

Flooding Noordereiland

A systematic approach to alter the performance of the urban block responding to the extreme circumstances of flooding

Building Technology Report

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A Systematic Approach to alter the Performance of the Urban Block responding to the Extreme Circumstances of Flooding

Building Technology Report

Philipp Wenzl

*Transitional Territories Graduation Studio
North Sea Landscapes of Coexistence
Altered Natures and the Architecture of Extremes*

09/07/2019

Under Supervision of:

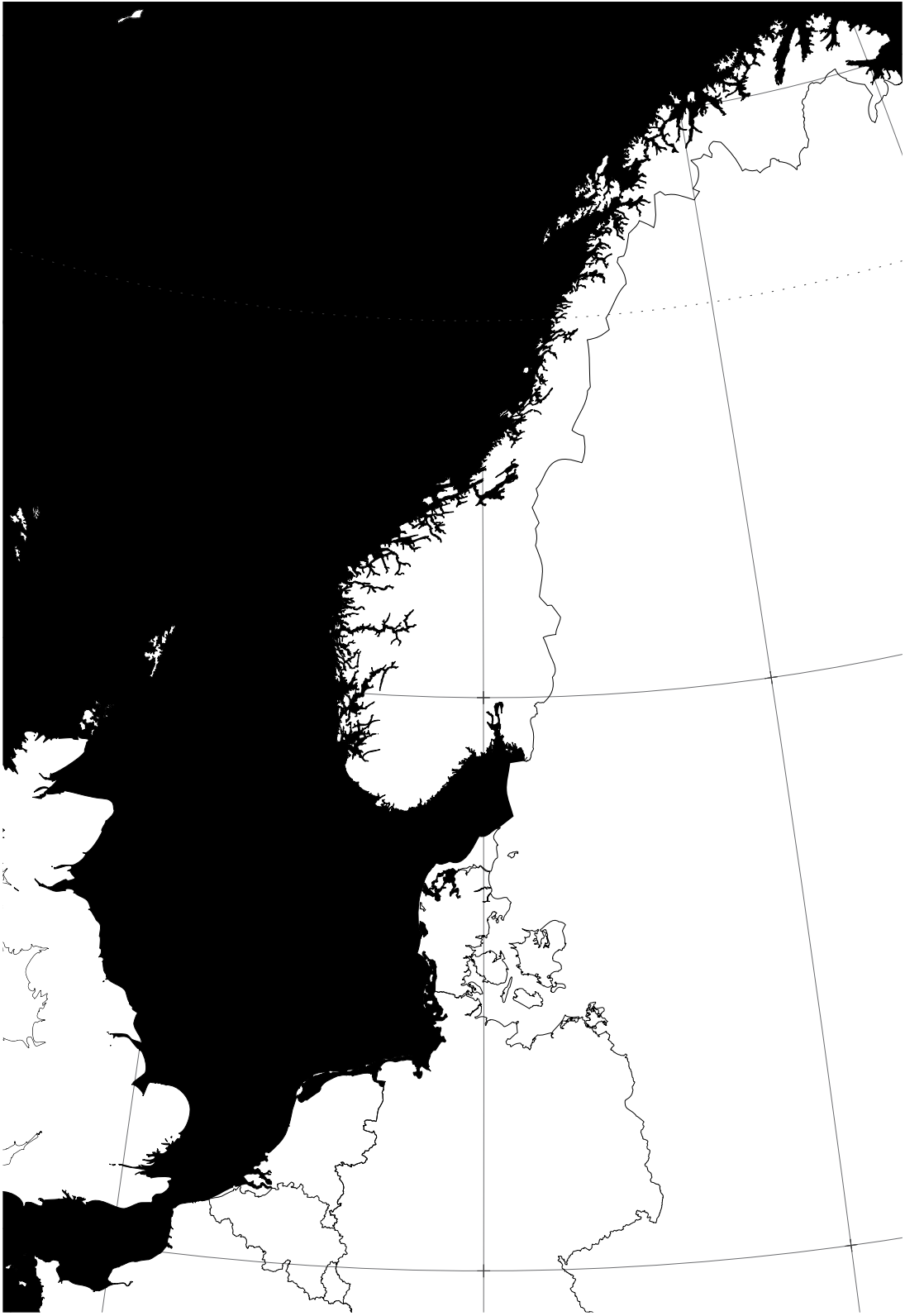
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The Studio Focus: The North Sea Landscapes of Co-Existence



Index

The Concept
Plans
Structure
Construction Details
Climate
Materialisation

Noordereiland



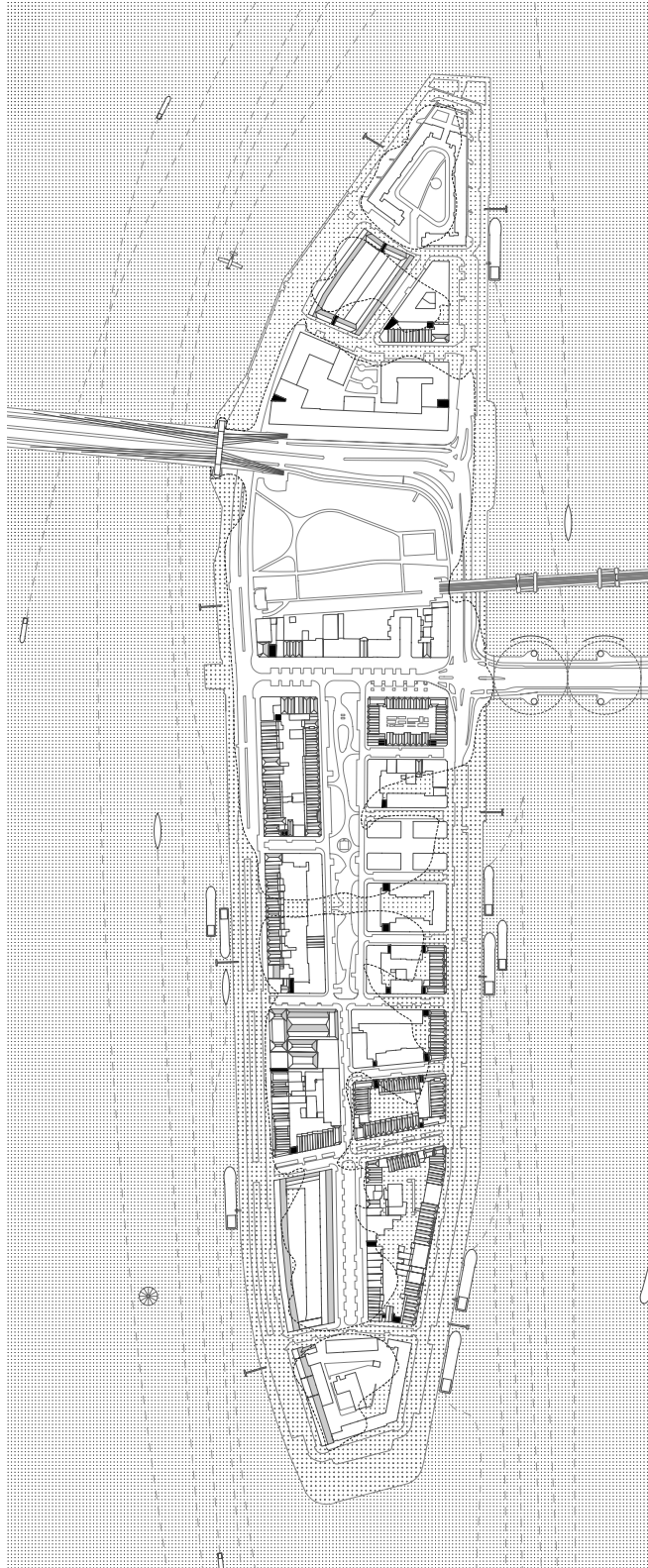


The Concept

“Weak Spots”

The mapped locations map the point of intervention of the project. They build the interface between the ground level and the new circulation system.

Noordereiland Site Plan



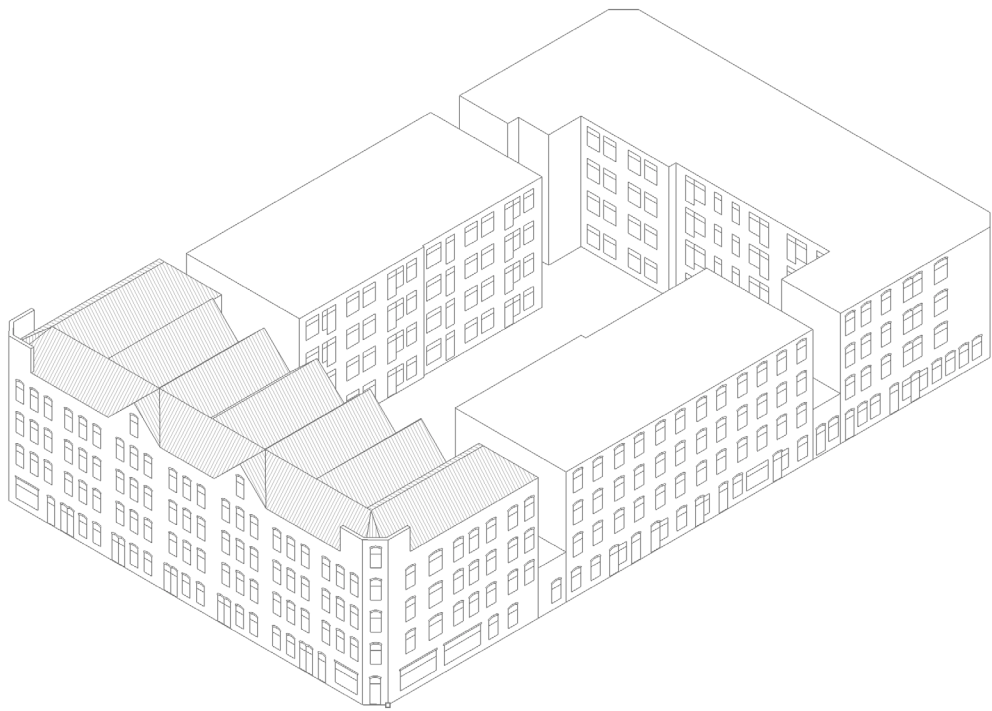
Elevations of the indentified
“Weak Spots”



The experimental Block

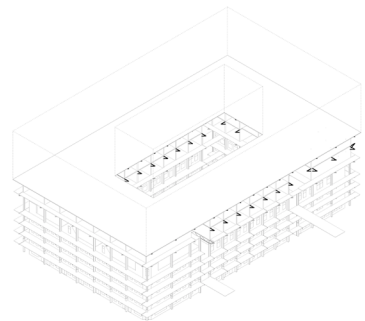
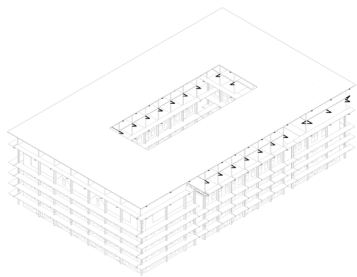
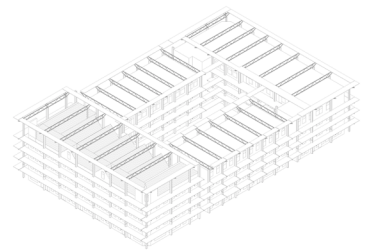
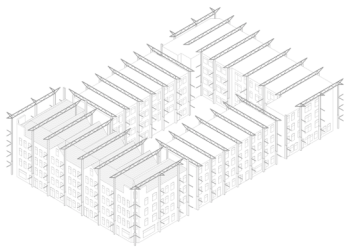
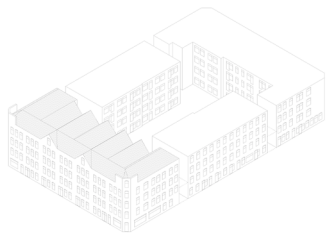
I chose this particular block to develop my strategy for my structural and technical system

Existing Block Axonometric View

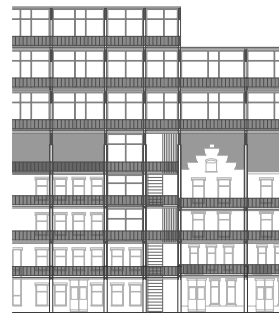


The Sequence of Transformation

1. The existing Block - weak spots identified
2. The compromised accessibility
3. The lost ground floor
4. The interface - the initiation of a centralised circulation system
5. The grafting of a circumscribed structural portal system
6. Building a framework for structures on top. Compromising for the lost Ground floor.
7. The grafted structures
8. The connection between the blocks



Elevation of the System arising
out of different Weak Spot
scenarios



Plans

Axonometrics

Floor Plans

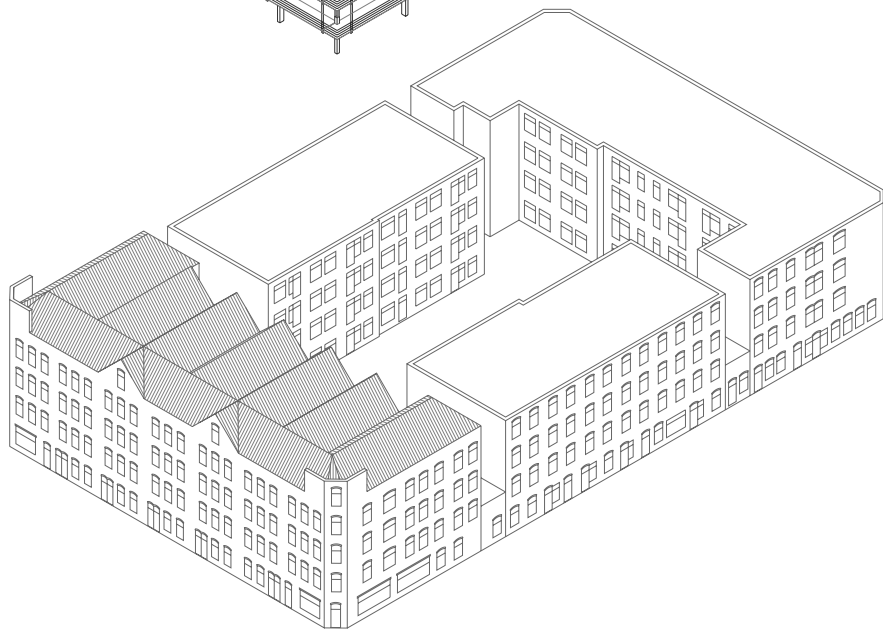
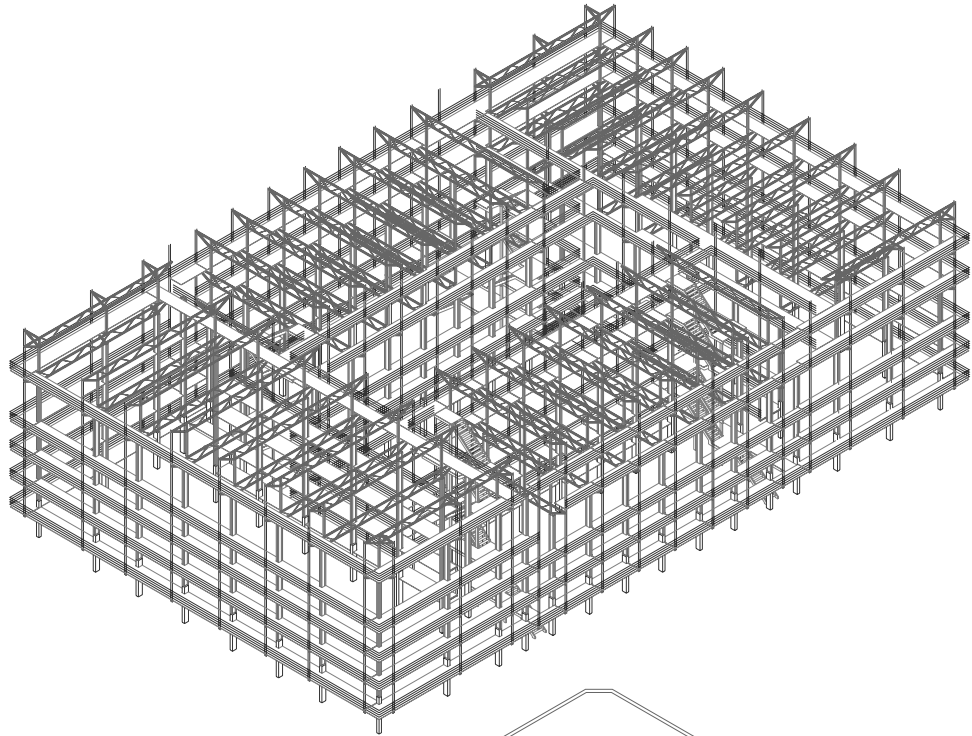
Sections

Apartment Conversion

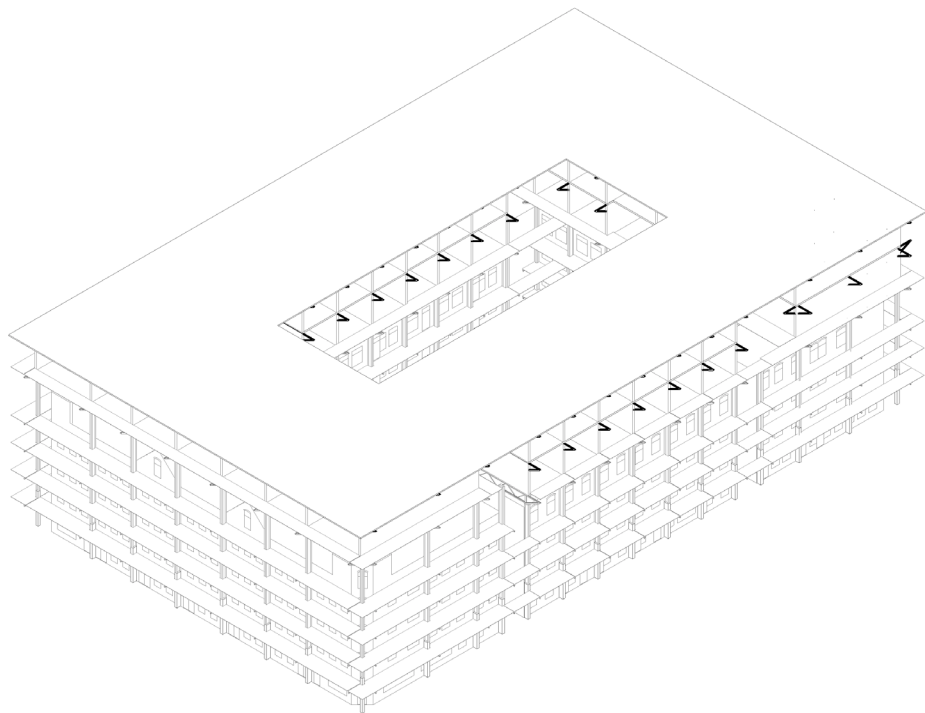
Module Floor Plans

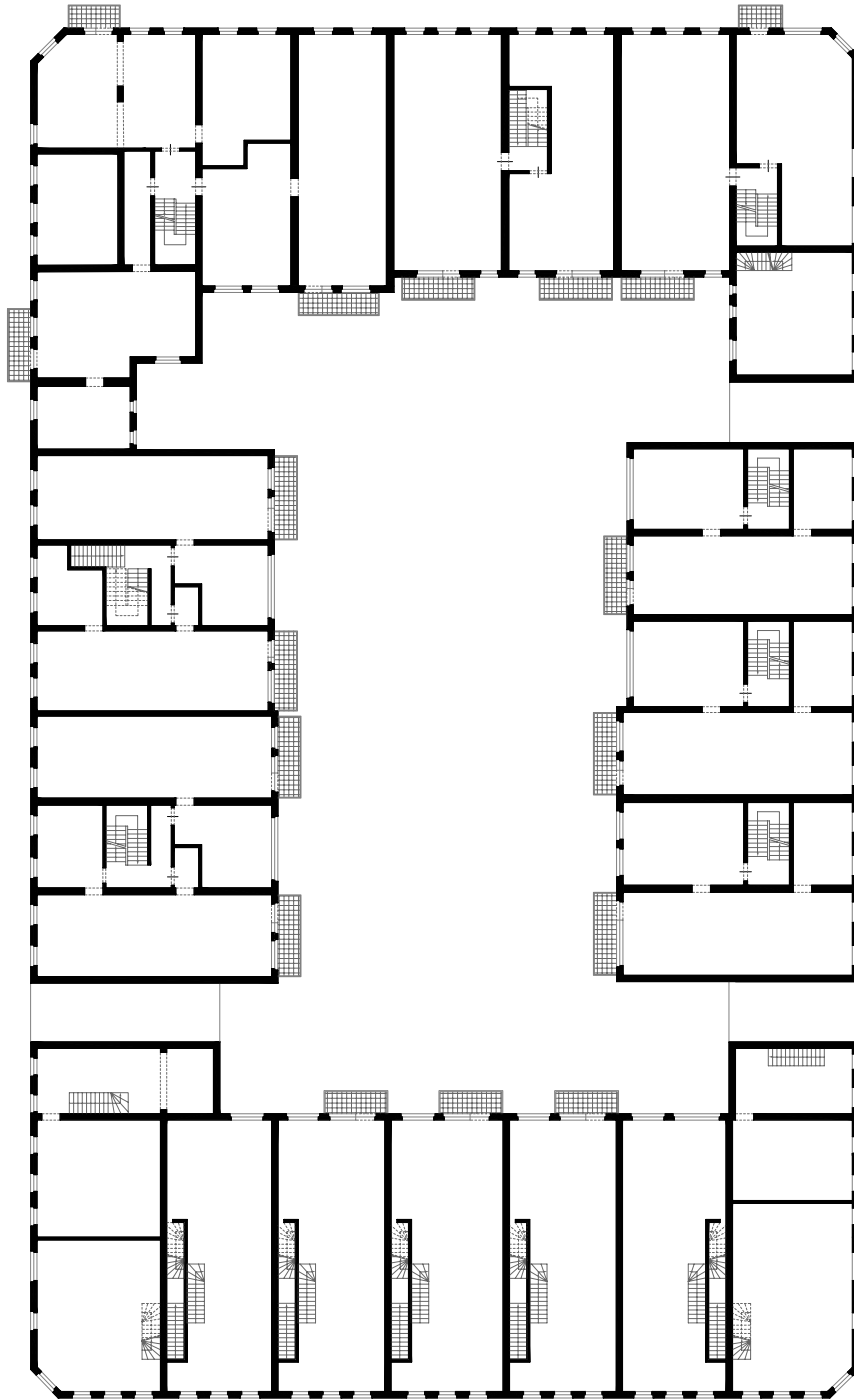
Views

The Grafted Structural System

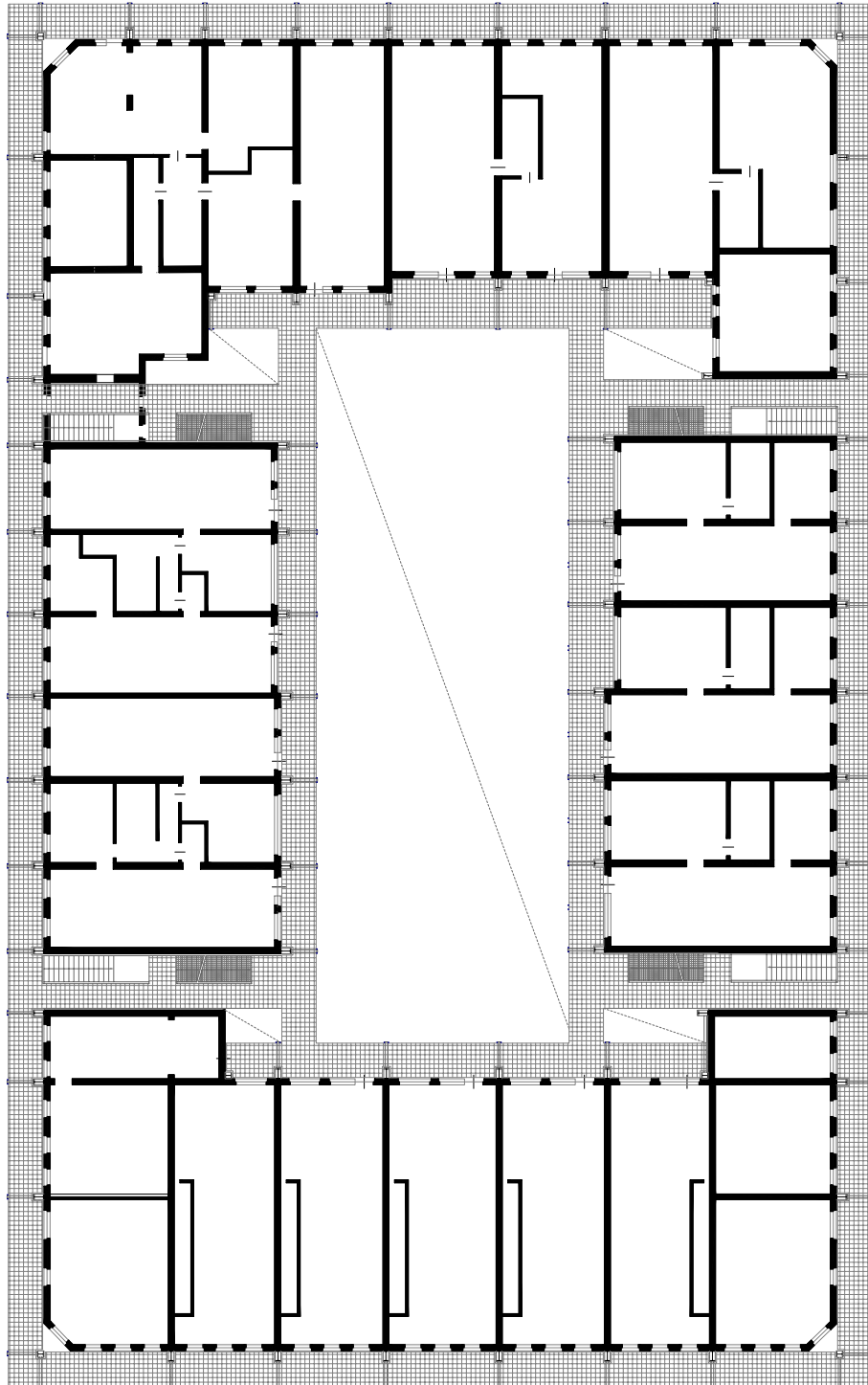


Impression of the Superimposition

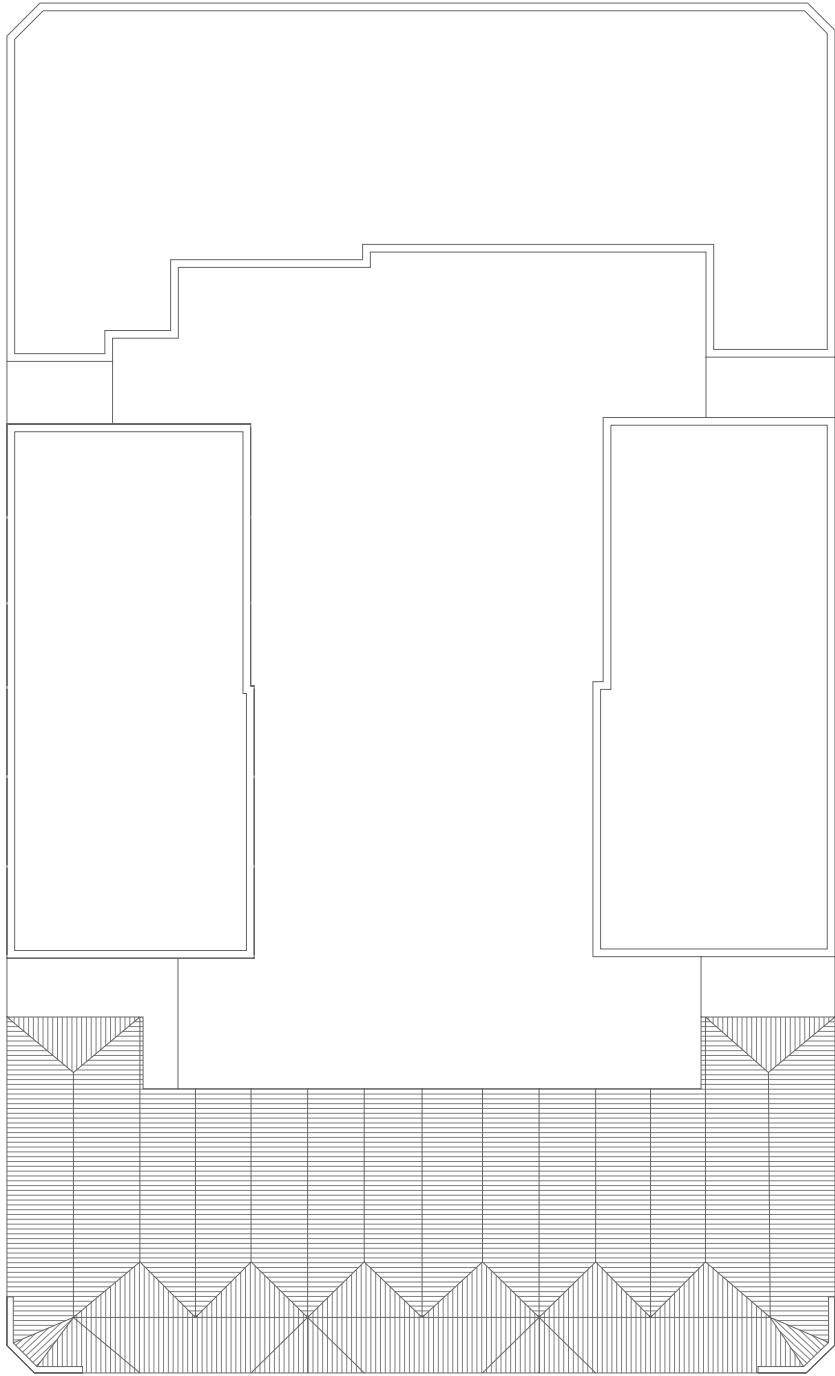




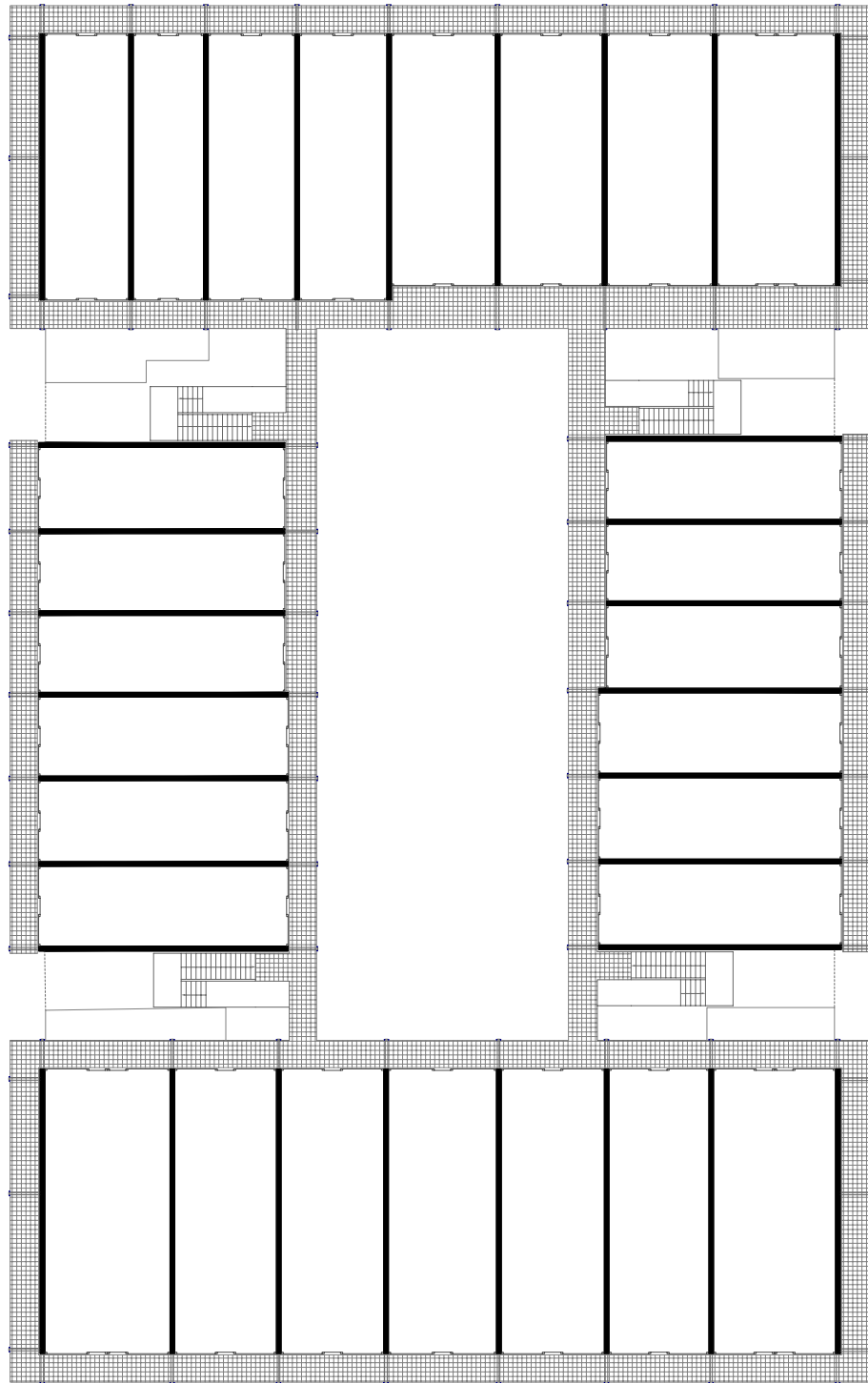
Typical Floor Before



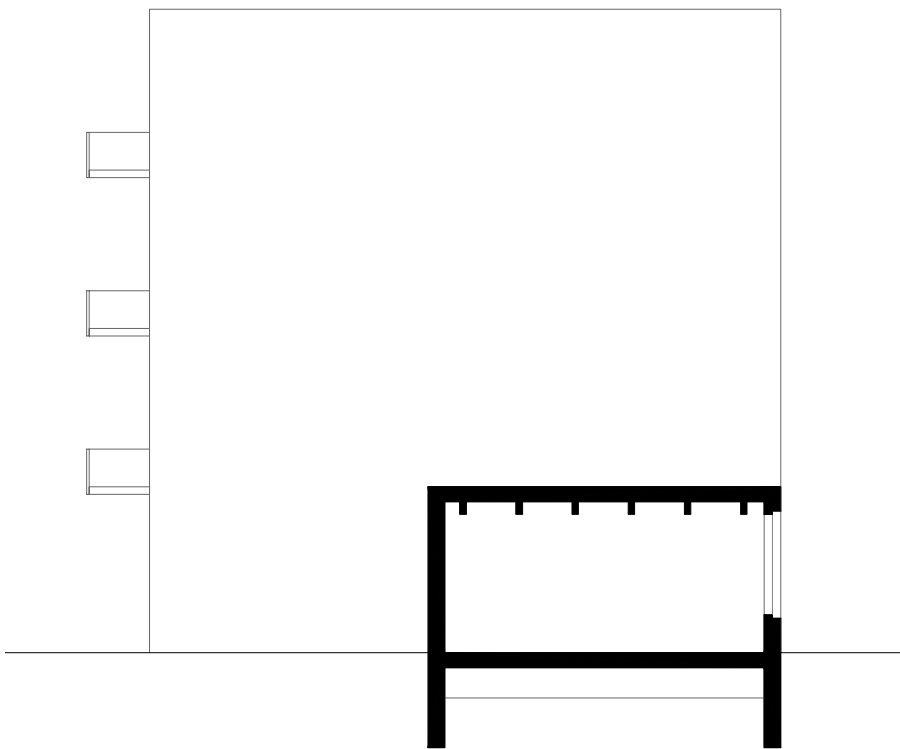
Typical Floor After



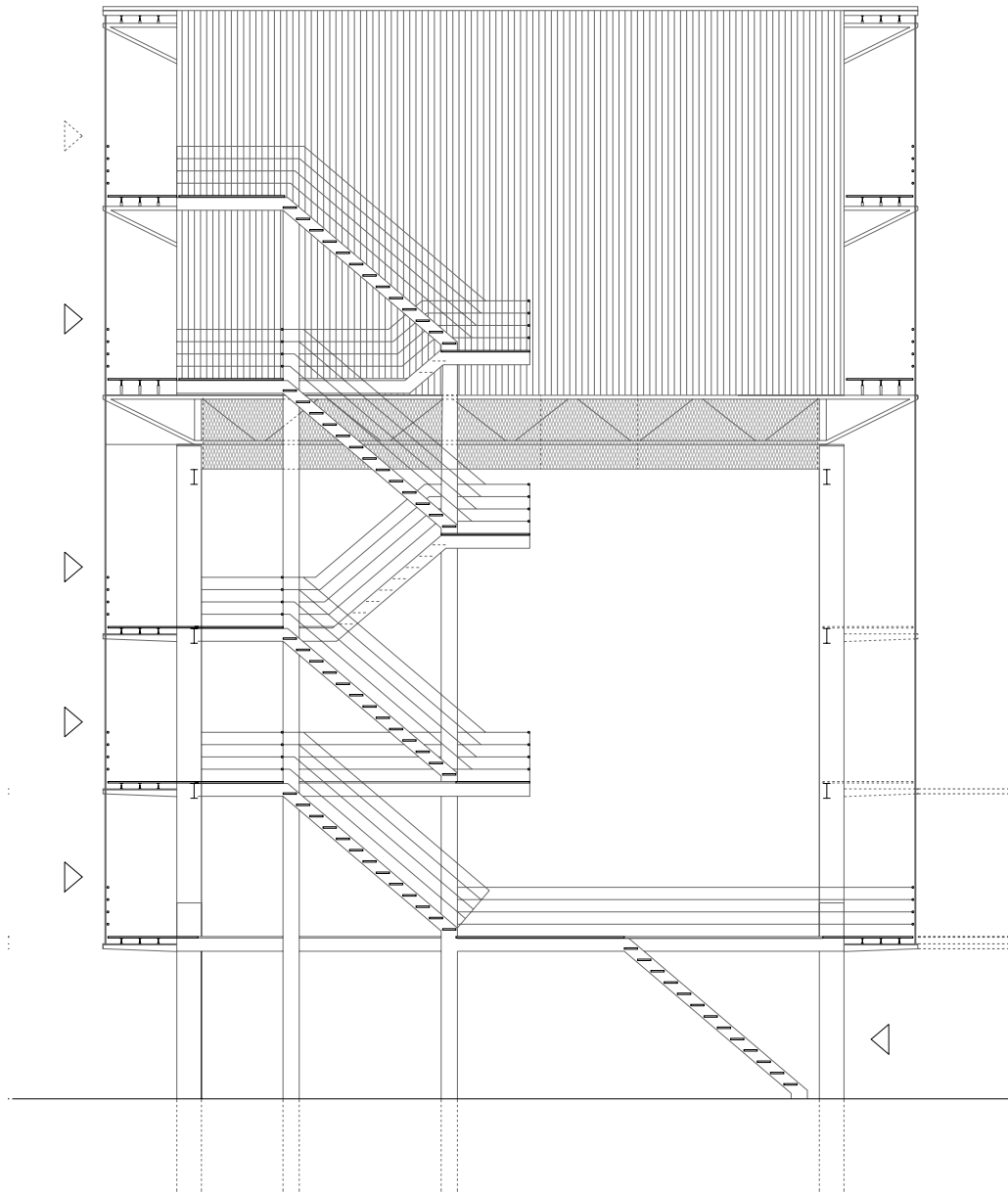
Rooftop Before



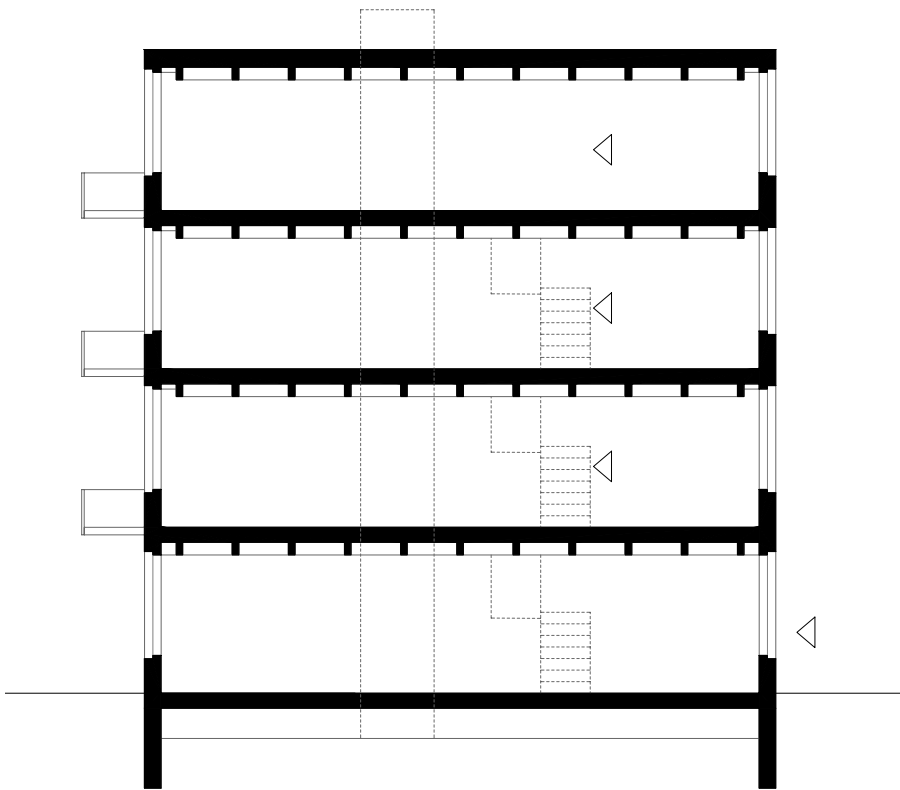
Grafted Floors on Top After



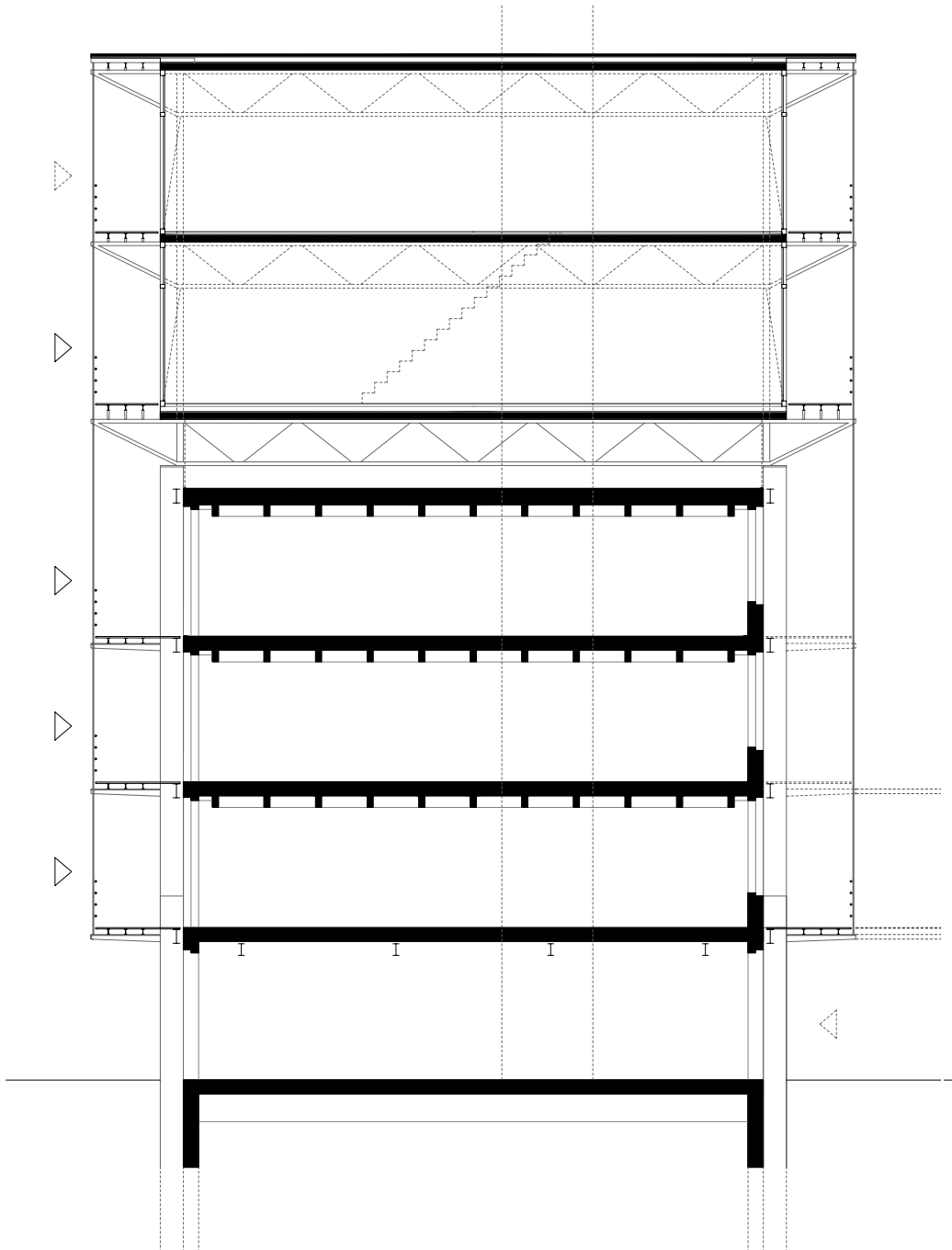
Section through Weak Spot
Before



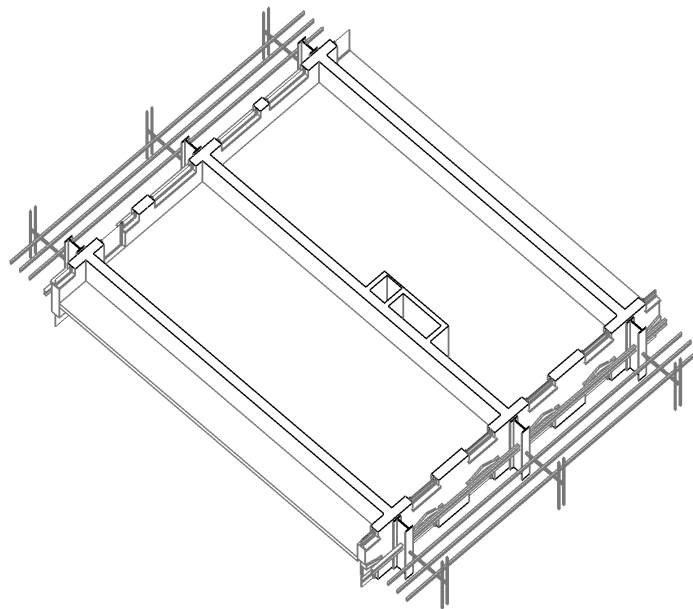
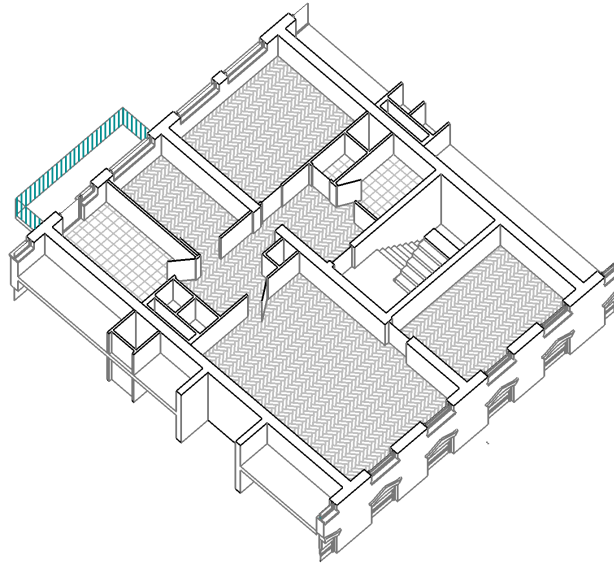
Section through Weak Spot
After: The Interface



Typical Section Before

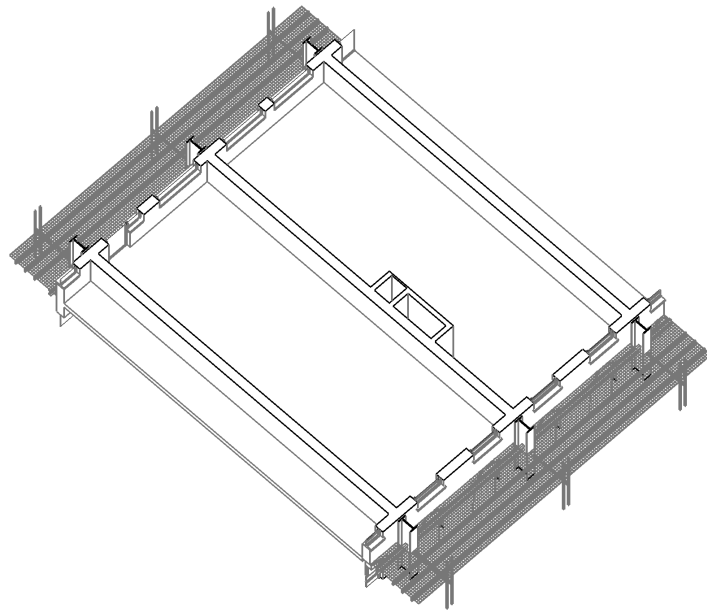
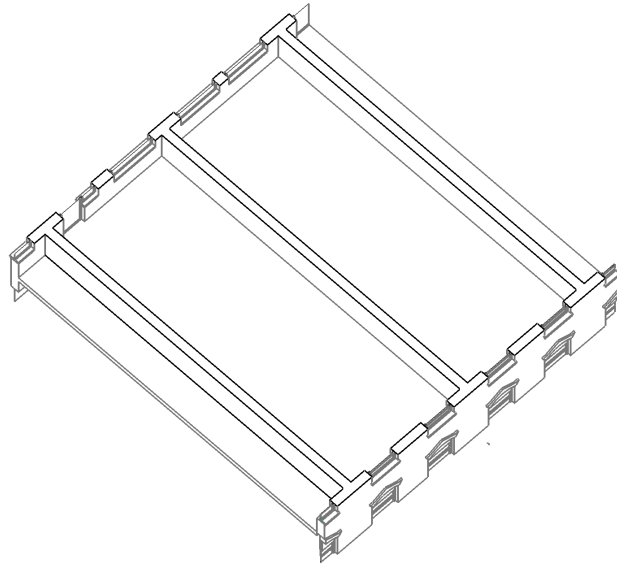


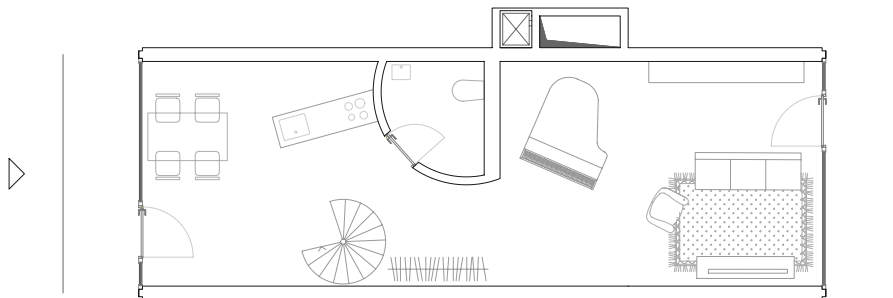
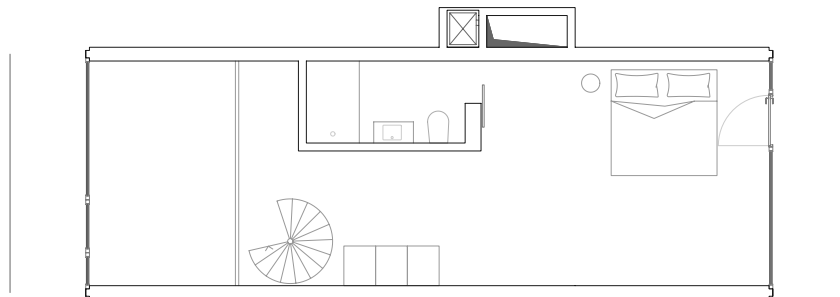
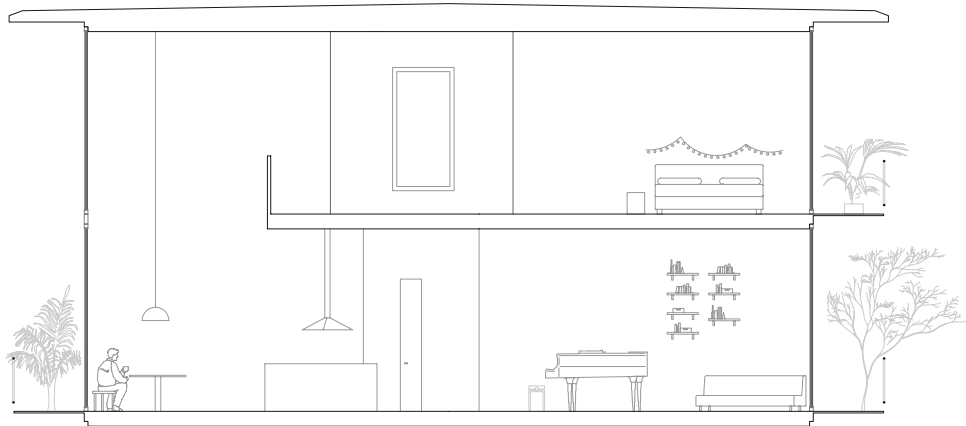
Typical Section After



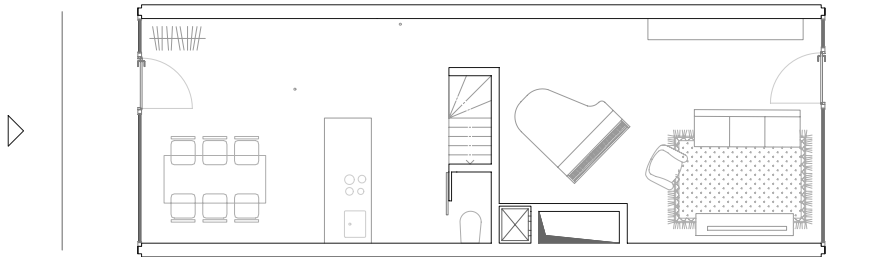
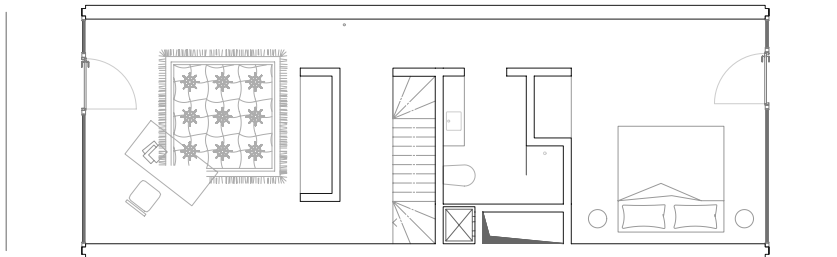
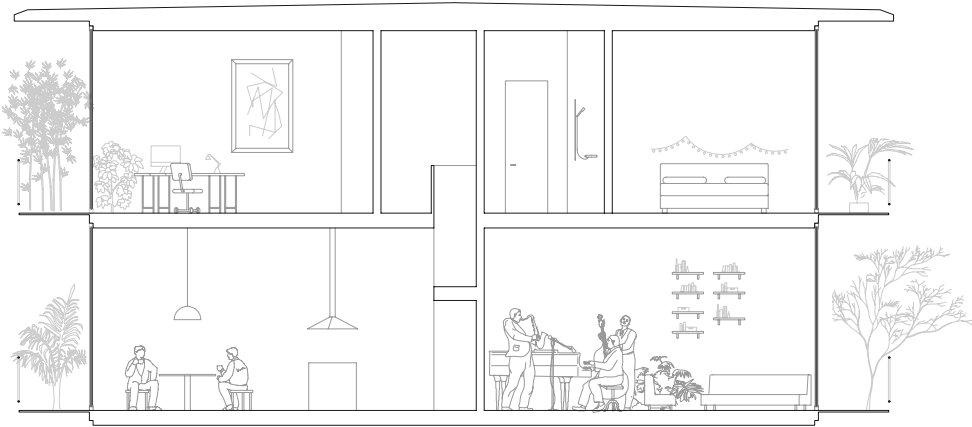
The Sequence of Transformation of the Existing Buildings

1. The existing situation
2. Removal of Stairs and existing separation walls
3. Adding of exoskeleton for a centralised circulation and a vertical shaft for technical amenities
4. Filling of the Exoskeleton to individual needs of the inhabitants: One side used for circulation, one for balconies, loggias, wintergardens.. Aiding the spatial alteration of the existing

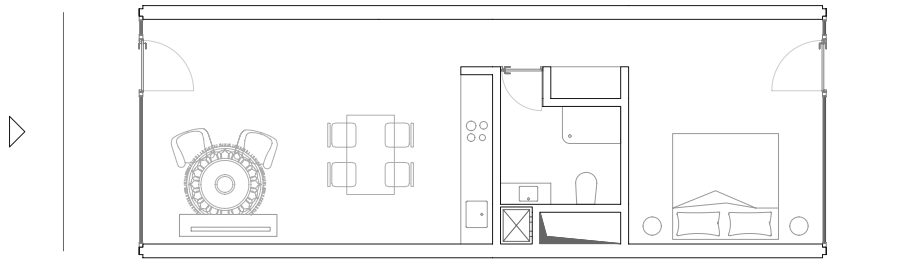
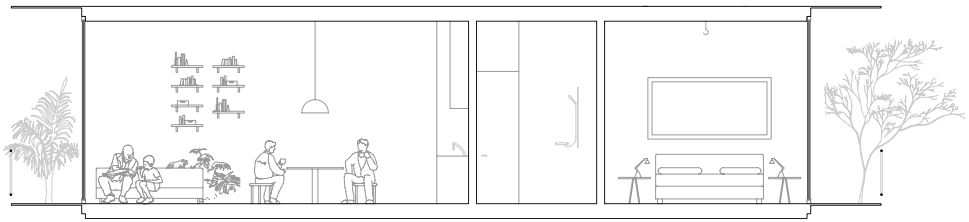




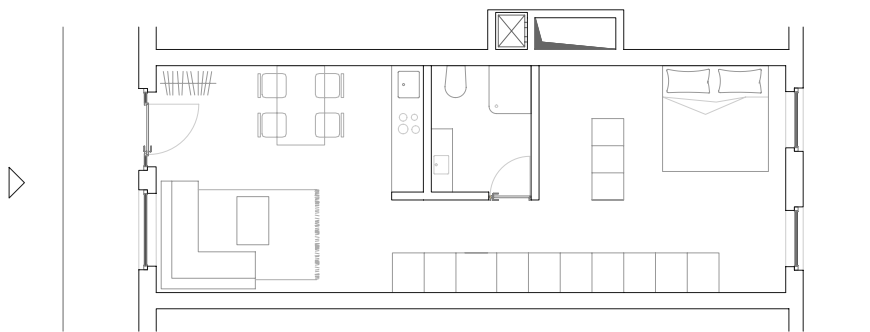
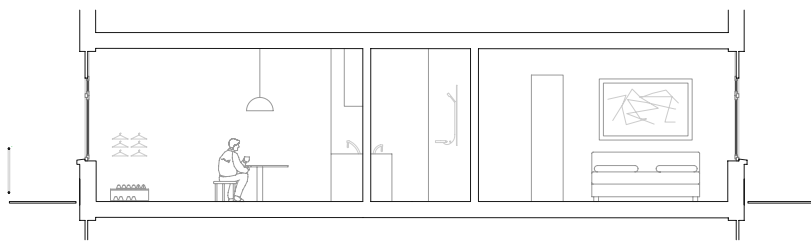
Module 1: Duplex Variation 1



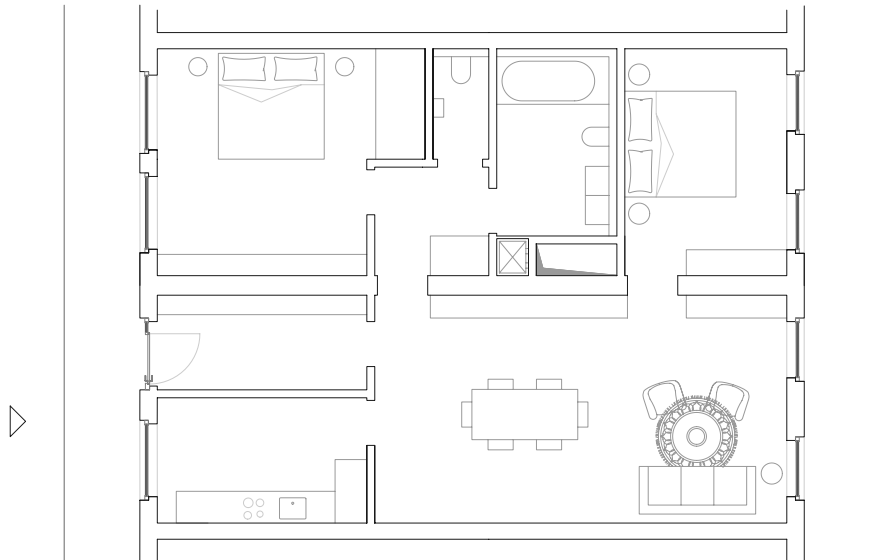
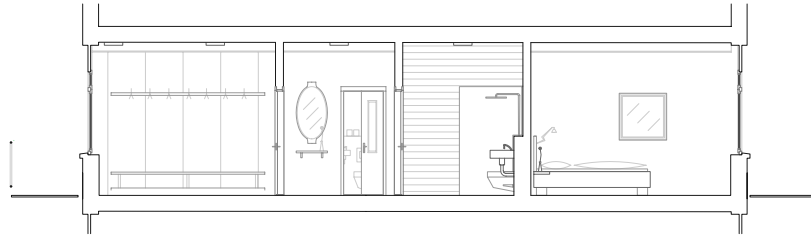
Module 2: Duplex Variation 2



Module 3: Single Unit Variation 1



Module 4: Single Unit Variation 2



Module 5: Double Unit Variation 1

Structure

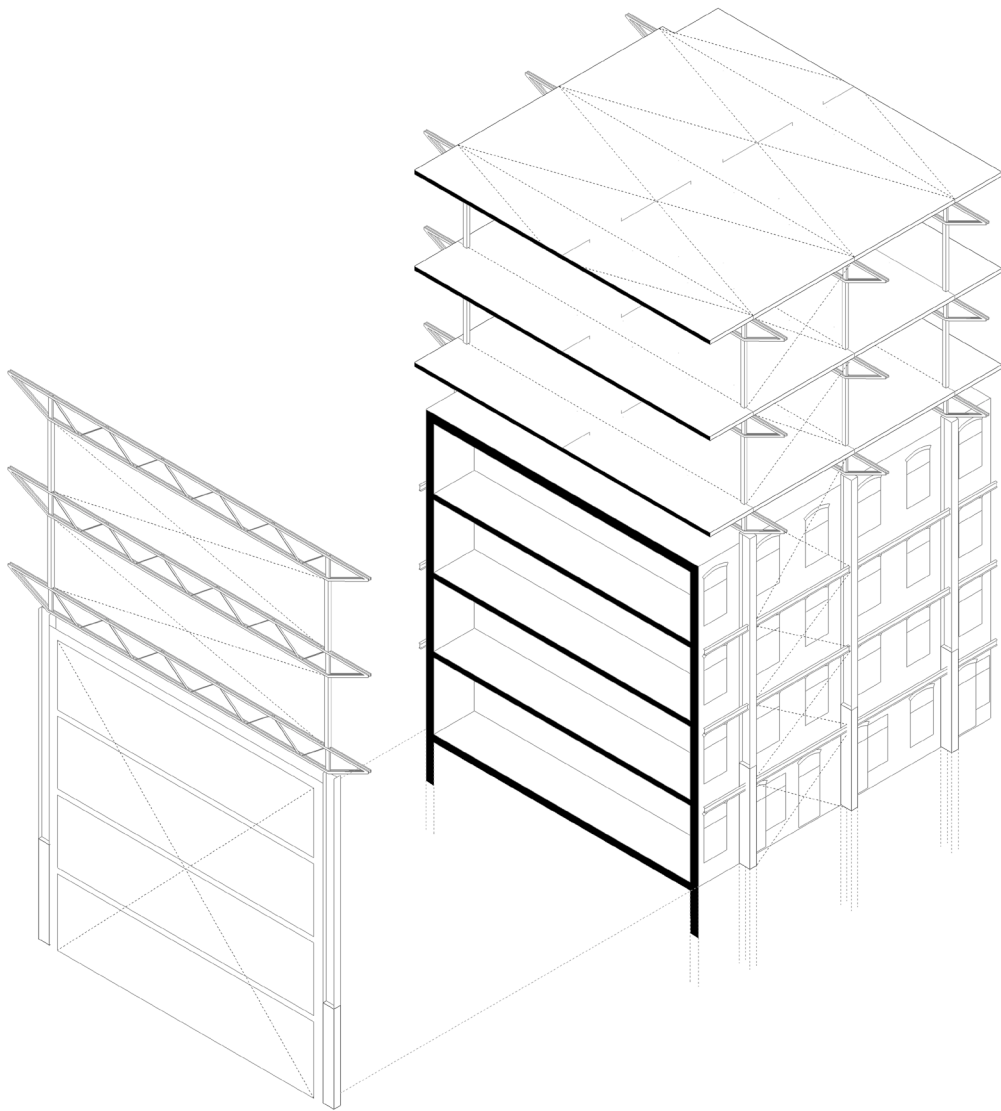
Lateral Force Bracing

Prefabricated Elements Assembly

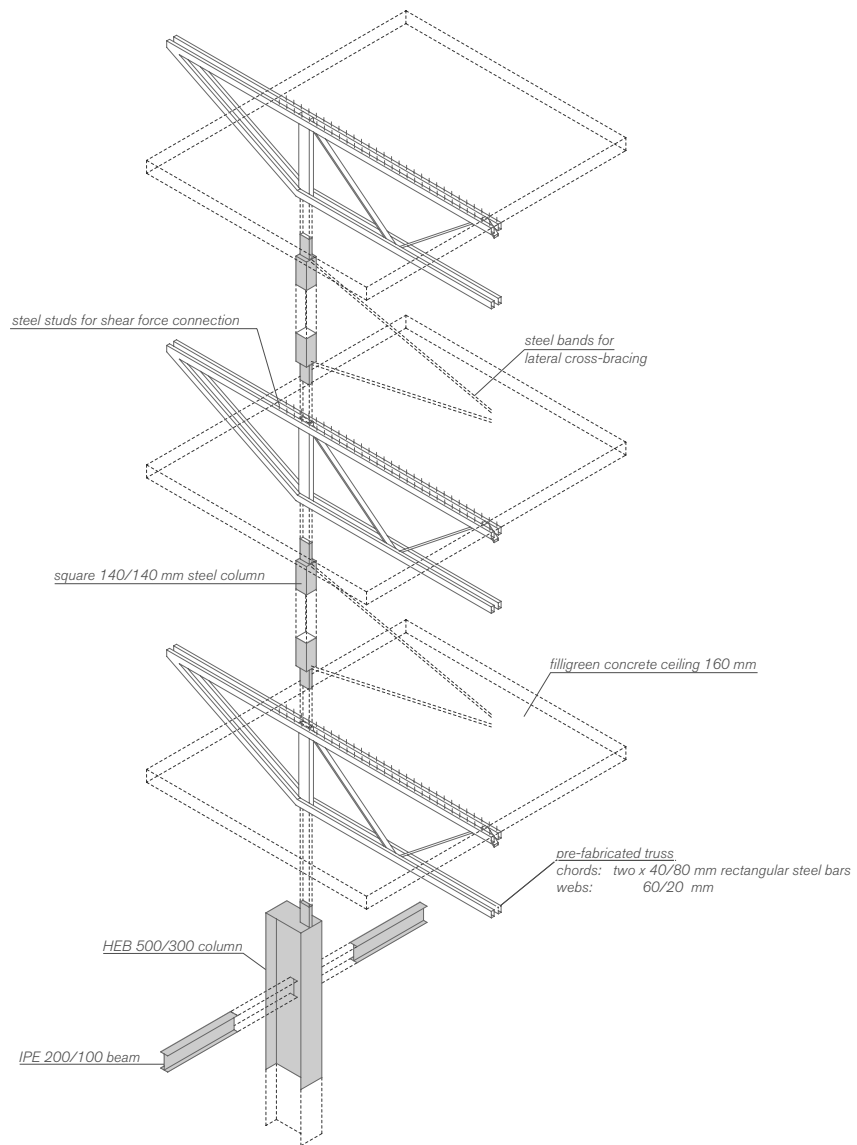
The Portal Structure

The Structural System

The Exoskeleton and the additional structures on top are supported by steel portal frames, founded on concrete pile foundations. Laterally the repeated sections are cross-braced by the concrete slabs on top, which are shear-force connected. On the bottom they rest on the structural walls of the existing and are connected by stiff connections between the steel beams in the other direction.



**Explosion Axonometric of
Pre-Fabricated Steel Elements**



Construction Details

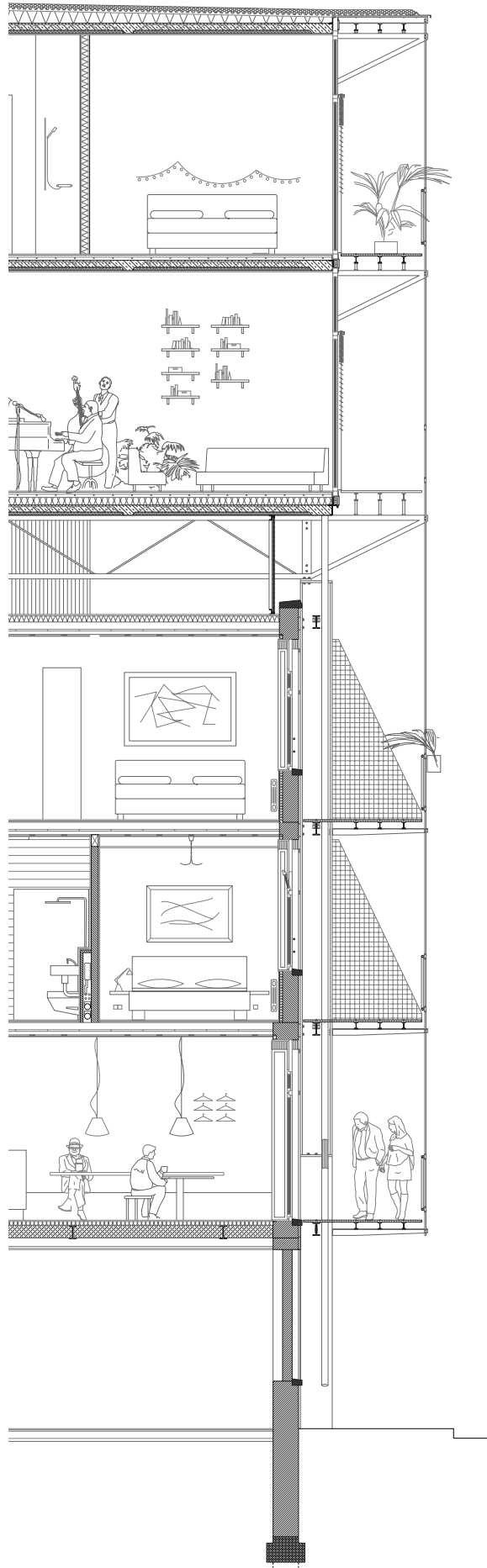
Facade Section

1-20 Sections and Elevations

1-5 Details

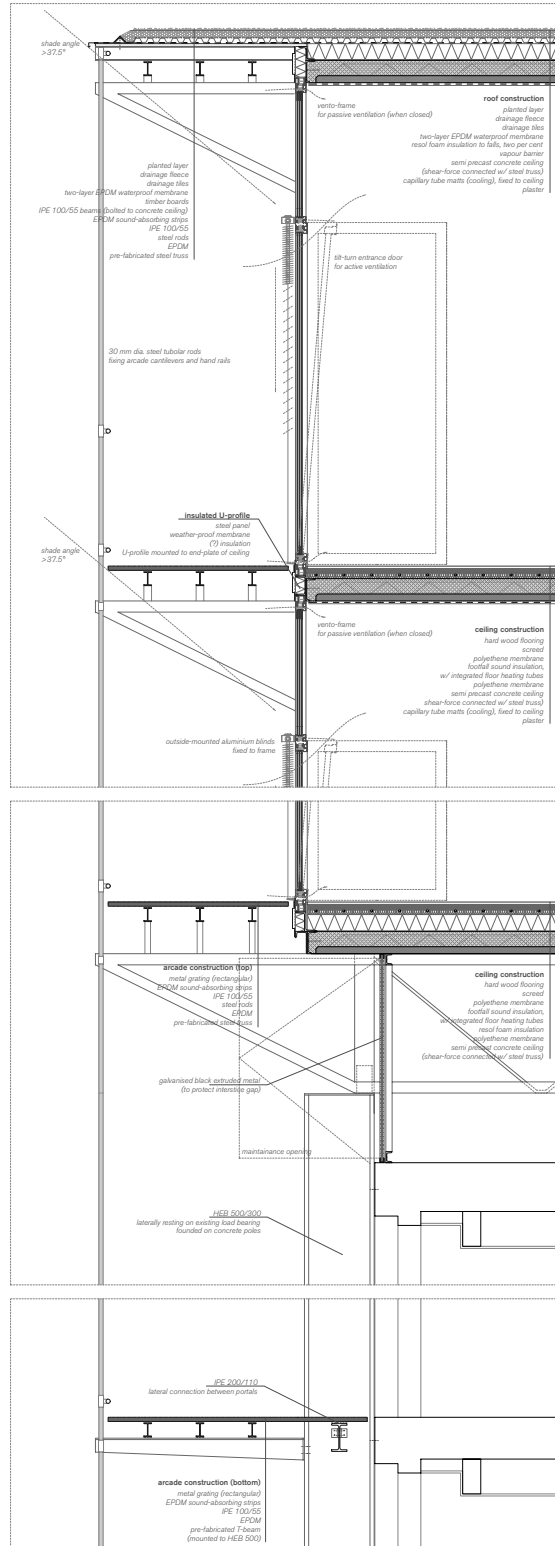
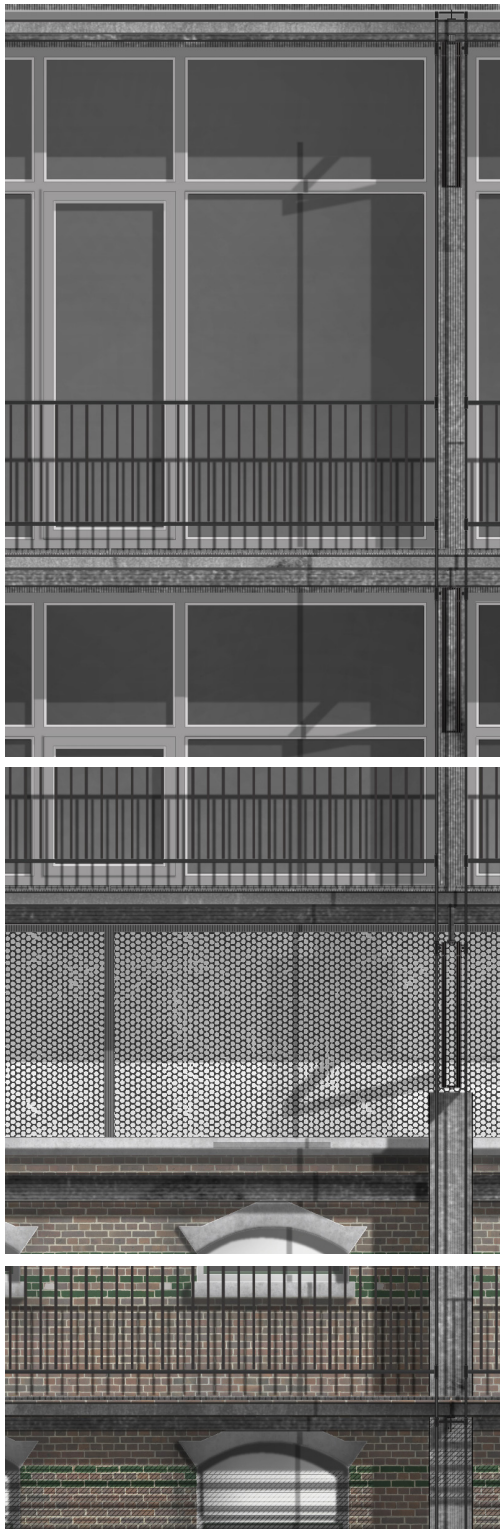
Facade Section 1:100

scaled down from 1:50



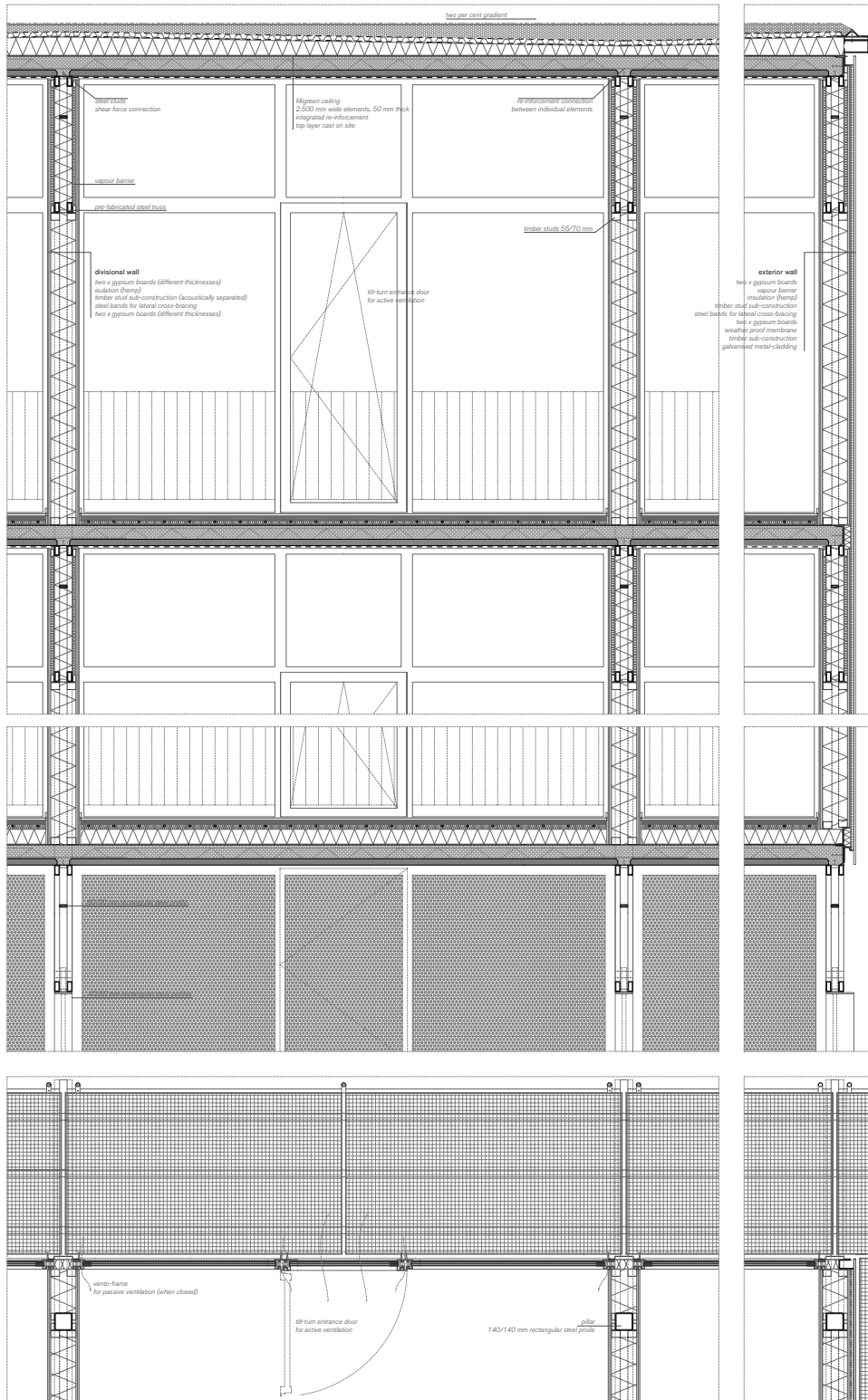
Facade Section 1:50

scaled down from 1:20



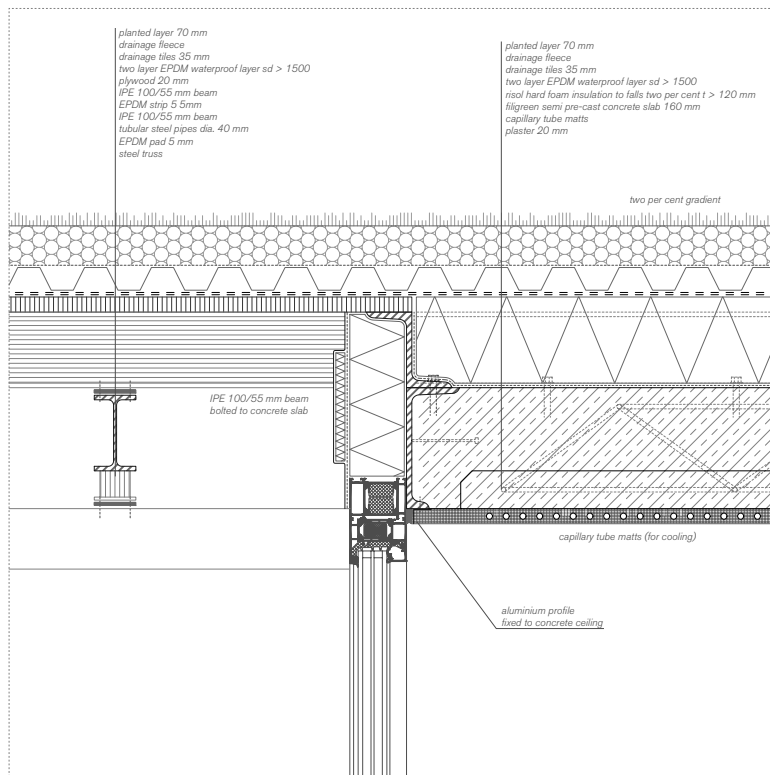
Facade Cross - Section 1:50

scaled down from 1:20



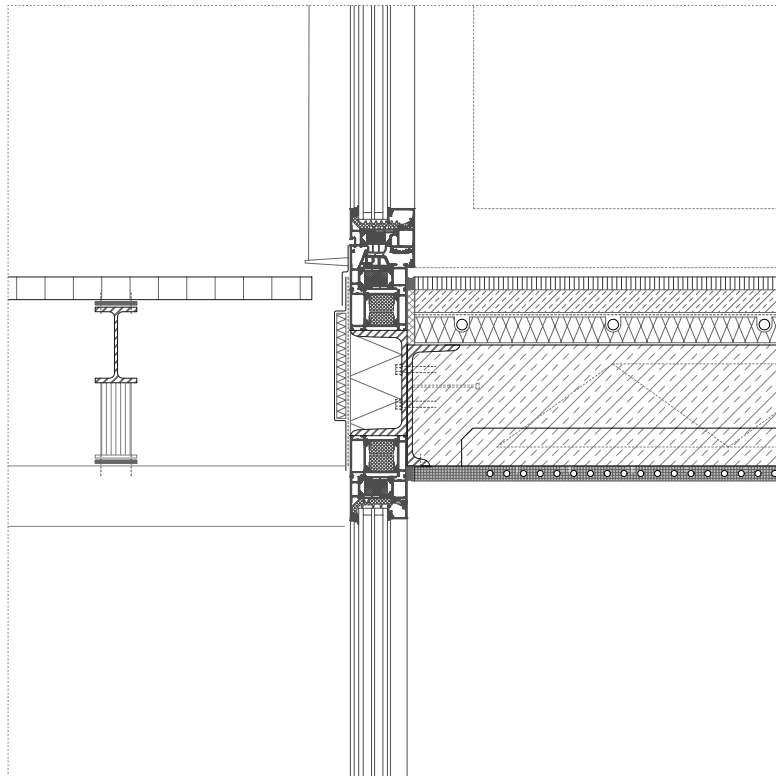
Roof Detail Facade 1:10

scaled down from 1:5



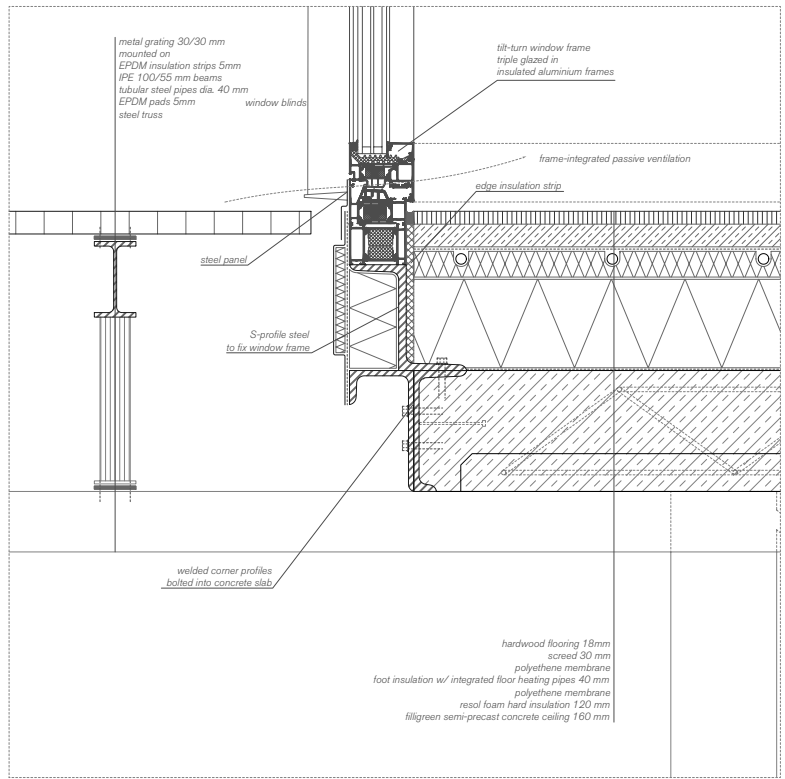
Ceiling Detail Facade 1:10

scaled down from 1:5



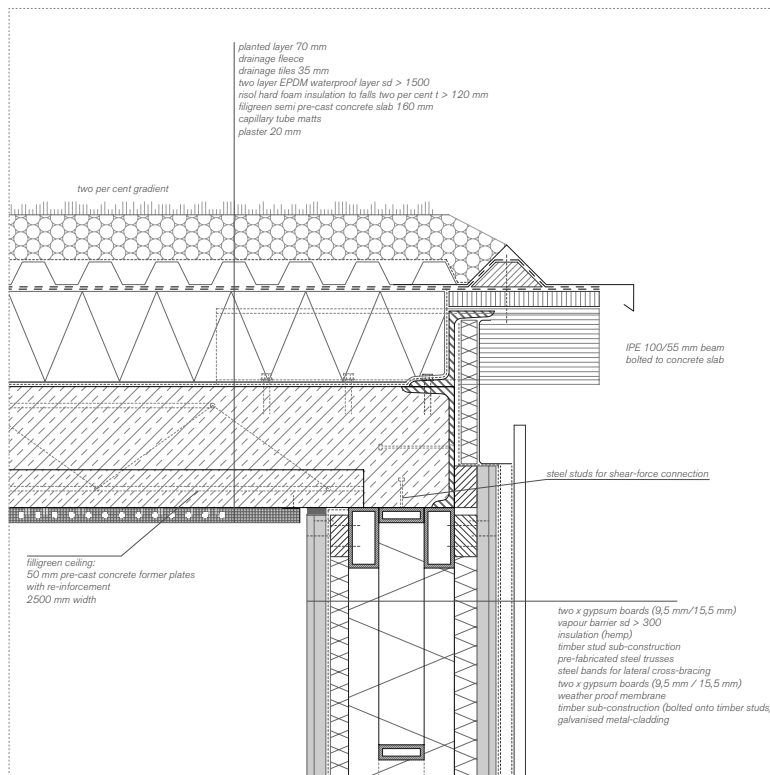
Bottom Floor Detail Facade 1:10

scaled down from 1:5



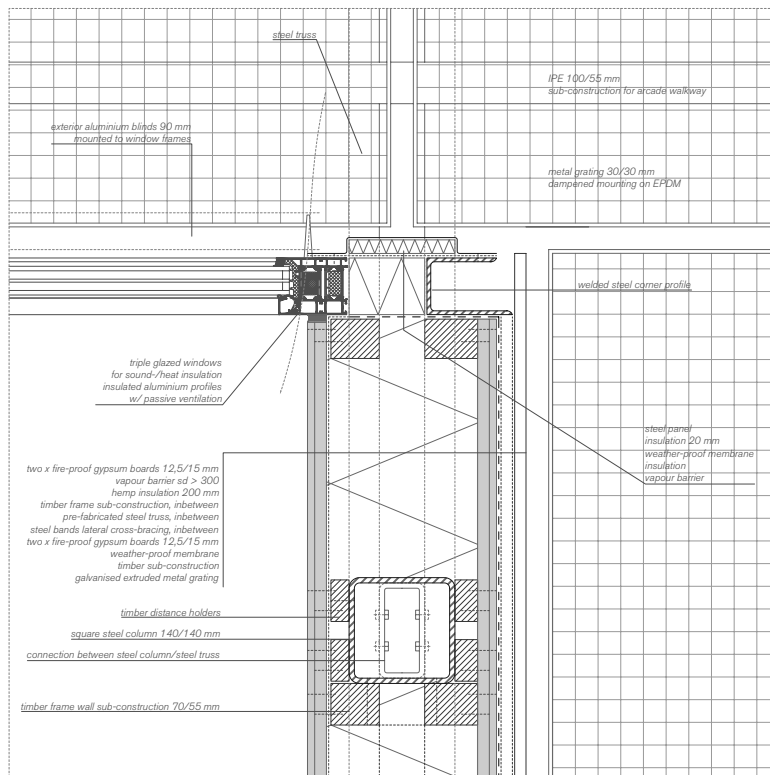
Roof Detail Facade Cross-Section 1:10

scaled down from 1:5



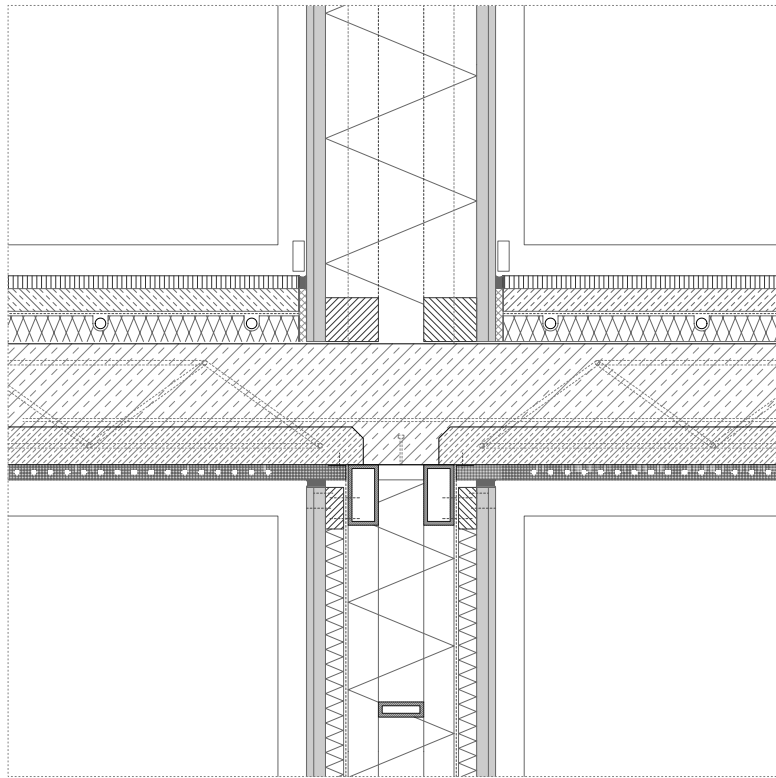
Roof Detail Facade Horizontal-Section 1:10

scaled down from 1:5



Separation Wall Cross-Section 1:10

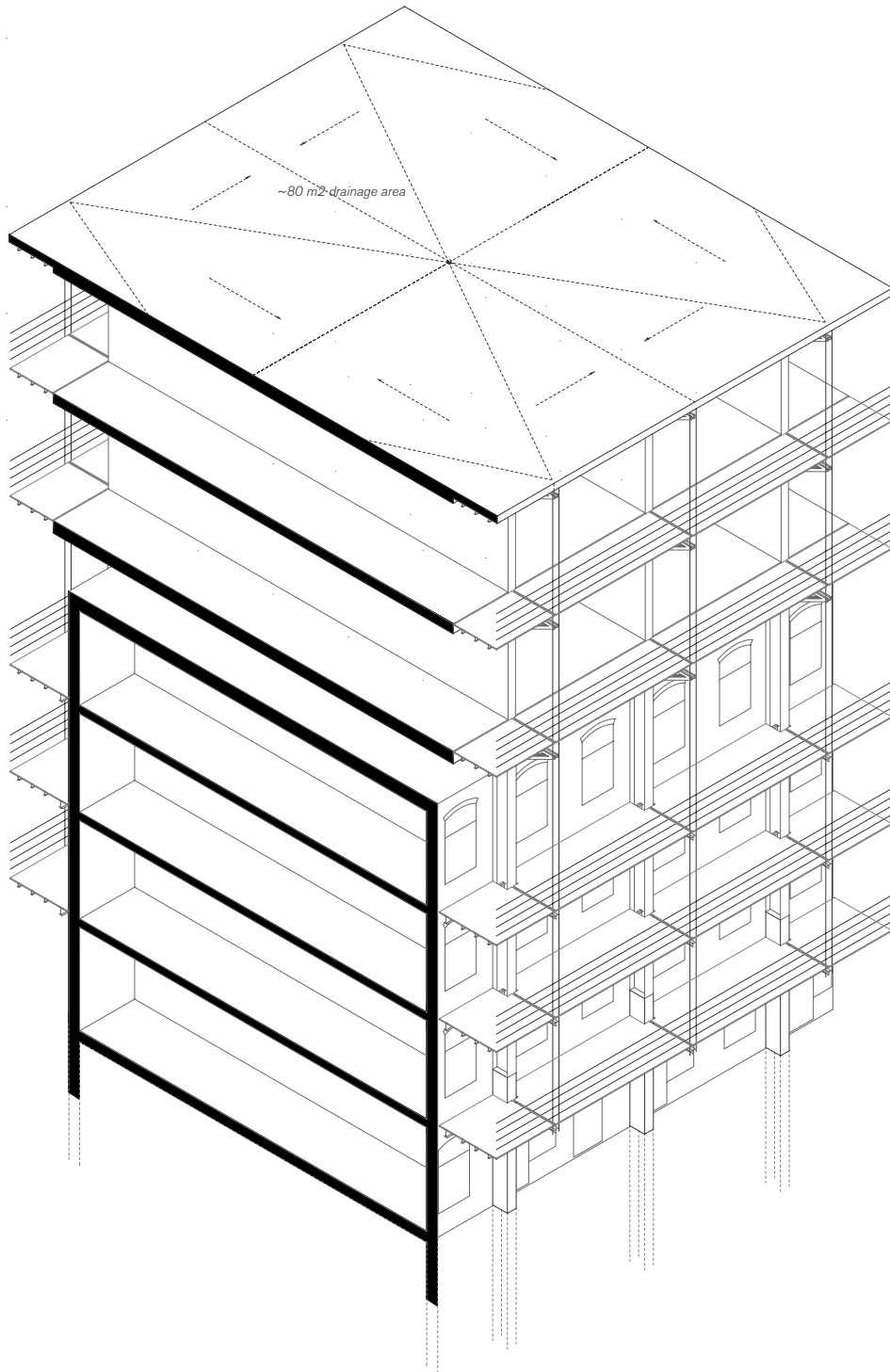
scaled down from 1:5



Climate

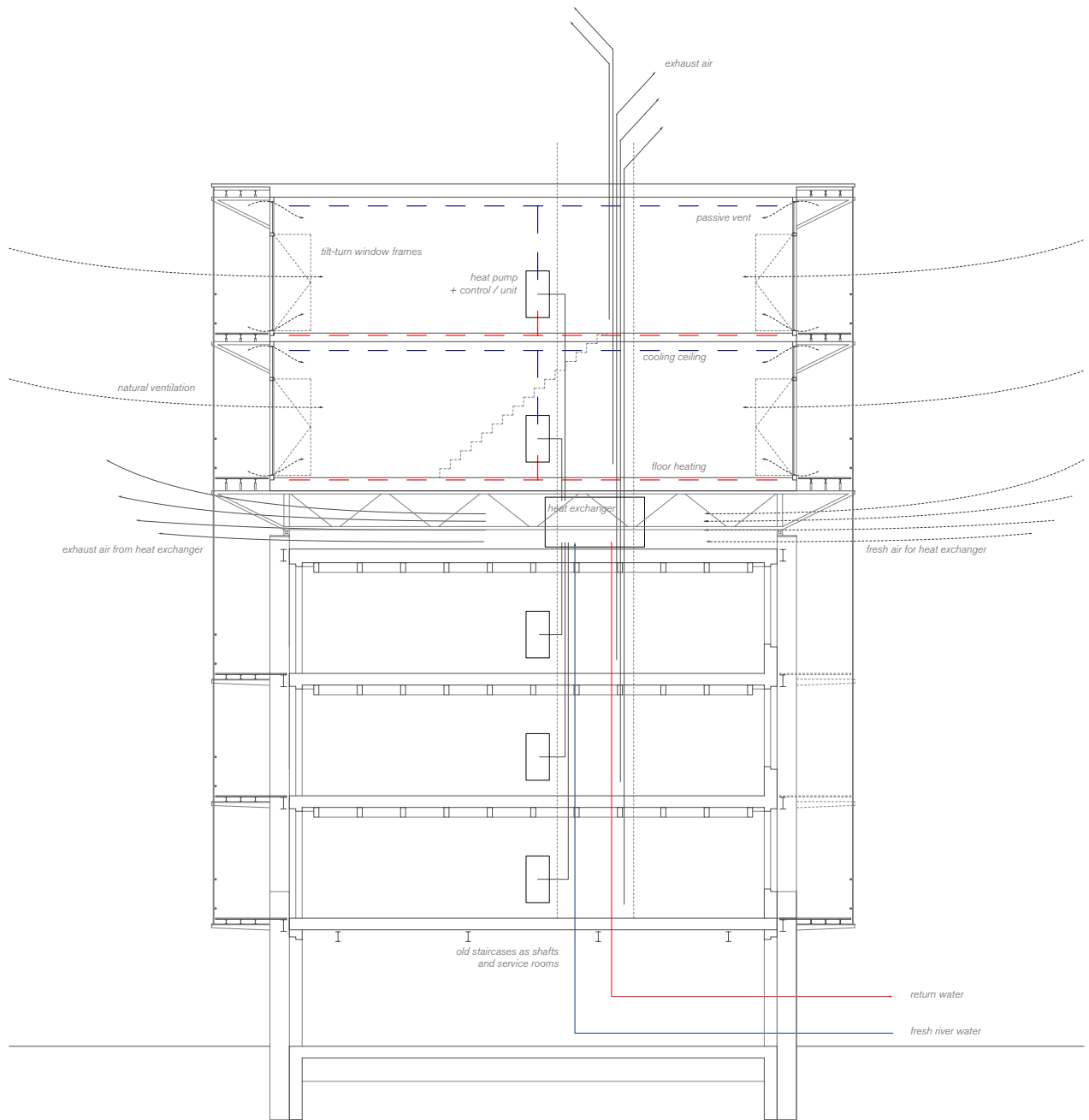
Drainage
Climate Diagrams

Drainage Diagram



Climate and HVAC Diagram

natural Ventilation;
every unit possesses an individual
heating unit. The water of the Maas
will be used in the summer months
for cooling, if necessary.



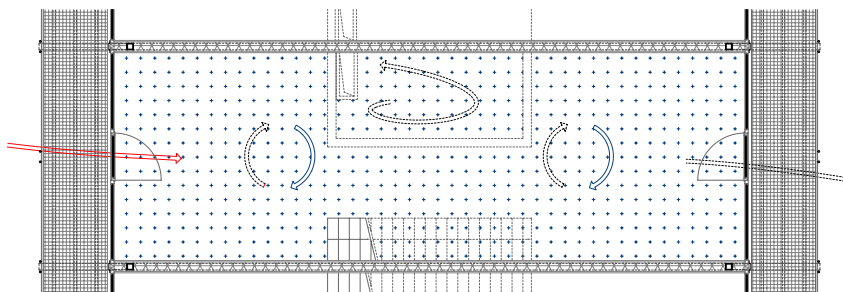
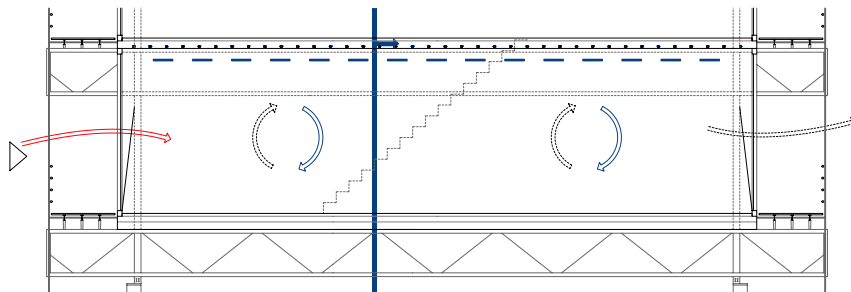
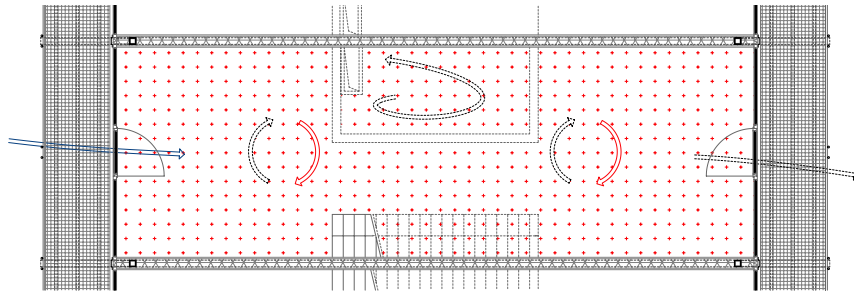
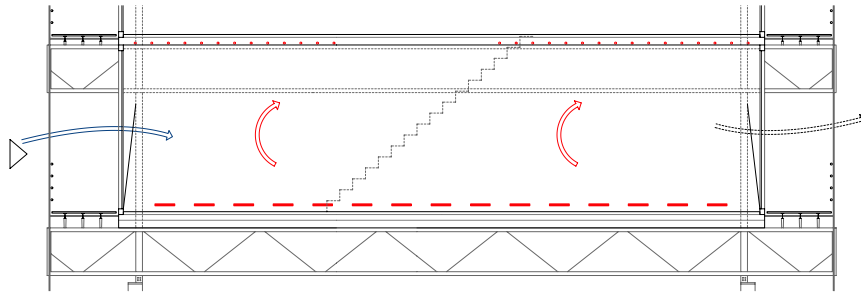
Climate Diagram of the Units

1. Winter Scenario

Floor heating is used to heat up the unit. The installed frames have the ability to ventilate automatically through the frames.

2. Summer Scenario

Cool water circulating in capillary tubes in the ceiling regulate the room temperature.



Use

Use Scenario

The exoskeleton towards the street provides for individual use and endless possibilities to alter the spatial quality. The structure furthermore breaks conventional hierarchies in the traditional block, as the public layer can be in any floor.



