From Stormwater Management to Artful Rainwater Design

Presentation by Salma Mehter

Based on the article by Stuart Echols and Eliza Pennypacker in the Landscape Journal

What is Stormwater?

Stormwater = Total Precipitation

- –Precipitation Infiltrated by soil
- –Plant uptake
- –Precipitation evaporated into the atmosphere

Why does Stormwater need to be managed?

Flooding: volume and timing of runoff

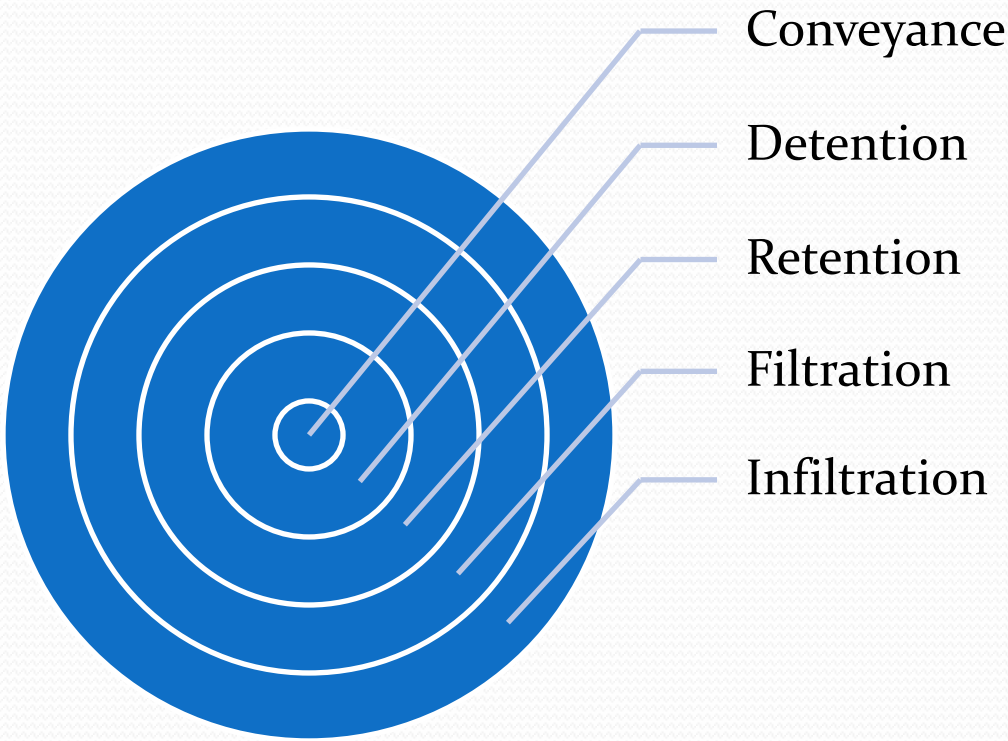
Polluting: possible contaminants that that water could carry

What is Artful Rainwater Design?

- -Effective stormwater management as an art form: approaching stormwater management in a way that is environmentally best management practice in designs that call attention to stormwater practices in ways that both educate and delight those who visit (Echols & Pennypacker 2008)

- Artful Rainwater Design = “the Utilities of Stormwater Management” x “the Specified Amenities”

Design techniques for the utility aspects of Stormwater Management



Conveyance → Safely convey stormwater away

- Curbing
- Pipes
- Swales
- Ditches

Conveyance Example

Detention →Reduce downstream flooding

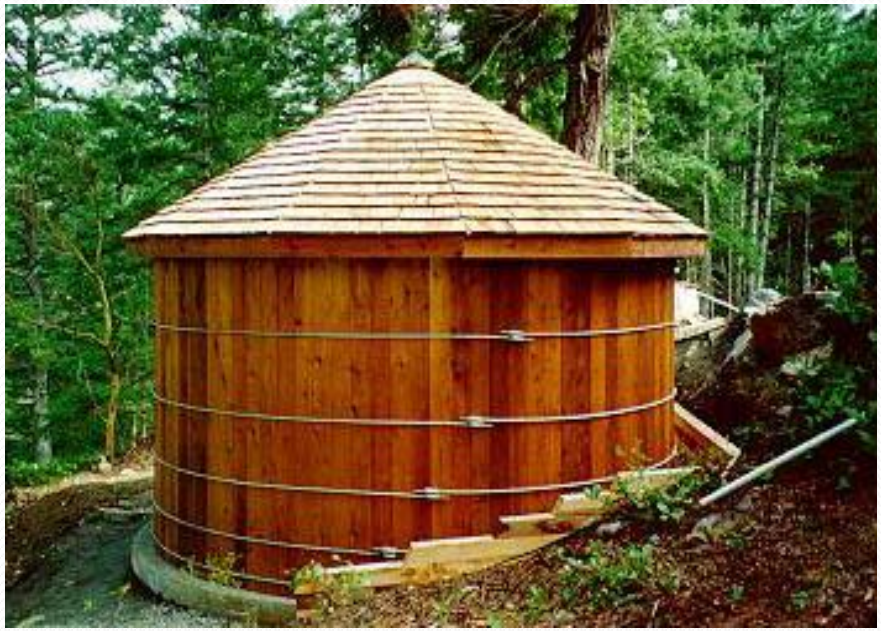
- Conventional dry basins
- Extended detention basins
- Micro-pool ponds

Detention Example

Retention →Hold stormwater for reuse

- Wet ponds
- Multiple pond systems
- Water harvesting ponds
- Cisterns

Example of Retention



http://www.forestlumber.com/images/cisternha.jpg

Filtration →Reduce stormwater pollution

- Bio-retention gardens
- Green roof systems
- Water quality inlets
- Constructed wetlands
- Sand filters
- Grassed swales
- Oil and grit separators

Bioretention Garden Plants

Herbaceous Perennials

New England Aster
Butterfly Weed
Purple Coneflower
Wild Geranium
False Blue Indigo
Heath Aster
Cardinal Flower
Stokes' Aster
New York Ironweed
Summer Phlox
Wild Bergamot
Joe Pye Weed
Obedient Plant
Goldenrod
Great Blue Lobelia
Blue Flag
Bleeding Heart
Soft Rush

Shrubs

Virginia Sweetspire
Summersweet
Winterberry Holly
Elderberry
Red Osier Dogwood
Chokeberry
Cranberry Bush
Snowberry

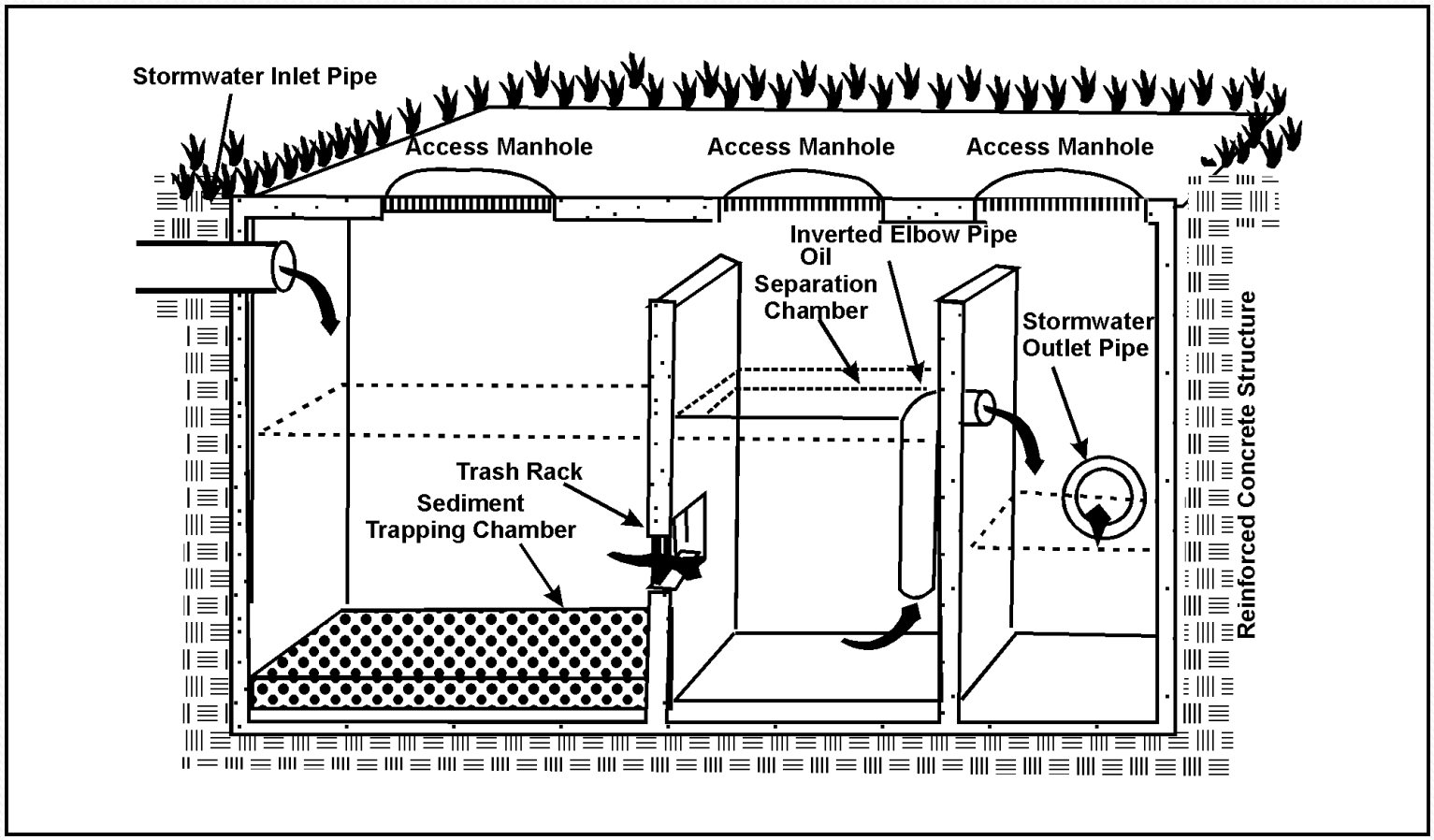
Trees

Serviceberry
Red Buckeye
Eastern Redbud
Red Maple

Others

Pennsylvania Sedge
Switch Grass

Filtration Example: Water Quality Inlet



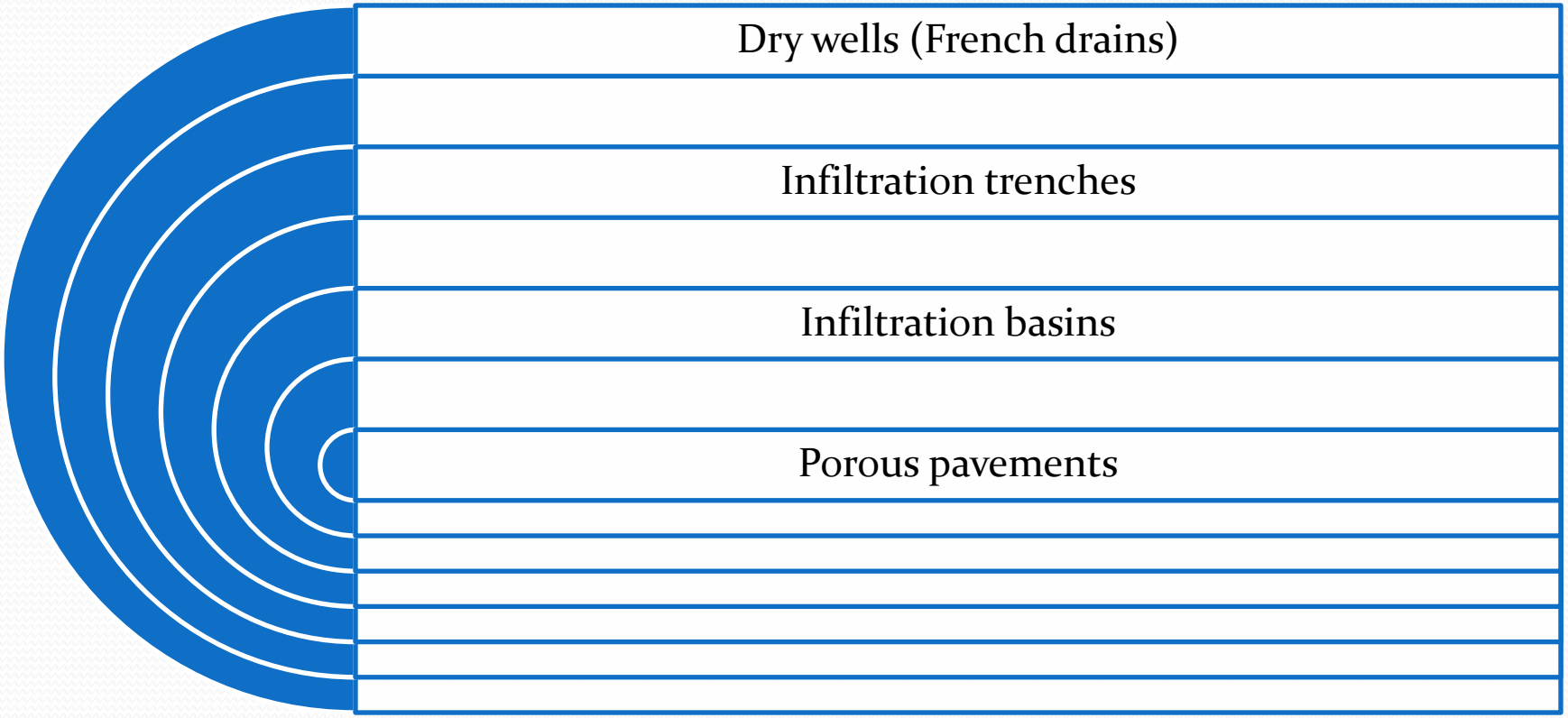
Source: Reference 3

http://www.epa.gov/owmitnet/mtb/wtrqlty.pdf

Filtration Examples: Green Roof

http://www.worldbusinesschicago.com/newsletters/art/CityHall.jpg

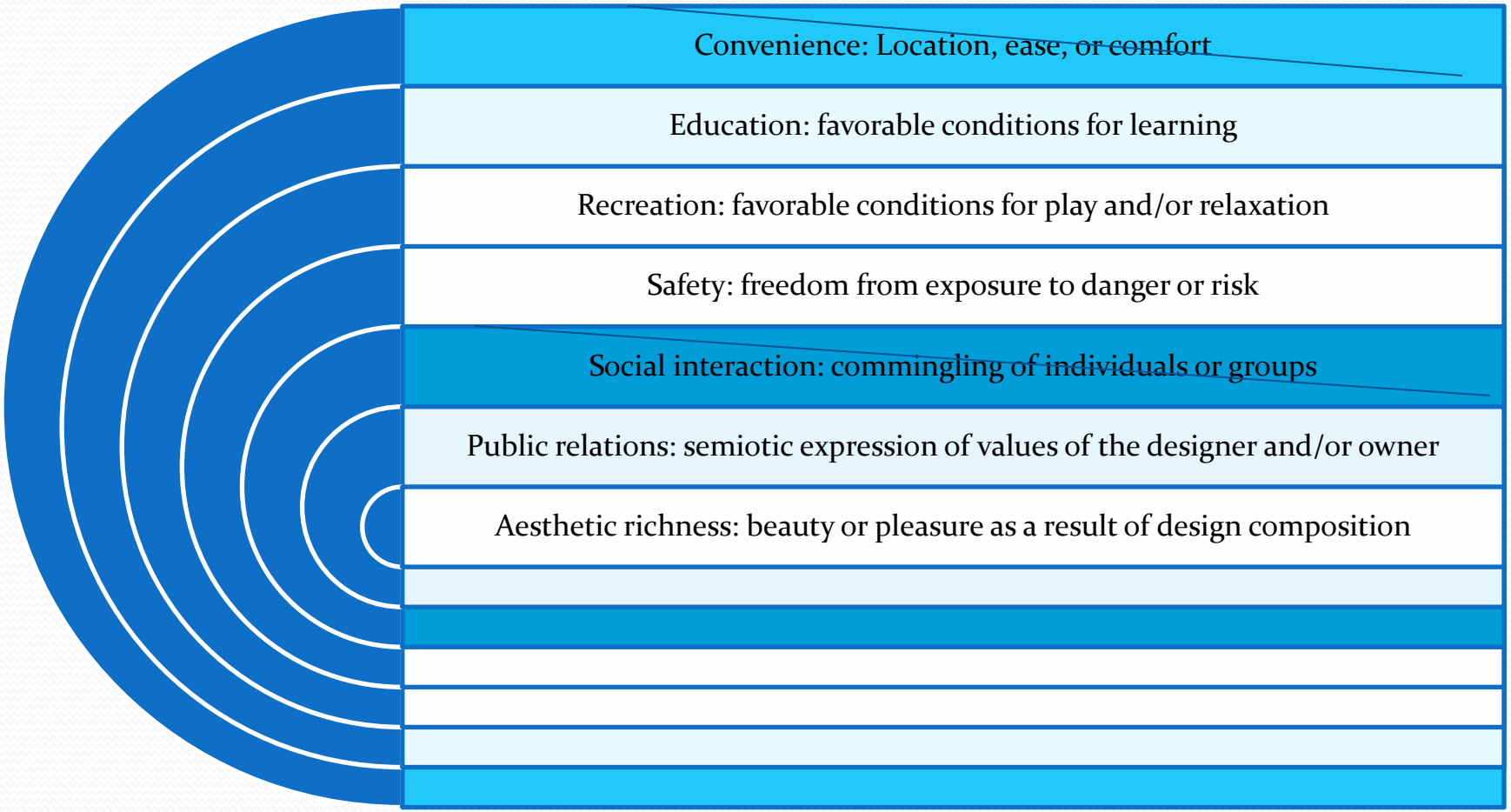
Infiltration →Promote groundwater recharge



Infiltration Example

High Point (West Seattle, Washington)

Amenity Aspects (the goals)



Examples of Artful Rainwater Design

10th @ Hoyt
Portland, Oregon

By Koch Landscape Architecture

All the stormwater proffesionals that I've spoken to recognize that it is the Landscape Architecture that made this (project) valuable and not the Engineering" –Echols (interview)

“You can do a lot of things to mitigate the impacts of stormwater, but typical and mostly mechanical methods provide no cultural or aesthetic function; the function here is detention and human delight.” –Steve Koch(Lead designer of the project)

Regarding the 10th @ Hoyt

"This project is one of the top, if not the top example currently of artful rainwater design in the United States" –Stuart Echols

Siskiyou Green Street

Portland, Oregon

By Kevin Robert Perry


Sustainable Stormwater Management
A Green Street Project

http://www.artfulrainwaterdesign.net/projects/show/34

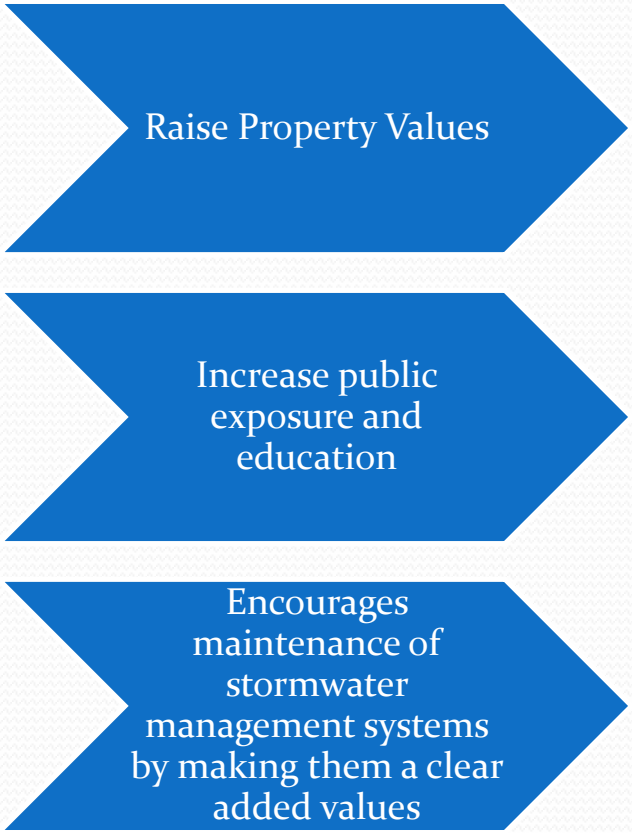
SEA Streets

“Seattle's pilot Street Edge Alternatives Project (SEA Streets) is designed to provide drainage that more closely mimics the natural landscape prior to development than traditional piped systems. To accomplish this, the design reduced impervious surfaces to 11% less than a traditional street, provided surface detention in swales, and added over 100 evergreen trees and 1100 shrubs. Two years of monitoring show that SEA Street has reduced the total volume of stormwater leaving the street by 98% for a 2-year storm event.”

Challenges- It is important for the designers to first consider all runoff treatment methods before designing because they all have pros and cons

- Conveyance can create awareness of stormwater but does not educate about environmental issues
- People rarely realize that wet ponds treat stormwater (unless there is signage)
- Infiltration presents amenity challenges because most this is where signage is used most frequently to reveal the infiltration story.

Why is Artful Rainwater design Beneficial?



Works Cited

- http://h2o.enr.state.nc.us/su/what_is_stormwater.htm
- http://www.twp.west-bloomfield.mi.us/departments/StormWater.cfm
- http://www.epa.gov/owmitnet/mtb/wtrqlty.pdf
- http://www.raingardens.org/bioretention.php
- http://www.epa.gov/greeningepa/stormwater/best_practices.htm#curb
- Echols, Stuart, & Pennypacker, Eliza. (2008). From Stormwater management to artful rainwater design. *Landscape Journal*, 27(2), 269-290.