

Patching up the Lowlands

A design exploration to strengthen peri-urban spatial qualities in the Deltametropolis
through biophilic and technophilic developments

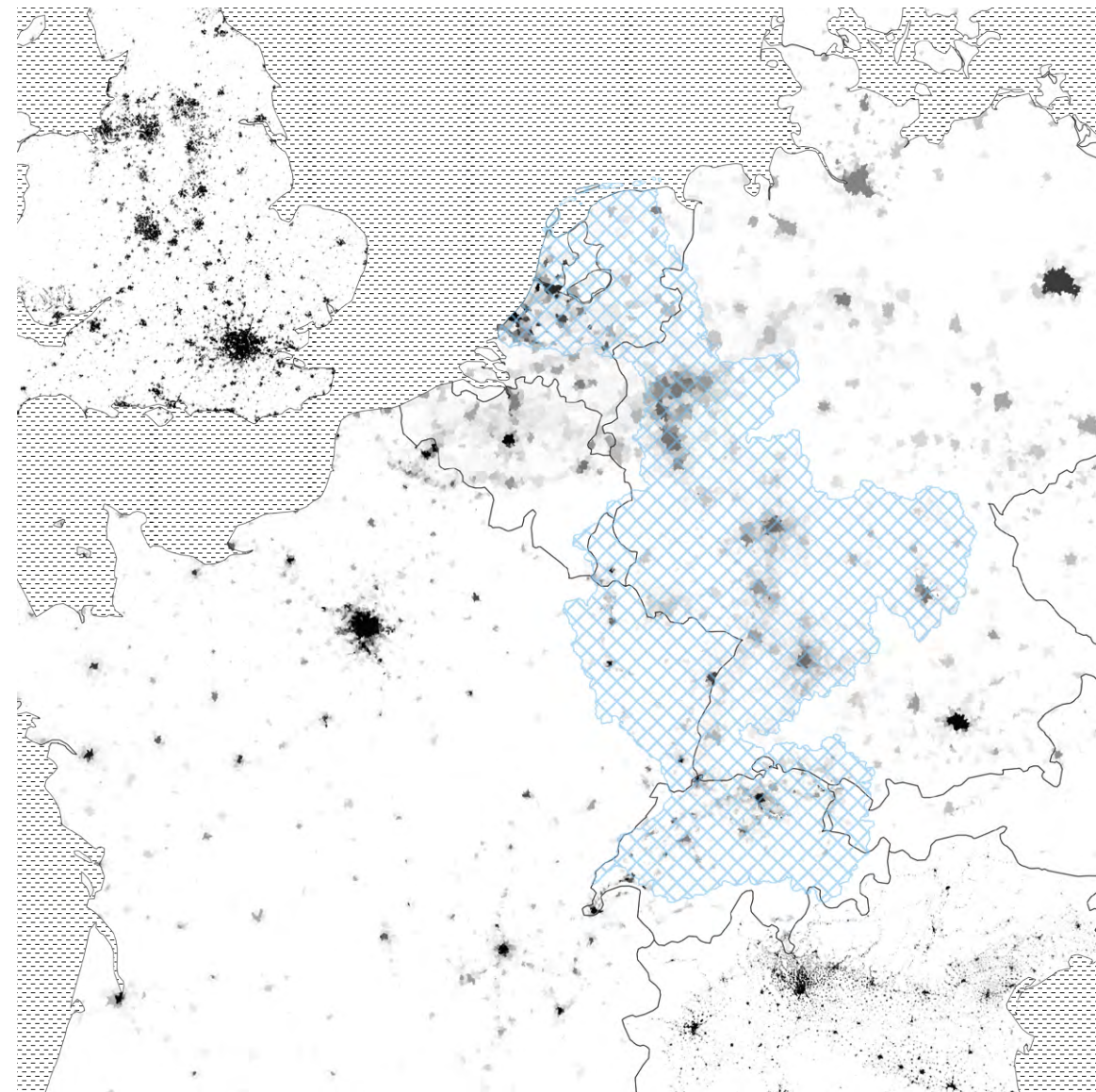
P5 Presentation
Pieter van Os

Graduation studio: Metropolitan Ecologies of Place

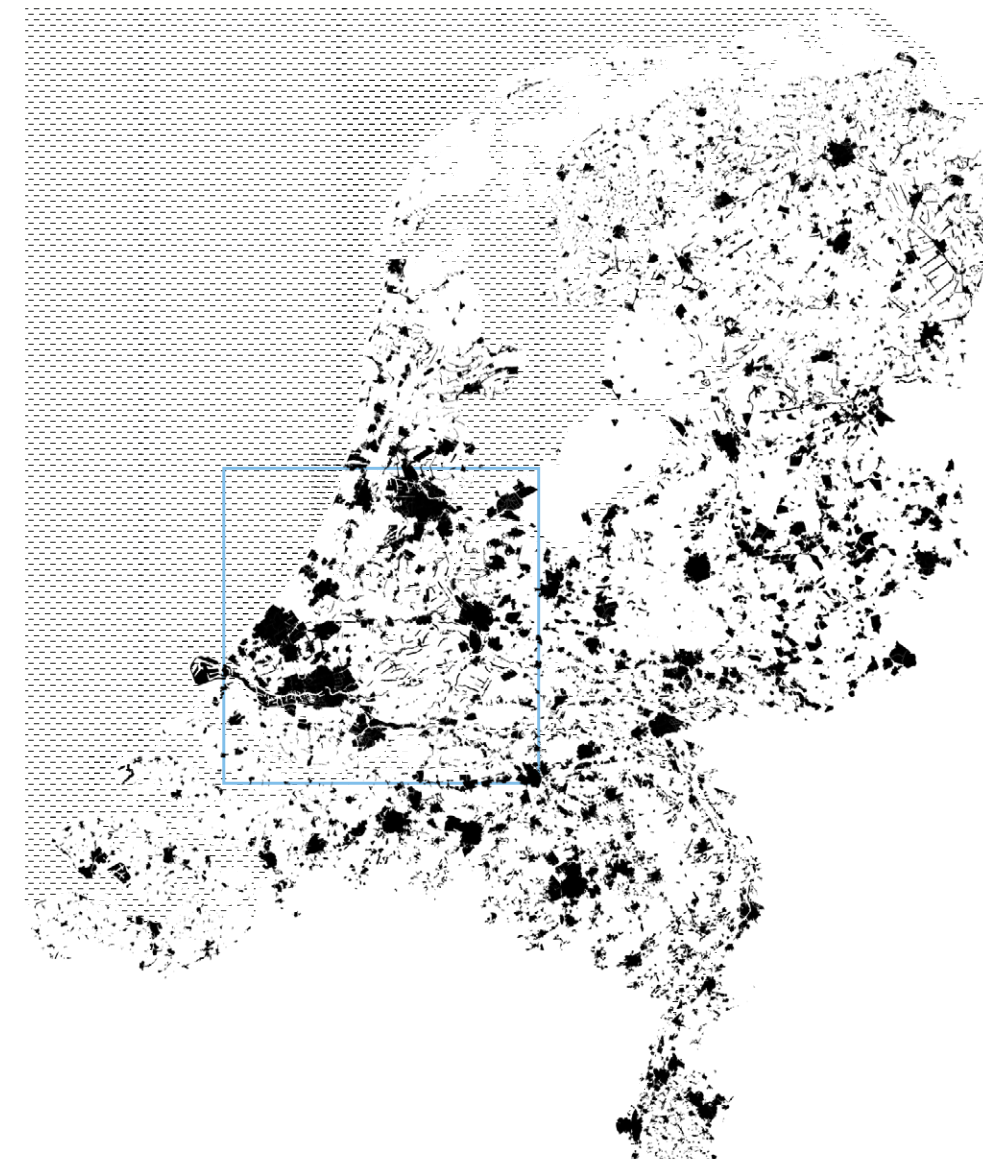
First mentor: Dr. Alexander Wandl
Second mentor: Prof.ir. Eric Luiten
External examiner: Dr.ir. Fred Veer

Delft University of Technology
June 30, 2023

The Dutch Deltametropolis



Rhine-Meuse-Scheldt Delta



The Netherlands



The Dutch Deltametropolis



De Nieuwkoopse Plassen

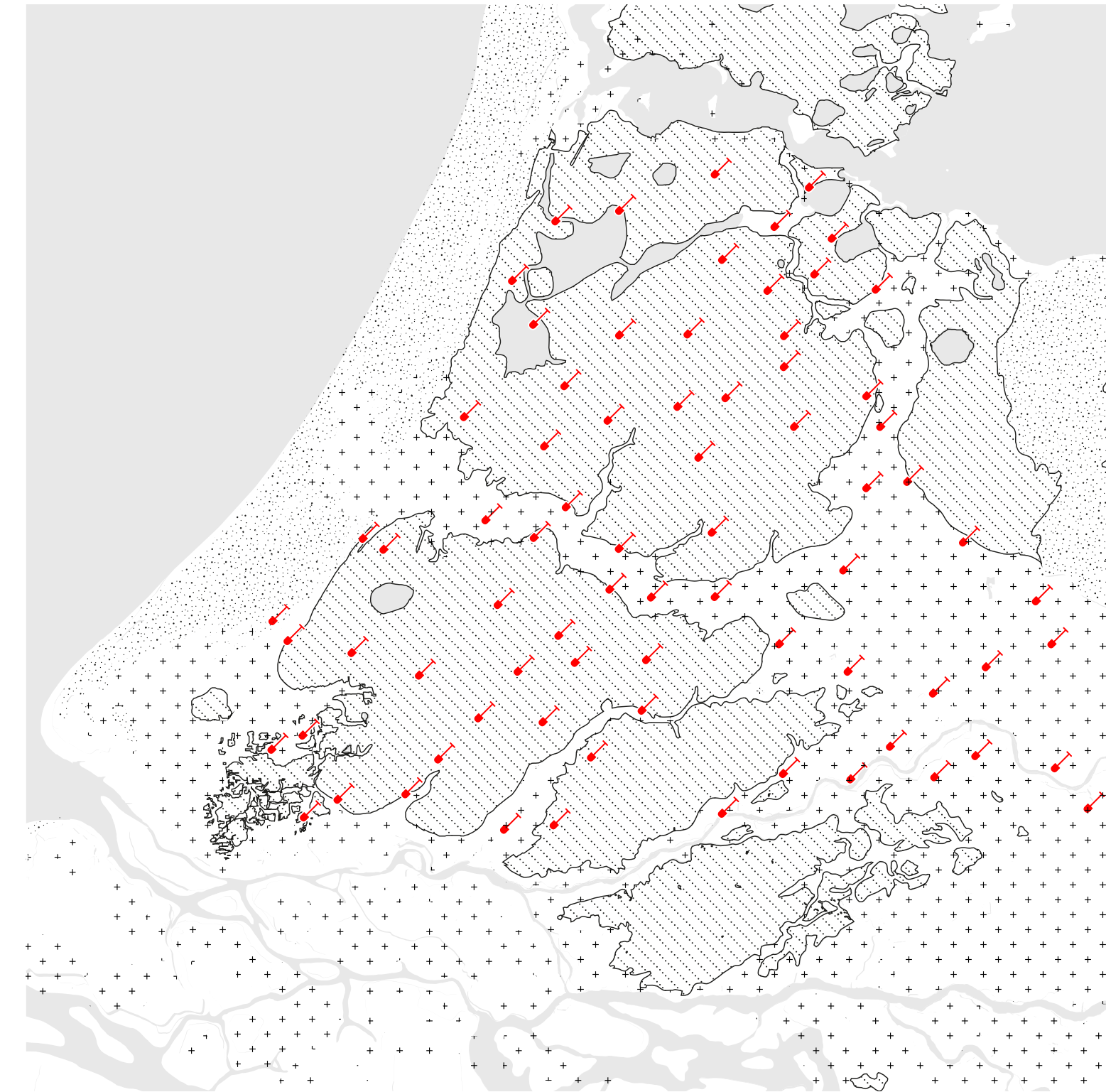


Nieuwkoopse Plassen from above. From Van de Biezen, 2015

De Grote Ontginning



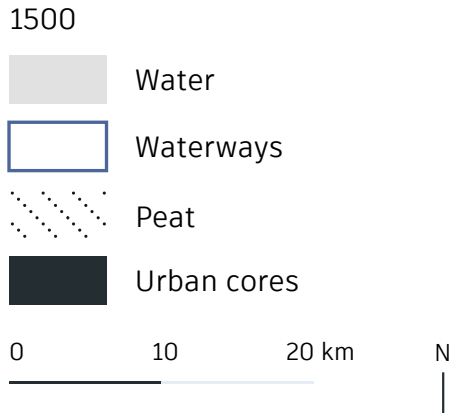
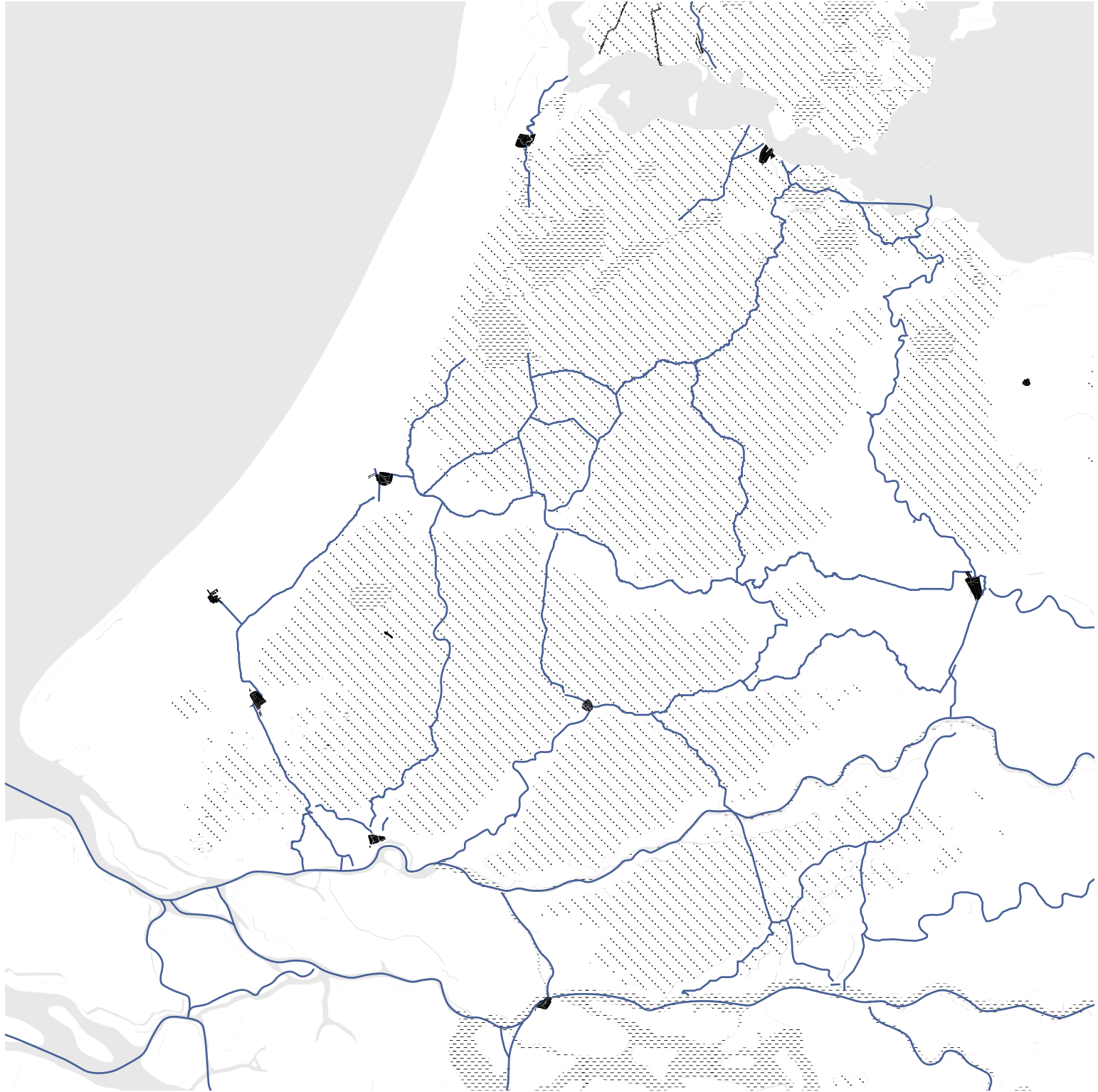
Peat reclamation, by H. van Brussel, 1806



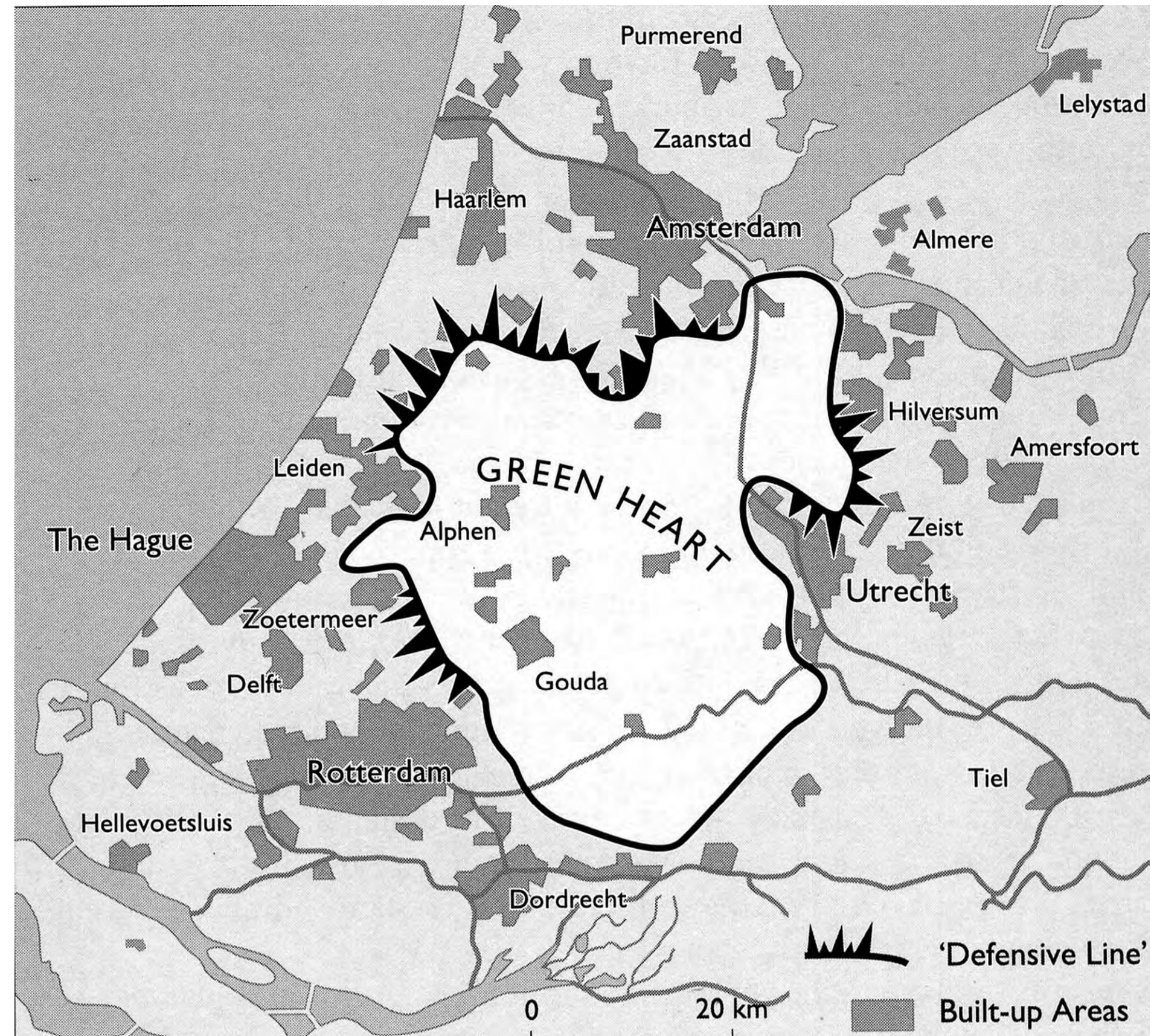
Urban-Rural Symbiosis



View of Delft, by Hendrick Cornelisz Vroom, 1634

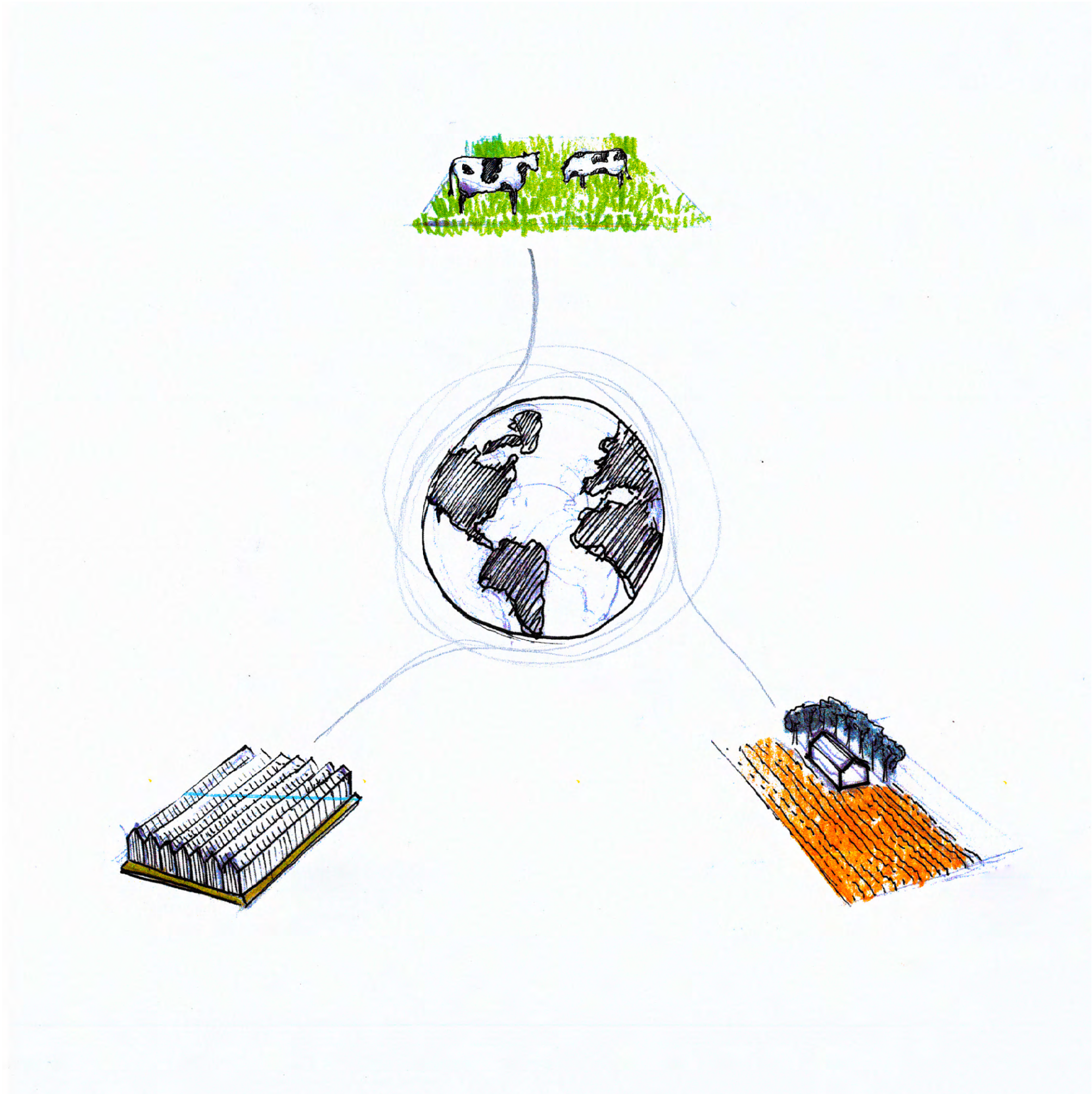


Urban - Rural Dichotomy



From Faludi & Van der Valk (1994) in Zonneveld (2007)

Globalized Food Chain



Industrialized Productive Landscapes



Greenhouses near Bleiswijk. From Siebe Swart, 2019

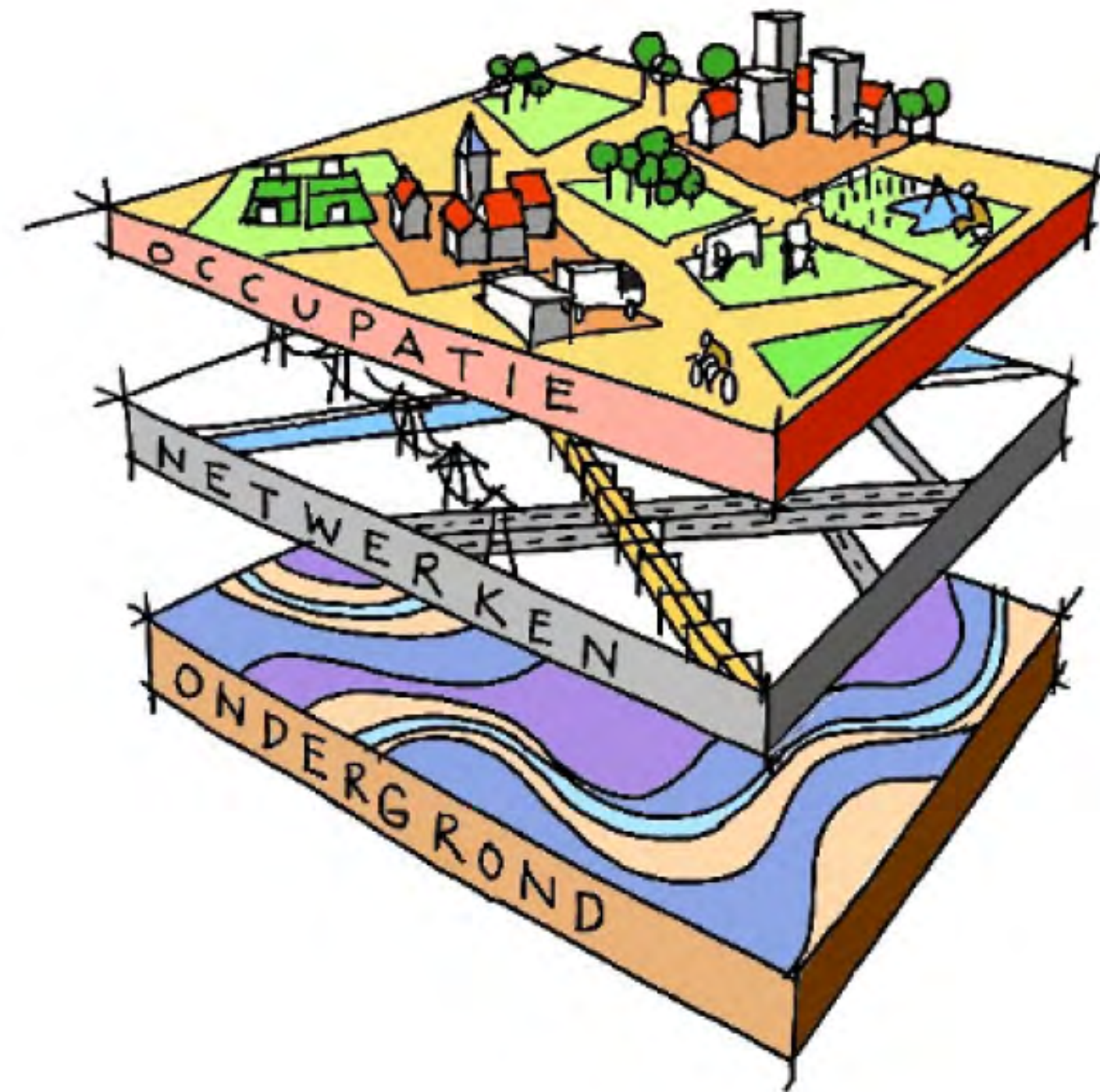


Areal view of agricultural plots. From Jan Ripma, 2014



Monoculture of English ryegrass. From Nicolette den Hartog, 2021

Market-Driven Development



--- *intensive agricultural industries*

--- *strongly manipulated water level*

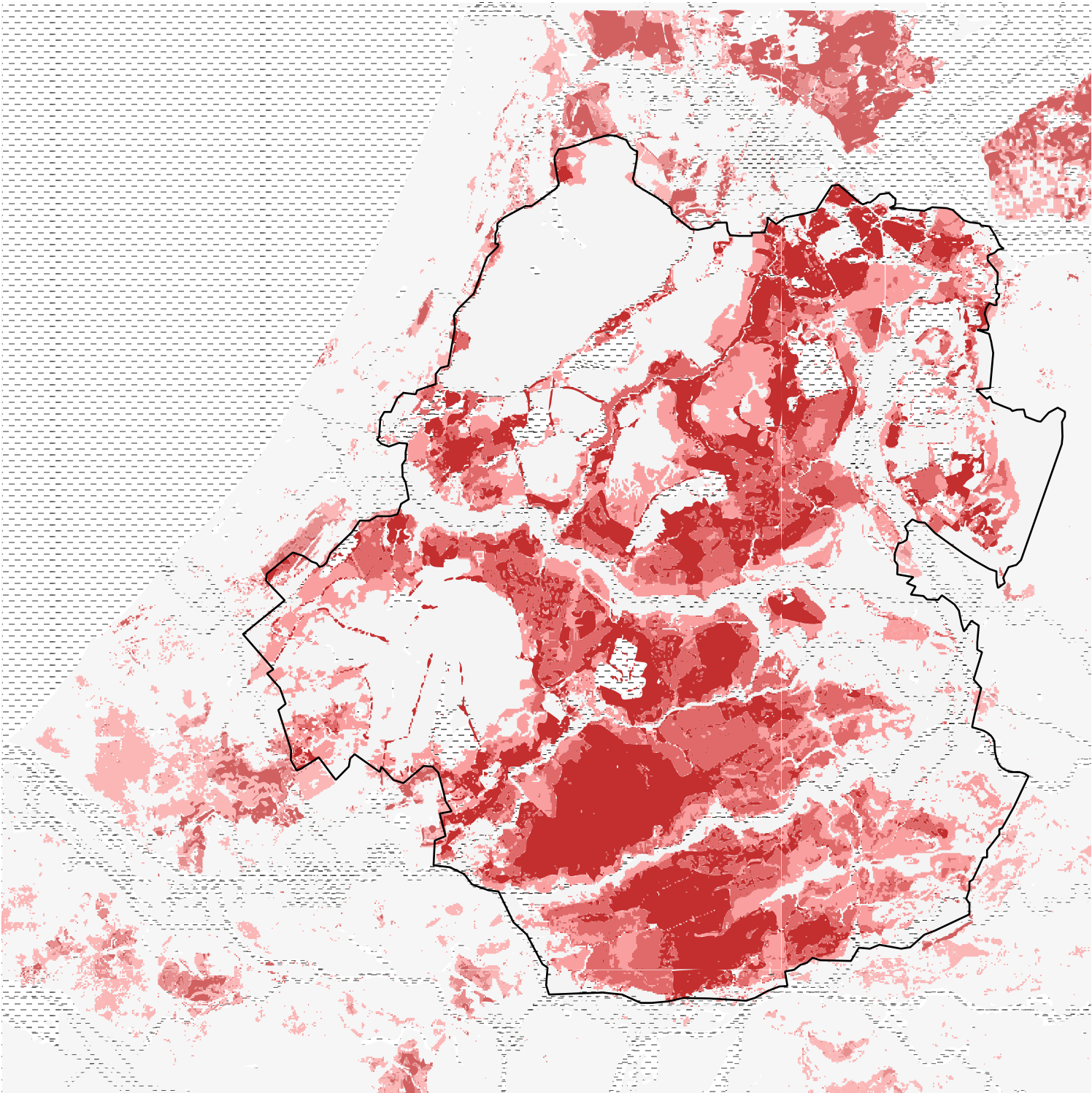
--- *negligence of subsoil*

From Deltares, 2021

Soil and Water related Issues - Subsidence



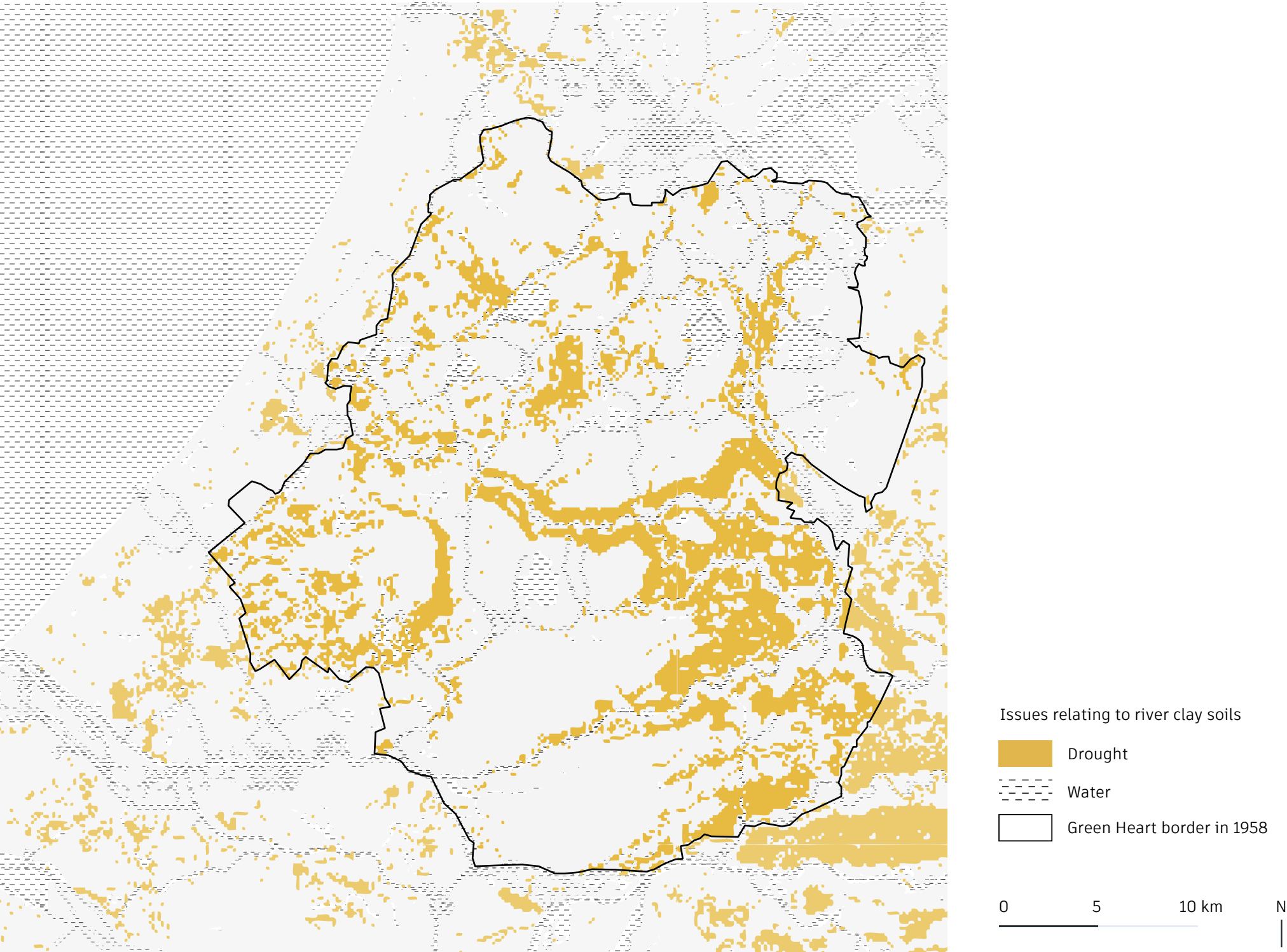
Subsidence of peat soils. From Arnoud van Otterloo, 2013



Soil and Water related Issues - Drought



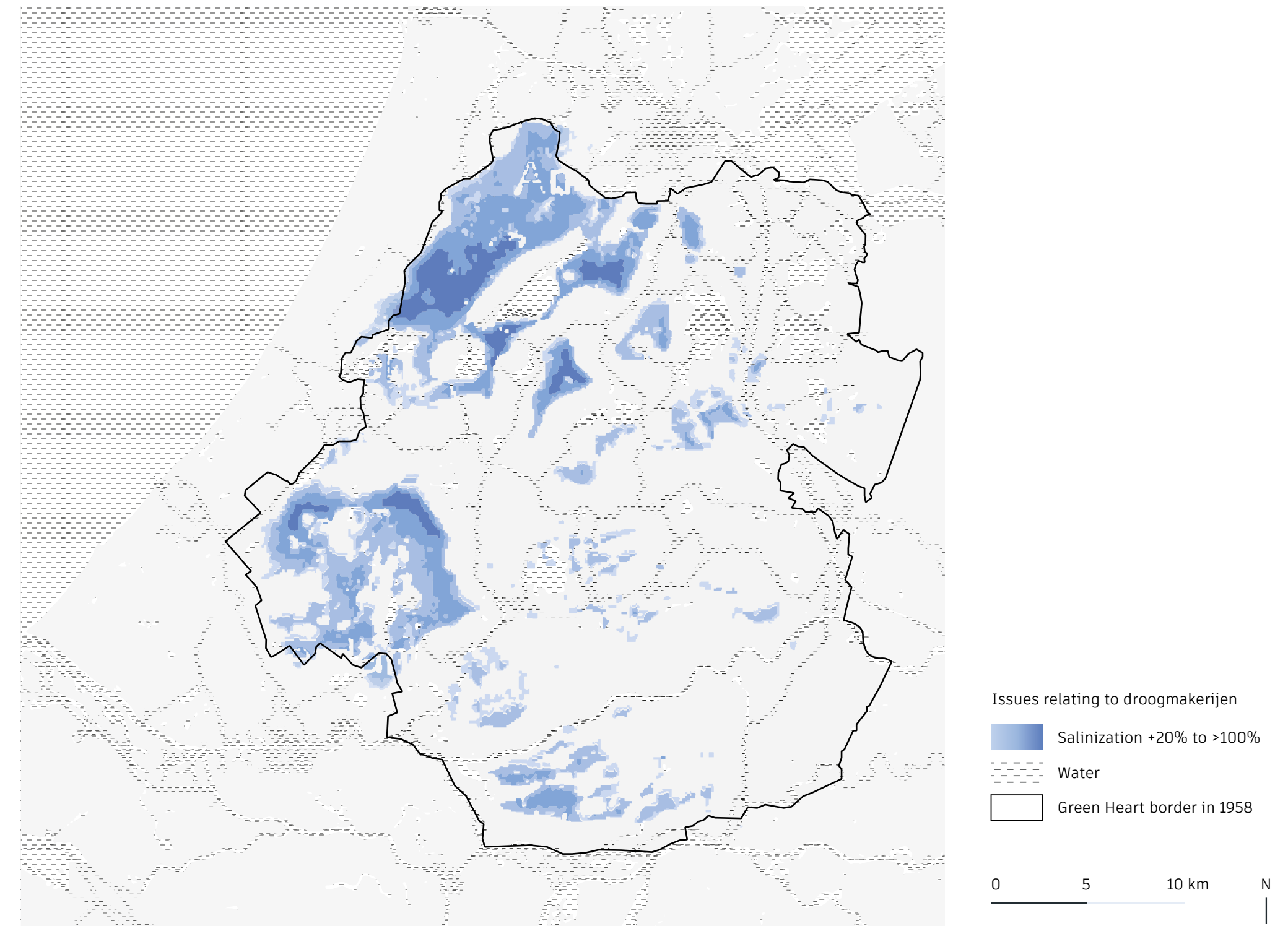
Increasing periods of drought. From Volkskrant, 2022



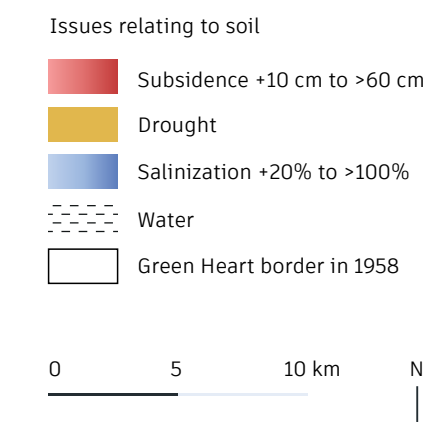
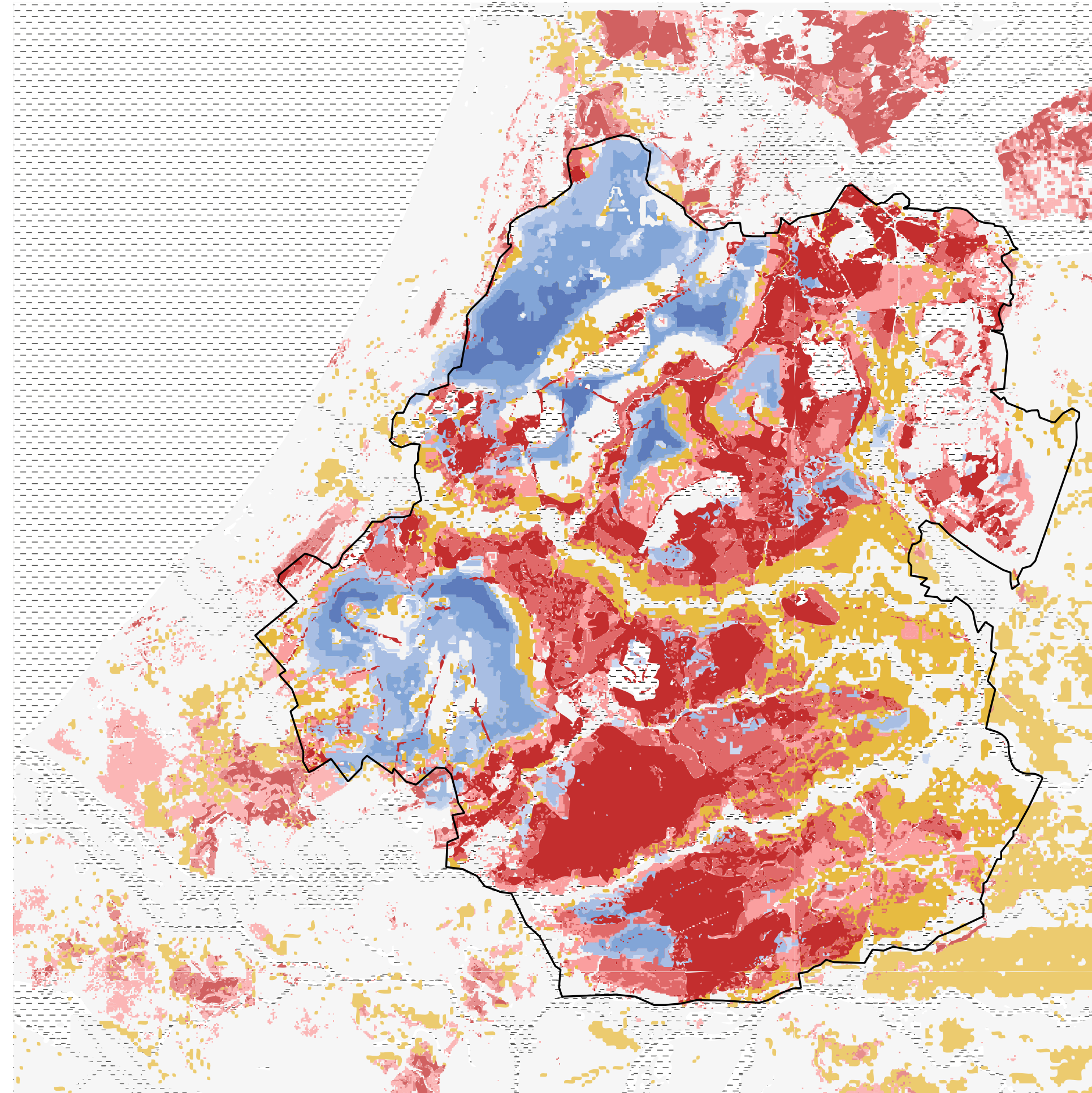
Soil and Water related Issues - Salinization



Salinization in droogmakerijen. From Salt Farm Foundation, 2018



Soil and Water related Issues



Stikstofcrisis



Excessive nitrogen emissions. From NRC, 2023

Stikstofcrisis



Contradicting spatial planning policies. From NOS, 2019

Value-based Spatial Planning: Ruimtelijke Verkenning 2023

Mondiaal Ondernemend



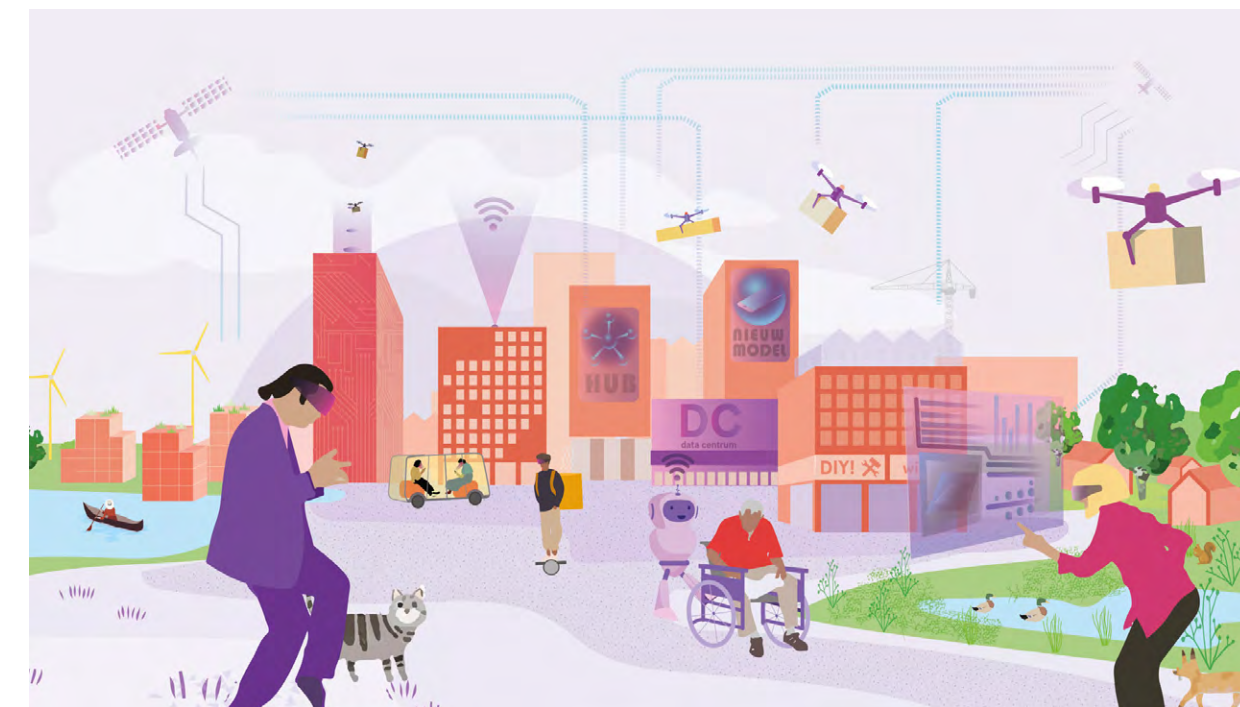
Regionaal Geworteld



Groen Land



Snelle Wereld



Value-based Spatial Planning: Ruimtelijke Verkenning 2023

Mondiaal Ondernemend



- market-driven development;
- individualism, hedonism & material wealth;
- distancing from nature;
- strong reliance on 'green growth'

Regionaal Geworteld



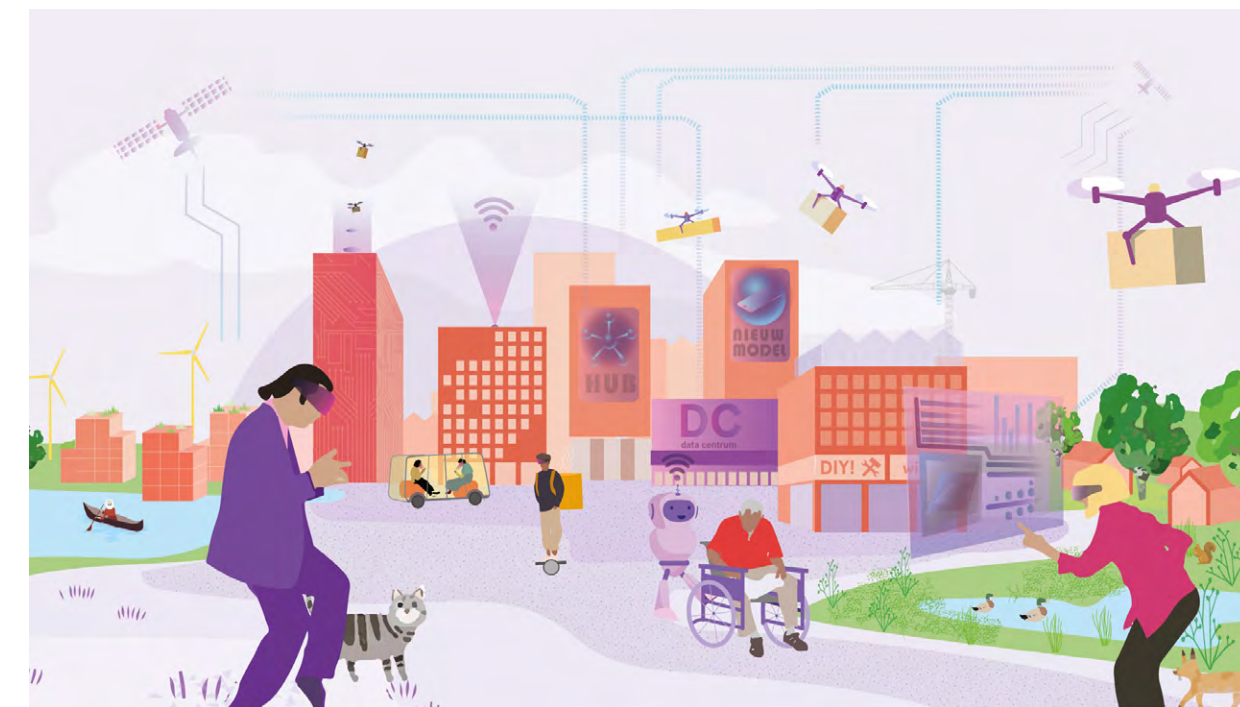
- strongly decentralized spatial development;
- identifying with the community;
- regional self-sufficiency;
- regional spatial qualities and small-scale agriculture

Groen Land



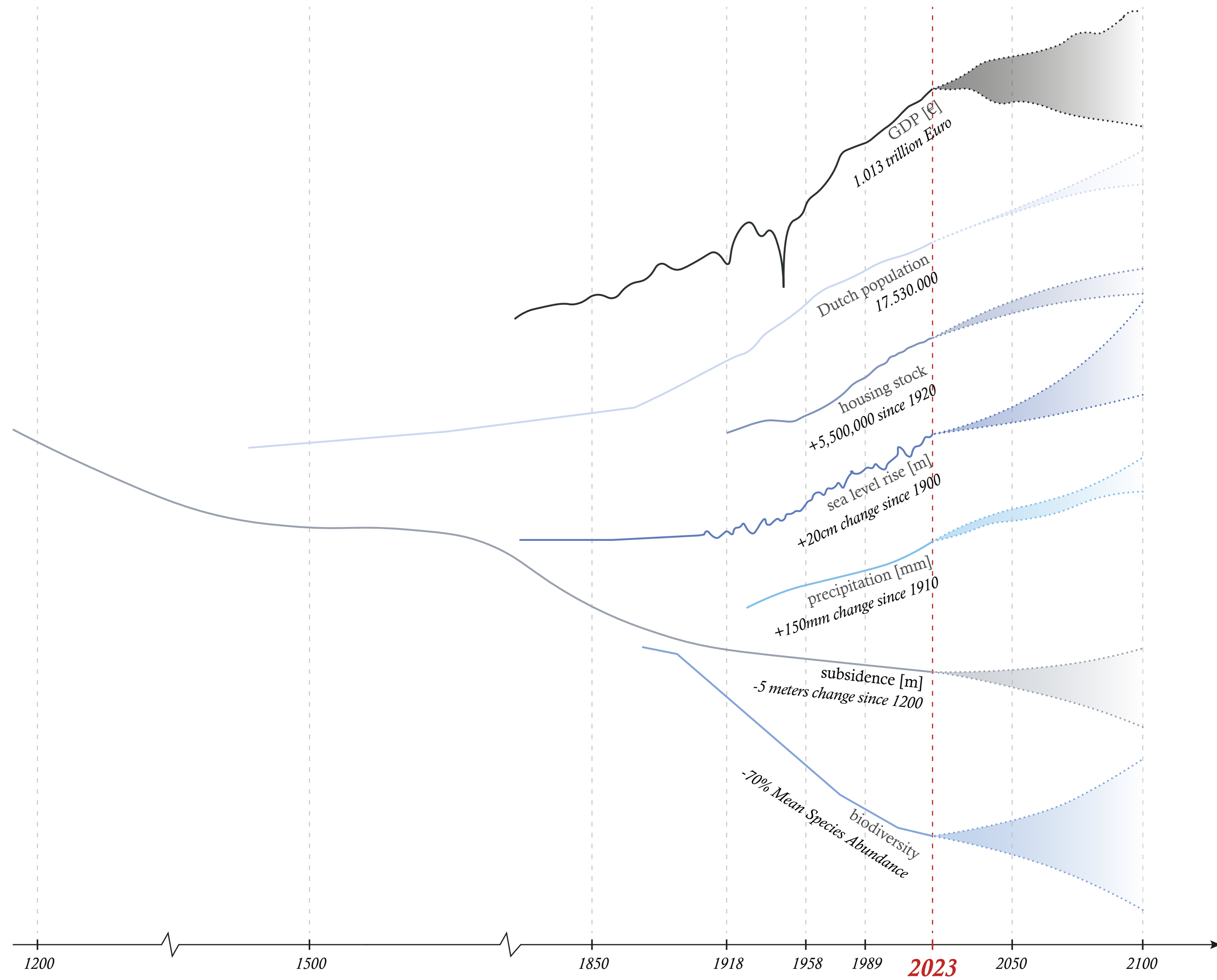
- strongly centralized spatial development;
- identifying with nature and the 'collective';
- emphasis on nature-based sustainable development;
- restricted consumer freedom & income redistribution

Snelle Wereld

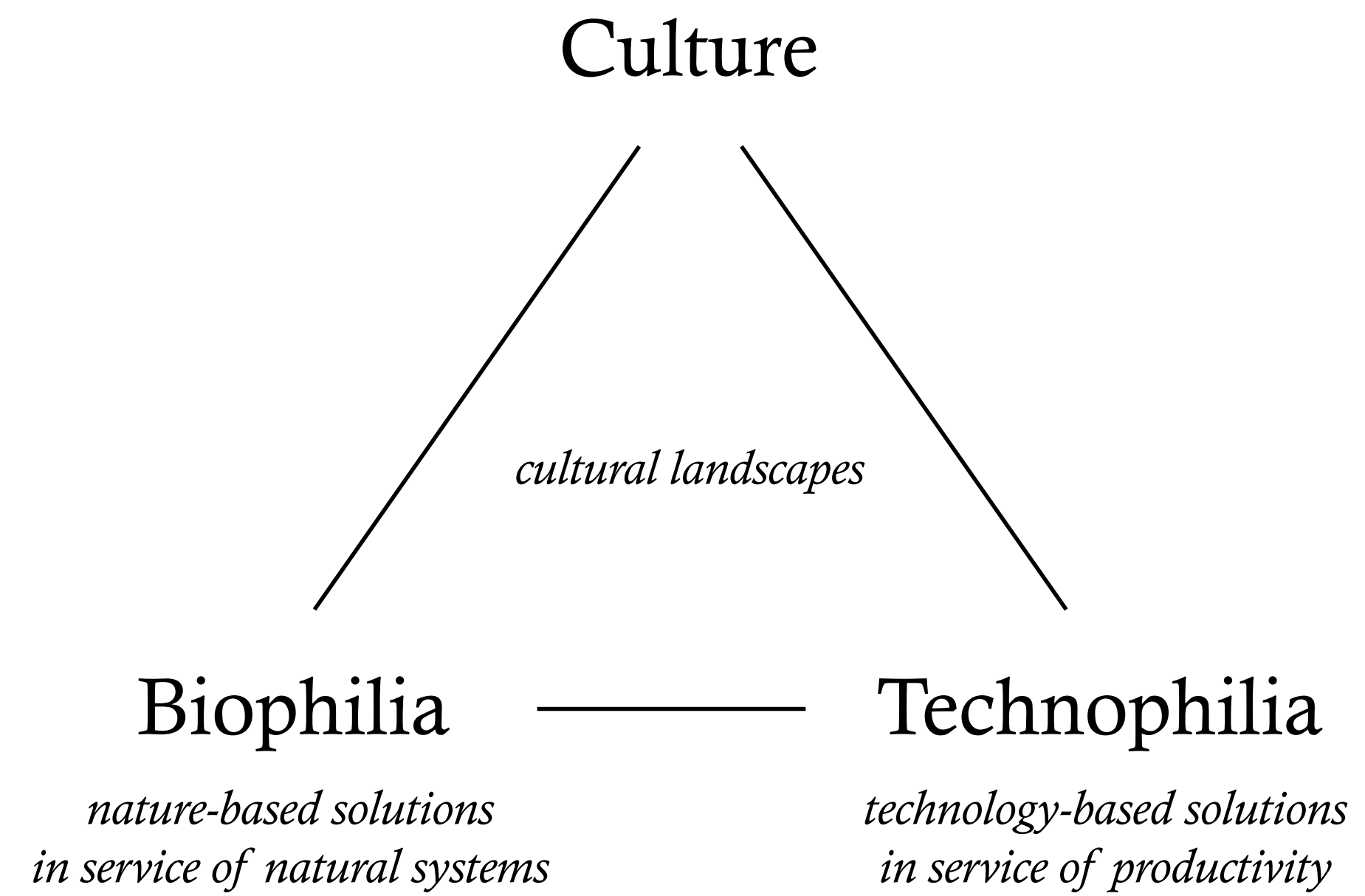


- strong reliance on technology-based sustainable development;
- digital space becomes more important than physical space;
- material property becomes less important

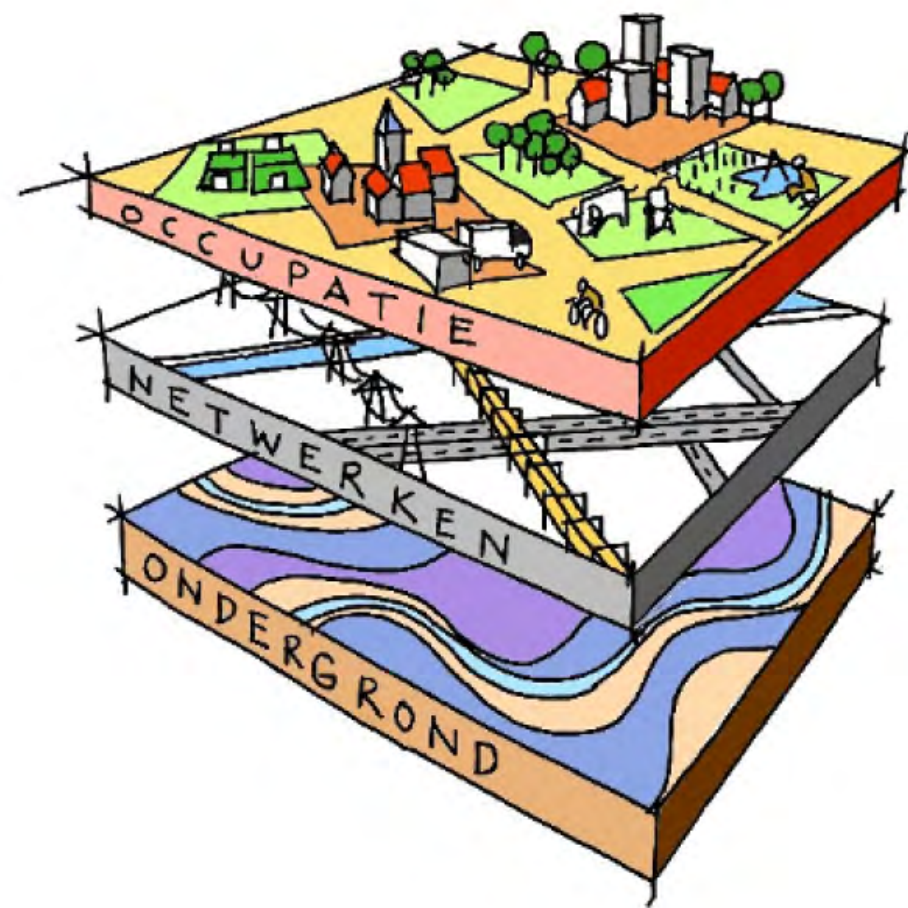
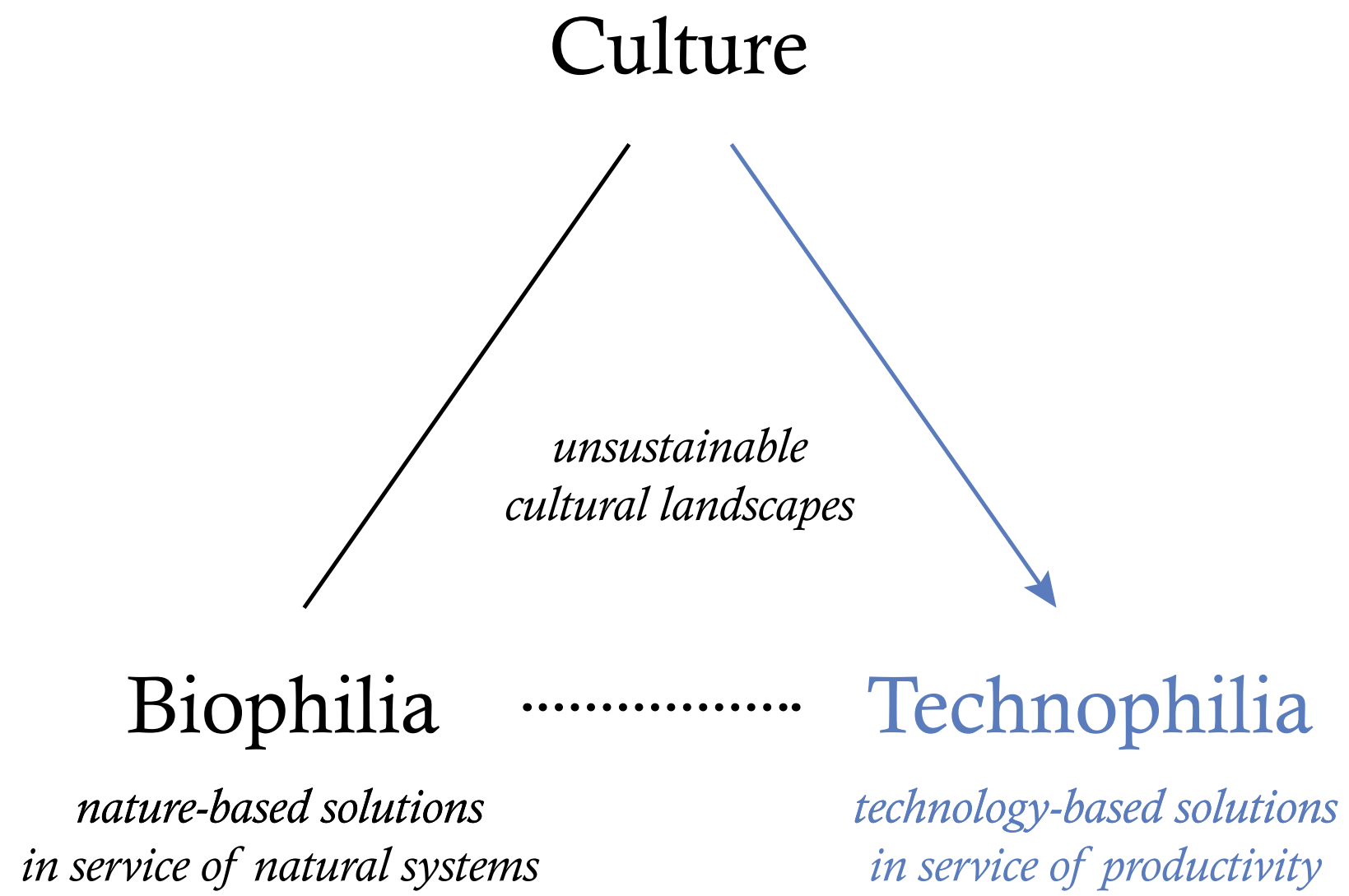
Uncertain Future: Need for Adaptivity



Biophilic-Technophilic Balance

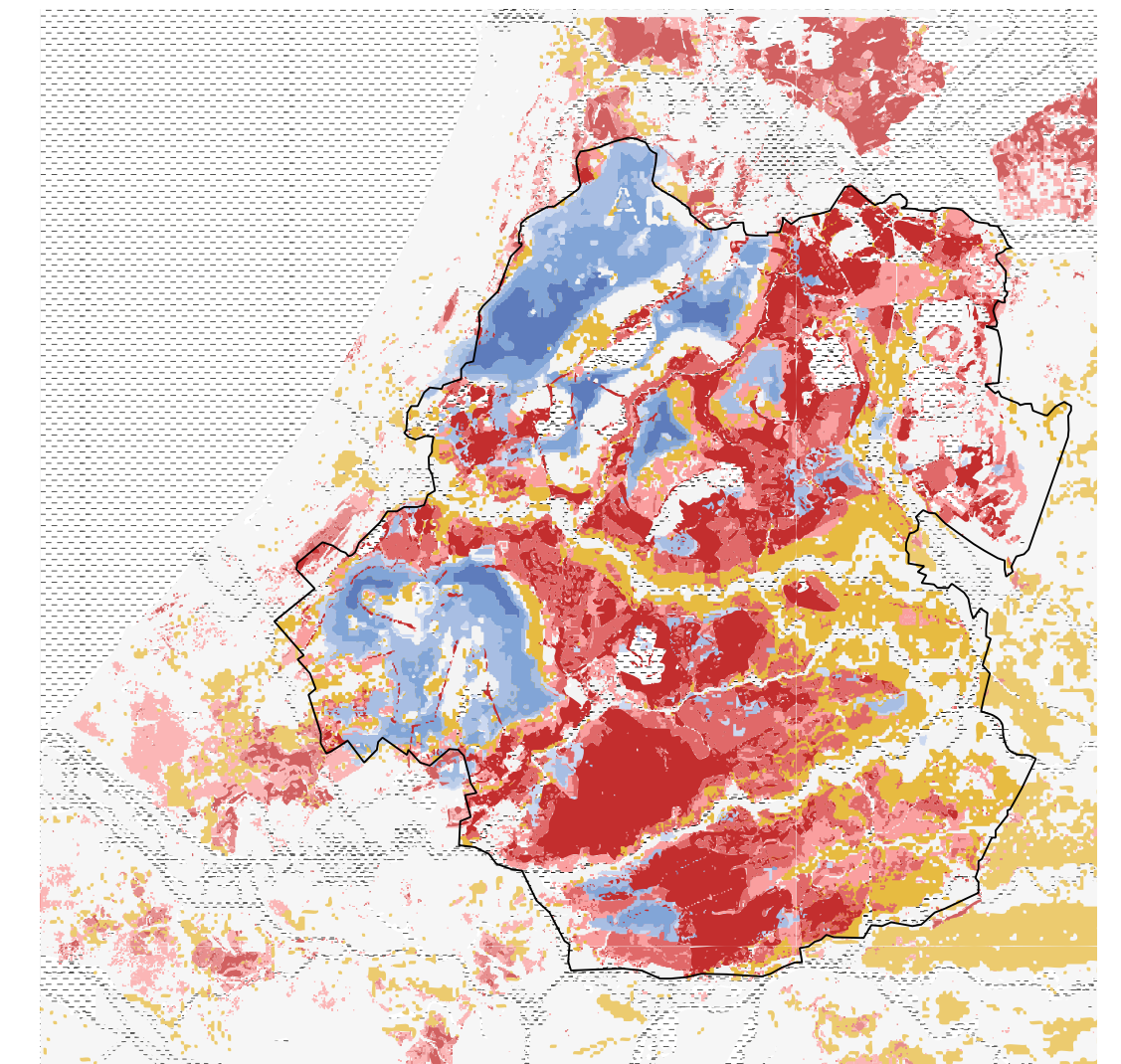


Biophilic-Technophilic Balance



From Deltares, 2021

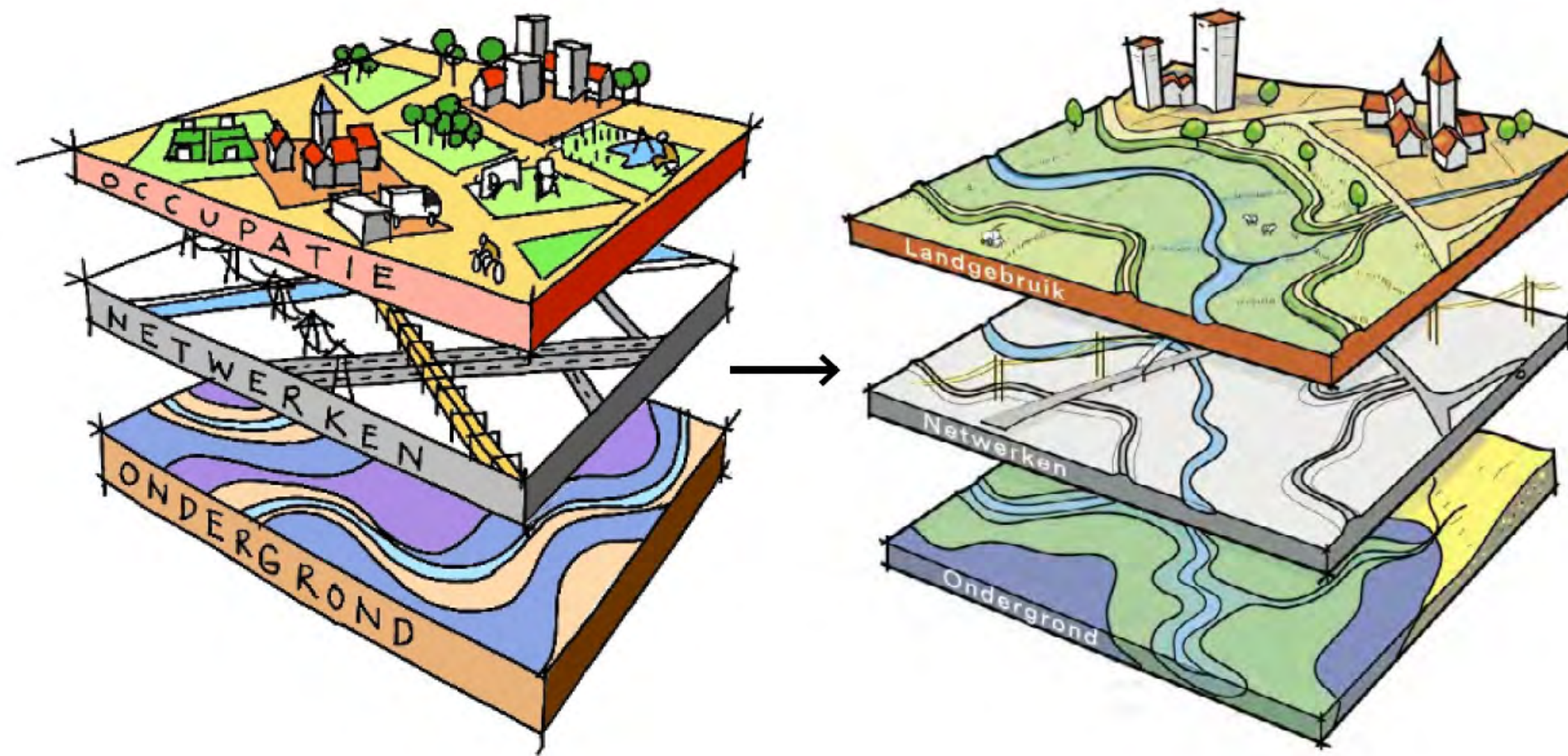
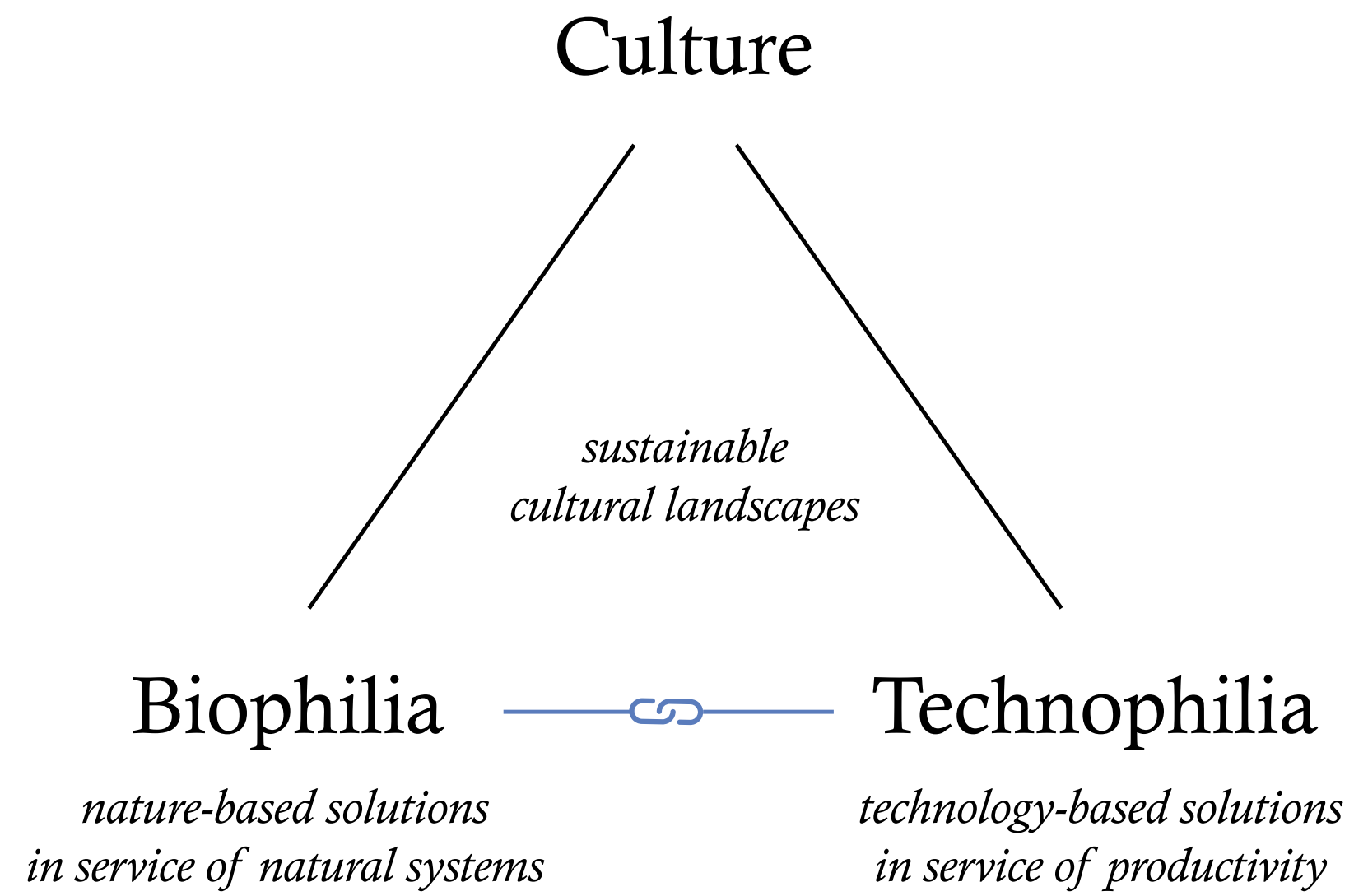
- *intensive agricultural industries*
- *strongly manipulated water level*
- *negligence of subsoil*



Issues relating to soil

- Subsidence +10 cm to +60 cm
- Drought
- Salinization +20% to +100%
- Water
- Green Heart border in 1958

0 5 10 km N



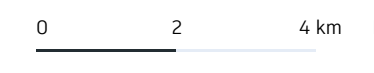
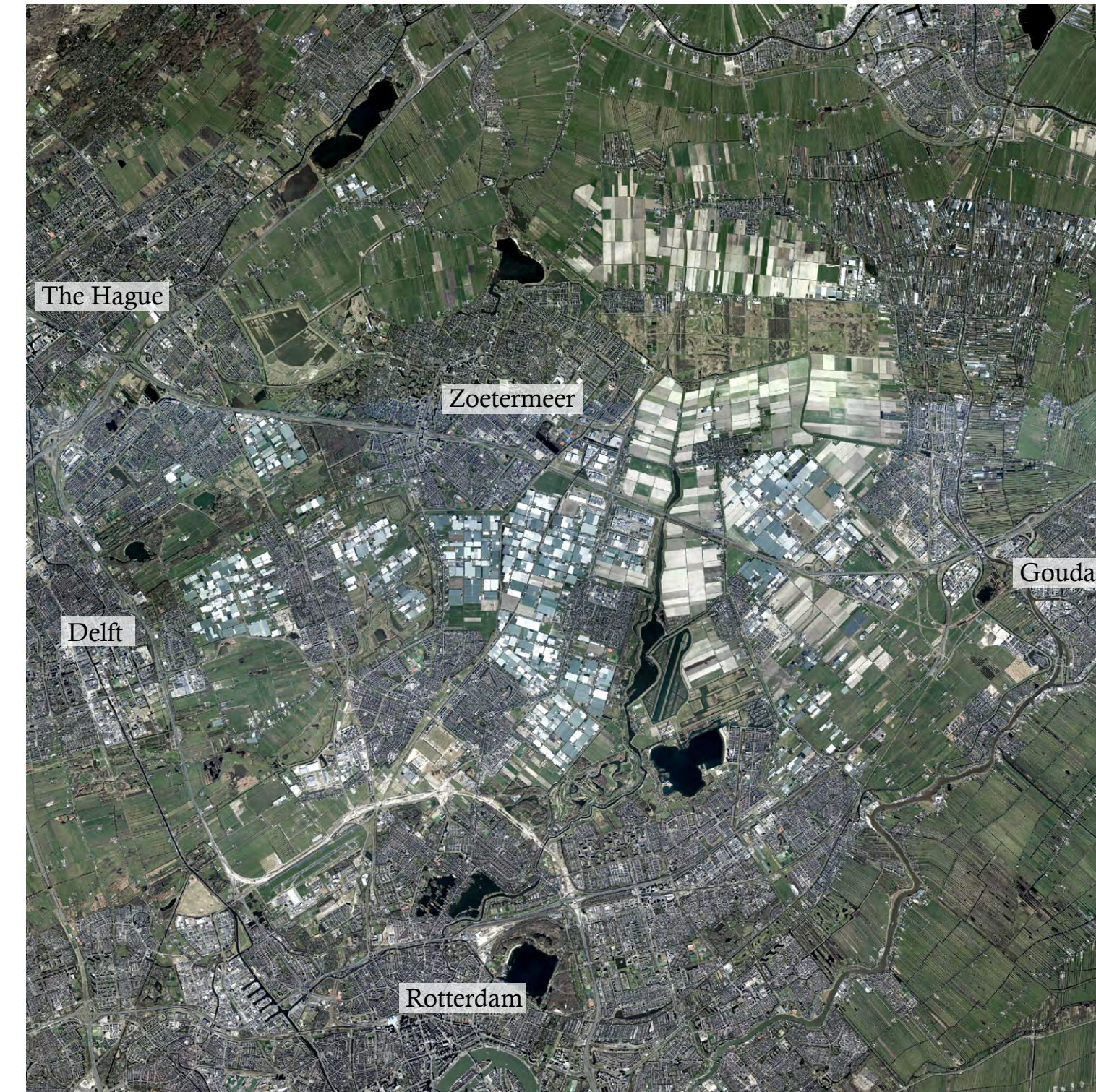
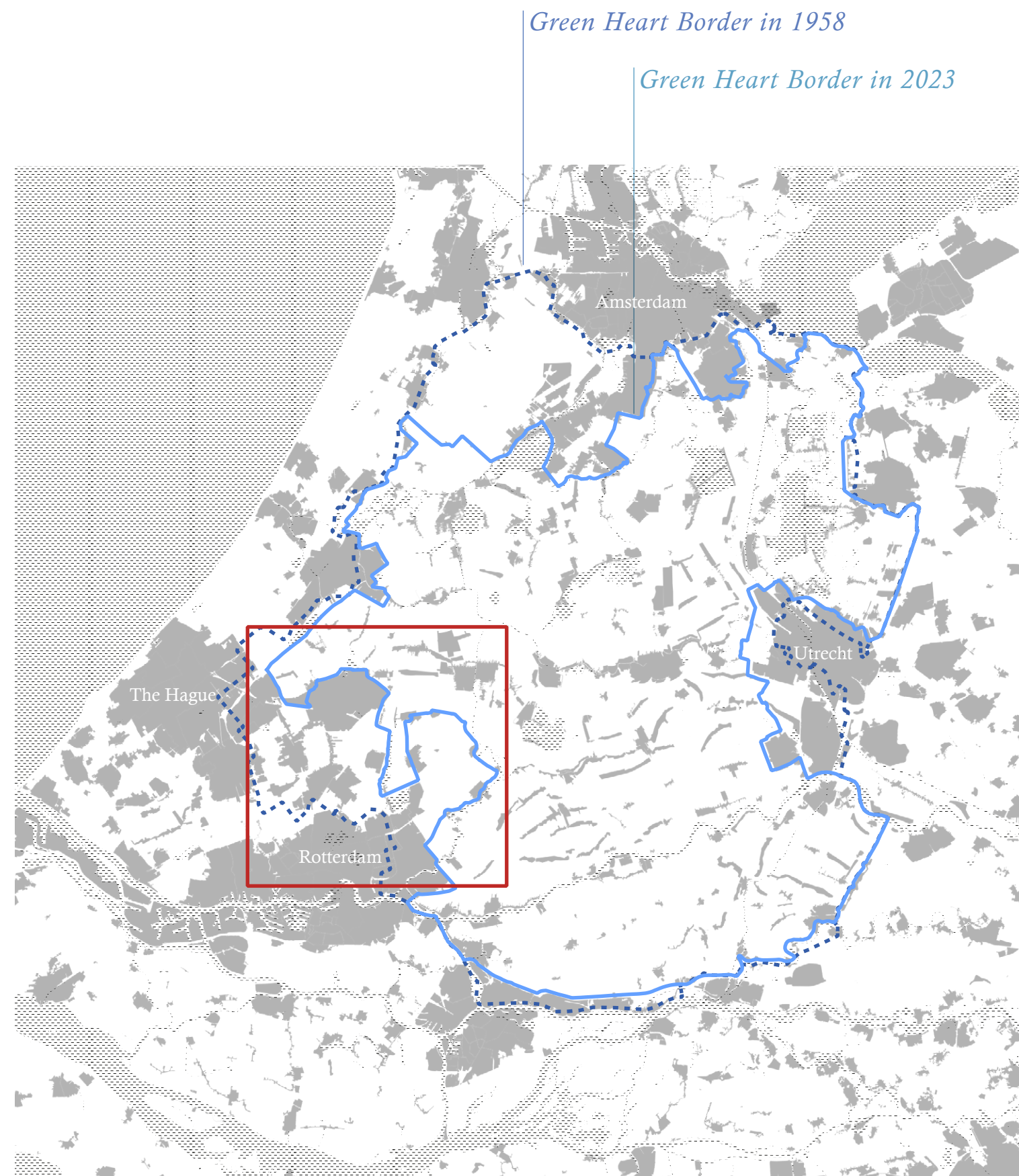
- *nature-inclusive agriculture*
- *raised water level*
- *regenerating subsoil*

From Deltares, 2021

Research Question

In the transition towards a sustainable Deltametropolis, how can an adaptive design enhance spatial qualities in the peri-urban interface through biophilic and technophilic developments?

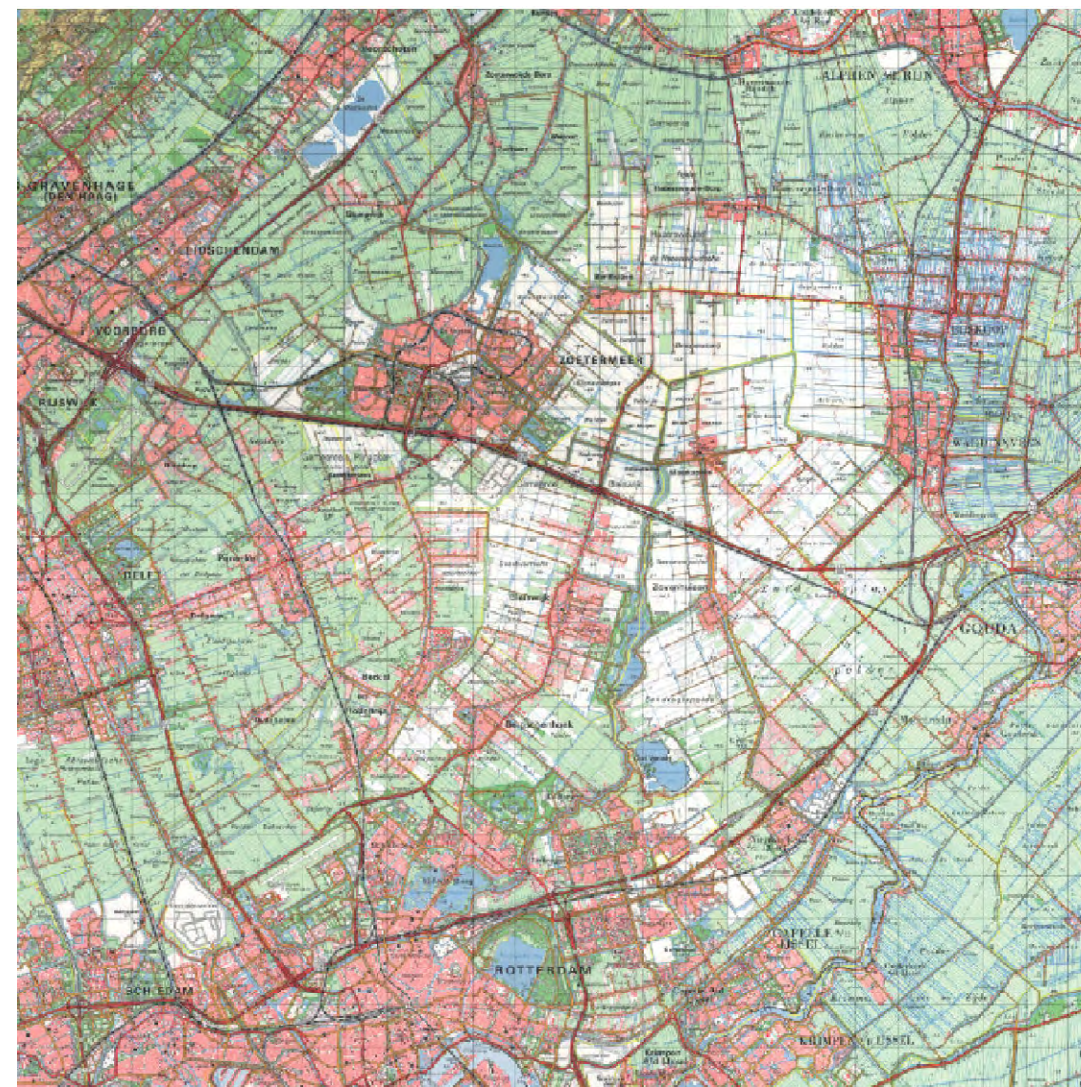
Design Region



Peri-Urban Morphogenesis



1958



1989



2019

Regional Features



Residential development



Infrastructure



Business Parks



Greenhouse Horticulture



Agricultural plots



Peat Meadows

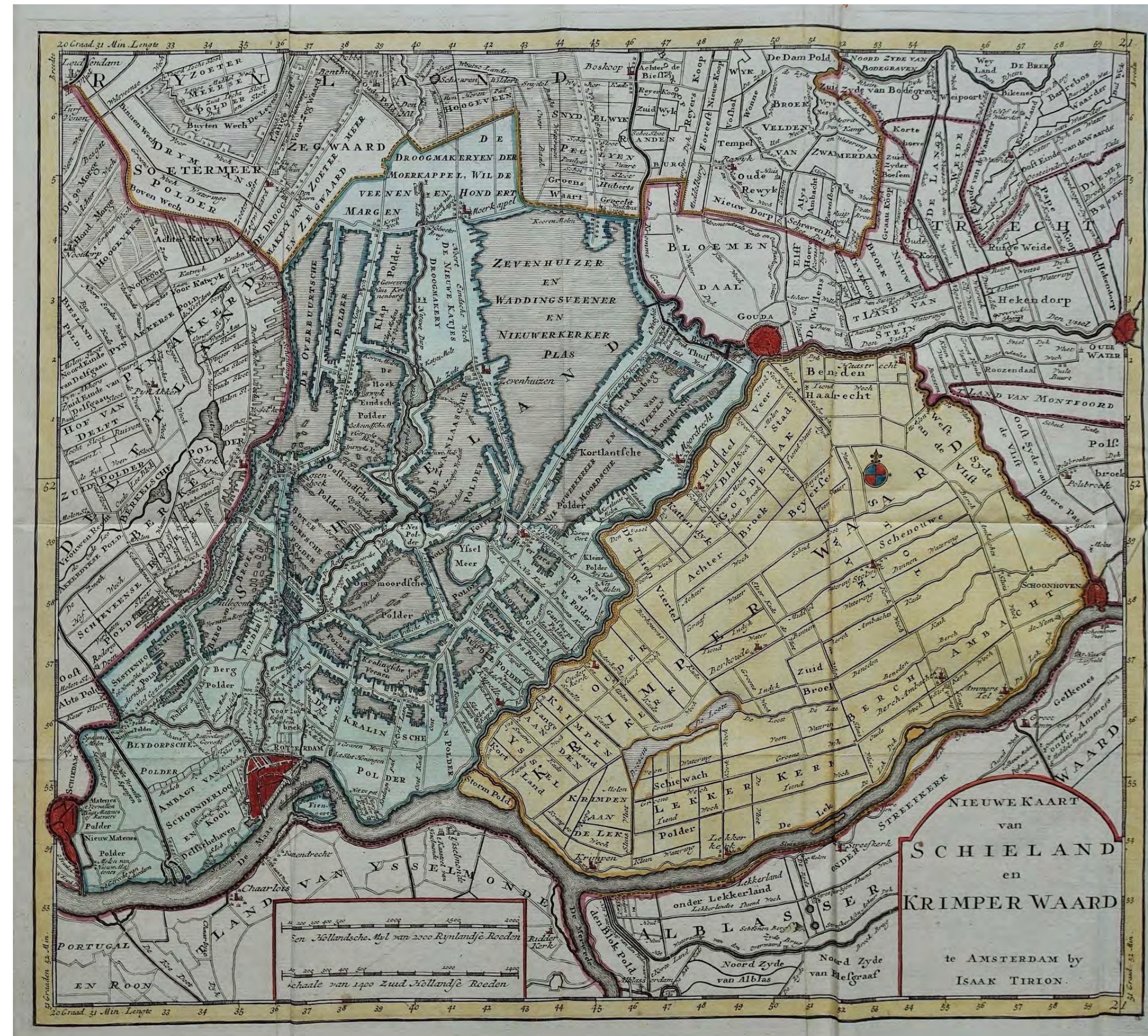
Patchwork Landscape



0 2 4 km N

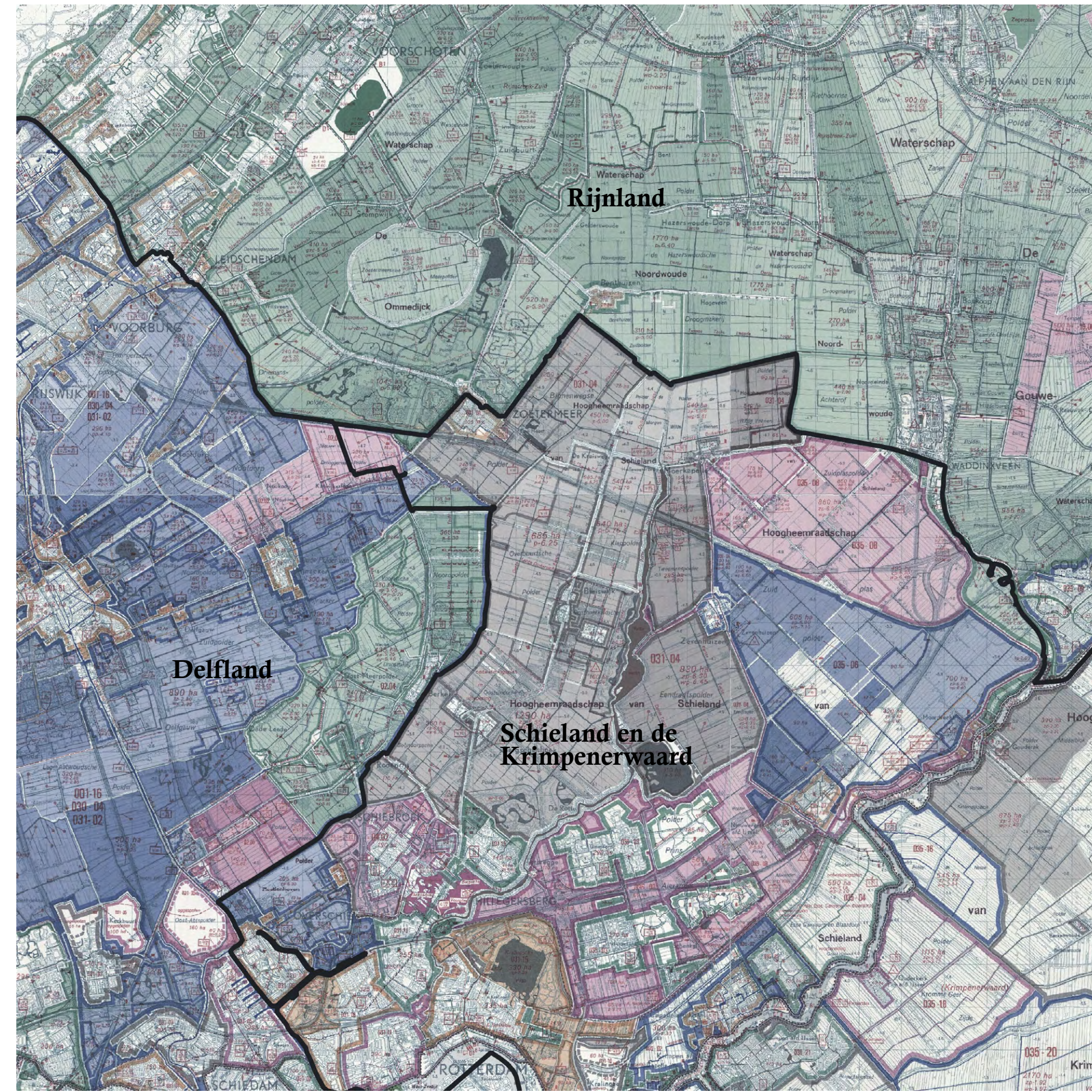


Underlying Polder Landscape

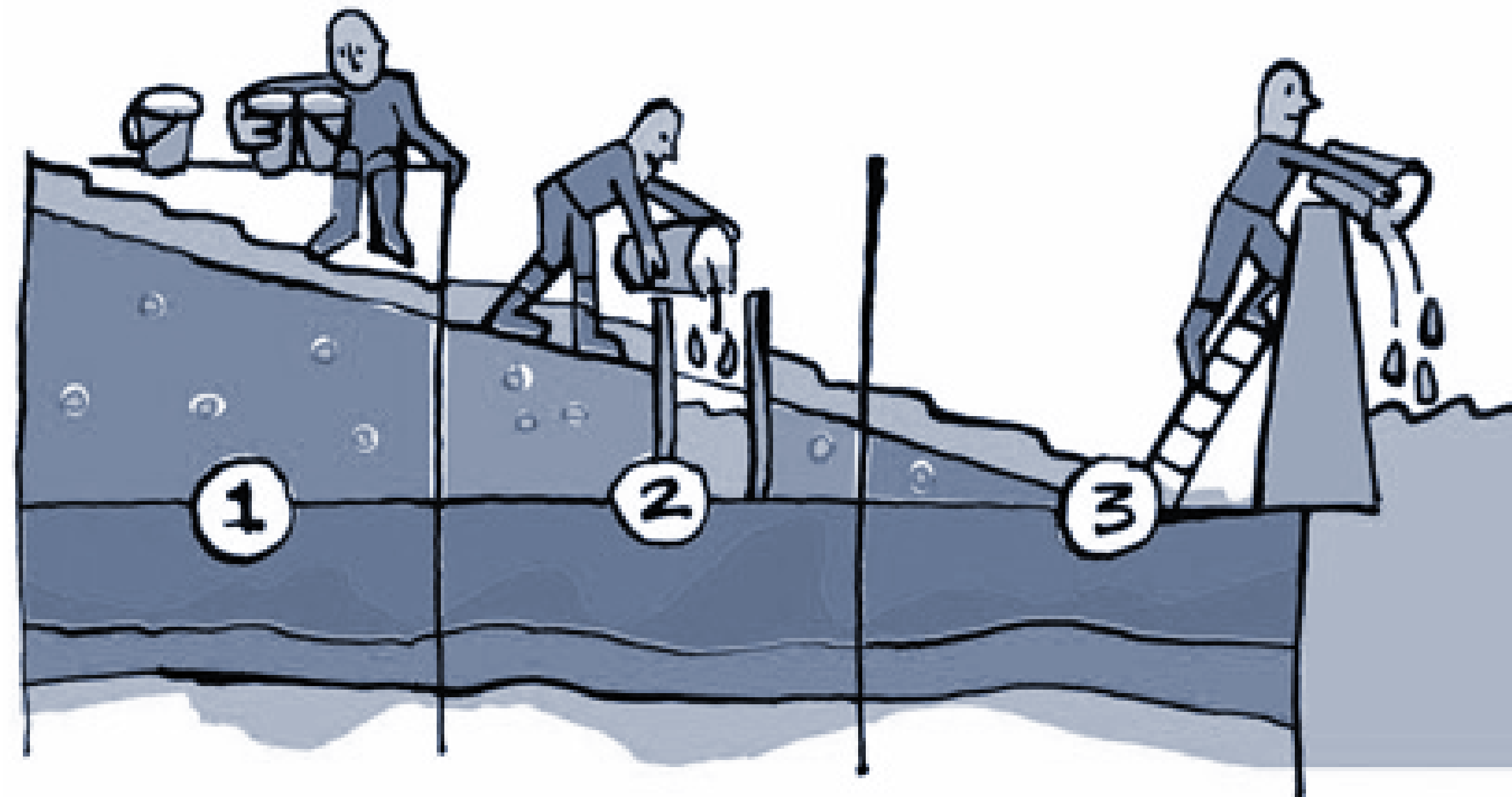


Structural map of Schieland en de Krimpenerwaard, by Isaaq Tirion, 1753

Water Boards



Water Trinity



1. Retain

2. Store

3. Drain

From Commissie Waterbeheer (2000)



Gouda

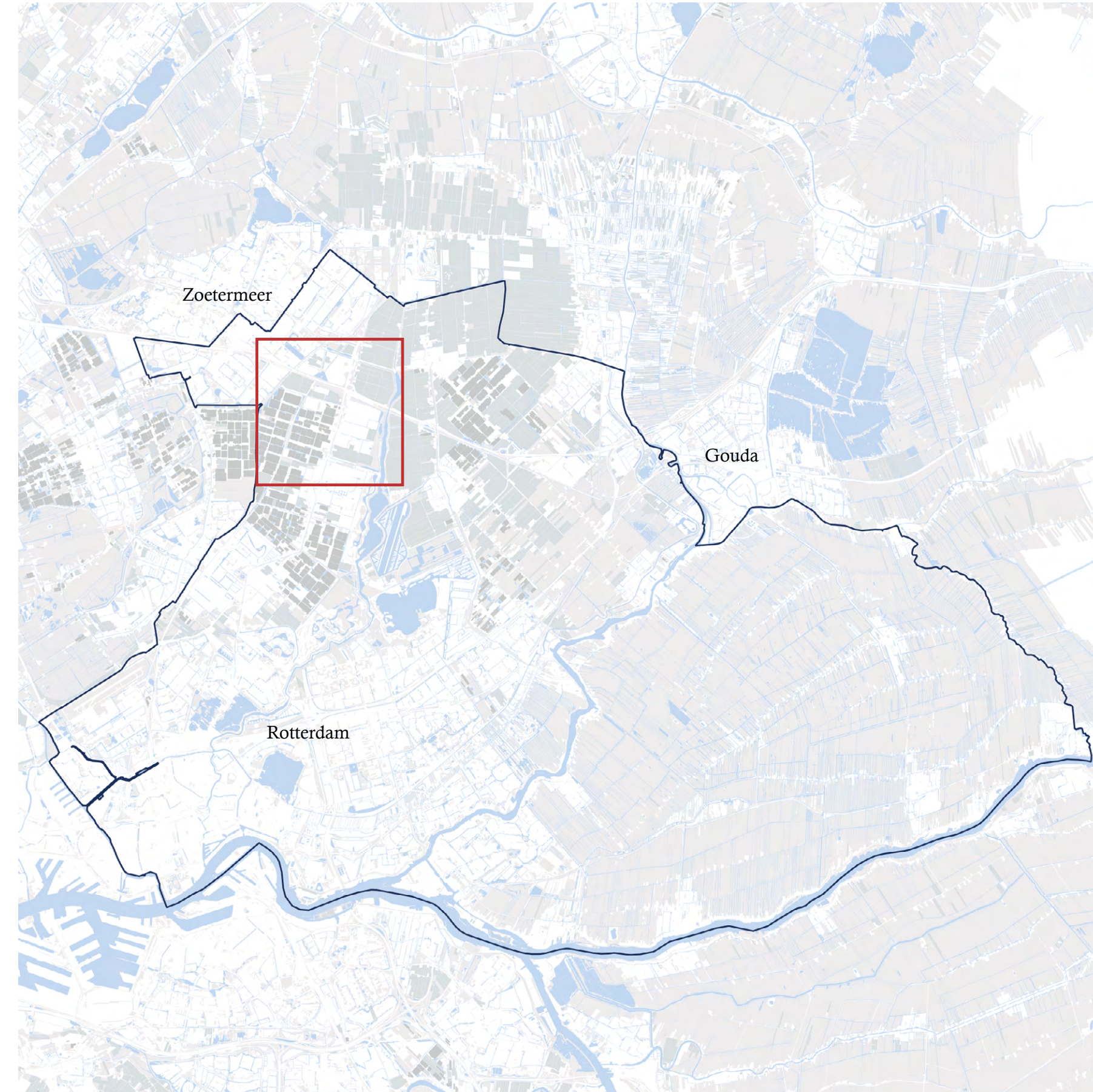
Zoetermeer

Rotterdam

Design Locations - Intensive Horticulture



Bleiswijkse Polder



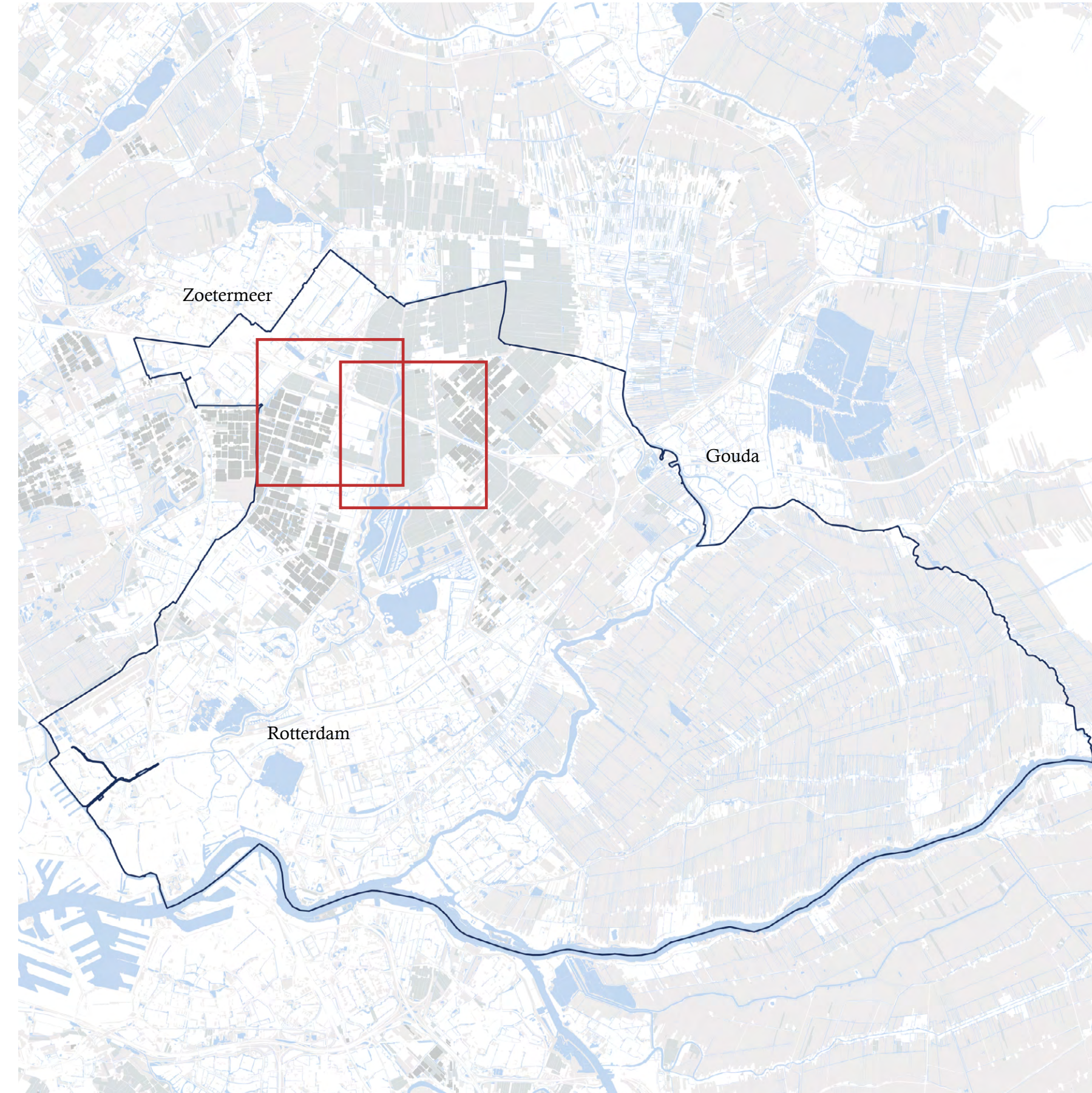
Design Locations - Intensive Agriculture



Bleiswijkse Polder



Tweemanspolder



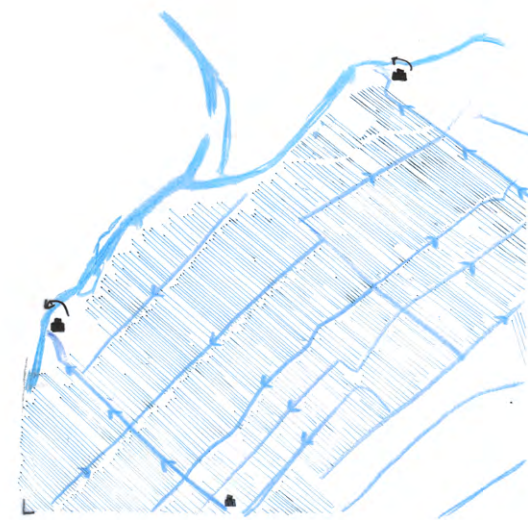
Design Locations - Intensive Dairy Farming



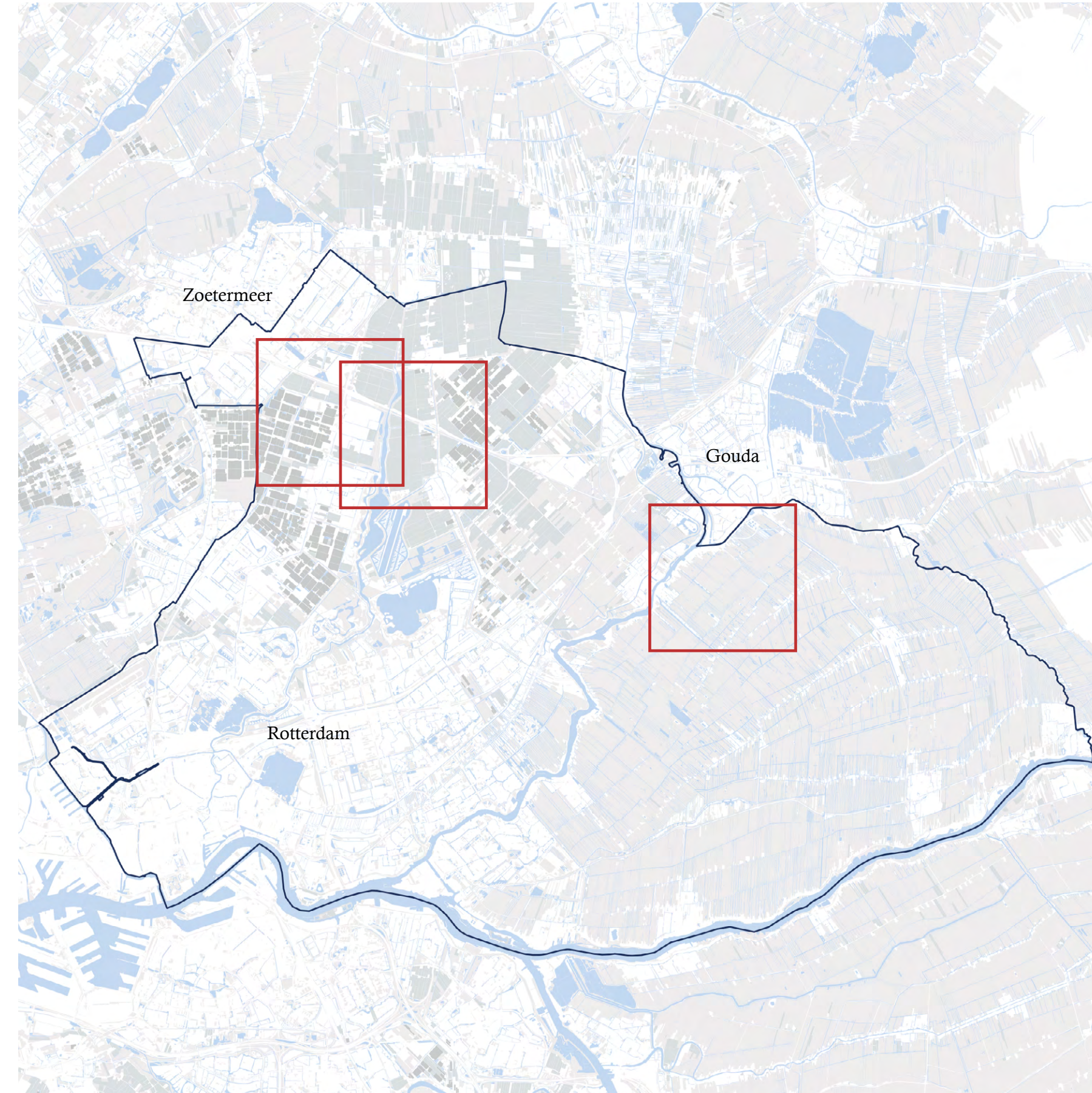
Bleiswijkse Polder



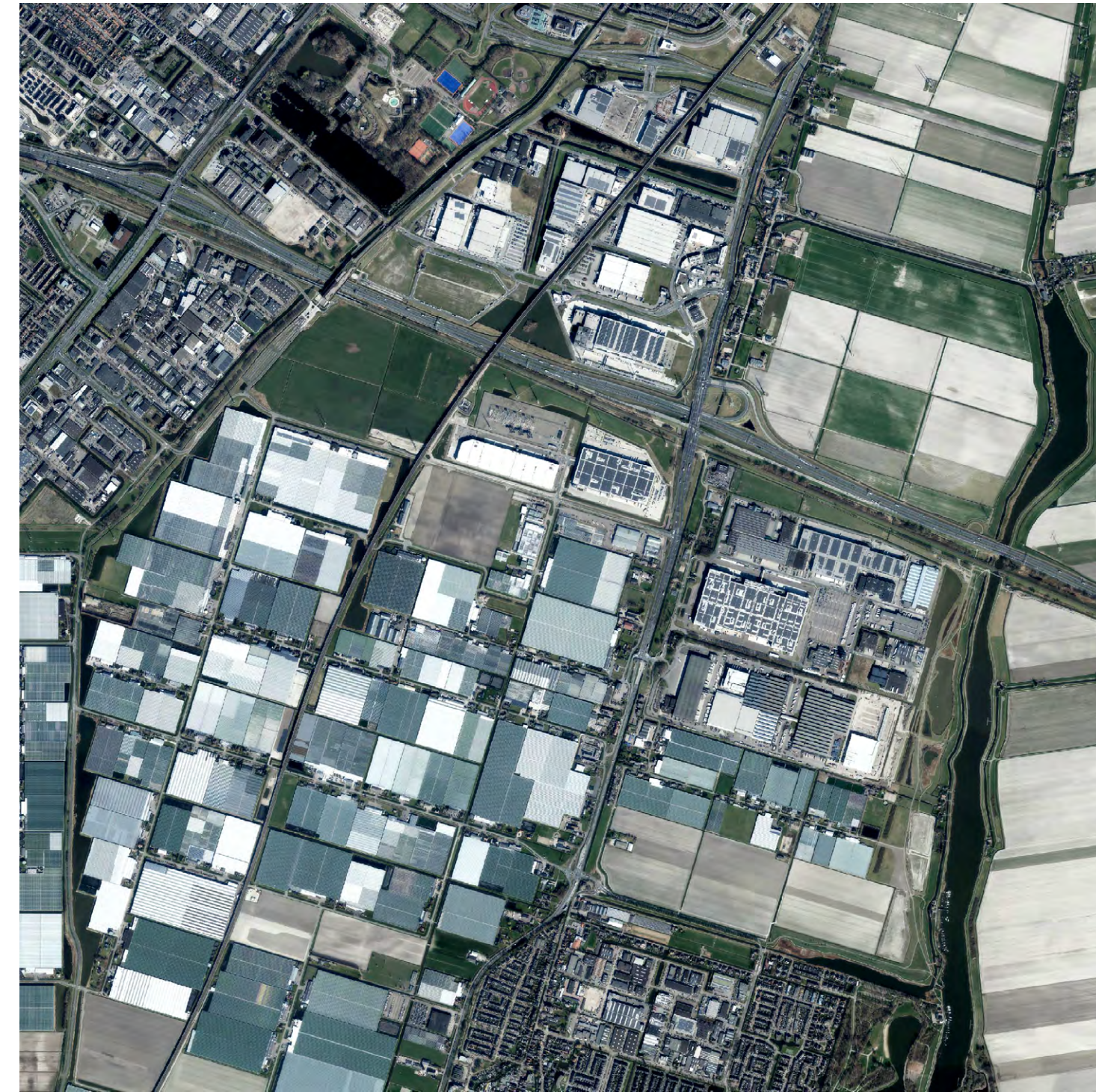
Tweemanspolder



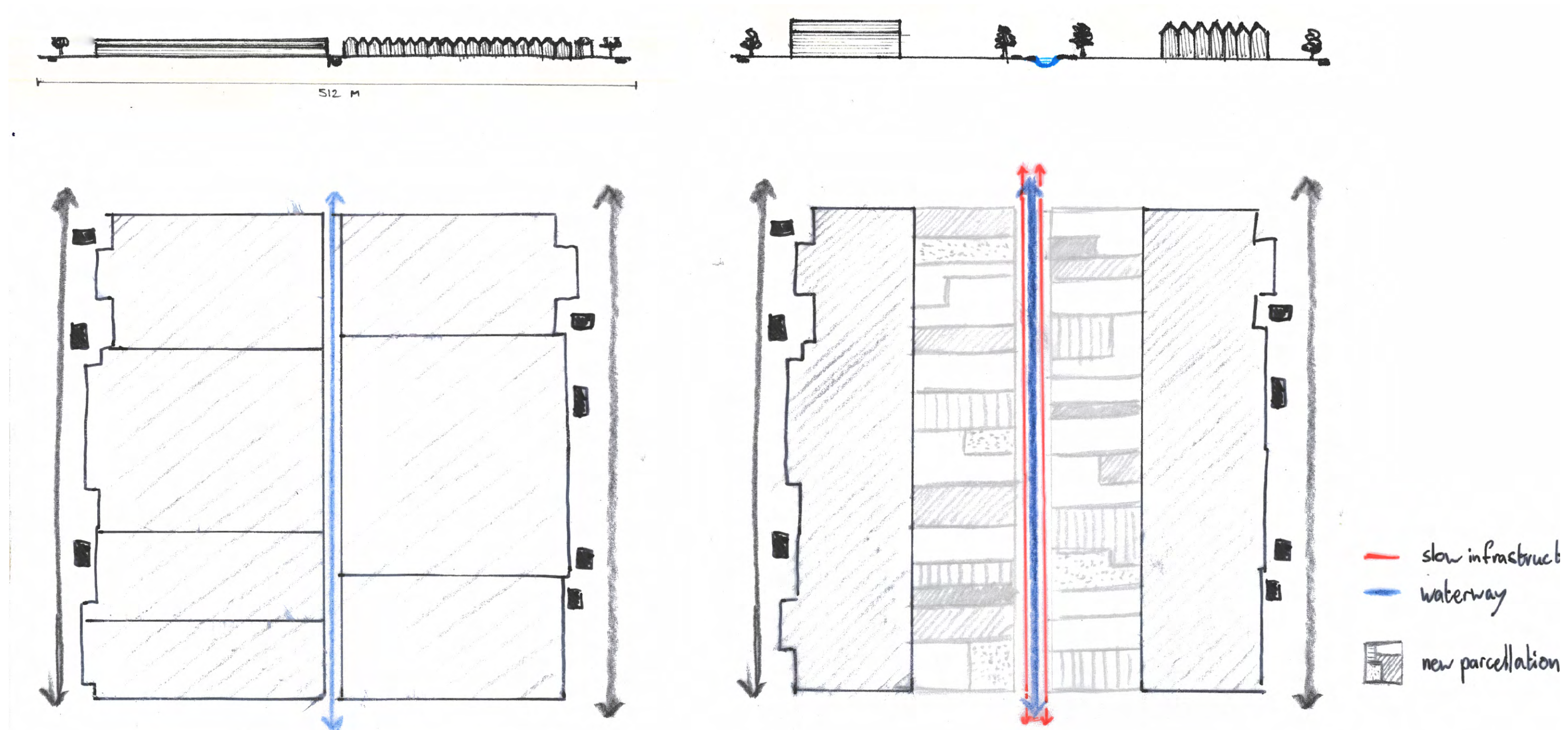
Middelblokpolder



Horticulture



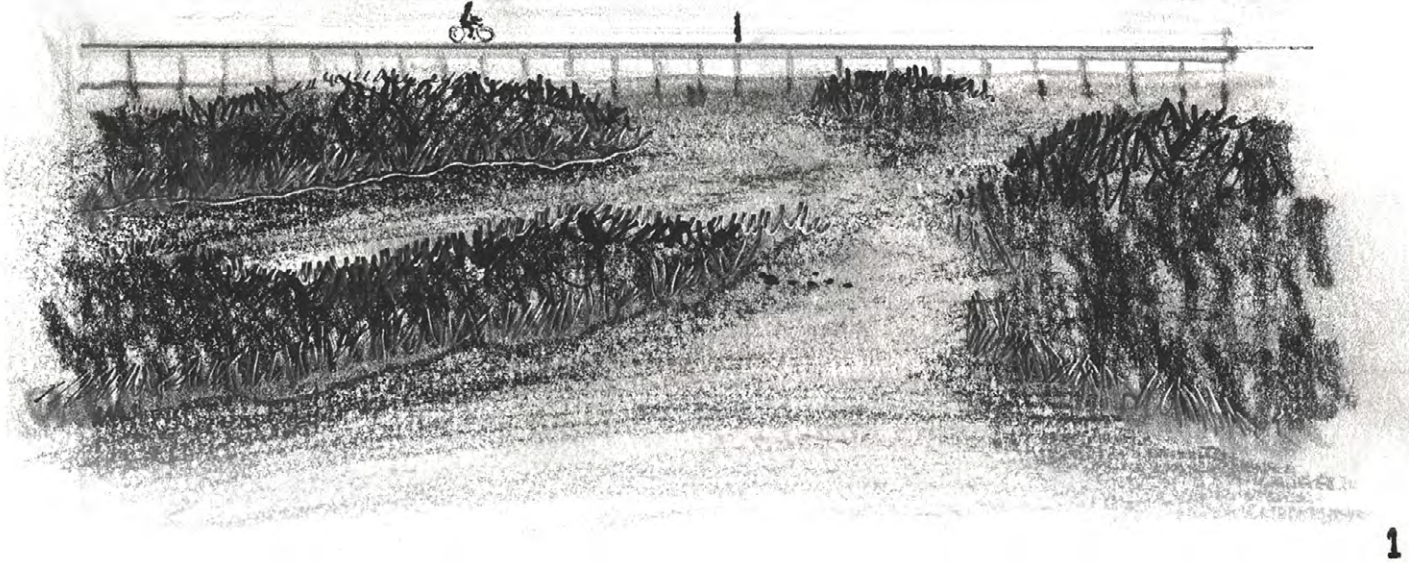
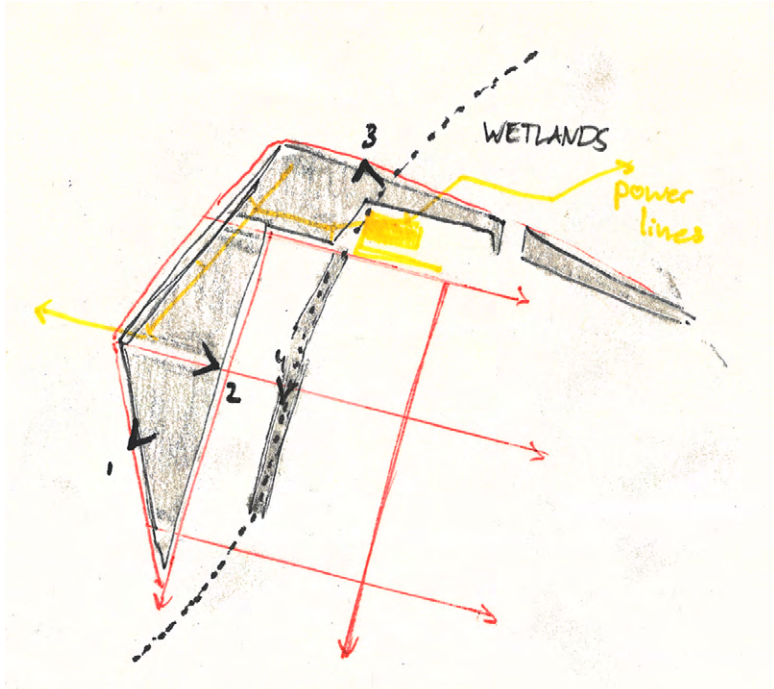
Horticulture - Vertical Greenhouses



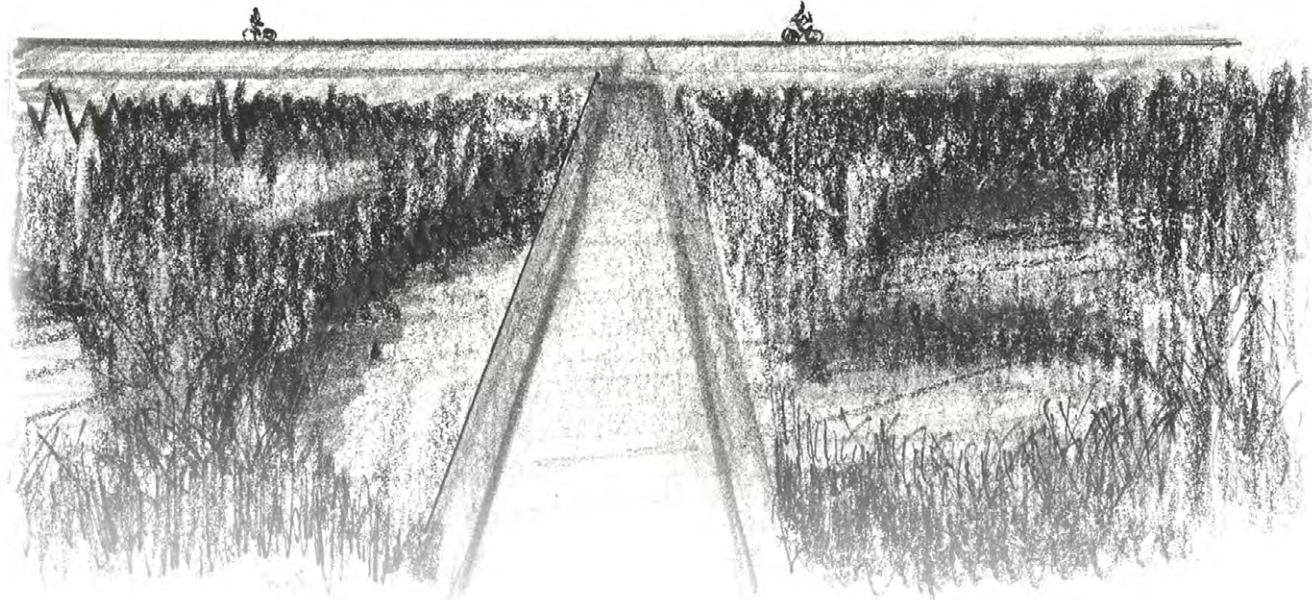
Horticulture - Design



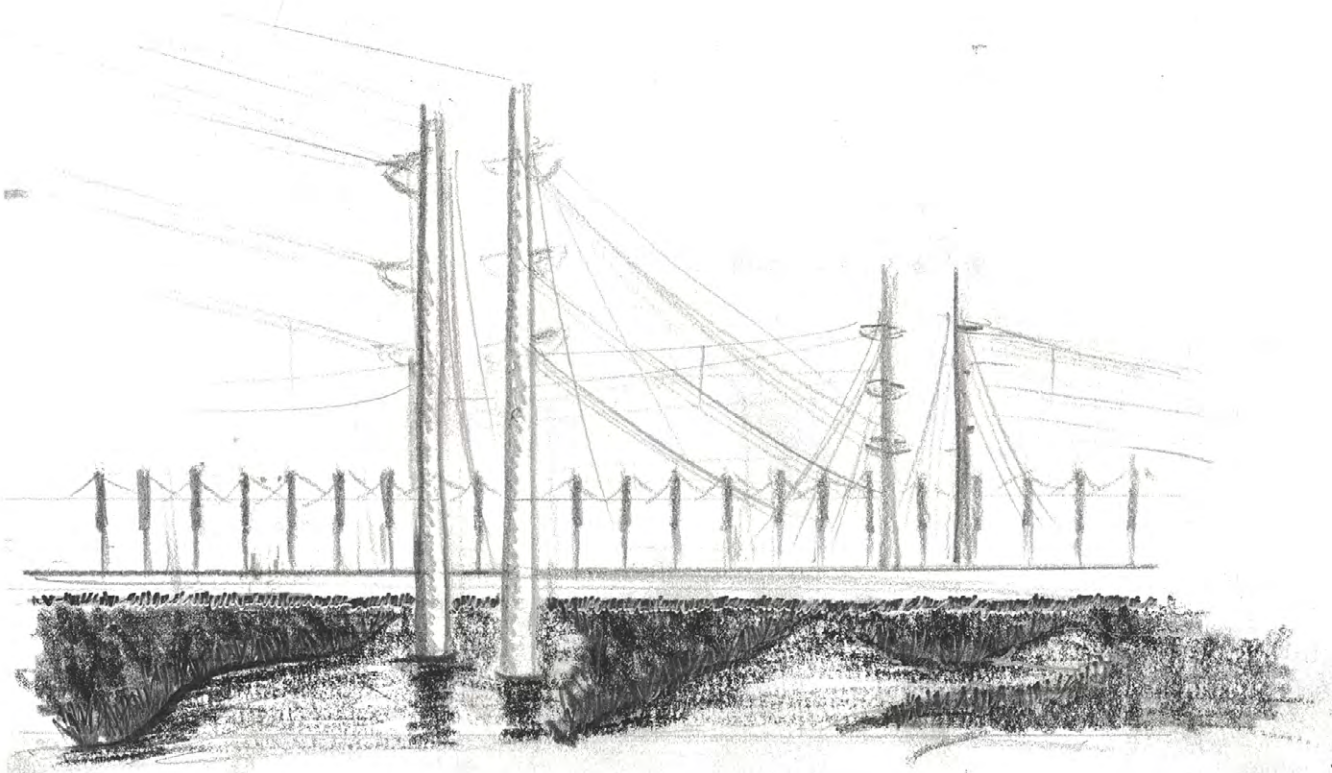
Horticulture - Wetlands



1

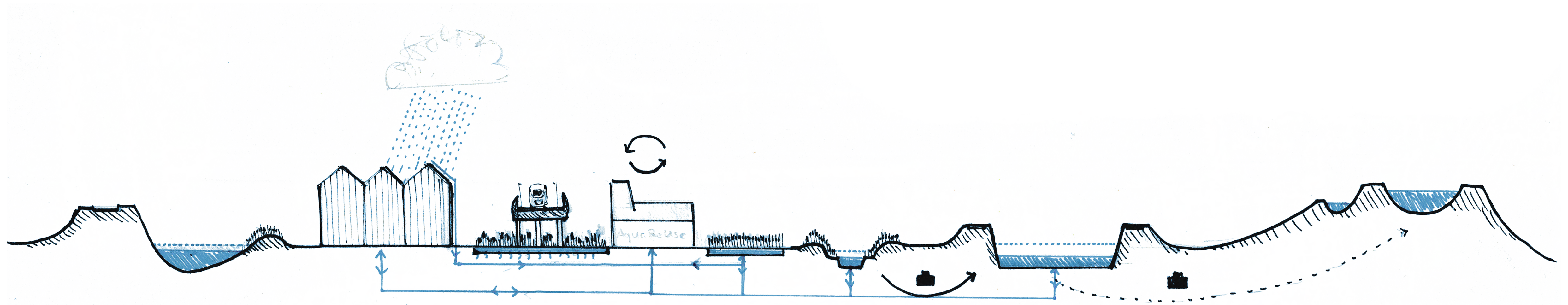
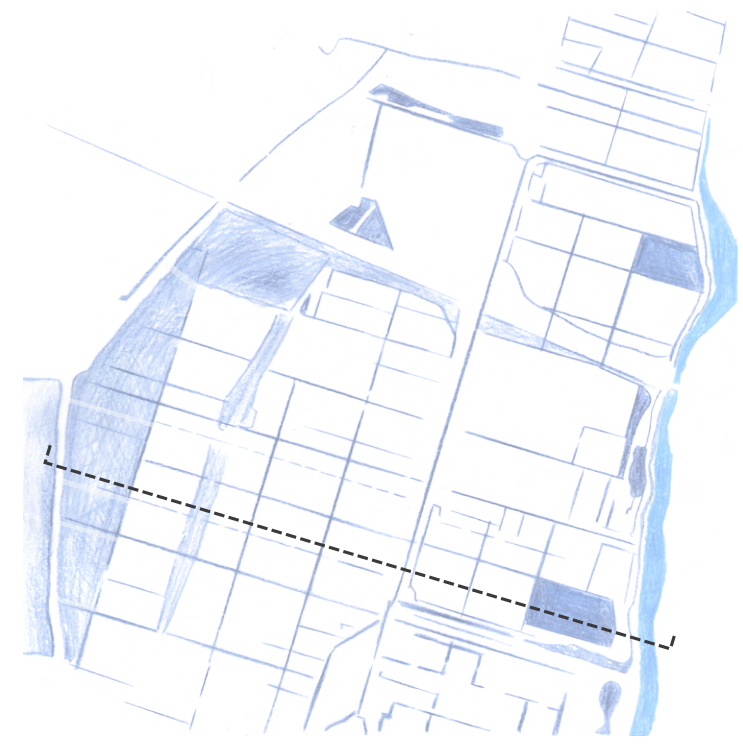


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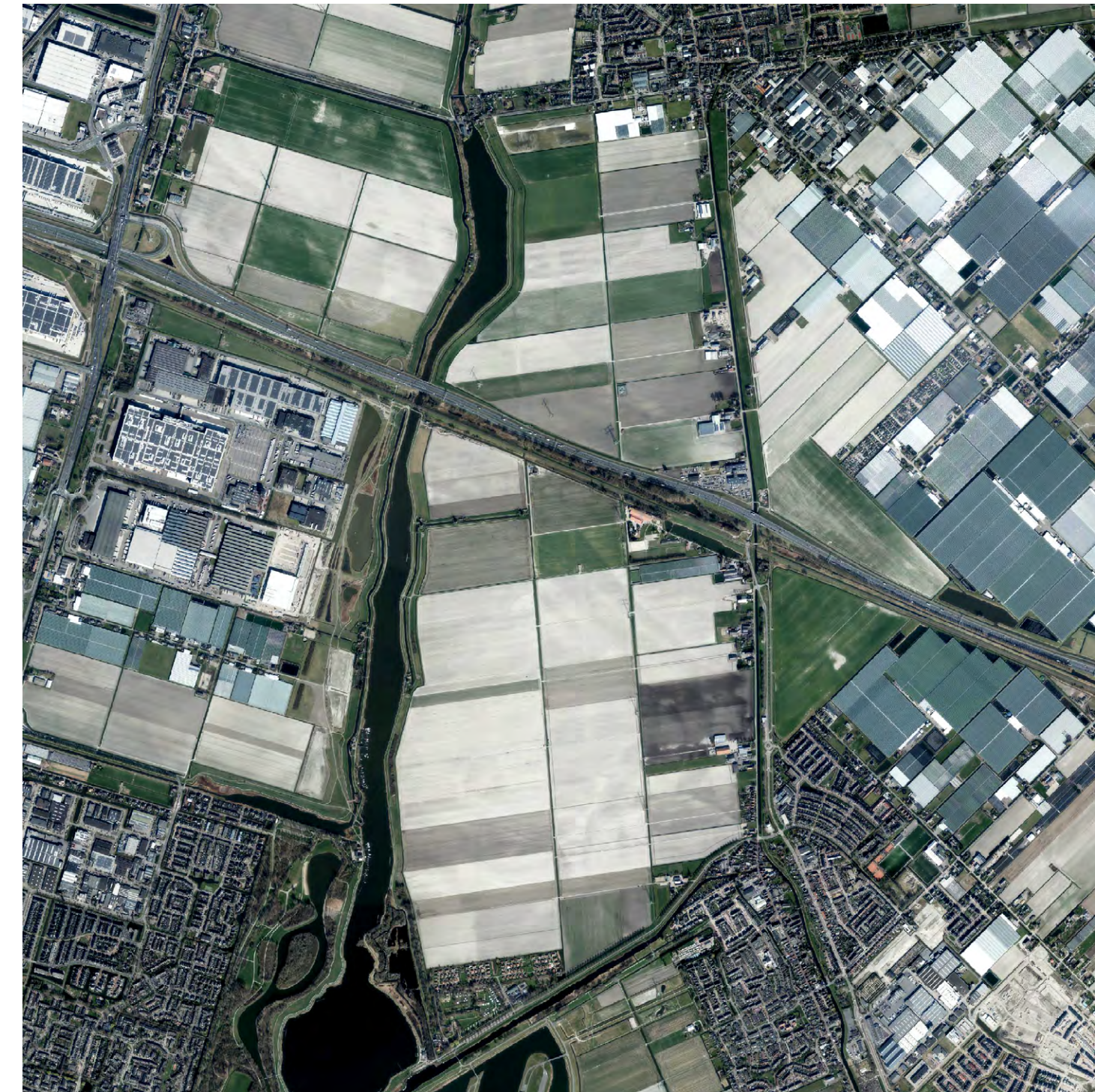


3

Horticulture - Circular Water System



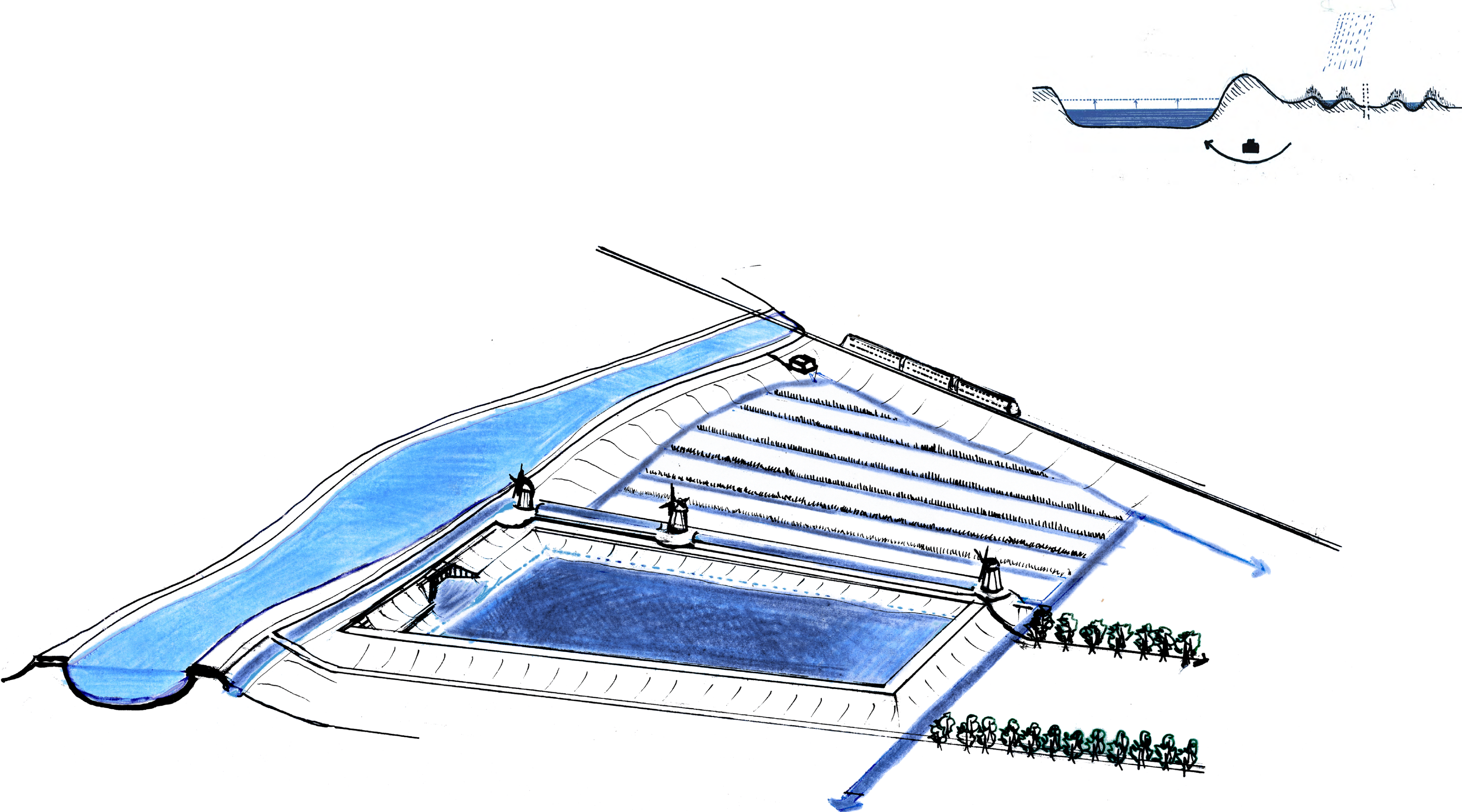
Agriculture

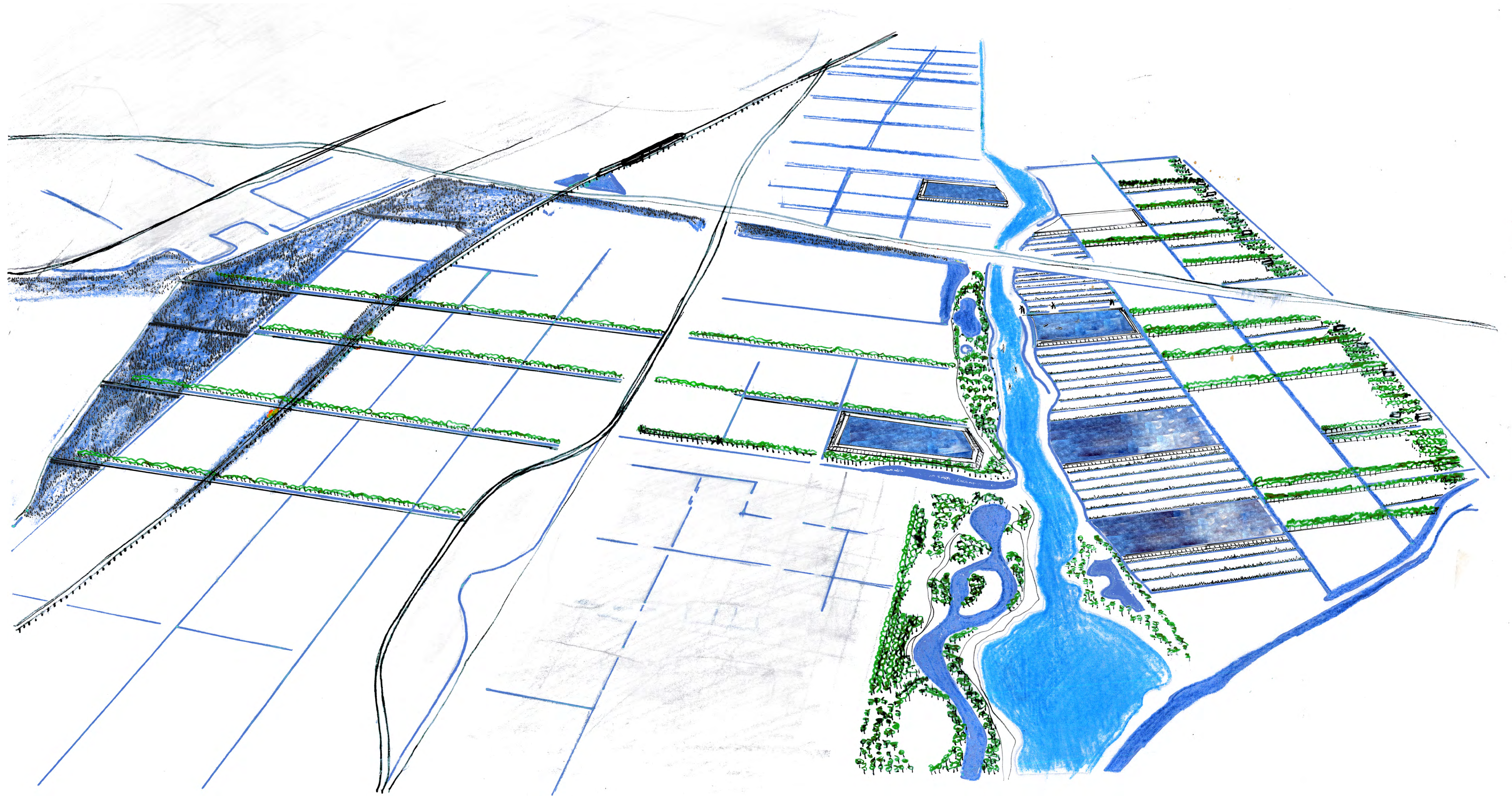


Agriculture - Design

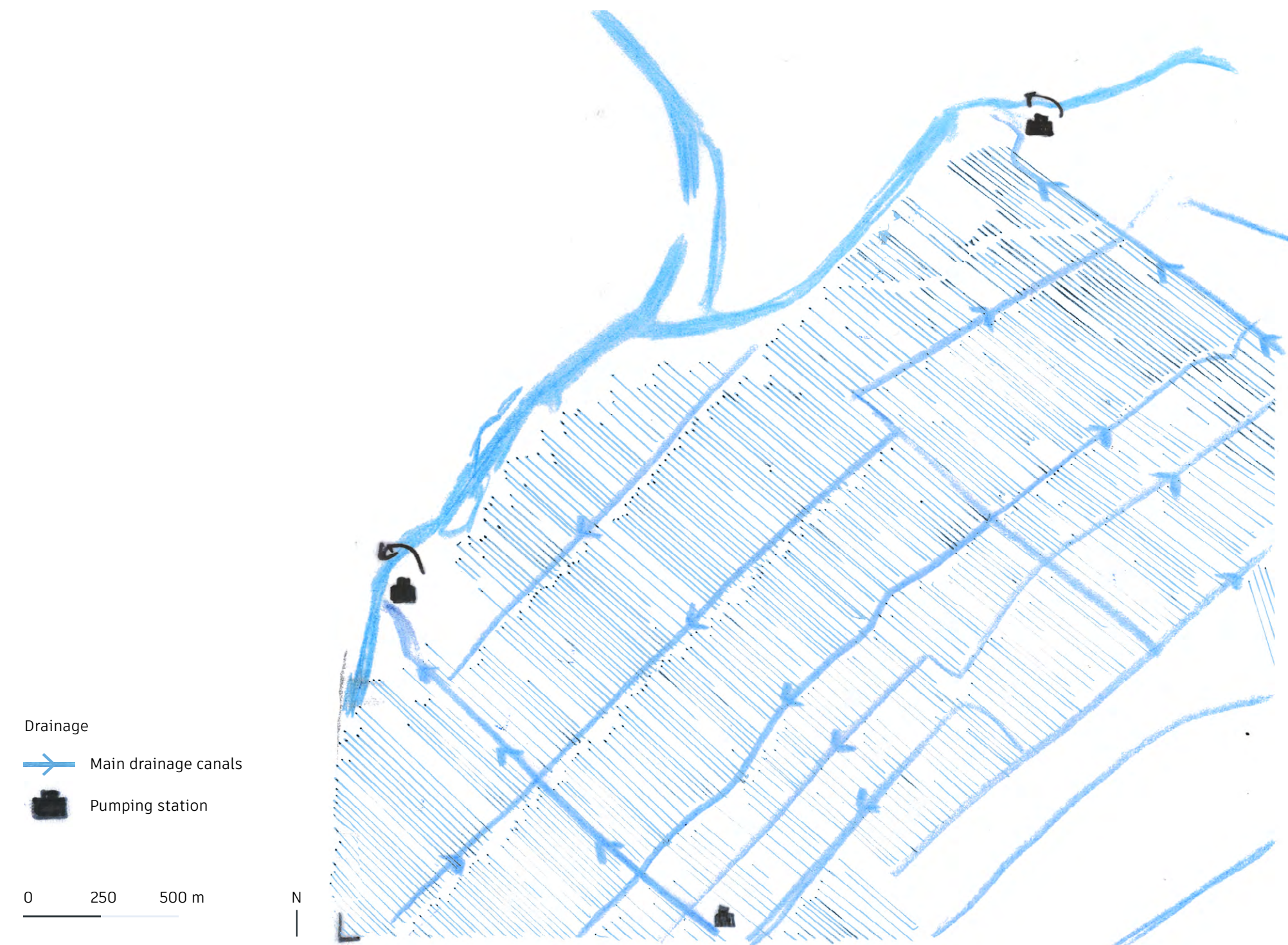


Agriculture - Circular Water System





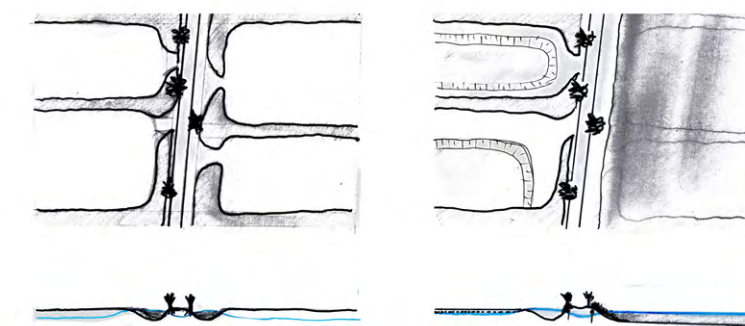
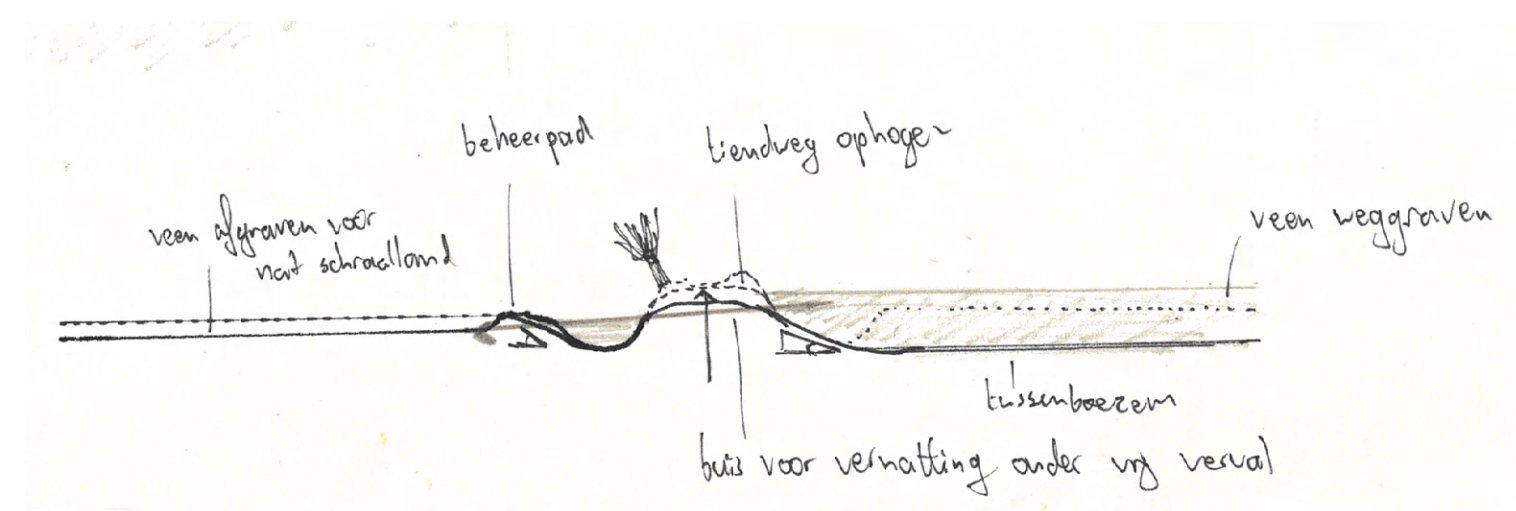
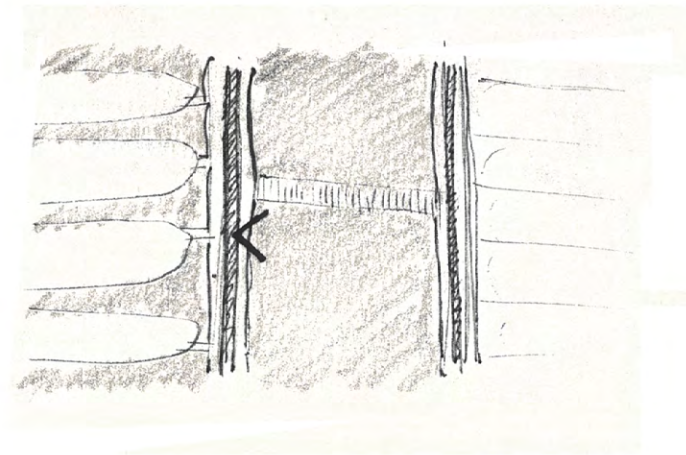
Dairy Farming

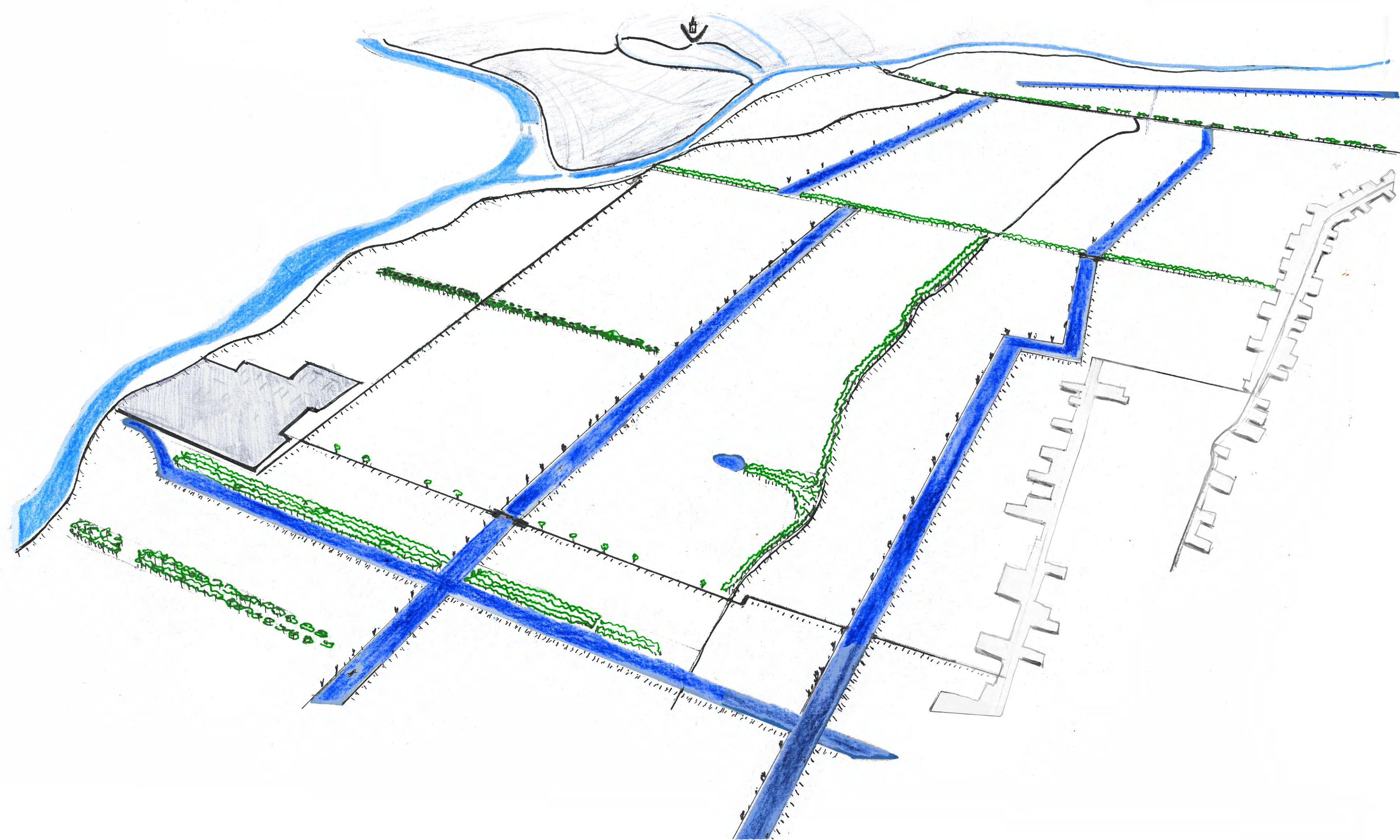


Dairy Farming - Design



Dairy Farming - Tussenboezem







Gouda

Zoetermeer

Rotterdam

Ruimtelijke Verkenning 2023

Mondiaal Ondernemend



- market-driven development;
- individualism, hedonism & material wealth;
- distancing from nature;
- strong reliance on 'green growth'

Regionaal Geworteld



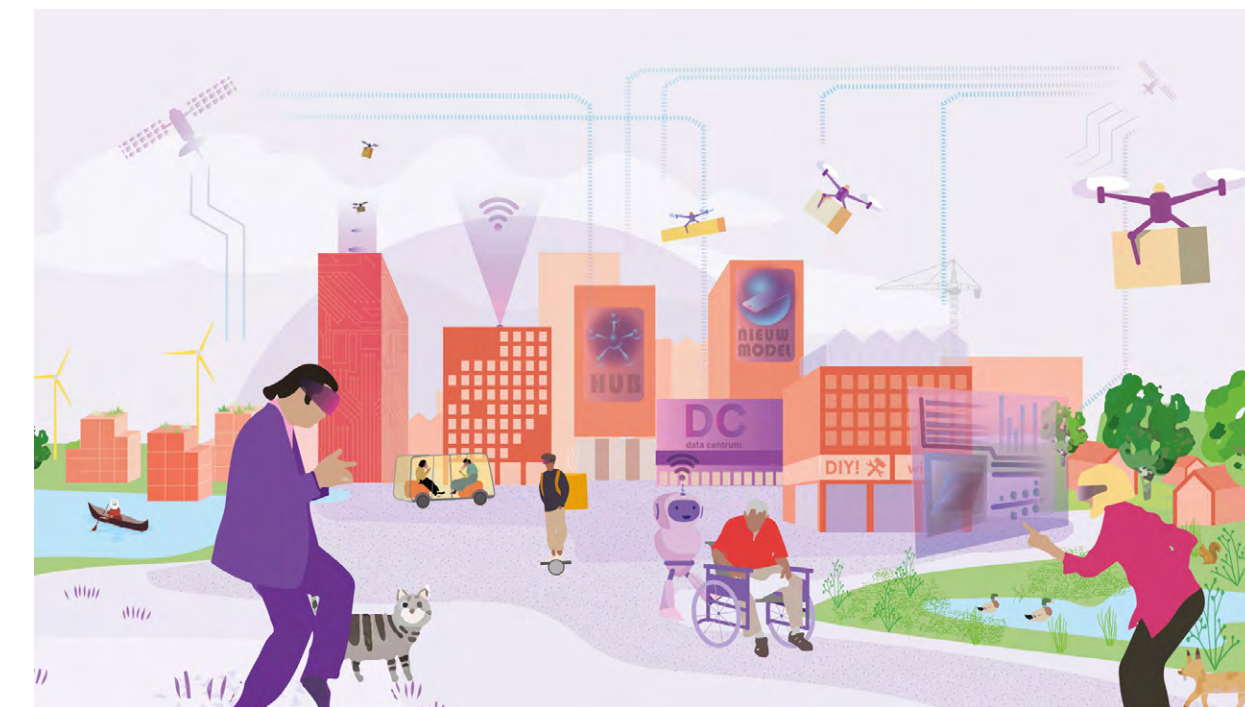
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Groen Land



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Snelle Wereld



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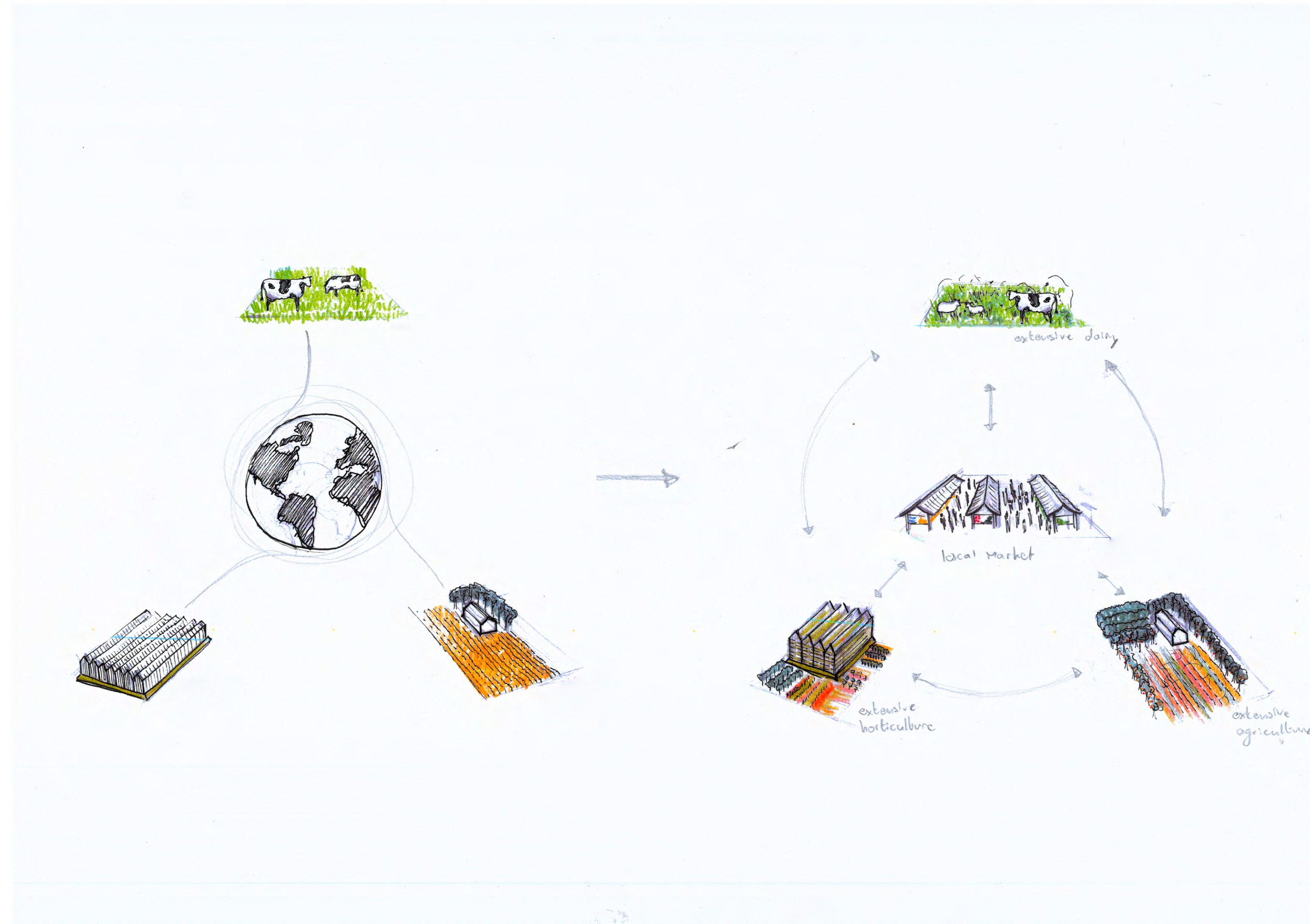
Ruimtelijke Verkenning: Regionaal Geworteld



- strongly decentralized spatial development;
- identifying with the community;
- regional self-sufficiency;
- regional spatial qualities and small-scale agriculture

From Planbureau voor de Leefomgeving (2023)

Local Production and Consumption

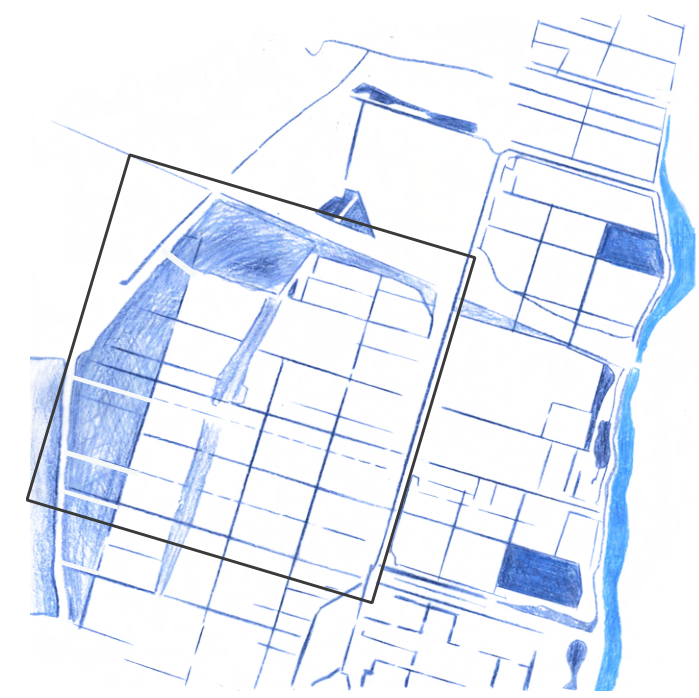




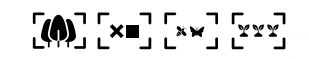
Zoetermeer

Gouda

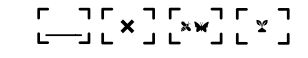
Rotterdam



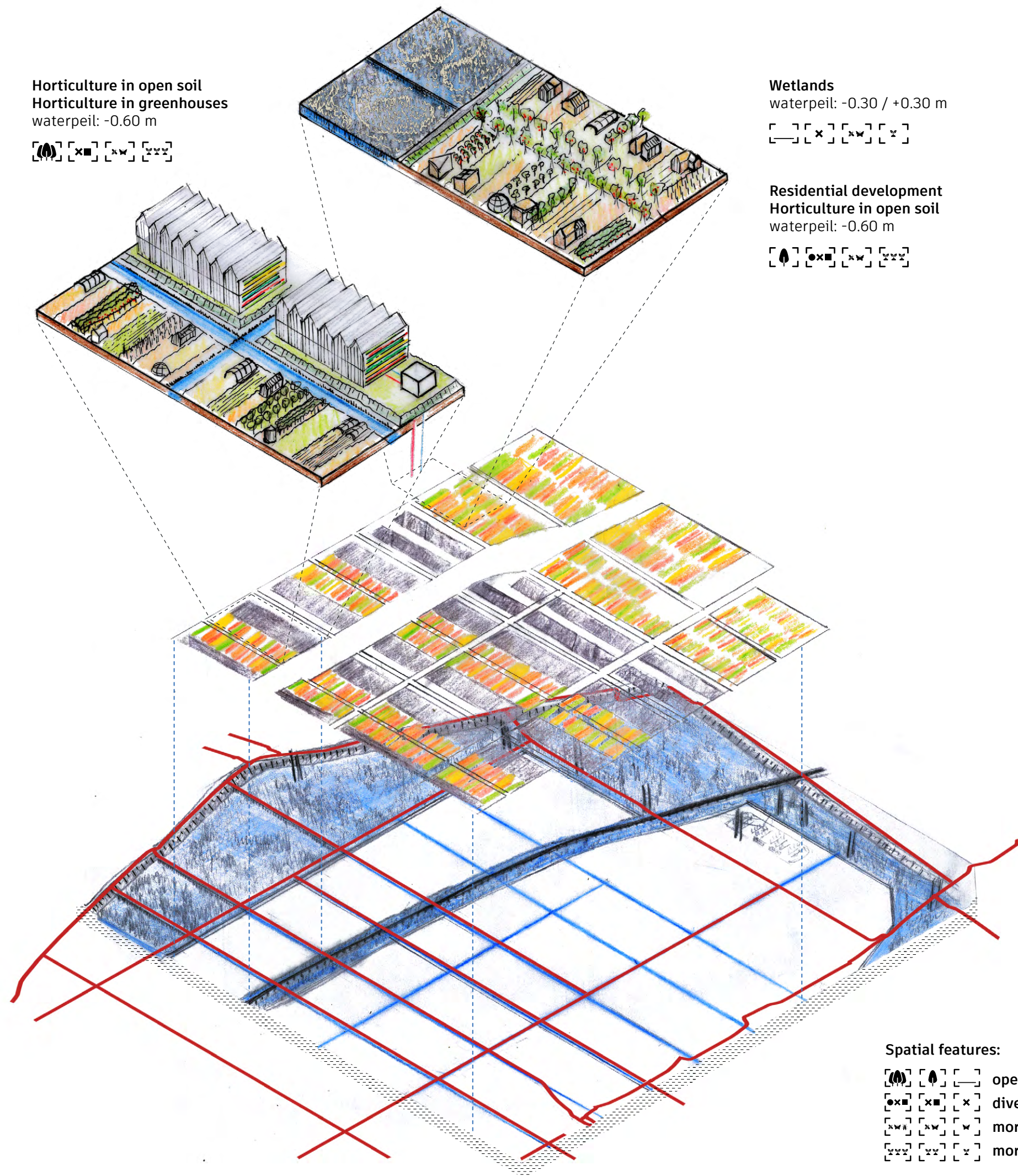
Horticulture in open soil
Horticulture in greenhouses
waterpeil: -0.60 m



Wetlands
waterpeil: -0.30 / +0.30 m

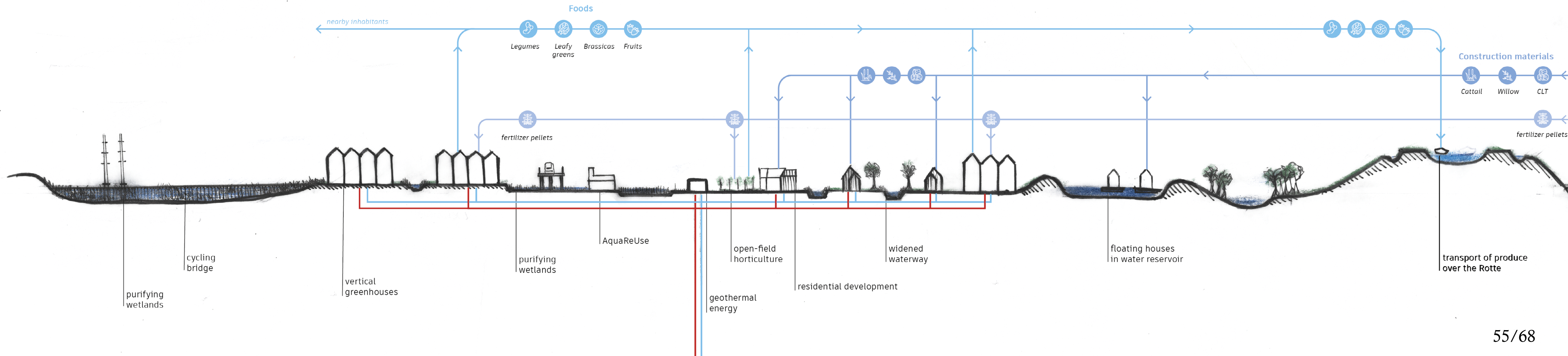
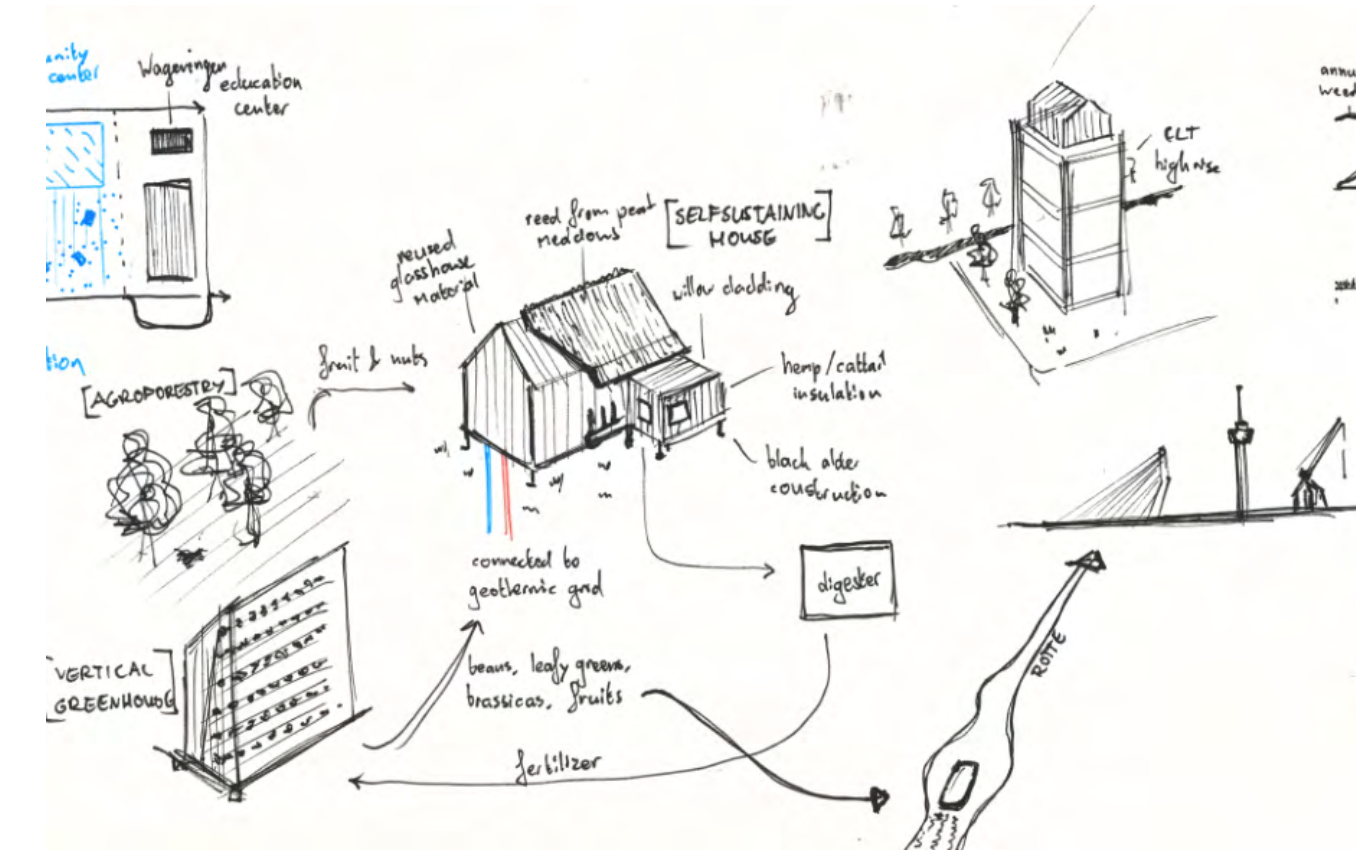
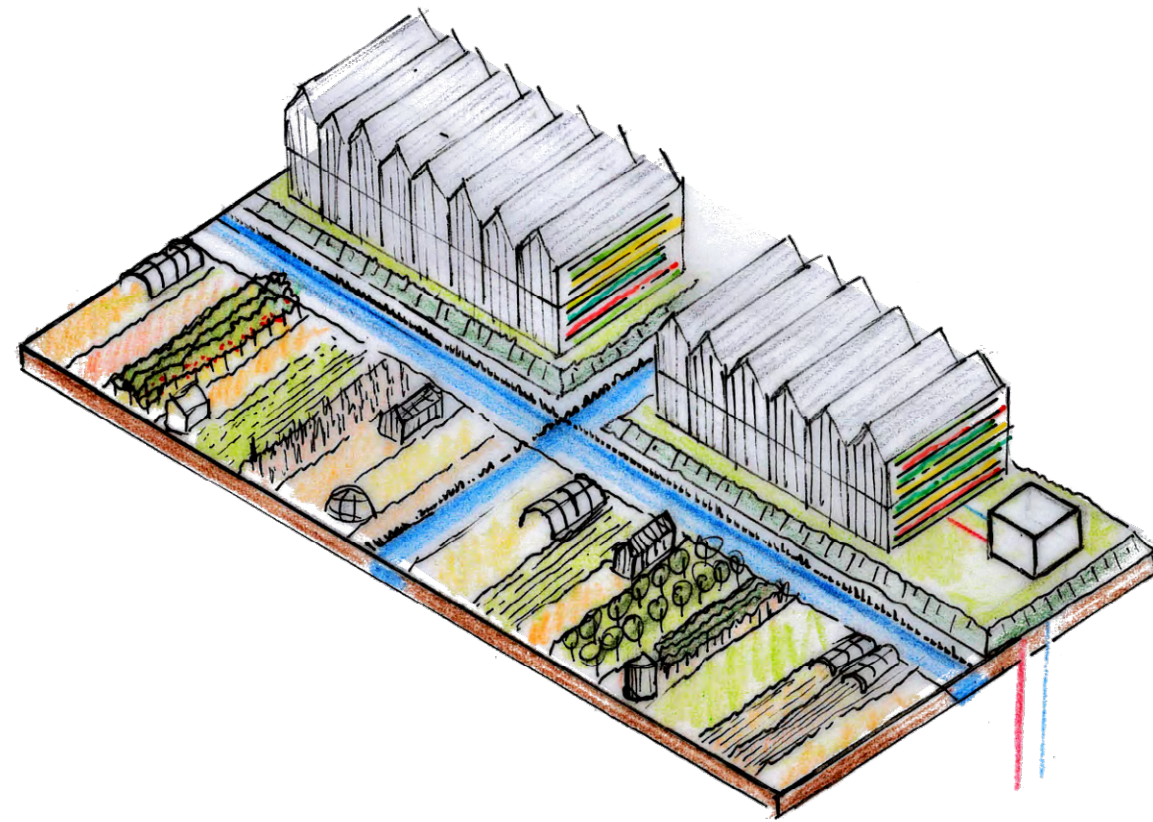


Residential development
Horticulture in open soil
waterpeil: -0.60 m



Spatial features:
 open / closed
 diverse / monotone
 more / less biodiverse
 more / less productive

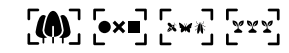
Horticulture on Open Soil



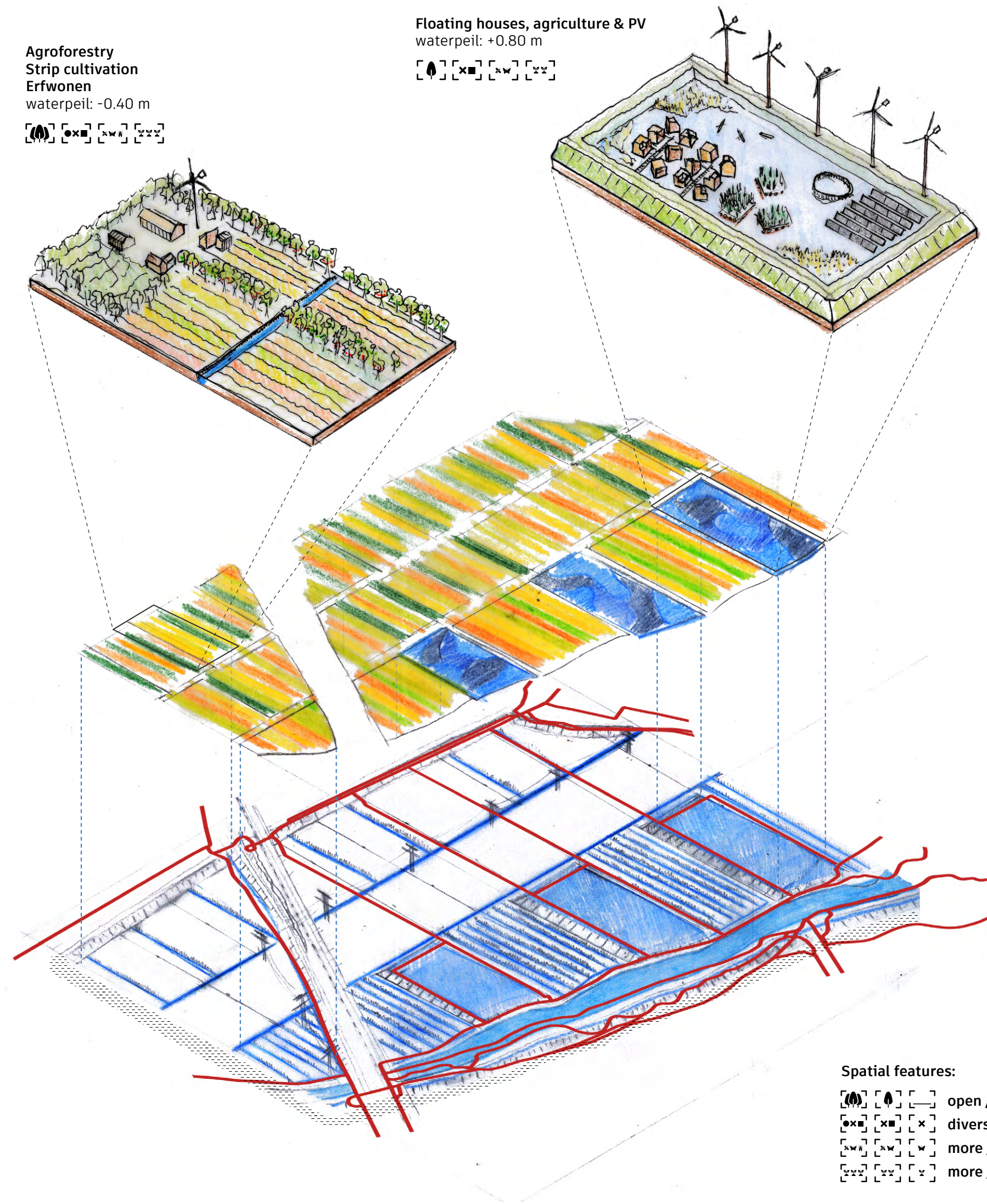
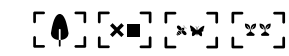




Agroforestry
Strip cultivation
Erfwonen
waterpeil: -0.40 m



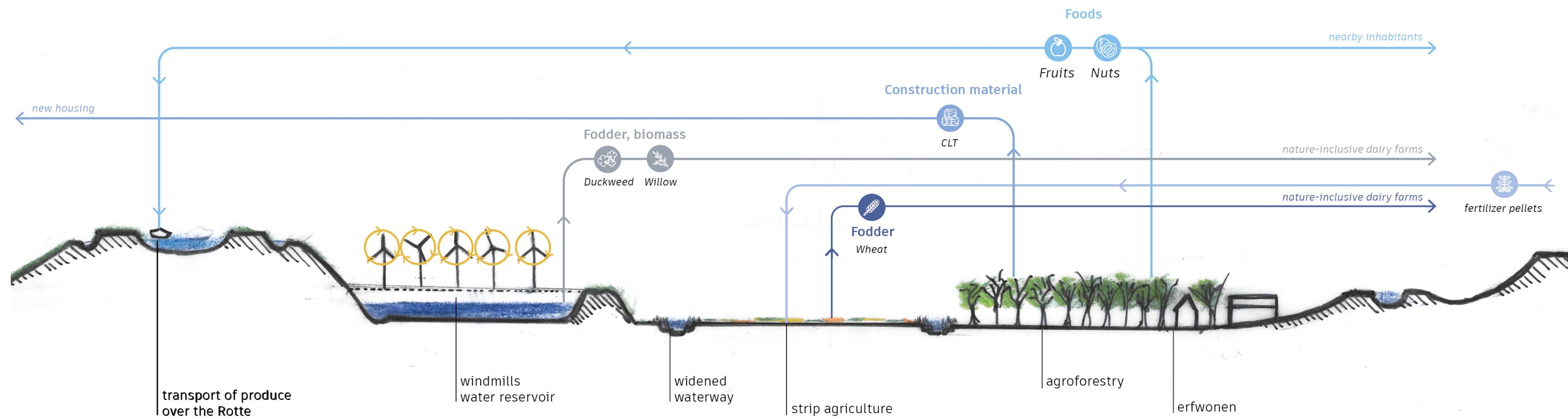
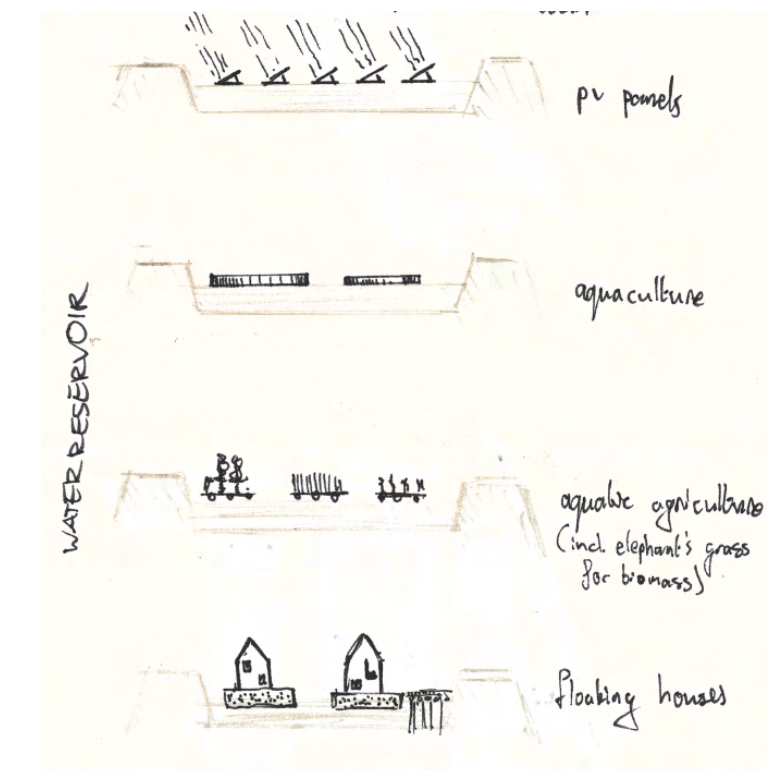
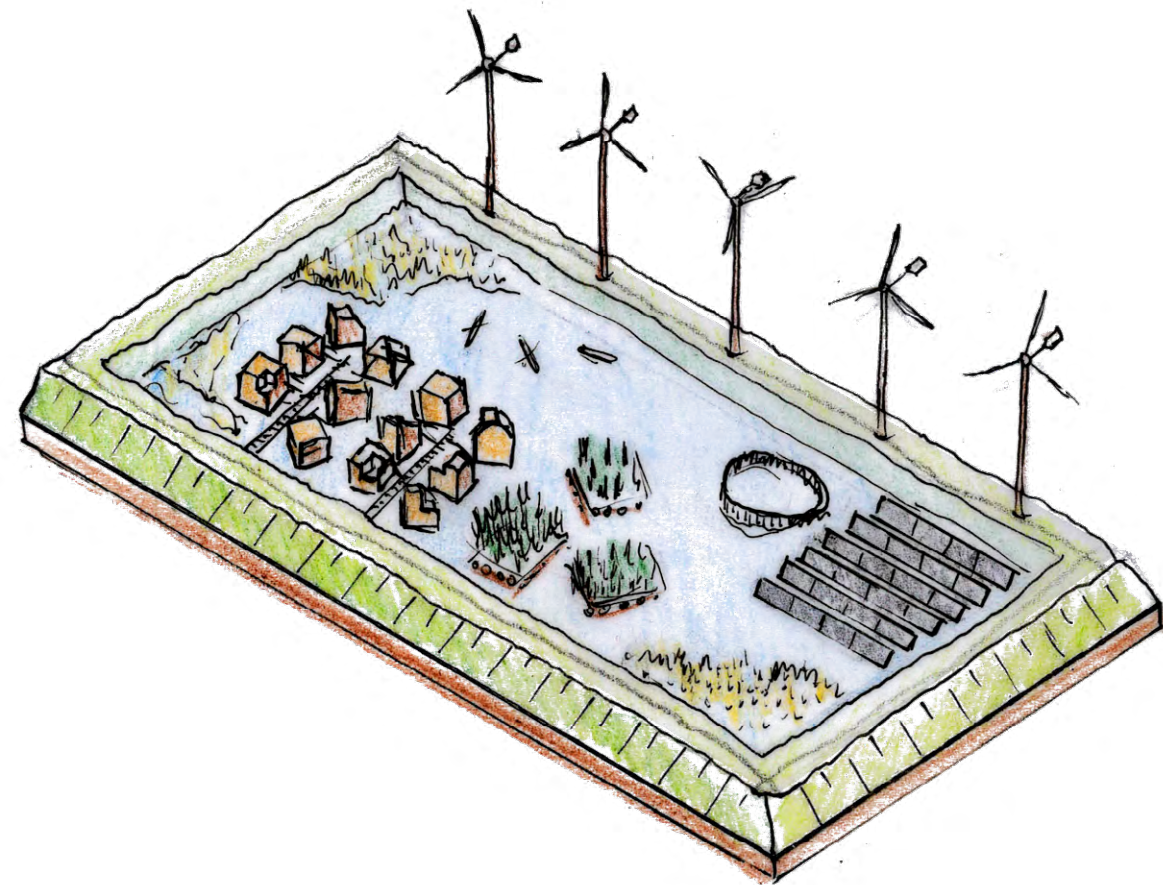
Floating houses, agriculture & PV
waterpeil: +0.80 m



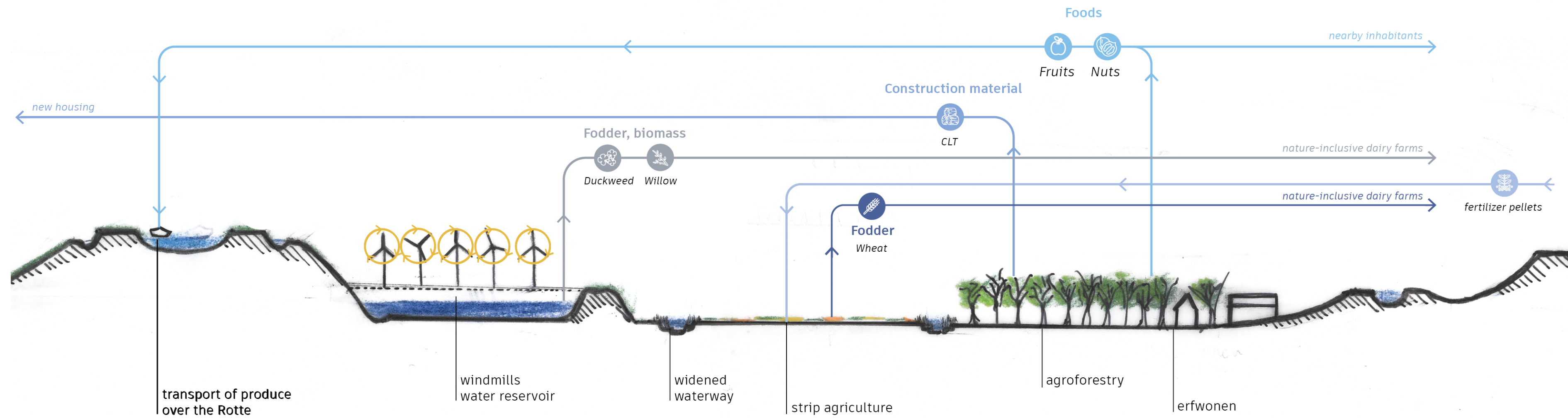
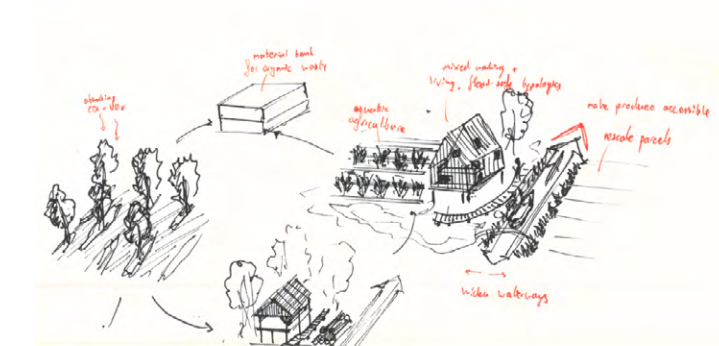
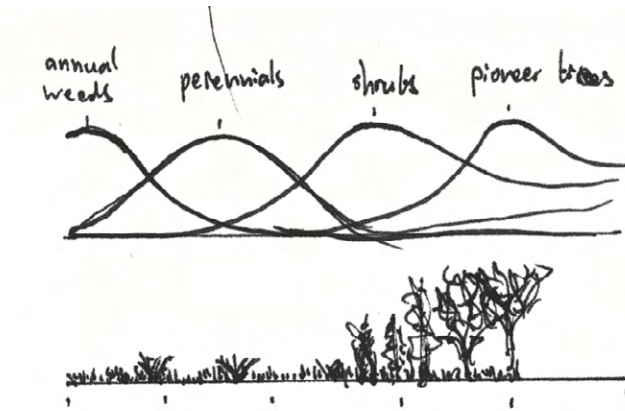
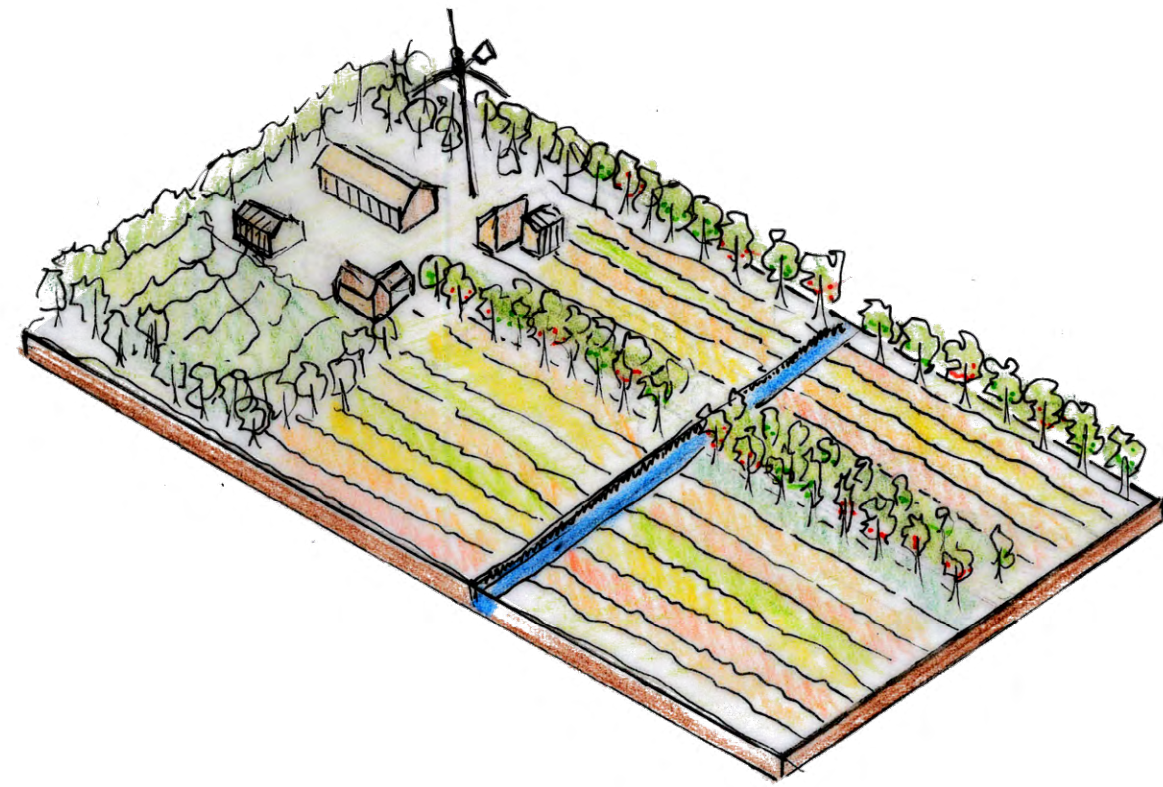
Spatial features:

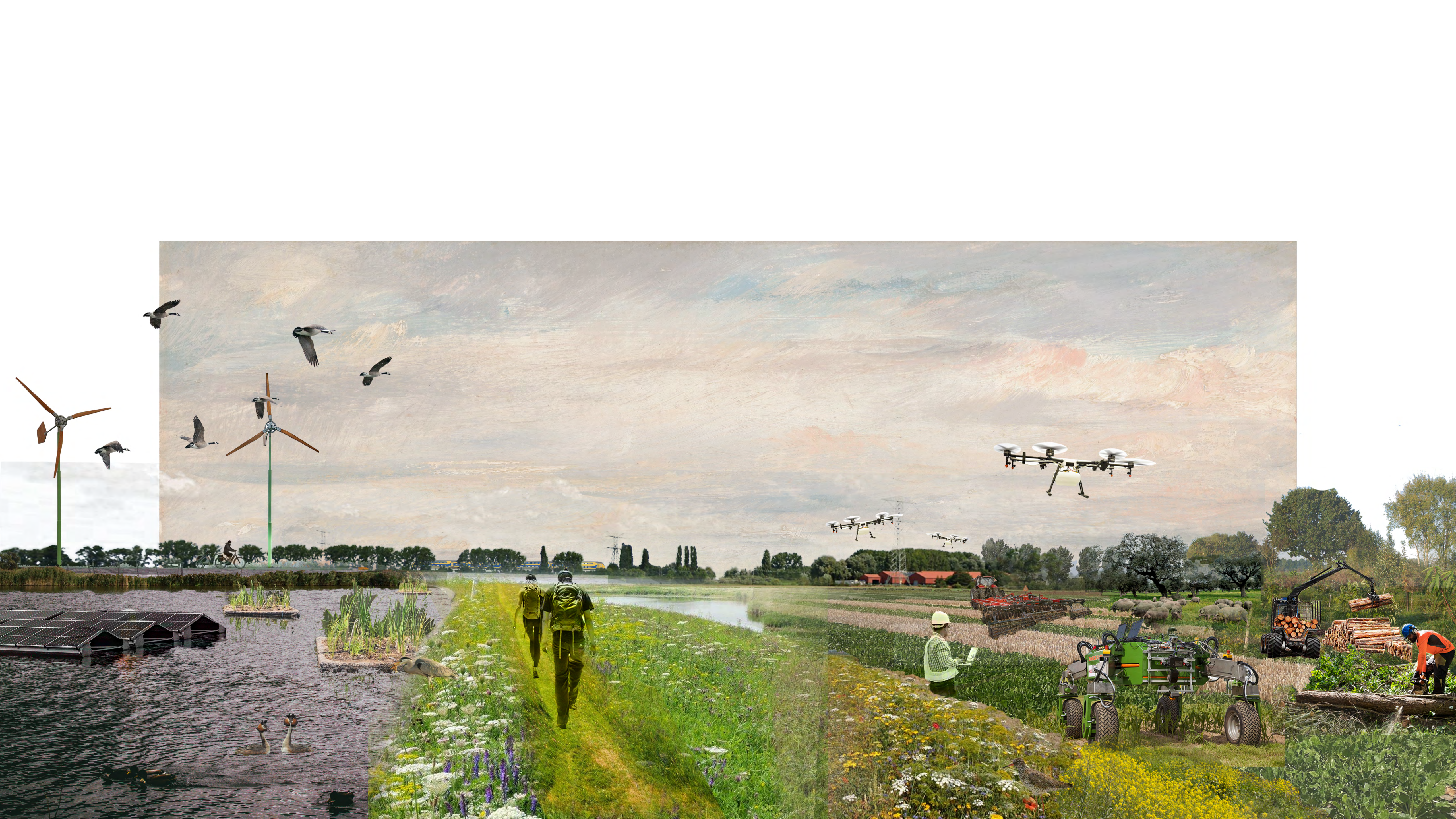
- [tree in circle] [house in circle] [] open / closed
- [x in square] [w in square] [v in square] diverse / monotone
- [w in square] [v in square] [] more / less biodiverse
- [v in square] [] [] more / less productive

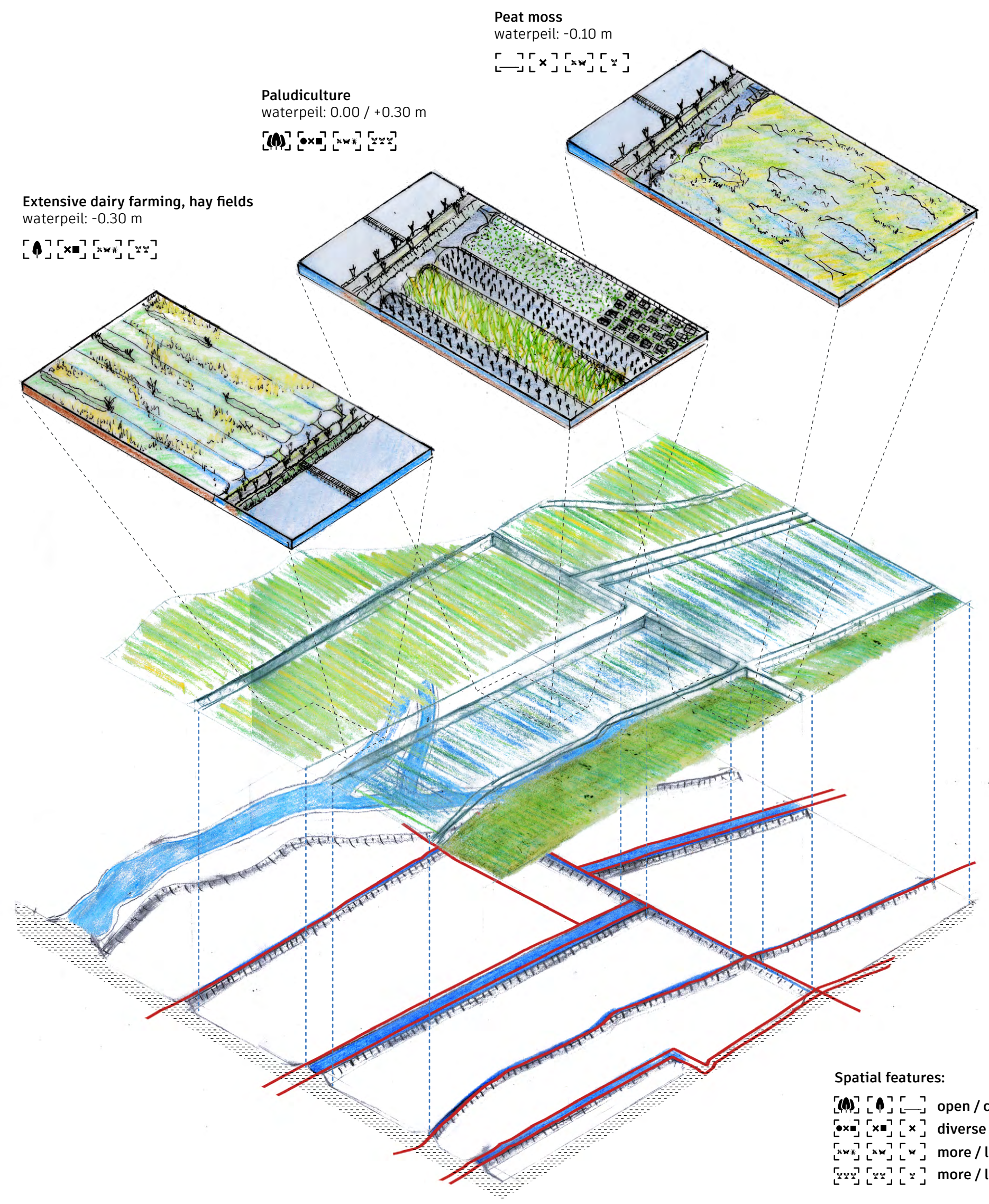
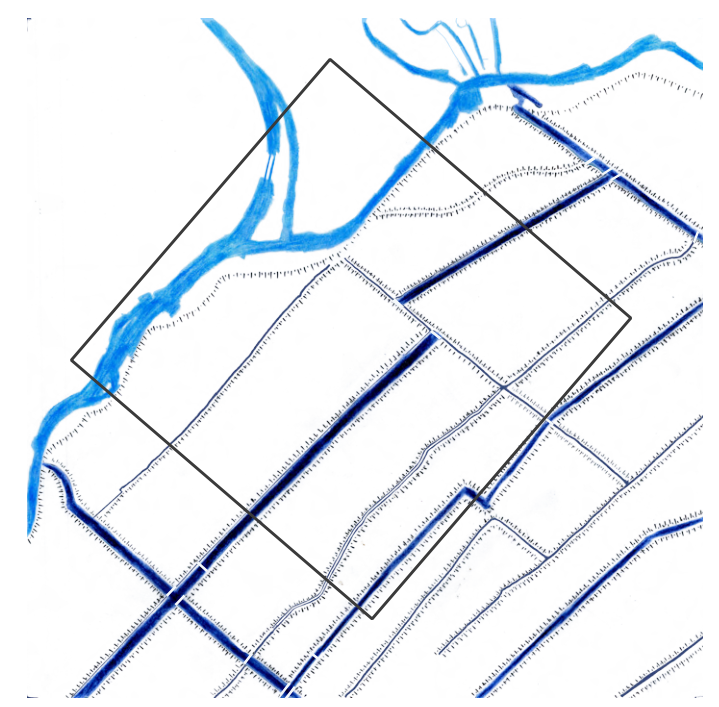
Aquatic Agriculture, Energy & Housing



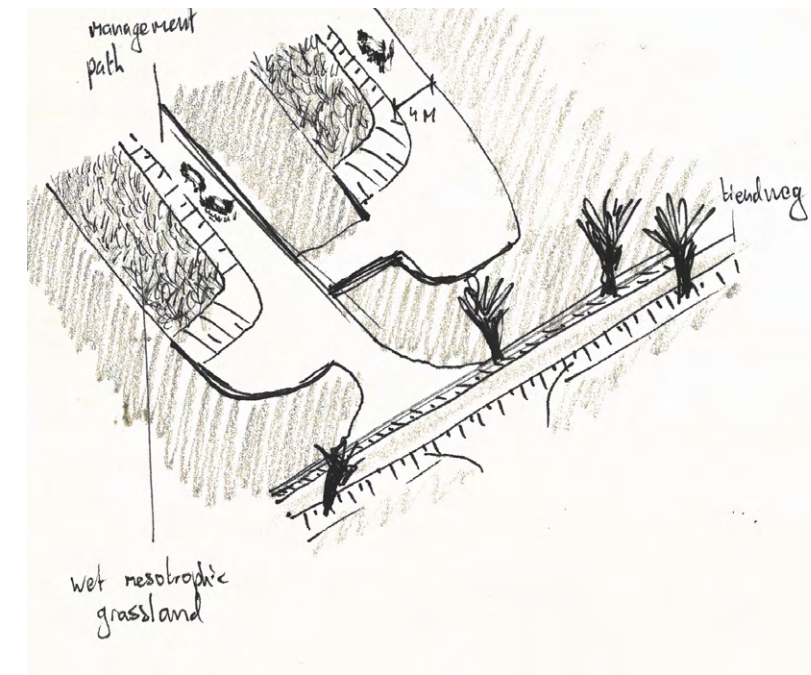
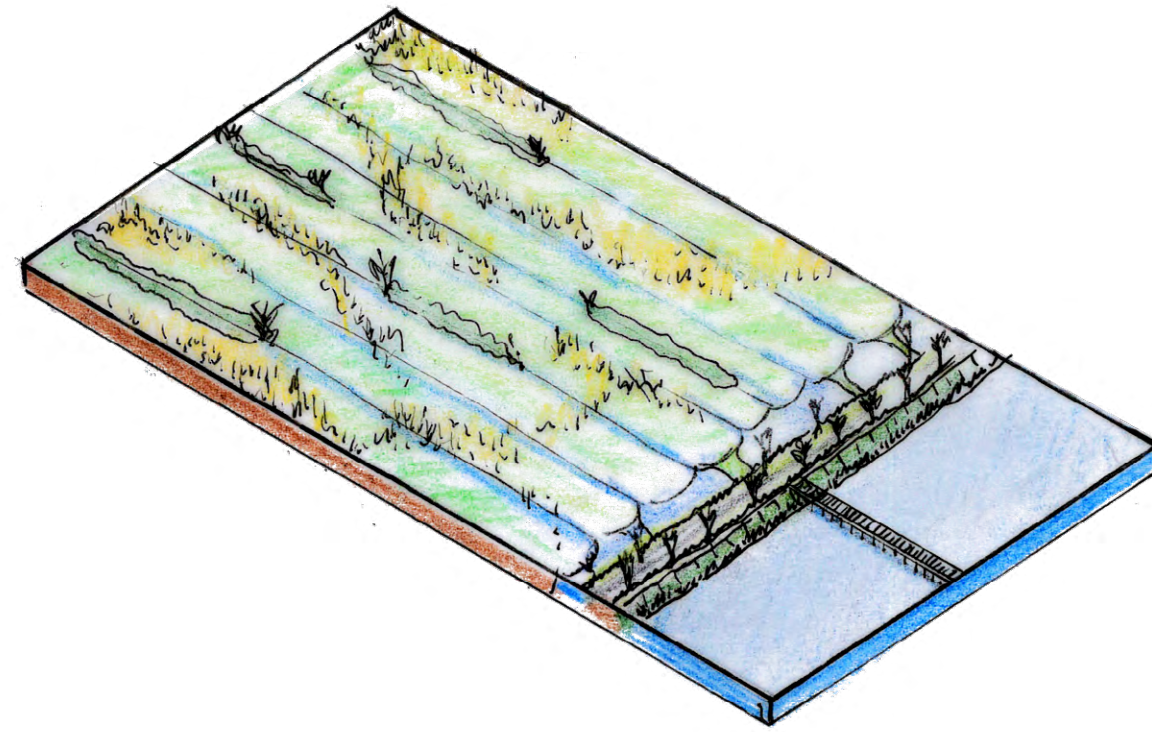
Strip Cultivation & Agroforestry



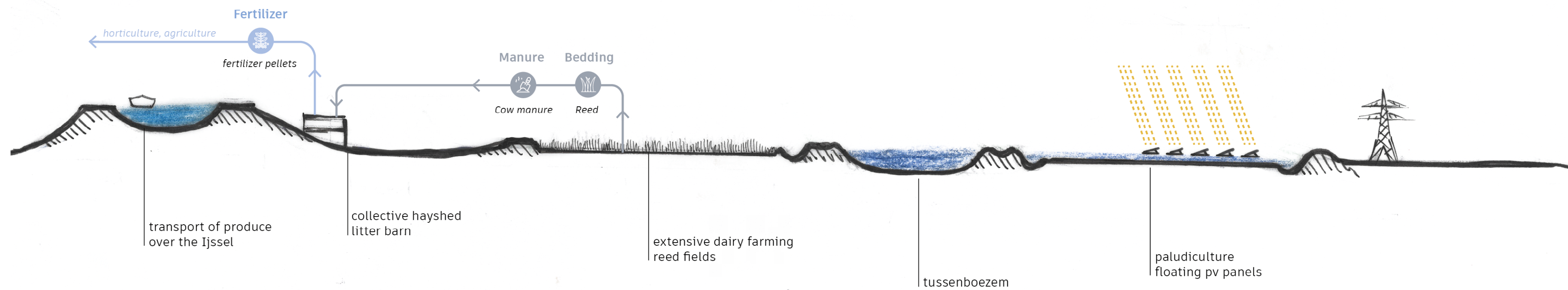




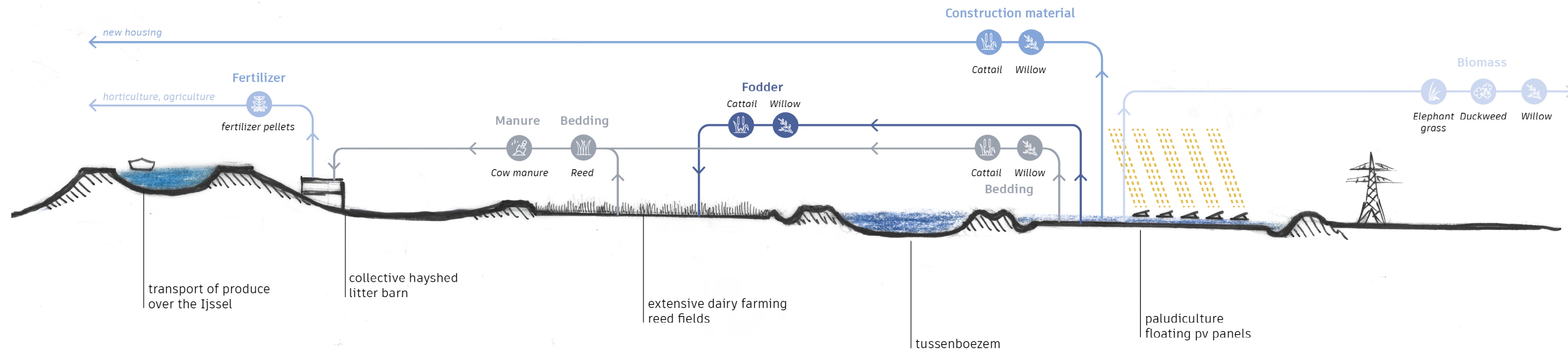
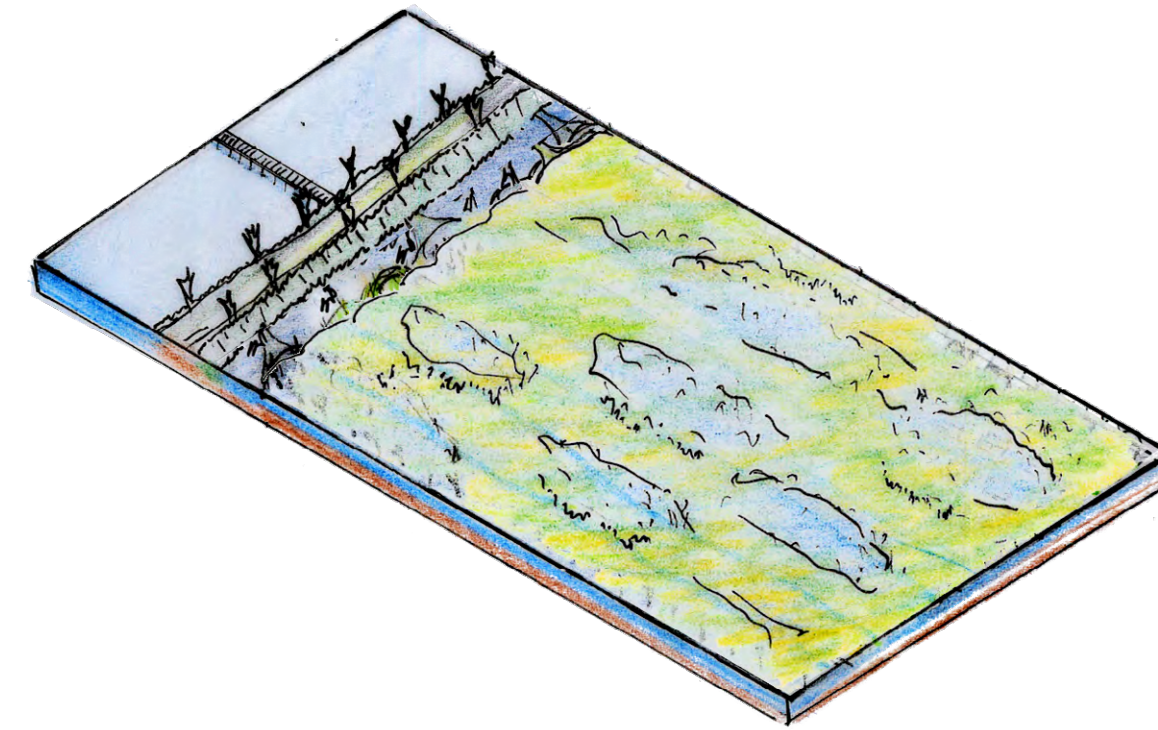
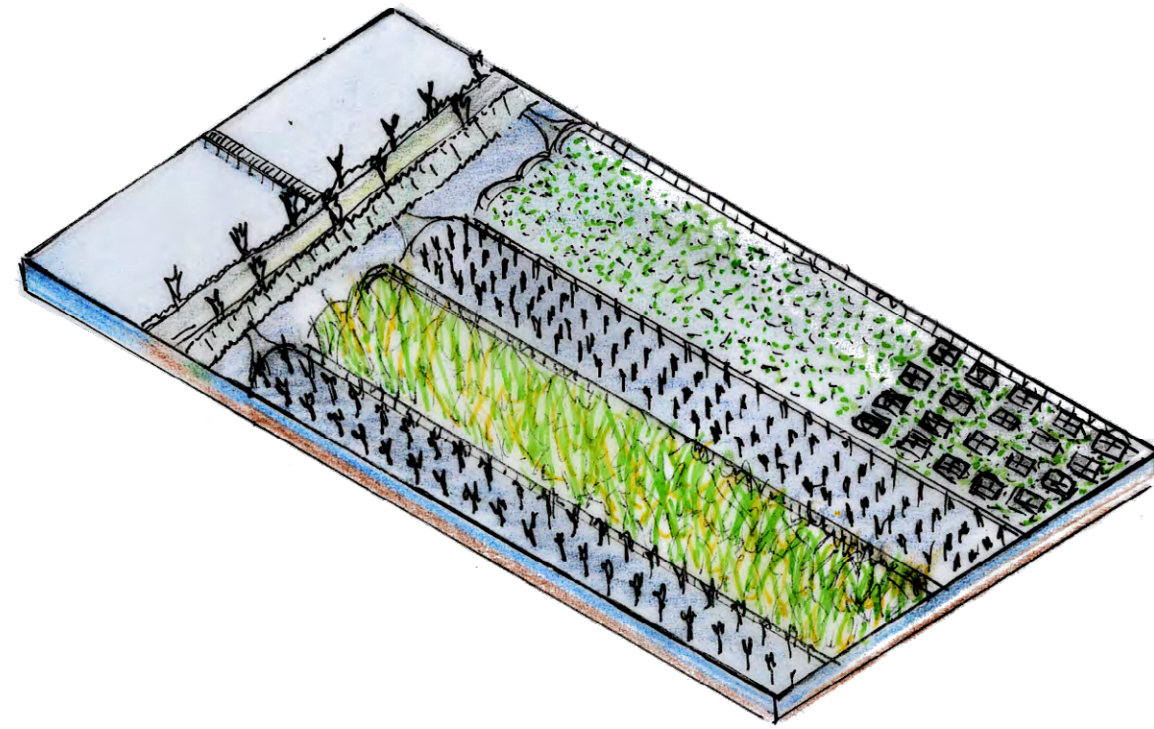
Extensive Dairy Farming



'De Stier' van Paulus Potter (1647)



Paludiculture





Final Remarks and Recommendations

In the transition towards a sustainable Deltametropolis, how can an adaptive design enhance spatial qualities in the peri-urban interface through biophilic and technophilic developments?



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Thank you!