De dijk ligt tussen land en water
met palen en basalt
hier ligt hij nu hier ligt hij
totdat de aarde valt.

Hij is gestegen uit de vloeden
met norse langzaamheid
Hij is tot schutten en tot hoeden
tot worstelen bereid

De regens zingen om hen henen
eentonig ongewis
De vogels nest'len in zijn stenen
en aan zijn voet schuilt vis

Hij ziet de lichte zeilen zweven
hij ziet de groene wei
Hij ziet de zilv'ren wolken zweven
veranderlijk en vrij

Hij overheerst het wild gewemel
en temt den grote wind
Hij doet ons dromen van de hemel
zo zorgeloos als een kind

DE DIJK | Jan Engelman (1937)

"Hybrid Dam"

Envisioning a Future Where Dikes Become Dams in Hoedekenskerke, Zeeland

Jenna Zuidmeer
Student number: 4865804

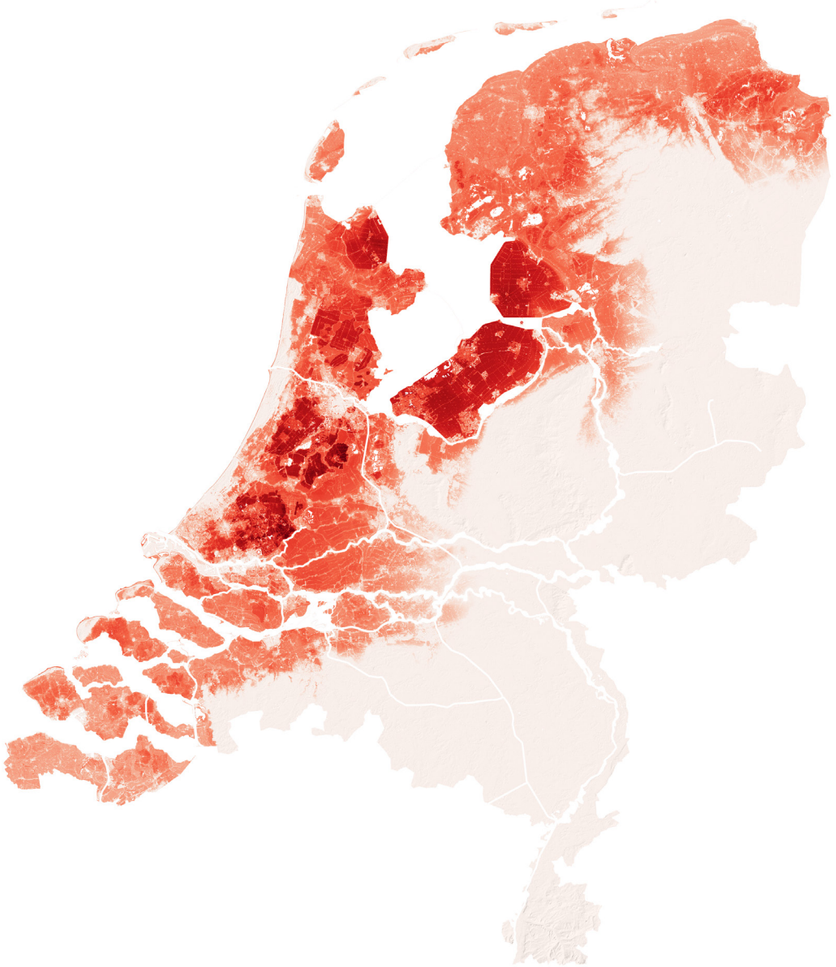
Design tutor: Thomas Offermans
Research tutor: Luca Iuorio
Building Technology tutor: Arie Bergsma

P5 | AR3AE100 Architectural Engineering

True Dutch

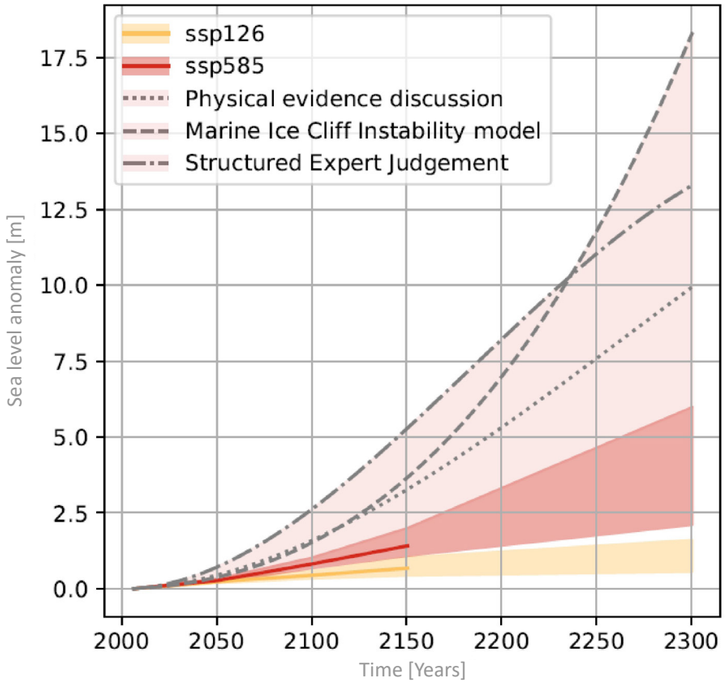
“God created the world but the dutch created the Netherlands”

The Struggle with Water



(Zuidmeer, 2024)

The Struggle with Water



(Dorland et al., 2023)

The Struggle with Water

(Van Ruiten, 2021)

The Struggle with Water

1:500.000
(Zuidmeer, 2024)

The Struggle with Water

1:500.000
(Zuidmeer, 2024)

The Struggle with Water

(Pleijster, 2014)

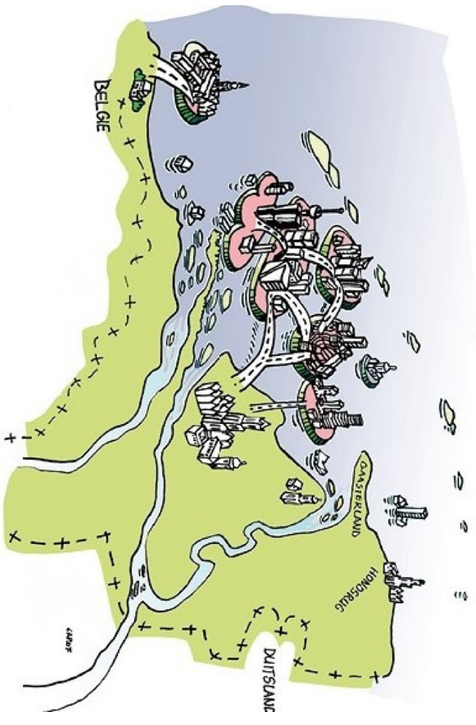
The Struggle with Water

(Zuidmeer, 2024)

The Ending Lyfe Cycle of Water Defence Systems

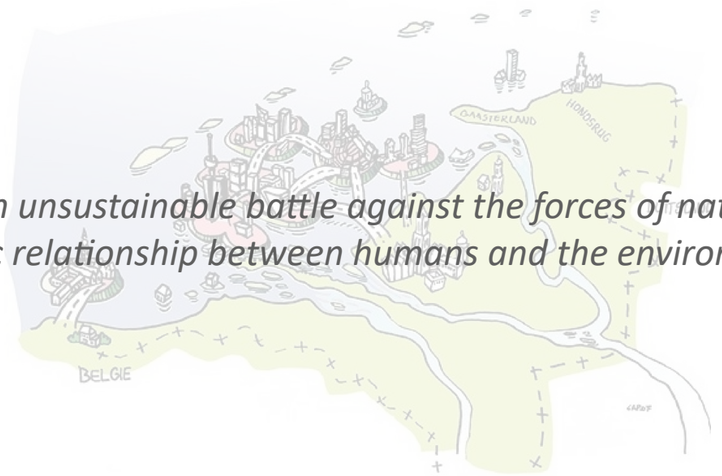
1:500.000
(Zuidmeer, 2024)

Adaptation Strategy: Living with Water



(De Beer et al., 2023)

Adaptation Strategy: Living with Water



“Rather than persisting in an unsustainable battle against the forces of nature, we should return to a symbiotic relationship between humans and the environment.”

(De Beer et al., 2023)

Adaptation Strategy: Living with Water

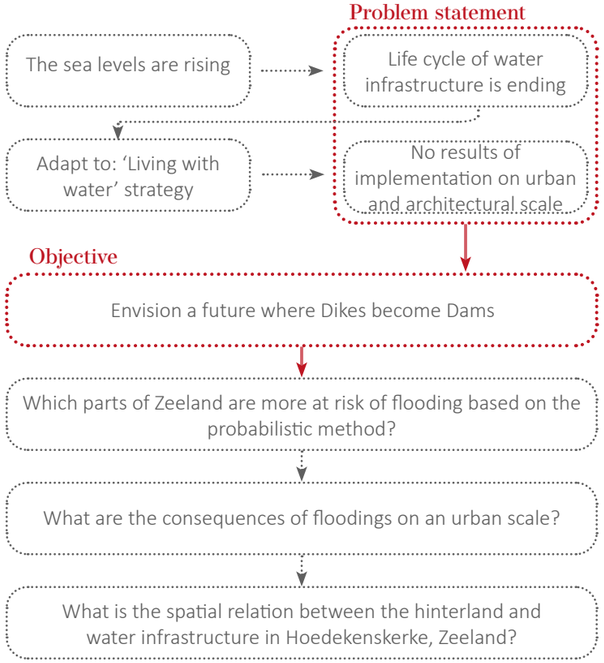
(Zuidmeer, 2024)

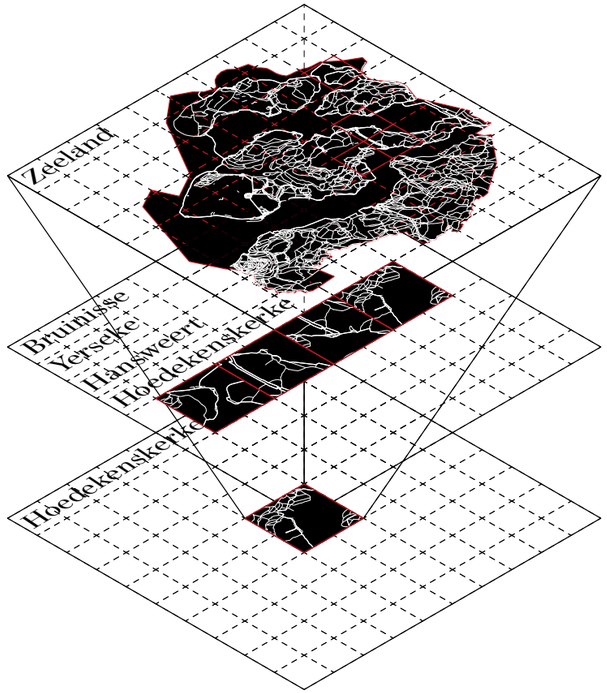
Where to start?

Regional Scale

Research Plan Structure

Since the **sea levels are rising** and the **life cycle of water infrastructure is ending**,
is there a new way in which we can **adapt hydraulic infrastructure** to **live in harmony with water**?

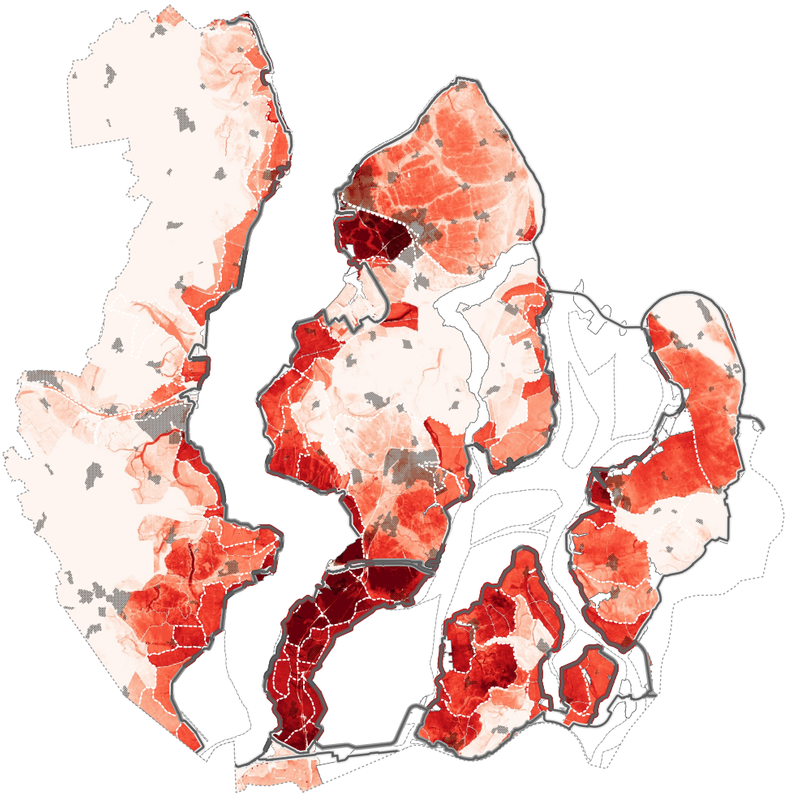




Risk of Dike Failure on a Regional Scale

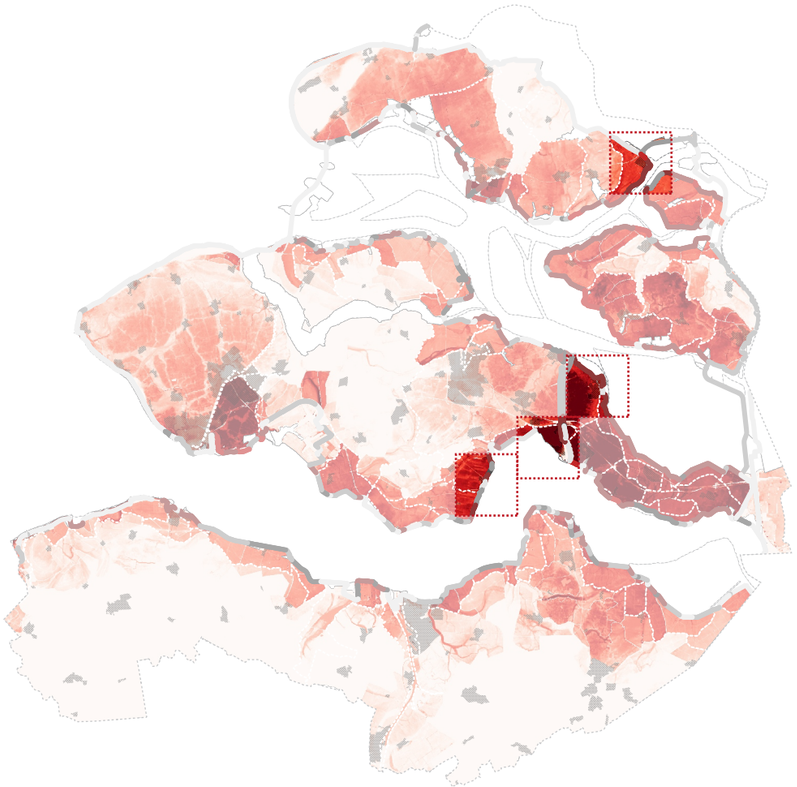
1:500.000
(Zuidmeer, 2024)

Risk of Dike Failure on a Regional Scale



1:500.000
(Zuidmeer, 2024)

Risk of Dike Failure on a Regional Scale



Bruinisse

Yerseke
Hansweert
Hoedekenskerke

1:500.000
(Zuidmeer, 2024)

Consequences of Dike Failure on an Urban Scale

Bruinisse

Yerseke

Hansweert

Hoedekenskerke

(Zuidmeer, 2024)

Consequences of Dike Failure on an Urban Scale

Bruinisse

Yerseke

Hansweert

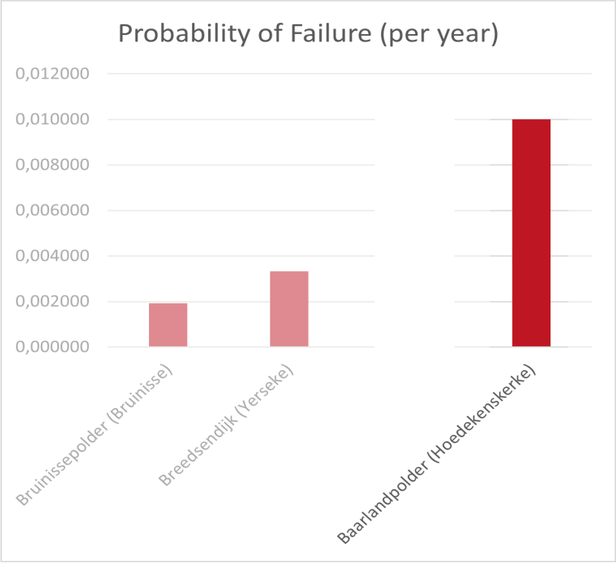
Hoedekenskerke

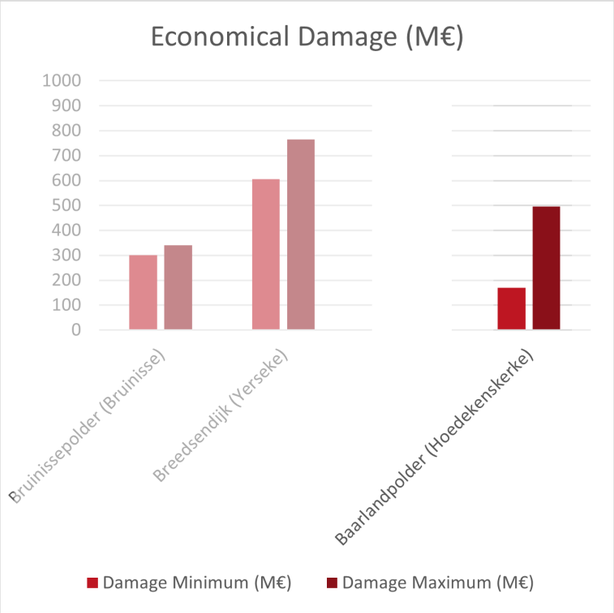
Risk

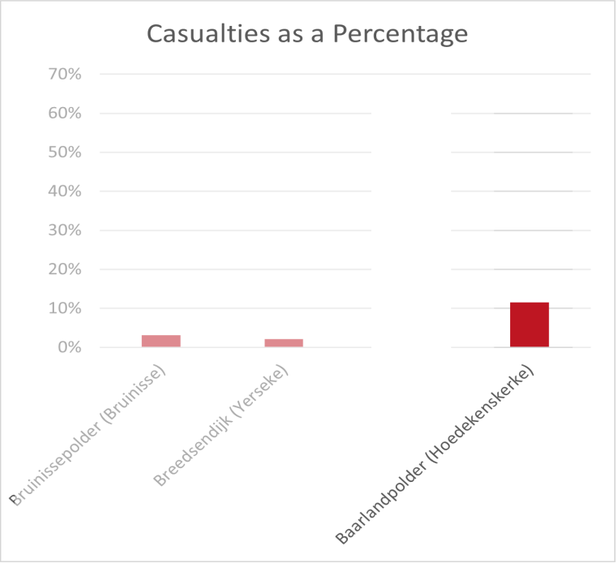
Consequences

1:50.000
(Zuidmeer, 2024)

Consequences of Dike Failure on an Urban Scale

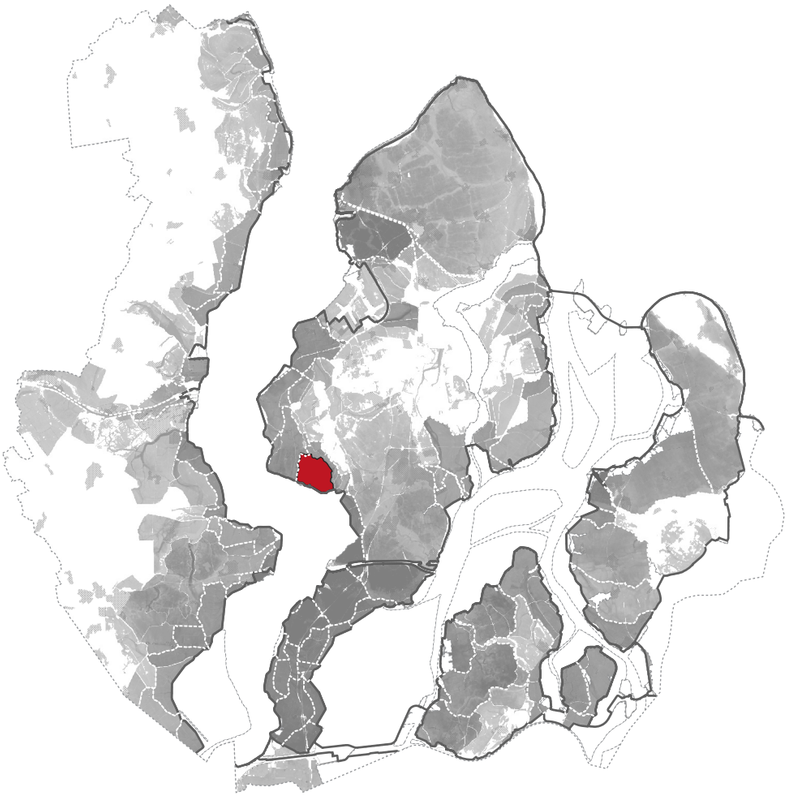






(Rijkswaterstaat; Ministerie van Infrastructuur en Waterstaat, 2022; Provincie Zeeland, 2014; Boon, 2012; Bart & Bossenbroek, 2011; Bossenbroek & Bardoel, 2014)

Hoedekenskerke



1:500.000
(Zuidmeer, 2024)

Where to start?

Local Scale

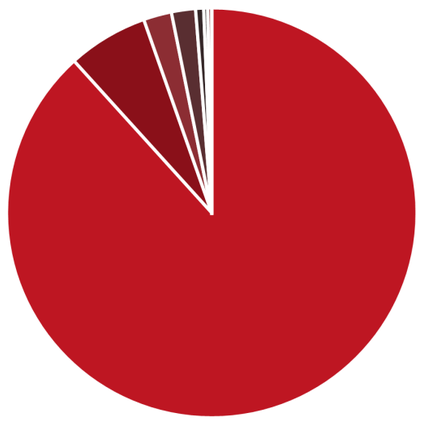
Hoedekenskerke

1:10.000
(Zuidmeer, 2024)

Hoedekenskerke

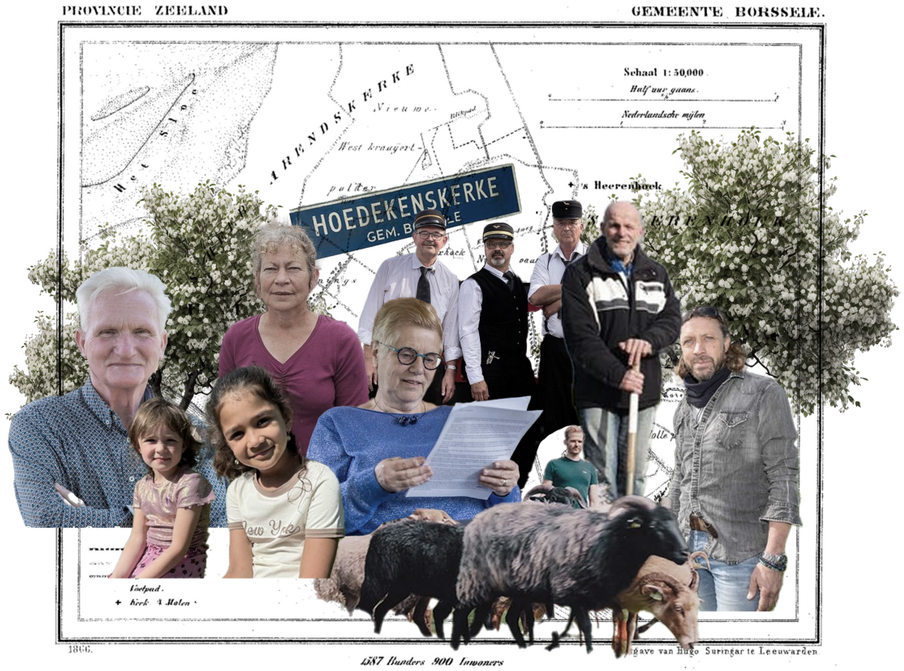
Use Function Hoedekenskerke

Residential	279
Other use	20
Industrial	7
Assembly	6
Retail	2
Educational	1
Accommodation	1
Healthcare	0
Sports	0
Office	0



(Kadaster, 2023)

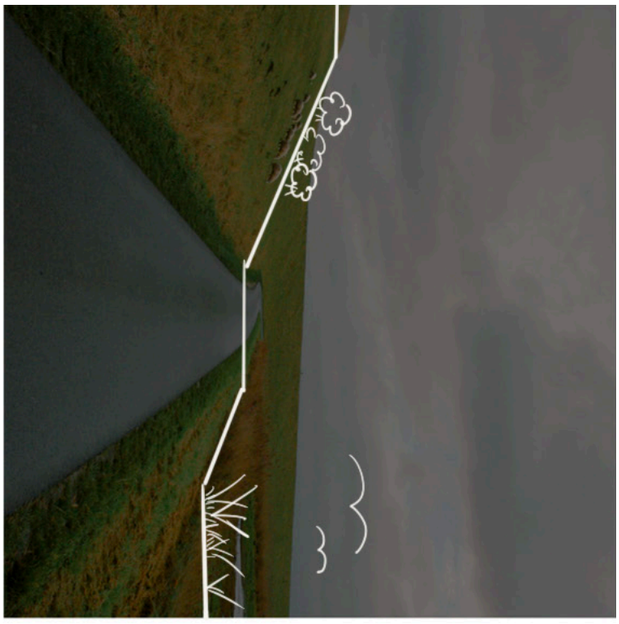
Hoedekenskerke

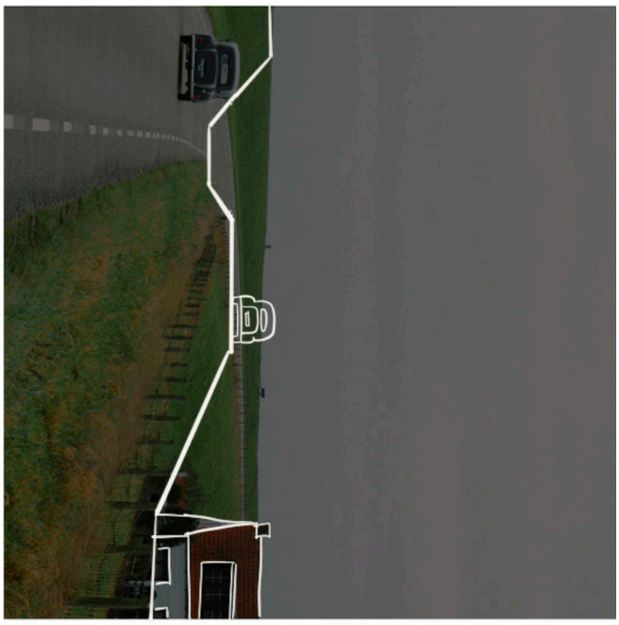


The Dike as a Landscape Element

(Zuidmeer, 2023)

The Dike as a Landscape Element





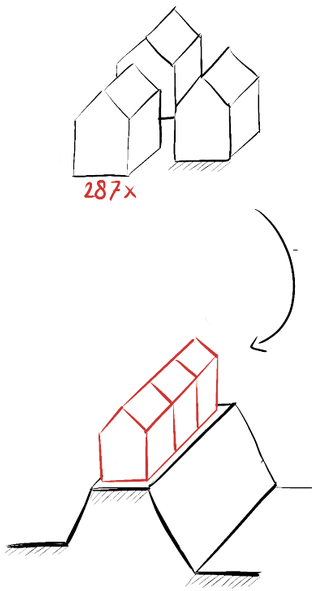
(Zuidmeer, 2023)

The Dike as Heritage

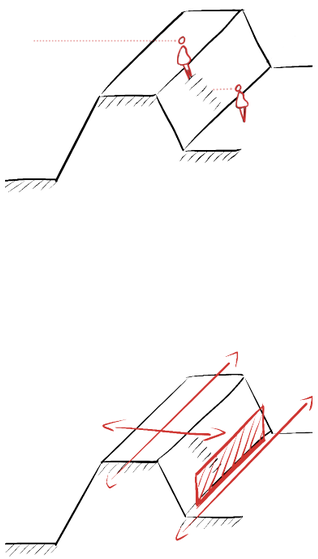
(Eshuis & Brader, 2020)

Conclusions

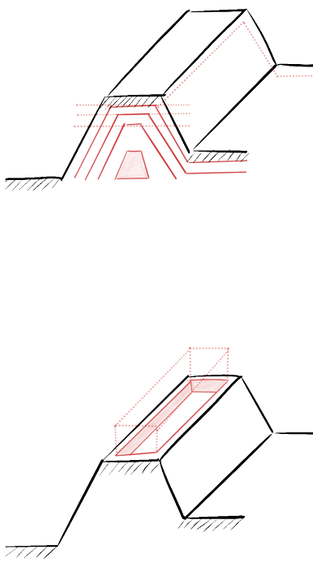
Location



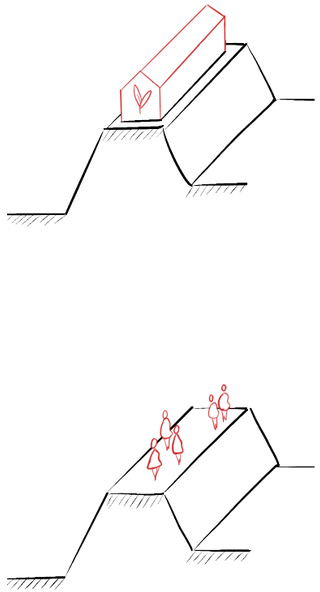
Dike as a Landscape



Dike as Heritage



Dike and Trust



(Zuidmeer, 2024)

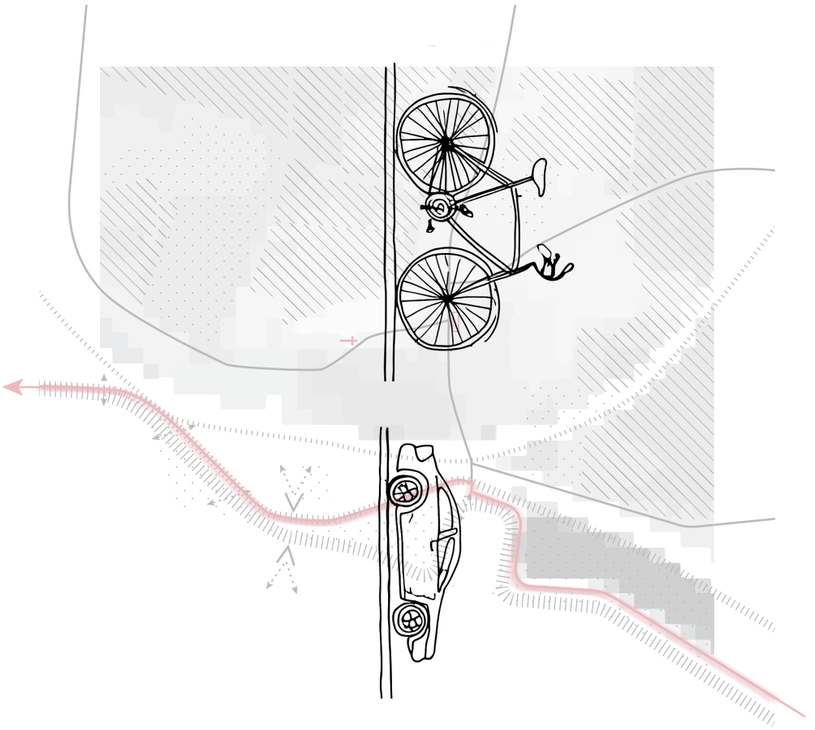
Conclusions

"By embracing a more ***adaptive and mindful coexistence*** *with water, the Netherlands can chart a* resilient course *into the future, one that* ***relocates its vulnerable hinterland****, while* ***honoring the intricate legacy of hydraulic engineering*** *that defines its identity"*

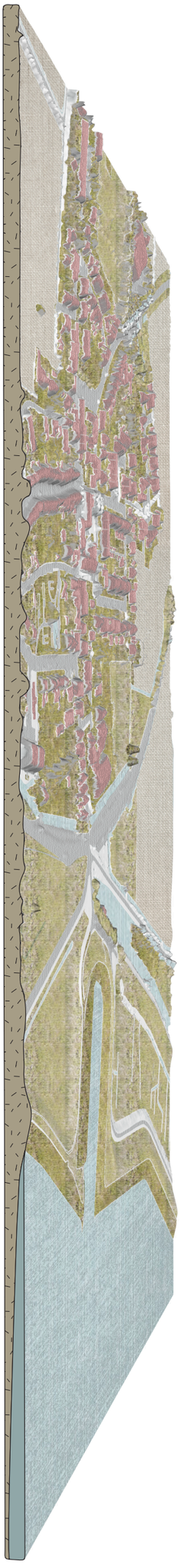
Hoedekenskerke

1 : 10.000

Hoedekenskerke

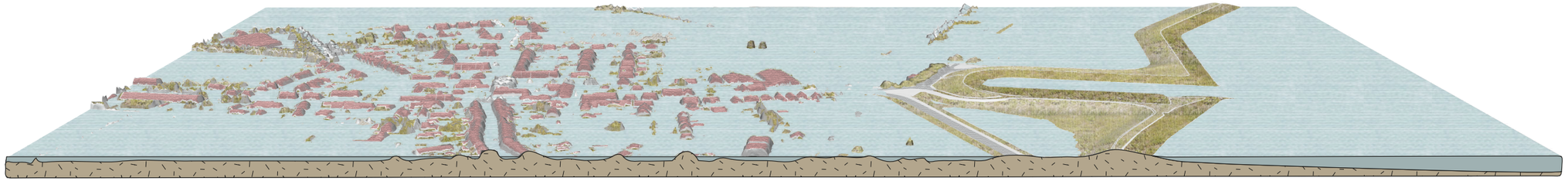


Hoedekenskerke - Now



(Zuidmeer, 2024)

Hoedekenskerke - Future

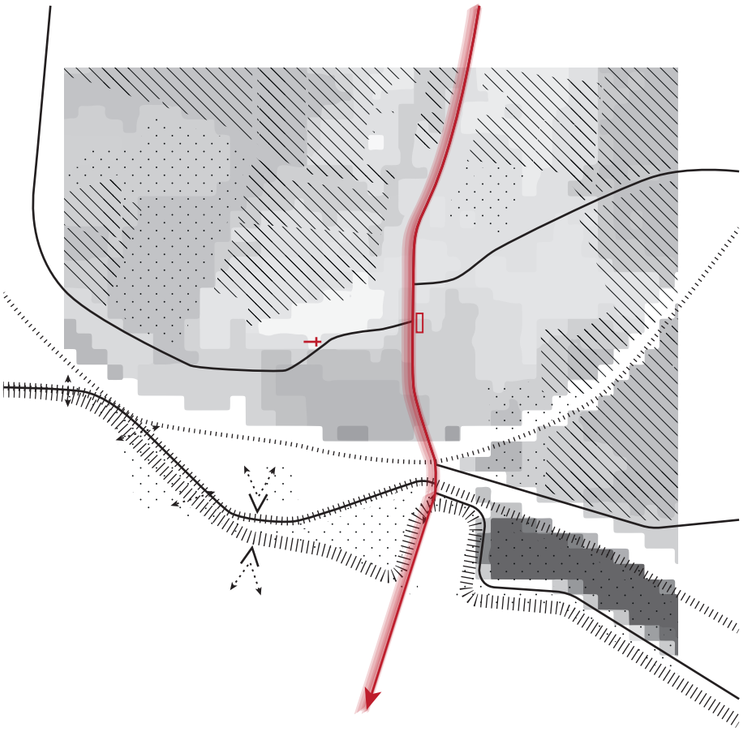


(Zuidmeer, 2024)

Hoedekenskerke

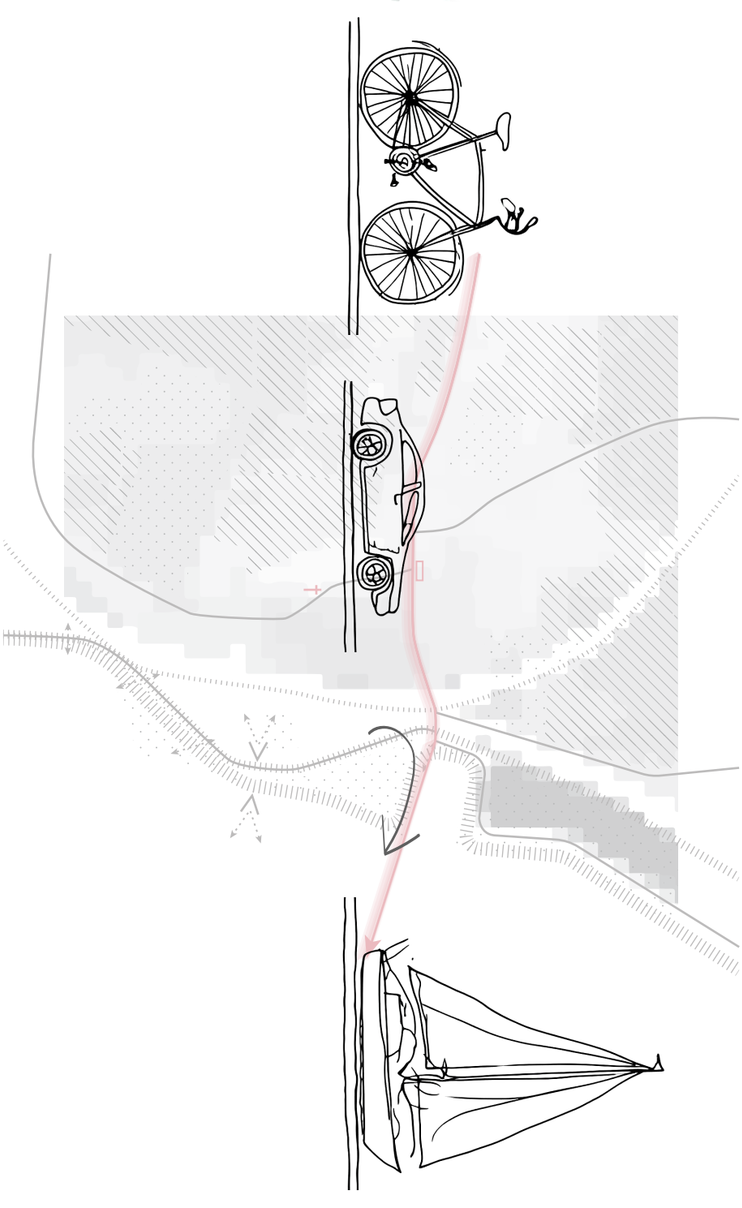
1 : 10.000

Hoedekenskerke



1 : 10.000

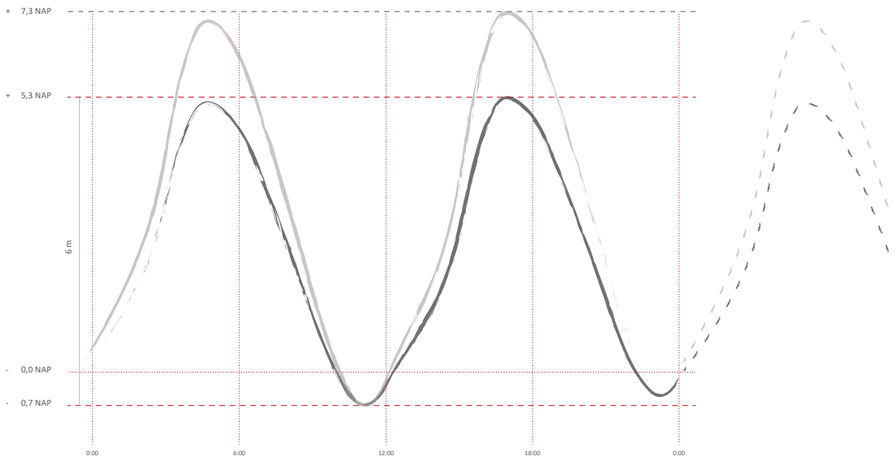
Hoedekenskerke



Design Goal

“Connecting land and water whilst solving the need for mobility and provide a base for future living”

Sea Level Rise



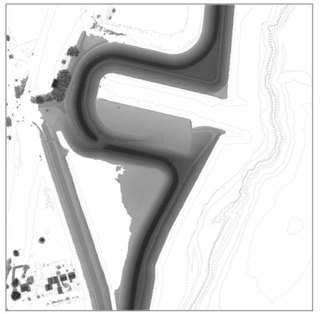
25 April

Sea Level Rise

NAP

+ 1 m

+ 2 m



+ 3 m

+ 4 m

+ 5 m

+ 6 m

+ 7 m

1 : 1.500

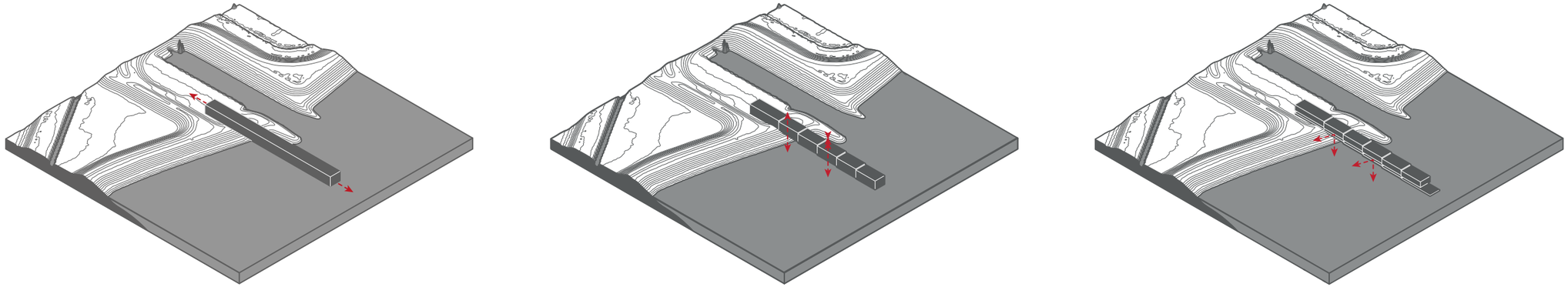
What to build?

Design Concept

Design Concept

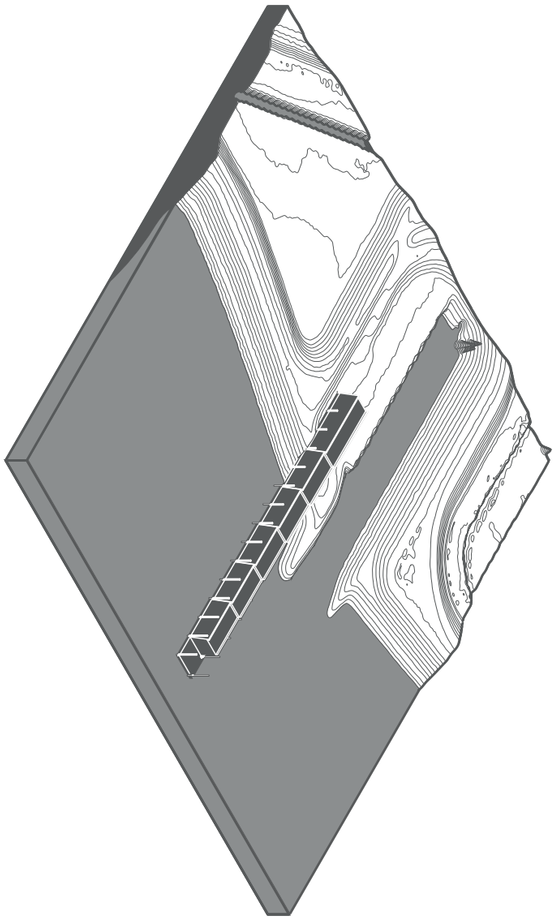
Design Concept

Design Concept



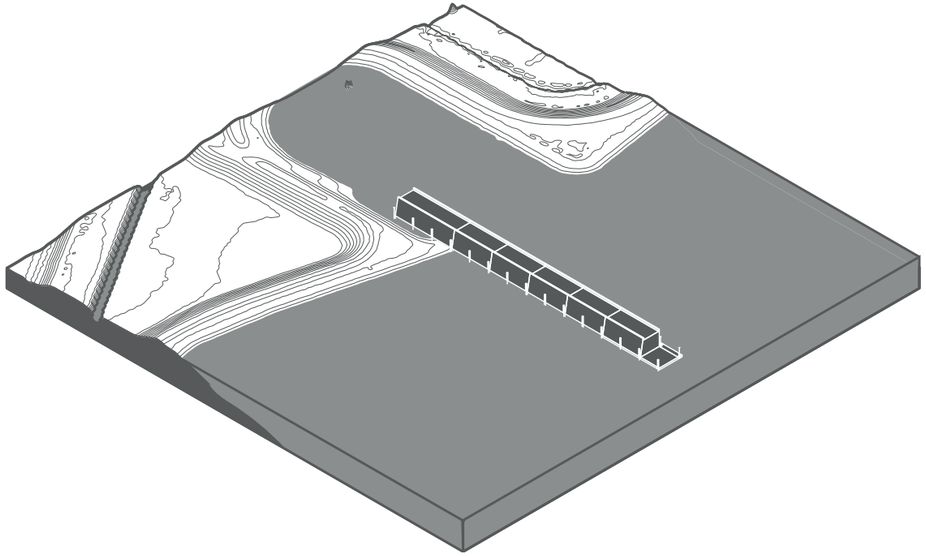
(Zuidmeer, 2024)

Design Concept



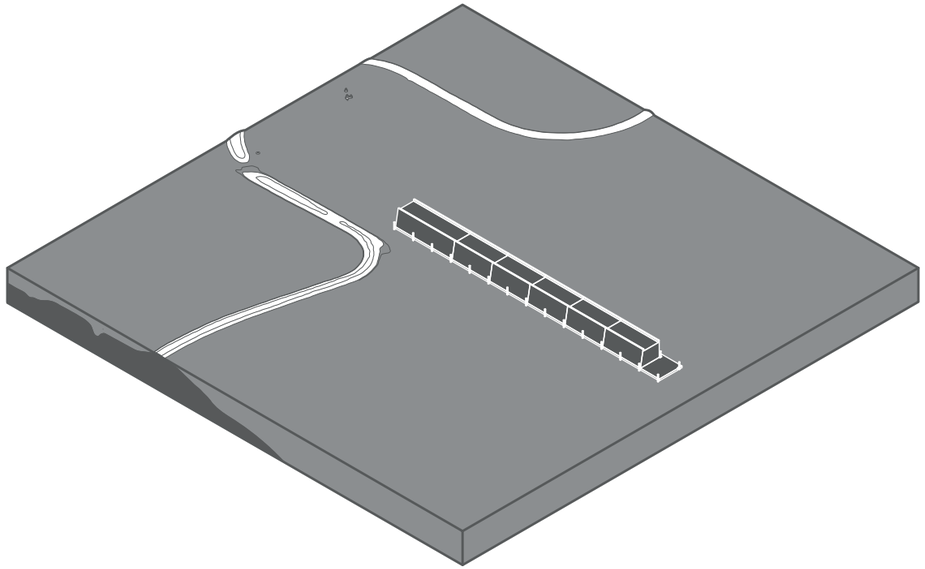
(Zuidmeer, 2024)

Design Concept



(Zuidmeer, 2024)

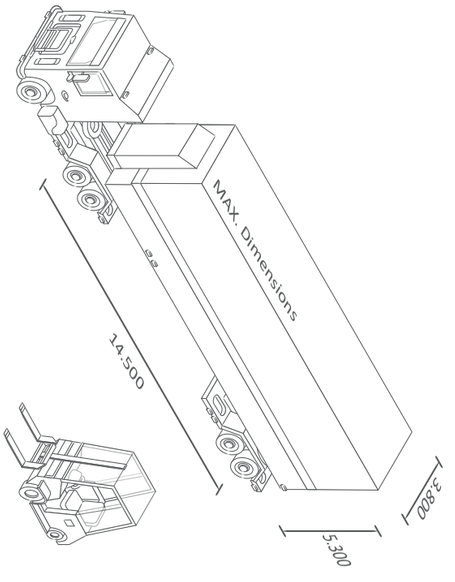
Design Concept



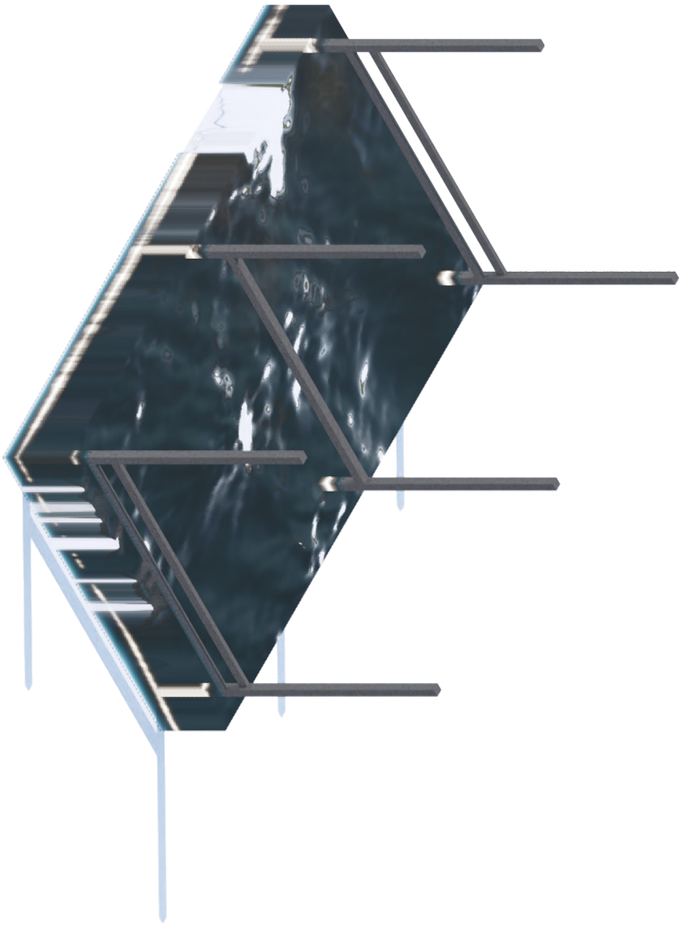
(Zuidmeer, 2024)

(Zuidmeer, 2024)

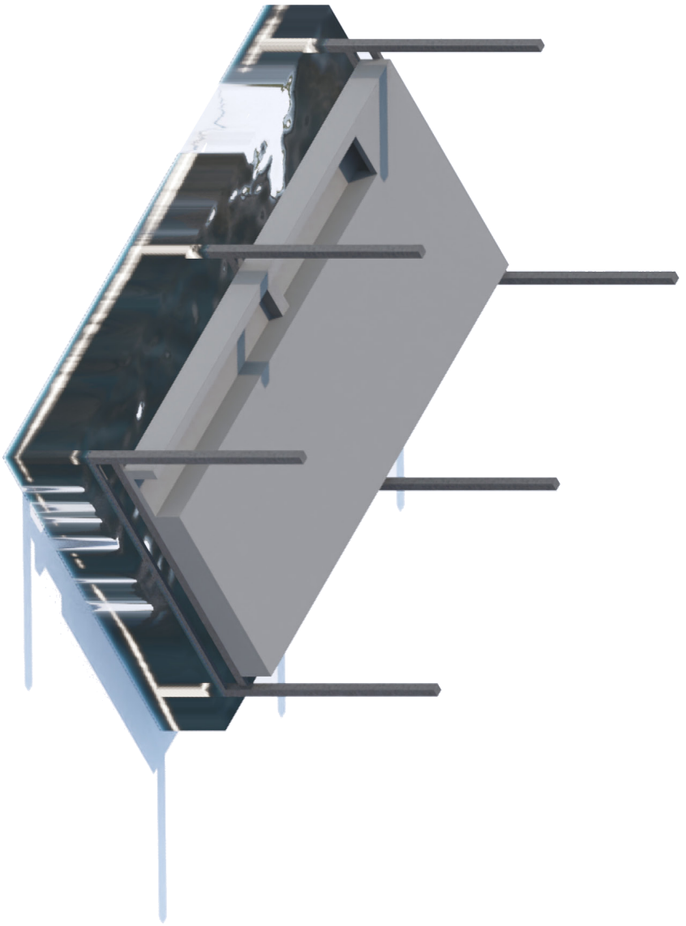
Construction



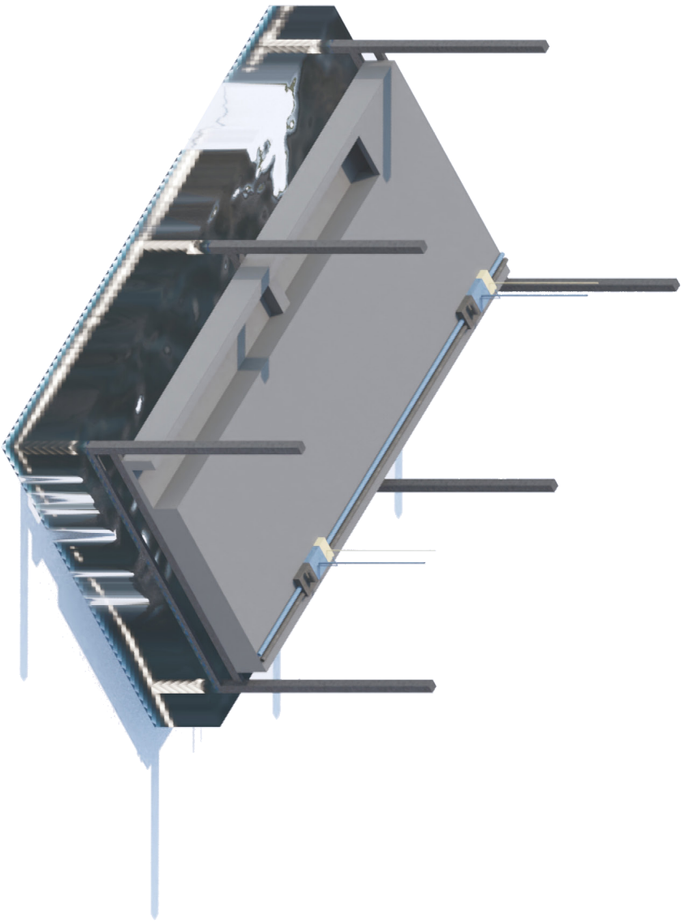
Construction



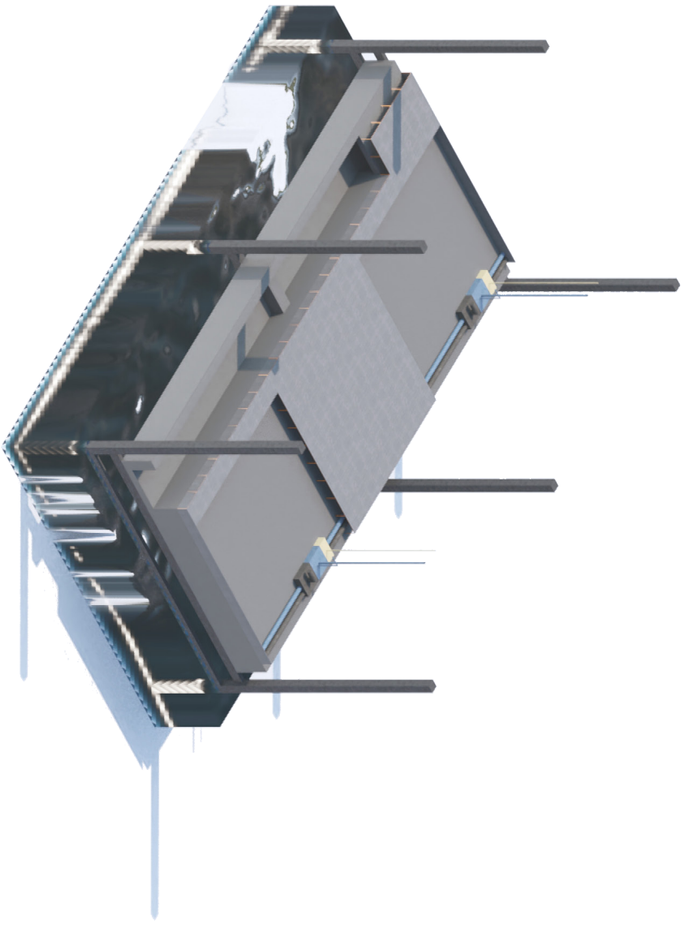
Construction



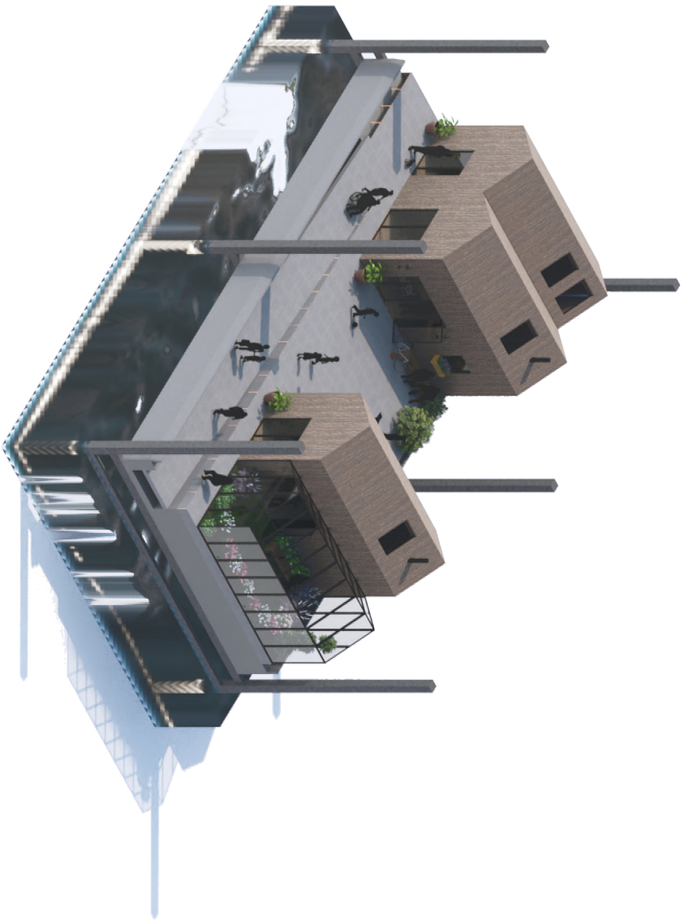
Construction



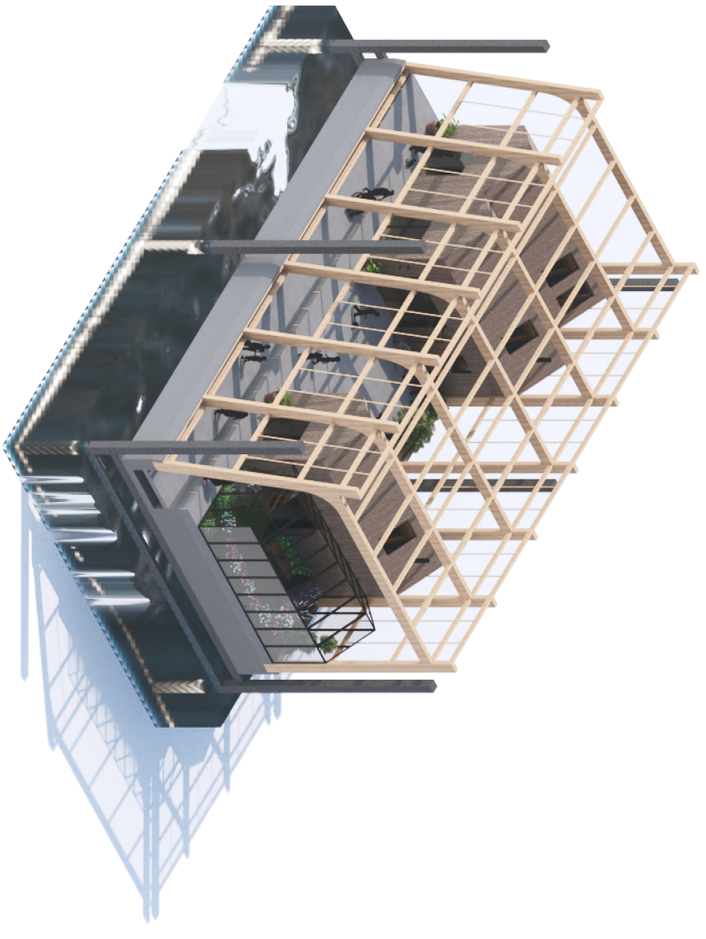
Construction



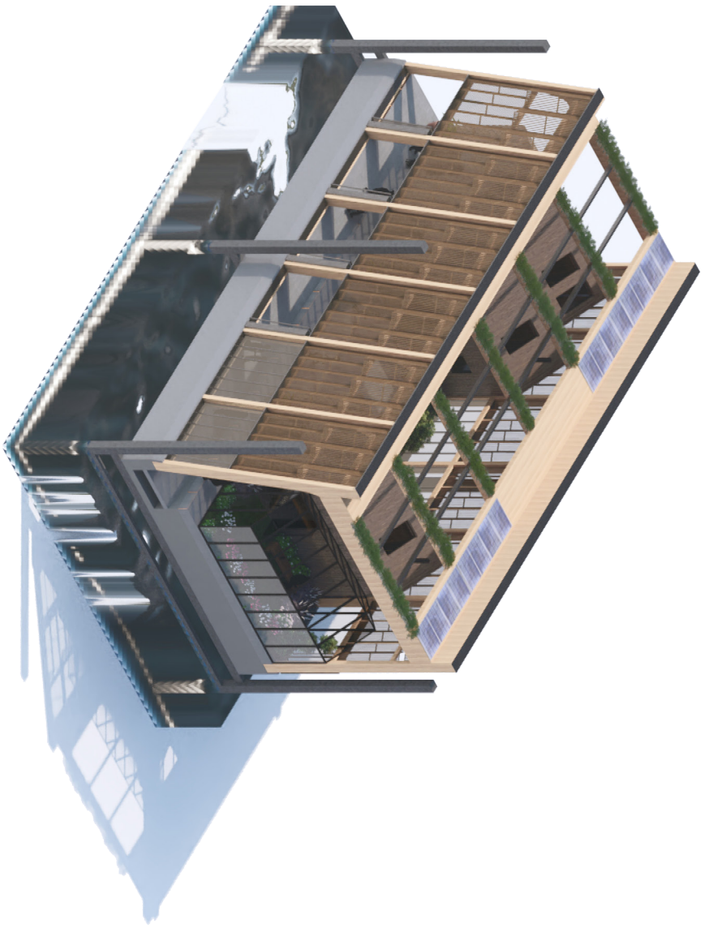
Construction



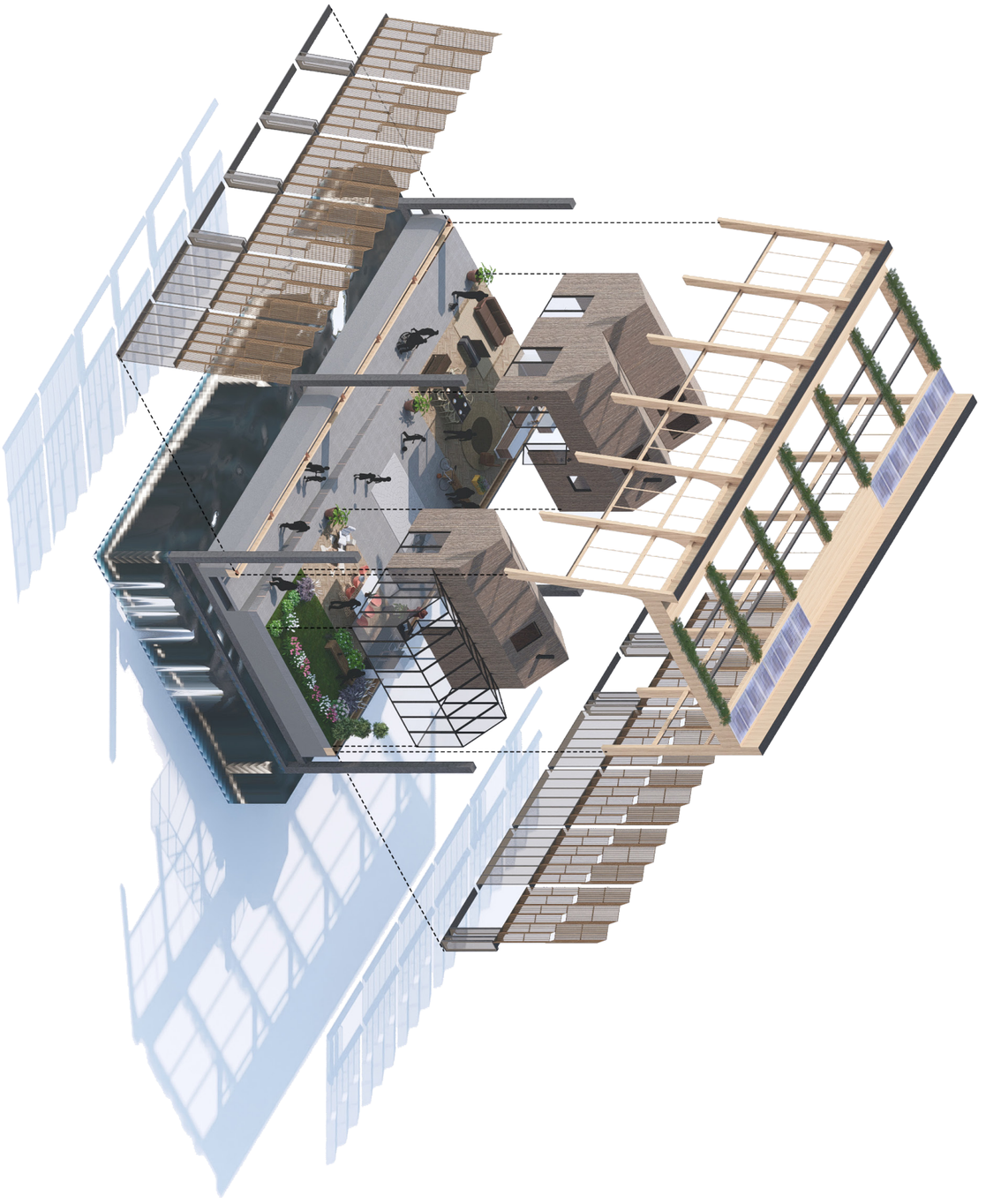
Construction



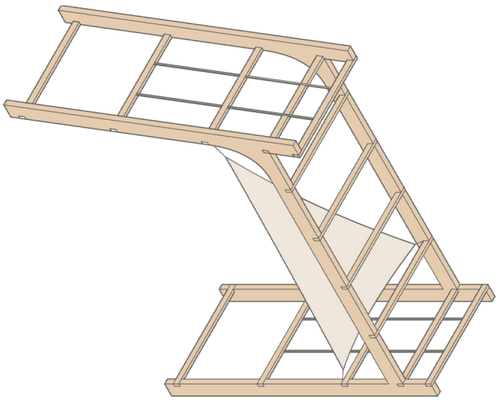
Construction

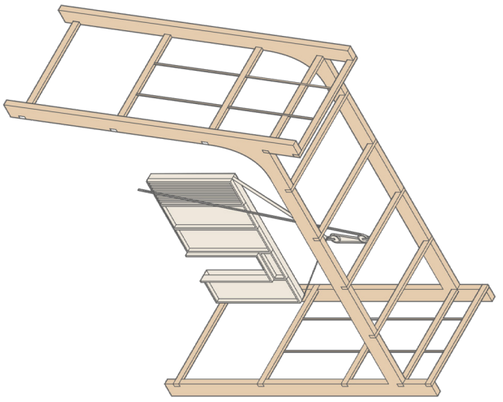


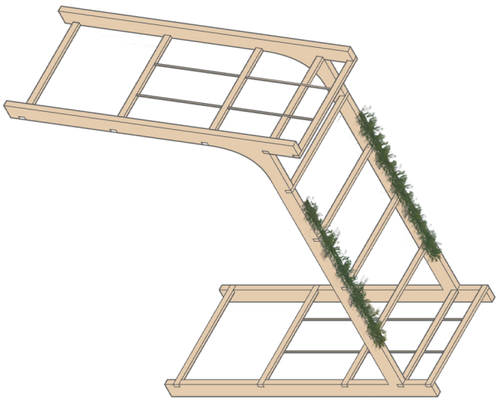
Construction

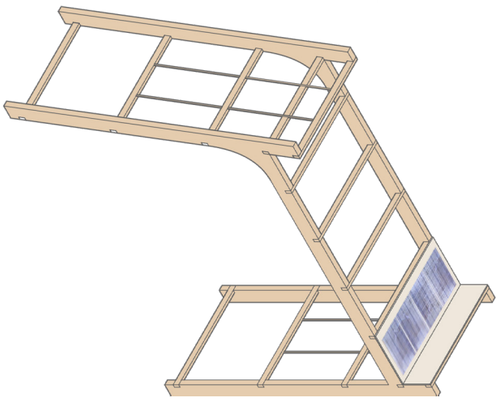


Construction



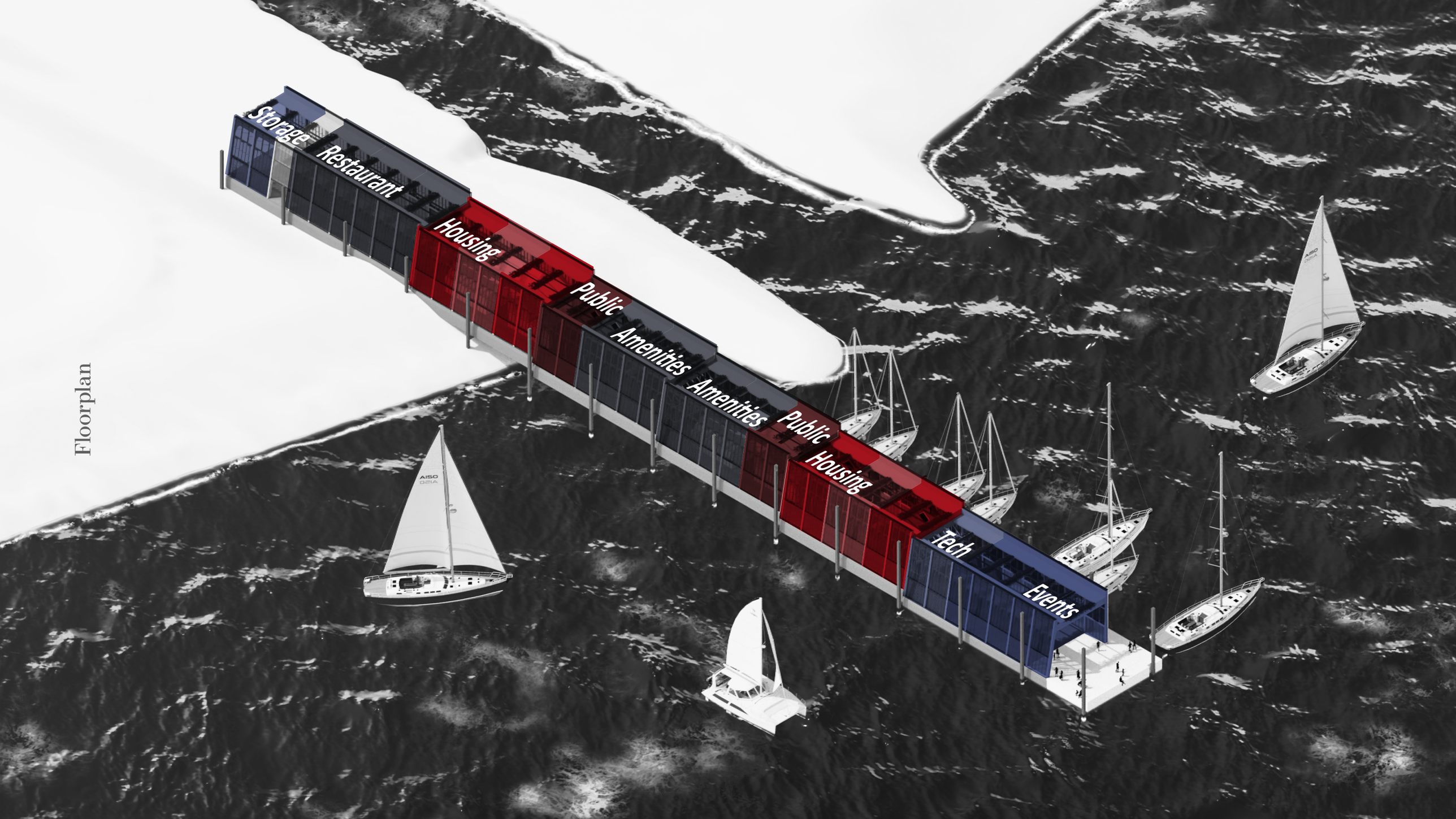






Construction

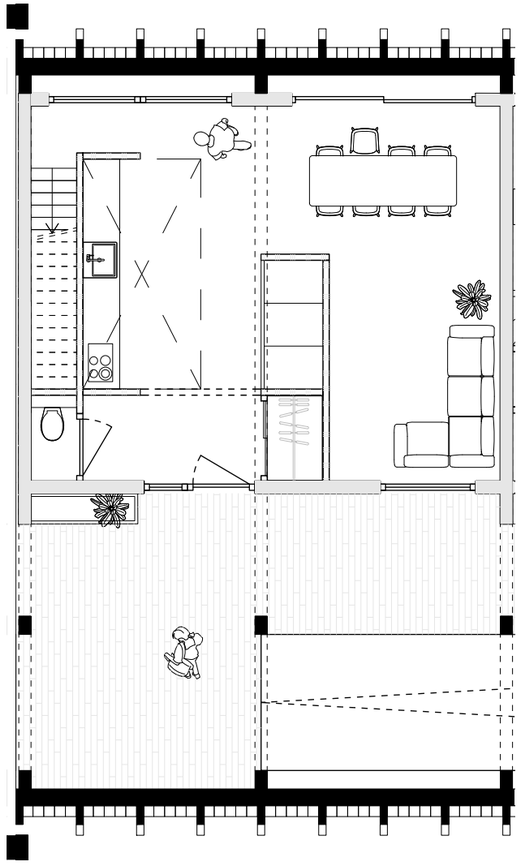
Floorplan


Storage
Restaurant
Housing
Public
Amenities
Amenities
Public
Housing
Tech
Events

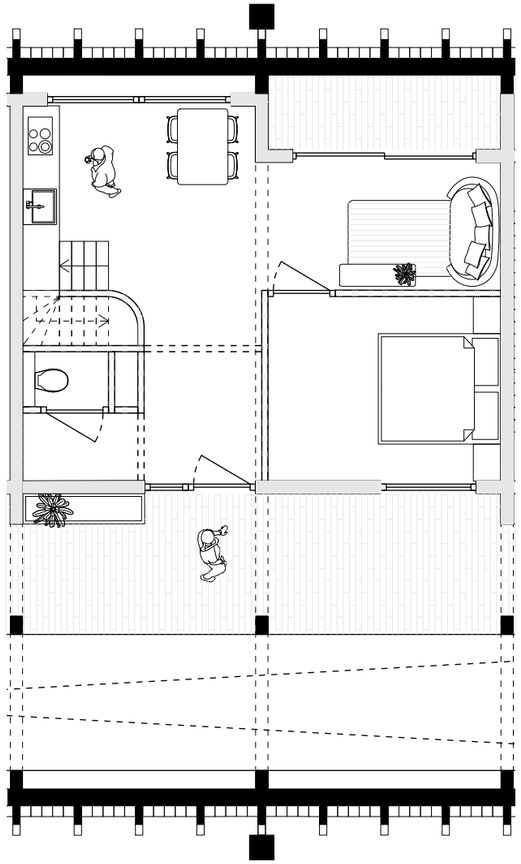
Floorplan

1 : 500

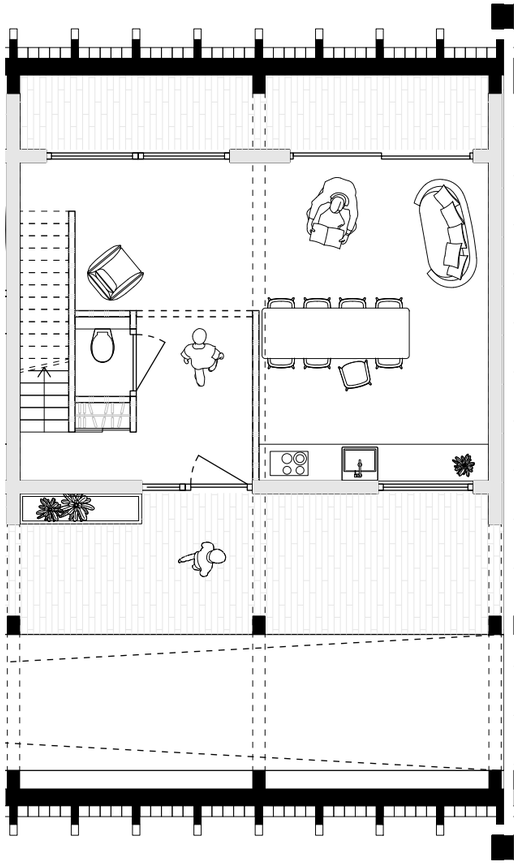
Floorplan



House 01



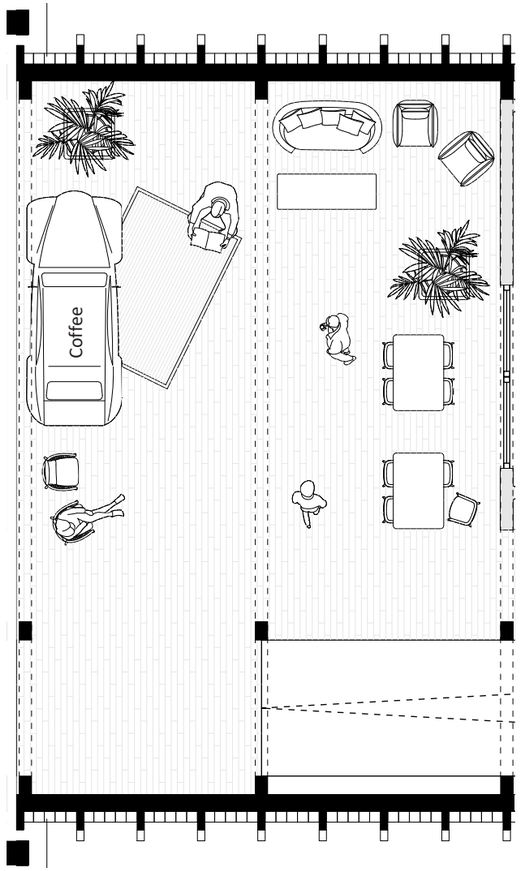
House 02



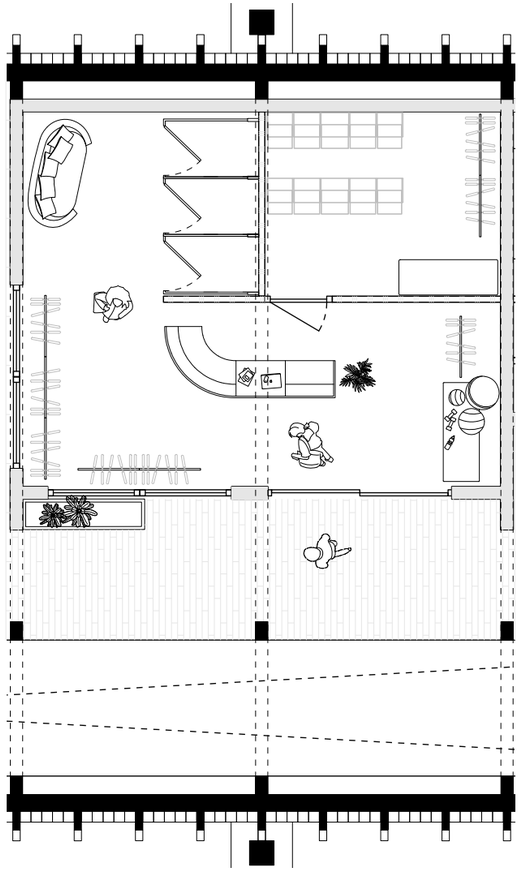
House 03

1 : 100

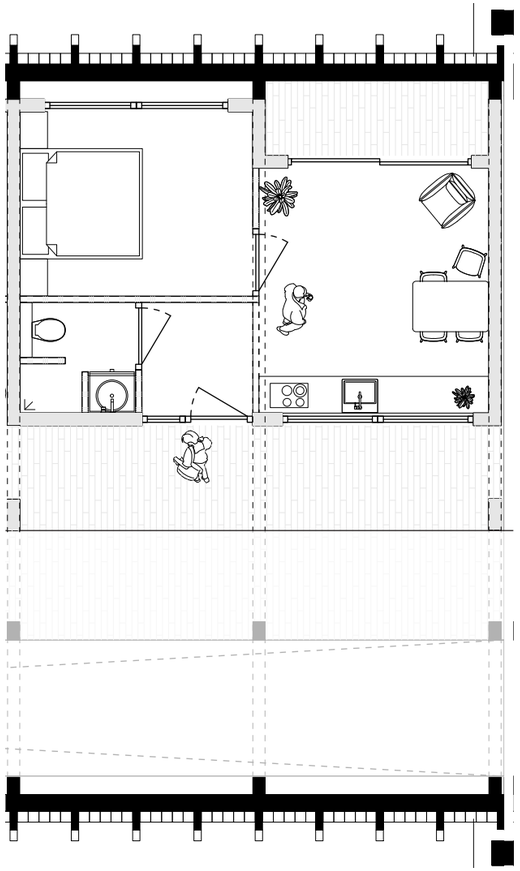
Floorplan



Square



Shop

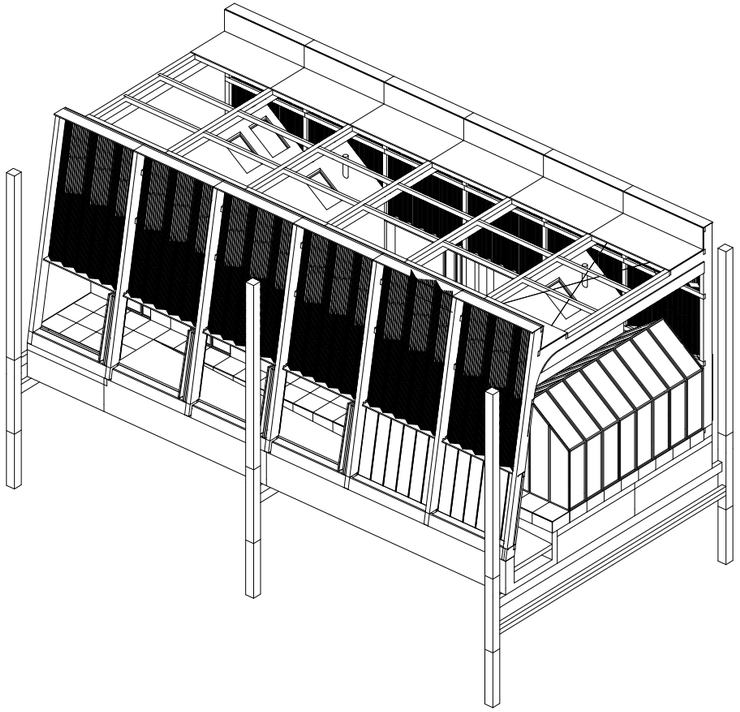


Appartment 01

1 : 100

Floorplan

Climate Design



Solar Panels

Electricity

Rain Water

Rain Water

- Filter
- Storage

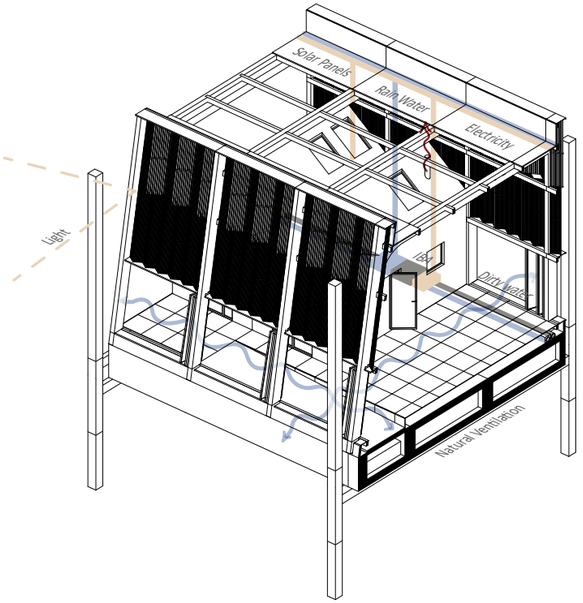
IBA-System

Hydrogen Power Box

Natural Ventilation

MechanicalVentilation

Climate Design



Solar Panels

Electricity

Rain Water

Rain Water

- Filter
- Storage

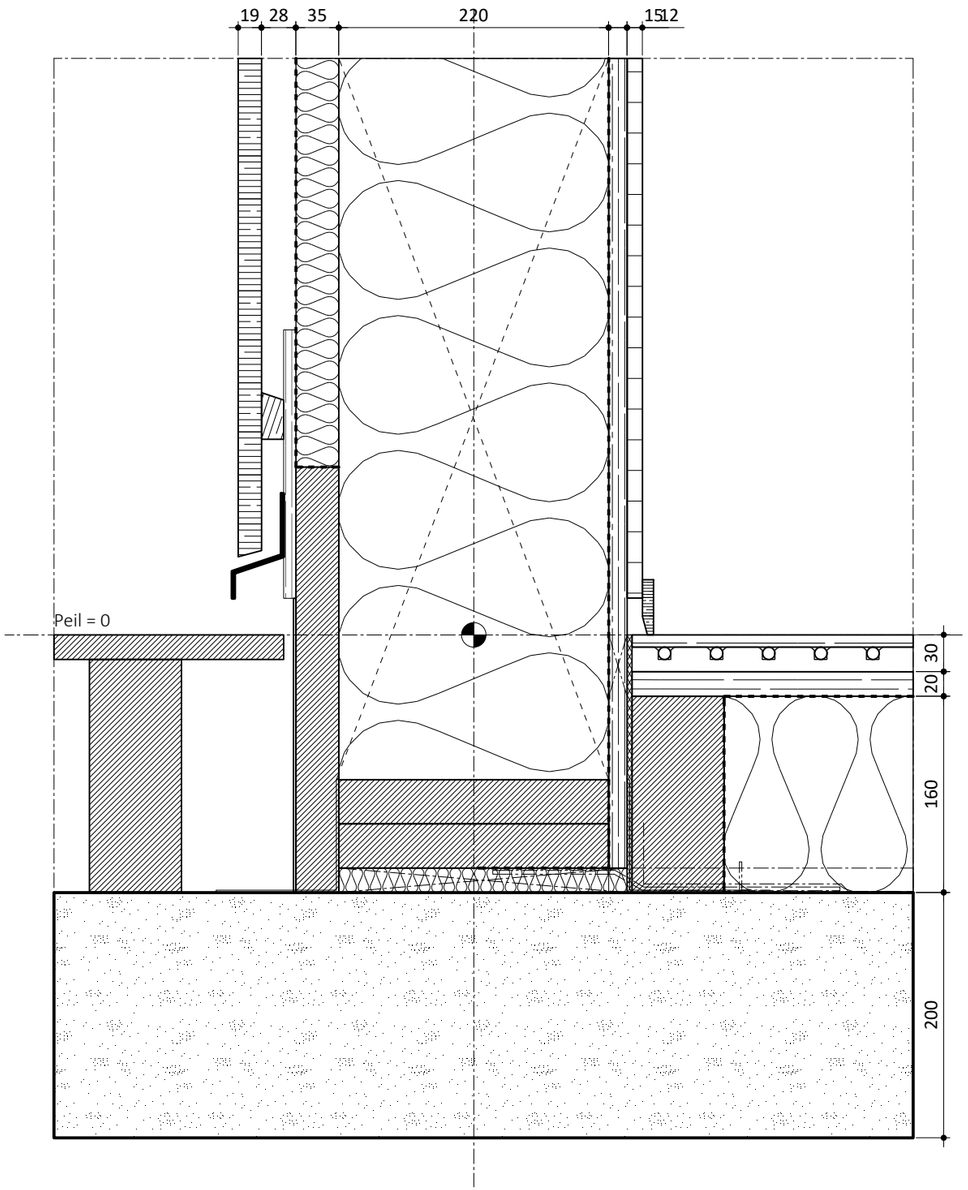
IBA-System

Hydrogen Power Box

Natural Ventilation

MechanicalVentilation

Construction Details



Vertical Section
scale 1:5

Interior Facade construction:
19 mm gevelelement Acoya hout,
28 mm Luchtspauw sterk geventileerd,
35 mm Waterkerende en dampdoorlatende houtvezelplaat isolatie (λ reken ≤ 0,044 W/mK)
220 x 35 Houten stijlen
220 mm Biobased vezel isolatie (λ reken ≤ 0,038 W/mK)
15 mm Biobased houtbeplating
12,5 mm Gipsplaat

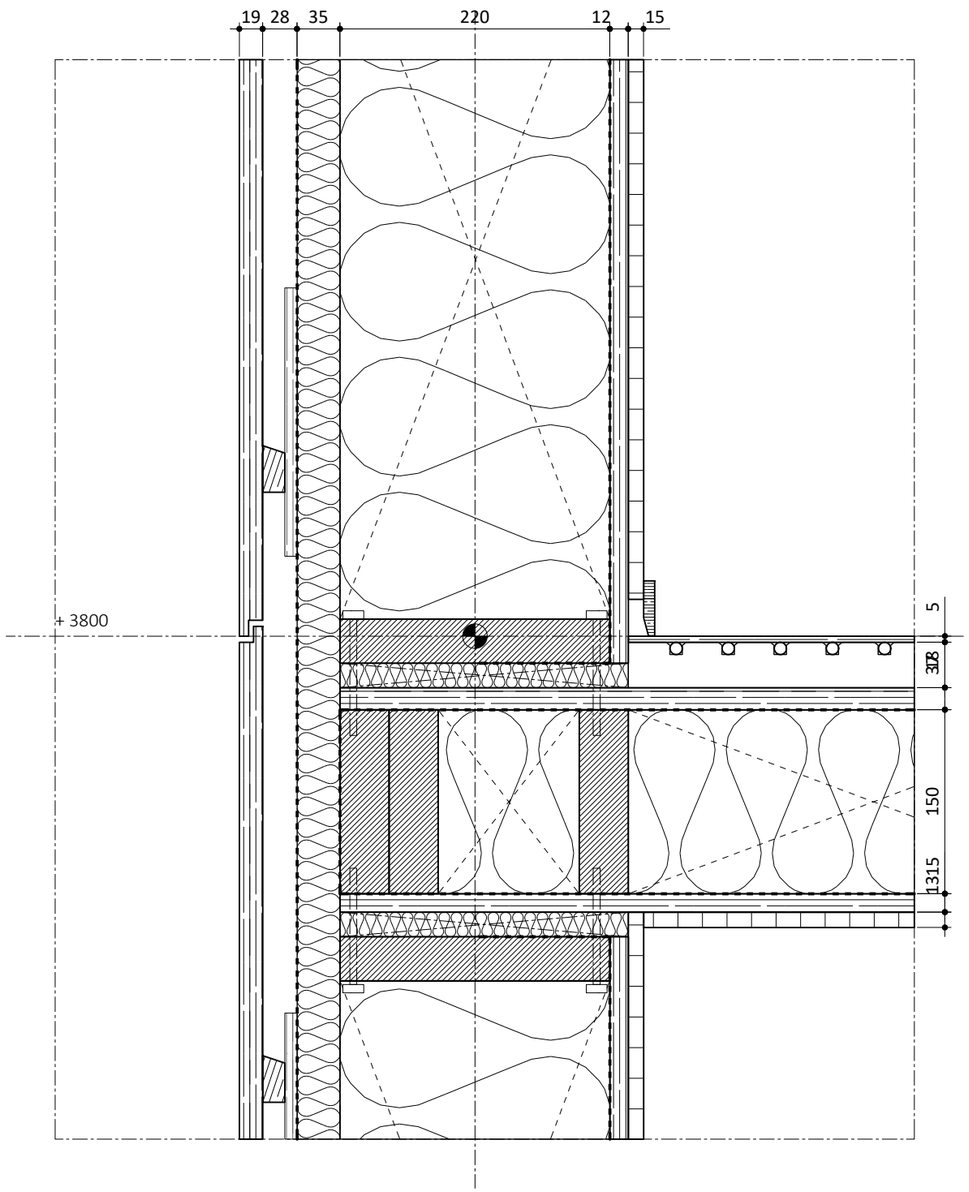
Rc Gevel = 4,5 (m²K)/W

Ground Floor construction:
10 mm Dekvloer steen,
20 mm Dekvloer vloerverwarming,
0,2 mm PE-Foil,
160 mm Kooltherm K3 Floorboard (λ reken ≤ 0,021 W/mK)
0,02 mm PE Film
220 mm Prefab beton (drijvende fundering)

Rc Floor = 7,6 (m²K)/W

1 : 5

Construction Details



Vertical Section
scale 1:5

First Floor construction:
5 mm Dekvloer Hout,
35 mm Dekvloer Vloerverwarming
0,2 mm PE-Foil,
150 mm Kooltherm K3 Floorboard (λ reken ≤ 0,021 W/mK)
0,02 mm PE Film
15 mm Biobased houtbeplating
12,5 mm Gipsplaat

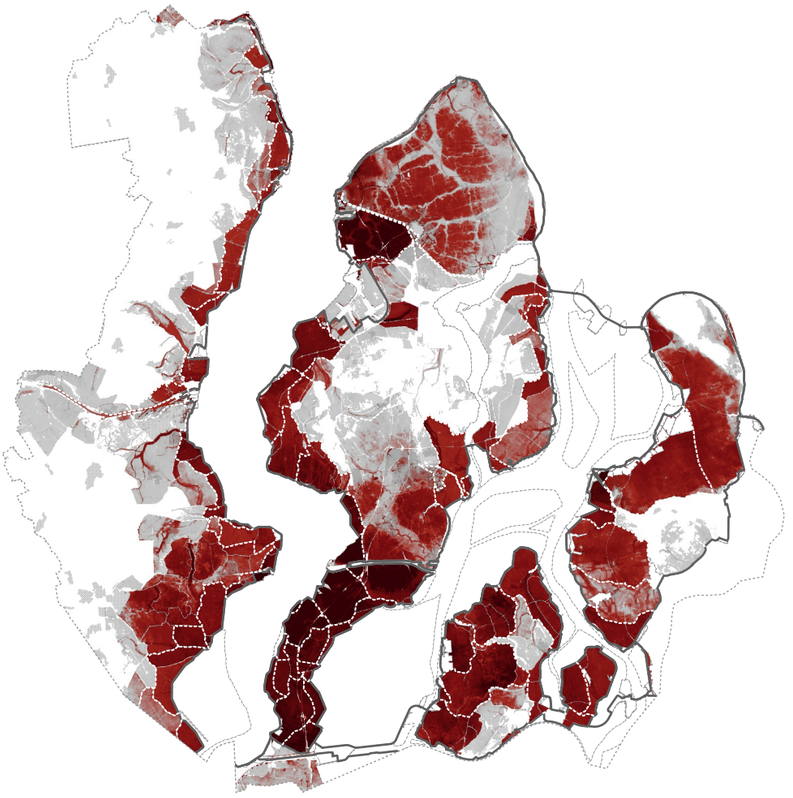
Rc Floor = 5,4 (m²K)/W

1 : 5

What will the future hold?

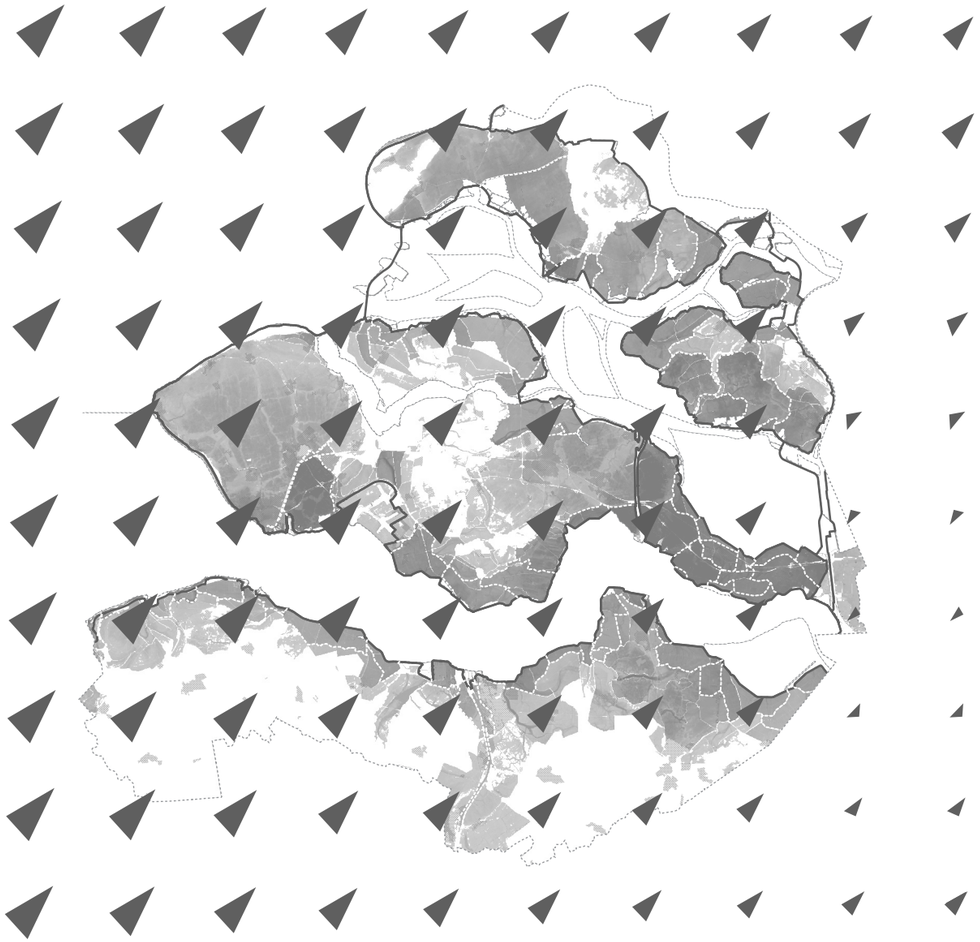
Regional Scale

Future Potential



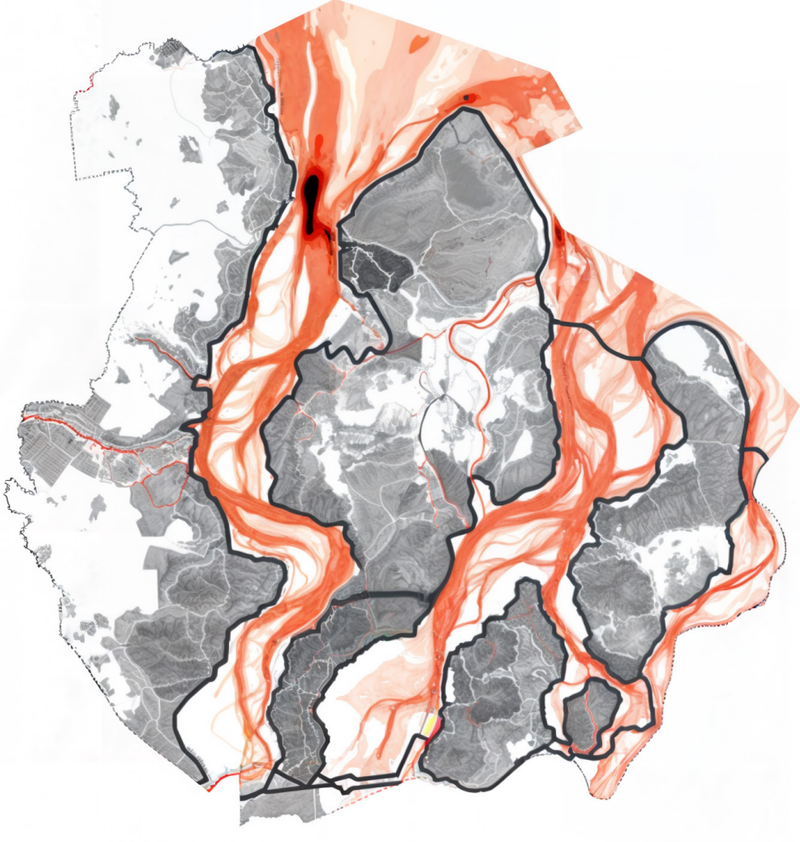
1:500.000
(Zuidmeer, 2024)

Future Potential



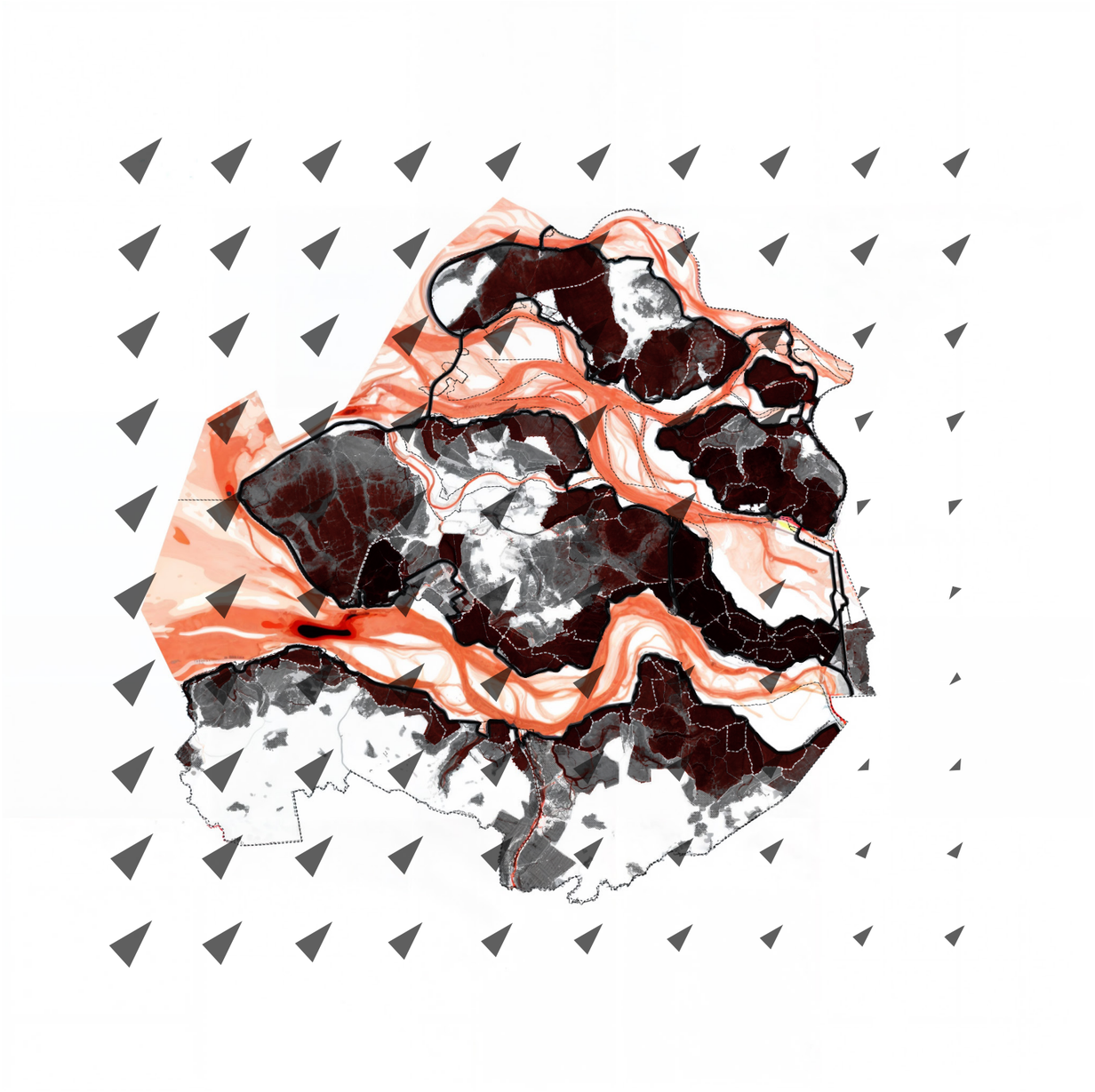
1:500.000
(Zuidmeer, 2024)

Future Potential



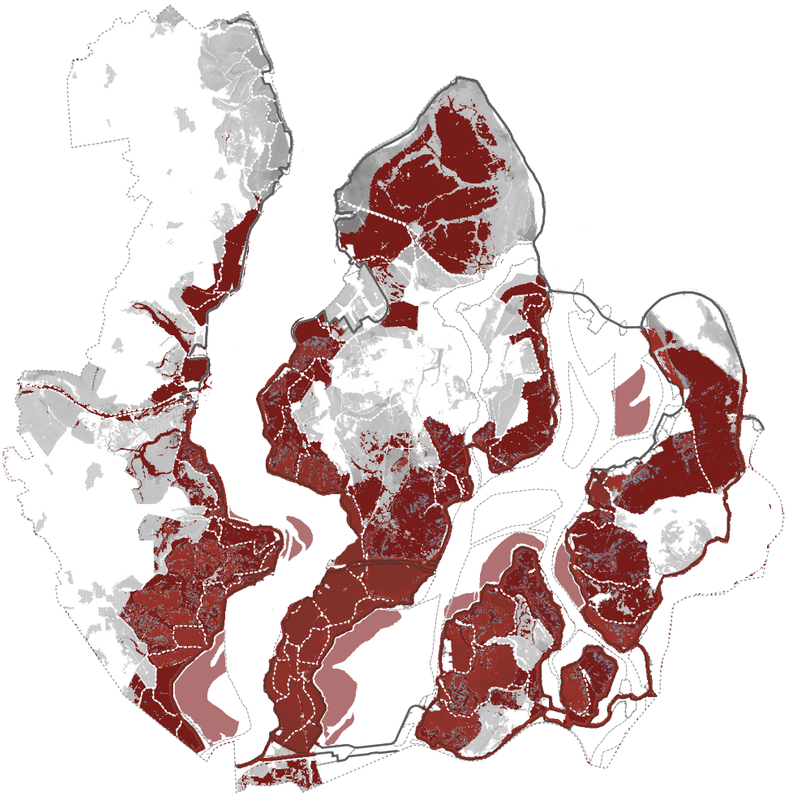
1:500.000
(Zuidmeer, 2024)

Future Potential



1:500.000
(Zuidmeer, 2024)

Future Potential

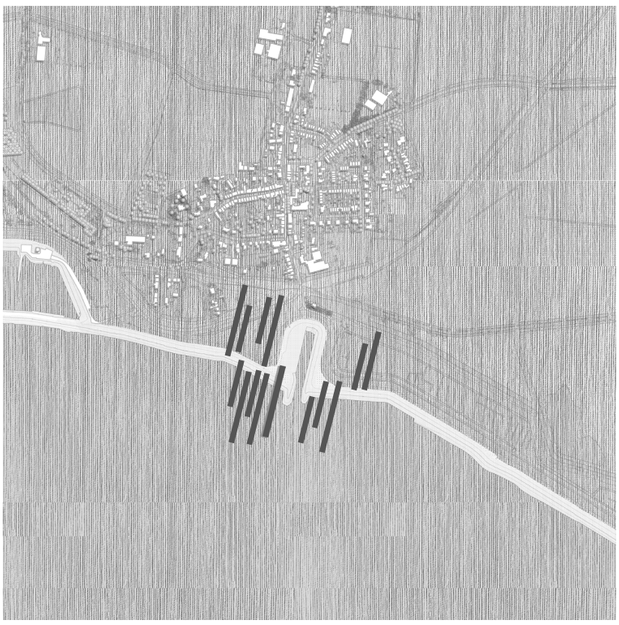


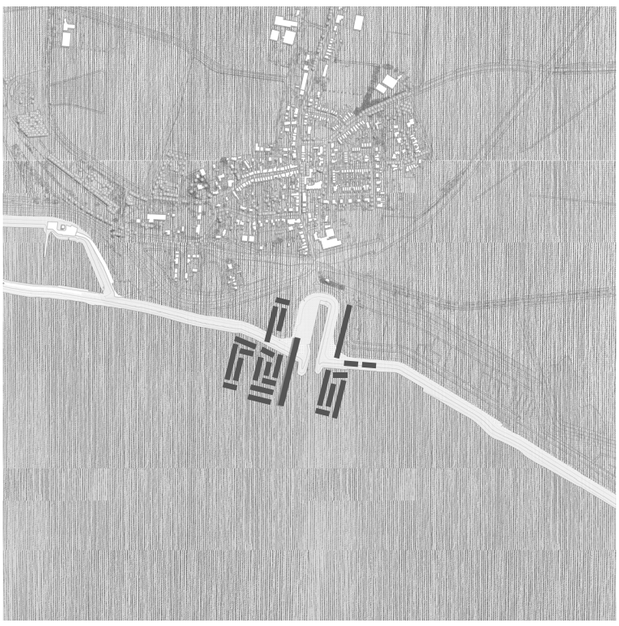
1:500.000
(Zuidmeer, 2024)


Future Potential
1 : 10.000


Future Potential

Future Potential





Future Potential

De dijk ligt tussen land en water
met palen en basalt
hier ligt hij nu hier ligt hij
totdat de aarde valt.

Hij is gestegen uit de vloeden
met norse langzaamheid
Hij is tot schutten en tot hoeden
tot worstelen bereid

De regens zingen om hen henen
eentonig ongewis
De vogels nest'len in zijn stenen
en aan zijn voet schuilt vis

Hij ziet de lichte zeilen zweven
hij ziet de groene wei
Hij ziet de zilv'ren wolken zweven
veranderlijk en vrij

Hij overheerst het wild gewemel
en temt den grote wind
Hij doet ons dromen van de hemel
zo zorgeloos als een kind

DE DIJK | Jan Engelman (1937)

"Hybrid Dam"

Envisioning a Future Where Dikes Become Dams in Hoedekenskerke, Zeeland

Jenna Zuidmeer
Student number: 4865804

Design tutor: Thomas Offermans
Research tutor: Luca Iuorio
Building Technology tutor: Arie Bergsma
P5 | AR3AE100 Architectural Engineering