

RETHINKING MINIMALISM

THE CONSTANT NEGOTIATION OF SPACE IN HIGH-DENSITY URBAN ARCHITECTURE



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In current architecture, we design with the preconceived notions of what rooms are, where habit and habitat are unconditionally linked. We sleep in the bedroom, we dine in the dining room, we live in the living room. The rooms are linked to each other, where the architecture is static, the user the dynamic factor moving from room to room, leaving most of the space unused most of the time.

The world's population is growing and in combination with a mass-urbanization movement, this results in the projection that 70% of the population will be living in cities by 2050. Not only will space become even more of a luxury in urban areas, there is an urge for a higher density in order to accommodate the cities future inhabitants. Manhattan, New York City's most dense borough, will need expansion in order to accommodate 105.000 new inhabitants. Instead of expanding upwards or outwards, I have an interest in exploring expanding 'inwards'.

My fascination is minimalism. I define minimalism as: *an architectural movement with a flexible and transformable floor plan, with sustainability, creating a higher urban density and reducing the ecological footprint of the design, as the main motive*. The user is static and the architecture is dynamic, constantly transforming the space and allowing for a 24-hr-architecture.

My problem statement includes both the need to create a higher urban density and the inefficient use of the contemporary floor plan. The aim of the graduation project is to develop a new way of urban living. Creating housing in a high density with a fundamentally different approach to the program and layout. Designing collective spaces, while maintaining the quality of urban individuality. The project will present the rethinking of minimal architecture.

This graduation project has been a year long journey full of explorations, design studies and research. Going back and forth, between research and design, between the urban and detailed scale.

I would like to express some words of gratitude.

To my mentors Roel, Stavros and Freek, for the inspiring conversations, critical notes and interesting references. Thank you for dragging me out of my comfort zone and pushing me to explore the boundaries of my design.

To my parents, my sister and my friends, who have supported me on this journey since 2014.

Still full of curiosity and ambition, the rethinking of minimal architecture maintains a fascination that I will continue exploring.



Lola Kleindouwel

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ARCHITECTURAL **THEORY**

Urban living is the future. Globally, the majority of people live in urban areas rather than rural areas. In 2018, 55% of the population was residing in urban areas (UN, 2019). The world's population is predicted to reach 9,7 billion by 2050 and 70% of the people are expected to live in cities. Urbanization determines the spatial distribution of the world's population. The phenomenon is one of the four demographic mega-trends, together with the growth of the global population, the population aging, and the international migration (UN, 2019). The share of the population living in cities will continue to grow, driven by a combination of factors, such as migration from rural to urban areas and from abroad, as well as the urbanization of formerly rural areas (Lerch, 2017).

The 2018 report by the UN states that the world's cities with more than 300,000 inhabitants grew at an average annual rate of 1.8% between 1990 and 2018. *'As the world continues to urbanize, sustainable development depends increasingly on the successful management of urban growth.'* (2019, p. 21) Urban areas will need to find a way to expand. As many cities are already bursting at the seams, accommodating such urban growth demands new modes of habitation. The limits of outwards and upwards expansion have been reached in most cities. Expanding horizontally will enlarge the city so much, that commuting is inevitable. Expanding vertically is limited and one should wonder how sustainable this is. How high are we willing to go? We are in need of new modes of habitation.

We need to design in a higher density. The densification of urbanization is a complex socio-economic process, transforming the built environment and converting rural areas into urban cities. This process does not only change the architecture, it changes the lifestyle, culture and behaviour, resulting in the alternation of the demographic and social structure (Montgomery et al., 2004). A higher density is often thought of in terms of traffic jams, crowded streets and

chaos. However, higher density areas do not have to be negative. Richard Hassell (Ingram, 2018, p. 132) has stated that *'High density means fewer people commute long distances by car, which translates into lower emissions [...] It also means you have a vibrant community at your doorstep.'* Winy Maas states that *'Intensifying the city offers more sustainability, more services, more life.'* (Ingram, 2018, p. 132)

To conclude the relevance; due to mass-urbanization and population growth, we need to explore more ways of expansion in metropolitan areas.

In current architecture we address the relation between program and layout in the same way we did a thousand years ago. We translate the program to rooms and the rooms to square meters. Functions are bordered by walls and habits and habitats are unconditionally linked. We eat in the dining room, we sleep in the bedroom, we work in the study. We move from room to room in order to do a certain activity. The architecture is a static aspect, the inhabitant is the dynamic factor that moves within.

As space is becoming more and more of a luxury in cities, rooms have gotten smaller and smaller, resulting in for example 6 m² bedrooms. Architect's rigid approach to the floorplan has resulted in the loss of spatial quality due to urbanization. In addition to the spatial quality

loss due to this minimalization of space, as we can only do one function at a time, let's say either cook, sleep or work, why do we design space in a way that most of the spaces are unused most of the time? In my opinion, this is a double loss of spatial quality. If we look at a standardized family housing floorplan and analyse the activity throughout the day, we can see the inefficiency of our floorplan design. Only 40% of the space is used, and some areas are even not used at all, as shown in figure 1.

With the pressure of population growth, mass-urbanization and urban densification, we need to find a new way of designing high density housing in urban areas while maintaining the spatial quality of the architecture.

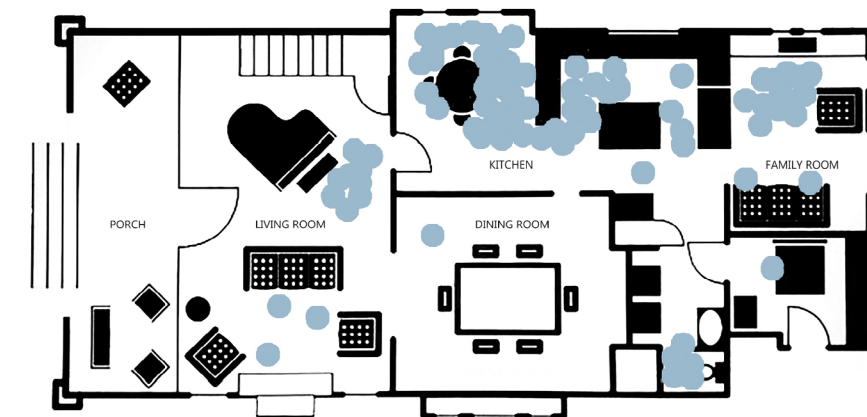


Figure 1- Daily activity in the floor plan.

Architecture is static, the user is dynamic. The problem statement in this paper shows that we design based on preconceived notions of what rooms are. Given that the user is the dynamic factor, and we can only do one activity at a time, this results in most of the rooms being unused most of the time. We link habit to habitat and therefore do not design space optimally. In a context of mass-urbanization, population growth and the need to create higher density housing, we have to reconsider the way we design our floorplans.

1.1 - scope

To narrow down the field of research, an initial scope will be introduced in terms of location and target group. In 2050, approximately 70% of the population is projected to live in urban areas. The percentages slightly differ per continent, with a leading 82% in Northern America, 81% in Latin America and the Caribbean, 74% in Europe and 68% in Oceania (UN, 2019). Within Northern America, specifically the United States, New York City is the largest city with the highest density (Smith, 2019).

New York City consists of five boroughs, the Bronx, Brooklyn, Manhattan, Staten Island and Queens. The overall percentage of population increase, based on the numbers of the NYC gov. (2019), is 9.5% over the time period of 2010-2040. The Bronx and Brooklyn have the highest expected growth, respectively 14.0% and 11.3%. Manhattan has an expected increase of 6.7%, thus below the average, however, Manhattan will be the scope of this research due to its geographical challenges. Manhattan is an island resulting in no possibility of horizontal expansion, as the other boroughs are bordering directly across the water and both the Hudson as the East River are important logistical connections. Also the vertical expansions have been exhausted, leading in high-

rise neighbourhoods Financial District and Midtown. In this paper vertical expansion is considered not sustainable as the population will continue to grow.

The target group of this research will be the Young Urban Professionals (YUP), this group is 20-35 years old, has a high educational attainment and is working in an urban environment. This target group enjoys city life and sees the city as an extension of their living space. One lives alone or as a couple and is openminded towards new architectural concepts. This target group is based on the New York City's Manhattan borough data, showing the average household of 2.07 people, and an educational attainment of a bachelor's degree or higher of 60.8% (USCB, 2019).

1.2 - hypothesis

Graham Hill is an architect and founder of sustainability platform LifeEdited, whom I interviewed a year ago (2019). He stated that, 'We have a reality, we have an environmental budget and it depends on how many of us there are, whether it is 2 billion or 12 billion.' As I personally agree with this statement, I would like to start the research paper with this starting point. The hypothesis of this research paper will be *Urban housing will be minimal in terms of size*.

It is important to define the word minimal here. In this research minimal architecture is defined as a micro-apartment with a flexible and transformable floorplan, with sustainability, urban density and reducing the ecological footprint as the main motive. It is also important to note that there are several examples of minimal apartments. However, they are often perceived as design objects or art installations and have never been developed on a larger scale. This makes one wonder, what makes minimal living undesirable?

1.3 - research questions

In order to formulate the main research question of this research paper, it is important to note the framework that has been set. The urban densification will increase following the projections of the UN (2019) report. This will result in New York City's most dense borough - Manhattan - in need of expansion in order to accommodate approximately 105.000 new inhabitants by 2040 (NYC gov, 2019). The expansion within the building block itself will be explored, based on the hypothesis *urban housing will be minimal in terms of size*. This framework and future scenario of urban expansion, results in the following research question:

How can we optimize minimal housing on both the architectural and urban scale in the future scenario of high density living due to mass-urbanization?

The sub-questions of this research will be the following:

1. *Which spatial quantities and qualities are desired and not present in current minimal architecture?*
2. *How can we rearrange the habits and habitats in a way that guarantees the flexibility of the space and allows for personal territory?*
3. *How can we share expressive spaces and live collectively in cities without sacrificing the urban quality of individuality?*

1.4 - methodology

The architectural research approach is *case studies and combined strategies*, according to the architectural approaches by Groat and Wang's *Architectural Research Methods* (2013). The combined strategy is a literature study, focusing on the theory of territory and framing (Deleuze, Grosz and Cache), which is subdivided into theory of territory, territory and architecture and territory and interiors in the first chapter, which forms the theoretical framework. It is important to note that the literature study is the main strategy and that the case studies are used to apply the theory and form conclusions.

The episteme for this project is typology. The repetitive pattern of floorplan design is analyzed and reinterpreted. The habits and habitat are disconnected and reordered. The research tool, plan analysis (in the form of case studies) will be an influence throughout the research.

The research paper starts with this introduction, highlighting the problem statement and the relevance. The main research question and three sub-questions are introduced. The paper structure will be guided by these sub-questions, which will be answered in chapter 3, 4 and 5. In chapter 3 *Defining minimalism*, two case studies will be analyzed by applying the theory from both a qualitative and quantitative perspective. The methodology in chapter 4 *Habits and Habitat*, can be interpreted as the correlational approach, due to the analysis of the habit patterns and the rearrangement based on desires instead of habitats. The final chapter *Collective Individualism*, focuses on the collective spaces and their territorialization. In the concluding chapter, the answers to the sub-questions will result in an answer to the main question. The research will conclude in the tools and framework needed to start the design phase. The research and design have been

intertwined throughout the project, going back and forth, doing quick design studies in order to continue the research. This research will not conclude in a traditional conclusion, but will end in some last words of the opening of a problematization of a global challenge. Throughout the research, and also in the final part of this paper, the connection with the design will be maintained.

1.5 - aim

The aim of this research is to develop a new way of urban living. Creating housing in a high density with a fundamentally different approach to the program and layout. Designing collective spaces, while maintaining the quality of urban individuality. Also the relationship between sustainability and square meters will be analysed, and the aim is to reduce the ecological footprint of the housing. This paper will present the rethinking of minimal architecture.



Manhattan bursting at the seams.
Horizontal expansion is limited due to Hudson River & East River.



Midtown Manhattan
current level of highrise



a scenario of vertical expansion,
how high are we willing to go?

Before diving into the research of the habits, habitats and need for territory, it is important to set the theoretical framework. In this chapter the theory of territory will be discussed, first from a more biological perspective based on the readings of Uexküll and Buchanan. Then the connection between territory and architecture will be made based on the readings of Grosz and Cache, followed by the relation between architecture, interiors, furniture and art. The literature of Deleuze will be used throughout this chapter.

2.1 - Theory of territory

Every animal has a bubble (Seifenblase) built around it to represent its own environment (Umwelt). The Umwelt is filled with perceptions that are only accessible to that animal alone. Once we step into this Seifenblase, the surrounding meadow (Umgebung) is completely transformed. 'A new world emerges in each bubble' (Uexküll, 1934, p. 5). These bubbles are milieus, consisting of an exterior milieu of materials, an interior milieu of composing elements, a membrane which is the intermediary milieu and an annexed milieu of energy (Buchanan, 2008).

This milieu is where actions occur. Every animal and human being has a milieu, a personal bubble. A communication or relation between two milieus is a rhythm. The coordination between heterogeneous space-times. Deleuze states that from chaos, milieus and rhythms are born. That a rhythm is the milieu's answer to chaos. On the subject of territory, Deleuze has stated the following: 'There is a territory precisely when milieu components cease to be directional, becoming dimensional instead, when they cease to be functional to become expressive. There is a territory when the rhythm has expressiveness. What defines the territory is the emergence of matters of expression.' (1987,

p. 315) In other words, we may conclude that when rhythms or milieus are not, or not only, functional but expressive, it becomes a territory, a signature. A territory, however, is not a rhythm or milieu, it borrows from all the milieus. It is built from aspects of the milieus, where the territory itself has an exterior and interior milieu, an intermediary milieu and an annexed milieu. The territory is an act, built up from aspects of the milieus, that affects milieus by territorializing them. The territory is in fact the product of territorialization (Deleuze, 1987).

Deleuze describes the colour of a fish as a territory as an example. The skin of the fish functions as a membrane, the hormonal state as the interior. The colour of the fish changes in a functional and transitory way and is tied to a certain action, for example aggressiveness, flight or sexuality. These changes in colour are functional, however, the colour can also change based on territorialization, leaving a mark, a signature (Deleuze, 1987).

Humans need territories in order to be able to express themselves, to have a style, a signature. The territory can borrow from the milieu of the body, but the theory of territory can also be projected onto architecture.

2.2 - Territory and architecture

Architect and theorist Elisabeth Grosz focusses on the connection between Deleuze's theory of territory and architecture in her book 'Chaos, territory, art' (2008). Where the milieu can be seen as an animal or humans body, where components are functional and expressive, a milieu – the Seifenblase – can also be seen as the habitat of the human. In this paragraph the translation of territory in architecture will be discussed.

2.2.1 Architecture and the frame

Grosz (2008) states that for her, the territorialization of the habitat itself is the concept of framing. She considers the emergence of the 'frame', the contribution of architecture allowing territorialization of the uncontrollable forces of the earth. 'The frame is what establishes territory out of the chaos [...]. The frame is thus the first construction, the corners, of the plane of composition. With no frame or boundary there can be no territory, without territory there may be objects or things but not qualities that can become expressive, that can intensify and transform living bodies.' (p.11). In other words, architecture consists of the concept of framing and creating boundaries, and it is these boundaries that allow for territorialization. It is also important to note that Grosz stresses the importance of this territorialization in this quote. That without the ability to be expressive in architecture, go beyond just the functional, there can be no qualities of expression.

A frame separates. It cuts into a milieu. In the essence, architects design frames (Cache, 1995). Cache (1995) states that even by looking at an architectural drawing, it becomes clear that it is nothing but the interlocking of frames in every dimension; plans, sections, elevations. Architecture is the creation of frames as cubes, interconnected, distorted, opened up or cut open. 'Even in its most sophisticated contemporary forms, architecture is the constitution of interlocking frames, frames that can connect with, contain and be contained by other frames.' (Grosz, 2008, p.13) Framing creates boundaries. Therefore deframing could be seen as letting go of these boundaries. Grosz (2008) states that framing and deframing become modes of territorialization and deterritorialization through sensation. Framing is done through composition, deframing is the opposite and is translated to transformation.

In his book 'Earth Moves', Cache (1995) goes back to the essence of a frame. He explains that the frame is originally four wooden linear elements surrounding a picture. But it is through 'unframing', that we allow ourselves to move from the canvas of a painting, to a fresco on the wall or art in the form of stained glass in a window frame. He considers the frame of a painting the foundation of architectural framing.

2.2.2 Frame follows function

Cache (1995) listed the three minimal functions that the architectural frame must fulfil, regardless of the purpose of the building. First, the function of **separation**. The architectural spatial translation of this function is the element the wall. Grosz (2008) states that the wall divides us from the world and creates another world on the other side. 'The wall is the basis of our coexistence. Architecture builds its space of compatibility on a mode of discontinuity.' (p. 23) She adds that, although it primarily divides, it also provides new connections, relations, both social and interpersonal.

The second function of a frame is **selection**. When translated to an architectural spatial element, Cache uses the window. A window selects the territory in a particular way. The location of the window can determine the views or vistas, how much sunlight enters the space and how the sun path moves across the interior. The wall separates and delimits dark space, the window lets the sunlight in. Cache (1995) states that the remaining architectural element is a surface that stretches its screen to the variable play of shadows formed. It is the flatness of the stage, the surface, that allows choreography to take place. This results in the third function of **arrangement**, which can be translated into the architectural elements of a floor or a roof (or ceiling).

To conclude, the architectural frame has three functions that are linked to specific architectural elements, or even tools. Separation, through a wall. Selection, through a window. Arrangement, through a floor or roof/ceiling. Where the first function removes the inhabitant from the territory, the second re-establishes the connection selectively. The third allows the connection with the exterior territory through selection to create a dynamic, whether this is a shadow projected on the wall, or enclosure of the space to allow the window to be exclusively selective.

So far, these functions have been abstract, even though linked to an architectural element, but remain not considering any concrete content. Cache (1995) states that a distance is maintained between a frame and its content. The selected interval by the frame is unknown, one never knows how the interval will be filled. An example of this is that the selecting frame can be designed in a way that allows sunlight in the bedroom in the morning, and sunlight in the dining room in the early evening. However, the sunlight is the unreliable and therefore unknown factor. The incongruence between the frame and the content explain why buildings are transformable; a church becomes a market; a school becomes a hospital (Cache, 1995). The same frame selects the same territory, yet in the interval the effect has changed. 'Form frames function' (p. 28)

2.3 - Territory in interiors

In the previous paragraph the relation between territory and architecture is analysed. This paragraph will zoom in a little further and analyse the relation between territory and the interiors. This will be done through furniture.

Cache (1995) has stated that through classified objects in our everyday language,

he sees furniture as an interior replication of architecture. 'The closet is a box in the box, the mirror a window onto the outside, and the table another floor on the floor.' (p.29) In other words, furniture can be seen as architecture within architecture, with the same functions when it comes to framing and allowing territory. Cache (1995) even states that as furniture is the object that is directly connected to our bodies, furniture is thus our primary territory. Grosz (2008) agrees with Cache, and states that as furniture is which most intimately touches the body, it is linked to the architectural frame via a direct contiguity with the body and its habits. He also states that furniture is the image where forms are fused together.

Given the three aspects of framing, and their influence on the allowance for territory, the question arises: *How can a wall be applied in minimal architecture? What can a floor be?* These questions have lead to design sub-studies, which can be found in the design brief. As the furniture is seen as the primary territory the following sub-questions arise: *How can we design the interiors of the private living space allowing the user to be expressive and create a territory?* and *How can we design the interior of the 'collective' spaces, allowing the user to be expressive and territorialize-deterritorialize-reterritorialize the space?* Both questions will be answered by both the following chapters and by the design itself.

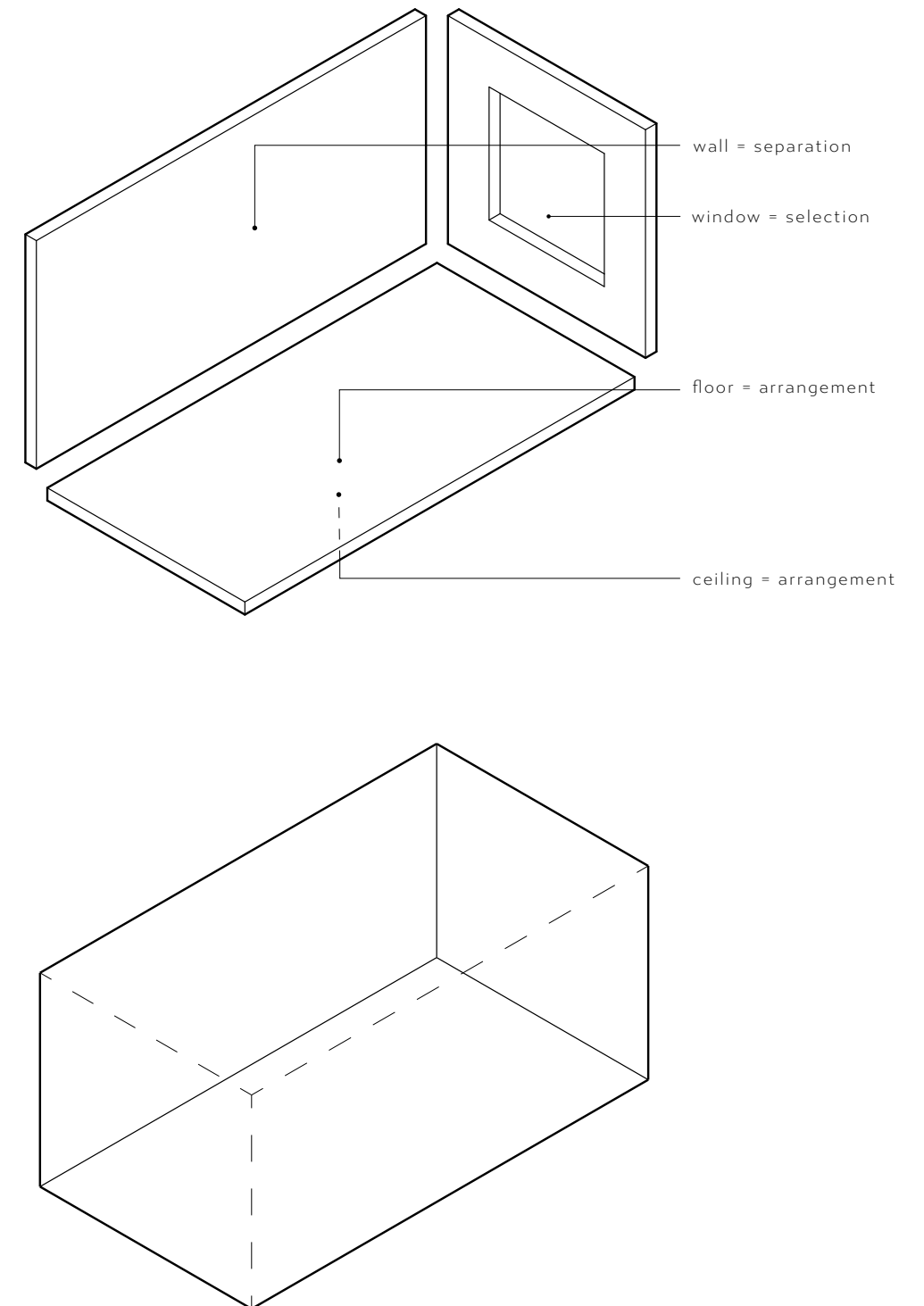


Figure 4 - analysis of the framing aspects separation and arrangement // illustration by author

Figure 5 - abstract visualization of the boundaries // illustration by author

Minimal architecture will be the starting point in this chapter. This architectural movement has a clear concept where the key elements are reducing the ecological footprint, reducing the square meters of the living space and making the architecture multifunctional and flexible. Quality over quantity, in terms of both consumption, materialization and space (Kleindouwel, 2019). The most known application of minimalism in architecture is the tiny house. Its main motivation is to downsize the living space and to see architectural design opportunities not only in square meters, but in cubic meters. Tiny houses are mainly located in natural or suburban areas. In other words, not the areas where the downsizing is necessary. Downsizing should be applied in areas where space is limited, where there is a high density and an even higher density is required. Therefore the concept of minimalism has been applied in a different way: micro-apartments. There are various examples by Graham Hill and Michael K. Chen Architecture (MKCA), which will be discussed later in this chapter. However, there is a lot of criticism on these designs. They are perceived as art installations that are overpriced and therefore exclude the target group that should downsize (Larrea, 2015). But why are these designs seen as art installations or design objects? I believe this is due to the exclusivity of the design. Minimalism – in urban areas – has not been developed on a large scale. This makes me wonder, as real estate developers meet demand with supply, the conclusion can be made that minimalism might not be high in demand. What makes minimal architecture undesirable?

The main question that will be discussed in this chapter is sub-question I: *Which spatial quantities or qualities are desired and not present in current minimal architecture?* First, minimalism will be analysed with a quantitative approach followed by the analysis of the qualitative aspects that are

desirable but not present. Then, a couple of examples of minimal urban architecture will be presented which will be analysed based on the previous conclusions and the theoretical framework.

3.1 - The spatial quantities

Current architecture is designed based on the preconceived notions of what rooms are. Functions are assigned to spaces, habits to habitats. The user moves from habit to habit, and therefore from habitat to habitat. With space becoming a luxury in cities due to both urban densification and rising real estate prices, these spaces are designed in minimal sizes. This results in 6 square meter bedrooms, where one could argue that the spatial quality of these spaces is lost. If we look at a standardized family ground floor plan in the United States, we see the activity throughout the day (figure I). Only 40% of the area is used, several spaces are not used at all. When this floorplan is divided into spaces that are used, and spaces that are not used, we see the results in figure 7 and 8. The spaces that we use actively are the kitchen (with dining area), the bathroom and the family room. The spaces that we do not use are the porch, living room, the guestroom and the dining room. How come that the kitchen with dining area is used, but the actual dining room is not? Why is the family room used to relax and watch a movie, instead of the living room?

What stands out when analysing these spaces, is that the spaces that are unused, are the spaces where a multiplicity of a function occurs. For example, both the kitchen and the dining room offer the activity of eating, and as a person can only eat a meal in one space at a time, this results in only one of these spaces being used. The same is applicable to the family room and the living room. Linking habits to habitats,

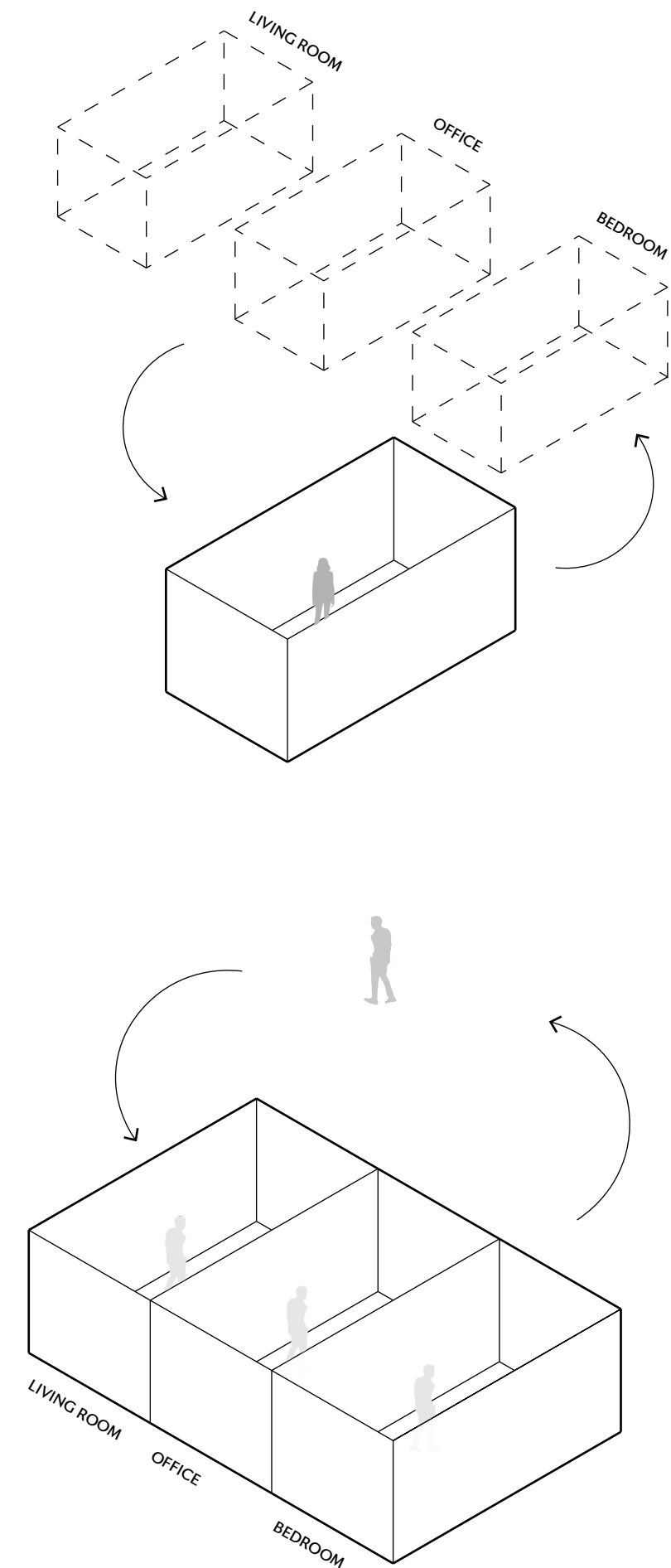


Figure 6 - Concept of minimalism. In the top image the architecture is static, the user dynamic, in the bottom image this is reversed. // illustration by author



Figure 7 - Daily activity in the floor plan. The used spaces are the kitchen, bathroom and family room.

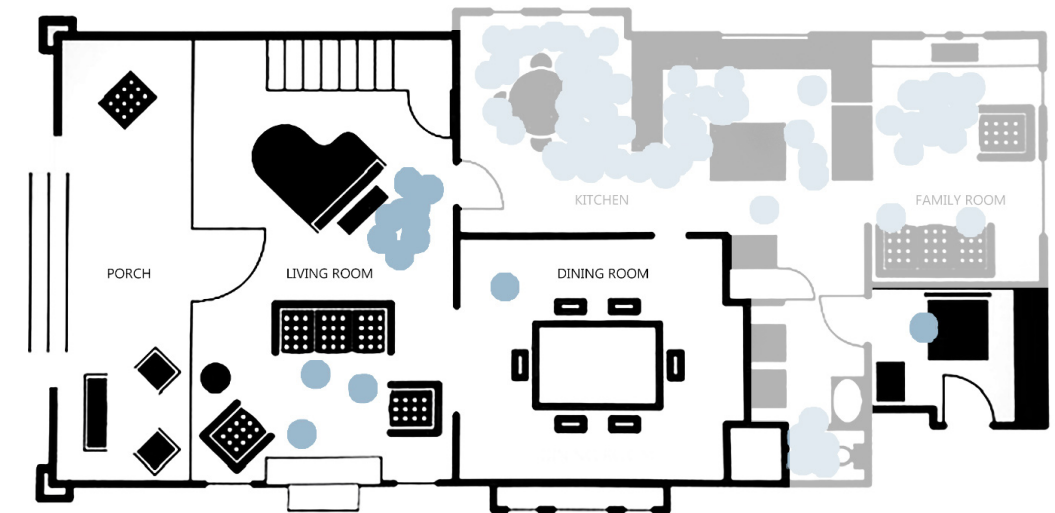


Figure 8 - Daily activity in the floor plan. The unused spaces are the porch, living room, dining room and guestroom.

results in most of the space being unused most of the time due to our inability to do two habits at the same time.

We can conclude that if spaces are unused, this is due to the multiplicity of the function linked to that space. One could wonder why we want to own these spaces, if we hardly ever use them? The theory of territory by Deleuze (1987) is based on the difference between functionality and expressiveness. When a milieu – in this case the room – ceases to be directional, it becomes dimensional. In other words, rooms cease to be functional in order to become expressive. The emergence of matters of expression, define the territory. The conclusion can be made that the unused spaces are expressive. Their expressiveness marks a territory, they are status spaces, give the home a style or signature. Going back to the example of the dining room versus the kitchen, the kitchen is the functional space. It perhaps even has a bar with stools where the inhabitant can eat a quick breakfast. The dining room however, serves a different purpose. Its expressiveness is shown by the choice for different furniture, or a different style of decoration. It hosts more significant activities of eating, such as a dinner party. It is meant to impress and provides luxury in terms of distance to the functional, like the kitchen. Same goes for the living room versus the family room. The family room is functional, small and cozy. You can watch a movie or read a book. The living room however, hosts a different kind of activity of relaxation and conversation. There will be a more formal setting in terms of furniture, which might be less comfortable and more aesthetically pleasing. There is a piano, and more advanced space to be expressive.

Based on the plan analysis in figures 7 and 8, we can make the conclusion that used space is the functional space, the unused space is the expressive space. One of the key aspects of minimal architecture is that it aims for a lower ecological footprint, but

also for the reduction of the actual footprint of the housing to a minimum. As a result, the expressive habitats are not included in the program, and only the functional habitats remain. Habits and habitats are interconnected, resulting in the lack of opportunity for executing the expressive habits within minimal architecture. However, even if the expressive space is not frequently used, people do have the desire to own them. They allow for both the chance to perform expressive activities, and to create the territory. To conclude, the answer to the question which spatial quantities are desired and not present in current minimal architecture, is the expressive space.

3.2 - The spatial qualities

In my opinion, an important misconception is that architecture that is minimal in terms of size, is automatically designed minimal in terms of style. The walls are white and the windows are large, positioned in one plane of the space. As the architecture is multifunctional and flexible, this includes movable walls and foldable beds. The floorplans are designed in a flexible way and are transformable in different set-ups, which I from now on will refer to as 'scenarios'. The scenarios of minimal architecture are fixed, and are a replication of the preconceived notion of a habitat. The space is 20-35 square meters and mostly usable in its total, meaning the space is either a complete bedroom, or a complete office. As these scenarios are very strictly scripted, it includes all furniture. There is no room for personal expression, both in the sense of decoration as in furniture. The designs are very clean and neat, almost hotel like. This could be interpreted as impermanent, the inability to make the house a home and resulting in the feeling of anonymity due to the lack of territory. Clean, anonymous, lack of expression, come with quite negative associations. Minimal style can also have a

beneficial side and can contribute to the transformation. Hasier Larrea (2015) has stated that transformation cannot just be easy, it has to be effortless. In order to allow that effortless transformation, lack of decoration can result in lack of clutter. The strict script of the flexibility can result in less storage thus owning less stuff, an important feature in the minimal lifestyle. Concluding, minimal architecture in terms of size should not be confused with minimal architecture in terms of style, or even be assumed to go hand in hand. However, there are simple practicalities in which a modern and clean design could be beneficial.

McLuhan (1964) makes an interesting distinction: hot and cold media. Hot media has a high definition, therefore providing a large amount of information. This high definition or resolution, results in the requirement of little participation and supplementation of the user. Hot media provides complete involvement without considerable stimulus. Cold media has a low definition and thus requires a high participation. It provides little involvement with substantial stimulus. Examples of hot media are film or photography, where a person does not need to exert much effort in filling in the details. In contrary, examples of cold media are cartoons, the phone or ideography, where the user needs to make an effort to fill in the details and understand the information provided. Where the hot is a synonymous of a high resolution and low participation, the cold is a synonymous for low resolution and high participation (McLuhan, 1964). We may conclude that to guarantee a high participation, we need to create a low resolution. In other words the less details are given, the more blanks can be filled in in a flexible way (Kleindouwel, 2019). It would be safe to say that in order to create flexible architecture that is transformable, it is required to have a high participation.

There should be a balance between the theory of cold media and lack of personal territory in modern minimalist styled architecture. I want to aim at a contemporary design, a white and light space where transformation is possible, yet allowing the inhabitant to create their own territory in terms of furniture or decoration. To conclude and answer the sub-question that this chapter has focused on: *Which spatial quantities or qualities are desired and not present in current minimal architecture?* The conclusion for the qualitative aspect of this question is that minimal architecture is minimal in size, but often also minimal in style. These aspects are intertwined, yet purely in terms of concept, do not have to be. Minimal architecture is very modern and clutter free. However, in order to make the place your own, in order to be expressive and go beyond simply functional, the owner needs to have the opportunity for expression, for territorialization. The conclusion for the quantitative aspect of this question is that there is a distinction between functional and expressive spaces. In order to make a reduction and form a program for minimal architecture, these expressive spaces are usually cut due to the low percentage of use of those spaces. However, the users have this need for expressive architecture

3.3 - Minimalism case studies

Minimal architecture has emerged in the last decade in response to the urge for sustainability and the high density in the city resulting in extreme housing prices. The perspective towards the housing market and the value of real estate is changing. This modern minimal architecture is around 30 square meters and is very flexible. Foldable beds, movable walls, minimalist interior. In this paragraph two case studies will be analysed based on the conclusions mentioned above, plus the theoretical framework in chapter 2.

A good example is the design in SoHo, New York by architect Graham Hill. It is a small apartment of 39 square meters, and has a lot of desired program. A living space for two, having a sit down dinner with 12 guests, being able to have 2 guests over in a guestroom, work from home with a standing desk and having a home cinema. A lot of program, very little square meters. This resulted in the flexible and transformable design in figure 10. The project is considered an experiment, a prototype for minimalist architecture. Hill's main goal was to show people that living in a small space does not have to be a sacrifice and that a well-designed minimalist apartment can perform as good or better than a house twice the size, while maintaining all the environmental low-fuss benefits of a compact home. The strategy is to design scenarios, to design every function as if it has the entire living area to its disposal. The space is either a 39 square meter office or a 39 square meter bedroom. The floorplans in figure 9 show these different transformations from scenario to scenario. Also the furniture design is key in this project. The chairs are foldable and the table is demountable, with separate storage spaces for when they are not in use. The beds are flexible and transform either into a couch with cupboard, or a wall element during the day. The movable elements

such as the wall dividing the space into two bedrooms is guided through a rail on the floor and ceiling. Only the kitchen and bathroom are fixed elements, all other functions are temporary.

An analysis with the quantitative approach: the program of this project includes all the aspects that a traditional apartment or house would have. A living room and bedroom large enough for two, a dining room, a guestroom, a study and a home cinema (comparable to the family room in the previous example in figure 7). This is a combination of functional and expressive spaces. This is very interesting, as it is common that when a reduced program has to be formulated, the expressive spaces are cut. The theory based on the readings of Deleuze and Buchanan show that it is important to have these expressive spaces in order to be able to territorialize. The studio is designed in a way that it is transformable to one function at a time. Hill takes the traditional combination of habits that we call rooms, and allows that room to occupy the entire area at once. The space is either the dining room, or the study. However, it is important to note that the kitchen, entrance and bathroom are fixed spaces in this design, and therefore the set-up of rooms always has to be considered in combination with them. So for example, as stated in the previous paragraph, the luxury of the expressive dining room is that it provides a distance between the expressive (dining area) and the functional (the kitchen). The same goes for the entrance, the luxury of having an entrance is to create a grandeur moment of arrival, where you have room to hang your coat and make your way into the home. The luxury is that it provides a distance between the entrance and the functional spaces. In my opinion the Hill design is very interesting, as it combines the functional and the expressive, and creates traditional rooms that are transformable. The critique that I would have on it is that these expressive spaces that are designed, have characteristics that do not translate in this design. There is

not a clear division between the expressive and the functional, which has an effect on the ability to territorialize.

An analysis with the qualitative approach: the design is a classic example of the relation between 'minimal in terms of size' and 'minimal in terms of style'. The interior is white, light and very modern. The layout is designed to be flexible, but due to this very strict scripting of the set-ups, there is actually very limited allowance for personal furniture or decorations. Based on the theory of Cache (1995) the furniture has the direct relation to the body and is therefore the primary territory. As the furniture in this design is fixed, there is no room for territorialization of the interior. In terms of personalization of the decoration, there is one location in the studio that allows for this expression of style, which is located next to the kitchen (figure 11). However, it is important to wonder whether this allowance suffices and the owner can feel like he or she can make the place their home.

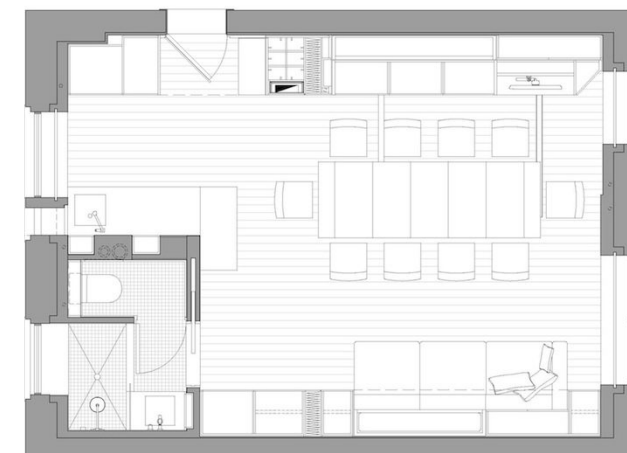
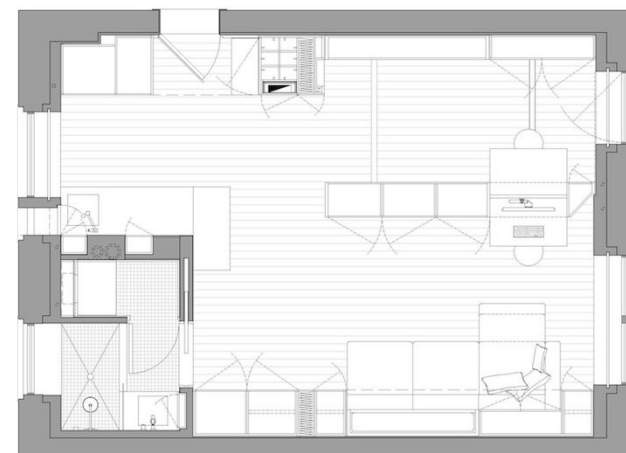
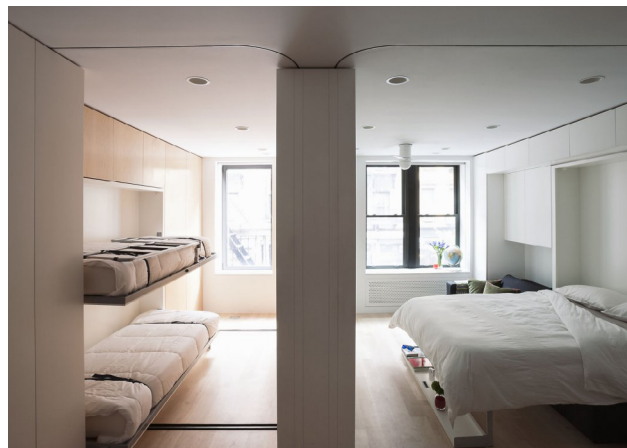
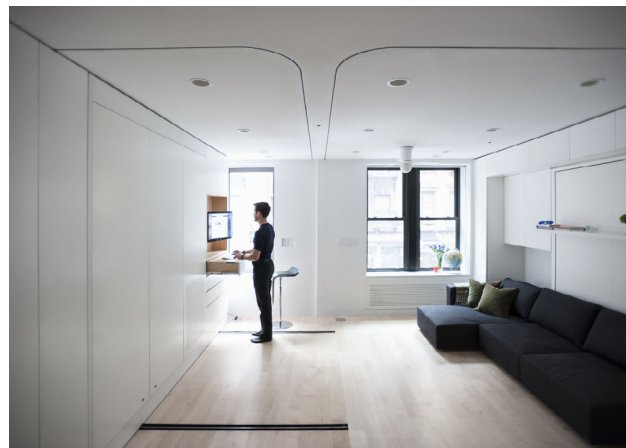


Figure 9 - floor plans of the SoHo studio. The kitchen and bathroom are static, all other functions are dynamic.

Figure 10 - series of photographs, correlating with the changing floor plans.



Figure II - series of photographs, illustrating the use and decoration.



Another example of minimal urban architecture is the Attic Transformer in the West Village of New York, designed by Michael Chen's architecture office MKCA (shown on the next pages). The space is a 21 square meter attic space in a landmarked 1840s townhouse with exposures on three sides. The design is flexible and includes custom transforming elements such as clothing storage, a pantry storage, a pull-out dining table, a desk and bed. All these elements are positioned in one wall sized furniture piece, strategically located on one side of the apartment, allowing a total transformation. Joining Hill in his main goal, Chen's design aims to use the entire space for one function at a time. The space is either a bedroom, either a home office or a dining room. Several furniture elements, such as the chairs, are foldable and can be stored away. Comparable to the SoHo design, the bathroom, kitchen and entrance are fixed elements and are located in the 'beginning' of the apartment.

An analysis with the quantitative approach: The approach to the program is very different than that of Hill in the previous example. Where Hill makes a program and includes all habits, both the functional ones as the expressive ones, Chen only applies the functional spaces. This includes a bedroom, bathroom, kitchen (with dining area) and living room. The habit is traditionally linked to the habitat, resulting in the entire space being occupied by one function at a time. The expressive habits such as a dining room are designed in a way where the table has different functions, it can be used as a desk (with foldable computer station), a dining place for two or a quick breakfast for one. The dining table – considering the expressive habit - can be extended and extra chairs placed. However, as mentioned in the critique in the previous case study, the luxury of having friends in a dining room is the distance it has from the functional. You have the opportunity to create a different

atmosphere in this space. Also this design allows for the maximum of four people total, which does not resonate with the desire of organizing a dinner party. The bed only sleeps two, making the option of having guests over limited.

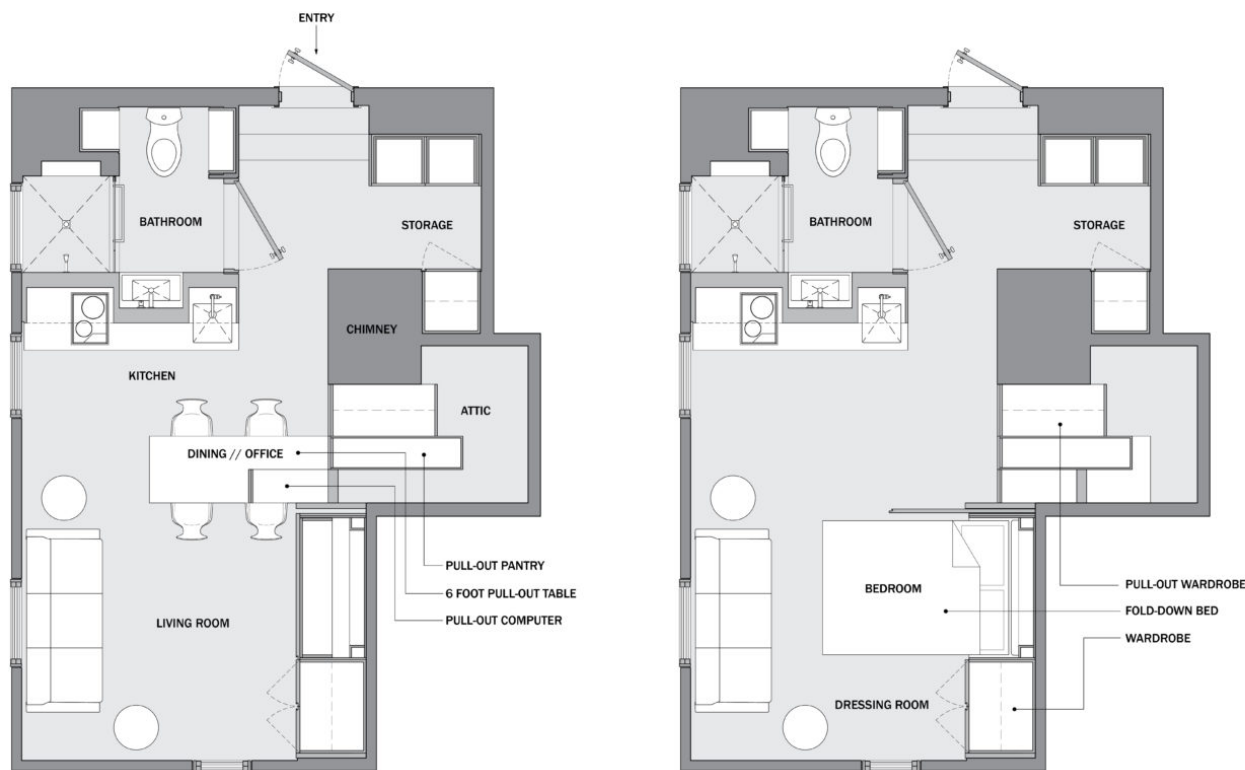
An analysis with the qualitative approach: The design includes a furniture 'wall' that houses most of the furniture. The bed with nightstand, the table with chairs, the computer station that transforms the dining table into a desk, the storage space. However, along the other wall of this studio, there is a couch and two side tables. This wall also displays a piece of art. As the scenarios are designed in a less strict way, there is more space to allow for personal furniture or decorations. What is also interesting in terms of furniture, is that Chen creates different home decoration styles within the furniture element, for example with the bed section. Once the bed is unfolded, the nightstand area appears with soft lights, calm light pink colour and space to place a candle or lay a stack of books.

3.4 - Conclusions minimalism

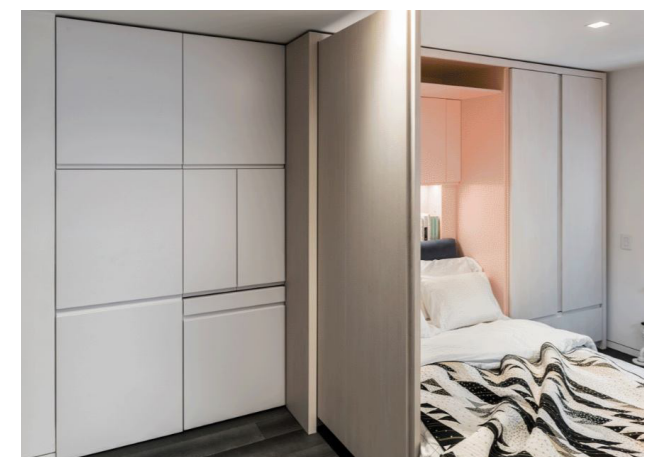
Concluding the minimal architecture case studies. It is interesting to see that there is a relation between the strictness of the scripting of scenarios and the allowance for personal territorialization. The more functions are desired in the design, so including both the functional and the expressive, the more transformations are required. Minimal transformations are supported by furniture. With furniture I mean elements that are smaller than architecture, but larger than furniture. This is shown in both the SoHo Studio and the Attic Transformer project. The SoHo Studio houses 8 transformations, resulting in two out of the four walls being used for furniture. The Attic Transformer houses only 3 transformations, resulting in one out of the four walls being dedicated to the furniture. The SoHo studio has a high flexibility in terms of program, but a low allowance for personal territory. The Attic Transformer has a low flexibility in terms of program, but a high allowance for personal territory.

The more flexibility is designed in a quantitative way, the less flexibility is allowed in terms of the qualitative desires of personal territory. The sub-question *Which spatial quantities or qualities are desired and not present in current minimal architecture?* is answered by the following statement. Both the spatial quantity of program and thus a high amount of transformations is desired, furthermore the spatial quality of the allowance for personal territory is desired. In order to house both in a minimal design, there has to be a balance between the number of transformations and the personal territory.





Figures I2 - floor plans showing the transformation along the East wall.



Figures I3 - series of photographs illustrating the transformation of the wall element.



Figures I4 - series of photographs illustrating the use and decorations of the space.



In the current minimal designs, the traditional link between habits and habitats maintains. The space is open and flexible, with furniture elements that are foldable, creating a function that occupies the entire space as a whole. This is shown in both the Graham Hill as the Michael Chen design. I believe there is room for development and innovation here. I would like to use the metaphor of the invention of the elevator here. Stairs existed, but they were exhausting and took a lot of space. If this were to be improved in a traditional sense, an electric staircase could have been developed. Instead, the inventor Elisha Otis went back to the essence of having a staircase. The basic function of the stairs is to get people up and down a building, leading to the invention of this literal vertical connection; the elevator. This is what I want to do in this research, take the rooms as a starting point and go back to the essence of them. What are the habits that collectively form a living room? And how can these habits and their combinations (rooms as we know them now) be rethought and be innovated?

The aim of this chapter is to make a rearrangement of the current approach to the layout of architecture. First the rooms – currently linked to a specific function – will be listed. Those will be analysed in order to generate a list of habits. Then those habits will be revalued in order to rearrange the habits into a certain amount of plan scenario's by combining this set of habits.

'Habits, nothing but habits. The organism is a complicated network of habits, of contemplations and contractions.' (Posteraro, 2016, p. 101) Habits differ from person to person. Let's say an analysis would be done in a museum, where the habits and desires would be researched. There is no fixed route, no defined motive. One could spend five minutes or five seconds looking at a specific painting. Everyone has their habits, everyone makes the sequence

of those habits unique. It is therefore important to take a position regarding the specificity of the research of habits. There is a spectrum from superficial to complex, and the position within that spectrum has to be done based on intuition. On the one hand, it is important to personalize this sequence of habits in order to optimize the use for the inhabitant. On the other hand, when considering the target group of this paper, it would be presumable that this group of young professionals do not have the financial means to buy an apartment in this stage of their life. Therefore, they will be renting their living space. The target group are professionals that might be presented with the opportunity to either make a career move and thus have more financial possibilities or relocate to another city or country. A high level of turnover is to be expected. There has to be a balance between the level of personalization and the 'generalization' of the habits in order to allow this turnover-rate.

4.1 - Habitat research

The problem statement is that we design architecture based on the preconceived notions of what rooms are. Rooms are habitats and these habitats consist of a certain combination of habits. What makes a bedroom different from a living room is that it entails a different set of habits that can be done in that space. Architecture is static, the person is dynamic, moving from habitat to habitat. In minimal architecture the person is static, the architecture is dynamic, transforming the space into different habitats throughout the day. The architecture becomes dynamic, but the set of transformations are still based on these preconceived notions of what rooms are.

The rooms that will be considered in this chapter are the following: [1] Bedroom, [2] Bathroom, [3] Kitchen, [4] Living room, [5] Dining room, [6] Entrance, [7] Guestroom, [8] Wardrobe/walk-in closet, [9] Laundry room, [10] Storage space, [11] Study/office and [12] Balcony/garden. This list is based on the most common rooms in current architecture and have been selected based on intuition. The habitats are combinations of habits, that we understand as rooms. In this paragraph I will list the habits per habitat based on intuition. Later on these habits will be analysed and placed within the set forcefield.

[1] Bedroom – sleeping, relaxing, leisure (reading a book, watching a movie, texting with a friend), changing, intimacy.

[2] Bathroom – showering, taking a bath, general care (brushing your teeth, using the toilet, etcetera), getting ready for going out (hair or make-up), getting ready for the night (more relaxed version of 'general').

[3] Kitchen – cooking, baking, eating a quick breakfast, preparing a snack or coffee, preparing for a larger dinner (party).

[4] Living room – relaxing, leisure (reading a book, reading a newspaper or magazine), watching a movie, having conversations, have a social gathering possibly with food and drinks, organizing a party or drinks for a larger group.

[5] Dining room – combinations of the following; breakfast, brunch, lunch, aperitivo, dinner; in the following social settings; alone, small gathering (one or two guests), large group or festive occasion.

[6] Entrance – hanging a coat, store shoes or bag, getting ready to leave the house, arriving at the house.

[7] Guestroom – sleeping, relaxing, leisure (reading a book, texting with a friend), changing, distancing (creating me-time for the guest).

[8] Wardrobe / Walk-in closet – changing, getting ready for an event, storage for clothing.

[9] Laundry room – washing clothes, drying clothes, storing laundry, storing laundry supplies, ironing.

[10] Storage space – storing cleaning supplies, storing books and decorations, storing miscellaneous.

[11] Study – work from home, have a (online) meeting, read a book or newspaper, doing personal finance, educational such as studying or following an online lecture course.

[12] Balcony / Garden – have a meal or drink in a terrace setting, read a book, sit back and relax.

4.2 - Habit research

Following the analysis from habitat to habit, these habits have been listed in a table, which is shown in appendix I. This table includes the following six vectors that will create the field of force (or frame of reference):

[1] Desire, to go back to the essence, the intention of the habits. Why do we do these habits? What effect do we want to achieve with it?

[2] Light, analysing whether the desire requires daylight, and if so then at which times of the day? Also the need for artificial lighting will be listed.

[3] Privacy. This is an important vector in the field of force. It is both applicable on the scale of the individual apartment and the exterior. It also lists certain required relations with other habits or desires based on the level of privacy required.

[4] Furniture. A list of minimally required furniture will be listed to give insight in the spatial elements required and desired in order to execute a certain habit.

[5] Territorial Typology, by this I mean whether the desire or habit is functional or expressive. This is based on the previous research into the theory of territory (Deleuze, Buchanan) in chapter 2 and 3.

[6] Use. The final vector in the analysis will be the use of the space. What is the duration of the use? And when does it typically occur?

After breaking down the habitats into habits and desires, the results will be problematized. In order to do this, a first rearrangement of the habits will be done. When studying the desires listed, it becomes clear that we can make a distinction between 7 types of desires. **[1] resting and relaxing**, **[2] leisure**, **[3] personal care**, **[4] social**, **[5] practical**

(such as storage or laundry), [6] food related and [7] work related. These 'desire typologies' are colour coded in the table, where the numeric ordering is based on this colour coding (appendix I). After making the first rearrangement of habits based on the desires, or in other words based on the essence of these habits, a second analysis can be made. The habits will be arranged on two axes, with two opposite key-aspects in this research. The habits will be shown in this diagram referring to their colour code, based on the desire.

- RESTING / RELAXING
- LEISURE
- PERSONAL CARE
- SOCIAL
- PRACTICAL
- FOOD RELATED
- WORK RELATED

- | | |
|---|--|
| 1 sleeping | 1 hanging a coat |
| 2 relaxing (bed) | 2 store shoes or bag |
| 3 intimacy | 3 storage |
| 4 take a bath | 4 washing clothes |
| 5 relaxing (couch) | 5 drying clothes |
| 9 sitting back and relax (balcony) | 6 ironing clothes |
| 1 reading a book (bed) | 7 storing laundry |
| 2 watching a movie (bed) | 8 storing laundry supplies |
| 3 leisure (reading a book, newspaper, magazine) | 9 store cleaning supplies |
| 4 watching a movie (couch) | 10 store books and decoration |
| 7 reading a book on the terrace | 11 store miscellaneous |
| 1 changing | 1 cooking |
| 2 take a shower | 2 baking |
| 3 general (brushing teeth, using toilet, etcetera) | 3 eating a quick breakfast |
| 4 getting ready for going out | 4 preparing a snack or coffee |
| 5 getting ready for the night (more relaxed version of 'general') | 5 eating alone |
| 6 getting ready to leave the house | 6 eating in small gathering |
| 7 arriving at the house | 7 eating in large group |
| 9 changing (walk-in closet) | 8 eating for festive occasion |
| 10 getting ready for an event | 9 having a meal or drink in a terrace like setting |
| 1 cooking for someone | 1 work from home |
| 2 preparing for a dinner party | 2 have a (zoom) meeting or interview |
| 3 having conversations | 3 read a book or newspaper |
| 4 social gathering with food/drinks | 4 personal finances |
| 5 organizing a party or drinks with friends | 5 educational (study or taking an online course) |

**4.2.1 Functional - Expressive
& Individual - Social**

The first rearrangement will be done based on the gradient of functionality and expressiveness, and the gradient of individuality and socialness (figure 15). It becomes clear that when considering the functional half of the field, the majority of the habits are located in the individual quarter. When considering the expressive half of the field, most habits are located in the social quarter. When looking at the distribution of the desire typologies, it stands out that all the social desires are located in the expressive-social field. All the practical desires are located in the functional-individual field. Personal care is functional, where only personal care desire nr. 2 (taking a bath) could be considered semi-expressive, from a luxury perspective.

**4.2.2 Daylight - Soft light
& High privacy - Low privacy**

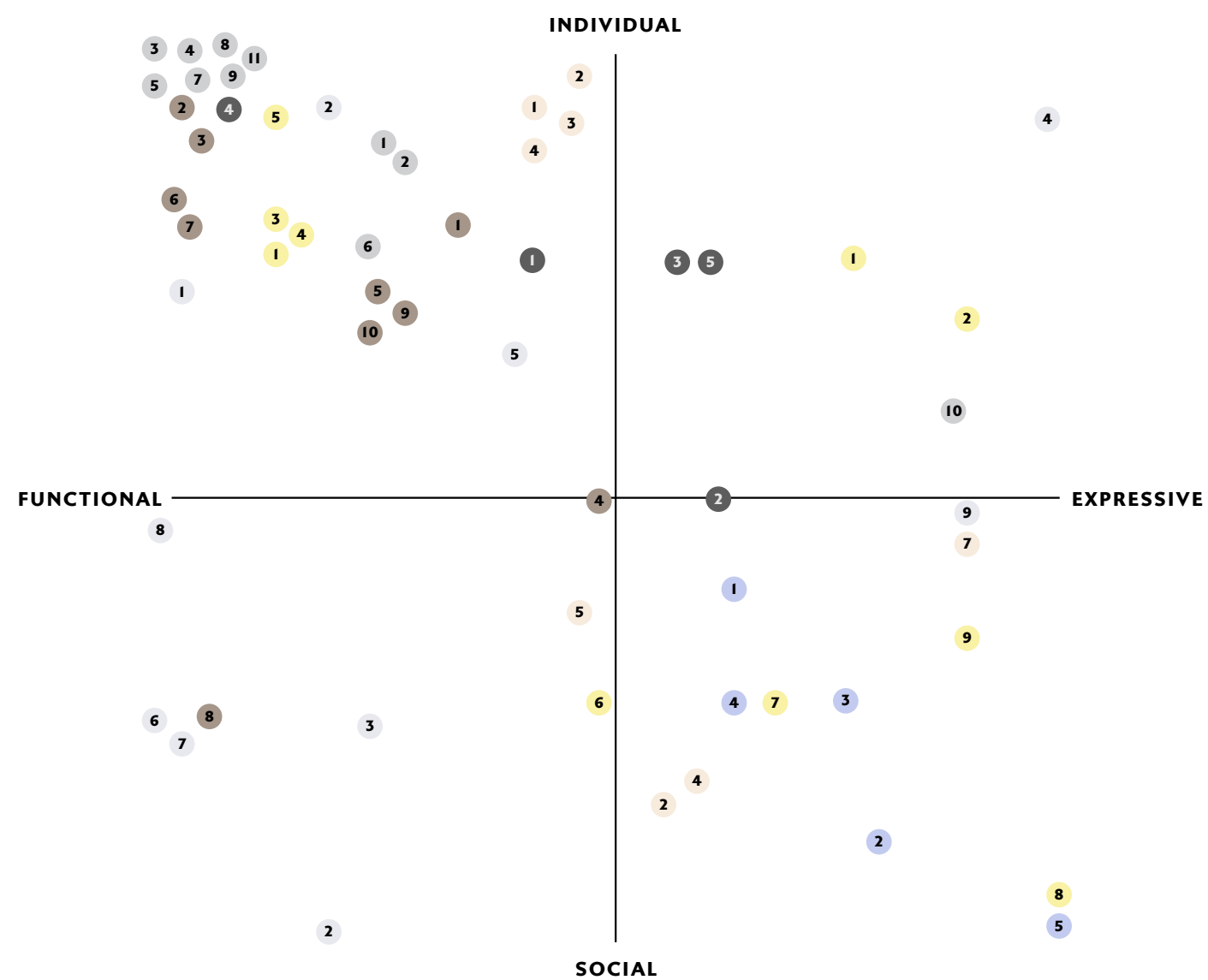
The second rearrangement is based on the level of privacy and the level of daylight (figure 16). On the daylight axe, the opposite is considered 'soft light' with the possibility to completely darken the space. There is also a subdivision along this axis, where the daylight is desired, but not the vistas. It is clear that all the food-related and social desires are located in the daylight & vistas field. Most of them are located in the low privacy quarter. None of the 'personal care' or 'practical' desires require daylight and vistas, and where the daylight without vistas is desired, this is not a requirement.

4.2.3 Conclusions of habits

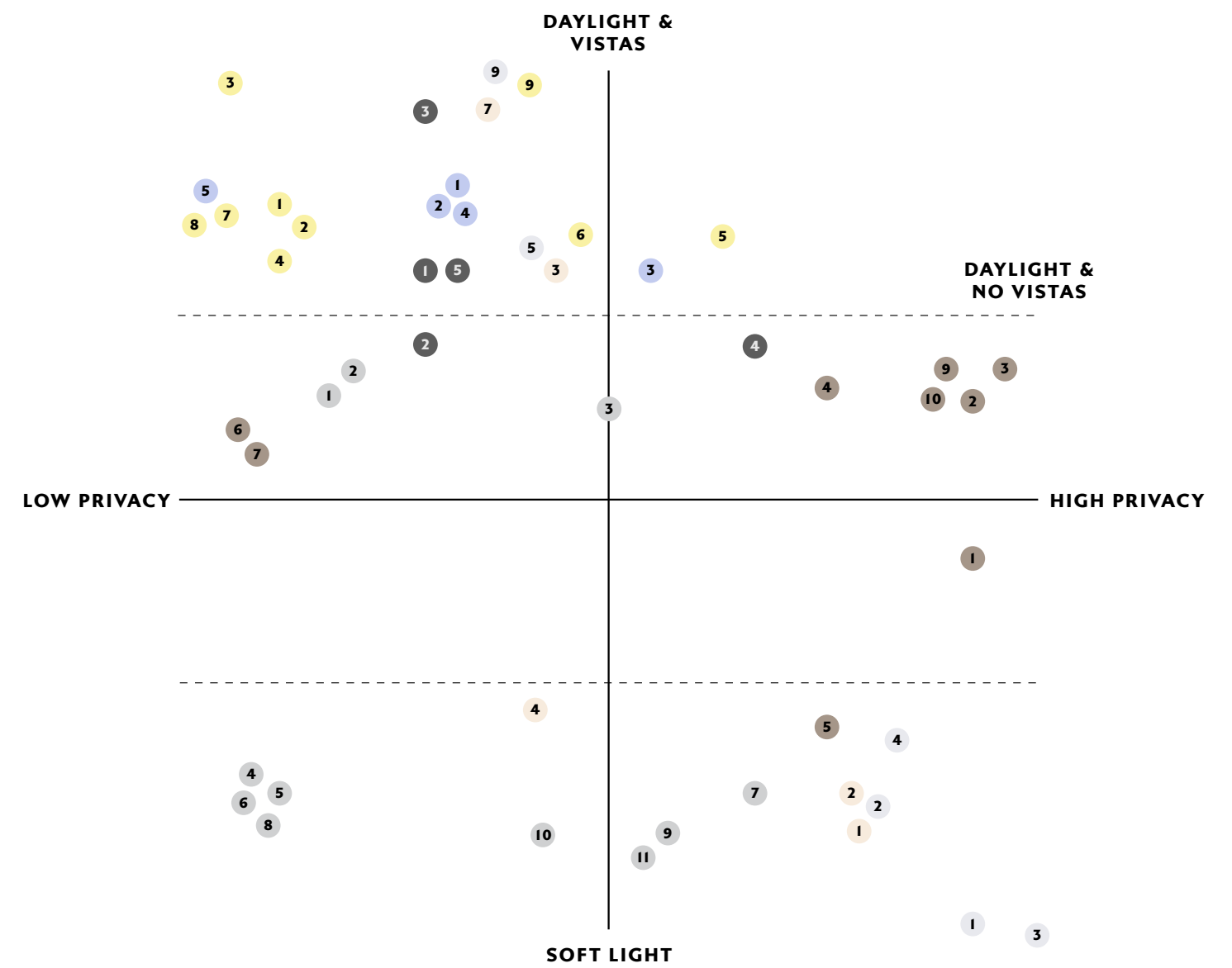
This analysis results in three conclusions. First, it becomes clear that there are several habits that have a certain overlap in terms of both the essence of the habit, thus desire, and the location in the field. For example, the habits 'reading a book in bed' and 'reading a book in the living room' could be considered as quite similar in terms of the desire relaxing and leisure. When looking at the first field of force, they are both located in the functional-individual quarter. When looking at the second set of axes, the habit 'reading a book in bed' (beige 1) is located in the high privacy – soft light quarter, whereas the 'reading a book in the living room' (beige 3) is located in the daylight-low privacy quarter. The conclusion can be made that these habits are so similar, that they could be combined in a layout scenario, but do need a certain level of flexibility within that scenario in terms of (day)light to allow the different desires.

The second conclusion will also be shown by an example. Taking a shower (brown 2) and taking a bath (light grey 4) would initially be seen as similar habits, probably because they are traditionally located in the same habitat 'bathroom'. In the first rearrangement of habits based on desire, it becomes clear that taking a shower is 'personal care', whereas taking a bath is 'relaxing'. When taking a look at the first set of axes, the shower is located in the functional-individual quarter, and the bath in the expressive individual quarter. When looking at the second set of axes, the shower is located in the high privacy – daylight (but no vistas) quarter, and the bath in the high privacy – soft light quarter. Both habits have one vector is common, but also are located on the opposite sides of the vector that they do not have in common. In combination with the difference in desire, it would not make sense to located these two habits in the same scenario.

The third conclusion will be demonstrated with the comparison between the social desires and the food-related desires. When looking at the first axes, all social desires are located in the expressive-social quarter, the food-related desires are evenly distributed along all axes. When looking at the second set of axes, all food-related and all social desires are located in the 'daylight & vistas' field. There is a slight difference where 'having conversations' and 'eating alone' could be considered more private habits, but they are only located just over the axe. There is a lot of overlap of habits within the social-expressive quarter and the low privacy – daylight quarter. The conclusion can be made that all social desires can be combined in a scenario where there is an allowance for socialness, expressiveness and has daylight and vistas. Several food-related desires, that include more than one user, can be included in this scenario as well.



Figures 15 - analysis of the habits along the vectors: functional / expressive and individual / social. illustration by author.



Figures 16 - analysis of the habits along the vectors: low privacy / high privacy and (day)light / soft light. illustration by author.

4.3 - timeline scenarios

The previous analysis resulted in three types of conclusions: (1) certain habits can be combined, yet there is a flexibility required within that combination, (2) certain habits cannot be combined and (3) certain habits can be combined. After rearranging the habits based on desires, expressiveness, functionality, privacy and (day)light, it is important to also look at the use of the habits. In the table shown above the use of every habit is listed, displaying both the frequency of this habit (for example, once a week or daily between 8 am and 9 am) and the duration of this habit (30 min or an hour).

‘We should get rid of the concept of bedrooms. We should start talking about functionalities, and instead of saying a four-bedroom apartment, we should say a place that sleeps four people. It doesn’t have to be four bedrooms all the time; it can have four bedrooms at night, but it doesn’t need to have four bedrooms in the morning.’ (Larrea, 2019) One of the key principles of minimal architecture that functionalities that are used a fraction of the time, should not be present in the space all of the time. Current minimal architecture displays the user as the static person and the architecture – or combination of functionalities – is dynamic, allowing for a more 24-hr-architecture. However, these combinations of functionalities, thus the set-ups in transformational architecture, resemble the traditional notion of rooms. This chapter aims to rethink these set-ups and minimize the scenarios of transformation. Therefore, instead of organizing a floor plan with the 12 previously mentioned habitats, this paragraph will research the possibilities regarding organizing a floor plan based on the minimal amount of scenarios, with new combinations of habits.

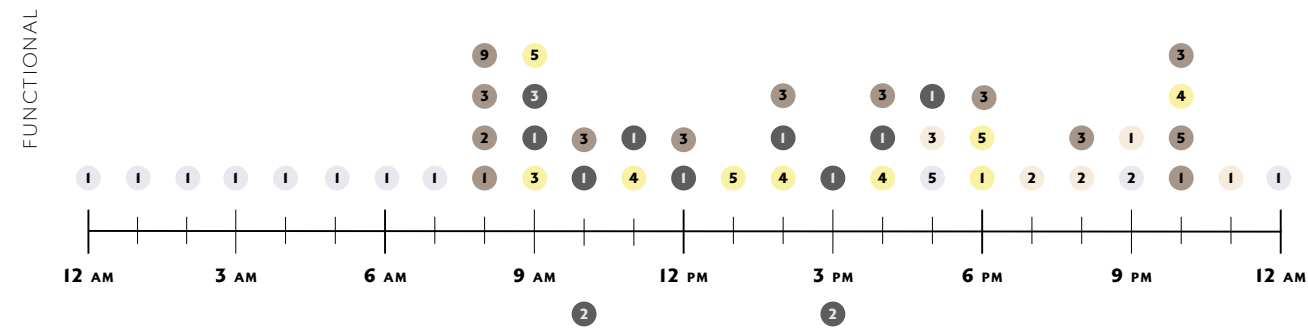
Four types of daily schedules can be distinguished. People either work, or have

a day off. Then there is a second division between being at home or going out. Based on these starting points, the following scenarios have been set: **[1] working from home, [2] going to work, [3] day off at home, [4] day off going out.** These four different scenarios have been translated into a timeline of 24 hours, which are shown on the following pages. The timeline has been set up within the framework of balancing personalized schedules and generalizing to a certain degree, which is done based on intuition and personal experience.

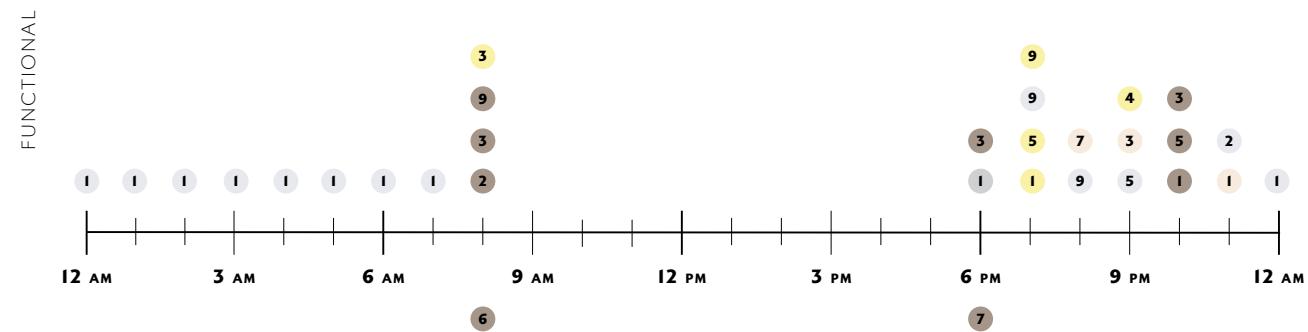
The first thing that stands out is the division between the functional habits and expressive habits throughout the day. During work-days the only expressive habits include having a (online) meeting and leaving the house / arriving at the house. On non-work-days, this includes leaving / arriving at the house, social habits and leisure habits such as watching a movie. This minority of the expressive habits can be explained by the use of these habits. Most of the expressive social or food-related desires only occur once in a while, for example organizing a dinner party or drinks for friends. The conclusions of chapter 3 show that it is important to have a balance between flexibility and personal territory, as too much flexibility – due to the implementation of too many functionalities – leads to a too strictly scripted scenario set-up that it does not allow for personal furniture or decorations, thus personal territory. One could say that in the rethinking of minimalism, the number of functionalities and scenarios has to be minimized as well, to allow this territory and personal ownership. When adding this chapter’s conclusion that the expressive habits are not used often in the four daily timelines that have been set up, it would make sense to separate the lesser used expressive habits from the often used functional habits.

If the expressive social and food-related desires are rarely used, and the aim of

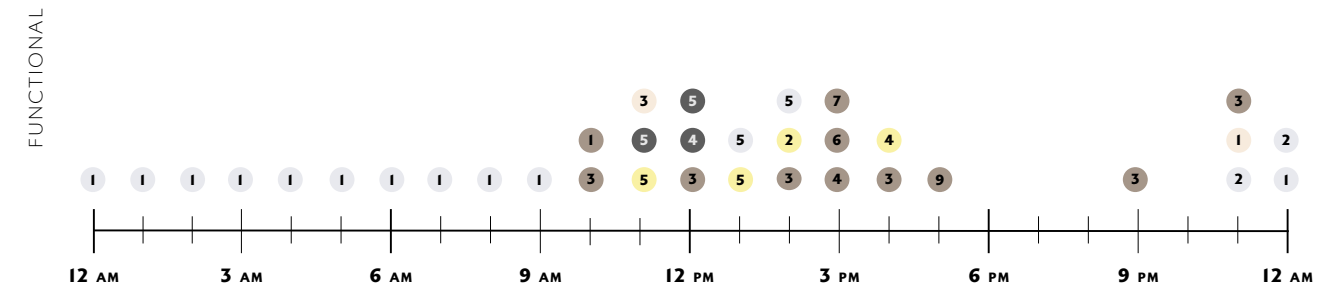
this research is to move to a more 24-hr-architecture, it makes sense to design these desires in a way that the space can be used collectively. The functional desires – due to the high level of privacy – will be organized in the form of a private housing unit, where the habits are laid out based on the timeline and the desire typology. When only the functional habits are considered, and the timelines are re-analysed, it becomes clear that there are four possible combinations. It is important to note that the social and food-related expressive habits are not considered, neither are the timeline sections where the user is outdoors, either to go to work or to go out for leisure. These four combinations include **[1] night time and morning routine, [2] working from home, [3] relaxing and leisure from home and [4] dinner time and night-time routine.** It is important to consider that all the non-social food-related desires, all practical desires (excluding laundry) and all personal care desires are used in short intervals throughout the day, resulting in the conclusion that these desires could be represented in a permanent way in the floorplan.



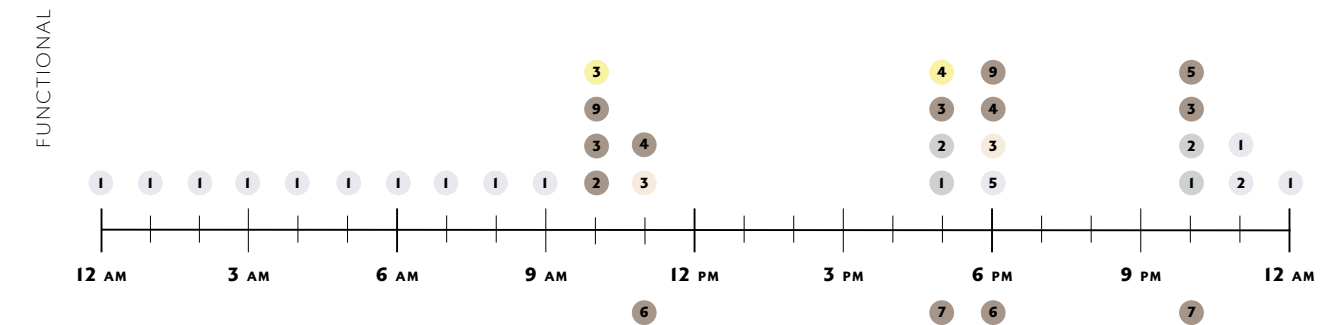
SCENARIO 1
working from home
and eating in



SCENARIO 2
going to work and
eating in



SCENARIO 3
day off
inviting a friend for
dinner



SCENARIO 4
day off, going out
and going out to a
restaurant

Figures 17 - analysis of the habits along the vector 'use'.
This resulted in four timelines. Note: storage and laun-
dry are not included. Illustration by author.

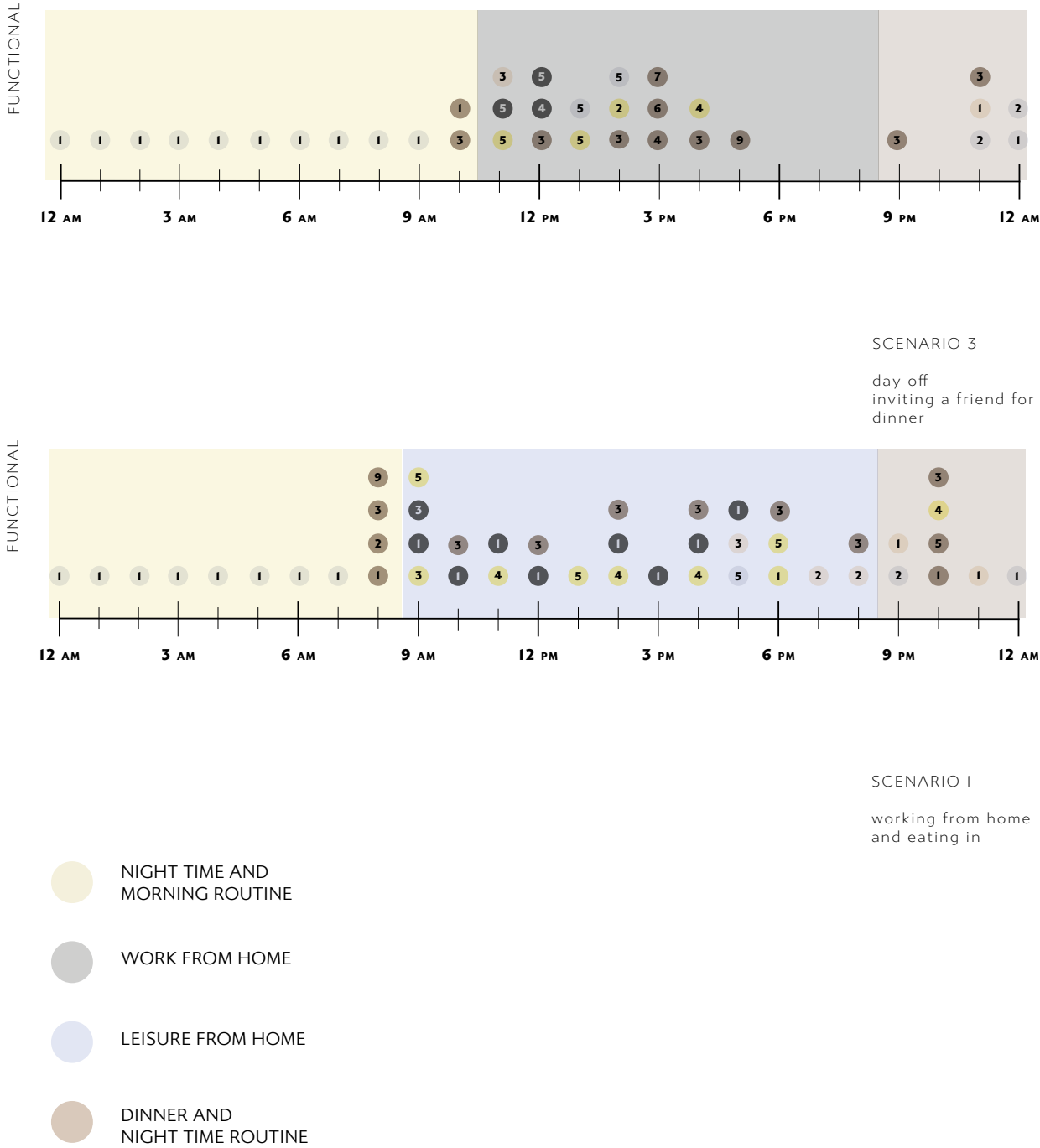
4.4 - plan scenarios

The four timeline scenarios are the following: [1] night time and morning routine, [2] working from home, [3] relaxing and leisure from home and [4] dinner time and night-time routine. In order to move from the theoretical timeline to a more practical architectural translation, it is important to set a laboratory. This laboratory is 30 m², 7.5 x 4 m, with a height of 4 meters. The boundaries have been set, which can be seen in the top diagram in figure I9. The division has been made between closed boundaries, which would be translated into the framing aspect ‘wall’, semi-open boundaries, which would be translated into a window and the temporary openable boundary, which would be the door.

The boundaries have an effect on both the privacy gradient and the light, which can be seen in the bottom two diagrams in figure I9. Based on the information that has been listed in the table (appendix I), and the given laboratory, the four timeline scenarios have been translated into conceptual plans. It is important to note that both the laboratory and the conceptual plans are not set in stone. They are used in order to translate the theory into a more tangible design tool and might be changed later in the project.

Figure 20 shows the four timeline based plan scenarios. Per scenario, the desire types have been listed, together with the corresponding habits. The desires are represented based on the use of habits that belong to that desire. For example, in plan I, the desire resting/relaxing is larger than the food-related desire. This is due to the fact that sleeping, corresponding to the resting desire is done for approximately 7 hours a day. The food-related desire would be used for about one hour in the morning. The plans 2, 3 and 4 show dashed squares. These squares resemble two things based on their location. If the square is located within the

laboratory, this shows that the social desire can be executed within the food-related or leisure desire. If the square is located outside of the laboratory, this resembles the expressive habit that is related to the desire but will not be placed within the functional unit.



Figures I8 - analysis of the habits along the vector ‘use’. The four timelines in figure I6 are analyzed and four ‘combinations’ of habits are concluded. Illustration by author.

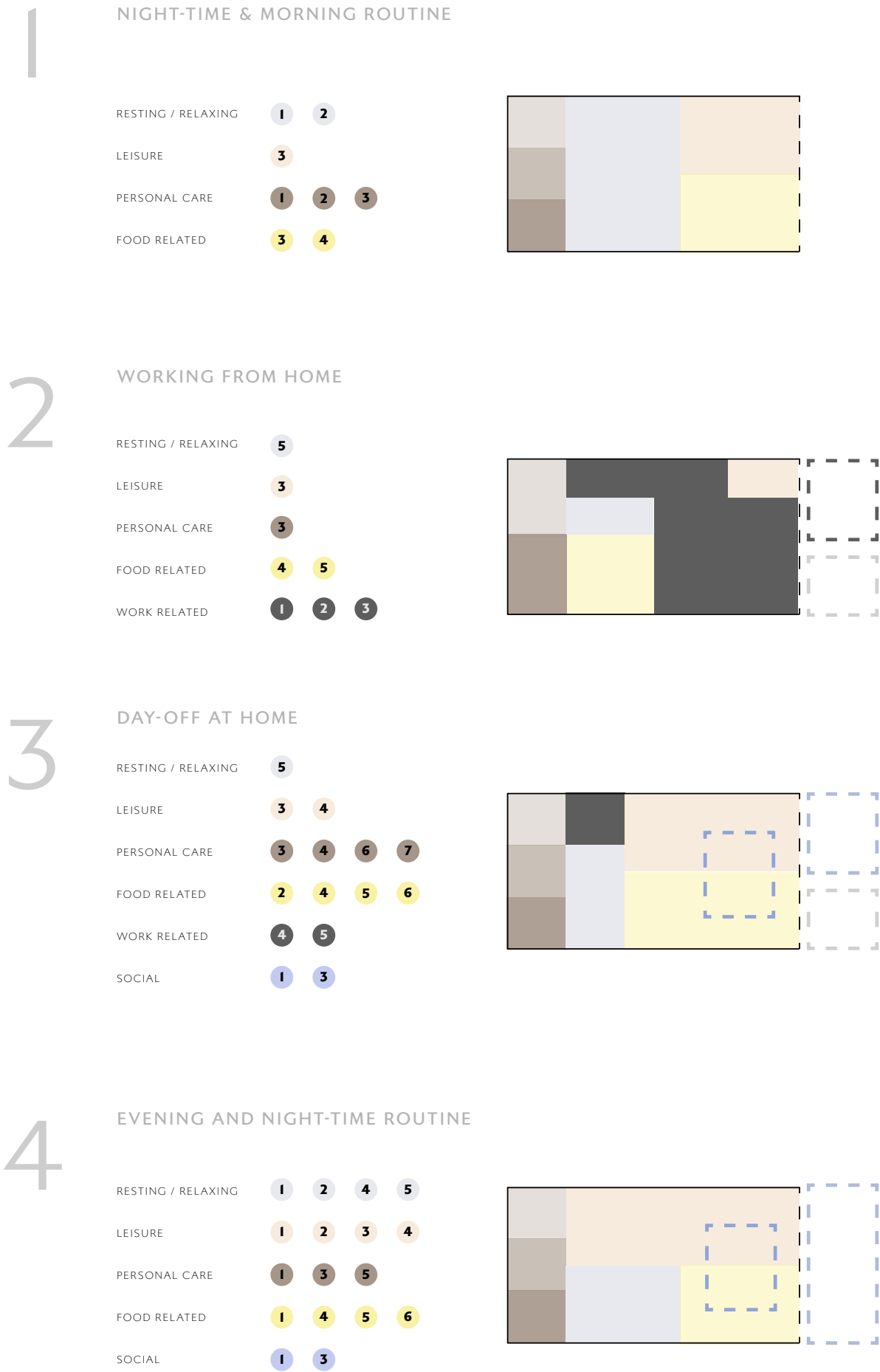
4.5 Conclusion of the habits and habitats

The central question in chapter 4 was: *How can we rearrange the habits and habitats in a way that guarantees the flexibility of the space and allows for personal territory?* The habits and habitats – and therefore the approach to the floorplan – have been rearranged by analysing them based on desire. The initial analysis included the vectors [1] desire, [2] light, [3] privacy, [4] furniture, [5] territorial typology and [6] use, which are displayed in the tables in appendix I.

The habits are colour coded based on the 7 desires that are distinguished: [1] resting and relaxing, [2] leisure, [3] personal care, [4] social, [5] practical, [6] food related and [7] work related. These habits have been placed in the field of force, with four opposite vectors: functionality, expressiveness, individuality, socialness and low privacy, high privacy, daylight, soft light. The third rearrangement is based on the use-vector. Four daily schedules have been listed which are represented in the arrangement of habits over a timeline. These timelines gave insight in the four scenario set-ups that will be designed in more detail in the design phase of this project.

The conclusions are made that the social and food-related expressive habits are not used enough to be provided in a private setting, and therefore will be arranged collectively. Regarding the private housing unit, this will entail the functional habits and the remaining expressive habits. This will be done in four scenarios based on time, the personal care and food-related habits are used in short intervals throughout the day and therefore will be organized in a permanent way.

Figure 20 - the 4 time-based scenarios are translated into conceptual floor plans. Illustration by author.



The division of certain expressive habits from all functional habits results in a different typology of these spaces. The functional habits (plus certain expressive habits that are non-social and non-food-related) will be organized in a private unit. In this chapter I will analyse the habits and desires that will not be placed in the functional unit. The aim of this space is to create a 24-hr use of the expressive functionalities, which one user can use at a time. The central question in this chapter is: *How can we share expressive spaces and live collectively in cities without sacrificing the urban quality of individuality?*

In order to answer this question in this chapter, the following sub-sub-questions will be discussed:

[1] *What functionalities will be designed in a (part-time) collective manner and what is the social gradient per desire?*

[2] *How can we design collective expressive spaces, allowing the theoretical concept of territory and guaranteeing the feeling of personal ownership over this space? Can there be a part-time territory?*

[3] *How can we design the threshold between the functional and expressive spaces?*

5.1 - shared expressiveness

The first paragraph of the 'collective individualism' chapter will focus on the following sub-question: *What functionalities will be designed in a (part-time) collective manner and what is the social gradient per desire?*

The rethinking of minimalism includes designing functionalities that are desired in minimal architecture, but cannot be housed in the private unit. The conclusions from

chapter 3 *defining minimalism* states that there has to be a balance between the number of transformations in minimal architecture - thus the quantity of functionalities - in order to maintain the allowance for personal territory. As the expressive desired spaces are used less, have a low privacy requirement and are often organized in a social setting, these spaces will be designed in a collective manner. However, all habits that will not be organized in the private unit, are not all expressive and social. Practical desires will also be organized in a collective way, due to their low privacy requirement and low usage. In order to determine which spaces are **individual**, **collectively individual** or **collective**, a social gradient will be made per desire. The desires that are considered are: [1] resting and relaxing, [2] leisure, [3] personal care, [4] social, [5] practical, [6] food-related and [7] work-related, and are based on the findings of chapter 4. The desires are listed, followed by the expressive habits that correspond to this desire. A social - privacy gradient is shown with a marked range of socialness or privacy for that specific desire. The desires are arranged in combinations that will be architecturally translated into a collective program. The argumentation for the placement on the social-private scale is stated in appendix II, of which the conclusions are stated below.

The desires have been linked to the expressive habits, which were then placed in the social - private gradient. A common phenomenon is that there is a social setting, which can also require a more intimate flexibility. For example, dining in a restaurant or dining in a dining room. The analysis has led to the following conclusion, answering the sub-question in this paragraph *What functionalities will be designed in a (part-time) collective manner and what is the social gradient per desire?* Within the spatial translation of the expressive desires: leisure, social, food-related and work-related, there needs to be a flexibility in terms of the

number of users, thus allowing for a gradient of a more social or more intimate setting. In order to create a 24 hr architecture, the space will be transformable from desire to desire. The space should be collective but used by one individual at a time, therefore being **collectively individual**. These spaces will from now on be referred to as the 'expressive spaces'. Other desires such as practical, resting, personal care and the more public food-related desire need to be organized in a non-transformational social setting which is **collectively** accessible. These spaces will from now on be referred to as the 'collective spaces'.

5.2 - part time territory

The desires leisure, social, food-related and work-related will be designed in a collective individual manner, as expressive spaces. The second paragraph of the final chapter will focus on the following sub-question: *How can we design common spaces, allowing the theoretical concept of territory and guaranteeing the feeling of personal ownership over this space? Can there be a part-time territory?*

Grosz (2008) considers the emergence of the frame architecture's contribution allowing territorialization of the chaos. She states that without frame or boundary there can be no territory. Deleuze (1987) has expressed the importance of territorialization, that it is a mean to express yourself, to have a style, a signature. There is a territory when milieu components - in this case the architecture is the milieu - become dimensional instead of directional, they go beyond the functional and become expressive. Chapter 4 *habits and habitat* focused on the habits and their division of functionality and expressiveness. The functional habits (plus certain expressive habits that are non-social and non-food-related) will be organized in

a private unit. The expressive and social habits, will be organized in the expressive spaces (collectively individual spaces). The aim is to allow the territorialization of these expressive spaces that are 'cut' from the individual program. Grosz (2008) states that in order to territorialize, architecture has to be designed through framing. As these expressive collective spaces are used by one individual at a time, it is necessary to be able to not only territorialize the space, but also deterritorialize and reterritorialize. Grosz (2008, p.16) states that *'In this process of territorialization, deterritorialization and reterritorialization, the body becomes intimately connected to and informed by the peristaltic movements, systole and diastole, contraction and expansion, of the universe itself.'* In other words, through the process of territorializing, deterritorializing and reterritorializing, one is able to make the space feel like their own, to be able to express themselves and create a territory. However, as the expressive spaces are used collectively individual, and thus is also used by others, this territory has to be temporary.

The process of territorializing, deterritorializing and reterritorializing (from now on referred to as te-de-re) is key in the expressive spaces. One could state that this process of te-de-re could be seen as a part-time territory. But how can this process of te-de-re be translated architecturally? Grosz (2008, p.11) addresses the relation between territory and architecture, through framing. *'The frame is what establishes territory out of the chaos [...]. The frame is thus the first construction, the corners, of the plane of composition. With no frame or boundary there can be no territory, without territory there may be objects or things but not qualities that can become expressive, that can intensify and transform living bodies.'* Grosz states that for her, the territorialization of the habitat itself is the concept of framing. She considers the emergence of the 'frame', the contribution of architecture allowing territorialization

of the uncontrollable forces of the earth. In other words, architecture consists of the concept of framing and creating boundaries, and it is these boundaries that allow for territorialization. As framing creates boundaries and boundaries allow for territorialization, deframing could be seen as letting go of these boundaries and thus allowing for deterritorialization. Figure 21 shows a diagrammatic presentation of a territory. The three characteristics that make a territory are the point of stability, the cycle of property and the line of flight. The cycle of property and line of flight can vary based on the territorial typology, resulting in a less stable territory or an intensification of the point of stability.

As the functional and expressive space are identical in size, the line of flight remains the same. The cycle of property differs, as the functional unit has a higher privacy, thus more allowance for personal property and decorations. The expressive space has a smaller cycle of property as it has a lower privacy, more users and thus less allowance for personal property. This results in a less stable expressive space and an intensification of the point of stability of the functional space. Figure 22 shows the movement between the expressive and functional space, analysing the te-de-re process. It shows that in the dashed frame the deterritorialization occurs, from functional to expressive and vice versa. The transition between the two territories is the movement from the one space to the other. In this movement the deterritorialization occurs. In order to allow this deterritorialization, deframing can be used as a design tool to break with the framed boundaries within the territories. By creating a transition zone to allow deterritorialization, a 'threshold' between the territories should be designed. This conclusion results in the sub-question of the third paragraph: *How can we design the threshold between the functional and expressive spaces?*

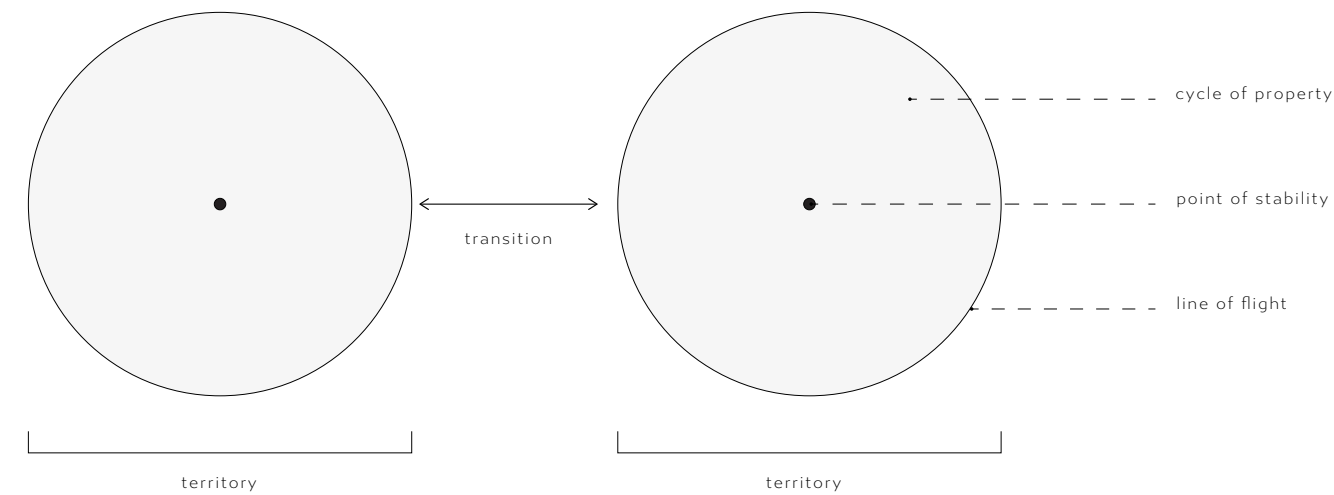


Figure 21 - diagram of the territory and transition between territories. Illustration by author.

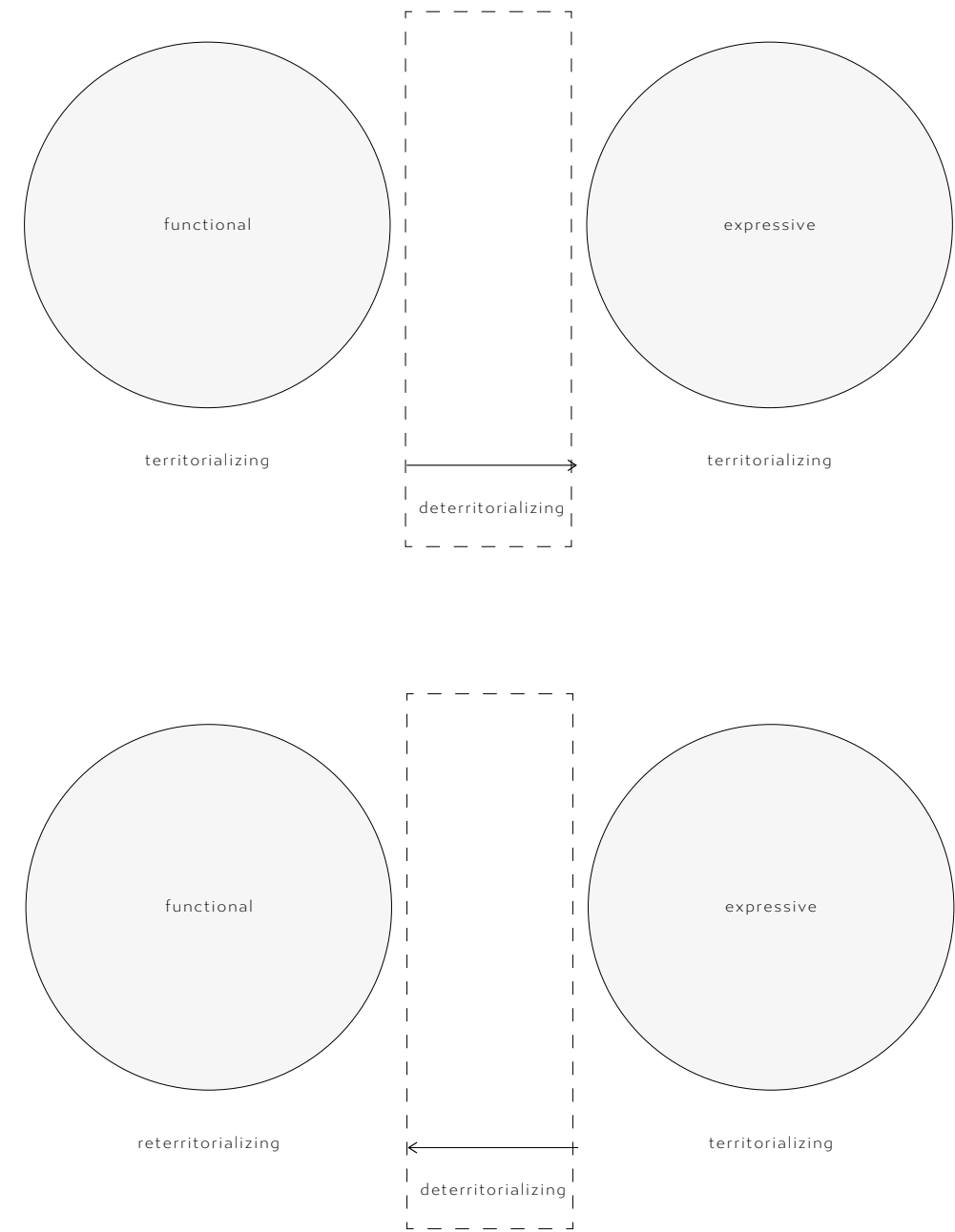


Figure 22 - diagram of the te-de-re proces between the functional and the expressive. Illustration by author.

5.3 - The threshold

Deterritorialization occurs in the movement from one territory to another, by deframing and therefore letting go of the boundaries. The previous paragraph shows that this deterritorialization should be architecturally translated into a threshold. *How can we design the threshold between the functional and expressive spaces?* is the question that arises, and will be central in the final paragraph.

The diagram in figure 23 shows the transition from a functional space to a collective/ expressive space, on a gradient from social to private. The first diagram shows a scenario that is placed on the most social side of the spectrum. The corridor is the threshold, thus the transition from functional to expressive is considered long. The bottom diagram is placed on the most private side of the spectrum. Both the functional and the expressive space are privately owned and therefore the transition is short. The threshold could be a door, a short hallway or an interior division of the space. The middle diagram reflects the 'rethinking minimalism' project, where the aim is to create expressive spaces that have the feeling of personal ownership while being shared collectively to create a 24-hr-architecture. When designing the threshold, the duration of the transition, thus movement, has to be taken into account.

Grosz (2008) discusses the concept of framing, but also touches on the concept of deframing. Letting go of the boundaries and therefore allowing chaos over order in order to allow the reterritorialization of the next space. When designing the threshold, several vectors will have to be taken into account. The duration of the transition, which has to be short enough to avoid falling into the social side of the spectrum, as shown in figure 23. Also the form, composition and material are important, as it can form a contrast with the functional and expressive

space and therefore function as deframing. Transparency and light are the last vectors that will be taken into account.

The question *How can we design the threshold between the functional and expressive spaces?* will be central during the design process of the 'Rethinking Minimalism' project.

5.4 - Conclusion of collective individuality

The central question in this chapter was: *How can we share expressive spaces and live collectively in cities without sacrificing the urban quality of individuality?* First, a division has been made between the collective and collective individual (expressive) spaces. Certain habits will be organized collectively due to their low privacy requirements and high social value. Other habits will be organized in the expressive spaces.

The aim is to allow for territory in these expressive spaces, but as they are used collectively individual, the question of part-time territory arises. In order to allow for a personal territory and therefore allow the territorialization of that space in a temporary manner, the te-de-re process was analysed. The territorialization and reterritorialization takes place in the functional and expressive spaces, but the deterritorialization takes place in the transition between them. That movement, that threshold, embodies the concept of deframing, letting go of the boundaries of the frame in order to deterritorialize the space and allow territorialization or reterritorialize in the functional and expressive space. This threshold will be analysed in the design process. Important vectors will be the duration of the transition, the form and composition of the threshold, the materialization and the transparency / translucency.

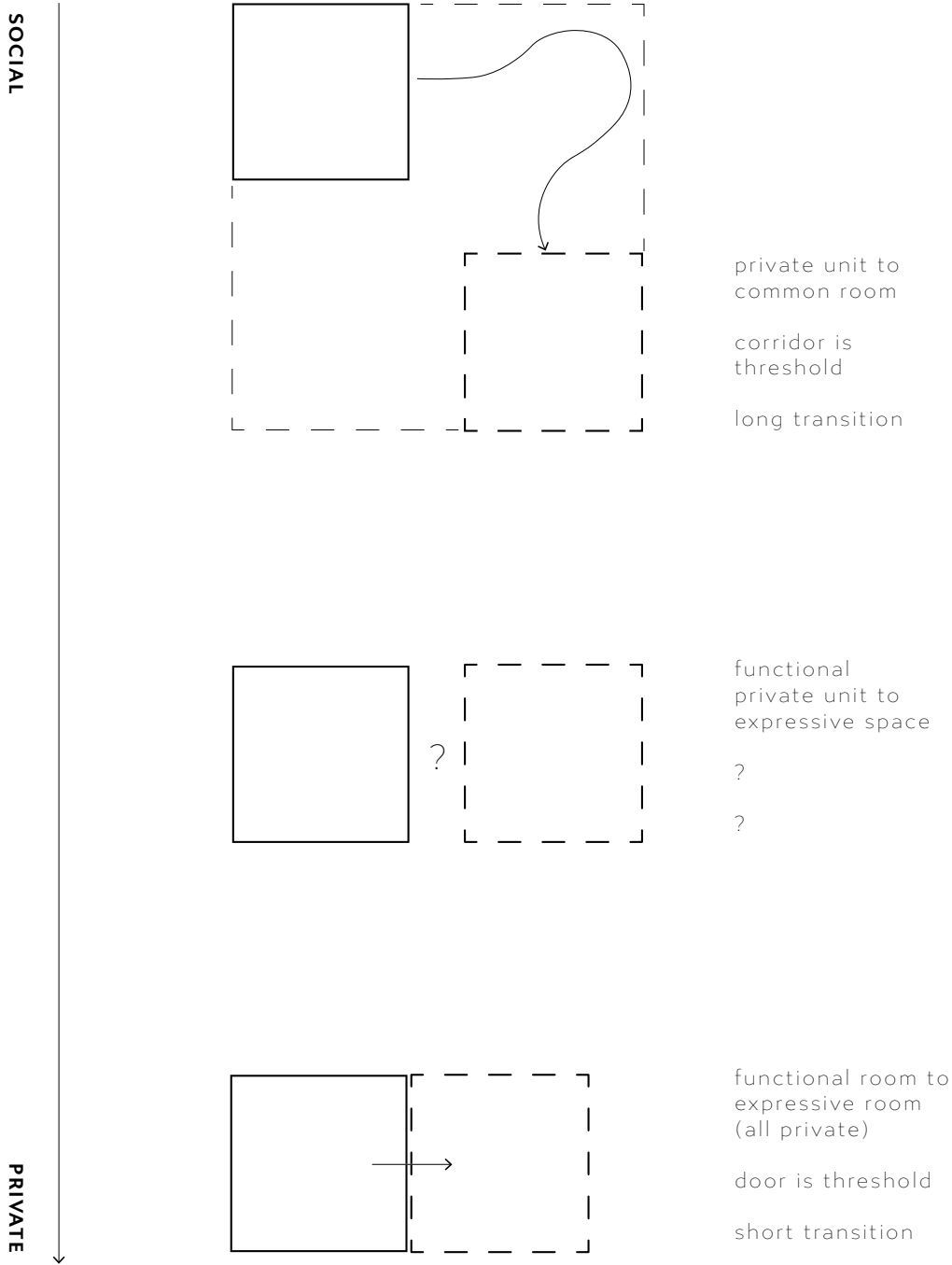


Figure 23 - a social - private gradient with transitions and thresholds between the functional space and the expressive space. Illustration by author.

Urban living is the future. Globally, the majority of people live in urban areas rather than rural areas. Due to mass-urbanization and population growth, we need to explore more ways of expansion in metropolitan areas. As horizontal and vertical expansions have been exhausted, inwards expansion is explored in this paper. The hypothesis of this research paper is *Urban housing will be minimal in terms of size*. Resulting in the research question: *How can we optimize minimal housing on both the architectural and urban scale in the future scenario of high density living due to mass-urbanization?*

The aim of the project is to develop a new way of urban living, by intertwining research and design. Creating housing in a high density with a fundamentally different approach to the program and layout. The goal is to rethink minimalism, in order to implement it in the future scenario of high density living. The research structure was based on three sub-questions, which have been addressed in the chapters 3 *defining minimalism*, 4 *habits and habitat* and 5 *collective individualism*. The final chapter of this paper *towards design*, functions as a brief summary of this paper and connection to the design.

6.1 - defining minimalism

Chapter 3, *defining minimalism* focused on the sub-question: *Which spatial quantities or qualities are desired and not present in current minimal architecture?* Two case studies in Manhattan are analyzed based on the theory of Deleuze, McLuhan and Cache, from a quantitative and qualitative perspective. It is interesting to see that there is a relation between the strictness of the scripting of scenarios and the allowance for personal territorialization. The more program is desired, the more transformations are required. Program is linked to habitats, which is linked to a transformation. In order

to support that transformation, furniture is needed. One case study houses 8 transformations, resulting in two walls being used for furniture. The design has a high flexibility in terms of program, but a low allowance for personal territory. The second case study houses 3 transformations, resulting in one furniture-wall only. This results in a low flexibility in terms of program but a high allowance for personal territory.

The observation was made that, the more flexibility is designed in a quantitative way, the less flexibility is allowed in terms of the qualitative desire of personal territory. Both the spatial quantity of program - thus a high amount of transformations - and the spatial quality of the allowance for personal territory is desired. In order to house both in a minimal design, there has to be a balance between the number of transformations and the personal territory.

6.2 - habits and habitat

Chapter 4, *habits and habitat* focused on the sub-question: *How can we rearrange the habits and habitats in a way that guarantees the flexibility of the space and allows for personal territory?* The previous chapter concluded in the need for a balance between the number of transformations and the personal territory. Ideally the number of transformations would be minimized, while still allowing the desired program. As the transformations have been linked to the habitats, the habits and habitats - and therefore the approach to the floorplan - have been rearranged by analyzing them based on desire.

The initial analysis included the vectors [1] *desire*, [2] *light*, [3] *privacy*, [4] *furniture*, [5] *territorial typology* and [6] *use*. The habits are colour coded based on the 7 desires that became clear: [1] *resting and relaxing*, [2] *leisure*, [3] *personal care*, [4] *social*, [5]

practical, [6] *food related* and [7] *work related*. Based on the vectors use, functionality, expressiveness, individuality, socialness and low privacy, high privacy, daylight and soft light, four scenario set-ups were constructed, which will be leading in the design phase of this project. The observation is made that the social and food-related expressive habits are not used enough to be provided in a private setting, and therefore will be arranged collectively. The private housing unit will entail all the functional habits and the remaining expressive habits.

6.3 - collective individualism

Chapter 5, *collective individualism* focused on the sub-question: *How can we share expressive spaces and live collectively in cities without sacrificing the urban quality of individuality?* Certain habits will be organized collectively due to their low privacy requirements and high social value. Other habits will be organized in the expressive spaces. The aim is to allow for territory in these expressive spaces, but as they are used collectively individual, the question of part-time territory arises. In order to allow for a personal territory and therefore allow the territorialization of that space in a temporary manner, the te-de-re process (**t**erritorialization, **d**eterritorialization, **r**eterritorialization) was analyzed. The territorialization and reterritorialization takes place in the functional and expressive spaces, but the deterritorialization takes place in the transition between them. That movement, that threshold, embodies the concept of deframing, letting go of the boundaries of the frame in order to deterritorialize the space and allow territorialization or reterritorialize in the functional and expressive space. This threshold will be analyzed in the design process. Important vectors will be the duration of the transition, the form and composition of the threshold,

the materialization and the transparency / translucency.

6.4 - towards design

The research question in this paper is: *How can we optimize minimal housing on both the architectural and urban scale in the future scenario of high density living due to mass-urbanization?*

The observations made in the research into minimalism, habits and habitat and collective individualism generate a framework that will be the starting point of the design. The design focusses on the following relations: the public space and the collective space, the collective space and the private space, the private space and the expressive space, but most importantly, the transition between them.

In this paper I am not aiming at answering the research question, as there is no absolute solution to the addressed problem. Every design is localized and temporalized and perhaps most influentially, defined by its context. The aim of this paper is to address the problem of mass-urbanization in relation to minimalism and to literally rethink minimalism as an architectural tool to generate this higher urban density. The topic will be further problematized in the design phase, which will be adapting and adopting aspects and conclusions that were made in the research phase.

The paper will end with a reflection on the design. In the given context of Manhattan, the design will be addressing the research question, allowing for more questions to emerge. The topic of minimalism and urbanization will remain a fascination that requires further exploration and therefore this final paragraph should be interpreted as the last words on the opening of the problem, not a conclusion.

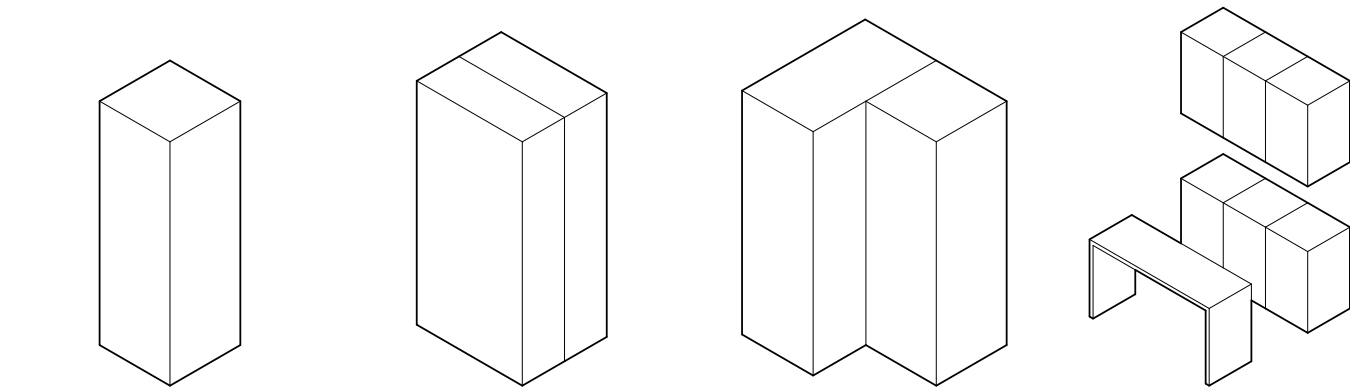
Nº I THE **APARTMENT**

The research breaks the link between habits and habitats. The habits are reevaluated and placed in two spectrums with the vectors functionality, expressiveness, individuality, socialness and low privacy, high privacy, daylight and soft light. This resulted in four scenarios. Four conceptual and theoretic plans. Instead of designing transformations as rooms, the transformations have been designed based on the timeline of the user. A night-time and morning set-up, a work from home scenario, a leisure scenario and an evening set-up.

In order to design the minimal apartment, a toolbox is created. The furniture for every scenario is listed and the absolute minimum dimensions are defined. The furniture will transform the space from one scenario to the other. In minimal architecture transformable furniture is referred to as furnitecture. *Furnitecture is everything that is larger than furniture and smaller than architecture, and is used as a transformational tool in minimal architecture.*

The case studies in the research show three furnitecture typologies: the floor, wall and ceiling. This design will feature the ceiling typology, with a minor addition of the wall typology.

The following pages will show the four scenarios in plan, the ceiling design, an exploded axonometric and the transformation of the space.



ENTRANCE

1000 x 1000 mm

CLOSET

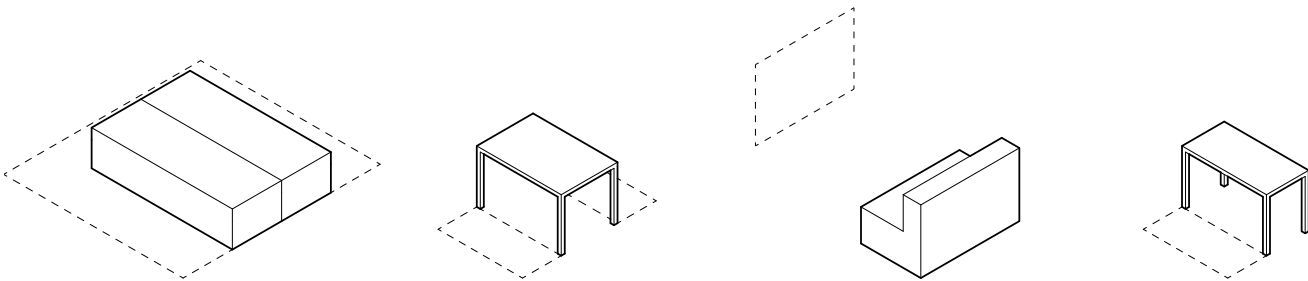
1500 x 600 mm (x2)

BATHROOM

1000 x 1750 mm
1000 x 1000 mm

KITCHEN

600 x 600 mm (x3)
600 x 1700 mm



BED

2000 x 1400 mm

TABLE

1200 x 800 mm

COUCH

1400 x 850 mm

DESK

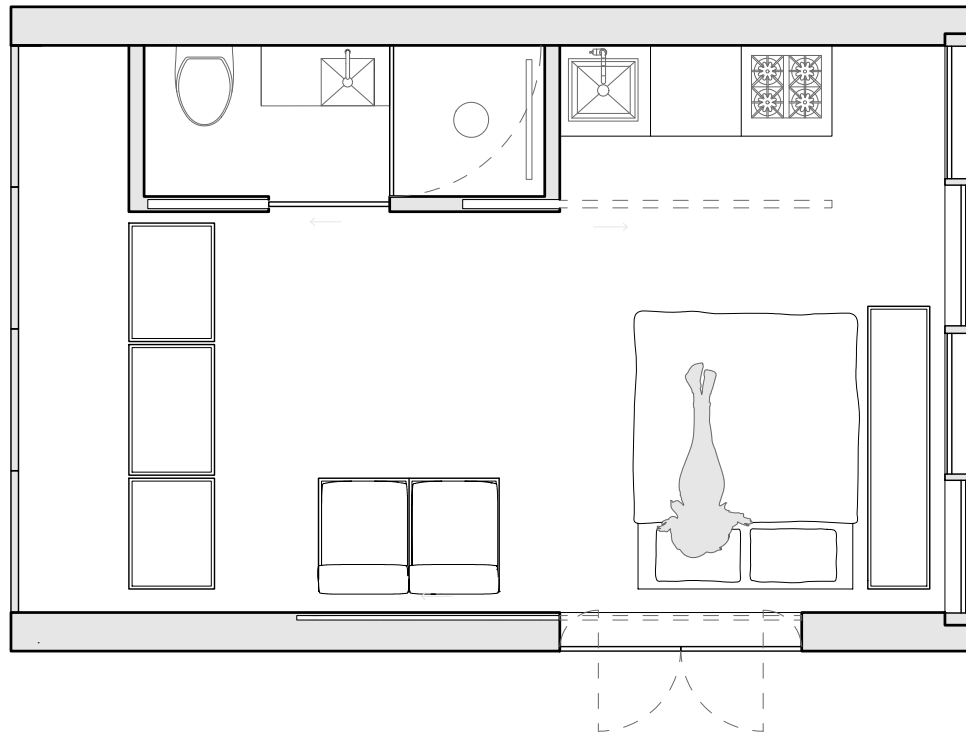
600 x 1200 mm



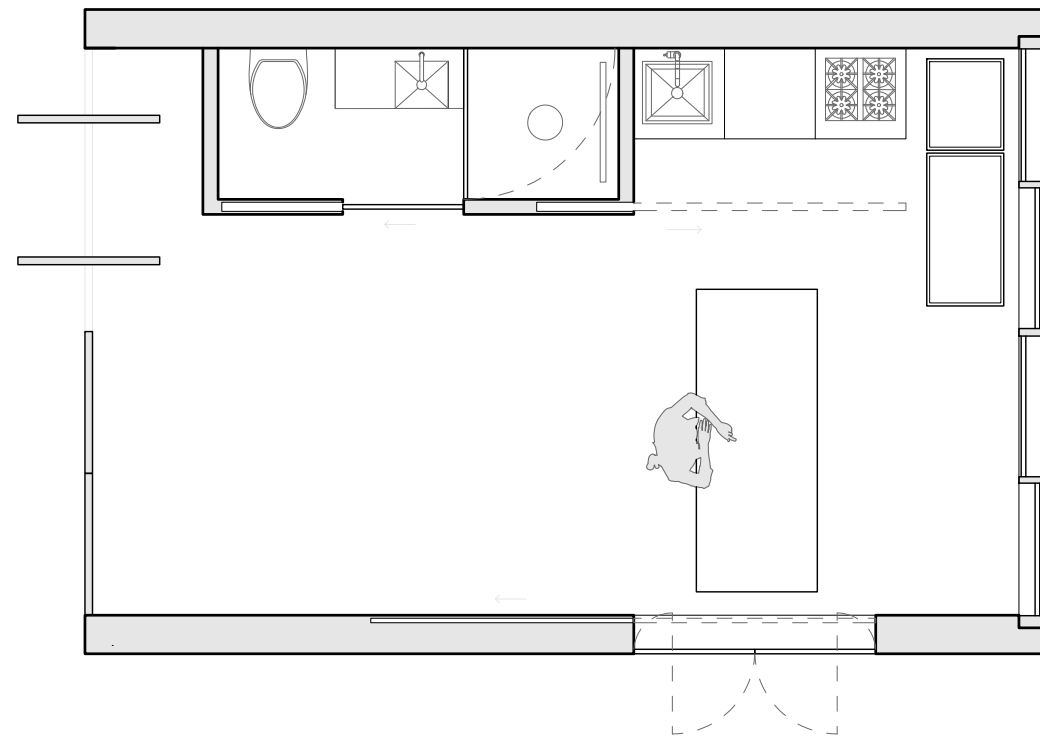
WALL FURNITECTURE



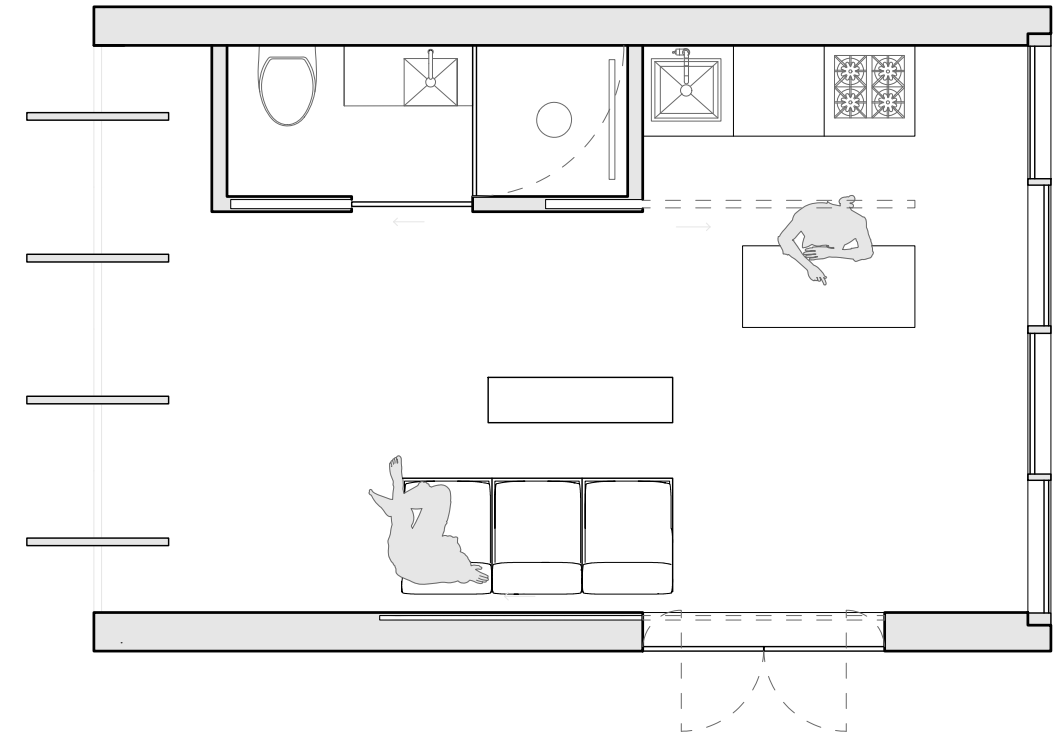
CEILING FURNITECTURE



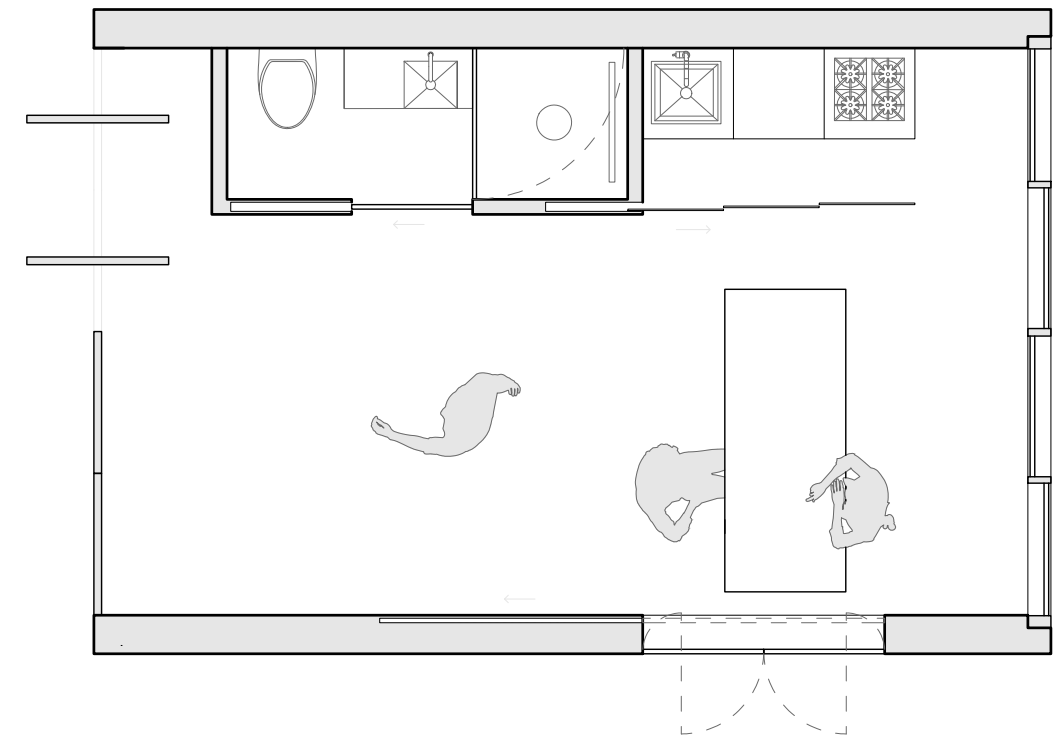
1. night-time / morning



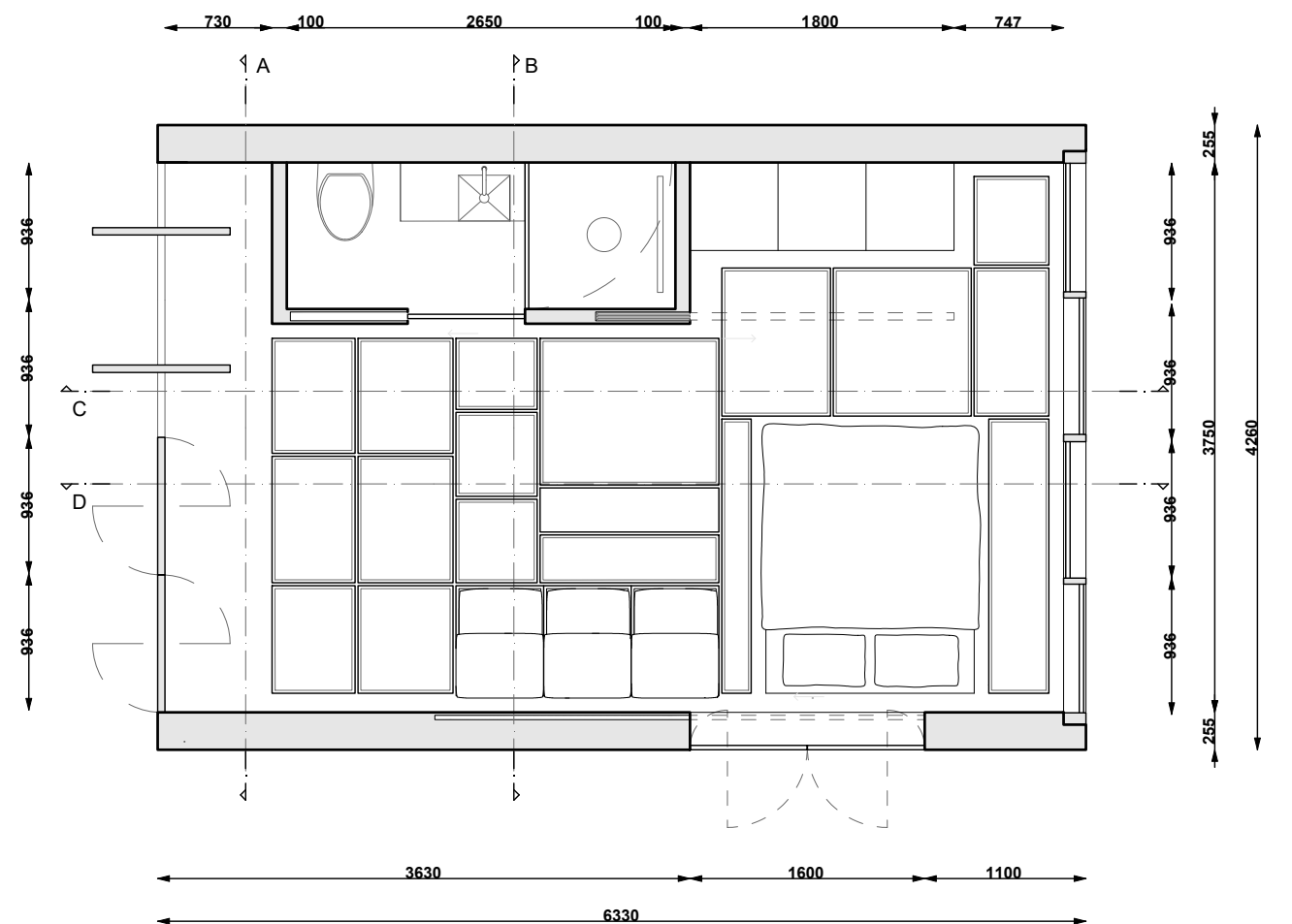
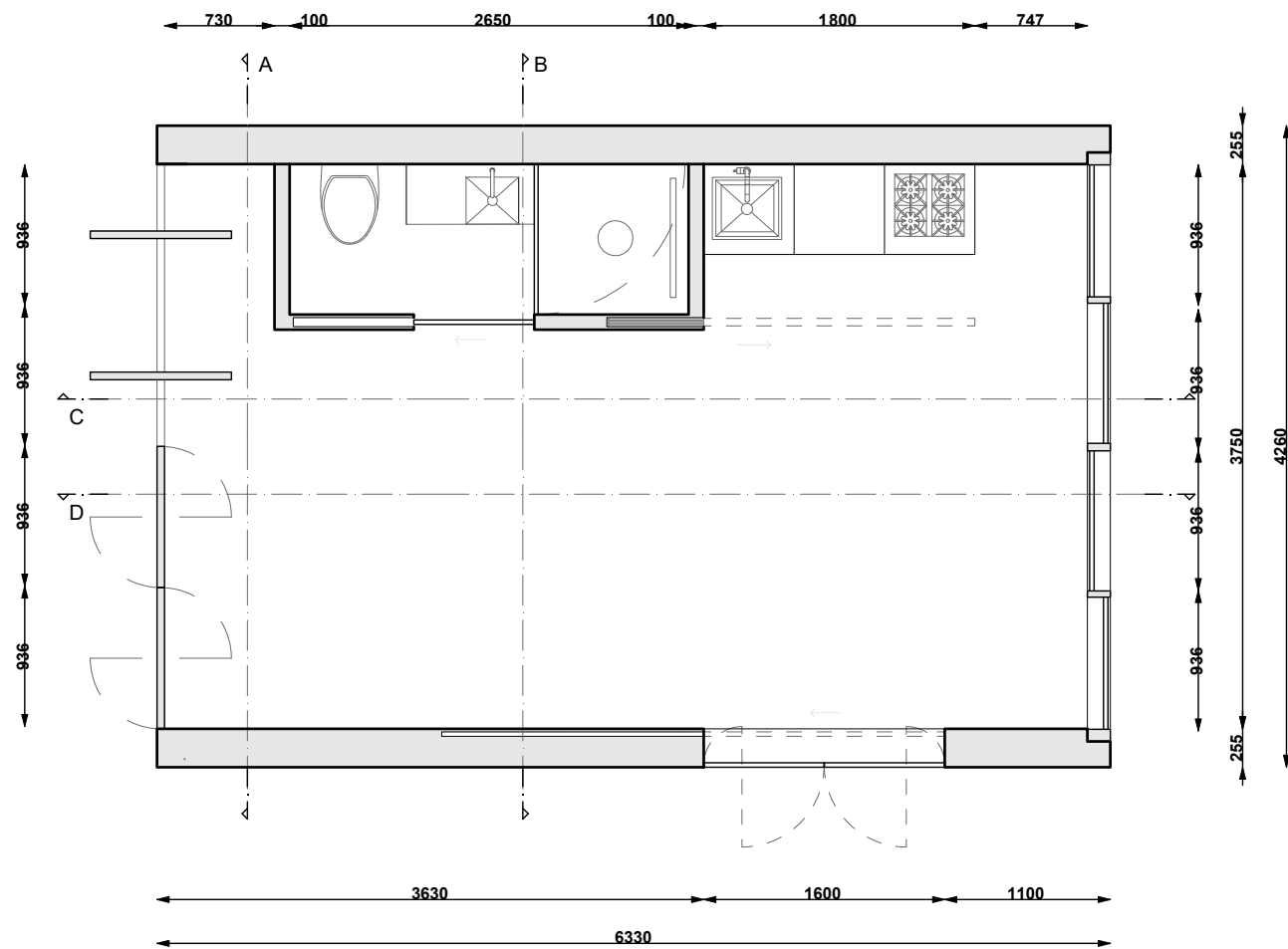
2. working from home



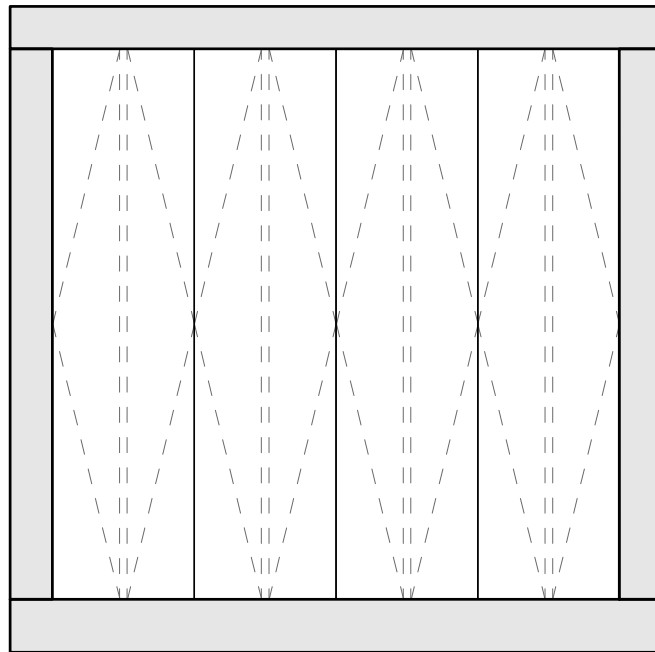
3. leisure



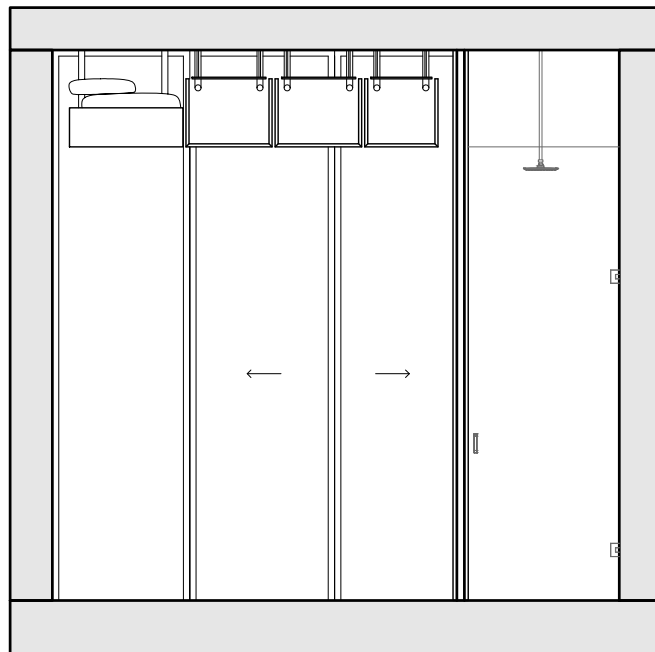
4. evening



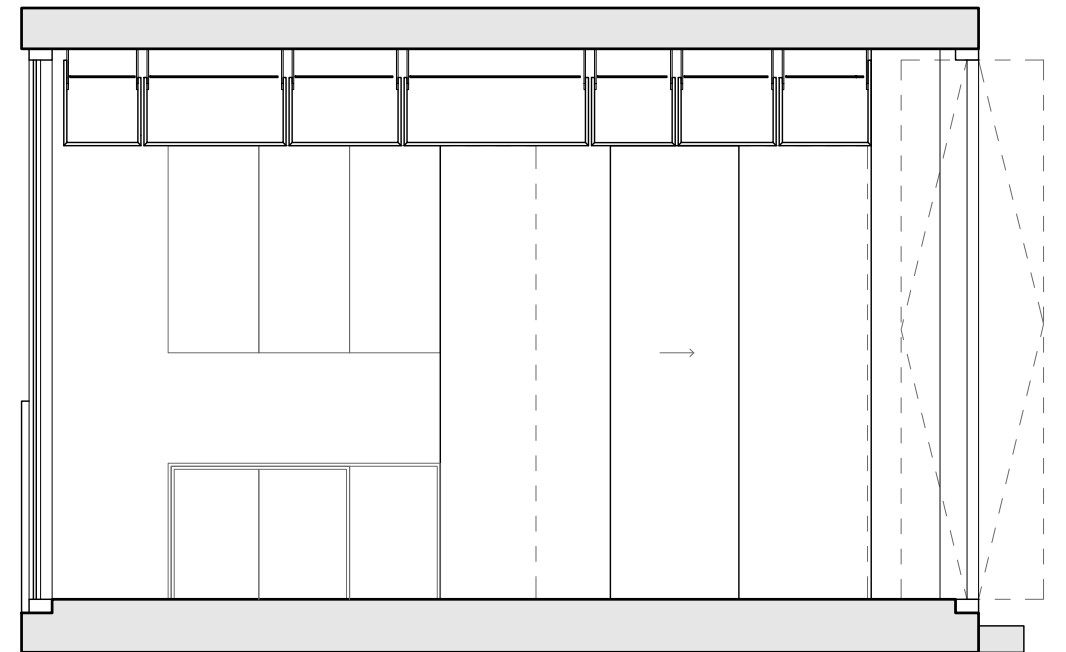
plan and ceiling design
scale 1 : 50



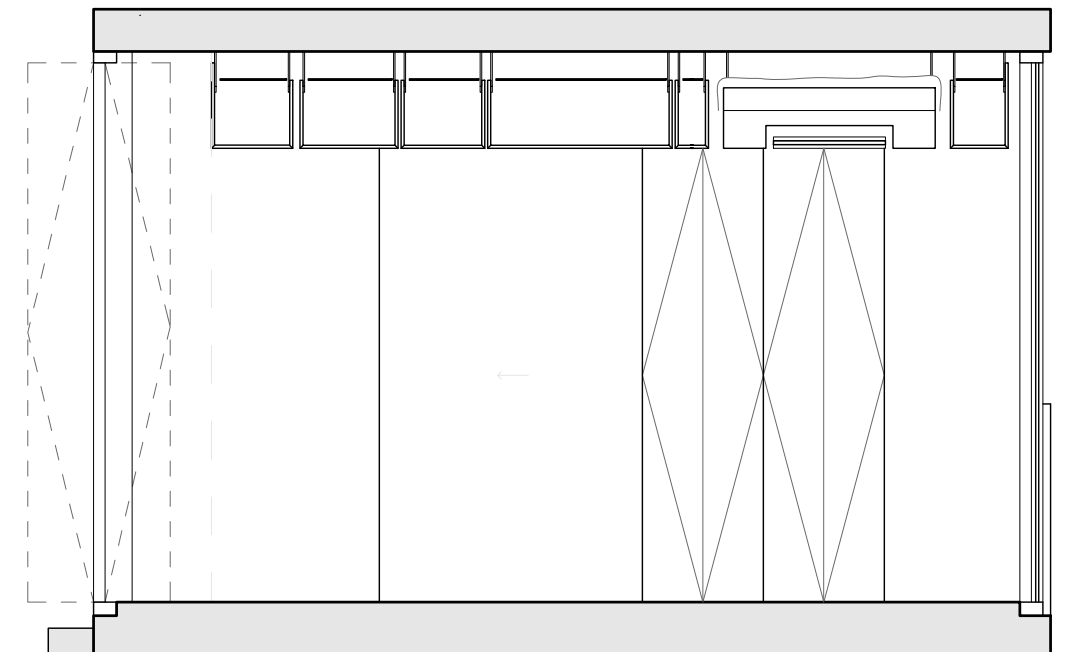
section A



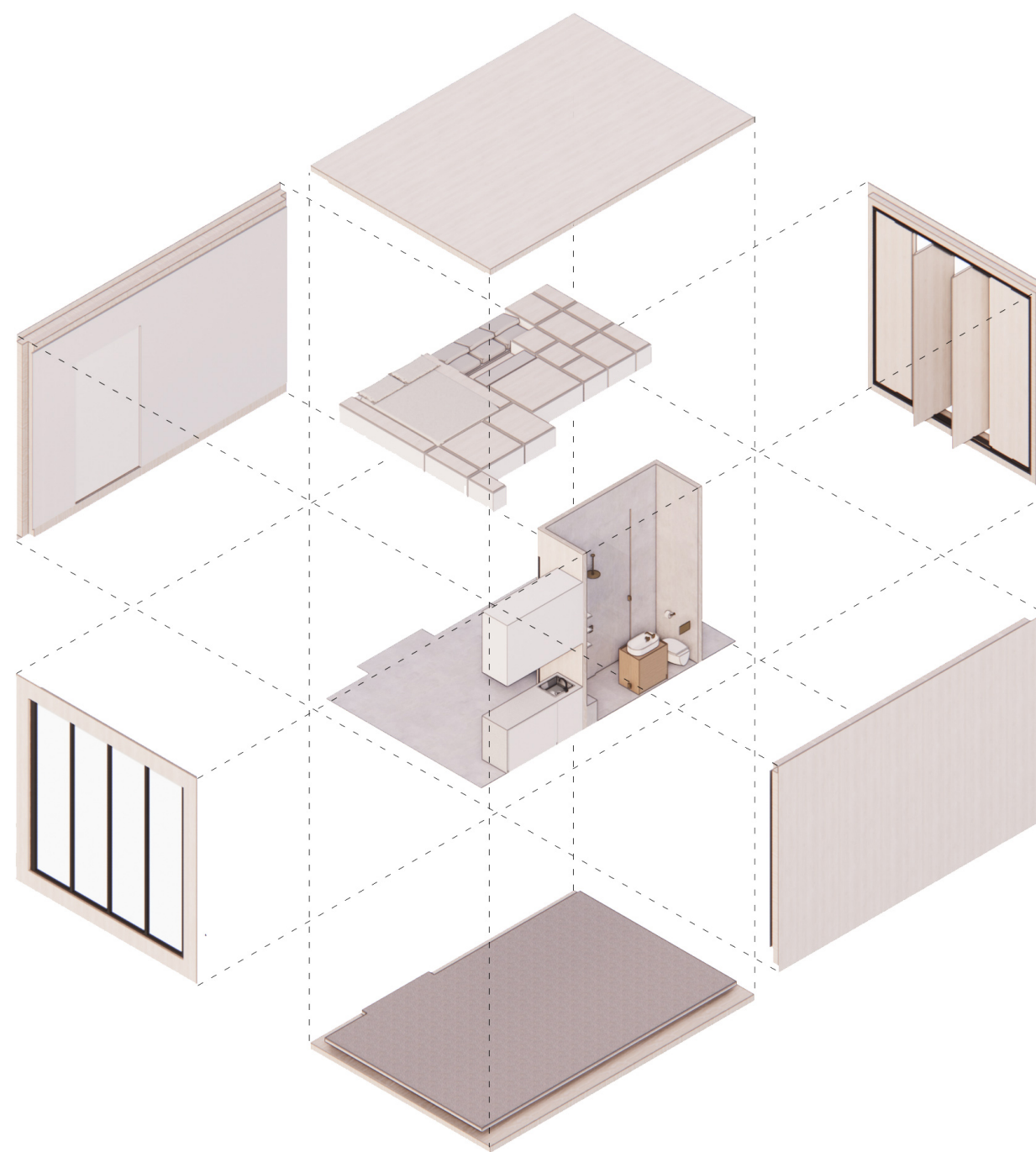
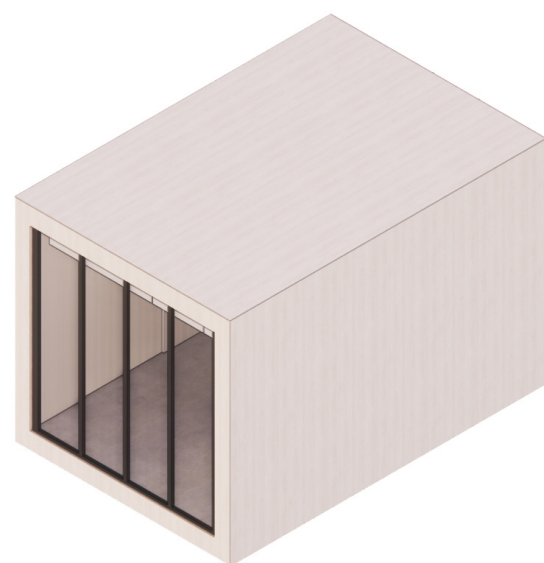
section B



section C



section D



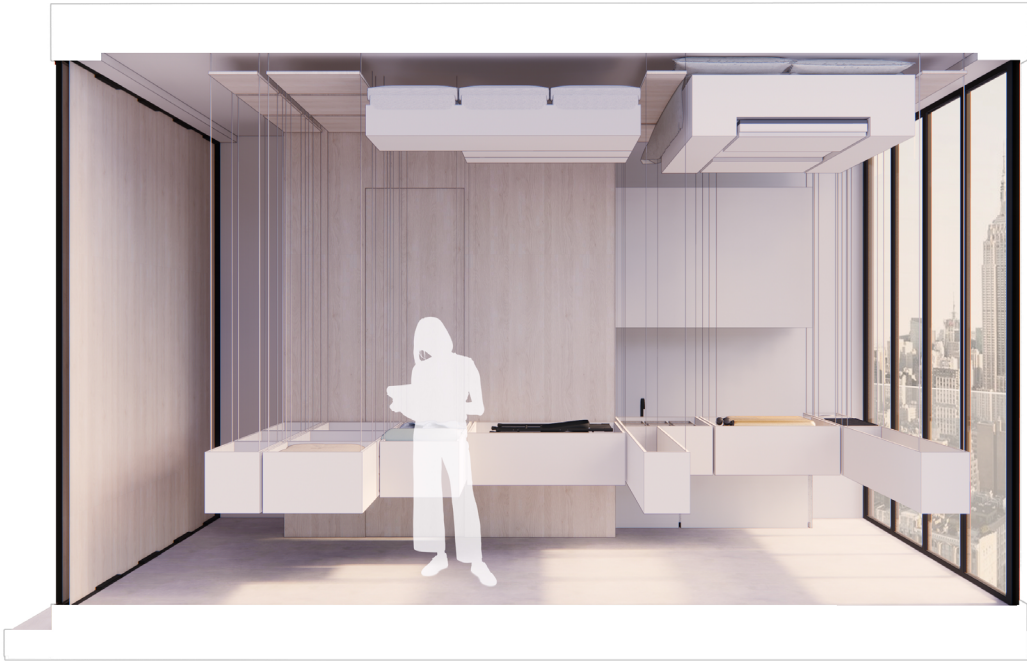
The top image on the right page shows scenario zero. The apartment is built up from several elements, a minimized bathroom and kitchen, the furniture ceiling and two openings. The glass sliding doors on the city side, four timber pivot doors on the atrium side.

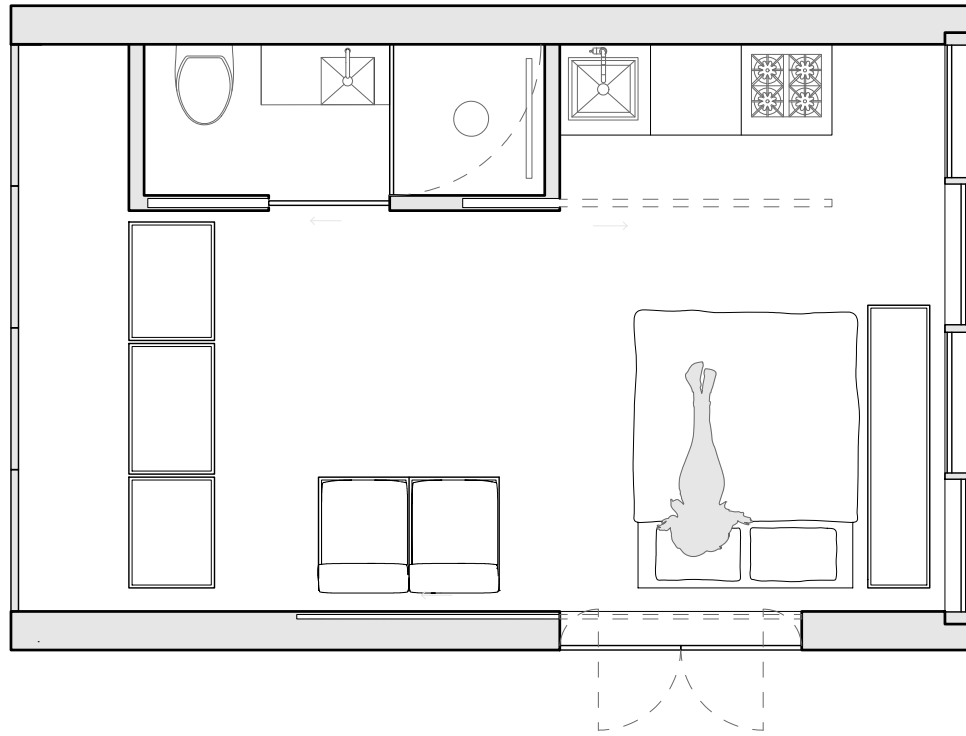
From a minimalist perspective, a simple entrance door is too one dimensional. In minimal architecture everything should serve at least two purposes. Therefore the pivot doors are designed as a tool to allow a social gradient. If two panels are opened, it serves as an entrance to the apartment. When all panels are opened, there is a strong inside-outside relationship with the atrium and invites social interaction. Only one open panel ensures a connection with the atrium but limits the sightline.

The sliding glass doors allow for an 'indoor balcony' and amazing views over the city of New York. The steel shutters in front of it can be used for sun shading or privacy.

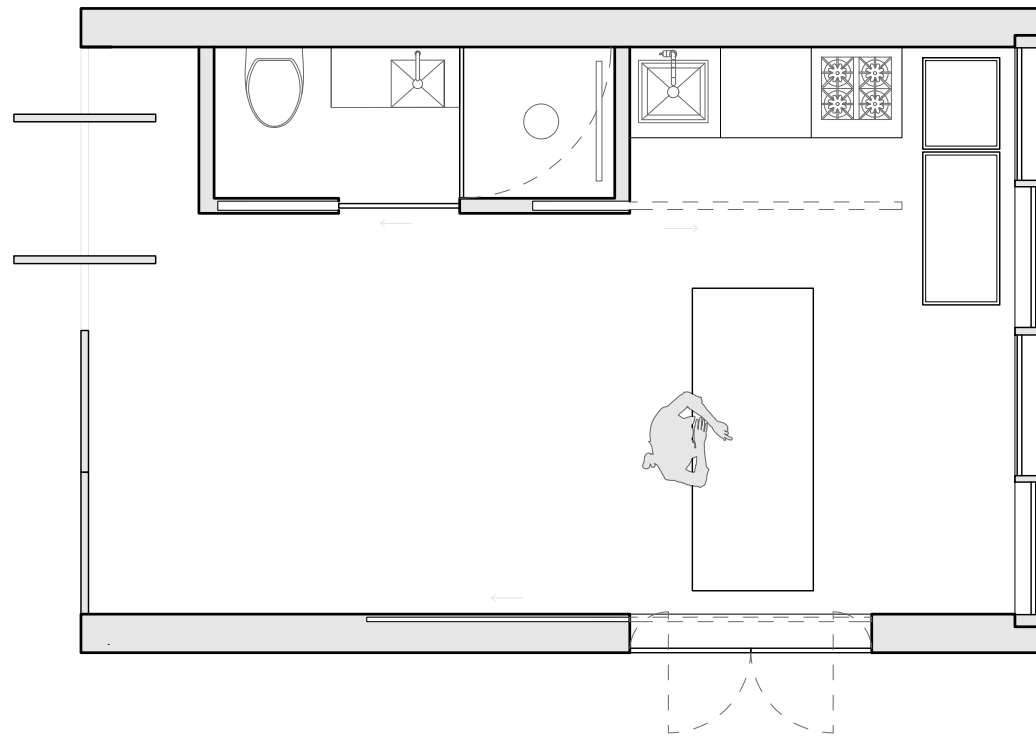
When living on a 22-square-meter surface, there is no room for clutter. Therefore the storage spaces within the unit are important. Around the furniture in the ceiling, several storage containers are designed, based on the dimensions of specific items. For example, the large container in the center of the space, fits exactly four foldable chairs. The container near the window, that can be lowered in the *work from home* scenario, is based on the width of office folders. Another container exactly fits a carry-on suitcase.

The following pages will show the transformation of the space, based on the four scenarios.



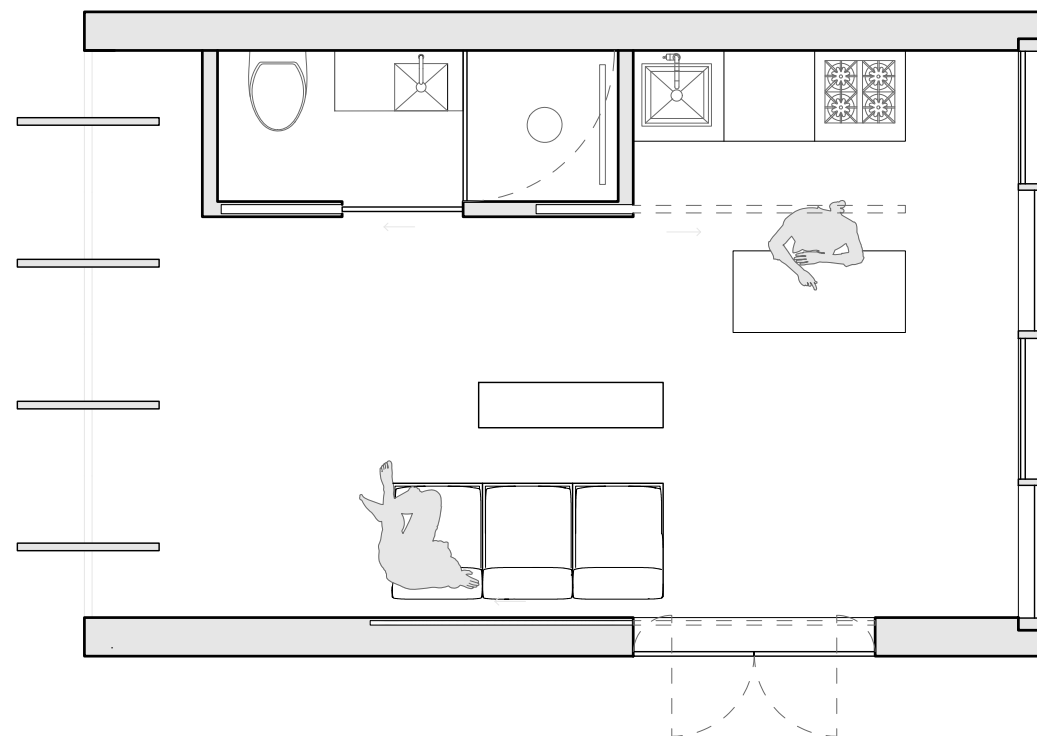


1. night-time / morning

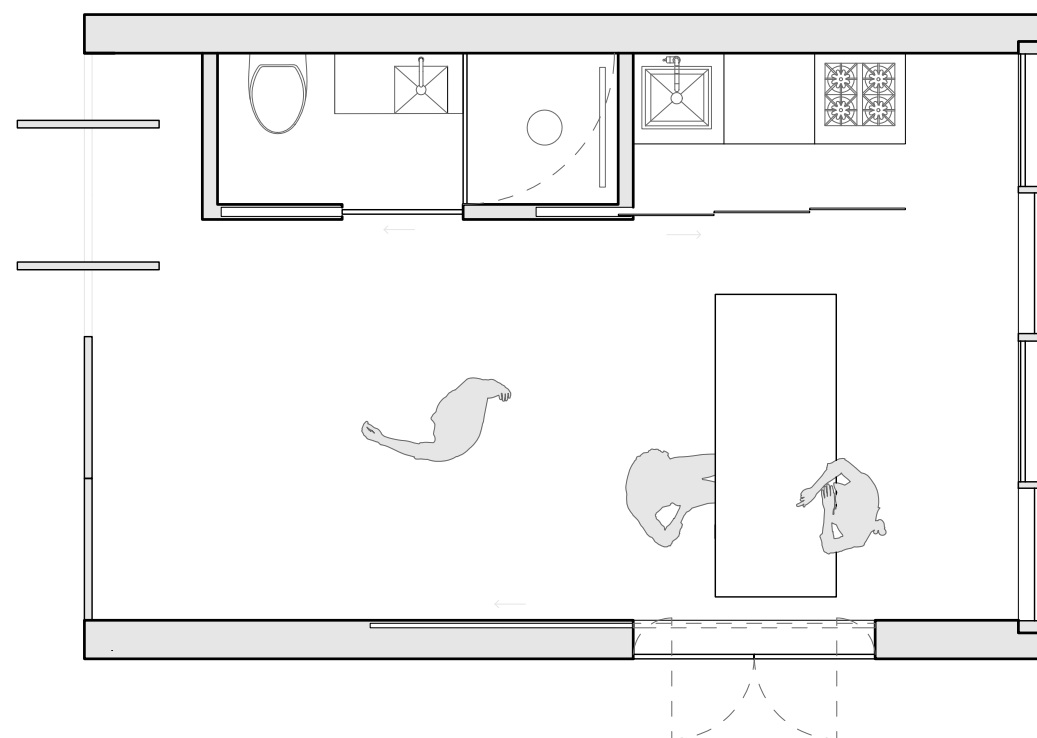


2. working from home





3. leisure



4. evening



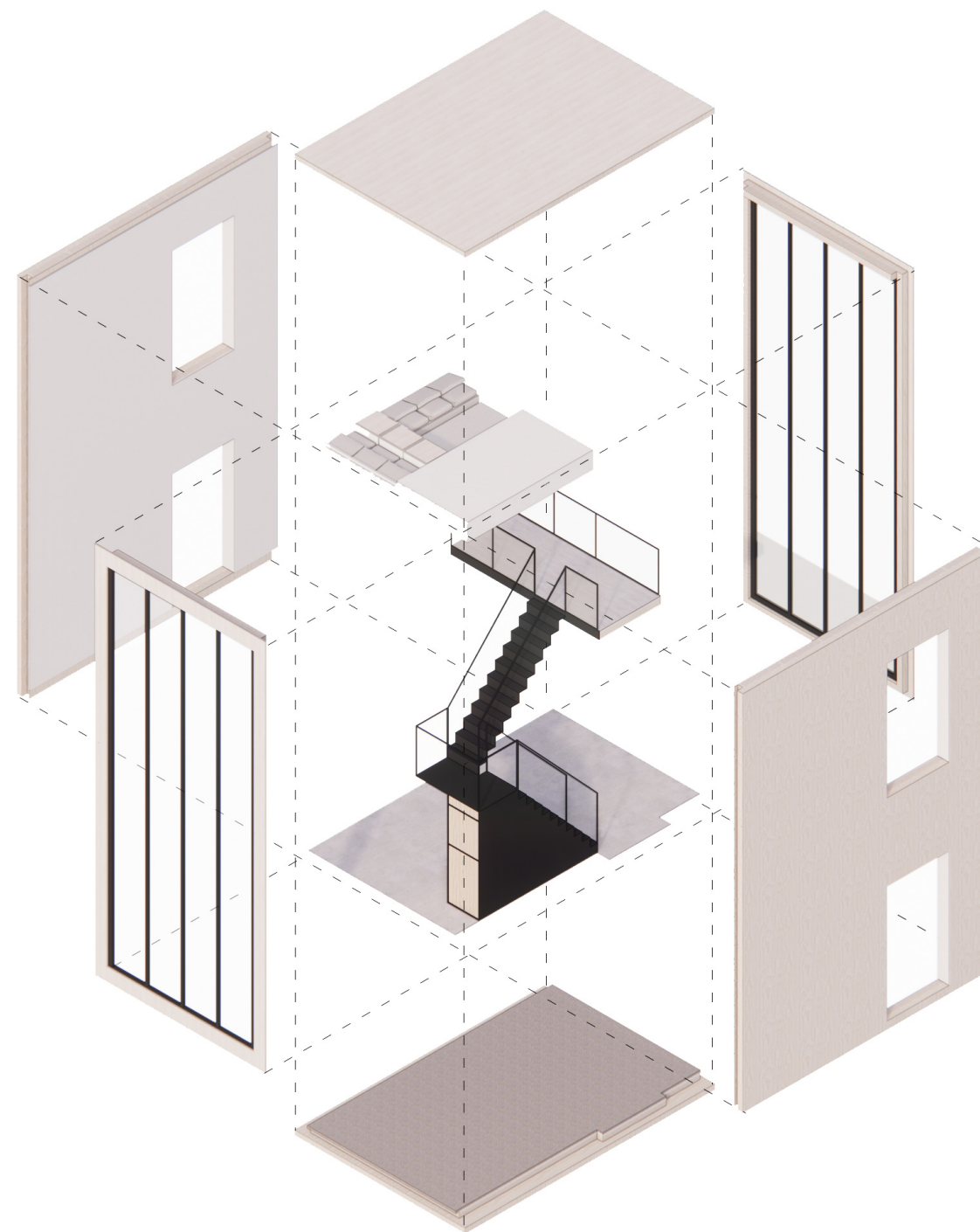
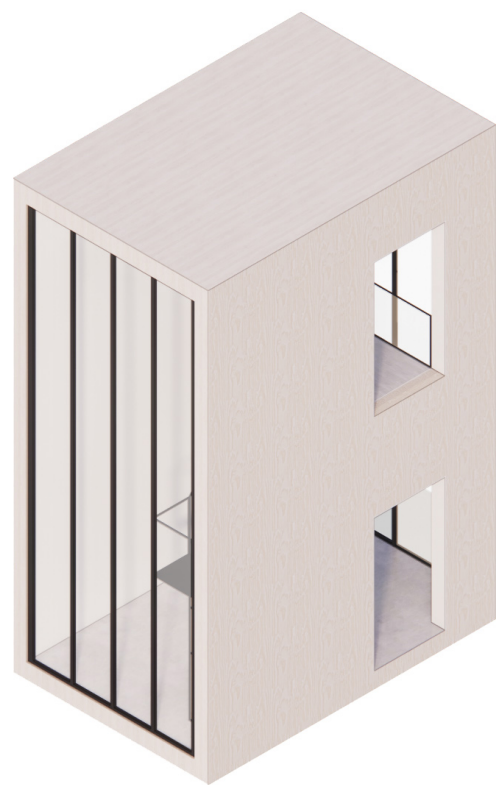
N° 2 THE **EXPRESSIVE** SPACES

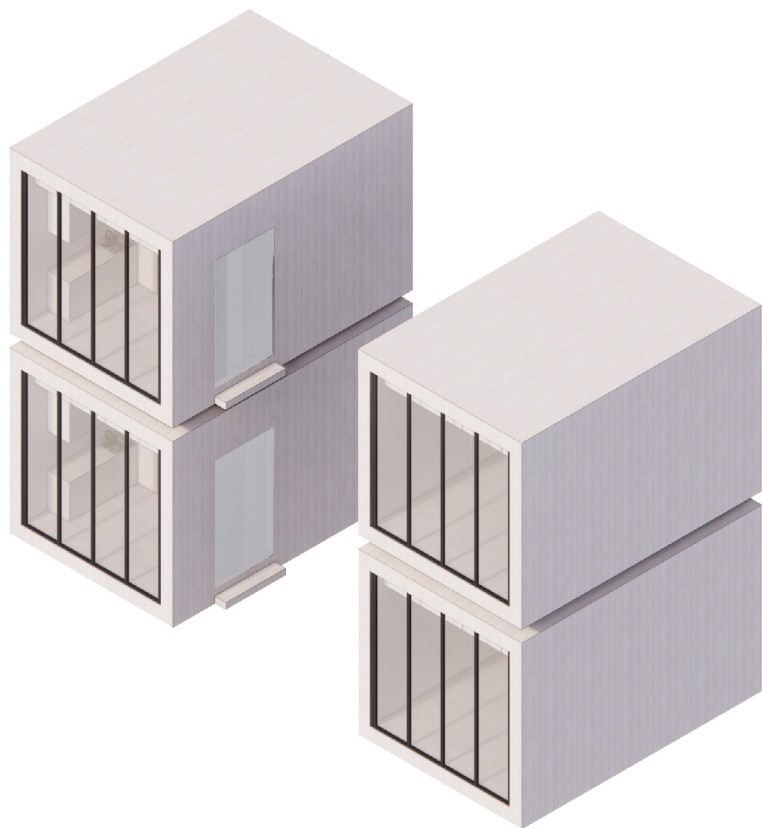
The expressive spaces are designed in addition to the functional apartment. The expressive space houses the expressive habits, that have a high social value, low privacy requirement and low use. Based on these values, the expressive habits are designed in a collective way. These spaces are used collectively, but by one user at a time. It feels like an extension of the living space.

The dimensions of the expressive space are identical to the apartment, but with a double height. The ceiling design includes two couches and a dining table, the steel stairs house the foldable chairs and expressive decorations that the users can store there.

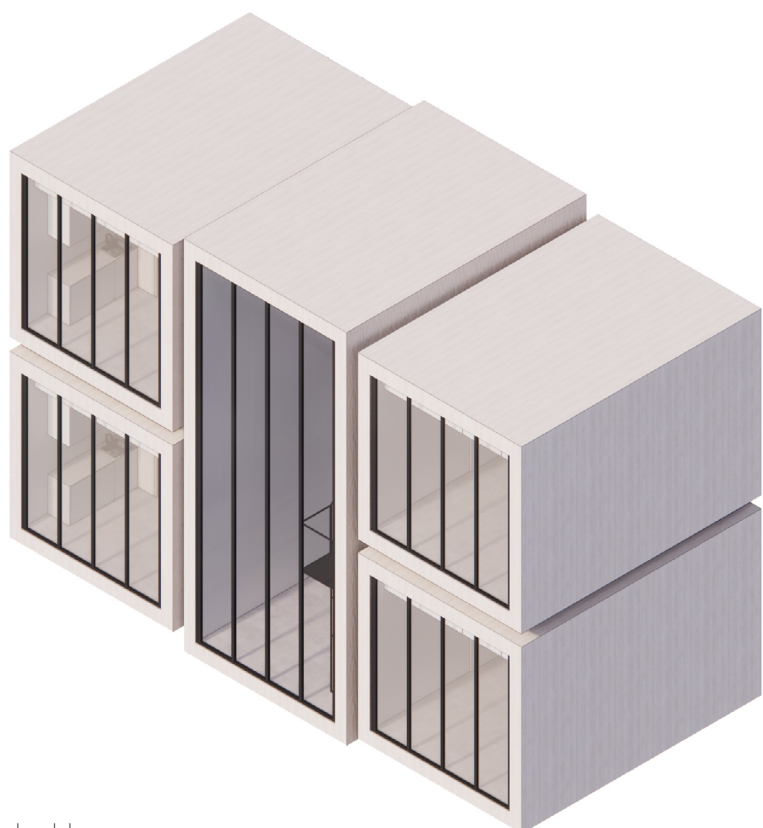
The research paper states that through the process of territorializing, deterritorializing and reterritorializing, one is able to make the space feel like their own, to be able to express themselves and create a territory. As this territory is part-time, and in order to territorialize the expressive space and reterritorialize the functional apartment, it is key to allow for a transition zone where the deterritorialization takes place.

This transition zone is designed on the border of the two spaces. The deterritorialization is guided by light and translucent materials that allow for a distortion of this light. The transition is designed in the form of two glass pivot doors, on the edge of the functional apartment. The pivot doors are off-center, to allow the doors to cover the entire depth of the transition space. Through light and shading a different atmosphere is created where the deterritorialization can take place.

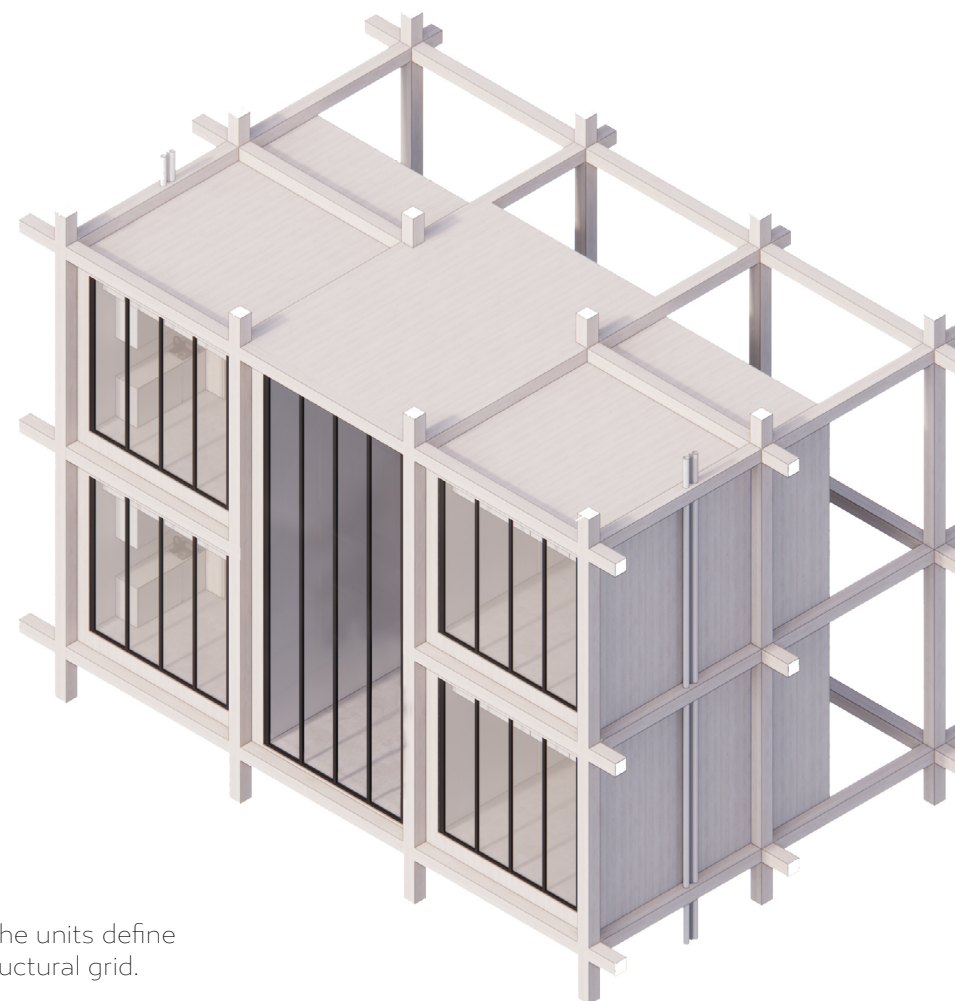




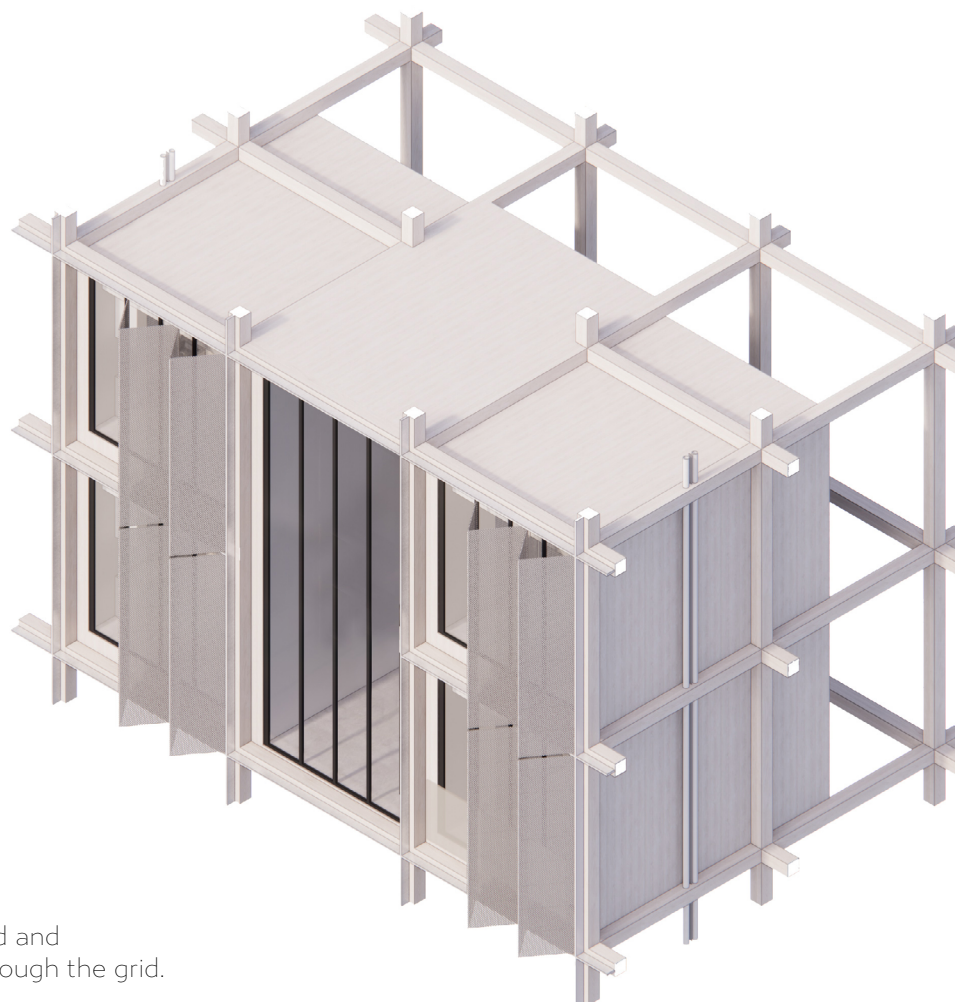
4 apartments are placed.



per four apartments, one double height expressive space is placed in the middle.



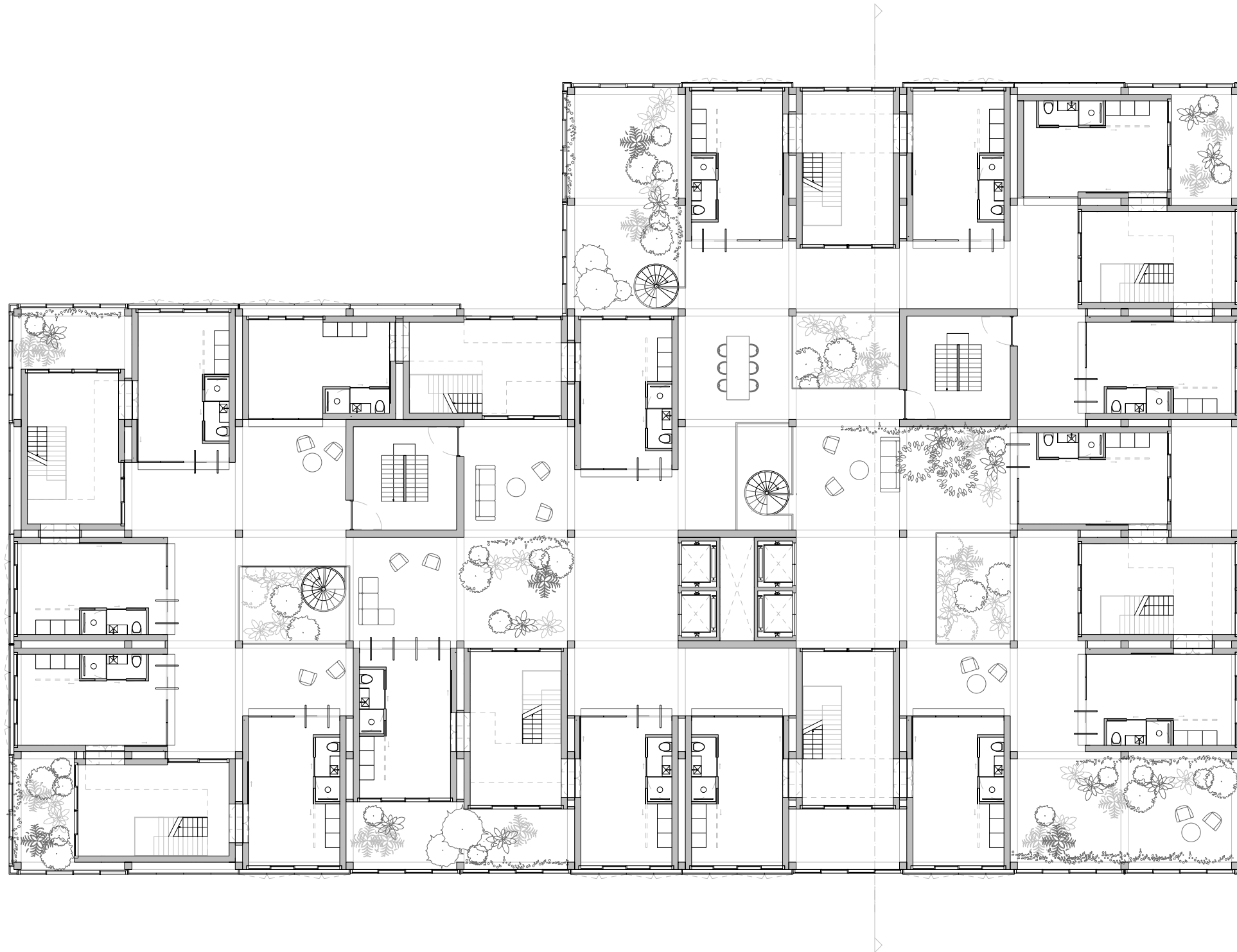
the dimensions of the units define the surrounding structural grid.



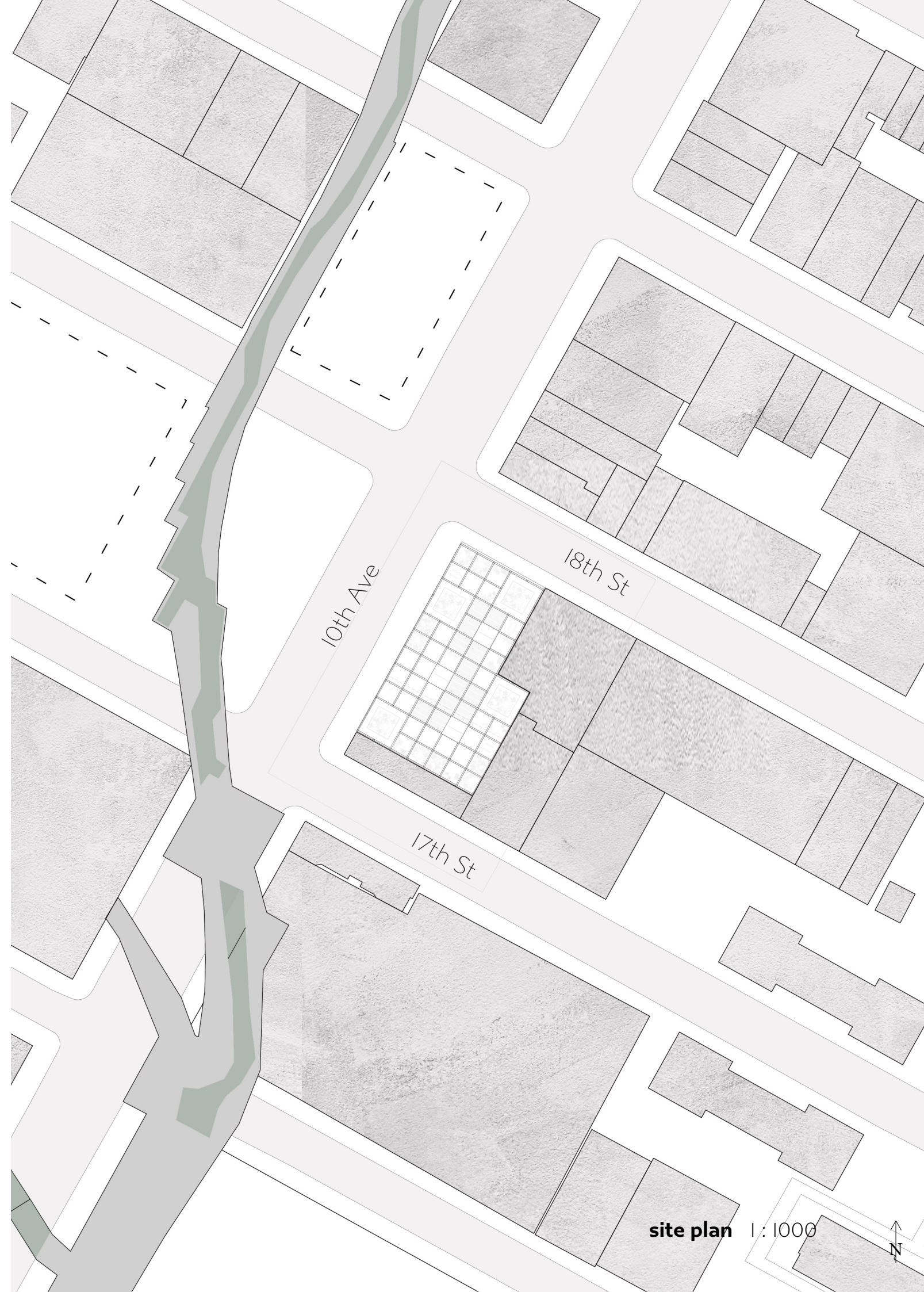
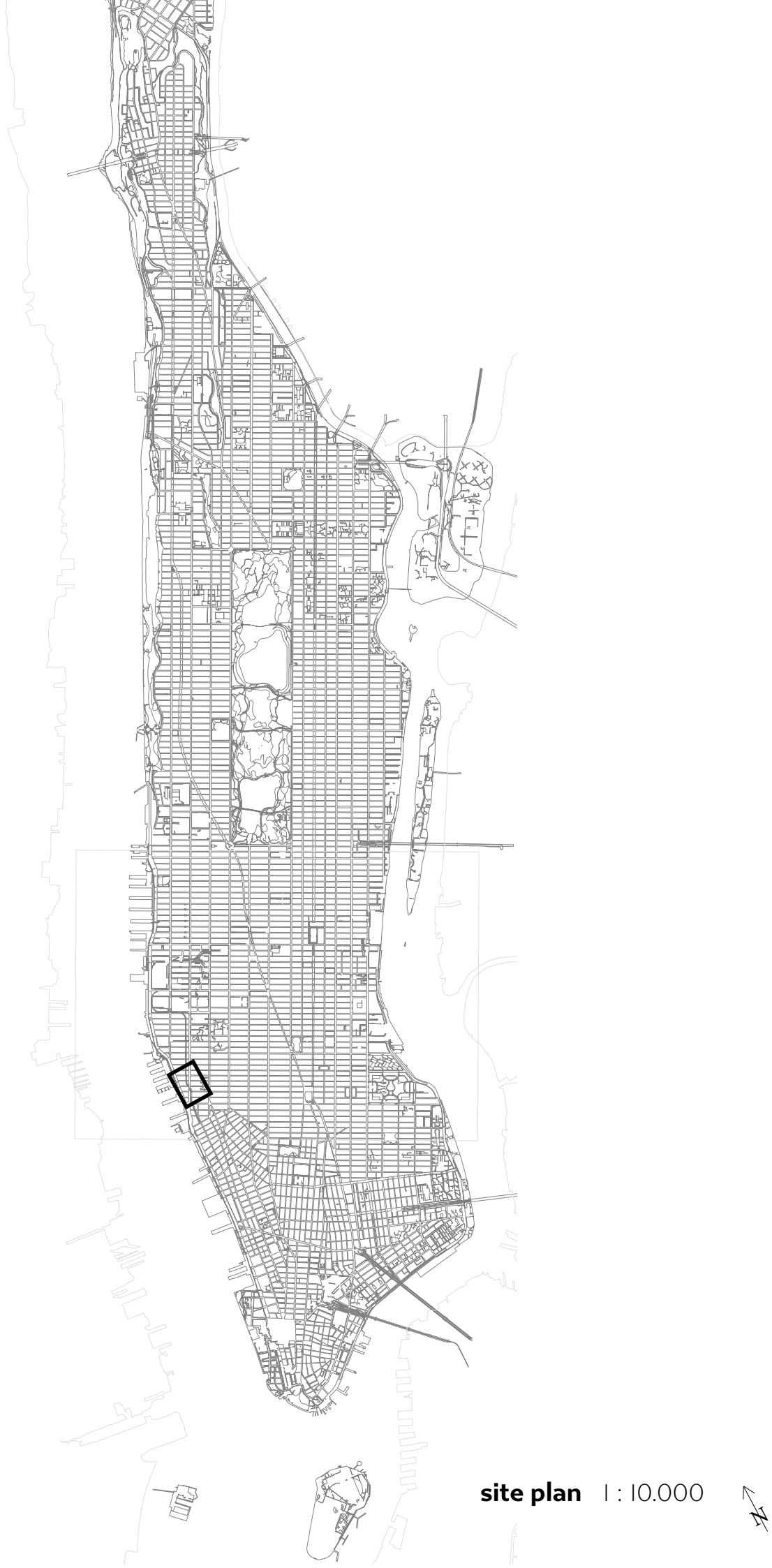
the façade is placed and installations run through the grid.







N° 3 THE **COLLECTIVE** ATRIUM

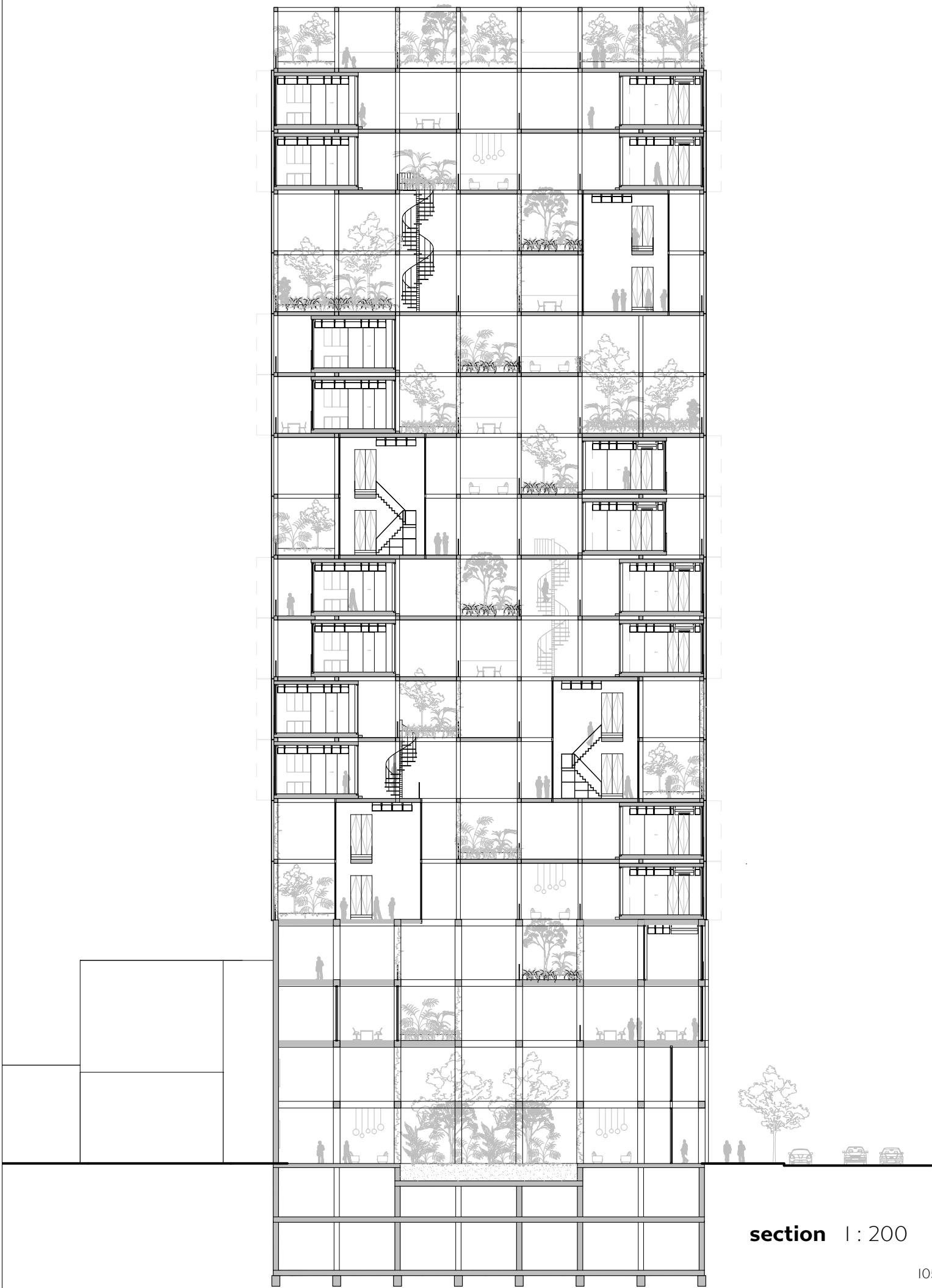


The apartment and expressive space are designed globally and based on the theory. Now it is time to contextualize. As previously stated, Manhattan is in need of expansion. The site that was chosen for this project is located in the artistic and mix-use neighbourhood Chelsea. The plot is situated on the corner of 10th Ave and 18th St, along the highline.

In order to create a flexible composition of the two designed volumes, the structural grid is placed on the entire plot. The height is defined by the context and is set at a maximum of 85 meters.

The apartments and expressive spaces are designed in clusters of five units and therefore the section is built up with duplicate layers. By positioning the units along the façade, or with a contrasting offset, the atrium literally surrounds the units, creating a different kind of space. One of the vertical connections within the atrium are the spiral staircases. These are inspired by the black iron fire escapes that run across the façades of traditional Manhattan housing. This has been translated to a minimal spiral staircase.

The section shows the composition of the units and the relation with each other. The atrium is a flexible space that allows the users to claim that space as their own. It is a social space with allowance for social interaction and can be seen as a large collective living room with a constant negotiation of space.

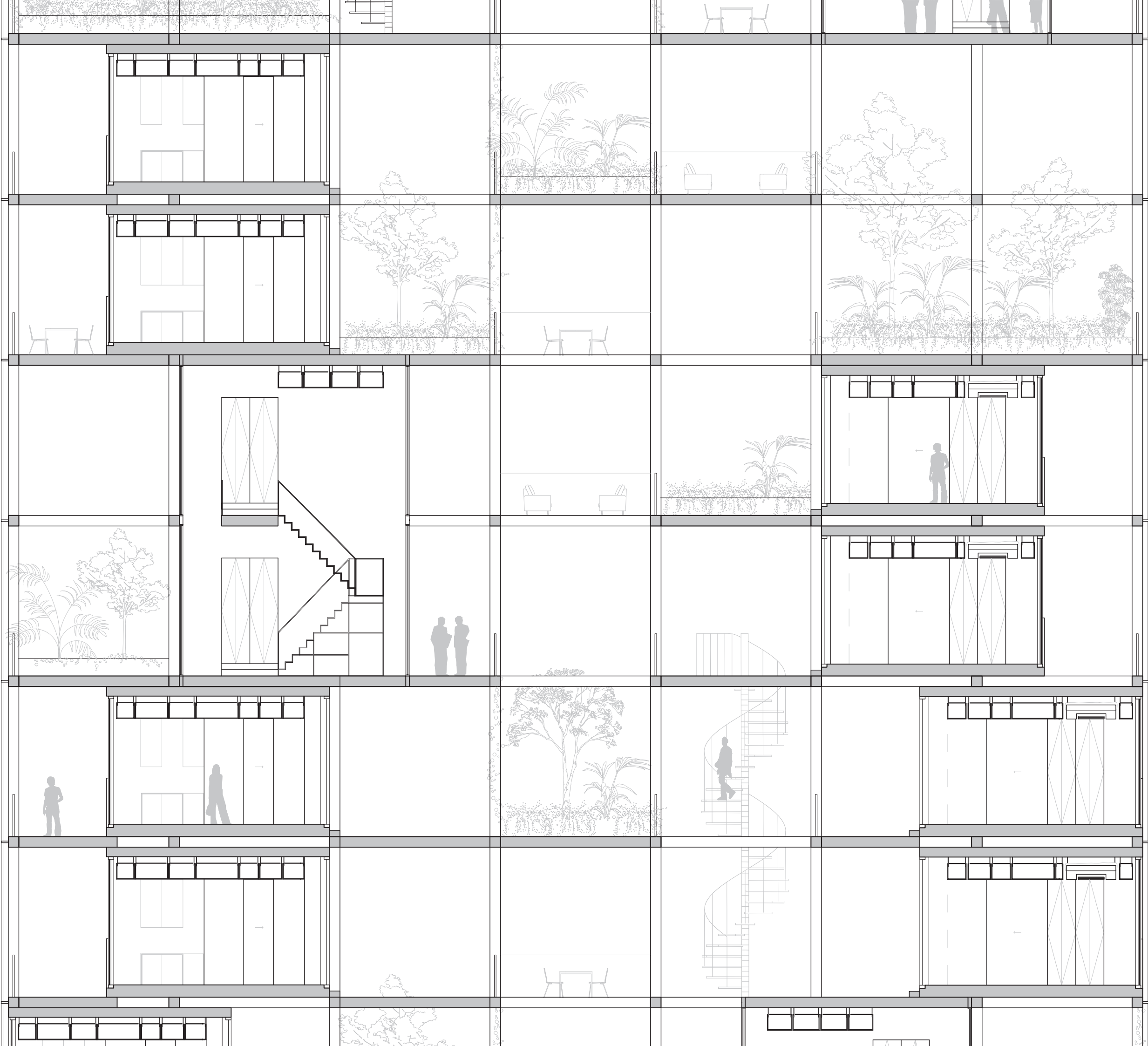




Black steel Manhattan fire escapes as a reference.



Translated to a minimal spiral staircase.









N° 4 THE **URBAN** ANCHORING

In the context of Manhattan, there is an additional desired program that can be defined as the urban spaces. Every city has a different culture, a different atmosphere and different amenities that are desired in relation to housing. Straightforward urban amenities include a reception, storage spaces and a laundromat. In order to comply with New York City specifically, urban spaces such as a lounge, café, gym and pool are introduced.

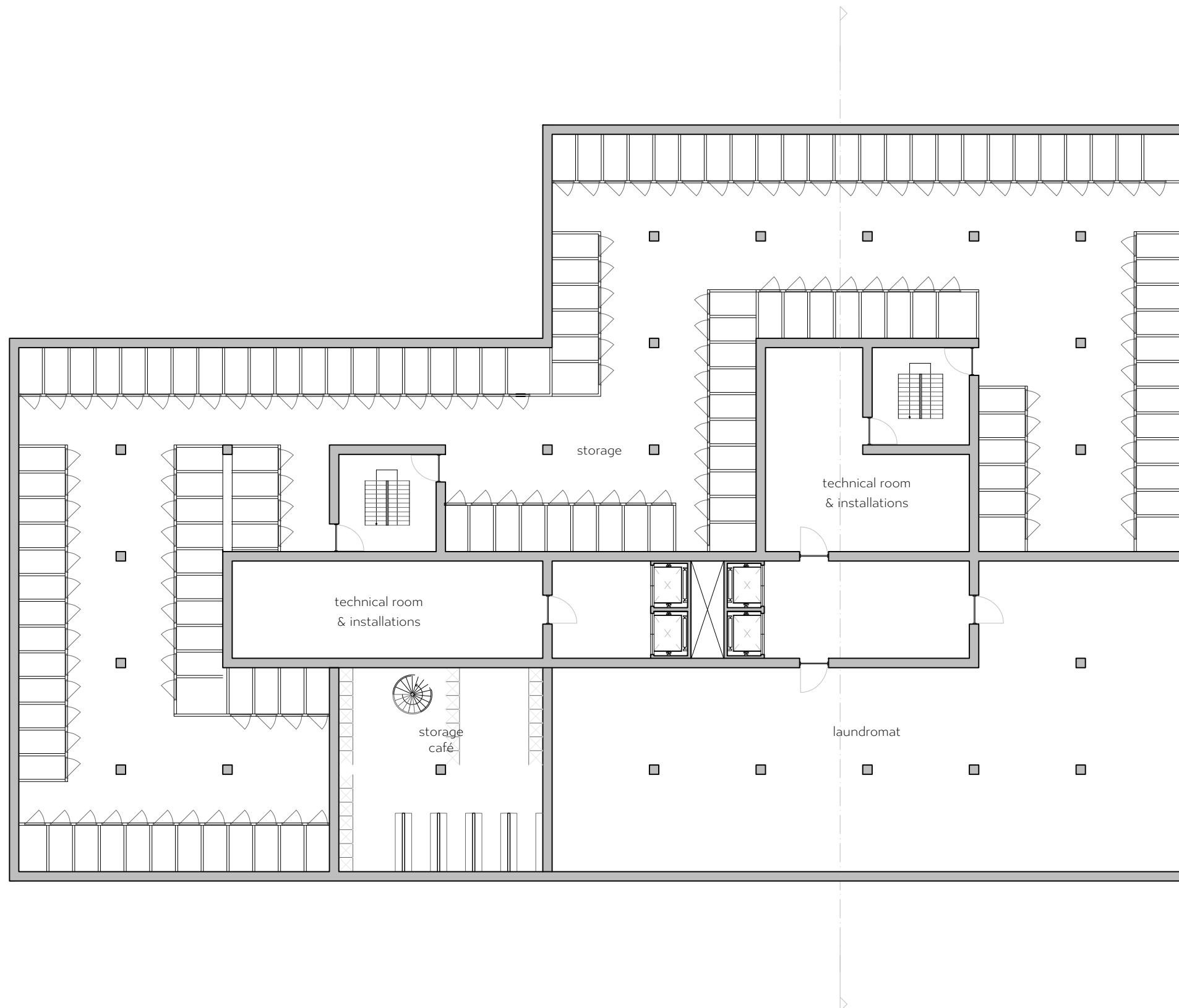
The urban plinth consists of four levels, plus two basement levels. The ground floor plan should be as accessible as possible, and therefore as open as possible. Therefore the entire façade is glass and the functionalities are placed in the basement. The basement includes spaces such as the storage units, technical and installation spaces, but also back of house for the reception where the packages and mail can be stored. Also a back of house for the café is designed in the basement. The entrance level is double height, topped up with a flexible workspace. The last floor of the urban plinth houses typical New York functionalities such as a pool and a gym, but also guestrooms and a collective living room.

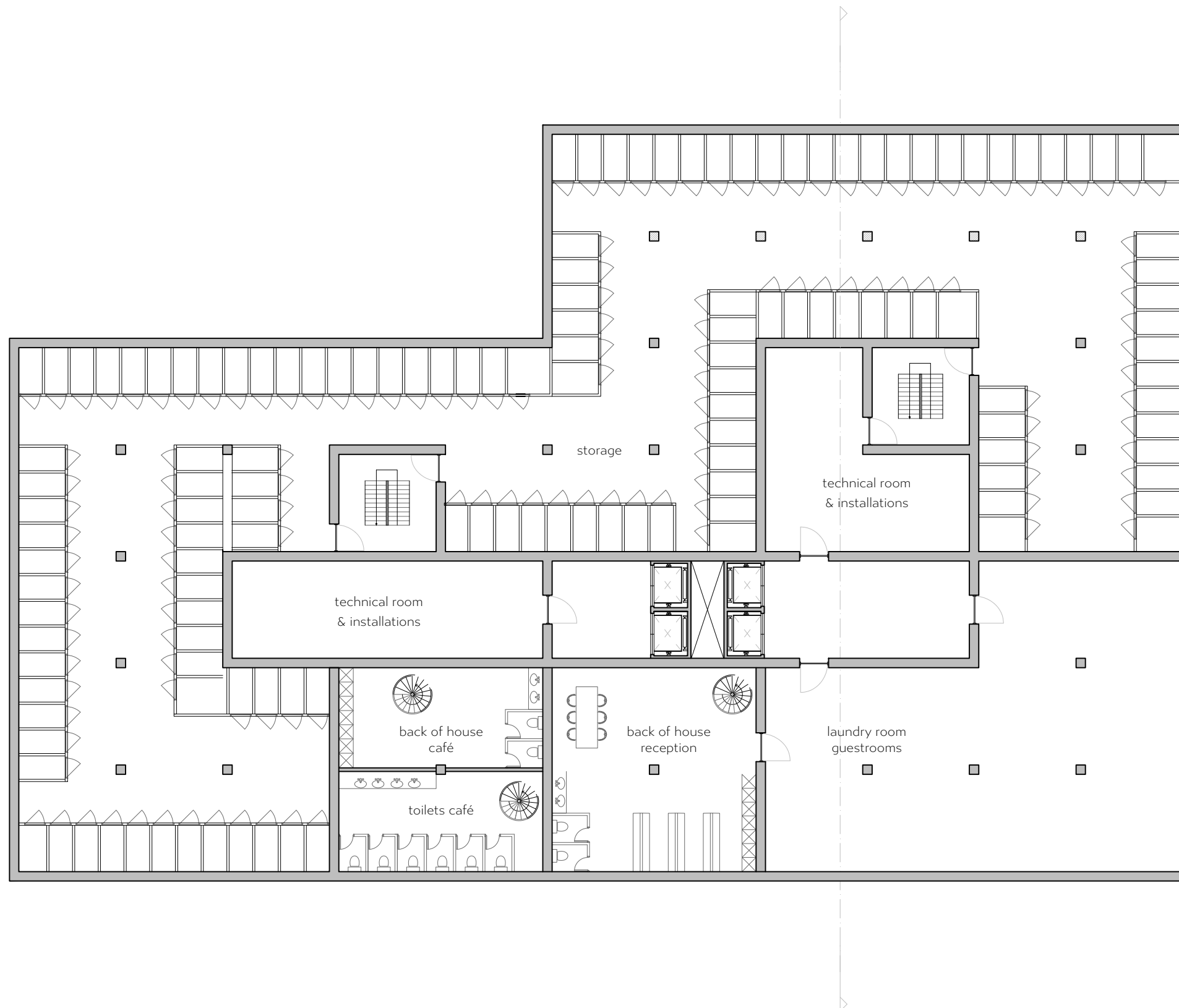
Chelsea is a very artistic neighbourhood. The area is filled with nice contemporary art galleries, but also street art. In order to anchor the building and let the ground floor intertwine with the urban tissue, the art passage is introduced. This passage will exhibit temporary pieces, giving a platform to street artists. The passage is accessible to all and can be seen as an

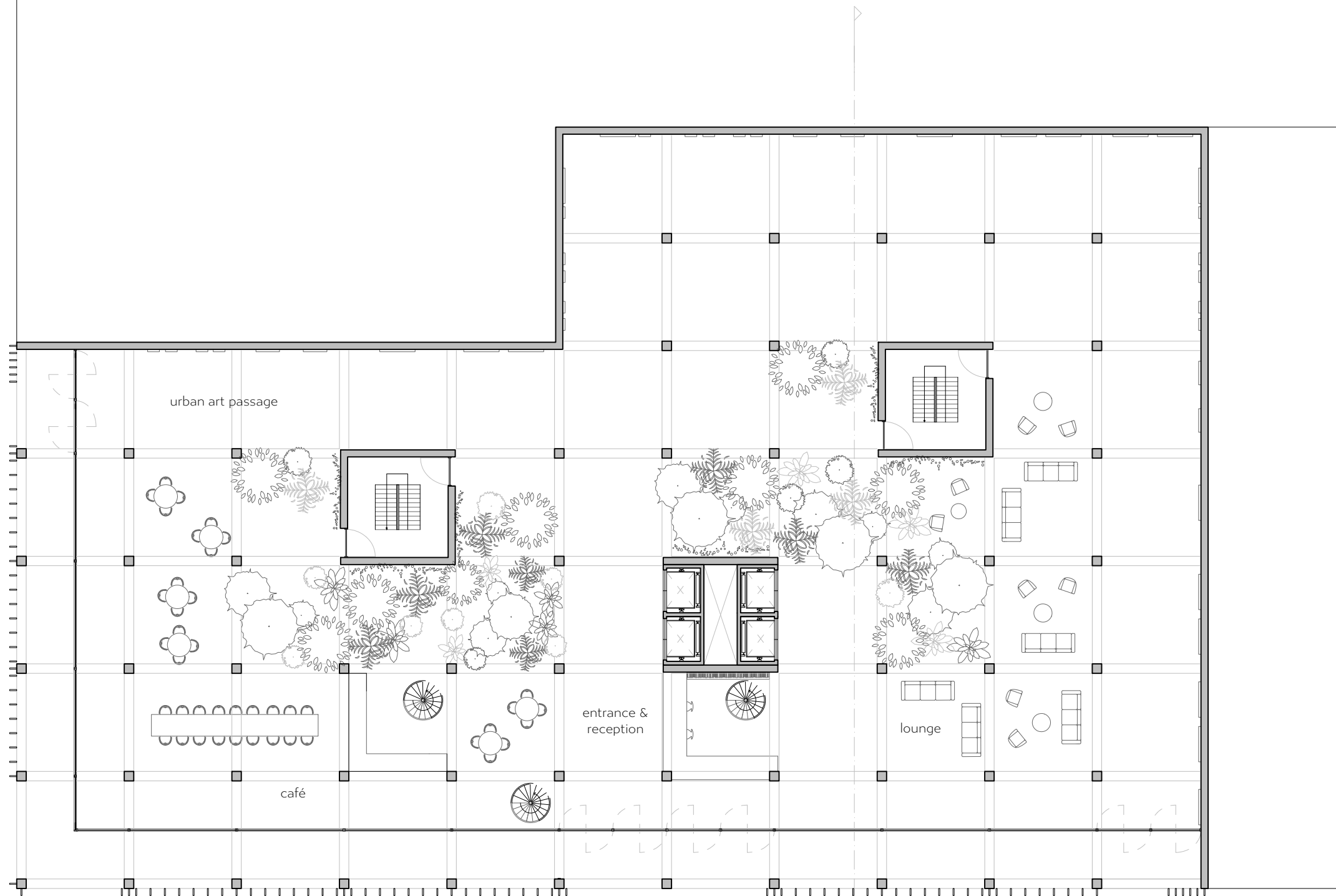
extension of the street. The art passage is the in between version of the galleries and street art and therefore fits into the artistic atmosphere of the area.

The structural grid is placed onto the entire plot and is strongly visible in the façades. In order to define the difference in the urban spaces and the collective atrium and housing above, the structural grid is larger on the first four floors (500 mm square), after which it minimizes to 300 mm square. This difference in dimensions creates two spaces within the atrium and therefore a boundary between the public spaces and more private spaces. The urban plinth has a different façade than the housing above. The window frames are positioned either inside the grid, or on the ground level half a grid offset. Vertical elements of American chestnut timber are placed in front of the windows, in a density based on the privacy requirement of the space behind it. On the first level the sides of the timber elements are layered with a mirror-like material, creating an interesting dynamic of reflection and sightlines towards the interior spaces.

The green roof was an important starting point in this project. Not only does it provide a garden for the building, it also helps combat the urban heat island effect. The roof is materialized with both greenery and concrete, to allow for rainwater collection. The crystalline pv solar panels will ensure a percentage of the energy supply and also create an interesting light and shading dynamic in the atrium below.





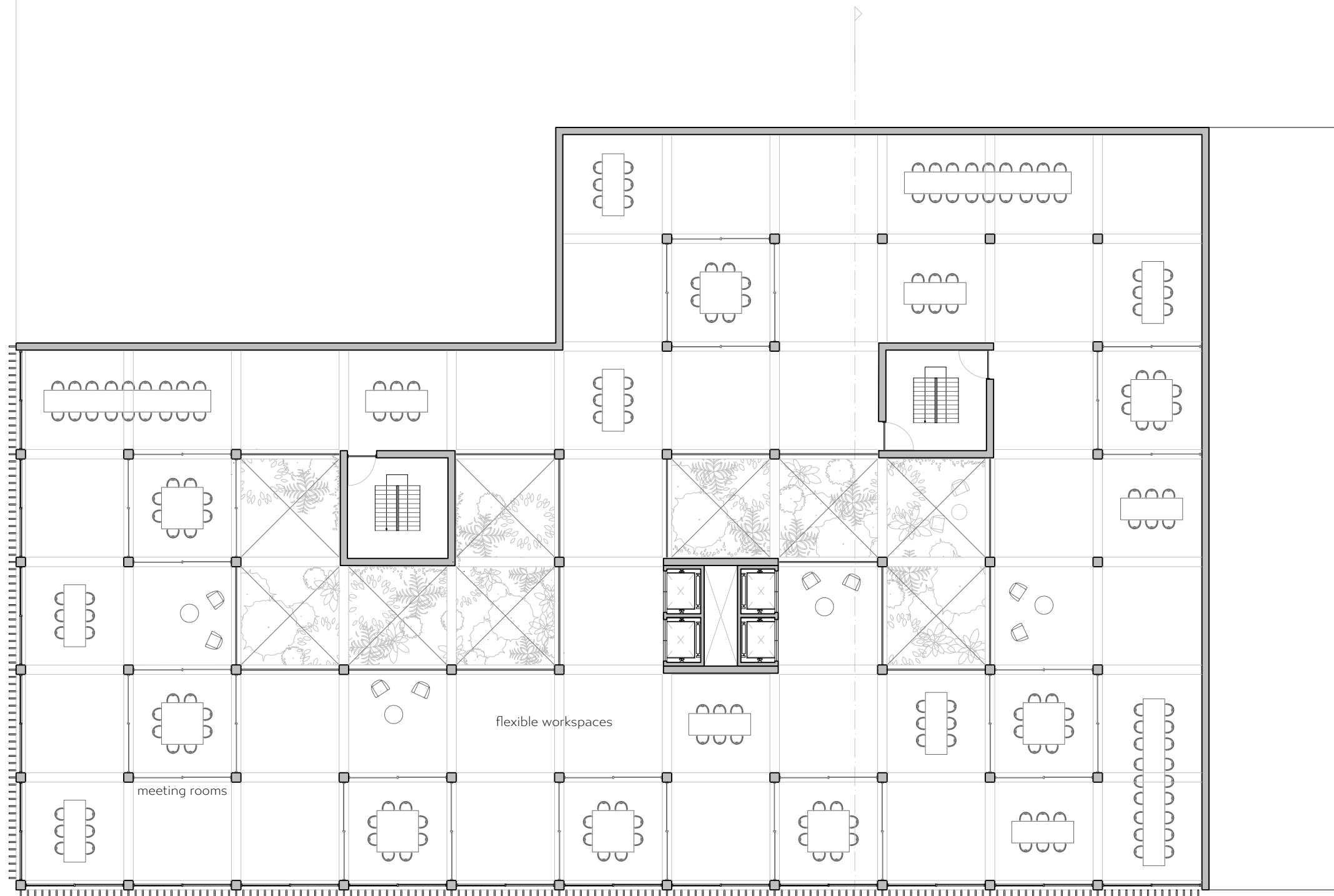


level 0 1 : 200

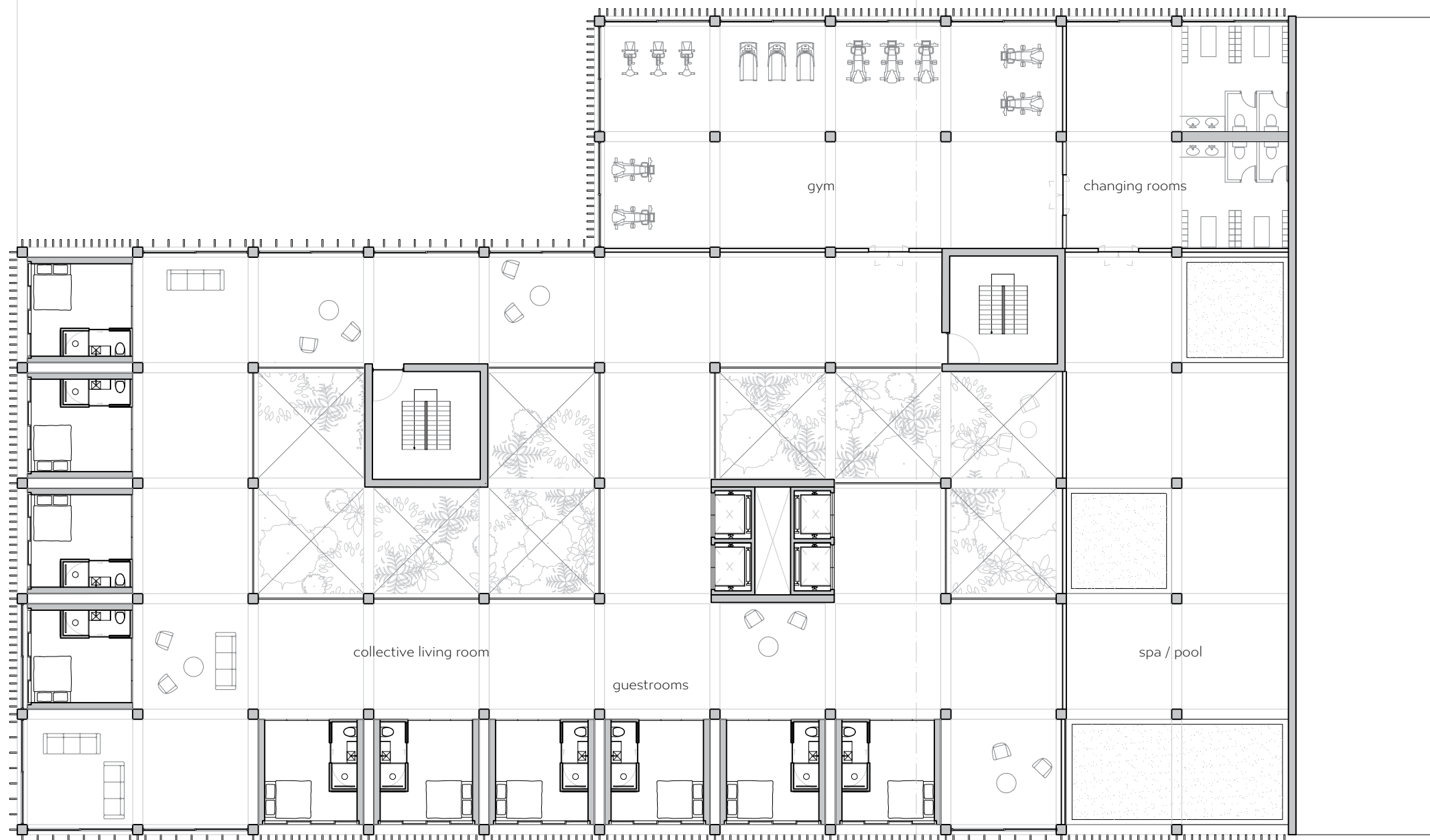


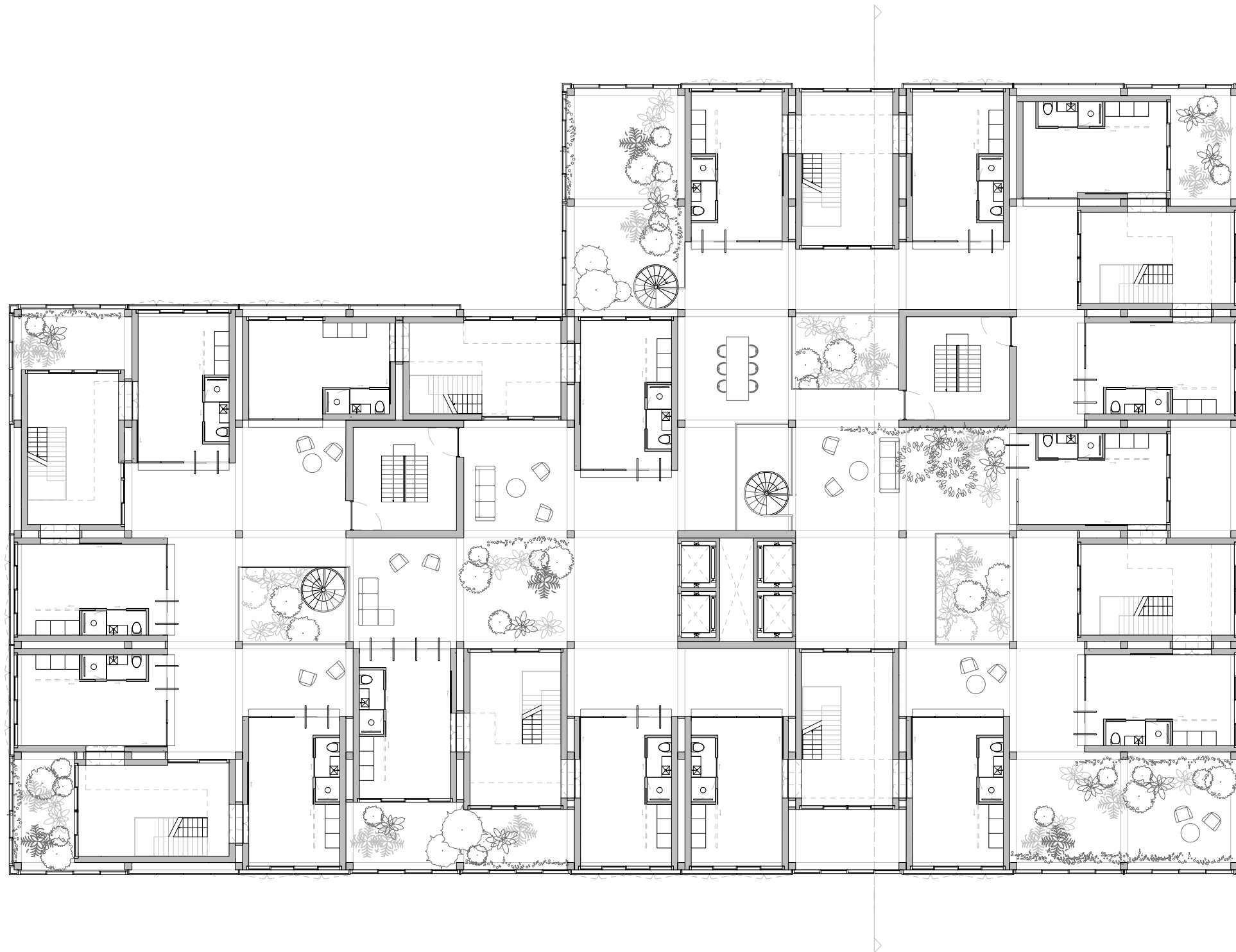




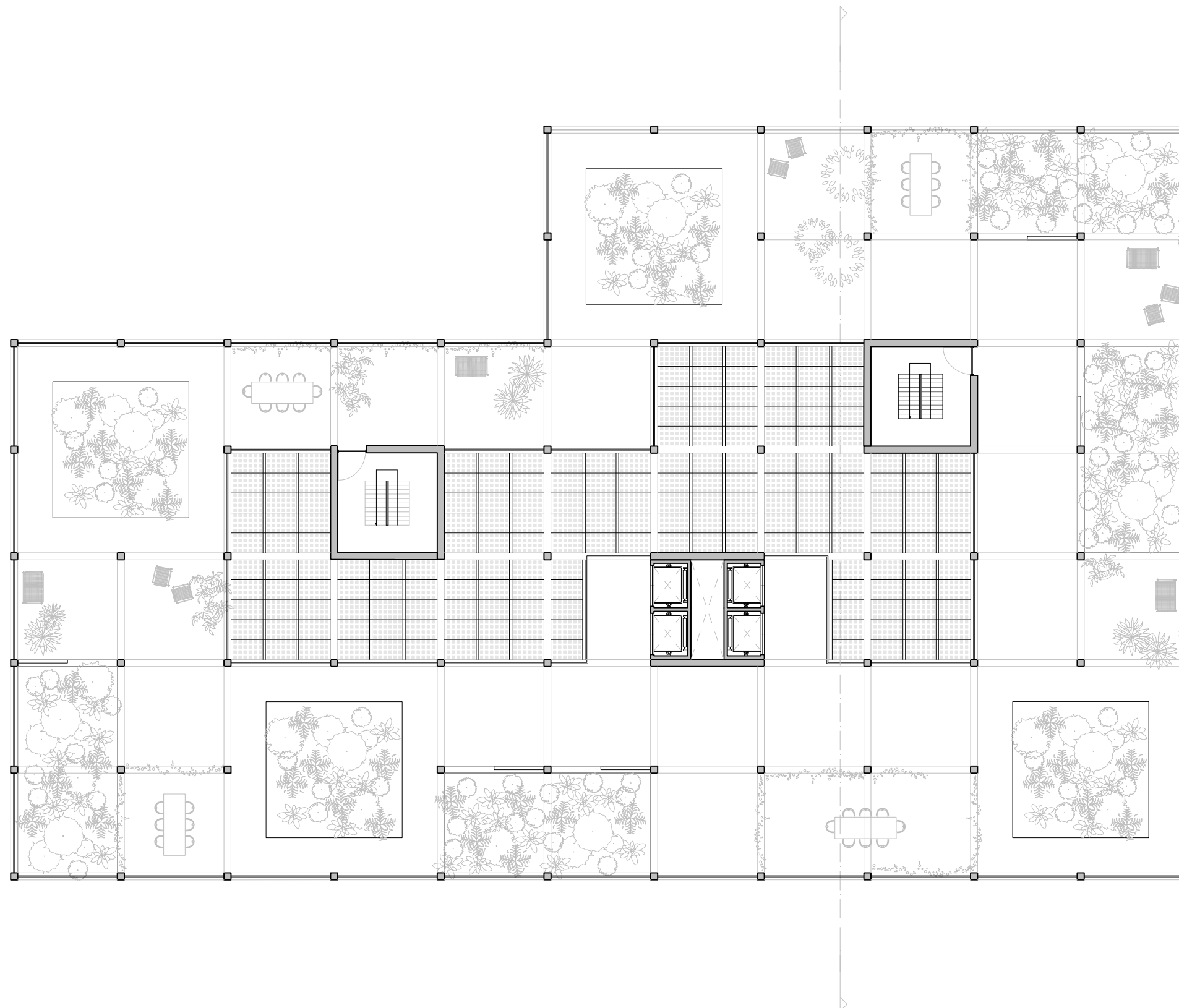


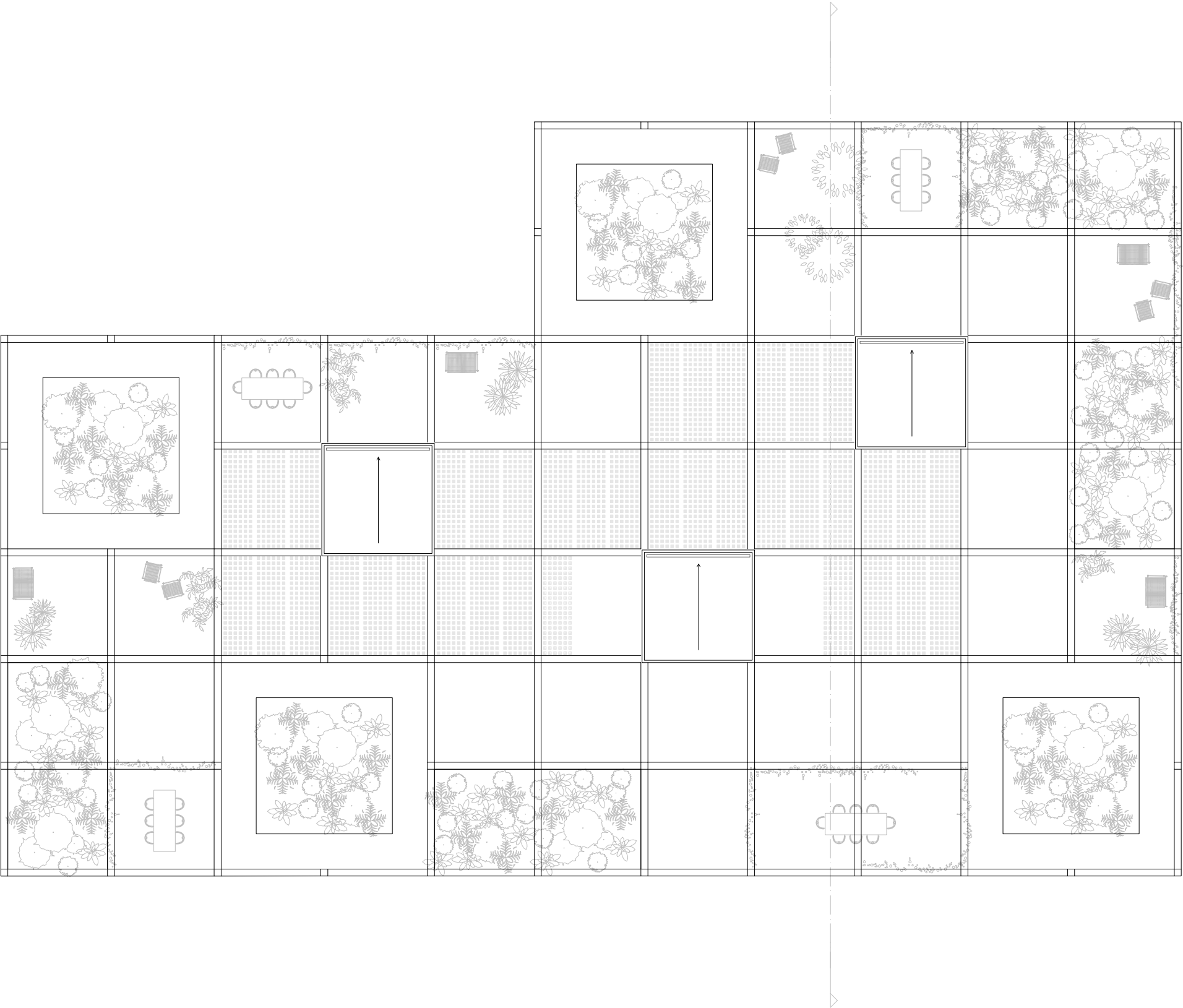
level 2 1 : 200



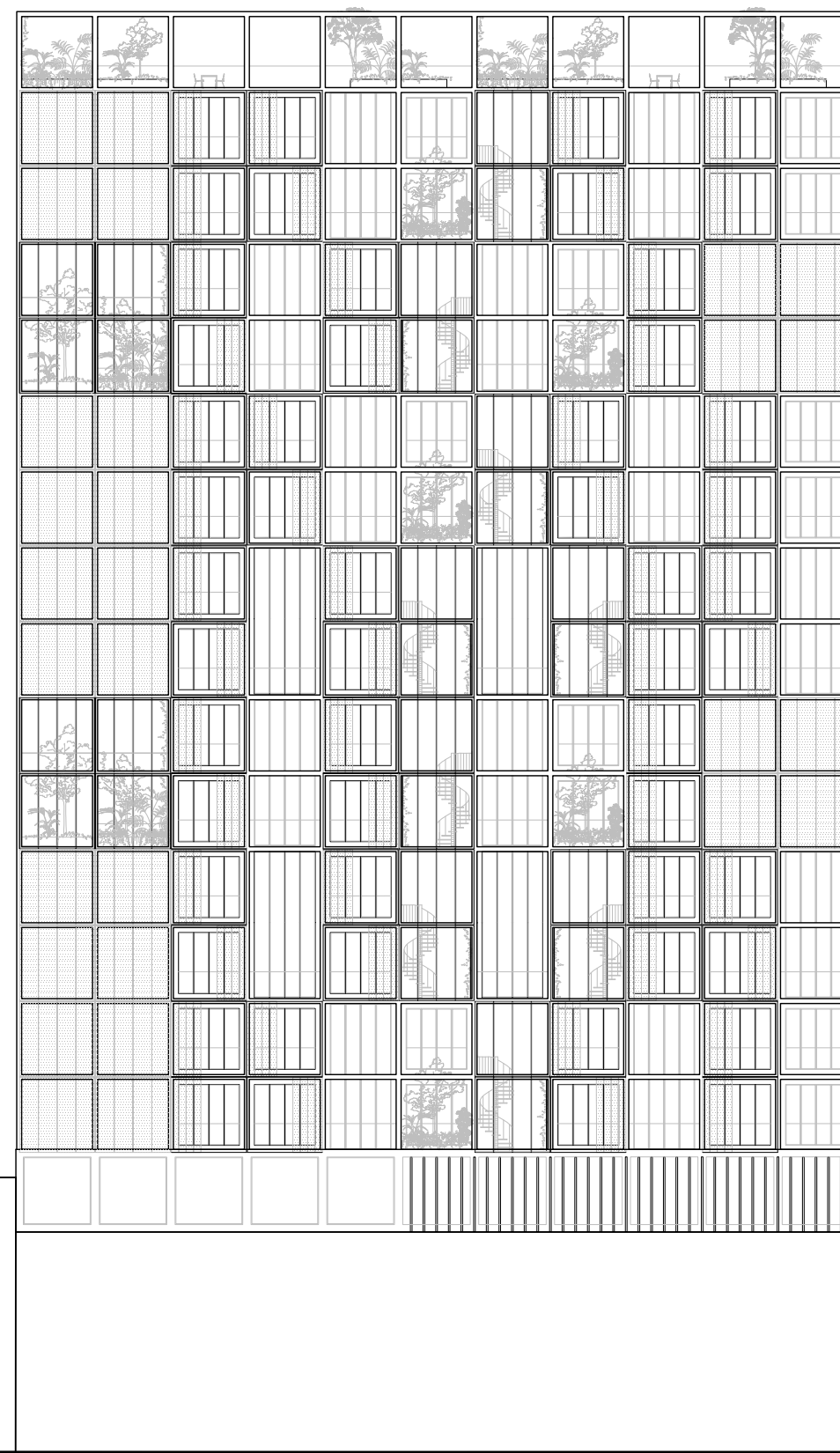
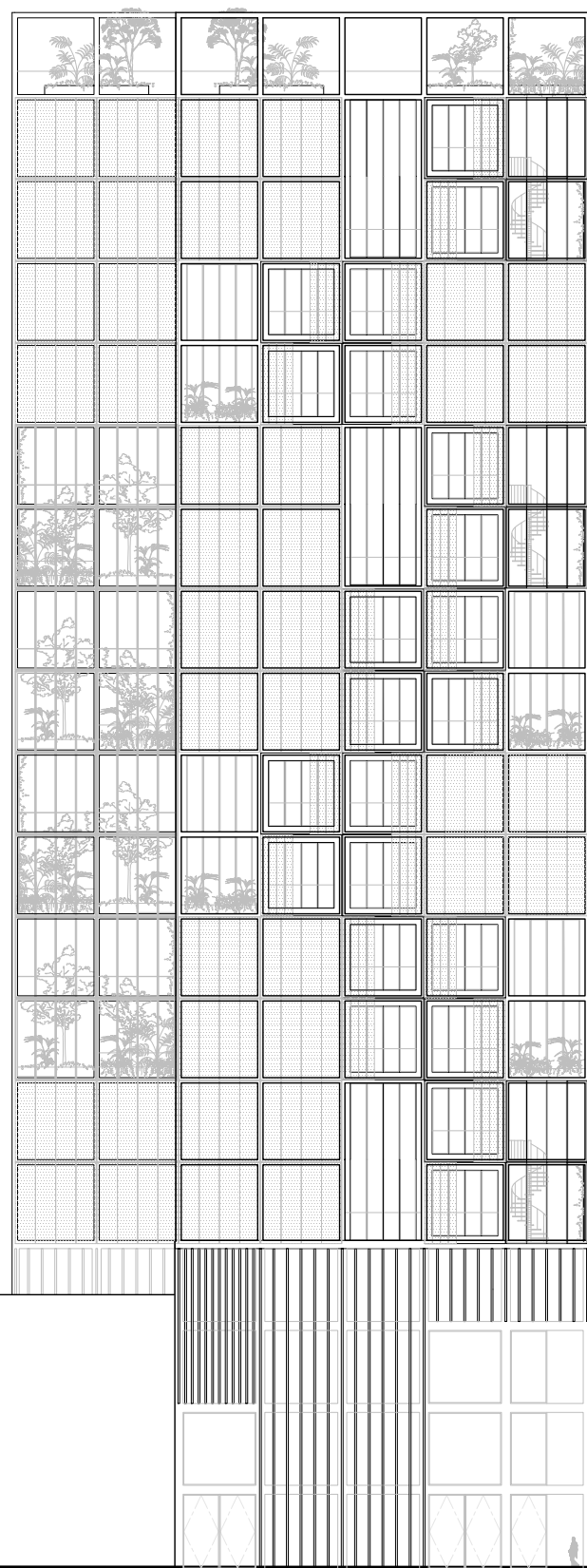


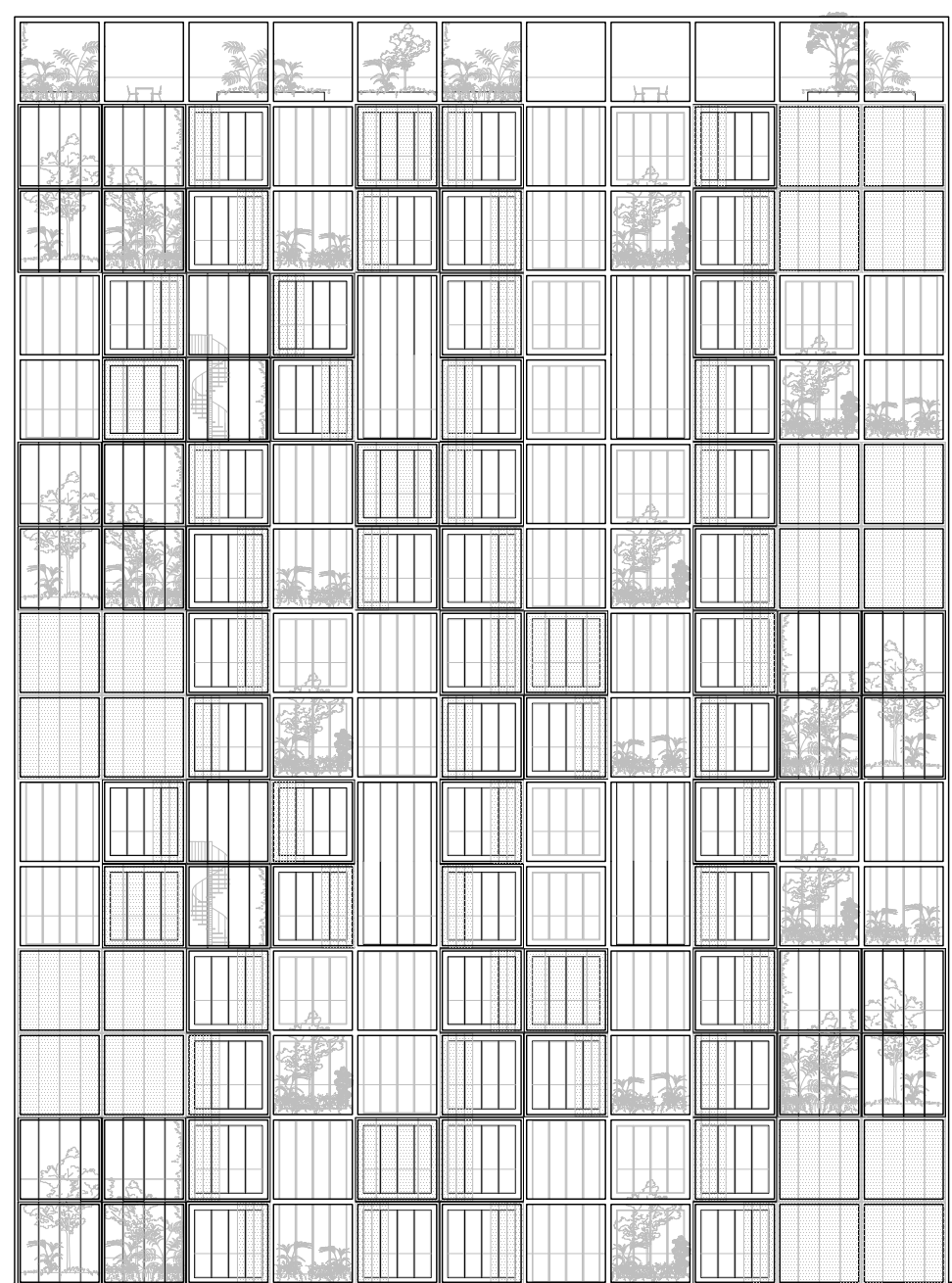
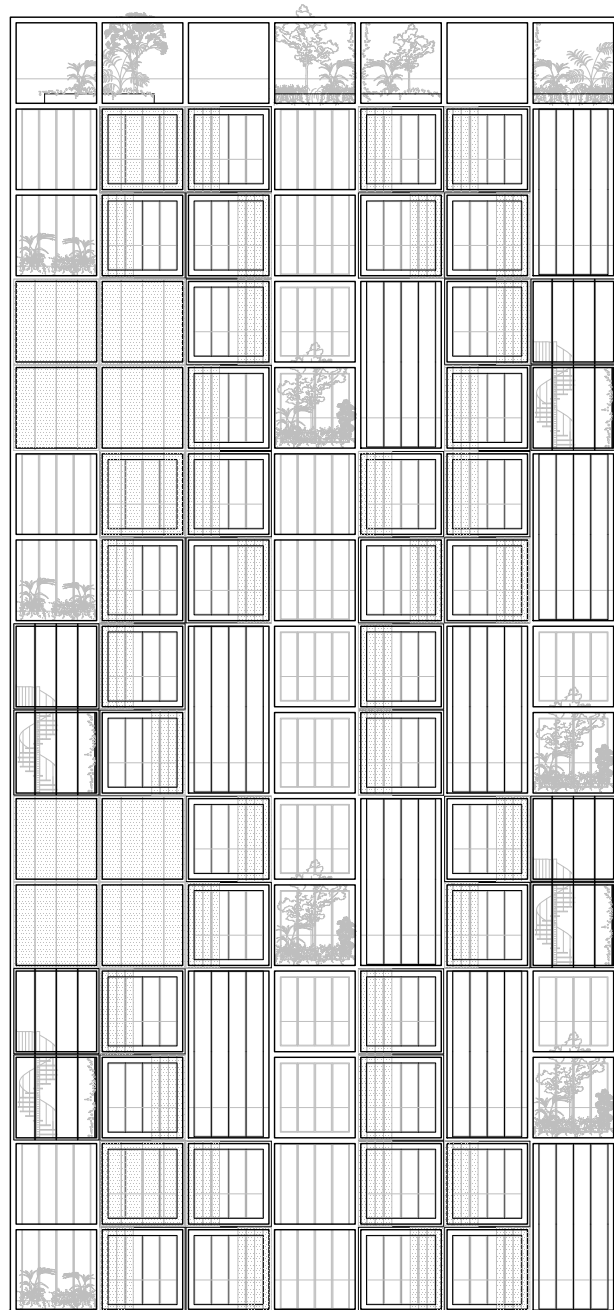




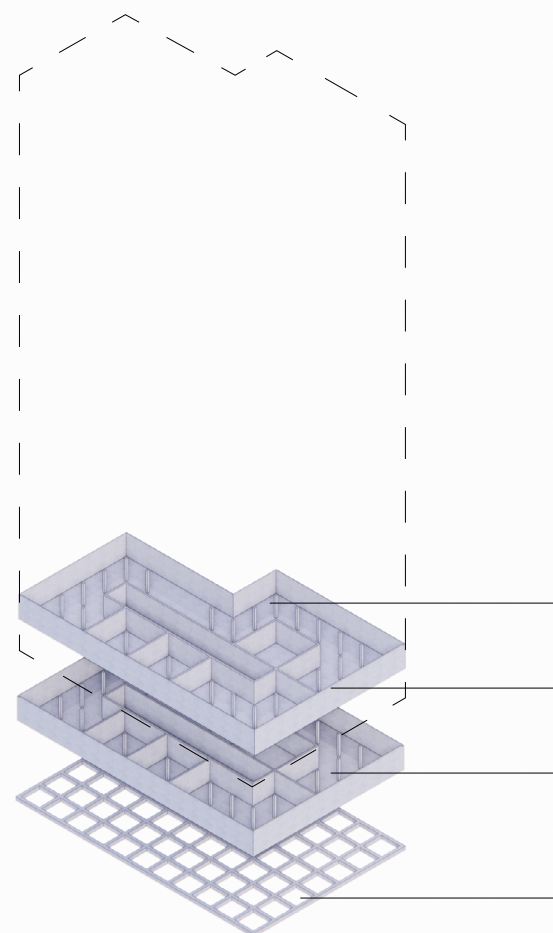








BUILDING **TECHNOLOGY**

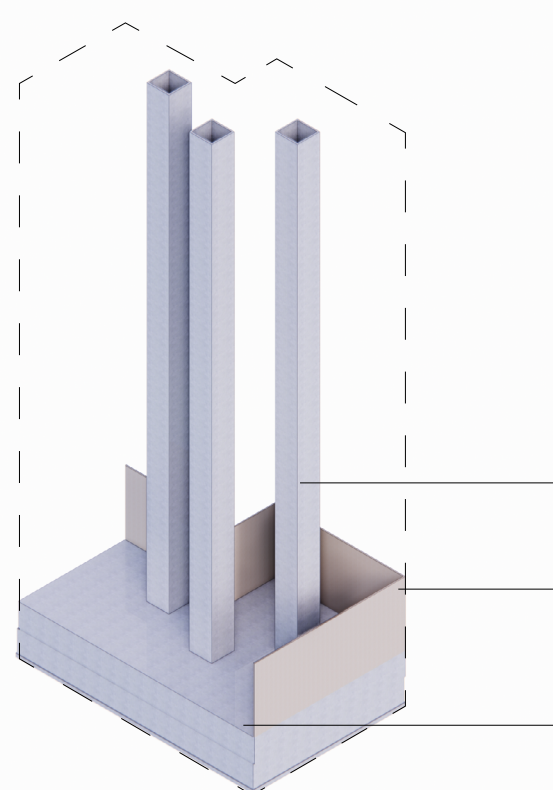


The structural grid is based on the dimensions of the minimal apartment, 4560 mm square. The structure is hybrid, a concrete foundation and basement with a timber column and beam structure above. On the first four floors the timber has a dimension of 500 mm square, stabilized with 300 mm CLT walls along the neighbouring buildings and 200 mm CLT floor elements. As the project is located in Manhattan, a concrete beam foundation (800 x 600 mm) will suffice.

The timber dimensions above the urban plinth are 300 mm square. Here the stability is guaranteed by the three concrete cores that houses the elevators, main staircase and fire escape.

The floor of the rooftop terrace is concrete, in order to give the structure more weight at the top of the building, also contributing to the stability of the project.

This forms the load bearing structure of the design, where the prefabricated CLT apartments can be placed freely within. The apartments are placed with steel C profiles, aligning with the structural grid. The atrium floors are placed with a T-lock system, making the space flexible in terms of organization.



concrete columns C45/55 reinforced in situ 300 x 300

concrete walls C45/55 reinforced in situ 300

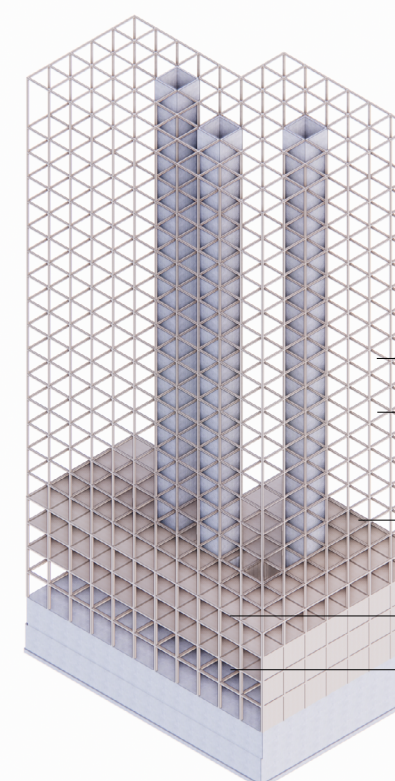
concrete floors C45/55 reinforced in situ 300

concrete foundation beams 600 x 800

concrete core C45/55 reinforced in situ
guarantee stability 300

CLT walls 7 layers 200

concrete floors C45/55 reinforced in situ 300



glulam columns 300 x 300

glulam beams 300 x 300

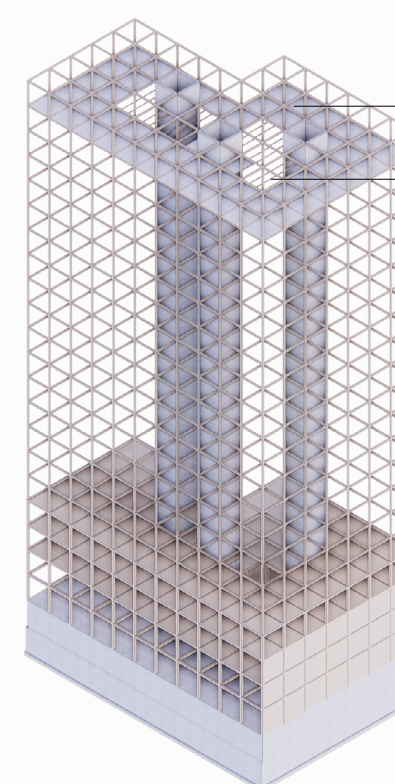
both american beech timber 10 layers

CLT floors 4160 x 4160 (5 layers x 30 mm) 150

glulam columns 400 x 400

glulam beams 400 x 400

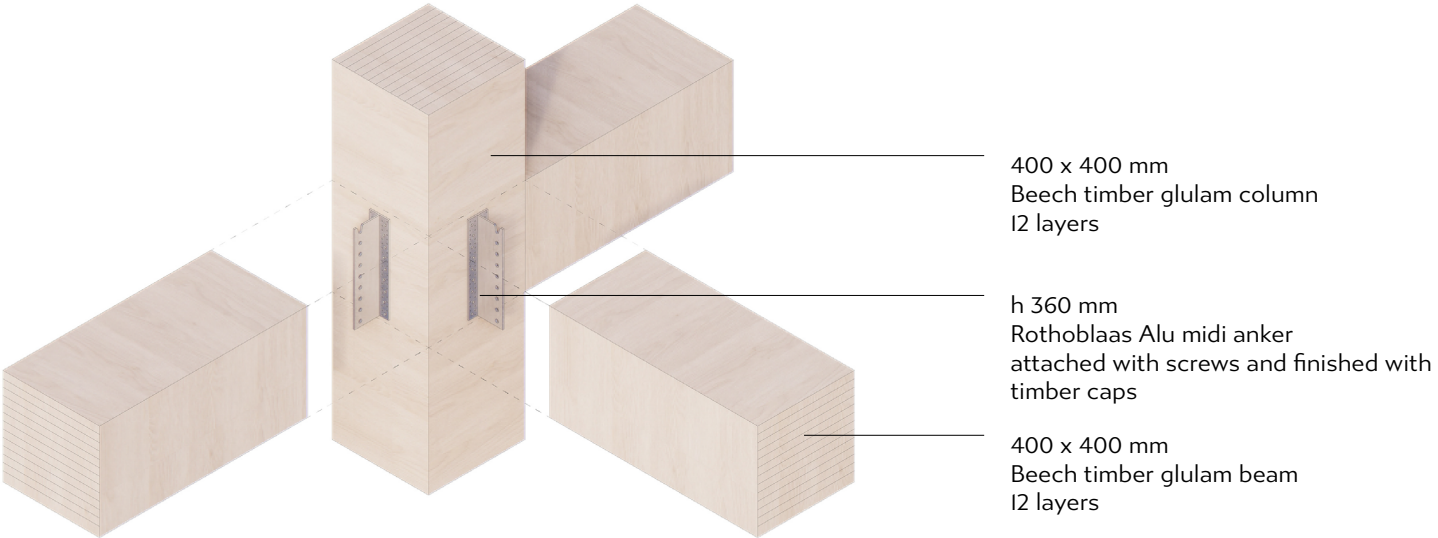
both american beech timber 12 layers



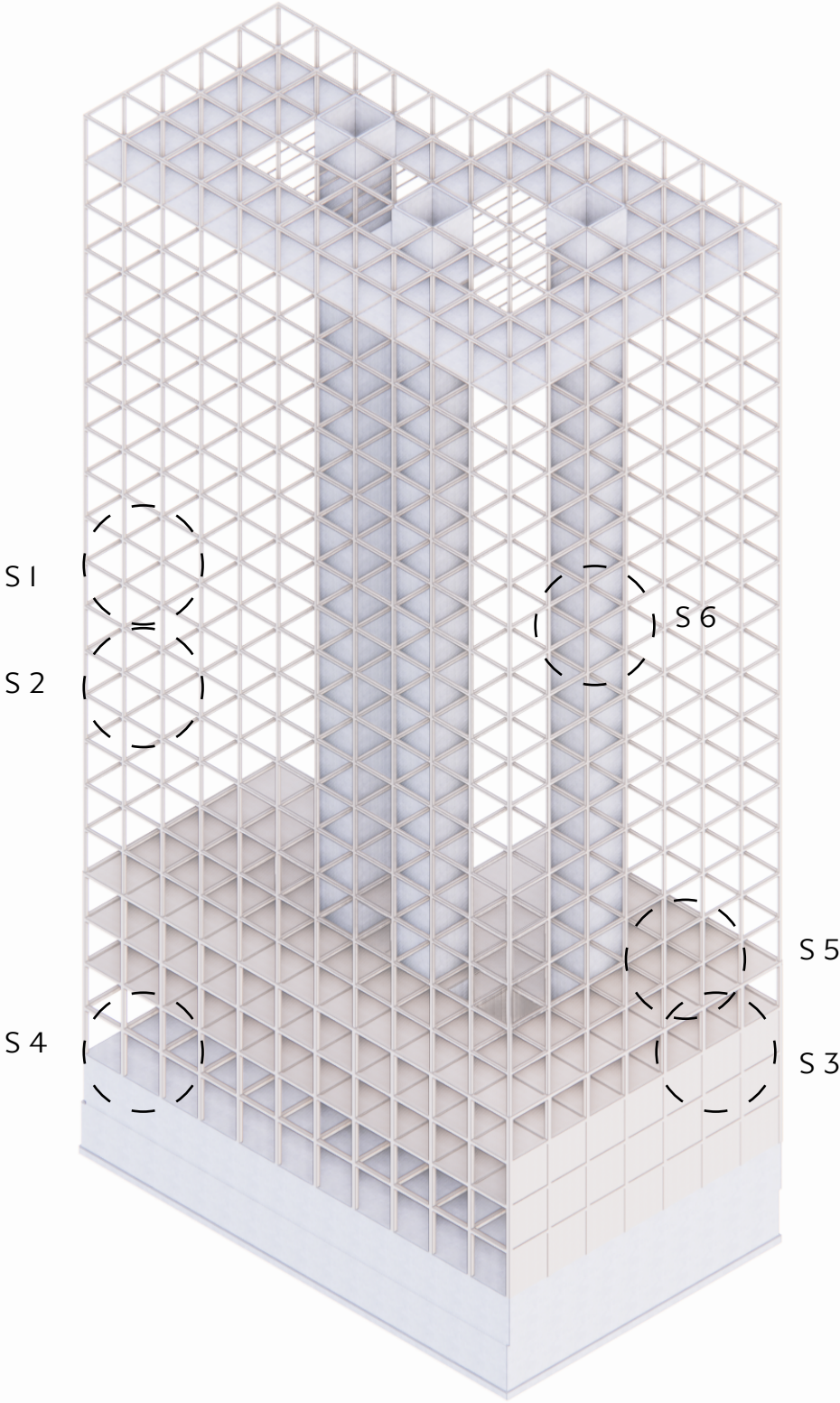
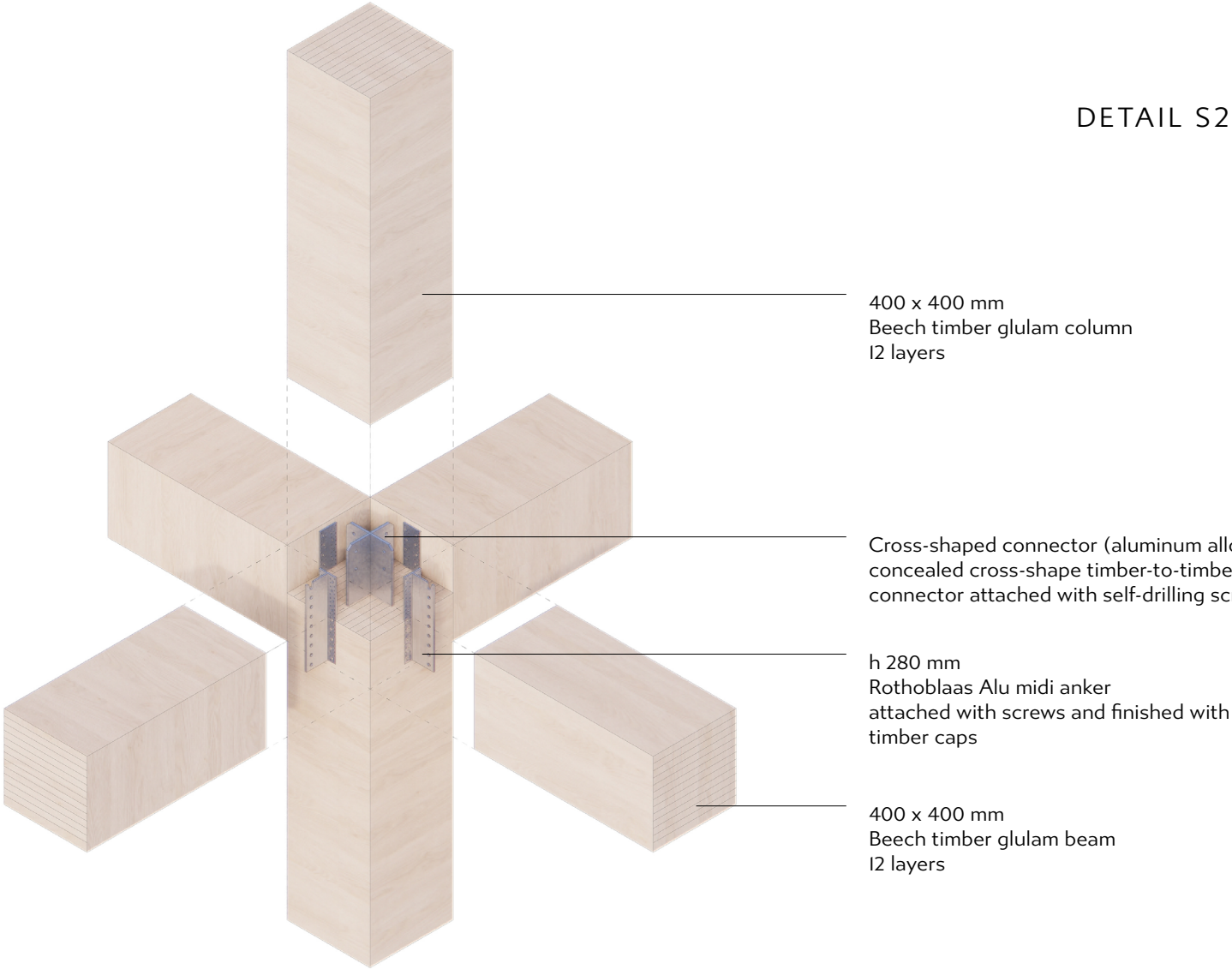
concrete floor
applied for extra mass to guarantee stability 200

timber beams for solar glass 200 x 100

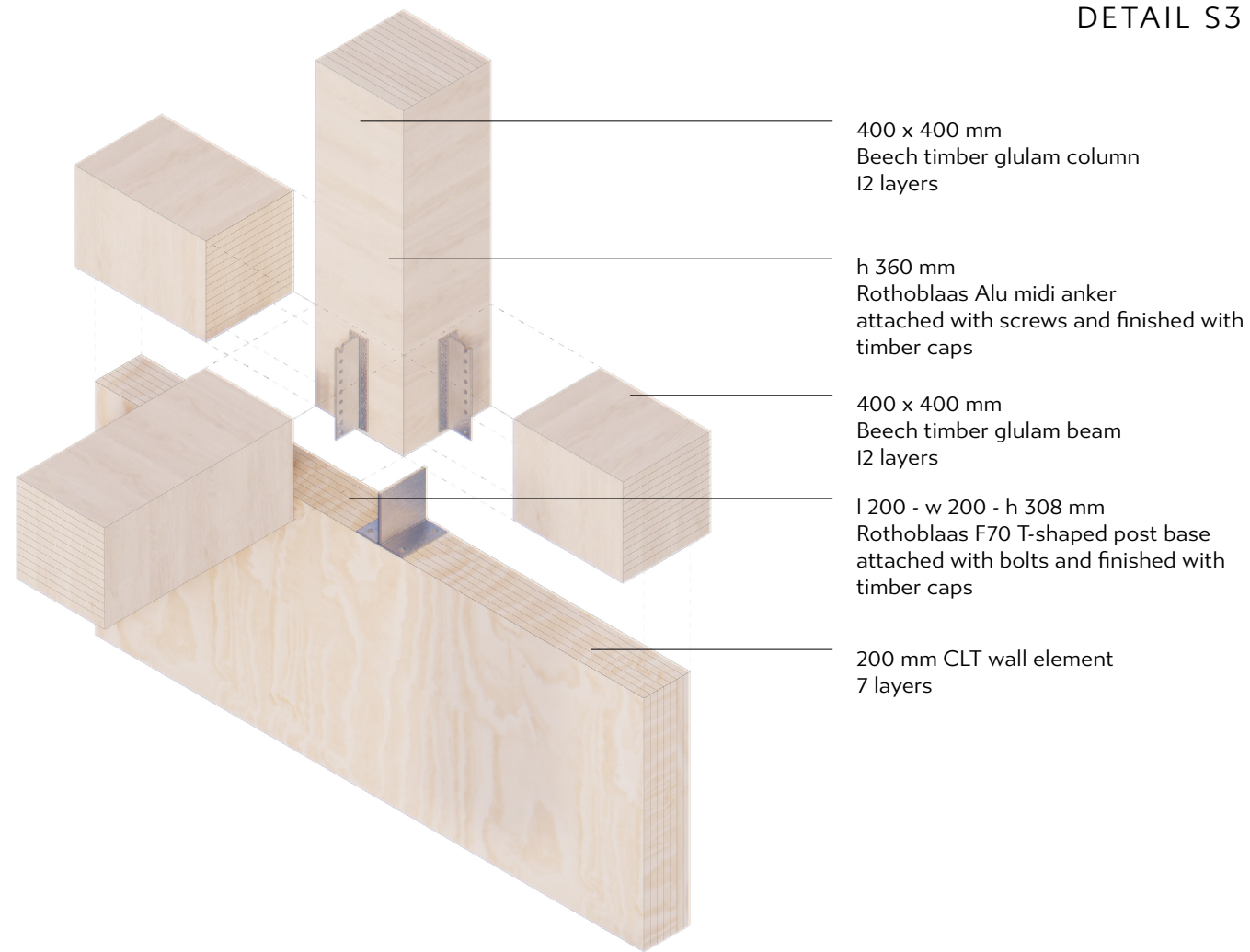
DETAIL S1



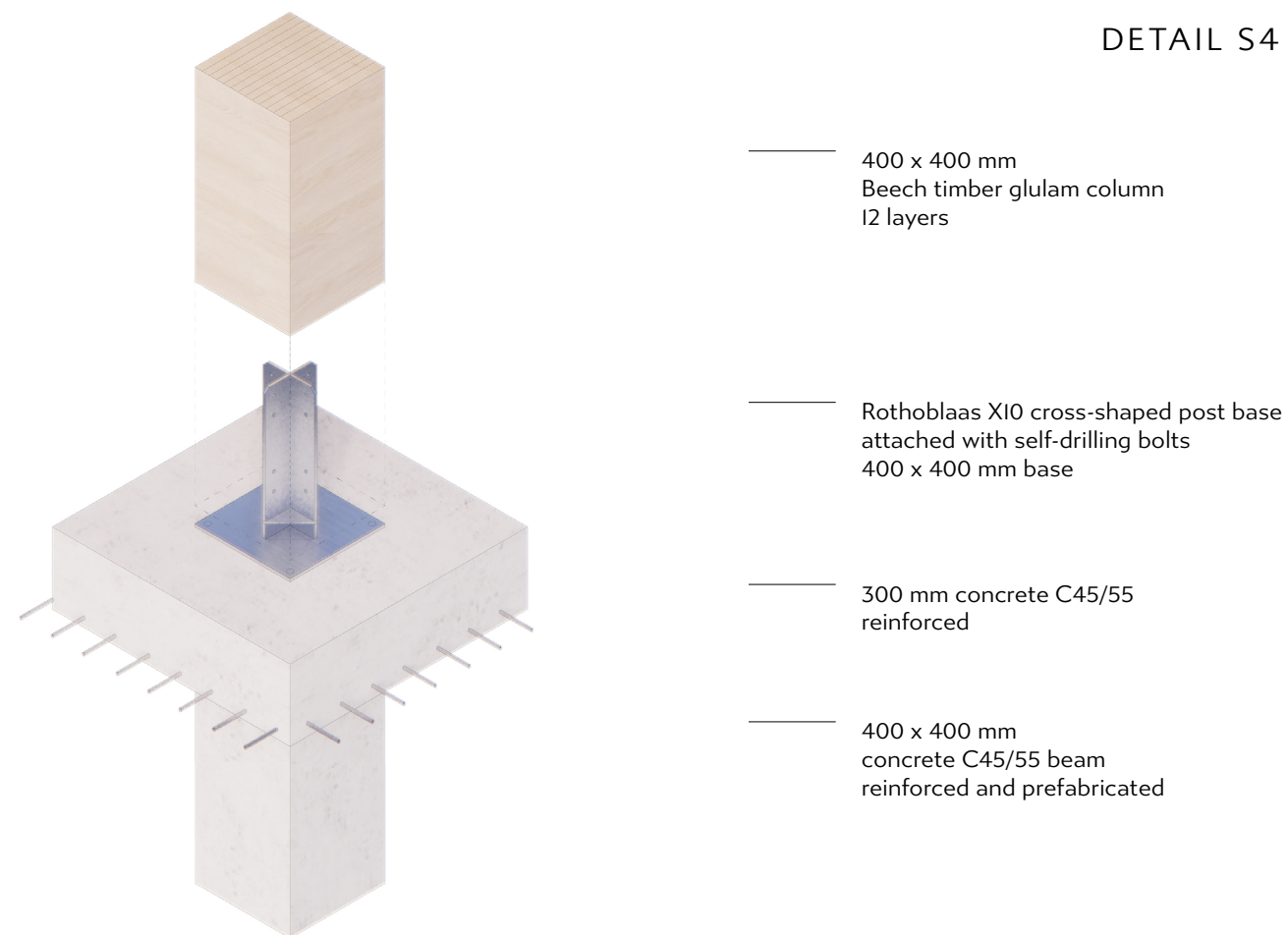
DETAIL S2



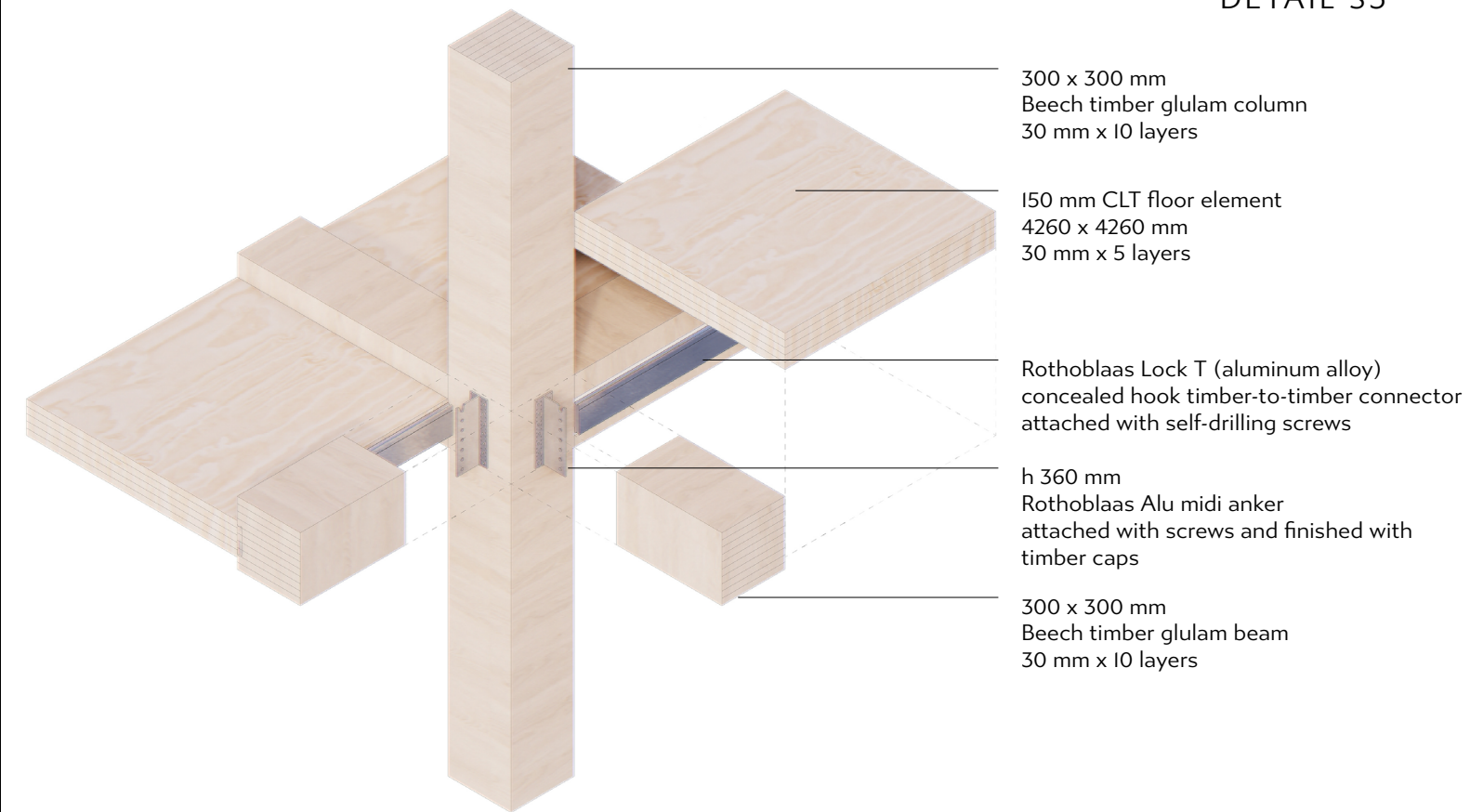
DETAIL S3



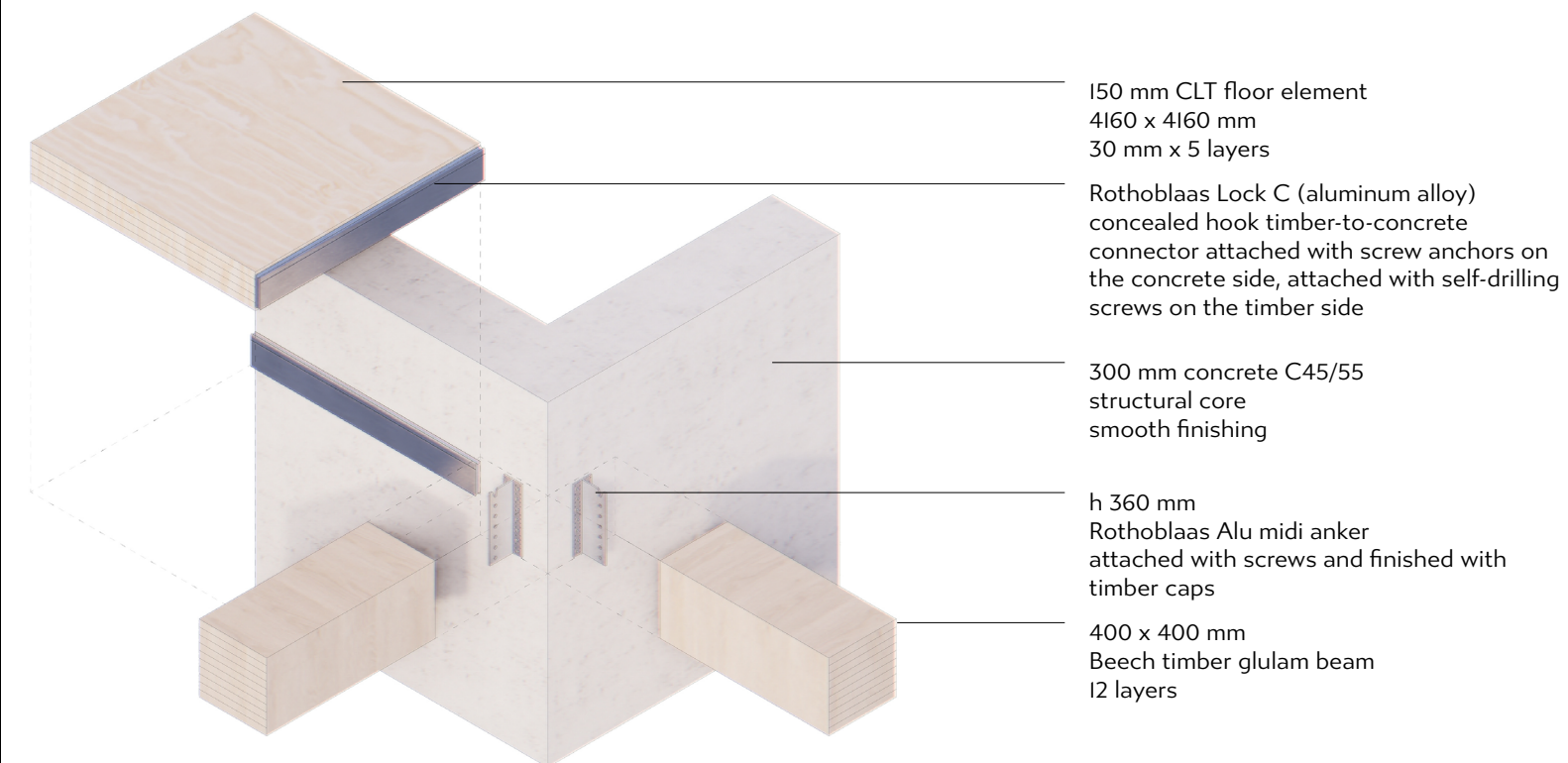
DETAIL S4



DETAIL S5



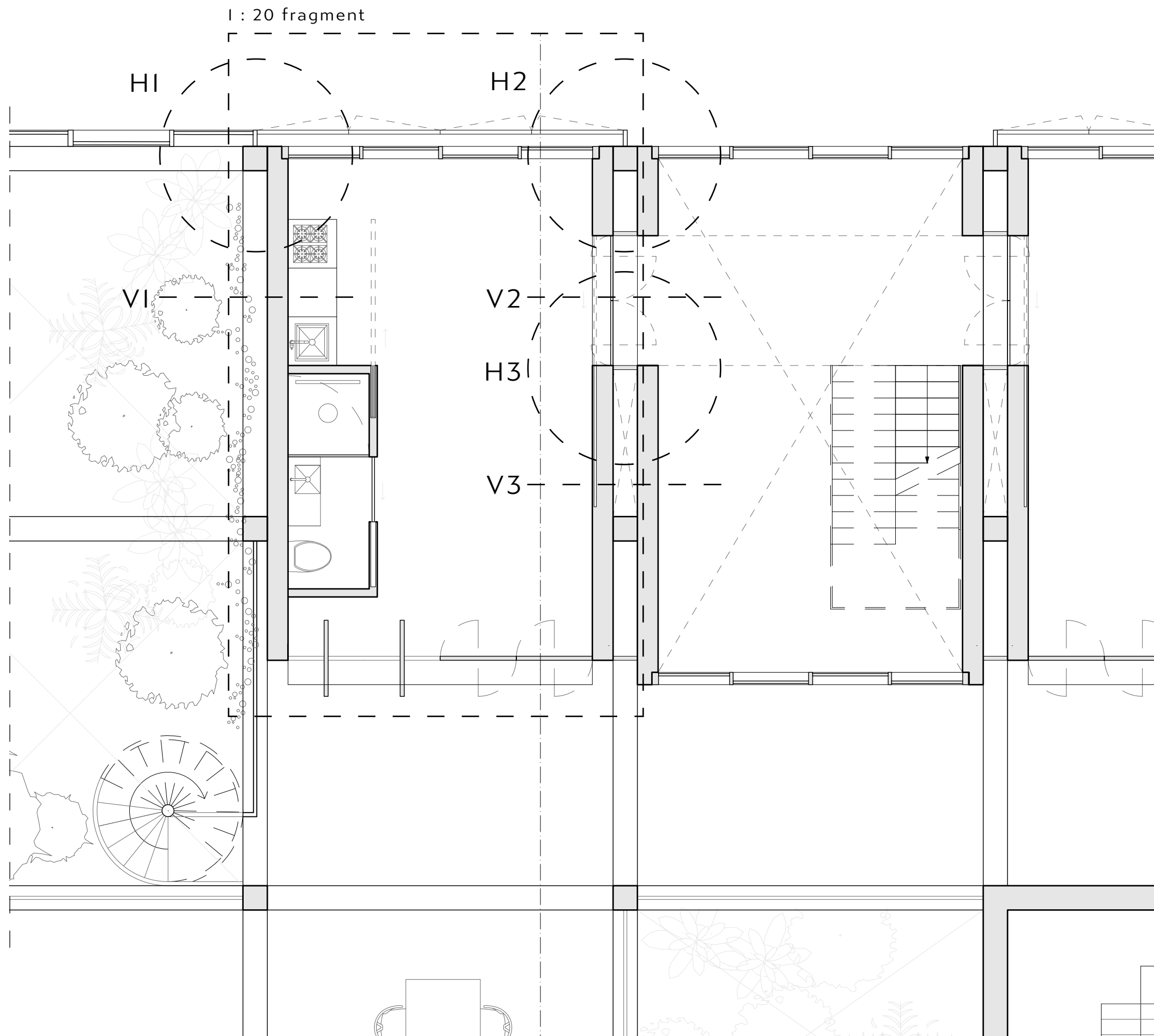
DETAIL S6











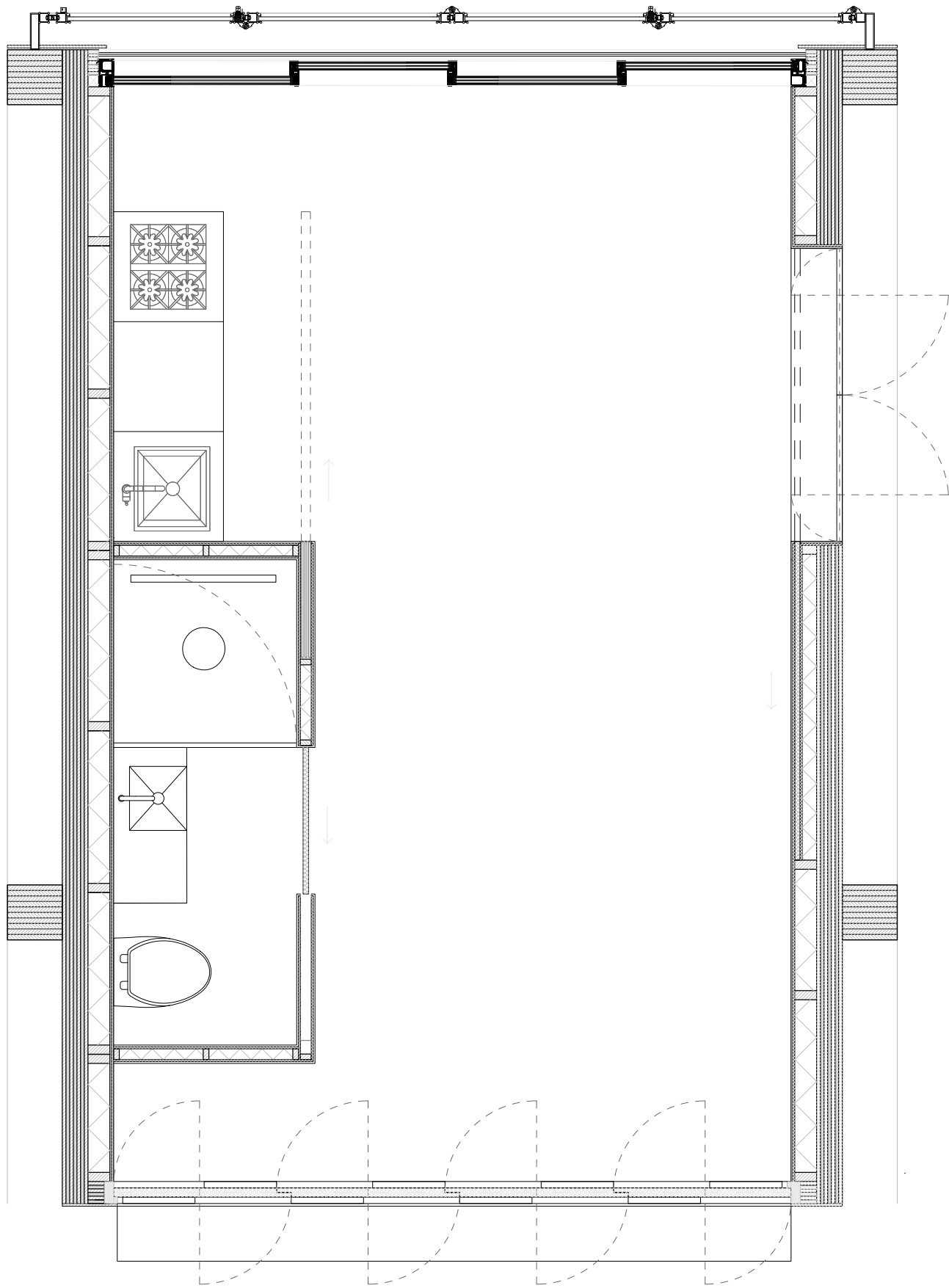
horizontal fragment I:50 ↗

In order to translate the research observations architecturally, the apartment is build-up from the interiors outwards. Starting with the interior volume, the minimized kitchen and bathroom are placed. The furniture ceiling design is positioned and the finishings are offset from the volume. The 120 mm rockwool insulation, together with the 140 mm 7 layer CLT structure, complete the apartment unit.

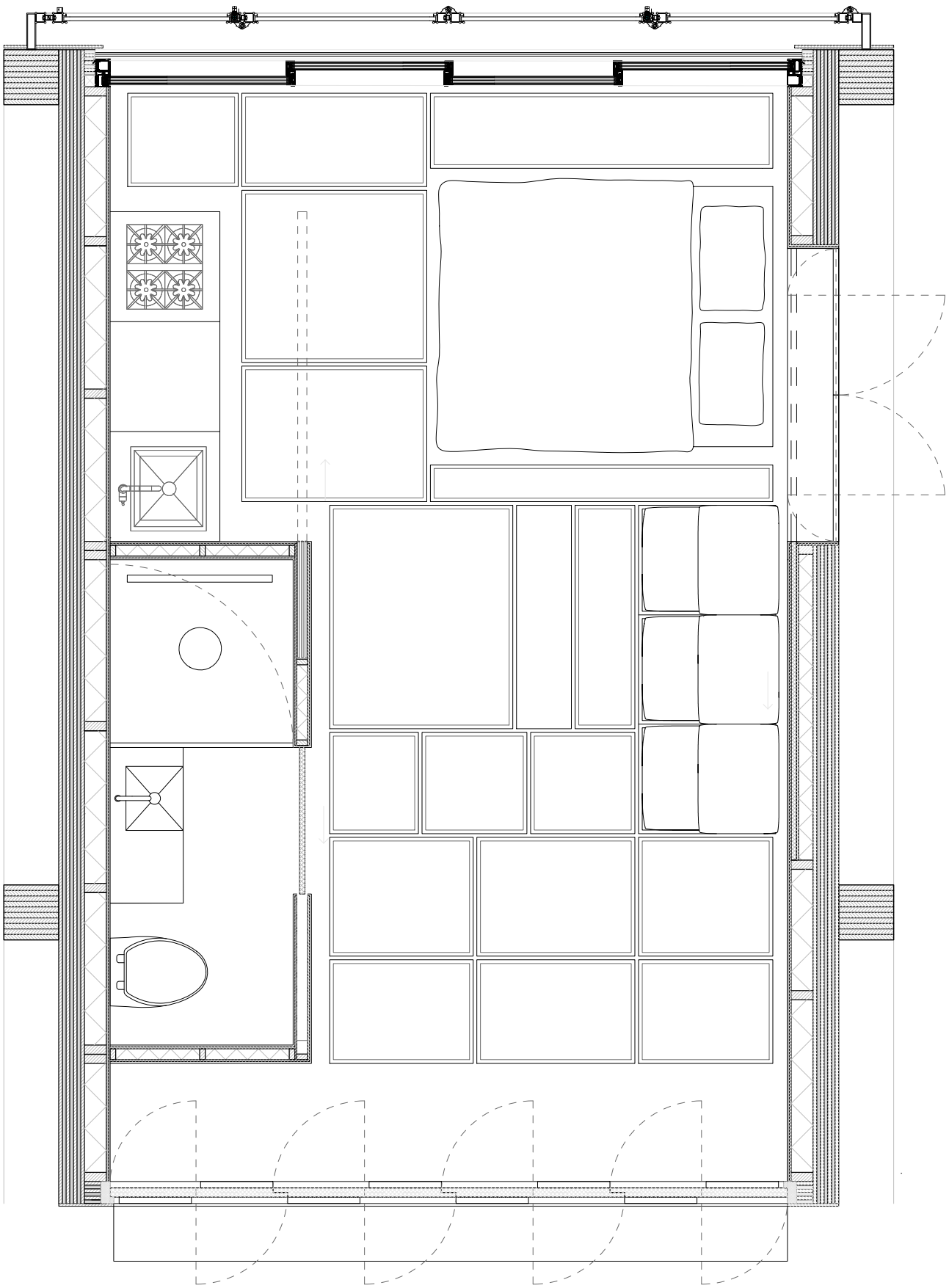
Due to the complexity of the high-density urban context, the construction is desired to be as short as possible. Therefore the units are prefabricated and structurally independent. They can be placed in the structural grid, with a flexible composition. The width of the minimal apartment, 4260 mm determines the structural grid of the design. To generate total freedom in terms of the composition of the units, the installations run in between the apartments, through the grid which is locally structurally interrupted with steel reinforcement, which is shown in detail V3.

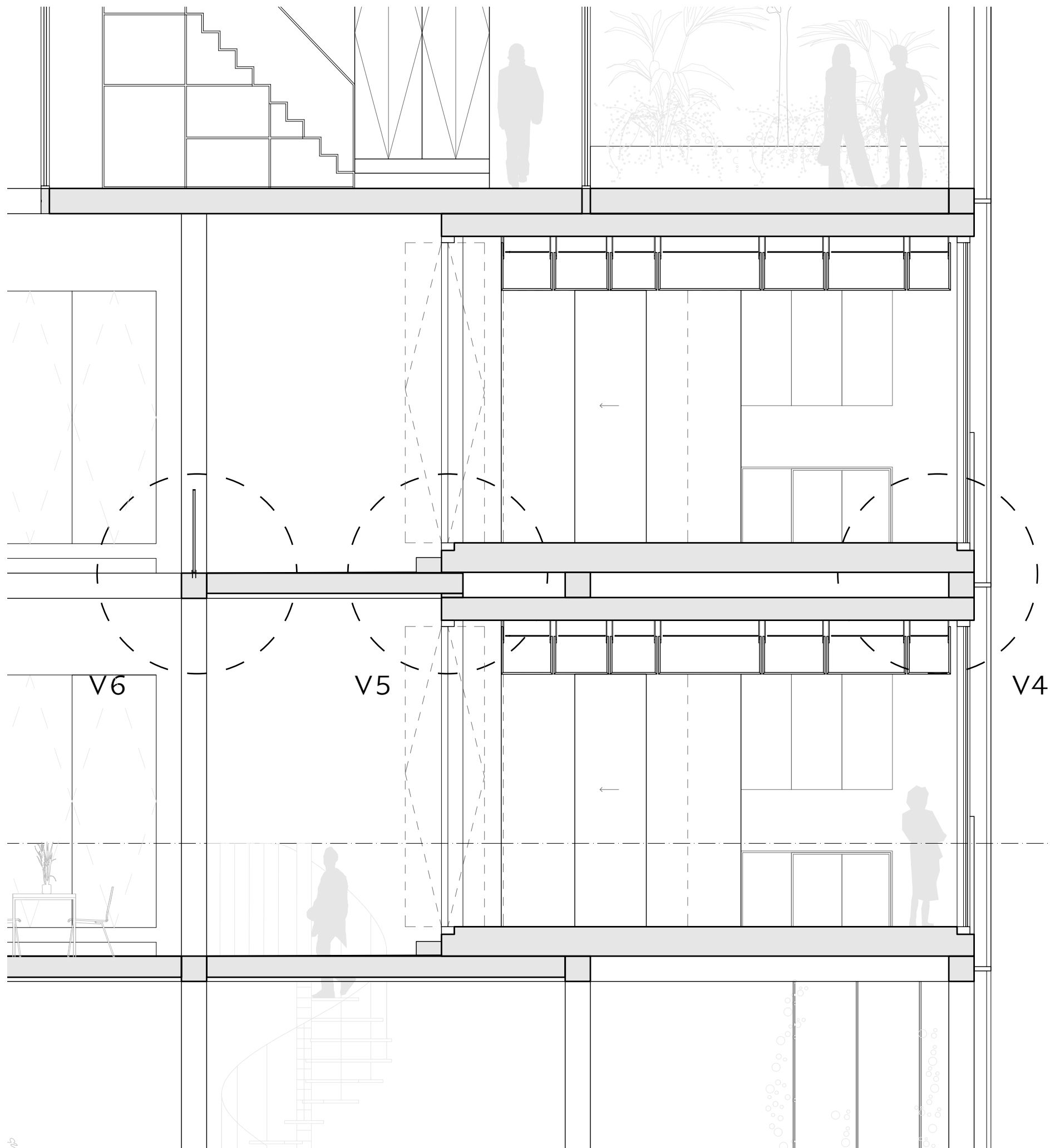
The apartment has three openings, the sliding doors façade, the timber pivot entrance and the glass pivot doors connecting to the adjacent expressive space. Here the thresholds were important, where the threshold at the entrance is high, adding a massive chestnut timber step, the threshold is lowered towards the expressive space.

The façade is composed of three layers, which is shown in detail V4 and H2. First, the glass sliding doors, which are detailed to align with the floor and walls to allow for a thin frame aesthetic. Secondly, the glass railing, positioned on the edge of the apartment unit. And lastly, the façade shutters. These are white coloured perforated steel panels, which are foldable. They generate shading and privacy and align with the concept of 24-hr-architecture. Through this dynamic, the building will have a very different aesthetic in the morning and in the evening, literally displaying the use on the exterior.



plan and ceiling design 1:20
scaled to 1:30



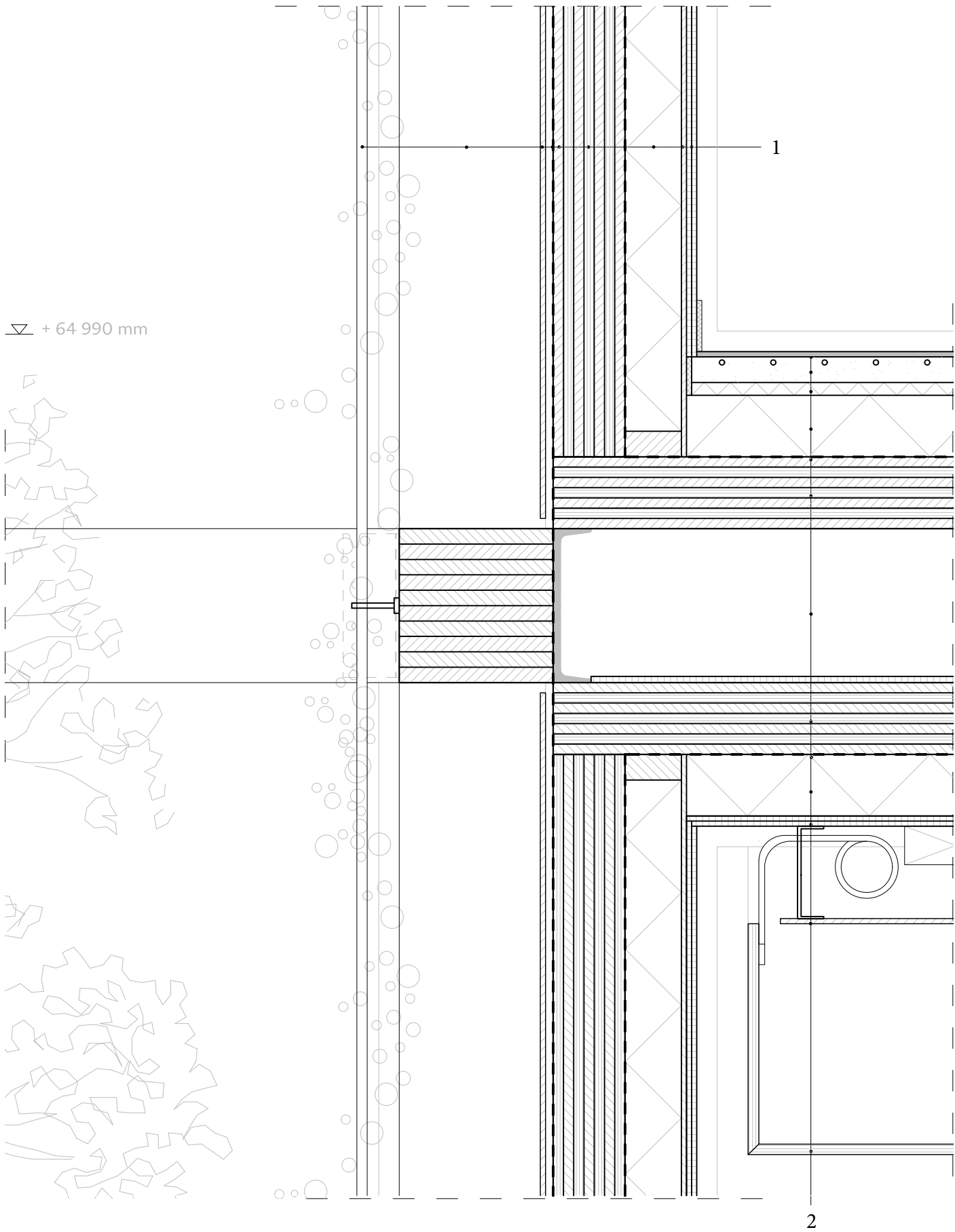


The vertical fragment shows the relation between the apartments, and the relation between the apartment and the atrium. The apartments are placed inside the grid, either aligning with the entrance or with the façade. This composition allows for the atrium to be positioned in front of and behind the apartment, creating two different collective spaces.

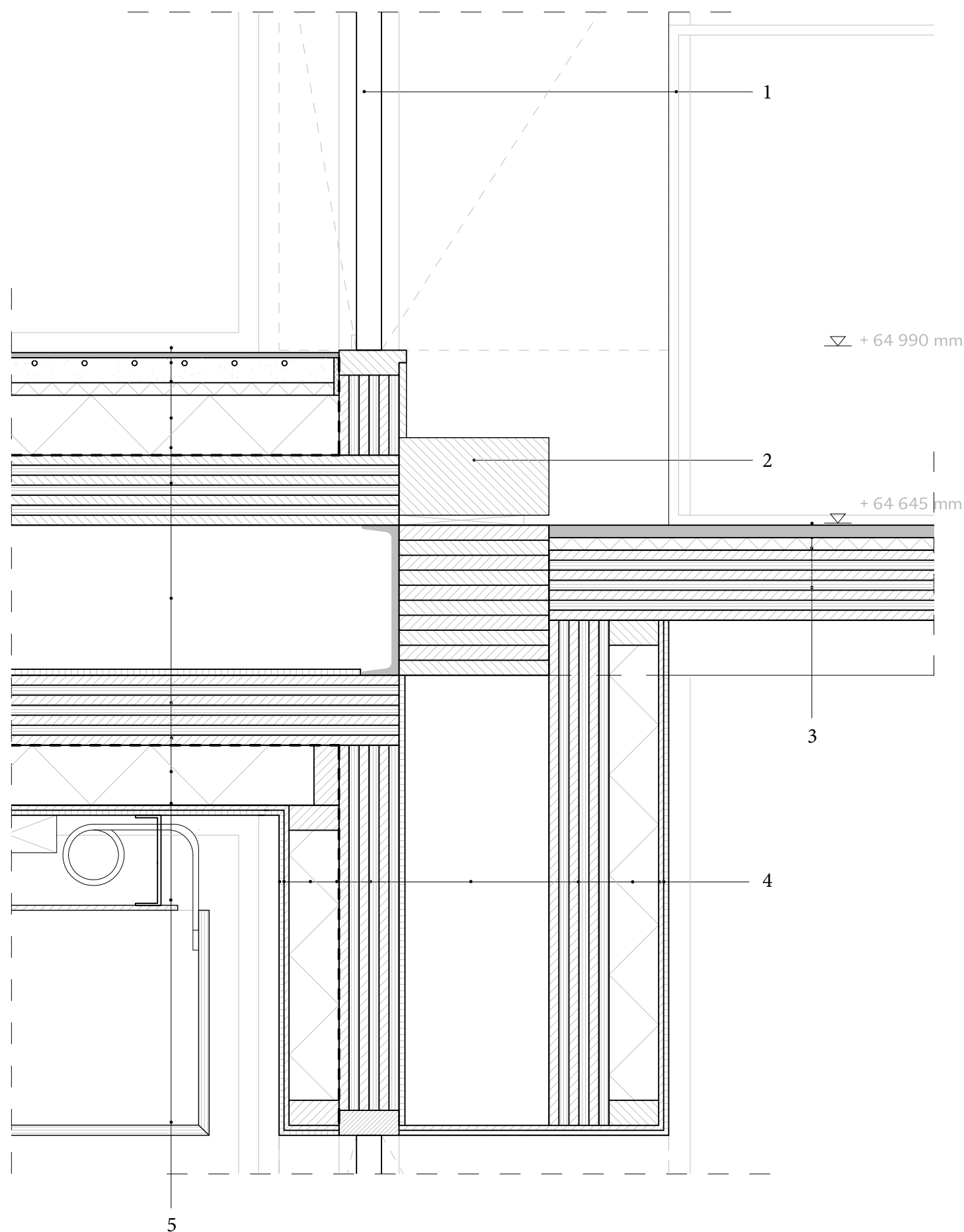
The atrium floors are CLT, aligning with the structural grid on the surface and having an offset of 50 mm at the ceiling in order to accentuate the grid structure from below. The space between the grid and between the apartment has deliberately been left empty. As the apartments are insulated independently, insulation around the apartments is not necessary. From a minimalist point of view it would therefore be unnecessary to fill this space.

In the Rethinking Minimalism project, the accessibility of a space is key. The lowering of the threshold and the allowance for the negotiation of space. However, the project also includes the creation of a threshold for the more private spaces, in this case the apartment. By placing the apartments on the grid and lowering the expressive spaces into the grid, a threshold in the form of a massive chestnut timber step is created. Both from the functional to the expressive space, but also from the functional apartment to the atrium. Detail V6 shows the low threshold of the atrium, which is an open space with opportunity for social interaction. Detail V2 and V5 show the threshold towards the apartment, respectively from the expressive space and the atrium, in order to create a feeling of privacy and ownership.

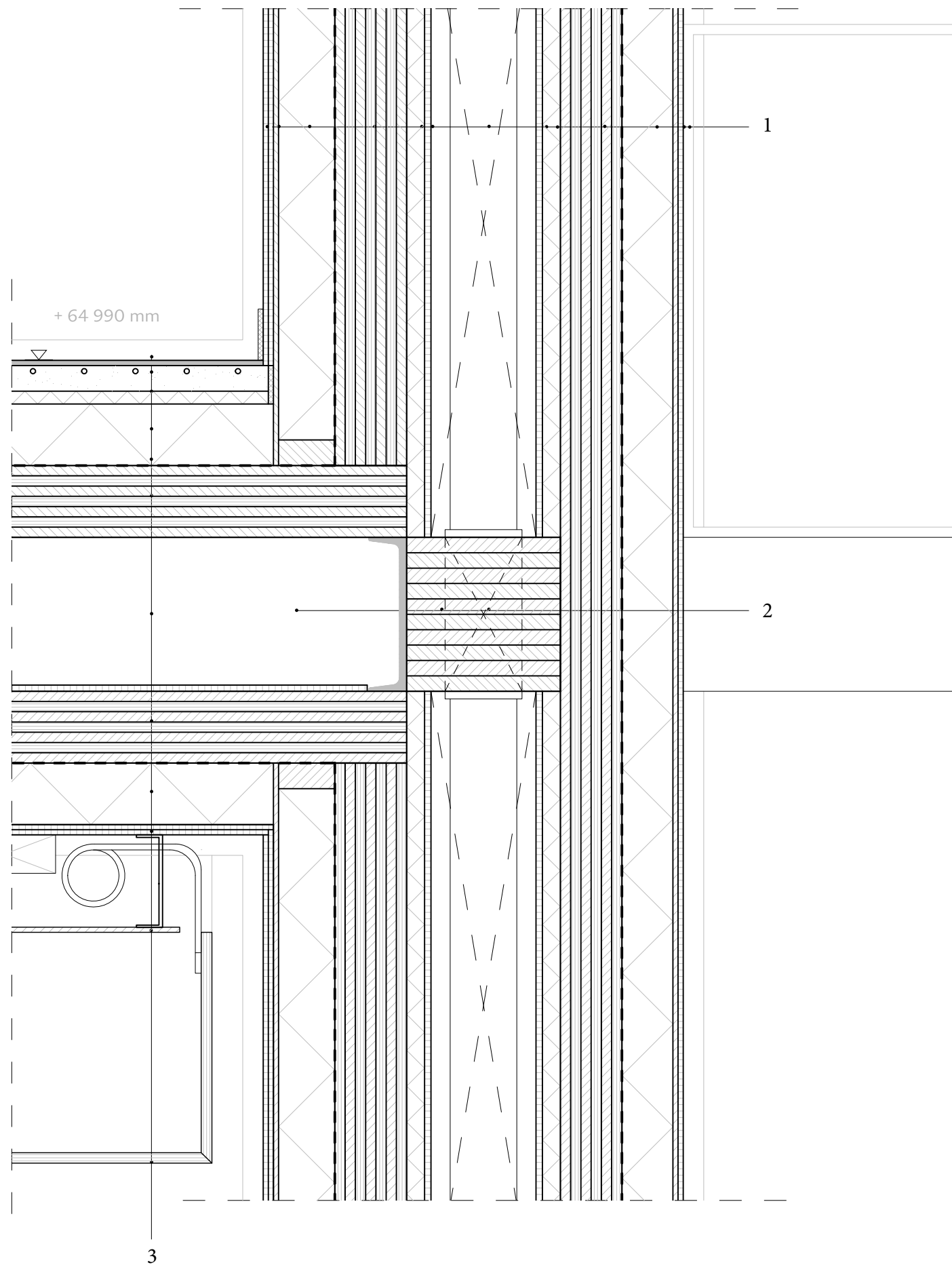
vertical fragment
scale 1:50



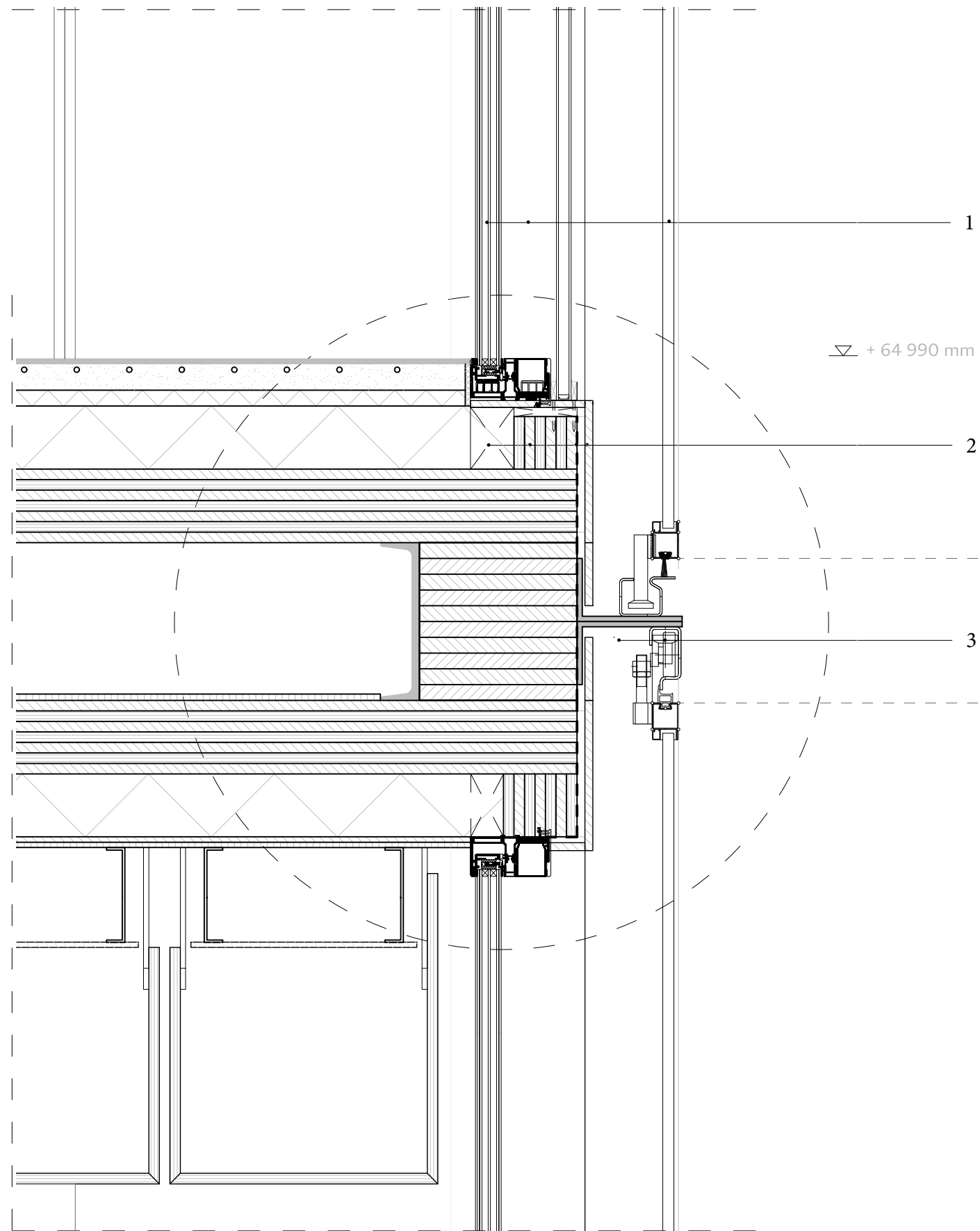
1	steel cable	20
	beech glulam beam	300 x 300
	nord treat fire retardant (tone NTD3I)	-
	Rothoblaas Alu midi anker h=280	-
	attached with screws and timber caps	-
	wooden finishing (american chestnut)	10
	wooden frame	10 x 10
	waterretaining foil	-
	CLT wall (7 layers x 20 mm)	140
	vapour barrier (polyethylene membrane)	-
	insulation in timber frame	120
	MDF panel	20
	plasterboard	2 x 12,5
2	concrete floor finishing	10
	underfloor heating / cooling	50
	accoustic insulation	30
	rock wool insulation	120
	vapour barrier (polyethylene membrane)	-
	CLT floor (7 layers x 20 mm)	140
	beech glulam beam	300 x 300
	nord treat fire retardant (tone NTD3I)	-
	Rothoblaas Alu midi anker h=280	-
	attached with screws and timber caps finishing	-
	gypsum fireproofing	12,5
	CLT floor (7 layers x 20 mm)	140
	vapour barrier (polyethylene membrane)	-
	insulation	120
	MDF panel	20
	plasterboard	12,5
	automated pulley system (ref. Bumblebee type S)	-
	specifics are yet to be determined.	-
	american chestnut finishing	10
	attached with steel C ankers	-
	american chestnut containers h=450	20



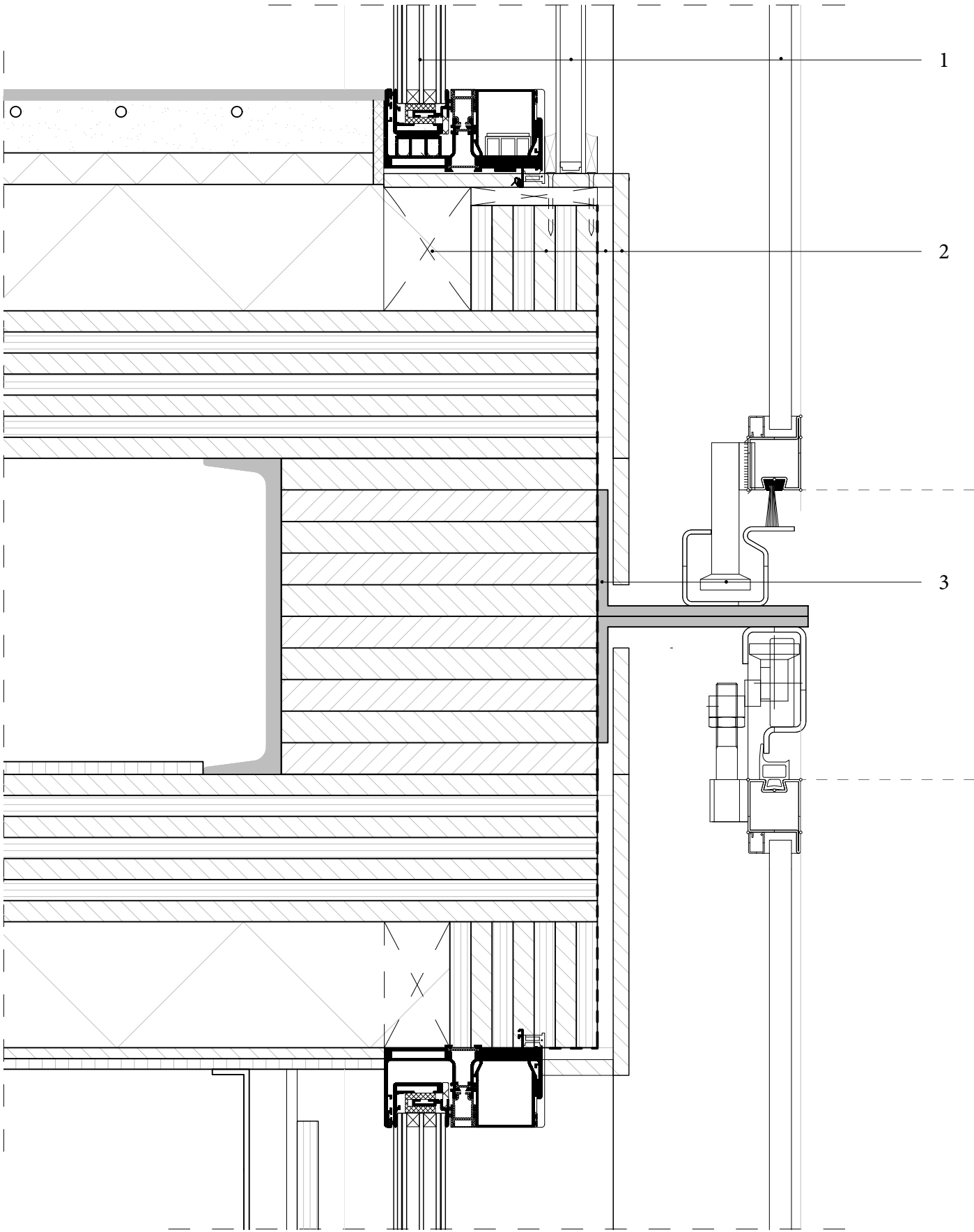
1	glass pivot door	50
	steel frame railing h=1000	20 x 20
2	american chestnut (massive)	300 x 150
	timber attachment (black finishing)	250 x 20
3	grey epoxy finishing	30
	acoustic insulation	30
	CLT floor (7 layers x 20 mm)	140
4	plasterboard	12,5
	MDF panel	20
	insulation in timber frame	120
	vapour barrier (polyethylene membrane)	-
	CLT wall (7 layers x 20 mm)	140
	beech glulam column	300 x 300
	gypsum fireproofing	12,5
	CLT wall (7 layers x 20 mm)	140
	insulation in timber frame	120
	MDF panel	20
	plasterboard	12,5
5	concrete floor finishing	10
	underfloor heating / cooling	50
	acoustic insulation	30
	insulation	120
	vapour barrier (polyethylene membrane)	-
	CLT floor (7 layers x 20 mm)	140
	beech glulam beam	300 x 300
	gypsum fireproofing	12,5
	CLT floor (7 layers x 20 mm)	140
	vapour barrier (polyethylene membrane)	-
	insulation	120
	MDF panel	20
	plasterboard	12,5
	automated pulley system (ref. Bumblebee type S)	
	specifics are yet to be determined.	
	american chestnut finishing	10
	attached with steel C anchors	
	american chestnut containers h=450	20



1	plasterboard	2 x 12,5
	MDF panel	20
	insulation in timber frame	120
	vapour barrier (<i>polyethylene membrane</i>)	-
	CLT wall (<i>7 layers x 20 mm</i>)	140
	sound insulation	30
	gypsum plasterboard	10
	installation shaft	205
	sewerage <i>d=110 mm</i>	
	hot water / cold water <i>2 x d=25 mm</i>	
	electricity	
	data	
	ventilation <i>d=130 mm (100 m³/h per 2 apartments)</i>	
	gypsum plasterboard	10
	sound insulation	30
	CLT wall (<i>7 layers x 20 mm</i>)	140
	vapour barrier (<i>polyethylene membrane</i>)	-
	insulation in timber frame	120
	MDF panel	20
	plasterboard	12,5
2	beech glulam beam	300 x 300
	Rothoblaas Alu midi anker <i>h=280</i>	
	steel C anker	<i>h=300</i>
	nord treat fire retardant (<i>tone NTD3I</i>)	-
	beech glulam beam	300 x 300
	<i>local interruption with steel reinforcement</i>	
3	concrete floor finishing	10
	underfloor heating / cooling	50
	acoustic insulation	30
	insulation	120
	vapour barrier (<i>polyethylene membrane</i>)	-
	CLT floor (<i>7 layers x 20 mm</i>)	140
	beech glulam beam	300 x 300
	gypsum fireproofing	12,5
	CLT floor (<i>7 layers x 20 mm</i>)	140
	vapour barrier (<i>polyethylene membrane</i>)	-
	insulation	120
	MDF panel	20
	plasterboard	12,5
	automated pulley system (ref. Bumblebee type S)	
	<i>specifics are yet to be determined.</i>	
	american chestnut finishing	10
	<i>attached with steel C ankers</i>	
	american chestnut containers <i>h=450</i>	20

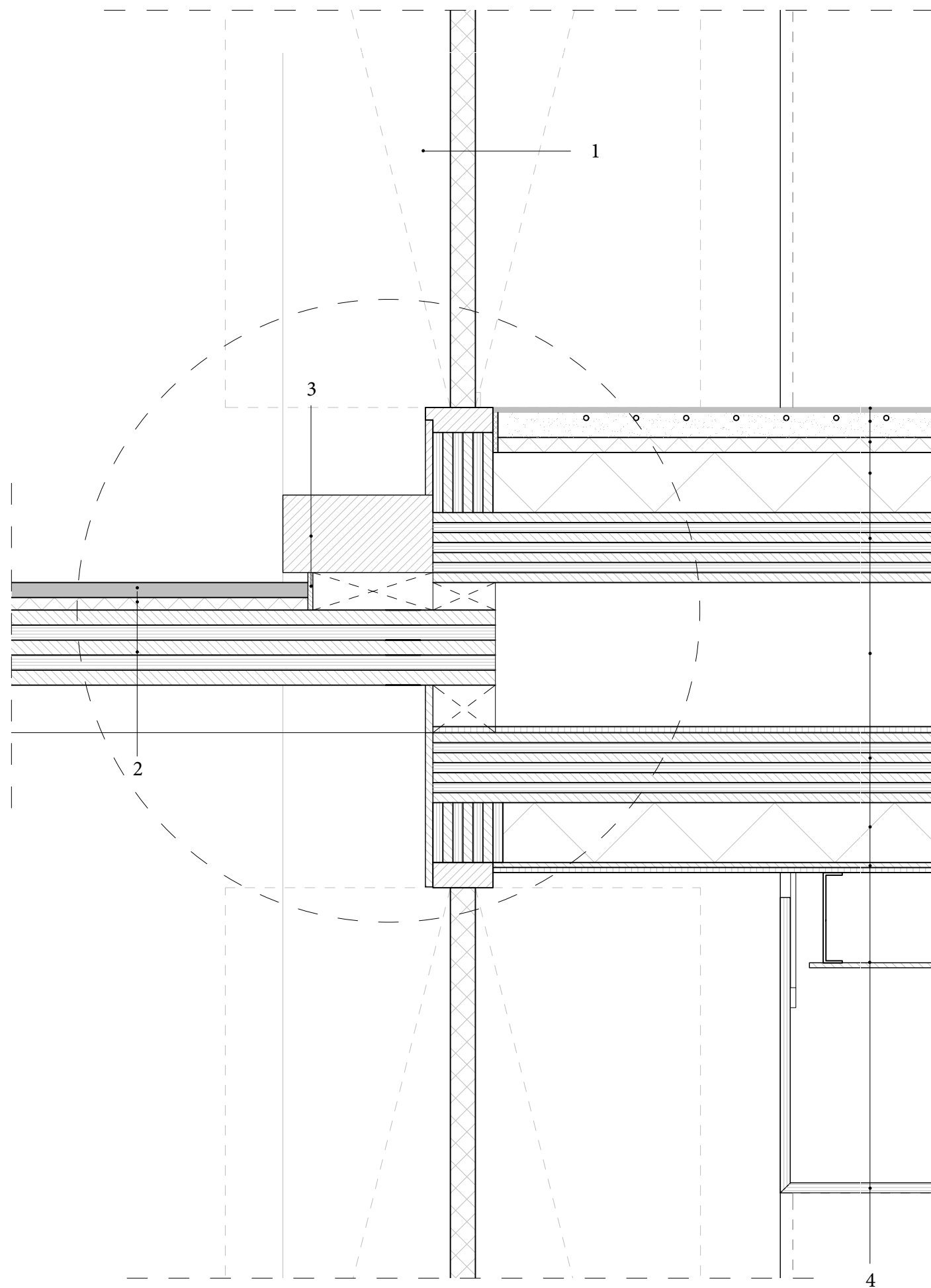


- | | | |
|---|---|------------------------|
| 1 | triple glazing
Metaglas Thermo XL XHS-9 sliding door frame
double glazing railing in steel C frame | |
| 2 | CLT wall (7 layers x 20 mm)
waterretaining foil
ventilation
american chestnut timber finishing
<i>waterretaining coating (specifics yet to be determined)</i> | 140
0,5
10
15 |
| 3 | steel L profiles
folding doors Jansen by ODS
perforated steel shutters
<i>white colour finishing throughout</i> | 120 x 100 x 8
21 |



+ 64 990 mm

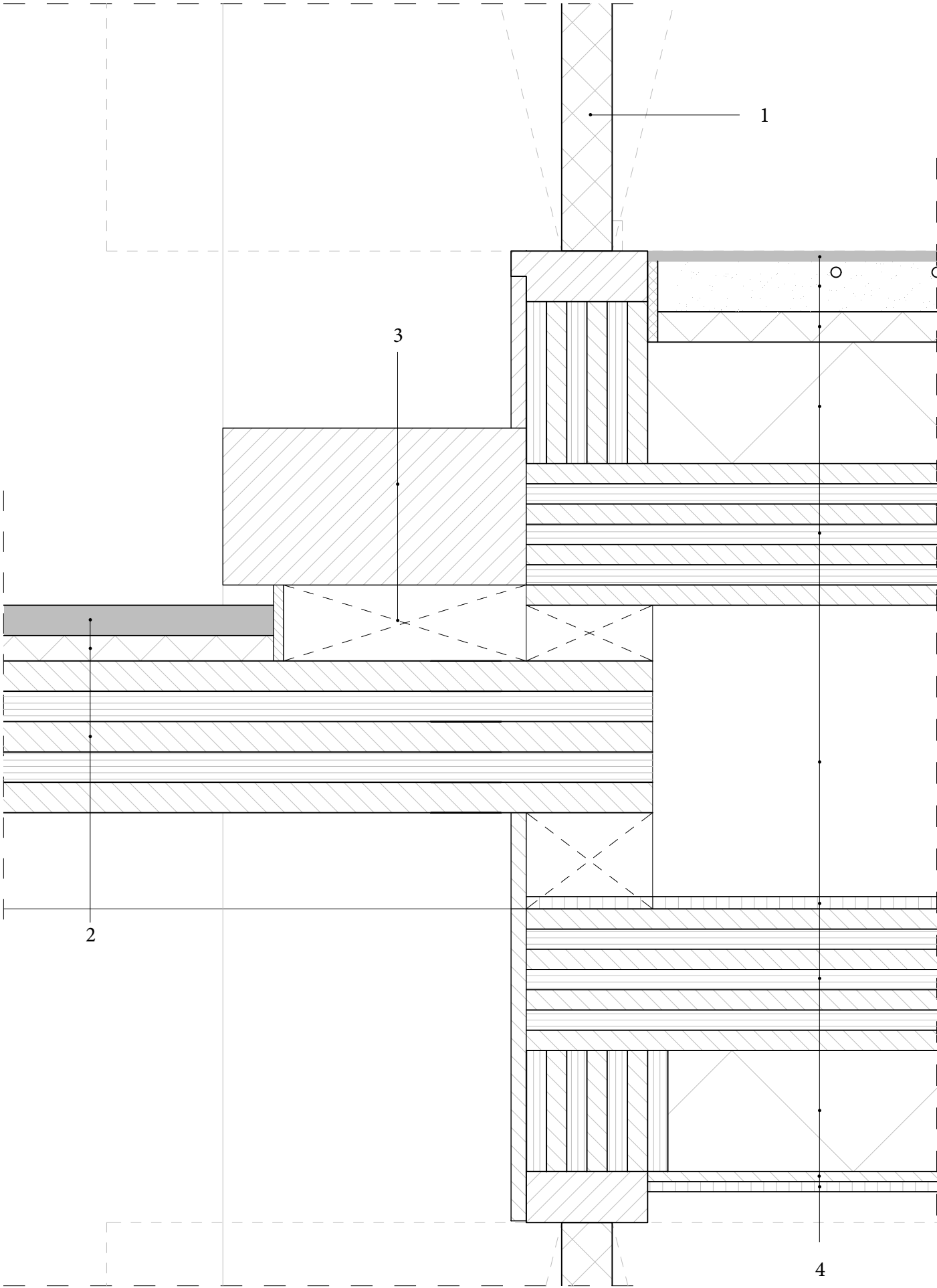
- 1 triple glazing
Metaglas Thermo XL XHS-9 sliding door frame
double glazing railing in steel C frame
- 2 CLT wall (7 layers x 20 mm) 140
waterretaining foil 0,5
ventilation 10
american chestnut timber finishing 15
waterretaining coating (specifics yet to be determined)
- 3 steel L profiles 120 x 100 x 8
folding doors Jansen by ODS
perforated steel shutters 21
white colour finishing throughout



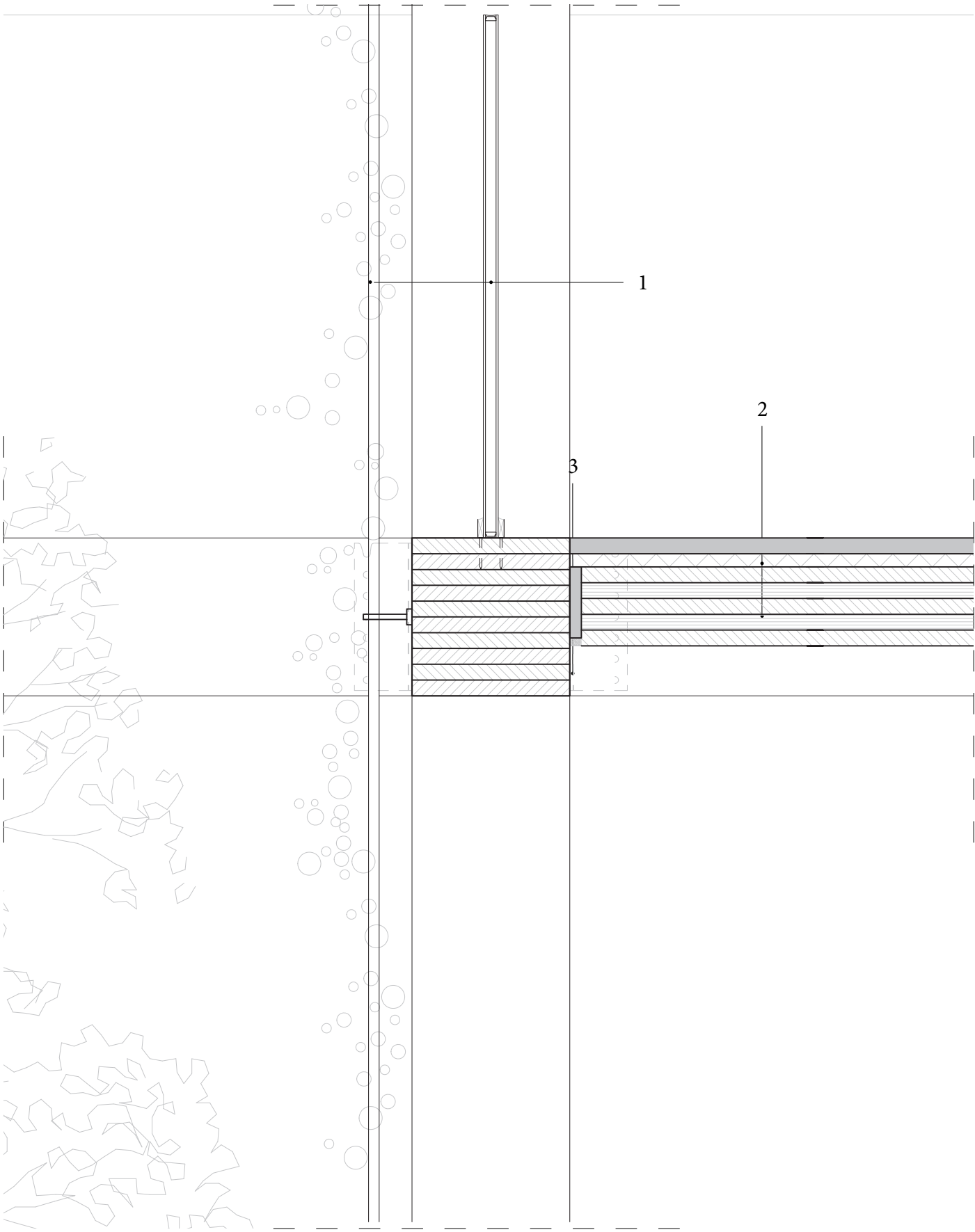
▽ + 64 990 mm

▽ + 64 645 mm

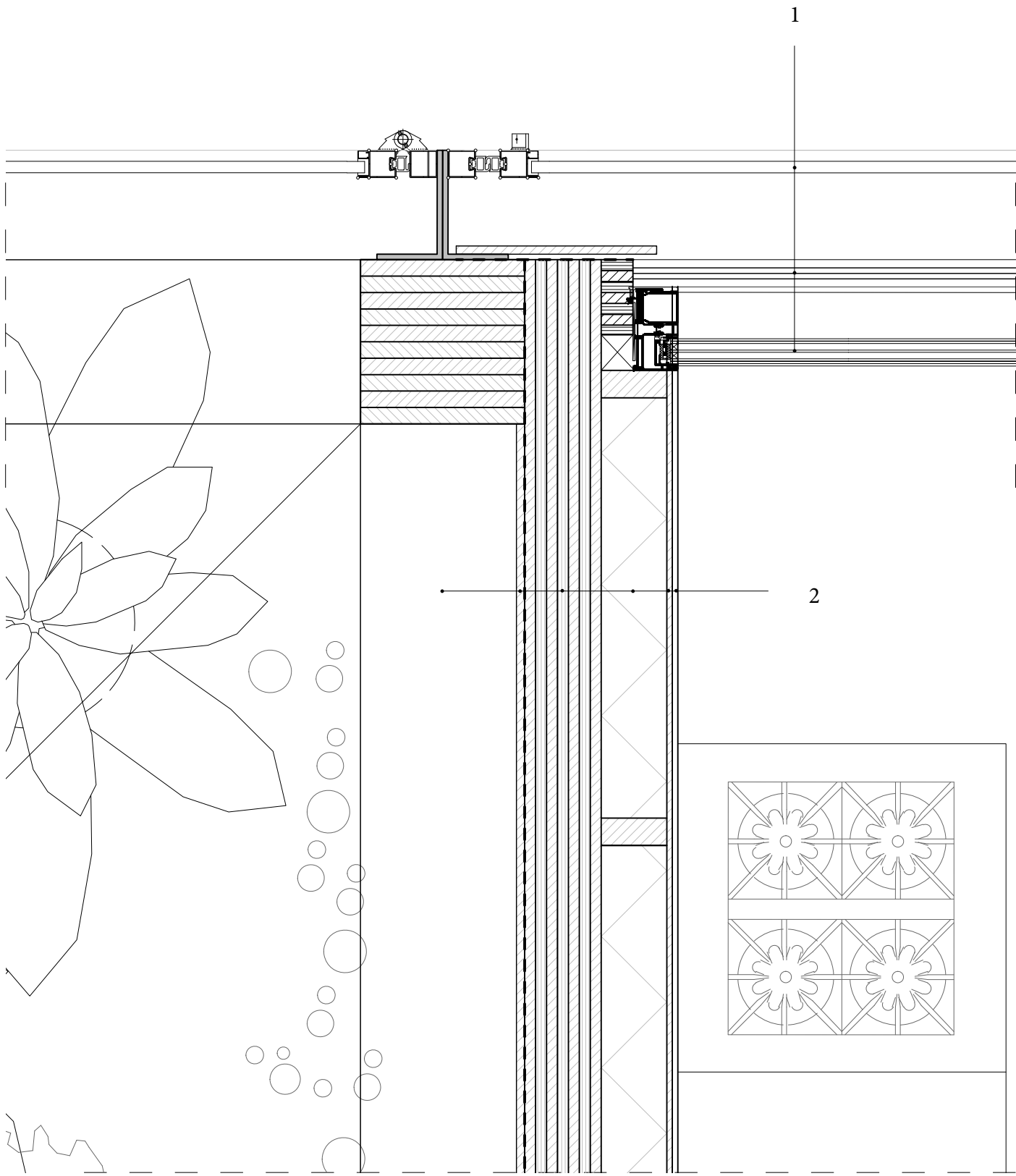
1	timber pivot door <i>eclipse acoustic panel (or similar)</i> <i>american chestnut veneer finishing</i> <i>steel frame, black finishing</i>	50
2	epoxy flooring white high shine finish	30
	acoustic insulation	30
	CLT floor (7 layers x 20 mm)	140
3	american chestnut (massive) timber attachment (black finishing)	300 x 150 250 x 20
4	concrete floor finishing	10
	underfloor heating	50
	acoustic insulation	30
	insulation	120
	vapour barrier (<i>polyethylene membrane</i>)	-
	CLT floor (7 layers x 20 mm)	140
	beech glulam beam	300 x 300
	gypsum fireproofing	12,5
	CLT floor (7 layers x 20 mm)	140
	vapour barrier (<i>polyethylene membrane</i>)	-
	insulation	120
	MDF panel	20
	plasterboard	12,5
	automated pulley system (ref. Bumblebee type S) <i>specifics are yet to be determined.</i>	
	american chestnut finishing <i>attached with steel C anchors</i>	10
	american chestnut containers h=450	20



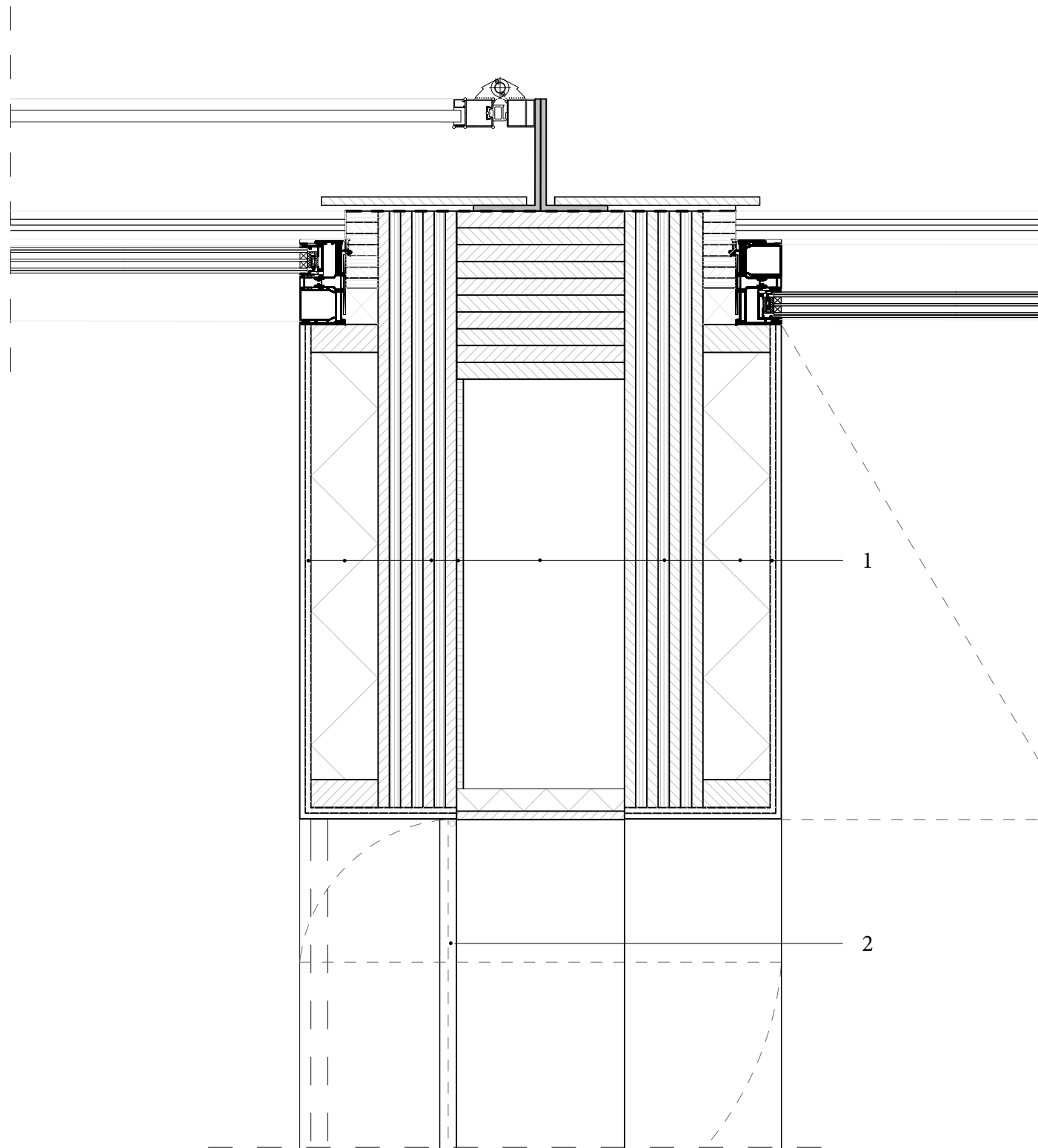
1	timber pivot door <i>eclisse accoustic panel (or similar)</i> <i>american chestnut veneer finishing</i> <i>steel frame, black finishing</i>	50
2	epoxy flooring white high shine finish accoustic insulation CLT floor (7 layers x 20 mm)	30 30 140
3	american chestnut (massive) timber attachment (black finishing)	300 x 150 250 x 20
4	concrete floor finishing underfloor heating accoustic insulation insulation vapour barrier (<i>polyethylene membrane</i>) CLT floor (7 layers x 20 mm) beech glulam beam gypsum fireproofing CLT floor (7 layers x 20 mm) vapour barrier (<i>polyethylene membrane</i>) insulation MDF panel plasterboard automated pulley system (ref. Bumblebee type S) <i>specifics are yet to be determined.</i> american chestnut finishing <i>attached with steel C anchors</i> american chestnut containers h=450	10 50 30 120 - 140 300 x 300 12,5 140 - 120 20 12,5 10 20



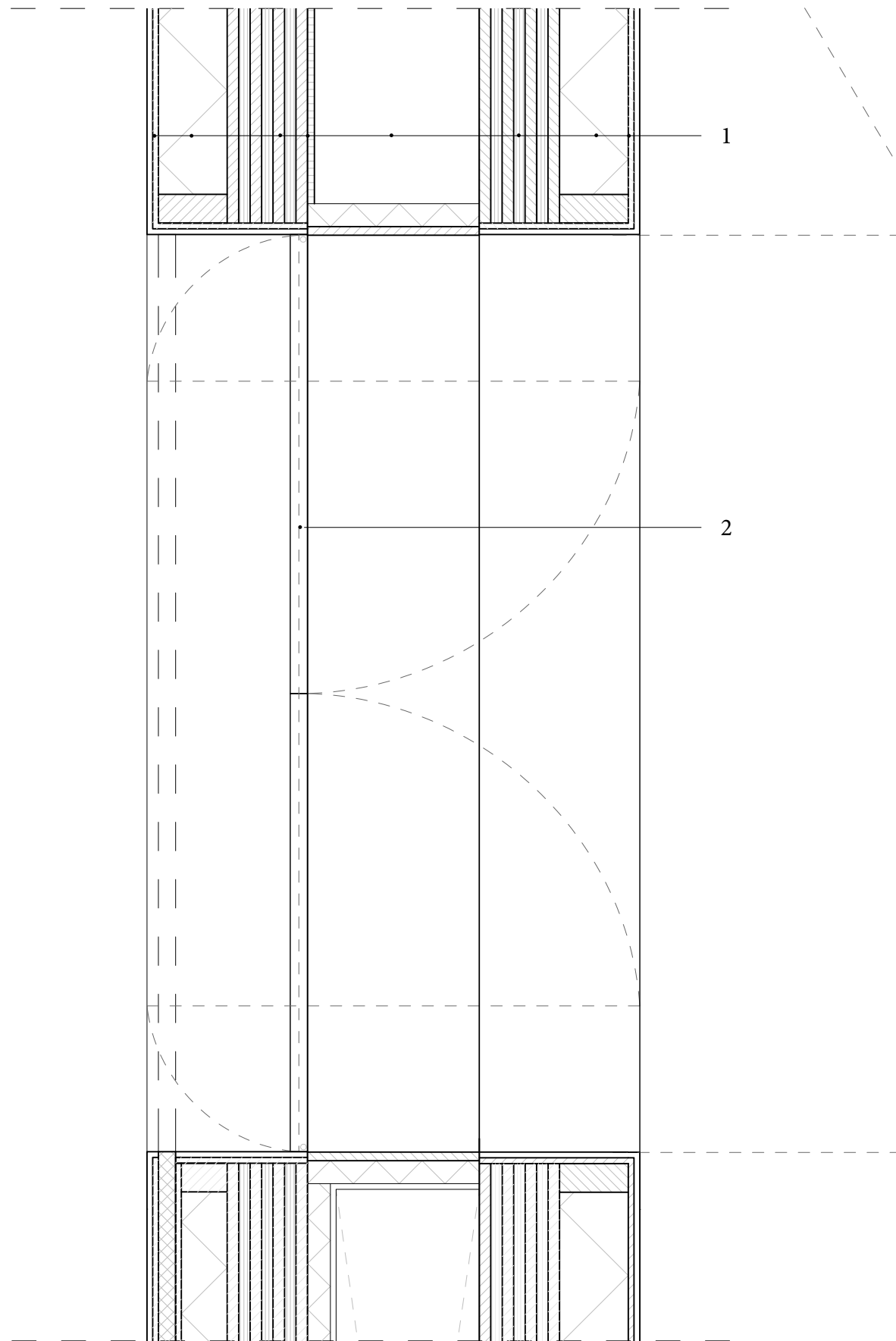
1	steel cable glass railing (h=1600)	d = 10 50
2	epoxy flooring white high shine finish accoustic insulation CLT floor (7 layers x 20 mm)	30 30 140
3	connection CLT floor to beam Rothoblaas T-lock connector nord treat fire retardant (tone NTD31) beech glulam beam	- 300 x 300



- 1 triple glazing
Metaglas Thermo XL XHS-9 sliding door frame
double glazing railing in steel C frame
- steel L profiles 120 x 100 x 8
folding doors Jansen by ODS
perforated steel shutters 21
white colour finishing throughout
- 2 nord treat fire retardant (tone *NTD31*) -
beech glulam beam 300 x 300
american chestnut timber finishing 15
waterretaining foil -
CLT wall (7 layers x 20 mm) 140
rockwool insulation 120
MDF panel 20
plasterboard 12,5



1	plasterboard	12,5
	MDF panel	20
	vapour barrier (<i>polyethylene membrane</i>)	-
	CLT wall (<i>7 layers x 20 mm</i>)	140
	beech glulam column	300 x 300
	CLT wall (<i>7 layers x 20 mm</i>)	140
	insulation in timber frame	120
	MDF panel	20
	plasterboard	12,5
2	glass pivot door	50
	steel stop	d = 10



1	plasterboard	12,5
	MDF panel	20
	vapour barrier (<i>polyethylene membrane</i>)	-
	CLT wall (<i>7 layers x 20 mm</i>)	140
	beech glulam column	300 x 300
	CLT wall (<i>7 layers x 20 mm</i>)	140
	insulation in timber frame	120
	MDF panel	20
	plasterboard	12,5
2	glass pivot door	50
	steel stop	d = 10

Insulation

The climate diagram on the right page shows the insulation principle of the building. The apartments and expressive spaces are prefabricated and insulated with 120 mm rockwool on the interiors. The units have floor heating and cooling and the temperature can be regulated individually.

The atrium is designed as an open space with a flexible composition and therefore the atrium occasionally borders the façade. Also larger cuts are made in the façade, in order to allow sunlight in the atrium. The atrium will be a half climate, closed off with an openable curtain wall system with triple glazing. The atrium is therefore insulated, but will not be heated.

The rooftop terrace will be completely open and therefore is not insulated nor heated.

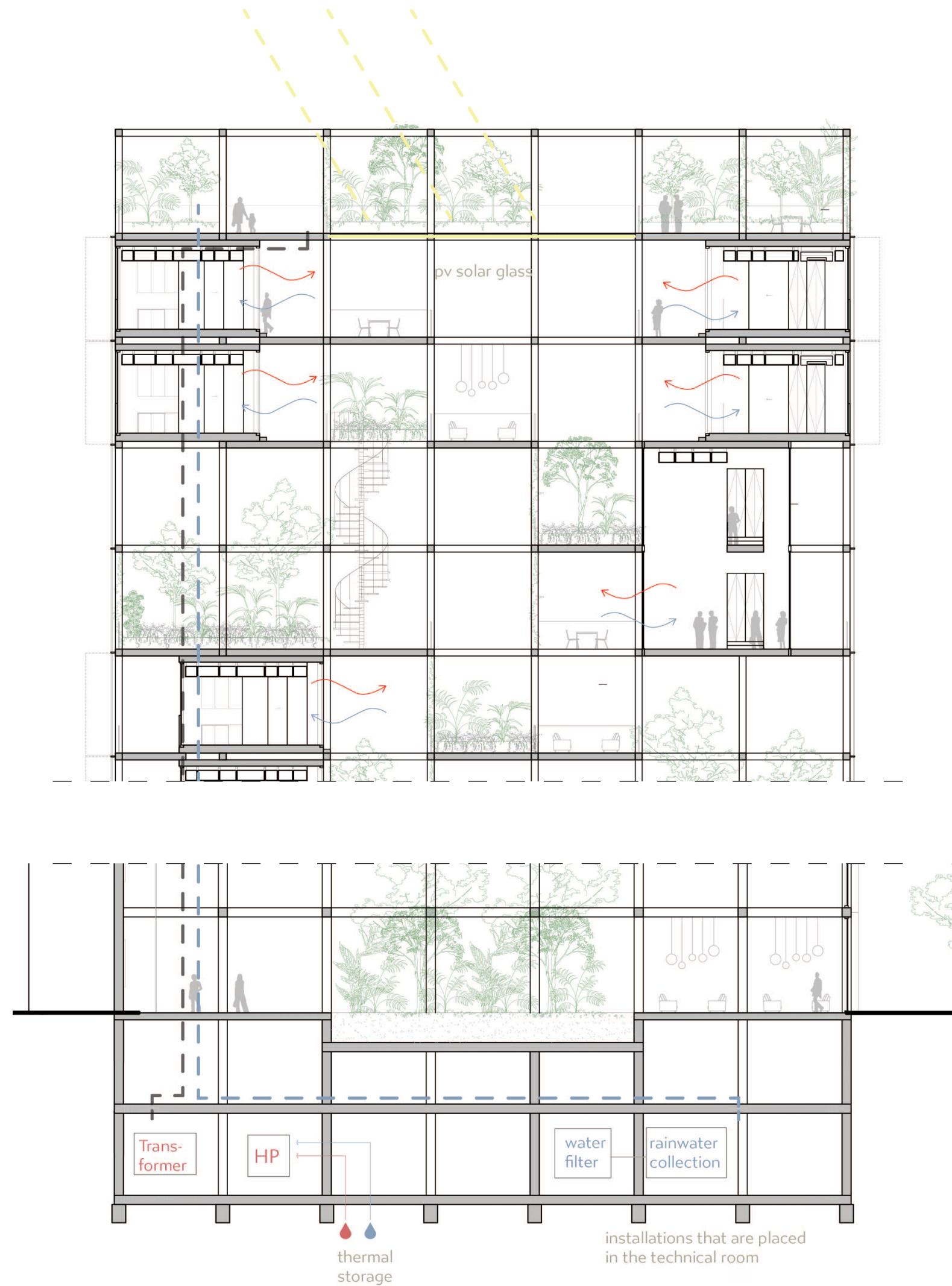
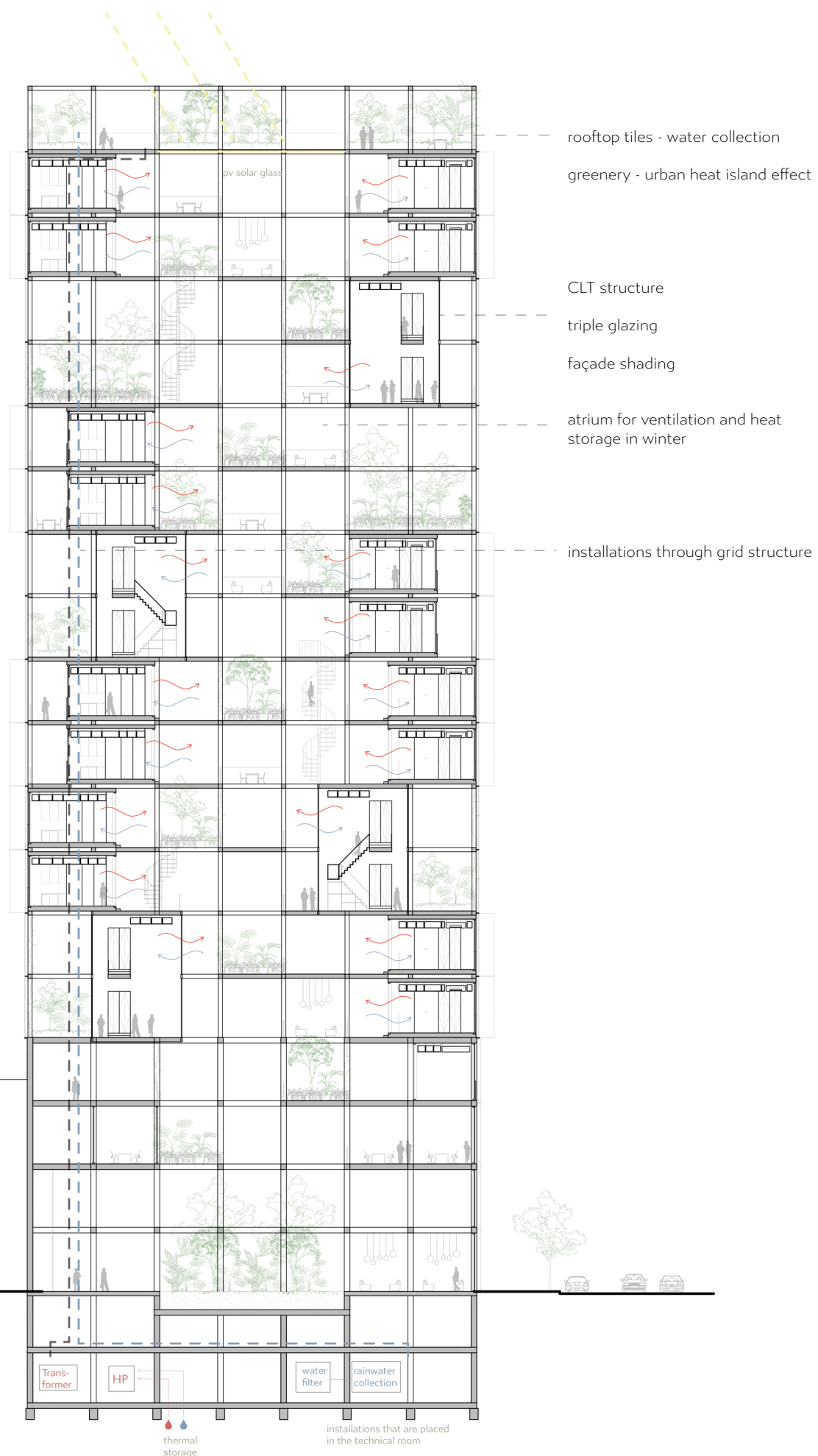
Installations

The roof has two materializations, concrete finishing to allow for rainwater collection and greenery to contribute to the urban heat island effect. The rainwater will be collected in the basement and after filtering, the grey water will be used for the toilets in the collective and urban spaces.

The roof also contains 240 m² crystalline pv glass (Onyx Solar or equivalent). This results in an average energy production of 44 197 kWh per year for the entire building. This will be used to facilitate basic energy consumptions such as lighting in the collective atrium.

The basement contains the installations, under which a heat pump and a thermal storage. The atrium will be used as natural ventilation and heat storage in winter. Also mechanical ventilation will be organized through the installation in the expressive space. The installations for the units will be placed through the grid and therefore allows full flexibility in terms of composition.





RESEARCH & DESIGN **DISCUSSION**

The Rethinking Minimalism project will conclude in a discussion, where the relation between the research and design will be evaluated. The chapter *towards design* stated that the paper will not conclude in an absolute answer to the research question, but rather in the given context of Manhattan, the design will be *addressing* the research question. This will allow for more questions to emerge, that could be adapted in a future continuation of the project. The project is tested on a broader socio-economic scale and shows the critical points in regards to sustainability, affordability, the target group and urban anchoring.

7.1 - sustainability

Minimal architecture. In the glossary it is defined as *'Architecture with a flexible and transformable floor plan, with sustainability, creating a higher urban density and reducing the ecological footprint of the design, as the main motive.'* The discussion gives the opportunity to test the project in terms of this sustainability. First it is important to define sustainability. The Cambridge dictionary (n.d.) states two definitions of sustainability:

- *'the quality of being able to continue over a period of time.'*
- *'the quality of causing little or no damage to the environment and therefore able to continue for a long time.'*

7.1.1 - durability

The first definition, which I would personally define as durability, has been the main starting point of the project. The world population is growing, and in combination with a mass-urbanization movement, urban areas need expansion. My critique on this is that I do not consider horizontal nor vertical expansion durable. Urban

sprawl leads to longer commutes, making 'outwards' expansion debatable in terms of sustainability. 'Upwards' expansion has a very literal limit and decreases the quality of urban life on the street level, therefore I also consider vertical expansion unsustainable. How high are we willing to go? This was the motivation to explore an 'inwards' expansion, through minimalism. The living space is compressed and designed for a 24-hr use. The 22-square-meter apartment is used in its entirety throughout the day. When more space is needed or desired, this space can be claimed from the collective, either in a social setting (the atrium) or in a private setting (the expressive space). This is shown in plan in figure 24 on the next page. Less space is needed individually, allowing for more housing to be developed in the same building envelope.

The average apartment in Chelsea for a single or couple is 57 square meters. When applied to the given building envelope on the corner of 10th Ave and 18th St, this results in the design of 11 apartments per floor. The context limits the height at 85 meters, allowing 14 floors. This results in the design of 154 apartments of an average size, with a minimal collective circulation space in the center. The Rethinking Minimalism design allows for 16 22-square-meter apartments per floor. This results in 224 apartments, with the addition of expressive spaces - one per four apartment - and a large collective circulation space, large enough to allow for social interaction. In terms of housing density - and therefore addressing the first sustainability definition of the Cambridge dictionary - the project increases the density with 145%.

Ofcourse there is a significant difference between 57 m² and 22 m². However, it is important to note that the average apartment is designed in a traditional sense, linking habit to habitat. The apartment probably consists of a small bedroom, a tiny kitchen,

perhaps a study and a living room. Those 57 m² are subdivided into smaller rooms and while the user can only do one habit at a time, most habitats are unused most of the time. The minimal apartment is only 22 m², but is used to full capacity all of the time.

7.1.2 - emergy

The second definition in the Cambridge dictionary states that sustainability is not causing damage to the environment. In relation to architecture, I believe this damage should be considered in twofold. The damage caused by the built of the design and the damage caused by the use of the design. This damage can be expressed in the term 'emergy'. Brown (2004) defines emergy as: *'the availability of energy (exergy) of one kind that is used up in transformations directly and indirectly to make a product or service.'* In other words, the total embodied energy in both the production and built of the design, plus the energy that will be used during the life of the building.

Living in a minimal space does not only contribute to the global problem of urbanization, it also means that the less square meters you use, the less you need to heat, cool, light and ventilate. In terms of the 'use' aspect of the emergy, minimal living is more sustainable than the alternative of the average apartment. A smaller surface also results in a smaller volume. This leads to the minimization of building materials. The minimal apartment simply requires less CLT, less insulation and less finishing than a larger apartment. However, the design fills the entire building envelope, therefore needing additional building materials for the collective atrium. The atrium in a minimal setting would be way larger than the atrium in a setting with average apartments. In order to minimize the emergy here, the atrium was designed with a very light structure with minimal floor areas. The structural grid is made from locally sourced beech timber,

being 30% stronger than for example pine, thus allowing to be 30% thinner. The fire resistance is guaranteed by applying a fire proof coating instead of over-dimensioning the timber. The floors in the atrium are only placed where needed for circulation space and occasionally in a small lounge setting to allow for social interaction.

Emergy also includes the energy needed for the use of the building. The previous paragraph stated that the less square meters you have, the less energy you need for the heating, cooling and lighting of the space. However, in addition to the standard energy needs of housing, the transformational furniture requires extra electricity. The initial design ambition was to compensate the 'extra electricity' that is needed for the transformations with the solar glass on the roof. The design includes 240 square meters of solar glass. When calculating the energy it produces in the given context, this resulted in an average of 44 197 kWh per year for the entire building. Being lower than expected, this energy supply could be used for basic collective functions such as the lighting in the atrium, but would not contribute significantly to the transformation of the furniture in the apartments. This would be the first critical note for the continuation of the project. Exploration into more energy producing architectural elements, for example solar cells in the façades, would be beneficial to the project.

Concluding the sustainability aspect of the discussion, I do believe the design has a contribution to the broader socio-economic scale. By increasing the housing density by 145%, this allows to take the pressure of the urban densification due to mass-urbanization. Living in a minimal apartment results in a lower emergy, both in terms of embodied energy of the building materials and the energy needed for the use of the building.

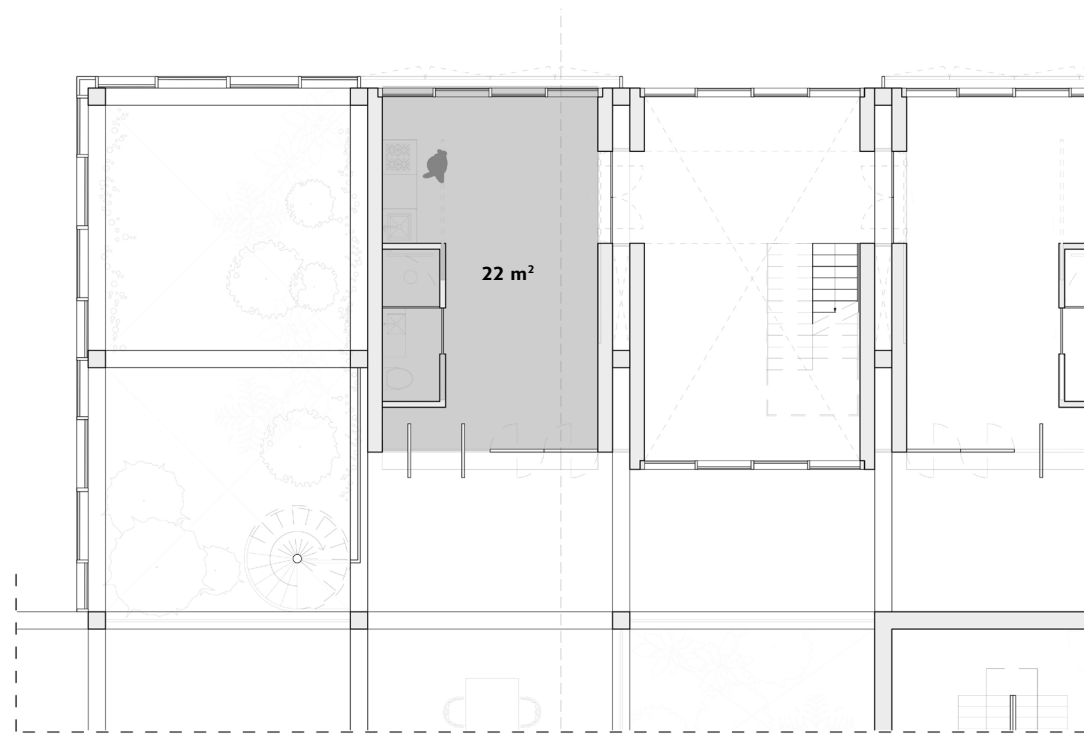
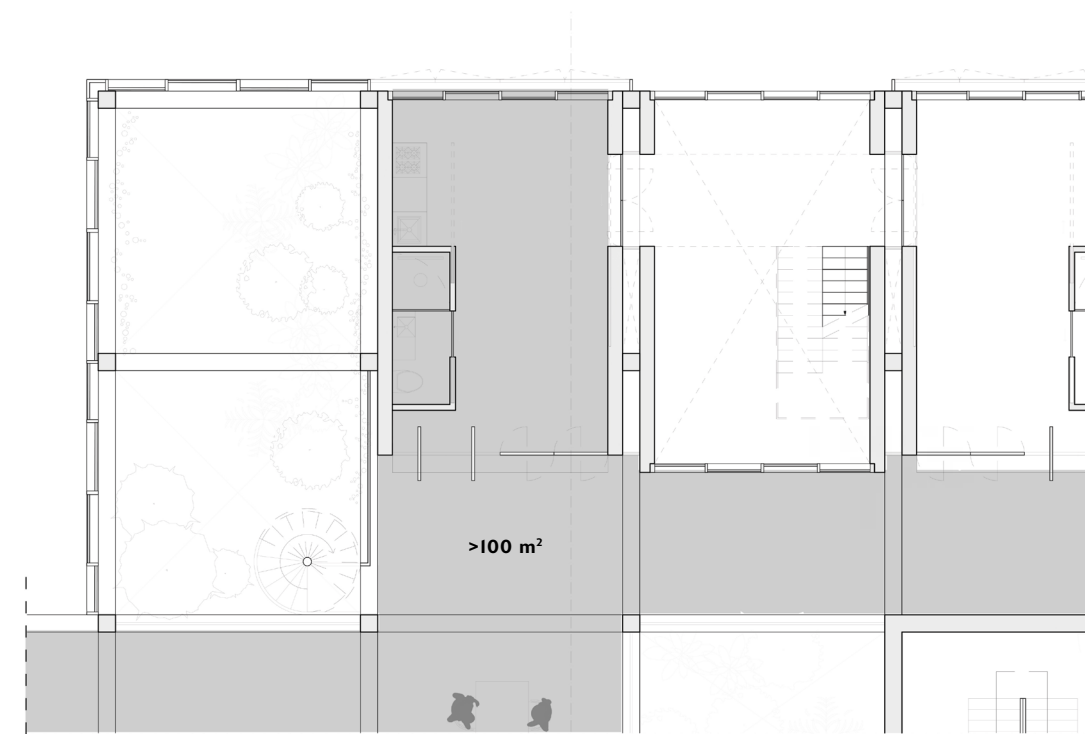
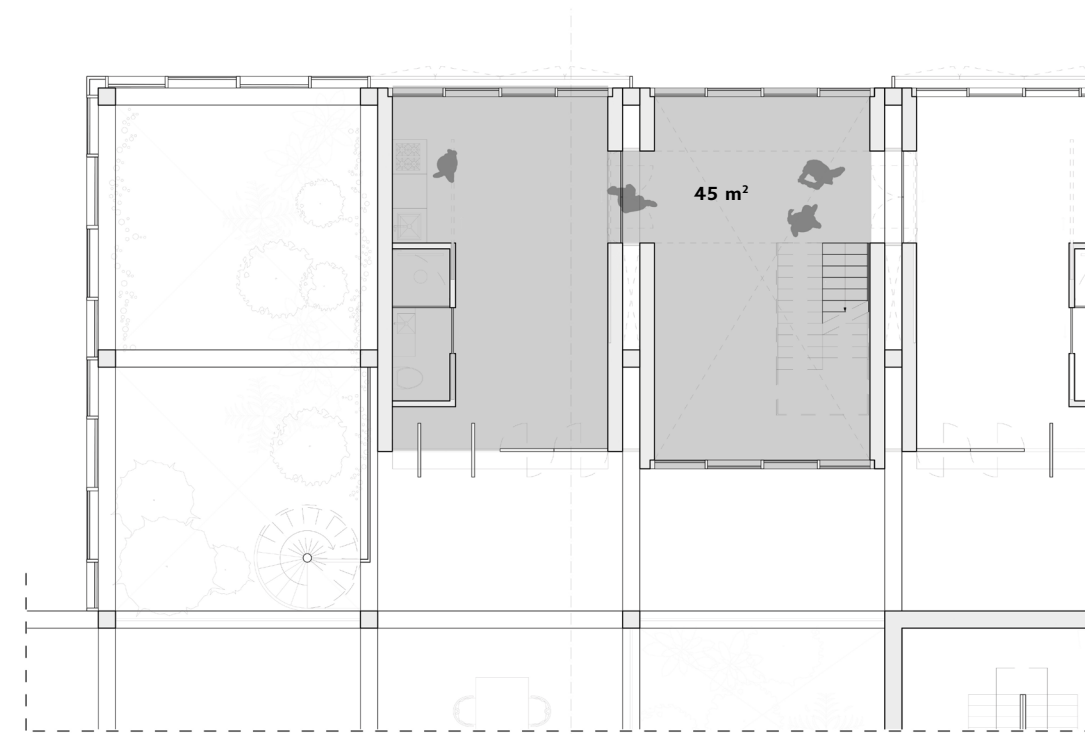


Figure 24 - the negotiation of space in plan.
Illustration by author.



7.2 - affordability

'If you were given the opportunity to pitch your project to president Biden, in regards to his plan to develop more social housing on a large scale, why would your project be advisable?'

This question became relevant in the last design phase of the project. It is relevant, in my opinion, in regards to the affordability of the project and perhaps application on a larger scale. First of all it is important to define social housing. *'Houses and flats that are owned by local government or by other organizations that do not make a profit, and that are rented to people who have low incomes.'* (Cambridge dictionary, n.d.) In other words, the housing has to be affordable both in terms of materials and maintenance.

The previous paragraph stated that through minimal living, the building materials and energy demand are minimized correspondingly. As every high density urban context is complex, the building construction should be as quick as possible. Therefore, very early on in the design phase, the decision was made to prefabricate the apartments, in order to fast-track the construction time. This results in the prefabrication of the apartments in high quantity, thus lowering the construction price as well. The building materials for the atrium will be prefabricated (up to the maximum transportation length of 14 meters) and transported to the site. As the timber is locally sourced, the transportation will be relatively affordable.

The collective atrium and its opportunity for social interaction aligns with the social value of social housing. However, a critical note has to be made. As the atrium is collective and has a social character, the feeling of ownership will be relatively low. Meaning that the residents will feel less responsible for the maintenance of the space. Therefore

maintenance for both the collective and urban space will have to be outsourced, resulting in a monthly fee for the residents. Concluding the affordability question, I do believe the Rethinking Minimalism project would be advisable to apply on a larger scale as social housing. Through the increase of the housing density more people can live on the same area, lowering the costs of the land, building materials and energy consumption. Furthermore, collective and urban spaces align with the social character of social housing.

7.3 - target group

With the emergence of the question regarding social housing, the target group of the project should be discussed. Very early on in the research phase the decision was made to focus on a specific target group. Young urban professionals, this group is 20-35 years old, has a high educational attainment and is working in an urban environment. This target group enjoys city life and sees the city as an extension of their living space. One lives alone or as a couple and is open-minded towards new architectural concepts. This target group is based on the New York City's Manhattan borough data, showing the average household of 2.07 people, and an educational attainment of a bachelor's degree or higher of 60.8% (USCB, 2019).

The decision for this target group was based on the complexity of the project. However, once the concept works for this group, it is necessary to explore expanding the target group. For example, families, elderly housing or student housing. This would entail that the research into habits and habitats would have to be tailored to this specific group and that new scenarios will be drafted. These new scenarios will then in combination with the furniture transformation technique be designed into the minimal living area

that can house those scenarios. In regards to designing minimal housing for a family, it would perhaps be interesting to explore the expansion of the housing based on the growth of the family. There is definitely potential in the expansion of the target group and will need further exploration in the continuation of the project.

7.4 - urban anchoring

The apartments and expressive spaces are designed based on the research, and could in theory be positioned in any high density urban area. When placing the concept of minimal living in a specific context, it is important to consider the urban anchoring. Here a couple of aspects are of importance, the contextualization of the grid, the collective atrium, the urban spaces and the entrance zone.

7.4.1 - the grid and atrium

The dimensions of the apartment units define the dimensions of the surrounding load bearing structural timber grid. When the design is translated to a specific urban area, the design will be contextualized. The grid will fill the entire plot, extruding the grid to the maximum height that the surroundings will allow. Then within this grid, the expressive spaces and functional apartments will be placed in an appropriate composition. Every plot, however, comes with certain restrictions. Sunlight and view, being the most impactful. The composition of the units will be determined by the edges of the plot, in order to allow for sunlight and views, but also to guarantee the highest building density. This positioning, which was also encountered in the Manhattan location, results in a 'leftover space' in the center of the building. This ofcourse allows room for circulations space, both horizontally and vertically. However, the ratio apartment -

circulation space can vary in every project. Therefore the collective atrium is designed as a combination of circulation space and a collective space, allowing for social interaction between the residents.

7.4.2 - the urban entrance

Every city has a different culture, a different atmosphere and different amenities that are desired in relation to housing. Those amenities include straightforward spaces such as a reception, storage spaces and a lounge or collective living room. In order to comply with New York City specifically, other urban spaces such as a coffee place, a collective work space, a gym, a pool and art passage are introduced. The research also defined the need for guestrooms, which have been placed on the third floor, the highest and therefore most private one of the collective plinth.

The grid is placed onto the entire plot and is strongly visible in the façades. In order to define the difference in the urban spaces and the collective atrium and housing above, the structural grid is larger on the first four floors (500 mm square), after which it minimizes to 300 mm square. This difference in dimensions creates two spaces within the atrium and therefore a boundary between the public spaces and more private spaces.

The discussion has reflected on the Rethinking Minimalism project. The design was 'tested' on the following vectors: sustainability, affordability, target group and urban anchoring. It became clear that the project has complied with the initial ambitions, while also stating the possibilities and opportunities for expansion of the project. Minimalism will remain a strong interest and fascination and will be further explored.

7.1 - FIGURES

I Fields Millburn, J. & Nicodemus, R. (2016) *Minimalism: a documentary about the important things*. Netflix documentary, released January 29, 2016 in the USA. // image edited by author

7 Fields Millburn, J. & Nicodemus, R. (2016) *Minimalism: a documentary about the important things*. Netflix documentary, released January 29, 2016 in the USA. // image edited by author

8 Fields Millburn, J. & Nicodemus, R. (2016) *Minimalism: a documentary about the important things*. Netflix documentary, released January 29, 2016 in the USA. // image edited by author

9-II LivingSpaces (n.d.) *The Life Edited apartment in New York by Graham Hill*. Visited on 13-05-2019 via <https://livinspace.net/life-edited-apartment-in-new-york-by-graham-hill/>

12-14 MKCA (n.d.) *The Attic Transformer*. Visited on 05-01-2021 via <http://mkca.com/projects/attic-transformer/>

7.2 - MAIN REFERENCES

I Buchanan, B. (2008) *Onto-ethologies: The animal environments of Uexküll, Heidegger, Merleau-Ponty, and Deleuze*. Albany: State University of New York Press.

2 Cache, B. (1995) *Earth Moves: The Furnishing of Territories*. Massachusetts: MIT Press Cambridge.

3 Deleuze, G. & Guattari, F. (1987) *A thousand plateaus: Capitalism and schizophrenia*. Minneapolis: University of Minnesota Press.

4 Grosz, E. A. (2008) *Chaos, territory, art: Deleuze and the framing of the earth*. New York: Columbia University Press.

5 Kleindouwel, L. (2019) *Less is more? An analysis of the influence of the minimalist movement on architecture*. Master theory thesis at Delft University of Technology, unpublished.

6 Kleinherenbrink, A. (2015) *Territory and Ritornello: Deleuze and Guattari on Thinking Living Beings*. Deleuze Studies. Edinburgh University Press. 9.2, 208-230, doi:10.3366/dls.2015.0183.

7 McLuhan, M. (1964) *Understanding Media: The extensions of man*. New American Library, USA.

8 Posteraro, T. (2016) *Habits, Nothing but Habits: Biological Time in Deleuze*. The Comparatist, Vol. 40, pp. 94-110. University of North Carolina Press.

9 Uexküll, J. von & Kriszat, G. (1934) *Streifzüge durch die Umwelten von Tieren und Menschen*. Geibungsyoin

Verlag. (A Stroll Through the Worlds of Animals and Men. Instinctive Behaviour. Edited and translated by Claire Schiller. New York: International Universities Press, 1957.)

7.3 - ADDITIONAL REFERENCES

10 Groat, L. N. & Wang, D. (2013) *Architectural research methods. - Second Edition*. Hoboken, New Jersey: John Wiley & Sons, Inc.

11 Ingram, T. (2018) *Is up the only way to go?* FRAME, 125, p. 131-137.

12 Larrea, H. (2015) *What if furniture had superpowers?* TEDxCambridge, visited 14-06-2019 via <https://www.youtube.com/watch?v=SQwpuQhWizA>

13 Larrea, H. (2019) *Exponential Rooms*, an interview by Nick Axel. Visited 12-12-2020 via <https://www.e-flux.com/architecture/digital-x/260427/exponential-rooms/>

14 Lerch, M. (2017) *International migration and city growth*. Population Division Technical Paper 2017/10. New York: United Nations.

15 The Spaces (n.d.) *First micro-apartments in New York begin leasing today*. Visited on 12-12-2020 via [First micro-apartments in New York begin leasing today](http://thespaces.com) (thespaces.com)

16 United Nations, Department of Economic and Social Affairs, Population Division (2019). *World Urbanization Prospects: The 2018 Revision (ST/ESA/SER.A/420)*. New York: United Nations.

A

ARCHITECTURE

'Even in its most sophisticated contemporary forms, architecture is the constitution of interlocking frames, frames that can connect with, contain and be contained by other frames: architecture is the creation of frames as cubes, interconnecting cubes, cubes respected or distorted, cubes opened up, inflected or cut open. The frame separates. It cuts into a milieu or space.' (Grosz, 2008, p. 13)

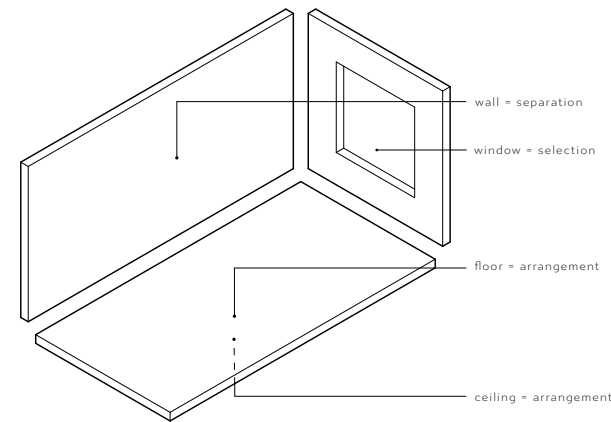
ARRANGEMENT

Cache (1995) states that there are three minimal functions that an architectural frame must fulfil: separation, selection and arrangement.

The arrangement is architecturally translated into a floor or ceiling/roof that allows the choreography of the separation and selection to take place.

'Once the interval is delimited and the vector is selected, this interval must be arranged in such a way as to allow the frame of probability to produce its effects.' (Cache, 1995, p. 24)

The illustration on the right shows the architectural translation of separation to wall, selection to window and arrangement to floor or ceiling.

**ART**

Elizabeth Grosz (2008) addresses art in her book 'Chaos, territory, art' that art does not produce concepts, but that it does address problems and provocations. The forms of the creativity or production that generate intensity, sensation, or affect: music, painting, sculpture, literature, architecture, design, landscape and so on.

B

BOUNDARY

'A real or imagined line that marks the edge or limit of something.' (Cambridge dictionary, 2021)

The connection can be made between the boundary and the membrane of the territory. The boundary is also

architecturally addressed as for example the site, the relation between the interior spaces or the relation between the interior and the exterior.

C

CHAOS

Elizabeth Grosz (2008, p. 5) defines chaos as *'Chaos here may be understood not as absolute disorder but rather plethora of orders, forms, wills - forces that cannot be distinguished or differentiated from each other, both matter and its conditions, for being otherwise both the actual and the virtual indistinguishably.'*

In addition, I personally see chaos as the complete opposite of order (see ORDER).

COLLECTIVE

'Of or shared by every member of a group of people' (Cambridge dictionary, 2021)

In architecture the 'collective' is usually interpreted as common spaces that are used by (or are accessible to) the users of the building.

I personally would like to state the difference between my architectural interpretation of collective and

public. Spaces or functionalities that are shared but have a low threshold to non-users of the building, such as a lobby, café or lounge on the ground floor of a building, are perceived as public. The moment that the threshold comes into place, where the non-users might get a sense of not belonging in the space, whereas the users do not, this space will be seen as collective.

COLLECTIVE INDIVIDUAL (ISM)

Collective spaces (see COLLECTIVE) that are used by one individual at a time. The group of 'users' of the building is limited to a specific amount, in case of the Rethinking Minimalism design, 4. The group of users will have access to the collective space but in a part-time manner.

D

DESIRE

To go back to the essence, the intention. In the research the desire is used in the context of habits (see HABITS). Why do we do certain habits? What effect do we want to achieve with it? The desire is used to define the essence or intention of a habit.

E

EXPRESSIVE

Deleuze's theory of territory (1987) is based on the difference between functionality and expressiveness. When a milieu ceases to be directional, it becomes dimensional. In other words, milieus cease to be functional in order to become expressive. The emergence of matters of expression, define the territory.

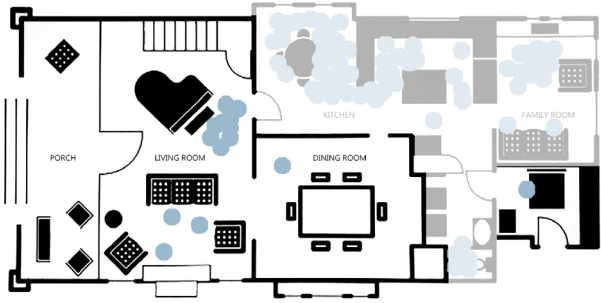
EXPRESSIVE HABITS

The habits that go beyond the functional in order to become expressive. The habits include the need to define a territory, for status purposes or to create a signature. The expressive habits are linked to the expressive spaces or habitats (see EXPRESSIVE SPACES).

EXPRESSIVE SPACES

The habitats that house the expressive habits. This is not only determined by the low use, low privacy, high daylight and high social factors, but also by the territorial aspect of it. The difference between a diningroom and a kitchen table is not only the difference in functional or expressive habits, it also includes the difference in style, signature and the purpose of impressing.

The plan below shows an example of expressive spaces such as the porch, living room, dining room and guest room.



This study was shown in the Netflix documentary *Minimalism* by Joshua Fields Millburn and Ryan Nicodemus (2016).

F

FRAME

'The frame is what establishes territory out of the chaos [...]. With no frame or boundary there can be no territory, without territory there may be objects or things but not qualities that can become expressive, that can intensify and transform living bodies.' (Grosz, 2008, p.II)

FRAMING

The design or creation of a frame (see FRAME).

FURNITECTURE

Everything that is larger than furniture (see FURNITURE) but smaller than architecture.

It is used as a tool to support the transformations in minimal architecture. The research paper has defined three typologies of furniteecture: [1] the floor, [2] the wall, [3] the ceiling.

FURNITURE

'Things such as chairs, tables, beds, cupboards, etc. that are put into a house or other building to make it suitable and comfortable for living or working in.' (Cambridge dictionary, 2021)

I would like to add that furniture supports habits. Furniture can be seen as the connection between habits and habitats, it supports the activity in a practical manner.

FUNCTIONAL

A milieu that is directional, without becoming dimensional and thus expressive.

FUNCTIONAL HABITS

The habits that are functional without becoming expressive. The habits have a low social value and a high privacy value.

The functional habits are architecturally

organized in the functional apartment in the Rethinking Minimalism design.

FUNCTIONAL SPACE

The habitats that house the functional habits. These spaces have a high use, high privacy and low social requirements and do not include the expressive habits or spaces.

The plan below shows an example of functional spaces such as the kitchen, family room and bathroom.



This study was shown in the Netflix documentary *Minimalism* by Joshua Fields Millburn and Ryan Nicodemus (2016).

H

HABIT

The activity or functionality that an individual or collective does. In this

project only the residential habits have been analysed. It is also important to state that habits differ from person to person. It is therefore important to take a position regarding the specificity of the research of habits. There is a spectrum from superficial to complex, and the position within that spectrum has to be done based on intuition. There has to be a balance between the level of personalization and the 'generalization' of the habits.

In this research the habits have been broken down based on the following six vectors: [1] desire, [2] light, [3] privacy, [4] furniture, [5] territorial typology and [6] use.

HABITAT

Architectural spaces also referred to as 'rooms'. These rooms are typically linked to a certain combination of habits (see HABIT), for example, dining in the diningroom, working in the study, etcetera.



INDIVIDUAL

'A single person or thing, especially when compared to the group or set to which it belongs.' (Cambridge dictionary, 2021)

In the Rethinking Minimalism project, the individual is seen as a user, that uses the space in a certain manner that requires a level of privacy or anonimity in regards to the collective.



MASS-URBANIZATION

The increase of the population of urban areas due to the following megatrends: [1] urbanization, [2] the growth of the global population, [3] the population aging, and [4] the international migration (UN, 2019)

MILIEU

As defined in the acknowledgements of 'A Throusand Plateaus' by Deleuze and Guattari (1987):

'In French, milieu means 'surroundings', 'medium' (as in chemistry), and 'middle'. In the philosophy of Deleuze and Guattari, 'milieu' should be read as a technical term combining all three meanings.'

Milieus are consisting of an exterior milieu of materials, an interior milieu of composing elements, a membrane which is the intermediary milieu and an annexed milieu of energy. (Buchanan, 2008)

MINIMALISM

The dictionary describes minimalism as the following:

[1] a movement in sculpture and painting which arose in the 1950s, characterized by the use of massive forms.

[2] an avant-garde movement in music characterized by the repetition of very short phrases which gradually, producing a hypnotic effect.

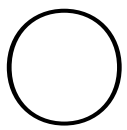
This is more the definition of minimalism in art and writing. This paper will focus minimalism on the socially and consumerism diven aspect of it.

The Minimalists (Joshua Fields Milburn and Ryan Nicodemus, 2016) explain that *'Minimalism is a tool to rid yourself of life's excess in favor of focussing on what's important - so you can find happiness, fulfillment, and freedom.'*

Personally I would define MINIMALISM as the movement of material minimization. To chose quality over quantity, often from a sustainability perspective.

MINIMAL ARCHITECTURE

Architecture with a flexible and transformable floorplan, with sustainability, creating a higher urban density and reducing the ecological footprint of the design, as the main motive.



ORDER

'The way in which people or things are arranged, either in relation to one another or according to a particular characteristic.' (Cambridge dictionary, 2021)

'The frame is what establishes territory out of the chaos [...]' (Grosz, 2008, p.11)

I personally interpret 'order' as the opposite of chaos (see CHAOS). The framing and thus territorializing of the chaos, is my definition of order.



PROGRAM

List of required and/or desired rooms, spaces or spatial functionalities (see HABITAT) with their minimally required square meters.

T

TERRITORY

'There is a territory precisely when milieu components cease to be directional, becoming dimensional instead, when they cease to be functional to become expressive. [...] What defines the territory is the emergence of matters of expression.' (Deleuze & Guattari, 1987, p. 315)

It is important to note that a territory is not a milieu, but it borrows from all milieus. The emergence of matters of expression, to go beyond the functional, is what defines a territory.

TERRITORIAL TYPOLOGY

The categorization of expressive and functional spaces from an architectural perspective.

TERRITORIALIZATION, DETERRITORIALIZATION, RETERRITORIALIZATION (TE-DE-RE)

The process of territorializing the space (see TERRITORY), then deterritorializing the space (through deframing and letting go of the boundaries thus allowing chaos over order), and finally reterritorializing the space (see TERRITORY). This process 'te-de-re' is interpreted as a 'part-time territory'.

R

RHYTHM

The communication or relation between two milieus. The coordination between heterogeneous space-times.

S

SELECTION

The second aspect in the theory of Bernard Cache (1995) following separation and arrangement. The selection is architecturally translated into a window that selects the territory.

'The second abstract function of the frame is selection. The frame thus becomes a window that carefully selects the causes of life in order to produce ever more singular effects. The first function of the frame removed us from the territory; the second function reestablishes connections, selectively.' (Cache, 1995, p. 23)

SEPARATION

The first aspect in the theory of Bernard Cache (1995) followed by selection and arrangement. It is the division of

two or more entities or spaces. This is architecturally translated to a wall.

Grosz (2008) states that *'The wall is the basis of our coexistence. Architecture builds its space of compatibility on a mode of discontinuity.'* (p. 23)

'The first function is that of separation. Its functional element is the wall. One must delimit an interval in which a form of life that doesn't fit a priori in its milieu will occur.' (p.22)

STYLE

'A way of doing something, especially one that is typical of a person, group of people, place, or period.' (Cambridge dictionary, 2021)

Style is a distinctive manner of expression and therefore is one of the aspects that are desired in expressive spaces or territorialization.

Q

QUALITY

In the research, the spatial qualities and quantities that are desired but not present in minimal architecture have been analysed. The spatial quality is defined by the desire for personal territory, to create ownership over the

space. This is translated in furniture, materialization and decorations.

QUANTITY

The spatial quantities, however, focus on the desired program (see PROGRAM) and the correlated square meters.

