BORDERSCAPE

- Increasing the level of permeability between land and sea (in Northern Netherlands)

- Introduction :
    1. Use of permeable borders establishing borderscapes
    2. Design location (Northern Netherlands)
    3. Relevance of borderscapes

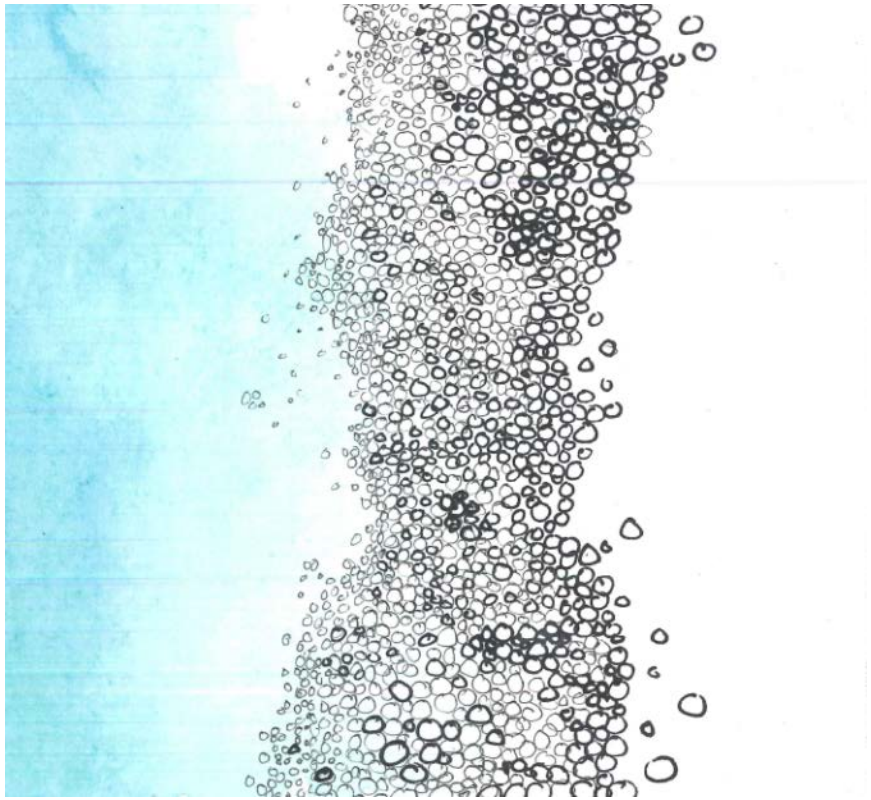
- Design : Transforming a narrow dike to a borderscape
- Reflection

INTRODUCTION

PERMEABLE BORDERS

- A '**natural**' border: gradual transition zone with a physical space between land and sea that has distinguished functions & experiences

Sea



Land

DESIGN LOCATION

- Coastal border along the Wadden area (UNESCO)

- A **man-made** coastal border of Northern Netherlands





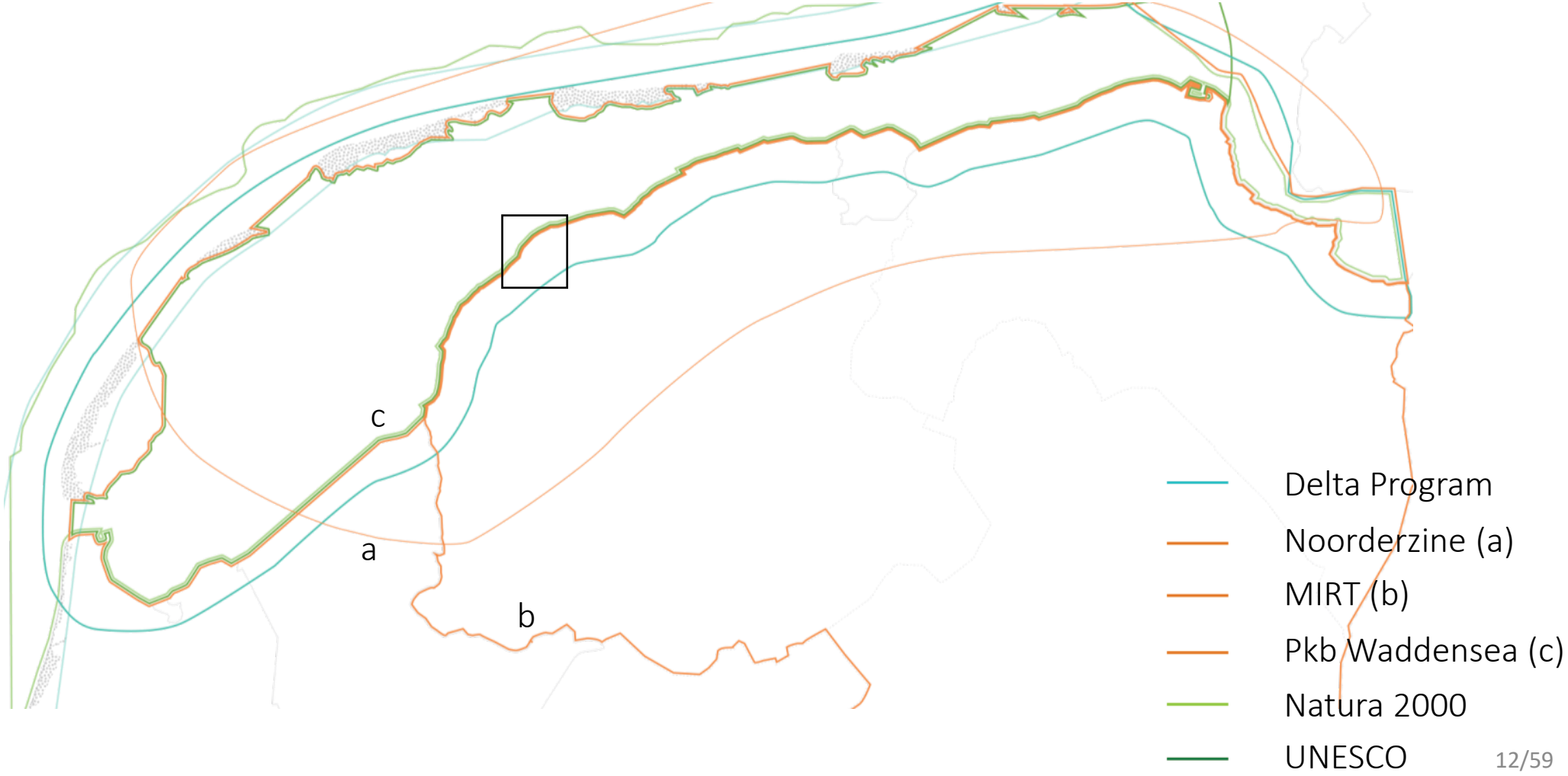

- **Design location Zwarte Haan**: node of artificial water exchange through the dike

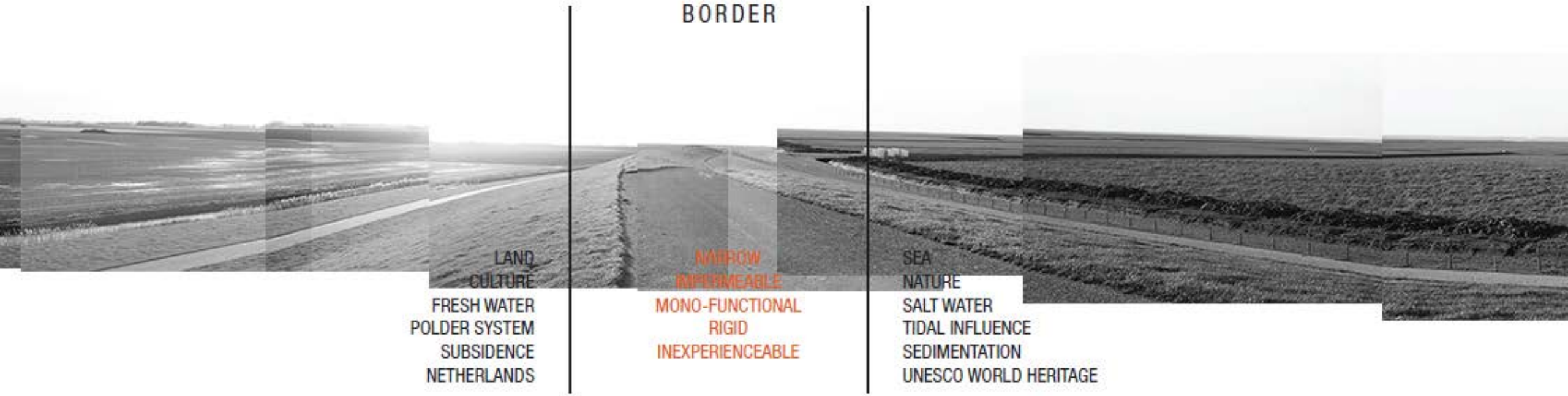
Sea dike (primary dike, 8,5m high)

No view of the sea

Production land (fresh water)

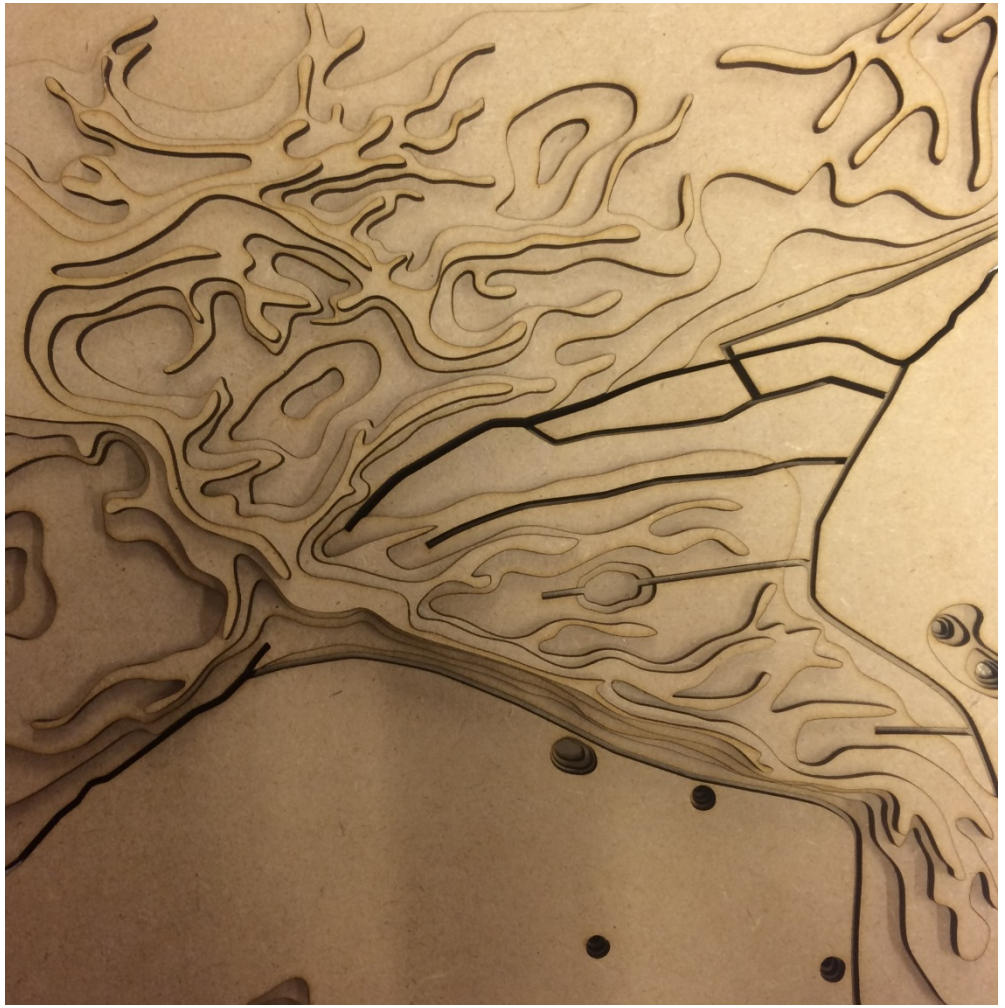

Dynamic water patterns (gullies)
Tidal difference
More saline/brackish vegetation
Deposit of sediments

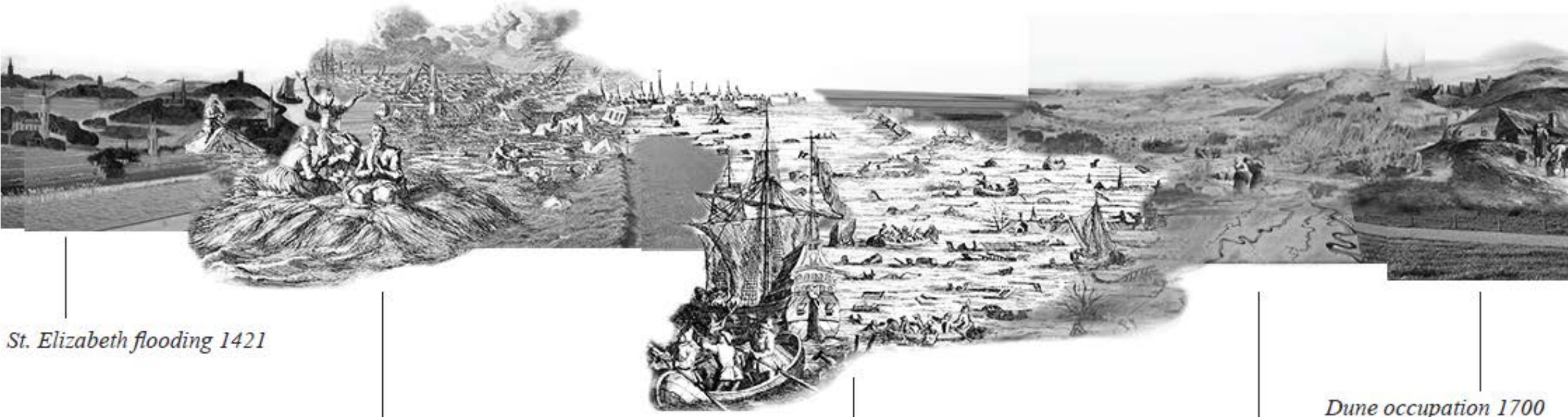

c
a
b
Delta Program
Noorderzine (a)
MIRT (b)
Pkb Waddensea (c)
Natura 2000
UNESCO


BORDER
LAND
CULTURE
FRESH WATER
POLDER SYSTEM
SUBSIDENCE
NETHERLANDS
NARROW
IMPERMEABLE
MONO-FUNCTIONAL
RIGID
INEXPERIENCEABLE
SEA
NATURE
SALT WATER
TIDAL INFLUENCE
SEDIMENTATION
UNESCO WORLD HERITAGE

RELEVANCE

- Sea level rise
- Increase of salinization





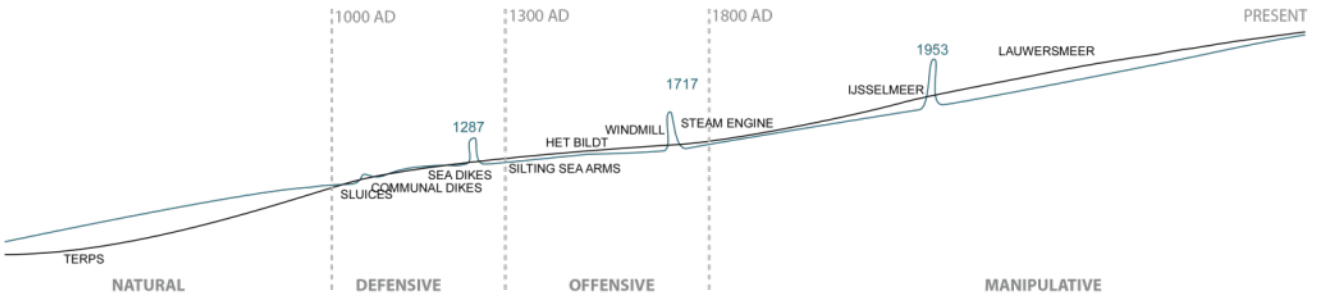
St. Elizabeth flooding 1421

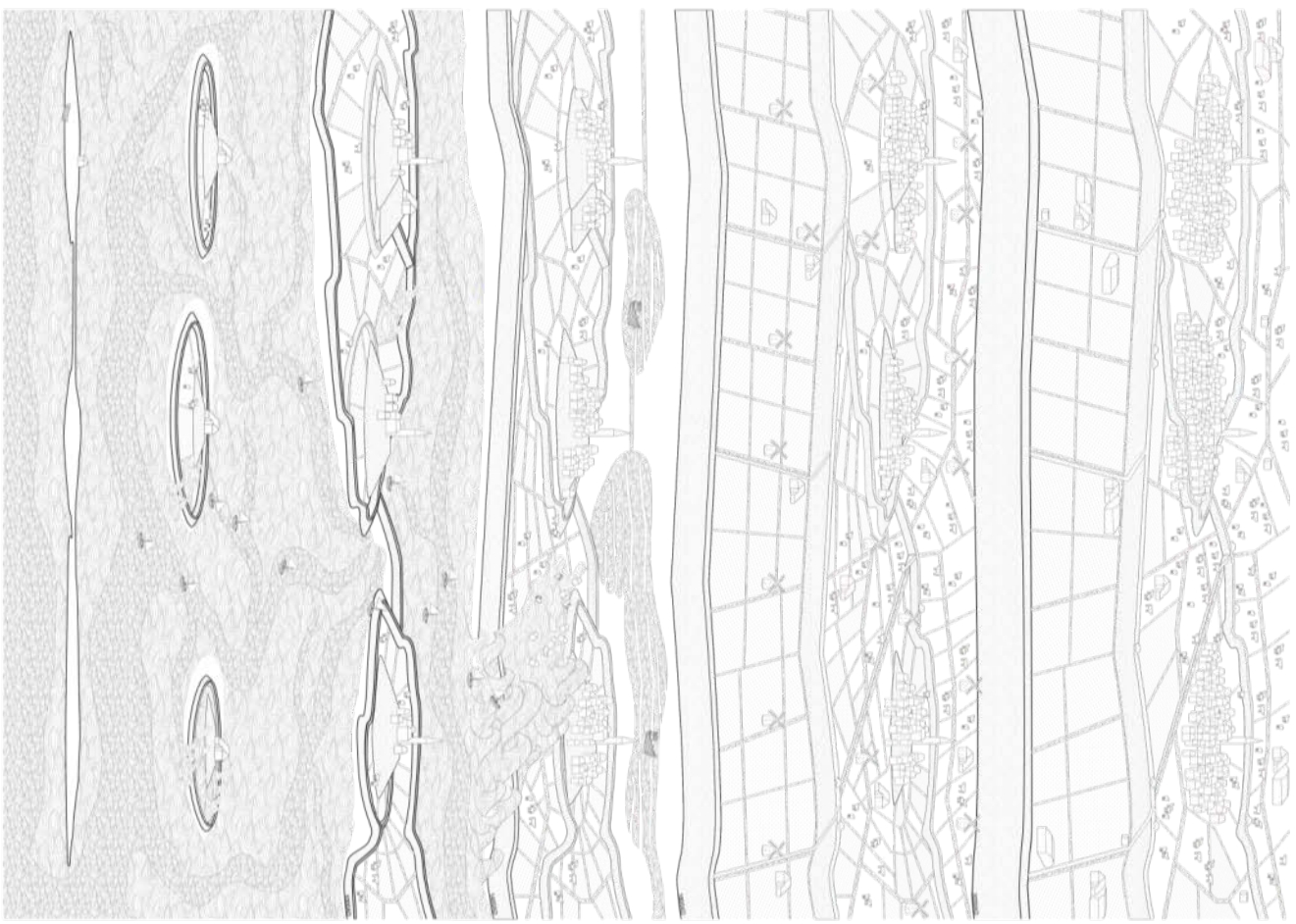
St. Lucia flooding 1287

Christmas flooding 1717

Sand-drift dunes 1500

Dune occupation 1700


1000 AD
1300 AD
1800 AD
PRESENT
1953
LAUWERSMEER
IJSSELMEER
1717
STEAM ENGINE
WINDMILL
1287
HET BILDT
SILTING SEA ARMS
SEA DIKES
COMMUNAL DIKES
SLUICES
TERPS
NATURAL
DEFENSIVE
OFFENSIVE
MANIPULATIVE



- Experience of dynamics

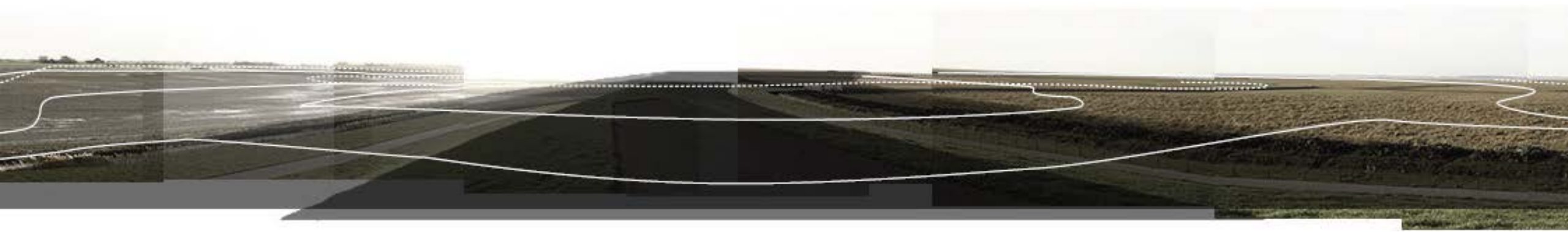
(spatial quality)

- Multi-functionality (system)

- Adaptive capacity (system)

(Sources: Joost Kingma, 2009)

BORDERSCAPE

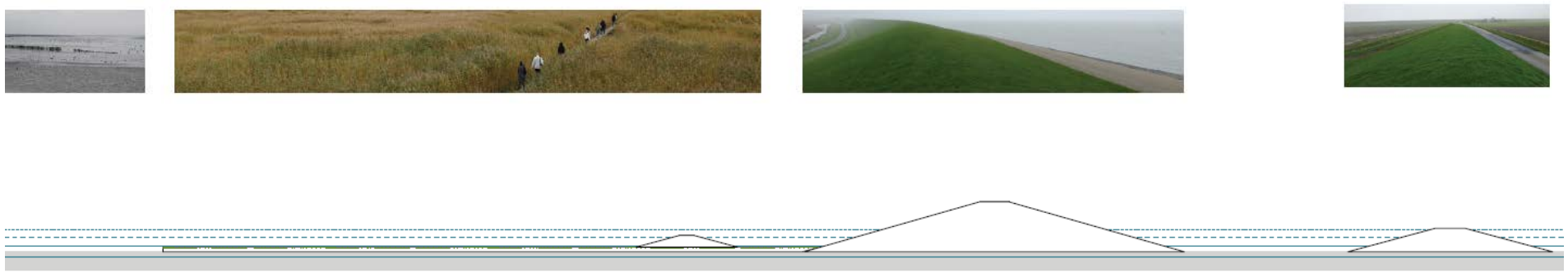


DESIGN

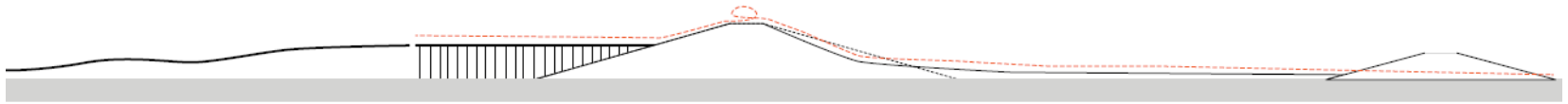
EXISTING POINT OF EXCHANGE AS DESTINATION

NEW ROLE SEA DIKE WITHIN BORDERSCAPE

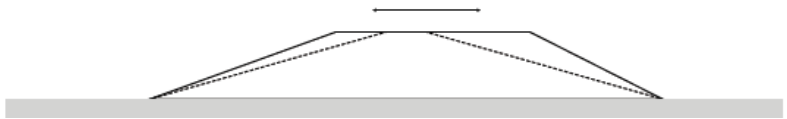
Narrow border



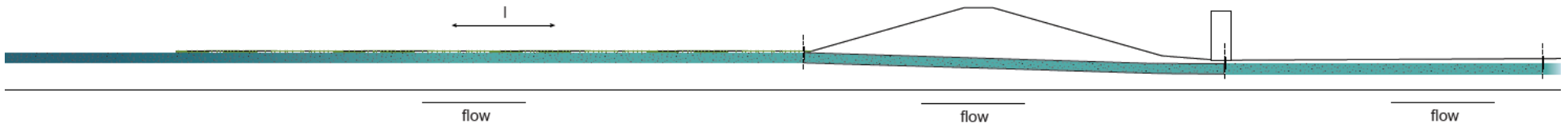
Element within wider safety system



Connects routing system of both sides



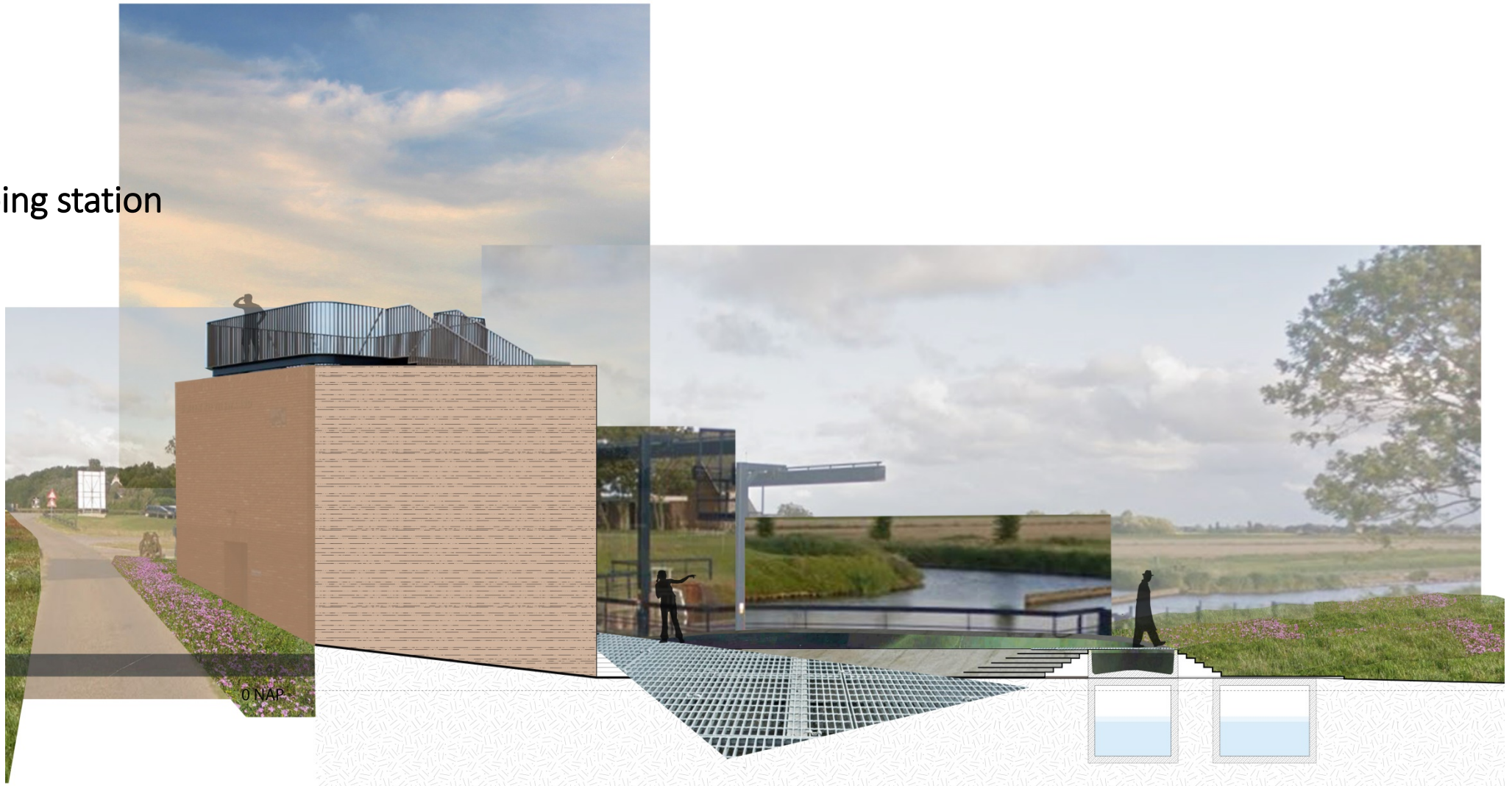
Becomes wider by adding plateaus



New salt water inlet through the dike

SEA WATER TO ENABLE EXCHANGE

I. The Pumping station

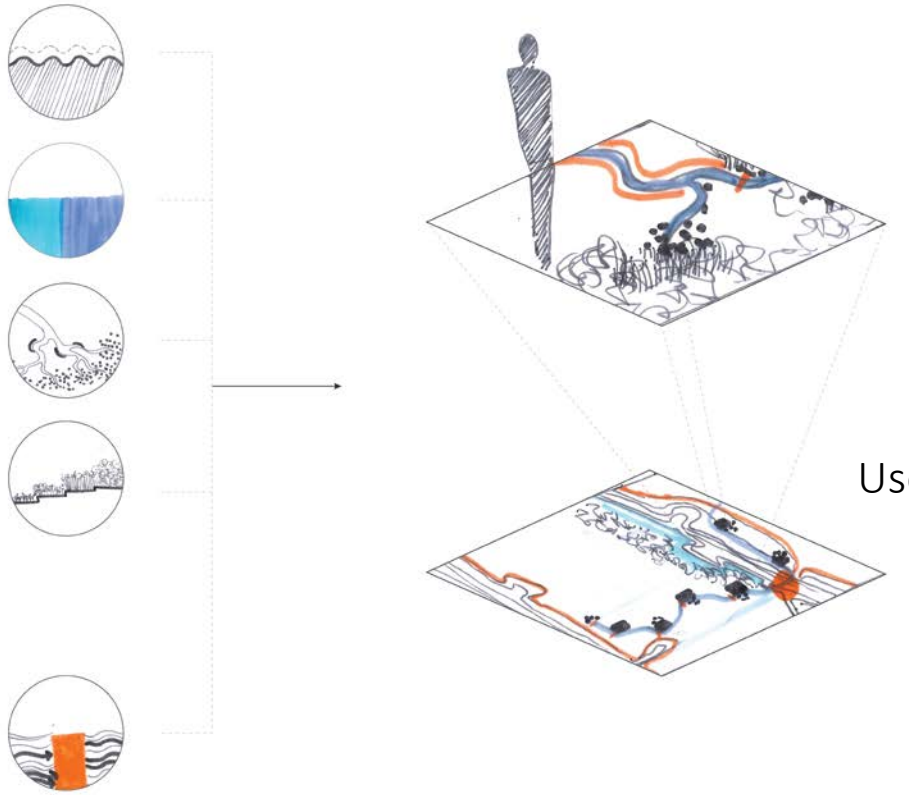


Water as transporter of sediments

Dynamic salt & brackish **water**

Succession of vegetation (saline **water** type*)*

Tidal difference of **water** (2.00m, 2/d)



Use of dynamics in **space**:

I: Experience of dynamics

Use of dynamics in **system**:

II: Multi-functionality

III: Adaptive capacity

SPACE

Dynamics

Tidal difference

Water types

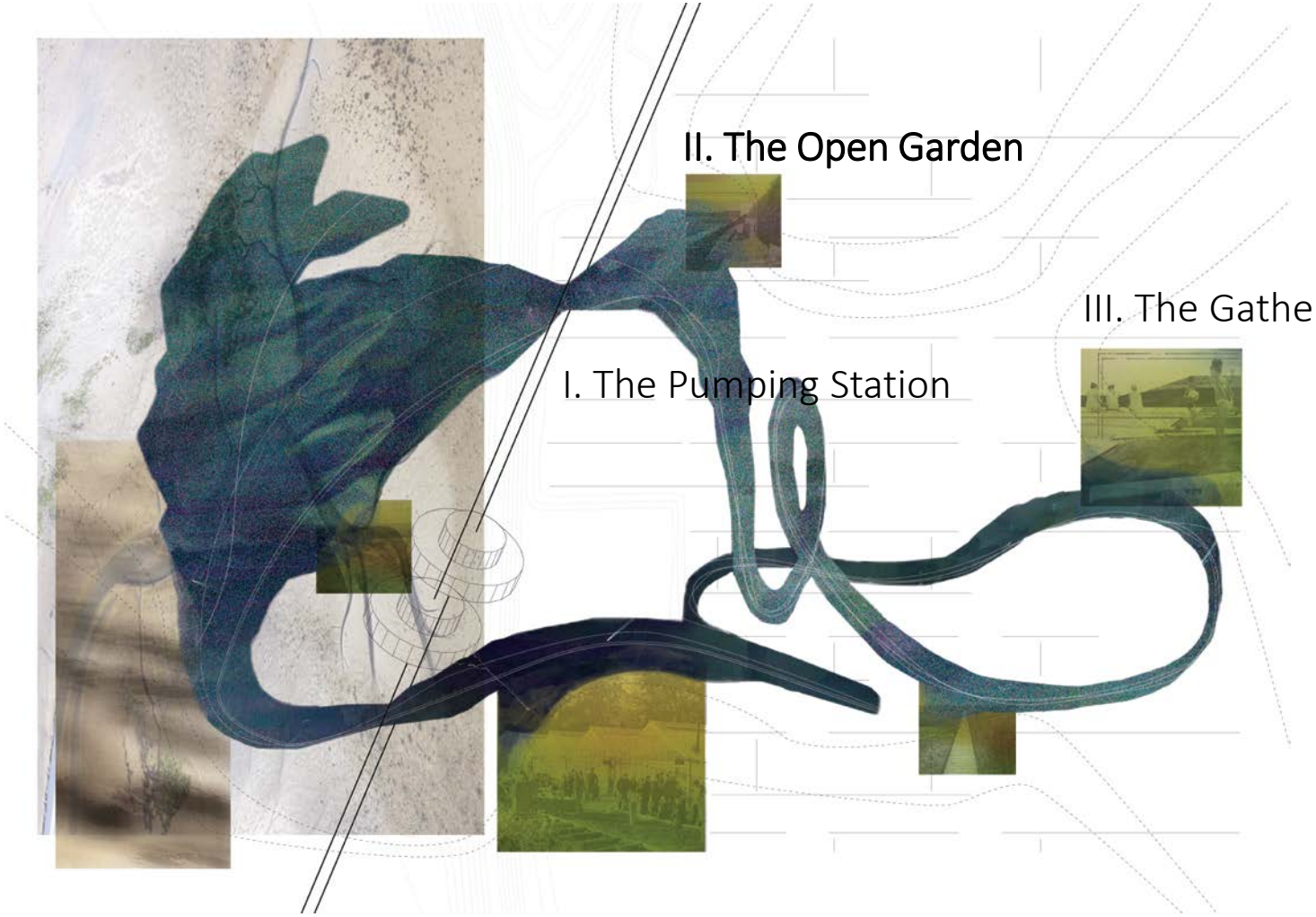
Sedimentation

Succession

Control

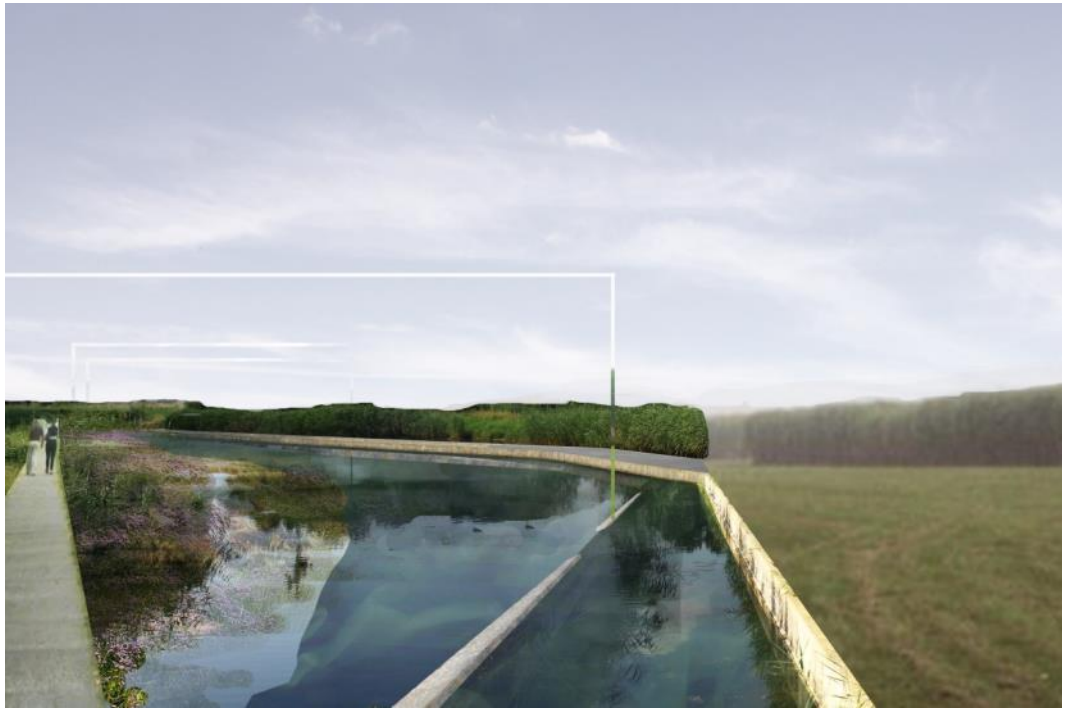
Use of dynamics in **space**:

I: Experience of dynamics


II. The Open Garden
III. The Gathering Garden
I. The Pumping Station

II. The Open Garden

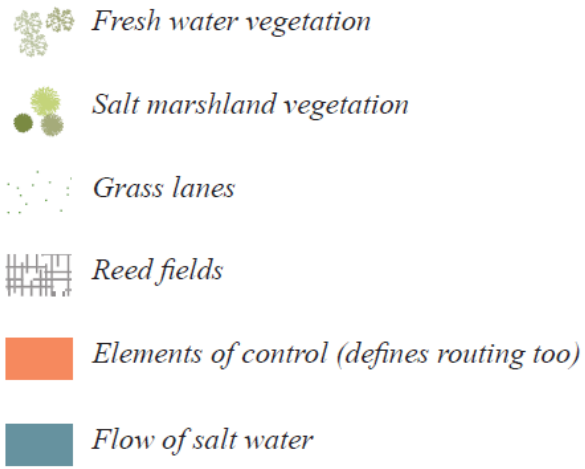
I. Low tide/ start of high tide

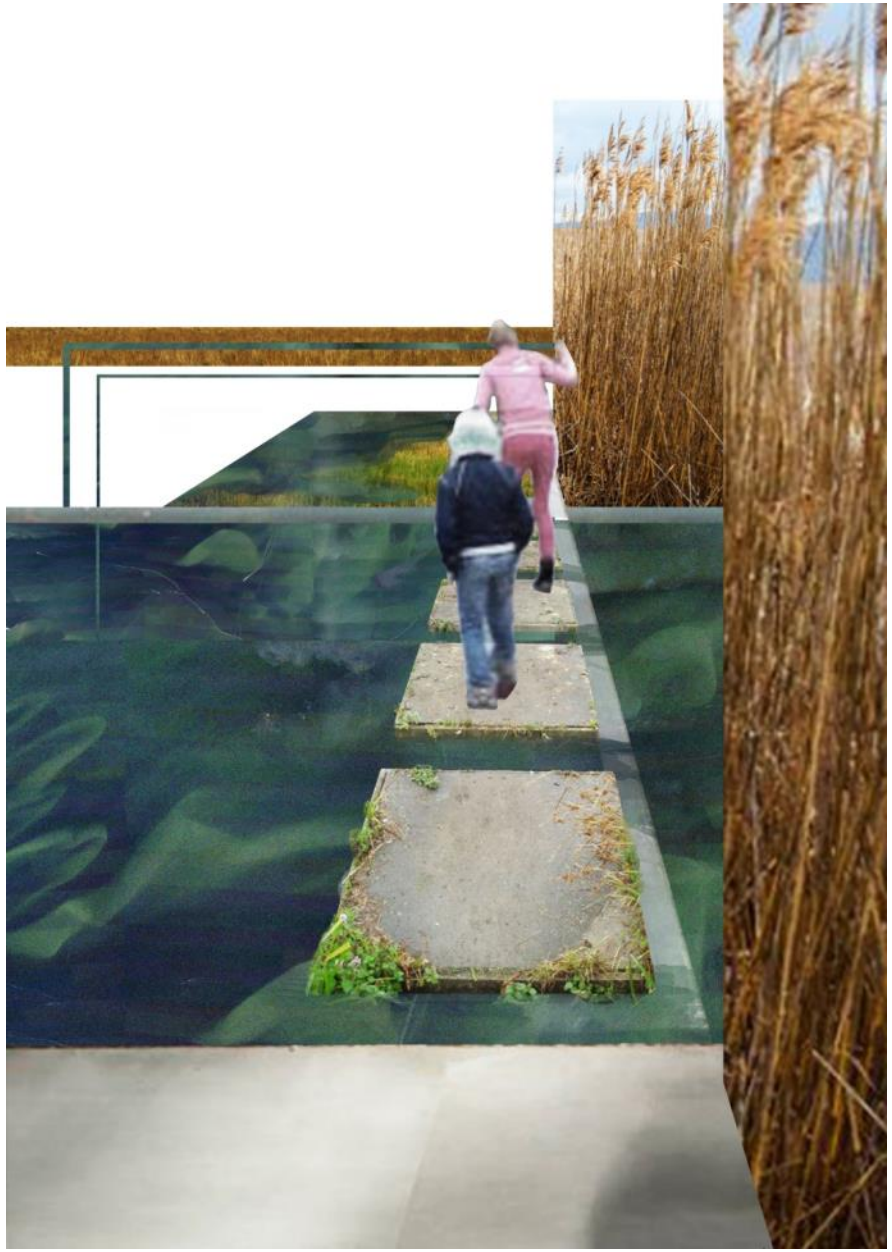


I. High tide

Low tide/ start of high tide

High tide



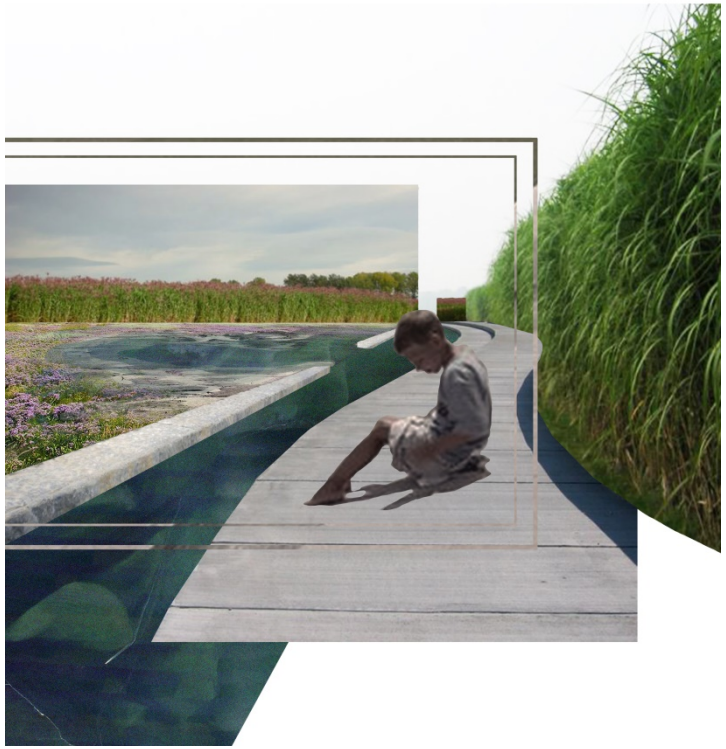


II. Dam slowing down the flow of water

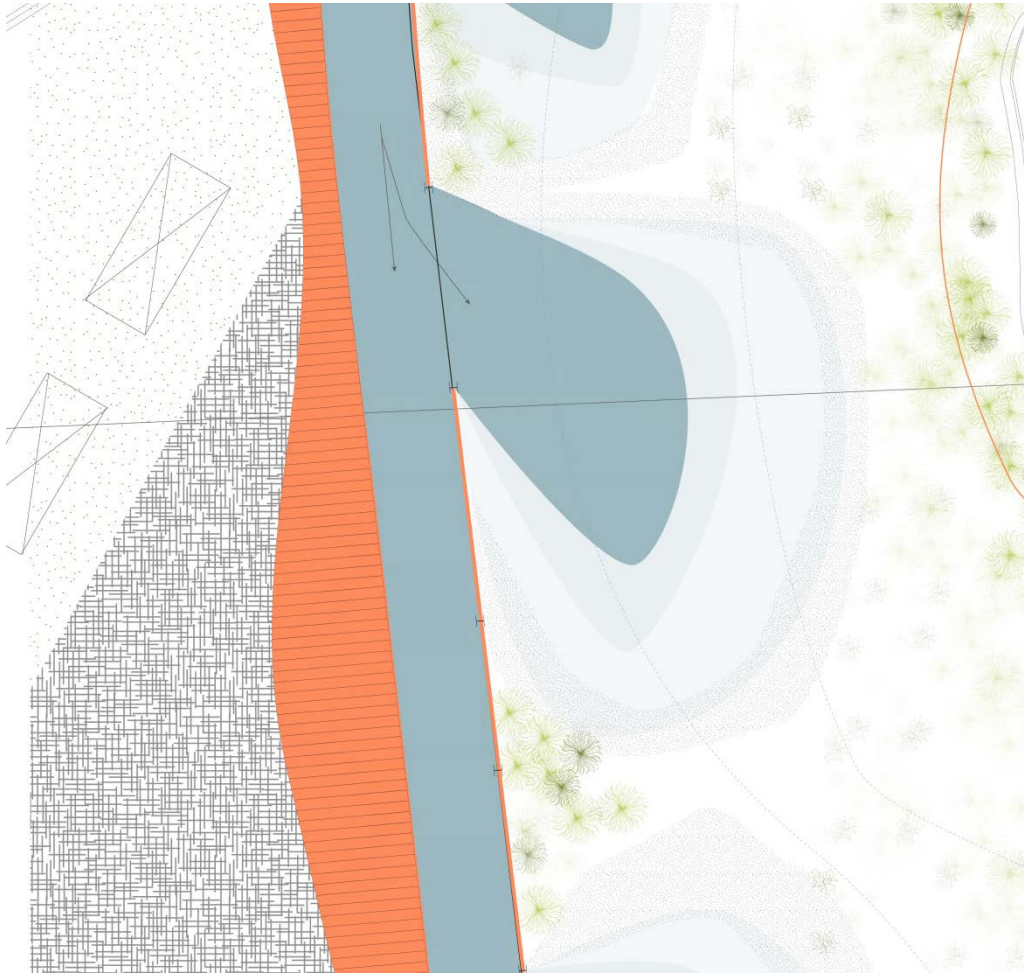
III. Low tide/start of high tide

III. High tide

III. Succession in 5 years

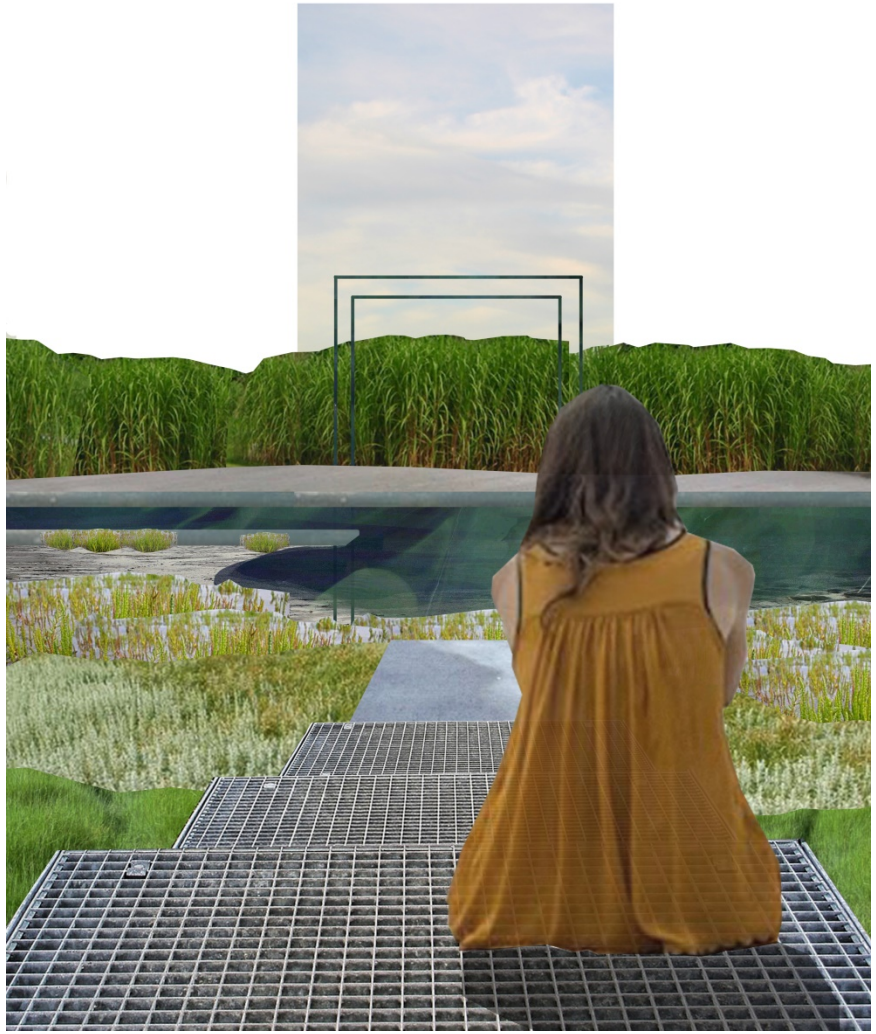


III. Succession in 10 years

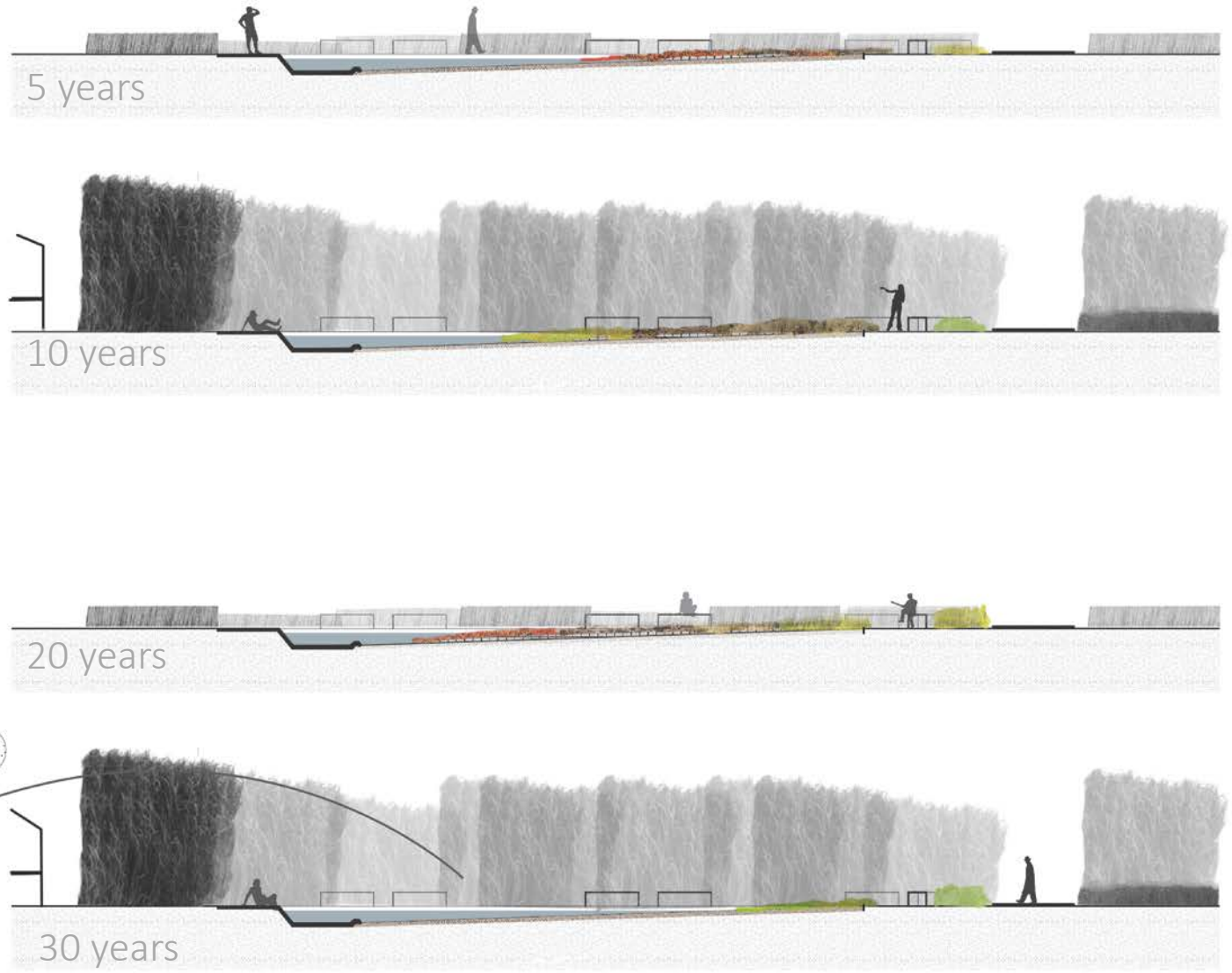


Time

Salt water

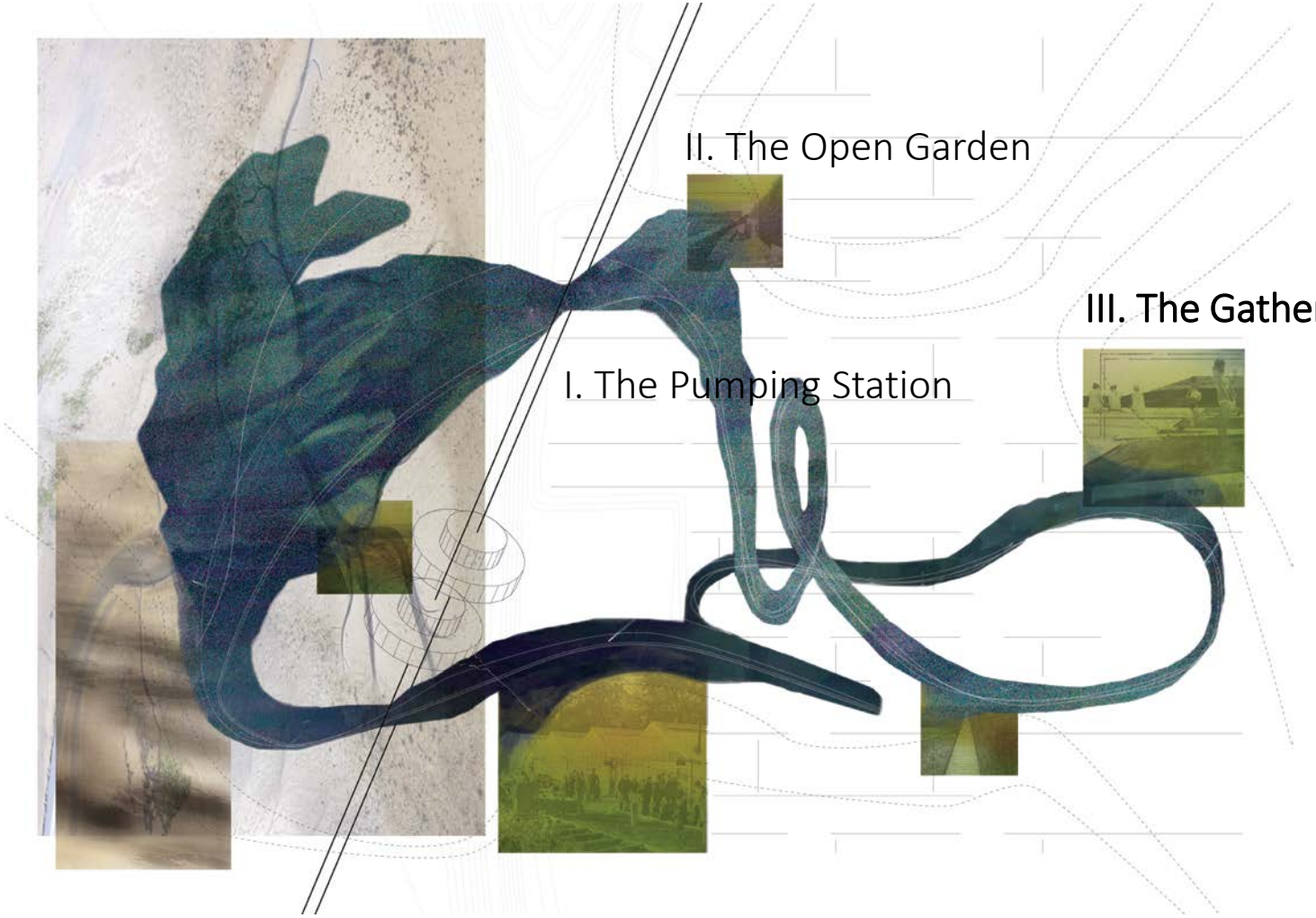


IV. Succession of vegetation



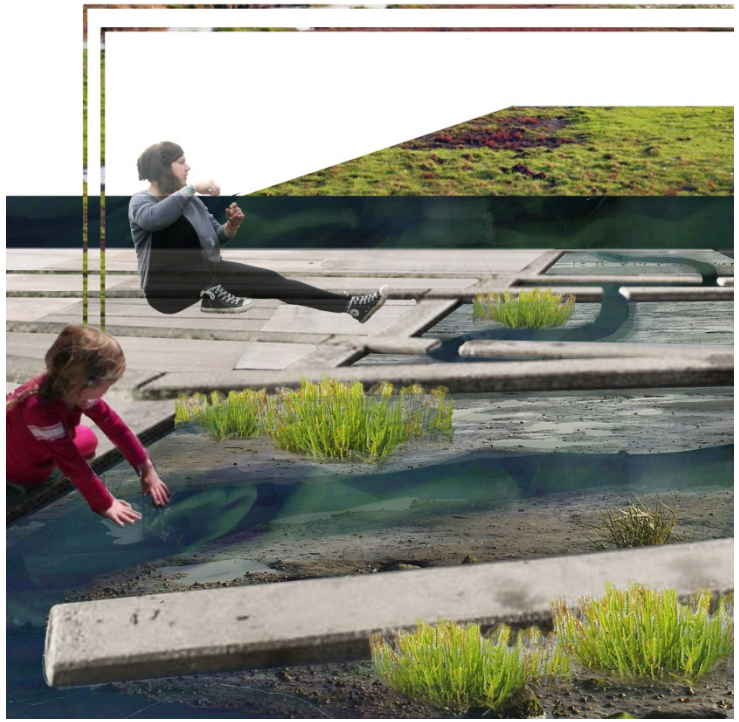
Succession

Use of sediments

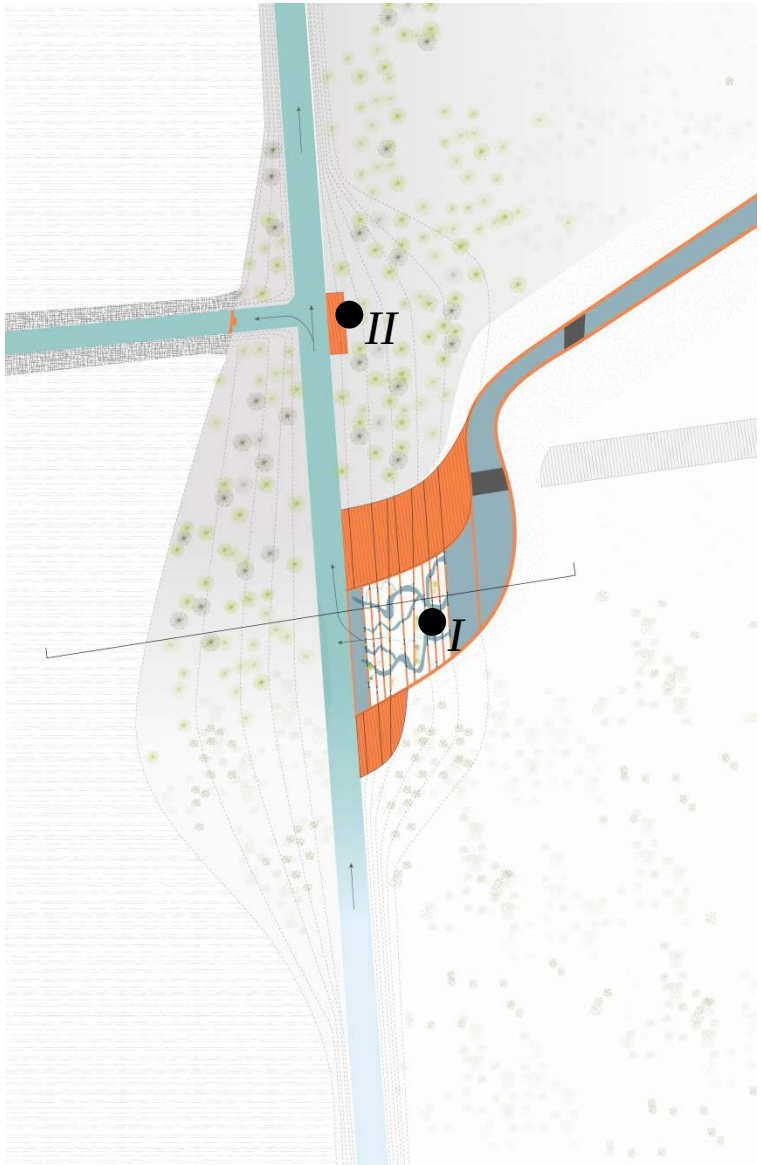

II. The Open Garden
III. The Gathering Garden
I. The Pumping Station

III. The Gathering Garden

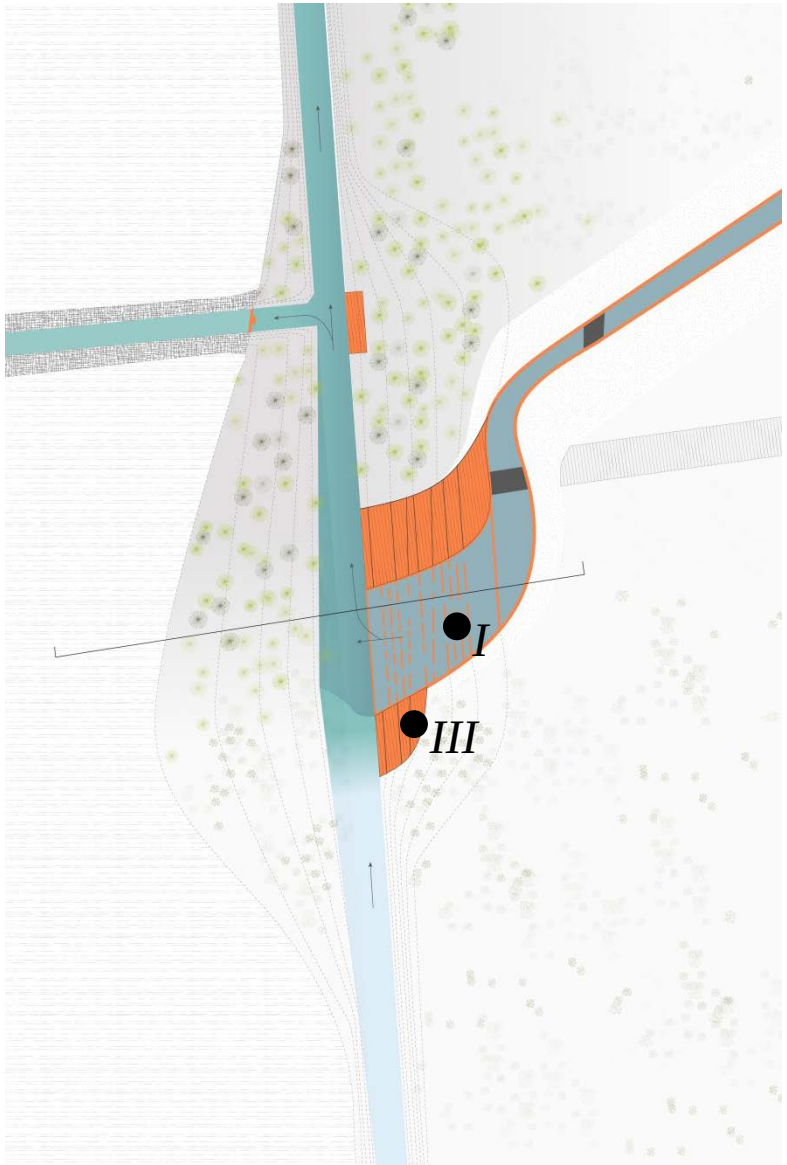
I. High tide



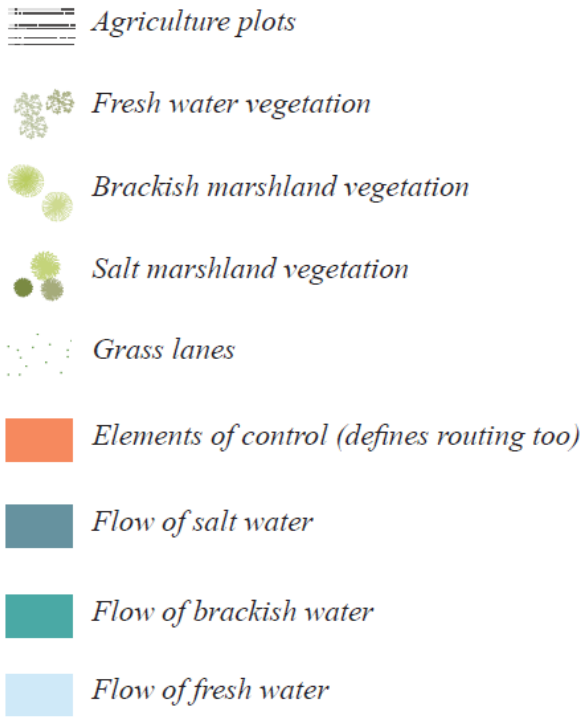
II. Low tide/ start of high tide

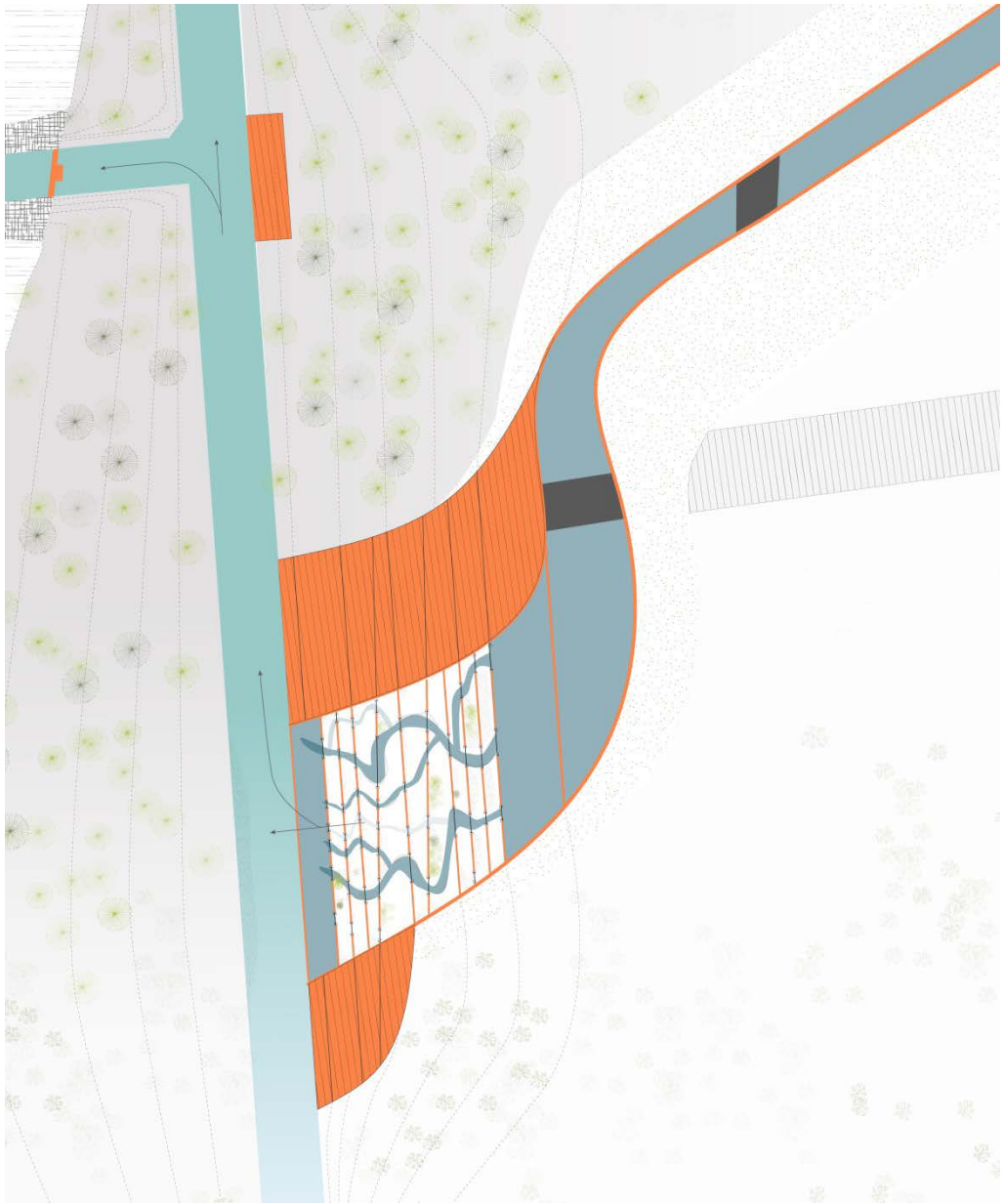


Low tide/ start of high tide



High tide













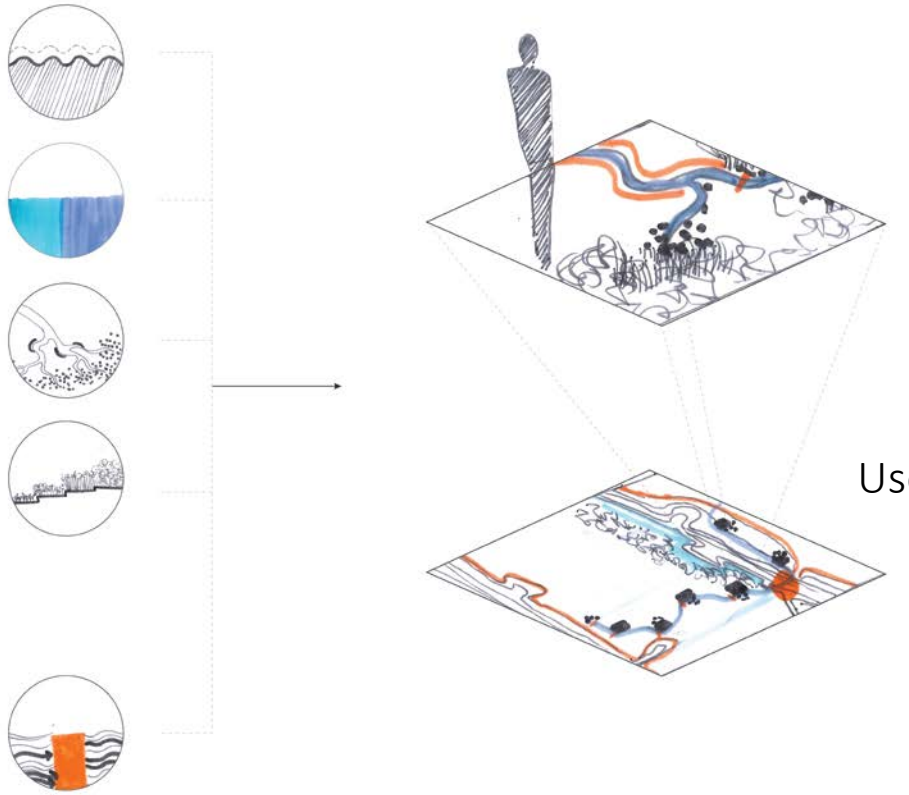

Fresh

Brackish

Salt

III. Gradient of fresh to brackish vegetation

SYSTEM



Use of dynamics in space:

I: Experience of dynamics

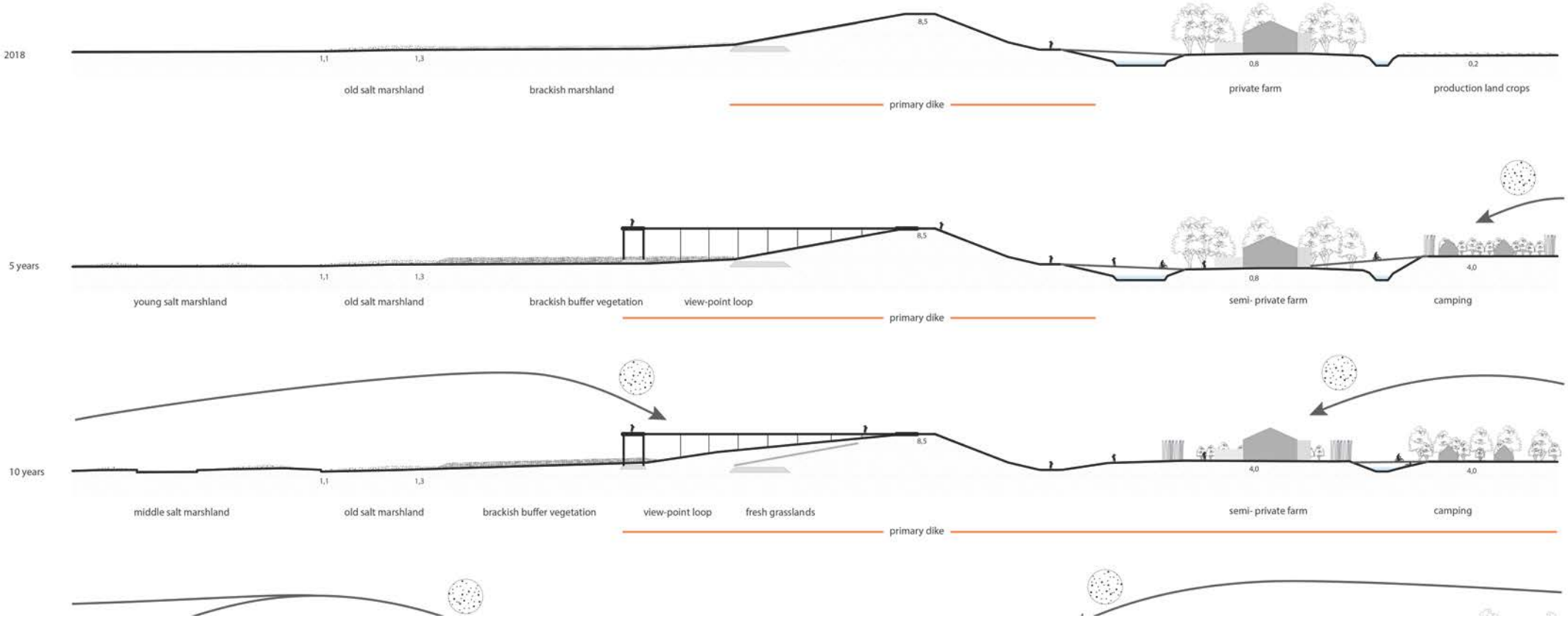
Use of dynamics in system:

II: Multi-functionality

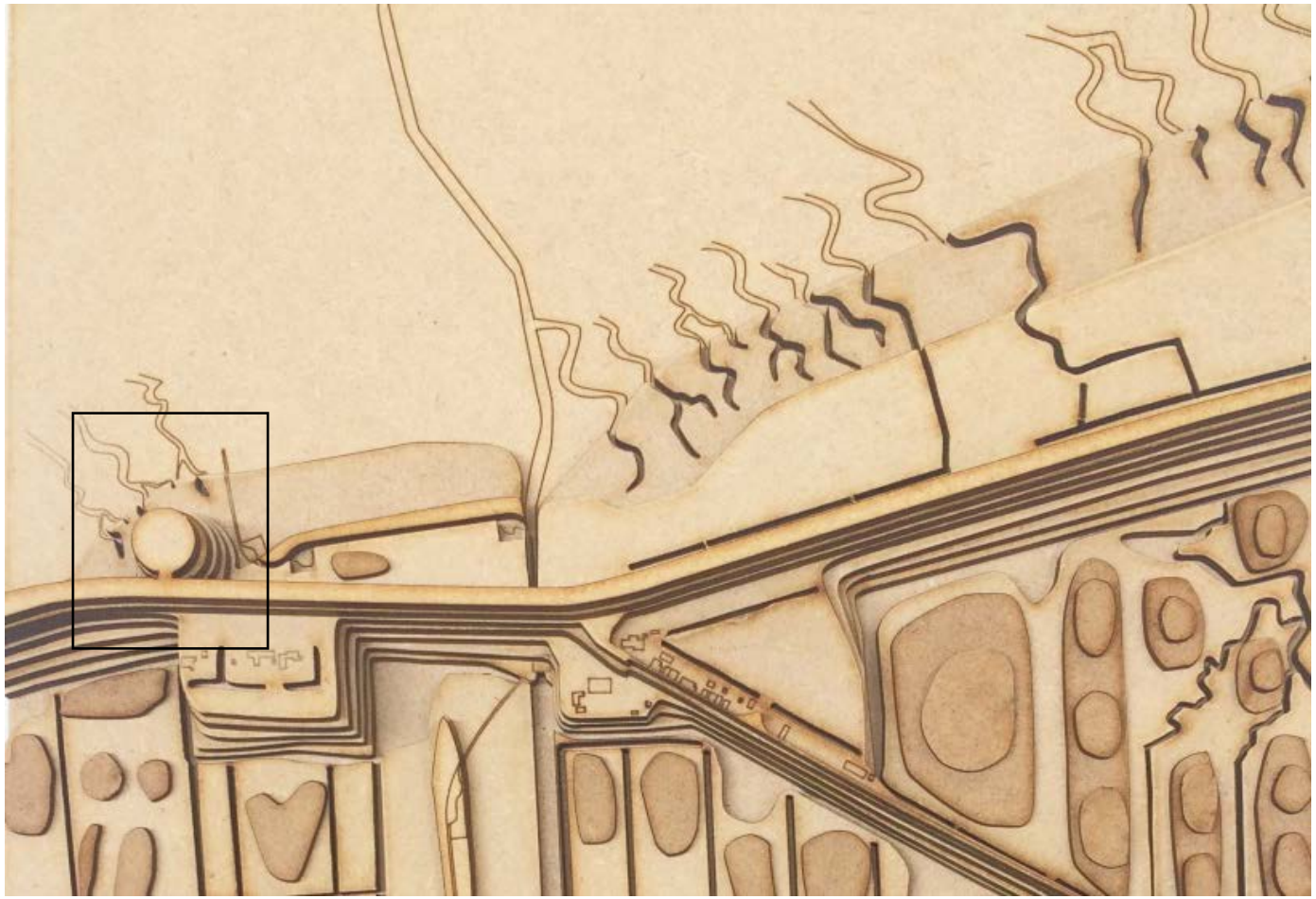
III: Adaptive capacity


I. The Pumping Station

A combined salt-fresh water system



BB’: The primary dike becomes wider and multi-functional in time



5 years

20 years

50 years




More ecological development




Recreation, education of ecological development

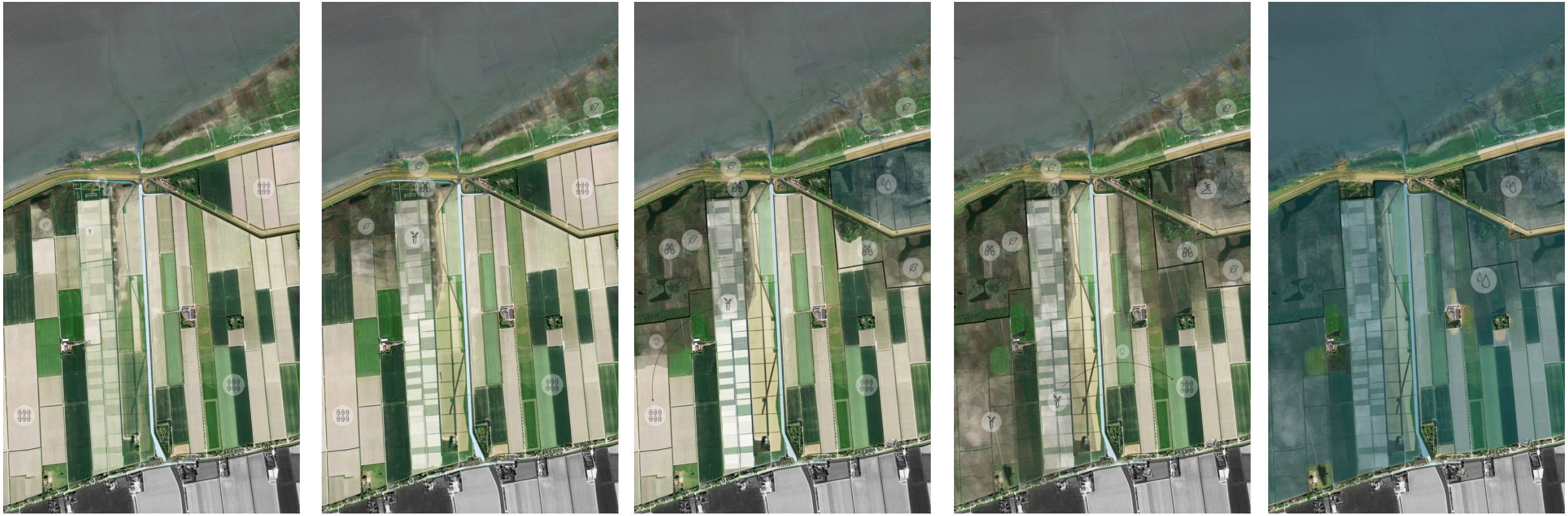
Experimental salty agriculture




Recreation & education of salty agriculture

- Ecological development
- Salty agriculture
- Knowledge of salty agriculture
- Agriculture
- Sediment farms
- Recreation
- Water buffer

Time



Recreation

Agriculture

Salty agriculture

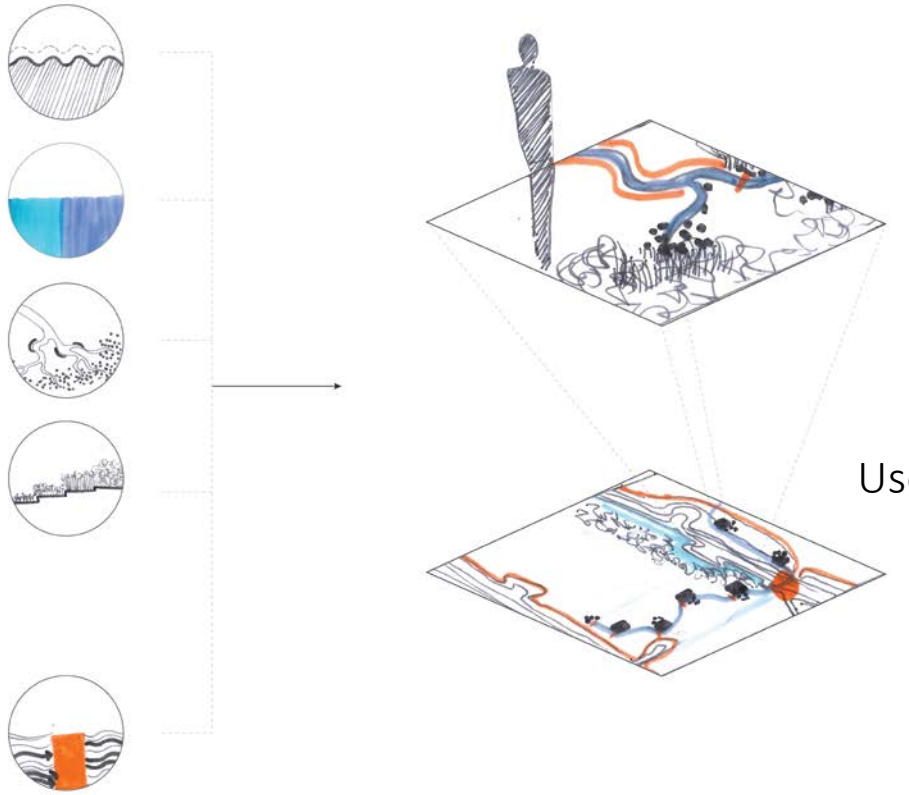
Ecological development

Water buffer

Sediment farms

Knowledge of salty agriculture

PERFORMANCE DESIGN



Use of dynamics in space:

I: Experience of dynamics

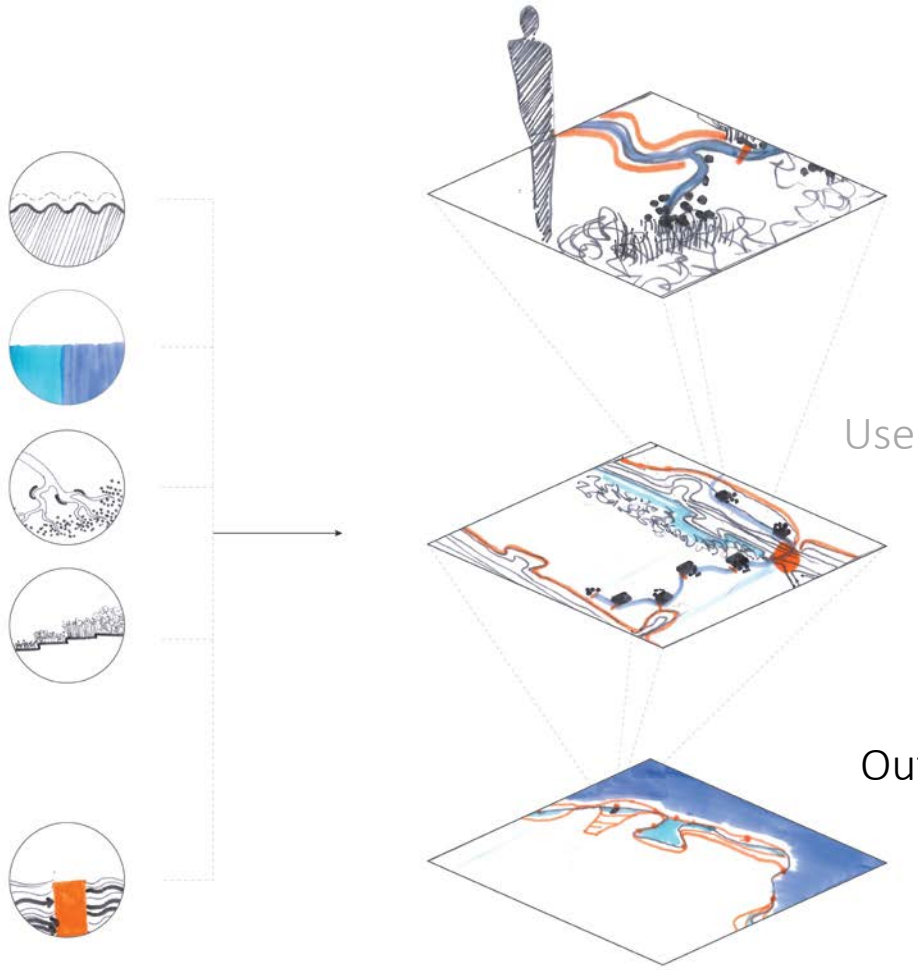
Use of dynamics in system:

II: Multi-functionality

III: Adaptive capacity

Use of dynamics in space:

I: Experience of dynamics



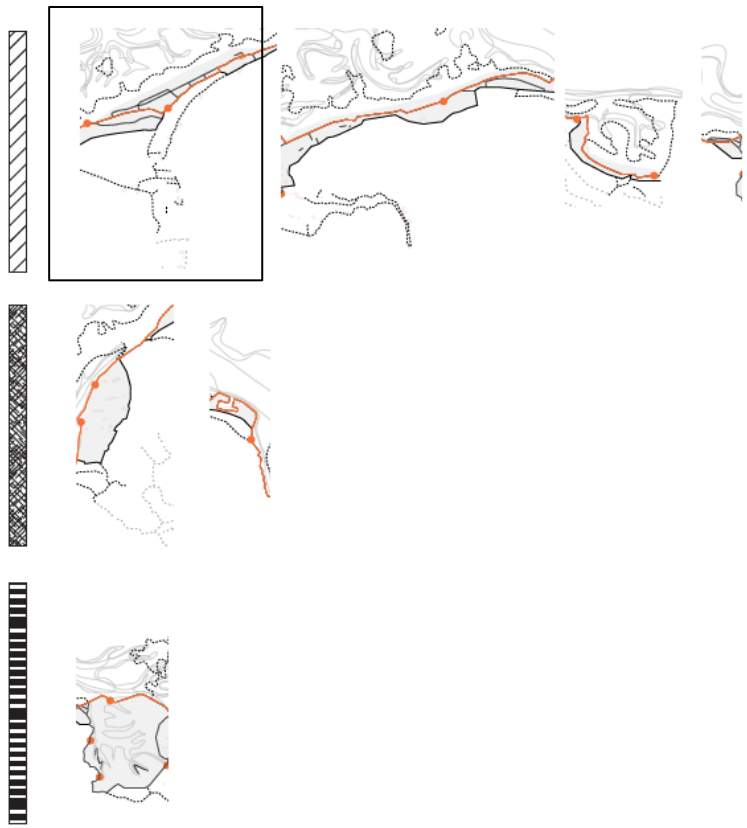
Use of dynamics in system:

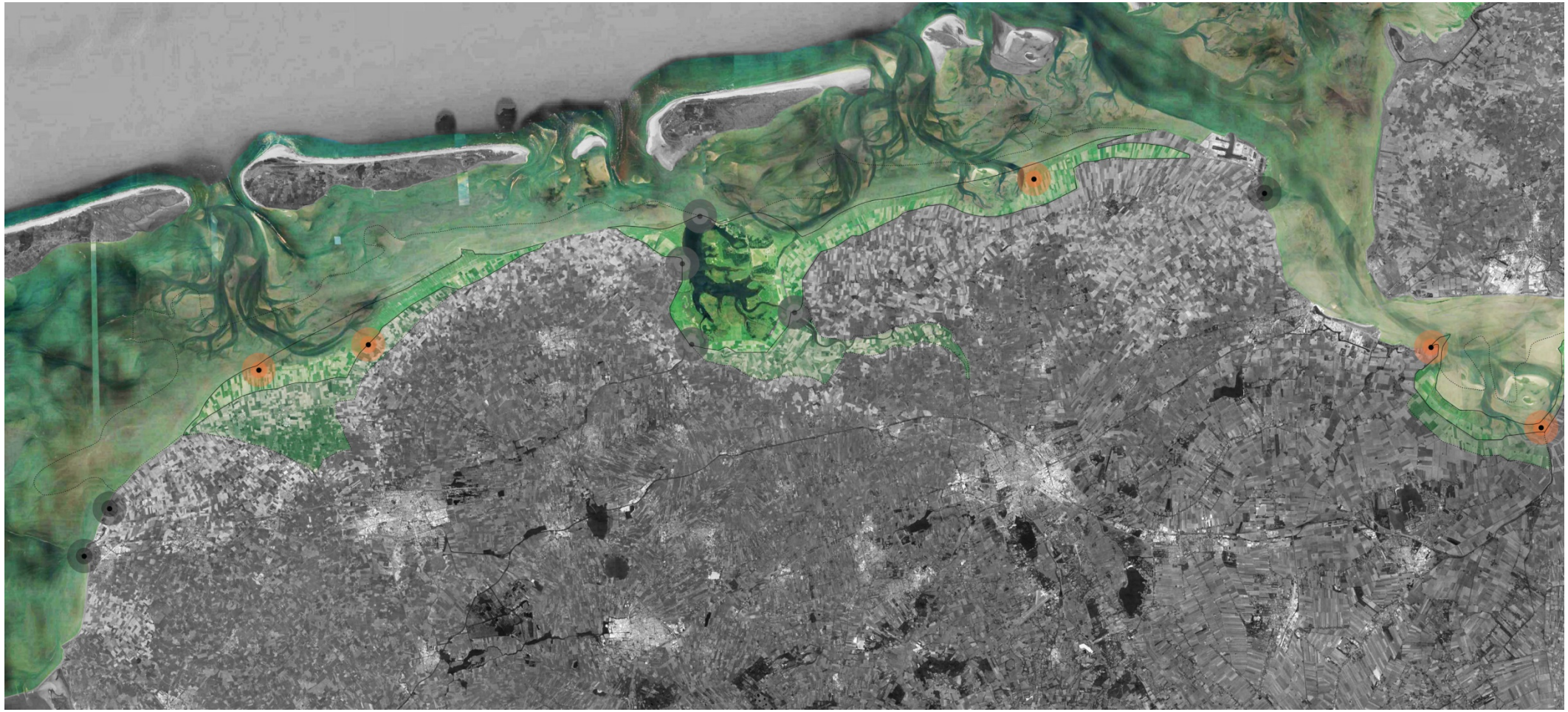
II: Multi-functionality

III: Adaptive capacity

Outline on regional scale

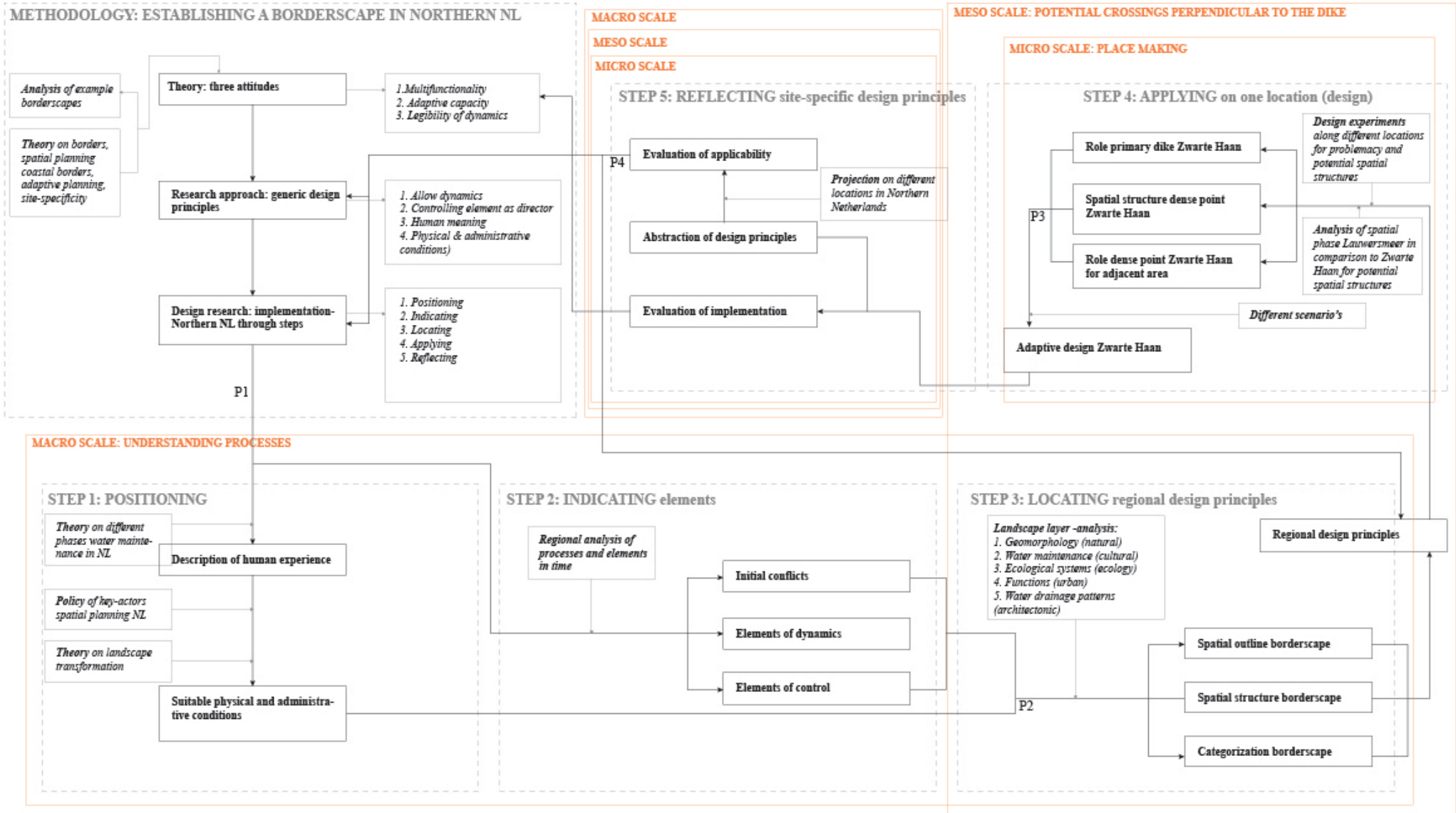
APPLICABILITY TO OTHER LOCATIONS





REFLECTION

RESEARCH FRAMEWORK



DESIGN EXPERIMENTS & ANALYSIS

- Inspiration for

Spatial structure

Zwarte Haan

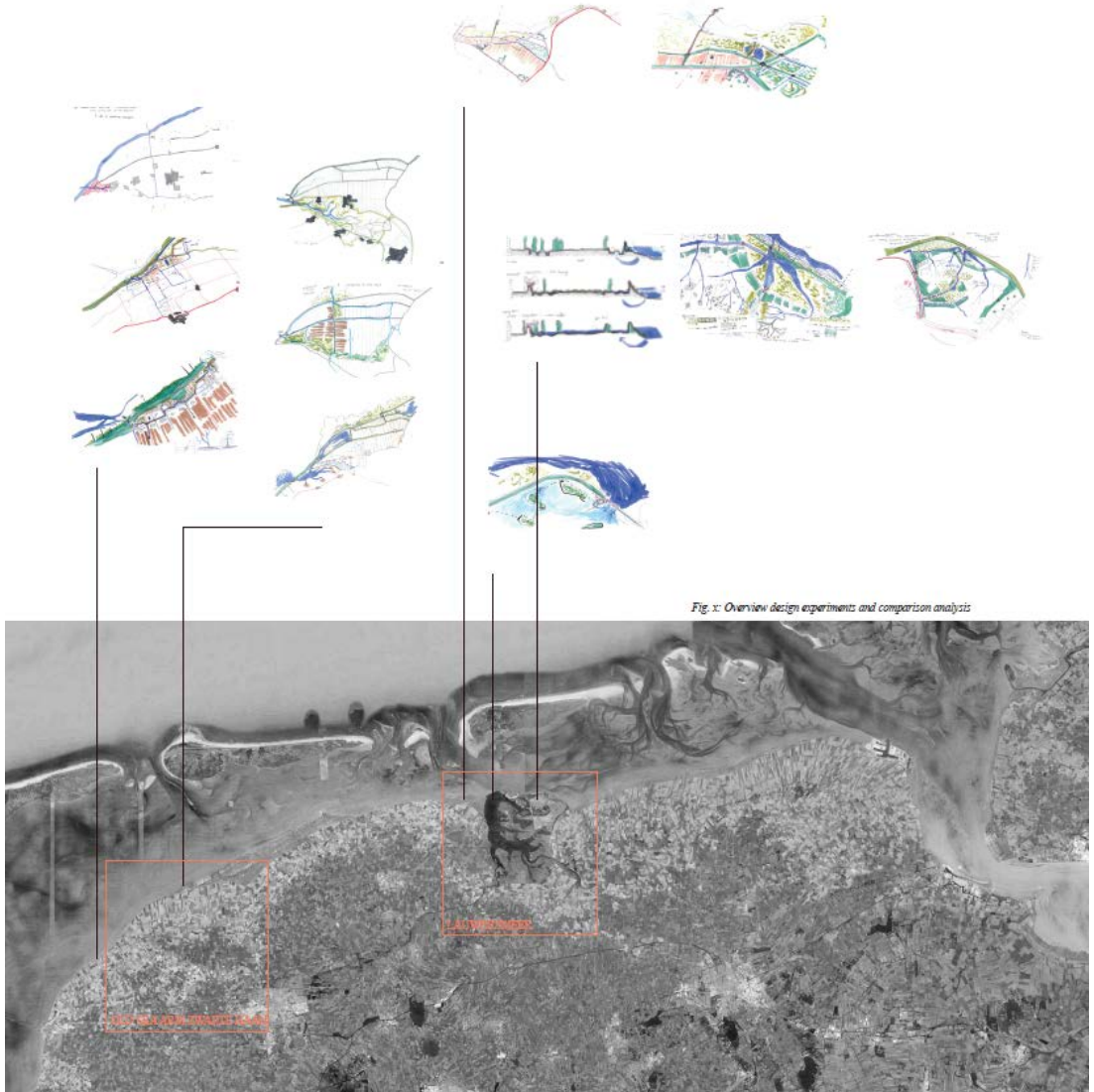


Fig. x: Overview design experiments and comparison analysis

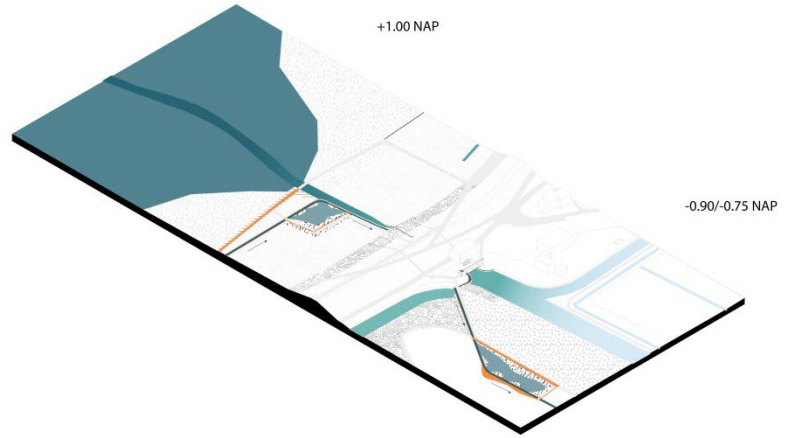
DESIGN EXPERIMENTS & ANALYSIS

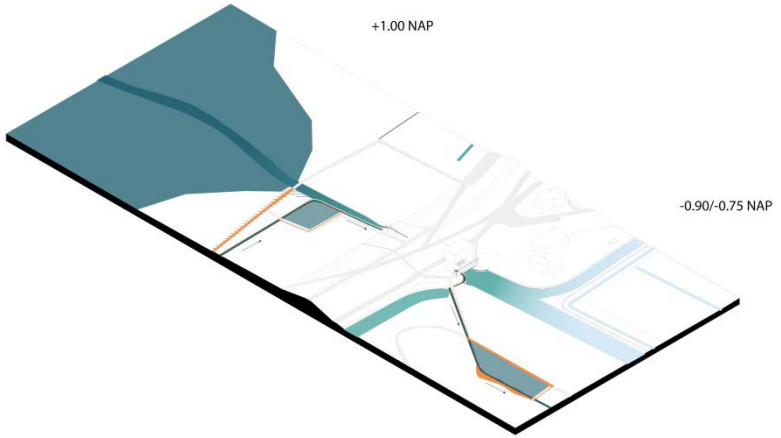
- **Returning themes**, e.g. regulated salt-fresh water systems, permeability of functions, multifunctional role dike, social involvement, human experiences

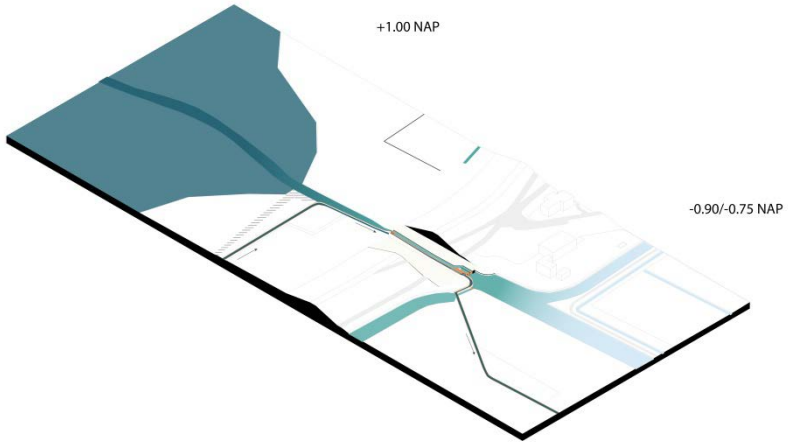
New drainage pattern

Acceptance of the current ditch pattern

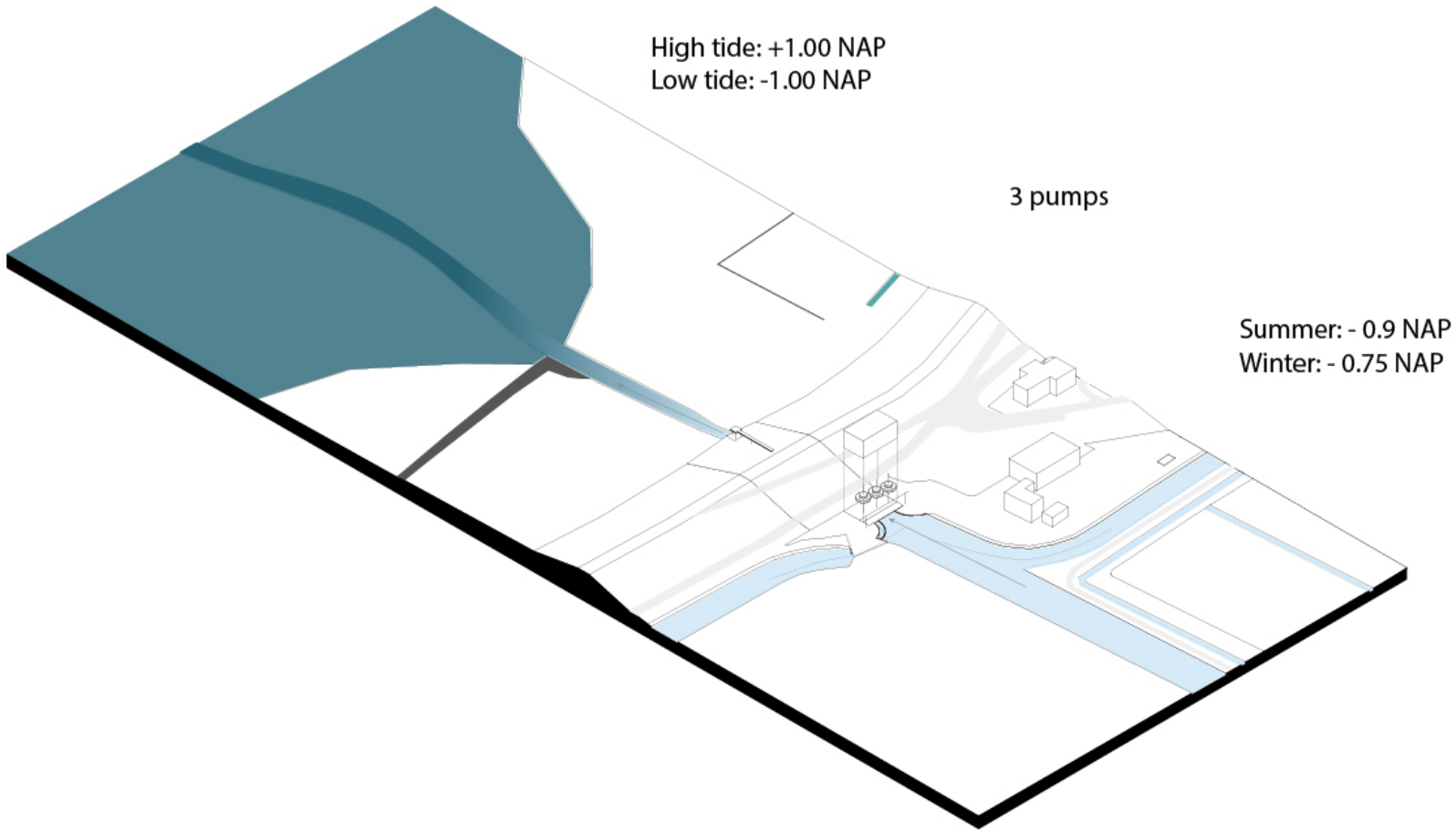
- Transforming existing pumping stat
  - *Use seperate ditch as **salt wat***
  - ***Flushing out** during low tide*
  - *Accept salinization in the ditch*



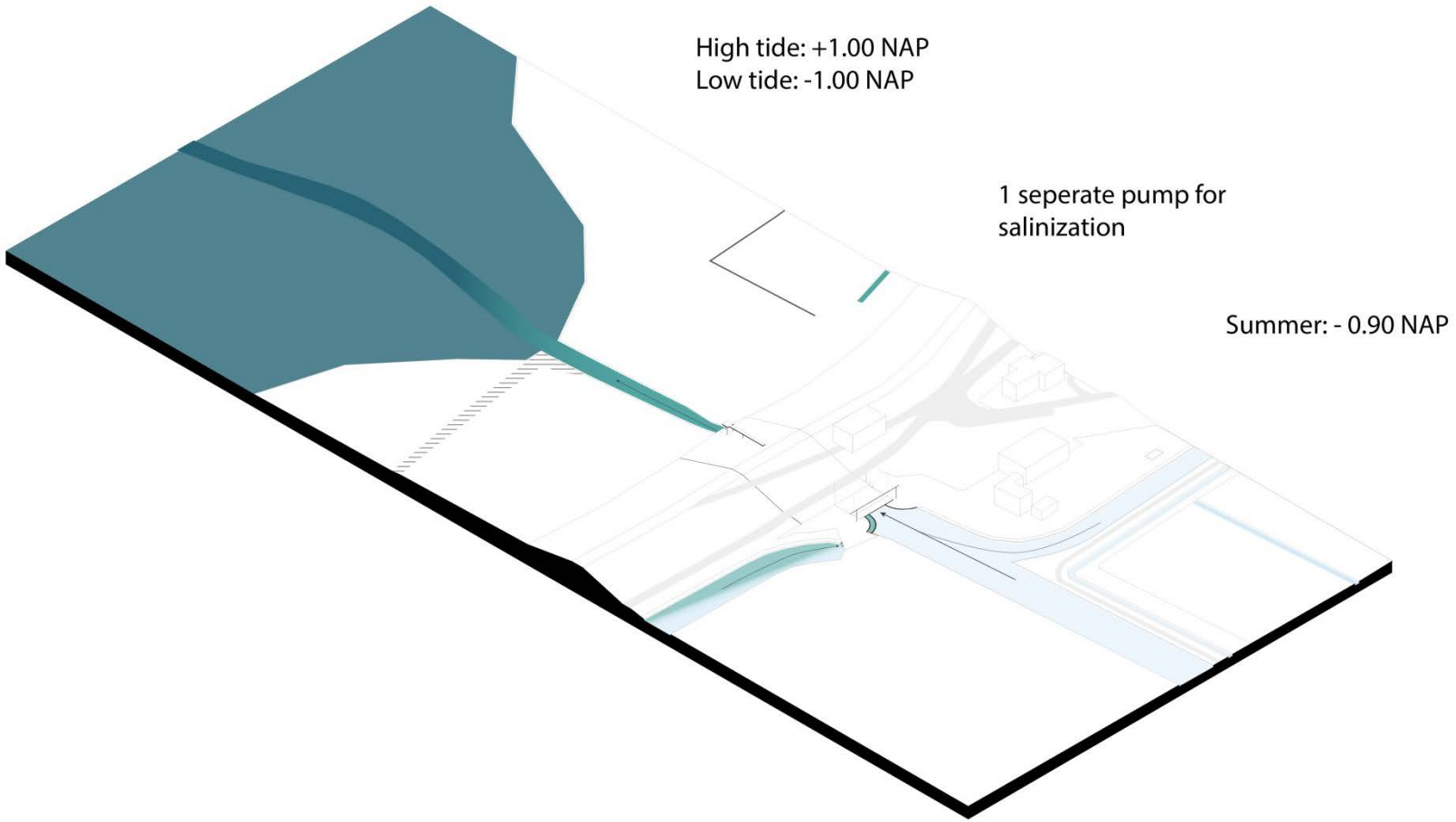




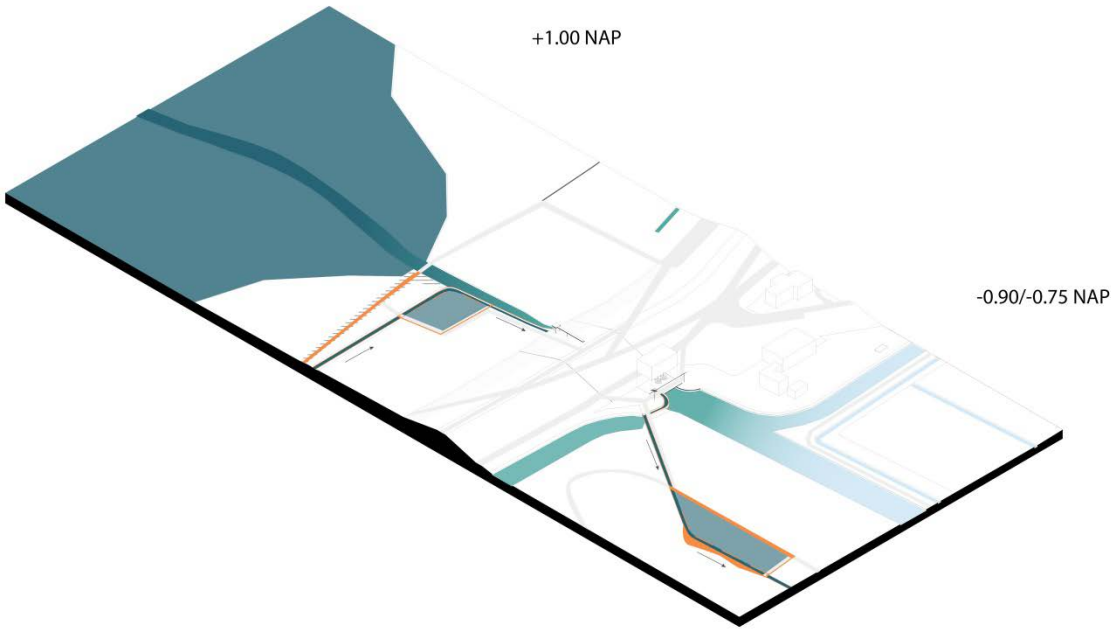
- 1. Transformation of pumping station becomes dense point of water exchange in **both directions**



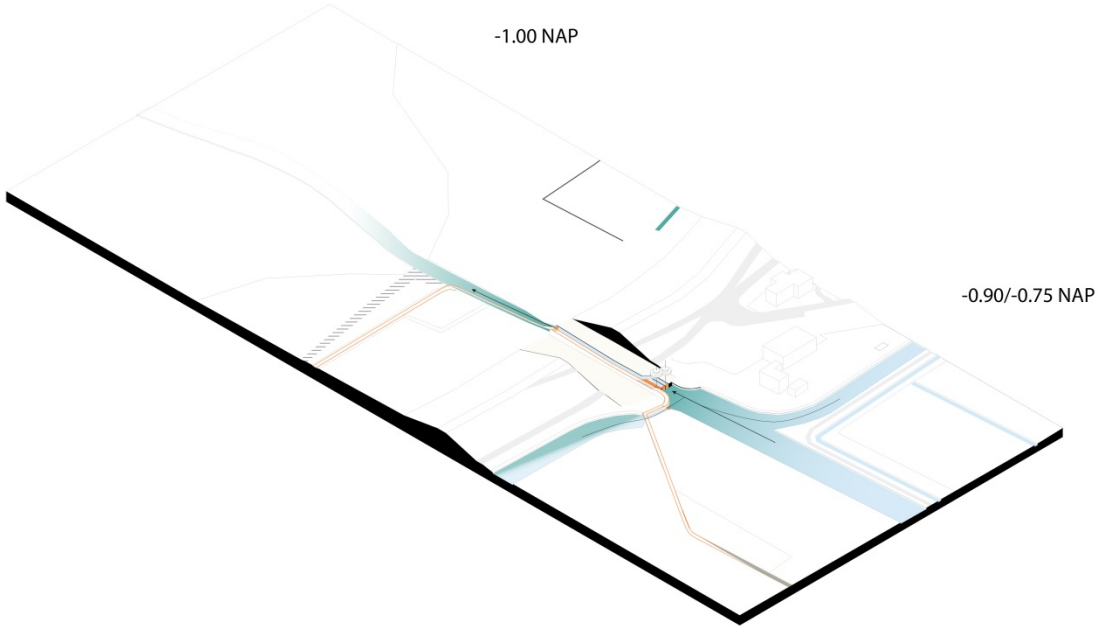
- Transforming the existing **pumping station**
  - *Pumps have no cooperation with tides*
  - *Seperate channel for salinization ditch in summer*



- Transforming existing pumping station: **use of tides**
  - *Use seperate ditch as **salt water inlet** during high tide*
  - ***Flushing out** during low tide*
  - *Accept salinization in the ditch*

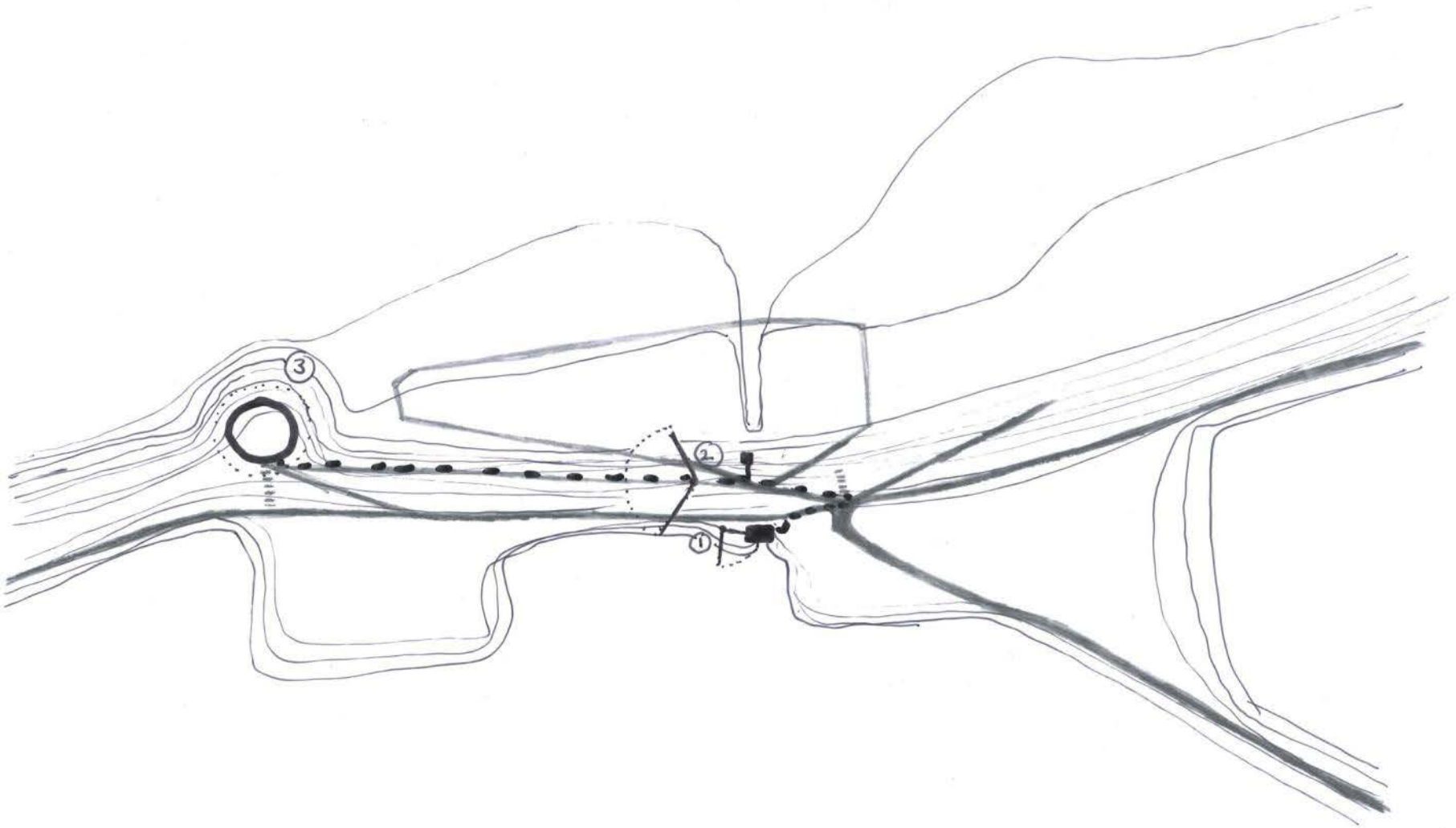


Summer - Low tide



- Dense point Zwarte Haan becomes a destination for **recreation and education**

- 2.



- Start from the exchange point

Wide view Wadden area

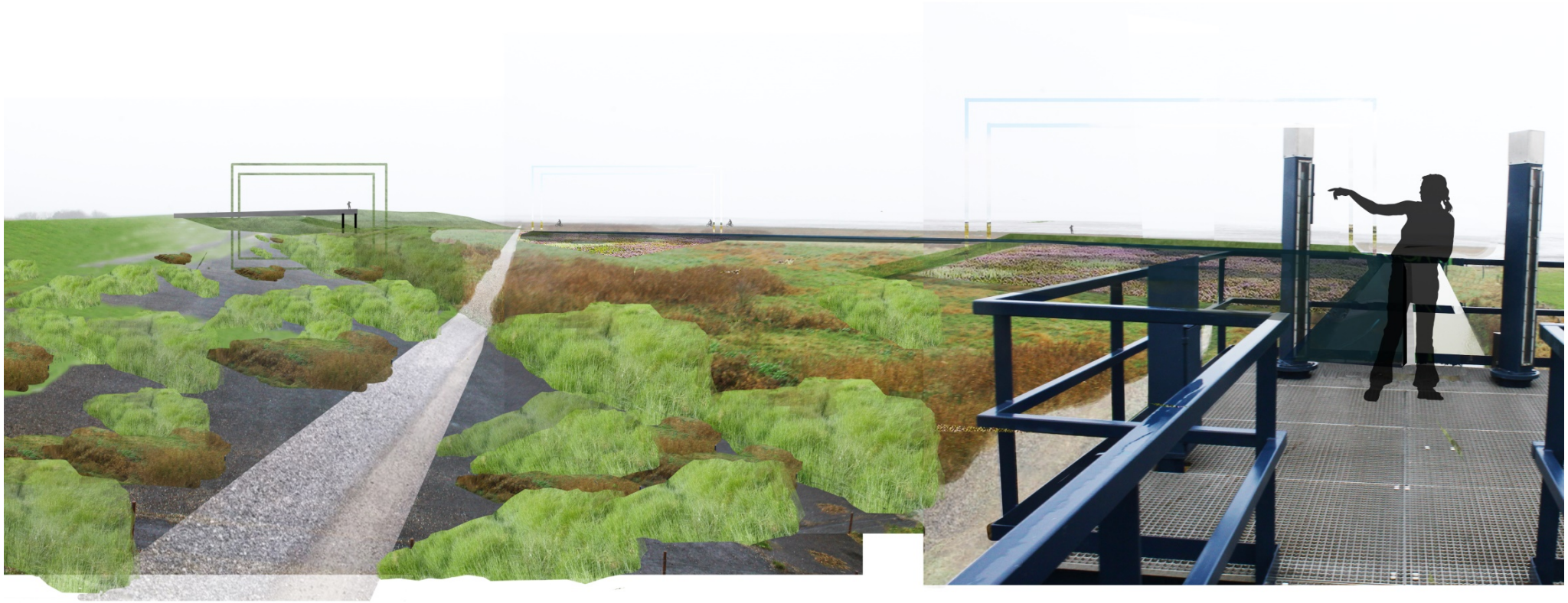
***Steel** view platform*

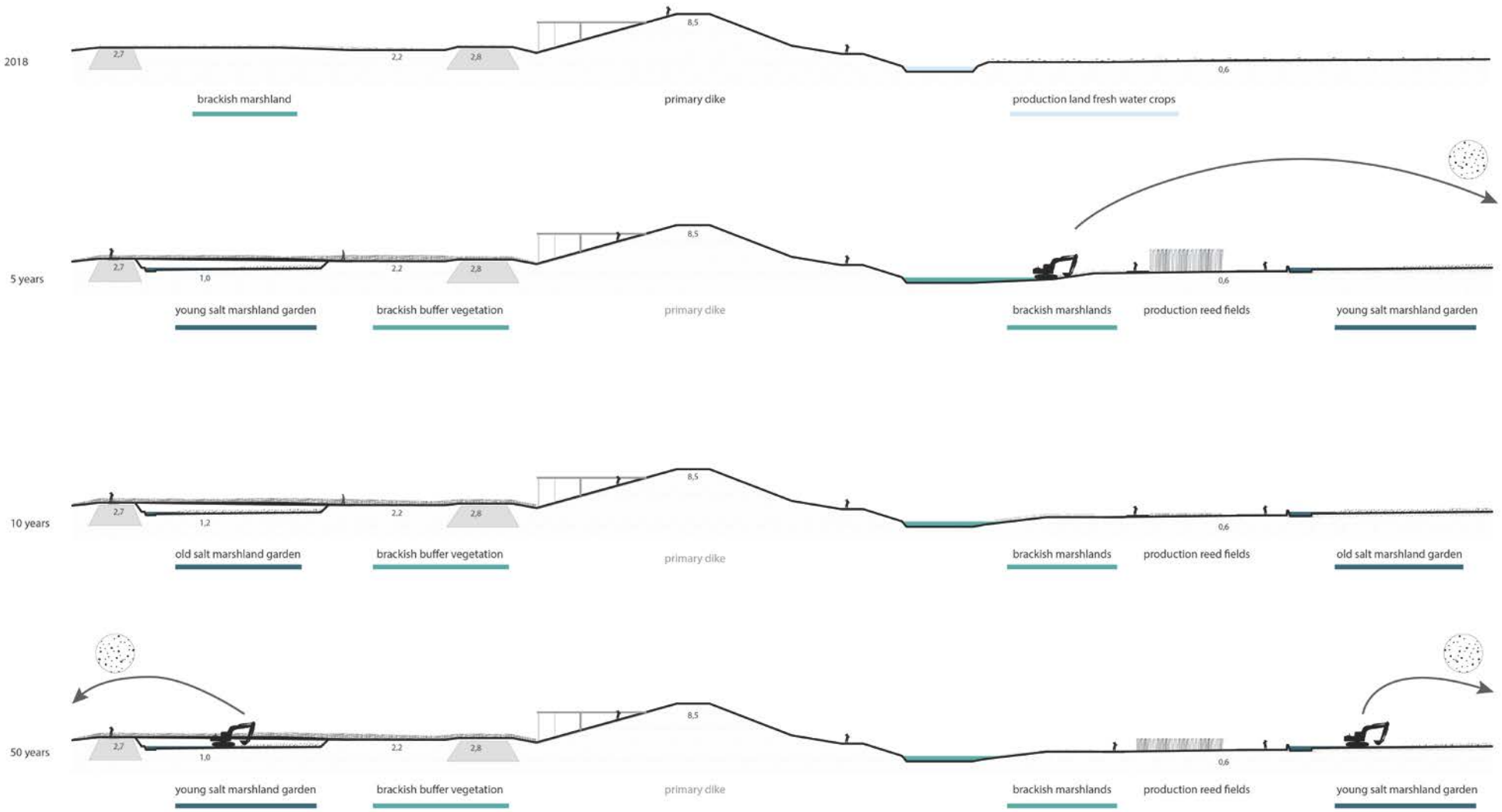
Angular/straight ascent

Straight axis

***Steel** view balcony*





Merging of water types: ecological diversity