INSERT WATER HERE

AN INSPIRED APPROACH TO DESIGNING HYDRIC CONNECTIONS BETWEEN WATER, PEOPLE, AND PLACE

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"Water is far from being just a designer´s resource or material: it begs to have its vital possibilities rediscovered. This starts at the beginning of the planning process for water projects, and involves linking up and integrating element themes. Knowledge of water's particular qualities as a material are needed, and often experiments need to be conducted to give a real idea of the result that will ensure."

- Herbert Dreiseitl

OVERVIEW

Progression of hydrophillic design .1

Fundamentals of design with nature .2

Treatment devices in practice .3

Shifting from “devices” to “biosystems” .4

Looking toward a new design aesthetic .5

Progression of hydrophillic design .1
Fundamentals of design with nature .2
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Looking toward a new design aesthetic .5

4 Main Epochs of Hydrologic Design in America:

1. Water as largely uncontrollable force in the landscape
(Settlement in the late 1700s – Late 1800s)

2. Water as strictly controlled and managed presence in the landscape
(Late 1800s – 1960s, Present)

3. Water as necessity, treated for quality in the landscape
(Mid 1900s – Present)

4. Water as celebrated and conserved resource
(Early 1980s – Present)

Progression of hydrophillic design .1

1. Water as largely uncontrollable force in the landscape

(Settlement in the late 1700s – Late 1800s)

Nature is both wild and uncontrollable

Focus of society is on discovery and inventory of the totality of the resources provided by the "wilderness"/land

Flooding and other natural disasters are a frequent and generally misunderstood or overlooked in patterns of settlement and design

Approach to hydrology is reactive, where events occur prior to detection and prevention of the potential for that event to occur

Few to no comprehensive systems occur for stormwater treatment since water is generally "clean"

Wastewater and stormwater treatment systems often coincide

Westward expansion and settlement of the West allows for larger parcels – no competition for land

Hydrology and nature rule

Progression of hydrophillic design .1

Upslope Settlement Beginning in the Floodplains of Manitou Springs - CA 1880. (Harrison, D.)

Progression of hydrophillic design .1

Grace Greenwood Cottage in Manitou Springs – 1894 Flood. (Harrison, D.)

Progression of hydrophillic design .1

2. Water as strictly controlled and managed presence in the landscape

(Late 1800s – 1960s, Present)

Population and economic bases are large enough to support community-based wastewater and stormwater treatment systems

Engineering efforts are set and standardized to control nature and hydrology for the health, safety, and welfare of the general public and integral structures and circulation systems

Because standard designs and design templates occur, it is relatively easy to apply them and link them into other existing systems as urbanization progresses

Treatment of stormwater is focused on conveyance via swales and storm sewers to adjacent ponds, rivers and other water bodies

Results of stormwater strategies prevents deep infiltration and groundwater recharge

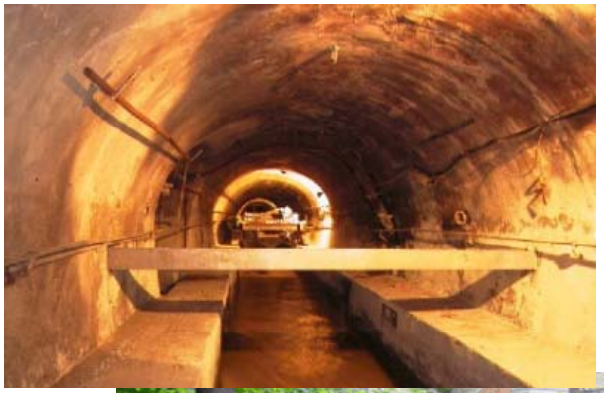
Few design strategies quantify impacts of development on water quality and ecosystem functioning

Functional necessities of the hydrology trump any potential aesthetic considerations

Progression of hydrophillic design .1

SOURCE: http://pic.templetons.com/brad/photo/japan/takayama/img_5406.jpg

Conveyance in Takayama, Japan



SOURCE: riversides.org

SOURCE: http://www.tredyffrin.org/

Progression of hydrophillic design .1

3. Water as necessity, treated for quality in the landscape

(Early 1960s – Present)

Study sites strive to use nature as a design template

Efforts are to re-create natural hydrologic patterns and functioning to foster a healthier eco*system*

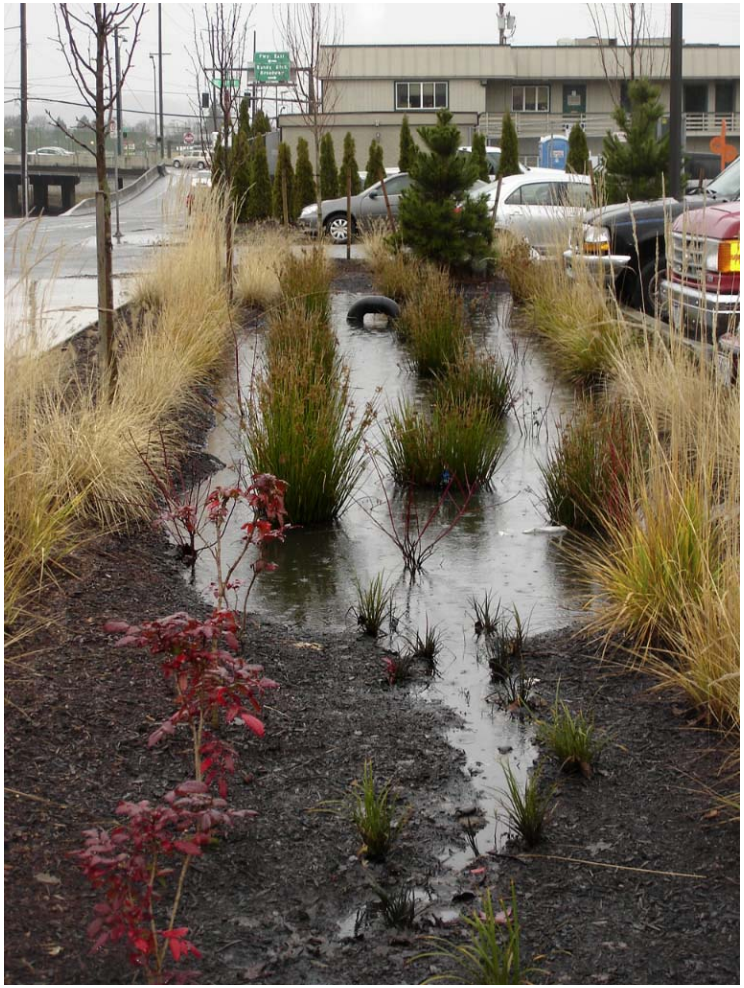
Problems occurring with urbanization (e.g. imperviousness, loss of biodiversity) can be offset with increased habitat creation in and out of streams

Stormflow volume is removed from pipes and cleansed biologically

Aesthetics are secondary to functional necessities of the hydrology

Progression of hydrophillic design .1

Progression of hydrophillic design .1



Functioning Bioswale in Oregon

SOURCE: http://blog.oregonlive.com

Progression of hydrophillic design .1

4. Water as celebrated and conserved resource

(Early 1980s – Present)

Study sites continue to utilized natural systems as design templates, but extrapolate their function into constructed/engineered devices

Natural hydrologic patterns in conjunction with human-engineered devices provide additional support to the eco*system* functions, but with new form

Limits created by mimicry of natural form (i.e. land constraints) are offset by structural ingenuity

Complex systems are built for site-specific functional hydrologic, ecologic, and social necessities

Stormflow volume is removed from pipes and cleansed biologically and structurally

Aesthetics and social necessities are indivisible from functional and hydrologic necessities

Progression of hydrophillic design .1
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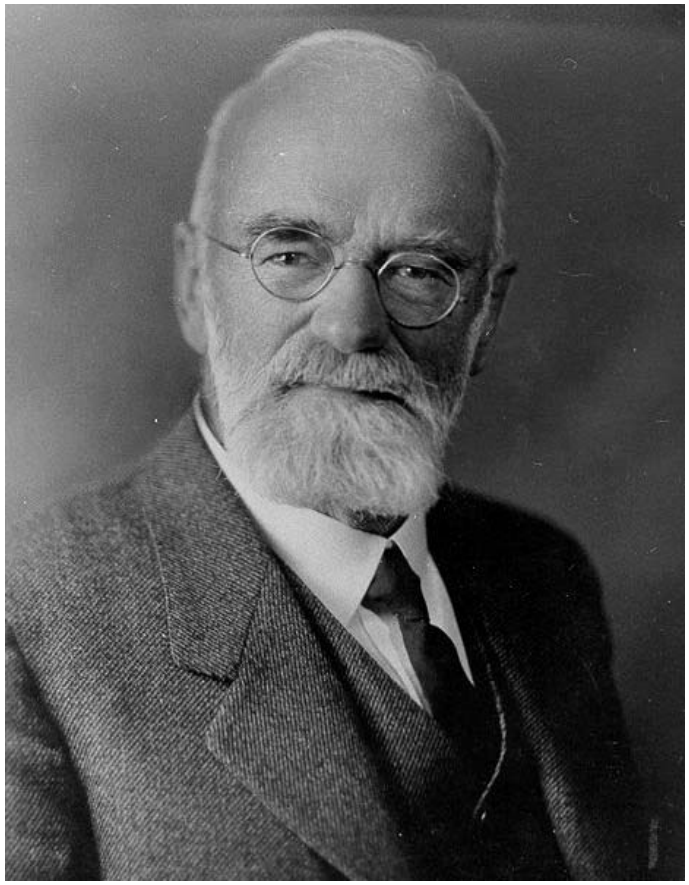
Fundamentals of design with nature .2



Warren Manning

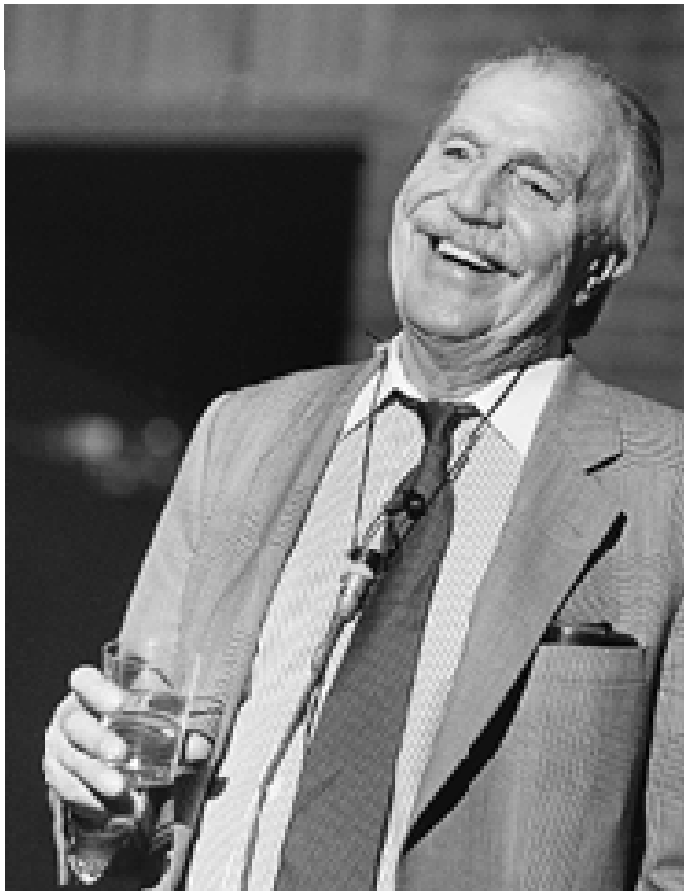
(1860 – 1938)

Prepared sketch maps of the area's vegetation which were then overlaid with sheets detailing road layout, topography, and water features. This methodology directly influenced the development of Manning's own version of resource-based planning. (Karson 2000).

Worked closely with Charles Eliot on relationship of place to a certain set of spatial components that would inform the understanding and nature of the site.

Pioneered "systems-based thinking" as an underspoken predecessor to Ian McHarg

Fundamentals of design with nature .2



Ian McHarg. (Source: http://en.wikipedia.org/)

Ian McHarg

(11.20.1920 – 03.05.2001)

Author of book, *Design with Nature* (1969), which pioneered a land-based system of inventory and planning for subsequent preservation and/or development

Concepts presented in *Design with Nature* were the forefathers of what has become widely known as Geographic Information Systems (GIS)

Pioneered "systems-based thinking"

Process presented conceptualized a system of spatial "overlays" to generate a comprehensive analysis of landscape resources and characteristics, including, but not limited to:

Hydrologic/hydrographic features
Topography and relative relief
Aspect/solar exposure
Soils
Bedrock and surficial geology
Vegetation
Cultural features
Historic features
Circulation systems

Naturalists & the Naturalism Movement

(Late 2000s – Present)

John Muir, John Burroughs, Aldo Leopold, and later E.O. Wilson and many more began to formally and informally study the landscape from an ecological perspective

Believed in principles that nature required study, protection, and maintenance

Decried that nature had a powerful effect on the psychology of the visitor, as well as a critical function to the sustainability of society

Out of the concept of ecology and ecological "systems" came ideas of "dynamic equilibrium," where effects to one part of each ecological system had far ranging effects on all parts the overall system itself

Progression of hydrophillic design .1

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Shifting from “devices” to “biosystems” .3

Looking toward a new design aesthetic .4

Shifting from “devices” to “biosystems” .3

Devices

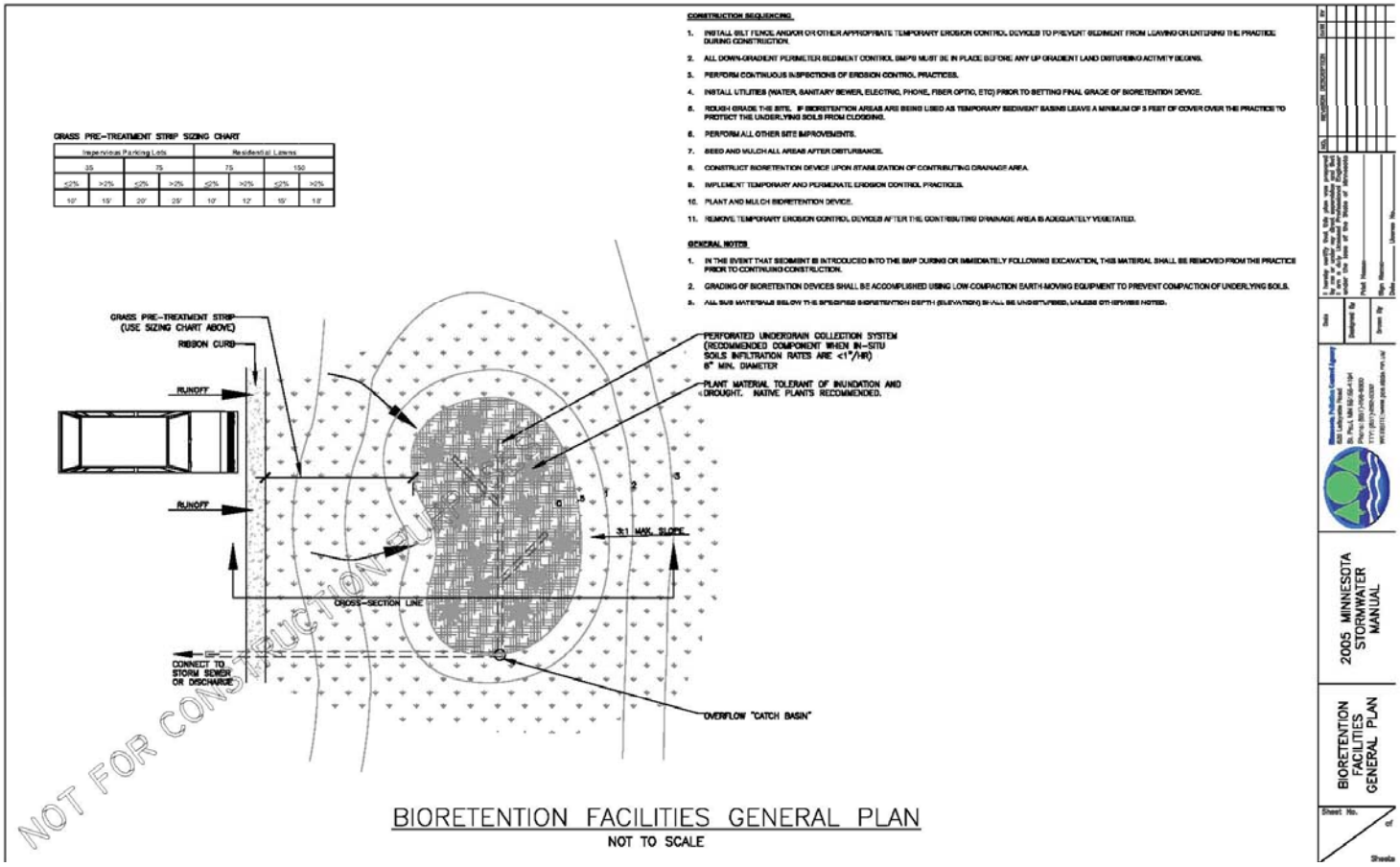
(Late 2000s – Present)

A palette of tools with non-specific, standardized application

Can be implemented as individual units in a larger system (e.g. catch basin at pipe junction)

The pharmacological equivalent of broad-spectrum antibiotics

Shifting from “devices” to “biosystems” .3



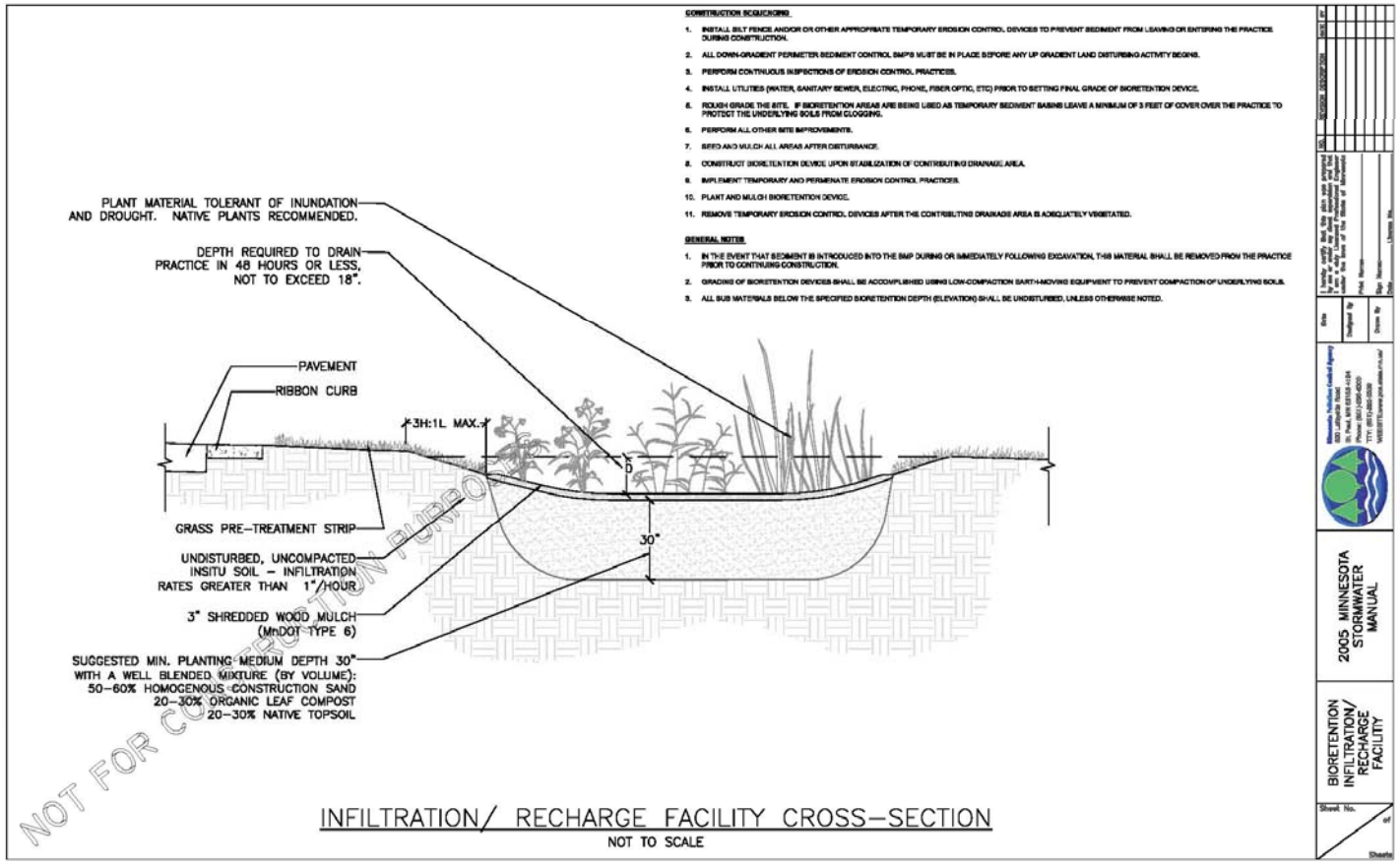
BIORETENTION FACILITIES GENERAL PLAN

NOT TO SCALE

Devices

(from the MN State Stormwater Manual)

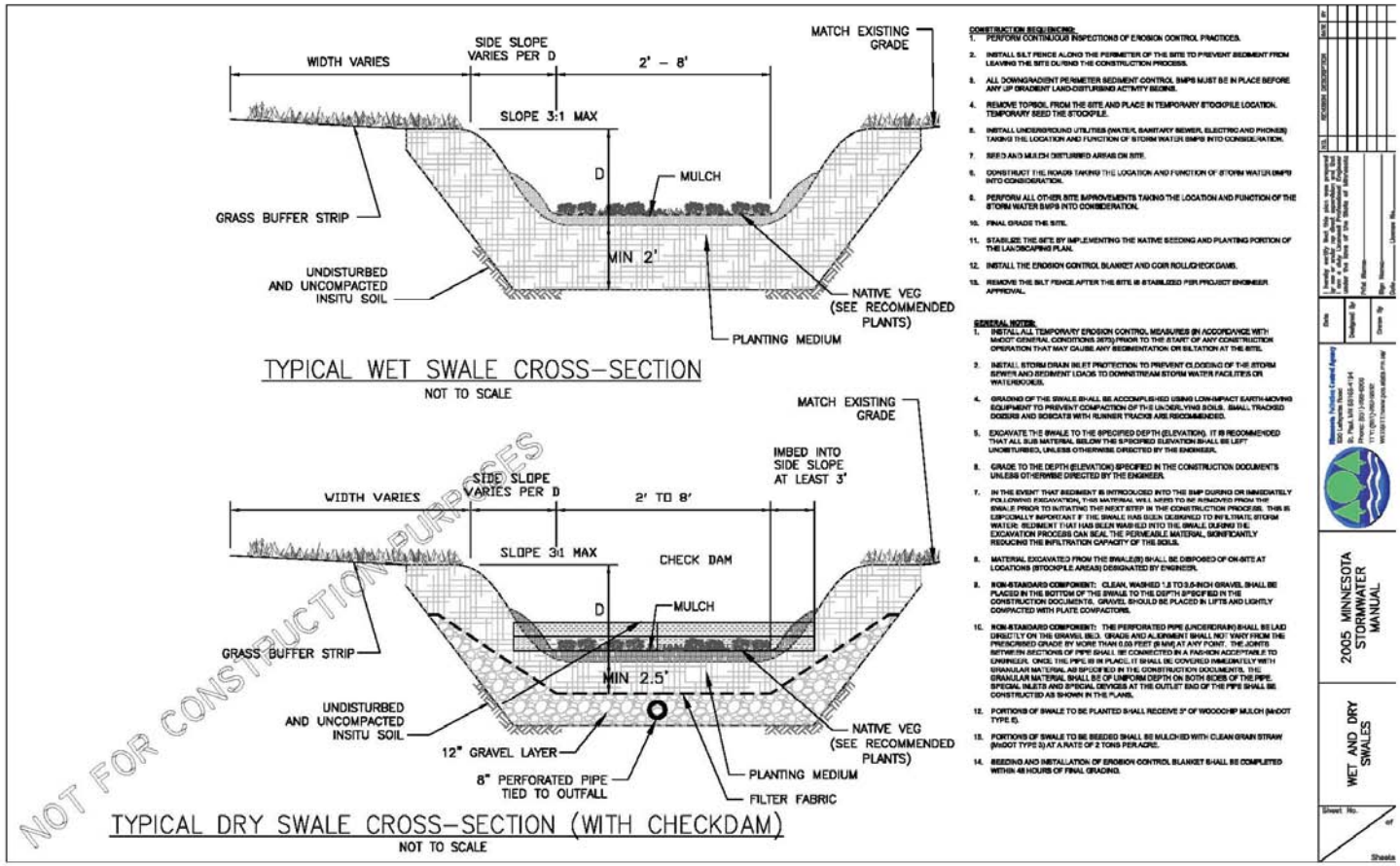
Shifting from “devices” to “biosystems” .3



Devices

(from the MN State Stormwater Manual)

Shifting from “devices” to “biosystems” .3



Devices

(from the MN State Stormwater Manual)

Shifting from “devices” to “biosystems” .3

Biosystems

(Late 2000s – Present)

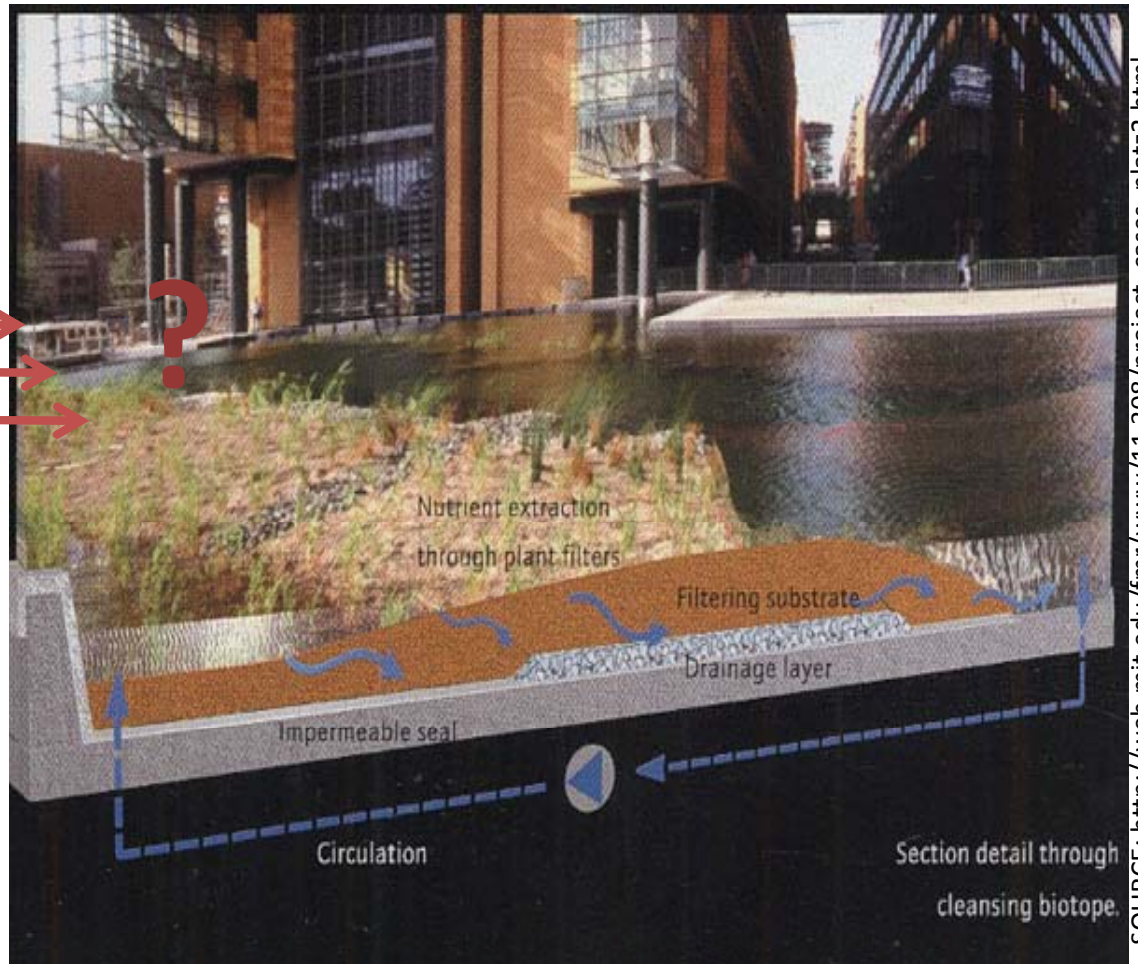
A palette of tools with specific applications for the system metrics and requirements

Require an understanding of system components and functions to effectively apply

Complex networks of treatment include redundancy and combinations of biological/ecological components (e.g. plants and microbes) and engineered products (e.g. geotextile fabrics, aeration, pumping) to mimick natural *functioning*

Shifting from “devices” to “biosystems” .3

SOURCE: http://www.cyberpunkreview.com/images/Terminator3-09.jpg



SOURCE: http://web.mit.edu/fmr/www/11.308/project_cases_platz2.html

Potsdamer Platz “Biotope”

Progression of hydrophillic design .1
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POTSDAMER PLATZ + BERLIN, GERMANY
ATELIER DREISEITL

SCHARNHAUSEN PARK + OSTFILDERN, GERMANY
ATELIER DREISEITL

ARKADIEN ASPERG + STUTTGART, GERMANY
ATELIER DREISEITL

WATER PLAYGROUND + PFORZHEIM, GERMANY
ATELIER DREISEITL

SIDWELL FRIENDS SCHOOL + WASHINGTON, DC, USA
ANDROPOGON ASSOCIATES

AVALON PARK & PRESERVE + STONY BROOK HARBOR, NY, USA
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BURGENLAND VILLA + VIENNA, AUSTRIA
BIOTOP LANDSCAFTSGESTALTUNG

+ UNDISCLOSED LOCATION
TEAM GRÜN-PLAN

Looking toward a new design aesthetic .4

POTSDAMER PLATZ + BERLIN, GERMANY

ATELIER DREISEITL [ÜBERLINGEN, GERMANY]

• SUBSURFACE STORAGE • GREYWATER REUSE •

Looking toward a new design aesthetic .4

Urban Water

"A vibrant urban construct was to be created, which is difficult in the shadow of towering company headquarters. A place for people.

The theme of water as a defining element in the open space had convinced. It is arranged, presented in the open space and it is used- in the building and for the lake.

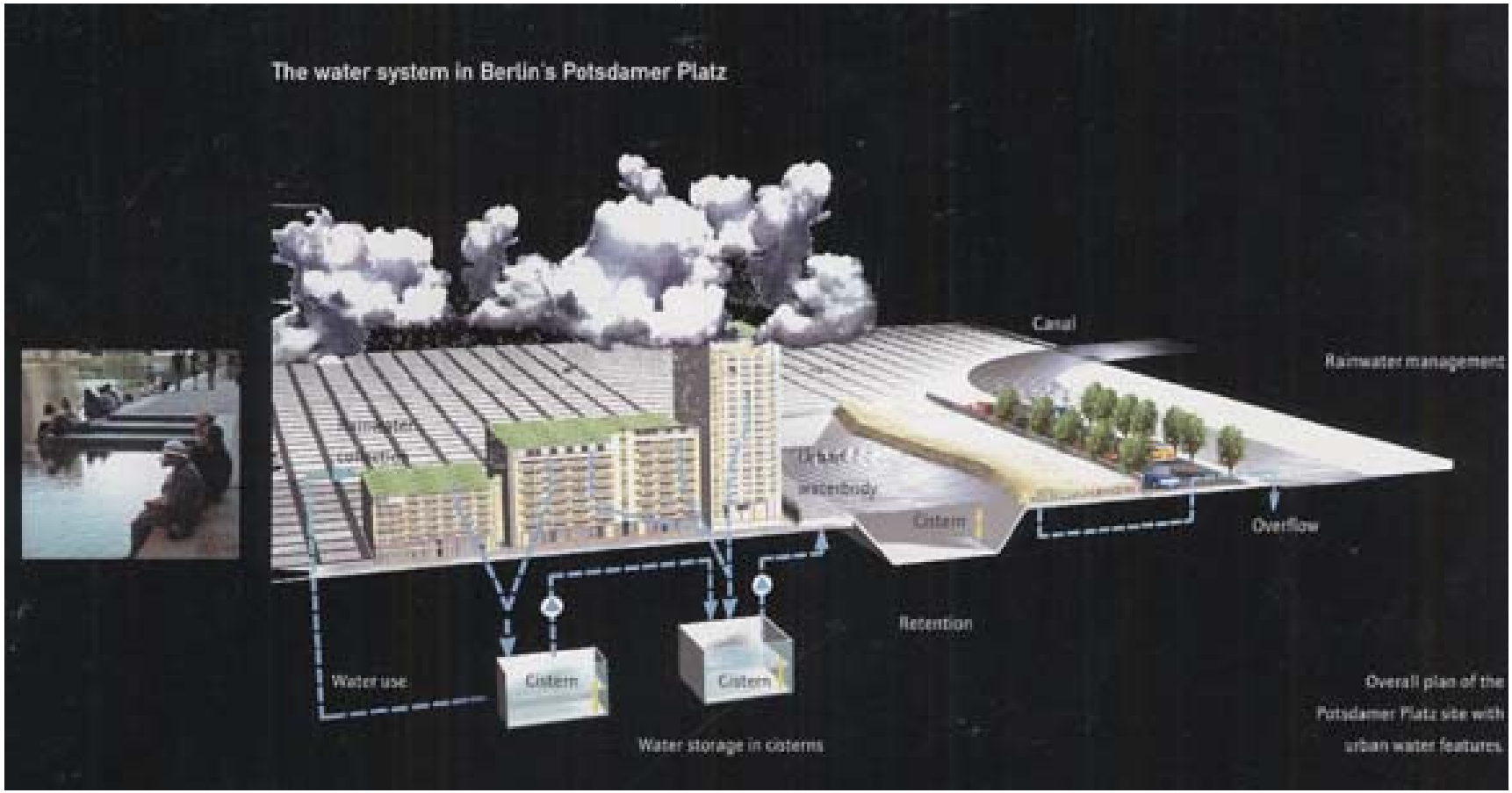
In Marlene-Dietrich-Platz water flows in intricate patterns to the lowest point in the piazza. The water glides of flowsteps from the main expanse of water, and here rhythmic wave structures are formed.

Then, immediately adjacent to the piazza, the water drifts from two sides over linear wave cascades, creating a clear link with the architecture. Finally water also emerges from a source in the northern area of water, then flows down a narrow channel.

Life in a metropolitan city is set to a circle of nature by the art of engineering. The use of water creates width in a narrow busy city."

[*Atelier Dreiseitl Waterscapes*]

Looking toward a new design aesthetic .4



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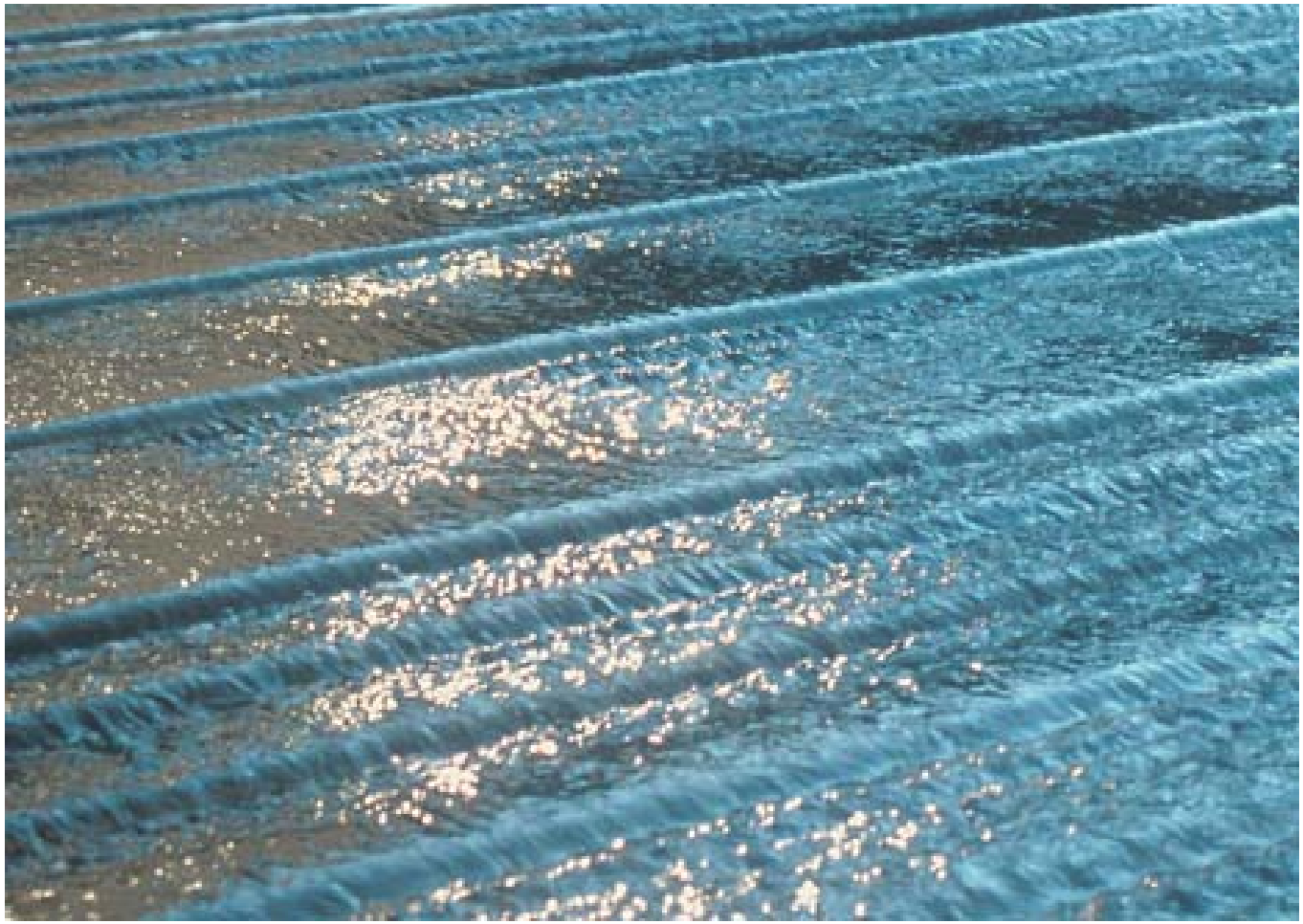

Looking toward a new design aesthetic .4

Technical Specifications

(from http://web.mit.edu/)

+ Planning and design: 1994-1998
+ Construction: 1997-1998
+ Water surface: ca 12,000 m2
+ Shoreline and edges: 1,700 m
+ Overflow edge: 44m
+ Total water volume: ca 12,000 m3
+ Flow rate: 500 m 3/h
+ Turnover: 3 days
+ Minimum water depth: 30cm
+ Maximum water depth: 185 cm
+ Cistern volume: 2,000 m3
+ Water treatment: Purification biotope w/1,900 m2 surface area
+ Pump power: 100 kW
+ Connected roof area:
  - Paved roof: 32,000 m2
  - Green roof: ca 12,000 m2
+ Annual rainfall: 530 mm
+ Drainage method: Evaporation ca 11,570 m3/year
+ Toilet flushing: ca 10,800 m3/year
+ Irrigation: ca 1,114 m3/year
+ Emergency overflow: (in canal) 0.2%
+ Retention volume: (in water basin) 3,100 m3

Looking toward a new design aesthetic .4

SCHARNHAUSEN PARK+ OSTFILDERN, GERMANY

ATELIER DREISEITL [ÜBERLINGEN, GERMANY]

• SUBSURFACE STORAGE • GREYWATER REUSE •

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Rainwater Management for a New City Quarter

"140 hectare greenfield on impermeable soils which should have the same stormwater run-off rate after development as before... This scenario has been a recipe for delight for Scharnhauser Parks residents.

A strategy of surface stormwater management with over 37.000 sq.m of detention space has inspired fundamentally integrated dual-function recreational spaces within the urban structure. The decentralized stormwater detailing gives a tangible green character to the overall development.

Construction costs were the same as conventional underground system, whereas maintenance costs are proving to be significantly less. Real estate values underline that quality of life is a deciding factor for the purchaser."

[*Atelier Dreiseitl Waterscapes*]

Looking toward a new design aesthetic .4

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ARKADIEN ASPERG + STUTTGART, GERMANY

ATELIER DREISEITL [ÜBERLINGEN, GERMANY]

• SUBSURFACE STORAGE • GREYWATER REUSE •

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Idea of the "urban village“

“Where do you live?

Arkadien Asperg is an urban village nestled within the congested conurbation of Stuttgart. A color strategy harmonizes a diversity of passive solar housing types within the 2 hectare site. Rainwater is harvested from the individual house roofs and collected in 14 decentralized cisterns. The water is recycled for irrigation, toilet flushing or washing machines. A central cistern tops-up the stream that meanders through semi-private community spaces. Underground parking liberates space for a central village square.

A continuity of green detailing lends a »garden-city« flair. Arkadien Asperg was awarded the 2003 German Real Estate award for housing.”

[*Atelier Dreiseitl Waterscapes*]

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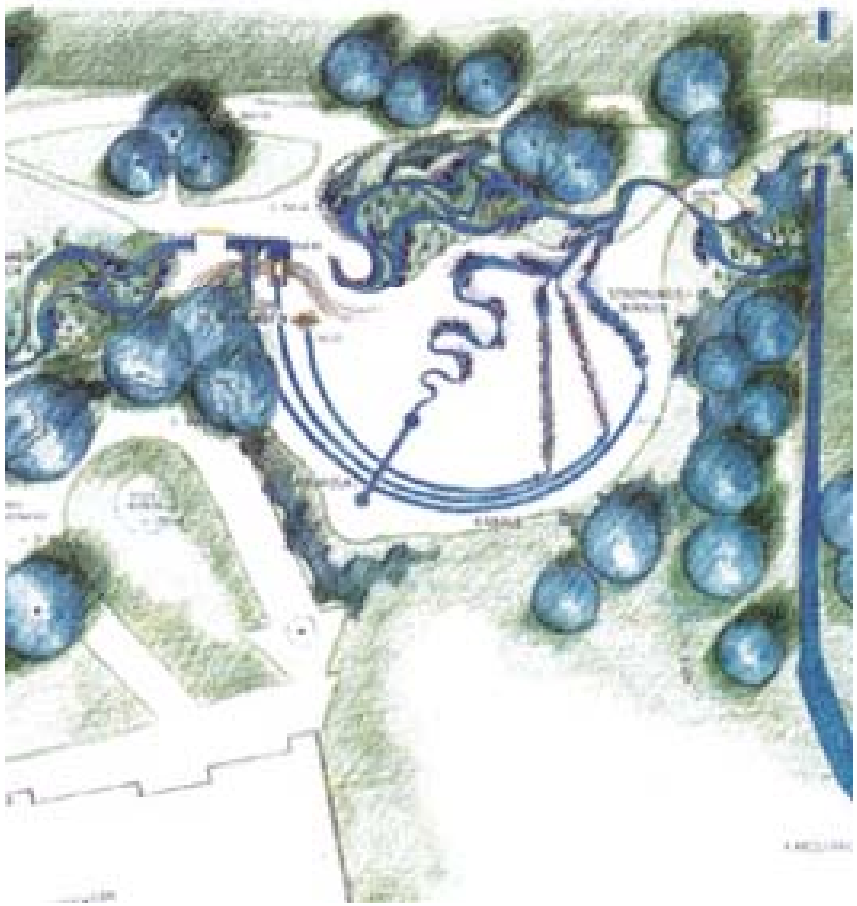
WATER PLAYGROUND + PFORZHEIM, GERMANY

ATELIER DREISEITL [ÜBERLINGEN, GERMANY]

• SUBSURFACE STORAGE • GREYWATER REUSE •

Looking toward a new design aesthetic .4



Playing and Learning

“Who does water belong to? Governments? Private utility companies?

In a 4000 sq.m water playground children are able to take into their own hands the global theme of water distribution. In an atmosphere of hands-on fun, numerous weir

gate valves can be opened and closed to redirected water... depriving some and flooding others.

Exploration of ancient water techniques delights - a tiny child lifts liters of water uphill with the ingenious Archimedies screw. Parents supervise, observe the wonder and surprise of their children, and most often can't help having a go themselves.”

[*Atelier Dreiseitl Waterscapes*]

Looking toward a new design aesthetic .4

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SIDWELL FRIENDS SCHOOL + WASHINGTON, DISTRICT OF COLUMBIA, USA

ANDROPOGON ASSOCIATES [PHILADELPHIA, PENNSYLVANIA, USA]

• SUBSURFACE STORAGE • TREATMENT WETLANDS • GREYWATER USE • LEED PLATINUM CERTIFIED DESIGN •

Looking toward a new design aesthetic .4

"Andropogon's Landscape Master Plan & Site Design at Sidwell Friends School included a central courtyard with a constructed wetland designed to utilize storm and wastewater for both ecological and educational purposes. Andropogon's plan integrated water management solutions into the landscape, inextricably linking the building to its site. The wetland becomes a "working landscape"; using biological processes to clean water while providing students with a vivid example of how such systems work in nature.

collaborator:

¬ Kieran Timberlake Associates, LLP

awards:

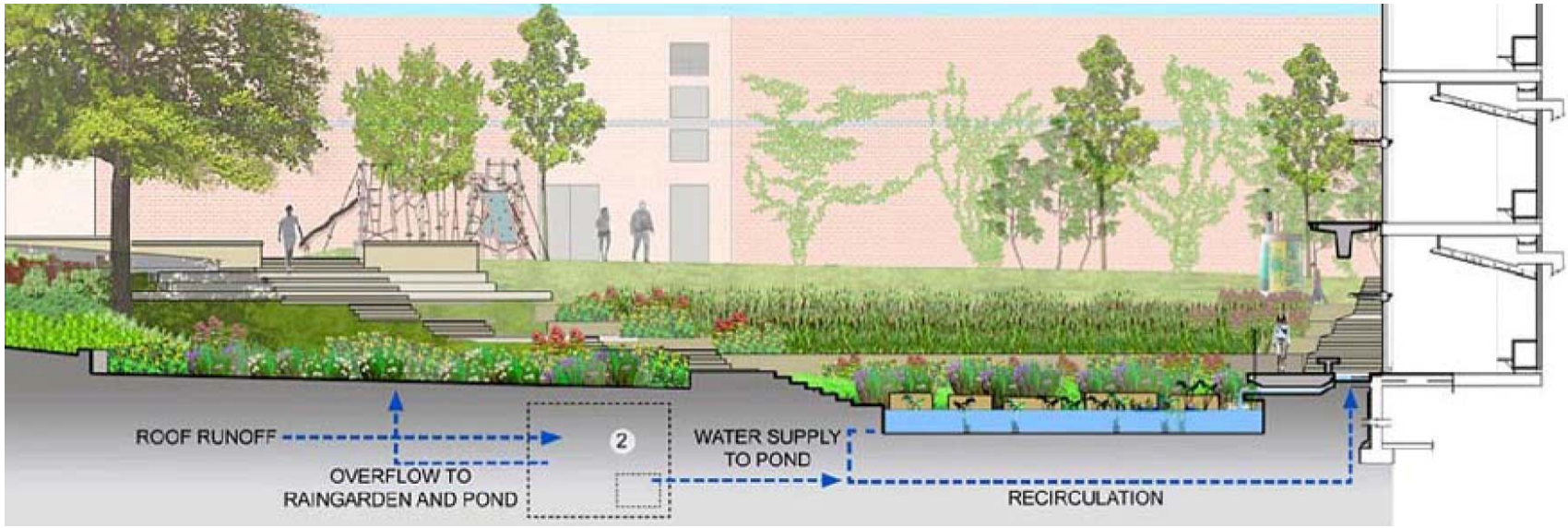
2007 AIA COTE

Top 10 Green Projects

LEED™ Platinum Certified

[*Andropogon Website*]

Looking toward a new design aesthetic .4



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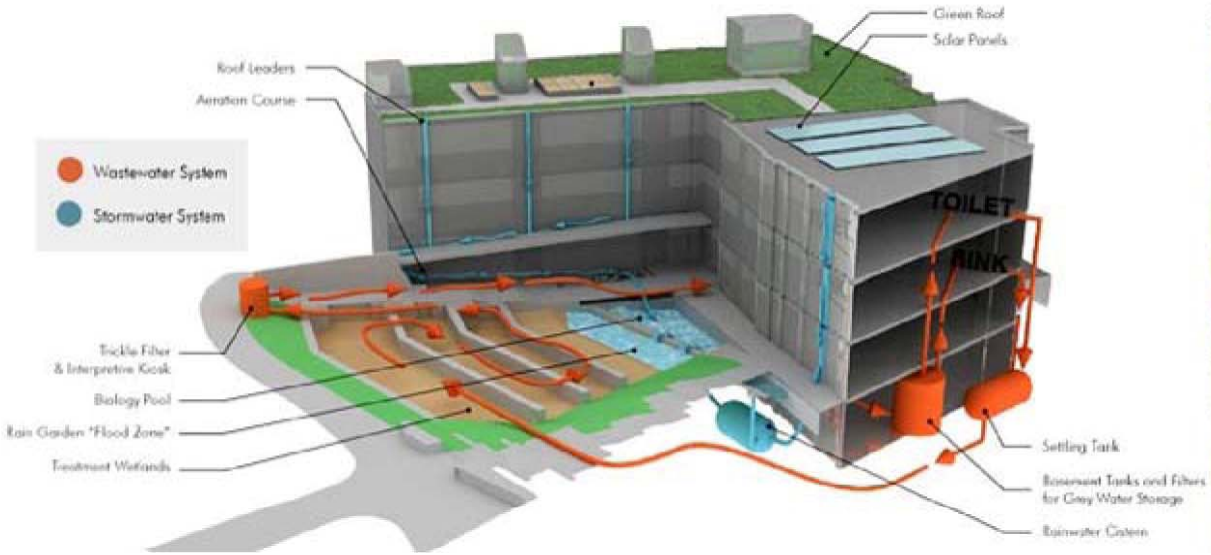

Looking toward a new design aesthetic .4

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AVALON PARK & PRESERVE + STONY BROOK HARBOR, NEW YORK, USA

ANDROPOGON ASSOCIATES [PHILADELPHIA, PENNSYLVANIA, USA]

• TREATMENT WETLANDS • ECOLOGICAL INFORMANTS • ECOSYSTEM RESTORATION •

Looking toward a new design aesthetic .4

"For Avalon Park, Andropogon created a community garden with a rich sequence of journeys and destinations. Andropogon used the latest and best ecological science to give the visitor an experience of representative plant communities in Northern long Island in all their beauty and diversity. "

collaborator:

¬ Paul Simons Foundation

[*Andropogon Website*]

Looking toward a new design aesthetic .4

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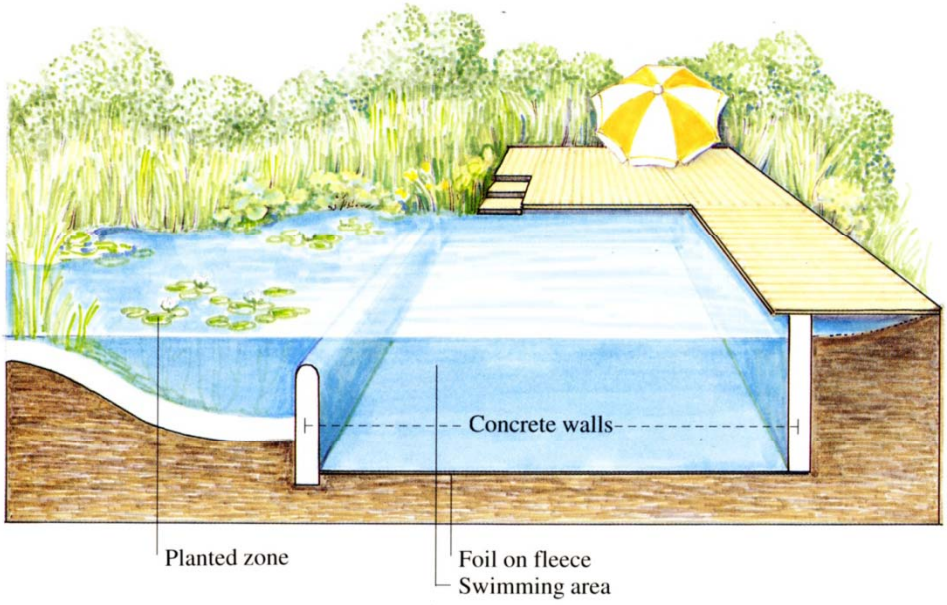
BURGENLAND VILLA + VIENNA, AUSTRIA

BIOTOP LANDSCAFTSGESTALTUNG [WIEDLING, AUSTRIA]

• SURFICIAL STORAGE • NATURAL SWIMMING POOLS • BIOFILTRATION • FUNCTIONAL DESIGN •

Looking toward a new design aesthetic .4



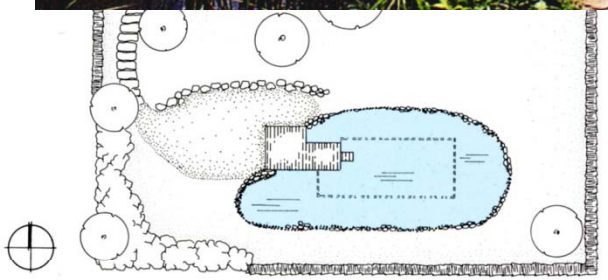
"The entire water area of some two thousand square feet was located at the lower end of the property, at the most natural place to build, for water always gathers at the lowest point.

...The swimming area, about five hundred square feet, was made six feet deep. Below water, it is separated from the shallow, planted border area by an earthen wall. In the so-called regeneration zone, where the swamp plants grow, the water is cleansed biologically.

…In all, twenty-five kinds of swamp and water plants were planted in this wide shoreline zone."

[*Timm, 1999*]

Looking toward a new design aesthetic .4



Looking toward a new design aesthetic .4

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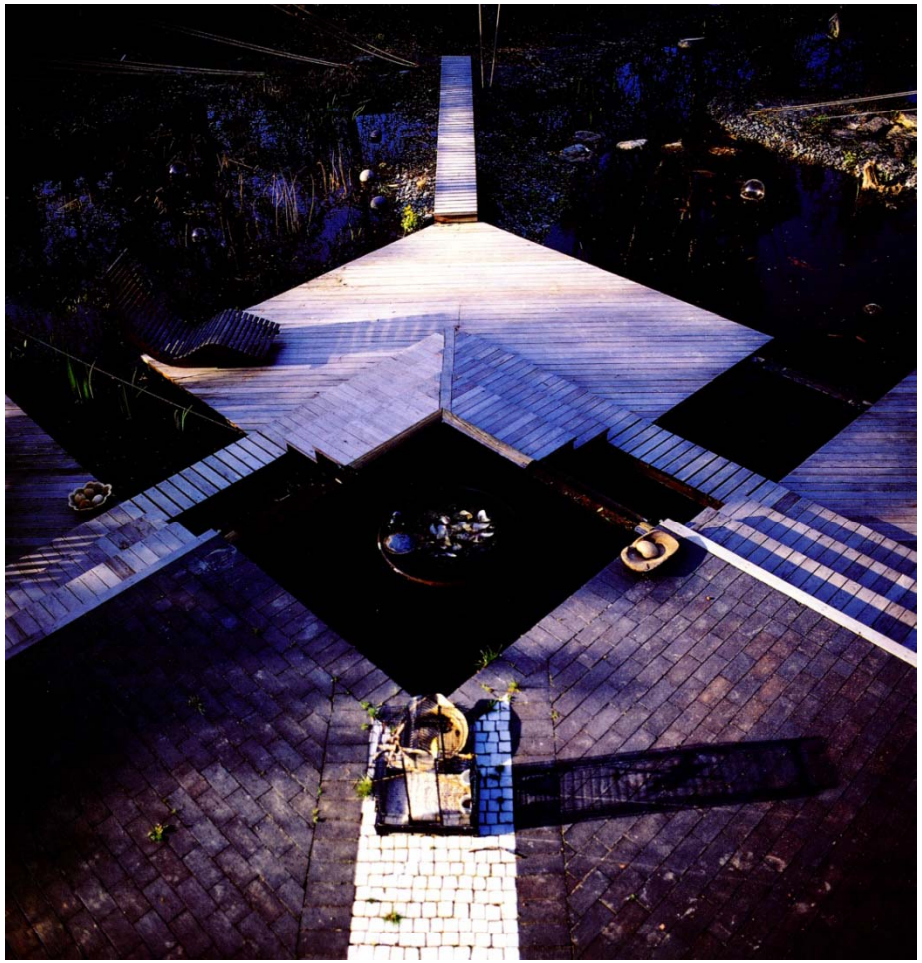
+ UNDISCLOSED LOCATION

TEAM GRÜHN-PLAN [WEHRHEIM, GERMANY]

• SURFICIAL STORAGE • TREATMENT & REUSE • GREYWATER USE • FUNCTIONAL DESIGN •

Looking toward a new design aesthetic .4



"Two lots, used only on weekends for thirty years, were completely renovated and revamped.

…The ponds, conceived as "walkable" water landscape, are linked by wooden footbridges and stepping stones...

…The water surfaces consist of two ponds at different levels. The upper one receives runoff from the roofs and drainage systems. The excess water then flows into the lower pond, which is located by the sauna and serves as a swimming and diving pool. It also provides water for the gardens and toilets."

[*Timm, 1999*]

Looking toward a new design aesthetic .4

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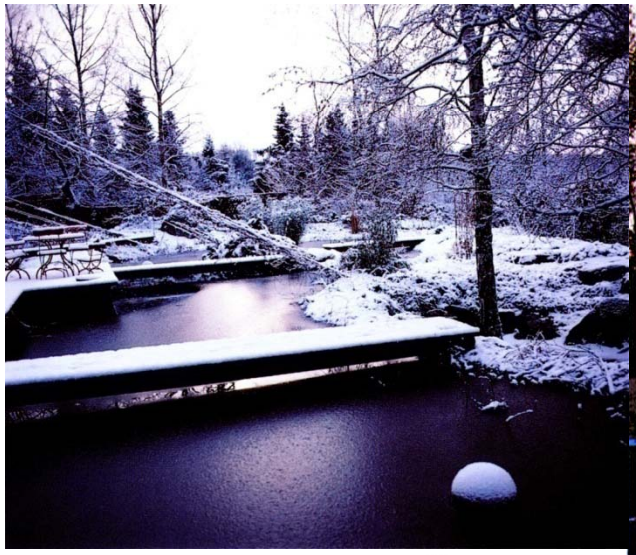

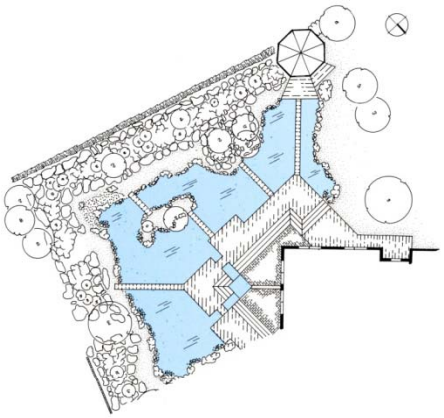

Changing Paradigms

In Conceptualization of a New Hydro-*Logic*

Change the way people look at their environments, ecological communities, water, and hydrologic patterns, which can link them to their larger watershed and environmental contexts

Changing the stormflow storage, transmission, and volumetric patterns to better distribute it across the landscape, which can have far-reaching implications for overall water quality and health, as well as ecosystem stabilization

Constantly reminded that our clean water sources are finite and our pollution sources are not

Design a functional, systems-based world that is both livable and sustainable, reconnecting ecology to place and place to people

SOURCES CITED

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WEB:

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