Deltares
Enabling Delta Life

Nature based Solutions in the city

Vand I Byer network
Some examples from the Netherlands

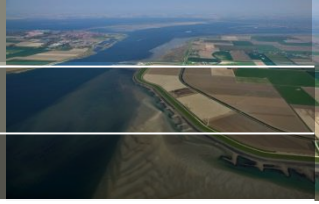
Dr. Victor Beumer, Deltares (NL), 24 Januari 2018

Hier wordt geïnvesteerd in uw toekomst.
Dit project is mede mogelijk gemaakt met steun van het Europees Fonds voor Regionale Ontwikkeling van de Europese Unie.

Building with Nature along coasts and in lakes

- **Make use of natures dynamics**
- **Think out of the box**
- **Multi-disciplinary water safety**
- **Multi-functional**

Building with Nature



- Building with Nature shows how to utilize natural processes and provide opportunities for nature while realizing hydraulic infrastructure.

- Building with Nature offers solutions which enable us to combine the needs of people and our natural environment in a cost effective way.

- Building with Nature contributes to:
  - Water safety
  - Nature development (biodiversity)
  - Everyday surroundings (well-being)
  - Improvement of water quality
  - Climate proof city
  - Economy/image

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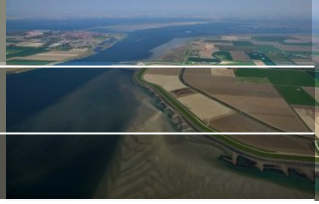

Nature-based Solutions (NBS): Solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. (EC)

Green infrastructure (GI): The spatial structure of natural and semi-natural areas, but also other environmental features, which enable citizens to benefit from its multi-functionality.

From ‘Greening’ towards ‘Building with Nature’

Installation of green areas
(to grow/maintain vegetation)

Liveability
(feel-good)

Recreation
(active experience)

Nature-like surrounding
(birds & flowers)

Local approach

Climate adaptive
(dry feet)

Awareness of physical and ecological surrounding (carrying capacity for problems)

Natural values
(realisation of suited conditions for natural development)

Self-reliance of nature
(minimisation maintenance)

System approach

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Nature-based solutions

2 groups:

- Existing nature areas → derive ecosystem services from existing ecosystems (*restoration/conservation* approach)
- Designing and constructing natural solutions → design specifically for certain ecosystem services (*installation* approach)

See blog: https://www.linkedin.com/feed/update/urn:li:activity:6331461951461355520/

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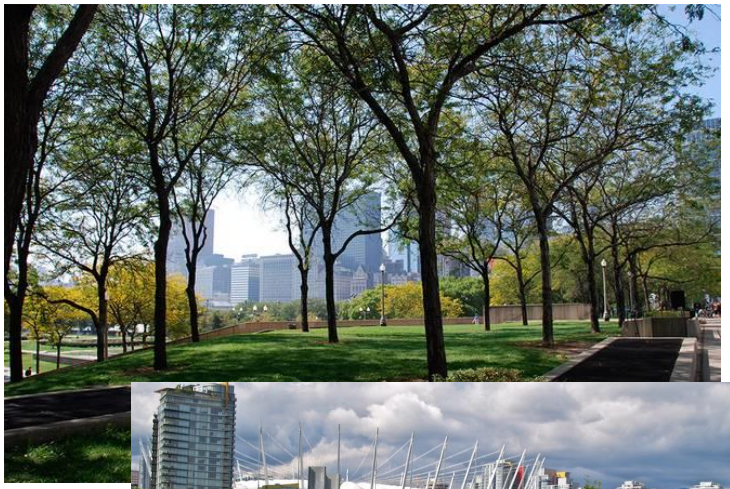
Hybrid versus ecosystem-based NBS



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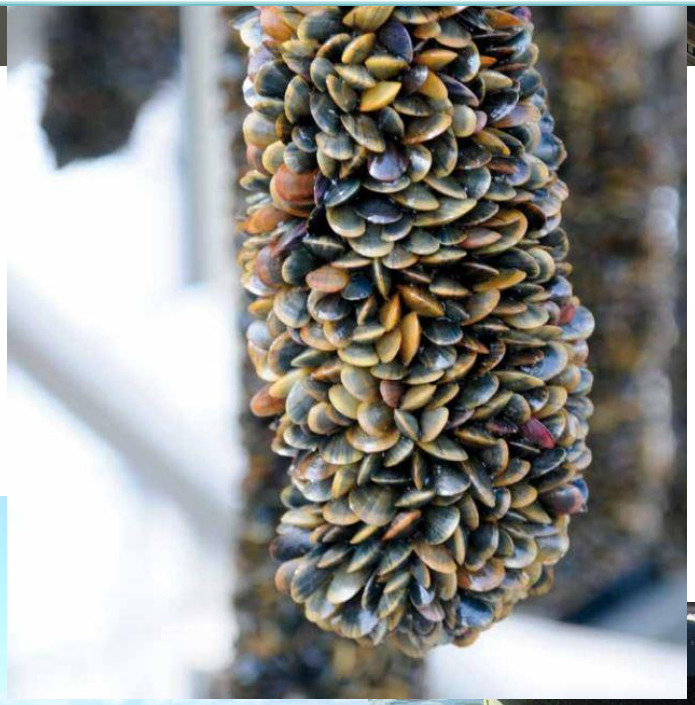
Hybrid solutions: **Floating or hanging structures**



Differences (important for implementation): hybrid versus ecosystem-based

Hybrid solutions

- Less to not dependent on the site conditions within the city
- Usually focus on 1 or 2 benefits
- Often needs little space
- Have clear business cases.

Ecosystem-based solutions

- Highly connected with local and regional site conditions (soil, groundwater and disturbance)
- Have multiple benefits
- Often need more space than hybrid solutions
- Have complex business cases

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River as a Tidal Park

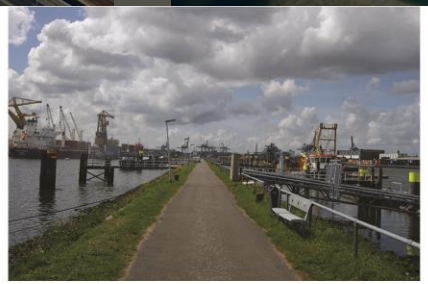
Climate adaptation & Rotterdam

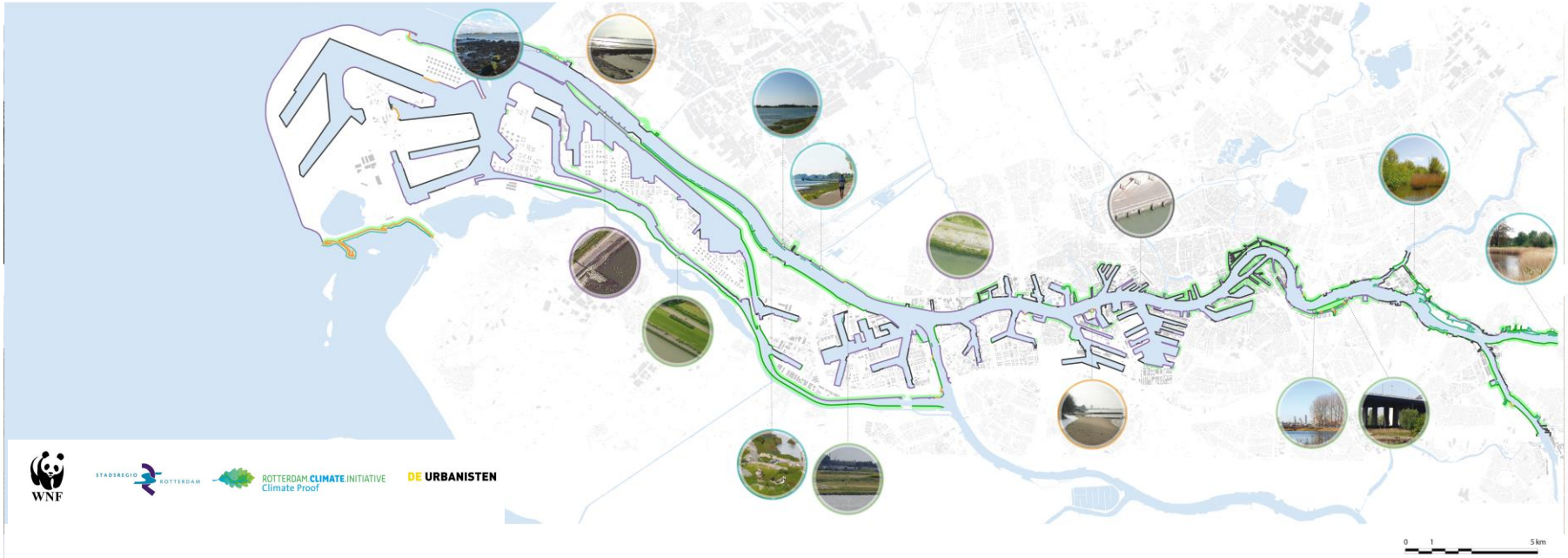
Rotterdam lies in a delta which makes it vulnerable to consequences of climate changing:

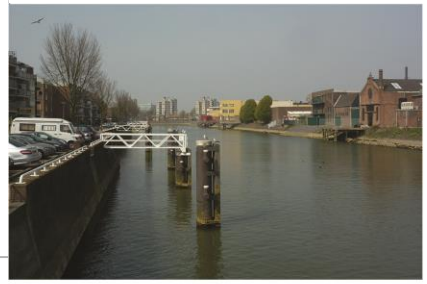
- more extreme weather conditions (rainstorms/drought/heatwaves)
- Higher water levels (sea and river)

Current situation: steep and stoney river banks (70%)

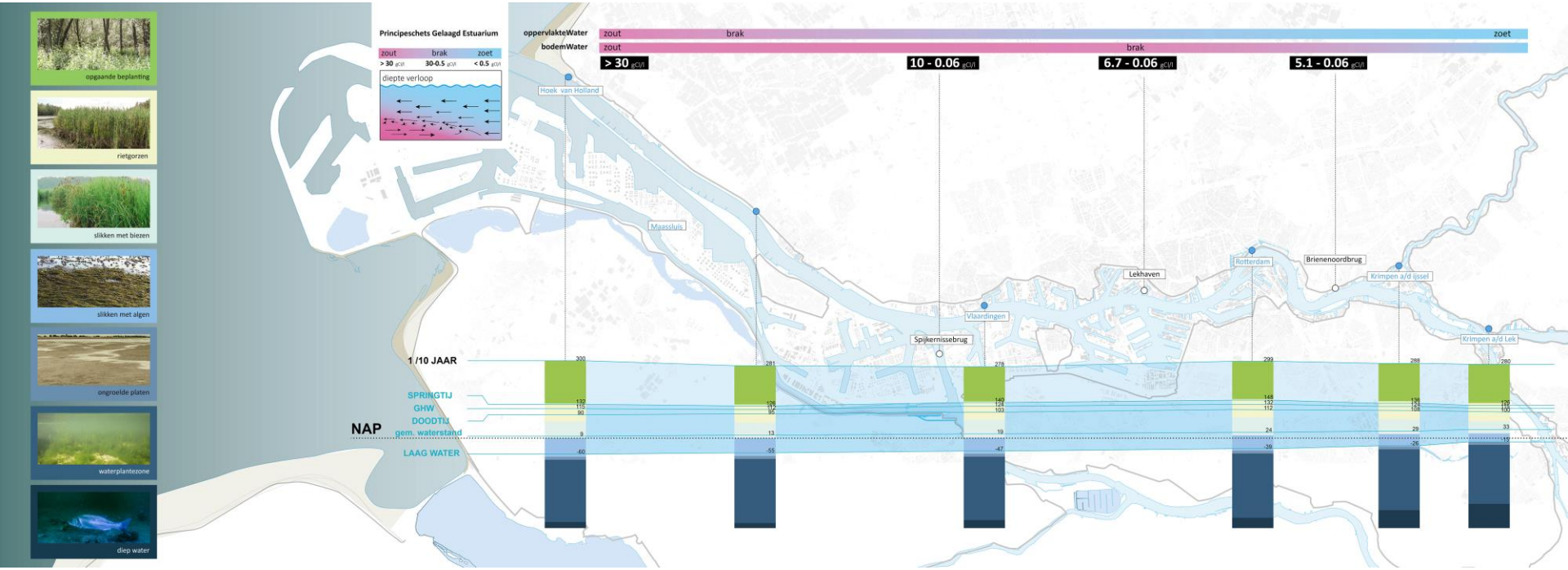







Current situation: ecological poverty



WNF

STADSREGIO ROTTERDAM

ROTTERDAM.CLIMATE.INITIATIVE
Climate Proof

DE URBANISTEN

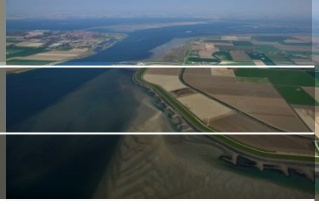
Water safety issue: dikes 2050

Deltaprogramma | Rijnmond-Drechtsteden

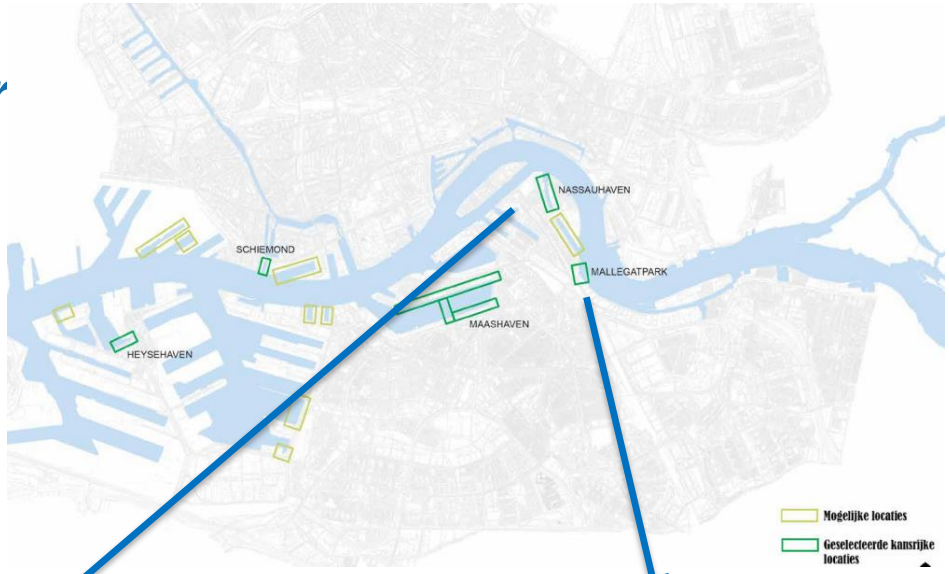
DE URBANISTEN D.EFAC.TO

2014-06-12

- hoogtetekort of -overschot ten opzichte van HBN 2050 REF
- klimaat + zetting + nieuwe norm als er niets aan de dijken zou worden gedaan ten opzichte van de referentiesituatie 2015
- overslagcriterium 0,1 l/m/s met uitzondering van Rivierenland en HHSK (zonder Hollandsche IJssel): 1,0 l/m/s

Showcase Tidal River

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IN DE STAD
www.buildingwithnatureinthecity.com
Natuurlijk talud
Minder verhoging van dijken dankzij golfdemping door
wilgen
strekdam voor oeveraangroei en vegetatie
drijvende structuren
Getijdenpark
Hangende structuren
Hellingbaan zwaluwwand, insectenwand
Natuurlijke golfbreker
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EcoShape
Witteveen + Bos

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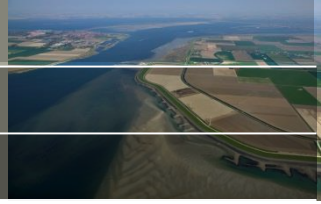
Discussion



1) In what way can climate adaptation solutions contribute to solve greater societal challenges / create a better world in 2030?

Nature-based Solutions represent by definition natural values, but also healthier environment (air, water, soil) → increased liveability in broader sense.

2) In order to do so, in what way should climate adaptation solutions in 2030 differ from today?

Systems approach to guarantee effectiveness and sustainability

More problem oriented

Design business cases not based on innovative character or on momentum

Keep it simple!

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Water supply and sanitation Technological Platform