

Out of the *Blue*

*A nature-based armature for
urban development*

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Diploma Autumn 2017
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“Without water no life”

(Tjallingii, 2012)



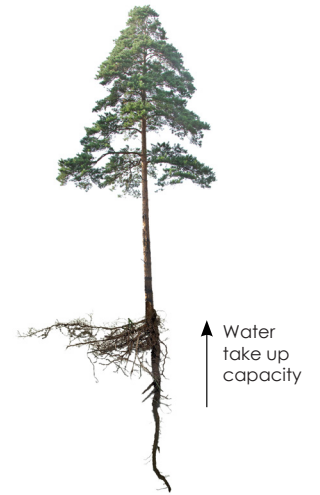
Salix caprea
1200 L/day



Juglans regia
260-400 L/day

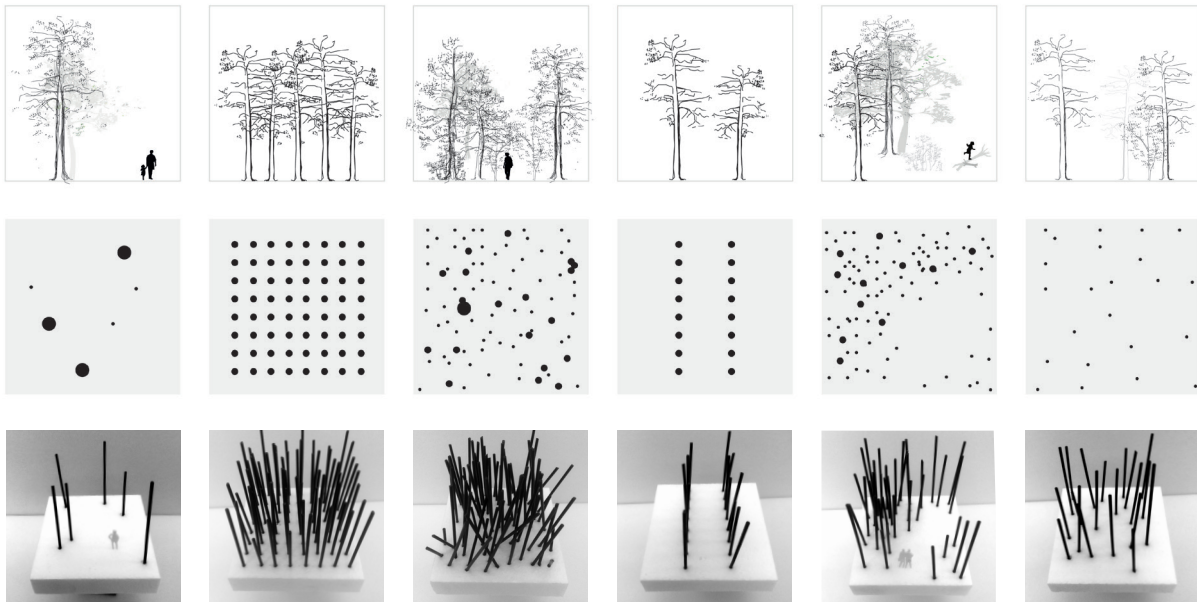


Betula pubescens
300-400 L/day



Pinus sylvestris
200 L/day

Depending on the species, trees have the capacity of taking up 200 to 1200 litres a day.



Tree language

At the same time, they create a language of orientation, atmosphere and spaces where people like to go.

The following question therefore rises:

“How can water and green create opportunities for an urban framework, while improving the city’s economical, ecological and social life?”

Where the Municipality of Lørenskog is a test case for the Eastern suburban area of Oslo.

Climate change

Rapid urban growth

1960



Flood, unknown, 1967



Natural landscape features and agriculture

1980



Flood, Morgan Andersen, 1983



Roads and housing

2000



Flood, Geir Fall Skei, 2007



Industry



Lisbeth Andresen, 2015



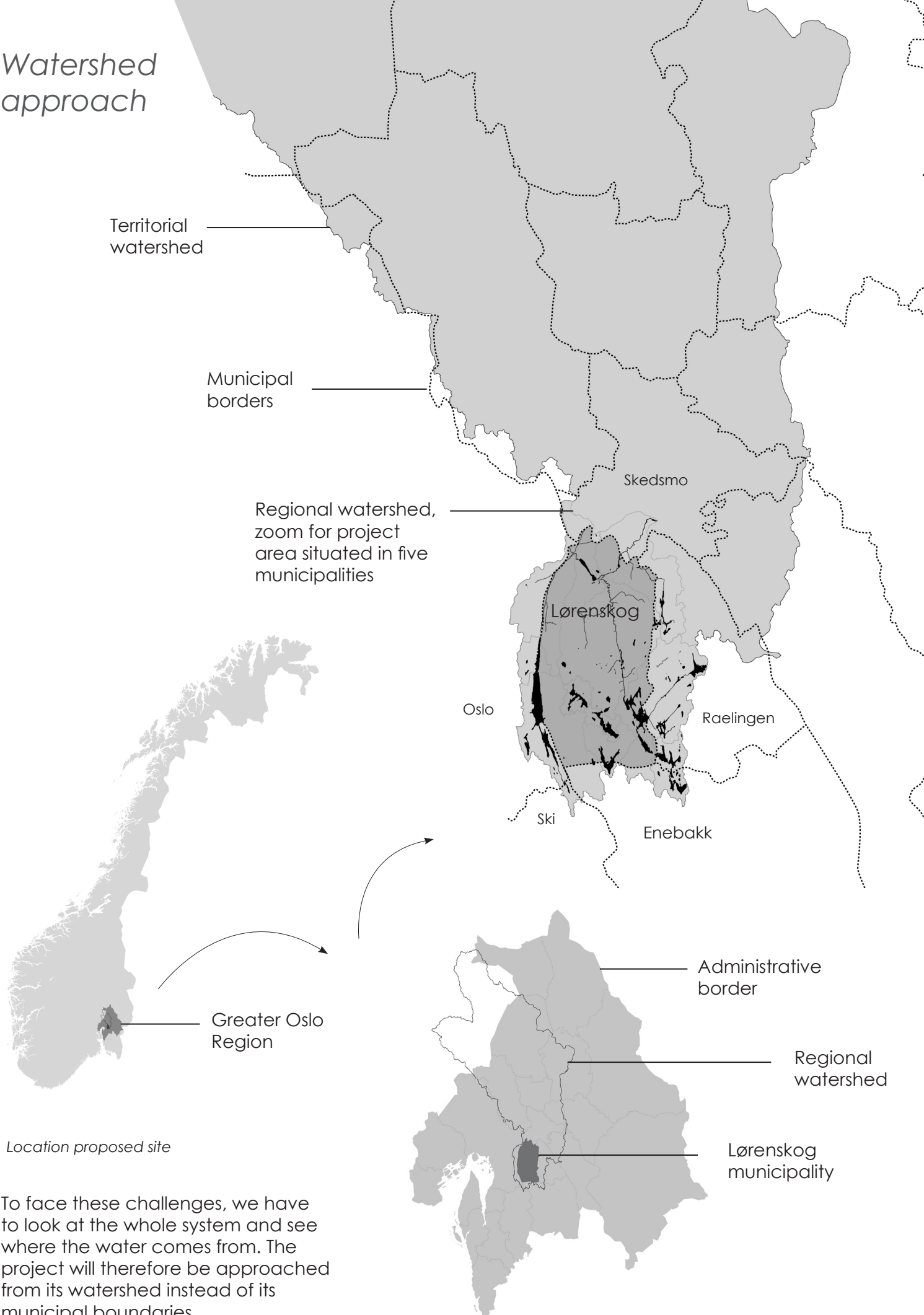
Femke Peters, 2017

2017

The Municipality of Lorenskog has gone through a time of rapid urban growth and climate change with increasing precipitation events. This resulting in two challenges: Underused spaces and the problem of flooding of the urban fabric.

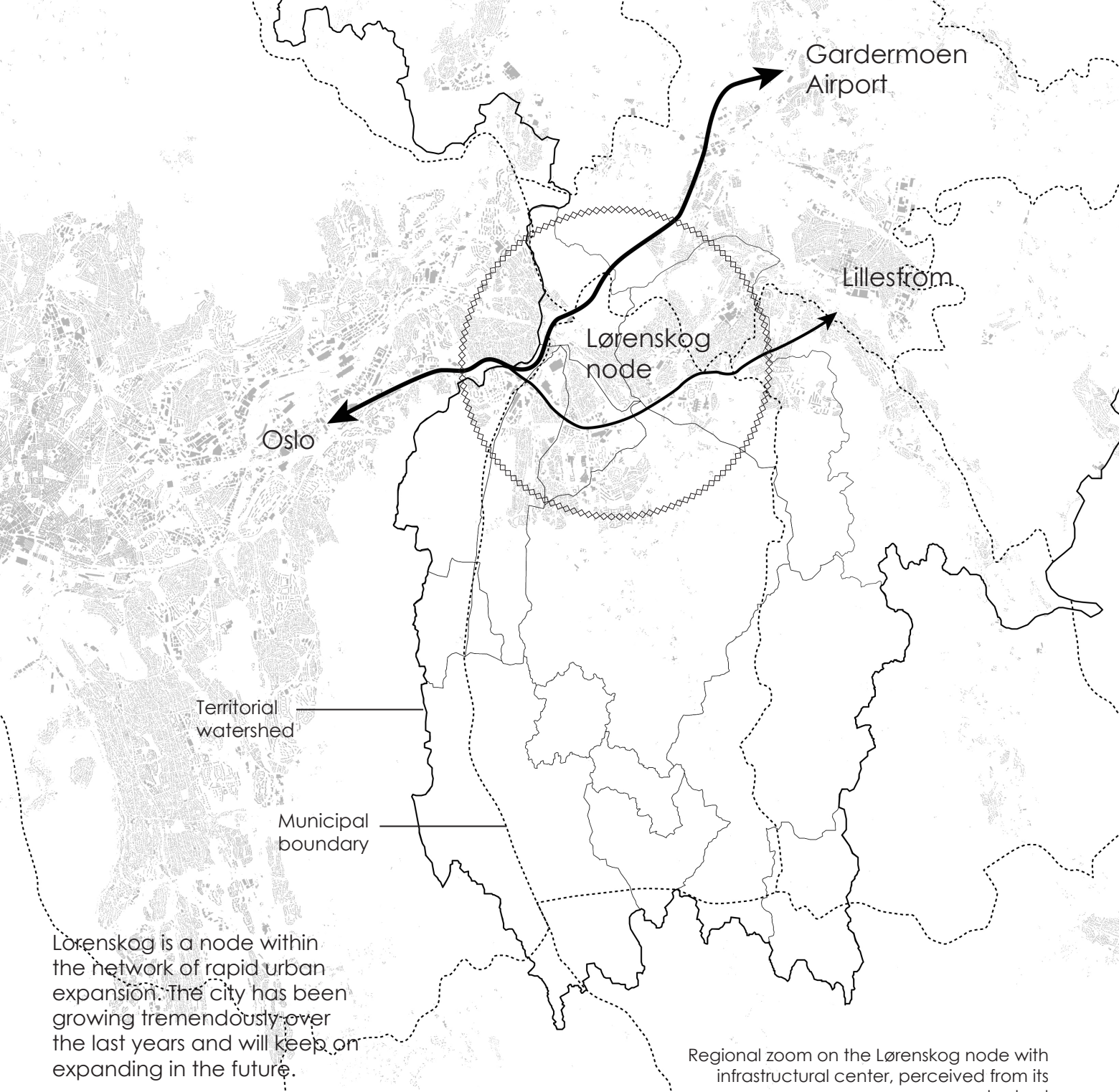
Flood
Underused spaces

Watershed approach



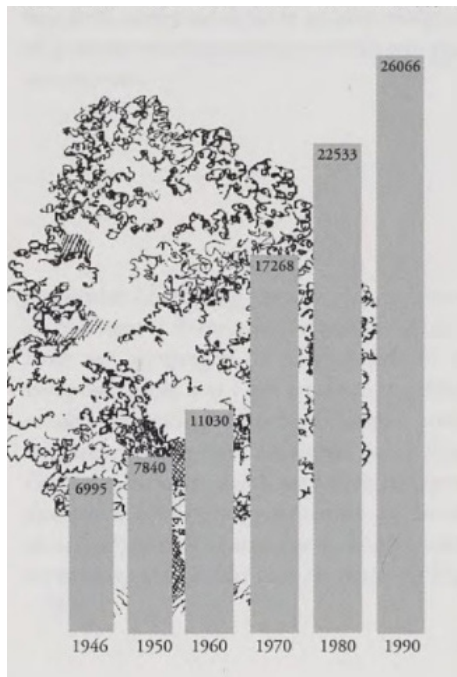
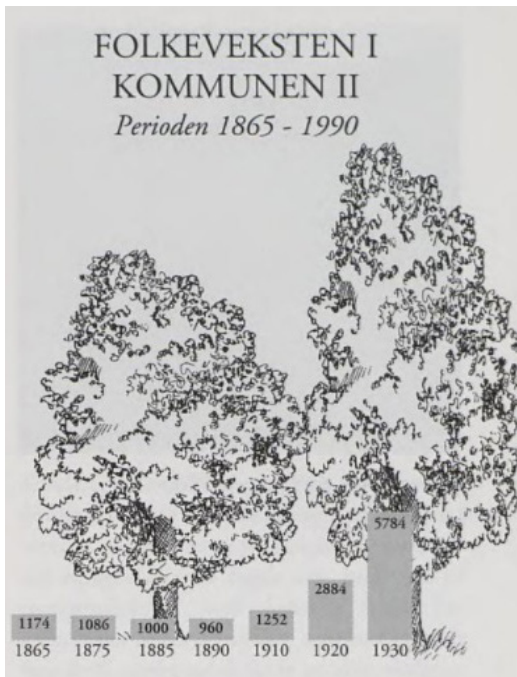
Location proposed site

To face these challenges, we have to look at the whole system and see where the water comes from. The project will therefore be approached from its watershed instead of its municipal boundaries.



Regional zoom on the Lørenskog node with infrastructural center, perceived from its watershed



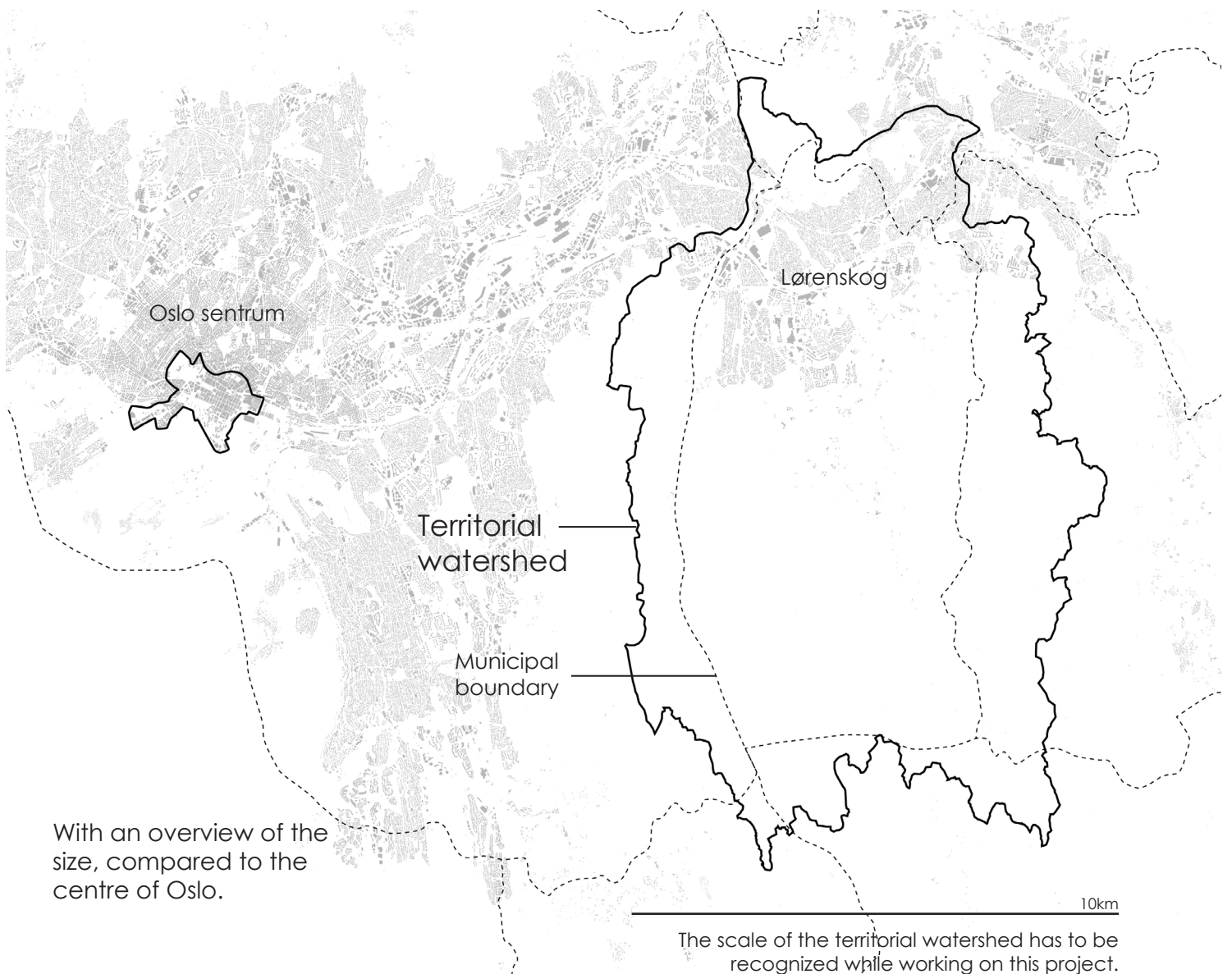


Lørenskog node

2000 - 29,505
2010 - 32,730
2017 - 37.407

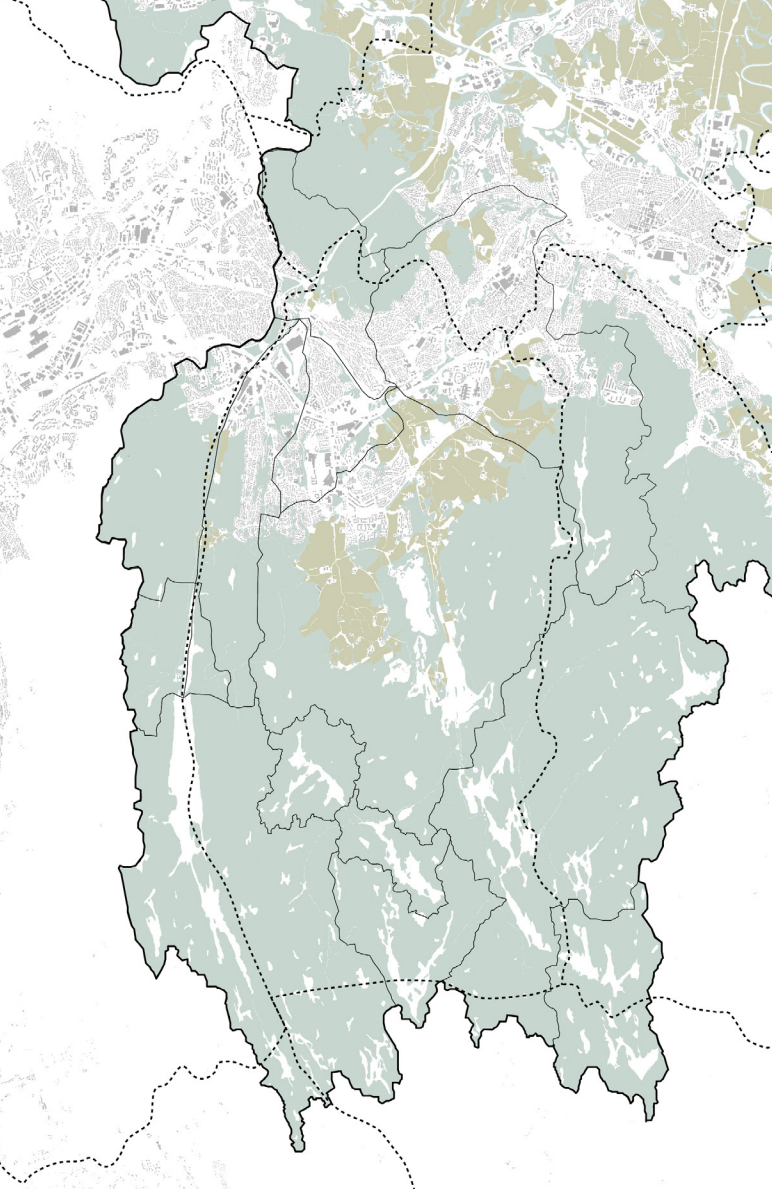
2030 - 44 133
2040 - 48 569

Lørenskog growth
pattern per decennia

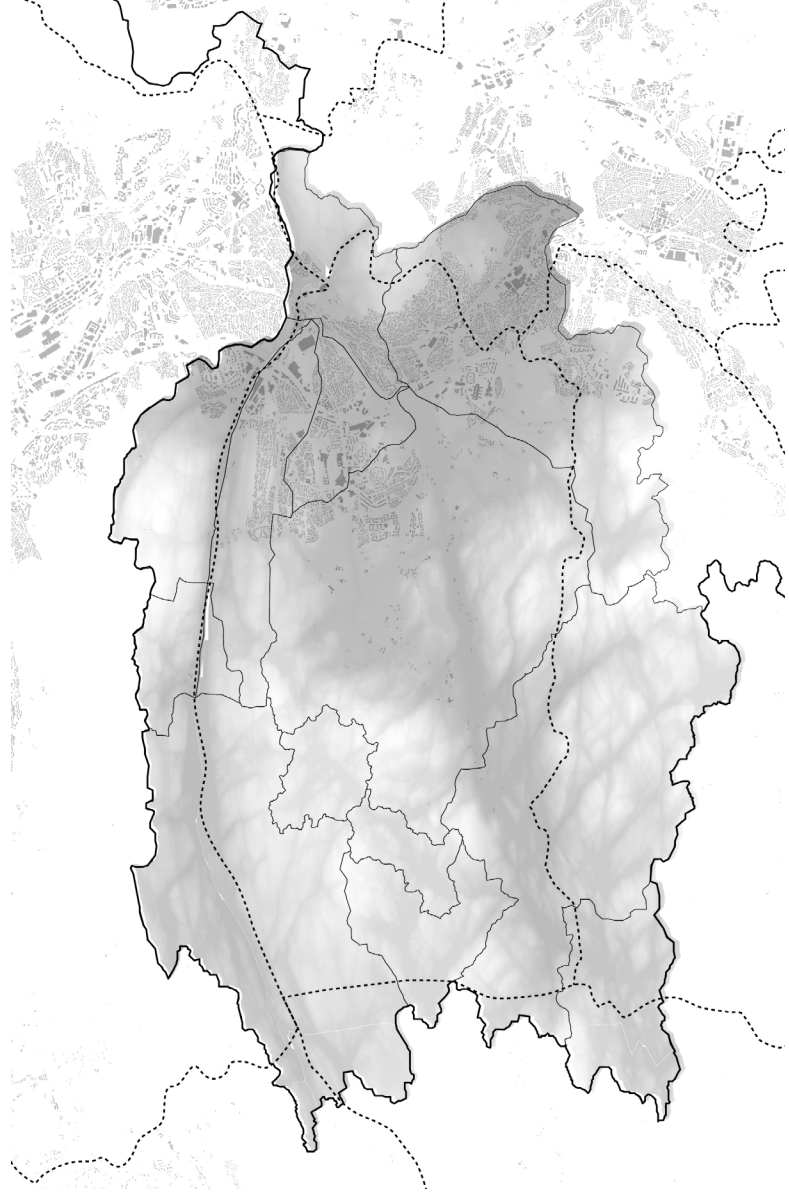


With an overview of the size, compared to the centre of Oslo.

The scale of the territorial watershed has to be recognized while working on this project.



Forested and agricultural area is productive in addition to aesthetic, recreational and social perspective



Topography leads all the water naturally towards the urbanized areas





The bedrock covered with a thin loose top soil layer doesn't give water the opportunity to infiltrate during heavy precipitation events so it runs into the city

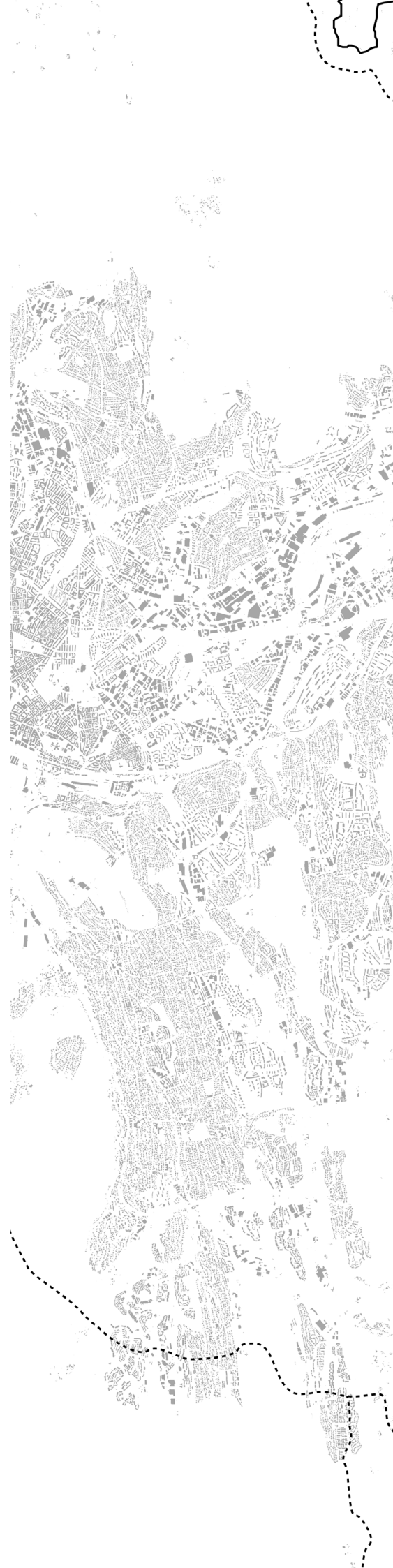


Once it arrives in the city, the big amount of impermeable surfaces will not be able to handle the water.

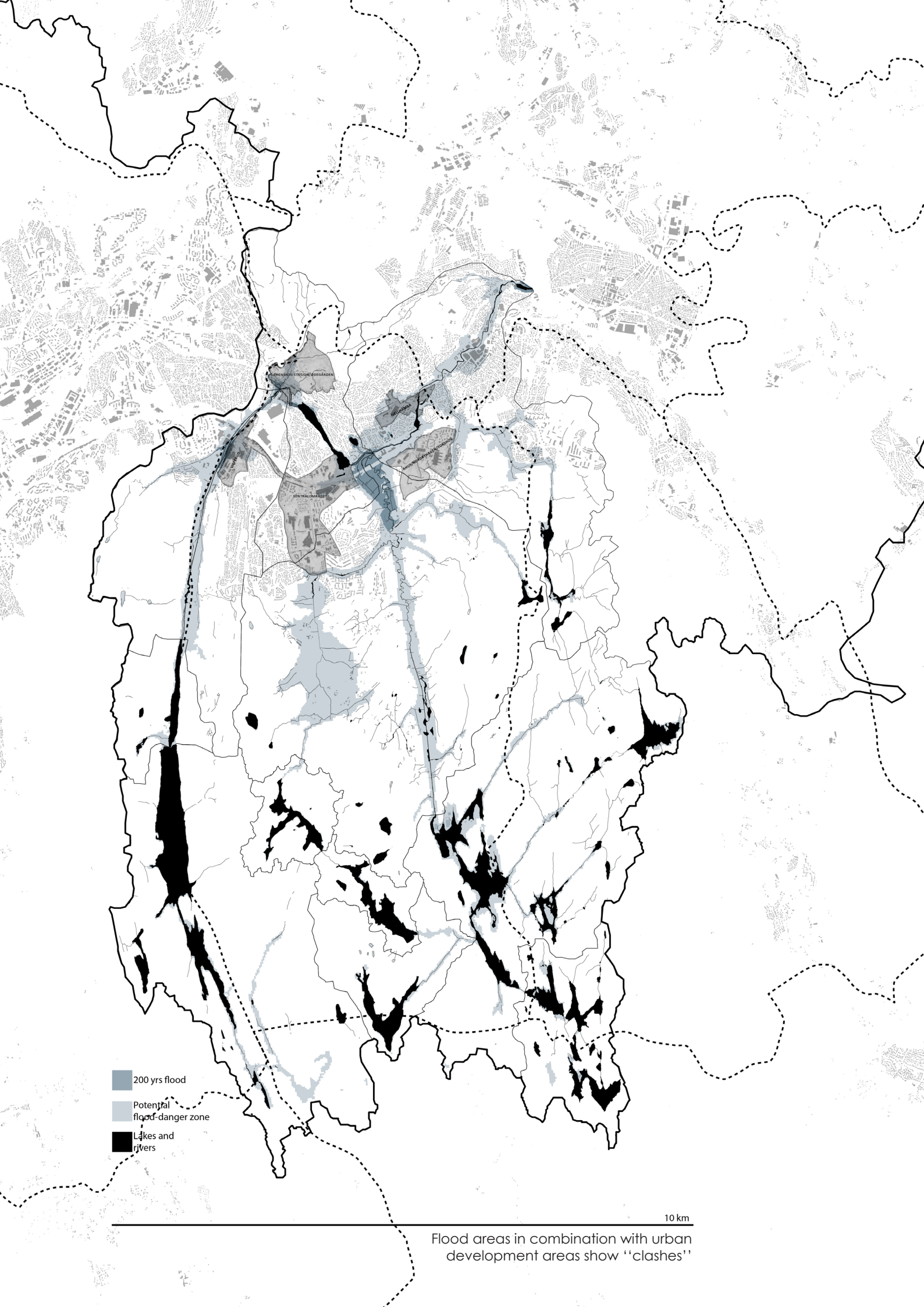


Lørenskog areal view (Krogsveen, 2017)

Flood zone and urban development



These facts result into occasional repeating urban flood events. By overlapping this map with the municipal urban expansion areas, it reveals the "clashes" in the urban fabric.



- 200 yrs flood
- Potential flood-danger zone
- Lakes and rivers

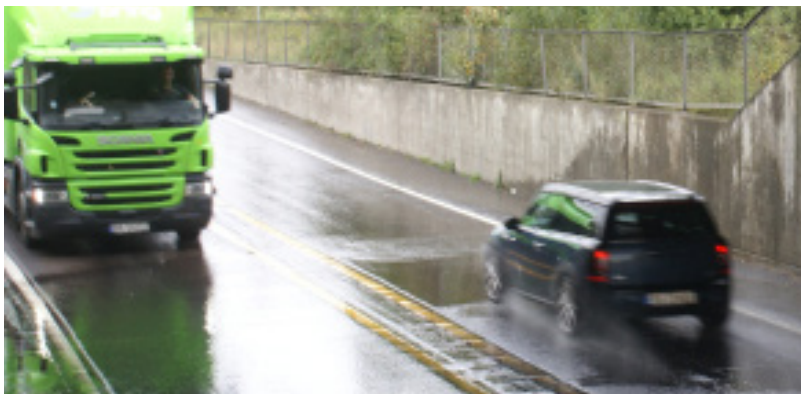
10 km

Flood areas in combination with urban development areas show "clashes"

“Clashes”



Flooding of infrastructural area



Flooding of industrial area

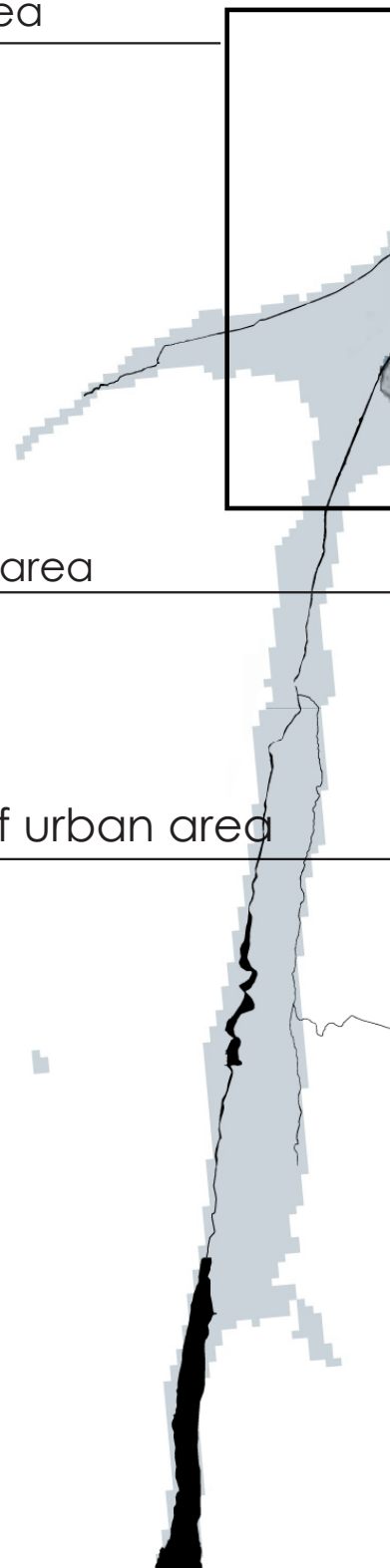


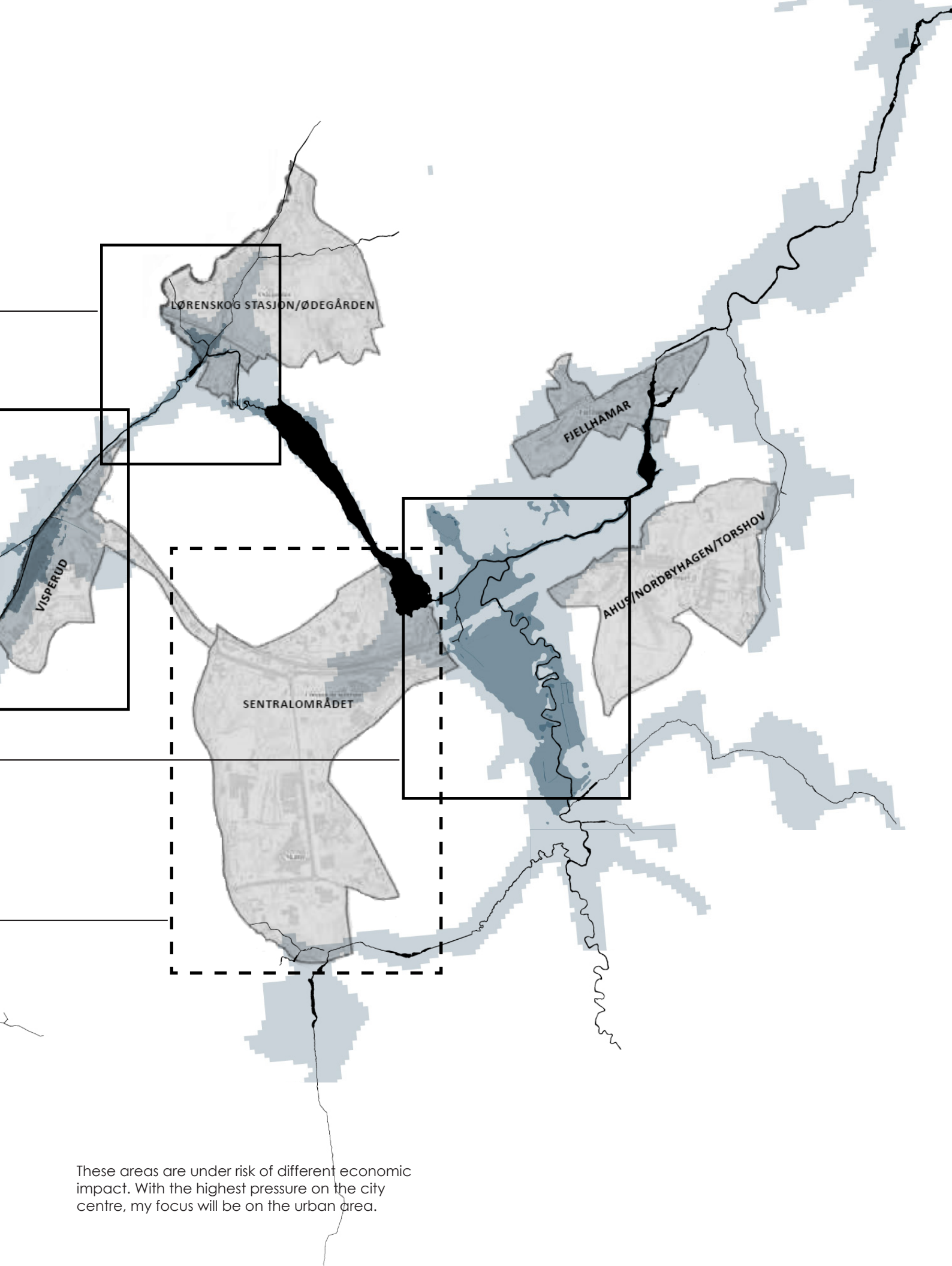
Flooding of agricultural area



Flooding of urban area

Images flooding areas





These areas are under risk of different economic impact. With the highest pressure on the city centre, my focus will be on the urban area.

Strategic approach

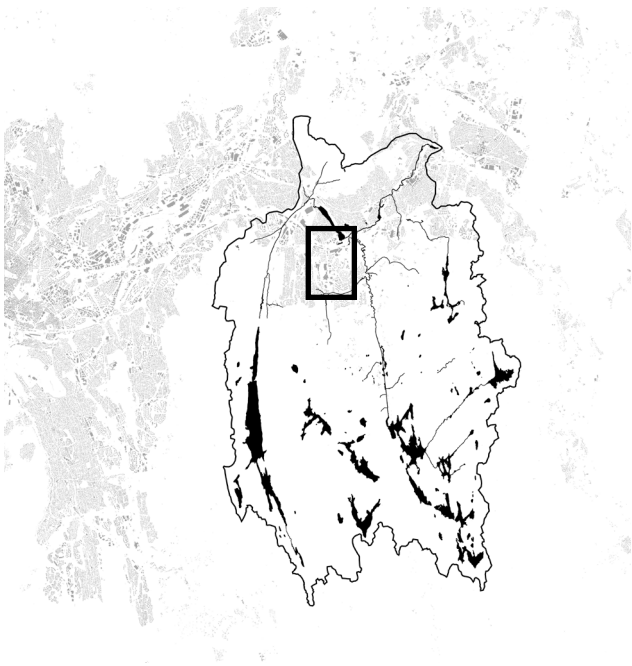


Watershed



***Municipality of
Lørenskog***

Within my project, strategies will be proposed for the Watershed, the municipality of Lørenskog, the city centre and eventually on a local scale.

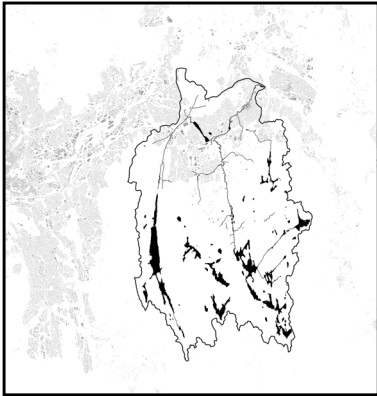


City centre

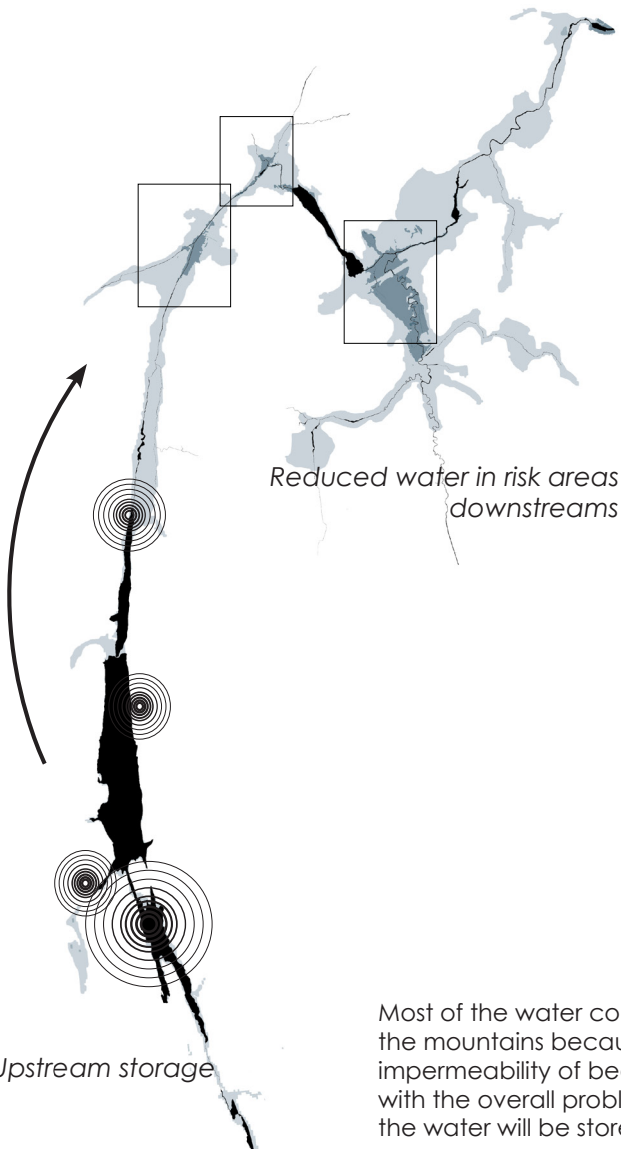


Local scale

Upstreams strategy



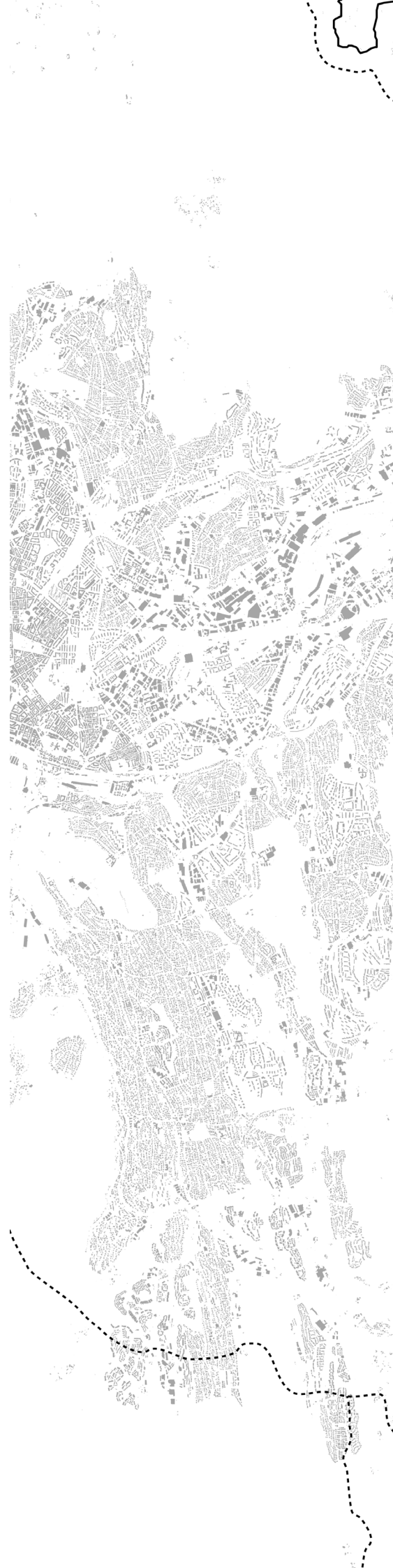
Watershed

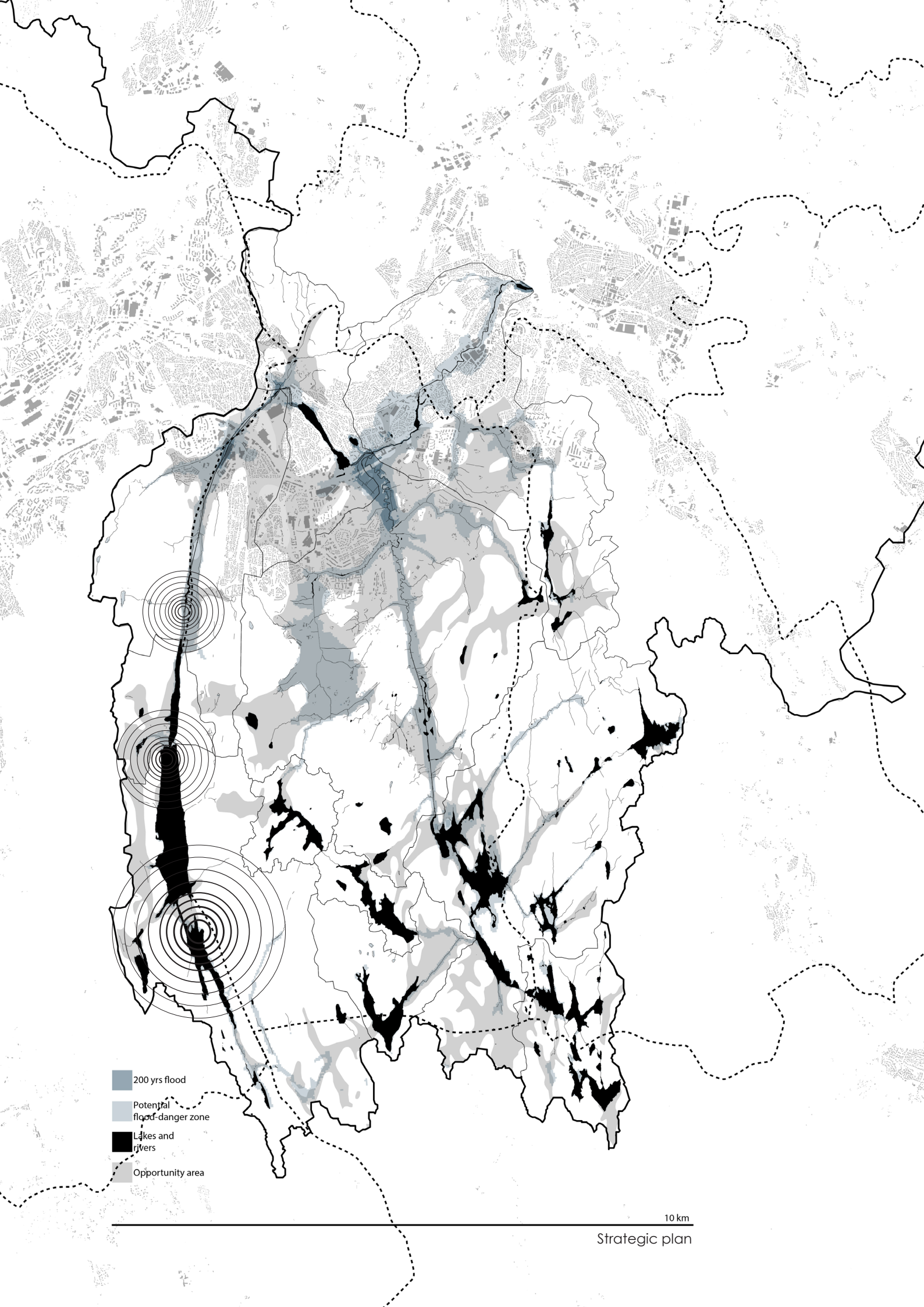


Reduced water in risk areas downstream

Upstream storage

Most of the water comes from the mountains because of the impermeability of bedrock. To deal with the overall problem of flooding, the water will be stored up streams.

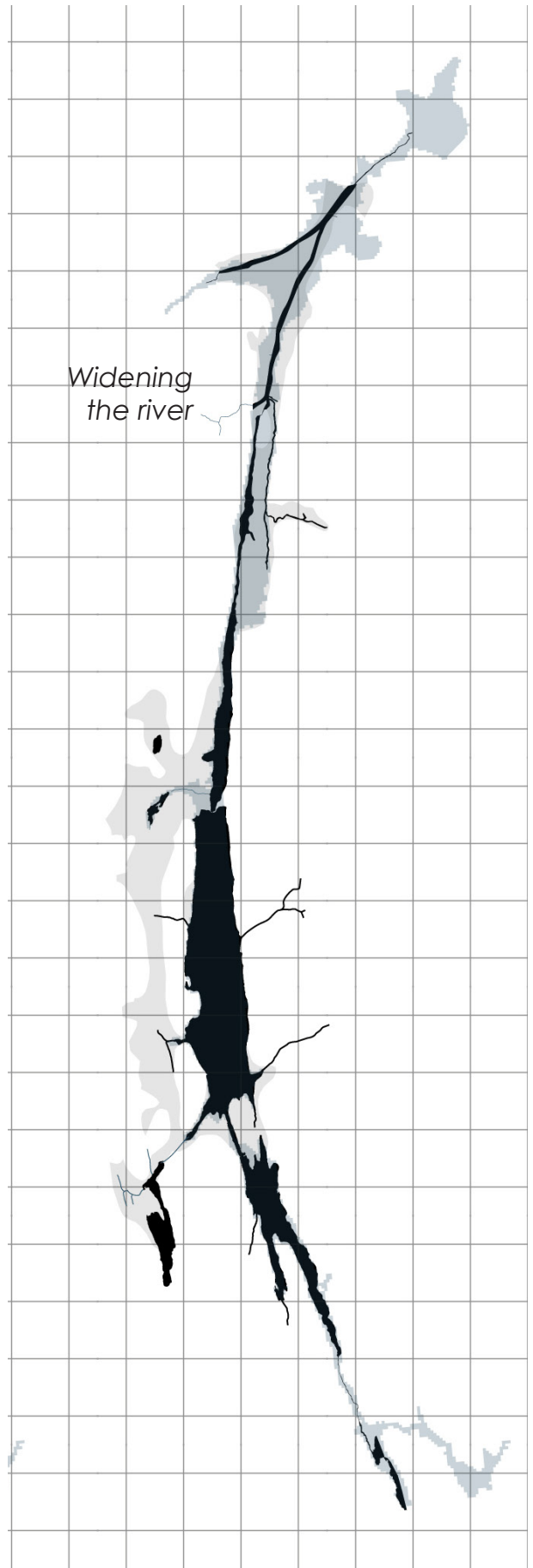
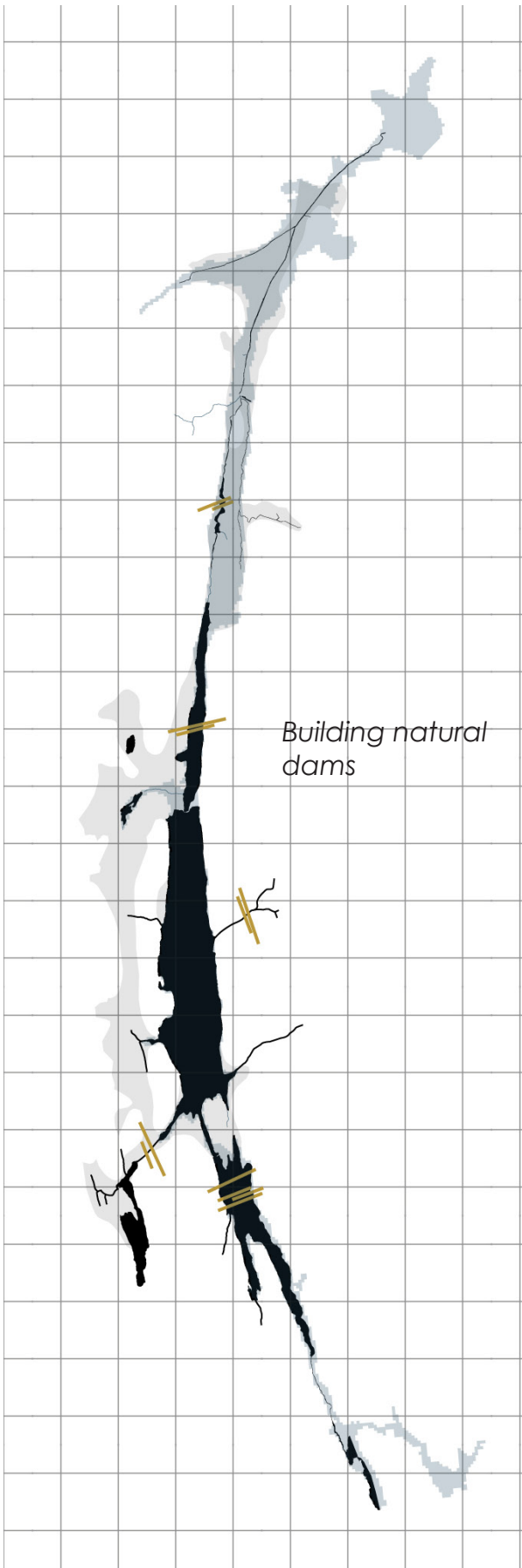




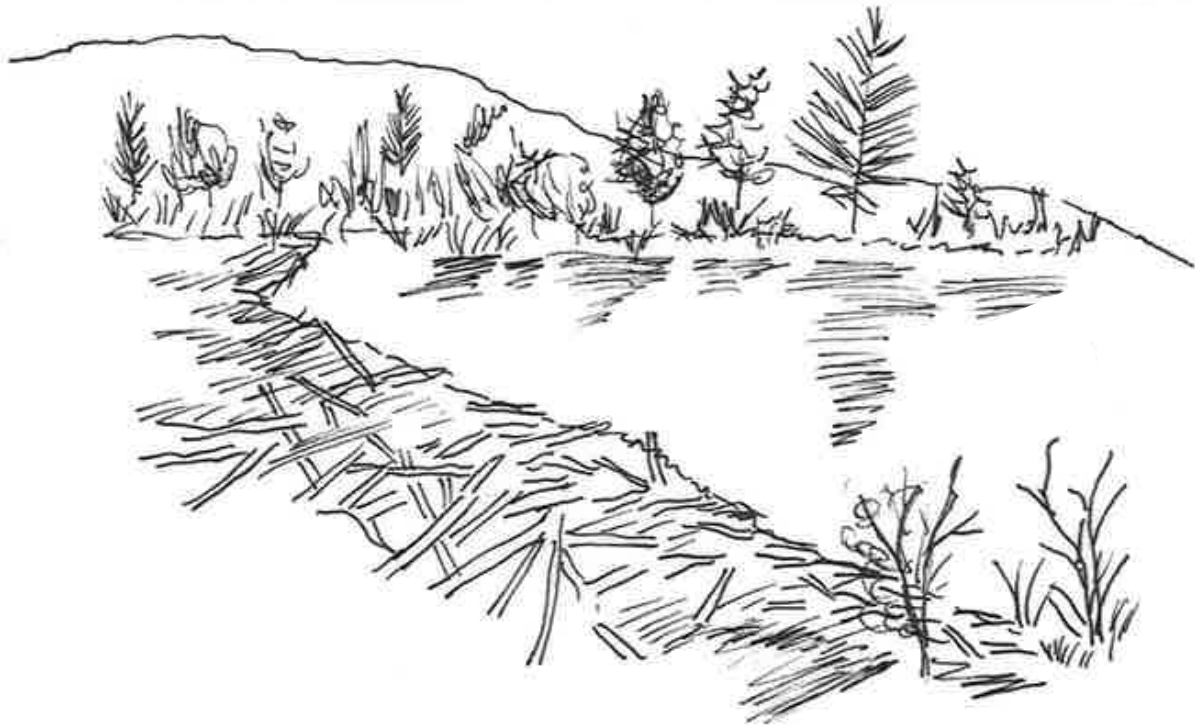
- 200 yrs flood
- Potential flood-danger zone
- Lakes and rivers
- Opportunity area

10 km

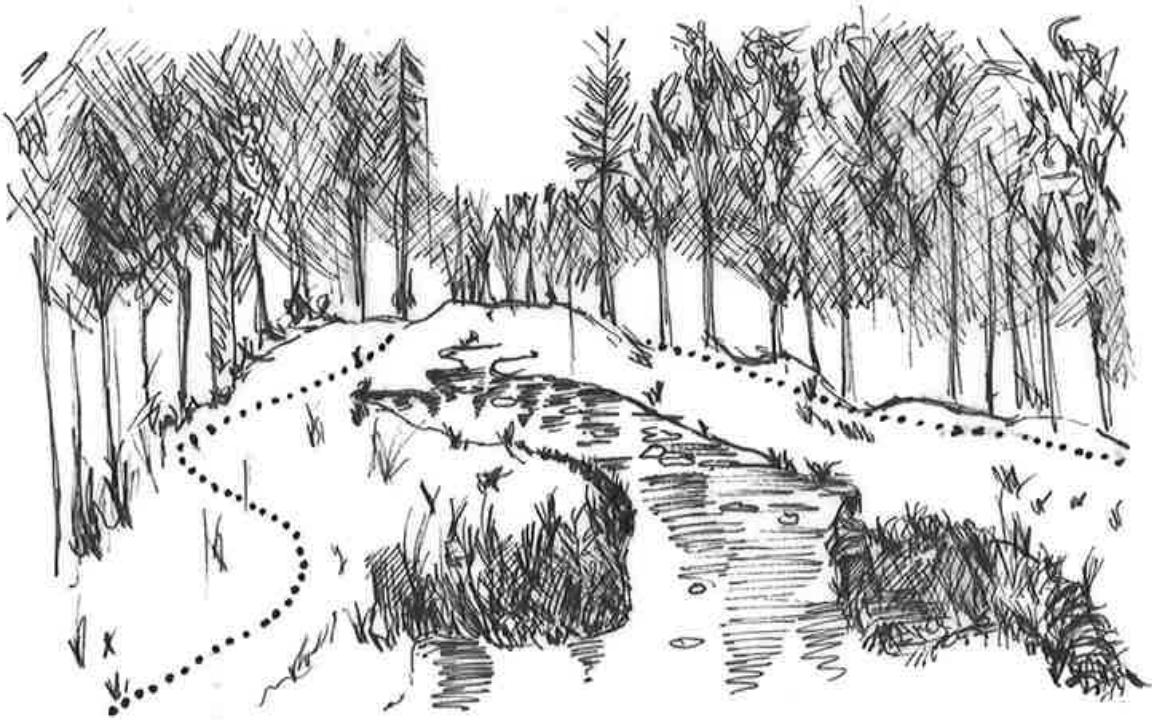
Strategic plan



The proposed strategies are building natural dams and widening the river.

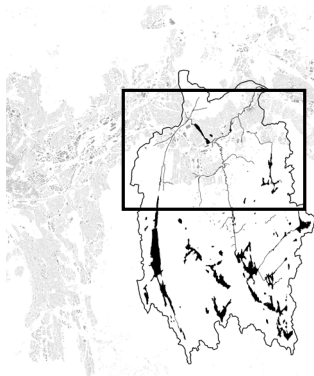


Buildings natural dams



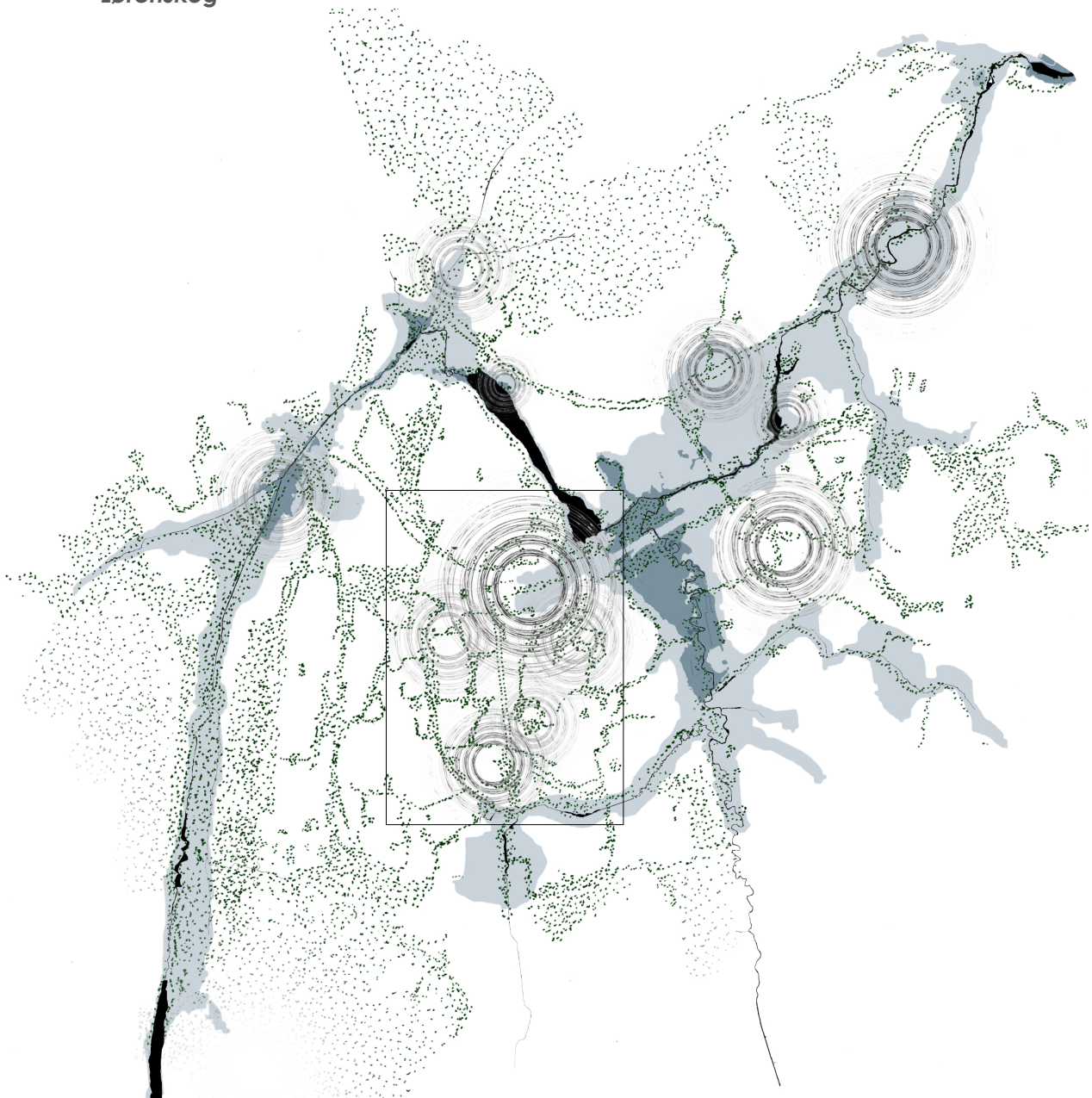
Widening the river

Downstream strategy



**Municipality of
Lørenskog**

With the changing climate, a new infrastructure is necessary. An infrastructure that will not only adapt to flood but also helps to secure these fast growing areas into habitats. A blue and green network strategy will be proposed. Where the blue consists out of existing rivers and the 200 year flood zone. Combined with the green network of existing forest, grassland and unused spaces. With a focus on social hubs, it will result into quality of public space and social connectivity.



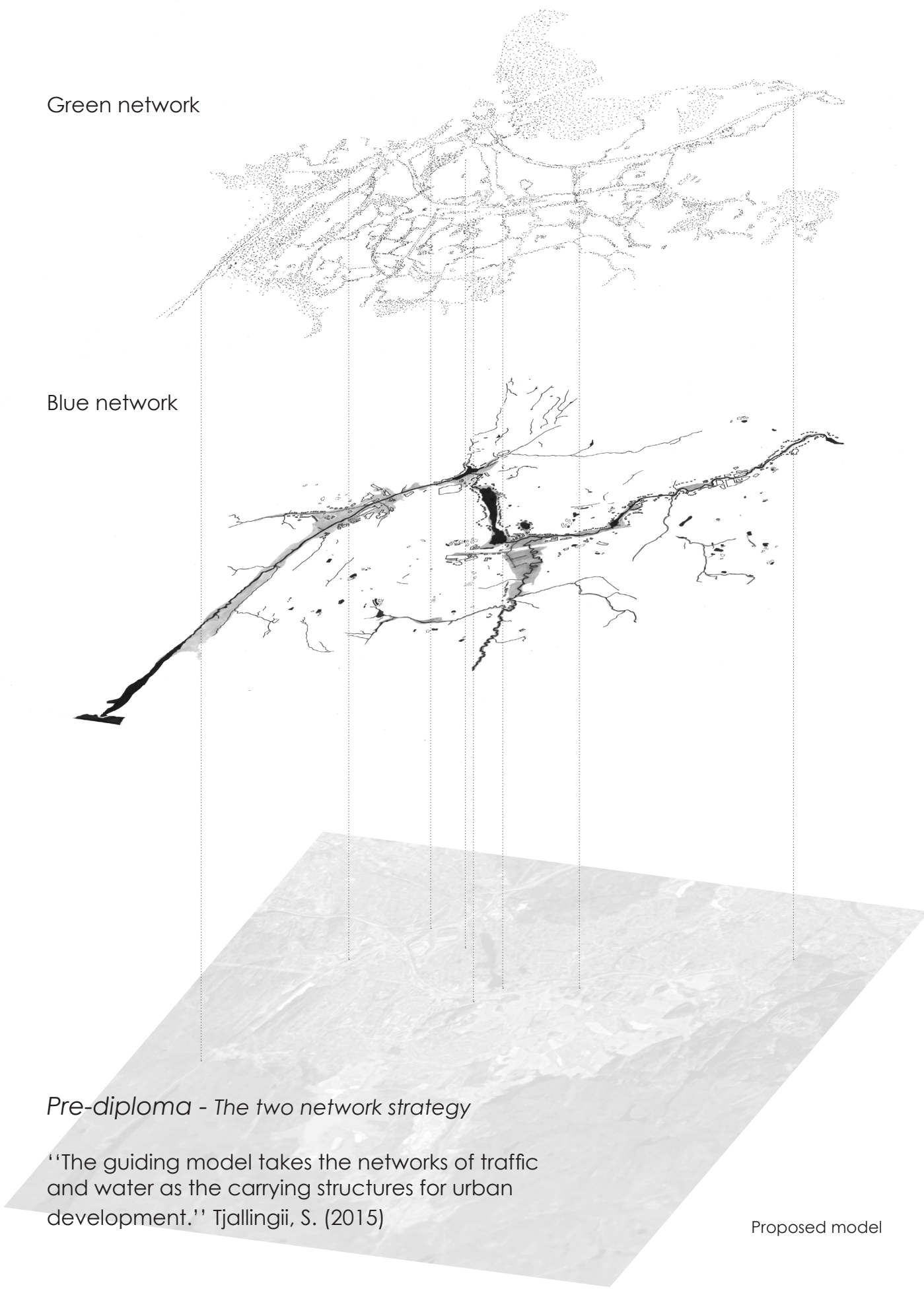
Green network

Blue network

Pre-diploma - The two network strategy

“The guiding model takes the networks of traffic and water as the carrying structures for urban development.” Tjallingii, S. (2015)

Proposed model



Downstream strategy



City centre

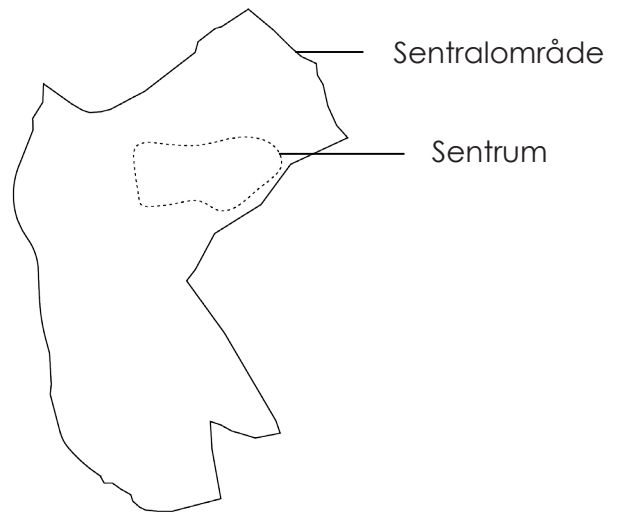
Zooming in on the City centre, the footprint of green went from a cover of 80% to only 10% today in the city centre.

Sentralområde

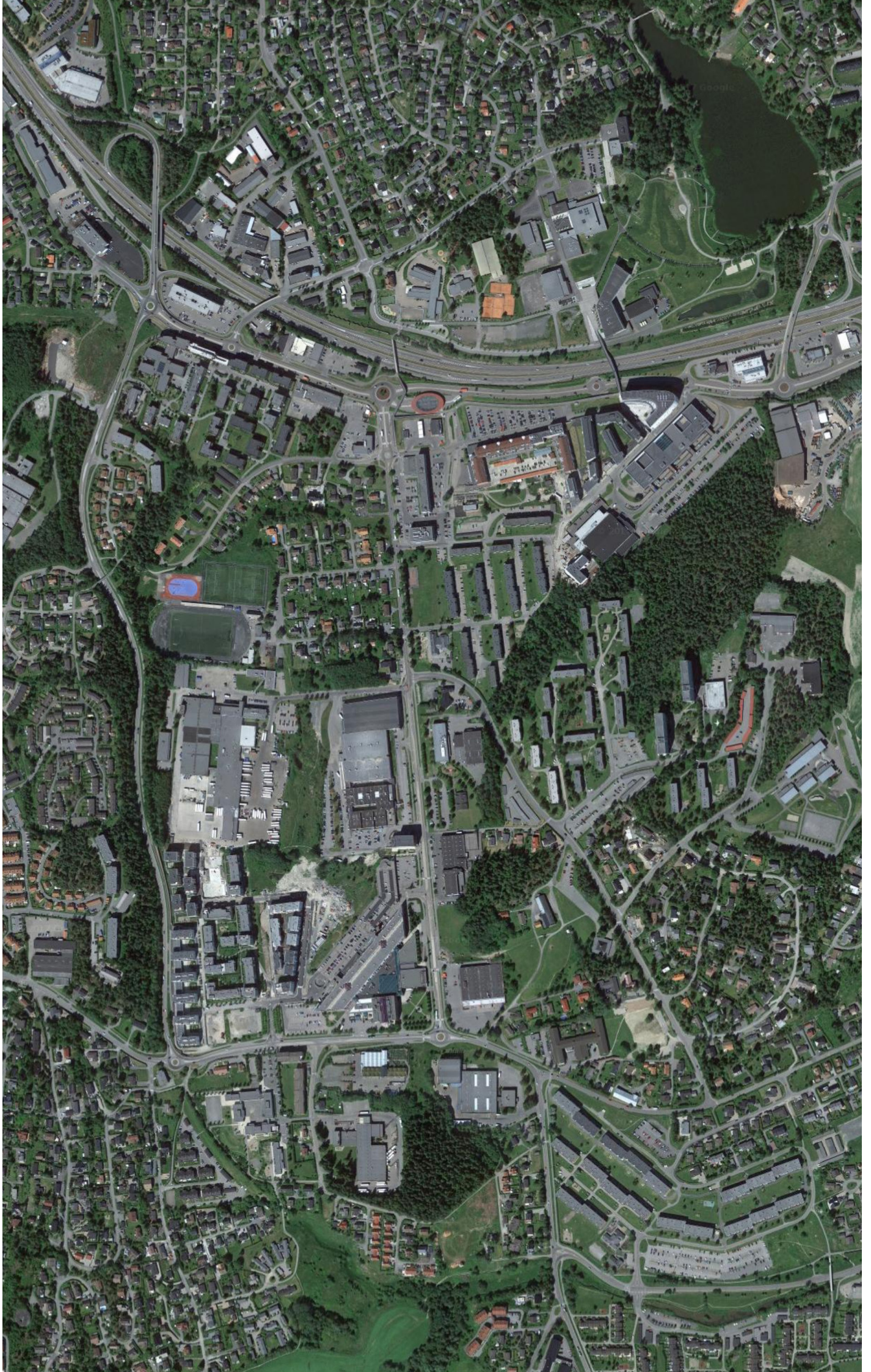
Total area:	1349668m ²	
Buildings:	238143m ²	18%
Impermeable surfaces:	425592m ²	31%
Green structures:	6859332m ²	51%

Sentrum

Total area:	149336m ²	
Buildings:	49058m ²	33%
Impermeable surfaces:	85976m ²	57%
Green structures:	14302m ²	10%



Commercial area / City centre

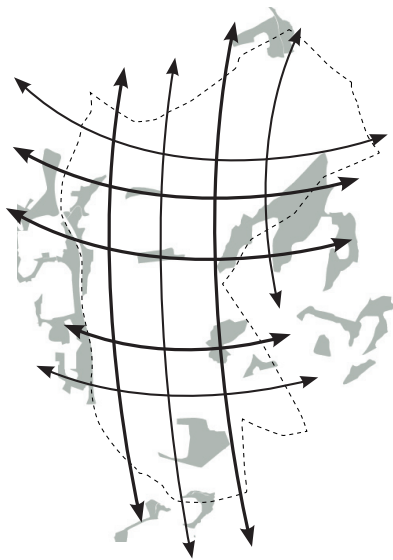


Challenges and opportunities

- Local flood areas
- Fragmented green structure
- Indoor activities
- Infrastructural boundary
- Lost identity

This causing challenges of local flood areas, fragmented green structures, indoor activities, infrastructural boundaries and a lost identity. The underlying landscape is taken away by urban growth. The strategy of blue and green will be proposed. Where the backbone of blue consist of the hidden rivers, occurring through topography and a proposed grid of trees will become a base for design.

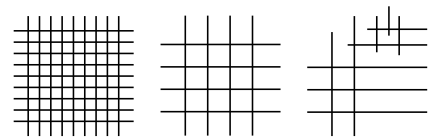
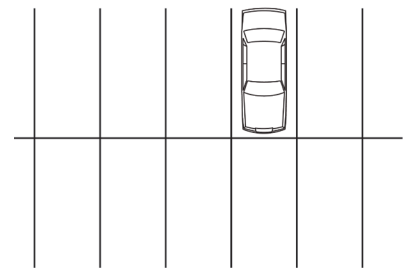
Lorenskog literally means "clay" and "wood". So the grid comes from an understanding of history, "the woods" and the phase of rapid urban growth, where it represents the formal structures of urban development.



Green network

Lørenskog

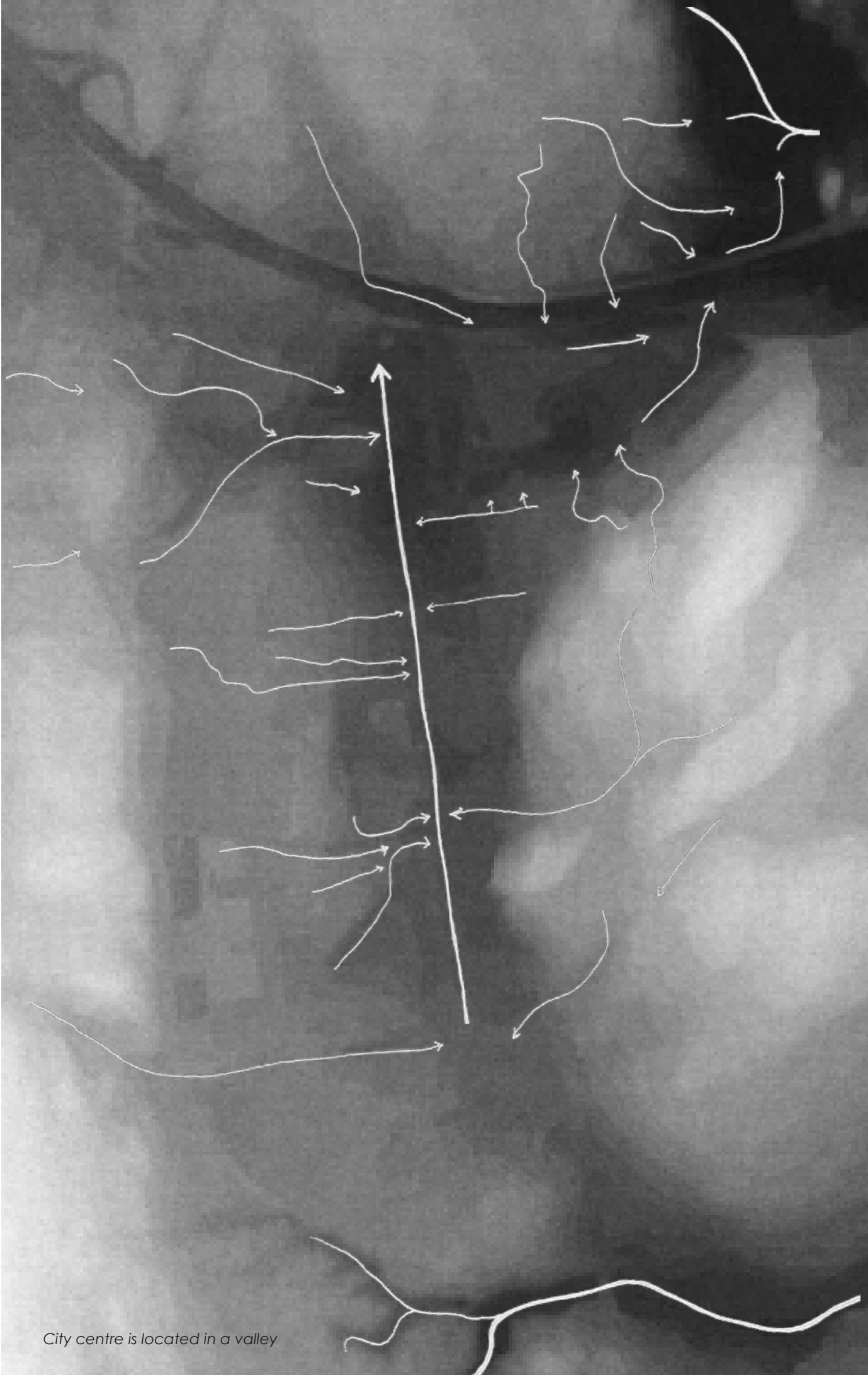
"Løren" = clay and
"skog" = woods



Urban grid



Local flood, commercial area / City centre



City centre is located in a valley





Accumulation 200 year flood event



Planned municipal development 'clashes' with flood areas



Flood areas as base for urban development

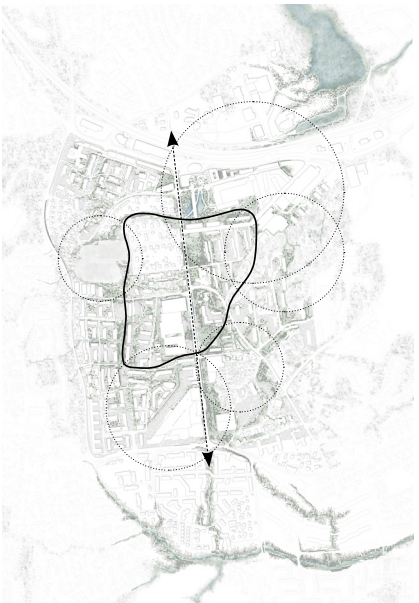


Fragmentated green structure

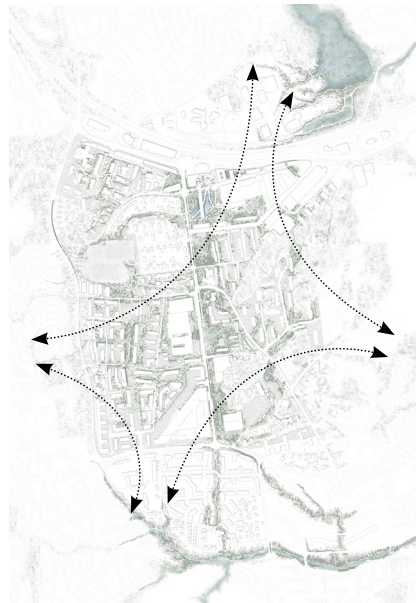


Proposed tree network to uptake water and improve public space

The 200 year flood map is base for design. Overlapping this with the existing and proposed buildings by the municipality, it reveals the 'clashes' in the area. My proposal provides space for the river by digging out the soil and taking out the planned/existing buildings in a floodzone. By opening up the grid, the streams (in dry and in wet conditions) become visible and provide new spaces for social activities. The proposed pathway connects these hubs and the structure to the wider urban network.



Path through nature area connects social hubs

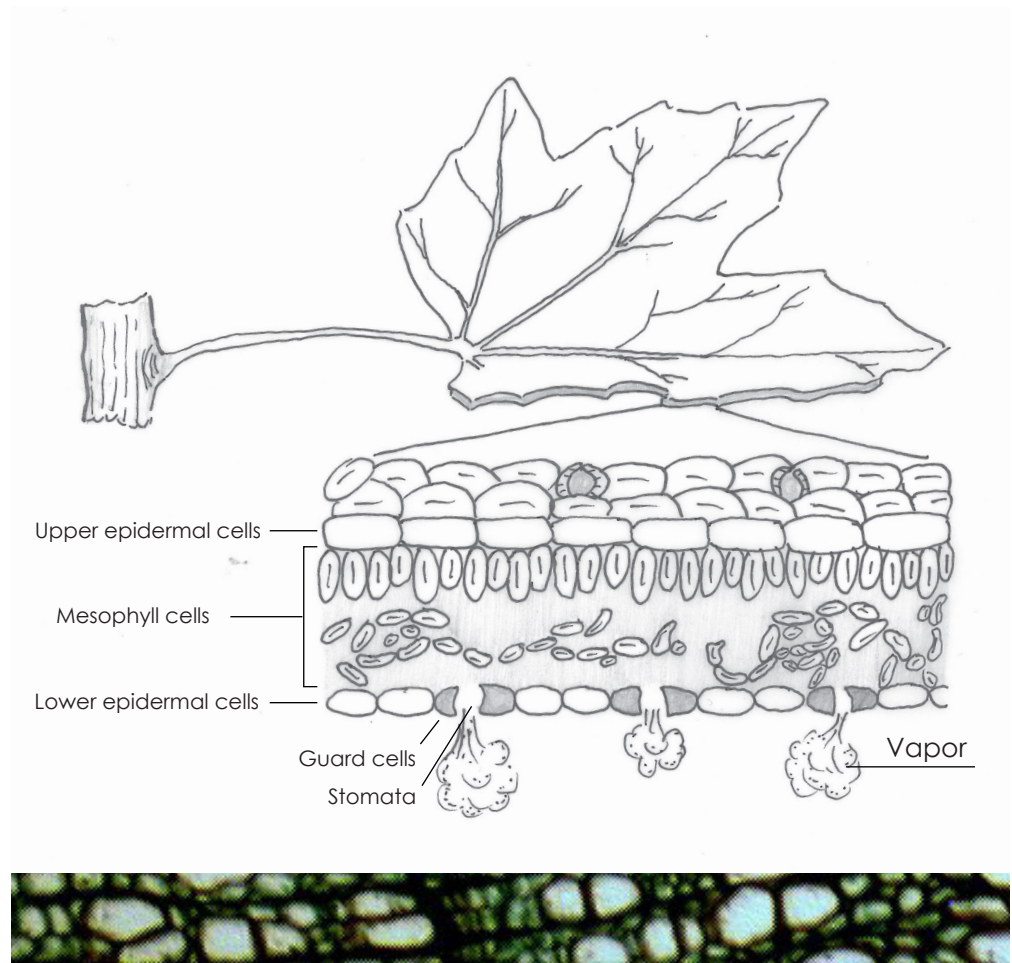


Proposed network connects the wider urban fabric, providing local flood adaptation and recreation

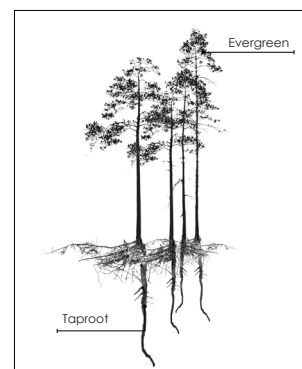
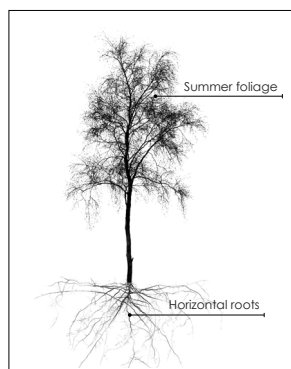
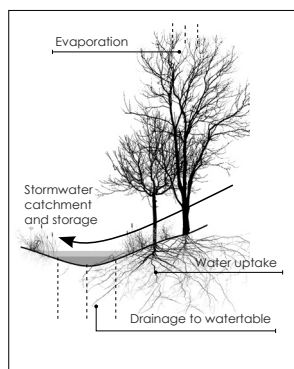
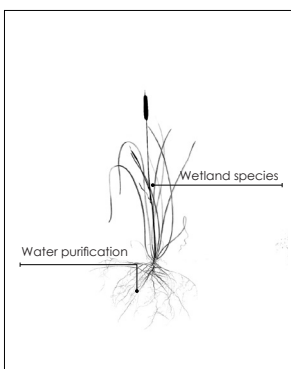
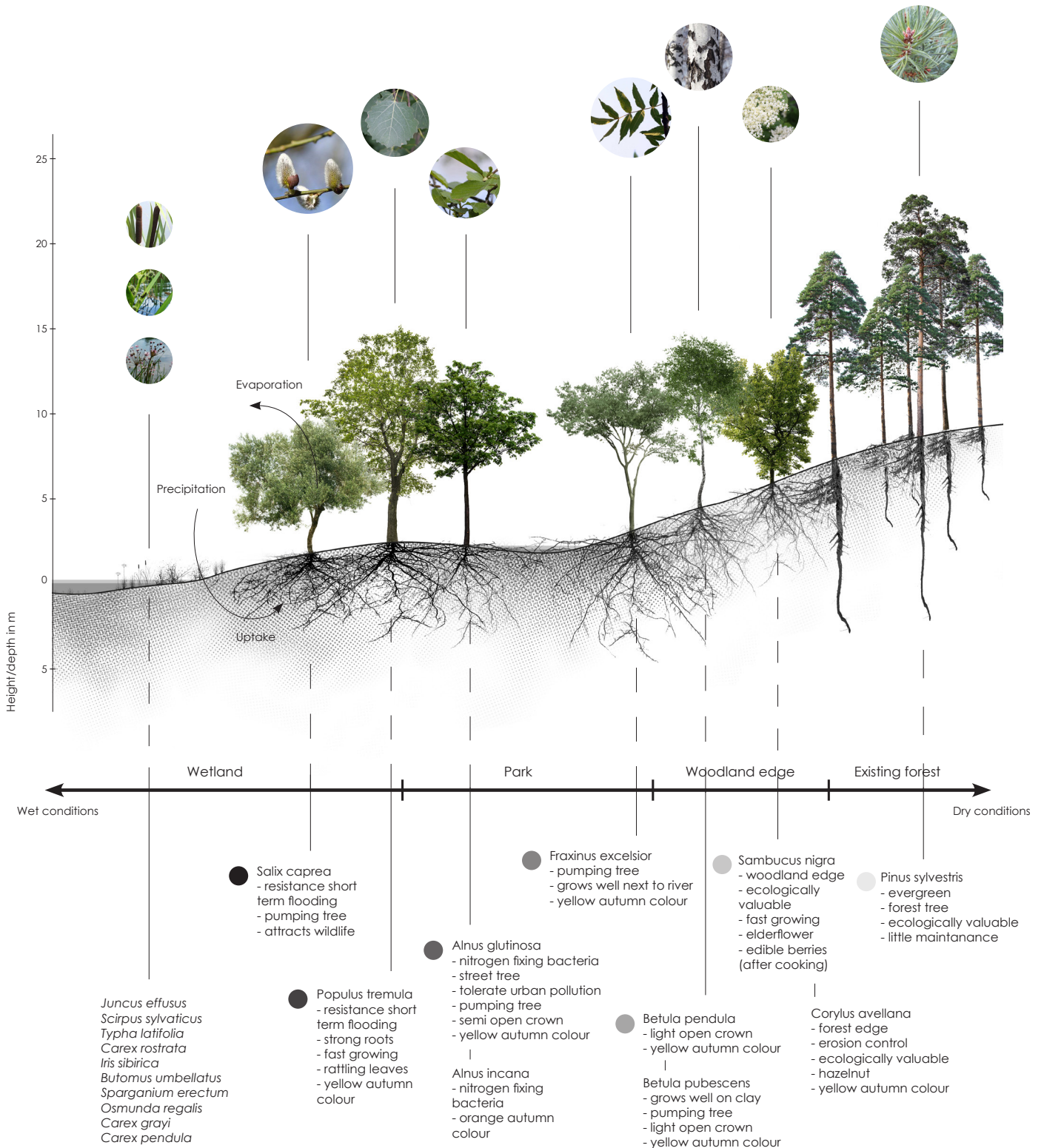
On a local scale, the trees provide the base for design. Where the trees for drier conditions grow more up in the mountains and the wetland species of trees grow in the citycentre, where the water accumulates. This proposal provides a strong orientation within the city centre and invites one to recreate in the new central park of Lørenskog.

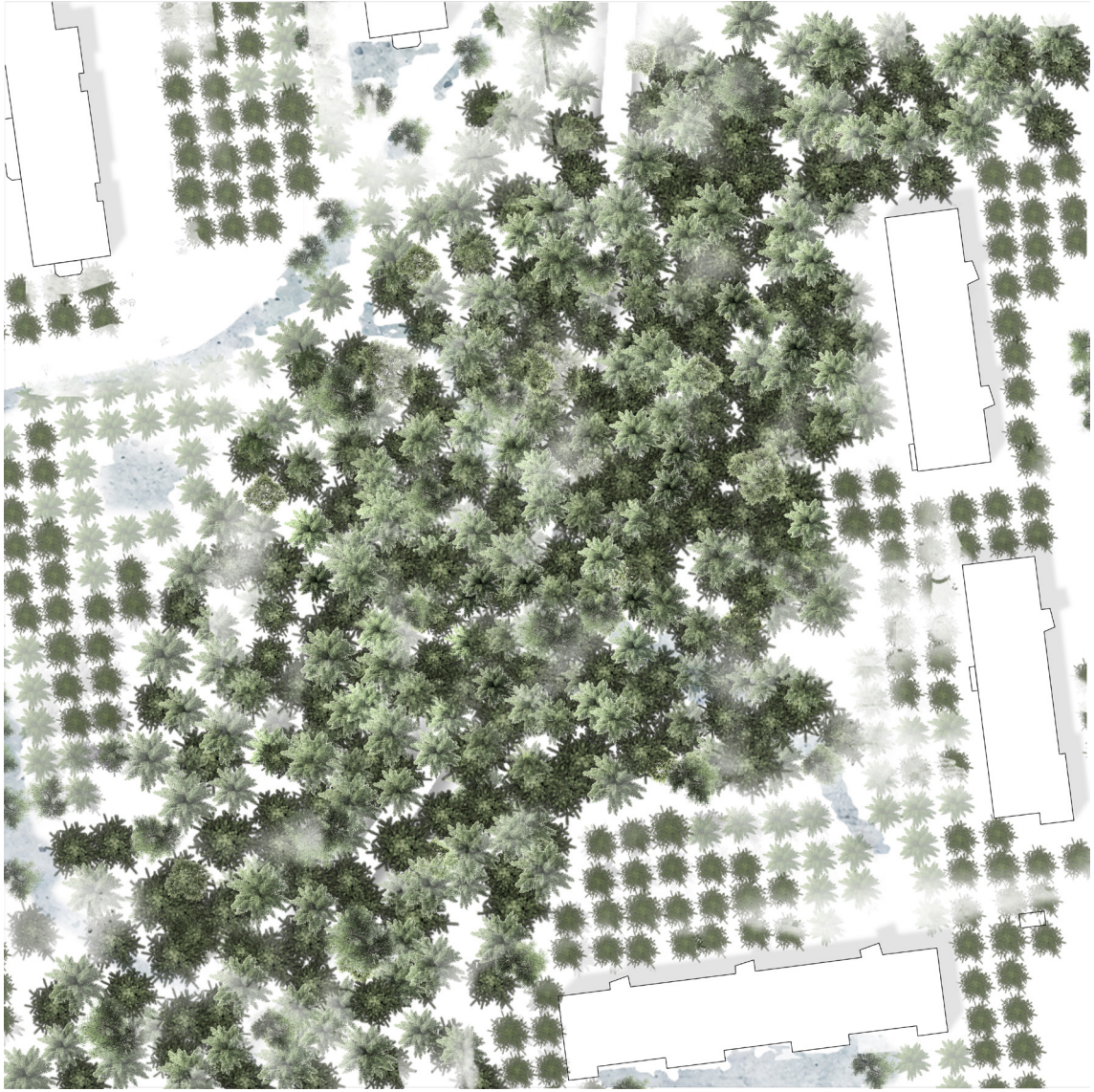


Local scale



Water flows through the inner tissue of plant foliage, released from the stomata as vapor.

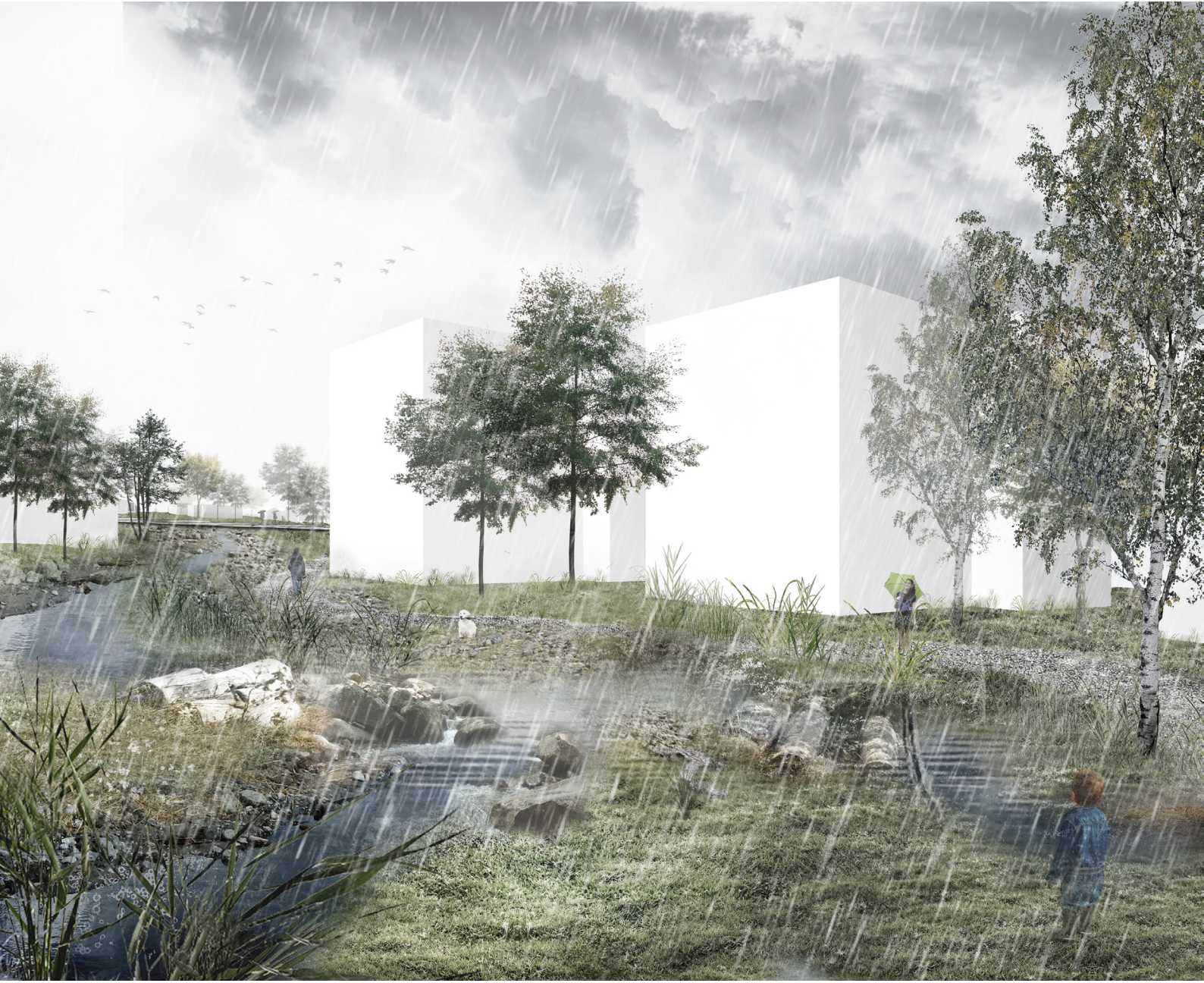




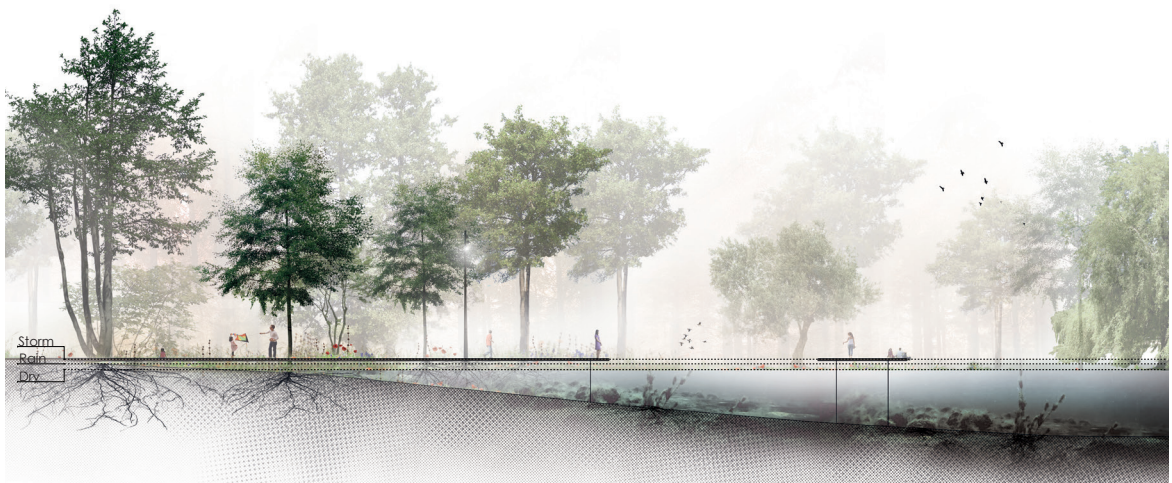
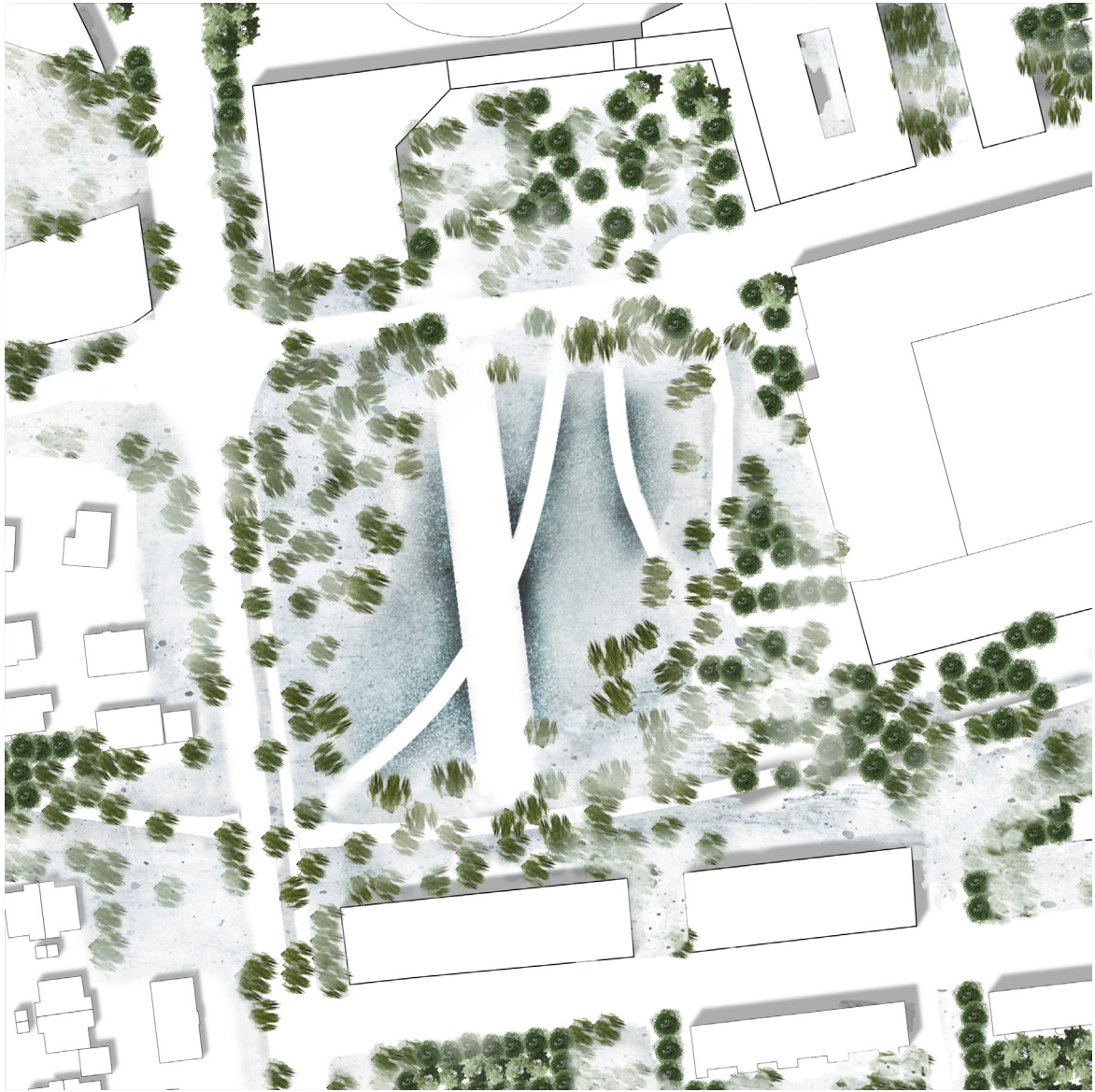


Zoom dense, enclosed forest with stream occurring in storm event.



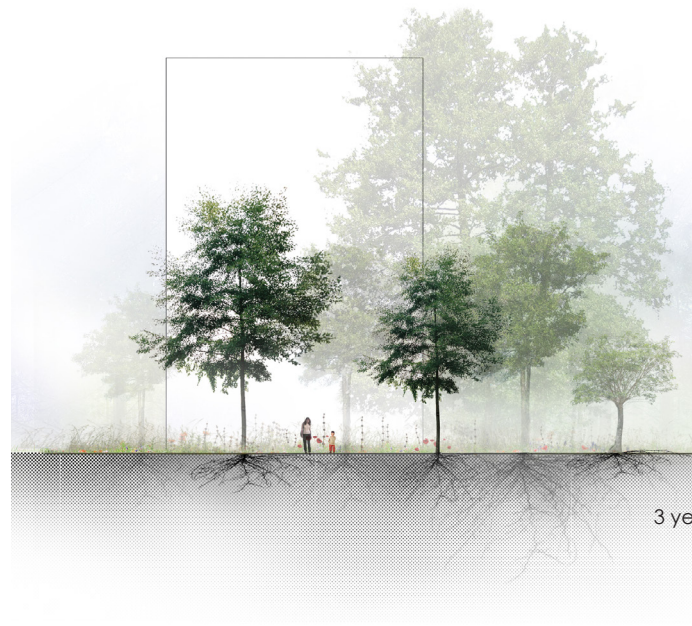
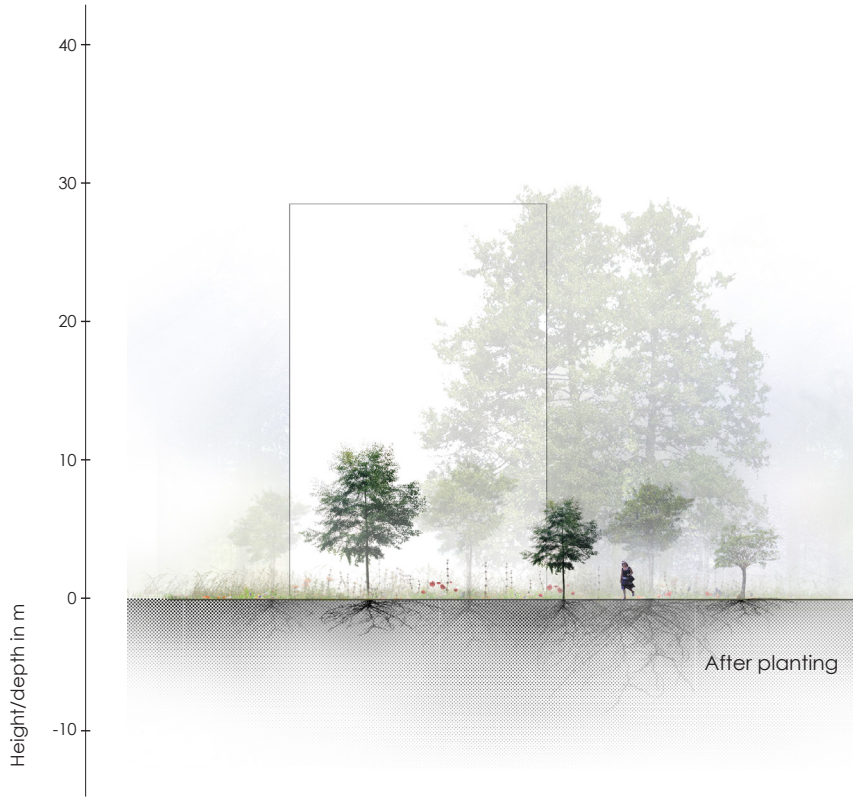


Zoom residential area where the trees open up, to make space for the river.





Zoom city centre where the water accumulates, providing a new main social park.



Fasing in time.

ars

