

Delivering Urban Flood Resilience using blue-green approaches

*The blue-green path to
urban flood resilience*

Fola Ogunyoye
7 March 2019



June 2012 - NEWCASTLE =THUNDER THURSDAY= + South Tyneside, Northumberland, etc



Coast Road



Dean St

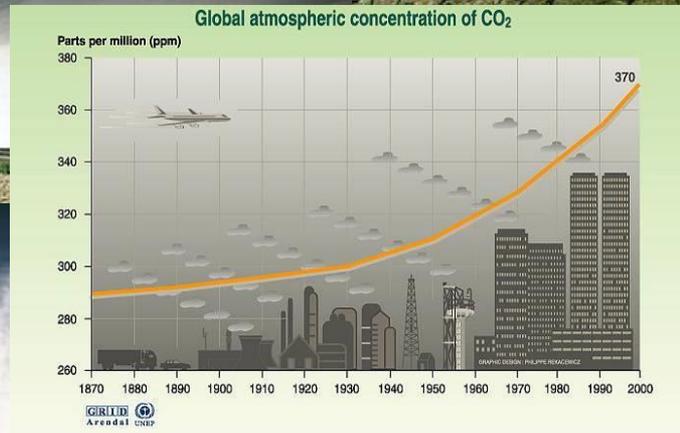


Walkergate



Horton

Extreme becoming the new normal

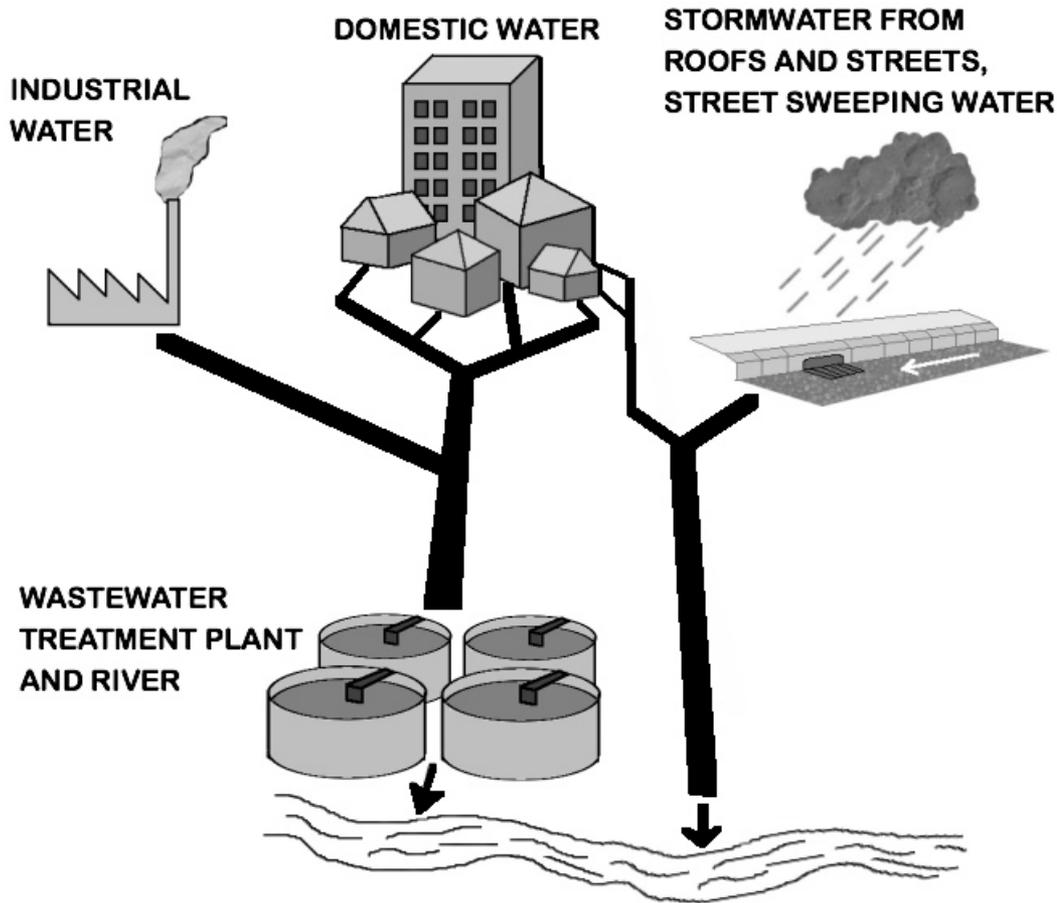


We can protect ourselves with large structures?



**WATER IS EXCLUDED
FROM MOST PUBLIC SPACES**

Or race the water off downstream

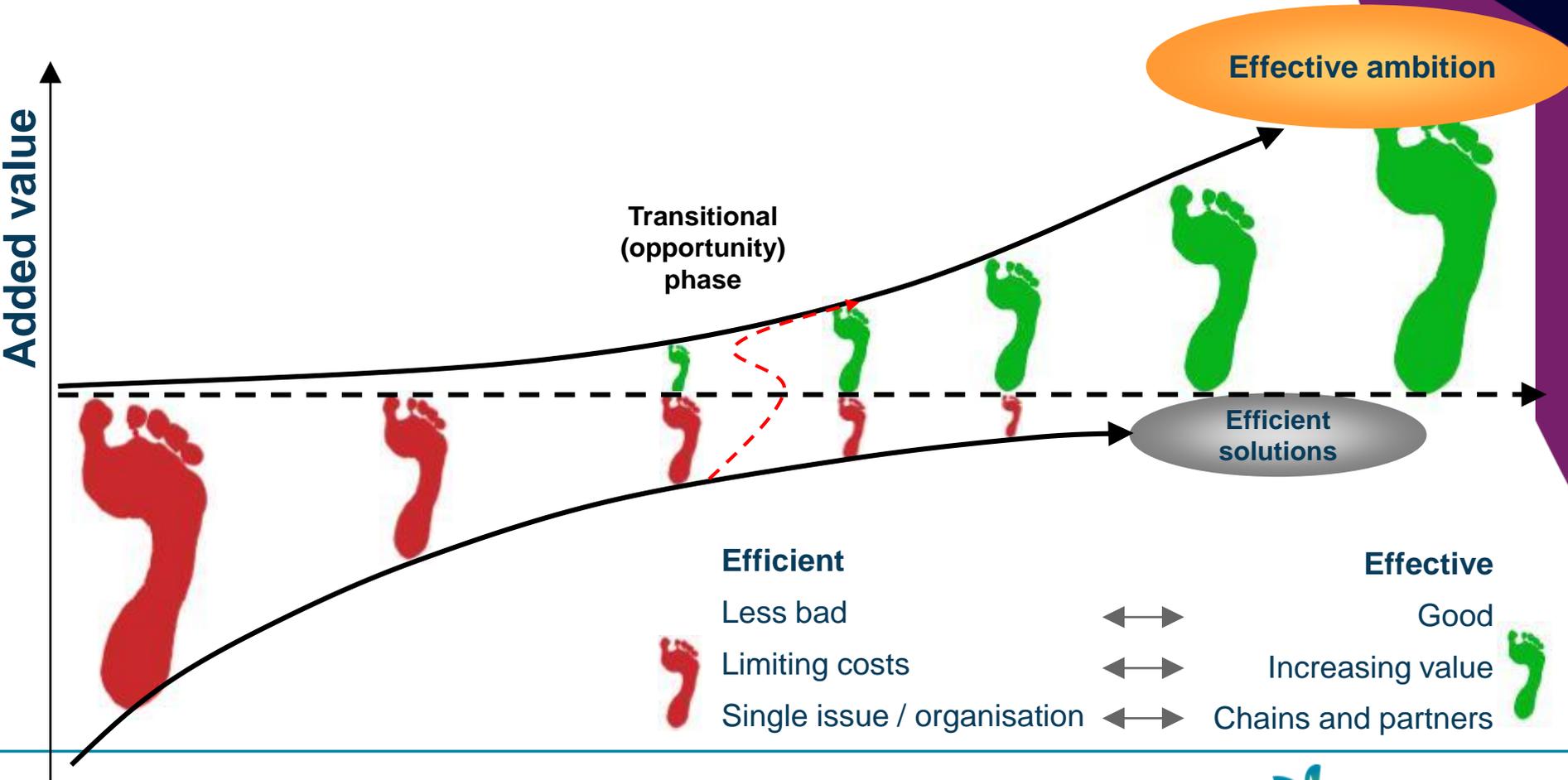


Combined & separate-sewers drainage systems, adapted from Dutang and Beaumont (1990)

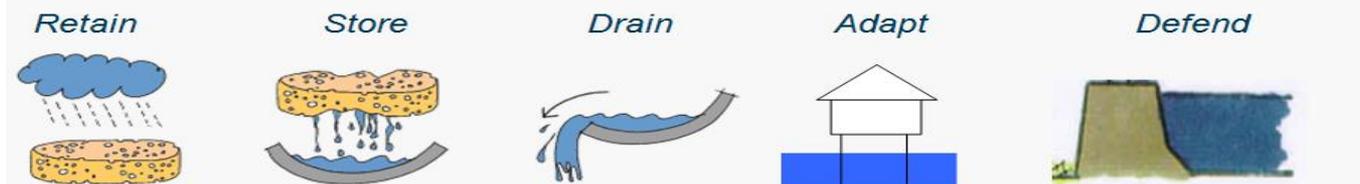
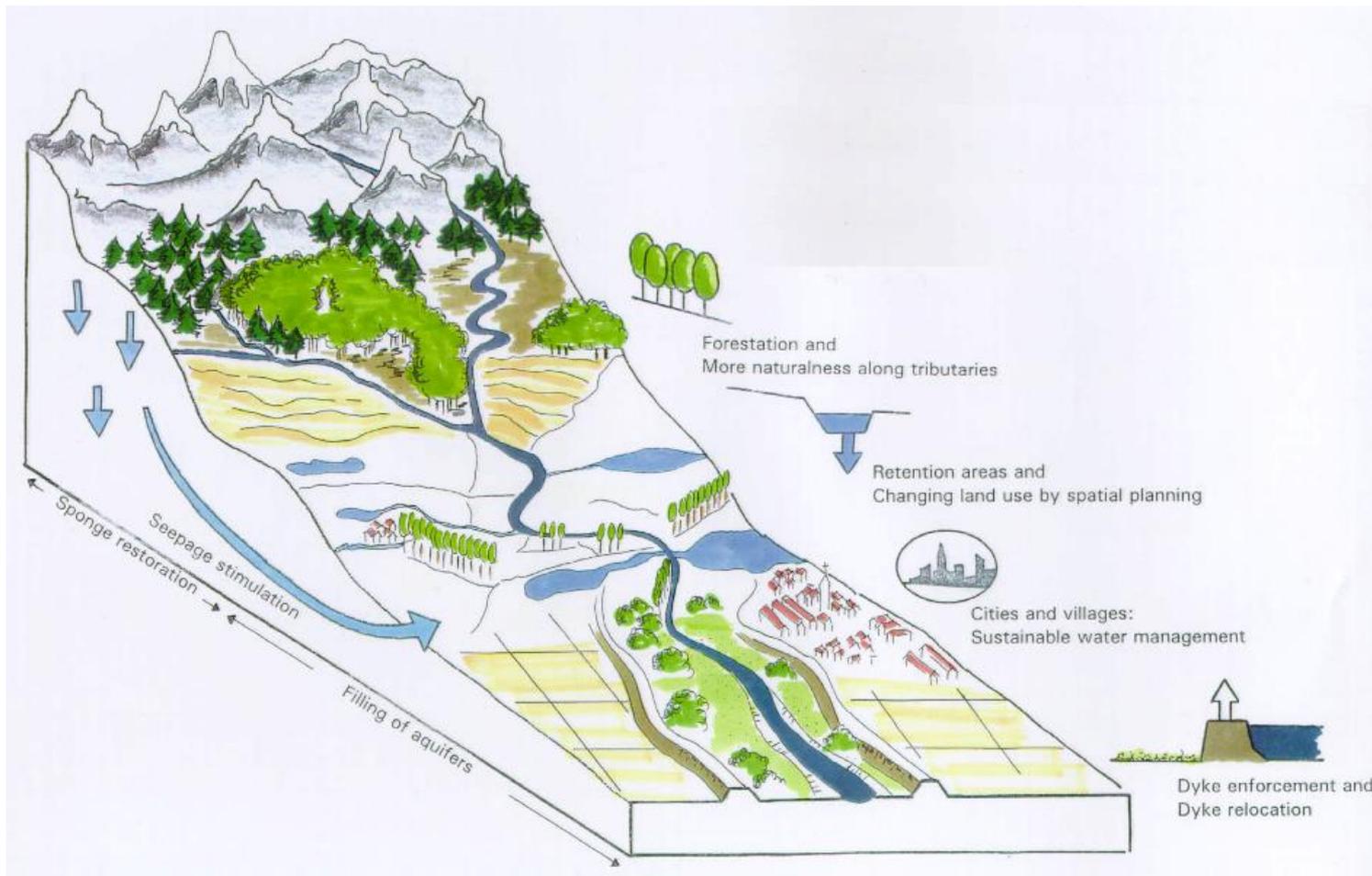
But... water is a driver for growth



We need a change of mindset from making things less bad to making things better



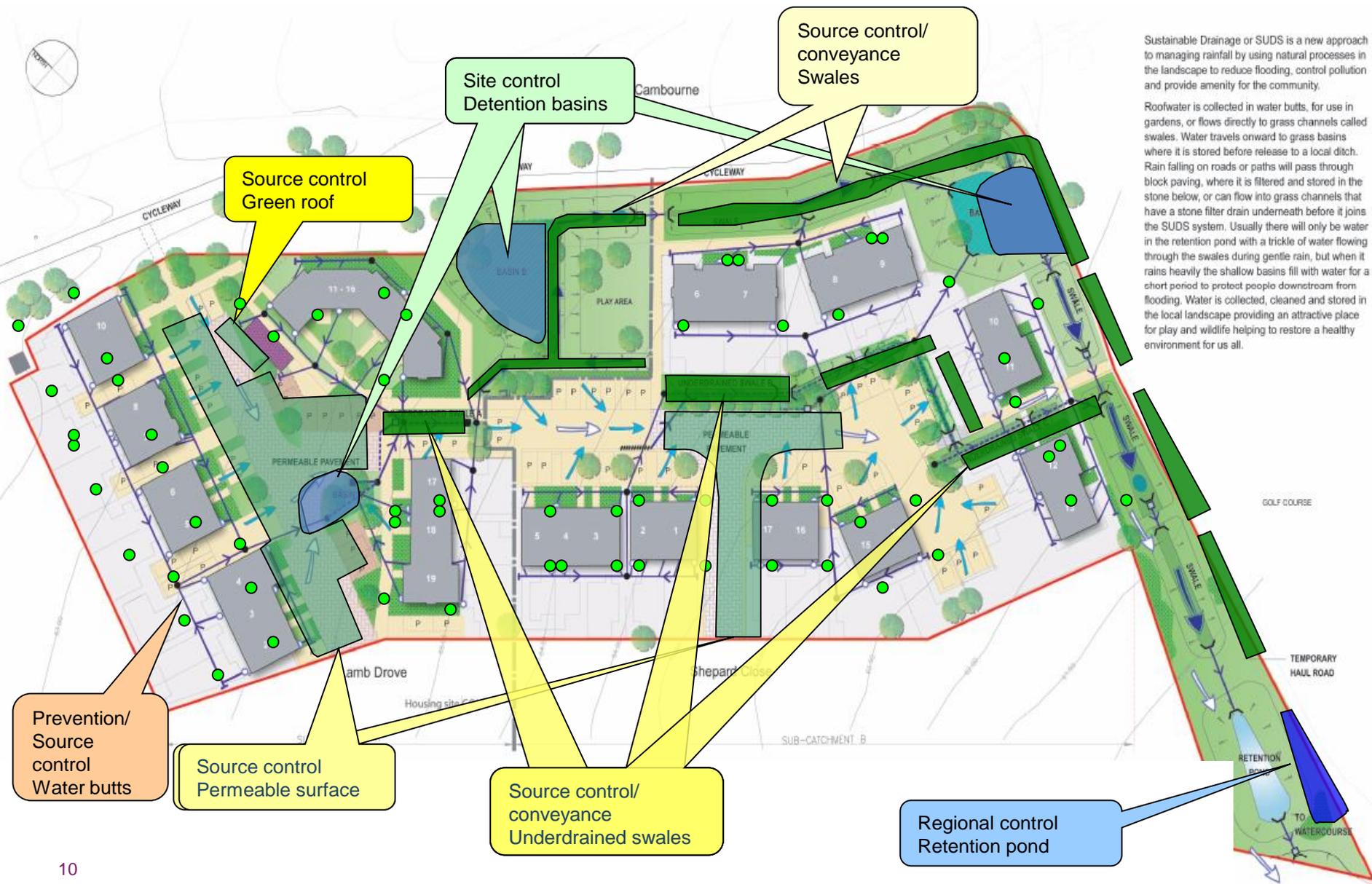
Work with the system, opportunities and challenges



Transform the landscape when you can



Surface water management as part of a multi-functional place



Sustainable Drainage or SUDS is a new approach to managing rainfall by using natural processes in the landscape to reduce flooding, control pollution and provide amenity for the community.

Roofwater is collected in water butts, for use in gardens, or flows directly to grass channels called swales. Water travels onward to grass basins where it is stored before release to a local ditch. Rain falling on roads or paths will pass through block paving, where it is filtered and stored in the stone below, or can flow into grass channels that have a stone filter drain underneath before it joins the SUDS system. Usually there will only be water in the retention pond with a trickle of water flowing through the swales during gentle rain, but when it rains heavily the shallow basins fill with water for a short period to protect people downstream from flooding. Water is collected, cleaned and stored in the local landscape providing an attractive place for play and wildlife helping to restore a healthy environment for us all.

Prevention/
Source control
Water butts

Source control
Permeable surface

Source control/
conveyance
Underdrained swales

Regional control
Retention pond

Source control
Green roof

Site control
Detention basins

Source control/
conveyance
Swales

Delivering beautiful, multifunctional, healthy and happy places



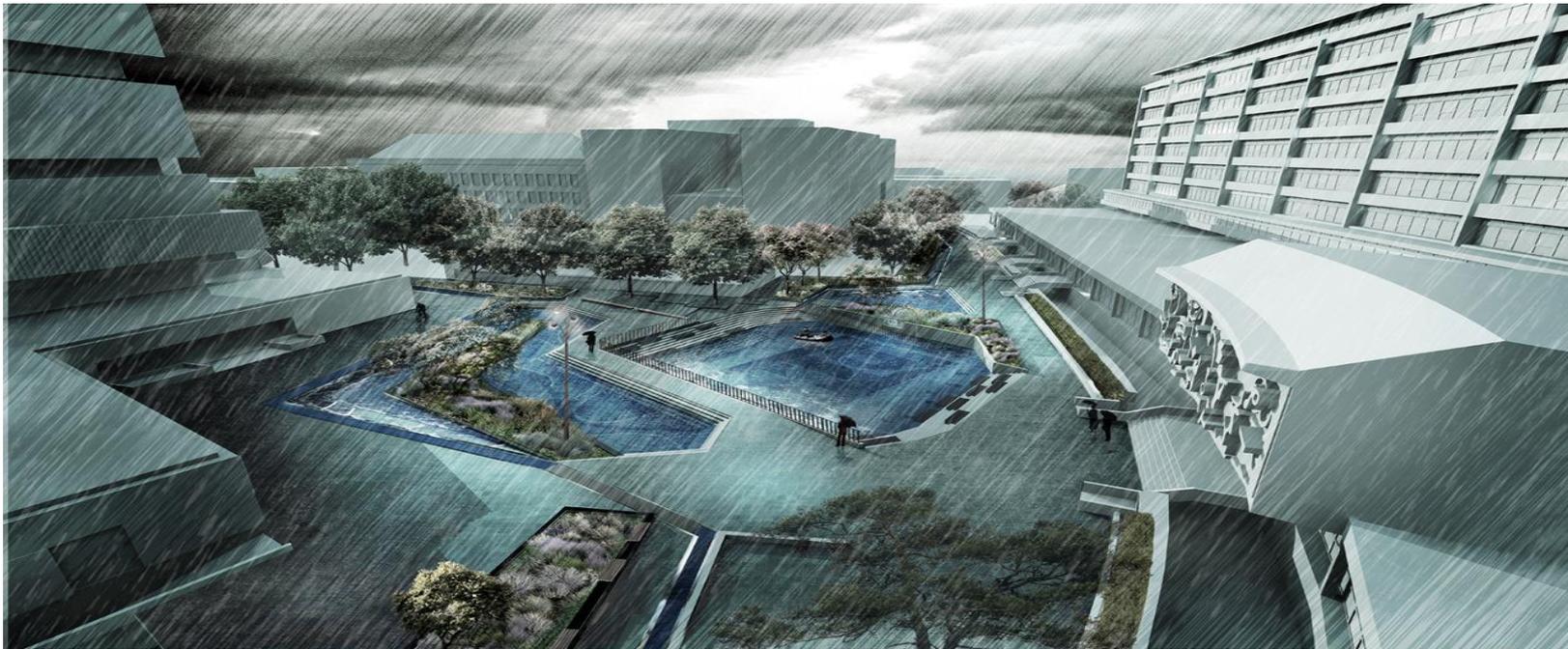
Rotterdam Multifunctional barrier



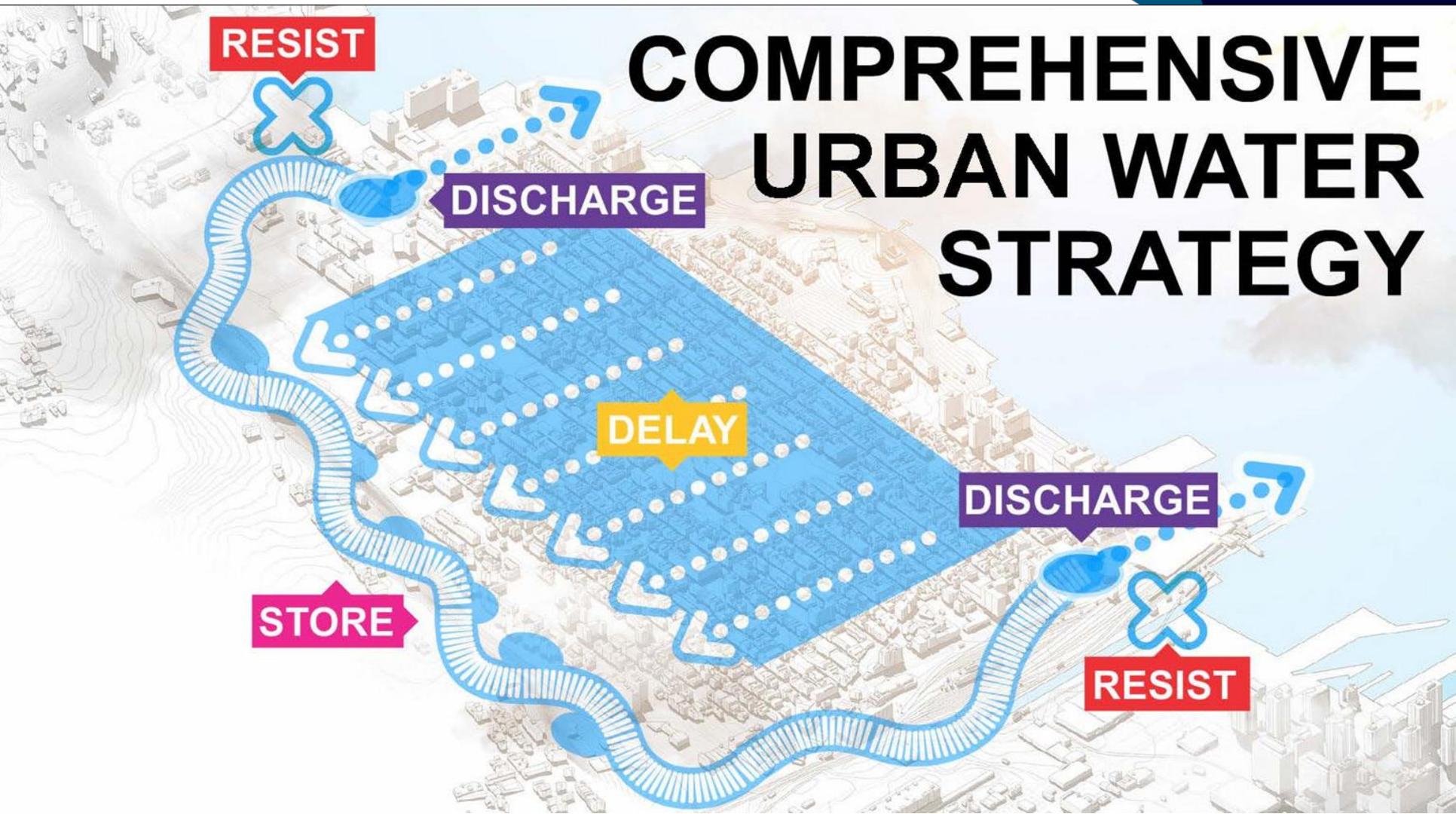
Water plazas Rotterdam



Water plazas Rotterdam



COMPREHENSIVE URBAN WATER STRATEGY



RESIST 

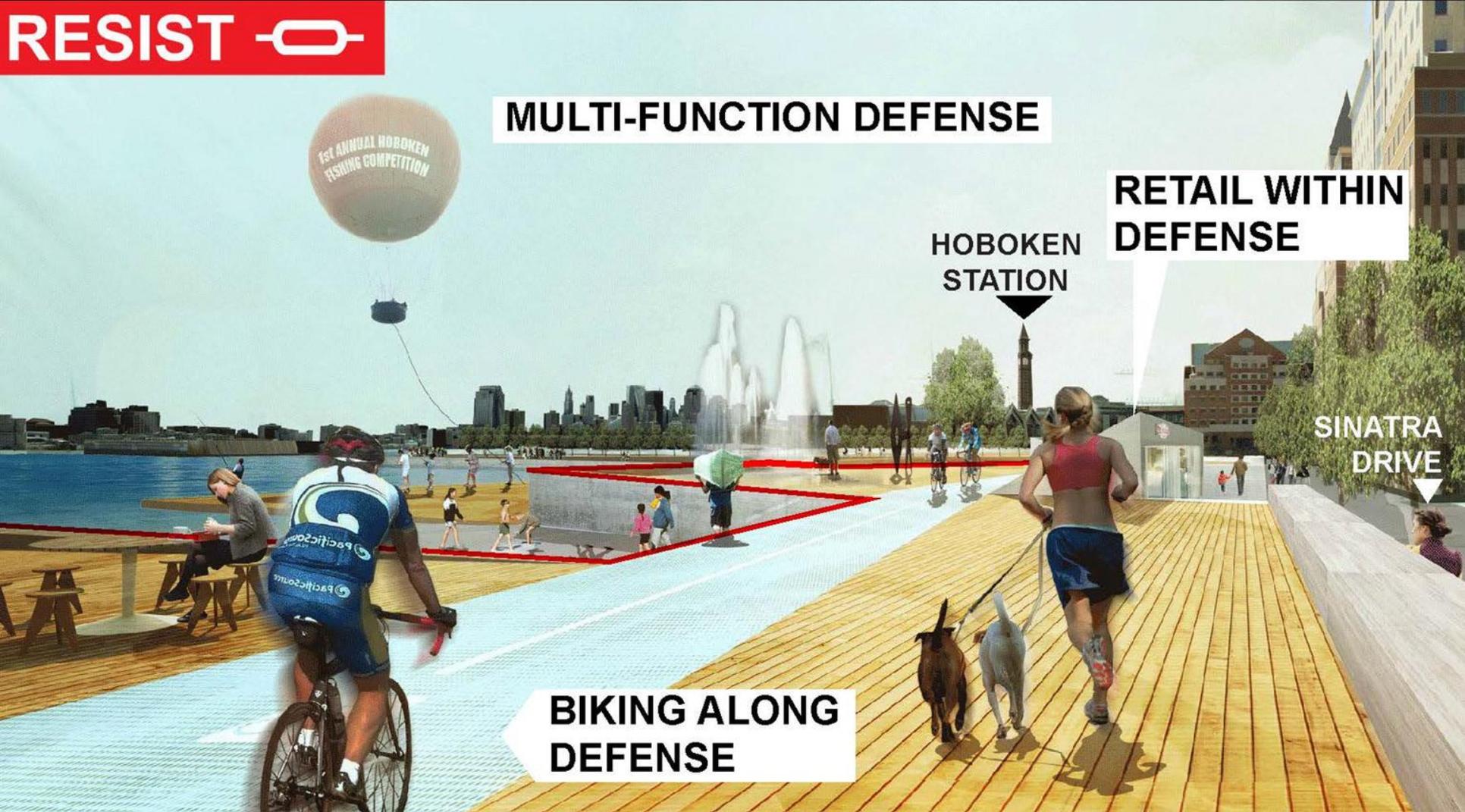
MULTI-FUNCTION DEFENSE

RETAIL WITHIN DEFENSE

HOBOKEN STATION
▼

SINATRA DRIVE
▼

BIKING ALONG DEFENSE



MULTI-FUNCTION DEFENSE

HOBOKEN

BOAT HOUSE

WETLANDS

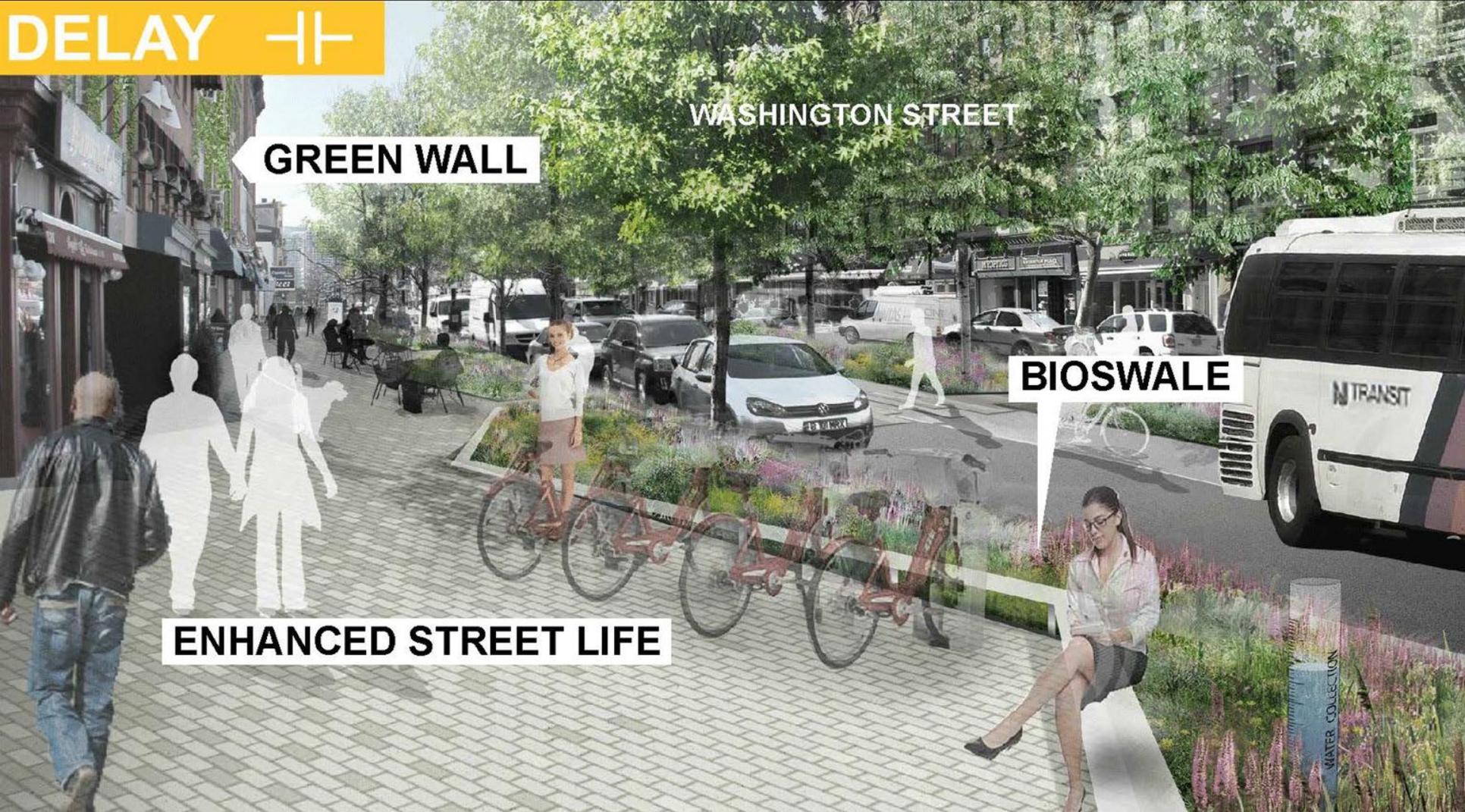
WEEHAWKEN COVE

WEEHAWKEN

PATH AS DEFENSE

BIORETENTION BASIN

DELAY 



WASHINGTON STREET

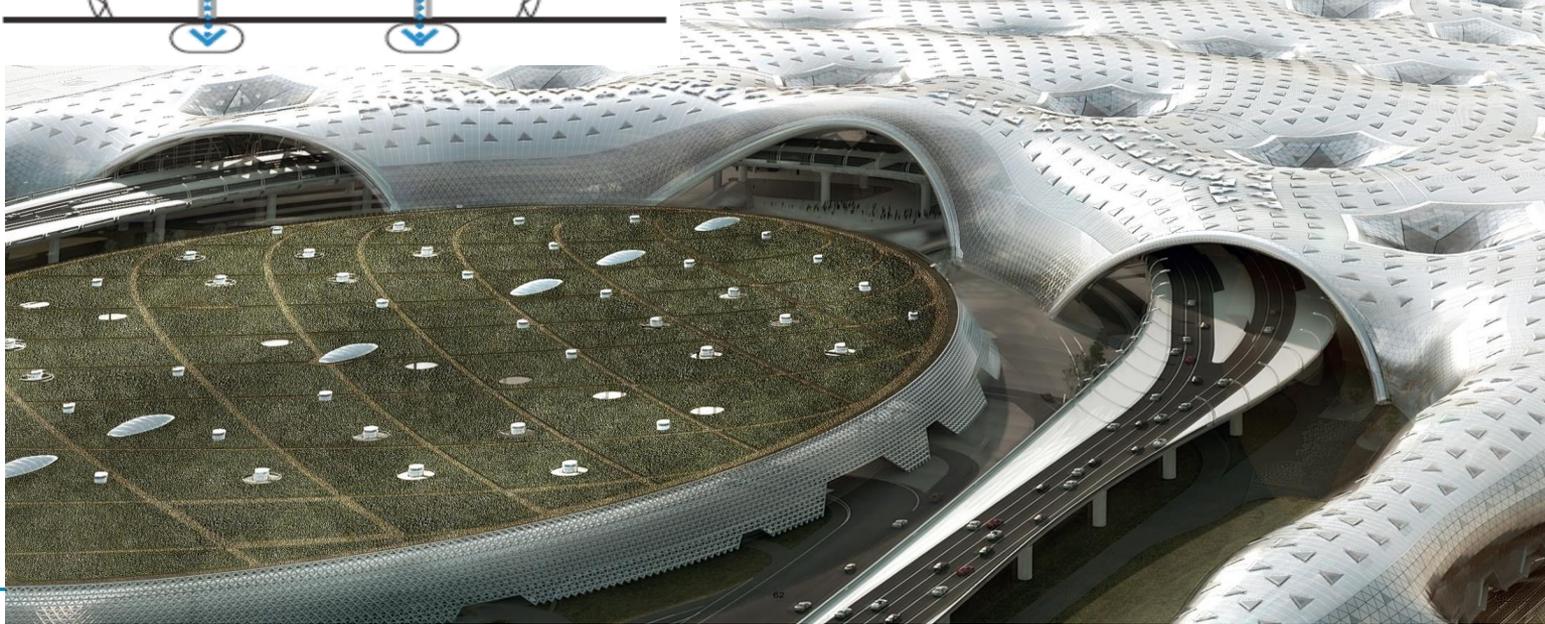
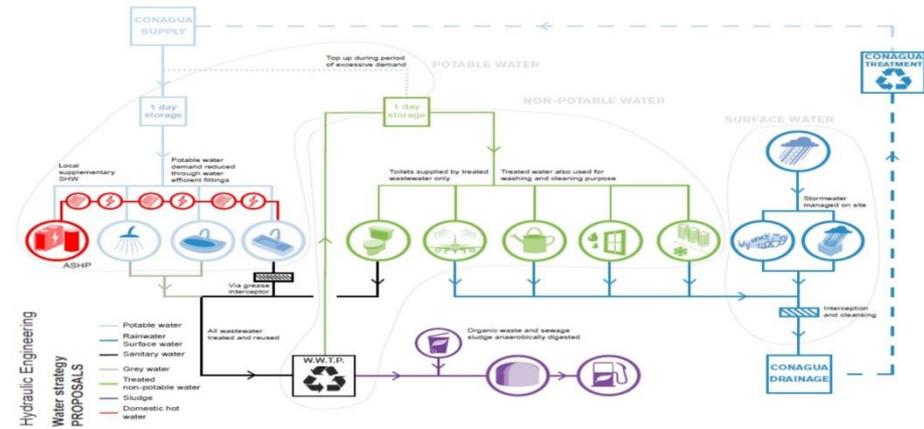
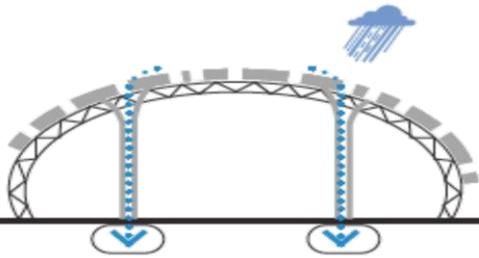
GREEN WALL

BIOSWALE

ENHANCED STREET LIFE



New Mexico City Airport



Rainwater Storage and harvesting



Mexico City Lake Texcoco Airport

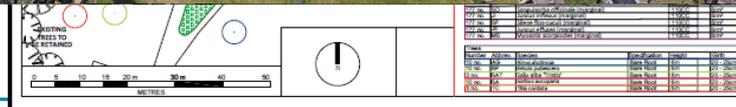


Case Study: South Tyneside



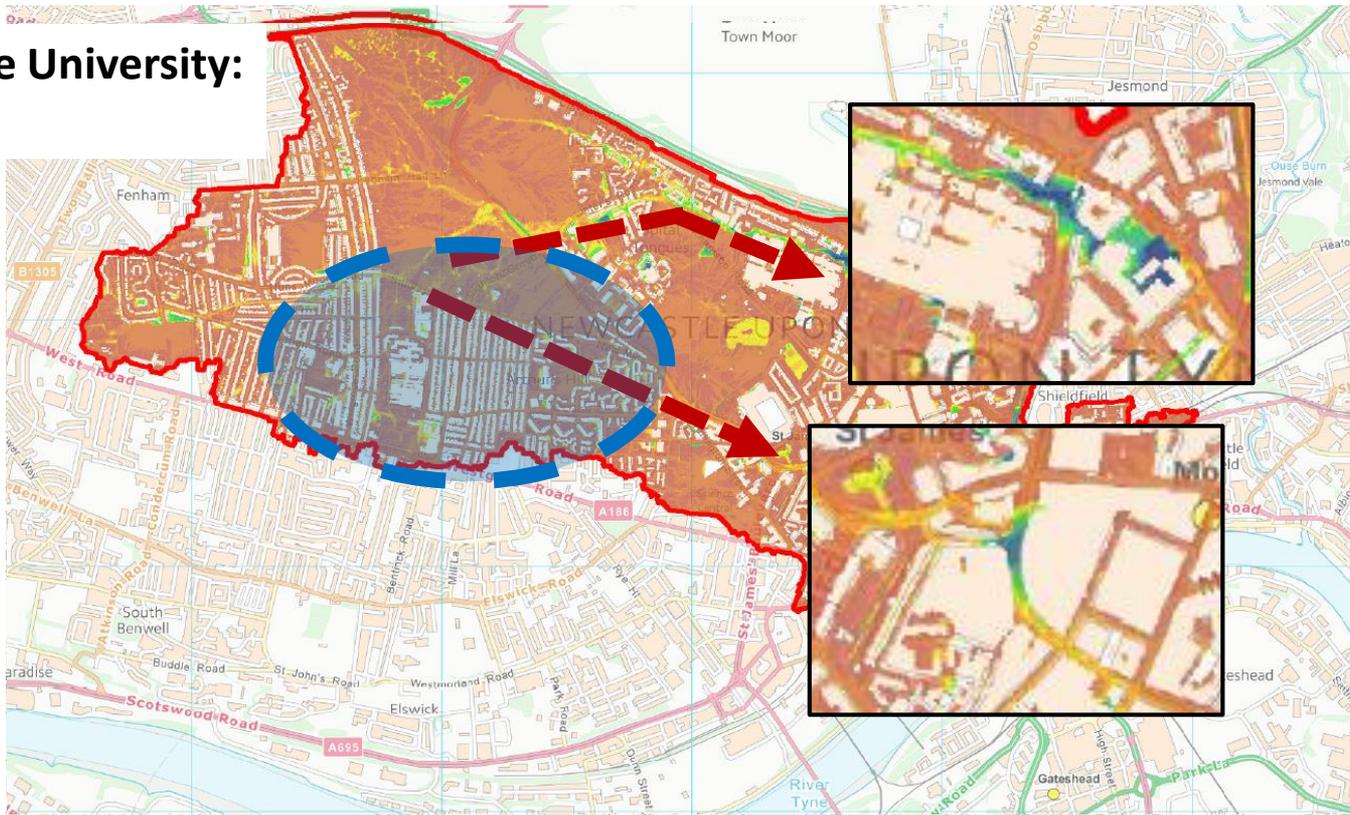
Case Study: South Tyneside

Culvert Daylighting
& Flood Storage:
Landscape P



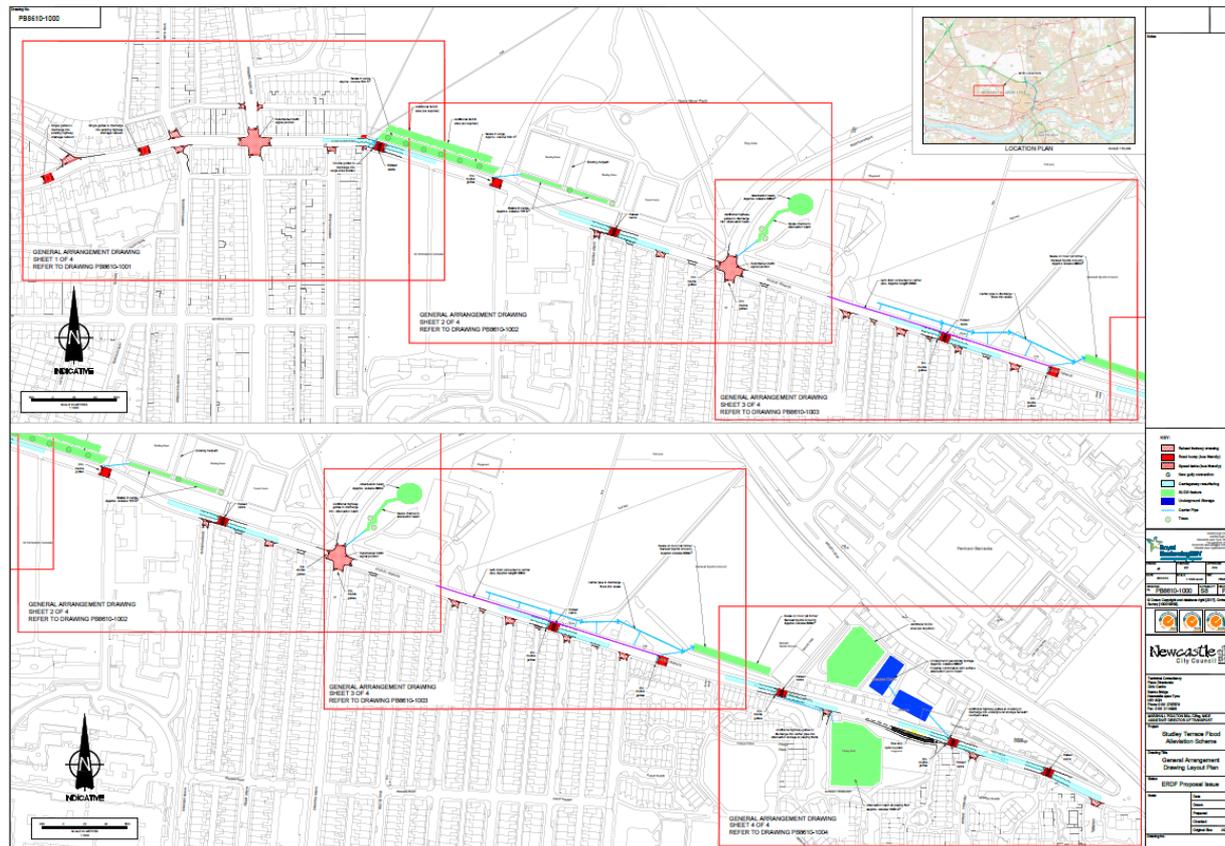
Case Study: Newcastle upon Tyne

Newcastle University: CityCAT



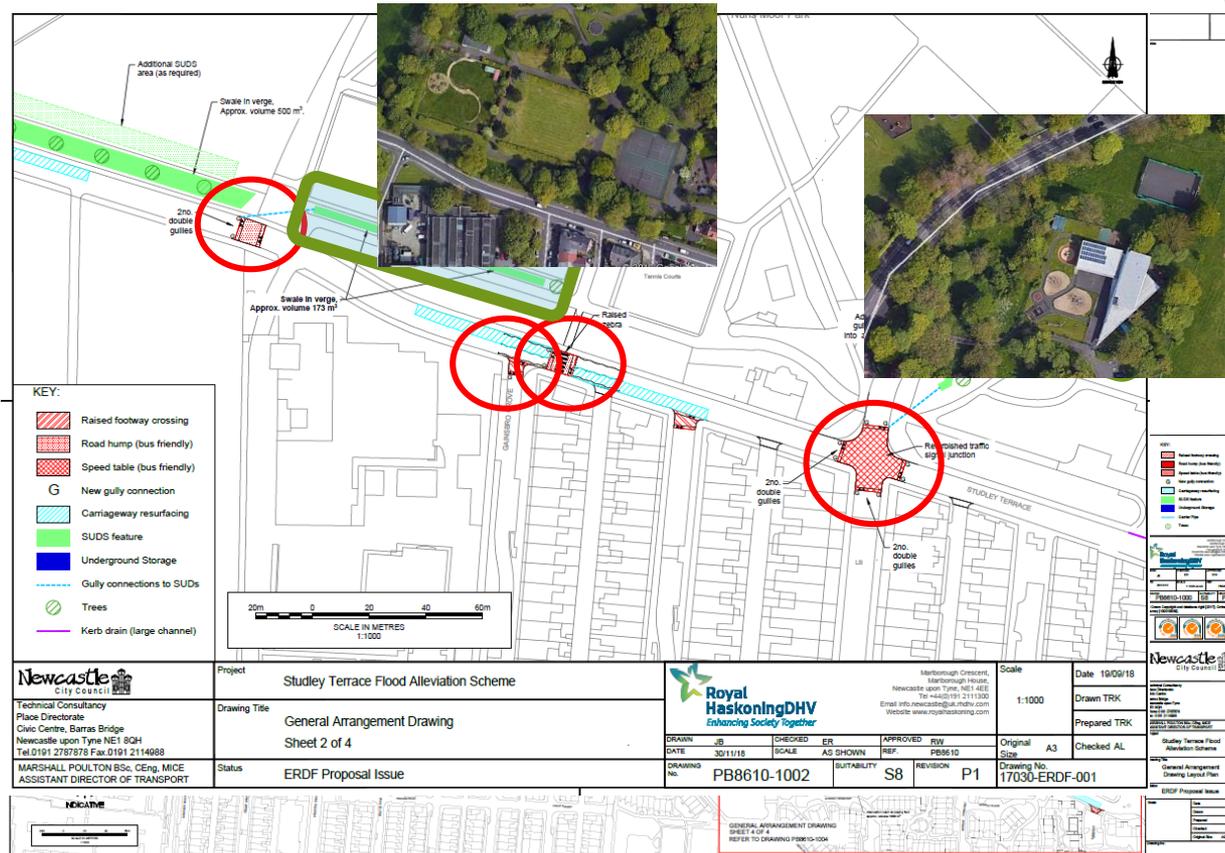
Case Study: Newcastle upon Tyne

Concept design
→ Outline design



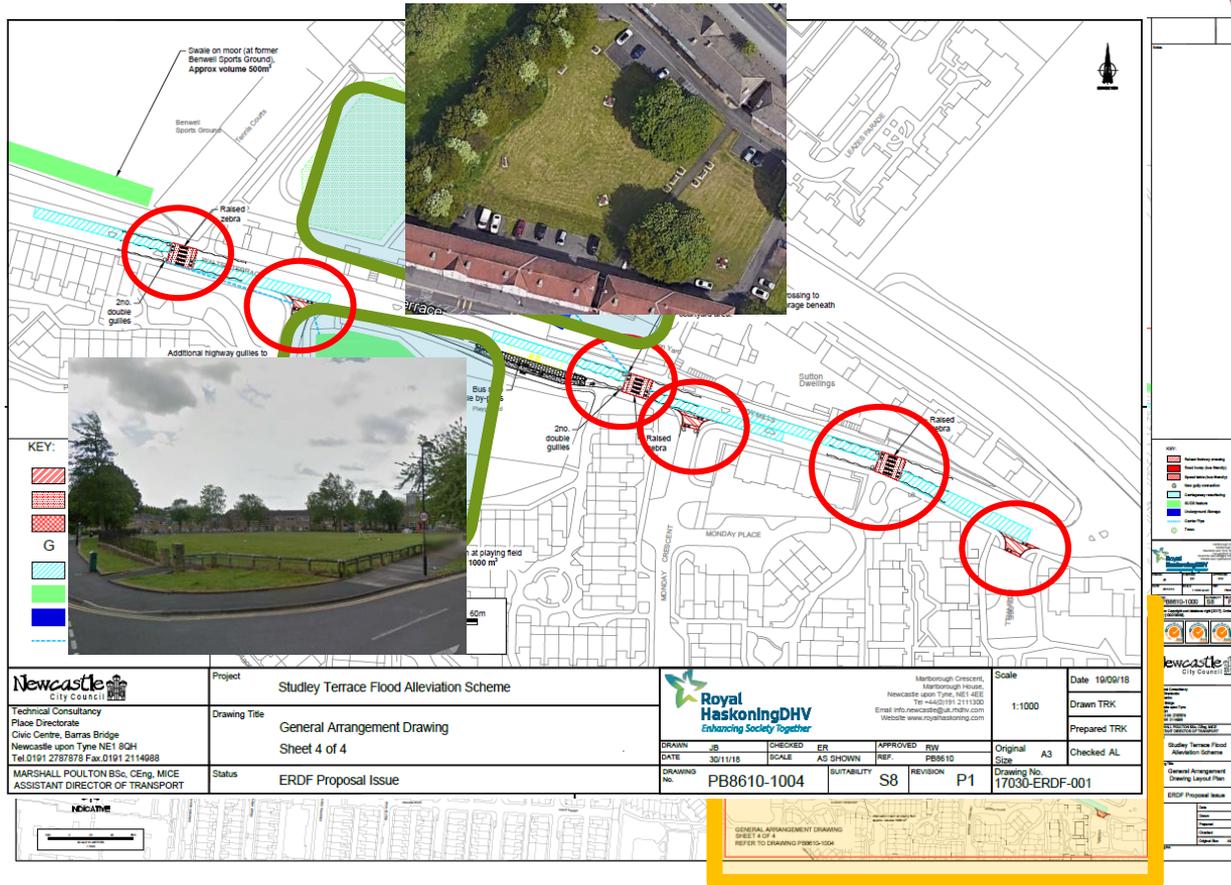
Case Study: Newcastle upon Tyne

Concept design
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Concept design
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**Royal
HaskoningDHV**
Enhancing Society Together

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