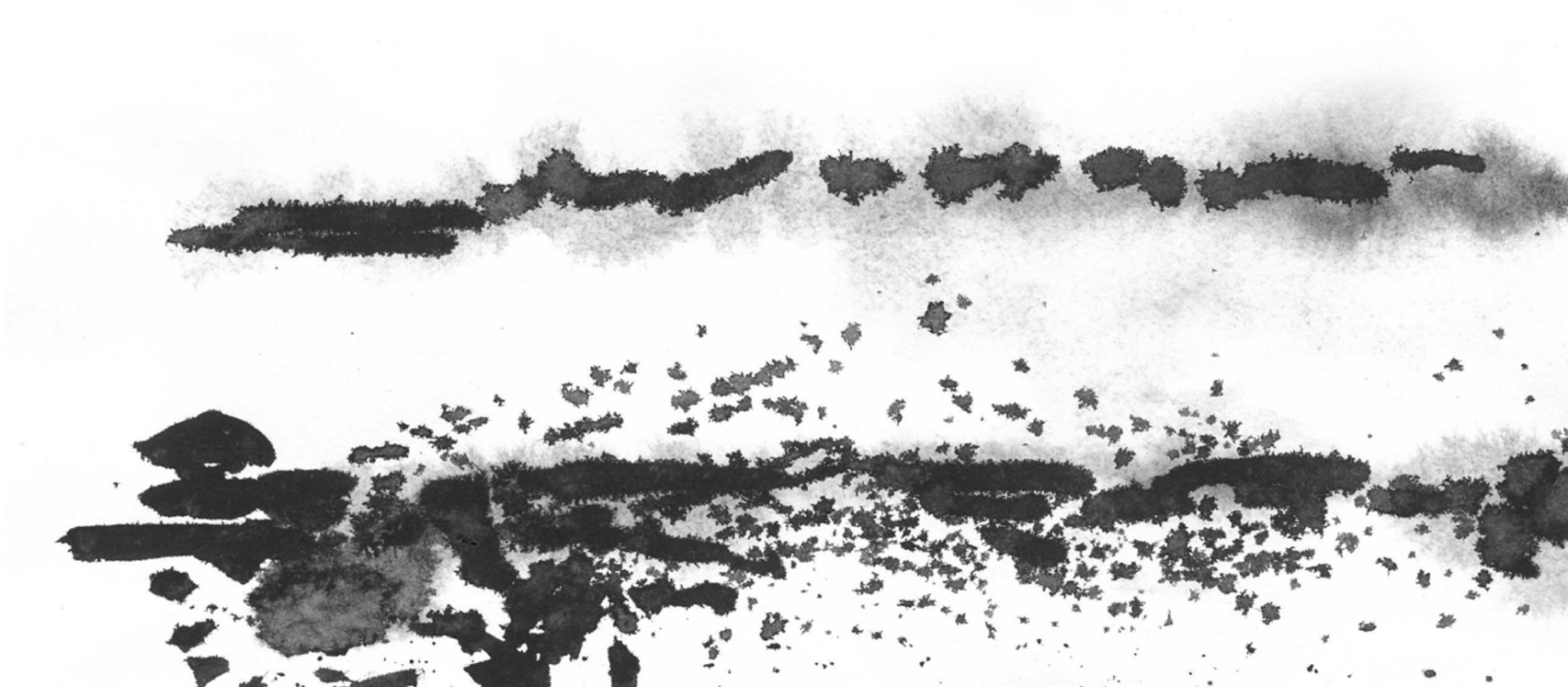
RE-PEAT

Different Futures for the Peat Polders as Social-ecological Landscape in the Netherlands

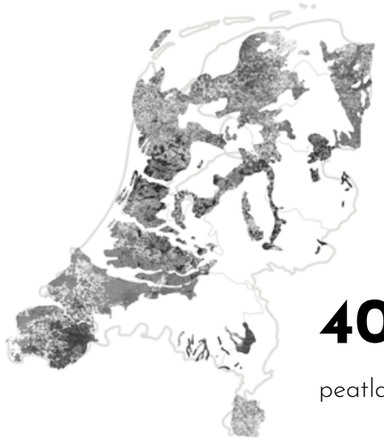
Case study: De Rijp village, Eilandspolder,
North Holland



Anastasiia Soshnikova

Supervisors: Prof. Undine Giseke (TU Berlin), Prof. Dr. Ir. Inge Bobbink,
Anna Neuhaus

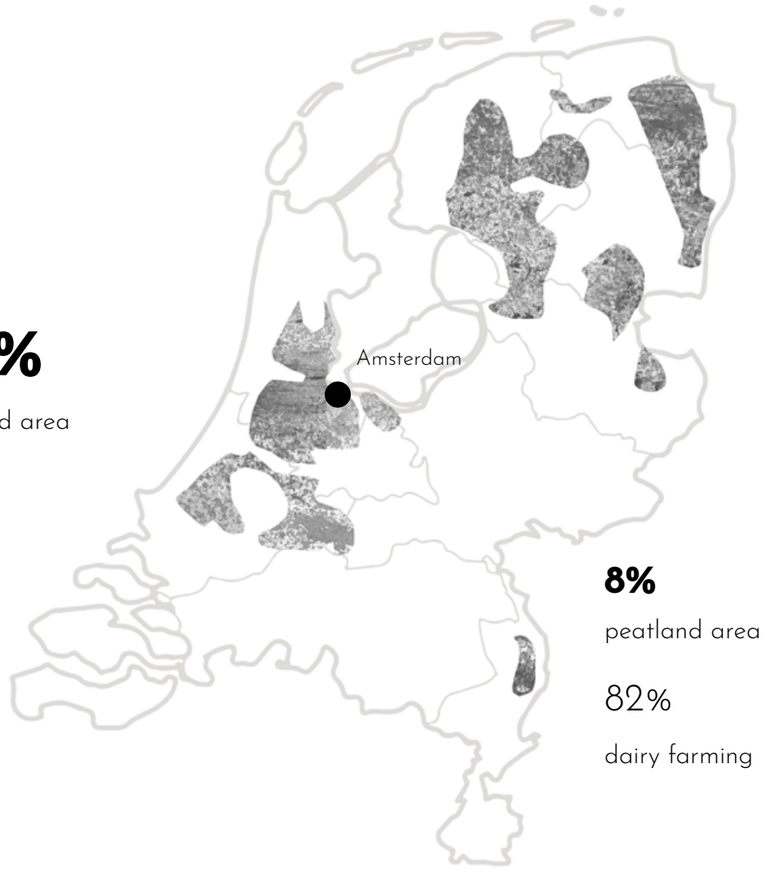
Story of peat soil in the Netherlands



40%

peatland area

Peatland distribution,
500 BC



8%

peatland area

82%

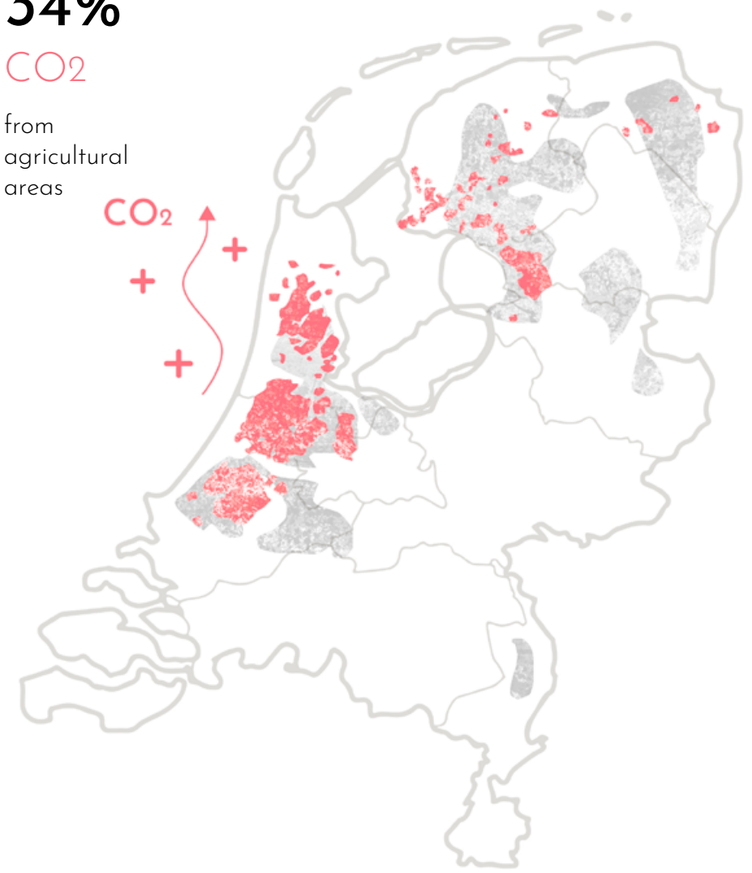
dairy farming

Peatland distribution,
currently

34%

CO_2

from
agricultural
areas

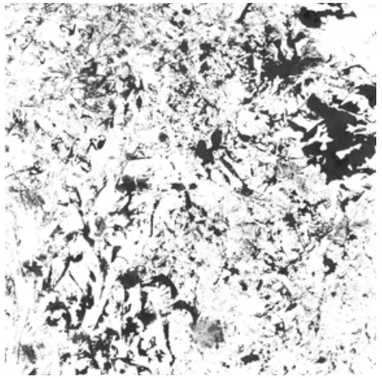


75-95%

degraded peatland
area

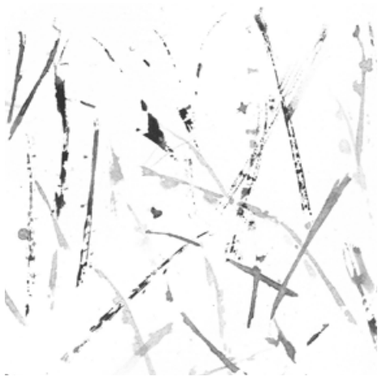
Peat mining sites

Perception of peat

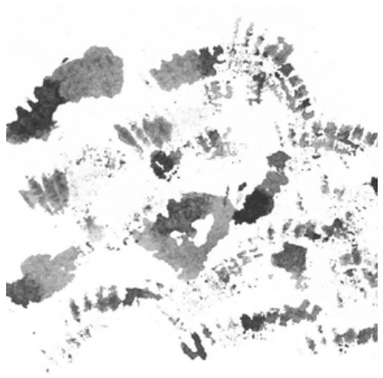


heterogeneous

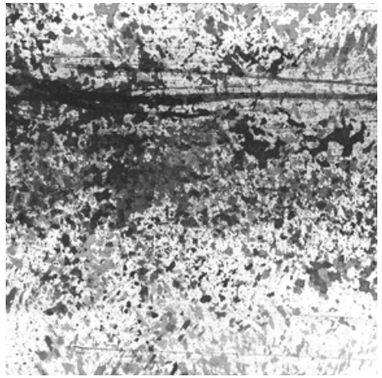
dry



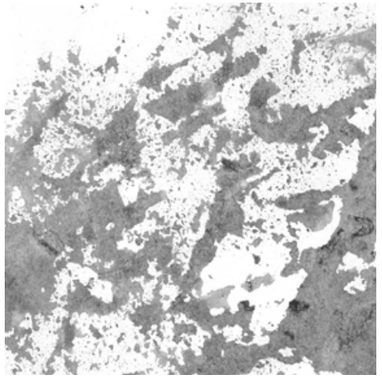
organic matter



non-degradable
objects

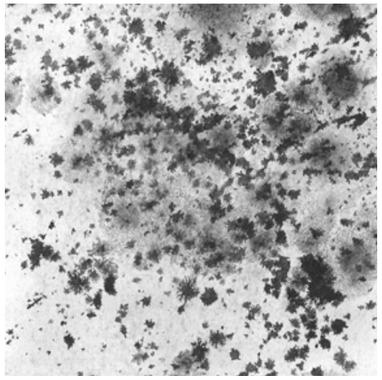


dense wet

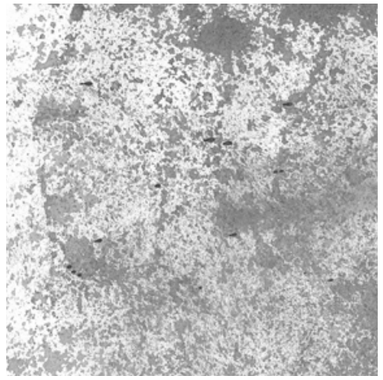


wet

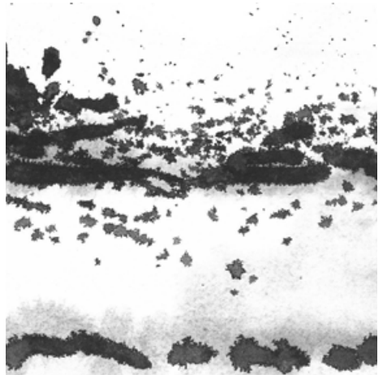
dry



scattered wet

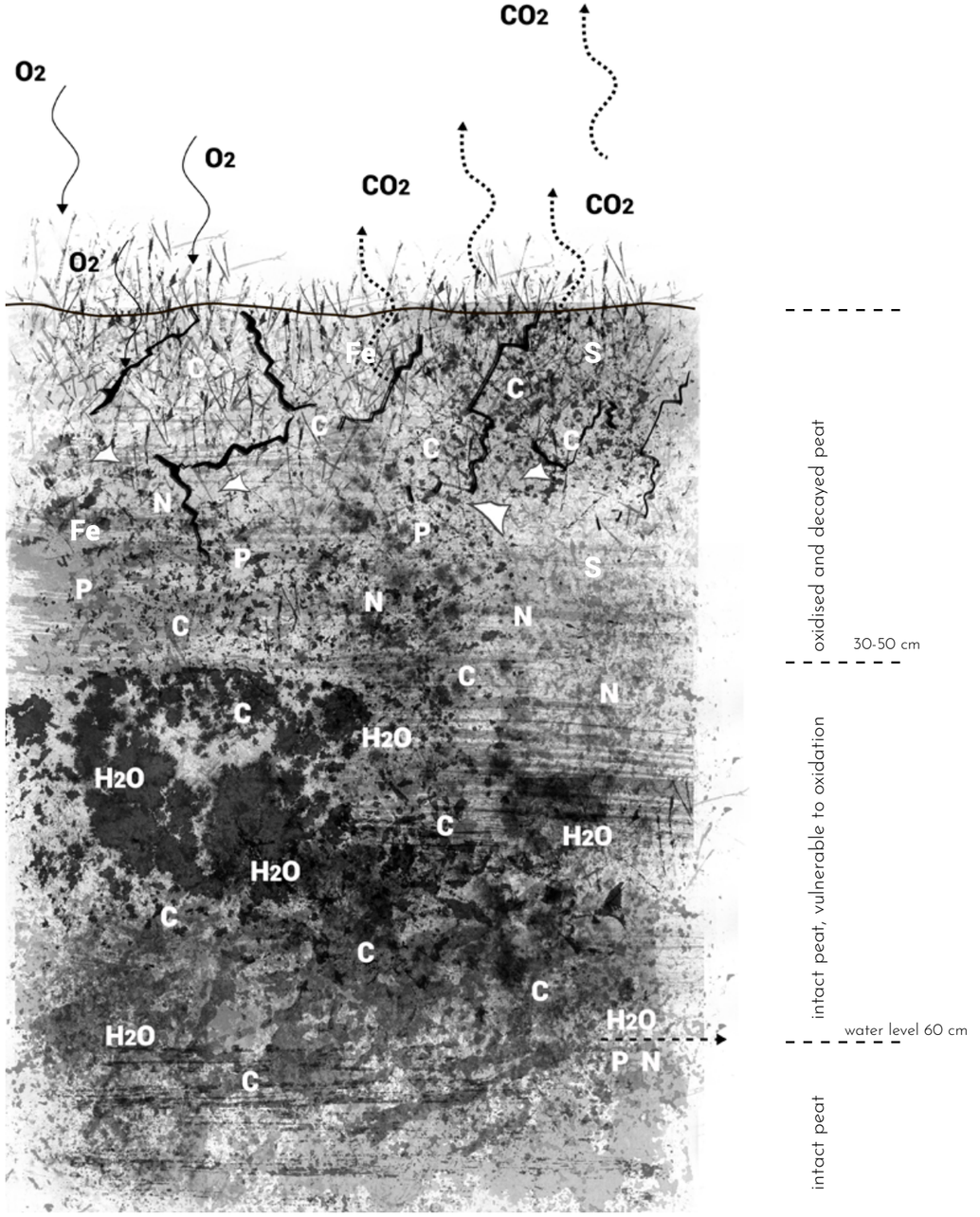


spongy

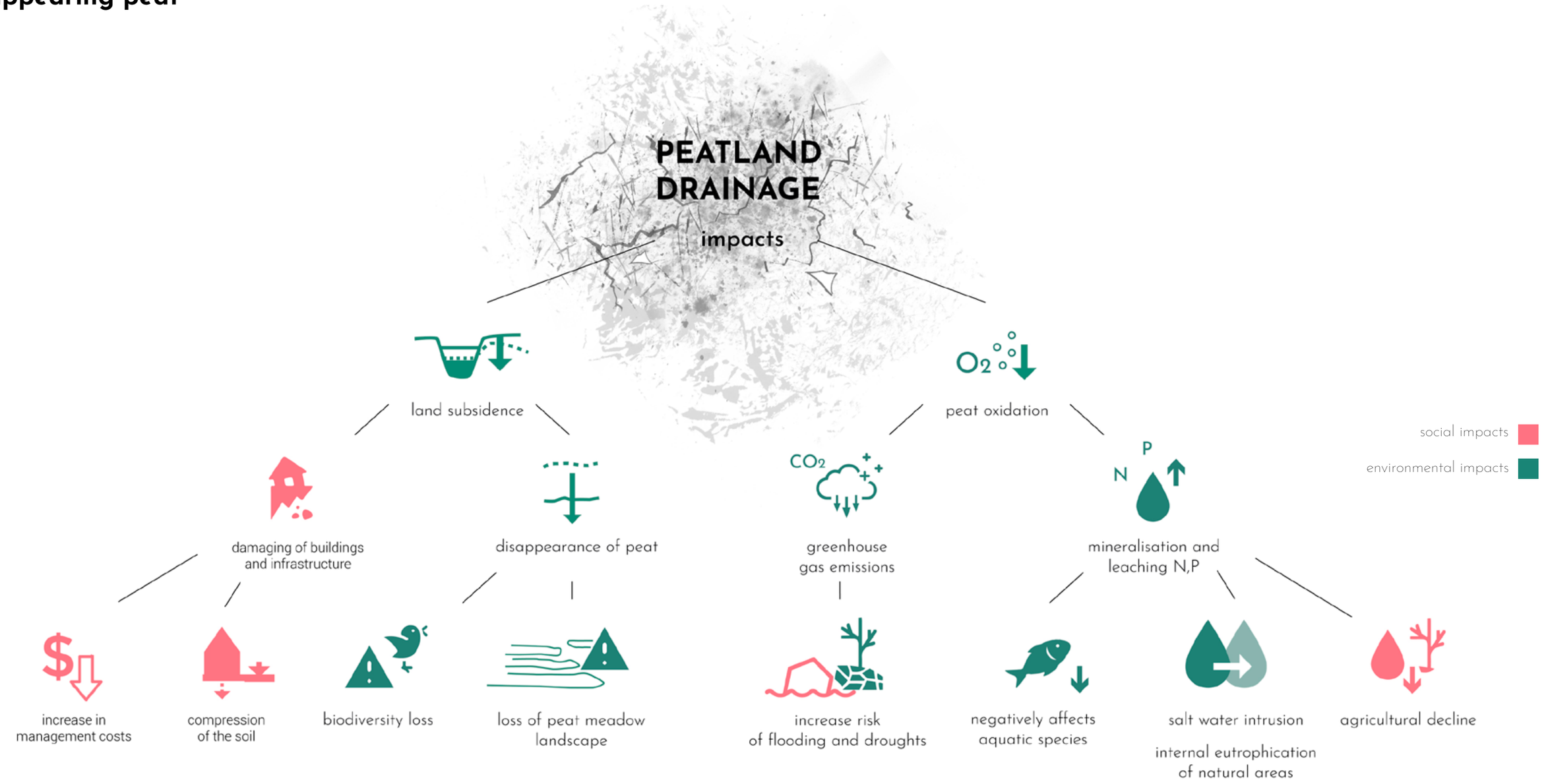


soft

Inside of the drained peat soil

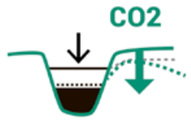


Disappearing peat

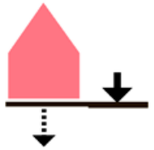


Coexisting settlements and peatlands

Problems



subsidence by peat oxidation
and lowering of groundwater level

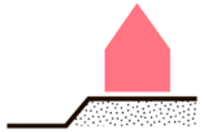


the pressure of buildings and pav-
ing creates compression of the soil

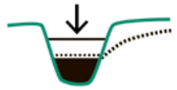
risk of flooding

increasing damage
and costs in time

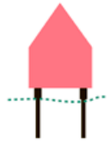
Current methods



raising of the ground level with
sand or polystyrene blocks



lowering the groundwater level



wooden piles foundations
with concrete tops

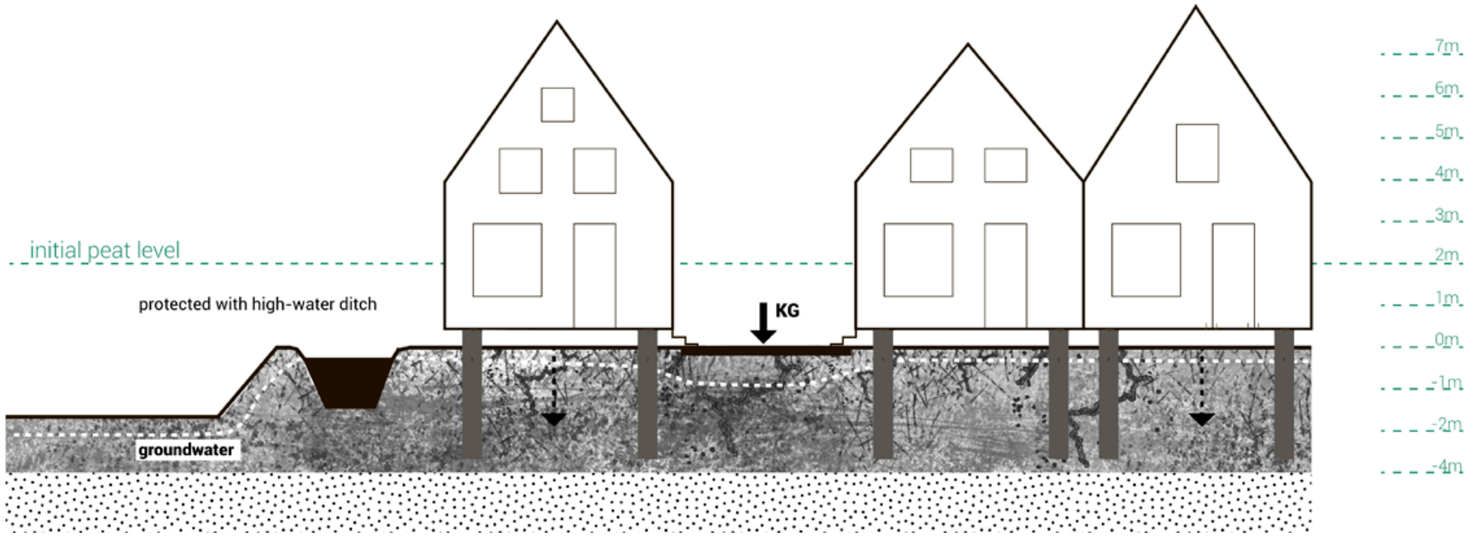
Opportunity

high pressure on the housing market and
the limited number of
good locations to build on

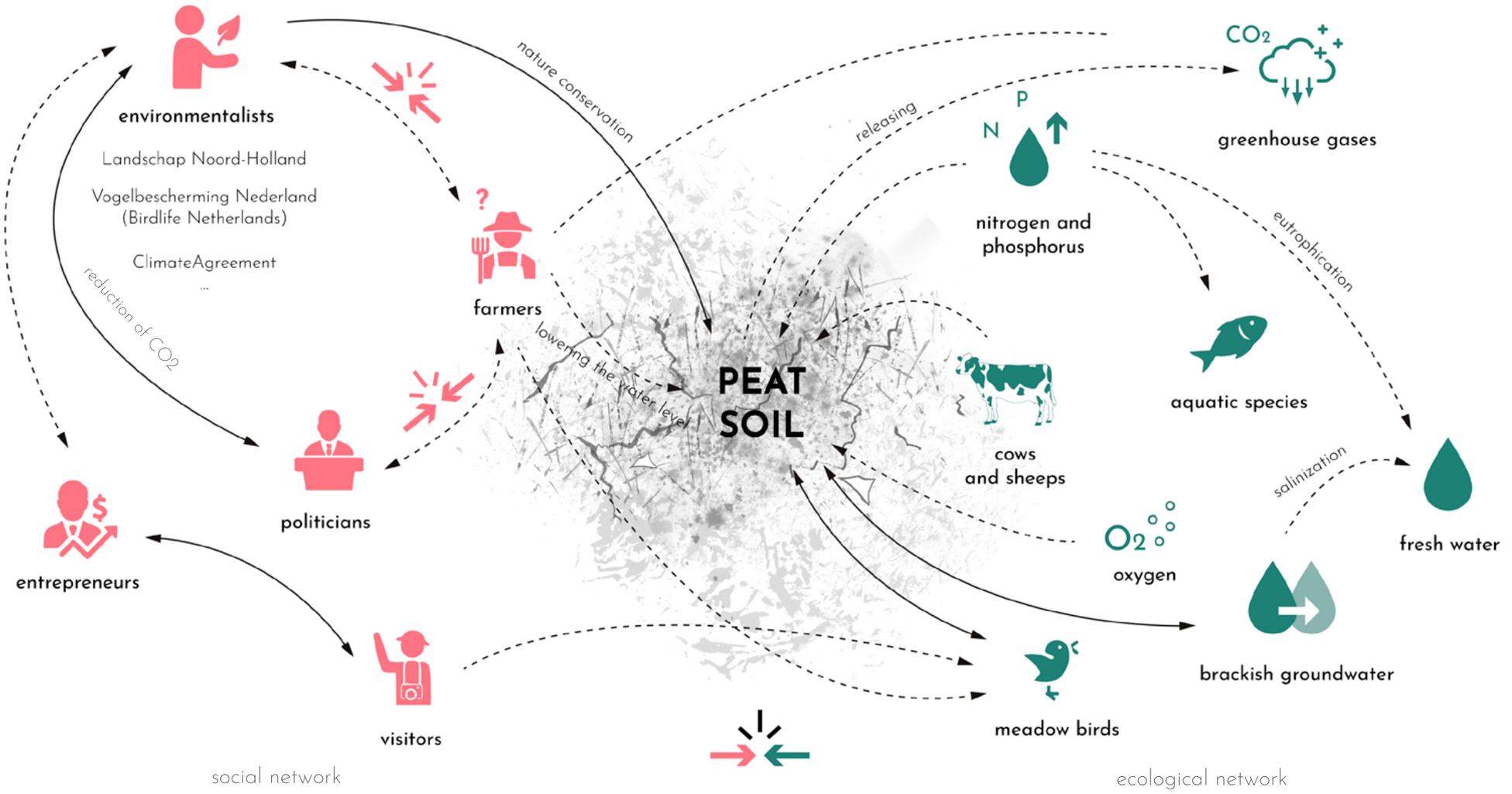
may economically be the main
driver on land-use

History

settlements have developed along water-
ways and on the edges of the
peat area on the sandy subsoil.



Human and non-human actors



How could peat polders be designed to mitigate harmful environmental and social impacts in the Netherlands?

Social-ecological systems

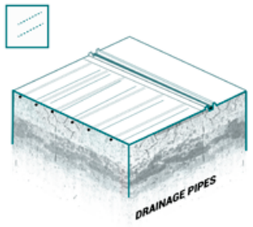
DESIGN STRATEGIES

Different futures of the peat polders

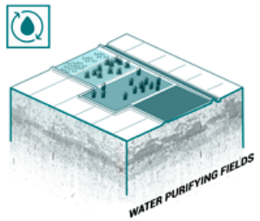
instrument

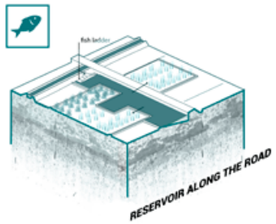
land use

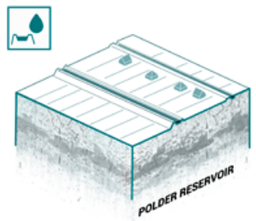
Underwater drainage

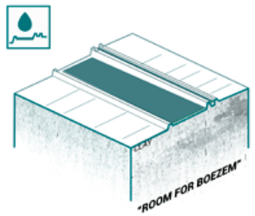


Rewetting

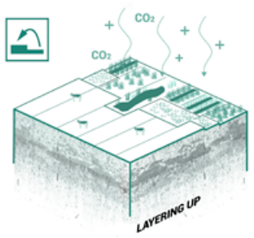




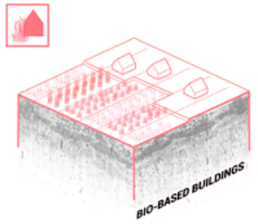


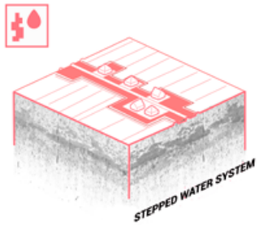


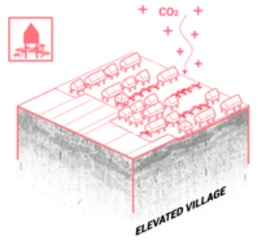
Layering up



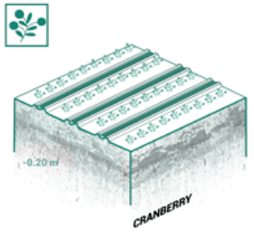
Settlements on peat soil

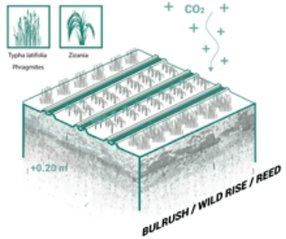


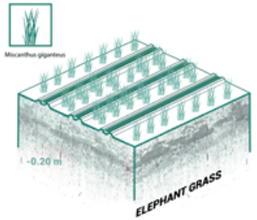


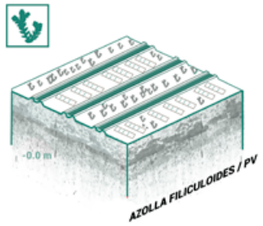


Paludiculture

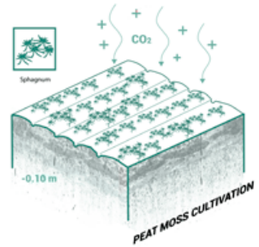




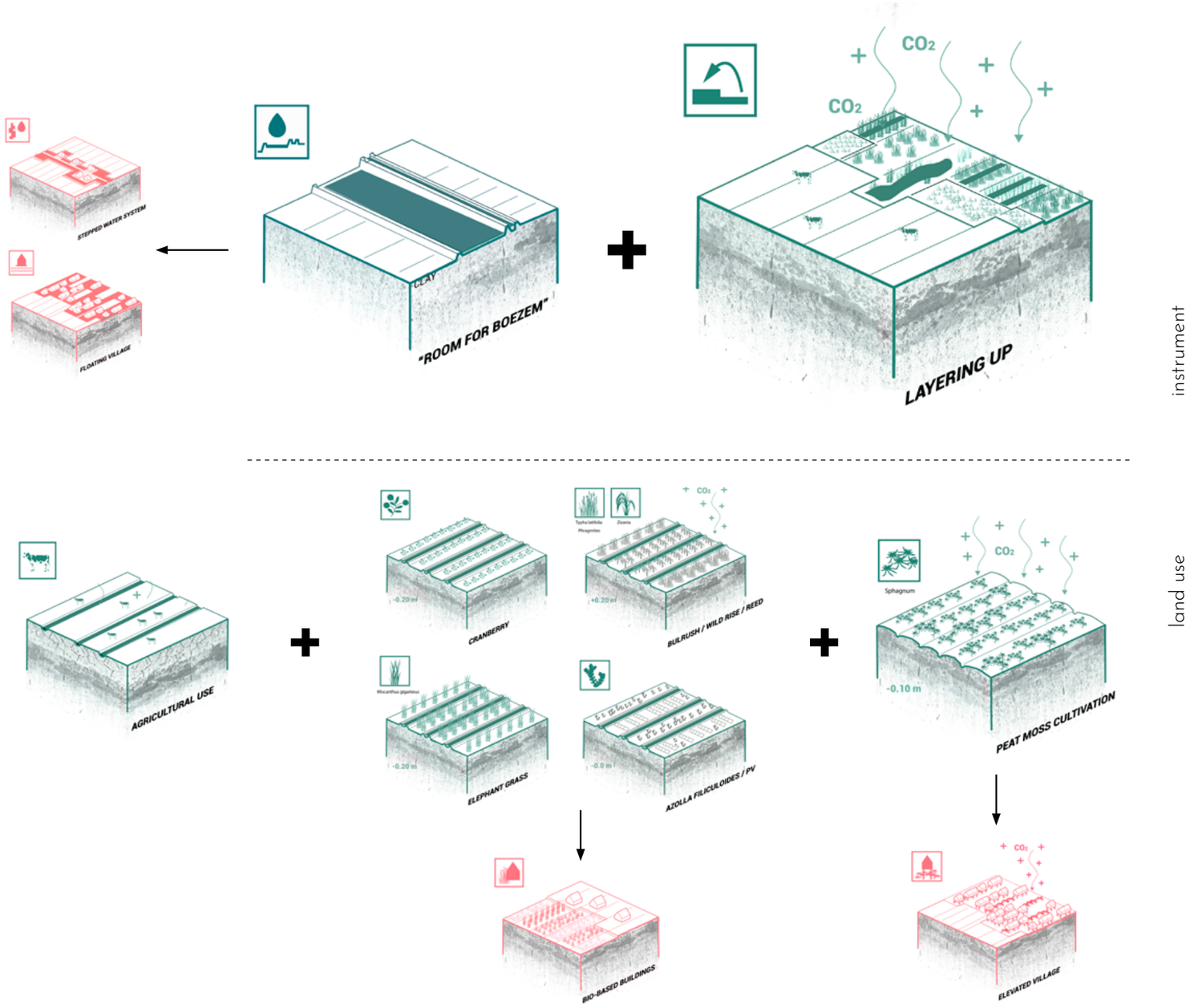




`RE-PEAT`

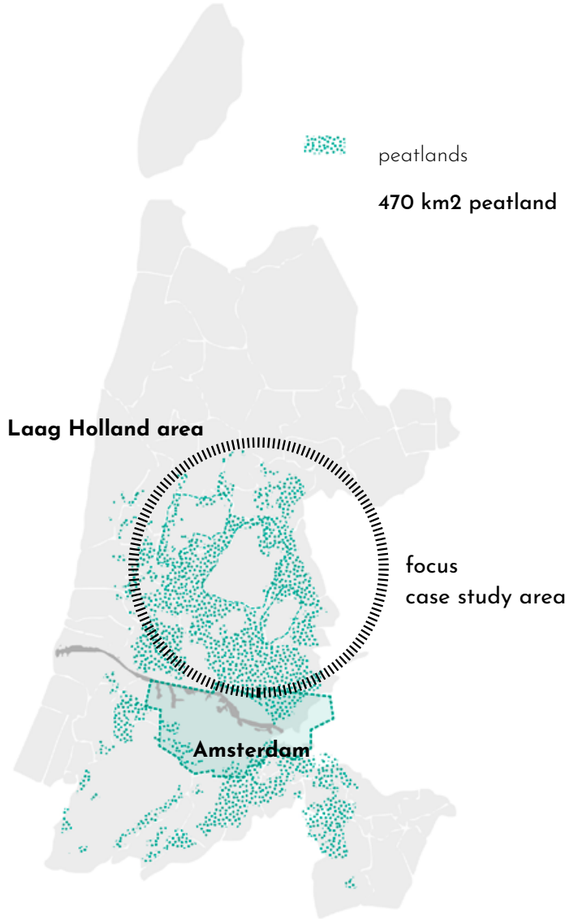


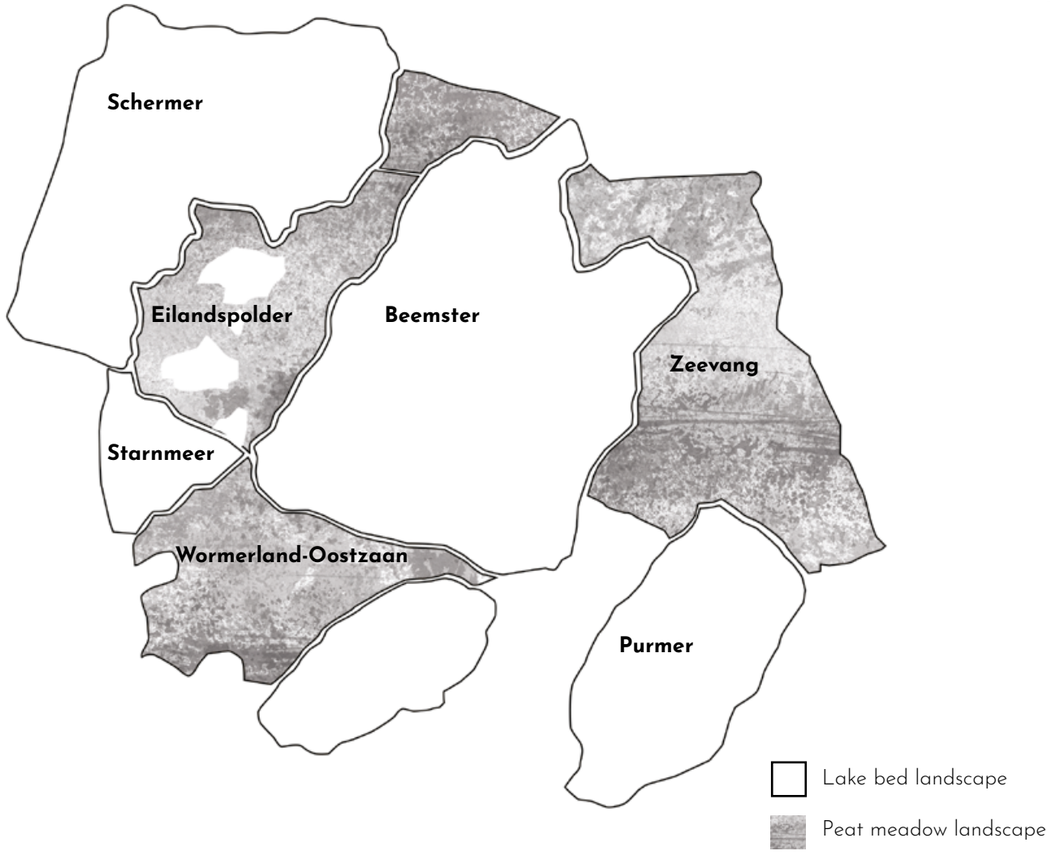
Synthesis

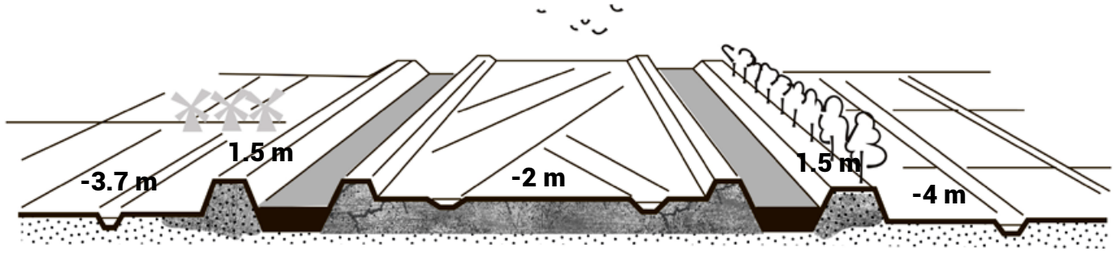

STEPPED WATER SYSTEM
FLOATING VILLAGE
CLAY
"ROOM FOR BOEZEM"
CO2
CO2
LAYERING UP
instrument
land use
AGRICULTURAL USE
CRANBERRY
BULRUSH / WILD RISE / REED
ELEPHANT GRASS
AZOLLA FILICULOIDES / PV
Sphagnum
-0.10 m
PEAT MOSS CULTIVATION
BIO-BASED BUILDINGS
ELEVATED VILLAGE

CONTEXT ANALYSIS

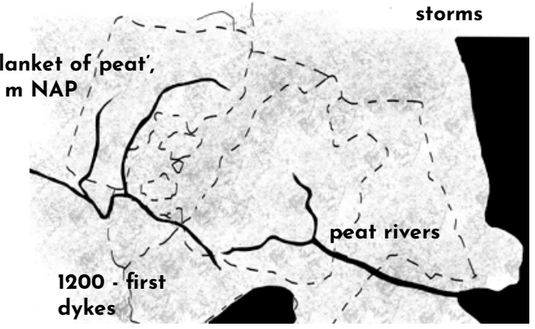
Story of peat soil in North Holland

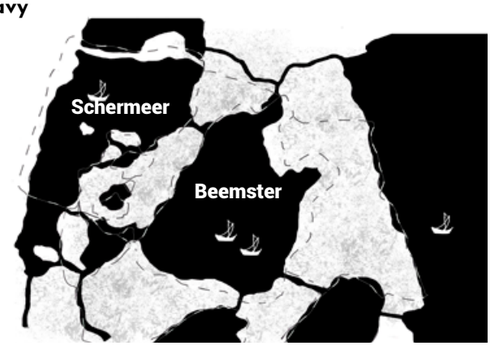


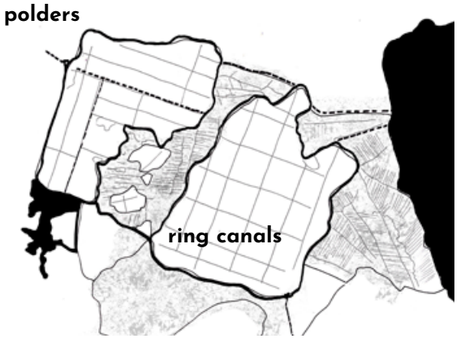




Landscape biography







Peat Formation

3000 BC - 800 AD

Reclamation

975 AD - 1200

Creation of lakes by wind

1350

Large Reclamation

1600-1650

Continuous Subsidence

Urbanization

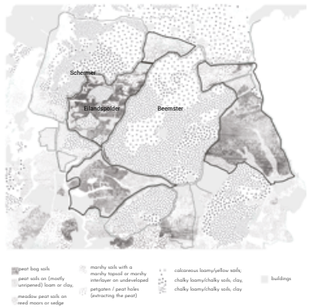
1650 - current

Future?

Gaia-graphic representation

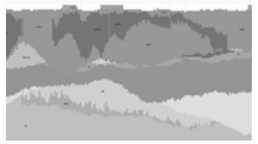
Disappearing peat

Current social-ecological systems



Soil map
depth 1.20 m

Geomorphological map



Structure of the subsoil
up to 50 m below sea
level

peat soil

clay soil

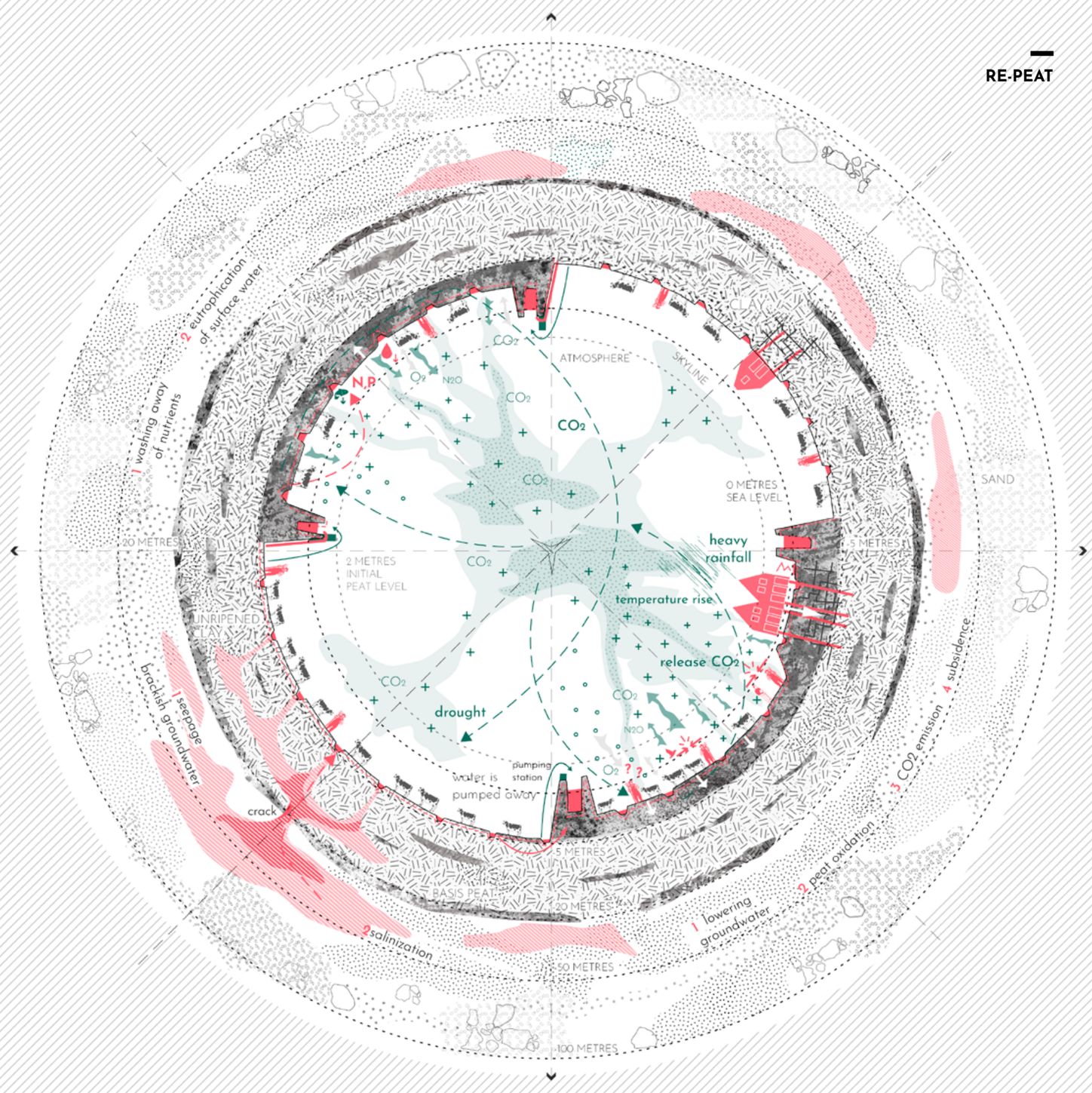
sand

brackish groundwater

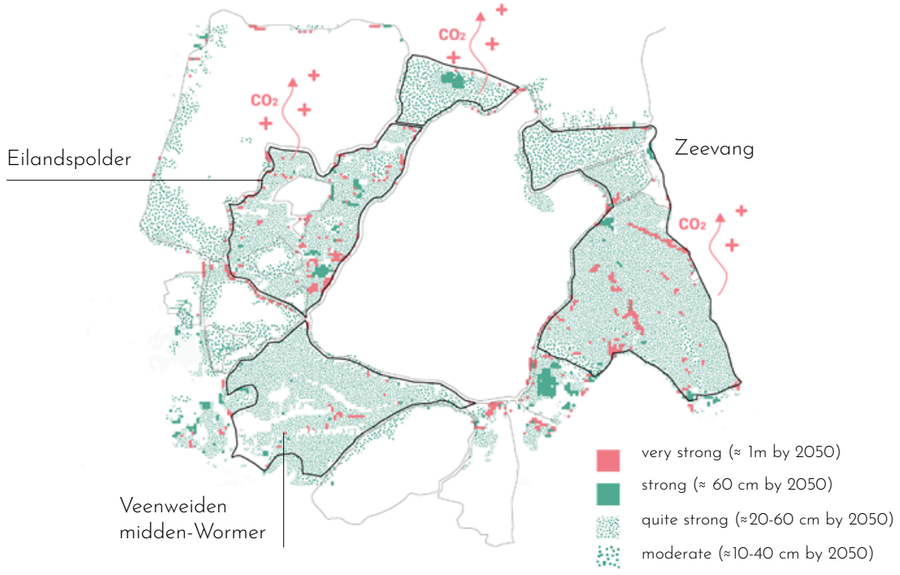
CO2

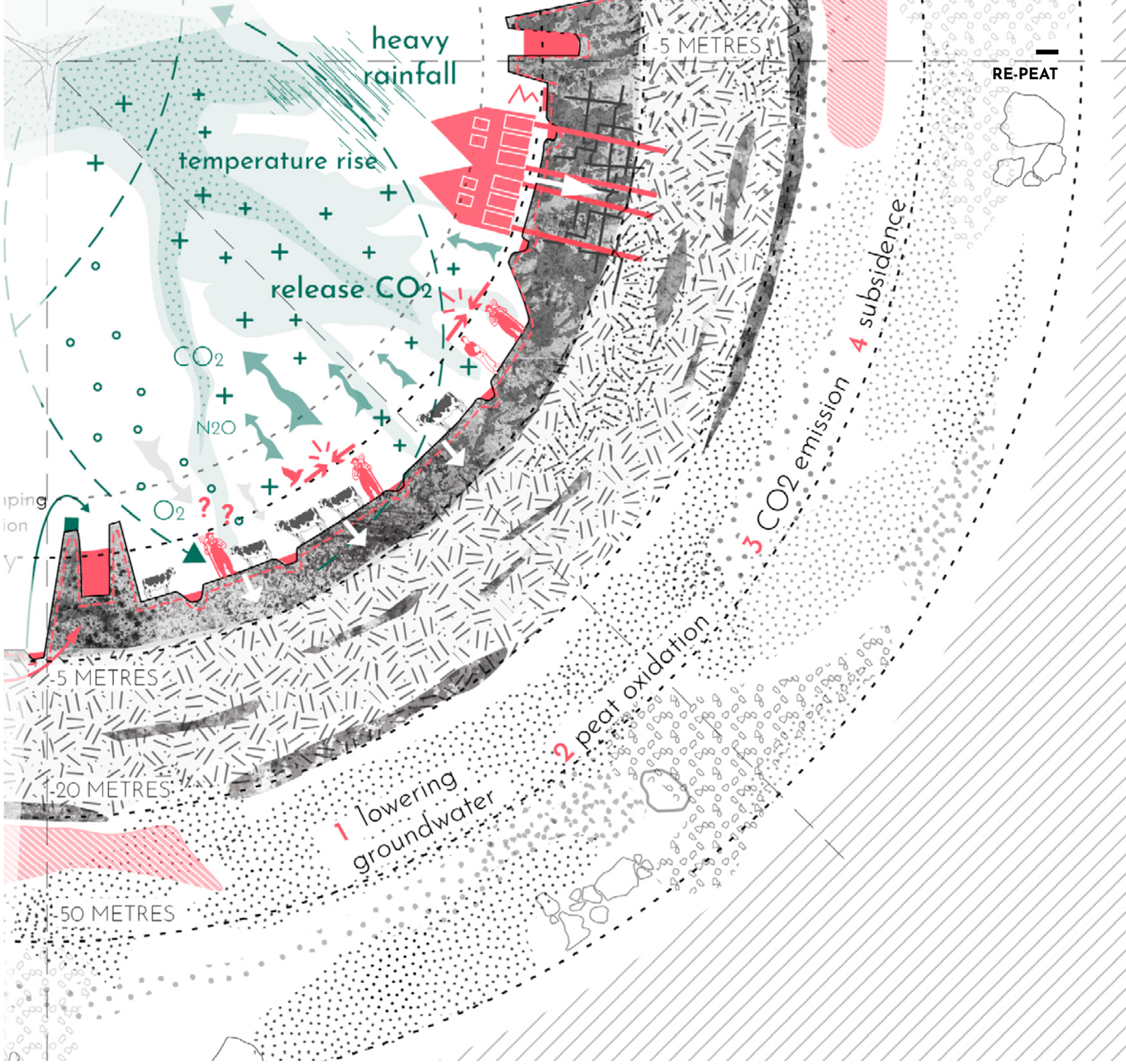
O2

RE-PEAT

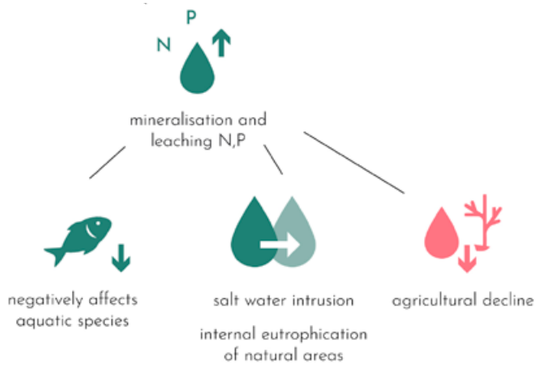


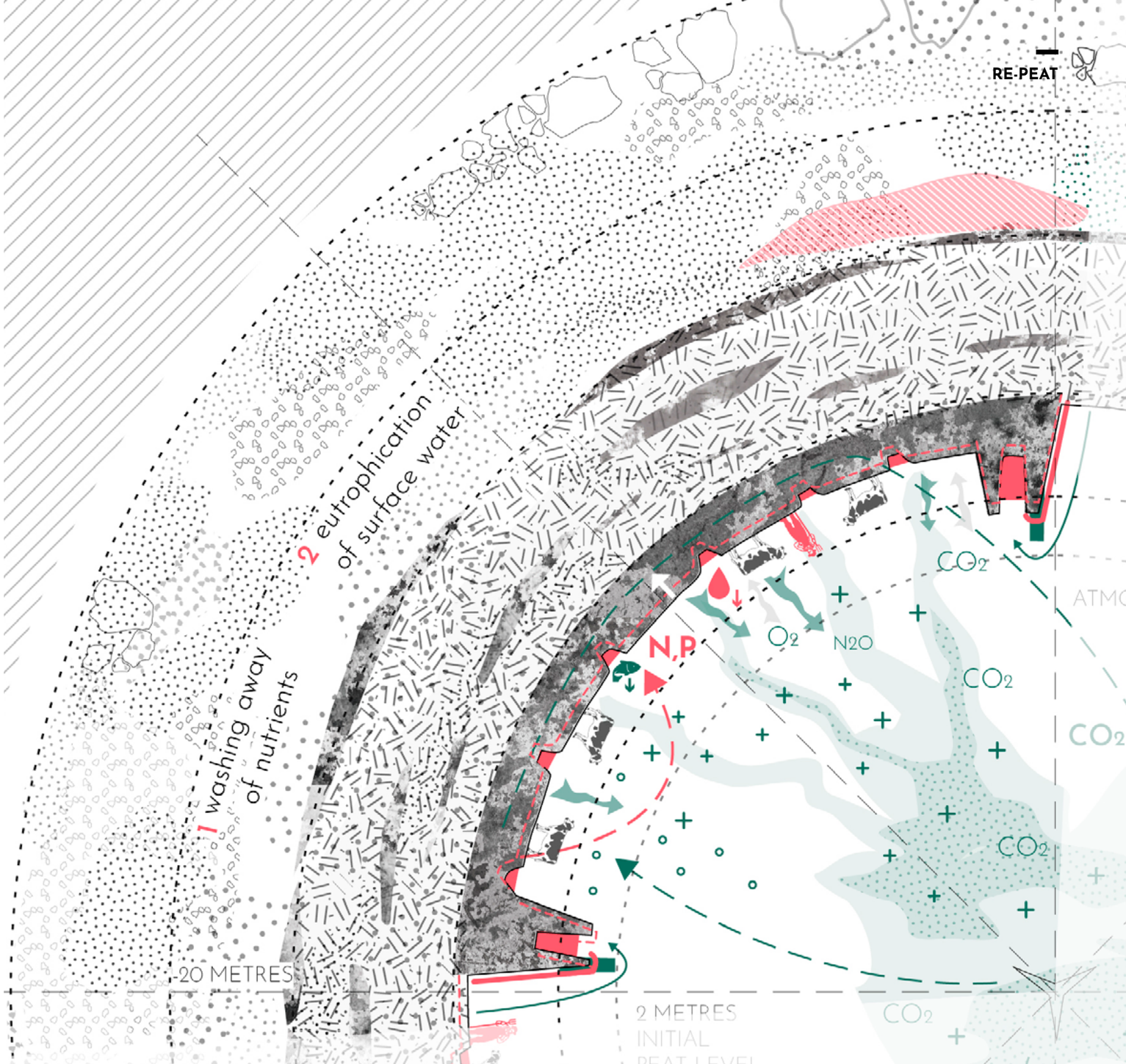
Subsidence and peat oxidation



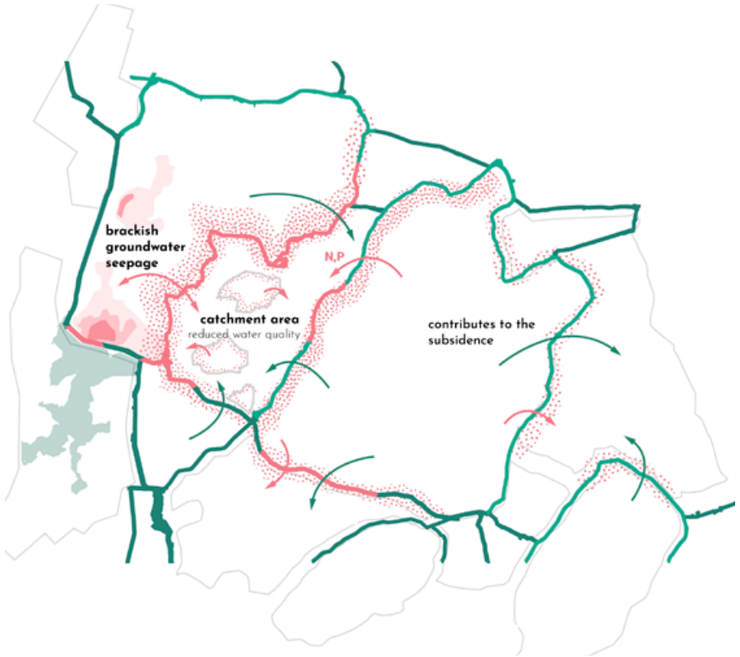


Reduced water quality

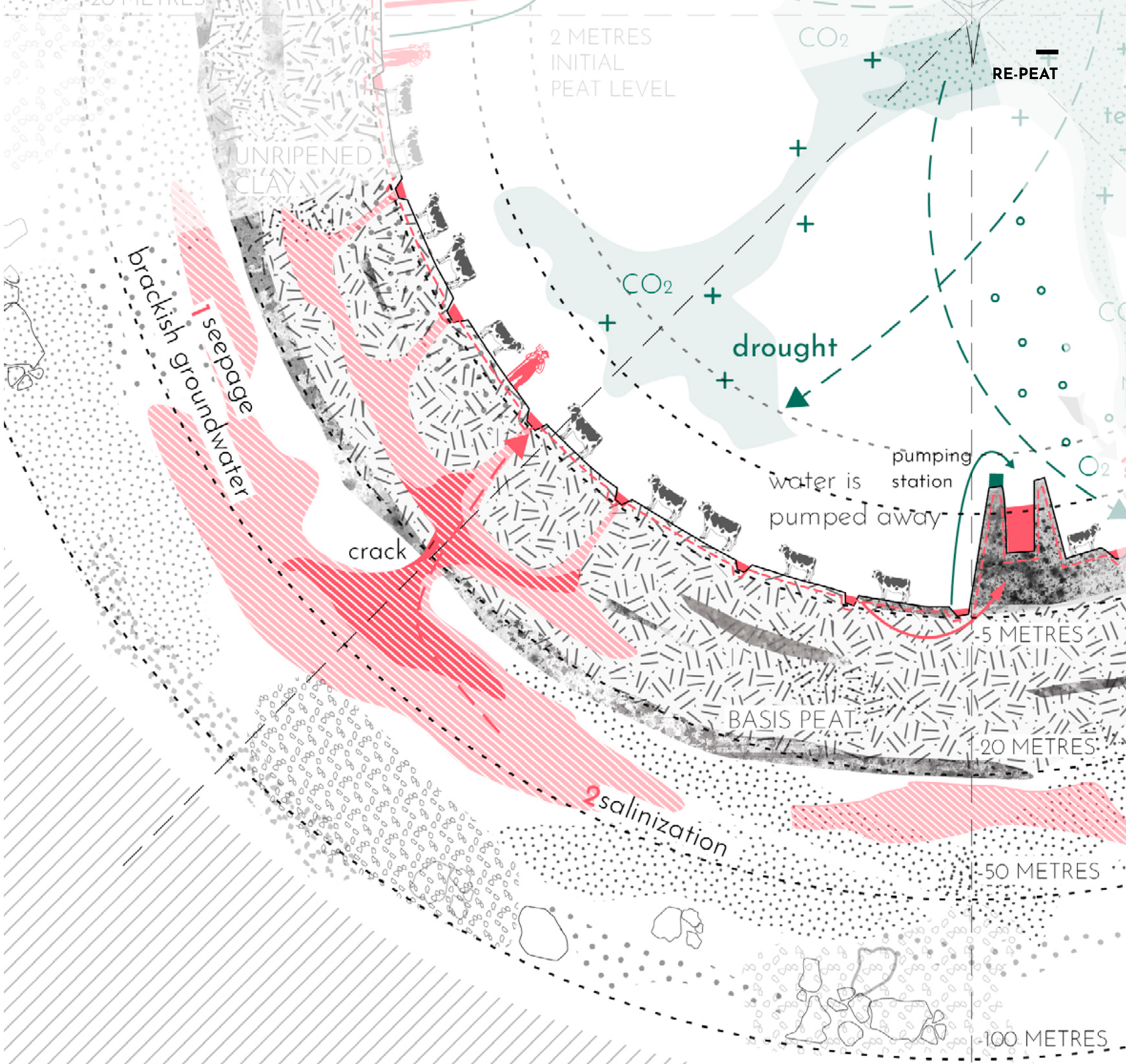




Brackish seepage groundwater in deep polders



Transition map



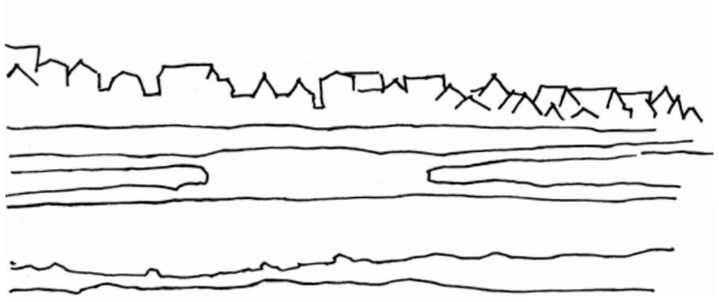
Perception of the peat polder

Eilandspolder

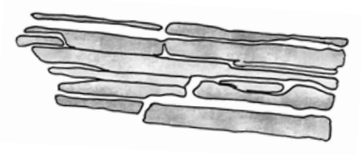
picturesque, silent and romantic

peat softness

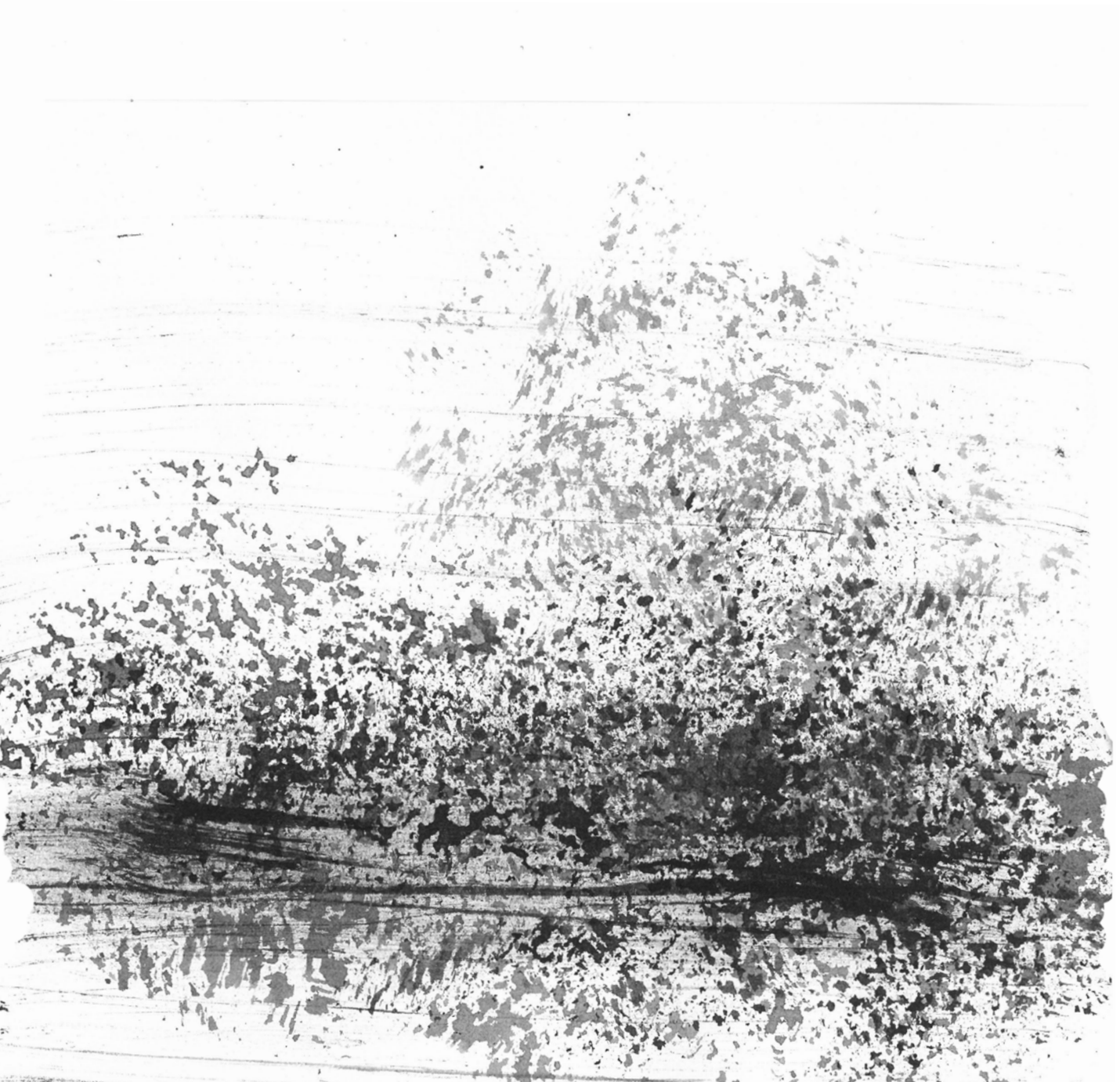
soft, curved edges



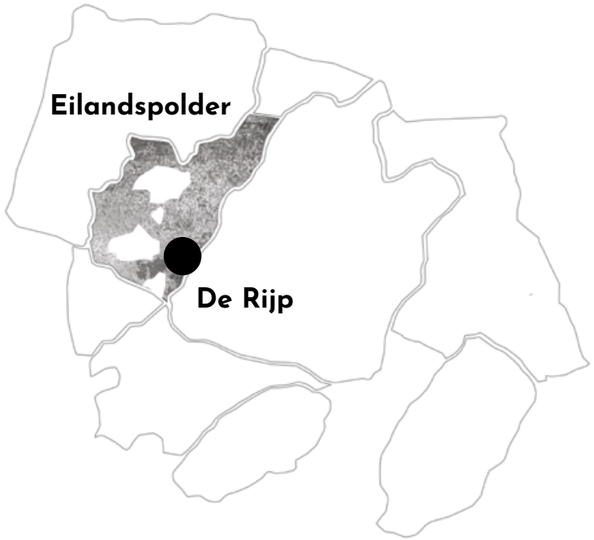
multi-layered landscape
with a village outline



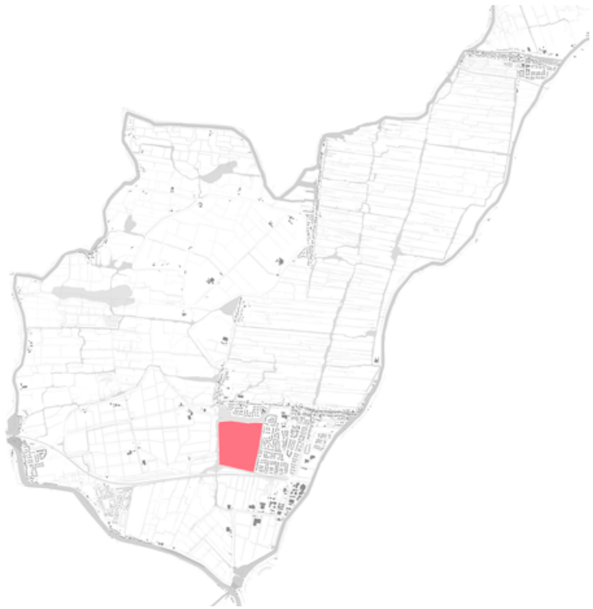
peat `islands`
with irregular parcelling



CASE STUDY



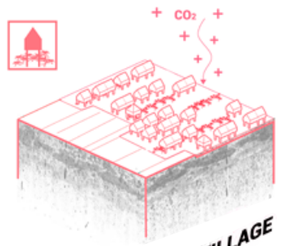
Selected strategies

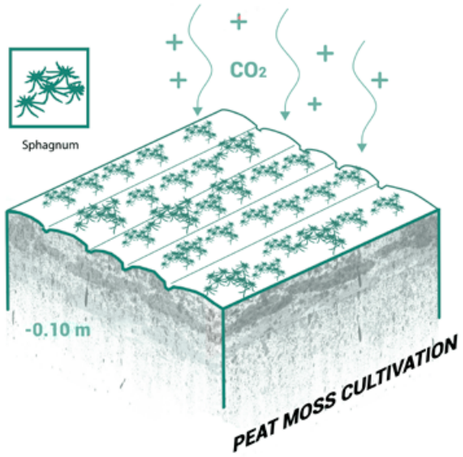


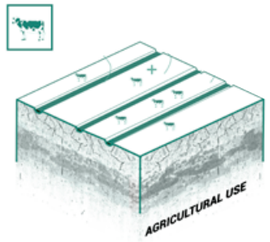
Village expansion

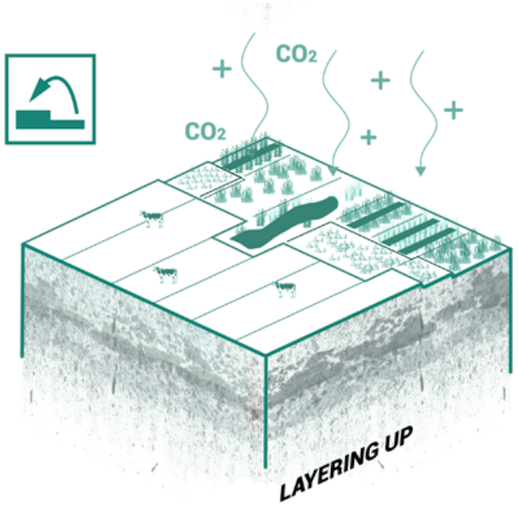
Limiting damage to the landscape and realising a compact village centre

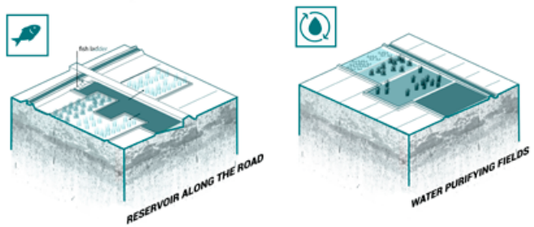
the highest chance of implementation



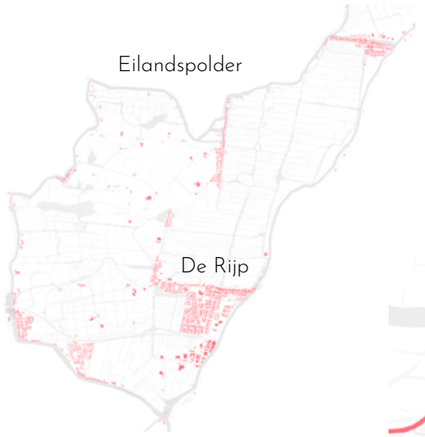


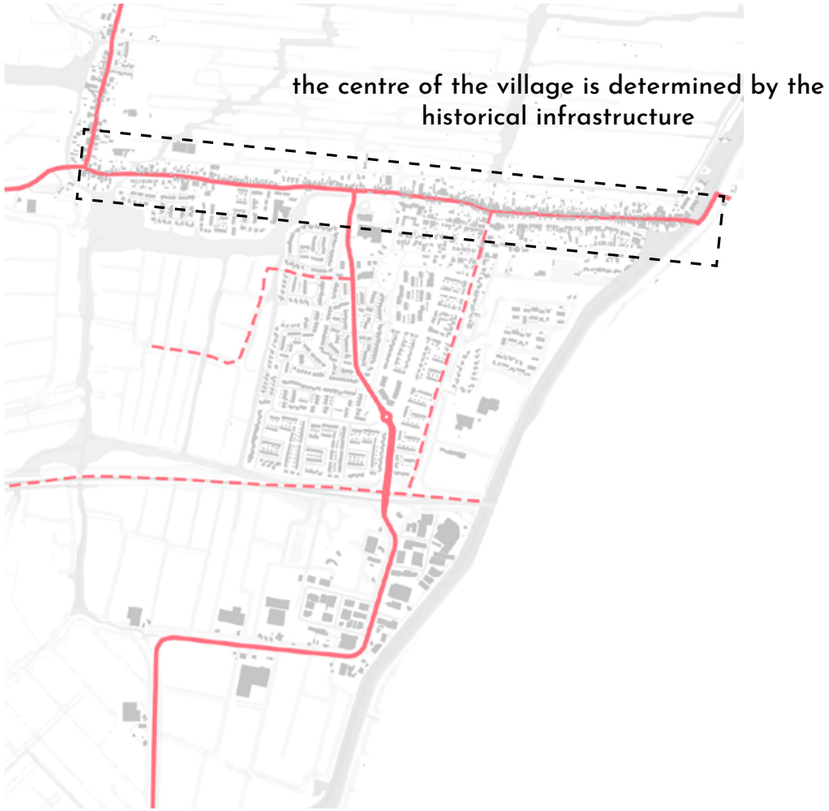




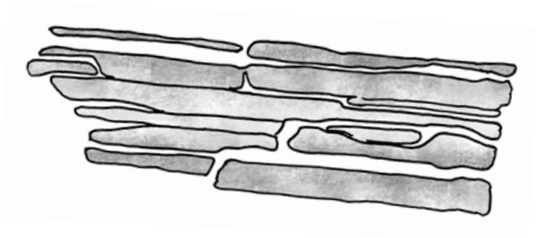


De Rijp analysis

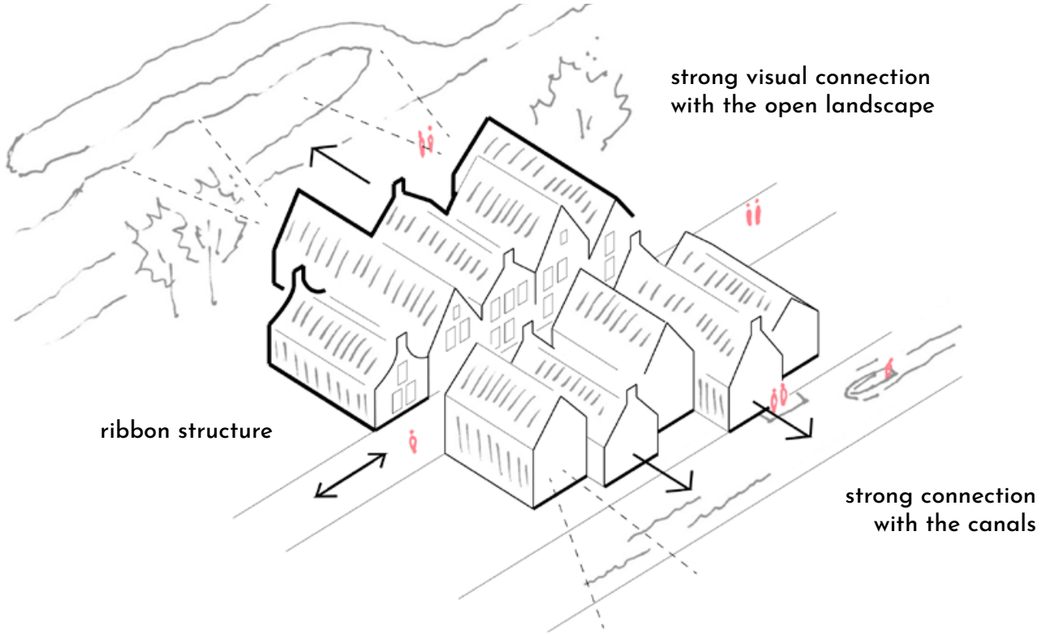




Infrastructure of De Rijp



structure of islands and wet conditions



Site plan

Structure of islands, based on the structure of the Eilandspolder

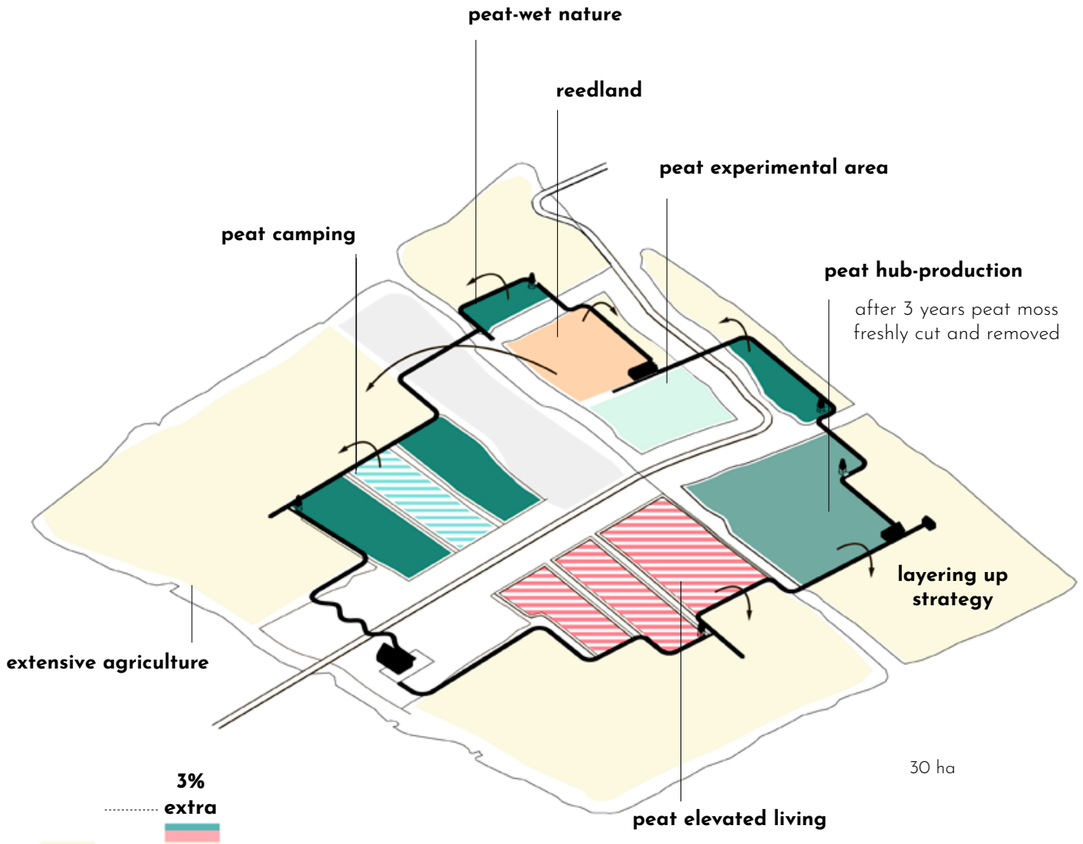
Connection with existing infrastructure

New development is determined by the infrastructure

Rainwater storage for the peat development in the lowest area

Existing situation

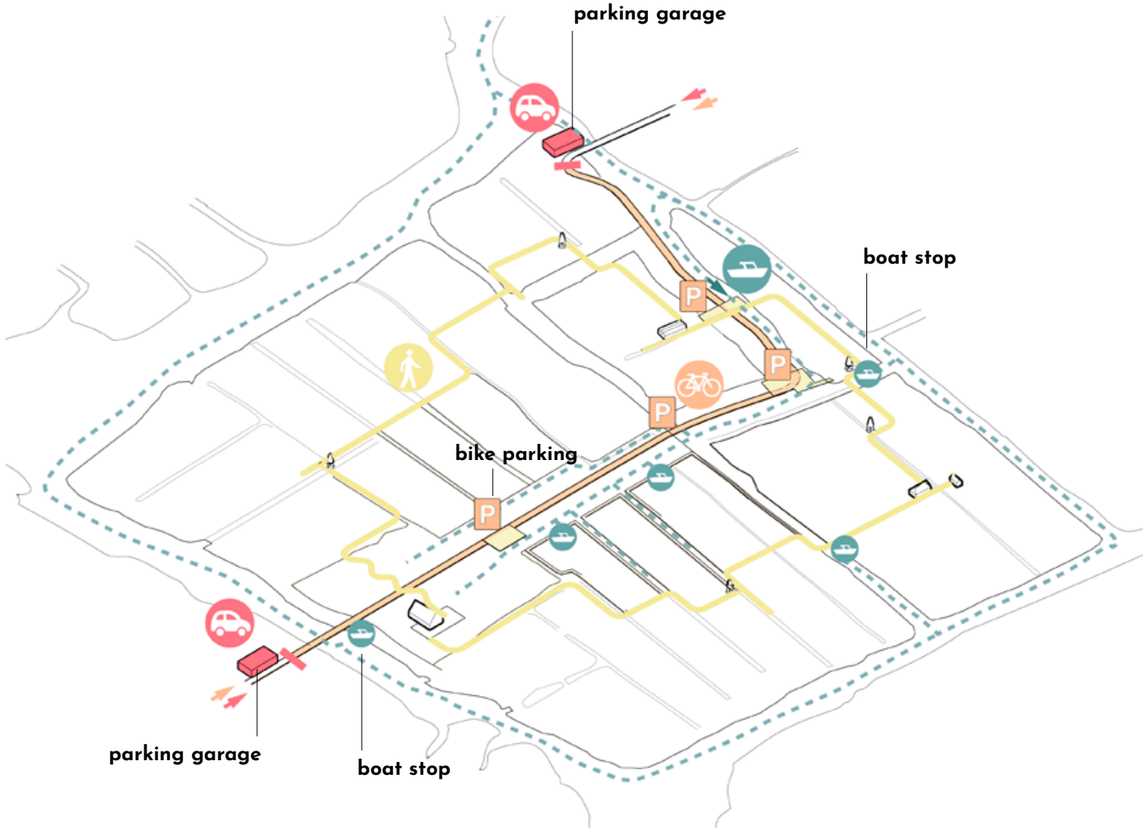
Land use



Land use comparison

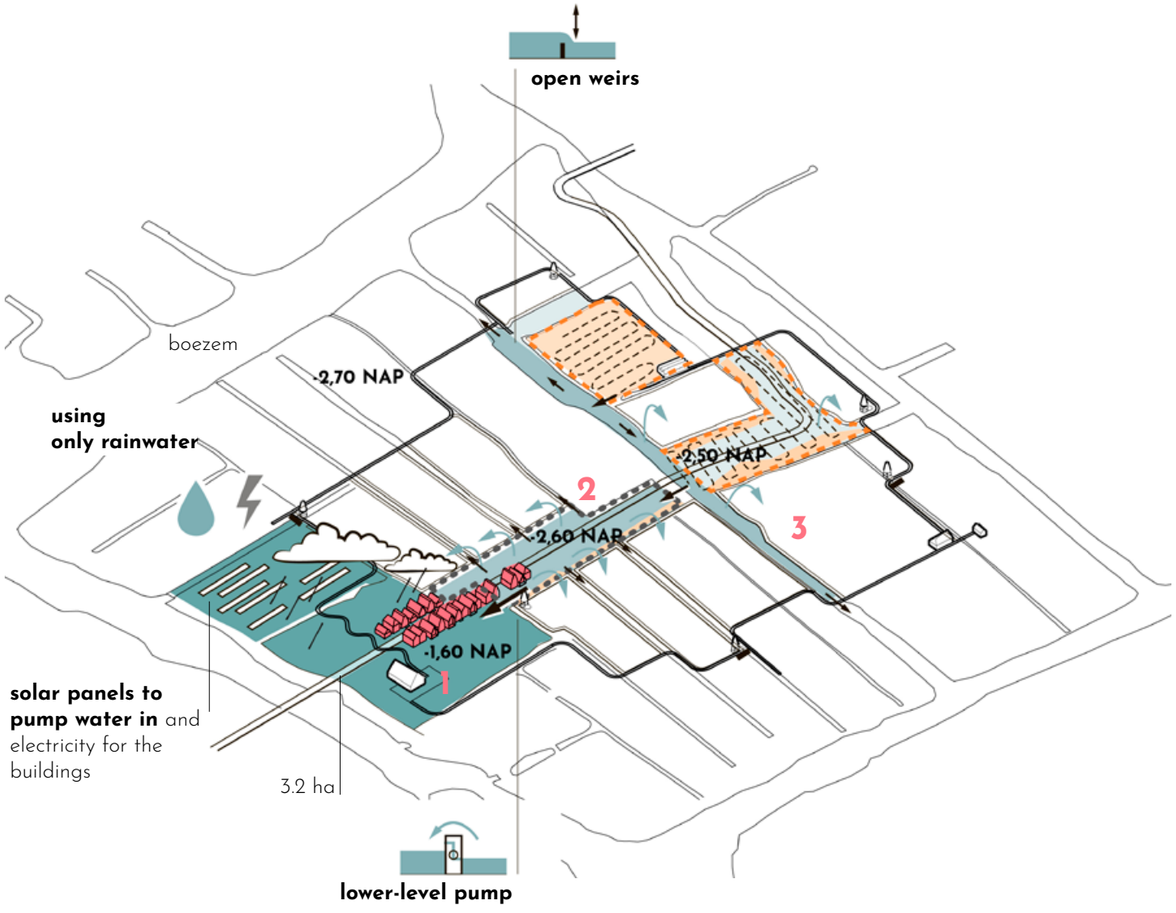
agriculture
existing gardening 6%
pet-wet nature 15%
experimental area 2%
reedland 5%
floating buildings 6%
rainwater storage 6%
peat hub-production 5%
waterways 3%
public spaces 1%
camping +1% extra
elevated buildings +2% extra

Accessibility



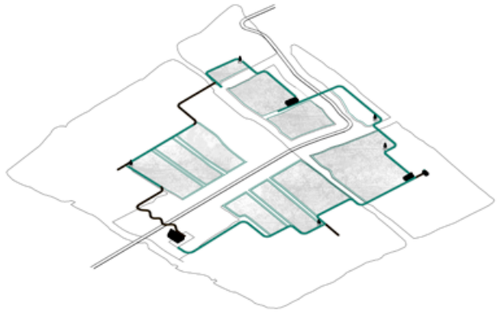
Water system

summer



winter

RE-PEAT



Path as a border for peat development

peat learning community center

camping housing

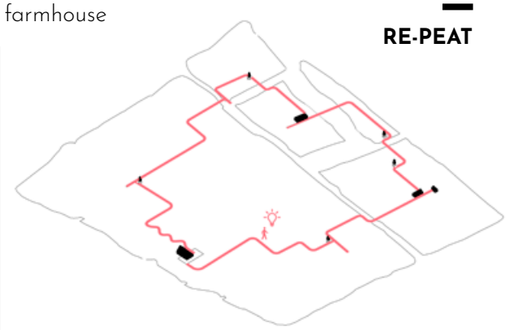
peat pumping station

peat observation center

landscape observation platform

peat station

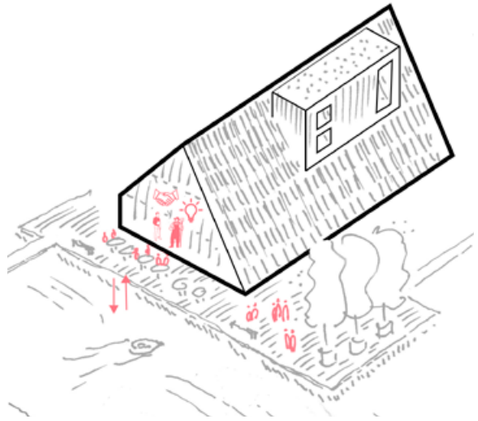
"Re-peat" farmhouse



Path as an excursion route

Typologies

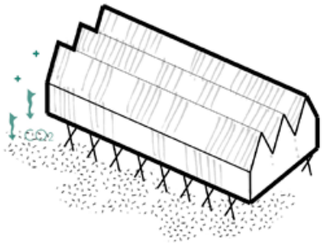
elements along the social-ecological path



peat learning community center

strengthen and extend
the social network

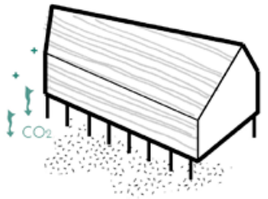
22x13x11 m



peat observation center

strengthen and extend
the ecological network

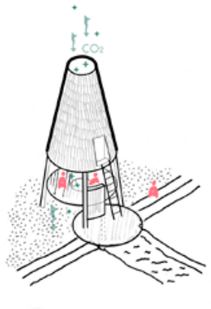
20x10x7 m



re-peat farm

new source of income

15x8x9 m

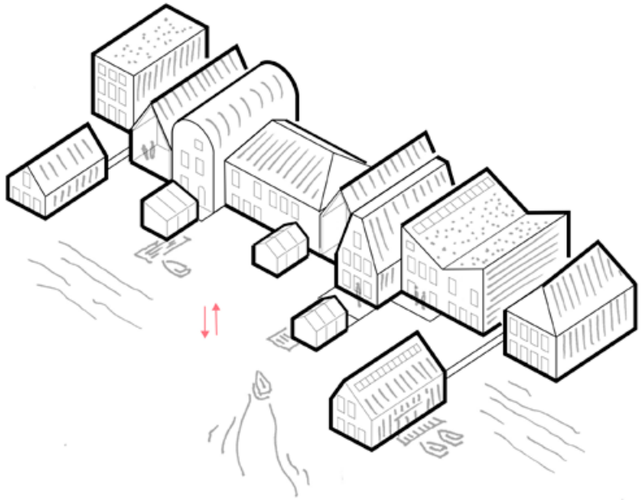


peat station

connects social and ecological
systems

5x5x12 m

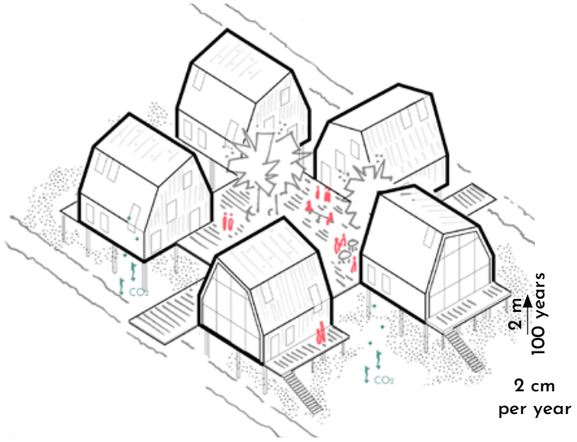
new types of living with peat landscape



peat floating living

connection with landscape water system

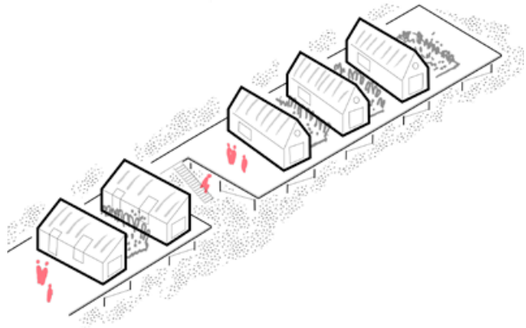
average 13x6x9 m



peat moss elevated living

connection with peat moss nature

9x9x10 m



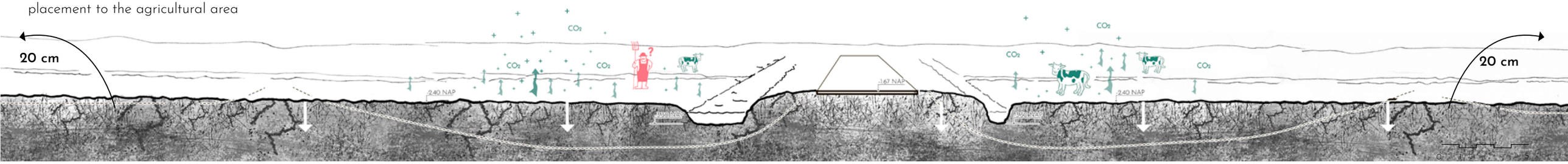
peat camping house

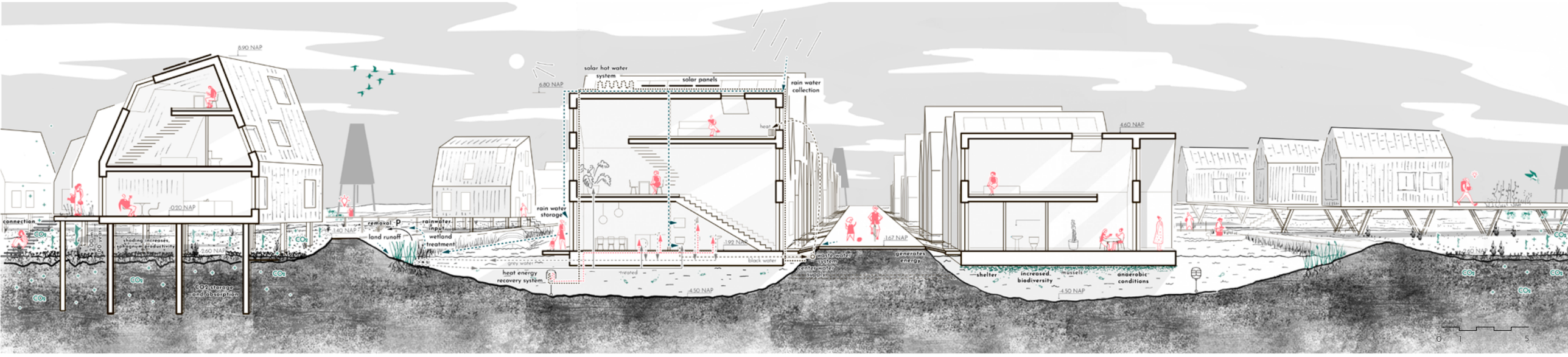
extra source of income, experience landscape

9x3,5x4,5 m

Sections

removal of the top layer and
placement to the agricultural area



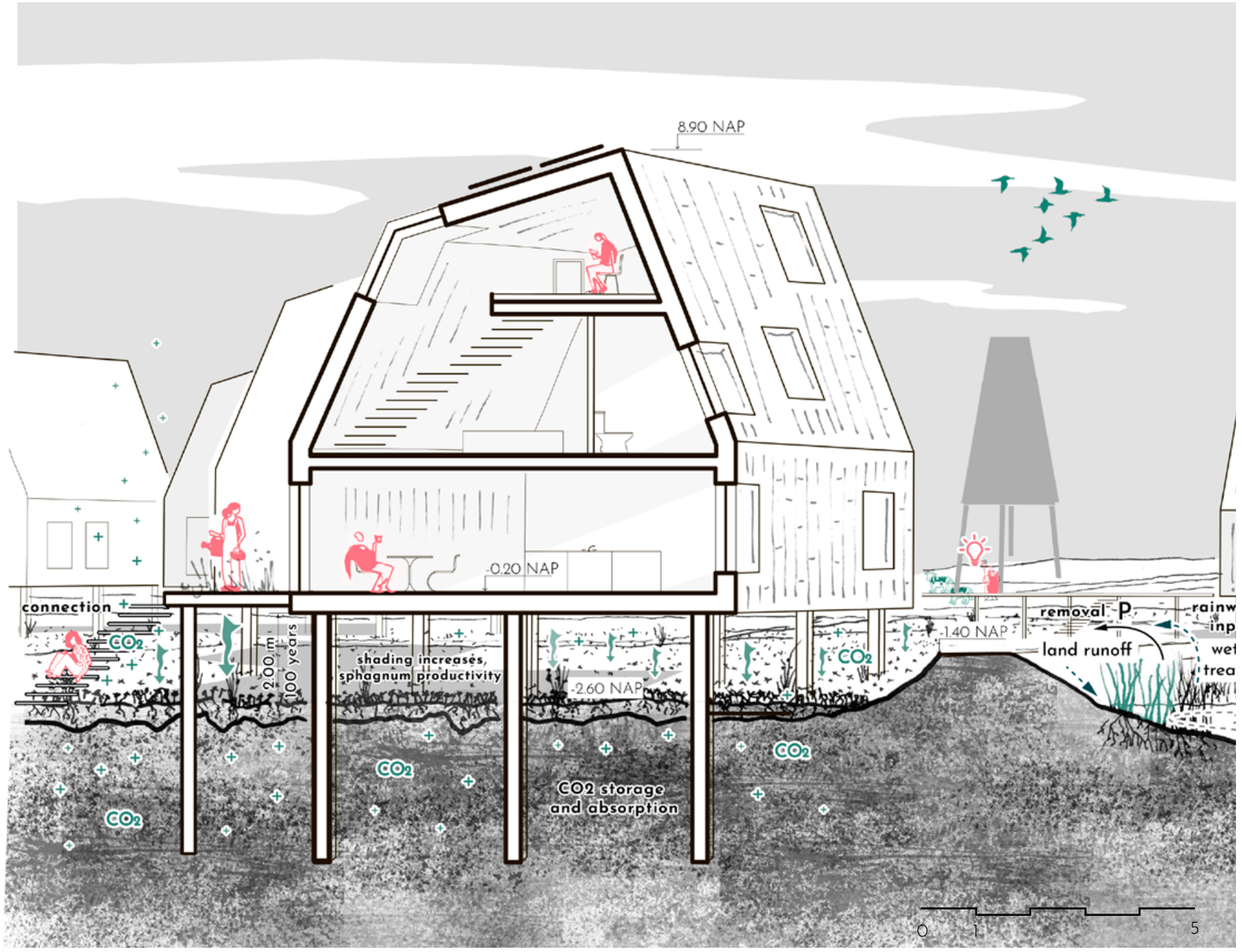


peat moss elevated living

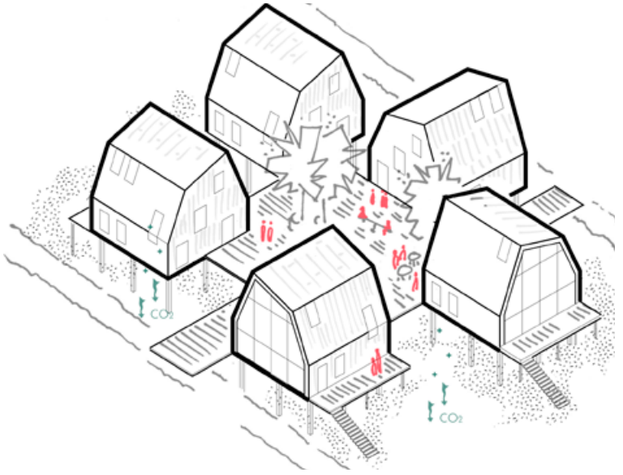
peat floating living

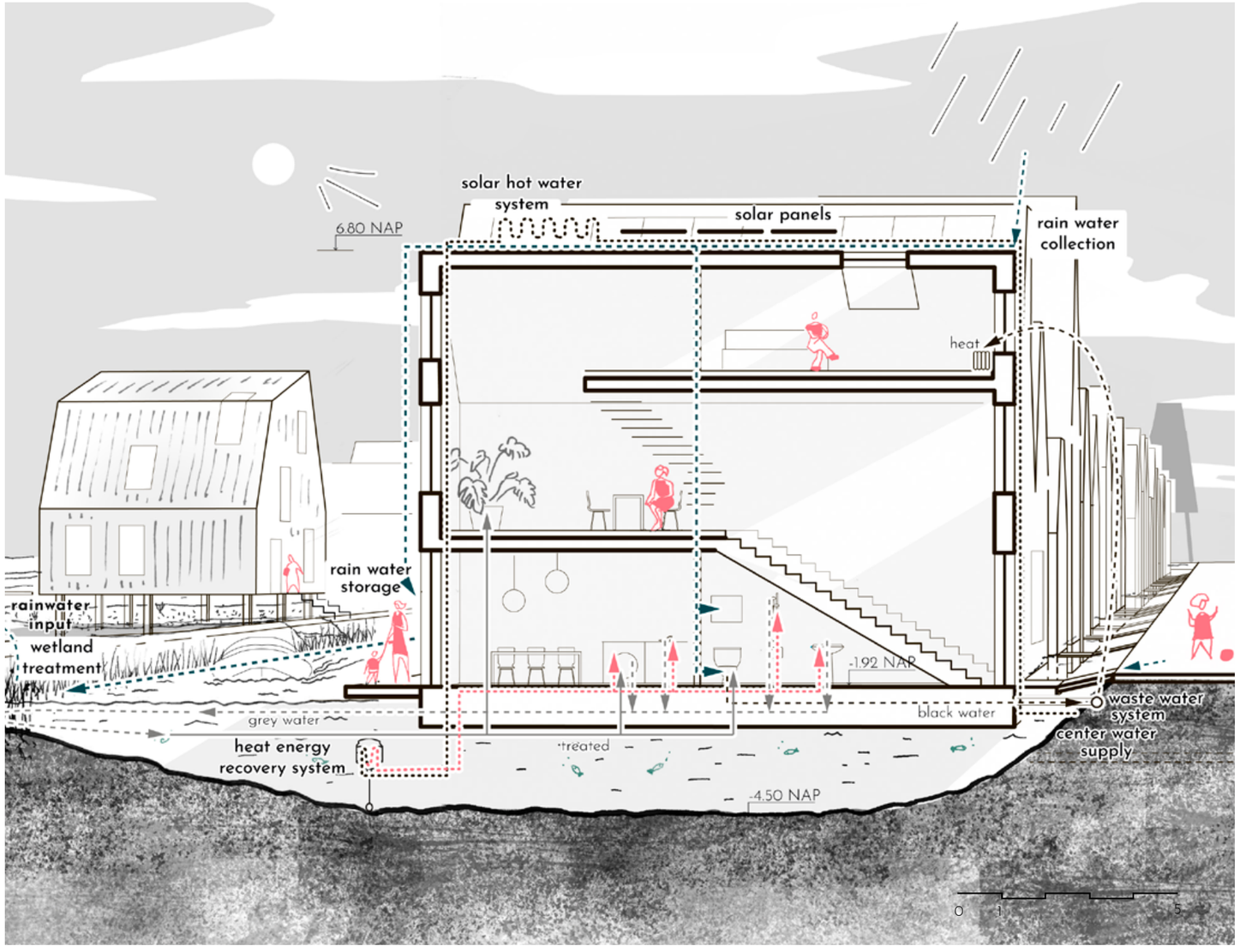
main pedestrian road

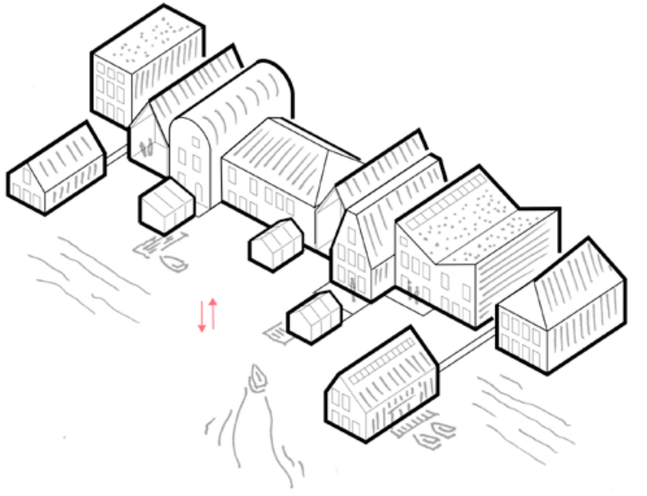
peat camping house



Peat moss elevated living

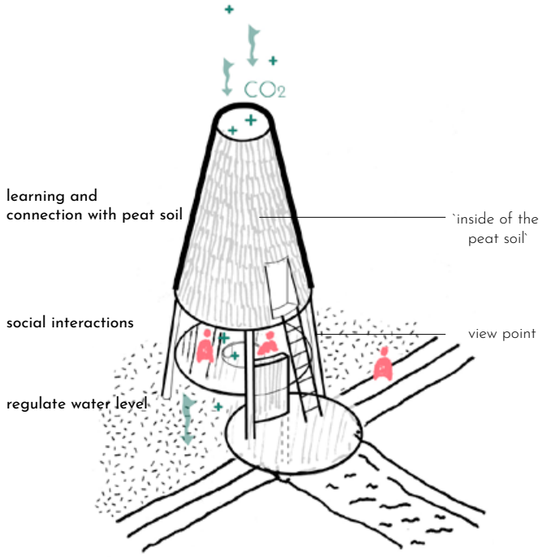


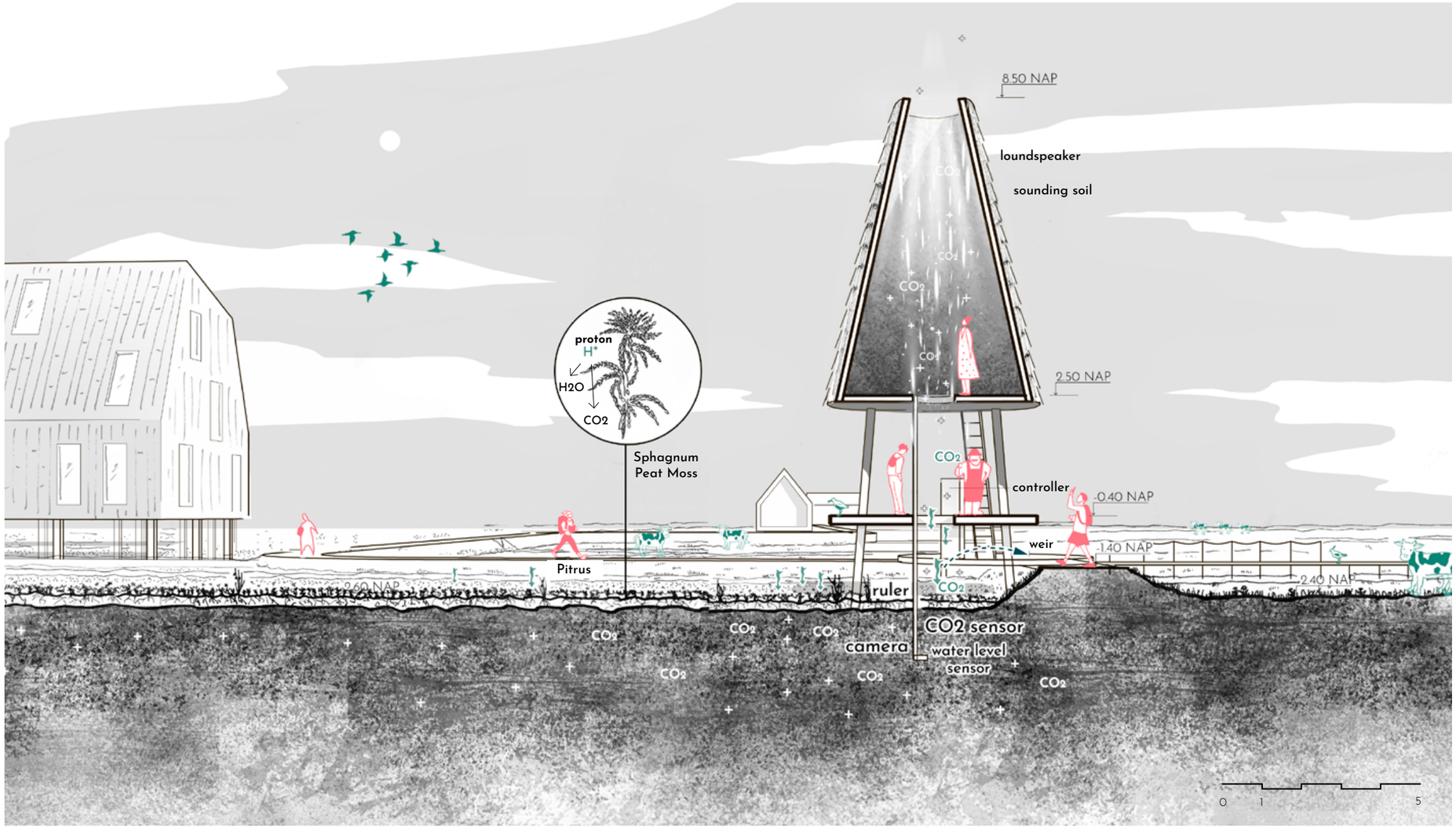




Peat floating living

Peat station





extensive agriculture

social-ecological path

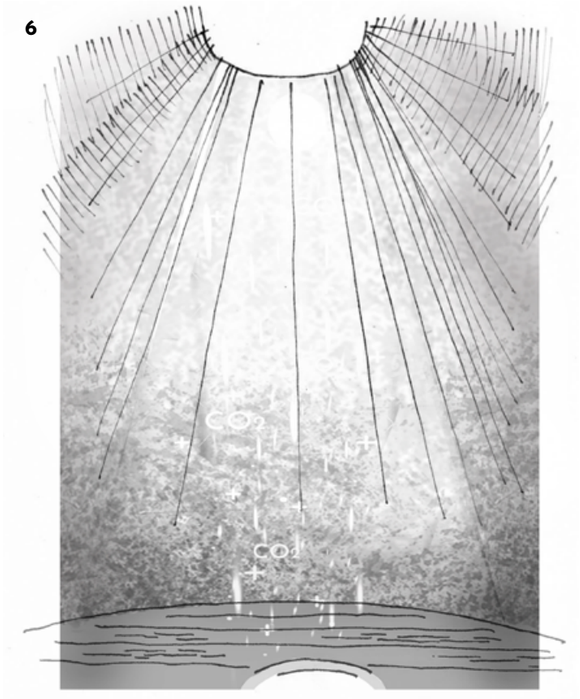
rainwater storage

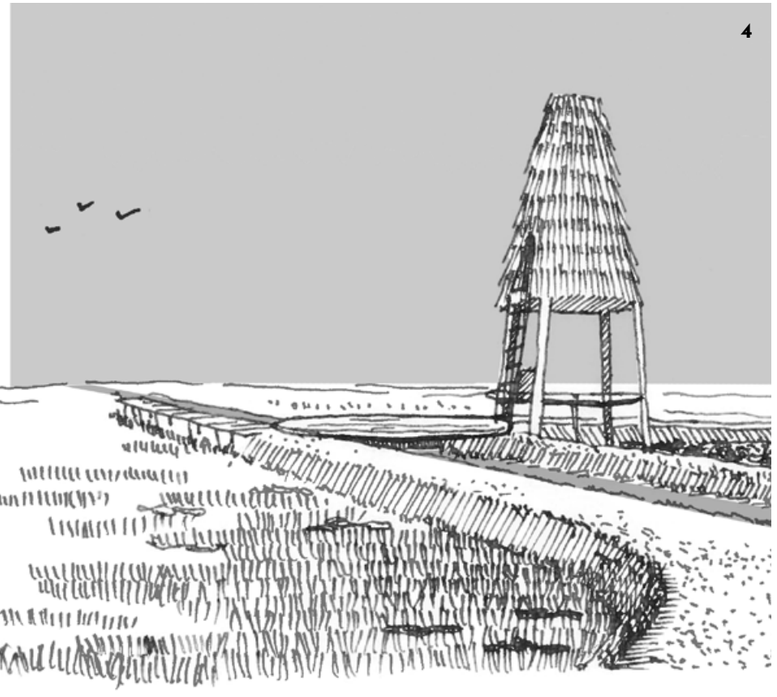
floating living

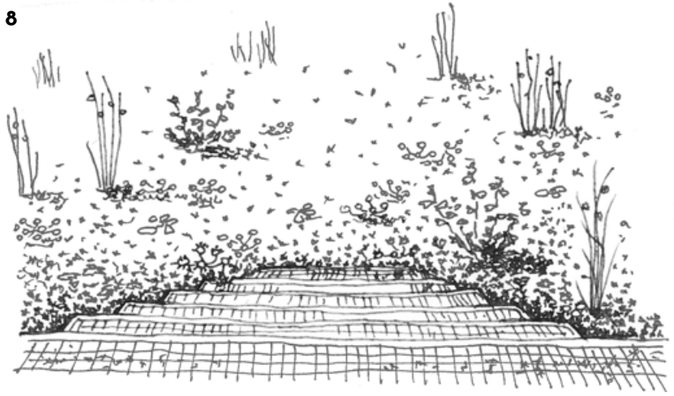
peat-wet nature

elevated living

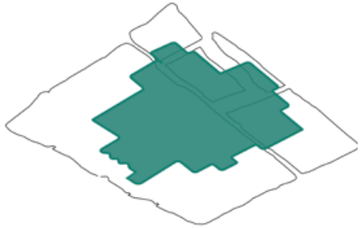
Experiencing the landscape

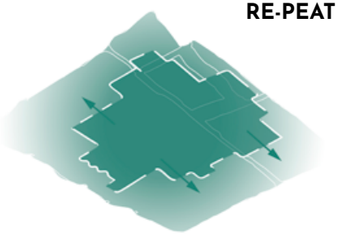


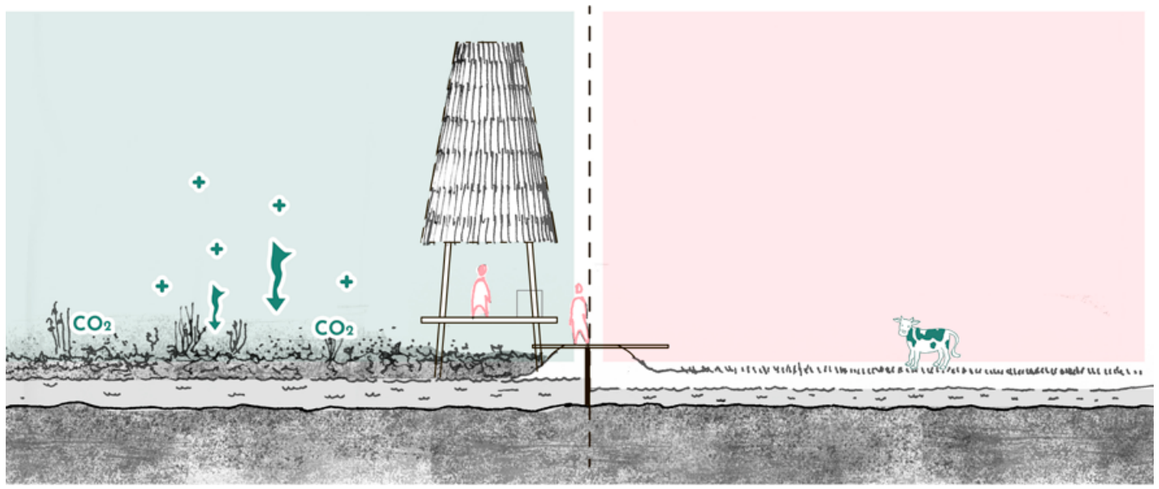




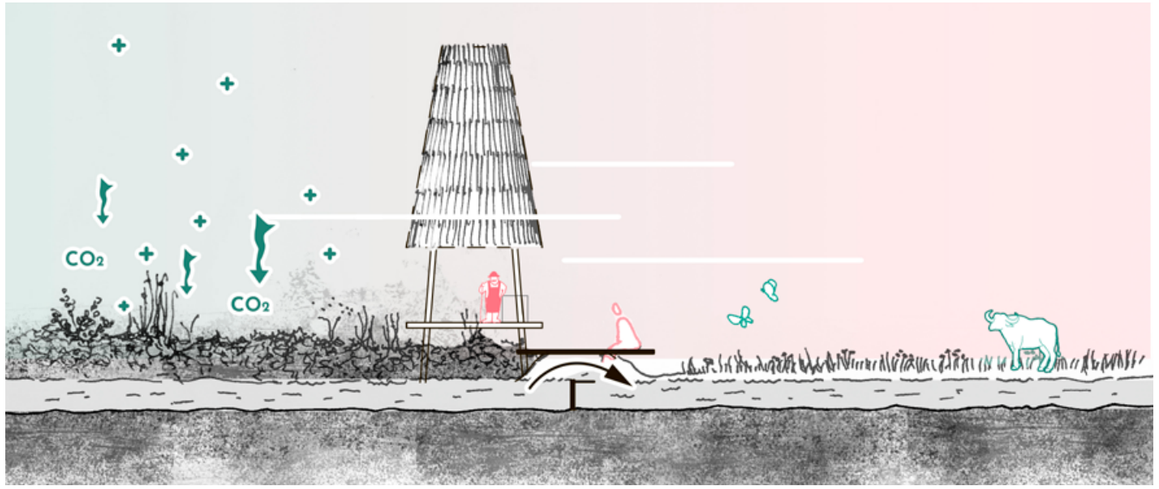
Change over time



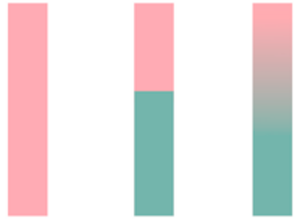




upon completion



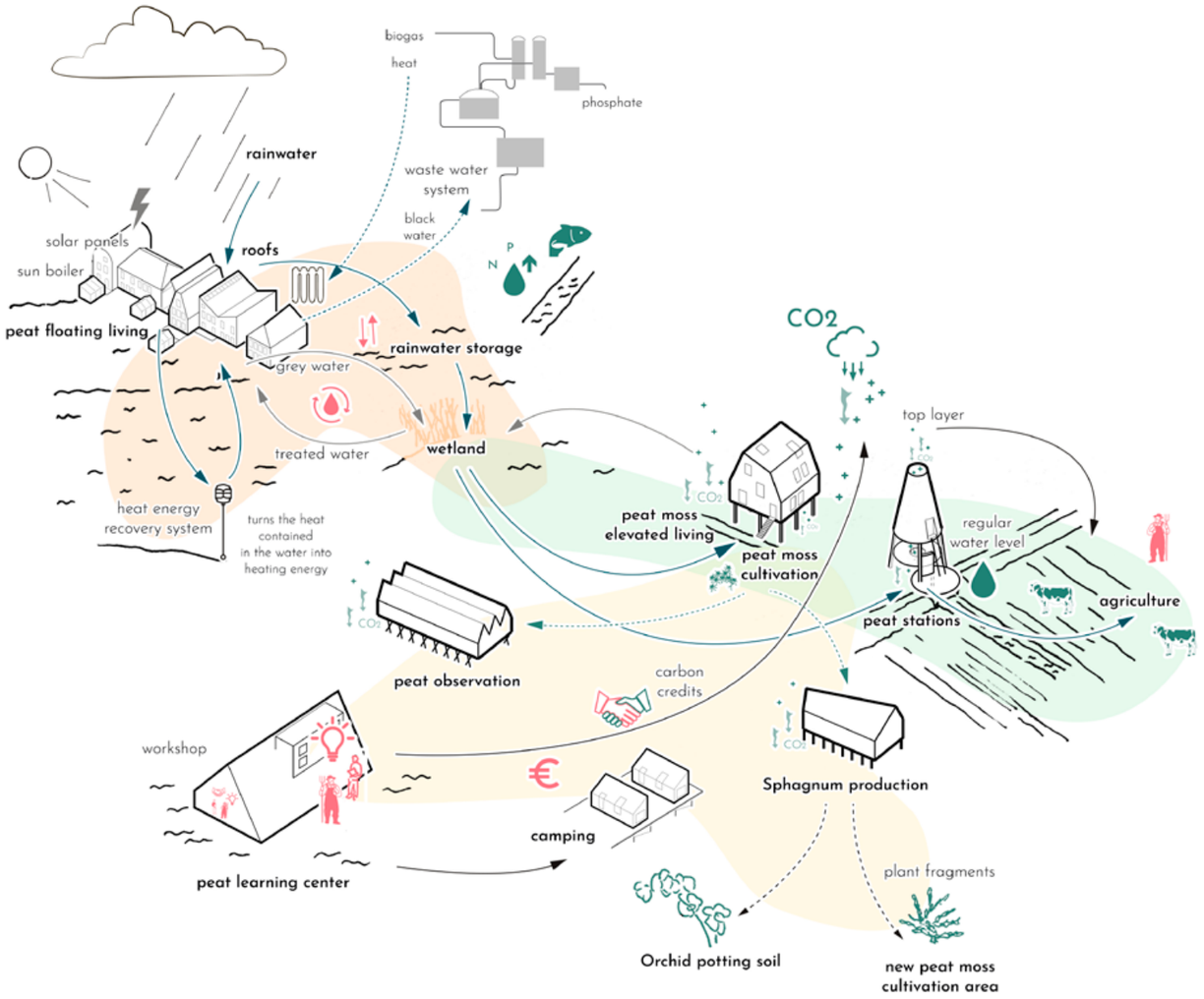
over time



Current Design Over time

over time,
the division will be blurred

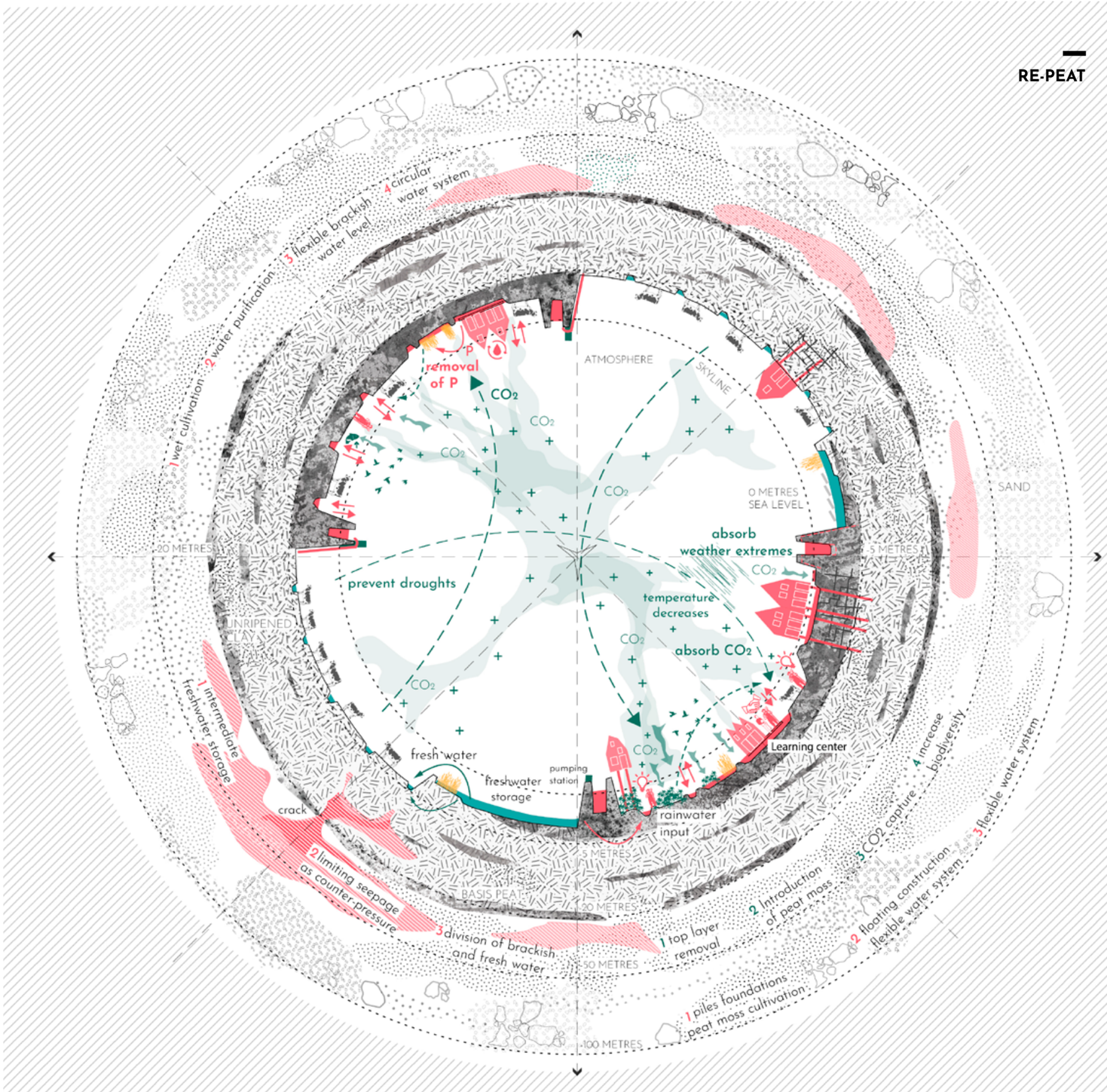
Social-ecological interactions



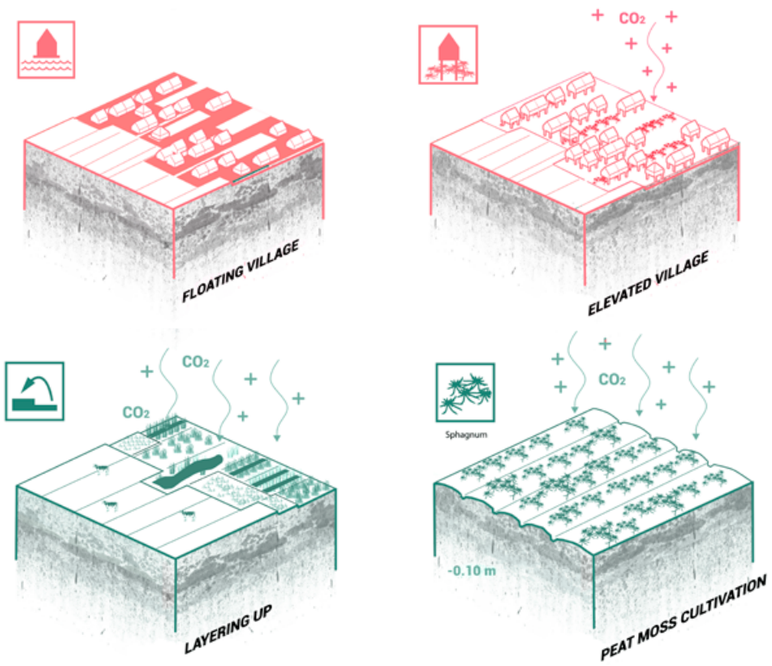
Social-ecological landscape

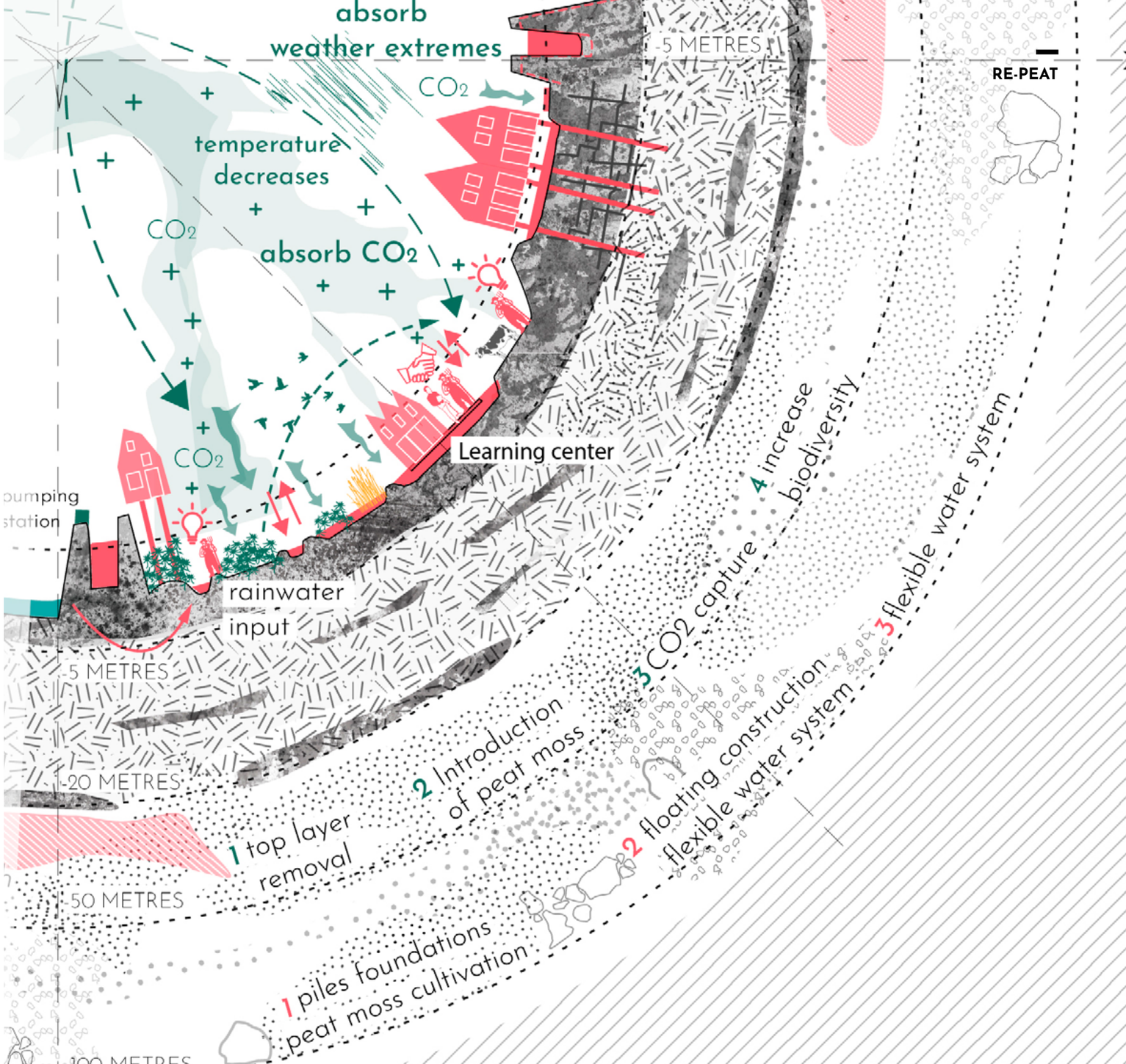
Gaia-graphic representation

Social-ecological landscape

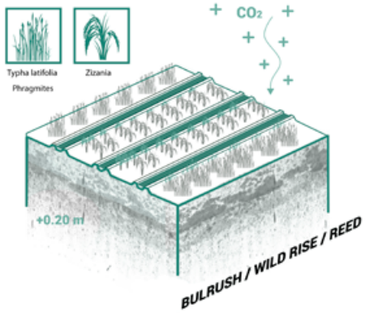


Stopped subsidence, sustainable urbanization





Improved water quality and conditions for nature and human

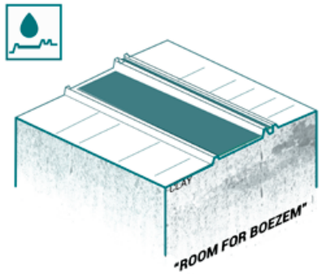


Paludiculture as a buffer for nature

RE-PEAT

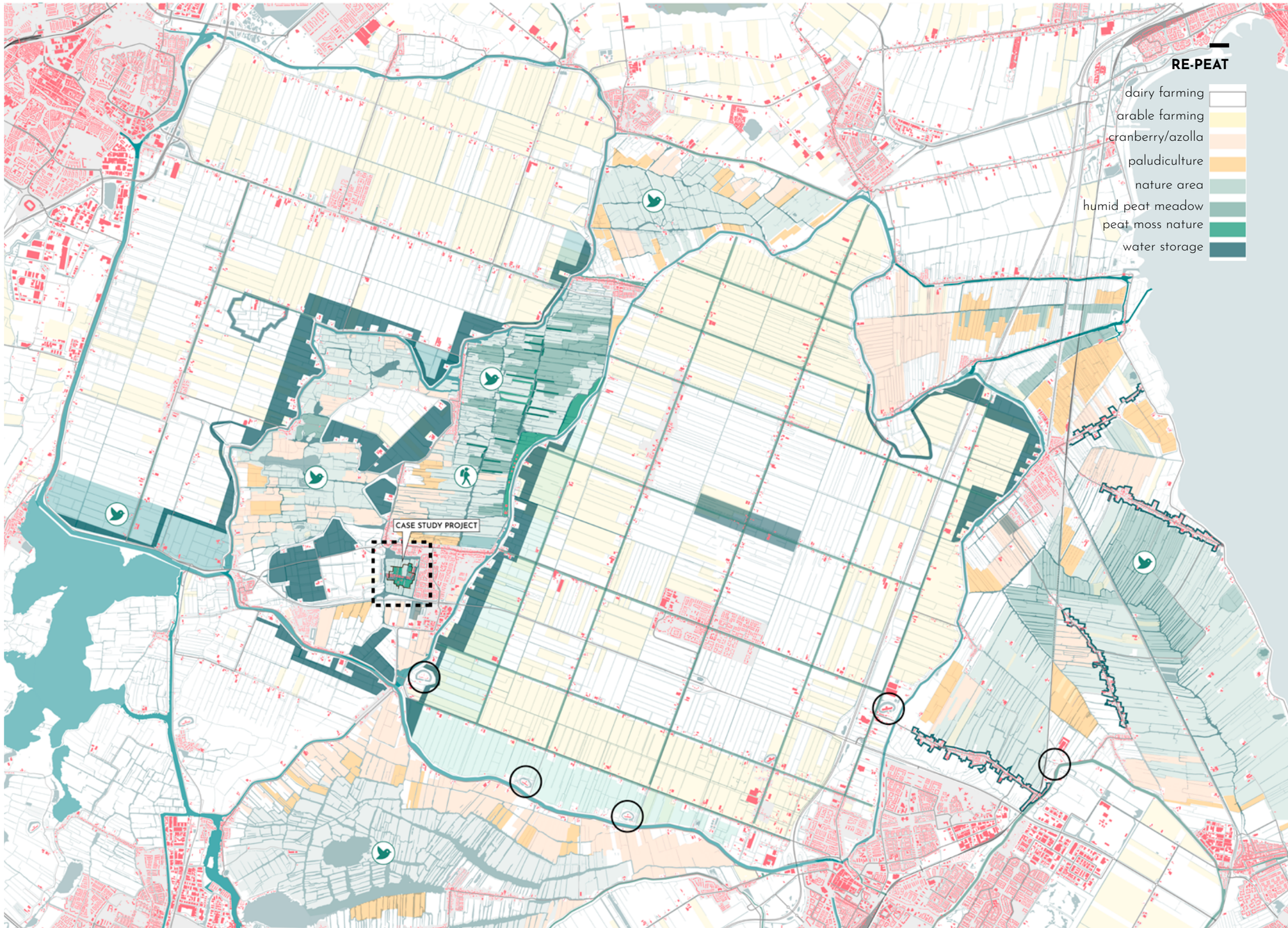
1 wet cultivation
2 water purification
3 flexible brackish water level
4 circular water system
P removal of P
CO_2
CO_2
CO_2
20 METRES
prevent droughts

Reduced brackish seepage groundwater and improved water quality for agriculture and nature

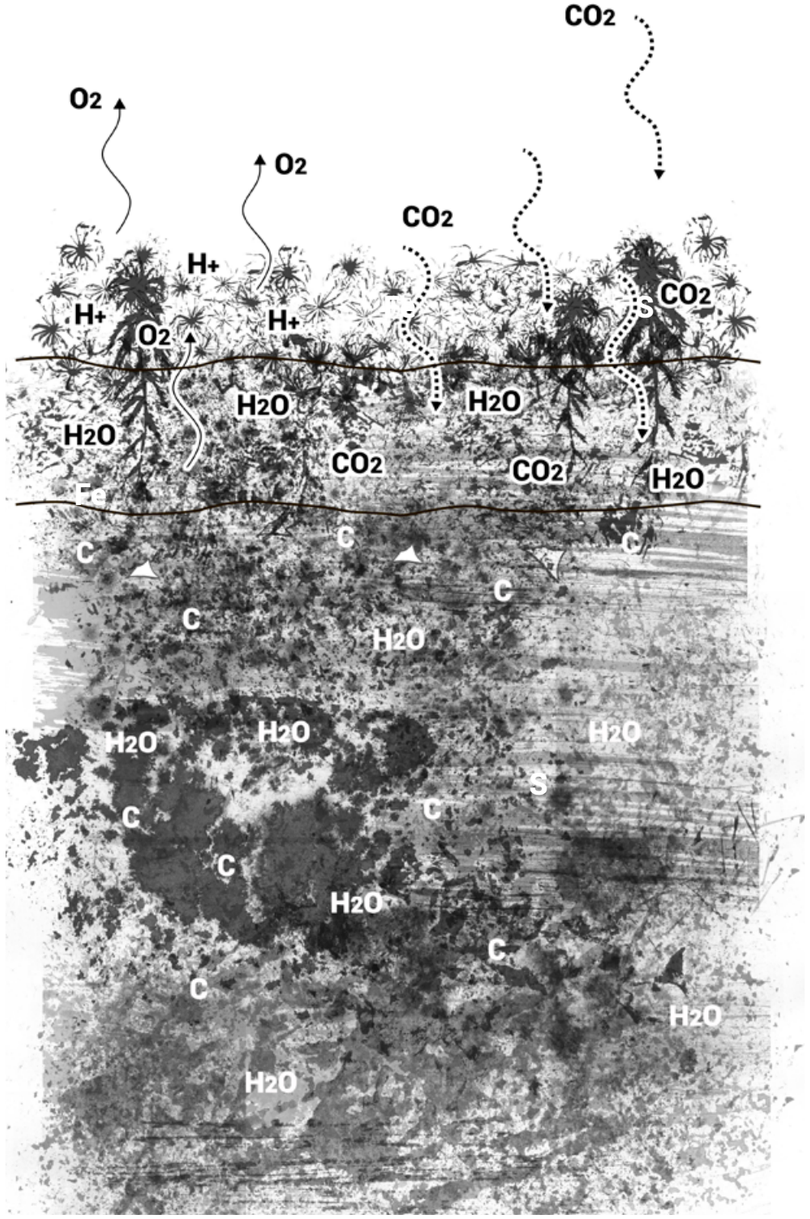


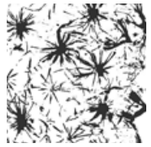
'inbetween boezem-network'

Future vision



CONCLUSION





Sphagnum

Section of peat soil in the social-ecological landscape

RE-PEAT