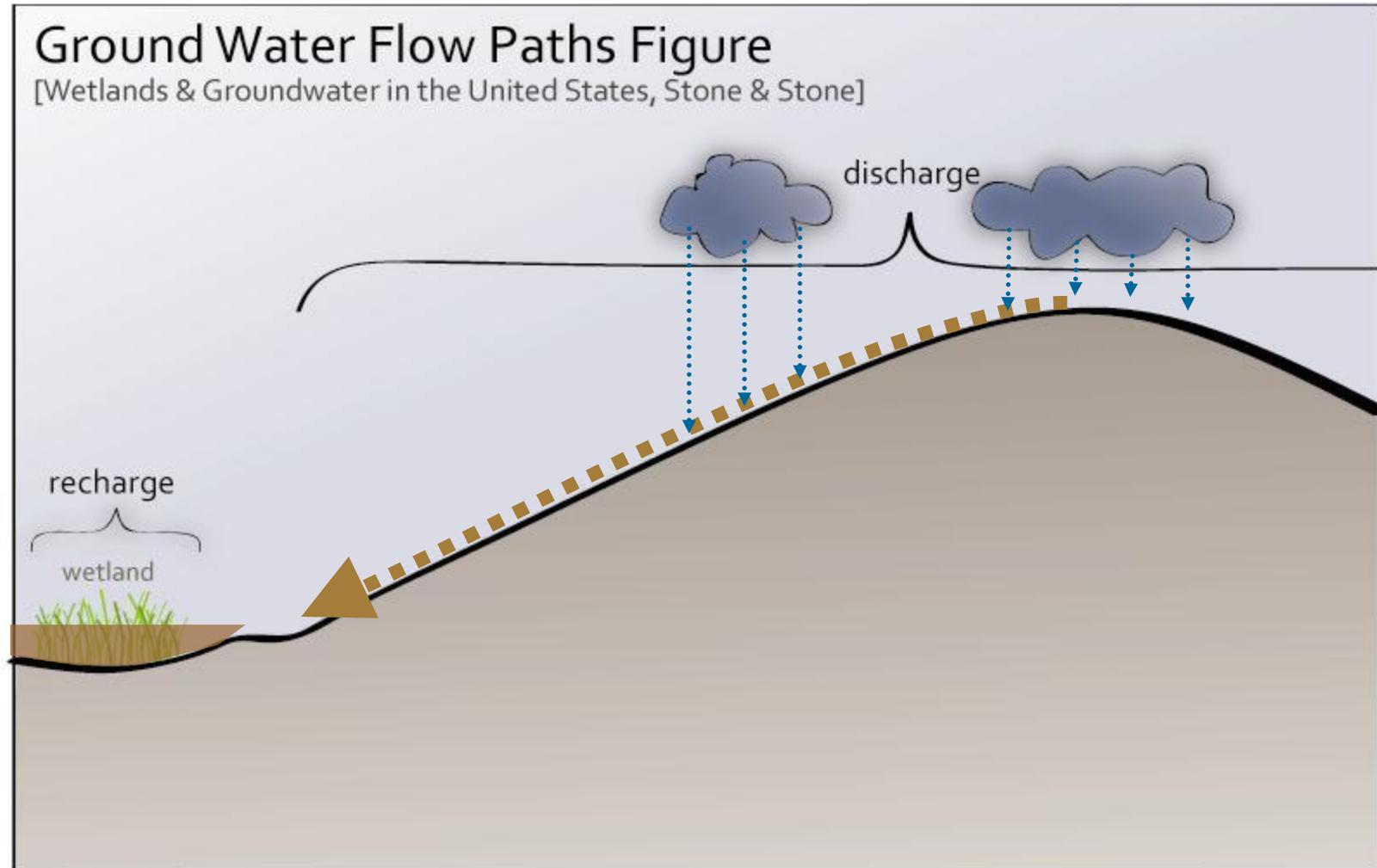
According to USEPA, 40-60% of nitrogen applied to lawns ends up in surface and groundwater systems



# Contemporary Hydrology

Upland becomes discharge zone

Natural wetlands are expected to function as recharge zones



Reversed hydrological pattern results in runoff containing sediments, oils, greases, salts, fertilizers, pesticides, and higher water temperatures that inundate historical systems adapted to completely different hydrological and water quality conditions



SOLAR ENERGY



PRECIPITATION



EVAPORATION

ANNUAL FIRE

PRAIRIE

NATIVE CULTURE

SAVANNA

SURFACE RUNOFF

INFILTRATION

SPRING

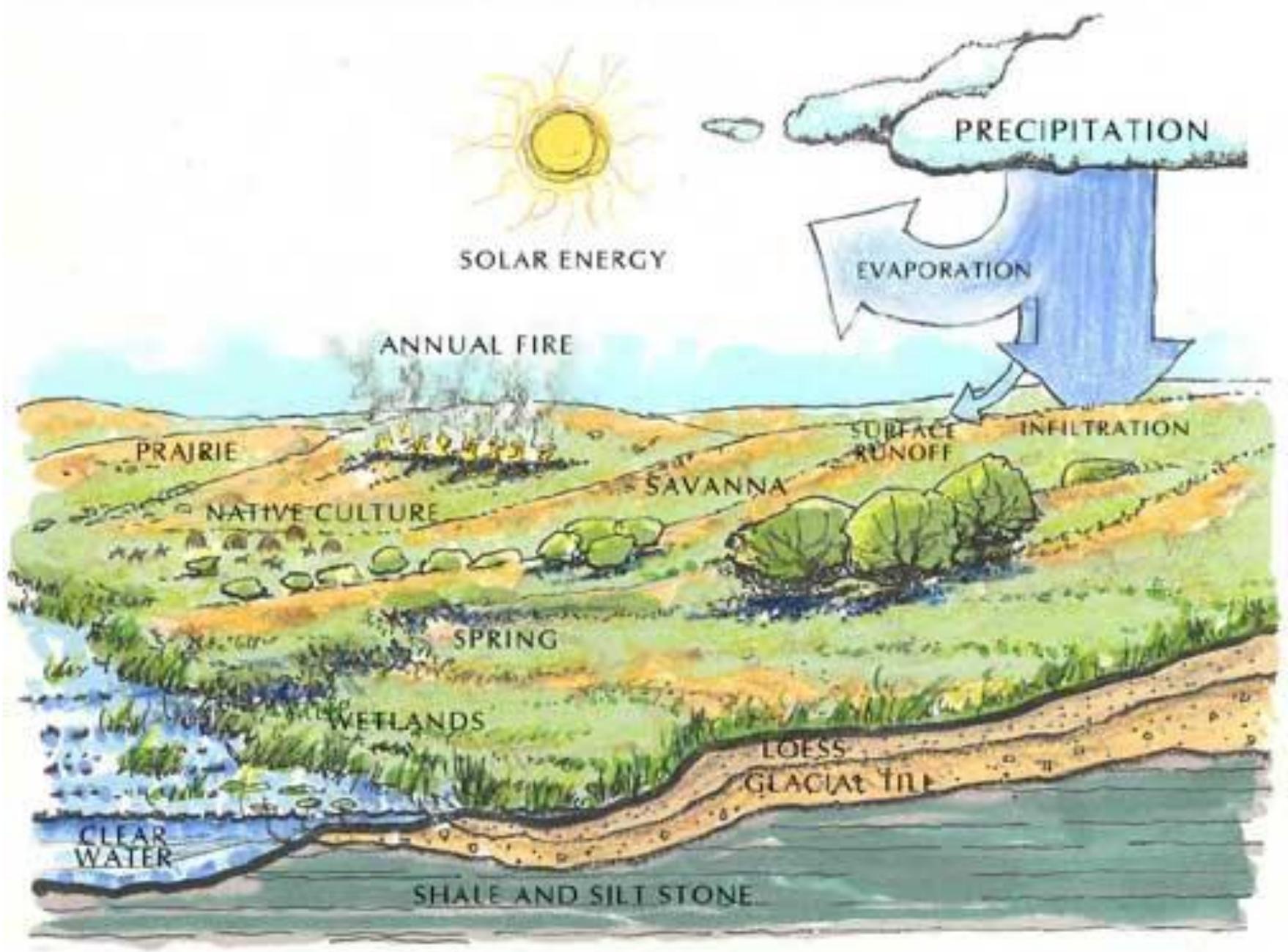
WETLANDS

LOESS

GLACIAL TILL

CLEAR WATER

SHALE AND SILT STONE



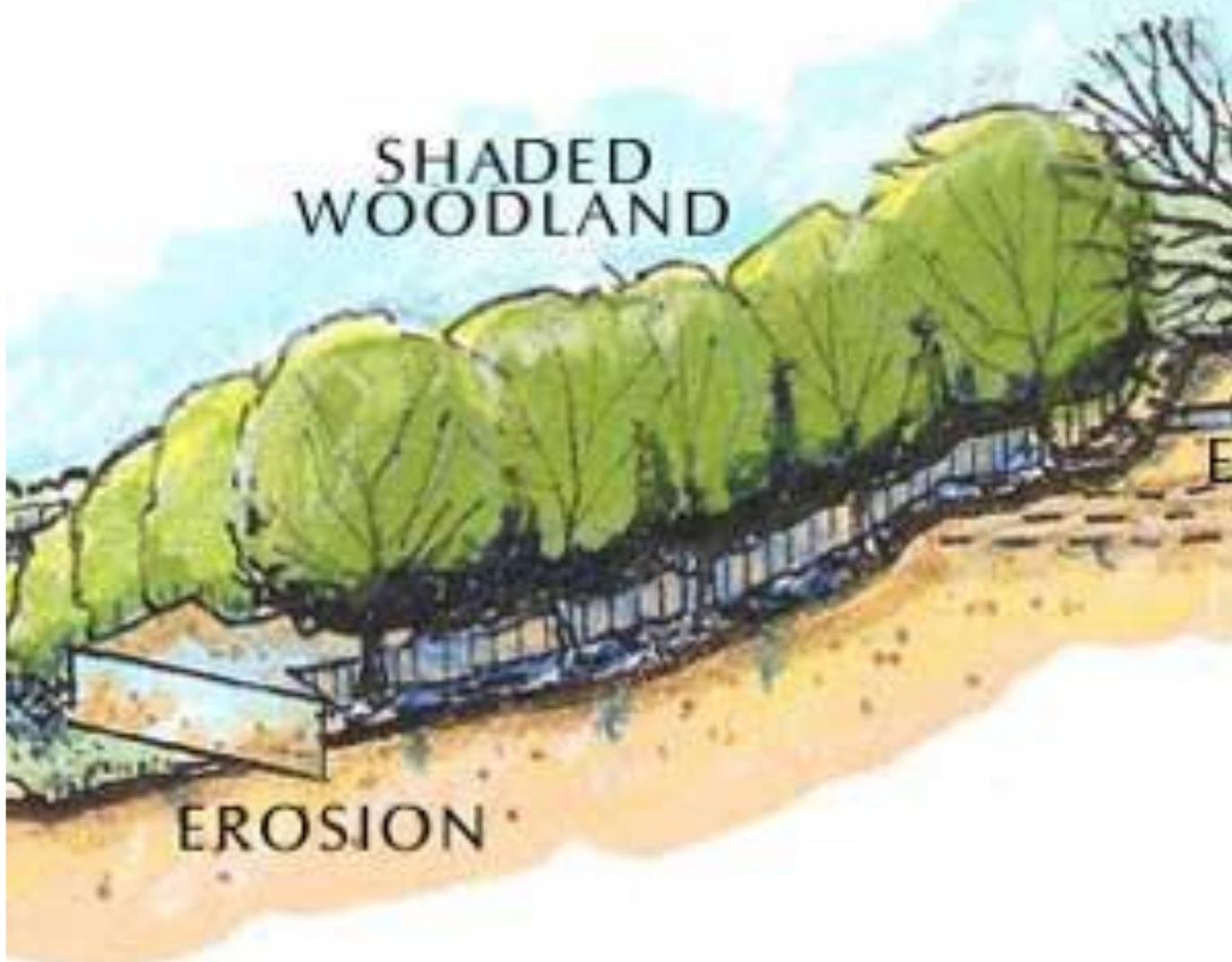






SHADED  
WOODLAND

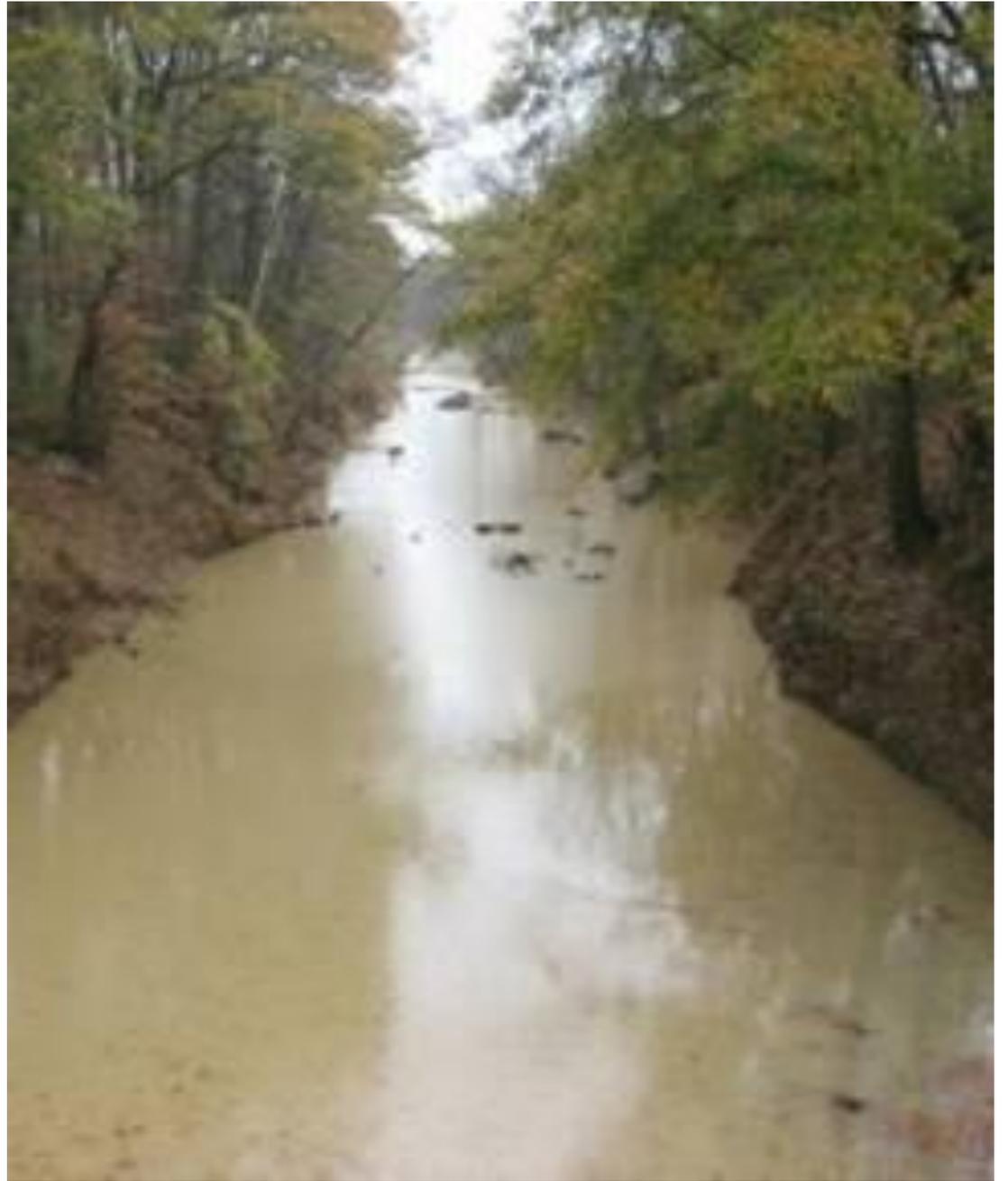
EROSION





# Severe erosion of stream and river systems caused by excessive runoff





# The Botanical Law

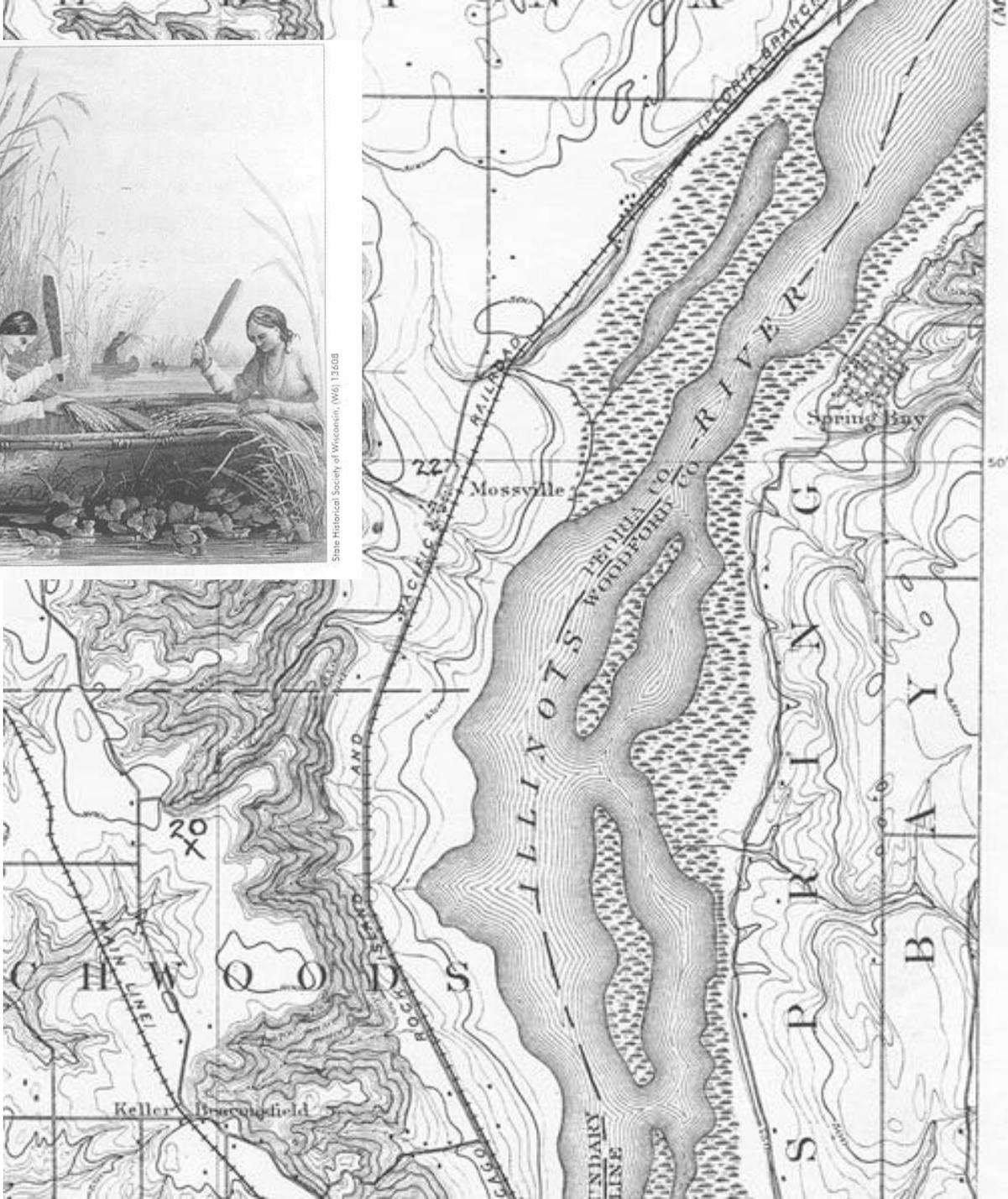
“Plants Grow in Habitats to Which They are Adapted”

Bluff Springs Fen  
*Elgin, Illinois*





State Historical Society of Wisconsin, W61 13608







# The hydrology of boom...



and bust



# Loss of system stability and biodiversity



# Confluence of Missouri, Illinois + Mississippi Rivers



August 1991



August 1993

# Iowa floods of 2008



[Photos taken or compiled by Dr. Tom Weingeist]



# CDF Philosophy and First Principles

The Foundation for Sustainable Design

**BEGINS WITH WATER**



# First Principles of Sustainable Design



## *Doctrine*

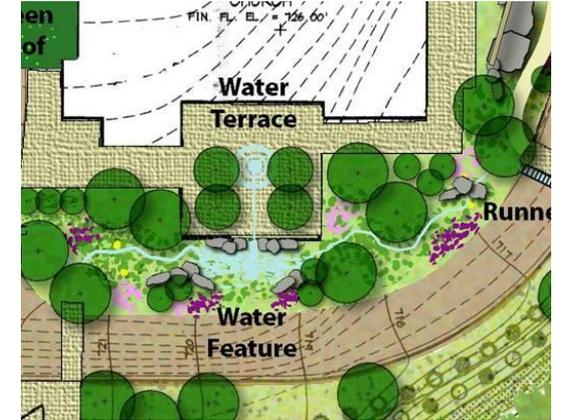
All water is a valuable resource; it should never be squandered or treated as a waste product in any of its forms or contexts.



## *Approach*

Replicate, to the degree possible, the historical natural and cultural processes to which local ecosystems are adapted.

# Integrated Site Planning + Green Infrastructure Solutions

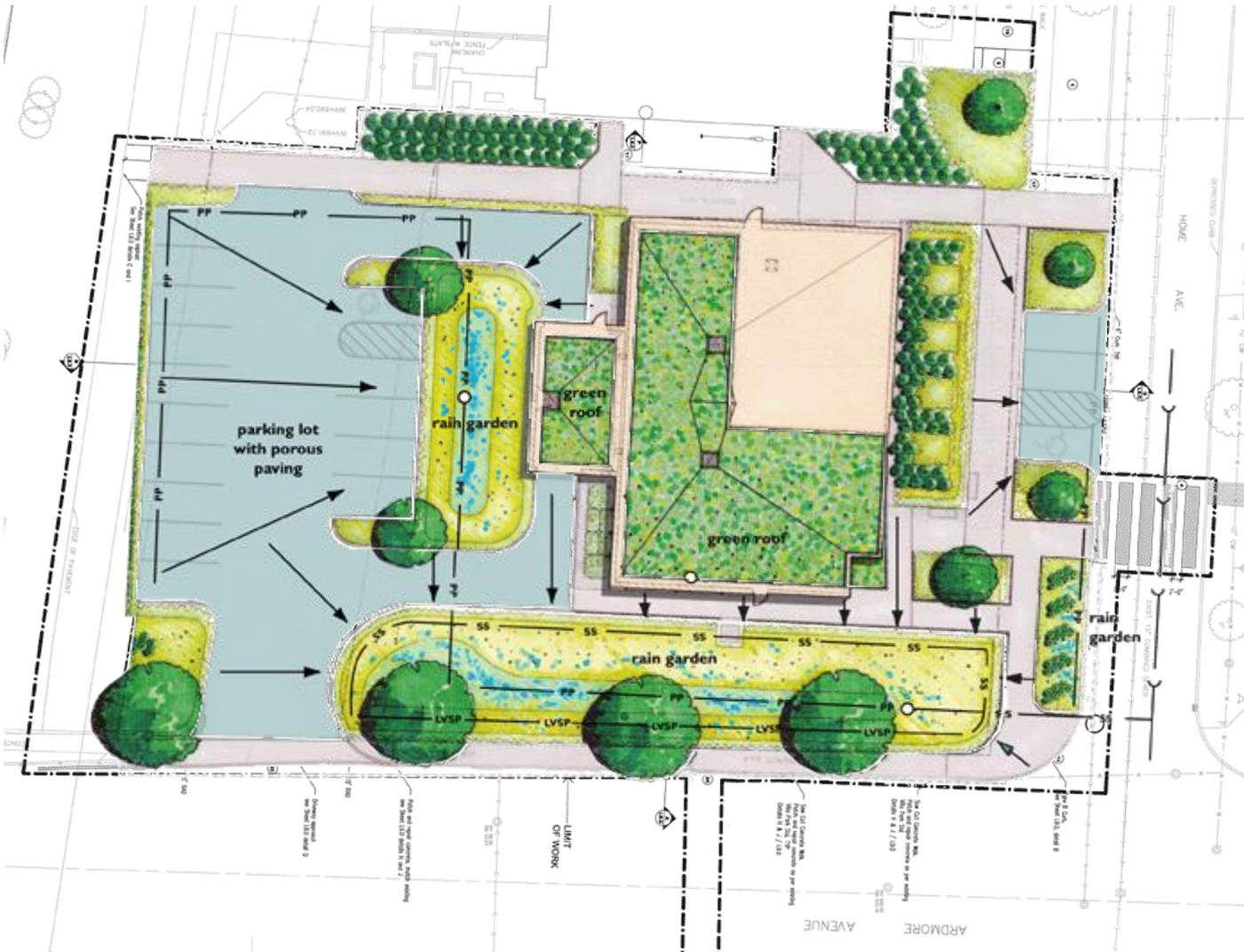


# Sustainable solutions for any environment





**Villa Park Police Station**  
*Villa Park, IL*



Green Roofs  
 Porous Pavement  
 Rain Gardens

Villa Park Police Station  
 Villa Park, IL



Villa Park Police Station  
Villa Park, IL

# Kresge Foundation Headquarters

*troy, michigan*

**Client: Kresge Foundation**

**Completion: 2006**

**Awards: Michigan ASLA Merit Award, 2009**

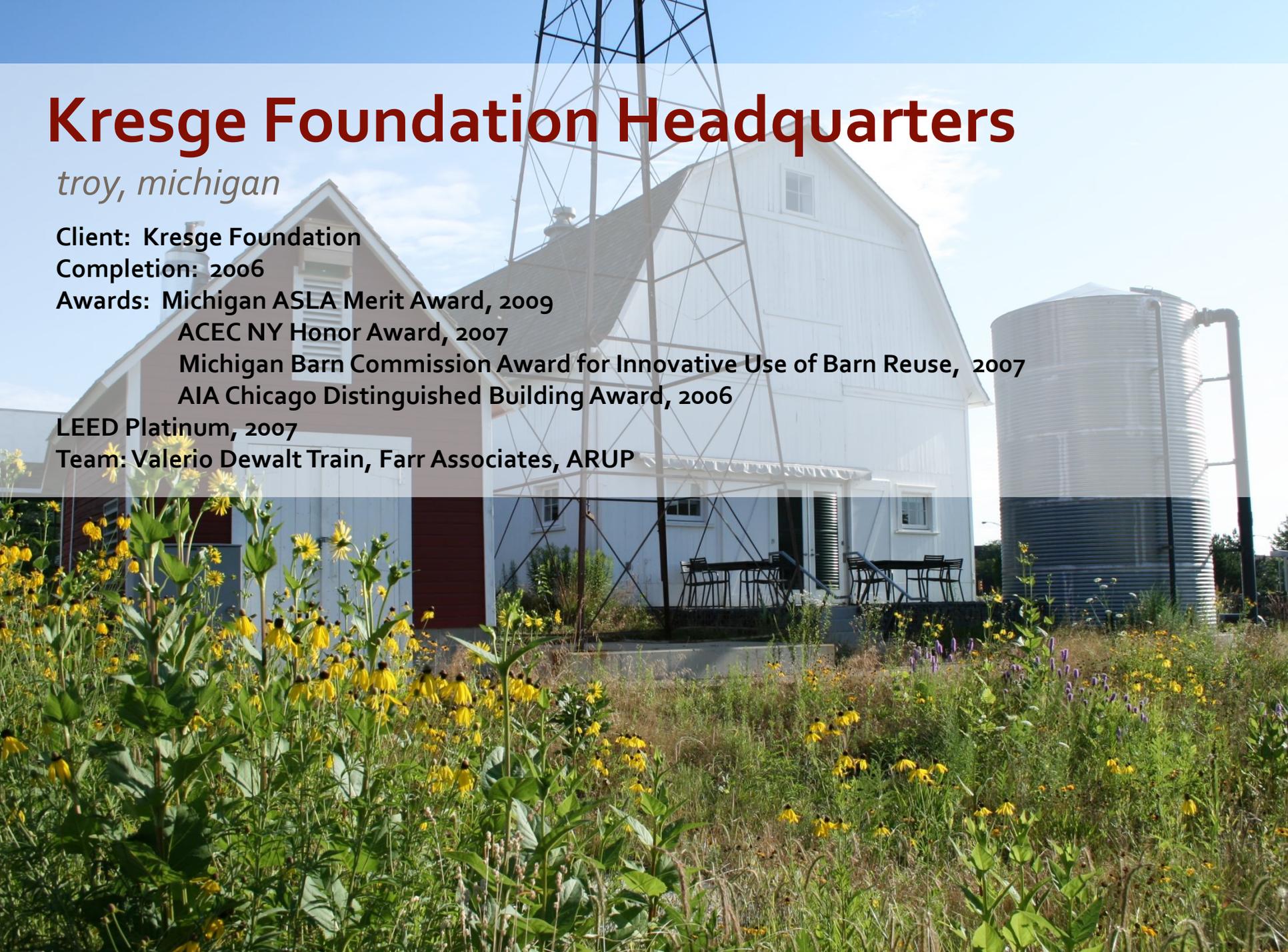
**ACEC NY Honor Award, 2007**

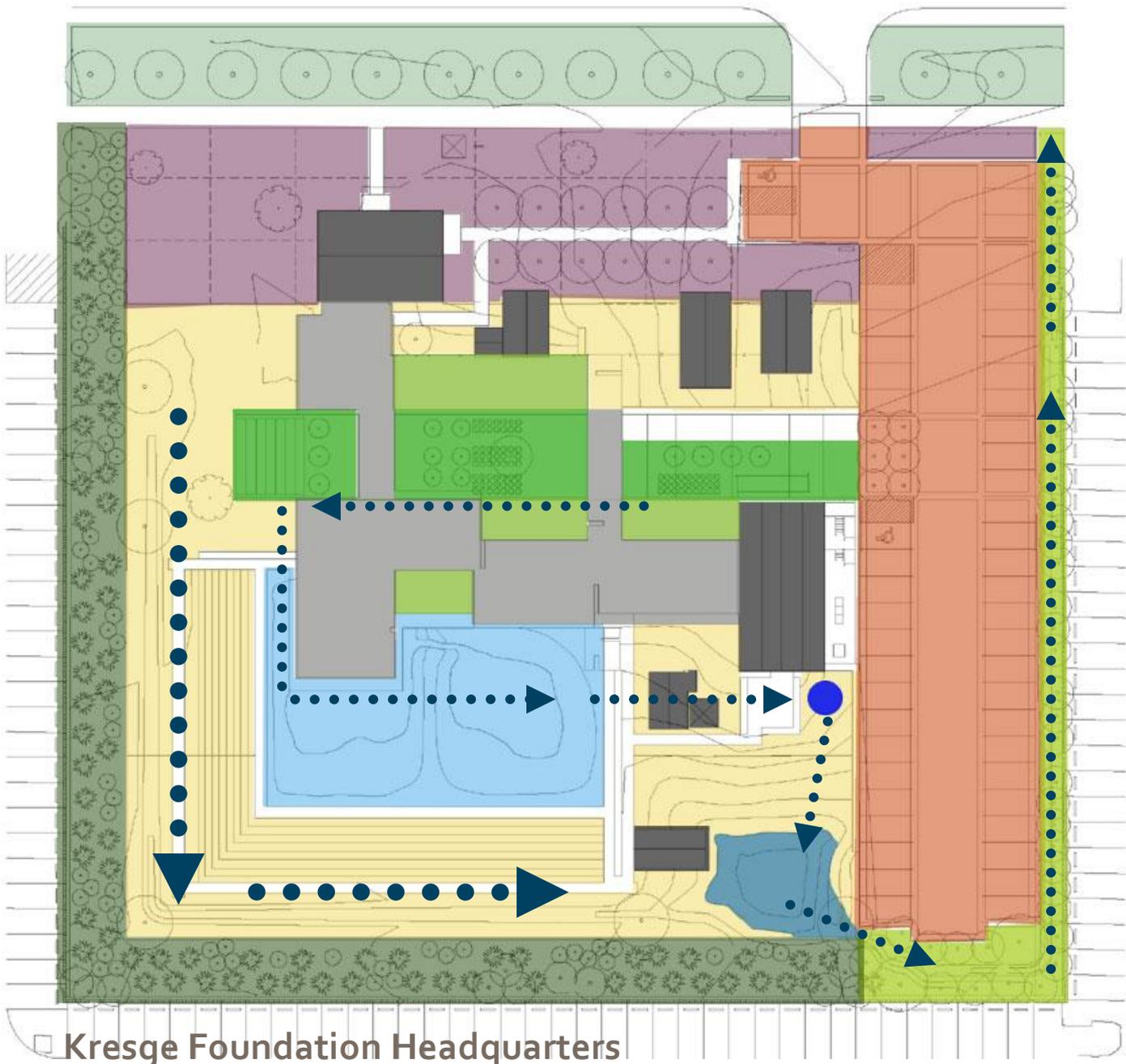
**Michigan Barn Commission Award for Innovative Use of Barn Reuse, 2007**

**AIA Chicago Distinguished Building Award, 2006**

**LEED Platinum, 2007**

**Team: Valerio Dewalt Train, Farr Associates, ARUP**





- Existing buildings
- New Buildings
- Native Landscape
- Green Roofs
- Permeable Paving
- Bioswale
- Water Feature/  
Detention
- Ornamental  
Landscape
- Water circulation

Kresge Foundation Headquarters  
Troy, MI



Kresge Foundation Headquarters  
*Troy, MI*

## Porous paving parking lot



**Kresge Foundation Headquarters**  
*Troy, MI*



Kresge Foundation Headquarters  
Troy, Michigan

# Education: k-12



Lloyd Street Global Education School

Herget Middle School

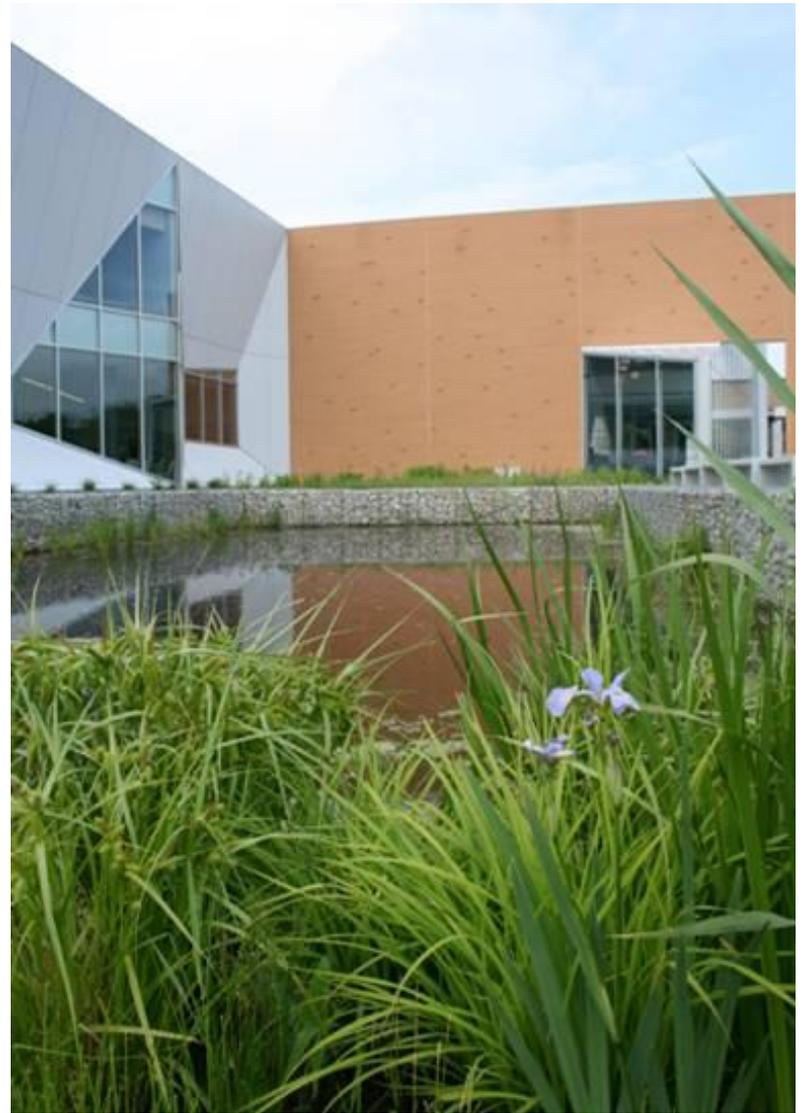
# Education: colleges + universities



Iowa State University College of Design



Waubonsee Community College



Walsh College

# Iowa State University College of Design





# Evelyn Pease Tyner Interpretive Center

*glenview, illinois*

**Client:** The Glen Development Corporation

**Completion:** 2007

**LEED Platinum, 2007**

**Team:** Wight and Company, Phoenix Architects, Bluestone + Associates





Evelyn Pease Tyner Interpretive Center  
Glenview, Illinois



**Evelyn Pease Tyner Interpretive Center**  
*Glenview, Illinois*



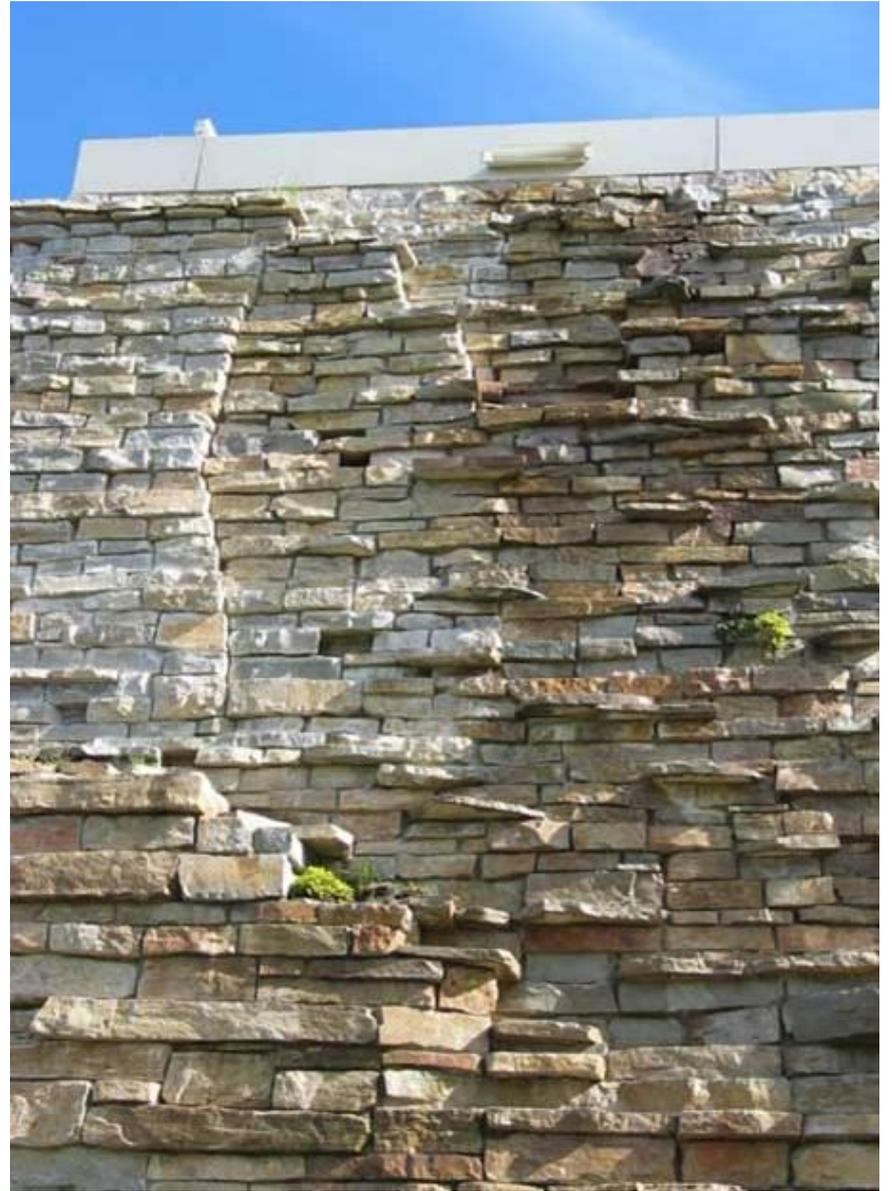
**Peggy Notebaert Nature Museum**  
*Chicago, IL*



**Peggy Notebaert Nature Museum**  
*Chicago, IL*



**Peggy Notebaert Nature Museum**  
*Chicago, IL*





**Peggy Notebaert Nature Museum**  
*Chicago, IL*

# Queens Botanical Garden

*flushing, new york*

**Client:** Queens Botanical Garden

**Completion:** 2002 (master plan), 2009 (administration building and gardens)

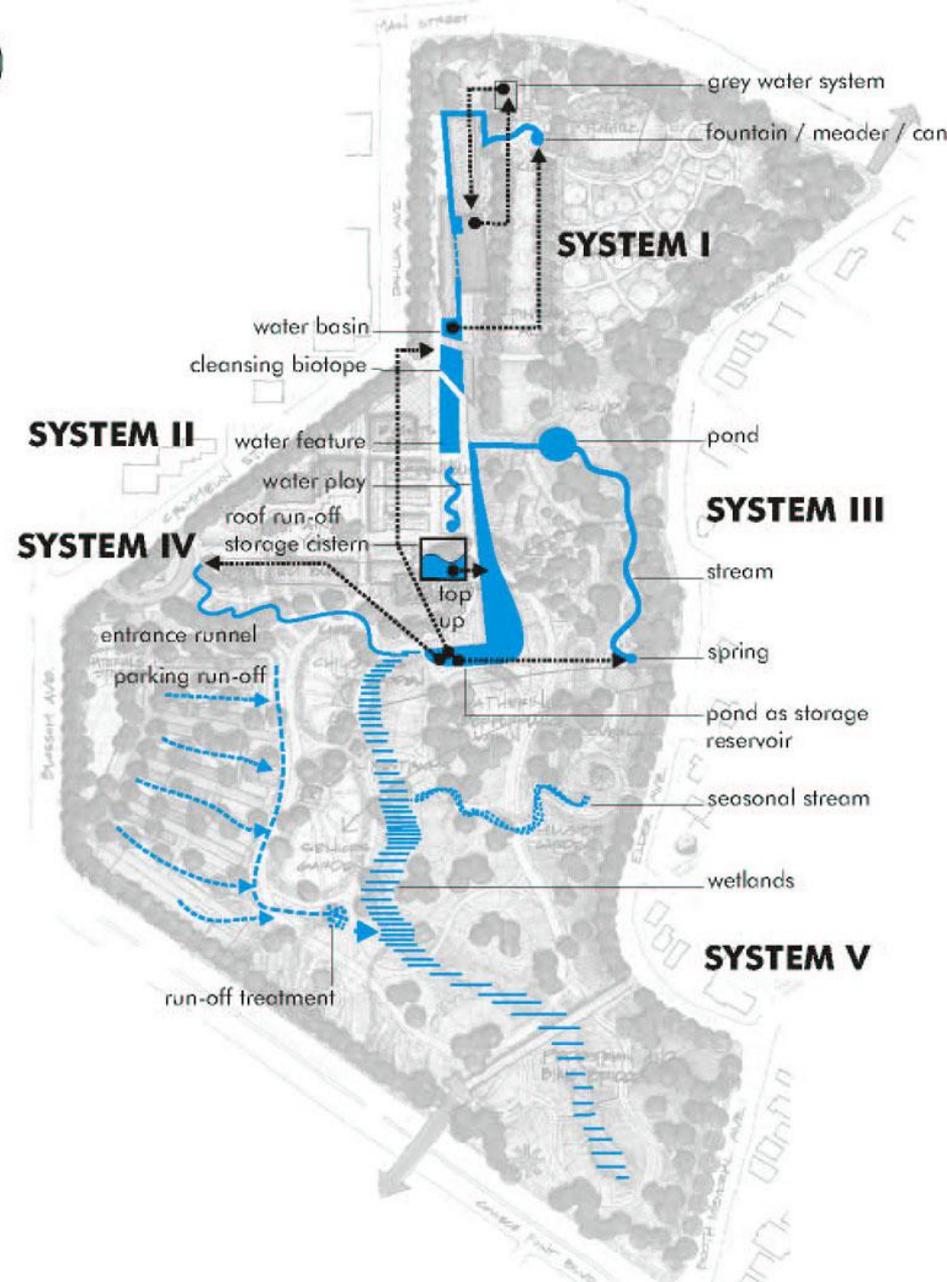
**Awards:** Illinois ASLA Merit Award, 2009 (administration building and gardens)

New York Green Building Design Award, 2004

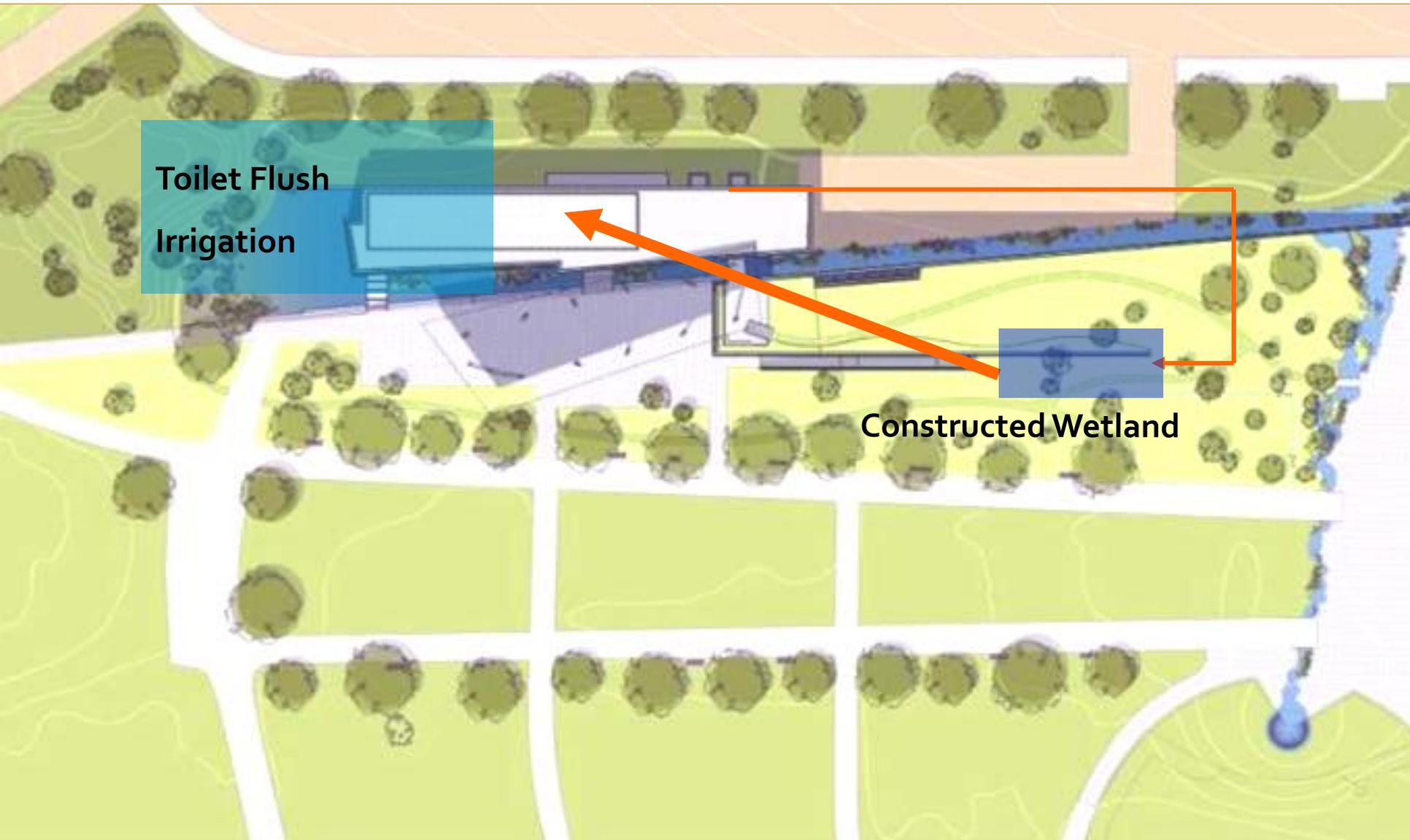
Illinois ASLA Merit Award, 2003 (master plan)

LEED Platinum, 2008

**Team:** Atelier Dreiseitl, BSKS Architects

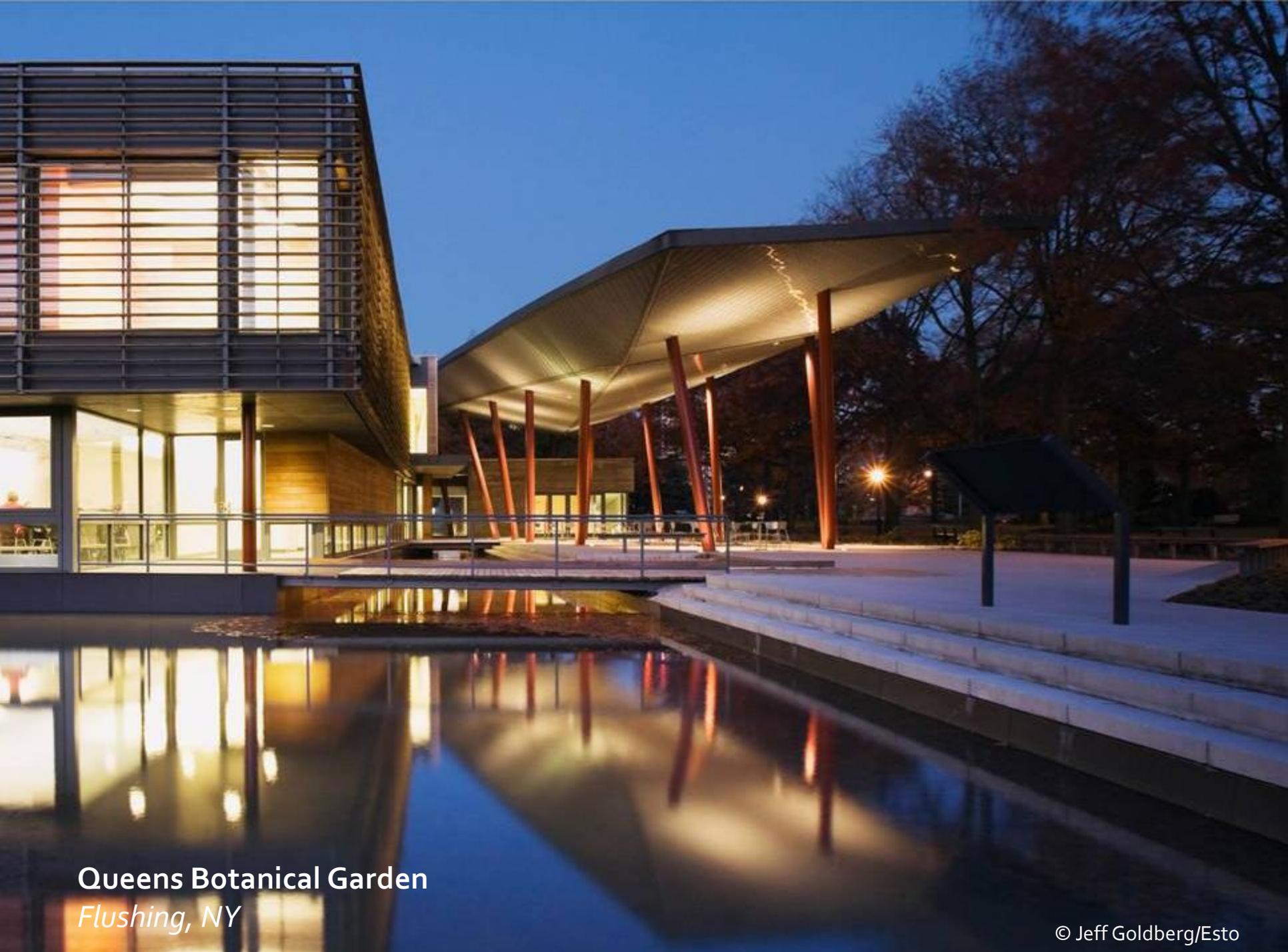


Queens Botanical Garden  
Flushing, New York

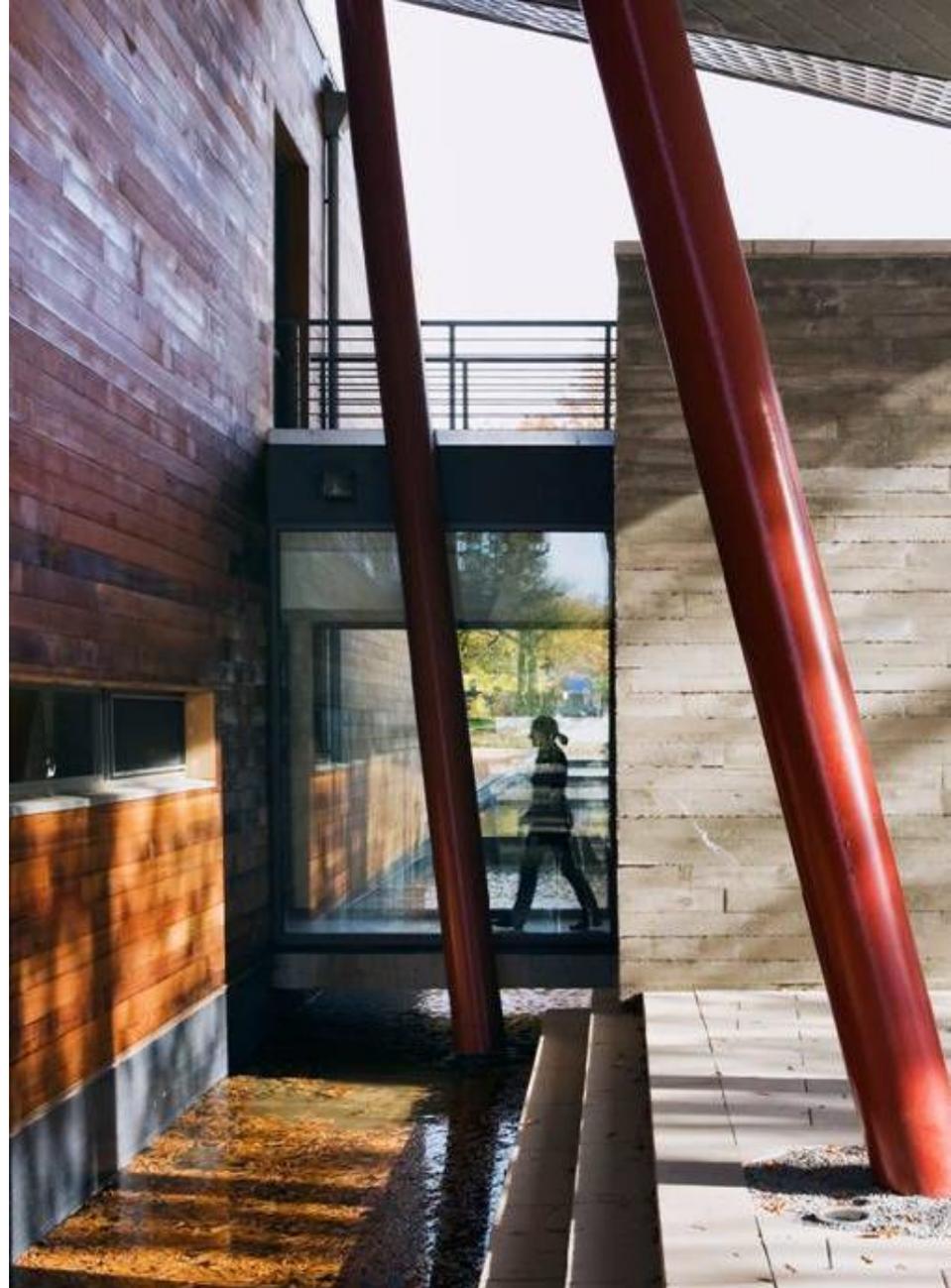


Toilet Flush  
Irrigation

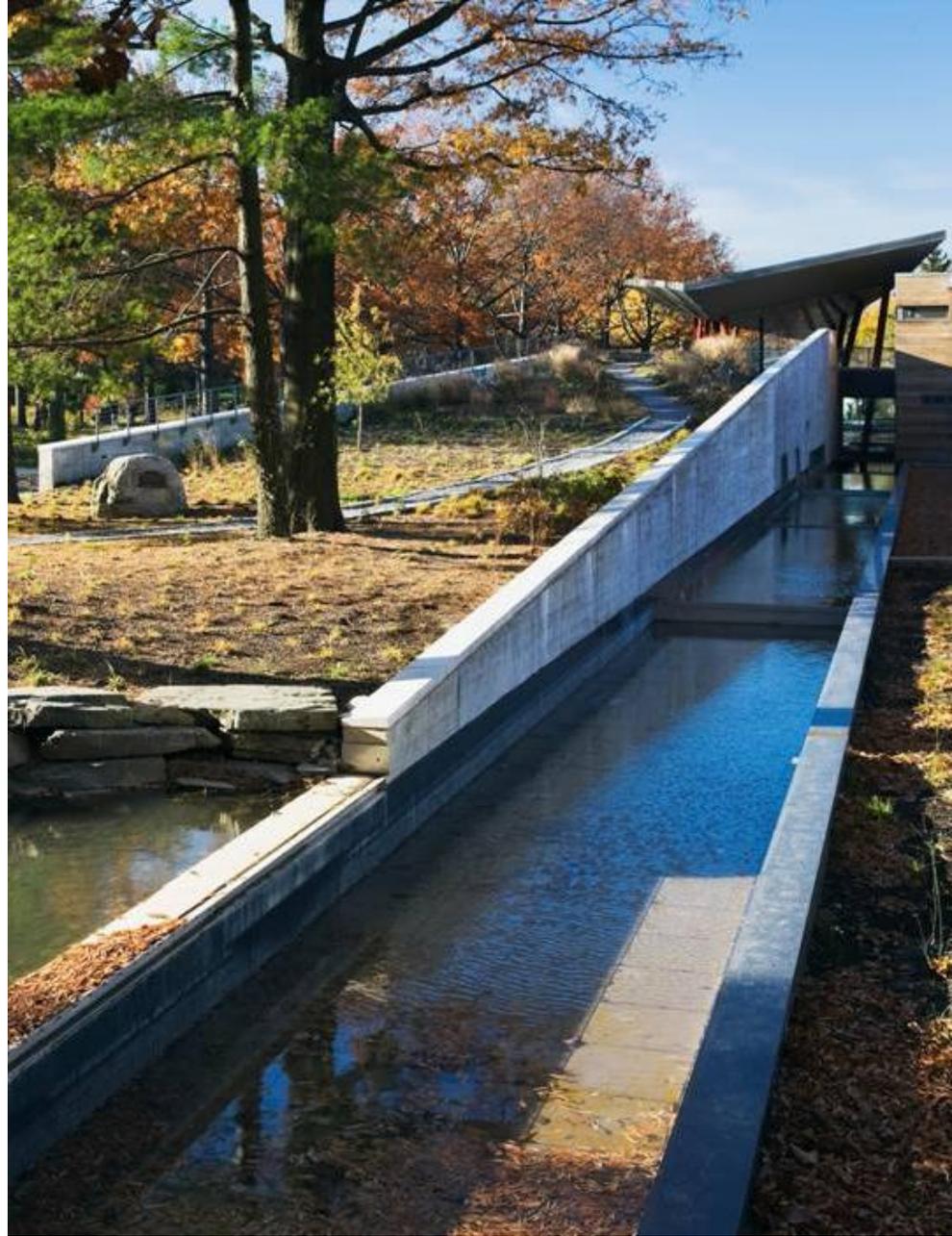
Constructed Wetland



**Queens Botanical Garden**  
*Flushing, NY*



**Queens Botanical Garden**  
*Flushing, New York*



**Queens Botanical Garden**  
*Flushing, New York*



**Queens Botanical Garden**  
*Flushing, NY*

# Ann Arbor Municipal Center

*ann arbor, michigan*

**Client:** City of Ann Arbor

**Completion:** on-going

**LEED:** Platinum (anticipated)

**Team:** Quinn Evans Architects, InSite Design Studio, Atelier Dreiseitl





**Ann Arbor Municipal Center**  
*Ann Arbor, Michigan*

# Health Care



Advocate Good Shephard



Advocate Lutheran General



Northwest Community Hospital

# Lutheran General Hospital Patient Tower

*park ridge, illinois*

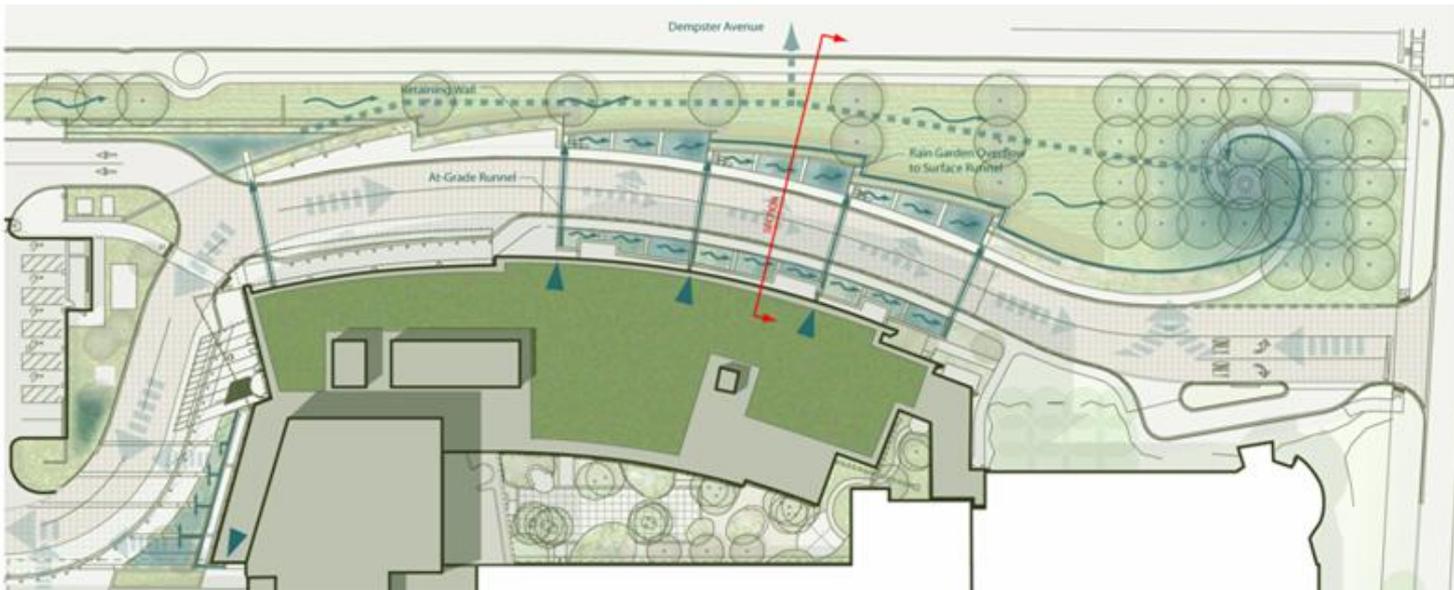
**Client: Advocate Health Care**

**Completion: 2009**

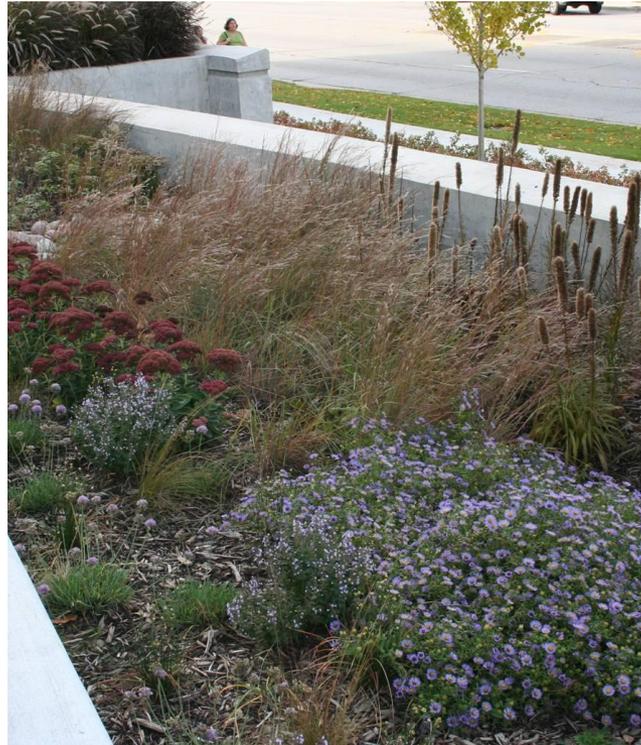
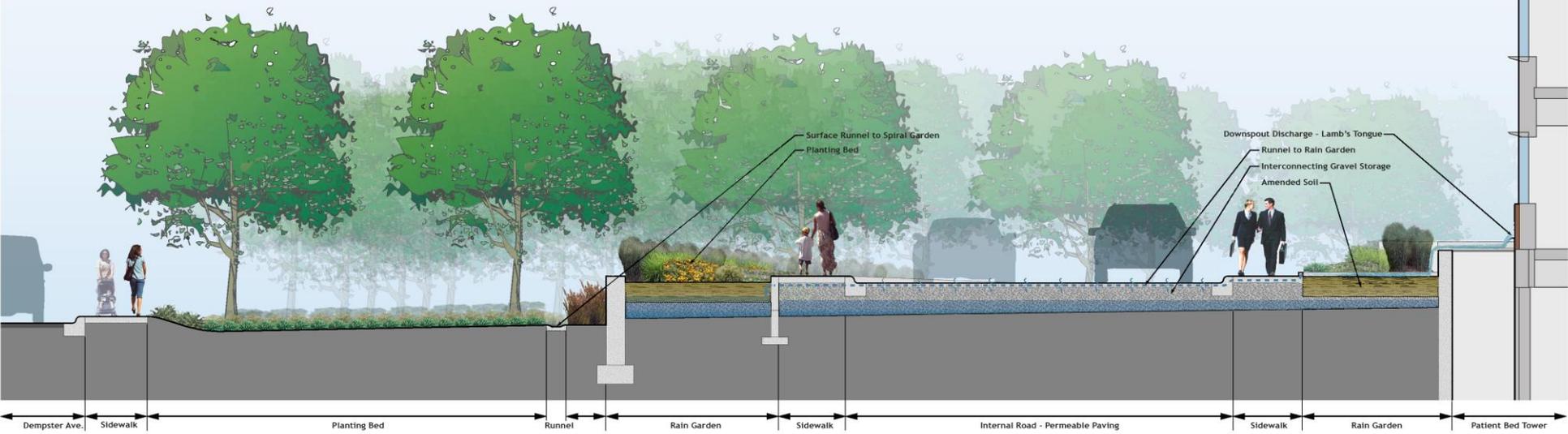
**LEED Gold, 2010**

**Team: Cannon Design, Gewalt Hamilton Associates**





**Advocate Lutheran General Hospital**  
*Park Ridge, IL*



**Lutheran General Hospital Tower**  
*Park Ridge, Illinois*

# Johnson Controls Headquarters

*glendale, wisconsin*

**Client:** Johnson Controls, Inc.

**Completion:** 2009

**Awards:** Wisconsin Builder Magazine Top Projects award, 2009

**LEED:** Platinum (anticipated)

**Team:** Gensler





© 2009 www.aagiscapes.com

**Johnson Controls Headquarters**  
*Glendale, Wisconsin*

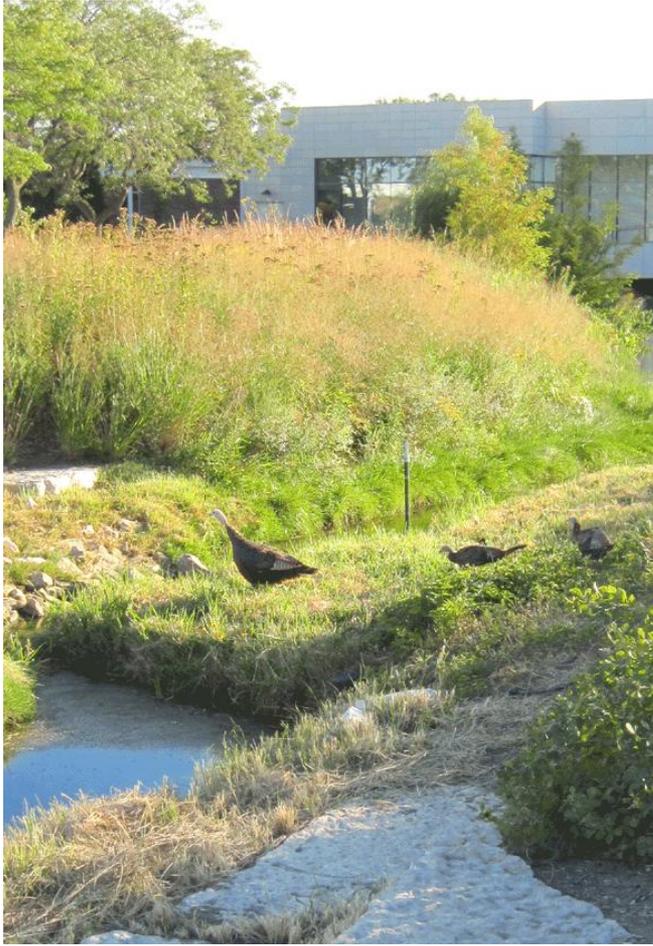




**Johnson Controls Headquarters**  
*Glendale, Wisconsin*



**Johnson Controls Headquarters**  
*Glendale, Wisconsin*



# Conservation Development in Practice

## A Guideline Document for Sustainable Design and Development



### CONSERVATION DEVELOPMENT IN PRACTICE

*The Nature Conservancy and Chicago Wilderness*

*"We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect."*  
 - Aldo Leopold, Ecologist

### CONSERVATION DESIGN TEMPLATES



11. landscaped water feature at Toledo, Inc. (Upperville, Illinois)

#### Commercial/Industrial/Multi-Family

##### General Character

Commercial/industrial developments include retail, light industrial, and offices in various scales from large-scale "big box" retail stores and light industrial and office park development, to smaller-scale restaurants, shops, and individual offices. The conventional and conservation versions of the two templates below have the same number of parking spaces and square feet of commercial area. The templates were developed and modeled for the Blackberry Creek Alternative Futures Analysis project.

##### Applied BMPs

- **Site Stormwater BMPs**
  - Bioswales with infiltration trenches
  - Green roofs
  - Naturalized detention
  - Porous pavement

- Rain gardens
- Vegetated swales

- **Landscaping**
  - Native landscaping within stormwater management areas

##### Cost Implications

The conservation template below was estimated to have a similar combined infrastructure and landscaping cost as the conventional template (Conservation Research Institute, CRI). Although parking and commercial space were intentionally held constant, there was significant potential for additional commercial space in the conservation version while still maintaining a high level of open space. Stormwater modeling of the two templates indicated that 40% less detention was required for the conservation template.

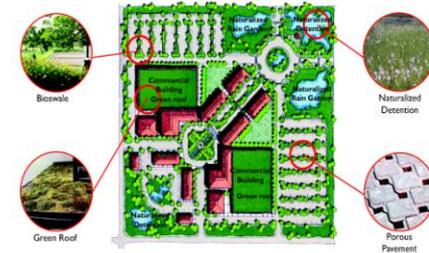
##### ➤ Conventional Template

The conventional template is laid out as a typical strip mall, with two "big box" retail establishments, isolated outlet shops, parking, landscaping, and stormwater detention according to code.



##### ➤ Conservation Template

Like the conventional template, the conservation template has two "big box" retail stores, but in the conservation design, they have green roofs and are designed as part of a "Main Street" retail setting with second floor mixed-use areas, a plaza, and parking both on-street and in parking lots. Permeable paving systems are used in the parking lots along with stormwater infiltration bioswales as part of a naturalized and landscaped stormwater system.

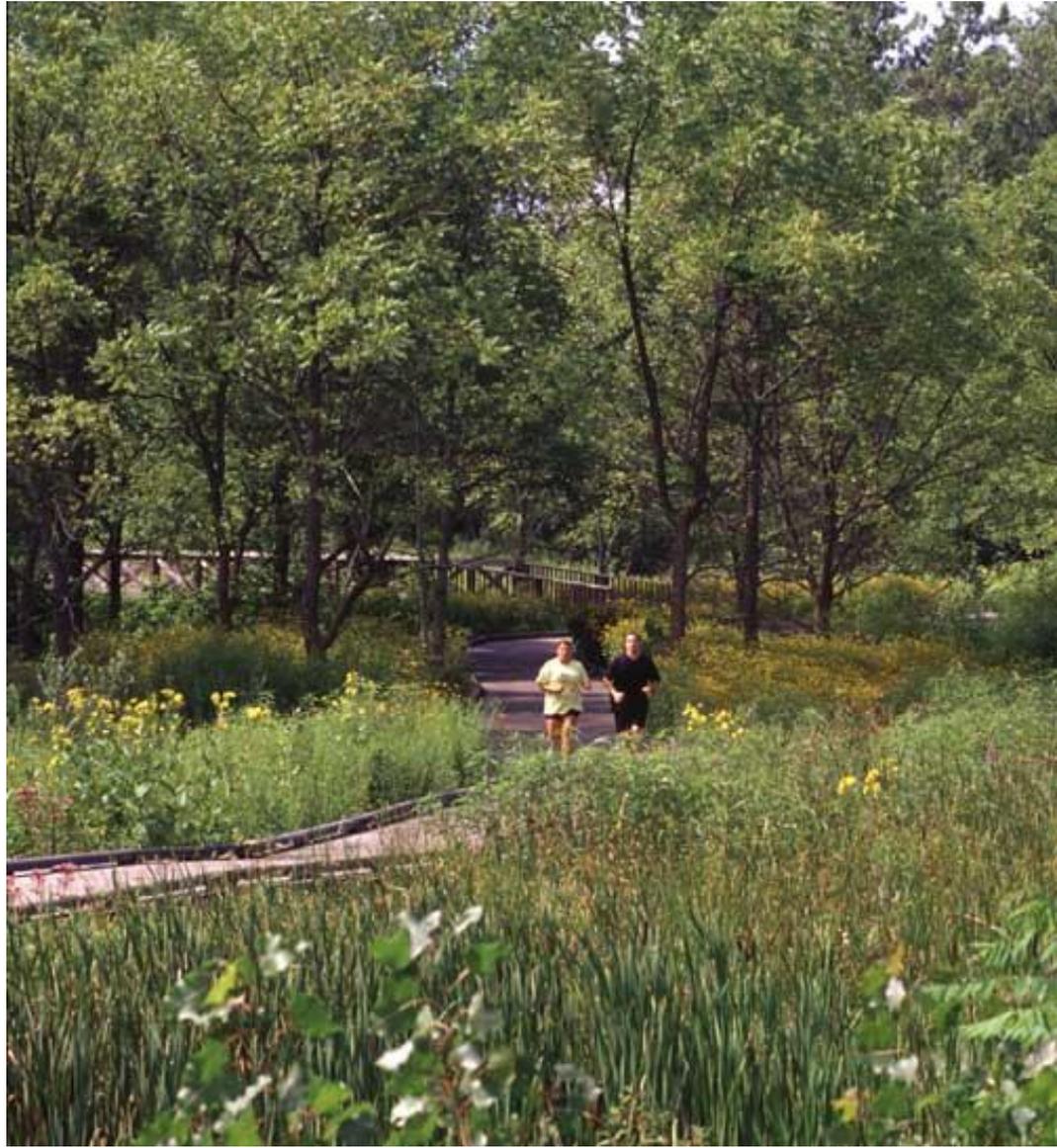






**Natural Designs for Water Filtration and Aeration**











POKAGONEK  
ÉDAWAT

*"Where Pokagons Live"*

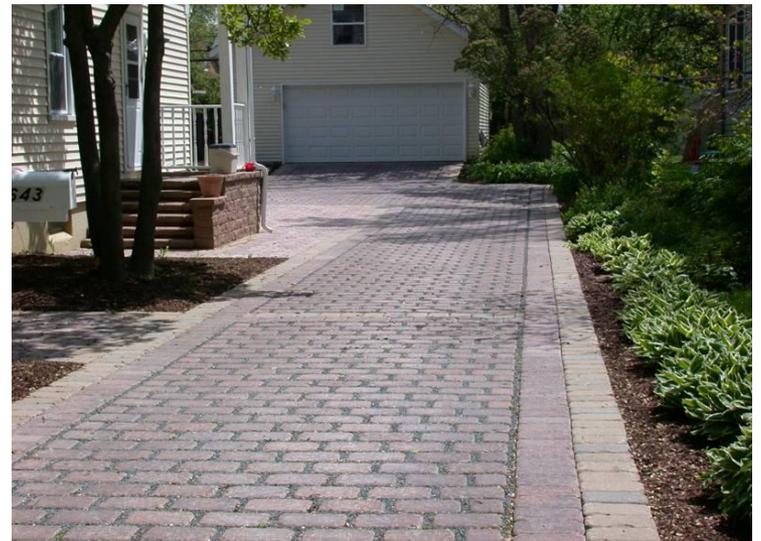
POKAGON BAND OF POTAWATOMI INDIANS







# Sustainable Sites for Residential Applications



# Residential Porous Pavement and Rain Garden Application Elmhurst, IL







# McDonald's Green Prototype

Chicago, IL



# JOSEY HEIGHTS

A TIMELESS NEIGHBORHOOD  
IN THE HEART OF MILWAUKEE!



single-family  
home/lot packages



townhome  
units

CLASSIC ARCHITECTURE  
MODERN AMENITIES



George Calaway  
414/226-4761, ext. 122

Exclusively Marketed By

ShoreWEST



Developed By



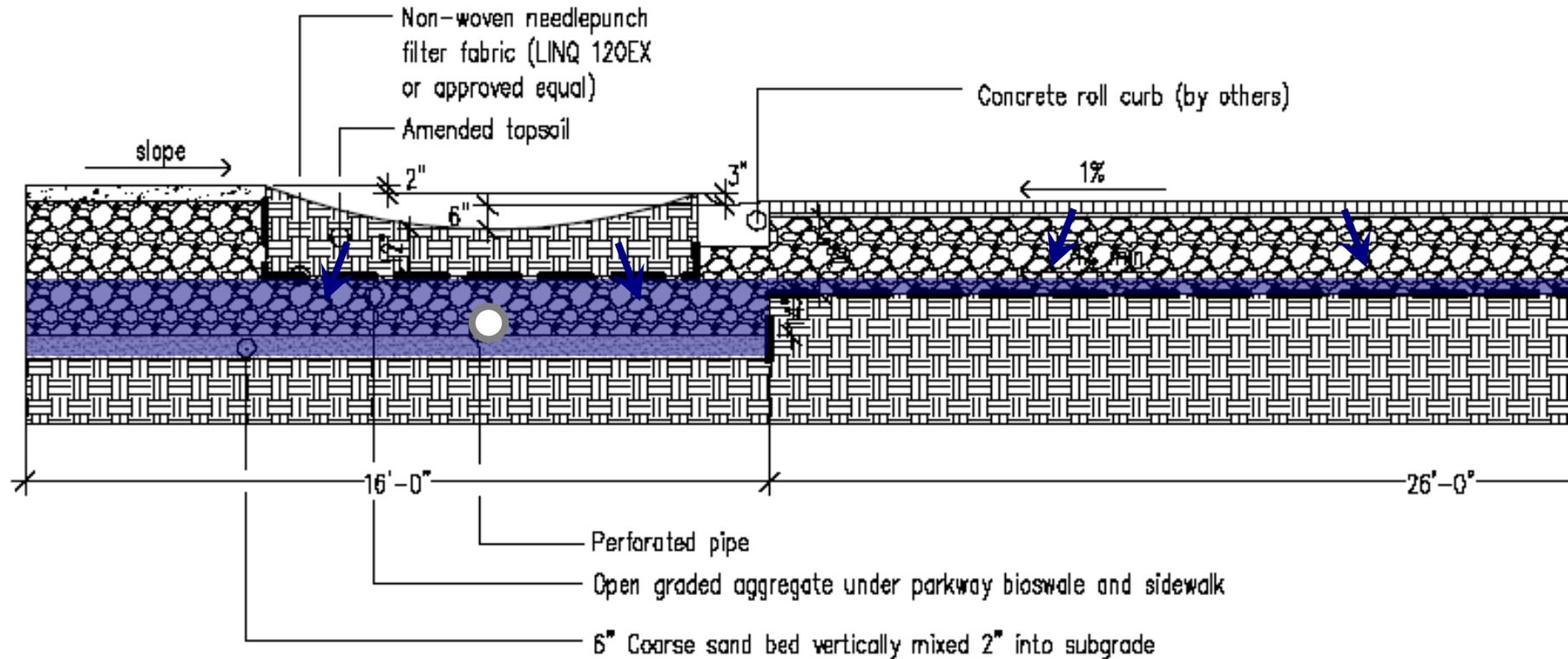
Financed By

Wauwatosa  
SAVINGS BANK

Hotline 262/814-1400 + PIN 35321



Josey Heights  
Neighborhood  
Milwaukee, Wisconsin



3

RIGHT OF WAY CROSS SECTION

NOT TO SCALE

# Josey Heights Neighborhood



Rain Gardens

Street Bioswales

Permeable Paving



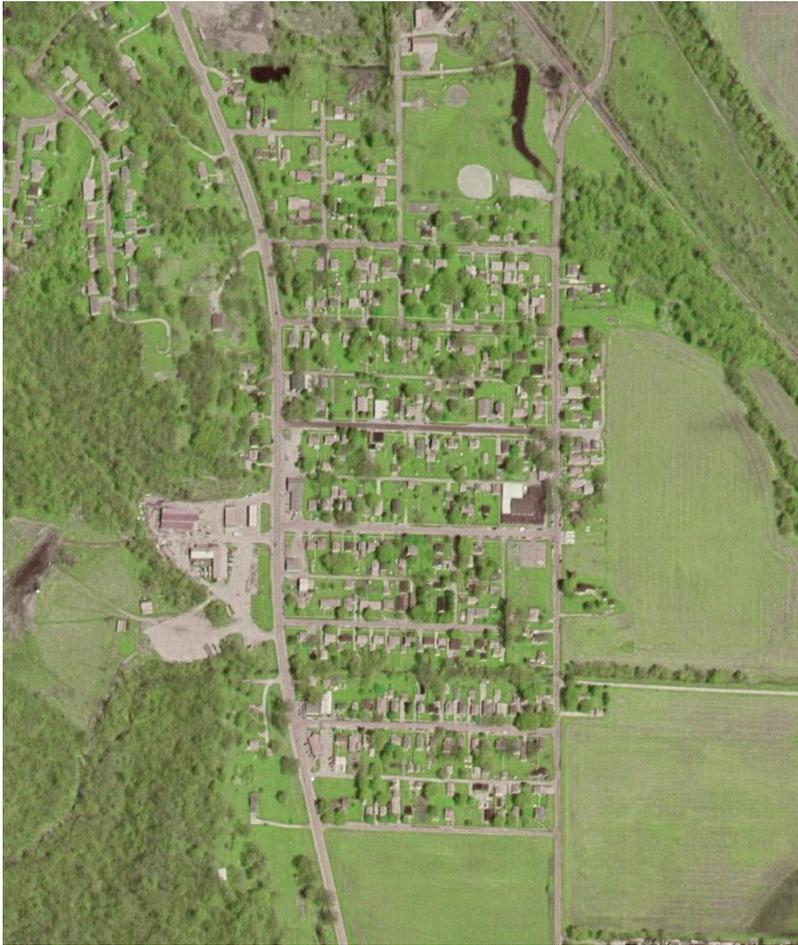


**Josey Heights, Milwaukee, WI**

Josey Heights  
Residential  
Neighborhood  
Milwaukee, WI



# Carbon Cliff Green Streets

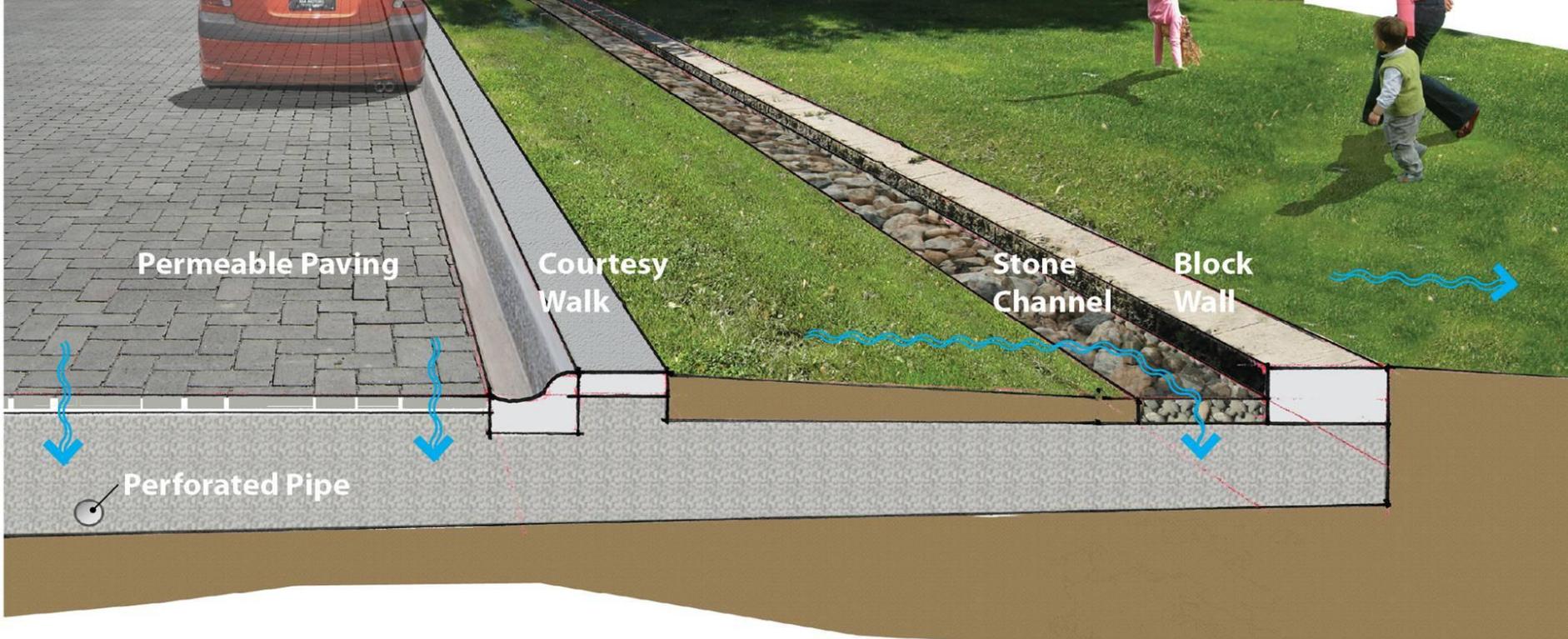




**Carbon Cliff Green Streets**  
*Carbon Cliff, Illinois*

# Street View Character - 40' Right-of-Way Street

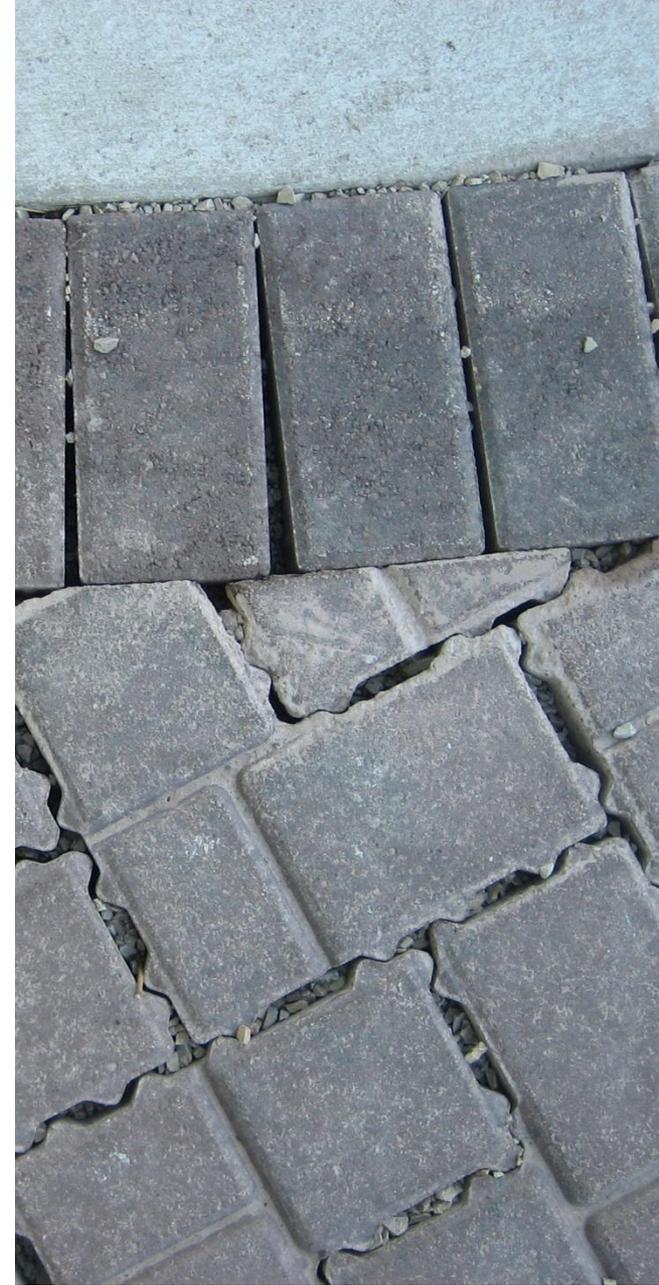
## Existing Conditions







**Charles City Green Streets**  
*Charles City, Iowa*



**Charles City Green Streets**  
*Charles City, Iowa*

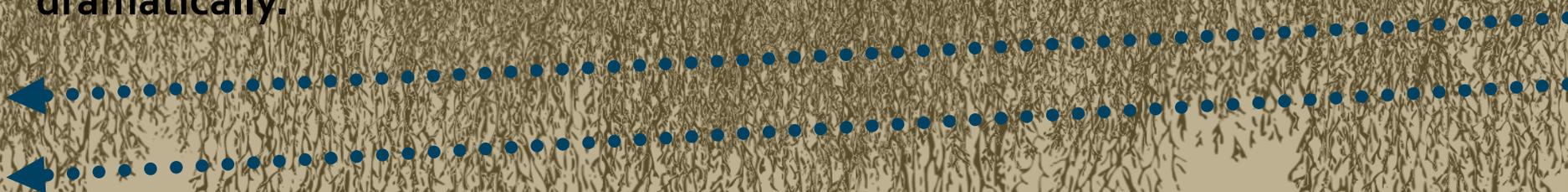


All the loss of a structure highly repaired soil together to be less oxygenated, less stable, and a lot of disruption of soil structure, which increases soil compaction, soil erosion, and its susceptibility to soil erosion and water erosion. nutrients.

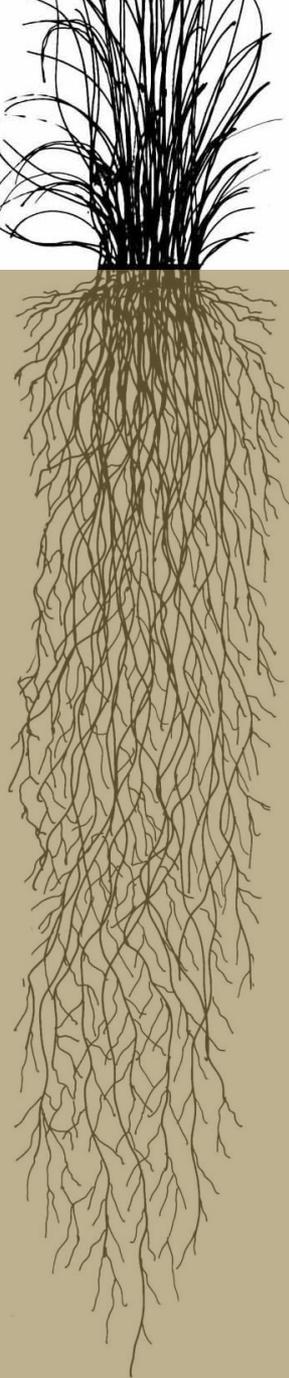


increased runoff and soil erosion

Compaction and loss of root structure and organic matter content alters soil bulk density causing water infiltration rates and capacity to drop dramatically.



Introduction of tile accelerates rate of water loss, oxidation, and depletion of soil nutrients. Crops need significant additional resources to grow.



# The Importance of a Healthy Rhizosphere & the Implications of its Systematic Destruction

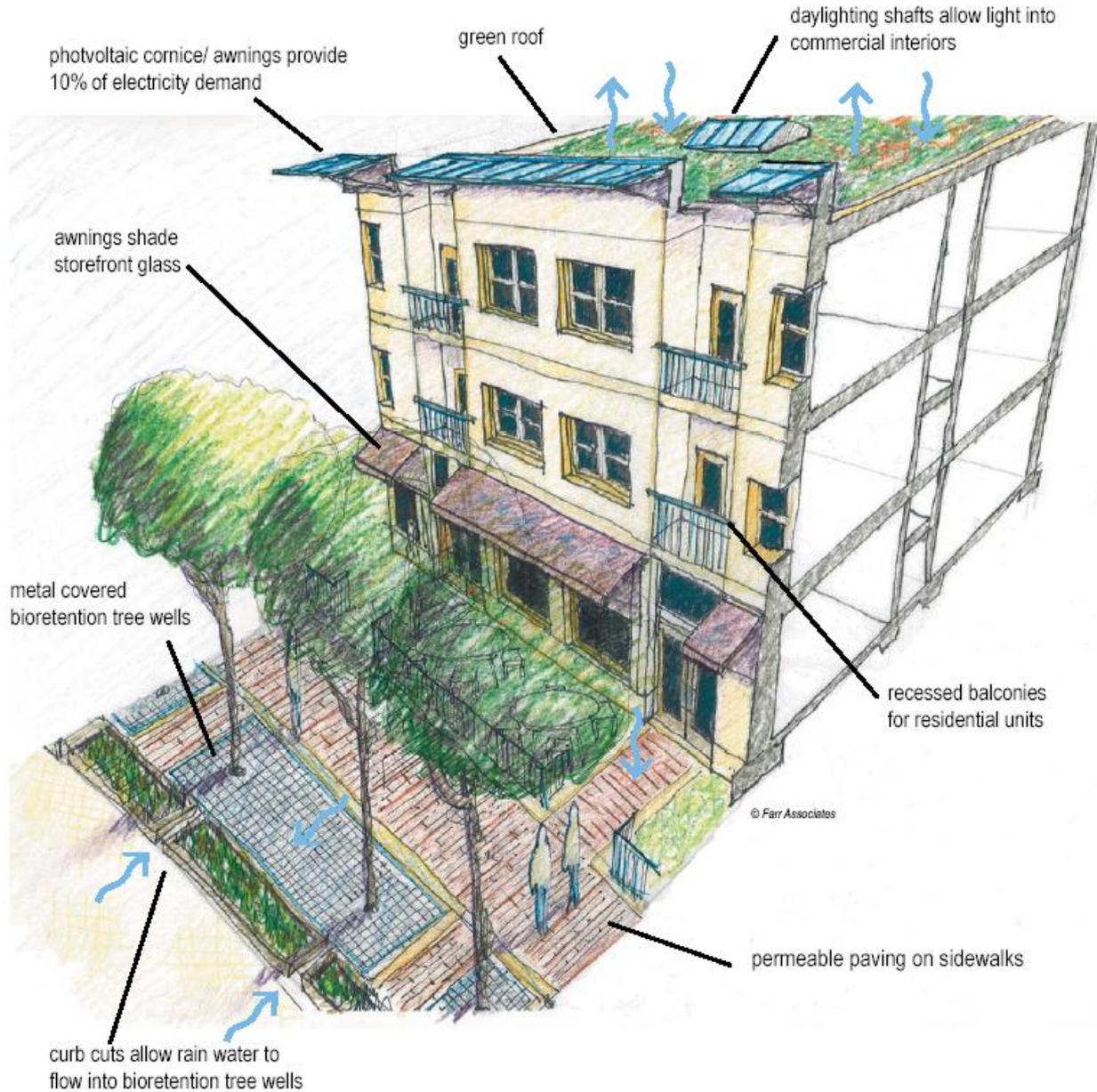
When the rhizosphere which includes the deep root systems of the native bunch grasses is destroyed:

- a contiguous connection to the stable thermal mass of the subsoil ceases to exist
- soil moisture decreases and the surface mineral soil, or other surfaces, become vulnerable to significant daily temperature fluxes
- no longer able to thermo-regulate, many conservative organisms, including flora and fauna, have difficulty maintaining a stable metabolism
- the land defaults to the few plants and animals that can survive such circumstances, while most native species are simply unable to compete
- evapotranspiration at the surface is drastically reduced, the moderating effects of water are lost, and the surface of the earth heats up
- the shifts in temperature and hydrology effect weather patterns, bio-diversity, and even global warming.





# Conservation Design Forum: City of Detroit East Riverfront District



scupper & downspout  
solar panels  
green roof system

planter boxes



FELDMAN

geothermal heat (de-icing)  
decorative bollards  
outdoor cafe' space  
fabric (vinyl) awnings

decorative street signage  
sidewalk (paver type a)  
parking lane (paver type b-permeab)  
driving lane (paver type c)

rendered by William Feldman  
**conceptual rendering**

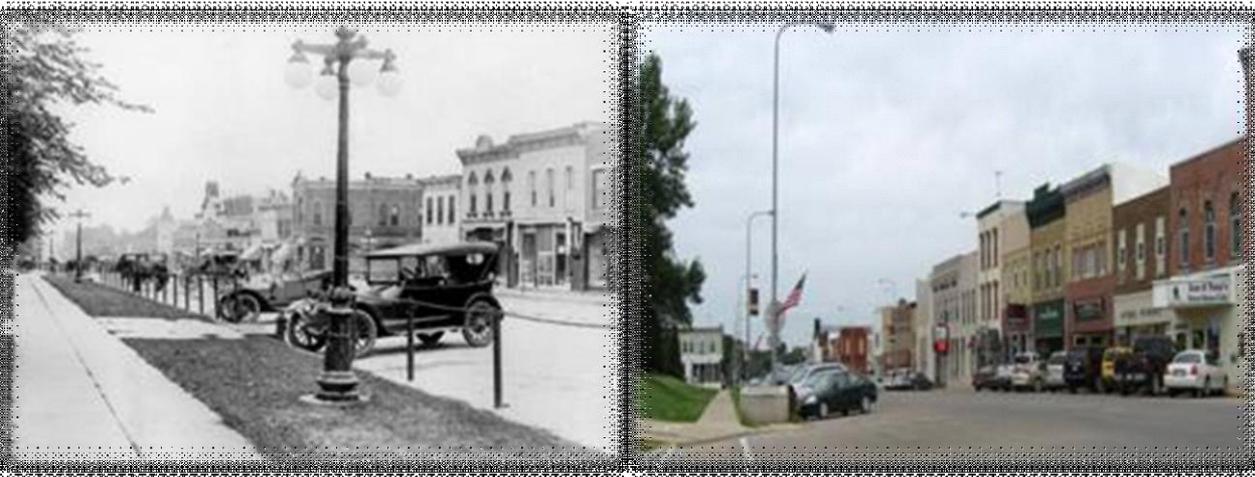
Client  
**Mazur Design Studios**  
Racine, Wisconsin  
Project Number  
**06012.01**  
Date  
**05.19.06**



**SIXTH STREET**  
RACINE, WISCONSIN

# Iowa's Green Streets Pilot Project

A Sustainable Vision for West Union, Iowa



**The City of West Union**

**Main Street West Union**

**Iowa Department of Economic Development**

**TeKippe Engineering, P.C.**

**Conservation Design Forum**





Lincoln Rd

Imper Rd

Harding Rd

150

Co Highway W42

230th St

E Bradford St

Co Highway B6

West Union West Union, IA

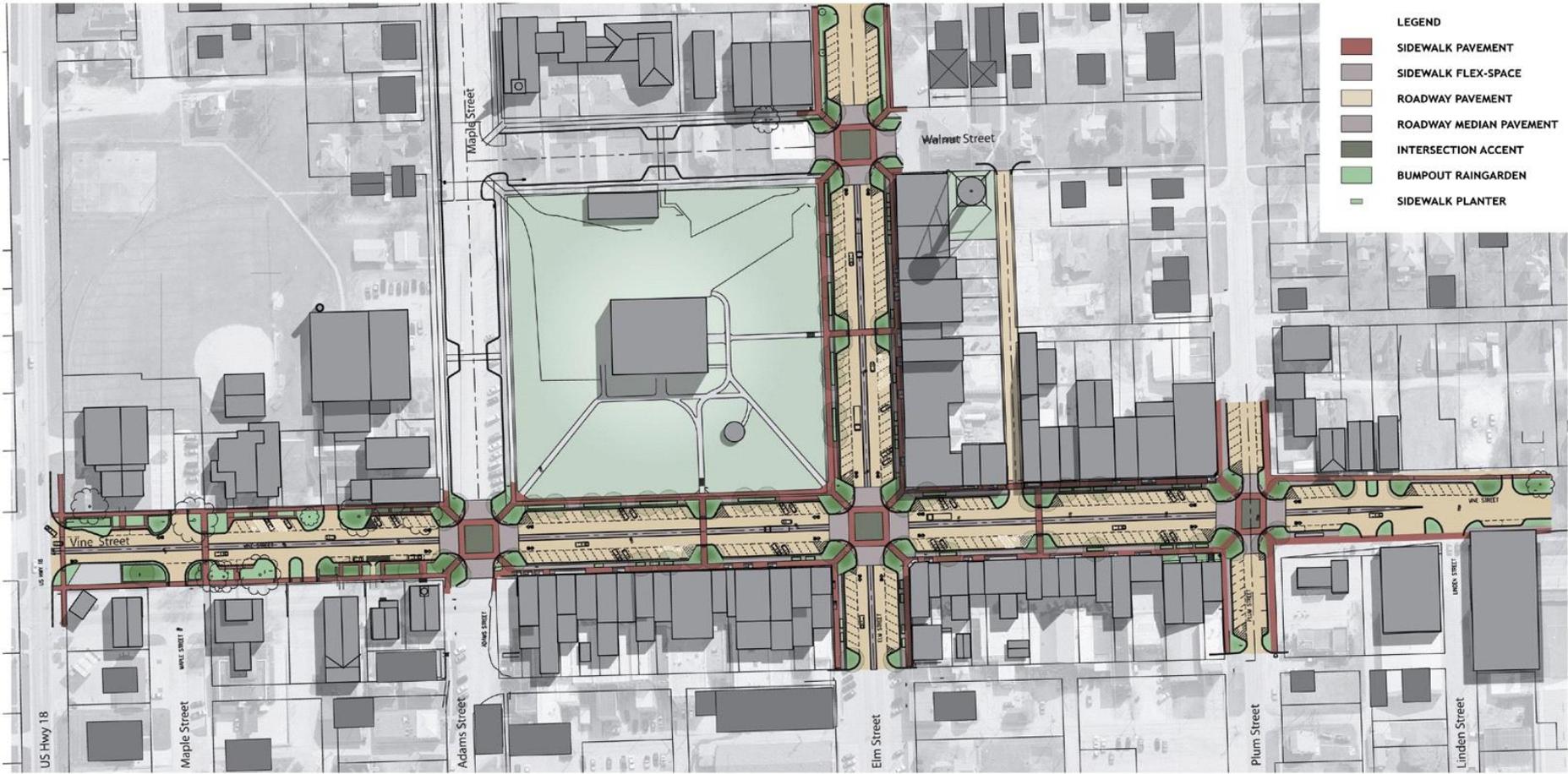
W Franklin St E Franklin St  
Image USDA Farm Service Agency  
© 2009 Google  
© 2009 Europa Technologies

42°57'45.92"N 91°48'29.58"W

elev 363 m

Jul 6, 2006

Eye



- LEGEND**
- SIDEWALK PAVEMENT
  - SIDEWALK FLEX-SPACE
  - ROADWAY PAVEMENT
  - ROADWAY MEDIAN PAVEMENT
  - INTERSECTION ACCENT
  - BUMPOUT RAINGARDEN
  - SIDEWALK PLANTER

WEST UNION, IA

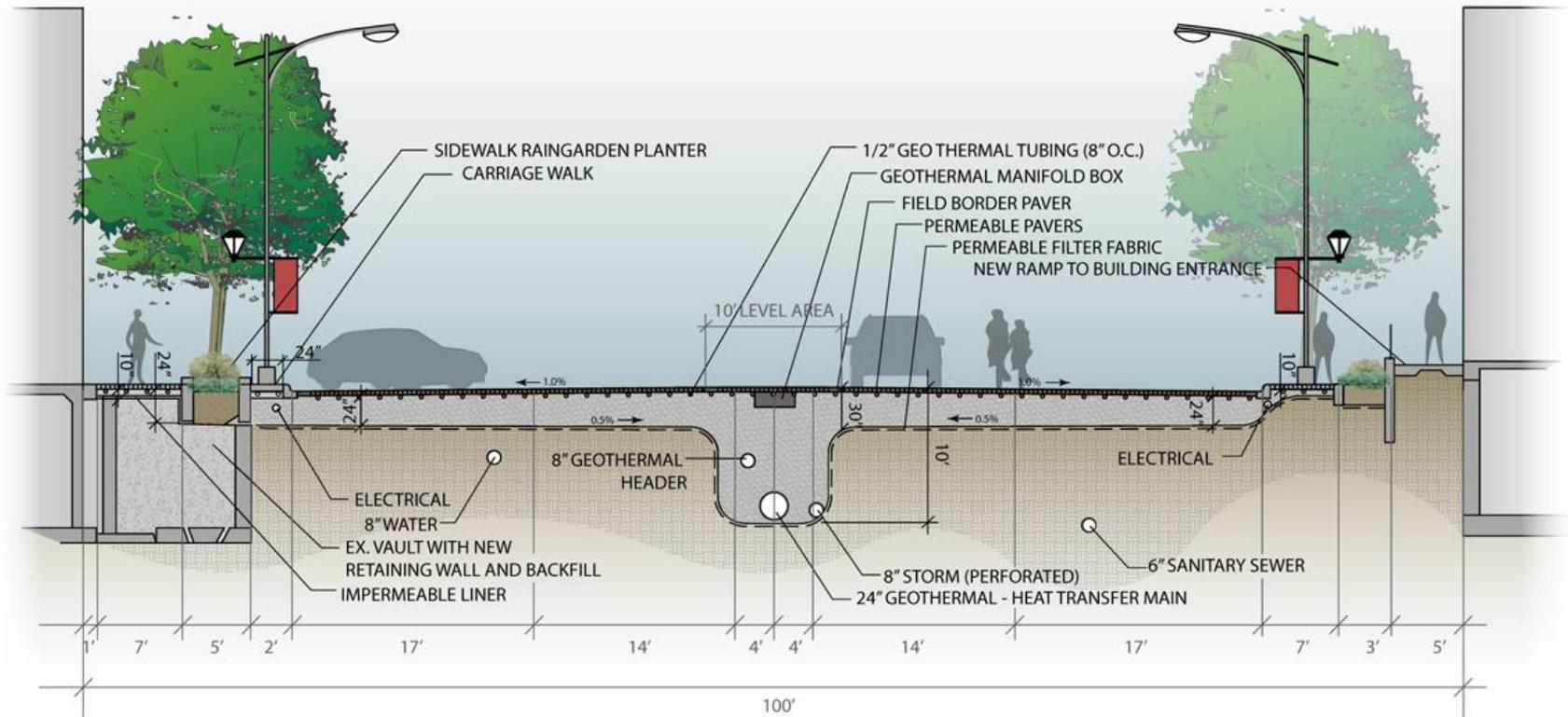
**IOWA GREEN STREETS - CONCEPT PLAN**

SCALE 1"=50'-0"

CONSERVATION DESIGN FORUM

City of West Union  
125 West Park Road  
West Union, IA 52758  
www.cityofwestunion.org

L-1.00



**IOWA GREEN STREETS - SECTION C - NORTH VINE ST.**

WEST UNION, IA

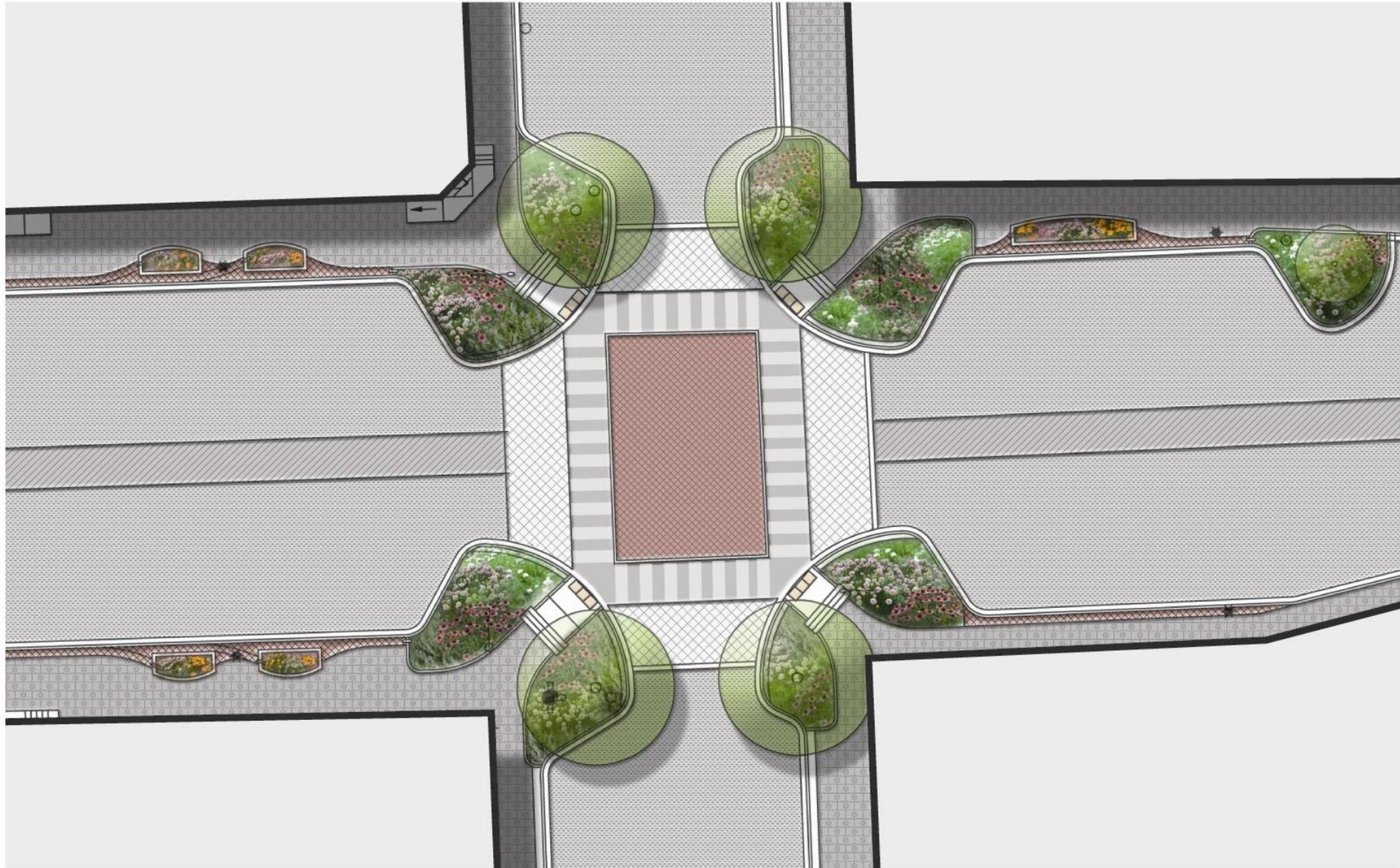
Project Number:  
09032.01  
Date:  
06-01-2009  
SCALE: 1/8" = 1'-0"

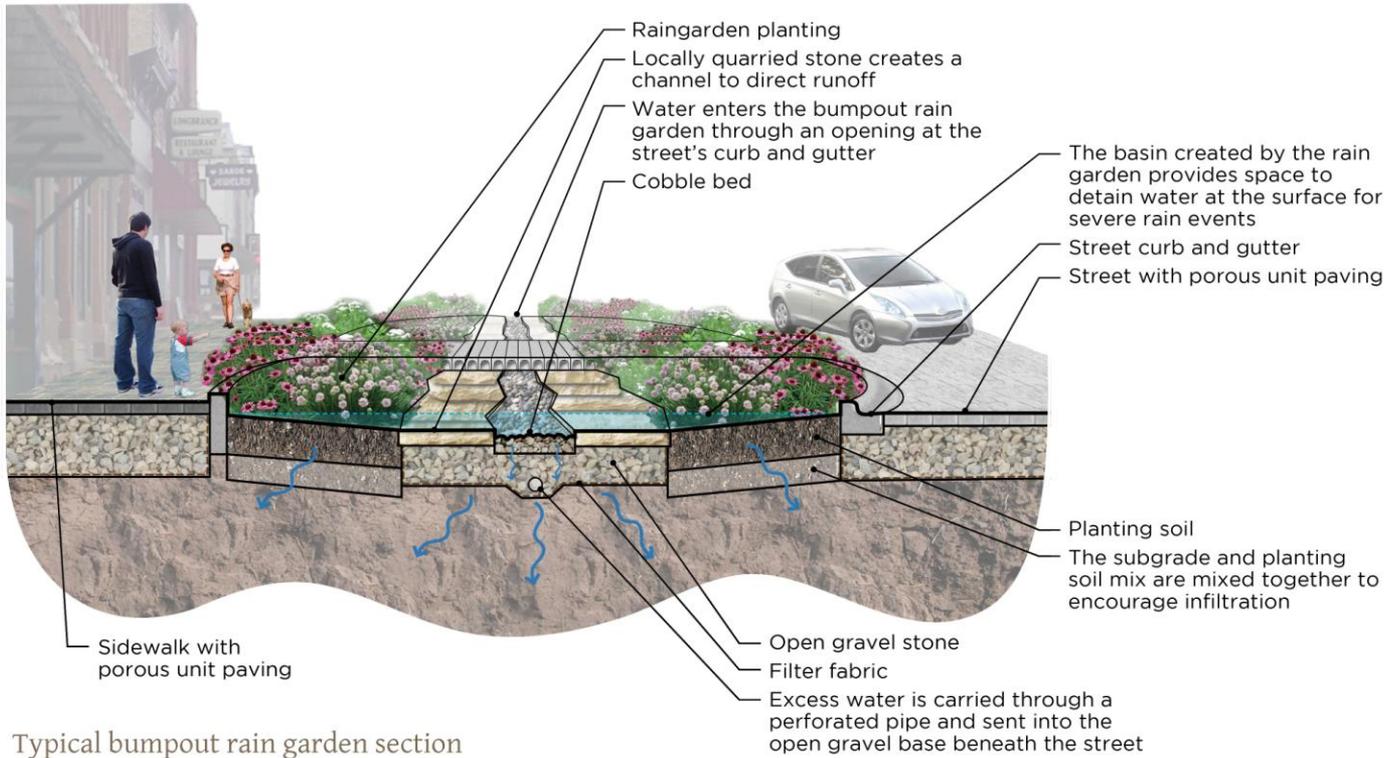


Landscape Architecture  
Community Planning  
Ecological Restoration  
Water Resource and  
Ecological Engineering  
375 West First Street  
Evanston, Illinois 60126  
630.559.2000 phone  
630.559.2030 fax  
www.cdfinc.com

CONSERVATION DESIGN FORUM

L-3.02





Typical bumpout rain garden section



# Communications

- Develop and implement community communications strategy



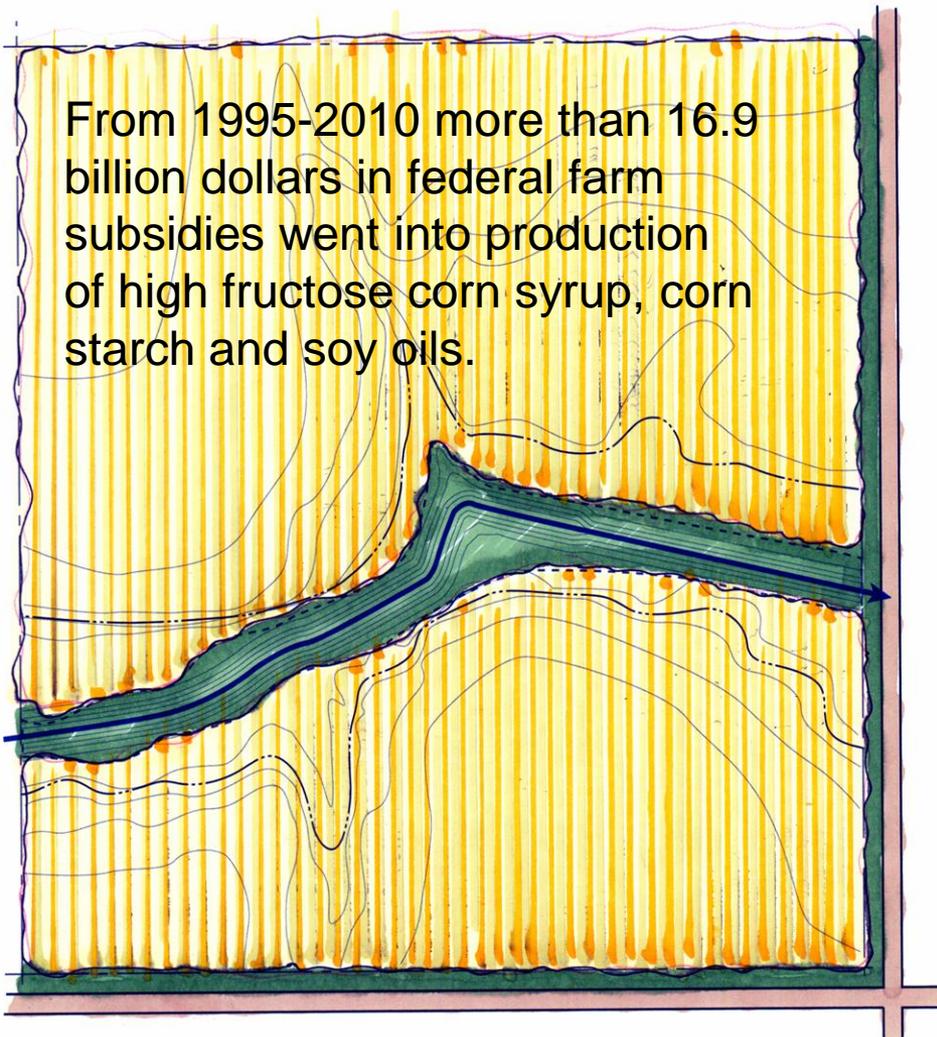
# Implementation/Funding

- Pursue range of support/funding opportunities

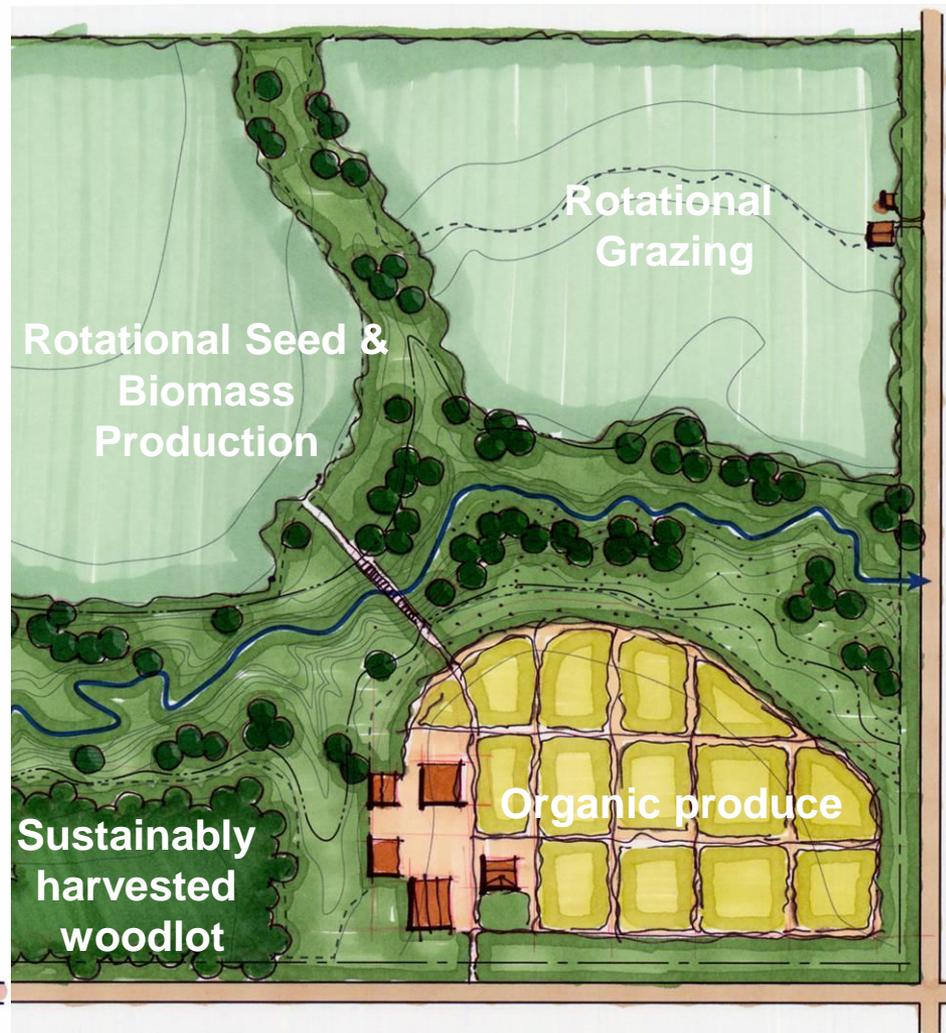


# Unsustainable Row Crop Agriculture

From 1995-2010 more than 16.9 billion dollars in federal farm subsidies went into production of high fructose corn syrup, corn starch and soy oils.



# Sustainable Agriculture







# CDF

*15 years of sustainability*

**James Patchett**

(630) 559-2025

[jpatchett@cdfinc.com](mailto:jpatchett@cdfinc.com)

[www.cdfinc.com](http://www.cdfinc.com)