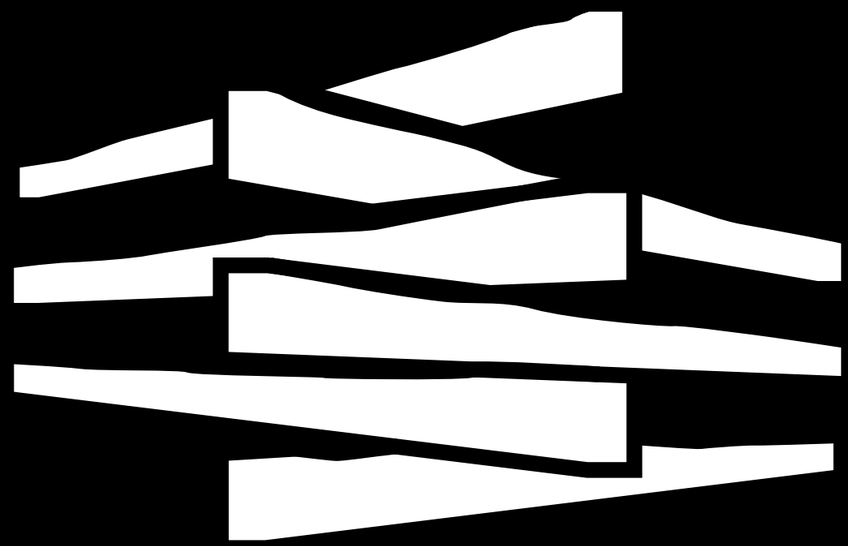


unTREEted

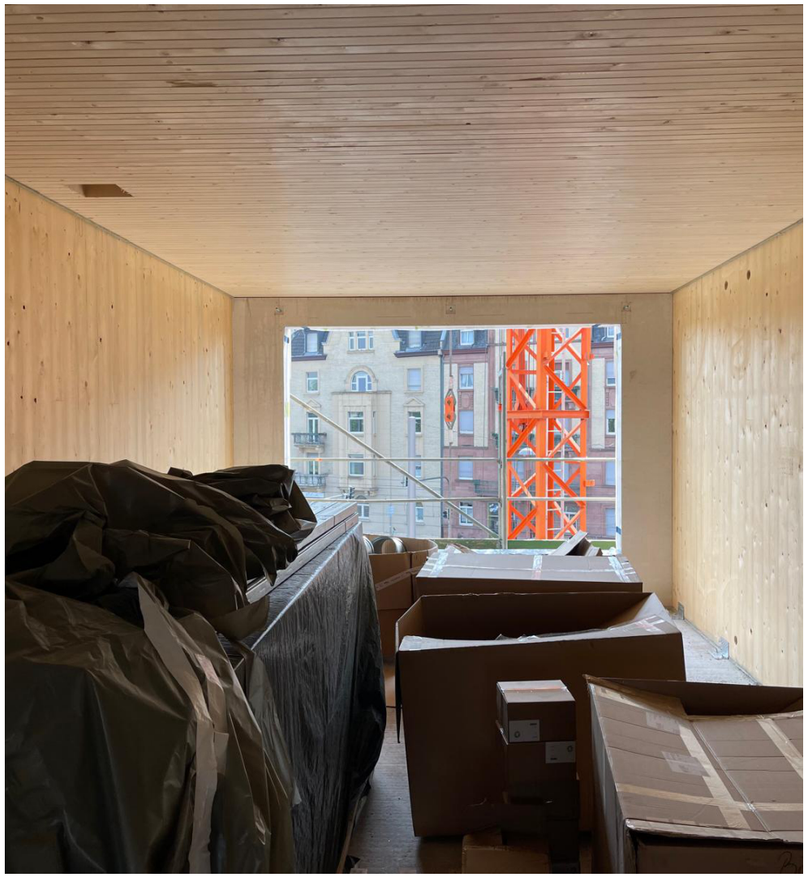
architecture from the material up

TU Delft

Faculty of Architecture & the Built Environment
Delft University of Technology
Julianalaan 134, 2628BL Delft

Thomas Offermans
Paddy Tomesen
Gilbert Koskamp

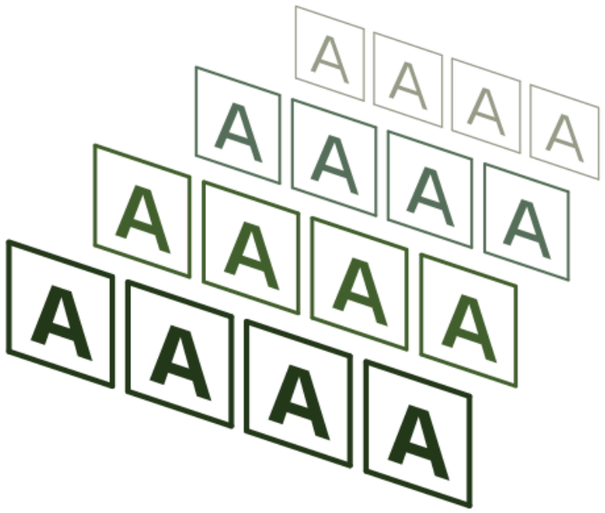
03. July 2025



research question

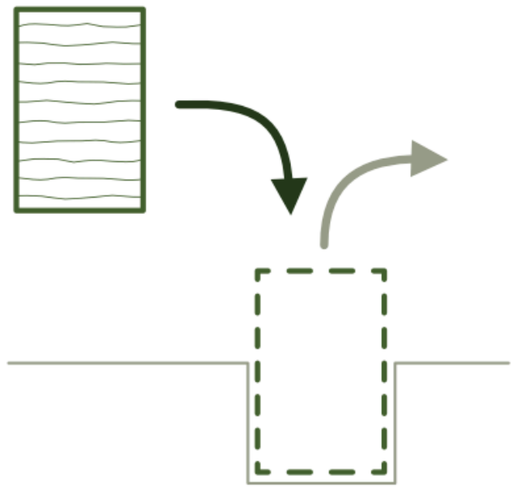
How can **timber's tectonic logic** evolve through digital fabrication and parametric design to create a **material- and fabrication-driven, context-sensitive** architecture in the **Dutch context**?

problem with the industry



monotony and loss of identity

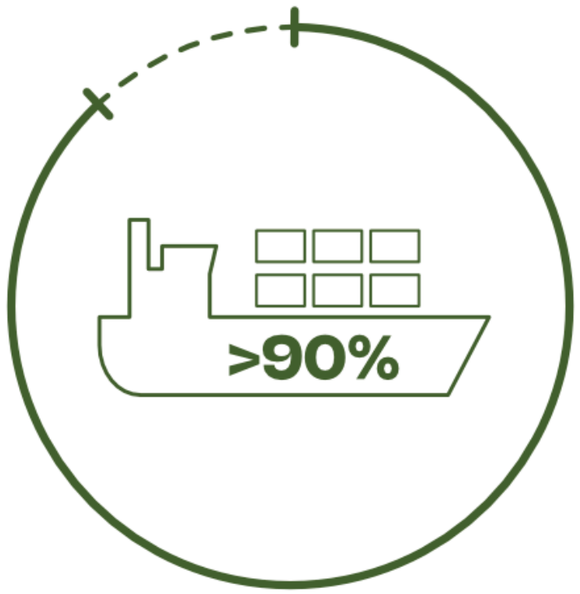
through mass standardisation
and exaggerated efficiency,
no connection local context



wrong tectonical approach

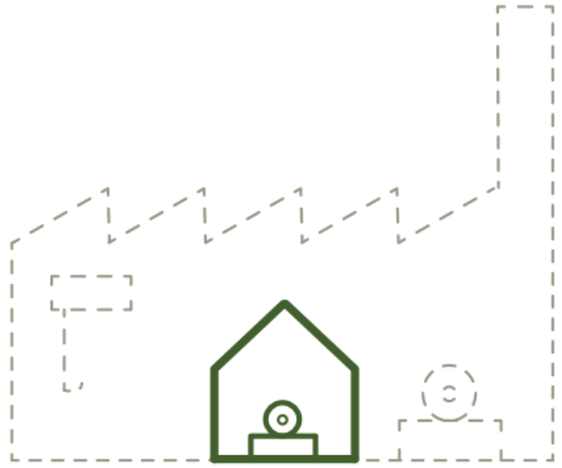
forcing wood into spacial and structural logics of different materials,
treating wood like a substitute

local problems



dependency on import

no sustainable industrial scale dutch forestry



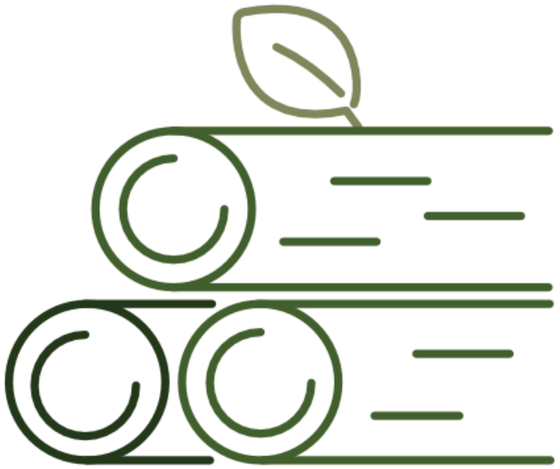
missing infrastructure

no industrial scale fabrication/ manifacturing and lack of knowledge


tree coverage (2010)
natural forests
Bremerhaven
Hambu
Groningen
Bremen
Assen
Emmen
Alkmaar
Zwolle
Amsterdam
Hanover
Apeldoorn
Enschede
Osnabrück
The Hague
Utrecht
Bielefeld
Münster
Rotterdam
Netherlands
Hamm
Paderborn
Breda
Dortmund
Middelburg
Eindhoven
Kassel
Ostend
Antwerp
Dusseldorf
Ghent
Dunkirk
Leverkusen
Brussels
Maastricht
Siegen
Cologne
Lille
Liège
Mons
Belgium
Koblenz
Hanau
30m
50km

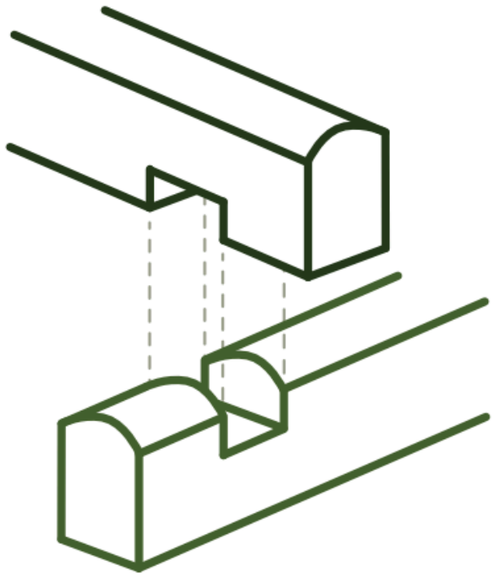
sixteen oak barn – Meierij region netherlands

concept



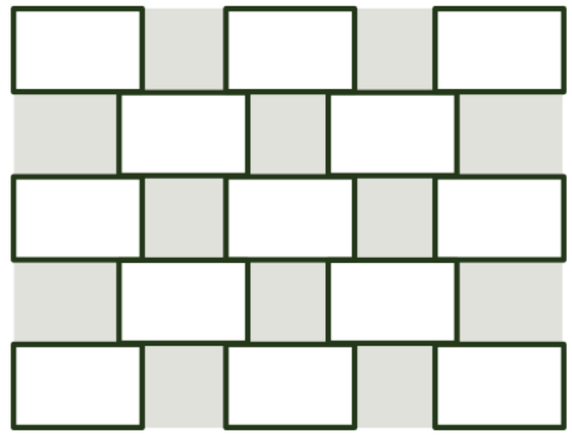
1. material = raw

minimally processed timber
or as "raw" as possible



2. joining = stacking

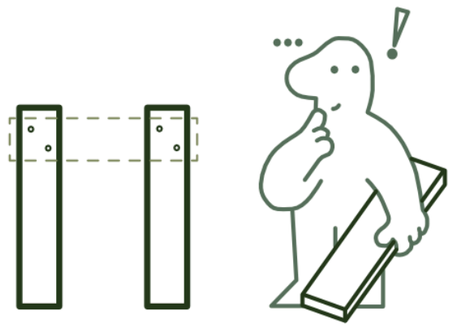
simple joints and connections



3. space = open-closed

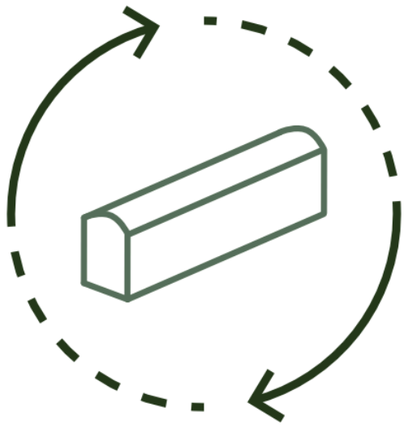
an interplay of material and function
create different qualities

benefits with raw



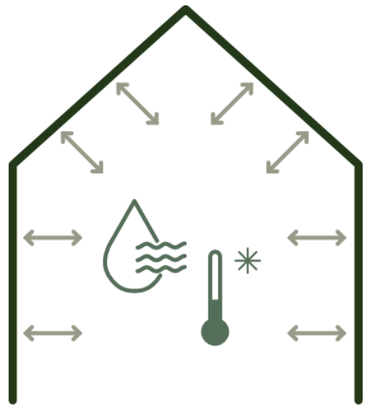
1. dis-/assembly

easier and quicker



2. re-use

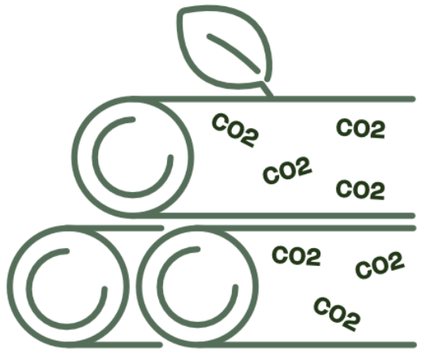
less “specialized” building components
easier to re-use



3. interior climate regulation

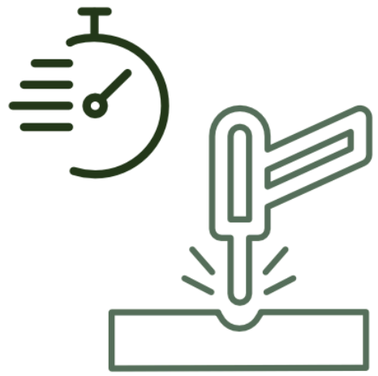
wood “breathes” when untreated and helps
regulating humidity and temperature

benefits with raw



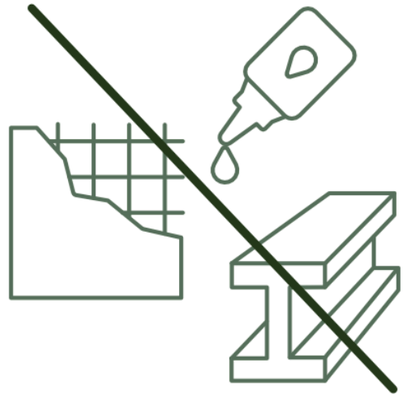
4. embodied carbon

maximize captured carbon use



5. less fabrication time

smaller footprint and quicker assembly



6. less carbon intensive materials

smaller mix of materials within the building, helps disassembly and future use

design assignment

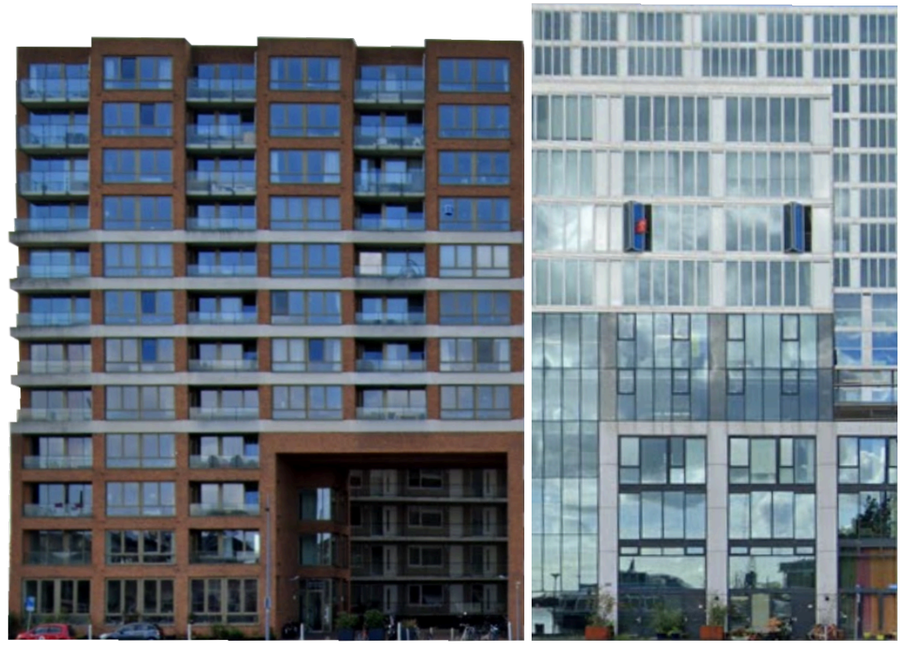
This project explores how **minimally processed timber** can act as a counter-strategy to the over- standardization of contemporary timber construction. In the dense urban context of **Rotterdam,** the design resists material monotony by **embracing the irregularity** and the expressive potential of wood – from **material texture** to **structural logic** and **urban form.** The goal is to create a **dwelling** that allows material **imperfection,** resists neutrality, and shows how **material-driven design** can shape richer architecture and a new urban identity.

Location: Rotterdam, Delfshaven – Lloydkwartier

Target group: Young families, singles, couples, small businesses

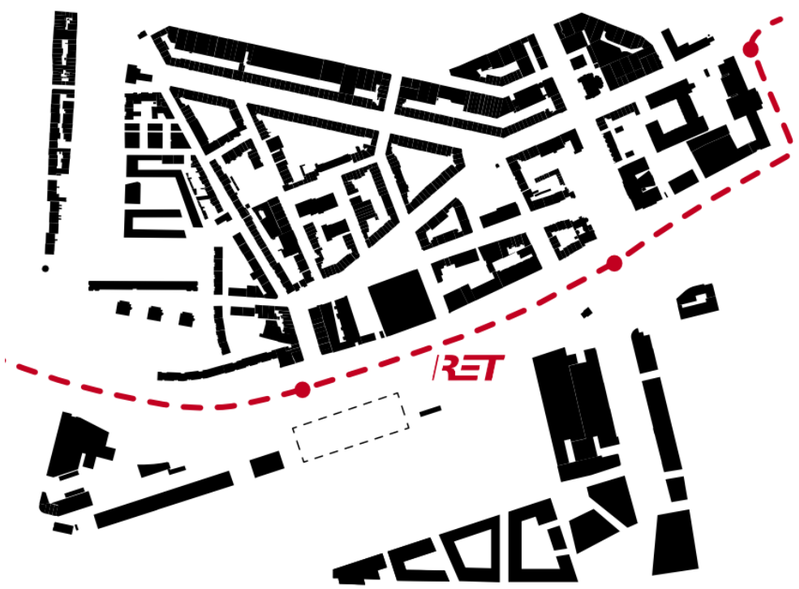

delfshaven
(lloydkwartier)

VS.




FIGHTER

site analysis

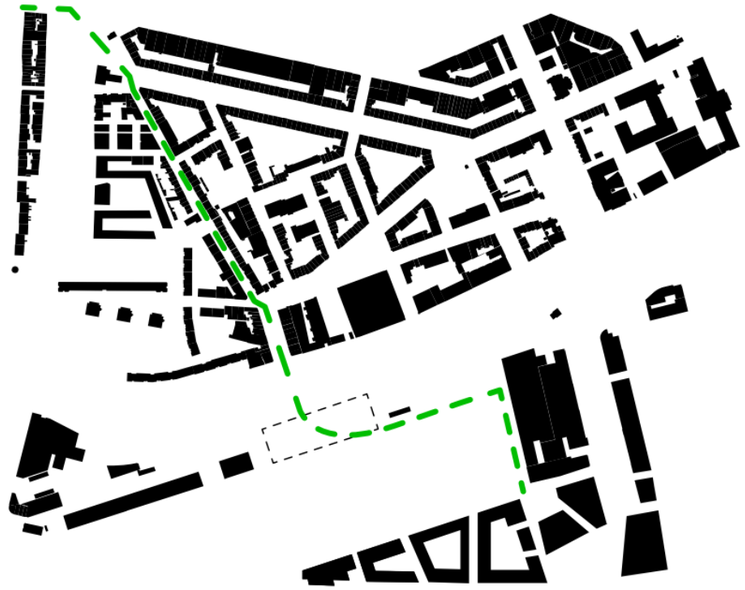


public transport

routes residents through site

pier line

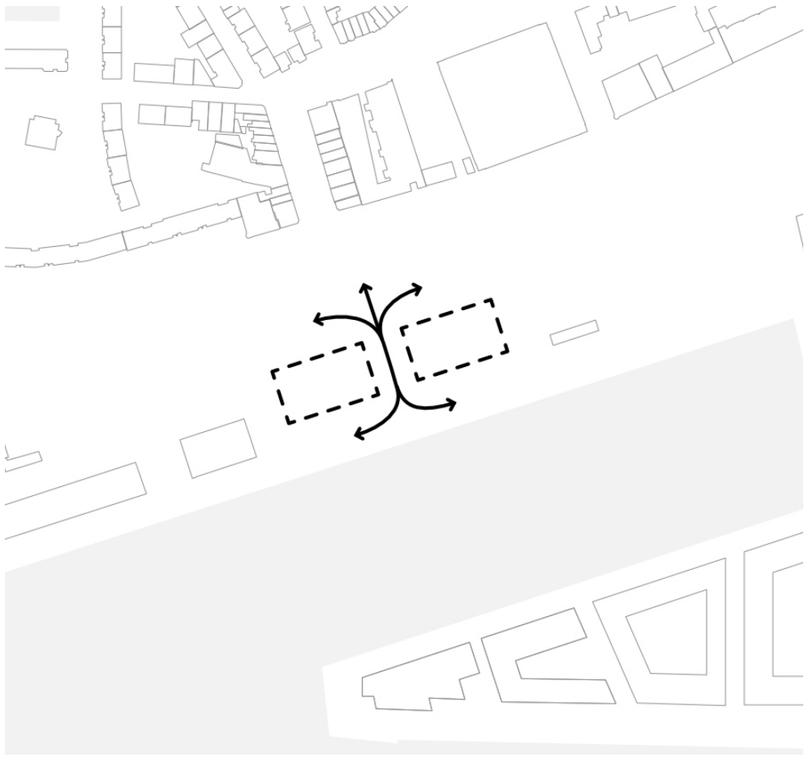
activating the waterfront for leisure to create high quality public spaces



urban connection

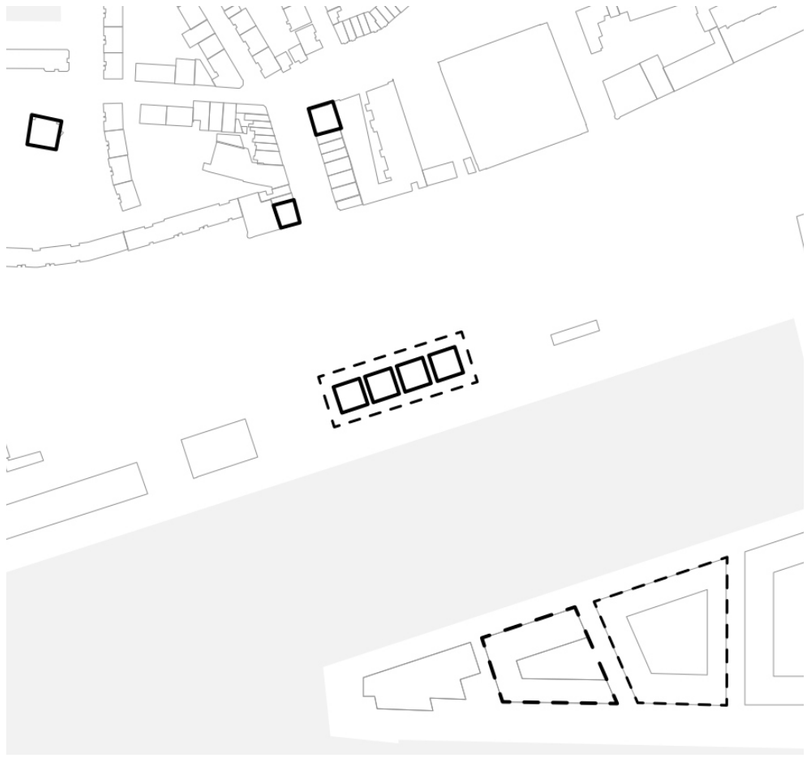
missing connection between and old and new neighbourhood

urban strategies



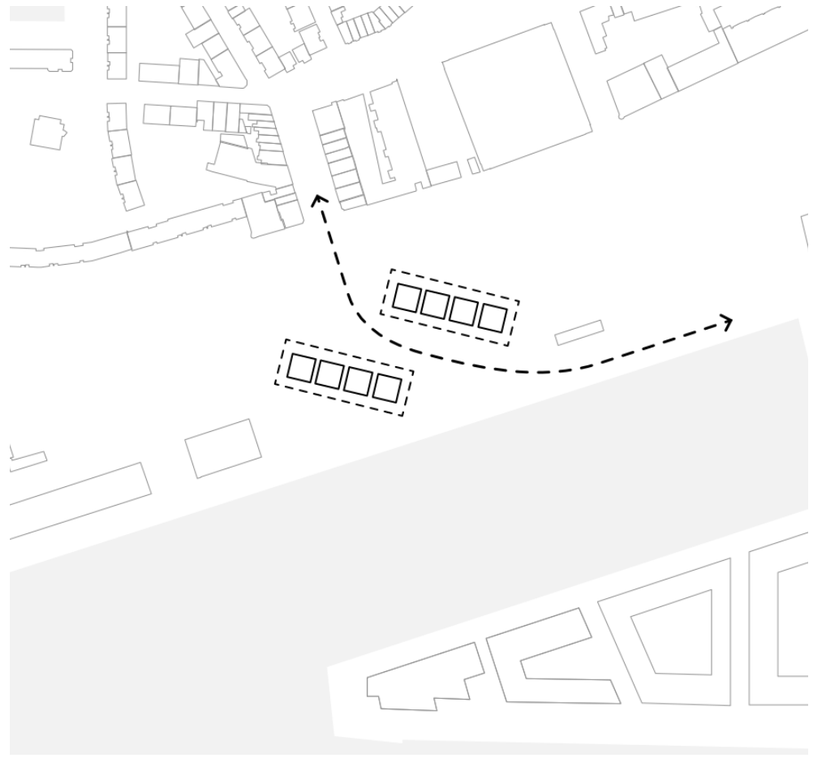
entrance for the neighbourhood

give the neighbourhood a face/identity and a clear entrance



bridging the urban grain

combine the big scale with the small scale



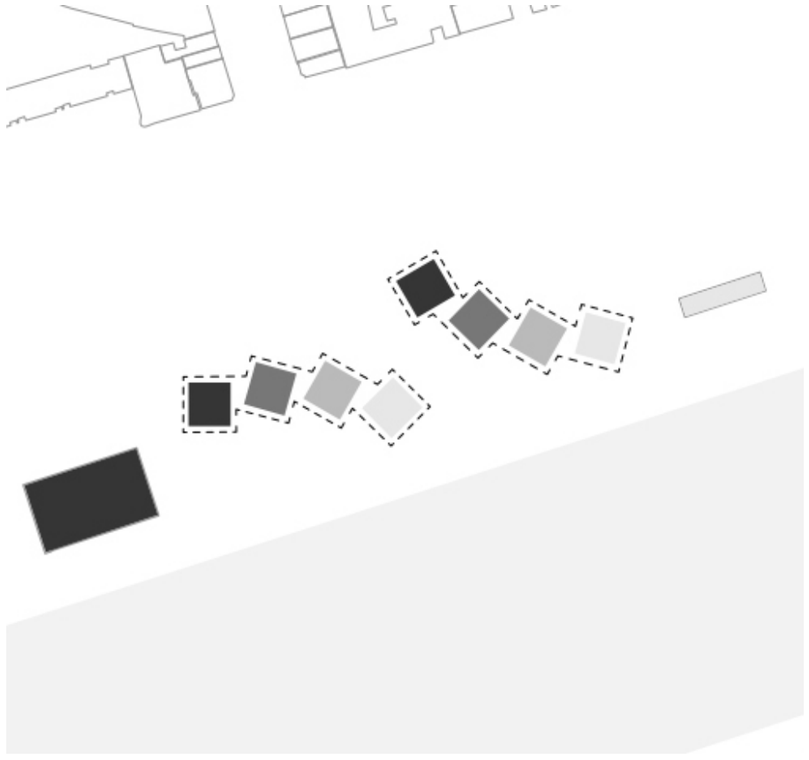
create a flow

give gentle but clear directions

urban strategies

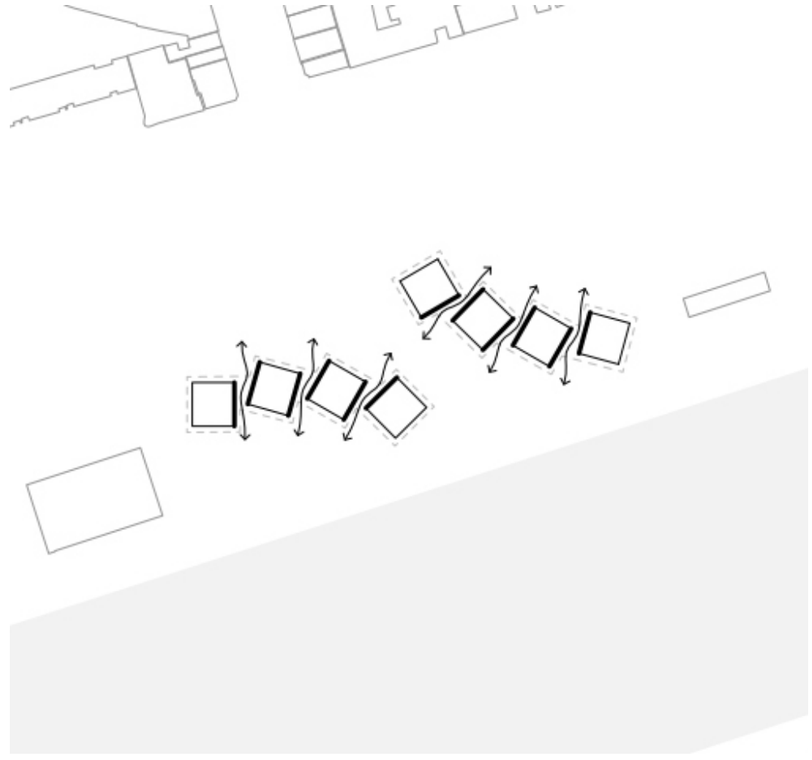
rotate

to face water and create plazas with different qualities



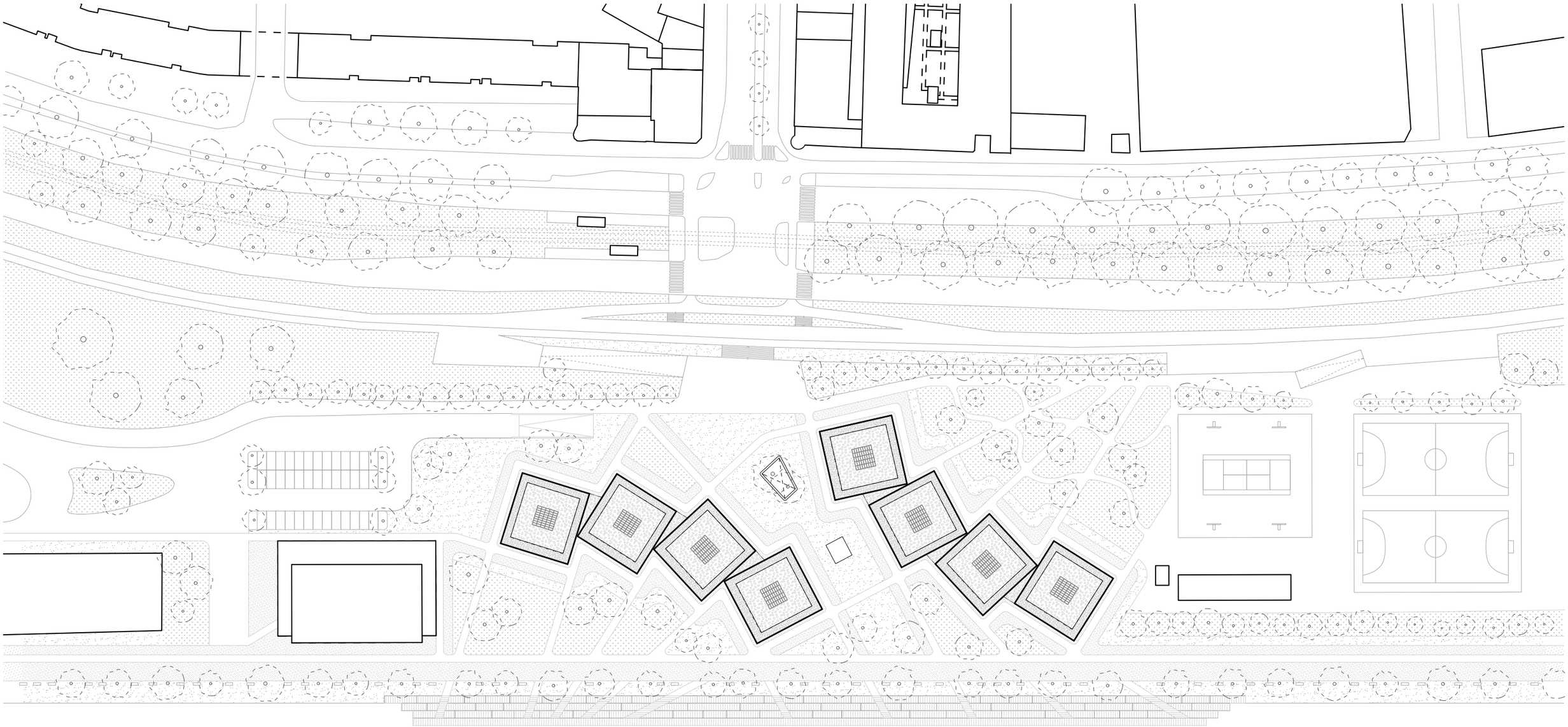
growing in height

bridge between existing identities



connections

allow a variety of flows and routes help the smaller grain



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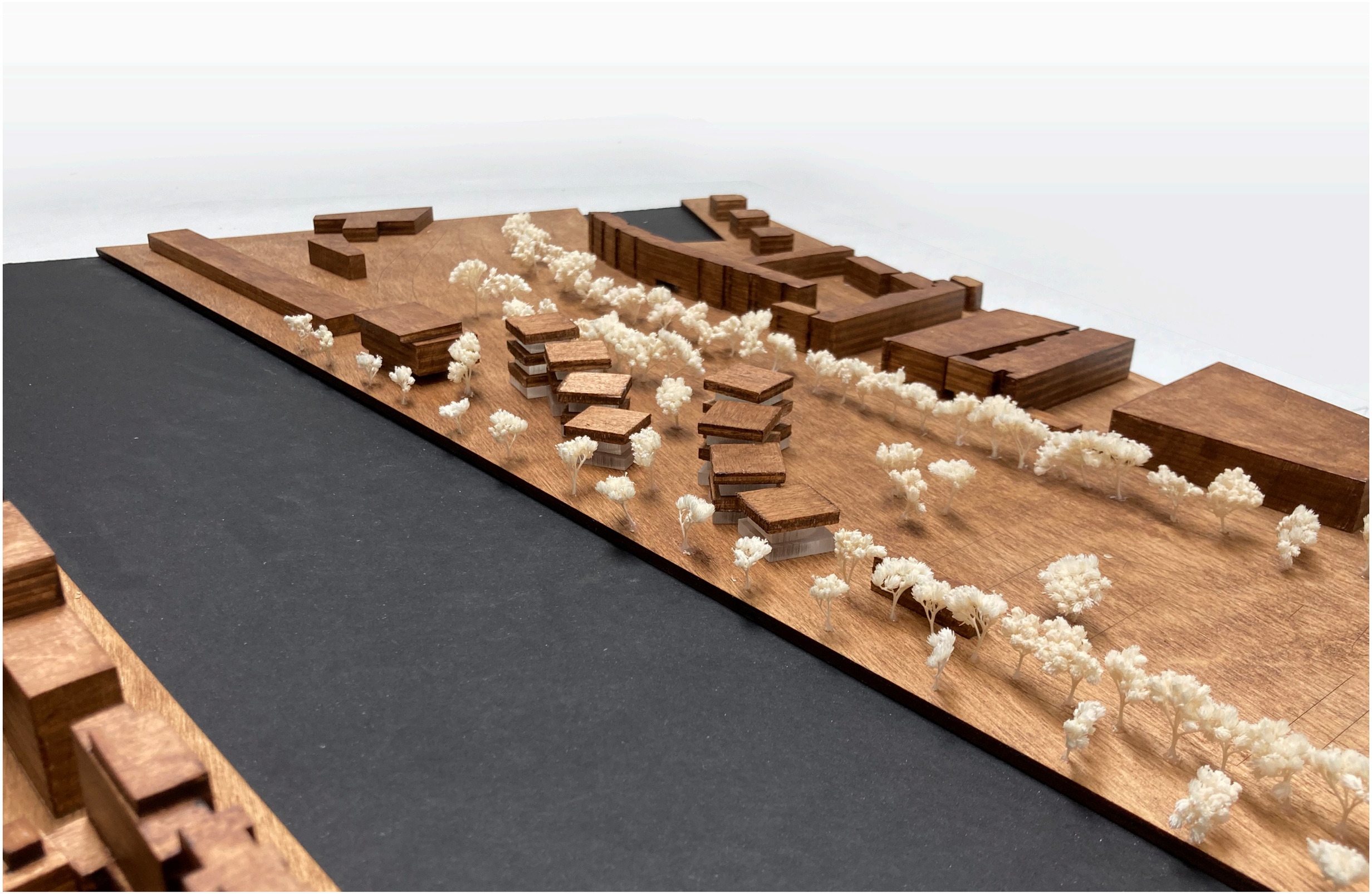
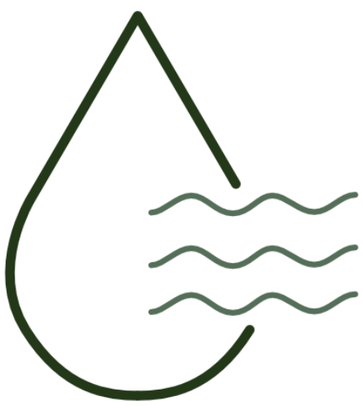
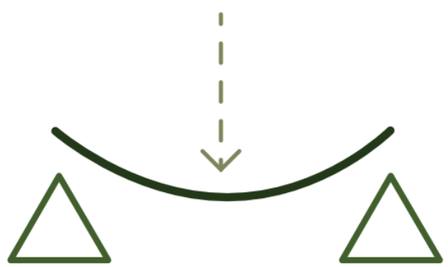


challenges with raw



water/humidity

how to protect from rain water, standing water and humidity while allowing aging/weathering

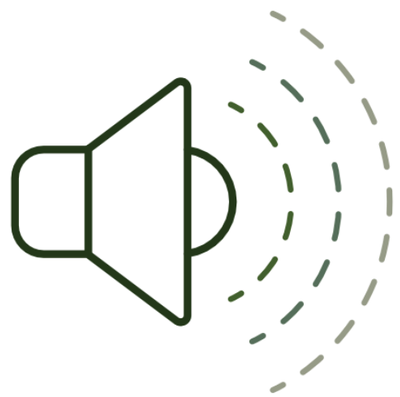


loadbearing structure

how to react on the different structural abilities/limits

fire safety

how to make the building safe while not covering all the structure

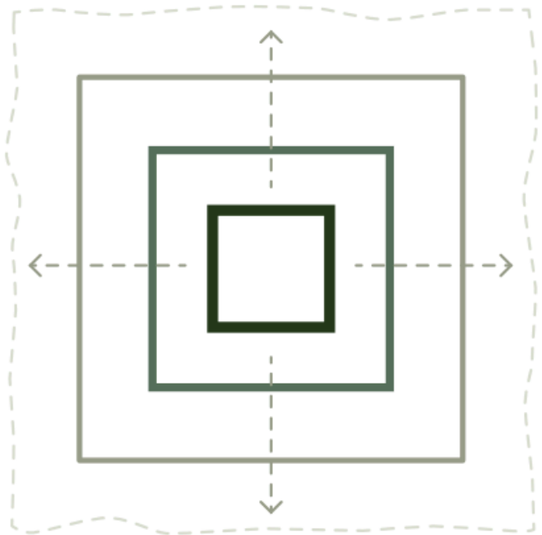


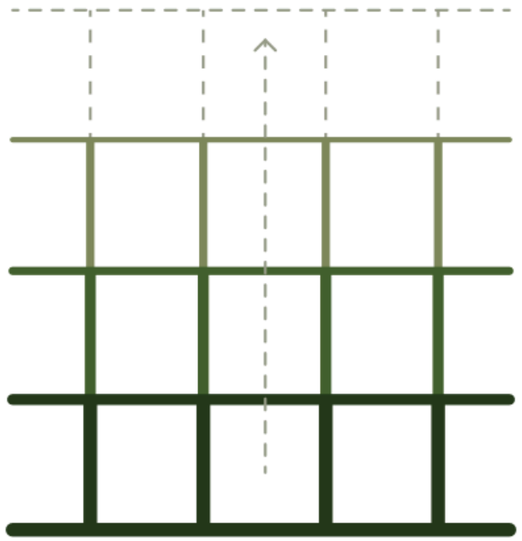
acoustics

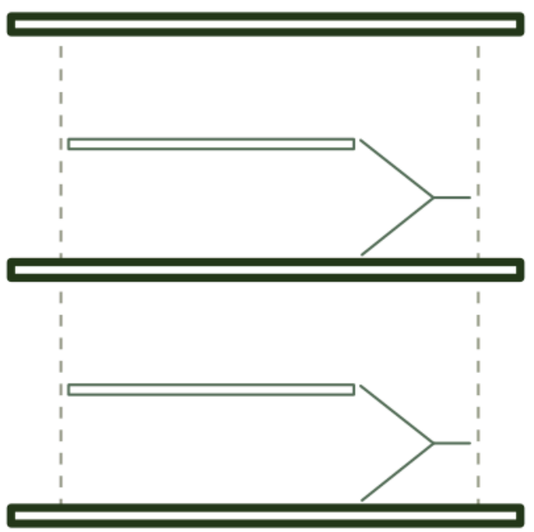
how to react to acoustics while not using unecessary amount of material/mass

→challenges as main design drivers

structural logic

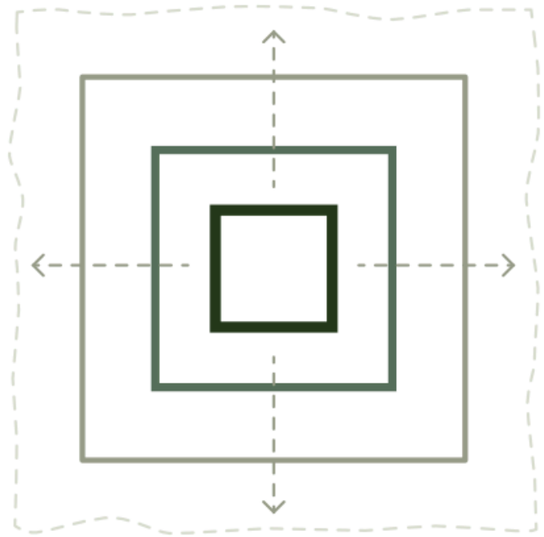






structural logic

1. strategy

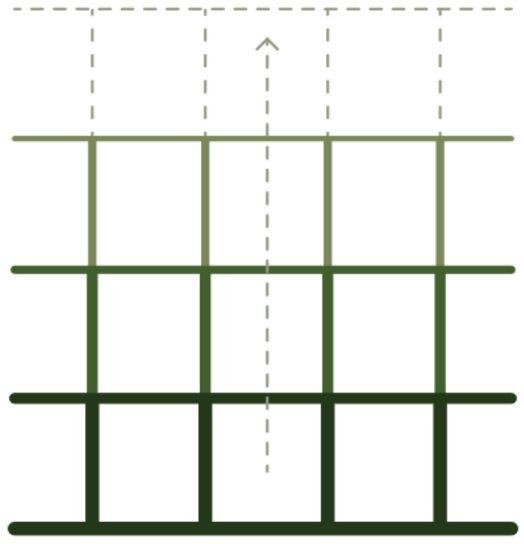


horizontal gradient

the core as the most treated component
and for lateral stability,
less treated towards the facade

structural logic

2. strategy

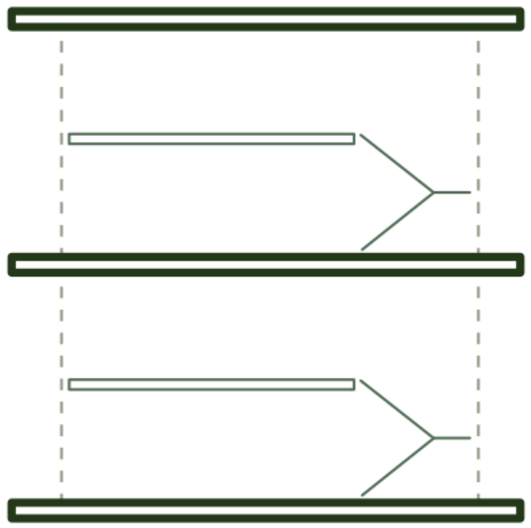


vertical gradient

dimensions and mass reduces towards the top to save weight/material

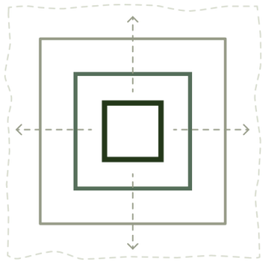
structural logic

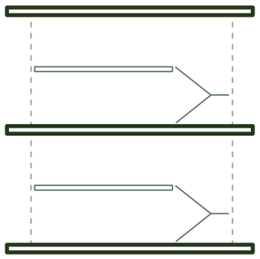
3. strategy

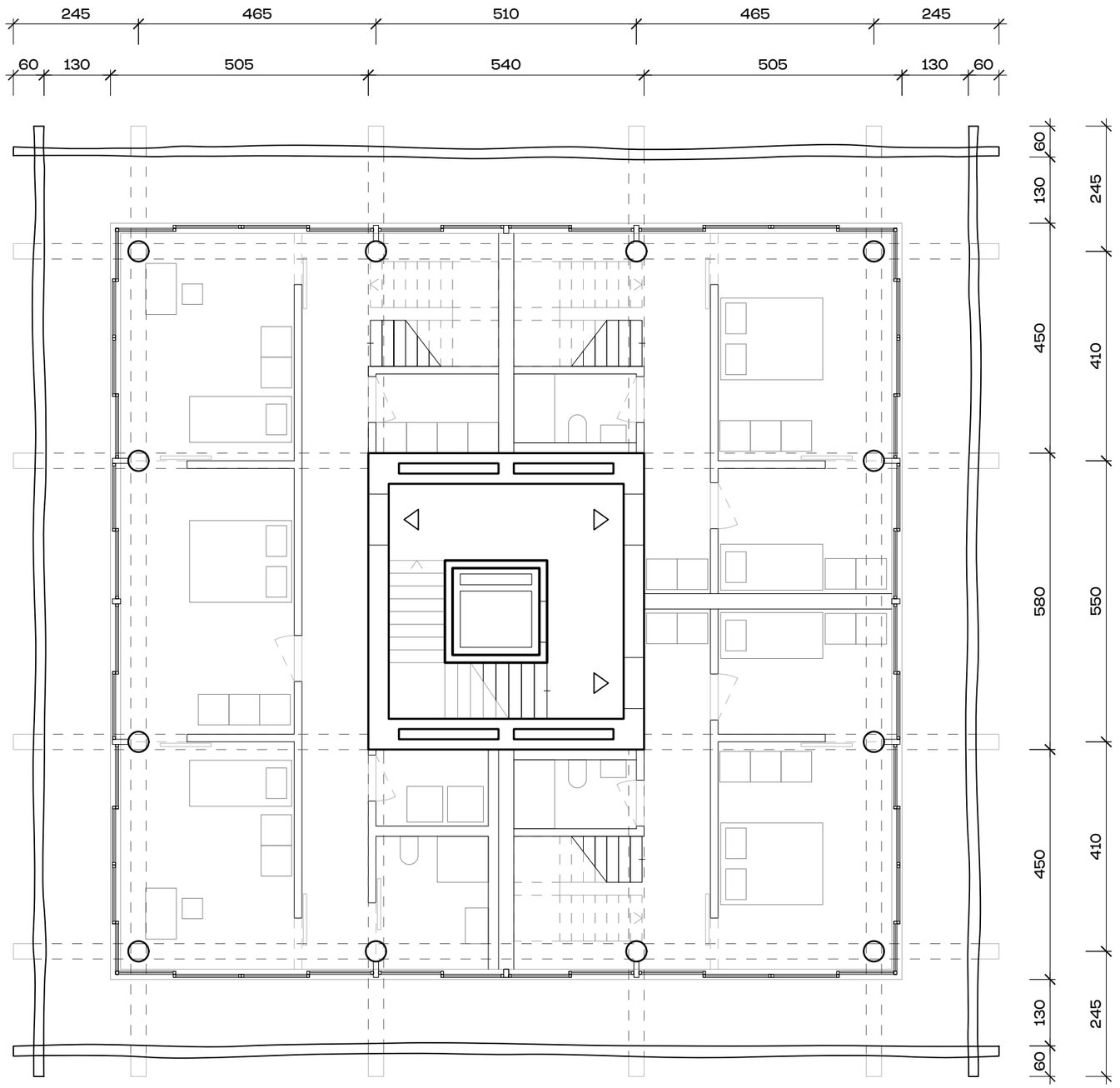


maisonette

maisonette logic allows to reduce the fire
and acoustic requirements by half,
this saves material and allows more
untreated material within one unit



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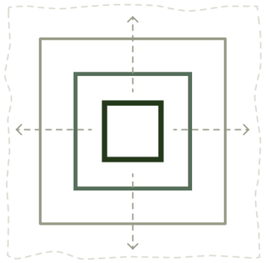

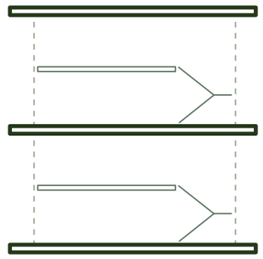

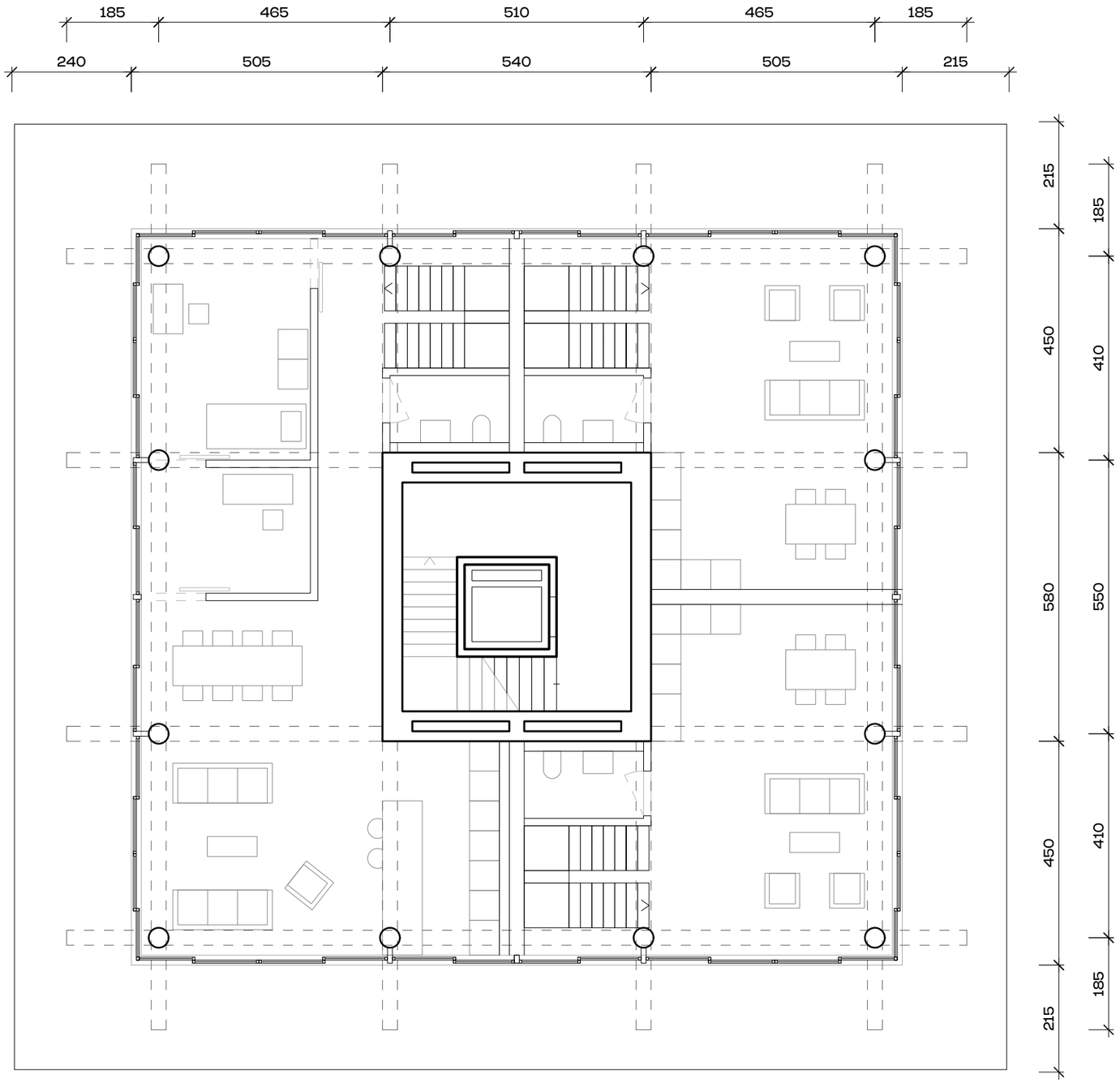
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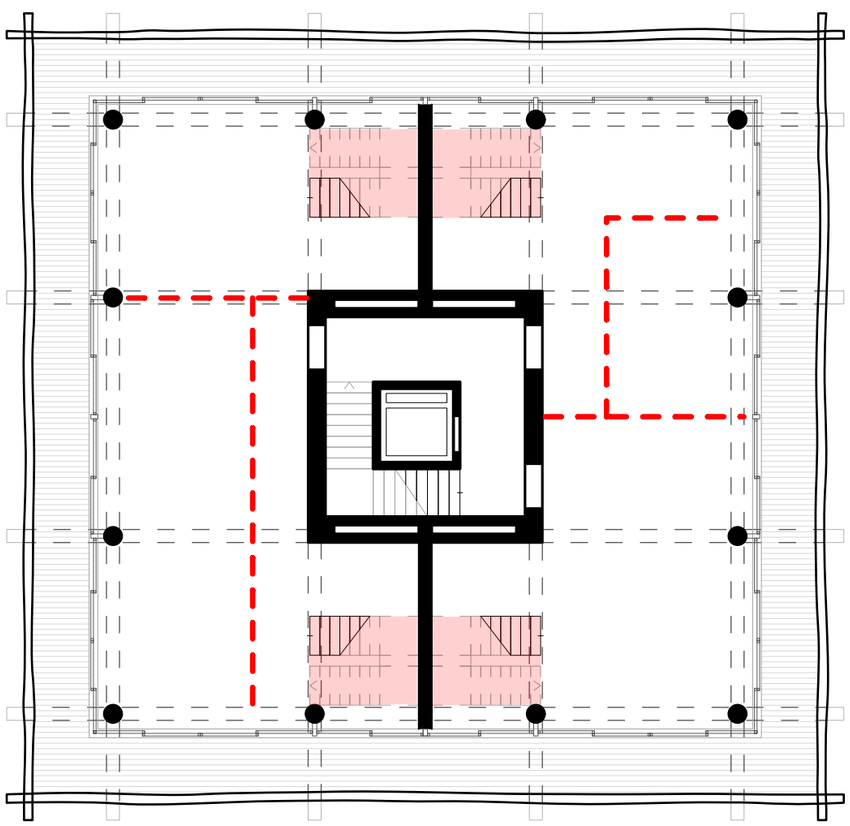
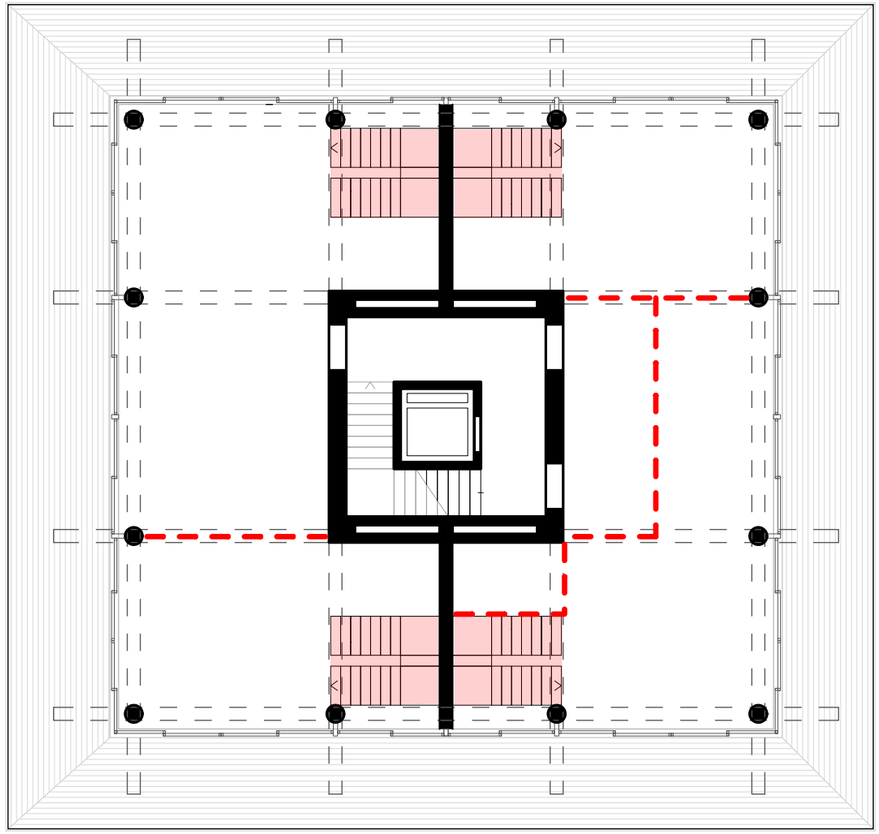


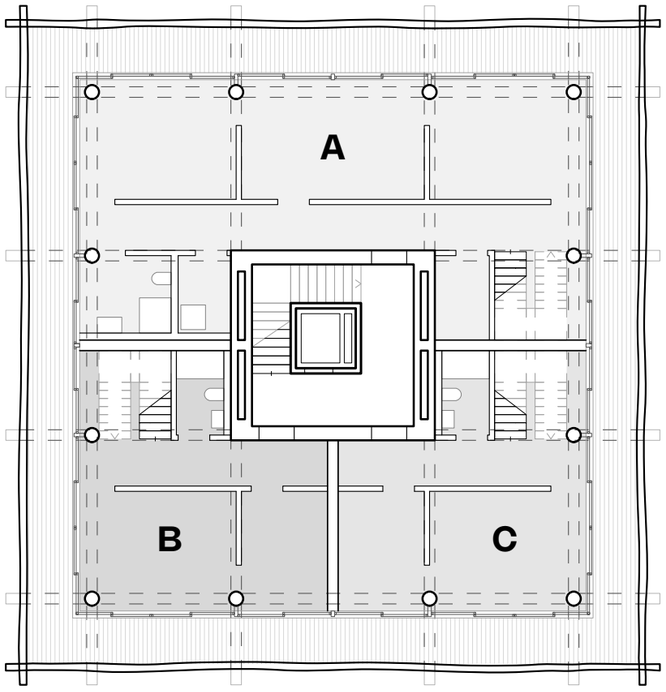


set

flexible

60 – 160m²

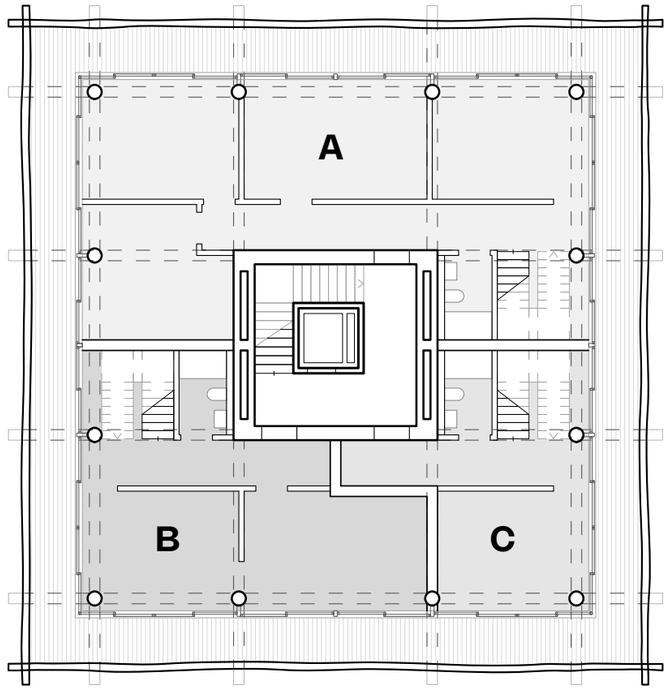
1. – 6. bedrooms



apartment A
6 rooms – 160m²

apartment B
3 rooms – 80m²

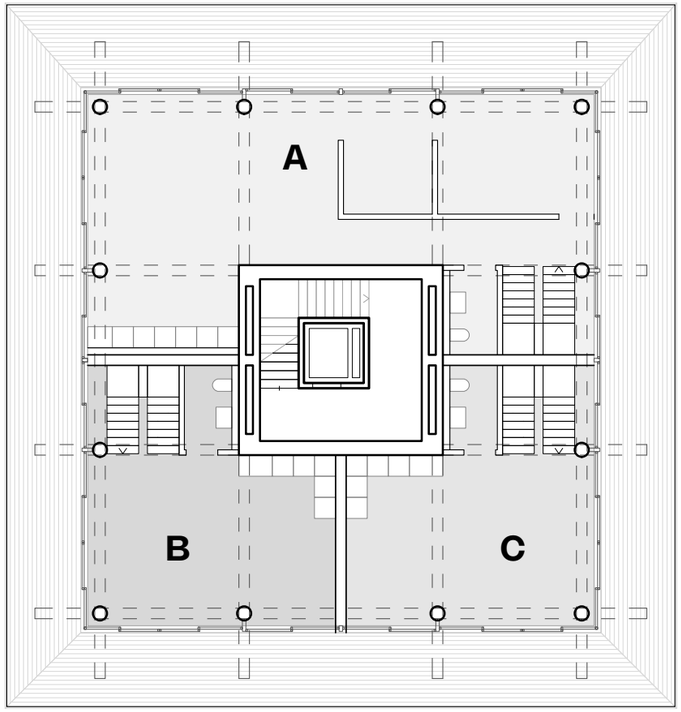
apartment C
3 rooms – 80m²

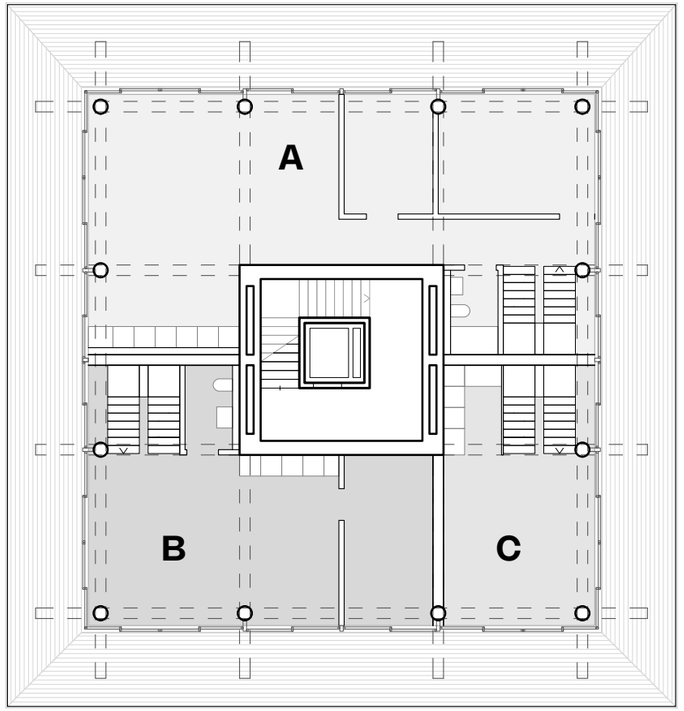


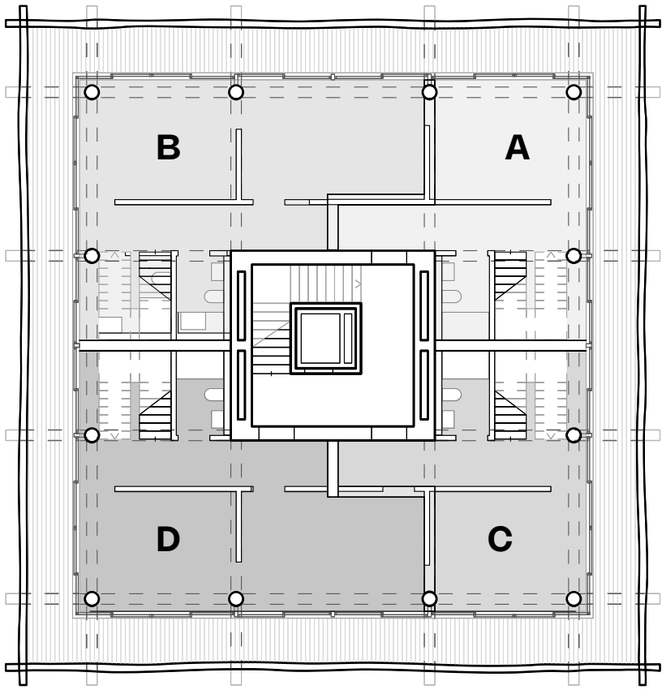
apartment A
7 rooms – 160m²

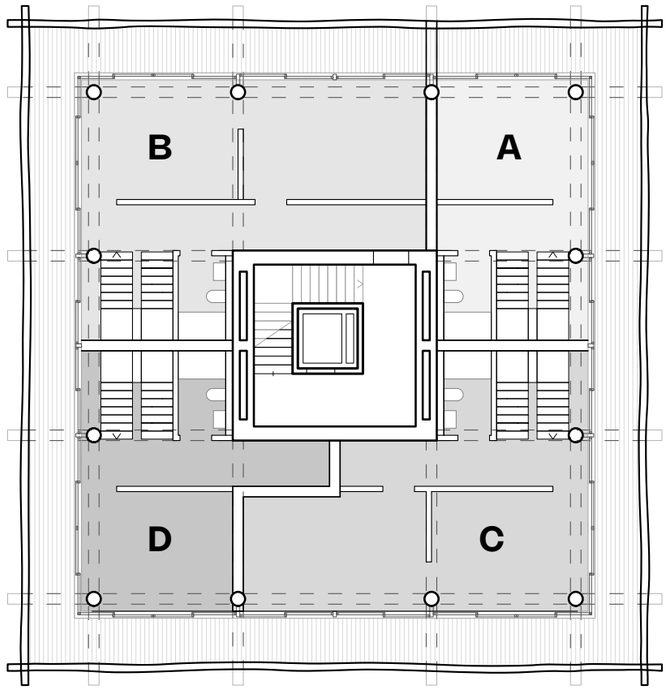
apartment B
4 rooms – 95m²

apartment C
2 rooms – 52m²







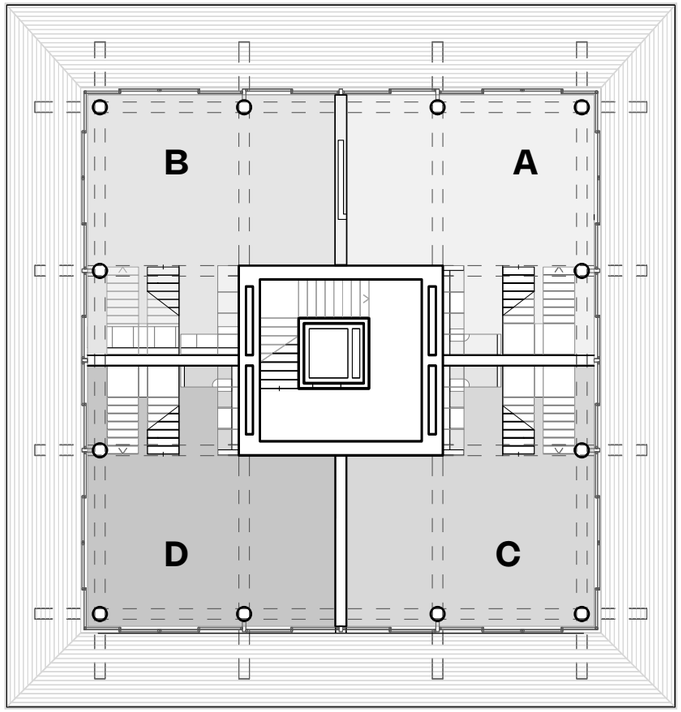


apartment A
3 rooms – 89m²

apartment B
5 rooms – 132m²

apartment C
4 rooms – 110m²

apartment D
4 rooms – 110m²



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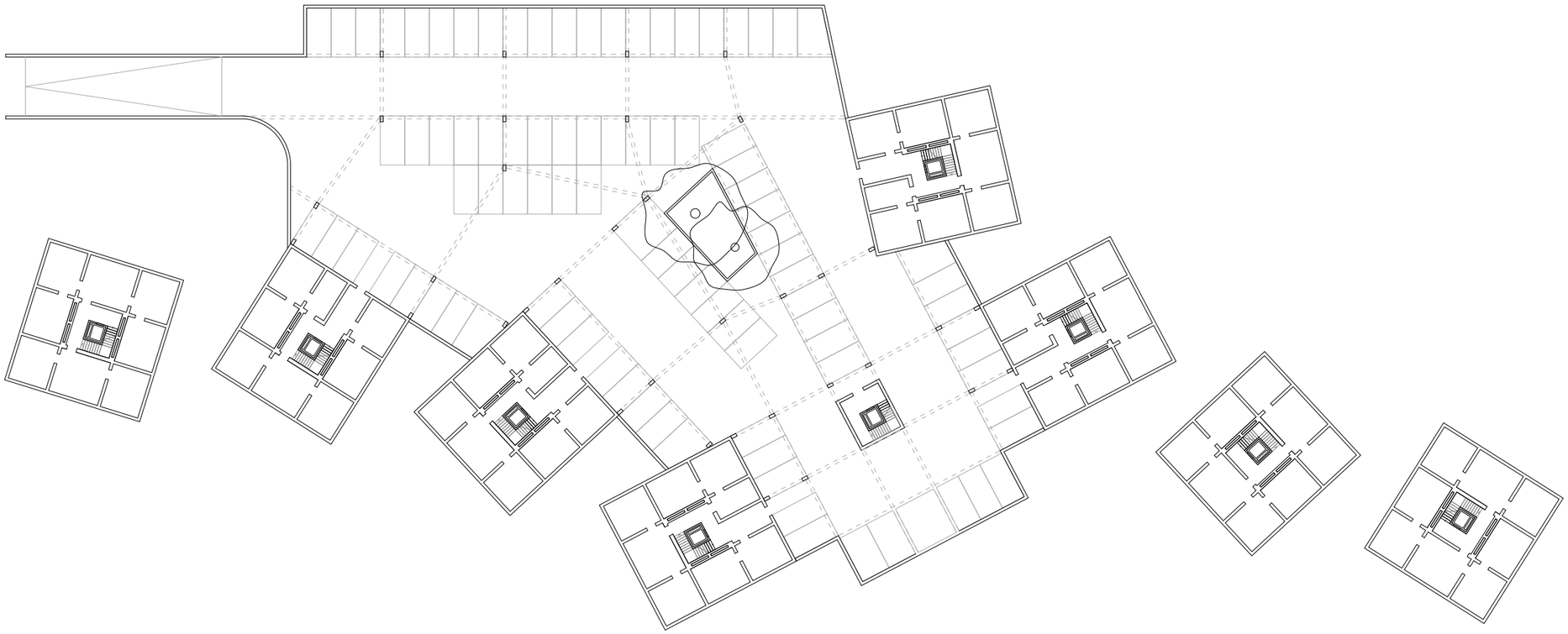

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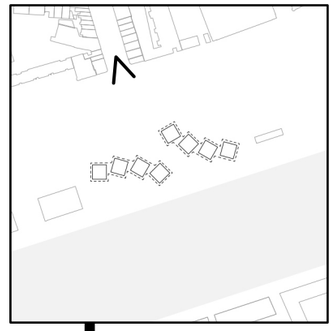
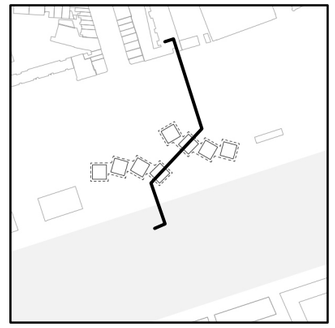
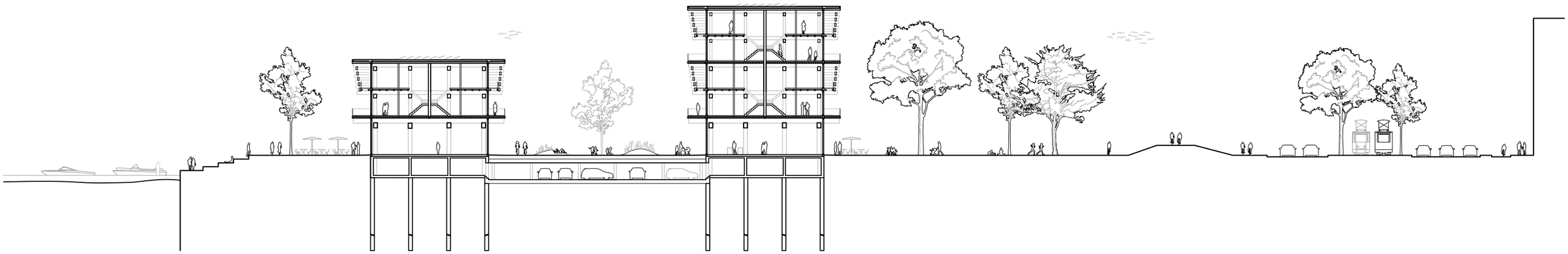
perspective **outlook**

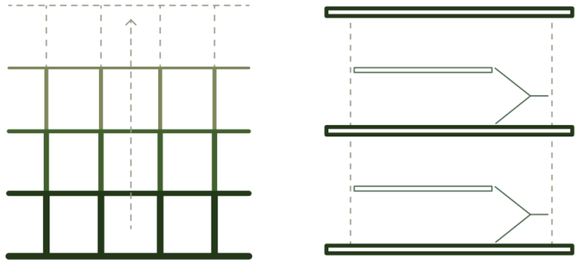


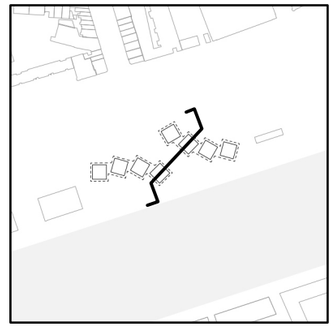


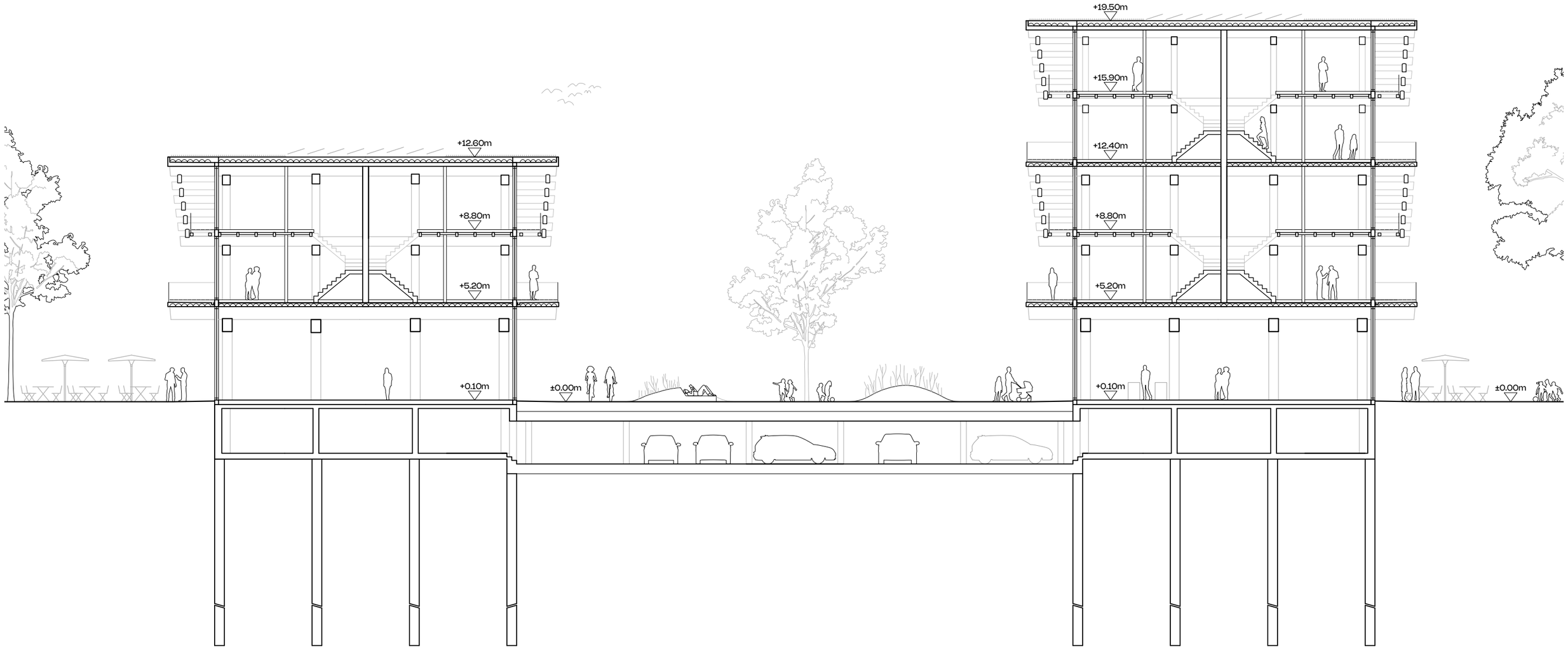


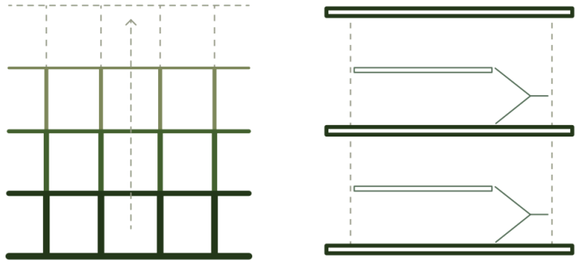
Stockholm, Henriksdalshamnen – AJ Landskap

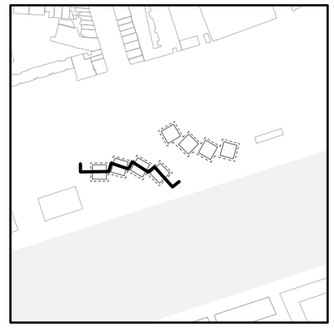
Copenhagen, Nordhavn waterfront – Cobe

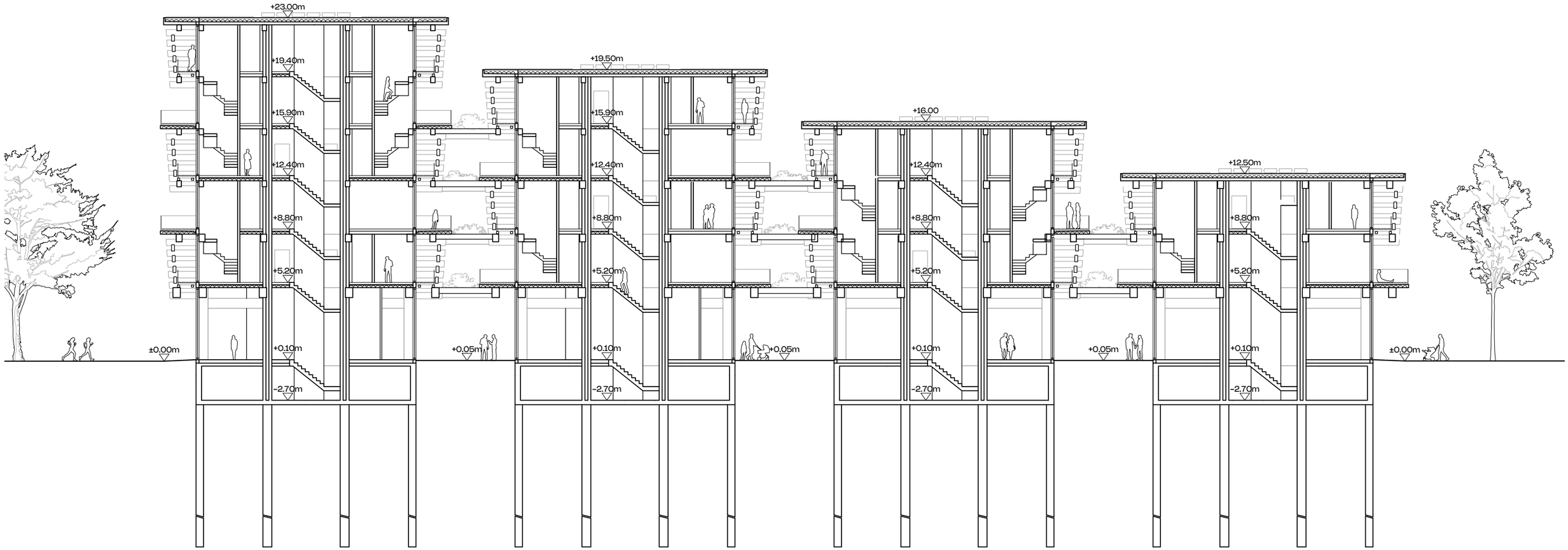





+19.50m
+15.90m
+12.60m
+12.40m
+8.80m
+8.80m
+5.20m
+5.20m
+0.10m
±0.00m
+0.10m
±0.00m



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+19.40m
+15.90m
+12.40m
+8.80m
+5.20m
+0.10m
-2.70m
±0.00m
+19.50m
+15.90m
+12.40m
+8.80m
+5.20m
+0.10m
-2.70m
+0.05m
+16.00
+12.40m
+8.80m
+5.20m
+0.10m
-2.70m
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+12.50m
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+5.20m
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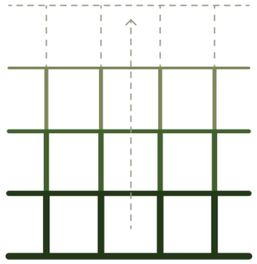
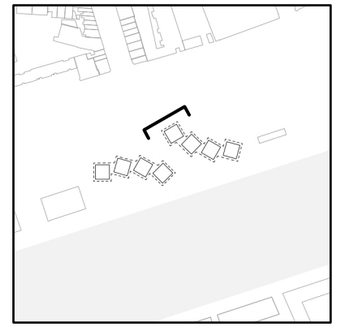
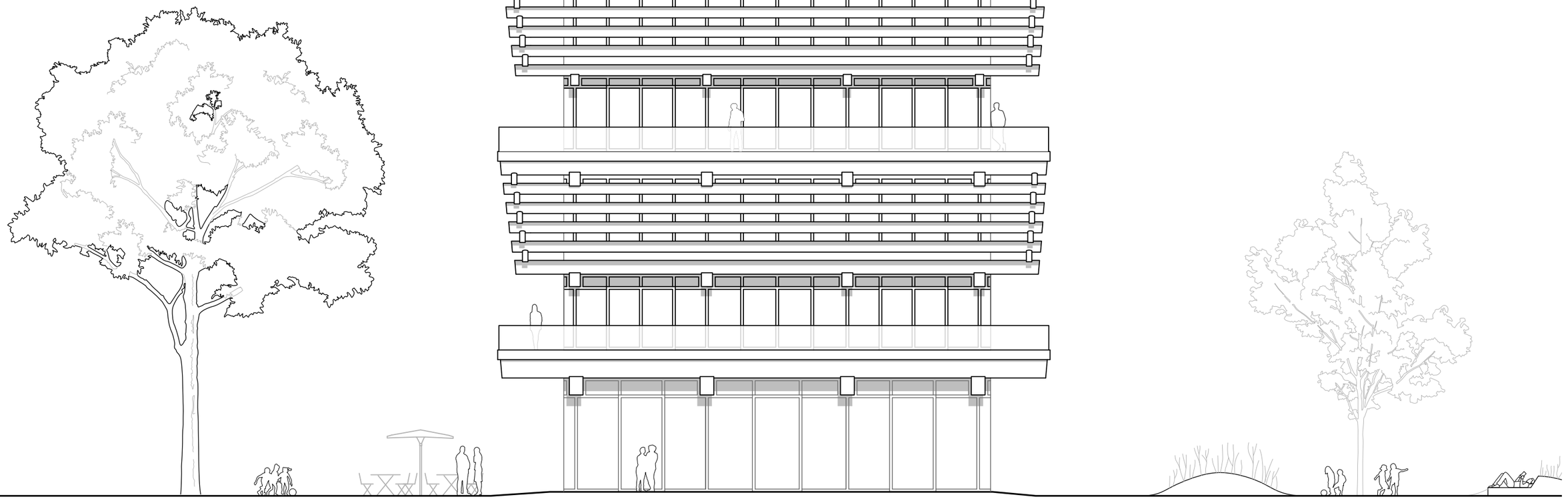
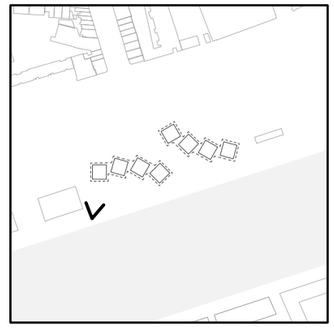
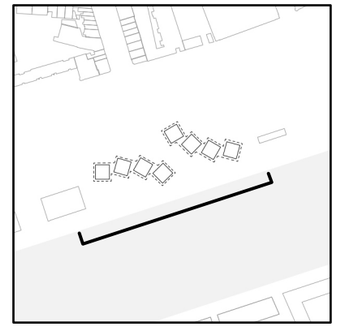
-2.70m
+0.05m
±0.00m

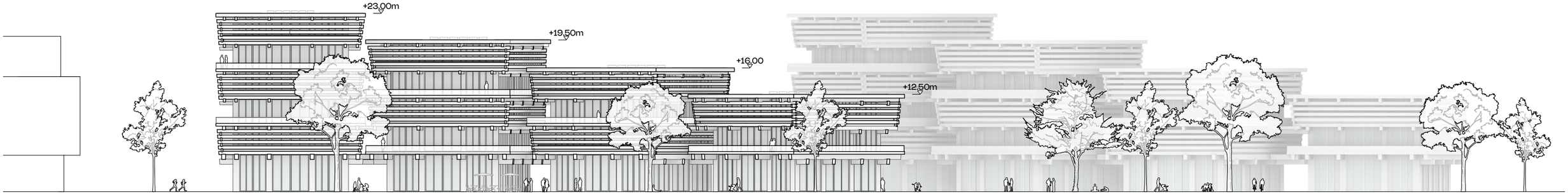


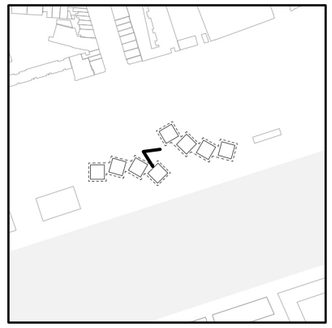


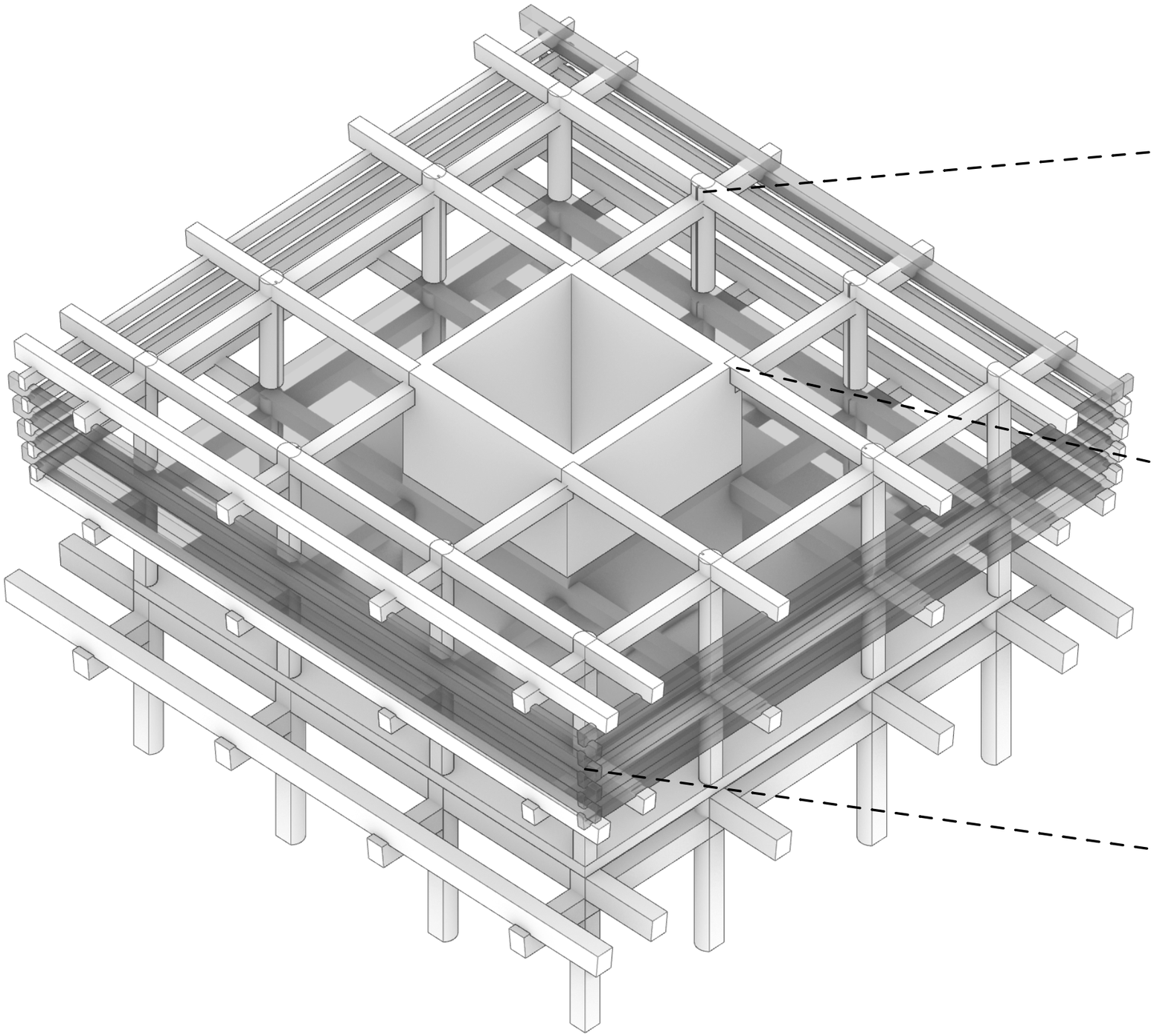


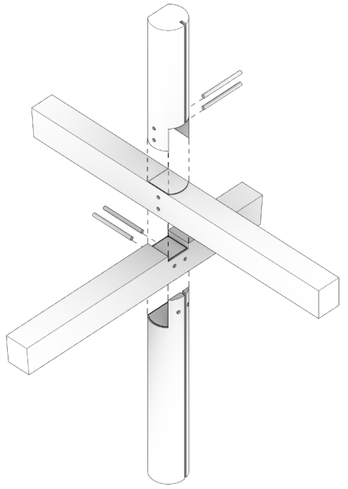


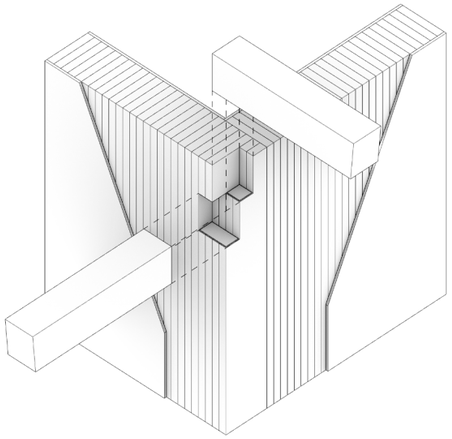


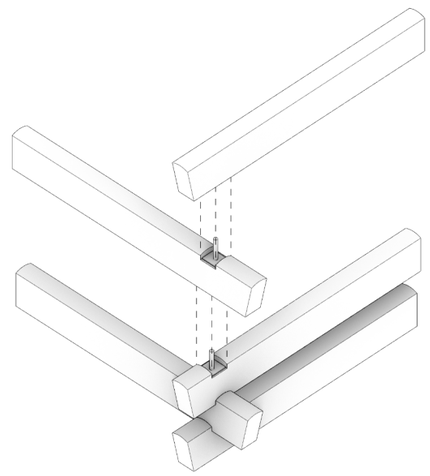

+23.00m
+19.50m
+19.50m
+16.00
+12.50m

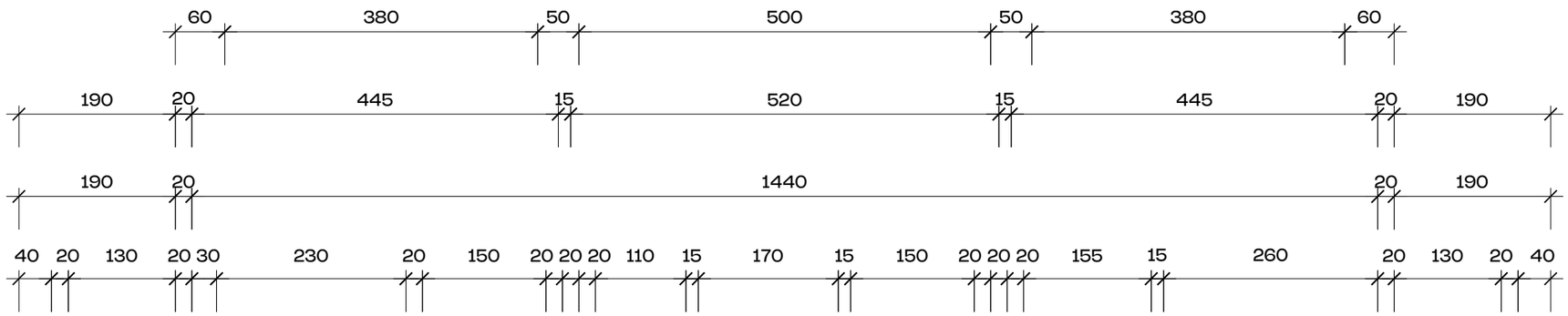








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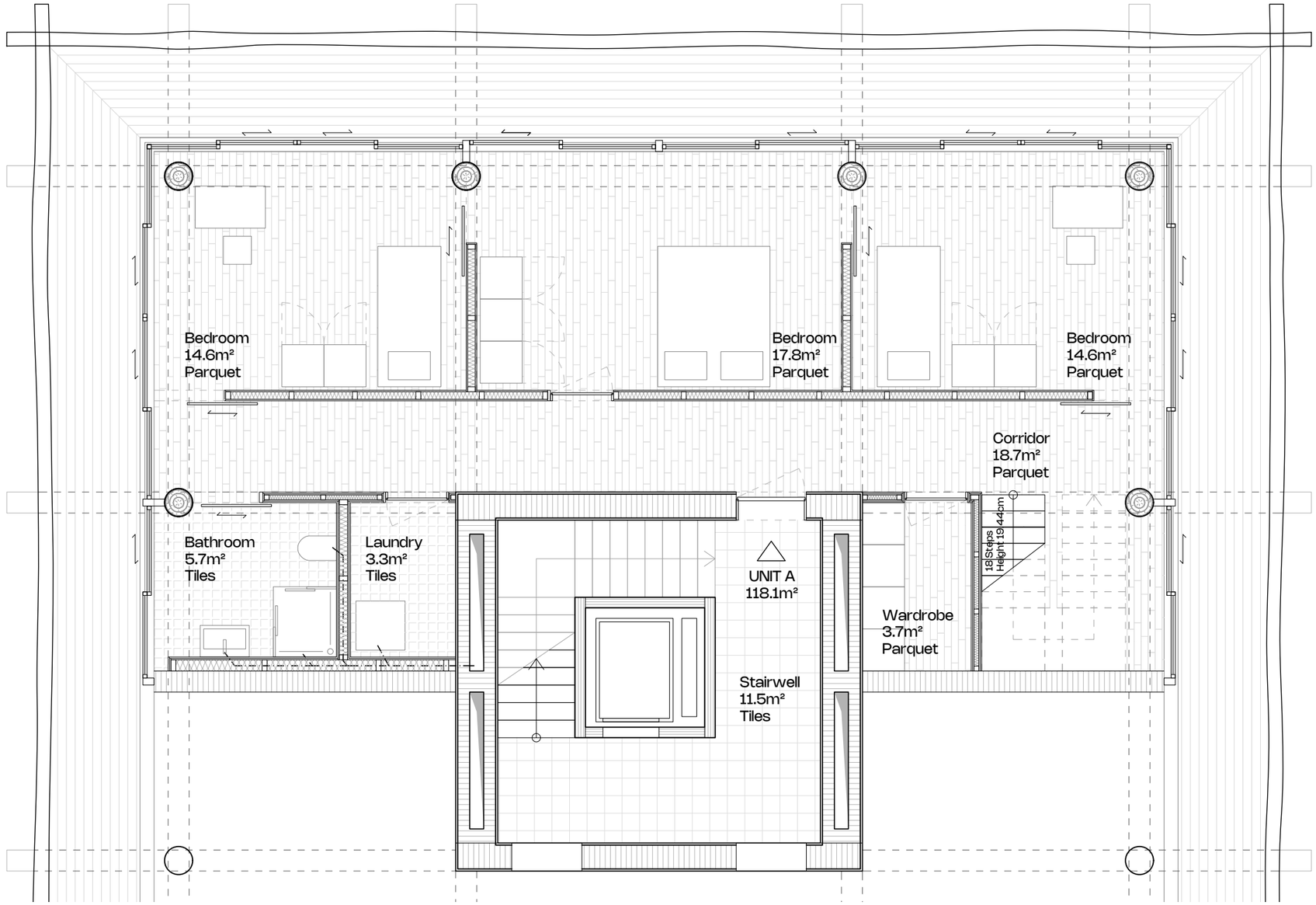
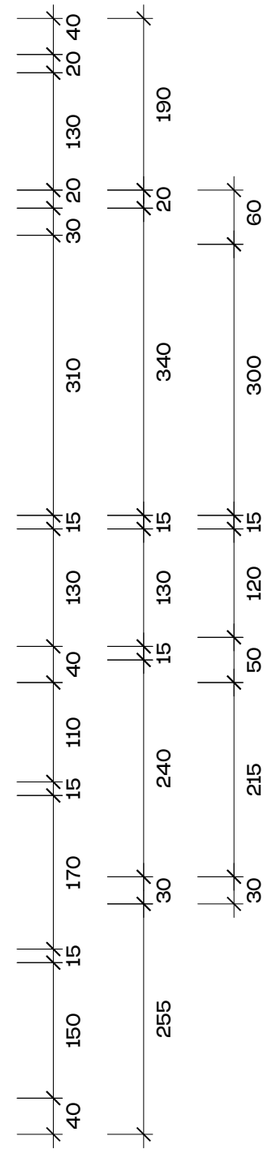
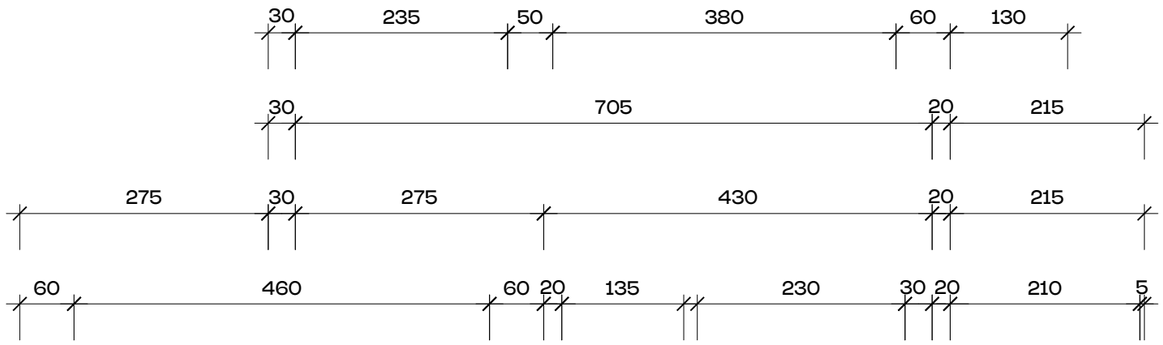
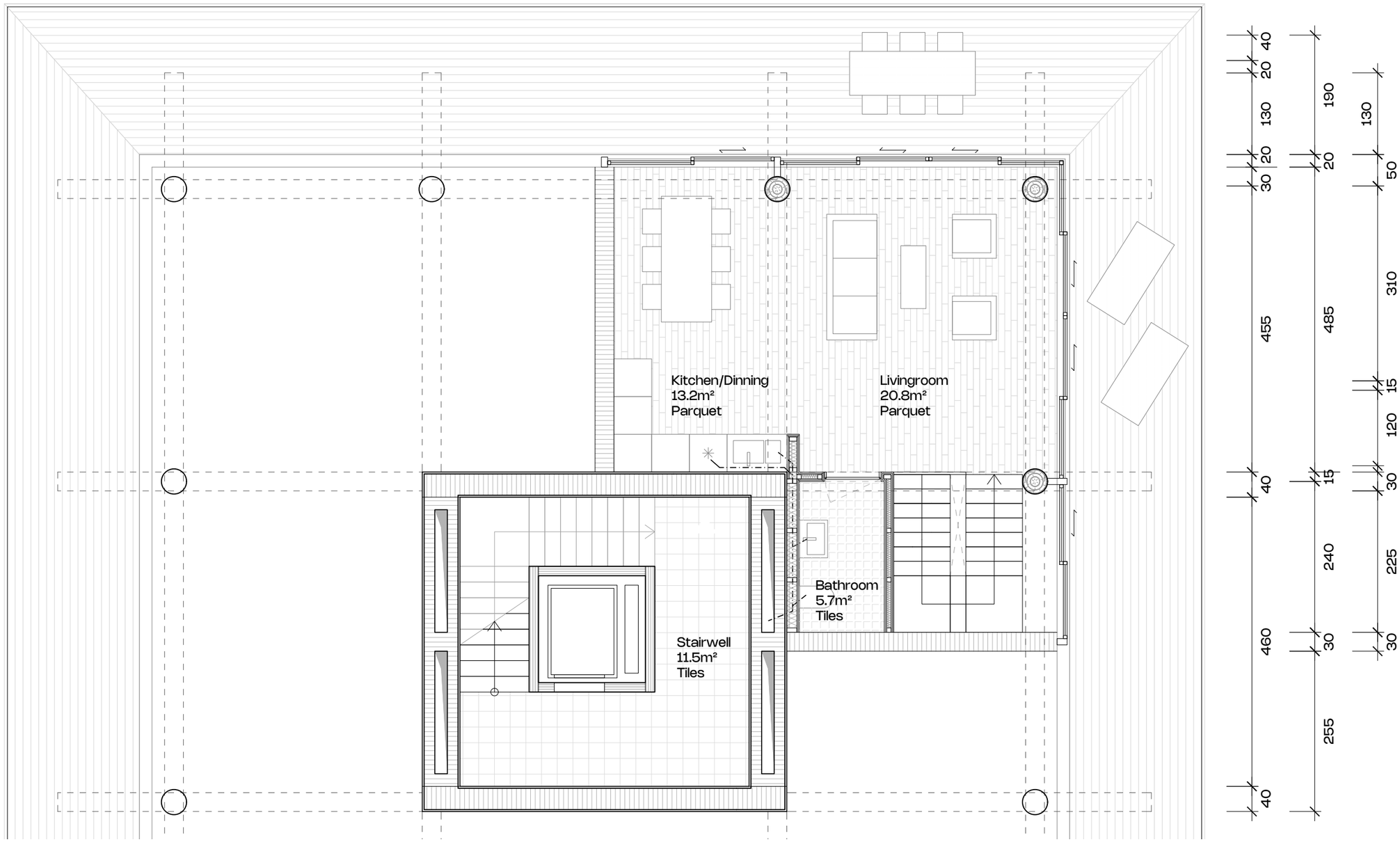
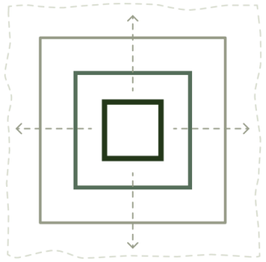
190 20 445 15 520 15 445 20 190
190 20 1440 20 190
40 20 130 20 30 230 20 150 20 20 20 110 15 170 15 150 20 20 20 155 15 260 20 130 20 40


Bedroom
14.6m²
Parquet
Bedroom
17.8m²
Parquet
Bedroom
14.6m²
Parquet
Corridor
18.7m²
Parquet
Bathroom
5.7m²
Tiles
Laundry
3.3m²
Tiles
UNIT A
118.1m²
Wardrobe
3.7m²
Parquet
Stairwell
11.5m²
Tiles
18 Steps
Height 19.44cm


40 20 130 20 30 310 15 170 15 150 40
190 20 340 15 130 15 240 30 255 40
60 300 15 120 50 215 30


30
235
50
380
60
130
30
705
20
215
275
30
275
430
20
215
60
460
60
20
135
230
30
20
210
5


Kitchen/Dinning
13.2m²
Parquet
Livingroom
20.8m²
Parquet
Bathroom
5.7m²
Tiles
Stairwell
11.5m²
Tiles
40
20
130
20
30
455
190
20
485
130
50
310
15
120
30
40
15
240
225
460
30
30
255
40

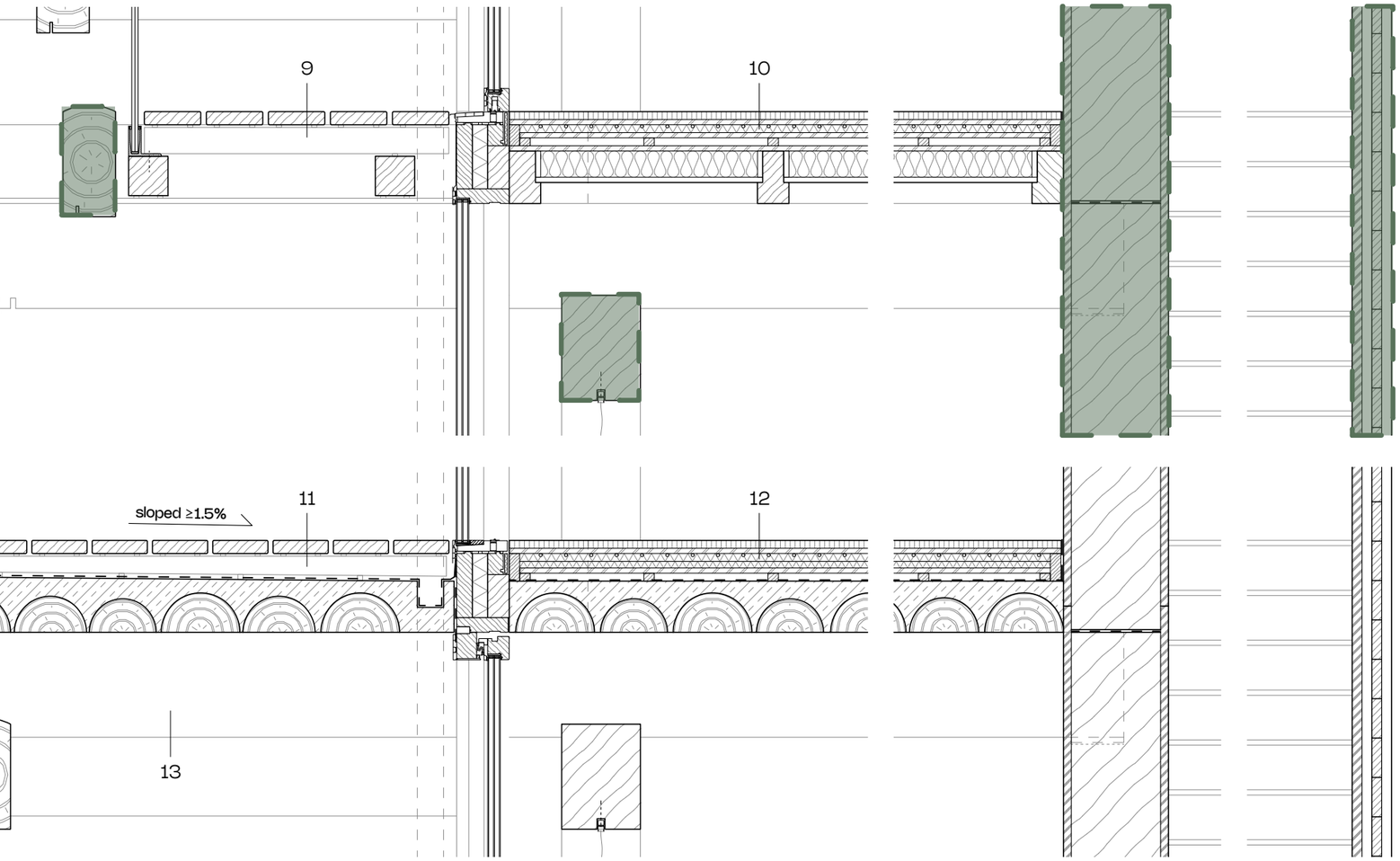


facade
sawn timber
C14/18

beams/columns
sawn timber
C24

stairwell core
D(L)T
C30

elevator core
CLT
C30



engawa
light timber frame

terrace
timber hybrid

maisonette
timber frame

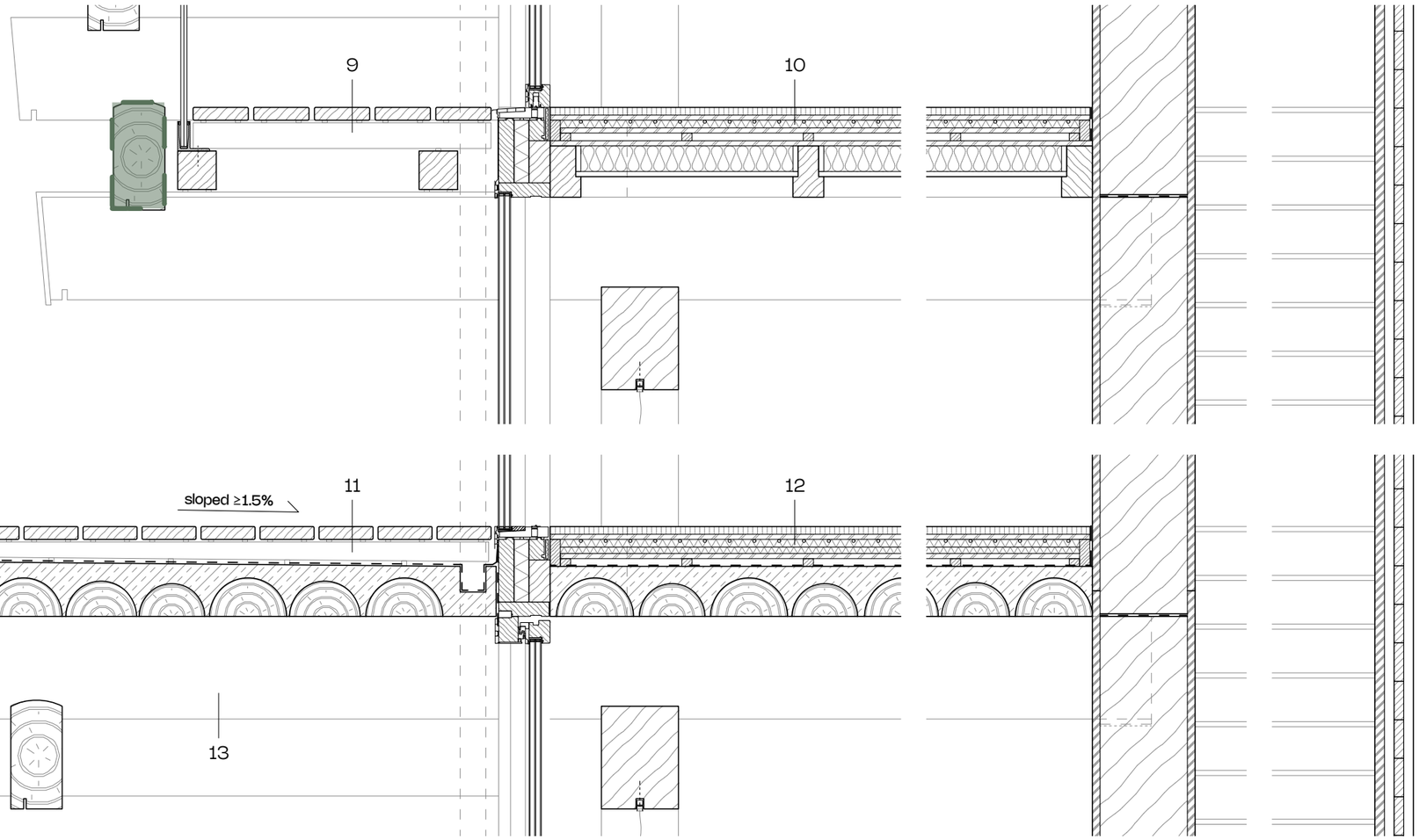
ceiling
timber hybrid

facade

larch

- ✓ durable
- ✓ stability (against wind)
- ✓ even weathering
- ✓ high resin (insects/rot)
- ✓ availability

- ✗ more expensive then douglas
- ✗ can crack (→ good details)

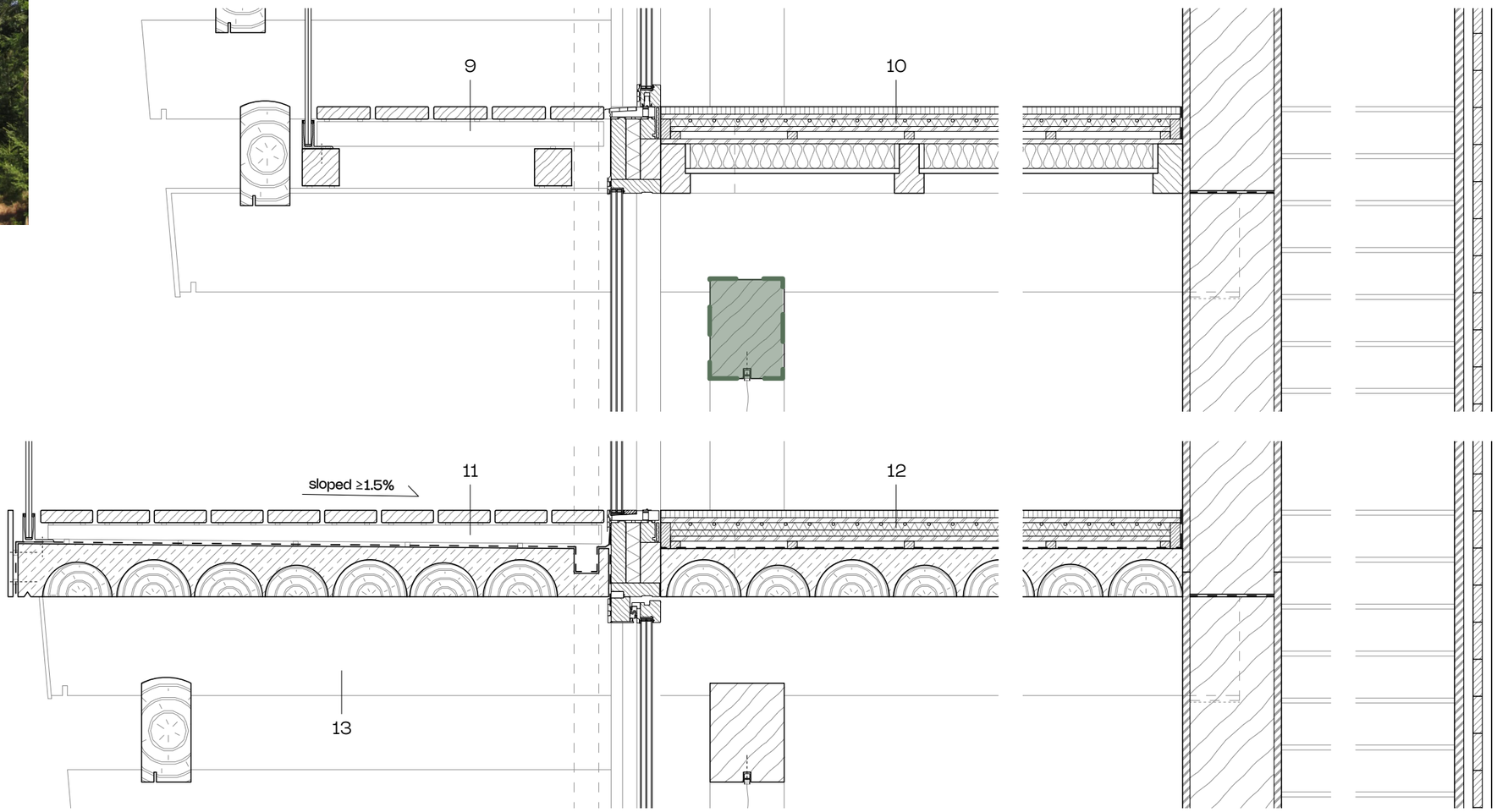


Beams/columns

douglas fir

- ✓ durable
- ✓ grows quite straight
- ✓ strong fibers
- ✓ available (even in NL)
- ✓ less expensive

- ✗ not so even weathering
- ✗ softwood
- ✗ easy to scratch or damage physically

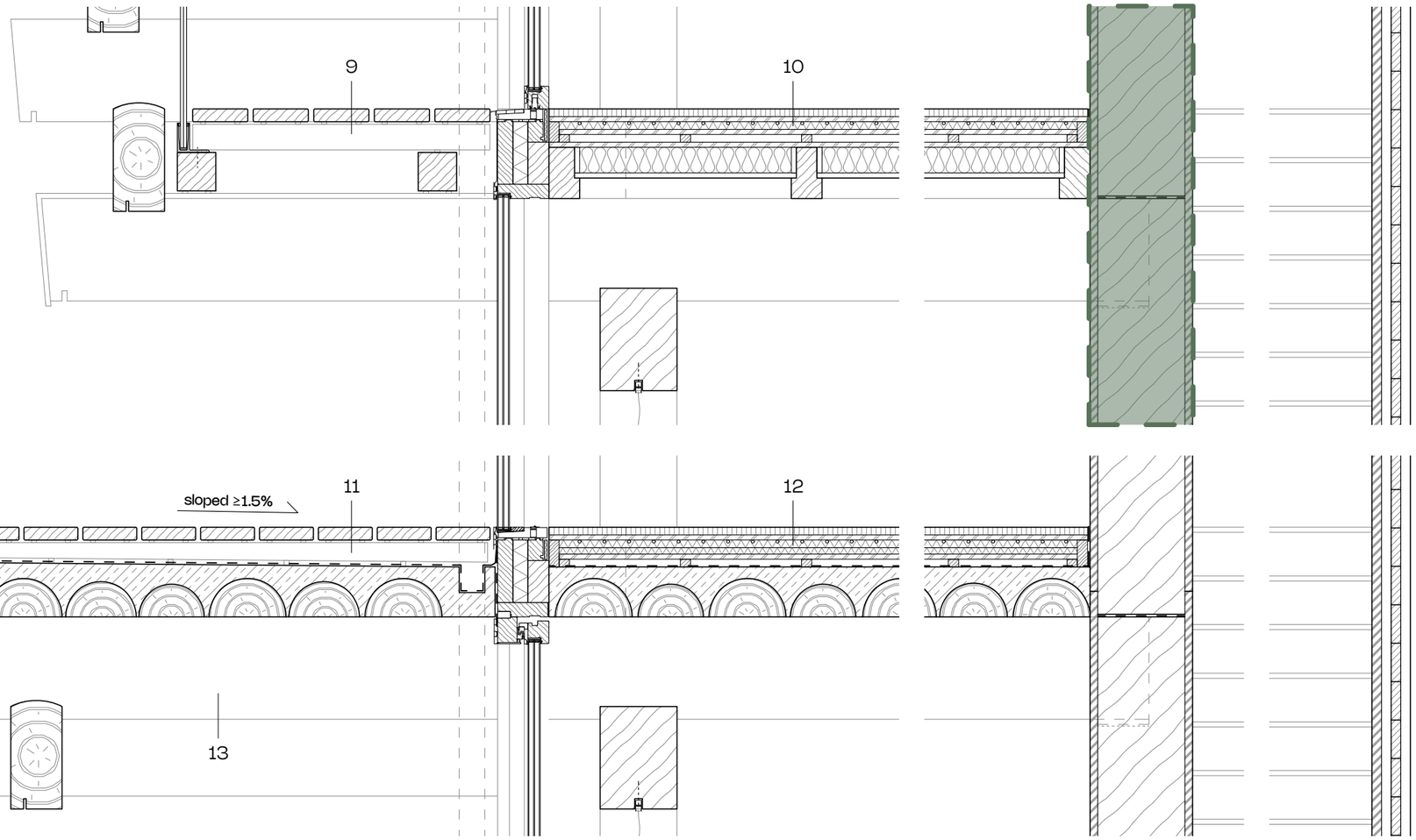


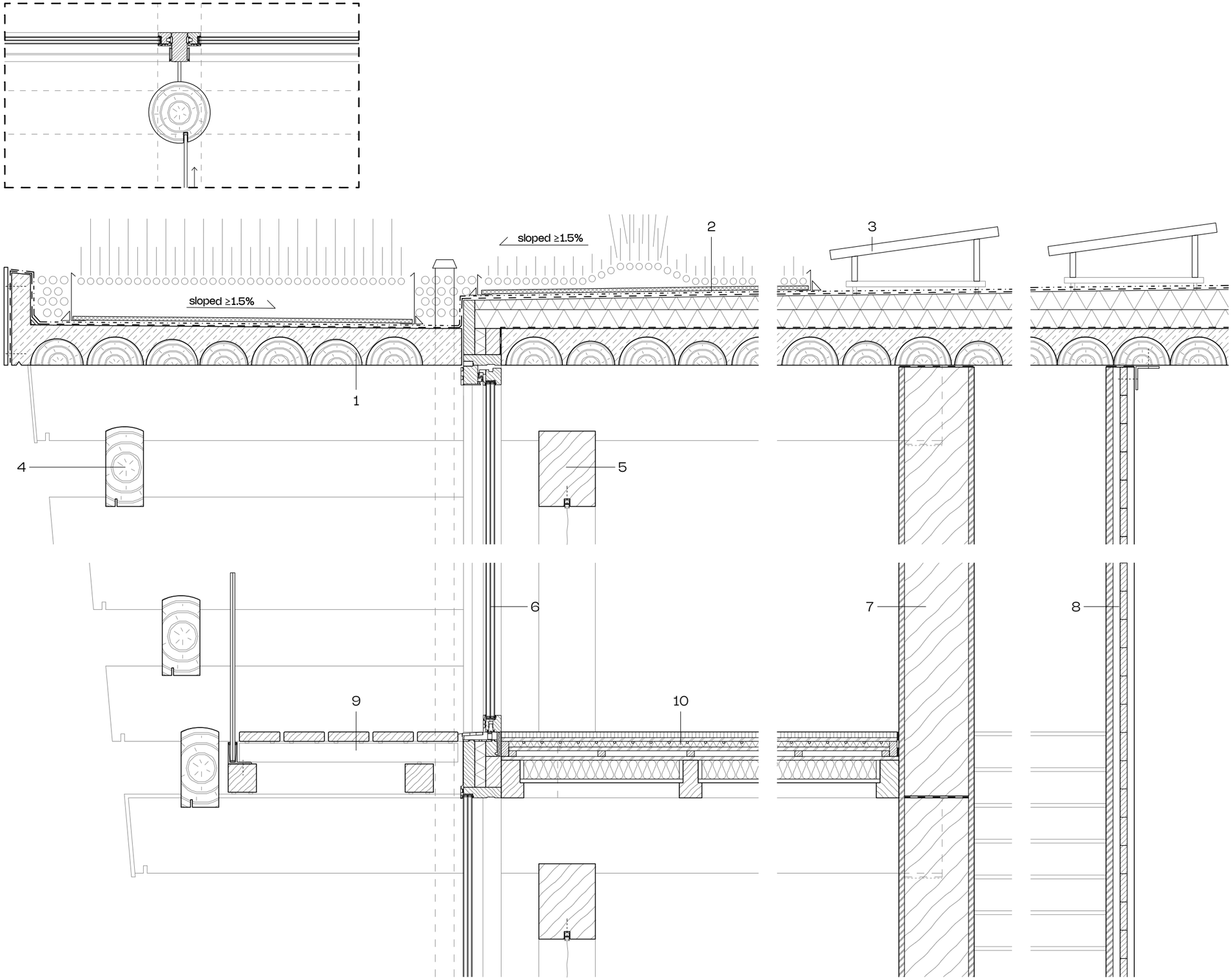
core

spruce

- ✓ strong and light
- ✓ straight grain
- ✓ cheap
- ✓ widely available
- ✓ aasy to work with

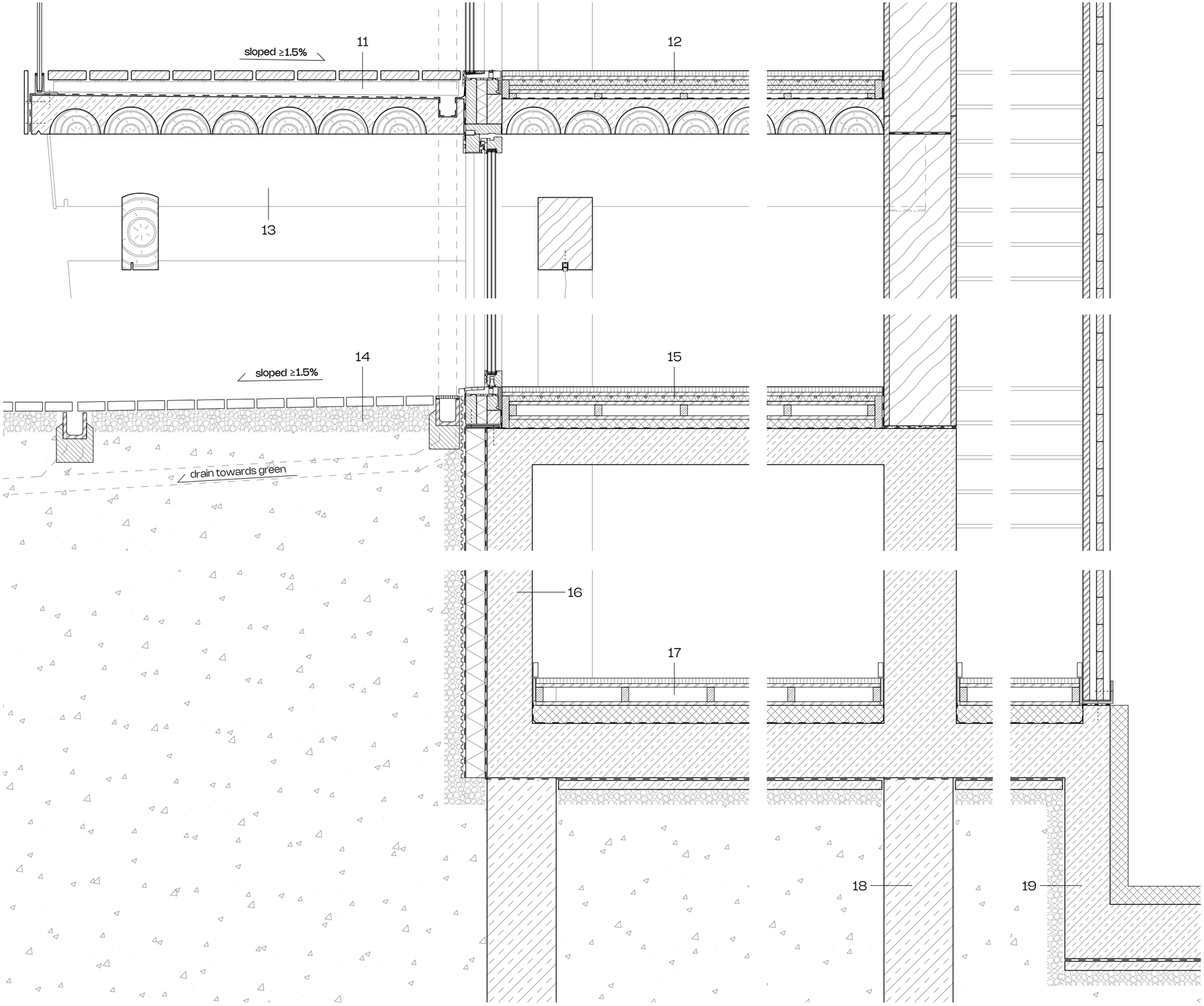
- ✗ rots quickly outdoors (low resistance)
- ✗ lots of knots
- ✗ small cracking when drying





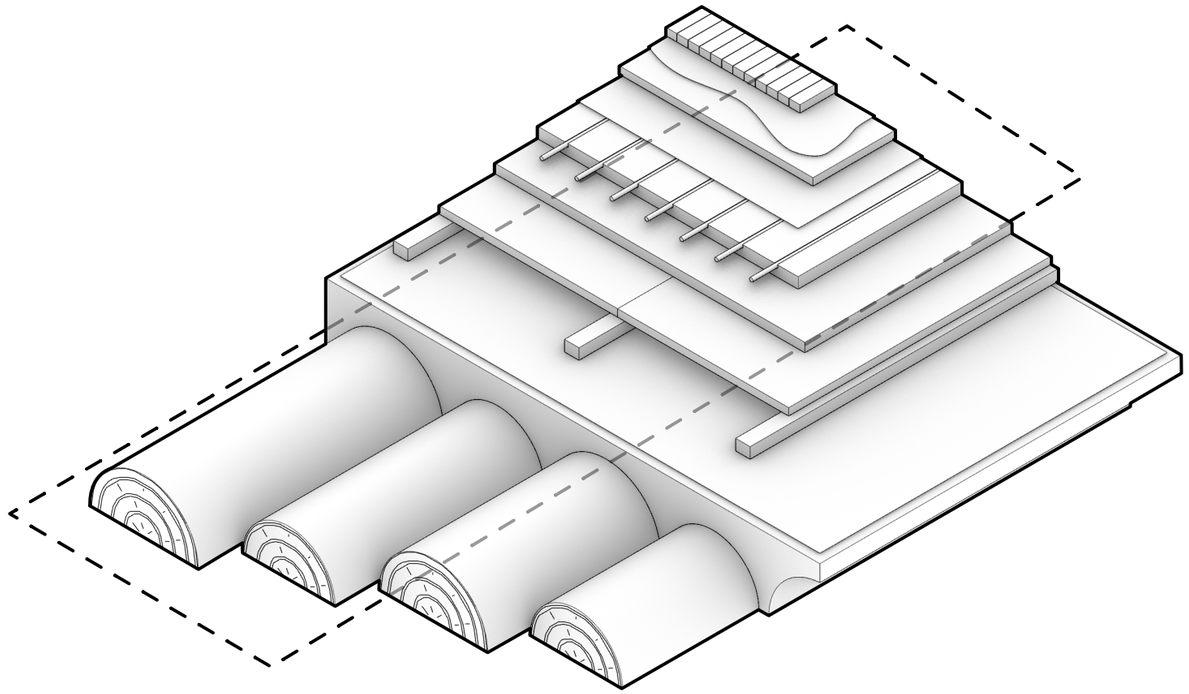
1		Prefab roof:
	300mm	Extensive green
	80mm	Substrate
	1mm	Filter fleece
	20mm	Drainage mat
	1mm	Root protection membran
	2mm	Waterproofing bitumen
	80mm	Sloped reinforced concrete
	150mm	Tree trunks
2		Roof:
	150mm	Extensive green
	80mm	Substrate
	1mm	Filter fleece
	20mm	Drainage mat
	1mm	Root protection membran
	2mm	Waterproofing bitumen
	>50mm	Sloped insulation
	100mm	Insulation
	1mm	Vapor barrier
	80mm	Reinforced concrete
	150mm	Tree trunks
3		PV panels
4		Sawn timber beam: 400mm x 200mm Douglas fir With cut against cracking used as dripping edge
5		Structural tiimber beam: 500mm x 300mm douglas fir min. C24 graded With cut against cracking used for curtains/lights
6		Sliding timber window: double glazed even with floor
7		GLT core:
	30mm	sheathing (against smoke/fire)
	340mm	GLT
	30mm	sheathing (against smoke/fire)
8		Elevator core:
	30mm	sheathing (against smoke/fire)
	120mm	CLT 3-layers
9		Engawa with glass railing:
	50mm	Wooden planks (douglas fir)
	10mm	Spacer
	100mm	Counter batten
	10mm	Spacer
	150mm	Batten
	10mm	Spacer
10		Floor maisonette:
	30mm	Industrial parquet
	1mm	Glue
	20mm	OSB
	30mm	Woodfiberinsulation + FH
	25mm	Cork
	20mm	OSB
	30mm	Installation layer
	20mm	OSB 3/4 (vapor barrier)
	200mm	Batten/Insulation

facade section 1:20 **drawings**



11		Prefab terrace with gutter and glass railing:
	50mm	wooden planks (douglas fir)
	10mm	Spacer
	>50mm	Sloped batten
	10mm	Spacer
	1mm	Waterproofing
	80mm	Sloped reinforced concrete
	150mm	Treetrunks
12		Floor partition:
	30mm	Industrial parquet
	1mm	Glue
	20mm	OSB
	30mm	Woodfiberinsulation + FH
	20mm	Cork
	30mm	OSB
	20mm	Installation layer
	1mm	Vaporbarrier
	80mm	Reinforced Concrete
	150mm	Tree trunks
13		Structural timber beam: 500mm x 300mm douglas fir min. C24 graded With cut against cracking used as dripping edge Sheathing to cover end grain
14		Pavement:
	30mm	Paving stone
	>100mm	Sloped gravel
		Soil
15		Floor ground floor:
	30mm	Industrial parquet
	1mm	Glue
	20mm	OSB
	30mm	Woodfiberinsulation + FH
	20mm	OSB
	60mm	Installation layer
	20mm	OSB
	50mm	Insulation
	1mm	Vapor barrier
	200mm	Reinforced concrete
16		Wall basement:
	100mm	Gravel
	20mm	Drainage mat
	2mm	Waterproofing
	120mm	Insulation
	1mm	Vapor barrier
	250mm	Waterproof reinforced concrete
17		Floor basement:
	30mm	Industrial parquet
	1mm	Glue
	20mm	OSB
	80mm	Installation layer
	20mm	OSB
	100mm	Insulation
	1mm	Vaporbarrier
	300mm	Waterproof reinforced concrete
	1mm	Waterproofing
	50mm	Blinding layer
	100mm	Gravel
18		Concrete pilefoundation: 15-20m
19		Elevator pit: 1m

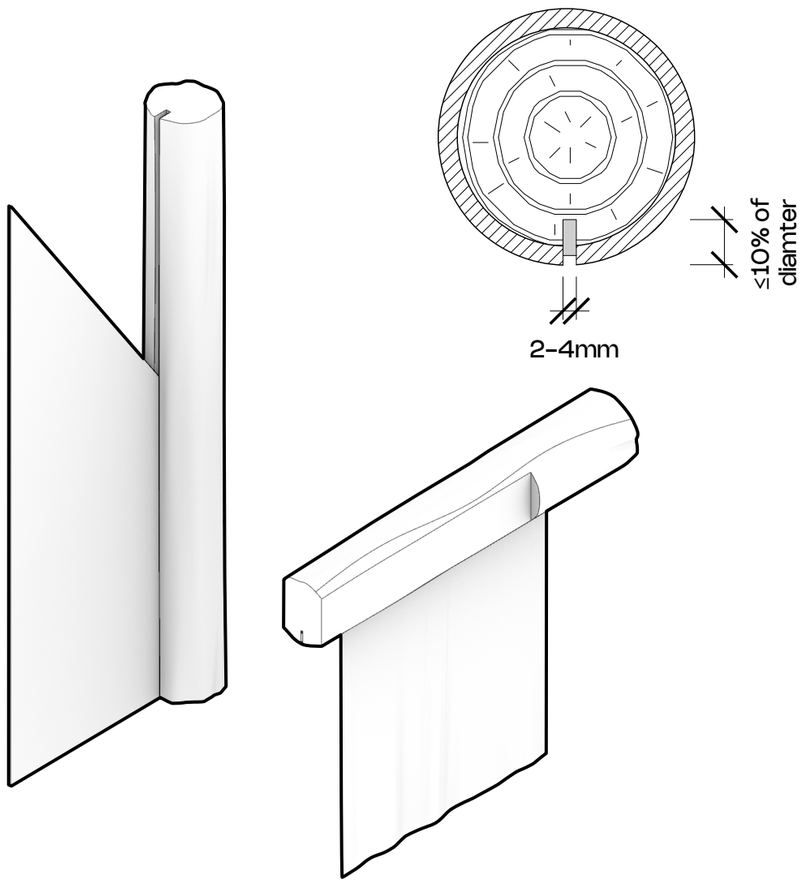
floorslab system



floor system with half cut trunks

prefabrication possibilities and alternatives
for concrete needs to be studied

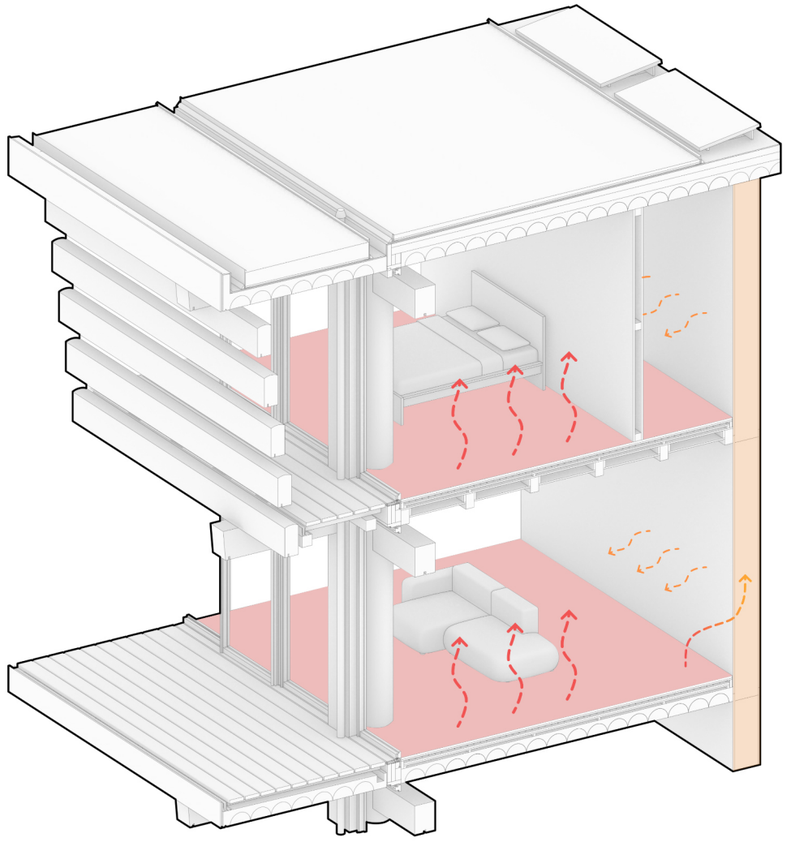
using a tension cut



using a tension cut smartly

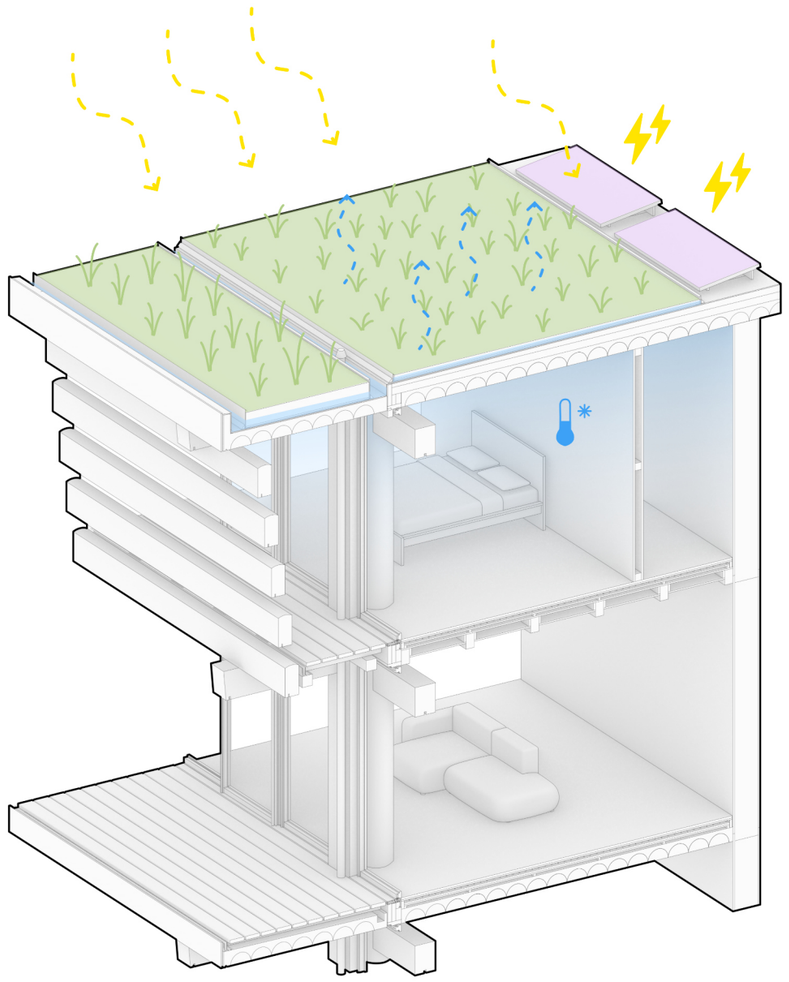
against uncontrolled cracking but can also
be used for curtains, door frames or
dripedges

P5 | Maximilian Friedmann



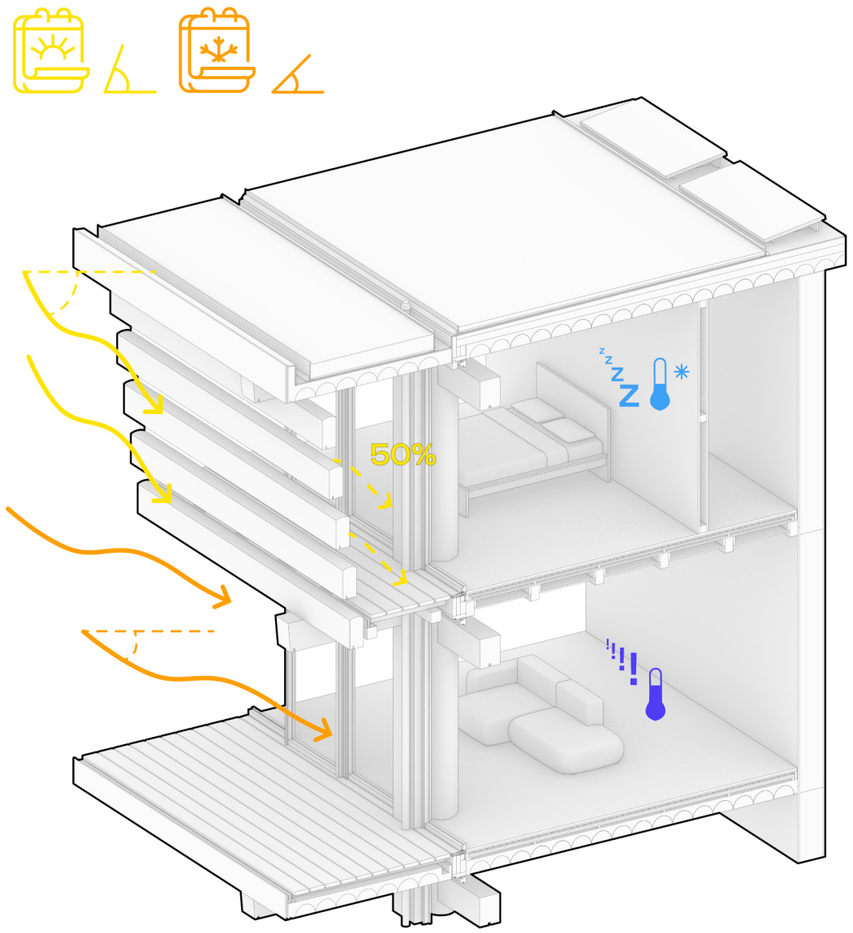
floorheating and heat storage

the mass timber core acts as a heat storage



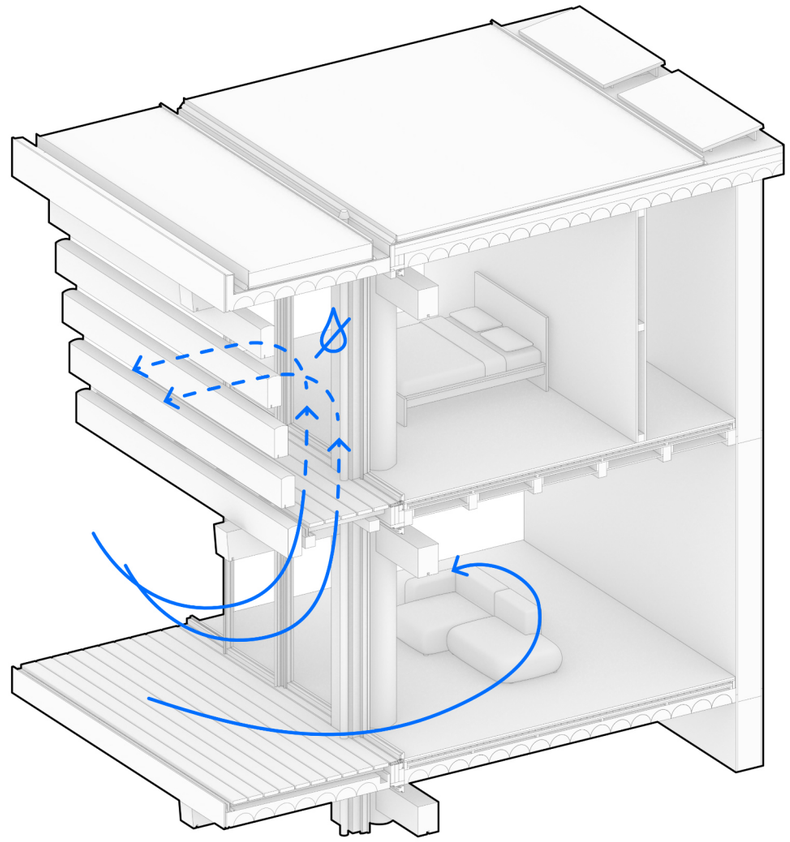
blue/green roof

evaporation and green buffer for passive cooling



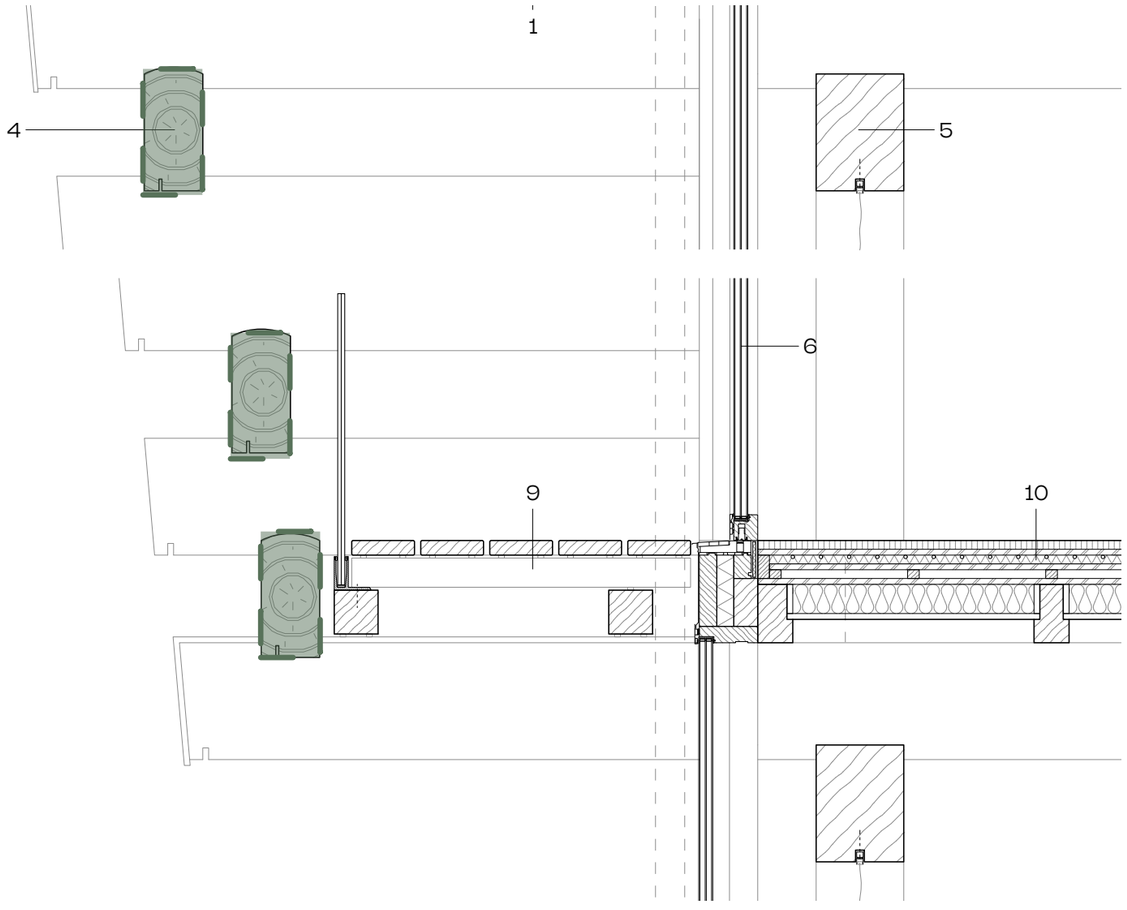
sun shading and use

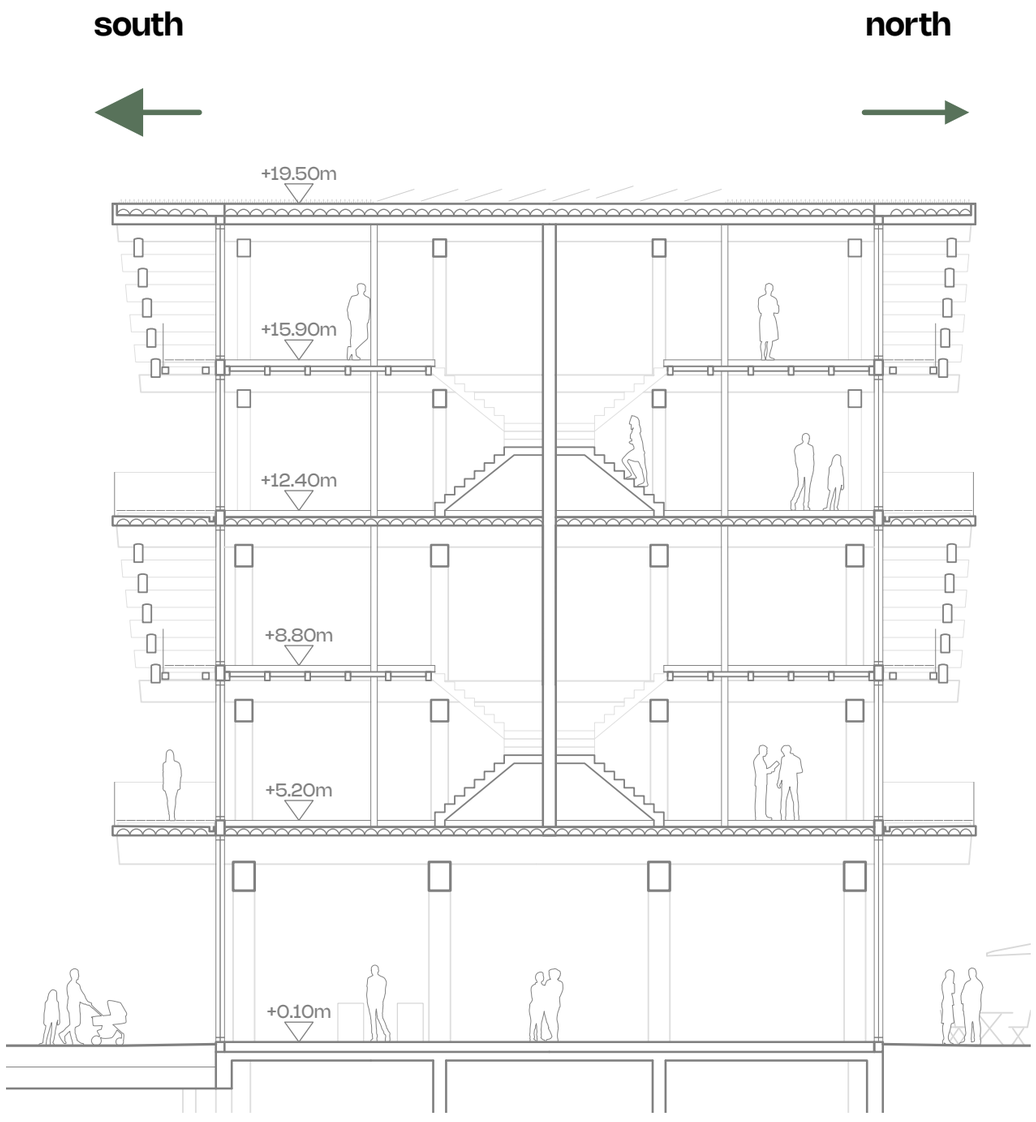
the facade elements and the overhang help keeping the steep summer sun out and allow the shallow winter sun to penetrate

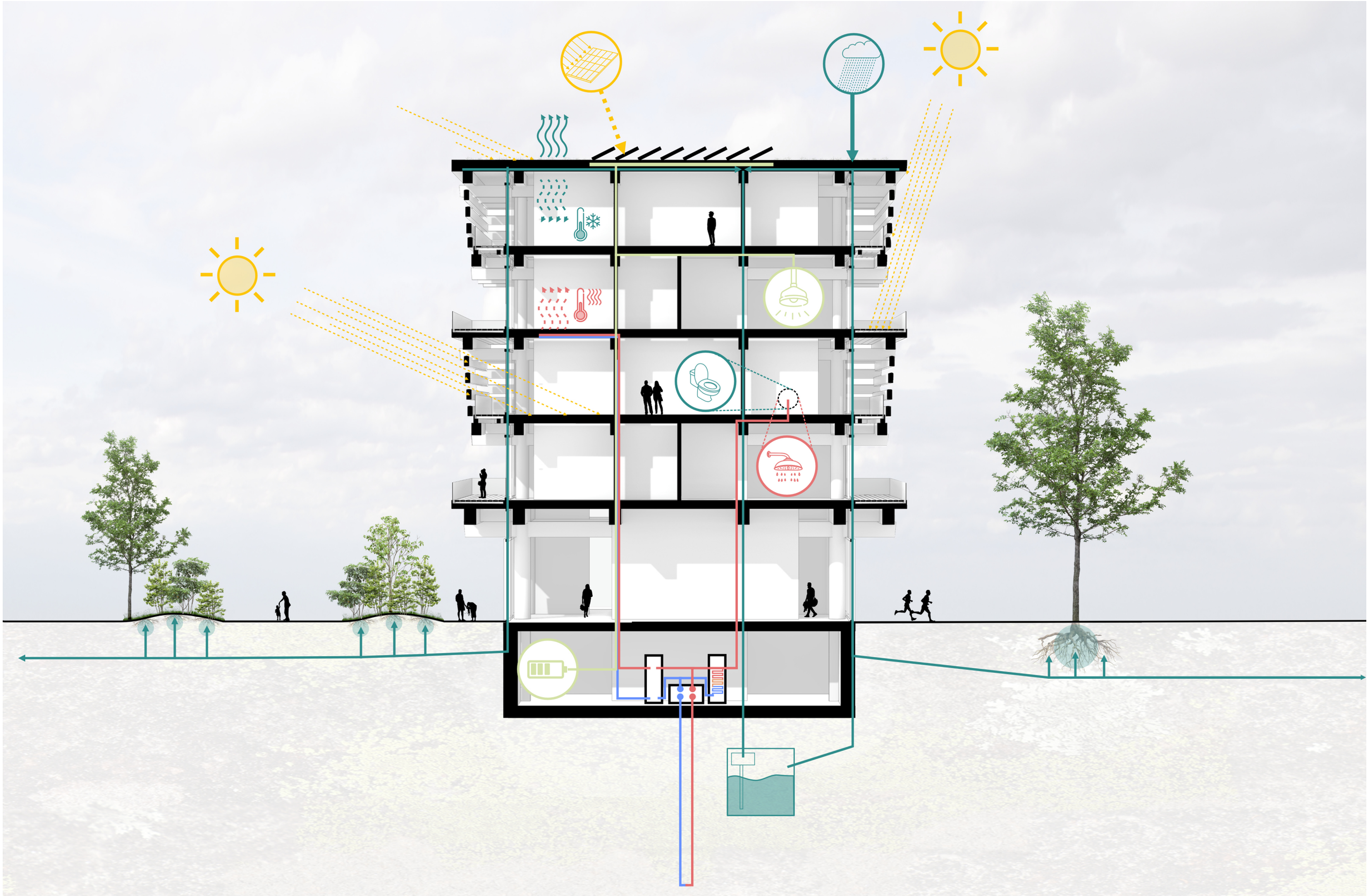


wind and drying

wind is allowed to penetrate the engawa space to help drying out the wooden parts after rain


1
4
5
6
9
10


south
north
+19.50m
+15.90m
+12.40m
+8.80m
+5.20m
+0.10m



conclusion/what I learned

thinking in wood doesn't require a lot

new qualities and languages

more sustainable/circular

easier to sell to clients

better collaboration with constructors/manifacturers