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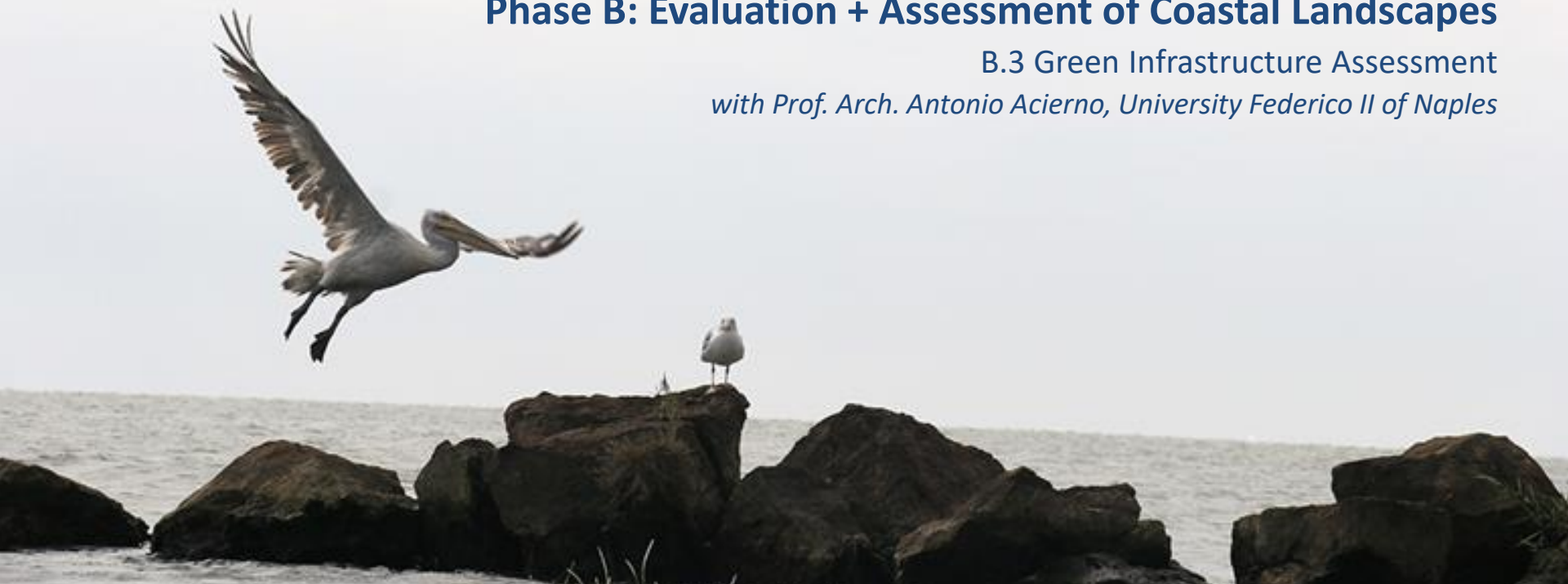
Inclusive Coastal Landscapes

Session 7 - Friday, 13th of March 2020

Phase B: Evaluation + Assessment of Coastal Landscapes

B.3 Green Infrastructure Assessment

with Prof. Arch. Antonio Acierno, University Federico II of Naples



Universitatea
de Arhitectură și Urbanism
"Ion Mincu"



Eesti Maaülikool
Estonian University of Life Sciences

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Faculté
d'Architecture
La Cambre Horta



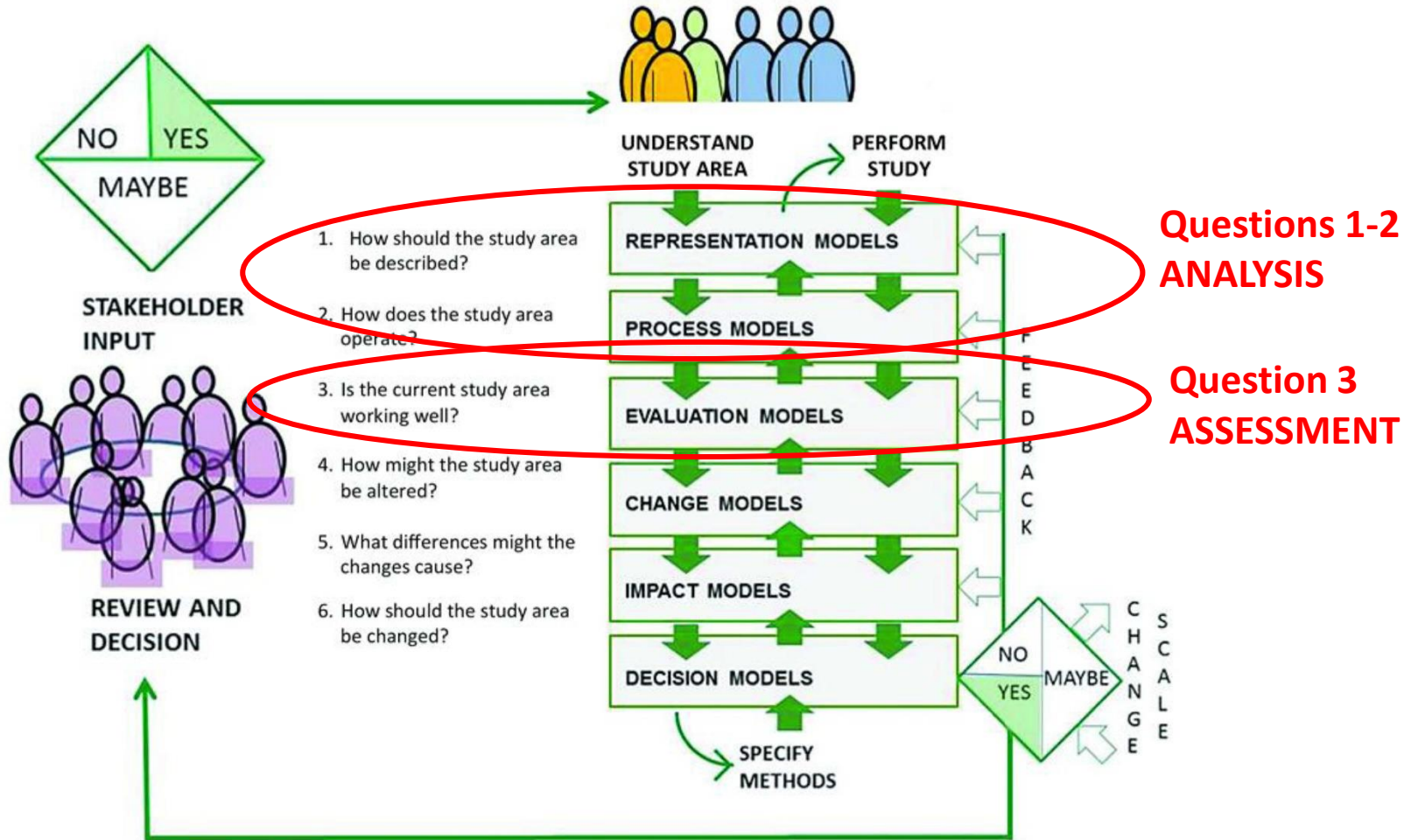
LE:NOTRE Institute
Linking landscape education, research and innovative practice



ISOCARP
Knowledge for Better Cities



Steinitz' Framework



Six questions to ask, source: Carl Steinitz

Our **values** are determining our **goals** for a landscape.

IMPORTANT
KEY WORDS

In order to assess if **goals** are achieved we need to define **criteria** and/or **development objectives**.

Indicators give us evidence if our **criteria/objectives** are met.

In this presentation I aim to synthetically describe the **Green Infrastructure approach** and propose to adopt it as **assessment strategy**. In such a way it will be possible mapping and defining priority setting

GREEN INFRASTRUCTURE AS PLANNING STRATEGY

Green Infrastructure brings together the key ideas of integration, diversity, innovation and a strategic investments/interpretation of urban environments



Stockholm - Lehmann (2011)

This is achieved through:

Better housing, better (and more focussed) greening, consideration of climate change (adaptation and mitigation), improved street scene, human-environmentally conscious, consideration scale

ABOUT GREEN INFRASTRUCTURE

Remind students that...

On Co-LAND wiki page there are a lot of documents about Green Infrastructure: recorded lectures, slide presentations, manuals, expert voices, weblinks, glossary, references

Green and Blue Infrastructure

Open Educational Resources

- [Lecture recordings, slides, glossary and learning materials](#)
- [Language training with expert interviews](#)

Green infrastructure case studies and policy directives in the European Union

- European Commission. [Building a Green Infrastructure for Europe](#). Publication, 2013.
- European Commission. [The Multifunctionality of Green Infrastructure](#). Directorate General Environment News Alert Service, March 2012.
- European Commission. [Towards a Green Infrastructure for Europe: Developing New Concepts for the Integration of Natura 2000 Network Int](#)

Basic background on green infrastructure, guidelines for communities

- Landscape Institute. [Green Infrastructure: An Integrated Approach to Land Use](#). Position statement, 2013.
- Landscape Institute. [Green Infrastructure: Connected and Multifunctional Landscapes](#). Position statement, 2013.
- Landscape Institute. [Local Green Infrastructure: Helping Communities Make the Most of Their Landscape](#). Position statement, 2011.

Coastal Management

- [Coast Learn](#)

URBAN AND ECOLOGICAL CRISIS

ENVIRONMENTAL



FLOODING
LANDSLIDES



EARTHQUAKES



POLLUTION

COMPLEXITY OF URBAN RISKS

SOCIAL



SOCIAL DEGRADATION
URBAN OUTSKIRTS



CRIME



URBAN DECAY

LOOKING FOR SAFETY IN CONTEMPORARY CITY

«NEW URBAN QUESTION»

FOR THE CITY OF THE 21st CENTURY

1 - CLIMATE CHANGE

2 - ACCESSIBILITY

3 - SAFETY



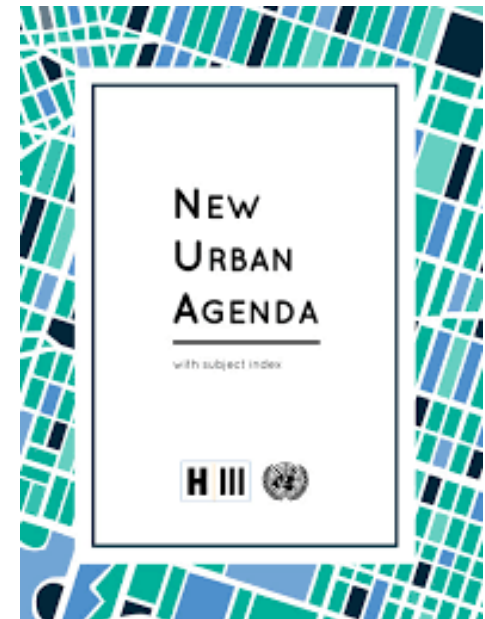
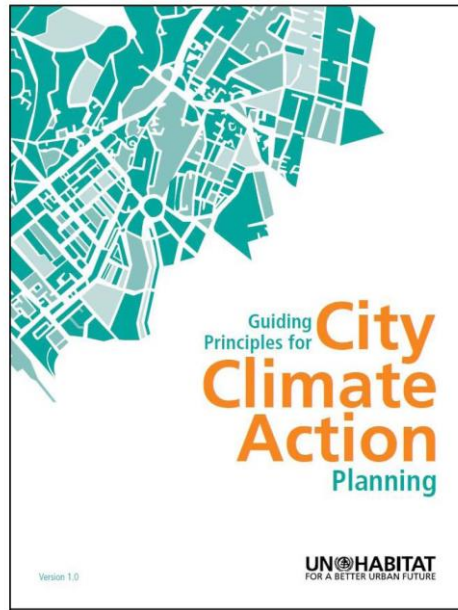
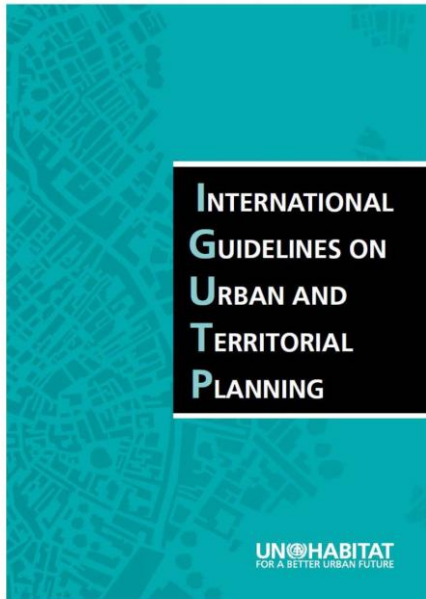
LOOKING AT INTERNATIONAL DOCUMENTS AND GUIDELINES



AGENDA 2030

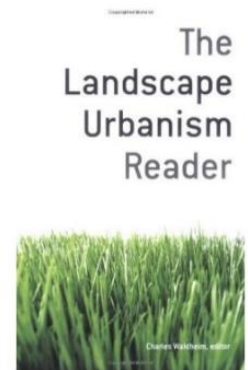
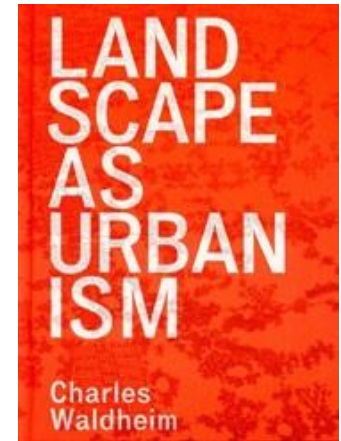
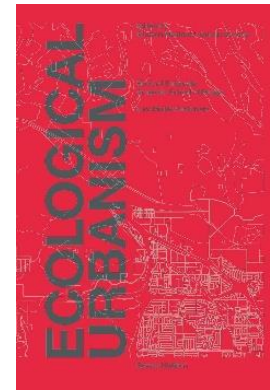


MAKE CITIES AND HUMAN SETTLEMENTS INCLUSIVE, SAFE, RESILIENT AND SUSTAINABLE



ECOLOGICAL AND LANDSCAPE URBANISM

Renewed interest in the ecology/urban planning relationship is expressed by discussions in 'landscape urbanism' before and the concept of 'ecological urbanism' more recently (Steiner, 2011).



Main projects are the New York City's Fresh Kills or the High Line Project in Manhattan

GREEN INFRASTRUCTURE concept was born in late 1990s in USA

Definition of EPA (Environmental Protection Agency) is based actually on **hydraulic risk control and mitigation (2 MAIN FUNCTIONS)**

“ Green infrastructure is a cost-effective, **resilient approach** to managing wet weather impacts that provides many community benefits...

green infrastructure reduces and treats stormwater at its source while delivering environmental, social, and economic benefits.

...

Green infrastructure uses vegetation, soils, and other elements and practices to restore some of the natural processes required to manage water and create healthier urban environments. At the city or county scale, **green infrastructure is a patchwork of natural areas that provides habitat, flood protection, cleaner air, and cleaner water.** ”

THE CONCEPT OF GREEN INFRASTRUCTURE IN EUROPE (MORE INTEGRATED FUNCTIONS)

EU DEFINITION

Green infrastructure is a strategically planned **network of natural and semi-natural areas** with other environmental features designed and managed to **deliver a wide range of ecosystem services** such as

- water purification,
- air quality,
- space for **recreation** and
- climate mitigation and adaptation.

This network of green (land) and blue (water) spaces can improve environmental conditions and therefore **citizens' health and quality of life**. It also **supports a green economy**, creates job opportunities and enhances biodiversity. **The Natura 2000 network constitutes the backbone** of the EU green infrastructure.

MAIN FEATURES OF GREEN INFRASTRUCTURE

1. MULTI-FUNCTIONALITY

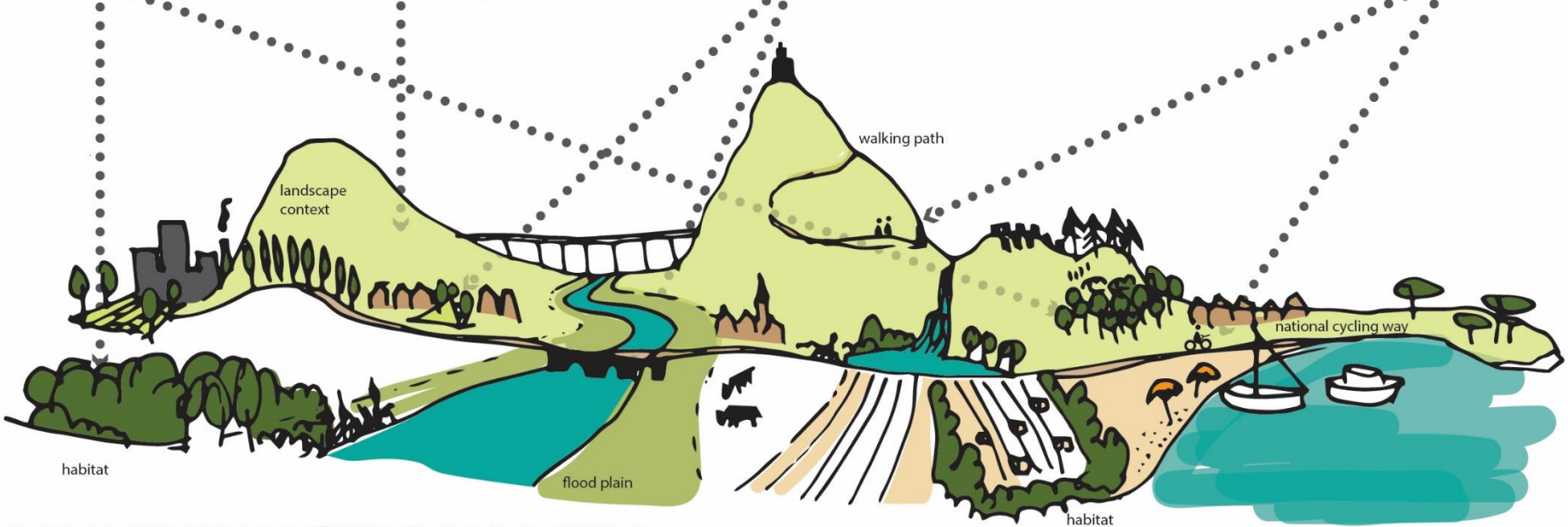
Multi-functionality is “*central to the green infrastructure concept and approach. It refers to the potential for green infrastructure to have a range of functions, to deliver a broad range of ecosystem services.*

Multi-functionality can apply to individual sites and routes, but it is when the sites and links are taken together that we achieve a fully multi-functional GI network”

(Natural England (2009) Green Infrastructure Guidance. <http://publications.naturalengland.org.uk/file/94026>).



habitat landscape context flood and water management recreation



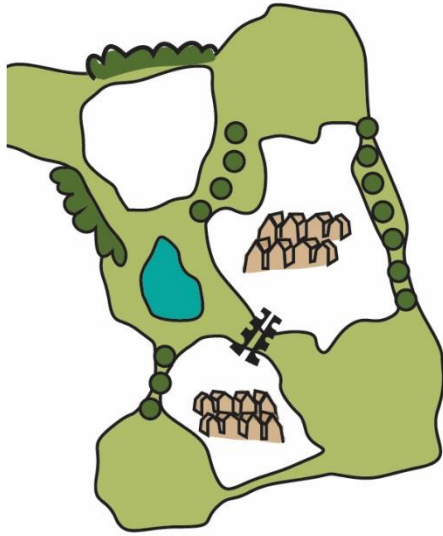
MULTIFUNCTIONALITY



GI FUNCTIONS

2. CONNECTIVITY

VALUES, GOALS

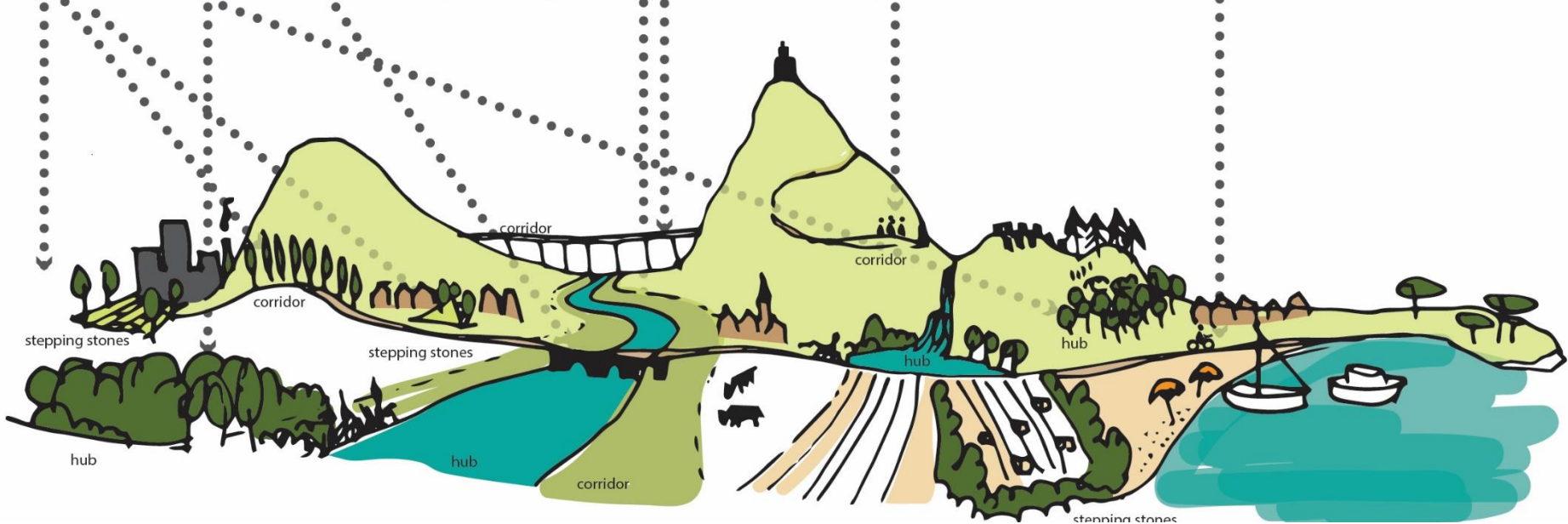


stepping stones, hubs & corridors

bridges and flyovers

walking path

cycle way



MULTI-FUNCTIONALITY + CONNECTIVITY

GREEN INFRASTRUCTURE AS A MULTIFUNCTIONAL NETWORK
including environment, heritage, and services

- **ECOLOGICAL NETWORK**
- **PUBLIC ACCESS NETWORK**
- **CULTURAL HERITAGE NETWORK**
- **RURAL LANDSCAPE NETWORK**

to be integrated with the grey infrastructure – built environment

ECOLOGICAL NETWORK:

- *Core areas*
- *Ecological development areas*
- *Ecological defragmentation areas*
- *Protection area*
- *Connection zones*
- *Buffer zones*
- *Blue network*

PUBLIC ACCESS NETWORK

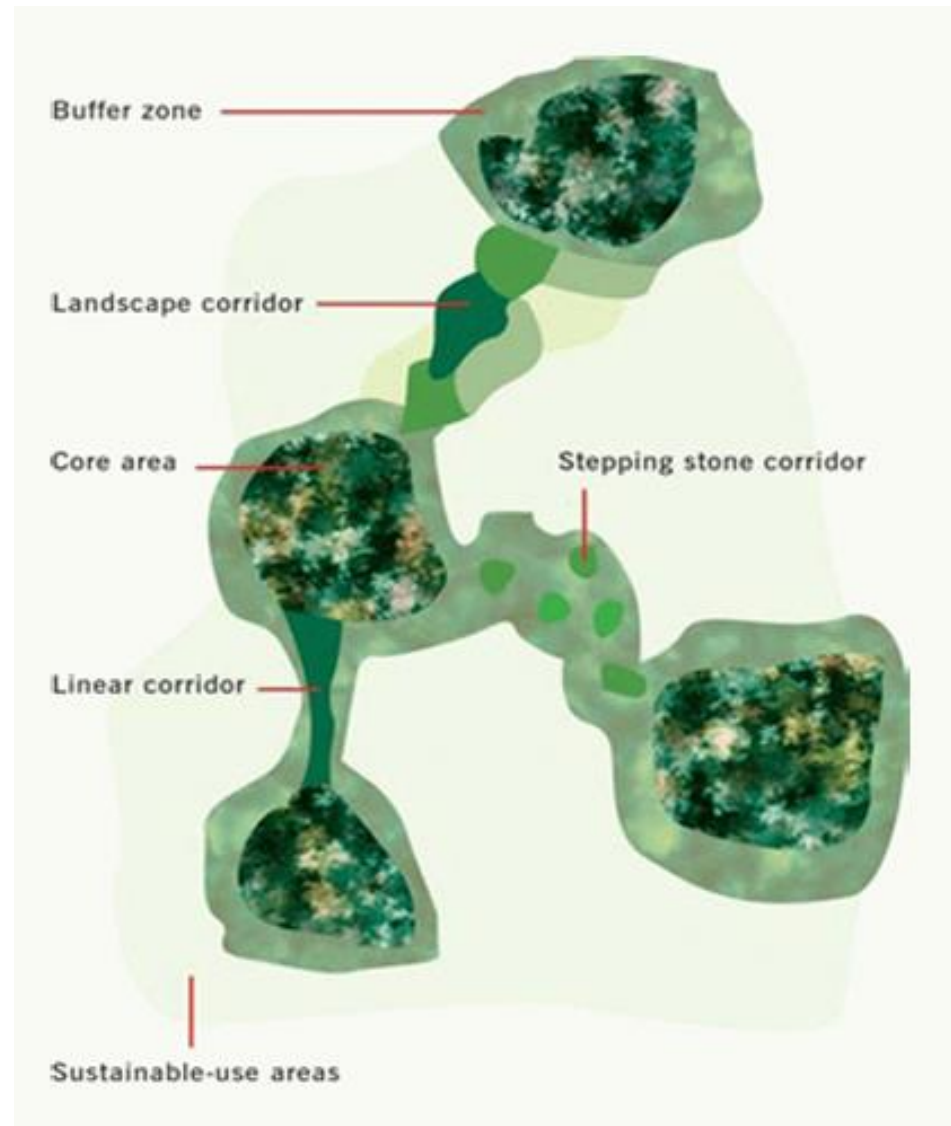
- *Attractors*
- *Greenways*
- *Info points*
- *Areas of remarkable landscape value*

CULTURAL HERITAGE NETWORK

- *Monuments*
- *Archaeological sites*
- *Traditional rural settlements*
- *Rural roads or paths and landscape structure*
- *Hydraulic works*
- *Agrarian landscape elements*

RURAL LANDSCAPE NETWORK

- *Farms and their structure*
- *Cultivation techniques*
- *Farming and further production structures*



GREEN INFRASTRUCTURE AS A MULTIFUNCTIONAL NETWORK

A GREEN-BLUE INFRASTRUCTURE MEANS MUCH MORE THAN AN ECOLOGICAL NET

Functions

- Hydraulic risk mitigation
- Crops, food and forest management/production
- Recreational activity
- Slow mobility
- Cultural and environmental tourism



Access to Open Space



Access to Nature



Managing Flood Risk and Urban Heat



Making Connections



Distinctive Destinations



Healthy Communities



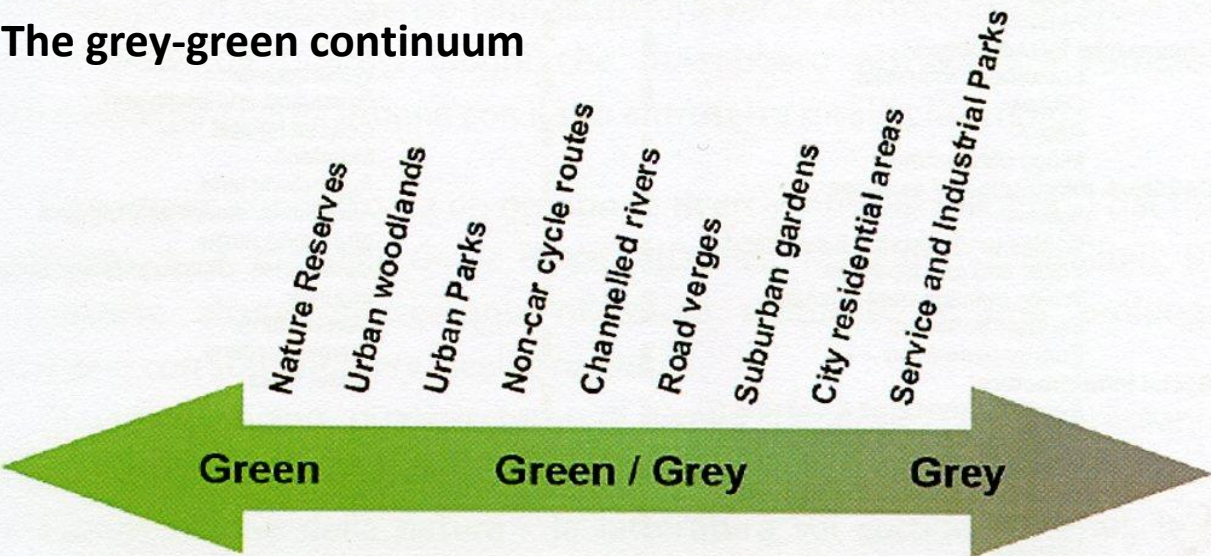
Productive Landscapes



Skills and Training

THE GREEN INFRASTRUCTURE AS INFRASTRUCTURE OF THE 21ST CENTURY

The grey-green continuum



Hybrid situations:
intermediate cases as
integration of green and
grey infrastructures



1.



2.



3.



4.

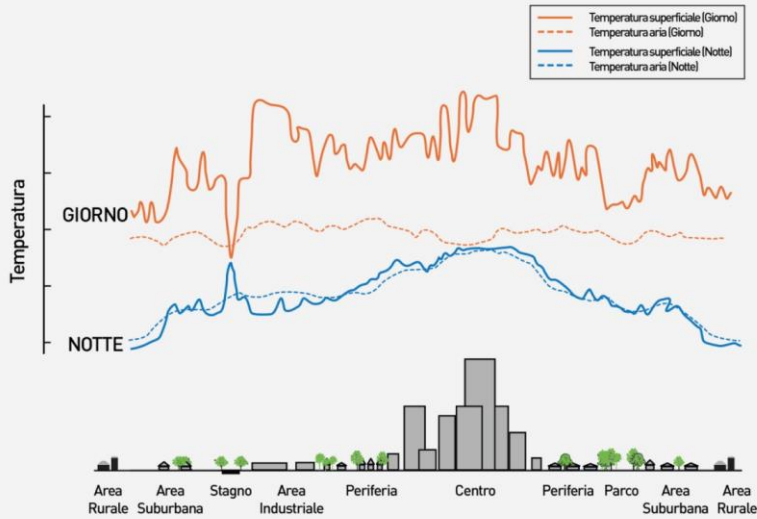
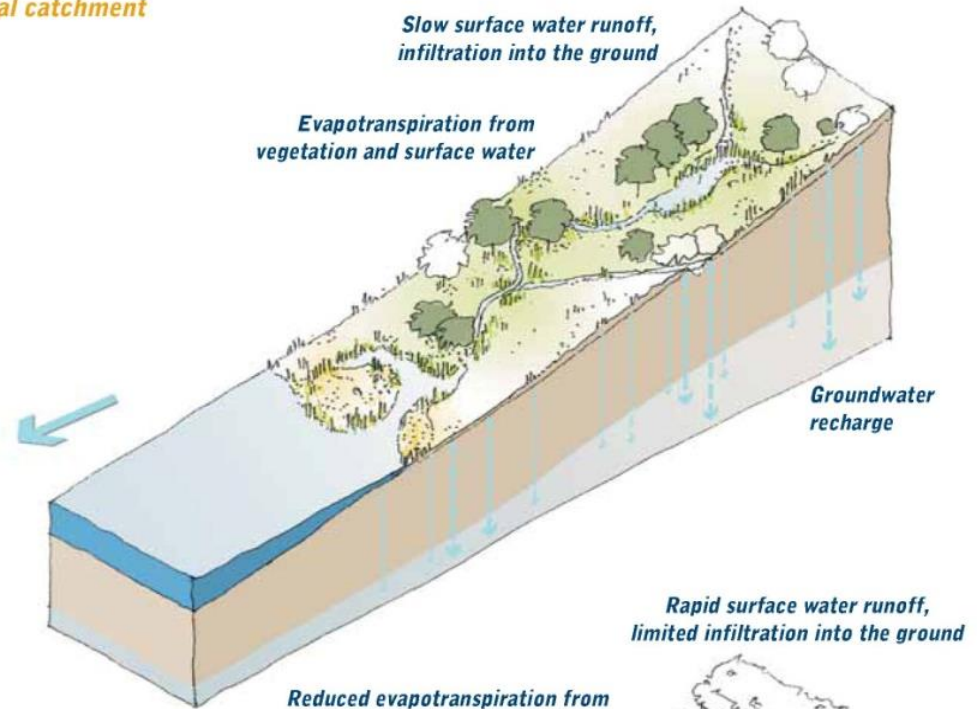
New idea of
green-blue infrastructure

20TH CENTURY
INFRASTRUCTURE

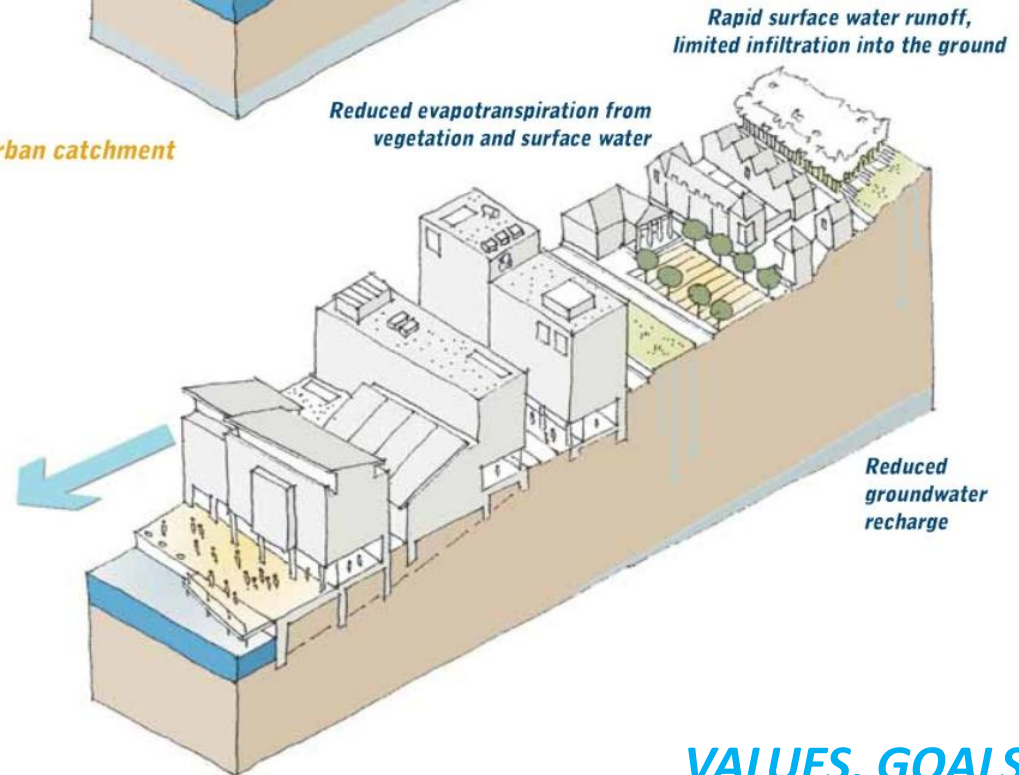
21ST CENTURY INFRASTRUCTURE



Natural catchment



Urban catchment



GREEN INFRASTRUCTURE AS A TOOL TO FACE THE HYDRAULIC RISK AND HEAT ISLAND PHENOMENON

VALUES, GOALS

INDICATORS, DEVELOPMENT GOALS

GREEN URBAN INFRASTRUCTURE AT NEIGHBOURHOOD/BUILDING SCALE

SUSTAINABLE URBAN DRAINAGE SYSTEM

Hydroscape

- Rainwater Harvesting
- Rain Gardens
- Planter Boxes
- Bioswales
- Permeable Pavements
- Green Streets and Alleys
- Green Parking
- Green Roofs
- Urban Tree Canopy
- Land Conservation



Cisterne

Superfici permeabili

Tetti verdi

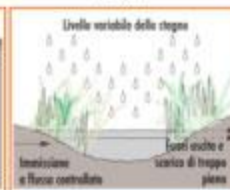
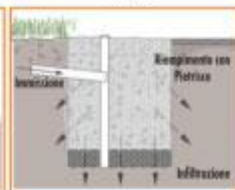
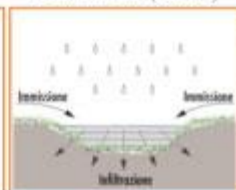
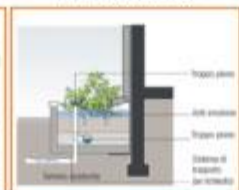
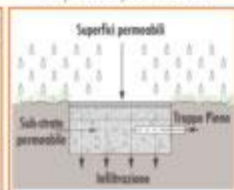
Fioriere continue

Fioriere a infiltrazione

Canali inerbiti (Swales)

Trincee

Bacini

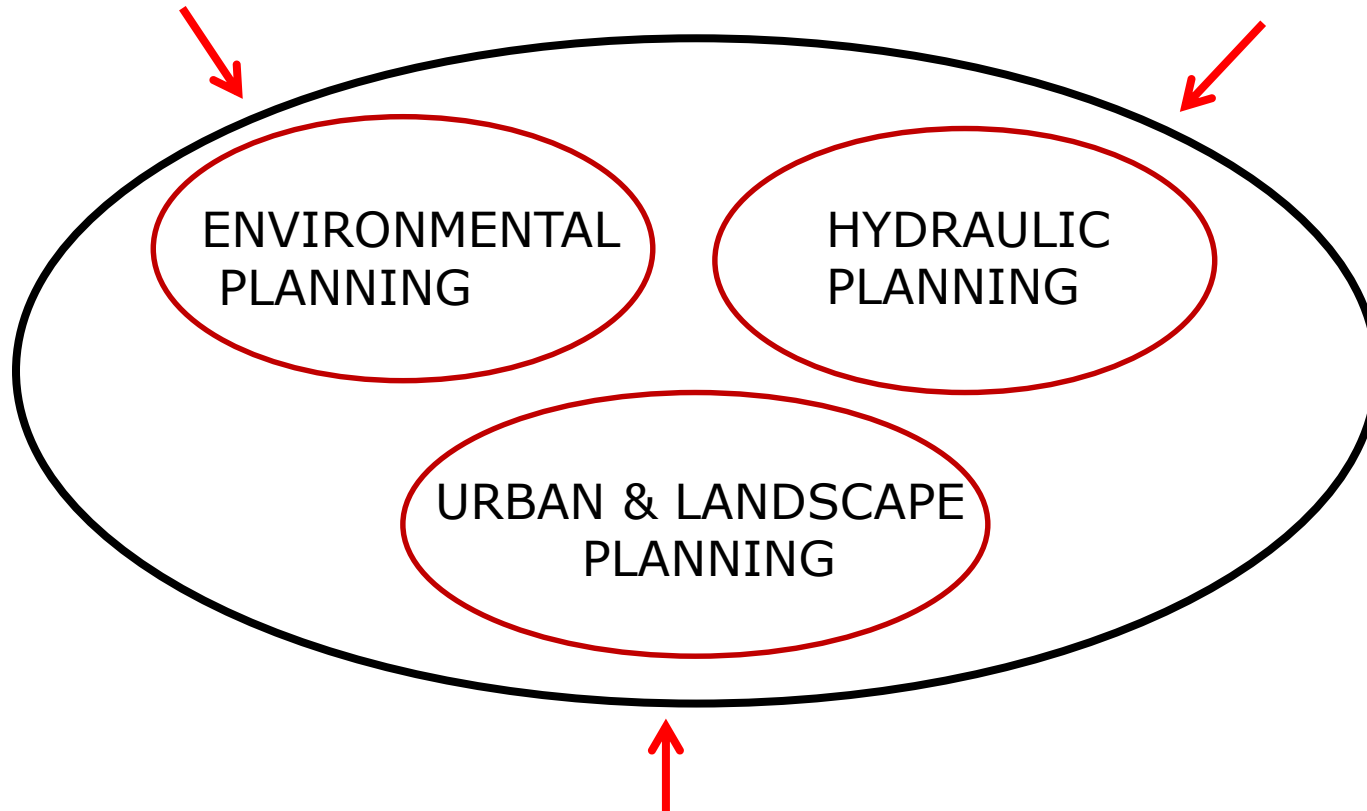


GREEN INFRASTRUCTURE AND PLANNING

DIFFERENT PLANS CONCERNING TERRITORY ARE NOT INTEGRATED

Water contamination

Hydraulic risk



Open space management and urban shape
(buildings, streets, squares, parks etc.)

INTEGRATION NEEDED!
GREEN INFRASTRUCTURE PLANNING COULD GIVE A SUITABLE RESPONSE

3. GREEN INFRASTRUCTURE AS MULTI-SCALE PROJECT

THE GREEN-BLUE INFRASTRUCTURES CAN BE DESIGNED AT DIFFERENT SCALES

Green Infrastructure: from Neighbourhood to Town & City through to City-Regional and Strategic Scales

NEIGHBOURHOOD OR LANDSCAPE UNIT SCALE

A network of local green spaces addresses many user needs especially in light of urban densification, demographic changes, social inclusion; and helps to move towards a low carbon economy



Street Trees / Home Zones

Local Rights of Way

Roof Gardens & Green Roofs

Dedicated Gardens / Cemeteries

Pocket Parks

Institutional Open Spaces

Gardens

Ponds & Small Woodlands

Urban Plazas

Play Areas

Village Greens

Local Nature Reserves

TOWN CITY SCALE

District scale green infrastructure contributes to an area's distinctiveness and biodiversity, allowing a wide range of user groups to share the same space.



City Parks

Country Parks / Estates

Urban Canals & Waterways

Continuous waterfront

Green Networks

Municipal / Cathedral Plazas

Multi-user routes

Lakes

Urban Commons

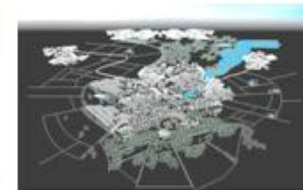
Major recreational spaces

Forest Parks

Landmarks & Vistas & Gateways

CITY REGIONAL SCALE

Including major sites and landscape tracts, as well as smaller interconnected neighbourhood and district assets, this scale of green infrastructure provision can deliver multiple ecosystem services and public benefits, such as biodiversity, landscape enhancement, recreation, health and climate change adaptation



Regional Parks

Rivers & floodplains
Shoreline & Waterfront
Strategic & Long-distance Trails
Major (> 100ha?) woodlands
Community Forests
Open Access Sites
Landmarks & Vistas
Reservoirs
Environmental Management Initiatives
Strategic Corridors & Gateways

Regional Environmental Frameworks for Biodiversity, Landscape, Heritage

Strategic River Catchment Plans

National Trails & Destinations

Strategic Infrastructure corridors

Behavioural & Societal Change

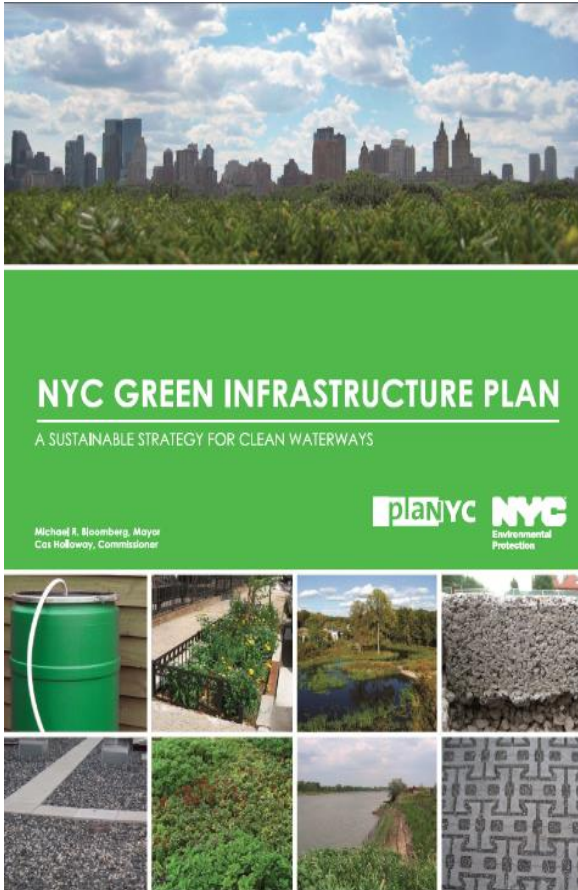
GREEN INFRASTRUCTURE CAN BE APPLIED TO DIFFERENT SCALE GROUPS

(according to the EEA report no 18/2011 - *Green infrastructure and territorial cohesion. The concept of green infrastructure and its integration into policies using monitoring systems.*)

Table ES.1 Potential assets that make up green infrastructure grouped into three scale groups

Local, neighbourhood and village scale	Town, city and district scale	City-region, regional and national scale
<ul style="list-style-type: none"> • street trees, verges and hedges • green roofs and walls • pocket parks • private gardens • urban plazas • town and village greens and commons • local rights of way • pedestrian and cycle routes • cemeteries, burial grounds and churchyards • institutional open spaces • ponds and streams • small woodlands • play areas • local nature reserves • school grounds • sports pitches • swales (preferably grassed), ditches • allotments • vacant and derelict land 	<ul style="list-style-type: none"> • business settings • city/district parks • urban canals • urban commons • forest parks • country parks • continuous waterfronts • municipal plazas • lakes • major recreational spaces • rivers and floodplains • brownfield land • community woodlands • (former) mineral extraction sites • agricultural land • landfill 	<ul style="list-style-type: none"> • regional parks • rivers and floodplains • shorelines • strategic and long distance trails • forests, woodlands and community forests • reservoirs • road and railway networks • designated greenbelt and strategic gaps • agricultural land • national parks • national, regional or local landscape designations • canals • common lands • open countryside

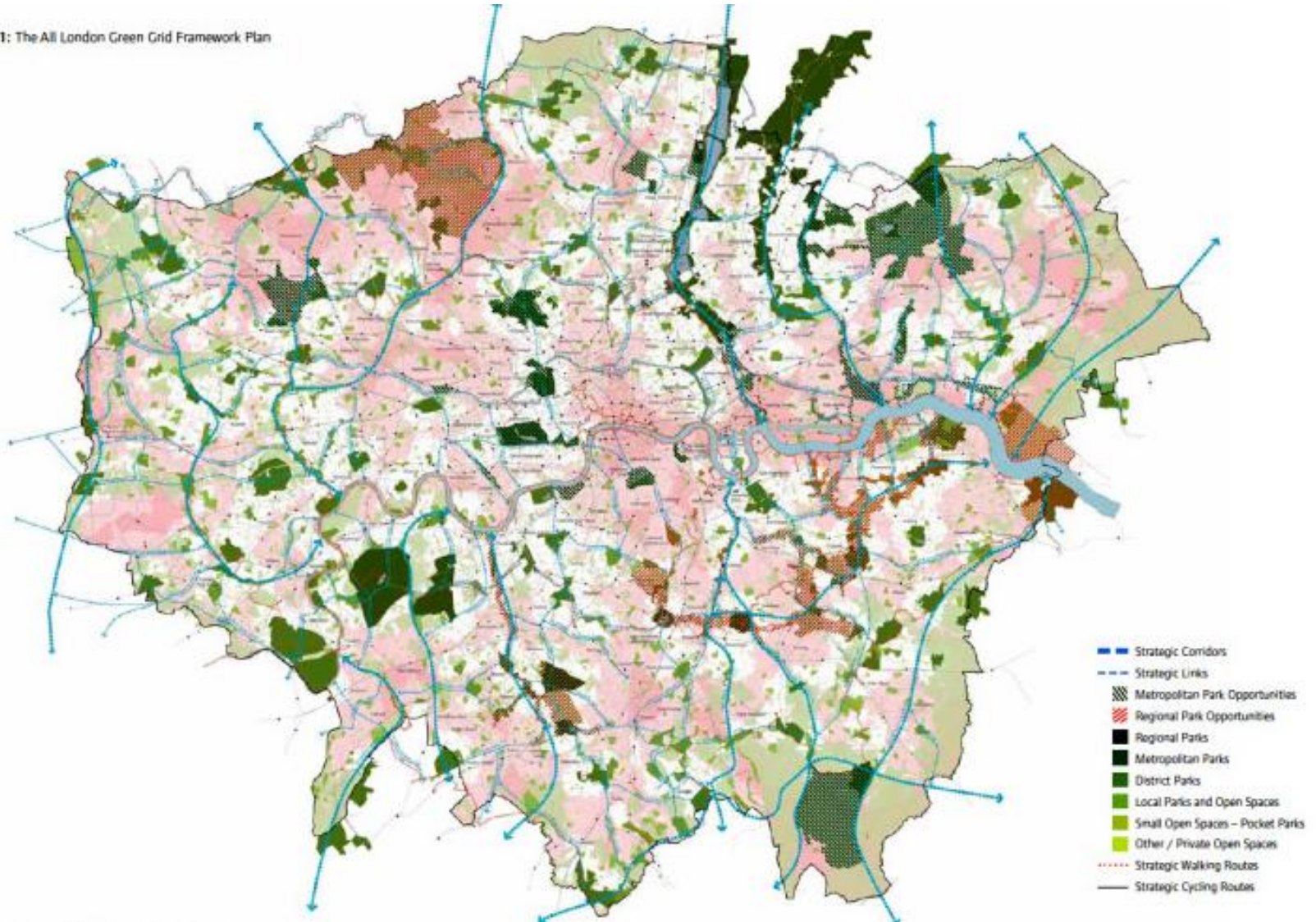
BEST PRACTICES



NEW YORK CITY GREEN INFRASTRUCTURE PLAN

BEST PRACTICES

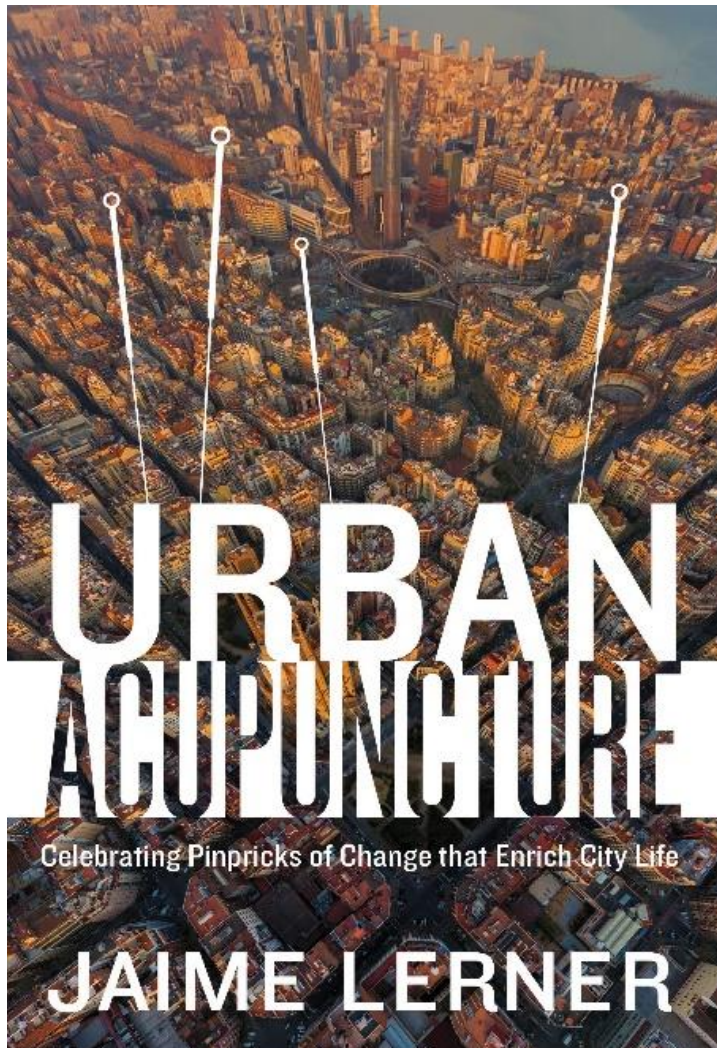
Figure 1: The All London Green Grid Framework Plan



ALGG (ALL LONDON GREEN GRID)

A NEW APPROACH FOR REGENERATING CITIES: URBAN ACUPUNCTURE

A SMALL-SCALE URBAN INTERVENTION, WHICH BRINGS BIG CHANGE



Manuel Solà-Morales (2008)



Urban Acupuncture

A small-scale urban intervention, which brings big change

Jaime Lerner (2014): Urban Acupuncture

Marco Casagrande (2013): Biourban Acupuncture. Treasure Hill of Taipei to Artena

Helena Casanova, Jesús Hernández (2015): Public Space Acupuncture. Strategies and Interventions for Activating City Life.

Main principles:

- *Determination of the sensitive points*
- *Quick act*
- *Creating Places*

A PROPOSAL FOR A MULTI-SCALAR PLANNING AND DESIGN



s-RGB *DESIGN*

safe – REGENERATIVE GREEN BLUE *DESIGN*
a new way of looking at contemporary city and landscape

Safety

Regeneration

Green

Blue

METHODOLOGY

TOP-DOWN
▼

① GREEN & BLUE INFRASTRUCTURE



Scala territoriale



Multifunzionalità



Assetto sistemico

② URBAN-TO-RURAL TRANSECT



Link interscalare



Linearità di progetto



Flessibilità di analisi

③ URBAN ACUPUNCTURE



Interventi mirati



Impatto diffuso

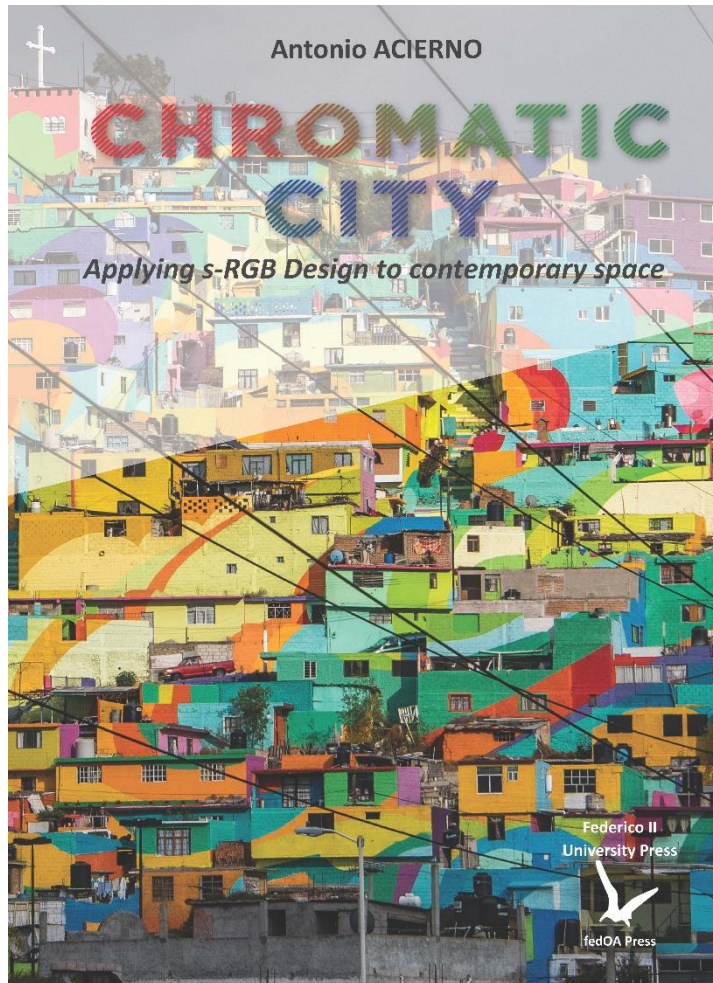


Ricucire le Urban Scars

▲
BOTTOM-UP



I suggest the last my book



CHROMATIC CITY APPLYING s-RGB TO CONTEMPORARY SPACE

Contents:

- Contemporary city crisis and «New Urban Question»
- S-RGB design proposal
- Safety of public spaces
- Regeneration of landscape/territory
- Green Blue Infrastructure
- Multi-scale design
- Acupuncture and Tactical Urbanism
- Annexes with examples, also from Co-Land Project

FREE DOWNLOAD

<http://www.fedoabooks.unina.it/index.php/fedoapress/catalog/book/145>



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Inclusive Coastal Landscapes

Online course - Phase B

Session 7 – March 13, 2020

Public landscape design of green infrastructures: components and opportunities.



Dr. Paolo CAMILLETTI, University Federico II of Naples

Sustainable: gardens, buidings, strategies

- **Sustainability** is the capacity to endure
- Landscape as living system – at **any** scale!
- Interaction of its three main elements:
 - Landscape structure
 - Functioning
 - Change

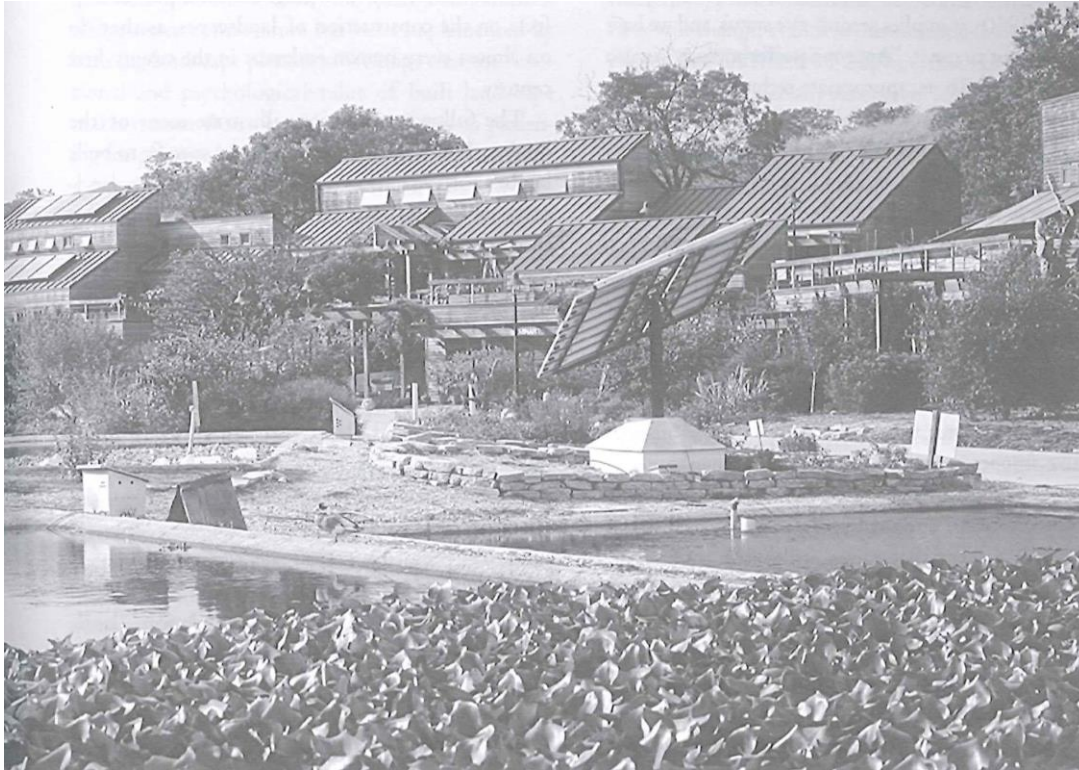


Figure 0.9 Tanner Springs Park in Portland OR, a “boutique wetland.” Though totally artificial, it is designed to simulate a functioning wetland. (Project: Atelier DresseitL. Photo: George Hazelrigg.)

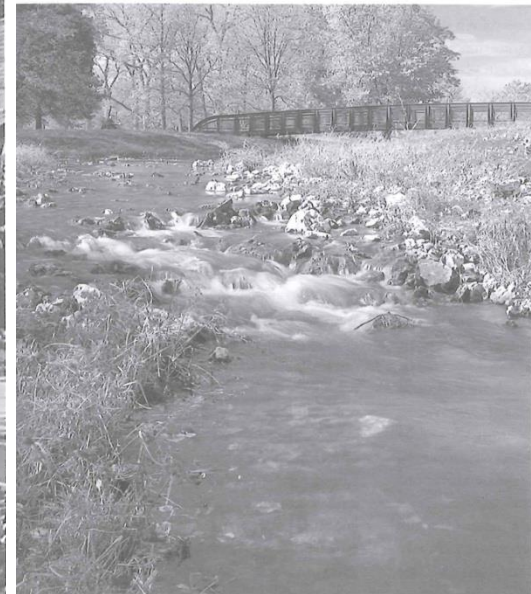
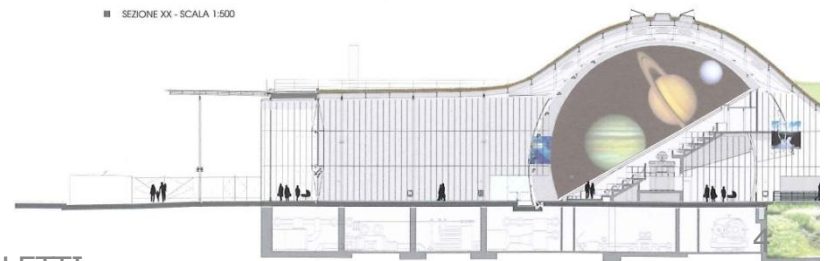
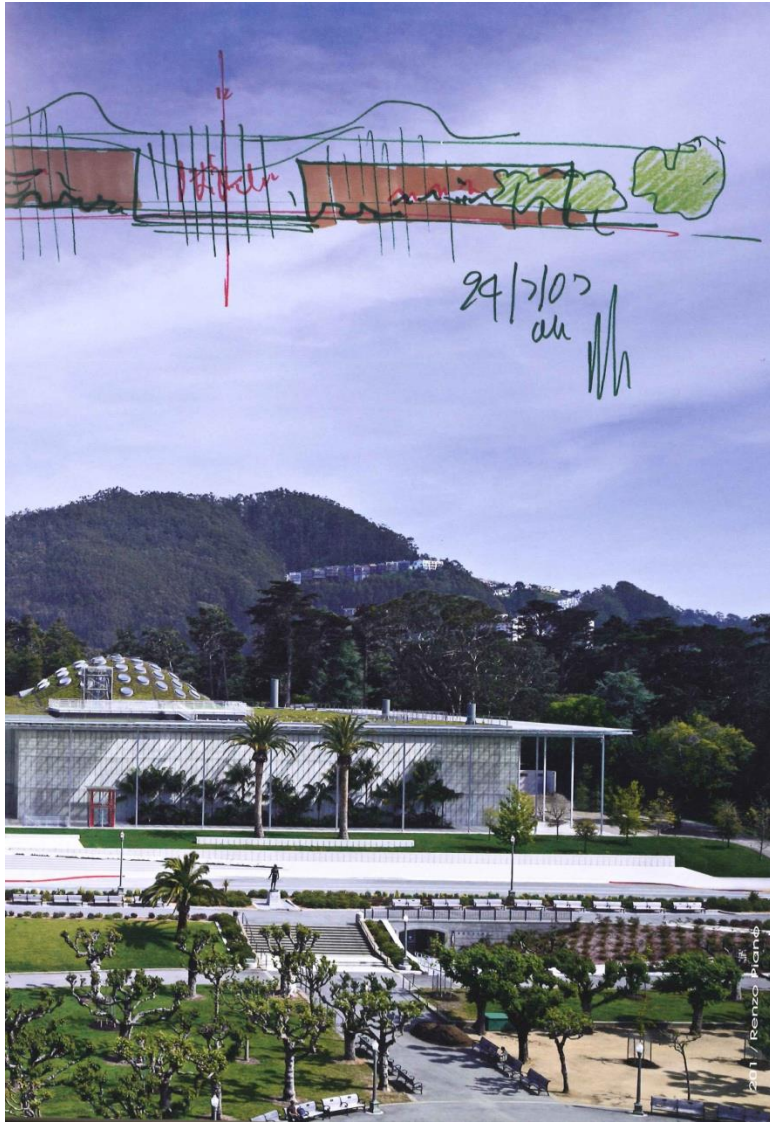


Figure 0.10 The River Returns (St. Louis): rather than “daylighting” the actual river, this facsimile was built, an example of “greenwash.” (Project: St. Louis Development Corporation. Photo: Scott Avetta.)

California Academy of Science, by Renzo Piano





G-Sky Green Wall Panels

Launch

Stratify

Fluid

Grooming

Digestive

Translate

Volatile

G-Sky Green Wall Panels are a patented modular planting system for 90° angled walls. They are suitable for interior and exterior wall applications and can thrive in a variety of environmental conditions. The 1x1ft (0.3x0.3m) panels can be arranged as needed to create a living cladding for a wall. The arrangement and selection of plants can also be customized to suit local conditions and design requirements.

The modular panels are made of an ultraviolet-resistant, non-flammable Polypropylene. Each panel contains a growing medium of natural peat block, encased in a non-woven, non-corrosive, non-flammable fabric. The panels are ~3in (82 – 89mm) deep and are mounted on a stainless steel or aluminum frame that is anchored into a concrete wall or other adequate structure.

The panels are shipped with 13 or 25 established plants growing out of the large perforations in the fabric. Plant species are selected for their ability to grow in 90° orientation and within the environmental conditions of the installed wall. Water is supplied to the plants with the G-Sky GWP Drip Irrigation System with pressure-compensating emitters. Depending on the selection, plants generally grow approximately 3 to 8in (76 – 200mm) from the panels to form a dense carpet of living green material.

Anticipated maintenance for the system is low. Weeding and some plant replacement are expected. Pruning and liquid fertilizer application, injected via the drip system, are recommended to keep the plants healthy over the long term.

Manufacturer: G-SKY, Inc.



Launch

Stratify

Fluid

Grooming

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Volatile

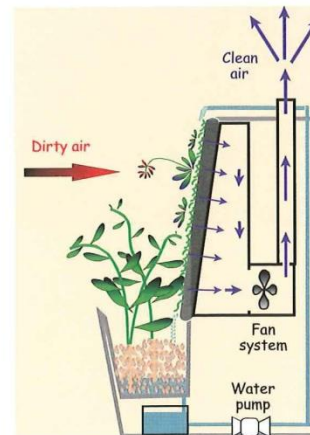
The Naturaire® Indoor Air Biofilter is an interior plantscape – a vertical hydroponic green wall that contains a range of foliage and flowering plants capable of removing common indoor contaminants. The technology is based on biofiltration, a technology commonly found in industrial application to remediate waste air streams. Air is passed over a biologically active media (beneficial microbes) to break down the contaminants.

The plants are selected according to their ability to facilitate biofiltration, grow in the hydroponic media, and withstand indoor conditions with varying levels of light and temperature. Although a range of plants can be used, woody tropical species such as *Ficus spp.* and *Schefflera spp.* have been found to be very effective.

The construction of the green wall includes a 2in (5cm) thick synthetic mat, into which plants are rooted. Water is circulated from a reservoir in the base and pumped to the top of the wall where it trickles out to irrigate the plants. Air is actively drawn through the biofilter via a fan system that is installed in the back of the green wall. As the air passes through the irrigated plants, it is cooled, so that when distributed through the building's HVAC system it contributes to temperature regulation and conservation of cooling energy.

The Naturaire® Biofilter is robust and can be adapted to a wide range of retrofits or new building venues. It can improve the indoor environment by reducing contaminant levels, and by regulating temperature and humidity. Tested under laboratory conditions, up to 90% of the formaldehyde was removed with a single pass of the indoor air biofilter. Microbial action around the root zone degrades pollutants such as formaldehyde and benzene into their benign constituents such as water and carbon dioxide.

Manufacturer: Air Quality Solutions Ltd



Keeping and enhancing soil permeability as a priority

■ Weaving Porous and Nonporous Surfaces // Vogt Landschaftsarchitekten + Herzog & de Meuron

Prior to each game, nearly 70,000 spectators weave through a network of paths that lead up to Allianz Arena soccer stadium. The expanse of pathways accommodates visitors arriving from rail and bus stations, and the parking structure adjoining the arena. The paths meander and climb to the stadium on a greenroof that caps the parking structure.

Designed by Vogt Landscape Architects, the greenroof surface is conceived as a single continuous plane, where combined levels of porosity allow for a hybrid of flows – visitor circulation and stormwater infiltration.

The greenroof surface is constructed of interwoven porous and nonporous substrates, installed flush to form a seamless ground plane. Visually similar, the porous and nonporous areas are distinguished by the respective performance of each substrate. The nonporous asphalt paths accommodate foot and bike traffic, while the porous black lava substrate mimics the black asphalt paths, yet allows for stormwater infiltration, retention, and vegetation growth. THE ARRANGEMENT OF PATHS APPEARS AS IF THEY HAVE BEEN CUT BY ORGANIC FLOWS TRAMPLING PATHWAYS THROUGH A GIANT MEADOW. The porous mix is composed of lava rock, compost, and pumice, with the capacity to retain most of the roof stormwater runoff. Drainage pipes are embedded in the substrate to

Allianz Arena Munich Stadium, Munich, Germany

channel the excess water to the edge of the parking structure, where it is redirected into the surrounding tree-planted soil.

Due to load constraints, the greenroof is extensive (vs. intensive) and therefore the total thickness of the substratum is 20cm (7.8in). The concrete garage roof was waterproofed and applied with a base layer of asphalt, 9–15cm (3.5–5.9in) thick. A top layer consists of 3cm (1.2in) of basalt and chalk stone gravel reinforced asphalt for abrasion resistance.

THE BENEFITS OF THE POROUS AND ABSORPTIVE SURFACE ARE MULTIFOLD. THE INTEGRATED WATER RETENTION SOLUTION MINIMIZED THE NEED FOR A CONVENTIONAL DRAINAGE INFRASTRUCTURE, RESULTING IN COST SAVINGS. ECOLOGICALLY, THE REDUCTION OF PEAK WATER VOLUME DURING RAINSTORM EVENTS PREVENTS POLLUTED RUNOFF FROM ENTERING NEARBY STREAMS AND RIVERS, AND REDUCES FLOODING. Lastly, the reuse of water allows for vegetation growth, which in turn contributes to reducing the heat-island effect, ultimately making the new structure compliant with Germany's permitting process.

- 1 A weaving of porous and nonporous asphalt surfaces.
- 2 With the two grades of asphalt the seamless surface allows for vegetation growth.





2



3



4



5



6

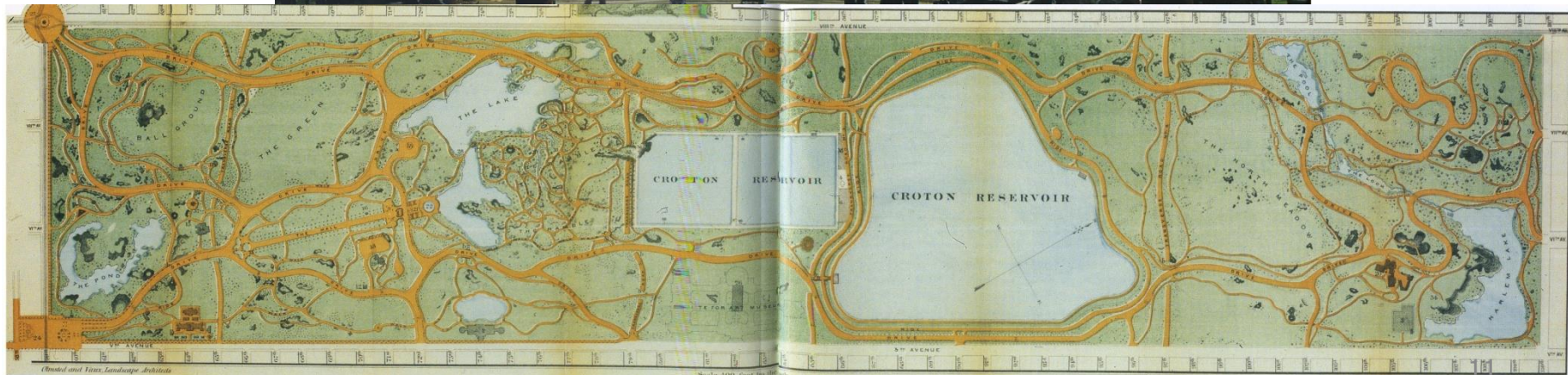


7



Parks and public grounds

Frederick Law OLMSTEAD, Central Park (New York)



Dr. Paolo CAMILLETI

Contemporary public landscapes



➤ From conventional and traditional design to innovative solutions

Figure 0.12 Shenyang students experience direct connection with their landscape and their food source. (Project: Turenscape. Photo: Turenscape.)

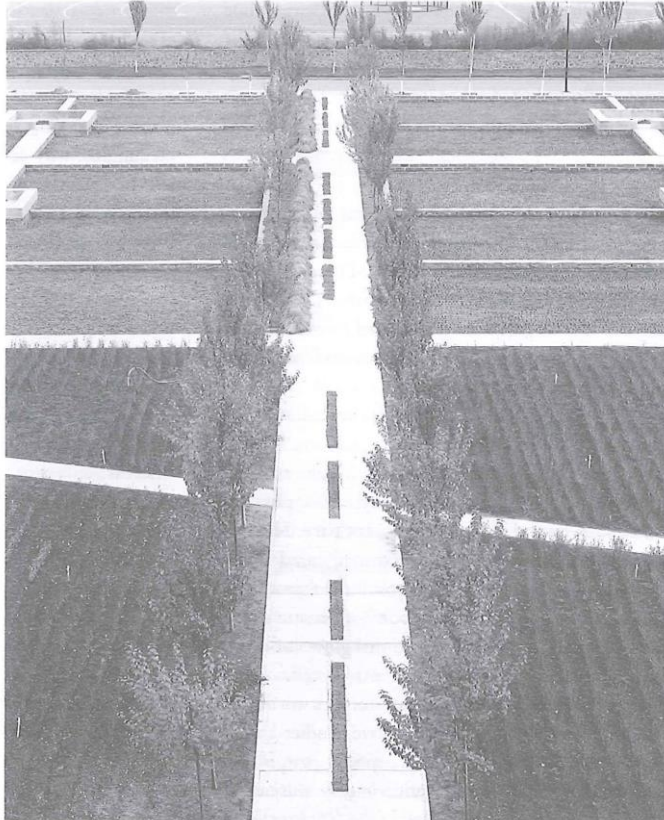


Figure 0.11 Shenyang University, China: sustainable rice paddies dissolve the separation between ornamental campus and food-producing landscape. (Project: Turenscape. Photo: Turenscape.)

➤ Always caring of the earth surface

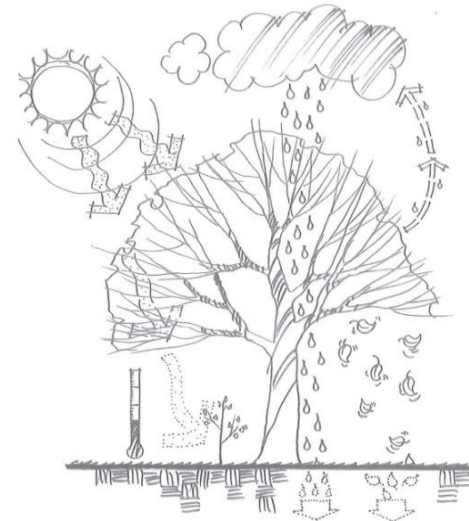


Figure 0.3 Vegetation cover protects soil, improves infiltration, and moderates climate. (Illustr.: Craig Farnsworth.)

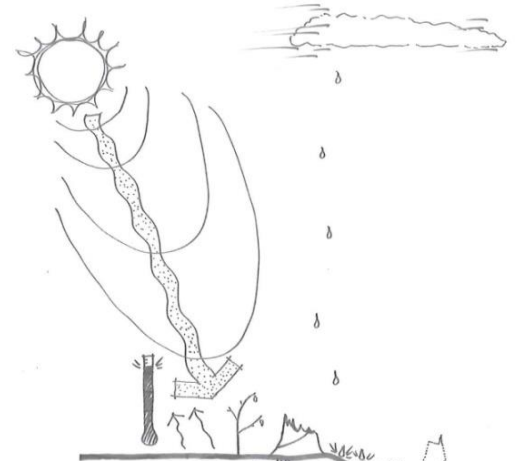
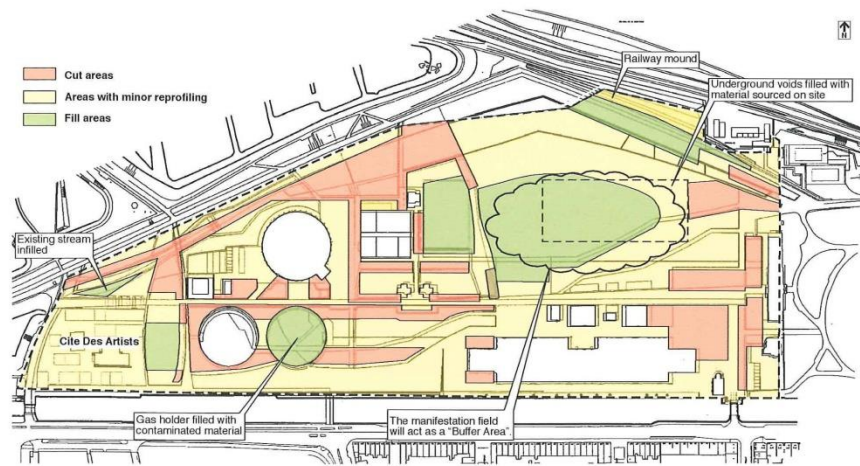
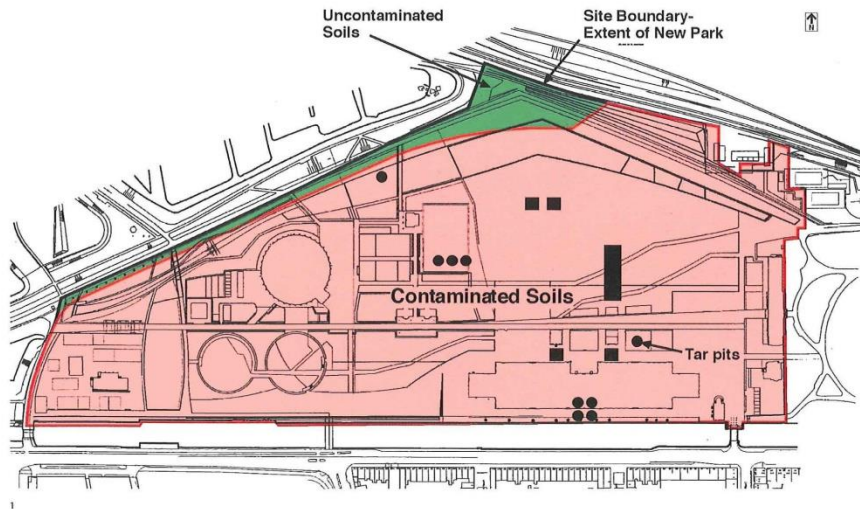


Figure 0.4 Vegetation clearance depletes and bakes soil, increases runoff, and warms climate, locally and cumulatively. (Illustr.: Craig Farnsworth.)

Culturaalpark, Amsterdam







Tree avenues



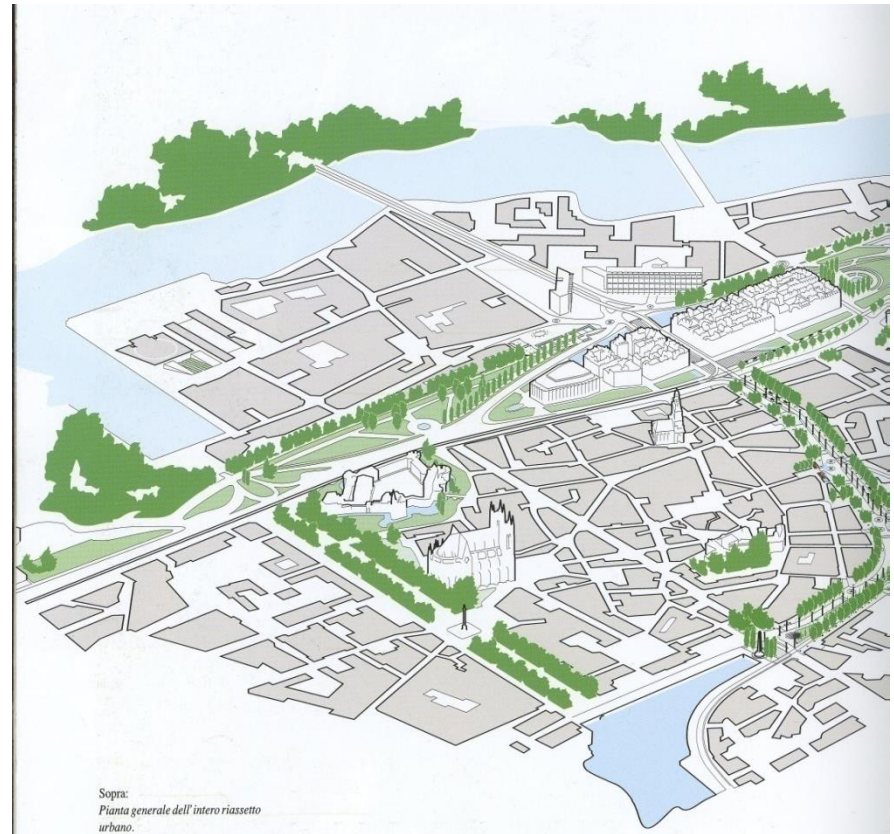
Pinus pinea in Via Flaminia, Roma



Mono-species tree avenues, *Tilia* ssp., Viterbo

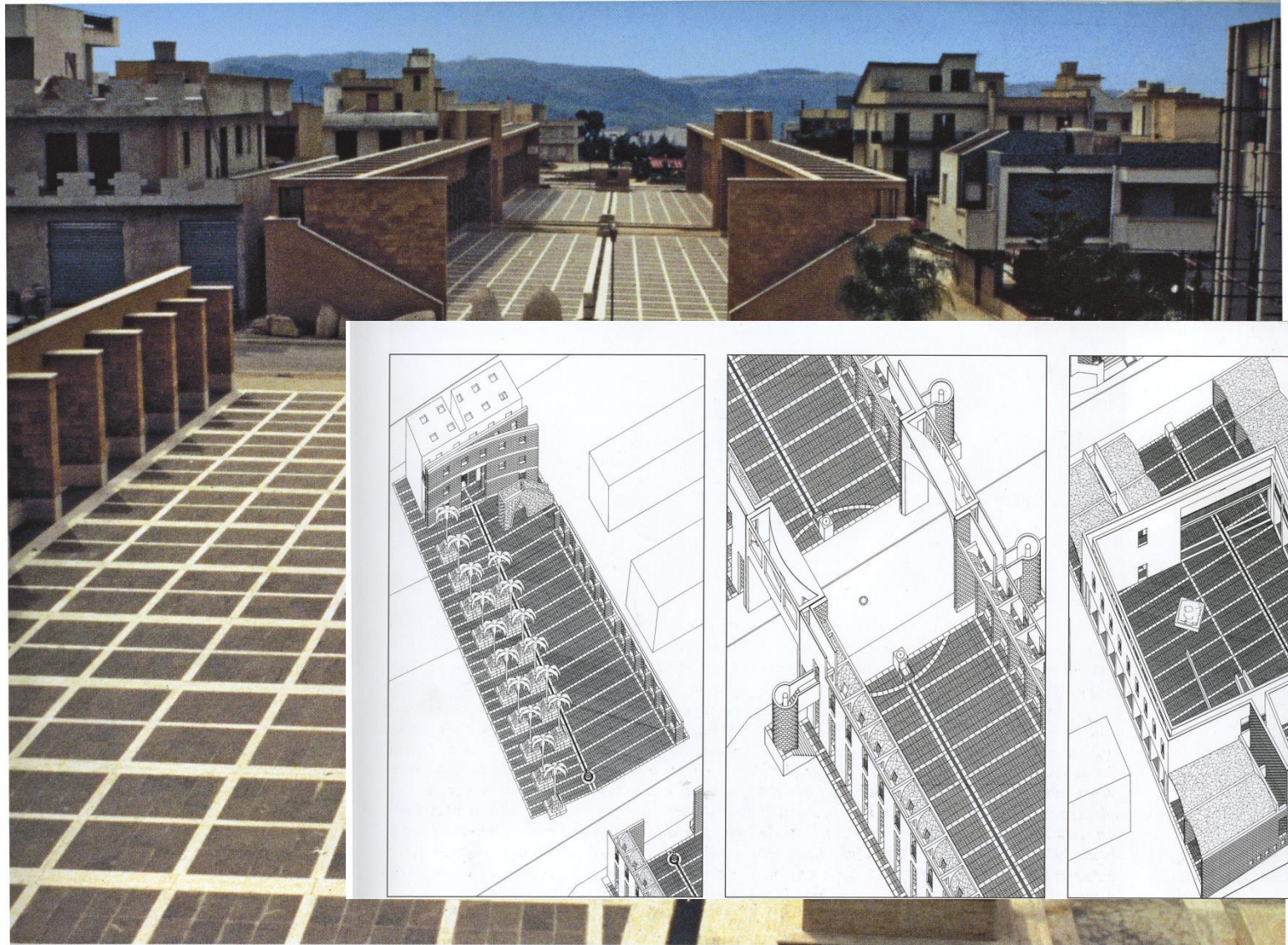


Pluri-species tree avenues, Viterbo



Nantes, 1992-2001
Bruno FORTIER, Italo ROSA

Squares



Square system at Gibellina (F.PURINI, L.THERMES)



Piazza Gabrio Rosa, Milano (CORVINO ed ass.)



Reichstag's square, Berlin

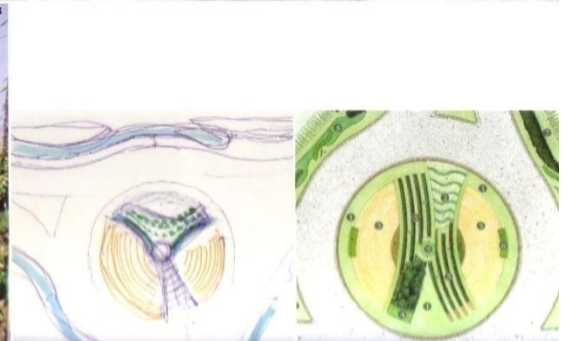
Roads and green components



Traffic circle at Valle Faul, Viterbo



Traffic circle at Orbassano, Turin



Traffic circle, Reggio Emilia (Silvia GHIRELLI, 2001)



Corso Mediterraneo, Turin

Dr. Paolo CAMILLETTI

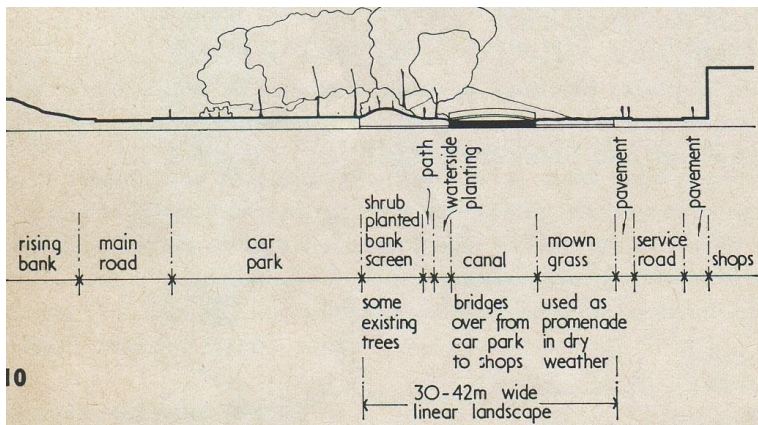
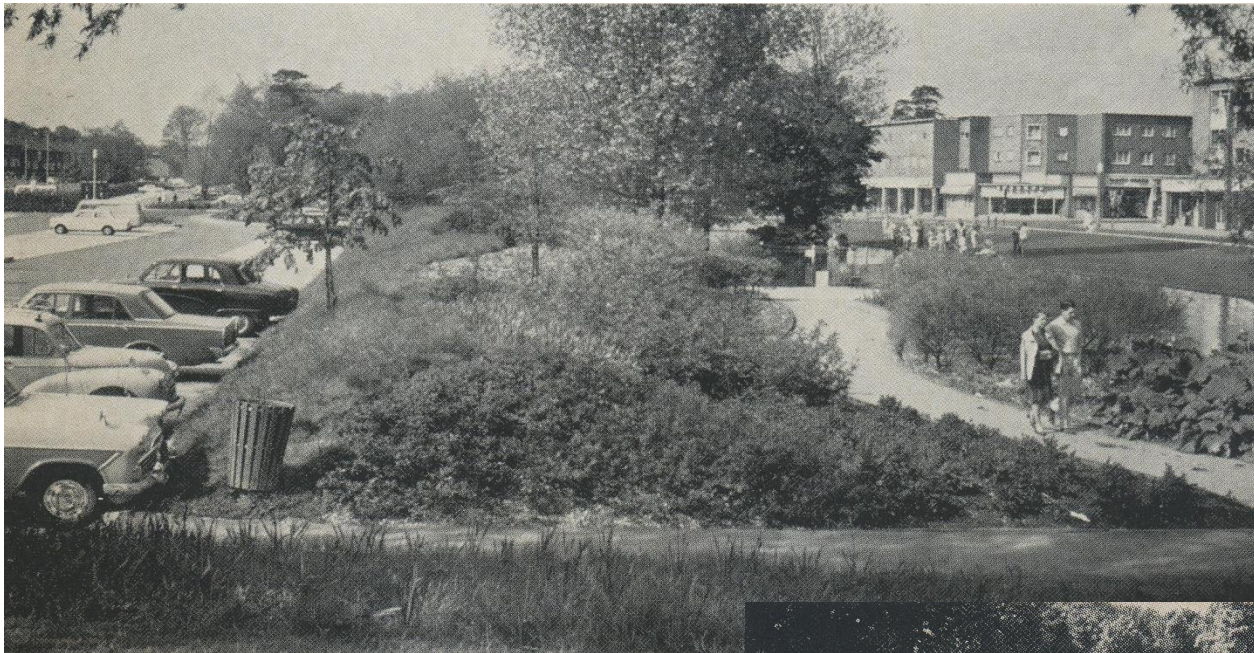


Linear gardens in Barcellona



Tramways, Barcellona

Parking areas



TANDY C., *Handbook of Urban Landscape*, ed. The Architectural Press, London 1970



Castel Traumattsdorf, Merano



La Alhambra, Granada

Marginal areas and grey infrastructures



Strada Le Terme, Viterbo



Bus terminal, Viterbo



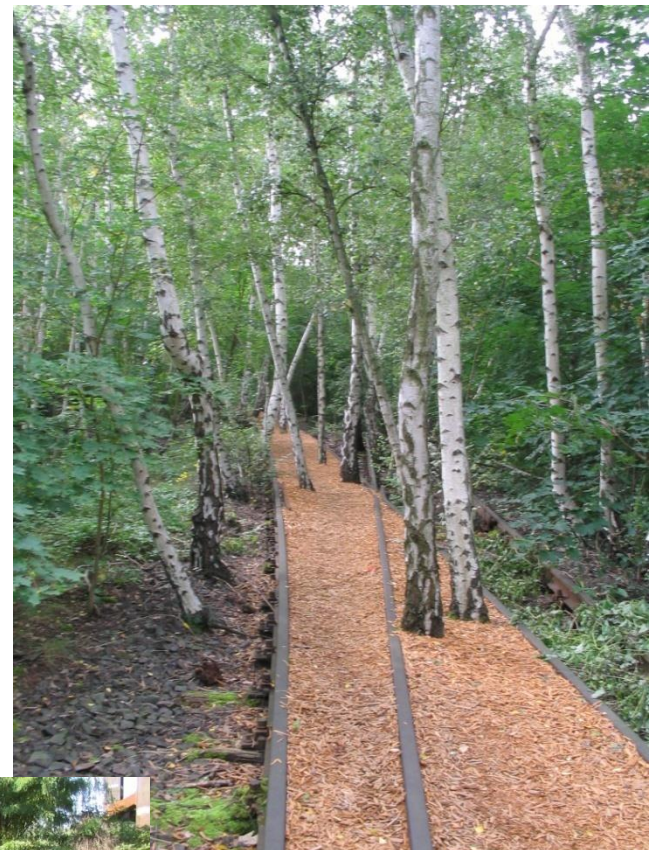
Francesca NEONATO
 Promenade plantée, Centro Affari, S.Donato Milanese 2002

Abandoned fabrics and areas: re-use



North Station Park, Berlin, Germany (Fugmann & Janotta)

Dr. Paolo CAMILLETTI

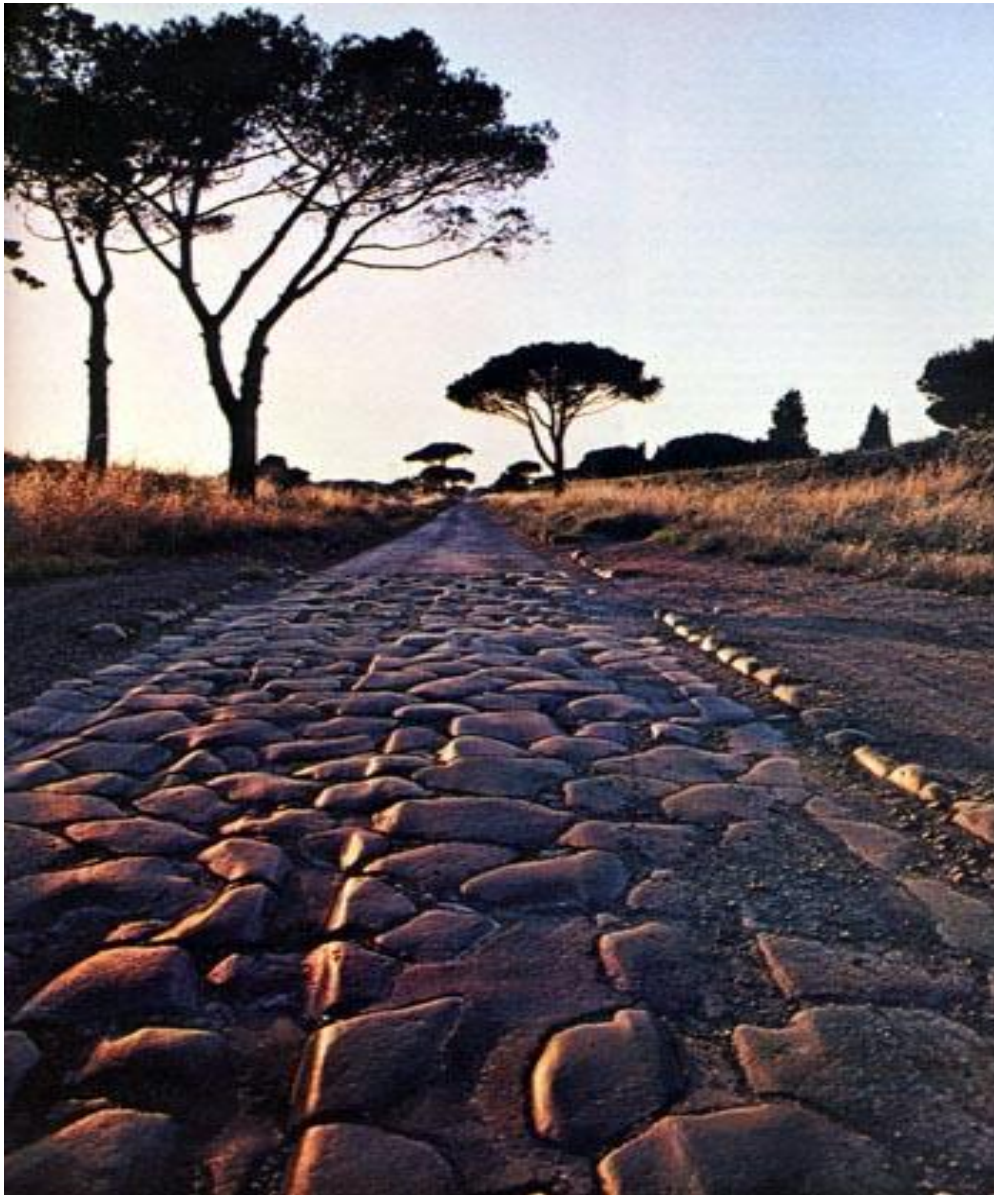


Natur-Park Schöneberger Südgelänge, Berlin

DI GIULIO CAMILLETTI

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Thank you!