

# Green Infrastructure Planning & Design for Human Health Co-Benefits



Kathleen Wolf, Ph.D.  
Research Social Scientist

University of Washington (Seattle)  
School of Environmental and Forest Sciences



**ACES 2018**

**A Community on Ecosystem Services**

December 2018, Washington DC



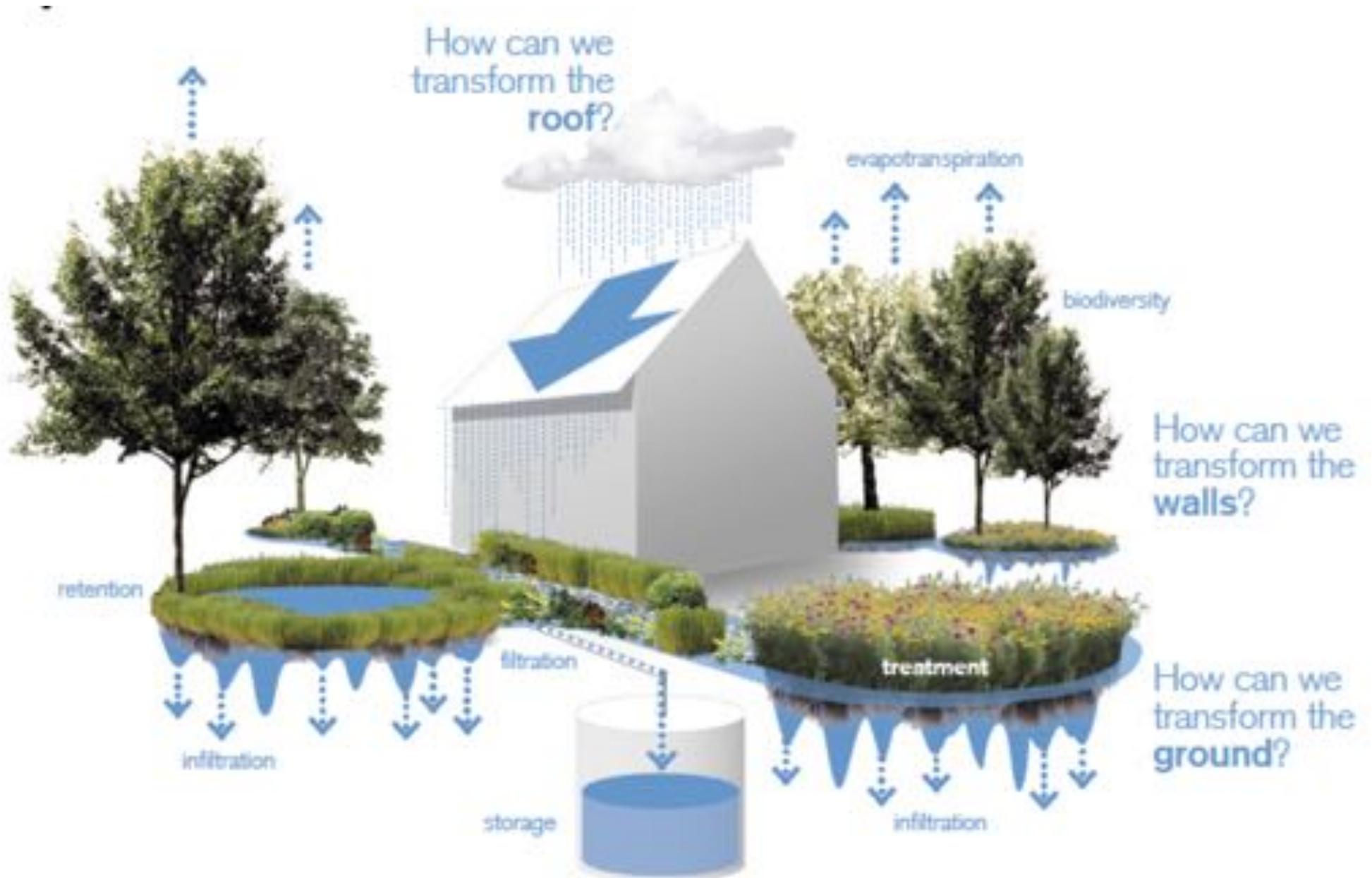


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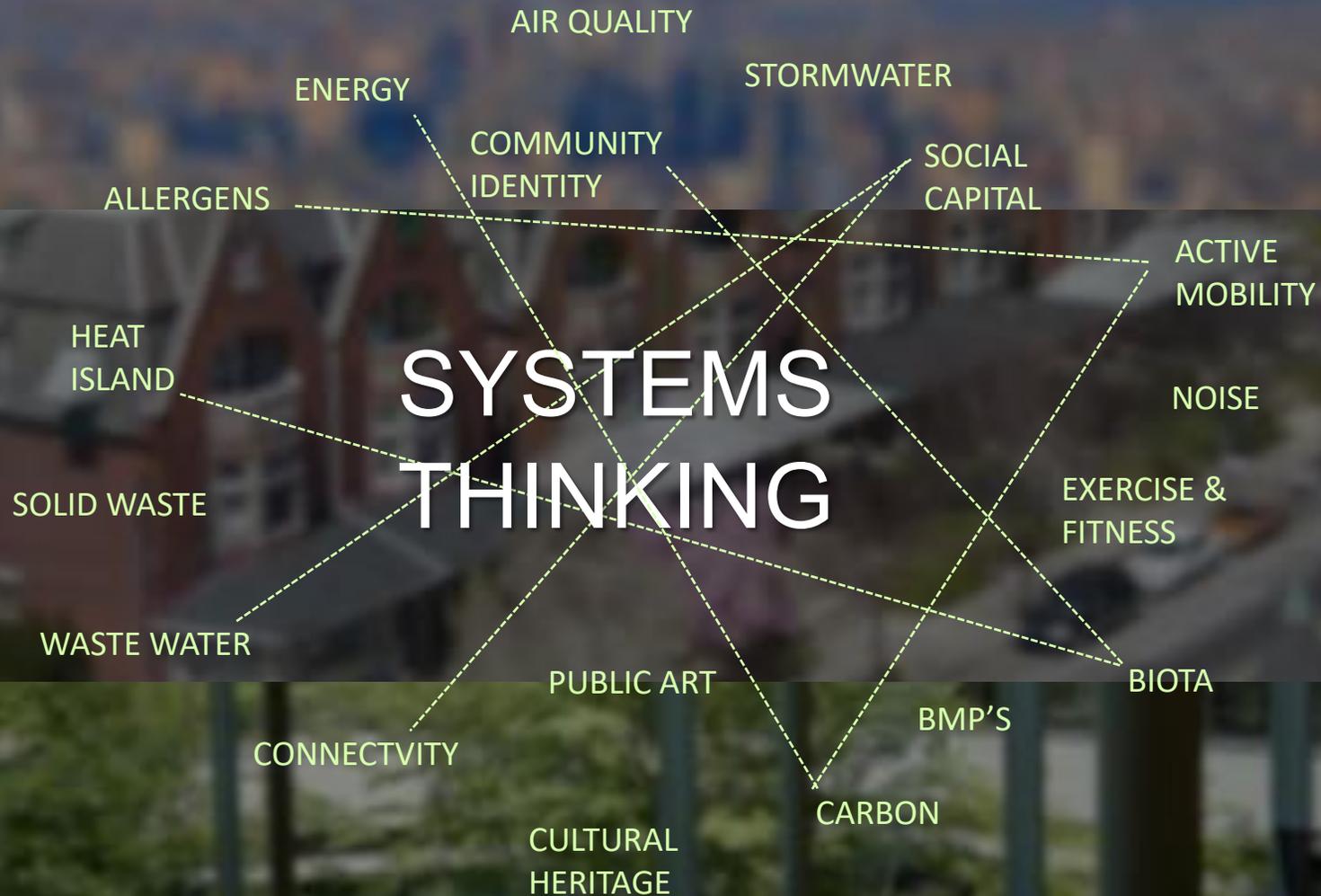
stormwater retention





Low Impact Development: A Design Manual for Urban Areas, 2010

# SYSTEMS THINKING



credit: American Planning Association



# World Health Organization

## Health Definition

*A state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity (1946)*



# Social Determinants of Health

# Green Cities: Good Health

[www.greenhealth.washington.edu](http://www.greenhealth.washington.edu)

## Sponsors:

USDA Forest Service,  
(U&CF Program + Pacific NW Research)  
University of Washington  
NGO partners

Thanks!

to U of WA students:

Katrina Flora

Mary Ann Rozance

Sarah Krueger



## Research Reviews & Summaries

# Green Cities: Good Health



INTRODUCTION RESOURCES FUTURE RESEARCH REFERENCES

Community Building

Local Economics ▶

Place Attachment & Meaning

Crime & Fear ▶

Safe Streets ▶

Active Living ▶

Reduced Risk

Wellness & Physiology

Healing & Therapy

Mental Health & Function ▶

Work & Learning

Culture & Equity

Lifecycle & Gender

## Local Economics

Trees in cities are not grown and managed for products that can be bought and sold on markets, but they do provide many intangible services and functions! This article serves two purposes. First, it introduces valuation methods that are used to convert intangible benefits to dollar sums.<sup>1,2</sup> Then, it shows how nonmarket valuations can support local decision-making.

### Fast Facts

- The presence of larger trees in yards and as street trees can add from 3% to 15% to home values throughout neighborhoods.
- Averaging the market effect of street trees on all house values across Portland, Oregon yields a total value of \$1.35 billion, potentially increasing annual property tax revenues \$15.3 million.<sup>9</sup>
- A study found 7% higher rental rates for commercial offices having high quality landscapes.<sup>14</sup>
- Shoppers claim that they will spend 9% to 12% more for goods and services in central business districts having high quality tree canopy.<sup>34</sup>
- Shoppers indicate that they will travel greater distance and a longer time to visit a district having high quality trees, and spend more time there once they arrive.<sup>34</sup>

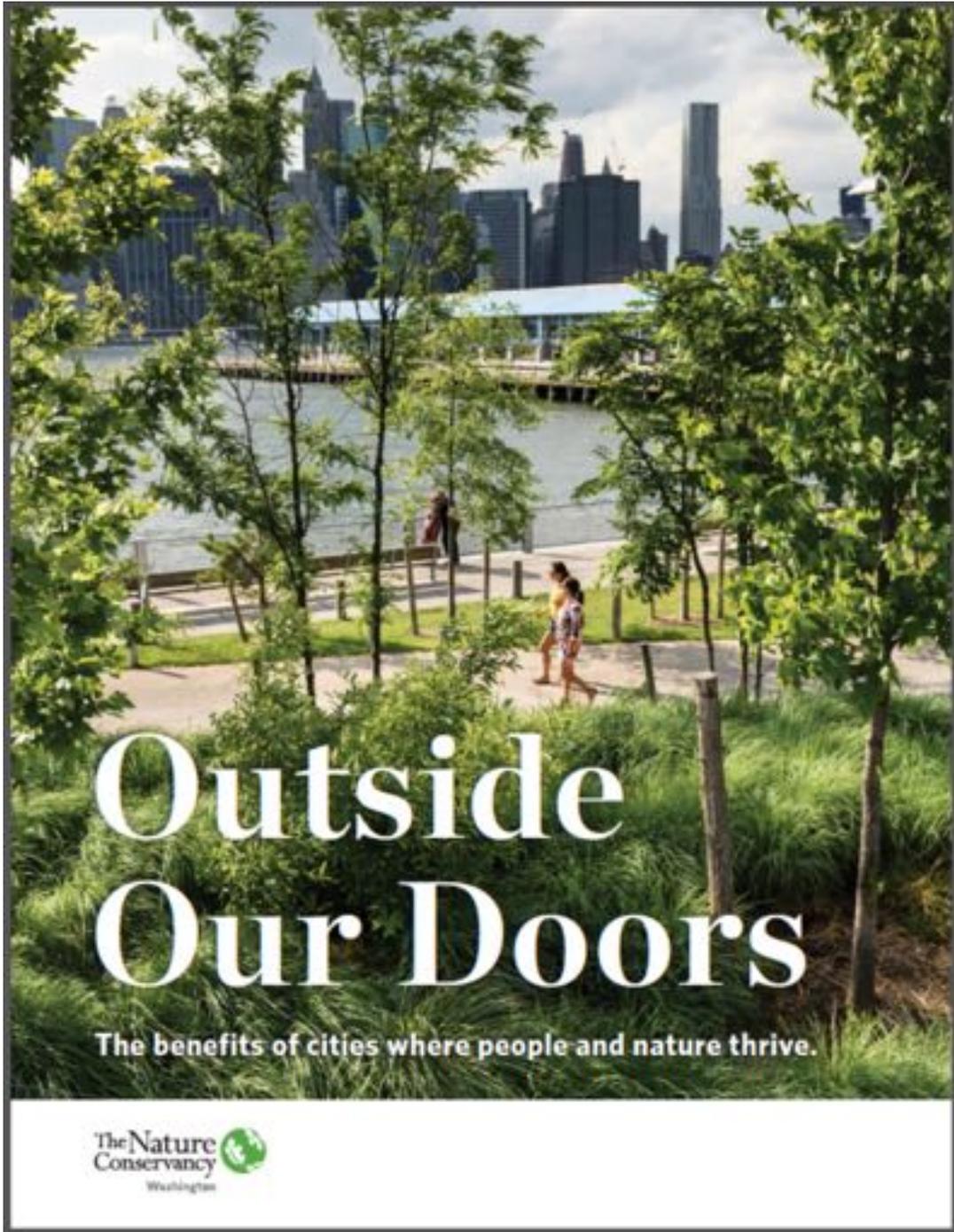
RSS Feed

Print



street trees boost market value of houses, providing tax revenue for communities





design:  milepost

co-author:  FOREST SERVICE  
U.S. DEPARTMENT OF AGRICULTURE

co-author & printing:  
The Nature   
Conservancy

# Urban Forests and Newborns

the natural environment may affect  
pregnancy outcomes . . .

10% increase in tree-canopy cover  
within 50m of a house

= lower number of low weight births  
(1.42 per 1000 births)

*Donovan et al., Health & Place 2011;*  
*Hystad et al., Env Health Perspectives 2014*



**health agencies recommend  
moderate activity for health  
promotion & disease prevention**

**parks, active living, active transit**



# Walking Programs

children  
elders  
families



Transport for Greater Manchester

## Greater Manchester Walking Weekends

Join our free guided walks  
Routes to suit all ages and abilities

16-18 September 2016  
21-23 October 2016

For more details visit:  
[www.tfgm.com/walking](http://www.tfgm.com/walking) | [/GMwalkingfestival](https://www.facebook.com/GMwalkingfestival)

The poster features a photograph of a diverse group of people, including children and older adults, walking along a stone path in a park-like setting. They are wearing light blue shirts and dark shorts or trousers. A large green banner is visible in the background.

# Improving Depression

20 adults with major depression  
walk in a park setting and a built setting

🌿 50-minute walks one week apart

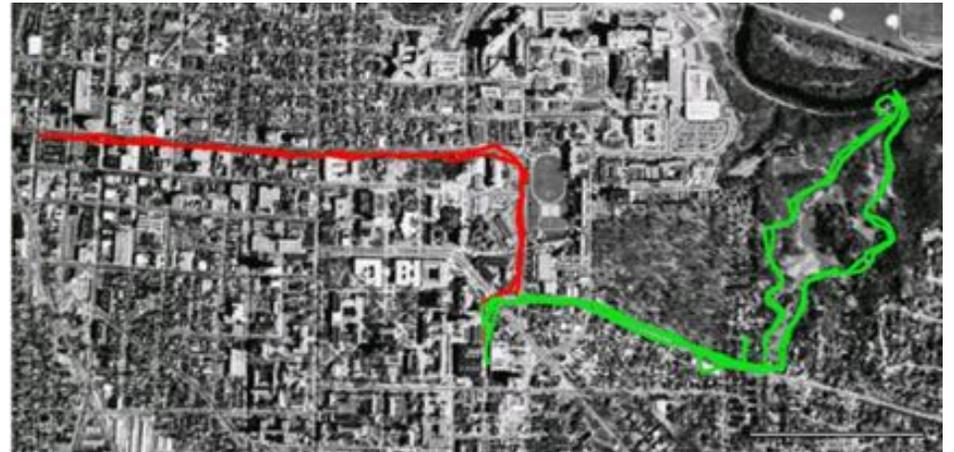
🌿 before-after testing:

🌿 Mood: Positive and Negative Affect (PANAS)

🌿 Cognition: Backward Digit Span (BDS)

Berman et al. 2012.  
*Journal of Affective  
Disorders*

cognitive and affective  
improvements after  
walking in a  
nature setting





# Evidence to Action

40 years of research  
nearby nature for health benefits  
> 3,500 published articles  
research to application

cases in stormwater management  
co-design for health co-benefits



Landscape



Community



credit: Ignacio Bunster-Ossa

Garden

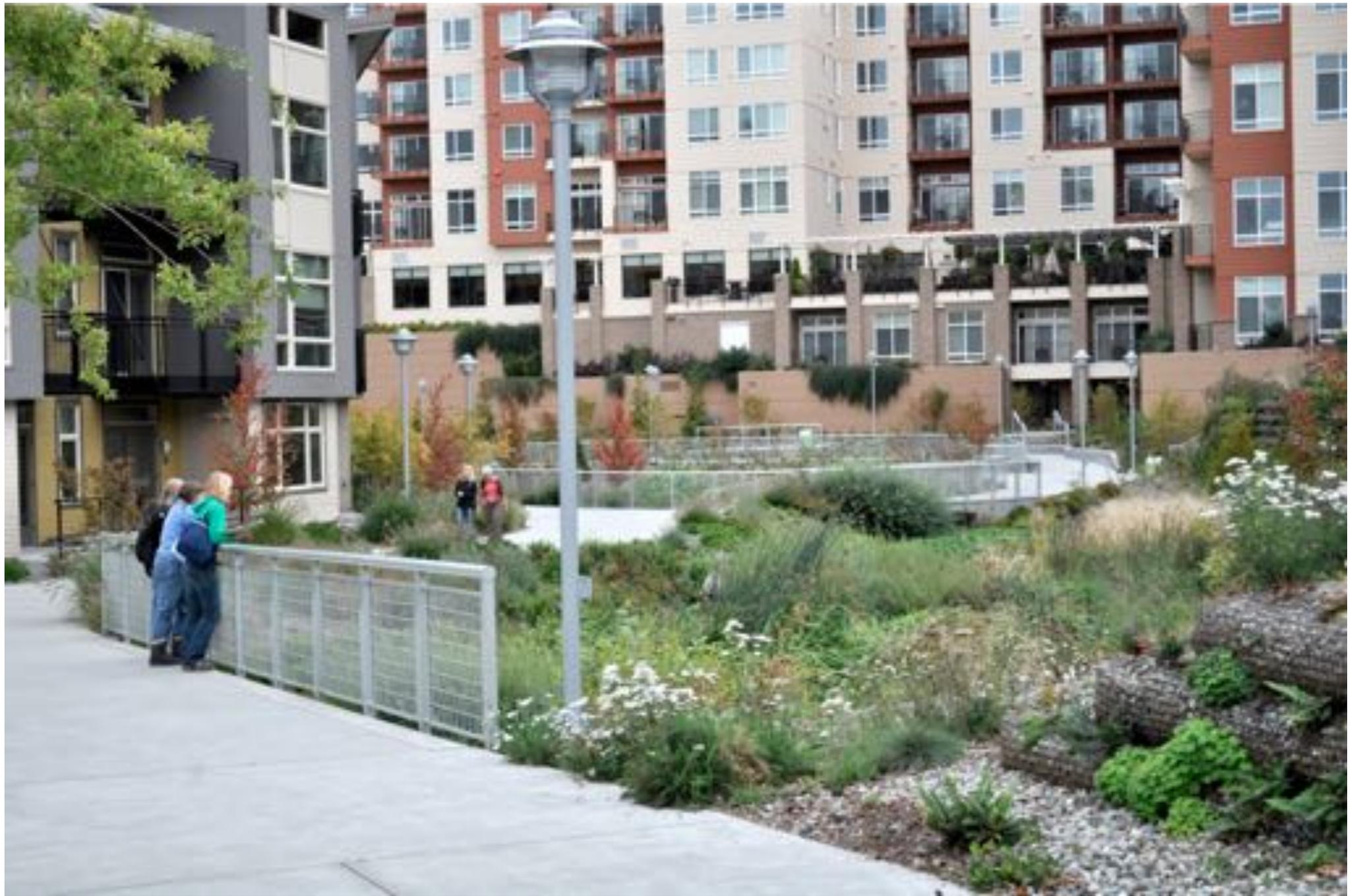
# Stormwater Management

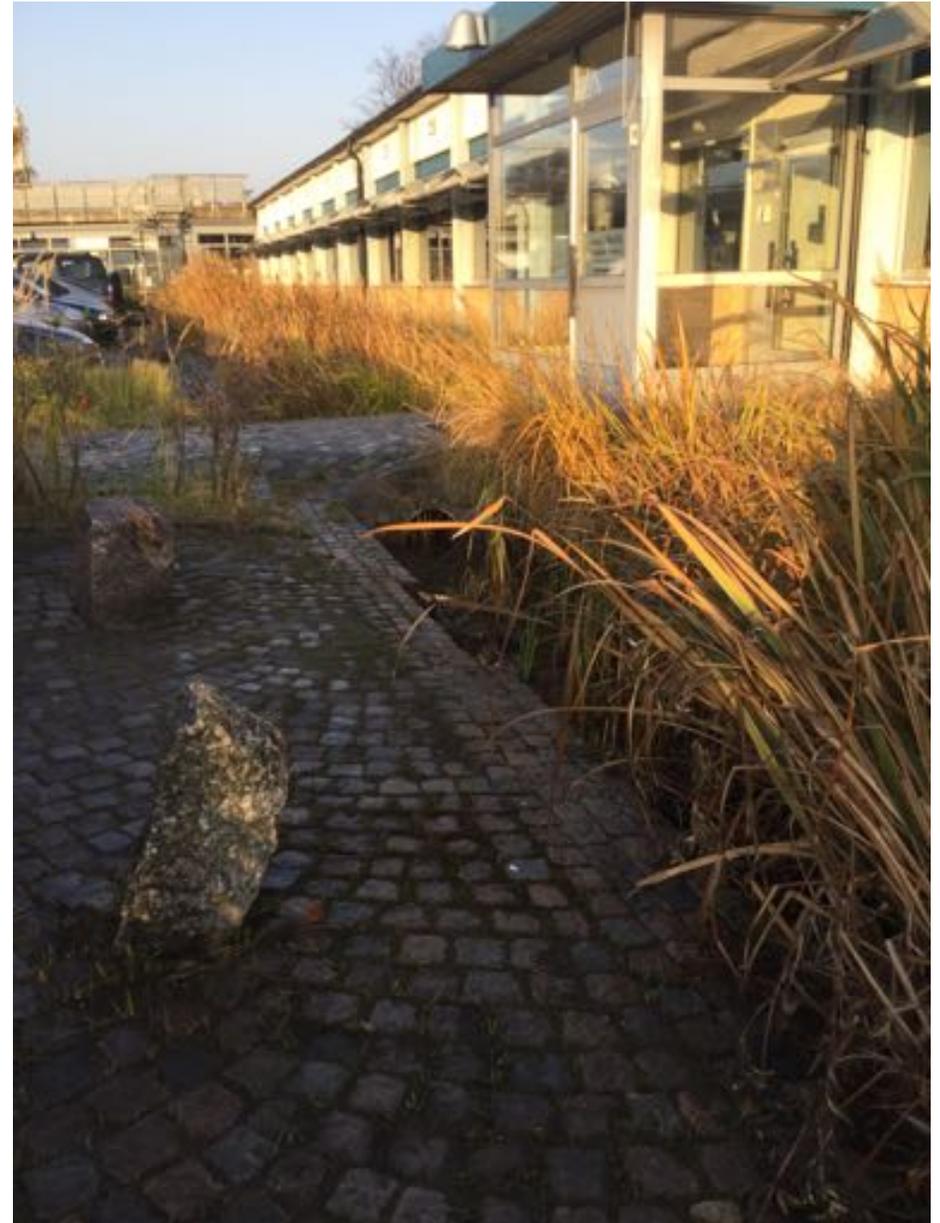
Seattle USA



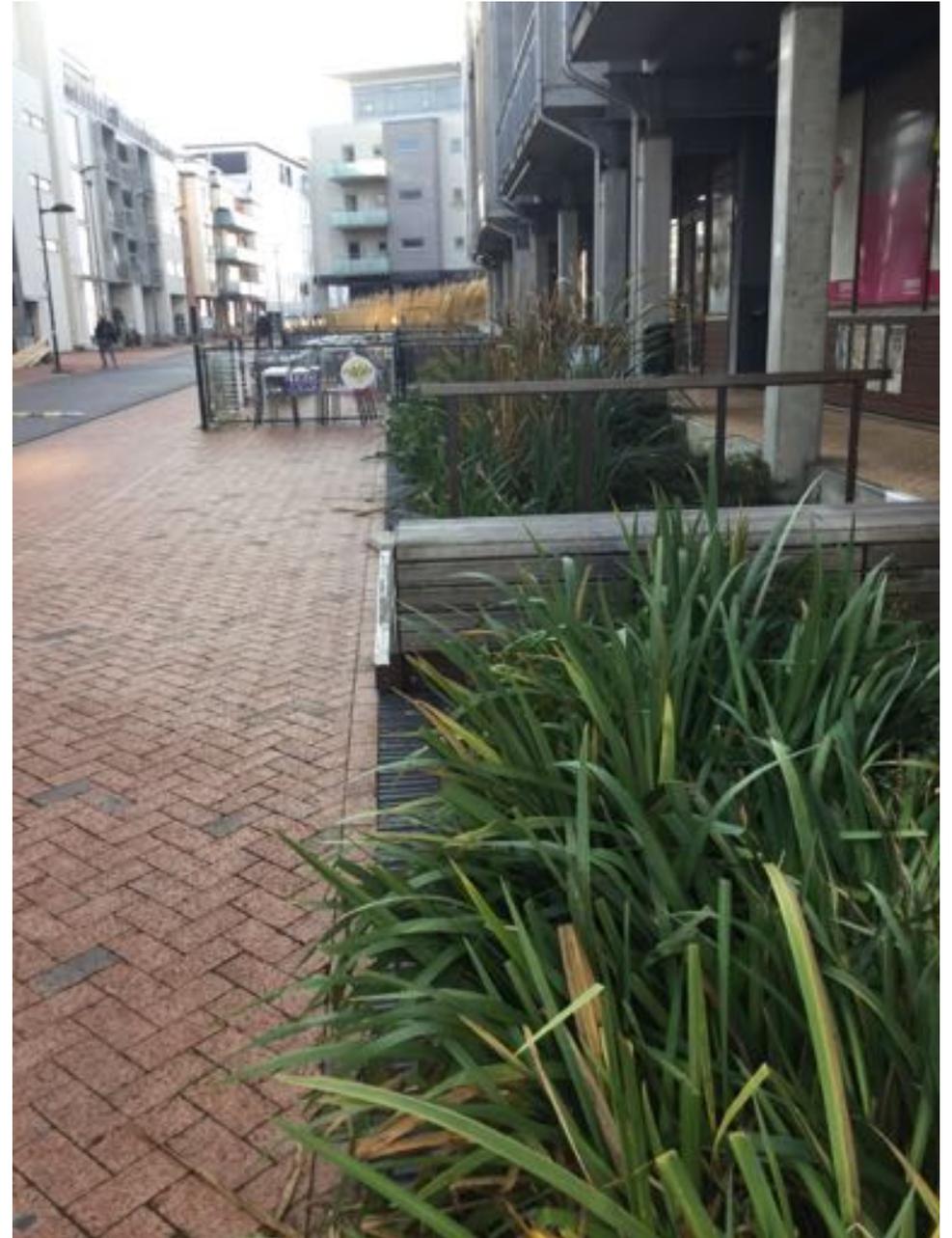
**Thornton Creek Water Quality Channel** (SvR Design)

1 hectare, treats runoff from 275 hectares (1 hectare = 2.47 acres)

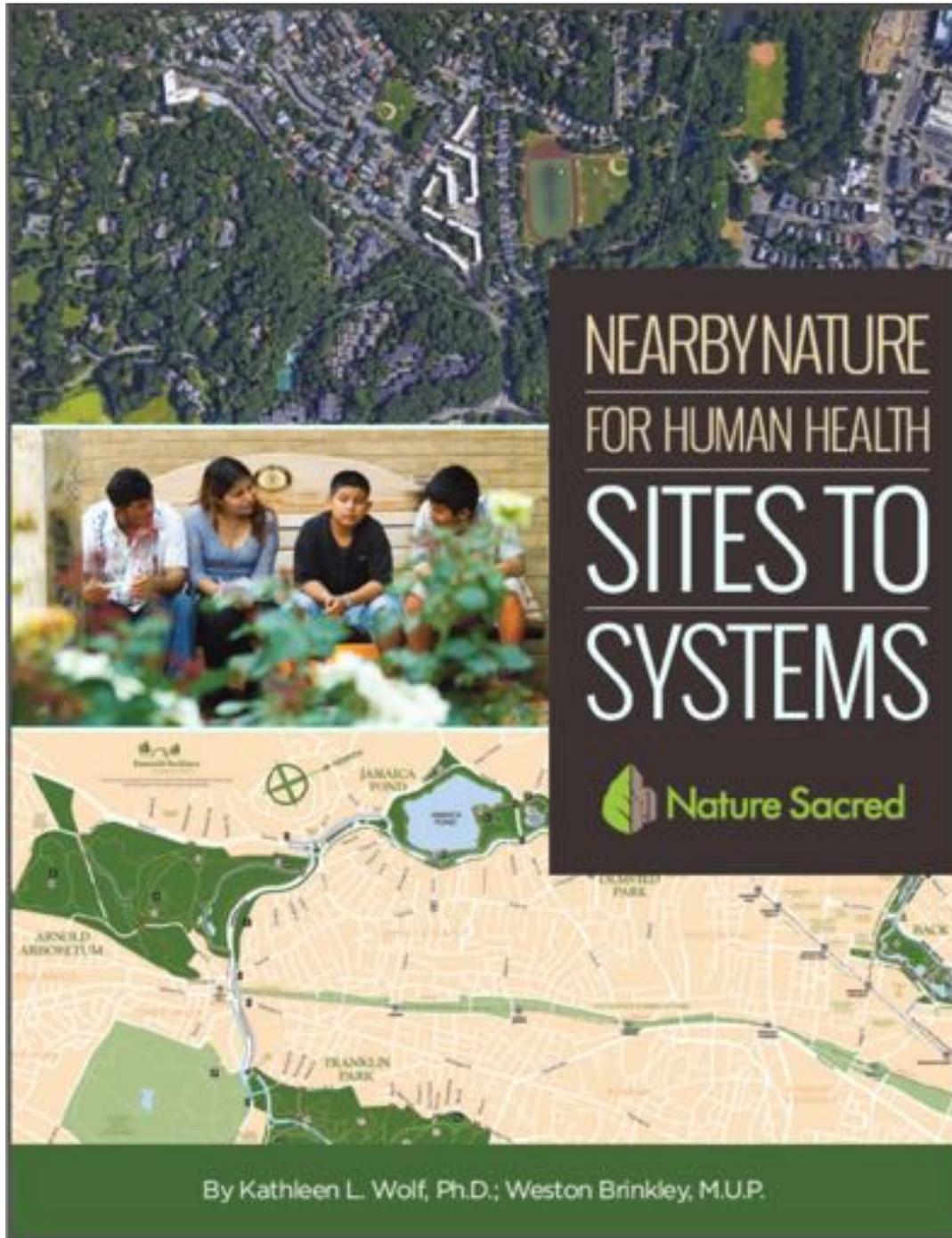




Malmö, Sweden – SUDS for cloudburst management

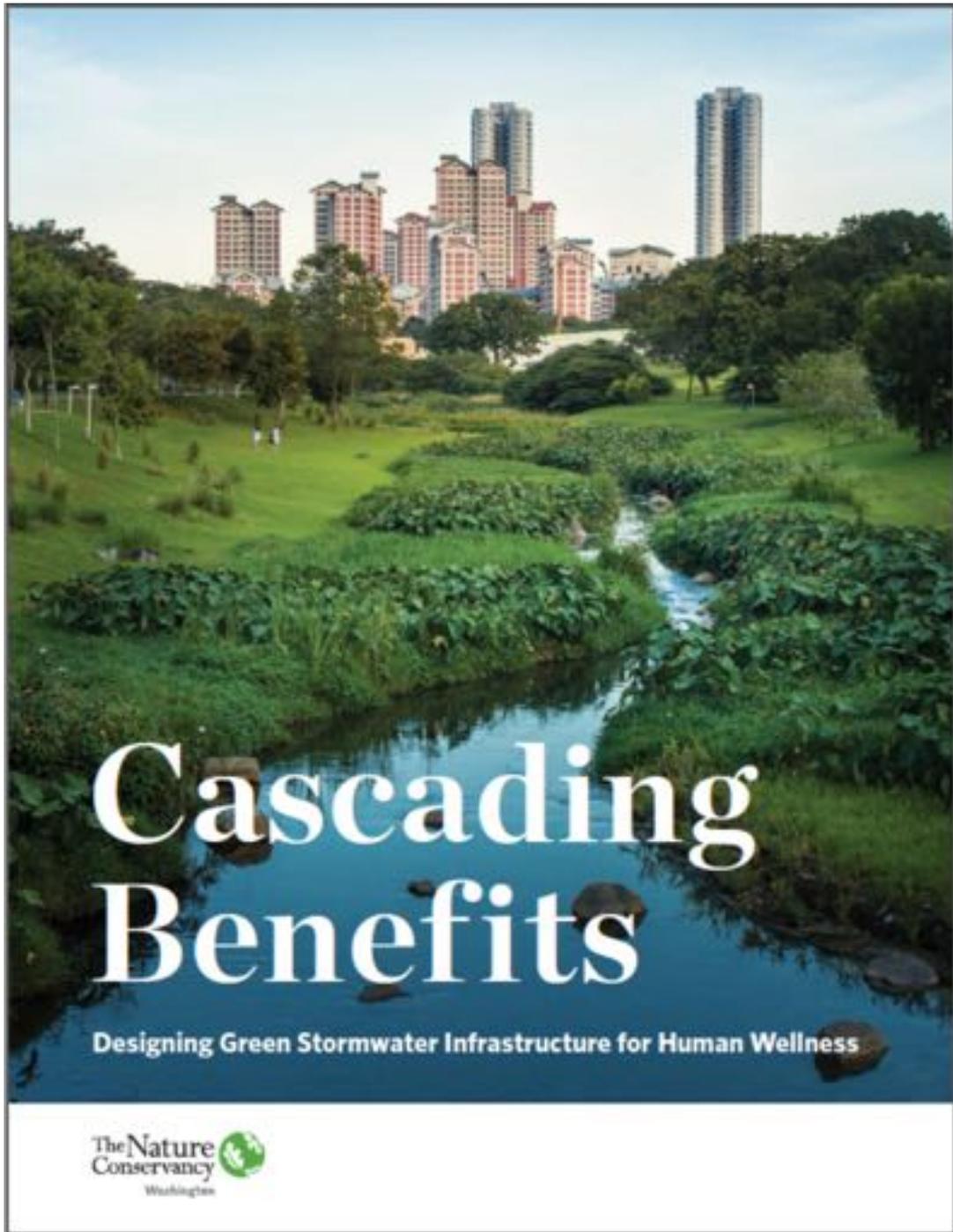


Malmö, Sweden – SUDS for cloudburst management



sponsor:





# Intentional green infrastructure design for human health outcomes

co-author:



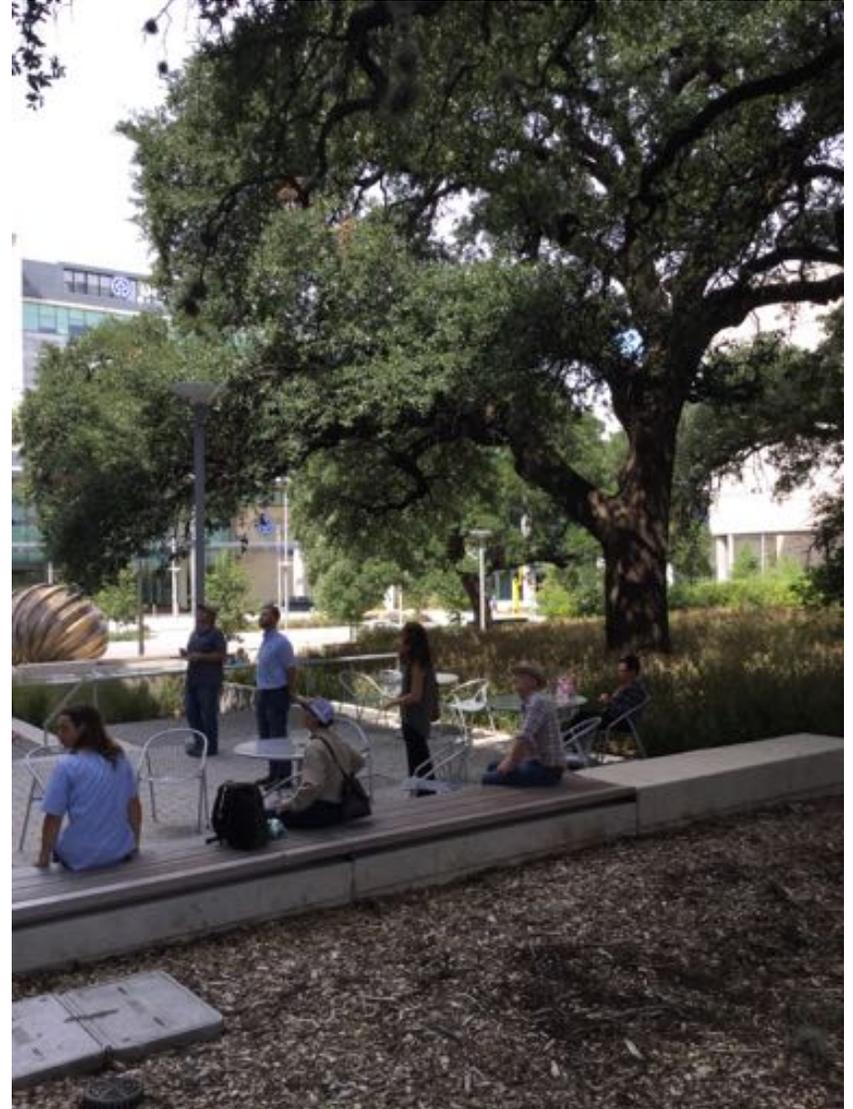
co-author & printing:

The Nature  
Conservancy



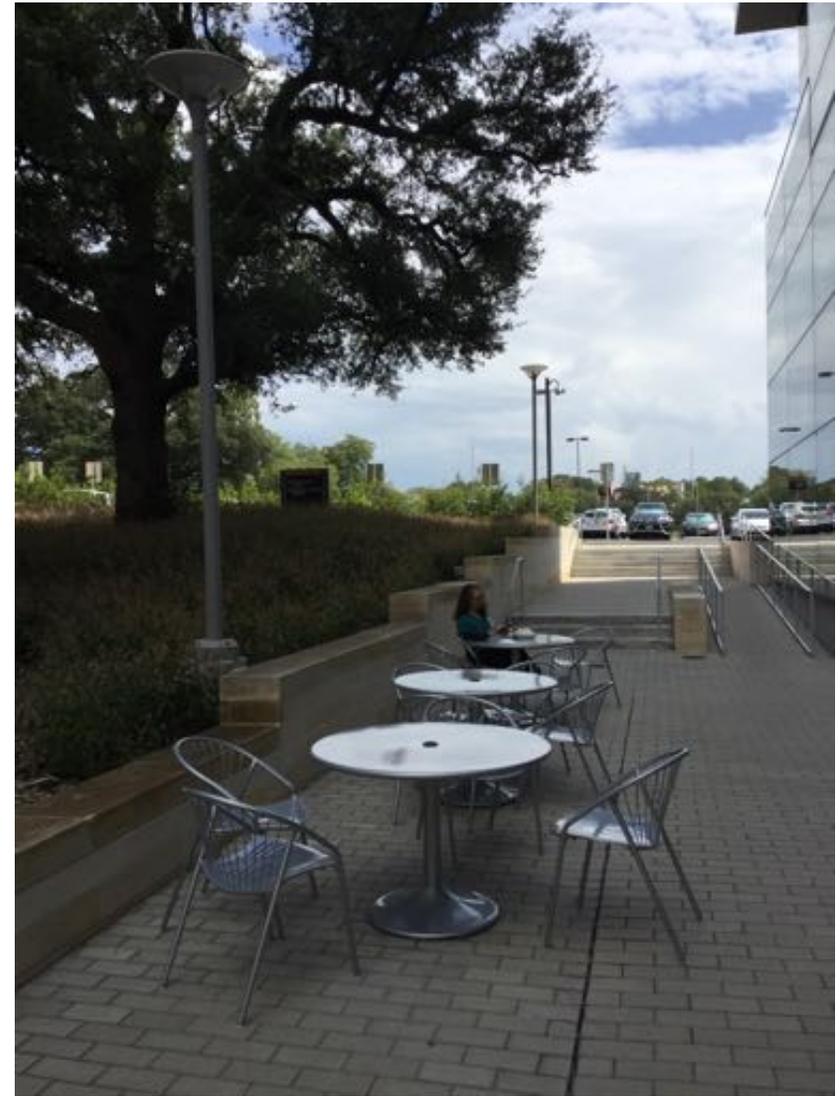


**University of Texas Medical School, Austin  
SITES Landscape Architect, Heather Venhaus**



stormwater management  
human health & well being





patient & medical staff interactions



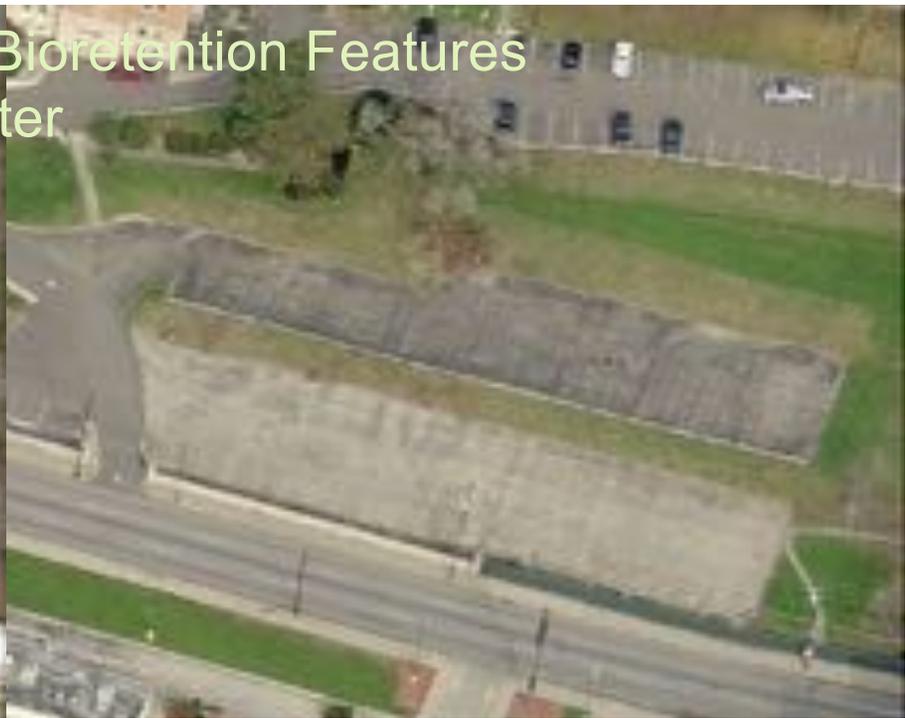
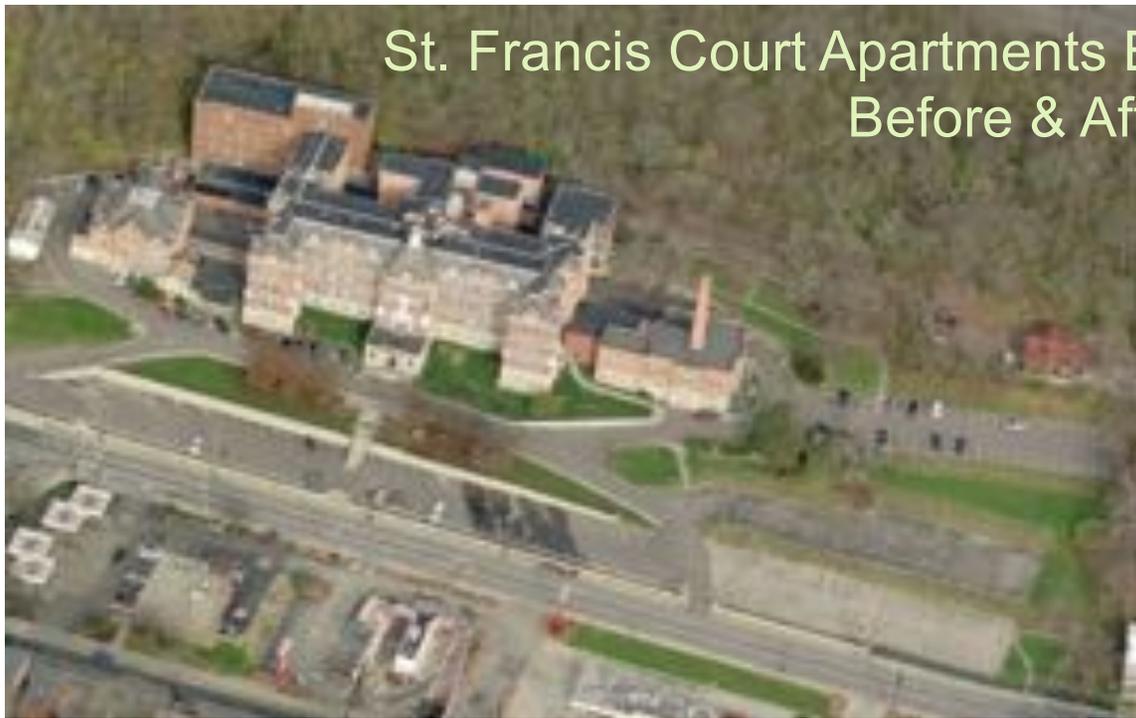


patient & medical staff interactions





# St. Francis Court Apartments Bioretention Features Before & After



2009: Two levels of unused parking lots



2012: Two bioinfiltration basins with walking path







Spring 2011, Ponding after rain event



Summer 2011, One year after installation

# Summary

from site to systems level solutions  
evidence of nature for health  
green infrastructure opportunities  
solutions :: complexity & diversity  
co-design for co-benefits



www.naturewithin.info

College of the Environment University of Washington

# Human Dimensions of Urban Forestry and Urban Greening

featuring research on peoples' perceptions and behaviors regarding nature in cities

**What's New?**

- Nature and Consumer Environments**  
Research about how the urban forest influences business district visitors.
- Trees and Transportation**  
Studies on the value of having quality landscapes in urban roadsides.
- Civic Ecology**  
Studies of human behaviors and benefits when people are active in the environment.
- Policy and Planning**  
Integrating urban greening science with community change.
- Urban Forestry and Human Benefits**  
More resources, studies and links . . .

**Green Cities-Good Health**  
human health & well-being research

**Projects Director**  
**Kathleen L. Wolf, Ph.D.**

Sponsors

