

Blue-green Aarhus - 2024



NBS and stormwater operational model of Aarhus



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**Departement of Nature and Environment,
Aarhus Municipality**



The Danish Planning System (simplified)

National level

National planning

- government policies
- National plan statements
- Overviews of national interests
- national plan directives

Sector plans

- Water framework directive from EU
- Traffic plan (national and regional level)
- Energy strategies & plans
- Raw material plans
- Business development strategies
- etc

Municipal level

- Plan Strategies
- Architectural plans
- Master plans
- zone development plans
- layout plans
- building plans

Sector plans

- Water management plans (state level)
- traffic plans (state/regional/local level)
- etc

In a way we are like a "state"

Water management planning in Denmark



The Danish Environmental Protection Agency, a technical agency under the Danish Ministry of Environment, is responsible for water management:

CENTRAL

- formulate policy,
- monitor and assess the status of groundwater and surface water,
- enforce regulations,
- carry out pressure and impact analysis, economic analysis,
- prepare and coordinate the implementation of the RBMPs (River Basin Management Plans) and Programme of Measures,
- coordinate the preliminary flood risk assessment, flood maps and the FRMPs (Flood risk management plans) for the International River Basin

Districts if needed, prepare the two overarching FRMPs incorporating municipal FRMPs,

- coordinate public participation,
- issue permits,
- provide assistance regarding environmental policy in general and the WFD in particular,
- disseminate knowledge and coordinate international cooperation,
- Oversee water supply and wastewater management.

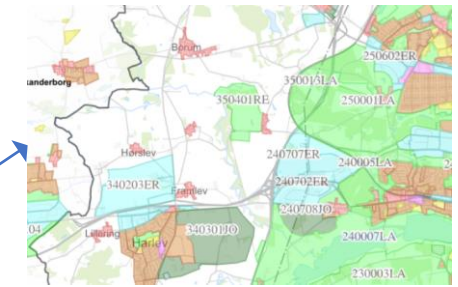
LOCAL

Municipalities:

- carry out operational responsibilities for water management,
- implement most of the intervention programmes,
- develop local action plans regarding water management, based on the RBMPs (River Basin Management Plans),
- prepare and implement municipal FRMPs (Flood risk management plans)
- own water supply and wastewater treatment companies (other water service providers are owned directly by consumers)

What is a Municipal Plan?

- Planning Framework for the **changes in areal Usage** within the borders of the municipality
- Based in the national Planning Legislation
- Adopted by the city council
- Renewed every 12th year
- Revised every 4th year
- The administration and politicians are obliged to work for implementation of the Municipal Plan



- Within the designation you should...
- Within the designation you may not...

National planning

Municipal planning

Local planning

- Designations

- Planning Frames

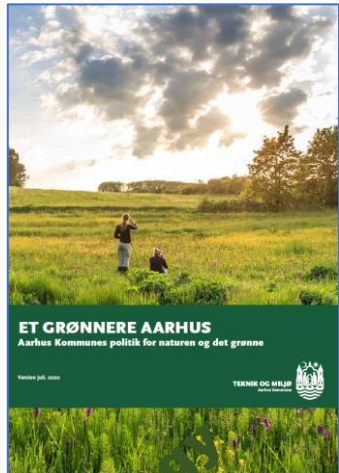
- Guidelines

Legally binding local regulations when building new city- and business areas

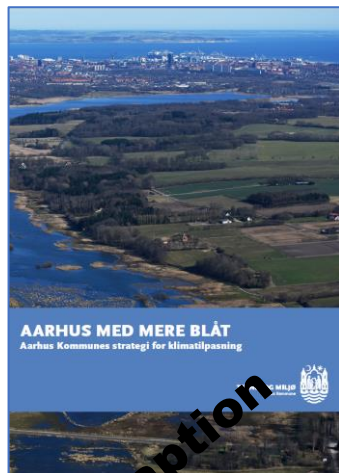


Umbrella Plan

A Greener Aarhus with more Blue



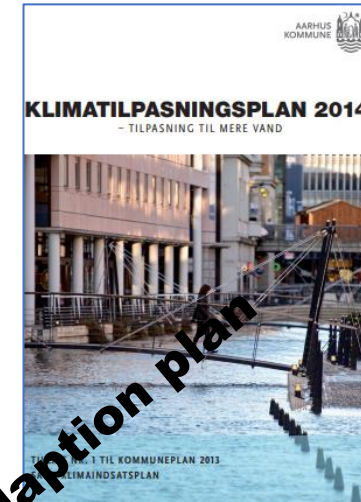
Green strategy



Climate adaption Strategy



Nature Quality Plan



Climate adaption plan



Leisure plan

Policy strategies

Action plans

Combined planning and investment

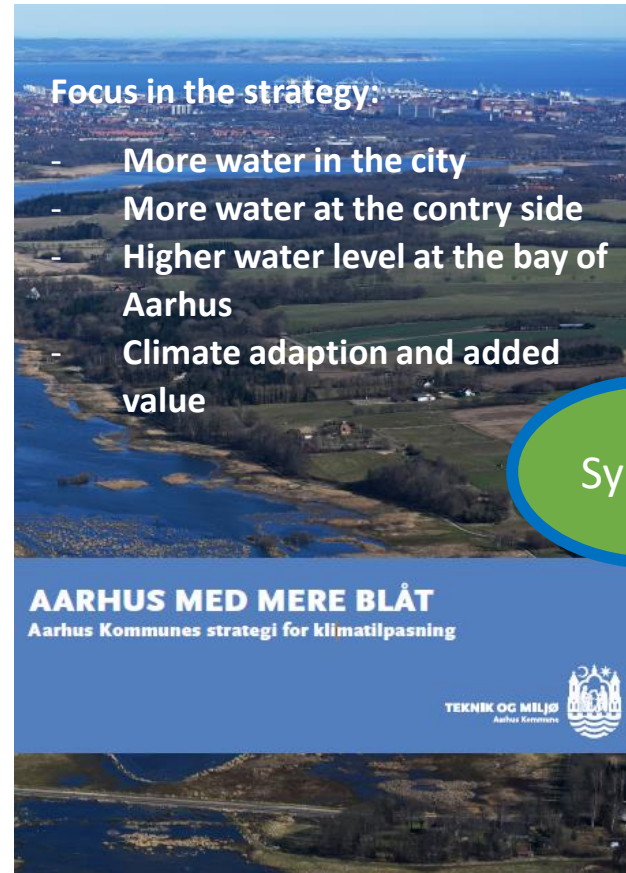
A Greener Aarhus - Aarhus with more 'blue'

Political framework

- Strategy for nature and green city
- Strategy for climate adaption to heavy cloudbursts
- Plan for blue-green structure
- Plan for quality of nature

Goals

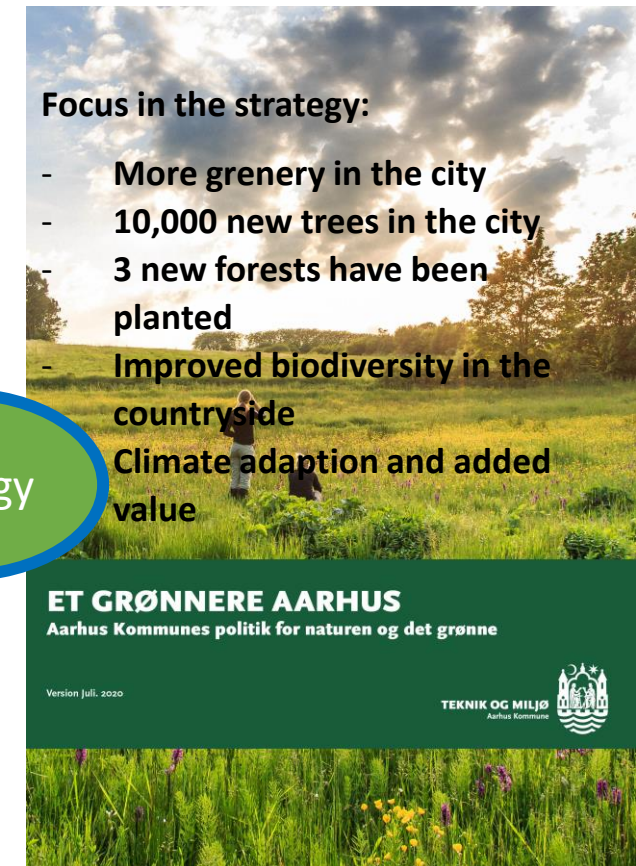
- Double the area to 4000ha protected nature and 8000ha forest
- Increase nature quality
- Create cohesive nature
- Double the capacity of retention of water in the landscape
- Increase biodiversity in streams
- CO2-neutral city by 2030



Focus in the strategy:

- More water in the city
- More water at the contry side
- Higher water level at the bay of Aarhus
- Climate adaption and added value

Synergy



Focus in the strategy:

- More grenery in the city
- 10,000 new trees in the city
- 3 new forests have been planted
- Improved biodiversity in the countryside
- Climate adaption and added value

Get the water at the terrain when it is possibly and necessary. More 'lakes' with rainwater.



The Vision

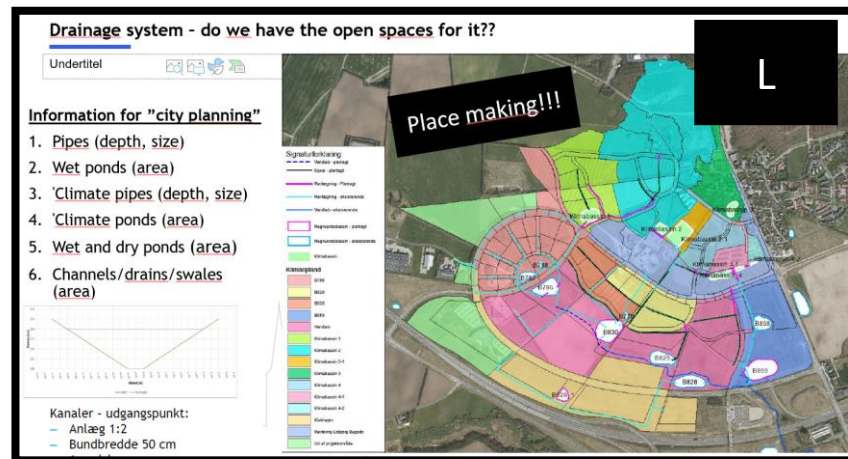
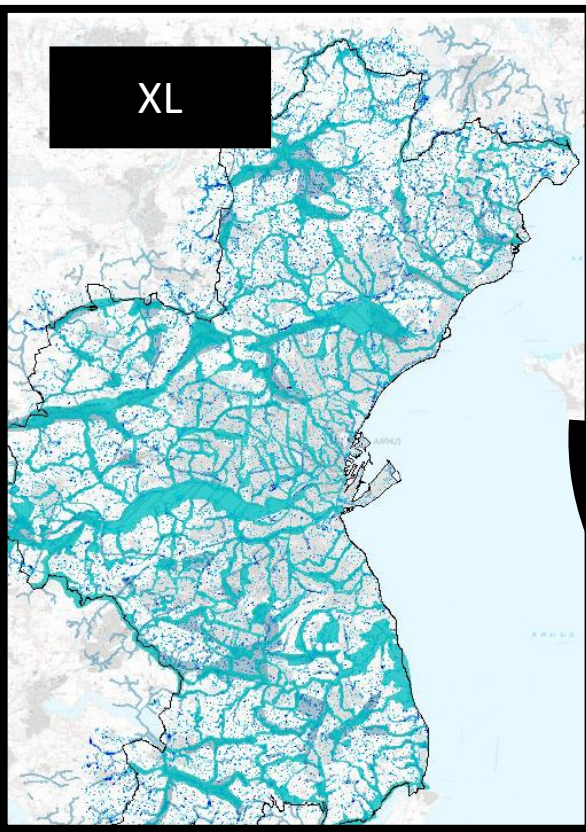
Create a high quality city and high quality surroundings

- Making the city more green:
 - Ensure important green connections
 - Ensure accessibility to green areas in the city and in open field
 - Adding quality to city development by introducing a Green Norm
- Making Aarhus robust and sustainable by finding space for water in the city and in green areas
 - Water gives live and added value to the city
 - Find enough space for surface water in the green structures of the city
 - Identify natural landscapes to store water and reducing flood risks
 - Find synergies between green areas and ground water protection



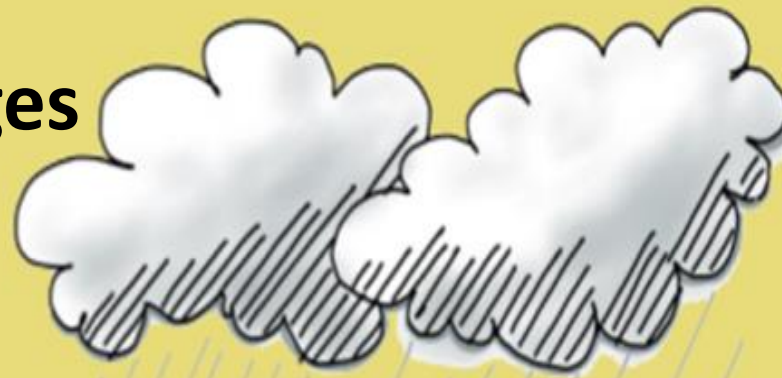
"Time and space for water"

How?
"place making"
(at all planning levels)



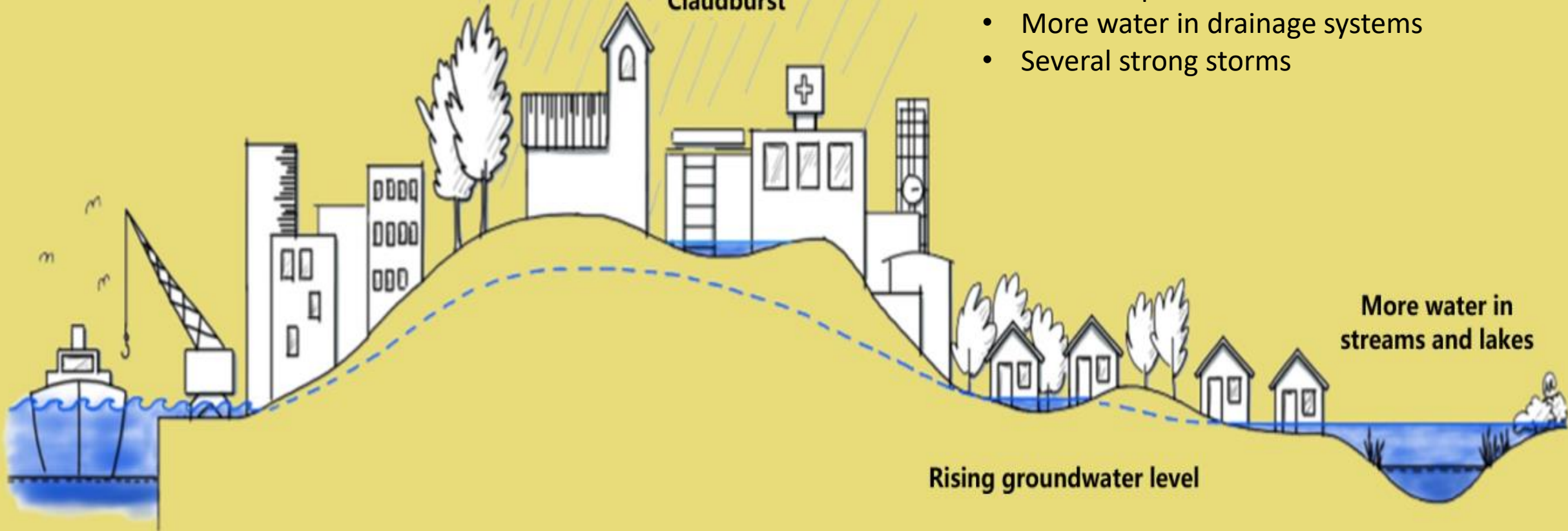
Aarhus and challenges

Water from everywhere...



Claudburst

- More water – less space
- High Groundwater level
- More frequent floods
- More water in drainage systems
- Several strong storms

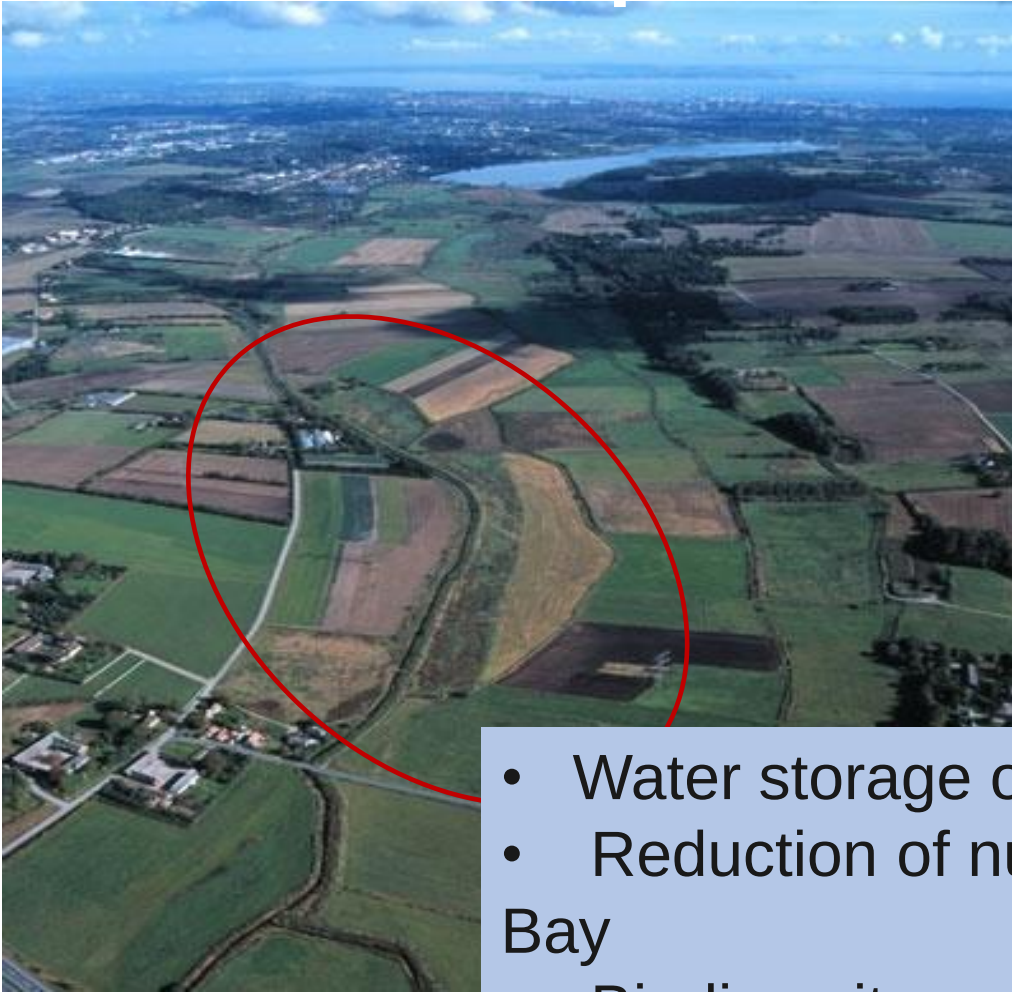


Rising sea level

Rising groundwater level

More water in
streams and lakes

We see water as a resource



Before river rejuvenation



After river rejuvenation

- Water storage outside urban areas
- Reduction of nutrient load to Aarhus Bay
- Biodiversity - animal and plant habitats
- More areas for activities

Water may still be an issue...



Continuous flooding 2023



Bridge removal 2023



City planning and urban growth

Rainwater management & climate adaptation

Planning a new city



TEKNIK OG MILJØ
Aarhus Kommune



Nye City

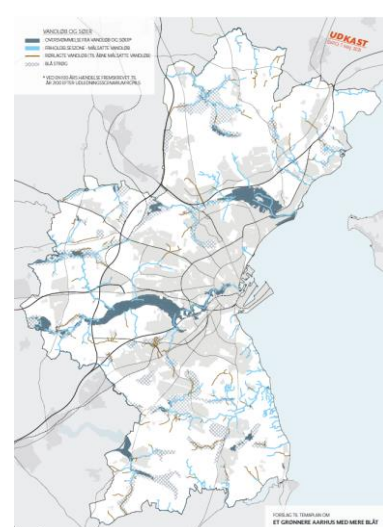


Sharing the space



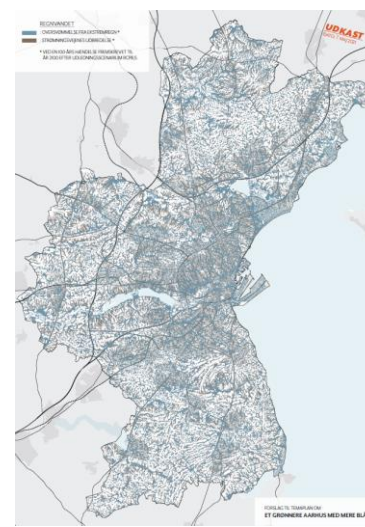
- Green areas of interest
- New green areas
- Living areas - Rules on size and placement
- Green Norm

Watercourses and lakes



- Flood Prone areas
- Bufferzones along watercourses
- Blue core areas in open field

Rainwater



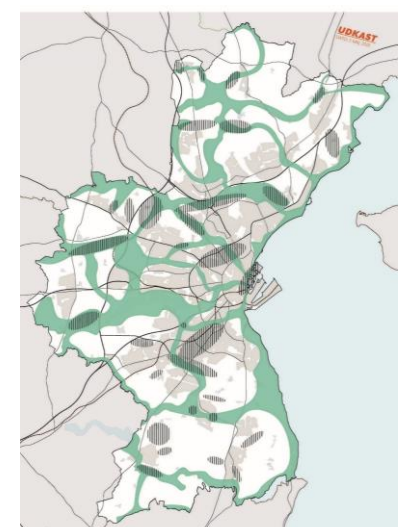
- Flood prone areas
- Surface Flows Paths of rainwater

Blue and green connections



- City parks
- Blue and green connections
- Leisure areas

Blue and green main structures



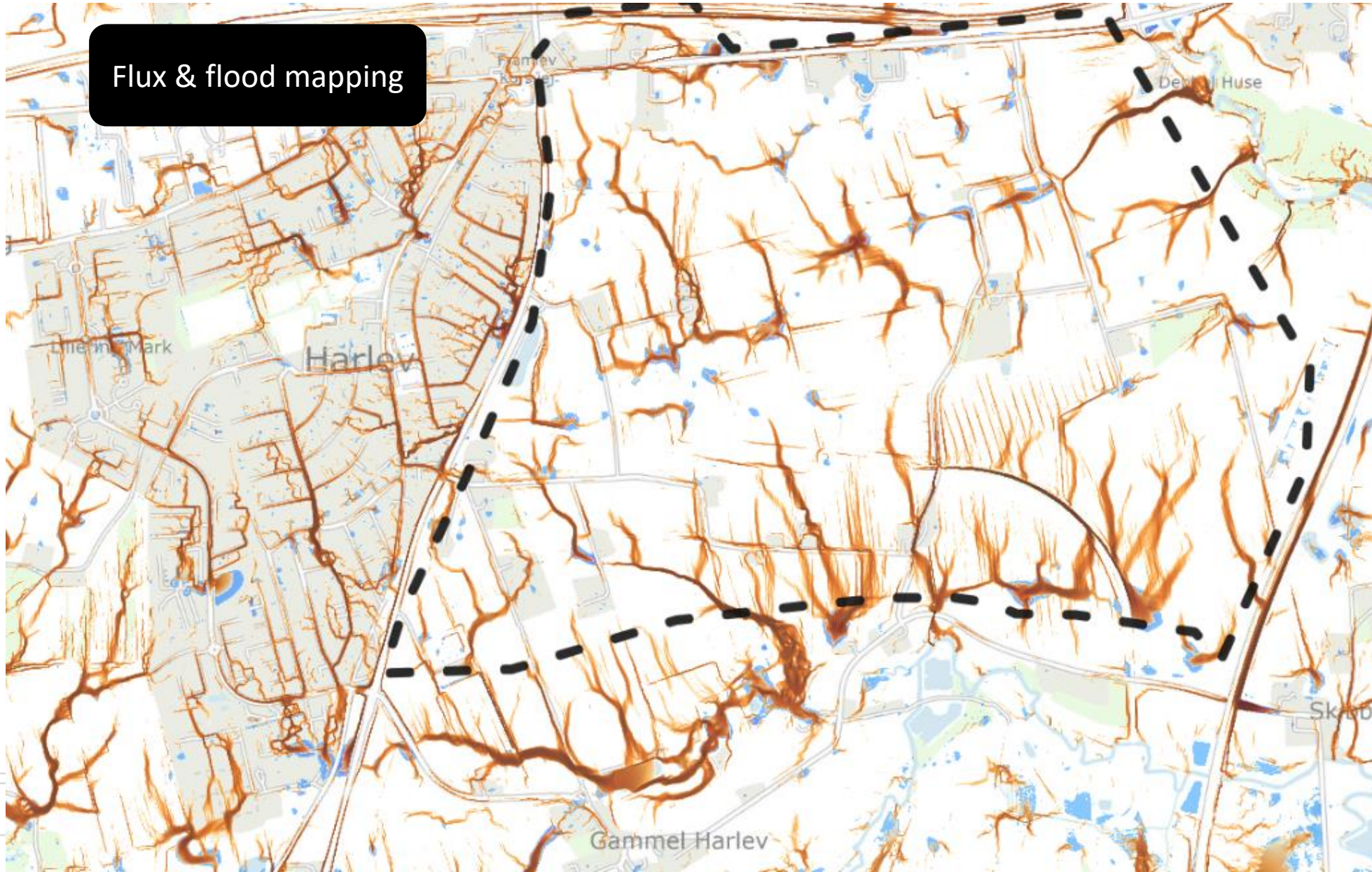
- Prioritized blue and green network derived from:
- Landscape and topology
 - Nature
 - Afforestation
 - Leisure areas
 - City development
 - Groundwater protection

Masterplanning: City development



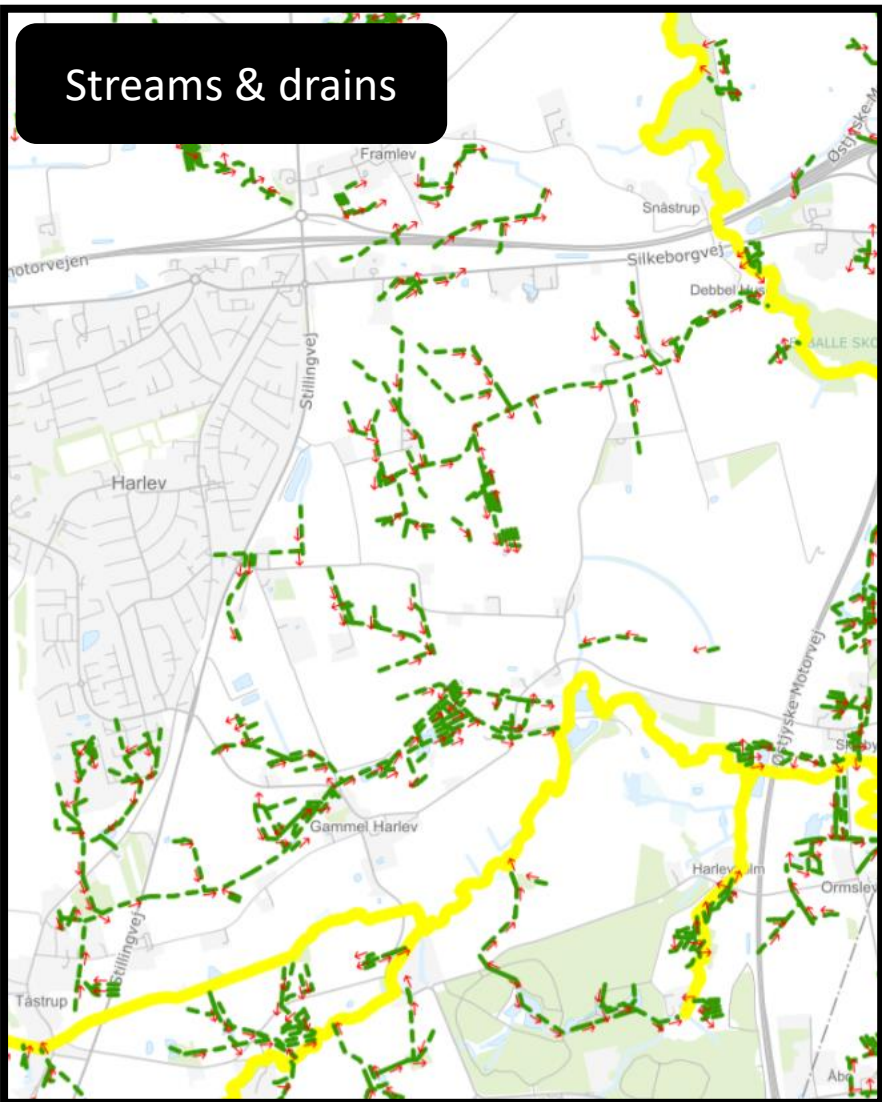
Masterplanning: 1. stormwater

Flux & flood mapping

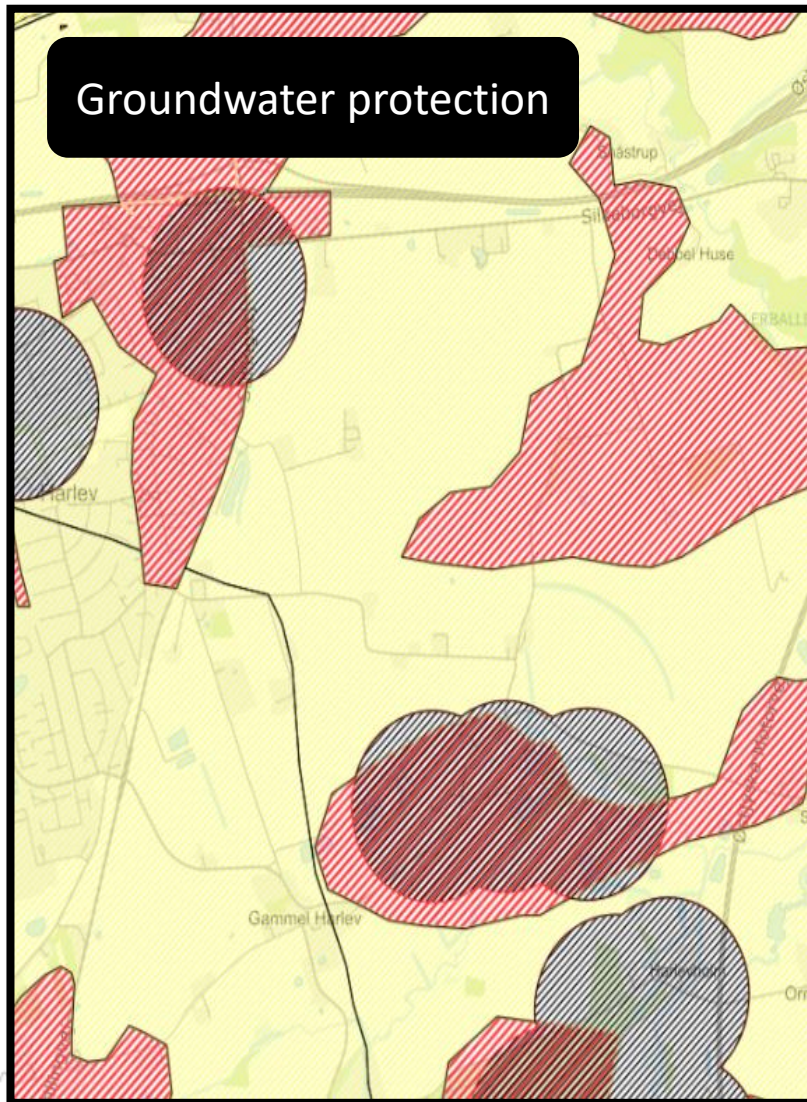


Masterplanning: 2. Existing conditions

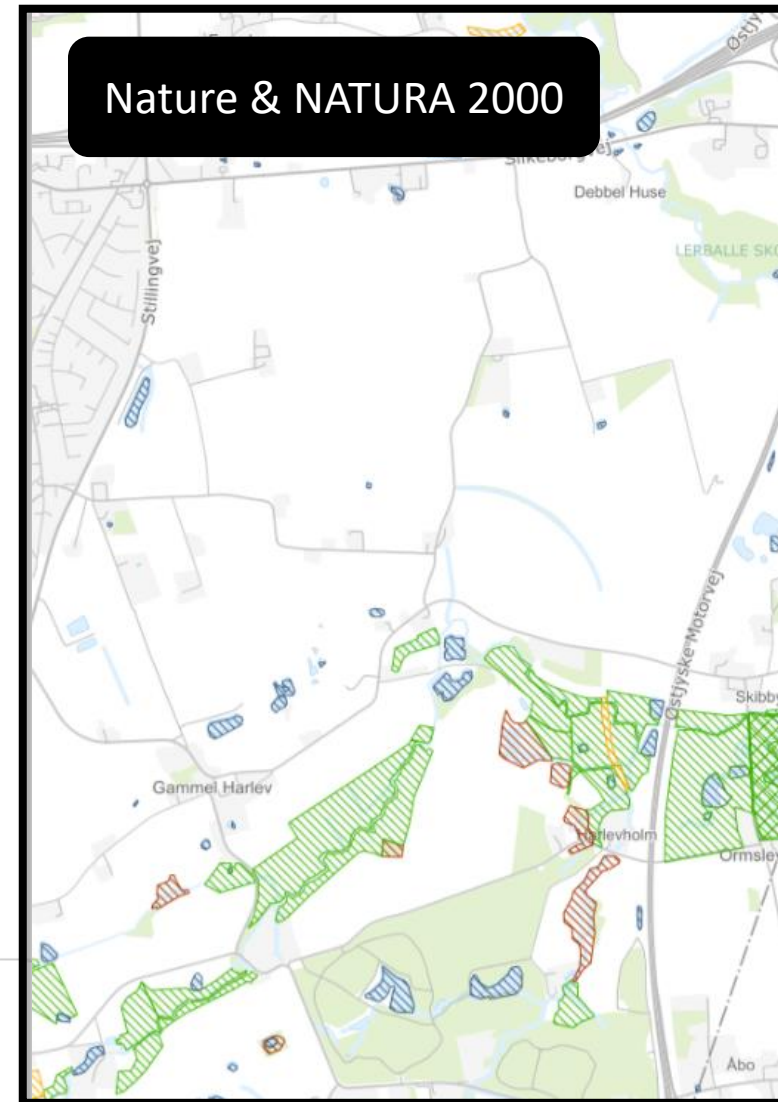
Streams & drains



Groundwater protection

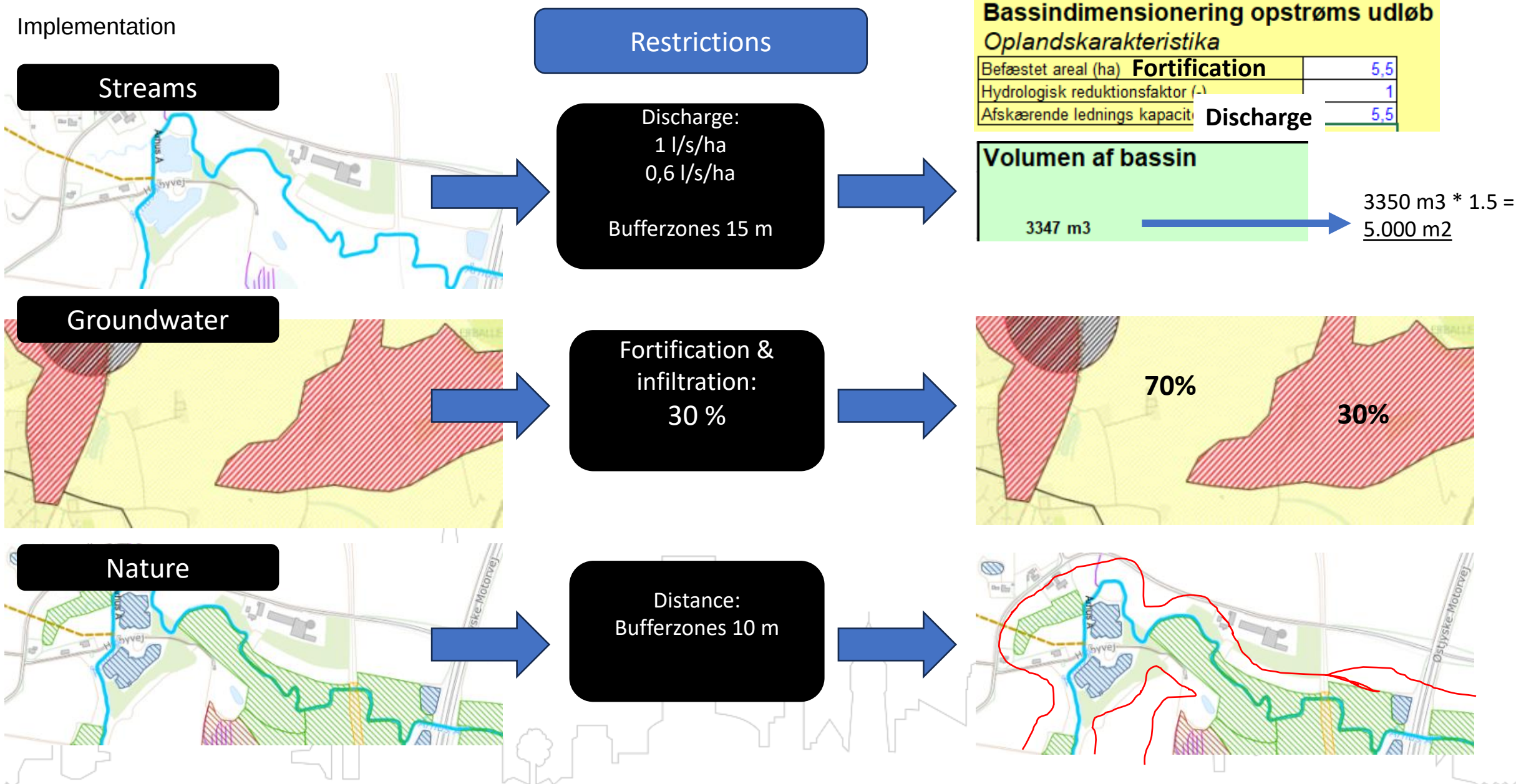


Nature & NATURA 2000



Masterplanning: Existing conditions

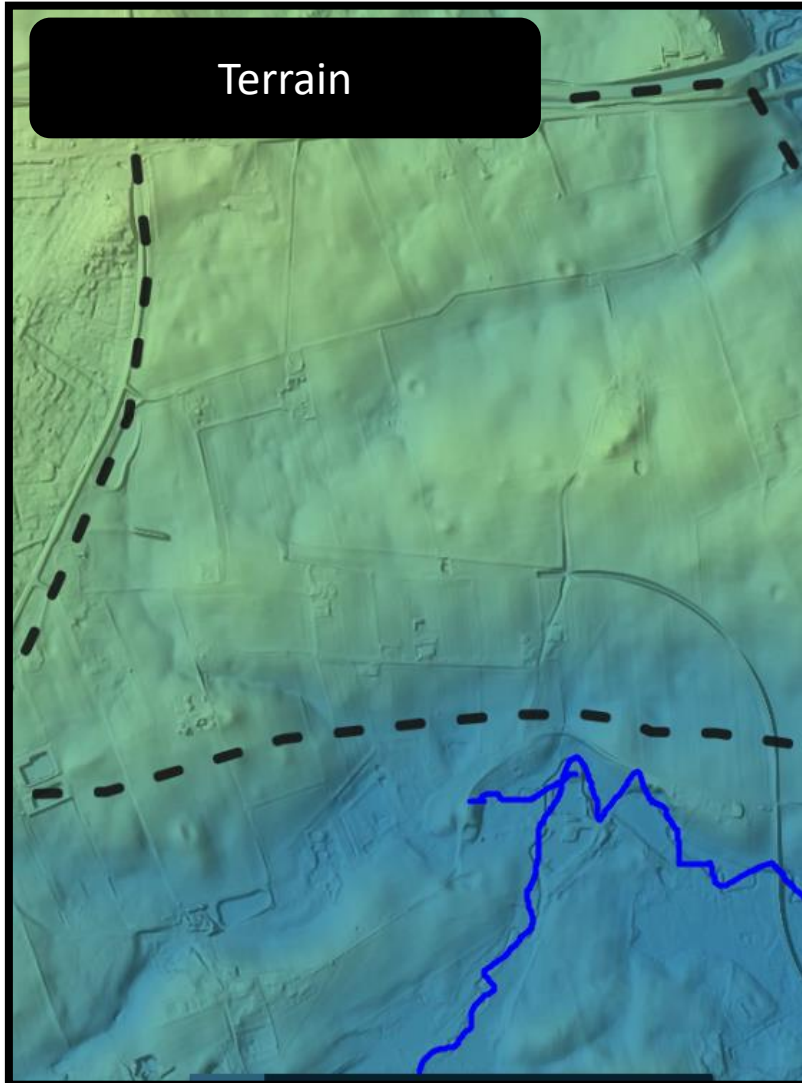
Implementation



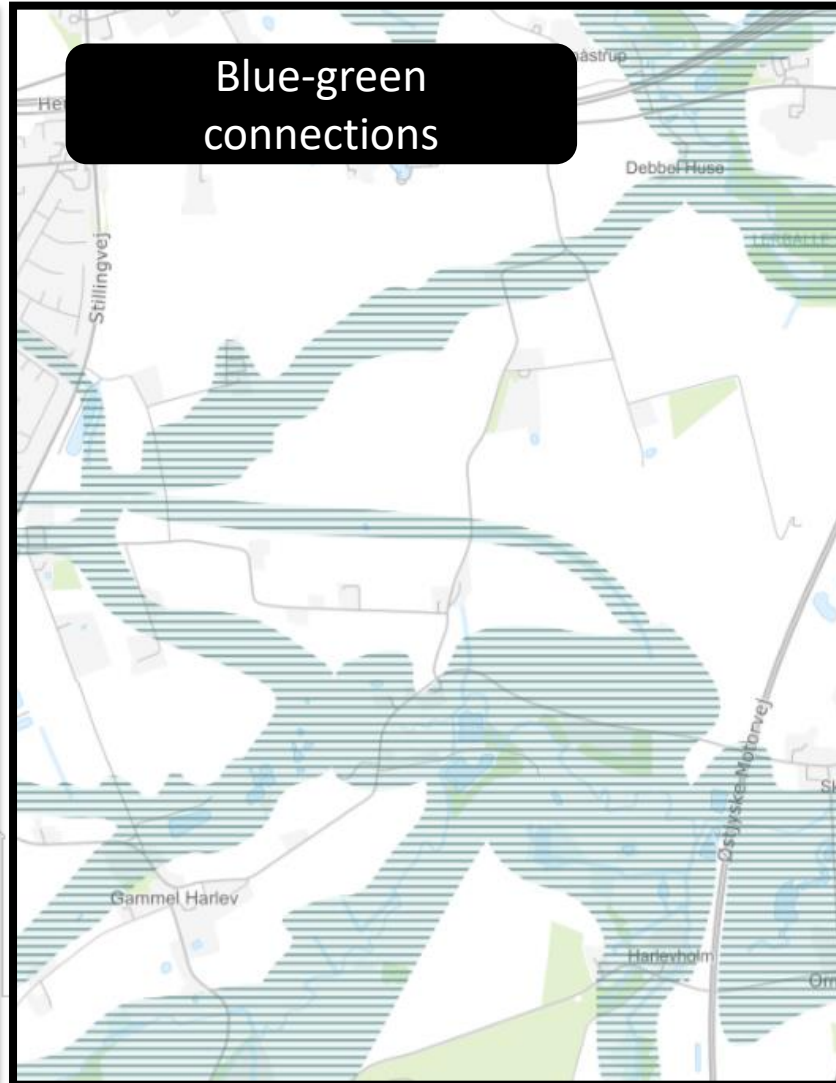
Masterplanning: Planning and input

Fortification and space making

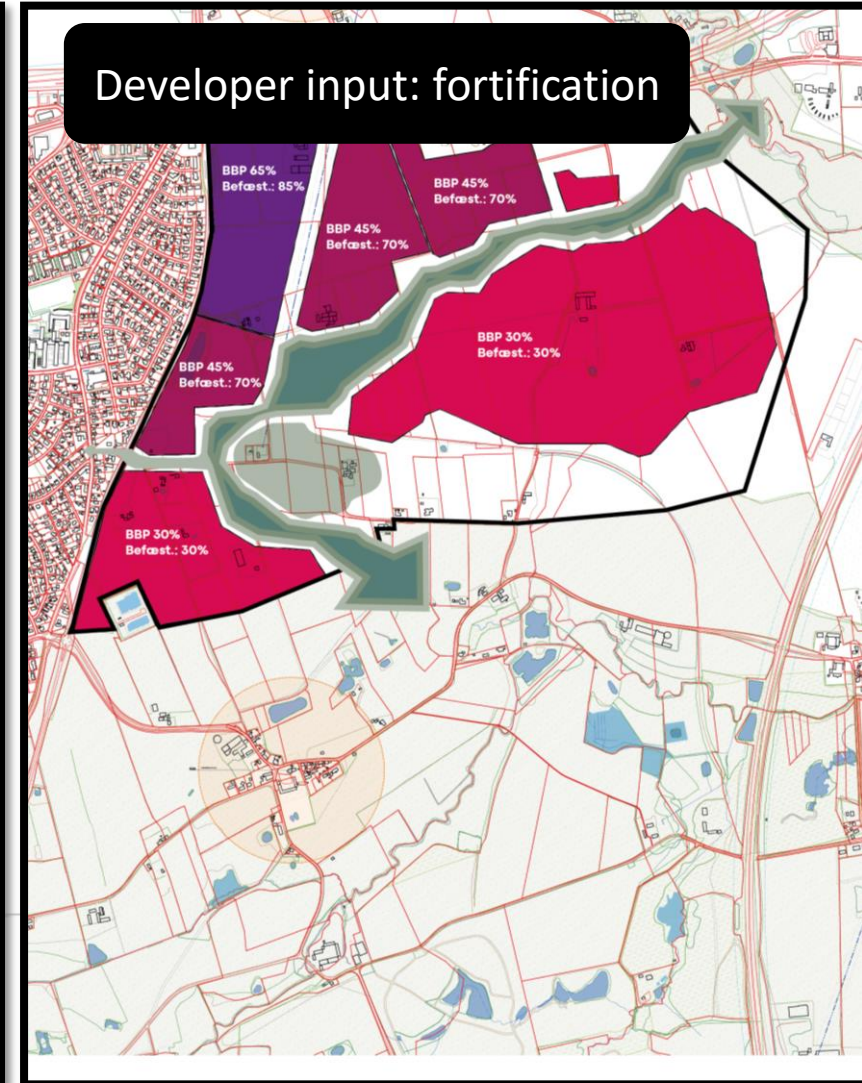
Terrain



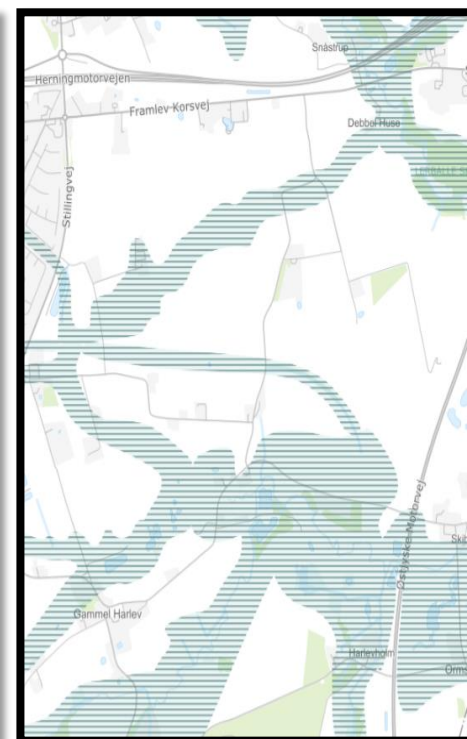
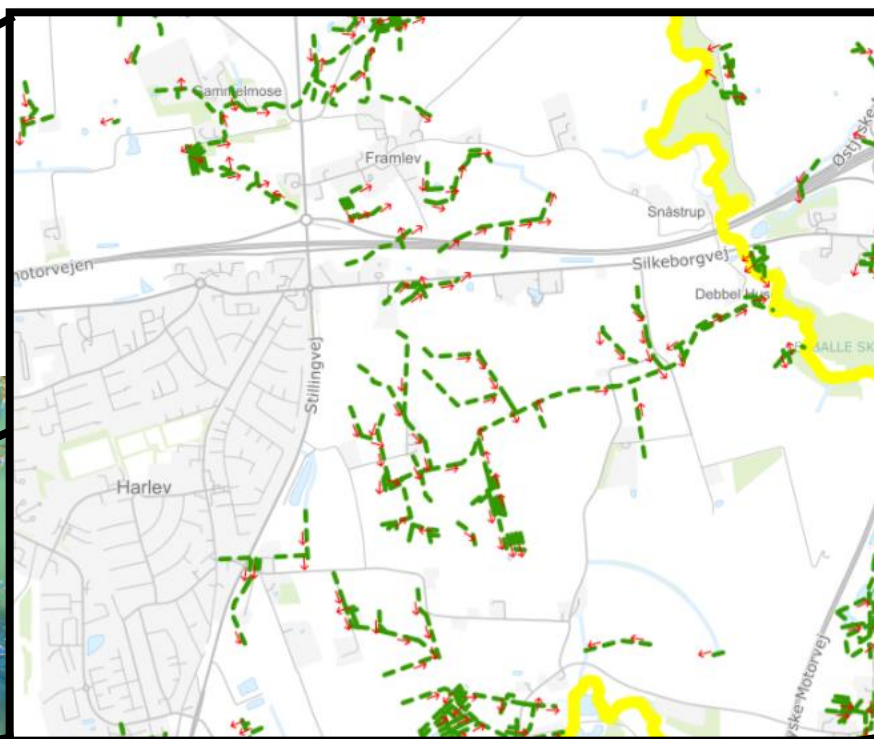
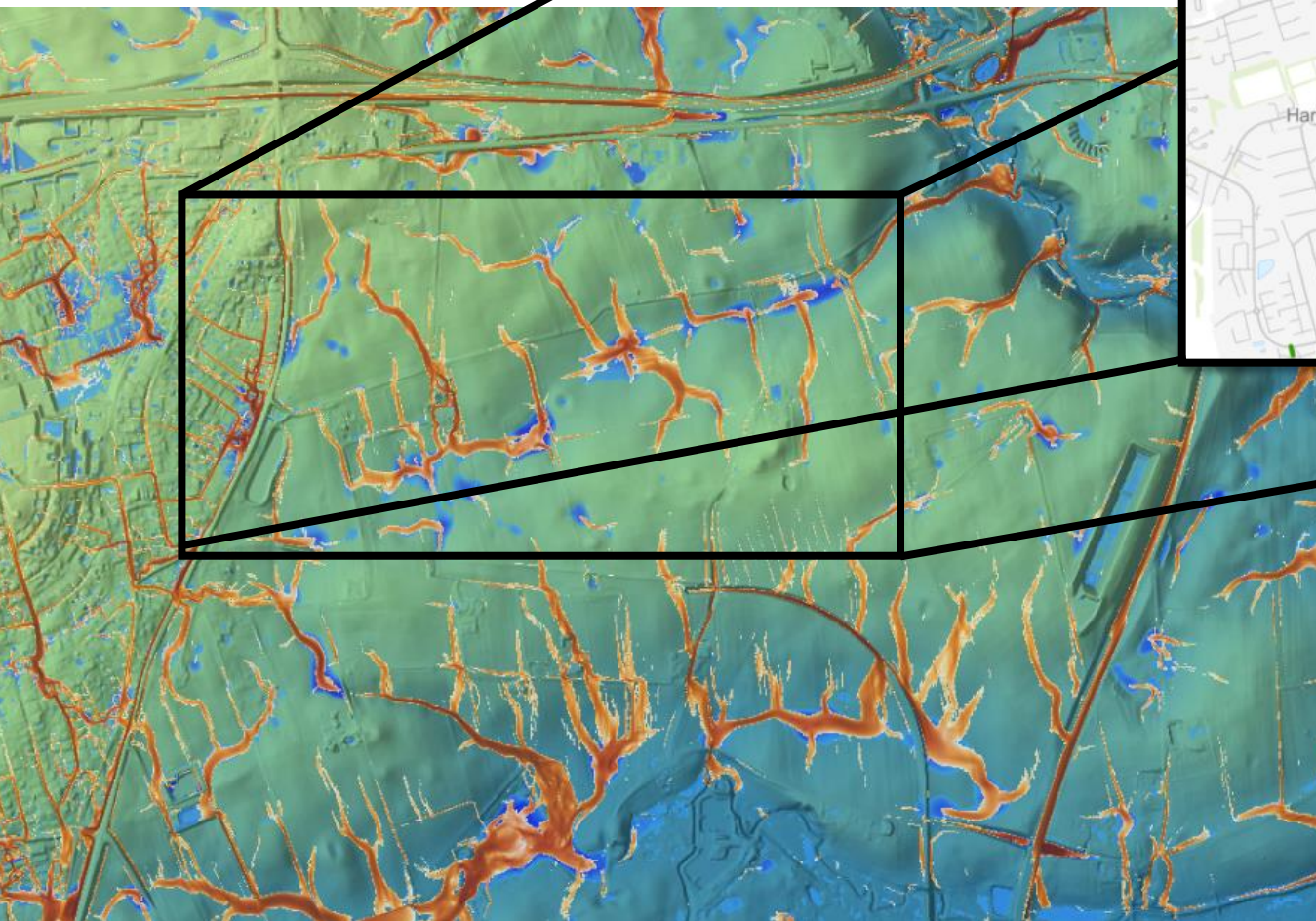
Blue-green connections

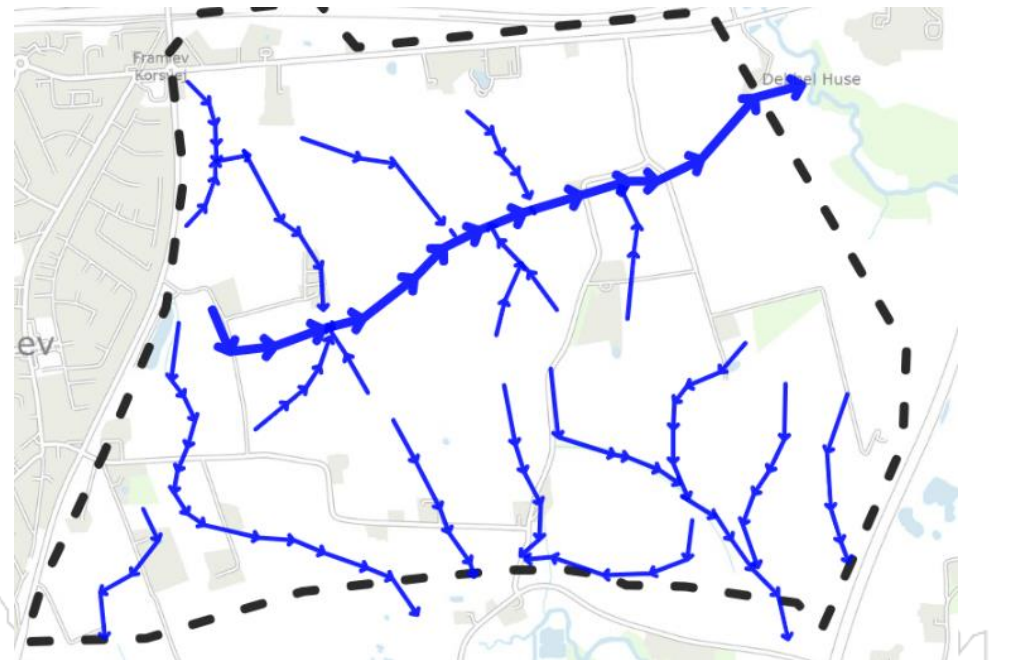
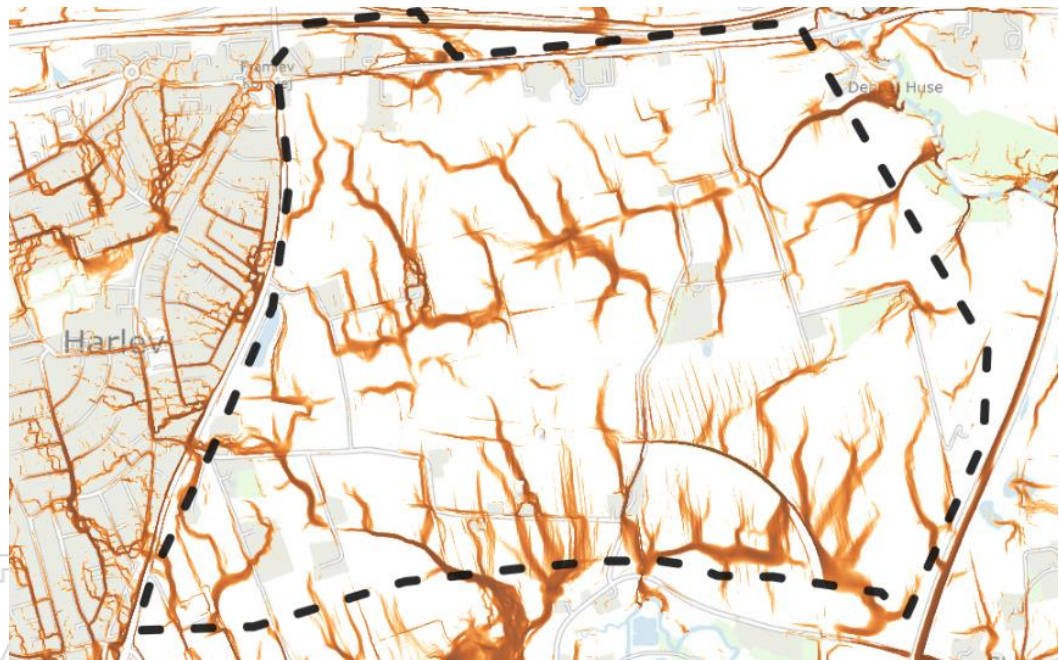
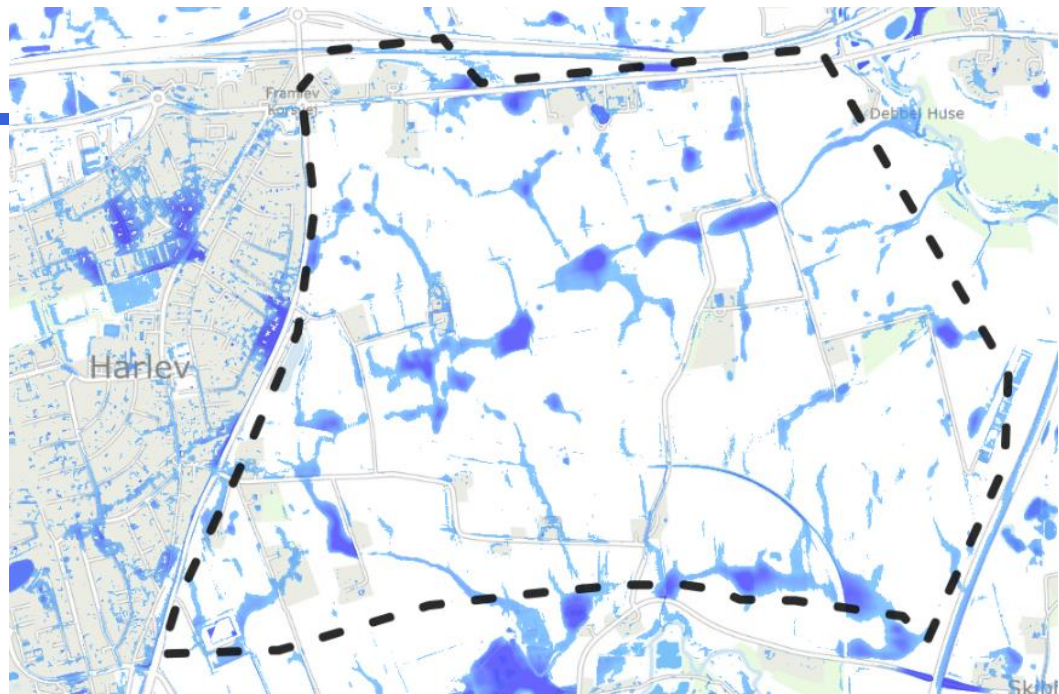


Developer input: fortification



Initial mappings & planning...





Masterplanning: water and space

Stream reopening

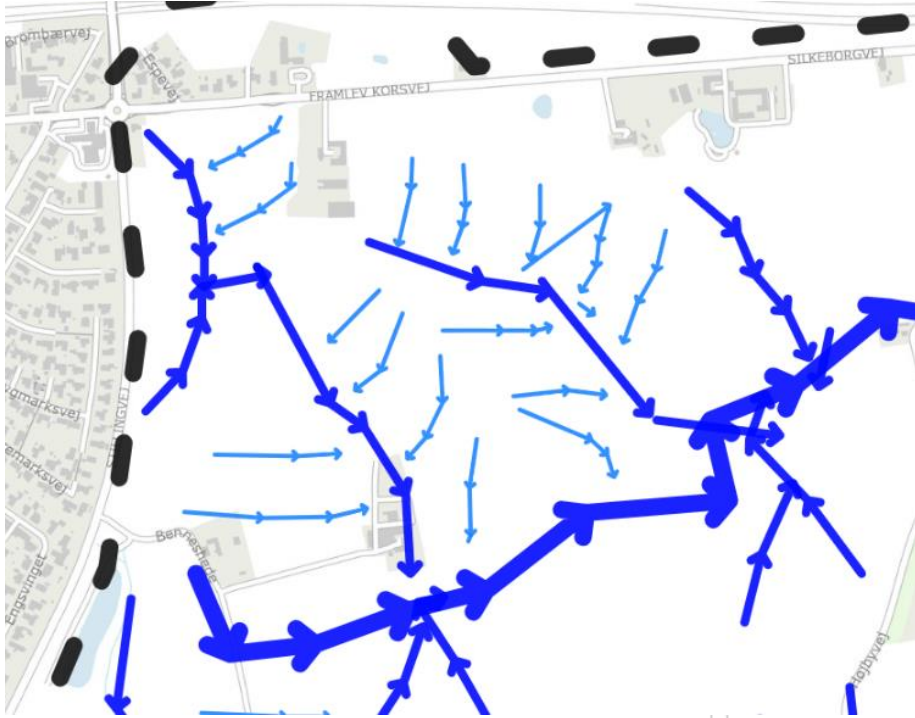
Distance requirements of stream & blue-green connection

NBS solutions!

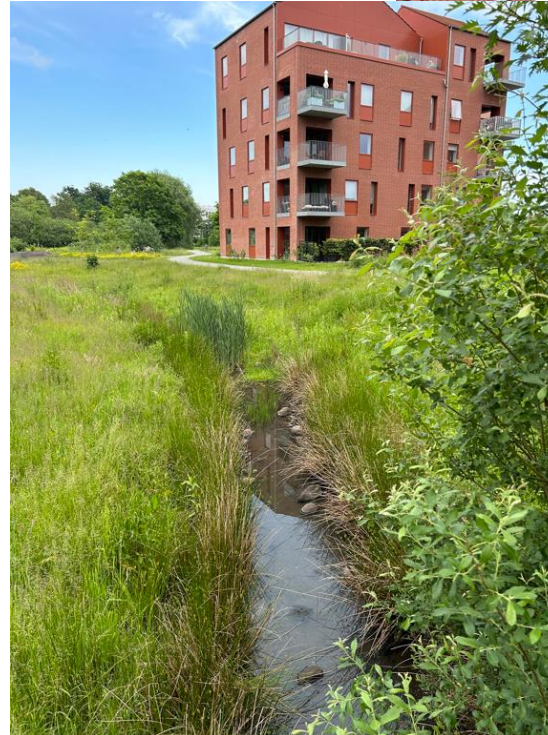
Place-making for rainwater + stormwater



Masterplanning: water ways



Water ways – rainwater piping



Masterplanning: ponds

Ponds

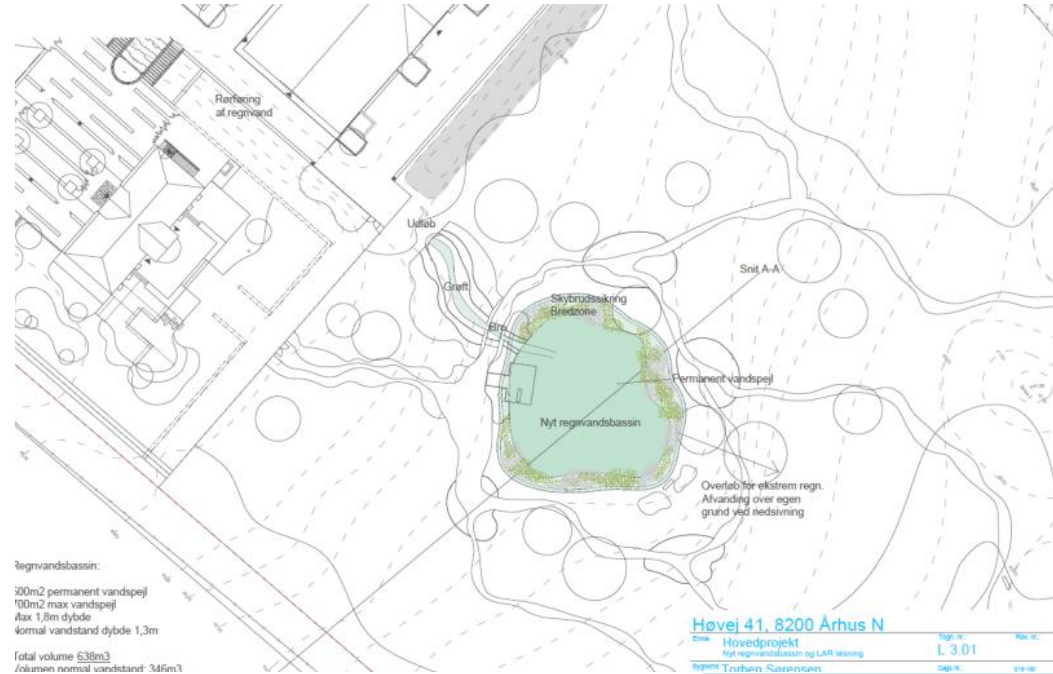
Design and dimension practices guide the planning

Wet detention

- Min. watervolumes
- Purification
- Nature
- Temperature

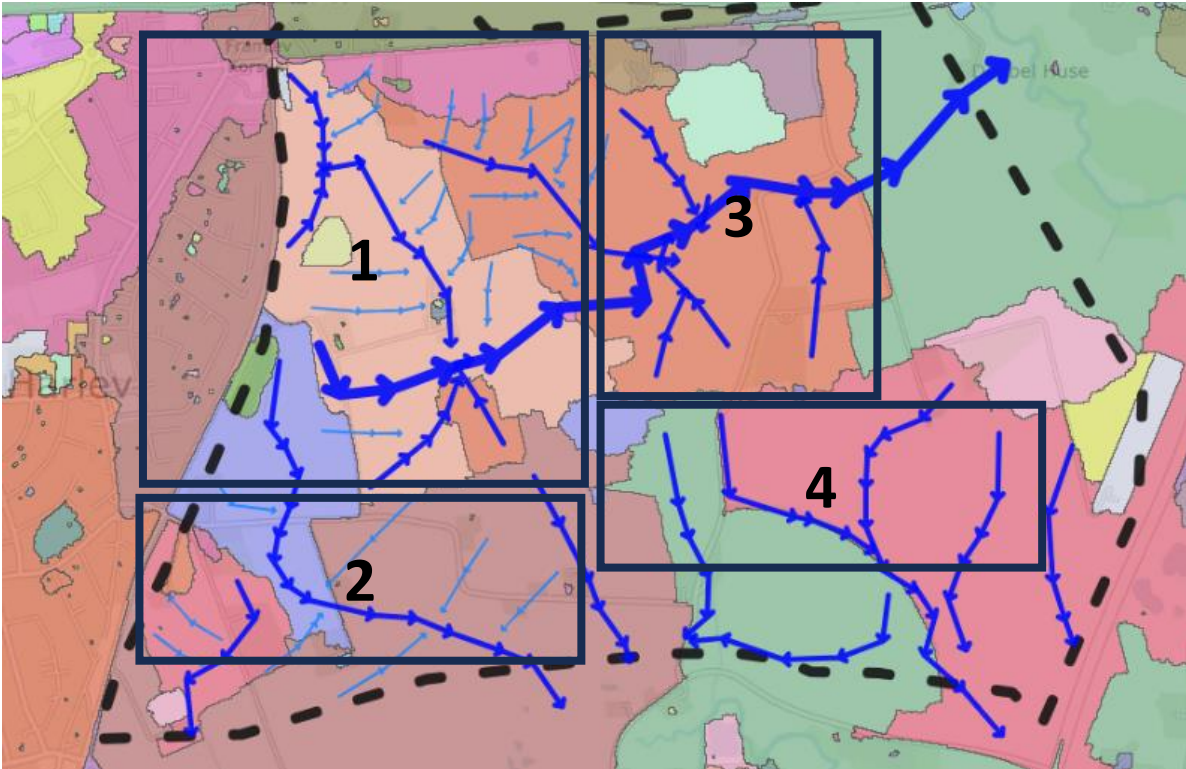
Infiltration ponds

- Soil composition
- Tile drainage
- Purifications
- temperature



Masterplanning: stages

Stageplanning – and continuously applicable plans?



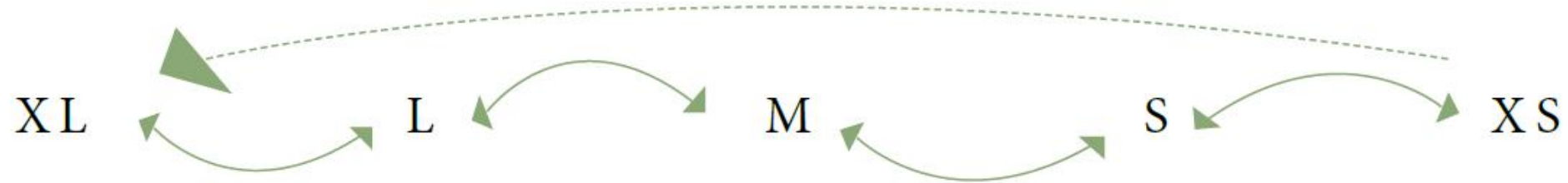
Problems...?

- Changing conditions
 - Waterframework
 - Development of nature
 - Internationally protected species
 - Streams
 - Politics



LANDSCAPE BASED URBAN PLANNING

Spatial planning hierarchy



Shared vision
Aarhus Municipality



condensed city
vs
open areas
1 : 100.000

Holistic interdisciplinary
strategic plan
for a smaller
area



theme plans
1 : 10.000

Guidelines for communal
living
- priorities of programs



what and where?
1 : 2.000

By-law spacial plan for
specific housing
or business area e.g.



how
1:500 / 1:200

Building permission

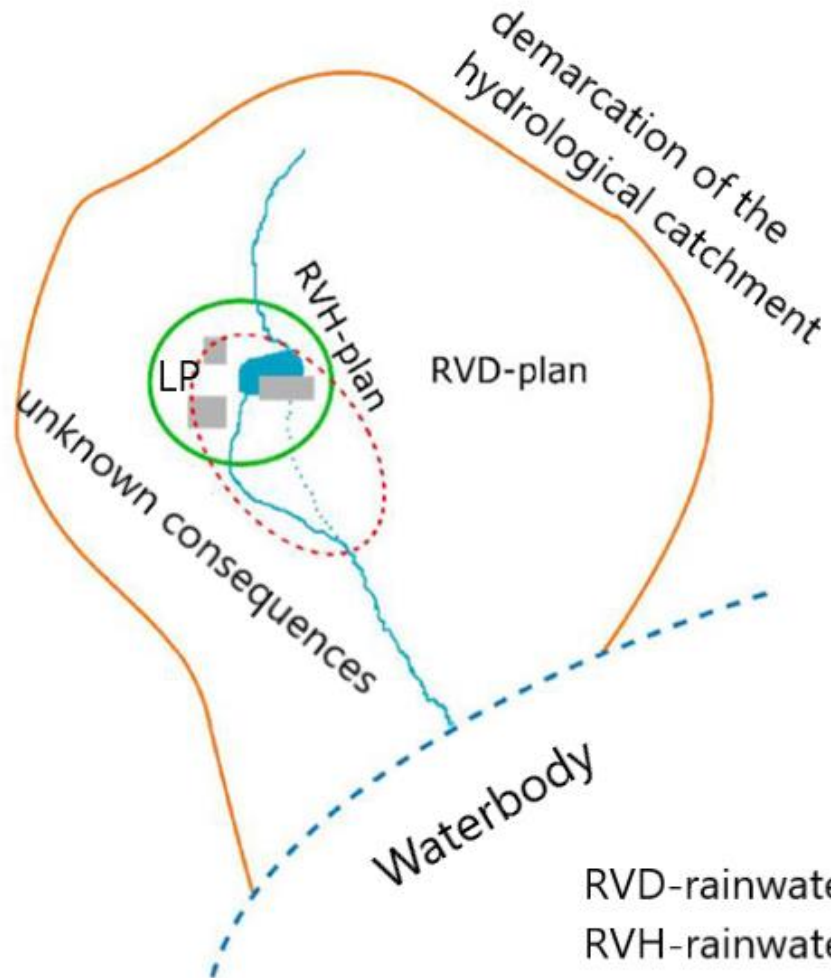


Cooperation of municipality & water utility – Aarhus Method

Rainwater dispositioning

Topographical scale / Urban catchment

- Prepared cloudburst map for the entire municipality
- Division into Rainwater disposal plan catchments for the entire municipality
- Digital map for the entire municipality



Existing city



Climate adapted city

RVD-rainwater disposal plan
RVH-rainwater management plan



Added Value & RVD-plan

How to put Things together

RVD-PLAN



Added Value



Combined Plan

Aarhus Vand

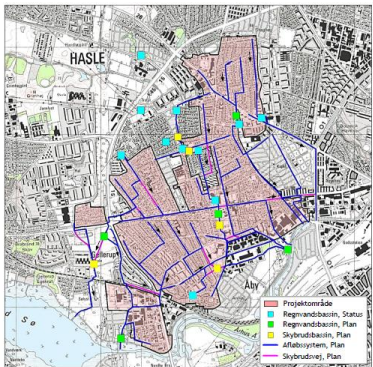
Regnvandsdispositionsplan

Adskillelse af regnvand og spildevand i Åby, Åbyhøj og Hasle

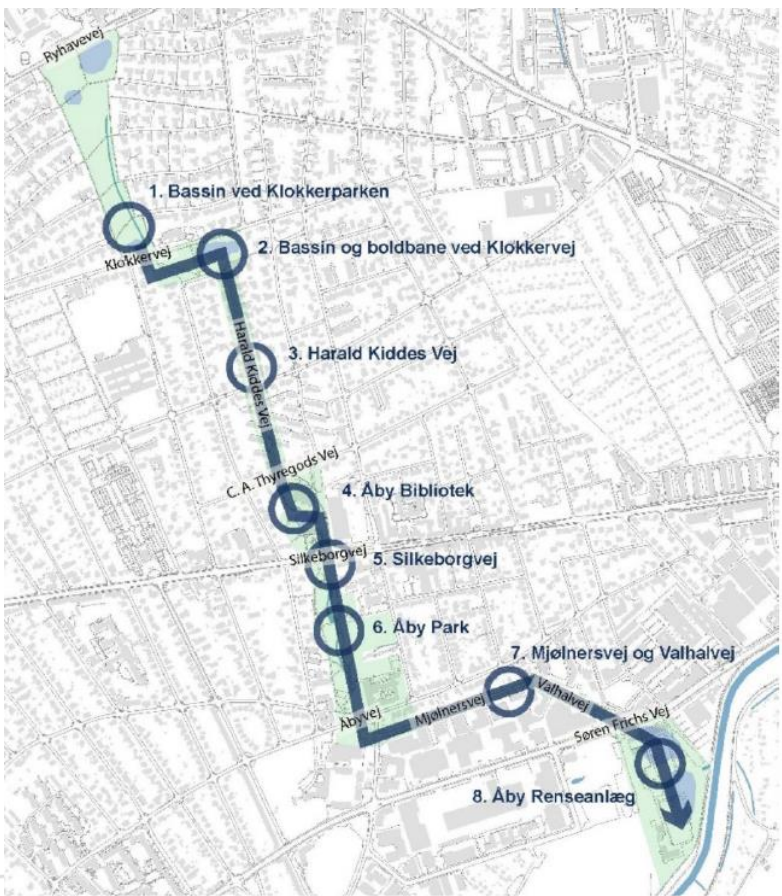
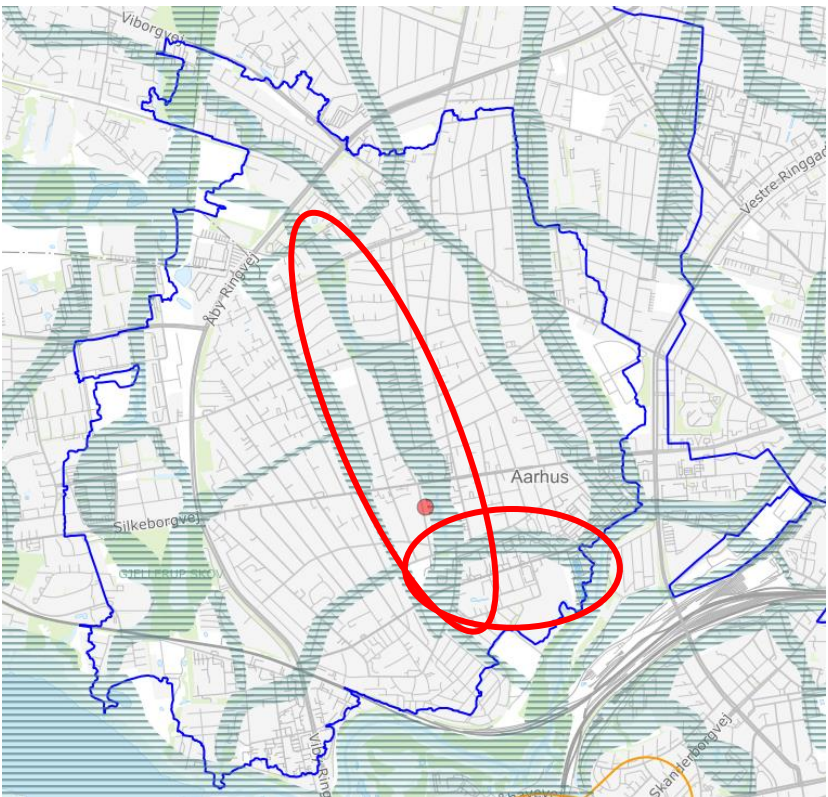
Opdatering 2021

2. december 2021

Udarbejdet til:
Aarhus Vand
Gunnar Clausens Vej 34
8260 Viby

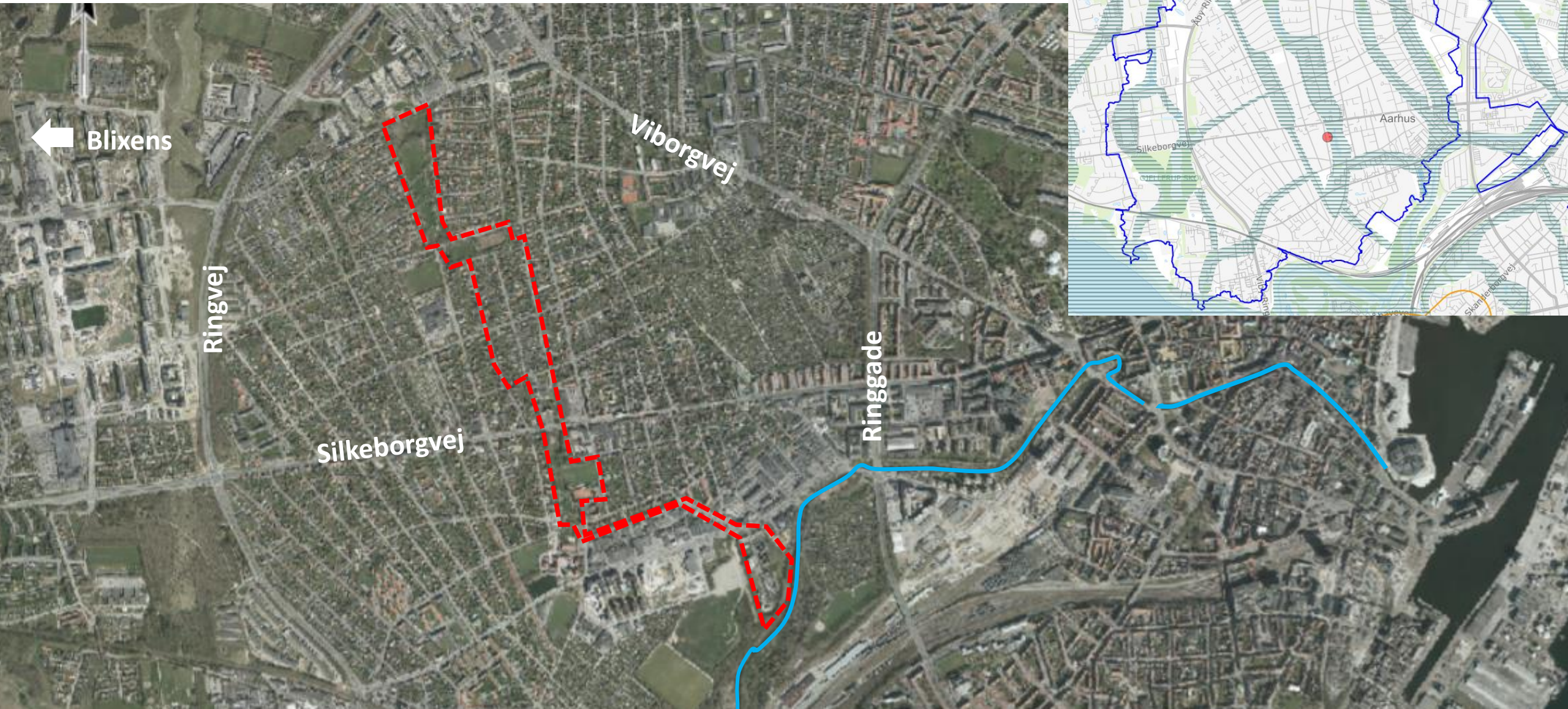


EnviDan



CLIMATE ADAPTATION IN ÅBYHØJ

Blue-green recreational path

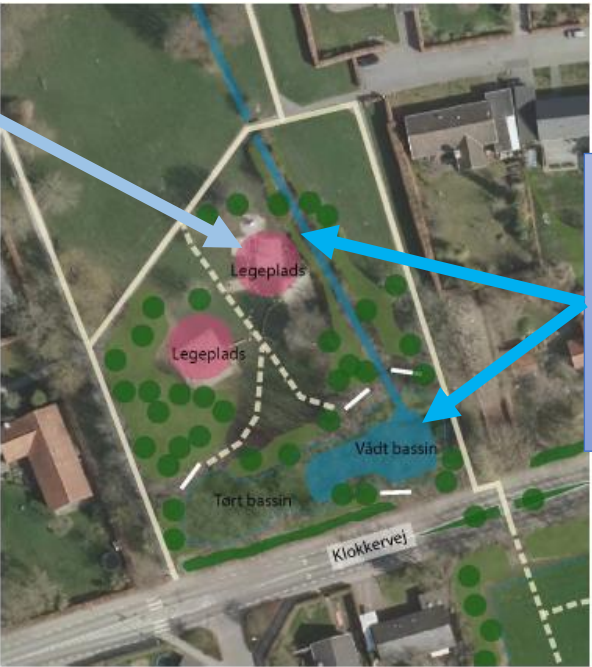
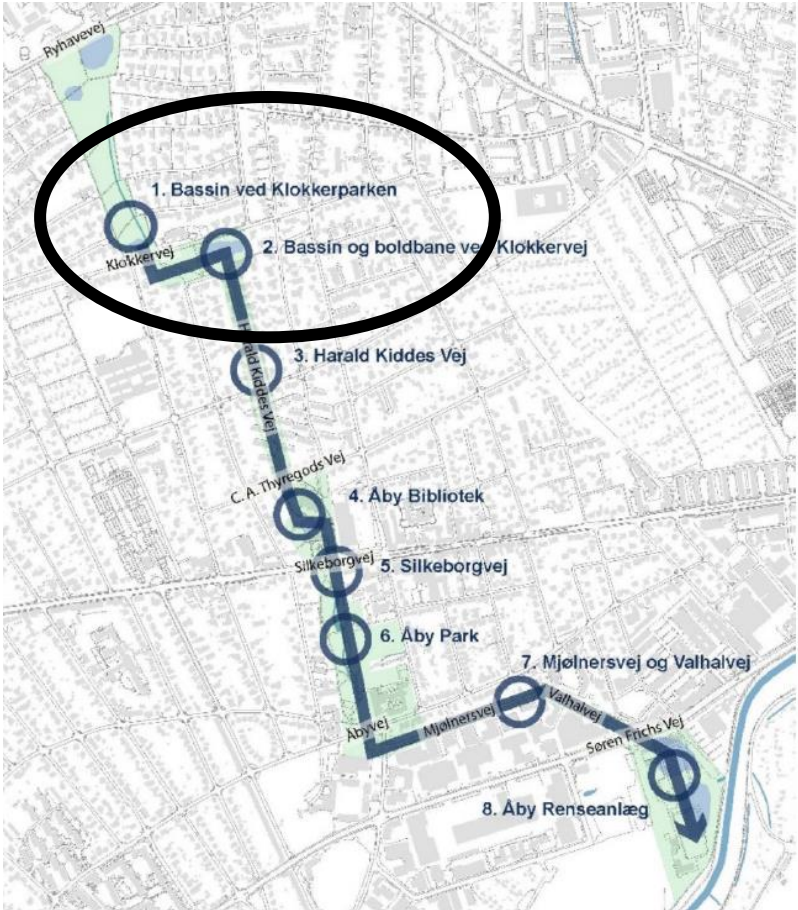


"MASTER PLAN" for CLIMATE ADAPTATION & ADDED VALUE

Playground & Park

28. juni 2021
Side 4 af 18

Detention Ponds and "path" for flash-floods



Den blå-grønne kile i Åbyhøj

– klimatilpasning med merværdi

Notat om designmanual for kilen

Formål

Aarhus Vand er i gang med at adskille regnvand og spildevand samt klimatilpasse Åbyhøj ift. Spillevandsplanen 2017-2020 og er nu kommet til den blå-grønne kile i Åbyhøj. En række offentlige arealer, der samlet set strækker sig fra Klokkeparken mod nord til Åby Renseanlæg og Aarhus Å mod syd. Aarhus Kommune ønsker i den forbindelse at anvende klimatilpasningen i kilen som løftestang til at styrke områdets nuværende kvaliteter og skabe merværdi for borgerne i Åbyhøj.

Dette notat indeholder en række skitser og beskrivelser med principper om hvorledes hvert enkelt område skal indrettes og udformes, når Aarhus Vand skal klimatilpasse kilen. Principperne skal sikre, at man opstår en fælles identitet for kilen med genkendelige elementer som f.eks. bæltet og træer samt sikre at de kommunale interesser på arealerne tilgodeses. Notatet skal således anvendes af Aarhus Vand som retningslinje for de kommende projekter i kilen.

Baggrund

Merværdi i klimatilpasningen i Åbyhøj

Aarhus Kommune har i samarbejde med lokale aktører og borgere i Åbyhøj udarbejdet en vision for udvalgte områder til merværdi. Kvaliteterne bygger videre på bydelens eksisterende kvaliteter og Åbyhøjs DNA som en grøn bydel med engagerede borgere.

Principperne for indretning og udformning af de enkelte områder i den blå-grønne kile lægges udgangspunkt i visionens seks kvaliteter:

Process

Der har forud for dette notat været afholdt en række arbejdsmeder med de forskellige kommunale interessenter, der enten som grundejere eller brugere af arealerne i den blå-grønne kile har krav eller ønsker til hvorledes kilen skal klimatilpasse og indrettes. Arbejdsmederne har haft til formål at afdække evt. konflikter og indsamle input omkring de enkelte områder, som er blevet medtaget i dette notat. Der er afslutningsvis blevet opsumeret på de mange arbejdsmeder via en samlet mail med alle arbejdsmederreferencer.

TEKNIK OG MILJØ

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Sagsbehandler:

Katrine Knudsen

Sophie Langkjær Jensen



Den blå-grønne kile i Åbyhøj – klimatilpasning med merværdi Notat om designmanual for kilen

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28. juni 2021
Side 1 af 18

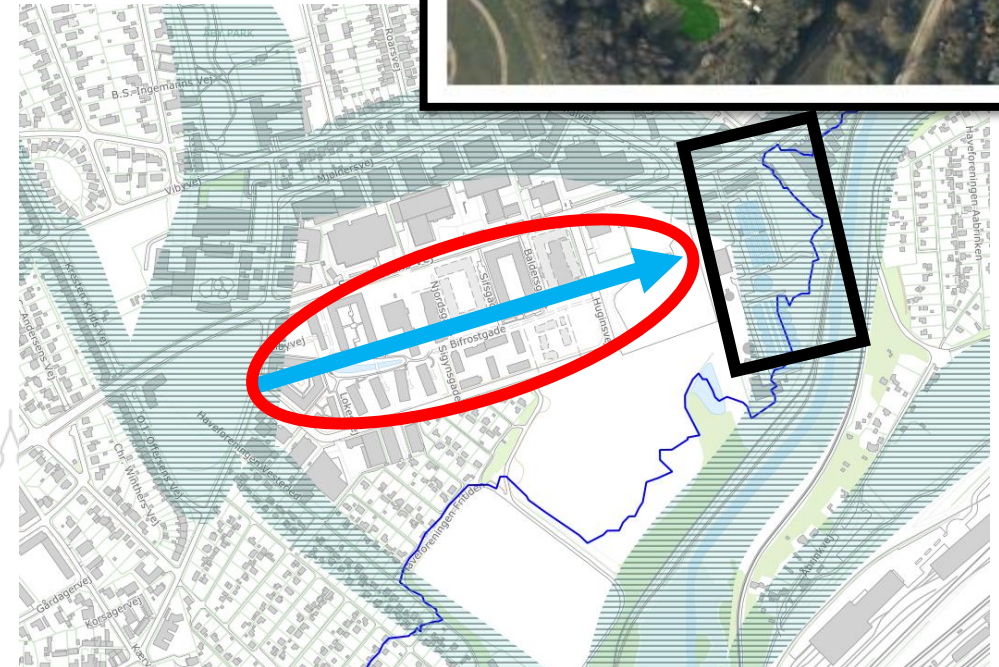
TEKNIK OG MILJØ
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Sagsbehandler:
Karin Knudsen
Sophie Langkjær Jensen



KLOKKERVEJ – project

water retainment
'lake'/basin



Multibane



Fuglekirsebær



Ny sti på vold.

Outdoor fitness

Picnic facilities

Boardwalk

water retainment
'lake'/basin

Pathways Basketball net



Ny sti på vold og overgang i beton, stål eller træ



Betonplinte i skrænt



Grønne master. Sluk belysning over naturområde og plant klatreplanter for foden.



Vildt område



Forløb af træbroer / trædæk i loop over naturområde



Urban Transformation

Exampel of:

Climate adaptation + Greenfactor + Courtyard + Vertical development



Before



"LOCAL" - MASTER PLAN +
Physical planning



Today



Thank you for your attention