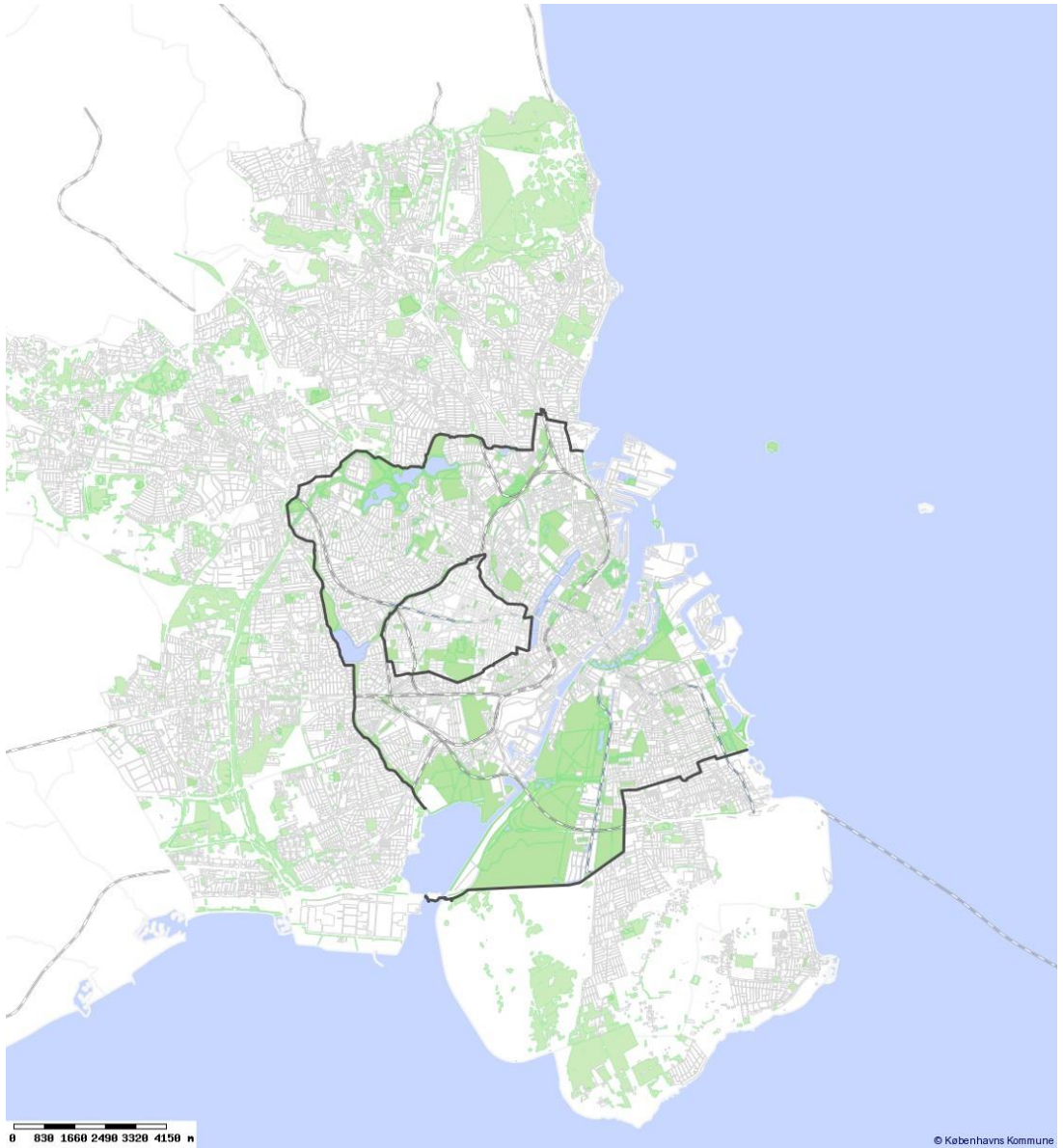
Cloudburst planning in Copenhagen

Lykke Leonardsen

Copenhagen



The City of Copenhagen (app. 600.000 inhabitants) is the capital of Denmark.

(Metropolitan area app. 1,500.000 Inhabitants)

Responsible for:
- Environmental planning
- Water supply planning
- Wastewater planning
- Climate change adaptation planning
- Mitigation planning

2018

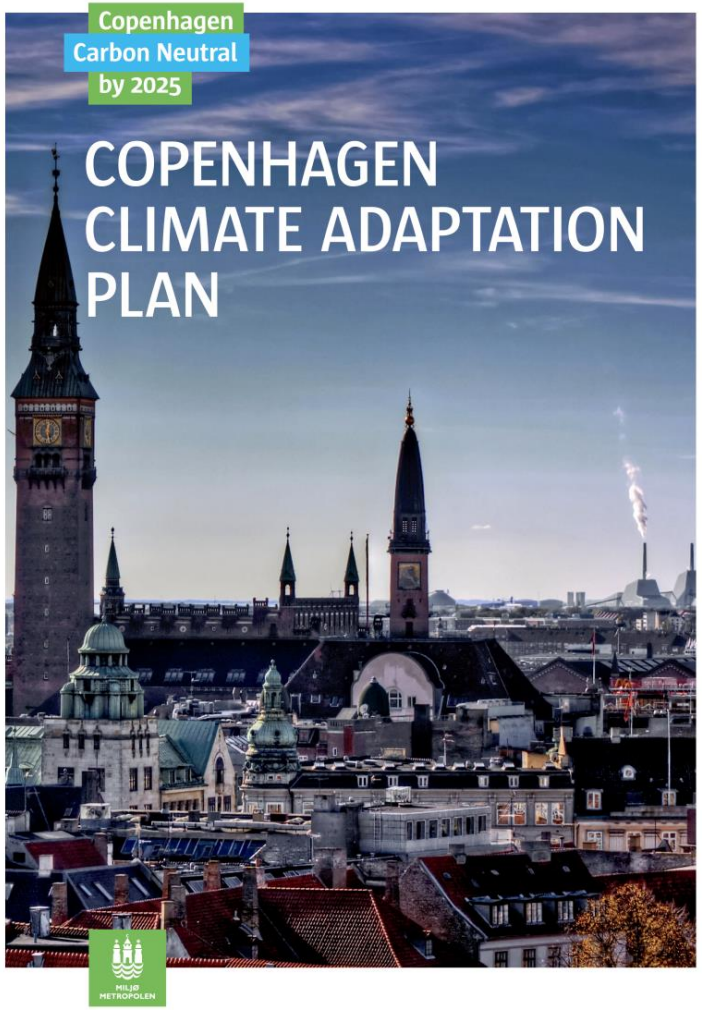
Combined sewer overflows today

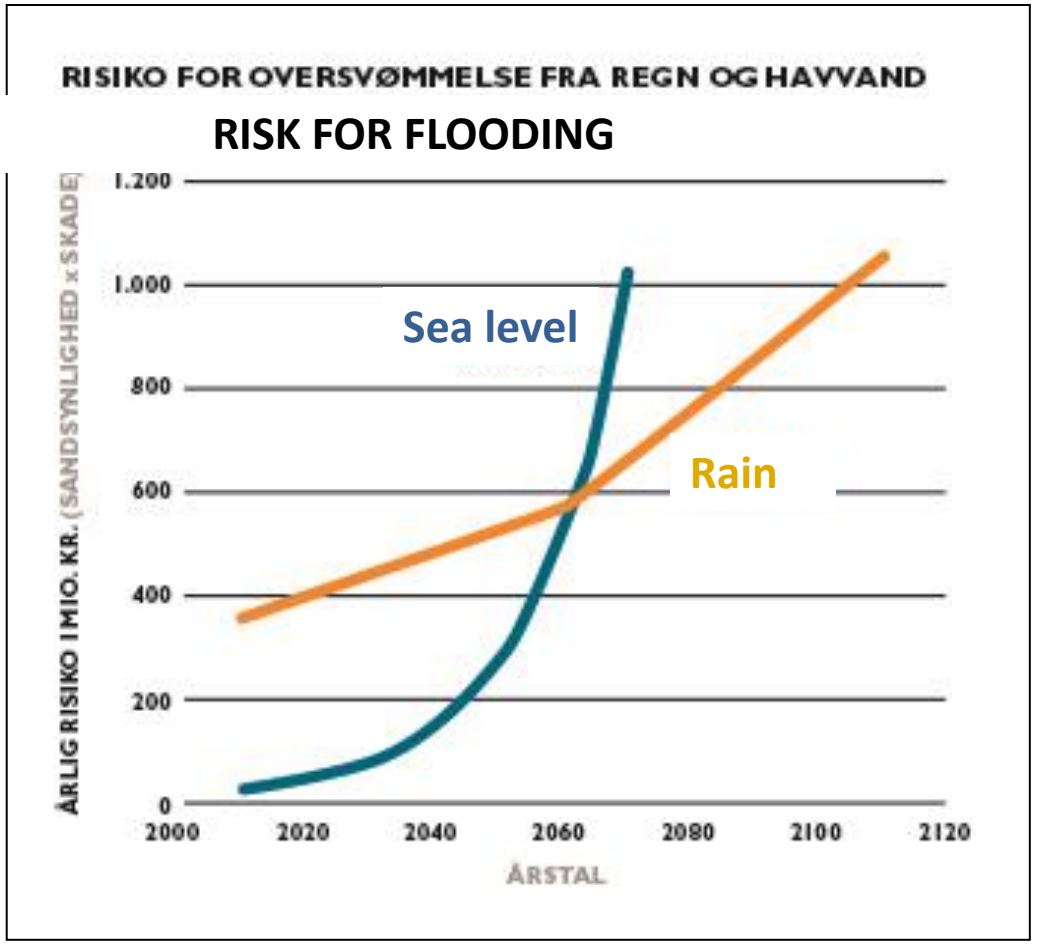
1) Yearly overflows into marine recipients – 162 per year – in the inner harbour – about 3-8 events per year.
2) About 2.000.000 m3/year
3) Yearly overflows in freshwater recipients – 229 per year
4) About 1.000.000 m3 per year

5) Copenhagen has higher targets than the national goals regarding water quality.
6) Will not meet all by 2027, because of construction delays

Building for Copenhagen life

Climate adaptation plan



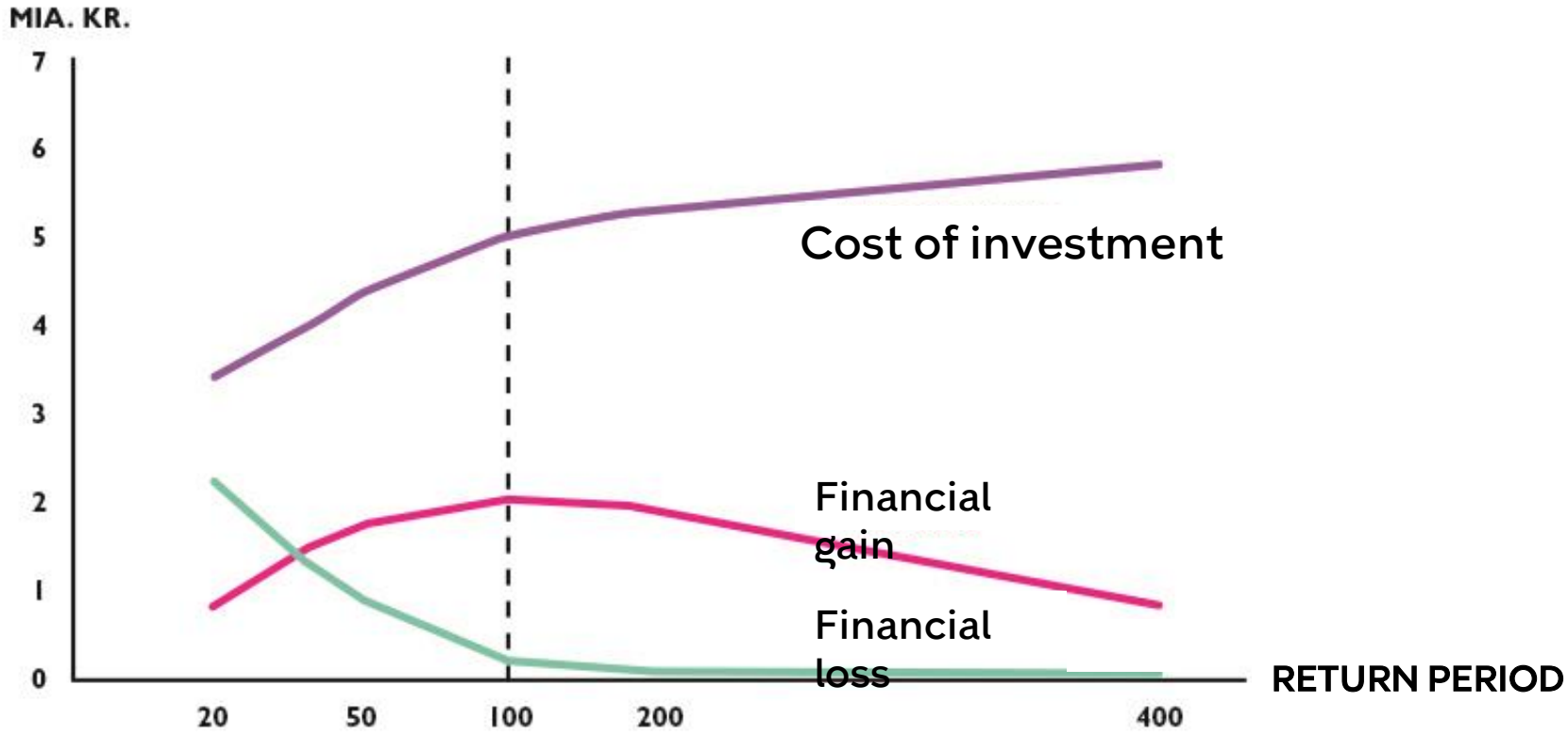


July 2011 –

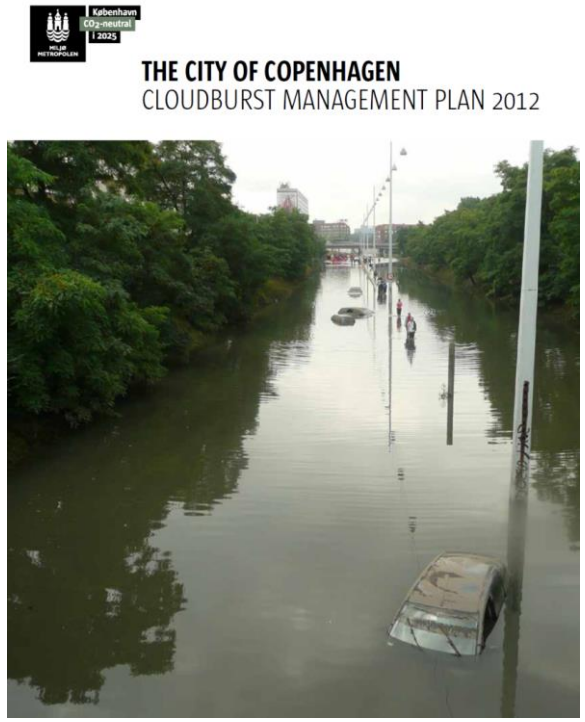
1000 year storm

- 150 mm rain in 2 hours
- Damages close to 1 bill. Euros
- Damages to critical infrastructure
- A game changer for the city
- Development of a Cloudburst management Plan

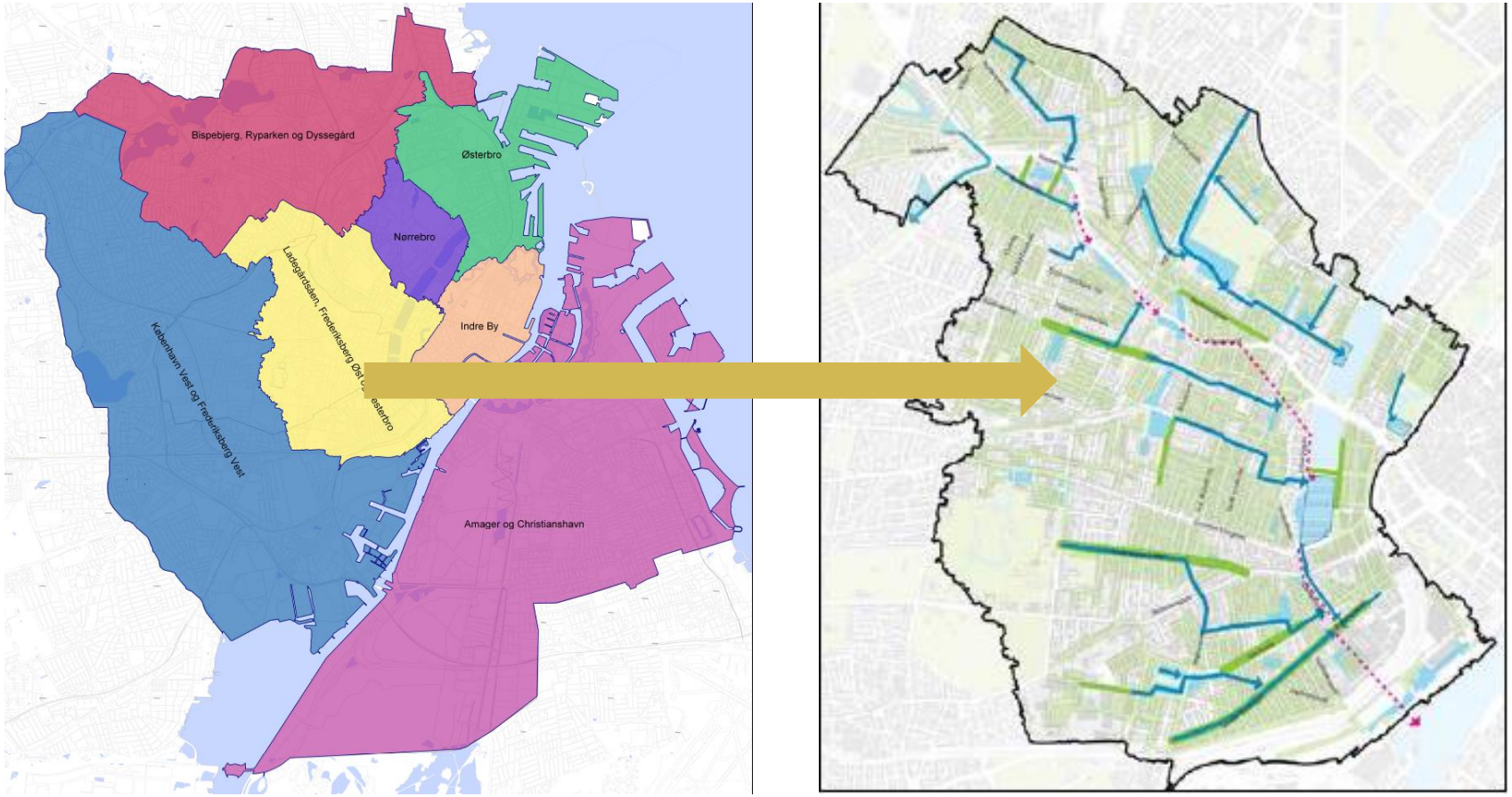
Decision of safety level



Following the natural flow of water

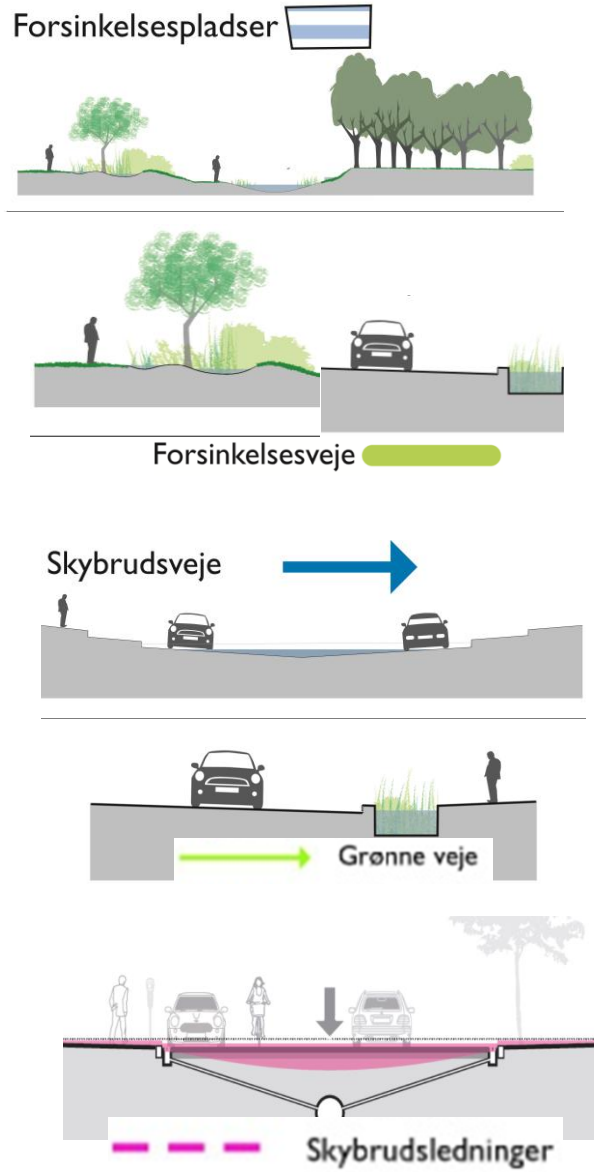


Dividing the city into catchments



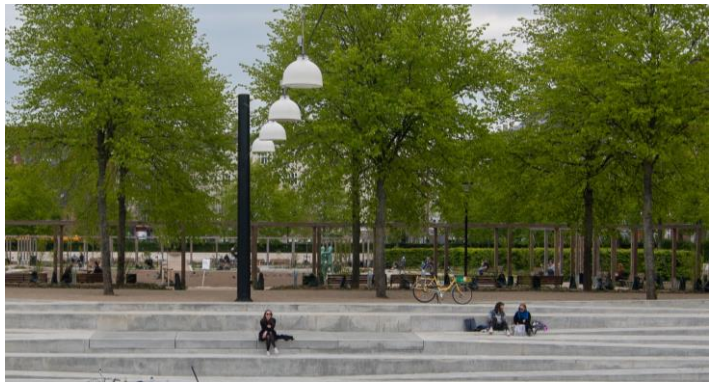
How do we manage the water

1. **Central delays – for storing water**
2. **Retention boulevards – delaying water**
3. **Cloudburst boulevards – transporting water**
4. **Green roads – transport and delay of water on small roads**
5. **Pipes transportation under ground**



Multifunctional solutions

- Allows us to use adaptation to transform the city as part of the adaptation process
- Shared costs
- Adaptation as the backbone for urban development



Climate adaptation – with co-benefits

- Recreational value
- Biodiversity
- Meeting places – social resilience
- Health
- Improved microclimate
- Accessibility and safety
- Economic growth

Resident involvement

Measures connected

350 individual projects

Implementation period: 20-30 Years

Total cost: EUR 1.6 bill.

Utility: EUR 1.15 bill.

Cloudburst project at Taasinge Square

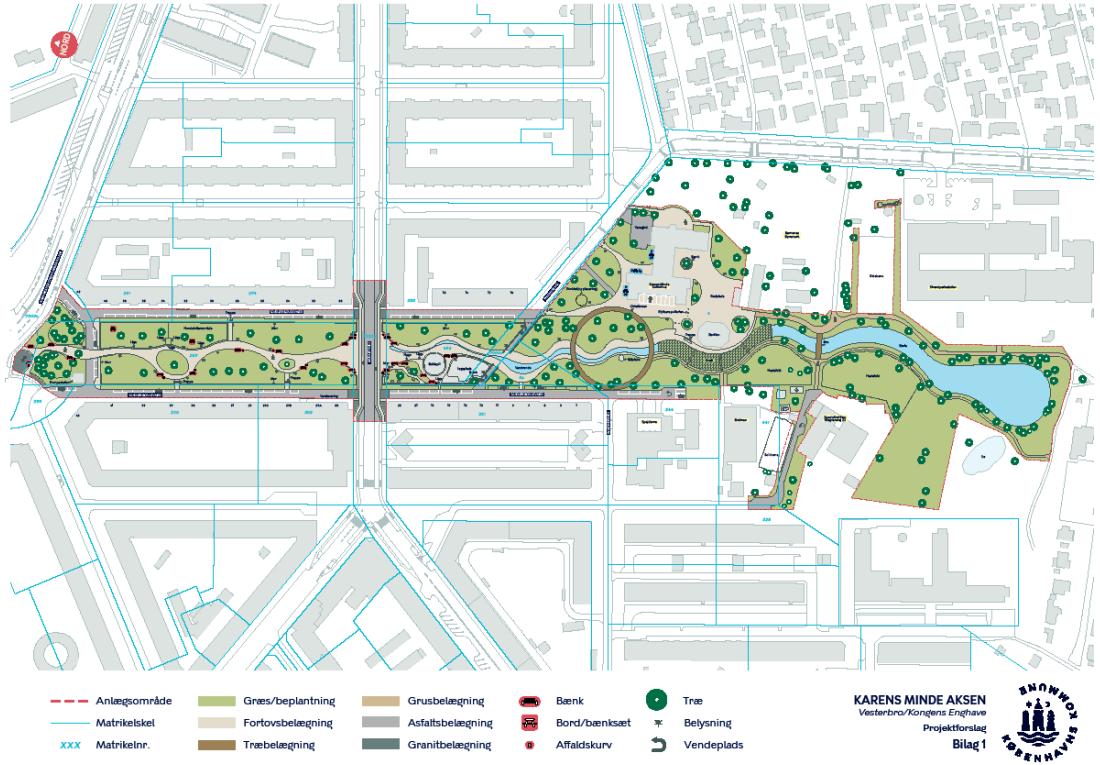
Retention and infiltration of rainwater at the square

Sct Kjelds square/Bryggervangen

Sct Kjelds Square/Bryggervangen

City of Copenhagen

Water as a resource (Karens Minde Axis)



- Canal – landscaping – works as both a path and a canal

Water as a resource (Karens Minde Axis)

Storing of 15,000 m3 of stormwater creates more urban nature and increases biodiversity

City of Copenhagen

Water as a resource (Enghaveparken)

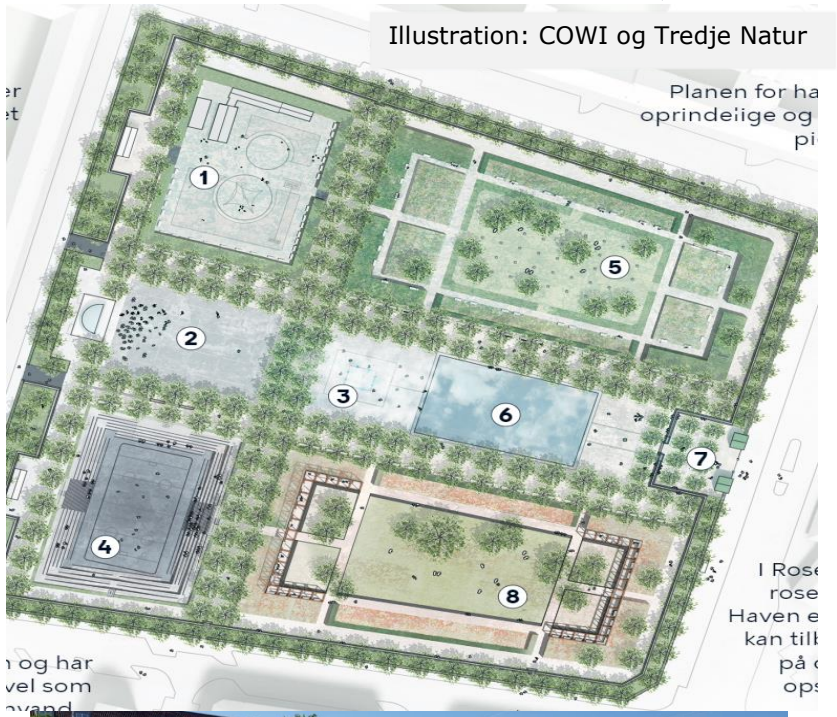
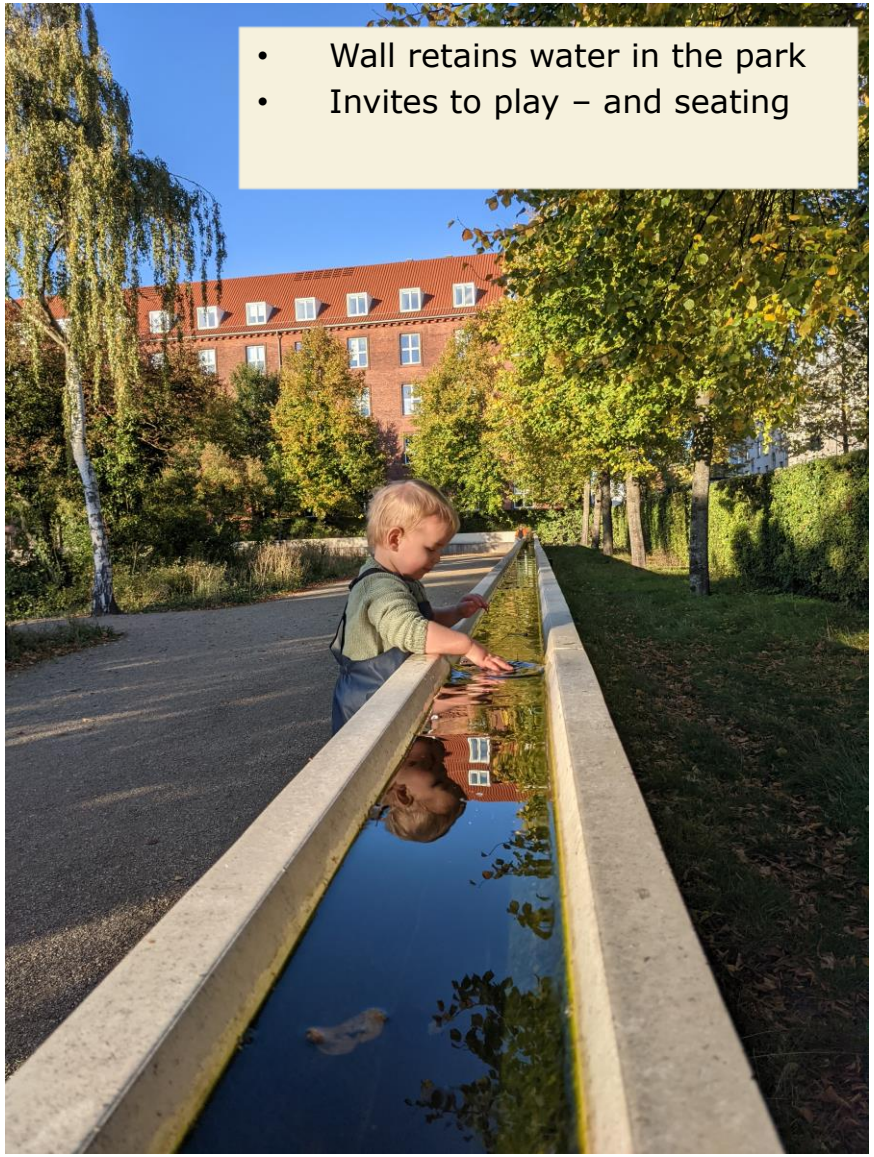


Illustration: COWI og Tredje Natur

Sports field with a volume of 3,700 m3



- Wall retains water in the park
- Invites to play – and seating

Enghave Park

City of Copenhagen

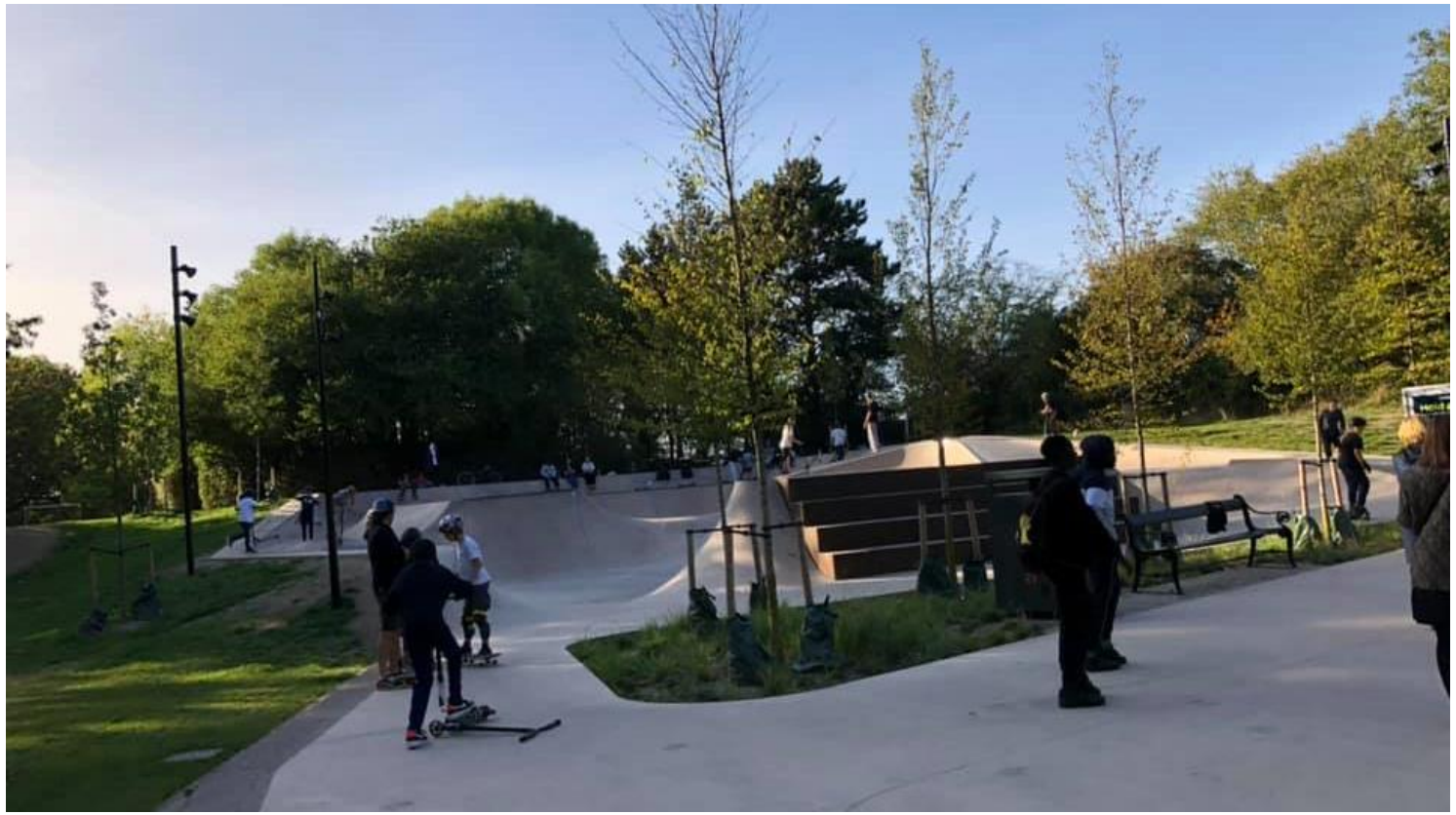
Water as a ressource (Scandiagade)

Eight sunken gardens – with total volume of 1,500 m3

Eight different themes for the gardens

Scandiagade

Remiseparken



Remiseparken

Financing: A new scheme for climate adaptation

'Co-financing' makes it possible to finance CLIMATE ADAPTATION SOLUTIONS through the water rates.

URBAN SPACE IMPROVEMENTS on the other hand is tax-financed and is therefore part of the city budget.

Large volume – but lots of challenges

- 190,000 m3 storing capacity in the inner lakes can be used for storm water management
- Requires extensive cleaning with advanced waste water treatment due to the EU Water Frame Directive.
- Difficult to find space for that in the dense city

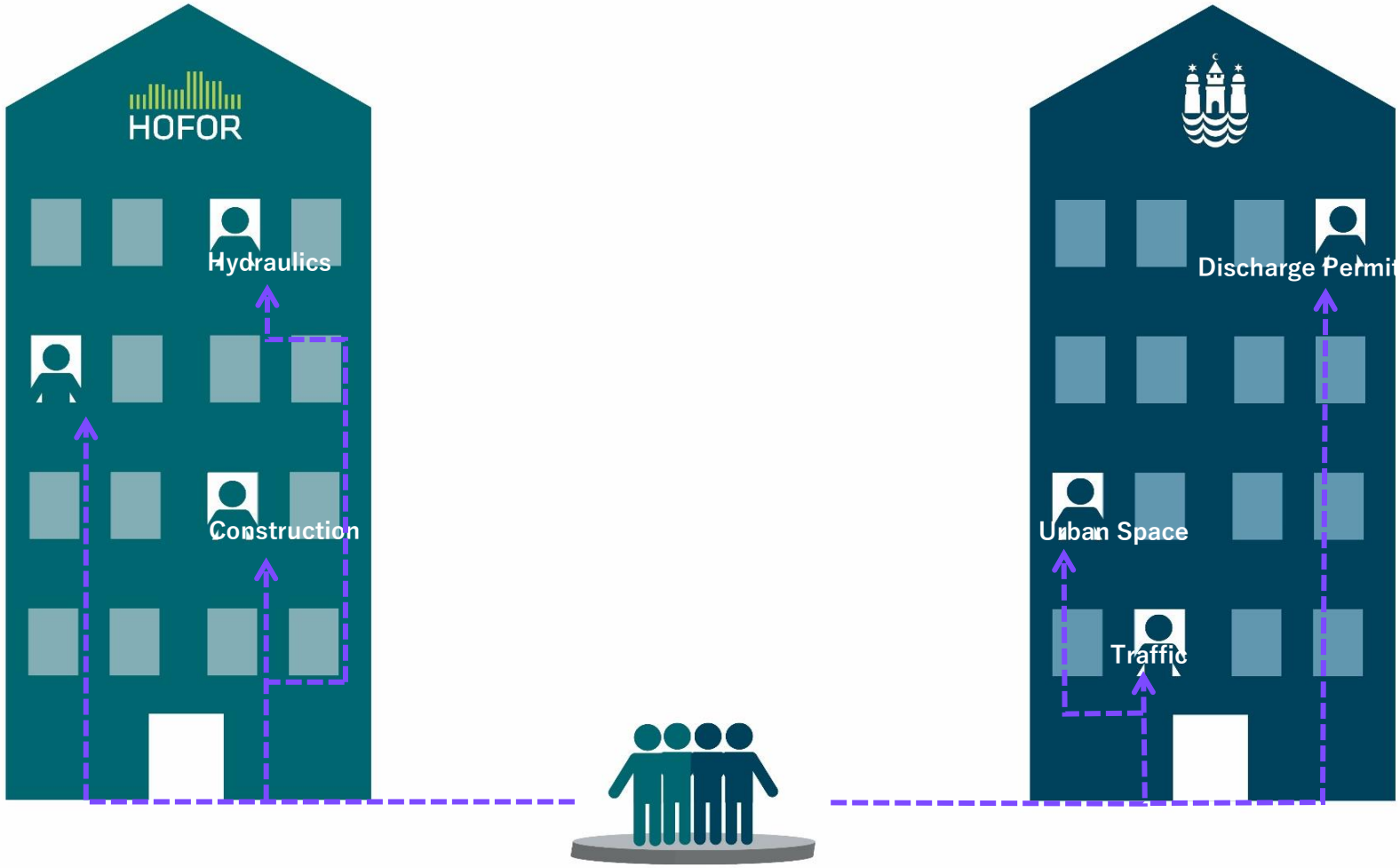
Planning challenges:

- Adaptive planning
- Different wishes to urban life – how do we fit in?
- We need to work within the existing infrastructure in the city
- Clash of professions

Governance challenges

- Involve all city agencies from the beginning!
- Internal and external stakeholders
- Constant organisational and political backup
- Economic – keeping prices low – and keeping adaptation from stopping economic development
- Clash of professions

ORGANISATION

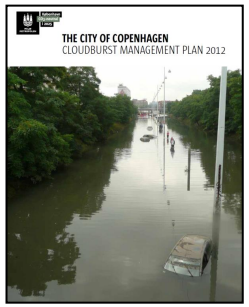


City of Copenhagen

1991 Plan for improvement of water quality

1998 New sewerage treatment facility constructed

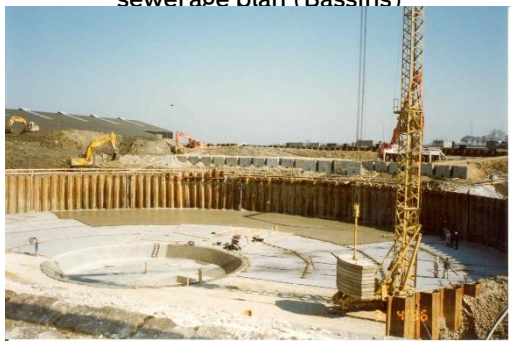
2002 Use of advanced warning system and opening of the harbour



2012 Cloudburst plan

2015 Implementation plan

1995 Start implementation of sewerage plan (Bassins)



2011 Climate adaptation plan

2013-2014 Catchment plans

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Thank you

Photo: Daniel Rasmussen / Copenhagen Media Center