DESIGN BOOKLET

ALL PARTS OF THE PROCESS

Colophon

Delft University of Technology
Master Architecture, Urbanism and Building Sciences
Dwelling Graduation Studio_AR3AD110
Designing for Health and Care in an Inclusive Environment

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Week 2.1

Fieldwork at ‘t Kampje

During the fieldwork week at ‘t Kampje in Loenen aan de Vecht, together with Lisa Vermeer, we immersed ourselves in the daily life of the community to better understand how the built environment influences social interactions and cohesion. By staying in the guest room and actively participating in communal activities, we were able to observe firsthand how residents engage in shared spaces and with each other. Through informal interviews with both residents and staff, we explored the social dynamics within the facility, as well as the challenges and opportunities that come with multigenerational living.

During the fieldwork week, I stayed at ‘t Kampje in Loenen aan de Vecht, together with Lisa Vermeer. We were accommodated in the guest room, which allowed us to fully immerse ourselves in the daily life of the community.

Our primary focus was to observe how residents utilized communal spaces—such as shared areas, outdoor gardens, and activity rooms. In addition, we conducted informal interviews with both residents and staff to gain a deeper understanding of their experiences, challenges, and perspectives on living in this multigenerational housing environment.

Being in an elderly home was a completely new experience for me. Since my grandparents still live independently, I had never been inside such a building before. This meant I had no clear expectations, which, in a way, was an advantage—I approached the experience with an open mind, ready to take in everything without preconceived notions.

One of the initial challenges was engaging with the residents. Asking personal questions felt somewhat unnatural at first, and there was a certain hesitation in approaching them directly. It was difficult to simply knock on someone’s door without having an established connection. However, I quickly realized that participating in the activities was a great way to break the ice. On the first day, by joining group activities, I was able to engage in casual conversations, making it easier to form connections.

By the second day, everything felt much more natural. I gained more confidence in starting conversations, and we also explored the surrounding neighborhood. This gave us additional topics to discuss with the residents, such as their connection to the local area and how the design of the neighborhood influenced their daily lives. Many residents shared fond memories of the town and reflected on how their mobility and independence had changed over time. This broader perspective helped us understand not just the internal dynamics of ‘t Kampje, but also how its residents relate to the outside world.

On the fourth day, we took the opportunity to speak with the nurses about their work and how they experience caring for the residents. This conversation was crucial because it provided insight into the “other side” of the facility—the perspective of the caregivers who interact with the residents on a daily basis. They shared their thoughts on the emotional aspects of their job, the importance of maintaining a personal connection with residents, and the challenges they face in balancing efficiency with meaningful social interaction. It became clear that the design of the building not only affects the residents’ experiences but also plays a role in how the staff performs their work.

Because of this conversation, we arrived late to the communal coffee moment, which did not go unnoticed by the residents. Some jokingly pointed out that we were late, which was a small but meaningful moment—it showed that we had become integrated into the community. The fact that they felt comfortable enough to tease us a little was a sign that we were no longer seen as outsiders. This shift in dynamic resulted in more relaxed and open conversations, as the residents now saw us as familiar faces rather than just visitors.

This growing trust also made it possible for us to ask if we could take a look inside some of the apartments. Being invited into their private living spaces was a clear vote of confidence, and it allowed us to see firsthand how residents personalize their homes within ‘t Kampje. It was fascinating to observe how the apartments were filled with personal items, decorations, and memorabilia that made them feel warm and homely. This reinforced the idea that while ‘t Kampje provides spaces to connect with each other, the residents still maintain a strong sense of individuality.



Main entrance ‘t Kampje



Guest room

Looking back, this fieldwork week was incredibly valuable—not just for gathering research insights, but also for challenging my own assumptions. At the beginning of the week, I felt hesitant and unsure of how to engage with the residents. I was concerned about overstepping boundaries or making them feel like subjects of a study rather than individuals with unique stories and experiences. However, by the end, I felt genuinely connected to some of them and had gained a deeper appreciation for the role of space and community in fostering social cohesion.

One of the biggest takeaways from this experience was realizing that even small interactions—like a joke about being late—can hold deep significance in making people feel connected. What might seem like a minor moment actually represented something much bigger: we were no longer outsiders simply observing for a school project but had become familiar faces, integrated into their daily routine.

This aligns with the broader theme of my research: that the built environment is not just about physical spaces, but about the relationships and moments it facilitates. The way a space is designed can either encourage or discourage these everyday exchanges, and it became clear to me that social cohesion is built on such seemingly small but meaningful interactions.

Beyond the academic insights, there was also a personal joy in realizing that we were welcomed with open arms. The fact that the residents felt comfortable enough to joke with us and invite us into their private spaces showed that we had formed genuine connections. This was something I hadn't fully anticipated at the start of the week. It was heartwarming to see that despite generational differences, a simple willingness to listen and participate was enough to create a sense of trust and familiarity.

Overall, this experience reinforced the importance of thoughtful design in creating environments that support both independence and togetherness. 't Kampje provided a unique setting to explore these themes, and the week-long immersion allowed me to experience firsthand how both architectural and social elements contribute to a sense of belonging. More than just a fieldwork assignment, it was a meaningful opportunity to engage with a community in a way that felt authentic, connected, and deeply human.



Working in the common space



Neighborhood cat Appelsientje visiting for food



Joining the coffee moment every morning



Enjoying lunch with some residents

Week 2.2

Visualisation Fieldwork

Collecting data during the fieldwork at ‘t Kampje was only the first step; the real challenge lay in transforming the observations into structured, useful information. To make sense of our findings, we developed clear formats, created resident personas, and structured interview questions to ensure consistency and comparability. This week explores how we organized and visualized our data, making it easier to analyze patterns and draw meaningful conclusions.

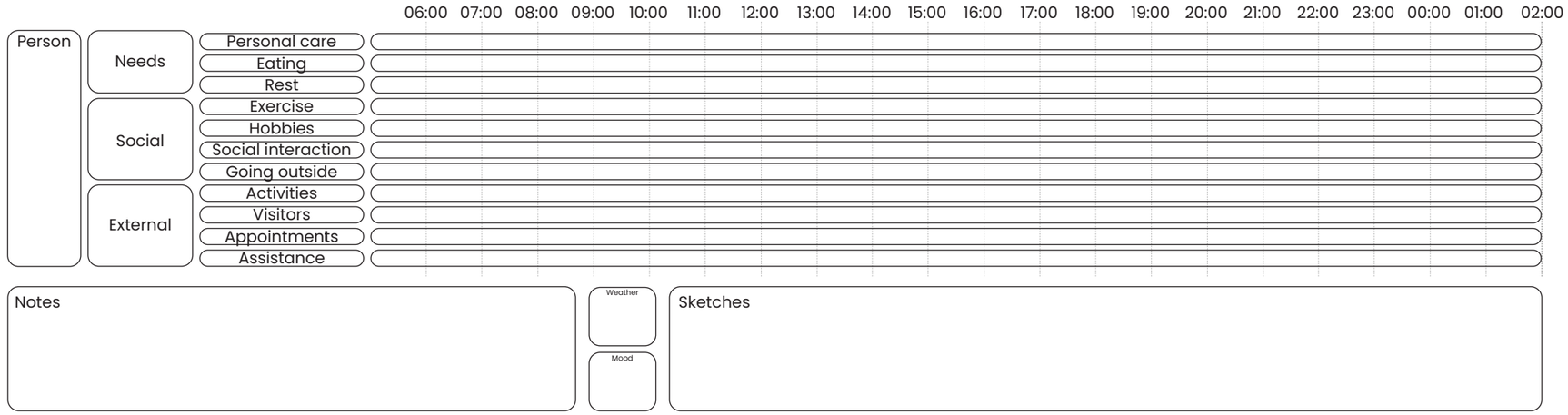
Transforming our fieldwork experiences into structured and useful data was a crucial step for our research. Throughout the week, we gathered a wealth of raw data—from direct observations and informal conversations to notes on the design and atmosphere of ‘t Kampje. However, simply collecting this information was not enough; we needed to organize it in a way that would allow us to analyze patterns, draw meaningful conclusions, and ultimately contribute to my research on social cohesion in multigenerational housing.

To ensure that the findings were both systematic and comparable, we worked together with other students to develop structured formats for documenting the insights. By creating shared templates, we made it easier to compare information across different experiences, identifying recurring themes and notable differences in the way residents engaged with their environment.

One of our key approaches was to develop “A Day in the Life” overviews and different “Personas”. These tools helped us visualize the different lifestyles, routines, and needs present among the residents of ‘t Kampje. Instead of looking at the community as a single entity, we were able to highlight the diversity within it—showing, for example, how some residents were highly social and engaged in many activities, while others preferred more solitude. This approach provided a deeper understanding of how different individuals interact with the space and each other, making our analysis more nuanced and human-centered.

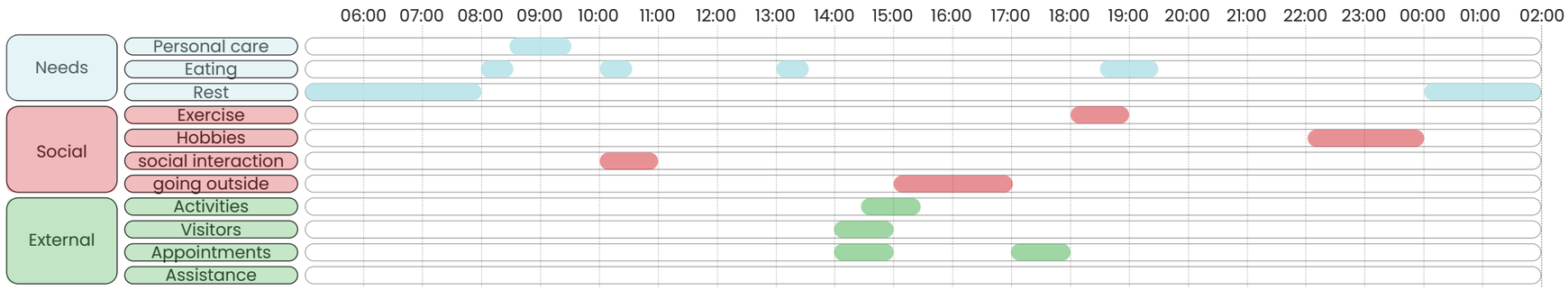
To support our interviews, we also compiled a structured list of questions that we could use during conversations with residents. This preparation was incredibly valuable, as it ensured that we didn’t have to come up with questions on the spot, allowing us to focus on building genuine connections with the people we spoke to. The format was designed to be easy to fill in during interviews, making it a practical tool for capturing responses in real-time without disrupting the conversation.

Day in a life



Person M 63

Going to the fysio, taxi-driver, drives car, going for a drive around the neighbourhood in his mobility scooter. Watching television.



Beyond its logistical benefits, having a prepared list of questions also served as a great icebreaker. When residents saw that we had taken the time to structure our interviews, it reassured them that we were genuinely interested in their experiences. This helped establish trust and often led to more open and engaging discussions. In some cases, residents even took the opportunity to elaborate on topics we hadn't initially considered, leading to valuable insights that we might not have uncovered otherwise.

Reflecting on this process, it became clear that structuring our fieldwork data was just as important as the fieldwork itself. Without organization, valuable observations risk being lost in scattered notes and fragmented impressions. By carefully curating our findings through formats, personas, and structured interviews, we were able to turn raw experiences into meaningful research material.

This process reinforced the importance of thoughtful data visualization in making research accessible and impactful.

Persona



"Intresting or fun quote"

AGE:
GENDER:
PREVIOUS OCCUPATION:
LIVING SITUATION:

Physical Activities

Explaing the activities

Explaing the activities

Explaing the activities

Social Activities

Explaing the activities

Explaing the activities

Explaing the activities

Frustrations

Positives



"WHAT ARE YOU SAYING??"

AGE: 68-97
GENDER: Female
PREVIOUS OCCUPATION: Healthcare
LIVING SITUATION: Living in 't Kampje

Physical Activities

I like to move around with my mobility walker in the building

I go outside for my daily walk to the nearby supermarket

There is a indoor bike here that i could use to cycle through Maastricht

Social Activities

I join every activity organised here, just to talk to everybody, not to do anything

I love it when family visits or when they take me outside to do something

Knitting or doing needlework

Introvert — Extrovert

Frustrations

- I am getting older, i can feel it in my knees.
- The age difference here makes it challenging for me to connect with the other residents as much as I'd like.

Positives

- Everybody is super friendly and they take good care of me here
- I lived in Loenen before I came here so its a familiar surroundings

Week 2.3

Site Analysis and Program of Requirements

Understanding of the site and a well-structured program of requirements form the foundation of a successful design. This week highlight the first steps and my contribution for the colleborative site analysis. Focusing on the existing conditions, spatial qualities, and opportunities for improvement. Additionally, it outlines the first ideas for the program of requirements, categorizing spaces into public, communal, and private functions to create a balanced and inclusive living environment.

Site Analysis

To efficiently analyze the design site, I collaborated with Lisa, Jasper, and Willisa, as we were all working on the same location. By dividing the workload, we ensured a more thorough and comprehensive analysis while preventing unnecessary overlap. This collaborative approach allowed us to focus on different aspects of the site while maintaining a broad understanding of its current state.

Our focus was to conduct a general analysis of the site, documenting what is currently there without immediately drawing conclusions. This involved mapping out existing structures, public spaces, and circulation routes to establish a clear baseline of the area. By keeping the analysis broad at this stage, we ensured that we weren't making premature assumptions about what needed to change.

My focus was on examining the greenery, atmospheric qualities, and the dog park area. I analyzed how the trees were distributed throughout the site, their impact, and how they contributed to the overall ambiance of the area. Observing the atmosphere helped me understand how people interact with the space, whether it felt welcoming and lively or underutilized and disconnected. Additionally, I assessed the dog park, considering its size, location, and how well it served both pet owners and the broader community.

Together with Lisa, I compiled all our findings into a separate booklet that presented the complete site analysis in a structured and visually clear format. This document includes all gathered information, ensuring that our analysis could serve as a solid foundation for the design phase. Having a well-organized booklet allowed us to refer back to specific insights easily and made it easier to communicate our findings with others.



Front page site analysis booklet made in collaboration with Lisa Vermeer

From the completed analysis, we began identifying opportunities for improvement. Understanding the strengths and weaknesses of the current site allowed us to pinpoint areas that could be enhanced—whether through better connectivity, more inviting public spaces, or improved green infrastructure. These insights provided a strong foundation for the next stages of the design process, ensuring that any interventions would be based on a well-informed understanding of the site's existing conditions.

Program of Requirements

To structure the program of requirements effectively, I categorized the spatial needs into three main groups: public, communal, and private spaces. This approach ensures a clear distinction between areas that serve the broader neighborhood, spaces designed for shared resident activities, and private living units that accommodate diverse household types.

The public spaces include both paid and free functions aimed at fostering interaction between residents and the surrounding community. By integrating these spaces, the design encourages social engagement beyond the immediate housing environment. For instance, a café is proposed as a welcoming, low-threshold meeting point where residents and neighbors can connect. Other public functions are a physio, library, music hall, hairdresser, and outdoor spaces that contribute to a lively and inclusive atmosphere.

The communal spaces serve as key gathering points for residents, both indoors and outdoors. These areas are essential for promoting a sense of belonging and supporting informal interactions among neighbors. Indoor communal spaces include shared kitchens and living areas, activity rooms, workspaces, playrooms, and a laundry. All spaces where residents can meet, organize events, or participate in group activities. Outdoor spaces, such as gardens, terraces, or courtyards, provide additional opportunities for social encounters while offering a connection to nature. The design of these spaces prioritizes accessibility and comfort, ensuring that all residents feel welcome and encouraged to use them.

The private homes accommodate a diverse range of household types. The variation in unit sizes allows for different living arrangements, from single-person households to larger family units. This variety ensures that the housing community remains inclusive and caters to the needs of multiple generations.

By structuring the program of requirements in this way, the design aims to create a well-balanced living environment that integrates the needs of individuals, fosters social connections, and strengthens the relationship between the housing community and the wider neighborhood.

1. DESIGN LOCATION

1.04. GREENERY- TREES



The design location is characterized by an abundance of greenery, which plays a crucial role in enhancing the quality of life for its residents. The area is home to many elm trees, reaching heights of 10 to 15 meters. These mature trees provide a visually appealing landscape and create a cooler environment during the summer months through their shade-providing canopy. This shading effect contributes significantly to reducing the urban heat island effect, a challenge that cities like Rotterdam increasingly face due to climate change and urbanization.

Green spaces are vital for mental well-being, as they offer residents a calm environment and opportunities for recreation. When planning for interventions on the site it is crucial to maintain the current level of greenery, ensuring that the ecological and aesthetic quality of the area remains intact. By preserving and potentially enhancing the existing green cover, the design respects the community's need for access to green amenities, which are known to support mental health and foster a sense of connection to nature.

The 3-30-300 rule serves as a guiding principle for the design. This framework emphasizes the importance of integrating nature into urban environments: ensuring that residents can see at least three trees from their homes, achieving a minimum of 30% tree canopy cover, and providing access to a park or green space within 300 meters. Applying these principles ensures that the site meets and exceeds expectations for urban greenery, promoting biodiversity and creating habitats for various species (The Transformative Impact Of The 3-30-300 Rule On Urban Living, 2024).

In addition to its environmental benefits, the greenery in Tarwewijk enhances the area's livability by acting as a buffer against noise and pollution and fostering social interactions in shaded, inviting outdoor spaces. Maintaining this natural infrastructure ensures that the neighborhood continues to be a vibrant, sustainable, and health-promoting place for all generations.

1. DESIGN LOCATION

1.04. GREENERY- ATMOSPHERE

1. **LOOKING AROUND**

The tall trees and neatly trimmed hedges along the edges create a natural boundary that encloses the space. Fallen leaves scattered across the ground add a seasonal charm, enriching the atmosphere with a sense of change and tranquility. However, the view is contrasted by the presence of many parked cars along the streets, and the hard, gray pavement tiles and red street bricks give the area a distinctly urban feel.





2. **LOOKIN IN**

Inside the park, contrasting elements become apparent. Vandalism, such as graffiti on the electricity unit, introduces a sense of neglect. The smaller street entrance evokes curiosity and a feeling of stepping into the unknown, while the park's openness provides a clear overview of its layout, offering a sense of safety and familiarity.





3. **LOOKIN THROUGH**

The dense tree canopy and abundant shade create pockets of obscurity, particularly in the dog area, which becomes a shadowy spot where its use is not immediately apparent. This interplay of light and shade adds visual depth and a sense of mystery to the park but can also reduce visibility and diminish the perception of activity and interaction in certain areas. Nonetheless, the presence of fixed objects such as benches and a ping pong table offers inviting spaces for rest, recreation, and social interaction, encouraging opportunities for community engagement.

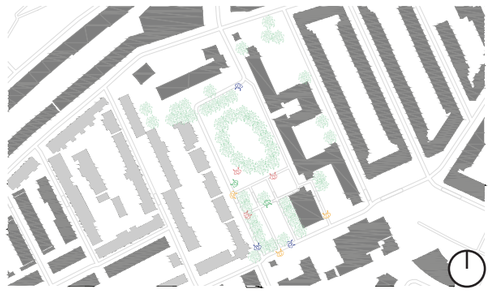




4. **LOOKIN OUT**

The view from the park reveals the surrounding urban environment. The diversity in housing styles reflects the neighborhood's character, while the trees along the edges soften the boundary between the built environment and the green space. This layering of natural and urban elements frames the park as a dynamic interface between the community and nature, offering both a retreat and a connection to the neighborhood.





1. DESIGN LOCATION

1.05. Dog park

02 SPACE & USE *// GREENERY & WATER*

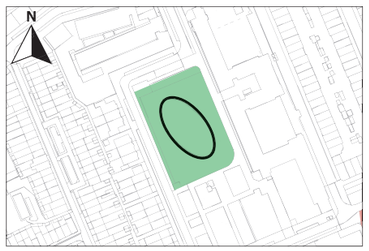
02.22 ACCESSIBILITY PARK 4



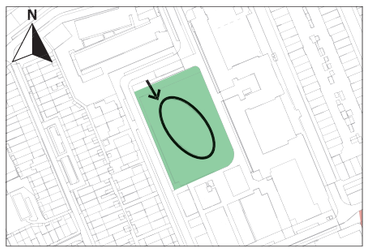
Section park 4. 1:100



Placement section



Placement fence



Entrances

Park 4 is a dedicated dog park where residents can bring their dogs to run and play freely. The park is enclosed by a small fence and hedge, ensuring that the dogs can't easily run off. This provides a safe space for dogs to enjoy off-leash play.

The park is accessible 24/7, allowing dog owners to visit at any time of day or night. It is a convenient spot where dogs can socialize and exercise with other dogs, giving them plenty of space to run around safely.

The dog area of the park occupies a substantial portion of the space, covering approximately two-thirds of the park, and is enclosed by fencing to ensure safety for pets. Its entrance, located on the north side, is the sole access point. Surrounded by tall trees, the area offers shade, creating a calm and natural setting. While this provides relief during hot days, the dense tree cover also makes the space darker and less welcoming, especially during overcast weather or evening hours.

Despite being one of the few designated spaces for dog owners in the neighborhood, the area is rarely used. Its size contrasts with its underutilization, suggesting a need for improvements. The secluded location and lack of visibility from other parts of the park may contribute to perceptions of isolation or safety concerns. Enhancing visibility by thinning tree cover, adding lighting, or incorporating benches and amenities for dog owners could encourage greater use. As it stands, the dog area remains a valuable resource for urban pet owners, combining functionality with the park's natural charm but requiring updates to fully realize its potential.

PROGRAM OF REQUIREMENTS

PUBLIC — COMMUNAL — PRIVATE

Café
120-150 m²

Dog park
40-50 m²

Library
70-80 m²

Music hall
70-80 m²

Entrance
50-60 m²

Physio
70-80 m²

Hair dresser
30-50 m²

Garden
200-250 m²

Indoor space 200-300 m²

Work space
50-60 m²

Hobby area
30-40 m²

Play room
20-30 m²

Living area
40-60 m²

Laundry room
15-25 m²

Dining / kitchen
40-60 m²

Outdoor space 400-500 m²

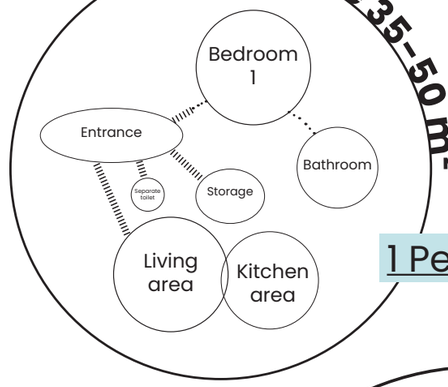
Vegetable Garden
100-150 m²

Rooftop
30-40 m²

Playground
40-60 m²

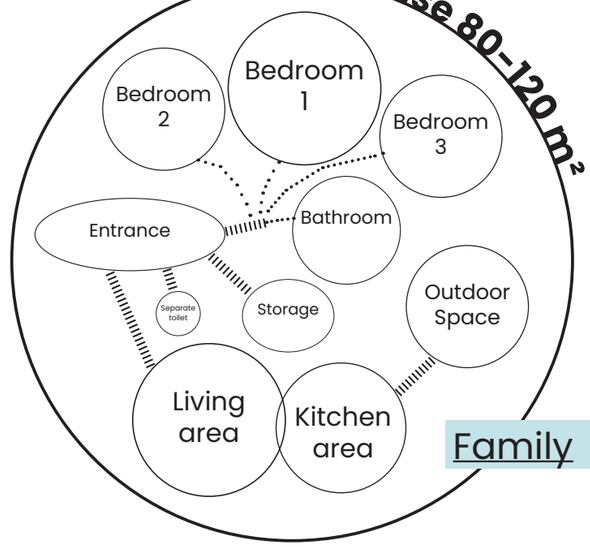
Terrace
80-100 m²

House 35-50 m²



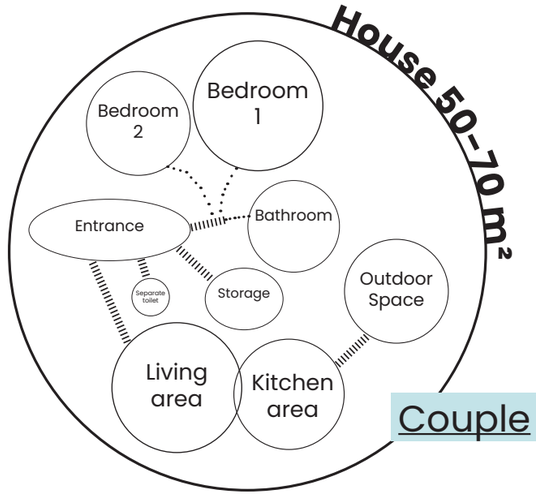
1 Peron

House 80-120 m²



Family

House 50-70 m²



Couple

Wide corridors with seating: at least 2.5 meters wide.

Week 2.4

Program of Requirements and Mass Study 1

After establishing the initial program of requirements, the next step was to refine it based on the site conditions and spatial needs. This week explores how the program was adjusted and translated into the first massing studies, testing different spatial configurations on the site. Through these studies, I examined how the building could integrate with its surroundings, balance private and communal spaces, and foster connections between residents and the neighborhood. Each iteration provided valuable insights, helping to shape a more effective and responsive design.

PROGRAM OF REQUIREMENTS

PUBLIC — COMMUNAL — PRIVATE

Café
120-150 m²

Dog park
40-50 m²

Library
70-80 m²

Music hall
70-80 m²

Shops
70-80 m²

Replace physio with small shops since health center is within walking distance from site

Entrance
50-60 m²

Hair dresser
30-50 m²

Garden
200-250 m²

Minimum Indoor: 410-550 m²
Minimum Outdoor: 240-300 m²

Indoor space 200-300 m²

Hobby area
30-40 m²

Work space
50-60 m²

Play room
20-30 m²

Living area
40-60 m²

Laundry room
15-25 m²

Dining / kitchen
40-60 m²

Outdoor space 250-350 m²

Vegetable Garden
100-150 m²

Rooftop
30-40 m²

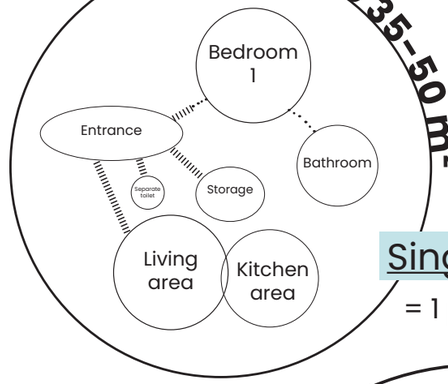
Playground
40-60 m²

Terrace
80-100 m²

Minimum Indoor: 2460 m²
Maximum Indoor: 3520 m²

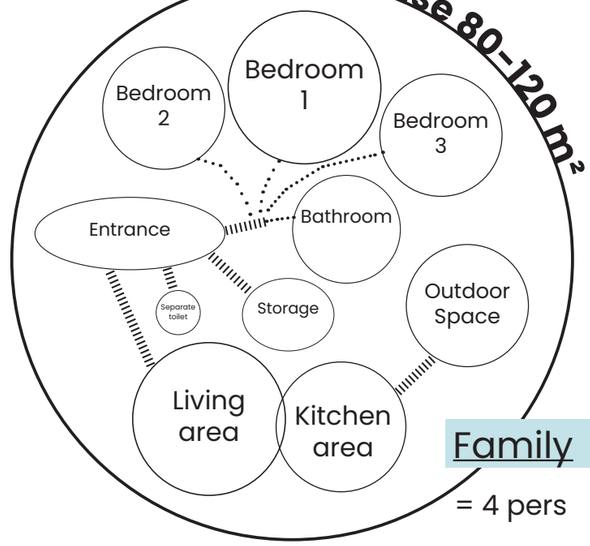
Minimum Outdoor: 490 m²
Maximim Outdoor: 650 m²

House 35-50 m²



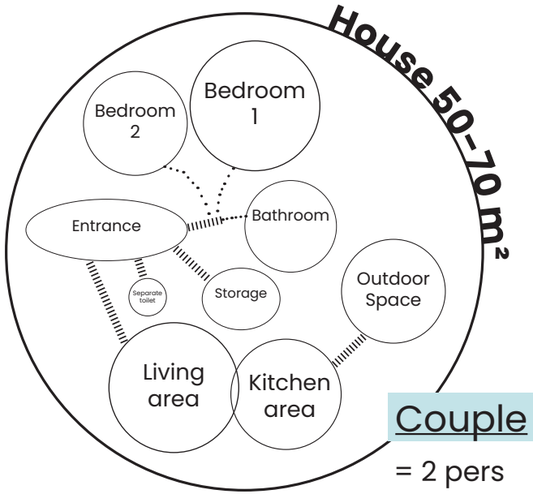
Single / Elderly
= 1 pers

House 80-120 m²



Family
= 4 pers

House 50-70 m²



Couple
= 2 pers

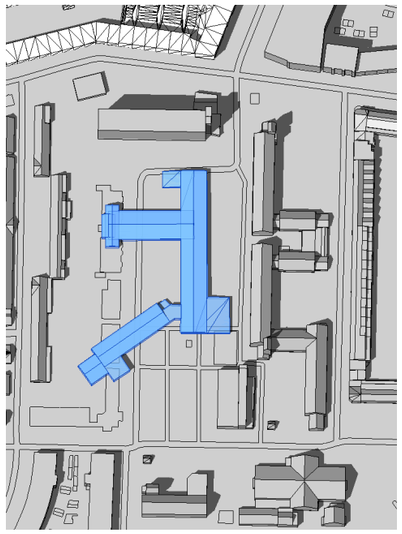
‘t Kampje for Scale Reference

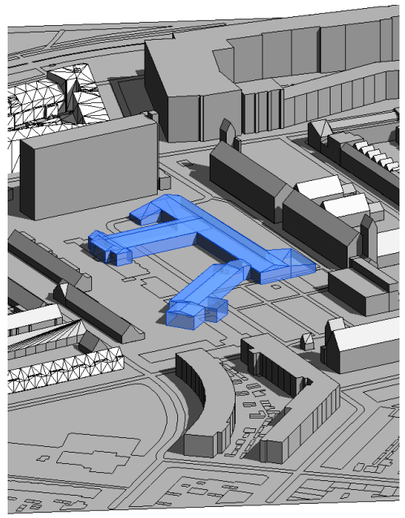
I placed the existing structure of ’t Kampje onto the design site to use it as a scale reference. This helped me to understand how a building of similar proportions would interact with the surrounding environment and available space. The focus of this placement was on the dog park area, examining how much space the structure would occupy and how it would shape the outdoor environment.

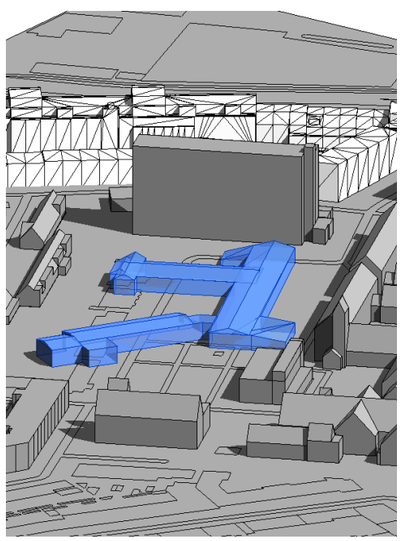
This first study provided valuable insights into the spatial limitations and opportunities of the site. While the scale was appropriate, the design needs to focus on enhancing connectivity and creating a more efficient use of space. These findings served as a starting point for the first mass studies, guiding the next steps in the design process.

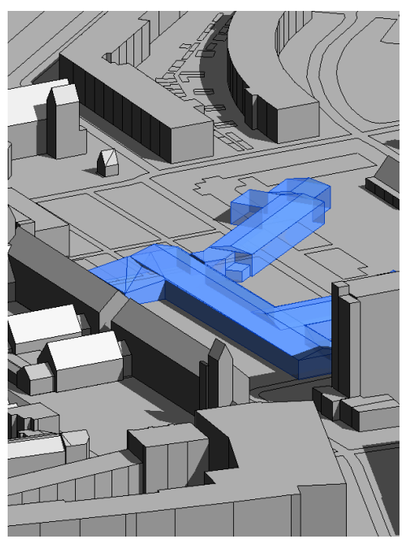
Positives
One of the positive aspects was that the structure naturally created different outdoor areas, providing a variety of open spaces that could serve different functions for residents and the community. Additionally, the scale of the building fit well with the surrounding urban fabric, ensuring that the development would not feel out of place within the neighborhood.

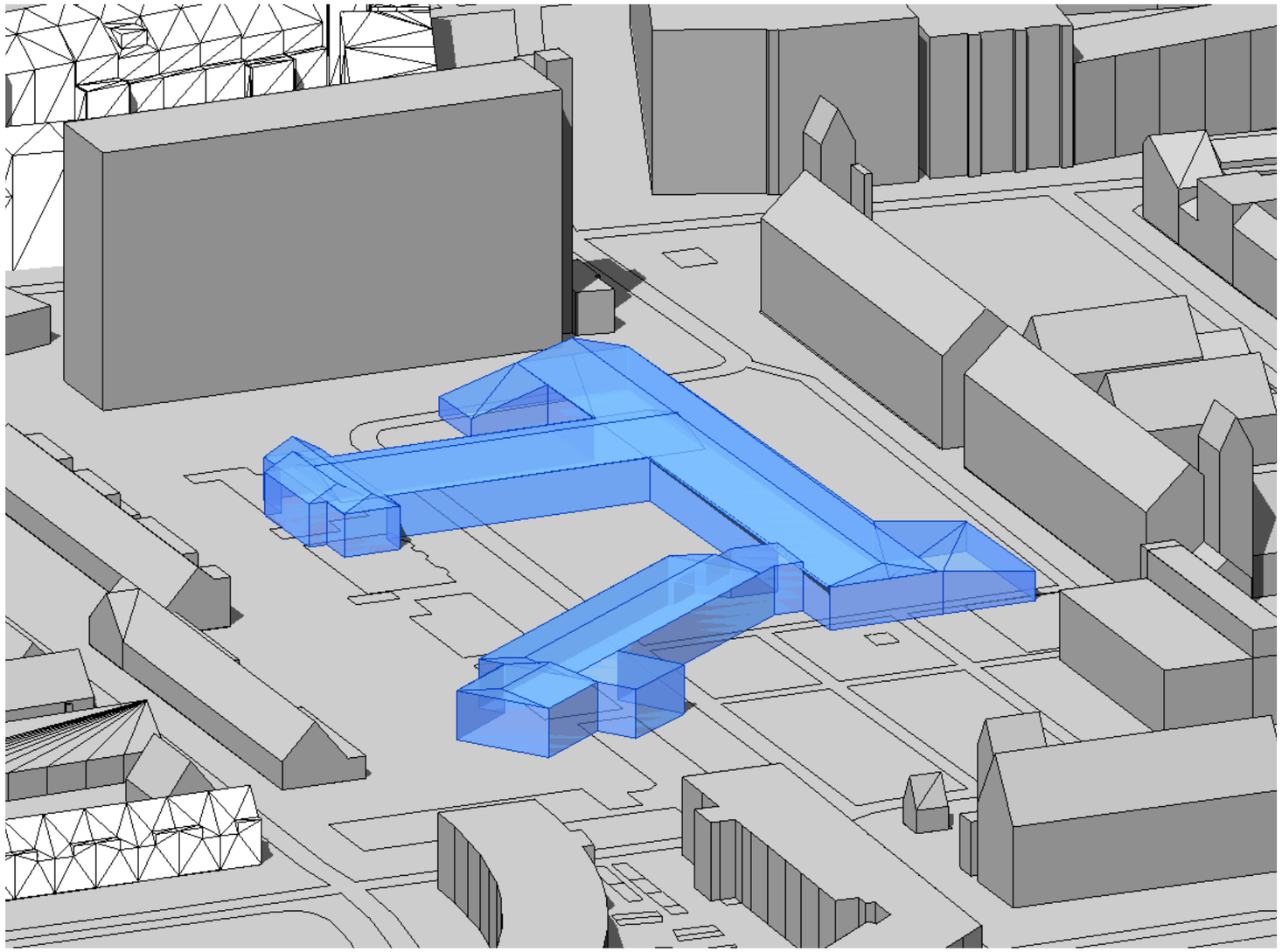
Negatives
However, the study also revealed some drawbacks. Since the massing is very spread out it takes up almost the entire site, which leaves little room for flexibility in designing additional communal or public spaces. Furthermore, the different wings of the building do not feel well connected, potentially leading to a fragmented living experience rather than a cohesive community. This lack of integration between the building’s sections highlighted the need for a more thoughtful approach to spatial organization, ensuring that shared spaces and circulation routes foster a stronger sense of connection among residents.











Mass Study 1.1

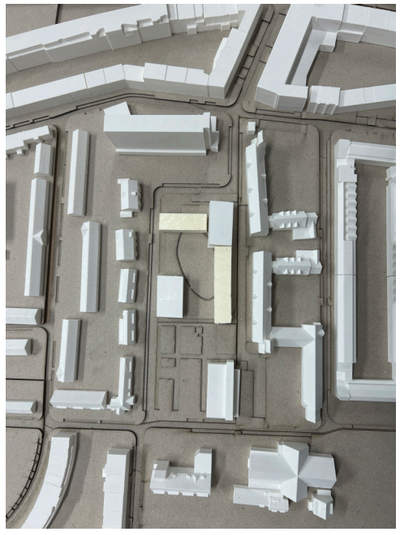
In the first mass study, I explored a layout that featured a central entrance with communal spaces, leading into two wings where the residential units would be located. Additionally, a separate community center was placed to connect with the surrounding neighborhood. This arrangement aimed to balance private, communal, and public functions and integrate green spaces throughout the site.

Positives

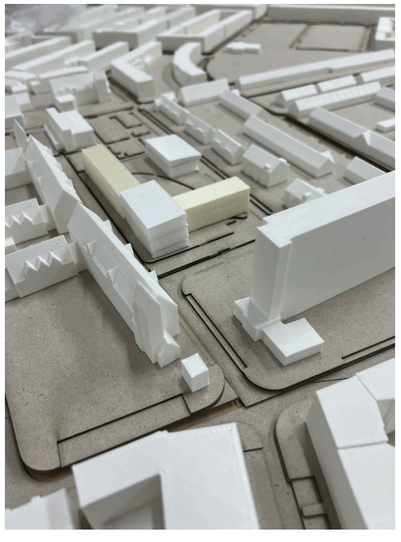
One of the key benefits of this layout was that the communal spaces were centrally positioned, creating a natural hub for social interaction among residents. The community center, being a separate structure, maintained a strong connection with the neighborhood, ensuring that the design was outward-facing rather than isolated. Additionally, the in-between green spaces gained a more enclosed and sheltered atmosphere, which could enhance their usability and comfort for residents.

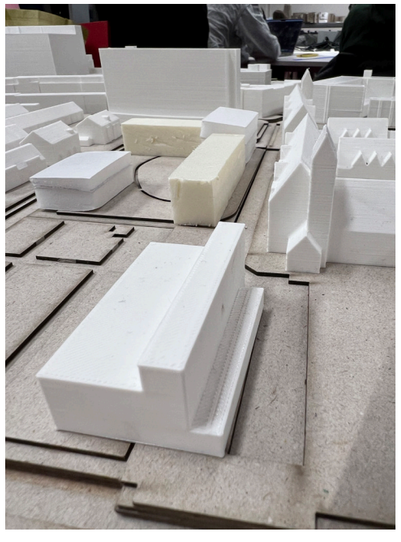
Negatives

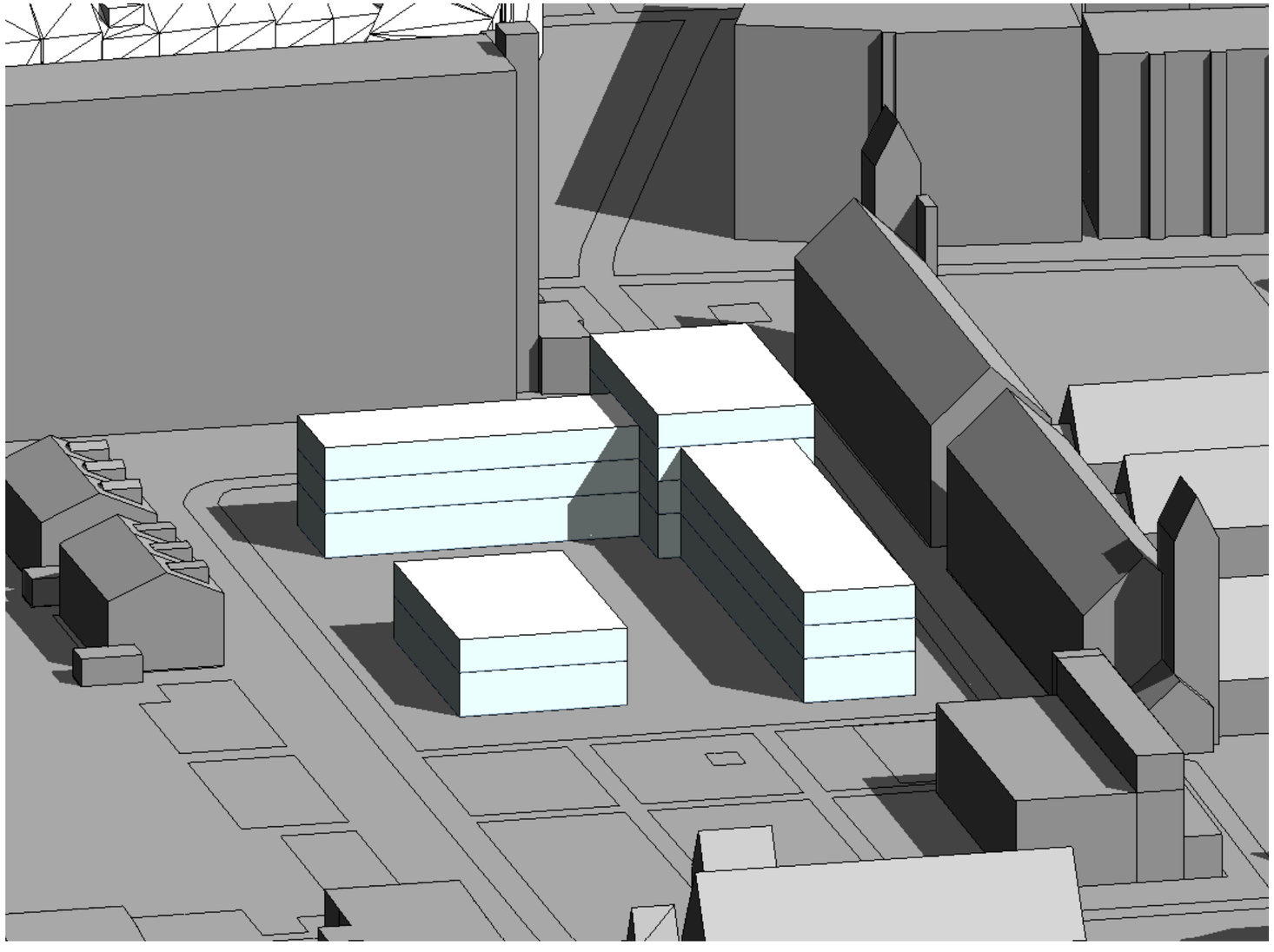
The building arrangement felt too closed off from the rest of the neighborhood, potentially limiting spontaneous interactions with the wider community. While the enclosed green areas created a sense of privacy, they also risked making the site feel less accessible and inviting. Additionally, the layout dedicated too much space to communal and community functions, which, while beneficial for social engagement, left less room for residential units and other necessary functions.











Mass Study 1.2

For the second mass study, I explored a layout where all residential and communal functions were fully integrated into a perimeter block. This approach aimed to create a living environment with a clear separation between private and communal spaces while maintaining strong internal connectivity. Additionally, the design allowed the separate wings to cater to different resident groups, offering flexibility in how living arrangements were organized.

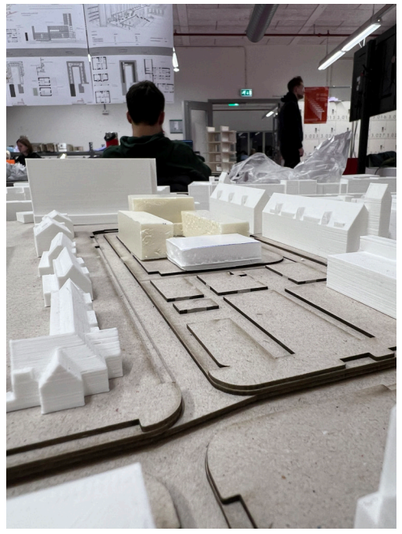
Positives

One of the advantages of this massing study was that it fit well within the neighborhood's existing structure, ensuring that the scale and form aligned with the surrounding urban fabric. The decision to connect all buildings also had a social benefit—by physically linking spaces, residents would naturally encounter each other more frequently, fostering interaction and a sense of community within the development.

Negatives

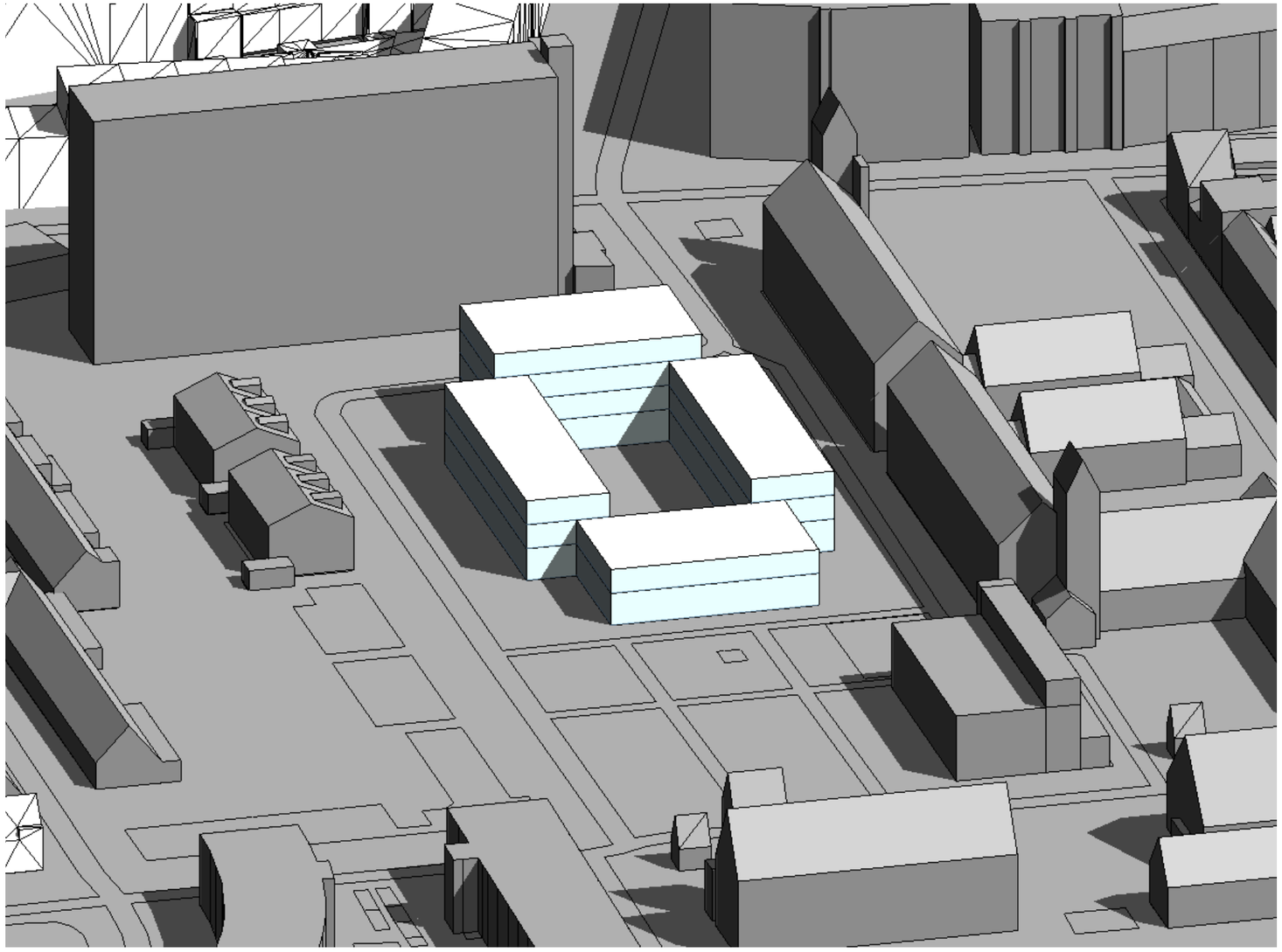
The building felt closed off toward the neighborhood, limiting potential interactions between residents and the wider community. While this provided privacy, it also risked creating a sense of isolation rather than integration with the surrounding area. Additionally, this massing strategy occupied the entire park space, reducing the opportunity to incorporate shared outdoor areas that both residents and neighbors could use. This highlighted the need for a more balanced design that maintained strong internal connections while preserving open spaces for social interaction and greenery.











Mass Study 1.3

For the third mass study, I explored a layout featuring a central community area with two connected wings extending outward. This design aimed to balance internal connectivity with openness, making the communal spaces into the heart of the building while also allowing for a strong relationship with the surrounding neighborhood. A key focus was to create an open green space that seamlessly connected to the neighborhood, making the site feel more inviting and accessible.

Positives

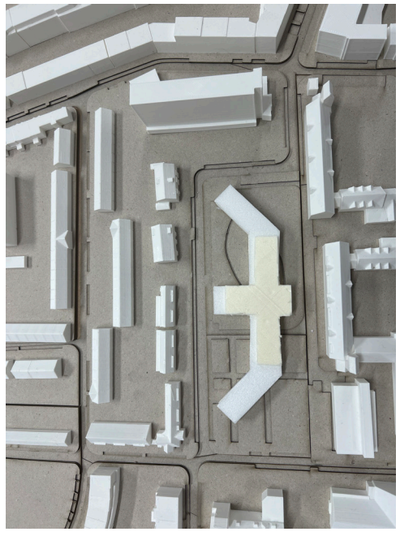
One of the main advantages of this approach was that it felt much airier compared to previous massing studies. By opening up the site and integrating opportunities for shared green spaces, the design avoided feeling too enclosed, promoting a sense of openness. Additionally, this massing strategy offered more outdoor space, providing greater opportunities for interaction between residents and the neighborhood. These outdoor areas could serve as shared gardens, seating areas, or recreational spaces, reinforcing the idea of a socially connected environment.

Negatives

The great distance between the ends of the wings meant that movement across the building could feel inefficient, potentially making it less convenient for residents to navigate and resulting in a feeling of separation. Additionally, the building became very widespread, which could lead to inefficiencies in space usage and circulation. This raised concerns about whether the layout was too stretched out, making certain areas feel disconnected rather than cohesive.

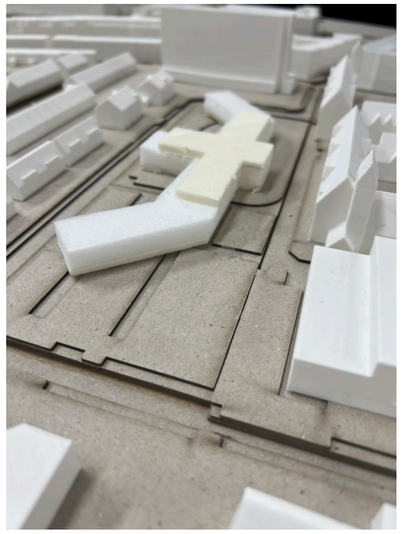
Tutoring Takeaways

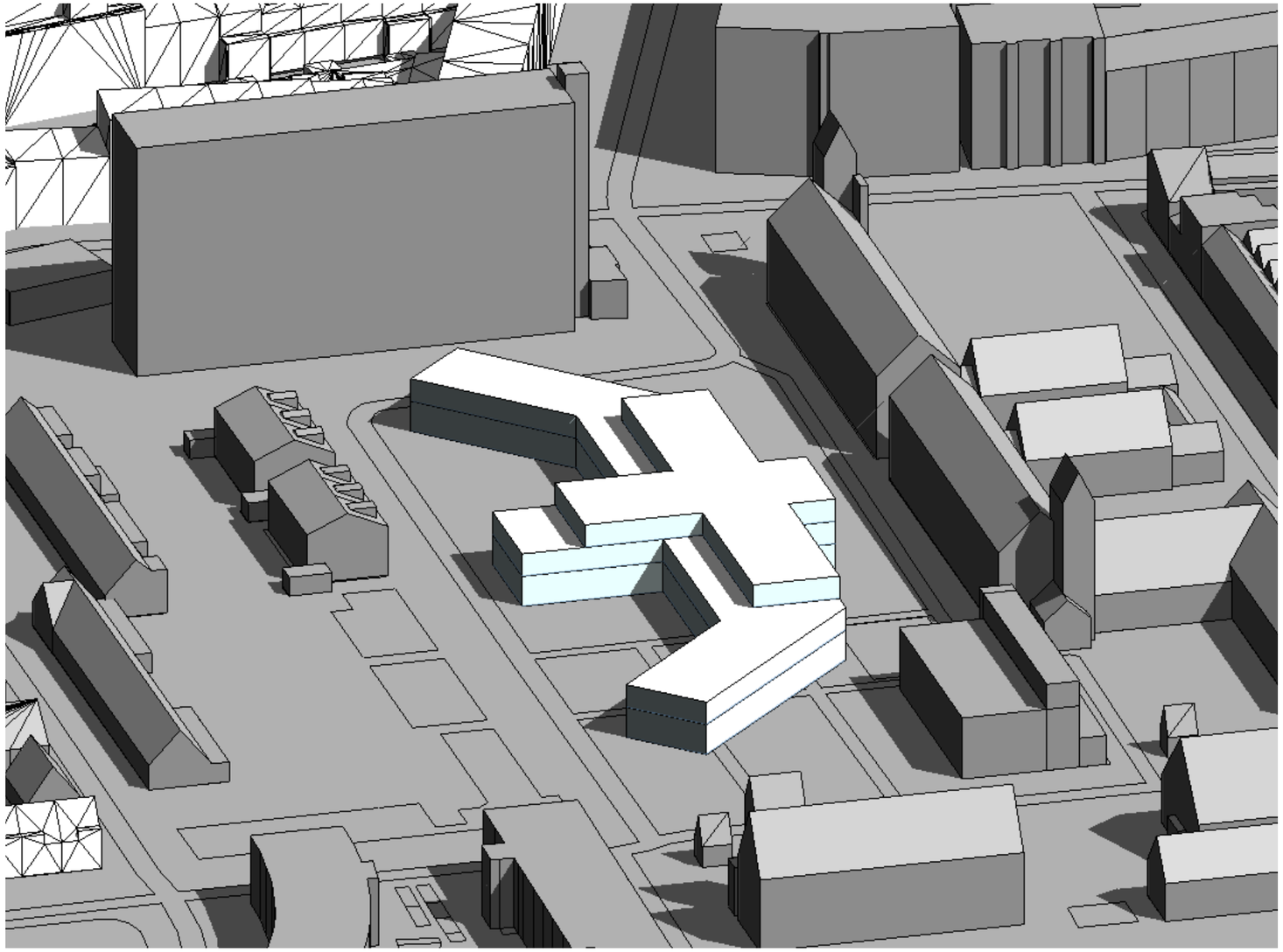
- Keep the dog park and park
- The buildings on the west of the site will already be demolished so why not design there?
- See the site as a whole and maybe it is possible to great the enclosed feeling within the whole area.











Week 2.5

Mass Study 2

Building on the feedback from last week, I identified clear site boundaries and defined a dedicated building area, which helped bring more structure to the design process. This led to a significant decision: moving the building location to the part of the site that will be demolished while preserving the existing park as an integral part of the masterplan. However, this week proved to be particularly challenging, as I struggled to make the outdoor spaces function the way I envisioned. This left me feeling somewhat lost, unsure of how to create a balanced interaction between built and open areas. To regain direction, I sought feedback from my tutor, looking for insights to refine the massing and improve the relationship between the building and its surrounding outdoor spaces.

Identifying Borders

This concept focuses on creating a well-integrated and balanced urban environment that connects with its surroundings while providing distinct boundaries. The design incorporates both hard and soft borders to define the site, ensuring privacy and connection to the community. By enhancing green spaces and thoughtfully placing buildings, the plan fosters a cohesive and dynamic relationship between public and private areas, offering a range of experiences for residents and visitors.

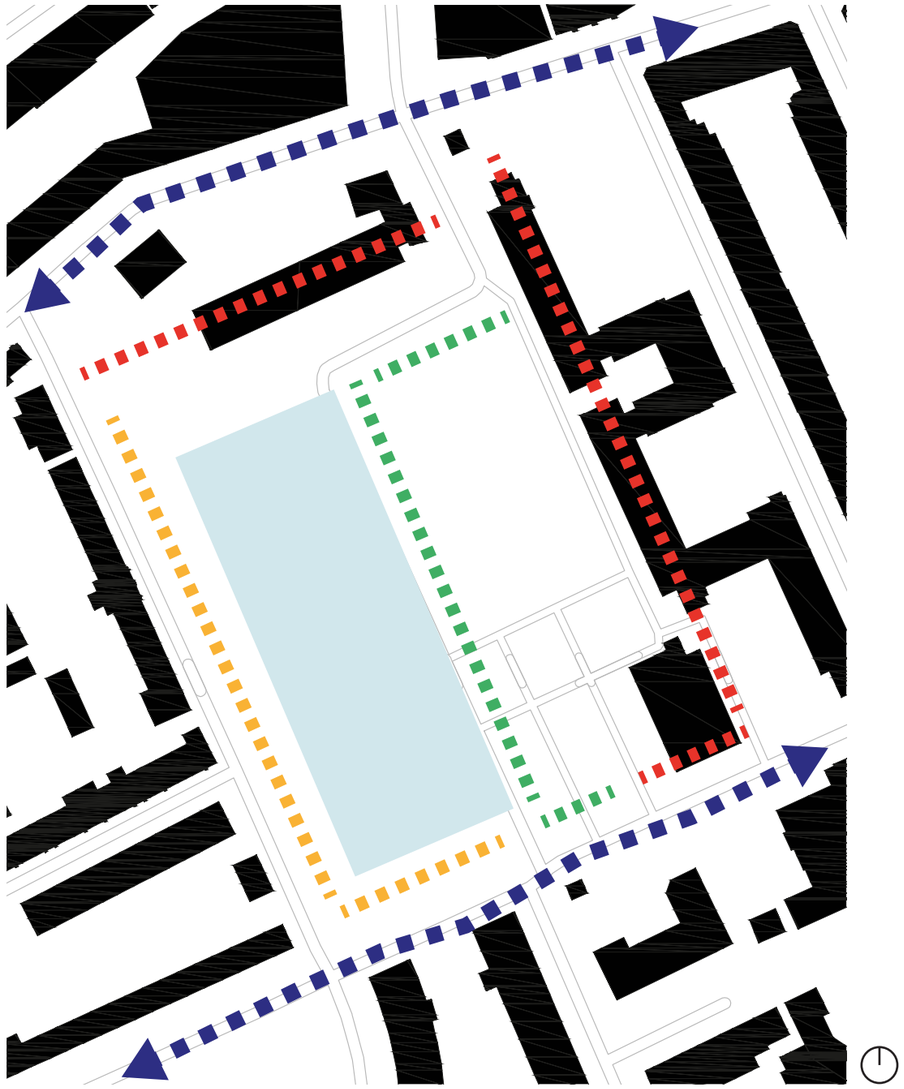
Hard Border - Streets
The site is bordered by two main roads running through Tarwewijk. The northern edge is more distanced due to high-rise buildings, which could act as a barrier to the supermarket. To the south, the road connects directly to the site, ensuring easy access and integration with the surrounding area.

Hard Border - Buildings
The site's boundaries are defined by existing structures: a high-rise flat to the north, a school building to the east, and a school gym to the south. These buildings establish strong physical limits around the site.

Hard Border - Missing
To create a more enclosed and cohesive area, an additional border is needed on the west side. This could be achieved with taller or larger buildings, though care should be taken to preserve connections to the surrounding neighborhood to prevent a sense of isolation.

Soft Border - Greenery
The design emphasizes enhancing existing green areas, rather than removing them. Rather than a single large green space, smaller, varied pockets of greenery will be created, each offering different levels of "intensity" to provide diverse outdoor experiences.

Building Area
Most buildings will be concentrated in the designated building area, where demolition is already planned. Some encroachment into the green space is possible, with buildings rising in height toward the west and gradually lowering toward the east, allowing for a smoother connection with the park. Careful attention to sightlines will ensure visual harmony and integration with the surroundings.



LEGEND

- Buildings Area
- Hard Border - Streets
- Hard Border - Buildings
- Hard Border - Missing
- Soft Border - Greenery

NUMBERS

Building Area
Lenght: 140m x Width: 50m
Area: 7000m^2

Greenery
Lenght: 135m x Width: 45m
Area: 5600m^2

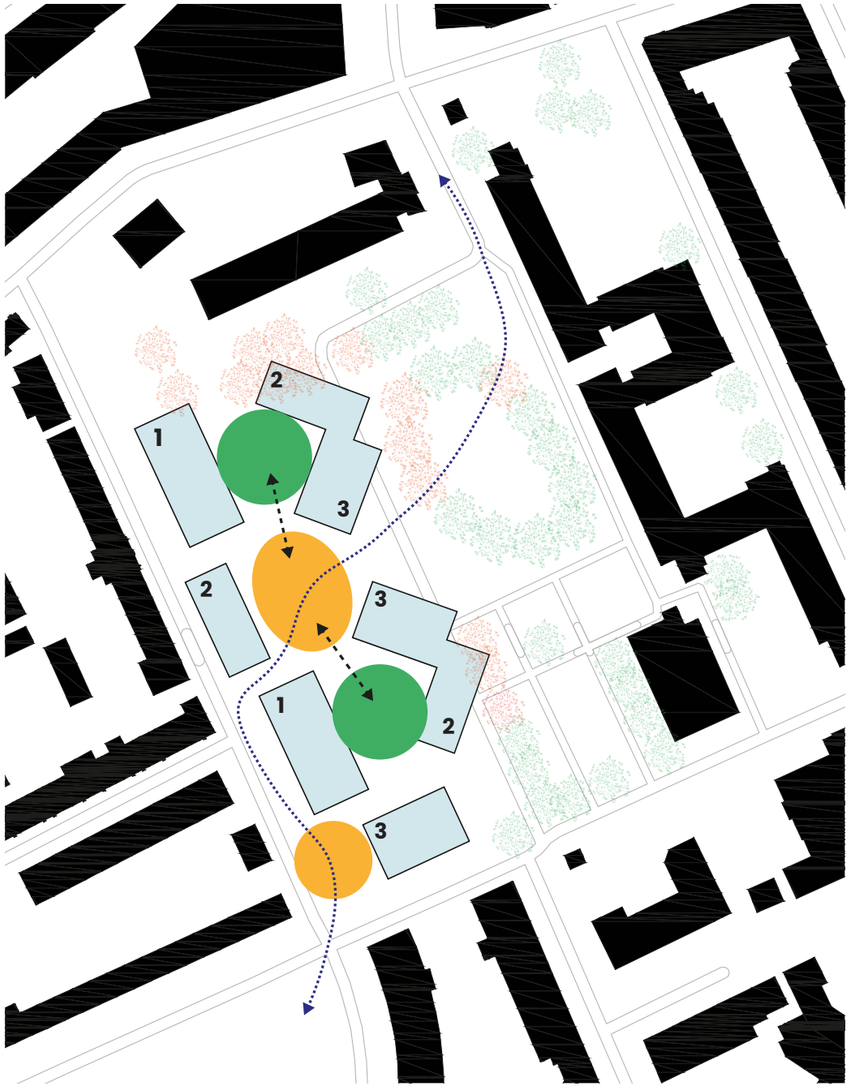
Total Area: 12600m^2

Mass Study 2.1

Mass Study 1 envisions a design centered around a public square located in the middle of the site, creating a direct connection to the adjacent park. From this central square, pathways lead to more private gardens, fostering a sense of intimacy and tranquility within the community. These gardens, strategically placed between the buildings, provide residents with direct access to green spaces, enhancing their daily living experience.
The arrangement of building heights further complements this design, with taller structures forming a protective barrier on the western side, decreasing in height as the buildings approach the park. This creates a harmonious transition from urban density to natural openness, ensuring both privacy and accessibility.

<u>Positives</u>
It achieves a thoughtful balance between public and private spaces, ensuring both open areas for interaction and secluded spots for personal retreat. The design fosters a strong sense of community, encouraging social connections among residents while maintaining boundaries for privacy. Additionally, the route through the development is limited to the public area, simplifying navigation and reinforcing the distinction between communal and private spaces.

<u>Negatives</u>
The design limits connections to the outside, reducing interaction with the broader neighborhood. This lack of openness may hinder integration with the community. As a result, it risks creating a sense of isolation despite its internal balance.











LEGEND

- New buildings
- **2 / 3 / 4** Building levels
- Busy area - Square
- Calm area - Garden
- Lively route
- Visual connection
- Greenery (preserve)
- Greenery (remove)

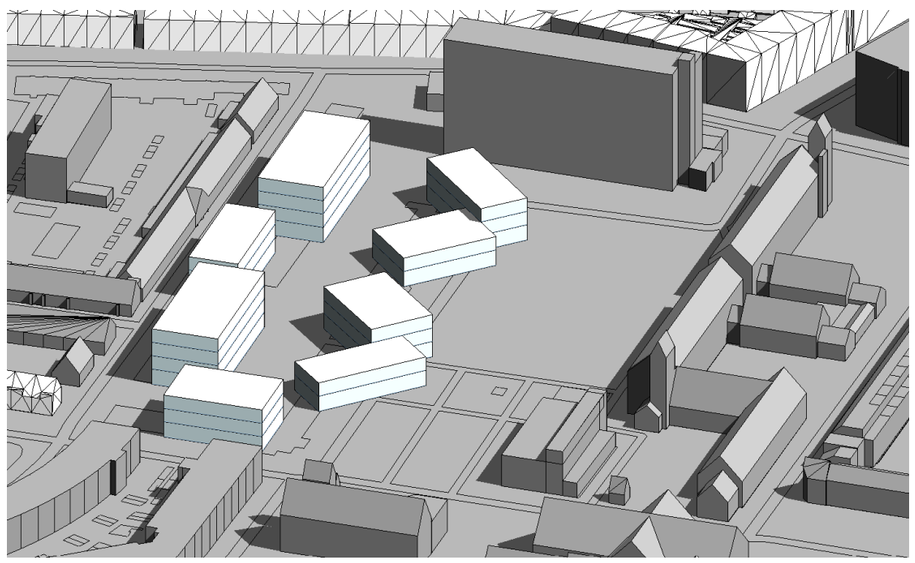
NUMBERS

<u>Type 1</u>
Lenght: 35m x Width: 16m
Height: 14,5m
Ground Floor Area: 560m²

<u>Type 2</u>
Lenght: 28m x Width: 12m
Height: 11m or 7,5m
Ground Floor Area: 336m²

<u>Type 3</u>
Lenght: 24m x Width: 16m
Height: 11m or 7,5m
Ground Floor Area: 384m²

Total Ground Floor Area: 3280m²

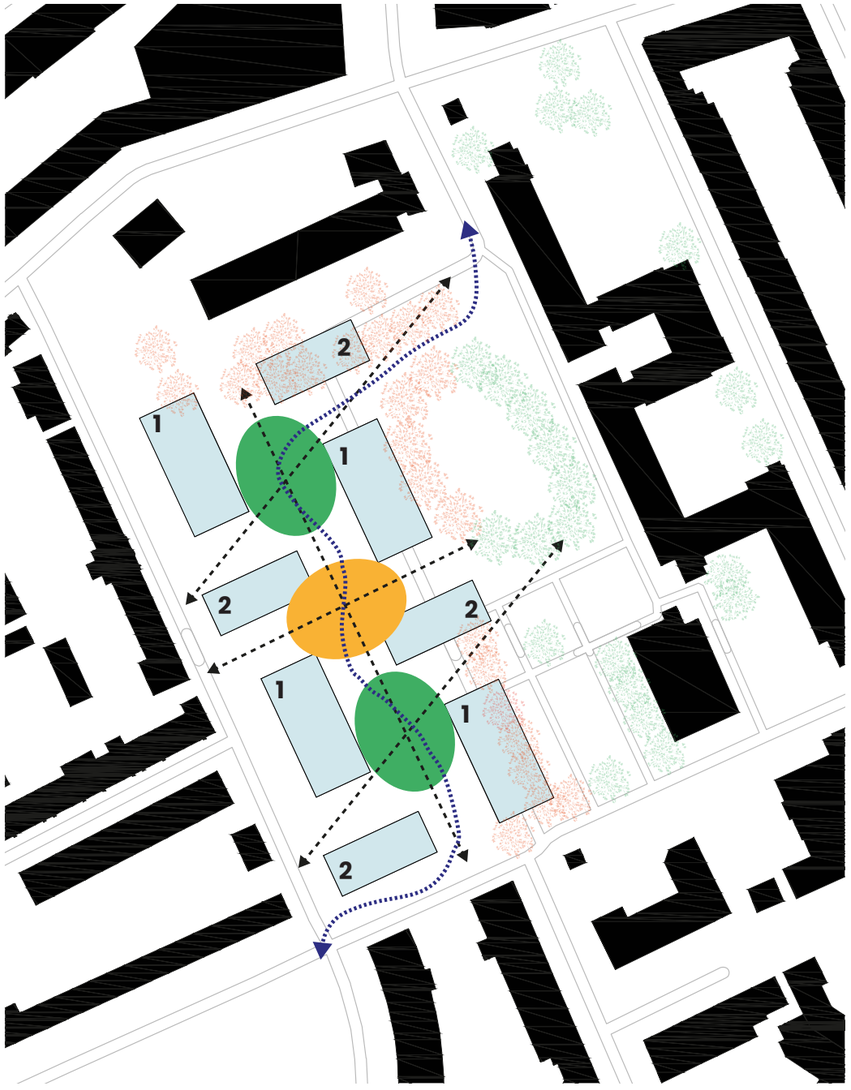


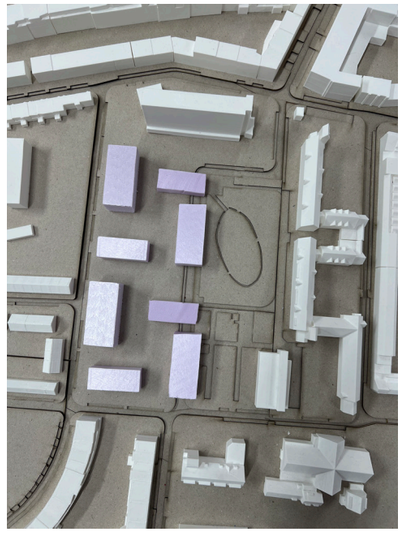
Mass Study 2.2

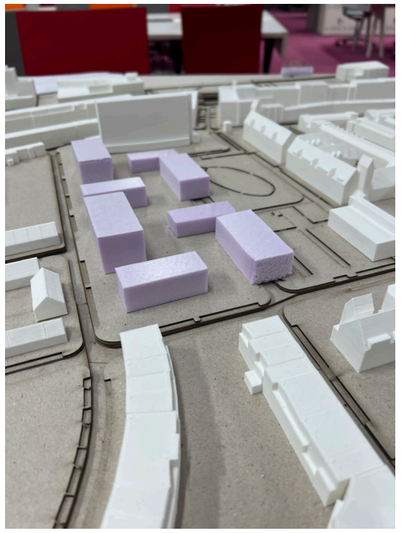
Mass Study 2 proposes two ‘blocks’, consisting of four separate buildings, organized around central gardens, with a public square serving as a connecting hub between the garden, park, and surrounding neighborhood. The design incorporates various diagonal sight lines, including one that runs continuously through the entire community, creating a sense of openness. A walking route takes visitors and residents through the different areas that transition from calm to busy and back to calm, offering a dynamic and varied experience. While the plan aligns well with the existing neighborhood structure, it requires the removal of a significant number of trees. Despite its integration into the urban fabric, the design currently feels incomplete, with many elements perceived as “half connections,” lacking full cohesion or seamless integration.

<u>Positives</u>
Offers numerous sight lines, creating openness and visual connections throughout the site. The gardens are directly connected to many residents, and transition into the central square, promoting interaction. It features multiple connections to both the park and the surrounding neighborhood, enhancing accessibility. These elements together foster a sense of integration and community.

<u>Negatives</u>
The route passes through all areas, potentially compromising privacy and calmness for residents. Additionally, the building shapes feel monotonous. This can make the design feel less dynamic or engaging. These aspects may impact the overall livability and aesthetic appeal.











LEGEND

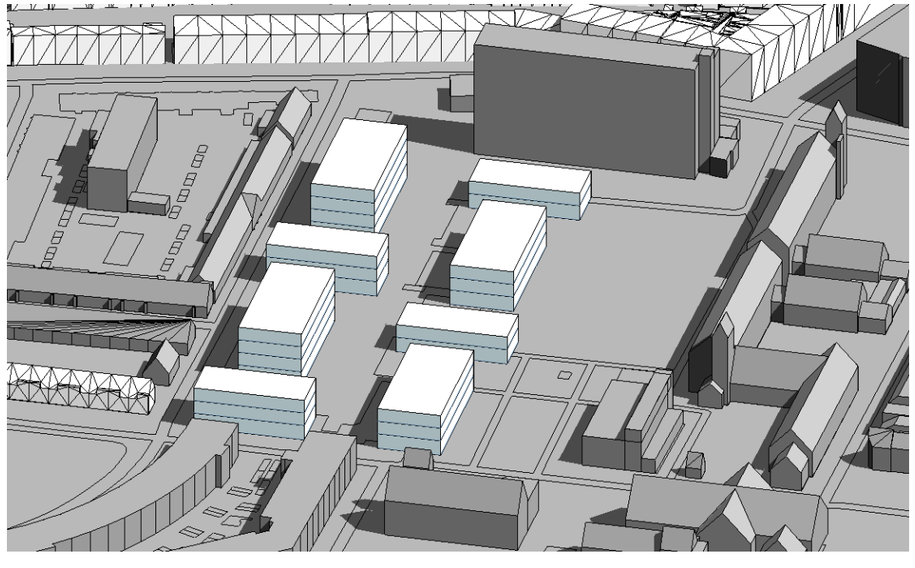
- New buildings
- 2 / 3 / 4 — Building levels
- Busy area - Square
- Calm area - Garden
- Lively route
- Visual connection
- Greenery (preserve)
- Greenery (remove)

NUMBERS

<u>Type 1</u>
Lenght: 35m x Width: 16m
Height: 14,5m or 11m
Ground Floor Area: 560m²

<u>Type 2</u>
Lenght: 28m x Width: 12m
Height: 11m or 7,5m
Ground Floor Area: 336m²

Total Ground Floor Area: 3584m²

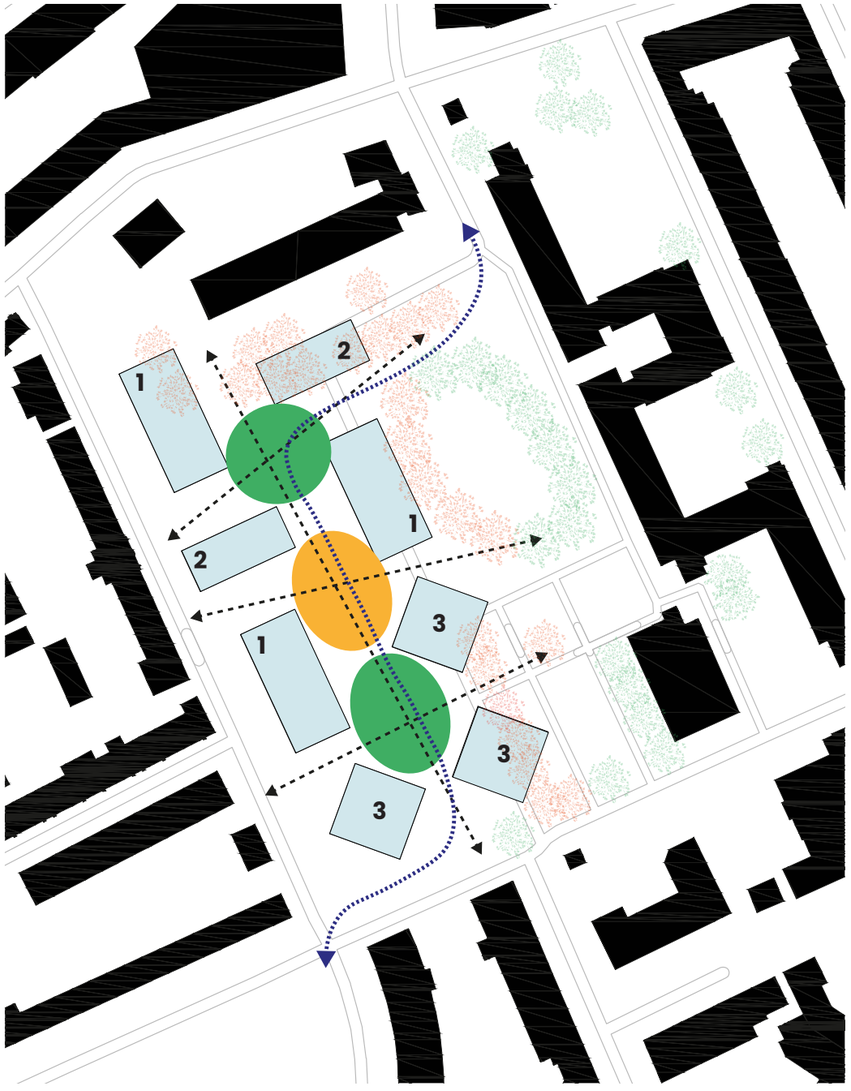


Mass Study 2.3

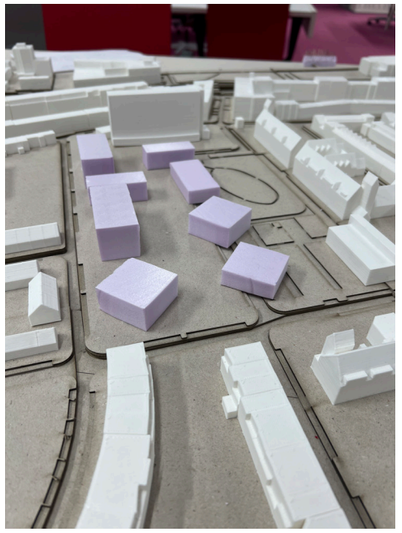
Mass Study 3 builds upon the framework of Mass Study 2, replacing the southern building block with a new building type to enhance connectivity and improve integration. This updated design introduces additional connections to the inner parts of the community and strengthens links with the surrounding neighborhood. Unlike the stricter structure of the existing neighborhood, the new layout adopts a more flexible and organic arrangement, promoting a sense of openness and adaptability. By reimagining the southern structure, the plan addresses the “half connections” identified in the previous study, fostering a stronger sense of unity within the community while maintaining a distinct, less rigid character that blends functionality with fluidity.

<u>Positives</u>
Mass Study 3 retains the strengths of Study 2, including numerous sight lines, gardens directly connected to many residents, and multiple links to the park and neighborhood. The new building types add more dynamism to the design, creating a more engaging and varied environment.

<u>Negatives</u>
The design feels too open and separate, potentially diminishing the sense of cohesion within the community. This openness might reduce the feeling of connectivity and unity within the community.











LEGEND

- New buildings
- **2 / 3 / 4** Building levels
- Busy area - Square
- Calm area - Garden
- Lively route
- Visual connection
- Greenery (preserve)
- Greenery (remove)

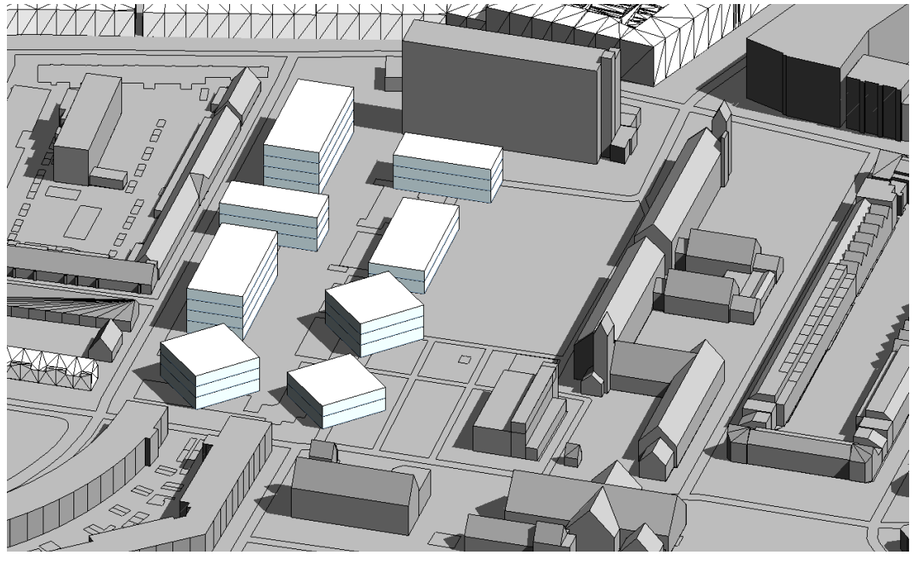
NUMBERS

<u>Type 1</u>
Lenght: 35m x Width: 16m
Height: 14,5m or 7,5m
Ground Floor Area: 560m^2

<u>Type 2</u>
Lenght: 28m x Width: 12m
Height: 11m
Ground Floor Area: 336m^2

<u>Type 3</u>
Lenght: 20m x Width: 20m
Height: 11m or 7,5m
Ground Floor Area: 400m^2

Total Ground Floor Area: 3552m^2

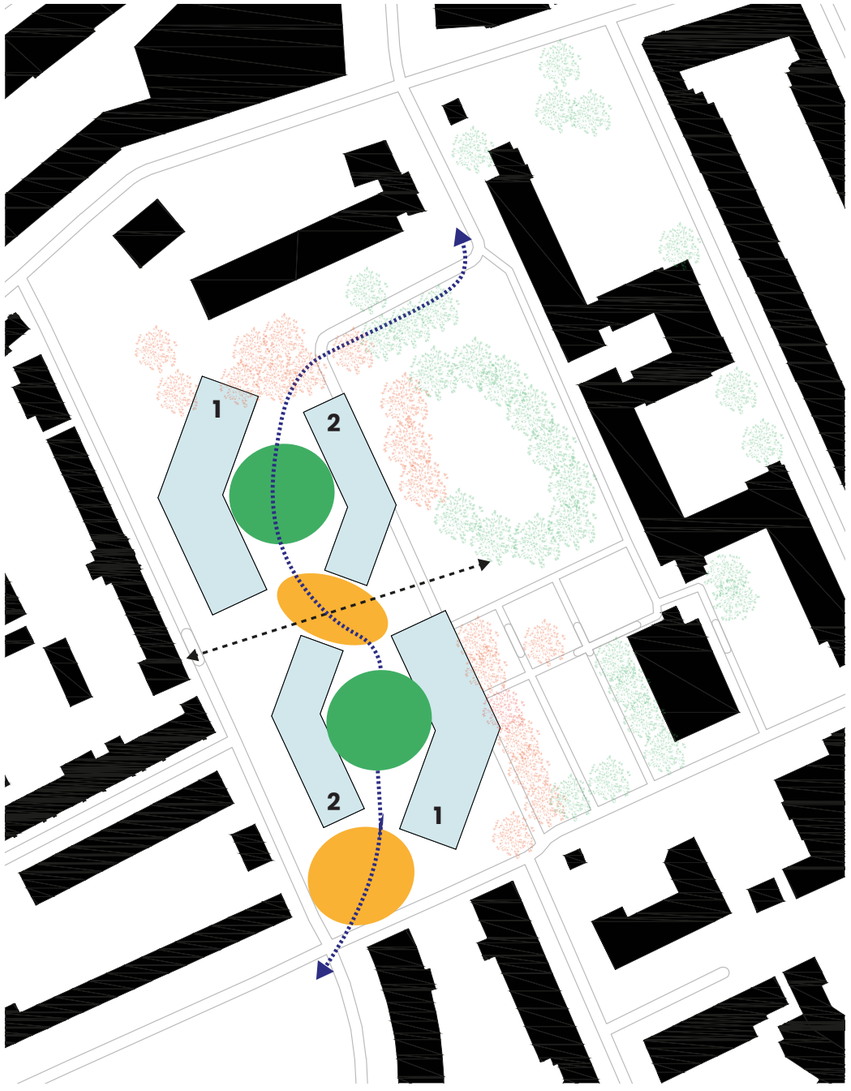


Mass Study 2.4

Mass Study 4 introduces completely new building shapes and uses these forms exclusively throughout the plan. This uniformity creates an organically flowing route through the community, shaped by the arrangement of the unique structures. The design features two calmer garden areas and two busier squares, each area has a specific role in fostering community interaction. The garden connect the residents of the community. One square, positioned at the intersection of the buildings, is closely connected to the park and the western neighborhood, acting as a hub for movement and connection. The other square, located on the southern edge of the plot, is linked to the neighborhood playground, encouraging interaction with the broader community. The route seamlessly connects all areas, culminating at the southern square, envisioned as a vibrant space for activities and relaxation, inviting people to stay and engage.

<u>Positives</u>
An organic route that creates a more fluid and natural flow through the community. It offers more intimate spaces and two public squares, providing a variety of gathering spots. The interesting building shapes add visual appeal, and with only four buildings, the design feels more connected. The square towards the south can be particularly inviting, fostering interaction.

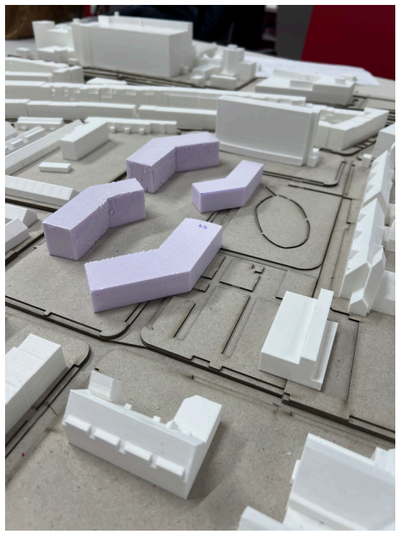
<u>Negatives</u>
The design feels divided into two distinct sides of the plot, potentially hindering cohesion. The central square is small and feels cramped, limiting its functionality as a gathering space.











LEGEND

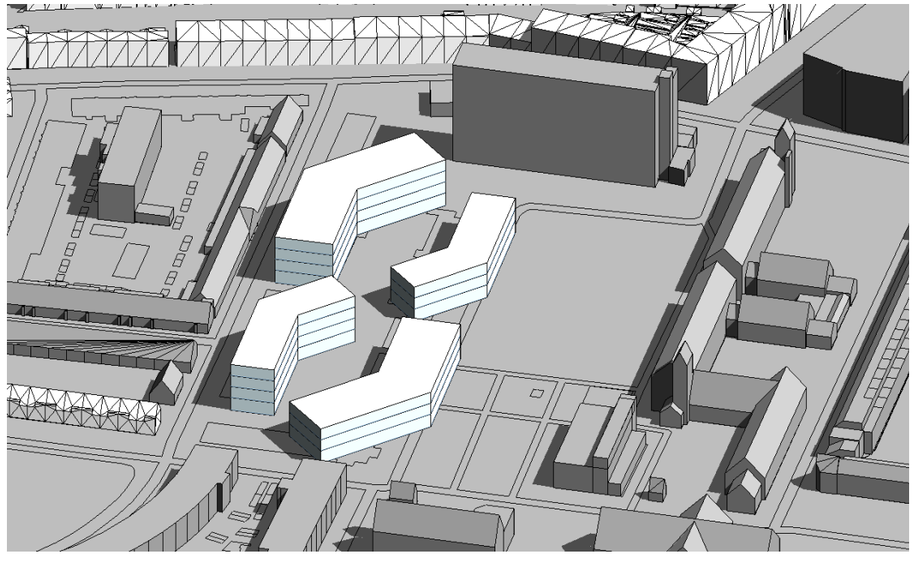
- New buildings
- 2 / 3 / 4 — Building levels
- Busy area - Square
- Calm area - Garden
- Lively route
- Visual connection
- Greenery (preserve)
- Greenery (remove)

NUMBERS

<u>Type 1</u>
Height: 14,5m or 11m
Ground Floor Area: 1000m²

<u>Type 2</u>
Height: 14,5m or 11m
Ground Floor Area: 610m²

Total Ground Floor Area: 3220m²



Week 2.6

Final Massing and Design Progress

This week, I took a new approach to the mass study by starting from the public space, ensuring that the design was shaped around accessibility and interaction from the outset. By combining this strategy with the strengths of the previous mass studies, I refined the spatial organization to better suit the needs of both residents and the surrounding neighborhood. Additionally, I focused on defining the target groups, analyzing how different user needs could influence the spatial layout. I also explored access systems, improving circulation and connectivity. Furthermore, I revisited the program of requirements and connected the functions to each block.

This week was about bringing all elements together, creating a more cohesive and thoughtful design that aligns with both the functional and social goals of the project.

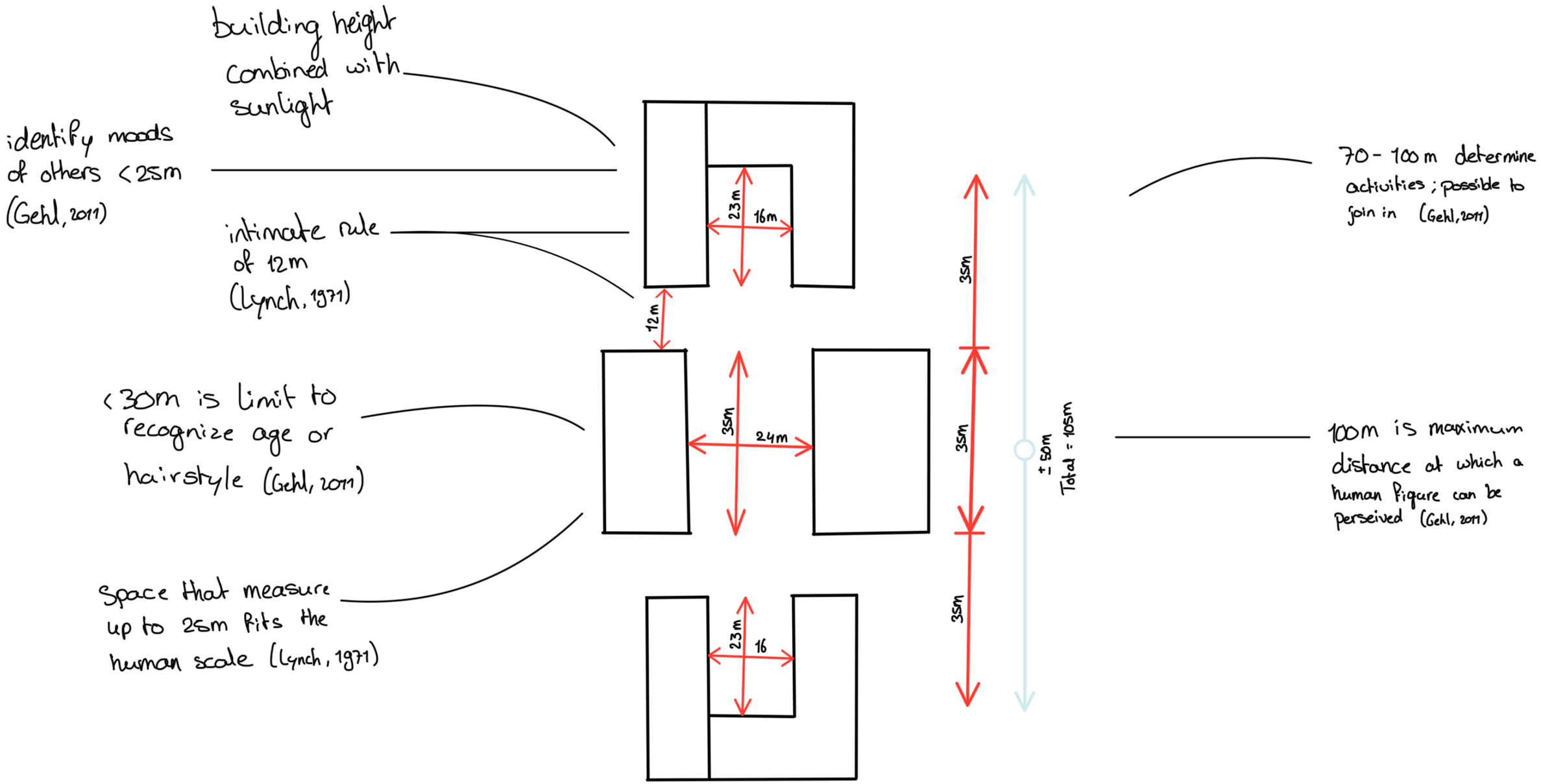
Starting with public space

The concept idea begins by focusing on public space as the starting point. After the last tutoring session, I continued searching for the "right" massing, guided by two key tips: first, to prioritize public spaces by considering how many people will use them, sightlines, and their activities; and second, to shape the buildings around these spaces with a "less is more" approach.

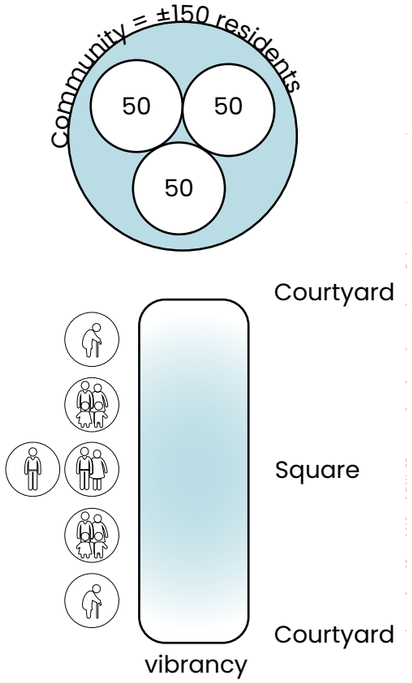
To refine this approach, I revisited literature such as *Life Between Buildings* by Jan Gehl (2011), extracting insights on distances necessary for recognition of people and determining from where people need to see each other and at what level.

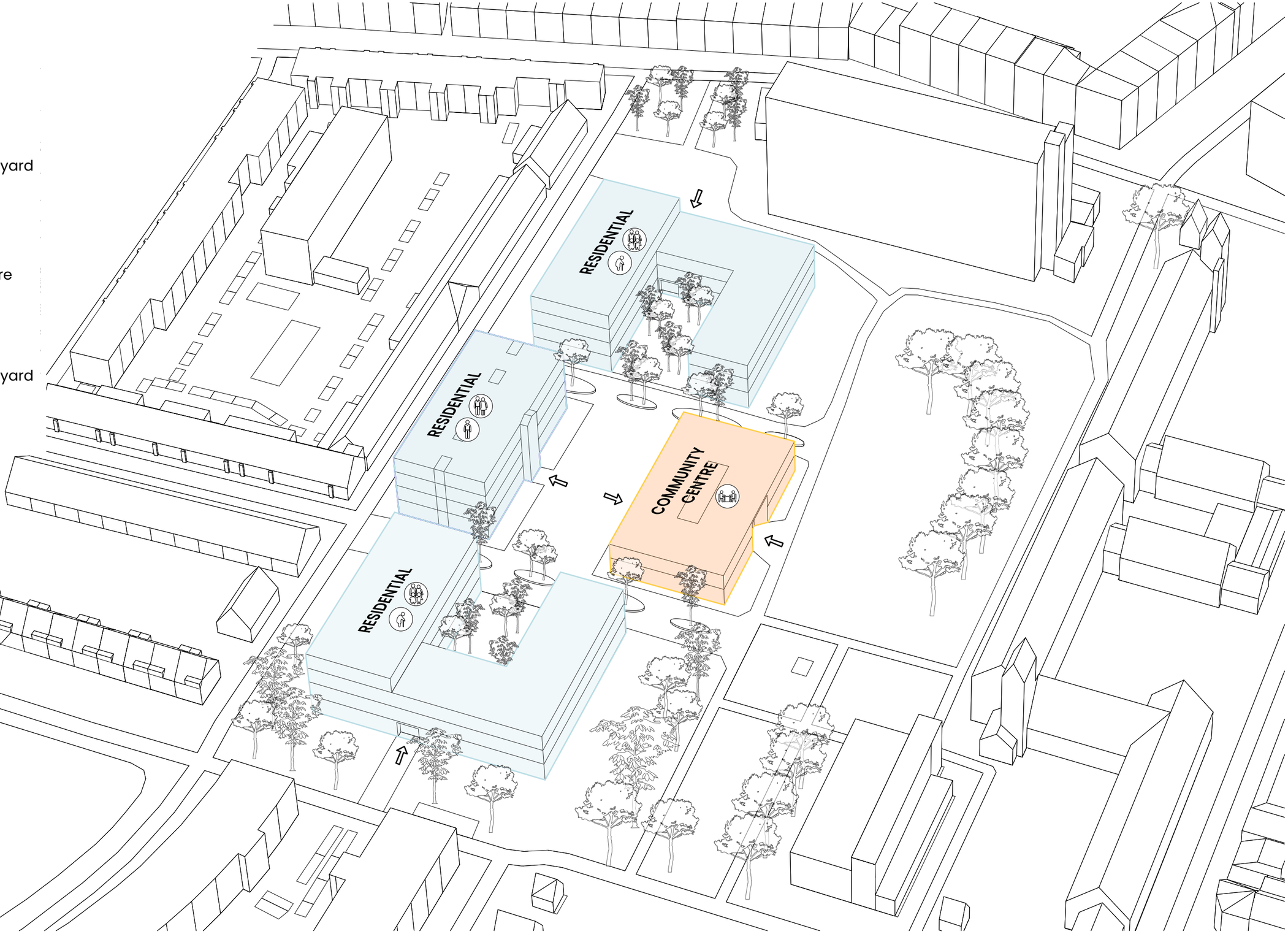
I also explored the relationship between building heights and the human scale, incorporating a formula to calculate these proportions and referencing Lynch's (1971) work on creating feelings of intimacy within streets.

Using these findings, I defined the public space layout and applied this "grid" to shape the building forms. This process integrated my initial concept for boundaries.



Target Groups





Final Massing

For the final massing, I implemented key aspects from the previous mass studies to create a well-balanced and functional design. By analyzing the strengths and weaknesses of earlier studies, I refined the spatial organization to enhance both the built environment and its connection to the surroundings.

The final design integrates the following elements:

• **Transition Zone Between Public and Semi-Public Spaces (Study 2.1)**
Creating a clear transition between fully public areas and semi-public spaces ensures a gradual transition that fosters both accessibility and a sense of community.

• **Sightlines from the Neighborhood Toward the Park (Study 2.2)**
By maintaining strategic visual connections, the design strengthens the relationship between the neighborhood and the preserved park, making it feel more inviting and accessible.

• **Providing a Variety of Gathering Spaces (Study 2.4)**
Different types of communal areas are incorporated, ranging from small, intimate courtyards to larger shared spaces, ensuring flexibility in how residents and visitors interact.

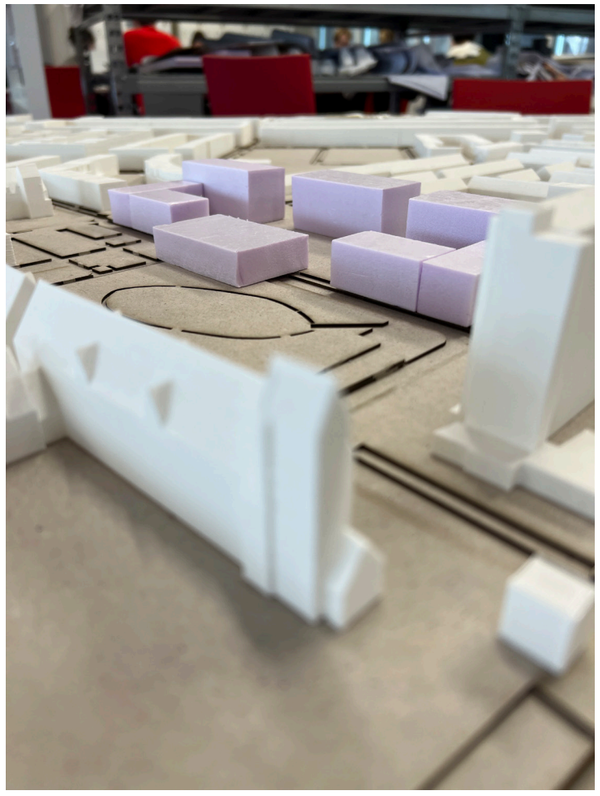
• **Fewer Buildings for a Calmer Environment (Study 2.4)**
Reducing the number of structures simplifies circulation and creates a more cohesive, tranquil setting, avoiding the fragmentation seen in earlier studies.

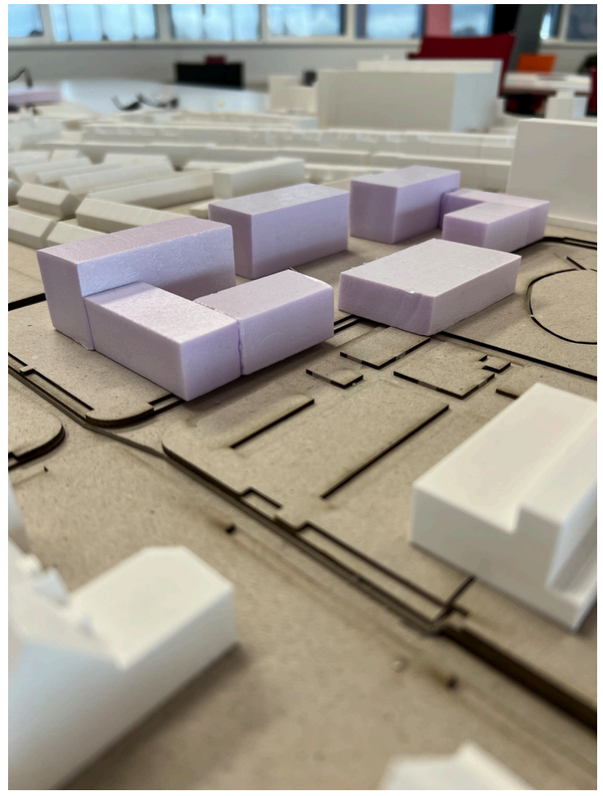
• **Considering Seeing Distances by Gehl (2011) (Public Space)**
Thoughtfully planned sightlines and distances improve wayfinding and connectivity, ensuring that residents feel oriented within the space while maintaining a sense of openness.

By integrating these aspects, the final massing achieves a strong balance between openness and enclosure, public and private, and structure and flexibility. This refined design serves as the foundation for a built environment that not only supports the needs of its residents but also strengthens its connection with the surrounding neighborhood.

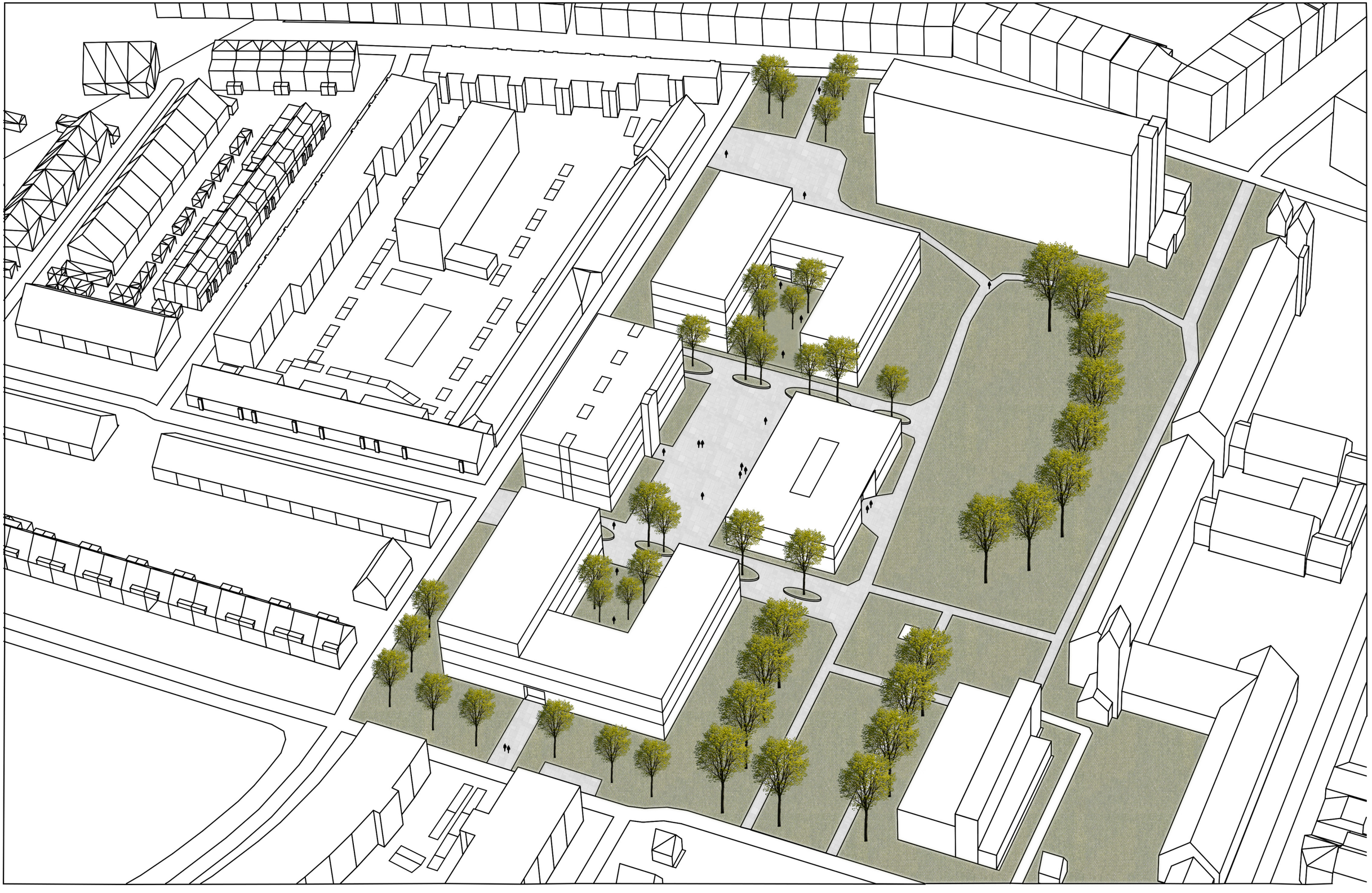






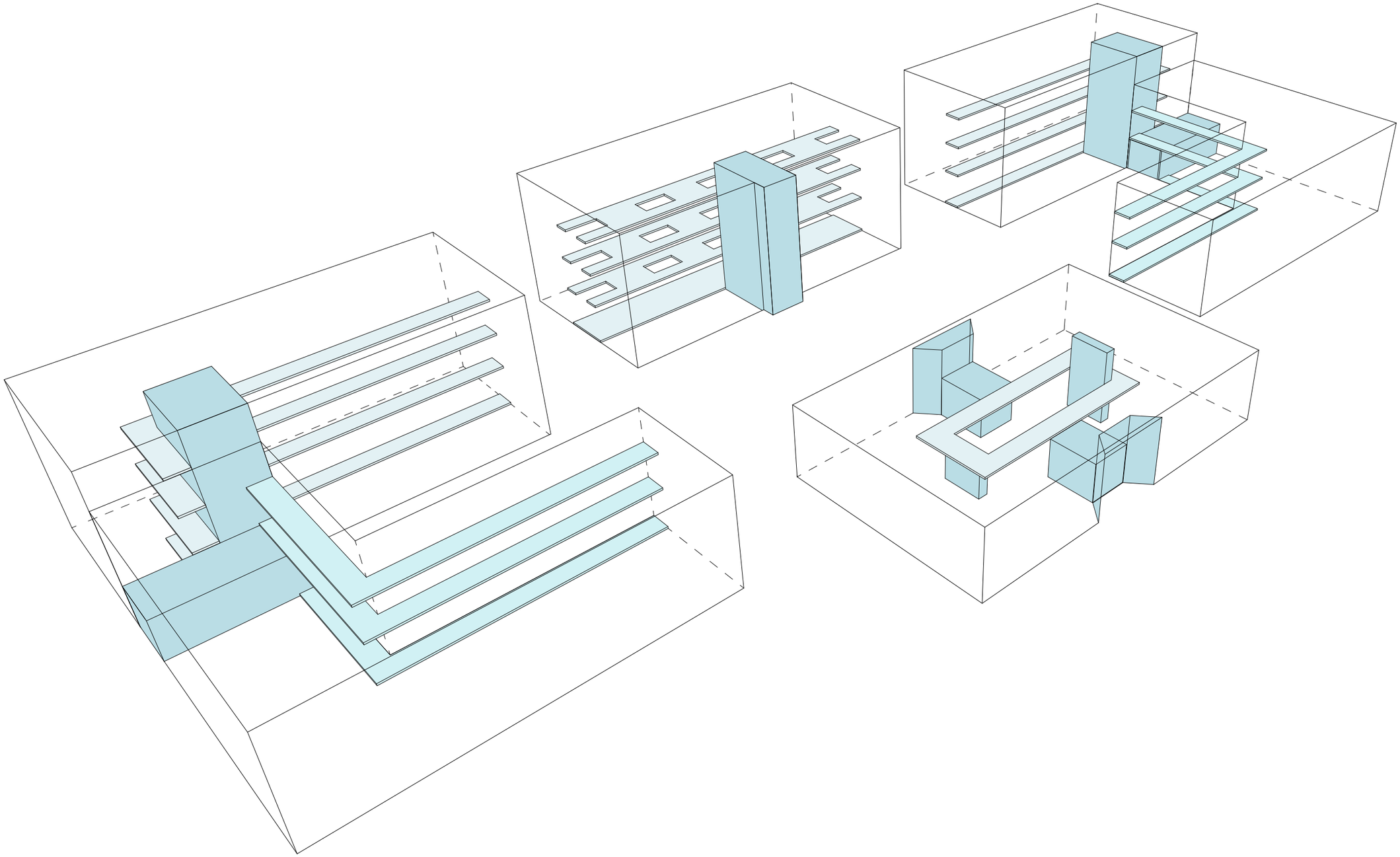


Site Plan



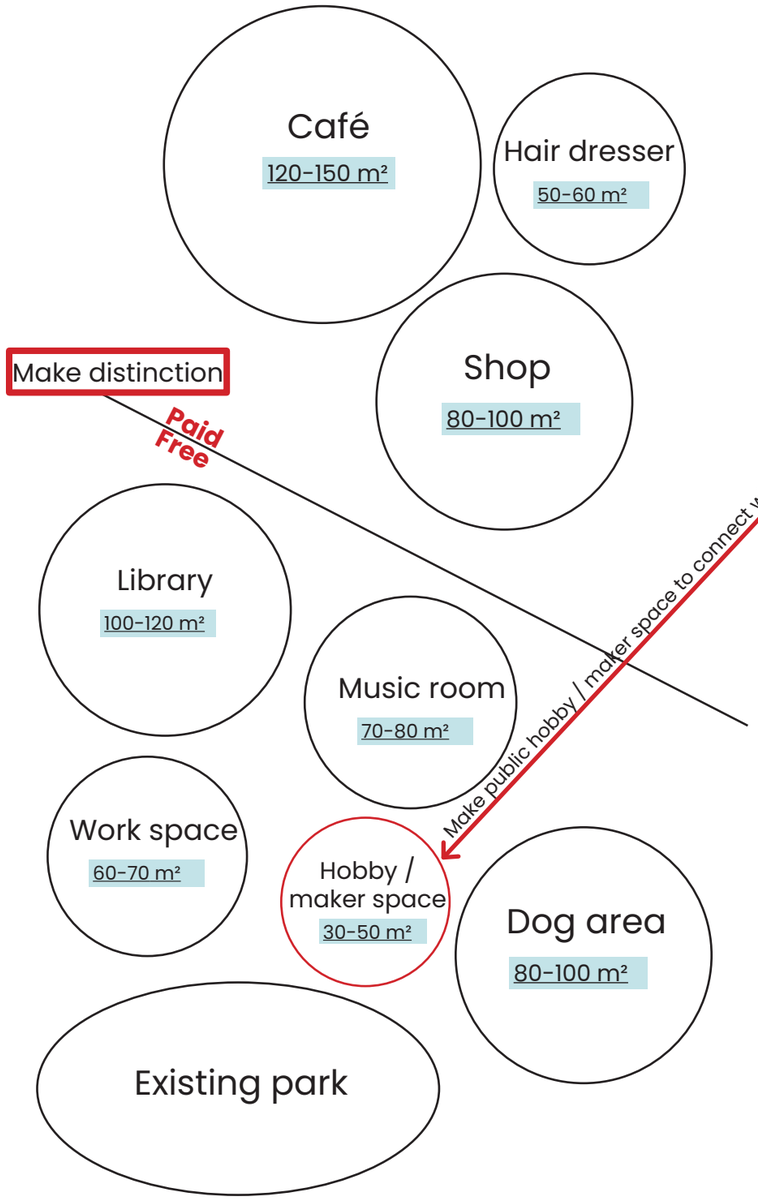
Access System

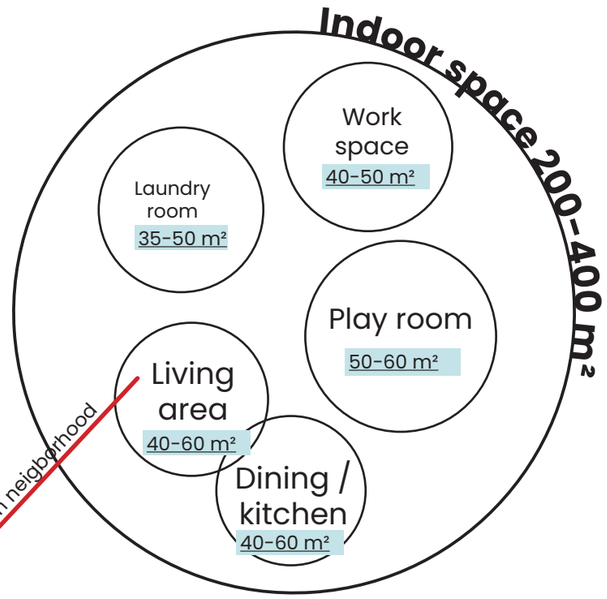
- Entrance and vertical system
- Gallery
- Corridor

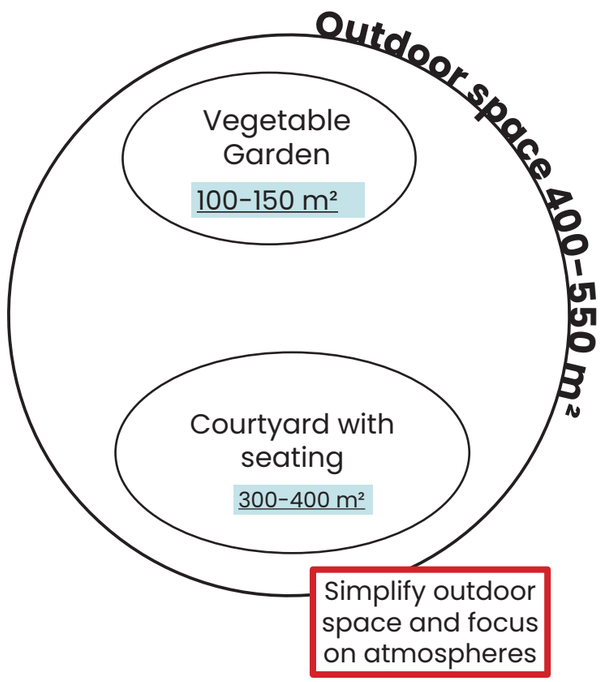


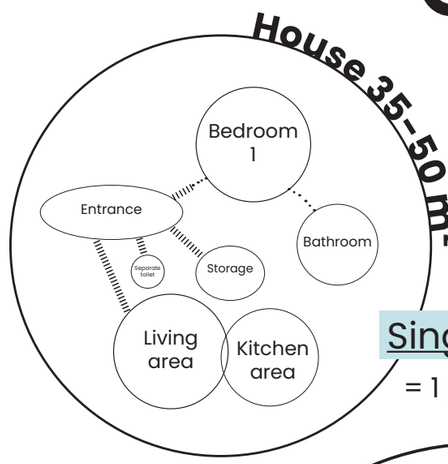
PROGRAM OF REQUIREMENTS

PUBLIC — COMMUNAL — PRIVATE

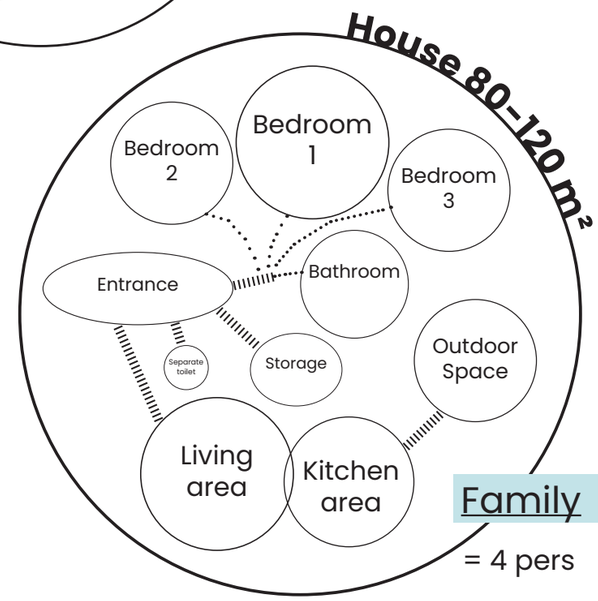




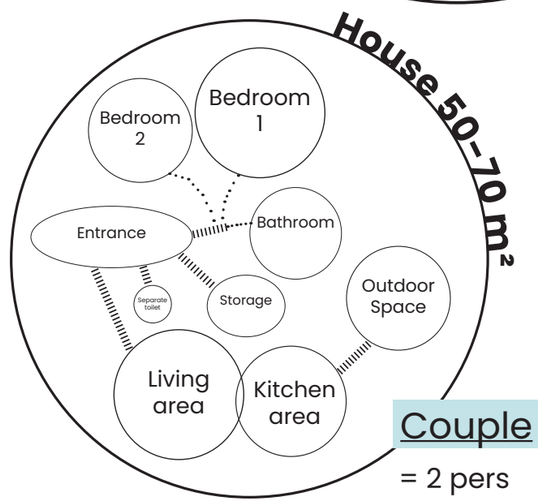




Single / Elderly
= 1 pers



Family
= 4 pers



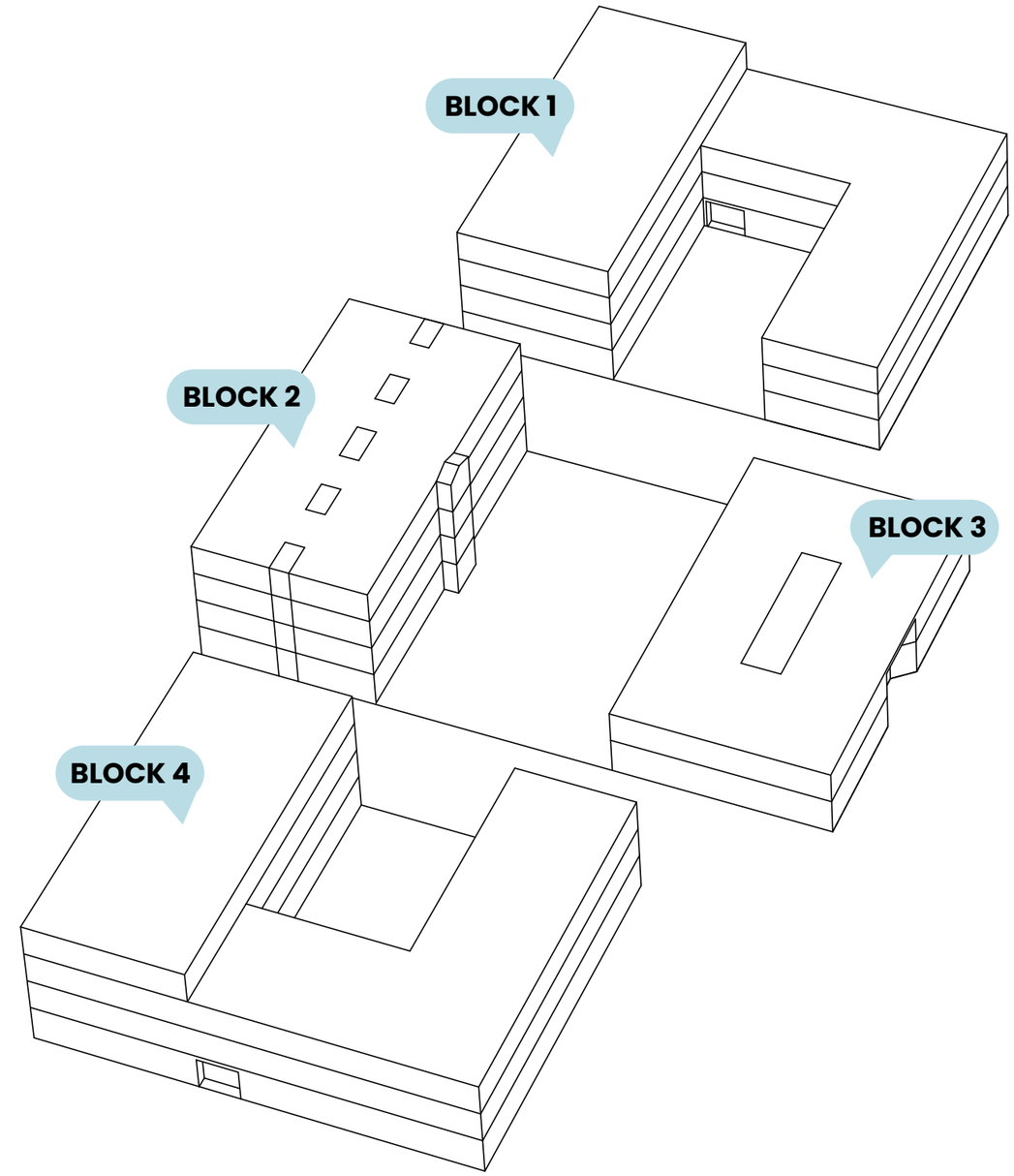
Couple
= 2 pers

Minimum: 590 m²
Minimum: 730 m²

07-01-2025

Program per Block

	Block 1 + 4	Block 2	Block 3
Main funtion	Residential	Residential	Community centre
Target group	Elderly, families	Singles, couples	Community members and neighborhood
Outdoor spaces	Communal garden, balconies	Balconies, public square	Rooftop garden
Indoor communal spaces	Living room and kitchen, laundry, playroom	Living room and kitchen, laundry, workplaces	Co-working places, library, music room, multifunctional space, hobby/ maker space
Paid facilities			Café, hairdresser, small shops
Housing types	Apartments 50-120m^2	Apartments 35-70m^2	
Access system	Corridor and Gallery	Corridor in atrium	Central staircase
Entrance	One, from outer side block to courtyard	One, on square side	Two; on square and park side



Tutoring Takeaways
- Have a look at the street between your plan and the existing row housing; what is going to happen here?
- With the higher part of blocks 1 and 3 orientated toward the sun, what is the effect on courtyard?

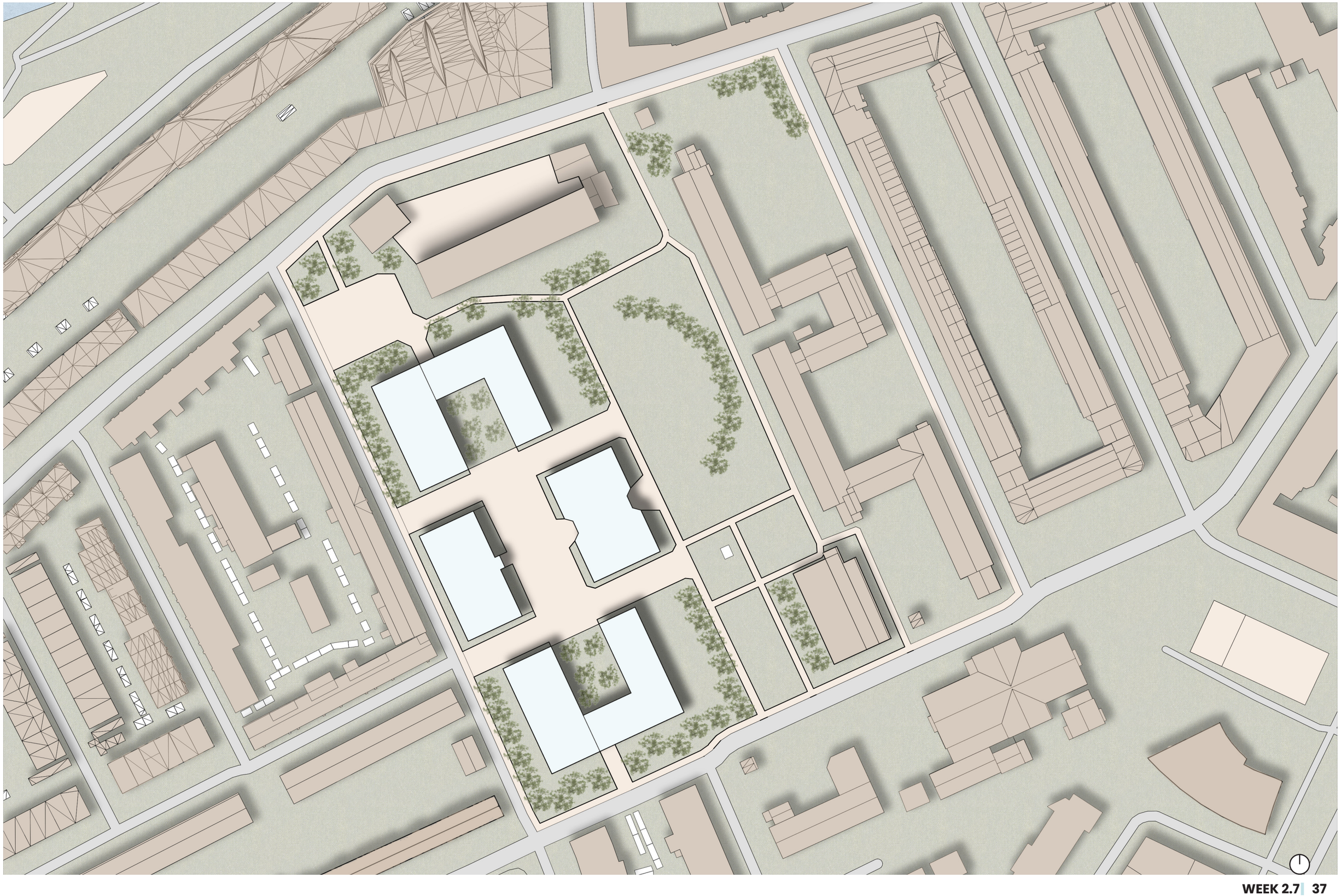
Week 2.7

Development: Masterplan

This week, I focused on further refining the masterplan, ensuring that all elements worked together cohesively. A key aspect was identifying different atmospheres within the plan, creating distinct spatial experiences that cater to both residents and the surrounding neighborhood. In addition, I defined the entrances and parking locations, optimizing accessibility while maintaining a pedestrian-friendly environment. To better understand the vertical relationships between the new development and its surroundings, I created profile sections. Another major milestone was defining the final program of requirements. This allowed me to connect apartment types and specific programs to each building block, ensuring a well-balanced mix of housing and communal spaces.

This week's work was crucial in bringing the masterplan to a more developed stage, integrating spatial qualities, accessibility, and programmatic clarity into a cohesive design.

Master Plan



ATMOSPHERES

1 SEMI-PRIVATE GARDEN

Offers a serene and inviting atmosphere, blending openness with a sense of enclosure. Lush greenery creates a natural sanctuary where residents can immerse themselves in a calm and tranquil environment. It fosters quiet moments of relaxation while encouraging connection and interaction among building residents, making it a peaceful retreat within the community.



(APM architecture, nd)



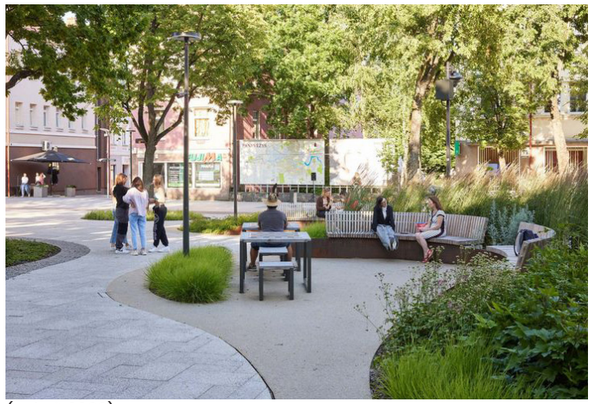
(brickvisual, 2016)



(S2L, n.d.)

2 PUBLIC PARK

Is a vibrant and welcoming space that preserves its greenery while enhancing its functionality. An improved dog area with engaging play equipment ensures a fun and active experience for pets and their owners. Small seating areas are placed throughout, providing spots for relaxation and socializing. An play area offers anenvironment for children, making the park a lively and inclusive space for the entire community.



(Tukaj, 2022)



(Oxvisual studio, n.d.)



(Burghout, 2023)

3 PUBLIC SQUARE

A dynamic and versatile space designed to bring people together. Its open layout supports multifunctional use, hosting events like markets and collective barbecues that foster community interaction. A café terrace adds a lively and inviting touch, while ample seating encourages relaxation and socializing. It unites the sub-communities and becomes a central hub for building connections and nurturing a sense of belonging within the larger community.



(Lincoln Square Ravenswood Chamber of Commerce, 2025)



(Larsen, nd)



(Project for Public Spaces, 2024)

4 CONNECTING PATH

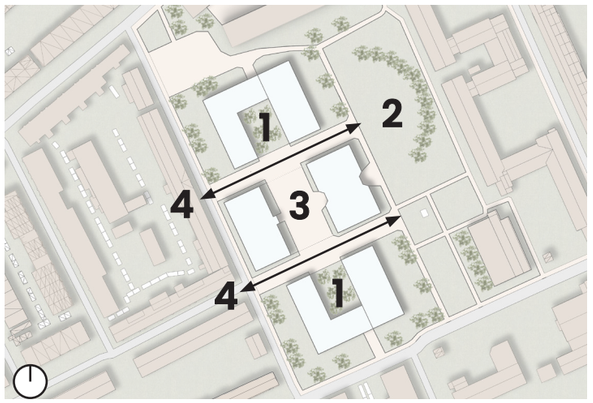
Serves as a vibrant connecting path that seamlessly blends functionality and community engagement. Lined with greenery and supported by seating, it invites residents and visitors to pause and enjoy the surroundings. The 'route' ensures smooth movement through the space. The lively plinth further enhances the atmosphere, creating a dynamic and inviting connection between the public square and the semi-private garden.



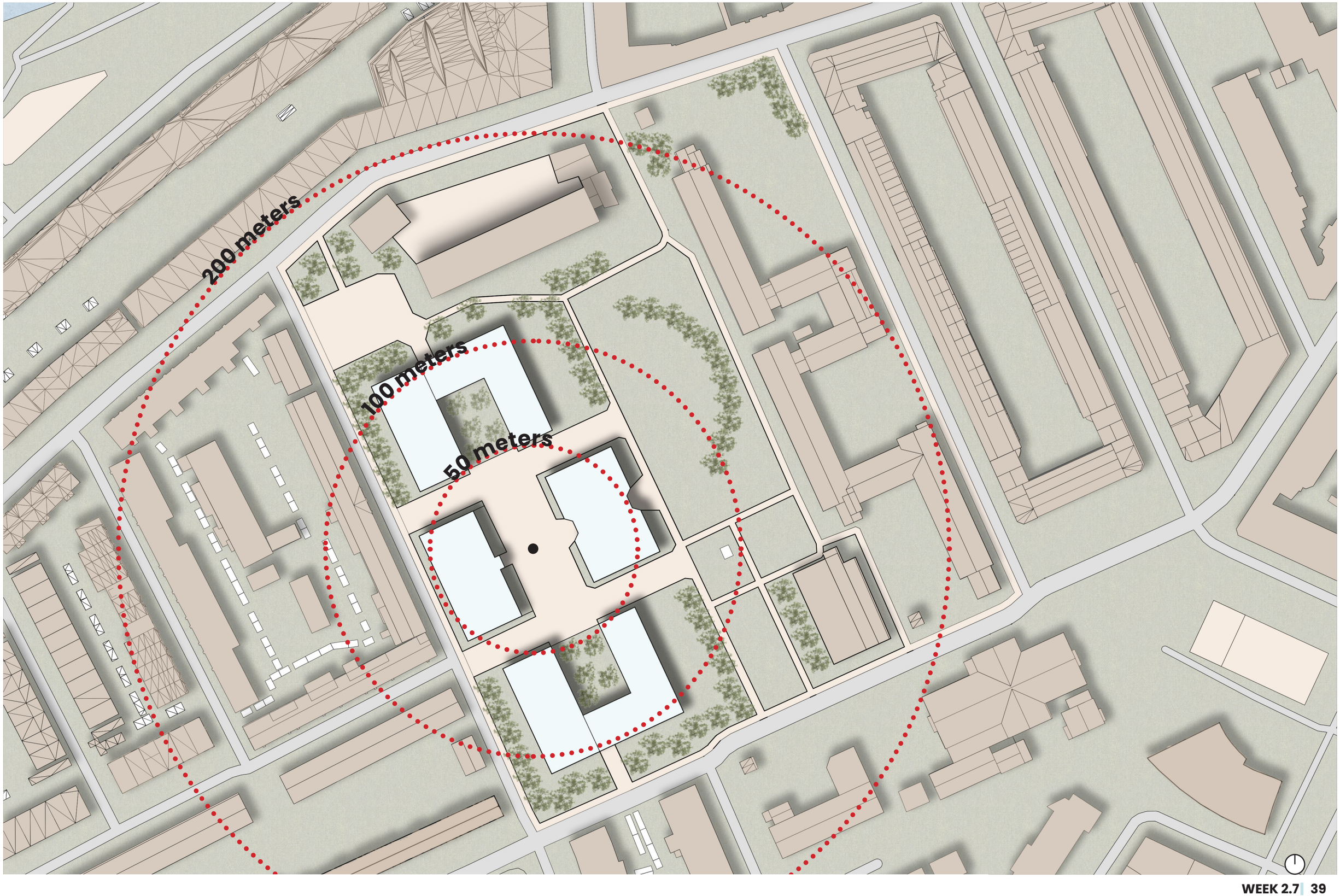
(mooool, n.d.)



(CGarchitect, 2020)



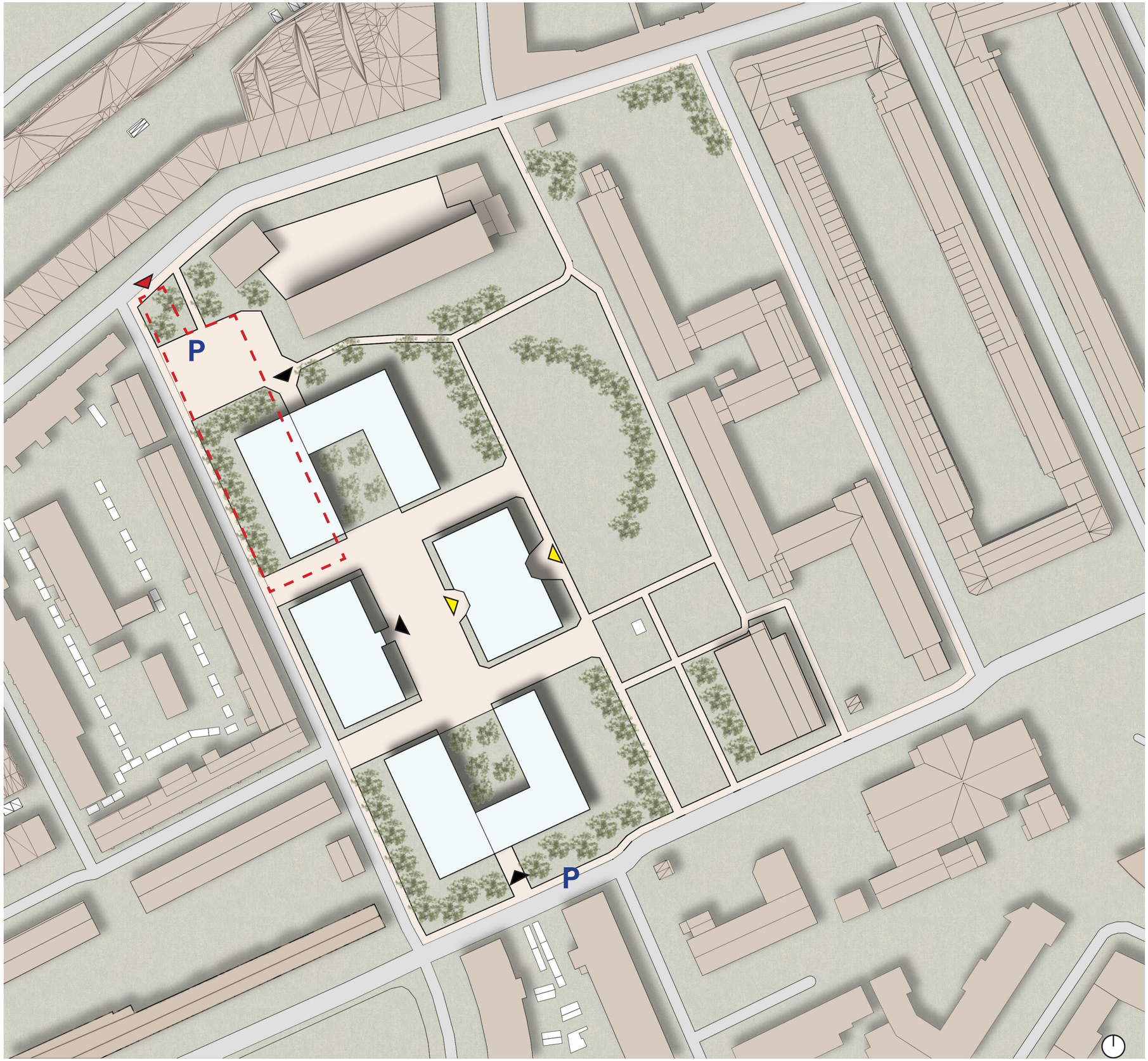
Walking Distance



Entrances and Parking

The new masterplan is designed to ensure accessibility, inclusivity, and seamless connectivity between different user groups and key areas. The entrances are strategically placed to cater to the needs of various residents and visitors. Families and elderly individuals, concentrated in block 1 and 4, will have a dedicated entrance located on the outside of the complex, providing a sense of privacy and easy access. Couples and singles, concentrated in block 2, will enjoy a more central entrance directly connected to the square, fostering interaction and community engagement. The community center, the hub for social activities, is accessible from both the square and the adjacent park, creating a dynamic link between outdoor and indoor communal spaces.

Parking solutions accommodate different mobility needs. Disability parking is available above ground on the north side and along the street on the south, offering convenient access for those requiring additional support. Additional parking spaces are situated underground beneath Block 1. Access through ground level is within the transition zone between Block 1 and 2. The masterplan emphasizes a harmonious balance between functionality, accessibility, and community-oriented design.



Legend

- New massing
- Entrance residential
- Entrance community center
- Entrance parking
- Underground parking garage
- P Above ground parking

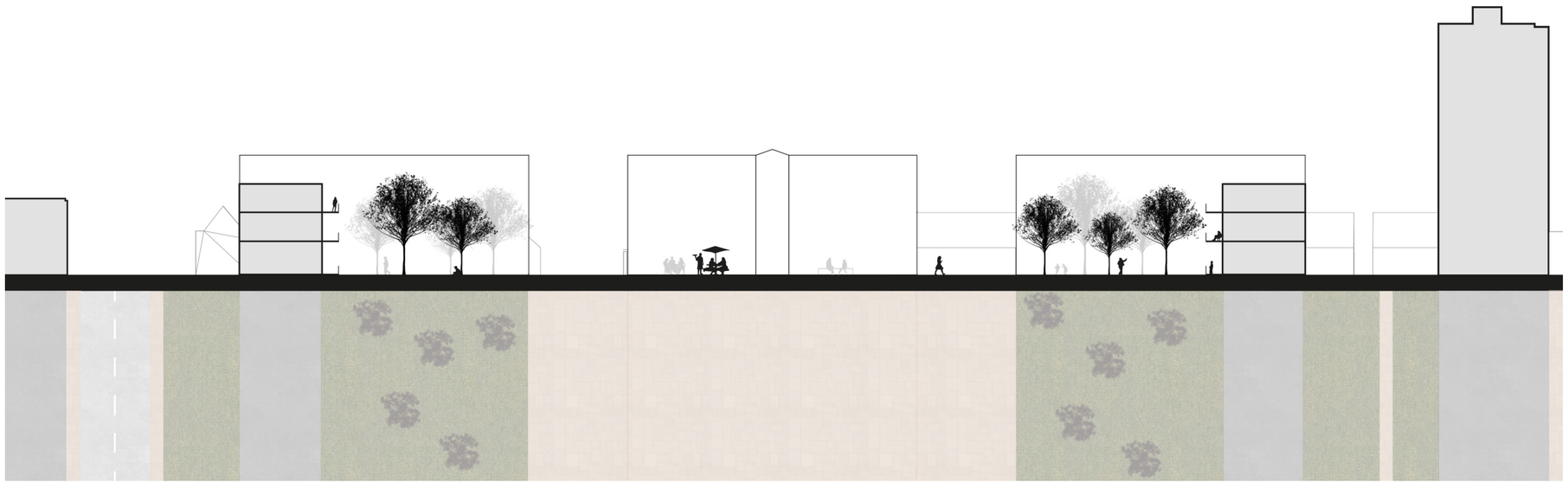
Profiles

The sections illustrate the relationship between the new massing and its surroundings.

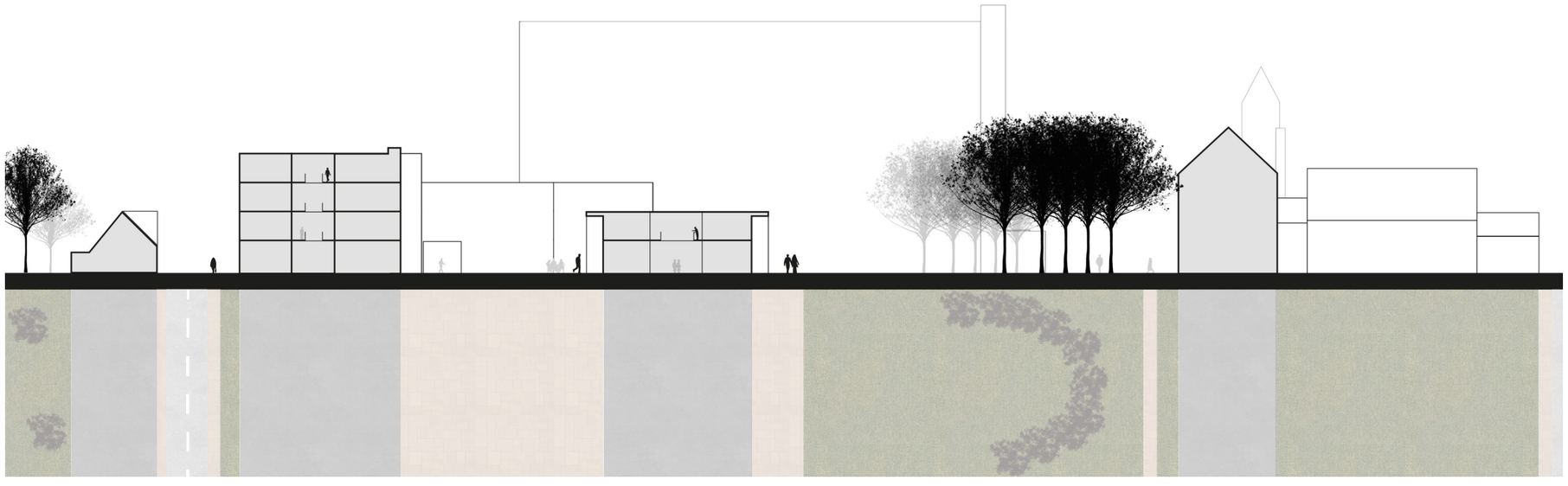
Section A-A
This profile highlights the green buffer zones surrounding the buildings, ensuring a smooth transition between the street, the high-rise flat, and the new development. These landscaped areas serve as soft boundaries, balancing privacy for residents while maintaining openness toward the public realm. The connecting path through the masterplan also reinforces the connection between the neighborhood and the park. By strategically placing these zones, the masterplan fosters a sense of flow and accessibility, rather than abrupt separations between different spatial elements.

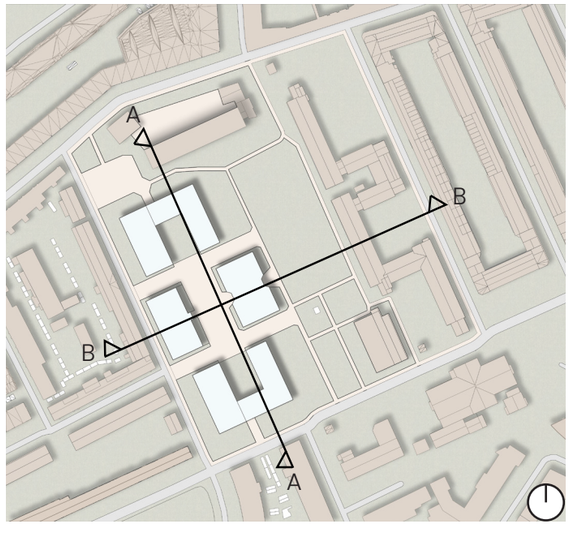
Section B-B
This profile demonstrates how the existing trees surrounding the dog park exceed the height of the buildings, preserving a green canopy that maintains a sense of enclosure within the site. It also emphasizes the large public spaces included in the masterplan, ensuring that shared spaces remain a focal point of the design. Additionally, the community center's placement is also visible, reinforcing its role as a key hub for interaction within the neighborhood.

Section A-A



Section B-B





FINAL - PROGRAM OF REQUIREMENTS

PUBLIC — COMMUNAL — PRIVATE

Café
120-150 m²

Hair dresser
50-60 m²

Shop
80-100 m²

Paid
Free

Library
100-120 m²

Music room
70-80 m²

Work space
60-70 m²

Hobby / maker space
30-50 m²

Dog area
80-100 m²

Existing park

Minimum: 590 m²
Maximum: 730 m²

Indoor space 200-400 m²

Laundry room
35-50 m²

Work space
40-50 m²

Play room
50-60 m²

Living area
40-60 m²

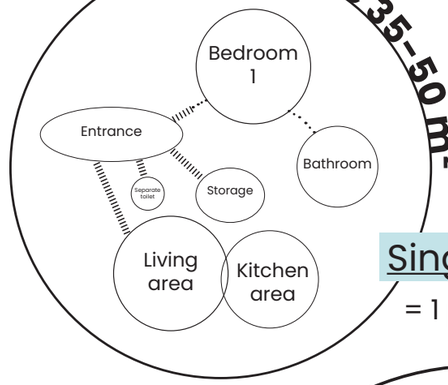
Dining / kitchen
40-60 m²

Outdoor space 400-550 m²

Vegetable Garden
100-150 m²

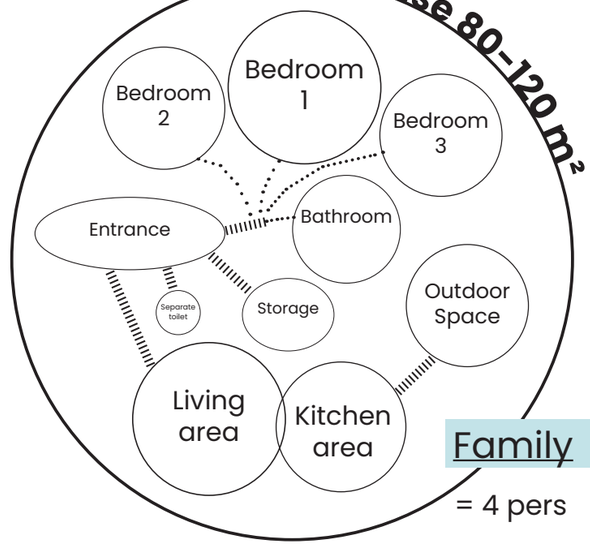
Courtyard with seating
300-400 m²

House 35-50 m²



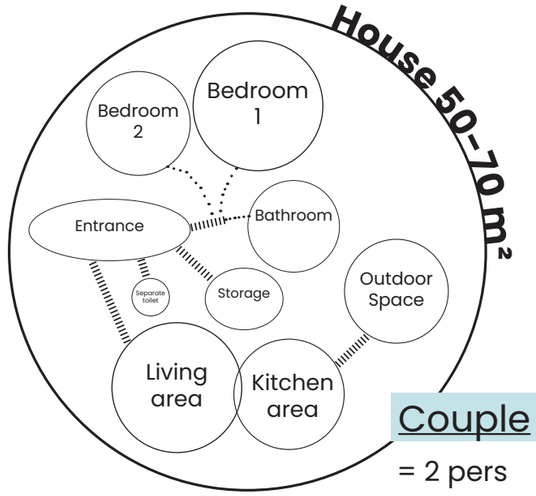
Single / Elderly
= 1 pers

House 80-120 m²



Family
= 4 pers

House 50-70 m²

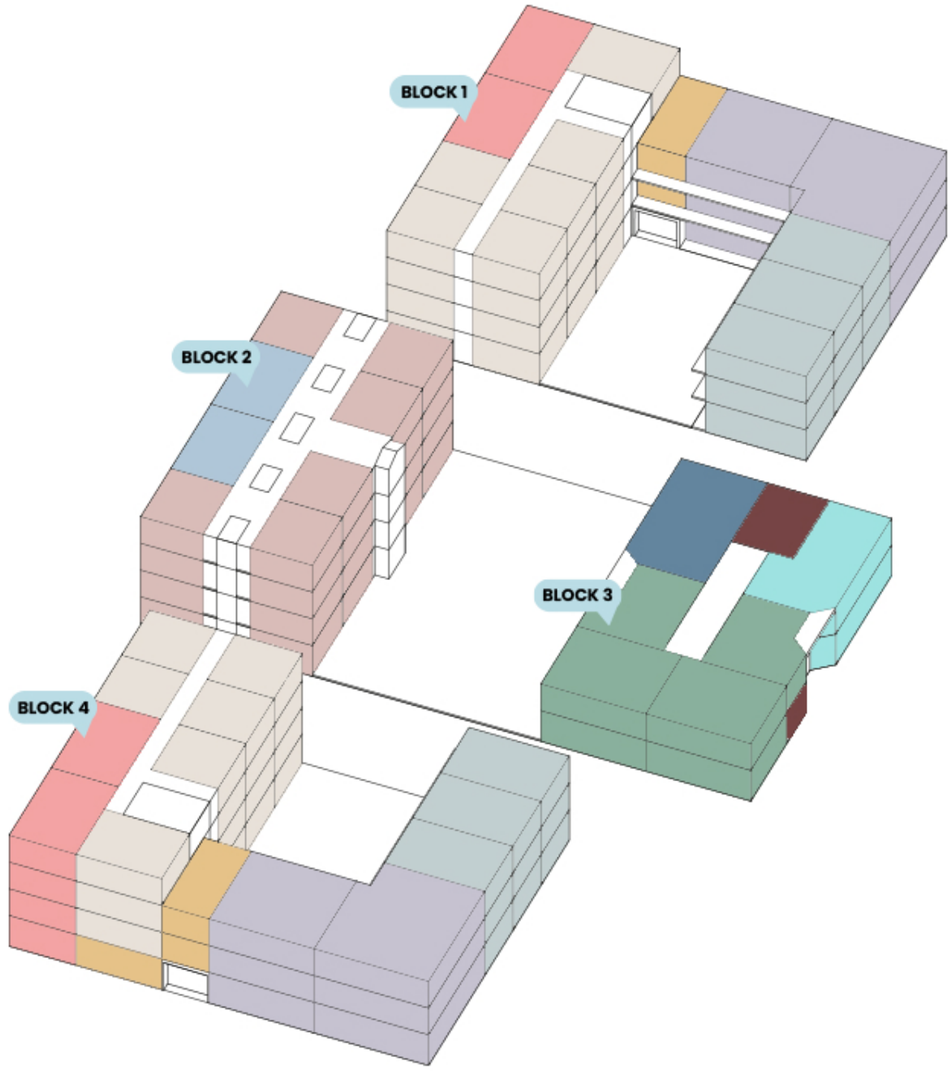


Couple
= 2 pers

07-01-2025

Program per Block

	Block 1 + 4	Block 2	Block 3
Main funtion	Residential	Residential	Community center
Units (124)	46	31	
Target group	Elderly, families	Singles, couples	Community members and neighborhood
Outdoor spaces	Communal garden, balconies	Balconies, public square	Rooftop garden
Indoor communal spaces	Living room and kitchen, laundry, playroom	Living room and kitchen, laundry, workplaces	Downstairs: -hobby/maker space -library Upstairs: -co-working places -music room, -multifunctional space
Paid facilities			Downstairs: -café -hairdresser -small shops
Housing types	Apartments 50-120m²	Apartments 35-70m²	
Access system	Corridor and Gallery	Corridor in atrium	Central staircase
Entrance	One, from outer side block to courtyard	One, on square side	Two; on square and park side



Legend - residential buildings

- Communal space
- Family - 3 bed
- Family - 2 bed
- Couple - 2 bed
- Elderly - 2 bed
- Elderly - 1 bed
- Single - 1 bed

Legend - community center

- >120m²
- 100-120m²
- 80-100m²
- 60-80m²

Tutoring Takeaways

- One side orientation for the elderly, is this ideal for them since they are often home all day?
- What view do you give the apartments?
- Entrances of blocks 1 and 3 only on the 'ouside' of the building or also access through courtyard?
- Good that you connect the communal space to the access system.

Week 2.8

Development: Mirror Blocks 1 and 3

Finalizing the massing of the site by mirroring Blocks 1 and 3, which helped to create a gradual transition visible in the section drawings. This mirrored approach led to a more cohesive layout, where the buildings' heights and distribution now create a smoother flow between different zones of the masterplan. I also worked on defining the apartment types, ensuring a wide variety to make the development more inclusive, offering options for families, elderly residents, couples, and singles. Additionally, I finalized the access system of the blocks, ensuring that circulation is intuitive and seamlessly connects residents.

The final massing and program distribution now reflect a balance between functionality, accessibility, and cohesion, setting the foundation for the next stages of the project.

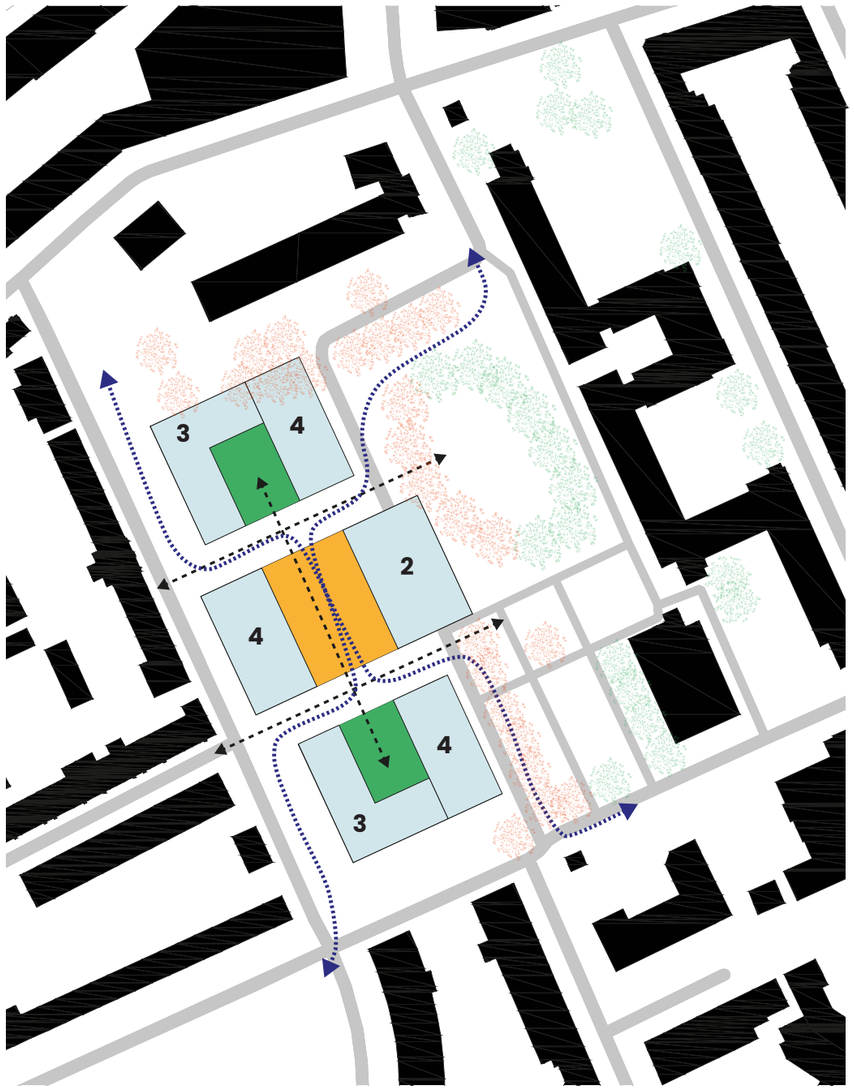
Final Massing after Mirroring

The decision to mirror Blocks 1 and 3 was informed by feedback from previous tutor sessions and a reevaluation of the spatial relationships within the masterplan.

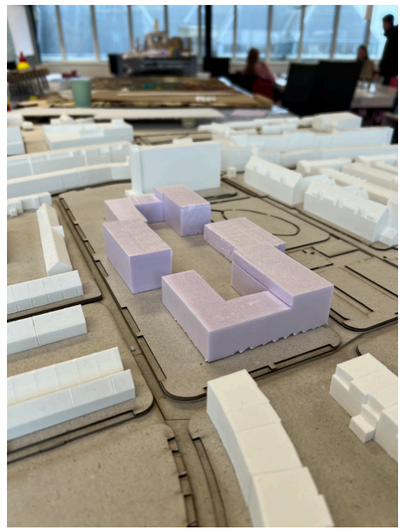
A primary consideration was the orientation of the elderly residents. By mirroring the blocks, the apartments now face either the park or the courtyard, ensuring optimal views and a stronger connection to outdoor spaces. This adjustment also improves sun orientation, allowing sunlight to better penetrate the courtyard and enhance its livability.

Additionally, it was crucial to soften the transition between the new development and the surrounding neighborhood. Instead of creating a harsh boundary, the mirrored design allows for a more seamless integration with the existing urban context. It also strategically positions the higher sections of the buildings toward the park and school, establishing a strong visual and functional connection with these public spaces. Meanwhile, the lower sections face the neighborhood, creating a gradual and cohesive transition in scale.

This mirrored approach significantly enhances livability, connectivity, and spatial harmony, ensuring that the new development not only meets the needs of the residents but also integrates smoothly with the surrounding urban environment.



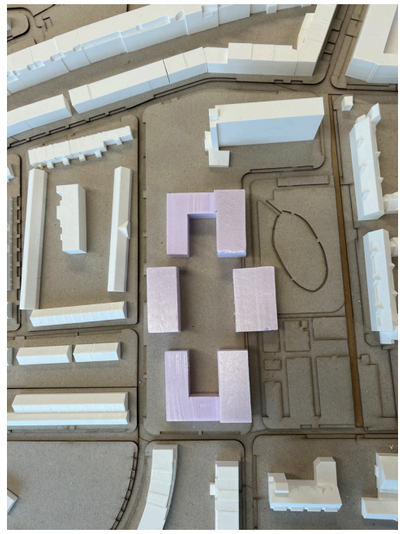




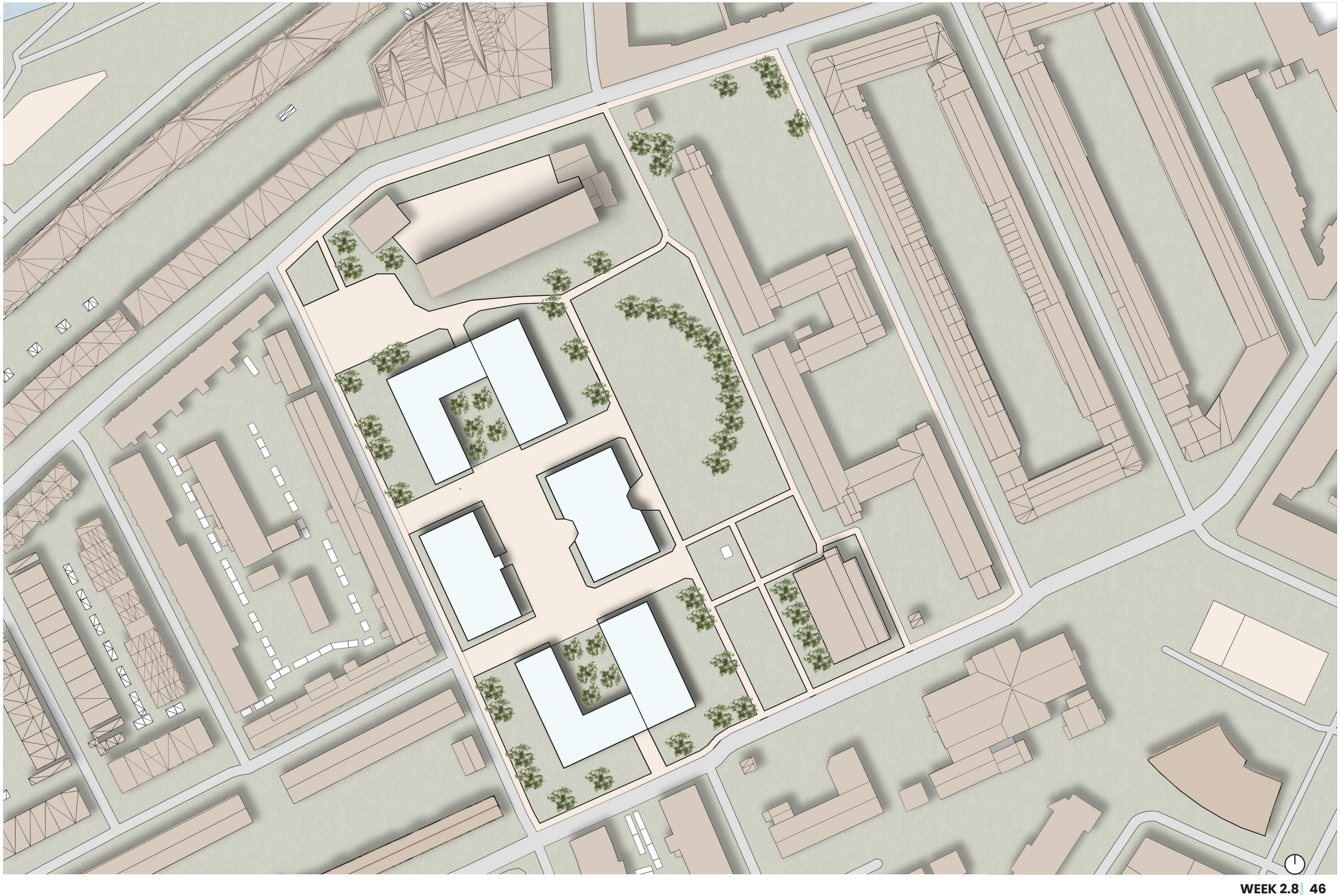








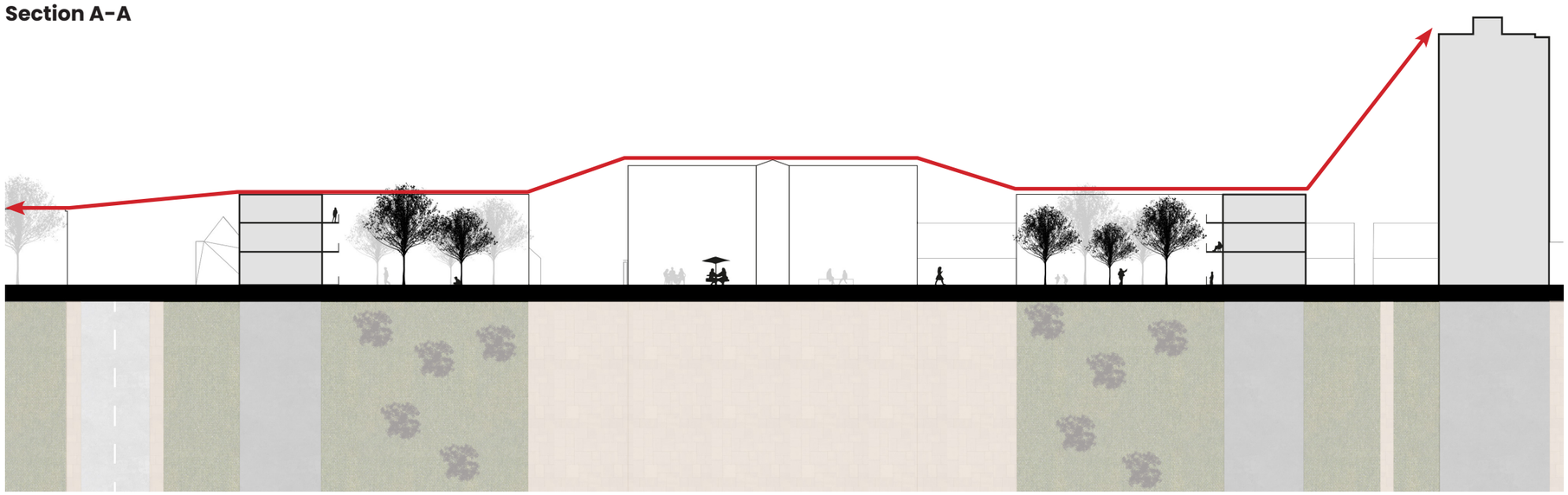
Mirroring Implemented in Masterplan



Profiles

The mirroring of Blocks 1 and 3 has significantly impacted the vertical transitions within the masterplan, especially in terms of the gradual progression of building heights. The revised sections show how the heights of the buildings transition from lower to higher across the site, creating a more cohesive and well-integrated environment.

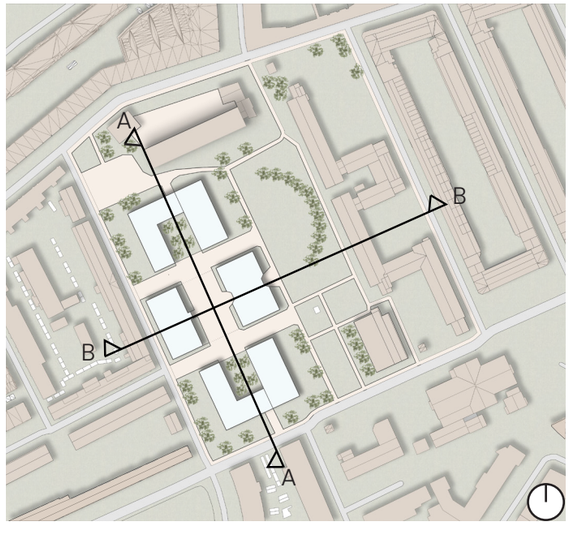
Section A-A



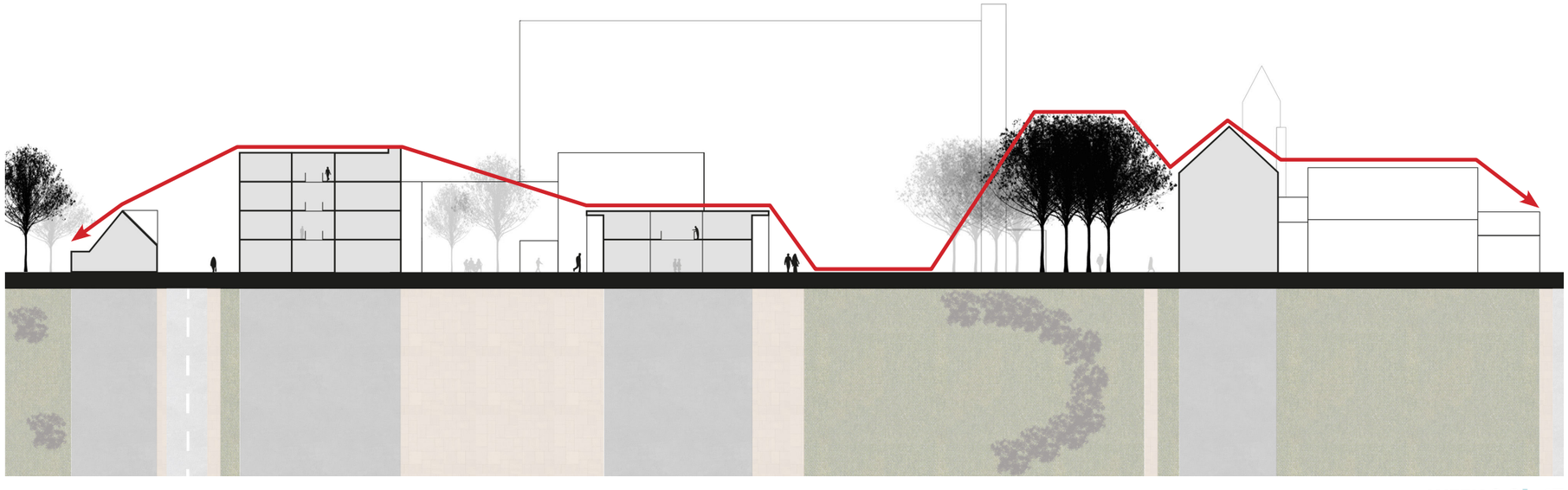
Section A-A
The building heights gradually increase, with the highest point aligning with the central public square. This ensures that the tallest section fits naturally within the larger public space, avoiding any disruptive visual impact. The transition from lower to higher buildings is particularly important around the housing areas, where the scale remains more human and comfortable. The buffer zone between the residential areas and the high-rise flat plays a critical role in softening the big height jump and helping the new development blend into the surrounding neighborhood.

Section B-B
The transition from the row housing to Block 2 is more noticeable, which serves as a key point of attention to ensure that the flow between the two areas remains seamless and connected. From block 2, the massing steps down toward the community center, creating a gentler transition to the heart of the community. Another step down occurs toward the park, preserving the openness and green space that is vital to the overall environment. As the profile continues, there's a step up due to the tall trees within the park. Finally, the profile flows over toward the school building, reinforcing the connection between the public spaces and the neighborhood.

These adjustments in height and massing help ensure that the development remains well-integrated with its surroundings while fostering a spatial harmony that enhances the experience of both residents and visitors. The changes in verticality not only improve the aesthetic cohesion of the masterplan but also provide a comfortable and thoughtful environment that responds to the needs of the community.



Section B-B



Final - Program Distribution

The final program distribution within the massing was carefully planned to ensure optimal functionality and connectivity, particularly with regard to the diverse needs of the residents and the surrounding community.

In Blocks 1 and 3, the communal space was expanded to create a larger, more connected area. This larger space not only encourages the interaction between the target groups but also creates a direct link to the courtyard and aligns seamlessly with the access system. This layout encourages greater flow between private, communal, and public spaces, fostering a sense of community while maintaining a clear and intuitive layout.

The apartment types proposed cater to various household configurations, ensuring that the development accommodates a range of living arrangements.

These include:
- Two types designed for families
- Two types for elderly residents
- One type for couples
- One type for singles

To reflect the demographic needs, the final distribution includes more single apartments than couple apartments, aligning with the trend of increasing single-person households in the city.

The community center also plays a key role in the masterplan, with spaces of varying sizes to accommodate different functions. These flexible spaces allow for a range of activities, from larger community events to smaller, more intimate gatherings, ensuring that the center can adapt to the evolving needs of the residents and the surrounding neighborhood.

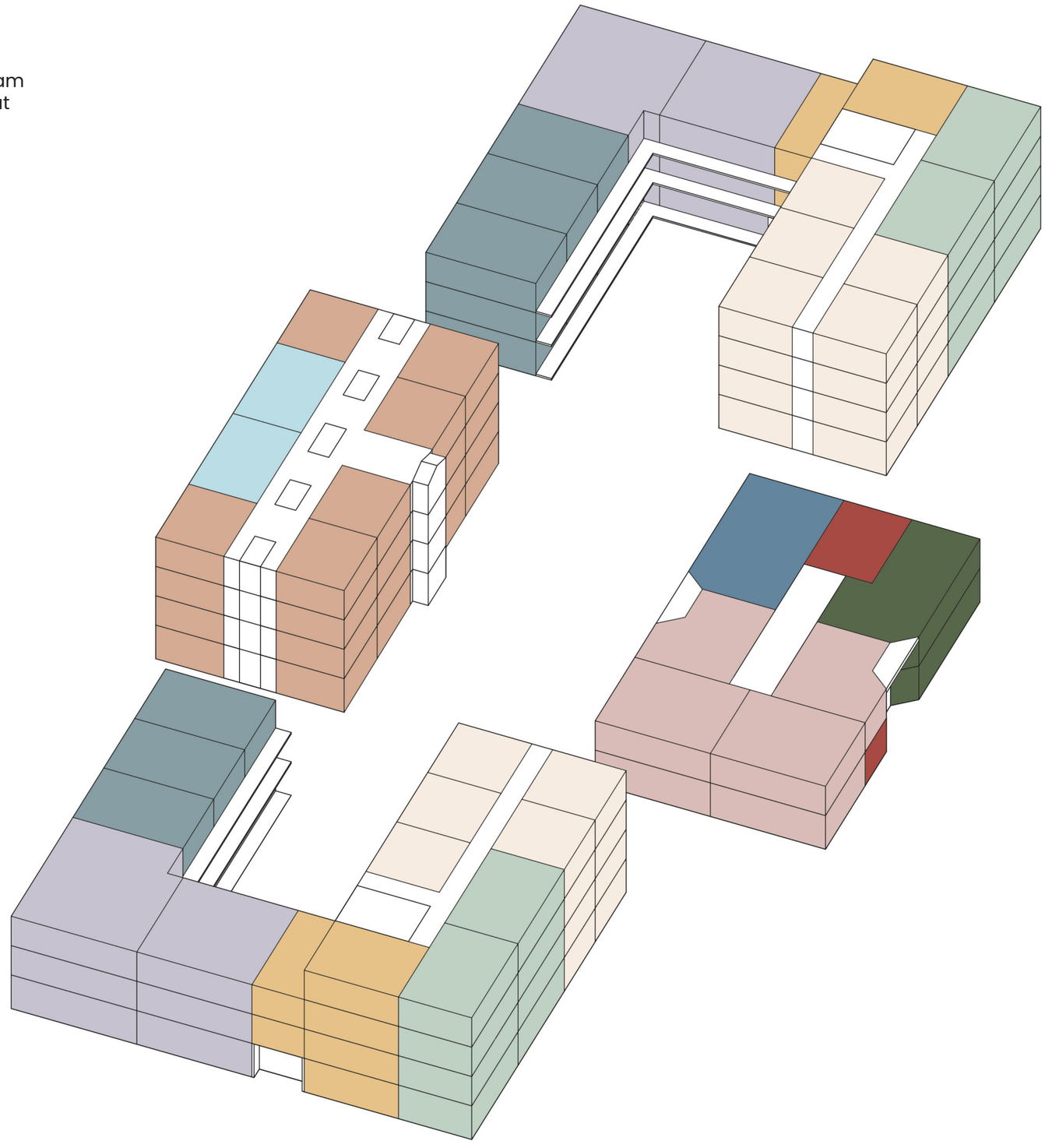
Overall, this program distribution aligns with the goal of creating a dynamic, inclusive, and functional space that supports both community and individual living needs. The careful consideration of apartment types, communal spaces, and the program within the community center ensures that the development is both practical and responsive to the future demands of its residents.

Residential buildings

- Communal space
- Family - 3 bed
- Family - 2 bed
- Couple - 2 bed
- Elderly - 2 bed
- Elderly - 1 bed
- Single - 1 bed

Community center

- >120m²
- 100-120m²
- 80-100m²
- 60-80m²



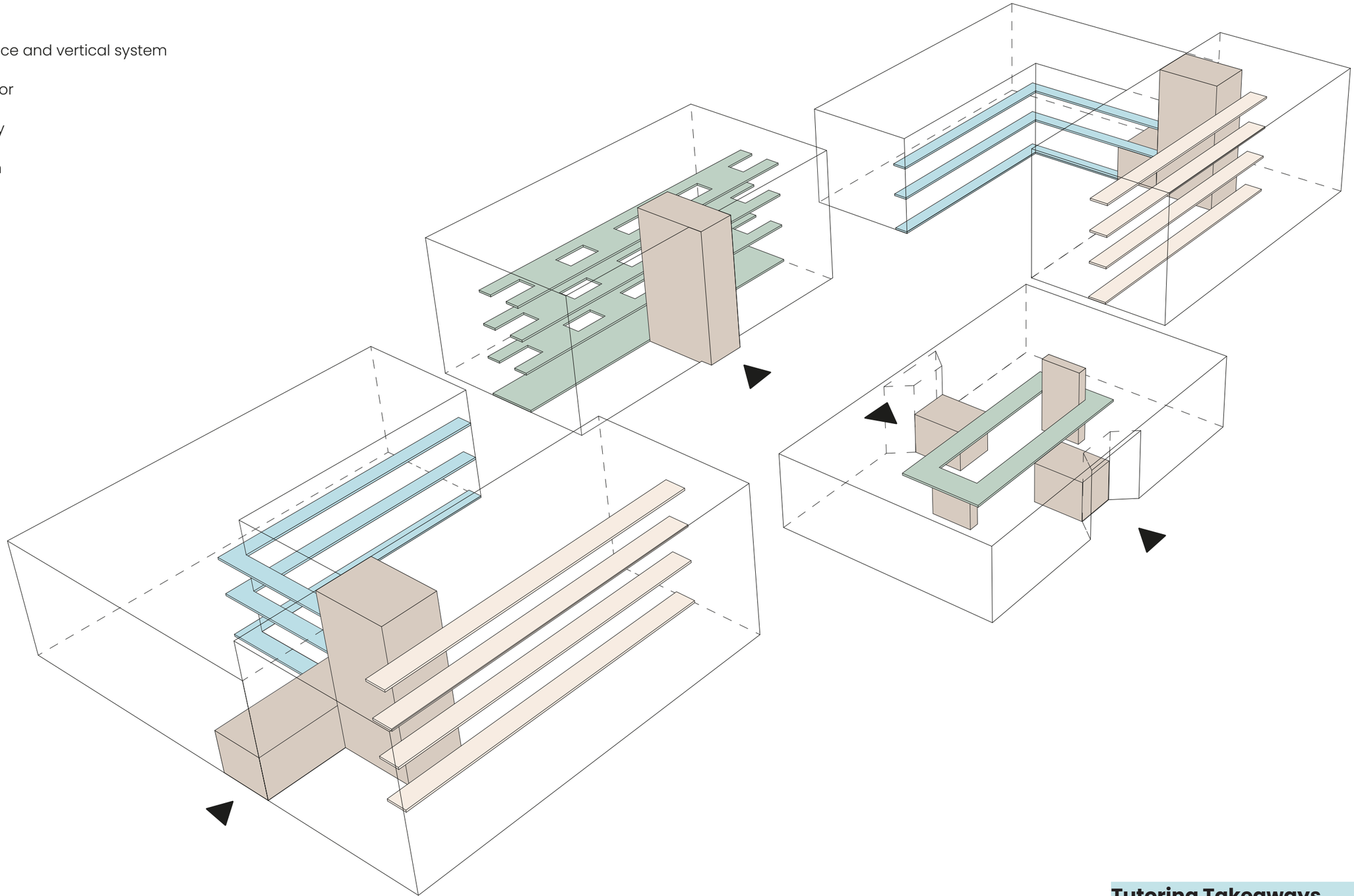
Access System

Entrance and vertical system

Corridor

Gallery

Atrium



Tutoring Takeaways

- Since this is maximum massing make sure you clearly point this out during the P2.
- Make some sketches for ideas to break this rigid forms to show at the P2.
- Show the connection with you Research and the design choices you made.

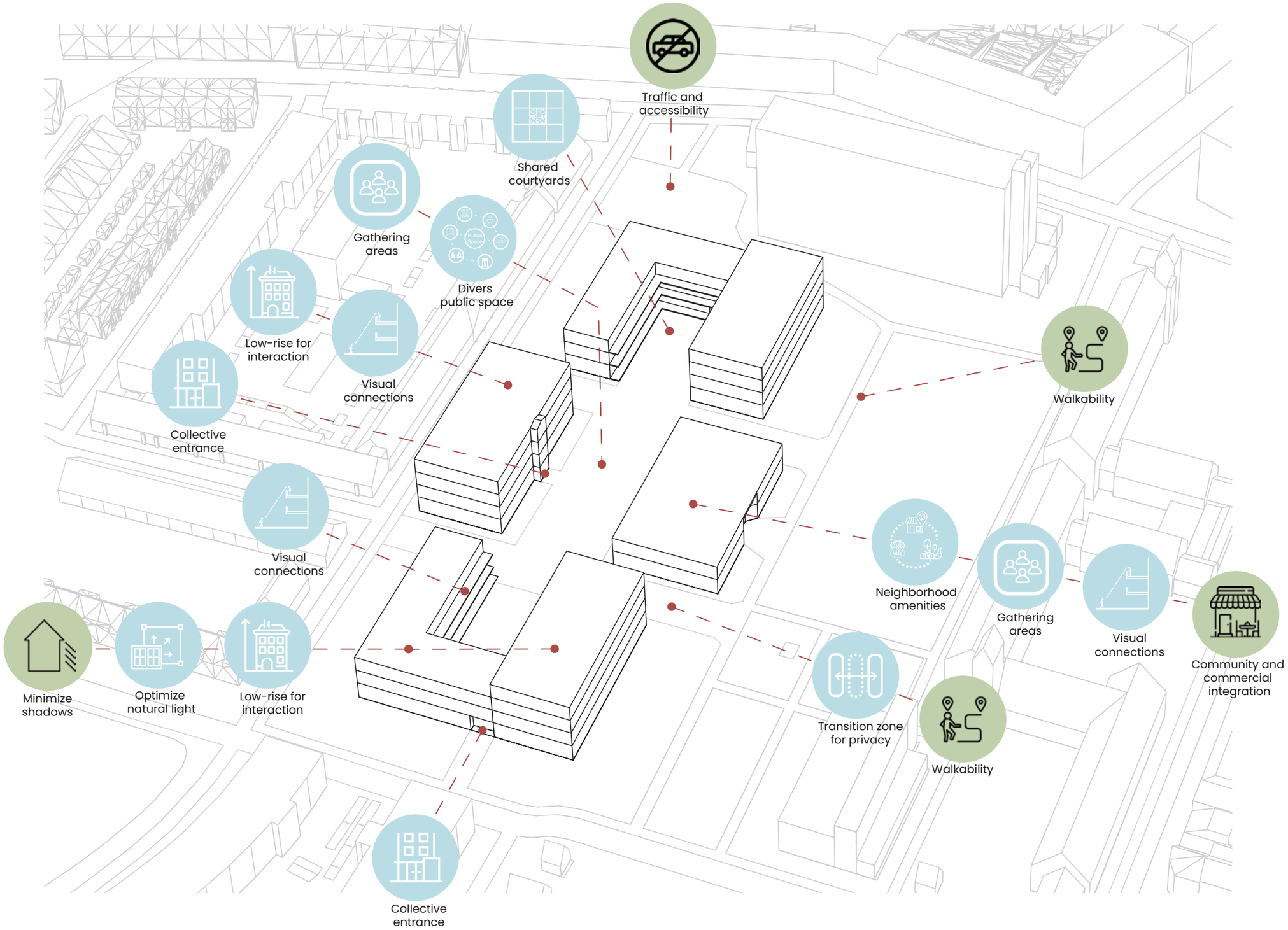
Week 2.9-2.10

P2 Presentation

The primary focus during these weeks was preparing for the P2 presentation, where I integrated key takeaways from the tutoring sessions. The presentation highlighted how to foster interactions between different target groups and generations, aiming to improve social cohesion and encourage mutual support within the community.

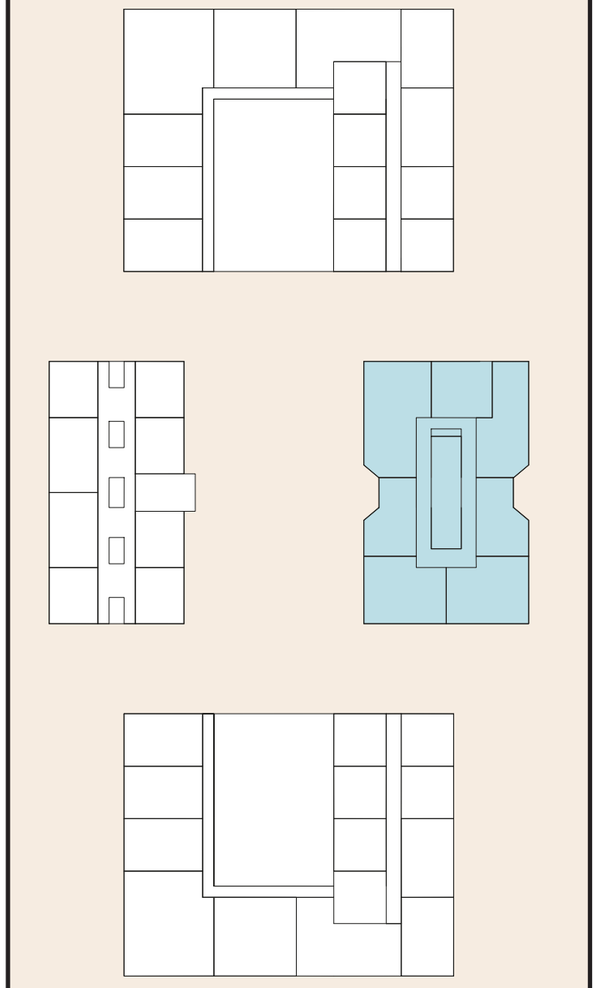
Additionally, the process from initial mass studies to the final massing played a crucial role in the presentation. I emphasized how the design decisions aligned with the research, ensuring that the architectural approach effectively supports the vision of creating a connected and supportive multigenerational community.

Guidelines Integration



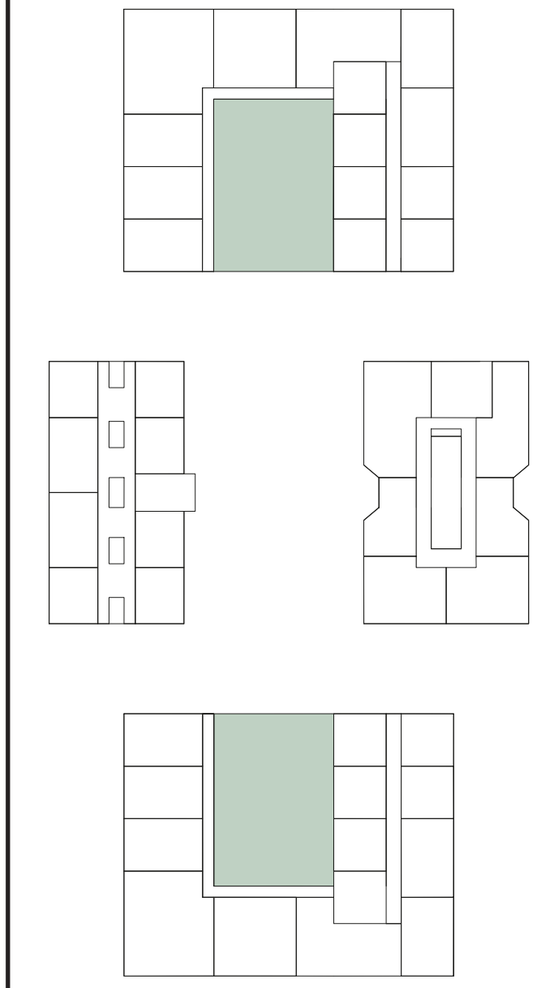
Layers of Privacy

1 PUBLIC



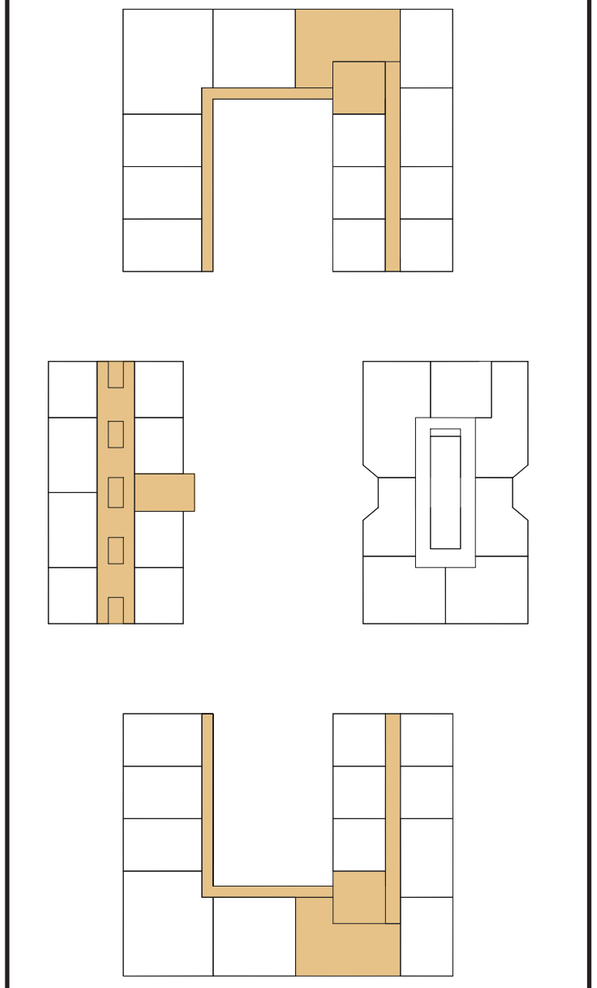
- Community center
- Outdoor area

2 SEMI-PUBLIC



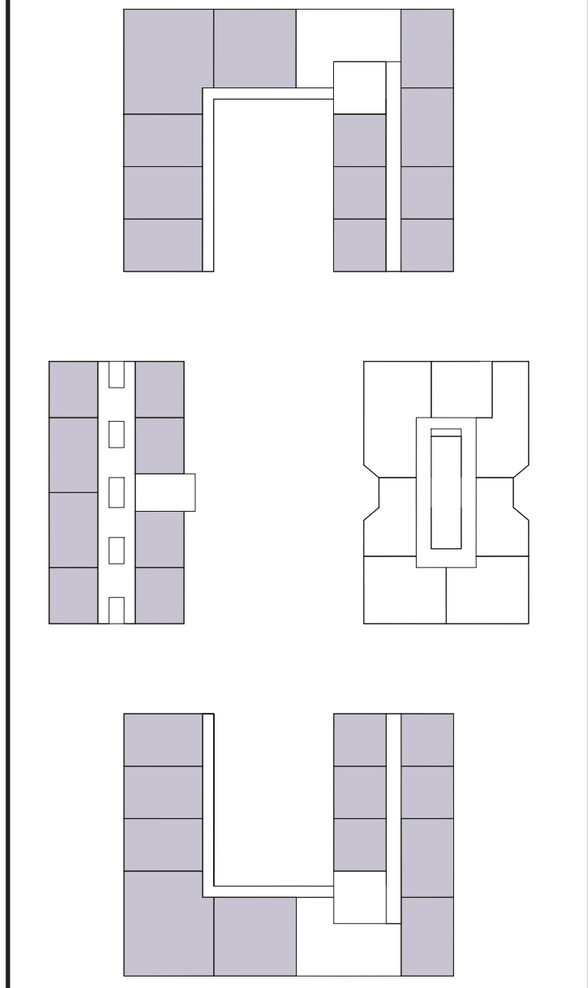
- Shared gardens

3 SEMI-PRIVATE



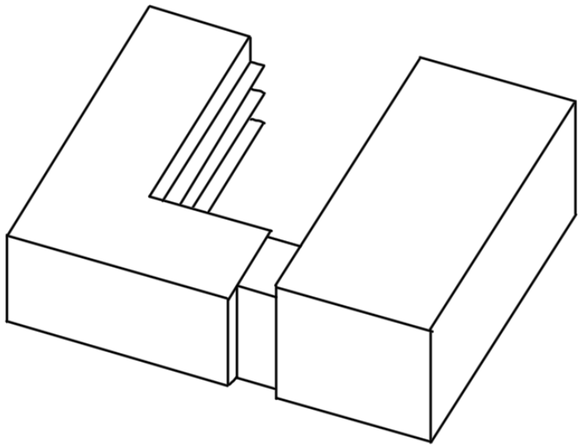
- Access stystem
- Communal spaces

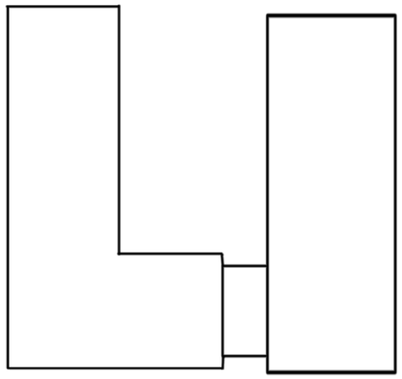
4 PRIVATE



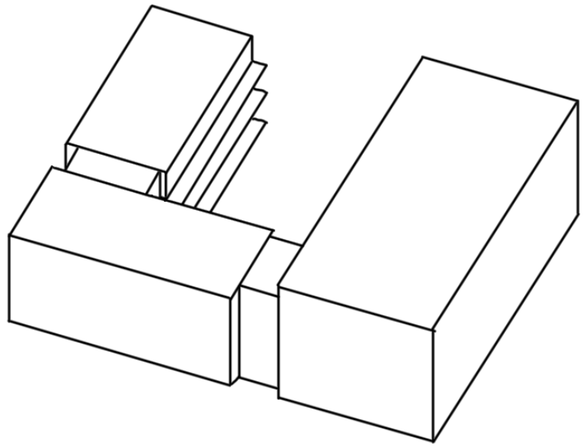
- Dwellings

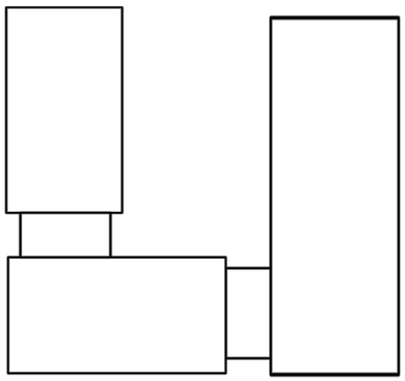
Sketches for Blocks 1 and 3



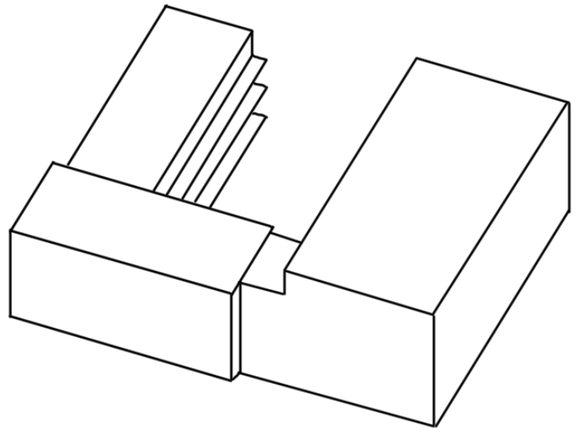


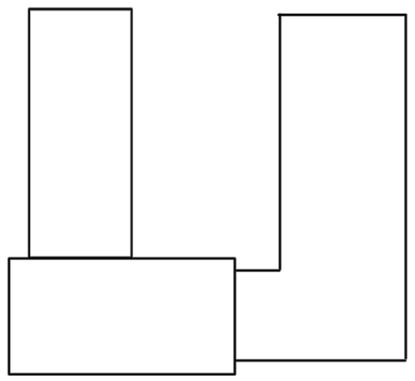
Dividing the mass into two parts, based on the target groups, connected by the entrance.





Introducing links between the different apartment types.





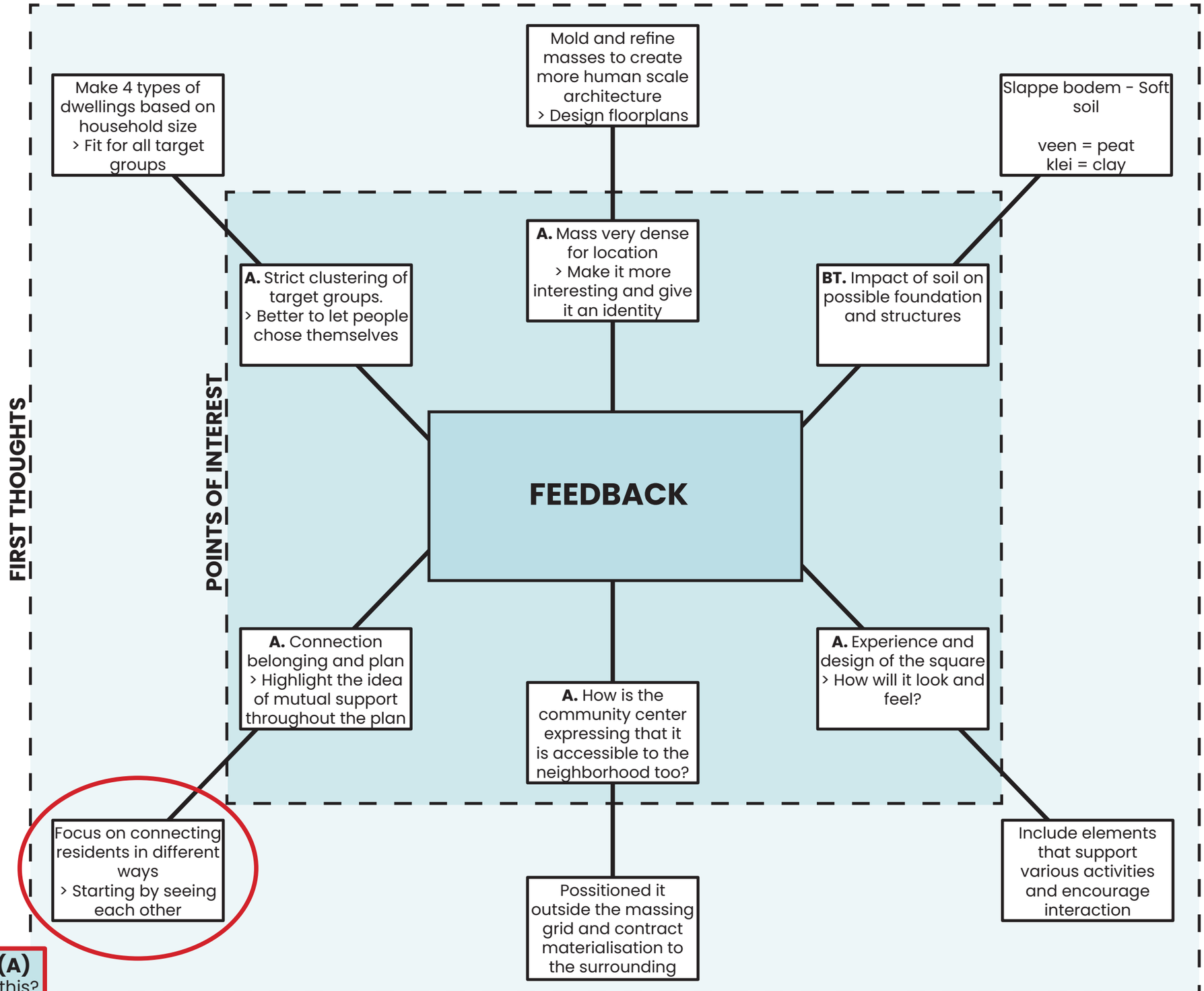
Creating set-backs between the blocks to form a hierarchy between the parts.

Week 3.0

Feedback P2 Presentation

Before starting Q3, I reviewed the feedback from my P2 presentation. The comments covered key aspects such as the massing, target groups, the square, the community center, and how the design fosters a sense of belonging. Based on this feedback, I began developing initial ideas on how to refine and improve these elements in the coming weeks.

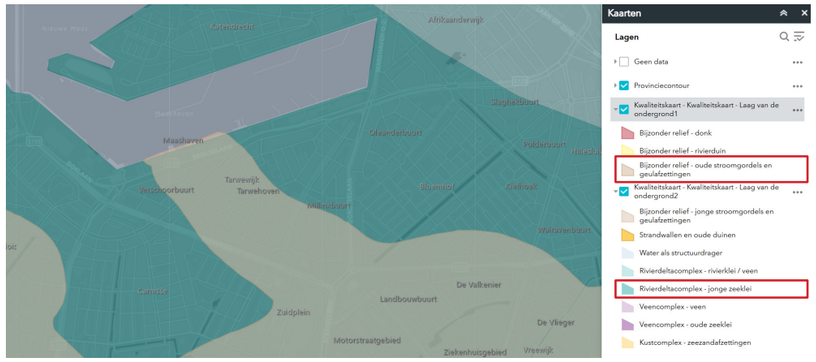
P2 Presentation



Tutoring Takeaways (A)
How are you going to do this?
> Think about the connection between communal spaces

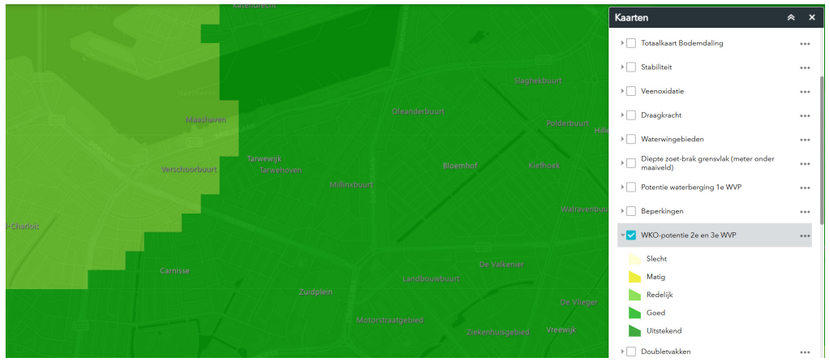
Soil Research

(Provincie Zuid-Holland, 2019)



Subsurface layer

- Peach - flow belts and channel deposits
- Turquoise - river delta complex; young sea clay



Warmte-koude opslag
The map shows the potential for heat-cold storage (WKO) in South Holland's deeper layers and current open WKO systems.



Bodemdaling
>land subsidence

Rotterdam's peat and clay soil sinks as sea levels rise. Caused by: peat oxidation, soil compression, drainage, and resource extraction like gas and oil.



Stock of fossil fuels
There is an oil field present on the edge of the Tarwewijk.

> May pose environmental concerns, such as land subsidence and pollution.



Stability
Based on the proportion of clay and peat in the top 8 meters of the soil, this map provides an estimate of soil stability

= Soft soil in Tarwewijk



Sewage systems
This map shows the percentage of sewage systems over 50 years old.

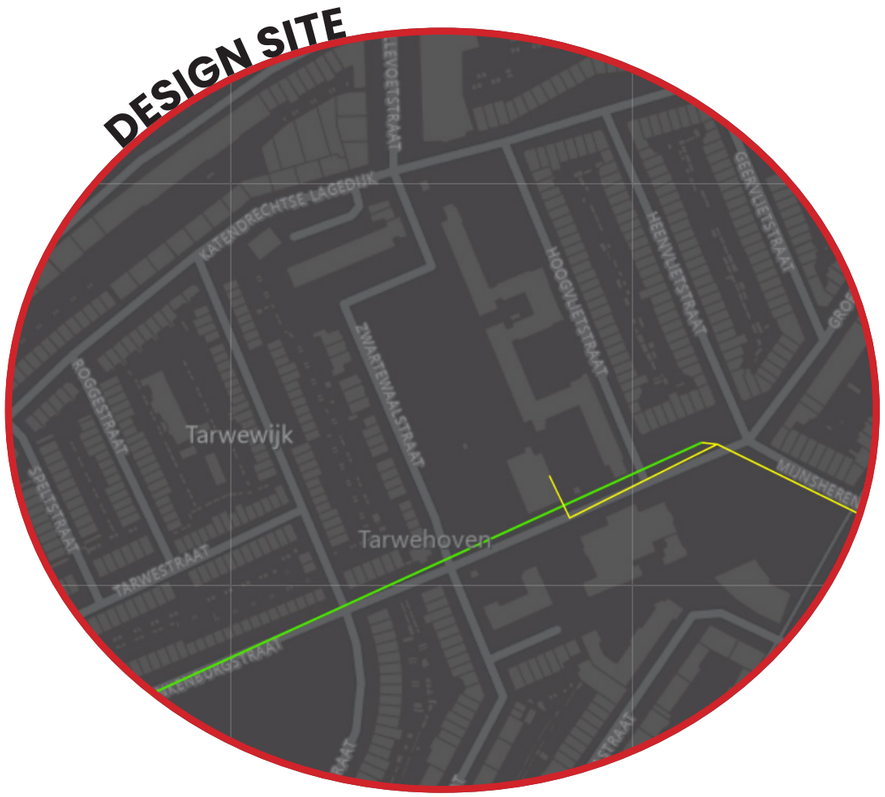
> Combining sewer replacement with infrastructure and public space renewal reduces costs and disruption.



Potential water storage
This map highlights the potential for storing fresh water in the first aquifer layer through infiltration systems. Access to sufficient and clean fresh water is crucial for society.

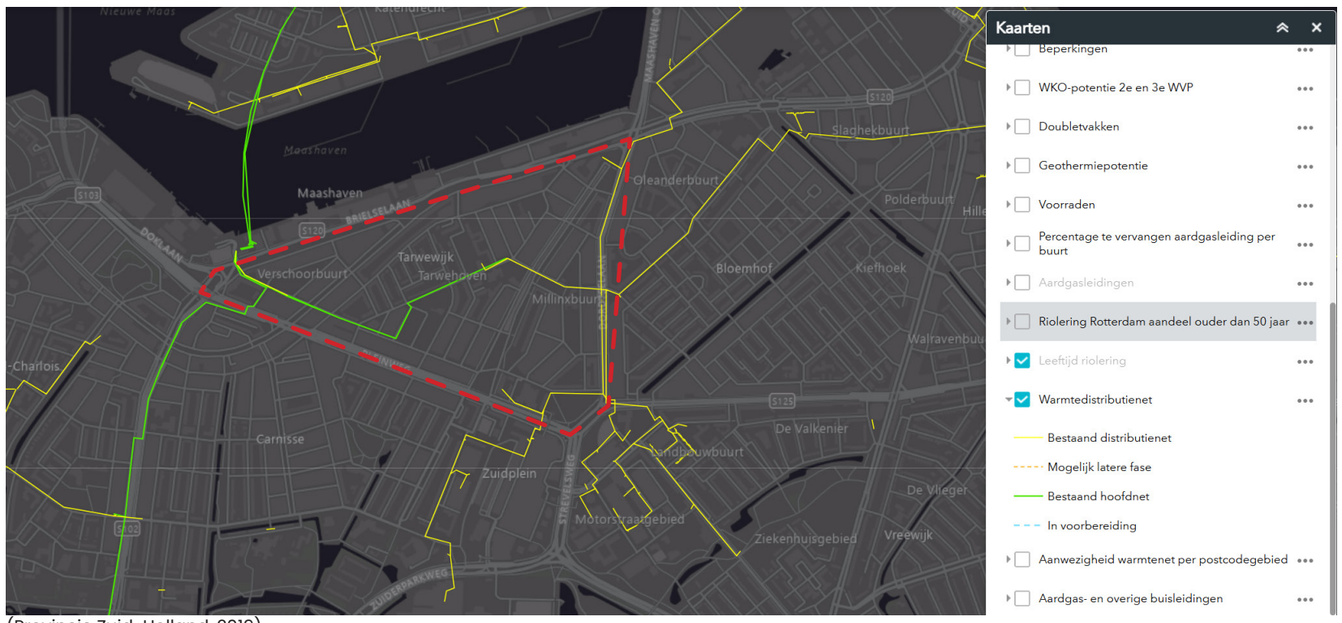
District heating network
This map shows the locations of district heating networks. The nearby presence of a district heating network offers opportunities for connection and switching to a sustainable energy supply.

> On the southern edge of the design site, two district heating networks are already established. These networks are directly connected to the school gym, offering sustainable heating options to the development.





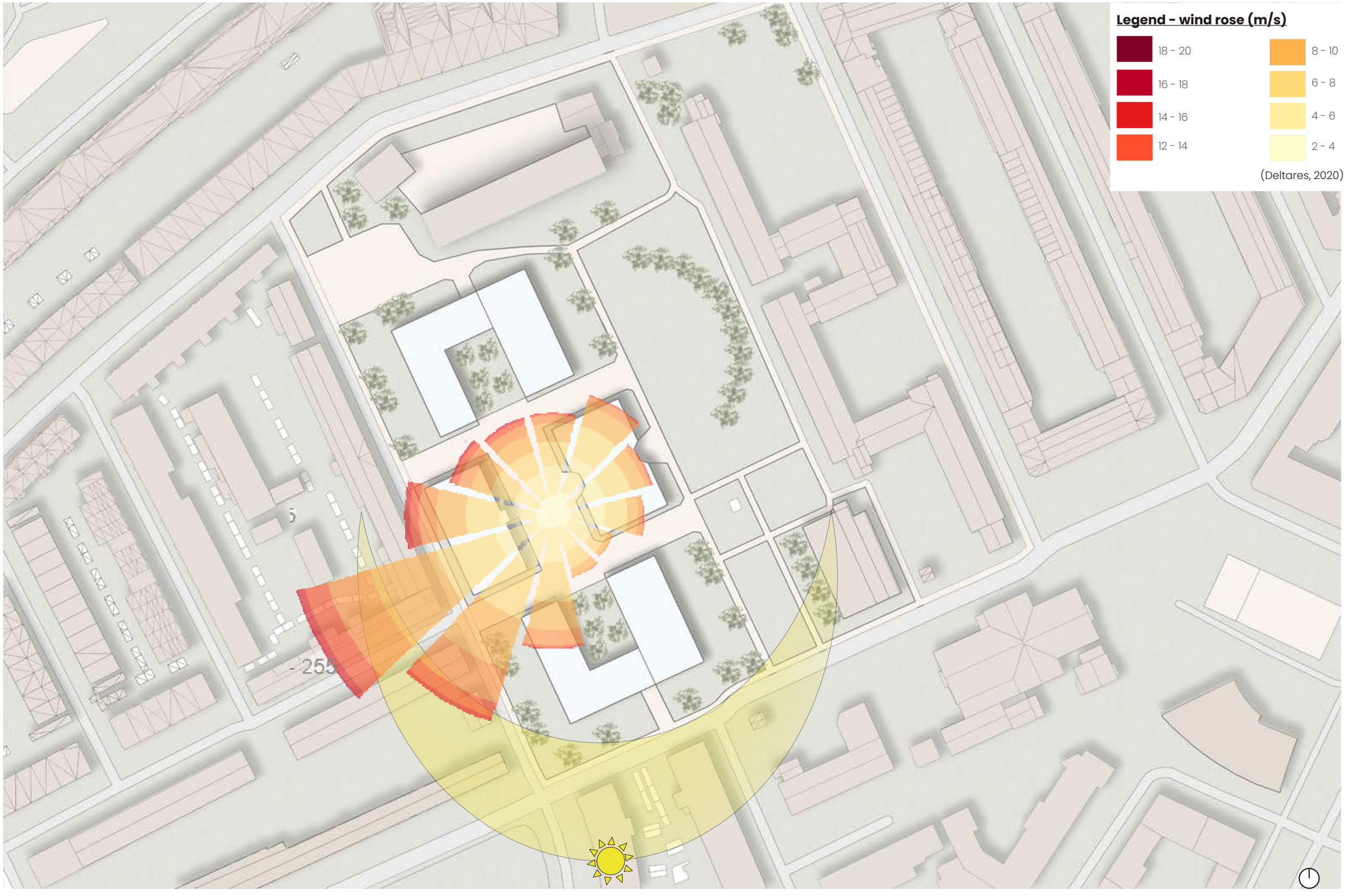
(Gemeente Rotterdam, 2023)



(Provincie Zuid-Holland, 2019)

Tutoring Takeaways (BT)
- Dive into Stadsverwarming network of Rotterdam > Can you connect to it?
- Look into types of foundation > What is possible / needed for you?
- Design the central square and define the functions of the roofs.

Weather Influence



First Sustainability Ideas

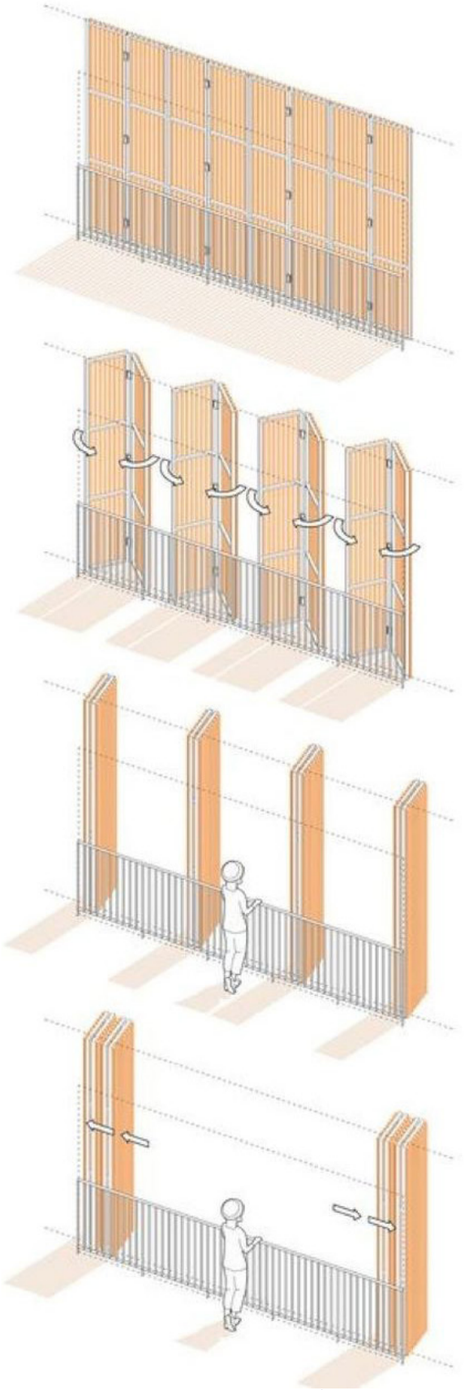
A key approach is to give sustainable features a dual purpose, making them both functional and beneficial for the residents. Additionally, I want to explore sustainable materials and ways to reuse resources that would otherwise go to waste.

1. One of the first strategies I consider is implementing louvres in the façade. These not only help regulate sunlight and temperature inside the apartments but also provide residents with control over their privacy. This dual function aligns with the project's overall goal of balancing comfort, sustainability, and adaptability.

2. To gain a better understanding of sustainable materials, I conduct preliminary research into available options. This helps me identify materials that align with the project's environmental goals while also being aesthetically and functionally suitable. The idea is to find materials that are both durable and eco-friendly, reducing the environmental impact of the building over time. Additionally, I want to research how waste materials could be reused into new building materials

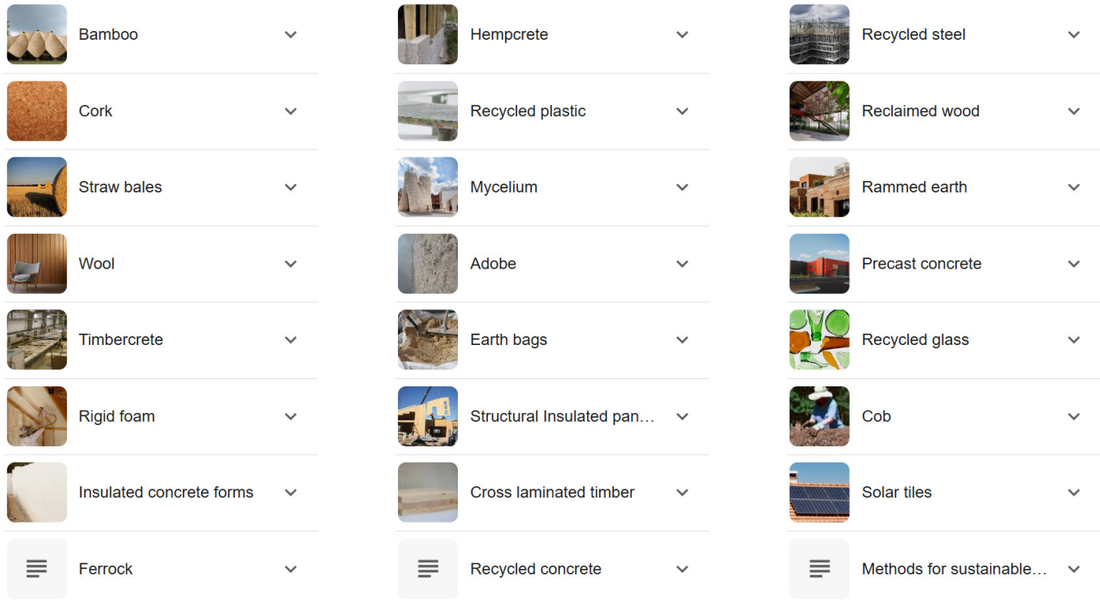
3. Another key sustainability strategy involves rainwater collection. With the increasing occurrence of heavy rainfall and potential flooding, it is crucial to develop a system that captures and reuses rainwater effectively. I plan to integrate rainwater collection systems within the design, which may serve multiple purposes—such as irrigating green spaces, reusing water within the building, or releasing it gradually into the sewage system to prevent flooding. This not only reduces water waste but also contributes to climate resilience.

1 Sun regulation & Level of privacy



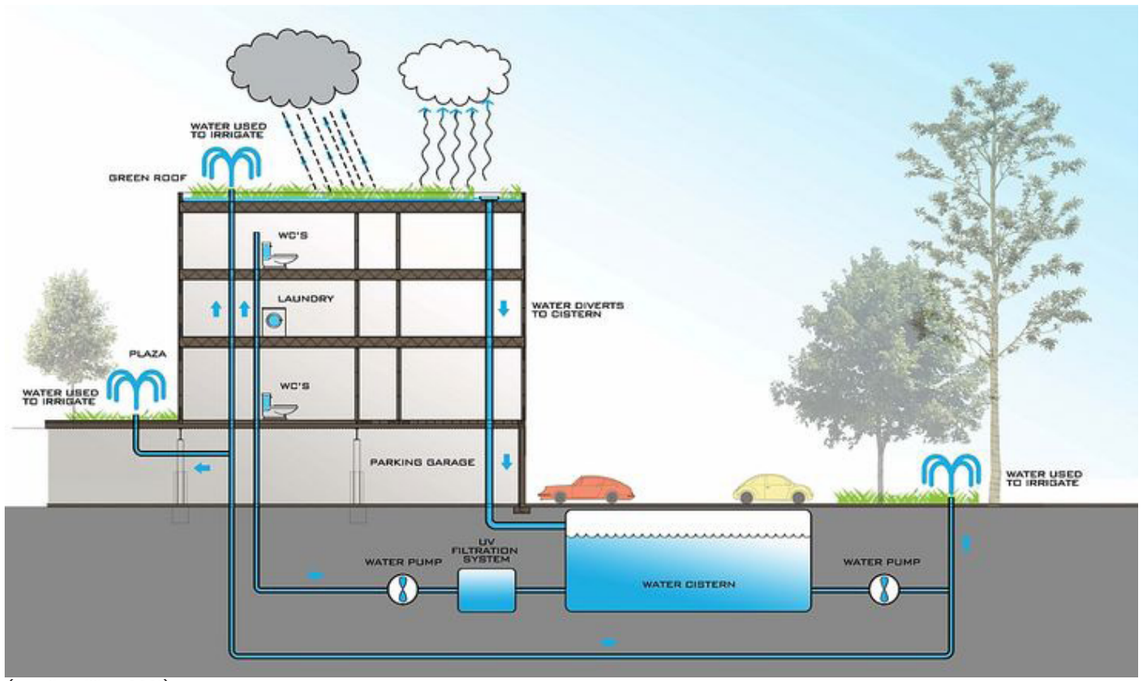
(Claudio Coello 121 Residential Building / Arenas Basabe Palacios, 2021)

2 Building Materials



(Google Search, n.d.)

3 Rainwater Collection



(Studio Hillier, 2021)

Week 3.1

Interaction, Technical Development, and Sustainability

This week, I focused on enhancing opportunities for interaction at the front door areas and further developing the design of the central square. In parallel, I continued working with the building technology feedback, specifically exploring solutions for the district heating system (stadsverwarming) and foundation. Additionally, I started shaping my approach to sustainability by prioritizing relevant Sustainable Development Goals (SDGs) and analyzing a reference project to understand its sustainability strategies.

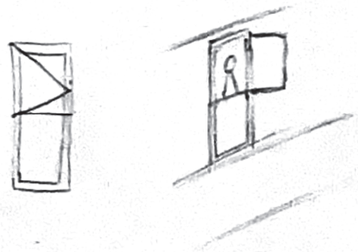
Ideas for “Starting by seeing each other”

- Glass Front door

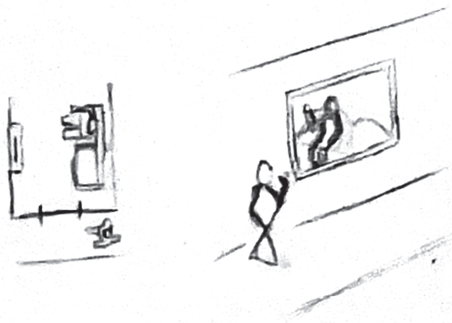


- direct connection living area
- entryway barrier?

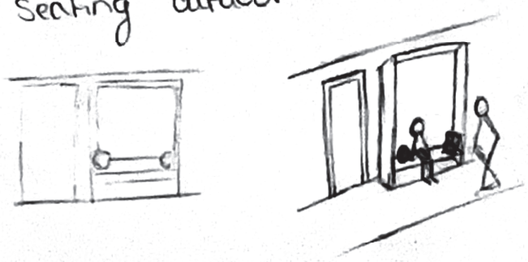
- Half open door



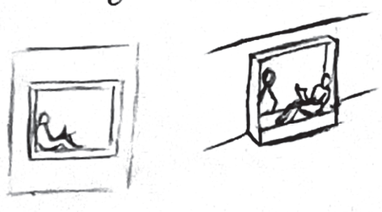
- Living area toward access



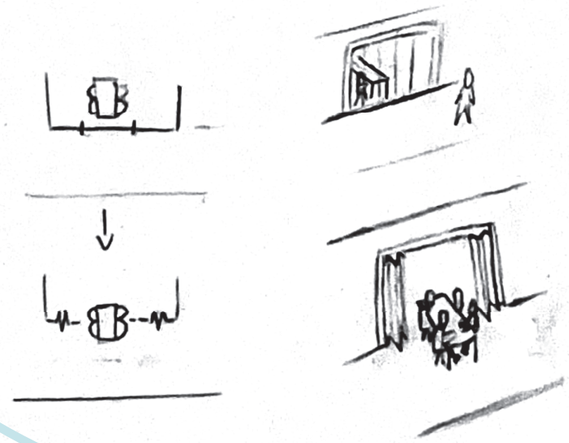
- Seating outdoor



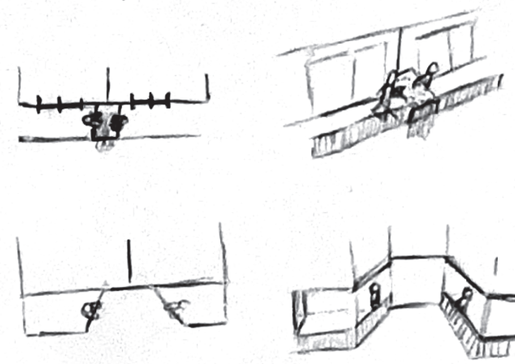
- Seating indoor



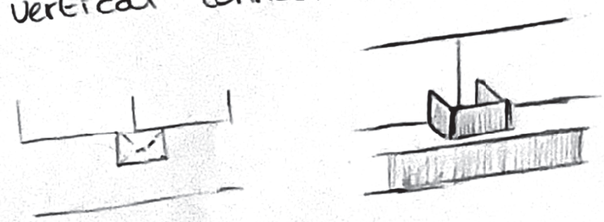
- extention indoor to outdoor



- balcony connection



- Vertical connection with void



Implementing into floorplans

To foster community and natural encounters, I integrate design elements that **balance privacy and social connection**.

1. Position kitchens toward access areas rather than living rooms, allowing residents to see neighbors without feeling exposed. Where possible, kitchens face each other to strengthen sightlines and casual interaction.

2. Outdoor seating near entrances provides space to pause and connect, additionally entrances will be paired to encourage small-scale interactions.

3. Inside the corridor, voids will allow daylight into hallway and create visual links between floors, enhancing interaction.

Square Design Sketch

The square serves as the heart of the masterplan, designed as a central gathering space for the community and a venue for events. To contrast the rigid layout of the overall plan, rounded shapes are introduced to soften the space and create a more inviting atmosphere. The square is anchored by a residential building and the community center, reinforcing its role as a vibrant social hub.

1. Zones

Different zones within the square help attract varying levels of activity. A calmer area is placed at the center, providing a quiet retreat, while a busier path runs alongside the community center to encourage movement and interaction.

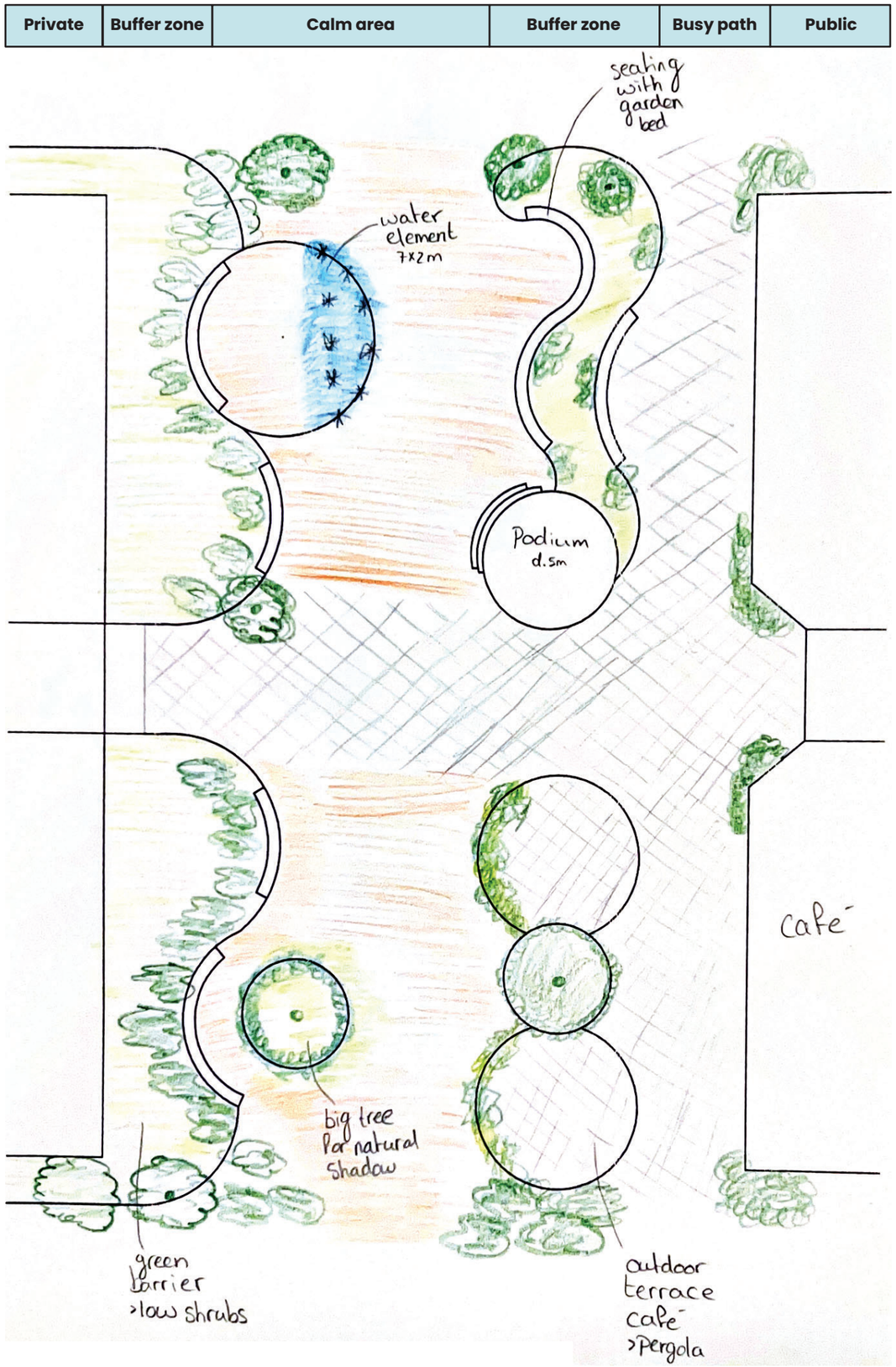
2. Elements

Greenery is incorporated throughout the design, serving as natural buffers and creating shaded areas for comfort. A water element is introduced, recognizing its ability to draw people in and enhance the overall experience. Additionally, a podium for live entertainment is centrally located and oriented to allow space for audiences to gather. To the south, a pocket park with a large tree and seating offers a shaded, relaxing environment during the summer. Across from the community center café, a pergola with greenery extends the café's presence into the square, creating a lively and active atmosphere throughout the day.

3. Pavement types

The pavement design further supports the functionality of the space. A durable, easy-access surface is used along the busy pathways and toward the residential entrance, ensuring smooth movement, while a softer, more textured pavement defines the quieter zones, such as the area around the water element and pocket park, encouraging a slower, more relaxed pace.

By integrating activity, natural elements, and thoughtful material choices, the square becomes a versatile and welcoming space that strengthens the sense of community.



Main feedback

- Waterelement will attract a lot of people so that area will not be 'calm', if you want it to be calm cosider moving it more toward the community center

- Using one pavement infront of the community center and toward the residential building does not reflect public to private transition; to achieve this use different materials

- Incorporate the "Layers of privacy" in square too

- Look into different options for the shape of the community center; make it really different than the residential buildings > is it a possibilitt to connect the rounded square design with the center?

Tutoring Takeaways (A)

- Define which elements of "Starting by seeing each other" I want to implement and expand on different levels
- Make "Layers of privacy" into square
- Look at the design language of the community center in relation to the design of the sqaure and the existing park; should it also use rounded shapes?
- Start working on the floorplans

Stadsverwarming

1 Eneco



(Eneco, 2024)

Eneco also operates a Stadsverwarming network in Rotterdam, though it is primarily concentrated in the northern part of the city.

Eneco's heat sources include:
1. The AVR waste processing plant in Rozenburg.
2. The Uniper power plant in Capelle aan den IJssel.
(Eneco, 2024)

Regarding Tarwewijk, the distribution network is located at the edge of the neighborhood. As a result, connecting to this network would require major and costly interventions, making it an impractical option for integration.

2 Vattenfall

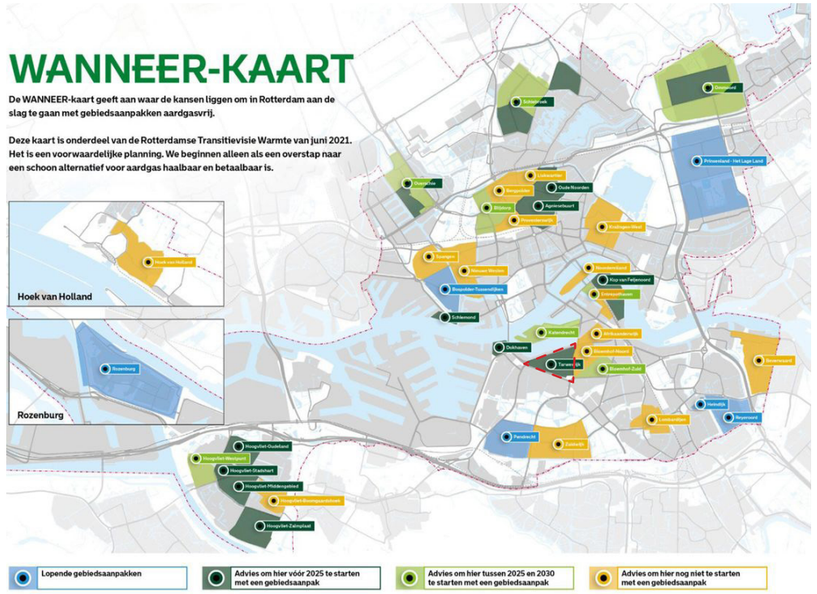


(Vattenfall, n.d.-b)

Vattenfall supplies Stadsverwarming to various cities in the Netherlands, including two areas in the southern part of Rotterdam. One of these areas includes Tarwewijk. The network enters from the east, but its presence in Tarwewijk is still relatively small. Notably, the network is already connected to the gymnasium on the design site. This existing connection provides a convenient opportunity to integrate the new development into the Stadsverwarming system, further expanding its use within Tarwewijk.

Vattenfall utilizes two primary heat sources in Rotterdam:
1. Waste Incineration Plant – At the AVR waste incineration facility (Rozenburg), residual waste is burned to generate steam. This steam is used to heat water for the Stadsverwarming network in the Rotterdam region.
2. Residual Heat from Industry – Waste heat from the Shell refinery in Pernis is repurposed to supply Stadsverwarming in the Rotterdam area.
(Vattenfall, n.d.-a)

3 Future expansion plan



(Kurvers, 2021)

In the report "De Rotterdamse Transitievisie Warmte", the unicipality of Rotterdam outlines its vision for the energy transition toward a gas-free city (Kurvers, 2021).

The map illustrates the phased transition to Stadsverwarming. Tarwewijk is part of the group advised to begin a district-wide transition approach before 2025 (dark green).

This indicates that connecting the new project to the Stadsverwarming network aligns with the Municipality of Rotterdam's vision for sustainable energy development.

Conclusion

The analysis of Stadsverwarming in Rotterdam highlights that Vattenfall's Stadsverwarming network already reaches Tarwewijk, albeit at a limited scale, and is directly connected to the gymnasium on the design site. This existing connection provides a practical **opportunity to integrate the new development into the Vattenfall network**, promoting a sustainable and energy-efficient heating solution. Additionally, the Municipality of Rotterdam's "Transitievisie Warmte" identifies Tarwewijk as a priority area for transitioning away from natural gas, recommending the initiation of a district-wide approach before 2025.

Foundation Types

In the Netherlands, two main types of foundations can be distinguished: pile foundations and shallow foundations (on sand).

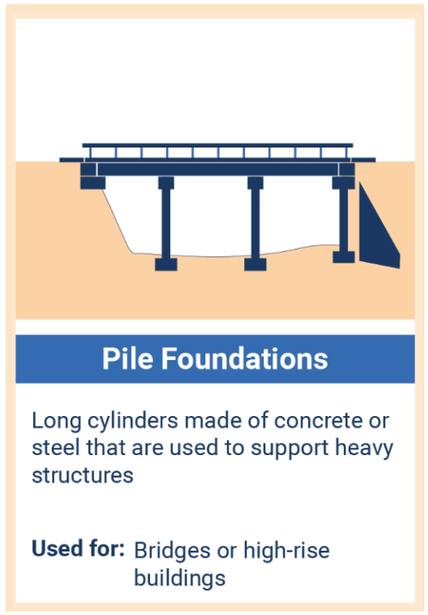
Pile Foundation (Paalfundering)
A pile foundation consists of multiple piles driven, drilled, or screwed into the ground to support a structure. These piles transfer the weight of the building to deeper, more stable soil layers.

Pile foundations are necessary when the soil near the surface is too weak to support a structure. If the sand layer is deeper than 3 meters, a pile foundation is typically required (Sleiderink, 2025).

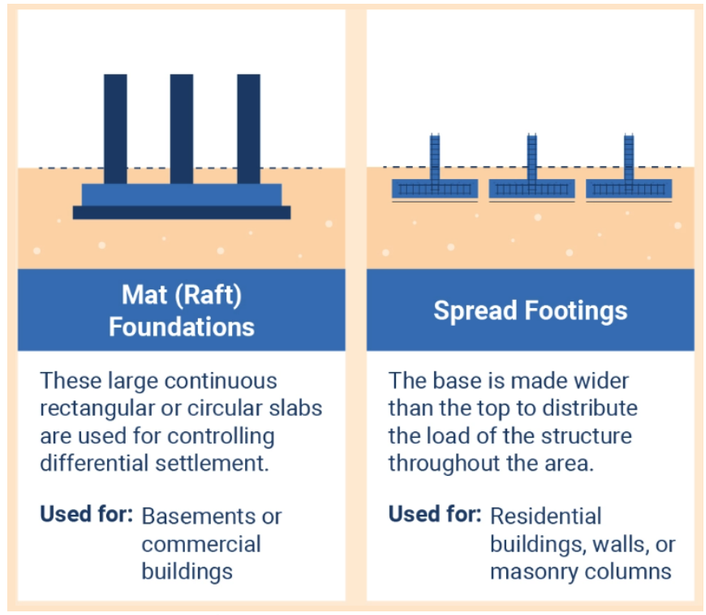
Additionally, certain ground conditions make pile foundations essential, including (BigRentz, 2023):
- A weak soil layer at the surface
- High groundwater levels
- Deep drainage systems
- Soil that cannot be excavated to the required depth

In the Netherlands, this often means that if a location would naturally be underwater without dikes, a pile foundation is the standard solution.

Shallow Foundation (Fundering op Staal)
A shallow foundation rests directly on a compacted sand layer without the need for piles or a concrete slab. This sand layer must be strong and stable enough to support the structure without additional reinforcement. The foundation is placed at least 80 cm below ground level to ensure it remains below the frost line, preventing damage from ground movement due to freezing temperatures (Sleiderink, 2025).



Pile foundation (BigRentz, 2023)



Shallow foundation (BigRentz, 2023)

Conclusion

Due to the soft, compressible soil conditions in Tarwewijk, a **pile foundation** is the most suitable solution for the project's foundation. The area's subsurface primarily consists of weak clay and peat layers, which lack the necessary bearing capacity to support the structure using a shallow foundation.

Priority

Level 1 - building a community
3 Good health and well-being
10 Reduced inequality
16 Peace and justice
17 Partnerships for the goals

Building a sustainable community starts with fostering social well-being, inclusivity, and strong relationships: when people feel happy, supported, and connected, they are more inclined to care for their environment and contribute to its long-term well-being.

By creating accessible, inclusive spaces, residents of all ages and backgrounds are given equal opportunities to connect and participate in community life. Communal areas, shared facilities, and public spaces serve as important meeting points, fostering natural interactions and mutual support. By cultivating strong relationships within and beyond the community, the neighborhood becomes more resilient, socially cohesive, and better equipped to address future challenges together, laying the groundwork for a truly sustainable future.

Level 2 - improve the environment
2 Zero hunger
6 Clean water and sanitation
7 Affordable and clean energy
11 Sustainable cities and communication
12 Responsible consumption and production
13 Climate action
15 Life on land

Facilitating sustainable choices within the community is essential for long-term environmental and social well-being. The built environment plays a key role in encouraging these choices. Vegetable gardens promote local food production, fostering a connection to nature and addressing food security. Rainwater collection systems support efficient water use, while solar panels and district heating (stadsverwarming) provide clean, renewable energy. Using locally sourced materials reduces the carbon footprint and supports responsible consumption.

Integrating greenery on the ground, walls, and rooftops enhances biodiversity, mitigates urban heat, and creates a more inviting living environment. By designing accessible, welcoming spaces that encourage interaction and eco-friendly habits, the community is empowered to care for both their social and natural surroundings.



(United Nations, n.d.)

Level 3 - depend on external actors
1 No poverty
4 Quality education
5 Gender equality
8 Decent work and economic growth
9 Industry, innovation and infrastructure
14 Life below water

Level 3 represents Sustainable Development Goals that rely on broader societal, economic, and policy decisions beyond the scope of architectural design. While the project can indirectly support these goals by fostering inclusivity and community engagement, the primary responsibility lies with external actors such as governments, educational institutions, and industries. The design can create spaces that promote social equity and learning, but systemic changes require action beyond the built environment.

This level acknowledges the interconnected nature of sustainability while recognizing the limitations of architecture in addressing these goals. The focus remains on building a supportive community that can contribute positively to larger societal efforts.

Order
1. 3 Good health and well-being
2. 17 Partnerships for the goals
3. 10 Reduced inequality
4. 16 Peace and justice
5. 15 Life on land
6. 7 Affordable and clean energy
7. 2 Zero hunger
8. 6 Clean water and sanitation
9. 12 Responsible consumption and production
10. 11 Sustainable cities and communication
11. 5 Gender equality
12. 13 Climate action
13. 9 Industry, innovation and infrastructure
14. 14 Life below water
15. 1 No poverty
16. 4 Quality education
17. 8 Decent work and economic growth

Reference - Sustainability

Project	Pixel
Function	Office building
Location	Melbourne, Australia
Completion Date	2010
Architect	studio505
Internal Area	1136.4 m²

Pixel, located in Melbourne, Australia, is an innovative office building designed by studio505 and completed in 2010. With an internal area of 1136.4 m², the building stands as Australia's first carbon-neutral office building, generating all its own power and water on-site. It achieved an outstanding environmental performance by scoring a perfect 105 points on both the Green Star and LEED rating systems, reflecting its exemplary sustainable design.

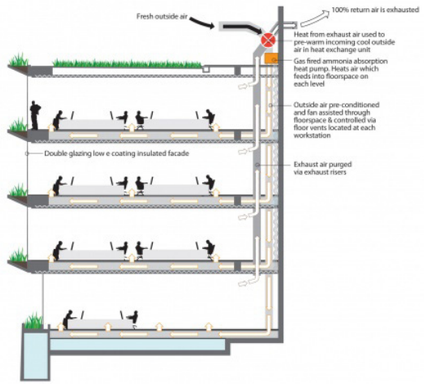
The building's facade features an integrated system of perimeter planters, fixed shading louvers, double-glazed window walls, and solar panel shading. This combination not only enhances energy efficiency but also contributes to the building's distinctive aesthetic. The facade design mitigates heat gain, reduces energy consumption, and maximizes natural light, while the planters provide an added ecological benefit by improving air quality.

Pixel was developed with the ambition to advance Grocon's Green Star credentials and to set a new benchmark for future projects on the site. The collaboration between studio505 and environmental consultants Umow Lai resulted in a building that demonstrates the potential of environmentally sustainable design (ESD) within a coherent architectural framework.

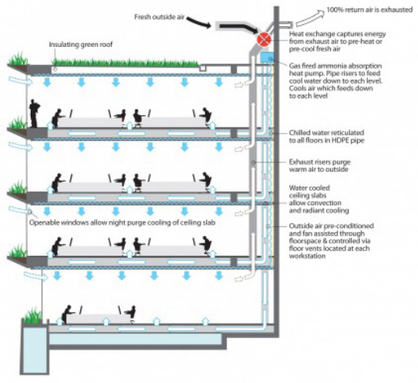
The project balances functionality and environmental performance, illustrating how design innovations can successfully address sustainability challenges in the built environment. Pixel remains a pioneering example of how contemporary office spaces can reduce environmental impact while maintaining high performance and design integrity.

Sources: Pixel / studio505 (2011) & Studio 505 (n.d.)

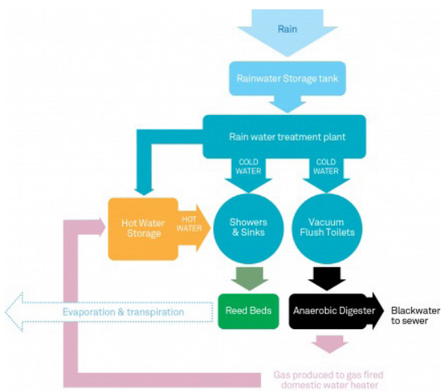




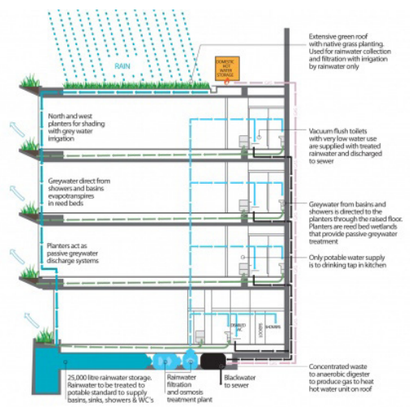
HEATING SYSTEM



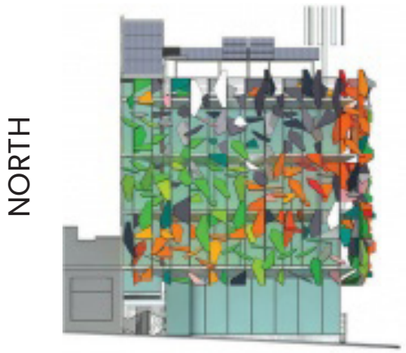
COOLING SYSTEM

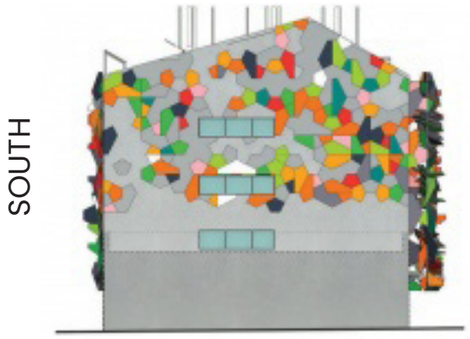


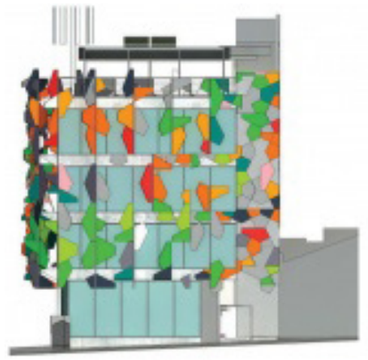
CYCLE

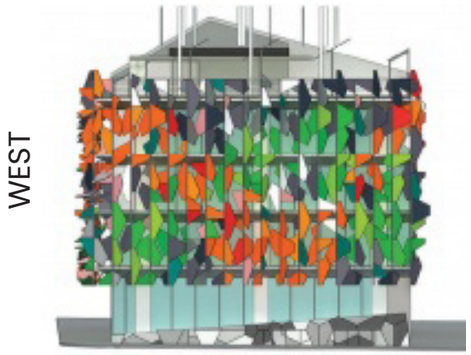


WATER COLLECTING

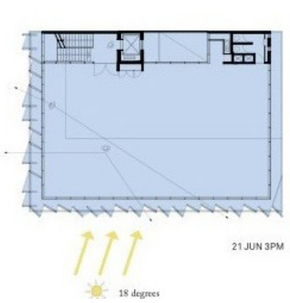




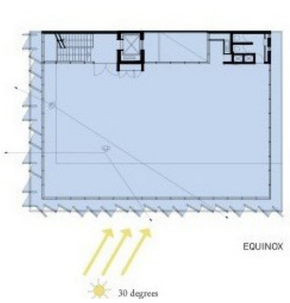




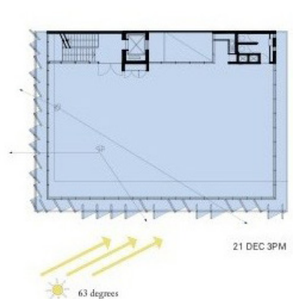
SHADING



18 degrees



30 degrees



63 degrees

Tutoring Takeaways (BT)
- If the energy system is decentral organised what is the impact in times of disaster?
- Look where you want to incorporate the SDG's into your masterplan
- What is happening on the roofs?

Week 3.2

First Floorplans and Integrating SDGs

Began developing the floorplans for Blocks 1/3, creating three different apartment types to accommodate all target groups. I also refined the shape of the community center to strengthen its connection with the square while distinguishing it from the residential buildings. Additionally, I incorporated the Sustainable Development Goals (SDGs) into the masterplan, ensuring a more integrated approach to sustainability.

GROUND FLOOR - with feedback
1:200



FIRST FLOOR – with feedback
1:100

gebruiksoppervlakte

- Less than 50.00 m²
- 50.00 m² - 80.00 m²
- 80.00 m² or more

- Toilet to far: Elderly use toilet during the night
- Possible to make into one wheelchair accessible bathroom?

- To much is happening inside this small space; remove storage and add to bathroom
- Using sliding door into hallway uses less space

- To much hall space; make third bedroom flexible with sliding doors access to from living area
- Bathroom and kitchen to small for household size

7200 7200 7200 7200 3600 1800

7200 7200 7200

7 8 9 10 11 12 13 14 15 16 17

FIRST FLOOR - with feedback type 3
1:100



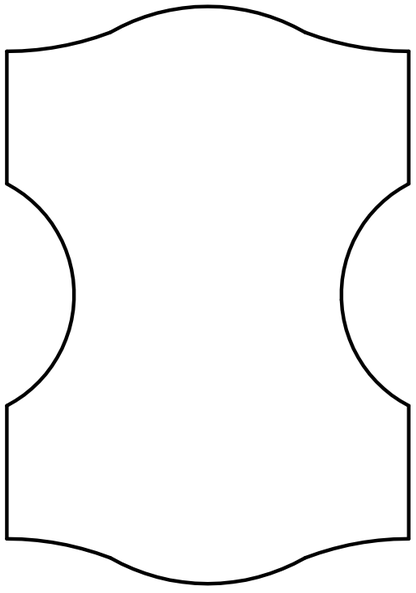
FIRST FLOOR
1:100

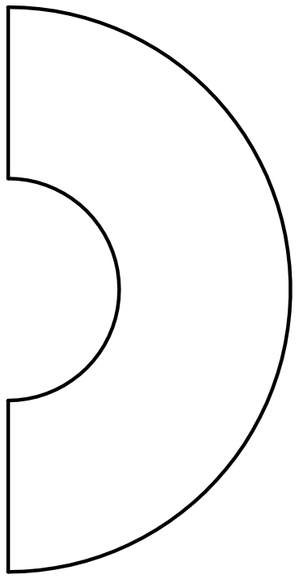
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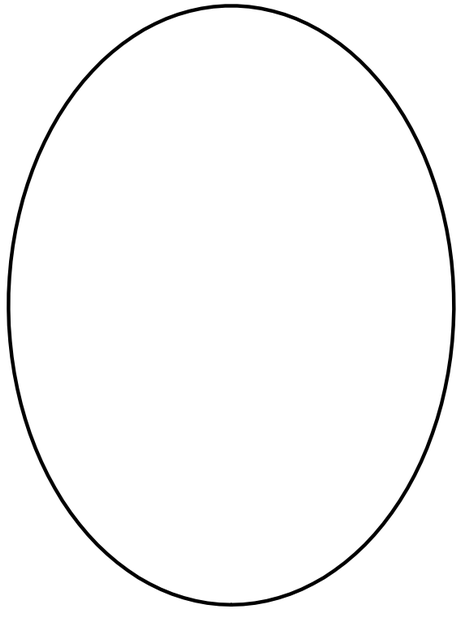
SECOND FLOOR
1:100

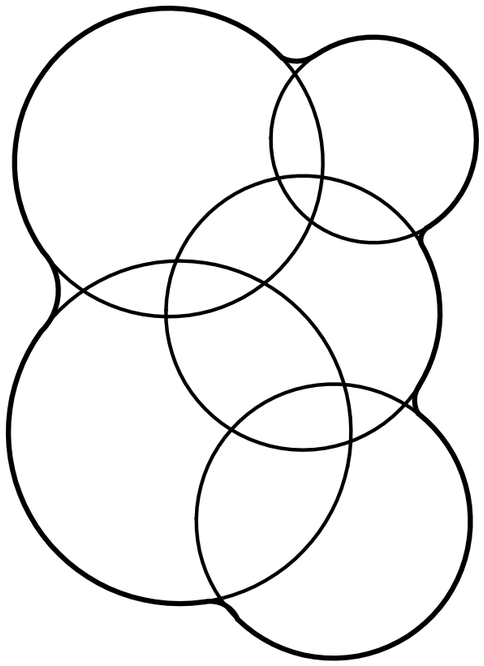


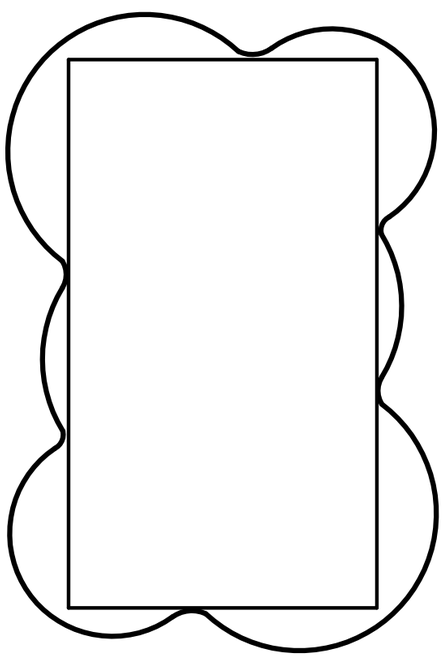
FORM STUDY COMMUNITY CENTER

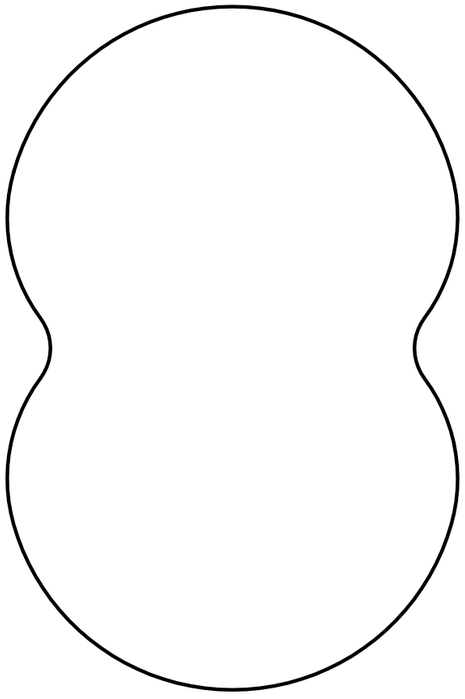




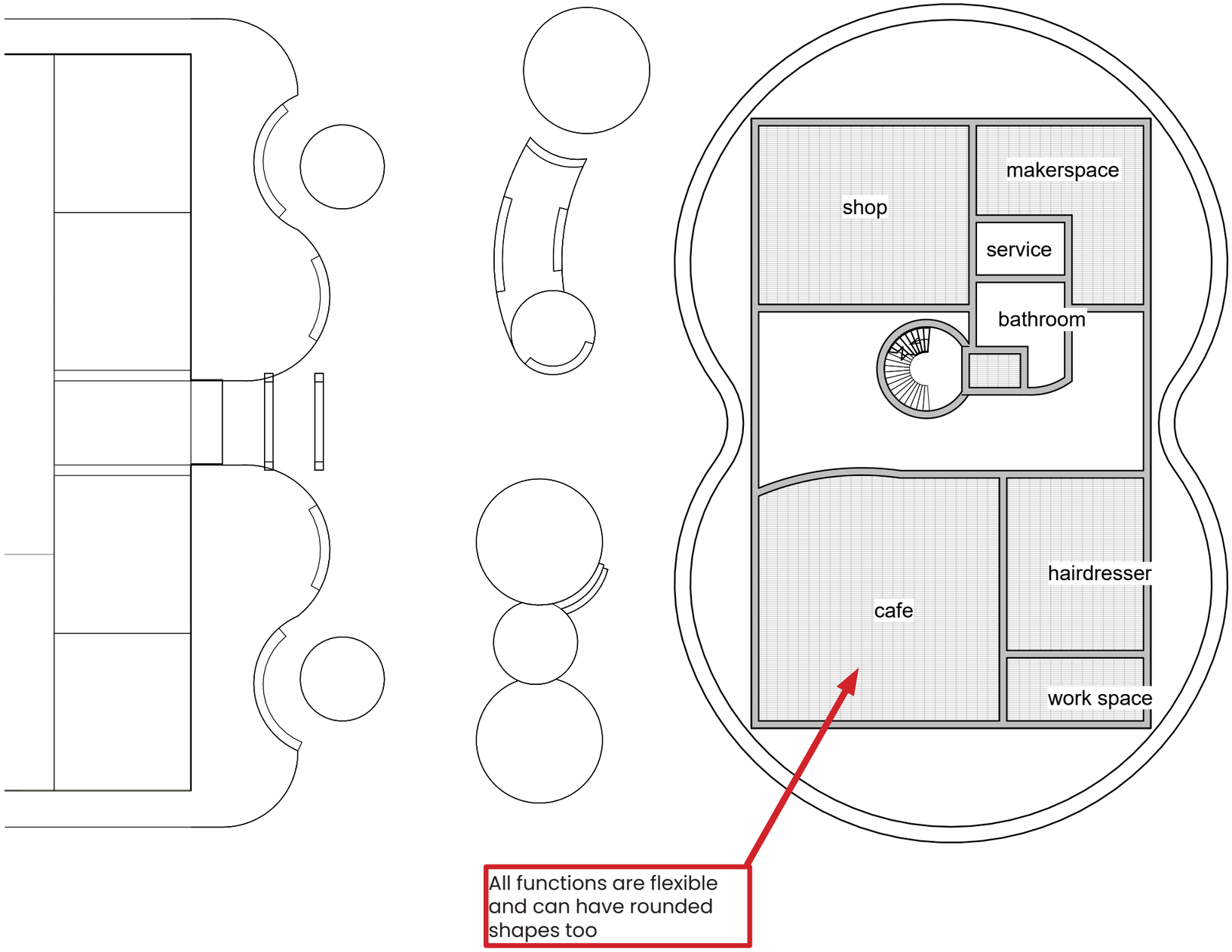






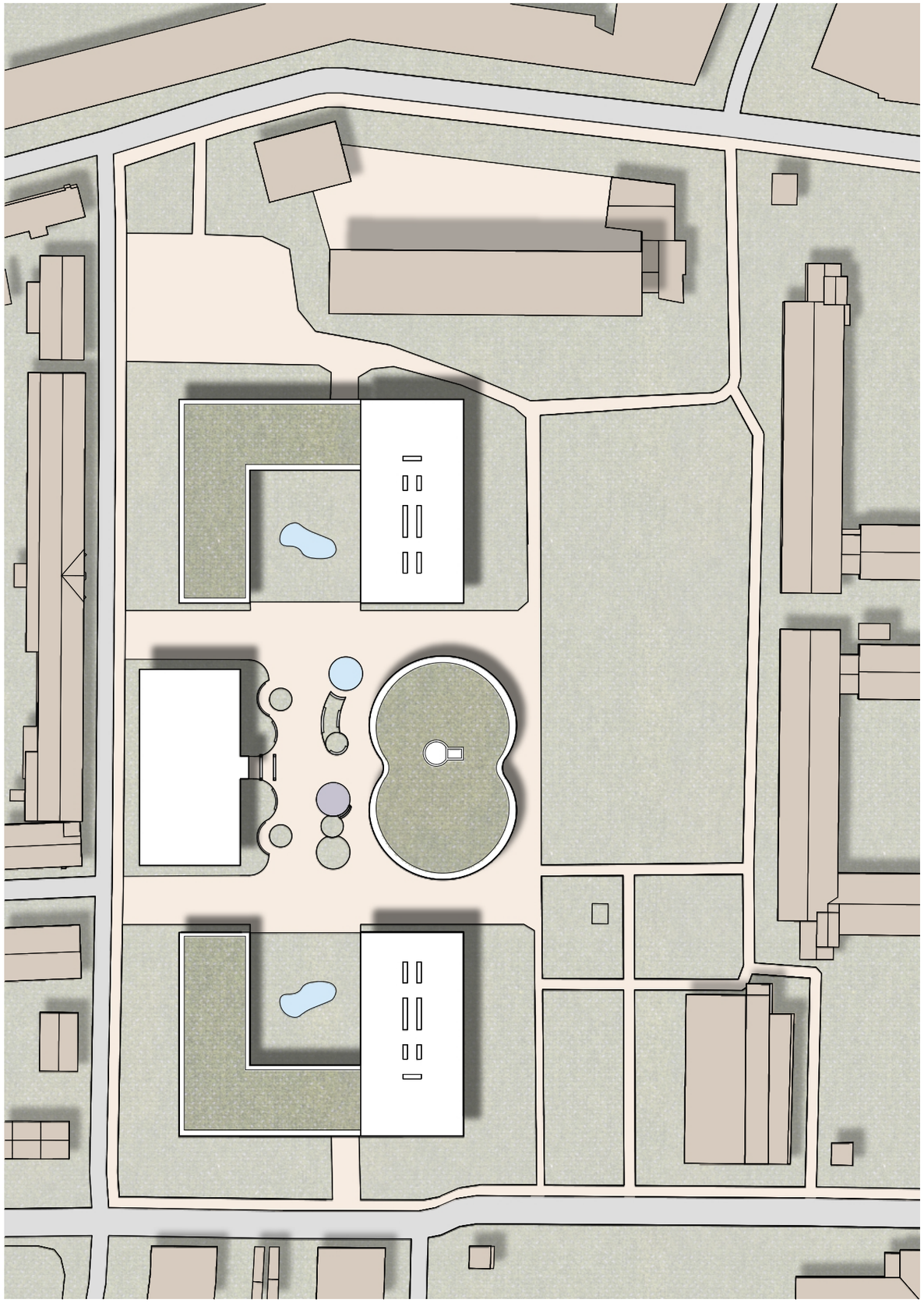


COMMUNITY CENTER AND SQUARE
1:200

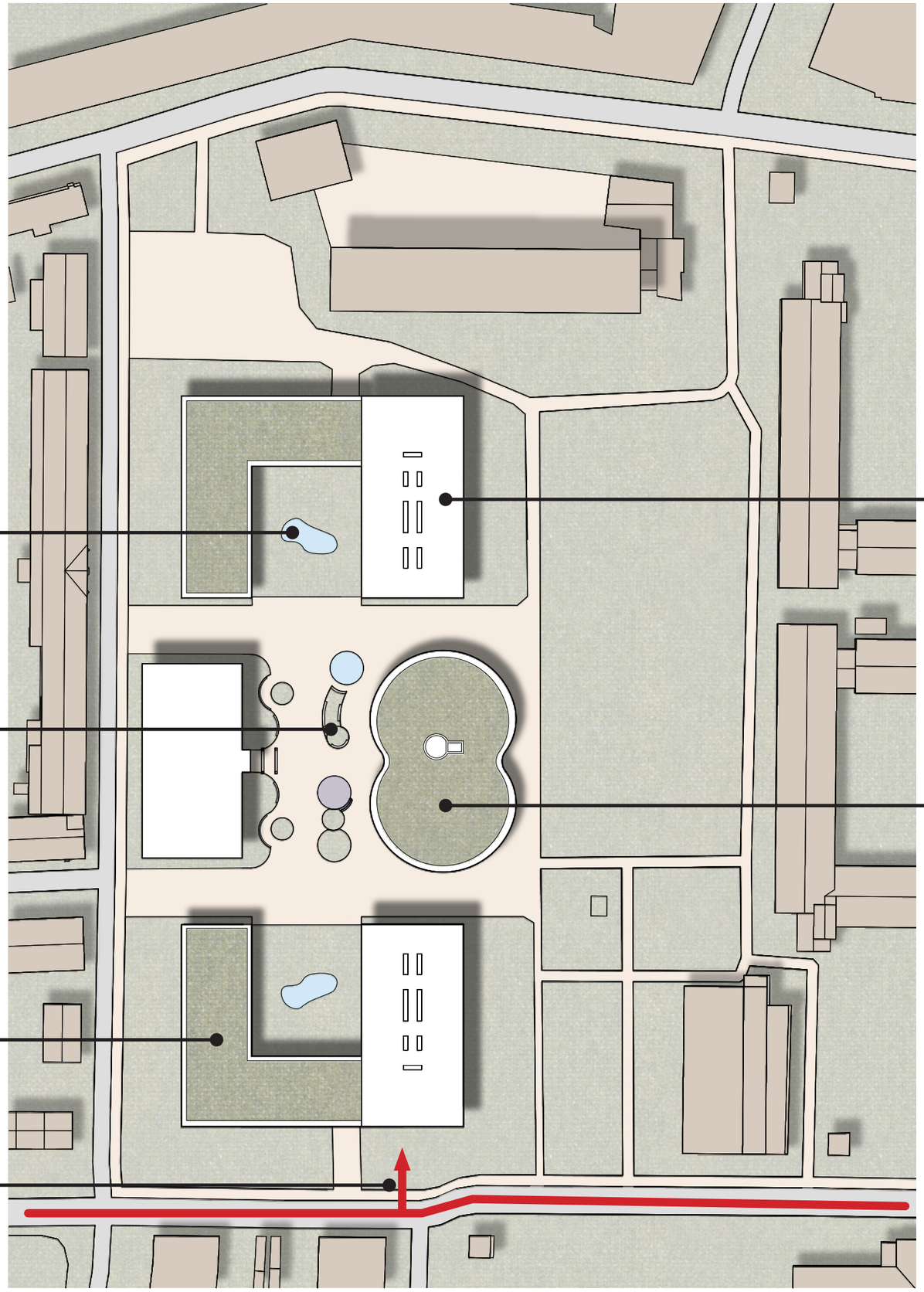


Tutoring Takeaways (A)
- When designing for elderly define day and night routines to see if floorplans are 'working' for them
- Make the third bedroom in the 3 bedroom apartment more flexible by having the possibility to use it as an extention of the living area/use as a master bedroom/use as s children bedroom
- Functions in community center are flexible to rounded spaces

Improved Masterplan



Masterplan - Incorporating SDG's and Sustainability



Wadi
> water collection

SDG 3 - Good health and well-being
SDG 15 - Life on land

Communal rooftop garden

Connect to Stadsverwarming network

SDG 7 - Affordable and clean energy
> Service roof

SDG 2 - Zero hunger
> rooftop community vegatable garden

Tutoring Takeaways (BT)
- Built on this foundation and expand with applications that contribute to the SDG's
- How do you deal with waste materials?
- What is the ecosystem of in the masterplan?

Week 3.3

Refining Floorplans and Enhancing the Ecosystem

Incorporating last weeks feedback, the floorplans were further developed to enhance functionality and spatial quality. The community center was rotated to strengthen its identity and improve its relationship with the surroundings. Additionally, research into native bird species and their habitat needs informed plant selection, ensuring the masterplan supports local biodiversity and creates a balanced ecosystem.

FIRST FLOOR – with solutions based on feedback last week
1:100

A

- One bathroom with toilet wheelchair accessible
- Toilet accessible through bedroom and hallway

Spaces

- Type 1 - Less than 50.00 m²
- Type 2 - 50.00 m² - 80.00 m²
- Type 3 - 80.00 m² or more
- Communal space - Kitchen and living area

- Space is calmer with less corners
- Bathroom is bigger
- Sliding door into hallway

UP

- Compact hallway; third bedroom flexible with sliding doors access to from living area
- Bathroom and kitchen to fit to household size

7400 | 7400 | 7400 | 7400 | 7400 | 3700 | 1850

6 7 8 9 10 11 12 13 14 15 16 17

GROUND FLOOR
1:200

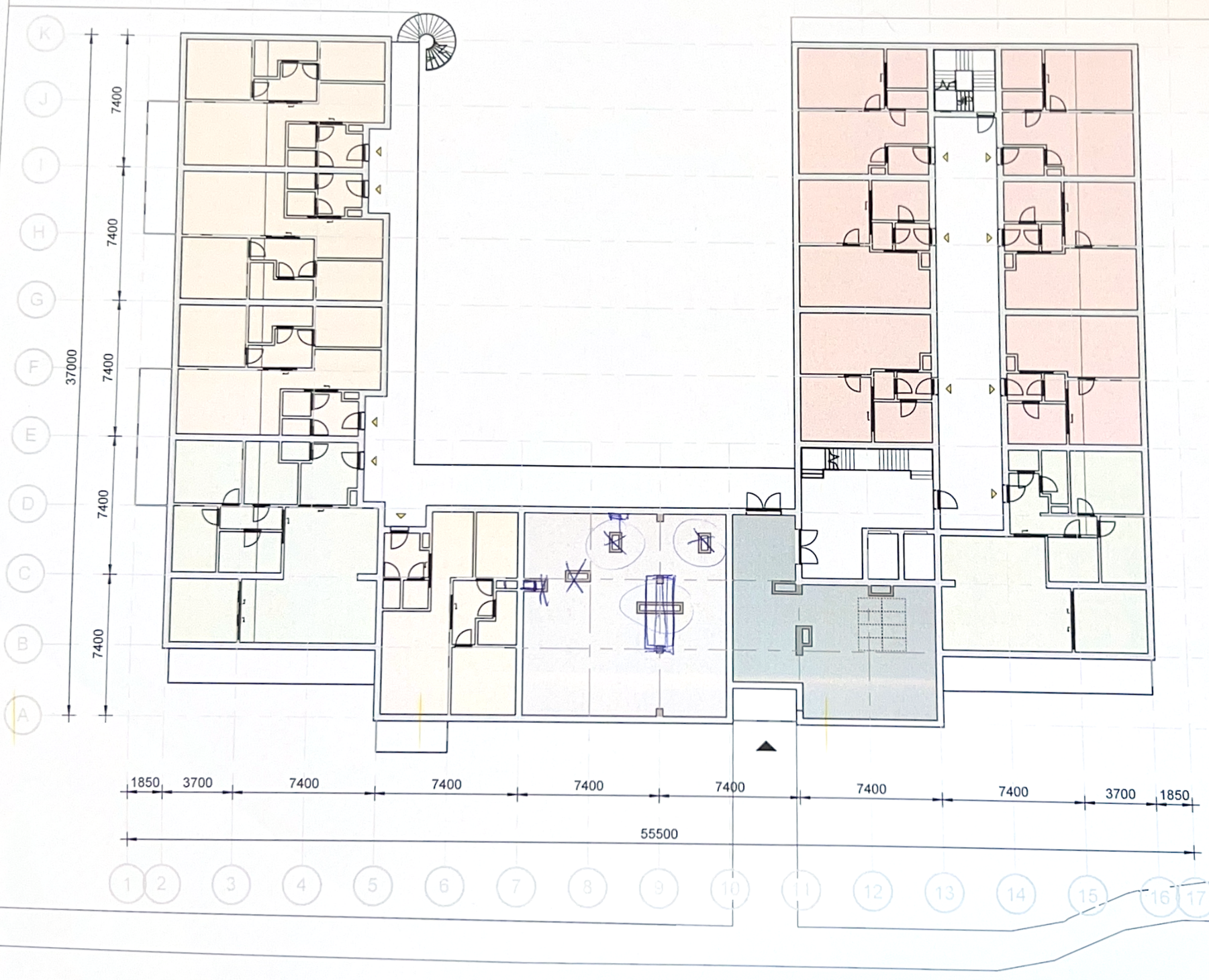


Spaces

- Type 1 - Less than 50.00 m²
- Type 2 - 50.00 m² - 80.00 m²
- Type 3 - 80.00 m² or more
- Communal space - multifunctional
- Entrance

GROUND FLOOR - feedback BT

1:200





Spaces

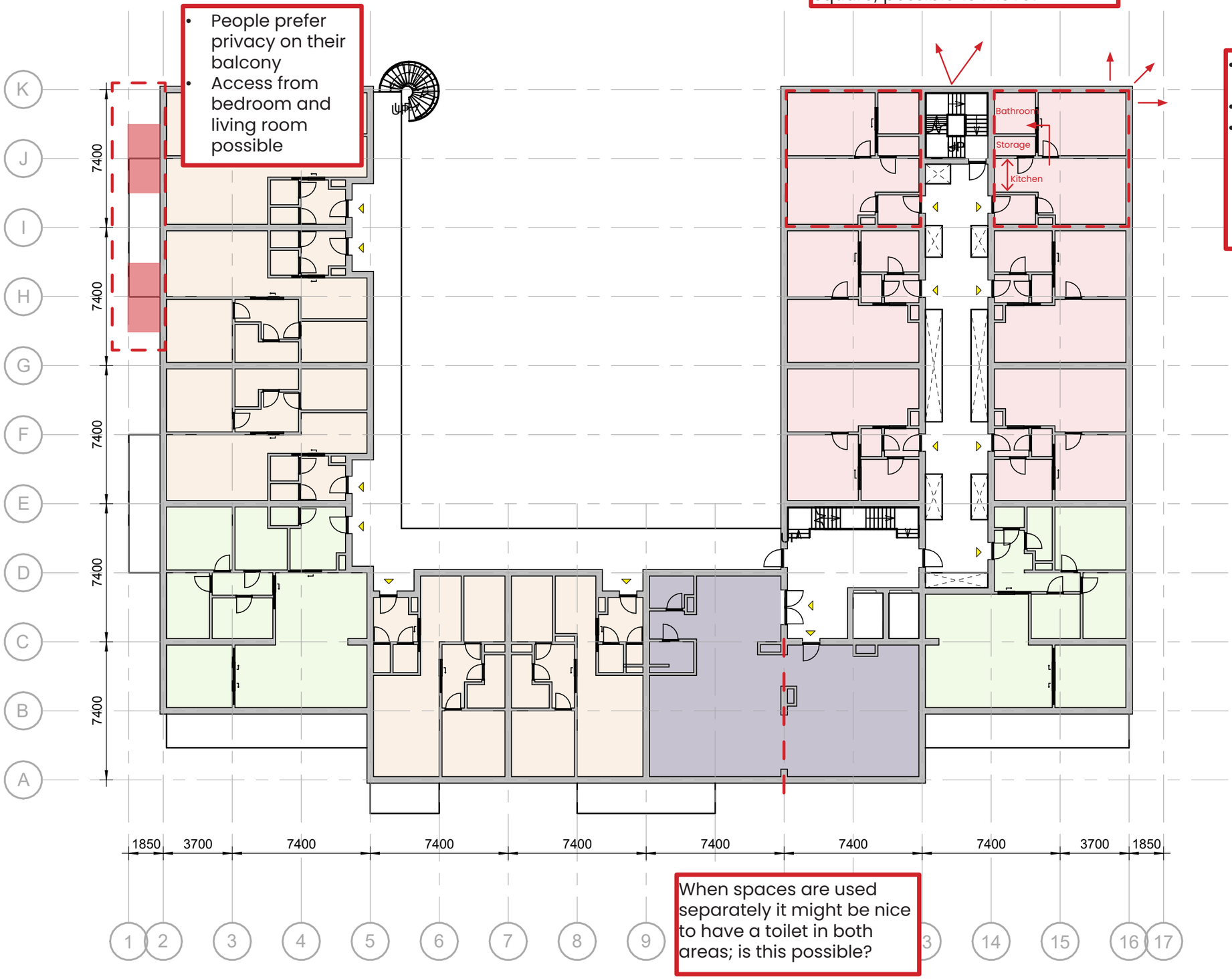
- Type 1 - Less than 50.00 m²
- Type 2 - 50.00 m² - 80.00 m²
- Type 3 - 80.00 m² or more
- Communal space - multifunctional
- Entrance

FIRST FLOOR - with feedback

1:200

- People prefer privacy on their balcony
- Access from bedroom and living room possible

Fire escape blocks the opportunity for daylight into the corridor and having a visual connection to the square; possible to move?



- Bathroom only accessible through bedroom
- Kitchen is very small
- It's a corner apartment and should have the best view but that is now not utilized; possible to orient the kitchen and living area toward the square and park side?

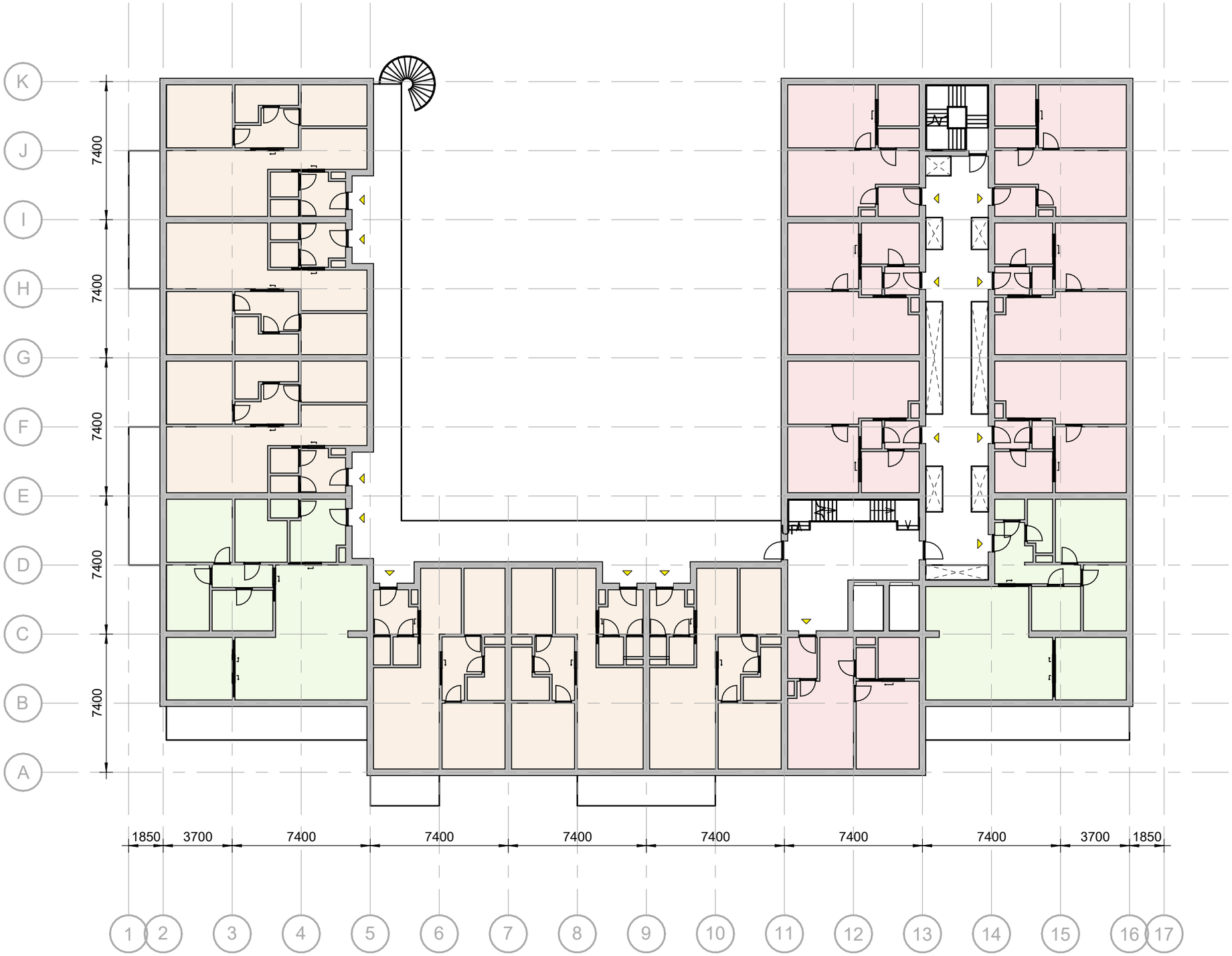
When spaces are used separately it might be nice to have a toilet in both areas; is this possible?

Balcony should be a must nowadays

Spaces

- Type 1 - Less than 50.00 m²
- Type 2 - 50.00 m² - 80.00 m²
- Type 3 - 80.00 m² or more
- Communal space - Kitchen and living area

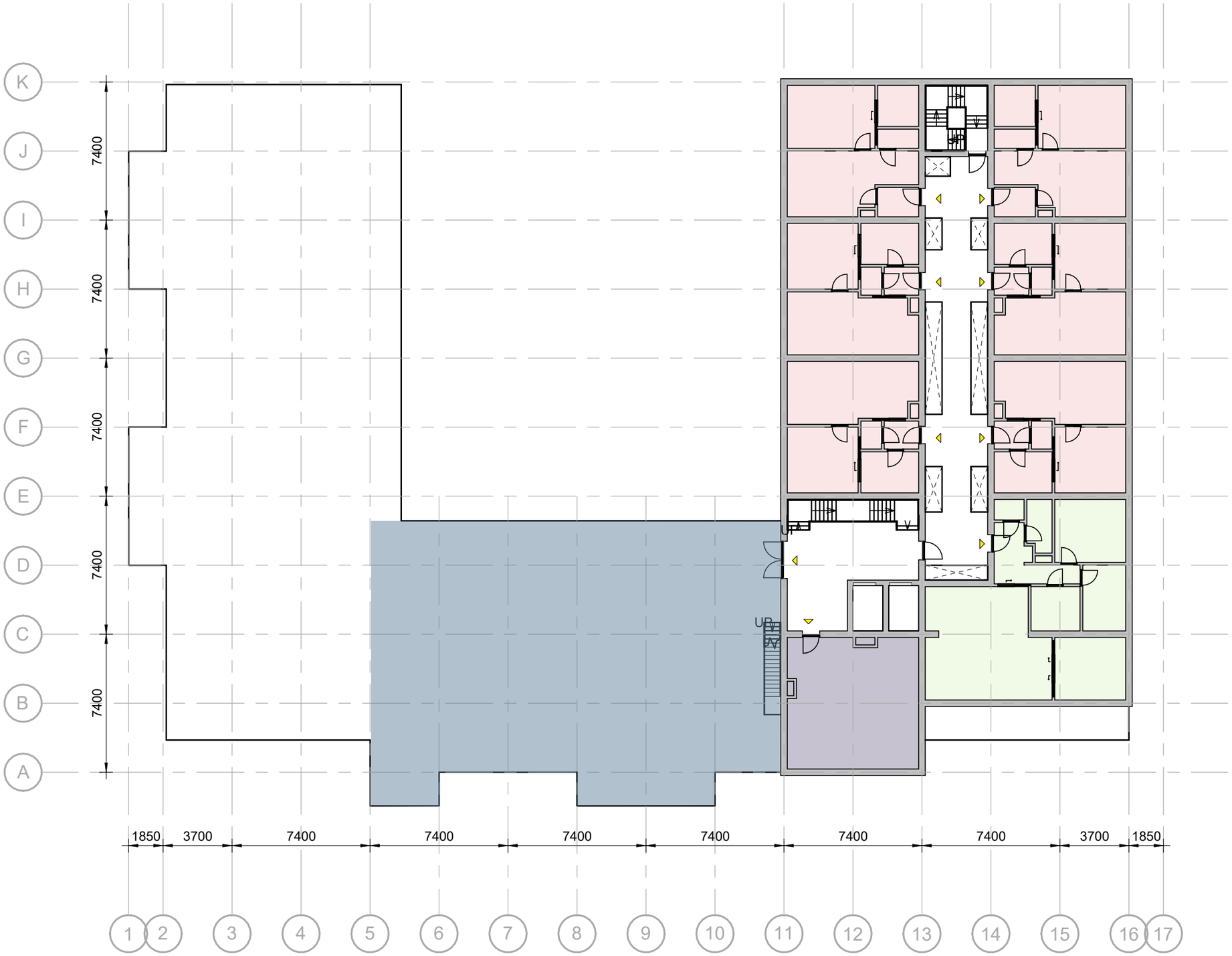
SECOND FLOOR
1:200



Spaces

- Type 1 - Less than 50.00 m²
- Type 2 - 50.00 m² - 80.00 m²
- Type 3 - 80.00 m² or more
- Communal space - Kitchen and living area

THIRD FLOOR
1:200



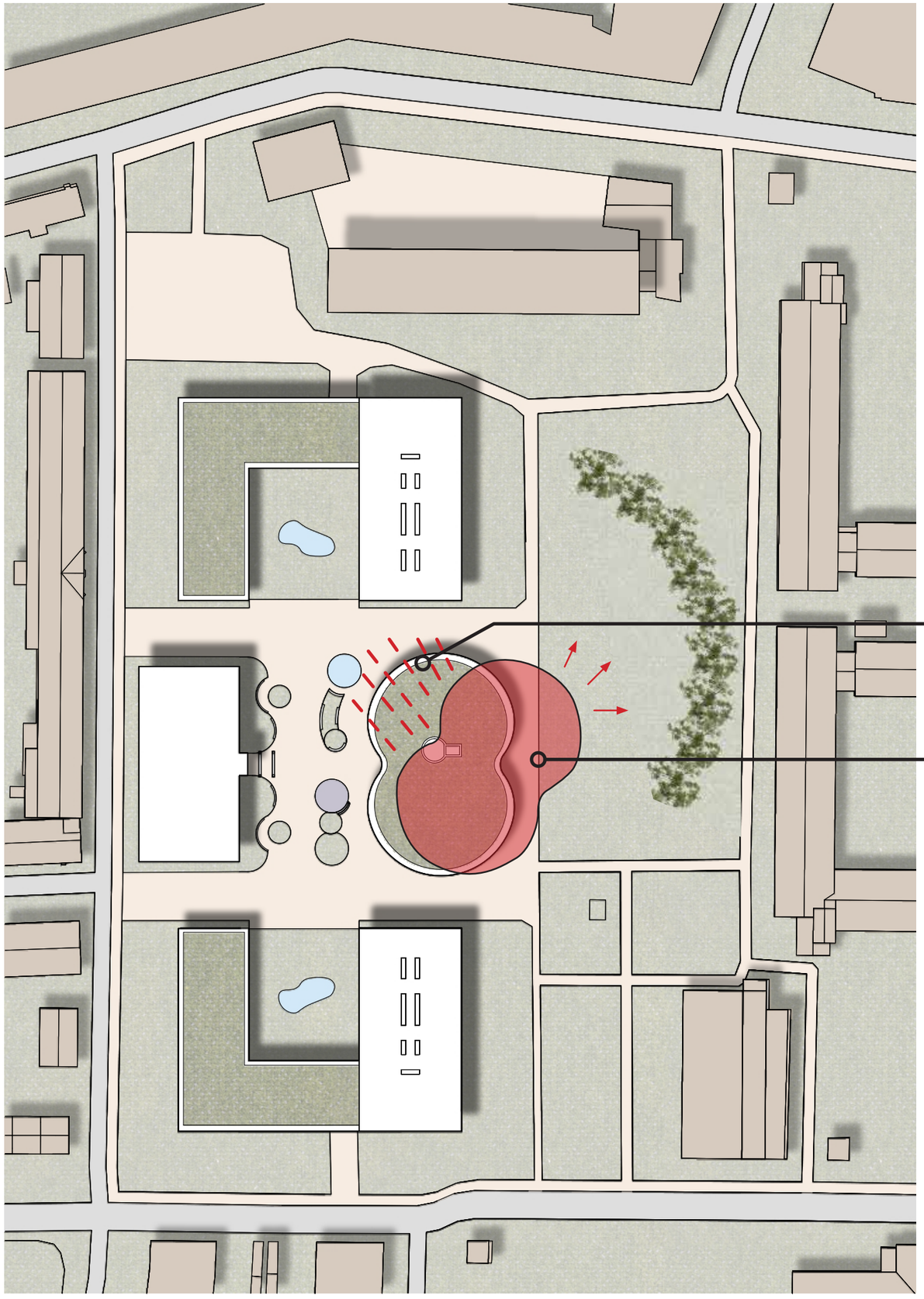
Spaces

- Type 1 - Less than 50.00 m²
- Type 3 - 80.00 m² or more
- Communal space - Laundromat
- Communal space - Rooftop garden

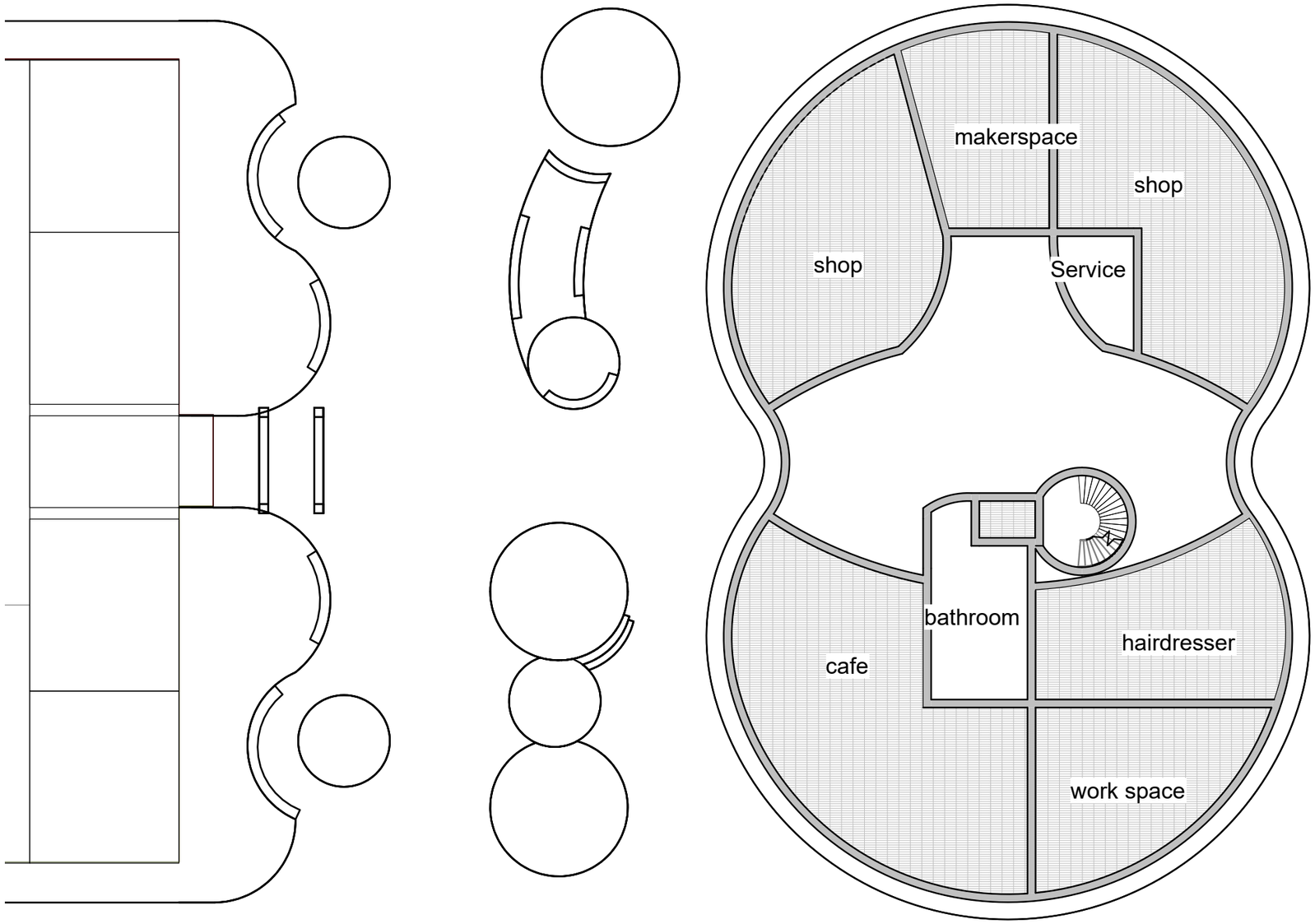
Masterplan - Community Center

The community center is rotated within the masterplan to create a stronger connection with the park and enhance its prominence. Instead of aligning with the residential buildings, this rotation reinforces its relationship with the green space, making it feel more integrated with its surroundings.

By reorienting the building, the square in front of the center expands, allowing for a more dynamic layout with distinct areas for different activities. This adjustment also improves visibility—facing the park makes the community center more noticeable and inviting from the road to the south, giving it a stronger presence within the neighborhood. Ultimately, this decision enhances both the spatial experience and the accessibility of the community center, strengthening its role as a vibrant hub for interaction and engagement.



COMMUNITY CENTER AND SQUARE
1:200

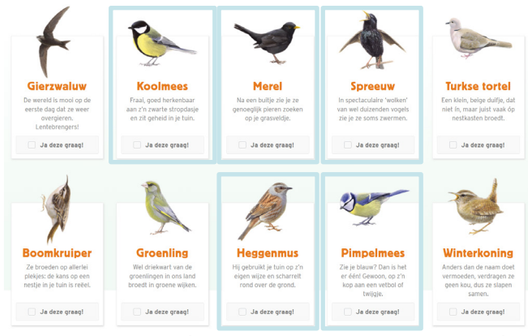


Tutoring Takeaways (A)
- Better to have 1 'less' apartment due to fire escape staircase than 2 and no daylight into corridor
- People prefer privacy on balcony > keep them separate if possible
> Go all out in making community center different within masterplan

Ecosystem Research

A well-functioning ecosystem supports biodiversity and fosters a resilient urban environment. In designing the multigenerational housing community in Tarwewijk, a key focus is creating a habitat that attracts and sustains local bird species while enhancing the quality of outdoor spaces. To achieve this, I explored the most common birds in Tarwewijk using data from **Vogelbescherming Nederland (2025)**, which provides an overview of local bird populations based on zip code. Their tool generates a list of frequently observed species, offering insight into which birds are naturally present in the area and how the design can cater to their needs.

From this research, I selected five bird species to integrate into the plan. These species were chosen based on their prevalence in the neighborhood and their ecological role in supporting a balanced habitat. Each of these birds has specific nesting, foraging, and sheltering requirements that will influence the choice of vegetation, structural elements, and green interventions in the project.



Chosen bird species (Vogelbescherming Nederland, 2025)

1. Koolmees > Great tit

- Nest: Prefers climbing plants oriented towards the sun and positioned higher up; also nests in birdhouses with an entrance hole of 28 mm.
- Food: Sunflowers attract many caterpillars and insects, and the seeds are also eaten. Hazel provides additional insects.

2. Merel > Blackbird

- Nest: Favors climbing plants such as wisteria, which can grow up to 10 meters high, preferably supported by a trellis rather than directly against a façade. Dense hedges provide additional safe nesting spots.
- Food: Wisteria attracts a variety of insects. Beech hedges retain their leaves in winter, offering both shelter and food (insects).

3. Spreeuw > Starling

- Nest: Nests in birdhouses with an entrance hole of 45 mm, preferably in groups since they breed in colonies.
- Food: Berry-producing shrubs such as hawthorn, elderberry, and rowan. Grassland and insect-rich areas are also important food sources.

4. Heggenmus > Dunnock

- Nest: Prefers nesting lower to the ground (around 2 meters) in climbing plants and dense shrubs.
- Food: Firethorn thrives in shaded areas and provides both berries and shelter. Blackberry bushes are also valuable due to their insect-attracting properties and berries.

5. Pimpelmees > Blue tit

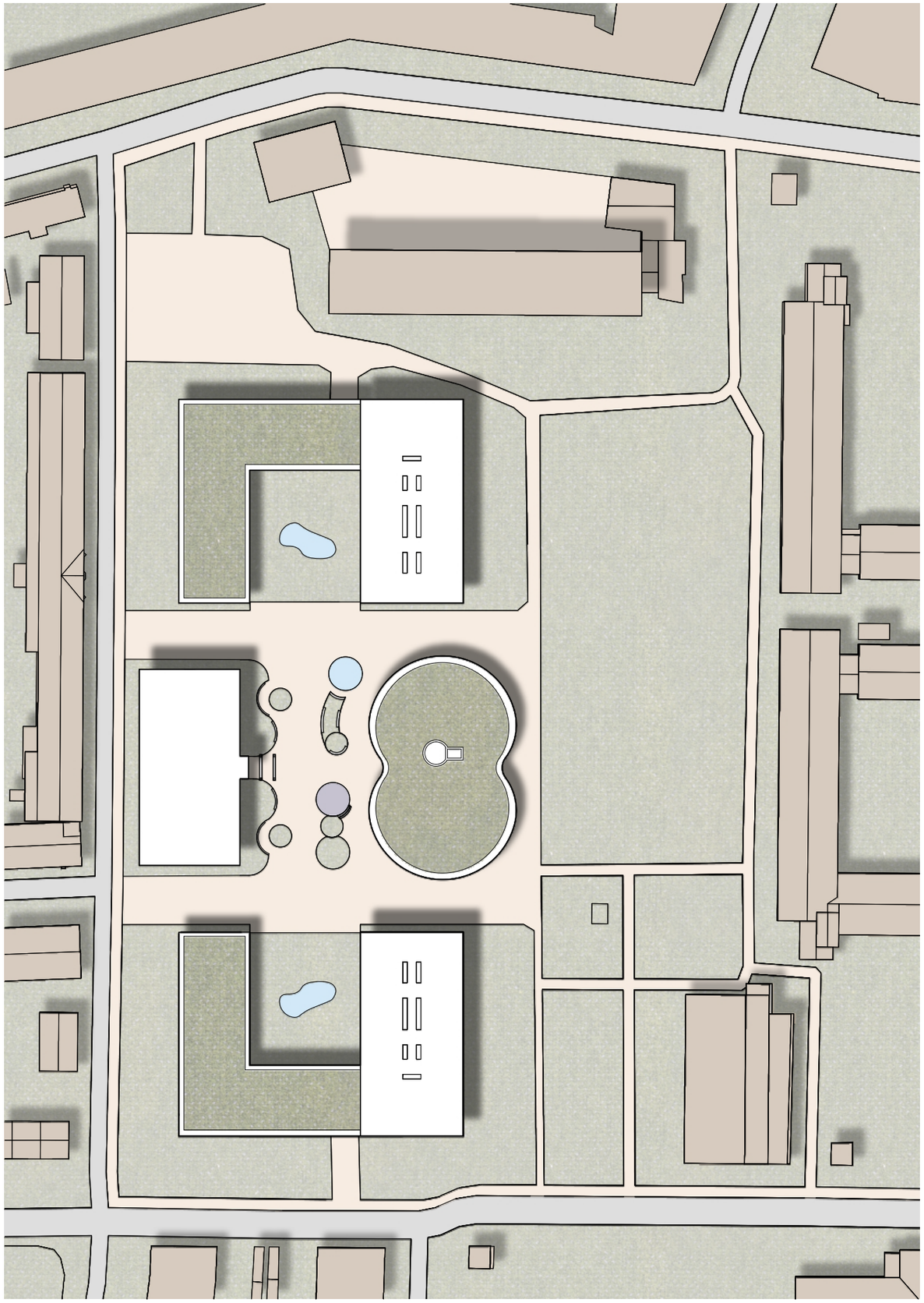
- Nest: Nests in birdhouses with an entrance hole of 25-28 mm, ideally placed at 2-3 meters height, with the opening facing northeast.
- Food: Feeds on insects and berries. Oak trees attract many caterpillars, a crucial food source for young blue tits.

	Koolmees > Great tit	Merel > Blackbird	Spreeuw > Starling	Heggenmus > Dunnock	Pimpelmees > Blue tit
Climbing plants	X	X		X	
Permanent planting and shrubs	X	X	X	X	X
Planting for butterflies			X		
Beech hedge		X		X	X
Firethorn				X	
Sunfowers	X				
Flower mix	X				X
Maple tree					
Wisteria		X			
Berry shrubs			X	X	X
Birdhouses	X		X	X	X

Conclusion

By incorporating targeted planting strategies—such as berry-producing shrubs, insect-attracting flowers, and climbing vegetation—the design also strengthens the connection between residents and their natural surroundings. Additionally, elements like nesting boxes, green façades, and varied vegetation layers provide essential resources for these species.

This approach aligns with the broader vision of creating a socially and ecologically sustainable living environment, where both people and nature thrive together.



Ecosystem integration in the Masterplan

The masterplan incorporates the carefully designed ecosystem that enhances biodiversity while contributing to the overall functionality and experience of the space. The shared garden orientated to the South has been planned specifically to **attract butterflies**, featuring nectar-rich flowering plants that support pollinators. Additionally, the **outer edges of the buildings** are designed with strategic planting that not only contributes to biodiversity but also enhances **privacy** for residents.

To maximize ecological benefits, **blind façades** have been utilized for climbing plants and bird-friendly features. These surfaces provide **nesting opportunities** for species such as the dunnock and blackbird, which prefer dense vegetation for shelter. In **shaded areas**, dedicated bird nesting spots offer safe breeding environments, particularly for species like the blue tit and great tit, which require a mix of insect-rich planting and concealed nesting sites.

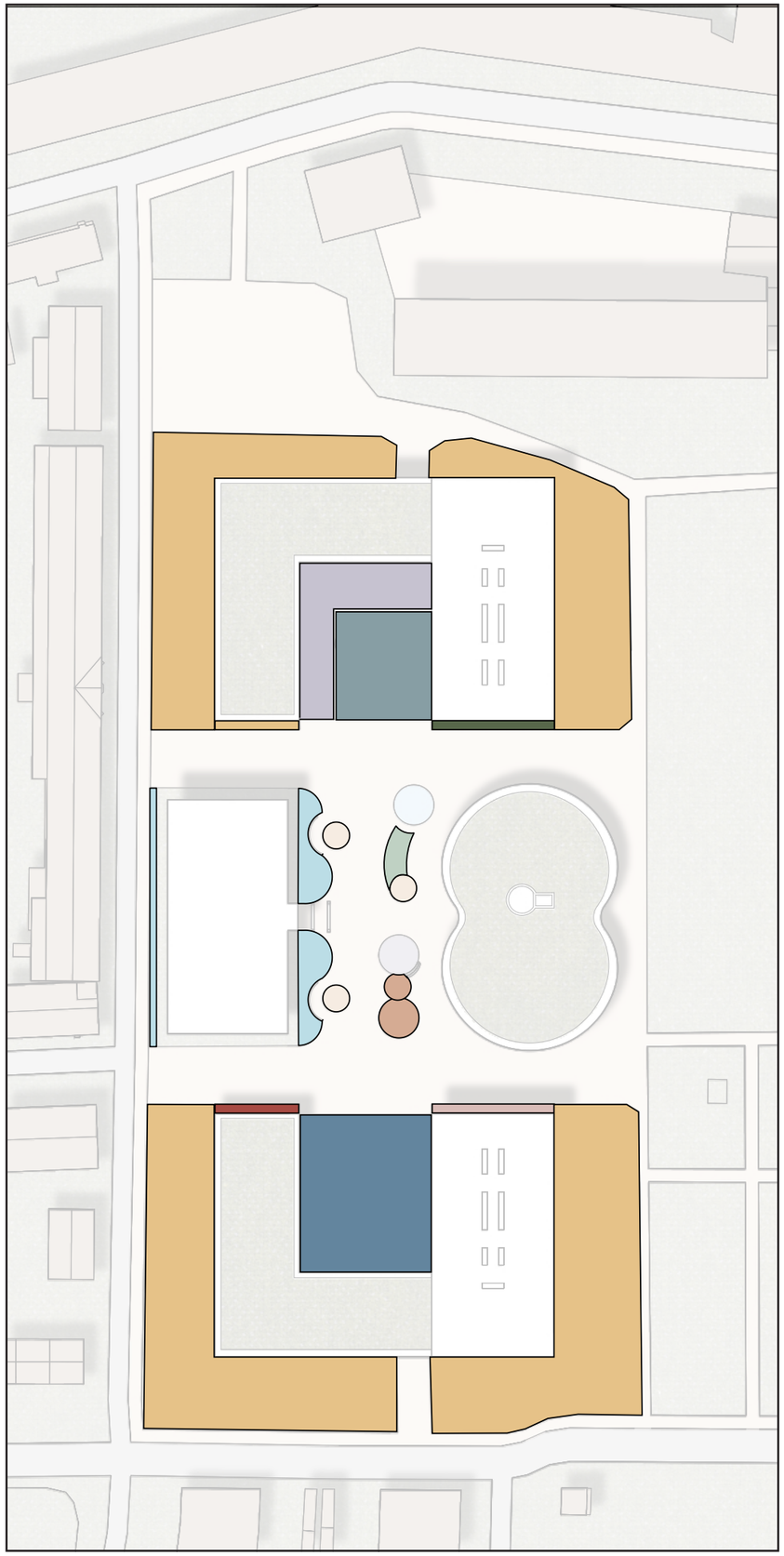
A critical ecological feature is the **flight path for birds**. To support this, the birdhouses are positioned on the **north façade**, ensuring an unobstructed approach route over the community center. This placement aligns with the natural flight patterns of species like starlings and blue tits, which prefer north-facing nesting spots for temperature regulation.

The central plaza is designed as a multifunctional green space, featuring **large trees** that provide shade while supporting a **mix of flowering plants** to introduce seasonal color and attract insects, essential for bird populations. Additionally, the **pergola** is covered with colorful climbing plants to serve as a visual and social focal point but also attracts 'innocent' insects—beneficial prey for insectivorous birds such as the great tit and blackbird.

By integrating these ecological principles, the masterplan creates a balanced, nature-inclusive living environment that supports both biodiversity and community well-being.

Legend

- Permanent planting and shrubs
- Permanent plants for privacy
- Focus on planting for butterflies; located in the sun
- Beech hedge for privacy > retaining leaves in winter is important for privacy and attracts insects
- Sunflowers > great tit and Flower mix > insects
- Maple tree > provide shade
- Pergola with wisteria > blackbird
- Focus on planting for birds; more in the shade > plants with berries and those that attract insects
- Climbing plant oriented to the south for nest builders; dunnock, blackbird, and great tit
- Nesting boxes in the façade for blue tits and starlings > facing north with a flight path from the northeast
- Firethorn growing on the façade > dunnock



Tutoring Takeaways (BT)

- Very good insight into ecosystem
- Possible to make schemtic diagrams of all you choices within the masterplan > separate them an keep it simple
- Start researching materials and what about sustainable materials

Week 3.4

Refining Floorplans and Material Choices

Floorplans for Blocks 1/3 were further developed based on the feedback, while initial plans for Block 2 were created. The masterplan was refined by integrating previous research and design choices. Additionally, a study on construction methods and materials was conducted, analyzing their advantages and disadvantages to support informed decision-making.

Blocks 1 and 3

FIRST FLOOR – with solutions based on feedback last week

1:250



- Corridor with natural daylight
- Living area orientated toward square and park > visual connection possible

- Balcony for every apartment type
- Detached from neighbor

- Fire escape moved
- 35m² apartment created

- Extra toilet in kitchen area

Spaces

- Type 1 - <35m²
- Type 2 - 35-50m²
- Type 3 - 50-80m²
- Type 4 - >80m²
- Communal

Blocks 1 and 3

GROUND FLOOR – with feedback

1:250



Blocks 1 and 3
FIRST FLOOR



Spaces

- Type 1 - <35m²
- Type 2 - 35-50m²
- Type 3 - 50-80m²
- Type 4 - >80m²
- Communal

Blocks 1 and 3
SECOND FLOOR
1:250



Spaces

- Type 1 - <35m²
- Type 2 - 35-50m²
- Type 3 - 50-80m²
- Type 4 - >80m²
- Communal

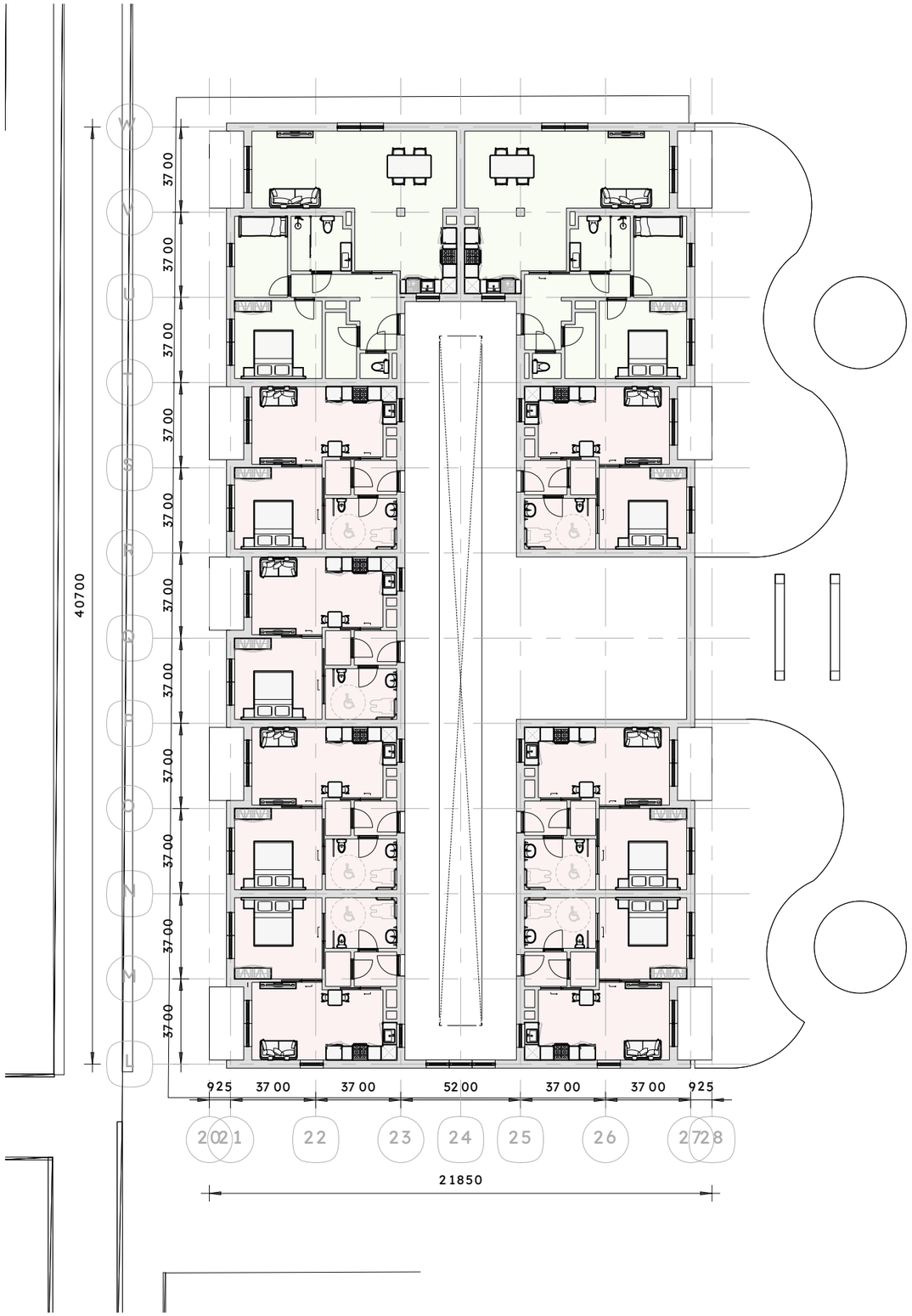
Blocks 1 and 3
THIRD FLOOR
1:250

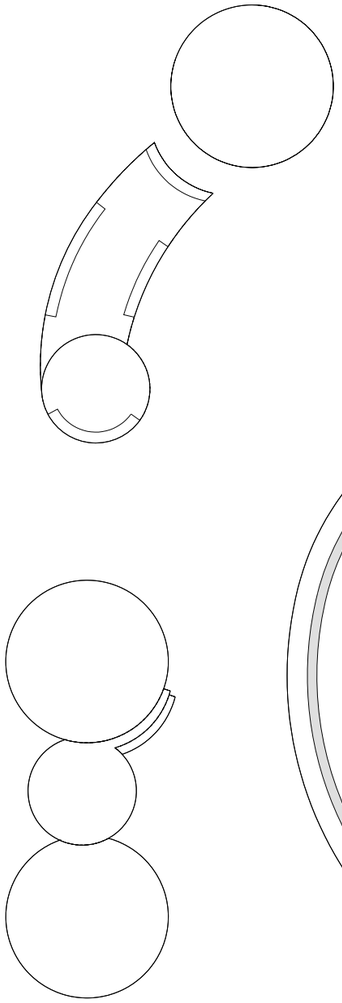


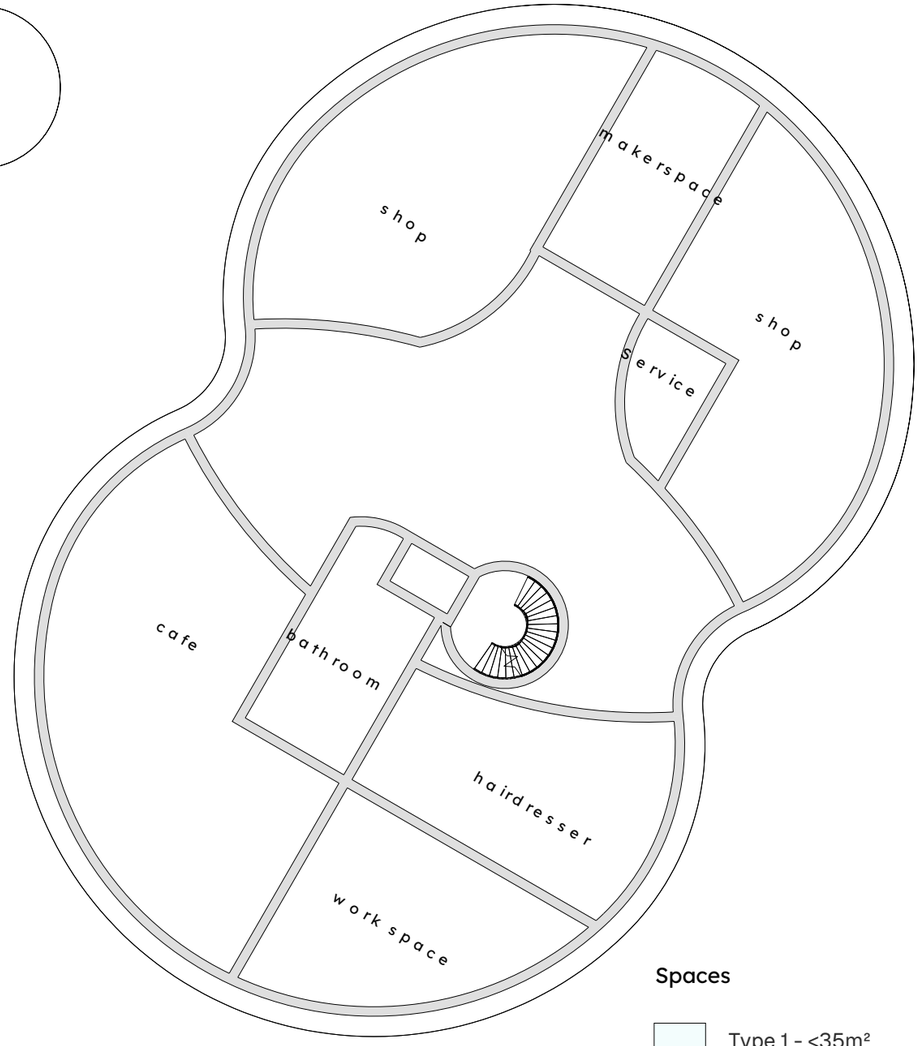
Spaces

- Type 1 - <35m²
- Type 2 - 35-50m²
- Type 3 - 50-80m²
- Type 4 - >80m²
- Communal

Block 2 and Community Center
GROUND FLOOR
1:250



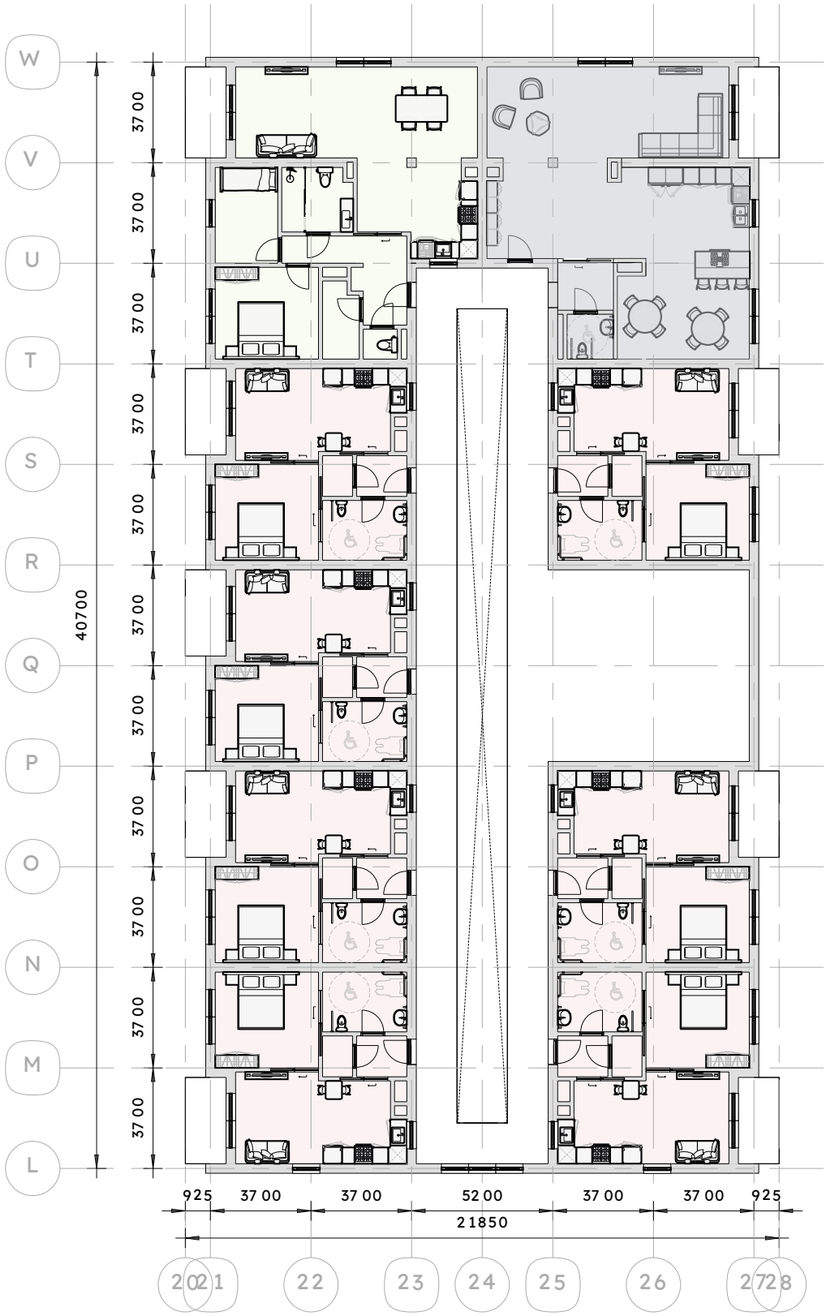


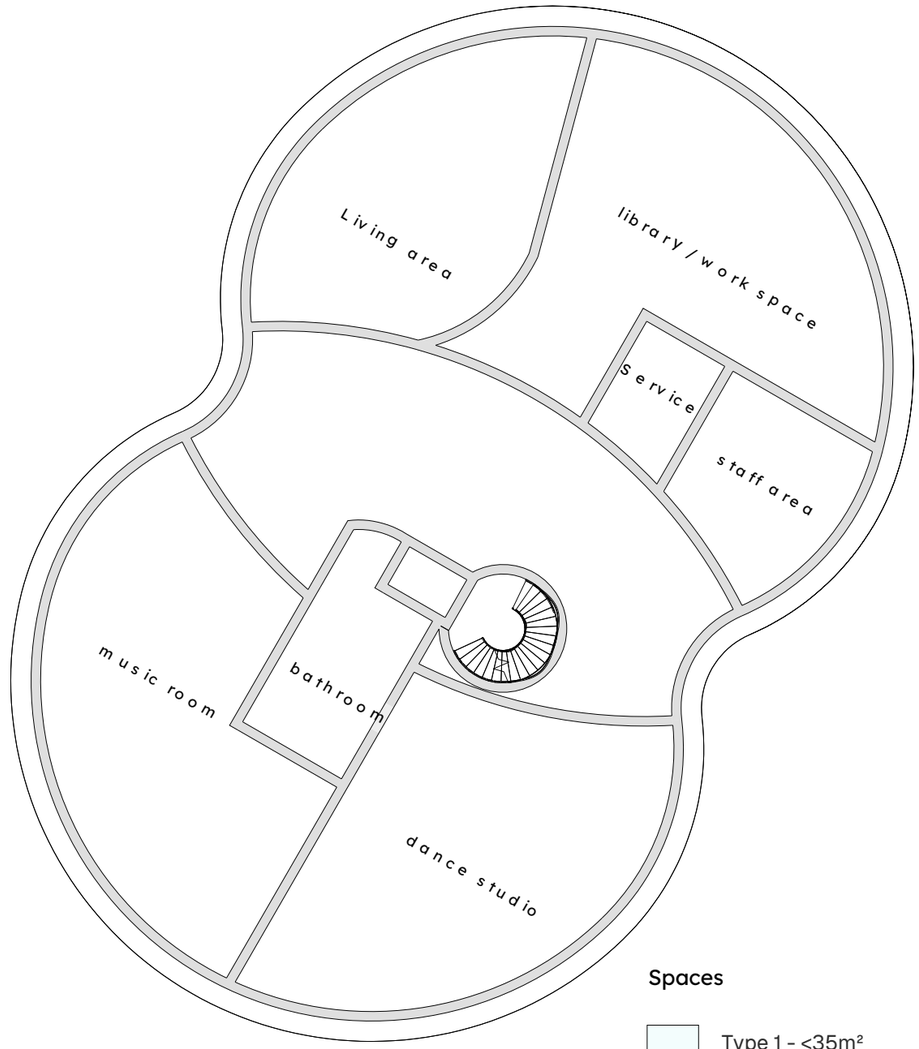


Spaces

- Type 1 - <35m²
- Type 2 - 35-50m²
- Type 3 - 50-80m²
- Type 4 - >80m²
- Communal

Block 2 and Community Center
FIRST FLOOR
1:250

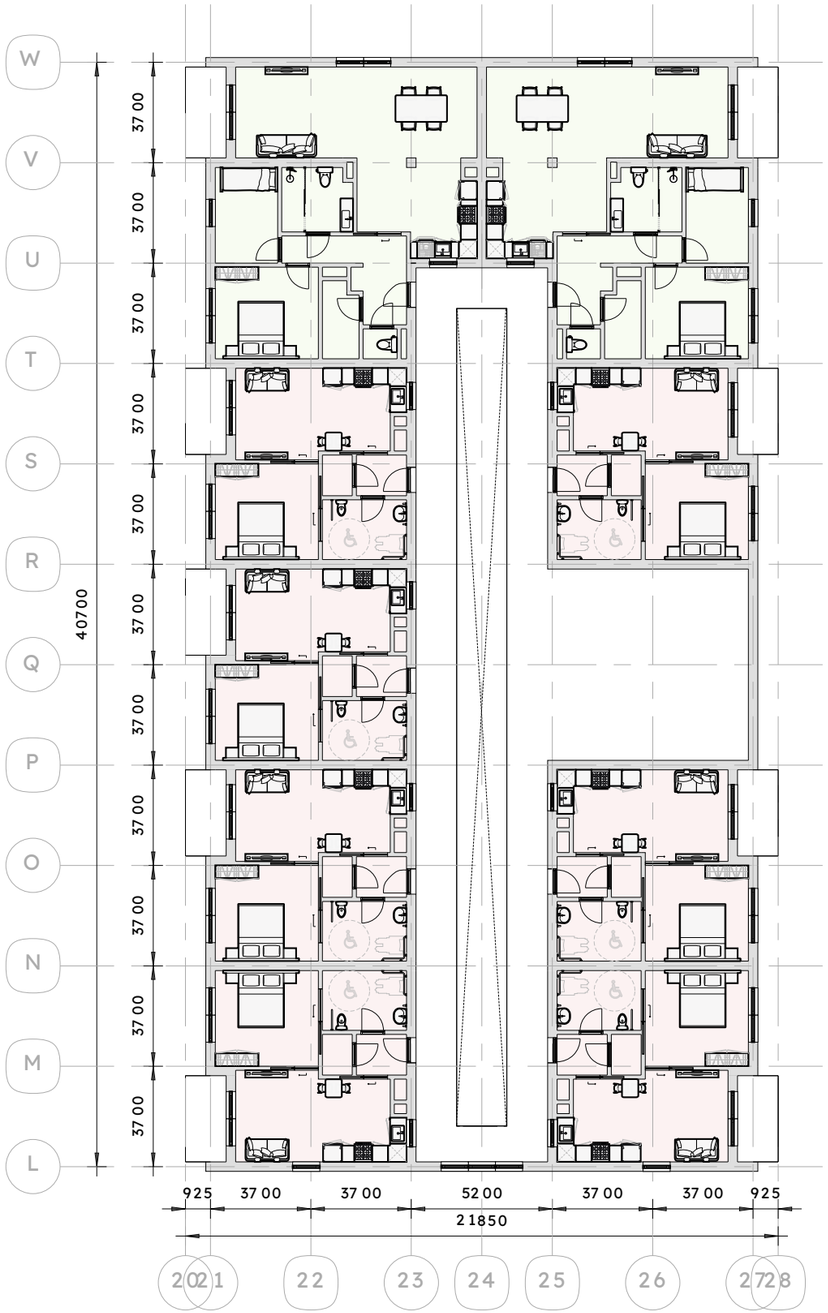


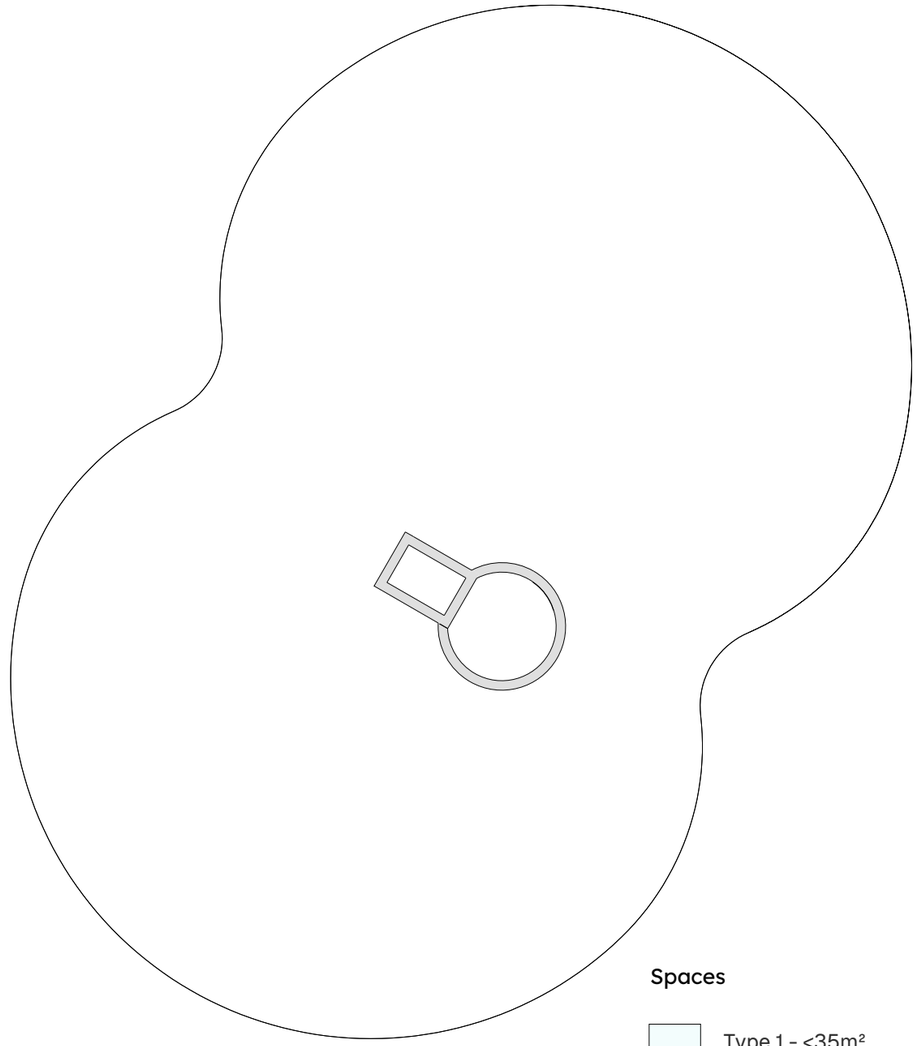


Spaces

- Type 1 - <35m²
- Type 2 - 35-50m²
- Type 3 - 50-80m²
- Type 4 - >80m²
- Communal

Block 2 and Community Center
SECOND FLOOR
1:250

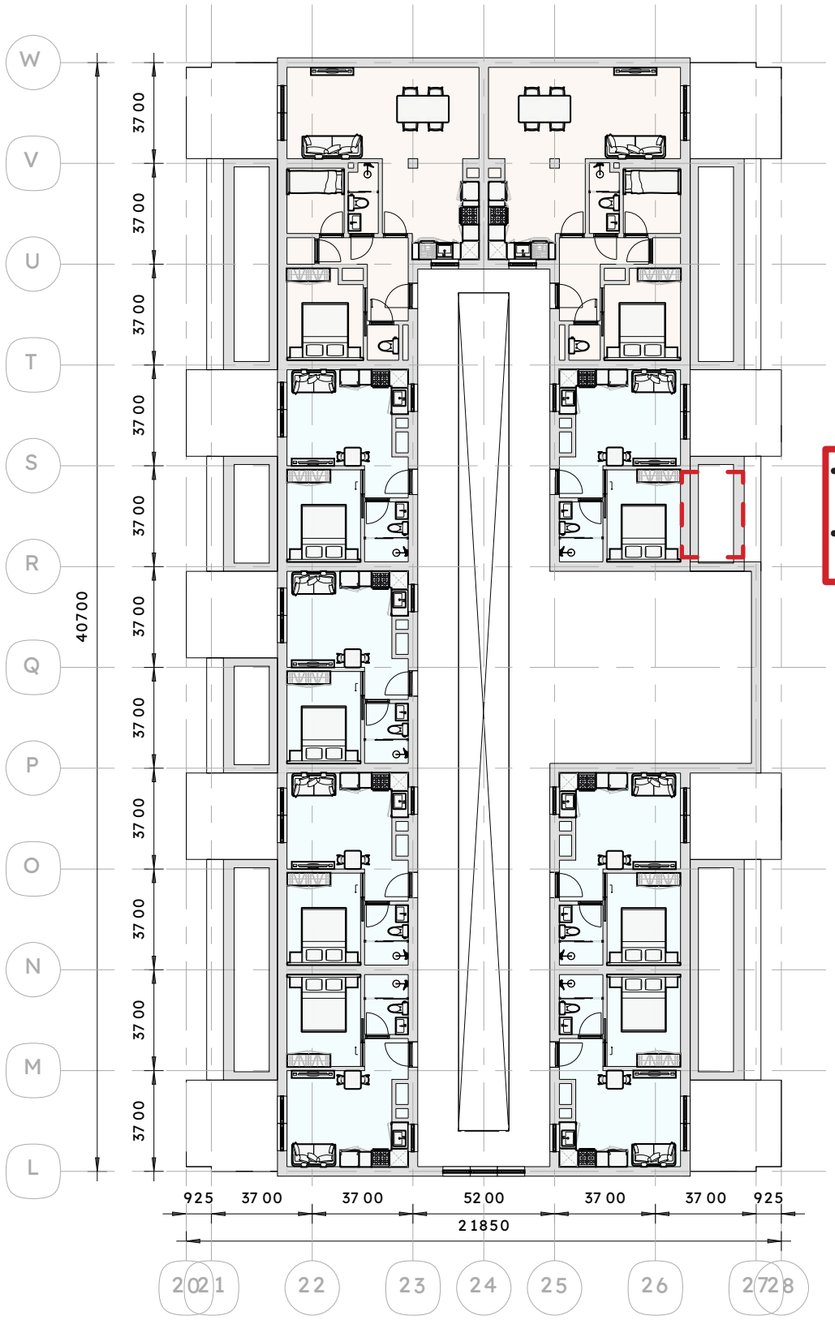




Spaces

- Type 1 - <35m²
- Type 2 - 35-50m²
- Type 3 - 50-80m²
- Type 4 - >80m²
- Communal

Block 2
THIRD FLOOR - with feedback
1:250

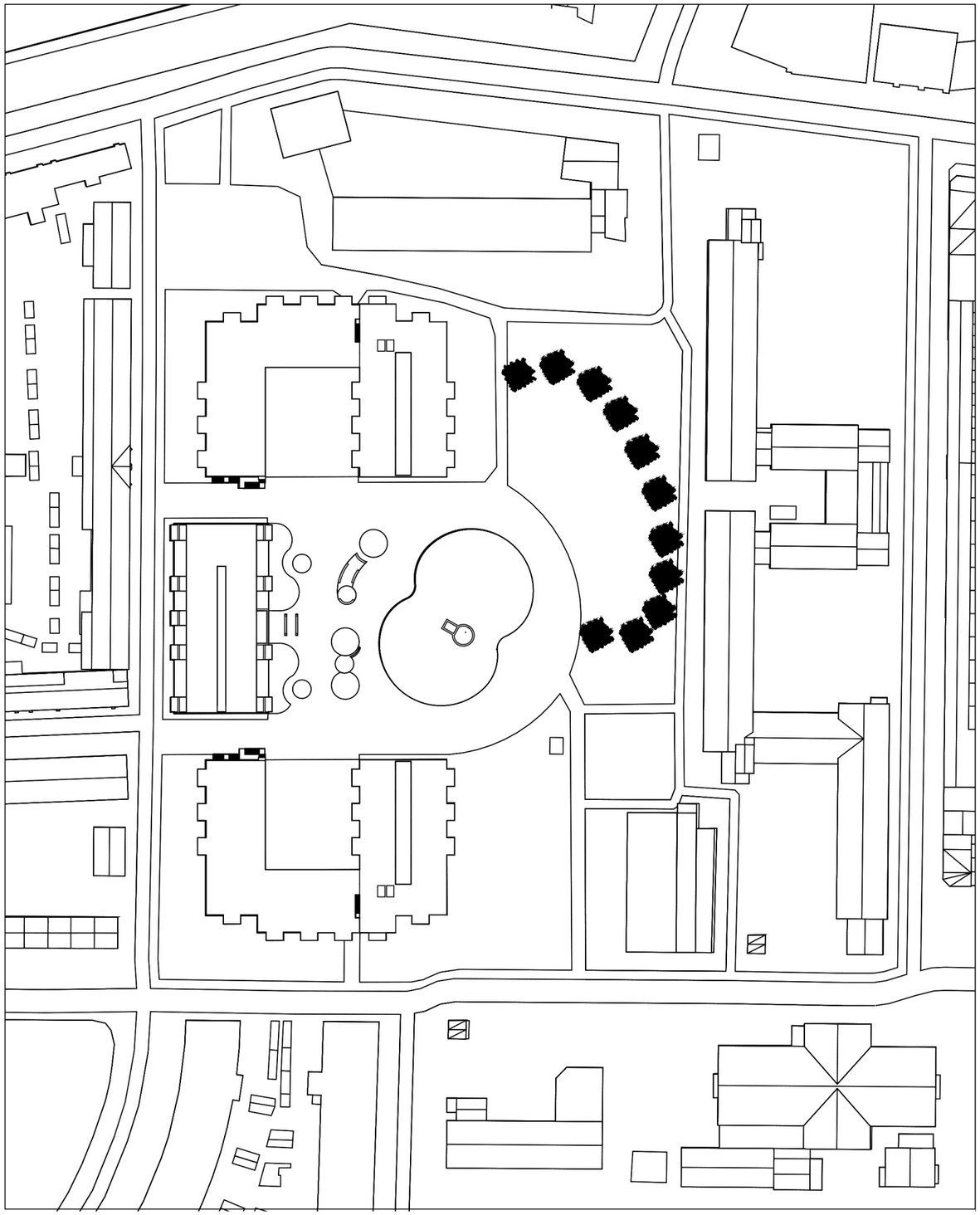


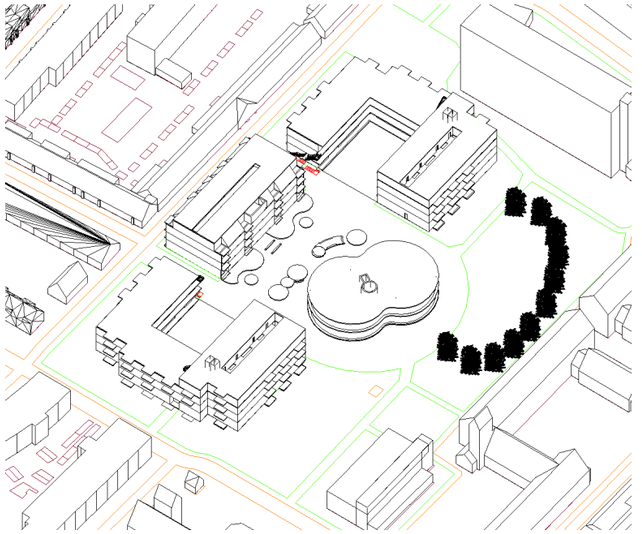
- Dormer needed for daylight in bedroom
- Bed can have a width of 1.4m

Spaces

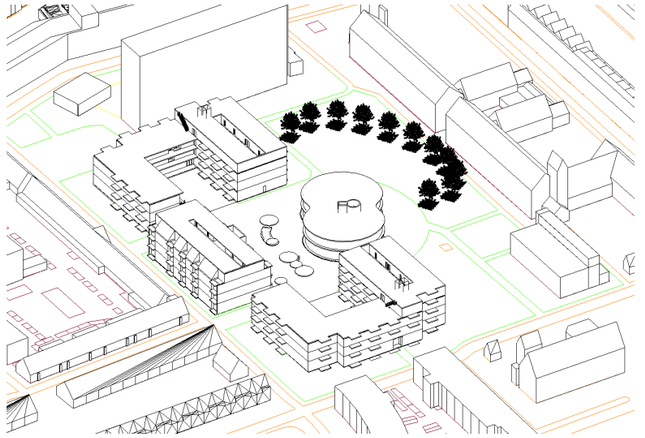
- Type 1 - <35m²
- Type 2 - 35-50m²
- Type 3 - 50-80m²
- Type 4 - >80m²
- Communal

Masterplan

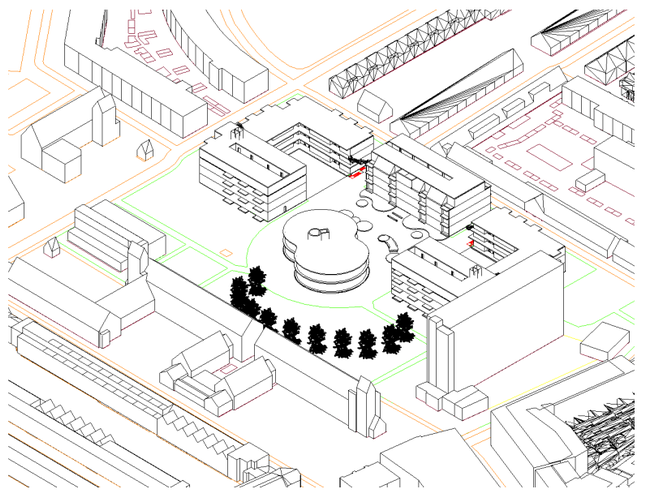




South east



South west

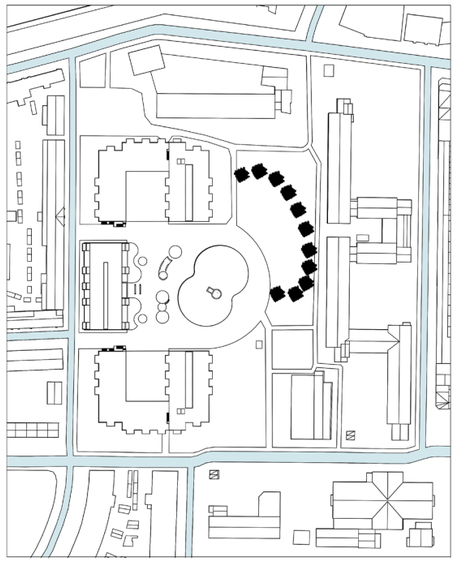


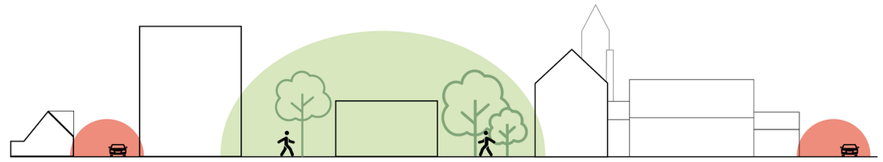
North east

Tutoring Takeaways (A)
- Improve type 3
- Make a section through block 2 for dormer placement in bedroom
- Have a look at roofs in the neighborhood when defining the roof of block 2
- Start working on the facades

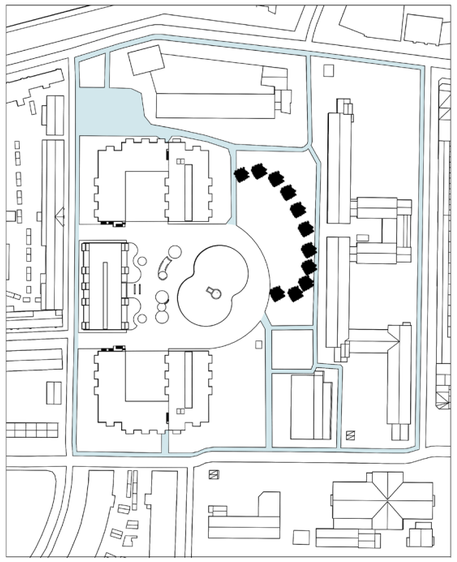
Diagrams 1:1000

Cars

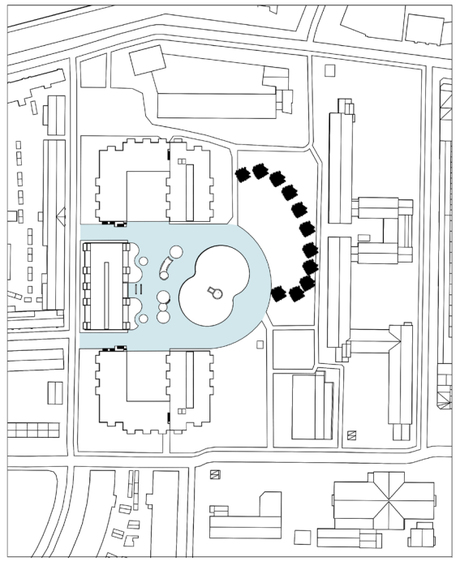


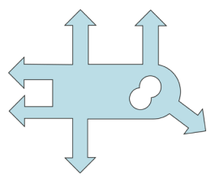


Walking

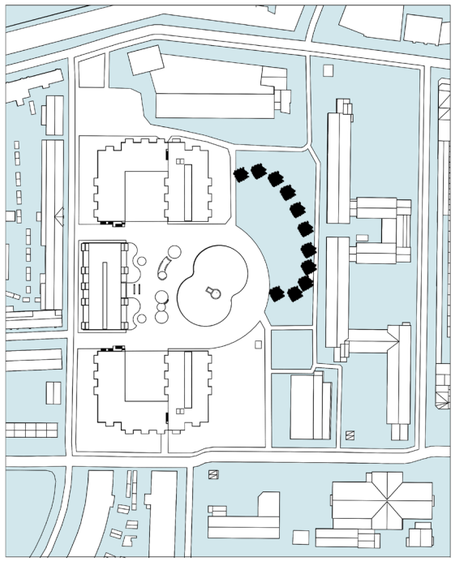


Square

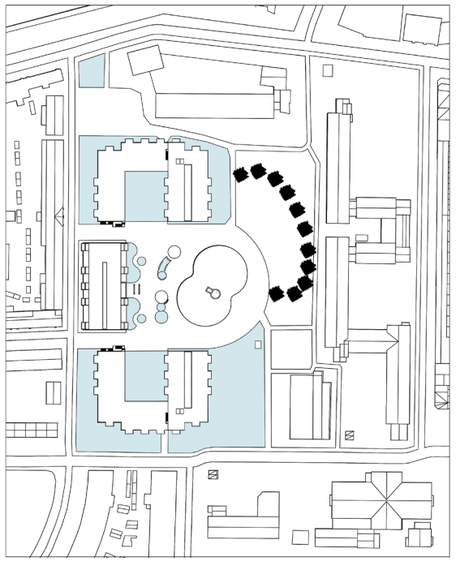




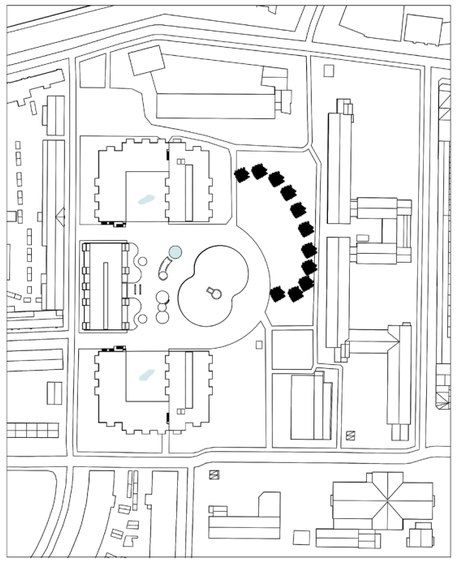
Greenery - exisiting



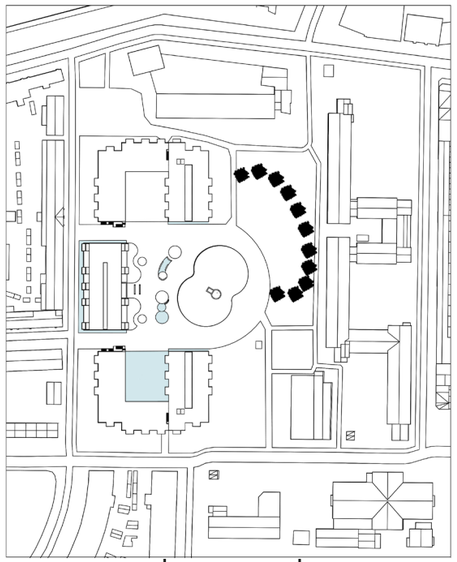
Greenery - new

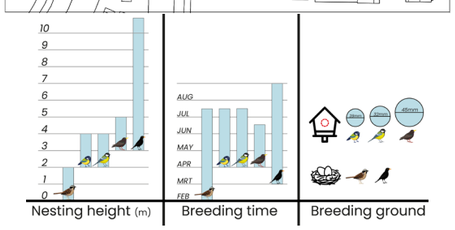


Water

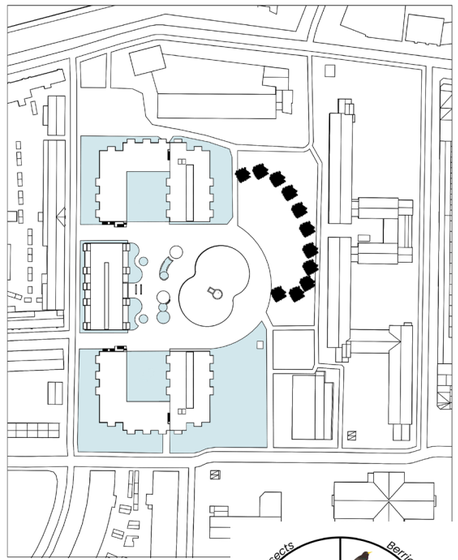


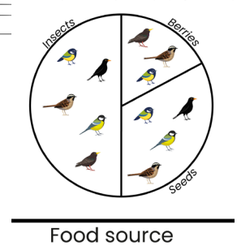
Ecosystem - Birds



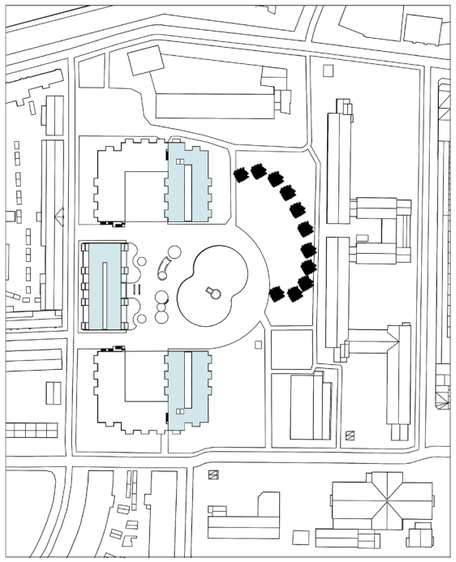


Ecosystem - Insects

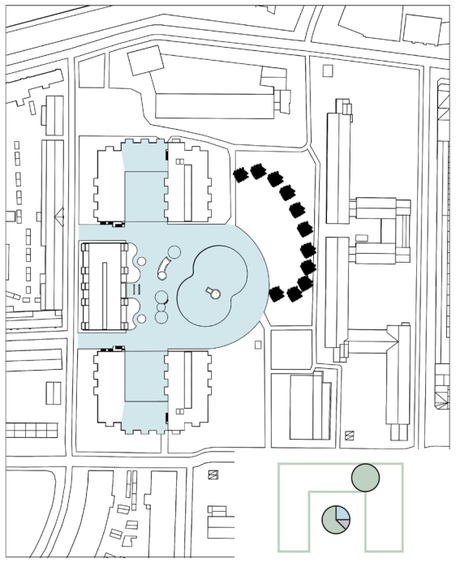


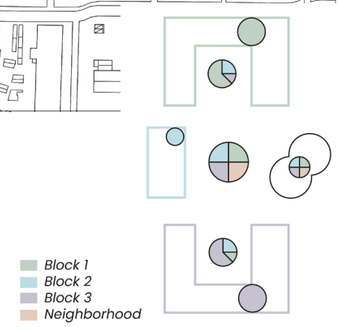


Service roof



Social points





Construction Research

Method

	STRUCTURE	STRUCTURE	STRUCTURE
Vertical	Columns	Disk construction	Monolithic
	A structural framework that is independent of the infill. There is a complete distinction between load-bearing and separating elements.		There is a unity between load-bearing and separating materials; walls are both load-bearing and separating.
	SKELETON CONSTRUCTION	LOAD BEARING WALLS	TUNNEL
	POSITIVES	POSITIVES	POSITIVES
	Does not require complicated formwork. Needs little space on the construction site	Facades are non-load-bearing; large openings are possible. Floor areas are less restricted compared to the walls, but be mindful of the buckling length.	Cost-effective in large quantities Fast construction time Smooth finish for walls and floors. Concrete load-bearing walls and floors meet noise disturbance requirements.
	NEGATIVES	NEGATIVES	NEGATIVES
	Floor areas are structure-defining.	This building method is relatively closed and space-defining; openings are possible but limited by the materials used. Walls must be rigidly fixed.	Only applicable in large repetition. Rigid structure. Requires great uniformity Clear spatial formation (tunnel)
	Sorts	**Sorts**	**Sorts**
	Concrete	Concrete	Concrete
	In situ Prefab Prestressed	prefab on site UHPC (ultra high performance concrete) Cellular concrete	Prefab In Situ
	Wood	Wood	
	Solid Timber Glulam (Glued Laminated Timber) CLT LVL	Solid wood beams and panels CLT LVL (laminated veneer lumber)	
	Steel	Bricks	
	I or H profiles HSS (Hollow Structural sections) Composite steel-concrete columns		

	STRUCTURE			
Horizontal	FLOOR			
	Prefab concrete (Hollow core slab / semi-precast slab)	IN SITU CONCRETE	WOOD	STEEL
	POSITIVES	POSITIVES	POSITIVES	POSITIVES
	Faster installation consistent quality reduced on-site labor	Strong fire-resistant versatile in design	Sutainable esthetics versatile in design	for balconies etc versatile in design
	NEGATIVES	NEGATIVES	NEGATIVES	NEGATIVES
	Transportation costs limited flexibility in design	Labor-intensive long curing time requires formwork		needs fire proofing thin
	Concrete			
	Slabs in situ Semi precast slab Prefab hollow slab			
	WOOD			
	Solid timber -beams CLT LVL + Glulam timber box element floor >lignatur >kielsteg	spans 4-8m / depth 120-320mm		
	Steel			
	Grated steel composite steel deck floor			

	STRUCTURE		
	ROOF		
	Hellend	Plat	free form
	POSITIVES	POSITIVES	POSITIVES
	Shape of the inside and outside is perceivable. Water drainage sunorientation The building becomes less stiff.	Various roofing materials are possible. To create a rooftop landscape. Can be used as a functional surface. Water storage is possible.	Can be an architecture feature optimally adapted to design endless possibilities with CAD
	NEGATIVES	NEGATIVES	NEGATIVES
	No direct view; no street connection. Loss of voluminous space.	Determining for architecture. Heatstress	Difficult construction often expensive Restriction with possible material

Materials

	Columns	Disk construction	Monoliet	NOTES
CONCRETE	POSITIVES	POSITIVES	POSITIVES	
	High compressive strenght Fire resistant Durable	High compressive strenght Fire resistant Sound-dampening.	High compressive strenght Fire resistant Durable	
	NEGATIVES	NEGATIVES	NEGATIVES	4m high-2,55 wide, 18,75 m long (truck)
	Heavy High Co2 footprint with production Needs a cast (formwork)	Heavy High Co2 footprint with production Less flexible	Prefab only in small scale High Co2 footprint with production rigid Needs water sealment	
WOOD	POSITIVES	POSITIVES		
	Renewable material Warm esthetics Lightweight	Renewable material Warm esthetics Lightweight High tensile strength.		
	NEGATIVES	NEGATIVES		
	Moisture Requires fireproofing treatment	Sensitive to moisture; impregnation needed. Requires fireproofing treatment		Overdimensioning is possible
		BRICKS		
STEEL	POSITIVES	POSITIVES		
	High strenght to weight ratio Flexible in design Fast to construct	sustainable Moisture-resistant. Fire proof		
	NEGATIVES	NEGATIVES		
	Corrosion Requires fireproofing treatment	Heavier then wood Less flexible		

	PREFAB HOLLOW SLAB	SEMI PRECAST SLAB	IN SITU CONCRETE	WOODEN SLAB/CLT	HOLLOW WOOD SLAB	STEEL
	POSITIVES	POSITIVES	POSITIVES	POSITIVES	POSITIVES	POSITIVES
	Lightweight - 1800kg/m³ Fast construction time Strong Sustainable Pipes can be integrated into holes. Good sound and thermal insulation through channels.	Flexible design combined with pipes and openings. Strong and monolithic combined with pressure layer. less cast materials good sound and thermal isolation Adjustments possible on-site. The possibility to embed pipes in the top layer.	High compressive strenght Fire resistant Durable Heavy loads possible	Sustainable material: Wood is a renewable material and stores CO_2. Lighter than concrete-450kg/m³ Fast construction time Good insulation: Natural thermal insulation and moisture-regulating. Potential aesthetic quality: wooden finish.	Lightweight - 510kg/m³ Sustainable material: Wood is a renewable material and stores CO_2. Pipes can be integrated into holes. Fast construction time Good thermal insulation – insulation value. Potential aesthetic quality: wooden finish.	High strenght to weight ratio Long spans possible
	1200x260 = 10 m spanning (VBI)	**8-10 m maximum spanning**	**8-10 m maximum spanning (niet te vinden)**	**5,4m - 6 m optimal (up to 7)**	**Optimal 7,5 m**	**9 m maximum**
	NEGATIVES	NEGATIVES	NEGATIVES	NEGATIVES	NEGATIVES	NEGATIVES
	Limited flexibility; connections and openings are predefined. Transportation costs: Due to the prefab process, there are logistical costs. An additional pressure layer is needed for heavy loads.	longer building time then hollow slab, curing time heavier (2400kg/m³) then hollow slab, needs more support during building process more support is needed	Heavy - 2400kg/m³ High Co2 footprint Needs proper curing	Acoustics/vibrations. Fire resistance Wood expands and contracts with moisture, so proper waterproofing is necessary. Higher costs than concrete.	Acoustics/vibrations. Fire resistance Wood expands and contracts with moisture, so proper waterproofing is necessary. Higher costs than concrete.	Acoustics are bad Requires corrosion protection

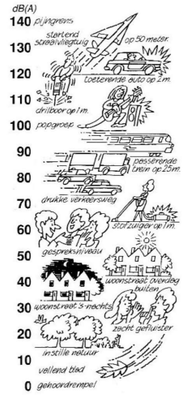
Acoustics

For contact insulation in a room above the bedroom, the standard requires an L'nT,w value of ≤ 54 dB in the case of normal comfort, and ≤ 58 dB for increased comfort.

High	High	High	Low	Low	Almost none

Classificatie volgens ISO/TS 19488.

Klasse	Algemeen
A	Een stille omgeving met een hoog niveau van bescherming tegen binnenkomend geluid. Deze klasse kan worden toegepast als een aanzienlijk beter akoestisch klimaat dan Klasse C wordt gevraagd.
B	Onder normale omstandigheden een goede bescherming tegen geluid, zonder noemenswaardige beperking van het gedrag van de buren. Deze klasse kan worden toegepast waar een beter akoestisch klimaat dan Klasse C wordt gevraagd.
C	Bescherming tegen aanzienlijke verstoring, gegeven normaal gedrag van de buren die rekening houden met andere bewoners. Nieuwe bouwwerken in veel landen moeten waarschijnlijk voldoen aan deze klasse of deze klasse overtreffen.



Conclusion

For the residential buildings, **concrete** is chosen as the primary material due to its durability, fire resistance, and acoustic benefits. However, to reduce environmental impact, the mix will **incorporate recycled materials** from the demolition of existing buildings. Further research will be conducted to explore the feasibility of integrating these waste materials into the concrete mixture. Additionally, a **disk construction system** is selected, as the strict grid layout of the buildings allows for an efficient load-bearing structure.

In contrast, the community center will be constructed using **timber**. This choice not only emphasizes sustainability but also gives the building a warm and inviting character, reinforcing its role as a social hub within the development. Timber construction also allows for a lighter structure, faster assembly, and a reduced carbon footprint compared to conventional materials. By differentiating the materiality of the community center from the residential buildings, the design strengthens its identity while maintaining harmony within the overall masterplan.

Tutoring Takeaways (BT)

- Research circularity of concrete > Concrete Valley
- In the glass roof of the corridor windows should be integrated that open automatic in case of fire
- Make a solar study for window placement in the facade > what do you offer the apartments orientated to the south and in the shade?
- In block 2 it's not necessary to have two staircases in the same location > make the balconies the safe space (when outside you're safe)

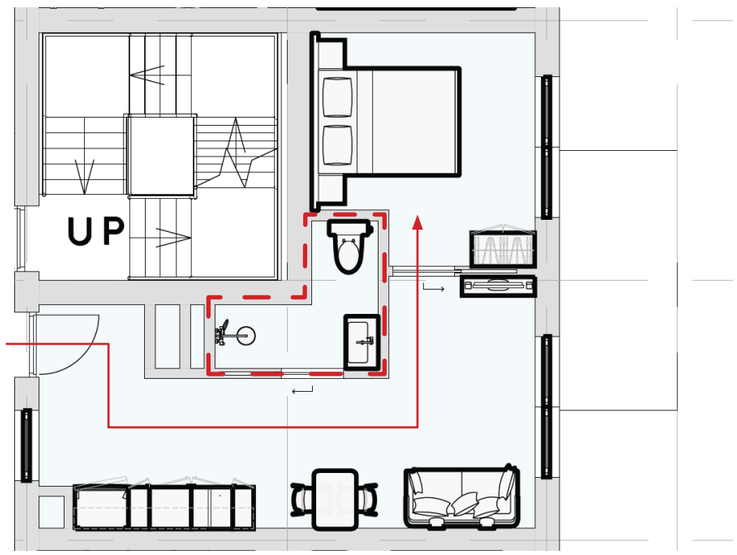
Week 3.5

Finalizing Floorplans and Forming Facades

I wrapped up the floorplans for blocks 1, 2, and 3 (for now) and shifted focus to the facade design of blocks 1 and 3. In this phase, I also started exploring sun shading systems as an integral part of the facade, both for comfort and sustainability. Alongside the design work, I researched concrete—focusing on material sources, recycling possibilities, and strategies to reduce the use of new resources.

Apartment Type 1 - Blocks 1 and 3

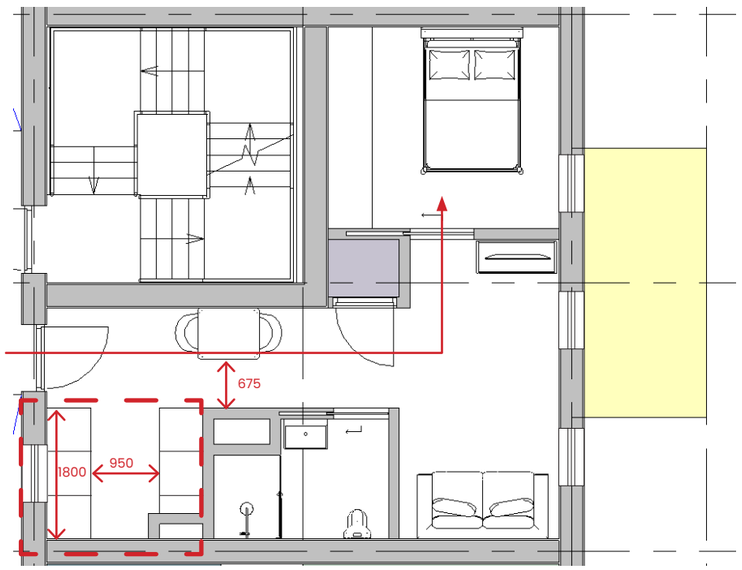
Last week



+ Direct daylight into kitchen from facade
+ Enough workspace in kitchen
+ Width table and bathroom block

- No direct ‘walking path’ to bedroom from entrance
- Living in ‘one’ line
- Bathroom to small
- No storage

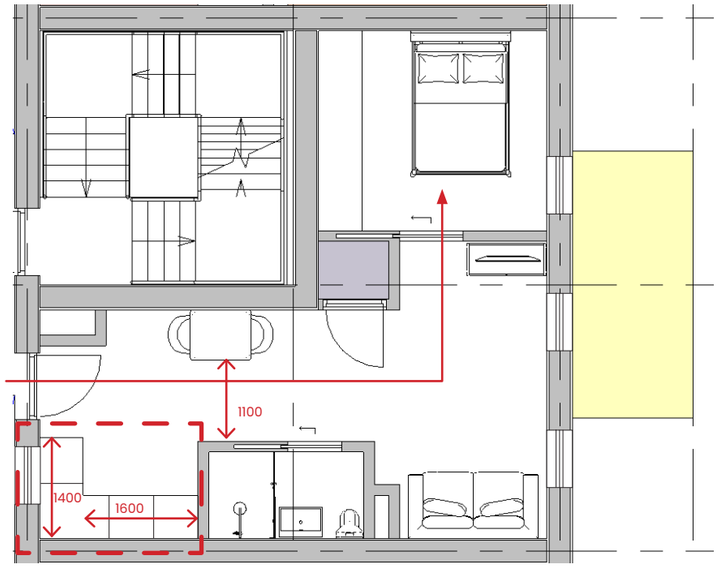
OPTION 1



+ Straight ‘walking path’ to bedroom from entrance
+ Enough workspace in kitchen

- No direct daylight in kitchen only via corridor with atrium
- Width table and bathroom block to small

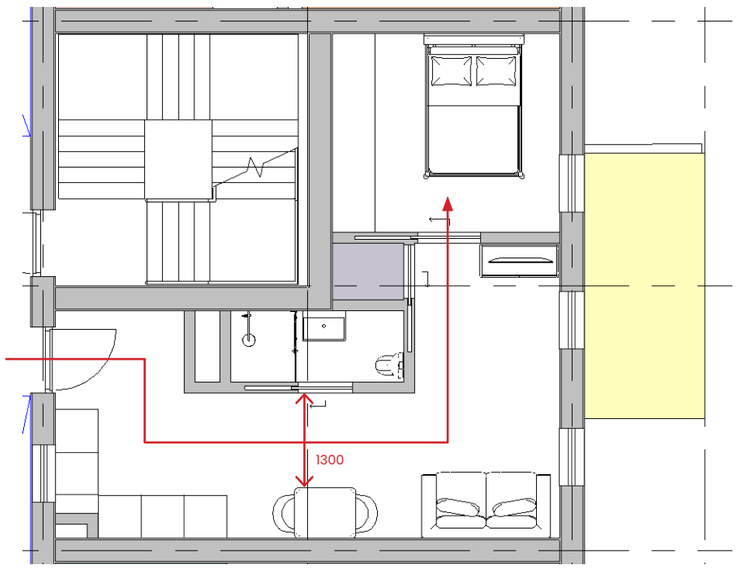
OPTION 2



+ Straight ‘walking path’ to bedroom from entrance
+ Width table and bathroom block

- No direct daylight in kitchen only via corridor with atrium
- Minimum workspace in kitchen

OPTION 3



+ Direct daylight into kitchen from facade
+ Enough workspace in kitchen
+ Width table and bathroom block

- No direct ‘walking path’ to bedroom from entrance
- Living in ‘one’ line

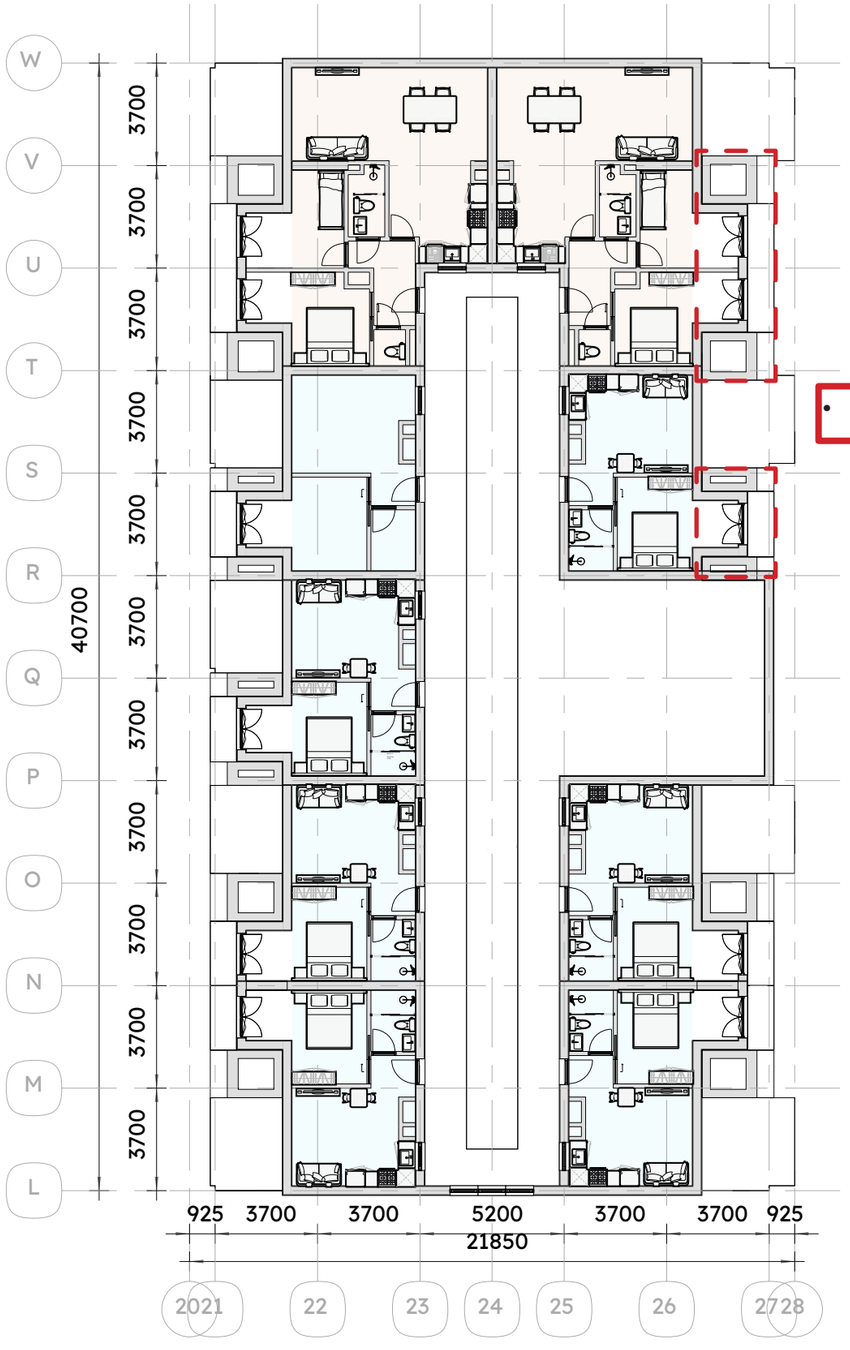
Blocks 1 and 3

GROUND FLOOR – with solutions based on feedback last week

1:200



Block 2
THIRD FLOOR - with solutions based on feedback last week
1:200

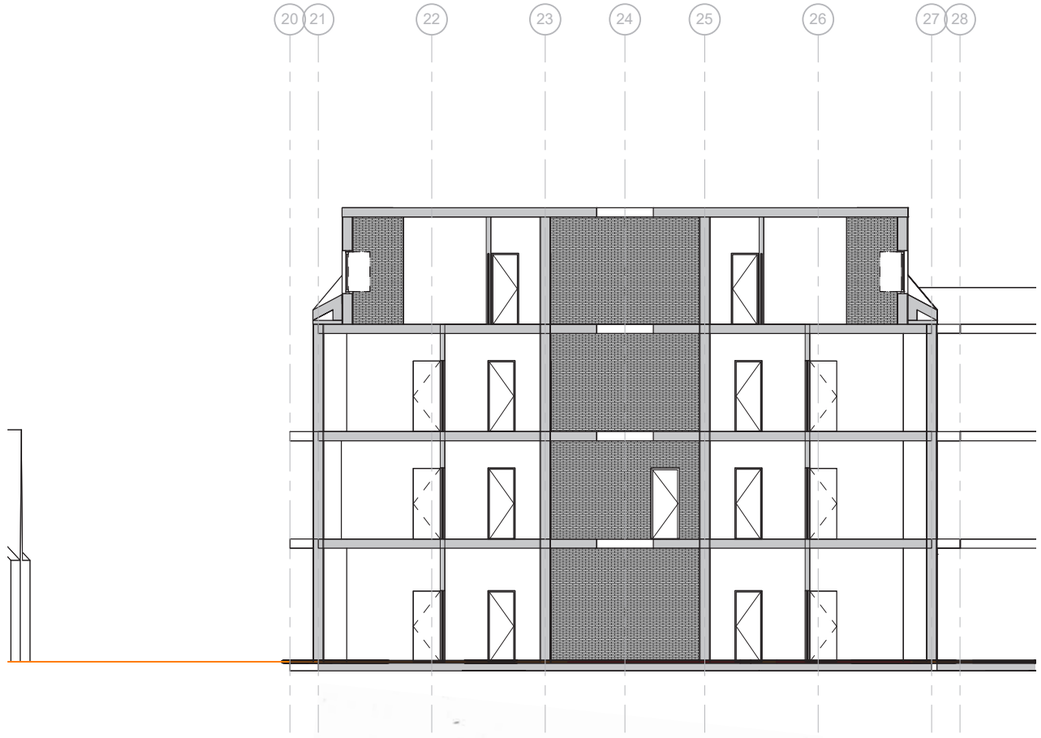


- Dormers added

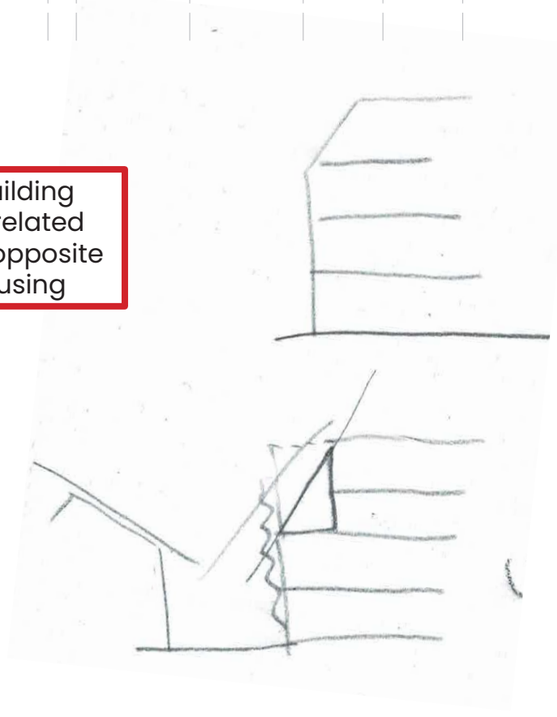
gebruiksoppervlakte

- Type 1 - Less than 35.00 m²
- Type 2 - 35.00 m² - 50.00 m²
- Type 3 - 50.00 m² - 80.00 m²
- Type 4 - 80.00 m² or more

Block 2
Section - height difference in street
1:100



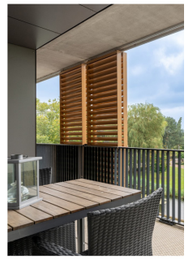
- Split building in two related to the opposite row housing



Facades - Blocks 1 and 3

Design influence:
- Separate characters but still connected > different color brick
- Shutters for sun protection and privacy
- Use of glass to highlight entrance and communal space



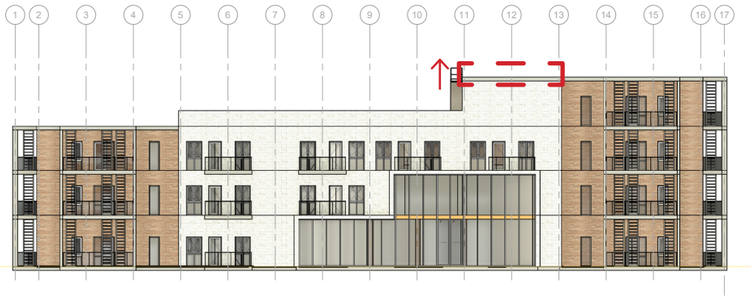


Shutter inspiration

South



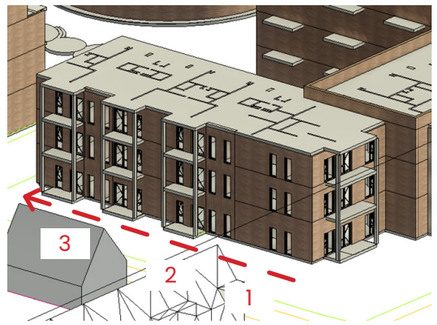
Feedback - make visual difference clear
in every location



West



Window placement based on room behind with ‘busier’ toward square



Implement vertical bricks around windows to make building feel less wide



East



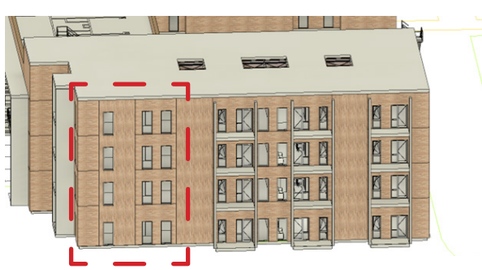
Connect look with west facade

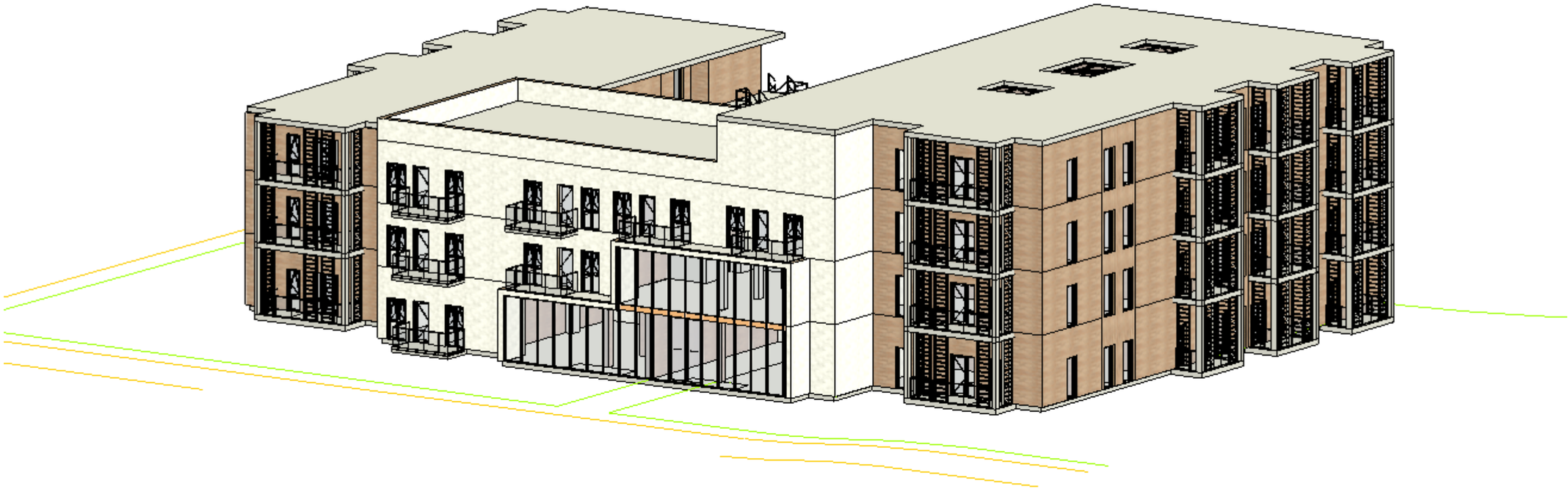


Delete row at the end (right) to make it feel less ‘crowded’

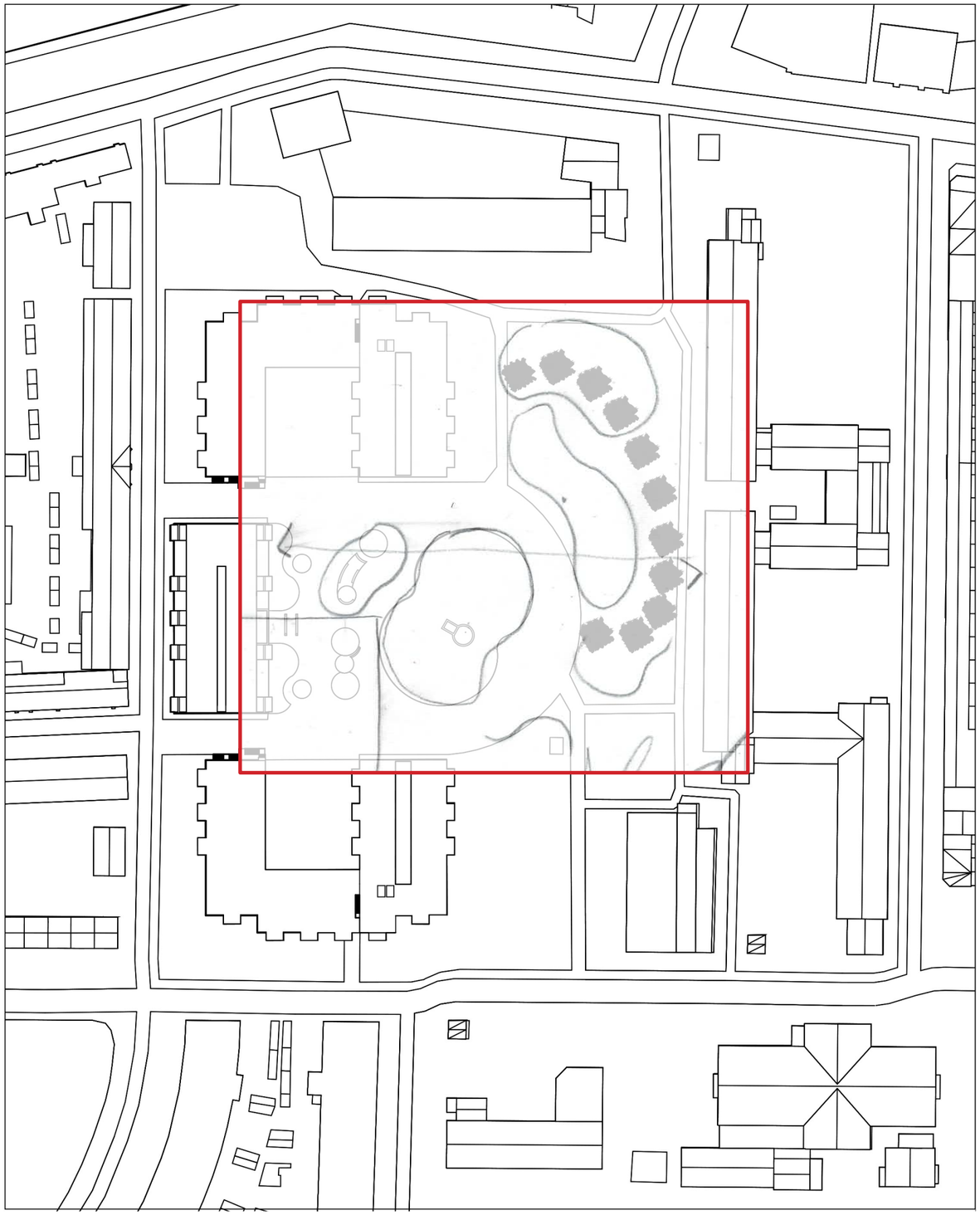


Difficult area; no balcony and bedrooms in plan need windows





Masterplan



The rotation of the community center has proven to be a valuable improvement to the masterplan, successfully setting it apart from the surrounding residential buildings and reinforcing its unique role of the community center.

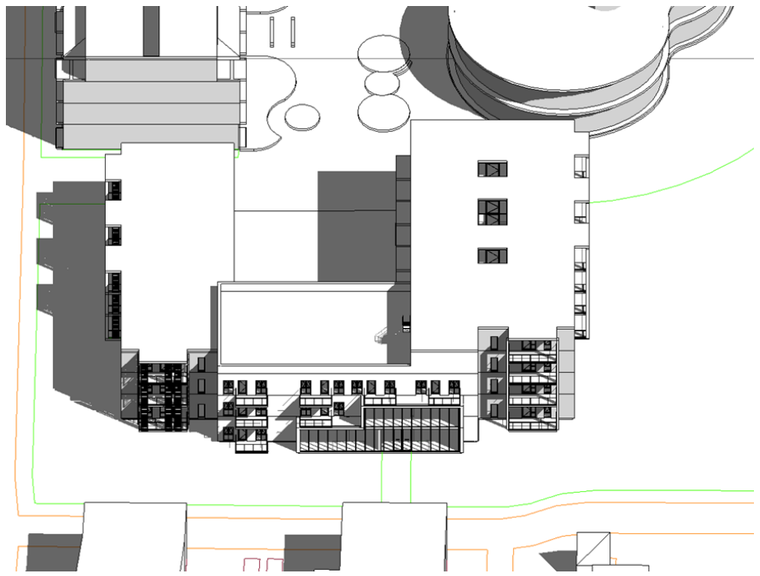
A key piece of feedback this week was to further extend the organic “bubble” shape of the community center into the design of the public space. These rounded forms can serve as spatial and visual connectors, subtly guiding people through the site while inviting them into the heart of the masterplan.

To strengthen this concept, the bubble form should be consistently applied across various elements—such as the design of planters, the curvature of pathways, and the way paths intersect and flow. This consistent visual language enhances the identity of the masterplan and contributes to a greater sense of belonging and natural movement throughout the space.

Tutoring Takeaways (A)
- Focus on facades coming weeks; floorplans again after P3
- Split block 2 to relate to opposite row housing
- Work on finalizing masterplan

Shadow Study

July



08:15

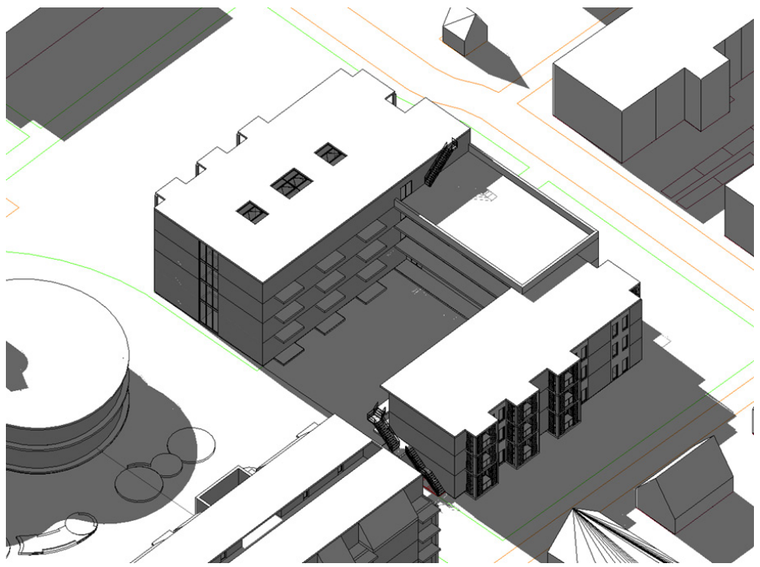


16:15



20:15

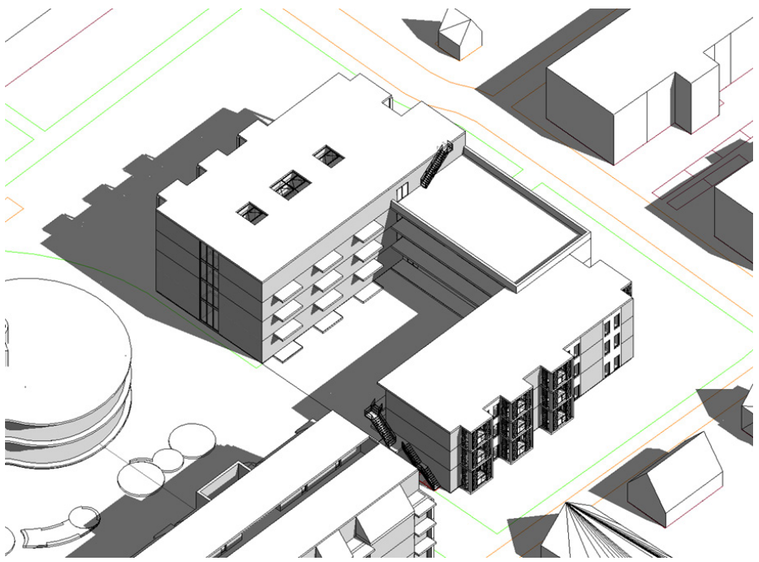
December



08:15



16:15



20:15

Concrete Research

In my research on reducing the use of new raw materials in concrete production, I explored different innovative strategies that focus on recycling and reducing CO_2 emissions.

Concrete Valley (2024) presents a strong example of sustainable concrete production. In their fully automated mixing facility, they produce around 200m³ of concrete per day. A key strategy they use is replacing part of the cement with *ecocem*, a more sustainable binder, which significantly reduces the overall cement demand. Their process is highly controlled, ensuring that mixtures are optimized for performance and sustainability. Additionally, they are experimenting with innovative additives like *miscanthus* (elephant grass) and *recycled concrete aggregate*—material that comes from demolished structures. They are also testing low-carbon alternatives such as *geopolymer binders*, which offer potential as CO_2-reduced replacements for traditional cement.

However, research like the **2019 Bloomberg case study** emphasizes that recycling concrete only becomes energy-efficient when the recycled material is sourced from within approximately 25 kilometers of the construction site. This highlights the importance of considering local availability in sustainable material strategies (Gretler, 2021).

At **TU Delft**, research led by Prof. Guang Ye (2023) explores ways to drastically reduce CO_2 emissions in cement by focusing on renewable and lower-impact binding agents. Alternatives to traditional cement include industrial byproducts such as *blast furnace slag* (from steel production) and *fly ash* (from coal combustion), both of which reduce environmental impact when used as the base for concrete. Furthermore, the cement industry is exploring carbon capture techniques and a shift toward sustainably sourced energy for production processes.

Together, these examples illustrate how concrete production can be made more circular—through recycling existing materials, using local resources, and replacing conventional binders with more environmentally friendly alternatives. These insights will inform my material choices in the design process, particularly the integration of demolition waste into new concrete for the residential buildings.

Conclusion

The production of concrete in a sustainable way requires both material innovation and a focus on processes. To achieve this the concrete of the project needs to be **produced on site** to stay within the 25-kilometer radius.

By reusing the granulate from the demolished buildings on the site, the demand for transporting new materials is **reduced**, and the waste produced by demolition is given a **second life**. This significantly cuts down on the need for mining new raw resources like gravel and sand, preserving natural landscapes and l**owering the overall environmental footprint** of the construction.

Incorporating this approach into the project creates a more circular material cycle, **aligns with the goals of reducing CO_2 emissions**, and fits the broader ambition of building more responsibly within an urban context.

It also strengthens the narrative of **continuity**—where parts of the old site live on in the new development.

Tutoring Takeaways (BT)

- What are you sun shading systems on the south facade
> shutters, greenery, shades
- Last research on brick material
> sustainable options?
- Think about the location of your fragment

Week 3.6

Facades and Circularity

Focused on implementing the feedback for refining the masterplan. This involved making adjustments to the overall layout and incorporating suggestions for improvement. The final versions of the floorplans for blocks 1, 2, and 3 were completed. The facades were the main focus with the integration of greenery in blocks 1 and 3, while block 2 features varying materials, set-backs, and a sloped roof starting from the second floor to highlight different parts of the building. The community center design also evolved, with further consideration of its role within the masterplan.

Alongside this, I conducted research into bricks and sustainable materials to ensure that the building materials align with the project's sustainability goals. This included looking into eco-friendly options and exploring how I can incorporate circularity into the design by focusing on reducing, reusing, and managing waste.

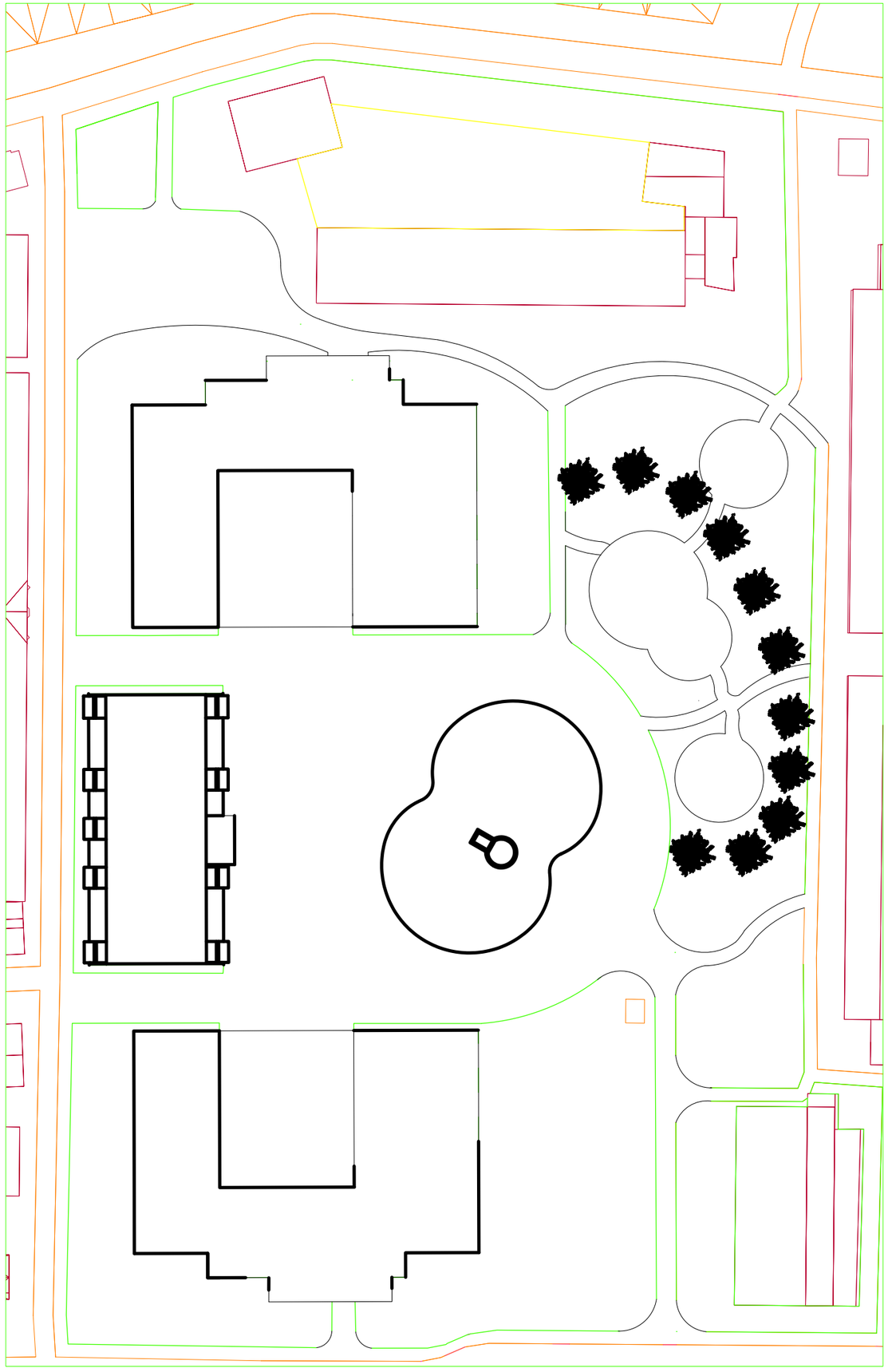
Throughout the week, I also gathered feedback and advice on how to better integrate all the research and choices made up to this point. This guidance helped refine my approach, ensuring that the design and materials used are in line with the overall vision of sustainability and functionality for the community. These choices will be highlighted into the fragment.

Start Masterplan Improvements

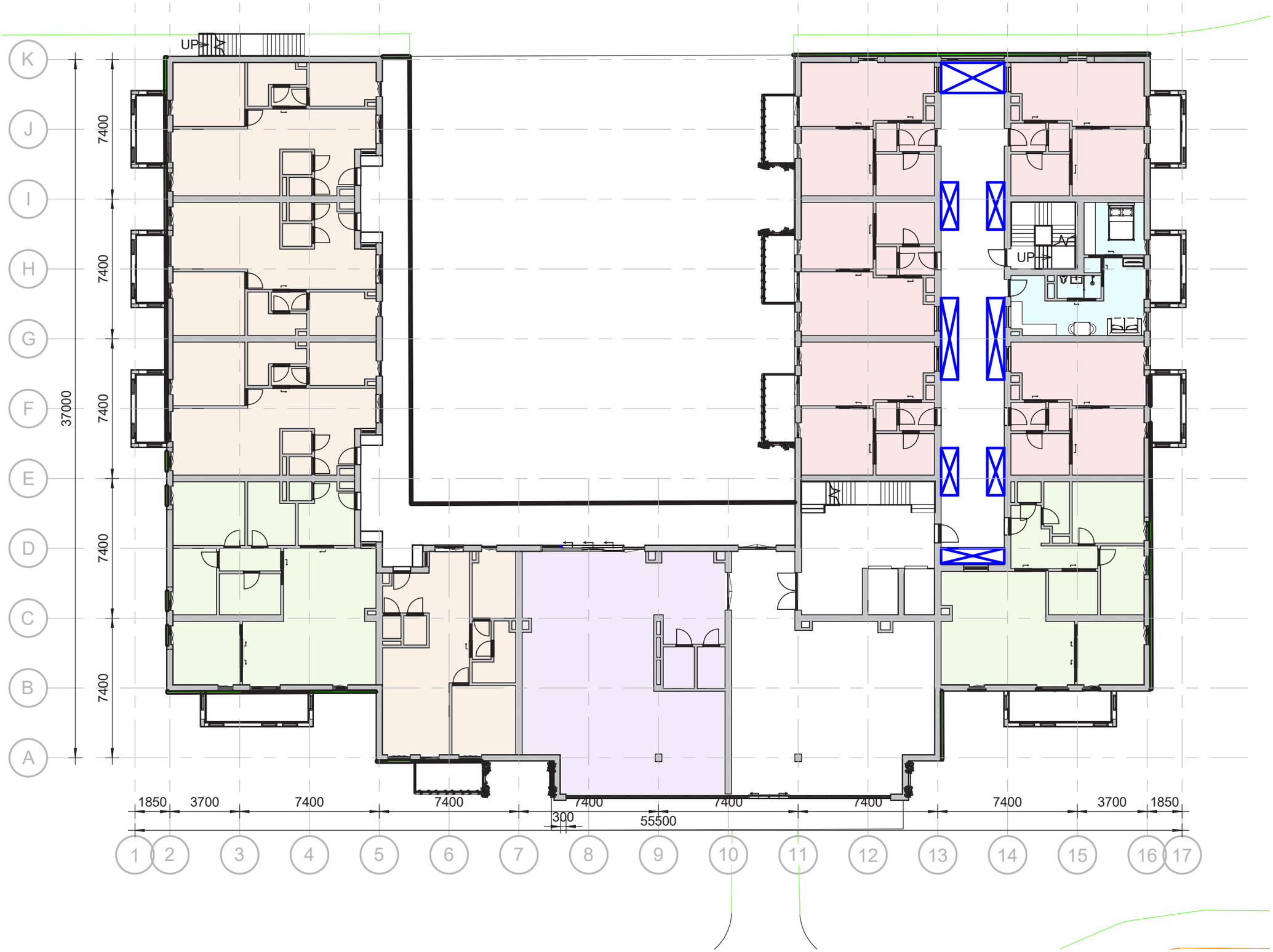
based on feedback last week

To begin improving the masterplan, the first step was to **implement the new building footprints**, reflecting the refined massing and spatial relationships. This adjustment laid the groundwork for a more cohesive layout. Alongside this, **curved path edges** were introduced to soften the previously rigid structure of the plan, creating a more inviting and natural flow through the public spaces. The **redesign of the dog park** was also initiated, enhancing its layout and integrating it more meaningfully into the green structure of the site.

The next steps will involve continuing this approach within the courtyard, extending the same **curving language** and sense of coherence. On the central square, further refinements will be made to strengthen its role as a communal heart. Around the community center, elements such as **seating and trees** will be added to enrich the atmosphere, encourage social interaction, and provide shading and comfort throughout the day.



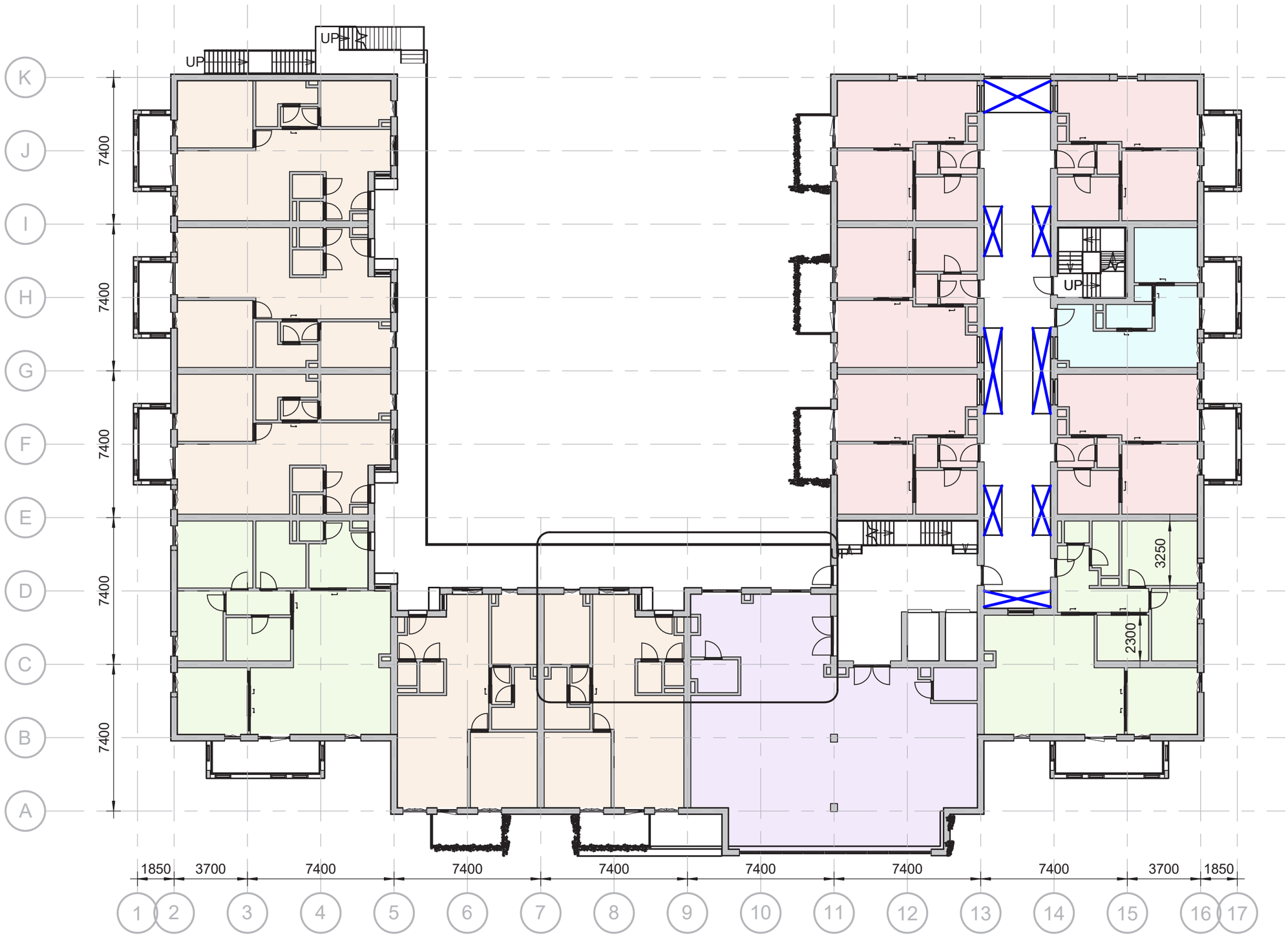
Blocks 1 and 3
GROUND FLOOR
1:200



Spaces

- Type 1 - <35m²
- Type 2 - 35-50m²
- Type 3 - 50-80m²
- Type 4 - >80m²
- Communal

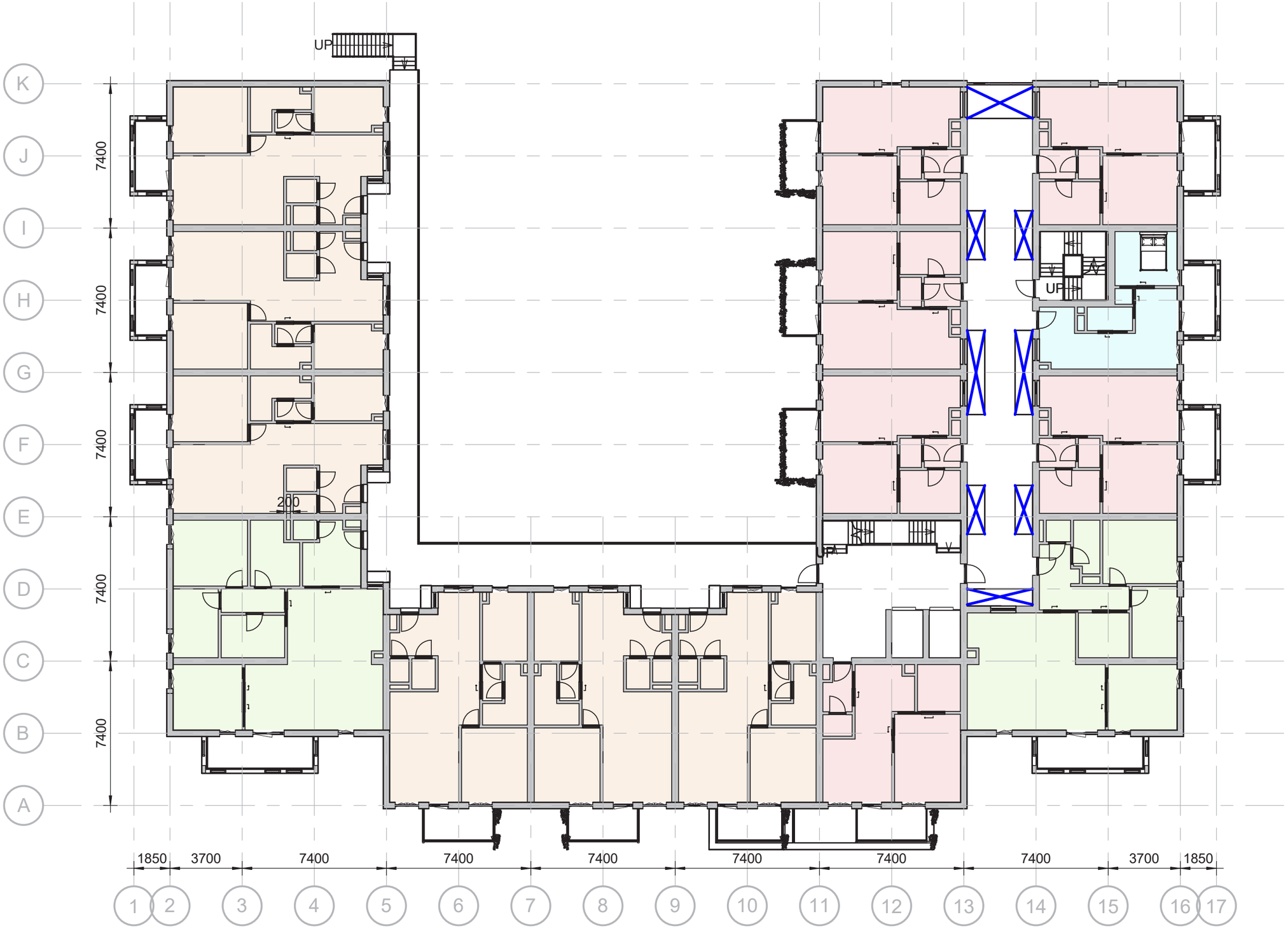
Blocks 1 and 3
FIRST FLOOR
1:200



Spaces

- Type 1 - <35m²
- Type 2 - 35-50m²
- Type 3 - 50-80m²
- Type 4 - >80m²
- Communal

Blocks 1 and 3
SECOND FLOOR
1:200



Spaces

- Type 1 - <35m²
- Type 2 - 35-50m²
- Type 3 - 50-80m²
- Type 4 - >80m²
- Communal

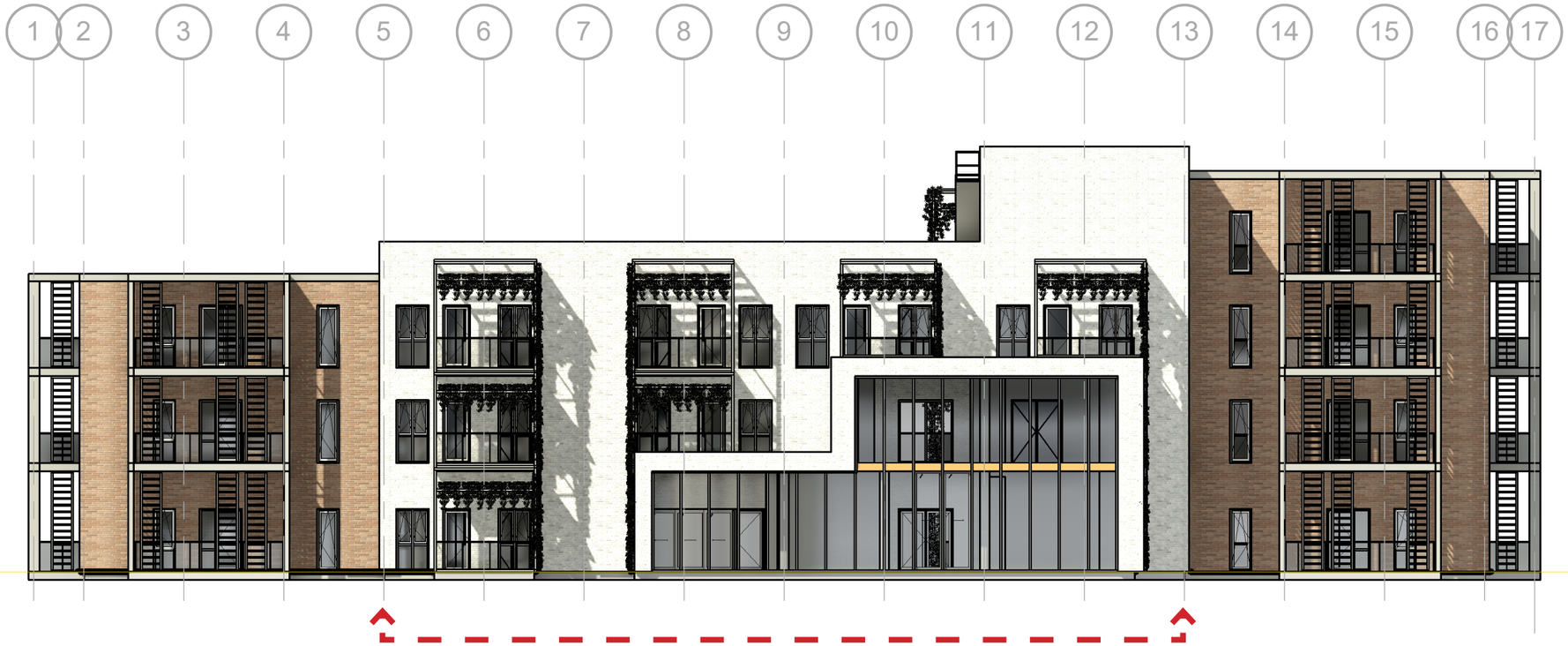
Blocks 1 and 3
THIRD FLOOR
1:200



Spaces

- Type 1 - <35m²
- Type 2 - 35-50m²
- Type 3 - 50-80m²
- Type 4 - >80m²
- Communal

Front facade



Add greenery feature for sun shading on south facade

Street facade



Facades blocks 1 and 3 - feedback park facade

The feedback on the façade design focused on how the end of the facade orientated towards the park currently feels visually “floating” and disconnected from the rest.

To address this, one suggestion was to rethink the composition of the end elevation, potentially by introducing a horizontal window. This could help to anchor the volume more clearly and give the ending a stronger visual base.

Additionally, placing the window slightly outside of the façade line, rather than flush, could help strengthen its connection to the adjacent balconies. This small shift would visually align the window with the balcony elements and their shutters, creating a more cohesive language across the façade and emphasizing the layering and rhythm of the building’s exterior.

Garden right facade



Garden left facade



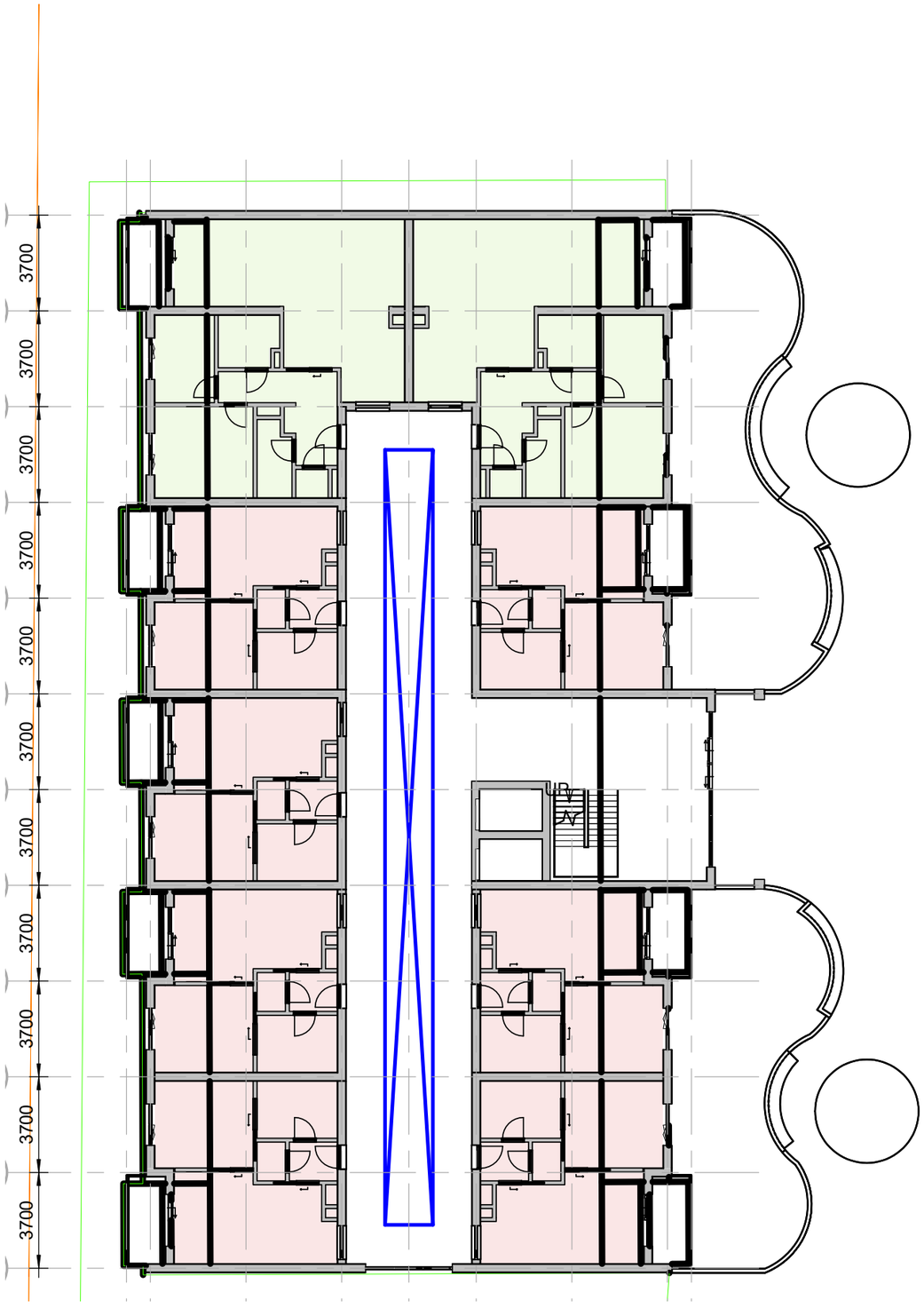


north facade garden



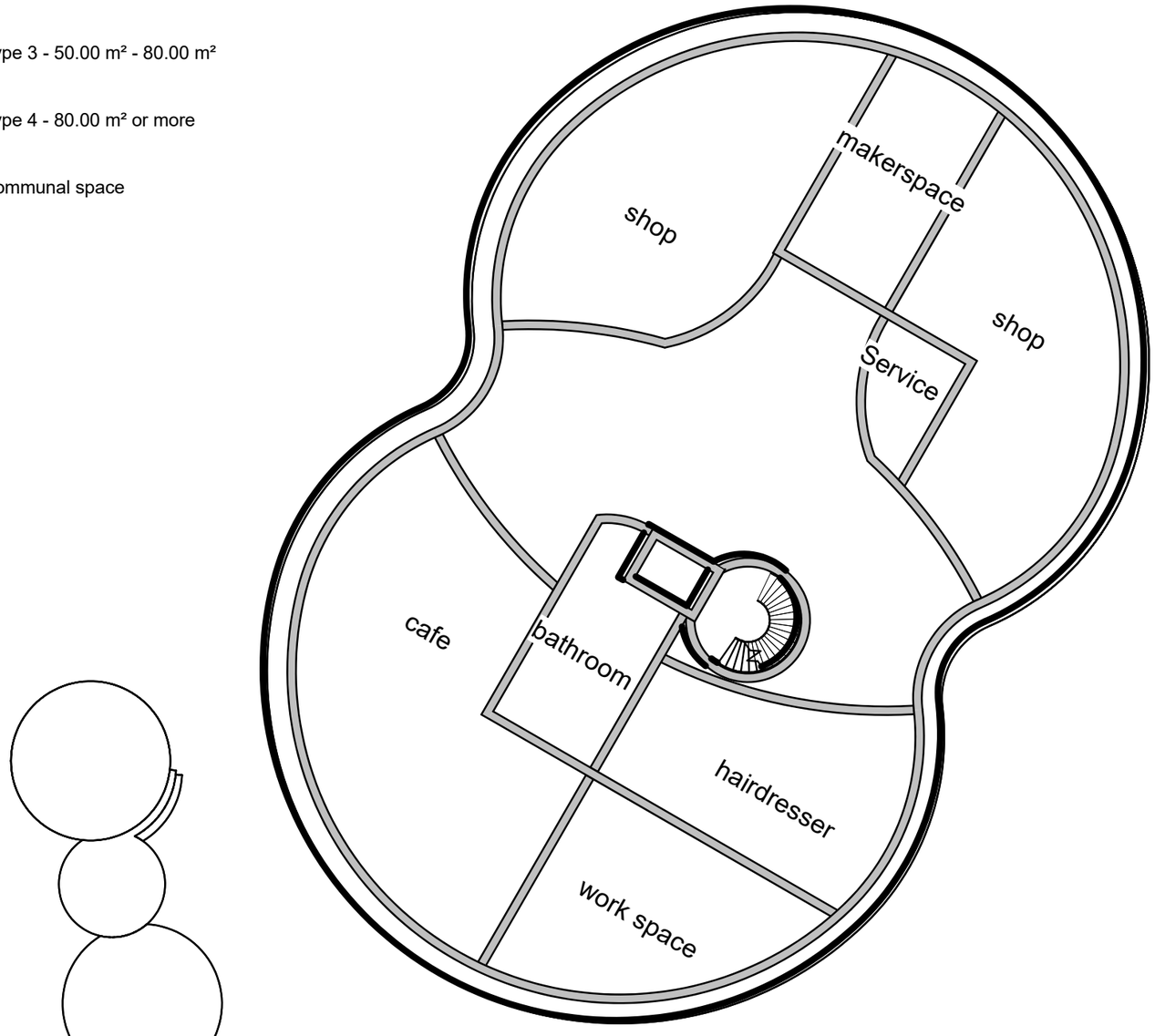
Park facade

Blocks 2 and Community Center
GROUND FLOOR
1:200

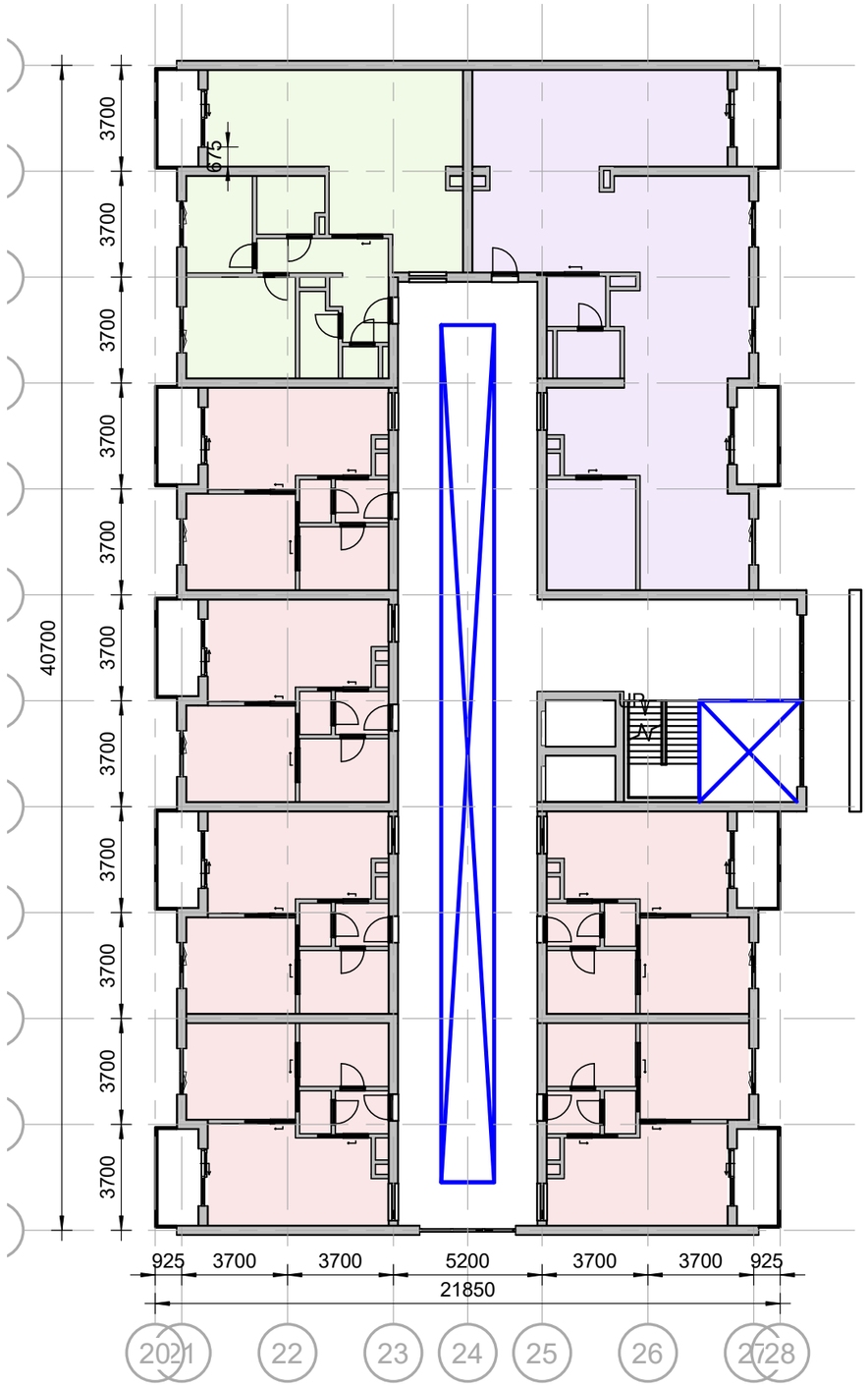


gebruiksoppervlakte

- Type 1 - Less than 35.00 m²
- Type 2 - 35.00 m² - 50.00 m²
- Type 3 - 50.00 m² - 80.00 m²
- Type 4 - 80.00 m² or more
- Communal space

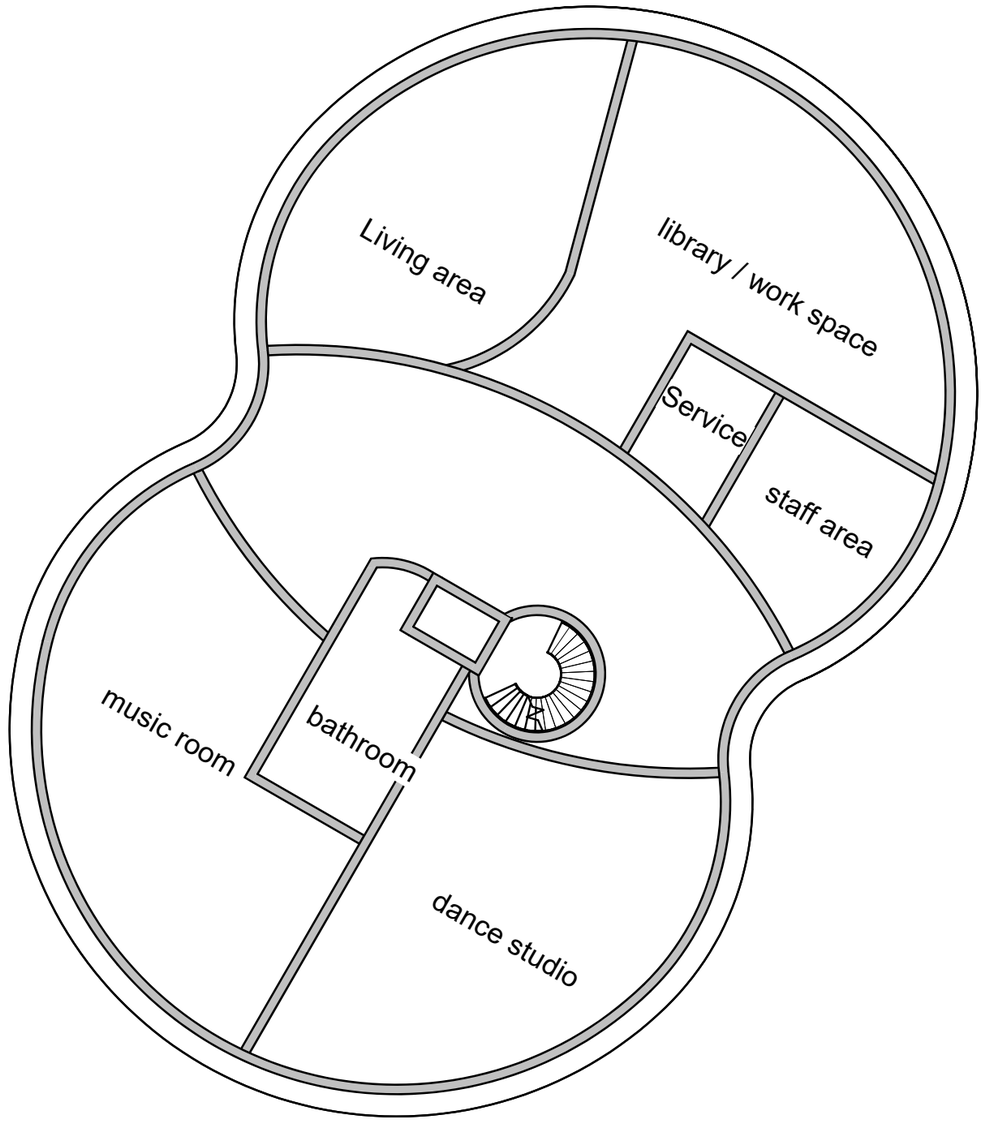


Blocks 2 and Community Center
FIRST FLOOR
1:200

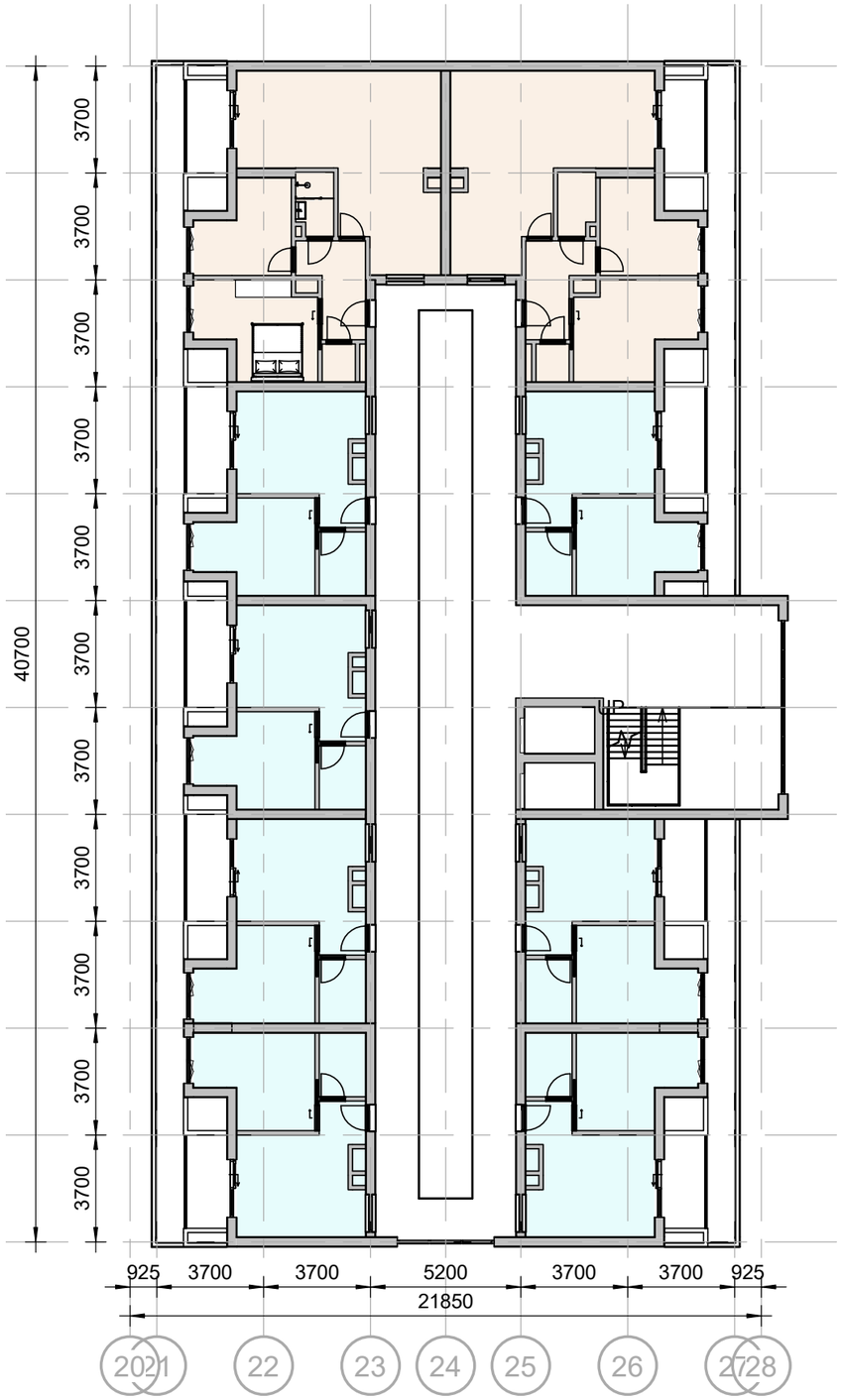


gebruiksoppervlakte

- Type 1 - Less than 35.00 m²
- Type 2 - 35.00 m² - 50.00 m²
- Type 3 - 50.00 m² - 80.00 m²
- Type 4 - 80.00 m² or more
- Communal space

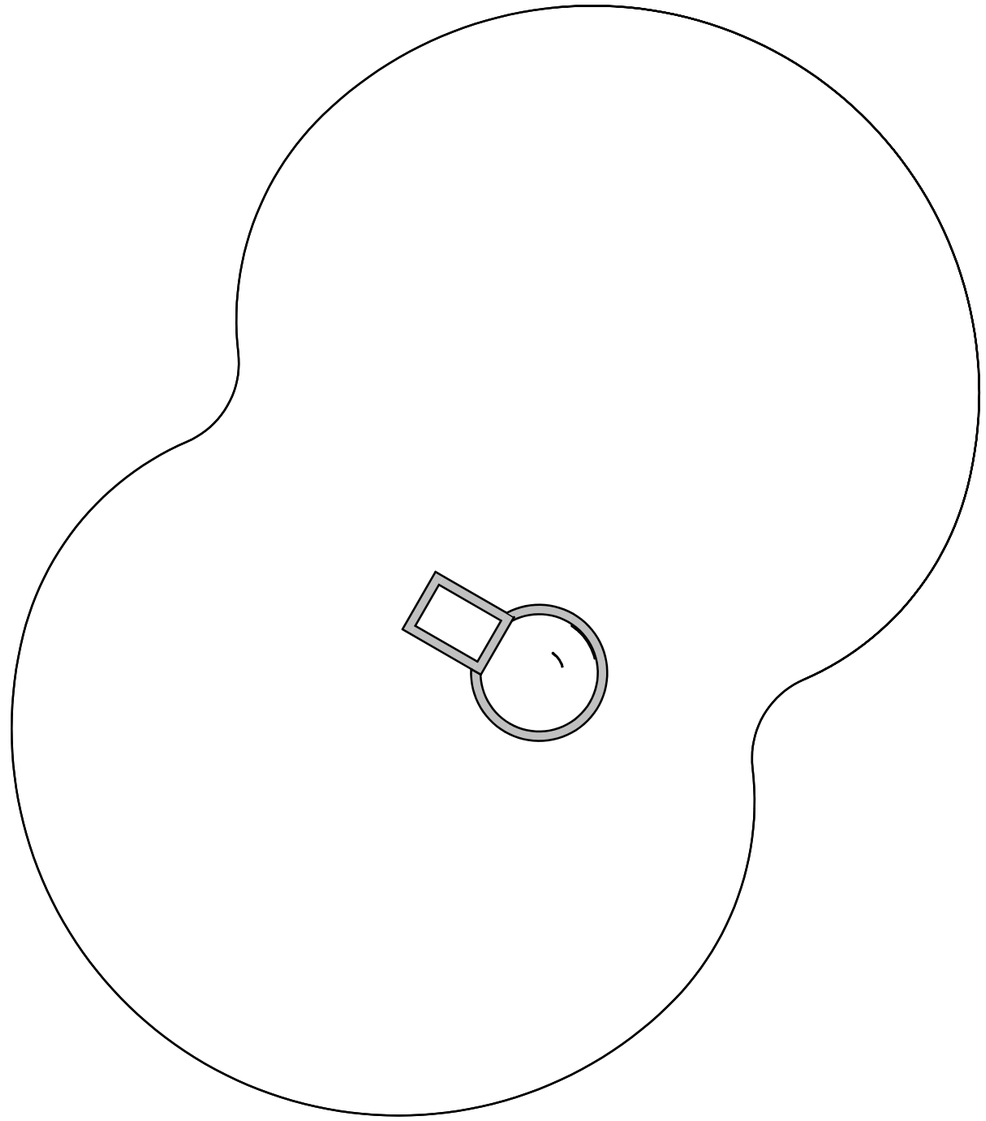


Blocks 2 and Community Center
SECOND FLOOR
1:200



gebruiksoppervlakte

- Type 1 - Less than 35.00 m²
- Type 2 - 35.00 m² - 50.00 m²
- Type 3 - 50.00 m² - 80.00 m²
- Type 4 - 80.00 m² or more
- Communal space



Square facade



Street facade



Tutoring Takeaways (A)
- Facade blocks 1/3
- Community Center look into functions and what they need
> cafe needs storage and access to outside for delivery of products

Plans Community Center

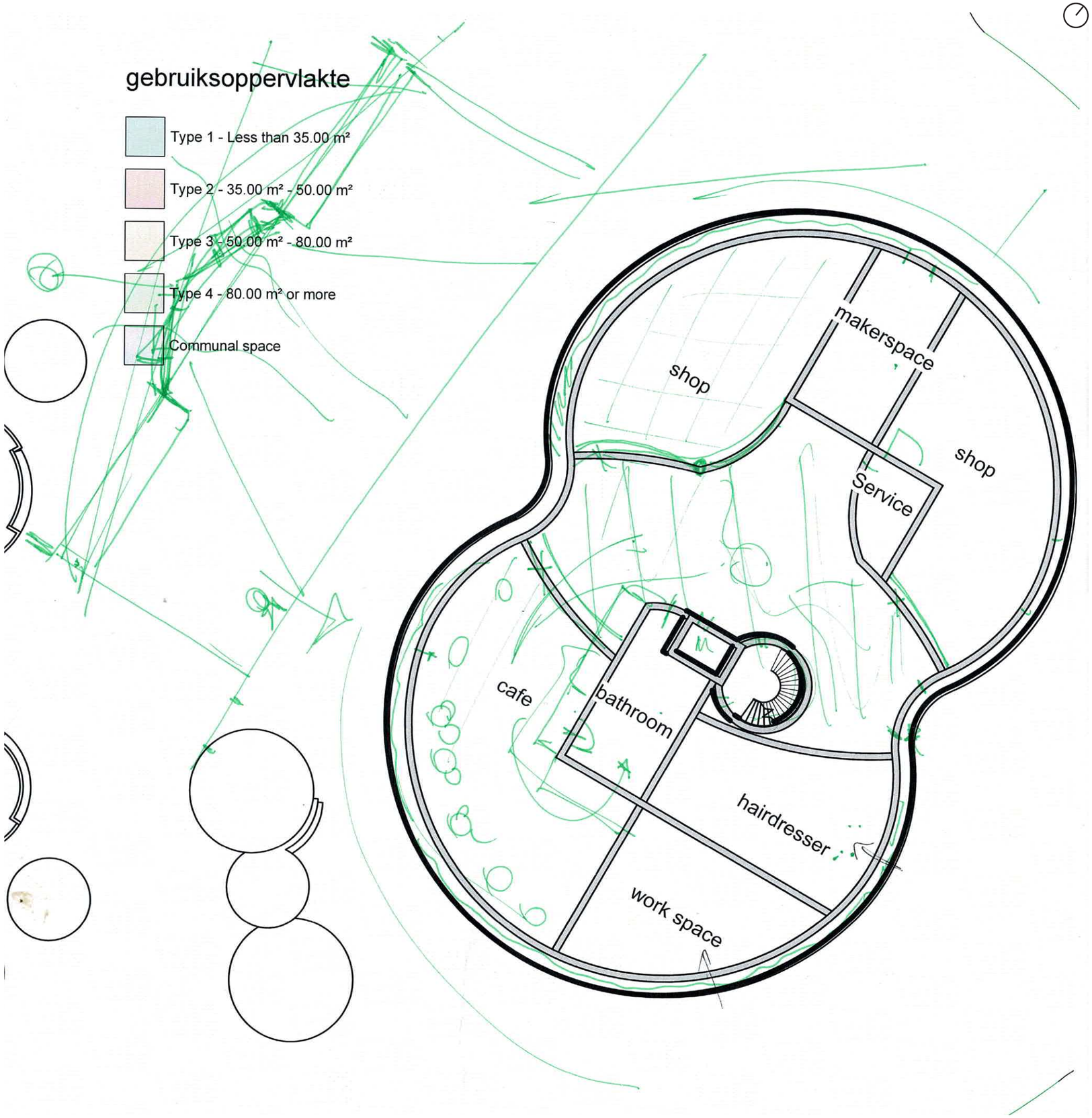
approach tips

The feedback I received for improving the floorplans of the community center provided valuable insights for creating a more engaging and functional space.

A key suggestion was to design the inner part of the community center as a space for staying and simply being. This would allow visitors to feel comfortable and relaxed before moving on to areas of interest within the building.

To enhance the experience, the center should be designed as an atrium, filled with natural light to create a pleasant and inviting environment. A skylight would be incorporated into the design, which could be opened to provide natural ventilation and help regulate the building's temperature, ensuring a comfortable atmosphere year-round.

In addition to this, it was recommended to include doors leading directly to the outside from the community center. This would help to strengthen the connection between the building and the surrounding neighborhood, allowing for seamless interaction between the residents and the wider community.



Bricks Research

For the bricks research, I explored three distinct types of bricks with various benefits and applications.

The **Click Brick** system is an innovative solution that focuses on horizontal installation. It is available in eight colors and is designed for easy installation with no need for special masonry expertise. The bricks are connected using stainless steel clips and cavity anchors, making them removable and reusable. This system stands out for its flexibility and sustainability, as it eliminates the need for mortar, reducing waste during construction and being remountable.

Eco Bricks are another option. These bricks are designed with a reduced volume, making them 35% smaller than traditional Waalformat bricks, with a width of just 65mm. The production process requires less energy and fewer resources, contributing to a reduction in CO_2 emissions. Additionally, the efficiency in packaging and transportation helps reduce the environmental impact by allowing more bricks to be transported per load, thereby reducing transport movements, pallets, and coverings.

Langformaat bricks are ideal for certain applications where faster installation is a priority. The longer size of these bricks allows for quicker processing, as they can be easily inserted without the need to adjust the joint thickness. This saves time during construction, especially when using bricks of lengths over 400mm.

(Sigterman, 2021)



(Sigterman, 2021)



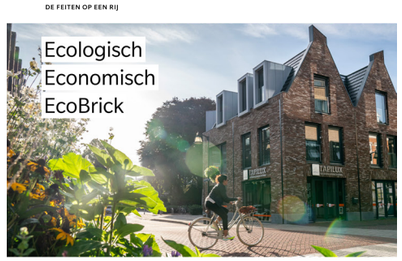
(Sigterman, 2021)

Conclusion

The decision to use Eco Bricks in the project is based on several compelling advantages. First, the application of these bricks can be **horizontal and vertical**. Their reduced size allows for improved insulation within the same wall construction or it enables the creation of smaller wall constructions, which translates to more space inside the homes.

Additionally, Eco Bricks contribute to reducing overall material usage, aligning with my sustainability goals by **minimizing waste and resource consumption**. The smaller size of the bricks also results in less labor-intensive installation, making the building process more efficient and cost-effective.

Overall, Eco Bricks offer an excellent balance of sustainability, space efficiency, and ease of construction, making them the ideal choice for this project.



Bouwen moet duurzamer én betaalbaarder. Strengere MPG-eisen vragen om nieuwe oplossingen met minder impact op het milieu. De smalle EcoBrick gevelbaksteen biedt een antwoord: duurzame voordelen én efficiënter bouwen tegen lagere kosten. Met minder grondstoffen in het product, minder CO_2-uitstoot bij transport en productie en een lichtere verwerking met minder ruimtebeslag op de bouwplaats en de steiger. Dit zijn de feiten.

Product

EcoBrick is een slimme metselsteen met minder volume. Met een dikte van 65 mm is hij 35% smaller dan traditionele waalformaat gevelbakstenen. De productie vraagt minder energie en minder grondstoffen.



Transport

Niet alleen de productie van de EcoBrick is efficiënter en duurzamer. Hetzelfde geldt voor de verpakking en het transport. Zo gaan er ruim 100 m² meer stenen in een volle vracht. Dat vraagt minder transportbewegingen, pallets en hoezen. En beperkt de CO_2-uitstoot aanzienlijk.



Verwerking

De specifieke eigenschappen van de EcoBrick zorgen voor een gevelbaksteen met minder gewicht en een kleiner volume. Dat zorgt voor een lichtere verwerking met minder ruimtebeslag op de bouwplaats en steiger. Door het kleinere oppervlak gebruik je bijvoorbeeld minder mortel.



wienerberger (Sigterman, 2021)

Circularity Approach

My sustainability strategies consist of reducing waste and transport emissions, reusing by incorporating waste material into new products, which together create a technical ecosystem, and creating a natural ecosystem by providing spaces for birds to nest and eat

- Distance

A radius of 250 km is set to minimize the transport of materials. All resources and production of materials need to be within this radius for it to be used.

- Principles

Concrete: load-bearing slab structure
REUSE - granulate from demolished buildings on location mixed into new concrete

REDUCE - less new resources necessary

DISTANCE - 0km

EcoBrick: facade
REDUCE
- thinner than traditional bricks = less resources needed
- less enery for producition
- more bricks per palet = less transport needed

DISTANCE - 125km

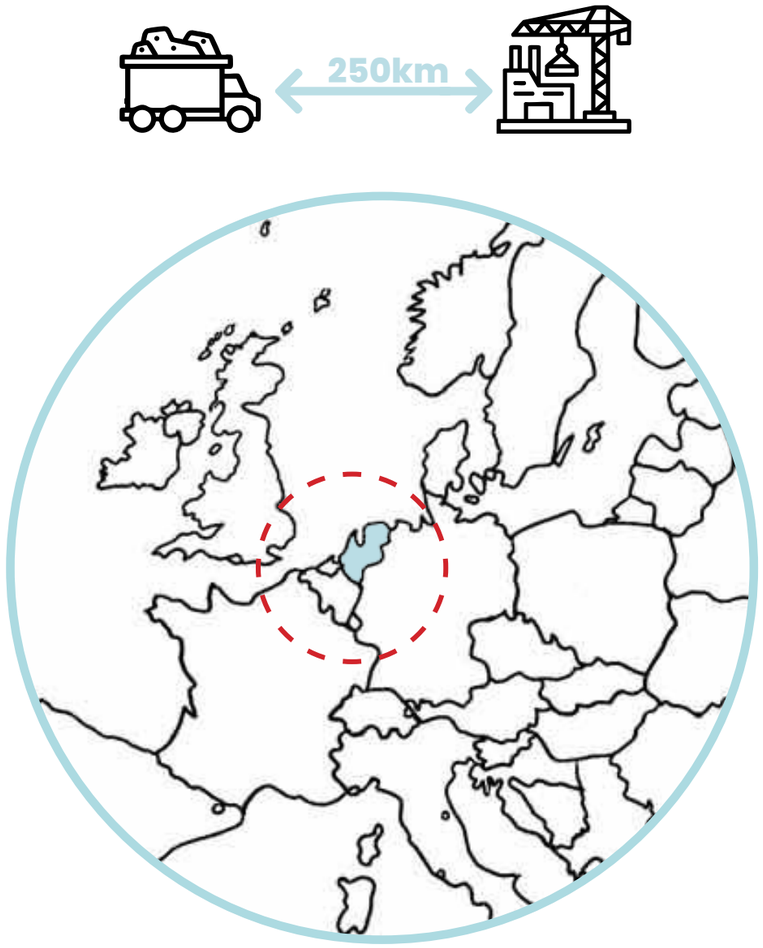
LABOR - reduced weight compared to traditional bricks

Metisse: thermal isolation
REUSE - made from old textile

REDUCE - less waste

DISTANCE - 200km

LABOR - no toxic substances



- Ecosystem

Birdhouses
LOCATION - on north orientated facades due to north-east flight path

TYPE - based on bird size different entrance diameter

HEIGHT - depending on preference species

Greenery
LOCATION - in courtyard and on roofs

TYPE - attracting different insects and nesting material

PRODUCTION - vegatable garden on roof community center

FUNCTION - providing sun protection on square and facades

PRESERVE - replant current trees surrounding the dog park

Water collecting
LOCATION - in courtyard

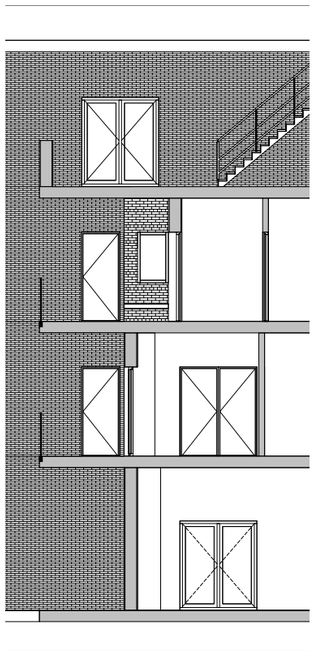
TYPE - natural pond / wadi

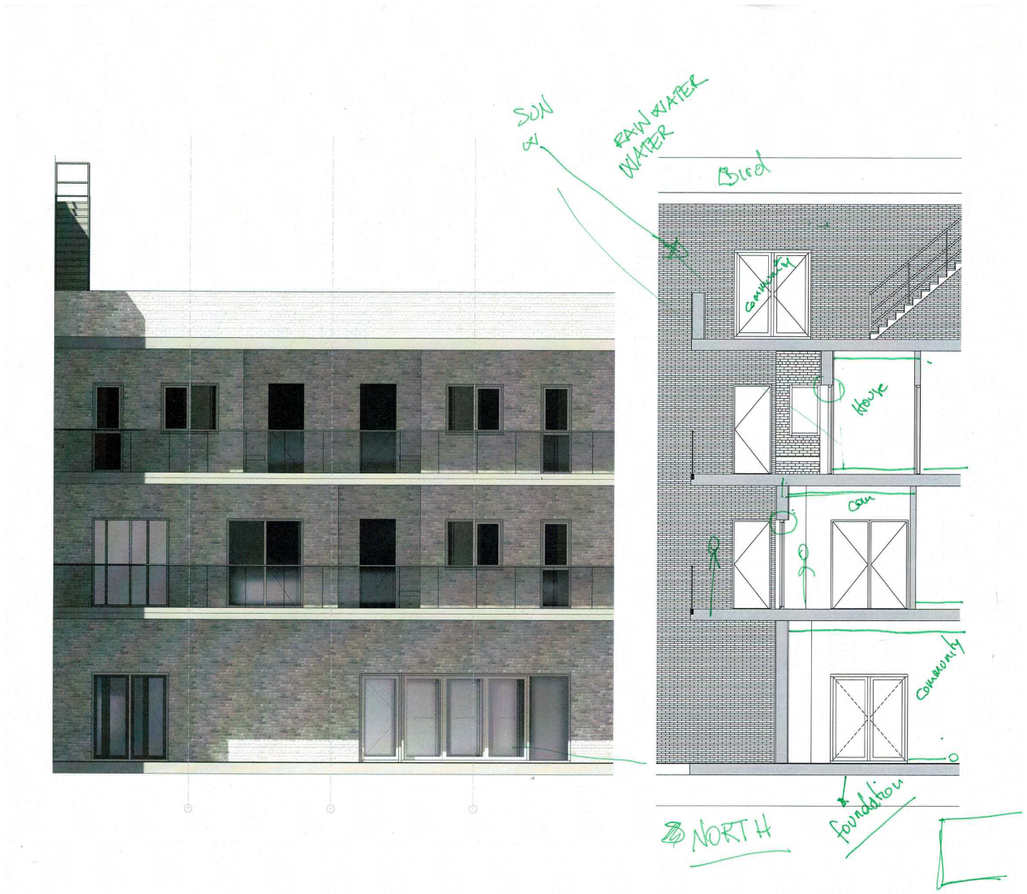
FUNCTION - cooling in summer and slow infiltration in winter

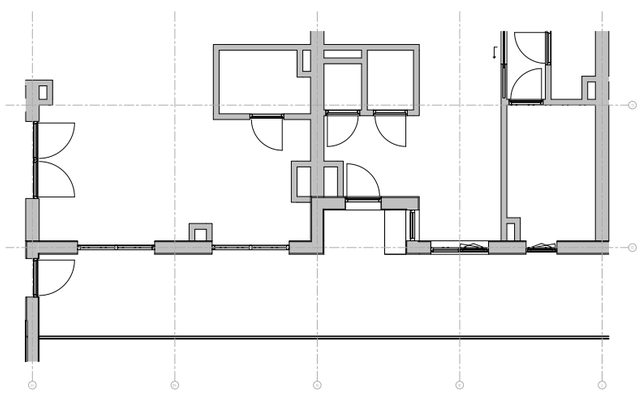
Fragment

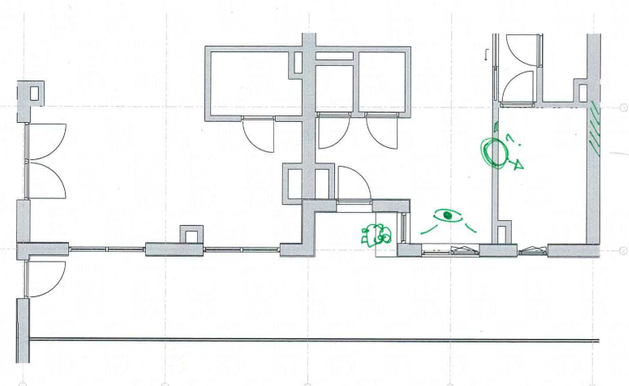
Choice:
- Elevation shows window difference as a reflection of the space behind, benches located at front door area, and window placement in kitchen area
- Vertical over different functions; multifunctional communal space (GF), living room communal space (1e), apartment type 3 (2e), and communal rooftop (3e)
- Horizontal highlight life inside a communal space and apartment and show visual connection between inside and outside spaces











Tutoring Takeaways (BT)
- Show all your research in the fragment
- Think about the layers of all parts of the building
> wall construction, inner walls, floors, roof, balcony

Week 3.7

P3 Presentation and Congress Den Bosch

I focused on preparing for the P3 presentation. During this time, I finalized the masterplan and further refined the design fragment, incorporating all the research I had done.

The feedback after the presentation from my tutors aligned with my expectations, as they pointed out the same areas of improvement that I had already identified.

Additionally, I had the opportunity to attend the ‘Thuis in de Wijk’ congress in Den Bosch, where I presented my plan and engaged with others about my approach to creating a strong community.

Masterplan Improvement

The final masterplan has been refined to create a balanced and functional environment, incorporating key design elements that foster connectivity and sustainability.

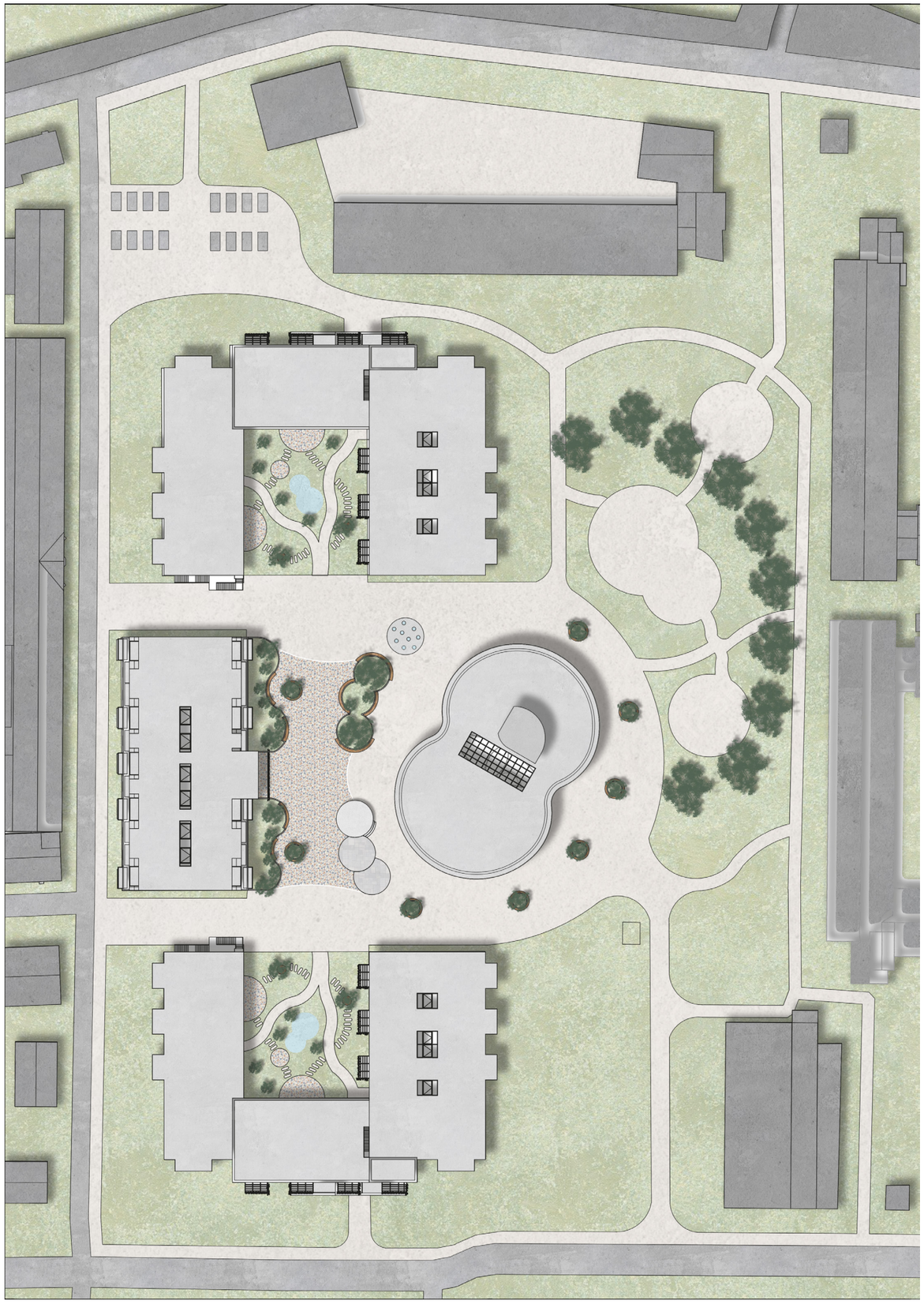
The courtyards feature **primary and secondary paths**, guiding residents and visitors through the site. This design enhances movement while providing varying experiences along the way. A **wadi** is integrated into the plan for rainwater collection, reinforcing the sustainable water management approach. Various seating areas are thoughtfully scattered throughout the courtyards, offering **spaces for relaxation and social interaction**. Some of these areas are directly connected to the communal spaces on the ground floor, encouraging a **seamless transition between indoor and outdoor living**.

The area in front of block 2 and around the community center are distinguished by **different paving styles**, reflecting the contrasting atmospheres. The space in front of block 2 focuses on greenery, creating a **calm and serene environment**, while the area surrounding the community center is more open, allowing for **easy movement and unobstructed views** toward the building.

Walking paths lead people through green spaces, with strategically placed benches and trees providing **inviting spots to pause and interact**. The trees offer shade, contributing to both the ecosystem and the comfort of users, while enhancing the site's biodiversity.

To the north, additional **above-ground parking** is integrated into the plan, addressing practical needs without compromising the site's aesthetic appeal or functionality.

Throughout the masterplan, greenery is central to **both the visual and environmental experience**. From the courtyards to the central square, plants are strategically placed to encourage biodiversity, provide shade, and contribute to the site's overall environmental performance. This approach ensures the development remains connected to nature, providing a comfortable, sustainable, and cohesive living environment.



Improved Fragment

Reseach implemented

Collecting on the roof
Solar panels are used to collect energy from the sun. Combined with sedum prevents from overheating. The drainage system collects the rainwater and is distributed to the wadi in the courtyard.

Protection
Since this is the north facade no sun protection is needed. However the gallery provides a shelted front door area where residents can stay year-round.

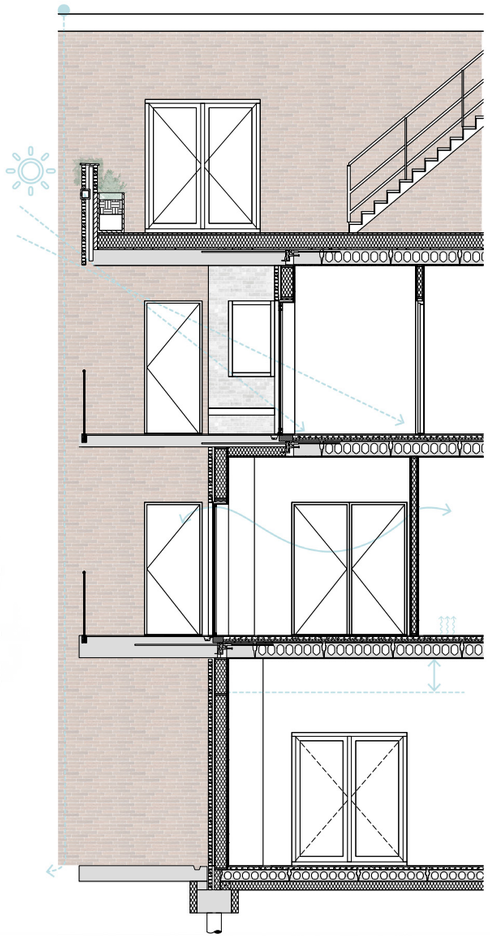
Floor heating
Providing an even heat distribution throughout the dwelling. The heating system of the plan is connected to the ‘Stadsverwarming’ of Rotterdam, using waste heat from factories.

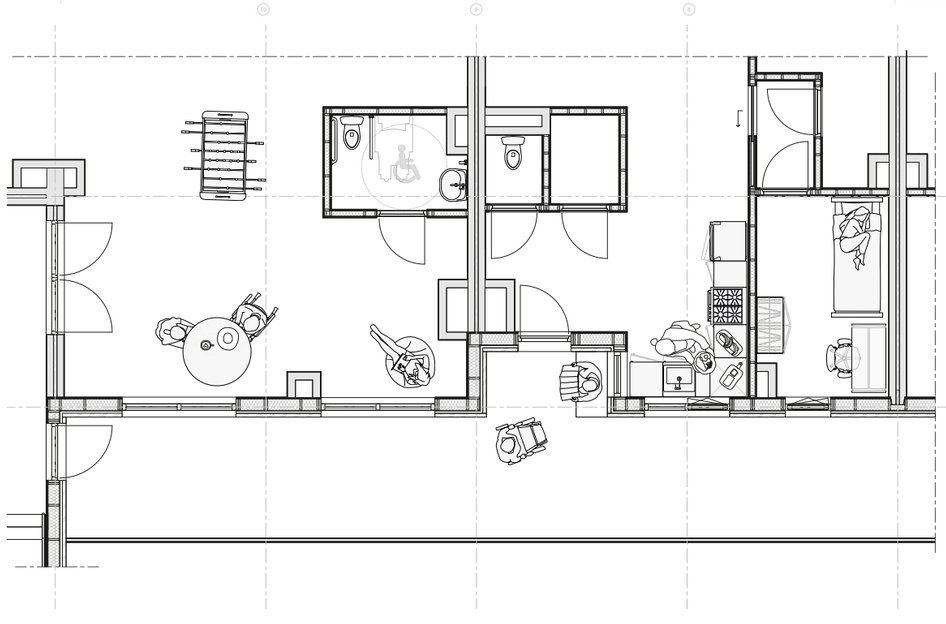
Ventilation
Air enters through the ventilation grids above the windows. Mechanical ventilation extracts the air in the kitchen, toilet, and bathroom.

Lowered ceiling
On the ground floor a lowered ceiling is implemented to collect the vertical distribution and decrease the amount of shafts in the communal space and entrance area.

Pile foundation
The area’s subsurface primarily consists of weak clay and peat layers, which lack the necessary bearing capacity. Therefore, a pile foundation is needed.



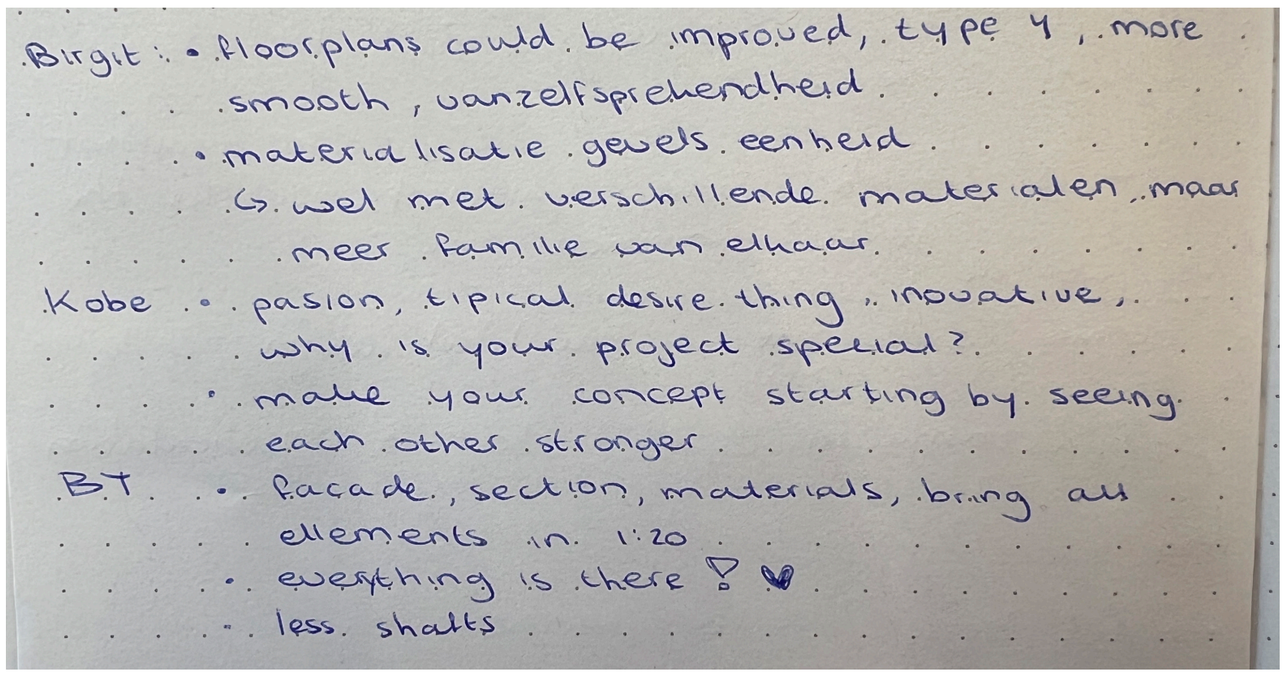




P3 Presentation



Feedback



Focus Points

- Improve facades
- 'Hokkerigheid' apartments
- Show 'starting by seeing each other' on all levels
- Work on fragment and detailing

Congress ‘Thuis in de Wijk’ in Den Bosch

On Wednesday, April 2nd, I had the opportunity to participate in the ‘Thuis in de Wijk’ congress in Den Bosch, where I was invited, along with Emmy, Zoï, Shreya, Marjolijn, Jasper, and Ruben, to showcase our plans.

For the event, I created posters that displayed my research and design, focusing on the theme of ‘starting by seeing each other’ and creating a strong sense of community within my project. The posters highlighted how I integrated this approach into my design, emphasizing the importance of fostering connection and interaction in residential environments.

Throughout the congress, I had the chance to talk to many people about my ideas. It was inspiring to discuss how my envisioned approach can shape the built environment, and the reactions were overwhelmingly positive. Attendees expressed great enthusiasm and highlighted the significance of this ‘new’ approach, especially in the context of the current architectural landscape. It was rewarding to see how others appreciated the emphasis on social cohesion and community-building.

The only question I received was about the financial aspect of the communal spaces. Someone asked, “How are you financing all the communal spaces?” . But overall, the feedback was incredibly encouraging.



Week 3.8

Incorporating P3 Feedback

This week focused on addressing the feedback received during the P3 presentation. Key areas of development included a floorplan study aimed at improving apartment types 3 and 4, as well as design refinements to the south façade of block 3. In addition, a landscape consultation was held to further develop the outdoor spaces and ensure better integration with the architectural design. These steps contribute to a more cohesive and responsive proposal moving forward.

Apartment Type 3

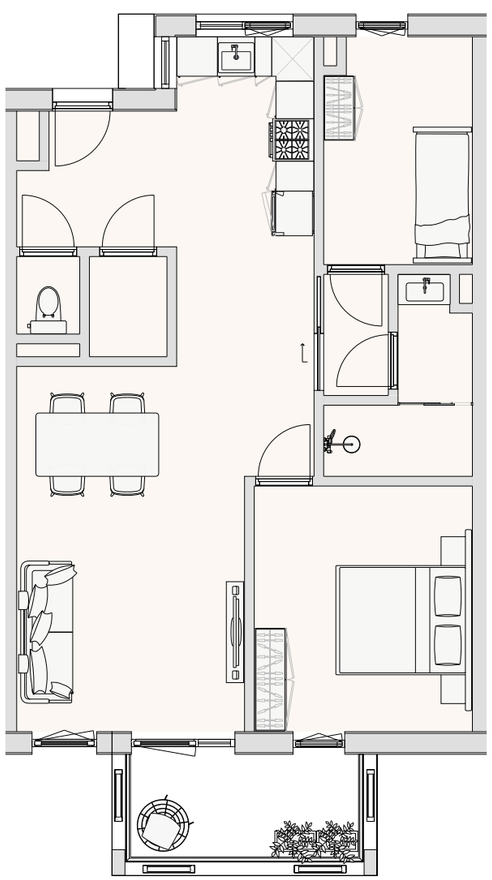
Feedback: feels ‘hokkerig’

Design influence:
- Kitchen on gallery for visual connection
- 2 bedrooms
- Storage
- Separate toilet
- Light from two sides
- Entrances clustered

CURRENT

+ All doors clustered in hallway
+ Possible to extend kitchen untill pocket door
+ Privacy for bathroom and small bedroom
+ Light from both sides (north and south OR east and west)
+ Access to balcony from living area and bedroom

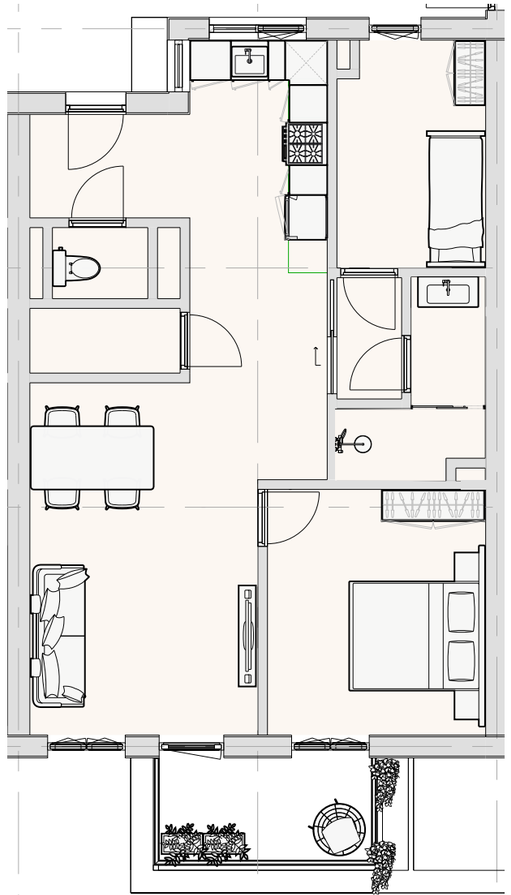
- Amount of ‘traffic area’
- Window small bedroom on gallery



OPTION 1

+ Hallway is a rectangle
+ Possible to extend kitchen untill pocket door
+ Privacy for bathroom and small bedroom
+ Light from both sides (north and south OR east and west)
+ Access to balcony from living area and bedroom

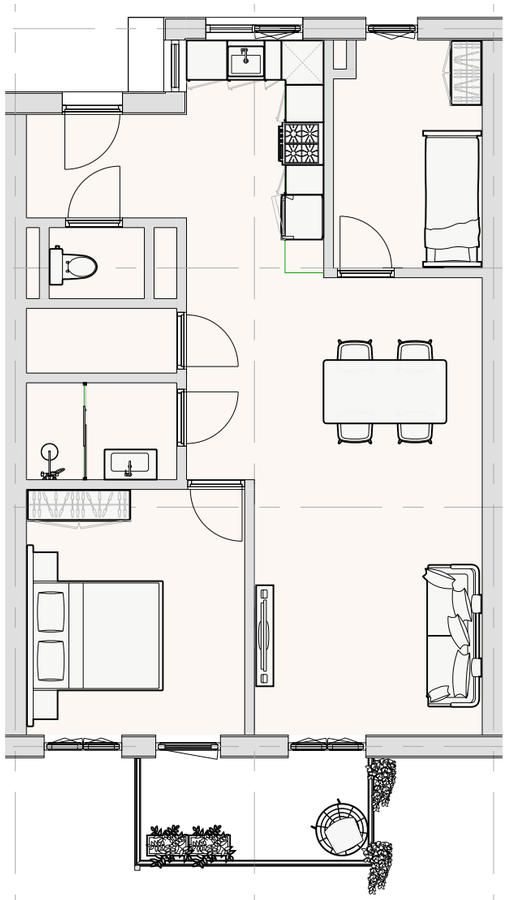
- Window small bedroom on gallery
- Amount of ‘traffic area’
- Entrance bedroom in living area



OPTION 2

+ Hallway is a rectangle
+ Kitchen, dining and living more connected
+ Bathroom clustered with storage and separate toilet
+ Access to balcony from living area and bedroom
+ Light from both sides (north and south OR east and west)

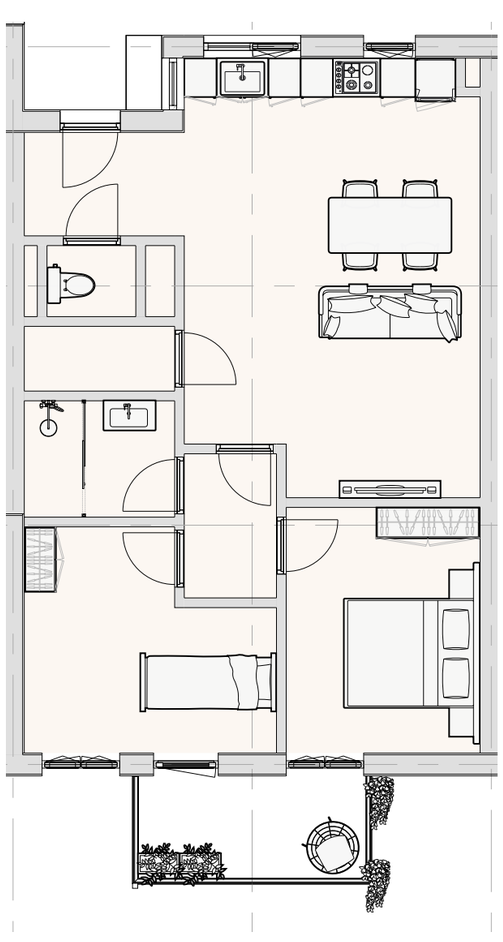
- Window small bedroom on gallery
- Maximum kitchen size based on small bedroom
- Small bedroom separare from rest of more private spaces
- No privacy for bathroom and bedrooms



OPTION 3

+ Hallway is a rectangle
+ Kitchen, dinging and living in one area
+ Privacy for bathroom and bedrooms
+ No windows in bedroom on gallery

- Light from one side (north OR east)
- No access from living area to balcony

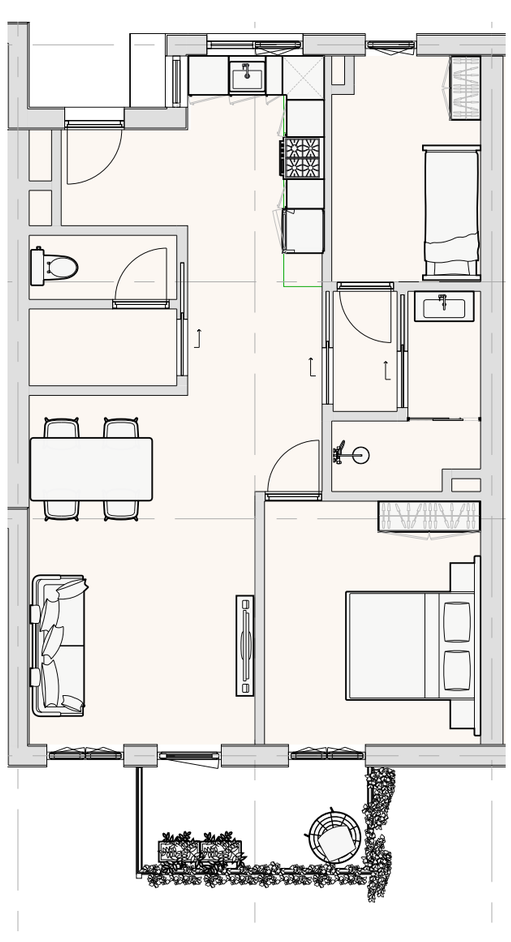


OPTION 4

+ Hallway is a rectangle
+ Shafts clustered
+ Two doors between toilet and kitchen
+ Possible to extend kitchen untill pocket door
+ Privacy for bathroom and small bedroom
+ Light from both sides (north and south OR east and west)
+ Access to balcony from living area and bedroom

- Via storage to toilet
- Window small bedroom on gallery

** option: move toilet door into entry and make it possible to close entry from living area*



Apartment Type 4

Feedback: feels ‘hokkerig’

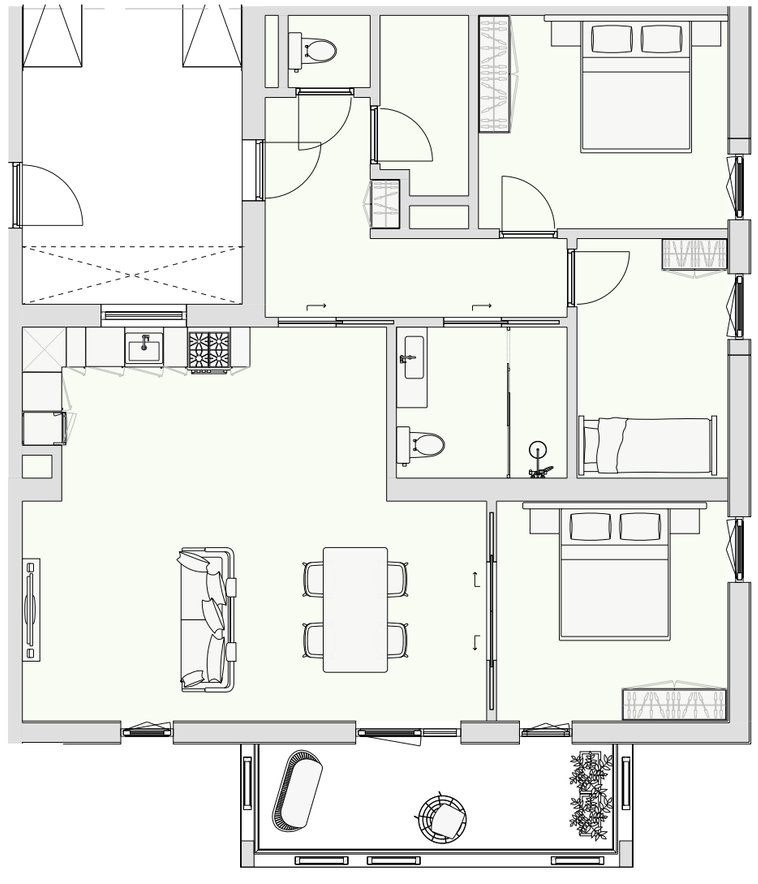
Design influence:
- Kitchen on corridor for visual connection
- 3 bedrooms; one flexible in use
- Storage
- Separate toilet
- Feeling of privacy towards bedrooms and bathroom
- Load-bearing wall

CURRENT

Hallway = 8.96m^2

+ Separation living area and hallway
+ No direct sightline from entrance into bedroom (privacy)
+ Hallway to bedrooms and bathroom free from doors

- Separate toilet far from bedrooms
- All kinds of corners

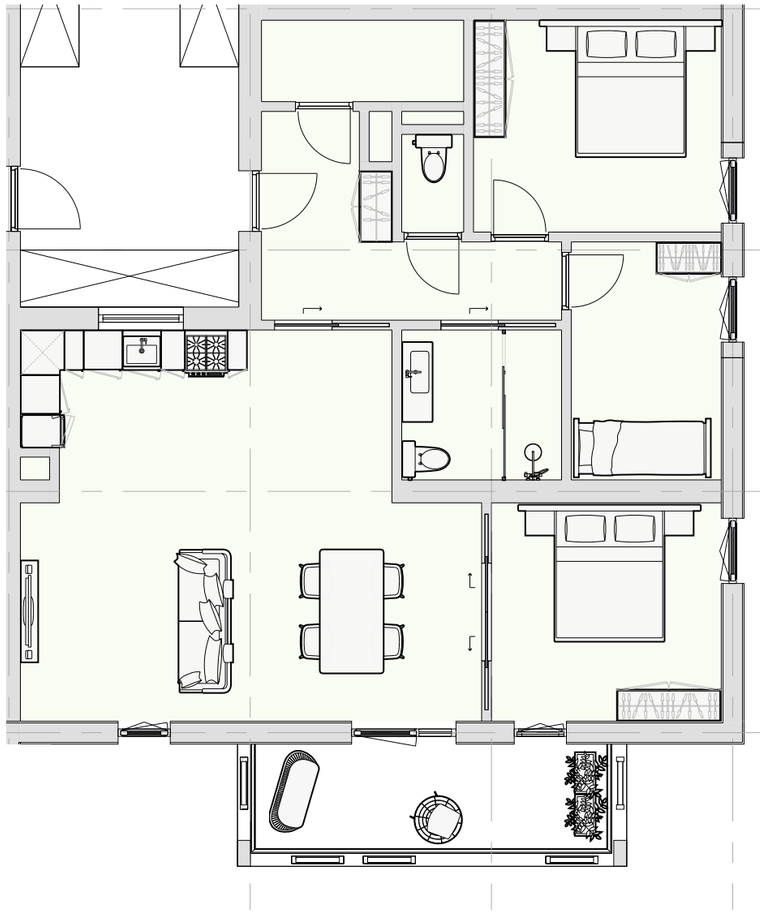


OPTION 1

Hallway = 8.52m^2

+ Separation living area and hallway
+ No direct sightline from entrance into bedroom (privacy)
+ No direct sightline from living area into separate toilet (privacy)
+ Private domain clustered > partition possible
+ Separate toilet close to bedrooms

- Door separate toilet obstructs movement path through hallway

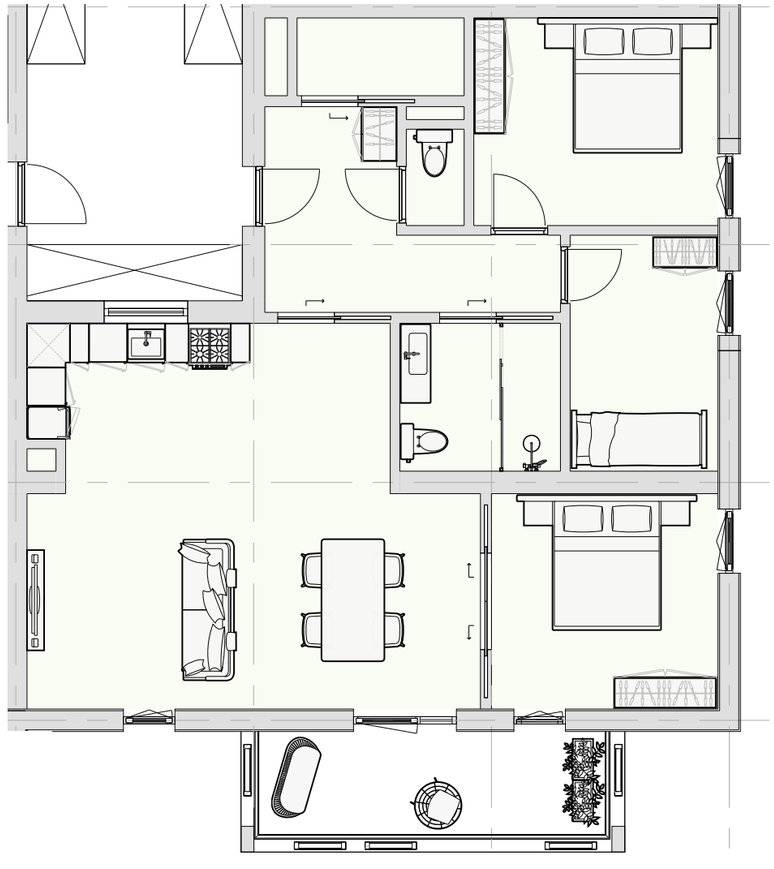


OPTION 2

Hallway = 9.15m^2

+ Separation living area and hallway
+ No direct sightline from living area into separate toilet (privacy)
+ Door separate toilet does not obstruct movement path through hallway
+ Private domain clustered
+ Fusebox in storage
+ Multiple options for wardrobe

- Biggest m^2 hallway

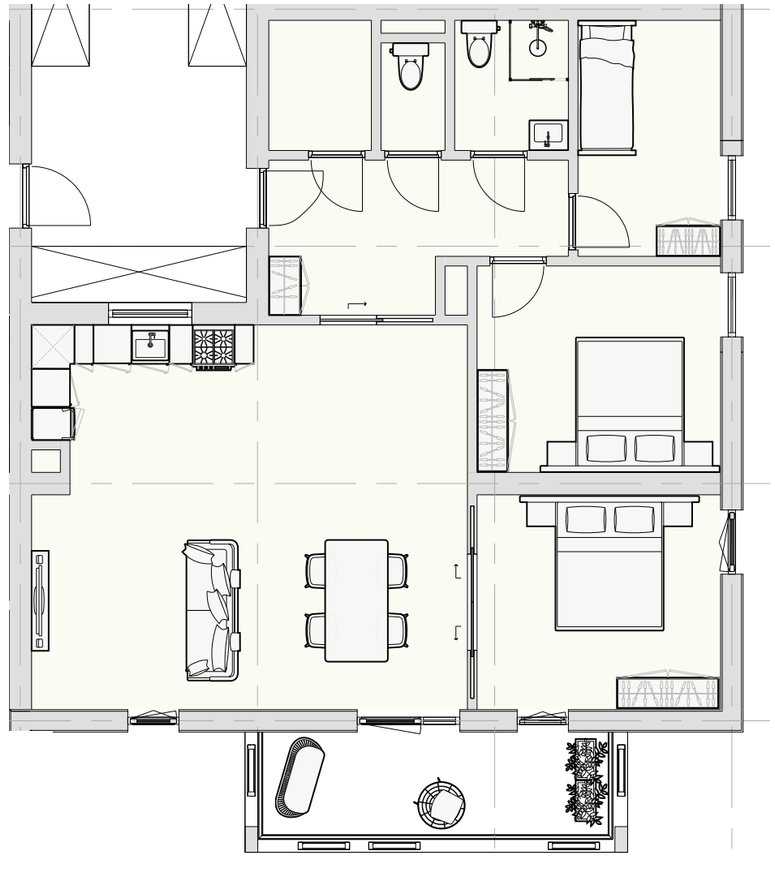


OPTION 3

Hallway = 9.03m^2

+ Separation living area and hallway
+ No direct sightline from living area into separate toilet (privacy)
+ Private domain clustered
+ Alcove feeling leading into living area
+ Living area is a rectangle

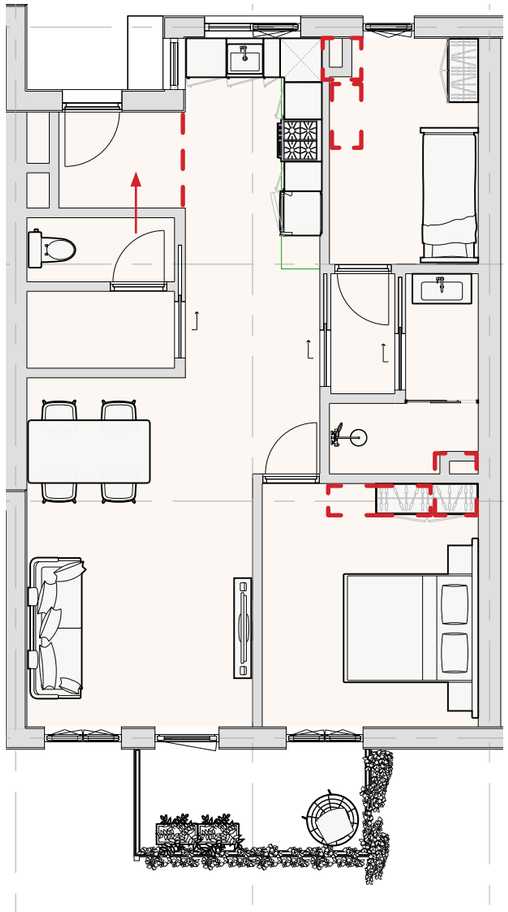
- Direct sightline from entrance into private domain
- Doors obstructing movement path
- Hallway full of doors
- Coat area no set space



Choices

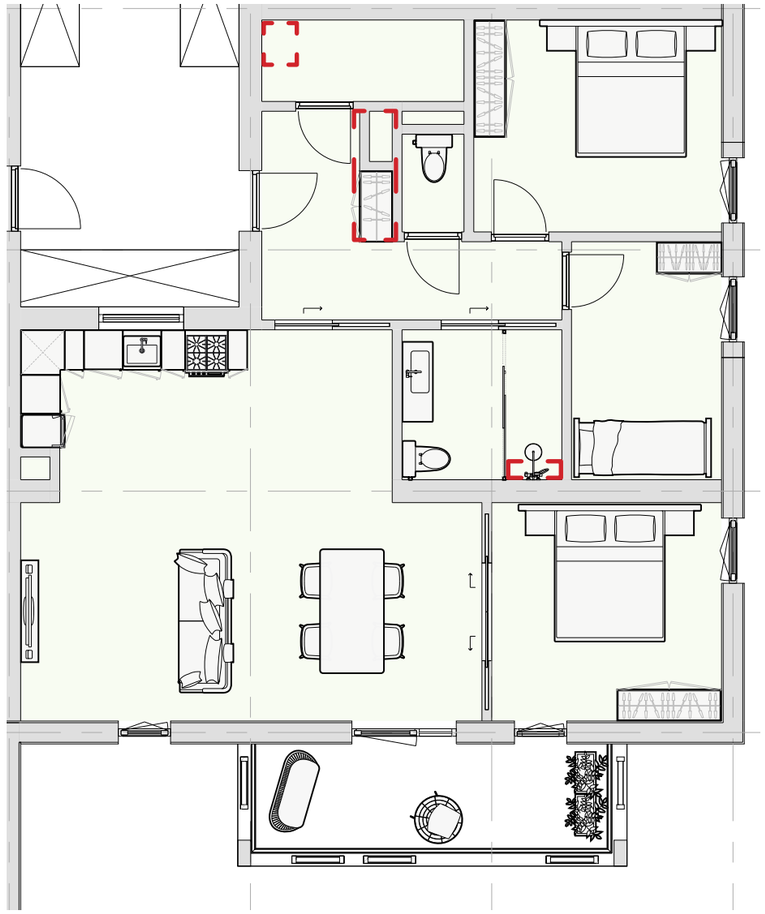
Apartment type 3 - option 4

Notes:
- Move toilet access into hallway; useable storage and there could be an option to place a partition between hallway and kitchen
- Connect shaft sizes with warderobes in bedroom; does not disturb the layout and is utilized instead of ‘randomly placed’



Apartment type 4 - option 1

Notes:
- Move fusebox into storage space and make warderobe full length in hallway
- Place shaft of bathroom behind shower; does not disturb the layout and is utilized instead of ‘randomly placed’



South Facade Block 3



South Facade Block 3



South Facade Block 3



Improving South Facade Block 3

AT P3



FEEDBACK AT P3
- There is to much going on
  - Balcony with shutters
  - Balcony with greenery
  - Outward-shifted glass facade
  - Height differences
  - Irregular shape repeated but differently

> Is it possible to 'tone it down' / more cohesive?

CENTRAL ACCENT



CHANGES
- Centralizing the communal spaces in the block
- Add two apartments to the right for symmetrical balcony structure on both sides
- Widen balconies in middle to make it possible for greenery to grow on side of the outward-shifted glass facade

ONE BRICK USED

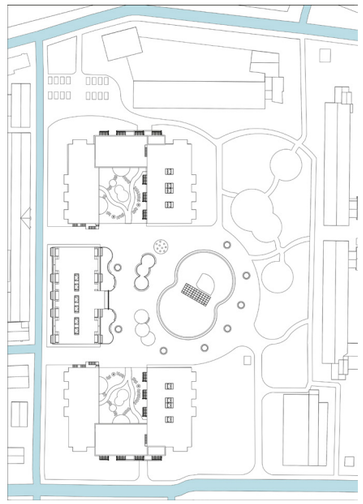


Test what it would look like to use only the brown brickwork in the building
- Not bad but prefer the separation of the block into three parts

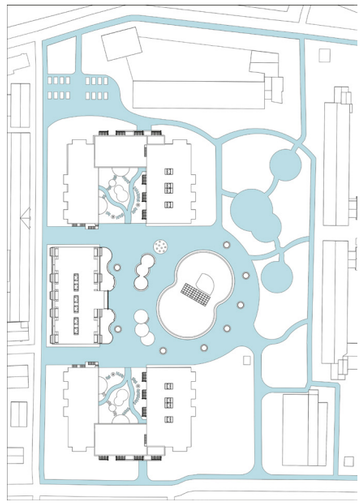
Tutoring Takeaways (A)
- Draw the different kind of shafts right to not confuse others
- Give shafts an 'extra' purpuse if possible
- Facade (south) is already better like this; to make the connection between the blocks stronger would be nice to give the outward-shifted glass facade the brown brickwork

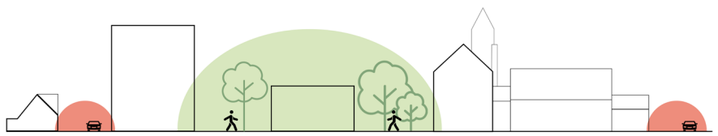
Goals

fast traffic

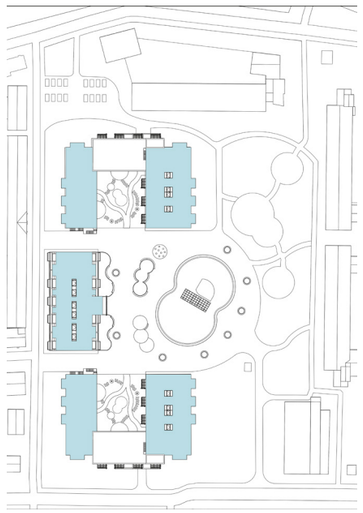


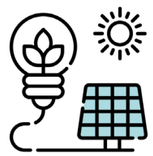
slow traffic





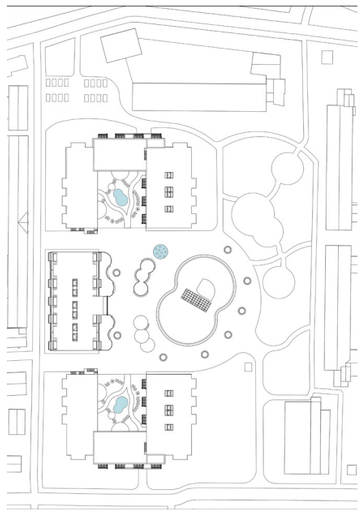
service roofs

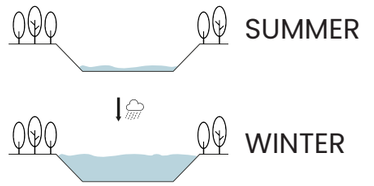




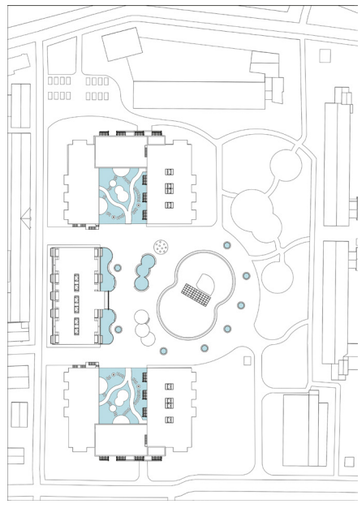
2000m²

water integration



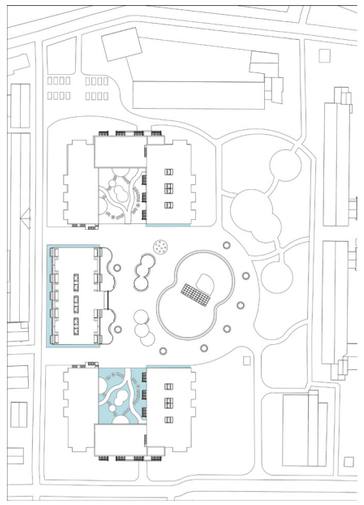


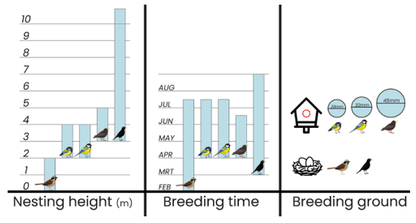
added greenery



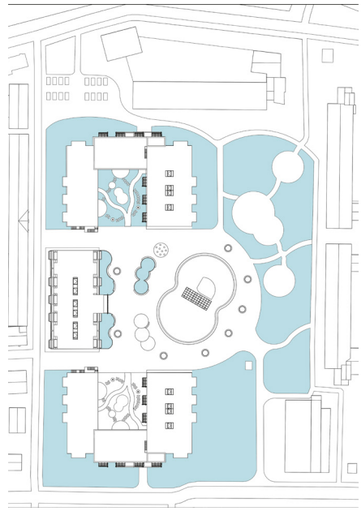


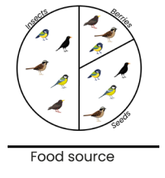
birds



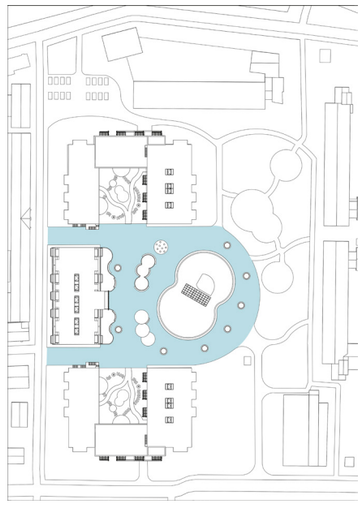


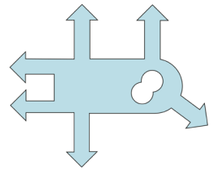
insects



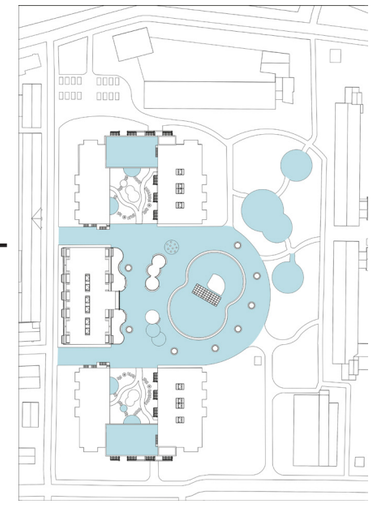


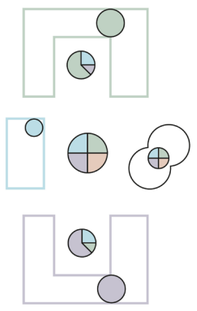
central square



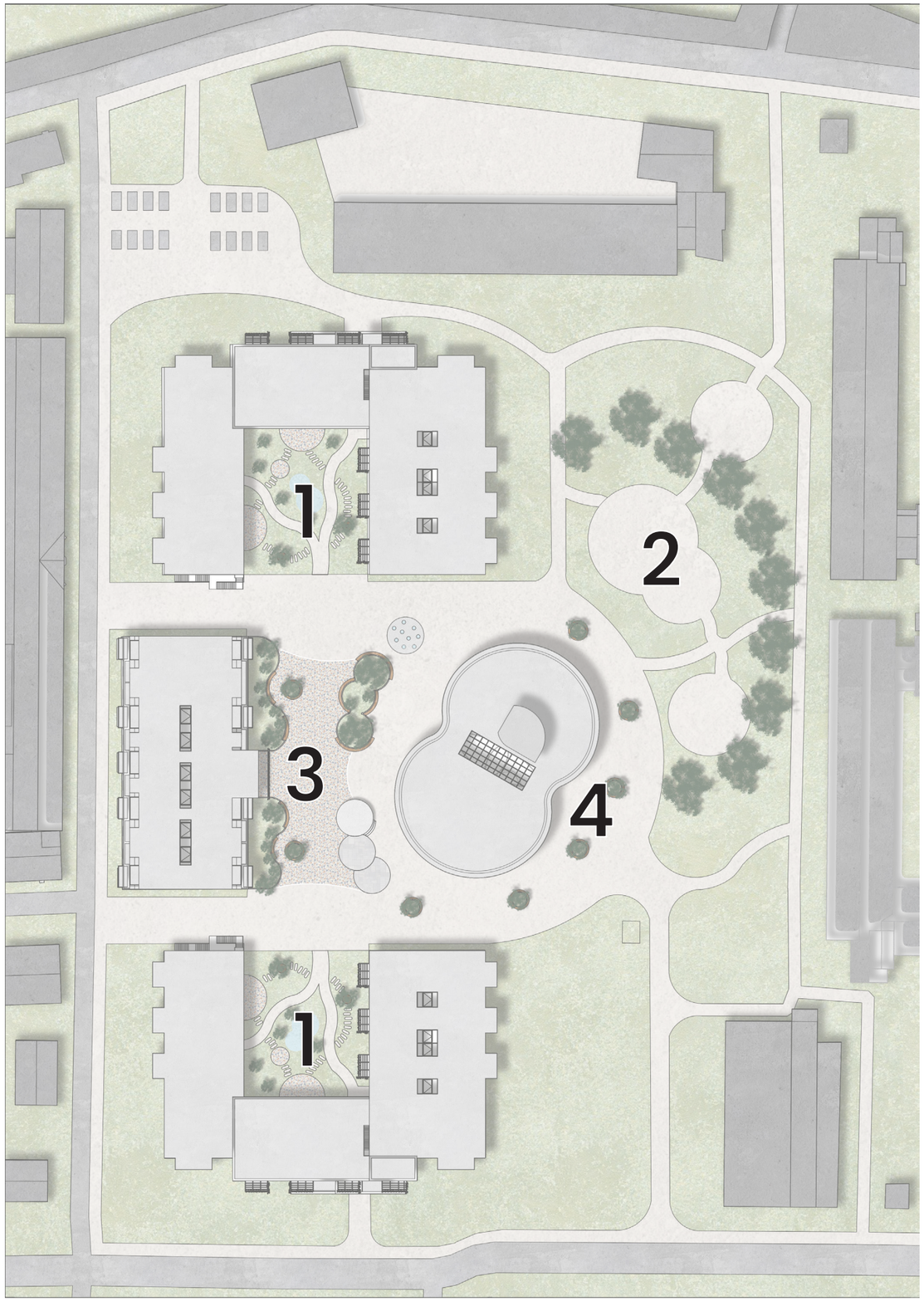


social points





Atmospheres

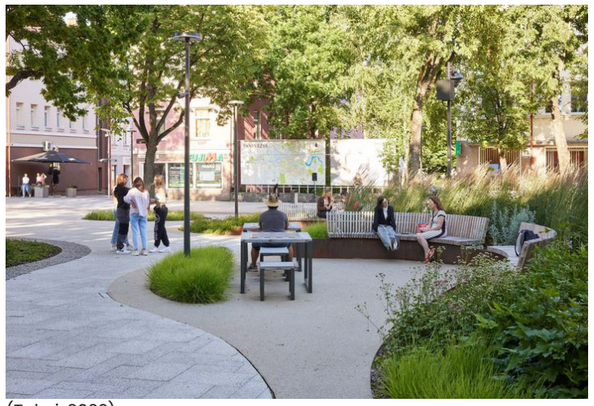




(brickvisual, 2016)

1 SEMI-PRIVATE GARDEN

Offers a **serene and inviting** atmosphere, blending openness with a sense of enclosure. Lush greenery creates a natural sanctuary where residents can immerse themselves in a **calm and tranquil** environment. It fosters quiet moments of relaxation while **encouraging connection and interaction** among building residents, making it a peaceful retreat within the community.



(Tukaj, 2022)

2 PUBLIC PARK

Is a **vibrant and inviting** green space that balances natural preservation with functional design. Scattered throughout the park are **small seating areas nestled among the trees**, offering comfortable spots for resting, relaxing, and socializing. By **dividing the park into smaller zones** a series of intimate and welcoming spaces is created, encouraging a variety of uses while maintaining a strong sense of **greenery and openness**.



(Divisare, 2024)

3 SQUARE - CALM

Offering a more i**ntimate and peaceful environment** close to the residents. A **buffer of greenery** creates a soft transition between private spaces and the public realm. This area is designed with an abundance of seating, **encouraging residents to pause, stay, and enjoy the surrounding nature.** The focus here is on greenery and simply being—offering a moment of calmness. Despite its serene character, this zone remains **well connected to the more vibrant parts** of the square, such as the podium and café terrace, ensuring a natural flow between activity and tranquility.



(Larsen, nd)

4 SQUARE - LIVELY

Establishing a **central meeting point** for residents and forms a connection with the community center. Its layout encourages **multifunctional use** for events such as collective barbecues and neighborhood gatherings that strengthen social ties. A **café terrace adds vibrancy** and invites casual interaction, while **seating beneath the trees** offers shaded areas for relaxation and informal encounters. By uniting the surrounding sub-communities, the square becomes a space with **a shared sense of belonging** within the wider neighborhood.

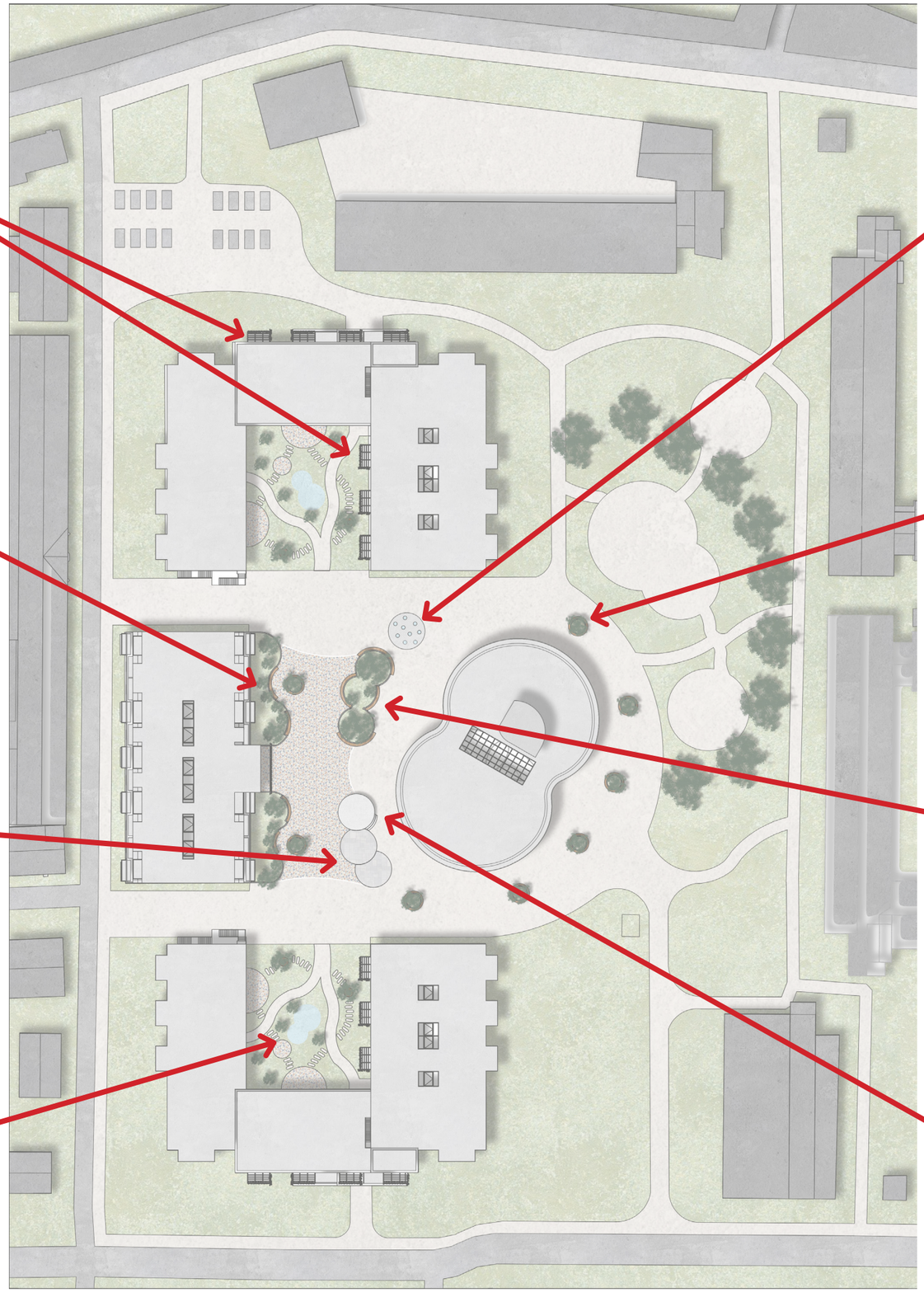
Elements





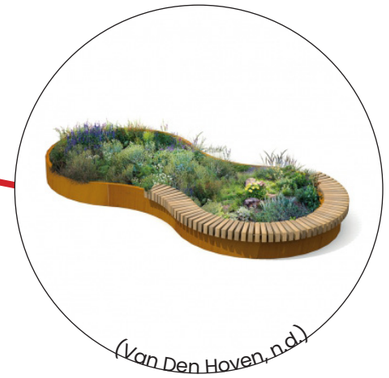






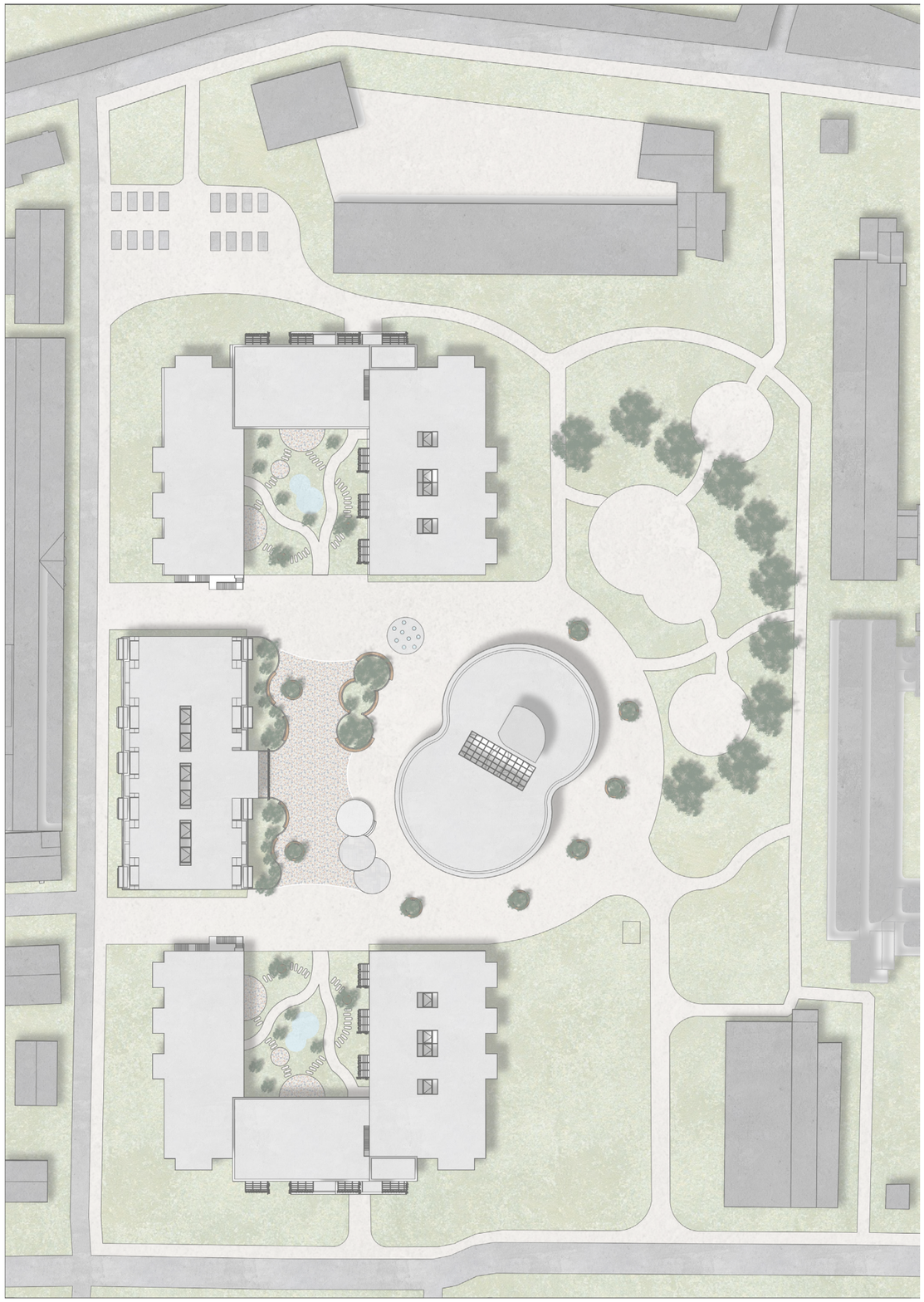








Landscape consult
- Make variation in path width; now everything looks the same and is very wide
- Think about what materials you use where
- Nice that the rounded shape is leading you through the project



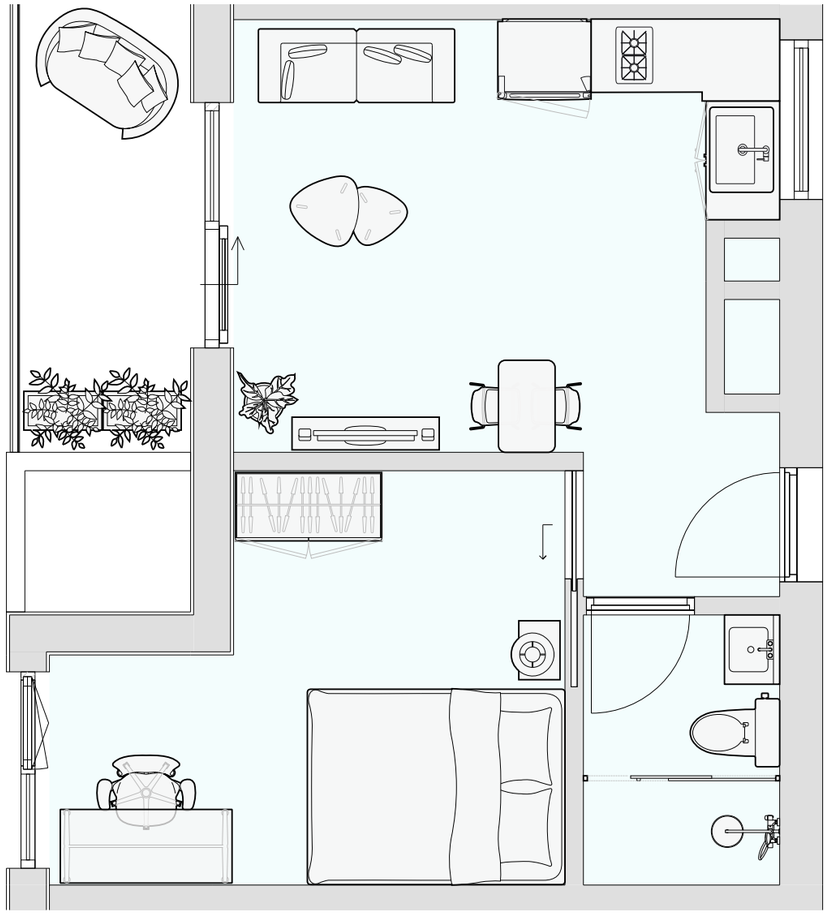
Week 3.9

Apartment Refinement and Technical Strategies

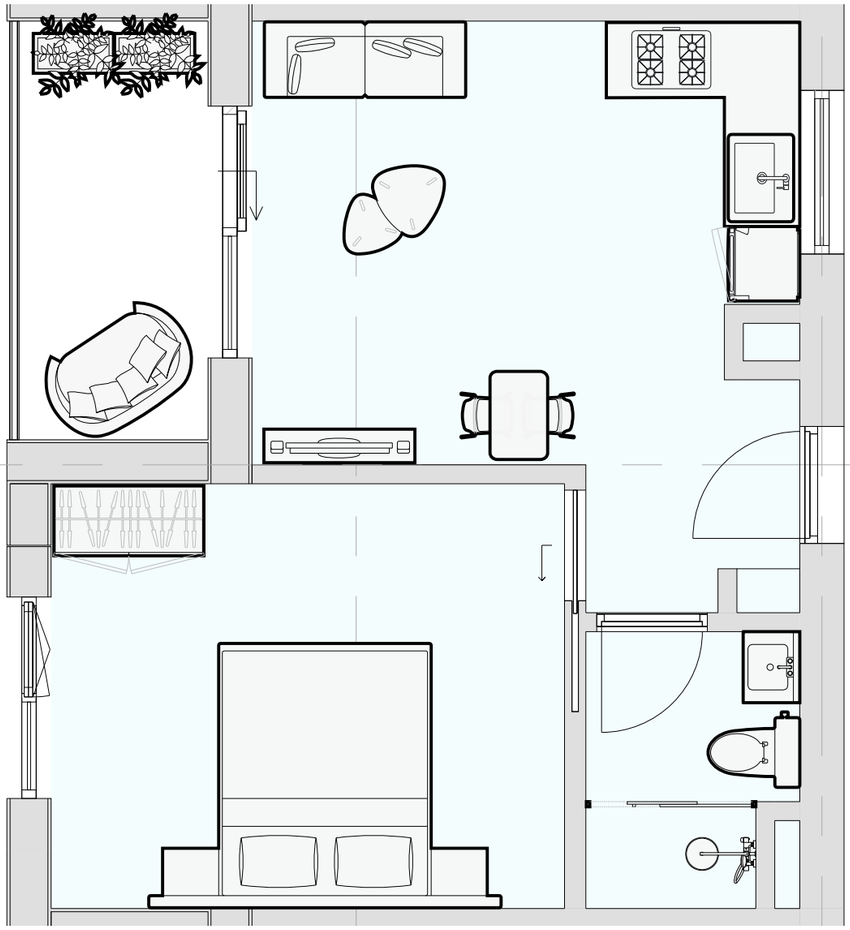
Final apartment types were defined to ensure a functional and diverse housing mix tailored to the needs of a multigenerational community. The east and west façades were further refined to enhance architectural coherence and improve interaction with the surrounding context. A parking vision was developed, focusing on reduced car dependency and alignment with sustainable urban mobility principles. In parallel, a strategy for placing solar panels on the service roofs was established, aiming for optimal energy efficiency and self-sufficiency.

Apartment Type 1

AT P3

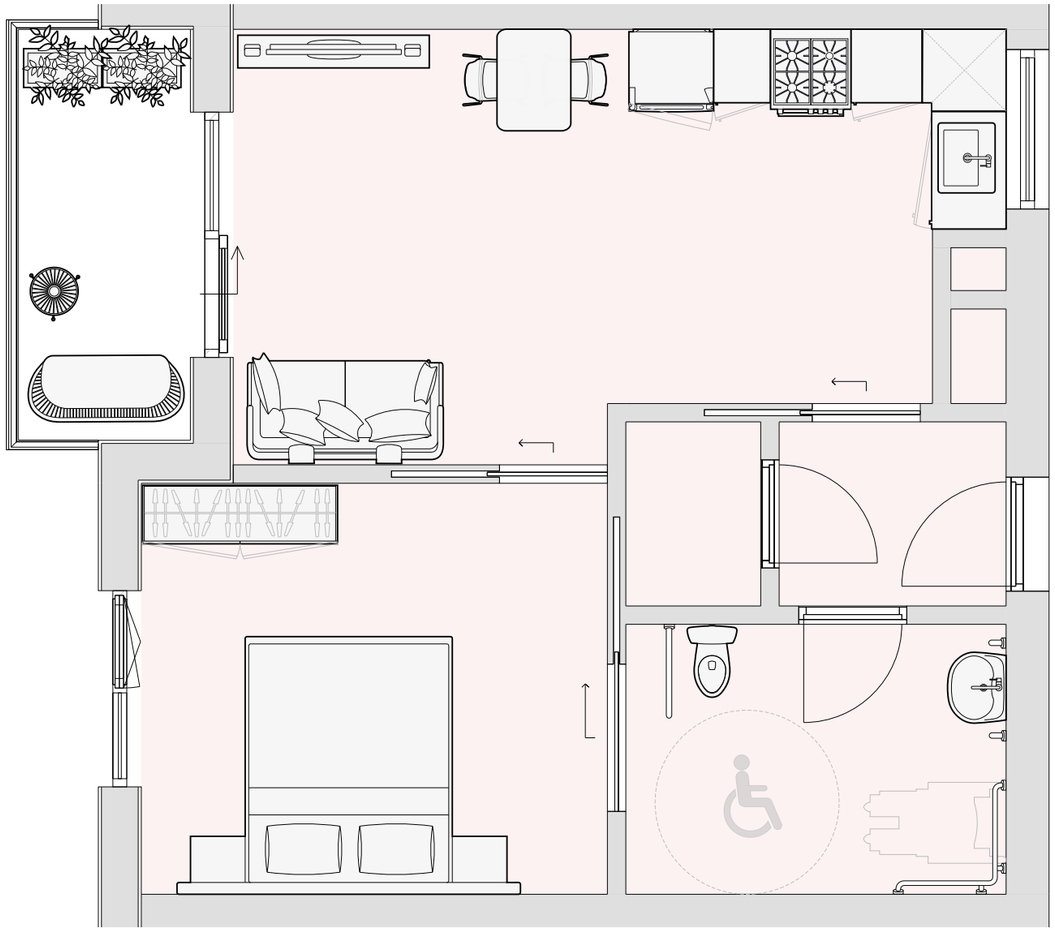


NEW

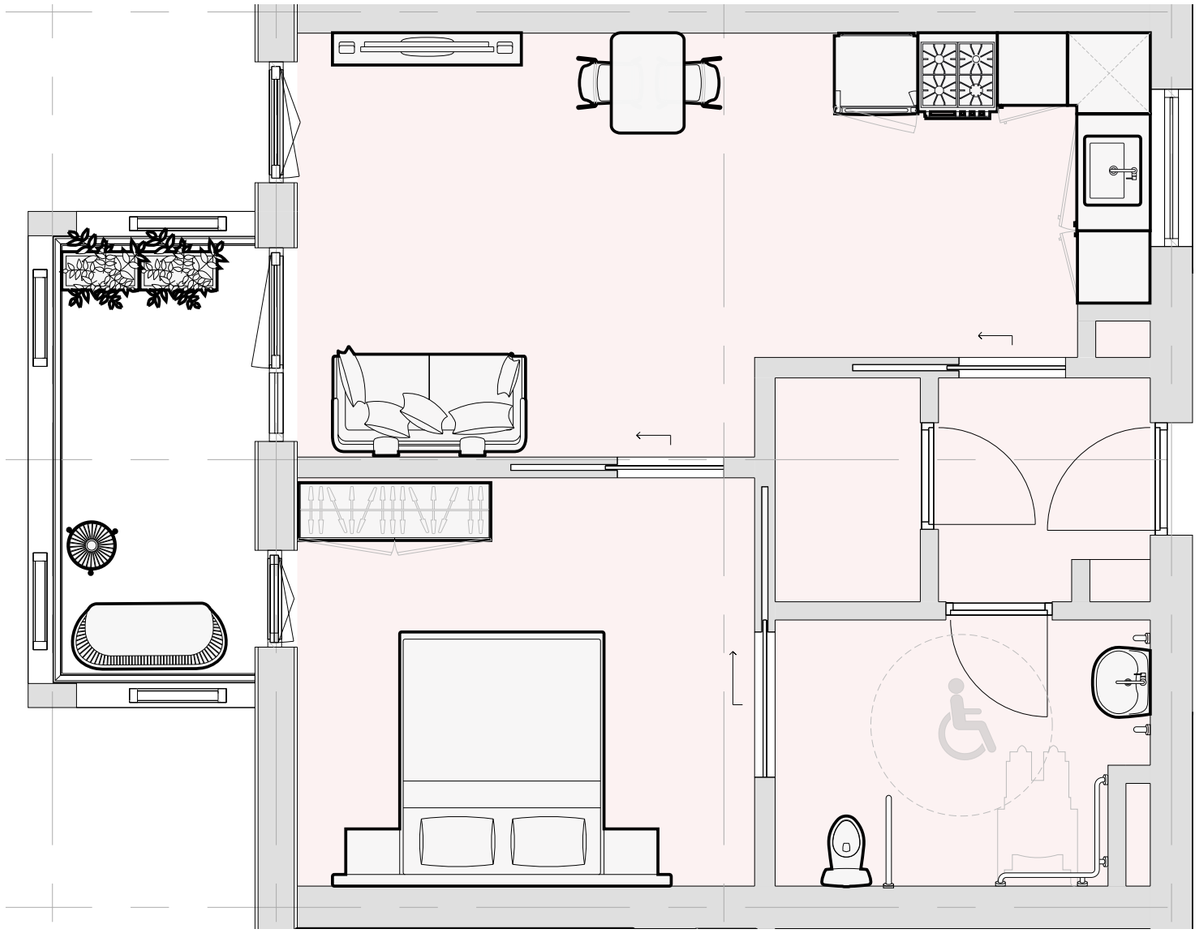


Apartment Type 2

AT P3



NEW



Apartment Type 3

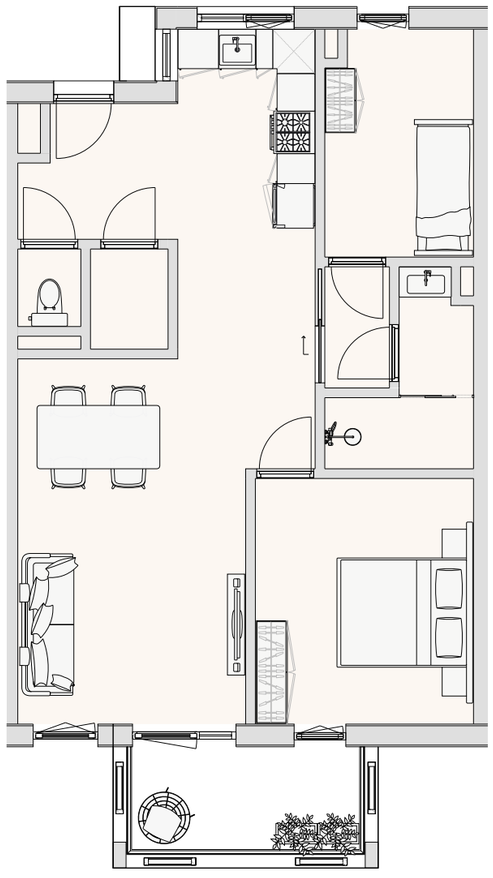
Feedback: feels ‘hokkerig’

Design influence:
- Kitchen on gallery for visual connection
- 2 bedrooms
- Storage
- Separate toilet
- Light from two sides
- Entrances clustered

AT P3

+ All doors clustered in hallway
+ Possible to extend kitchen untill pocket door
+ Privacy for bathroom and small bedroom
+ Light from both sides (north and south OR east and west)
+ Access to balcony from living area and bedroom

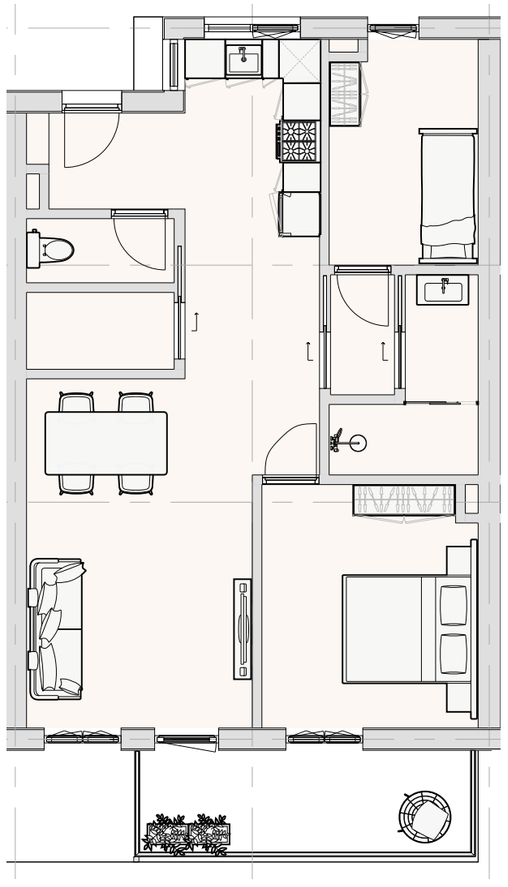
- Amount of ‘traffic area’
- Window small bedroom on gallery



NEW

+ Hallway is a rectangle
+ Possible to extend kitchen untill pocket door
+ Privacy for bathroom and small bedroom
+ Light from both sides (north and south OR east and west)
+ Access to balcony from living area and bedroom

- Window small bedroom on gallery
- Amount of ‘traffic area’
- Entrance bedroom in living area



Apartment Type 4

Feedback: feels ‘hokkerig’

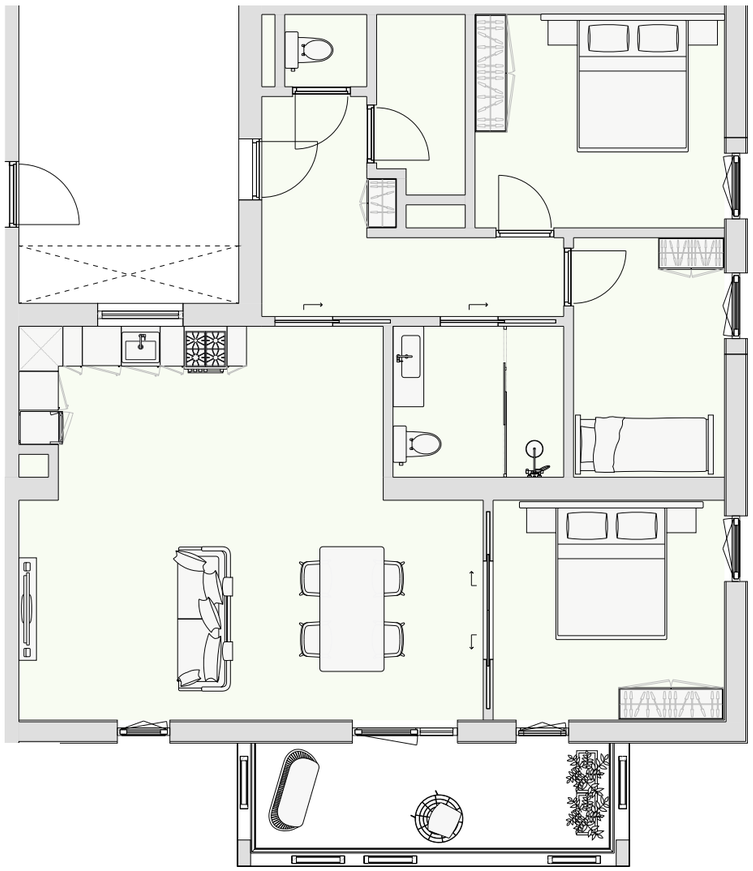
Design influence:
- Kitchen on corridor for visual connection
- 3 bedrooms; one flexible in use
- Storage
- Separate toilet
- Feeling of privacy towards bedrooms and bathroom
- Load-bearing wall

AT P3

Hallway = 8.96m²

+ Separation living area and hallway
+ No direct sightline from entrance into bedroom (privacy)
+ Hallway to bedrooms and bathroom free from doors

- Separate toilet far from bedrooms
- All kinds of corners

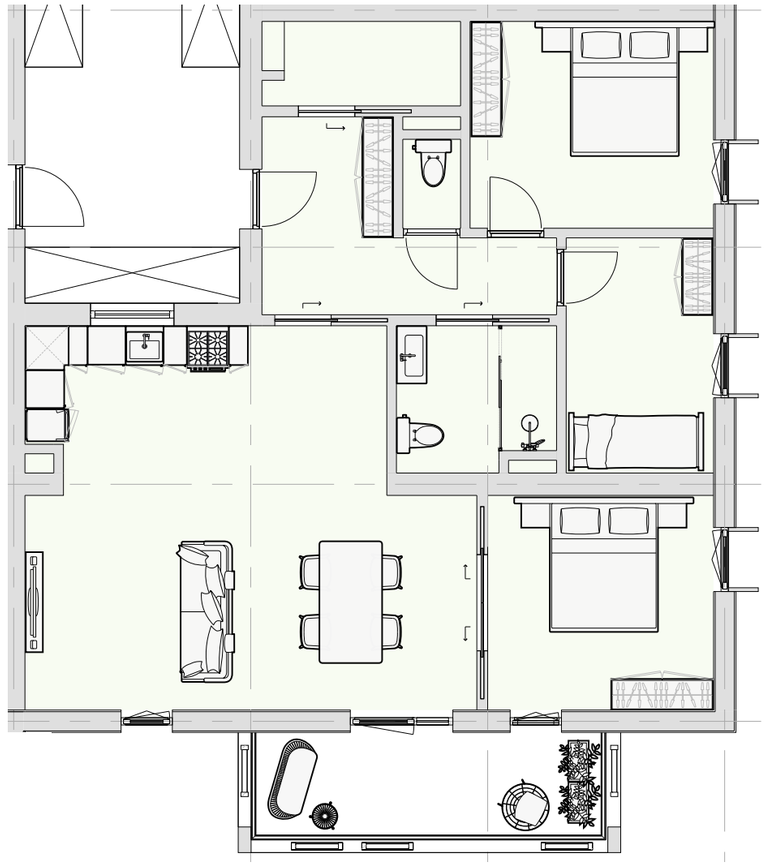


NEW

Hallway = 9.15m²

+ Separation living area and hallway
+ No direct sightline from living area into separate toilet (privacy)
+ Private domain clustered
+ Fusebox in storage
+ Enough wardrobe space

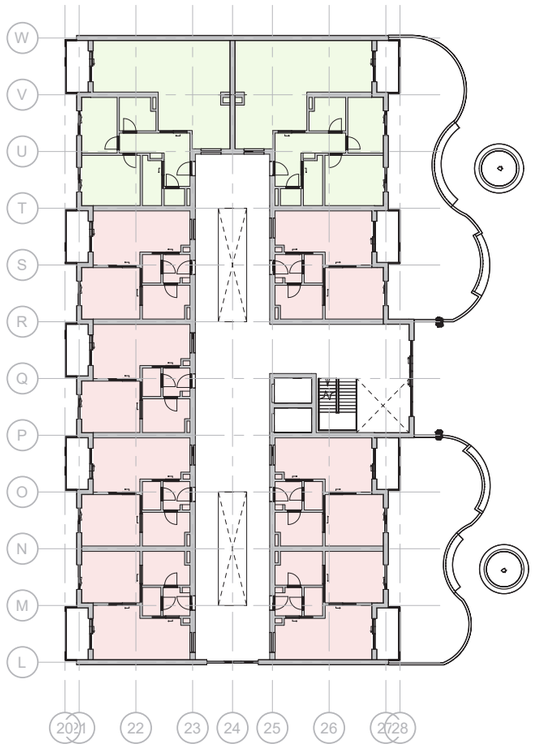
- Bigger m² hallway
- Door separate toilet might obstructs movement path through hallway

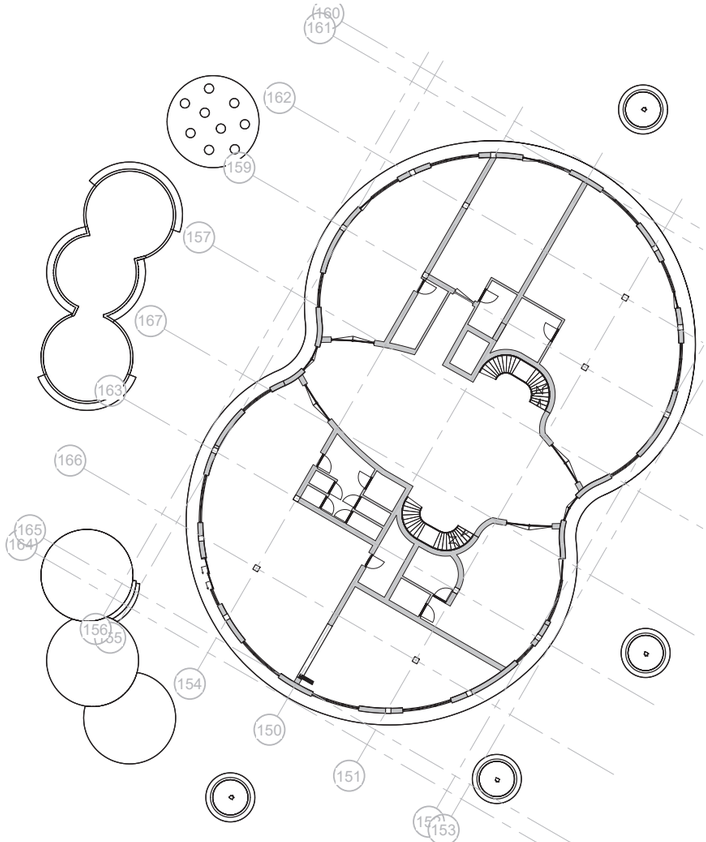


GROUND FLOOR 1:200

(SCALED 50%)

- Type 1 - Less than 40.00 m²
- Type 2 - 40.00 m² - 65.00 m²
- Type 3 - 50.00 m² - 85.00 m²
- Type 4 - 85.00 m² or more
- Communal space

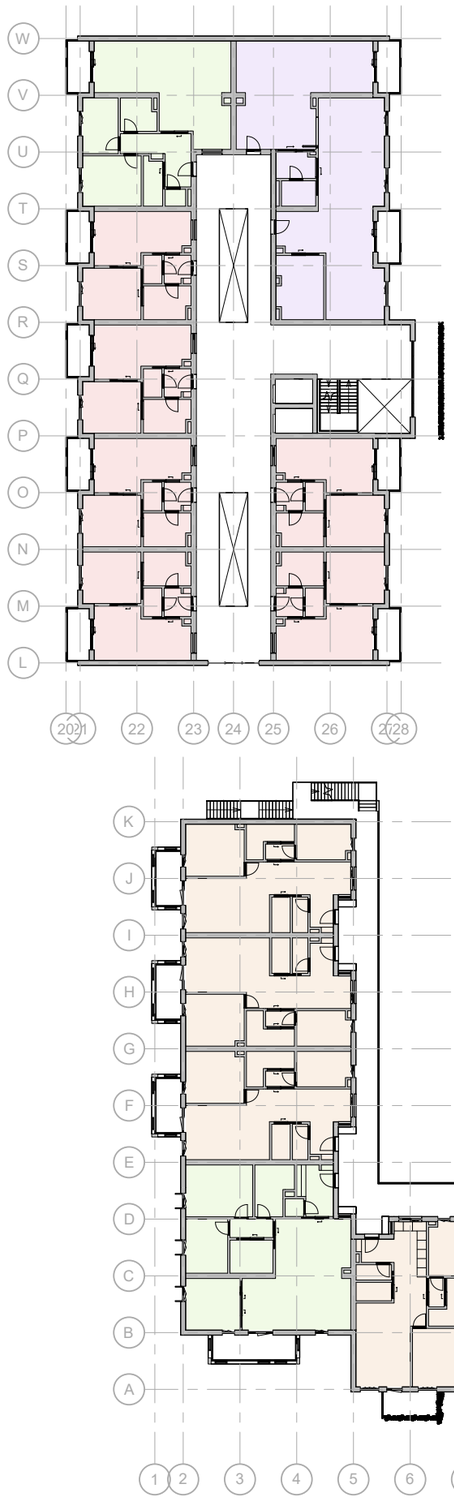


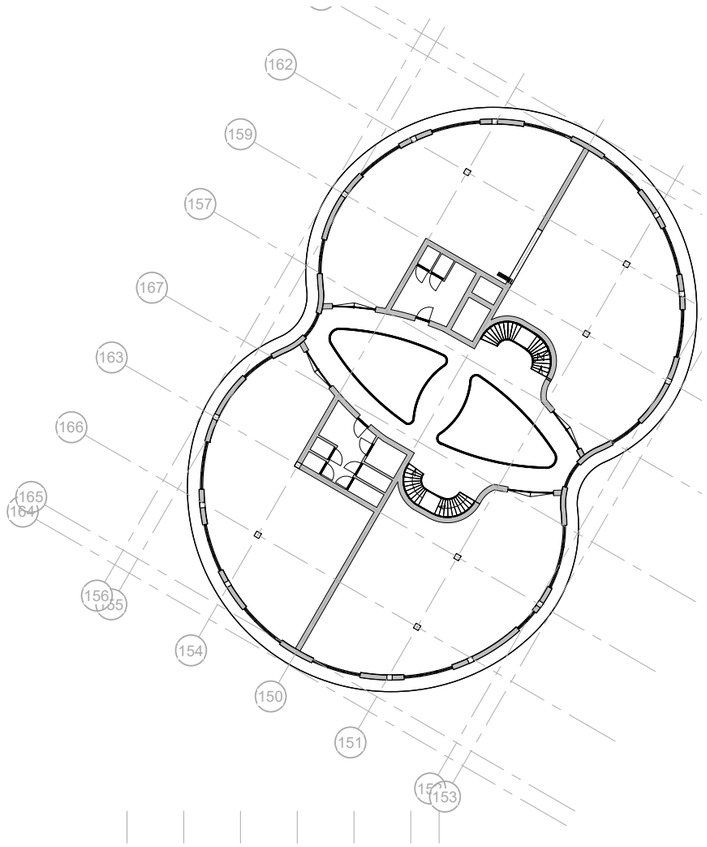




FIRST FLOOR 1:200
(SCALED 50%)

- Type 1 - Less than 40.00 m²
- Type 2 - 40.00 m² - 65.00 m²
- Type 3 - 50.00 m² - 85.00 m²
- Type 4 - 85.00 m² or more
- Communal space

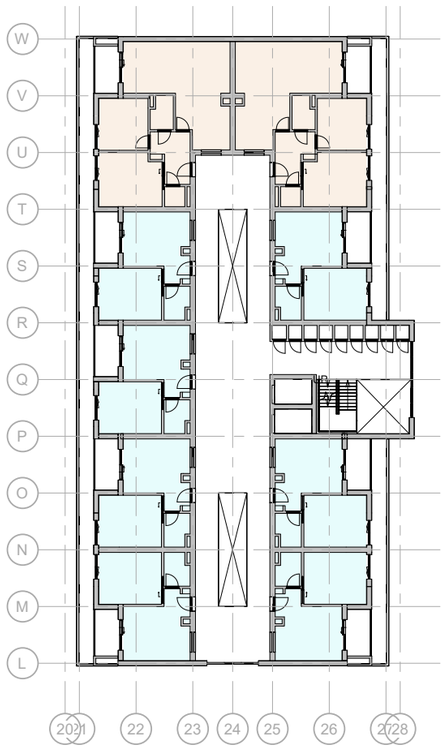


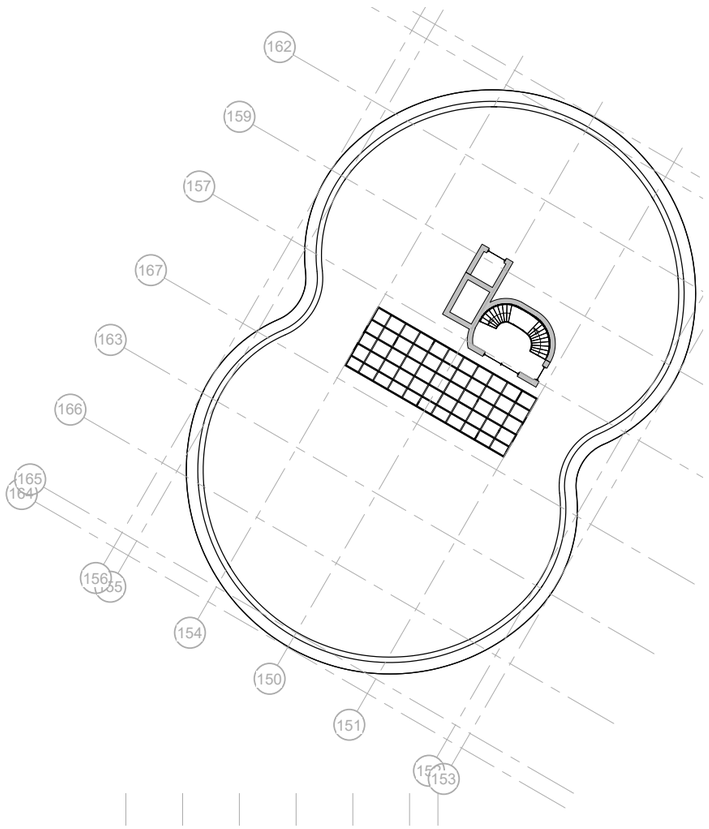


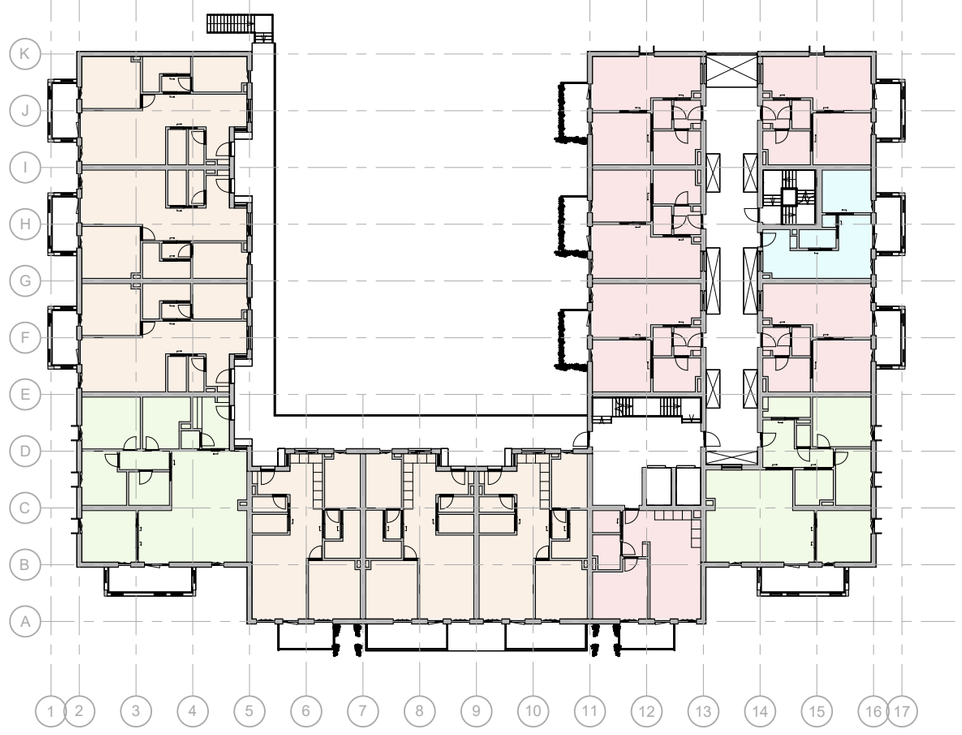
SECOND FLOOR 1:200

(SCALED 50%)

- Type 1 - Less than 40.00 m²
- Type 2 - 40.00 m² - 65.00 m²
- Type 3 - 50.00 m² - 85.00 m²
- Type 4 - 85.00 m² or more
- Communal space



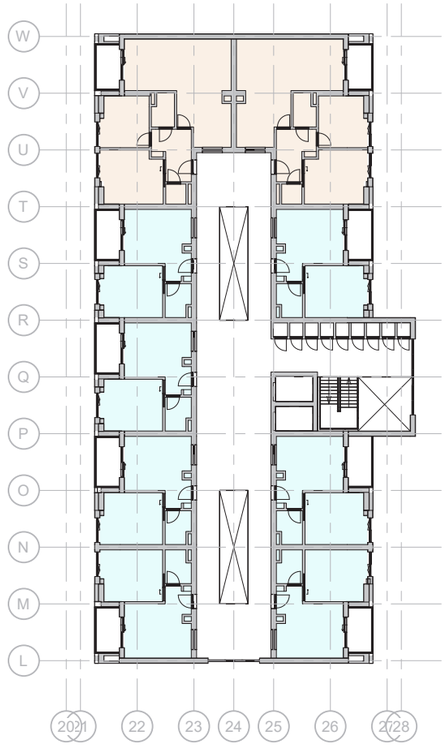


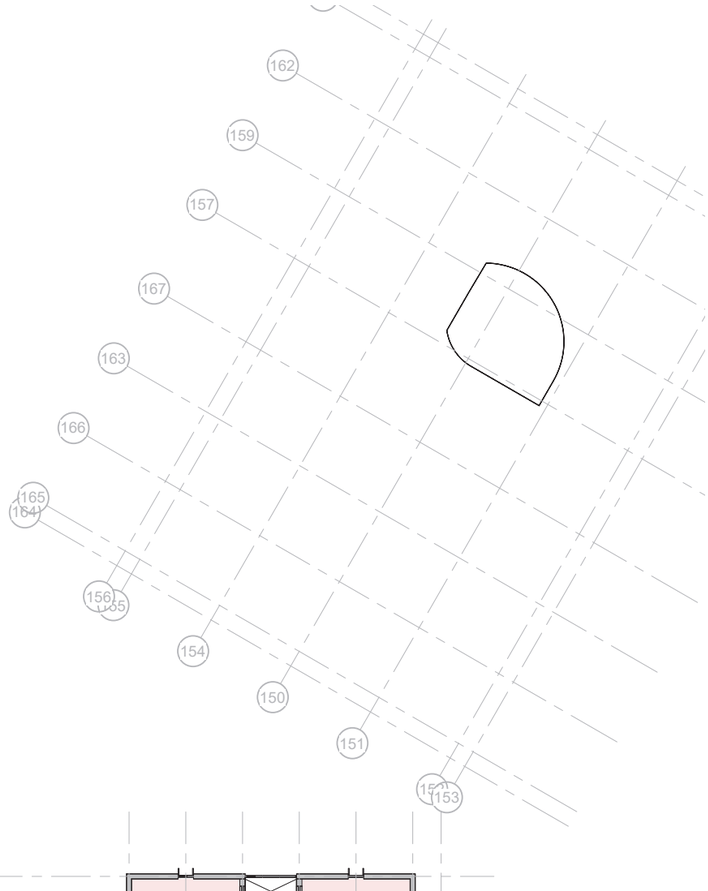


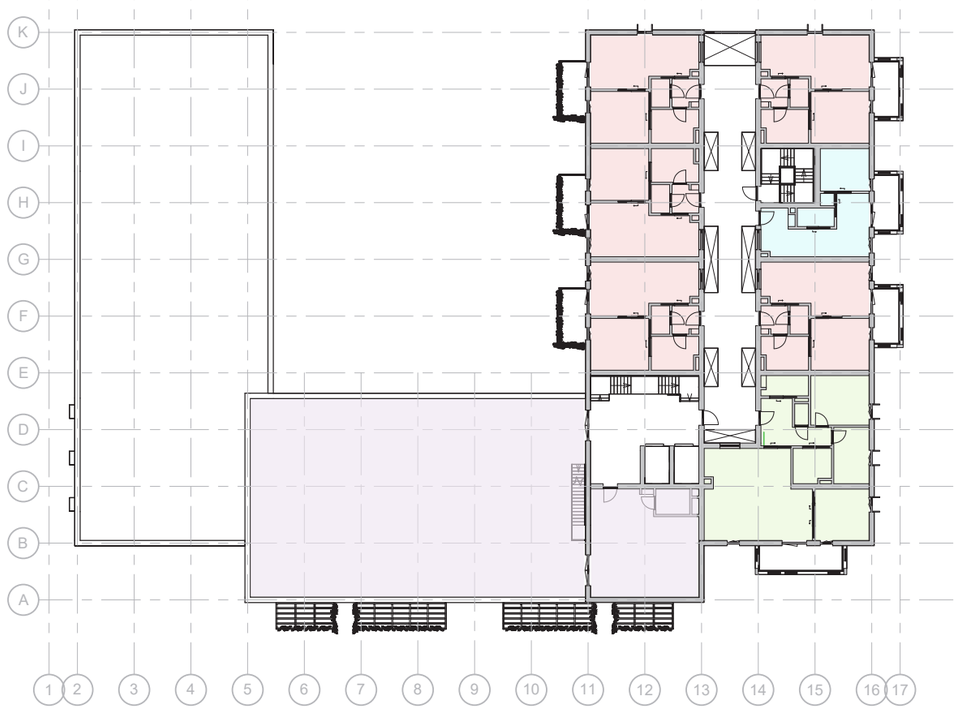
THIRD FLOOR 1:200

(SCALED 50%)

- Type 1 - Less than 40.00 m²
- Type 2 - 40.00 m² - 65.00 m²
- Type 3 - 50.00 m² - 85.00 m²
- Type 4 - 85.00 m² or more
- Communal space







Parking

Apartments (currently 56 on site)

	GF			1st			2nd			3th			total
Block	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	
<40m²	1		1	1		1	1	7	1	1	7	1	22
40-65m²	6	7	6	6	6	6	6		6	5		5	59
65-85m²	4		4	4		4	6	2	6		2		32
85-120m²	2	2	2	2	1	2	2		2	1		1	17
													130

Cars (currently 25 on street)

	Norm*	Amount of dwellings	Amount of parking	
<40m²	0,1	22	2,2	
40-65m²	0,5	59	29,5	
65-85m²	0,8	32	25,6	
85-120m²	1	17	17	
			74,3	total = 75

Bicycle

	Norm*	Amount of dwellings	Amount of parking	
<40m²	2	22	44	
40-65m²	2	59	118	
65-85m²	3	32	96	
85-120m²	3	17	51	
			309	total = 309

*(Overheid.nl, 2022)
**(Tess, 2025)
*** (HalloStroom, 2024)

Solar Panels

Household size per type

	Size	kWh/year max consumption**	Amount of dwellings	Amount of kWh/year	
<40m²	1-2	1300	22	28.600	
40-65m²	1-2	1300	59	72.800	
65-85m²	2-3	1700	32	54.400	
85-120m²	4-5	2900	17	49.300	
				205.100	total

Panels

m²***	roof m²	amount	kWh/year ***	total
1,98	2000	1000	350	350.000

Conclusion

Given the **central location** of the project in Rotterdam, it is not necessary to provide the full number of car parking spaces required. Instead, the design encourages **alternative modes of transportation** in line with the principles of the **15-minute city**, where daily needs can be met within a short walk or bike ride.

In terms of energy, the available roof surface is **sufficient** to install enough solar panels to **supply electricity** to all households. No additional energy sources are required. While the system may not produce enough electricity year-round, especially during the winter months, it is expected to generate surplus energy in the summer. This balance between seasonal supply and demand results in a **net-positive energy performance over the course of the year**.



Improving South Facade Block 3





(Forma Interieur Rotterdam B.V., n.d.)

Sun Shading

Type: Markisolette

- Positioned on the exterior, markisolettes block solar radiation before it hits the glass, significantly **reducing indoor heat gain** and decreasing the need for cooling

- They **reduce glare** inside without darkening the room completely, allowing comfortable natural light levels

- The angled lower section provides shade while still **allowing a clear view to the outside and visual connection**

- Helps **maintain a more stable indoor temperature**, contributing to user well-being, especially since this is south-facing facade

- **Wind resistant** because of their structure and fixing points, markisolettes tend to be more stable than traditional drop-down screens

Improving East Facade Block 3

AT P3



FEEDBACK AT P3
- Difference between facade part left and right is very big
  - Left is very flat compared to right
  - No ‘building end’ feeling

> Possible to give left side more depth to make the connection with the balconies?

Inspiration



(Breaking Ground, n.d.)

FRAMING WINDOWS



CHANGES
- Separate the windows like the balconies are separate
- Add a frame around the windows to create depth on the facade
- Distance to grid B and K equal

EQUAL SPACING



CHANGES
- Center left side between grid B and E

Improving West Facade Block 3

AT P3



FEEDBACK AT P3
- Difference between facade part left and right is very big
    - Right is very flat compared to right

> Possible to give right side more depth to make the connection with the balconies, like East Facade?

- Improve staircase on the left

CONNECTION EAST



CHANGES
- Used same design principles as East Facade

FIRE ESCAPE



CHANGES
- Make side profile of the balcony structure as thin as the front profile
- Convert fire escape stairs into U-shape so the stairs end on the courtyard side and leading toward the square
- Use same structure as balconies

Tutoring Takeaways (A)
- On curtain wall on south facade sun protection is a must
- Really nice improvement since P3; feels logical now
- Community Center possible to make facades load-bearing to keep inside colomn free; needed for dansstudio
- Make a vision for parking; think about 15-min city

Week 3.10

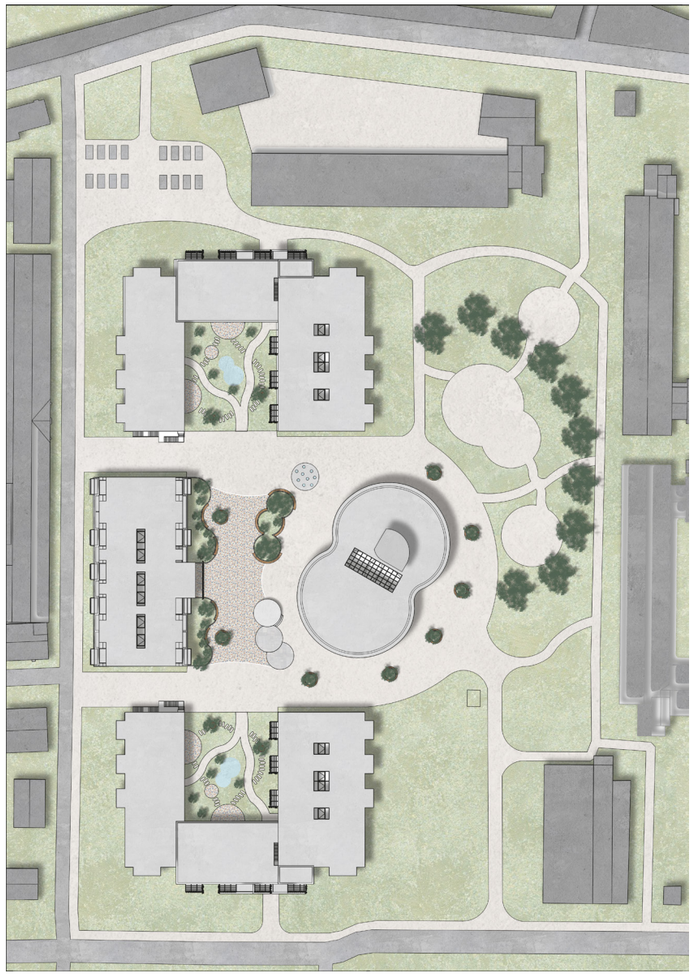
Finalizing Masterplan and Sustainability Exploration

The masterplan was brought to completion, ensuring coherence between spatial layout, building massing, and communal functions. A structural consultation was held to refine key load-bearing elements and address remaining stability concerns. Work on the community center progressed, with a strong focus on sustainability and material expression. Research was conducted into rammed earth construction as a low-impact building method, along with investigations into the solar chimney effect and solar tubes to enhance passive ventilation and daylighting. Additionally, further improvements were made to the architectural fragment to better reflect spatial quality and facade detailing.

Finishing Masterplan

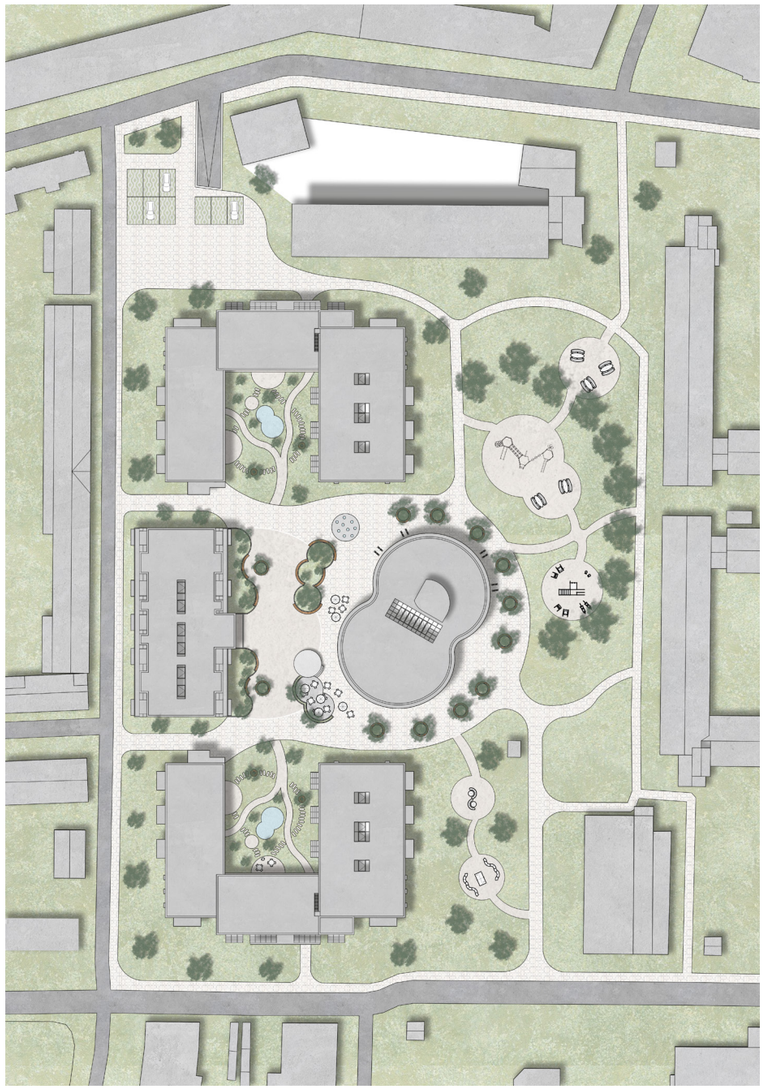
A

FEEDBACK



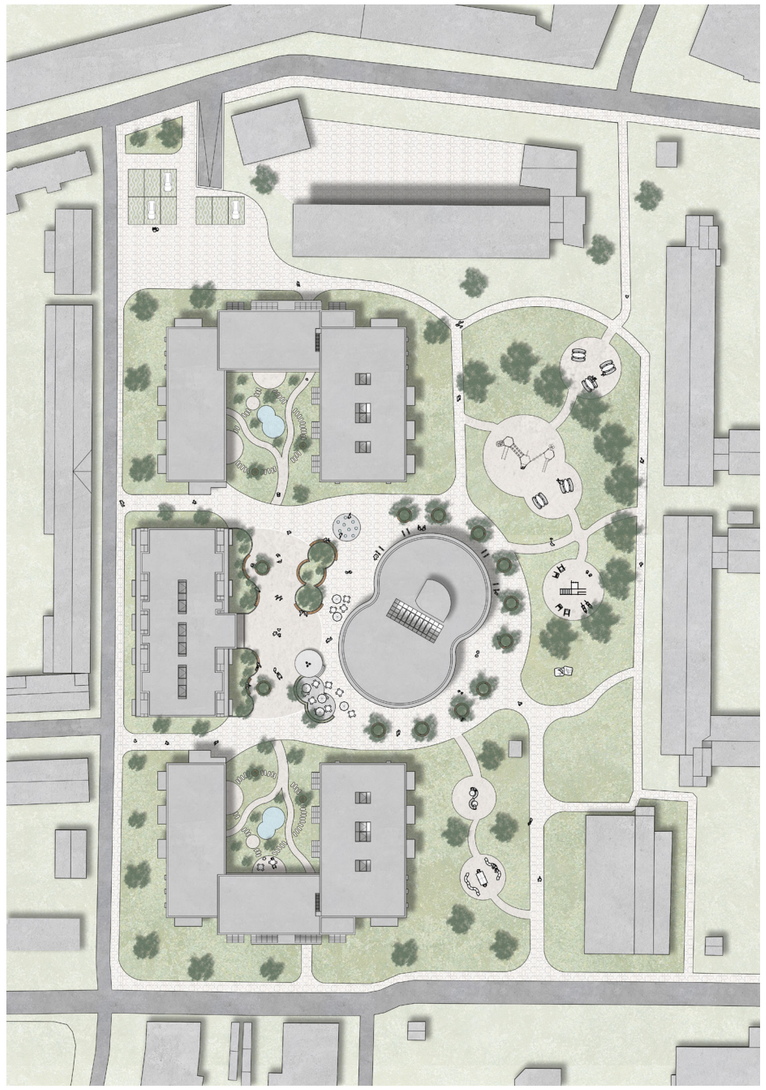
FEEDBACK AT P3
- Add trees in whole plan
- Add outdoor furniture etc. to show what happens within the spaces
- Make transition between courtyards and square more organic
- Make paths less wide

IMPROVED



FEEDBACK AT P3 IMPROVEMENTS
- Smaller path leading residents into masterplan from the neighborhood (left)
- More seating elements added around community center
- Paved area around community center less wide
- Add gathering spaces in green area to south
- Incorporate entrance to underground parking
- Let activities from community center transition into square

ADDING LIFE



LIFE
- Show gathering areas
- Clustering of people in plan
- Different target groups are present
- Show movement

Tutoring Takeaways (A)
- By adding ‘life’ (= ‘fruit’) into the drawing it comes to life and really showed what’s going on and how you thought it through

Structure Consult

Feedback: stability and gallery connection

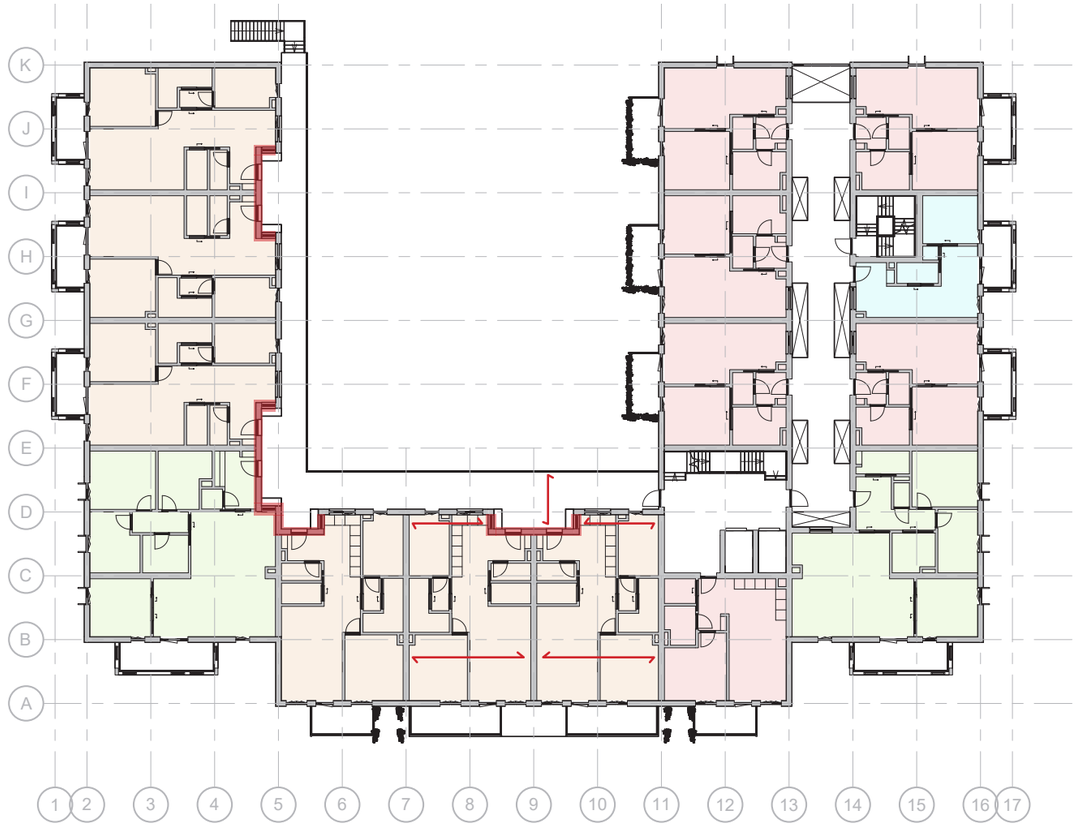
The span direction of the floor structure is logical, and all load-bearing walls should be clearly highlighted in the drawings. Stability is primarily provided by the central staircase and an additional staircase located in the right wing. However, the left wing lacked sufficient structural stability and required the integration of additional load-bearing walls. In the orange apartment types, there is no support for the final portion of the floor slab if the set-back at the entrance is not designed as load-bearing. Therefore, it was suggested that by making this entrance set-back load-bearing, both the support and the stability issues could be resolved.

Upon further reflection, I realized that this set-back is currently not present on the first and ground floors, raising the question of how to ensure structural continuity at these levels. In discussion with fellow students, we concluded that the most straightforward solution would be to extend the load-bearing set-back all the way to the ground floor. The impact on the communal spaces would be minimal and would not compromise their usability. As such, this approach offers a practical and effective solution to the structural challenges identified.

FIRST FLOOR



SECOND FLOOR



Improved Structure
first floor



Rammed Earth Research

Rammed earth is a construction technique where a **mixture of gravel, sand, silt, and clay** is compacted layer by layer into a formwork to create solid monolithic walls. Once the earth mixture has dried, the formwork is removed, revealing the natural texture and layered look of the material.

The soil used for rammed earth is usually **sourced directly from the building site** or nearby, reducing the need for transportation and minimizing CO_2 emissions. The ideal subsoil lacks organic content like humus or plant matter and is mixed with crushed aggregates on-site to reach the right composition.

Although rammed earth walls are highly durable, protection against moisture is essential. To ensure longevity, the walls should be placed on a raised foundation of **at least 225 mm above ground level**. Roof overhangs are recommended to **shield the walls from rainfall**, and proper drainage must direct water away from the structure. The design should also allow any trapped moisture to evaporate freely (Fernandes, 2025).

Thermal Mass Performance

Rammed earth walls offer excellent thermal mass properties, meaning they can **absorb heat during the day and release it slowly when temperatures drop**. This helps stabilize indoor climates and reduce reliance on active heating and cooling systems.

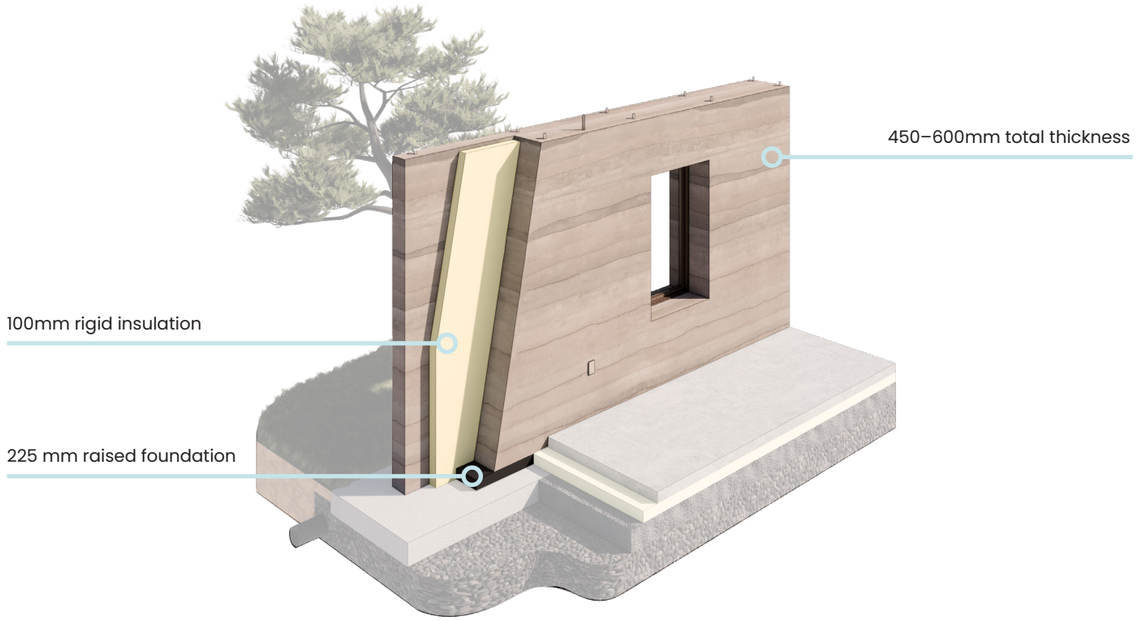
When applied correctly and in suitable climates, the thermal mass of rammed earth can **delay heat transfer through the building envelope by 10 to 12 hours**, evening out temperature fluctuations. This effect is most effective when the outdoor temperature difference between day and night reaches at least 6°C (Downton, 2013).

SIREWALL

SIREWALL (Stabilized Insulated Rammed Earth WALL) is an advanced system that combines the aesthetic and structural qualities of rammed earth with modern performance requirements. The system integrates interior and exterior rammed earth finishes, structural reinforcement, insulation, and a vapor barrier in one wall build-up.

A typical SIREWALL is 450–600mm thick, with a 100mm layer of rigid insulation placed in the center of the wall. The materials used are non-toxic and do not require chemical sealants or surface treatments.

This combination of thermal mass, insulation, and air-tight construction results in high indoor comfort and energy efficiency throughout the year. Standard SIREWALL systems reach an **insulation value of RSI 5.8**, making them highly suitable for both warm and cold climates while maintaining healthy indoor air quality by preventing moisture build-up and mold formation (SIREWALL, 2025).



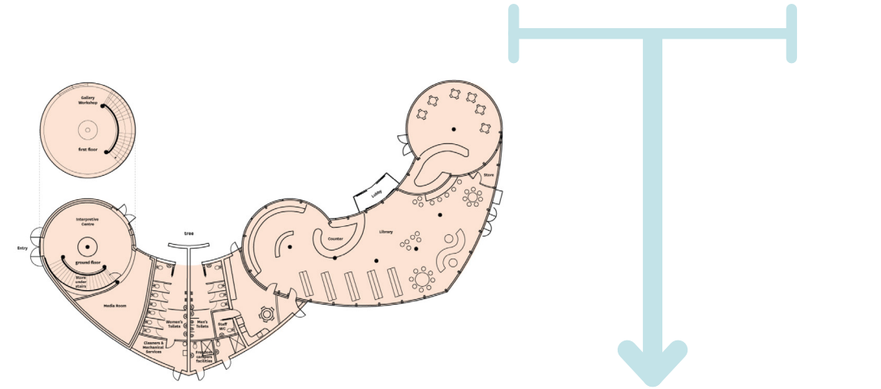
(SIREWALL, 2025)

Te Hononga Hundertwasser Memorial Park

Location: Kawakawa, New Zealand
Architects: Pip Bolton, Avail Pacific Ltd
Year of completion: 2020
Site area: 6,500 sqft = ±600m²
Typology: Library & Council service centre

(Burges, 2024)







Solar Chimney Effect Research

A solar chimney is a **passive system** designed to improve both the indoor climate and air quality of a building, using natural forces rather than mechanical installations. The system consists of a **vertical shaft** that forms a direct link between the interior spaces and the outside environment. By harnessing the power of solar radiation, the chimney helps regulate air movement through the building.

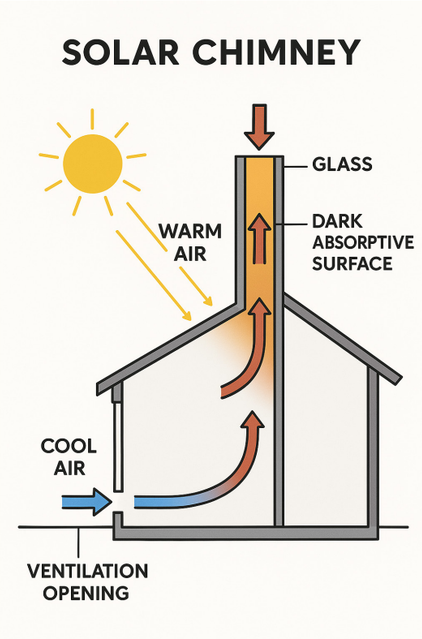
Process
When sunlight warms the outer surface of the chimney, the air inside the shaft heats up. As the air becomes warmer, it rises and exits through openings located at the top of the chimney. This rising air creates a **low-pressure zone** that naturally draws cooler air into the building through lower vents, setting up a continuous airflow that both ventilates and helps cool the interior spaces.

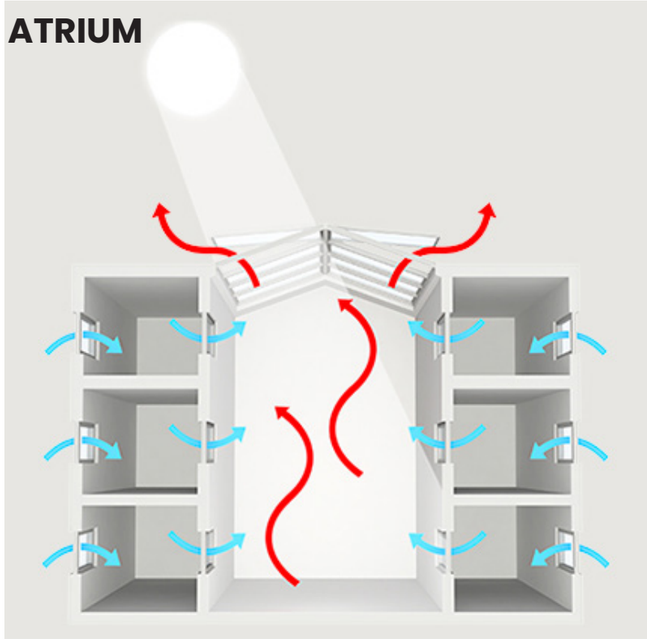
During colder seasons, the same principle can be used to assist in heating. By closing the outlet at the top, the warmed air is directed back into the building, where it circulates and increases the indoor temperature. As the air cools down again, it sinks, re-enters the chimney, and is reheated, allowing the cycle to repeat as long as solar energy is available.

Wind can further enhance this natural airflow. When the wind passes over the chimney, it lowers the pressure at the outlet, which helps draw more air through the system and improves ventilation efficiency (Energy Education, n.d.).

Through this simple yet effective setup, the solar chimney can contribute to reducing energy consumption, **offering both ventilation and temperature regulation** by making clever use of natural conditions.

Atrium as solar chimney
While a solar chimney is typically designed as a dedicated, enclosed shaft, the same principles can be applied on a larger architectural scale through the use of an atrium. Due to its open vertical form and the ability to connect lower-level air inlets with high-level exhaust points, the atrium can function as a large, central solar chimney. As solar radiation heats the air inside the atrium, the warm air rises and is **expelled through roof openings or skylights**, creating a natural draft that continuously draws in fresh, cooler air through facade-level openings. This process not only enhances indoor air quality but also helps stabilize the interior climate, reducing the reliance on mechanical ventilation and supporting energy-efficient building design (VELUX, 2022).





(VELUX, 2022)

Solar Tubes Research

A solar tube is a passive daylighting system designed to bring natural light into rooms without exterior windows. The system consists of three key parts: a clear dome on the roof that captures sunlight, a highly reflective tube that channels the light through the building, and a diffuser in the ceiling that spreads the light evenly into the room (SolarBright, 2025).

While solar tubes can reduce the need for artificial lighting, especially in deep interior spaces, their application is limited. In this project, the only suitable place for solar tubes would be in the toilets. However, the installation requires roof area, which impacts the use the roof as a community vegetable garden.

Given these spatial and design drawbacks, the disadvantages of solar tubes outweigh their potential benefits in this case, and they will not be implemented in the design.



(SolarBright, 2025)

Conclusion research

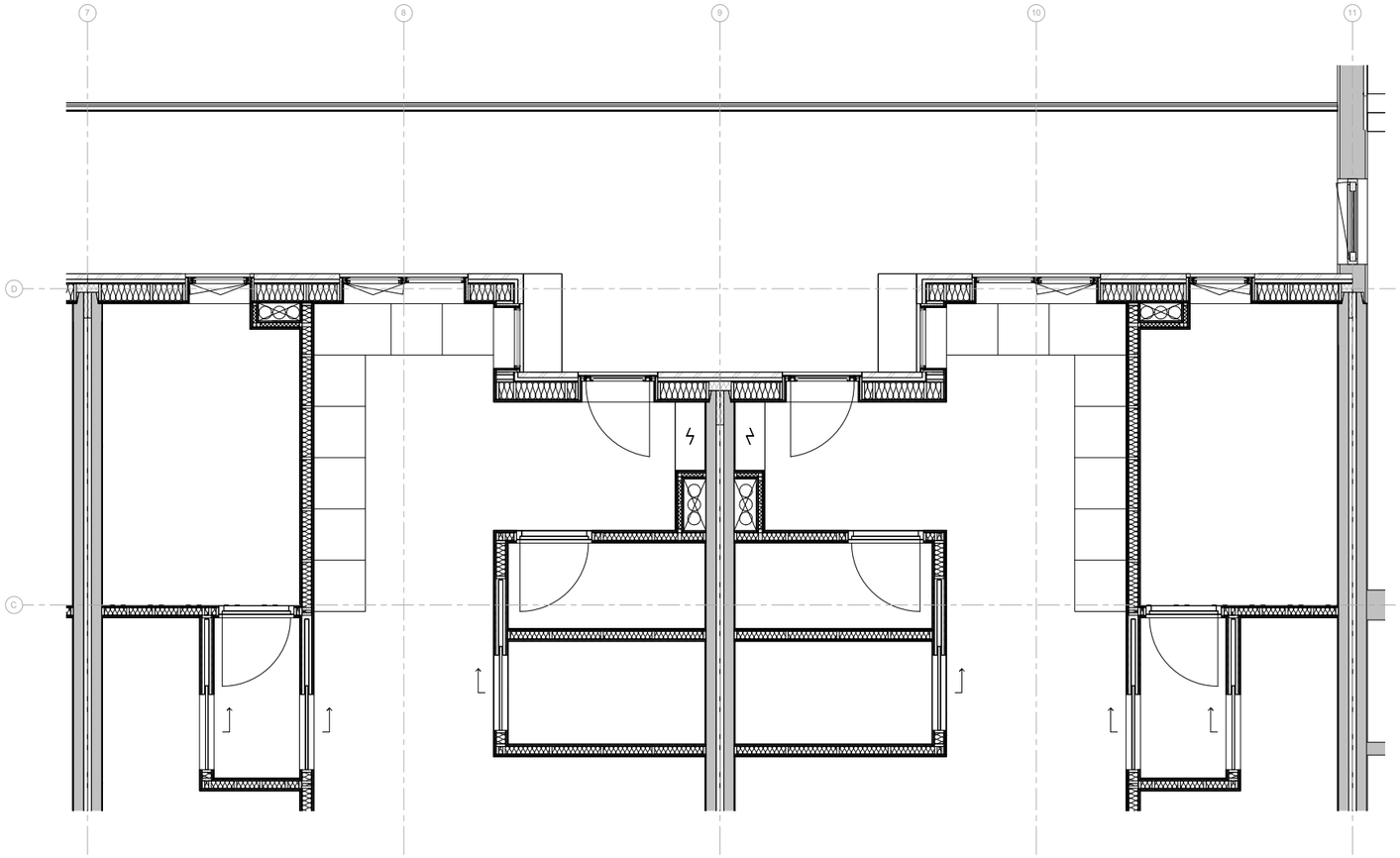
For the community center, several design choices and systems have been integrated to optimize both spatial flexibility and energy efficiency.

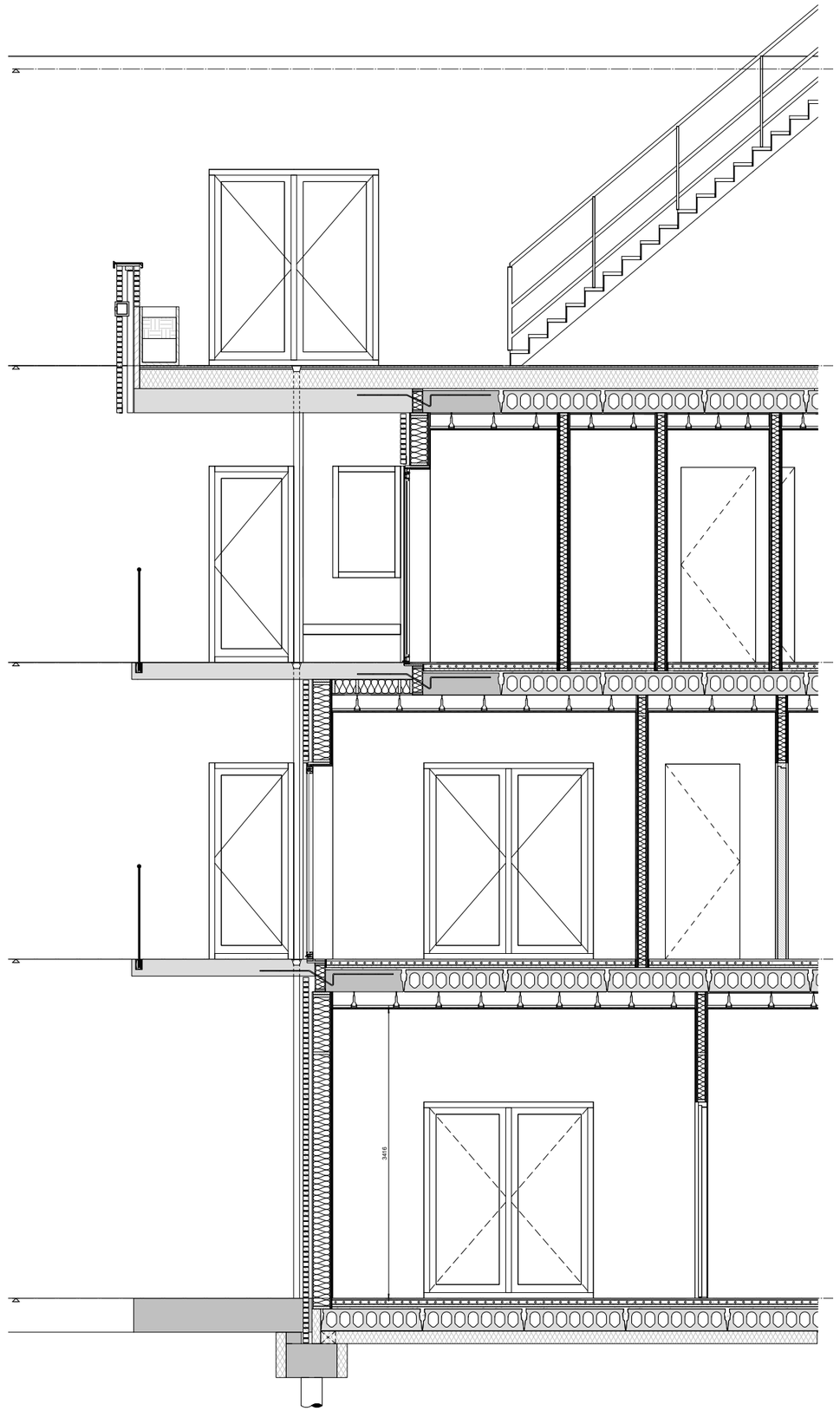
The exterior walls will be constructed from **rammed earth**, which will serve as load-bearing elements. This approach not only provides a **sustainable and thermally massive envelope** but also allows the **interior layout to remain flexible**, as no additional columns are needed. Only a central concrete core is required to ensure overall structural stability.

Passive ventilation will be facilitated through the atrium, which is equipped with openable skylight elements. This setup allows warm air to escape naturally while drawing in cooler air at lower levels, reducing the need for mechanical ventilation and improving indoor comfort.

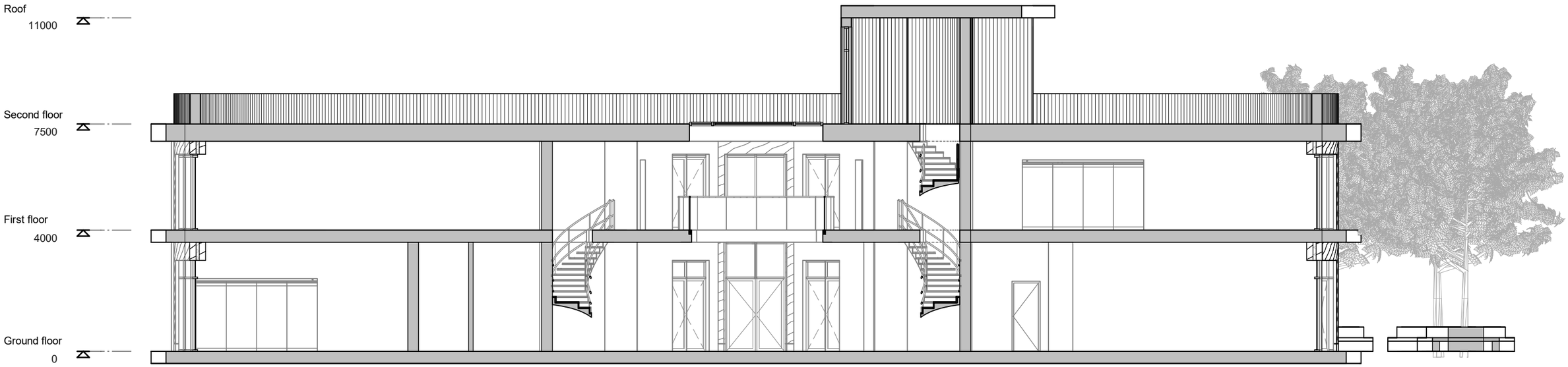
The use of solar tubes was considered but ultimately rejected. All **primary functions within the building receive sufficient daylight** through façade openings. The only spaces without direct access to daylight are the public toilets, but the cost and technical implications of installing solar tubes — including roof perforations, which would **limit future use of the roof** — outweigh the limited benefit they would provide. Therefore, solar tubes will not be included in the final design.

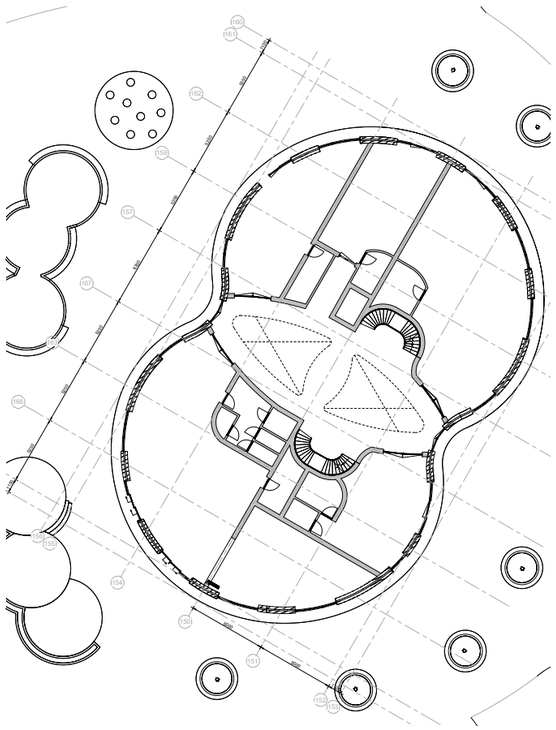
Improved Fragment



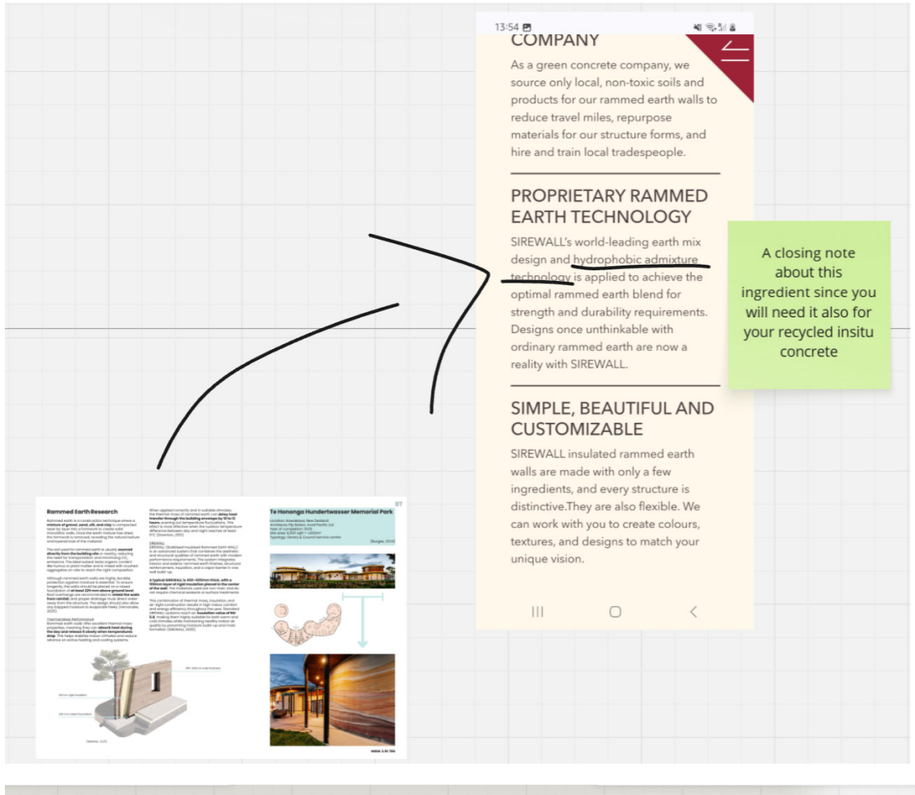


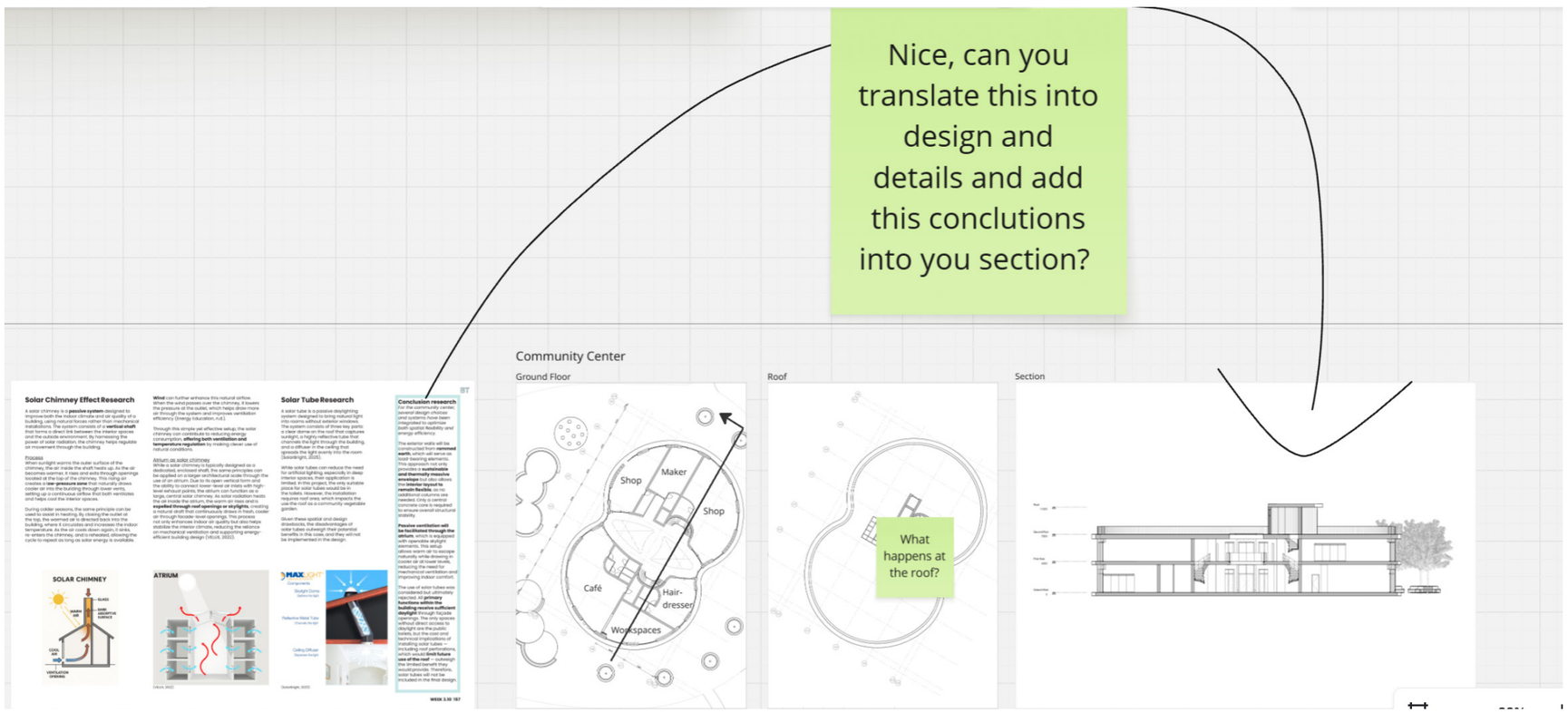
Community Center





Feedback on Miro





Tutoring Takeaways (BT)

- Defining load-bearing structure in plan to check completeness
- Show specifications like climate and wall/floor structure in fragments

- Possible to look into hydrophopic possiblities of concrete and rammed earth
> In this stage of process no time to do this; possible for P5

Week 4.1
Spatial Adjustments and Climate Integration

Based on the outcomes of the structural consultation in the previous week, several changes were made to the communal spaces to ensure spatial coherence and proper load distribution. The parking vision was further expanded, aligning mobility choices more closely with the project's sustainability goals. In response to overheating in the communal spaces, additional shading screen were integrated in the south façade of block 3. A climate consultation was held to refine passive design strategies and support overall energy performance. The architectural fragment was further improved and initial steps were taken toward the detailing of the fragment.

Changes to Communal Spaces

Why: making set-back load-bearing

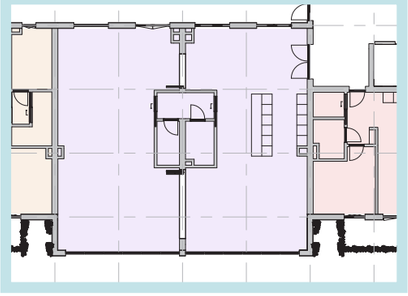
As previously mentioned, the set-back introduced on the second floor was extended down to the first and ground floors to provide the necessary structural support. This adjustment required several changes to the design of the communal spaces.

On the galleries of both floors, a bench was added to create a covered seating area, enhancing the social connection with the courtyard.

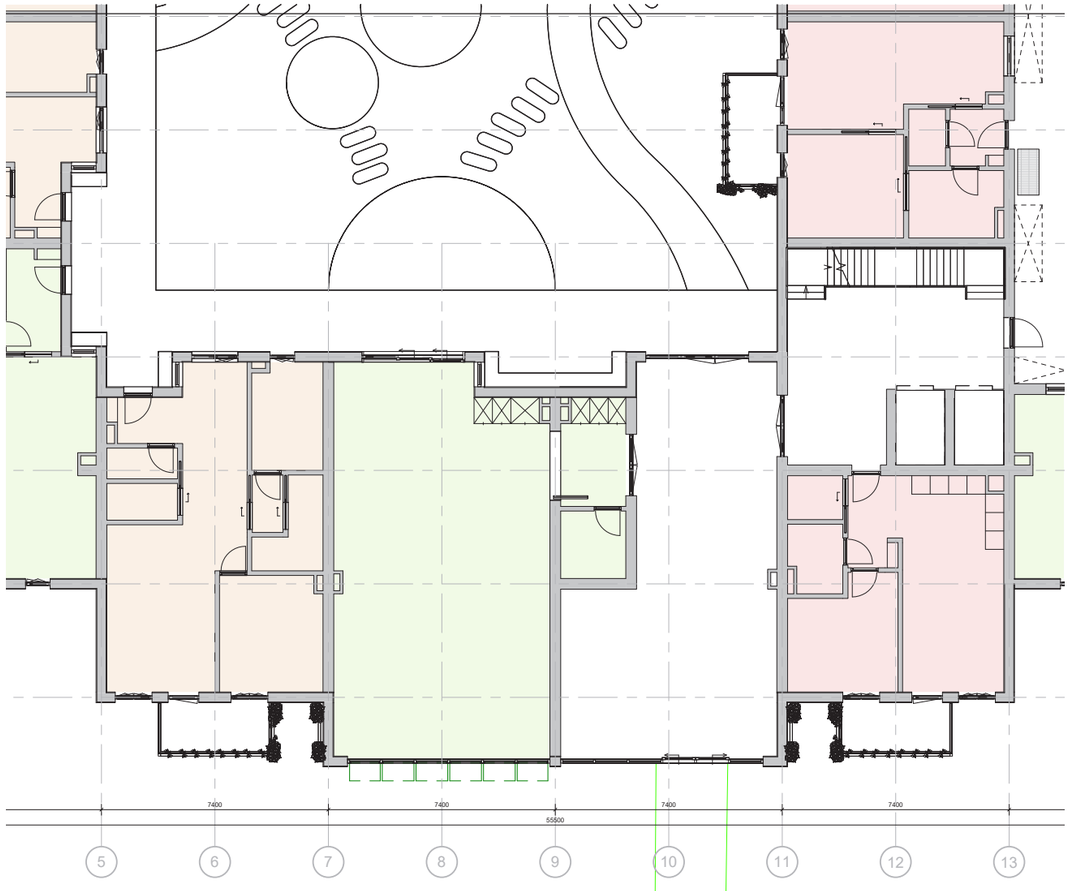
On the ground floor, an entryway with a wardrobe and toilet was introduced, while the rest of the space remains one large, open area.

On the first floor, the toilet and storage block was relocated to the façade, allowing for better spatial organization. The use of bi-fold doors was retained to preserve the option of separating the space. To support this flexibility, two entrances were added—providing access to the communal space and toilets from either side when the area is used independently. Larger windows were also incorporated in these zones to strengthen the visual connection between the interior and the courtyard.

FIRST FLOOR - OLD



GROUND FLOOR



FIRST FLOOR



Vision on Parking

Looking at accessibility of the Tarwewijk with means other than cars. The concept of the 15-minute city is fitting.

This concept focuses on how daily life is reached within 15 minutes.

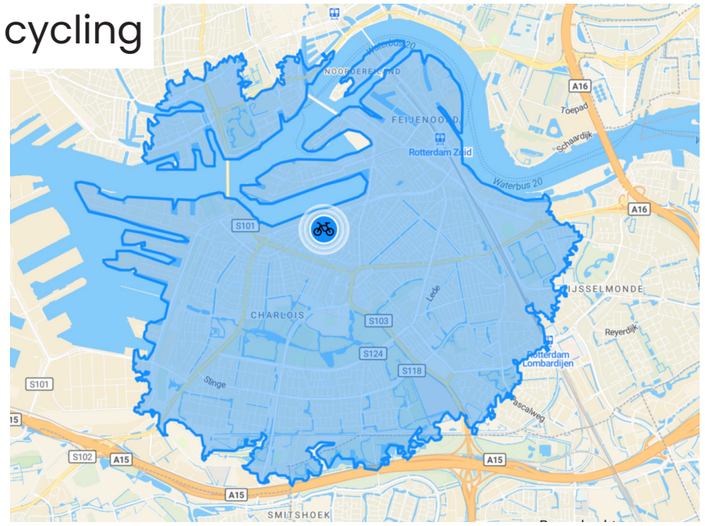
Here you can see that:
- Residents can walk the whole neighborhood
- Cycling brings you even further
- And within the neighoborhood, different public transport is available
this makes it possible to reach the city of Rotterdam and beyond without using a car

15-min city

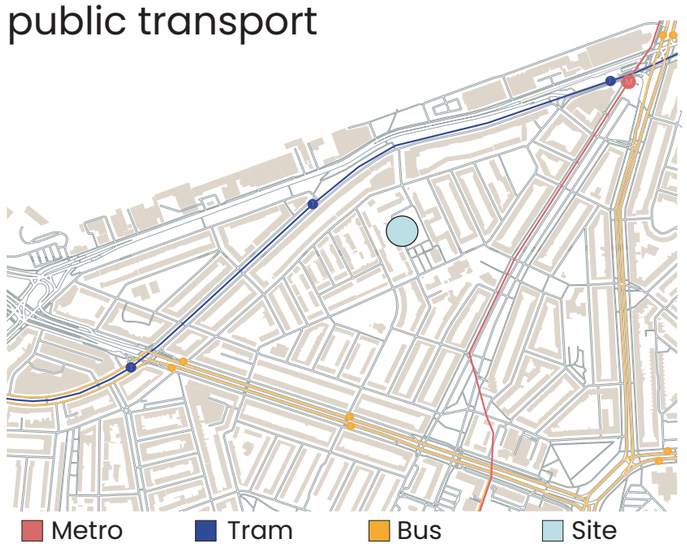
walking



cycling



public transport



Markisolette on South Facade Block 3



Climate Consult

Integrated aspects:
- Heating = floor heating connected to district heating of Rotterdam using waste heat from factories in harbor
- Ventilation = Type C in residential buildings and solar chimney effect with mecahnical in community center
- Electricity = solar panels on service roofs
- Shading systems = passive cooling = markisolette screens, greenery, shutters
- Environment = ecosystem with birds, insects, and plants / reducing waste

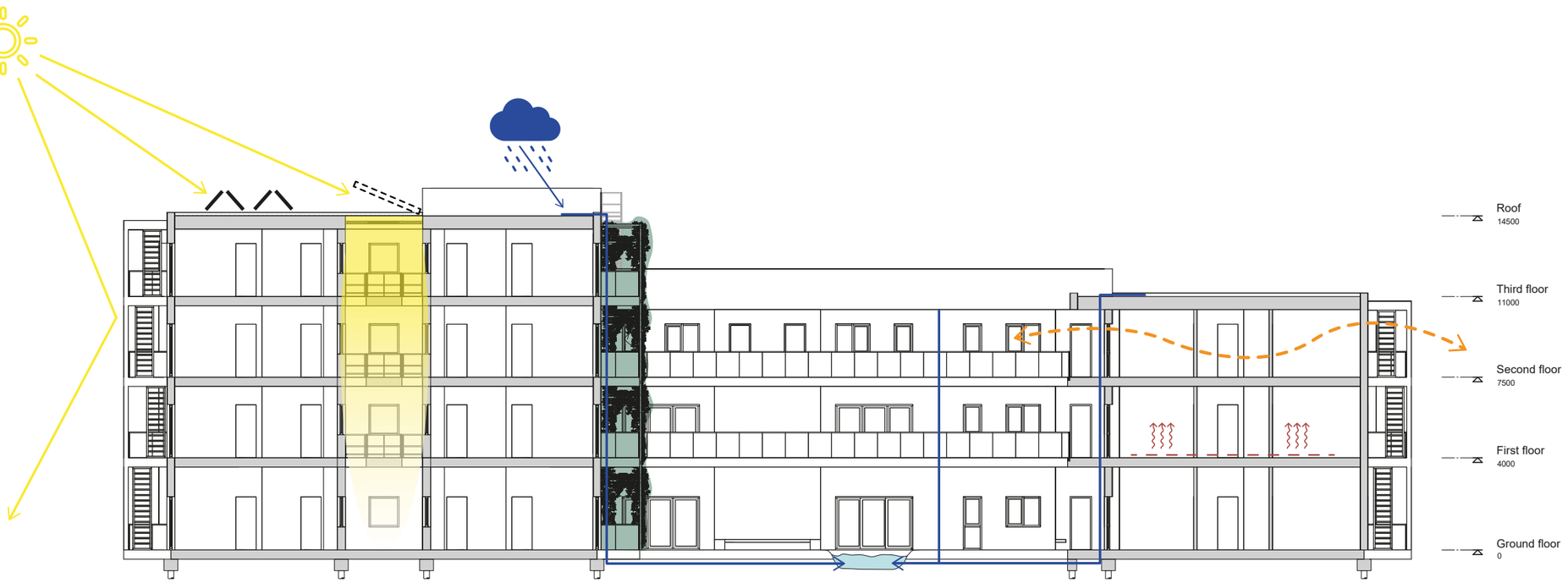
Learned
Meaning climate neutral = demand as low as possible
> Can be facilitated by solar panels

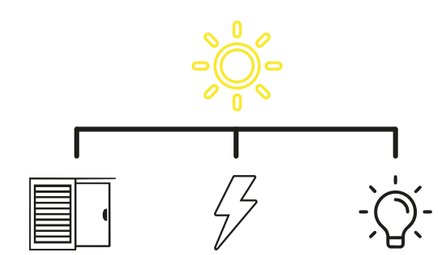
Heating:
- Geothermal heating = very expensive and more on whole neighborhood scale than couple of buildings only
- Heat pump sources: ground / surface water / air
- Distribution: radiayors / wall heating / floor heating

Ventilation:
- Type A = all natural = not possible
- Type C = natual IN and mechanical OUT = often used in housing / not controlable
- Type D = all mechanical = heat recovary possible / space needed for all air ducts

Passive cooling principles:
- Insulation
- Shading screens
- Shutters
- Greenery
- Overhang
- Summer-Night ventilation (cross-ventialtion)

Climate Design





Shutters for sun protection

Electricity with solar panels

Natural light into corridor



Greenery for sun protection and positive impact on residents



Water collection on the roofs and distribution toward the wadi in courtyard

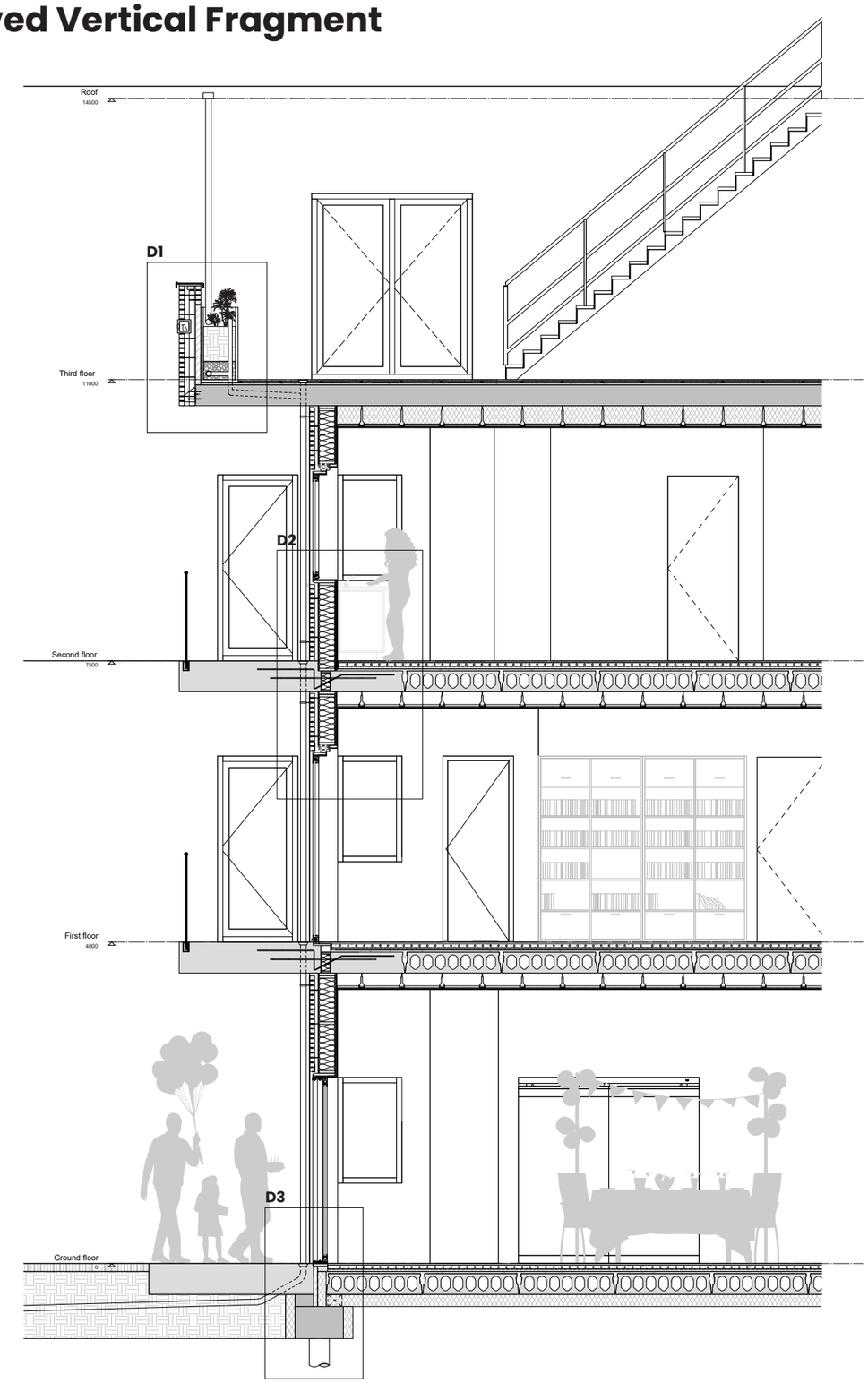


Type C with cross-ventilation

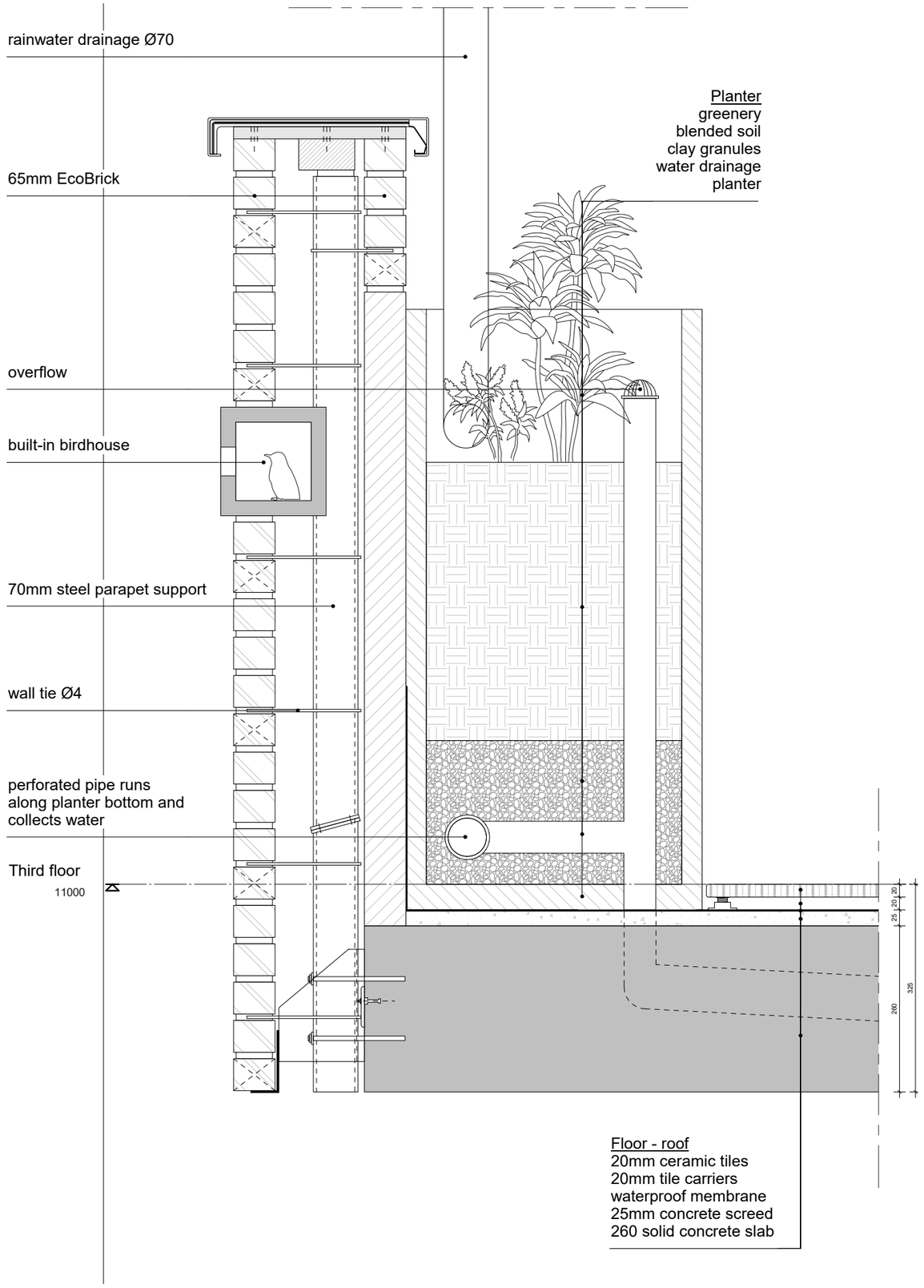


Floor heating with district heating, using waste heat from factories in harbor

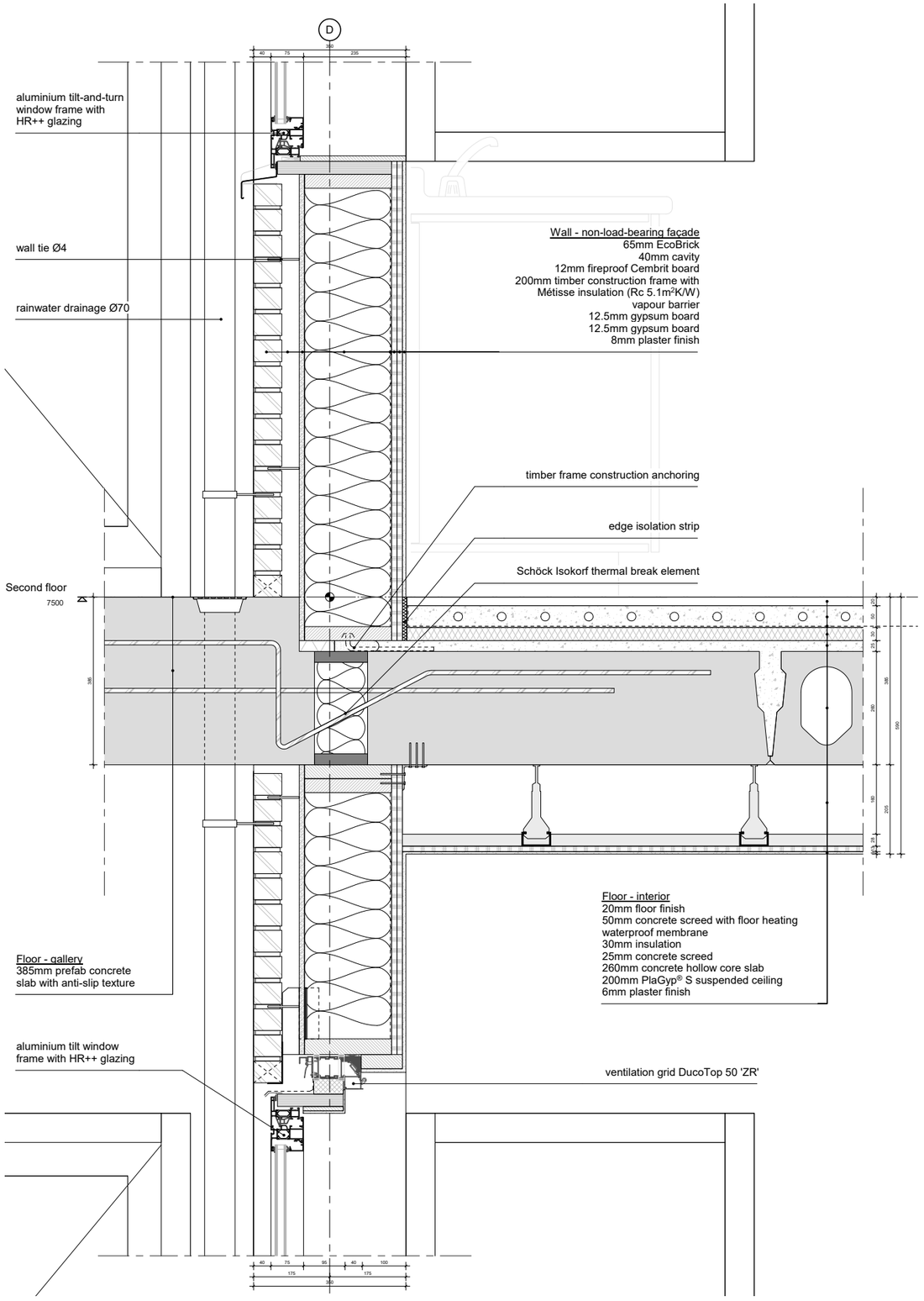
Improved Vertical Fragment



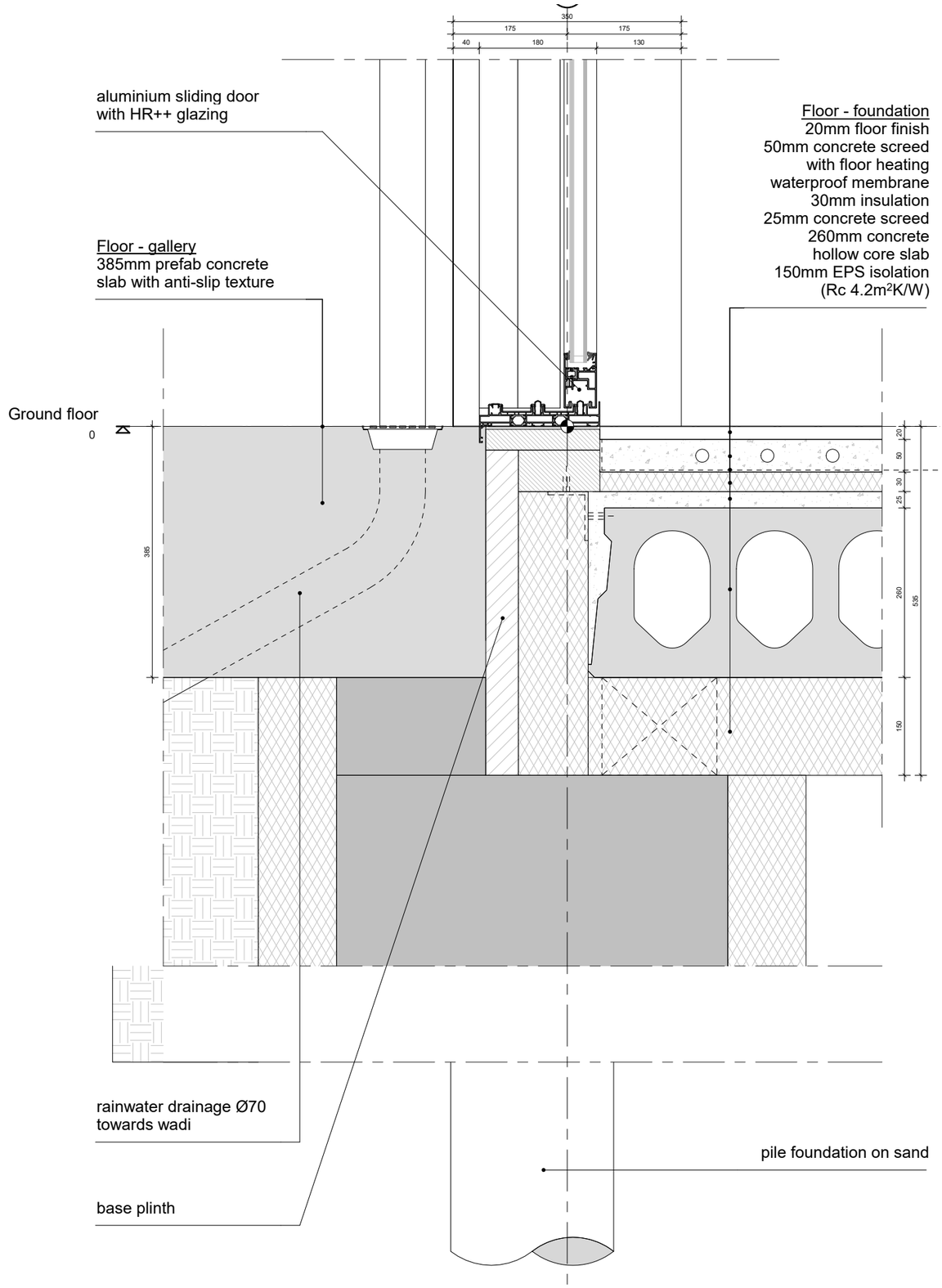
Detail 1. Roof terrace



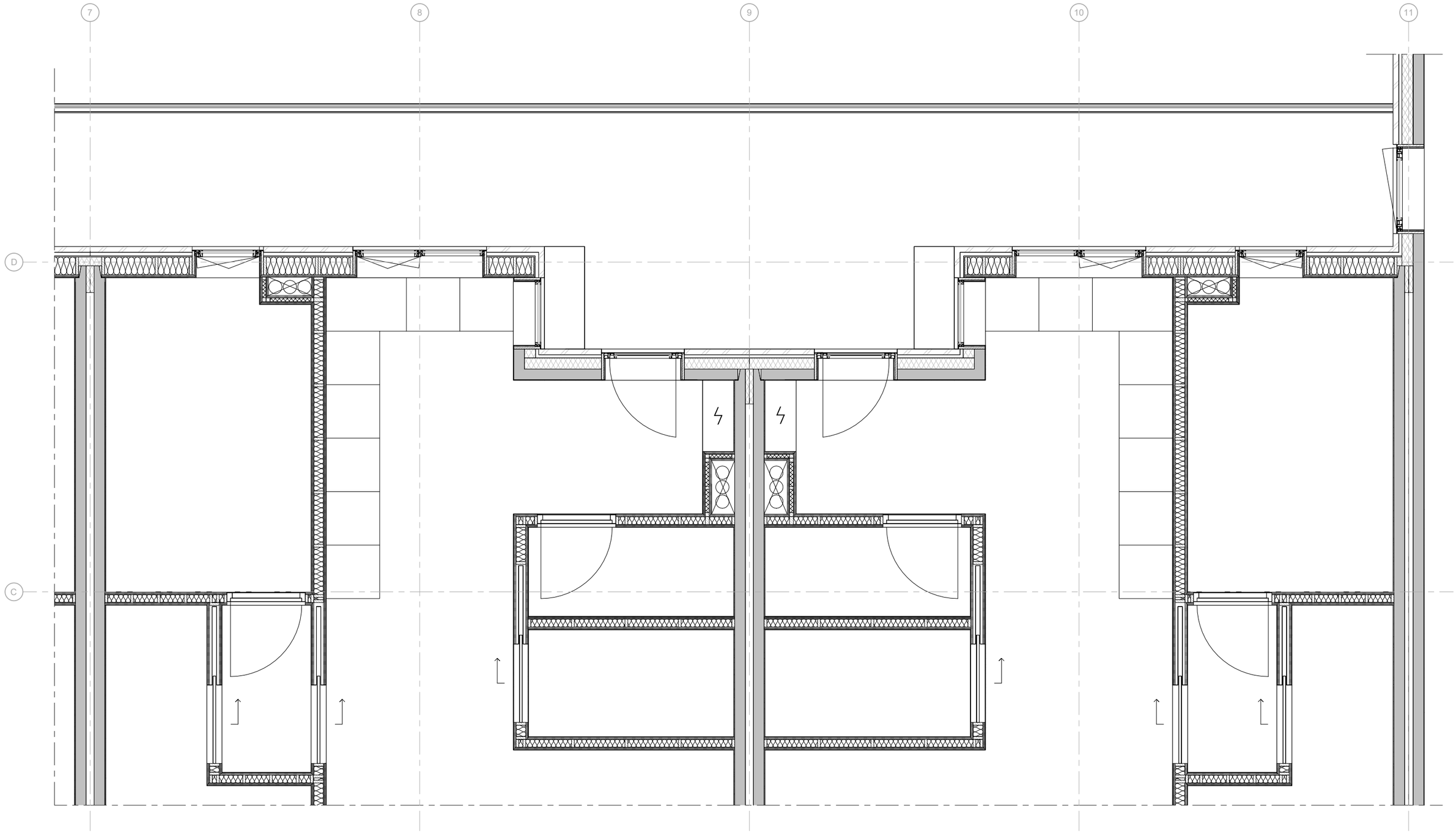
Detail 2. Second floor



Detail 3. Foundation



Improved Horizontal Fragment



Week 4.2-4.3

Preparing P4 Presentation

The focus during these weeks was on preparing the P4 presentation. This involved crafting a clear and cohesive narrative that communicates all key aspects of the project, with special attention to how the design brings people together across all scale levels — from building layout to public space. Final drawings were completed and refined, ensuring they supported the story effectively. Careful decisions were made about what to present and what to leave out, in order to keep the presentation focused, engaging, and aligned with the core message of social connection and community building.

FINAL DESIGN







PROGRAM OF REQUIREMENTS

PUBLIC

Café
120-150 m²

Hair dresser
50-65 m²

Shops
70-150 m²

Paid
Free

Library
200-300 m²

Music studio
100-120 m²

Work space
60-70 m²

Hobby / maker space
40-55 m²

Vegetable Garden
300-400 m²

Existing park

Dance studio
120-150 m²

COMMUNAL

Indoor space 200-400 m²

Work space
40-50 m²

Laundry room
35-50 m²

Flexible space
50-60 m²

Living area
40-60 m²

Dining / kitchen
40-60 m²

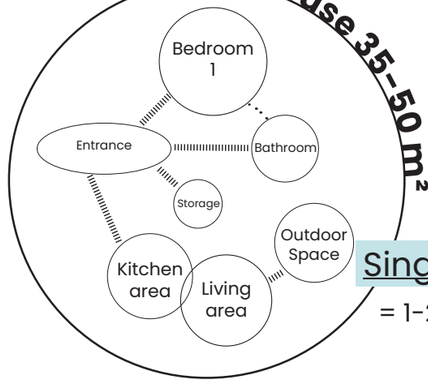
Outdoor space 550-700 m²

Courtyard with seating
300-400 m²

Roof terrace
250-300 m²

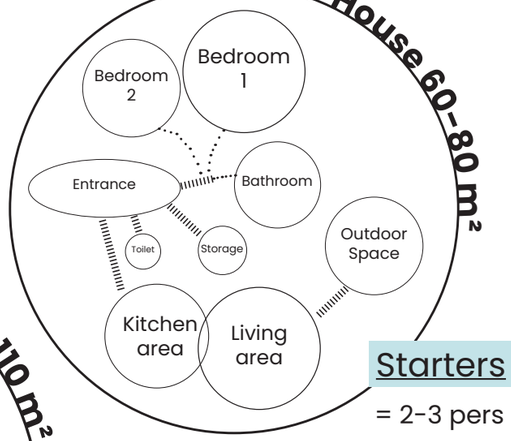
PRIVATE

House 35-50 m²



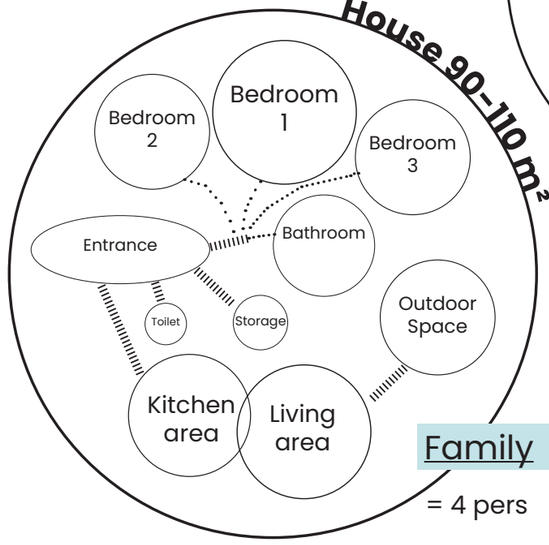
Single / Elderly
= 1-2 pers

House 60-80 m²



Starters
= 2-3 pers

House 90-110 m²



Family
= 4 pers

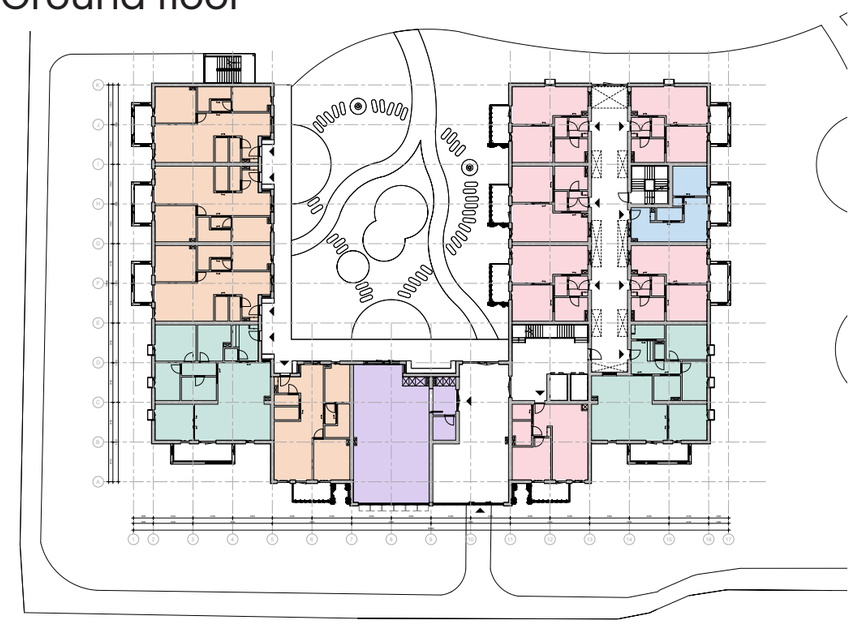
FLOORPLANS

1:200

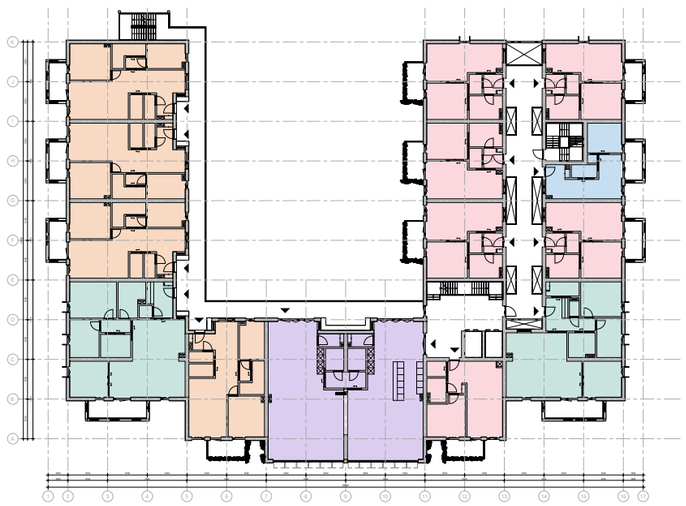
Type 1 35m²
Type 2 50m²
Type 3 73m²
Type 4 100m²
Communal space
Access system

A

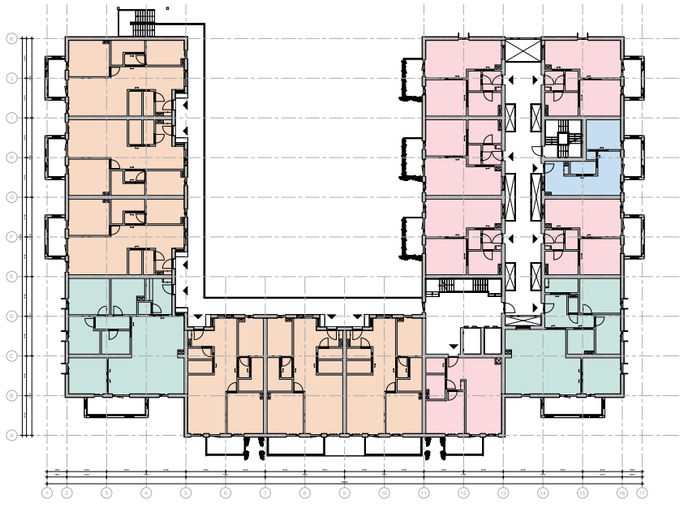
Ground floor



First floor



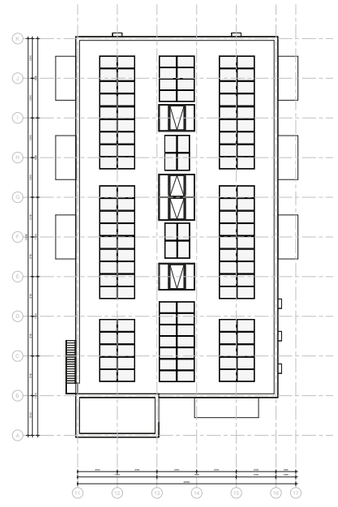
Second floor



Third floor

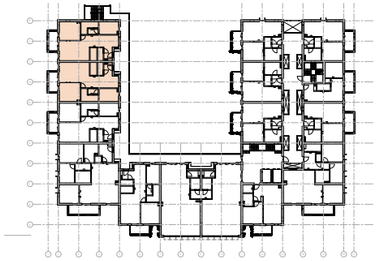


Roof



APARTMENT TYPES

1:50

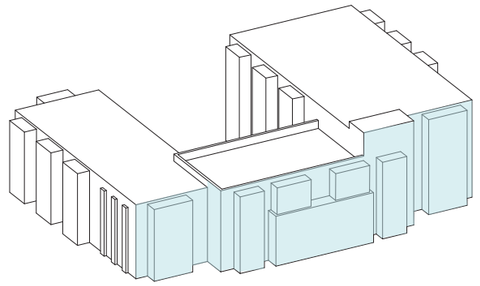




Type 3 - 73m²

FACADE - SOUTH

1:100

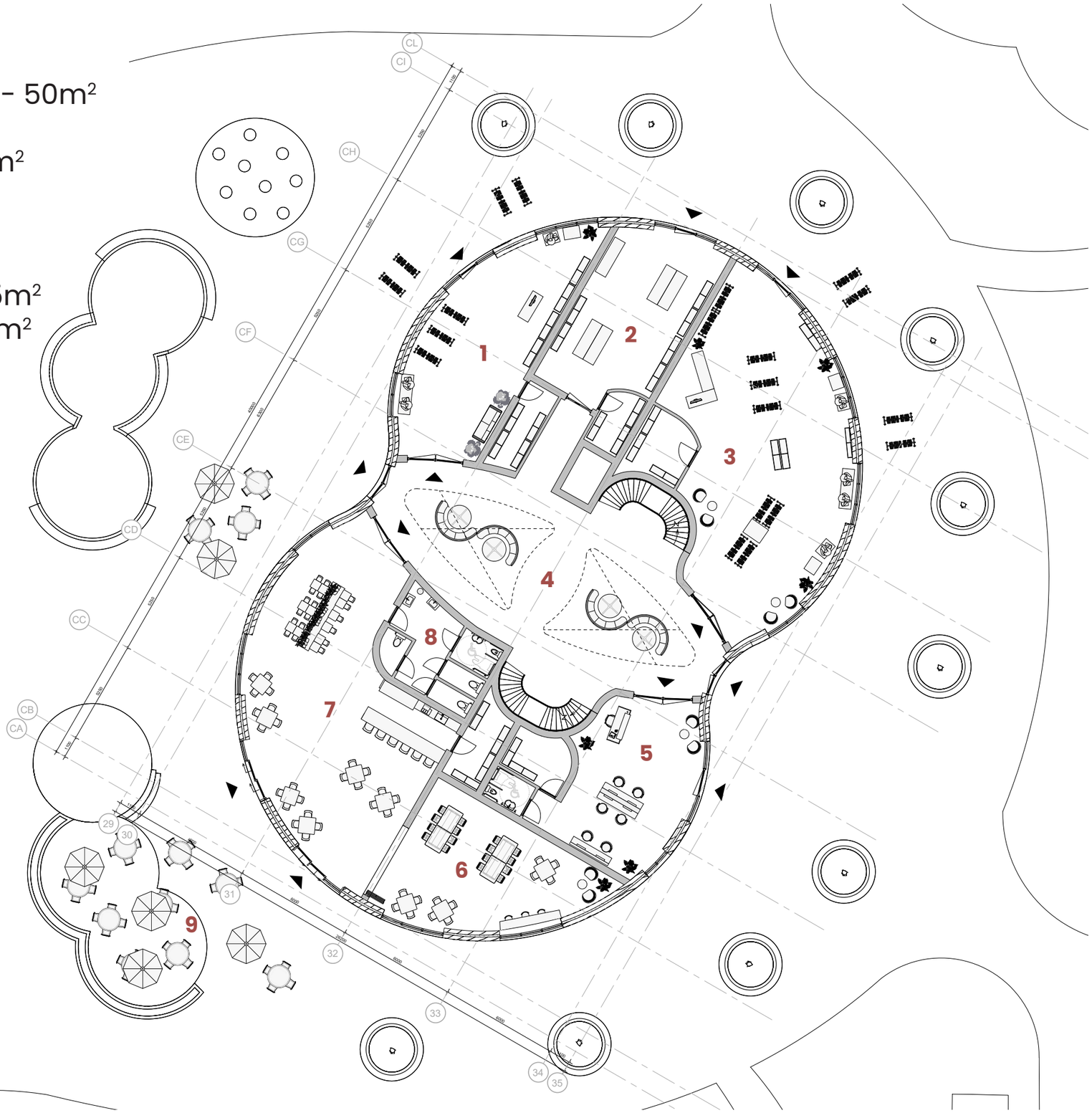




FLOORPLAN – GROUND FLOOR

1:100

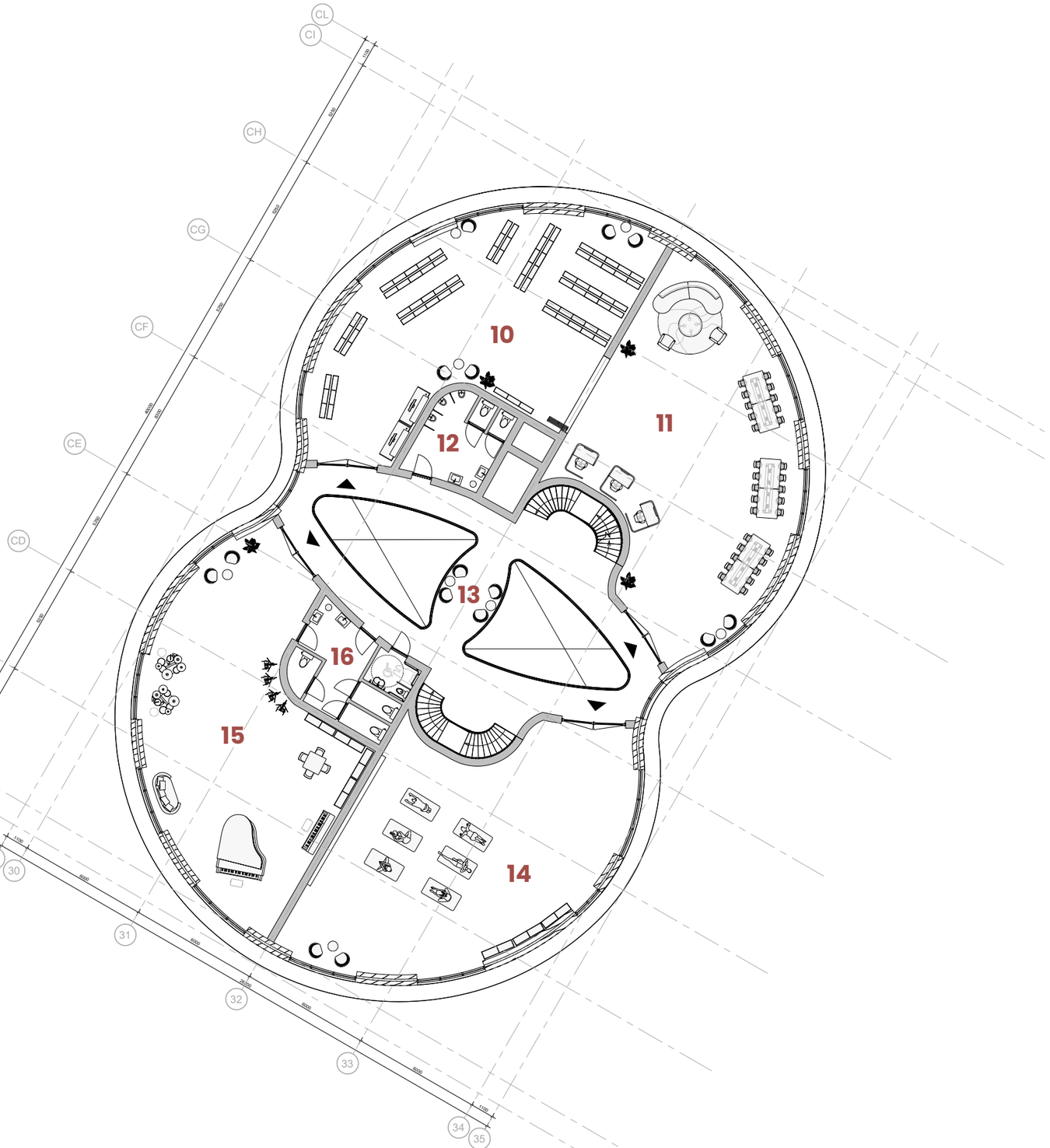
1 Shop - 70m²
2 Hobby/maker space - 50m²
3 Shop - 135m²
4 Central atrium - 150m²
5 Hairdresser - 60m²
6 Workspaces - 60m²
7 Café - 130m²
8 Public bathroom - 25m²
9 Outdoor terrace - 70m²
▲ Entrance



FLOORPLAN - FIRST FLOOR

1:100

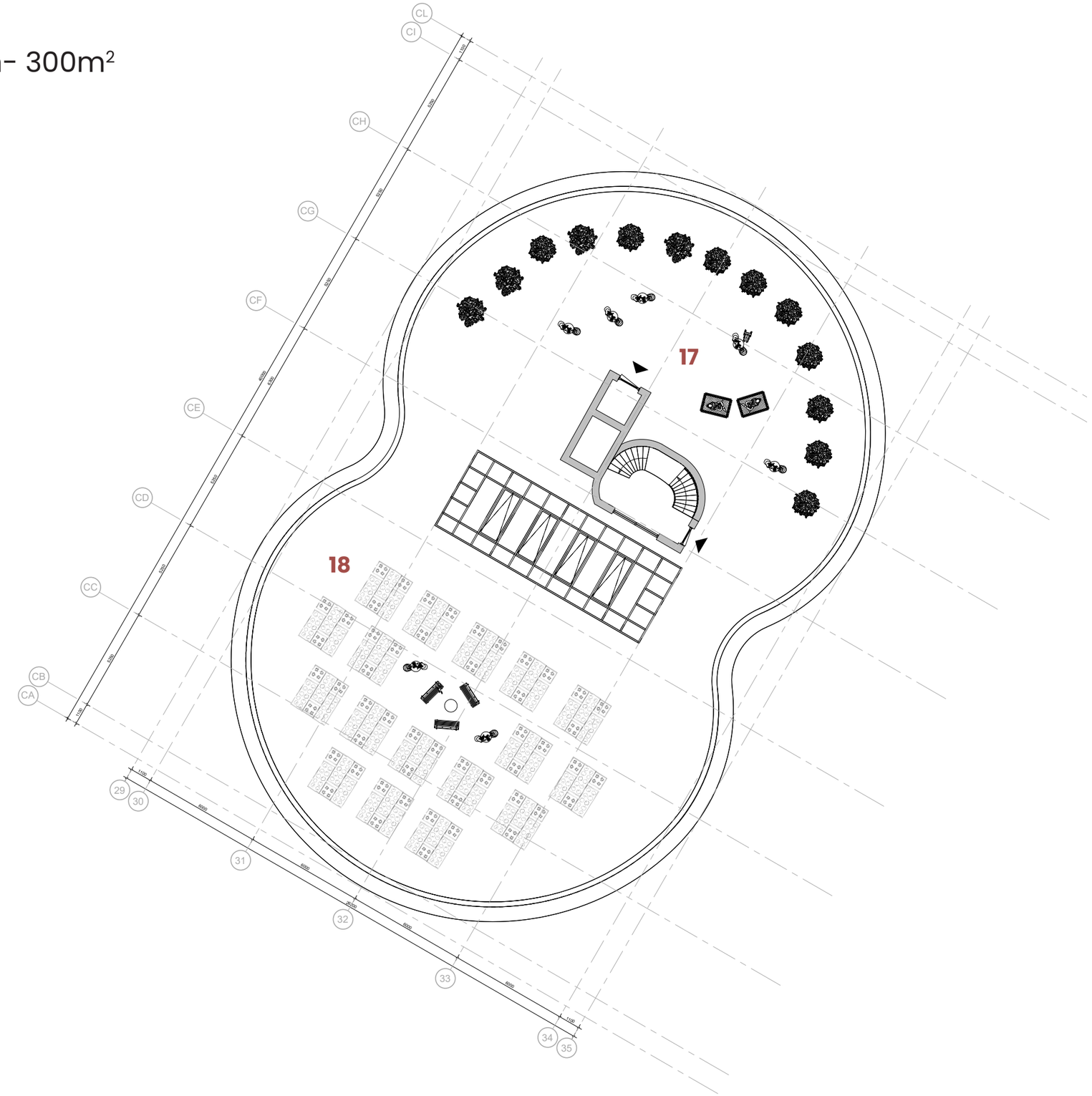
10 Library - 120m²
11 Workspaces - 130m²
12 Public bathroom - 15m²
13 Central atrium - 95m²
14 Dance studio - 120m²
15 Music studio - 120m²
16 Public bathroom - 25m²
▲ Entrance



FLOORPLAN - ROOF TERRACE

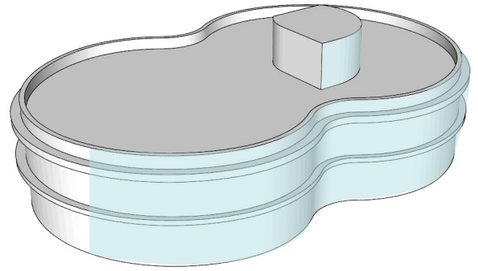
1:100

17 Terrace - 300m²
18 Community garden- 300m²
▲ Entrance



FACADE - EAST

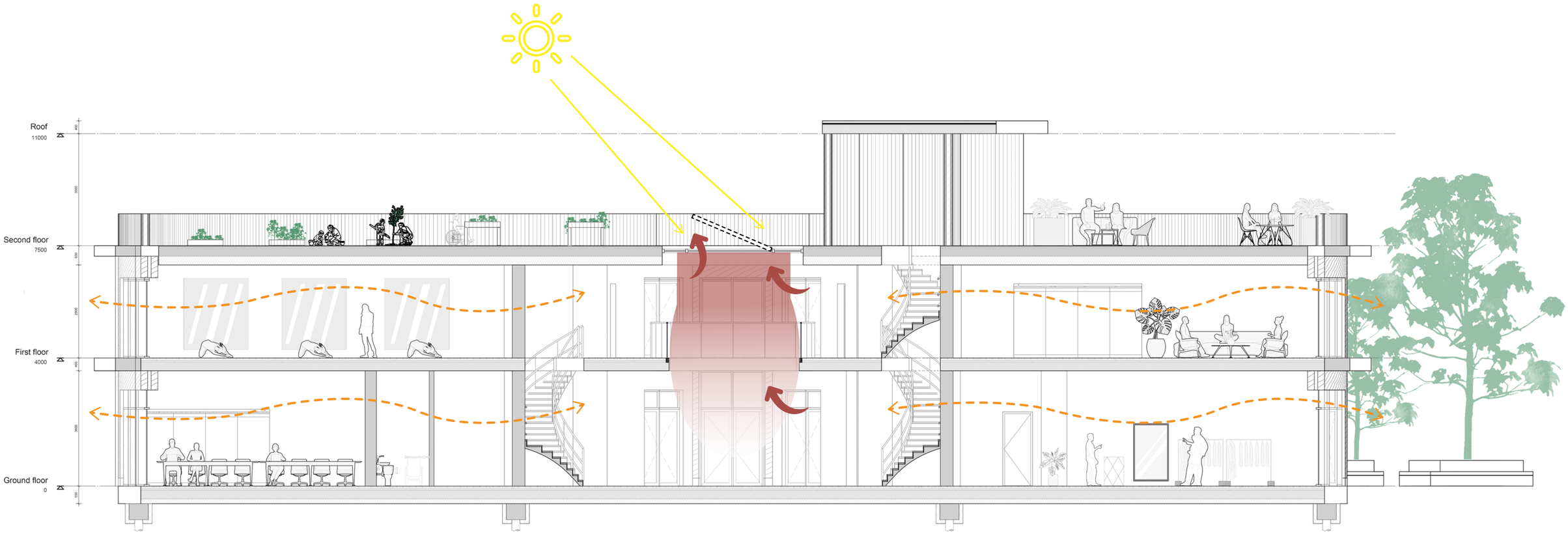
1:100





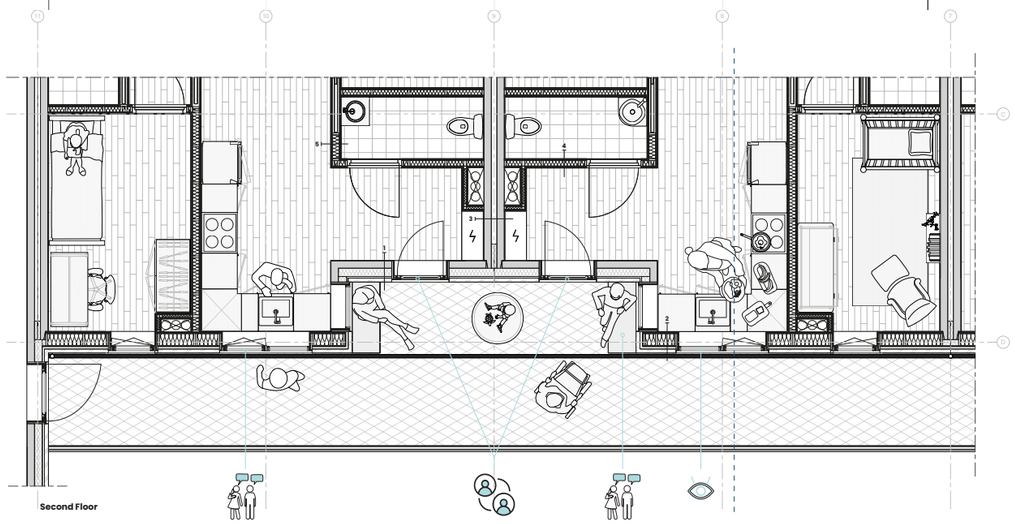
SOLAR CHIMNEY EFFECT

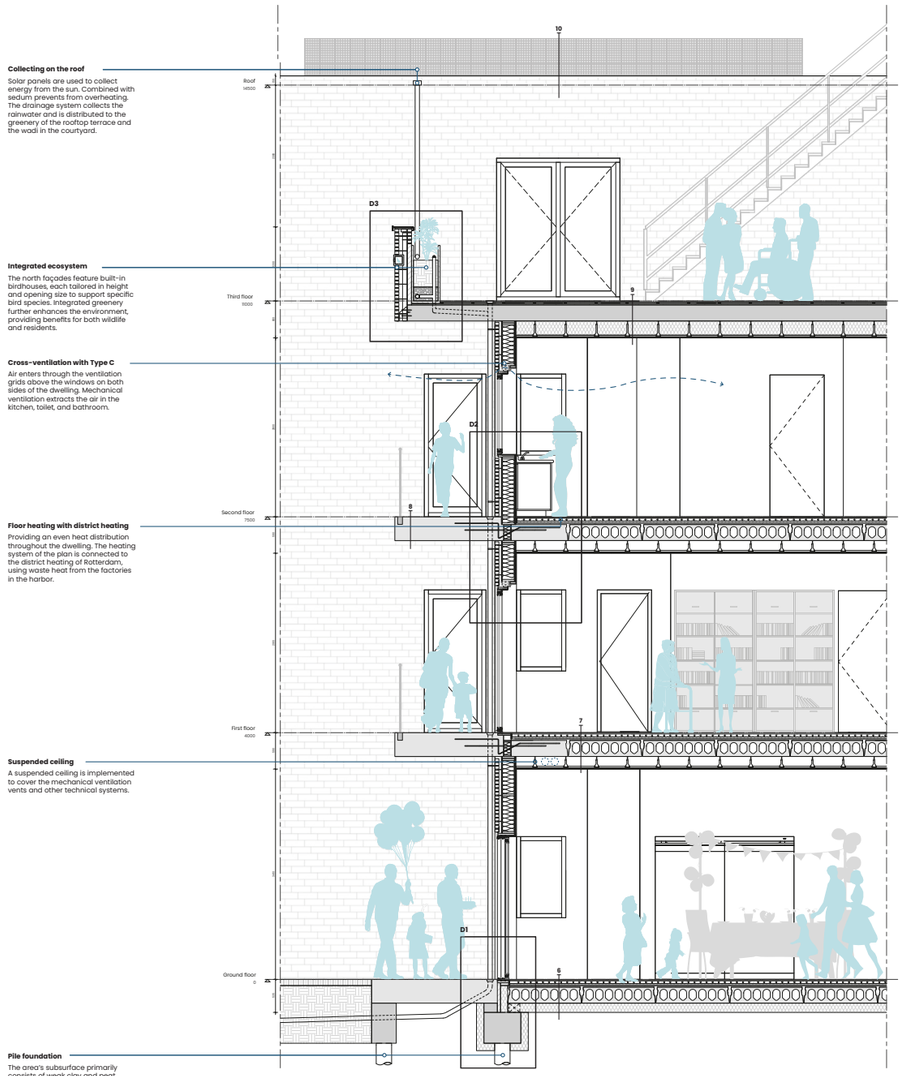
1:50



FRAGMENT 1:20







Collecting on the roof

Solar panels are used to collect energy from the sun. Combined with sedum prevents from overheating. The drainage system collects the rainwater and is distributed to the greenery of the rooftop terrace and the wadi in the courtyard.

Integrated ecosystem

The north façades feature built-in birdhouses, each tailored in height and opening size to support specific bird species. Integrated greenery further enhances the environment, providing benefits for both wildlife and residents.

Cross-ventilation with Type C

Air enters through the ventilation grids above the windows on both sides of the dwelling. Mechanical ventilation extracts the air in the kitchen, toilet, and bathroom.

Floor heating with district heating

Providing an even heat distribution throughout the dwelling. The heating system of the plan is connected to the district heating of Rotterdam, using waste heat from the factories in the harbor.

Suspended ceiling

A suspended ceiling is implemented to cover the mechanical ventilation vents and other technical systems.

Pile foundation

The area's subsurface primarily consists of weak clay and peat layers, which lack the necessary bearing capacity. Therefore, a pile foundation is needed.

1. Wall – load-bearing facade
350mm
65mm EcoBrick
25mm cavity
waterproof membrane
135mm recycled XPS insulation (Rc 4.8m²K/W)
120mm solid concrete
5mm plaster finish

2. Wall – non-load-bearing facade
350mm
65mm EcoBrick
40mm cavity
12mm fireproof Cembrit board
200mm timber construction frame with Métisse insulation (Rc 5.1m²K/W)
vapour barrier
12mm plywood
12.5mm plaster board
8mm plaster finish

3. Wall – load-bearing dividing wall
350mm
10mm plaster finish
120mm solid concrete
90mm cavity
120mm solid concrete
10mm plaster finish

4. Wall – interior
150mm
5mm plaster finish
12.5mm gypson board
12.5mm gypson board
90mm timber frame with Métisse insulation
12.5mm gypson board
12.5mm gypson board
5mm plaster finish

5. Wall – interior with pocket door
170mm
5mm plaster finish
12.5mm gypson board
12.5mm gypson board
110mm timber frame with Métisse insulation
12.5mm gypson board
12.5mm gypson board
5mm plaster finish

6. Floor – foundation
535mm
20mm floor finish
50mm concrete screed with floor heating
waterproof membrane
30mm insulation
25mm concrete screed
260mm concrete hollow core slab
150 EPS insulation (Rc 4.2m²K/W)

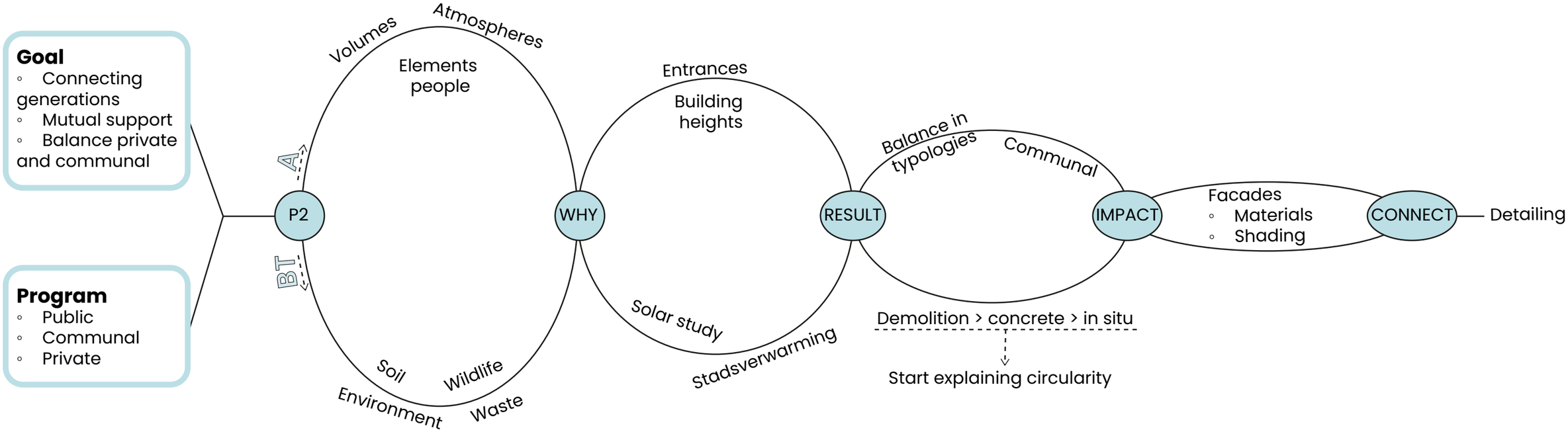
7. Floor – interior
590mm
20mm floor finish
50mm concrete screed with floor heating
waterproof membrane
30mm insulation
25mm concrete screed
260mm concrete hollow core slab
200mm PyGyp® S suspended ceiling
6mm plaster finish

8. Floor – gallery
385mm
385mm prefab concrete slab with anti-slip texture

9. Floor – roof terrace
600mm
20mm ceramic tiles
20mm tile carriers
waterproof membrane
25mm concrete screed
260mm solid concrete slab
270mm PlyGyp® S suspended ceiling filled with Métisse insulation (Rc 6.4m²K/W)
5mm plaster finish

10. Floor – roof service
650mm
solar panels
50mm sedum with substrate layer
filter fleece
40mm drainage element
root protection layer
waterproof membrane
25mm concrete screed
260mm solid concrete slab
270mm PlyGyp® S suspended ceiling filled with Métisse insulation (Rc 6.4m²K/W)
5mm plaster finish

P4 Scheme


Goal
◦ Connecting generations
◦ Mutual support
◦ Balance private and communal
Program
◦ Public
◦ Communal
◦ Private
P2
A
BT
Volumes
Atmospheres
Elements
people
Soil
Wildlife
Environment
Waste
WHY
Entrances
Building
heights
Solar study
Stadsverwarming
RESULT
Balance in typologies
Communal
Demolition > concrete > in situ
Start explaining circularity
IMPACT
Facades
◦ Materials
◦ Shading
CONNECT
Detailing

Week 4.4
P4 Presentation

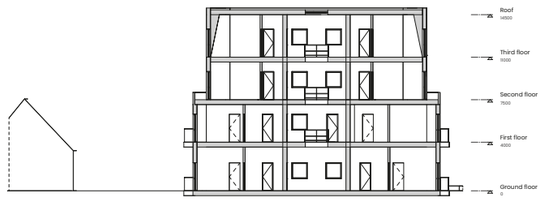
In the week of P4, the presentation slides were completed and refined. A poster was created to represent the second residential building, which is not actively discussed during the presentation, ensuring it was still visually and present. Additionally, the massing was 3D printed to show the relation with the existing situation in the studio model.

The feedback on the presentation was positive. Due to time constraints, certain aspects of the project had to be left out or only briefly addressed. The feedback for P5 included a request to highlight and integrate these elements into the final presentation, ensuring a complete representation of the full design.

RESIDENTIAL BUILDING

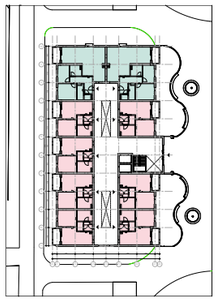
Desiré Verlaan (5944694)
P4 presentation
14 may 2025



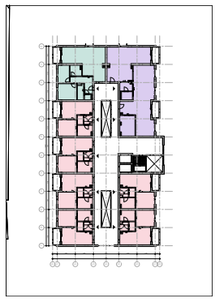




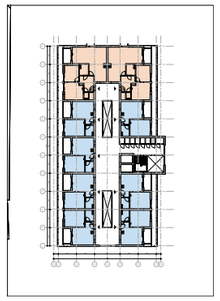
Ground floor



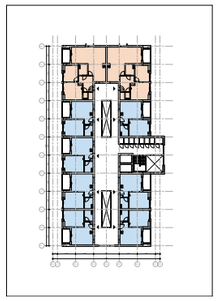
First floor



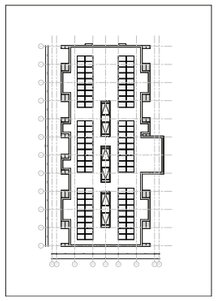
Second floor

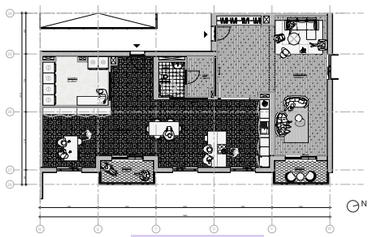


Third floor



Roof





Communal space



East

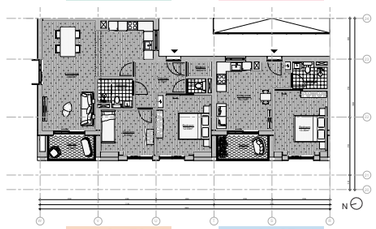


Type 4 - 90m²

Type 2 - 50m²



West



Type 3 - 76m²

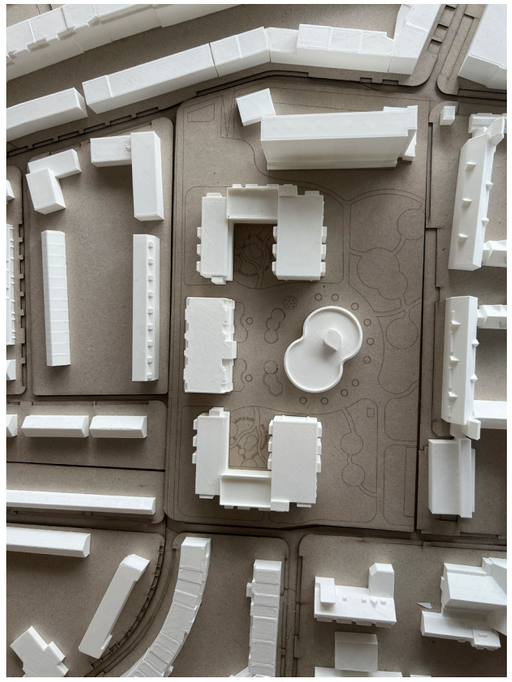
Type 1 - 35m²



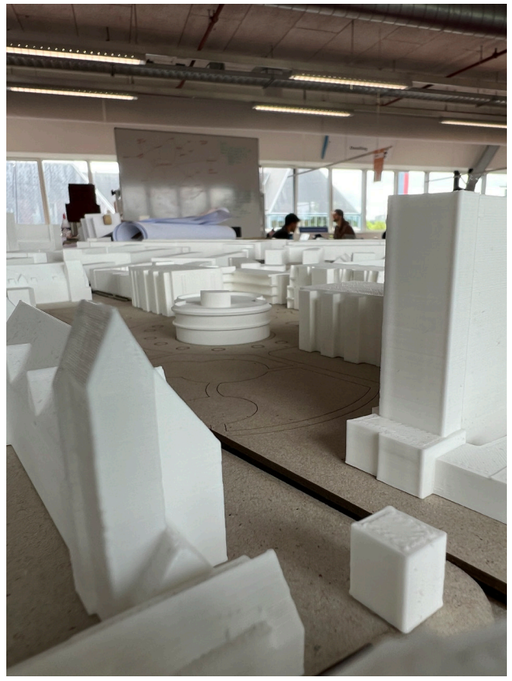
North

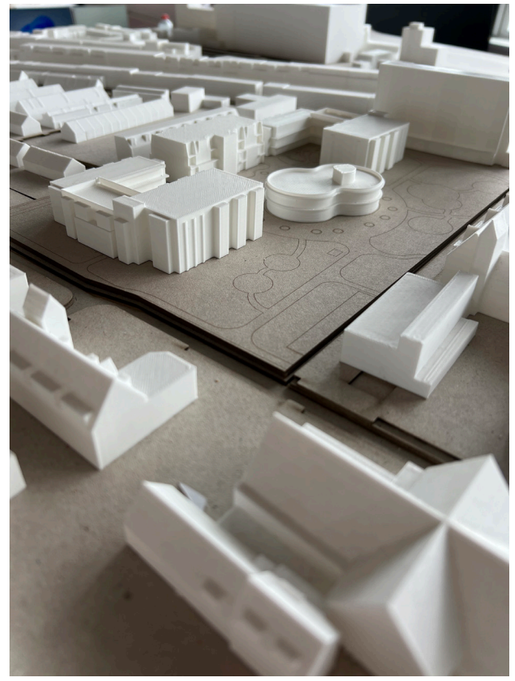


South









Feedback

Desiré 14-5

B: mirrored building → orientation, can you regarding to the sun really mirror it ?-?

B Slide 37: iets met gat (wall sorry!)
DID you think about it. yes you did.

B Communal garden community centre → WHy on roof?

B Multiculti Tarwewijk → How can your floorplans adapt to culture etc.

B Courtyard atmosphere → own project ipv referenties

V rammed earth → is roof enough to protect it?
↳ connection to sustainability
↳ voor p5 zowel concrete + rammed earth.
↳ leo over pfas....

y Soil + foundation met map van grond.

y Detail scale in detailling → alles op 1 niveau iets meer info in klimaat doorsnede

y Sun path to enter the appartments + location
Wadi met insects

L Hofjes structuur → WHy do you have an inbetween
↳ Safety. Heel verhaal van heo

L concrete is Bad want cement

L Guidelines do not have priority, WHy .. HA Goed antwoord.

Vert. concrete vanuit oud... why make it part of story

Voor p5

Spiegeling woningen in orientatie zon
Breng meer kennis erin (eventueel keuzes)

Week 4.5
Incorporating P4 Feedback

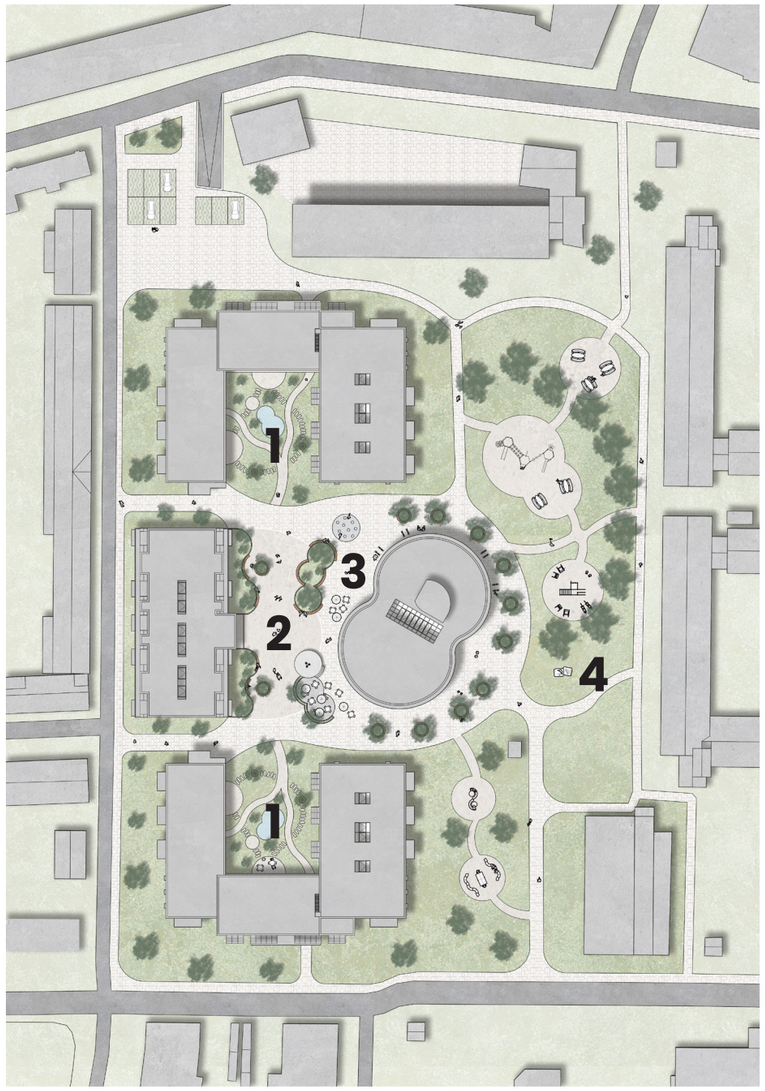
This week focused on further developing the visual representation of the masterplan. Atmospheric impressions of the different outdoor areas were created to replace the reference images previously used in the P4 presentation. These new visuals offer a more accurate reflection of the final design and its spatial qualities.

In parallel, research was conducted into waterproofing strategies for the recycled concrete and rammed earth elements, ensuring the material choices remain feasible and durable in real-world conditions.

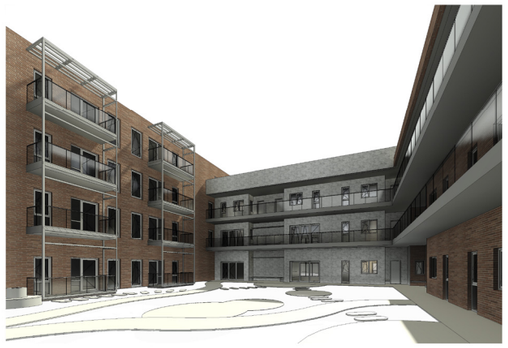
Initial ideas for the physical model were also explored, setting the groundwork for material selection and construction techniques in the coming weeks.

Atmosphere Illustrations

To illustrate the different outdoor spaces within the masterplan, four atmospheric impressions were created. In previous presentations, this was done using reference images. Now that the design phase is finished, I was able to generate my own impressions. These were produced by creating various views from the Revit model and enhancing them in Photoshop to convey materiality, mood, and spatial quality.



1



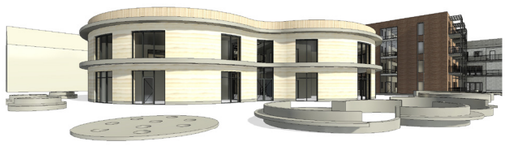


2





3





4





Hydrophobic Admixtures Research

Crafting a New Material 'Recipe'
I am rethinking traditional building materials by developing new, context-specific "recipes" for recycled concrete and rammed earth—two materials that reflect my commitment to both sustainability and social resilience.

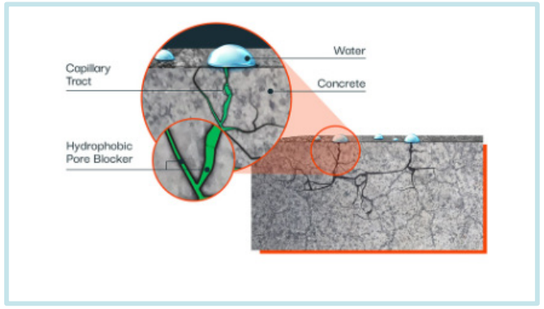
These materials form the backbone of two core functions in the project:
- Recycled concrete is used for the residential buildings
- Rammed earth is used for the community center

This deliberate material choice responds not just to environmental concerns, but also to how architecture can embody values of care, locality, and durability.

Recycled Concrete: Closing the Material Loop
Concrete has a heavy environmental footprint, but it also has great potential for circularity. I use recycled concrete aggregates (RCA) sourced from local demolition waste, reintroducing this material into the construction loop. This avoids the extraction of new raw materials, reduces transportation emissions, and keeps valuable resources in use (Nick, 2021).

However, recycled concrete is more porous and less water-resistant than conventional concrete. Even though the residential buildings are not directly exposed to rain or groundwater, moisture can still migrate through slab edges or ground contact zones.
To address this, I am incorporating hydrophobic integral admixtures into the recycled concrete mix.

Why Hydrophobic Admixtures?
Hydrophobic admixtures are chemical additives mixed directly into the concrete during batching. Unlike surface sealers, these admixtures penetrate the entire matrix and repel water by lining the capillaries and pores within the concrete. This creates a permanent internal barrier that resists moisture ingress while still allowing vapor to diffuse out.



(Hycrete, 2024)

Key Performance Benefits:
- Improved water resistance and lower capillary absorption
- Reduced risk of rebar corrosion and freeze-thaw damage
- No need for external membranes, reducing material layers and maintenance
- Compatible with recycled concrete, without hindering recyclability

Selected Product:
Hycrete Endure WP: A Cradle to Cradle Certified® Gold product. It is VOC-free (= Volatile organic compound =organic chemical compounds that under normal conditions are gaseous or can vaporise and enter the atmosphere (European Environment Agency, n.d.)), enhances concrete durability, and is recyclable at the end of life (Hycrete, 2024).

Thus, the hydrophobic admixture in my recycled concrete acts as an invisible durability layer, allowing the structure to stay dry, healthy, and low-maintenance—without undermining its circularity.

Rammed Earth: An Honest, Exposed Façade
For the community center—an expressive, grounding part of the project—I chose rammed earth as the load-bearing and exposed facade material.

This choice is rooted in its:
- Low embodied energy, made from local soil, sand, and clay
- Thermal mass, helping regulate indoor temperature
- Tactile, natural aesthetic, reinforcing the building's connection to place and people
- Being clearly different than the residential buildings

But rammed earth is vulnerable to erosion and water damage when exposed to wind-driven rain and splashing.

Waterproofing for Rammed Earth
To protect the rammed earth without sealing its breathability, I'm using Tech-Dry Plasticure; a penetrating hydrophobic **water-based silicone admixture** that soaks into the surface, bond with the minerals, and create a hydrophobic barrier. This product makes the structure permanently water repellent throughout and for its lifetime (Gower, 2022).

This ensures:
- Protection against rain and splashes
- Preservation of vapor permeability
- No alteration of the visual or tactile character of the earth walls

Building Performance Meets Planetary Boundaries
By rethinking what concrete and earth can do, I'm not only reducing the project's material footprint, but also exploring how buildings can become healthier, more resource-responsible, and deeply connected to their context.

Key Sustainability Highlights:
- Recycled Concrete: Circular, durable, waterproofed internally with admixtures
- Rammed Earth: Local, breathable, protected with passive and active detailing
- Hydrophobic Admixtures: Low-toxicity, certified solutions that extend life without sealing nature out

This "recipe" isn't just technical—it's conceptual. It shows how construction materials can become part of a socially engaged architecture, where care for people is mirrored by the care for materials that house them.

Week 4.6
Preparing the Model

I have decided to create a physical model that represents the design. This week focused on preparing the laser cutting file, which proved to be an intensive process. Key considerations included determining the appropriate material thickness, planning overlapping parts for structural stability, and designing the parts in a way that would simplify the assembly process. These steps are essential to ensure the model is both precise and easy to construct.

Create a plan and work it out in detail

Create a detailed physical model of the front façade of Block 3. This particular façade was chosen because it showcases several interesting architectural features, including all passive cooling systems and prominent communal spaces.

The model will highlight key elements such as the gallery with benches at the dwelling entrances and carefully planned window placements that create visual connections. Additionally, part of the roof terrace will be designed as a removable section, allowing an inside view to display Apartment Type 3.

Following the design decisions, the next step is selecting the appropriate material for laser cutting. Triplex has been chosen due to its minimal burn marks when cut, ensuring a clean and precise finish.

After material selection, preparation of the laser cutting files will commence, including detailed dissection of all the individual parts and thoughtful consideration of the assembly process to accurately bring the model to life.

Model in pieces



Model views

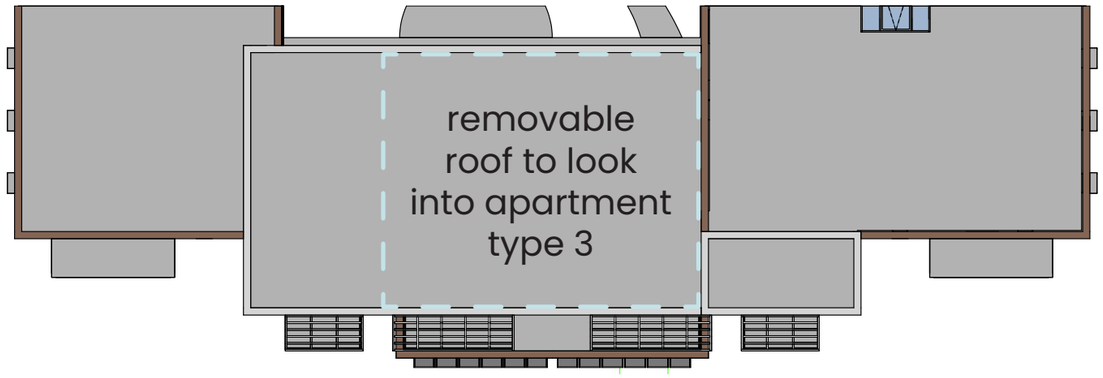
FRONT



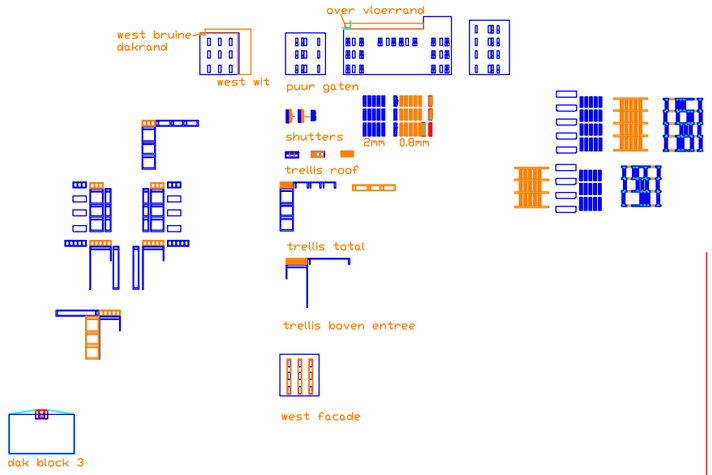
BACK

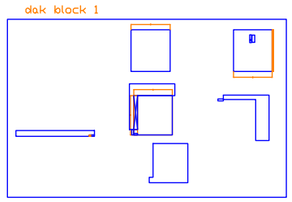


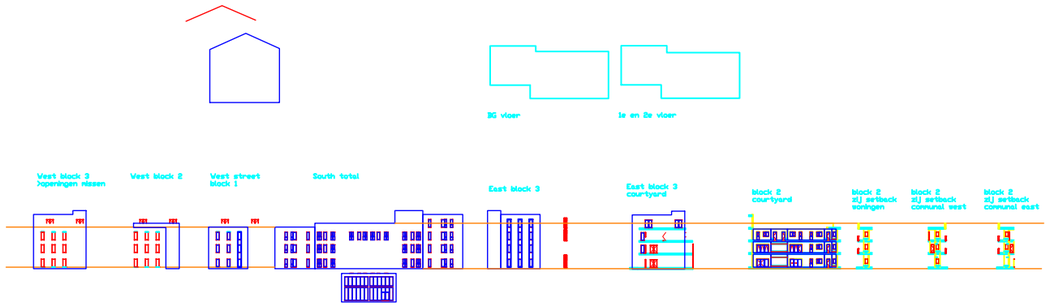
TOP

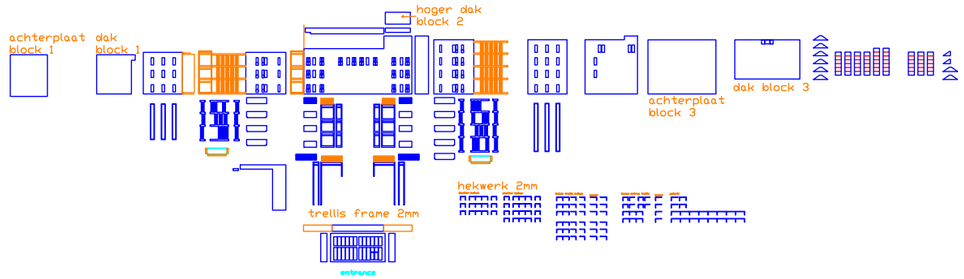


Preparing Laser Cut File

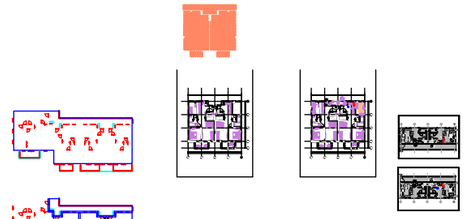


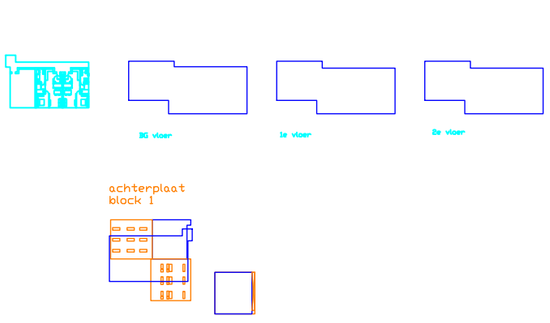


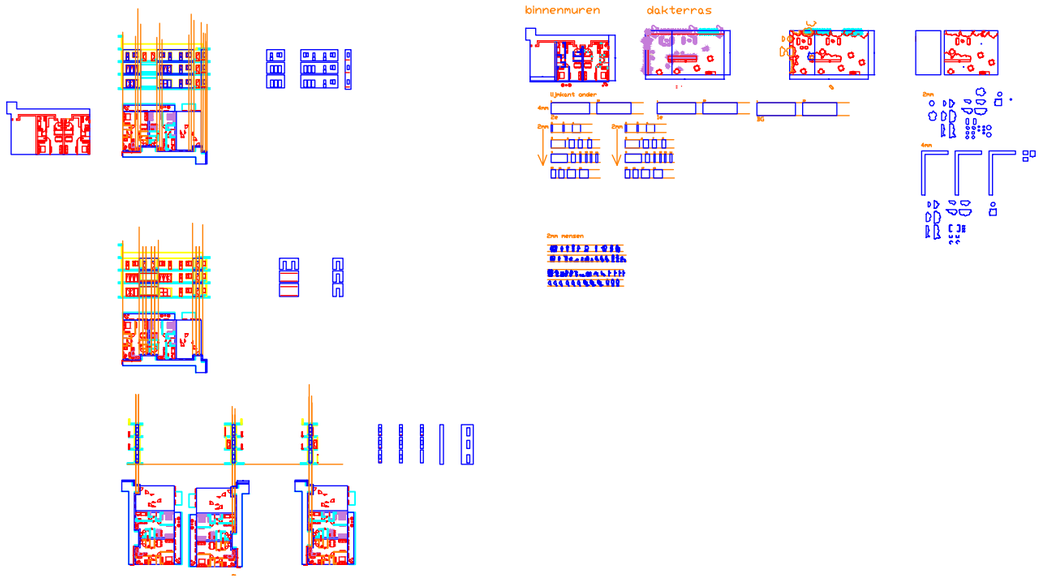












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