

Rotterdam Climate Proof

the transition towards the
Rotterdam Resilience Programme



John Jacobs

Rotterdam Climate Proof – Water Management

www.rotterdamclimateinitiative.nl



WHY ACT NOW?



The climate
is changing



Developing
the city is a
continuous
process



Building
trust in a
safe region



Adapting
offers
opportunities

ADAPTATION IS NOT NEW



ROTTERDAM 2012

ROTTERDAM 1652



LARGEST PORT OF EUROPE

40 KM HARBOUR

2800 KM SEWER SYSTEM

THREE WATERBOARDS

612.000 INHABITANTS

400 KM CANALS + 1000 PUMPING STATIONS



PRECIPITATION

WATER CHALLENGES

RIVER DISCHARGES

GROUNDWATER

SEA LEVEL RISE



WATER CHALLENGES





CLOUDBURST COPENHAGEN





FLOODS UK 2014





LIVING WITH WATER



OFFERS OPPORTUNITIES



ROTTERDAM CLIMATE PROOF

ADAPTATION PROGRAMME 2018



ROTTERDAM APPROACH

**(climate) resilient
in 2025**

+

**attractive and
economically
strong city**

+

holistic approach

+

**LT Vision =>
ST Actionplan**

ROTTERDAM APPROACH



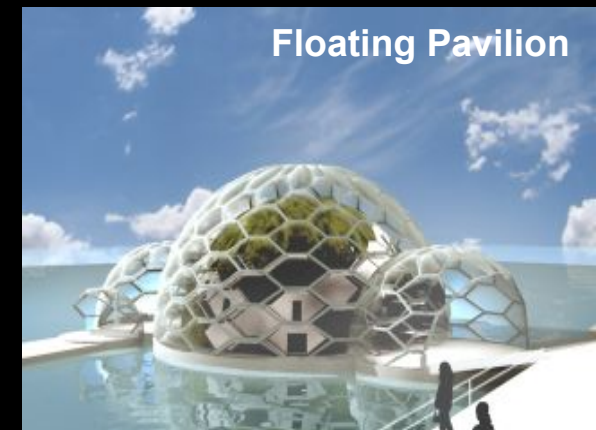
Knowledge



Action

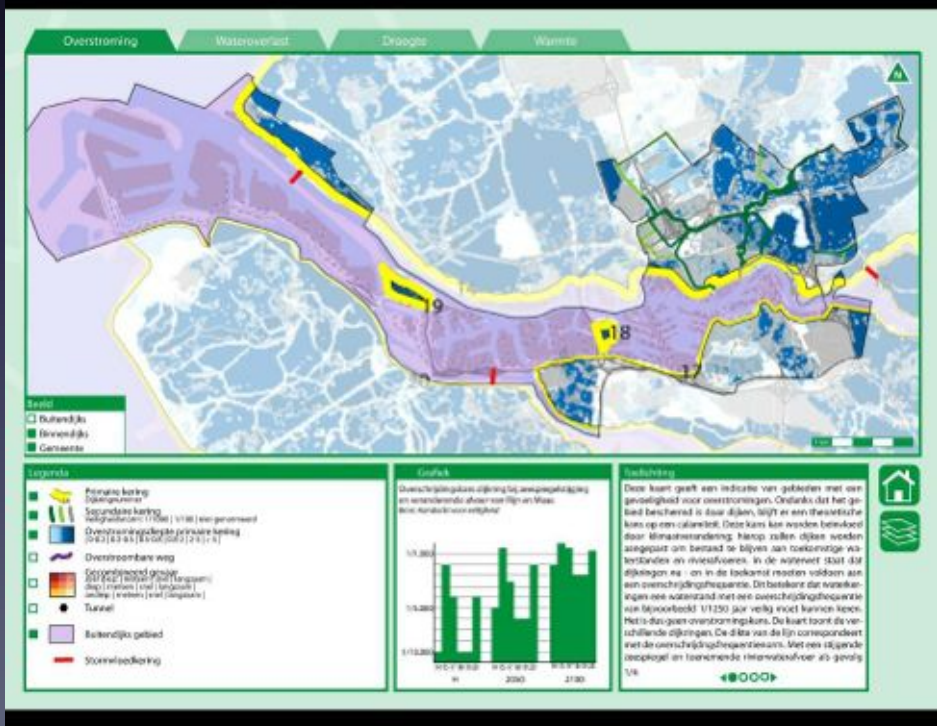
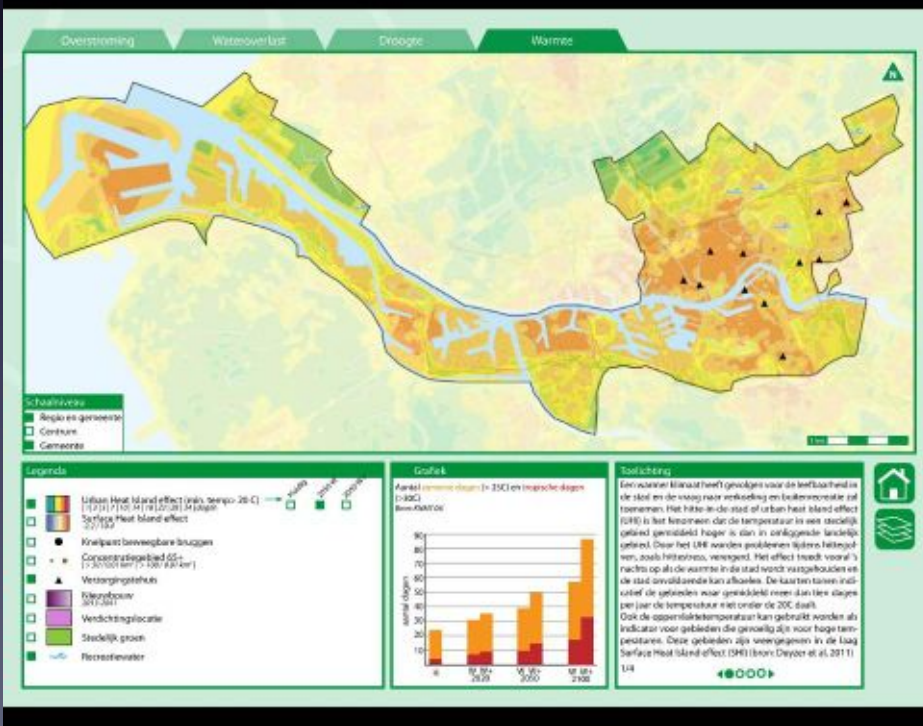


Marketing

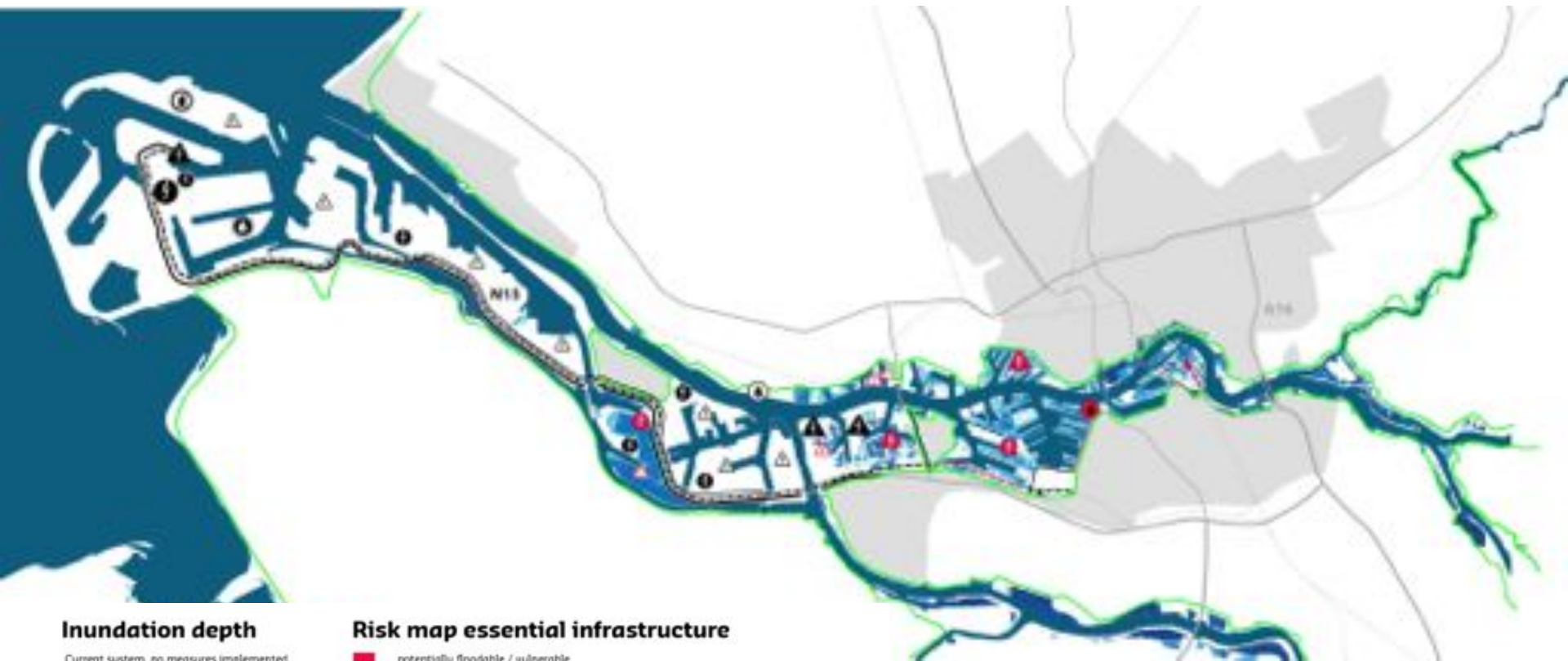


KNOWLEDGE DEVELOPMENT

Interactive Climate Atlas Rotterdam: Risk Assessment



RISK ASSESSMENT



Inundation depth

Current system, no measures implemented
source: DeHaas

2100 t = 1000
inundation depth

- 0.0m - 0.2m
- 0.2m - 0.5m
- 0.5m - 0.8m
- 0.8m - 2.0m
- 2.0m - 5.0m
- > 5m

- municipal area Rotterdam
- primary dike

Risk map essential infrastructure

- potentially floodable / vulnerable
- may not become flooded / vulnerable

Infrastructure

- motorway
- main access route
- tunnel
- railway
- railway tunnel
- station

Businesses at risk

- BRZO-cluster ³

Essential infrastructure junctions

- 380kV switching and transformer substations ¹
- 150 kV switching and transformer substations ¹
- power generating station more than 250Mwe ¹
- gas compressor station ²
- oil terminal ²
- water purification installation

bronnen 1. www.tenneT.org
2. Structure Vision Pipelines 2012-2035
3. www.risicokaart.nl

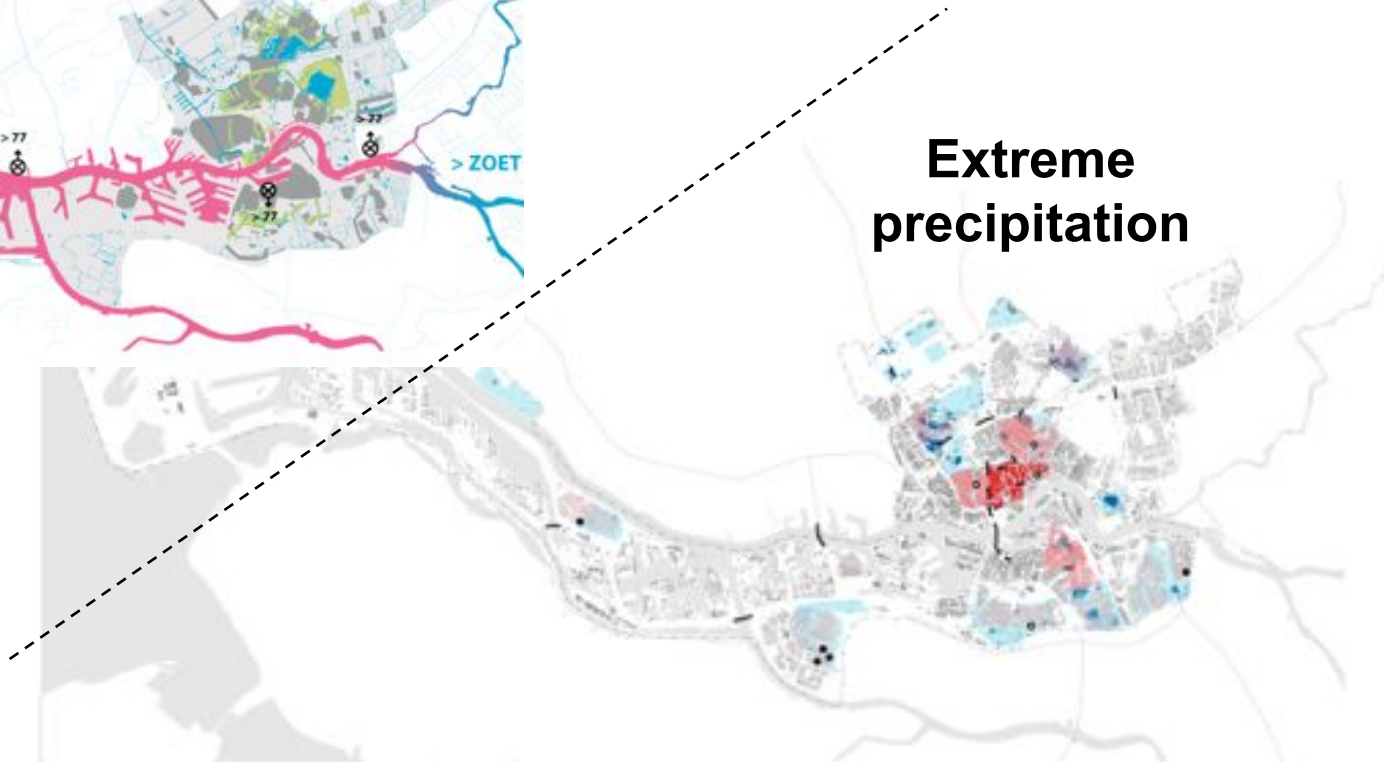
* projected inundation in 2100
85 cm sea level rise
1:1000 probability



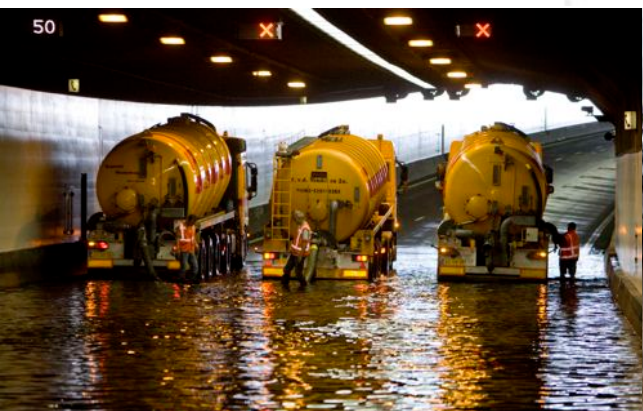
RISK ASSESSMENT



Salt intrusion

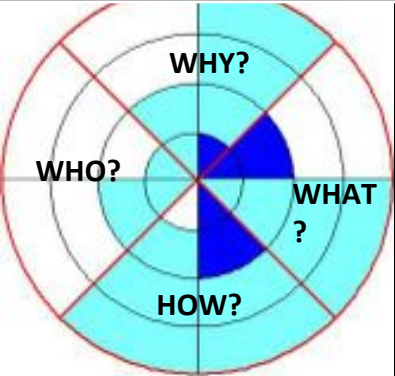


Extreme precipitation



INNOVATIVE INSTRUMENTS

ADAPTATION BAROMETER



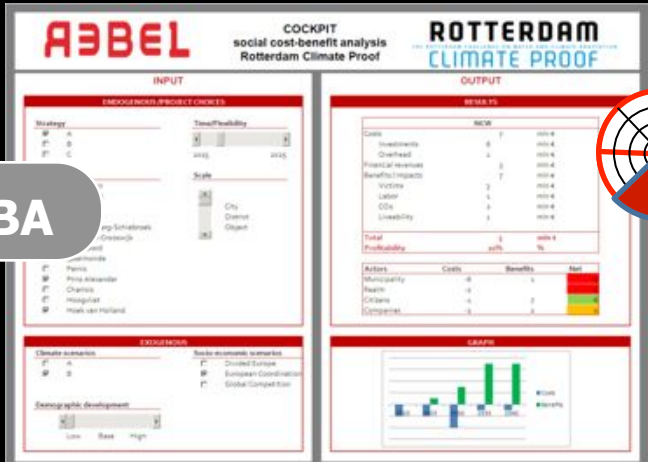
SERIOUS GAME



TOOLKIT

	PREVENTION	REDUCING EFFECTS	RECOVERY
REGION			
CITY			Back up systems
DISTRICT/ STREET			
BUILDING			

SCBA



RAINGAIN RADAR





Rotterdam climate change adaptation strategy

A SAFE, LIVABLE CITY WITH ADDED VALUE



The city and its inhabitants are **protected** from the rivers and the sea



The city and its inhabitants experience **minimal disruption** from too much or too little rainfall



The **port** of Rotterdam remains **safe and accessible**



The inhabitants of Rotterdam are **aware** of the effects of climate change and know what they can do themselves



Climate change adaptation contributes to a **comfortable, pleasant and attractive** city in which to live and work



Climate change adaptation strengthens the **economy** of Rotterdam and its image



RAS: PRINCIPLES



Robust and resilient



Protection and moving in time



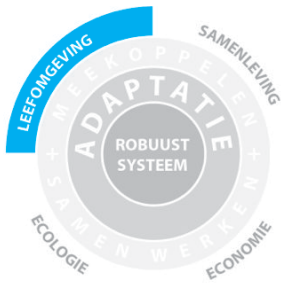
Delta works and small-scale projects



Technology and nature



Rotterdam climate change adaptation strategy



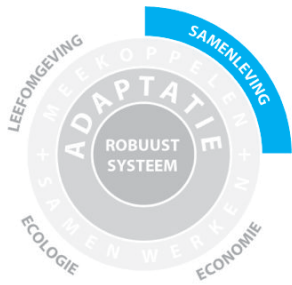
Climate change adaptation increases the **quality of the living environment**



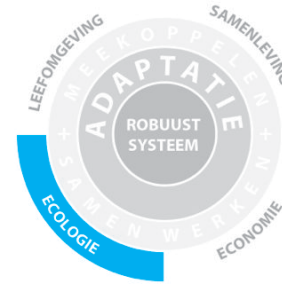
Climate change adaptation strengthens **the economy**



Rotterdam climate change adaptation strategy



Climate change adaptation **involves the inhabitants**



Climate change adaptation strengthens the **ecological quality**



Rotterdam climate change adaptation strategy

Perspective for the climate resilient delta city

Illustrative reproduction of the possibilities for climate adaptation for different types of city districts

- What **measures** could we apply here?
- Which **stakeholders** are important to play a role?
- What **value** is added by those measures?
- Which stakeholders **profit**?





Water storage / sports

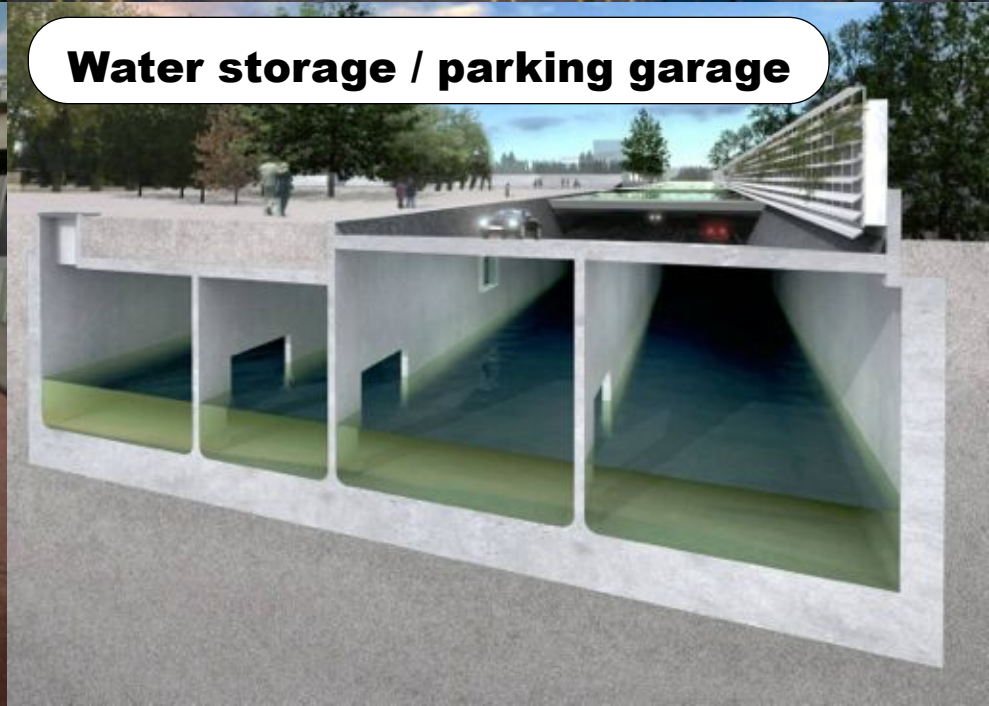
BLUE SOLUTIONS



Water storage / housing



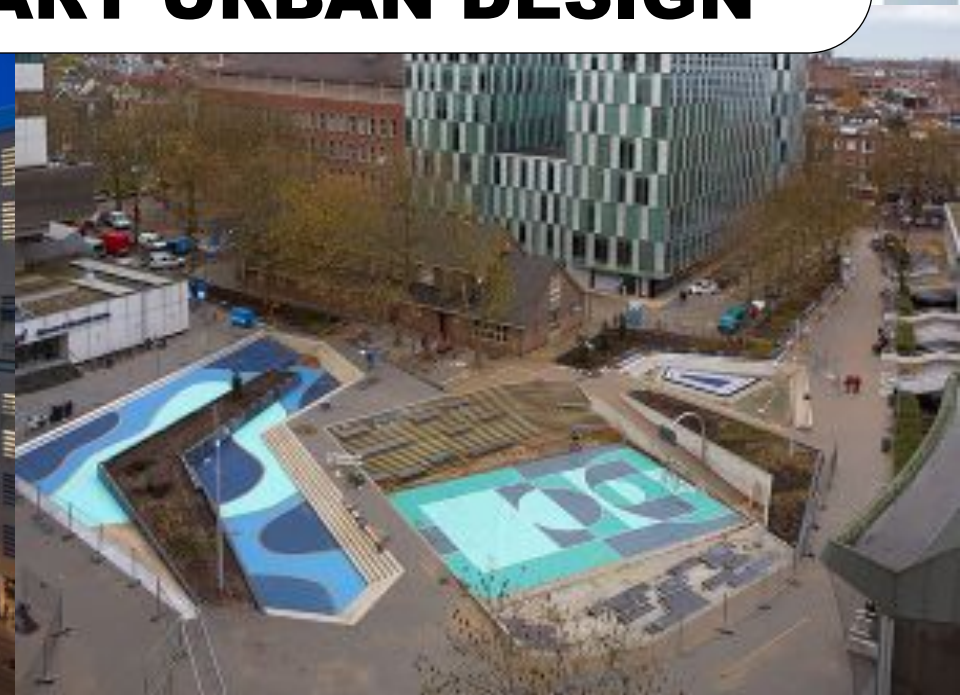
Water storage / attractive public area



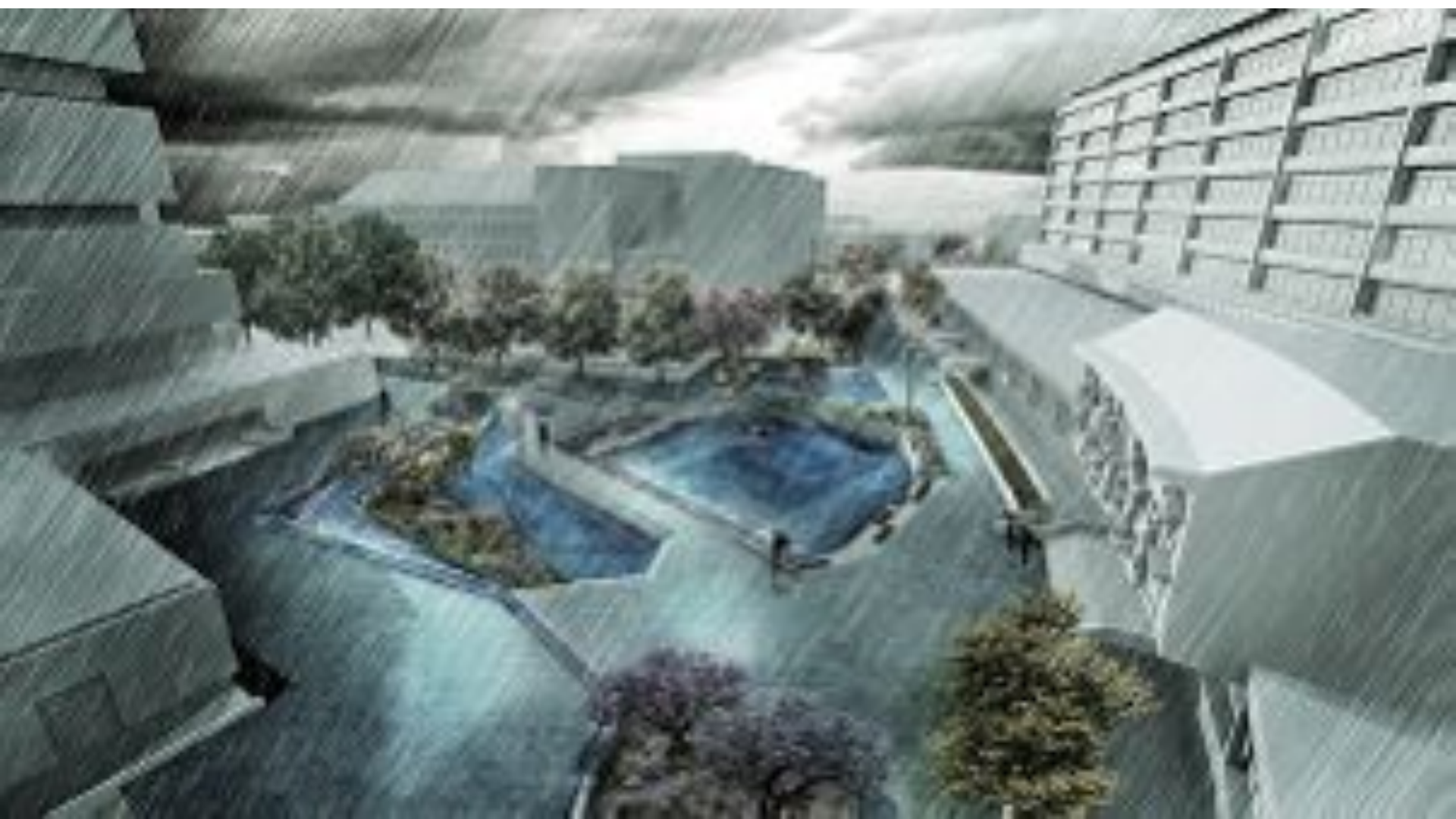
Water storage / parking garage



SMART URBAN DESIGN









Trappen te gebruiken als tribune voor studenten. Zaskine



Dagelijks gebruik buitenruimte



Veelzijdig gebruik bassin #2 voor samenkomst van mensen.



Oranjerode vloer geschikt op actief gebruik en verschillende groepen.



Bezoedigen De Libertijnen

GREEN ROOFS FOR AN ATTRACTIVE CITY





INVOLVING STAKEHOLDERS





GREENING HOFBOGEN



POST-OFFICE



7 SEASONS



DE URBANISTEN

GREENING HOFBOGEN = WORK IN PROGRESS

DE URBANISTEN

ADDING SURFACE WATER



- Green aan water
- Water aan water
- Indicative ligging blou water
- Indicative versterking
- Indicative roete blou water
- Roads



Blue Corridors



PORT FLOOD PROTECTION

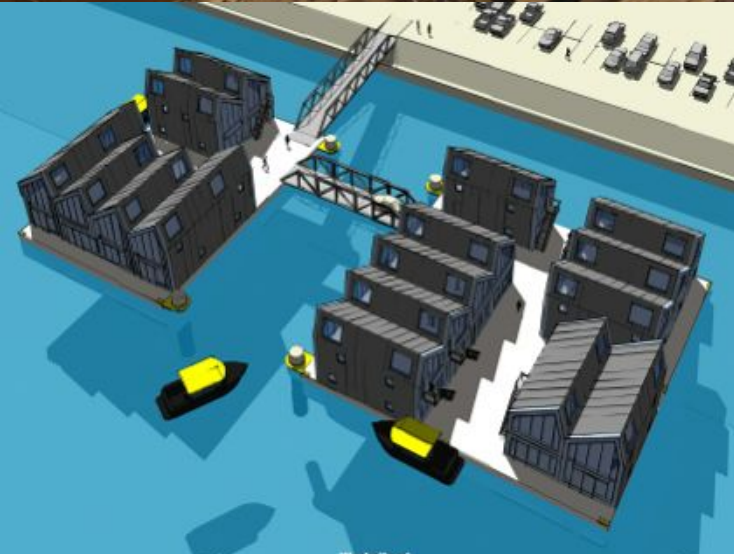


WATER FRONT DEVELOPMENT





ADAPTIVE BUILDING



TOGETHER WITH PARTNERS



AABEL



DURA VERMEER

**C40
CITIES**
CLIMATE LEADERSHIP GROUP



TU Delft Delft University of Technology



TYGRON
Serious Gaming



NWP Netherlands Water Partnership

DE URBANISTEN

VU UNIVERSITY AMSTERDAM



NWC Netherlands Water Centre



IBM

Deltares
Enabling Delta Life

Grontmij

delta sync
WATERBASED URBAN DEVELOPMENT

Rotterdam welcomes Delta Cities from around the world



CONNECTING DELTA CITIES





DELTA IN TIMES OF CLIMATE CHANGE

2nd INTERNATIONAL CONFERENCE

ROTTERDAM, THE NETHERLANDS 24 - 26 SEPTEMBER 2014

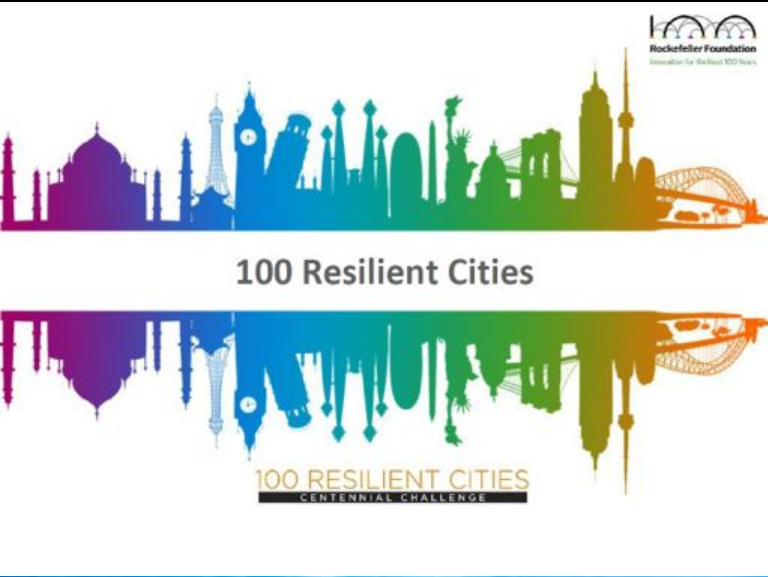


OPPORTUNITIES FOR PEOPLE, SCIENCE, CITIES AND BUSINESS

www.climatedeltaconference2014.org



ROTTERDAM RESILIENT CITY



33 Resilient Cities Announced by Rockefeller Foundation

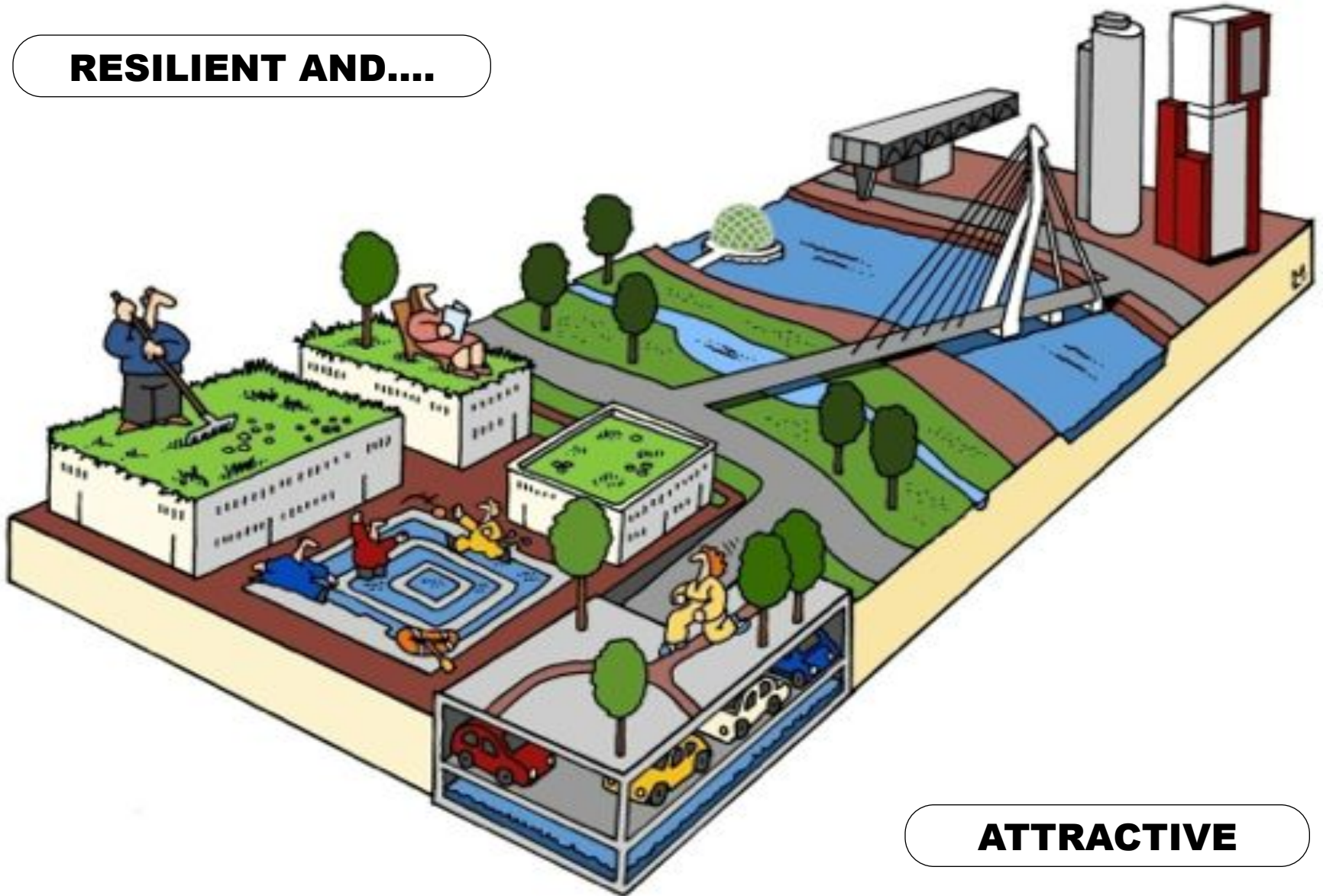
By: [Judith Rodin](#)



RESILIENT ROTTERDAM



RESILIENT AND....



ATTRACTIVE



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