

Prevention of Cognitive Impairments Through Architectural Design

Personal
motivation



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Graduation Studio *'Towards a Healthy and Inclusive Living Environment'*
Designing for Health & Care

Studies show that the number of people living with dementia will triple by 2050

Due to the changes in demographics and a shift to an aging society, the healthcare system is no longer able to provide care for people in nursing facilities.

The absence of inter-generational contact and a deficit of care-taking in communities leads to societal exclusion of the elderly and increases the development aforementioned diseases

Background - relevance for society

Therefore, inspired by the phrase "prevention is better than cure" we should develop a new model of neighbourhood and housing design that inspires physical movement and social interactions.

There is currently no available cure for dementia **but** modifying certain risk factors can reduce the probability of developing dementia by around a third.

Architects are put in the spotlight and encouraged to come up with design strategies that help prevent the development of cognitive impairments

The most prominent risk factors according to the NHS are: untreated depression, loneliness or social isolation and lack of regular exercise.

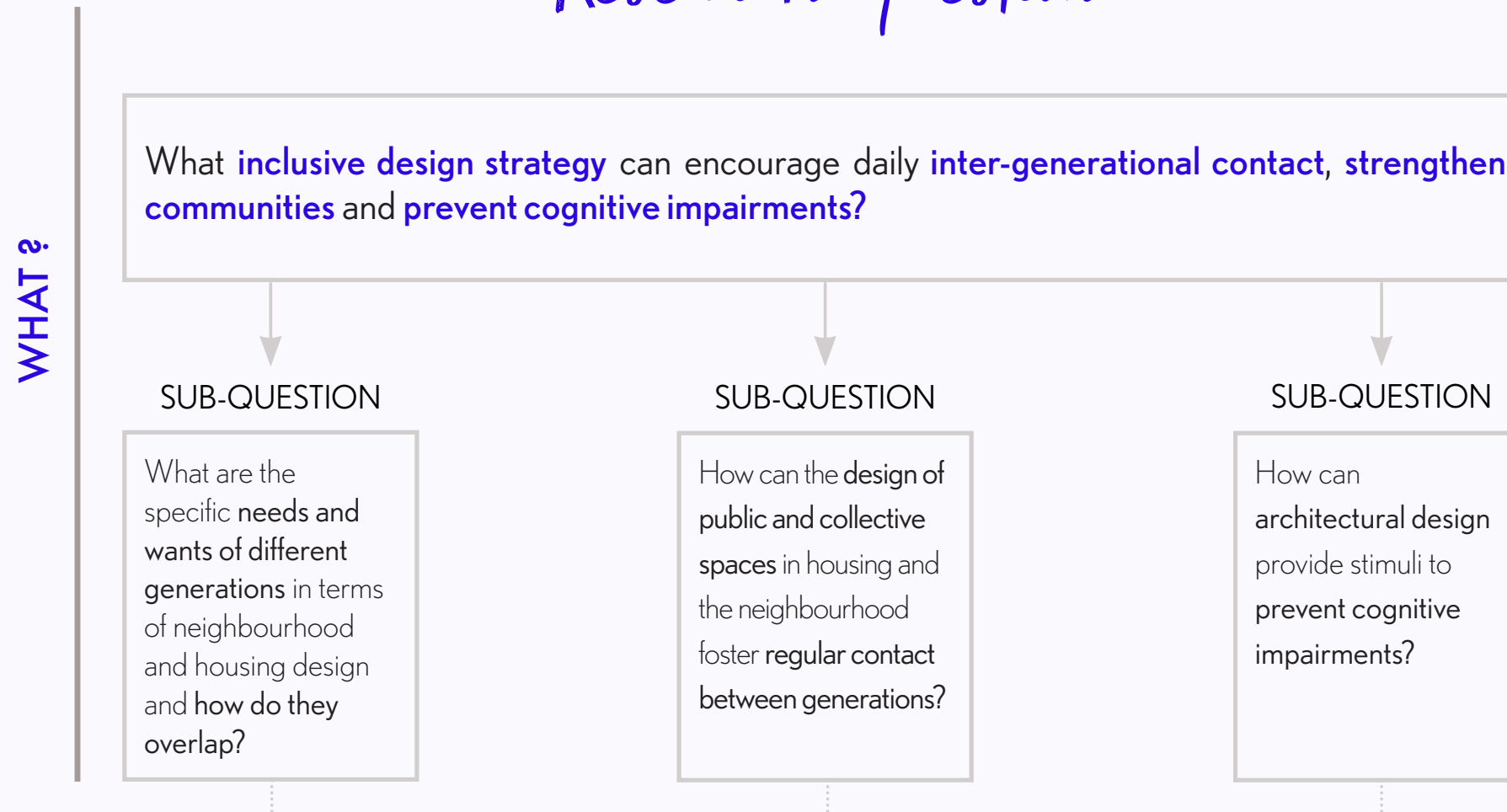
Hypothesis.

Architecture that inspires physical movement and social interactions reduces the probability of developing cognitive impairments and depression.

Knowledge gap:

How can architectural design provide stimuli to prevent cognitive impairments?

Research question





Research method

Fieldwork

1. Needs and wants of different generations and their overlaps

1. Needs of the target group
2. Inclusive and future-proof living space design

2. Design of public and collective spaces that foster contact

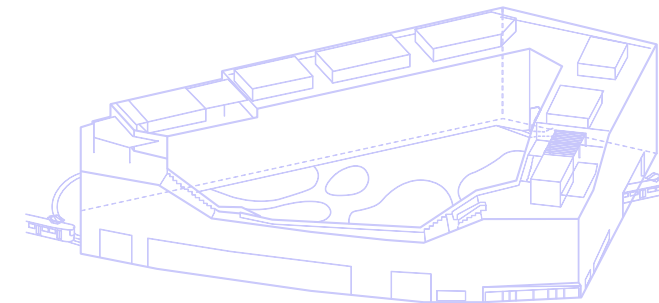
1. Needs on the neighbourhood scale
2. Design ideas based on questionnaires



Case studies:

Architects: Müller Sigrist Architekten
Area : 22900 m²
Year of completion : 2014
Number of dwellings: 88
Residents (approximate) : 250
Average living space per person : 31.2 m²

Kalkbreite
Housing cooperative
by: Müller Sigrist Architekten



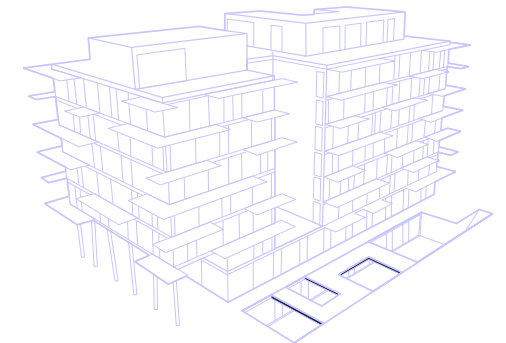
1. Needs and wants of different generations and their overlaps

2. Design of public and collective spaces that foster contact

3. Design of living and half private spaces

Wohnprojekt Wien
Co-housing Vienna
by: einszueins architektur

Architects: einszueins architektur
Area : 5.300 m²
Year of completion : 2013
Number of dwellings: 39
Residents (approximate) : 100
Average living space per person : 32 m²



Literature themes



Main literature findings



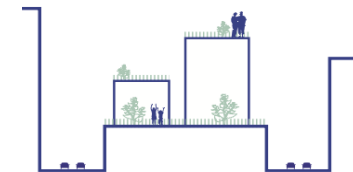
ACCESSIBILITY, PROXIMITY & CONCENTRATION

of everyday destinations, public transport, health and care facilities, amenities and public spaces



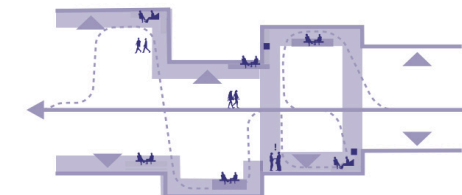
FUNCTIONAL SYNERGIES

Proximity of functions used by different age groups



GREEN SPACES

Different scales of attractive green spaces and parks



MEETING POINTS THIRD PLACES

Public outdoor spaces and communal indoor spaces

"I have a lot of interests. I think that having something that you are passionate about is very important when you have retired. It started with digging in the archives to find out who my ancestors were. Nowadays, I do it more professionally. I have recently written a book with my friend about a family of Wężyki "

"I sometimes go to the Dom Tramwajarza (House of the Tram Driver), which is a cultural spot on the map of Jezyce district. **It is a meeting place for artists and residents. They also organise plenty of musical events and workshops**"

"My village has a community and cultural center. They offer a lot of workshops and classes for us. I really enjoyed the dancing classes that we had with the younger generation. **The community center organises many meetings with special such as artists, athletes and writers that I like to attend.**"

"I have brought an album with me in which I have collected the weirdest surnames I have heard. I have categorised them thematically."

"I think that small local shops and market squares play an important role and make me feel like a part of a community."

"A green roof with a community area would be an excellent spot to meet with neighbours and enjoy the views."

"I love to do Nordic walking. I regularly train and attend competitions. We have a Nordic walking group and we meet in parks in Poznan to train together. Besides that, I love to go for walks. I find that having a lot of benches definitely helps. **It is important that the neighbourhood has a lot of green areas.**"

"We would like to attend workshops and events, but finding out information about them is not so easy. **It would make a big difference to have an information board with all events for the month!** In this way, I would end up attending more of them."

"I often go for walks with my friend to the Sołacki park. I also really enjoy the dendrological garden. They now made some impressive light installations there."

"I love to organise meetings for my friends. I take control of all our celebrations. **What would make meeting my friends easier would be a place that would make it possible to organise meetings for larger groups.** I often struggle to find places which are not incredibly expensive to rent and have enough space to offer."

"I live in Suchy Las; we have many places for the local community. There is a swimming pool and gym that I use a lot, a community center, a cultural center, a public library and a municipal sports center. **The village organises a lot of exciting events for the residents that I gladly attend.**"

"I have met a lot of my neighbours because of my dog. I like to chat with others during dog walks. It also forces me to stay active."

My Grandma: **We know each other from The University of The Third Age.** We attend lectures together once or twice a month. After the meetings, we often get coffee and catch up. We also meet for special occasions to celebrate!

"I used to dance in the folk dance club, but since my knee injury, I can no longer do that."

Meeting with my grandma's friends from The University of the Third Age



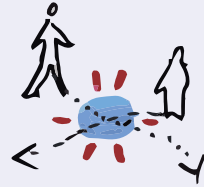
Design guidelines

Figure 23. Author's own Sketch, Fieldwork Design Guidelines.



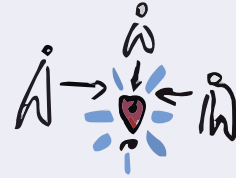
Community

Create a housing block which revolves around community



Design for encounter

Design to increase the possibility of spontaneous encounters



Meeting spots

Create meeting spots where passions and hobbies can be embraced



Balcony design

Design balconies of generous size with floor on the same level as in the apartment



Watering system

Design plant beds on the balconies with automatic watering system



Connections with neighbourhood

Design connections with the neighbourhood



Affordability

Provide affordable meeting places



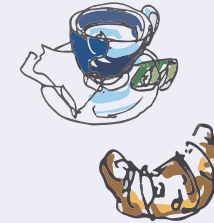
Communal use

Provide communal spaces like: shared rooftop, communal garden, library, shared kitchen, play room, workout room



Ownership

Provide in-between spaces to enable the residents to take ownership of them



Connective spots

Design connective spots for the neighbourhood like: cafés, restaurants, bakeries, local grocery shops



Locality

Break with anonymity by focusing on local businesses, markets and community centres



Neighbourhood as a community

Design communal fictions for the neighbourhood like: community centre, event space, workshop spaces



Activity spaces

Provide a variety of activity spaces like: indoor and outdoor gyms, yoga and meditation, rehabilitation and physiotherapy



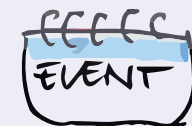
Workshop spaces

Provide workshop spaces for the residents



Future-proof living spaces

Design future proof living spaces to enable aging in place



Information

Provide information about ongoing communal events



Medical services

Provide access to medical services like: medical clinic, house doctor, care centre rehabilitation, pharmacy



Nature

Design with close connection to nature and provide sufficient amount of green spaces

Housing block scale



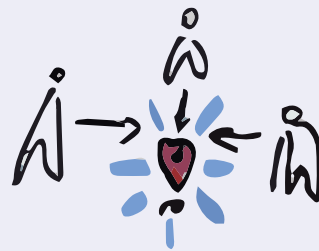
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Create a housing block which revolves around community



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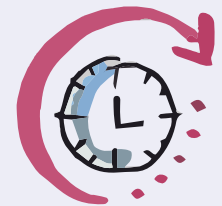
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Neighbourhood scale



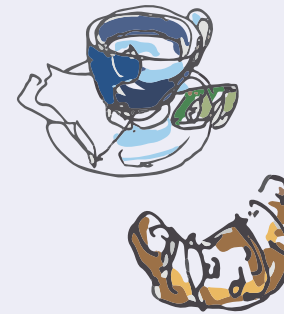
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WohnProjekt Wien



I really value the social aspect of this place. There is always something to do around here!

I find it important that people of different age groups are living in our housing project.

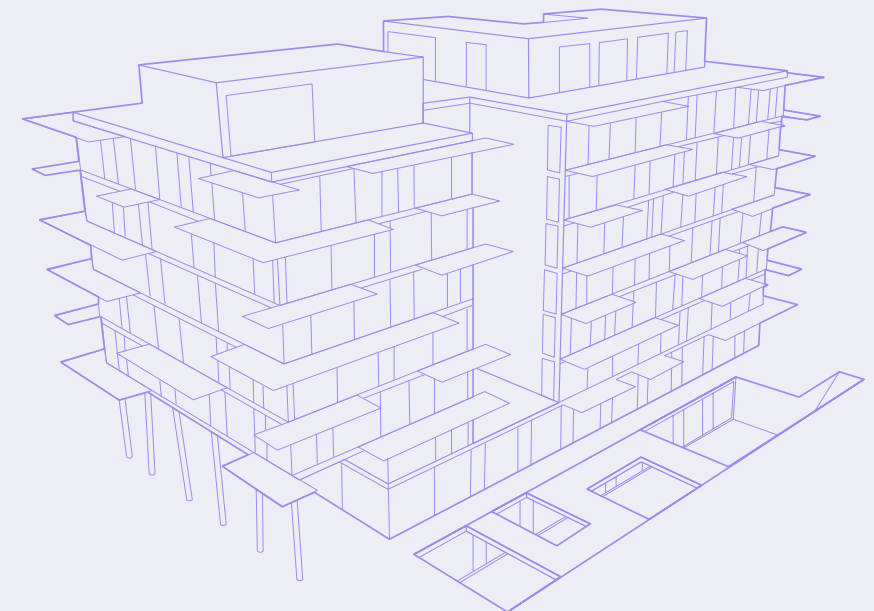


When I need help or a friendly talk all that I have to do is step out of my door!

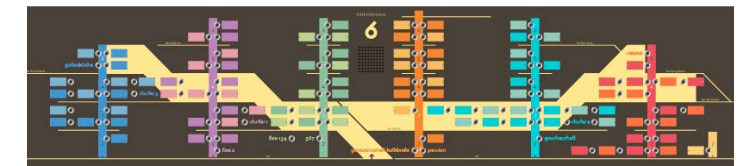
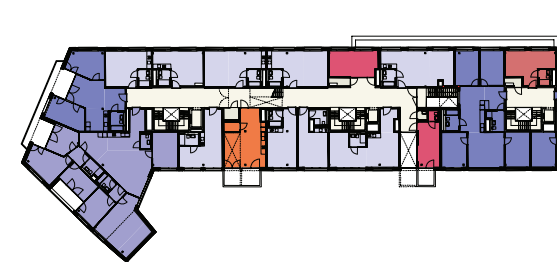
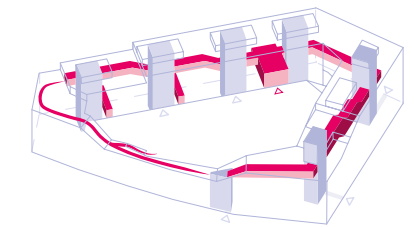
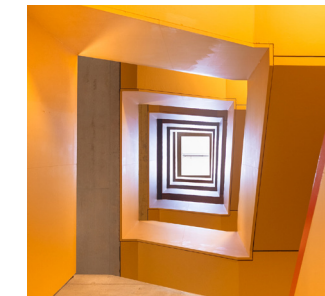
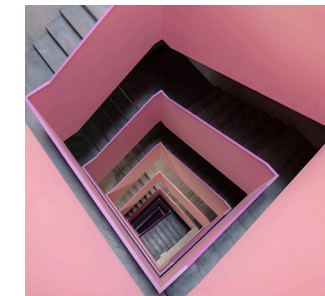
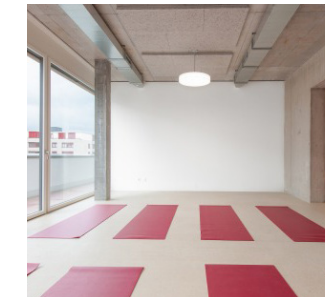
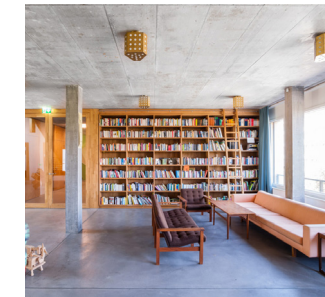
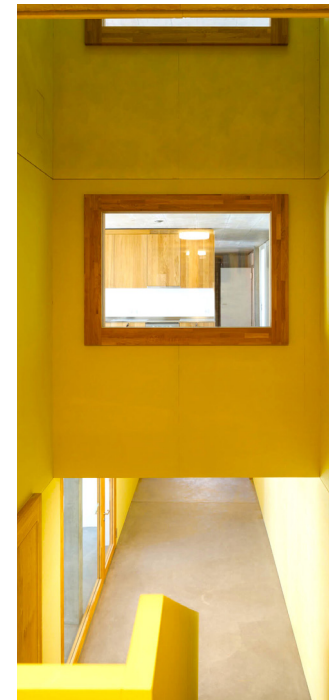
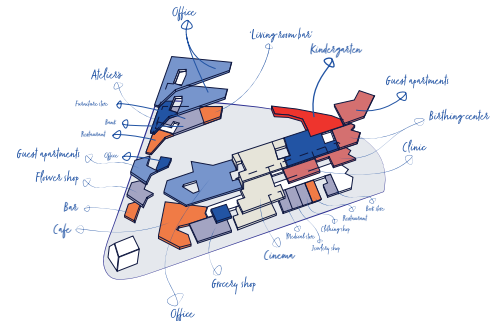


I really enjoy having so many communal spaces. My apartment is not the biggest so they are of great advantage.

It is important for me to feel like I am a part of a community.



Kalkbreite



WohnProjekt Wien



Light-wells



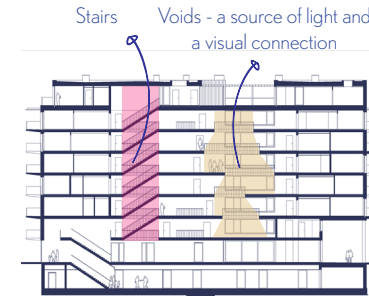
Event room



Workshop



Attractive communal rooftop



Voids on the staircase



Shared library



Rooftop garden



Active underground



Vegetable garden



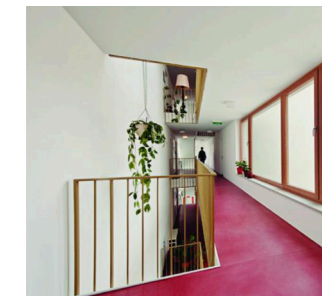
Bicycle storage + car pool



Free arrangement of balconies



Voids on the staircase



Staircase filled with light



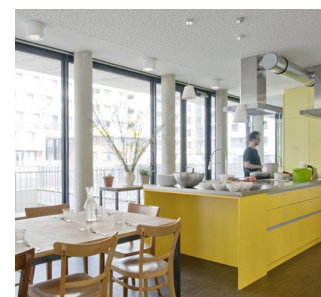
Individuality within community



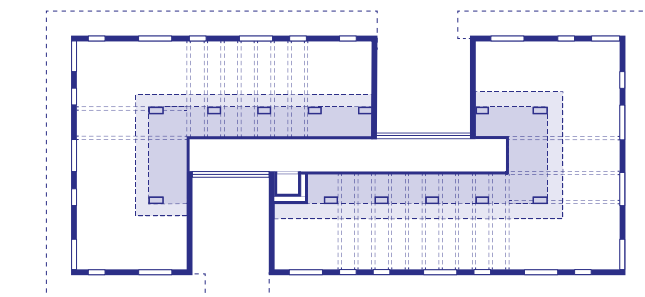
Small businesses



Visual connection



Communal kitchen



Free plan

Design scale

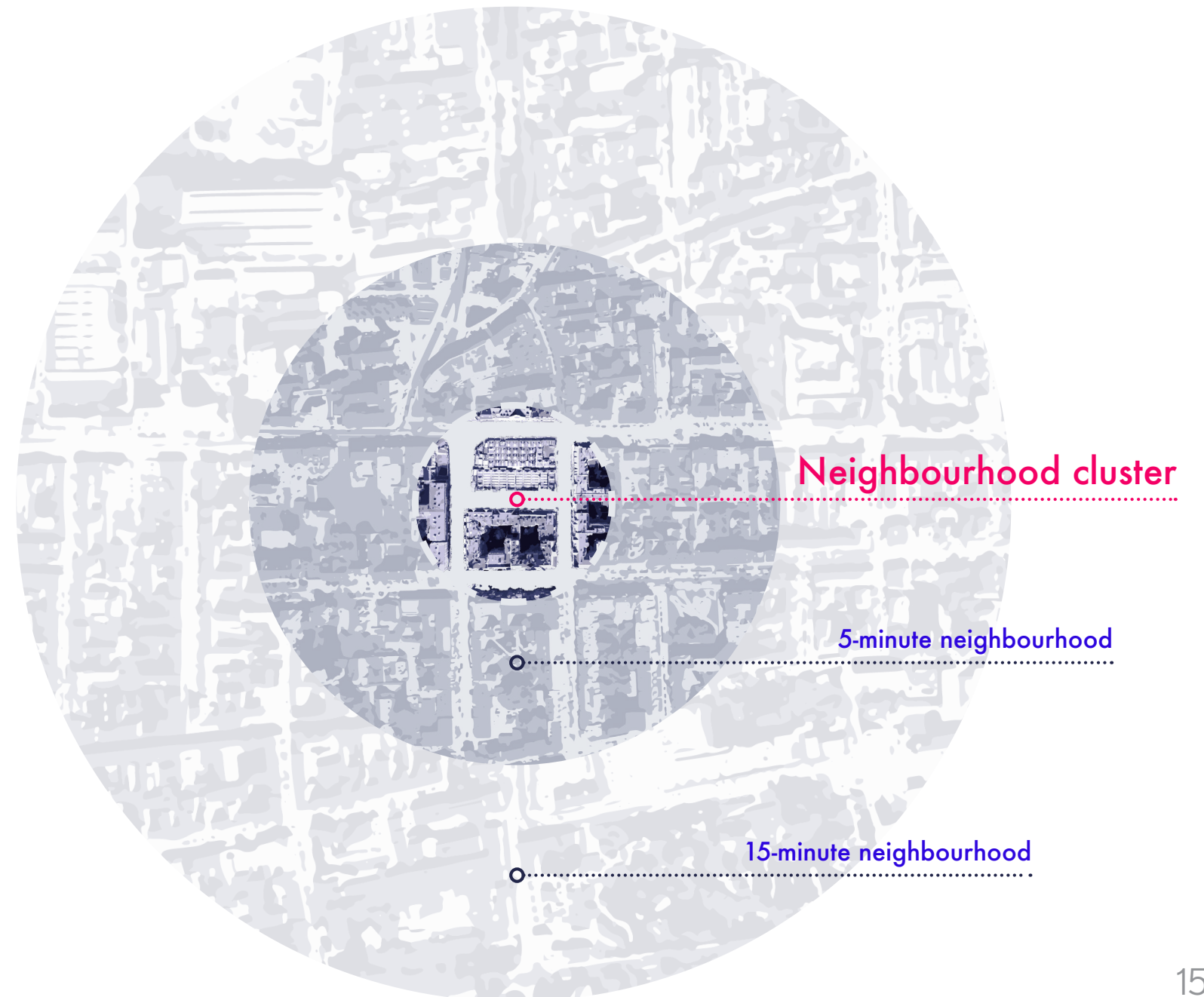
Since

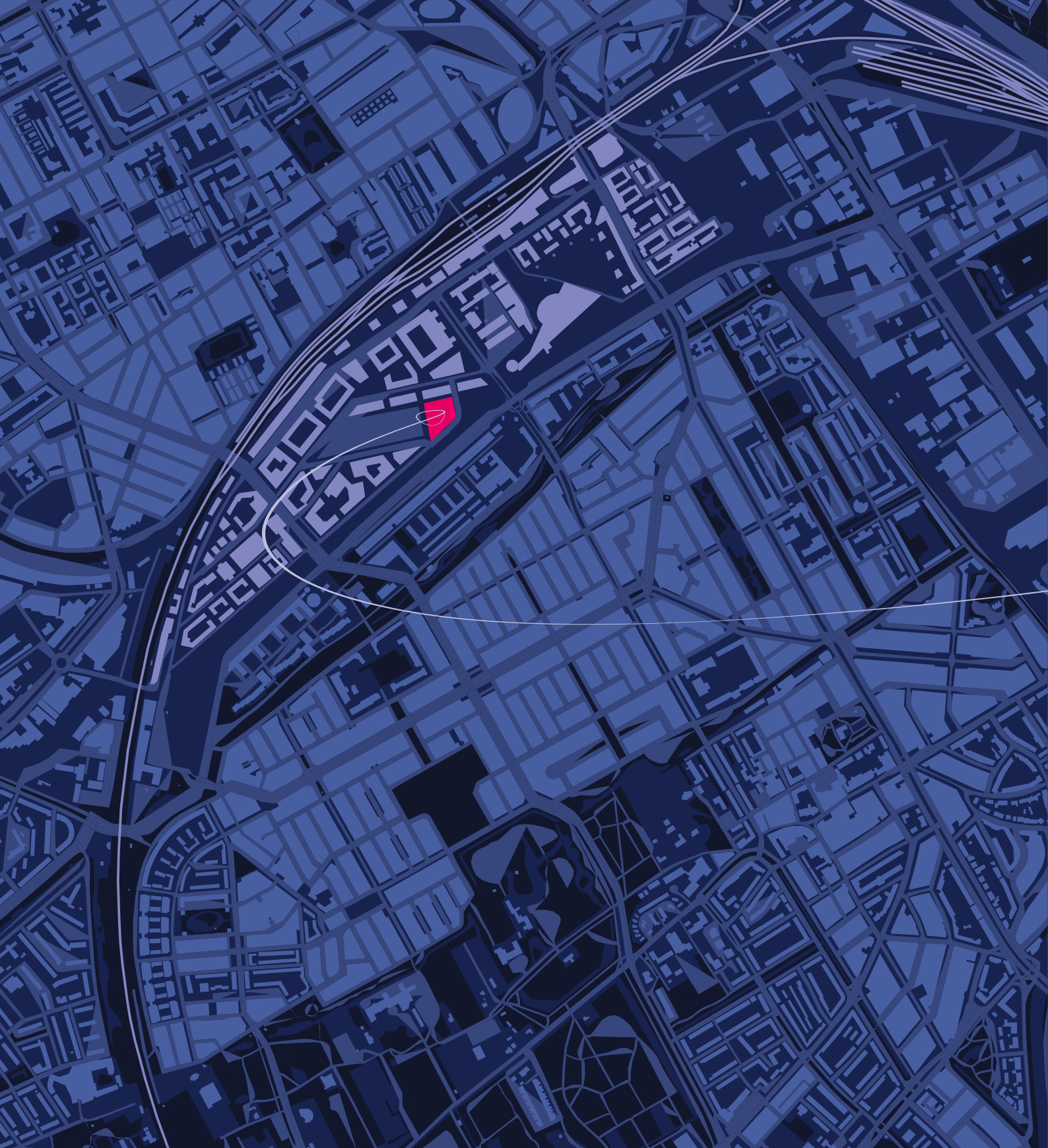
Architecture that inspires **physical movement** and **social interactions** reduces the probability of developing cognitive impairments and depression.

and...

Older residents tend to spend more time in their homes and closest surroundings

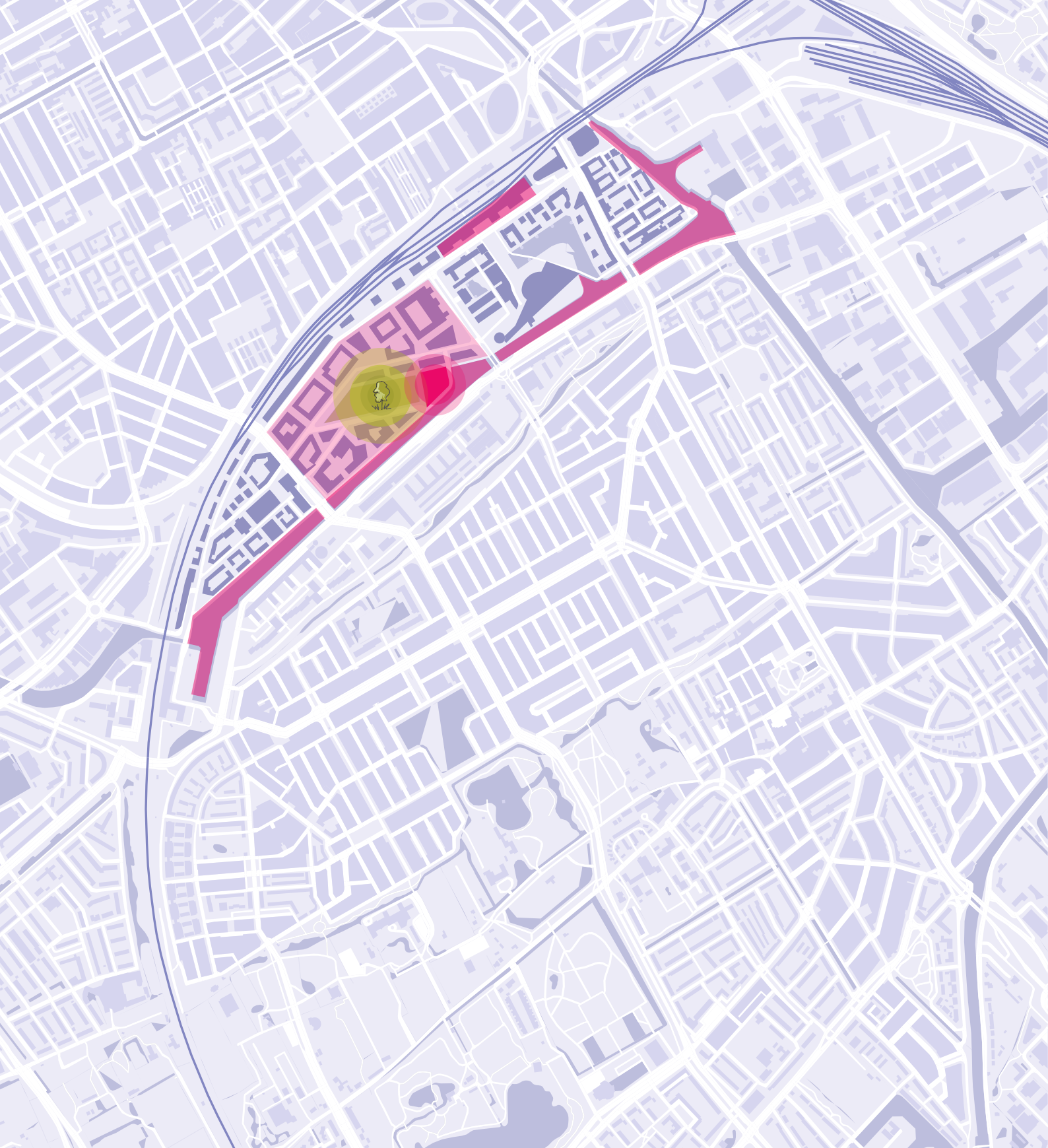
the importance of the **housing block** and the neighbourhood **as the catalyst for activities, interactions** and social networks increases





Site choice

● *Project site*



Strengths :

- Sufficient plot size for a co-housing development
- Good location in relation to the sun-path (**optimal day-light conditions**)
- **Attractive location next to the planned park** and canal
- Proximity of the university allows for more diversity and **intergenerational character**(important for the elderly)
- Close proximity to the public transport
- Planned high concentration and variety of functions and **compact size of the neighbourhood** increases the **walkability of the neighbourhood** (The elderly are more self sufficient)

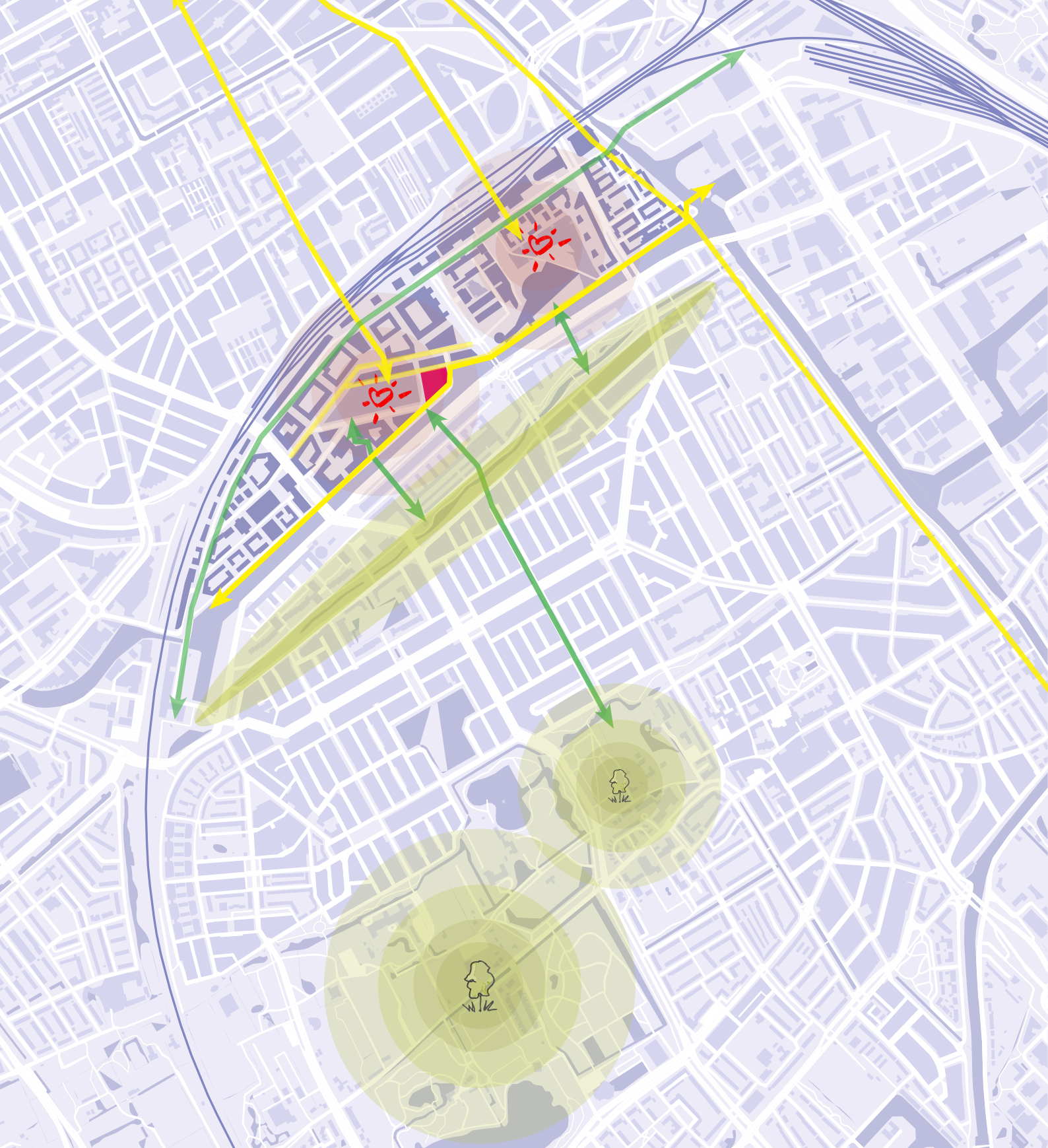


Weaknesses :

- Proximity of busy **high traffic roads** that divide and separate the district
- Strong **barrier between the city centre and the district** - train tracks
- Big distance to the green areas in Julianapark and Te Werve (20 min.)

Current situation, will change:

- Currently **lack of meeting spots** and attractive and well maintained public places, squares and parks
- Currently the **area is very car dominated** resulting in less social contacts and a bad pedestrian experience
- Currently an **abundance of trees and greenery**



Opportunities :

Redevelopment of the whole area :

- mixed use functions, large green areas, **higher density - more chances for encounter**

- **pedestrian friendly areas** and water front (increase walkability of the district)

- Possibility to **create connections** with other parts of the city by

pedestrian bridges (strengthen interconnectivity and walkability of the city)

- Creation of the **large district park** can make this place more attractive (parks are one of the biggest assets of districts)

- Possibility to **connect green areas in the district** to the green strip next to Laakweg + Julianapark and Te Werve

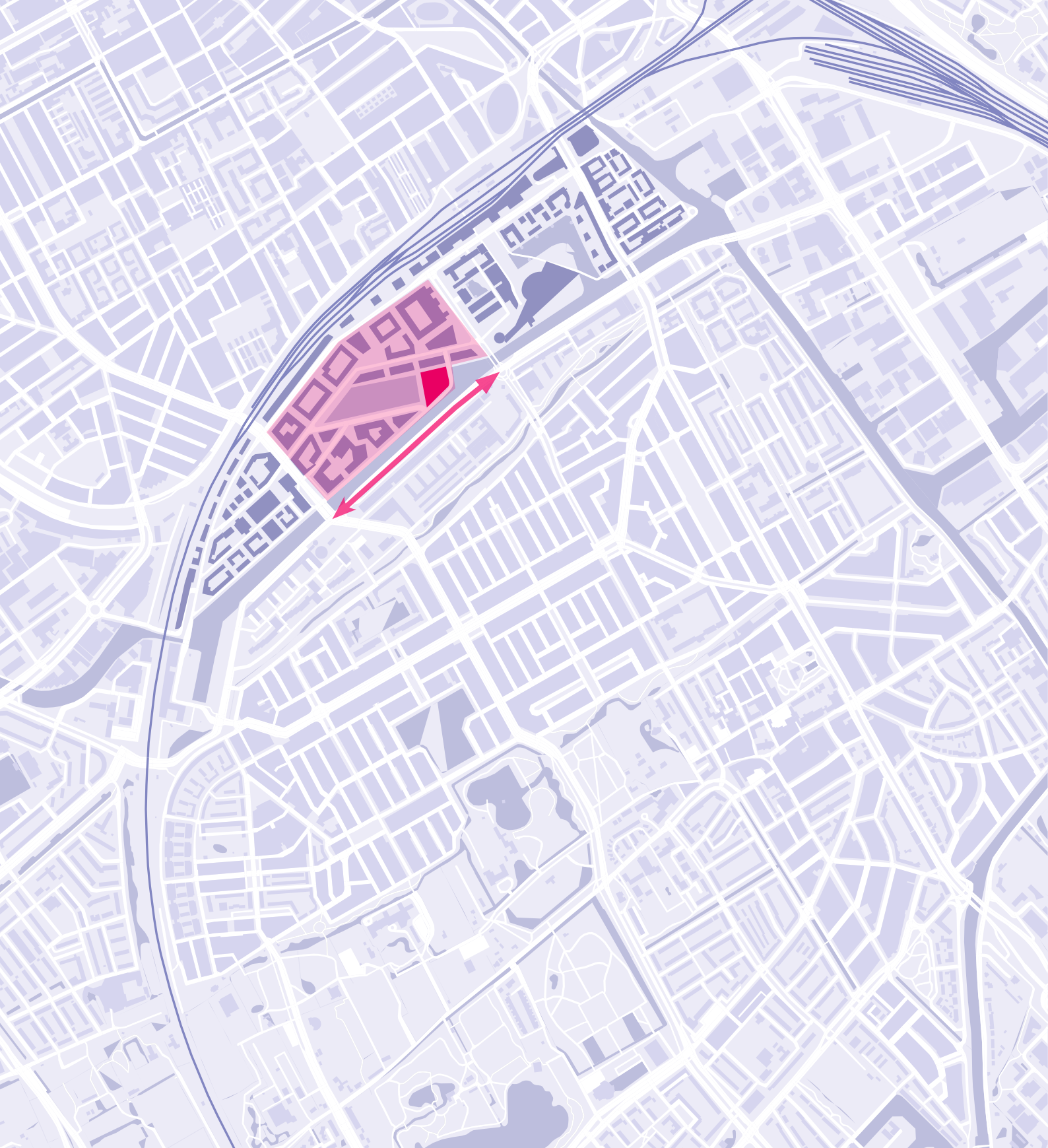
- Possibility to create **community generating functions** and links with the neighbourhood

- A good location to show the **strengths of co-housing and cooperative housing**:

a) Low income neighbourhood

(flats in co-housing developments are **more affordable** - less m²/per person compensated by substantial communal spaces)

b) Most households in the district are 1pers. households. **20% of residents are lonely** (co-housing offers affordable housing for singles and **embraces social contact**, thus battles loneliness)



Threats:

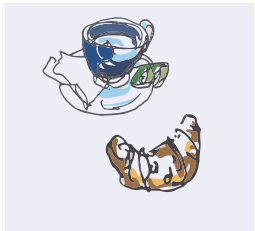
- Planned **high rise development** can counter the human scale of the project and make the residents feel more anonymous
- **The sigma** around the Laakhaven district and the **high crime rates** can be problematic and can make it harder for the district to re-establish itself
- The **high intensity** of the district can make it hard to create a sense of locality
- Putting the **high trafficked streets** underground can be very expensive and difficult



Master Plan 1:1000



Accessibility,
Proximity, Locality



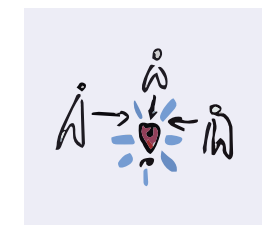
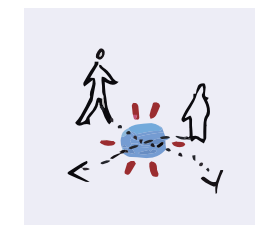
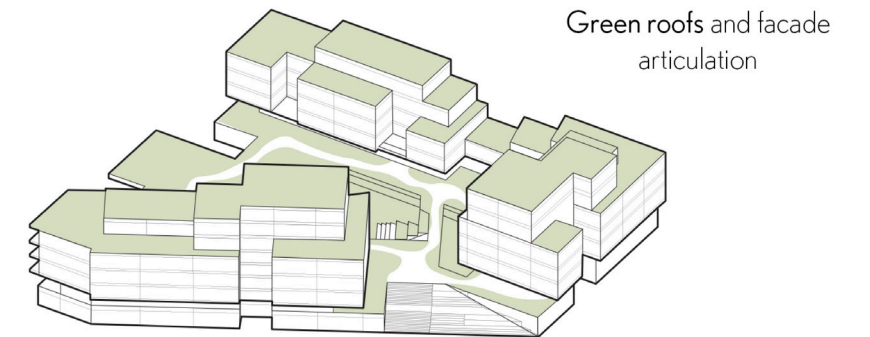
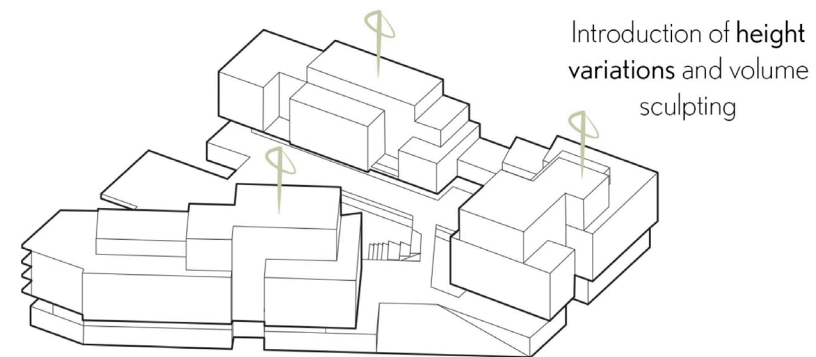
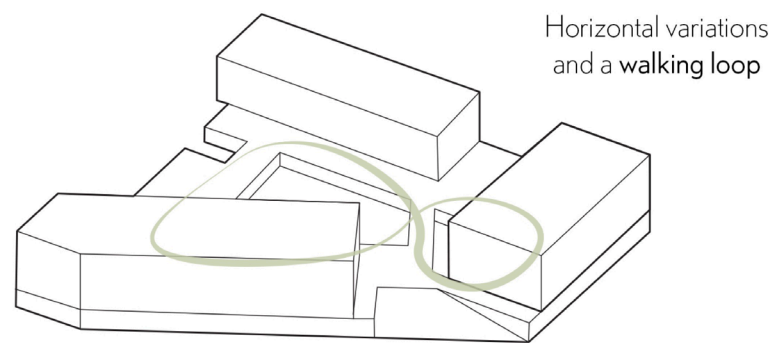
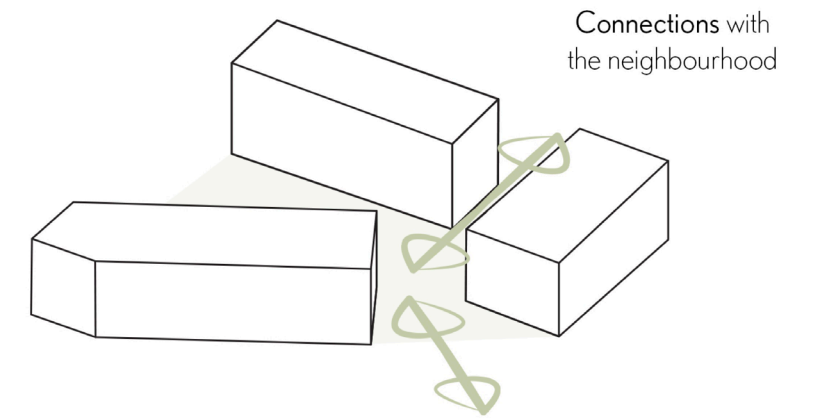
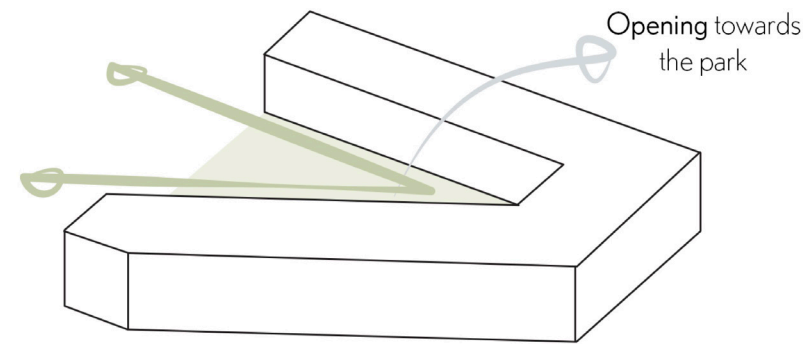
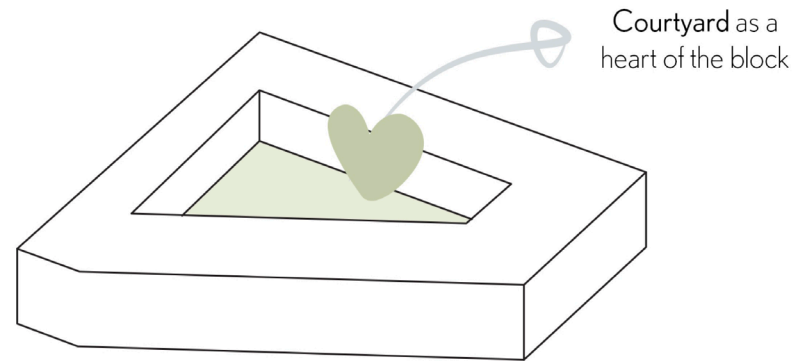
ConnectiveSpots



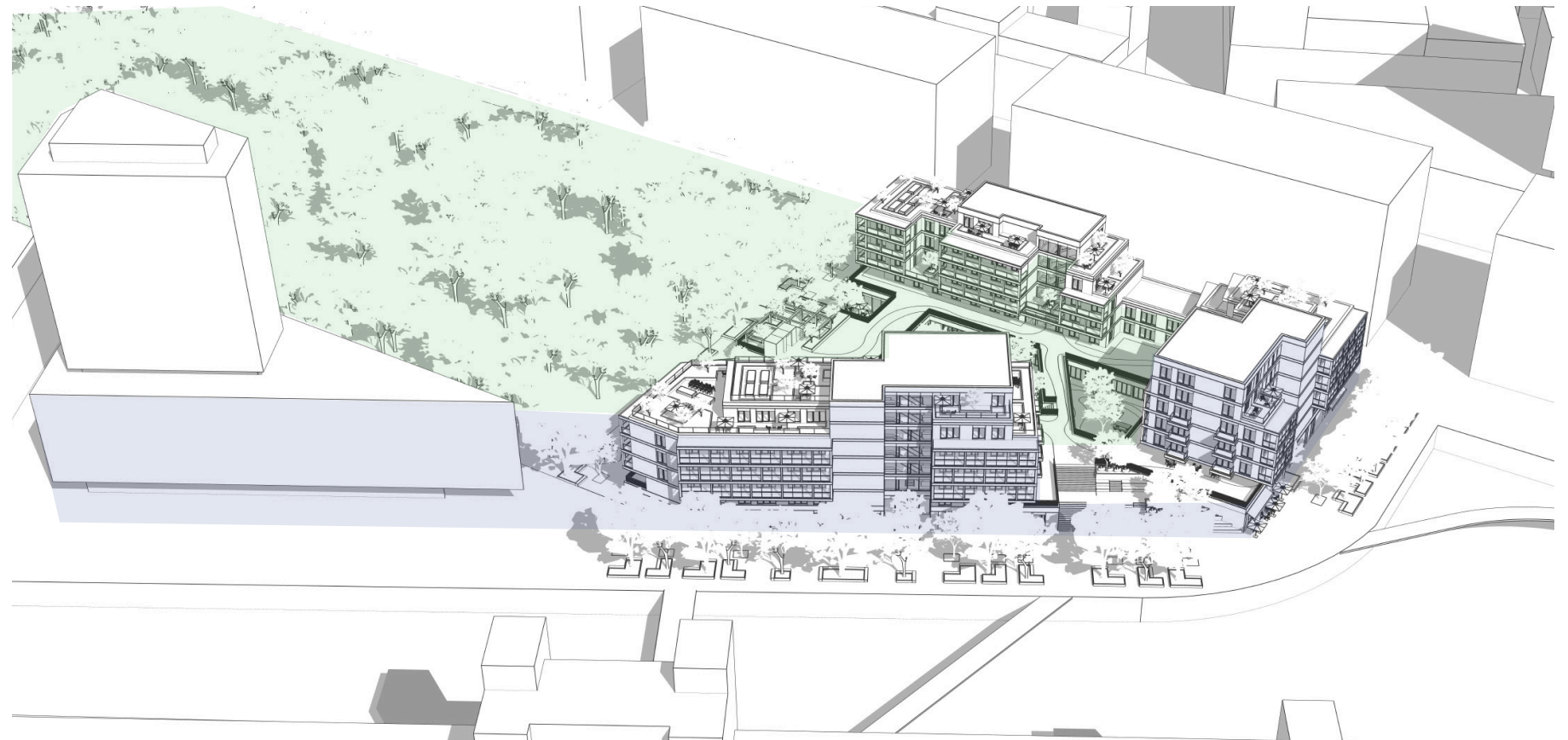
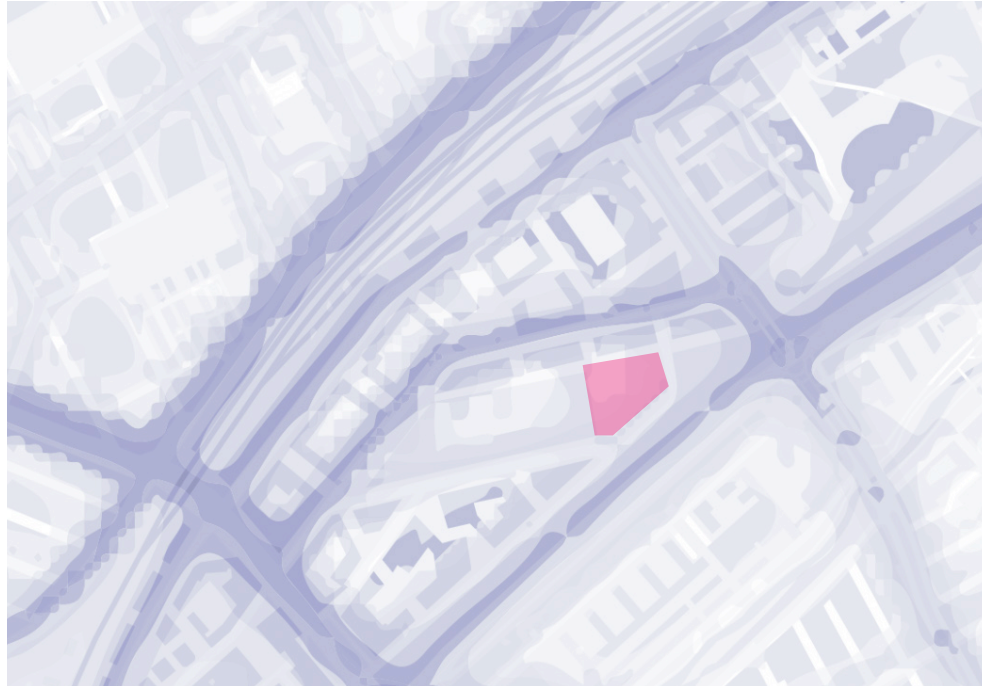
Connections with the
Neighbourhood



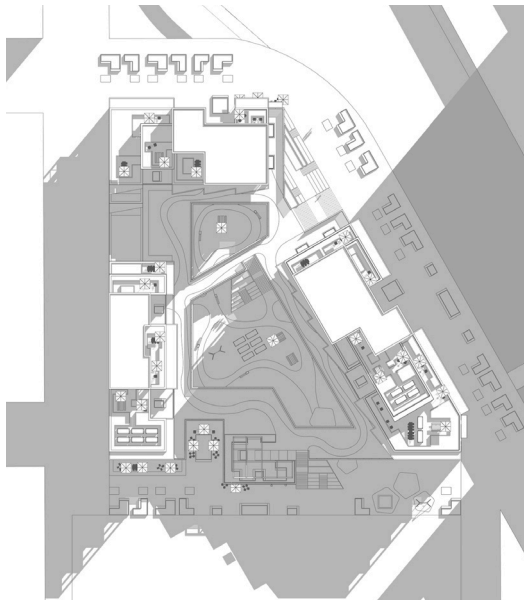
Nature and
Walkability



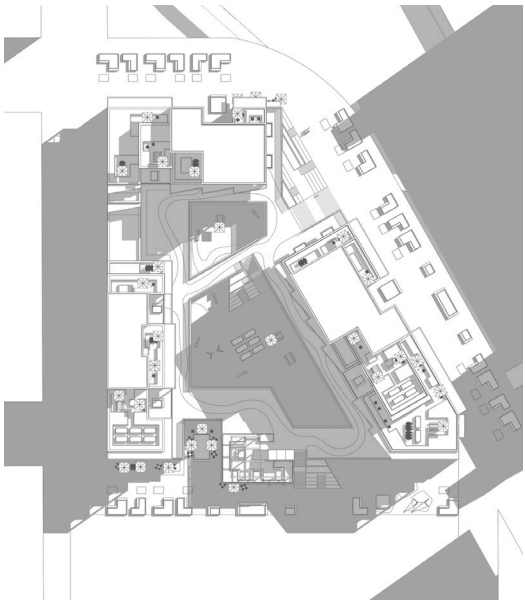
Wind and Noise



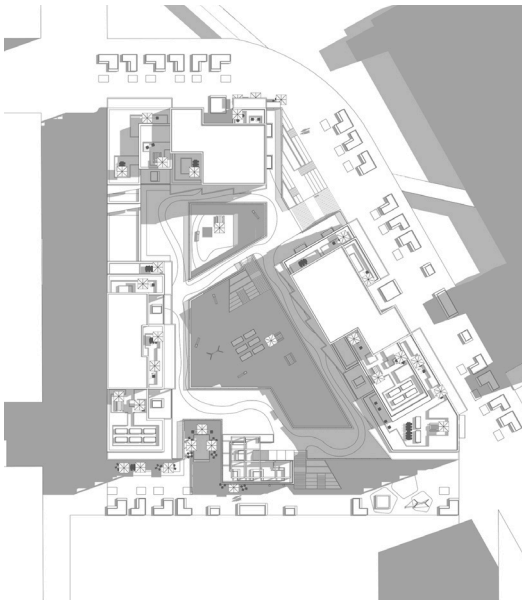
Sun Analysis on the 21st of September



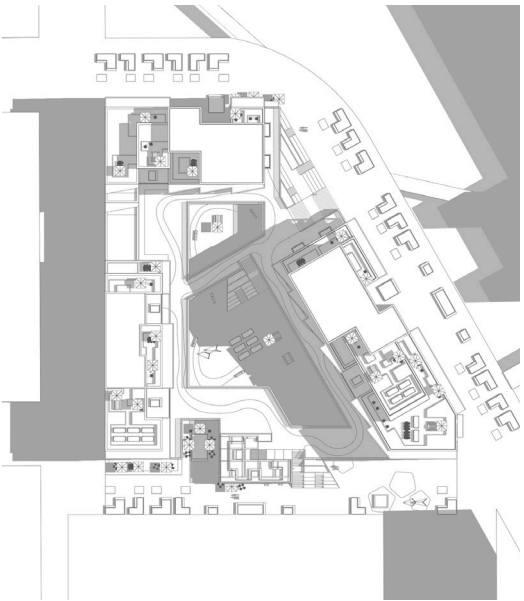
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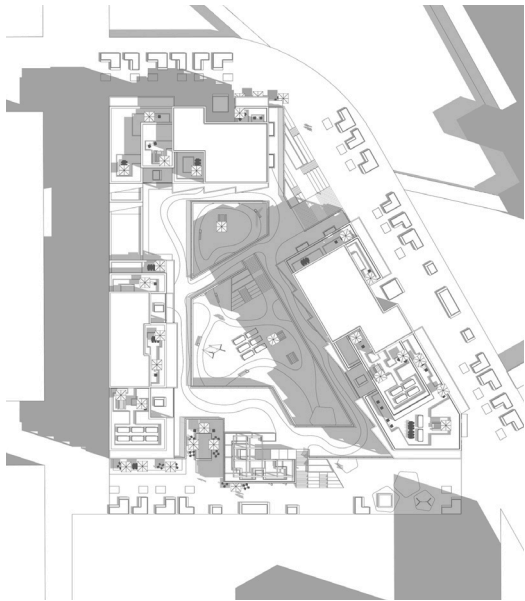
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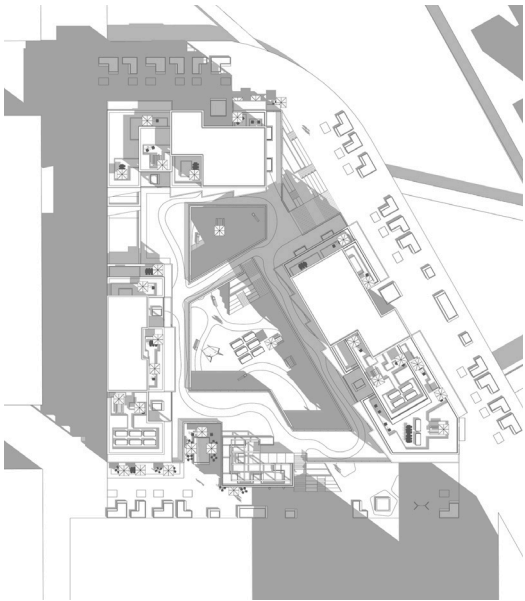
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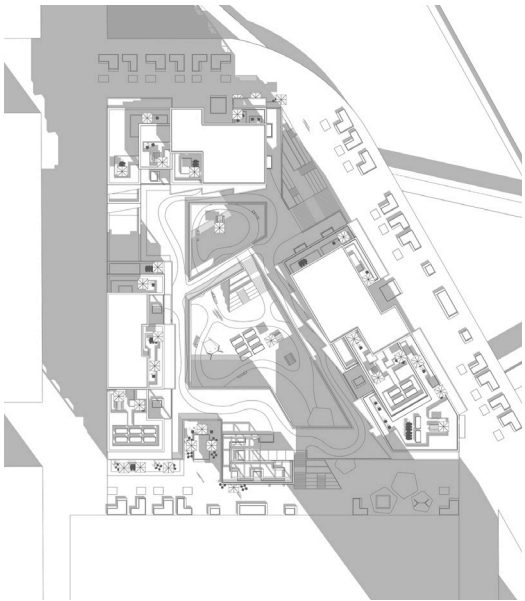
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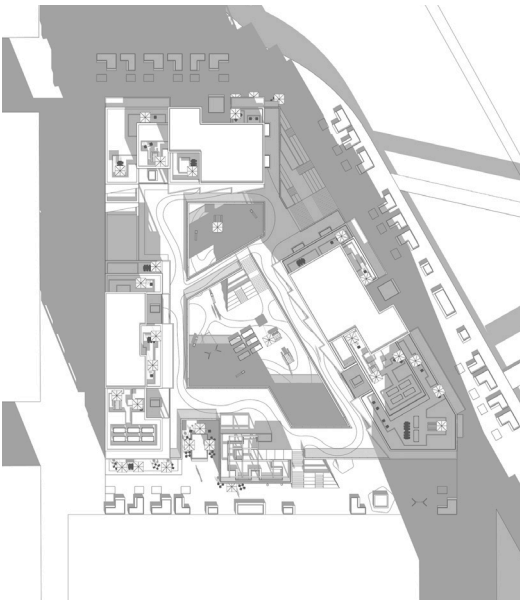
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13:00

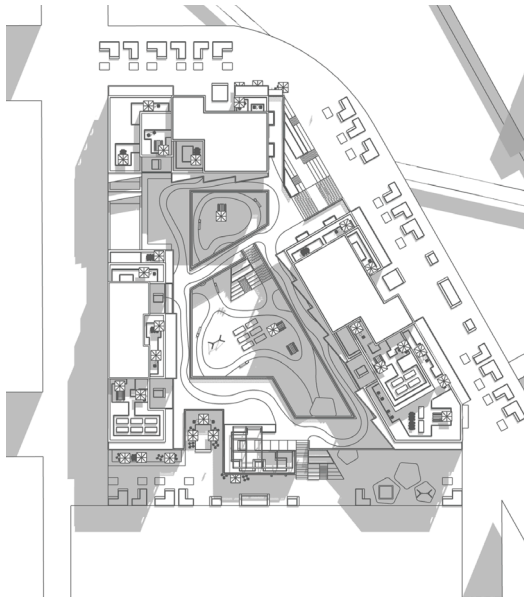
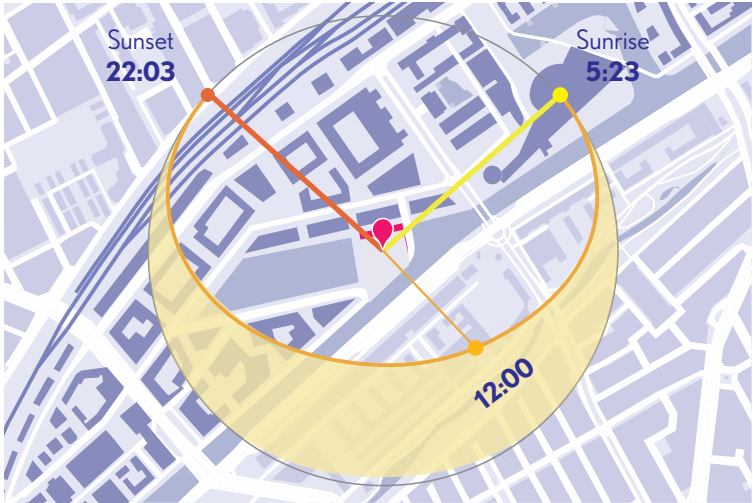


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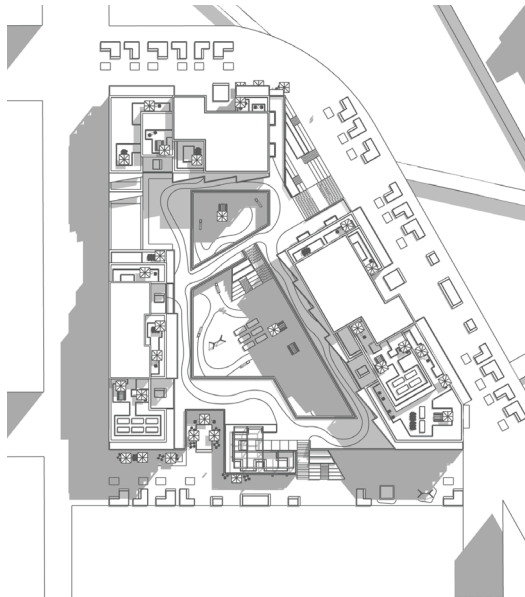


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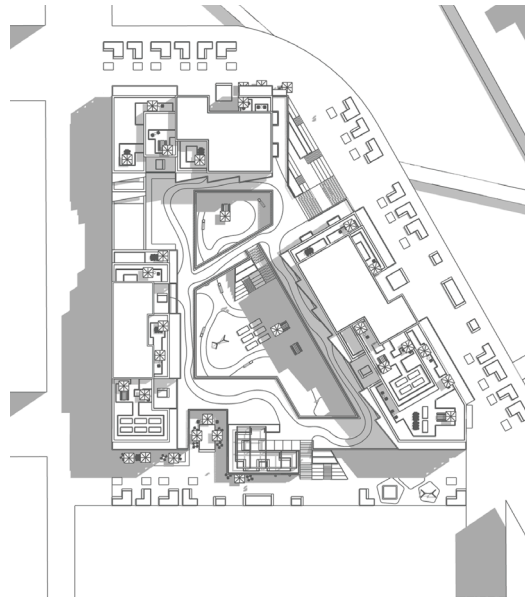
Sun Analysis on the 21st of June



8:00



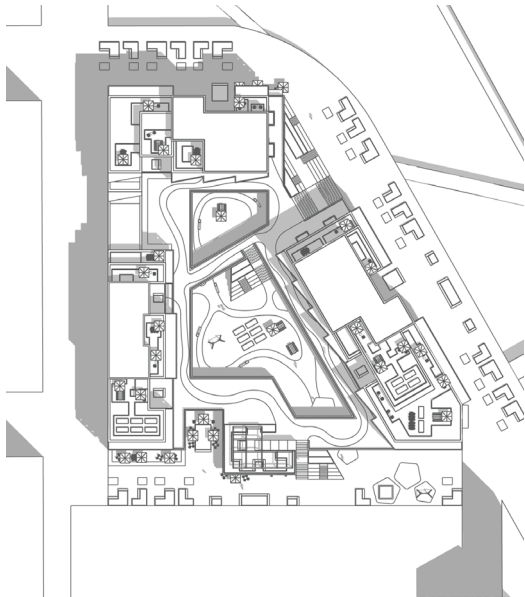
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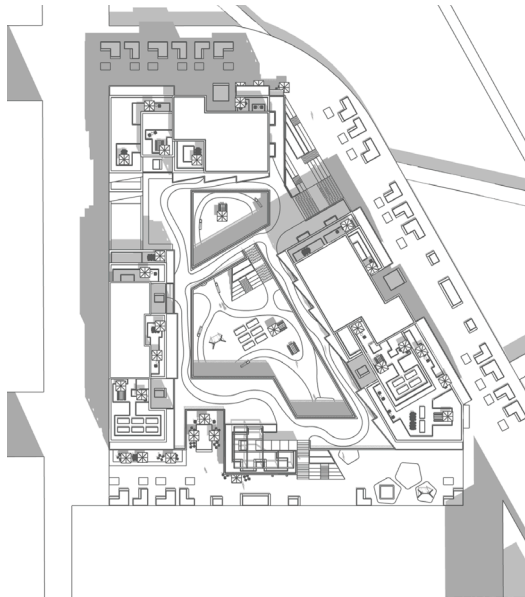
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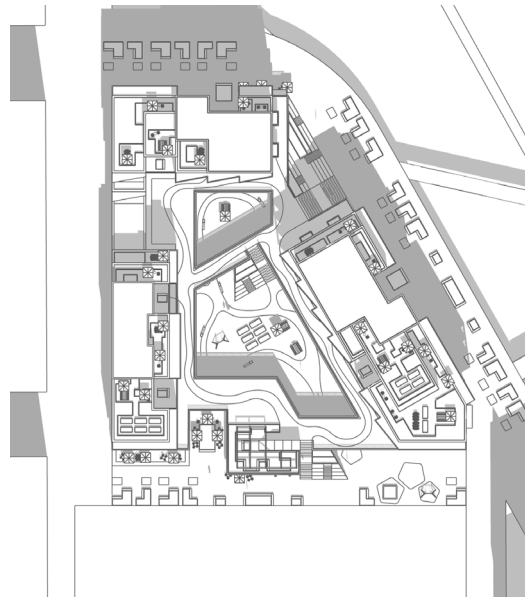
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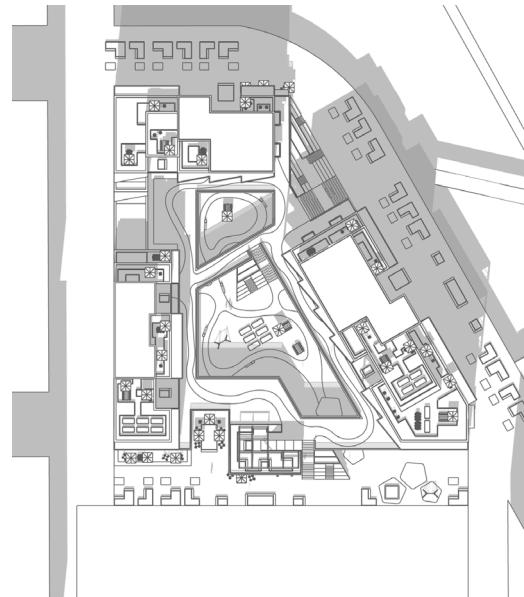
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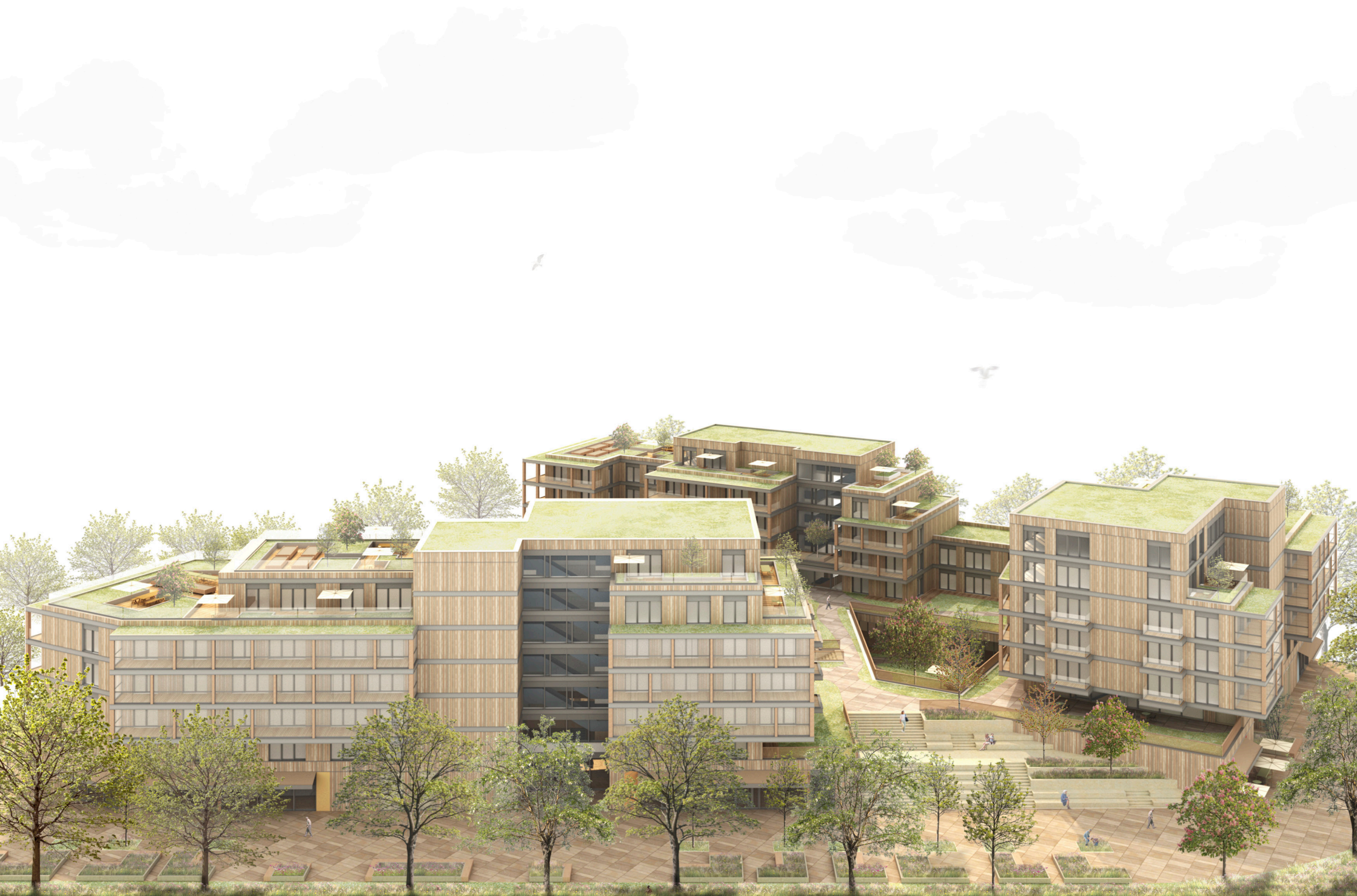
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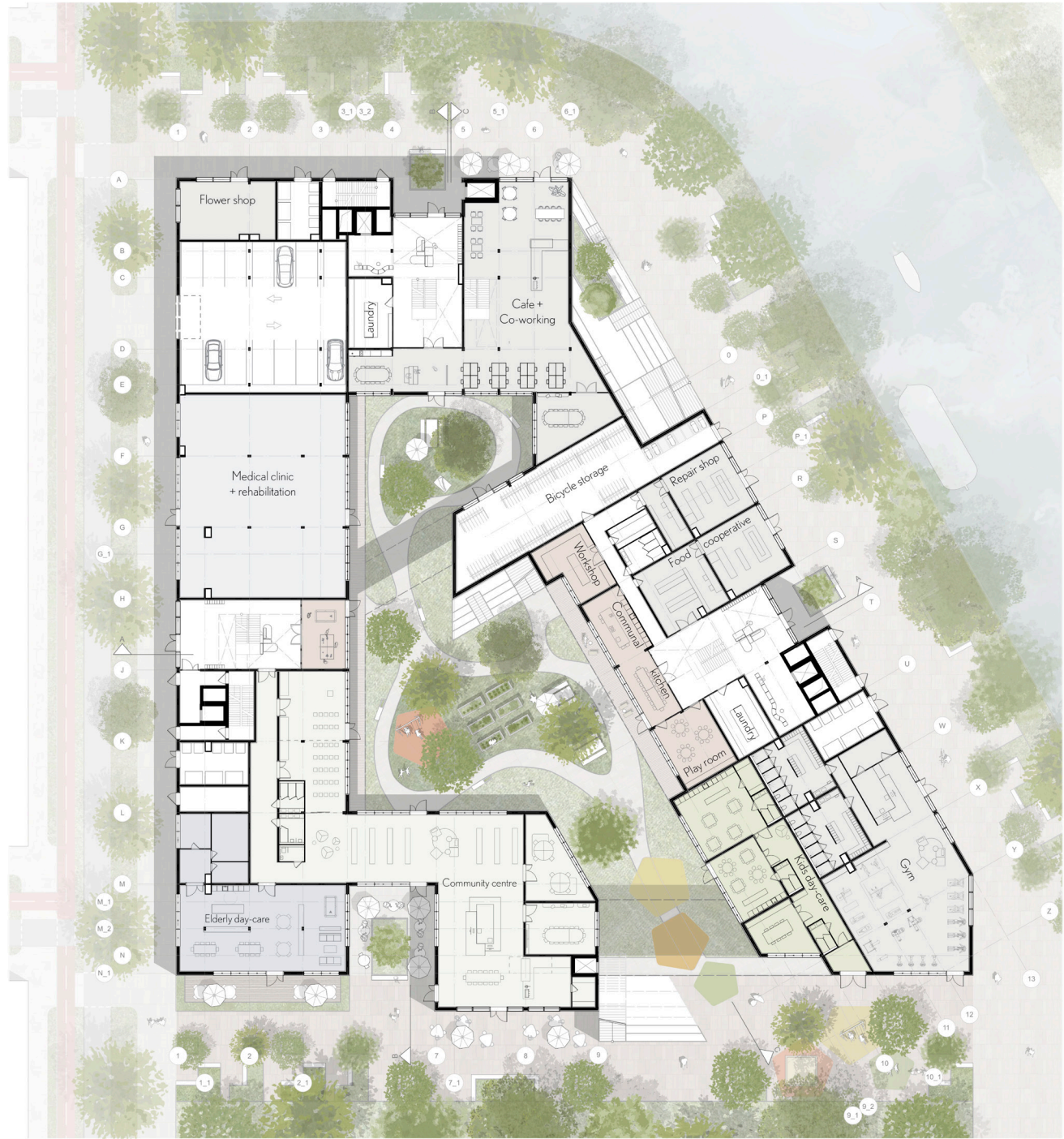
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15:00







Ground Floor Plan 1:200



1st Floor Plan 1:200



- Student studio 32m²
- 1-2 pers. apartment 64-69 m²
- 2-4 pers. apartment 87-120 m²
- Dementia care, Elderly day-care
Medical clinic + rehabilitation
- Kids day-care
- Cafe + Co-working, Bakery,
Repair shop, Food cooperative
- Community centre
- Communal kitchen, Play room,
Workshop, Activity room







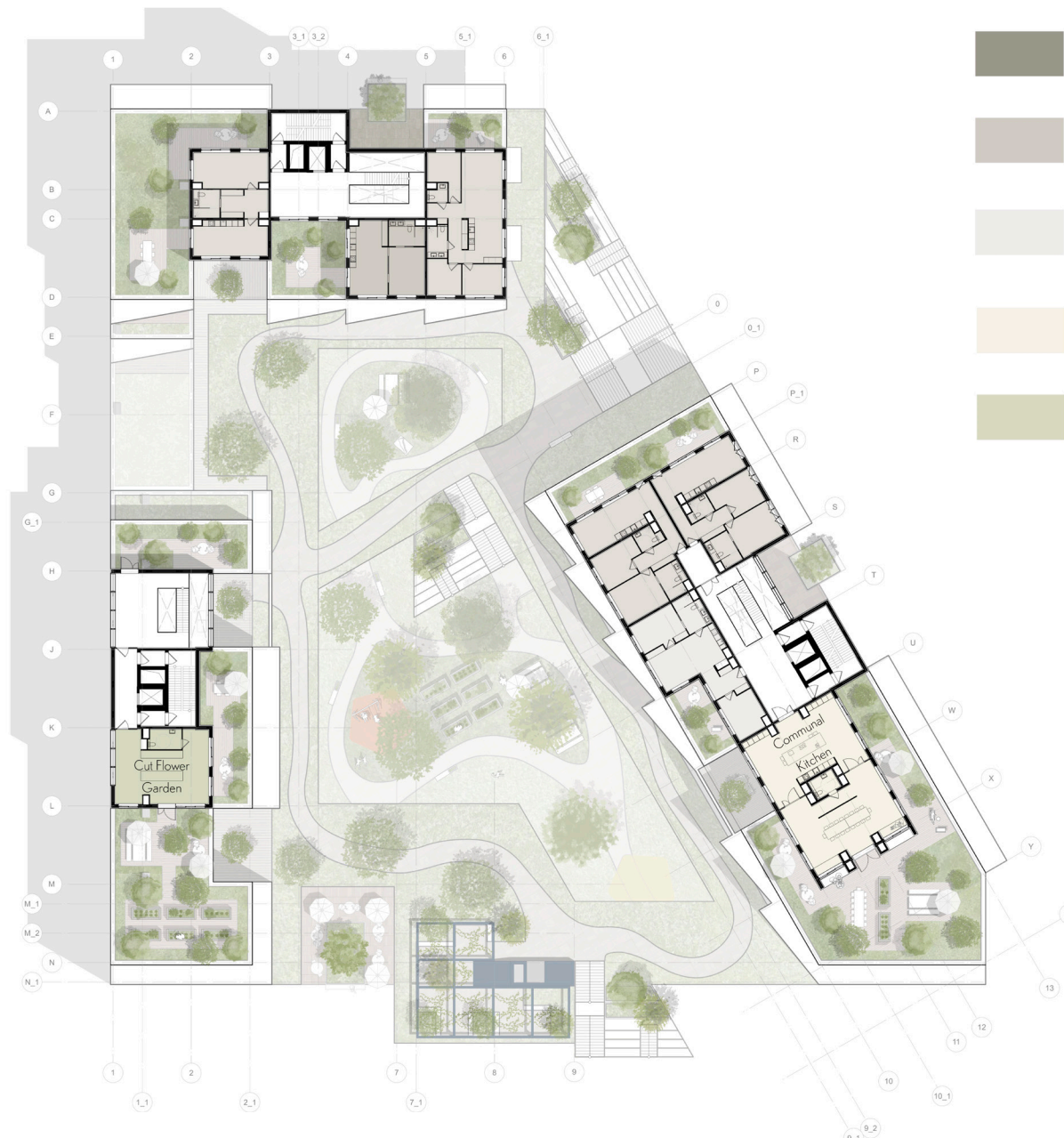
South Elevation 1:200





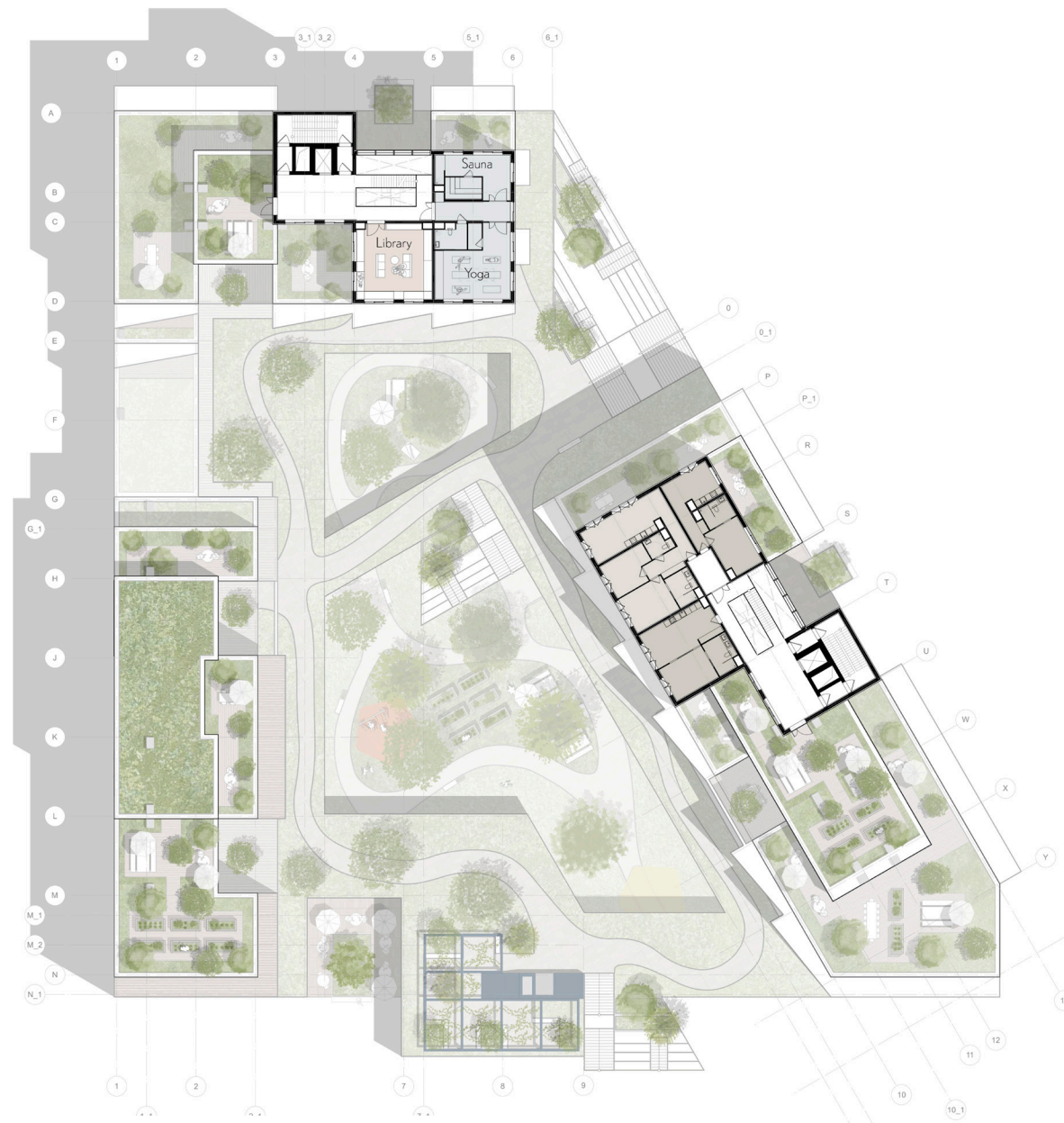


⊙ 2nd Floor Plan 1:200

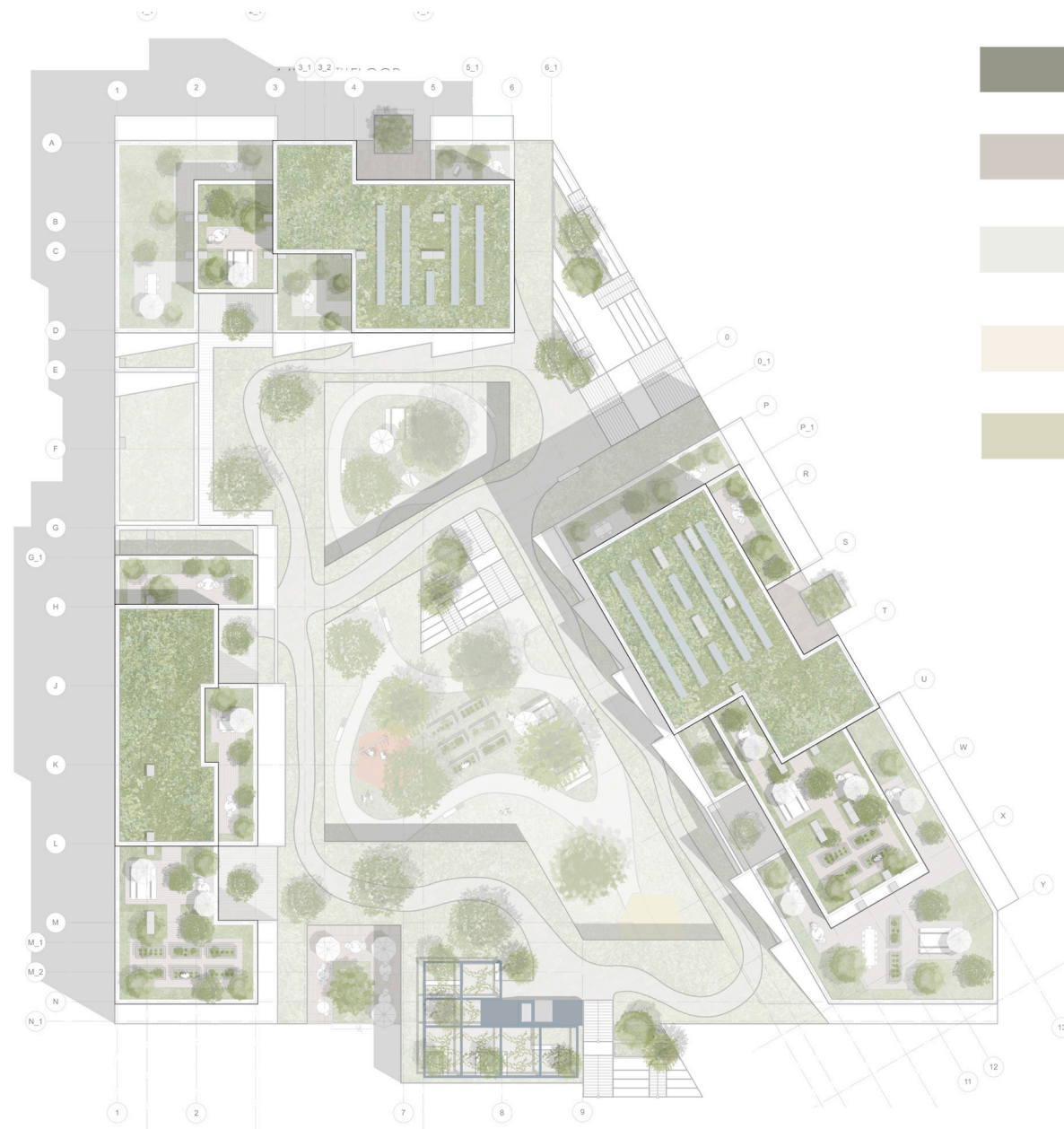


⊙ 5th Floor Plan 1:200

- Student studio 32m²
- 1-2 pers. apartment 64-69 m²
- 2-4 pers. apartment 87-120 m²
- Communal Kitchen
- Cut Flower Graden

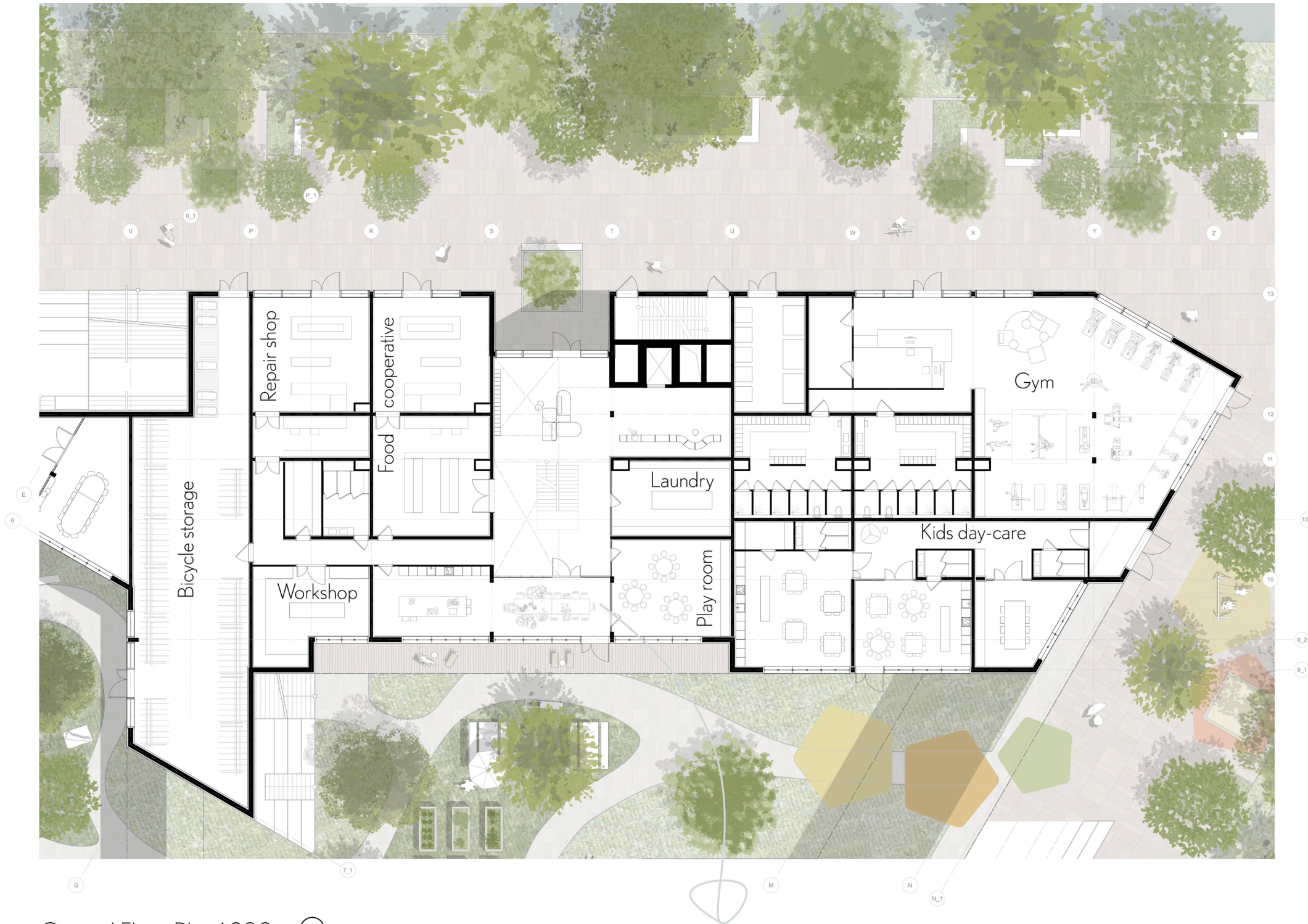


⊙ 6th Floor Plan 1:200



⊙ Roof Floor Plan 1:200

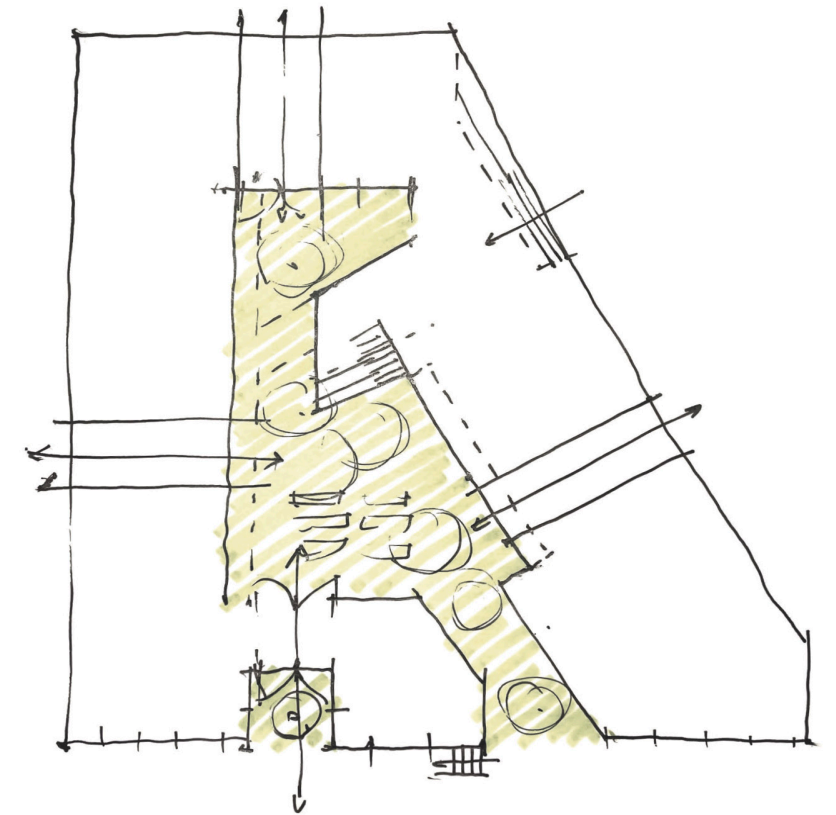
- Student studio 32m²
- 1-2 pers. apartment 64-69 m²
- 2-4 pers. apartment 87-120 m²
- Communal Kitchen
- Cut Flower Graden



Ground Floor Plan 1:200

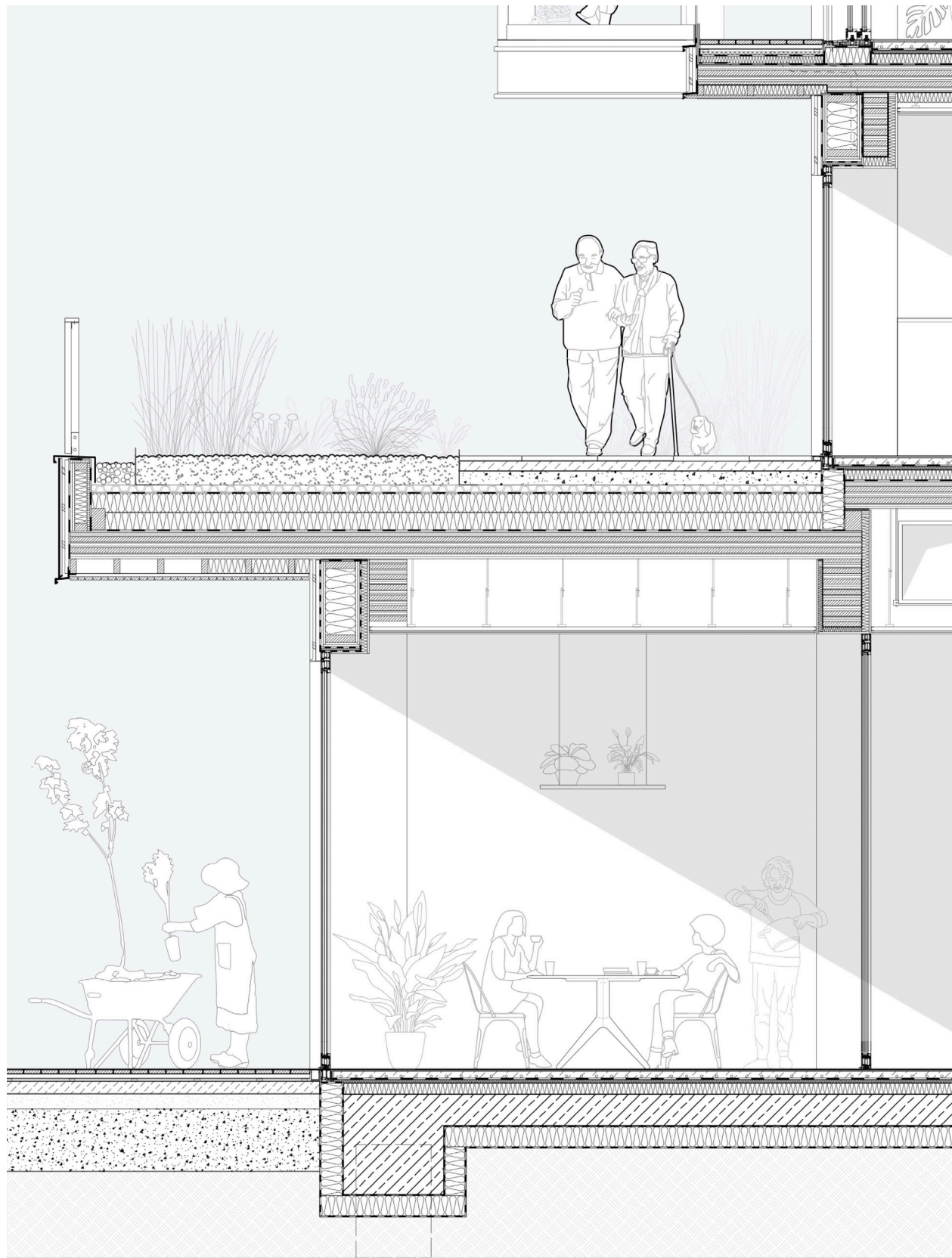


Location of communal functions like communal kitchen, workshop and kids play room, right next to the lobby encourages use





Crossection fragment 1:100 & Facade section detail 1:50

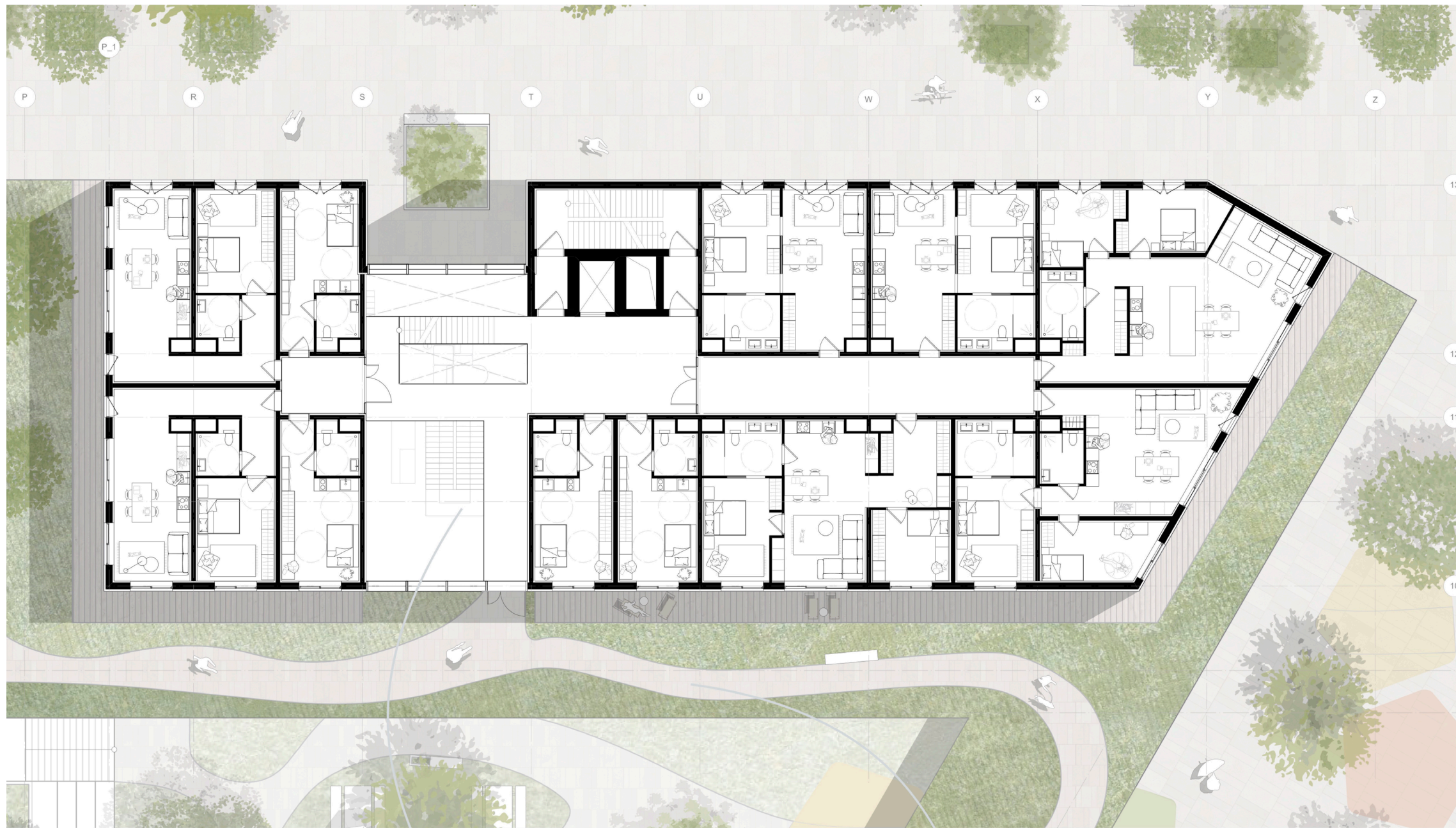






North-West Elevation 1:200





1st Floor plan 1:200



Double height well lit lobby space introduces horizontal variations to enhance experience and feed curiosity

Intimate routing signals half private character of the space and fosters contact between residents





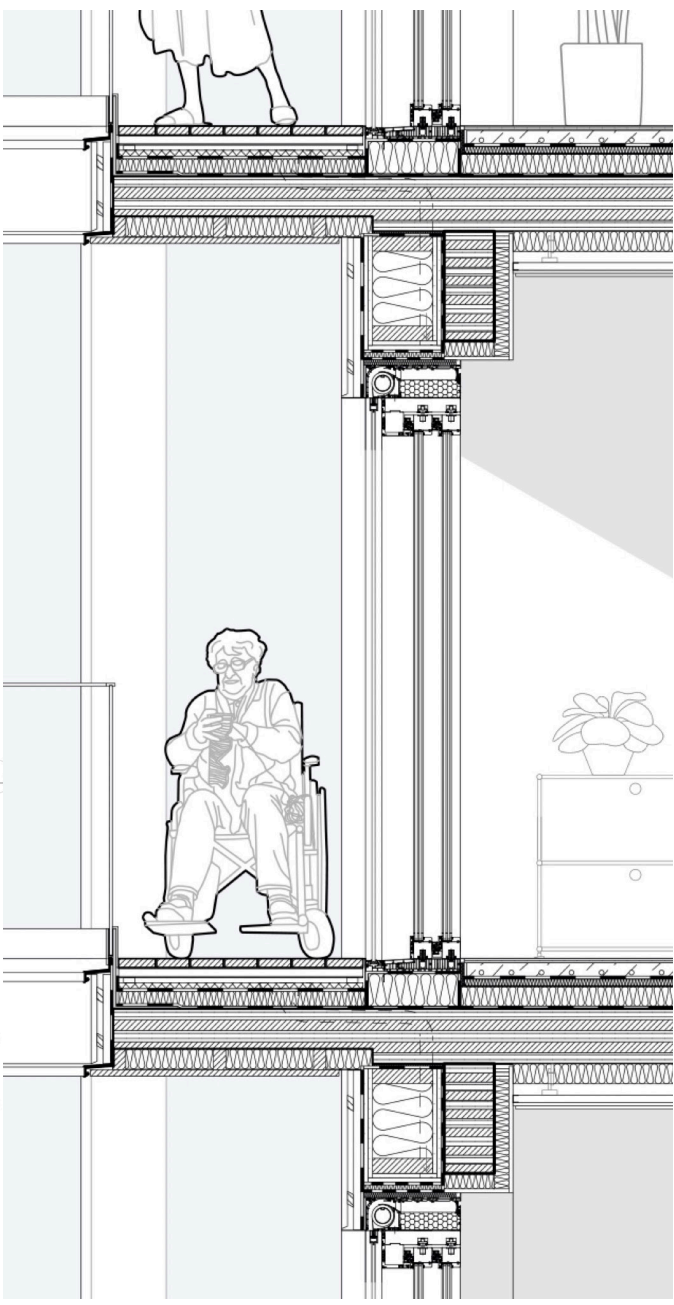


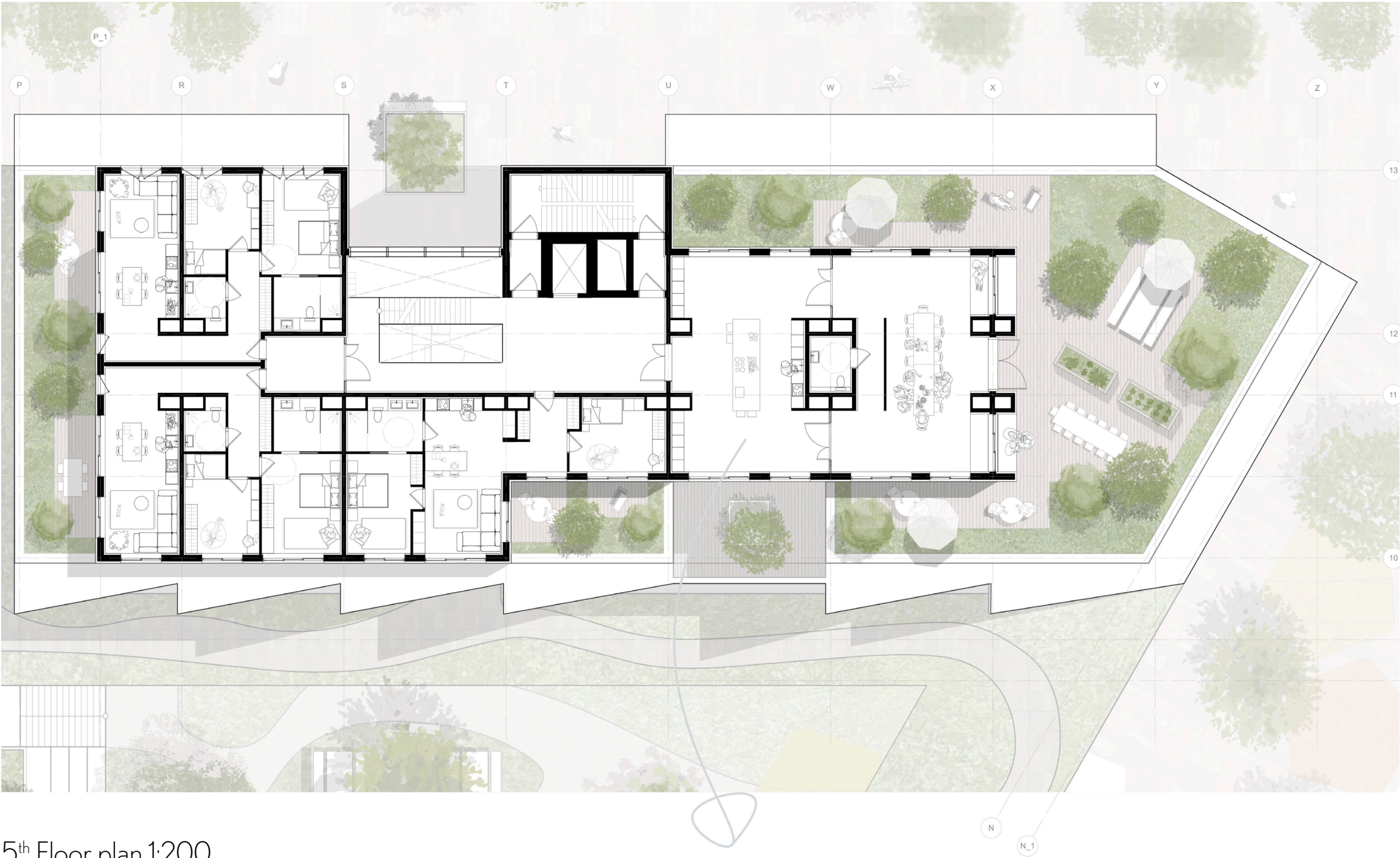
2nd Floor plan 1:200



Attractive and well lit open staricase with voids between floors encourages people to use stairs and fosters unplanned encounters

Balconies are of generous size with floor on the same level as in the apartment for full accesibility





5th Floor plan 1:200

Communal green rooftop becomes a meeting spot
for the residents



Young adult
69 m²
I When I need help
or a friendly talk all that I have to
do is step out of my door! I meet
my neighbours on the staircase all
the time! I am very happy about
the shared library. I no longer
need to buy all of the books.



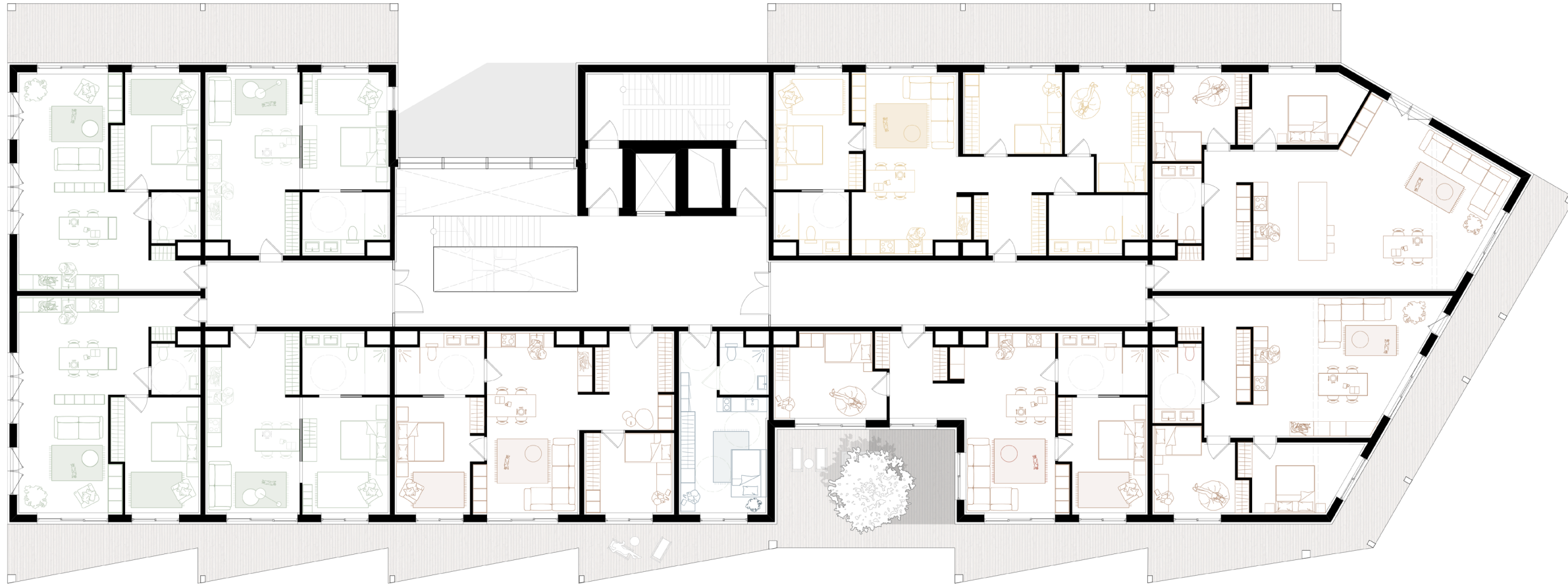
Elderly disabled woman
64 m²
She is very happy that the
building is fully accessible.
She loves that she can just
go out to the terrace
without anyone's help
because the balcony's
floor is at the same level as
in the apartment!



Family with two
children
118 m²
Our children go
to the day care
donstairs every
day! They love the
variety of play
spaces.



Family with one child
69 m²
They value the shared
areas in the building.
They used the
workshop
to make my own
furniture!



Young couple
69 m²
They moved in because
they were looking for
an affordable first
apartment.
They really enjoy
working in the
co-working cafe
downstairs.



Elderly woman
64 m²
She was actively looking for a
community housing project
because she used to have a flat in
a big housing block where she
did not know her neighbours. The
communal aspect of this project
convinced her to move in
because she really wants to have
more social contact. When she
goes out of her flat she often
bumps into her neighbours!



Elderly couple
96 m²
Their children moved out
of their family home and
decided to move to the
city. The couple decided
to move to a smaller
apartment in the city to
spend more time with
their grandchildren.



Art student
32 m²
He was looking for an
affordable student
location close to the
university. He chose to
live here because of the
communal spaces
outside of the flat which
feel like an extension of
his home.



Young family
87 m²
They love to spend
time in nature and
could not say no to
an apartment located
right next to a park.
They also love to
spend time on the
big terrace of their
apartment.

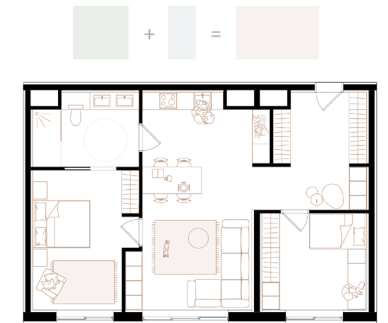


Young family
90 m²
They love the feeling
of being a close knit
community! They
spend a lot of time in
the communal
kitchen where they
cook meals together
with their
neighbours.



Module 1
32 m²

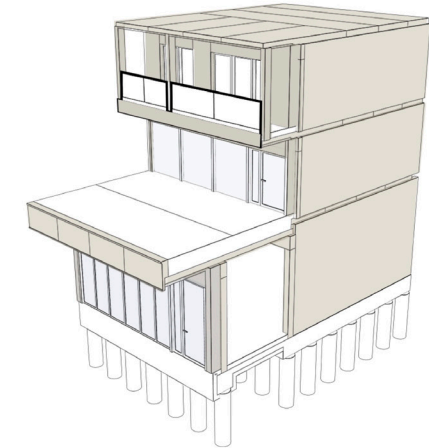
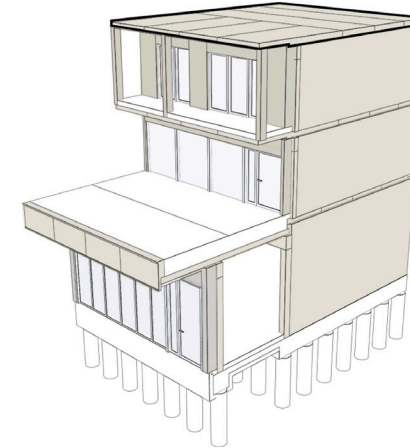
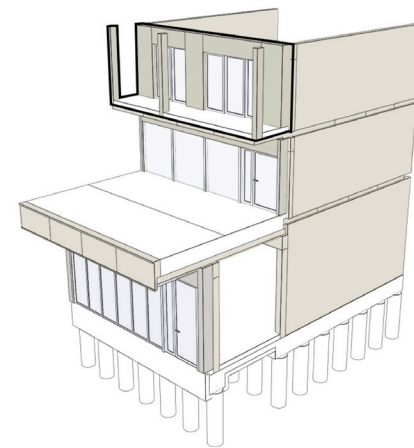
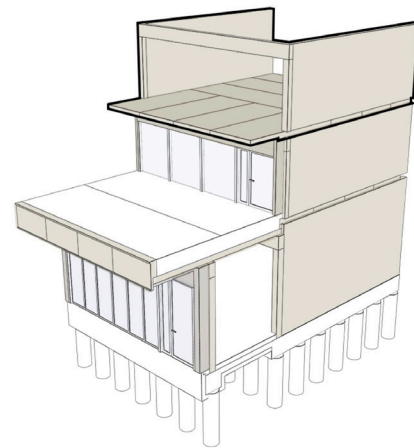
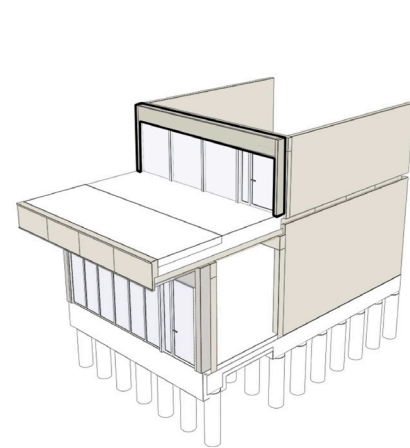
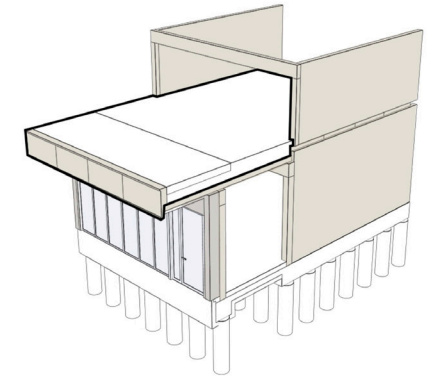
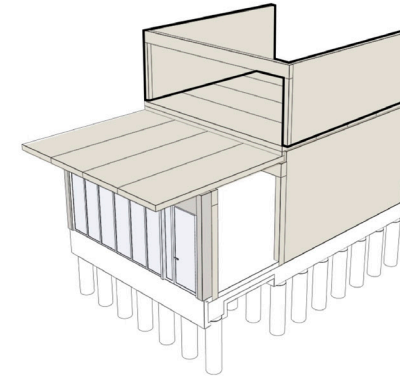
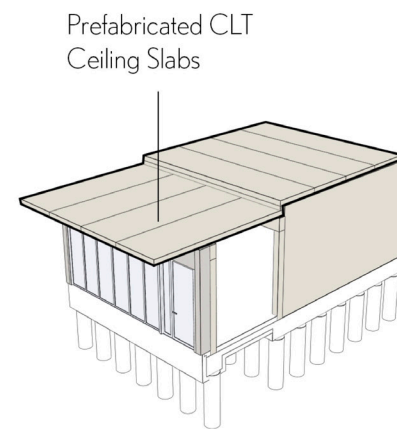
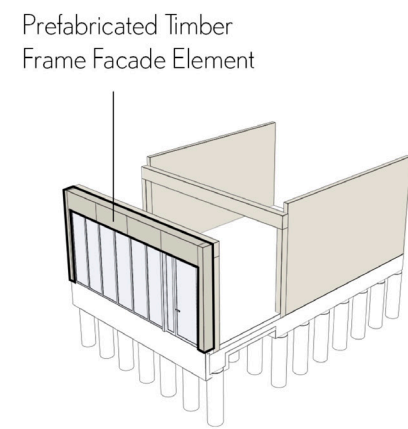
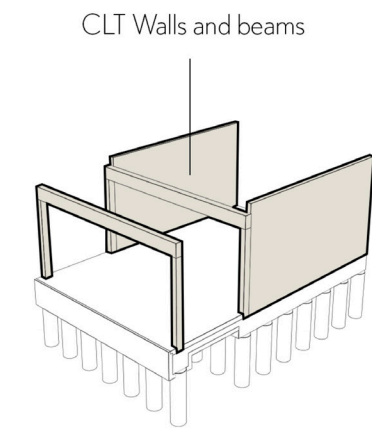
Module 2
64 m²



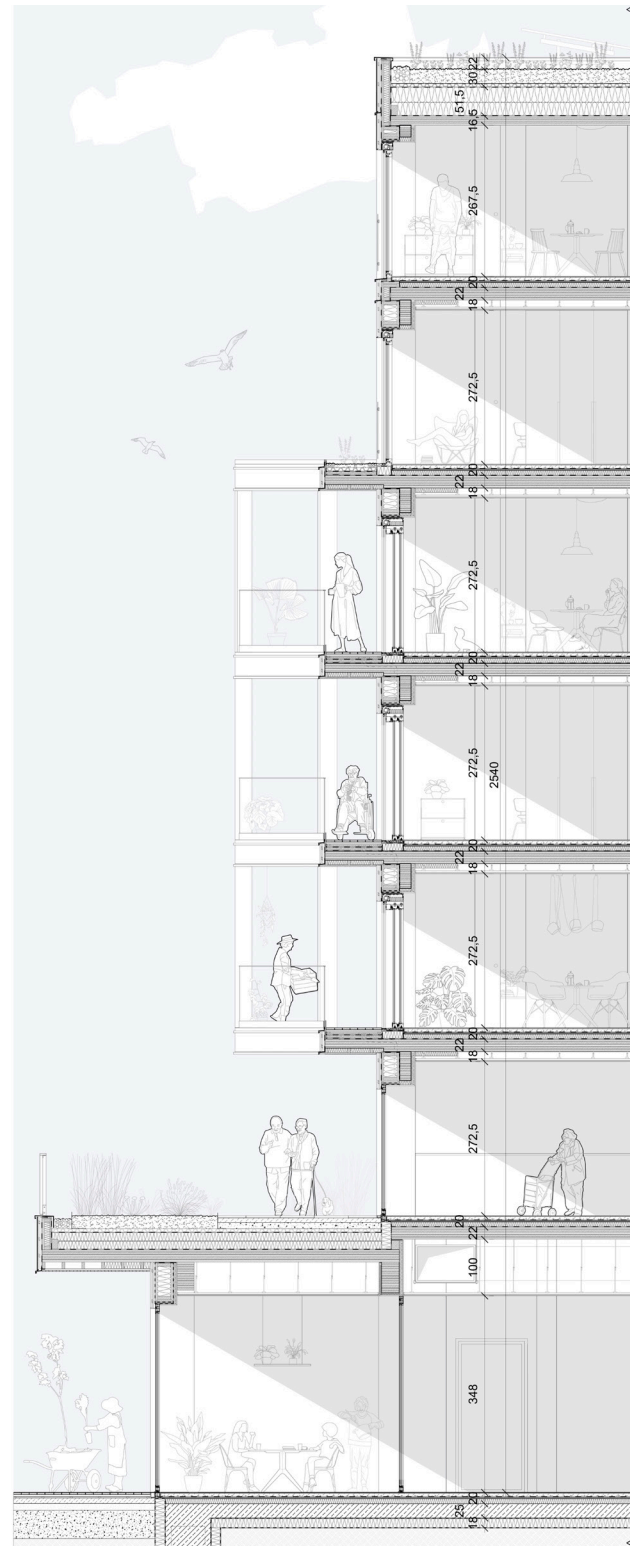
Module 3
96 m²



Module 4
118 m²

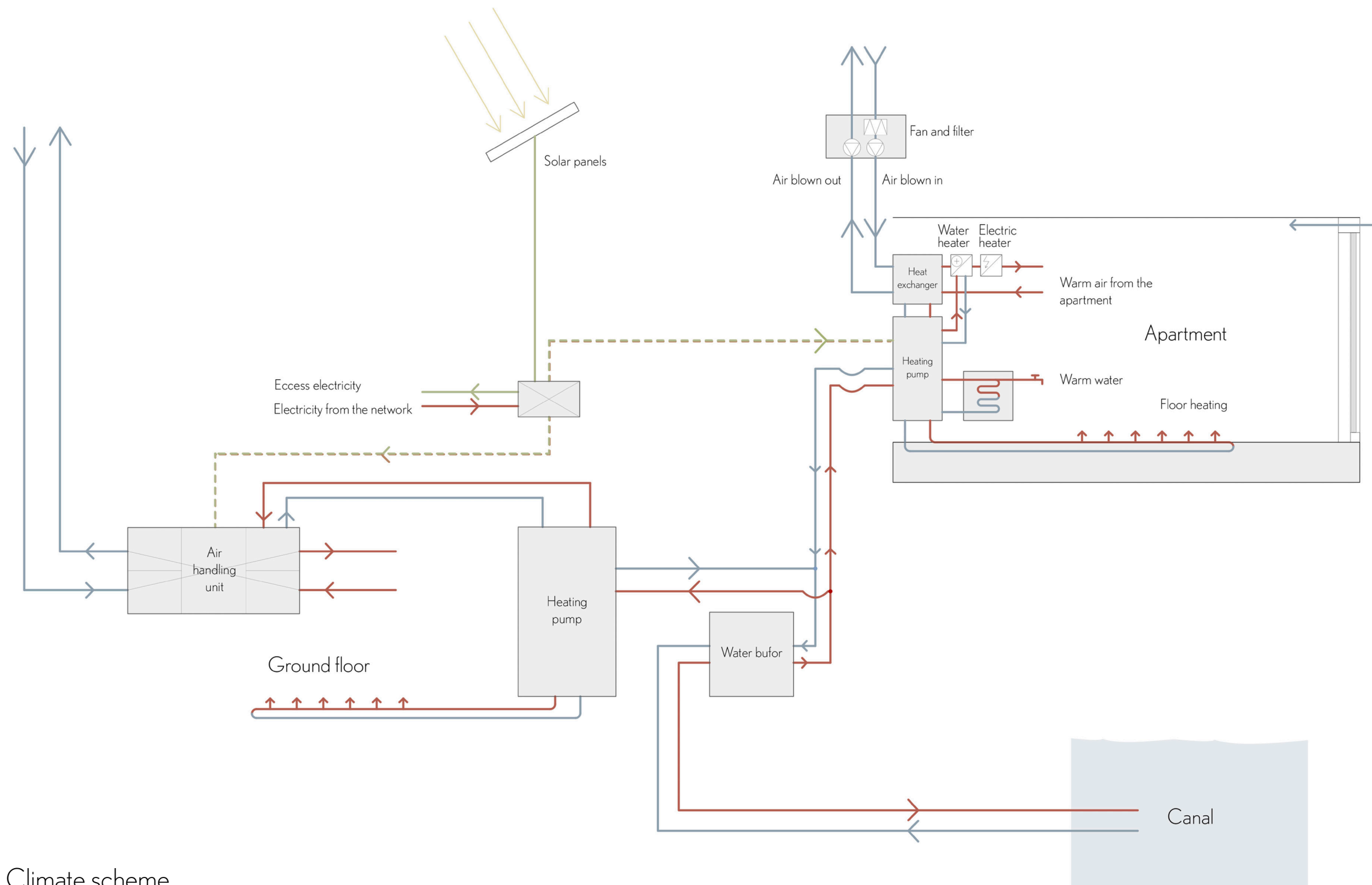


Construction scheme / Sequence of assembly



Re-used azobe wood
from former Dutch quay walls





Climate scheme

Thank you !

