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NAPOLI, 21.03.2019

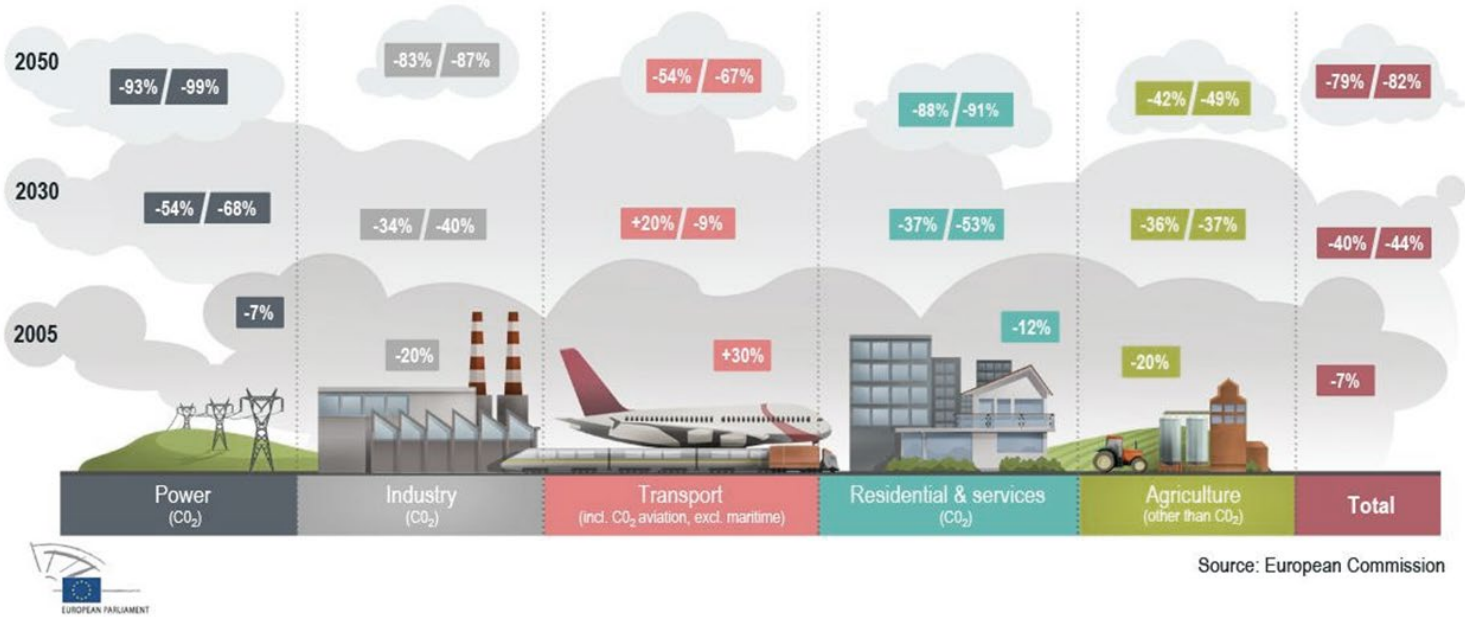
SVILUPPO SOSTENIBILE E PROGETTAZIONE CLIMATE PROOF

MARIO LOSASSO | Dipartimento di Architettura | Università di Napoli Federico II

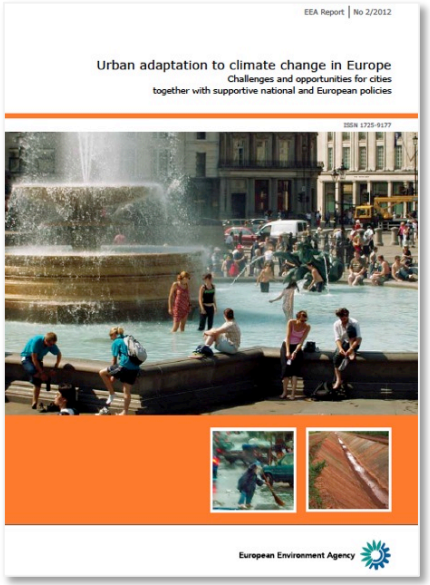
Gruppo di Ricerca DiARC: Mattia Leone, Enza Tersigni

LOW-CARBON STRATEGY FOR 2050

Targets compared to 1990 levels

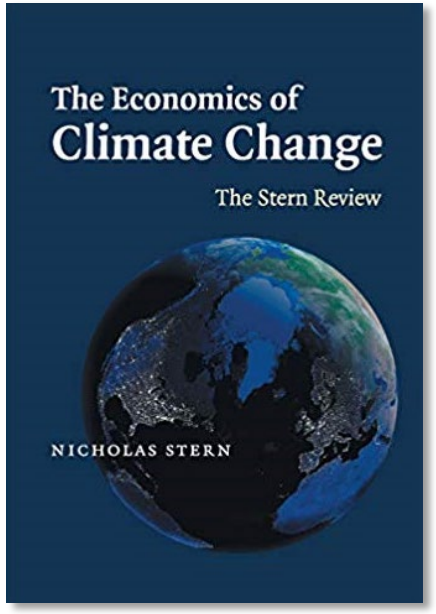


Source: European Commission



> Many cities are now facing impacts such as water scarcity, flooding and heatwaves, which are **expected to become more frequent and intense** than they are used to. **Cities need to start investing in adaptation measures** using ideas and best practice from around the world. The longer political leaders wait, the more expensive adaptation will become and the danger to citizens and the economy will increase.

Jacqueline McGlade EEA - European Environmental Agency Executive Director



MINIMUM COST OF CLIMATE CHANGE IMPACTS: **5% del PIL**

MAXIMUM COST OF CLIMATE CHANGE IMPACTS: **20% del PIL**

ADAPTATION AND MITIGATION ACTIONS AVERAGE COST: **2% del PIL**

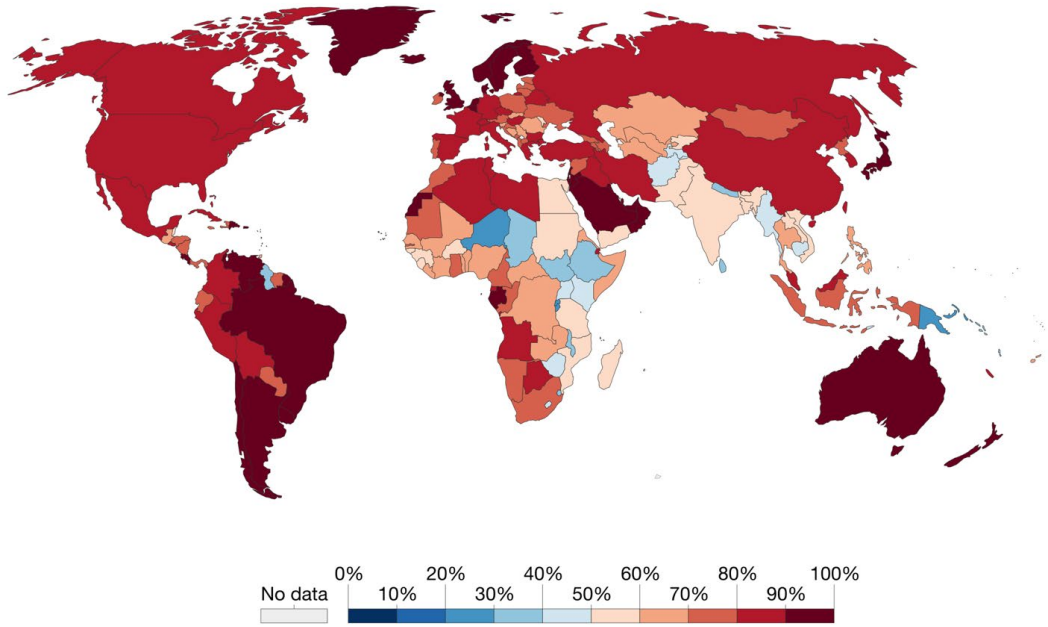
MAIN ACTION AREAS OF NEXT 10-20 YEARS: **energy, buildings, transport**

Nicholas Stern, The Economics of Climate Change

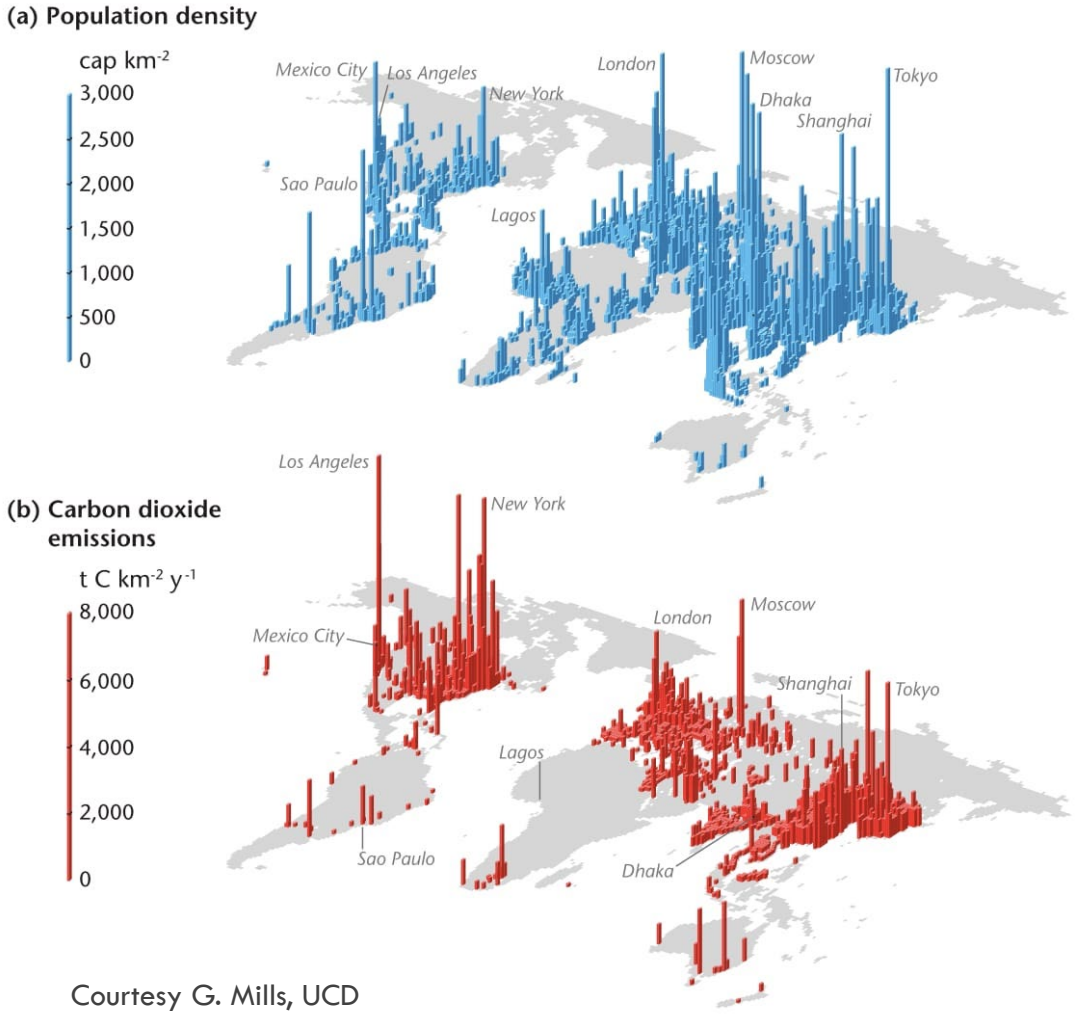
Share of the population living in urban areas (projected to 2050), 2050

Share of the total population living in urban areas, with UN Urbanization projections to 2050. Urban areas are defined based on national definitions which can vary by country.

Our World in Data

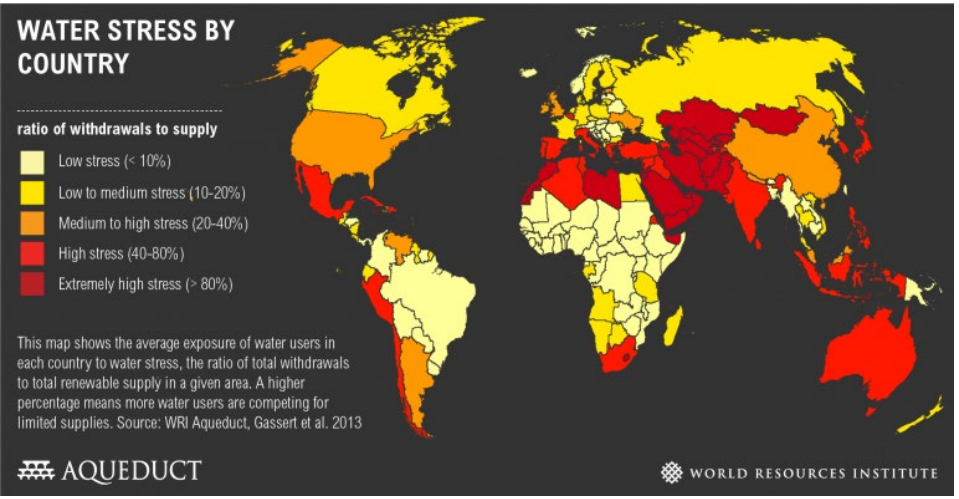


Source: OWID based on UN World Urbanization Prospects 2018 and historical sources (see Sources)

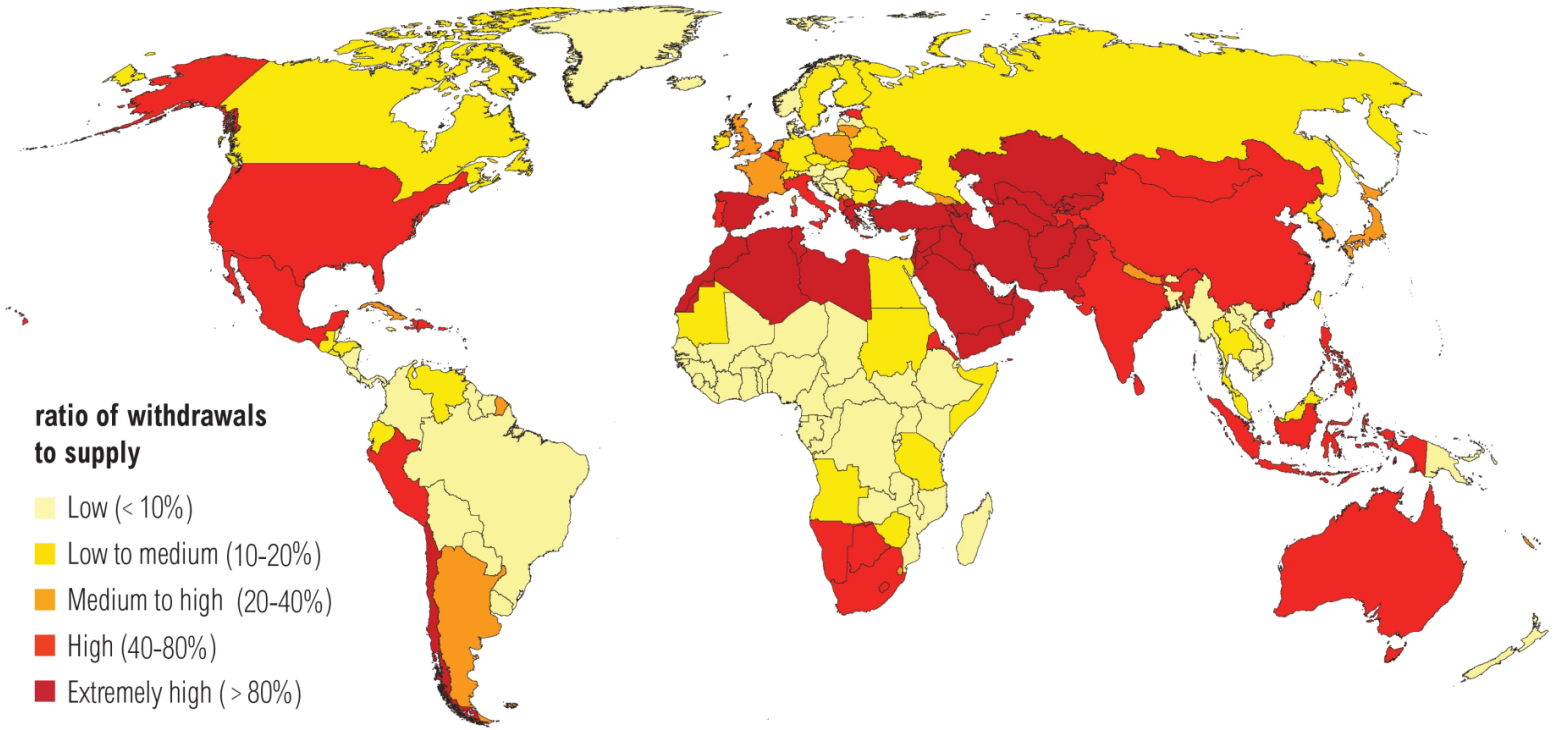


Courtesy G. Mills, UCD

CLIMATE CHANGE



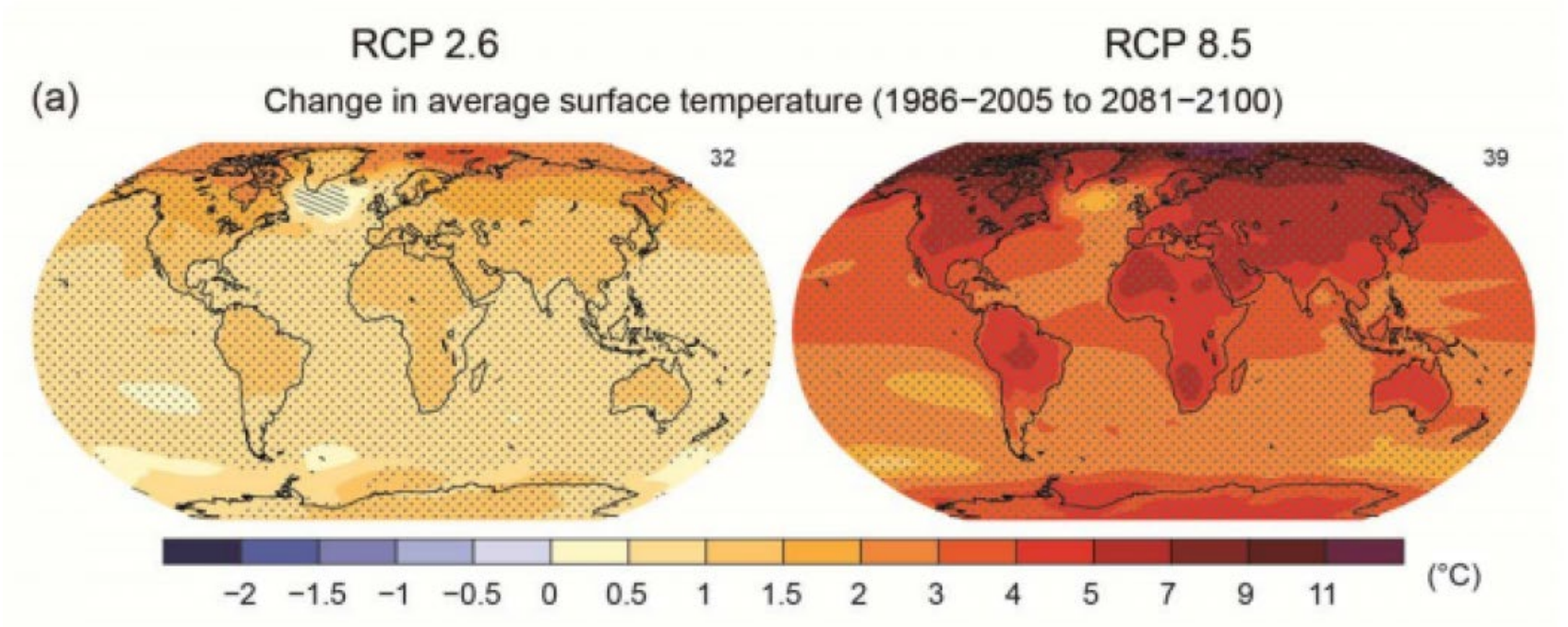
Water Stress by Country: 2040



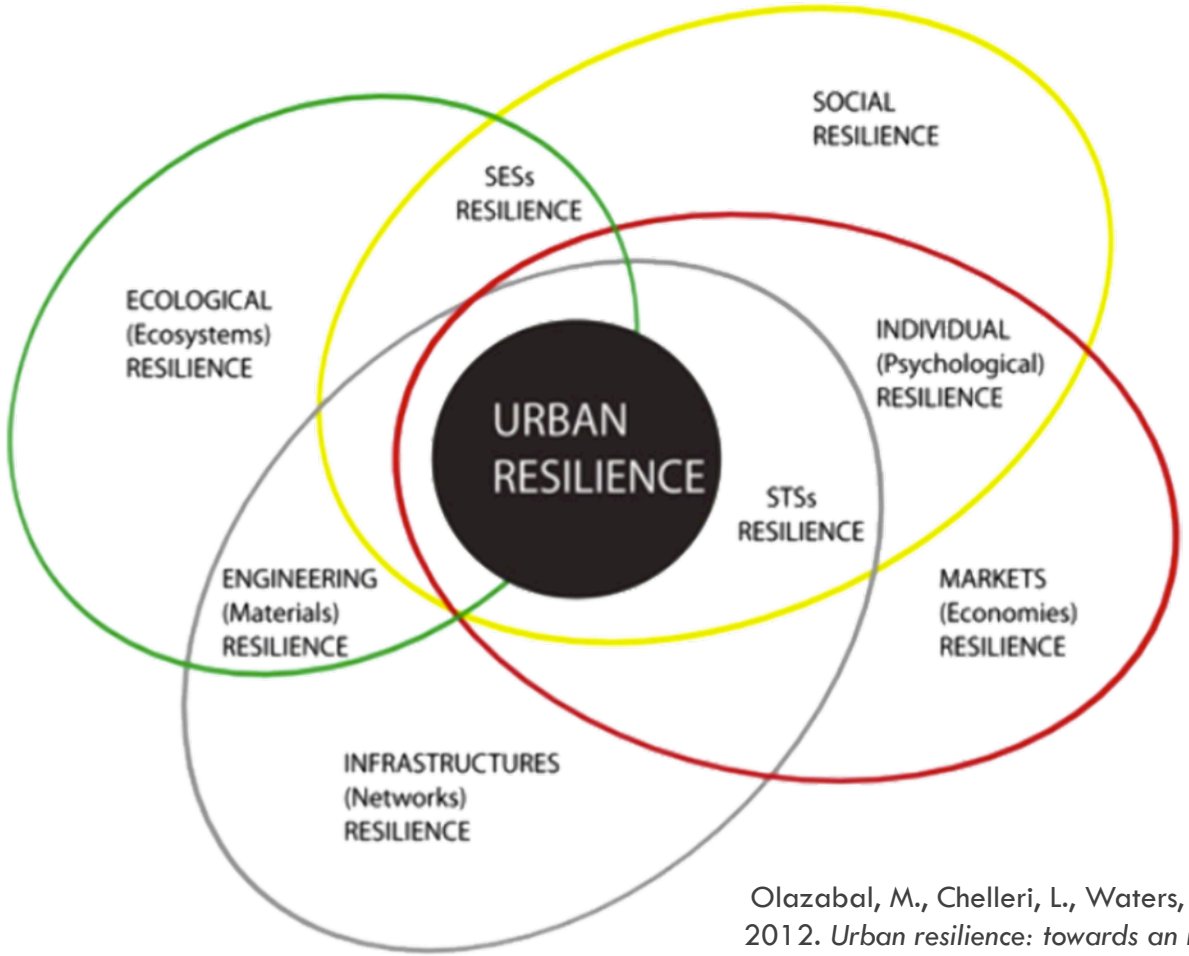
NOTE: Projections are based on a business-as-usual scenario using SSP2 and RCP8.5.

For more: ow.ly/RiWop

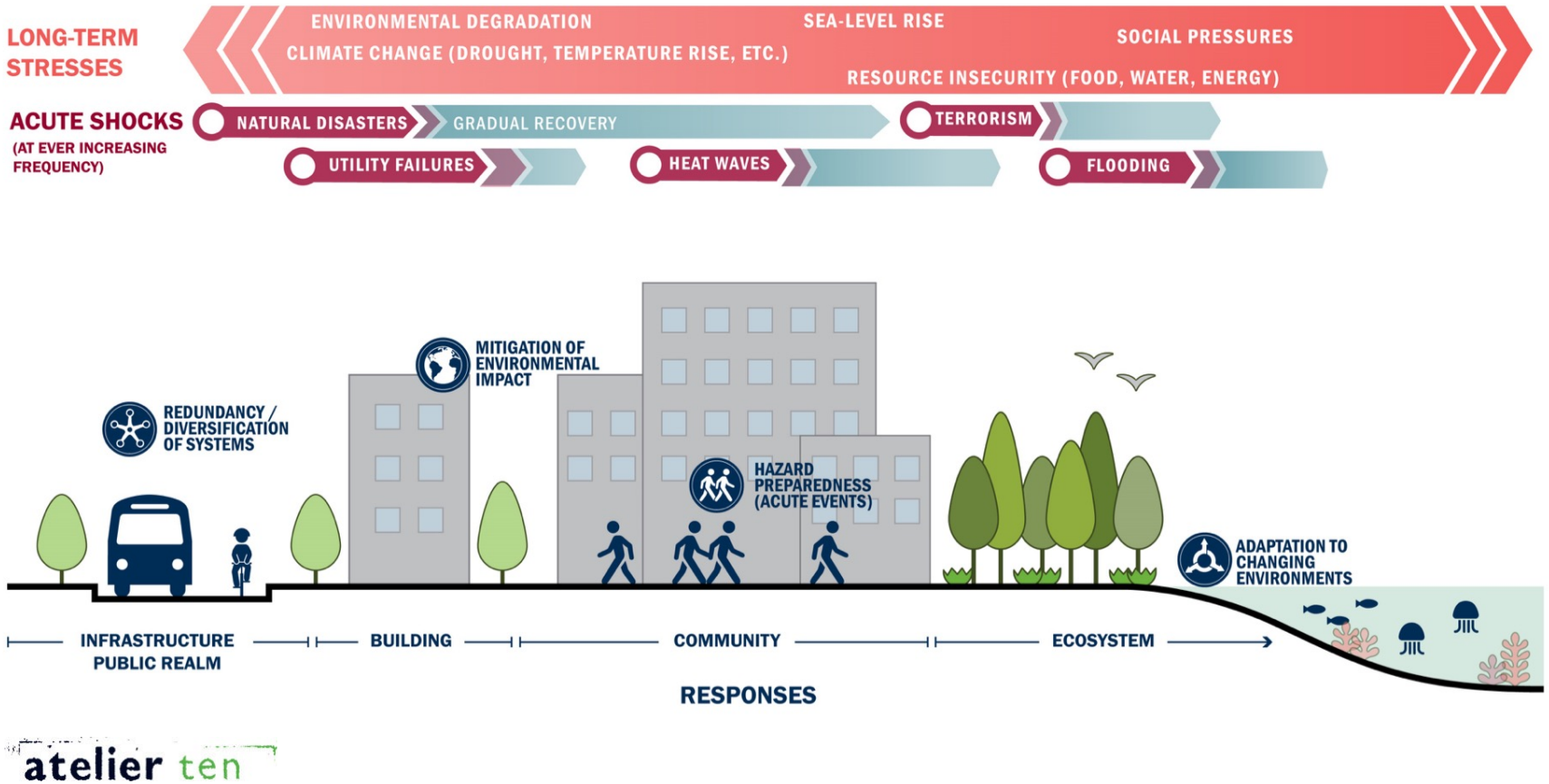
WORLD RESOURCES INSTITUTE



Different greenhouse gas concentration scenarios of annual mean surface temperature change in 2081– 2100. IPCC Working Group I



Olazabal, M., Chelleri, L., Waters, J. J., and Kunath, A. 2012. *Urban resilience: towards an integrated approach.*


LONG-TERM STRESSES
ENVIRONMENTAL DEGRADATION
CLIMATE CHANGE (DROUGHT, TEMPERATURE RISE, ETC.)
SEA-LEVEL RISE
SOCIAL PRESSURES
RESOURCE INSECURITY (FOOD, WATER, ENERGY)
ACUTE SHOCKS
(AT EVER INCREASING FREQUENCY)
NATURAL DISASTERS
GRADUAL RECOVERY
TERRORISM
UTILITY FAILURES
HEAT WAVES
FLOODING
MITIGATION OF ENVIRONMENTAL IMPACT
REDUNDANCY / DIVERSIFICATION OF SYSTEMS
HAZARD PREPAREDNESS (ACUTE EVENTS)
ADAPTATION TO CHANGING ENVIRONMENTS
INFRASTRUCTURE PUBLIC REALM
BUILDING
COMMUNITY
ECOSYSTEM
RESPONSES

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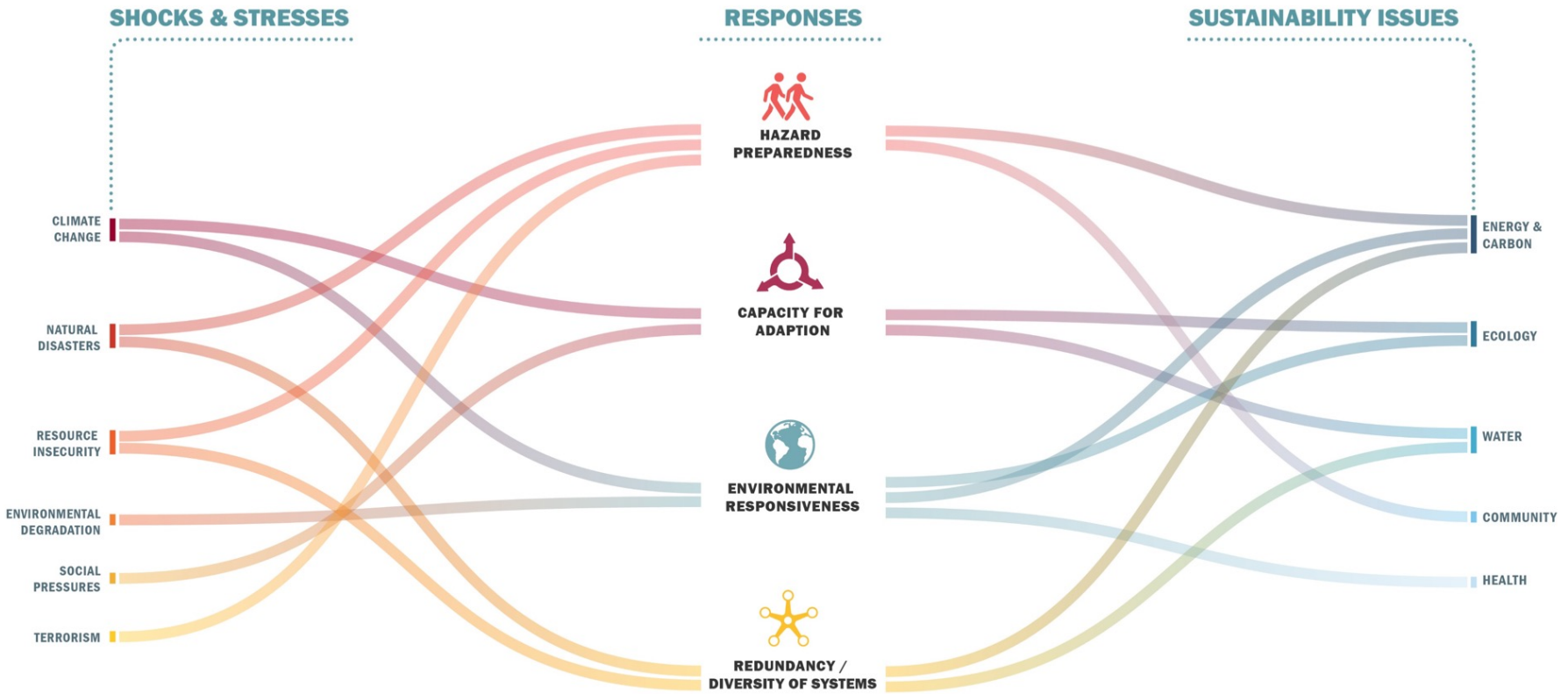
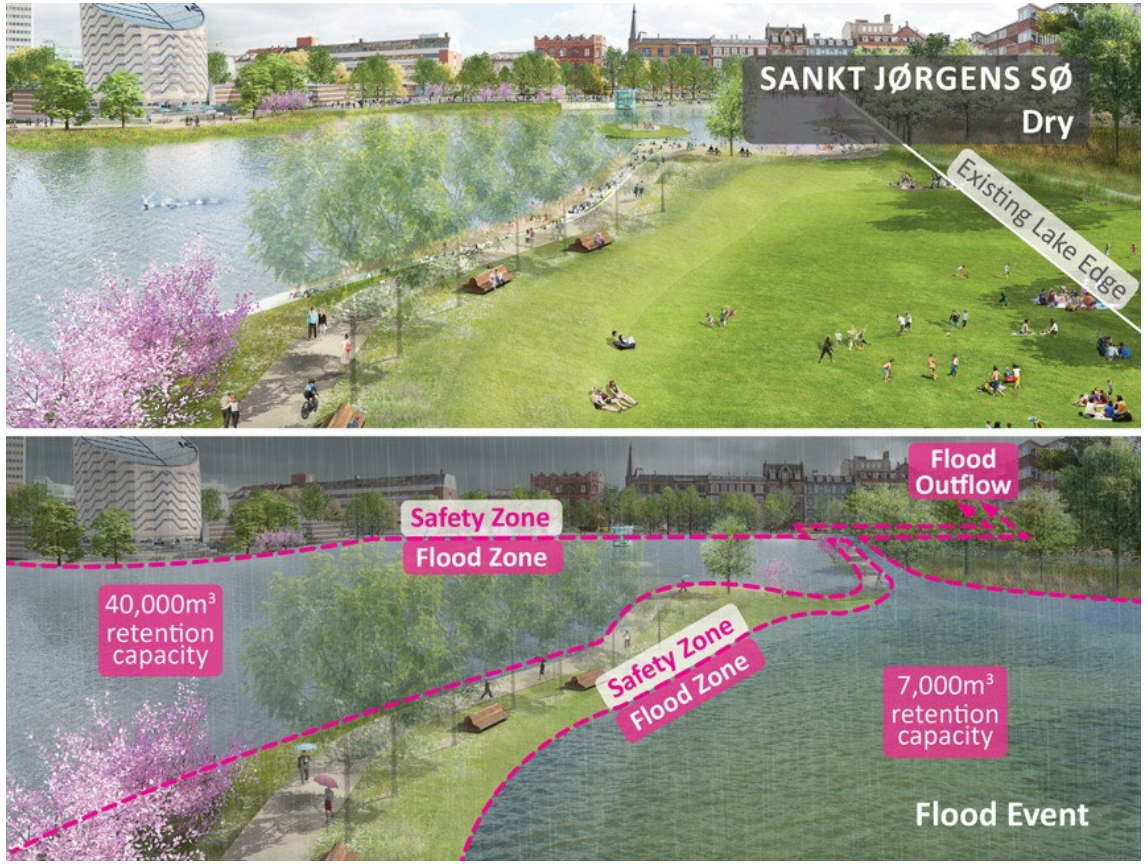

SHOCKS & STRESSES
RESPONSES
SUSTAINABILITY ISSUES
CLIMATE CHANGE
NATURAL DISASTERS
RESOURCE INSECURITY
ENVIRONMENTAL DEGRADATION
SOCIAL PRESSURES
TERRORISM
HAZARD PREPAREDNESS
CAPACITY FOR ADAPTION
ENVIRONMENTAL RESPONSIVENESS
REDUNDANCY / DIVERSITY OF SYSTEMS
ENERGY & CARBON
ECOLOGY
WATER
COMMUNITY
HEALTH

atelier ten

COPENHAGEN

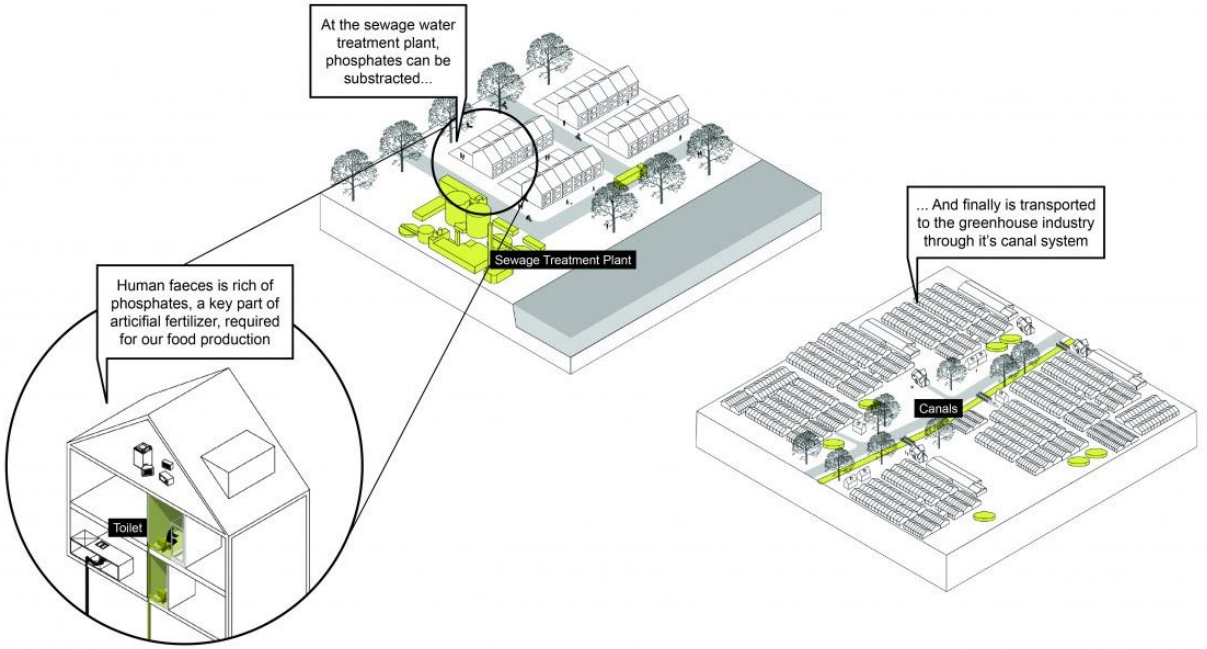

SØNDERBOULEVARD
Dry
Existing Street Profile
Safety Zone
Flood Pathway
3,300 l/s flow capacity
EVERYDAY RAIN
30% DISCONNECTION
from existing combined
SEWER system.
Flood Event

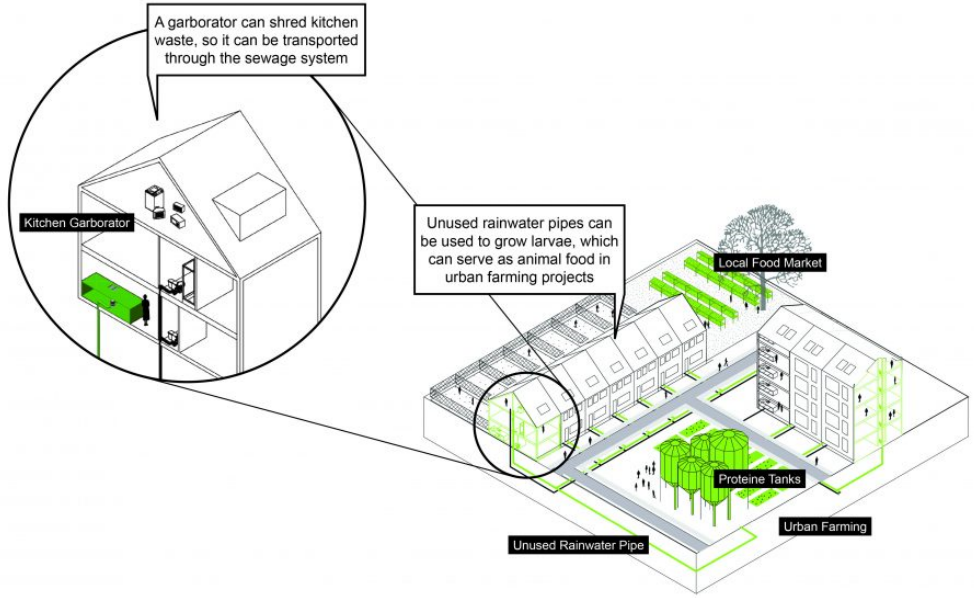

SANKT JØRGENS SØ
Dry
Existing Lake Edge
Flood Outflow
Safety Zone
Flood Zone
40,000m³
retention
capacity
Safety Zone
Flood Zone
7,000m³
retention
capacity
Flood Event

COPENHAGEN

San Kjeld

ROTTERDAM

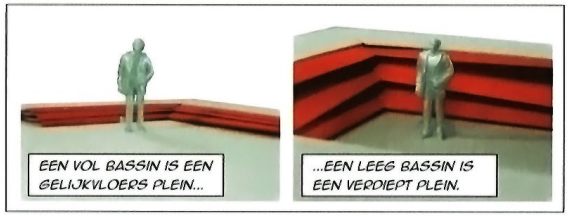

At the sewage water treatment plant, phosphates can be substracted...
Sewage Treatment Plant
... And finally is transported to the greenhouse industry through it's canal system
Canals
Human faeces is rich of phosphates, a key part of articifial fertilizer, required for our food production
Toilet


A garborator can shred kitchen waste, so it can be transported through the sewage system
Kitchen Garborator
Unused rainwater pipes can be used to grow larvae, which can serve as animal food in urban farming projects
Local Food Market
Proteine Tanks
Urban Farming
Unused Rainwater Pipe

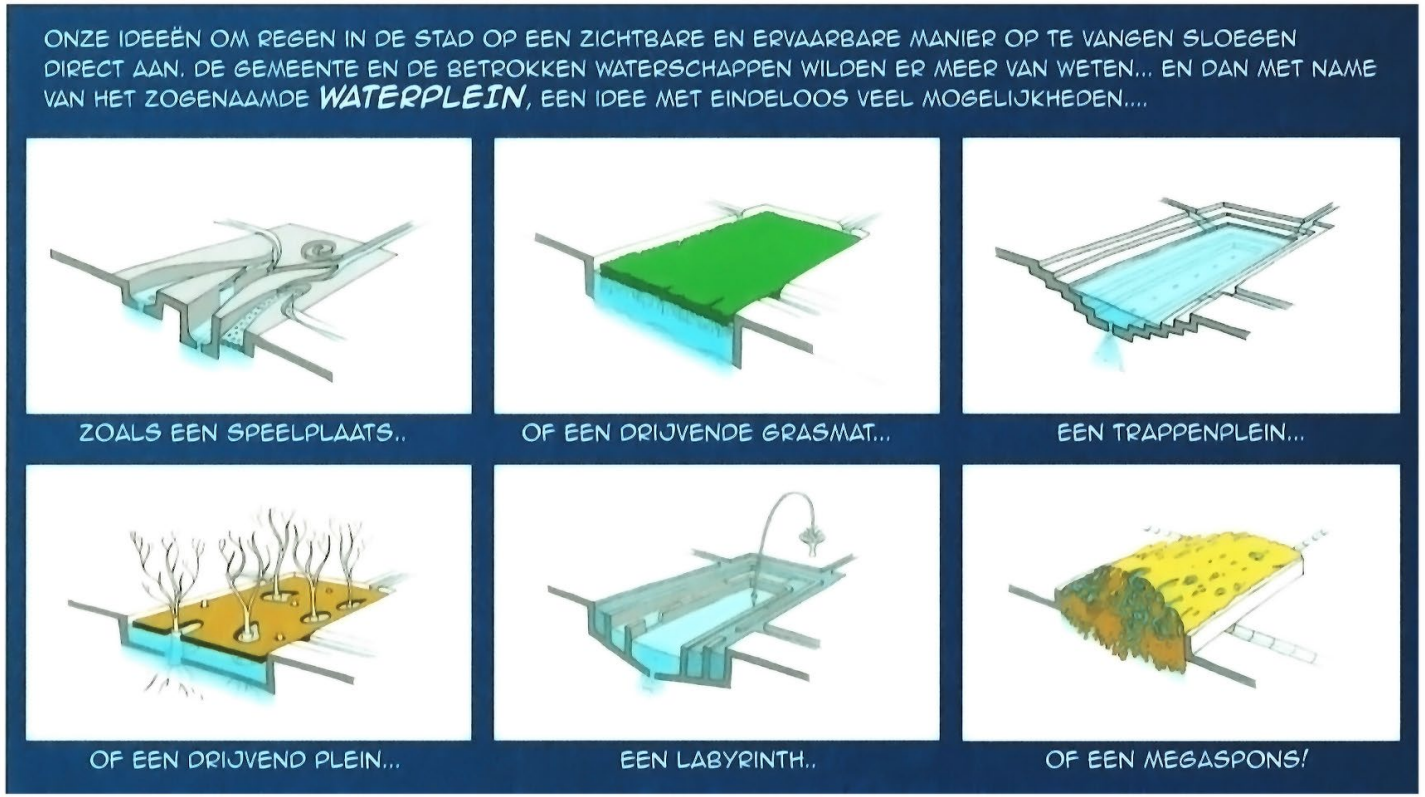
ROTTERDAM

Water square Benthemplein

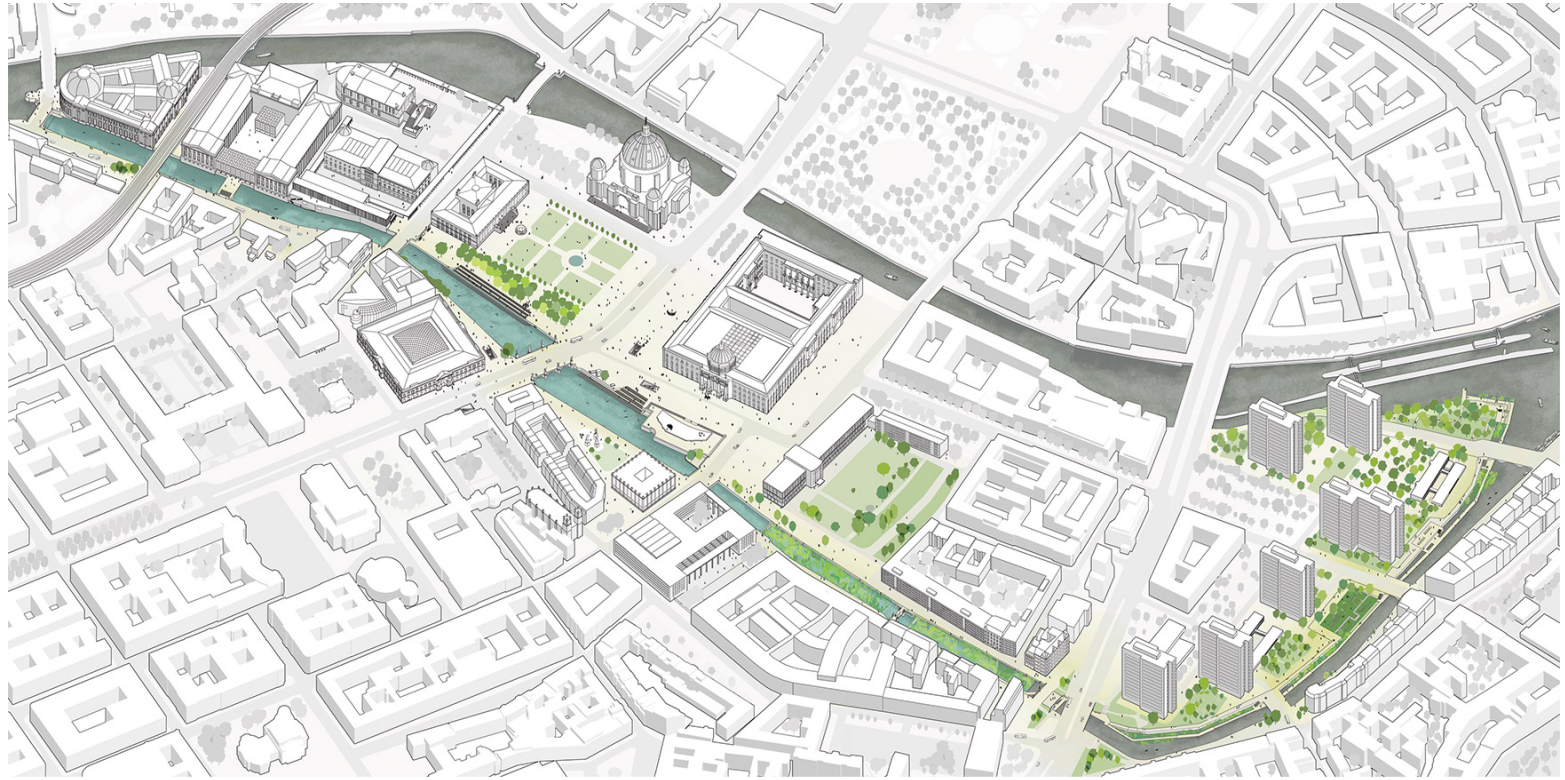
ROTTERDAM



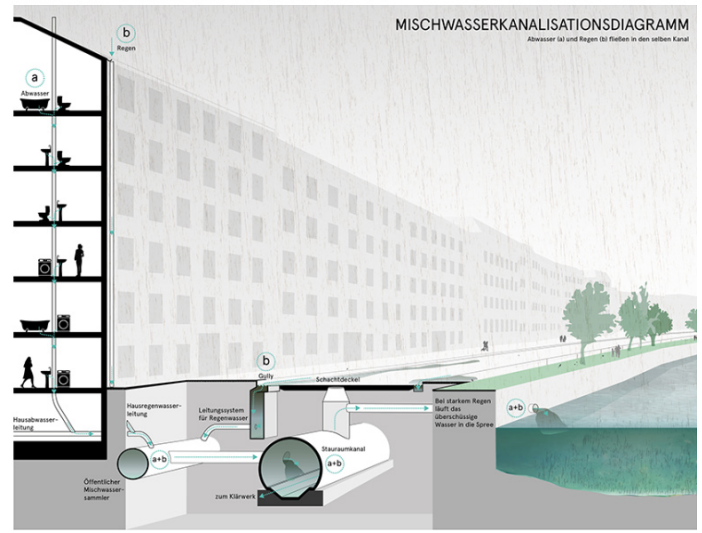
Boer F. et al. 2010



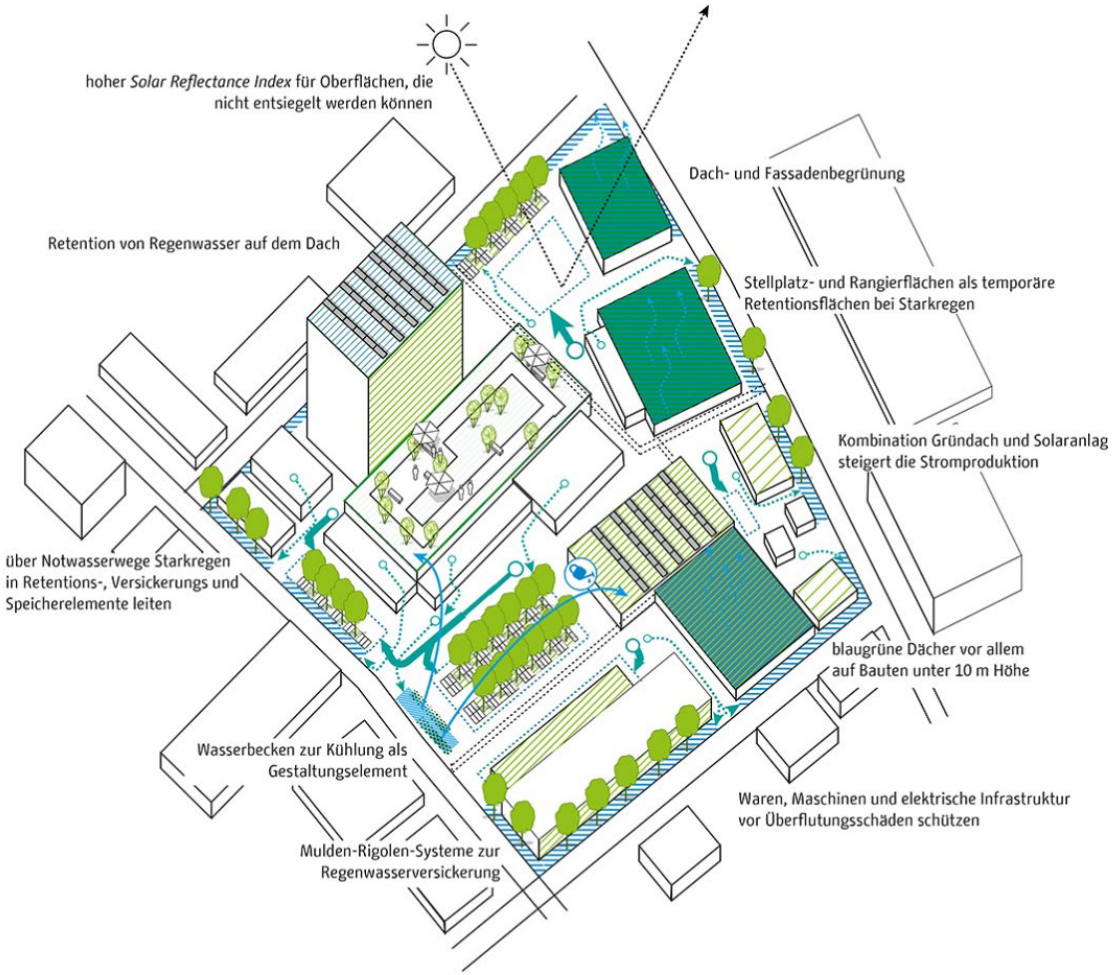
BERLIN




rotisserie

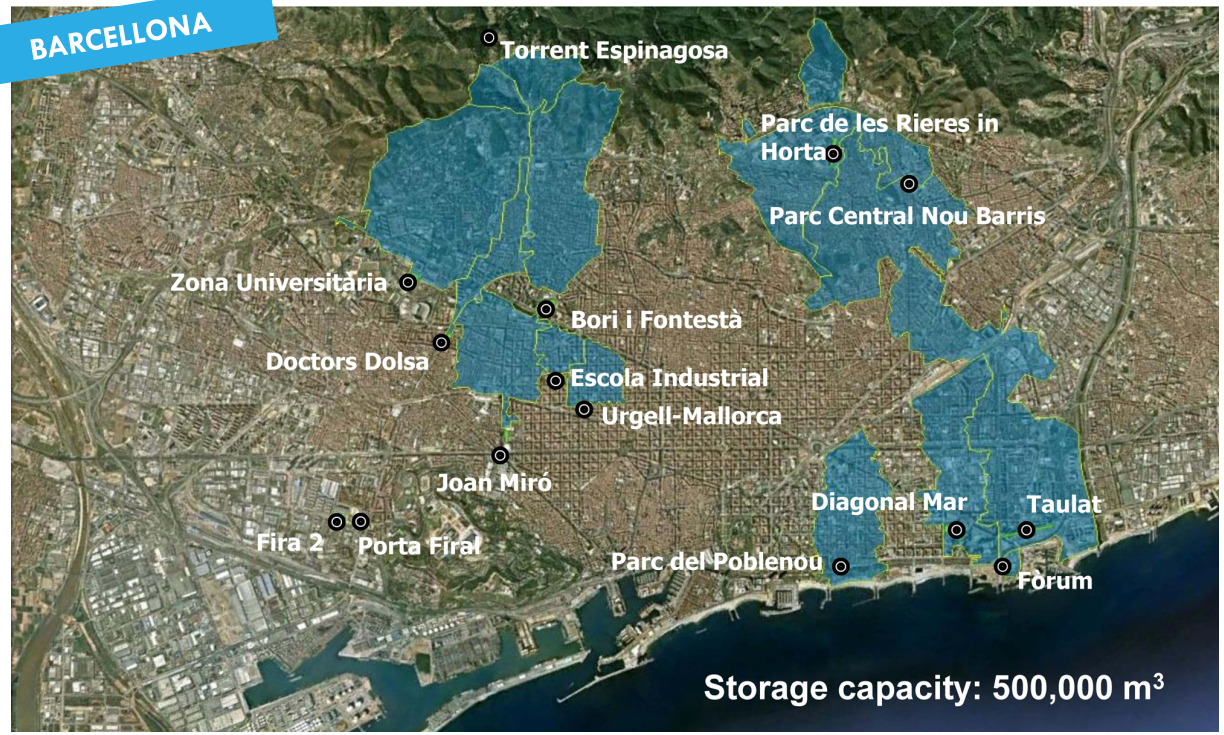

MISCHWASSERKANALISATIONSDIAGRAMM
Abwasser (a) und Regen (b) fließen in den selben Kanal
b
Regen
a
Abwasser
b
Gully
Schachtdeckel
Hausregenwasser-leitung
Leitungssystem für Regenwasser
Hausabwasser-leitung
a+b
Stauraumkanal
a+b
Bei starkem Regen läuft das überschüssige Wasser in die Spree
a+b
Öffentlicher Mischwasser-sammler
zum Klärwerk

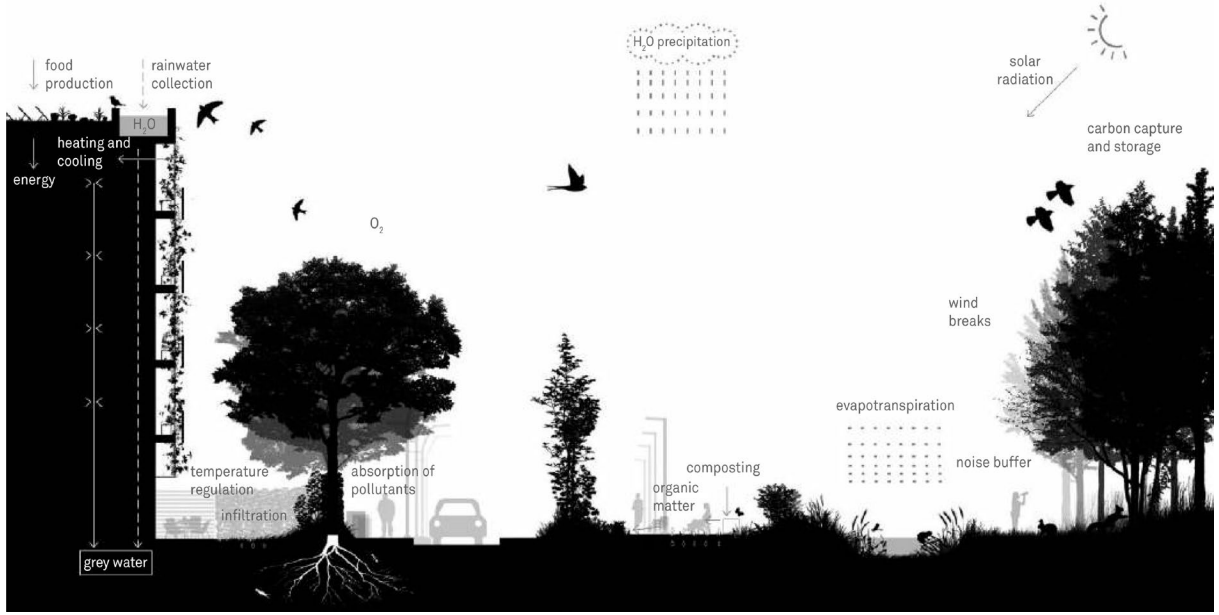
BERLIN



	Versiegelung vermeiden	Versickern statt entwässern	Zurückhalten und Abfluss verlangsamen	Über Notwasserwege ableiten
Maßnahmen	Entsiegelung	Flächenversickerung	Retentionsdach	Straßenraum als Notwasserweg
		Muldenversickerung	Stauraum Straße	
	Anlegen von teilentsiegelten Flächen	Mulden-Rigolen-Versickerung	Stauraum Stellflächen	Mulde als Notwasserweg
		Rohr-Rigolen-Versickerung und Schachtversickerung	Stauraum Sportplatz	
			Retentionsbeet	
Orte				

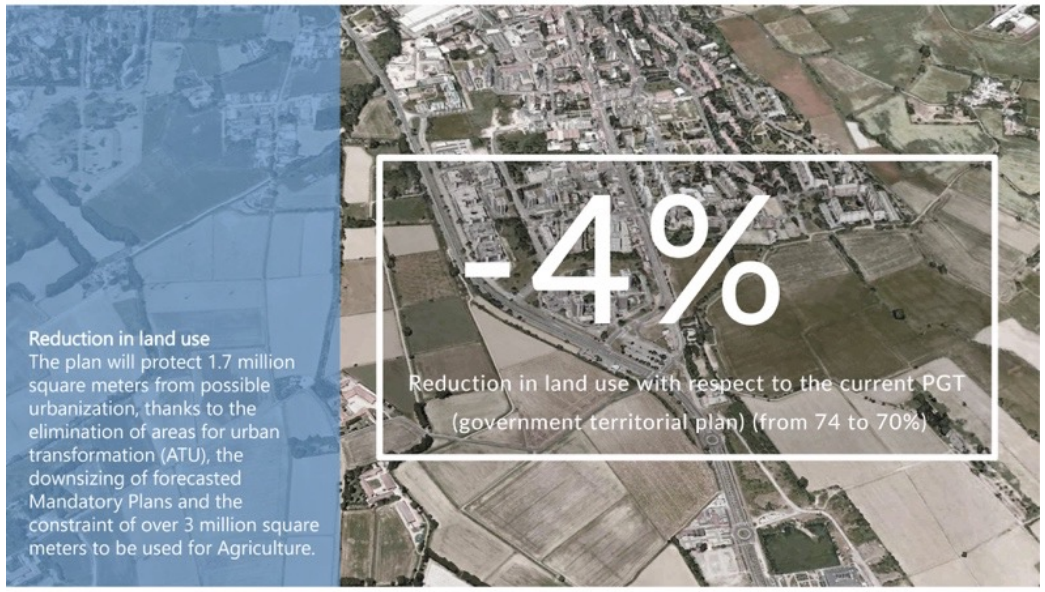
BARCELLONA





urban green corridors
landscaped areas or areas with natural vegetation
urban area with major presence of private greenery

MILANO

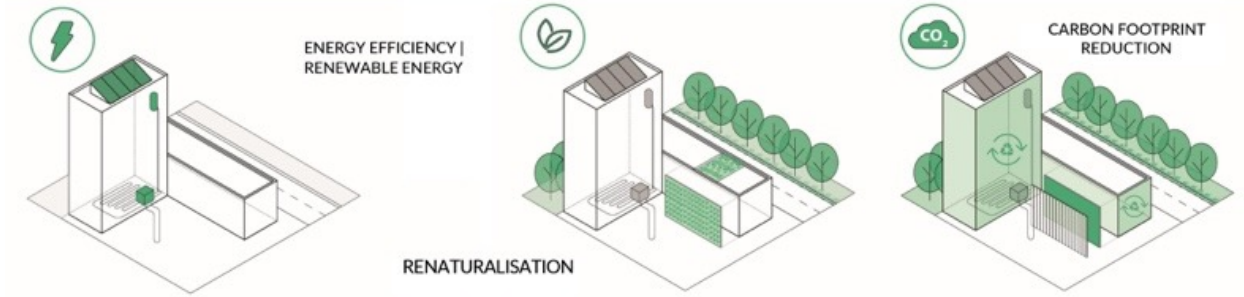


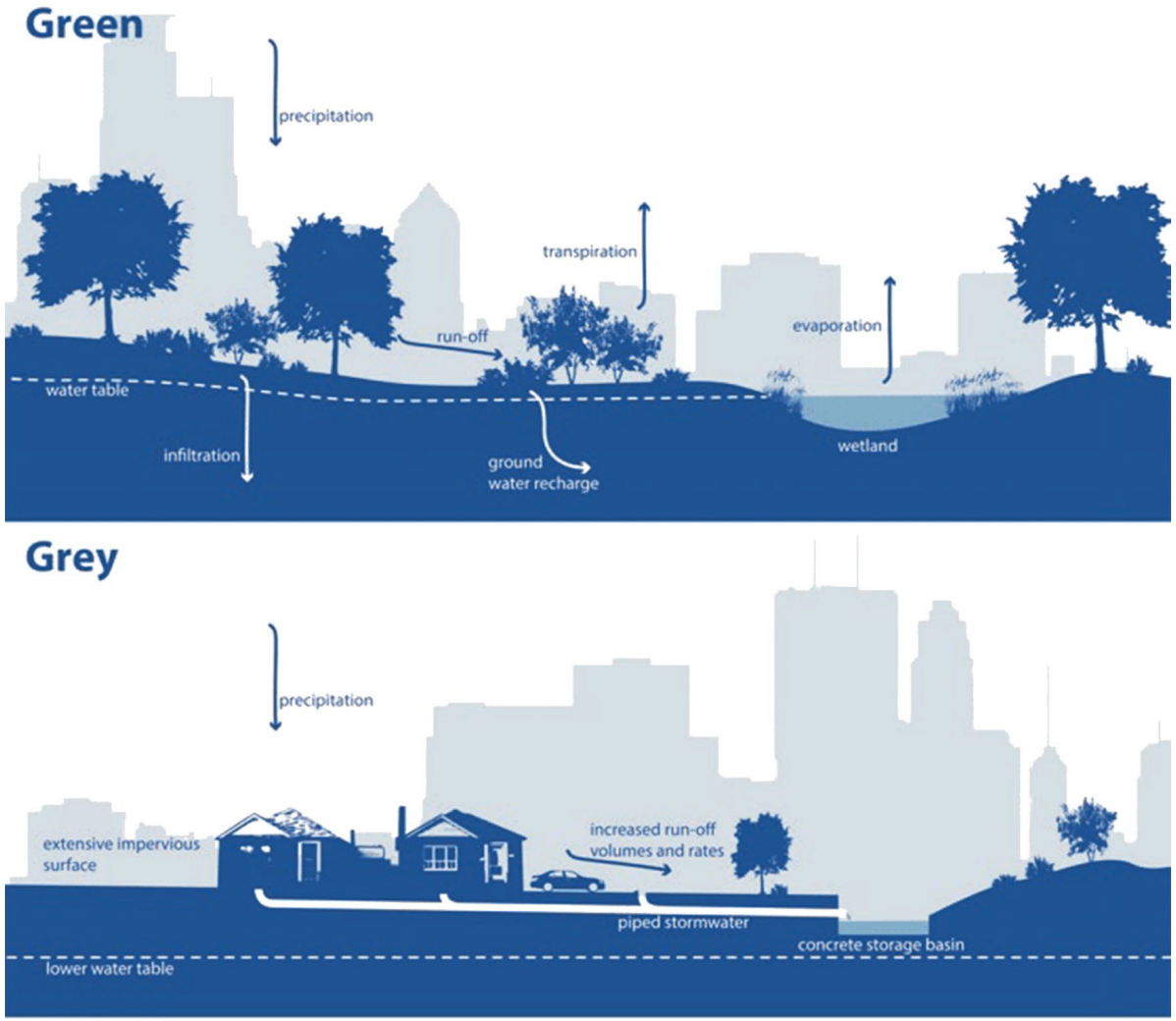
MAKING ROOM FOR THE ENVIRONMENT

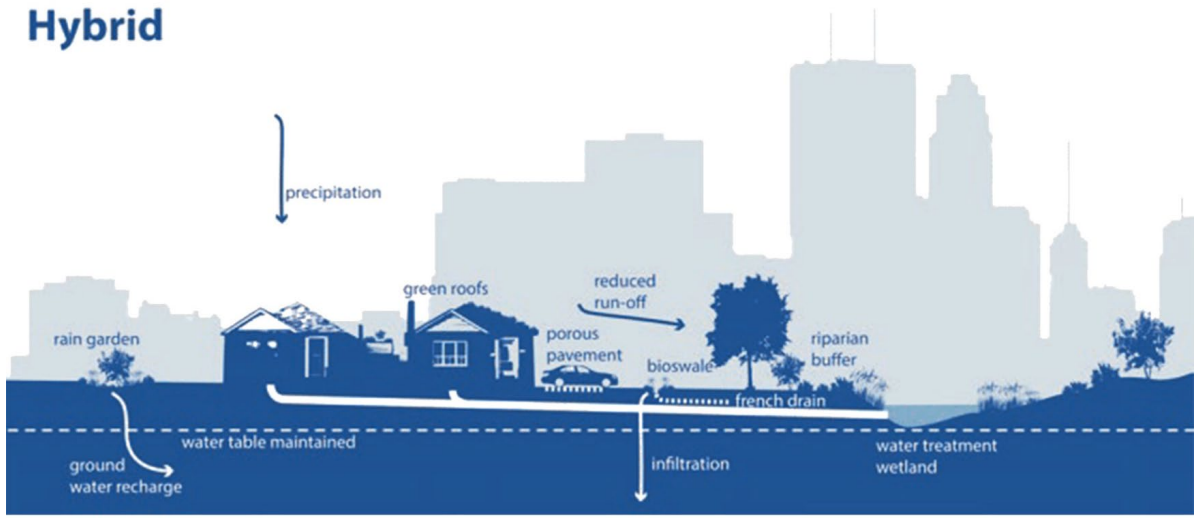
Projects for land and water include combining the North and South park to make a large Metropolitan park which, thanks to the plan, will provide Milan with 1.5 million m2 of agricultural land adjacent to the South Milan Agricultural Park. Additional areas will be safeguarded along large environmental systems.

SUSTAINABILITY STANDARDS

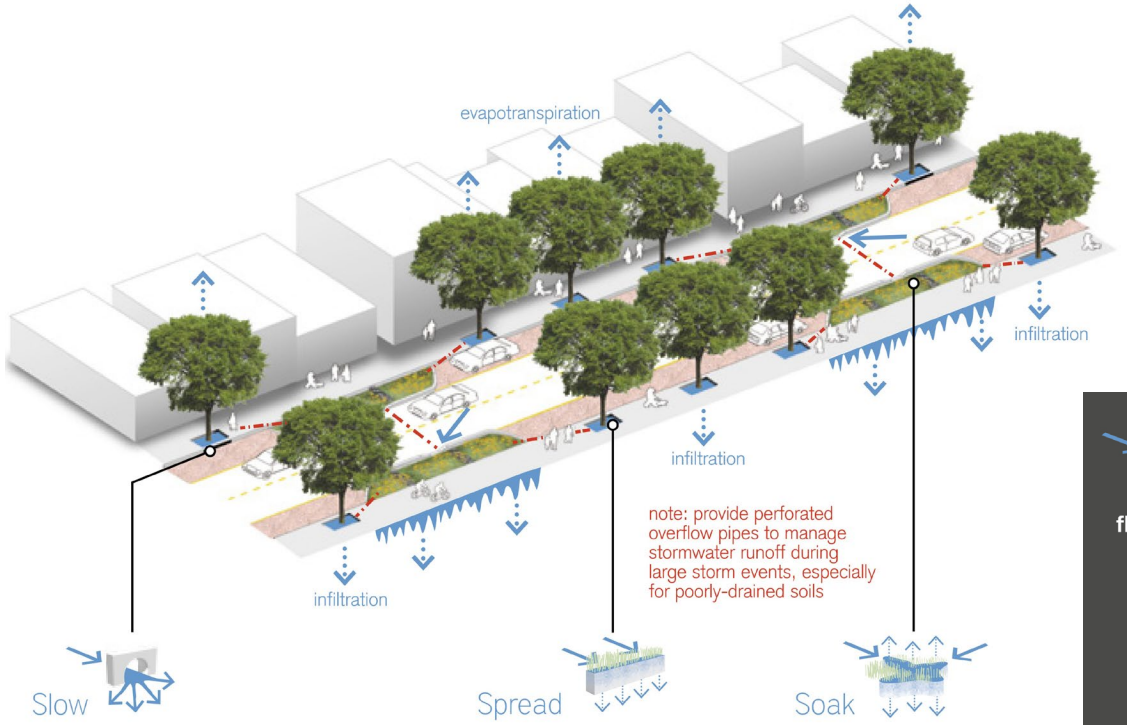
High performance rules for new construction will allow a reduction in energy consumption, restore and maximize permeable areas in the city, and to reduce carbon footprint, both in new construction and in upgrading/renovation interventions.

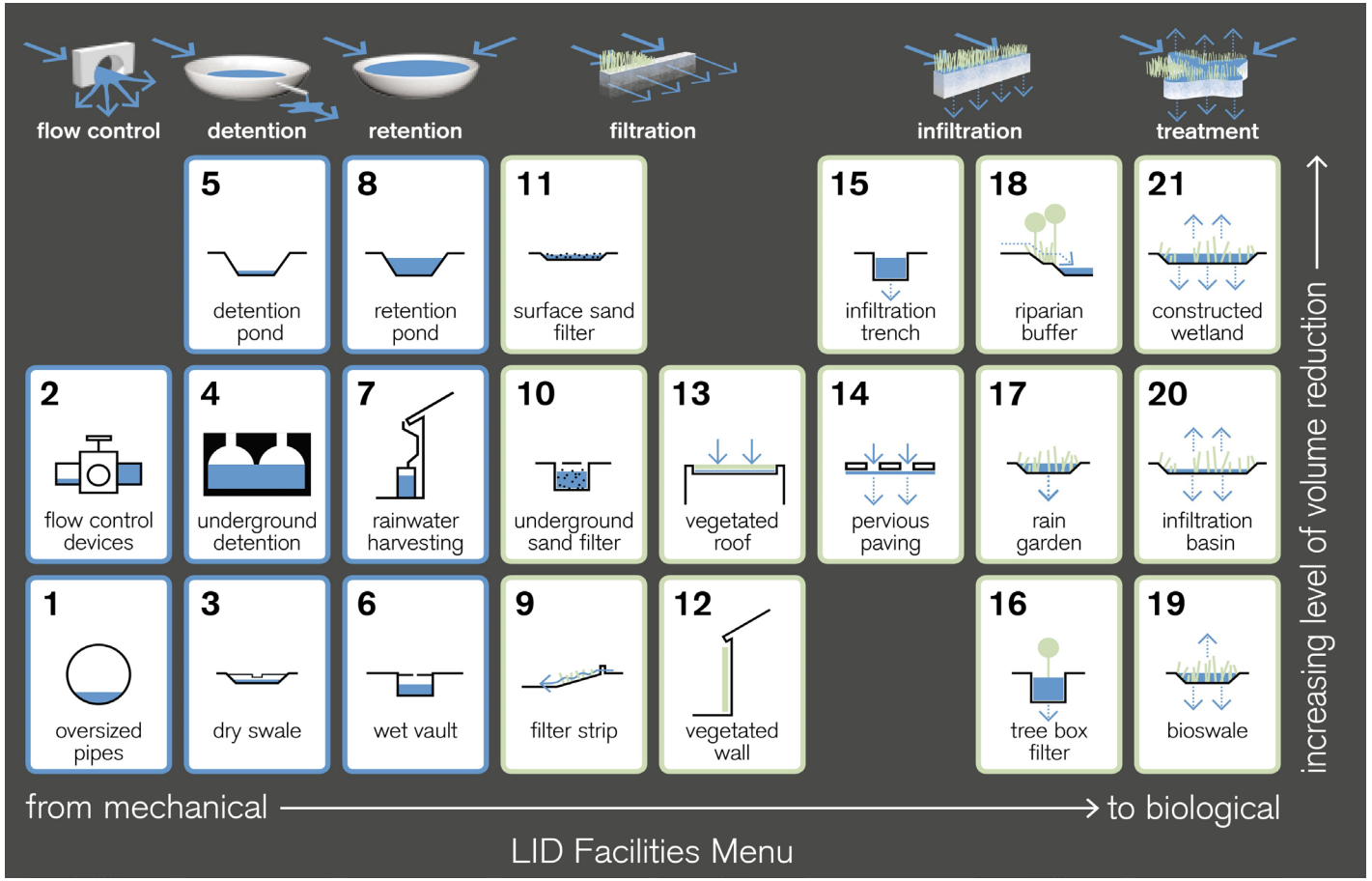




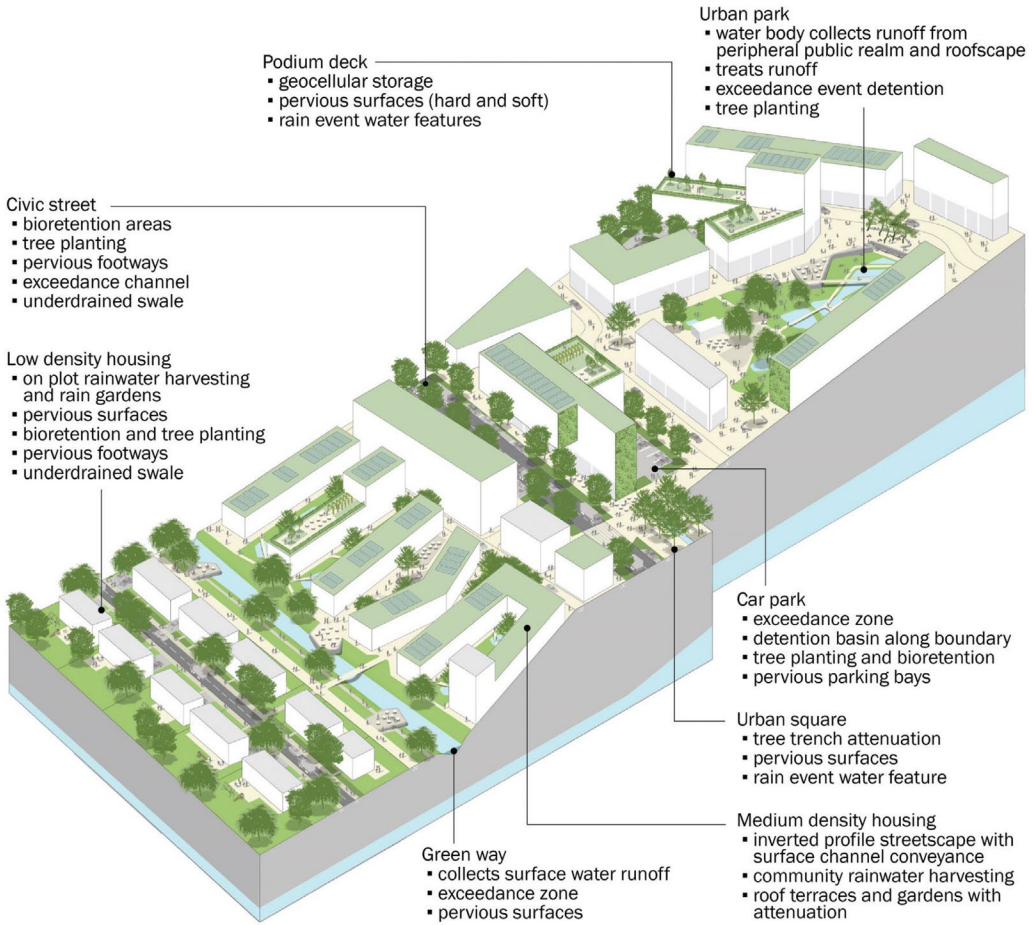


Y. Depietri, T. McPhearson, 2017

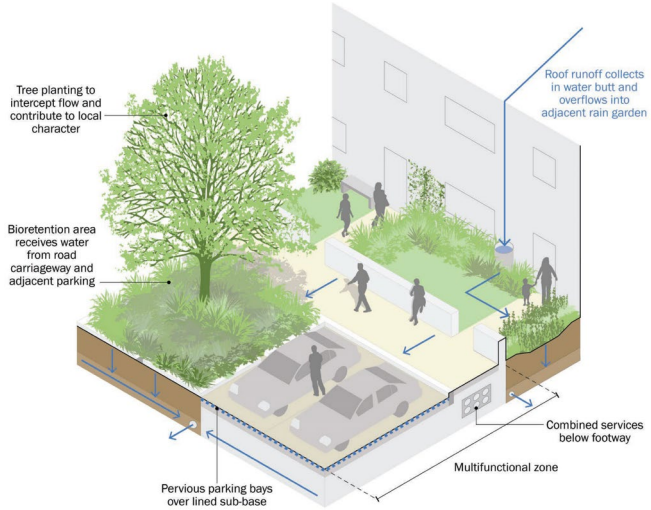


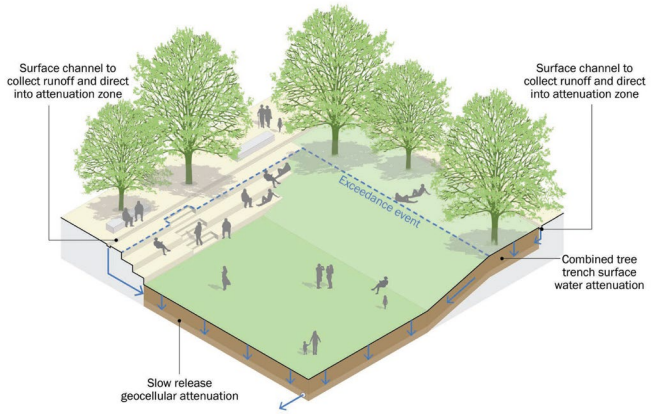


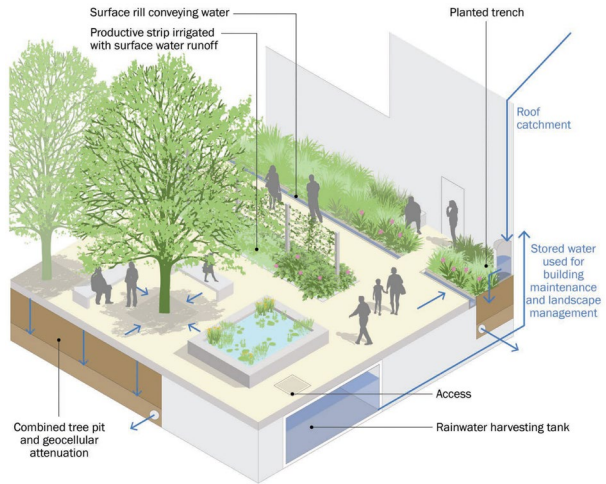
Low Impact Development
University of Arkansas Community Design Center, 2010

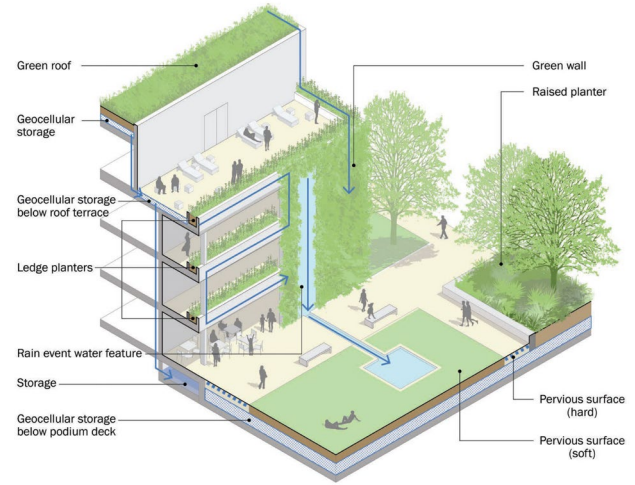


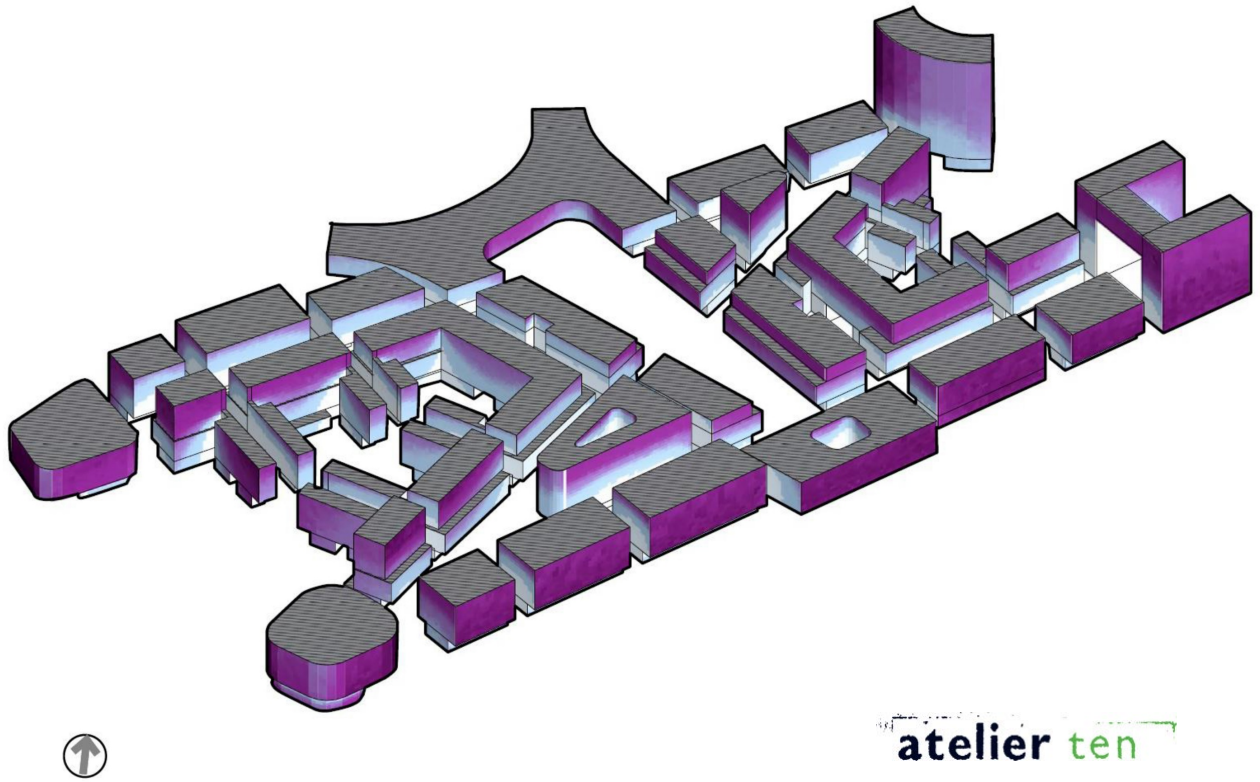
Sustainable Urban Drainage Systems – SUDS
Woods Ballard, B. et al., 2015











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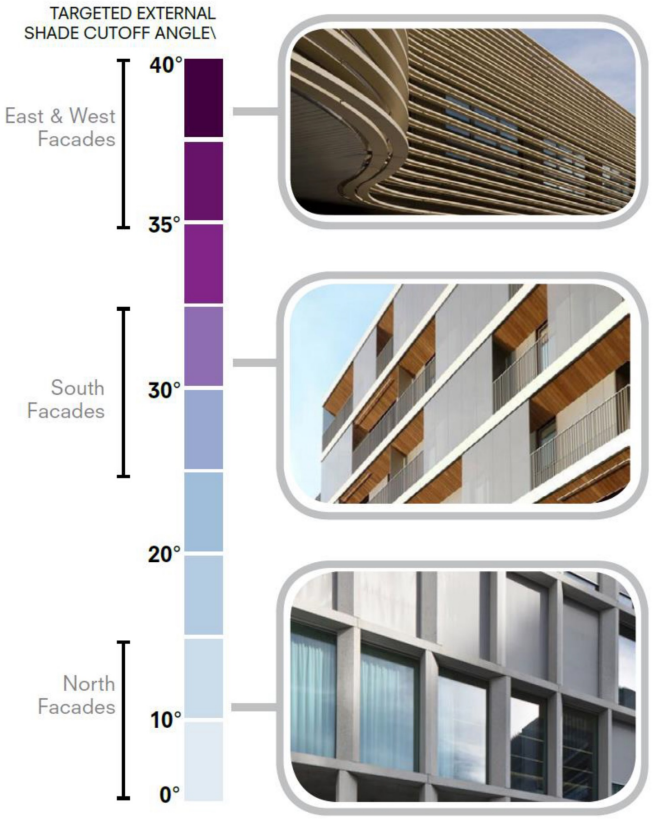
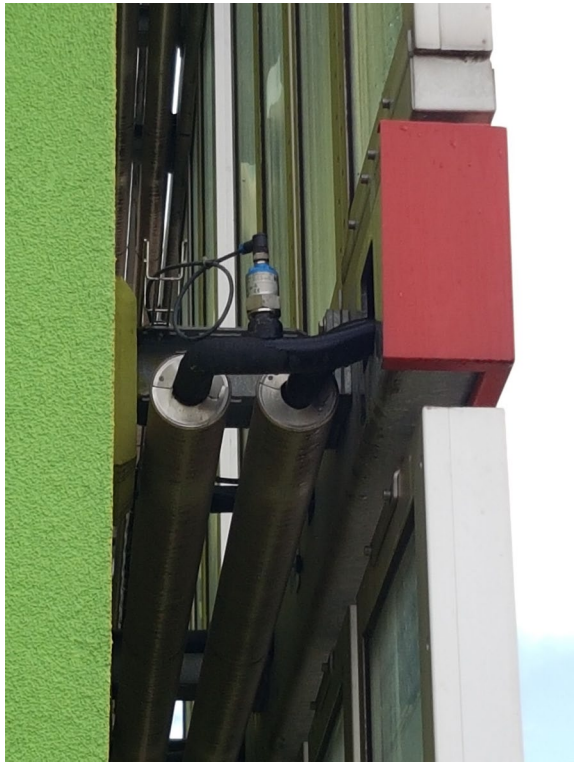
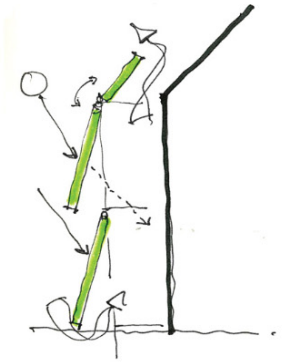
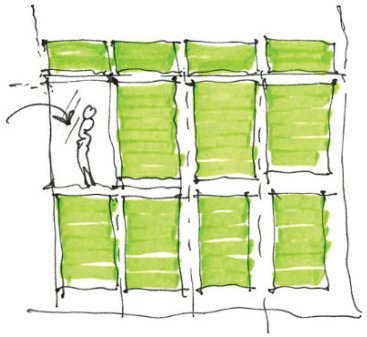
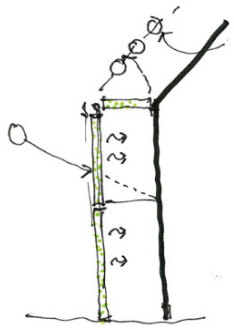

TARGETED EXTERNAL SHADE CUTOFF ANGLE\
East & West Facades
40°
35°
South Facades
30°
20°
North Facades
10°
0°

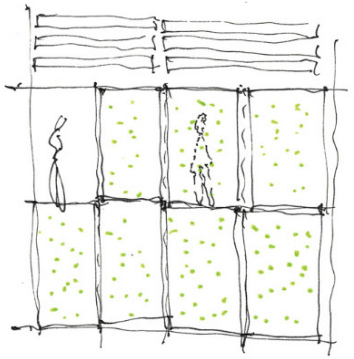
Retrofit in Vienna | Rataplan studio











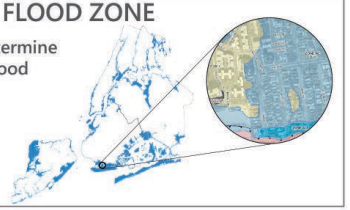
BIQ – Das Algen Haus | Arup

STEP 1

IDENTIFY YOUR FLOOD ZONE

Use FEMA maps to determine your flood zone and flood elevation

V Zone
Coastal A Zone
A Zone
X Zone

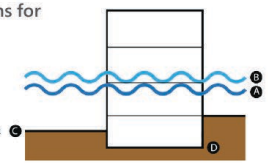


STEP 2

IDENTIFY YOUR FLOOD ELEVATION

Determine critical elevations for your building

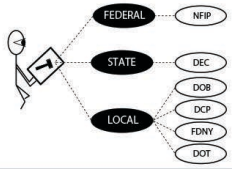
- A Base Flood Elevation (BFE)
- B Design Flood Elevation (DFE) =BFE + Freeboard
- C Lowest Adjacent Grade Elevation
- D Lowest Floor Elevation

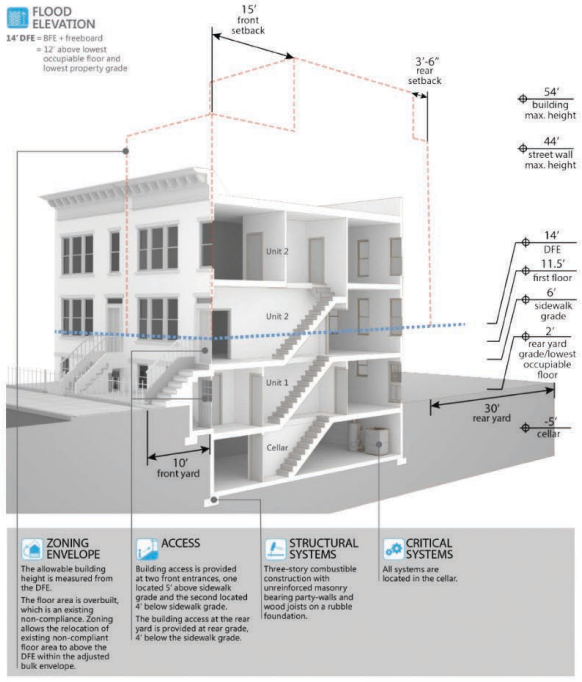


STEP 3

REVIEW RELEVANT CODES & REGULATIONS

Understand how Federal, State and city floodplain regulations impact your options





STEP 4

IDENTIFY YOUR MITIGATION STRATEGY

Become familiar with resilient retrofit standards and methodologies

STEP 5

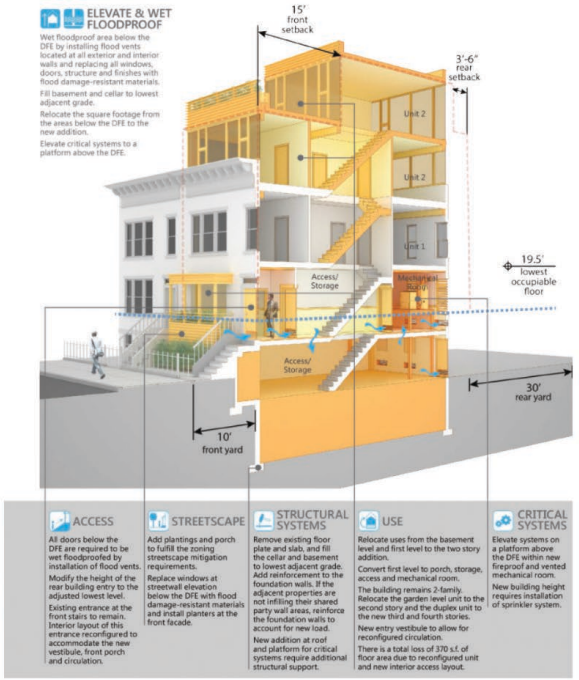
DESIGN YOUR STRATEGY

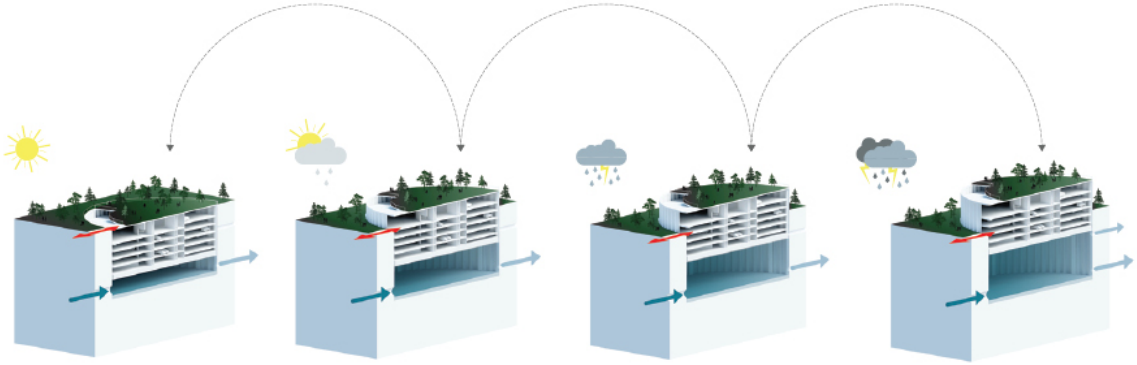
Identify the physical and operational characteristics to inform design decisions and best practices

Identify building type

Select approach

Assess Feasibility





EVERYDAY SITUATION

The water reservoir is empty and the parking structure functions as a standard underground parking facility. The urban urban space at the top of the plant is accessible from street level.

HEAVY RAIN

The rainwater slowly fills the water reservoir and the parking facility moves up in the terrain. Access to the parking facility and the urban space is through an opening in the wall of the structure, where a spiral ramp leads pedestrains up to the urban space and leads cars both up and down in the structure.

CLOUDBURST

As the water reservoir is filled with rainwater, the parking facility shoots up in the landscape. The docking ramp ensures access to the parking facility regardless of the water level in the reservoir for pedestrians and cars alike.

100-YEAR EVENT

Rainwater fills the reservoir to maximum capacity and the parking facility is raised to the highest level. The lower levels of the parking facility remain under terrain to maintain buoyancy and horizontal plans and ensure that the structure is kept in place.

POP-UP | Tredje Natur

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