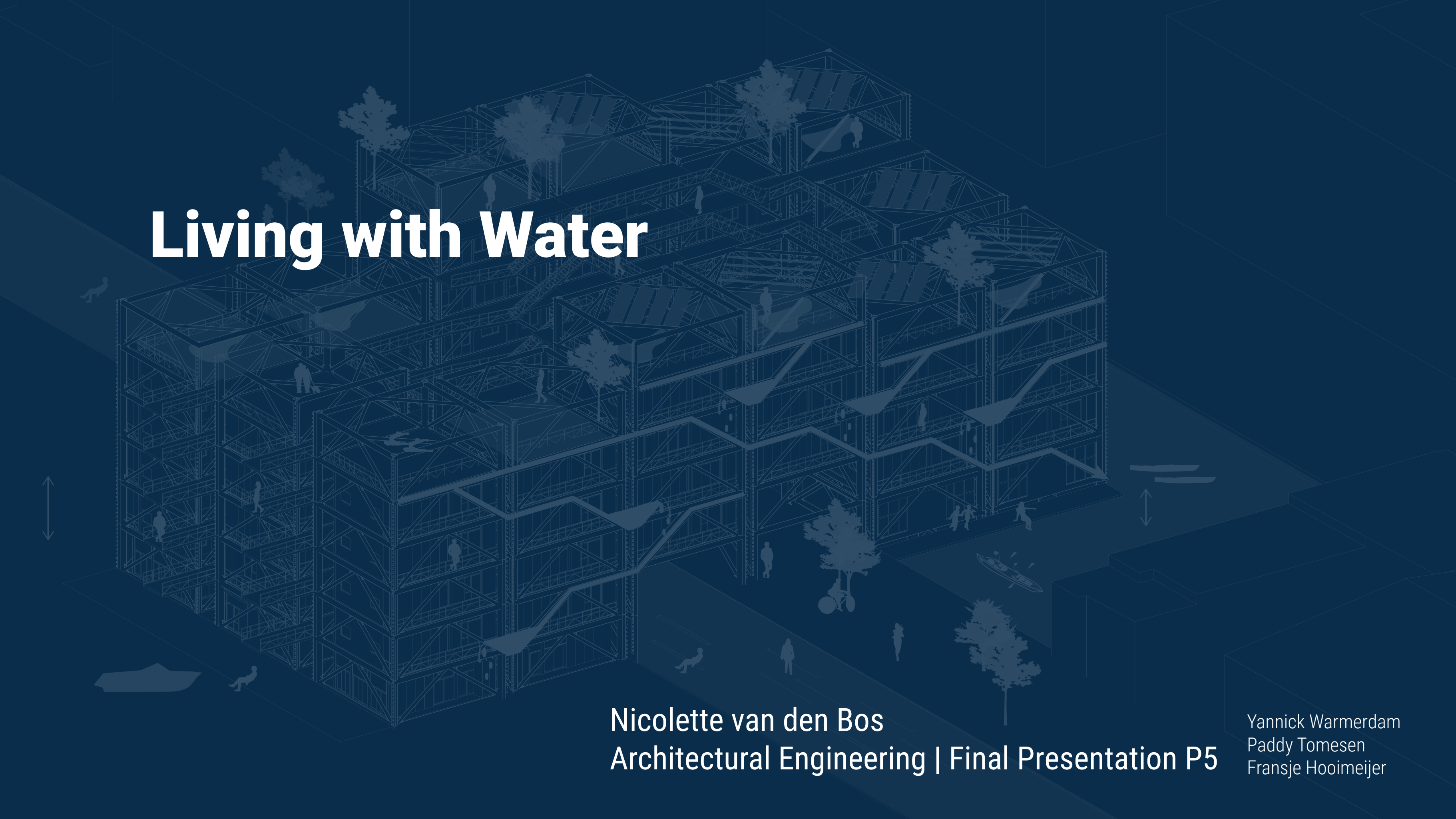


Living with Water



Nicolette van den Bos
Architectural Engineering | Final Presentation P5

Yannick Warmerdam
Paddy Tomesen
Fransje Hooimeijer

Problem statement

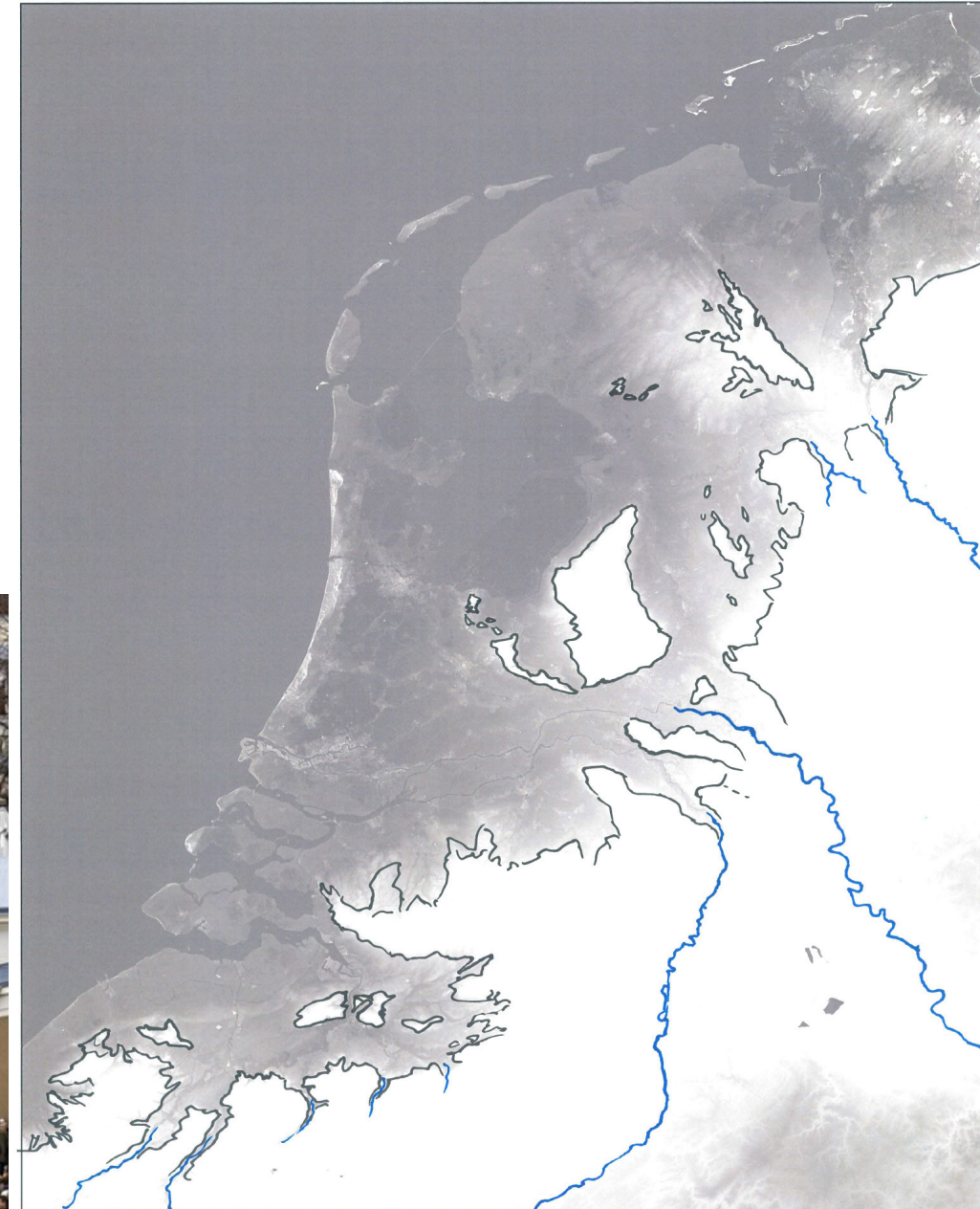


Sea level rise

More often state of emergency in the news....



Hoogwater in Deventer, huizen dreigen onder te lopen (RTL nieuws, 26-12-2023)



The Netherlands below sea level
Universiteit Utrecht (dr. Kim Cohen, 2019)

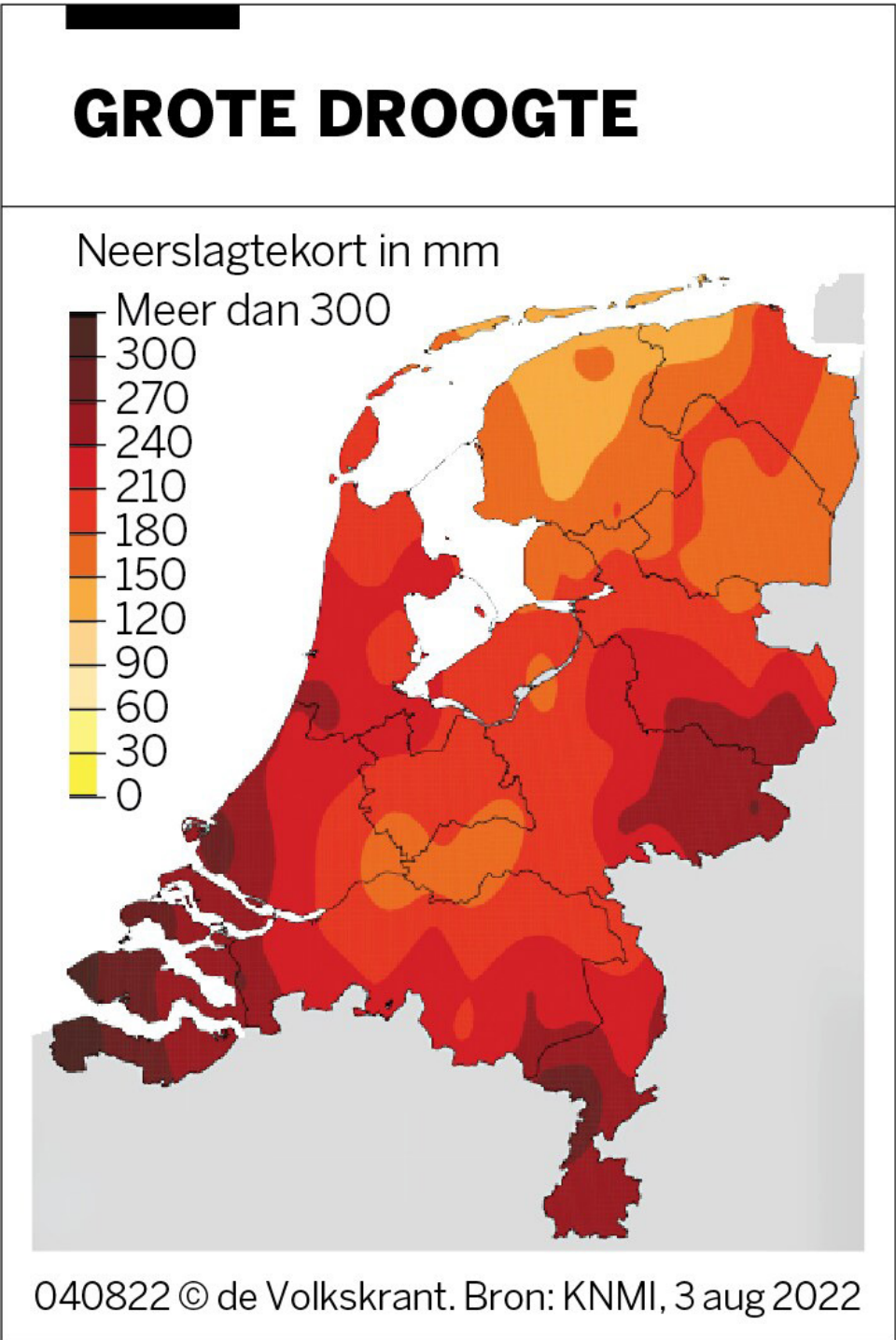
On the other hand, water scarcity

NIEUWS

Nederland heeft ‘feitelijk’
watertekort: crisisteam ziet
toe op waterverdeling

Nederland heeft een ‘feitelijk watertekort’, terwijl de droogte de komende twee weken aanhoudt. Een landelijk crisisteam, het Managementteam Watertekorten, gaat toezien op de waterverdeling. Huishoudens wordt gevraagd terughoudend met kraanwater om te gaan.

Remco Meijer 3 augustus 2022, 19:00



Coastal settlements are most vulnerable

Select city:

×

▼

Climate scenario:

2050 RCP 4.5

▼

Stormwater flooding in C40 cities by 2050

The map shows the change in frequency of a 10 year return period downpour for every C40 city by 2050. **Select a city** to see the change in frequency for 2050 (for the RCP 4.5 and RCP 8.5 scenario).

Change in frequency

- Severe increase (>100%)
- Moderate increase (50-100%)
- Slight increase (<50%)
- Decrease

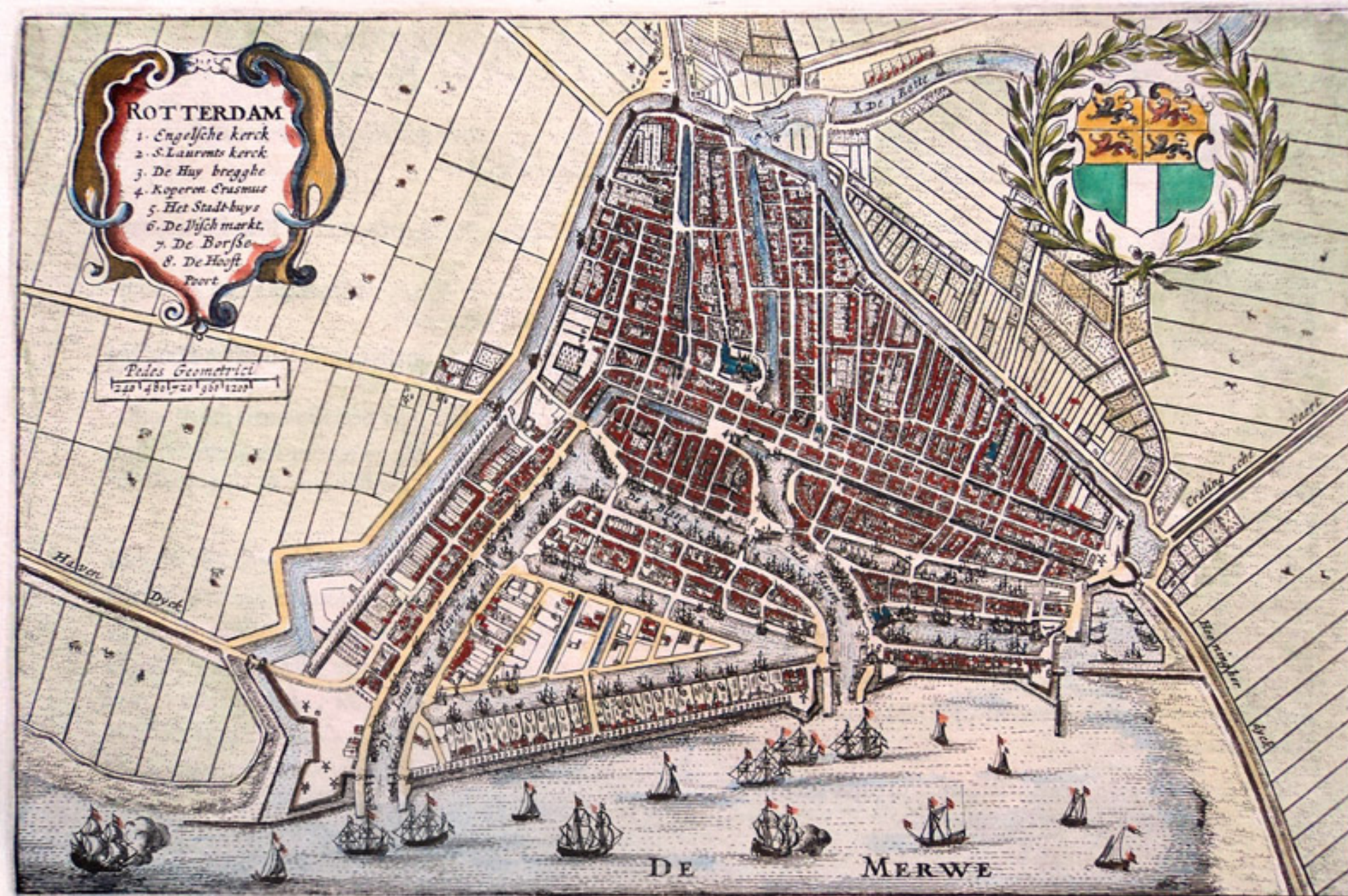
Rotterdam

The map shows the change in frequency of a 1 in 10 year downpour event for every C40 city by 2050 as a proxy for stormwater flooding. Select a city to see the change in frequency for 2050 (for the RCP 4.5 and RCP 8.5 scenario).



Disconnection with water

How the city of Rotterdam started



Stadsplattegrondje van Rotterdam in 1634 (Boxhorn, 1634)

But then... it was destroyed: tabula rasa,

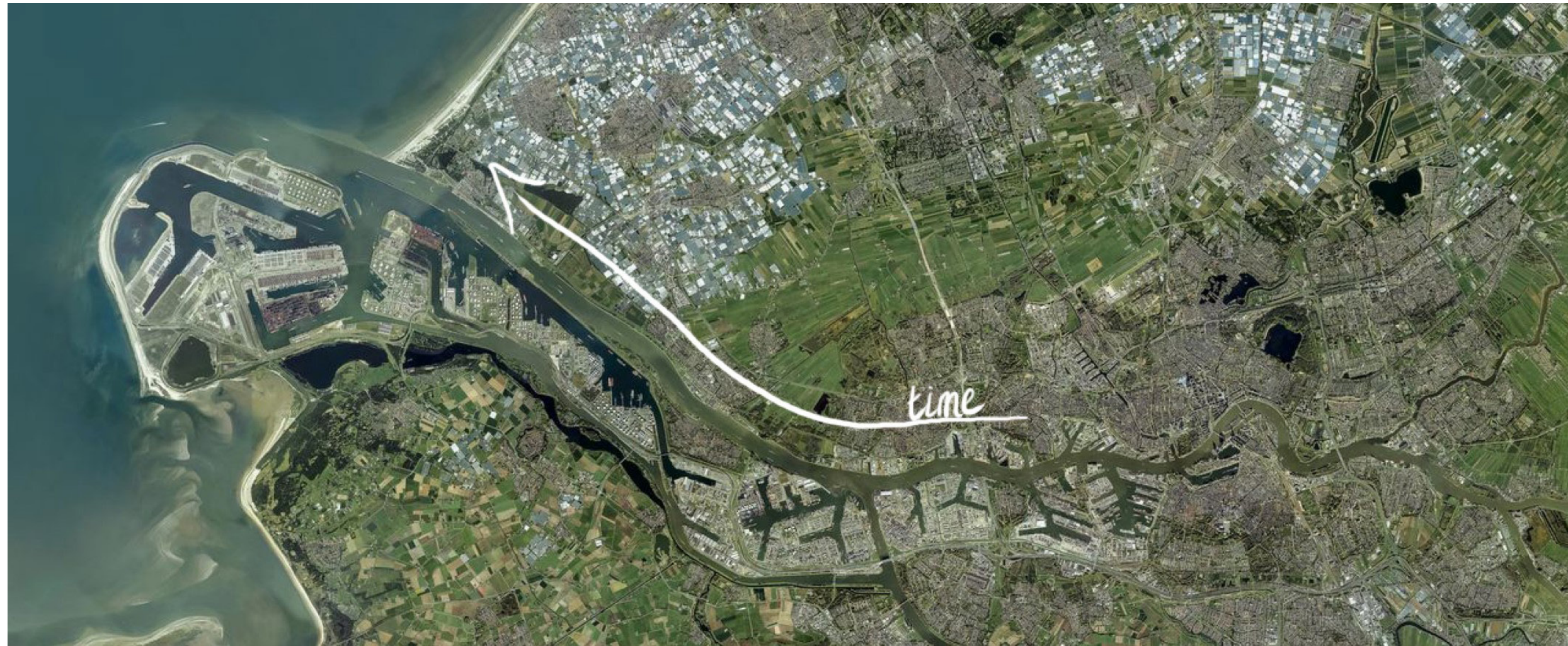


Luchtopname Stadshart (Stadsarchief Rotterdam, 1946)



Schoenenmagazijn Huf (Wederopbouw Rotterdam, 1953)

and the port moved out of the city

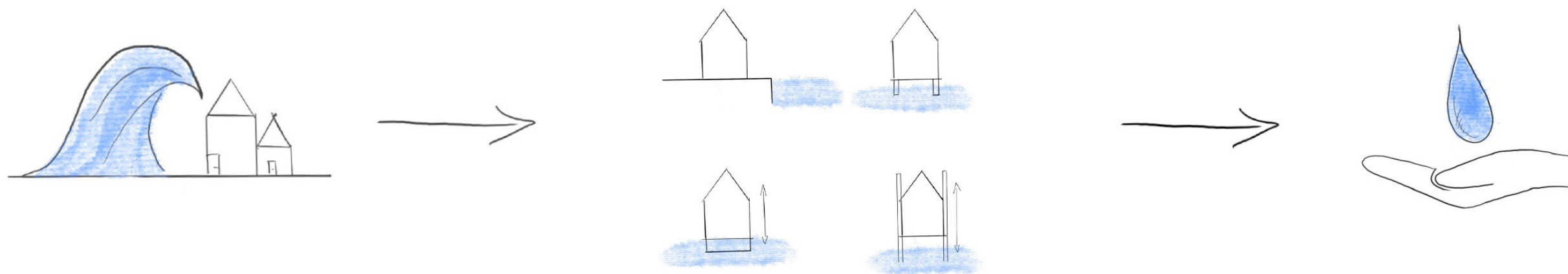


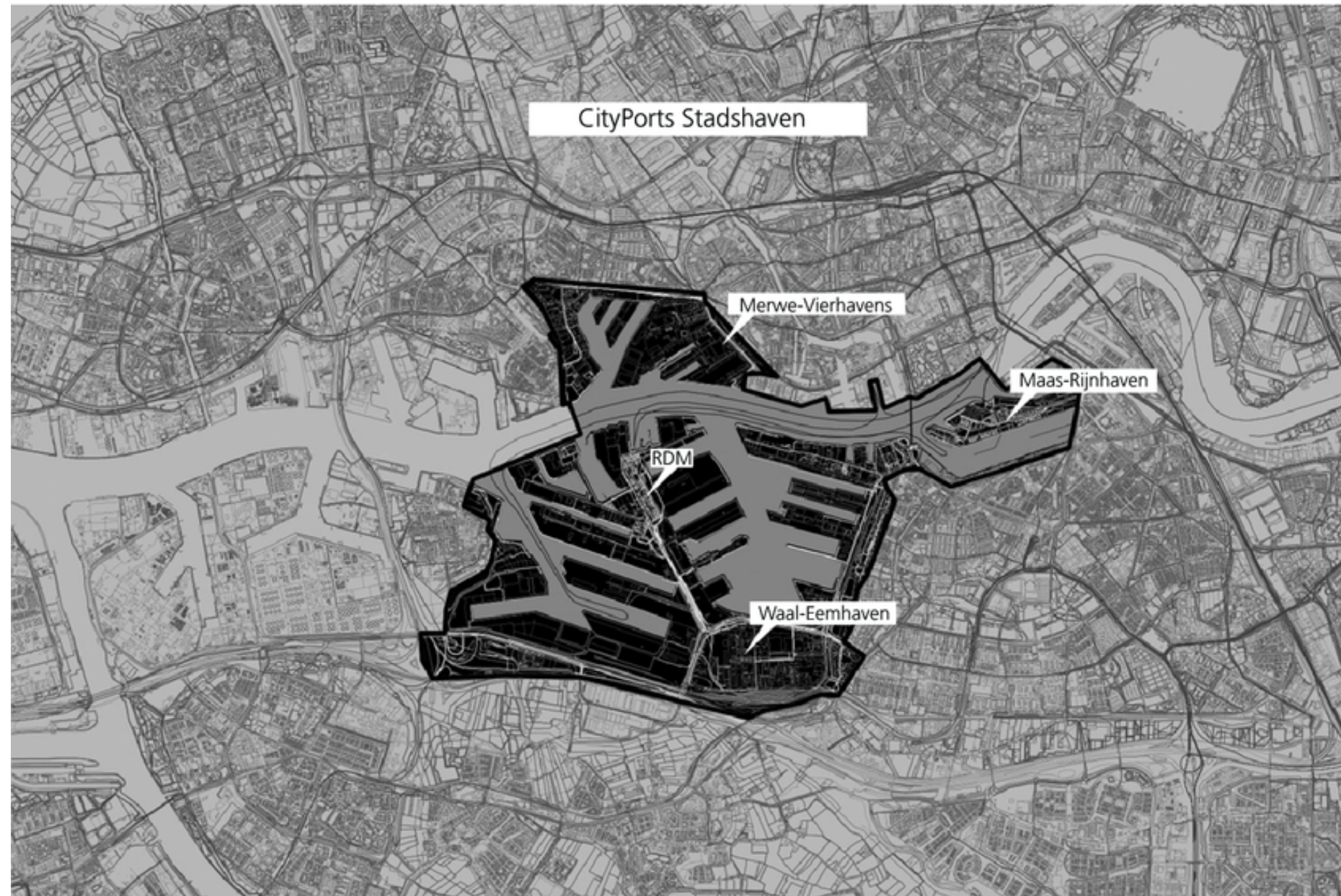
Rotterdam city and harbour (Google Maps, 2024)



Human experience/perception not reflected in design

Design Objective





CityPorts Stadshaven district (Moretti et al., 2019)

City Harbour Merwehaven



Rotterdam (Google Maps, 2024)

Scale 1:20000

Nicolette van den Bos | Final Presentation I Architectural Engineering

Research

Thematic Research Question

“How can from a human perspective, where emotions and experiences play a role, architecture influence and enhance the perceived experience of buildings in port cities that interact with water?”

Human perception lens

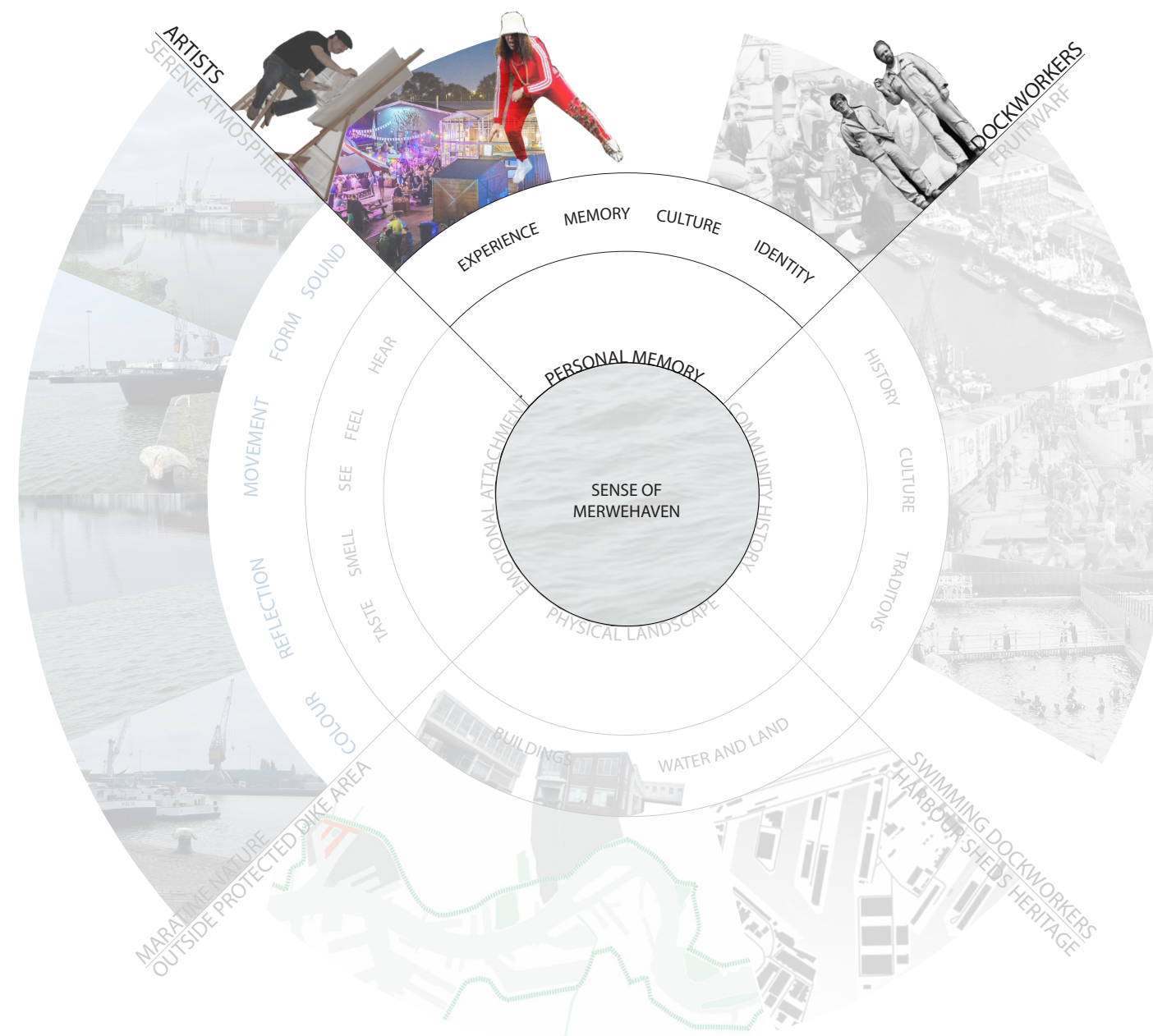
Architectural engineering lens

'Sense of Place'

- | | | |
|-------------------------|--------|---|
| 1. Personal memory | —————> | Who is going to live there? |
| 2. Community History | —————> | What is the collective history of the community/ neighbourhood? |
| 3. Physical landscape | —————> | What are the visual aspects of a place? |
| 4. Emotional Attachment | —————> | What is the deeper sense of connection with the place? |

Defined by Ryden (1993)

Context



Personal Memory



Name: Jan

Age: 71 years old

Background: Jan worked his entire life as a dockworker in Merwehaven, Rotterdam. The job gave him a strong connection to the harbor and the water, which remains a significant part of his identity.

Current situation: He has always lived in Rotterdam and now resides in Oud-Mathenesse. Since retiring, Jan misses the daily connection with the harbor. The sounds of the ships, the smell of the sea, and the hustle and bustle are things he often reminisces about.

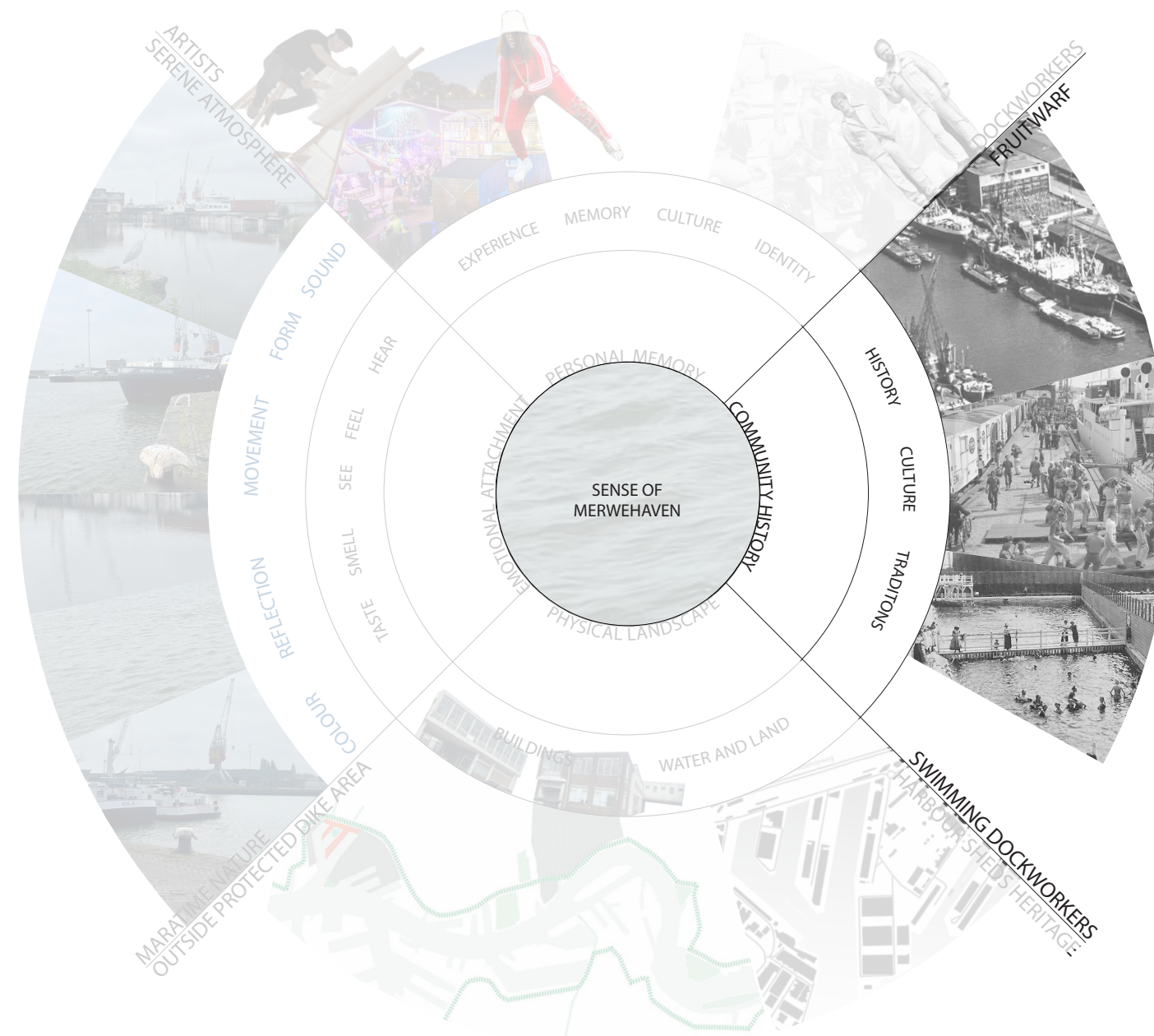


Name: Charlie

Age: 32 years old

Background: Charlie runs her own art studio with other creatives in old warehouses at Merwehaven. She appreciates the creative freedom and the raw, industrial character of the area.

Current situation: She lives nearby in Oud-Mathenesse. She often attends local art events and exhibitions to stay connected with the broader art scene.



Community History



Old photo's Merwehaven (Stadsarchief Rotterdam)

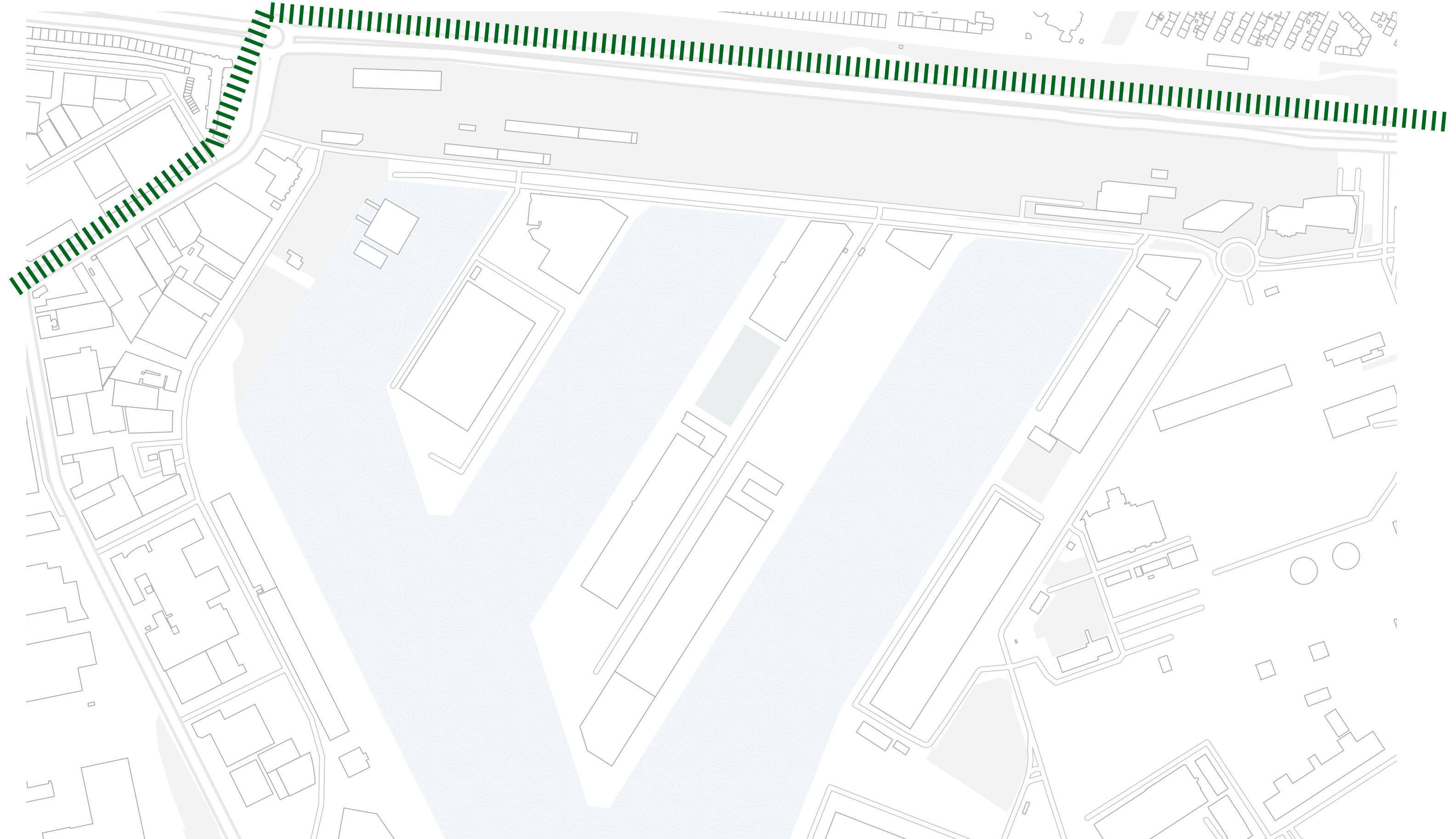


Physical landscape



De Maas (Rotterdam)

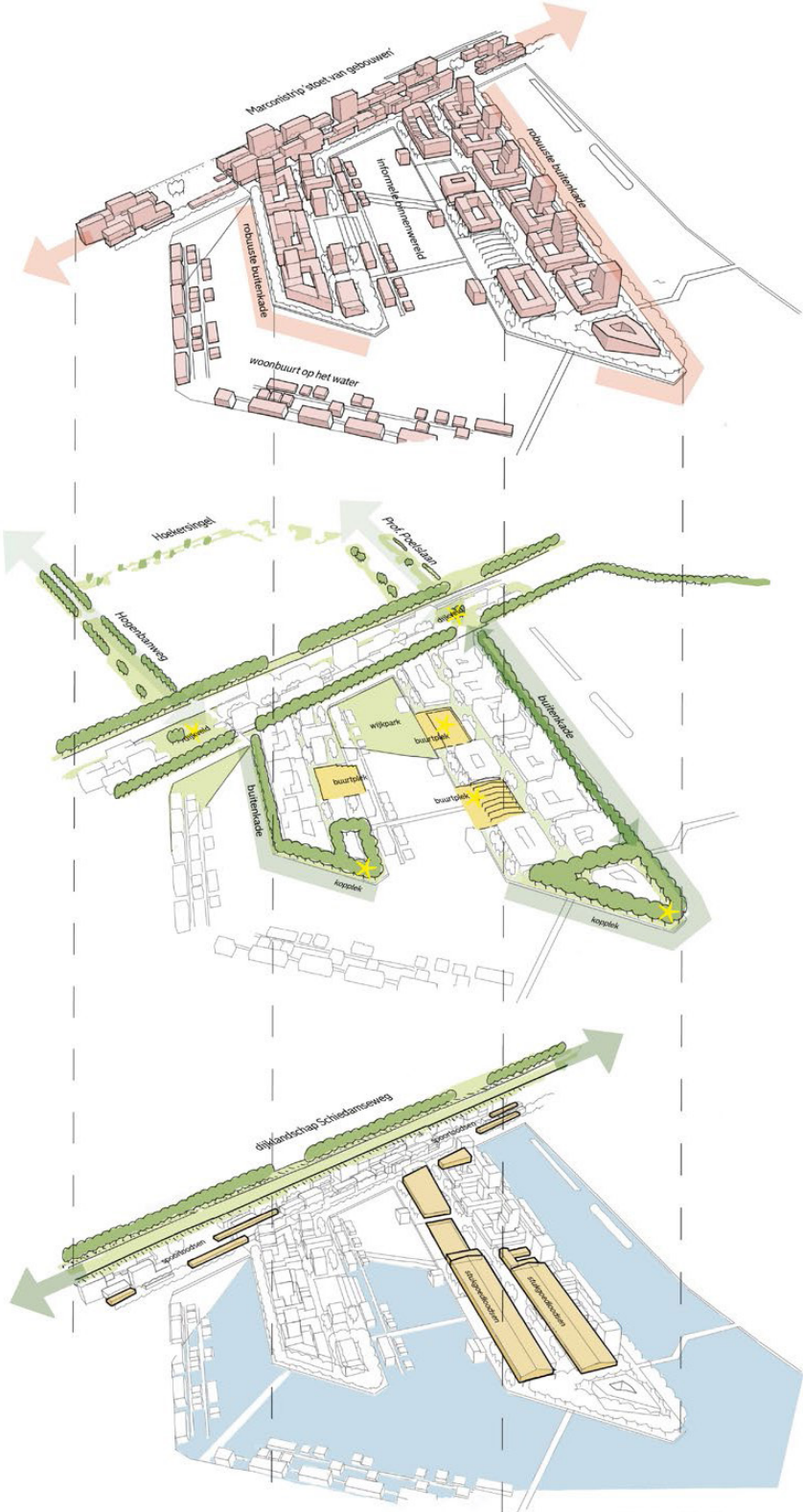
Site Merwehaven



Harbour Heritage

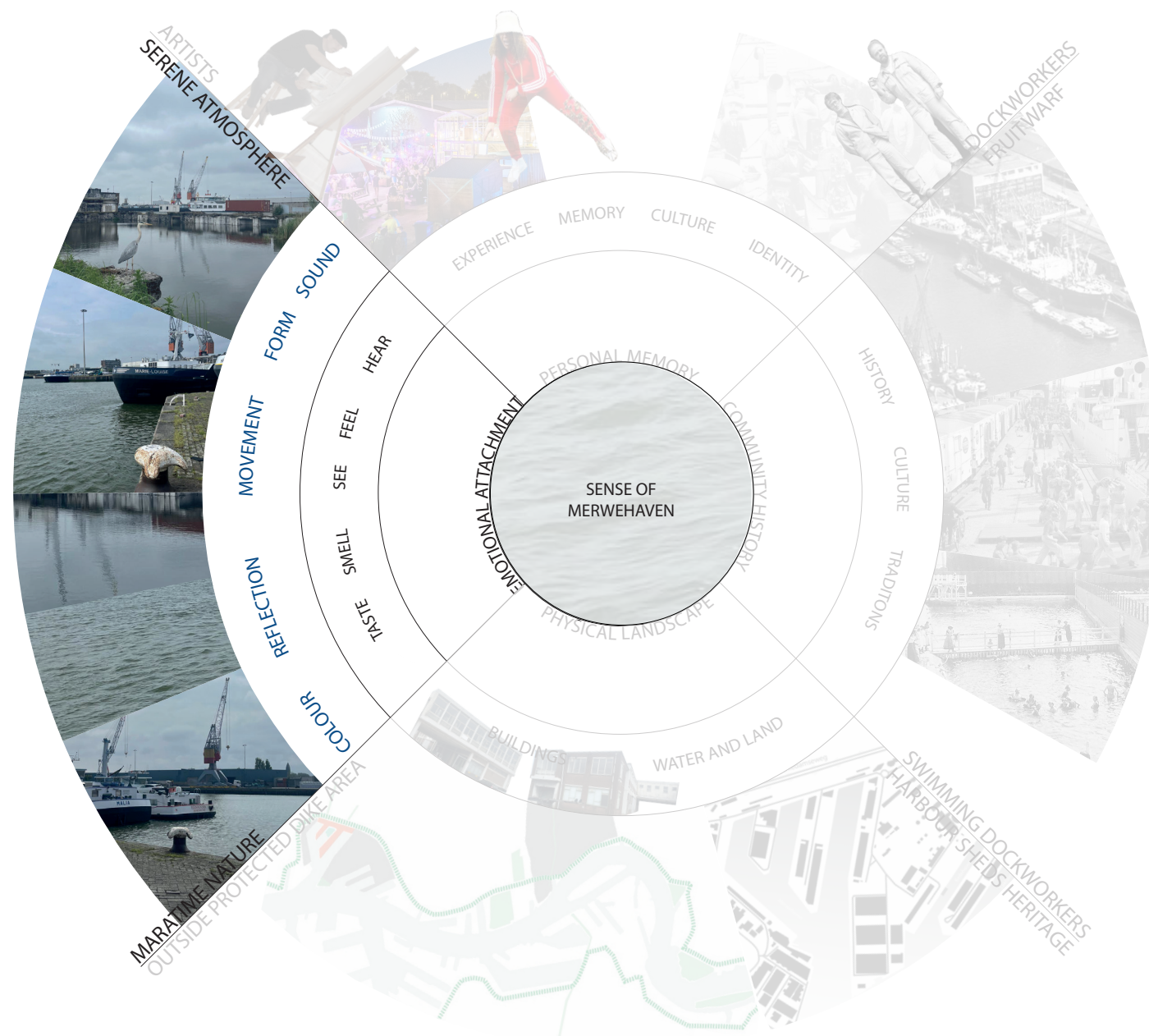


Axo Masterplan Merwehaven

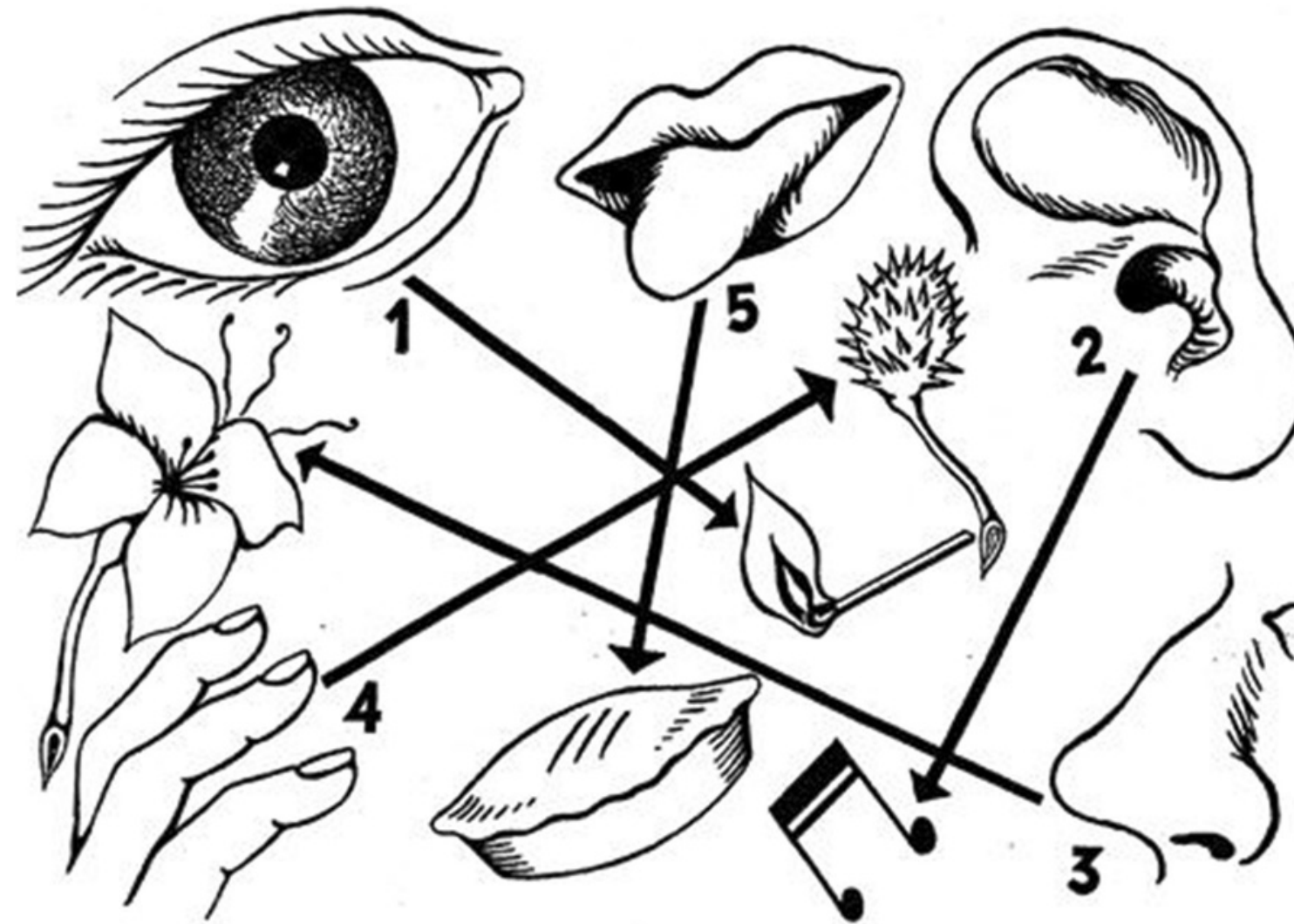


Structure map Merwehaven





Emotional Attachment



Perception through senses (see, hear, smell, touch, taste) (Heilig, 1992)

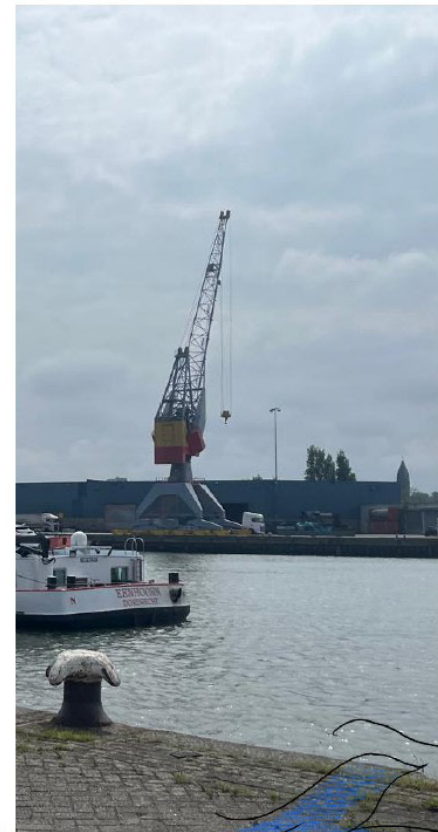
Characteristics of Merwehaven



Sound



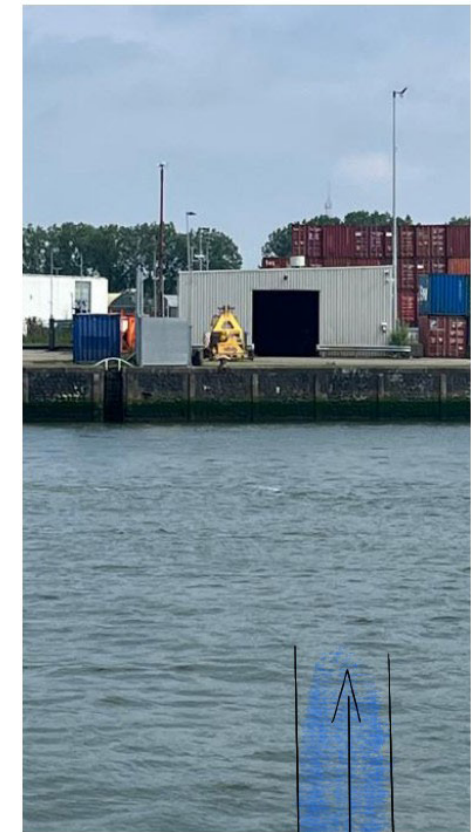
Reflection



Movement

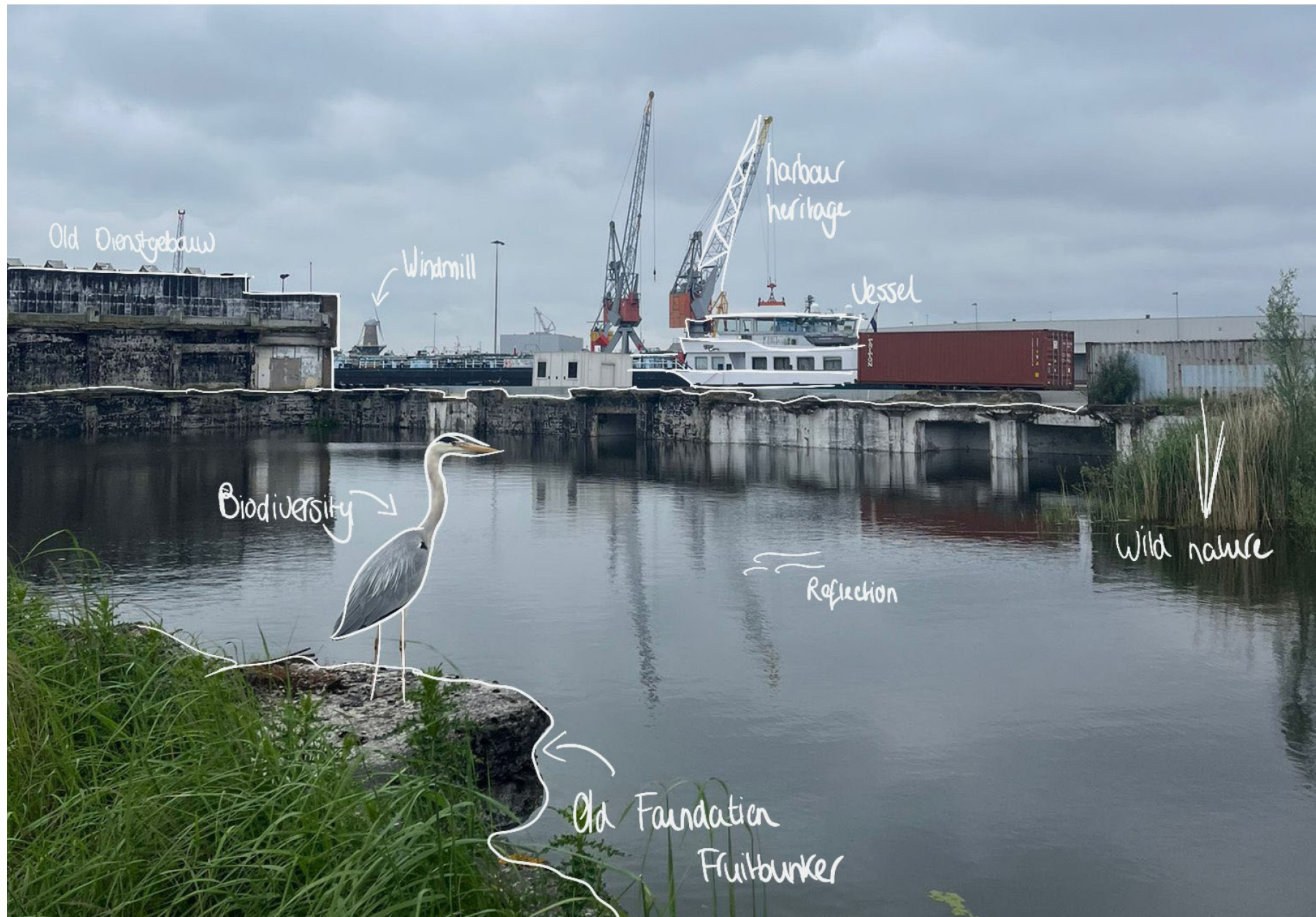


Colour

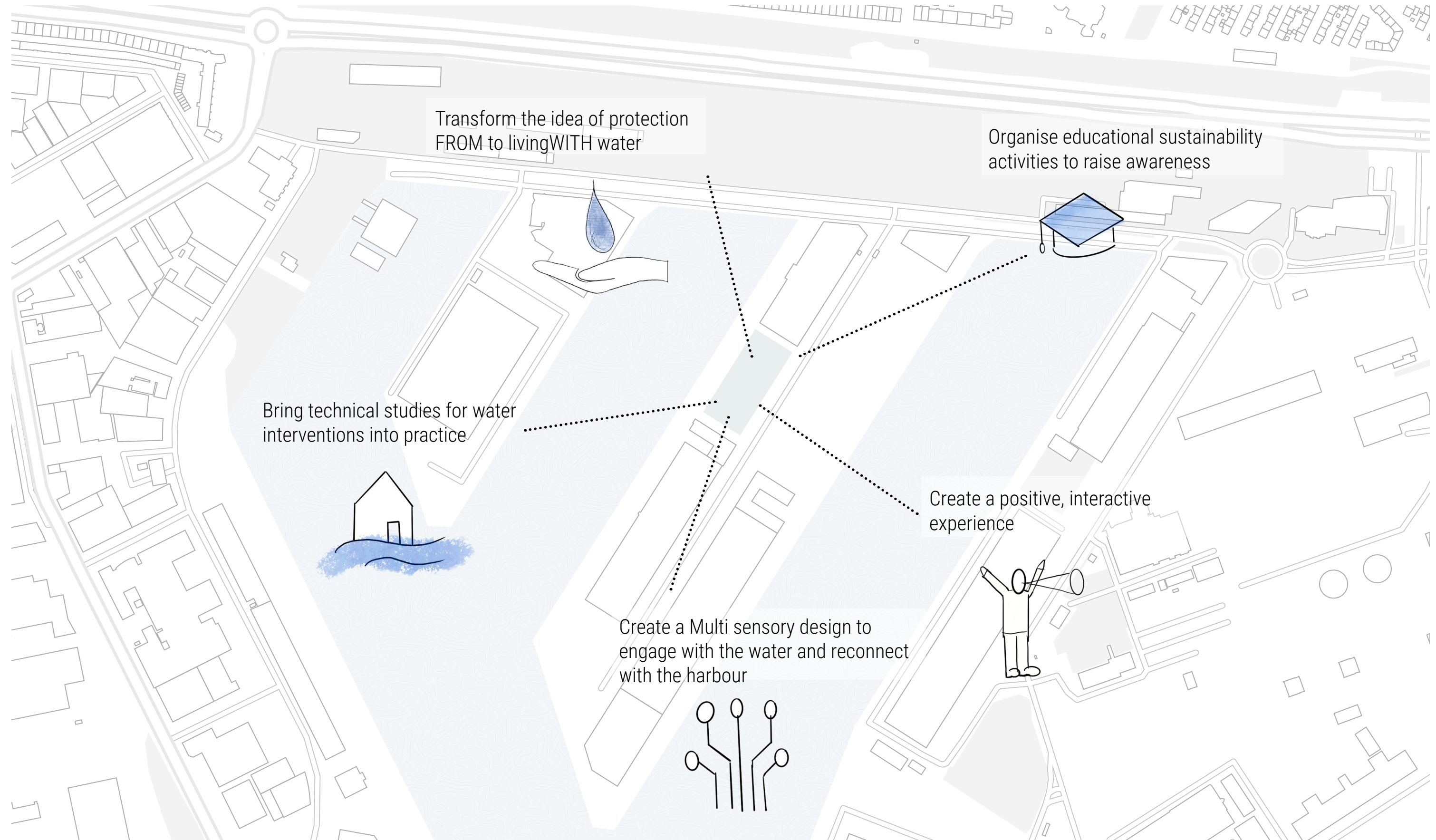


Form

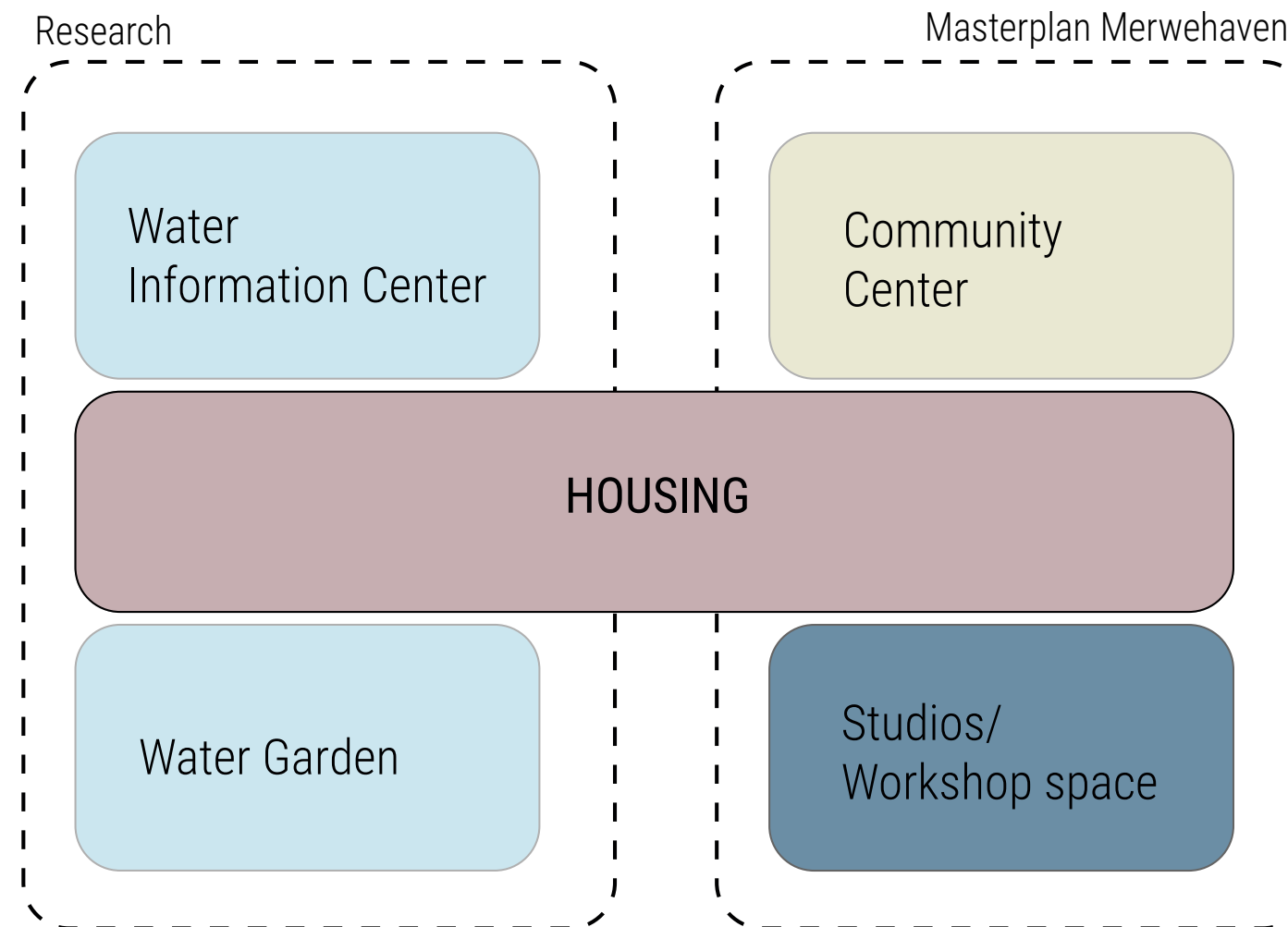




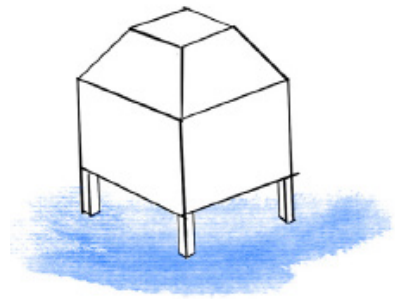
Design intentions



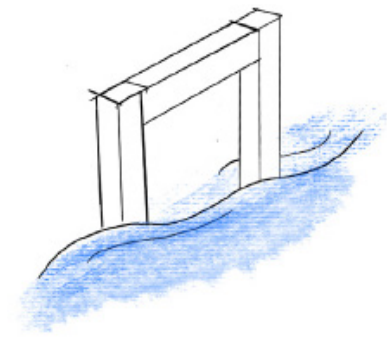
Program



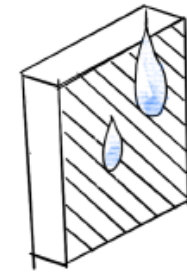
Architectural Engineering



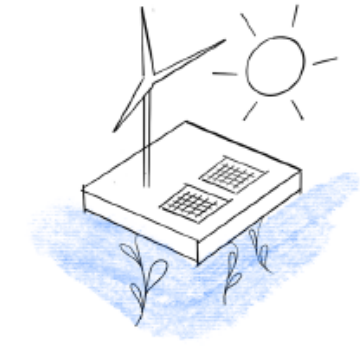
Water typologies



Construction

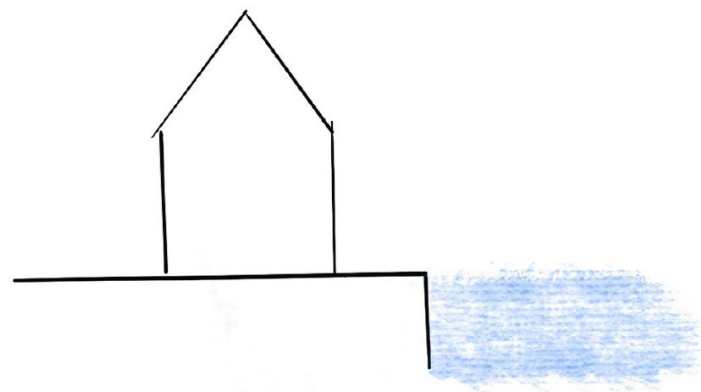


Building materials

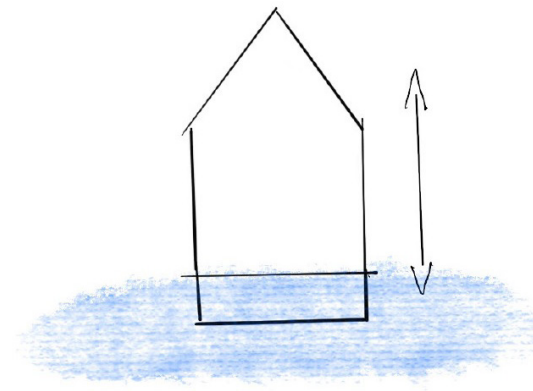


Sustainability

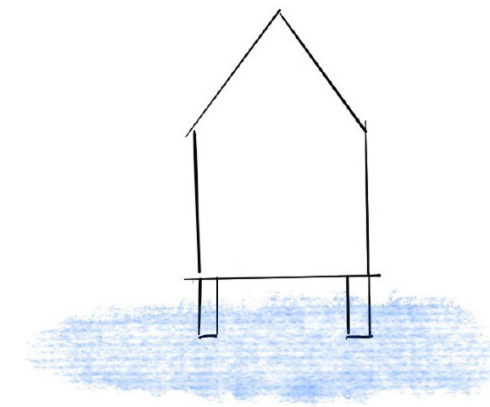
Water Typologies



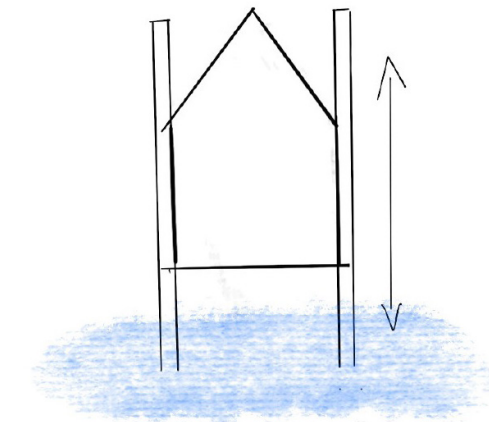
Waterside



Floating

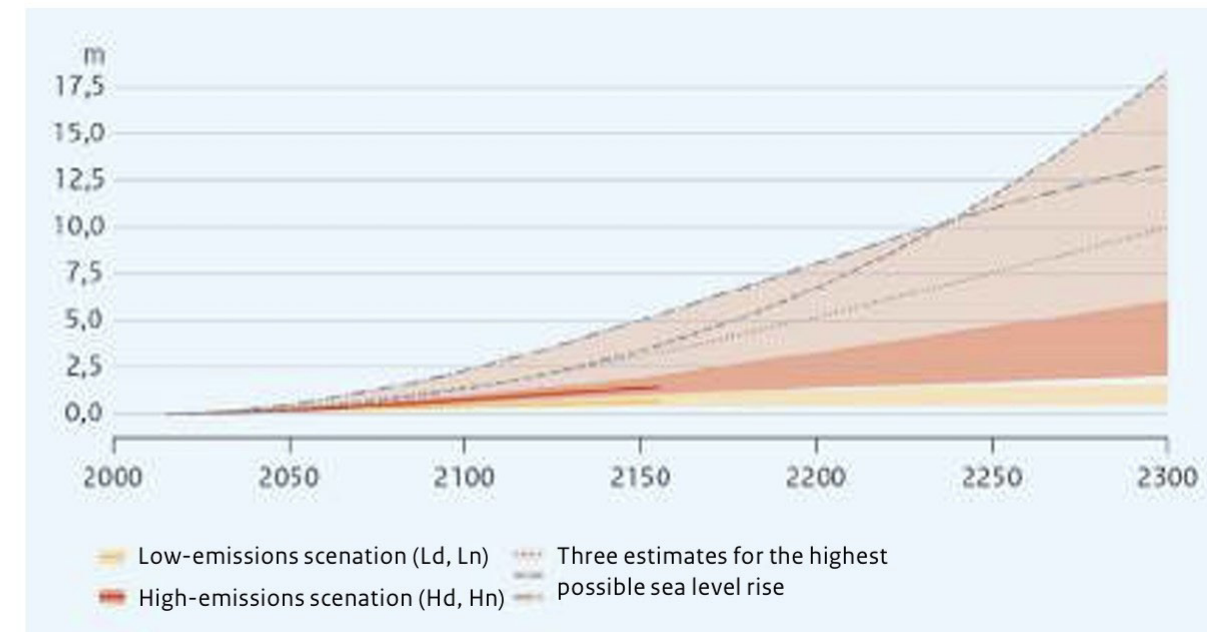
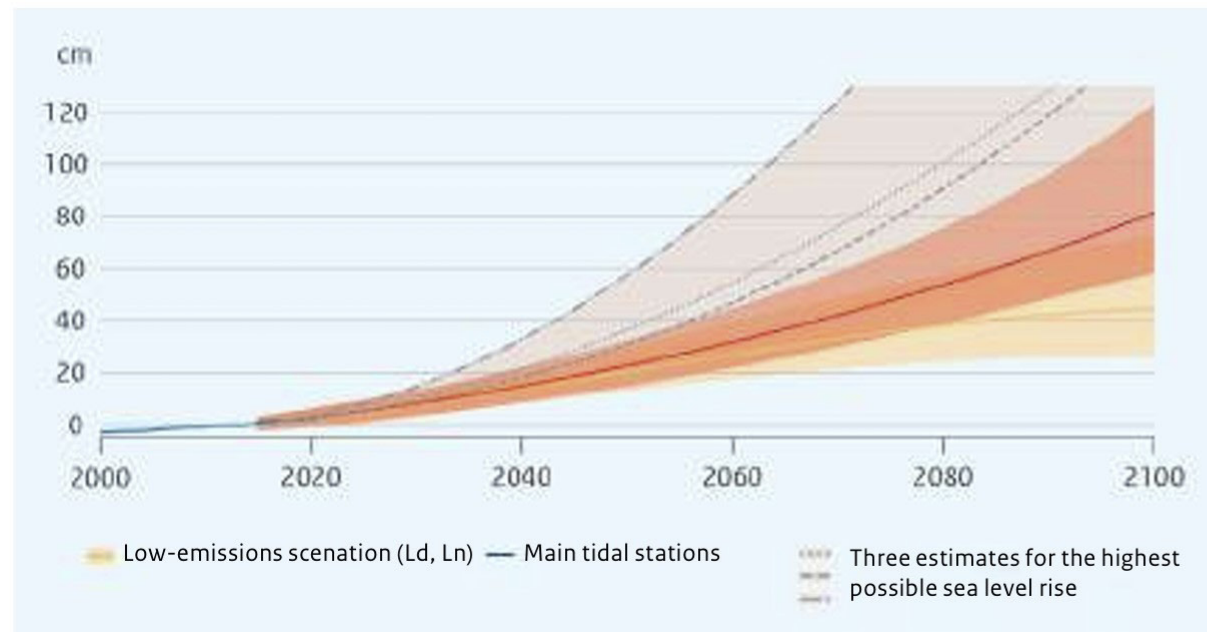


Pile



Amphibious

Scenario's

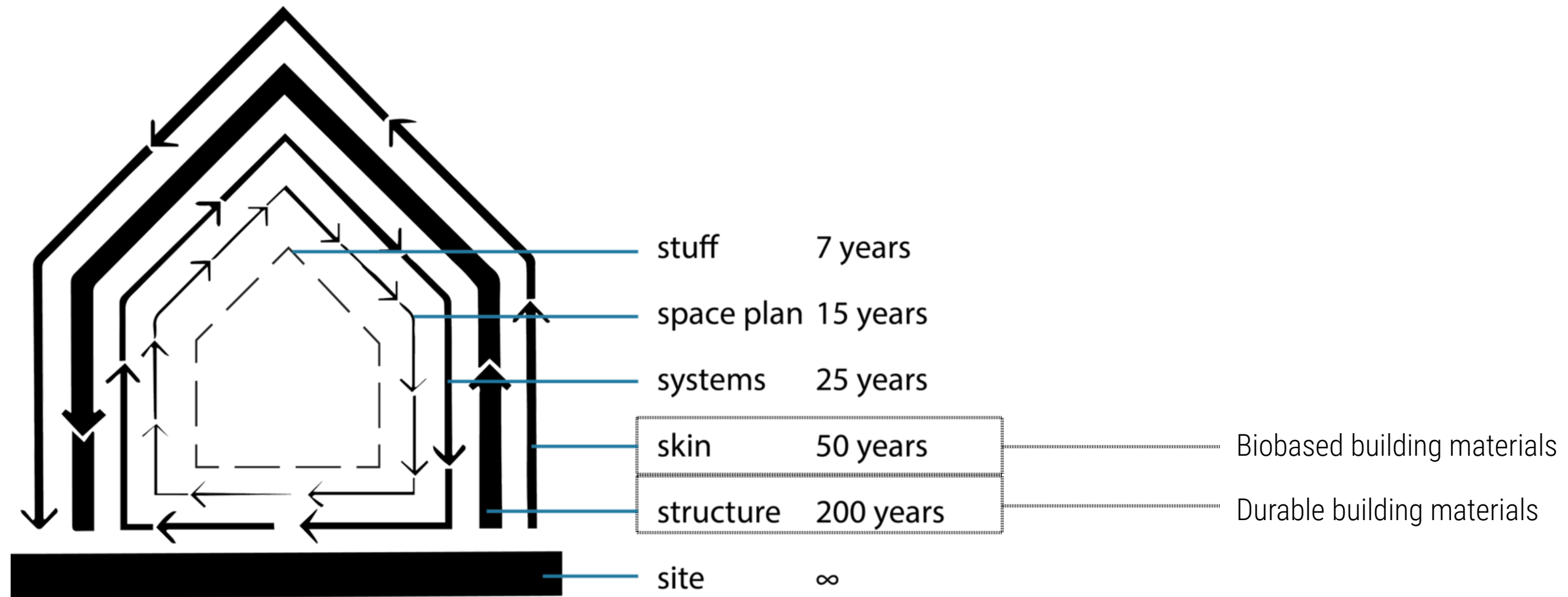


Scenarios through to 2100 and 2300 of National Delta Programma

4 Strategies to future-proof design

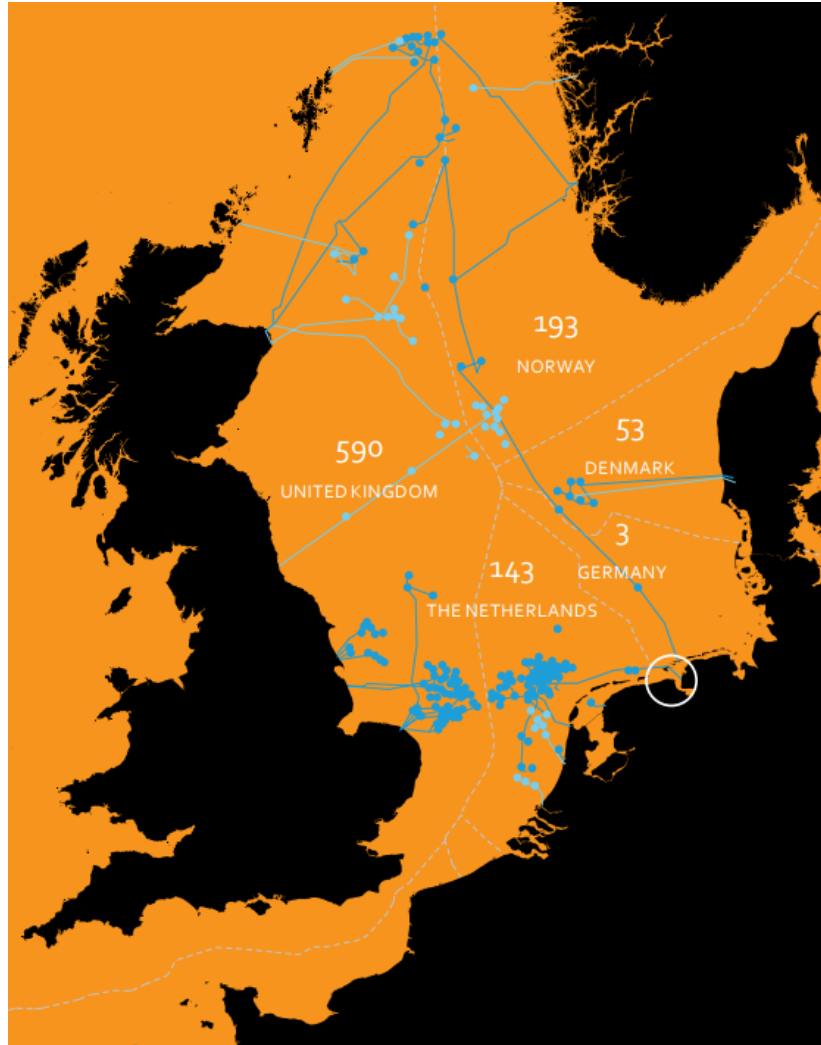
1. **Robust design** (water resistant when level rises)
2. Short lifespan (nature-based solutions)
3. **Adaptability of design** (long-term object, higher, wider or stronger)
4. Dismountable design (object can be moved to another location)

Construction



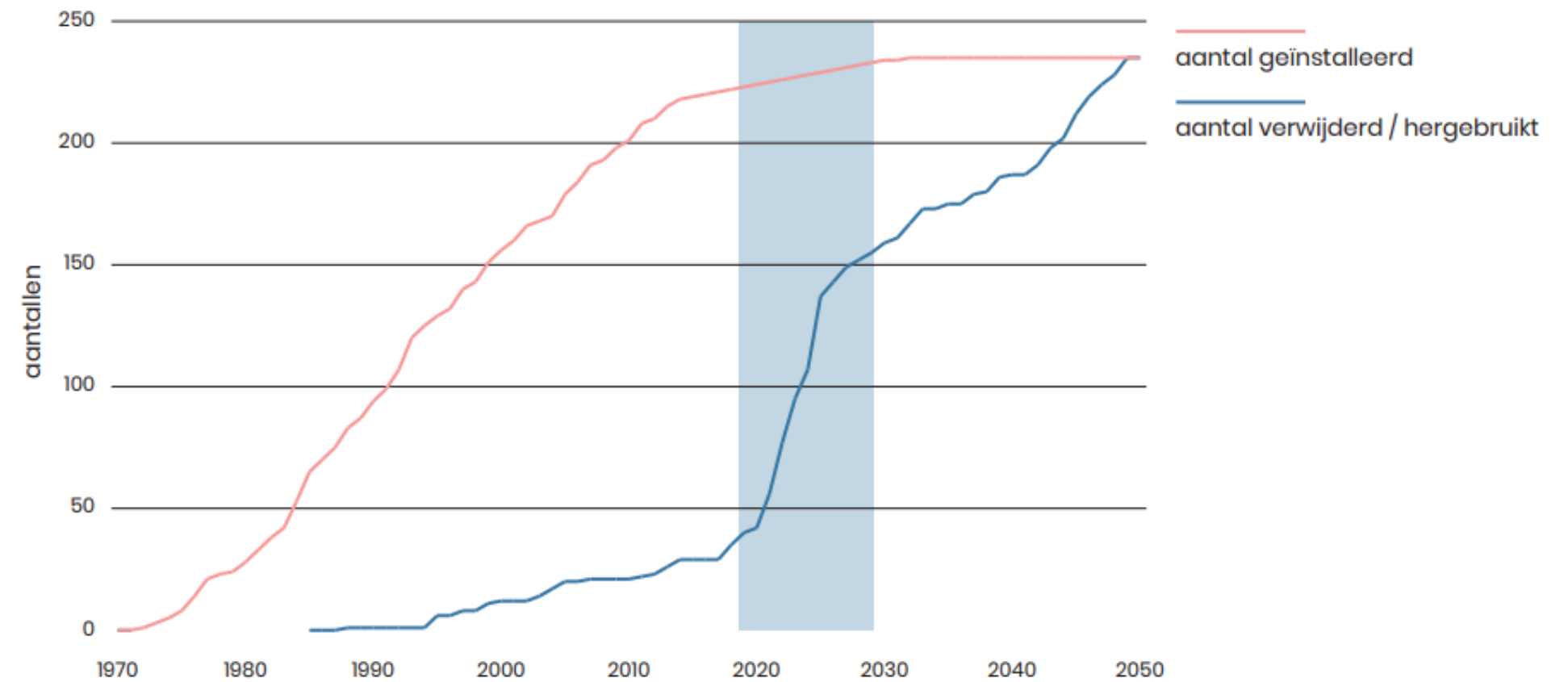
Layers of Change (1994) Steward Brand

Construction



Drilling platforms North Sea

Figuur 4.0.1. Cumulatief aantal geïnstalleerde en verwijderde offshore infrastructuur



Number of going to be removed offshore infrastructure

Construction

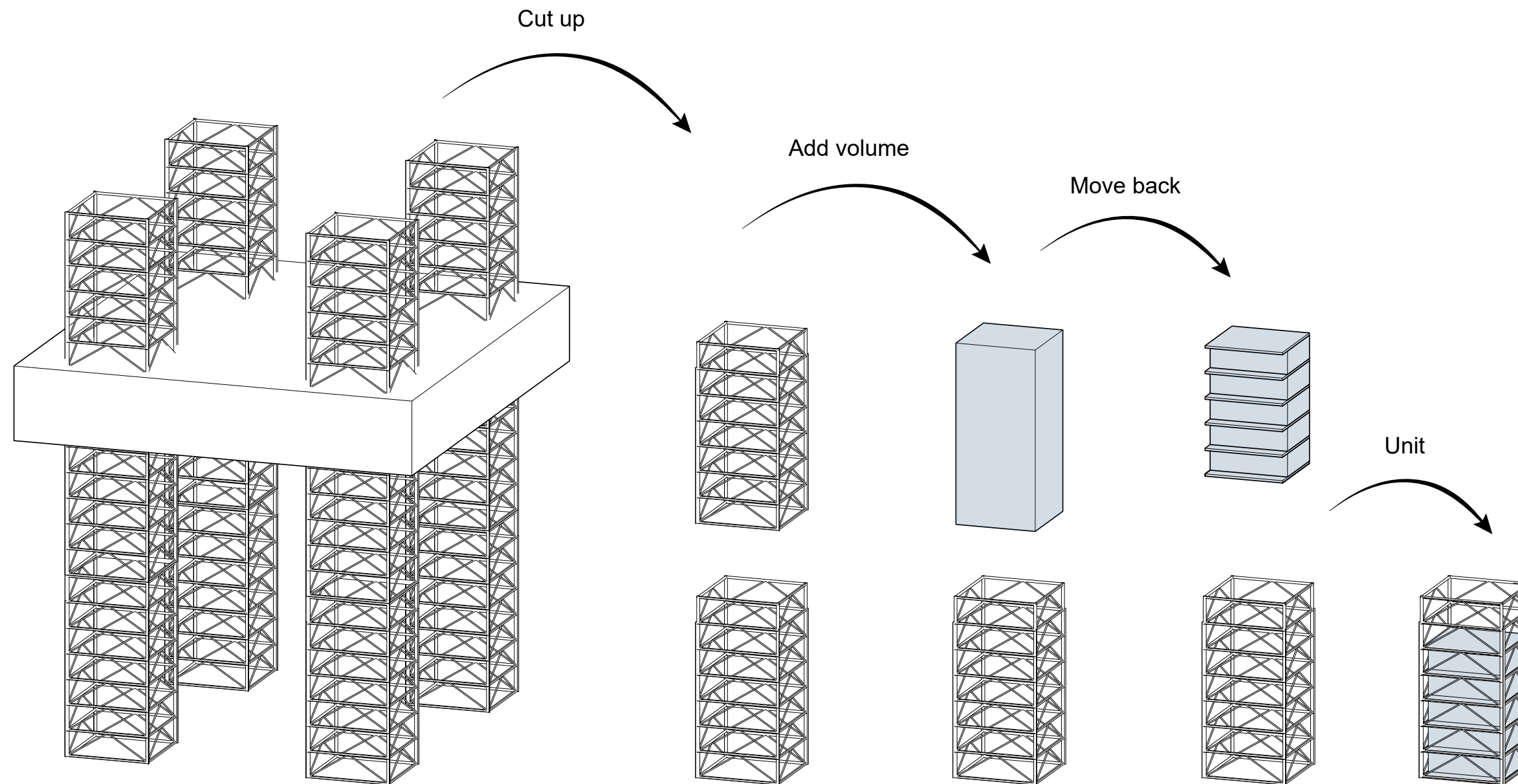


Re-use



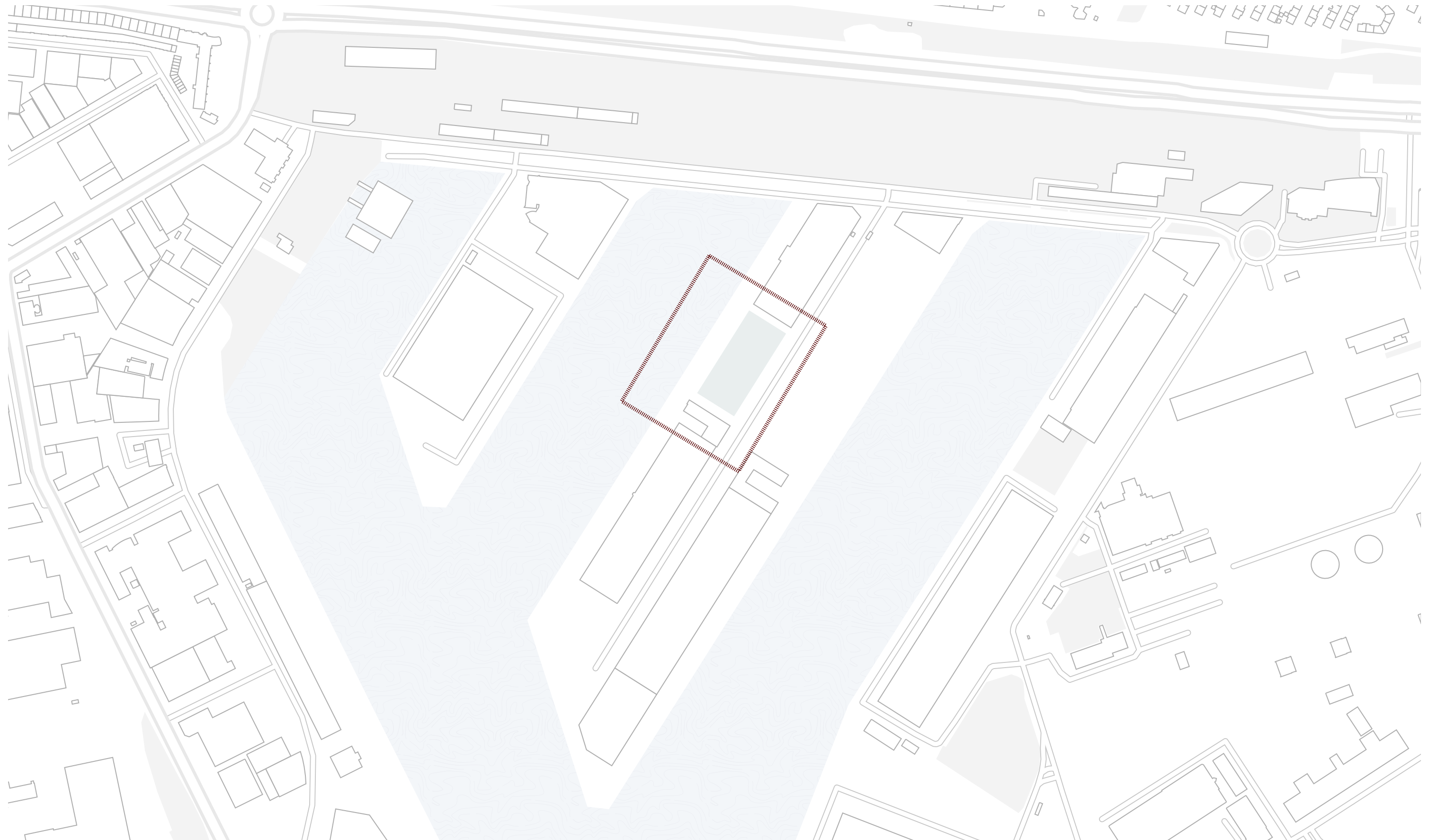
Green

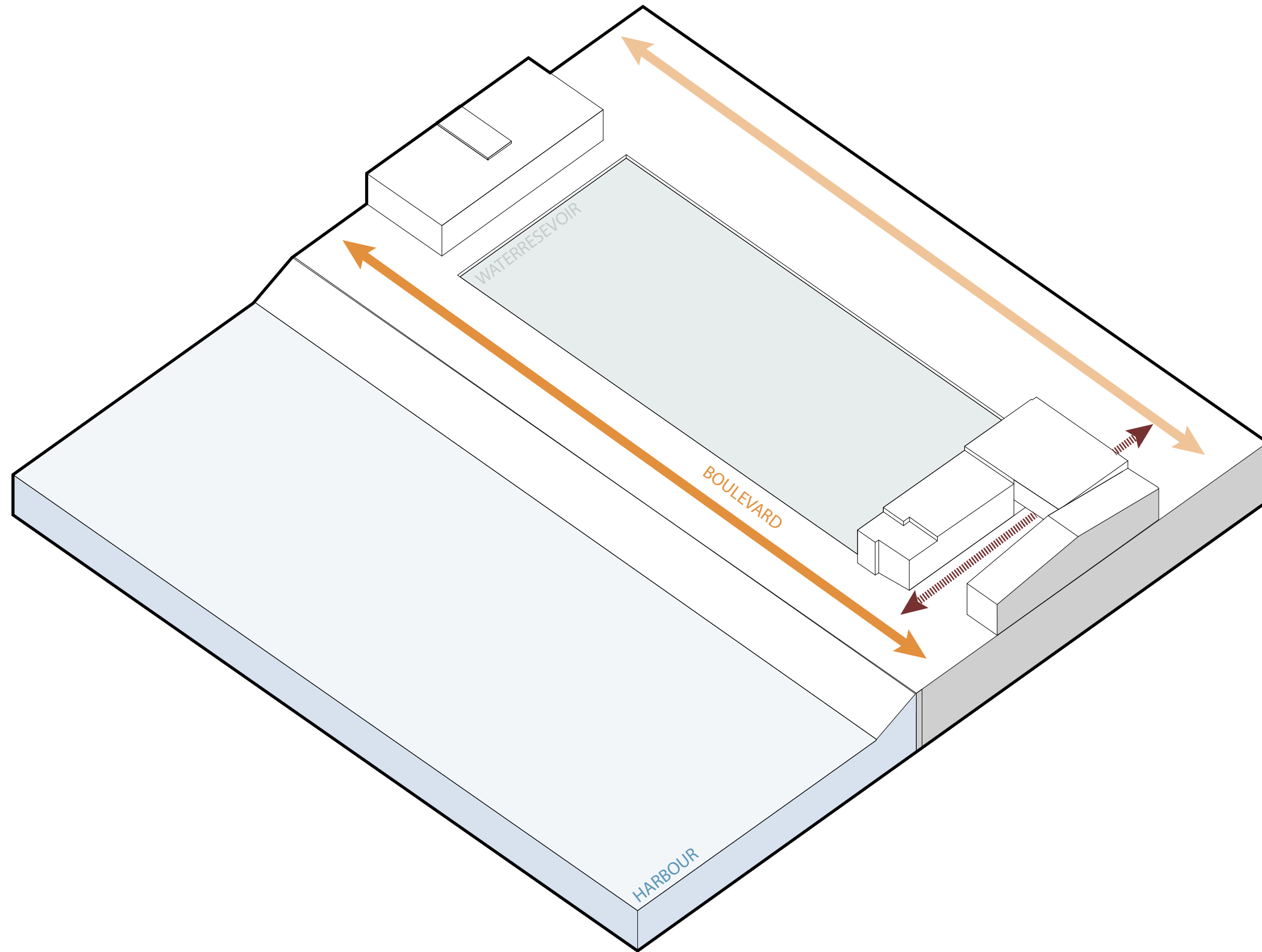
Construction

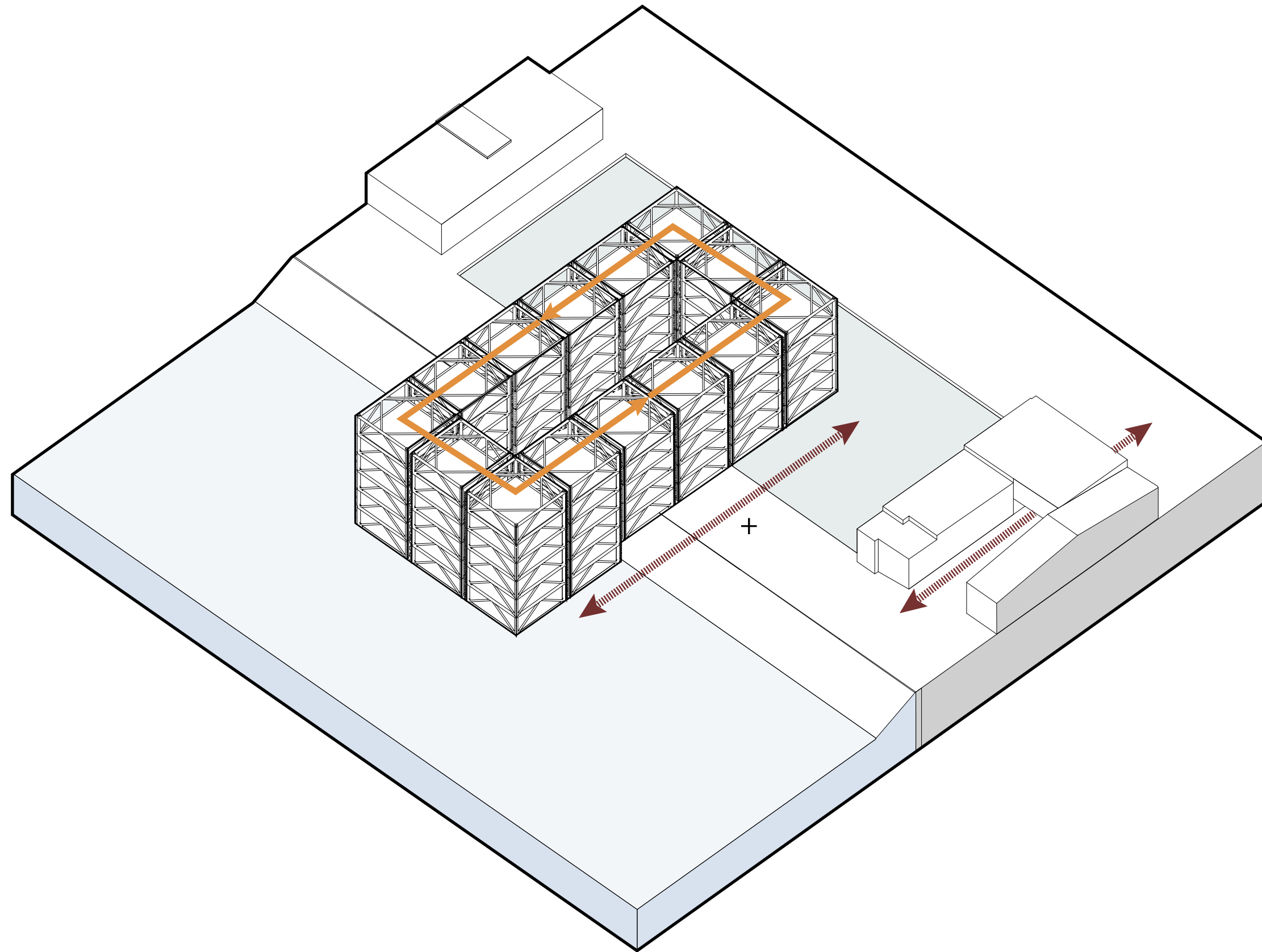


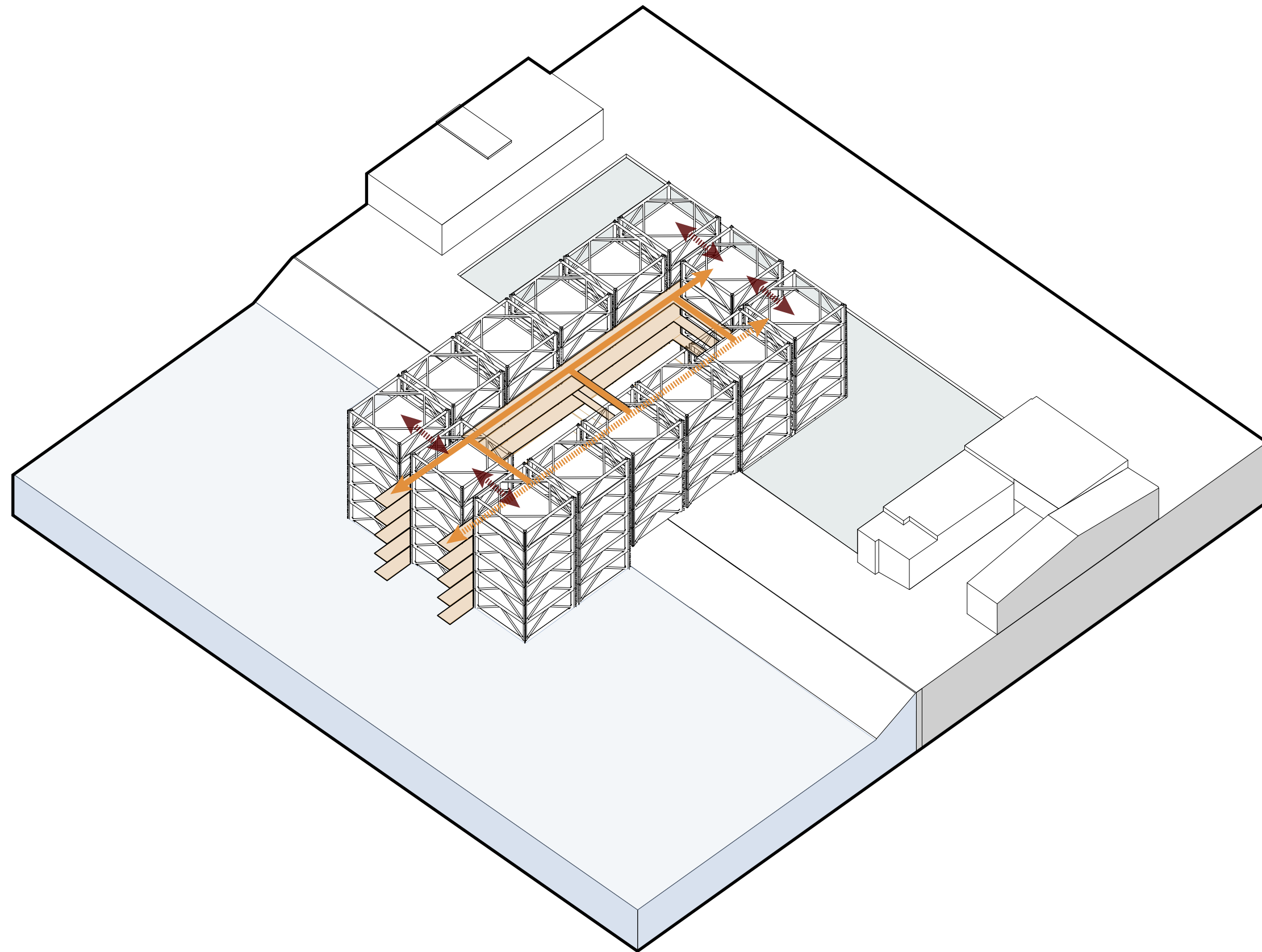
Design

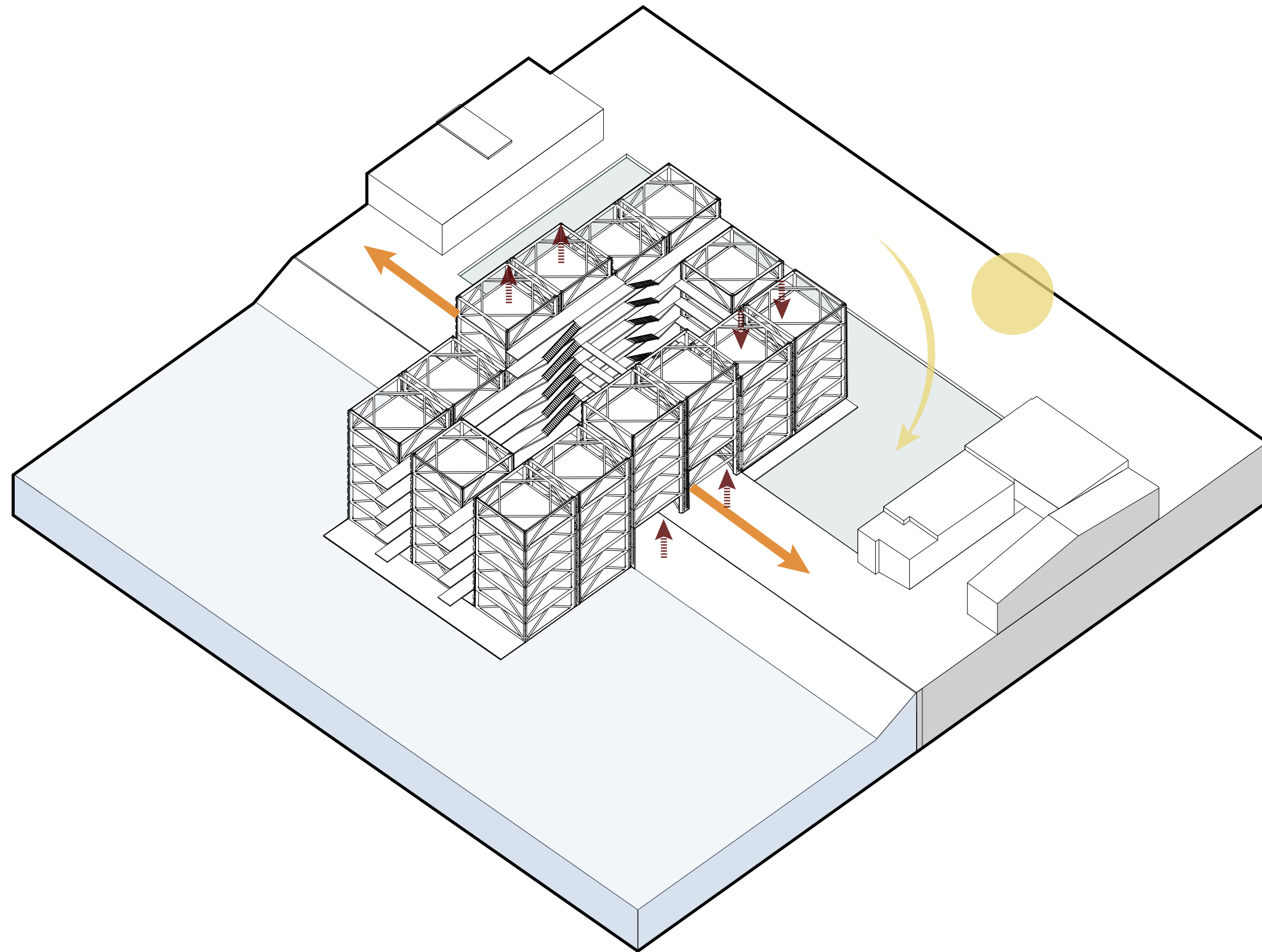
Site Merwehaven

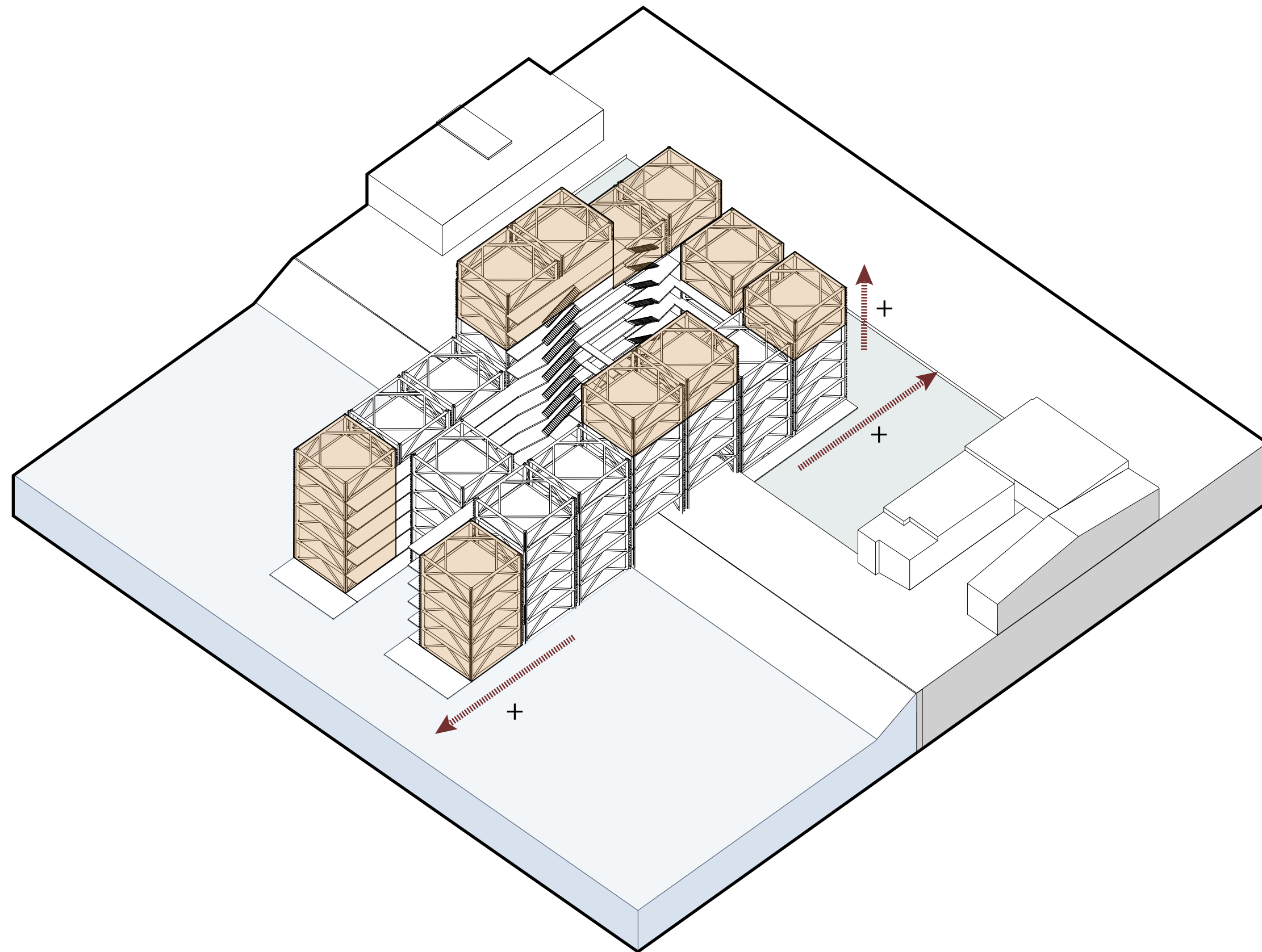


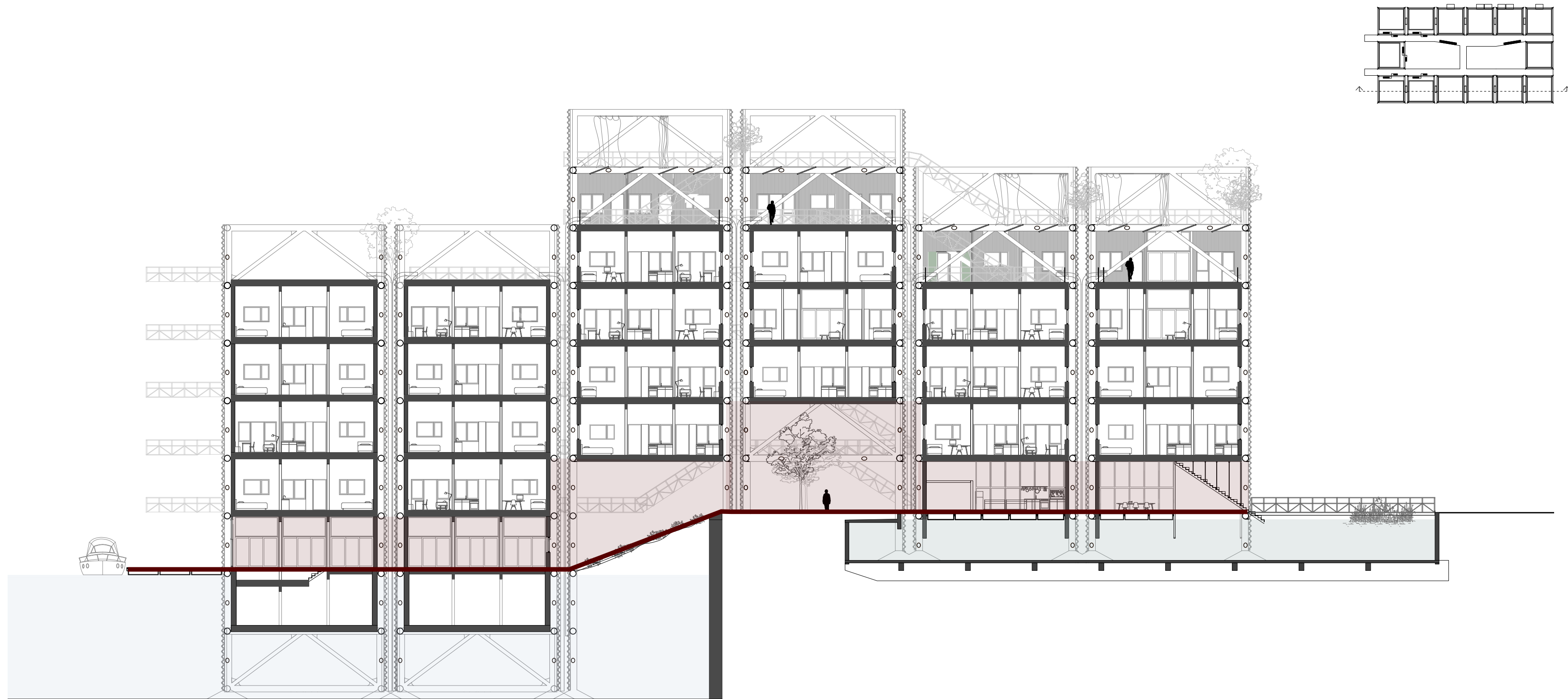




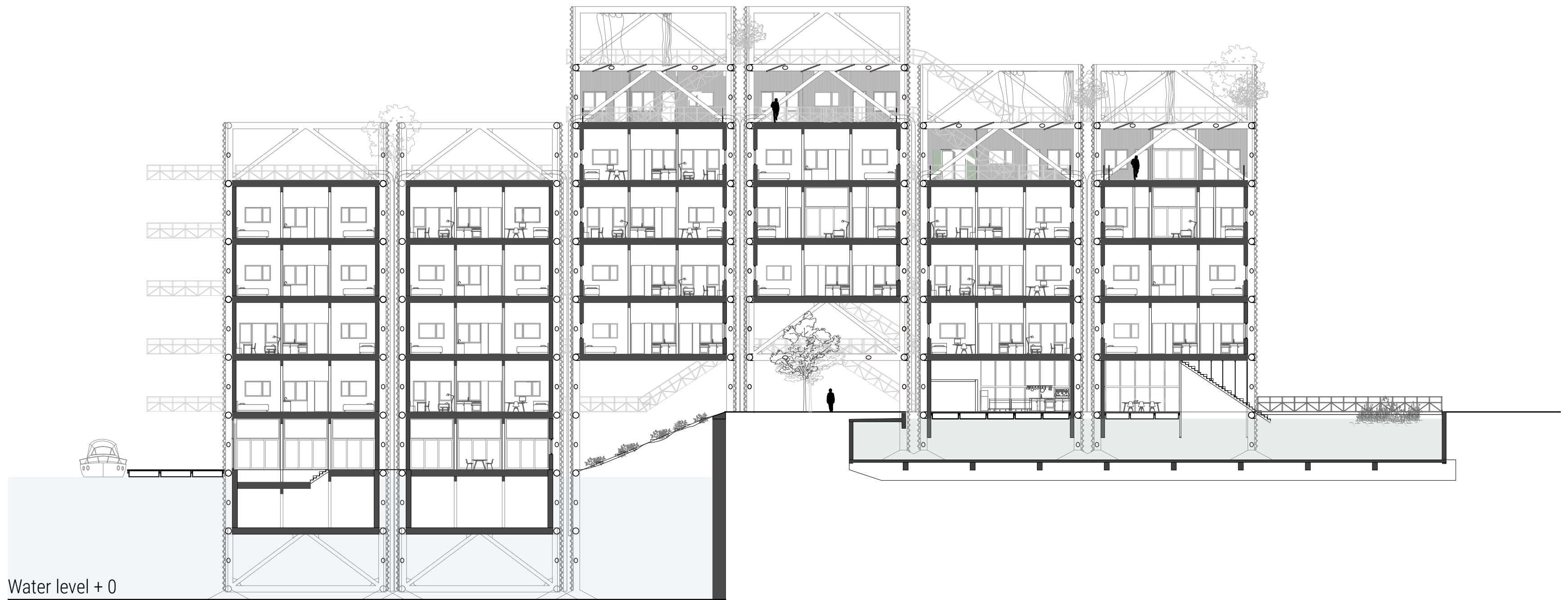




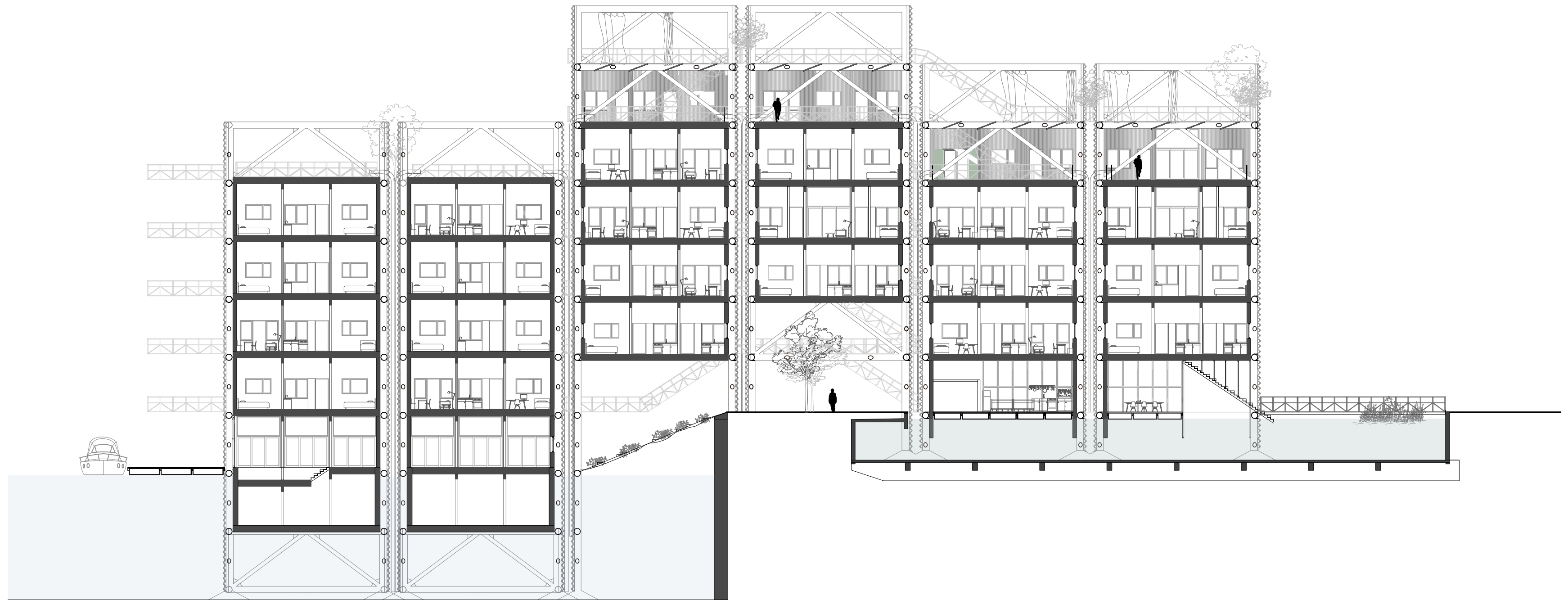








Water level + 0



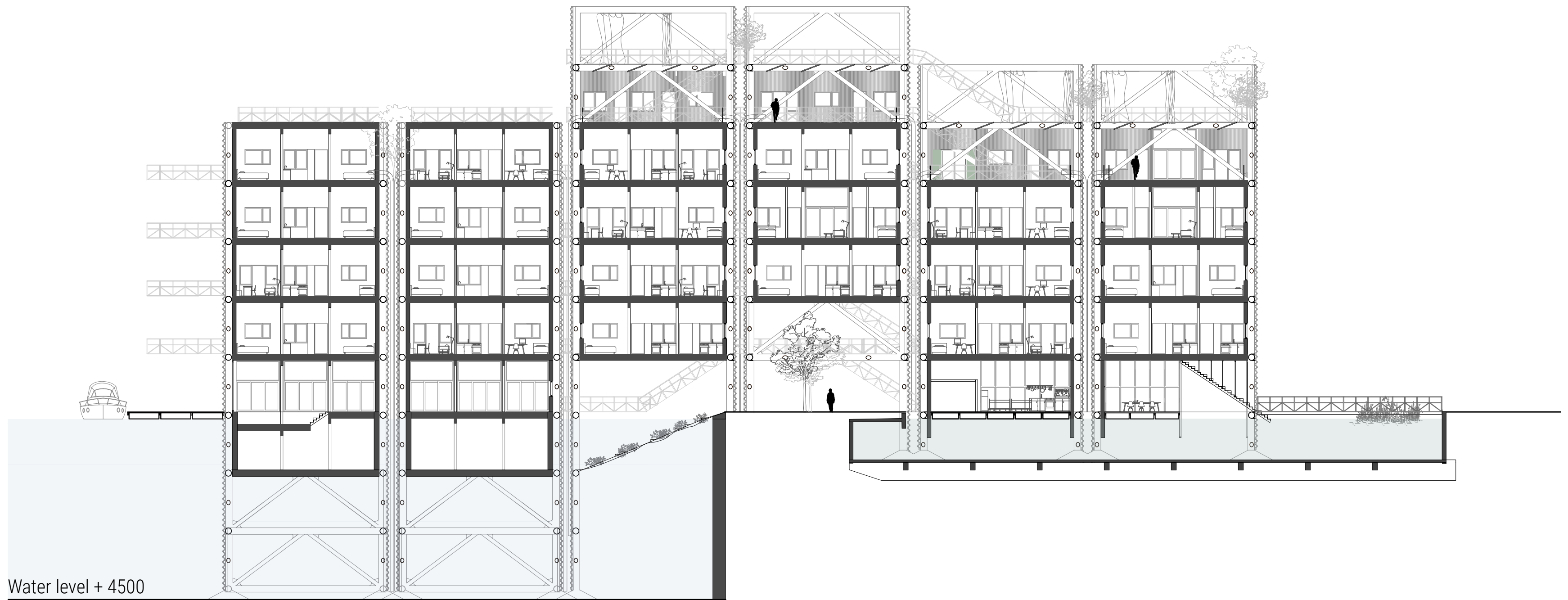
Water level + 200

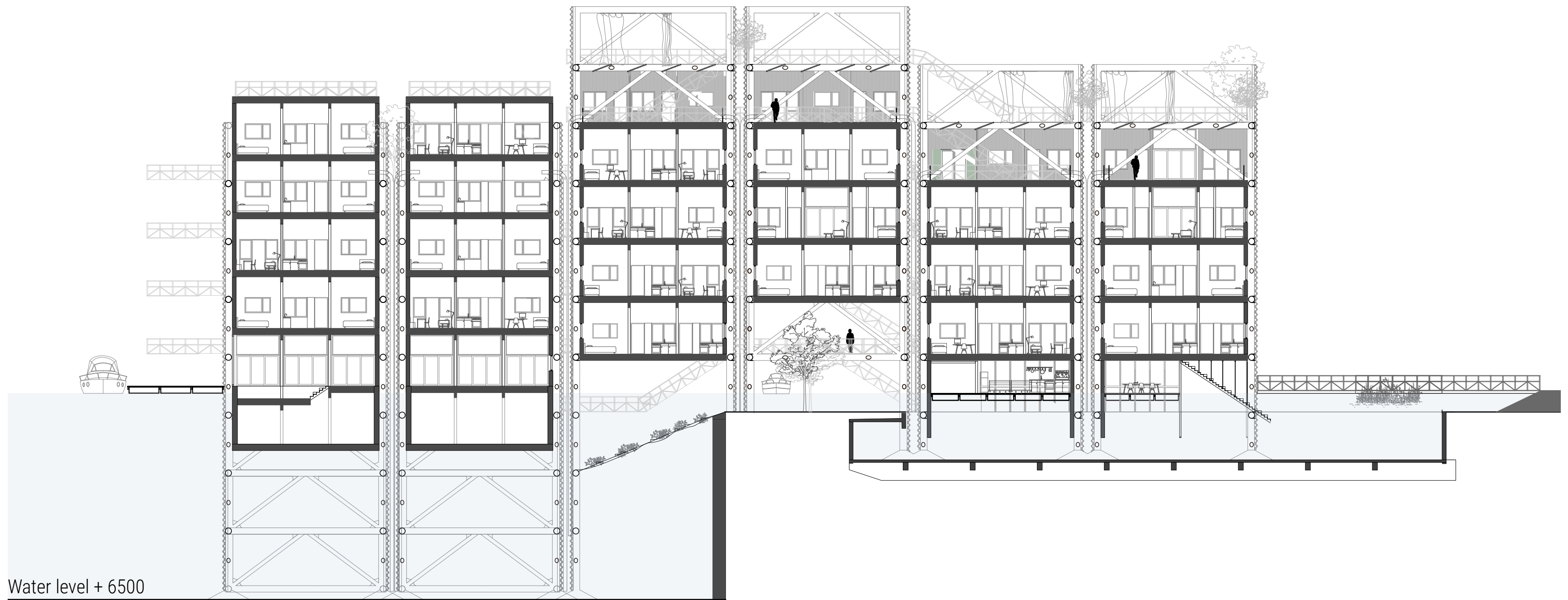


Water level + 1000



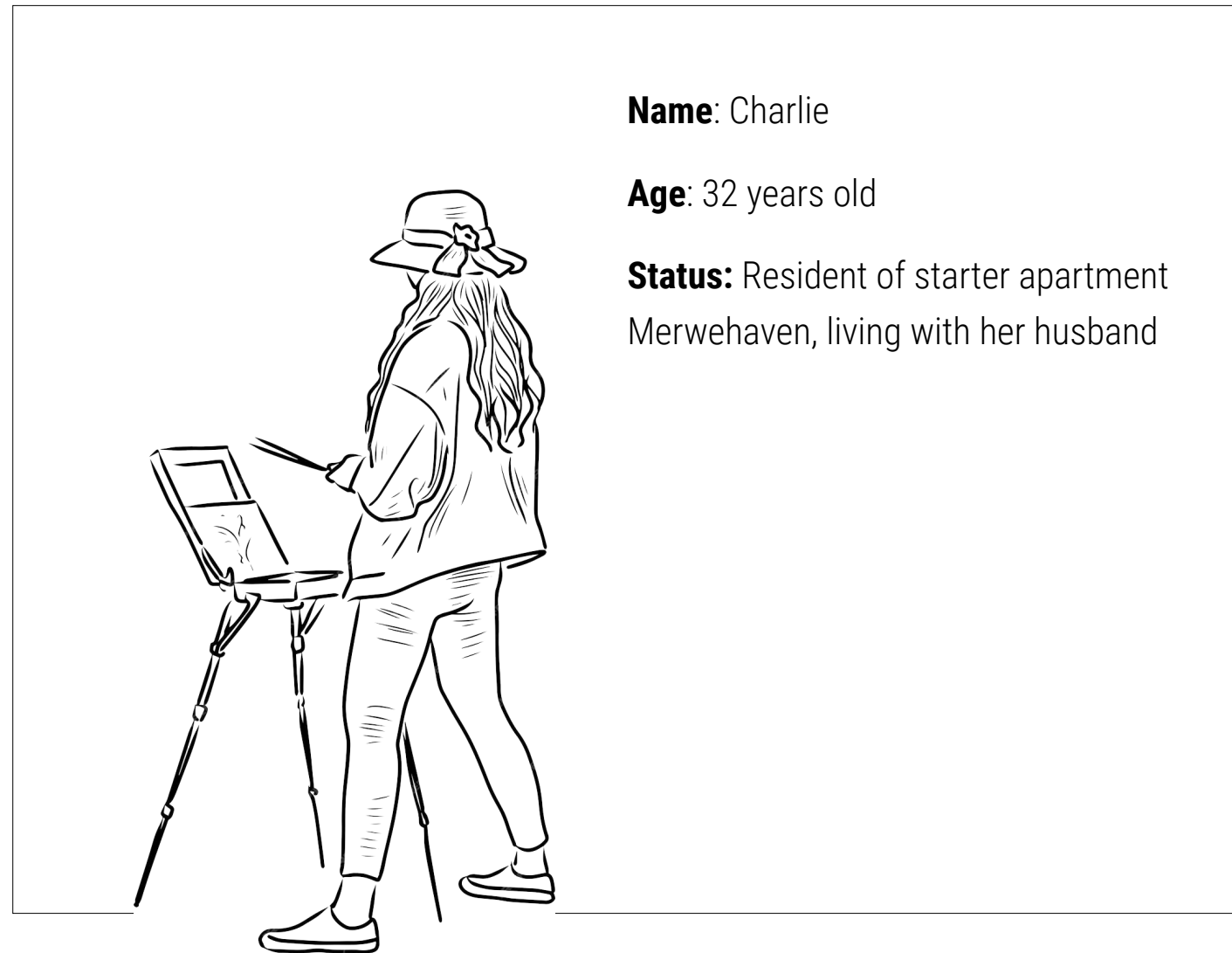
Water level + 2000

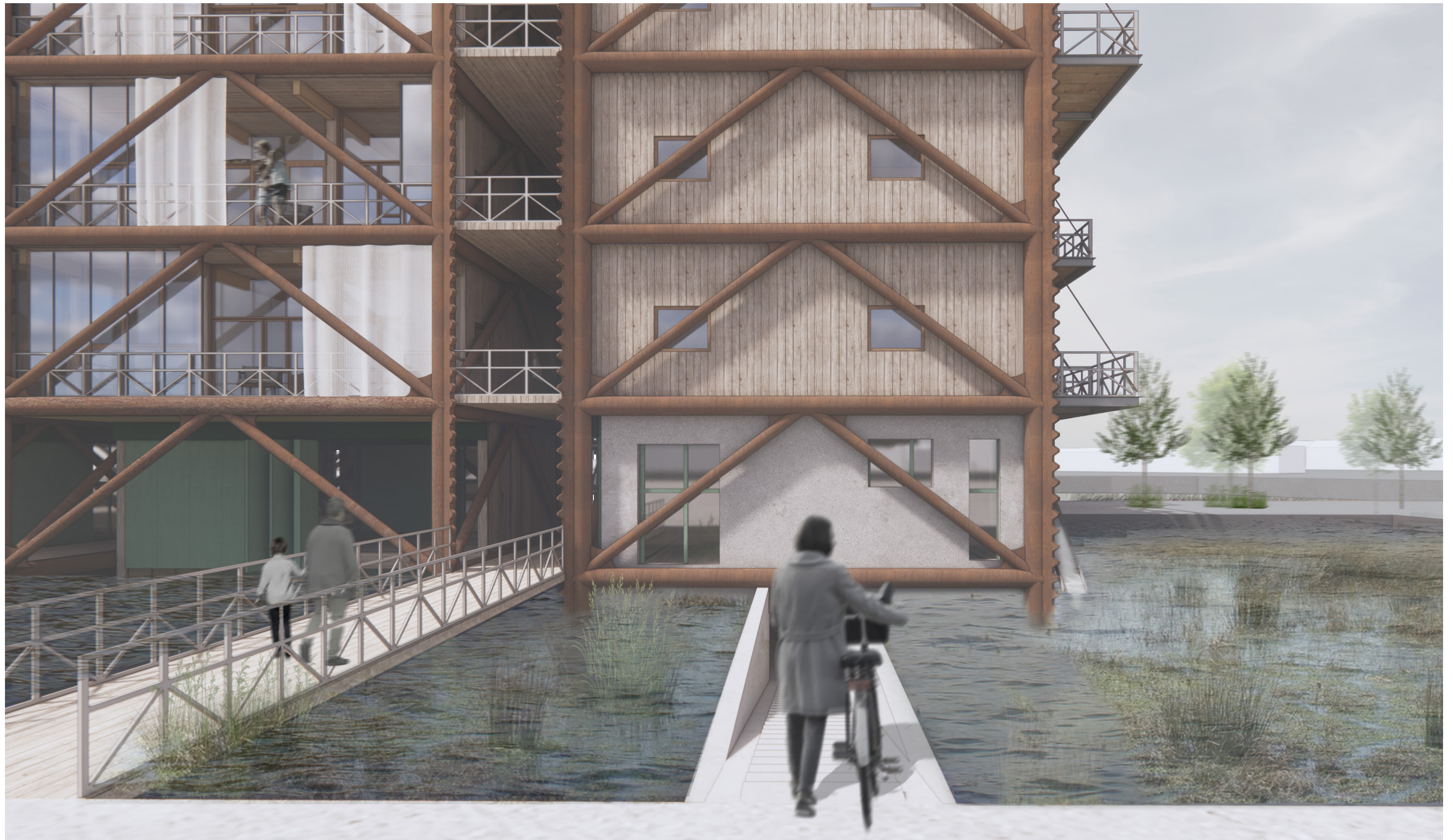


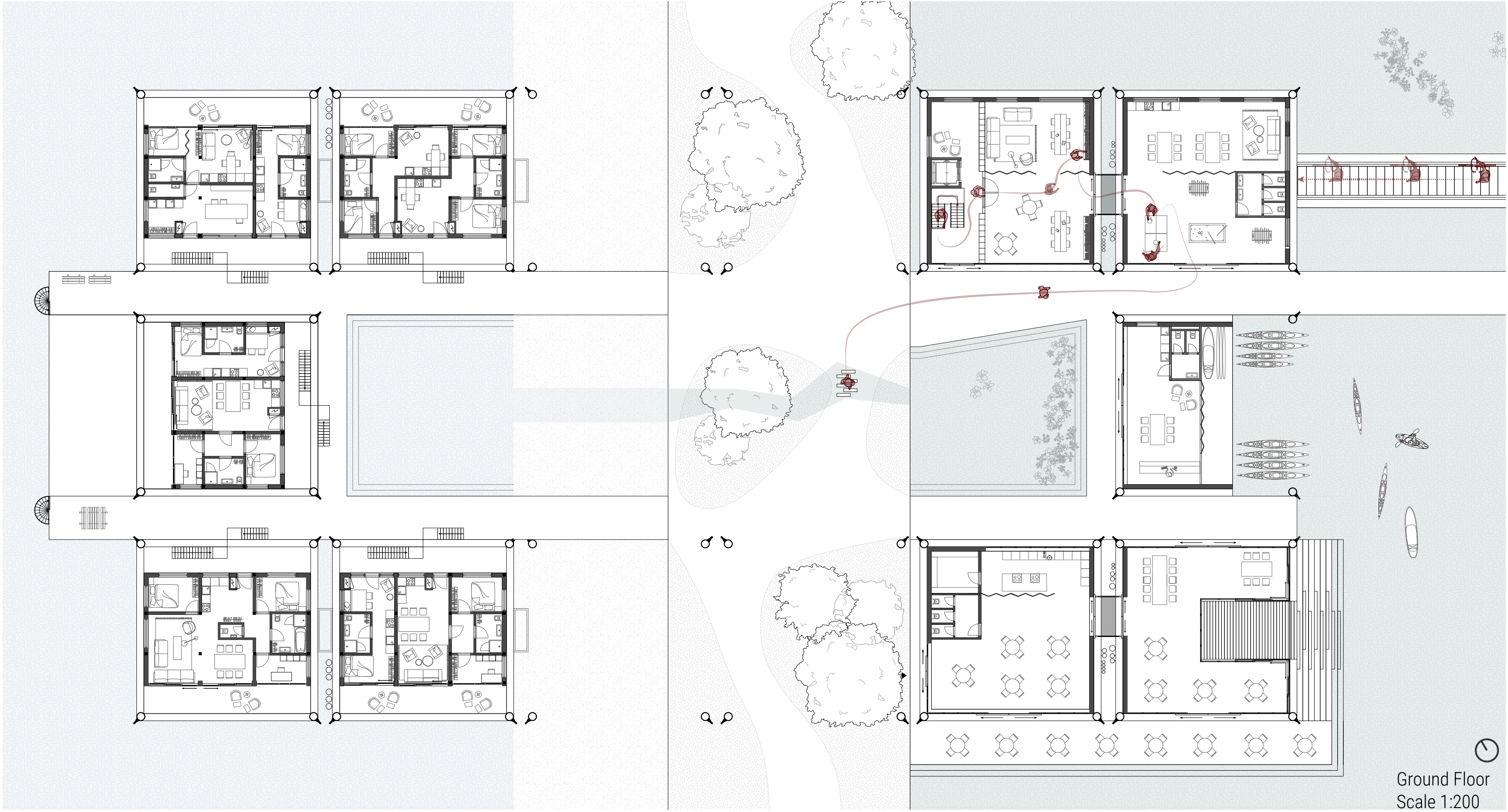


Water level + 6500

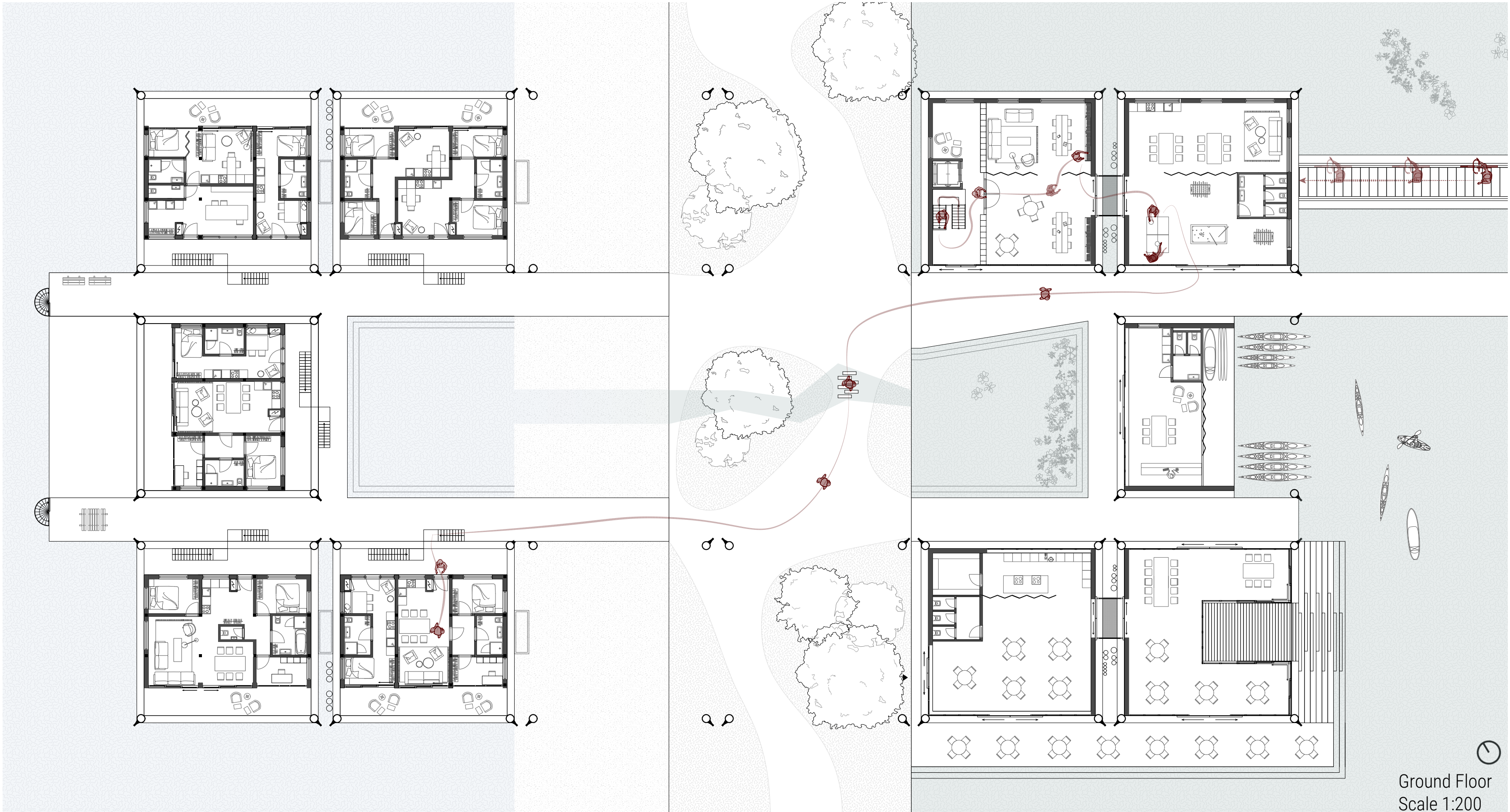
Persona



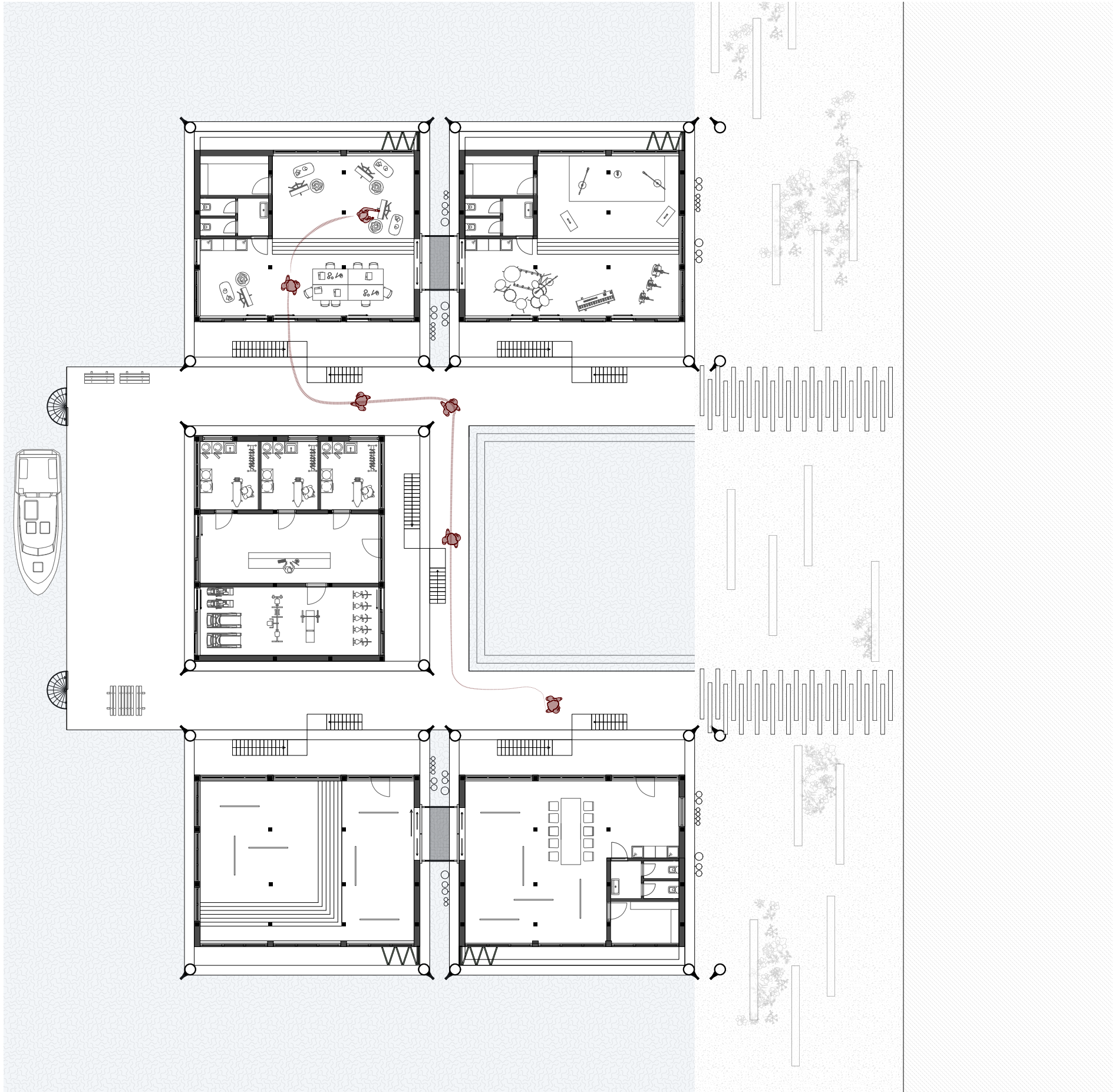






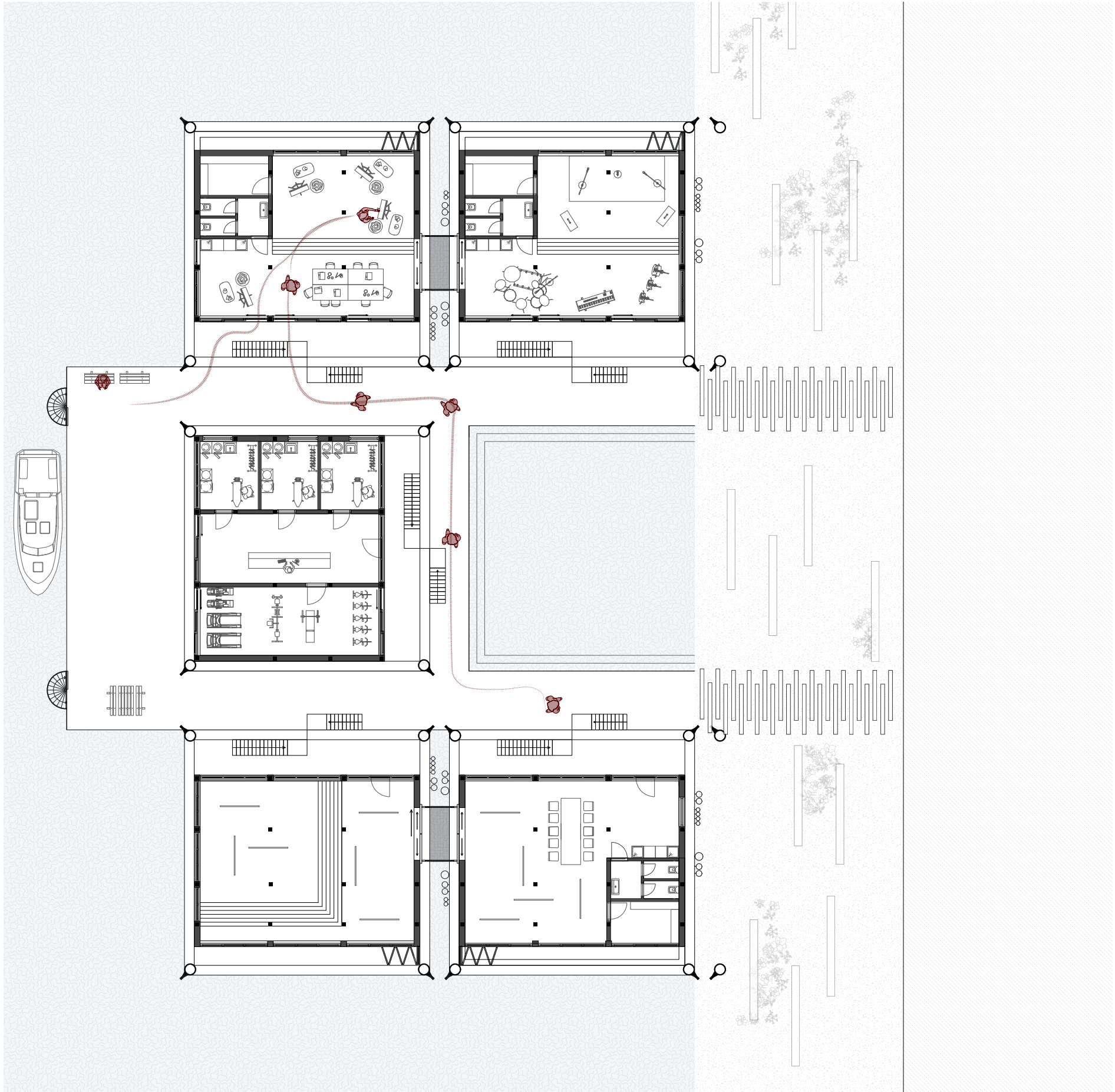






Floorplan level -1

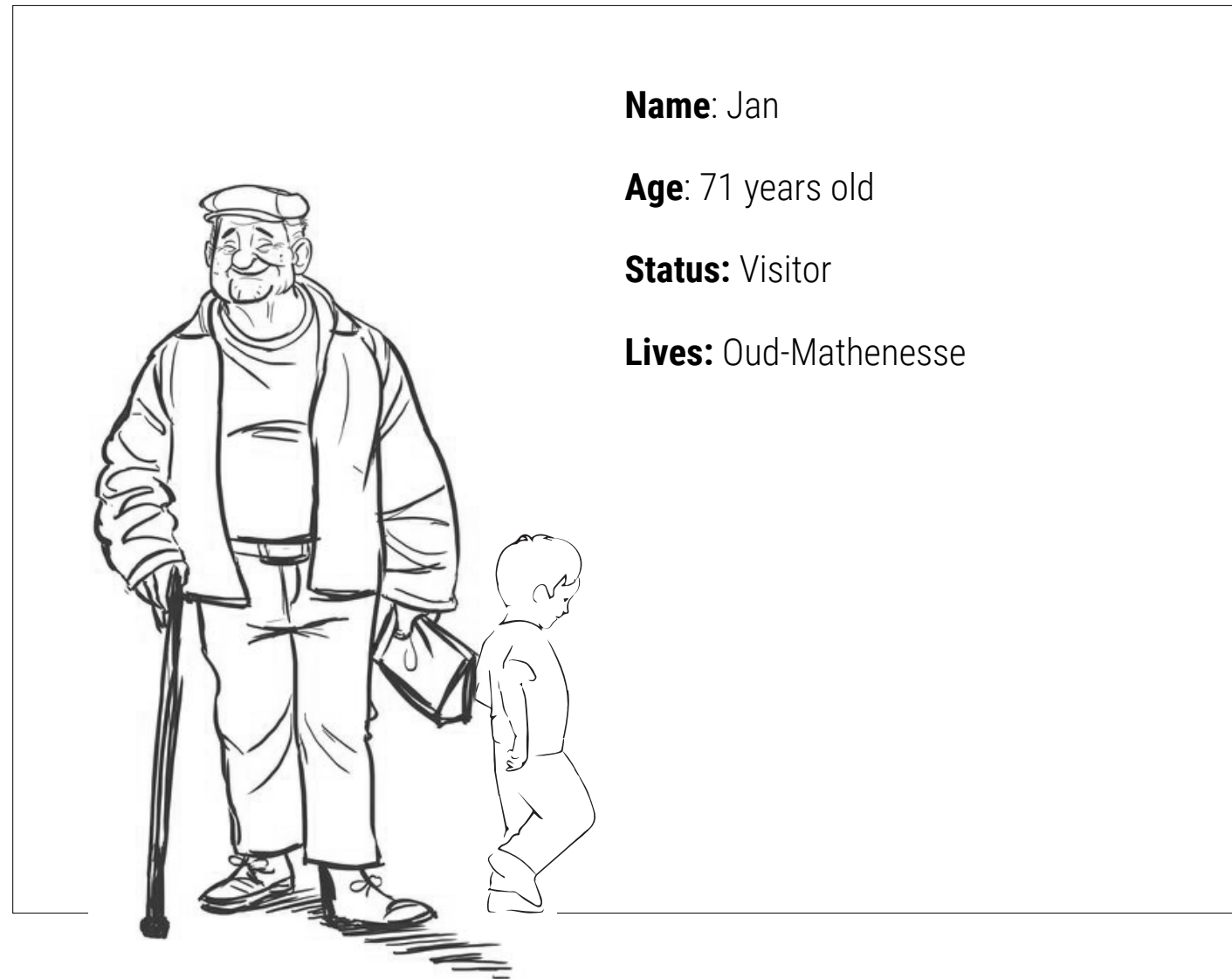


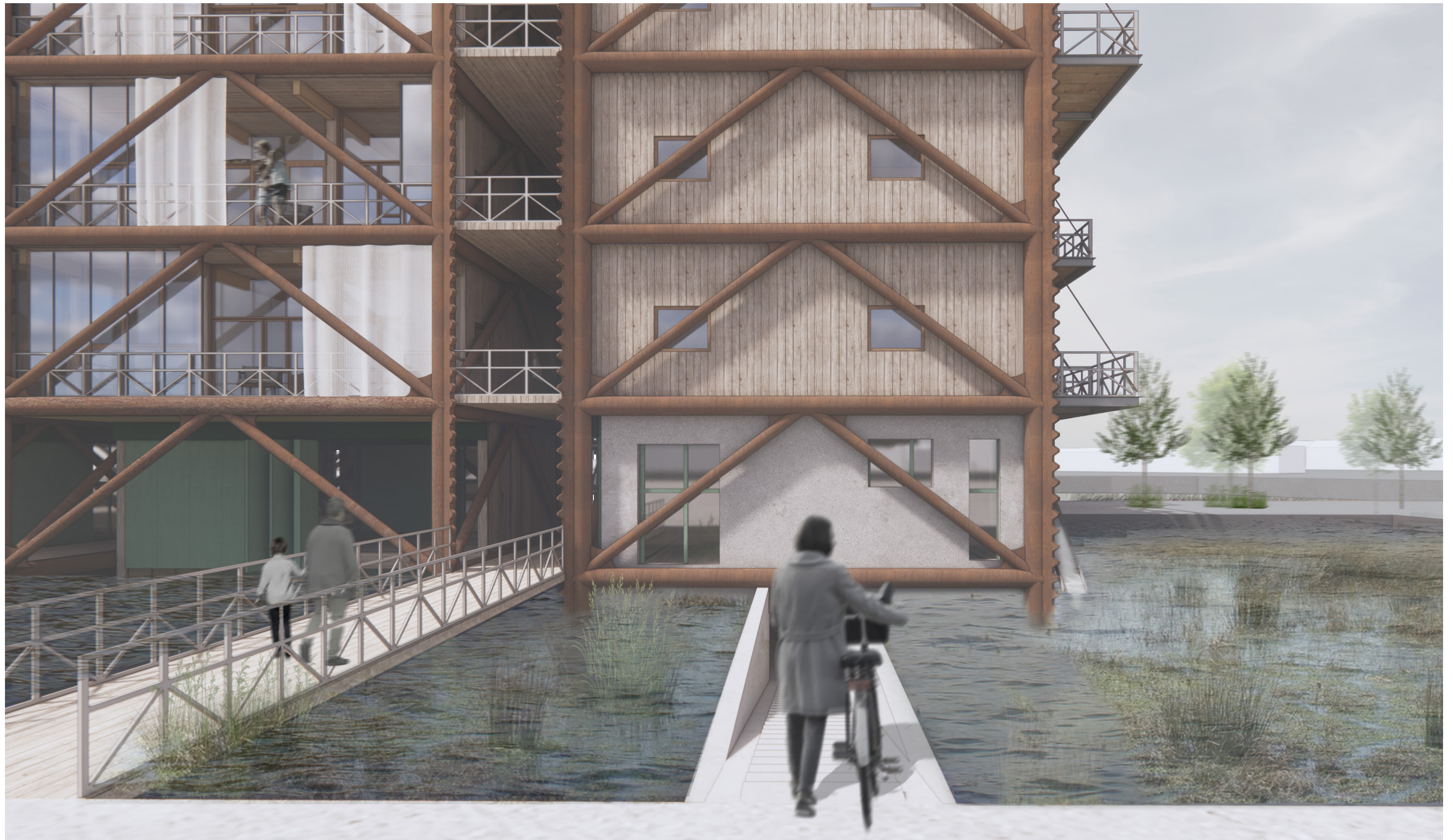


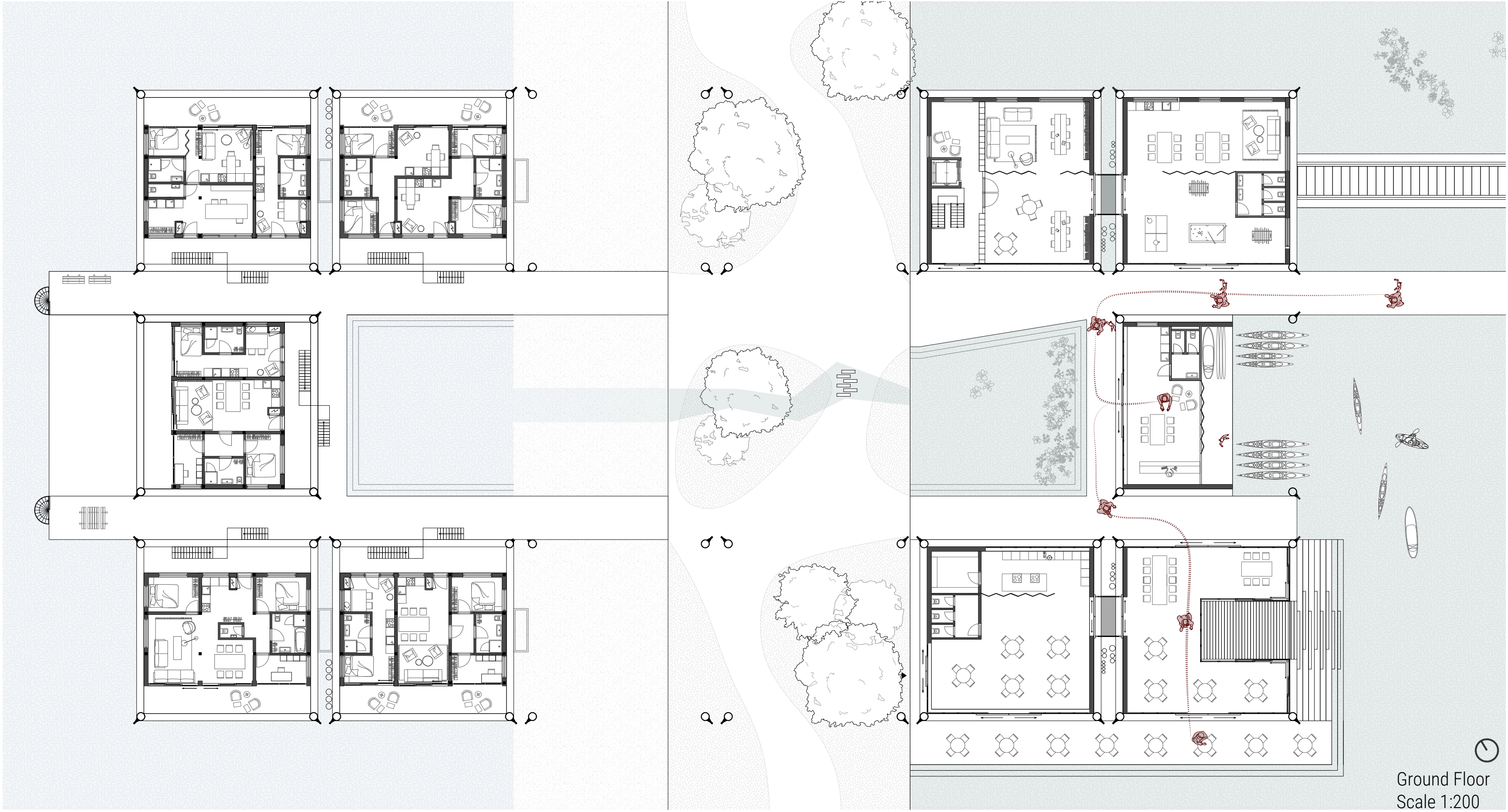
Floorplan level -1





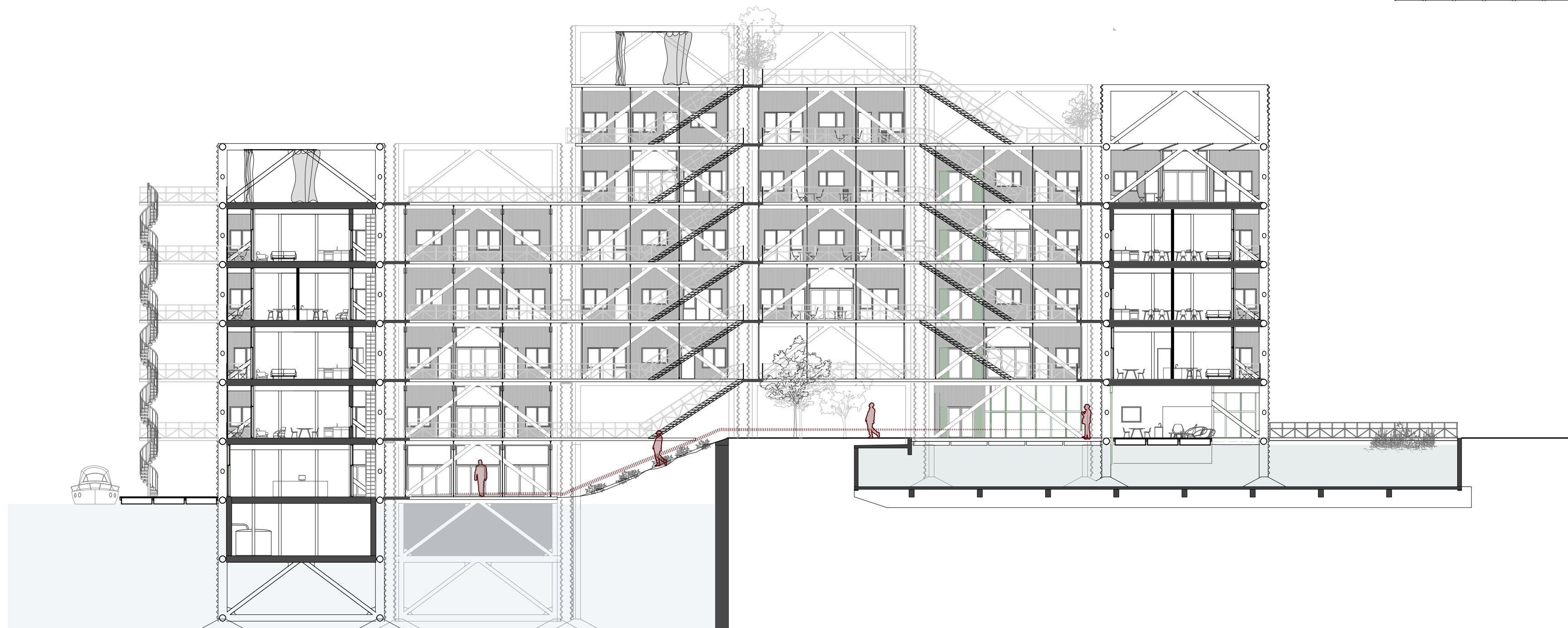
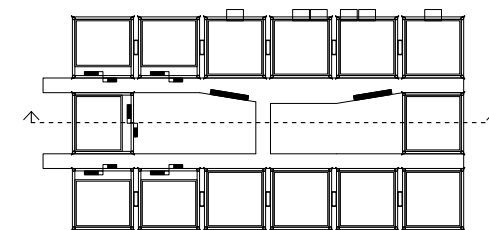


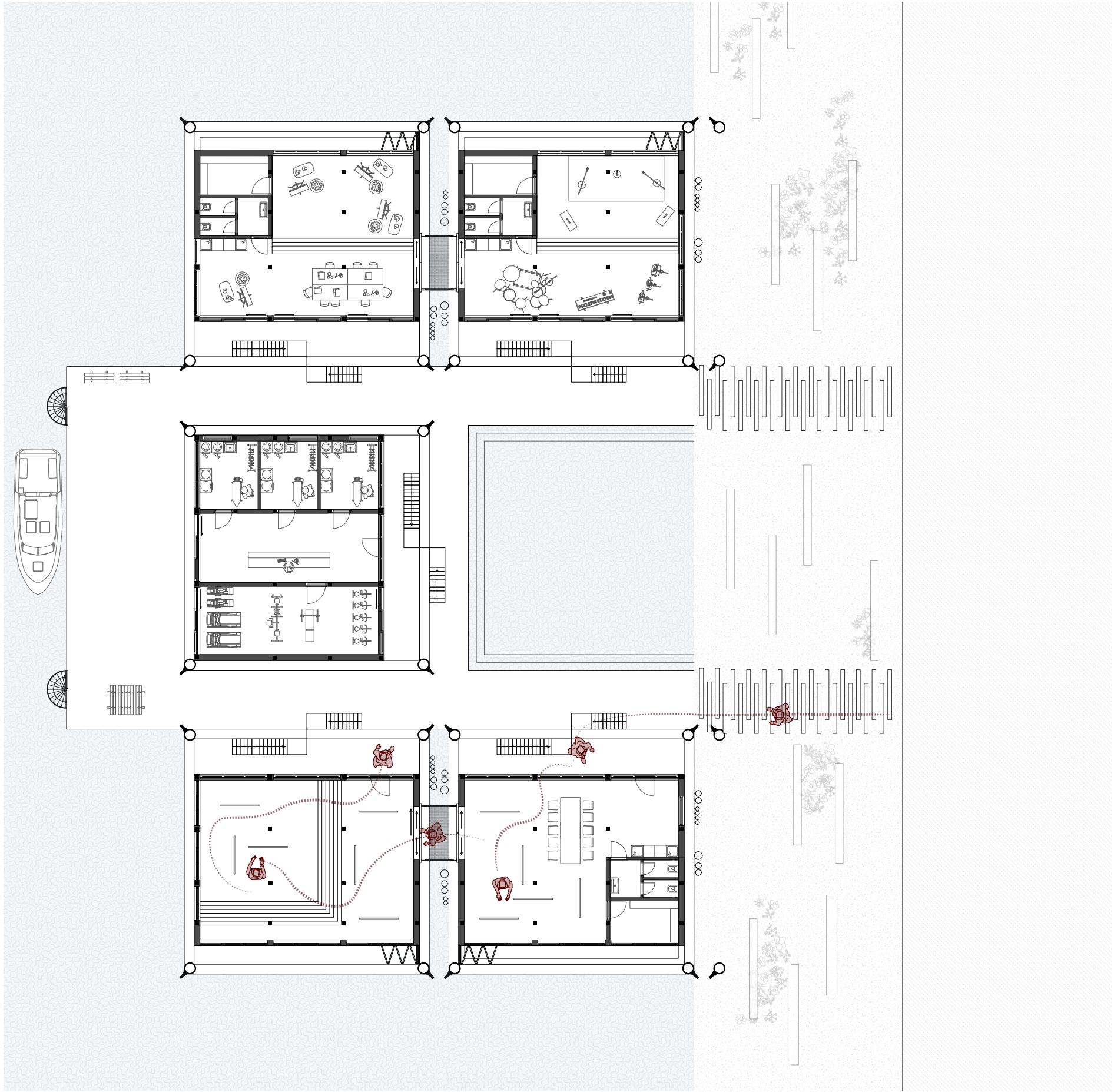












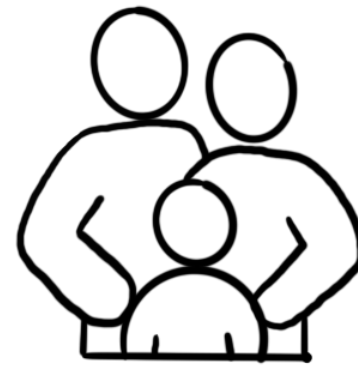
Target groups



Singles



Starters



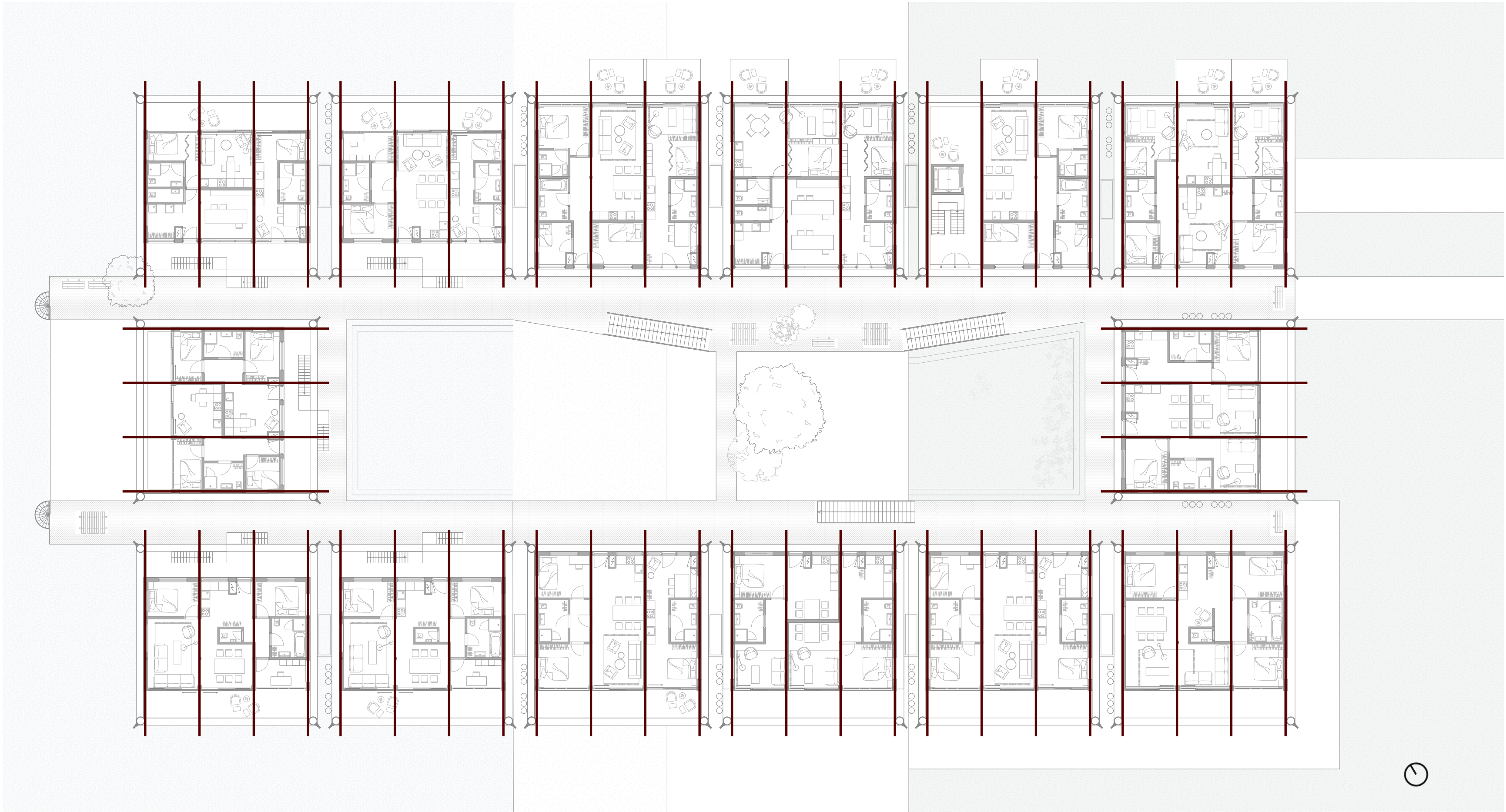
Family



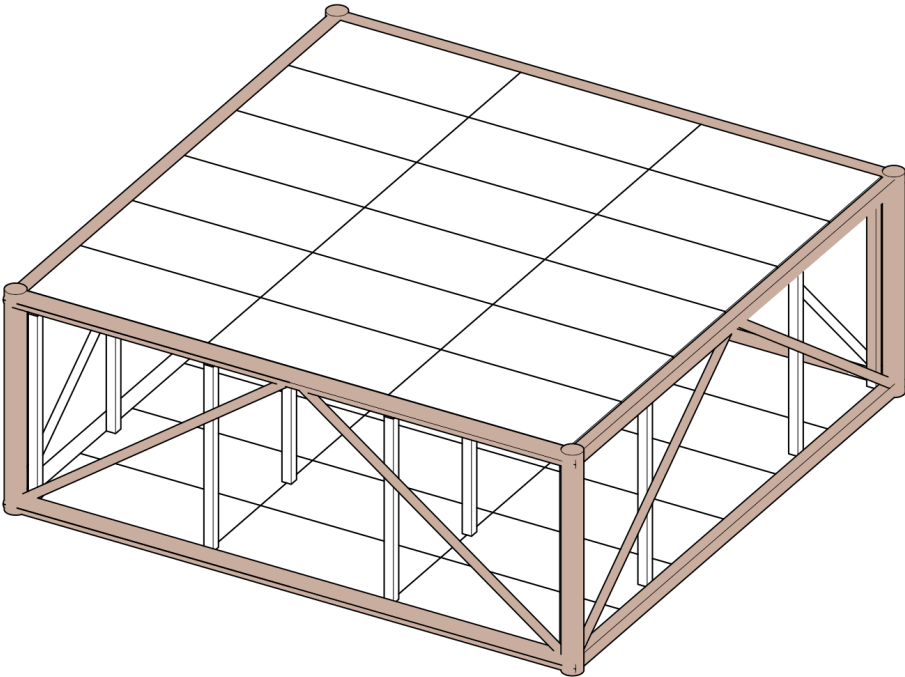
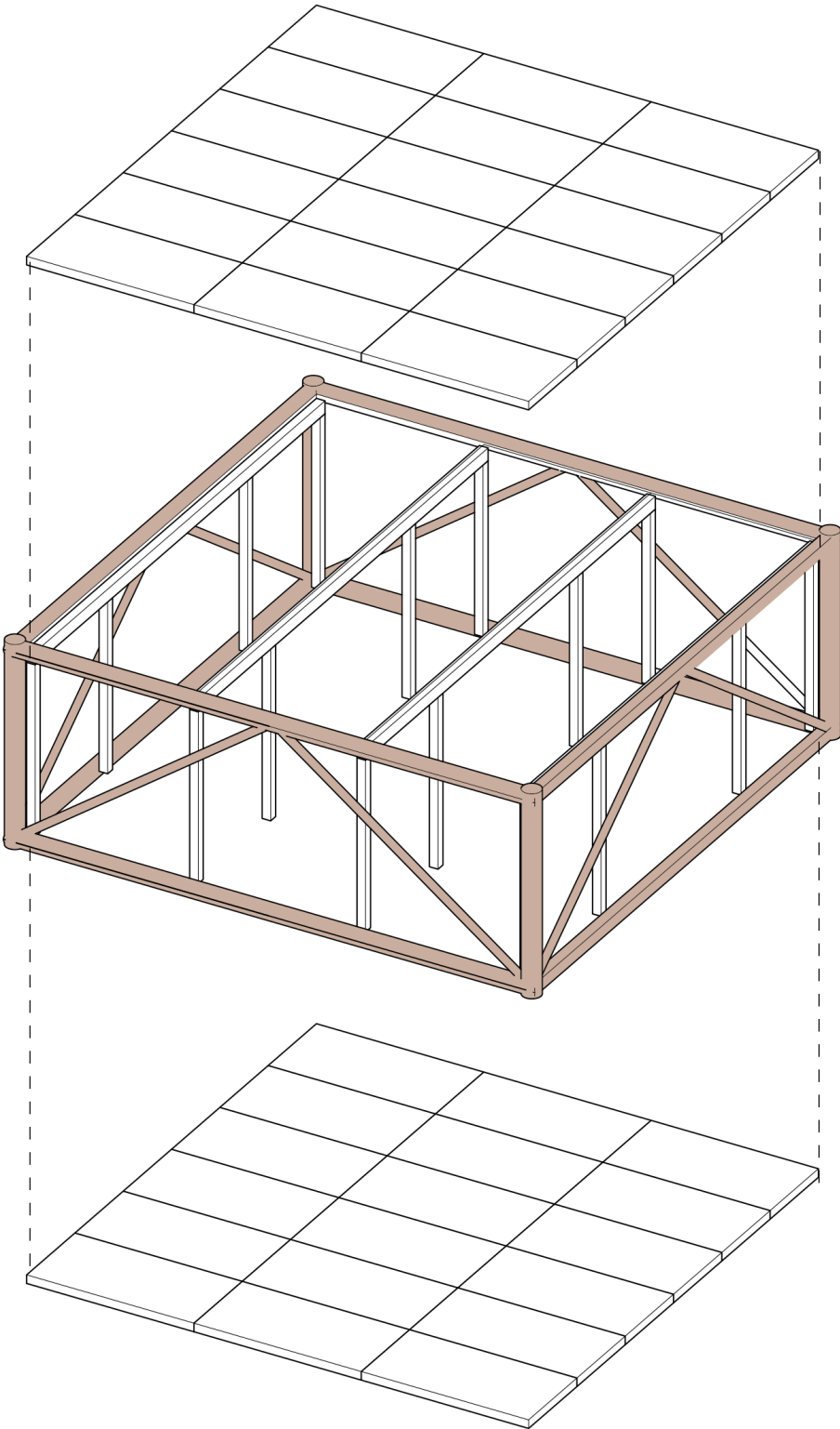
Friends

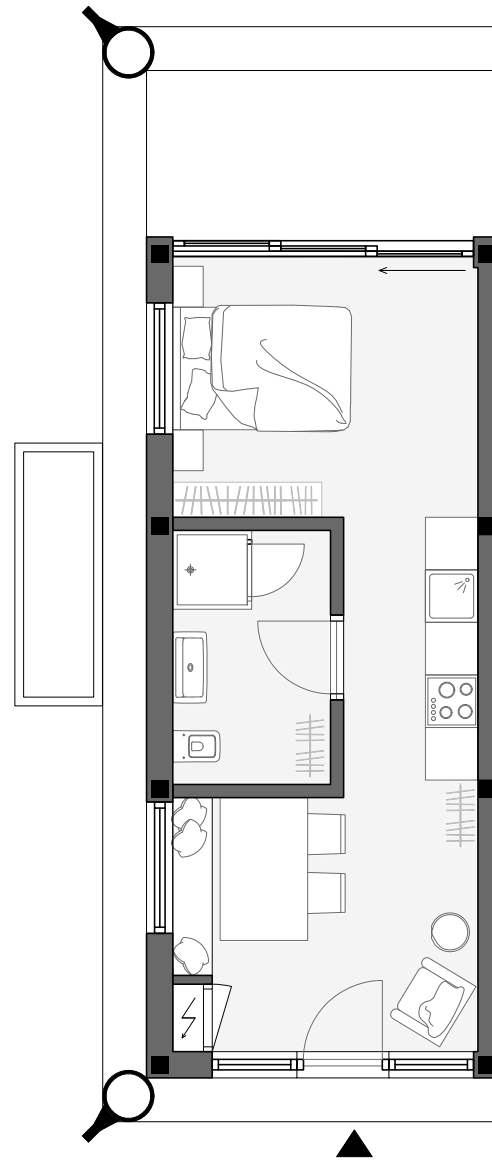


Elderly



Construnction

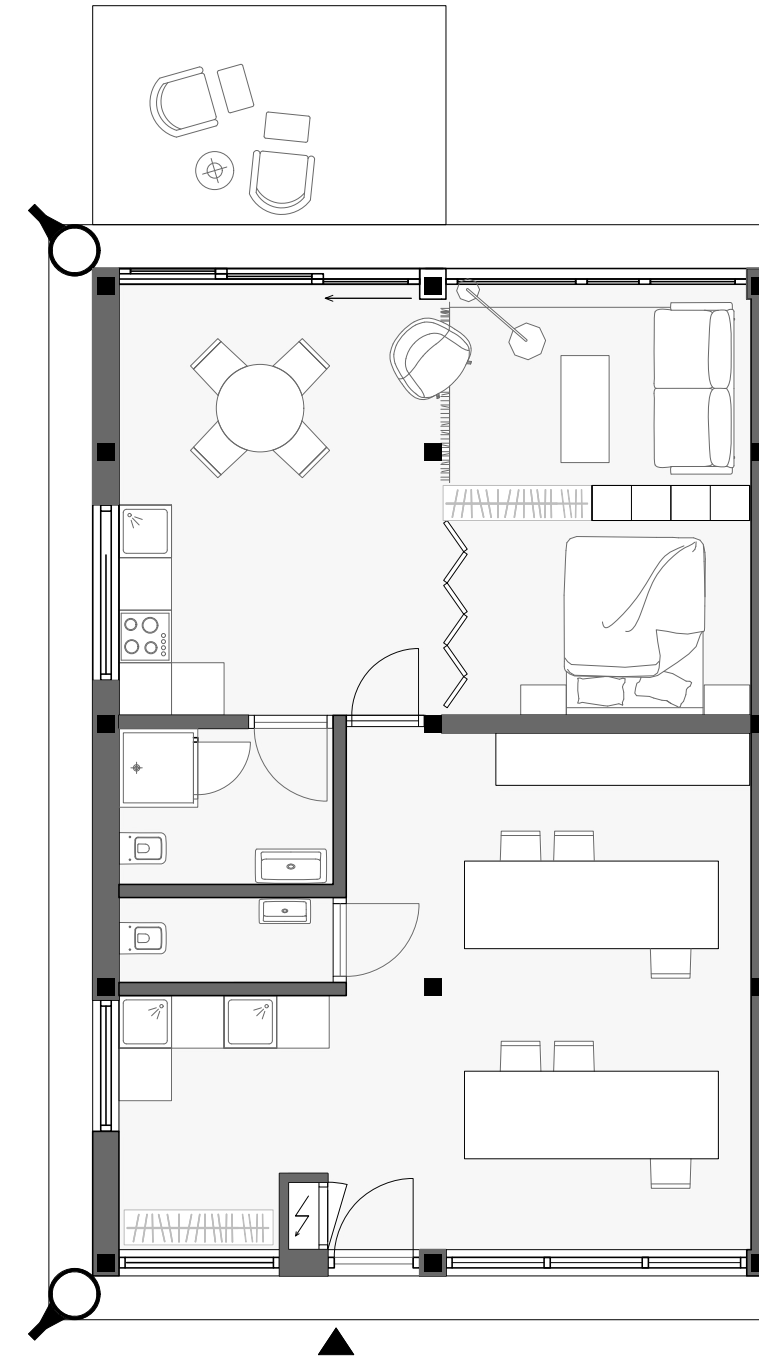




Studio
32 m2



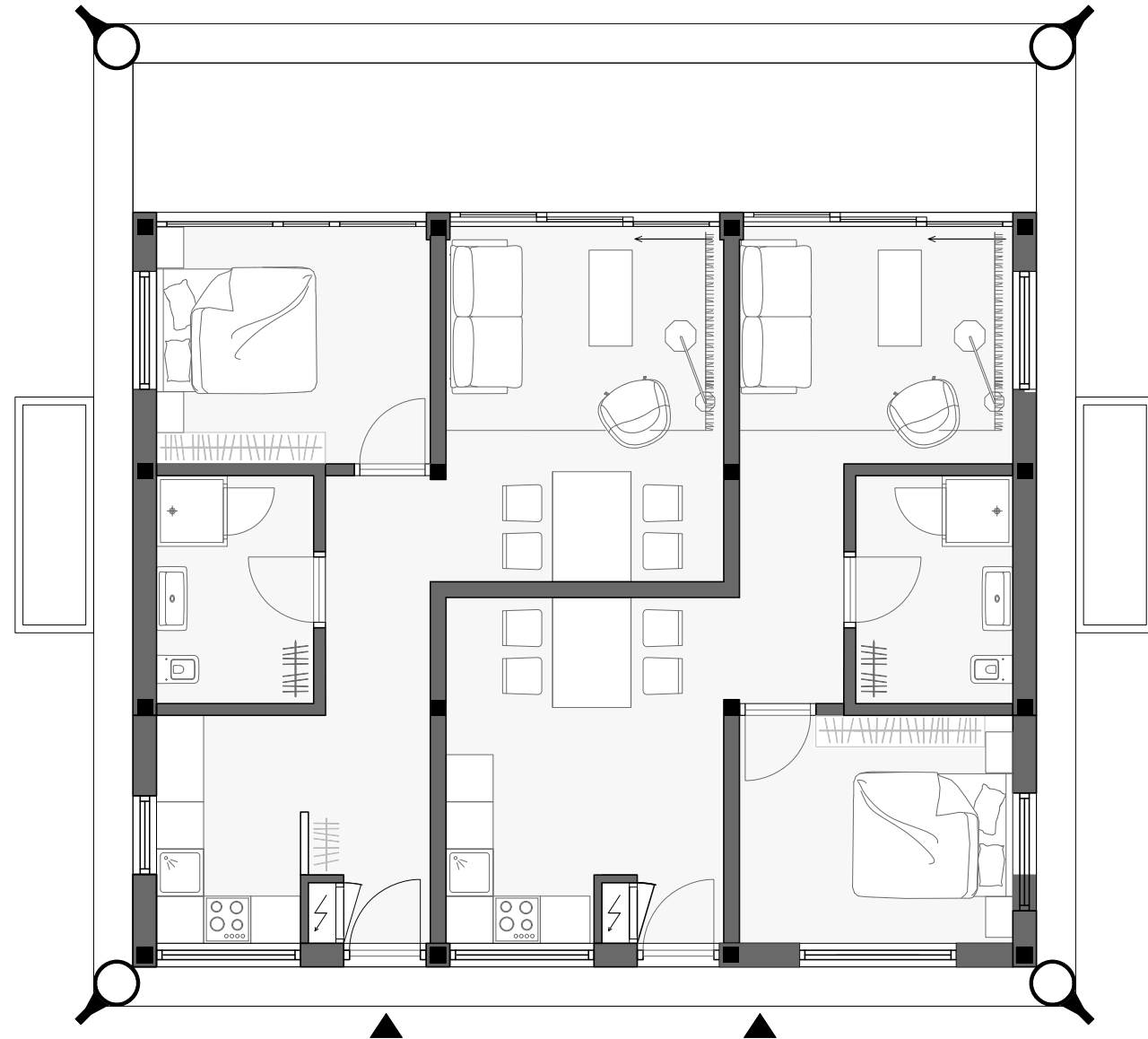
Starter apartment
66 m2



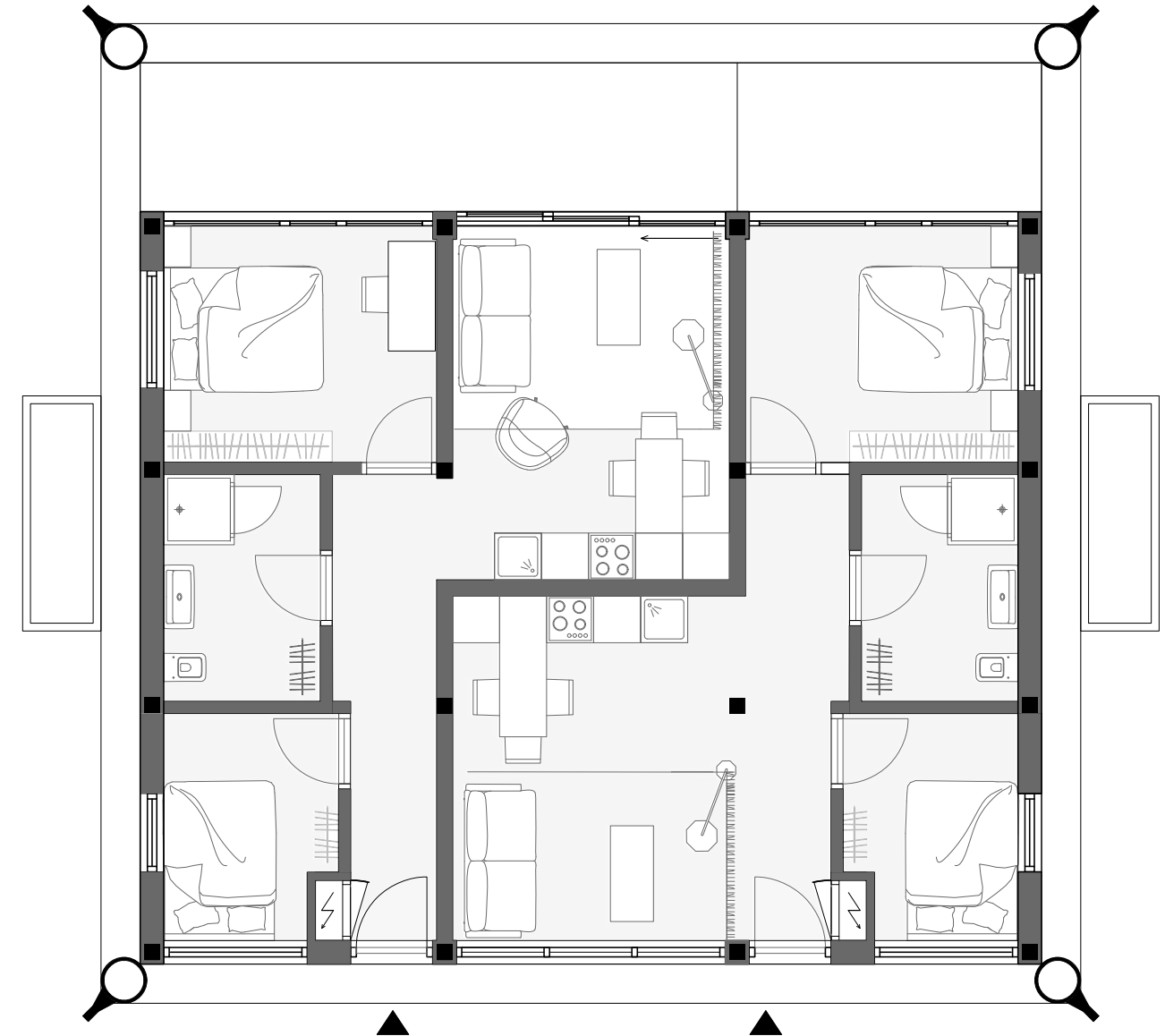
Creative apartment
78 m2



Floorplans



Elderly apartment
50 m2



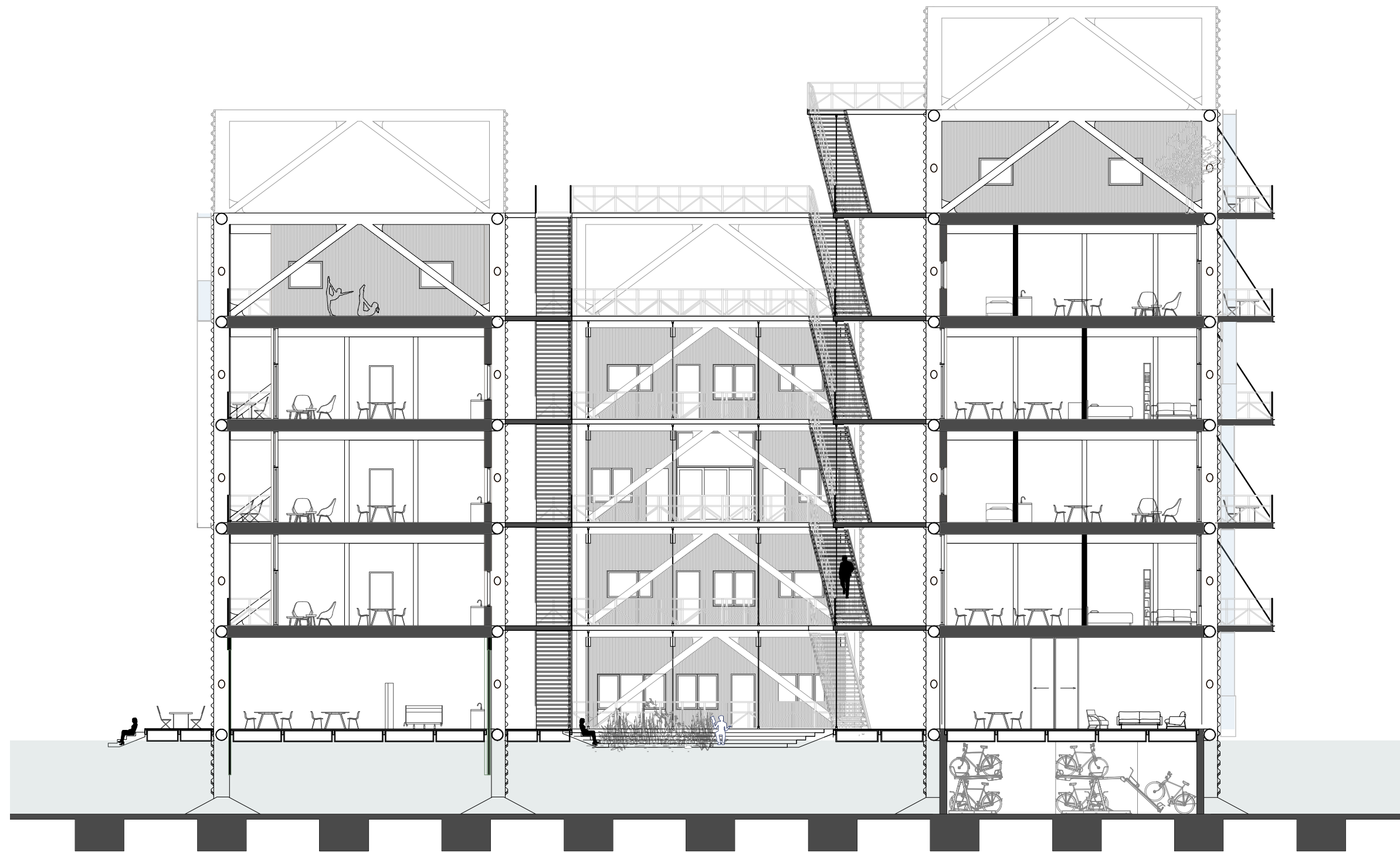
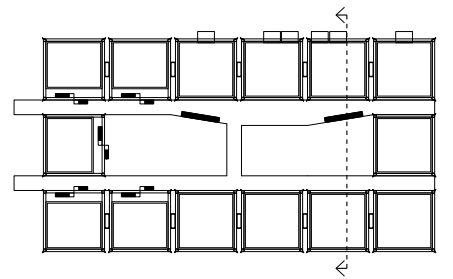
Friends apartment
50 m2



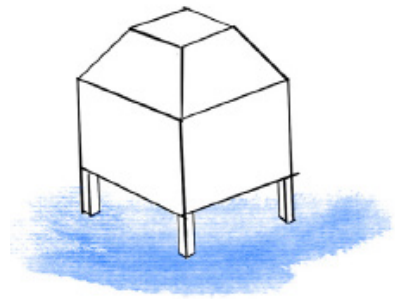
Floorplans



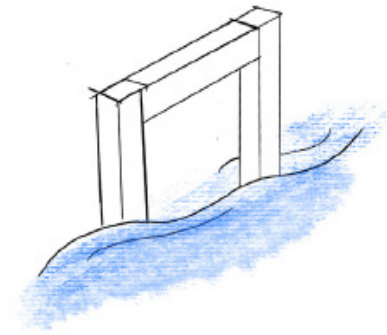
Floorplan Dwellings
Scale 1:200



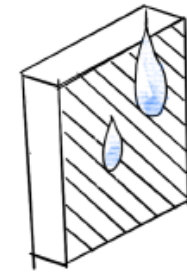
Architectural Engineering



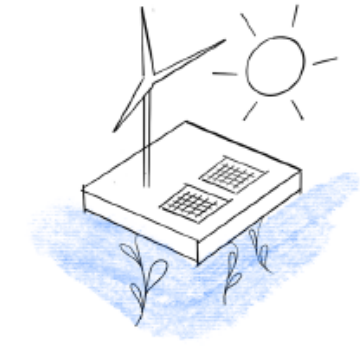
Water typologies



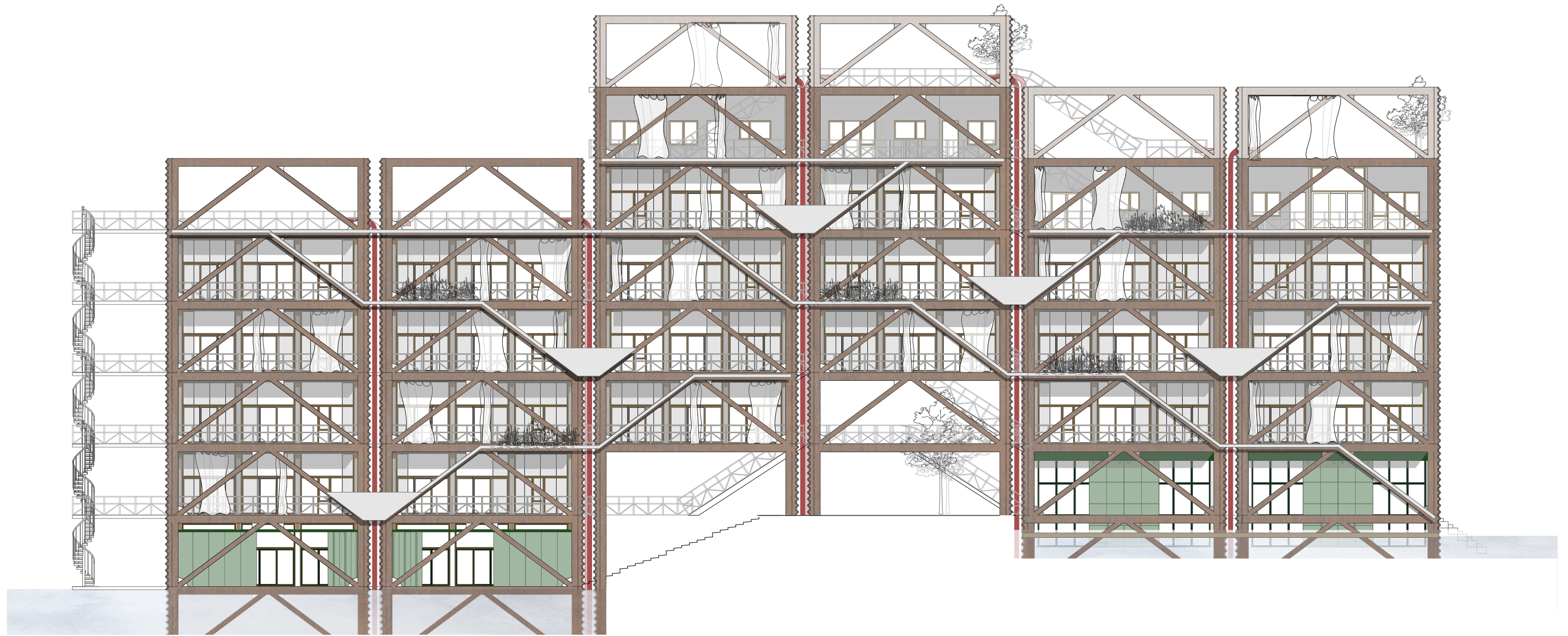
Construction



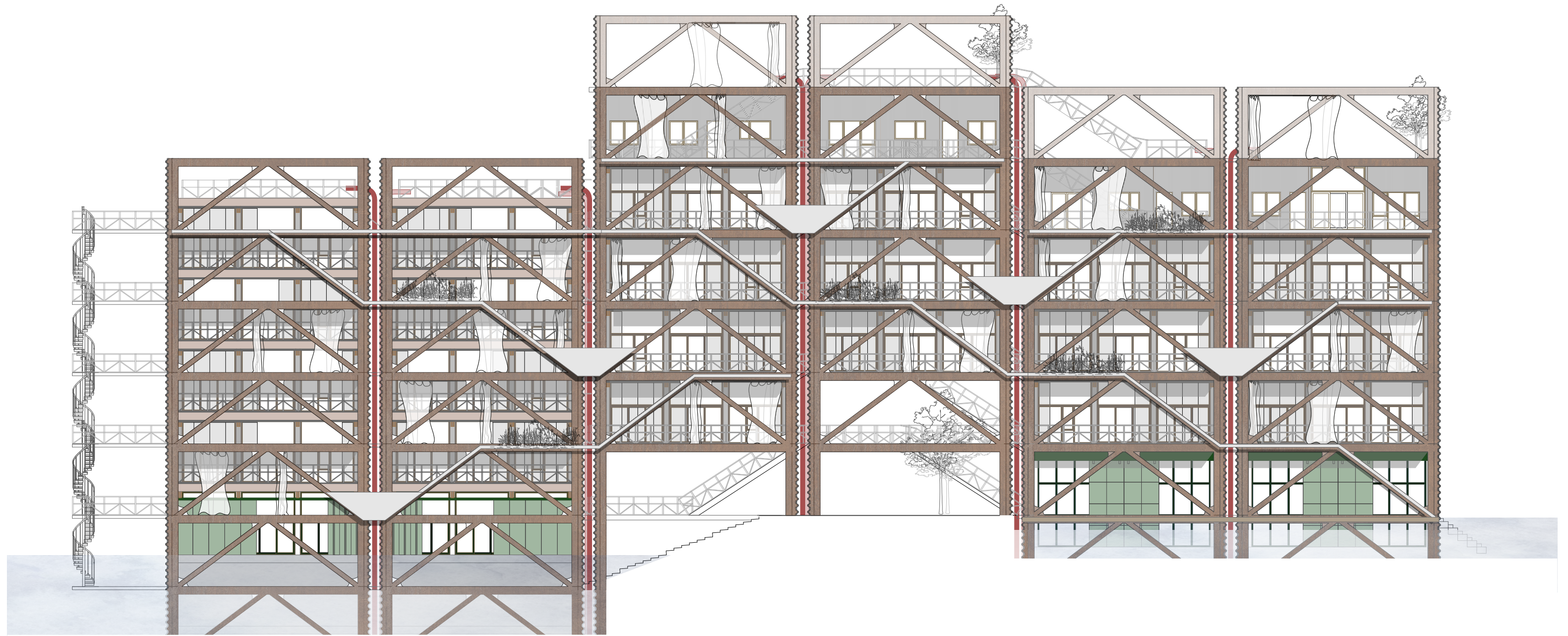
Building materials



Sustainability



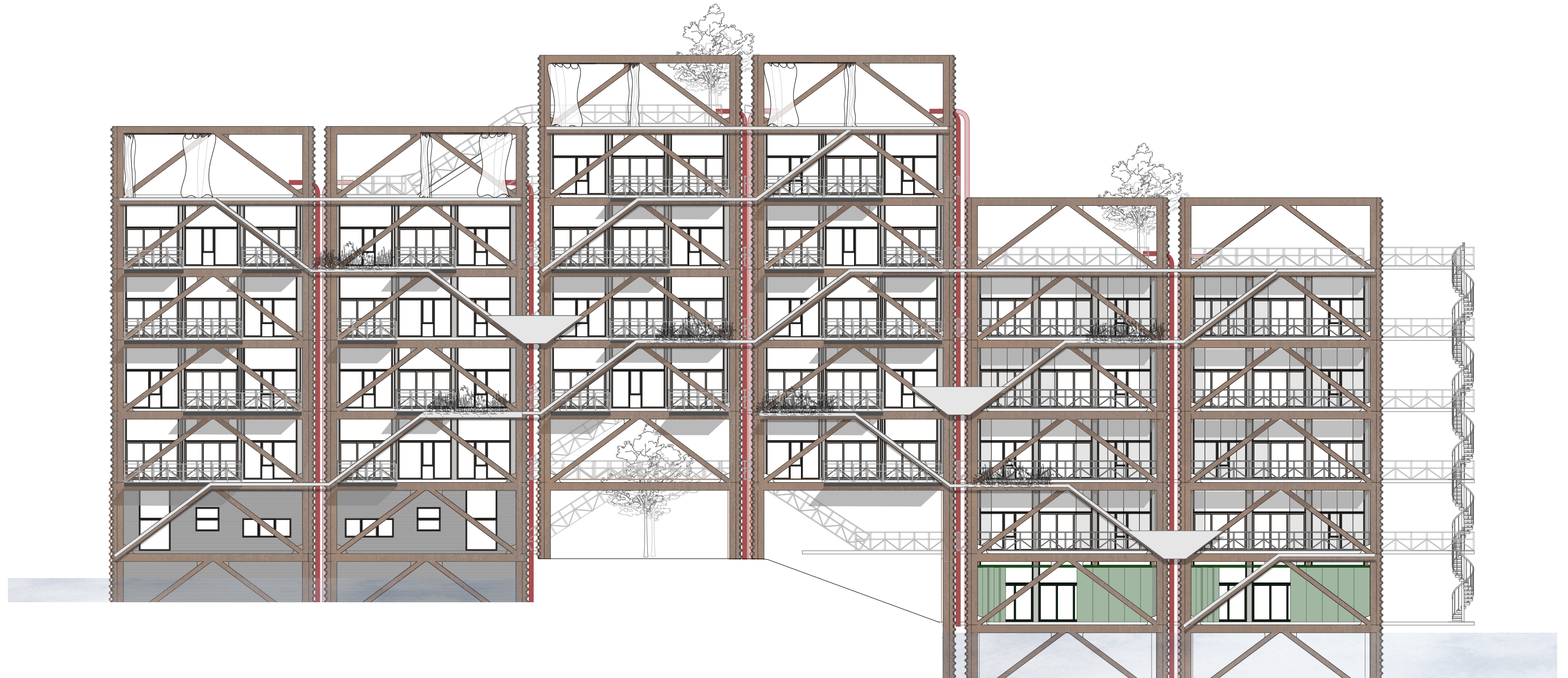
South Facade
Scale 1:200



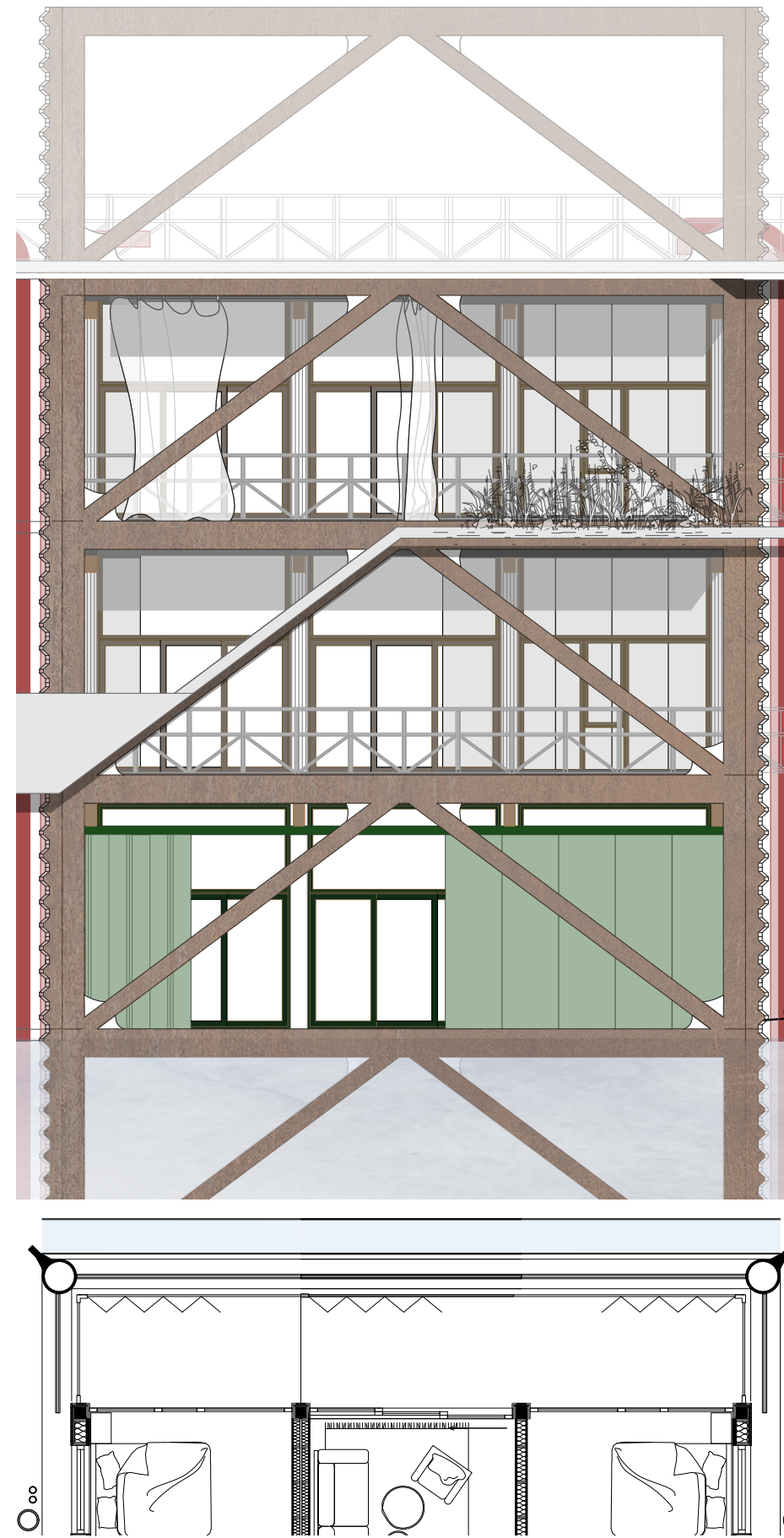
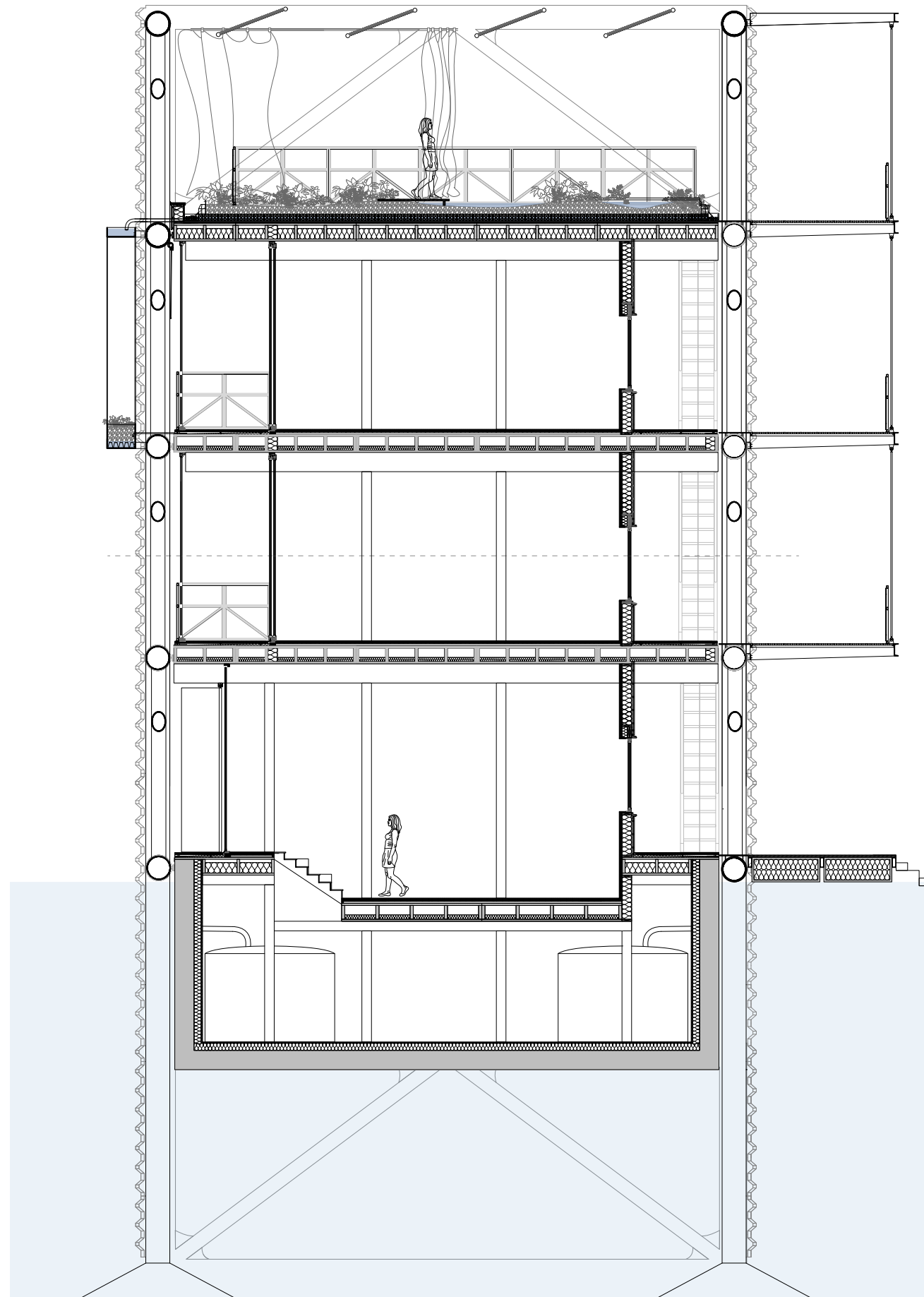
South Facade
Scale 1:200





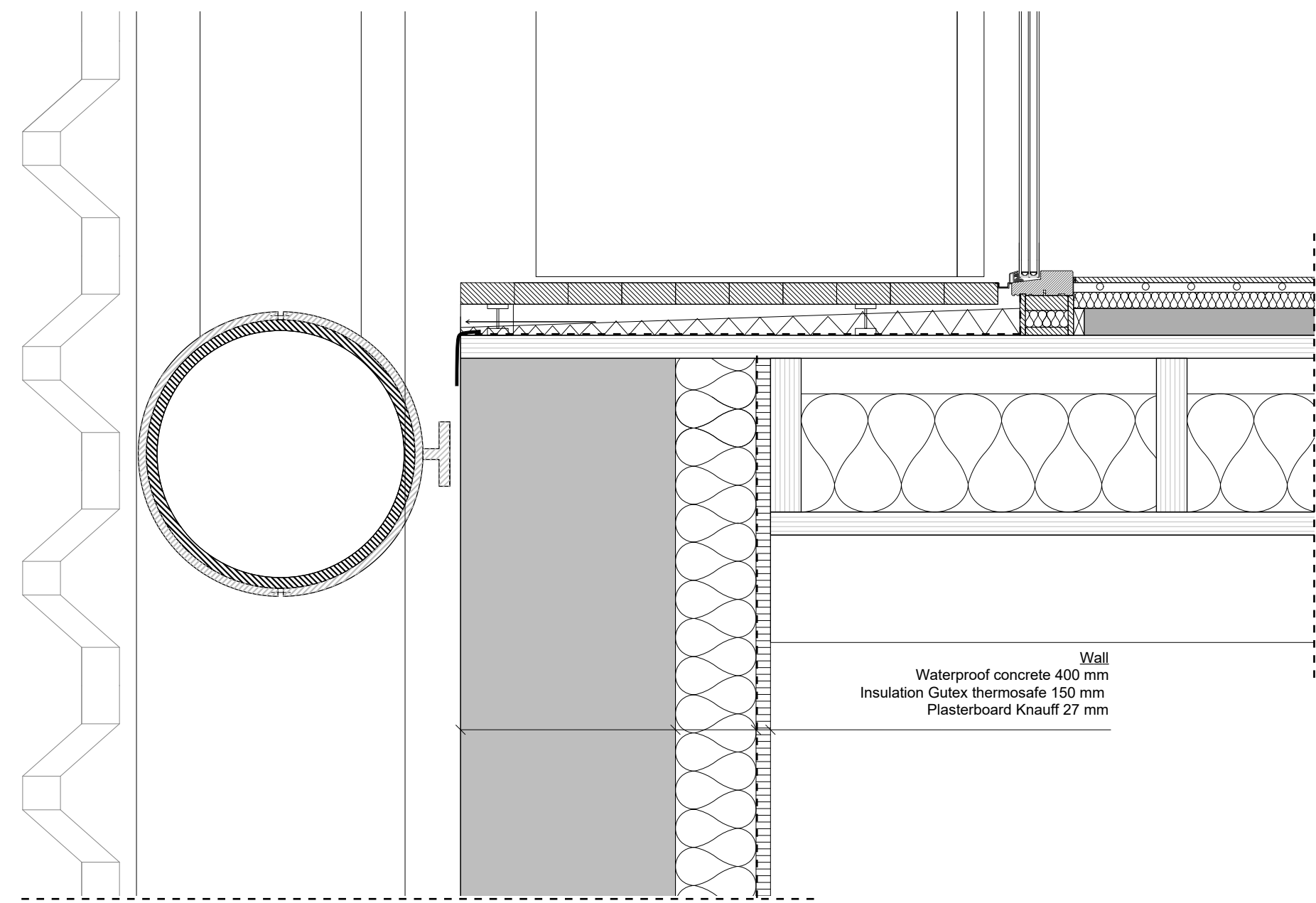




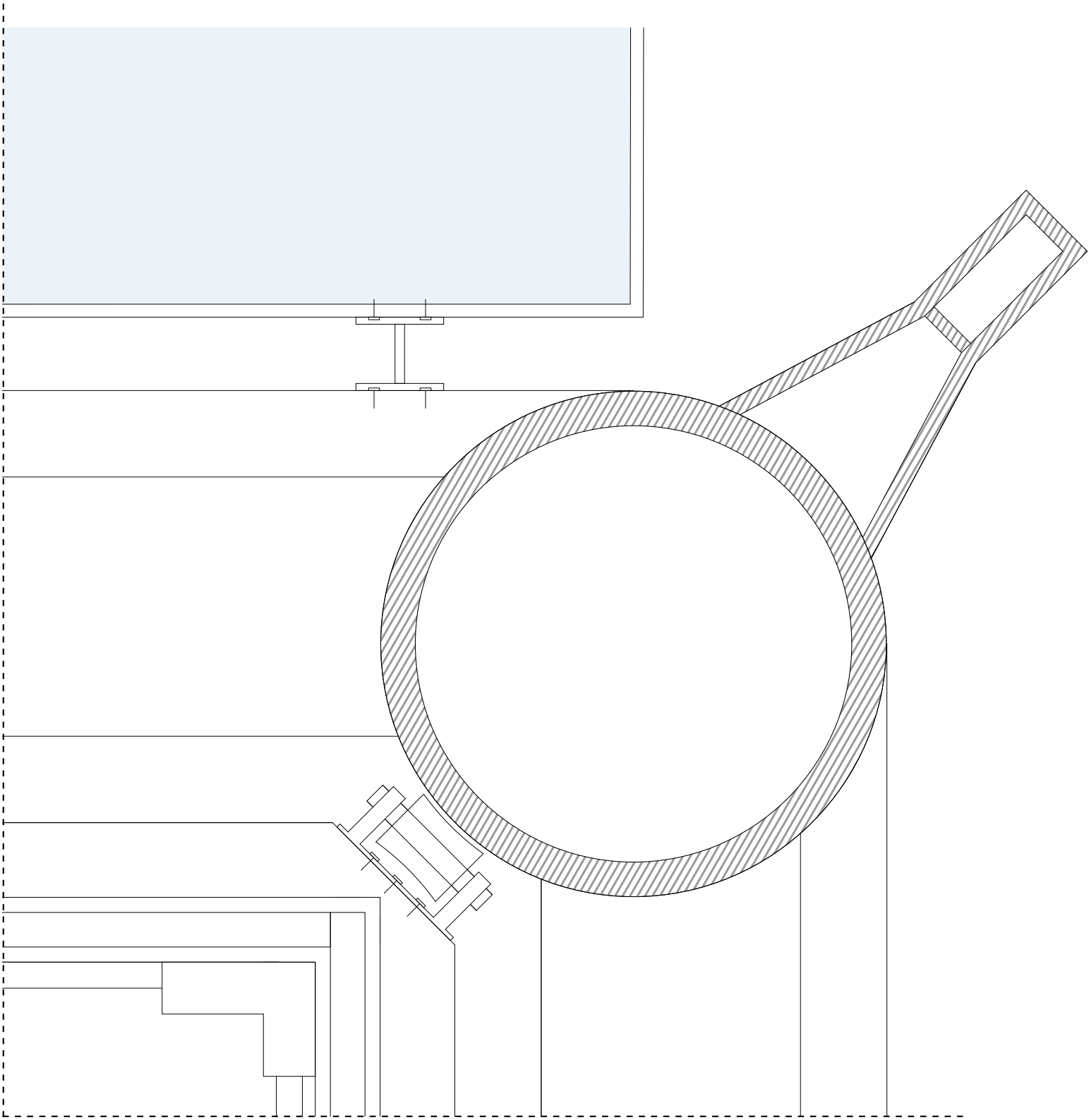


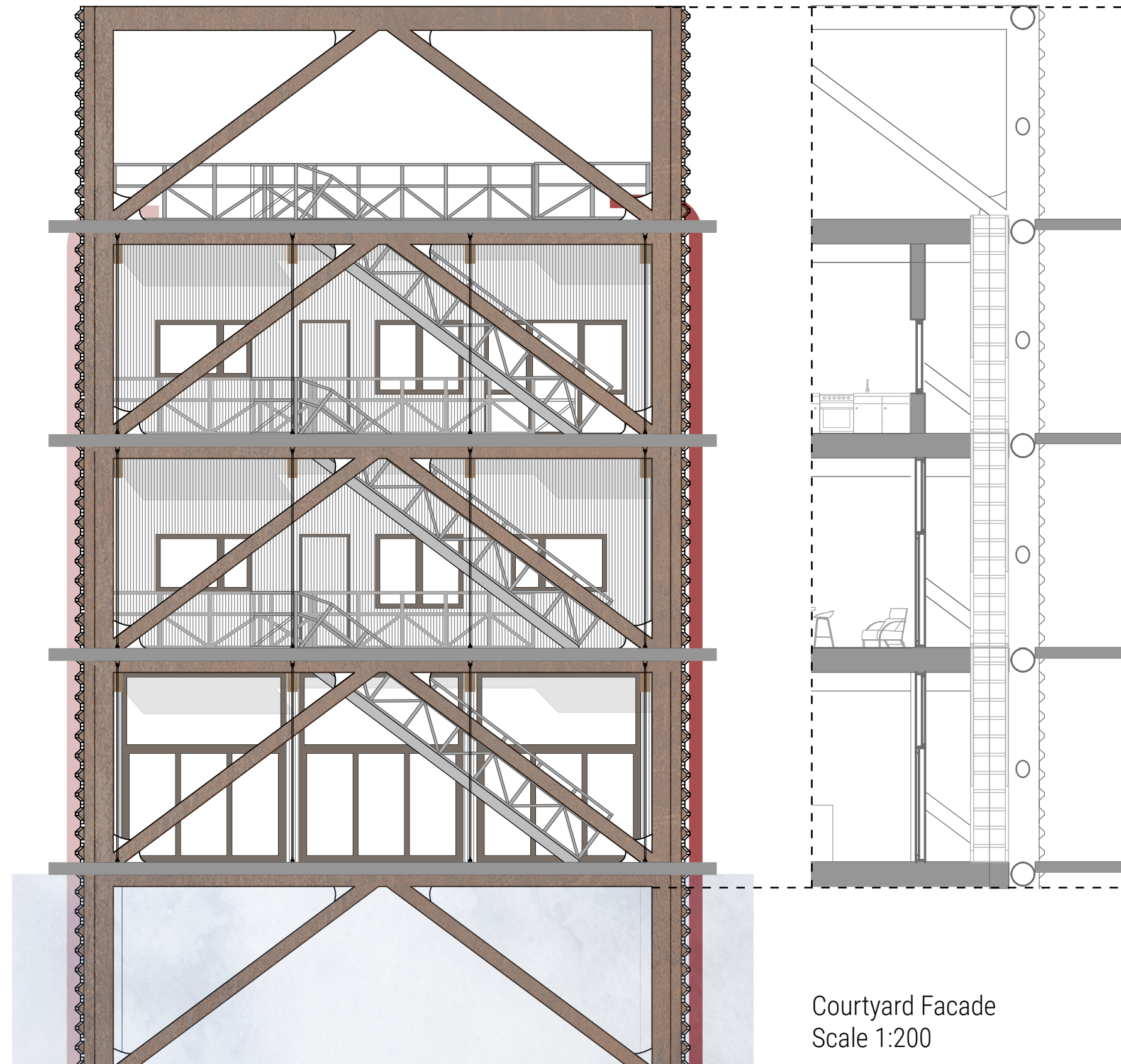
Floating fragment
Scale 1:20

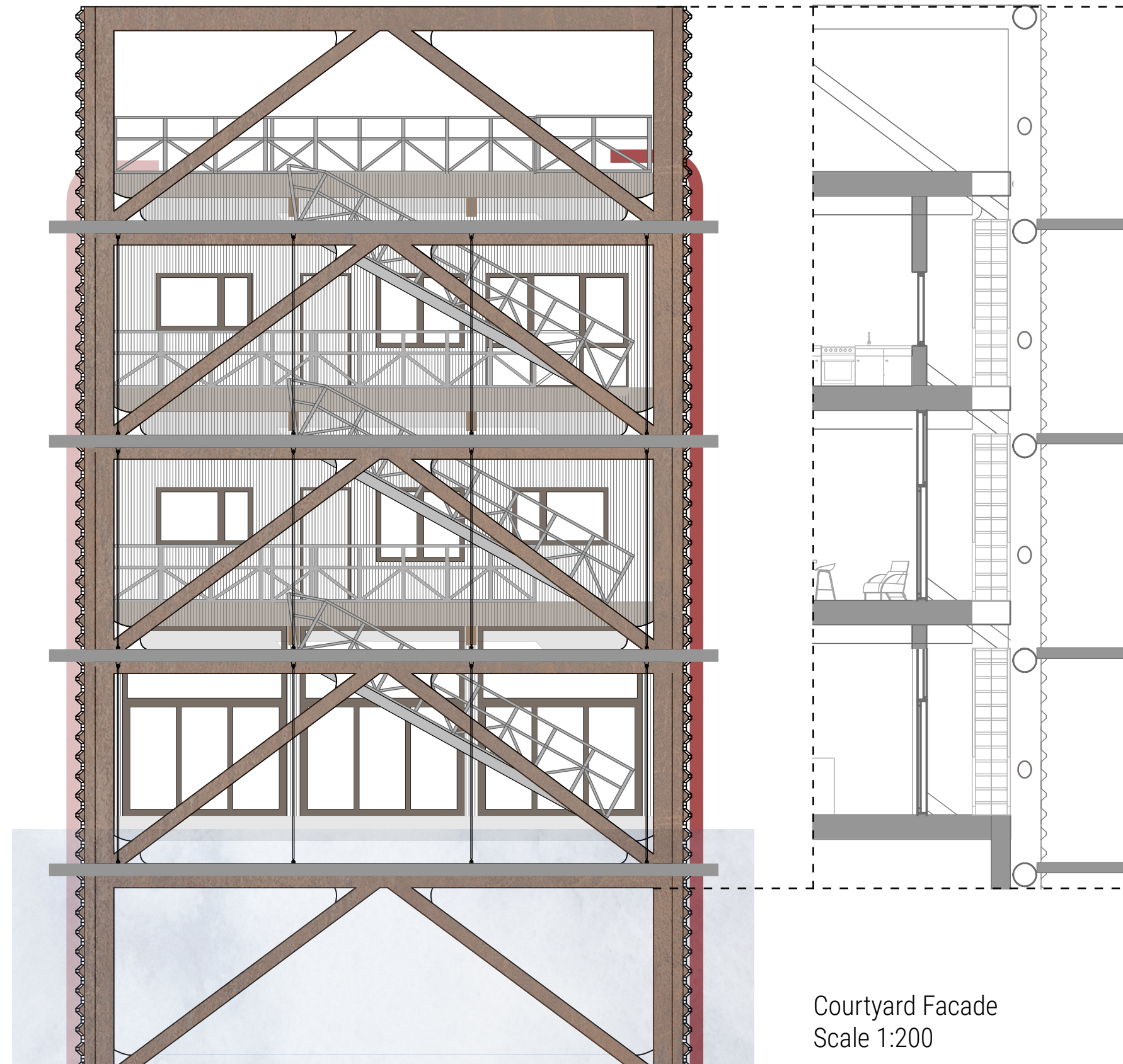
Detail basement

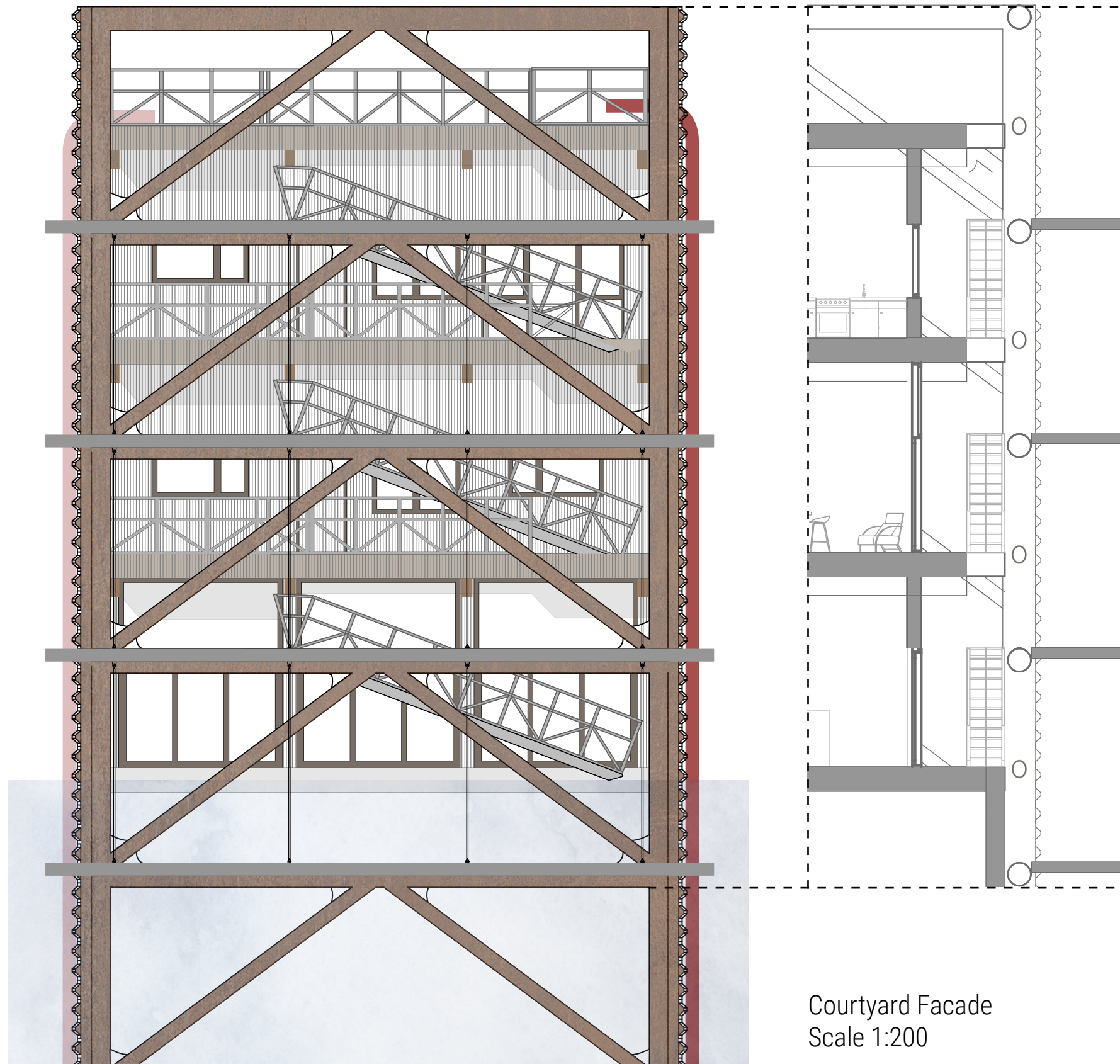


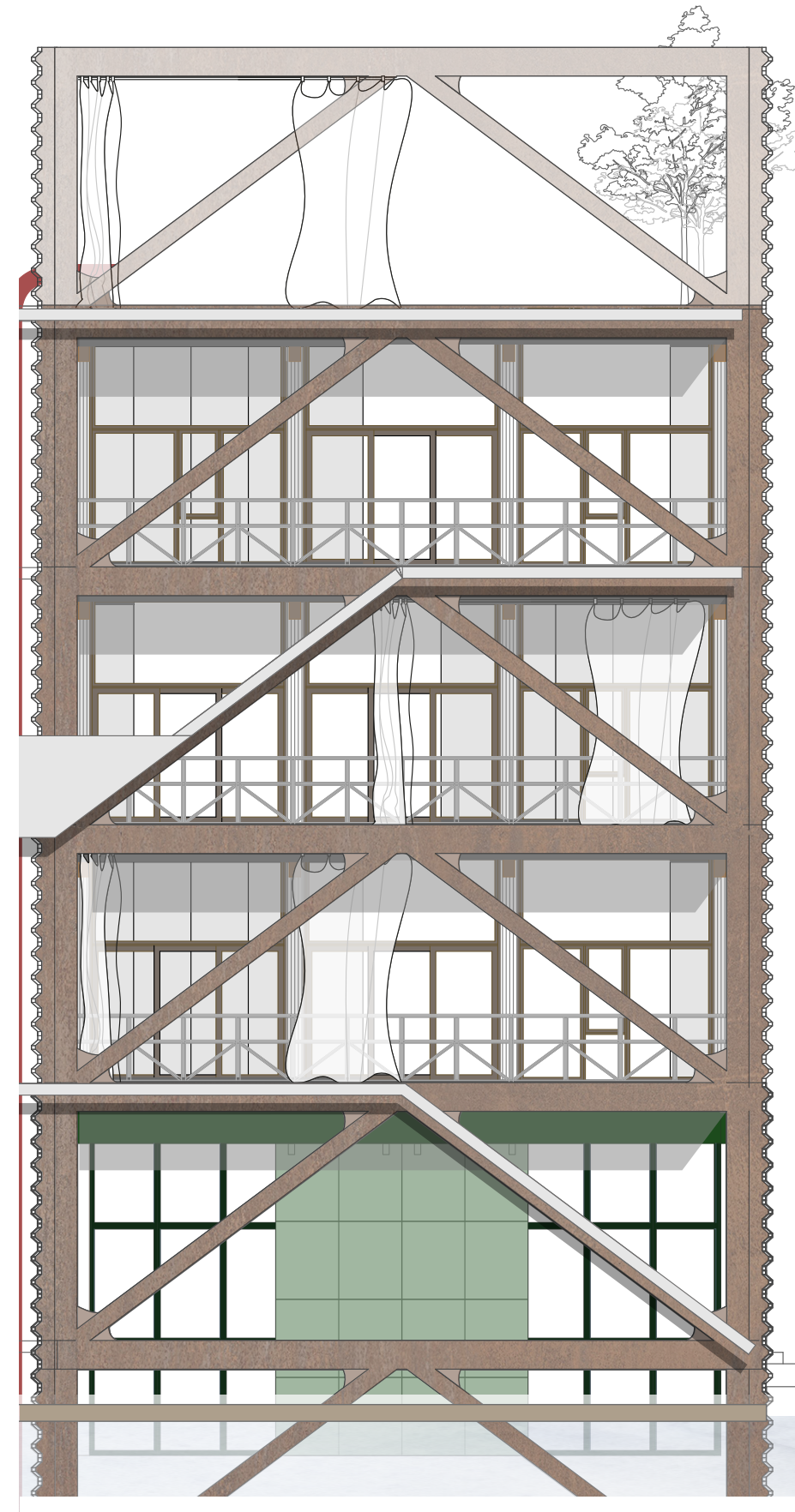
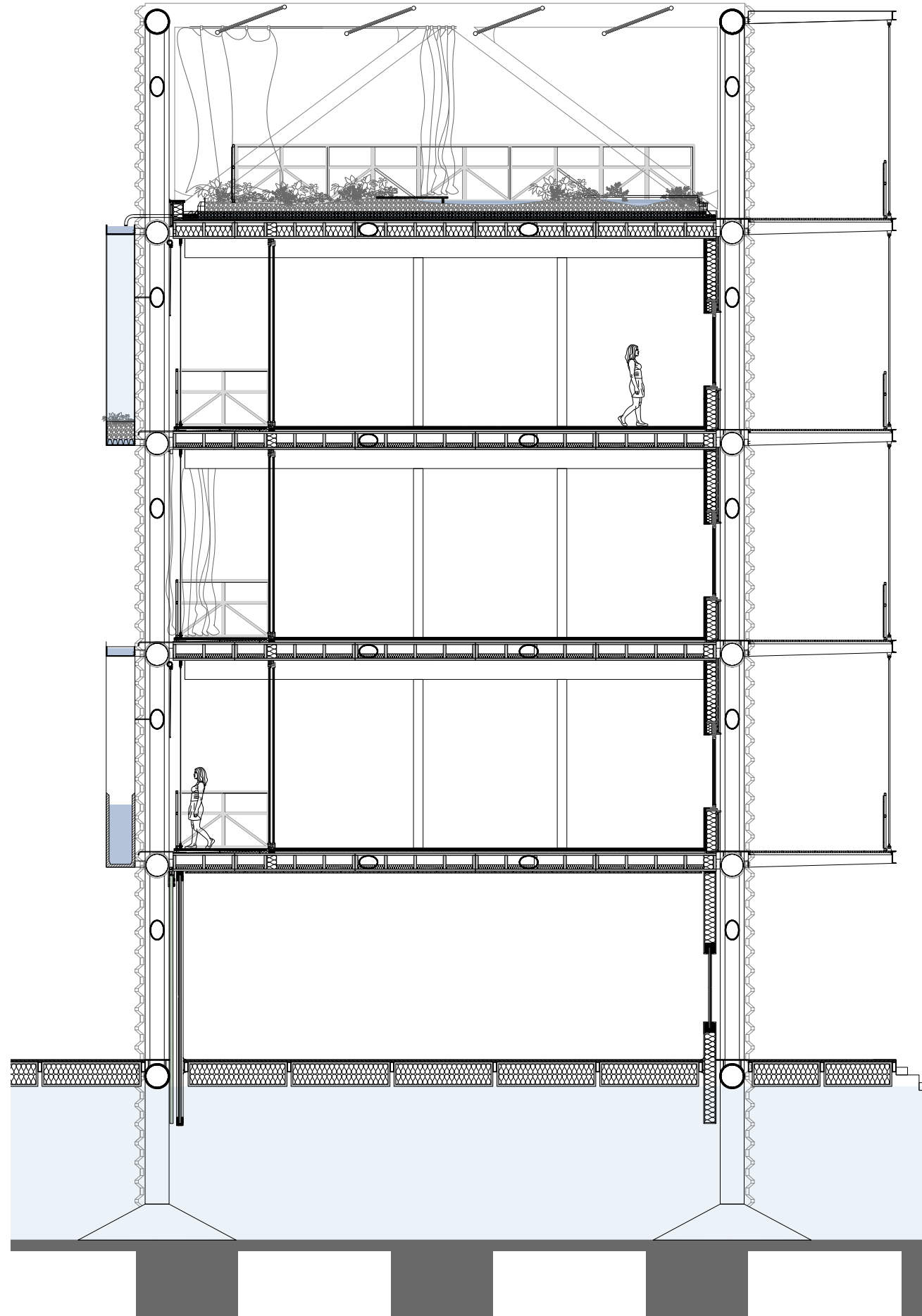
Horizontal detail



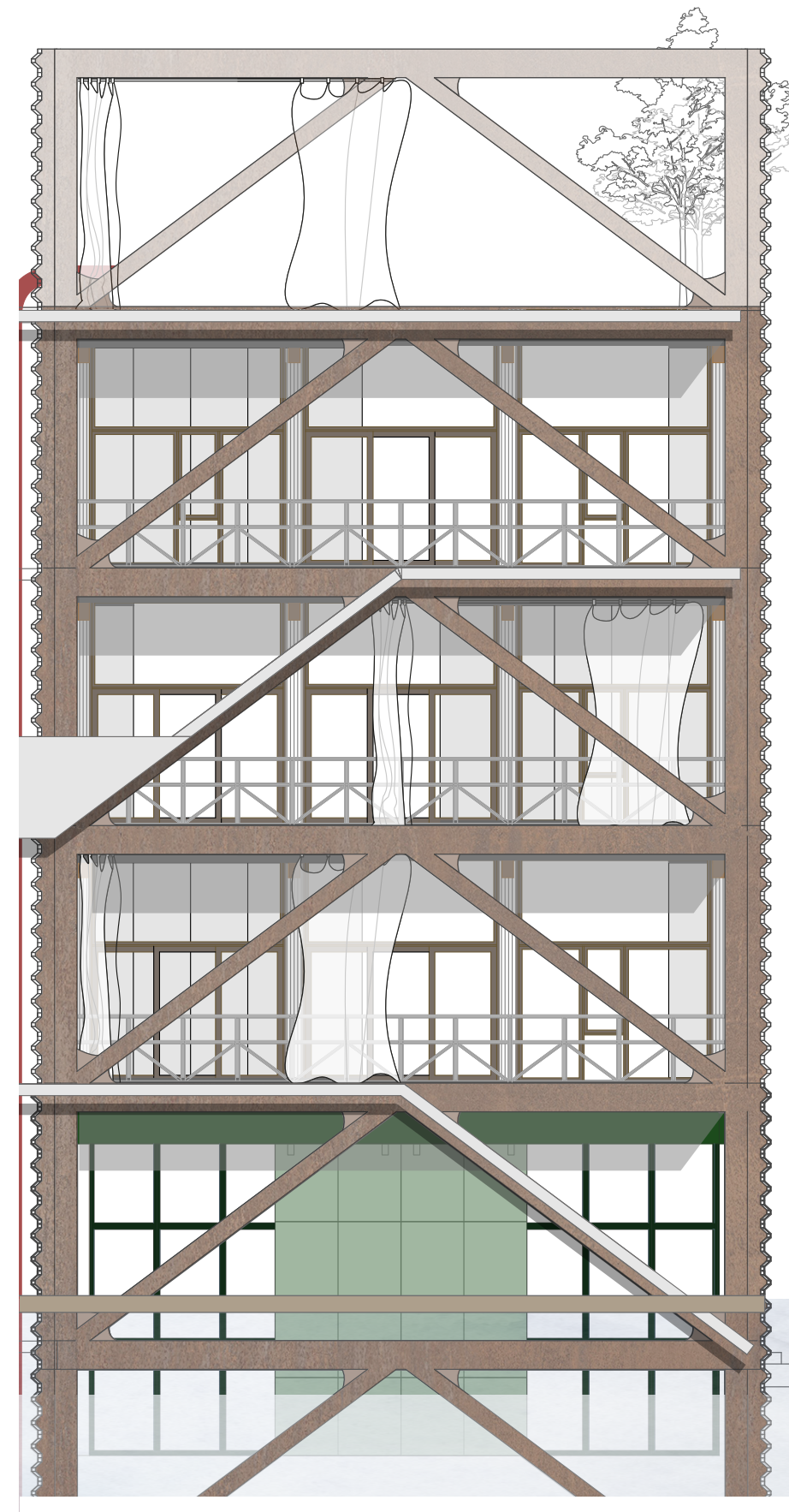
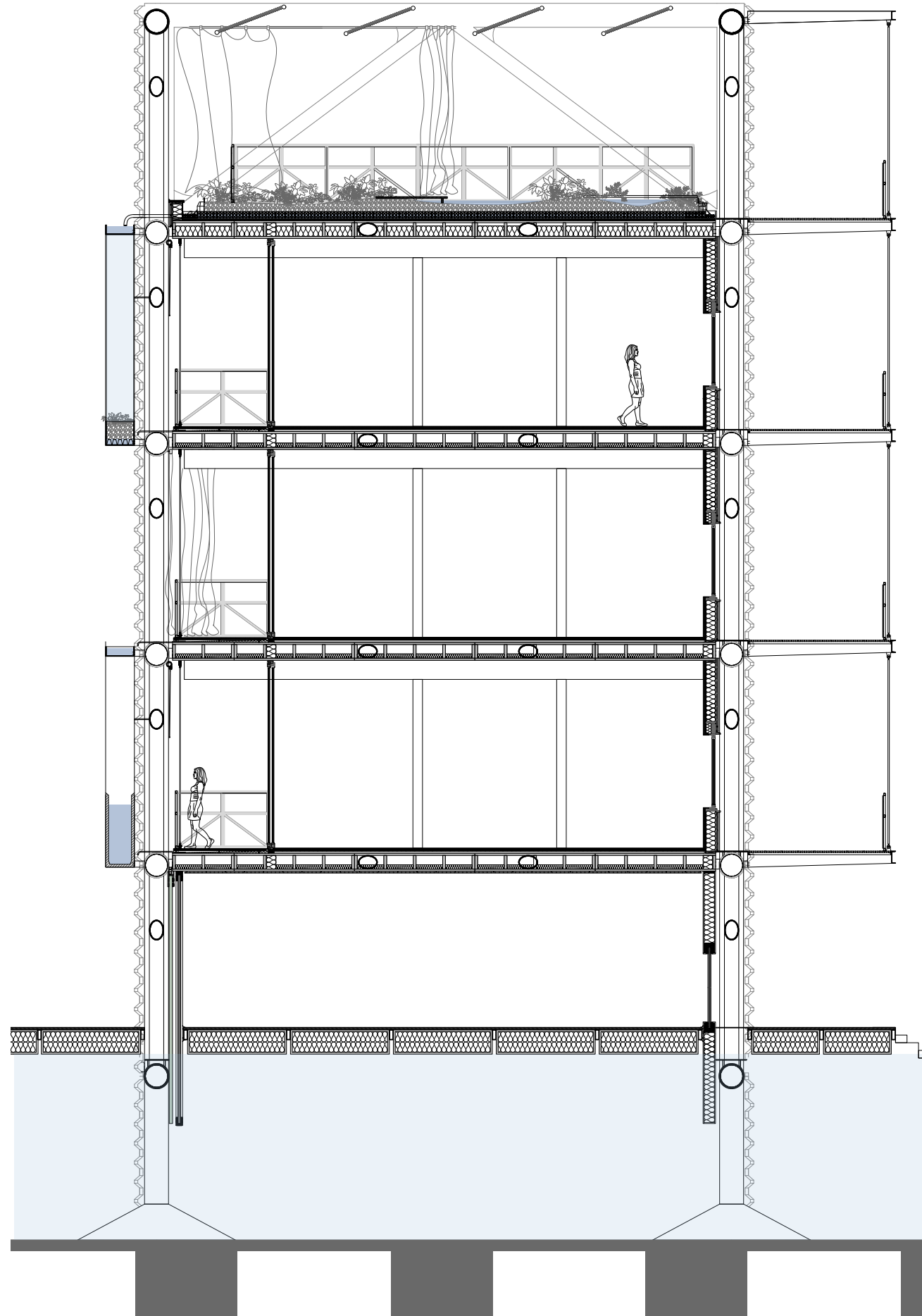








Fragment
Scale 1:20

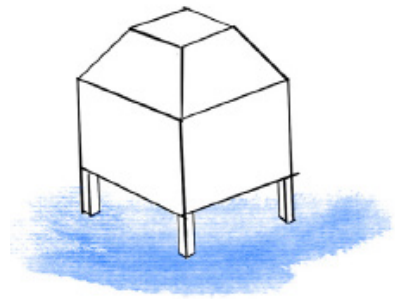


Fragment
Scale 1:20

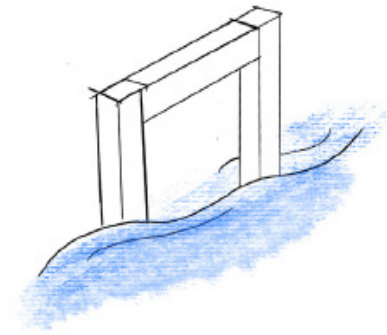




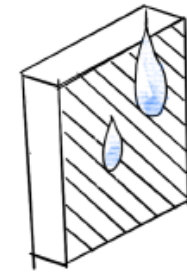
Architectural Engineering



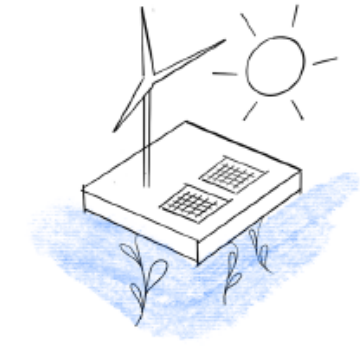
Water typologies



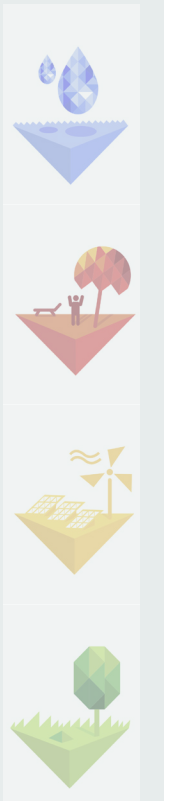
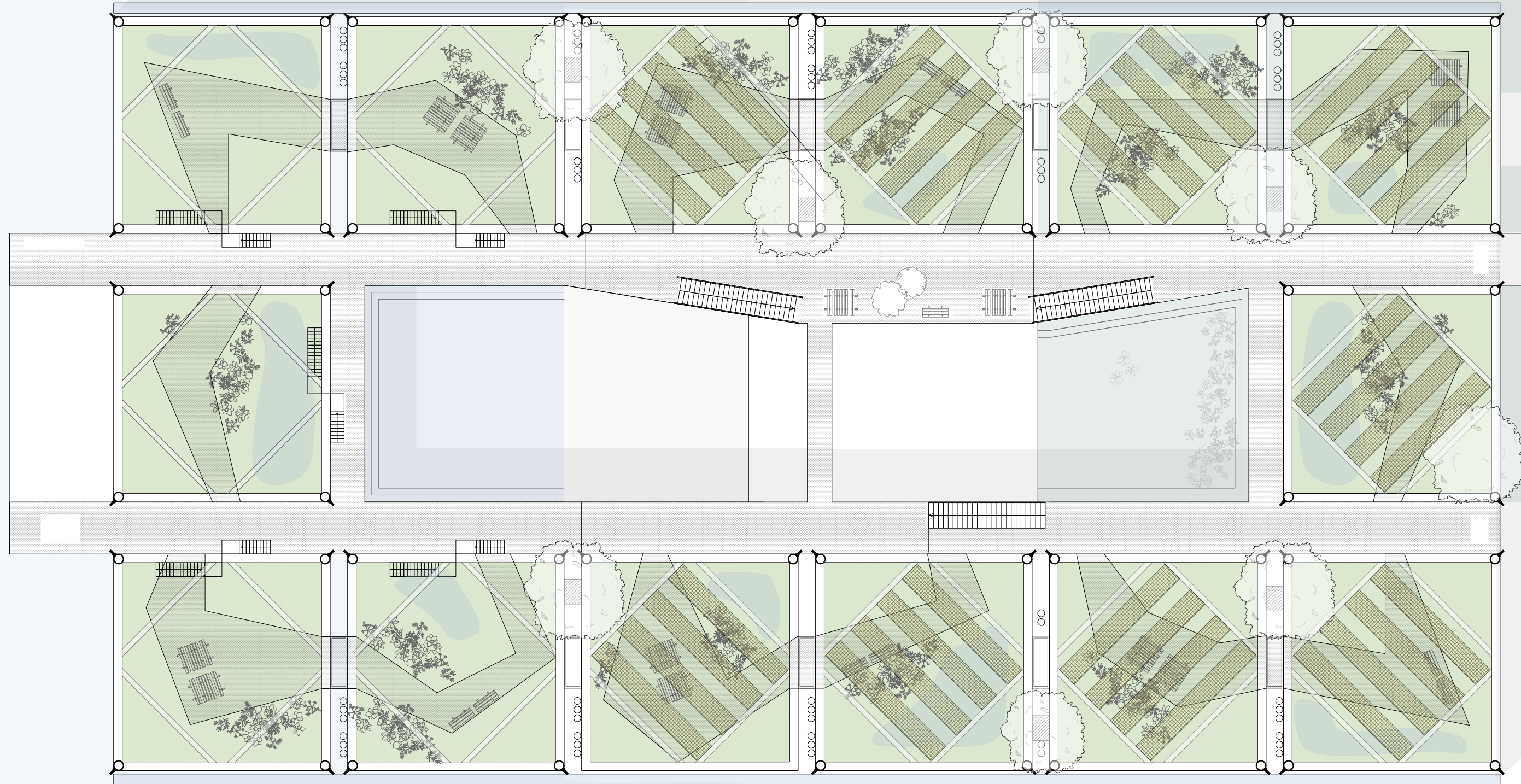
Construction



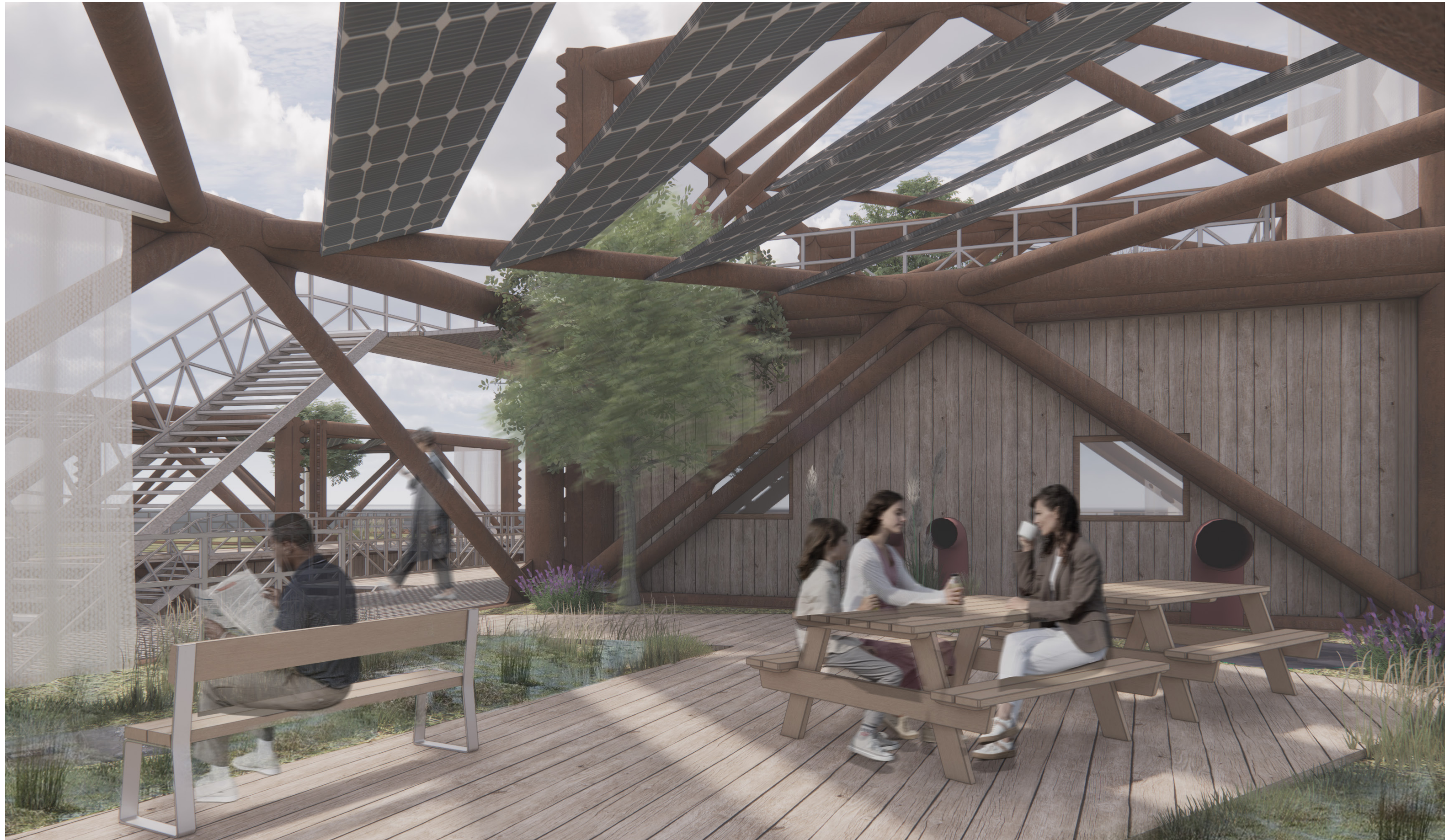
Building materials



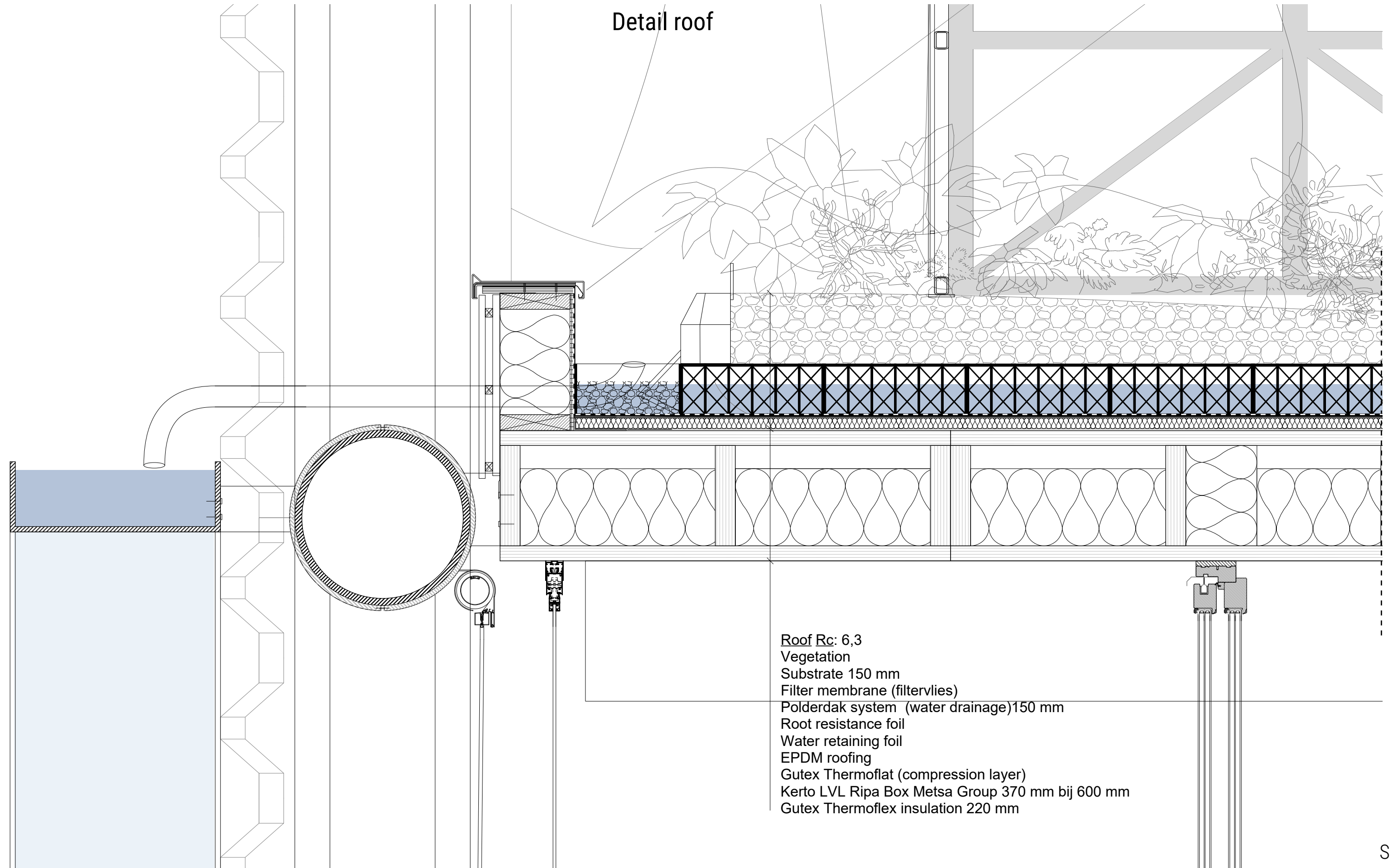
Sustainability



Roofplan
Scale 1:200



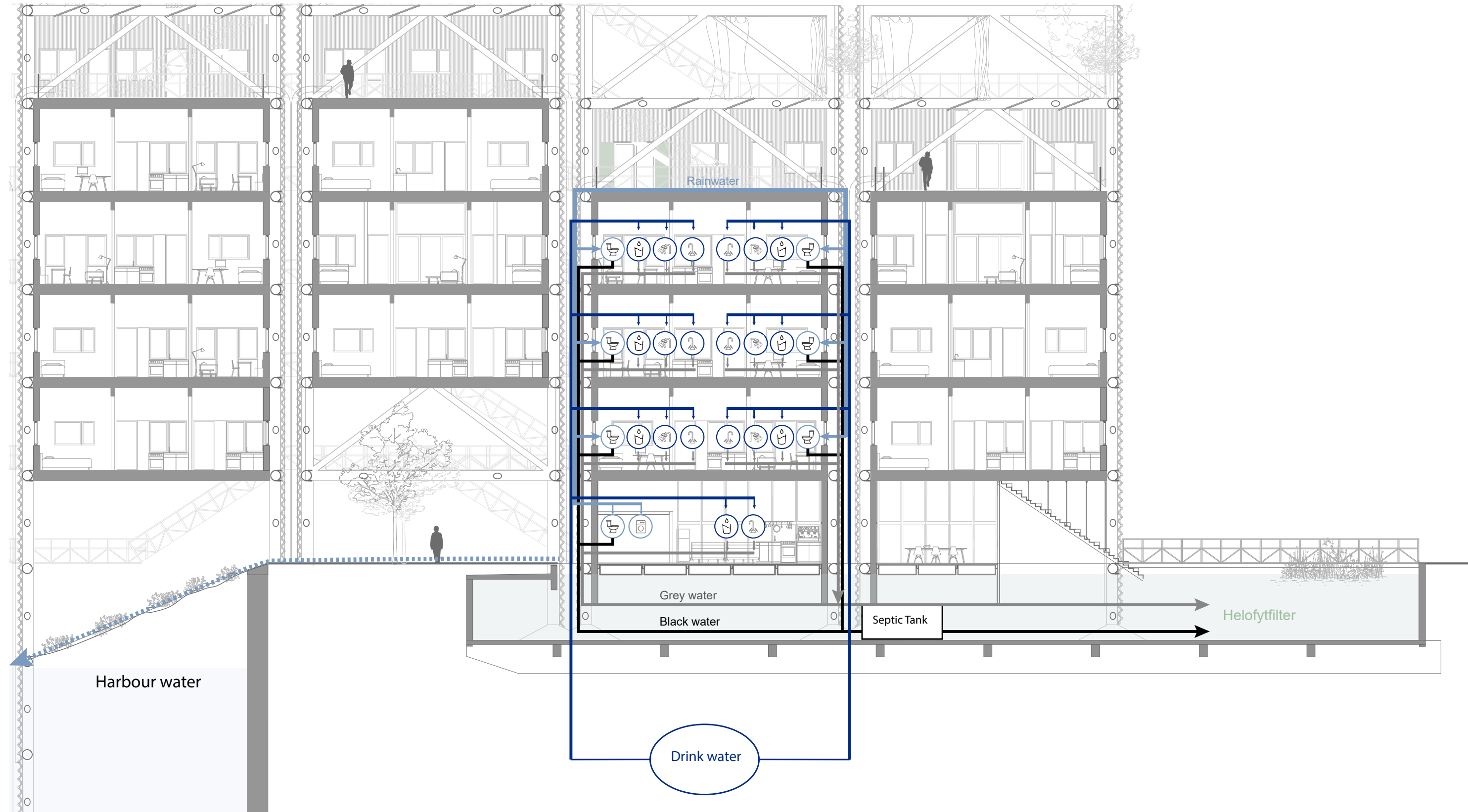
Detail roof



Roof Rc: 6,3
Vegetation
Substrate 150 mm
Filter membrane (filtervlies)
Polderdak system (water drainage) 150 mm
Root resistance foil
Water retaining foil
EPDM roofing
Gutex Thermoflat (compression layer)
Kerto LVL Ripa Box Metsa Group 370 mm bij 600 mm
Gutex Thermoflex insulation 220 mm

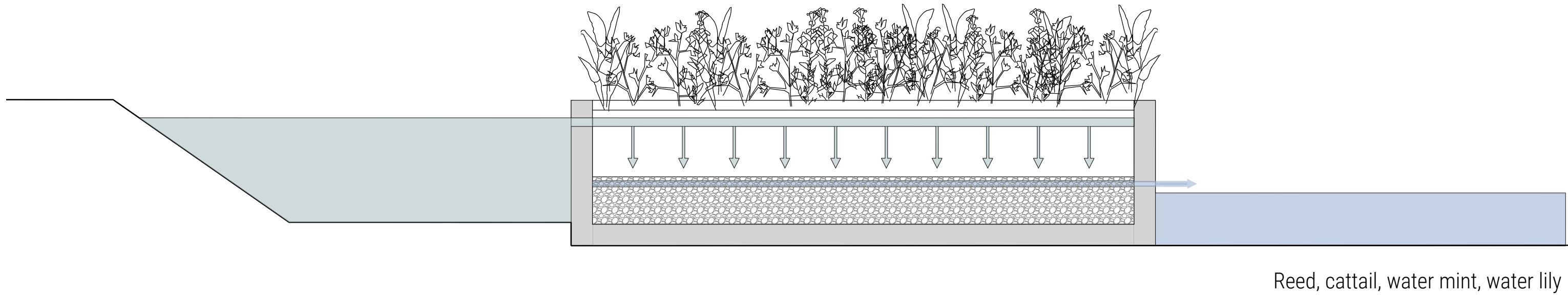
Scale 1:5

Water system





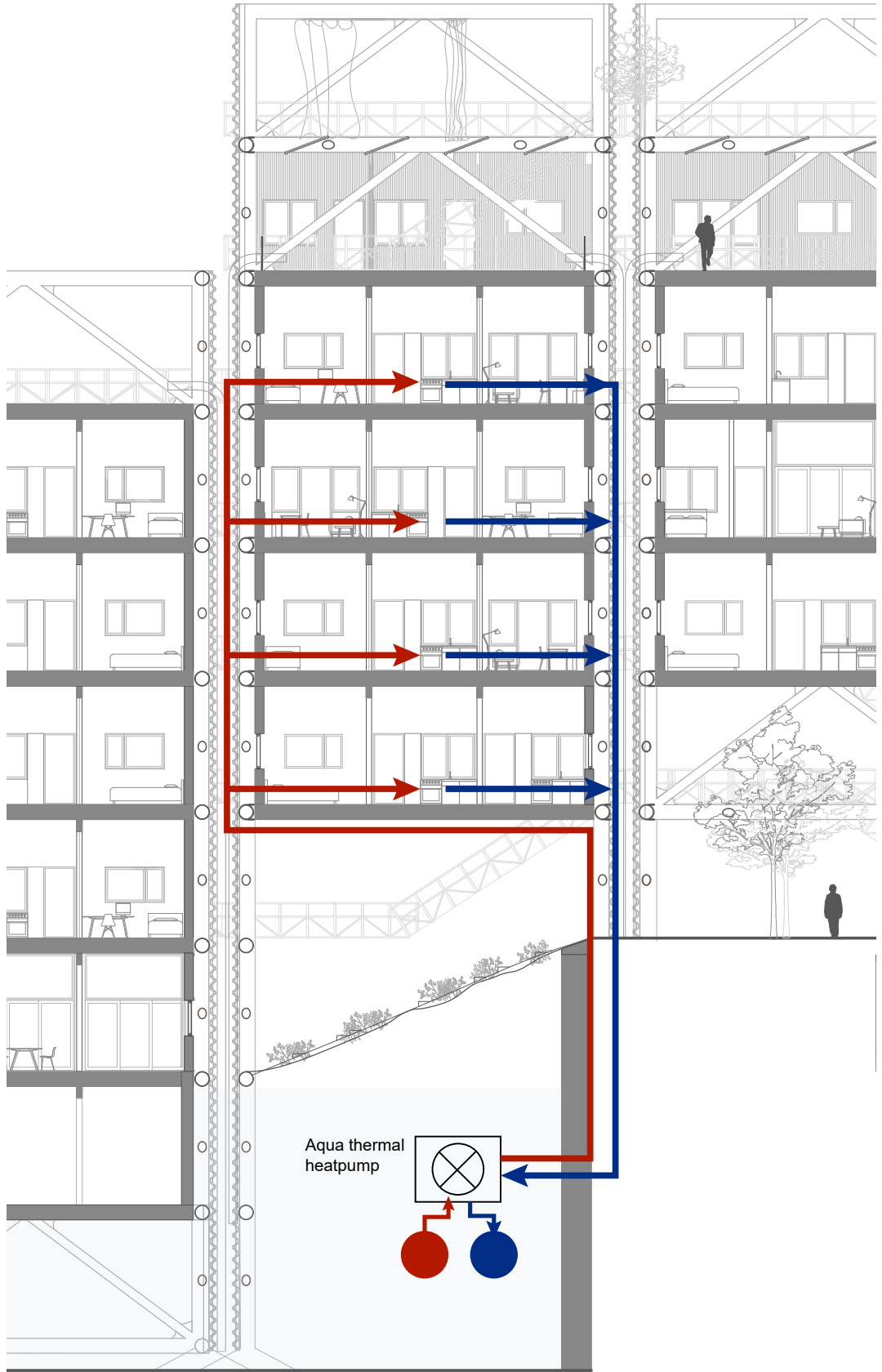
Helophyte filter



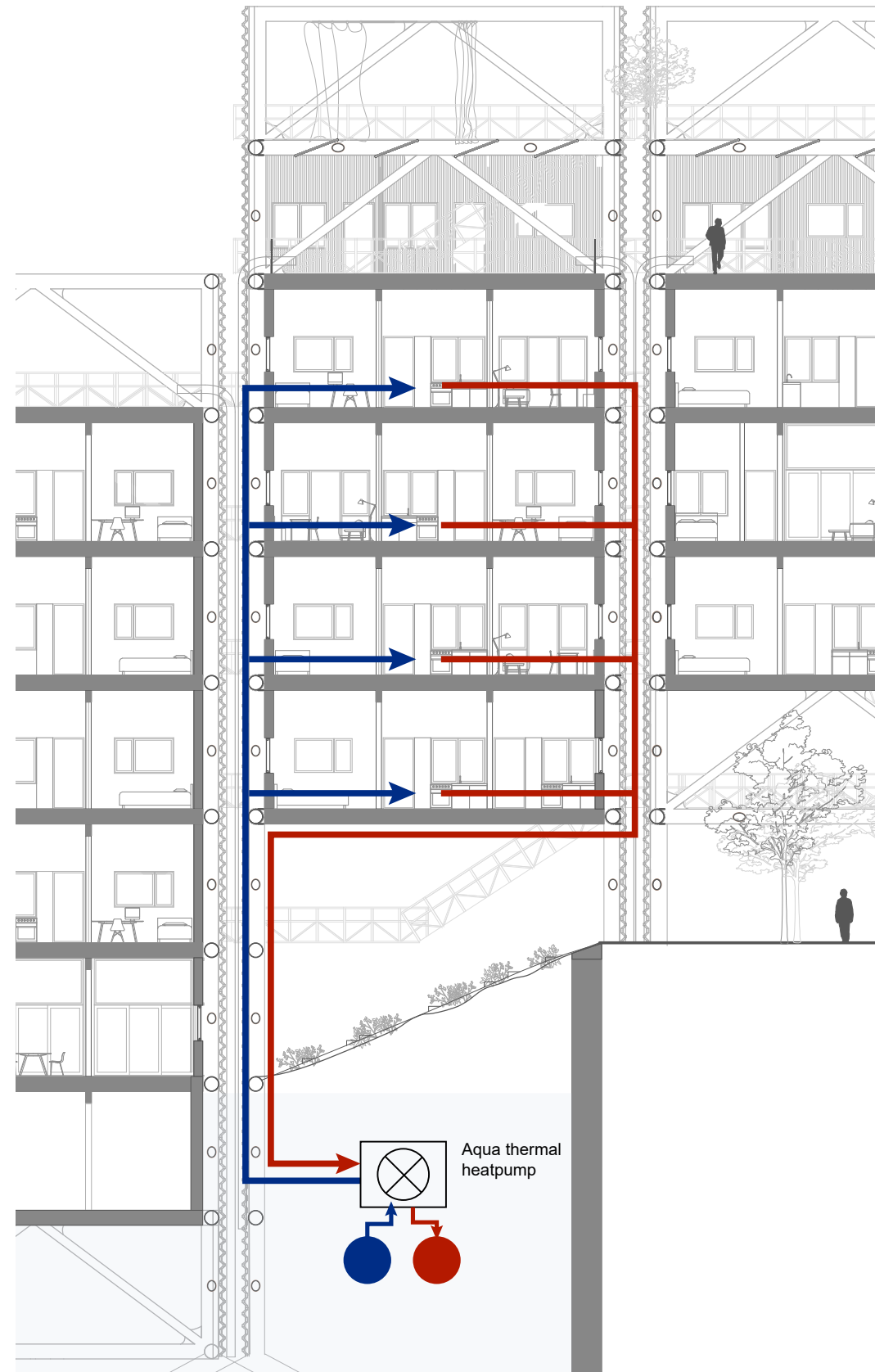
Masterplan Merwehaven



Winter heating

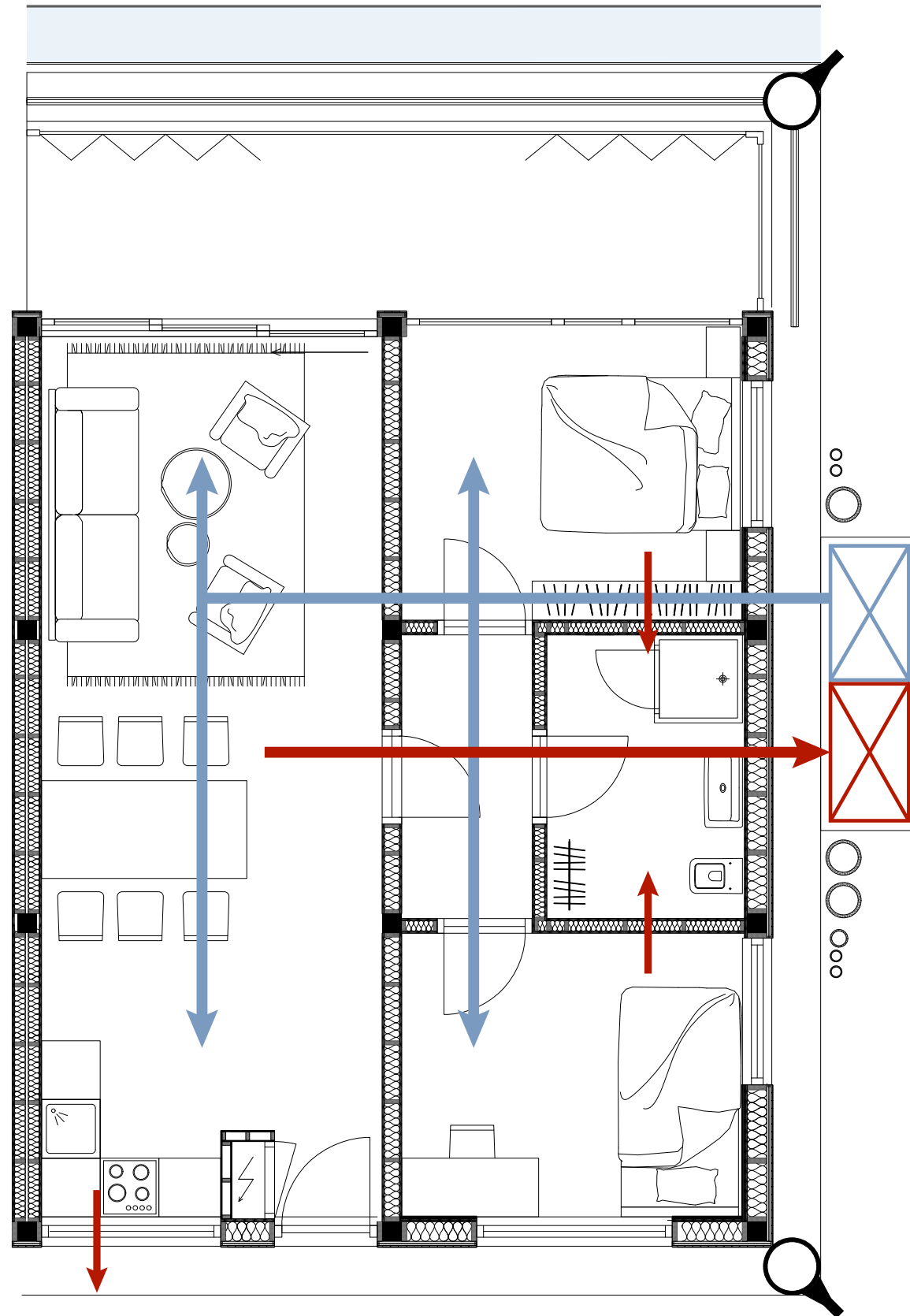


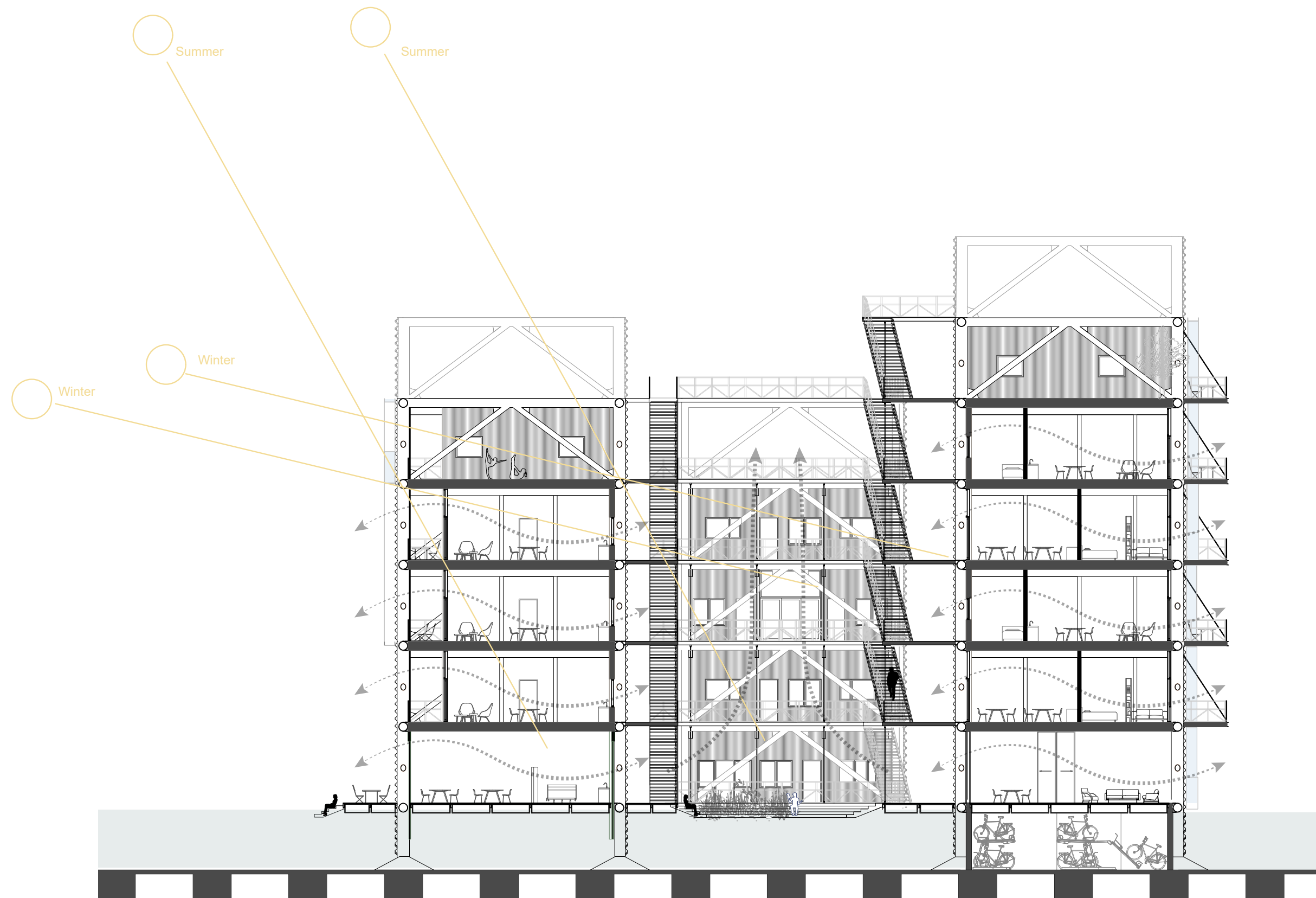
Summer cooling



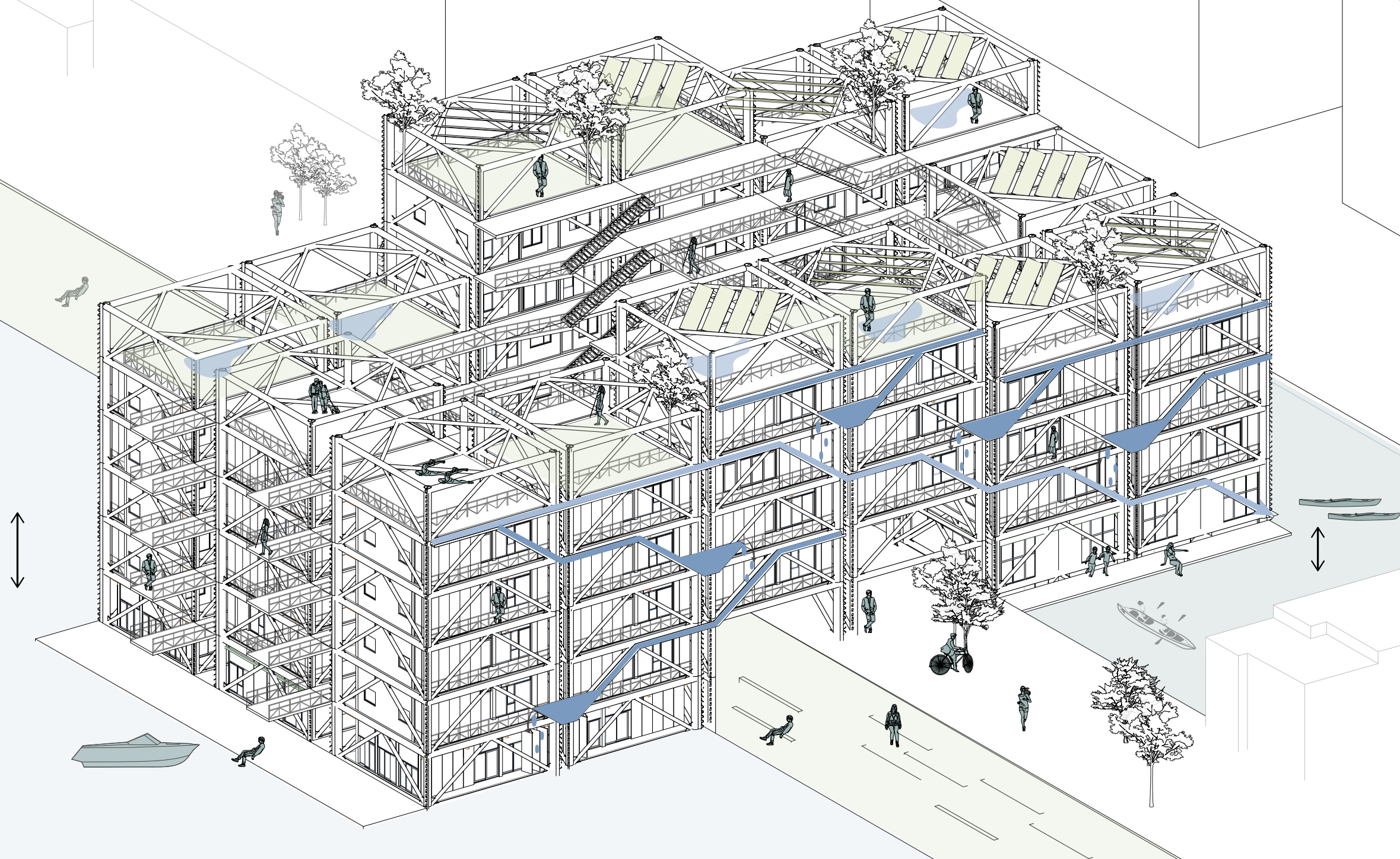
Ventilation



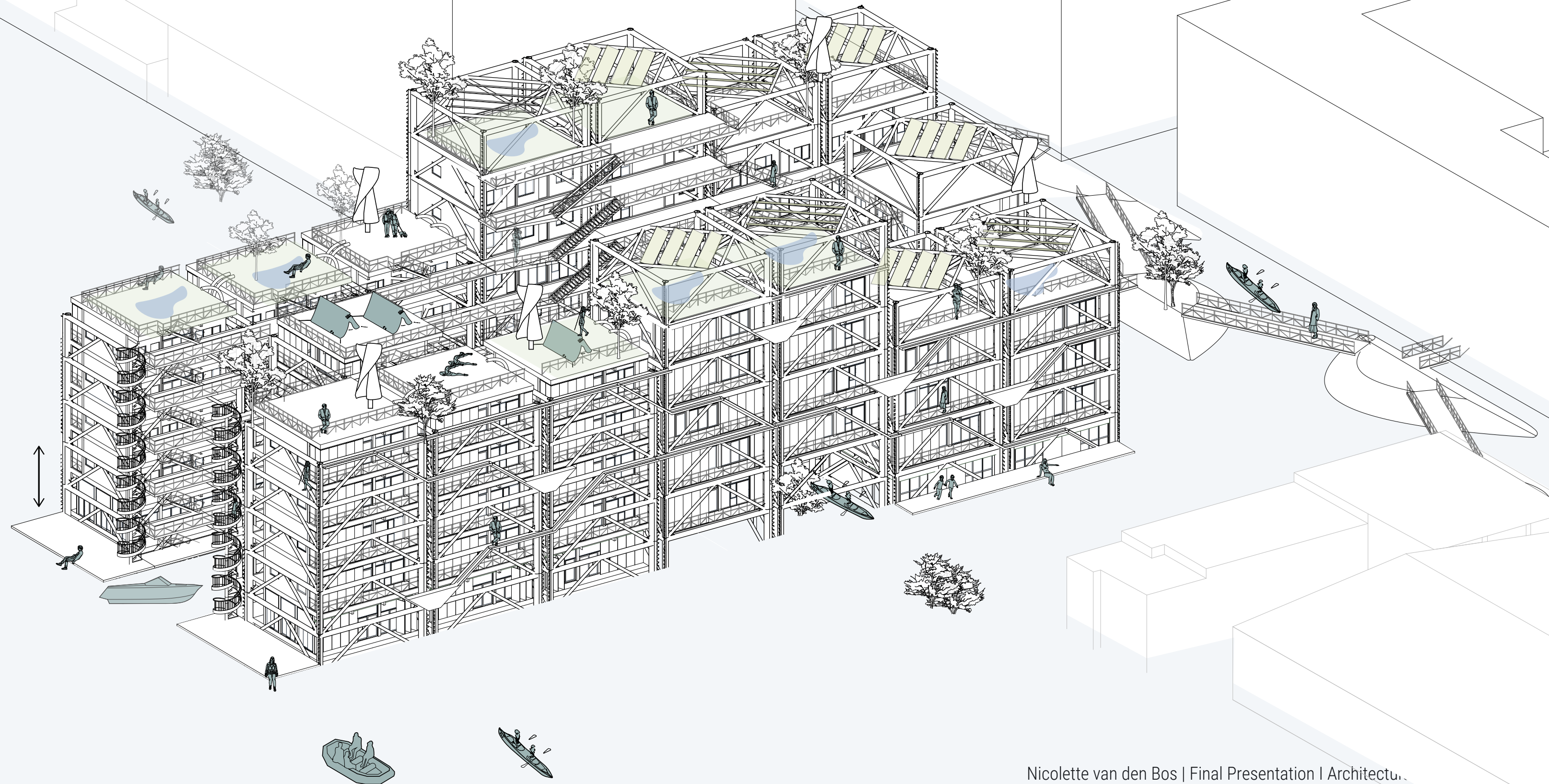


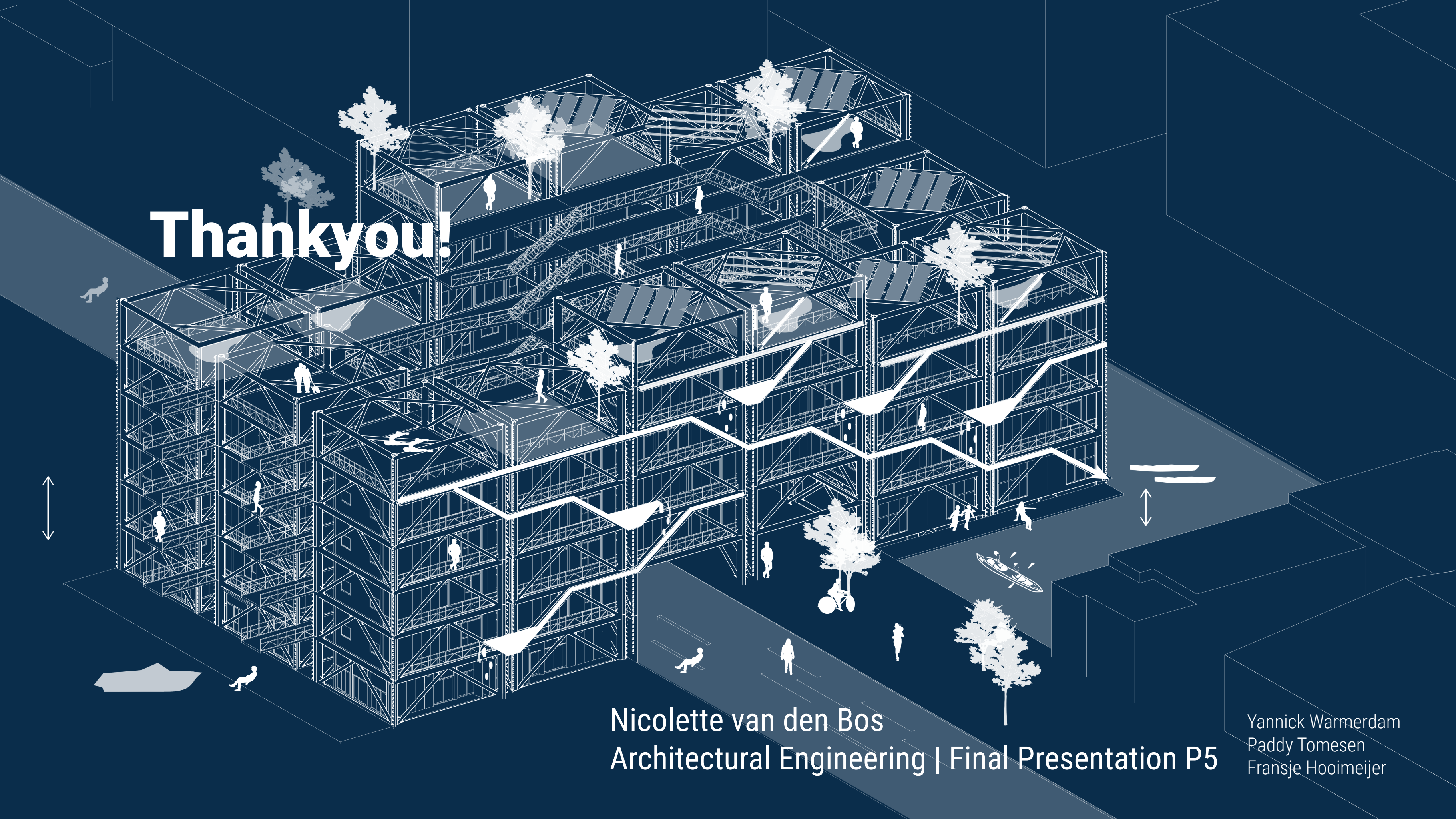


Living with water 2025



Living with water 2125





Thankyou!

Nicolette van den Bos
Architectural Engineering | Final Presentation P5

Yannick Warmerdam
Paddy Tomesen
Fransje Hooimeijer