Even
for
social housing?

Realising high quality affordable social housing with the use of local bio-based materials and shared facilities.

P5 presentation

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Research tutor: Mo Smit
BES tutor: Pierre Jennen

* Title reference to the book: ‘En dat al voor de arbeidende klasse’ : 75 jaar volkshuisvesting Rotterdam from Len de Klerk



The Netherlands is facing an enourmous housing crisis.

The demand for new homes was 390.000 in 2023.

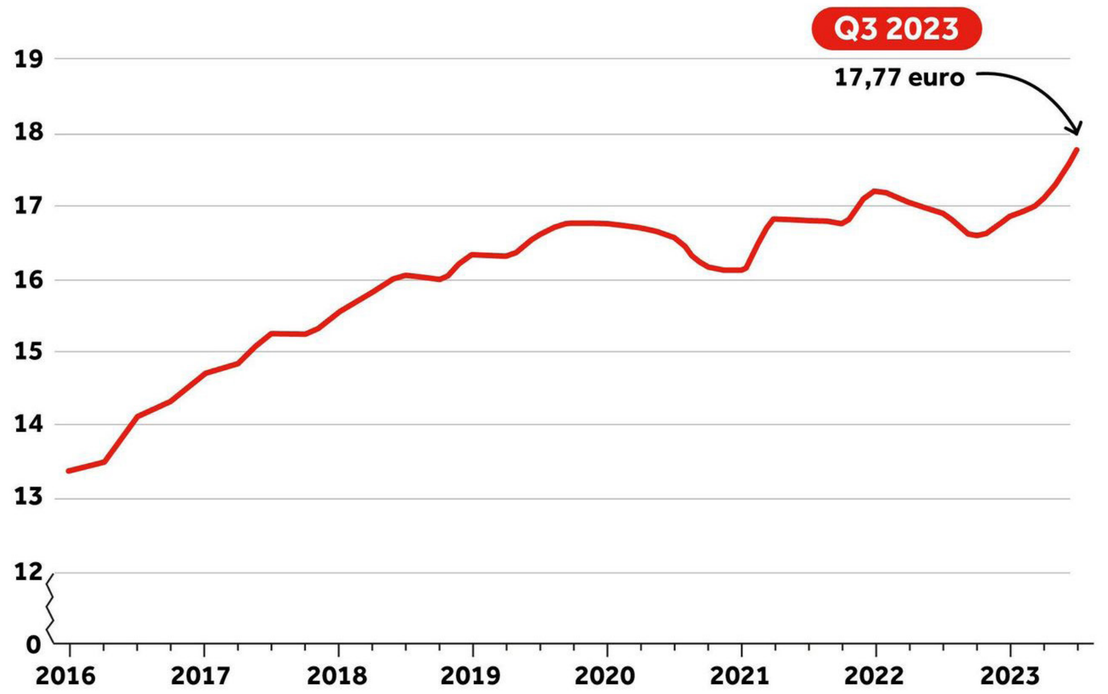
Even more is to be expected.

For social housing in Amsterdam the expected waiting time is more than **13 year**



Rent price in the free sector has never been this high

Average renting price per m² in the Netherlands

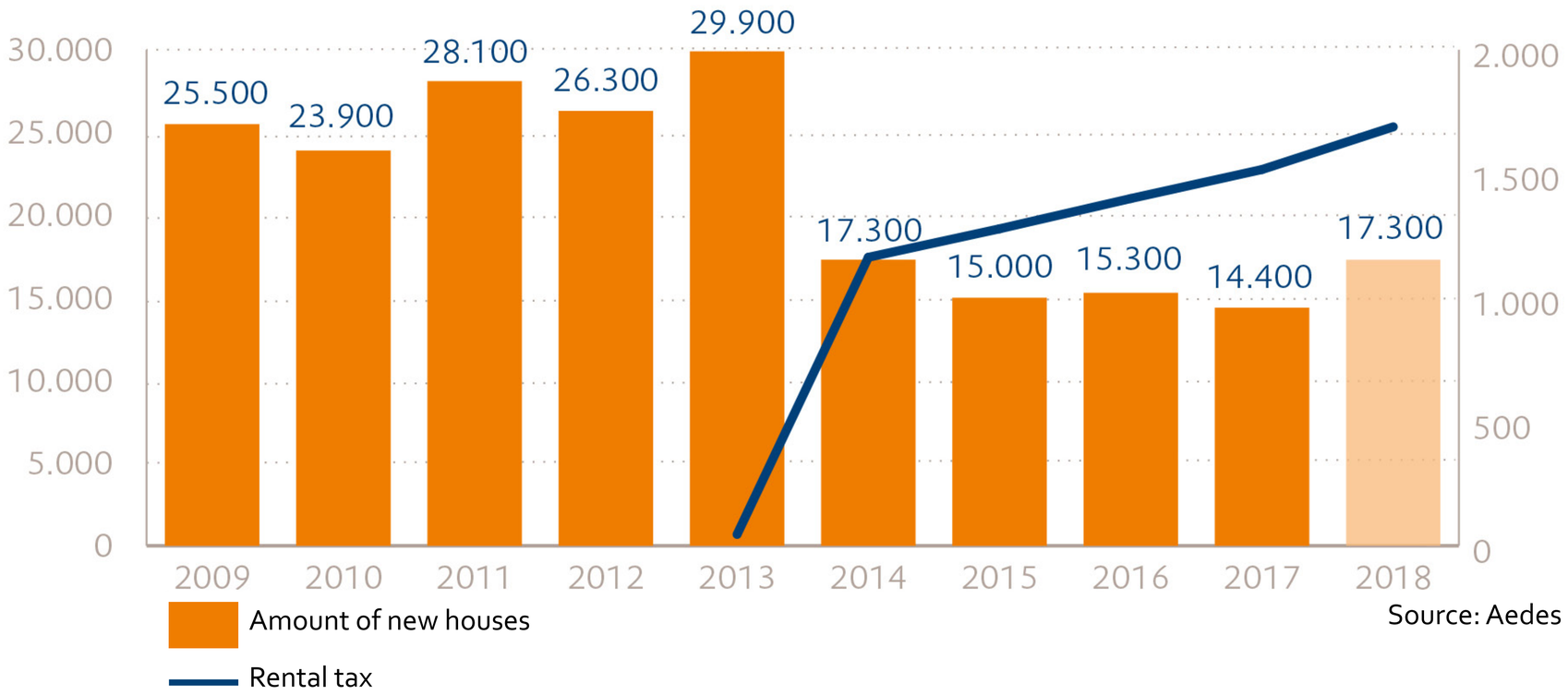


Bron: Pararius

What is causing this crisis?

Middle rent turns into high rent

Rental tax and new building by corporations



Source: Aedes

And corporations are selling their stock to private investors

'Minister verkoopt huurwoningen voor dumpprijzen'

Minister Stef Blok verkwanselt de belangen van de Nederlandse volkshuisvesting, schrijft Leo Onderwater.

Door: Leo Q. Onderwater 21 april 2015, 19:00



Source: het Parool, 2015

Then there is still the worldwide crisis of…

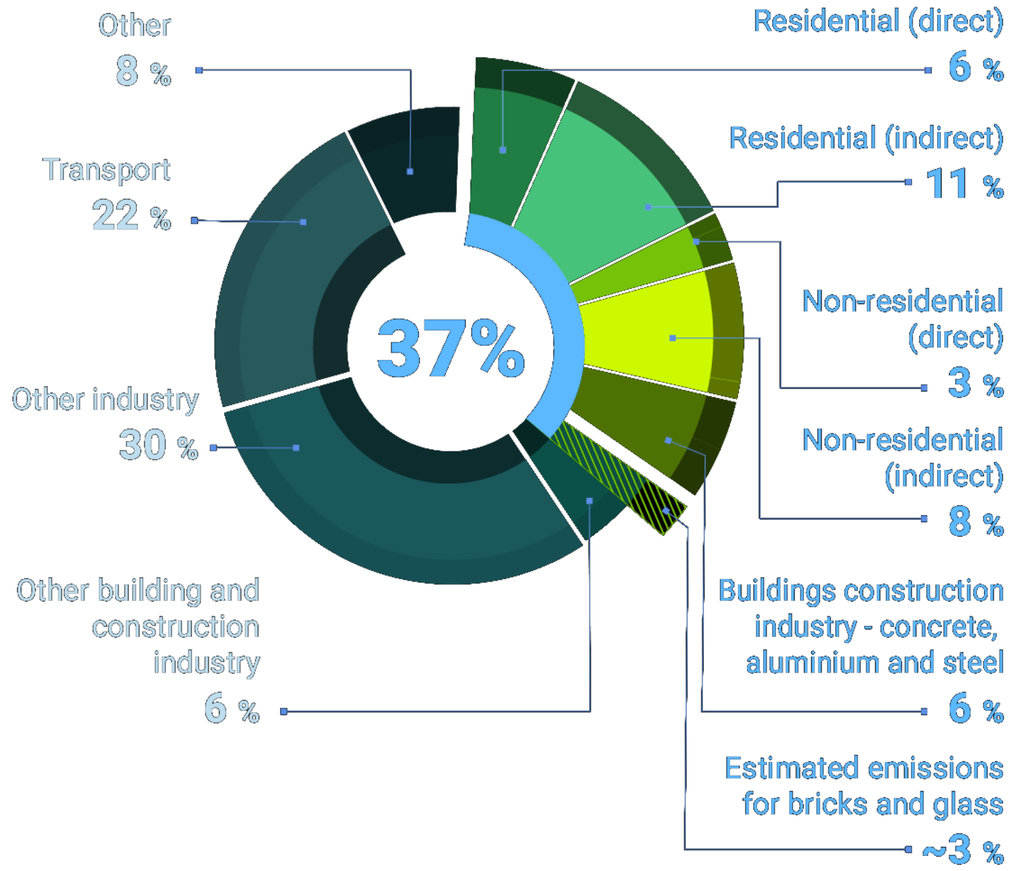
Global warming and (CO_2) emissions



Where the building sector is contributing to majorly

Almost 40% of total emissions worldwide are linked to the building sector

Emissions in the building sector



Material use in the Netherlands

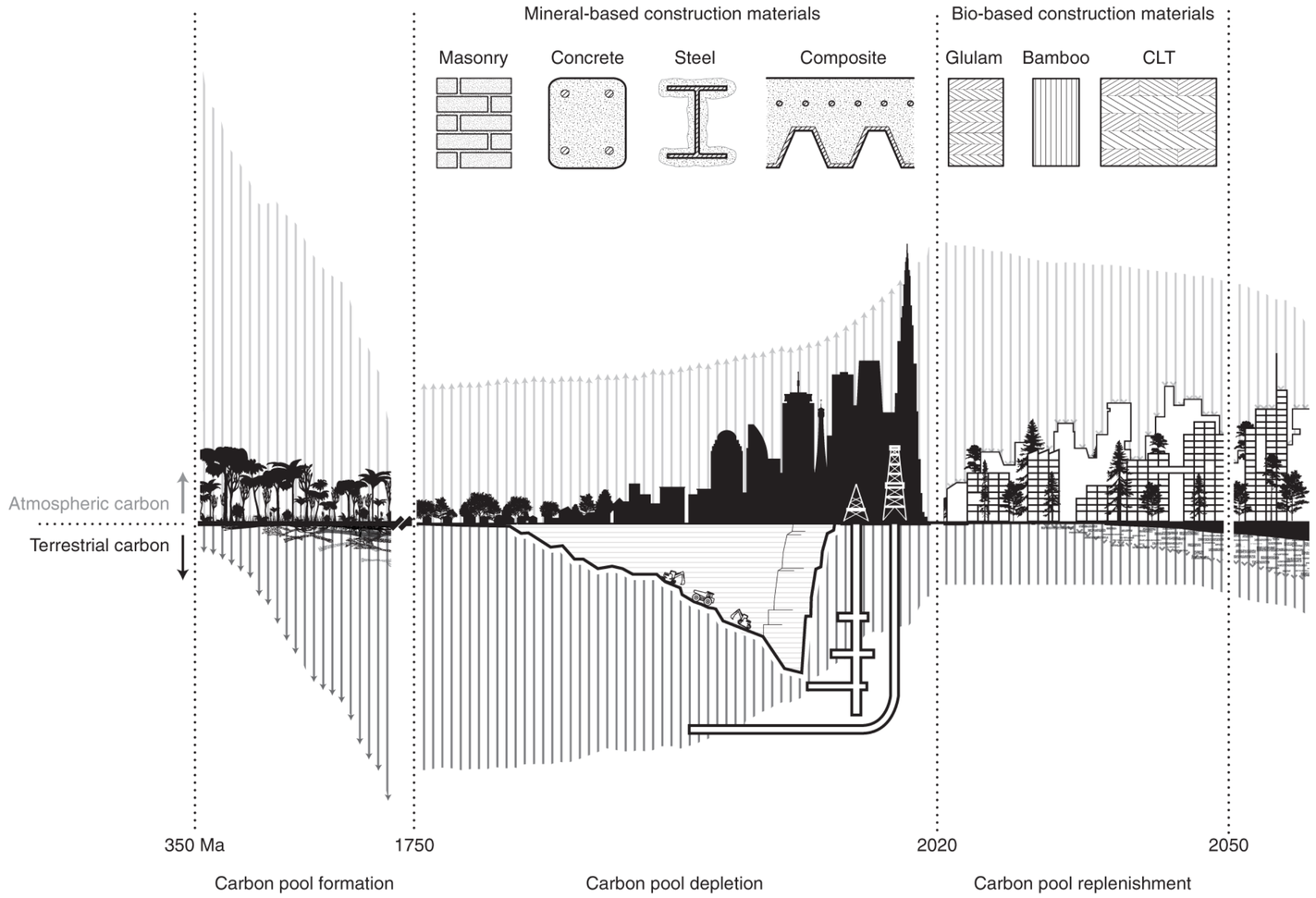
22.000.000 KG material

16.600.000 KG concrete

Only 13% renewable materials

Source:
Metabolic

Impact can be made by using more
nature-friendly materials


Mineral-based construction materials
Bio-based construction materials
Masonry
Concrete
Steel
Composite
Glulam
Bamboo
CLT
Atmospheric carbon
Terrestrial carbon
350 Ma
1750
2020
2050
Carbon pool formation
Carbon pool depletion
Carbon pool replenishment

Which is already done, but only for high quality projects for the ‘happy few’



Haut Amsterdam - Team V Architecture



Energy Neutral Villa Weesp - Welsch architecten

From the 7.3 milion homes in the Netherlands, 2.3 milion are social housing

Want to make impact?

Combine these problems and build:

Biobased affordable housing for the masses

Design question

How can affordable (social) housing be built with high quality standards (space, materials and living conditions), with the use of local biobased materials and co-housing/community building principles?

Context

Buurtschap Crailo

Context - Location NL

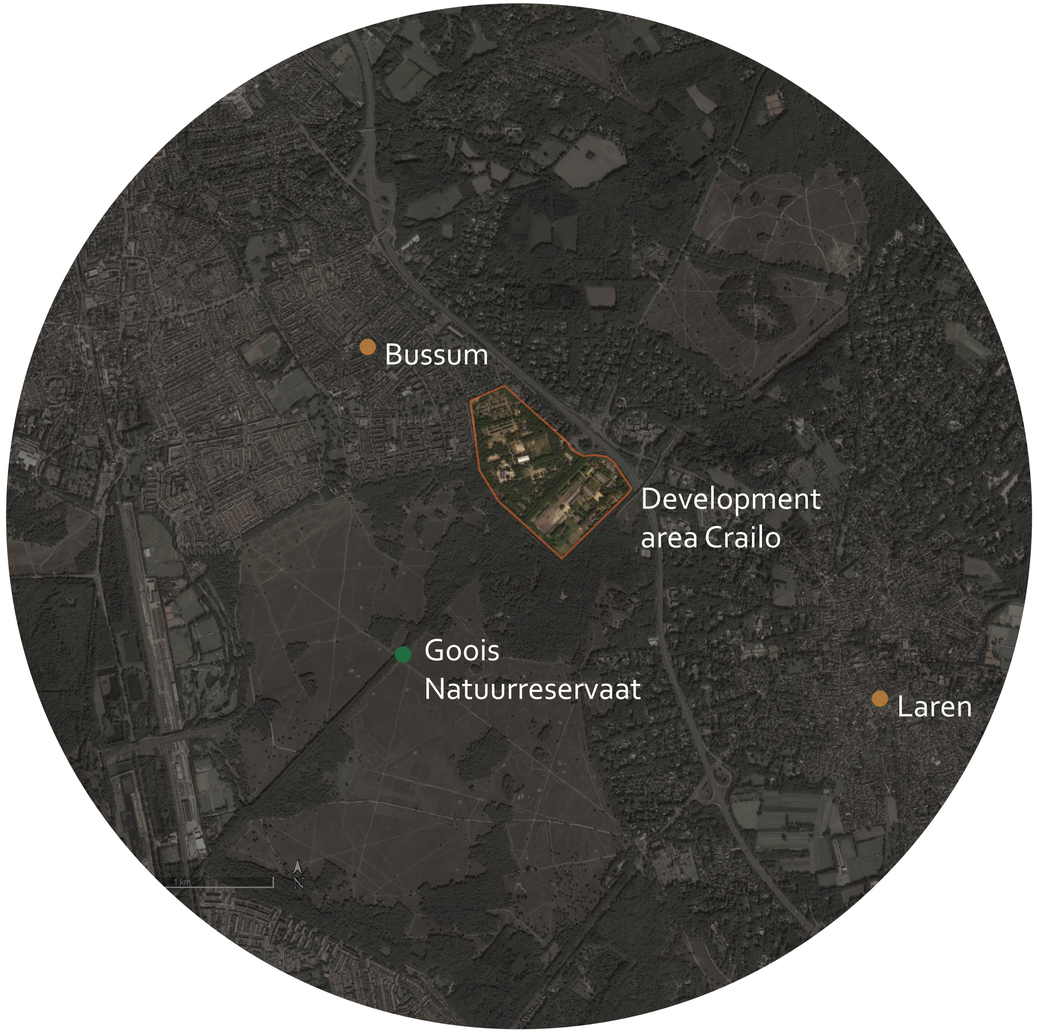


Context - Region



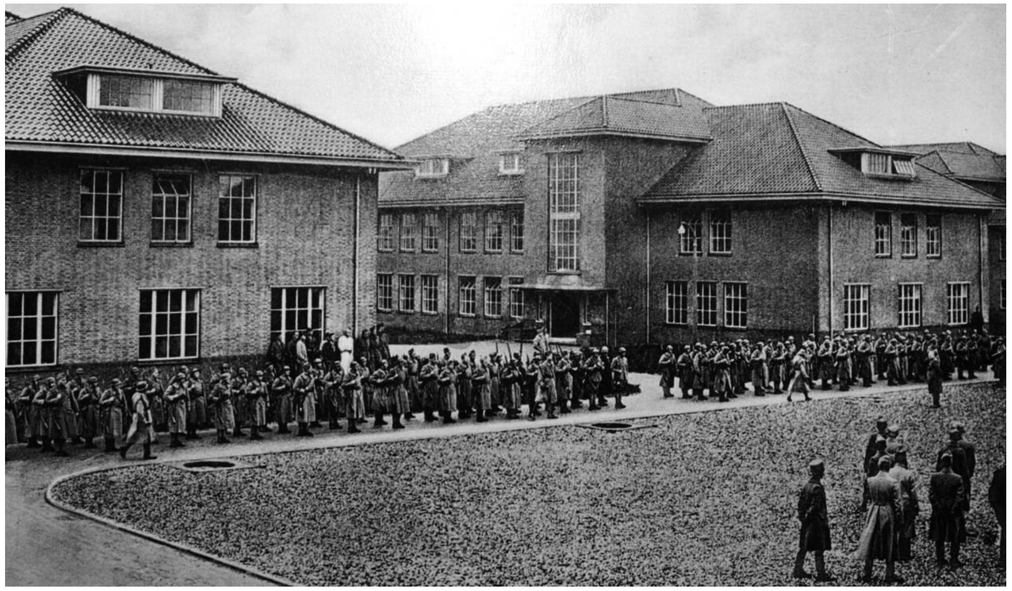
- Central location in Het Gooi
- Rich area
- Perfectly located near cities
- Still a very green area

Context - Close area



- Crailo in between villages with facilities such as supermarkets, schools and care
- Directly accessible via A1 highway
- Accessible by bike and foot - directly connected to neighbourhoods in Bussum
- In between cycling and walking routes of GNR and Staatsbosbeheer

From military terrain to Buurtschap







Masterplan Crailo

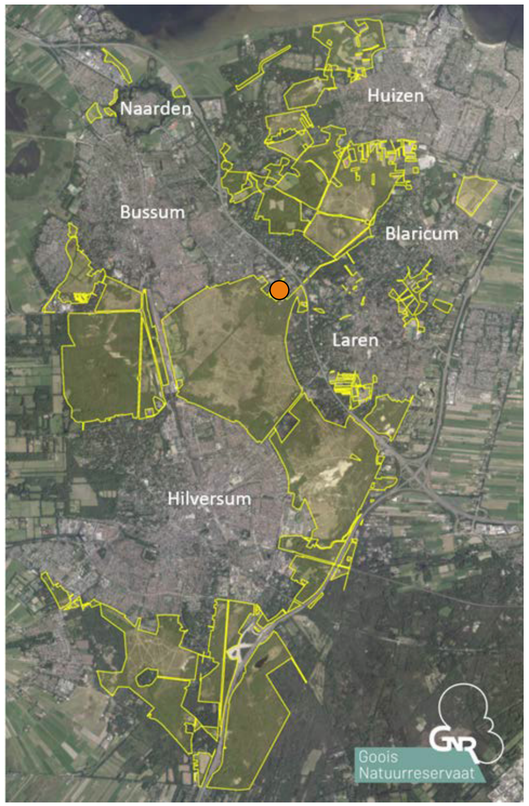


- 700 new dwellings
- Differentiation in scale
- Nature is central element

Research

Wood in Goois Natuur Reservaat

Goois Natuur Reservaat



Ex - production forests

Monculture forests



Are a problem



- Vulnerable for diseases and insects
- Low variety of insects and plants
- Bad soil quality

We need biodiverse forests

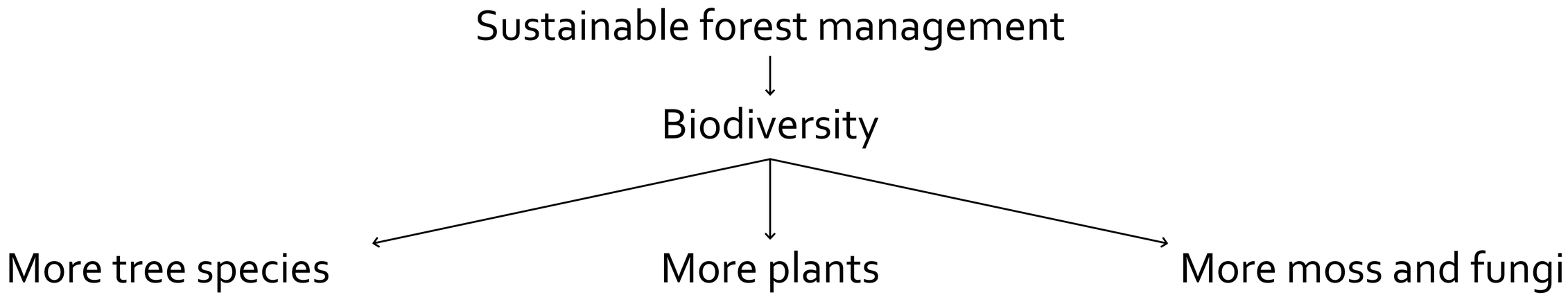


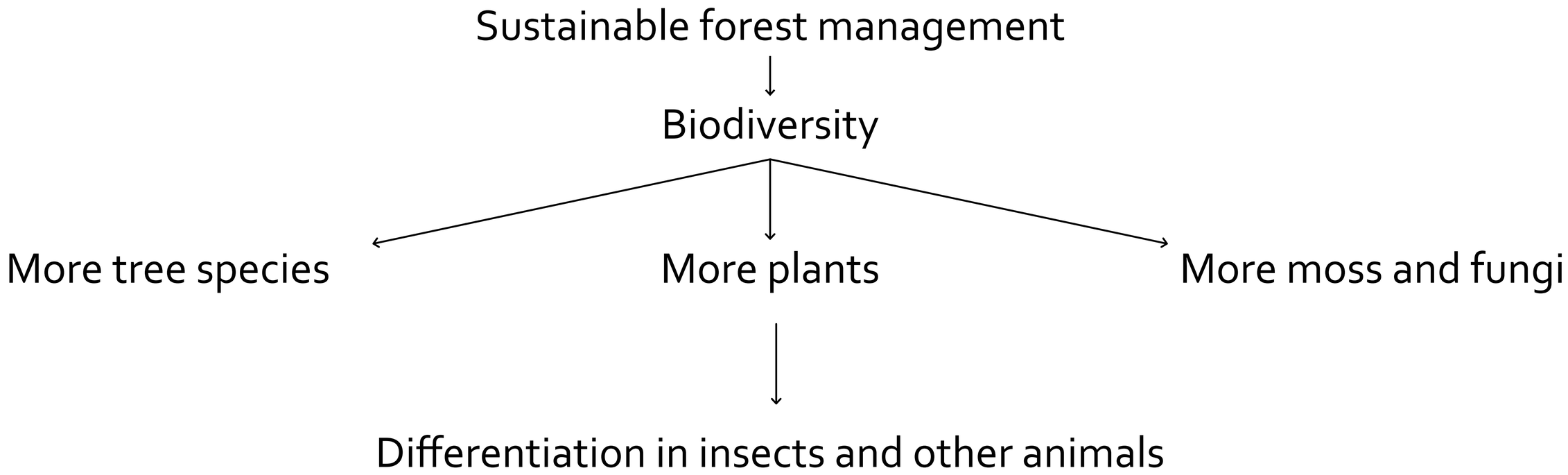
Sustainable forest management

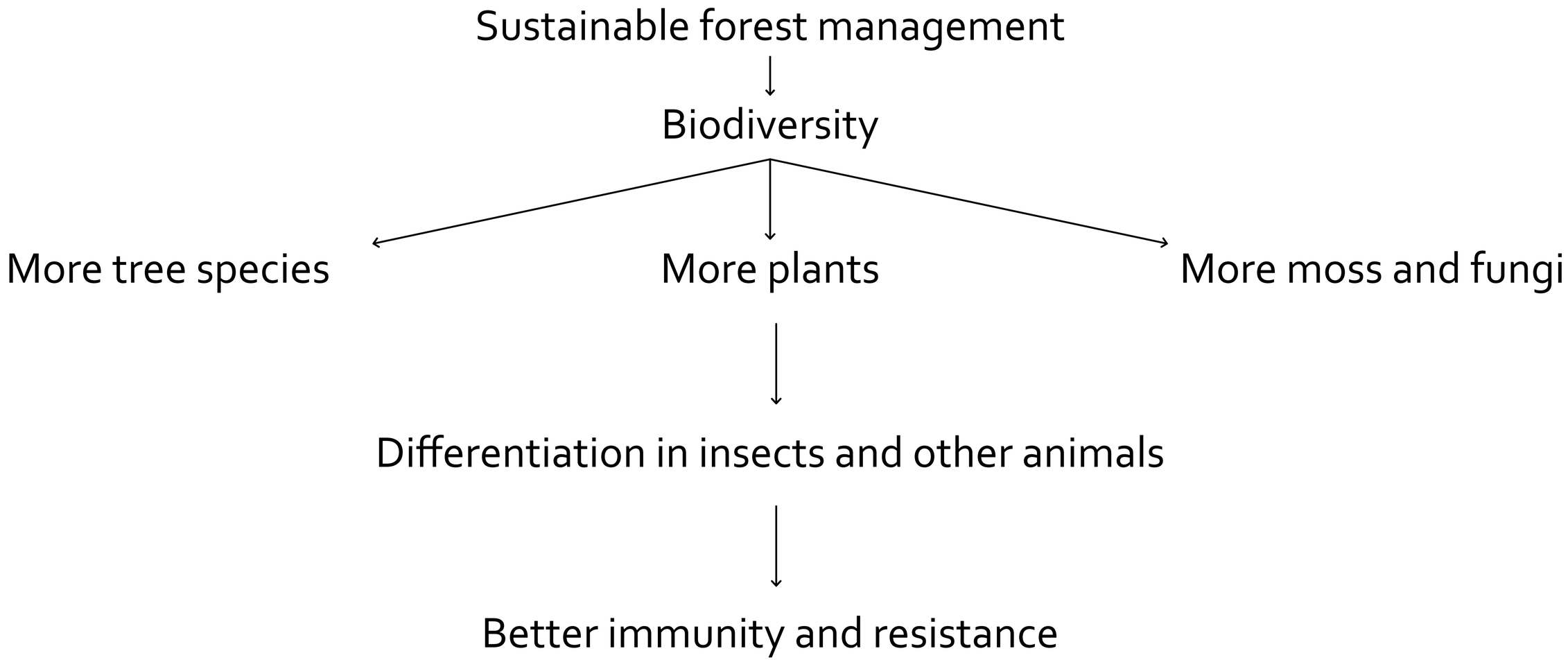
Sustainable forest management

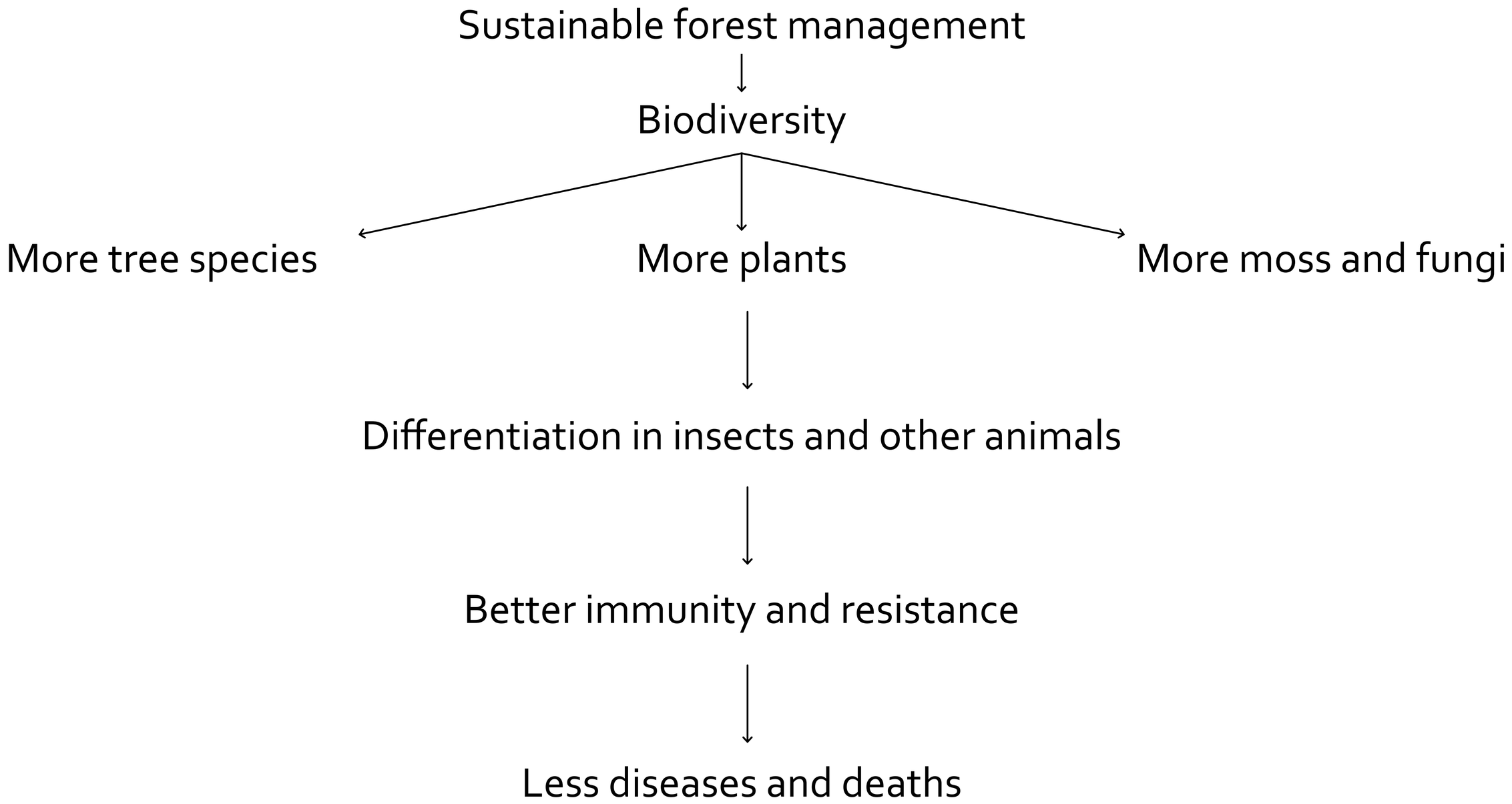
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Biodiversity


Sustainable forest management
Biodiversity
More tree species
More plants
More moss and fungi

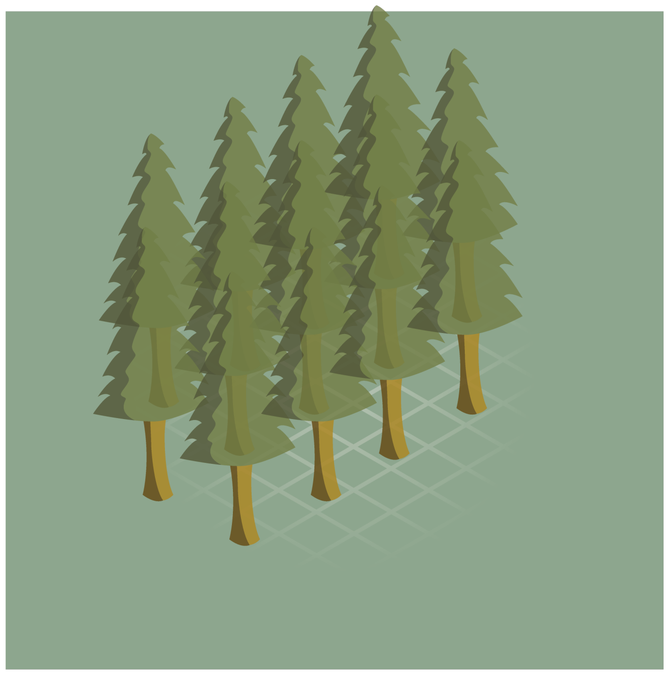

Sustainable forest management
Biodiversity
More tree species
More plants
More moss and fungi
Differentiation in insects and other animals


Sustainable forest management
Biodiversity
More tree species
More plants
More moss and fungi
Differentiation in insects and other animals
Better immunity and resistance

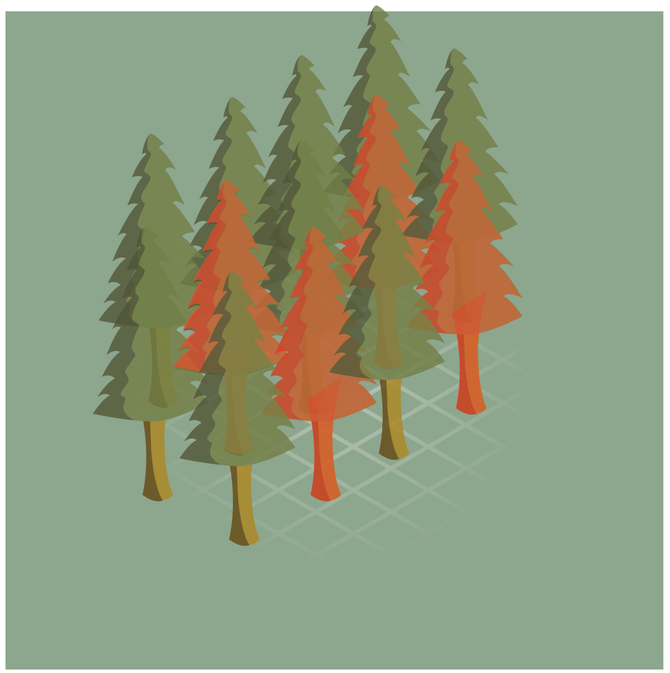

Sustainable forest management
Biodiversity
More tree species
More plants
More moss and fungi
Differentiation in insects and other animals
Better immunity and resistance
Less diseases and deaths

Healthy forest

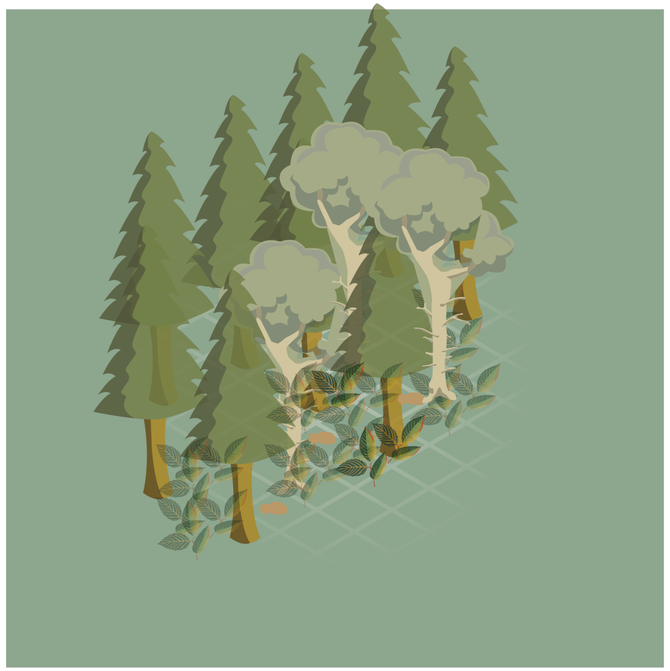
Process



Process



Process



Process



Process





Process





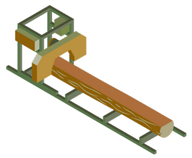


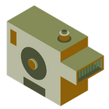
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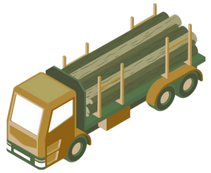


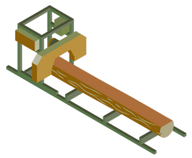


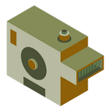
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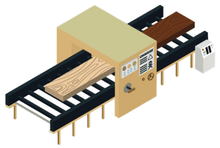


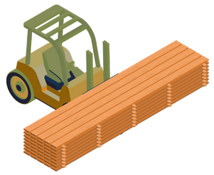










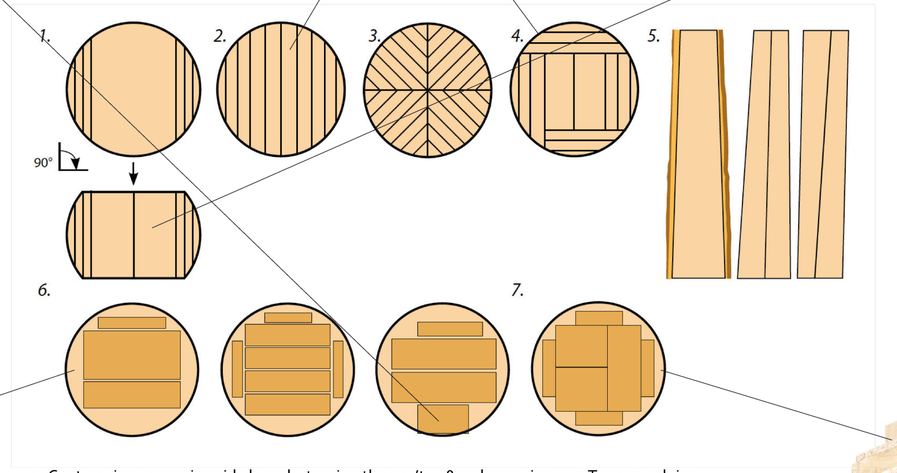


Process







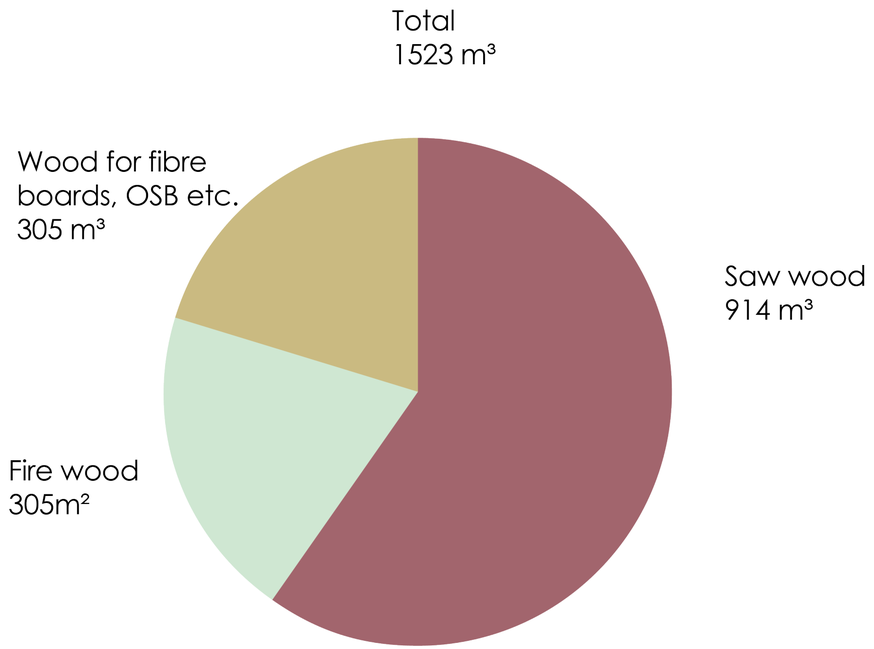




1. Cant sawing: removing side boards, turning the can't 90° and resawing
2. Through-and-through sawing
3. Quarter sawing
4. Grade sawing
5. Trapeze edging
6. Asymmetrical sawing
7. Component sawing

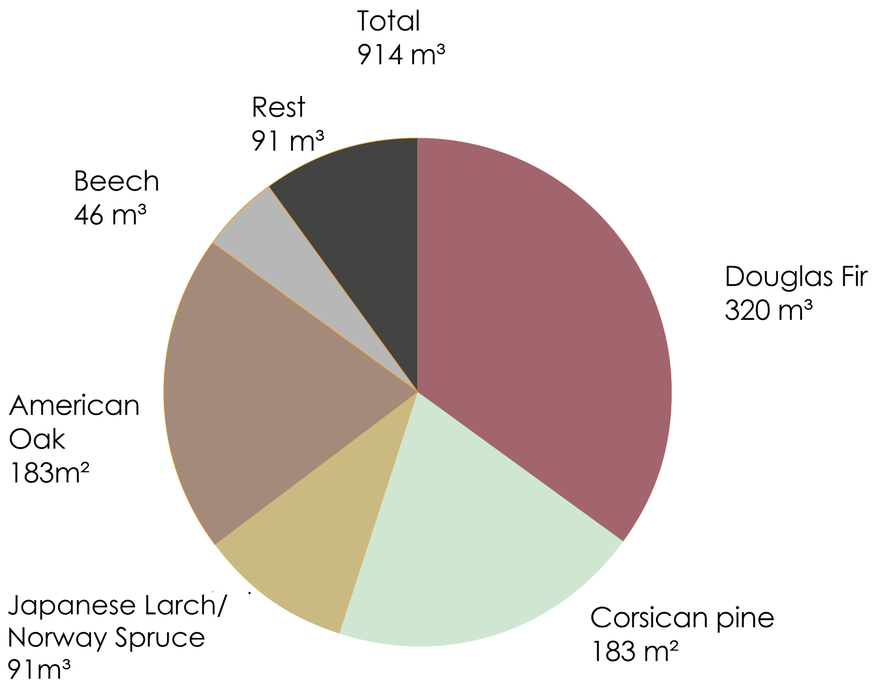


Yearly yield of wood in GNR



Yearly yield of wood in Goois Natuur Reservaat

Wood species of the saw wood



Wood species of saw wood in Goois Natuur Reservaat

Wood species and their qualities

Douglas Fir

320m³

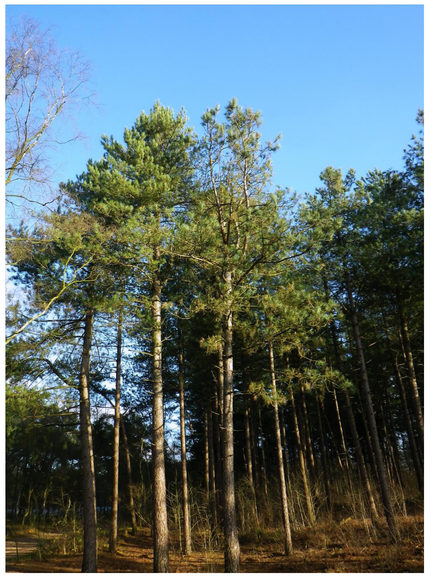
- Suitable for every use
- Very hard wood
- Sustainability class III -> can be used outside without threatment
- Good for the facade



Corsican pine

183m³

- Suitable for almost every use
- Lots of branching
- Very good for construction



Wood species and their qualities

Japanese Larch and Norway Spruce

91m³

- Not usable outside without preserving
- Preverving is very hard and not a sustainable process
- Excellent for construction



American Oak

183m³

- Suitable for almost every use
- Usualy not a lot of long pieces
- Can be used outside
- Short pieces -> Window frames, railings, doors and inside use



Wood species and their qualities

Beech

$46m^3$

- Only usable inside
- Perfect finishing for stairs



Design

Three main guiding themes



High quality housing

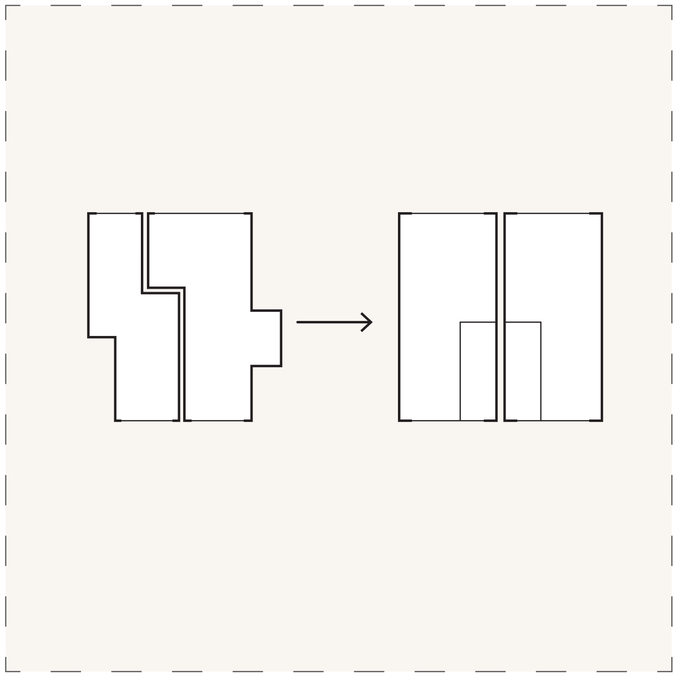


Affordable housing



Nature inclusive design

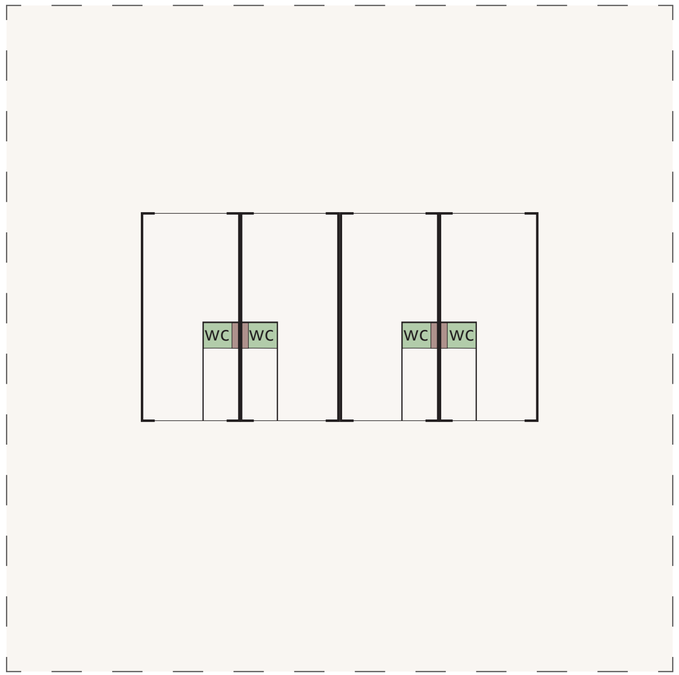
Concept and program



Floorplans of the dwellings efficient and functional

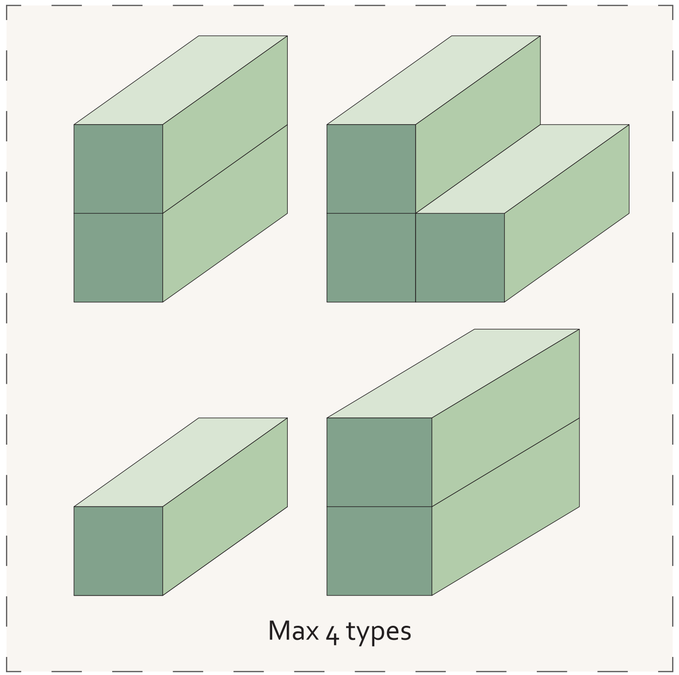


Concept and program



Smart repetition of the dwellings

Concept and program

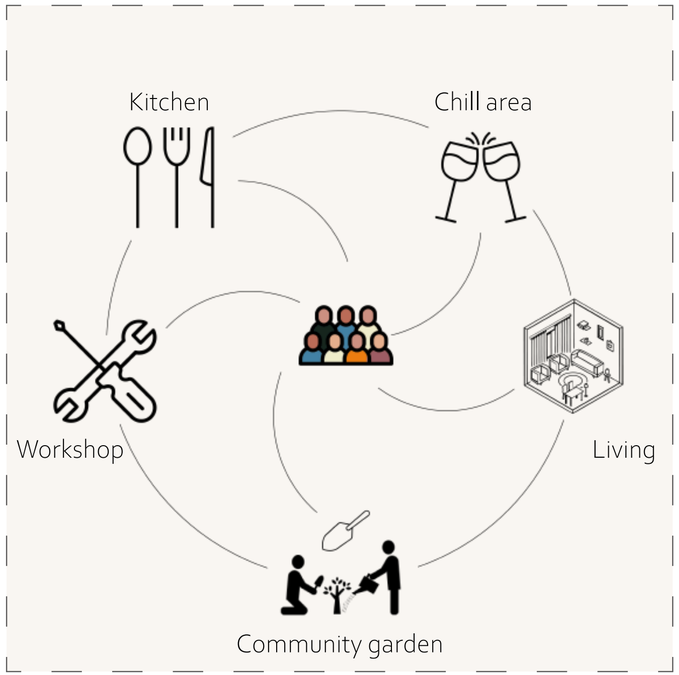


Maximum 4 types of housing to keep te building simple and efficient

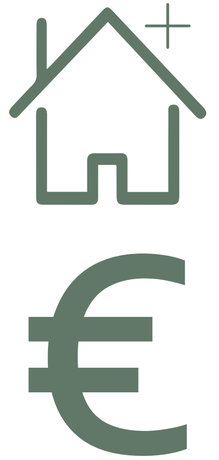


Concept and program

Community housing principles

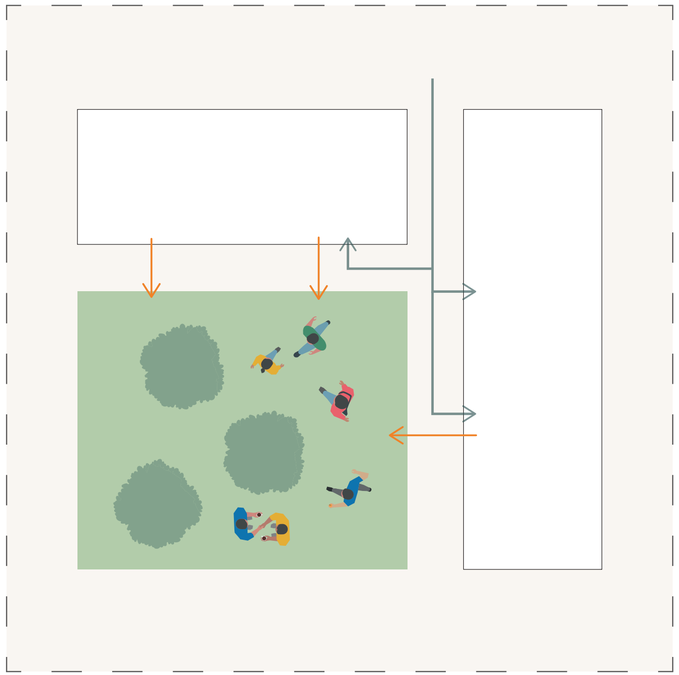


Communal functions to improve the community, social security and housing quality



Concept and program

Communal garden and entrances at the garden





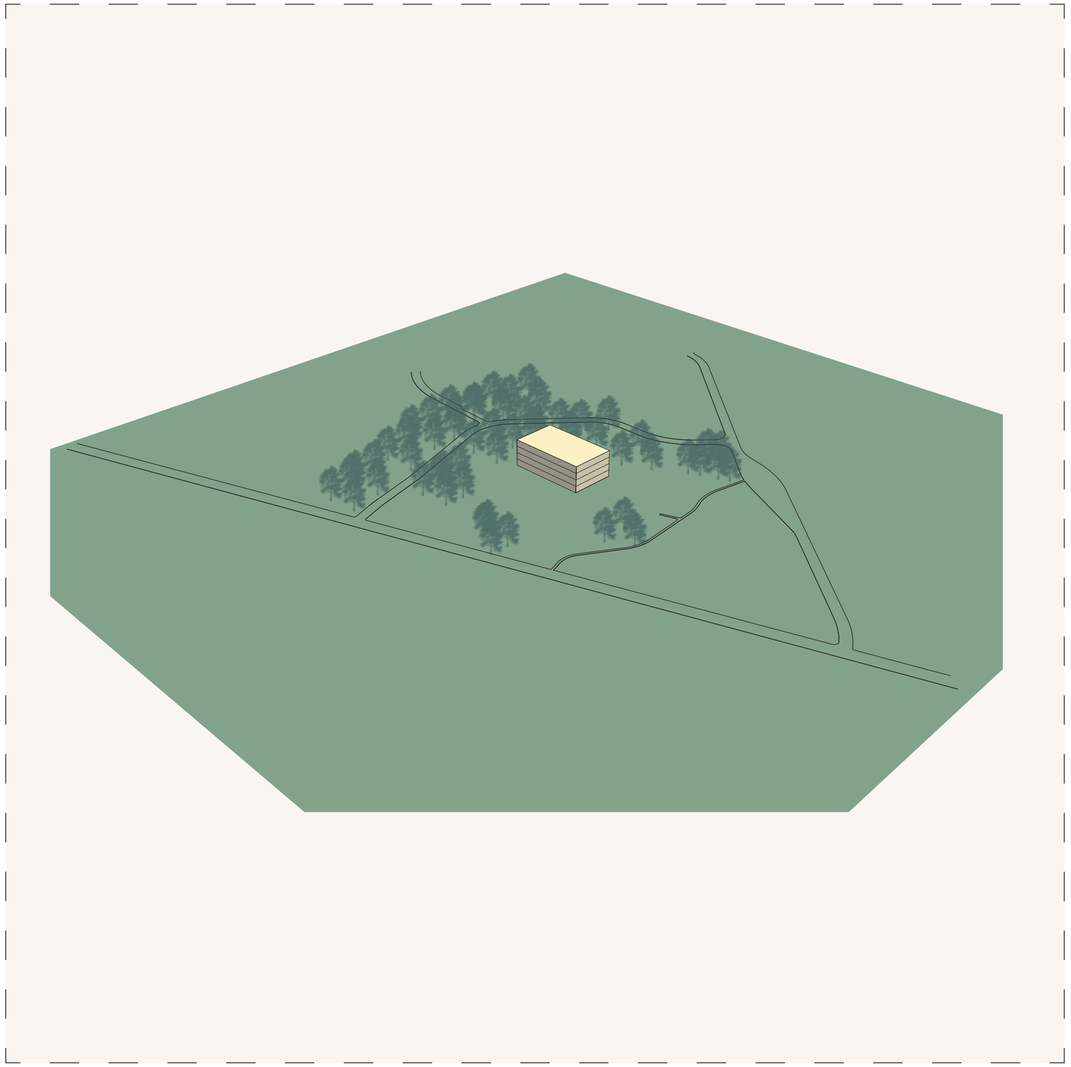
A place to meet with a shared responsibility.

To enter the dwelling inhabitants have to go through the garden to improve meeting and social cohesion

Program

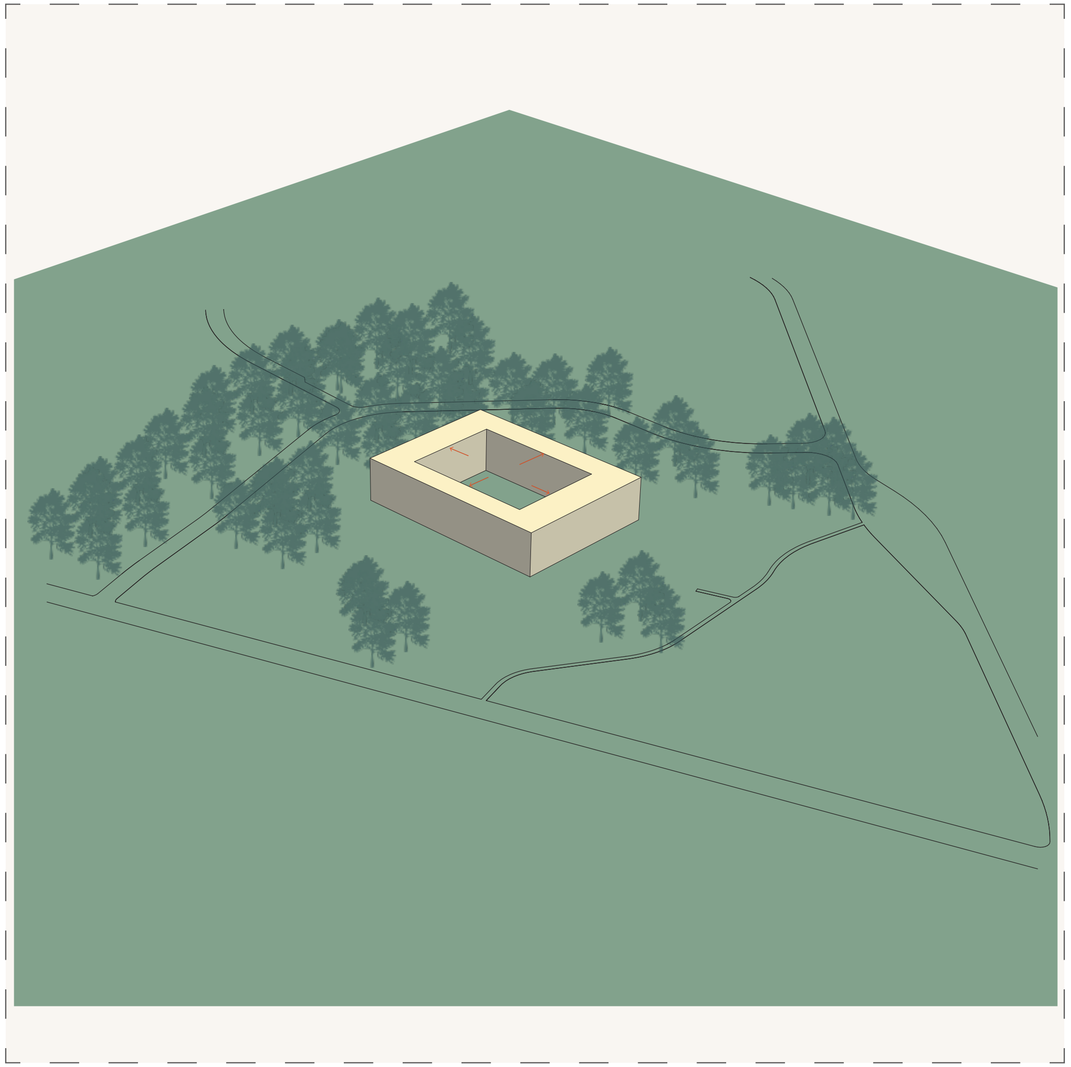

105m²
shared kitchen and living
40m²
workshop
shared facilities
15m²
green house
dwellings 2437m²
storage and tech 180m²
shared facilities 160m²
total 2777m²
80m²
bike storage
>100m²
communal garden
10m²
tech space
storage and tech
90m²
storage
43 dwellings
88m² 4x
maisonette XL
66m² 18x
maisonnette
33m² 18x
studio
101m² 3x
corner house

Concept and program



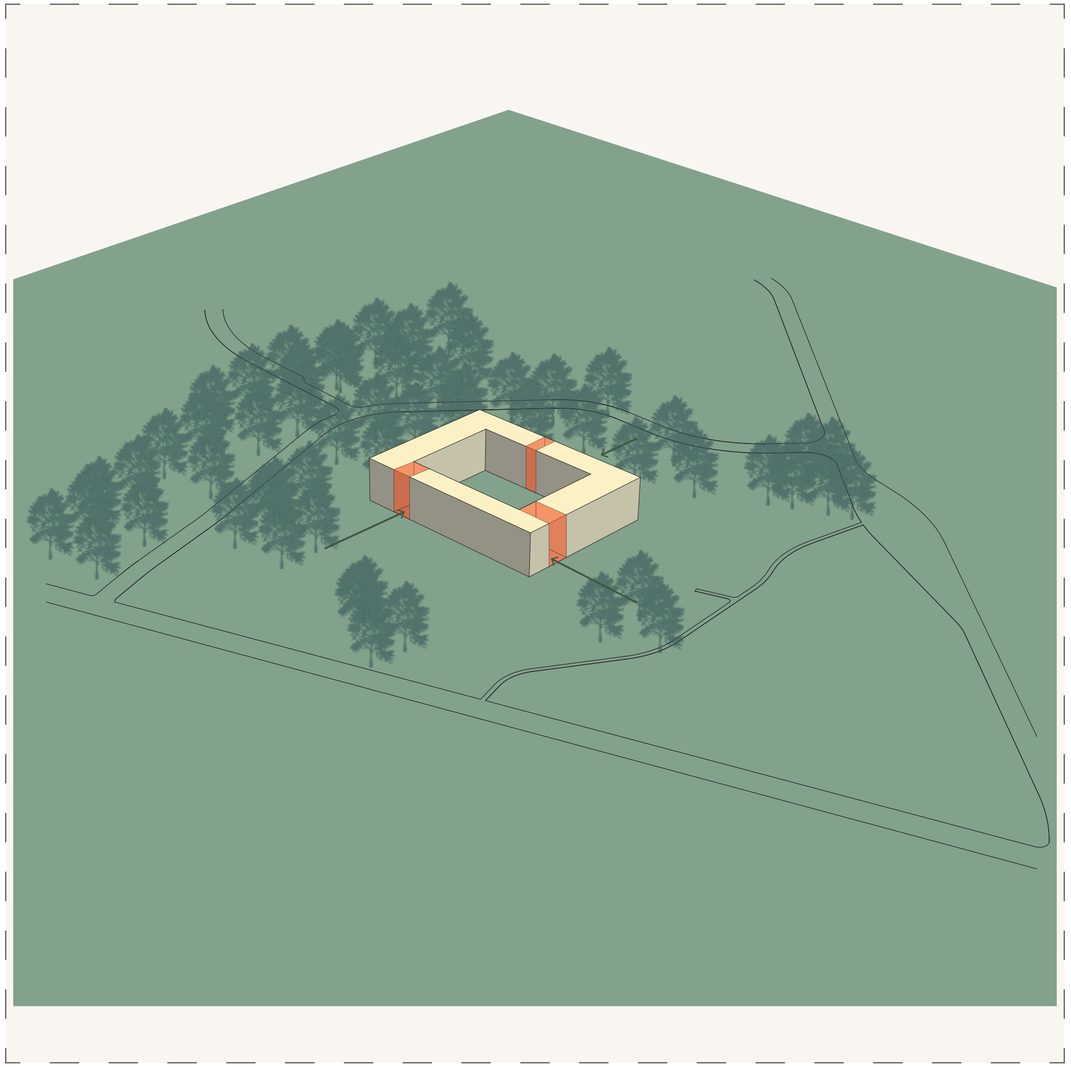
Concept and program

Creating a communal garden

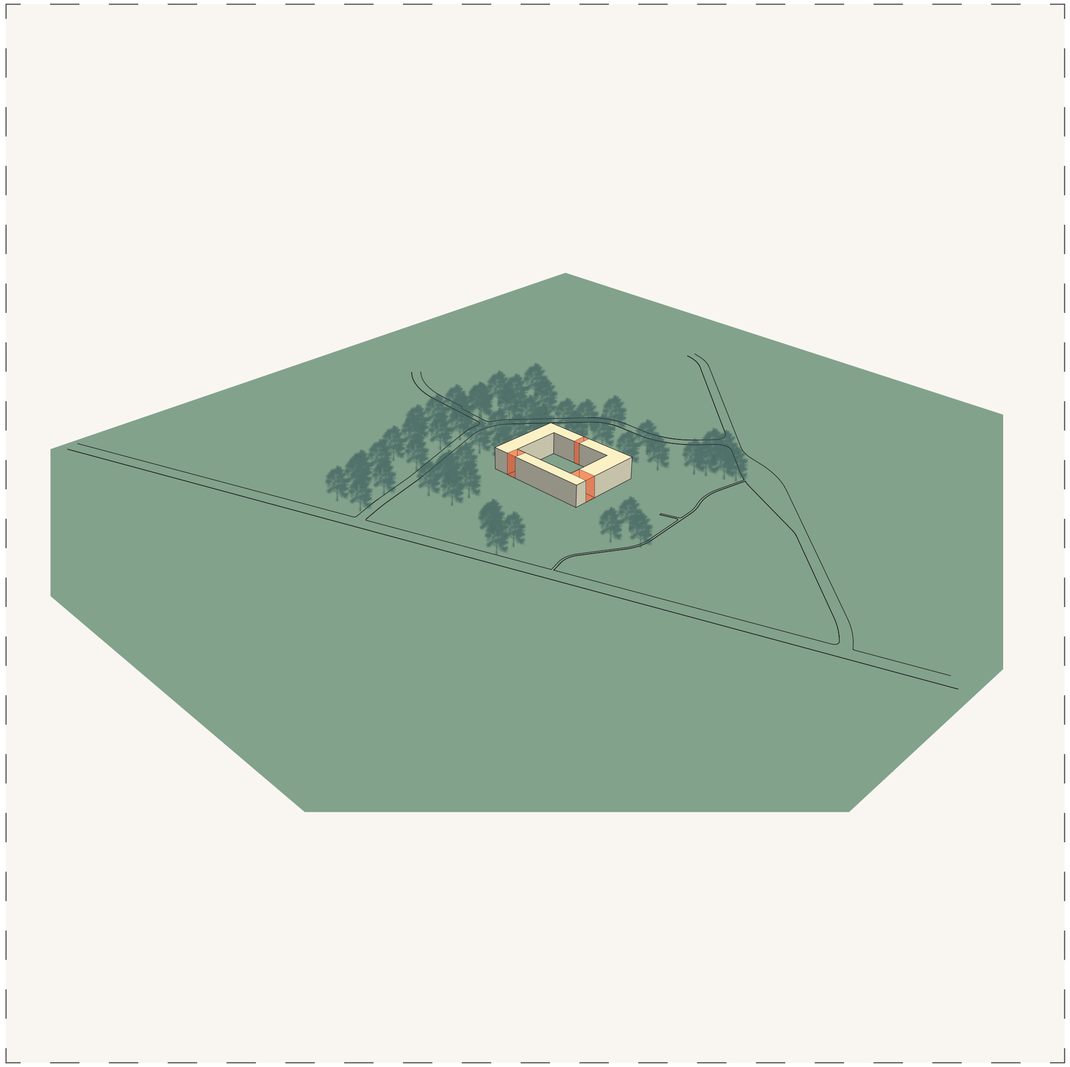


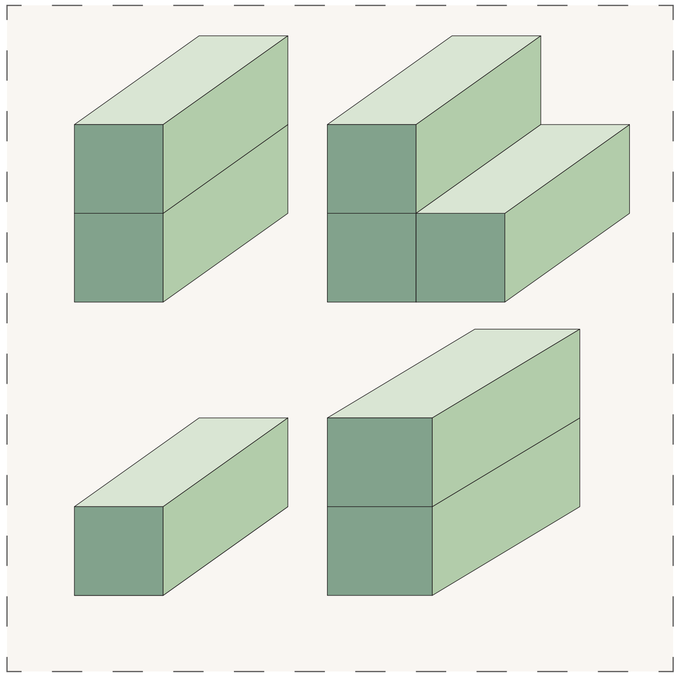
Concept and program

Making space for green to continue



Concept and program

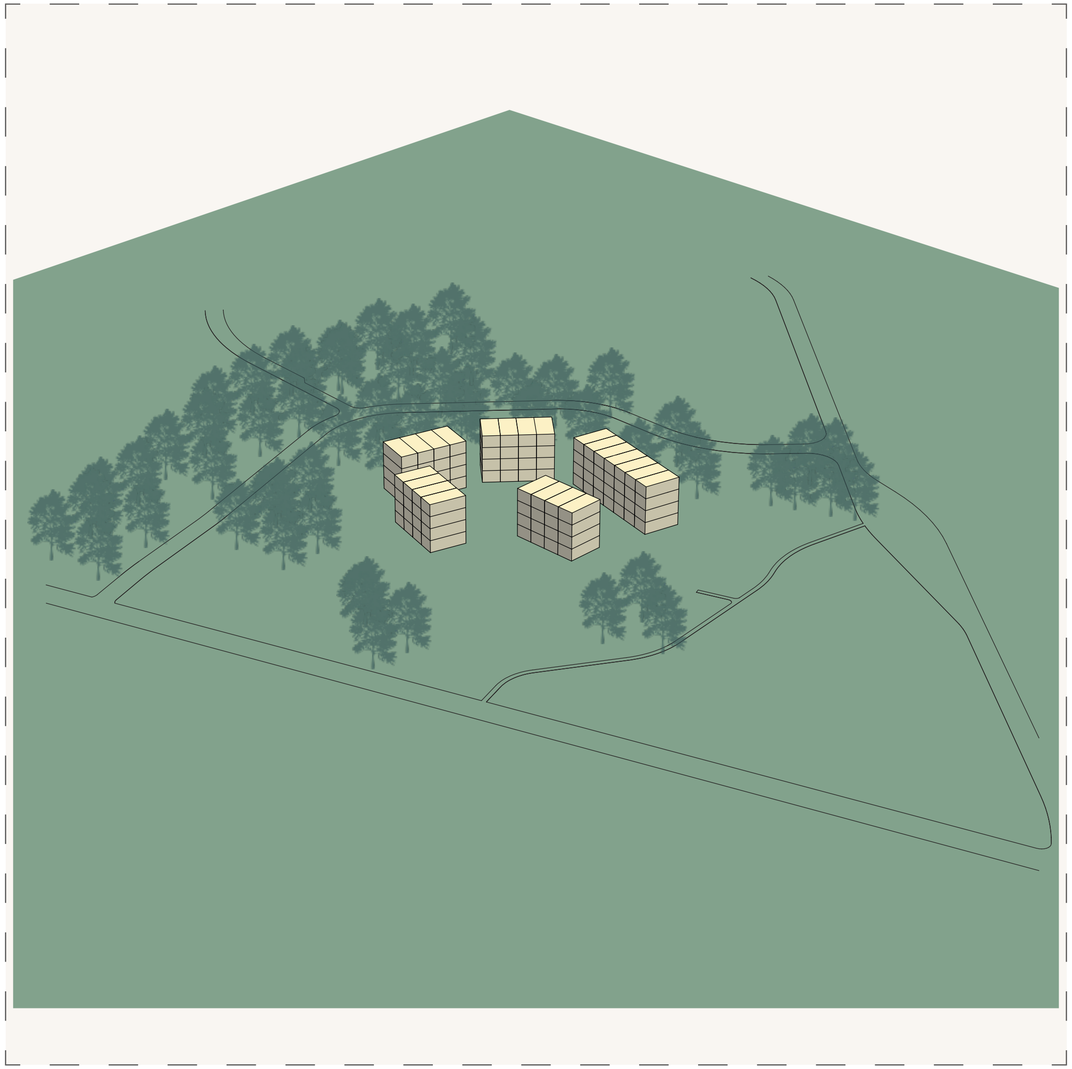




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Concept and program

Units placed in plan



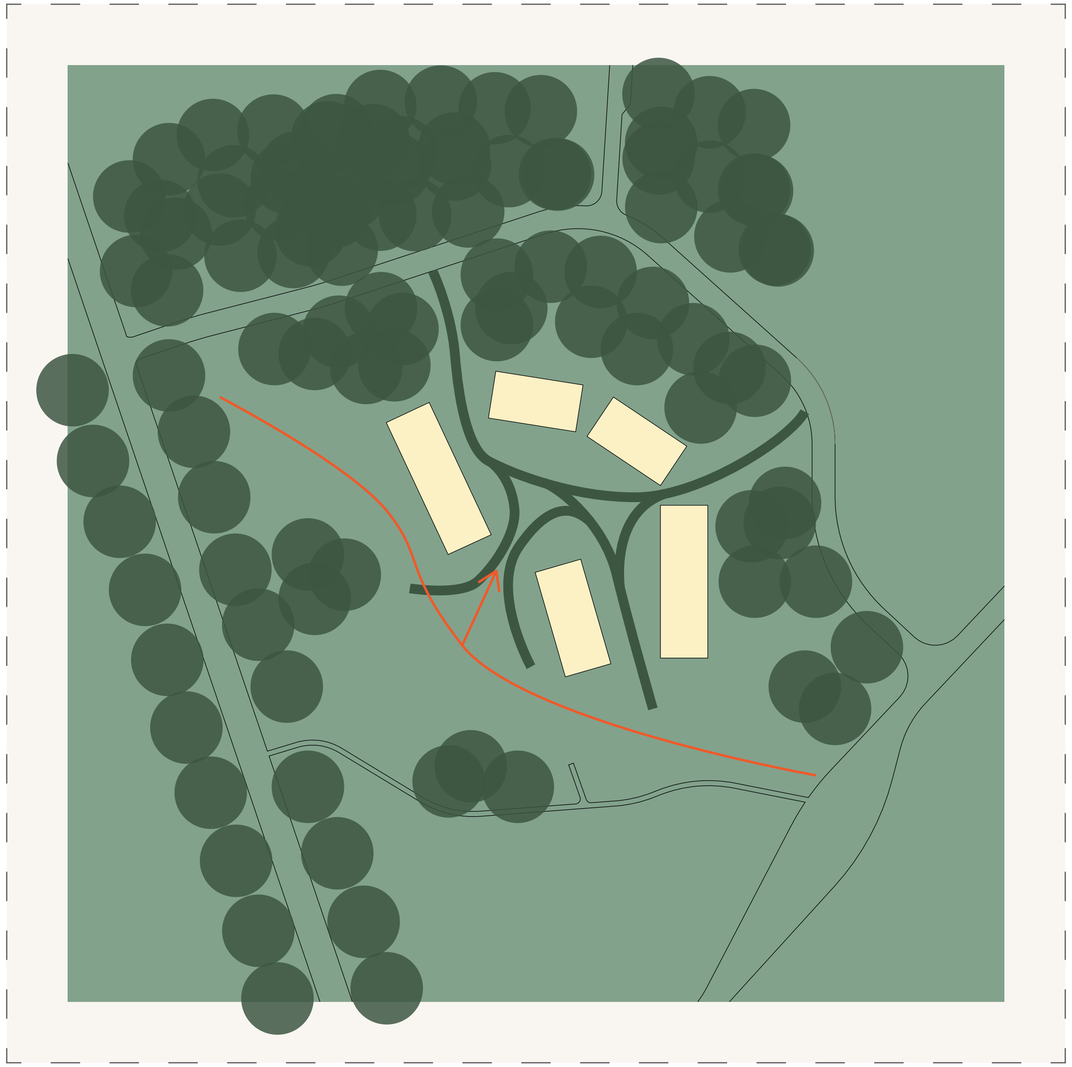
Concept and program

Continue the green structure

Short facade sides towards the sun

Spacious

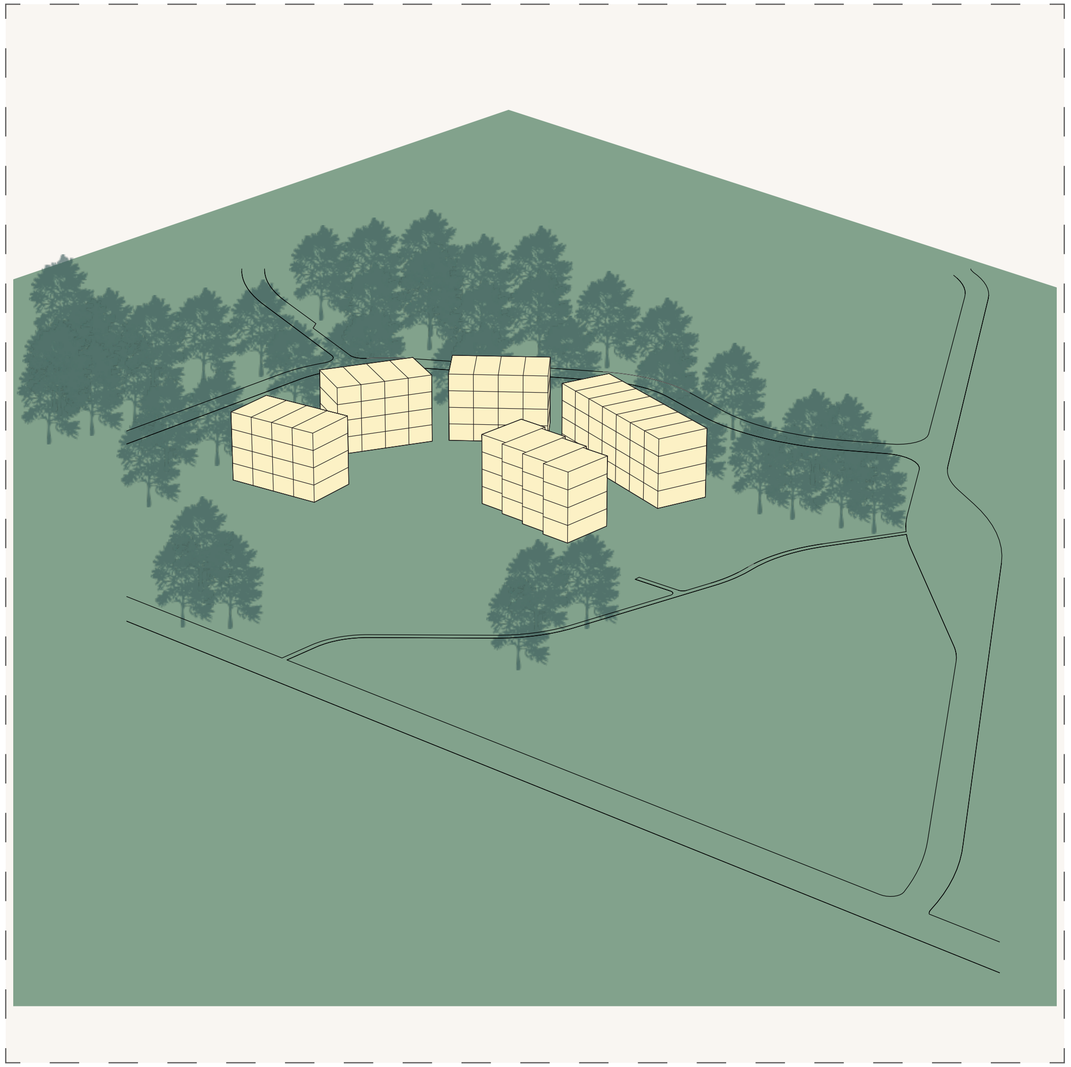
Puzzling





Concept and program

Units in their place



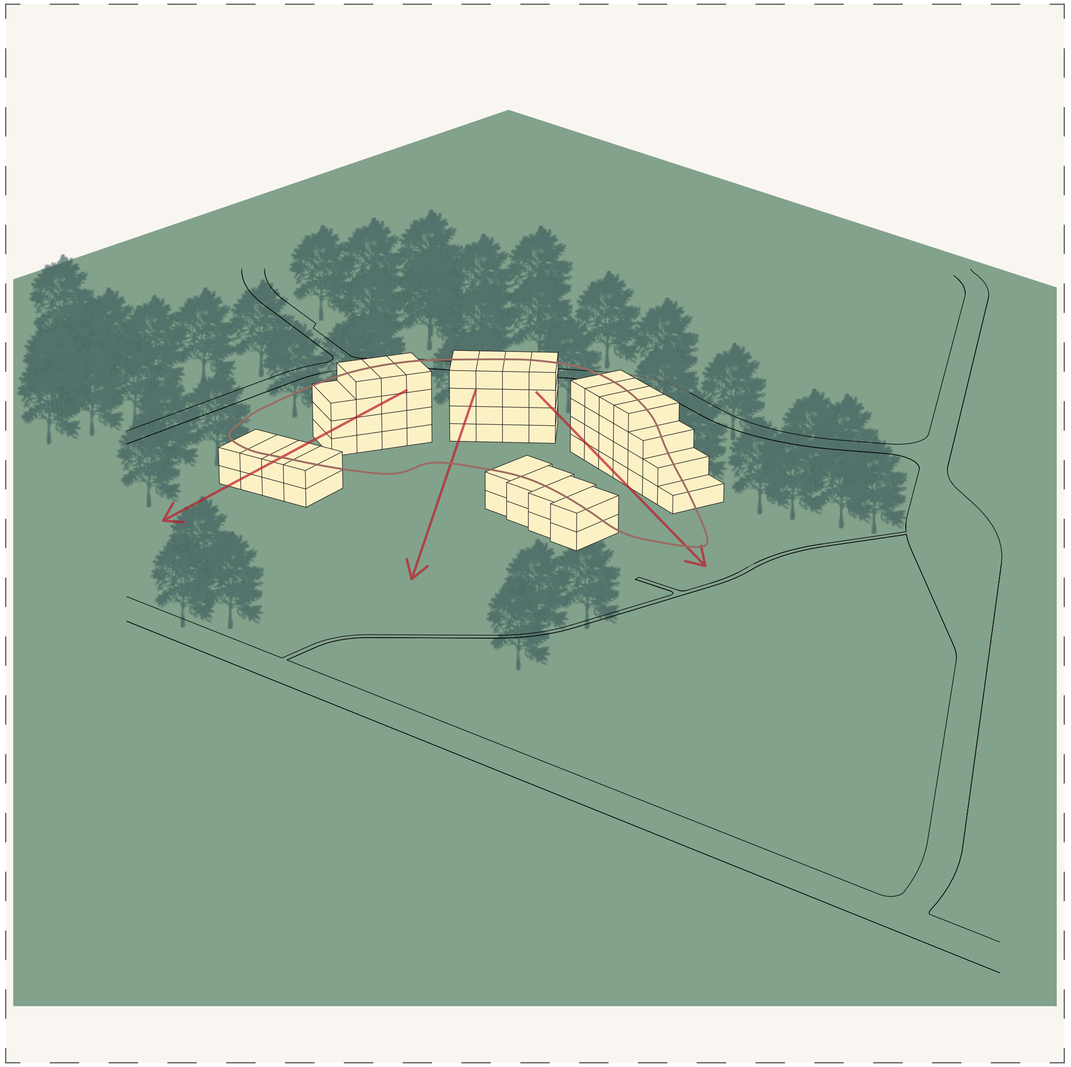
Concept and program

Removing certain units



Concept and program

To improve sightlines and integration in landscape



Concept and program

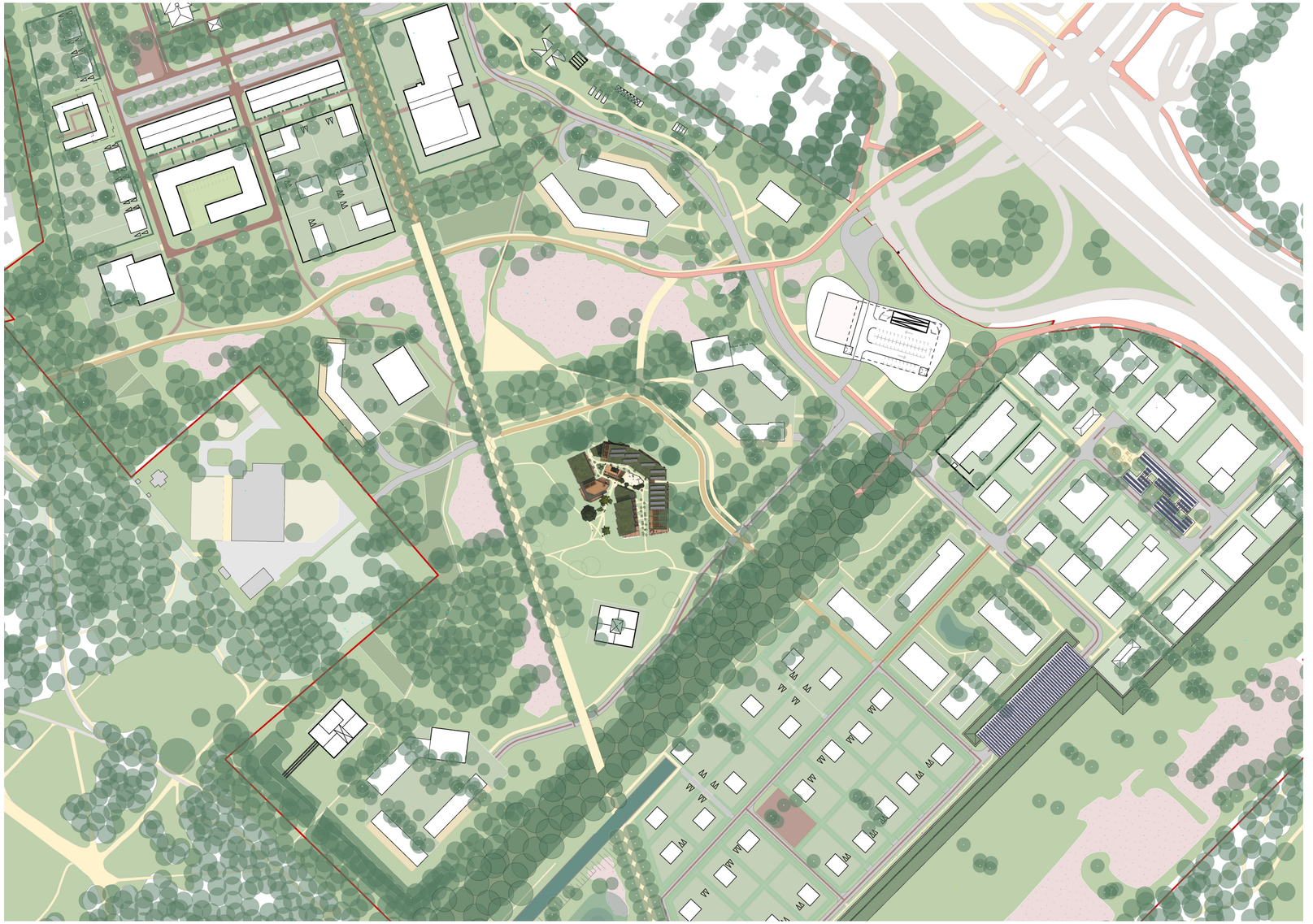
Adding shared facilities, storage and circulation spaces



What does it look like?



Plan view in situation



1:2000

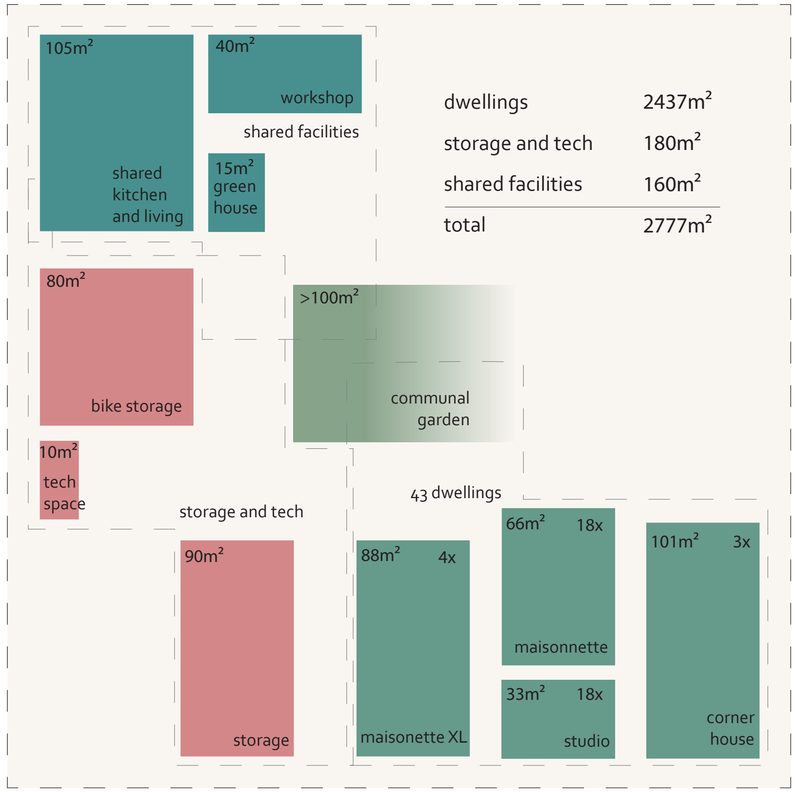
Ground floor in situation

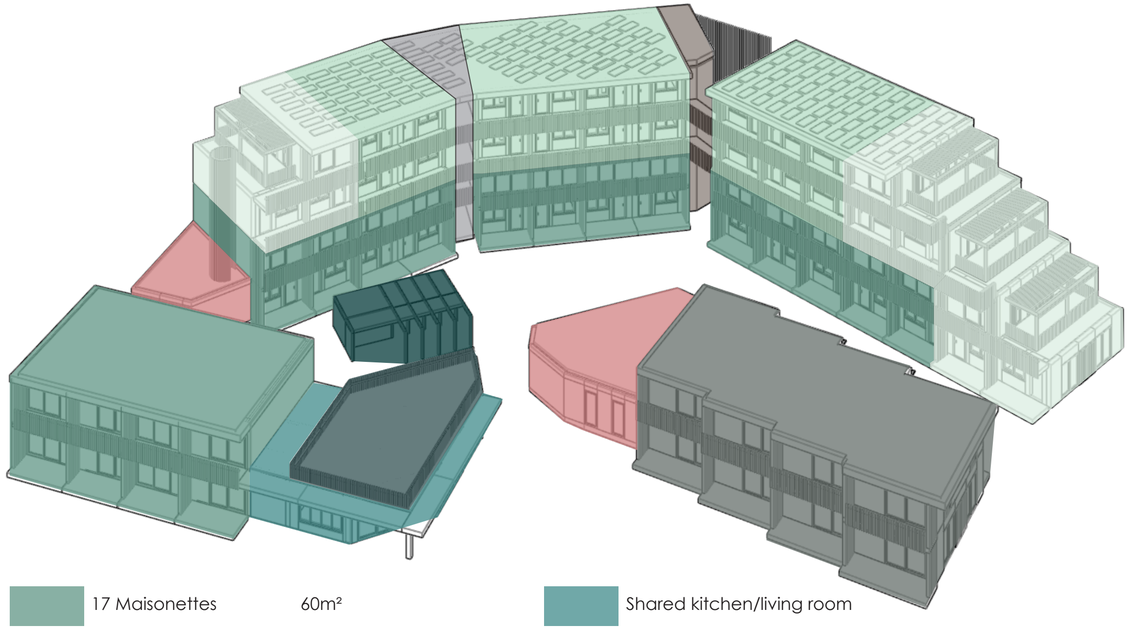


1:500



Program to typology





17 Maisonettes	60m²	Shared kitchen/living room	
18 Studio's	30m²	Bike storage + workshop	
4 Maisonette XL	88m²	Community Deck + tech space(Terrace/BBQ/Green house/Post)	
3 corner house	101m²	Shared roof terrace	
Storages		Elevator + stairs	

Ground floor in situation



Entrances accessible via communal garden

Community garden

Shared living and kitchen

Workshop

1:200

First floor



1:200

Second floor



Studio’s

Large galery can be used as outside space

Gallery provide shading on the level below

Due to lower volumes on the west, there is an open view

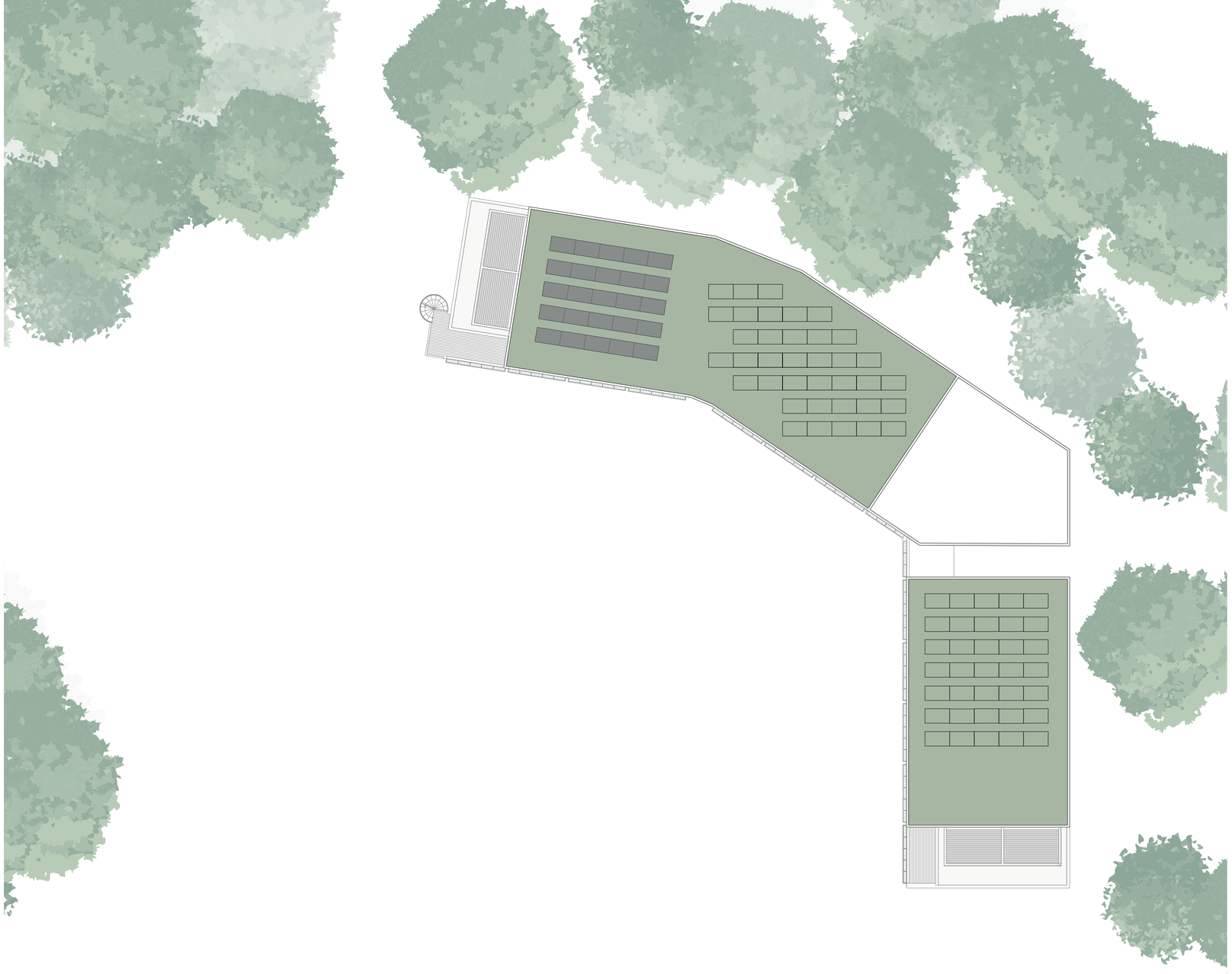
1:200

Second floor



1:200

Roof



Green roofs with solar panels

Overhang roof provide shade on gallery and dwellings

1:200

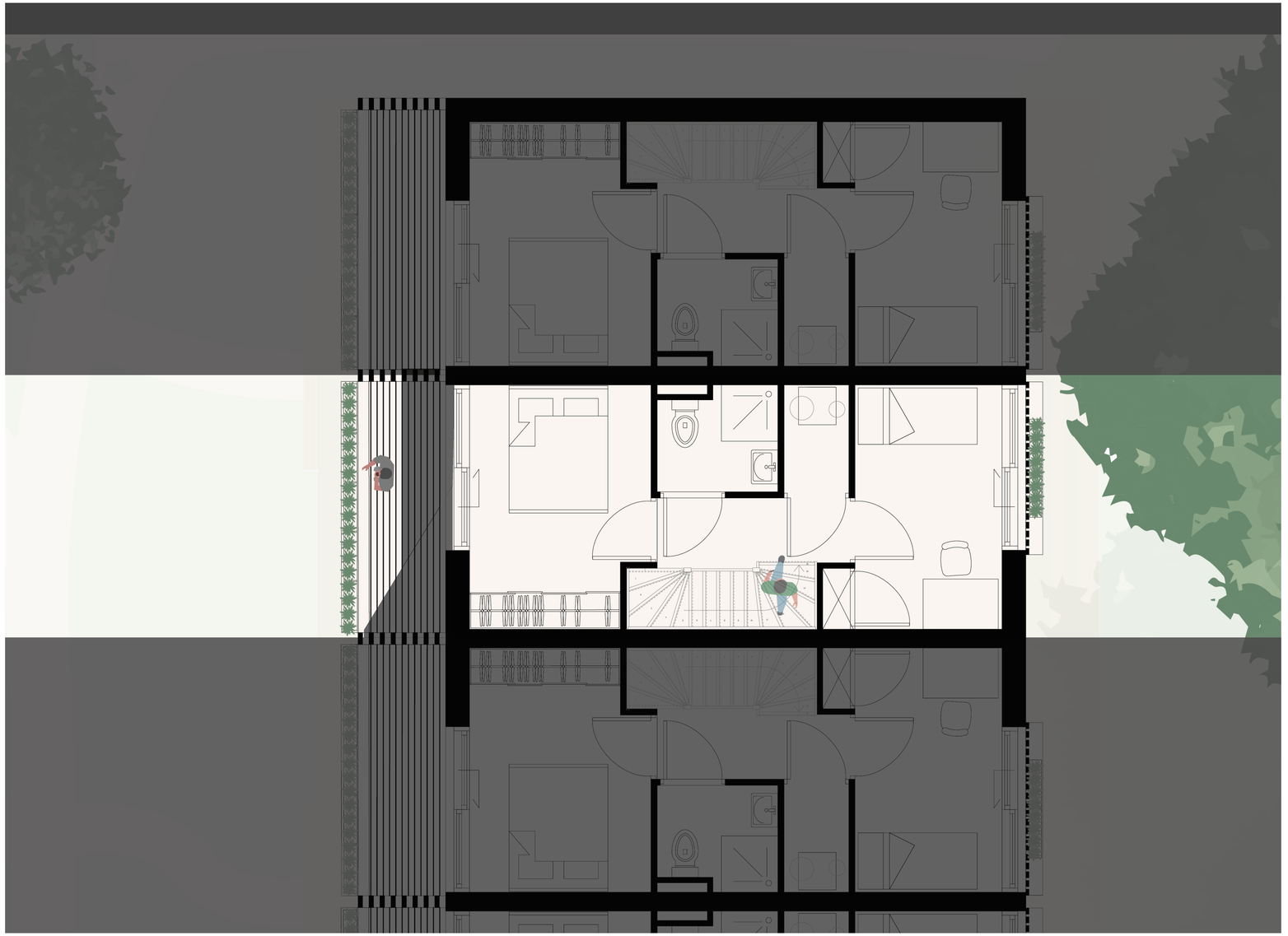


Maisonette ground floor



1:100

Maisonette top floor



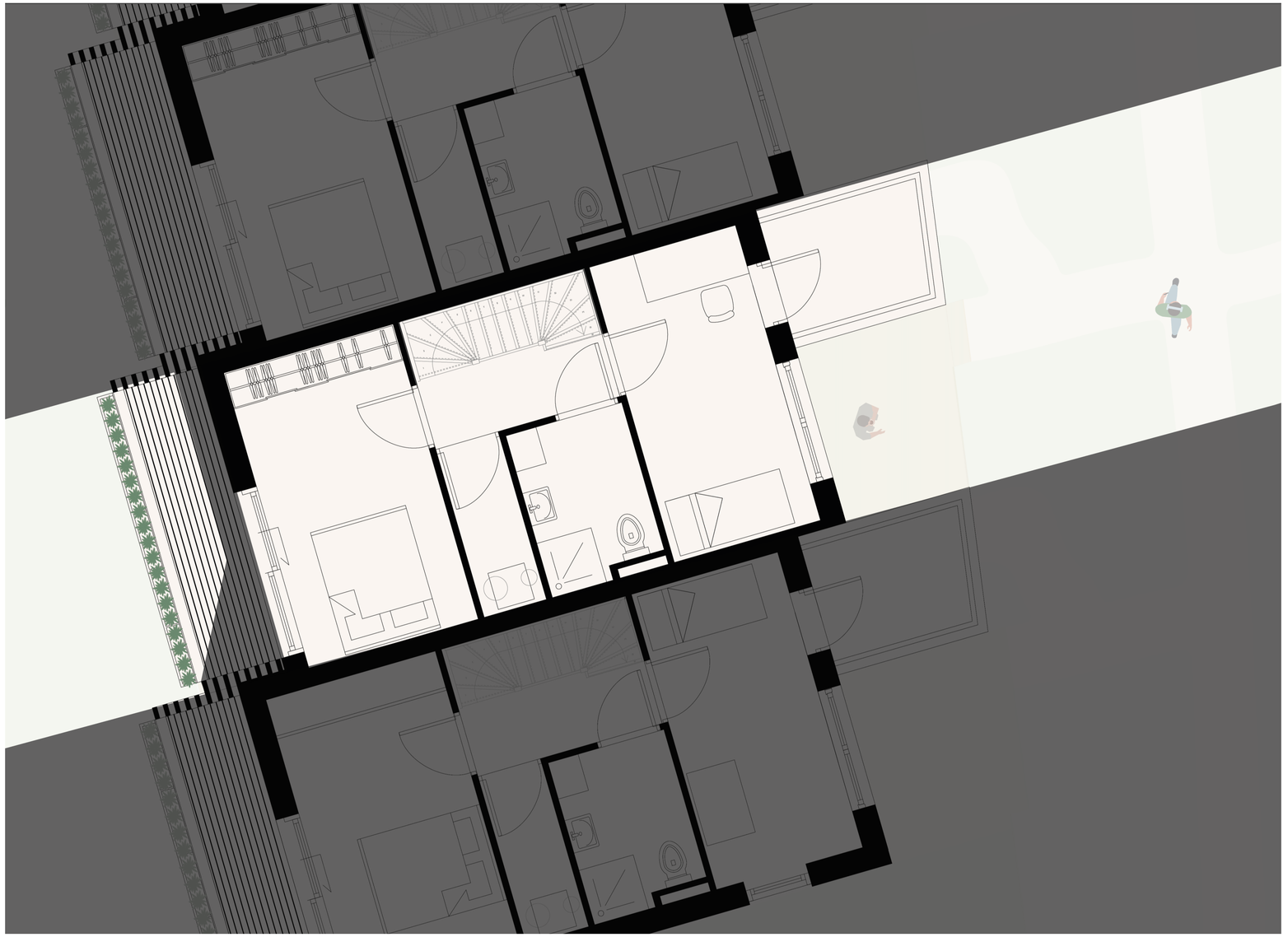
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Maisonette XL ground floor



1:100

Maisonette XL top floor



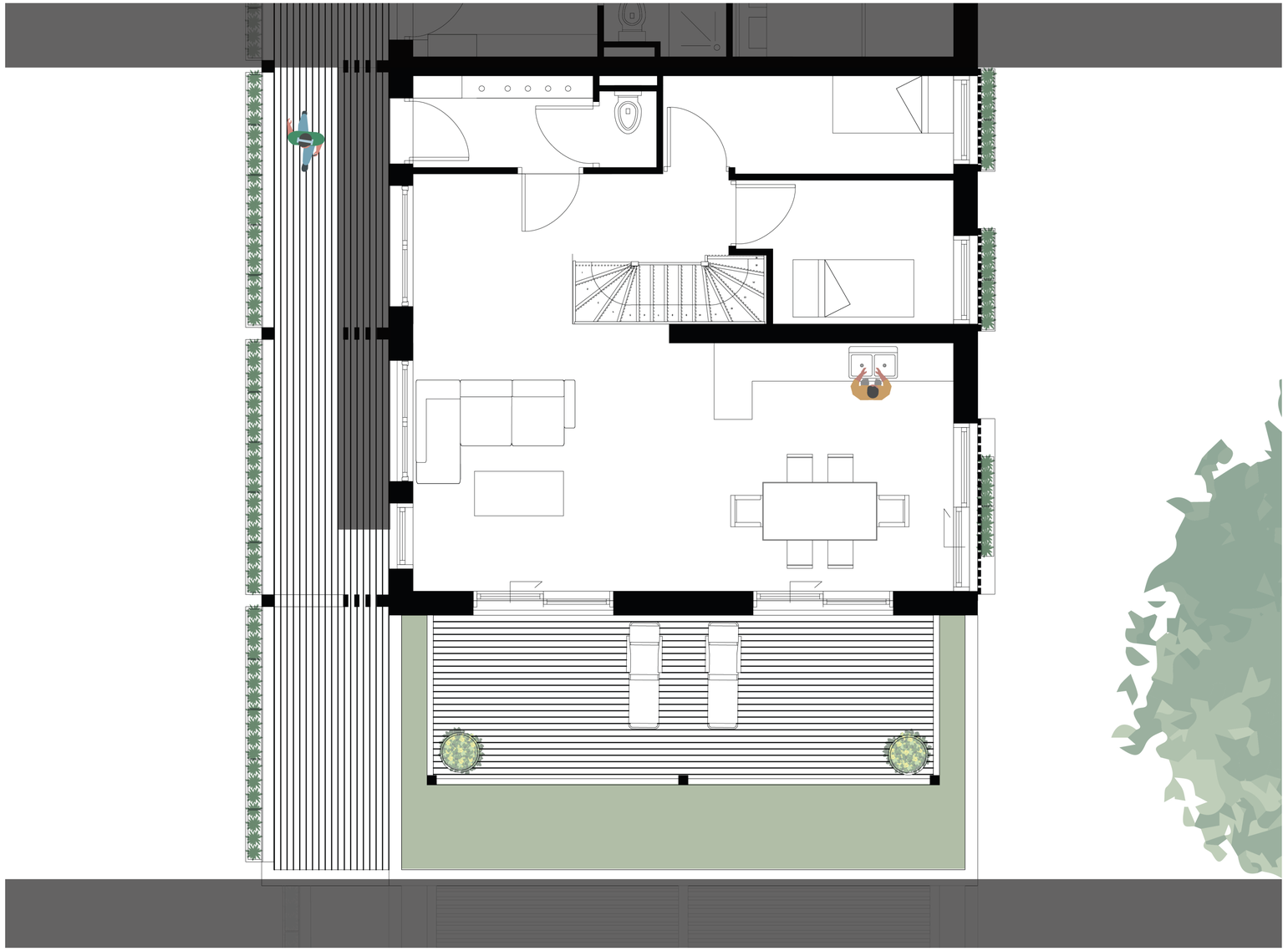
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Studio



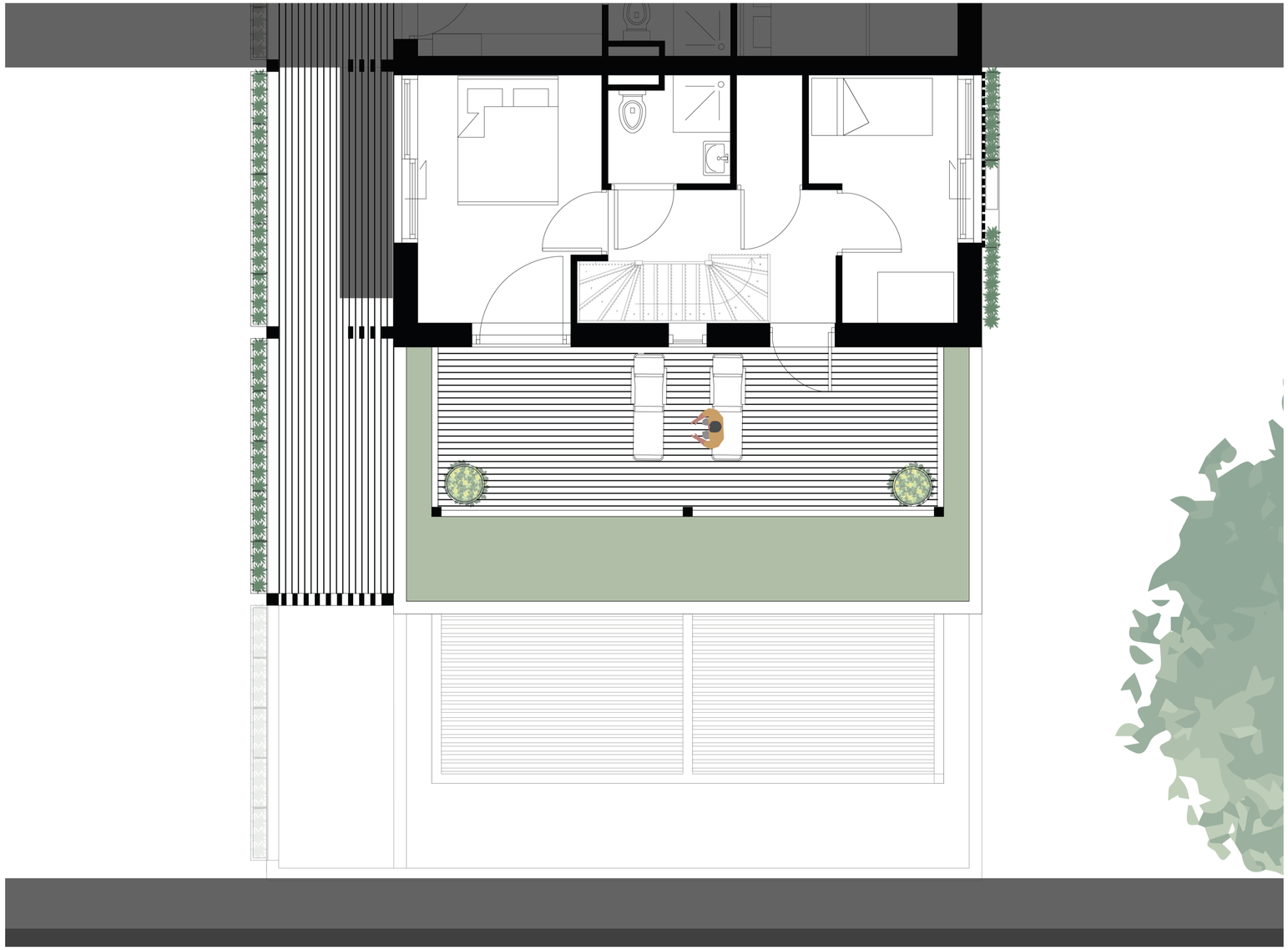
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Corner house ground floor



1:200

Corner house top floor



1:200

Section



South facade



South facade



West facade



West facade



East facade

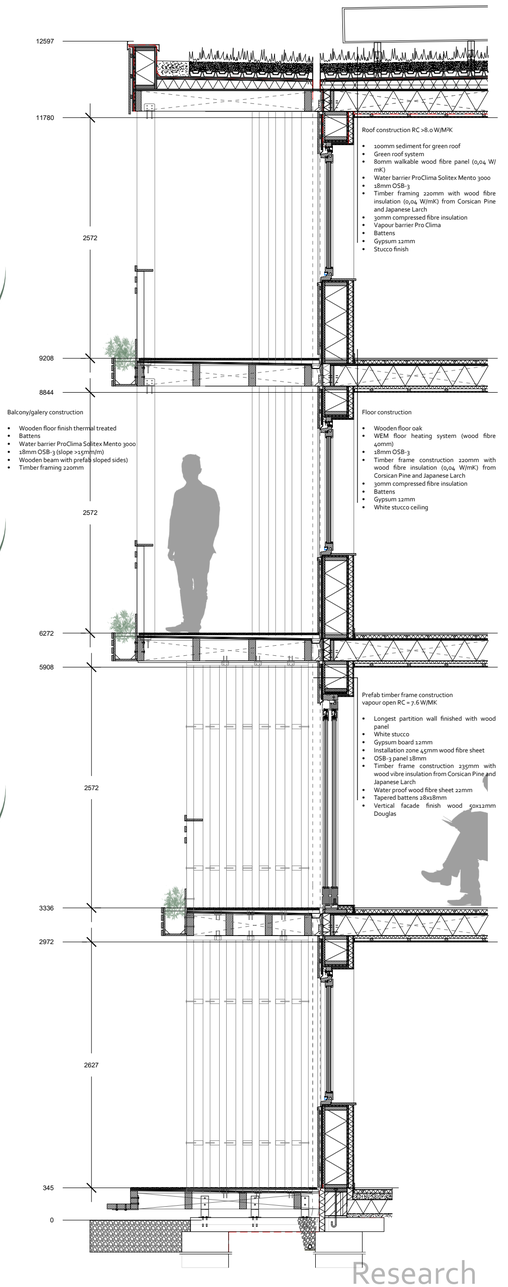


Facade section

Prefab timber elements to reduce building time and impact on the area.

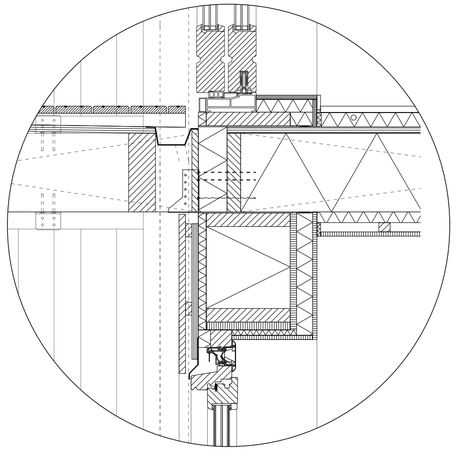
Different kind of wood per element/function:
Facade: Douglas wood
Railings, balcony's, shading, window frames: Oak
Inside: beech and oak
Construction: Corsican Pine, Japanese larch and Norway Spruce
Balcony's and gallery's and the construction provide outside space, shade, privacy and are self supporting.

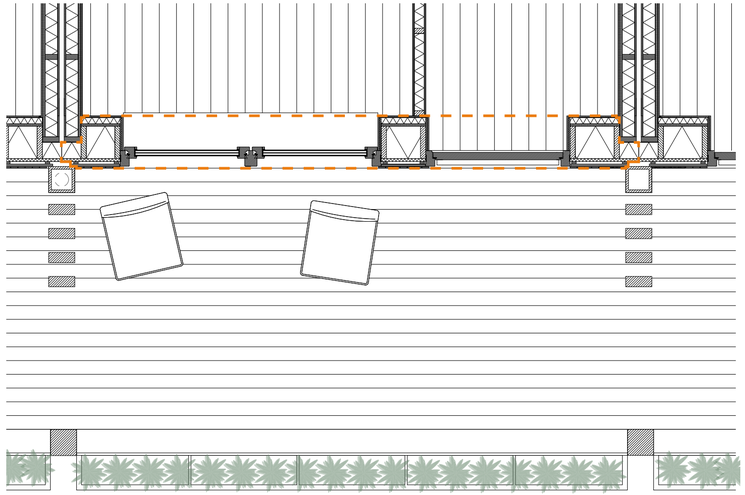
High insulation values in combination with the wood provide comfort, but also a lower energy bill.

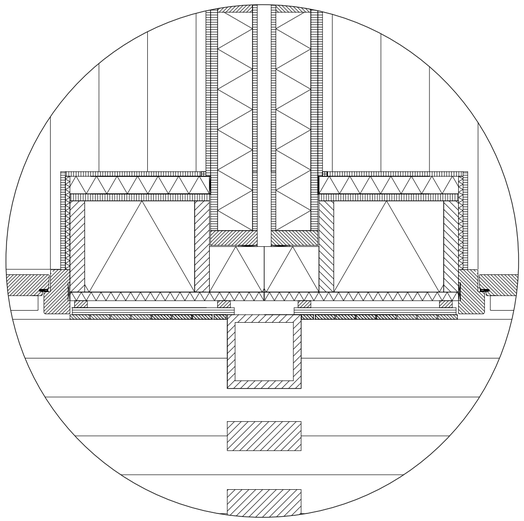


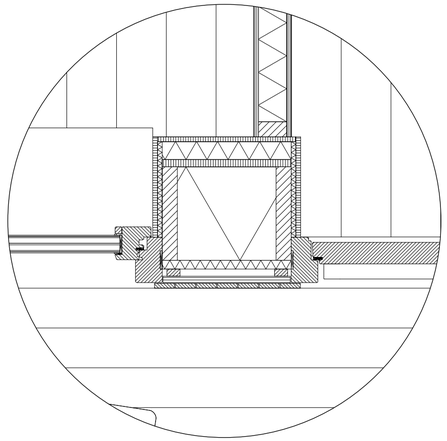


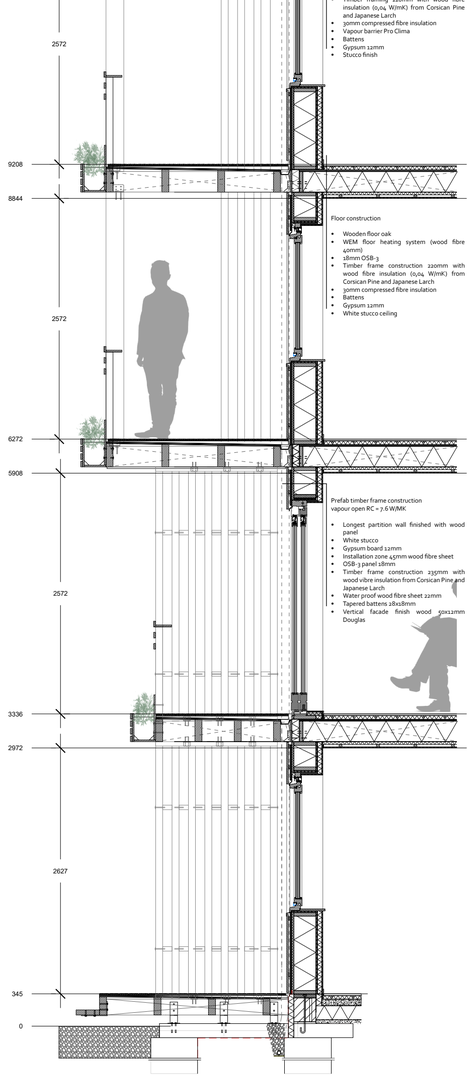
Facade section

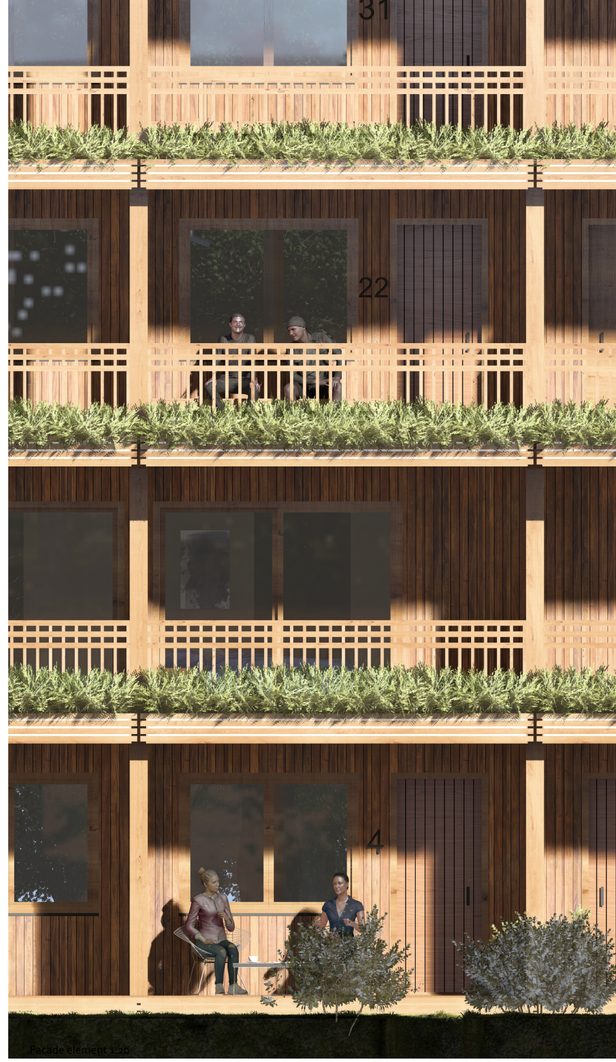




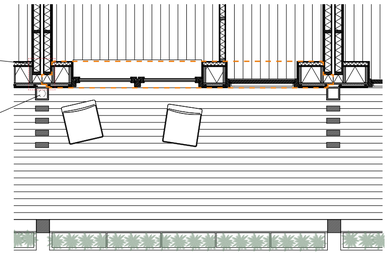






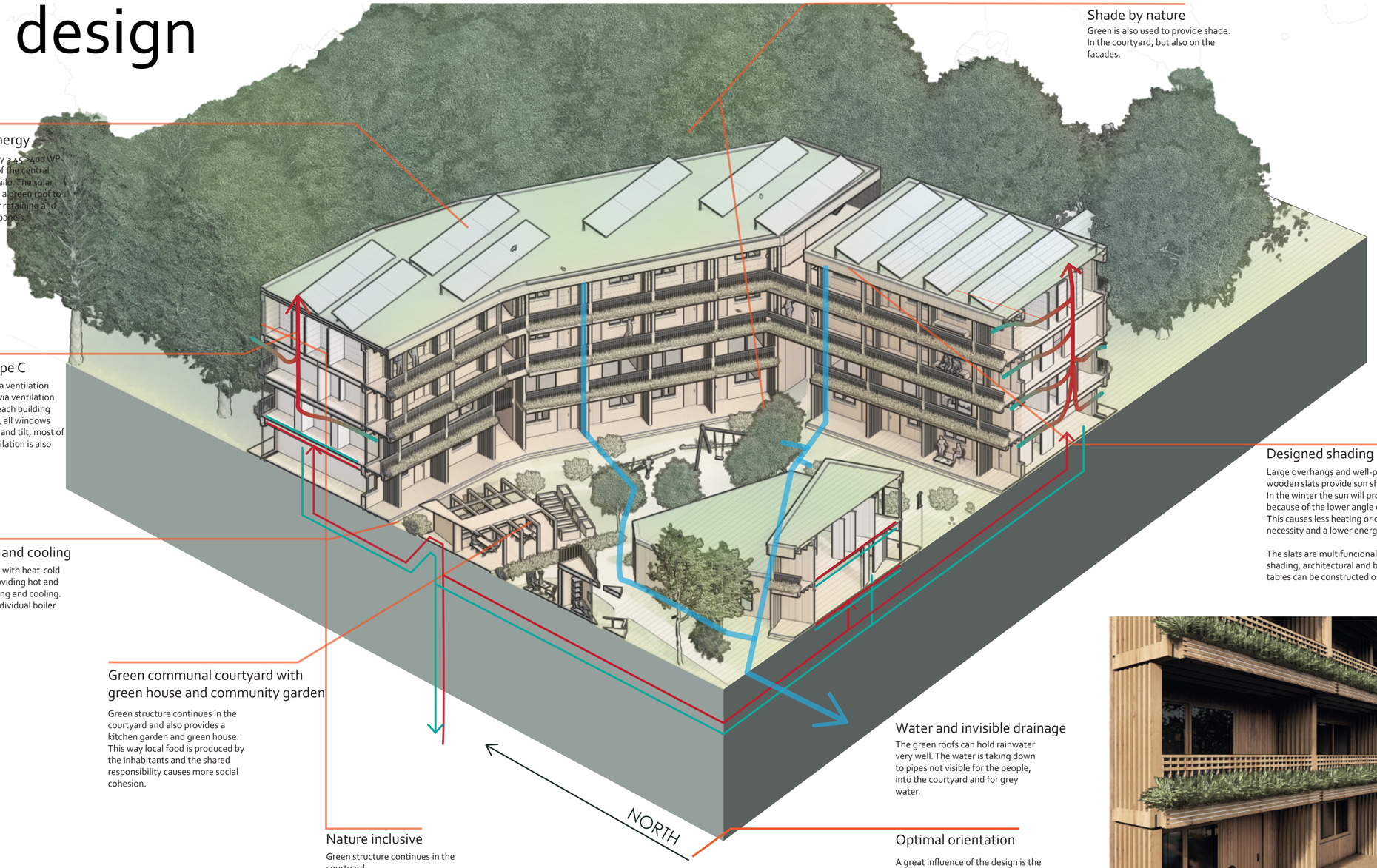


- Tolerances to ensure enough room for fitment of the prefab elements
- Rainwater drain in sun shading construction





Climate design



Shade by nature

Green is also used to provide shade. In the courtyard, but also on the facades.

Renewable energy

Energy is provided by > 45 - 400 WP solar panels on top of the central energy system of Crailo. The solar panels are placed on a green roof to provide better water retaining and more efficient solar panels.

Ventilation type C

Fresh air comes in via ventilation grills and is extored via ventilation units on the roof of each building block. (Type C). Also, all windows can be opened (turn and tilt, most of them). So cross ventilation is also possible.

Floor heating and cooling

A centrail heatpump with heat-cold storage (WKO) is providing hot and cold water and heating and cooling. People can have a individual boiler for kitchen water.

Designed shading

Large overhangs and well-placed wooden slats provide sun shading. In the winter the sun will provide heat, because of the lower angle of the sun. This causes less heating or cooling necessity and a lower energy bill.

The slats are multifuncional: structural, shading, architectural and benches or tables can be constructed onto it.

Green communal courtyard with green house and community garden

Green structure continues in the courtyard and also provides a kitchen garden and green house. This way local food is produced by the inhabitants and the shared responsibility causes more social cohesion.

Water and invisible drainage

The green roofs can hold rainwater very well. The water is taking down to pipes not visible for the people, into the courtyard and for grey water.

Nature inclusive

Green structure continues in the courtyard.
On the north and east facade (because of less heat from the sun) the railings are designed with green and bird boxes.
The other balcony's are also designed with green.

Optimal orientation

A great influence of the design is the sun. Therefore the shapes and orientation are chosen to have to short side of the buildings directed towards the south. Also the balcony's are faced towards the south and west to provide shade and a nice outside space.





Building the building

2D timber elements

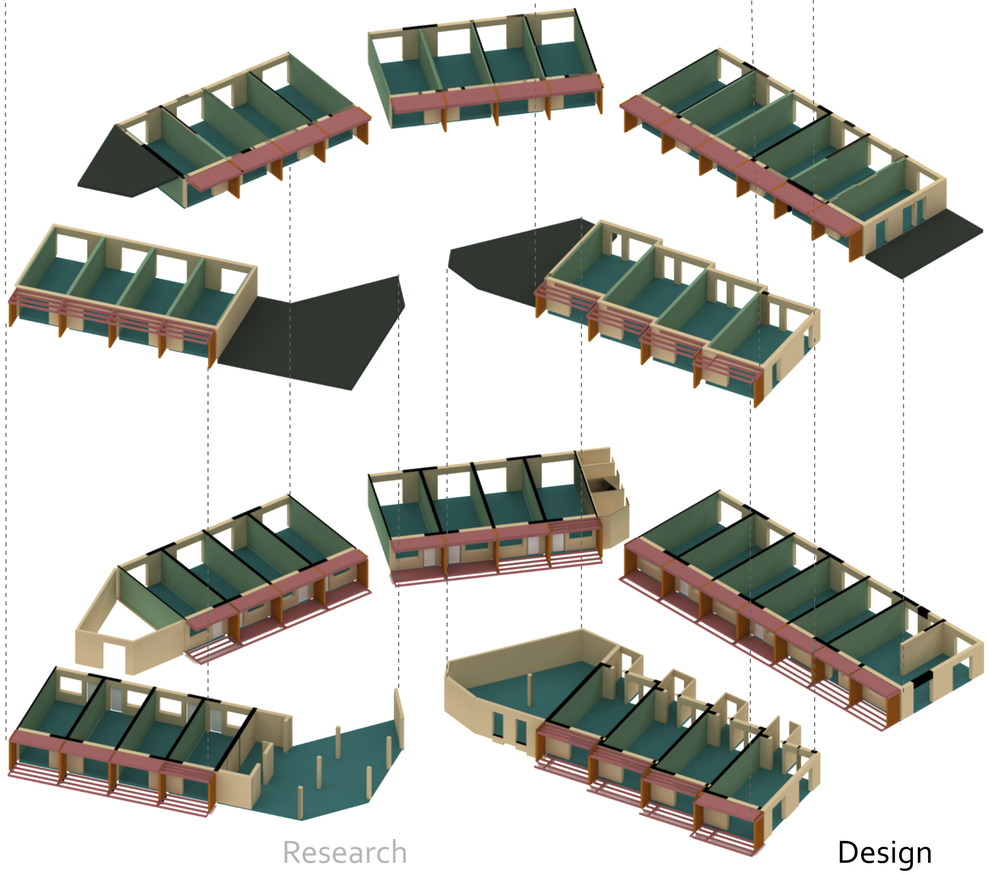
- Prefab made in the factory and placed on site
- Less building time, saves money and impact on the environment
- Less waste material
- High precision

Amount of wood

- Facade 90m³ Douglas wood
- Construction and wood for the balcony's = 570m³
- Total almost 700m³ wood







To conclude



High quality housing



Affordable housing



Nature inclusive design

How can affordable (social) housing be built with high quality standards (space, materials and living conditions), with the use of local biobased materials and co-housing/community building principles?


Thank you!